AVERSA BROS INDUSTRIAL CONTRACTORS

INJURY AND ILLNESS PREVENTION PROGRAM

FOR THE STATE OF NEW YORK

PRINT DATE: SEPTEMBER 17, 2018

TABLE OF CONTENTS

NEW YORK FOREWORD

CORE CHAPTERS

ELECTED CHAPTERS

SCOPE

This section of your manual provides you with information specific to New York. The chapters that follow this foreword contain information that is aligned, at a minimum, to federal Occupational Safety and Health Administration (OSHA) standards. If an applicable OSHA standard does not exist, or is superseded by another regulatory agency or state-specific requirement, the most stringent standard available will be provided.

STATE OSHA

The New York Department of Labor operates the Worker Protection Bureau. Within the worker protection bureau are the Public Employee Safety and Health Bureau (PESH) and the Division of Safety and Health (DOSH).

PESH administers New York's Public Employer State Plan and enforces occupational safety and health standards as they apply to all municipal and state employees. As a State Plan state, PESH adopts and enforces standards that are at least as effective as the federal requirements.

DOSH oversees occupational safety and health standards in private businesses in New York. The division requires businesses whose most recent annual payroll is in excess of eight hundred thousand dollars and whose most recent experience rating exceeds the level of 1.2 to institute and maintain an effective safety and loss prevention program to identify, evaluate and control workplace hazards.

The program must be in writing and at a minimum:

- Contain policies, procedures, and practices that recognize and protect employees from occupational safety hazards
- Establish and communicate a clear goal for the workplace safety and loss prevention program and the mechanisms that will be used to meet this goal
- Define top management commitment in implementing the program and ensure that all workers at the site are provided equally high quality safety protection, so that all will understand that management's commitment is serious
- Provide for and encourage employee involvement in the structure and operation of the program, so that they will commit their insight and energy to achieving the goals and objectives of the safety program
- Assign and communicate responsibilities for all aspects of the workplace safety and loss prevention program to managers, supervisors and employees so that such persons know and understand what is expected of them in the implementation of the program. Provide a system to hold managers and supervisors accountable for their responsibilities under the workplace safety and loss prevention program

- The employer will ensure that the supervisors, managers and employees understand their responsibilities under the workplace safety and loss prevention program and their importance to the safety of the workplace. In particular, appropriate training for managers, supervisors and employees shall enable them to:
    - Recognize potential hazards
    - Maintain safety protection in the work area
    - Reinforce employee training on the nature of the potential hazards and required protective measures
- Provide a reliable system for employees to notify management personnel of conditions that appear hazardous or of non-compliance with the terms of the workplace safety and loss prevention program, without fear of reprisal and provide a mechanism to ensure timely and appropriate responses
- Provide a mechanism to investigate accidents so that the root cause(s) and means for preventing a recurrence are identified. For the purposes of this rule, the term "accident" shall mean any unexpected happening that interrupts the work sequence or process and that may result in injury, illness, or property damage
- Provide a means to review injury and illness trends over time so that patterns with common causes can be identified and eliminated
- Establish a mechanism for the employer to conduct ongoing, periodic in-house safety inspections so that new or previously missed hazards or failures in controls are identified. Such inspections shall be conducted with a frequency necessary to be effective and this frequency shall be reviewed by the consultant performing the workplace safety and loss prevention consultation
- Address the impact of emergencies and develop written plans and procedures to insure employee safety during such emergencies. For the purposes of this rule, the term "emergency situation" shall mean an unforeseen single event or combination of events that calls for immediate action to prevent, control or contain injury or illness to person(s) or damage to property
- Establish procedures for transmitting and enforcing safe work practices in the workplace through training, positive reinforcement and correction of unsafe performance

Such program shall be provided to the recognized employee organizations and shall be made available to the employees upon request.

FEDERAL REGULATIONS

The U.S. Department of Labor’s Occupational Safety and Health Administration (OSHA) govern safety and health regulations for private businesses in New York. OSHA operates several area offices in the state of New York, whose locations are listed below in this document. The remainder of this section contains reporting and other regulatory information that is specific to private businesses in New York.

LABOR POSTERS

In addition to the posters required by federal agencies, New York requires the following posters to be prominently displayed in the workplace.

The required postings are:

- Construction Industry Fair Play Act (for employers in the construction industry)
- Criminal Conviction Records
- Discrimination
- Minimum Wage
- Safety & Health
- Public Work/Prevailing Wage Rates
- Public Work Project
- Unemployment Insurance
- Workers' Compensation and Disability Benefits

Your business may be required to post additional mandatory federal postings. To determine additional requirements, go to www.dol.gov/elaws/posters.htm.

REPORTING

Companies and employees should use the following contacts when:

- Reporting unsafe workplaces – Federal OSHA
- Reporting injuries or accidents – Federal OSHA
- Filing for workers' compensation – New York Worker's Compensation Board
- Reporting acts of discrimination – New York Division of Human Rights, or the Equal Employment Opportunity Commission

INJURIES OR ACCIDENTS

New York private employers must report any work-related amputation, loss of an eye, or in-patient hospitalization of any employee, within 24 hours of the incident, and any fatal accident to the nearest federal OSHA Area Office within 8 hours.

To report a private sector fatality to federal OSHA during normal business hours (8:30 a.m. – 4:30 p.m.), call the nearest OSHA area or regional office. All other times, contact the federal hotline at:

- 1-800-321-OSHA (6742)
- TTY 1-877-889-5627

When reporting a health or safety hazard in the workplace, you will need to have as much of the following information as possible:

DISCRIMINATION PROTECTION

In the state of New York, it is against the law for an employer to refuse to hire, to discharge, to promote or demote, or to discriminate in matters of compensation or the terms, conditions, or privileges of employment against a qualified disabled person or any person otherwise qualified because of:

- Race
- Color
- National Origin
- Religion
- Sex (including pregnancy, childbirth, and related medical conditions)
- Disability
- Age (40 and older)
- Citizenship status
- Genetic information
- Marital Status
- Sexual orientation (includes perceived sexual orientation)
- Lawful use of any product or lawful recreational activities when not at work
- Military status or service
- Observance of Sabbath
- Political activities
- Use of service dog
- Criminal accusation
- Domestic violence victim status

Employees who believe that have been subjected to discriminatory practices based on any status in the list above can file a complaint with the **New York Division of Human Rights** at: (718) 741-8400

Workers can also contact the Equal Employment Opportunity Commission (EEOC), which is the federal agency that regulates workplace discrimination.

EEOC: 1(800) 669-4000

UNSAFE WORKPLACE

If you are an employee or employee representative, and believe you or another employee are/is exposed to a condition that is immediately dangerous to life or health, you should first attempt to resolve the matter with the employer. If that is not possible, you may file a complaint with OSHA by mail, phone, fax, or online.

For Health Hazards

- Do any employees have injuries or symptoms that they believe are caused by the hazardous condition or substance?
- Have any employees been treated by a doctor for an injury, illness, or disease related to the hazardous condition or substance? What was it?

For Safety Hazards

- How many employees work at the site and how many are exposed to the hazard?
- How and when are workers exposed?
- What work is performed in the unsafe or unhealthful area?
- What type of equipment is used? Is it in good condition?
- What materials and/or chemicals are used?
- Have employees been informed or trained regarding hazardous conditions?
- What processes and/or operations are involved?
- What kinds of work are done nearby?
- How often and for how long do employees work at the task that leads to their exposure?
- How long (to your knowledge) has the condition existed?
- Have any attempts been made to correct the problem?
- On what shifts does the hazard exist?
- Has anyone been injured or made ill because of this problem?
- Have there been any "near-miss" incidents?

Filing by Fax or Mail

To file a complaint by fax or mail, complete the form near the end of this foreword, and send it to the nearest OSHA office. Written complaints that are signed by a worker or representative and submitted to the closest OSHA Area Office are more likely to result in onsite OSHA inspections. Please include your name, address, and telephone number so that OSHA can contact you to follow up. The information you provide is confidential.

Filing by Phone

Contact the nearest OSHA Regional or Area office, or call 1-800-321-OSHA.

Filing Online

To file an online compliant, go to www.OSHA.gov and complete the OSHA 7 form.

DISCRIMINATION

New York workers who believe they have been punished or discriminated against for exercising their rights under the OSH Act have the right to file a complaint against their employer. However, employees must file a complaint with OSHA **within 30 days of the alleged reprisal**.

No particular form is required to report the discrimination. You may call or send a letter to the OSHA Area Office nearest you, use the Whistleblower Complaint form attached near the end of this foreword, or file online at www.OSHA.gov using the Online Whistleblower Complaint Form.

REFUSAL TO PERFORM UNSAFE WORK

New York employees who refuse to perform work in conditions where there is an imminent danger to life or health may be protected under state and federal laws. OSHA recommends that employees first address the issue with their employer before taking action.

Refusing to perform work is recognized favorably for the employee only when it is done in good faith, in an imminently dangerous workplace where there is not enough time to contact OSHA, and when the employee remains readily available to perform other assigned tasks. Employees who simply walk off the job will not be protected.

OSHA Offices

OSHA offices are established in 10 geographical regions, with area offices located in most states. The addresses and phone numbers of the offices for New York are listed below.

Albany 401 New Karner Rd. Ste. 300 Albany, NY 12205 Phone: (518) 464-4338 Fax: (518) 464-4337	**Queens District, Manhattan Area** 45-17 Marathon Parkway Little Neck, NY 11362 Phone: (718) 279-9060 Fax: (718) 279-9057	**Buffalo** US Dept. of Labor/OSHA 130 S. Elmwood Ave. Ste. 500 Buffalo, NY 14202 Phone: (716) 551-3053 Fax: (716) 551-3126	**Long Island** 1400 Old Country Road Ste. 208 Westbury, NY 11590 Phone: (516) 334-3344 Fax: (516) 334-3326
Manhattan 201 Varick Street Rm. 908 New York, NY 10014 Phone: (212) 620-3200 Fax: (212) 620-4121	**Syracuse** 3300 Vickery Rd. N. Syracuse, NY 13212 Phone: (315) 451-0808 Fax: (315) 451-1351	**Tarrytown** 660 White Plains Rd. 4th Floor Tarrytown, NY 10591 Phone: (914) 524-7510 Fax: (914) 524-7515	

WORKERS' COMPENSATION

Employees who are injured on the job may file a worker's compensation claim for related medical costs, lost wages, and permanent disability.

After an injury, employees must report it to their employer immediately. For claims regarding an occupational illness, report it to the employer as soon as it becomes apparent the illness is work related. It is the employer's responsibility to report the injury to its insurance provider.

It is the burden of the injured party to provide proof through medical evidence the nature of the injuries as well as that they are work related.

Employees

After reporting the injury, you should file an Employee Claim Form (C-3) as soon as possible, and inform your employer in writing of the details of your injury or illness (including when, where, and how).

There are three ways to file the C-3 form:

1. File online at: https://www.wcb.ny.gov/onlineforms/accessEC3.jsp

2. Call 1(866) 396-8314, or;

3. File by mail. Forms may be obtained from any district office in person, printed online (http://www.wcb.ny.gov/content/main/forms/c3.pdf), or from the Attachments section of this document.

Send forms to:

NYS Workers' Compensation Board

328 State Street

Schenectady, NY 12305-2318

Phone: (518) 632-4996

Toll-Free: (877) 632-4996

Employers

Once an employee has notified you of their work-related injury or illness, it is your responsibility to provide them with, or direct them to, the various outlets through which they can complete the necessary forms.

In addition, you must file a First Report of Injury (Form C-2F) within ten (10) days of having received notification.

A copy of the C-2F form can be found in the Attachments section of this document.

TRAINING

OSHA requires employers to train employees before they perform any task that may endanger their health or safety. Employees must be deemed competent to perform all work tasks, or they will work under the supervision of a competent worker.

Employers must perform a job hazard analysis (JHA) to establish the presence and degree of onsite safety hazards, and to effectively mitigate or handle them. This investigation will include:

- The tasks to be performed
- The equipment to be used and/or operated
- The work environment and atmosphere
- The health and safety risks involved with the work

An onsite, competent professional may conduct training, or the company may choose to hire trainers from an approved third-party source.

The training must at least:

- Determine the level of competence required by workers who perform hazardous tasks, and evaluate the competence of workers who perform them
- Ensure employees who are not competent to complete a hazardous task are reassigned or trained appropriately
- Ensure training is updated to reflect changes in equipment, processes, environment, and employee responsibilities

ATTACHMENTS

- OSHA Safety and Health Complaint form (OSHA7)
- Employee Claim Form (C-3)
- Employer's First Report of Injury Form (C-2F)

Notes:

Effective July 28 2017, the OSHA Whistleblower Complaint form has been revised, and must be completed online. Once completed the form can be sent electronically, or printed and mailed to the nearest OSHA office.

The forms listed above are available online as either downloadable or fillable forms at the websites listed below.

- http://www.wcb.ny.gov/content/main/forms/Forms_CLAIMANT.jsp#C3
- http://www.wcb.ny.gov/content/main/forms/Forms_EMPLOYER.jsp
- https://www.osha.gov/whistleblower/WBComplaint.html

U. S. Department of Labor
Occupational Safety and Health Administration

Notice of Alleged Safety or Health Hazards

For the General Public:

This form is provided for the assistance of any complainant and is not intended to constitute the exclusive means by which a complaint may be registered with the U.S. Department of Labor.

Sec 8(f)(1) of the Williams-Steiger Occupational Safety and Health Act, 29 U.S.C. 651, provides as follows: Any employees or representative of employees who believe that a violation of a safety or health standard exists that threatens physical harm, or that an imminent danger exists, may request an inspection by giving notice to the Secretary or his authorized representative of such violation or danger. Any such notice shall be reduced to writing, shall set forth with reasonable particularity the grounds for the notice, and shall be signed by the employee or representative of employees, and a copy shall be provided the employer or his agent no later than at the time of inspection, except that, upon request of the person giving such notice, his name and the names of individual employees referred to therein shall not appear in such copy or on any record published, released, or made available pursuant to subsection (g) of this section. If upon receipt of such notification the Secretary determines there are reasonable grounds to believe that such violation or danger exists, he shall make a special inspection in accordance with the provisions of this section as soon as practicable to determine if such violation or danger exists. If the Secretary determines there are no reasonable grounds to believe that a violation or danger exists, he shall notify the employees or representative of the employees in writing of such determination.

NOTE: Section 11(c) of the Act provides explicit protection for employees exercising their rights, including making safety and health complaints.

For Federal Employees:

This report format is provided to assist Federal employees or authorized representatives in registering a report of unsafe or unhealthful working conditions with the U.S. Department of Labor.

The Secretary of Labor may conduct unannounced inspection of agency workplaces when deemed necessary if an agency does not have occupational safety and health committees established in accordance with Subpart F, 29 CFR 1960; or in response to the reports of unsafe or unhealthful working conditions upon request of such agency committees under Sec. 1-3, Executive Order 12196; or in the case of a report of imminent danger when such a committee has not responded to the report as required in Sec. 1-201(h).

INSTRUCTIONS:

Open the form and complete the front page as accurately and completely as possible. Describe each hazard you think exists in as much detail as you can. If the hazards described in your complaint are not all in the same area, please identify where each hazard can be found at the worksite. If there is any particular evidence that supports your suspicion that a hazard exists (for instance, a recent accident or physical symptoms of employees at your site) include the information in your description. If you need more space than is provided on the form, continue on any other sheet of paper.

After you have completed the form, return it to your local OSHA office.

NOTE: It is unlawful to make any false statement, representation or certification in any document filed pursuant to the Occupational Safety and Health Act of 1970. Violations can be punished by a fine of not more than $10,000. or by imprisonment of not more than six months, or by both. (Section 17(g))

Public reporting burden for this voluntary collection of information is estimated to vary from 15 to 25 minutes per response with an average of 17 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An Agency may not conduct or sponsor, and persons are not required to respond to the collection of information unless it displays a valid OMB Control Number. Send comment regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the Directorate of Enforcement Programs, Department of Labor, Room N-3119, 200 Constitution Ave., NW, Washington, DC; 20210.

OMB Approval# 1218-0064; Expires: 08-31-2017

Do not send the completed form to this Office.

U. S. Department of Labor
Occupational Safety and Health Administration

Notice of Alleged Safety or Health Hazards

			Complaint Number	
Establishment Name				
Site Address				
	Site Phone		Site FAX	
Mailing Address				
	Mail Phone		Mail FAX	
Management Official			Telephone	
Type of Business				

HAZARD DESCRIPTION/LOCATION. Describe briefly the hazard(s) which you believe exist. Include the approximate number of employees exposed to or threatened by each hazard. Specify the particular building or worksite where the alleged violation exists.

Has this condition been brought to the attention of:	☐ Employer ☐ Other Government Agency(specify)
Please Indicate Your Desire:	☐ Do NOT reveal my name to my Employer ☐ My name may be revealed to the Employer
The Undersigned believes that a violation of an Occupational Safety or Health standard exists which is a job safety or health hazard at the establishment named on this form.	(Mark "X" in ONE box) ☐ Former Employee ☐ **Current** Employee ☐ Federal Safety and Health Committee ☐ Representative of Employees ☐ Other (specify) _____

Complainant Name		Telephone	
Address(Street, City, State, Zip)			
Signature		Date	

If you are an authorized representative of employees affected by this complaint, please state the name of the organization that you represent and your title:

Organization Name: Your Title:

Instructions for Completing Form C-3, "Employee Claim"

Please complete this form and send it to the Workers' Compensation Board centralized mailing address listed at the bottom of these instructions. If you need additional help in completing this form, contact the Workers' Compensation Board at **1-877-632-4996. You may also fill this form out online at: http://www.wcb.ny.gov/**

If you do not have or know your Workers' Compensation Board Case Number, please leave this field blank. It is not required to process your claim. Remember to enter your name and the date of your injury/illness on the top of page two.

Section A - Your Information (Employee):

Item 1: Enter your full name, including first name, middle initial, and last name.
Item 2: Enter your date of birth in month/day/year format. Include the four digit year.
Item 3: Enter your mailing address, including P.O. Box, if applicable, city or town, state, and Zip code.
Item 4: Enter your Social Security Number. This is very important to help service your claim faster.
Item 5: Indicate the primary contact phone number, including area code. This may include a cell phone number.
Item 6: Indicate your gender (Male or Female).
Item 7: Board hearings are conducted in English. If you will need a translator to understand the proceeding, the Board will provide one. Check Yes and indicate the language needed.

Section B - Your Employer(s):

Item 1: Indicate the employer you were working for at the time you were injured or became ill.
Item 2: Enter the phone number for this employer, either a primary contact number or the number for your supervisor.
Item 3: Enter the employer's address, including P.O. Box, if applicable, city or town, state, and Zip code.
Item 4: Indicate the date you were hired by this employer.
Item 5: Enter your direct supervisor's name, whom you report to on a regular basis.
Item 6: If you have more than one job, please indicate the names and addresses of all other employers you work for besides the one you were injured at. Please attach a separate sheet if you need more room.
Item 7: Check Yes if you lost time from any of your other jobs as a result of your injury or illness; otherwise, check No.

Section C - Your Job on the Date of the Injury or Illness:

Item 1: Indicate your current job title or job description (e.g., warehouse worker).
Item 2: Indicate your typical work activities for this job (e.g., keeping inventory, unloading trucks, etc.).
Item 3: Check the type of job you had.
Item 4: Enter your gross pay (before taxes) per pay period.
Item 5: Indicate how often you received a paycheck (weekly, bi-weekly, etc.).
Item 6: Indicate if you received any tips or lodging in addition to your regular pay. If you did, describe them.

Section D - Your Injury or Illness:

Item 1: Enter the date when you were injured or the first date you noticed you became ill. Enter the date in month/day/year format. Include the four digit year. If this is an illness or occupational disease, then skip item 2.
Item 2: Enter the time when the injury occurred. Check whether it was AM or PM.
Item 3: Indicate the location where the injury/illness occurred, including the address of the building and the physical location in the building where the injury/illness happened.
Item 4: Check whether this was your normal work location. If it was not, explain why you were at this location.
Item 5: Describe in detail what you were doing at the time of the injury/illness (e.g., unloading boxes from a truck by hand). This explains the events leading up to the injury.
Item 6: Describe in detail how the injury/illness occurred (e.g., I was lifting a heavy box off a truck). This should include all people and events involved in the injury/illness.
Item 7: Indicate fully the nature and extent of your injury/illness, including all body parts injured. Be as specific as possible. (e.g., I strained my back trying to lift a heavy box. It hurts to bend over or hold even lighter objects now.)
Item 8: Indicate if some object was involved in the accident OTHER THAN a licensed motor vehicle. Other objects may include a tool (e.g., hammer), a chemical (e.g., acid), machinery (e.g., forklift or drill press), etc.
Item 9: Indicate if a licensed motor vehicle was involved in the accident. If so, check if the motor vehicle involved was yours, your employer's, or a third party's. Include the license plate number (if known). If your vehicle was involved, fill out the name and address of your automobile liability insurance carrier.
Item 10: Check if you gave your employer or supervisor notice of your injury or illness. If so, indicate who you gave notice to as well as if it was orally or in writing. Include the date you gave notice.
Item 11: Check if anyone else saw the injury happen. If anyone did see it, include their name(s).

Section E - Return to Work:

Item 1: If you stopped working as a result of your work-related injury/illness, check Yes and indicate on what date you stopped working. If you have not stopped working, check No and skip to the next section.

Section E - Return to Work (cont):

Item 2: If you have since returned to work, check Yes. Also indicate on what date you started working again, as well as if you have returned to your Normal Duties or if you are on Limited or Restricted Duty. (If you have not returned to your full pre-injury or illness work duties, then you are on Limited Duty.)

Item 3: If you have returned to work, indicate who you are working for now.

Item 4: Enter your gross pay (before tax pay) per pay period for the job you are working at now. Indicate how often you are receiving a paycheck (weekly, bi-weekly, etc.).

Section F - Medical Treatment for This Injury or Illness:

Item 1: If you did not receive medical treatment for this injury/illness, check None Received and skip to item 5. Otherwise, enter the date you first received treatment for this injury/illness and complete the rest of this section.

Item 2: Check if you were first treated on the job for this injury or illness.

Item 3: Check the location where you first received off site medical treatment for your injury or illness. Include the name and address of the facility as well as the phone number (including area code).

Item 4: If you are still receiving ongoing treatment for the same injury or illness, check Yes and indicate the name and address of the doctor(s) providing treatment as well as the phone number (including area code); otherwise check No.

Item 5: If you believe you already had an injury to the same body part or a similar illness, check Yes and indicate if you were treated by a doctor for this injury or illness. If you were treated by a doctor, indicate the name(s) and address(es) of the doctor(s) whom provided care and **complete and file Form C-3.3 together with this form.**

Item 6: If you had a previous injury or illness, check if your previous injury or illness was work-related. If Yes, check if the injury or illness happened while working for your current employer.

Sign Form C-3 in the place provided for "Employee's Signature on page 2, print your name, and enter the date you signed the form. If a third-party is signing on behalf of the employee, that person should sign on the second signature line. If you have legal representation, your representative **must** complete and sign the attorney/representative's certification section on the bottom of page 2.

What Every Worker Should Do in Case of On-The-Job Injury or Occupational Disease:

1. Immediately tell your employer or supervisor when, where and how you were injured.
2. Secure medical care immediately.
3. Tell your doctor to file medical reports with the Board and with your employer or its insurance carrier.
4. Make out this claim for compensation and send it to the Workers' Compensation Board centralized mailing address. Failure to file within two years after the date of injury may result in your claim being denied. If you need help in completing this form, contact the Workers' Compensation Board at 1-877-632-4996.
5. Go to all hearings when notified to appear.
6. Go back to work as soon as you are able; compensation is never as high as your wage.

Your Rights:

1. Generally, you are entitled to be treated by a doctor of your choice, provided he/she is authorized by the Board. If your employer is involved in a preferred provider organization (PPO) arrangement, you must obtain initial treatment from the preferred provider organization which has been designated to provide health care services for workers' compensation injuries.
2. DO NOT pay your doctor or hospital. Their bills will be paid by the insurance carrier if your case is not disputed. If your case is disputed,
   the doctor or hospital must wait for payment until the Board decides your case. In the event you fail to prosecute your case or the Board decides against you, you will have to pay the doctor or hospital.
3. You are also entitled to be reimbursed for drugs, crutches, or any apparatus properly prescribed by your doctor and for carfares or other necessary expenses going to and from your doctor's office or the hospital. (Get receipts for such expenses.)
4. You are entitled to compensation if your injury keeps you from work for more than seven days, compels you to work at lower wages, or results in permanent disability to any part of your body.
5. Compensation is payable directly and without waiting for an award, except when the claim is disputed.
6. Injured workers or dependents of deceased workers may represent themselves in matters before the Board or may retain an attorney or licensed representative to represent them. If an attorney or licensed representative is retained, his/her fee for legal services will be reviewed by the Board and if approved will be paid by the employer or insurance company out of any compensation benefits due. Injured workers or dependents of deceased workers should not directly pay anything to the attorney or licensed representative representing them in a compensation case.
7. If you need help returning to work, or with family or financial problems because of your injury, contact the Workers' Compensation Board office nearest you and ask for a rehabilitation counselor or social worker.

This form should be filed by sending directly to the address listed below:

New York State Workers' Compensation Board
Centralized Mailing
PO Box 5205
Binghamton, NY 13902-5205

Customer Service Toll-Free Number: 877-632-4996

WORKERS' COMPENSATION BOARD

Employee Claim

State of New York - Workers' Compensation Board

C-3

Fill out this form to apply for workers' compensation benefits because of a work injury or work-related illness. Type or print neatly. This form may also be filled out on-line at www.wcb.ny.gov.

WCB Case Number (if you know it): _____

A. YOUR INFORMATION (Employee)

1. Name: _____ (First / MI / Last) 2. Date of Birth: ____/____/____

3. Mailing address: _____ (Number and Street/PO Box / City / State / Zip Code)

4. Social Security Number: ___-___-___ 5. Phone Number: (___)_____ 6. Gender: ☐ Male ☐ Female

7. Will you need a translator if you have to attend a Board hearing? ☐ Yes ☐ No If yes, for what language? _____

B. YOUR EMPLOYER(S)

1. Employer when injured: _____ 2. Phone Number: (___)_____

3. Your work address: _____ (Number and Street / City / State / Zip Code)

4. Date you were hired: ____/____/____ 5. Your supervisor's name: _____

6. List names/addresses of any other employer(s) at the time of your injury/illness: _____

7. Did you lose time from work at the other employment(s) as a result of your injury/illness? ☐ Yes ☐ No

C. YOUR JOB on the date of the injury or illness

1. What was your job title or description? _____

2. What types of activities did you normally perform at work? _____

3. Was your job? (check one) ☐ Full Time ☐ Part Time ☐ Seasonal ☐ Volunteer ☐ Other: _____

4. What was your gross pay (before taxes) per pay period? _____ 5. How often were you paid? _____

6. Did you receive lodging or tips in addition to your pay? ☐ Yes ☐ No If yes, describe: _____

D. YOUR INJURY OR ILLNESS

1. Date of injury or date of onset of illness: ____/____/____ 2. Time of injury: _____ ☐ AM ☐ PM

3. Where did the injury/illness happen? (e.g., 1 Main Street, Pottersville, at the front door) _____

4. Was this your usual work location? ☐ Yes ☐ No If no, why were you at this location? _____

5. What were you doing when you were injured or became ill? (e.g., unloading a truck, typing a report) _____

6. How did the injury/illness happen? (e.g., I tripped over a pipe and fell on the floor) _____

7. Explain fully the nature of your injury/illness; list body parts affected (e.g., twisted left ankle and cut to forehead): _____

YOUR NAME: _____ DATE OF INJURY/ILLNESS: _____/_____/_____
First MI Last

D. YOUR INJURY OR ILLNESS *continued*

8. Was an object (e.g., forklift, hammer, acid) involved in the injury/illness? ☐ Yes ☐ No If yes, what? _____

9. Was the injury the result of the use or operation of a licensed motor vehicle? ☐ Yes ☐ No
   If yes, ☐ your vehicle ☐ employer's vehicle ☐ other vehicle License plate number (if known): _____
   If your vehicle was involved, give name and address of your motor vehicle insurance carrier: _____

10. Have you given your employer (or supervisor) notice of injury/illness? ☐ Yes ☐ No
    If yes, notice was given to: _____ ☐ orally ☐ in writing Date notice given: _____/_____/_____

11. Did anyone see your injury happen? ☐ Yes ☐ No ☐ Unknown If yes, list names: _____

E. RETURN TO WORK

1. Did you stop work because of your injury/illness? ☐ Yes, on what date? _____/_____/_____ ☐ No, skip to Section F.
2. Have you returned to work? ☐ Yes ☐ No If yes, on what date? _____/_____/_____ ☐ regular duty ☐ limited duty
3. If you have returned to work, who are you working for now? ☐ Same employer ☐ New employer ☐ Self employed
4. What is your gross pay (before taxes) per pay period? _____ How often are you paid? _____

F. MEDICAL TREATMENT FOR THIS INJURY OR ILLNESS

1. What was the date of your first treatment? _____/_____/_____ ☐ None received (skip to question F-5)
2. Were you treated on site? ☐ Yes ☐ No
3. Where did you receive your first off site medical treatment for your injury/illness? ☐ none received ☐ Emergency Room
   ☐ Doctor's office ☐ Clinic/Hospital/Urgent Care ☐ Hospital Stay over 24 hours
   Name and address where you were first treated:
   _____ Phone Number: (_____)_____
4. Are you still being treated for this injury/illness? ☐ Yes ☐ No
   Give the name and address of the doctor(s) treating you for this injury/illness: _____
   _____ Phone Number: (_____)_____
5. Do you remember having another injury to the same body part or a similar illness? ☐ Yes ☐ No
   If yes, were you treated by a doctor? ☐ Yes ☐ No If yes, provide the names and addresses of the doctor(s) who treated you and **COMPLETE AND FILE FORM C-3.3 TOGETHER WITH THIS FORM:**
   _____
   _____
   _____
6. Was the previous injury/illness work related? ☐ Yes ☐ No
   If yes, were you working for the same employer that you work for now? ☐ Yes ☐ No

I am hereby making a claim for benefits under the Workers' Compensation Law. My signature affirms that the information I am providing is true and accurate to the best of my knowledge and belief.

Any person who knowingly and with INTENT TO DEFRAUD presents, causes to be presented, or prepares with knowledge or belief that it will be presented to, or by an insurer, or self-insurer, any information containing any FALSE MATERIAL STATEMENT or conceals any material fact, SHALL BE GUILTY OF A CRIME and subject to substantial FINES AND IMPRISONMENT.

Employee's Signature: _____ Print Name: _____ Date: _____/_____/_____

On behalf of Employee: _____ Print Name: _____ Date: _____/_____/_____

An individual may sign on behalf of the employee only if he or she is legally authorized to do so and the employee is a minor, mentally incompetent or incapacitated.

I certify to the best of my knowledge, information and belief, formed after an inquiry reasonable under the circumstances, that the allegations and other factual matters asserted above have evidentiary support, or are likely to have evidentiary support after a reasonable opportunity for further investigations or discovery.

Signature of Attorney/Representative (if any): _____ Date: _____/_____/_____

Print Name: _____ Title: _____

ID No., if any: R _____ If Licensed Representative, License No.: _____ Expiration Date: _____/_____/_____

WORKERS' COMPENSATION BOARD

Limited Release of Health Information (HIPAA)

State of New York - Workers' Compensation Board

C-3.3

WCB Case No. *(if you know it)*:_____

To Claimant: If you received treatment for a *previous* injury to the same body part or for an illness similar to the one described in your current Claim, fill out this form. This form allows the health care providers you list below to release health care information about your previous injury/illness to your employer's workers' compensation insurer. The federal HIPAA law (Health Insurance Portability and Accountability Act of 1996) says you have a right to get a copy of this form. If you do not understand this form, talk to your legal representative. If you do not have a legal representative, the Advocate for Injured Workers at the Workers' Compensation Board can help you. Call: 800-580-6665.

To Health Care Provider: A **copy** of this HIPAA-compliant release allows you to disclose health information. If you send records to the employer's workers' compensation insurer in response to this release, also mail copies to the Claimant's legal representative. (If no legal representative is listed below, send copies to the Claimant.) Health care providers who release records must follow New York state law and HIPAA.

This release is:

- **Voluntary.** Your health care provider(s) must give you the same care, payment terms, and benefits, whether you sign this form or not.
- **Limited.** It gives your health care provider(s) permission to release only those health records that are related to the previous illness/condition you describe below.
- **Temporary.** It ends when your current claim for compensation is established or disallowed and all appeals are exhausted.
- **Revocable.** You can cancel this release at any time. To cancel, send a letter to the health care provider(s) listed on this form. Also, send a copy of your letter to your employer's workers' compensation insurer and the Workers' Compensation Board. *Note: You may not cancel this release with respect to medical records already provided.*
- **For records only.** It gives your health care provider(s) listed on this form permission to send copies of your health care records to your employer's workers' compensation insurer.

This form does NOT allow your health care provider(s) to release the following types of information:

- **HIV-related information**
- **Psychotherapy notes**
- **Alcohol/Drug treatment**
- **Mental Health treatment** (unless you check below)
- **Verbal information** (your health care providers may not discuss your health care information with anyone)

Any medical records released will become part of your workers' compensation file and are confidential under the Workers' Compensation Law.

A. YOUR INFORMATION (Claimant)

1. Name:_____ 2. Social Security Number:_____-_____-_____
3. Mailing Address: _____
4. Date of Birth: _____/_____/_____ 5. Date of the current injury/illness: _____/_____/_____
6. Current injury/illness, including all body parts injured:_____
   _____
7. Your legal representative's name and address (if any):_____
   _____

☐ *Check here if you allow your health care provider(s) to release **mental health care** information.*

B. YOUR HEALTH CARE PROVIDER(S)

(List all health care providers who treated you for a *previous* injury to the same body part or similar illness. If more than 2 providers attach their contact information to this form.)

1. Provider:_____ 2. Phone Number: (_____)_____
3. Mailing Address: _____
4. Other provider (if any):_____ 5. Phone Number: (_____)_____
6. Mailing Address:_____

C. READ AND SIGN BELOW.

I hereby request that the health care provider(s) listed above give my employer's workers' compensation insurer copies of all health records related to any previous injury/illness, to all body parts, described above.

_____
Claimant's signature (ink only -- use blue ballpoint pen, if possible.) Date

If the claimant is unable to sign, the person signing on his/her behalf must fill out and sign below:

_____
Your name | Relationship to Claimant | Signature (ink only -- use blue ballpoint pen, if possible.) | Date

Versión en español al reverso de la forma.

WORKERS' COMPENSATION BOARD

Divulgación limitada de información sobre la salud (HIPAA)

C-3.3

Estado de NuevaYork - Junta de Compensación Obrera (WCB)

WCB Case No. (if you know it) (Número de caso WCB *[si lo sabe]*)

Al reclamante: Si usted recibió tratamiento por una lesión anterior en la misma parte del cuerpo o por una enfermedad similar a la que motiva ahora su reclamación, complete este formulario. Este formulario les permite a los proveedores de salud que usted señala a continuación divulgar a la compañía de seguros de compensación obrera de su empleador la información sobre su salud relacionada con su lesión/enfermedad anterior. La Ley federal HIPAA (Ley de portabilidad y responsabilidad del seguro de salud de 1996) establece que usted tiene derecho a recibir una copia de este formulario. Si no comprende este formulario, hable con su representante legal. Si no tiene un representante legal, el Representante de los obreros lesionados de la Junta de Compensación Obrera puede ayudarlo. Llame al 800-580-6665.

Al proveedor de salud: Una **copia** de esta divulgación, redactada según lo que establece la ley HIPAA, le permite divulgar información sobre la salud. Si envía los registros al asegurador de compensación obrera del empleador en respuesta a la presente divulgación, también debe enviar por correo copias al representante legal del reclamante. (Si a continuación no se especifica un representante legal, envíe las copias al reclamante). Los proveedores de salud que divulgan los registros deben cumplir con las leyes del estado de Nueva York y la HIPAA.

Esta divulgación es:

- **Voluntaria.** Su(s) proveedor(es) de salud deben otorgarle la misma atención, condiciones de pago y beneficios, independientemente de que usted firme este formulario o no.
- **Limitada.** Le otorga a su(s) proveedor(es) de salud permiso para divulgar únicamente los registros médicos que se relacionen con la enfermedad/ afección anterior que usted describe a continuación.
- **Temporal.** Termina cuando se otorgue o desestime su actual reclamación de compensación y se hayan agotado todas las apelaciones.
- **Revocable.** Usted puede cancelar esta divulgación en cualquier momento. Para hacerlo, envíe una carta al (a los) proveedor(es) de salud que se indican en este formulario. Además, envíe una copia de su carta a la compañía de seguros de compensación obrera de su empleador y a la Junta de Compensación Obrera. *Nota: No podrá cancelar esta divulgación en lo que se refiere a registros médicos que ya se hayan provisto.*
- **Solamente para registros.** Le otorga a su(s) proveedor(es) de salud que se indica(n) en este formulario permiso para enviar copias de sus registros de salud a la compañía de seguros de compensación obrera de su empleador.

Este formulario NO autoriza a su(s) proveedor(es) de salud a divulgar los siguientes tipos de información:

- **Información relacionada con el VIH**
- **Notas de terapia psicológica**
- **Tratamientos por abuso de alcohol o drogas**
- **Tratamiento de salud mental** (a menos que usted lo indique a continuación)
- **Información verbal** (sus doctores no pueden hablar con nadie sobre su información de salud)

Los registros médicos divulgados se incorporarán a su expediente de compensación obrera y son confidenciales conforme a la Ley de compensación obrera.

CONTESTA LAS SIGUIENTES PREGUNTAS, EN INGLÉS SI ES POSIBLE, EN LOS ESPACIOS PROVISTOS Y FIRMA AL FRENTE DE LA FORMA.

A. YOUR INFORMATION (Claimant) INFORMACIÓN PERSONAL (Reclamante)

1. Name (Nombre)
2. Social Security Number (Número de seguro social)
3. Mailing Address (Dirección postal)
4. Date of Birth (Fecha de nacimiento)
5. Date of the current injury/illness (Fecha de la lesión/enfermedad actual)
6. Current injury/illness, including all body parts injured (Descripción de la lesión/enfermedad actual, incluyendo todas las partes del cuerpo lesionadas)
7. Your legal representative's name and address (if any) (Nombre y dirección de su representante legal [si corresponde])

*Check here if you allow your health provider(s) to release **mental health care** information. (Marque aquí si autoriza a su(s) proveedor(es) de salud a divulgar información sobre **tratamientos de salud mental**.)*

B. YOUR HEALTH CARE PROVIDERS (List all health care providers who treated you for a *previous* injury to the same body part or similar illness. If more than 2 providers, attach their contact information to this form.

SU(S) PROVEEDOR(ES) DE SALUD (Enumere todos los proveedores de salud que le han tratado por lesiones previas a las mismas areas del cuerpo ó por enfermedades semejantes.Si son más de 2 proveedores, adjunte su información de contacto a este formulario.)

1. Provider (Proveedor de salud)
2. Phone Number (Nº de teléfono)
3. Mailing Address (Dirección postal)
4. Other provider (if any) (Otro proveedor [si corresponde])
5. Phone Number (Nº de teléfono)
6. Mailing Adress (Dirección postal)

C. READ AND SIGN BELOW I hereby request that the health care provider(s) listed above give my employer's workers' compensation insurer copies of all health records related to any previous injury/illness, to all body parts, described above. LEA Y FIRME A CONTINUACION. Por la presente solicito que los proveedores de salud aquí enumerados le provean al asegurador de compensación obrera de mi patrono copias de todos los records médicos relacionados a cualquier lesión/enfermedad aquí enumeradas.

If the claimant is unable to sign, the person signing on his/her behalf must fill out and sign below: (**Si el reclamante no puede firmar**, la persona que firme el formulario en su nombre y representación debe llenar y firmar a continuación)

Claimant's signature (Firma del reclamante) use solo tinta - preferiblemente azul _____ Date (Fecha) _____

Your name (Su nombre) _____ Relationship to Claimant (Relación con el reclamante) _____ Signature(Firma) _____ Date(Fecha) _____

WORKERS' COMPENSATION BOARD

State of New York - Workers' Compensation Board

Employer's First Report of Work-Related Injury/Illness

C-2F

A work-related injury or illness must be reported within 10 days (Per Section 110) of the injury/illness or be subject to a penalty. Employers are not required to submit form C-2F to the Workers' Compensation Board if the employer's insurer will be submitting the accident information electronically to the Board on the employer's behalf. If you need assistance completing this form, please contact your insurer for guidance on the best method of reporting work-related accident information. If you submit this form to the Board, please send it to P.O. Box 5205, Binghamton, NY 13902 and provide a copy to your insurer.

Employee Name

WCB Case Number (JCN) **Date of Injury**

Claim Administrator Claim Number

INSURER / CLAIM ADMINISTRATOR INFORMATION

Insurer Name **Insurer ID**

Name

Info/Attn

Address

City **State**

Postal Code **Country**

Claim Admin ID

EMPLOYEE INFORMATION

First Name **Middle Name/Initial**

Last Name **Suffix**

Mailing Address

City **State**

Postal Code **Country**

Phone Number **Date of Hire**

Date of Birth **Gender** ☐ Male ☐ Female ☐ Unknown

Employee SSN

Occupation Description

CLAIM INFORMATION

Time of Injury

Date Employer Had Knowledge of the Injury

Employment Status

Date Employer Had Knowledge of Date of Disability

Estimated Weekly Wage

Number of Days Worked Per Week

Work Week Type ☐ Standard Work Week ☐ Fixed Work Week ☐ Varied Work Week

Work Days Scheduled ☐ Sun ☐ Mon ☐ Tues ☐ Wed ☐ Thurs ☐ Fri ☐ Sat

EMPLOYEE INJURY

Full Wages Paid for Date of Injury ☐ Yes ☐ No **Employer Paid Salary in Lieu of Compensation** ☐ Yes ☐ No

Initial Treatment ☐ No Medical Treatment ☐ Minor On-Site Treatment By Employer ☐ Minor Clinic/Hospital Treatment
☐ Emergency Evaluation ☐ Hospitalization Greater Than 24 Hours ☐ Future Major Medical/Lost Time Anticipated

Death Result of Injury ☐ Yes ☐ No ☐ Unknown **Date of Death** **Number of Dependents**

Nature of Injury (i.e. Laceration, Burns, Fracture, Strain, etc)

Part of Body (i.e. left arm, right foot, head, multiple, etc)

Cause of Injury (i.e. Motor Vehicle, Machine, Strain or Injury by lifting, etc)

Accident/Injury Description (see instructions)

WORK STATUS

Initial Date Last Day Worked

Initial Date Disability Began

Initial Return to Work Date

Return To Work Type ☐ Actual ☐ Released

Physical Restrictions ☐ Yes ☐ No

Return To Work Same Employer ☐ Yes ☐ No

ACCIDENT LOCATION AND WITNESSES

Premises (see instructions) ☐ Employer ☐ Lessee ☐ Other

Organization Name

Street **State**

City **Postal Code**

County **Country**

Location Narrative

Witnesses	Business Phone Number

EMPLOYER INFORMATION

Name | **Employer FEIN**

UI Number | **Manual Classification Code**

Industry Code

Info/Attn

Mailing Address

City | **State**

Postal Code | **Country**

Physical Addr

City | **State**

Postal Code | **Country**

Contact Name

Contact Business Phone Number

INSURED INFORMATION

Insured Name | **Insured FEIN**

Insured Type ☐ Insured ☐ Self-Insured ☐ Uninsured | **Insured Location ID**

Policy Number ID

Policy Effective Date | **Policy Expiration Date**

An employer or carrier, or any employee, agent, or person acting on behalf of an employer or carrier, who KNOWINGLY MAKES A FALSE STATEMENT OR REPRESENTATION as to a material fact in the course of reporting, investigation of, or adjusting a claim for any benefit or payment under this chapter for the purpose of avoiding provision of such payment or benefit SHALL BE GUILTY OF A CRIME AND SUBJECT TO SUBSTANTIAL FINES AND IMPRISONMENT.

The above information is true to the best of my knowledge and belief.

If prepared by the employer:

Signature of Person Preparing Form | **Date**

Print Name

Title | **Phone Number**

POLICY

The safety and health of employees is the first consideration in operating any business. Without question, it is the responsibility of every employee at all levels in the hierarchy.

Aversa Bros Industrial Contractors will comply with all laws and prevent workplace injuries and illnesses. To do this, we must be aware of conditions that can result in injury or illness in every work area. No employees will be required to work at a job they know is unsafe or unhealthy. Companywide cooperation in detecting hazards and controlling them is a condition of employment. Employees will inform their supervisor immediately of any hazardous situation beyond their ability or authority to correct.

Preventing workplace injuries and illnesses takes precedence over operating productivity when necessary. To the greatest degree possible, management will provide safeguards for personal safety and health, in keeping with the highest standards.

We strive to maintain an occupational injury and illness prevention program (IIPP) that conforms to industry best practices for organizations of this type. To be successful, such a program must embody proper attitudes toward injury and illness prevention on the part of both supervisors and employees. It also requires cooperation in all safety and health matters, not only between supervisor and employee, but also among coworkers.

Our objective is an (IIPP) that reduces the number of work place incidences to an absolute minimum, not merely in keeping with, but surpassing the best experience of operations similar to ours. Our goal is zero accidents and injuries.

Safety and Health Program Components

Our (IIPP) includes the following:

- Communicating with employees about safety issues and workplace hazards through a range of avenues including a safety training program and meetings to exchange ideas about workplace safety and health among employees
- Providing and maintaining mechanical, physical and administrative safeguards to control risks presented by workplace hazards to the maximum possible extent
- Conducting a program of safety and health inspections to find and eliminate unsafe working conditions or practices, to control health hazards, and to comply with safety and health regulations and standards
- Providing necessary personal protective equipment (PPE) and instructions for proper use and care
- Developing and enforcing safety and health rules and requiring employees to cooperate with these rules as a condition of employment
- Investigating promptly and thoroughly every accident, safety incident, and near miss to determine root causes and make appropriate changes to remedy those causes
- Creating a culture of safety that encourages employees to identify workplace hazards, recommend changes to reduce the risks they pose and work for a safer workplace
- Periodic review of all elements of our IIPP to maintain its accuracy

We recognize the responsibilities for occupational safety and health are shared: Aversa Bros Industrial Contractors will see that all employees are properly instructed and supervised in safe operation of machinery, tools, equipment, processes, and practices while at work.

Aversa Bros Industrial Contractors accepts responsibility for the leadership, effectiveness and improvement of the injury and illness prevention program and for providing the required safeguards to ensure safe work conditions.

Supervisors are responsible for encouraging proper attitudes toward safety and health and for ensuring that workers perform operations with the utmost regard for the safety and health of all personnel.

Employees are responsible for wholehearted, genuine implementation of all aspects of the (IIPP), including compliance with all rules and regulations, and for continuously following best safety and health practices while performing their duties.

Requirements in multiple chapters may apply to the same job, and some health and safety procedures will be addressed at different levels of focus. Where a circumstance is addressed by different requirements throughout this manual, then all requirements apply and when a conflict occurs, the more specific one must be followed.

PROGRAM GOALS

The goal of Aversa Bros Industrial Contractors is to continue operating a profitable business while protecting employees from injuries or illness. This can be achieved by delegating responsibility and accountability to all involved in this company's operation.

- Responsibility: Having to answer for activities and results
- Accountability: The actions taken by management to ensure the performance of responsibilities

To reach our goal of a safe workplace, everyone needs to take responsibility and be accountable.

Owner Name	Owner Signature	Date

Our designated safety professional is responsible for the implementation and enforcement of safety rules.

FOLLOWING SAFETY RULES

Aversa Bros Industrial Contractors employees will follow all Safety and Health Program rules, provide first aid up to their level of training and promptly report unsafe conditions or practices that can't be immediately remedied to a supervisor. Not following safety policies and procedures can affect co-workers and the public, and may result in disciplinary action up to and including termination.

If employees are unsure of the safe method to do a job, they must STOP and ask a supervisor.

Employees have the authority to stop work to address a hazard.

DISCIPLINARY ACTION

Employees will be disciplined for infractions of safety rules and unsafe work practices that are observed, not just those that result in an injury. Care will be taken to ensure discipline does not discriminate. Consistency in the enforcement of safety rules will be exercised at all times. While safety rules will be enforced rigorously, no one will be punished for reporting unsafe work practices or for reporting illness or injury. In any disciplinary action, discipline is given to the employee only for violation of safe work policy, not because they were injured or filed a workers' compensation claim.

Discipline for safety violations will be administered in a manner consistent with Aversa Bros Industrial Contractors's system of progressive discipline.

As in all disciplinary actions, each situation is to be carefully evaluated and investigated. The steps taken in the disciplinary process, up to and including termination, will depend on the severity of the violation, employee history and overall consideration for the well-being of the company, its employees and its customers.

Each department or supervisor may have additional safety rules and policies specific to operations. In following these rules, employees are expected to exercise sound judgment and work in a manner to ensure the safety of themselves and coworkers.

SAFETY INCENTIVE PROGRAMS

Although strict adherence to safety policies and procedures is required of all employees, Aversa Bros Industrial Contractors may periodically provide recognition of safety-conscious employees and acknowledge safety-conscious work habits through a safety incentive program. Safety incentive programs must not discourage reporting of injuries and illnesses.

TRAINING AND SAFETY COMMUNICATION

OSHA requires employers to train employees in the safe methods of performing their job. Aversa Bros Industrial Contractors is committed to instructing all employees in safe, healthy work practices. Awareness of potential hazards and knowledge of how to control them is critical to maintaining a safe, healthy work environment and preventing injuries. Aversa Bros Industrial Contractors will provide training to each employee on general safety issues and safety procedures specific to that employee's work assignment.

Training provides the following benefits:

- Makes employees aware of job hazards
- Teaches employees to perform jobs safely
- Promotes two-way communication
- Fulfills legal requirements
- Encourages safety suggestions
- Creates additional interest in the safety program

Aversa Bros Industrial Contractors will only use training material appropriate in content and vocabulary to the educational level, literacy and language of employees, and will offer retraining as needed to ensure safe practices.

Training Program

Actual demonstration of proper task performance will be used whenever possible to instruct new workers. Workers must provide evidence of topic mastery before training is complete. Trainers will rely on the following safe training techniques: tell them how, show them how, have them tell you how, and have them show you how.

Training topics will reflect the hazards of the workplace and may include the following: employee's safety responsibilities; general safety rules; IIPP contents; safe job procedures; mandatory and optional PPE.

New Employees

Every new employee will be given instruction by their supervisor or appropriate member of management in the general safety requirements of their job. New employees will not begin a job until they have demonstrated or otherwise confirmed awareness of safe practices for their tasks and general workplace safety rules and guidelines. A copy of the general safety rules will be provided to each new employee, and each new employee will be given access to any element of the safety program that pertains to the work he or she will be expected to do.

Documentation of Training

All employee safety training will be documented. Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

Retraining

Employees observed performing unsafe acts or not following safe work procedures will be retrained by their supervisor or an appropriate safety trainer. A safety contact report may be completed by the supervisor to document the training. If multiple employees are involved, additional safety meetings will be held.

SAFETY COMMUNICATION

Aversa Bros Industrial Contractors will advise employees of changes relating to the safety program. Employee safety communication procedures are designed to develop and maintain employee involvement and interest in workplace safety and health. These activities help ensure effective communication between management and employees on safety-related issues and nurture a culture of safety.

The following are some of the safety communication methods that may be used:

- Frequent accident prevention instructions and periodic practice drills
- Distribution of articles, memos, payroll stuffers and other communication concerning workplace safety and health
- Regular safety meetings with employees that encourage participation and open, two-way communication
- Employee bulletin boards or other displays discussing safety issues, accidents, and general safety suggestions
- New employee safety orientation and training

Safety Suggestion Program

Aversa Bros Industrial Contractors encourages all employees to become involved in the development and implementation of the safety and health program. Management will request opinions and comments from workers at all levels and respond to them respectfully and appropriately.

All employee-initiated safety related suggestions will be channeled to the appropriate authority by supervisors, either verbally or in writing. Unresolved issues may be relayed to Frank Aversa, the safety coordinator.

Aversa Bros Industrial Contractors will not discriminate against any employee that raises a safety concern, files a complaint, causes a regulatory action to be brought, or testifies against the employer. There will be a system where employees may share safety or health concerns anonymously.

Rules

The following rules are a selection of safety practices to help prevent work-related injury and illness. It is not comprehensive; employees are expected to adhere to any safe work practice necessary to complete their job safely.

Drug- and Alcohol-Impaired Workers

Aversa Bros Industrial Contractors encourages employees to discuss personal and interpersonal problems with their supervisor. Supervisors will handle all such contacts with appropriate confidentiality and refer employees who may benefit from outside assistance to appropriate resources.

No employee may work while fatigue, illness, prescription drugs or over-the-counter drugs impair his or her ability or alertness.

No one known to be under the influence of alcohol or drugs will be allowed on the job while in that condition.

Notify a supervisor of any coworker demonstrating signs of impairment that may present a safety or health hazard.

GENERAL SAFETY

- Take time to do every job safely
- Refrain from horseplay, scuffling, pranks, and similar acts that may have an adverse influence on the safety and well-being of employees
- Walk - don't run - in the workplace
- Smoke, eat and store personal items only in designated areas. Smoking is not allowed in any indoor place of employment
- Maintain awareness of potential hazards when walking about the workplace
- Use tools only for their intended purpose, and always use the right tool for the job
- Listen to instructions. If you don't understand them, ask before starting work
- Inspect all safeguards before beginning work. Ensure proper functioning of protective devices and report any known deficiencies immediately
- Only operate equipment you can have been trained on
- Refrain from handling or tampering with equipment, machinery or lines outside the scope of your duties
- Report all injuries to the appropriate supervisor so arrangements can be made for medical or first-aid treatment and appropriate reporting may be completed
- Ensure clothing and footwear is appropriate to the hazards of the job. If you are unsure, ask your supervisor
- Wear approved protective equipment in work areas that demand such equipment
- Heed signs, posters, hazard bulletins, and tags posted on company premises
- Only enter hazardous areas after they are made safe to enter

Aversa Bros Industrial Contractors strictly prohibits possession of firearms, weapons, illegal drugs or alcoholic beverages on Aversa Bros Industrial Contractors property, customer property or other locations while on the job.

Housekeeping

- Keep all exits, fire doors, aisles, and areas around fire extinguishers, first aid kits, emergency equipment, electrical panels, and traffic lanes clear
- Keep tools, materials or other objects off the floor to prevent trips and falls. Remove waste from the work area promptly
- Keep work areas clean and free of debris, electrical cords, and other hazards; immediately clean spilled liquids
- Keep stairways, passageways, exits, and sidewalks clean and clear of obstructions
- Bend or cap sharp wires or protruding nails must be bent or capped
- Place tools and equipment so they will not fall from elevated areas
- Only use approved cleaning agents

Fire Prevention

- Firefighting equipment will be inspected on a regular basis
- Discharged, damaged or missing equipment must be reported immediately to a supervisor. Tampering with fire equipment is prohibited
- Take precautions to prevent fires, particularly from oily waste, rags, gasoline, flammable liquids, acetylene torches, improperly installed electrical equipment and trash
- Access to fire extinguishers must be kept clear at all times. Make note of the location of firefighting equipment in your work area
- In case of fire, employees will consider the safety of themselves and other individuals before saving property
- Never use gasoline or flammable solvents to clean
- Smoking is prohibited within 20 feet of flammable substances

Lifting and Material Handling

- Think before lifting
- Find a better way. If at all possible, use mechanical help from a pushcart or hand truck
- If the load is heavy or awkward to lift alone, get help. Team lifting cuts the load in half and reduces likelihood of injury
- Break the load down into smaller lifts if possible. It is better to make two or more light trips than one heavy trip
- If possible, bring the load up between the knees and waist before lifting
- Do not lift on slippery surfaces
- Test the load before doing the lift; determine how heavy it is by giving it a shove
- Ensure a good handhold on the load before attempting to lift
- Keep the load close. Walk as closely as possible to the load
- Do not jerk the load or speed up. Lift the load in a smooth and controlled manner
- Do not lift in an awkward position or twist while lifting (especially with a heavy load). Turn and take a step
- Avoid long forward reaches and bending your back. Use a step stool or platform if necessary
- Make sure you have plenty of room to lift and to set down the object
- If you are lifting an object above your head, get a ladder or step stool

Personal Protective Equipment (PPE)

- Use the correct PPE for any job assignment that requires it. If you do not know, ask
- PPE will be maintained in good condition and cleaned regularly
- PPE will be stored properly when not in use to protect it from damage
- Damaged or broken PPE must be returned for replacement
- PPE may not hamper or restrict freedom of movement due to improper fit
- Eye protection must be worn when working with hazardous materials or chemicals

Ladder Safety

- Keep portable stairways, ladders, and step stools in good condition and use them only in a safe manner
- Inspect the ladder before using it. If it is broken, remove it from service
- Use the proper ladder for the job
- Do not use “A” frame self-supporting ladders as straight ladders
- Make sure the ladder is tall enough to reach the work area
- Do not use metal ladders for electrical work
- Avoid temporary ladders. Always use a commercially made ladder of the proper length and strength for the work being performed
- Keep ladder rungs must be kept free of grease, oil, mud, or other slippery substances
- Do not place ladders in passageways, doorways, or any location where they might be hit or jarred, unless protected by barricades or guards
- Place ladders only on hard, level surfaces. Make sure ladder feet are not placed on sandy, slippery or sloping surfaces. Clean or sweep the area where the ladder feet will be and make sure the rubber feet are in good shape
- Arrange work so you can face the ladder and use both hands while climbing. Do not carry tools or equipment in your hands while climbing. If tools or equipment cannot be safely stored on your person, as with a belt or vest, climb the ladder, and then hoist them with a line or hoisting device
- Secure portable ladders in place and at a pitch so the leveling indicator is in alignment or the distance from the wall to the base of the ladder is at least 1’ away from the wall for every 4’ of ladder height
- Tie-off straight ladders at the top of the ladder to prevent slipping
- Be aware of objects below you; move or cover sharp objects in case you fall
- Do not stand on or work from the second rung from the top or above
- Do not reach too far from the ladder, and keep your center of gravity as close to the center of the ladder as possible
- Ensure extension ladders extend at least 36" above the level being accessed
- On all ladders, do not step on cross bracing not intended to be used for climbing
- Do not use a ladder as a brace, workbench or for any other purpose than climbing

Electrical Safety

- Only trained, qualified, and authorized employees may work on or repair electrical equipment
- Report exposed wires and damaged electrical equipment or wires immediately
- Extension and temporary power cords must be appropriate to the task and grounded, and only used only as a last resort. Frayed or defective cords will not be used
- Never overload an outlet or circuit. Use approved power strips and extension cords in accordance with company policy and best safety practices
- All energized equipment and installations will be de-energized before work. If the equipment or installation must be energized, special precautions will be taken to protect against the hazards of electric shock

- All equipment will be locked out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy-isolating device bearing a lock
- Safety grounds will always be used where there is a danger of shock from back feeding or other hazards
- Suitable attire and personal protective equipment (PPE) must be worn at all times while working on electrical equipment
- Always exercise caution when energizing electrical equipment or installations. Take steps to protect against arc flash and exploding equipment in the event of a fault
- All power tools will be grounded or double insulated. Tools with defective cords or wiring will not be used
- Don't wear metal jewelry around energized circuits
- Suitable temporary barriers or barricades will be installed when access to opened enclosures containing exposed energized equipment is not under the control of an authorized person
- Enclosures or tight-fitting covers must protect electrical installations from accidental contact.
- Metal measuring tapes, fish tapes, ropes or other metal devices are prohibited where they may contact energized parts of equipment or circuits

Company Vehicles

- Only authorized employees are permitted to operate Aversa Bros Industrial Contractors vehicles
- Company vehicles are to be used for Aversa Bros Industrial Contractors business only. Personal, off duty and family use is prohibited
- Drive defensively and obey all traffic and highway laws
- Always wear a seat belt, whether driver or passenger
- Report accidents to a supervisor as soon as possible, and obtain a police report
- Lock vehicles and remove keys from unattended vehicles
- Inspect the vehicle before operation and report any defects or operating problems to the appropriate supervisor so repairs can be made
- Smoking is prohibited while inside the vehicle and during vehicle refueling
- If your driver's license is revoked or expired, immediately notify your supervisor and do not drive. If you receive a moving violation or any citation that may affect your eligibility to drive a company vehicle, inform your supervisor immediately

Hazardous Materials and Chemicals

- Ask a supervisor about any unfamiliar material, chemical or substance
- Read GHS warning labels and pay close attention to the pictographs and signs
- Read the Safety Data Sheets (SDS) before using any chemicals. SDS contain a wealth of safety information and are available to employees at their request
- Hazardous materials will be handled in accordance with the SDS and label. If protective equipment is required, use it
- Store all hazardous materials in suitable containers that are properly labeled
- Use chemicals that produce fumes or vapors only in well-ventilated areas

- Wear eye protection when working with hazardous materials or chemicals
- Mixing of chemicals is prohibited at all times, unless required by the label. Before you mix, review all SDS
- Practice appropriate hygiene after handling hazardous substances and follow special instructions from authorized sources. Wash hands thoroughly after handling chemicals and before eating or smoking, even if wearing protective gloves. Never use solvents for hand cleaning
- Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use
- Air under Pressure (Compressed Air)
- Air pressure at the discharge end of a portable air blow gun or portable air hose must be less than 30 pounds per square inch gauge when dead-ended
- When air under pressure is used to remove chips and dust, a chip guard, such as a fixed or removable shield, safely located, will be provided to protect an employee in an adjacent area
- The employee using air under pressure will be provided with and use appropriate PPE to the extent necessary to protect against hazards created by the operation
- Air under pressure, used in a manner that could cause injury, must not be used for cleaning clothes while being worn
- Air under pressure must not be directly applied to any part of the body. This could cause a serious or fatal injury (embolism) if air penetrates the skin/enters the body
- Air under pressure must not be used to move flammable dust in an area containing open flames or spark-producing equipment
- Air under pressure must not be used to remove toxic dusts in an employee environment
- Polyvinyl chloride (PVC) piping must not be used for the transportation and distribution of compressed air or other compressed gases in an above-ground installation
- An employee must be protected by guards or location when pressure tests are being performed on materials or equipment where rupture or failure would create a hazard

Accident Prevention Signage and Tags

An employer must provide, install and maintain signs and tags where an employee might be, or would likely be, injured or harmed if not alerted to an existing or potential hazard.

Signage must be unobscured, displayed in a well-lit area, and legible from a distance that provides sufficient time or warning for an employee to take appropriate action.

Similarly, accident prevention tags will be used as a temporary means of warning an employee of an existing hazard on certain items, such as defective tools or equipment. Don’t use tags in place of accident prevention signs or consider them a complete warning. Tags must be attached to prevent accidental disengagement, and they must be large enough to attract attention to the hazard. Use “Do Not Start,” “Out of Order,” and “Out of Service” tags in appropriate situations.

Sanitation

Potable water must be provided and placed in locations readily accessible to all employees. The water must be suitably cool and available continuously in sufficient amounts to keep all workers hydrated, taking into account the air temperature, humidity and nature of the work performed. The water will be dispensed in sanitary single-use drinking cups, or by fountains. Common drinking cups are prohibited.

Portable containers used to dispense drinking water must be tightly covered, regularly cleaned and refilled at least daily. Containers must have a tap, and water must not be dipped from containers. The containers must be clearly marked as to the nature of their contents, made of a material that maintains water quality, and not used for any other purpose.

Potable drinking water, as well as toilet and hand-washing facilities, must be maintained in accordance with appropriate public health sanitation practices.

Outlets for non-potable water, such as water for industrial or firefighting purposes only, will be identified by signs that clearly indicate the water is unsafe and is not to be used for drinking, washing or cooking purposes. There will be no cross-connection, open or potential, between a system that furnishes potable water and a system that furnishes non-potable water.

Employers must provide onsite general washing facilities (one per 20 employees) for construction projects, must keep them in sanitary condition, and must provide suitable cleaning agents/single-use towels for the removal of hazardous and other substances.

Toilet facilities must be adequately ventilated, readily accessible, and maintained in a clean and sanitary condition. Mobile crews may be provided transportation to nearby toilet facilities.

Every enclosed workplace must be constructed, equipped, and maintained, as reasonably practicable, to prevent the entrance and presence of rodents, insects, and other vermin. A continuing and effective extermination program must be instituted where their presence is detected.

Color Coding

- Green is used for general safety or accident-prevention signs; yellow is the basic color for designating caution on signage, and for marking physical hazards—solid yellow, yellow and black stripes, or yellow with a suitable contrasting background may be used interchangeably; red is used to indicate a warning/danger on signage, and to indicate “stop” when used with buttons
- A stop bar, stop button, electrical switch, or other mechanical device for the emergency stopping of machinery, excluding cables, will be red in color
- A safety can will be red in color

FORMS AND ATTACHMENTS

Please find the following document on the next page:

- General Safety Rules Receipt and Attestation

This form may be reproduced freely by Aversa Bros Industrial Contractors for the purposes of implementing and maintaining a safety and health program.

GENERAL SAFETY RULES RECEIPT AND ATTESTATION

This is to certify that I have received a copy of the general safety rules.

- I have read these instructions, understand them and will comply with them while working for Aversa Bros Industrial Contractors.
- I understand that failure to follow the company injury and illness prevention program may result in disciplinary action and possible termination of my employment with this company.
- I understand that I am to report any injury to my supervisor and report all safety hazards as soon as safely possible.
- I further understand that I have the following safety rights:
  - I am not required to work in any area I feel is not safe.
  - I am entitled to receive information about all hazards I am exposed to while working.
  - I am entitled to see a copy of the company safety and health manual.
  - I will not be discriminated against for reporting safety concerns.

Employee Name	Signature	Date
Supervisor Name	Signature	Date

cc: Employee File

SCOPE

This chapter is based on OSHA interpretations of the following training regulations to be applicable to the global training policy.

- 1910.134(k) Respiratory Protection; Training and Information
- 1910.147(c) The Control of Hazardous Information; General
- 1910.1030(g) Bloodborne Pathogens; Communication of Hazards to Employees
- 1910.1200(h) Hazard Communication; Employee Information and Training
- 1926.21 Construction; Safety Training and Education

Where unique training requirements particular to specific regulations are needed, they will be addressed in that chapter.

POLICY

Aversa Bros Industrial Contractors will freely provide training necessary for employees to perform assigned work in a safe and healthful manner.

Training will be tailored to encourage and assist understanding for all employee education and literacy levels in the languages they receive other job instruction.

EMPLOYER RESPONSIBILITIES

- Provide training to employees:
  - Free of charge
  - During regular working hours
  - In a language and at a competence level that employees can understand
- Train employees in routine and emergency response procedures
- Ensure that, where necessary, only competent/qualified personnel will deliver the training
- Maintain records of employee training for the duration of their employment, or as required by specific regulations
- Provide additional and/or refresher training as required or requested

EMPLOYEE RESPONSIBILITIES

- Attend and participate in all company required training
- Follow all company procedures and safe work practices
- Not perform any work that they have not been trained to safely complete
- Request additional training as needed

GENERAL TRAINING REQUIREMENTS

Employees must know how to identify the health and safety issues at their worksite, analyze the causes, and bring about healthier and safer workplaces for themselves and their co-workers.

Particular standards of training requirements common to most workplaces include:

- Emergency response and evacuation procedures
- Fire protection and prevention
- First Aid (if required)
- Hazardous Communication, as necessary
- Personal Protective Equipment (PPE)

Emergency Action Plan

Employees designated in the emergency evacuation plan to assist in evacuation, will be trained how to safely and orderly help evacuate other employees

Additional educational considerations include:

- Reviewing the plan with each designated employee when:
- The plan is developed
- An employee is first assigned to a job
- The employee's emergency action plan responsibilities change
- The plan is changed
- Providing the written plan for review when an employee asks to see it.

Fire Prevention Plan

Employees will be informed of the fire hazards they are exposed to at the worksite, and the parts of the fire prevention plan they need to know to protect themselves.

The written plan will be available for review when an employee asks to see it.

First Aid

The company will have the appropriate number of people available for employees to talk to and give advice on health and safety matters relevant to that worksite hazards.

At worksites that are too far from a clinic or hospital identified as able to handle likely safety and health hazards and injuries at that worksite, there will be an appropriate number of people adequately trained provide first aid.

Hazard Communication Standard

Written programs maintained at each worksite will describe how employees will be provided effective information and training on hazardous chemicals they might encounter in their work area:

- At the time of initial assignment
- When a new physical or health hazard is introduced

This training will cover at least:

- How to detect the presence or release (e.g. spills) of hazardous chemicals in that work area
- Physical and health hazards of chemicals in the work area (i.e. either the specific chemicals, or broader categories of hazards like: flammable or cancer causing)

- How employees are to protect themselves from exposure, such as specific safe work procedures
- Details of the written program, particularly the labels and Safety Data Sheets (SDS) of specific chemicals at the worksite, and how to get and use needed hazard information

Personal Protective Equipment (PPE)

Before beginning work that requires PPE, employees will be trained in at least:

- What PPE is needed and when it is necessary
- The protective limitations of the PPE
- How to put on, take off, adjust, and wear the assigned PPE
- How to properly care for and maintain the PPE
- Knowing and recognizing the assigned PPE's useful life, and how to properly dispose it when necessary

Retraining will occur when the employee shows that they don't understand or have the skill required to correctly use the PPE in the way they've been trained.

Training records will show that the employee as demonstrated they understand the training and how to correctly use the PPE how they've been trained.

REFRESHER TRAINING

Aversa Bros Industrial Contractors will provide refresher training to employees when:

- There are periodic intervals required by the regulation
- Changes in the workplace render previous training obsolete
- Changes in the types of equipment or materials being used render previous training obsolete
- Inadequacies in an affected employee's knowledge or use of safe practices indicate that the employee has not retained the requisite understanding or skill
- Periodic evaluations show inadequacy in training or results in new safe work procedures

The Company will verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

SUPPLEMENTAL TRAINING

Company training in each subject will be developed according to the intent of each regulation; covering all elements listed in prescriptive regulations (e.g. respiratory protection training), and focusing on the desired outcome in performance regulations (e.g. confined spaces training.)

In addition to the common training listed above, Aversa Bros Industrial Contractors will provide affected employees with job specific training based on their responsibilities. This training can include, but is not limited to:

- Lockout/Tagout
- Confined spaces
- Hand and power tool use

- Fall protection
- Equipment/machinery operation
- Scaffold work
- Welding and hot work
- Respiratory protection

TRAINING RECORDS

Aversa Bros Industrial Contractors will maintain records of all employee training for the length of their employment, or for the time required by specific OSHA regulations. These records will include:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

All training records will be provided when an employee or their representative, or another authorized person asks for it.

FORMS AND ATTACHMENTS

On the following page, please find a generic training record sheet. This form may be reproduced for the purposes of implementing and maintaining a safety and health program.

(TOPIC NAME) _____ TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name:	**Signature:**

POLICY

Aversa Bros Industrial Contractors is committed to providing a safe, healthy workplace by eliminating or controlling all workplace hazards. A Job Hazard Analysis (JHA) systematically investigates a job process, equipment, and the workplace environment to identify hazards and reduce risk. Frank Aversa is responsible for ensuring facilities and workplaces are inspected regularly for hazards, and will do so with support and assistance from employees.

EMPLOYER RESPONSIBILITIES

Aversa Bros Industrial Contractors is responsible for:

- Ensuring that safety inspections of the facility occur on regular basis
- Training personnel in how to perform a job hazard analysis
- Responding quickly to eliminate workplace hazards
- Ensuring all equipment is kept in good repair
- Ensuring employees follow safe job procedures
- Reviewing job hazard analysis whenever there is a significant change to any element of the job or there has been an injury or illness

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Assist in job hazard analyses
- Follow safe job procedures
- Report hazards to a supervisor immediately

TRAINING

Aversa Bros Industrial Contractors will ensure every manager, supervisor and safety team member participates in a JHA training program. This training will be provided at no cost to the employee during working hours.

The Company will use only training material appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

Frank Aversa will verify that all employees have been trained in the following minimum elements:

- Importance of involving employees in job safety analyses
- How to review safety records to identify areas that present hazards
- How to analyze a job to determine the level of risk it presents
- How to prioritize job hazard analysis and hazard control activities

- Basic steps of a job hazard analysis, including: breaking the job into steps, analyzing risks, and determining controls
- How much detail to include when listing the steps of a job for a JHA
- What kinds of workplace hazards might exist and what types of risk they pose
- H Process of hazard controls and advantages of certain types of controls
- How to review a job hazard analysis and how to write a safe job procedure
- When to reanalyze a job for hazards

The person conducting the training will be knowledgeable in the subject matter of the training program as it relates to the workplace.

All employees will be trained in basic hazard identification and will be trained in their jobs according to safe job procedures, as directed by the job safety analysis.

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions and attached documents
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions
- Attendance and attestation forms of all persons trained

Employee training records will be retained for the length of their employment.

EMPLOYEE INVOLVEMENT

No one knows how to do a job better than the person currently doing that job does. Employees who are included in a JHA) provide valuable insight and knowledge into work procedures that is valuable in identifying hazards and controlling them. This insight can help prevent potentially dangerous oversights.

Further, soliciting employee input demonstrates that management values everyone's involvement in creating a safer workplace and provides an opportunity for employees' active involvement in the JHA process.

Preliminary Review

Reviewing the worksite's accident history with employees draws attention to failures in hazard controls and deficiencies in work processes, which in turn suggests opportunities for safety program growth. A thorough review of recorded accidents, illnesses and near misses points to jobs, processes and tasks that require closer examination. It also indicates the immediate actions necessary to control all existing risks.

A discussion with employees about hazards they already know to exist also provides an opportunity to discuss ideas to control them.

If there is a hazard that poses an immediate danger, do not wait until after the JHA is complete to establish controls. Problems need to be corrected quickly. This demonstrates a commitment to safety and permits more time and thought for more complicated work safety issues.

Prioritize Hazardous Jobs

Understanding the risk posed by a job requires consideration of two main factors: the likely severity or impact of the injury or illness caused by a hazard and the likelihood injury or illness will actually occur (see Table 1). It is important, when assessing the overall risk of a job to determine the number of people exposed to a hazard who could be affected by an incident. Hazards that affect the whole worksite present much more risk than hazards that affect only one worker.

Jobs that present unacceptable risk need to take priority. Place priority on jobs:

- With exceptionally high injury or illness rates
- Where there already have been close calls
- Where violations of standards already have occurred
- With potential to cause serious harm

Severity

Factors that increase risk because they increase the severity of an injury or illness often rely on chance. However, certain job elements and behaviors intensify the severity of possible incidents:

- Using high-powered machinery and heavy equipment
- Working at elevation
- Working around hazardous chemicals
- Moving heavy or cumbersome loads
- Working around or with electrically energized equipment
- Working in a confined space

Probability

Factors that increase risk because they increase the likelihood of an injury or illness include the number of employees exposed to a hazard, frequency of exposure, duration of exposure, proximity to “point of danger”, unreasonable workload, working under stress, and environment.

TABLE 1: RISK ASSESSMENT MATRIX

		Probability of Harm		
		Not Likely	**Likely**	**Very Likely**
Severity of Harm	**Serious Harm**	Moderate Risk	High Risk	Very High Risk
	Significant Harm	Low Risk	Moderate Risk	High Risk
	Minor or no harm	Low Risk	Low Risk	Moderate Risk

Analysis

When analyzing a job's hazards and determining how best to control them, it's important to identify all significant hazards accurately, and understand each within the context of the entire job.

Break Job into Steps

Every job requires several steps. Each has its share of hazards that puts workers at risk.

To complete a job hazard analysis, first there must be a clear understanding of the steps required to complete the job. The observer will watch the worker perform the job and list the steps the worker takes to complete it.

When breaking a job into its individual steps, it's important to balance between too much and too little detail. Too much detail will make the analysis needlessly long, and too little will not cover the basic steps.

Each step is one action. Some actions may not be observable, and some steps may involve specifically not doing things.

The observation stage of the JHA shouldn't focus on either the employee's performance, or individual unsafe acts, it should focus on the task itself. All phases of the analysis benefit from employee insight and feedback, and extensive employee involvement is strongly encouraged.

OSHA recommends video recording or photographing the worker performing the job, having them explain each step, and why they did it that way. These visual records can be handy references when doing a more detailed assessment of the work.

When all the steps are documented, the observer will review them with the employee to ensure nothing is missed.

Identify Hazards

The JHA requires answers to the following:

- What can go wrong?
- What are the consequences?
- How could the hazard arise?
- What are the other contributing factors?
- How likely is it that the hazard will result in an incident?

A good description of a possible hazard scenario will reveal the answers to those questions by describing the hazard in terms of the environment in which it occurs, the trigger that would precipitate an incident, how a worker faces exposure to the hazard, and the worst-case consequences.

Again, workers provide excellent insight into the hazards they work with as well as suggestions for how to control risks presented by hazards where they work.

The JHA will not only include actual hazards, but also potential hazards that could arise while performing the job:

- Is there danger of striking against, being struck by or otherwise making harmful contact with an object?
- Can the worker be caught in, by, or between objects?
- Is there potential for a slip or trip?
- Can the employee fall from one level to another or even on the same level?
- Can pushing, pulling, lifting, lowering, bending or twisting cause strain?
- Is the work environment hazardous to safety or health?
- Are there concentrations of toxic gas, vapor, fumes or dust?
- Are there potential exposures to heat, cold, noise or ionizing radiation?
- Are there flammable, explosive or electrical hazards?

Please see the table of Workplace Hazards at the end of this chapter for reference.

A list of hazards must accompany each step of the job. This provides a framework pointing to controls already in place and controls needed to prevent hazards from causing injuries or illnesses.

Control

Though awareness and thoughtfulness are excellent ways to reduce risk in the workplace, it is not enough simply to identify workplace hazards. Hazards in the workplace that are identified must be controlled if possible to minimize their risk. The JHA provides a systematic way to approach hazards and their controls. To control a hazard, it is important to remember two very basic principles. First, either eliminate the hazard itself or control worker exposure to the hazard. Second, eliminating a hazard is more effective than controlling exposure to a hazard.

These two principles shape a hierarchy of hazard control strategies (see Figure 1). When considering how to address the hazards in each step of a given job, controls at the top of the hierarchy need to be considered before controls toward the bottom of the hierarchy. The more reliable and less likely a hazard control can be circumvented, the better.

A good hazard control plan often includes a mixture of different things, such as the following:

- Priority given to high-risk hazards
- Inexpensive, easy improvements and temporary solutions until more reliable controls are in place
- Long-term solutions to risks most likely to cause accidents or ill health
- Long-term solutions to risks with the worst potential consequences
- Arrangements for training workers on the main risks that remain and how they are to be controlled
- Regular checks to make sure the control measures stay in place, and clear responsibilities. Who will lead on what action, and by when?

Controlling the Hazard

The most effective strategy is to "engineer the hazard out" by using control methods that physically remove or change a hazardous machine, work environment condition or other hazard. If, during the JHA, you discover a hazard that can be engineered out, do it. Turn the dangerous step into a safe step that doesn’t require safety precautions.

Elimination

If there are hazards that can be removed from the worksite, do this first. Good housekeeping procedures keep many hazards under control. Removing redundant or unnecessary equipment, materials or processes also rids the workplace of any risks associated with them.

Substitution

There may be alternative chemicals, machines or processes to accomplish the job but pose fewer hazards to workers. Explore ways to incorporate these alternatives into the job.

Isolation and Other Engineering Approaches

Creating a boundary between a hazard and workers can reduce risk almost as effectively as removing the hazard from the workplace altogether. Limit access to hazards with enclosures, machine guards and physical barriers that reduce the likelihood of exposure to a hazard before turning to controls that rely on a person.

Redesigning equipment and installing new guards (within manufacturer specifications) can remove or redirect hazards away from workers to prevent exposure.

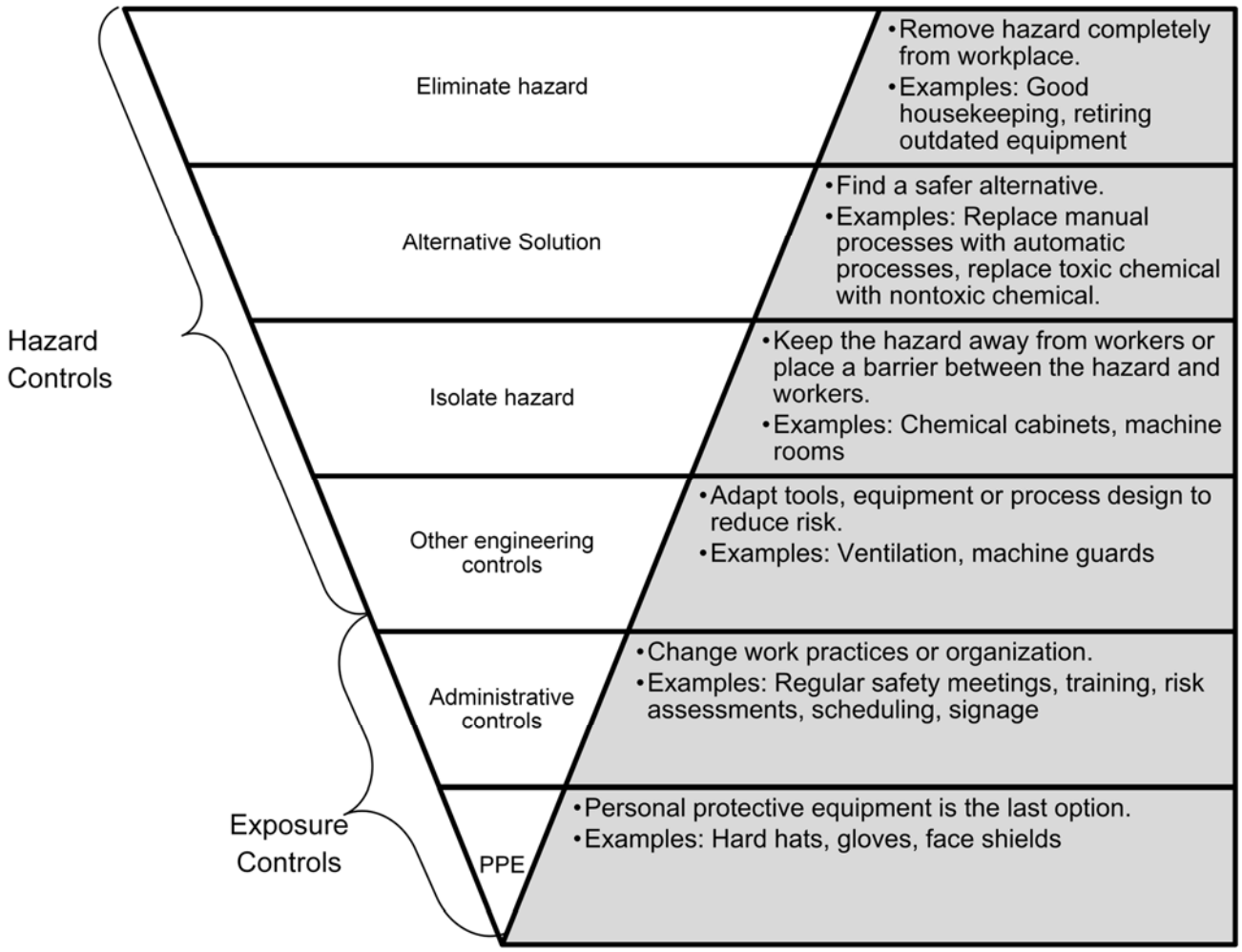
Controlling Exposure

Some jobs and processes demand a level of exposure to some workplace hazards. If this is the case, controlling risk means controlling or eliminating the exposure and the negative effects of exposure.

Administrative or Management Controls

Administrative hazard controls are far-reaching and varied when implemented. These controls rely on appropriate human behavior, which is why they are lower on the hazard control hierarchy than engineering controls. Administrative controls include:

- Policies, procedures and practices to reduce exposure
- Modifying work schedules to reduce exposure
- Monitoring the use of hazardous
- Alarms, signs and warnings
- The buddy system
- Training



Personal Protective Equipment

Personal protective equipment (PPE) is the least effective way to control hazards, but is necessary for some hazardous jobs. The following are examples of when PPE is acceptable:

- When engineering controls are not feasible or do not totally eliminate the hazard
- While engineering controls are being developed;
- When safe work practices do not provide sufficient additional protection
- During emergencies when engineering controls may not be feasible

PPE needs to be chosen carefully to address the hazard, and fitted to the person using it.

Document and Evaluate

By the end of the JHA, there will be a document that clearly outlines the steps to perform the job, the hazards encountered in each step, and appropriate controls that need to be in place to reduce the risk posed by those hazards. This will paint a picture of a process that considers safety from the start to end of the job.

However, unsafe habits have a way of introducing themselves into a process as workers find their "own way" of performing tasks — ways that may not take into account the safety measures identified in the JHA. Further, there may be risks that were not identified or were left insufficiently controlled that may only become evident after the JHA is complete. Monitoring and periodic reviews help ensure the JHA remains current to prevent accidents and injuries.

Document the Safe Job Procedure

Once the analysis is complete, communicate the results to all workers who are, or will be, performing that job. The side-by-side format used in JHA worksheets is not an ideal one for instructional purposes. Use a narrative-style communication format to create a safe job procedure that is easy to understand:

Write in step-by-step format. Each step needs its own paragraph that describes the step as one action.

Point out the hazard: If the step involves exposure to a hazard, point out the hazard in the step. Include the possible injury or illness that could result from unprotected exposure to the hazard.

Identify safety precautions: If the step involves exposure to a hazard, also point out the safety precautions to stay safe and healthy.

Paint a 'word picture': Write the procedure in a way that someone unfamiliar with the task could perform it safely. The safe job procedure can serve as a training document as well as a safety document. Avoid jargon and technical terms so new employees can easily understand the process.

Write in the second person, present tense. Treat the safe job procedure as a set of instructions. Tell the person who is doing the job exactly how to do it.

Write clearly. While it is important to be concise, it is more important to be clear and accurate. Keep sentences short. Clear writing helps make sure all workers can understand the instructions and follow them. If employees speak a language other than English, translate the job procedure into the language they speak so there is as little confusion as possible.

Monitor and Review

Periodically reviewing your JHA ensures it is current and continues to prevent workplace accidents and injuries. Even if the job does not change, unnoticed hazards may become apparent. It is particularly important to review job hazard analyses if an illness or injury occurs.

Based on the circumstances, the job procedure may need to change to prevent similar incidents in the future. If an employee's failure to follow proper job procedures results in a "close call or near miss," discuss the situation with all employees who perform the job and remind them of proper procedures. Any time you revise a job hazard analysis, it is important to train all employees affected by the changes in the new job, procedures or protective measures.

Hazard identification, and risk assessment and control are ongoing processes. Make sure to undertake a hazard identification and risk control analysis whenever there is a change to the workplace, including when work systems, tools, machinery or equipment change, or when the existing process is otherwise potentially out of date or no longer valid.

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Workplace Hazards
- Job Hazard Analysis Worksheet
- Safe Job Procedure Form
- Job Hazard Analysis Training Documentation

WORKPLACE HAZARDS (PAGE 1 OF 2)

Hazard		Description
Slips/Trips/Falls		Conditions that result in falls (impacts) from height or walking surfaces (such as slippery floors, poor housekeeping, uneven walking surfaces, exposed ledges, etc.)
Mechanical	Failure	Self-explanatory; typically occurs when devices exceed designed capacity or are inadequately maintained.
	Caught-in/ Caught-on/Crush	Skin, muscle or body part exposed to crushing, caught-between, cutting, tearing, shearing items or equipment.
Impact	Struck By	Accelerated mass that strikes the body causing injury or death. (Examples are falling objects and projectiles.)
	Struck Against	Injury to a body part due to coming into contact with a surface in where the action was initiated by the person. (An example is when a screwdriver slips.)
Chemical	Toxic	A chemical that exposes a person by absorption through the skin, inhalation, or through the blood stream that causes illness, disease, or death. The amount of chemical exposure is critical in determining hazardous effects. Check Safety Data Sheets (SDS), and/or OSHA 1910.1200 for chemical hazard information.
	Flammable	A chemical that, when exposed to a heat ignition source, results in combustion. Typically, the lower a chemical's flash point and boiling point, the more flammable the chemical. Check SDS for flammability information.
	Corrosive	A chemical that, when it comes into contact with skin, metal, or other materials, causes damage. Acids and bases are examples of corrosives.
Explosion	Chemical Reaction	Self-explanatory.
	Pressurization	Sudden and violent release of a large amount of powder blast/gas/energy due to ignition or a significant pressure difference such as rupture in a boiler or compressed gas cylinder.
Temperature Extreme		Temperatures that result in heat stress, exhaustion, or metabolic slow down such as hypothermia or hyperthermia.

WORKPLACE HAZARDS (PAGE 2 OF 2)

Electrical	Shock/Short Circuit	Contact with exposed conductors or a device that is incorrectly or inadvertently grounded, such as when a metal ladder comes into contact with power lines. 60Hz alternating current (common house current) is very dangerous because it can stop the heart.
	Fire	Use of electrical power that results in electrical overheating or arcing to the point of combustion or ignition of flammables, or electrical component damage.
	Static / ESD	The moving or rubbing of wool, nylon, other synthetic fibers, and even flowing liquids can generate static electricity. This creates an excess or deficiency of electrons on the surface of material that discharges (spark) to the ground resulting in the ignition of flammables or damage to electronics.
	Loss of Power	Safety-critical equipment failure due to a loss of power.
Ergonomics	Strain	Damage of tissue due to overexertion (strains and sprains), work positioning or repetitive motion.
	Human Error	A system design, procedure or equipment that is likely to cause error. (A switch goes up to turn something off).
	Vibration	Vibration that can cause damage to nerve endings, or material fatigue that results in a safety-critical failure.
Radiation	Ionizing	Alpha, Beta, Gamma X-rays and neutral particles that cause injury (tissue damage) by ionization of cellular components.
	Non-Ionizing	Ultraviolet, visible light, infrared, and microwaves that cause injury to tissue by thermal or photochemical means.
Noise		Noise levels that result in hearing damage (an 8-hour time-weighted average greater than 85 decibels) or inability to communicate safety-critical information.
Visibility		Lack of lighting or obstructed vision that results in an error or other hazard.
Weather Phenomena		Self-explanatory.

JOB HAZARD ANALYSIS WORKSHEET (PAGE 1 OF 2)

Department/Project:	Job/Activity:	Step	Hazard(s)	Controls
Date:	Created By:	1)		
		2)		
		3)		
		4)		
		5)		
		6)		
		7)		

JOB HAZARD ANALYSIS WORKSHEET (PAGE 2 OF 2)

Step
8)
9)
10)
11)
12)
Required Training:
Required Personal Protective Equipment:
Special Inspection Requirements:
Please attach any diagrams, flowcharts, or photographs that may be helpful in hazard assessment.

SAFE JOB PROCEDURE

DO NOT undertake this job unless a supervisor has instructed you in the safe use of all equipment and appropriate safety precautions for work processes associated with the job. Any employee who undertakes this job must have explicit supervisor permission to do so.

Job Performed	
Potential Hazards	

Personal Protective Equipment

						
Hand Protection	Respiratory Protection	Eye Protection	Face Protection	Special Footwear	Hearing Protection	Special Clothing

Other (Specify)	

Safe Work Procedures (attach additional sheets if necessary)

Pre-Operation	
Operation	
Post-Operation	

Competent Personnel
These individuals are permitted to perform the job and supervise others learning to do this job

Name		Title		Contact	
Name		Title		Contact	

JOB HAZARDS TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name:	**Signature:**

POLICY

Aversa Bros Industrial Contractors has implemented this policy for the protection of our employees during emergencies in the workplace. Frank Aversa will supervise the Emergency Action Plan.

The Company will have a written Emergency Action Plan (EAP). The EAP will be posted in the workplace and remain available to employees for review, along with the names and job titles of every person in the chain of command during emergencies.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Aversa Bros Industrial Contractors to:

- Ensure adequate workplace safeguards against hazards, including appropriate exit routes, fire alarms, and fire protection systems
- Ensure development and implementation of the EAP
- Ensure training of employees in accordance with this policy

EMPLOYEE RESPONSIBILITIES

Every employee is expected to:

- Report fires or other emergencies
- Follow the EAP

TRAINING

Aversa Bros Industrial Contractors will ensure every employee is provided training on emergency planning. This training will be provided at no cost to the employee and held during their working hours.

Training will be provided:

- At the time of assignment
- When the employee's responsibilities under the Plan change
- When any element of the Plan is changed
- At least annually thereafter, annual training for all employees will be provided within one year of their previous training

The Company will provide additional training when tasks or procedures are added or changed that may affect the employee’s work. It is acceptable for additional training to be limited to addressing only the changes or additions to the employees’ exposure.

Aversa Bros Industrial Contractors will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training Components

Frank Aversa will ensure all employees are informed and trained in the following minimum elements for the Emergency Action Plan and Fire Protection Program:

- Fire hazards at the worksite
- Means of controlling or removing fire hazards at the worksite
- Procedures for reporting a fire or other emergency
- Procedures for emergency evacuation for all areas of work, including type of evacuation and exit route assignments
- Safe assembly areas designated for all work areas in the event of evacuation
- Procedures to be followed by employees who are requested to remain to operate critical plant operations before they evacuate, if applicable
- Procedures to account for all employees after evacuation
- Procedures to be followed by employees performing rescue or medical duties
- The members in the chain of command who may be contacted by employees for information about the plans or for an explanation of their duties under the plans
- Proper operation of fire extinguishers provided by the company if the EAP allows employees to fight incipient stage fires rather than evacuate
- The hazards involved in incipient stage firefighting. Employees are instructed to ensure the local emergency response service (Fire Department) is notified before attempting to extinguish any fire, and that if a fire is not immediately extinguished, or the fire recurs to evacuate immediately

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

Emergency Action Plan

Aversa Bros Industrial Contractors is committed to providing a safe workplace and ensuring procedures are in place to protect employees in the event of any emergency. Accordingly, Aversa Bros Industrial Contractors will ensure there is an Emergency Action Plan, written and available to employees, that includes:

- Procedures for reporting a fire or other emergency
- Procedures for emergency evacuation, including type of evacuation and exit route assignments
- Procedures to account for all employees after evacuation

- Procedures to be followed by employees performing rescue/medical duties and operating critical plant operations
- The name or job title of every employee from whom other employees can find out more about the plan

Employee Involvement

The continued development and thorough implementation of the EAP is a company-wide effort that demands concerted effort of management and all employees. Accordingly, employees will be involved in every step of the EAP from planning to training to implementation in an emergency.

Frank Aversa, or an approved designate, will review the EAP with all employees to verify they understand procedures to be followed in an emergency.

Employees will report or remedy workplace hazards and unsafe work practices as soon as they may do so safely.

Possible Workplace Emergencies

In the planning and implementation of the company's EAP, employees will consider the range of emergencies that may require response and develop contingencies that respond to the unique workplace impact of these emergencies.

Weather

Weather-related events include hurricanes, tornadoes, blizzards, floods and severe storms. Supervisors must communicate unexpected schedule changes because of severe weather to employees as quickly as possible. Such events may result in a loss of power or communication and may limit the ability of first-responders to respond quickly.

Medical

Medical emergencies are the most likely workplace emergency. Response time is critical to a positive outcome during a severe medical emergency. Onsite medical first responders will know first aid and CPR, but no employee will perform first aid beyond their training or capability. If first aid trained, personnel are not available, stop any bleeding with firm pressure (avoiding contact with body fluid) and in case of choking, clear the air passages. In the event of a medical emergency, it is imperative to call 911 promptly.

Threat of Violence

Threats of violence can come through a range of modes of communication, directed at a single employee, a group of employees or the entire workplace. Every threat is serious. If you receive or are aware of a threat of violence, contact a supervisor immediately, if you are able to do so safely. Please see the chapter on "Workplace Violence Prevention" for more information about how to prevent and respond to threats of violence and violence in the workplace.

Fire

The fire prevention plan requires involvement of all employees to prevent fire emergencies. Response to a fire emergency depends on whether your workplace has decided to allow all employees or some employees to fight incipient-stage fires. Supervisors may have to serve as evacuation wardens, and if the emergency action plan demands it, an employee may need to shut down critical operations before evacuation. A quick, orderly evacuation accompanied by a call to 911 is the acceptable response to an out-of-control fire.

Explosion

If there are flammable substances at your worksite, take extra care during planning to address the hazards they present. Explosions do not offer any warnings, and often, panic presents the biggest obstacle to safety in the wake of such a disaster. Further, explosions often accompany fires, adding complexity to fire response planning.

Earthquake

When an earthquake strikes, the greatest risks come from above, collapsing ceilings and falling objects can severely injured workers. If the workplace is in an earthquake-prone location, consider earthquake drills and make sure you and your coworkers know to protect their head and neck under sturdy furniture or against an inside wall. A severe earthquake will occupy emergency workers, and onsite rescue and triage may be a task that falls into the hands of supervisors or members of the safety committee, if applicable. No employee should perform first aid or attempt rescue beyond training or capacity to do so safely.

CHAIN OF COMMAND

During an emergency, it's critical that employees understand the chain of command in the emergency action plan. In addition to the chain of command, it's also important to recognize that the authority of local emergency response officials, like members of the fire department, supersedes the authority of any Aversa Bros Industrial Contractors employee.

Emergency Scene Commander

Unless precluded by unforeseen contingencies, Frank Aversa will act as the scene commander in the event of a workplace emergency. Aversa Bros Industrial Contractors will determine whether an emergency exists, oversee procedures during an emergency, and notify and coordinate with outside emergency services.

Emergency Scene Coordinators

The emergency action plan requires the worksite to have enough people trained to assist in the evacuation of employees and assist the safety coordinator/emergency scene commander. The number of scene responders depends on the number of employees, the size and complexity of the worksite and the hazards posed by likely emergencies.

Table 3 provides a good guideline when considering how many coordinators will be necessary to implement the EAP. Scene coordinators should know CPR and first aid and would benefit from additional safety training, including workplace violence response. Their duties in an emergency include, but are not limited to the following:

- Checking for employees who may be unable to evacuate
- Knowing who may need assistance during evacuation and how to assist them
- Coordinating emergency activities
- Using their knowledge of workplace, escape routes and hazards to perform a swift, safe evacuation
- Verifying all employees are in designated safe areas following an evacuation

TABLE 3

Number of Emergency Scene Responders for Typical Workplaces		
Employees in Workplace	**Emergency Scene Commander**	**Emergency Scene Coordinator**
11-19	1	1
20-49		1-2
50-99		2-5
100-249		5-12
250+		12+

Emergency Reporting Procedures

Employees must report emergencies as quickly as they may do so safely. Emergencies may be reported through manual pull stations or other alarm systems. If the EAP requires employees to call Frank Aversa or other assigned staff, those numbers will be posted at every phone. Major emergencies demand an immediate call to 911 to prevent damage, injury or death. After the report of an emergency, the alarm system will notify employees about the emergency.

WORKPLACE EVACUATION

The EAP will include a floor diagram with arrows to designate exit route assignments based on location within the building. There need be secondary routes and exits whenever possible. It is important every employee knows the building's exit routes and keeps them free of obstacles and debris at all times. For more information about exit routes, please see the floor diagram and consult "Exit Routes" in this chapter.

Evacuation Assistance

Scene coordinators or other assigned personnel will act as evacuation wardens to ensure employees move from danger to safety during an emergency. An employee designated to assist in evacuations will need to know which employees need extra assistance and be trained and prepared to offer this assistance. Further, any visitors on premises may need assistance during evacuations. It is useful to implement a system to account for visitors, like a sign-in sheet, to promote facility security and account for everyone in case of an emergency.

Services During Evacuation

Workplaces with equipment and processes that take time to shut down or with systems that may pose a hazard if not shut down may include, as part of the EAP, a partial evacuation procedure. The roles of those performing critical operations during evacuation must be clear, and anyone left behind must be able to recognize when to abandon the task and evacuate. The same goes for workplaces that plan for employees to fight incipient-stage fires.

Accounting for Employees

The emergency action plan requires Aversa Bros Industrial Contractors to account for employees after an evacuation. Employees will gather in an established assembly area (or areas) after an evacuation. After the evacuation is complete, Frank Aversa or an approved designate, will perform a headcount and note the names and last known whereabouts of anyone missing. Accuracy in accounting for employees during an evacuation is vital to prevent a dangerous search-and-rescue operation if one is not needed. Procedures need to include a way to account for visitors, customers and suppliers who are onsite as well.

Sheltering in Place

Not every emergency requires evacuation. Certain contaminants and disasters present greater hazards outside than inside. If an emergency does not require evacuation, it may demand employers instead “shelter-in-place.” Frank Aversa will determine the extent of evacuation, and whether employees need to shelter in place. Sheltering in place means taking refuge in an interior room with no or few windows until the emergency has passed. In many cases, local authorities will issue advice to shelter-in-place via TV or radio. In case of chemical release, special precautions to protect against toxic atmospheres may be necessary. Including shelter-in-place preparations in the EAP demands a means of alerting employees in distinguishable ways and additional training on shelter-in-place procedures.

First Aid and Rescue

Aversa Bros Industrial Contractors will ensure that local fire, police and other emergency medical personnel are available and trained to provide assistance. In the absence of those resources, at least one person on staff will be trained to render first aid. An amount and dispersal of first aid supplies appropriate to the size of the facility, number of employees and hazards present will remain readily available. First aid supplies will be added or replaced as frequently as necessary to ensure availability. Facilities for rinsing or drenching eyes or body will be provided as hazards demand. First Aid kits will include or will be accompanied by appropriate personal protective equipment for anticipated hazards, including exposure to blood borne pathogens for personnel while performing first aid. More information is available in the chapters titled “Medical Services and First Aid” and “Bloodborne Pathogens.”

Critical Information

As part of the personnel file, there will be a record of emergency contact information for employees, in case an employee is unable to contact someone for themselves. The confidential record should include physician information and any other medical information the employee shares for use in case of an emergency.

Multi-Employer Workplaces

If the company shares a building or worksite with other employers, consider working with them to develop a building-wide emergency plan. If a building-wide plan is not feasible, take all necessary steps to ensure the EAP does not conflict with the plans of other employers in the building.

PERSONAL PROTECTIVE EQUIPMENT

During some emergencies, it is necessary for an employee to encounter hazards that require personal protective equipment. A medical emergency involving blood, for instance, will call for gloves as indicated in the bloodborne pathogen exposure control plan. Training, preparation and procedures will include consideration for any necessary PPE.

EXIT ROUTES

During an emergency, swift evacuation can ensure the safety and well-being of employees. In an emergency that requires employees to evacuate, Aversa Bros Industrial Contractors will adhere to all applicable regulations to ensure safe exit routes remain available to employees in case fire or other emergency demands evacuation of the workplace.

Basic Requirements

An exit route must be established and separated by fire resistant materials as quickly as possible during construction, and a safe means of egress must be maintained during renovation and demolition.

If the route connects three or fewer floor levels, construction materials separating the exit from other parts of the workplace must have a one-hour of fire resistance rating. (More stories call for a two-hour resistance rating.) An opening to an exit will only have self-closing, laboratory-tested fire doors as necessary to allow passage of individuals through the established route.

Enclosure and protection of openings for means of passage must occur as soon as possible after exterior walls/windows are in place.

Adequate Exit Routes

Aversa Bros Industrial Contractors will ensure sufficient exit routes for the workplace. While a single exit route is permissible in small workplaces with possible safe evacuation, two exit routes, located as far as practical from each other helps employees evacuate safely if one exit route is blocked. There will be enough exit routes to ensure safe evacuation of all employees.

Consult local codes to ensure safe means of passage in any construction. Exit stairways and means of egress in multi-level buildings must be provided immediately after floor decking is installed. In new multi-level buildings, one of the exit stairs may be obstructed for construction, but do not obstruct exit stairs for more than two contiguous floor levels.

Exit Discharge

Exits must discharge outside or to a space with access to the outside that is large enough to accommodate the number of people taking that route. For stairs that continue past the evacuation level, there will be indication of proper direction to discharge area.

Unlocked, Side-Hinged

Under no circumstances will an exit door be locked from the inside. Nothing can restrict the use of an exit door or any means of egress established in the fire protection plan in an emergency.

All exit doors will be side-hinged, with doors that swing out in the direction of exit travel, and rooms designed to hold more than 50 people or in a high-hazard area.

Capacity and Size Requirements

Exit routes must be able to handle the maximum occupant load for that floor. The capacity may not decrease as the route approaches the exit discharge.

The ceiling of an exit route must be at least seven feet six inches high. Any projection from the ceiling must not reach a point less than six feet eight inches from the floor.

An exit access must be at least 28 inches wide at all points. Where there is only one exit access leading to an exit or exit discharge, the width of the exit and exit discharge must be at least equal to the width of the exit access. The width of an exit route must be sufficient to accommodate the maximum permitted occupant load of each floor served by the exit route.

Objects that project into the exit route must not reduce the width of the exit route to less than the minimum width requirements for exit routes.

Outdoor Exit Routes

An outdoor exit route must be protected by guardrails if a fall hazard is present; covered or protected from slipping hazards; reasonably straight, smooth, solid and level; and free of dead ends longer than 20ft.

Minimize Dangers

Exit routes will be unobstructed and clear of hazardous materials or flammable furnishings. An exit route that goes toward a high hazard area requires barriers or partitions to provide a suitable shield from the hazard for workers.

Lighting and Marking

Exit routes must be adequately lit, clearly visible and marked by a sign reading “EXIT.” Decorations and signs must not obstruct or obscure the visibility of the exit door. If a doorway could be mistaken for an exit, it must be marked “Not an Exit” or a sign that identifies its use. If the direction to the exit is not apparent, signs must be posted to indicate the direction for evacuation.

Exit signs must be lighted and comply with the NFPA requirements.

Construction, Repairs, Alterations

Employees may not occupy any workplace during construction, repairs or alterations unless all exit routes and required safety standards are maintained. The Company will ensure removal of or appropriately minimize hazards beyond normal conditions during construction activities.

FORMS

On the following pages, please find the Emergency Action Plan form, which may be reproduced freely by the Company Aversa Bros Industrial Contractors for the purposes of implementing and maintaining a safety and health program.

EMERGENCY ACTION PLANS (PAGE 1 OF 4)

Company Name				Job Location			
Street		City		State		ZIP	
Prepared By		Title			Phone		
Signature					Date		

Purpose

This plan is for the safety and well-being of company employees. It identifies necessary management and employee actions during fires and other emergencies. Education and training are provided so that all employees know and understand the Emergency Action Plan.

Location of Plan

The Emergency Action Plan can be found at the station or office of	
Upon request, an OSHA representative may obtain a copy of the plan from	

Exit Routes

Draw a diagram of jobsite or facility exit routes in space below. Locate meeting place or “Roll-Call” area on diagram

EMERGENCY ACTION PLANS (PAGE 2 OF 4)

Accounting for Employees			
After exiting jobsite or facility, all employees are to assemble for “Roll-Call” at this location Note location on exit route diagram			
The following are responsible for ensuring that employees comply with this requirement			
Name		Title	
Name		Title	

Critical Operations	
To minimize damage from the emergency, the following personnel are responsible for shutting down the listed critical operations	
Personnel Names	Critical Operations
As soon as shutdowns are completed, the employees who performed critical operations must take the nearest exit route in accordance with general emergency procedures.	

Rescue and Medical Duties		
The following personnel are certified and trained in both CPR and general first aid		
Name	Title	Phone Number

EMERGENCY ACTION PLANS (PAGE 3 OF 4)

Reporting Emergencies		
The following personnel have the duty of contacting public responders to come to the emergency scene. The personnel are listed in descending order of availability		
Name	Title	Phone Number

Alarm Systems and Notification of Emergencies	
In the event of a workplace or facility emergency, employees will be notified as follows	

Types of Evacuation	
OSHA requires this Company to have an established system of types of evacuation to follow for different emergency circumstances. The following listing represents Company policy for various emergency situations	
PARTIAL EVACUATION: Code Yellow – 3 rings or horn blasts RESPONDERS (trained extinguisher personnel and trained rescue and medical personnel)	
FULL EVACUATION: Code Red – 4 rings or horn blasts: RESPONDERS (n/a)	
NOTE: If there is more than one evacuation type, the alarm signal for each must be distinctive.	
Other (describe)	

EMERGENCY ACTION PLANS (PAGE 4 OF 4)

Public Emergency Response Information	
911 emergency services DO / DO NOT cover the area this Emergency Action Plan covers. (circle one)	
Local Police Department	
Local Fire Department	
Local Ambulance/EMS	
Local Hospital	

Further Information	
For further information or explanation about any duties under this Plan, contact	
Name	Title

This Emergency Action Plan is authorized and approved by (Name and Title)		
Name (print)	Signature	Title

POLICY

Safety incidents indicate the failure of safety control systems and demand changes to prevent future harm. In order to implement necessary changes and prevent future harm, Aversa Bros Industrial Contractors will investigate accidents and near misses to identify causes and make safety recommendations.

The primary purpose of workplace accident investigations performed by Aversa Bros Industrial Contractors is to find facts to guide future actions, not to find fault or assign blame.

Fatalities must be reported to OSHA within eight hours. Serious accidents where an employee is admitted to a hospital for treatment or observation because of injuries suffered from a workplace accident must be reported to OSHA within 24 hours.

If an employee with an occupational injury or illness receives a medical emergency procedure, Frank Aversa or designate will document the incident on OSHA's Form 301, "Injury and Illness Incident Report," and record the injury or illness on OSHA's Form 300, "Log of Work Related Injuries and Illnesses." See "29 CFR 1904.7 — Recordkeeping Forms and Recording Criteria" for more information.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Aversa Bros Industrial Contractors to:

- Provide accident investigation training
- Require that every accident is investigated to find and remedy the root causes
- Respond promptly to any recommendation following an accident
- Take corrective actions to prevent the recurrence of an accident
- Avoid blaming individuals in incident investigations for safety purposes
- Report to the appropriate authority, as required by law, any fatality, injury or work-related illness
- Share with employees the findings of accident investigations
- Review these accident investigation procedures and this policy annually and revise as necessary

EMPLOYEE RESPONSIBILITIES

Every Aversa Bros Industrial Contractors employee is expected to:

- Immediately report any work-related accident, injury, or near miss
- Actively cooperate with investigators during accident investigations
- Participate in recommending changes to processes, systems, and the workplace, and in helping to implement changes as necessary to prevent future accidents

TRAINING

Aversa Bros Industrial Contractors will ensure all employees are provided training on their role in the accident investigation process. This training will be provided at no cost to the employee during working hours.

Aversa Bros Industrial Contractors will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training Components

Frank Aversa will ensure that all employees at Aversa Bros Industrial Contractors are informed and trained in the following minimum elements for accident investigation:

- What an accident is and why accidents occur
- What a near-miss is
- How to report an accident
- A general overview of the accident investigation process
- Why accident investigations are important, and the purpose of them
- Different levels of causes for accidents

Managers and supervisors will complete training in the following minimum elements for accident investigation:

- Learning the legal requirements of accident reporting
- Securing an accident scene
- Planning an accident investigation
- Collecting information from an accident scene
- Conducting interviews as part of an accident investigation
- Photographing and sketching an accident
- Creating a timeline of an accident
- Learning root-cause analysis techniques
- Compiling accident investigation reports
- Recommending change to prevent accidents

Training Records

The company will retain training records for three years from the date on which the training occurred.

The following information must be included:

- Dates of the training
- Contents or a summary of the training
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training

PROCEDURE

It is easy to think of an accident simply as a single event that results in injury or illness to an employee, or in property damage. In reality, an accident is the culmination of a series of events. Accidents are the end of an unplanned, unintended and undesired process. They are complex, and in some industries exceedingly rare, often with several events that can be identified as causes.

It is also easy to think of accidents as being the result of poor chance or fate. However, a competent person can examine workplace conditions, behaviors, and underlying systems to predict what kind of accidents will occur. There is certainly an element of chance in every incident. However, most accidents can be prevented by eliminating and controlling workplace hazards.

A serious accident may result in disability, severe property damage or even death; a minor accident may only cause an inconvenience; near misses may not harm anyone or anything. However, nearly all accidents and near misses point to failures in safety systems that demand a closer look to prevent more harm in the future.

Investigations

An accident investigation may have different purposes, including:

- Identifying and describing the actual course of events
- Identifying the direct and root causes / contributing factors of the accident
- Identifying risk-reducing measures to prevent future, comparable accidents
- Investigating and evaluating the basis for potential criminal prosecution
- Fulfilling legal requirements or processing workers' compensation claims
- Evaluating the question of guilt in order to assess the liability for compensation

Police, insurance investigators and safety regulators may investigate an accident for other reasons, but Aversa Bros Industrial Contractors accident investigations emphasize finding the root causes of the accident to prevent future accidents from happening again.

Investigators are interested in not only individual harmful events, but also the events, systems, and processes that led to the accident. Accident investigations need to determine exactly what happened, but more importantly, must look for deeper causes — the how and why.

Incidents that don't involve injury or property damage will still be investigated to determine which hazards need to be corrected. The same principles apply to a quick inquiry of a minor incident, and to the more formal investigation of a serious event.

Procedures for Accident Investigations

The best time to develop accident investigation procedures is before the accident occurs.

The plan will include procedures that determine:

- Who to notify when an accident occurs
- Who may notify outside agencies (fire, police, etc.)
- Who will conduct investigations

- Who will maintain recordkeeping documents
- What training is required for accident investigators
- Who receives and acts on investigation reports
- Timetables for conducting hazard correction

At Aversa Bros Industrial Contractors, pre-accident investigation planning is a team effort between supervisors and Frank Aversa. Nevertheless, there are some key steps to help ensure an accident investigation will accomplish its goal of preventing future incidents. See Figure 1 for an outline of the general steps of an accident investigation.

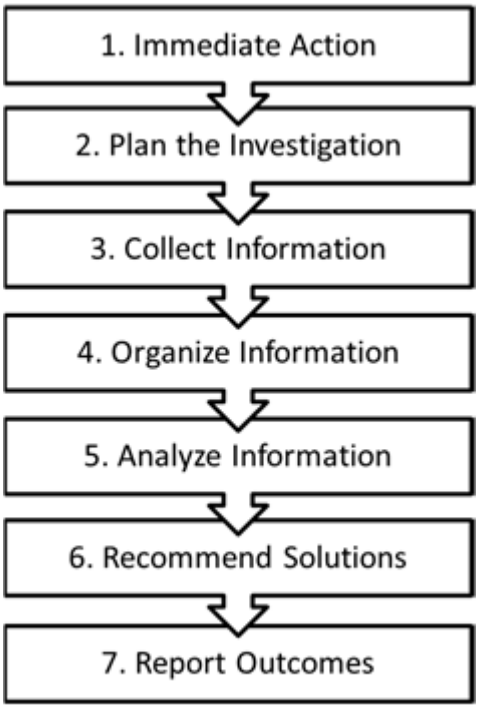


Figure 1

IMMEDIATE ACTION

Secure Accident Scene

The first action to take at an accident scene is to prevent further injuries and make the area safe. Administer first aid (or ensure it is administered) or summon appropriate emergency responders as necessary.

Sometimes, an investigation can begin while the victim is being assisted by emergency responders. However, the priority is always taking care of the victim, and usually investigations don't begin until emergency response is completed. Material evidence will most likely not be in its original location, but effective interviews can shed light on the scene at the time of the accident.

At this point, gathering as much pertinent information as possible for later analysis takes priority over determining the cause of the accident, but the top priority must always be the safety and well-being of workers and the public.

Preliminary Investigation

It is important to start the investigation as soon as possible. Significant elapsed time between the accident and the investigation can lead to a deterioration of evidence and undermine the accuracy of the investigation.

Material Evidence

There is a temptation to clean up the accident scene immediately so people can get back to work, but an effective procedure will protect material evidence for the investigation.

It is important to secure the scene of an accident quickly and effectively. Tape, rope, cones, or even personnel, can secure the accident scene.

Plan Investigation

Most investigation planning should happen well in advance of an accident. However, some details of the investigation can only be seen after the fact. The nature of the accident will determine the extent of the investigation, the resources that will be needed, what types of investigative processes will be required, who will need to be interviewed, etc.

Build Team

Ideally, someone experienced in accident causation and investigative techniques will conduct accident investigations. An investigator who is also fully knowledgeable of the work processes, procedures, peoples, and general work environment of a particular situation will be able to shed some light on the causes of the accident.

In most cases, the supervisor will help investigate, together with the safety coordinator and/or whoever is in charge of worksite inspections.

Other members of the team can include:

- Employees with knowledge of the work
- A union representative, if applicable
- Employees with experience in investigations
- An impartial expert from outside the company

It's important the team represent a variety of expert perspectives on workplace safety and the job being performed when the accident happened. However, everyone on the team needs to be trained in appropriate investigative techniques and not be involved in any disciplinary proceedings that might emerge out of the incident, if possible.

It is important to keep the safety-related aspect of the investigation separate from any possible disciplinary action. Accident investigations will always focus on identifying safety failures and remedying them promptly.

COLLECT INFORMATION

The next step is to gather useful information about what directly and indirectly contributed to the accident. When collecting information to understand an incident or accident, consider all possible sources.

Photograph and Video

Photographs and video recording can help in the preparation of a report, as well as in analyzing conditions at the site of the incident. Take photographic evidence as soon as safely possible.

Following are some techniques useful in taking photographs at incident scenes:

- Photograph the overall area before moving to detail the precise incident site
- Take photos from different perspectives and angles—close-up and from a distance
- Use witnesses to help you decide what to shoot, and note their comments

- Record what photos you take in a log that includes details like when the shot was taken, by whom, where, what the shot contains, identifying number on a sketch of the area, and a brief description of what the photograph is trying to identify
- Keep the photos in a safe place along with notes, evidence, and sketches from the accident investigation
- Narrate video with details like those above

Sketch Scene

Sketches complement information in photos or video, indicating distances among elements of the accident scene. It is important to be as precise as possible when making sketches.

Following are some things to remember:

- Make sketches large and clear
- Include basic facts (date, time, location, identity of objects, victims, etc.)
- Define spatial relationships with identifiable points of reference and compass directions
- Include important measurements, and note key concepts
- Indicate what has been included in photographs
- Mark where people were standing

Eventually, a precise diagram can reflect the information in a sketch, but it is important to get as much information as possible immediately after the accident.

Interview Witnesses

Interviewing witnesses is the easiest way to gain an understanding of how the accident occurred, and the conditions that led to it. Witnesses include people who saw the incident, such as any injured people, and others whose behavior, actions and/or inactions— either intentionally or unintentionally—contributed to the incident. This can include supervisors and trainers, maintenance personnel, and anyone else tied to the investigation.

When interviewing, it is important to remember emotions can run high in the wake of an accident, especially a catastrophic one. The accident investigation is a cooperative effort to create a safer workplace by gathering and understanding information. Keep an open mind and listen with a calm, relaxed, unhurried demeanor.

- Use a voice recorder only with permission; if possible, offer a copy of the recorded conversation, or a transcription, to the interviewee
- Express to the individual that the information given is important, but put the person at ease. Explain the purpose of the interview and your role. Express sincere concern regarding the accident and your desire to prevent a similar occurrence
- Interview witnesses separately, and ensure witnesses can discuss the incident with you in relative privacy where possible. Don’t promise confidentiality though
- Take the witness to the scene if they are comfortable. If you can’t conduct a private interview at the location, find an office or meeting room that the interviewee considers a "neutral" location

- Allow witnesses to have a support person present, but ensure the support person is not directly linked to the incident and is not a witness. If there is a collective bargaining agreement, and a worker requests union representation, do not continue the interview until representation has been secured
- Direct an eyewitness to "explain what happened" in their own words. If you don't ask them to explain, you may be left with a simple "Yes" or No" response, which is not as helpful. Open-ended questions elicit much more information than closed-ended questions. "Why" questions can put an interviewee on guard. Look for facts and observations; ignore speculation
- Take notes casually, but with care. Allow the interviewee to review notes of the interview to ensure accuracy and help bring details to mind. Give the interviewee a copy of the notes you take to help reduce any thought that you're trying to conceal information
- Repeat the facts and sequence of events back to the person to avoid misunderstanding, and to establish the correct version of events
- Request interviewees to offer their own suggestions as to how the incident could have been avoided
- Conclude interviews by thanking interviewees for their contribution. Ask them to contact you if they think of anything else. If possible, tell witnesses personally of the outcome of the investigation before it becomes public knowledge

Consult Records

When searching for information, investigations will continue after evaluating the scene of the accident, collecting physical evidence and interviewing the people involved. Documents related to the incident can provide incredible insight into the causes of an accident; especially root causes.

Some examples of useful documents include:

- Technical data sheets
- Inspection reports
- Company policies
- Maintenance reports
- Past accident reports
- Job hazard analyses and safe-work procedures
- Training records and reports
- Work schedules
- Injury and illness logs
- Any other document that may shed light on the safety-related systems in place where the accident took place

Determining the causes of the accident based on available information may be difficult because events must be analyzed not only to identify direct causes for the accident, but also related root causes. "Surface" causes can be obvious. However, it may take a great deal of additional time to unearth weaknesses in management systems, or other root causes that contributed to the conditions and practices associated with the accident.

ORGANIZE AND ANALYZE THE FACTS

Develop Sequence of Events

When all of the evidence is collected, and all the interviews are complete, a timeline of the accident should emerge. Each event on the timeline describes an actor and an action. The actor effects change through action or inaction. Actors do not have to be personnel. Equipment or processes can affect the system to precipitate an accident.

When developing the sequence of events, do not hesitate to stretch the timeline further back as deeper causes begin to emerge. Accidents often result from long-term oversights and failures that have taken some time to have a negative impact.

If gaps in the timeline are apparent, they need to be filled in. If re-interviewing witnesses or investigating the evidence fails to fill the gaps, develop an “educated guess” supported by the rest of the timeline and available evidence.

The sequence of events must describe what happened in such a way that someone unfamiliar can understand what likely happened.

Determine the Causes

When the timeline is established, the next step is to determine the causes of the accident. The key question for an investigator to establish cause is “Why?” Why did an unsafe condition emerge in the workplace? Why did the worker end up exposed to the unsafe condition? Determining the root causes of an accident requires asking “Why?” over and again.

Implement Solutions

Although an accident investigation can be a reactive safety process, it typically ends in recommendations for effective control strategies and system improvements that will help prevent similar accidents in the future.

WRITE THE REPORT

An accident or incident investigation aims to create systemic change and ensure everyday safeguards remain in place to reduce risk and promote safety in the workplace. However, the information uncovered in the investigation, and recommendations that come from the investigation, need to be available to people with authority. A report that includes the pertinent information about the causes of an incident, as well as concrete recommendations, helps the investigation to positively affect the safety culture of Aversa Bros Industrial Contractors.

Please see the “Accident/Incident Report” at the end of this chapter for an example template for an incident report.

Background: This section of the report covers the basic information about the accident: when and where the accident occurred, who was involved, etc.

Description: The description of the incident is a timeline of the incident, a step-by-step narrative of what occurred. The incident and the findings of the investigation will determine how far before and after the incident itself, the narrative should stretch. Include enough information to give a person who was not there a clear understanding of the accident. Be specific. Include a diagram of the event.

Findings: Report results of the root-cause analysis with complete thoughts, not short notes. Remember to describe both hazardous conditions and unsafe actions. Findings need to include direct and indirect surface causes. Findings must also clearly outline the root causes of the accident and frame recommendations. Remember, the point of the investigation is not to assign blame. Findings will describe unsafe actions of individuals, but any lack of hazard controls, or deficient safety systems, at the organizational level is what the report aims to remedy.

Recommendations: Recommendations can only be as effective as the findings on which they are based. In the report, recommendations need to be specific and help those in authority take the first steps to implement the recommendations. Include who will be responsible to implement the recommendations, a timeline, and estimated cost—if that can be determined.

Summary: Review the causes of the accident and the corrective steps that are recommended.

Review and Follow-up: This can be included as part of the recommendations. Necessary changes require a system of accountability. Suggesting a specific timeframe and identifying individuals with appropriate authority to enact recommendations will drive the needed changes. Incorporating accident follow-up and accountability is a useful way to build widespread accountability for the types of safety system changes workplace accidents often demand.

Attachments: Be sure to include with the report the notes from interviews, as well as photographs and any other pertinent information and evidence from the investigation.

REPORTING ACCIDENTS

Aversa Bros Industrial Contractors will investigate all lost-time injuries. Any fatality, or the hospitalization of three or more employees, must be reported to OSHA within eight hours.

Effective January 1, 2015 any accidents resulting in hospitalization, amputation, and eye loss must be reported within 24 hours (amputations do not include avulsions, enucleations, deglovings, scalpings, severed ears, or broken/chipped teeth.)

Employees will report all accidents and near-miss incidents that result in personal injury, property damage, chemical spills or other emergencies to the assigned supervisor at the time of the event. In addition, emergency medical services, the fire department, and hazmat services will be immediately summoned as needed.

NOTE: Effective Jan. 1, 2017, OSHA will require certain employers to electronically submit injury and illness data that they are already required to record on their onsite Injury and Illness forms.

The new reporting requirements will be phased in over two years:

Establishments with 250 or more employees in industries covered by the recordkeeping regulation must submit information from their 2016 Form 300A by July 1, 2017. These same employers will be required to submit information from all 2017 forms (300A, 300 and 301) by July 1, 2018. Beginning in 2019 and every year thereafter, the information must be submitted by March 2.

Establishments with 20-249 employees in certain high-risk industries must submit information from their 2016 Form 300A by July 1, 2017, and their 2017 Form 300A by July 1, 2018. Beginning in 2019 and every year thereafter, the information must be submitted by March 2.

For a complete list of industries that fall into the “high risk” category, please refer to the compliance section of the following OSHA web location: osha.gov/recordkeeping/finalrule/index.html

OSHA's Form 300, 300A and 301

Unless a company is in a low-hazard industry (see list at right) or employs 10 or fewer individuals, all recordable injuries and illnesses must be recorded appropriately. See 1904.7 — Recordkeeping Forms and Recording Criteria.

If an employee with an occupational injury or illness receives a medical emergency procedure, Frank Aversa or designate will document the incident on OSHA’s Form 301 “Injury and Illness Incident Report” and record the injury or illness on OSHA’s Form 300 “Log of Work Related Injuries and Illnesses.” within seven (7) calendar days of receiving information that a recordable injury or illness has occurred.

Yearly, OSHA’s form 300A “Summary of Work-Related Injuries and Illnesses,” will be completed based on the information in form 300 and posted between February 1 and April 30 of the year following the year covered by the form.

FORMS AND ATTACHMENTS

Please find the documents listed below on the following pages:

- Accident/Incident Report
- Accident Investigation Training Documentation

These forms may be reproduced freely by Aversa Bros Industrial Contractors for the purpose of implementing and maintaining a safety and health program.

OSHA reporting forms and work-related injury and illness logs are available at:

http://www.osha.gov/recordkeeping/new-osha300form1-1-04.pdf

ACCIDENT/INCIDENT REPORT FORM (PAGE 1 OF 3)

Date of Accident	Time	Day of Week	Shift	Department
		☐ S ☐ M ☐ T ☐ W ☐ T ☐ F ☐ S	☐ 1 ☐ 2 ☐ 3	

Injured Person

Name				Address	
Age		Phone			
Job Title			Supervisor Name		
Length of Employment at Company			Length of Employment at Job		
Employment Classification	☐ Full Time ☐ Part Time ☐ Contract ☐ Temporary				

Nature of Injury	☐ Bruising	☐ Dislocation	☐ Other (specify)	Injured Body Part
☐ Strain/Sprain	☐ Scratch/Abrasion	☐ Internal		
☐ Fracture	☐ Amputation	☐ Foreign Body	Remarks	
☐ Laceration/Cut	☐ Burn/Scald	☐ Chemical Reaction		

Treatment	Name and Address of Treating Physician or Facility
☐ First Aid	
☐ Emergency Room	
☐ Doctor's Office	
☐ Hospitalization	

Damaged Property

Property, Equipment, or Material Damaged	Describe Damage
Object or Substance Inflicting Damage	

ACCIDENT/INCIDENT REPORT FORM (PAGE 2 OF 3)

Incident Description	
Describe what happened (attach photographs or diagrams if necessary)	
Make sketches or illustrations to help describe incident	

ACCIDENT/INCIDENT REPORT FORM (PAGE 3 OF 3)

Root Cause Analysis (check all that apply)		
Unsafe Acts	Unsafe Conditions	Management Deficiencies
☐ Improper work technique ☐ Safety rule violation ☐ Improper PPE or PPE not used ☐ Operating without authority ☐ Failure to warn or secure ☐ Operating at improper speeds ☐ Bypassing safety devices ☐ Guards not used ☐ Improper loading or placement ☐ Improper lifting ☐ Servicing machinery in motion ☐ Horseplay ☐ Drug or alcohol use ☐ Unnecessary haste ☐ Unsafe act of others ☐ Other:	☐ Poor workstation design/layout ☐ Congested work area ☐ Hazardous substances ☐ Fire or explosion hazard ☐ Inadequate ventilation ☐ Improper material storage ☐ Improper tool or equipment ☐ Insufficient knowledge of job ☐ Slippery conditions ☐ Poor housekeeping ☐ Excessive noise ☐ Inadequate hazard guards ☐ Defective tools/equipment ☐ Insufficient lighting ☐ Inadequate fall protection ☐ Other:	☐ Lack of written policies and procedures ☐ Safety rules not enforced ☐ Hazards not identified ☐ PPE unavailable ☐ Insufficient worker training ☐ Insufficient supervisor training ☐ Improper maintenance ☐ Inadequate supervision ☐ Inadequate job planning ☐ Inadequate hiring practices ☐ Inadequate workplace inspection ☐ Inadequate equipment ☐ Unsafe design or construction ☐ Unrealistic scheduling ☐ Poor process design ☐ Other:

Accident/Incident Analysis	
Using the root-cause analysis list, explain the cause(s) of the incident in as much detail as possible. Attach a sheet if there is not enough room.	
How bad could the accident have been?	☐ Very Serious ☐ Serious ☐ Minor
What is the chance of the accident happening again?	☐ Frequent ☐ Occasional ☐ Rare

ACCIDENT/INCIDENT REPORT FORM

Recommendations and Follow Up			
Describe actions that will be taken to prevent recurrence (attach another sheet if necessary)	Deadline	By Whom	Complete

Summary

Investigation Team		
Name	Signature	Position

POLICY

Aversa Bros Industrial Contractors is committed to the safety and health of our employees and to ensuring prompt medical attention for any injury that occurs at work.

Part of that commitment includes having readily available medical personnel. Where there is no medical facility close to the worksite, Frank Aversa and other personnel as needed will be trained to provide first aid. First-aid kits are located at: Trucks/Shops

Aversa Bros Industrial Contractors will provide, at no cost, medical services for employee evaluations, employment requirements and special conditions of work.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Aversa Bros Industrial Contractors to:

- Verify that all employees receive training that explains the first-aid response plan
- Determine who must be trained to render first aid and ensure every employee expected to render first aid will be trained in appropriate practices and techniques, including response to site-specific hazards
- Check that the first-aid response plan, amount of first-aid-trained personnel, first-aid equipment and all other hazard controls protect against the workplace hazards as determined in job hazard analyses and worksite inspections
- Check that first-aid kits remain fully stocked and any emergency response equipment is in good repair
- Respond to recommendations and concerns from Aversa Bros Industrial Contractors employees

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Follow the first-aid policy and the first-aid response plan
- Understand the hazards presented by “Good Samaritan” first aid response

TRAINING

Aversa Bros Industrial Contractors will ensure every employee receives training that covers the Aversa Bros Industrial Contractors first-aid response plan. All personnel expected to render first aid will be certified by an approved first-aid training organization. All training for workplace safety will be provided at no cost to the employee during working hours.

Aversa Bros Industrial Contractors will provide training:

- At the time of assignment to tasks where occupational exposure may take place.
- At least annually thereafter, annual training will be provided within one year of previous training.

Aversa Bros Industrial Contractors will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The training program for medical services and first aid will contain at a minimum the following elements:

- Location and contents of workplace first-aid kits
- “Good Samaritan” hazards and bloodborne pathogens
- Self-care and incident reporting

The person conducting the training will be knowledgeable in the subject matter of the training program as it relates to the workplace.

Any Aversa Bros Industrial Contractors employee who is expected to render first aid as part of his or her job duties, will receive additional training from an external organization (e.g. American Heart Association, American Red Cross, and the National Safety Council) including, but not limited to:

- Recommended first-aid practices, especially those that may be necessary for hazards specific to the Aversa Bros Industrial Contractors workplace
- Bloodborne pathogen exposure control
- Cardiopulmonary resuscitation incorporating use of automated external defibrillators (if present at worksite)

If a third-party first aid training provider is unable to provide first aid training specific to hazards at Aversa Bros Industrial Contractors, first aid responders require supplementary training over the appropriate response to injuries that may result from worksite-specific hazards.

Potential First Aid Training Elements

OSHA suggests a number of elements to include when planning first-aid training programs.

Teaching Methods

Training programs will incorporate the following principles:

- Basing the curriculum on a consensus of scientific evidence where available
- Having trainees develop “hands-on” skills through the use of mannequins and partner practice
- Having appropriate first-aid supplies and equipment available
- Exposing trainees to acute injury and illness settings as well as to the appropriate response through the use of visual aids
- Including a course information resource for reference both during and after training
- Allowing enough time for emphasis on commonly occurring situations
- Emphasizing skills training and confidence-building over classroom lectures
- Emphasizing quick response to first-aid situations

First Aid Training Elements

The training program will include instruction in repositioning ill/injured victims to prevent further injury.

Preparing to Respond to a Health Emergency

The training program will include instruction or discussion in the following:

- Prevention as a strategy in reducing fatalities, illnesses and injuries
- Interacting with the local EMS system
- Maintaining a current list of emergency telephone numbers (police, fire, ambulance, poison control) accessible to all employees
- Understanding the legal aspects of providing first-aid care, including Good Samaritan legislation, consent, abandonment, negligence, assault and battery, State laws and regulations
- Understanding the effects of stress, fear of infection, panic; how they interfere with performance; and what to do to overcome these barriers to action
- The importance of universal precautions and body substance isolation to provide protection from bloodborne pathogens and other potentially infectious materials
- Learning about personal protective equipment — gloves, eye protection, masks, and respiratory barrier devices
- Appropriate management and disposal of blood-contaminated sharps and surfaces; and awareness of OSHA's Bloodborne Pathogens standard 29 CFR 1910.1030

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Aversa Bros Industrial Contractors will maintain employee-training records for the length of their employment.

First aid training courses provided to Aversa Bros Industrial Contractors employees will include instruction in general and workplace hazard-specific knowledge and skills.

First-aid trained employees will repeat training periodically to maintain and update knowledge and skills.

First Aid Response Planning

Frank Aversa, working with management, will determine a first-aid response plan appropriate to the worksite.

The first-aid response plan can be incorporated into the emergency action plan and will:

- Fit the work location, type of work and environmental conditions
- Identify the police, fire and emergency medical services available, and determine their estimated response times to the worksite
- Verify they are trained to handle the types of emergencies that can be expected
- Verify that their contact numbers are posted at the work site
- Describe the type of first-aid training employees receive, if applicable
- Identify the location(s) of first-aid supplies and/or first-aid station
- Identify the contents of first-aid kits
- Describe how first-aid supplies, kits and equipment will be inspected and maintained
- List all first-aid trained employees

Sharing First Aid Response Plan Information

First-aid policies and procedures are most effective when they are in writing. Whether in writing or not, the first-aid response plan needs to be communicated in such a way that every worker, can understand and follow the plan.

IMPLEMENTATION

Hazard Assessment

A job hazard analysis (see chapter on “Job Hazard Analysis”) will define the extent and nature of first-aid training for a given job and determine the first-aid supplies that need to be available.

First Aid Kits

First-aid supplies will remain available in adequate quantities and be readily accessible at Trucks/Shops.

Frank Aversa or a designated person will determine the types and quantities of kits and additional first-aid equipment and supplies required at the work site to accommodate larger operations or multiple operations.

Responding to Medical Emergencies

A wide variety of medical emergencies can occur in the workplace; however, they can be divided into two categories, life threatening and non-life threatening. It’s important for Aversa Bros Industrial Contractors first aid providers to be trained to deal with situations as they arise, and to be able to recognize the severity of the emergency. Medical emergencies can include, but are not limited to:

- Chest pain
- Impalements
- Electrocution
- Breathing problems
- Hypoglycemia in diabetics taking insulin
- Pregnancy complications
- Reduced level of consciousness
- Stroke
- Crushing
- Severe bleeding
- Anaphylactic reaction
- Seizures
- Abdominal injury

Assessing the Scene and the Victim(s)

The top priorities of first aid providers when responding to a medical emergency are"

- Assessing the scene for safety, number of injured, and nature of the event
- Assessing the toxic potential of the environment and the need for respiratory protection
- Establishing the presence of a confined space and the need for respiratory protection and specialized training to perform a rescue
- Prioritizing care when there are several injured
- Assessing each victim for responsiveness, airway patency (blockage), breathing, circulation, and medical alert tags
- Taking a victim's history at the scene, including determining the mechanism of injury
- Performing a logical head-to-toe check for injuries
- Continuous monitoring of the victim
- Early activation of EMS
- Safely moving and rescuing victims

RESPONDING TO LIFE-THREATENING EMERGENCIES

First aid training will be designed for the specific worksite and include first-aid instruction for the management of the following:

Breathing Problems

The training program will be designed or adapted for the specific worksite and may include first-aid instruction in the following:

- Establishing responsiveness
- Establishing and maintaining an open and clear airway
- Performing rescue breathing
- Treating airway obstruction in a conscious victim
- Recognizing asphyxiation and the danger of entering a confined space without appropriate respiratory protection

Additional training is required if first-aid personnel will assist in the rescue from the confined space.

Poisoning

- Ingested poisons: alkali, acid, and systemic poisons. Role of the Poison Control Center (1-800-222-1222)
- Inhaled poisons: carbon monoxide; hydrogen sulfide; smoke; and other chemical fumes, vapors, and gases. Assessing the toxic potential of the environment and the need for respirators
- Knowledge of the chemicals at the worksite and of first aid and treatment for inhalation or ingestion
- Effects of alcohol and illicit drugs so that the first-aid provider can recognize the physiologic and behavioral effects of these substances

Physical Injuries

Aversa Bros Industrial Contractors first aid providers will be able to:

- Recognize the signs and symptoms of shock and provide first aid for shock due to illness or injury
- Assess and treat a victim who has an unexplained change in level of consciousness or sudden illness
- Control bleeding with direct pressure

Sudden Cardiac Arrest

Cardiopulmonary Resuscitation

OSHA standards require training in cardiopulmonary resuscitation (CPR) in some employment situations where sudden cardiac arrest from asphyxiation, electrocution or exertion may occur: permit-required confined spaces; logging operations; electric power generation, transmission, and distribution; dive teams; and power transmission and distribution construction. However, sudden cardiac arrest is a potential risk at all worksites and those trained in first aid benefit greatly from learning CPR regardless of work hazards.

Automated External Defibrillators

Aversa Bros Industrial Contractors will determine the need for an automated external defibrillator (AED) program as part of the first-aid response plan. Training will reflect whether an AED is included.

If an AED is available at the worksite, CPR training will incorporate AED training.

Corrosive Materials, Strong Irritants or Toxic Chemicals

If a job hazard analysis determines hazards from corrosive materials, strong irritants or toxic chemicals, the Aversa Bros Industrial Contractors first-aid plan will include appropriate hazard controls. These controls include eye irrigation equipment, eyewash stations and emergency showers.

Even worksites without high-risk levels from corrosives, irritants and toxic chemicals may find eye-irrigation equipment and eyewash equipment appropriate to address workplace hazards. Be aware that some state requirements and specific chemical safety procedures require such equipment on worksites. Where such requirements exist, Aversa Bros Industrial Contractors will adhere to applicable workplace safety and health regulations, and industry best practices.

At construction jobsites, employers must provide a sanitary washing facility for every 20 employees. At jobsites where employees work with paint, coatings, or any substance that may be harmful, the facilities must include suitable cleaning agents/towels for the removal of hazardous and other substances.

Bloodborne Pathogens

If an employee is designated to render first aid as part of his or her job duties, or if they may otherwise be exposed to the hazard of bloodborne pathogens, the employee must meet the requirements of 29 CFR 1910.1030, Bloodborne Pathogens, and must be trained accordingly. Additional requirements may also apply. Please see the chapter on “Bloodborne Pathogens” for more information.

Employees who have not received first-aid training need to understand the hazards presented by delivering first aid to a coworker. While Aversa Bros Industrial Contractors discourages the administration of first aid by any employee who has not been trained in first aid, “Good Samaritan” first-aid delivery is a possibility if necessary.

RESPONDING TO NON-LIFE-THREATENING EMERGENCIES

First aid training will be designed for the specific worksite and include first-aid instruction for the management of the following:

Wounds

- Assessment and first aid for wounds including abrasions, cuts, lacerations, punctures, avulsions, amputations and crush injuries
- Principles of wound care, including infection precautions
- Principles of body substance isolation, universal precautions and use of personal protective equipment

Burns

- Assessing the severity of a burn
- Recognizing whether a burn is thermal, electrical, or chemical and the appropriate first aid
- Reviewing corrosive chemicals at a specific worksite, along with appropriate first aid

Temperature Extremes

- Exposure to cold, including frostbite and hypothermia
- Exposure to heat, including heat cramps, heat exhaustion and heat stroke

Musculoskeletal Injuries

- Fractures
- Sprains, strains, contusions and cramps
- Head, neck, back and spinal injuries
- Appropriate handling of amputated body parts

Eye Injuries

- First aid for eye injuries
- First aid for chemical burns

Mouth and Teeth Injuries

- Oral injuries; lip and tongue injuries; broken and missing teeth
- The importance of preventing aspiration of blood and/or teeth

Bites and Stings

- Human and animal bites
- Bites and stings from insects; instruction in first-aid treatment of anaphylactic shock

RECORD KEEPING

All safety and health incidents and near misses will be documented and investigated according to the policy on “Accident Investigation.” This includes prompt notification to OSHA of fatalities and may include other reporting requirements.

PROGRAM REVIEW

Frank Aversa will review the first-aid response plan and all elements at least annually to ensure all elements sufficiently address the safety needs of Aversa Bros Industrial Contractors and its employees. Recommended first-aid techniques and knowledge change over time, and Aversa Bros Industrial Contractors policy will reflect those changes.

FORMS AND ATTACHMENTS

On the following page, please find a First-Aid Response Plan form that you can use to create your companies plan

FIRST AID RESPONSE PLAN FORM (PAGE 1 OF 2)

Company		Date	
This plan was written for (site or location this plan covers)			
The following person/position is responsible for managing our first-aid response plan			
The emergency medical service to be called			
Summon the emergency medical service by doing the following (in most cases, it will be to call 911 or some other phone number, but a direct alarm or some other method may be the preferred way)			
Emergency phone numbers are posted at the following location(s)			
Other means to summon aid are at the following location			
When employees need first aid they must do the following			
Employees on site who are first-aid trained			

FIRST AID RESPONSE PLAN FORM (PAGE 2 OF 2)

First-aid kits (or a first aid station) are located at	
The following person/position is responsible for inspecting the first-aid kits	
The Company's Designated Medical Provider is	

Person Preparing Plan	Signature	Date
Supervisor's Name	Signature	Date

POLICY

Aversa Bros Industrial Contractors is committed to the safety and health of our employees and to preventing the spread of bloodborne pathogens. Therefore, Aversa Bros Industrial Contractors adheres to the following bloodborne pathogen policy and Exposure Control Plan (ECP).

Bloodborne pathogens are diseases caused by microorganisms that live in the bloodstream and are spread through blood and other body fluids. Bloodborne pathogens include the human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV). HIV compromises the body's immune functions and can lead to acquired immunodeficiency syndrome. While the virus does not live out of the body for long, it can enter the bloodstream through cuts, abrasions, small tears in mucous membranes, etc. Hepatitis affects the health of the liver.

Bloodborne pathogens can be transmitted through any bodily fluid, and employees must take care when they are near, or are exposed to, possible contaminants, in order to prevent the spread of bloodborne infections.

If employees, such as those designated as responsible for first aid and medical assistance, or those doing work in certain medical or sanitation facilities, are exposed to bloodborne pathogens, will use universal precautions that requires them to treat all human blood and certain human body fluids as if they were known to be infectious. This includes the use of appropriate gloves, mask and/or gowns.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Aversa Bros Industrial Contractors to:

- Enact and enforce an exposure control plan to prevent occupational exposure to potentially infectious materials
- Identify employees who may reasonably be anticipated to come into contact with blood and other potentially infectious materials
- Provide for post-exposure evaluation and follow-up if an employee is exposed to potentially infectious materials
- Verify employees receive appropriate bloodborne pathogens training
- Check that there's an adequate supply of Personal Protective Equipment

EMPLOYEE RESPONSIBILITIES

Every employee is expected to:

- Offer input on ECP as appropriate, including identification, evaluation, and selection of new control methods
- Follow all elements of the bloodborne pathogens policy and training
- Notify a supervisor if they encounter any problems or concerns related to this policy

TRAINING

Aversa Bros Industrial Contractors will ensure every employee who may reasonably anticipate coming into occupational exposure to potentially infectious materials, participate in a bloodborne pathogen training program. This training will be provided at no cost to the employee during working hours.

Training will be provided:

- At the time of assignment to/prior to working on tasks where occupational exposure may take place
- At least annually thereafter

Aversa Bros Industrial Contractors will provide additional training when tasks or procedures are added or changed that affect the employee's occupational exposure. It is acceptable for additional training to be limited to addressing only the changes or additions to the employees' exposure.

The Company will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The training program will contain, at a minimum, the following elements:

- A general explanation of bloodborne diseases
- An explanation of the modes of transmission of bloodborne pathogens
- An explanation of the methods for recognizing tasks and other activities that could cause exposure to blood and other potentially infectious materials
- An explanation of methods to prevent or reduce exposure, including engineering controls, work practices, and personal protective equipment
- Information on the types, proper use, location, handling, decontamination and disposal of PPE
- Information on the hepatitis B vaccine, the benefits of being vaccinated and that the vaccine and vaccination will be offered free of charge to employees who face occupational exposure
- Information on the actions to take and persons to contact in an emergency involving blood or other potentially infectious materials
- An explanation of the procedures to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available
- Information on the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident
- An explanation of the applicable signs, labels, and/or color coding

The training will be conducted by a person knowledgeable in the subject matter.

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

PROCEDURES

Exposure Determination

It is crucial to determine what jobs expose an employee to blood and other potentially infectious material, as well as how that exposure might occur. Accordingly, management will determine which job classifications can reasonably expect occupational exposure to potentially infectious material.

The following will be determined and documented:

- Job classifications in which all employees have occupational exposure
- Job classifications in which some employees have occupational exposure
- Tasks and procedures in which occupational exposure occurs

Further, input from non-managerial employees exposed to contaminated sharps and infectious material is vital to the success of this exposure control plan, and every employee is encouraged to offer suggestions that will help the effectiveness of the exposure control plan.

Methods of Compliance

Employees will take universal precautions to prevent contact with potentially infectious material. If an employee can't easily determine the nature of a body fluid, he or she must treat it as infectious.

Engineering and Work Practice Controls

As part of this exposure control plan, Aversa Bros Industrial Contractors will seek methods by which to eliminate occupational exposure to the greatest extent possible. This plan encourages work task changes to reduce exposure, as well as for isolating or removing materials that might pose a hazard. The exposure control plan requires the Company to examine regularly, and maintain or replace, engineering controls to ensure their effectiveness.

Handwashing

- Aversa Bros Industrial Contractors will provide readily accessible handwashing facilities to every employee. If providing handwashing facilities is not feasible, the Company will provide antiseptic towelettes or an appropriate antiseptic hand cleanser in conjunction with clean cloth/paper towels.
- For construction projects, employers must provide onsite general washing facilities (one per 20 employees), keep them in sanitary condition and provide suitable cleaning agents/towels for the removal of hazardous and other substances.
- In addition to basic workplace hygiene requirements, employees will wash their hands as soon as possible after removing gloves or other PPE.
- If an employee's skin or mucous membrane were exposed to potentially infectious materials, the employee will immediately wash their skin with soap and water or flush their mucous membranes with water.

Sharps

- Employees will handle and dispose of contaminated sharps in a way that prevents unnecessary exposure to hazards. Employees will not bend, recap or remove contaminated sharps unless no alternative is feasible and the employee can accomplish any bending, recapping or needle removal using a mechanical device or one-handed technique.
- As soon as possible after use, contaminated reusable sharps will be placed in a container that is puncture resistant, labeled or color-coded appropriately, leak-proof on the sides and bottom, constructed in a manner that does not require employees to reach into it to use it.

Other Engineering and Work-Practice Controls

- Employees may not eat, drink, smoke, apply cosmetics or handle contact lenses where occupational exposure may occur.
- No food or drink is to be stored where potentially infectious materials are present.
- Employees may not use their mouths to pipette or suction potentially infectious materials.
- Containers used to store or transport potentially infectious materials must be closable, prevent leaks and be appropriately labeled or color-coded. They should also be puncture resistant, if necessary.
- Employees will examine any equipment that may be contaminated before servicing or shipping, and will decontaminate it as necessary and feasible. If decontamination is impossible, the employee will attach a label to the equipment, and inform all appropriate personnel of the contamination to ensure they take proper precautions.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Where the possibility of occupational exposure exists, Aversa Bros Industrial Contractors will provide personal protective equipment appropriate to the hazards and the work being performed. Appropriate personal protective equipment is impermeable to blood or other potentially infectious material under normal conditions and durations of use
- PPE will be provided free to employees and available in appropriate sizes, and provisions will be made for employees who are allergic to gloves normally provided
- An employee may decline using appropriate PPE under “rare and extraordinary circumstances” when PPE use might prevent the delivery of health care or public safety services. These exceptions will be investigated and documented to prevent future occurrences
- PPE will be removed as soon as feasible before leaving the general work area. After removal, the employee will place contaminated PPE in an appropriate area or container to be stored, washed, decontaminated or disposed of

Gloves

Employees must wear gloves if they anticipate hand contact with potentially infectious materials. Do not reuse single-use gloves, and replace as quickly as possible if torn, punctured or otherwise compromised.

Masks, Eye Protection, and Face Shields

Employees will wear masks, together with proper eye-protection devices whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose or mouth contamination can be reasonably anticipated.

Gowns, Aprons, etc.

Employees will wear appropriate protective clothing like gowns or clinic jackets when appropriate; the type of protective clothing is determined by the nature of exposure, and will be sufficient to protect against occupational exposure.

HOUSEKEEPING

- Employees will keep the workplace clean and sanitary. Aversa Bros Industrial Contractors will implement a written schedule for cleaning and decontamination based on the demands of the site
- Employees will use an appropriate disinfectant to clean and decontaminate contaminated or potentially contaminated work surfaces after any spill of infectious materials, and at the end of the work shift. Aversa Bros Industrial Contractors will replace protective surface coverings as soon as possible if they are contaminated. Bins, cans, pails or other receptacles that may become contaminated must be inspected and decontaminated regularly, in addition to being decontaminated as soon as feasible after visible contamination. Employees must not pick up, by hand, any broken glassware that may be contaminated. Use a brush/dustpan or tongs

LAUNDRY

Employees will handle any contaminated laundry as little as possible. They must put such laundry into a color-coded or labeled container at the site where it was used. Place wet laundry in a leak-proof container. Employees handling contaminated laundry must use appropriate PPE. Employees must never take or wear contaminated clothing outside of the work site.

HEPATITIS B VACCINATION

Aversa Bros Industrial Contractors will make available the hepatitis B vaccination series at no cost to any employee who faces occupational exposure. If not vaccinated, employees will be informed of the opportunity to be vaccinated within 24 hours of an exposure incident.

An employee occupationally exposed to potentially infectious material may decline the hepatitis B vaccine, but must sign a declination statement to be kept on file. Anyone who declines vaccination may request and receive the vaccination later at no cost.

Medical records relating to employees' hepatitis B vaccination status and post-exposure evaluation and follow-up must be kept for 30 years plus the duration of employment.

If an exposure incident occurs, the employee must contact Frank Aversa (or designate), immediately.

In Case of Exposure

A licensed health care professional will conduct a confidential medical evaluation and follow-up, and will provide a medical opinion on diagnosis/course of action, as soon as possible following an exposure incident. After administering initial first aid (cleaning the wound, flushing the eyes or other mucous membranes, etc.), follow the procedure below:

1. Document the routes of exposure and how the exposure occurred.

2. Identify and document the source individual (unless the employer can establish that identification is infeasible or prohibited by state or local law).

3. Obtain consent, and arrange to have the source individual tested as soon as possible, to determine HIV, HCV and HBV infectivity, document and notify the employee's health care provider of the source individual's test results. If the source individual is known to be HIV, HCV and/or HBV positive, new testing is not necessary.

4. Provide the exposed employee with the source individual's test results and with information about applicable disclosure laws and regulations concerning the identity and infectious status of the source individual (e.g., laws protecting confidentiality).

5. After obtaining consent, collect the exposed employee's blood as soon as feasible after an exposure incident, and test the blood for HBV and HIV serological status. This will establish a baseline for periodic testing over the next six months. Depending upon the circumstances of the exposure, post-exposure prophylaxis may be recommended to reduce the risk of infection from HIV or HBV.

6. If the employee does not give consent for HIV serological testing during collection of blood for baseline testing, preserve the baseline blood sample for at least 90 days; if the exposed employee elects to have the baseline sample tested during this waiting period, perform testing as soon as feasible.

Administrative Responsibilities Following Exposure

The Company will ensure that the health care professional responsible for post-exposure evaluation and follow-up receives the following:

- A copy of OSHA's bloodborne pathogens standard
- A description of the employee's job duties relevant to the exposure incident
- Route(s) of exposure
- Circumstances of exposure
- Results of the source individual's blood test if possible
- Relevant employee medical records, including vaccination status
- The Company will provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation

Counseling

The Company will make post-exposure counseling available to employees following an exposure incident. Counseling should include Centers for Disease Control and Prevention (CDC) recommendations for prevention and transmission of bloodborne infections including HIV, HBV and HCV. Counseling must be made available regardless of the employee's decision to accept serological testing.

RECORDKEEPING

Medical Records

The Company will maintain a confidential medical record for every employee with occupational exposure that will include at least the following:

Figure 1

- Name and social security number of the employee
- Copy of the employee's HBV status (with dates of all Hep B vaccinations)
- Copy of all post-exposure documentation and healthcare professional's written opinion
- Copy of the information provided to the healthcare professional

Do not share or report this record unless the employee provides written consent

Sharps Injury/Exposure Incident Log

A Sharps Injury Log is a record of each exposure incident involving a sharp. The purpose of the Sharps Injury Log is to generate a record of exposure incidents that will include enough information about the cause of the incidents to allow the company to analyze them and take preventive action.

The Sharps Injury Log must include:

- The date and time of the sharps-related exposure incident
- The type and brand of the sharp involved in the incident
- A description of the incident including:
  - The job classification of the exposed employee
  - The department or work area where the incident occurred
  - The procedure being performed
  - How the incident occurred
  - The body part injured
  - For sharps with engineered sharps injury protection (ESIP), if the safety mechanism was activated
  - If the incident occurred before action, during activation or after activation of the mechanism. For sharps without ESIP, the employee's opinion if ESIP could have prevented the injury

Sharps injuries/exposures must be recorded on the log within 14 working days of when the incident was reported to the employer. The Sharps Injury Log must be maintained for five years from the date of the occurrence of the exposure incident.

HAZARD COMMUNICATION

Label containers of regulated biological waste, any container used to store or transport potentially infectious material, as well as contaminated equipment, to prevent exposure. Labels for such containers will include the legend depicted in Figure 1.

All such labels will be fluorescent orange or orange-red and be attached on, or as close as feasible to, the container.

REVIEW AND UPDATE OF EXPOSURE CONTROL PLAN (ECP)

Management will review this ECP and update it at least annually, and whenever necessary, to reflect new or changed tasks and procedures that affect occupational exposure.

Reviews and updates will:

- Reflect changes in technology that eliminate or reduce exposure to bloodborne pathogens
- Document the annual consideration and implementation of effective medical, and commercially available, devices and services designed to eliminate or minimize occupational exposure

The Company will seek the input of non-managerial employees to identify, evaluate and select controls to reduce occupational exposure. This input will be documented as part of this ECP.

FORMS AND ATTACHMENTS

Please find the following documents on the pages below:

- Exposure Control Plan Documentation
- Declination Statement
- Exposure Incident Report
- Evaluating Physician’s Written Opinion
- Sharps Injury Log

These forms may be reproduced freely for the purposes of implementing and maintaining a safety and health program.

EXPOSURE CONTROL PLAN DOCUMENTATION FORM

Exposure Determination	
Jobs in which all employees have occupational exposure to potentially infectious materials	Task or procedure where exposure occurs
Jobs in which some employees have occupational exposure to potentially infectious materials	Task or procedure where exposure occurs
Engineering Controls and Work Practice Controls	
The following types of PPE are available in the following locations	
Personal Protective Equipment	Location

HEPATITIS B DECLINATION STATEMENT FORM

DECLINATION STATEMENT

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Employee Signature		Date	

DECLINATION STATEMENT

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Employee Signature		Date	

DECLINATION STATEMENT

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.

Employee Signature		Date	

EXPOSURE INCIDENT REPORT FORM (PAGE 1 OF 2)

(Routes and Circumstances of Exposure Incident) – Please Print					
Employee's Name				Date	
Date of Birth			SS#		
Telephone	Business		Home		
Job Title					
Date of Exposure		Time of Exposure		☐ AM ☐ PM	
Hepatitis B Vaccination Status					
Location of Incident					
Describe job duties you were performing when the exposure incident occurred					
Describe the circumstances under which the exposure incident occurred (What happened that resulted in the incident?)					
What body fluid(s) were you exposed to?					

EXPOSURE INCIDENT REPORT FORM (PAGE 2 OF 2)

What was the route of exposure? (e.g., mucosal contact, contact with non-intact skin, percutaneous)			
Describe any personal protective equipment in use at time of exposure incident			
Did PPE fail?	☐ Yes ☐ No	If yes, how?	
Identification of source individual(s) (names)			
Other pertinent information			

EVALUATING PHYSICIAN'S WRITTEN OPINION FORM

To the Evaluating Physician:

This employee may have suffered an exposure incident to a Bloodborne Pathogen. In accordance with OSHA standards, covering post-exposure evaluation and follow up, the following documents are provided for you:

- A copy of OSHA regulations covering Occupational Exposure to Bloodborne Pathogens
- A description of the exposed employee's duties as they relate to the exposure incident
- Documentation of the routes of exposure and circumstances under which exposure occurred
- Results of the source individual's blood testing, if available
- All medical records relevant to this employee's appropriate treatment, including vaccination status

---

After you have determined whether there are contra-indications to vaccination of this employee with Hepatitis B vaccine, please state in the space below if:

Vaccine was indicated	Vaccine was received	
(All other findings are to remain confidential and are not to be included on this page)		
Please return this sheet to this employee		
Thank you for your evaluation of this employee.		
Physician's name (printed)	Physician's signature	Date

SHARPS INJURY LOG

Facility/Location				Year	
Address					
City		State		ZIP	

Date	Time	Type, Brand, Model of Sharp Device	Department / Work Area	Description of How Incident Occurred

(Retain at least 5 years)

POLICY

Aversa Bros Industrial Contractors encourages a safe and healthy work environment. Verbal or physical intimidation, harassment, threats of violence or any violent acts are expressly forbidden. A person who makes threats of violence, exhibits threatening behavior, or engages in violent acts on Aversa Bros Industrial Contractors property will be removed from the premises as quickly as safety permits and will be kept off premises pending the outcome of an investigation.

Aversa Bros Industrial Contractors is committed to preventing acts of violence and intimidation. Aversa Bros Industrial Contractors has adopted a system of controls to prevent workplace violence, mitigate the harm caused by it and otherwise address violence and harassment in the workplace.

Frank Aversa is responsible for implementing and enforcing this policy and will do so with the assistance of management and all employees.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Aversa Bros Industrial Contractors to:

- Ensure managers remain committed to preventing aggression and violence
- Document plan to control aggressive or violent behavior in the workplace
- Evaluate reports of workplace violence at least yearly to determine necessary changes to violence prevention policy
- Ensure job hazard analyses include workplace violence hazards
- Exhibit commitment to the safety and health of workers and customers
- Ensure employees understand and fulfill obligations under the violence prevention program
- Establish a program to address medical and psychological repercussions of workplace violence
- Enforce prohibition on sexual harassment

EMPLOYEE RESPONSIBILITIES

Aversa Bros Industrial Contractors employees are expected to:

- Contribute to developing procedures to address concerns over safety and security
- Understand and comply with the workplace violence prevention program, and safety and security measures
- Report violent incidents promptly and accurately
- Refrain from hostile and violent acts
- Participate in safety and health committees or teams that receive reports of violent incidents or security problems, make facility inspections and respond with recommendations for corrective strategies
- Participate actively in training programs and share on-the-job experiences that cover techniques to recognize escalating agitation, aggressive behavior or criminal intent

TRAINING

Aversa Bros Industrial Contractors will provide training to employees regarding their roles in workplace violence prevention. This training will come at no cost to the employee during working hours.

Aversa Bros Industrial Contractors will use only training material that is appropriate in content and vocabulary to the educational level, literacy and language of employees.

Training Components

Frank Aversa will ensure that every employee is trained in the following elements:

- The workplace violence prevention policy
- Risk factors that cause or contribute to assaults
- Early recognition of escalating behavior or recognition of warning signs or situations that may lead to assaults
- Ways to prevent or diffuse volatile situations, manage anger and appropriately
- A standard response action plan for violent situations, including the availability of assistance, response to alarm systems and communication procedures
- Ways to deal with hostile people in the workplace
- Relaxation, stress management and anger control
- Basic self-protection measures
- The location and operation of safety devices such as alarm systems, along with the required maintenance schedules and procedures
- Ways to protect oneself and coworkers, including use of the “buddy system”
- Policies and procedures for reporting and recordkeeping
- Information on multicultural diversity to increase staff sensitivity to racial and ethnic issues and differences
- Policies and procedures for obtaining medical care, counseling, workers’ compensation or legal assistance after a violent episode or injury
- The sexual harassment policy

Managers and Supervisors at Aversa Bros Industrial Contractors will be trained in:

- The Company’s Workplace Violence Prevention Program
- Communication skills
- Recognition of aggressive behavior
- Dealing with employee layoffs, job terminations, and discipline; how to assess violence potential of individuals; and take appropriate measures
- Violence prevention, Aversa Bros Industrial Contractors security and response procedures
- Addressing problems and conflict promptly

Any employee engaged in a task that faces a high risk of workplace violence (e.g. working alone, especially late at night) will be trained for workplace safety practices specific to the worksite that reduce the risk of workplace violence.

Where Aversa Bros Industrial Contractors operations require security personnel, such personnel will receive training specific to the worksite, including the psychological components of handling aggressive and abusive customers, types of disorders and ways to handle aggression and defuse hostile situations.

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

PROCEDURES

Workplace Violence

Workplace violence includes violence or the threat of violence against workers. It can occur at or outside the workplace and can range from threats and verbal abuse to physical assaults and homicide. For this policy, workplace violence also includes aggressive behavior, workplace harassment, bullying and intimidation.

Aversa Bros Industrial Contractors permits no workplace violence. No negative action will be taken against an employee for reporting any hazardous situation, and appropriate confidentiality considerations will be taken in every instance of such a report.

High-Risk Occupations

Workplace violence is a hazard at any worksite for every worker. Some workers, however, are at significantly increased risk, including workers who:

- Exchange money with the public
- Deliver passengers, goods, or services
- Work alone or in small groups, during late night or early morning hours, in high-crime areas, or in community settings and homes with extensive contact with the public

Any Aversa Bros Industrial Contractors employee, who faces an increased risk of workplace violence, will be informed of the increased risk, and trained in appropriate practices based on a job hazard analysis of the job. Please see “Workplace Risk Factors” later in this chapter.

Types of Workplace Violence

Type I Criminal Intent: The perpetrator has no legitimate relationship to the business or its employees and may be committing a crime in conjunction with the violence. These crimes can include robbery, shoplifting, trespassing and terrorism.

Type II Customer Client: The perpetrator has a legitimate relationship with the business and becomes violent while being served by the business. This category includes customers, clients, patients, students, inmates, and any other group for which the business provides services.

Type III Worker on Worker: The perpetrator is an employee or past employee of the business who attacks or threatens another employee(s) or past employee(s) in the workplace.

Type IV Personal Relationship: The perpetrator usually does not have a relationship with the business but has a personal relationship with the intended victim. This category includes victims of domestic violence assaulted or threatened while at work.

Horseplay

Horseplay includes playing tricks on coworkers; distracting coworkers; wrestling; showing off; playing punching, kicking, or slapping games; and otherwise drawing focus away from the task to engage in a playful way that disregards safety precautions. Horseplay creates unnecessary hazards in the workplace and presents needless distractions. While horseplay is not necessarily violent, it can have a harmful impact on the safety of Aversa Bros Industrial Contractors employees, and is therefore forbidden and will be treated as a workplace violence issue for the sake of this company's safety and health program.

PROGRAM PLANNING

As with any element of the Aversa Bros Industrial Contractors safety and health program, workplace violence prevention requires site-specific and job-specific planning.

Frank Aversa will work with management and appropriate employees to evaluate the ability of Aversa Bros Industrial Contractors to prevent workplace violence and handle incidents involving violence to enforce effective protections from workplace violence.

Plans to prevent workplace violence will be evaluated regularly, and when changes are made that affect the risk of workplace violence and when a workplace incident involving violence occurs.

Job Hazard Analyses

Workplace violence risks will be considered in every job hazard analysis performed at Aversa Bros Industrial Contractors. If a job or task presents hazards, steps will be taken to control those hazards as soon as safely possible to prevent injury. (See the chapter on "Job Hazard Analysis" in this manual for more information).

Other Planning Considerations

As part of the organization-wide violence prevention program, Aversa Bros Industrial Contractors may conduct a screening survey to get employee ideas on the potential for violent incidents and to identify opportunities for improved security measures. These surveys may be repeated as part of the periodic review of this policy.

Independent reviewers such as safety and health professionals, security consultants or law enforcement professionals can provide expert opinions on workplace safety and provide a fresh perspective on preventing workplace violence.

HAZARDS

Violent behavior, like any safety and health risk factor, occurs within a context. Controlling workplace violence hazards first requires identifying them.

Warning Signs of Violence

There is no way to predict all acts of violence; however, the FBI suggests the following indicators of escalating violence risk in an individual:

- Increasing belligerence
- Hypersensitivity to criticism
- Apparent obsession with another person
- Interest in recently publicized violent events
- Extreme disorganization
- Homicidal/suicidal comments or threats
- Ominous, specific threats
- Recent acquisition/fascination with weapons
- Preoccupation with violent themes
- Outbursts of anger
- Noticeable changes in behavior

Workplace Risk Factors

A variety of workplace factors can contribute to violence risk as well, including the following:

- Understaffing
- Frustrations arising from poorly defined job tasks and responsibilities
- Downsizing or reorganization
- Labor disputes and poor labor-management relations
- Inadequate security or a poorly trained, poorly motivated security force
- A lack of employee counseling
- Poor management styles (for example, arbitrary or unexplained orders; over-monitoring; corrections or reprimands in front of other employees, inconsistent discipline)
- A high injury rate or frequent grievances may be clues to problem situations in a workplace

Research indicates that in addition to management oversights, certain job elements increase risk and may indicate the need for greater care when performing job hazard analysis and violence prevention planning.

These factors include the following:

- Contact with the public
- Exchange of money
- Delivery of passengers, goods, or services
- Having a mobile workplace
- Working with unstable or volatile people
- Working alone or in small numbers
- Working late at night or during early morning hours
- Working in high-crime areas
- Guarding valuable property
- Working in community-based settings

CONTROLS

Aversa Bros Industrial Contractors will identify and implement effective controls to protect workers against violence hazards. These controls will be determined based on the work, the environment and the organizational context of the work. Controls may include a variety of engineering and administrative approaches to control the hazards associated with violence in the workplace.

Please see the section on “Control” in the chapter covering “Job Hazard Analysis.”

Engineering

- Develop emergency signaling, alarms and monitoring systems
- Increase visibility, especially in high-risk areas. Use cameras and curved mirrors in hallways, and ensure good lighting in the workplace and in parking lots
- Restrict movement of the public and employees with appropriate barriers and card- or key-controlled access
- Design public areas to minimize assault risk
- Provide staff restrooms and emergency exits
- Install enclosed stations, deep service counters, or bullet resistant and shatterproof glass enclosures in reception areas if appropriate
- Arrange furniture and other objects with safety in mind. Be mindful of objects or furniture that can easily be turned into weapons

Administrative and Work Practice Controls

- Demonstrate concern for workers’ emotional and physical health and safety, communicating that violence is not permitted
- Design staffing patterns to prevent personnel from working alone and to minimize waiting time for customers
- Provide security escorts to the parking lots at night if appropriate
- Develop a system for alerting security personnel or management to threats of violence and recording incidents to determine need for additional controls
- Encourage employees to use the “buddy system” when personal safety threatened
- Limit the amount of accessible cash and valuables in the workplace

- Consider an employee assistance program to help employees handle their personal problems that may affect job performance and workplace safety
- Consider potential for violence in human resources operations. Areas where appropriate procedures and policies to prevent violence should be in place include the following:
  - Pre-employment screening
  - Employee assistance
  - Employment transition or outplacement services during layoffs
  - Substance abuse prevention programs
  - Detailed post-termination security protocol

RESPONSE

Aversa Bros Industrial Contractors understands violence can best be prevented through appropriate workplace security measures and caring for the people who work for our company through communication, adequate training and a system for reporting and following up on incidents. However, regardless of the level of hazard control, Aversa Bros Industrial Contractors may experience a safety incident involving violence. Response to violence in the workplace will depend on the nature of the incident, but will focus on reducing the negative impacts of the incident and discovering ways to prevent similar incidents in the future.

Workplace violence will be considered during the development of the Emergency Action Plan. Please see the chapter entitled “Fire Prevention and Emergency Action Plans” for more information.

NOTIFICATION

Employees will notify a supervisor as soon as safely possible if an incident involving violence occurs. However, if there is an immediate danger of harm and the situation demands the presence of emergency responders, an employee will contact the appropriate authorities or see that a supervisor contacts them. Employees must report any criminal act immediately to police if safely possible and keep a line of communication with the authorities until police arrive.

Management will handle all reports of violence and threats of violence in a manner that respects the sensitive nature of such reports and maintains confidentiality.

It is a good idea for every worksite to have a means to alert others to an emerging incident. Such means include alarms, codes and signals. These alerts need to be in place, and shared, before an incident occurs to ensure their effectiveness.

DE-ESCALATION STRATEGIES

DO	DON'T
Be calm. Move and speak slowly, quietly, and confidently. Encourage the person to talk; listen closely and patiently. Maintain a relaxed, attentive posture. Position yourself at an angle. Arrange yourself so your access to emergency exits is not blocked. Acknowledge the person's feelings. Ask for small, specific favors such as asking the person to move outside. Use delaying tactics to give the person time to calm down, such as offering a drink of water. Point out choices, break big problems into smaller ones. Avoid sudden movements and maintain a 3-6 foot distance. If necessary, call the police when safe. A fitness-for-duty evaluation may be appropriate for employees exhibiting dysfunctional behaviors. Potential victims will be informed of any threat made to them and permitted access to legal assistance and psychological counseling as warranted.	Make sudden movements. Speak rapidly, raise your volume or use an accusatory tone. Reject all demands. Make physical contact, jab your finger at the other person or use long periods of eye contact. Pose in challenging stances — directly opposite someone, hands on hips or with arms crossed. Challenge, threaten or dare the individual. Belittle the other person. Criticize or act impatient. Attempt to bargain with a threatening individual. Try to make the situation seem less serious than it is. Make false statements or promises you cannot keep. Try to impart a lot of technical or complicated information when emotions are high. Take sides or agree with distortions. Invade individual's personal space.

INCIDENT RESPONSE TEAM

Frank Aversa and management, as part of hazard control planning may determine the need for an incident response team responsible for violence response. Training for this team will include identifying hazard escalation, techniques for de-escalating conflict and other appropriate incident response.

EVACUATION AND SHELTER IN PLACE

All employees will be made aware of appropriate evacuation and "Shelter-In-Place" procedures and follow them as necessary in response to a violent workplace incident. Training and preparation may include drills and simulations for a violent incident.

POST-INCIDENT RESPONSE

In the event of workplace violence, Aversa Bros Industrial Contractors will ensure victims and witnesses are provided appropriate treatment, regardless of the severity of the incident. In addition to physical injuries, victims of workplace violence may suffer other consequences such as the following:

- Psychological trauma
- Fear of returning to work
- Changes to relationships
- Feelings of guilt, powerlessness and incompetence
- Fear of criticism by supervisors

Further, to address opportunities to remedy oversights in the violence prevention program, any incident that demands managerial response under this violence prevention program will be followed by an incident investigation.

Please see the chapter on “Accident Investigation” for more information.

RECORDKEEPING AND PROGRAM EVALUATION

Aversa Bros Industrial Contractors will record and communicate injuries and illnesses to workers according to applicable regulations.

This policy will be reviewed, and these reviews documented, at least once a year or under the following circumstances:

- Following a workplace violence incident or report
- Change in management
- Change of contact person
- To make needed changes or improvements to the policy
- To identify new training or refresher training needs

SEXUAL HARASSMENT

It is Aversa Bros Industrial Contractors’s policy that sexual discrimination, unwelcome sexual advances, requests for sexual favors, and any other conduct of a sexual nature is strictly prohibited.

Requiring coworkers, subordinate employees, or prospective employees to submit to conduct of this nature, explicitly or implicitly, as a term or condition of employment, or used as a basis for any employment decisions is forbidden.

Any behavior that has the purpose or effect of unreasonably interfering with an individual’s work performance, or creating an intimidating, hostile or offensive work environment is banned.

Sexual harassment can occur in a variety of circumstances:

- The victim as well as the harasser may be a woman or a man. The victim does not have to be of the opposite sex
- The harasser can be the victim's supervisor, an agent of the employer, a supervisor in another area, a co-worker or a non-employee
- The victim does not have to be the person harassed but could be anyone affected by the offensive conduct
- Sexual harassment may occur without economic injury to or discharge of the victim
- The harasser's conduct must be unwelcome

Prevention is the best tool to eliminate sexual harassment in the workplace. Aversa Bros Industrial Contractors has designated appropriate managers (rather than a direct supervisor) and other alternative routes by which an employee can issue formal complaints of sexual harassment. If possible, any victimized employee should attempt to resolve a sexual harassment issue informally by directly informing the harasser that the conduct is unwelcome and must stop. If informal resolution is unsuccessful, the victim will use the formal complaint form and submit it to an appropriate supervisor.

Aversa Bros Industrial Contractors will take immediate appropriate action when an employee files a complaint.

Aversa Bros Industrial Contractors recognizes that the question of whether a particular course of conduct constitutes sexual harassment requires a factual determination. Aversa Bros Industrial Contractors also recognizes that false accusations of sexual harassment can have serious effects on innocent persons. If an investigation results in a finding that a person who has accused another of sexual harassment has maliciously or recklessly made false accusations, the accuser will be subject to appropriate sanctions, including discharge.

When investigating allegations of sexual harassment, this company will look at the whole record, the circumstances, and the context in which the alleged incidents occurred. Aversa Bros Industrial Contractors will make a determination on the allegations from available facts on a case-by-case basis. Outside avenues of resolution are available to employees who feel their rights have not been protected. Aversa Bros Industrial Contractors tolerates no sexual harassment.

FORMS AND ATTACHMENTS

Please find the below documents on the following pages:

- Assault/Threat Report
- Sexual Harassment Complaint Form

ASSAULT/THREAT REPORT FORM (PAGE 1 OF 3)

(Attach additional sheets as necessary)

Employee Information			
Name		Telephone	
Address		Employee Classification	
Manager's Name		Telephone	

Employee Information			
Name of Assailant		Is he/she an employee?	☐ Yes ☐ No
Date of Incident		Location of Incident	
This Incident Occured	☐ Over the phone ☐ In person ☐ Over the internet ☐ Other (please explain)		

Were there any witnesses?	☐ Yes ☐ No	(Please provide relevant information below and attach statements)

Witnesses			
Name		Telephone	
Address		Witness Roll (e.g. employee, customer)	
Name		Telephone	
Address		Witness Roll (e.g. employee, customer)	

Threat Information	
As closely as possible, what were the exact words used?	
Was the assailant in a position to carry out the threat immediately?	
How serious do you believe the threat was and why?	

ASSAULT/THREAT REPORT FORM (PAGE 2 OF 3)

(Attach additional sheets as necessary)

Assault Information	
What (if anything) happened to set off the assault?	
Did the assailant say anything during the assault? What?	
How did the assailant attack? (e.g. punching, kicking, knife, words)	
What injuries, if any, did you sustain? Did injuries require medical treatment?	
What ended the assault?	
How did you leave the site of the assault?	

ASSAULT/THREAT REPORT FORM (PAGE 3 OF 3)

(Attach additional sheets as necessary)

Employee Actions					
What actions did you take later? (e.g. worker's comp claim, medical treatment, sick leave)					
Do you request Aversa Bros Industrial Contractors action at this time related to the assault? What? (If none, please specify "None.")					
Law Enforcement Information (attach police report when possible)					
Law Enforcement Agency Contacted					
Name of Official		Date Contacted		Telephone	
Was a written report completed?	☐ Yes ☐ No	Indicate any action promised			
Manager Actions					
Directions given to employee					
Manager Recommendation	☐ Prosecution ☐ Restraining Order ☐ Letter to Threatener ☐ Other (please specify)				
Legal Counsel Actions					

SEXUAL HARASSMENT COMPLAINT FORM (PAGE 1 OF 2)

Please write legibly and fill out form completely. Attach additional sheets if necessary. Submit completed form to appropriate manager.

Complainant		Alleged Harasser	
Department		Department	
Job Title		Job Title	
Mailing Address		Other relevant information about Alleged Harasser	
Home Phone			
Work Phone			
Details of Incident			
What exactly occurred or was said?			
When did it occur, and is it ongoing?			
Where did it occur?			
How often did it occur?			
How did it affect you?			
What response did you make when the incident(s) occurred or afterwards, and how did you react?			
Has your job been affected in any way?			
Was anyone present when the alleged harassment occurred? List any third-party witnesses			

SEXUAL HARASSMENT COMPLAINT FORM (PAGE 2 OF 2)

Please write legibly and fill out form completely. Attach additional sheets if necessary. Submit completed form to appropriate manager.

Are there any persons who have relevant information?	
Did you tell anyone about it?	
Did anyone see you immediately after episodes of alleged harassment?	
Did the person who harassed you harass anyone else?	
Do you know whether anyone complained about harassment by that person?	
Are there any notes, physical evidence or other documentation regarding the incident(s)?	
Do you know of any other relevant information?	
How would you like to see the situation resolved?	
I am aware that false accusations of sexual harassment can have serious effects on innocent persons. I further understand that if it is determined, after investigation, that I have maliciously or recklessly made false accusations, I will be subject to appropriate sanctions, including discharge.	

Complainant's printed name	Complainant's signature	Date
Received by	Signature	Date

POLICY

Aversa Bros Industrial Contractors has implemented this policy for the protection of our employees against the fire and other emergencies in the workplace. Frank Aversa will supervise the Fire Protection Program.

Aversa Bros Industrial Contractors will have a written Fire Protection Program (FPP). The FPP will be posted in the workplace and remain available to employees for review along with the names and job titles of every person in the chain of command during emergencies.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Aversa Bros Industrial Contractors to:

- Ensure adequate workplace safeguards against hazards, including appropriate exit routes, fire alarms, and fire protection systems
- Ensure development and implementation of FPP and EAP
- Ensure training of employees in accordance with this policy

EMPLOYEE RESPONSIBILITIES

Every Aversa Bros Industrial Contractors employee is expected to:

- Report a fire or other emergency
- Follow fire prevention plan and emergency action plan
- Report any suspected problem with fire control systems to their supervisor
- Assist in fire hazard assessment

TRAINING

Aversa Bros Industrial Contractors will ensure every employee is provided training on fire protection and emergency planning. This training will be provided at no cost to the employee and held during their working hours.

Training will be provided:

- At the time of assignment
- At least annually thereafter

Aversa Bros Industrial Contractors will provide additional training when tasks or procedures are added or change, that may affect the employee's work. It is acceptable for additional training to be limited to addressing only the changes or additions to the employees' exposure.

Aversa Bros Industrial Contractors will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training Components

Aversa Bros Industrial Contractors is committed to informing employees about all fire hazards with which they may come into contact. Frank Aversa or a designate will review the FPP with all employees and inform them of any fire hazards a new assignment might present.

Frank Aversa will verify all employees at Aversa Bros Industrial Contractors are informed and trained in the following minimum elements for the Emergency Action Plan and Fire Protection Program:

- Fire hazards at the worksite
- Means of controlling or removing fire hazards at the worksite
- Procedures for reporting a fire or other emergency
- Procedures for emergency evacuation for all areas of work, including type of evacuation and exit route assignments
- Safe assembly areas designated for all work areas in the event of evacuation
- Procedures to be followed by employees who are requested to remain to operate critical plant operations before they evacuate, if applicable
- Procedures to account for all employees after evacuation
- Procedures employees are to follow when performing rescue or medical duties
- The members in the chain of command that employees can contact for information about the plans or for an explanation of their duties under the plans
- Proper operation of fire extinguishers provided by the company if the EAP allows employees to fight incipient stage fires rather than evacuate
- The hazards involved in incipient stage firefighting. Employees are instructed to ensure the local emergency response service (Fire Department) is notified before attempting to extinguish any fire, and that if a fire is not immediately extinguished, or the fire recurs to evacuate immediately
- Where employees have been provided portable fire extinguishers, Aversa Bros Industrial Contractors will provide training on the general principles of fire extinguisher use and the hazards involved with incipient-stage firefighting. This training will occur upon hire and repeated annually

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FIRE PREVENTION PLAN

Aversa Bros Industrial Contractors is committed to protecting its employees in the event of a fire emergency. Accordingly, Aversa Bros Industrial Contractors will ensure there is a Fire Protection Program written and available to employees as required by OSHA regulations.

This plan will include the following:

- A list of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard
- Procedures to control accumulations of flammable and combustible waste materials
- Procedures for regular maintenance of safeguards installed on heat-producing equipment to prevent the accidental ignition of combustible materials
- The name or job title of employees responsible for maintaining equipment to prevent or control sources of ignition or fires; and the name or job title of employees responsible for the control of fuel source hazards

Determining Fire Hazards

Figure 1

A fire is essentially the rapid oxidation of a chemical. It requires heat, oxygen and fuel in the right proportion. Different types of fuel react in different ways and require different levels of heat and oxygen to ignite; however, once the chemical reaction begins, fire provides a source of heat for continued ignition until one of the essential aspects of combustion — fuel, heat or oxygen — is removed and the reactions end. See figure 1.

Frank Aversa or designee will perform an area-by-area assessment of fire hazards and record them by location on the “Major Fire Hazards” list. The assessment will ascertain and document whether the hazard is a fuel or ignition source, control systems in place to protect against fire, and the name or job title of the individual who is responsible for removing or minimizing the listed hazard.

The goal is to systematically eliminate fire hazards wherever possible; ensure a means to prevent a fire if the hazard cannot be removed; inform employees about fire hazards in their workspace; and identify the party responsible for controlling any given fire hazard. Fire hazard identification plays a central role in the FPP, and all employees are expected to contribute their efforts to identify and mitigate fire hazards in the workplace.

Employees will familiarize themselves with the safety data sheet of any hazardous chemicals with which they work and know proper handling and storage procedures to reduce hazards. Flammable and combustible material will be stored and staged in amounts as small as possible for operations and away from sources of ignition. It is important for employees to monitor the workplace for changes that might pose additional fire hazards.

FIRE PROTECTION EQUIPMENT AND SAFEGUARDS

Local Fire Alarm Systems

An alarm system to alert employees and the local fire department will provide a distinctive signal in case of fire or other emergency. The alarm needs to be audible above ambient noise levels and/or seen over ambient light levels.

Inspection, Maintenance and Testing

Aversa Bros Industrial Contractors will provide for the frequent testing of all alarm systems and make sure they remain in operating condition. A local, unsupervised fire alarm system must be tested by a qualified, trained, and authorized employee or an outside service not less than once a week to insure operability by the activation of not less than 1 box, not using the same box in consecutive tests, and replacing power supplies as necessary.

Tests for systems that are capable of being supervised will occur at least annually.

Portable Fire Extinguishers

Any portable fire extinguisher provided will:

- Be fully charged and operable
- Be kept in a conspicuous place when not in use
- Not use carbon tetrachloride, chlorobromomethane, or other toxic vaporizing extinguishing agents
- Not be operated by inverting the extinguisher to rupture a cartridge or initiate an uncontrollable pressure-generating chemical reaction to expel the extinguishing agent
- Be protected from freezing (if subject to freezing)

Fire extinguishers are composed of a variety of materials depending on the type of fire they are designed to eliminate. All extinguishers will contain contents under high pressure:

Not all fire extinguishers are manufactured exactly alike. Variations may include operating instructions or distance the user should stand from the fire when dispersing contents. See the required cylinder labeling for specific information.

Each 3,000 square feet of protected buildings during construction requires a fire extinguisher rated at least 2A, spaced within 100 feet of any point of the protected area. In multi-story construction, each floor needs its own extinguisher rated at least 2A, adjacent to the stairwell

Aversa Bros Industrial Contractors will provide a fire extinguisher rated not less than 10B within 50 feet of anywhere there is more than 5 gallons of flammable or combustible liquids being used on the jobsite (aside from vehicle fuel tanks)

Inspection, Maintenance and Testing

Aversa Bros Industrial Contractors is responsible for the inspection, maintenance and testing of all portable fire extinguishers in the workplace. Maintenance checks of portable fire extinguishing equipment will occur at least annually. The dates of fire extinguisher checks will be recorded; the record of these checks will be retained for at least a year after the last check or the life of the shell (whichever is less). An individual trained to perform hydrostatic testing will test each portable fire extinguisher with suitable equipment. Such testing is also called for when portable fire extinguishers show new evidence of corrosion or mechanical wear.

Each extinguisher in the workplace will be accompanied by a record securely fixed to the extinguisher that indicates:

- Name of the person or agency who performed the last test, and the test date
- Signature of the person who performed the test
- Serial number or other identifier of the fire extinguisher that was tested

Alternatives to Portable Fire Extinguishers

During construction activities, a 55-gallon drum with two fire pails may substitute for a fire extinguisher with a 2A rating.

A ½-inch diameter garden-type hose no longer than 100 feet, can substitute for the same as long as it can discharge at least 5 gallons per minute and the stream ranges at least 30 feet horizontally.

Further, 100 feet or fewer of 1½-inch hose with a nozzle capable of discharging water at 25 gallons or more per minute may be substituted, if the hose line can reach all points in the area. (Make sure the hose connections are compatible with local firefighting equipment.)

Other Fire Protection Systems

Aversa Bros Industrial Contractors will meet or exceed all legal requirements for any fire protection system in the workplace and keep in good working order all safeguards designed to protect employees during emergencies, including fire retardant paints and solutions. Any other fire protection systems in use will also meet applicable regulatory requirements and may include the following:

- Temperature limit switches
- Fixed extinguishing systems
- Fire detection systems
- Standpipe and hose systems
- Flashback arresters
- Automatic sprinkler systems
- Fire brigades

During demolition activities involving combustible materials, charged hose lines that are supplied by hydrants, water tank trucks with pumps, or equivalent, must be available.

WATER SUPPLY

A water supply adequate for the operation of firefighting equipment must be available as soon as there is an accumulation of combustible materials. Underground water mains must be made available as soon as practicable where they are to be provided.

SPRINKLERS

If there will be an automatic sprinkler fire protection system, install, and place it in service as soon as permitted following completion of each story.

Ensure that sprinklers are spaced to provide a maximum protection area per sprinkler, a minimum of interference to the discharge pattern by building or structural members or building contents and suitable sensitivity to possible fire hazards.

Maintain a 36” clearance between the top of stored material and sprinkler heads.

A stock of extra sprinklers must be on hand or readily available for each temperature rating and type so that the system can be returned to readiness as soon as possible.

An automatic sprinkler system having 20 or more sprinklers must have at least one automatic water supply capable of providing design water flow for at least 30 minutes.

During demolition or alterations, keep automatic sprinkler installations in service as long as reasonable. Only authorized personnel may operate sprinkler control valves. Expedite sprinkler system modifications made to permit alterations or additional demolition so that the automatic protection may be returned to service as quickly as possible. Check sprinkler control valves daily at close of work to ensure service.

No one may occupy a portion of a structure (except as permitted under law) that must be protected by automatic sprinklers until the sprinkler system is operable and has been approved.

STANDPIPES

If standpipes are required, or exist in structures being altered, they must be brought up as soon as applicable laws permit and will be maintained as construction progresses in such a manner that they are always ready for fire protection use. Standpipes will be provided with Siamese fire department connections on the outside of the structure, at the street level, and conspicuously marked. Local codes may specify lighting or painting requirements. There must be at least one standard hose outlet at each floor.

During demolition, maintain a standpipe as long as possible in operable condition for firefighting use. Do not demolish the standpipe further than one floor below the floor being demolished.

FIRE PROTECTION

Controlling fire hazards (e.g. accumulations of flammable and combustible materials) and ensuring safe storage of building materials is a priority of the highest order for Aversa Bros Industrial Contractors and its employees. Controlling fuel sources demands all workers maintain a tidy work area and dispose of refuse in the appropriate receptacle; it also calls for due consideration of piles and stacks or materials at the worksite. Controlling means of ignition requires following appropriate safety guidelines especially around electricity, open flame, or any work that may produce arc, sparks, excessive heat, etc.

No Smoking, No Open Flame

Smoking is prohibited at the jobsite at all times. Signs will be posted according to local requirements alerting employees and the public to this prohibition. Open fires may not be ignited or maintained at the worksite. Only approved heaters may be used in designated locations in such a way to prevent fires.

Ignition Hazards

Electrical wiring onsite must be installed safely by qualified personnel and in compliance with applicable regulations. If equipment is powered by an internal combustion engine, make sure it is located so that the exhausts are well away from combustible materials. If the exhausts are piped outside, verify there is a 6 in. clearance between piping and combustible materials. If portable battery powered lighting equipment is used near flammable gases or liquids, make sure it's approved for hazardous locations.

During the cleaning or ventilation of tanks and vessels that contain hazardous concentrations of flammable gases or vapors nozzles, lines, or hoses for air, inert gas, or steam must be bonded to the tank or vessel shell and neither attached nor detached in hazardous concentrations of flammable gases or vapors.

All debris and refuse must be disposed of promptly (at the end of each shift or more frequently as required), especially if it is combustible. If material is to be disposed of by burning onsite, make sure that method has been approved, and complies with all relevant safety controls. All materials susceptible to spontaneous ignition (oily rags) will be stored in an approved disposal container.

Hotwork must be completed according to appropriate guidelines, and appropriate fire watch must be established and maintained to ensure safety of any operation that presents a fire hazard.

TEMPORARY BUILDINGS

- No temporary building may adversely affect a means of exit
- Temporary buildings erected within another building must be of noncombustible construction or of combustible construction with a fire resistance rating of at least 1 hour
- Temporary buildings, not inside another building and not used for the storage, handling, or use of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, must be located at least 10 feet from another building or structure
- Groups of temporary buildings, not exceeding 2,000 square feet in size total, will be considered a single temporary building

OPEN YARD STORAGE

Combustible materials must not be piled higher than 20 feet and must be piled in a stable manner.

Where driveways go between or around combustible storage piles, they must be at least 15 feet wide and free of any obstruction. A driveway grid formed by such driveways may not exceed 50ft. by 150ft.

Make sure the storage area is clean and any plant life is controlled to prevent additional fire hazards. Piles of combustible material must be organized, orderly and 10 feet or more from buildings. Ensure appropriate fire extinguishers (at least 2A) are easily accessible.

INDOOR STORAGE

Make sure materials stored indoors do not block exits or impede exit in any way and are piled to maintain a 36” clearance between the top of the stored material and sprinkler heads.

Maintain safe clearance between material piles and lights or heating elements. Also, provide a barricade or ensure at least 24” around the path of travel to fire doors. Never store material within 36” of a fire door.

ACCESS FOR FIREFIGHTING

Vehicle access to a construction, remodel or demolition site must be maintained at all times within 100 feet (consult local codes) of available fire department connections. Temporary vehicle access must be maintained until permanent access is established. Such roads may need to be inspected by local authorities to comply with local laws. Horizontal and vertical clearance for such access routes must be sufficient for emergency vehicle approach and meet applicable local codes.

FLAMMABLE LIQUIDS

Flammable liquids must be stored and handled in approved containers and tanks. Handling and use of flammable liquid materials in quantities of 5 gallons or less requires approved safety cans or DOT-approved containers. Flammable liquids that are hard to pour may be stored, handled and used in quantities of one gallon or less in their original container.

Ensure flammable or combustible liquids are kept clear of areas used for exits or safe passage of people.

This section applies to the handling, storage and use of flammable liquids with a flashpoint below 140°F but not to:

- Bulk transportation of flammable and combustible liquids
- Storage, handling and use of fuel oil tanks and containers connected with oil burning equipment

NOTE: With the adoption of the Globally Harmonized Standards (GHS) by OSHA, liquids capable of being ignited are divided into four categories based on their flash points.

Category 1	**Category 2**	**Category 3**	**Category 4**
Flash Point < 72ºF Boiling point ≤ 95ºF	Flash Point < 72ºF Boiling point > 95ºF	Flash Point ≥ 72ºF Boiling point ≤ 140ºF	Flash Point > 140ºF Boiling point ≤ 200ºF
Extremely flammable	Highly flammable	Flammable	Combustible

INDOOR STORAGE

Outside of an approved storage cabinet, limit storage of flammable or combustible liquids to 25 gallons. An approved storage cabinet must adhere to the following specifications:

- The bottom, sides, and top will be constructed of an exterior grade of plywood at least 1 in. thick, which will not break down or delaminate under standard fire test conditions

- All joints must be rabbeted and fastened in two directions with flathead wood screws
- When more than one door is used, there will be a rabbeted overlap of not less than 1 inch
- Steel hinges will be mounted in such a manner as to not lose their holding capacity due to loosening or burning out of the screws when subjected to fire
- These cabinets will be painted inside and out with fire retardant paint
- Approved metal storage cabinets are acceptable
- Cabinets must be labeled in conspicuous lettering, “Flammable-Keep Fire Away”

Any one storage cabinet is limited to 60 gallons of flammable liquids, and 120 gallons of combustible liquids. Any one storage area is limited to three storage cabinets. Higher quantities must be stored inside a storage room.

INDOOR STORAGE ROOMS

Storage rooms inside must be sufficiently fire-resistive for their use and comply with test specifications outlined in “Standard Methods of Fire Test of Building Construction and Material, NFPA 251-1969” and table 2.

Fire Protection Provided*	Fire Resistance	Maximum size	Total allowable quantities gals. / sq.ft. / floor area
Yes	2 hrs.	500 sq.ft.	10
No	2 hrs.	500 sq.ft.	4
Yes	1 hr.	150 sq.ft.	5
No	1 hr.	150 sq.ft.	2

Automatic extinguishing systems will be designed and installed to meet the following requirements:

- Openings to other rooms or buildings require noncombustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area must be at least 4 inches below the surrounding floor
- Openings will be equipped with approved self-closing fire doors
- The room will be liquid-tight where the walls join the floor
- A permissible alternate to the sill or ramp is an open-grated trench, inside of the room, which drains to a safe location
- Where other portions of the building or other buildings are exposed, windows will be protected as set forth in the Standard for Fire Doors and Windows, NFPA No. 80-1970, for Class E or F openings
- Wood of at least 1-inch nominal thickness may be used for shelving, racks, dunnage, scuff boards, floor overlay, and similar installations
- Materials that will react with water and create a fire hazard may not be stored in the same room with flammable or combustible liquids
- Wiring and equipment in such rooms must be approved for Class I, Division 1, Hazardous Locations as outlined in CFR 1926.449

- Every storage room must have one clear three-foot wide aisle
- Containers over 30 gallons capacity cannot be stacked on top of each other

Each indoor storage room must be equipped with either a gravity or a mechanical exhausting system that meets the following specifications:

- It must start no more than 12 inches above the floor
- It must be designed to provide a complete change of air within the room at least 6 times per hour
- If a mechanical exhausting system is used, it must be controlled by a switch located outside of the door
- Ventilating equipment and any lighting fixtures must not be operated by the same switch
- An electric pilot light will be installed next to the switch if flammable liquids are dispensed within the room
- Where gravity ventilation is provided, the fresh air intake, as well as the exhausting outlet from the room, must be on the exterior of the building where the room is located

Limit the quantity of flammable or combustible liquids near any spraying operations to the minimum required for operations. This must not exceed a supply for 1 day or one shift. Bulk storage of portable containers of flammable or combustible liquids will be in a separate, constructed building detached from other important buildings or cut off in a standard manner.

STORAGE OUTSIDE BUILDINGS

Flammable and combustible liquids in excess of the amount permitted in inside storage rooms will be stored outside of buildings.

Limit groupings of containers (not more than 60 gallons each) to 1,100 gallons in any one pile or area. Piles or groups must be separated by a 5-foot clearance and placed 20 feet or further away from a building.

Within 200 feet of such piles, ensure a 12-foot-wide access for fire control approach.

The area reserved for storing flammable and combustible liquids must be graded to divert spills away from building. Alternatively, the area may be surrounded by a curb or dike at least 12 inches high if provisions are made for draining off accumulations of ground or rain water, or spills of the stored liquids. Drains must terminate at a safe location and be accessible to operation under fire conditions.

OUTDOOR PORTABLE TANK STORAGE

- Portable tanks must be at least 20 feet from any building
- Two or more portable tanks, grouped together, having a combined capacity in excess of 2,200 gallons, must be separated by a 5-foot-clear area
- Individual portable tanks exceeding 1,100 gallons must be separated by a 5-foot-clear area
- There must be a 12-foot-wide access way within 200 feet of each portable tank, to permit approach of fire control equipment
- Storage areas will be kept free of weeds, debris, and other combustible material not necessary to the storage

- Portable tanks, not exceeding 660 gallons, must have emergency venting and other devices, as required by chapters III and IV of NFPA 30, The Flammable and Combustible Liquids Code
- Portable tanks, in excess of 660 gallons, must have emergency venting and other devices, as required by chapters II and III of “The Flammable and Combustible Liquids Code, NFPA 30”

FIRE CONTROL FOR FLAMMABLE LIQUIDS

- At least one portable fire extinguisher, with a rating of at least 20-B units (capable of extinguishing a twenty square foot fire), must be located outside of, but not more than 10 feet from, the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids
- At least one portable fire extinguisher having a rating of at least 20-B units must be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside
- When sprinklers are provided, they will be installed in accordance with the current “Standard for the Installation of Sprinkler Systems, NFPA 13”
- At least one portable fire extinguisher having a rating of not less than 20-B:C units will be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable or combustible liquids

DISPENSING LIQUIDS

- Areas where combustible liquids are transferred more than 5 gallons at a time must be separated from other activity by 25ft. or construction with a fire resistance rating of 1 hour. Drainage in such areas to control spills is required as is ventilation sufficient to maintain flammable vapor concentrations below 10 percent of the lower flammable limit
- Flammable liquid transfer between two containers requires the containers to be electrically bonded
- Draw or transfer flammable or combustible liquids from vessels, containers, or tanks within a building or outside only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited
- Protect dispensing units against collision damage
- Dispensing devices and nozzles for flammable liquids must be of an approved type

HANDLING LIQUIDS AT POINT OF FINAL USE

- Keep Flammable liquids in closed containers when not in use
- Dispose of leakage or spillage of flammable or combustible liquids promptly and safely
- Flammable liquids may be used only where there are no open flames or other sources of ignition within 50 feet of the operation, unless conditions warrant greater clearance

SERVICE AND REFUELING AREAS

- Flammable or combustible liquids must be stored in approved closed containers, in tanks located underground, or in above-ground portable tanks
- Tank trucks must comply with the requirements covered in the latest edition of the Standard for Tank Vehicles for Flammable and Combustible Liquids, NFPA No. 385
- Only approved types of dispensing hoses may be used
- The dispensing nozzle will be an approved automatic-closing type without a latch-open device
- Do not abandon underground tanks
- Provide clearly identified and easily accessible switch(es) at a location remote from dispensing devices to shut off the power to all dispensing devices in the event of an emergency
- Heating equipment of an approved type may be installed in the lubrication or service area where there is no dispensing or transferring of flammable liquids, provided the bottom of the heating unit is at least 18 inches above the floor and is protected from physical damage
- Heating equipment installed in lubrication or service areas, where flammable liquids are dispensed, must be of an approved type for garages, and will be installed at least 8 feet above the floor
- No smoking or open flames will be permitted in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids
- Post conspicuous and legible signs prohibiting smoking
- Shut off motors of equipment being fueled during the fueling operation; and provide each service or fueling area with at least one fire extinguisher having a rating of not less than 20B:C located so that an extinguisher will be within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service area.

FORMS AND ATTACHMENTS

Please find on the following page the Major Fire Hazards Form, which may be reproduced freely by Aversa Bros Industrial Contractors for the purposes of implementing and maintaining a safety and health program.

MAJOR FIRE HAZARDS FORM

Major Fire Hazards Form	Location	Fire Hazard	Fuel source hazard	Ignition source hazard	Handling, storage, and/or maintenance procedures and other relevant protections (include PPE)
Name or job title of responsible party	Example				
Housekeeping: Employees, Custodian Fire extinguisher: Frank Aversa	Site Gate	cigarette butts at gate	Yes	Yes	Ensure all materials have been completely extinguished and properly disposed of. Fire extinguisher is inside office.

POLICY

Aversa Bros Industrial Contractors will manage or eliminate hazards in the workplace to the greatest extent possible with engineering controls and work practice controls. However, if such controls fail to provide employees sufficient protection, Frank Aversa or designate will provide employees with personal protective equipment (PPE) and ensure proper use thereof. PPE minimizes exposure to a range of hazards. All protective devices must meet the following minimum requirements:

- Provide adequate protection against the hazards for which they are designed
- Be of safe design and construction for the work to be performed
- Be reasonably comfortable when worn under the designated condition
- Fit snugly and not unduly interfere with the movements of the wearer
- Be durable
- Be capable of being disinfected
- Easily cleaned
- Be distinctly marked to facilitate identification of the manufacturer

HAZARD ASSESSMENT

As explained in the chapter on Job Hazard Analysis, hazard assessment is the backbone of the Aversa Bros Industrial Contractors safety and health program. Recognizing and documenting hazards is the first step to protecting employees from them. An initial walk-through to develop a list of potential hazards will be followed by a review of records and an analysis of the facility layout to determine what controls would best protect workers. If engineering and administrative controls are unable to protect employees from hazards they face, Frank Aversa and management will determine what PPE is necessary.

Aversa Bros Industrial Contractors job hazard analysis is an ongoing process. as needed inspections and periodic reassessments will look for changes that may affect occupational hazards for workers and will determine if PPE remains viable (in terms of condition, age and appropriateness) to protect a worker from hazards on the job.

Aversa Bros Industrial Contractors must certify and document the required workplace hazard assessment in a way that identifies the following:

- Workplace evaluated
- Person certifying the evaluation has been performed
- Date of the hazard assessment
- Document as a certification of hazard assessment

EMPLOYER RESPONSIBILITIES

It is the responsibility of Aversa Bros Industrial Contractors to:

- Identify in the hazard assessment where PPE is appropriate and what type is necessary
- Identify and provide properly fitting PPE for employees
- Inform employees how and when to use identified PPE
- Enforce PPE use
- Train employees in the use and care of PPE
- Ensure employees maintain PPE
- Replace worn or damaged PPE
- Ensure employee provided PPE is adequate
- Periodically review, update and evaluate the effectiveness of the PPE program

EMPLOYEE RESPONSIBILITIES

Aversa Bros Industrial Contractors employees are expected to attend PPE training sessions provided by management

Aversa Bros Industrial Contractors requires employees use personal protective equipment (PPE) appropriate to the hazards of their job. This equipment may include protection for the following: eyes, face, feet, hands, head and body.

Employees required to use such equipment will be trained in all aspects of its use, maintenance and applicability.

The following list of PPE is available to employees and will be used as required: hard hat, eye protection, gloves and steel-toed shoes.

- Use, and properly wear, all PPE provided by the employer
- Properly care for, clean, and maintain all PPE
- Inform a supervisor of the need to repair or replace PPE

TRAINING

Aversa Bros Industrial Contractors will ensure every employee is provided training on personal protective equipment. This training will be provided at no cost to the employee during working hours.

Aversa Bros Industrial Contractors will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

Aversa Bros Industrial Contractors will ensure training for every employee in the following minimum elements:

- When PPE is necessary
- What specific PPE is necessary
- How to properly put on, take off, adjust and wear PPE

- Limitations of PPE
- Proper care, maintenance, useful life and disposal of the PPE

Affected employees must demonstrate an understanding of all training and the ability to use PPE properly before they will be permitted to perform work requiring PPE.

Aversa Bros Industrial Contractors will provide retraining for any affected employee who is unable to demonstrate the understanding or skills to use PPE properly. Circumstances that require retraining include, but are not limited to the following:

- When there have been changes in the workplace that have rendered previous training obsolete
- When there have been changes to PPE used that render previous training obsolete
- When an employee demonstrates or expresses inadequacies in understanding or skill needed to use assigned PPE properly

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

PPE SELECTION

Aversa Bros Industrial Contractors will select only PPE of safe design and construction and will work with employees to ensure PPE remains clean and reliable. In selecting PPE used to control hazards in the workplace, Aversa Bros Industrial Contractors will consider comfortable fit, providing sizes appropriate to the affected employees, and ensure any PPE used will be compatible to provide sufficient protection. Comfort and ease of use is an important consideration because workers are more likely to wear comfortable PPE.

All PPE at Aversa Bros Industrial Contractors, including any employee-owned PPE, will meet at least the minimum standards and requirements to provide sufficient protection for workers. Following are the standards referenced by OSHA for select groups of PPE:

- Eye and Face: ANSI Z87.1
- Head: ANSI Z89.1
- Foot: ANSI Z41.1

However, alternative protective equipment is acceptable if Aversa Bros Industrial Contractors demonstrates it is at least as effective as equipment constructed according to the above standards.

NON-PROVIDED PPE

Aversa Bros Industrial Contractors will provide all PPE and replacement PPE at no cost to employees except for the following:

- Non-specialty safety-toe protective footwear, non-specialty prescription eyewear, provided they may be worn away from work
- Shoes or boots with metatarsal protection if Aversa Bros Industrial Contractors provides separate metatarsal guards
- Logging boots
- Everyday clothing
- Clothing worn only for protection from weather
- Replacement PPE the employee has intentionally damaged or lost
- Where the employee provides his or her own adequate PPE

WORK CLOTHING

Aversa Bros Industrial Contractors requires employees to wear clothing appropriate to the work and conditions. Examples of this stipulation include clothing that provides protection against high temperature hazards that can cause burns, and not wearing loose clothing like ties or loose fitting clothing near moving machinery. Employees will not wearing jewelry that might contact or electric circuitry.

Also any clothing contaminated with a hazardous material (e.g. flammable liquids, toxic substances, irritants or oxidizers) must be removed immediately and properly cleaned before it can be worn again.

EYE AND FACE PROTECTION

Aversa Bros Industrial Contractors will ensure adequate protection against the following:

- Flying particles
- Molten metal
- Liquid chemicals
- Acids or caustic liquids
- Chemical gases or vapors
- Potentially infected material
- Potentially harmful light radiation

When there is a hazard from flying particles, eye protection will provide side protection, or Aversa Bros Industrial Contractors will provide effected employees with detachable side protectors.

- Employees will ensure that face and eye protectors are used by only the person to whom the items are issued.
- Eye and face PPE must have the manufacturer's identification distinctly marked.

Prescription Lenses

Everyday glasses will not provide sufficient protection against the types of hazards that require eye protection. Employees who wear prescription lenses to correct their vision must wear either eye protection that incorporates their prescription or that can be worn over glasses without compromising the glasses' ability to correct the wearer's vision.

If Aversa Bros Industrial Contractors requires more than one worker to wear the same piece of eyewear, employees must disinfect the protective eyewear after each use.

Types of Eye Protection

Safety Spectacles: These protective eyeglasses have safety frames constructed of metal or plastic and impact-resistant lenses. Side shields are available on some models.

Goggles: These tight-fitting eye protectors completely cover the eyes, eye sockets and the facial area immediately surrounding the eyes and provide protection from impact, dust and splashes. Some goggles will fit over corrective lenses.

Welding Shields: Constructed of vulcanized fiber or fiberglass and fitted with a filtered lens, welding shields protect eyes from burns caused by infrared or intense radiant light; they also protect both the eyes and face from flying sparks, metal spatter, and slag chips produced during welding, brazing, soldering and cutting operations. OSHA requires filter lenses to have a shade number appropriate to protect against the specific hazards of the work being performed in order to protect against harmful light radiation.

Laser Safety Goggles: These specialty goggles protect against intense concentrations of light produced by lasers. The type of laser safety goggles an employer chooses will depend upon the equipment and operating conditions in the workplace.

Face Shields: These transparent sheets of plastic extend from the eyebrows to below the chin and across the entire width of the employee's head. Some are polarized for glare protection. Face shields protect against nuisance dusts, potential splashes or sprays of hazardous liquids, and smaller particles, but will not provide adequate protection against larger impact hazards. Face shields must be worn over the top of basic eye protection devices such as goggles or safety spectacles.

Typical uses for face shields include, but are not limited to, the following situations: woodworking operations where chips and particles fly; metal machining that causes flying particles; buffing, polishing, wire brushing, and grinding; operations that cause flying particles or objects; spot welding; and handling of hot or corrosive materials.

Laser Operations

Laser light radiation can be extremely dangerous to the unprotected eye, and direct or reflected beams can cause permanent eye damage.

Laser retinal burns can be painless, so it is essential that all personnel in or around laser operations wear appropriate eye protection.

Laser safety goggles must protect for the specific wavelength of the laser and must be of sufficient optical density for the energy involved. Safety goggles intended for use with laser beams must be labeled with the laser wavelengths for which they provide protection, the optical density of those wavelengths and the visible light transmission.

TABLE1 - LASER SAFETY GLASS

Intensity, CW maximum power density (watts/cm²)	Attenuation	
	Optical density (O.D.)	Attenuation factor
10-²	5	105
10-1	6	106
1.0	7	107
10.0	8	108

Laser safety goggles must protect for the specific wavelength of the laser and must be of sufficient optical density for the energy involved. Safety goggles intended for use with laser beams must be labeled with the laser wavelengths for which they provide protection, the optical density of those wavelengths and the visible light transmission.

When a face shield is used in atmospheres or working areas requiring special conditions of non-conductivity or non-sparking, the equipment and materials used must meet those requirements. A face shield must be identified as a “non-conductive face shield” or “non-sparking face shield.”

Welding Operations

The intense light associated with welding operations can cause serious and sometimes permanent eye damage if operators do not wear proper eye protection. The intensity of light or radiant energy produced by welding, cutting or brazing operations varies according to a number of factors including the task producing the light, the electrode size and the arc current. Table 2 shows the minimum protective shades for a variety of welding, cutting and brazing operations in general industry and in the shipbuilding industry.

Helmets or hand shields must be used during all arc welding or arc cutting operations, excluding submerged arc welding. Helpers or attendants must be provided with proper eye protection. A hand shield must be constructed of materials similar to those used for a helmet, in a like manner, to protect the body from direct radiant energy.

TABLE 2 -- FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operations	Electrode Size 1/32 in.	Arc Current	Minimum (*) Protective Shade
Shielded metal arc welding	Less than 3	Less than 60	7
	3-5	60-160	8
	5-8	160-250	10
	More than 8	250-550	11
Gas metal arc welding and flux cored arc welding		Less than 60	7
		60-160	10
		160-250	10
		250-500	10
Gas tungsten arc welding		Less than 50	8
		50-150	8
		150-500	10
Air carbon arc cutting	(Light)	Less than 500	10
	(Heavy)	500-1000	11
Plasma arc welding		Less than 20	6
		20-100	8
		100-400	10
		400-800	11
Plasma arc cutting	(light)(**)	Less than 300	8
	(medium)(**)	300-400	9
	(heavy)(**)	400-800	10
Torch brazing			3
Torch soldering			2
Carbon arc welding			14

FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operations		Plate Thickness – inches	Plate Thickness – mm	Minimum (*) Protective Shade
Gas Welding	Light	Under ⅛	Under 3.2	4
	Medium	⅛ to ½	3.2 to 12.7	5
	Heavy	Over ½	Over 12.7	6
Oxygen Cutting	Light	Under 1	Under 25	3
	Medium	1 to 6	25-150	4
	Heavy	Over 6	Over 150	5
Footnote (*) As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade, which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation. Footnote (**) These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.				

HEAD PROTECTION

Aversa Bros Industrial Contractors will protect employees from potential head injuries by providing proper head protection and accessories, and ensuring that employees wear these items to protect themselves from injury. Hard hats and helmets can protect employees from impact and penetration hazards, as well as from electrical shock and burn hazards.

Aversa Bros Industrial Contractors will ensure employees wear head protection if any of the following apply:

- Objects might fall from above and strike them on the head;
- They might bump their heads against fixed objects, such as exposed pipes or beams
- There is a possibility of accidental head contact with electrical hazards or any other harmful contacts or exposures
- There is a risk of injury from any of the following:
  - Electric shock
  - Hair entanglement
  - Chemicals
  - Temperature extremes

Some examples of occupations where employees will be required to wear head protection include construction workers, carpenters, electricians, linemen, plumbers and pipefitters, timber and log cutters, welders, among many others. Whenever there's a danger of objects falling from above, such as working below others who are using tools or working under a conveyor belt, head protection must be worn. Hard hats must be worn with the bill forward to protect employees properly.

In general, protective helmets or hard hats should do the following:

- Resist penetration by objects
- Absorb the shock of a blow
- Be water-resistant and slow burning
- Have clear instructions explaining proper adjustment and replacement of the suspension and headband, which must be replaced if slack, twisted, worn out, sweat-soaked, etc.

Hard hats must have a hard outer shell and a shock-absorbing lining that incorporates a headband and straps that suspend the shell from 1 to 1¼ inches (2.54 cm to 3.18 cm) away from the head. This type of design provides shock absorption during an impact and ventilation during normal wear.

A metallic head device must not be furnished by an employer or used by an employee for head protection, except where it has been determined that the use of other types of protective helmets or safety hats or caps is impractical, such as where chemical reaction will cause the deterioration of other types of head protection.

Types of Hard Hats/Helmets

Aversa Bros Industrial Contractors will select protective headgear that meets ANSI standard requirements and will ensure employees wear hard hats/helmets to provide appropriate protection against potential workplace hazards. Hardhat selection must consider all hazards on the worksite, including electrical hazards. This can be done through a comprehensive hazard analysis and an awareness of the different types of protective headgear available.

Hard hats are divided into three industrial classes:

- **Class G** (formerly Class A) hard hats (General) provide impact and penetration resistance along with limited voltage protection (up to 2,200 volts)
- **Class E** (formerly class B) hard hats (Electrical) provide the highest level of protection against electrical hazards, with high-voltage shock and burn protection (up to 20,000 volts). They also provide protection from impact and penetration hazards by flying/falling objects
- **Class C** hardhats (Conductive) provide lightweight comfort and impact protection but offer no protection from electrical hazards

In addition, hard hats/helmets that protect against impacts are classified as either:

- **Type I** – Helmets that are intended to reduce the force of impact resulting from a blow only to the top of the head
- **Type II** – Helmets that are intended to reduce the force of impact resulting from a blow to the top or sides of the head

Another class of protective headgear on the market is called a “bump hat,” designed for use in areas with low head clearance. They are recommended for areas where protection is needed from head bumps and lacerations. These are not designed to protect against falling or flying objects and are not ANSI approved. It is essential to check the type of hardhat employees are using to ensure that the equipment provides appropriate protection. Each hat will have a label inside the shell that lists the manufacturer, the ANSI designation and the class of the hat.

Size and Care Considerations

Head protection that is too large or too small is inappropriate for use, even if it meets all other requirements. Protective headgear must fit appropriately on the body and for the head size of each individual. Most protective headgear comes in a variety of sizes with adjustable headbands to ensure a proper fit (many adjust in ⅛-inch increments). A proper fit allows sufficient clearance between the shell and the suspension system for ventilation and distribution of an impact. The hat must not bind, slip, fall off or irritate the skin.

Some protective headgear allows for the use of various accessories to help employees deal with changing environmental conditions, such as slots for earmuffs, safety glasses, face shields and mounted lights. Optional rims may provide additional protection from the sun and some hats have channels that guide rainwater away from the face. Protective headgear accessories must not compromise the safety elements of the equipment.

Periodic cleaning and inspection will extend the useful life of protective headgear. A daily inspection of the hardhat shell, suspension system, and other accessories for holes, cracks, tears or other damage that might compromise the protective value of the hat is essential. Paints, paint thinners and some cleaning agents can weaken shells of hard hats and may eliminate electrical resistance. Consult the helmet manufacturer for information on the effects of paint and cleaning materials on their hard hats. Never drill holes, paint, or apply labels to protective headgear as this may reduce the integrity of the protection. Do not store protective headgear in direct sunlight, such as on the rear window shelf of a car, since sunlight and heat can damage them.

Hardhats with any of the following defects must be removed from service and replaced:

- Perforation, cracking, or deformity of the brim or shell
- Indication of exposure of the brim or shell to heat, chemicals or ultraviolet light and other radiation (in addition to a loss of surface gloss, such signs include chalking or flaking)

Always replace a hardhat if it sustains an impact, even if damage isn't noticeable. Suspension systems are available as replacement parts, and must be replaced if damaged or excessive wear is noticed. It's not necessary to replace the entire hard hat when deterioration or tears of the suspension systems are noticed.

Hoods

A hood must be made of materials that combine all of the following:

- Have mechanical strength and lightness of weight to a high degree
- Be non-irritating to the skin when subjected to perspiration
- Be capable of withstanding frequent cleaning and disinfection
- Materials used in the manufacture of hoods must be suitable to withstand the hazards to which the user may be exposed
- A hood must be designed to provide adequate ventilation for the wearer

A protective helmet must be used in conjunction with a hood where there is a head injury hazard and the hood must be designed to accommodate helmets.

Accessories

Faceshield Protection: Faceshield devices can be attached to the helmet without changing the helmet strength and electrical protection. A metal faceshield bracket system can be used on a Class G helmet; however, if a Class E helmet is to be used in an area where Class E protection is required, a type of bracket and shield system that won't conduct electricity (has a dielectric rating) must be used.

Earmuffs: The required degree of hearing protection will be considered prior to selecting earmuff attachments. If earmuffs are to be attached to helmets, metal attachments are acceptable for Class G helmets. Attachments with a dielectric rating must be used for Class E helmets.

Sweat Bands: If sweatbands are necessary, they must not interfere with the effectiveness of the helmet headband system. Some sweatband devices are made to fit on the headband. For electrical work, metal components must not be used to attach sweatbands to helmets.

Winter Liners: There are many varieties of winter liners. One type fits over the hardhat assembly. It must be flame retardant and elasticized to give the user a snug, warm fit. Other styles fit under the helmet. If the liner is to be used with a Class E helmet, it must have a dielectric rating. Regardless of the warmth characteristics, the liner and helmet combination must be compatible. The liner and helmet must fit properly to give the employee proper impact and penetration protection.

Chin Straps: When wind or other conditions present the possibility of the hard hat being accidentally removed from the head, chinstraps can be used. If chinstraps are used, they must be the type that fastens to the shell of the hard hat. If the chinstraps fasten to the headband and suspension system, the shell may blow off and strike another employee.

Hair Enclosures: Employees must wear a hat, cap or net if there's a danger of hair entanglement in moving machinery or equipment, or where there's a risk of exposure to an ignition source. Hair enclosures must completely enclose all loose hair; be adjustable to accommodate all head sizes; be designed to be reasonably comfortable to the wearer.

FOOT AND LEG PROTECTION

Employees who are exposed to possible foot or leg injuries from falling or rolling objects or from crushing or penetrating materials must wear protective footwear. In addition, employees whose work involves exposure to hot substances or corrosive or poisonous materials must have protective gear to cover exposed body parts, including legs and feet. If an employee's feet may be exposed to electrical hazards, nonconductive footwear must be worn. On the other hand, workplace exposure to static electricity may necessitate the use of conductive footwear.

An employer must ensure that employees wear protective footwear when working in areas where any of the following occur:

- Employees' feet are exposed to electrical hazards
- There is a danger of foot injuries due to falling or rolling objects, such as barrels or tools
- There is a danger of sharp objects, such as nails or spikes, piercing the soles of shoes
- There is exposure to molten metal that might splash on feet or legs
- There is possible exposure to chemical spills

Employees must also wear proper footwear (including protective footwear when necessary) when working on or around hot, wet, or slippery surfaces.

Foot and leg protection choices include the following:

- Leggings or high boots made of a suitable material (e.g. leather, rubber) for workers exposed to dangerous chemical spill and heat hazards such as molten metal or welding sparks
- When an employee uses a chain saw, he must wear chaps or leg protectors, made from material designed to resists cuts, covering from at least upper thigh to mid-calf
- Metatarsal guards protect the instep area from impact and compression. Made of aluminum, steel, fiber, or plastic, these guards may be strapped to the outside of shoes. Footwear designed to newer versions of ANSI Z41 and the ASTM standards require metatarsal protection to be built into the footwear
- Toe guards fit over the toes of regular shoes to protect the toes from impact and compression hazards. They may be made of steel, aluminum, or plastic

An employer who chooses to provide employees with toe guards must demonstrate that they are as protective as an incorporated toebox used in safety-toe footwear.

- Combination foot and shin guards protect the lower legs and feet, and may be used in combination with toe guards when greater protection is needed
- Safety shoes have impact-resistant toes and heat-resistant soles that protect the feet against hot work surfaces common in roofing, paving and hot metal industries. The metal insoles of some safety shoes protect against puncture wounds. Safety shoes may also be designed to be electrically conductive to prevent the buildup of static electricity in areas with the potential for explosive atmospheres or nonconductive to protect workers from workplace electrical hazards
- If a hazard is created from a process, environment, chemical, or mechanical irritant that could cause an injury or impairment to the feet by absorption or physical contact, other than from impact, the employer must provide any of the following to the employee:
  - Boots
  - Overshoes
  - Rubbers
  - Wooden-soled shoes
  - An equivalent of the above

Special Purpose Shoes

Electrically conductive shoes provide protection against the buildup of static electricity. Employees working in explosive and hazardous locations such as explosives manufacturing facilities or grain elevators must wear conductive shoes to reduce the risk of static electricity buildup on the body that could produce a spark and cause an explosion or fire.

Don’t use foot powder when wearing protective conductive footwear because it provides insulation, reducing the conductive ability of the shoes. Don’t wear silk, wool and nylon socks that can produce static electricity with conductive footwear. Conductive shoes must be removed when the task requiring their use is completed.

Employees exposed to electrical hazards must never wear conductive shoes. Electrical hazard, safety-toe shoes are non-conductive, and will prevent the wearers' feet from completing an electrical circuit to ground. These shoes can protect against open circuits of up to 600 volts in dry conditions, and should be used with other insulating equipment and additional precautions to reduce the risk of a worker becoming a path for hazardous electrical energy.

The insulating protection of electrical hazard, safety-toe shoes may be compromised if the shoes become wet, the soles are worn through, metal particles become embedded in the sole or heel, or workers touch conductive grounded items. Note: Nonconductive footwear must not be used in explosive or hazardous locations.

Foundry shoes insulate the feet from the extreme heat of molten metal. They keep hot metal from lodging in shoe eyelets, tongues or other shoe parts. These snug-fitting leather or leather-substitute shoes have leather or rubber soles and rubber heels. All foundry shoes must have built-in safety toes.

Care of Protective Footwear

As with all protective equipment, safety footwear must be inspected prior to each use. Shoes and leggings need to be checked for wear and tear at reasonable intervals. This includes looking for cracks or holes, separation of materials, broken buckles or laces. Check the soles of shoes for pieces of metal or other embedded items that could present electrical or tripping hazards. Employees will follow the manufacturers' recommendations for cleaning and maintenance of protective footwear.

HAND AND ARM PROTECTION

If a workplace hazard assessment reveals employees face potential injury to hands and arms that cannot be eliminated through engineering and work practice controls, Aversa Bros Industrial Contractors will ensure employees wear appropriate protection. Potential hazards that require protection include skin absorption of harmful substances, chemical or thermal burns, electrical dangers, bruises, abrasions, cuts, punctures, fractures, amputations and harmful temperature extremes.

Protective equipment includes gloves, finger guards, and arm coverings. In addition, items such as machine guards and barriers are examples of engineering controls that may eliminate hazards to the hands and arms.

Types of Protective Gloves

There are many types of gloves available today to protect against a wide variety of hazards. The nature of the hazard and the operation involved will affect the selection of gloves. The variety of potential occupational hand injuries makes selecting the right pair of gloves challenging. No gloves can provide protection against all potential hand hazards. Employees must use gloves specifically designed for the hazards and tasks found in their workplace. Gloves designed for one function may not protect against a different function even though they may appear to be an appropriate protective device.

The following are examples of some factors that may influence the selection of protective gloves for a workplace:

- Type of chemicals handled (toxic properties of the chemical(s))
- Chemical concentration and temperature (the higher the concentration and temperature, the shorter the breakthrough time)
- Nature of contact (total immersion, continual contact, splash, etc)
- Duration of contact
- Area requiring protection (hand only, forearm, arm)
- Degree of dexterity (fine motor work)
- Grip requirements (dry, wet, oily)
- Thermal protection
- Size and comfort
- Abrasion/cut resistance requirements
- Other job hazards (such as biological, electrical, and radiation hazards)

Gloves are made from a wide variety of materials and are designed for many types of workplace hazards. In general, gloves fall into four groups:

- Gloves made of leather, synthetic fibers, or metal mesh
- Fabric and coated fabric gloves
- Chemical protective gloves
- Insulating rubber gloves (See 29 CFR 1910.137, Electrical Protective Equipment, for detailed requirements on the selection, use and care of insulating rubber gloves)

Leather, Canvas or Metal Mesh Gloves

- Sturdy gloves made from metal mesh, leather or canvas provide protection against cuts and burns. Leather or canvas gloves also protect against sustained heat
- Leather gloves protect against sparks, moderate heat, blows, chips and rough objects. These gloves can be used for tasks such as welding
- Aluminized gloves provide radiant heat protection by reflection and insulate/reduce heat conduction with a liner or insert. Employees working with molten materials would benefit from this type of glove
- Aramid fiber gloves such as Kevlar, protect against heat, are cut- and abrasion-resistant and wear well. Employees working in jobs such as firefighting, automotive work, metal fabrication, glass and ceramic handling would benefit from this type of glove
- Synthetic gloves of various materials offer protection against heat and cold, are cut- and abrasion-resistant and may withstand some diluted acids. These materials do not stand up against alkalis and solvents
- Metal mesh hand, wrist, arm and finger protective wear protects against knife cuts; however, it offers very little, if any, protection against punctures. Plastic dots can be adhered to the metal mesh to facilitate gripping

Fabric and Coated Fabric Gloves

Fabric and coated fabric gloves are made of cotton or other fabric to provide varying degrees of protection.

- Fabric gloves protect against dirt, slivers, chafing and abrasions. They do not provide sufficient protection for use with rough, sharp or heavy materials. Adding a plastic coating will strengthen some fabric gloves
- Coated fabric gloves normally are made from cotton flannel with napping on one side. By coating the un-napped side with plastic, fabric gloves are transformed into general-purpose hand protection offering slip-resistant qualities. These gloves are used for tasks ranging from handling bricks and wire to chemical laboratory containers. When selecting gloves to protect against chemical exposure hazards, always check with the manufacturer or review the manufacturer's product literature to determine the gloves' effectiveness against specific workplace chemicals and conditions

Chemical- and Liquid-Resistant Gloves

Chemical-resistant gloves are made with different kinds of rubber: natural, butyl, neoprene, nitrile and fluorocarbon (viton); or various kinds of plastic: polyvinyl chloride (PVC), polyvinyl alcohol and polyethylene. These materials can be blended or laminated for better performance. As a general rule, the thicker the glove material, the greater the chemical resistance but thick gloves may impair grip and dexterity, having a negative impact on safety

Some examples of chemical-resistant gloves include:

- Butyl gloves are made of a synthetic rubber and protect against a wide variety of chemicals, such as peroxide, rocket fuels, highly corrosive acids (nitric acid, sulfuric acid, hydrofluoric acid and red-fuming nitric acid), strong bases, alcohols, aldehydes, ketones, esters and nitro-compounds. Butyl gloves also resist oxidation, ozone corrosion and abrasion, and remain flexible at low temperatures. Butyl rubber does not perform well with aliphatic and aromatic hydrocarbons and halogenated solvents
- Natural (latex) rubber gloves are comfortable to wear, which makes them a popular general-purpose glove. They feature outstanding tensile strength, elasticity and temperature resistance. In addition to resisting abrasions caused by grinding and polishing, these gloves protect workers' hands from most water solutions of acids, alkalis, salts and ketones. Latex gloves have caused allergic reactions in some individuals and may not be appropriate for all employees. Hypoallergenic gloves, glove liners and powderless gloves are possible alternatives for workers who are allergic to latex gloves
- Neoprene gloves are made of synthetic rubber and offer good pliability, finger dexterity, high density, and tear resistance. They protect against hydraulic fluids, gasoline, alcohols, organic acids and alkalis. They generally have chemical and wear resistance properties superior to those made of natural rubber

- Nitrile gloves are made of a copolymer and provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene. Although intended for jobs requiring dexterity and sensitivity, nitrile gloves stand up to heavy use even after prolonged exposure to substances that cause other gloves to deteriorate. They offer protection when working with oils, greases, acids, caustics, and alcohols but are generally not recommended for use with strong oxidizing agents, aromatic solvents, ketones, and acetates

Care of Protective Gloves

Protective gloves will be inspected before each use to ensure they are not torn, punctured or made ineffective in any way. A visual inspection will help detect cuts or tears but a more thorough inspection by filling the gloves with water and tightly rolling the cuff towards the fingers will help reveal any pinhole leaks. Gloves that are discolored or stiff may also indicate deficiencies caused by excessive use or degradation from chemical exposure. Interiors of gloves must be kept free of corrosive or irritating contaminants.

Any gloves with impaired protective ability must be discarded and replaced. Reuse of chemical-resistant gloves must be evaluated carefully, taking into consideration the absorptive qualities of the gloves. A decision to reuse chemically exposed gloves should take into consideration the toxicity of the chemicals involved and factors such as duration of exposure, storage and temperature. All gloves must be sanitized and clean before reissue.

BODY PROTECTION

Employees who face possible bodily injury of any kind that cannot be eliminated through engineering, work practice or administrative controls must wear appropriate body protection while performing their jobs. In addition to radiation, the following are workplace hazards that could cause bodily injury, and require protection:

- Temperature extremes
- Hot splashes from molten metals and other hot liquids
- Potential impacts from tools, machinery, and materials
- Hazardous chemicals
- Wetness

There are many varieties of protective clothing available for specific hazards. Employers are required to ensure that their employees wear personal protective equipment only for the parts of the body exposed to possible injury. Examples of body protection include laboratory coats, coveralls, vests, jackets, aprons, surgical gowns and full body suits.

If a hazard assessment indicates a need for full body protection against toxic substances or harmful physical agents, the clothing must be carefully inspected before each use, it must fit each worker properly and it must function properly and for the purpose for which it is intended.

Protective clothing comes in a variety of materials, each effective against particular hazards, such as:

- Paper-like fiber, which is used for disposable suits provide protection against dust and splashes
- Treated wool and cotton, which adapts well to changing temperatures, is comfortable and fire-resistant, and protects against dust, abrasions and rough, irritating surfaces

- Duck, which is a closely woven cotton fabric that protects against cuts and bruises when handling heavy, sharp, or rough materials
- Leather, which is often used to protect against dry heat and flames
- Rubber, rubberized fabrics, neoprene and plastics, which protect against certain chemicals and physical hazards
- When chemical or physical hazards are present, check with the clothing manufacturer to ensure that the material selected will provide protection against the specific hazard

HEARING PROTECTION

Determining the need to provide hearing protection for employees can be challenging. Employee exposure to excessive noise depends upon a number of factors, including:

- The loudness of the noise as measured in decibels (dB)
- The duration of each employee's exposure to the noise
- Whether employees move between work areas with different noise levels
- Whether noise is generated from one or multiple sources

Generally, the louder the noise, the shorter the exposure time before hearing protection is required. For instance, employees may be exposed to a noise level of 85 dB for 8 hours per day (unless they experience a Standard Threshold Shift) before hearing protection is required. At a noise level of 85 dB the Company is required to implement a hearing protection program that includes monitoring, employee audiometric testing and training on the use of hearing protection. If employees are exposed to a noise level of 115 dB, hearing protection is required and the exposure time can't exceed 15 minutes. For more information on the requirements for a comprehensive hearing conservation program, see the chapter on hearing protection.

If engineering and work practice controls do not lower employee exposure to workplace noise to acceptable levels, employees must wear appropriate hearing protection. It is important to understand that hearing protectors reduce only the amount of noise that gets through to the ears. The amount of this reduction is referred to as attenuation, which differs according to the type of hearing protection used and how well it fits. Hearing protectors worn by employees must reduce an employee's noise exposure to within the acceptable limits.

Types of hearing protection include the following:

- Single-use earplugs are made of waxed cotton, foam, silicone rubber or fiberglass wool. They are self-forming and, when properly inserted, they work as well as most molded earplugs
- Pre-formed or molded earplugs must be individually fitted by a professional and can be disposable or reusable. Reusable plugs must be cleaned after each use
- Earmuffs require a perfect seal around the ear. Glasses, facial hair, long hair, or facial movements such as chewing may reduce the protective value of earmuffs

Safety Belts, Lifelines, And Lanyards

The only acceptable use of lifelines, safety belts and lanyards is to safeguard employees. If a lifeline, safety belt or lanyard is subjected to in-service loading; it must be removed from service and discarded.

- Lifelines must be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds
- If a lifeline is subject to cutting or abrasion, as may be the case on rock scaling operations, it must be at least ⅞-inch wire core manila rope. Otherwise, it may be a ¾-inch manila or equivalent, with a nominal breaking strength of at least 5,400 pounds
- Safety belt lanyards will be at least ½-inch nylon and provide for a fall that does not exceed 6 feet. They must also have a nominal breaking strength of 5,400 pounds
- Hardware on safety belts and lanyards in use must be drop forged or pressed steel or cadmium plated according to federal specifications. The surface must be smooth and free of sharp edges
- Safety belt and lanyard hardware, except rivets, must withstand a tensile loading of 4,000 pounds without cracking, breaking, or taking a permanent deformation

For more information, see the “Fall Protection” chapter.

OTHER PPE

High Visibility Apparel

High visibility apparel must be used by workers involved in traffic control, such as flaggers or law enforcement officers, or for employees who work on the roadways, such as sanitation, utility or construction workers and emergency responders. The apparel must be high visibility orange, yellow, yellow-green or a fluorescent version so that it contrasts with the surrounding area. Reflective material visible from all sides for 1,000 feet must be worn during dark hours.

Flotation Vests

Employees working over or near water, where the danger of drowning exists, will be provided with approved life jackets or buoyant work vests. These vests are available as flotation pads inside high visibility international orange nylon shells or as vinyl coated flotation pads of international orange. The flotation vests must be U.S. Coast Guard approved.

Additionally, in any other workplace where employees work over or near water, or use boats, approved life jackets, buoyant work vests or other flotation devices must be provided. All buoyant work vests and life preservers will be checked for defects before and after each use.

Welding and High Heat

Coveralls, jackets, pants and aprons are available for operations involving high heat or molten metal splashes. Leather is the traditional protective material for many welding operations. Where there is exposure to radiant heat as well as molten metal splashes, aluminized garments may be used. They reflect up to 95 percent of the radiant heat. Flame-resistant cotton coveralls designed for comfort and protection are sometimes preferred. Whatever the type of clothing used for welding operations, it must not have external pockets or cuffs. Fabrics of silica, ceramic and fiberglass eliminate the need for asbestos and are now available for welding operations. Protective clothing with asbestos will not be used.

FORMS AND ATTACHMENTS

Please find on the following pages the PPE Hazard Assessment Certification Form, which may be reproduced freely by Aversa Bros Industrial Contractors for the purposes of implementing and maintaining a safety and health program.

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 1 OF 5)

Workplace		Conducted By	
Address		Date	
Area(s)		Job or Task	

Eyes

Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ abrasive blasting ☐ chopping ☐ cutting ☐ drilling ☐ hammering ☐ other: ☐ punch press operations ☐ sanding ☐ sawing ☐ grinding ☐ chipping	☐ airborne dust ☐ dirt ☐ UV ☐ flying particles/ objects ☐ blood splashes ☐ hazardous liquid chemicals and mists ☐ chemical splashes ☐ molten metal splashes ☐ glare/ high intensity lights ☐ laser operations ☐ intense light ☐ hot sparks ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Safety glasses ☐ Safety goggles ☐ Dust-tight goggles ☐ Impact goggles ☐ Welding helmet/shield ☐ Chemical goggles ☐ Chemical splash goggles ☐ Laser goggles ☐ Shading/ Filter (# ___) ☐ Welding shield ☐ Other: **With:** ☐ Side shields ☐ Face shield ☐ Shaded ☐ Prescription

Face

Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ cleaning ☐ cooking ☐ siphoning ☐ painting ☐ dip tank operations ☐ pouring ☐ other: ☐ foundry work ☐ welding ☐ mixing ☐ pouring molten metal ☐ working outdoors	☐ hazardous liquid chemicals ☐ extreme heat ☐ extreme cold ☐ potential irritants ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Face shield ☐ Shading/ filter (#____) ☐ Welding shield ☐ other:

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 2 OF 5)

Head				
Work activities, such as		Work-related exposure to	Can hazard be eliminated without the use of PPE?	
☐ building maintenance ☐ confined space operations ☐ electrical wiring ☐ walking/ working under catwalks ☐ walking/ working on catwalks	☐ walking/ working under conveyor belts ☐ working with/ around conveyor belts ☐ walking/ working under crane loads ☐ utility work ☐ other:	☐ beams ☐ pipes ☐ exposed electrical wiring or components ☐ falling objects ☐ fixed object ☐ machine parts ☐ other:	☐ Yes **If No, use:** ☐ Protective Helmet ☐ Type G (low voltage) ☐ Type E (high voltage) ☐ Type C	☐ No ☐ Bump cap (not ANSI-approved) ☐ Hair net or soft cap ☐ other:
Hand/Arms				
Work activities, such as		Work-related exposure to	Can hazard be eliminated without the use of PPE?	
☐ baking ☐ cooking ☐ grinding ☐ welding ☐ working with glass ☐ using computers ☐ using knives ☐ dental and health care services	☐ garbage disposal ☐ computer work ☐ material handling ☐ sanding ☐ sawing ☐ hammering ☐ using power tools ☐ working outdoors ☐ other:	☐ blood ☐ irritating chemicals ☐ tools or materials that could scrape, bruise, or cut ☐ extreme heat ☐ extreme cold ☐ animal bites ☐ electric shock ☐ vibration ☐ musculoskeletal disorders ☐ sharps injury ☐ other:	☐ Yes **If No, use:** ☐ Gloves ☐ Chemical resistance ☐ Liquid/leak resistance ☐ Temperature resistance ☐ Abrasion/cut resistance ☐ Slip resistance ☐ Latex or nitrile ☐ Anti-vibration	☐ No ☐ Protective sleeves ☐ Ergonomic equipment _____ ☐ Other:

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 3 OF 5)

Feet/Legs		
Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ building maintenance ☐ construction ☐ demolition ☐ food processing ☐ foundry work ☐ working outdoors ☐ logging ☐ plumbing ☐ trenching ☐ use of highly flammable materials ☐ welding ☐ other:	☐ explosive atmospheres ☐ explosives ☐ exposed electrical wiring or components ☐ heavy equipment ☐ slippery surfaces ☐ impact from objects ☐ pinch points ☐ slippery/wet surface ☐ crushing ☐ sharps injury ☐ blood ☐ chemical splash ☐ chemical penetration ☐ extreme heat/cold ☐ fall ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Safety shoes or boots ☐ Toe protection ☐ Electrical protection ☐ Puncture resistance ☐ Anti-slip soles ☐ Leggings or chaps ☐ Foot-Leg guards ☐ Metatarsal protection ☐ Heat/Cold protection ☐ Chemical resistance ☐ Other:
Body/Skin		
Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ baking or frying ☐ battery charging ☐ dip tank operations ☐ fiberglass installation ☐ sawing ☐ other:	☐ chemical splashes ☐ extreme heat ☐ extreme cold ☐ sharp or rough edges ☐ irritating chemicals ☐ blood ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Vest ☐ Coveralls ☐ Raingear ☐ Apron ☐ Welding leathers ☐ Abrasions/ cut resistance ☐ Other:

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 4 OF 5)

Body/Whole			
Work activities, such as	Work-related exposure to		Can hazard be eliminated without the use of PPE?
☐ building maintenance ☐ construction ☐ logging ☐ computer work ☐ working outdoors ☐ utility work ☐ other:	☐ working from heights of 10 feet or more ☐ impact from flying objects ☐ impact from moving vehicles ☐ sharps injury ☐ blood ☐ electrical/ static discharge ☐ hot metal ☐ sparks	☐ musculo-skeletal disorders ☐ chemicals ☐ extreme heat/cold ☐ elevated walking/working surface ☐ working near water ☐ injury from slip/trip/fall ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Fall arrest/restraint ☐ Traffic vest ☐ Static coats/overalls ☐ Flame resistant jacket/pants ☐ Insulated jacket ☐ Cut-resistant sleeves/ wristlets ☐ Hoists/lift ☐ Ergonomic equipment _____ ☐ Other: **With:** ☐ Hood ☐ Full sleeves
Lungs/Respiratory			
Work activities, such as	Work-related exposure to		Can hazard be eliminated without the use of PPE?
☐ cleaning ☐ mixing ☐ painting ☐ fiberglass installation ☐ compressed air or gas operations ☐ confined space work ☐ floor installation ☐ ceiling repair ☐ working outdoors ☐ pouring ☐ sawing ☐ other:	☐ dust or particulate ☐ toxic gas/vapor ☐ chemical irritants (acids) ☐ welding fume ☐ asbestos ☐ pesticides	☐ organic vapors ☐ oxygen deficient environment ☐ paint spray extreme heat/ cold ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Dust mask ☐ Disposable particulate respirator ☐ Replaceable filter particulate w/cartridge ☐ PAPR (air recycle) ☐ PPSA (air supply) **With:** ☐ Face shield ☐ Acid/gas crtg ☐ Organic crtg ☐ Pesticide crtg ☐ Spray paint crtg ☐ Half-faced ☐ Full-faced ☐ Hooded

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 5 OF 5)

Ears/Hearing		
Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ generator ☐ ventilation fans ☐ motors ☐ sanding ☐ pneumatic equipment ☐ punch or brake presses ☐ use of conveyers ☐ grinding ☐ machining ☐ routers ☐ sawing ☐ sparks ☐ other:	☐ loud noises ☐ loud work environment ☐ noisy machines/tools ☐ punch or brake presses ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Ear muffs ☐ Ear plugs ☐ Leather welding hood
Additional Notes		

POLICY

Aversa Bros Industrial Contractors is committed to the safety and health of its employees. To identify and control hazards presented by products that contain materials, chemicals or components that may cause injury or illness in the workplace, Aversa Bros Industrial Contractors has in place a Hazard Communication Program (HCP) to provide information to employees about any hazardous materials to which they are exposed.

If Aversa Bros Industrial Contractors employees are exposed to any hazardous chemical, Aversa Bros Industrial Contractors designates Frank Aversa to ensure a written HCP is created, communicated to all employees, and maintained according to all applicable regulations, standards and industry best practices.

All aspects of this policy and the Aversa Bros Industrial Contractors Hazard Communication Program are subject to annual review by Frank Aversa to verify the effectiveness of the policy, to guarantee a safe working environment for Aversa Bros Industrial Contractors employees, and to reflect any regulatory changes to which the policy must respond.

OSHA has adopted the United Nation's Globally Harmonized System (GHS) of Classification and Labeling of Chemicals into its Hazard Communication standard, this includes:

- Safety Data Sheets (SDS) and their new format instead of Material Safety Data Sheets (MSDS)
- The requirements and formats for the new primary and secondary labels
- Employee Training requirements so workers understand the risks to safety and health that hazardous materials pose at their worksite, and being able to read and understand the new SDS sheets and labels."

The Hazard Communication Program (HCP) describes how Aversa Bros Industrial Contractors will meet all applicable requirements regarding identifying hazardous chemicals, labeling under the GHS guidelines, providing availability of safety data sheets (SDS), and employee information and training.

The HCP also will include the following:

- A list of chemicals (SDS) in inventory known to present a hazard to Aversa Bros Industrial Contractors employees
- Methods Aversa Bros Industrial Contractors will use to inform employees of hazards presented by non-routine tasks
- Methods Aversa Bros Industrial Contractors will use to inform employees of hazards associated with chemicals contained in unlabeled pipes in their work areas

EMPLOYER RESPONSIBILITIES

- It is the responsibility of Aversa Bros Industrial Contractors (through Frank Aversa) to:
- Establish a Hazard Communication Program if employees work with or around any potentially hazardous material
- Ensure that proper safeguards are in place to ensure the safety of personnel working with or around hazardous chemicals
- Maintain a list of hazardous chemicals that exist in the workplace as well as in formation on the hazards they present (SDS), and ensure that every employee can readily access them
- Ensure all hazardous chemicals in the workplace are labeled and have a complete safety data sheet on file
- Ensure all employees are trained on the Hazard Communication Program (HCP)
- Provide support for the implementation of HCP
- Review the HCP at least annually to evaluate the effectiveness of the program
- Report the use of known carcinogens to the state OSHA division as required.

EMPLOYEE RESPONSIBILITIES

Every Aversa Bros Industrial Contractors employee is expected to:

- Follow safety policy and adhere to all precautions and safety requirements when working with or around hazardous chemicals
- Understand the hazards of the chemicals in the workplace by reviewing SDS before using any hazardous chemical
- Understand how to lessen or prevent exposure to hazardous chemicals through safe work practices and use of personal protective equipment
- Understand emergency procedures in the event of exposure to these chemicals
- Verify the proper labeling of chemicals at the worksite, and the presence of SDS for each
- Report any deficiencies in hazard communication as soon as safely possible to his or her supervisor
- Attend and participate actively in safety trainings

TRAINING

Aversa Bros Industrial Contractors will provide training covering all aspects of the Hazard Communication Program. Aversa Bros Industrial Contractors will provide training on hazardous chemicals in their employee's work area at the time of assignment and whenever a new hazard is introduced to their work area.

All employees who may be exposed to hazardous chemicals under normal operating conditions while performing their job duties in their assigned work areas must receive training. Aversa Bros Industrial Contractors may design training or use training designed to cover categories of hazards or specific chemicals.

The HCP will be made available upon request to any employee (or their designated representatives) and any regulatory official with the authority to demand it.

Training Components

Frank Aversa will ensure that all employees at Aversa Bros Industrial Contractors are informed and trained in the following minimum elements for hazard communication:

- The requirements of regulatory bodies, industry standards and best safety practices regarding specific chemicals
- Operations in the employee's work area that involve hazardous chemicals
- Physical, health, simple asphyxiation, combustible dust, and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area
- Reading and understanding hazardous chemical labeling, including pictograms, signal words, hazard statements, and precautionary statements
- The availability and location of the written HCP, list of hazardous chemicals, and SDS
- How to detect the presence or release of a hazardous chemical in the work area
- The classified and unclassified hazards of chemicals in the work area
    - The Globally Harmonized System of Classification (GHS) determines if a substance or mixture meets their criteria for a hazardous substance, meaning harmful to the environment or to humans. OSHA has adopted the GHS classification of chemicals. Those substances that are identified as hazardous are referred to as Classified. Substances that have not yet been classified are referred to as 'Hazards Not Otherwise Classified' (HNOC) or Unclassified.
- Measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented for employee protection
- The details of the HCP, including an explanation of all labels and SDS, how employees can obtain and use the appropriate hazard information. Training must include the order of information on the SDS and how to obtain and use the hazard information

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Aversa Bros Industrial Contractors will retain employee training records for the length of their employment.

HAZARD DETERMINATION AND COMMUNICATION

Aversa Bros Industrial Contractors will rely on the evaluation of the chemical manufacturer or importer of any hazardous chemicals at the worksite to provide the identifying labels and safety data information required for the HCP.

Container Warning Labels

The purpose of a container warning label is to warn employees about the container's contents and to refer employees to an appropriate SDS for more information about the chemical's physical and health hazards. Manufacturers, importers and distributors must ensure that each hazardous chemical product sold to you has a label that includes the chemical's identity, a hazard warning, and a name and address for additional information about the product. If you use hazardous chemicals at your workplace, you must ensure that each hazardous chemical container has a legible label, in English that identifies the chemical and warns of its hazards.

Original Containers

Original containers of hazardous chemicals from a manufacturer, importer or distributor must have warning labels. Do not remove or deface them.

The GHS does not specify a label format or layout, but requires the inclusion of several elements. All hazardous material containers at Aversa Bros Industrial Contractors will be labeled, tagged or marked with the following:

1. **Product Identifier**. The product identifier must match the identifier on the safety data sheet and include the chemical identity of the substance or ingredients in a mixture that contribute to the product's hazards.

2. **Pictograms**. Pictograms are combinations of graphical elements that convey information about the product's hazards. GHS hazard pictograms are a black symbol on a white field within a red diamond.

3. **Signal Word**. Signal words indicate the severity of the product's hazard. "Danger" indicates severe hazards while "Warning" indicates less sever hazards.

4. **Hazard Statements**. Hazard statements are assigned based on the nature of the product's hazards.

5. **Precautionary Statements**. Precautionary statements inform the reader about how to prevent or minimize the negative effects of storing or handling the product unsafely. They fall into four categories: prevention, response, storage and disposal.

6. **Supplier Identification**. The supplier identification includes the name, address and telephone number that can be used to locate or communicate with the manufacturer or supplier.

Other Elements: GHS permits competent authorities to require or allow additional information and specify where it must be presented on the product label as long as it does not impede, contradict or confuse the standard information. Examples include transport pictograms, precautionary pictograms, first-aid recommendations, universal product codes, general usage information, etc.

Secondary/Portable Containers

Secondary containers are used to hold material transferred from the manufacturers' original container. These must be labelled if:

- It's not used within the work shift by the individual who makes the transfer
- The worker who made the transfer leaves the work area
- The container is moved to another work area and is no longer in the possession of the person who filled the container

Aversa Bros Industrial Contractors will verify that workplace labels or other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift. If Aversa Bros Industrial Contractors has employees who speak other languages, the company may add the information in their language to the material presented, as long as the information is presented in English as well.

Labels for secondary containers must include:

- The identity of the chemical and appropriate hazard warnings must be shown on the label.
- The hazard warning that provides users with an immediate understanding of the primary health and/or physical hazard(s) of the chemical through the use of words, pictures, symbols, or any combination of these elements
- The name and address of the manufacturer, importer or other responsible party

The hazard label message must be legible, permanently displayed and written in English

Portable containers are intended for immediate use of a chemical by the person who makes the transfer. Labels on portable containers are not required if the worker who made the transfer uses all of the contents during the work shift, or the chemical is return to a labelled primary or secondary container at the end of the shift, or when work is completed.

For unclassified hazards, the label requires supplementary information, a description of the unclassified hazards and appropriate precautionary measures to take for safe handling and use.

- Alternatively, hazardous material containers at Aversa Bros Industrial Contractors can be marked with the product identifier and words, pictures, symbols, or combination thereof, to provide at least general information regarding the hazards of the chemicals. Labeling is done in conjunction with other information immediately available to employees under the HCP to provide employees with the specific information regarding the physical and health hazards of the hazardous chemical
- Instead of labelling individual containers, the Aversa Bros Industrial Contractors HCP may rely on signs, placards, process sheets, batch tickets, operating procedures or similar written materials, as long as the alternative method provides workers with the same information. See the signage provisions of the National Fire Protection Association contained in NFPA 704 – Standard System for the Identification of the Hazards of Materials for Emergency Response
- A container for a hazardous substance into which the substance has been transferred for immediate use does not have to be labeled. Labels are necessary, however, for any container that is stored
- No employee will remove or deface labels or other forms of warnings
- Aversa Bros Industrial Contractors will check that labels are legible in English, but may present the chemical's hazard information in another language, as long as it's also present in English

- Don't use any container that's contained a hazardous substance unless the it's been thoroughly cleaned to remove all traces of any hazardous substance, except where the container is refilled with the same substance
- Verify that every container is correctly labeled with regard to its contents

SAFETY DATA SHEETS

Aversa Bros Industrial Contractors will continuously compile and keep at the workplace a list of all known hazardous chemicals that are present

The GHS does not specify a specific format or layout for the data sheet, but requires the inclusion of several elements, which will include the following section numbers and headings, and the information about the chemical associated with each:

- Section 1, Identification
- Section 2, Hazard(s) identification
- Section 3, Composition/information on ingredients
- Section 4, First-aid measures
- Section 5, Fire-fighting measures
- Section 6, Accidental release measures
- Section 7, Handling and storage
- Section 8, Exposure controls/personal protection
- Section 9, Physical and chemical properties
- Section 10, Stability and reactivity
- Section 11, Toxicological information
- Section 12, Ecological information
- Section 13, Disposal considerations
- Section 14, Transport information
- Section 15, Regulatory information
- Section 16, Other information, including date of preparation or last revision.

EMERGENCY PLANNING

Facilities that maintain Extremely Hazardous Substances (EHS) on-site in quantities greater than corresponding threshold planning quantities must cooperate in emergency plan preparation with local/state governments. Local governments are required to prepare chemical emergency response plans, and to review plans at least annually. State governments are required to oversee and coordinate local planning efforts.

For a complete list of related requirements, see the Emergency Planning and Community Right-to-Know Act (EPCRA), passed by Congress in 1986. This section, and the two that follow, contain the major provisions of the EPCRA.

REPORTING

Facilities must immediately report to state and local officials accidental releases of EHS chemicals and "hazardous substances" in quantities greater than corresponding Reportable Quantities (RQs) defined under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Information about accidental chemical releases must also be available to the public.

The EPA requires facilities that manufacture, use, or store 500 pounds or the Threshold Planning Quantity (whichever is less), of an extremely hazardous substance (EHS), report to state and local officials, and to local fire departments, inventories of all on-site chemicals for which safety data sheets exist. Facilities that manufacture, use or store 10,000 pounds of any hazardous chemical must also follow the same reporting procedures (gasoline and diesel fuel are the only hazardous chemicals to have higher threshold levels).

Facilities, as applicable, must complete and submit a toxic chemical release inventory form (Form R) annually. Form R must be submitted for each of the over 600 TRI chemicals that are manufactured or otherwise used above the applicable threshold quantities.

COMMUNITY RIGHT TO KNOW

In addition to providing employees with information regarding the hazards of chemicals in the workplace, employers must also, upon request, inform members of the public about the health and environmental hazards posed by stored or released chemicals. The public is also entitled to know the approximate quantities of chemicals stored or released at a given workplace. If an employer denies a reasonable request, the requesting party may then file an application for information with the state agency that has jurisdiction, or federal OSHA.

HAZARD CONTROL

Employers must protect workers against the potential negative health effects of exposure to hazardous substances by ensuring employees use respirators and appropriate equipment if they are, or may be, exposed to substances at levels above permissible exposure limits (PELs).

Permissible Exposure Limits (PELs)

Approximately 500 PELs have been established by OSHA as part of 29 CFR 1910.1000. See tables Z-1 and Z-2 for the current levels, and check to see if their state OSHA (if applicable) has more stringent standards for specific hazardous substances.

Multi-Employer Workplaces

If hazardous chemicals present risk to employees of another employer, Aversa Bros Industrial Contractors will ensure the HCP includes the methods to do the following for the other employers on the site:

- Provide onsite access to SDS for each hazardous chemical to which their employees may be exposed
- Inform them of any precautionary measures that need to be taken for worker protection during normal operating conditions and foreseeable emergencies
- Inform them of the labeling system used in the workplace

Multiple Workplaces

If employees must travel between workplaces during a shift, Aversa Bros Industrial Contractors may keep the HCP at only the primary workplace facility.

Non-Routine Tasks

Before employees begin work on hazardous non-routine tasks, the appropriate supervisor will give affected employees information about hazardous chemicals to which the employee may be exposed during such activity. This information will include the following:

- Specific chemical hazards
- Protective/safety measures employees can take
- Measures Aversa Bros Industrial Contractors has taken to reduce the hazards

Hazardous Chemicals in Unlabeled Pipes

If there are hazards associated with chemicals in the piping system in the work area, a supervisor must inform employees working around the pipes and provide information about the chemical and its hazards. Labels to relay this information are good practice for workplaces that transport potentially hazardous chemicals through pipes, and may be required by other regulations.

Standards for labeling pipes in the workplace can be found in ANSI A13.1.

FORMS AND ATTACHMENTS

Please find on the following pages the below documents, which may be reproduced freely by Aversa Bros Industrial Contractors for the purposes of implementing and maintaining a safety and health program.

- Hazardous Chemical labels
- Hazardous Chemicals List

HAZARDOUS CHEMICAL LABEL

HAZARDOUS CHEMICAL	HAZARDOUS CHEMICAL
NAME OF CHEMICAL:	**NAME OF CHEMICAL:**
Physical Hazards:	Physical Hazards:
Health Hazards, Target Organs, or Systems:	Health Hazards, Target Organs, or Systems:
Optional Information, such as Personal Protective Equipment or Safe Handling:	Optional Information, such as Personal Protective Equipment or Safe Handling:
HAZARDOUS CHEMICAL	HAZARDOUS CHEMICAL
NAME OF CHEMICAL:	**NAME OF CHEMICAL:**
Physical Hazards:	Physical Hazards:
Health Hazards, Target Organs, or Systems:	Health Hazards, Target Organs, or Systems:
Optional Information, such as Personal Protective Equipment or Safe Handling:	Optional Information, such as Personal Protective Equipment or Safe Handling:

HAZARDOUS CHEMICALS LIST

The following list identifies all hazardous chemicals used at this workplace. Detailed information about the physical and health effects of each chemical is included in a safety data sheet; the identity of each chemical on the list matches the identity of the chemical on its safety data sheet. Safety data sheets are readily available to employees in their work areas.

Product or Brand Name	Manufacturer	Hazardous Ingredient

POLICY

Aversa Bros Industrial Contractors has established this electrical safety policy to protect all employees from the hazards of working with and around electricity. This policy is intended for employees who may be exposed to electrical hazards on the job. Employees who are qualified and assigned the duties of performing electrical work need to refer to the “Electrical Work” chapter of this manual for additional information. Qualified workers (electrical trade workers) require additional training and or certification.

Many workers in manufacturing and construction deal with potential electrical hazards when working with power equipment and tools, but office personnel and others can also be exposed to these hazards. For that reason, all employees must be trained on electrical hazards and how to avoid them.

EMPLOYER RESPONSIBILITY

Aversa Bros Industrial Contractors is responsible for providing:

- All tools and equipment will meet the required safety standards
- Approved PPE to employees as needed
- A written electrical safety program and training on the program

EMPLOYEE RESPONSIBILITIES

All Aversa Bros Industrial Contractors employees are expected to:

- Follow safe work practices and adhere to all precautions and safety requirements when working with or around electrical equipment or circuits
- Understand how to reduce or prevent exposure to electrical hazards through safe work practices and use of PPE
- Use only hand tools, electric tools, extension cords and other equipment that are in good repair
- De-energize electric power circuits and/or equipment before working near, inspecting or making repairs
- Understand emergency procedures in the event of an electrical accident
- Report any potential electrical hazards as soon as safely possible to their supervisor
- Attend and participate actively in safety trainings
- Exercise good judgment when working near energized lines (including underground and overhead lines). Comply with OSHA regulations and the current National Electric Code, NFPA 70

HAZARDS

Electrical Shock

An electrical shock is received when electrical current passes through the body. Current will pass through the body in a variety of situations. Whenever two wires are at different voltages, current will pass between them if they are connected. Your body can connect the wires if you touch both of them at the same time. Current will pass through your body.

The severity of injury from electrical shock depends on the amount of electrical current and the length of time the current passes through the body. For example, 100 milliamps of electricity going through the body for just 2 seconds is enough to cause death. The amount of internal current a person can withstand and still be able to control the muscles of the arm and hand can be less than 10 milliamps

The table below shows what usually happens for a range of currents (lasting one second) at typical household voltages. Longer exposure times increase the danger to the shock victim. For example, a current of 100 mA applied for 3 seconds is as dangerous as a current of 900 mA applied for 0.03 seconds. The muscle structure of the person also makes a difference. People with less muscle tissue are typically affected at lower current levels. Even low voltages can be extremely dangerous because the degree of injury depends not only on the amount of current but also on the length of time the body is in contact with the circuit.

LOW VOLTAGE DOES NOT MEAN LOW HAZARD!

Effects of Electrical Current* on the Body	
Current	**Reaction**
1 milliamp	Just a faint tingle
5 milliamps	Slight shock felt. Disturbing, but not painful. Most people can “let go.” However, strong involuntary movements can cause injuries.
6–25 milliamps (women)† 9–30 milliamps (men)	Painful shock. Muscular control is lost. This is the range where “freezing currents” start. It may not be possible to “let go.”
50–150 milliamps	Extremely painful shock, respiratory arrest (breathing stops), severe muscle contractions. Flexor muscles may cause holding on; extensor muscles may cause intense pushing away. Death is possible.
1,000–4,300 milliamps (1–4.3 amps)	Ventricular fibrillation (heart pumping action not rhythmic) occurs. Muscles contract; nerve damage occurs. Death is likely.
10,000 milliamps (10 amps)	Cardiac arrest and severe burns occur. Death is probable.
15,000 milliamps (15 amps)	Lowest over-current at which a typical fuse or circuit breaker opens a circuit!
*Effects are for voltages less than about 600 volts. Higher voltages also cause severe burns. †Differences in muscle and fat content affect the severity of shock.	

Electrical Burns

The most common shock-related, nonfatal injury is a burn. Electrical burns can result when a person touches electrical wiring or equipment that’s being used or maintained improperly. Typically, such burns occur on the hands. Electrical burns are one of the most serious injuries you can receive. They need to be given immediate attention. Additionally, clothing may catch fire and a thermal burn may result from the heat of the fire.

Electrical Fires

Electricity is one of the most common causes of fires and thermal burns in homes and workplaces. Defective or misused electrical equipment is a major cause of electrical fires. If there is a small electrical fire, be sure to use only a Class C or multipurpose (ABC) fire extinguisher, or you might make the problem worse.

All fire extinguishers are marked with letter(s) that tell you the kinds of fires they can put out. Some extinguishers contain symbols, too.

Thermal burns may result if an explosion occurs when electricity ignites an explosive mixture of material in the air. This ignition can result from the buildup of combustible vapors, gasses or dusts. Occupational Safety and Health Administration (OSHA) standards, the NEC, and other safety standards give precise safety requirements for the operation of electrical systems and equipment in such dangerous areas. Ignition can also be caused by overheated conductors or equipment, or by normal arcing at switch contacts or in circuit breakers.

PREVENTING ELECTRICAL ACCIDENTS

To prevent electrical accidents, Aversa Bros Industrial Contractors will take the following steps:

- Establish safe practices and procedures for working around electrical control cabinets without getting hurt
- Make sure all employees know the importance of de-energizing electrical sources before performing repairs

Note: only qualified personnel can perform work on circuits, including testing

PERSONAL PROTECTIVE EQUIPMENT

Employees who are not working directly on energized parts, equipment or circuits may still be required to wear PPE to prevent the risk of electrical injury. This equipment must meet OSHA/ANSI requirements and be appropriate for the parts of the body that need protection and the work performed. When working near electrical circuits, or on equipment that could become energized, employees must:

- Wear electrically protective gloves
- Wear insulated shoes
- Use only insulated tools

FIRST AID FOR ELECTRICAL INJURIES

If a co-worker is shocked or burned by electricity, the following actions need to be taken:

- Shut off the electrical current if the victim is still in contact with the energized circuit
- Have someone else call for help
- If you can’t shut off the power quickly, pry the victim from the circuit with something that doesn’t conduct electricity such as dry wood. Don’t touch the victim yourself if he or she is still in contact with an electrical circuit!

- Don't leave the victim unless there's no other option. Stay with the victim while Emergency Medical Services (EMS) is contacted. The caller should come back to you afterwards to verify that the call was made

Once you know that electrical current is no longer flowing through the victim, call out to the victim to see if he or she is conscious. If the victim is conscious, tell them not to move. It's possible for a shock victim to be seriously injured and not realize it. Quickly examine the victim for signs of major bleeding. If there's heavy bleeding, place a cloth over the wound and apply pressure. If the wound is in an arm or leg, gently elevate the injured area while keeping pressure on the wound. Keep the victim warm and talk to them until help arrives.

If the victim is unconscious, check for signs of breathing. While you do this, move the victim as little as possible. If the victim isn't breathing, someone trained should begin CPR.

You also need to know the location of:

- Electricity shut-offs ("kill switches")
- First-aid supplies
- A telephone so you can find them quickly in an emergency

CREATE A SAFE WORK ENVIRONMENT

A safe work environment is created by controlling contact with electrical voltages and the currents they can cause. Electrical currents need to be controlled so they don't pass through the body. In addition to preventing shocks, a safe work environment reduces the chance of fires, burns and falls.

You need to guard against contact with electrical voltages and control electrical currents in order to create a safe work environment.

A safe work environment isn't enough to control all electrical hazards. You must also work safely. Safe work practices help you control your risk of injury or death from workplace hazards. If you are working on electrical circuits or with electrical tools and equipment, you need to use safe work practices.

Before you begin a task, ask yourself:

- What could go wrong?
- Do I have the knowledge, tools and experience to do this work safely?

All workers need to be very familiar with the safety procedures for their jobs. You must know how to use specific controls that help keep you safe. You must also use good judgment and common sense.

ELEMENTS OF ELECTRICAL SAFETY

Aversa Bros Industrial Contractors employees will use the three-stage approach to safety: recognize, evaluate and control hazards. To be safe, you must think about your job and plan for hazards. To avoid injury or death, you must understand and recognize hazards. You need to evaluate the situation you are in and assess your risks. You need to control hazards by creating a safe work environment, by using safe work practices, and by reporting hazards to a supervisor. If you do not recognize, evaluate and control hazards, you may be injured or killed by the electricity itself, electrical fires or falls.

Recognize Hazards

The first part of the safety model is recognizing the hazards around you. Only then, can you avoid or control the hazards. It is best to discuss and plan hazard recognition tasks with your co-workers. Sometimes others see hazards that we overlook.

Knowing where to look helps you to recognize hazards.

- Inadequate wiring is dangerous
- Exposed electrical parts are dangerous
- Overhead power-lines are dangerous
- Wires with bad insulation can give you a shock
- Electrical systems and tools that are not grounded or double insulated are dangerous
- Damaged power tools and equipment are electrical hazards
- Using the wrong PPE is dangerous
- Using the wrong tool is dangerous
- Ladders that conduct electricity are dangerous
- Electrical hazards can be made worse if the worker, location or equipment is wet
- Overloaded circuits are dangerous

Hazard Indicators

- Tripped circuit breakers and blown fuses show that too much current is flowing in a circuit. This condition could be due to several factors, such as malfunctioning equipment or a short between conductors. You need to determine the cause in order to control the hazard
- An electrical tool, appliance, wire or connection that feels warm may indicate too much current in the circuit or equipment. A qualified person must evaluate the situation
- An extension cord that feels warm can indicate there's too much current for the wire size of the cord. Unplug the cord and notify your supervisor or a qualified person
- A cable, fuse box or junction box that feels warm may indicate too much current in the circuits
- A burning odor may indicate overheated insulation
- Worn, frayed or damaged insulation around any wire or other conductor is an electrical hazard because the conductors could be exposed. Contact with an exposed wire could cause a shock. Damaged insulation can cause a short, leading to arcing or a fire. Inspect all insulation for scrapes and breaks. You need to evaluate the seriousness of any damage you find and decide how to deal with the hazard
- A GFCI that trips indicates there is current leakage from the circuit. Have a qualified person inspect the circuit

Any of these conditions, or "clues," tell you something important, there is a risk of fire and electrical shock. The equipment or tools involved must be avoided. You can find yourself in a situation where you need to decide if these clues are present. A supervisor needs to be called if there are signs of overload and you're not sure of the degree of risk. Ask for help whenever you're not sure what should be done.

Evaluate Hazards

After you recognize a hazard, your next step is to evaluate your risk from the hazard. Obviously, exposed wires are a hazard. If the exposed wires are 15 feet off the ground, your risk is low. However, if you are going to be working on a roof near those same wires, your risk is high. The risk of shock is greater if you will be carrying metal conduit that could touch the exposed wires. You must constantly evaluate your risk.

Combinations of hazards increase your risk. Improper grounding and a damaged tool greatly increase your risk. Wet conditions combined with other hazards also increase your risk. You'll need to make decisions about the nature of hazards in order to evaluate your risk.

Control Hazards

Once electrical hazards have been recognized and evaluated, they must be controlled.

In order to control hazards, you must first create a safe work environment, and then work in a safe manner. Generally, it is best to remove the hazards altogether and create an environment that is truly safe. When OSHA regulations and the NEC are followed, safe work environments are created.

However, you never know when materials or equipment might fail. Prepare yourself for the unexpected by using safe work practices. Use as many safeguards as possible. If one fails, another may protect you from injury or death.

Controlling electrical hazards (as well as other hazards) reduces the risk of injury or death.

HAZARD TYPES

Wiring Hazards

An electrical hazard exists when the wire is too small a gauge for the current it will carry. Normally, the circuit breaker in a circuit is matched to the wire size. However, in older wiring, branch lines to permanent ceiling light fixtures could be wired with a smaller gauge than the supply cable.

For example, let's say a light fixture is replaced with another device that uses more current. The current capacity (ampacity) of the branch wire could be exceeded. When a wire is too small for the current it is supposed to carry, the wire will heat up. The heated wire could cause a fire.

When you use an extension cord, the size of the wire you are placing into the circuit may be too small for the equipment. The circuit breaker could be the right size for the circuit but not right for the smaller-gauge extension cord. A tool plugged into the extension cord may use more current than the cord can handle without tripping the circuit breaker. The wire will overheat and could cause a fire.

The kind of metal used as a conductor can cause an electrical hazard. Special care needs to be taken with aluminum wire. Since it is more brittle than copper, aluminum wire can crack and break more easily. Connections with aluminum wire can become loose and oxidize if not made properly, creating heat or arcing. You need to recognize that inadequate wiring is a hazard.

Exposed Electrical Parts Hazards

Electrical hazards exist when wires or other electrical parts are exposed. Wires and parts can be exposed if a cover is removed from a wiring or breaker box. The overhead wires coming into a home may be exposed. Electrical terminals in motors, appliances and electronic equipment may be exposed. Older equipment may have exposed electrical parts. If you contact exposed live electrical parts, you will be shocked. You need to recognize that an exposed electrical component is a hazard.

Overhead Power-Line Hazards

Most people don't realize that overhead power-lines aren't normally insulated. More than half of all electrocutions are caused by direct worker contact with energized power-lines.

When dump trucks, cranes, work platforms or other conductive materials (such as pipes and ladders) contact overhead wires, the equipment operator or other workers can be killed. If you do not maintain required clearance distances from power-lines, you can be shocked and killed. Never store materials and equipment under or near overhead power-lines. You need to recognize that overhead power-lines are a hazard.

Defective Insulation Hazards

Insulation that is defective or inadequate is an electrical hazard. Usually, a plastic or rubber covering insulates wires. Insulation prevents conductors from coming in contact with each other. Insulation also prevents conductors from coming in contact with people.

Extension cords may have damaged insulation. Sometimes the insulation inside an electrical tool or appliance is damaged. When insulation is damaged, exposed metal parts may become energized if a live wire inside touches them.

Electric hand tools that are old, damaged or misused may have damaged insulation inside. If you touch damaged power tools or other equipment, you will receive a shock. You are more likely to receive a shock if the tool is not grounded or double insulated. (Double-insulated tools have two insulation barriers and no exposed metal parts.) You need to recognize that defective insulation is a hazard.

Improper Grounding Hazards

When an electrical system is not grounded properly, a hazard exists. The most common OSHA electrical violation is improper grounding of equipment and circuitry. The metal parts of an electrical wiring system that we touch (switch plates, ceiling light fixtures, conduit, etc.) must be grounded and at 0 volts. If the system is not grounded properly, these parts may become energized. Metal parts of motors, appliances or electronics that are plugged into improperly grounded circuits may be electrified. When a circuit is not grounded properly, a hazard exists because unwanted voltage cannot be safely eliminated. If there is no safe path to ground for fault currents, exposed metal parts in damaged appliances can become energized.

Extension cords may not provide a continuous path to ground because of a broken ground wire or plug. If you touch a defective electrical device that's not grounded or grounded improperly, you will be shocked. You need to recognize that an improperly grounded electrical system is a hazard.

Electrical systems are often grounded to metal water pipes that serve as a continuous path to ground. If plumbing is used as a path to ground for fault current, all pipes must be made of conductive material (a type of metal). Many electrocutions and fires occur because (during renovation or repair) parts of metal plumbing are replaced with plastic pipe, which does not conduct electricity. In these cases, the path to ground is interrupted by nonconductive material.

A ground fault circuit interrupter, or GFCI, is an inexpensive lifesaver. GFCIs detect any difference in current between the two circuit wires (the black wires and white wires). This difference in current can occur when electrical equipment isn't working correctly, causing leakage current. If leakage current is detected in a GFCI-protected circuit, the GFCI switches off the current, protecting you from a dangerous shock. GFCIs are set at about 5 mA and are designed to protect workers from electrocution. GFCIs are able to detect the loss of current resulting from leakage through a person who is beginning to be shocked.

GFCIs are different from circuit breakers because they detect leakage currents rather than overloads. Circuits with missing, damaged or improperly wired GFCIs may allow you to be shocked. You need to recognize that a circuit improperly protected by a GFCI is a hazard.

Overload Hazards

Overloads in an electrical system are hazardous because they can produce heat or arcing. Wires and other components in an electrical system or circuit have a maximum amount of current they can carry safely. If too many devices are plugged into a circuit, the electrical current will heat the wires to a very high temperature. If anyone tool uses too much current, the wires will heat up. The temperature of the wires can be high enough to cause a fire. If their insulation melts, arcing may occur. Arcing can cause a fire in the area where the overload exists, even inside a wall.

In order to prevent too much current in a circuit, a circuit breaker or fuse is placed in the circuit. If there is too much current in the circuit, the breaker "trips" and opens like a switch. If an overloaded circuit is equipped with a fuse, an internal part of the fuse melts, opening the circuit. Both breakers and fuses do the same thing: open the circuit to shut off the electrical current.

If the breakers or fuses are too big for the wires they are supposed to protect, an overload in the circuit will not be detected and the current will not be shut off. Overloading leads to overheating of circuit components and may cause a fire. You need to recognize that a circuit with improper overcurrent protection devices—or one with no overcurrent protection devices at all—is a hazard.

Overcurrent protection devices are built into the wiring of some electric motors, tools and electronic devices. For example, if a tool draws too much current or if it overheats, the current will be shut off from within the device itself. Damaged tools can overheat and cause a fire. You need to recognize that a damaged tool is a hazard.

Wet Conditions Hazards

Working in wet conditions is hazardous because you may become an easy path for electrical current. If you touch a live wire or other electrical component—and you are well grounded because you are standing in even a small puddle of water—you will receive a shock.

Damaged insulation, equipment or tools can expose you to live electrical parts. A damaged tool may not be grounded properly, so the housing of the tool may be energized, causing you to receive a shock. Improperly grounded metal switch plates and ceiling lights are especially hazardous in wet conditions. If you touch a live electrical component with an uninsulated hand tool, you are more likely to receive a shock when standing in water.

Remember: you don't have to be standing in water to be electrocuted. Wet clothing, high humidity and perspiration also increase your chances of being electrocuted. You need to recognize that all wet conditions are hazards.

HAZARD CONTROL

Lock-Out and Tag-Out Circuits and Equipment

Don't work on equipment unless it's been locked and tagged out. Only qualified and trained persons are allowed to perform lockout/tagout procedures.

OSHA requires companies to have adequate machine-specific procedures for lockout/tagout. These will be written procedures that are on site and readily available to employees. Provide training on lock-out/tag-out to both authorized and affected employees. Interlocks may not be used as lockout or as equivalent lockout protection.

For more information on lock-out/tag-out procedures, see the "Controlling Hazardous Energy" chapter (if included) of this manual.

Control Inadequate Wiring Hazards

Electrical hazards result from using the wrong size or type of wire. You must control such hazards to create a safe work environment. You must choose the right size wire for current expected in a circuit. The wire must be able to handle the current safely. The wire's insulation must be appropriate for the voltage and tough enough for the environment. Connections need to be reliable and protected.

MAXIMUM CURRENT DIFFERENT WIRE SIZES CAN SAFELY CONDUCT

Gauge Amperage	12 AWG (stranded)	12 AWG (solid)	10 AW G	8 AW G	6 AW G	2 AW G	1/0 AW G
	25 amps	25 amps	30 amps	40 amps	55 amps	95 amps	125 amps

Control Hazards of Fixed Wiring

The wiring methods and size of conductors used in a system depend on several factors:

- Intended use of the circuit system
- Building materials
- Size and distribution of electrical load
- Location of equipment (such as underground burial)
- Environmental conditions (such as dampness)

- Presence of corrosives
- Temperature extremes

Fixed, permanent wiring is better than extension cords, which can be misused and damaged more easily. NEC requirements for fixed wiring must always be followed.

Control Hazards of Flexible Wiring

Electrical cords supplement fixed wiring by providing the flexibility required for maintenance, portability, isolation from vibration, and emergency and temporary power needs. Flexible wiring can be used for extension cords or power supply cords. Power supply cords can be removable or permanently attached to the appliance. **DO NOT** use flexible wiring in situations where frequent inspection would be difficult, where damage would be likely, or where long-term electrical supply is needed. Flexible cords cannot be used as a substitute for the fixed wiring of a structure.

Flexible cords must not be

- Run through holes in walls, ceilings, or floors
- Run through doorways, windows, or similar openings (unless physically protected)
- Attached to building surfaces (except with a tension take-up device within 6 feet of the supply end)
- Hidden in walls, ceilings, or floors
- Hidden in conduit or other raceways

Use the Right Extension Cord

The size of wire in an extension cord must be compatible with the amount of current the cord will be expected to carry. The amount of current depends on the equipment plugged into the extension cord. Current ratings (how much current a device needs to operate) are often printed on the nameplate. If a power rating is given, it is necessary to divide the power rating in watts by the voltage to find the current rating. For example, a 1,000-watt heater plugged into a 120-volt circuit will need almost 10 amps of current. Let’s look at another example: A 1- horsepower electric motor uses electrical energy at the rate of almost 750 watts, so it will need a minimum of about 7 amps of current on a 120-volt circuit. However, electric motors need additional current as they startup or if they stall, requiring up to 200% of the nameplate current rating. Therefore, the motor would need 14 amps.

Add to find the total current needed to operate all the appliances supplied by the cord. Choose a wire size that can handle the total current.

AMERICAN WIRE GAUGE (AWG)

Wire Size	Handles Up To
#10 AW G	30 amps
#12 AW G	25 amps
#14 AW G	18 amps
#16 AW G	13 amps
Remember: The larger the gauge number, the smaller the wire!	

The length of the extension cord also needs to be considered when selecting the wire size. Voltage drops over the length of a cord. If a cord is too long, the voltage drop can be enough to damage equipment. Many electric motors only operate safely in a narrow range of voltages and will not work properly at voltages different from the voltage listed on the nameplate. Even though light bulbs operate (somewhat dimmer) at lowered voltages, do not assume electric motors will work correctly at less-than-required voltages. In addition, when electric motors start or operate under load, they require more current. The larger the size of the wire, the longer a cord can be without causing a voltage drop that could damage tools and equipment.

The grounding path for extension cords must be kept intact to keep you safe.

A typical extension cord grounding system has four components:

1. A third wire in the cord, called a ground wire
2. A three-prong plug with a grounding prong on one end of the cord
3. A three-wire, grounding-type receptacle at the other end of the cord
4. A properly grounded outlet

Control Hazards to Exposed Live Electrical Parts

Isolate Energized Components

Electrical hazards exist when wires or other electrical parts are exposed. These hazards need to be controlled to create a safe work environment. Isolation of energized electrical parts makes them inaccessible unless tools and special effort are used. Isolation can be accomplished by placing the energized parts at least 8 feet high and out of reach, or by guarding. Guarding is a type of isolation that uses various structures—like cabinets, boxes, screens, barriers, covers and partitions—to close-off live electrical parts.

Take the following precautions to prevent injuries from contact with live parts:

- Immediately report exposed live parts to a supervisor
- Unless qualified, don’t attempt to correct the condition yourself without supervision
- Provide guards or barriers if live parts cannot be enclosed completely

- Use covers, screens, or partitions for guarding that require tools to remove them
- Replace covers that have been removed from panels, motors, or fuse boxes
- Even when live parts are elevated to the required height (8 feet), use caution when using objects (like metal rods or pipes) that can contact these parts
- Close unused conduit openings in boxes so that foreign objects (pencils, metal chips, conductive debris, etc.) cannot get inside and damage the circuit

Control Hazards of Exposure to Live Electrical Wires

Use Proper Insulation

Insulation is made of material that does not conduct electricity (usually plastic, rubber, or fiber). Insulation covers wires and prevents conductors from coming in contact with each other or any other conductor. If conductors make contact, a short circuit is created.

In a short circuit, current passes through the shorting material without passing through a load in the circuit, and the wire becomes overheated. Insulation keeps wires and other conductors from touching, which prevents electrical short circuits. Insulation prevents live wires from touching people and animals, thus protecting them from electrical shock.

Insulation helps protect wires from physical damage and conditions in the environment. Insulation is used on almost all wires, except some ground wires and some high-voltage transmission lines. Insulation is used internally in tools, switches, plugs, and other electrical and electronic devices.

Special insulation is used on wires and cables that are used in harsh environments. Wires and cables that are buried in soil must have an outer covering of insulation that is flame-retardant and resistant to moisture, fungus and corrosion.

In all situations, you must be careful not to damage insulation while installing it. Do not allow staples or other supports to damage the insulation. Bends in a cable must have an inside radius of at least 5 times the diameter of the cable so that insulation at a bend is not damaged. Extension cords come with insulation in a variety of types and colors. The insulation of extension cords is especially important.

Since extension cords often receive rough handling, the insulation can be damaged. Extension cords might be used in wet places, so adequate insulation is necessary to prevent shocks. Because extension cords are often used near combustible materials (such as wood shavings and sawdust) a short in an extension cord could easily cause arcing and a fire.

Insulation on individual wires is often color-coded. In general, insulated wires used as equipment grounding conductors are either continuous green or green with yellow stripes. The grounded conductors that complete a circuit are generally covered with continuous white or gray insulation. The ungrounded conductors, or “hot” wires, may be any color other than green, white or gray. They are usually black or red.

Conductor and Cable Markings

Conductors and cables must be marked by the manufacturer to show the following:

- Maximum voltage capacity
- AWG size
- Insulation-type letter
- Manufacturer's name or trademark

Control Shock Hazards

When an electrical system is not grounded properly, a hazard exists. This is because the parts of an electrical wiring system that a person normally touches may be energized, or live, relative to ground. Parts like switch plates, wiring boxes, conduit, cabinets and lights need to be at 0 volts relative to ground. If the system is grounded improperly, these parts may be energized. The metal housings of equipment plugged into an outlet need to be grounded through the plug.

Grounding is connecting an electrical system to the earth with a wire. Excess or stray current travels through this wire to a grounding device (commonly called a "ground") deep in the earth. Grounding prevents unwanted voltage on electrical components. Metal plumbing is often used as a ground. When plumbing is used as a grounding conductor, it must also be connected to a grounding device such as a conductive rod. (Rods used for grounding must be driven at least 8 feet into the earth.

Sometimes an electrical system will receive a higher voltage than it is designed to handle. These high voltages may come from a lightning strike, line surge, or contact with a higher voltage line. Sometimes a defect occurs in a device that allows exposed metal parts to become energized. Grounding will help protect the person working on a system, the system itself, and others using tools or operating equipment connected to the system. The extra current produced by the excess voltage travels relatively safely to the earth.

Grounding creates a path for currents produced by unintended voltages on exposed parts. These currents follow the grounding path, rather than passing through the body of someone who touches the energized equipment. However, if a grounding rod takes a direct hit from a lightning strike and is buried in sandy soil, the rod must be examined to make sure it will still function properly. The heat from a lightning strike can cause the sand to turn into glass, which is an insulator. A grounding rod must be in contact with damp soil to be effective.

Leakage current occurs when an electrical current escapes from its intended path. Leakages are sometimes low-current faults that can occur in all electrical equipment because of dirt, wear, damage or moisture. A good grounding system must be able to carry off this leakage current. A ground fault occurs when current passes through the housing of an electrical device to ground. Proper grounding protects against ground faults. Ground faults are usually caused by misuse of a tool or damage to its insulation. This damage allows a bare conductor to touch metal parts or the tool housing.

When you ground a tool or electrical system, you create a low-resistance path to the earth (known as a ground connection). When done properly, this path has sufficient current-carrying capacity to eliminate voltages that may cause a dangerous shock. Grounding does not guarantee that you will not be shocked, injured or killed from defective equipment. However, it greatly reduces the possibility.

EQUIPMENT GROUNDING REQUIREMENTS

Equipment needs to be grounded under any of these circumstances:

- The equipment is within 8 feet vertically and 5 feet horizontally of the floor or walking surface
- The equipment is within 8 feet vertically and 5 feet horizontally of grounded metal objects, you could touch
- The equipment is located in a wet or damp area and is not isolated
- The equipment is connected to a power supply by cord and plug and is not double- insulated

Use of GFCIs

The use of GFCIs has lowered the number of electrocutions dramatically. A GFCI is a fast- acting switch that detects any difference in current between two circuit conductors. If either conductor comes in contact—either directly or through part of your body—with a ground (a situation known as a ground fault), the GFCI opens the circuit in a fraction of a second. If a current as small as 4 to 6 mA does not pass through both wires properly, but instead leaks to the ground, the GFCI is tripped. The current is shut off.

There is a more sensitive kind of GFCI called an isolation GFCI. If a circuit has an isolation GFCI, the ground fault current passes through an electronic sensing circuit in the GFCI. The electronic sensing circuit has enough resistance to limit current to as little as 2 mA, which is too low to cause a dangerous shock.

GFCIs are usually in the form of a duplex receptacle. They are also available in portable and plug-in designs and as circuit breakers that protect an entire branch circuit. GFCIs can operate on both two- and three-wire ground systems. For a GFCI to work properly, the neutral conductor (white wire) must:

- Be continuous
- Have low resistance
- Have sufficient current-carrying capacity

GFCIs help protect you from electrical shock by continuously monitoring the circuit. However, a GFCI does not protect a person from line-to-line hazards such as touching two “hot” wires (240 volts) at the same time or touching a “hot” and neutral wire at the same time. Also, be aware that instantaneous currents can be high when a GFCI is tripped. A shock may still be felt. Your reaction to the shock could cause injury, perhaps from falling.

Test GFCIs regularly by pressing the “test” button. If the circuit does not turn off, the GFCI is faulty and must be replaced.

The NEC requires that GFCIs be used in these high-risk situations:

- Electricity is used near water
- The user of electrical equipment is grounded (by touching grounded material)
- Circuits are providing power to portable tools or outdoor receptacles
- Temporary wiring or extension cords are used

Specifically, GFCIs must be installed in bathrooms, garages, outdoor areas, crawl spaces, unfinished basements, kitchens, and near wet bars.

Bond Components to Assure Grounding Path

In order to assure a continuous, reliable electrical path to ground, a bonding jumper wire is used to make sure electrical parts are connected. Some physical connections, like metal conduit coming into a box, might not make a good electrical connection because of paint or possible corrosion. To make a good electrical connection, a bonding jumper needs to be installed.

A metal cold water pipe that is part of a path to ground may need bonding jumpers around plastic anti-vibration devices, plastic water meters or sections of plastic pipe. A bonding jumper is made of conductive material and is tightly connected to metal pipes with screws or clamps to bypass the plastic and assure a continuous grounding path. Bonding jumpers are necessary because plastic doesn't conduct electricity and will interrupt the path to ground.

Additionally, interior metal plumbing must be bonded to the ground for electrical service equipment in order to keep all grounds at the same potential (0 volts). Even metal air ducts need to be bonded to electrical service equipment.

Control Overload Current Hazards

When a current exceeds the current rating of equipment or wiring, a hazard exists. The wiring in the circuit, equipment or tool cannot handle the current without heating up or even melting.

Not only will the wiring or tool be damaged, but the high temperature of the conductor can also cause a fire. To prevent this from happening, an overcurrent protection device (circuit breaker or fuse) is used in a circuit. These devices open a circuit automatically if they detect current in excess of the current rating of equipment or wiring. This excess current can be caused by an overload, short circuit or high-level ground fault.

Overcurrent protection devices are designed to protect equipment and structures from fire. They do not protect you from electrical shock! Overcurrent protection devices stop the flow of current in a circuit when the amperage is too high for the circuit. A circuit breaker or fuse will not stop the relatively small amount of current that can cause injury or death. Death can result from 20 mA (.020 amps) through the chest. A typical residential circuit breaker or fuse will not shut off the circuit until a current of more than 20 amps is reached!

However, overcurrent protection devices are not allowed in areas where they could be exposed to physical damage or in hazardous environments. Overcurrent protection devices can heat up and occasionally arc or spark, which could cause a fire or an explosion in certain areas. Hazardous environments are places that contain flammable or explosive materials such as flammable gasses or vapors (Class I Hazardous Environments), finely pulverized flammable dusts (Class II Hazardous Environments), or fibers or metal filings that can catch fire easily (Class III Hazardous Environments). Hazardous environments may be found in aircraft hangars, gas stations, storage plants for flammable liquids, grain silos and mills where cotton fibers may be suspended in the air. Special electrical systems are required in hazardous environments.

If an overcurrent protection device opens a circuit, there may be a problem along the circuit. (In the case of circuit breakers, frequent tripping may also indicate that the breaker is defective.) When a circuit breaker trips or a fuse blows, the cause must be found.

A circuit breaker is one kind of overcurrent protection device. It is a type of automatic switch located in a circuit. A circuit breaker trips when too much current passes through it. Don't use a circuit breaker to turn power on or off in a circuit, unless it's designed for this purpose and marked "SWD" (stands for "switching device").

A fuse is another type of overcurrent protection device. A fuse contains a metal conductor that has a relatively low melting point. When too much current passes through the metal in the fuse, it heats up within a fraction of a second and melts, opening the circuit. After an overload is found and corrected, a blown fuse must be replaced with a new one of appropriate amperage.

Avoid Wet Working Conditions and Other Dangers

Remember that any hazard becomes much more dangerous in damp or wet conditions. To be on the safe side, assume there is dampness in any work location, even if you do not see water. Even sweat can create a damp condition!

Avoid Overhead Power Lines

Be very careful not to contact overhead power lines or other exposed wires. More than half of all electrocutions are caused by contact with overhead lines. When working in an elevated position near overhead lines, avoid locations where you (and any conductive object you hold) could contact an unguarded or uninsulated line. Stay at least 10 feet away from high-voltage transmission lines.

Vehicle operators must also pay attention to overhead wiring. Dump trucks, front-end loaders and cranes can lift and make contact with overhead lines. If you contact equipment that is touching live wires, you will be shocked and may be killed. If you are in the vehicle, stay inside. Always be aware of what is going on around you.

USE PROPER WIRING AND CONNECTORS

- Avoid overloads — Don't overload circuits
- Test GFCIs — Test GFCIs monthly using the "test" button
- Check switches and insulation — Tools and other equipment must operate properly
- Make sure that switches and insulating parts are in good condition
- Use three-prong plugs — Never use a three-prong grounding plug with the third prong broken off

When using tools that require a third-wire ground; use only three-wire extension cords with three-prong grounding plugs and three-hole electrical outlets. Never remove the grounding prong from a plug! You could be shocked or expose someone else to a hazard. If you see a cord without a grounding prong in the plug, remove the cord from service immediately.

Use extension cords properly — If an extension cord must be used, choose one with sufficient ampacity for the tool being used. An undersized cord can overheat and cause a drop in voltage and tool power. Check the tool manufacturer's recommendations for the required wire gauge and cord length. Make sure the insulation is intact. To reduce the risk of damage to a cord's insulation, use cords with insulation marked "S" (hard service) rather than cords marked "SJ" (junior hard service). Make sure the grounding prong is intact. In damp locations, make sure wires and connectors are waterproof and approved for such locations. Do not create a tripping hazard.

Check power cords and extensions — Electrical cords must be inspected regularly using the following procedure:

- Remove the cord from the electrical power source before inspecting
- Make sure the grounding prong is present in the plug
- Make sure the plug and receptacle are not damaged
- Wipe the cord clean with a diluted detergent and examine for cuts, breaks, abrasions, and defects in the insulation

Coil or hang the cord for storage. Do not use any other methods. Coiling or hanging is the best way to avoid tight kinks, cuts and scrapes that can damage insulation or conductors.

Test electrical cords regularly for ground continuity using a continuity tester as follows:

- Connect one lead of the tester to the ground prong at one end of the cord
- Connect the second lead to the ground wire hole at the other end of the cord
- If the tester lights up or beeps (depending on design), the cord's ground wire is okay. If not, the cord is damaged and must not be used
- Don't pull on cords, always disconnect a cord by the plug
- Use correct connectors — Use electrical plugs and receptacles that are right for your current and voltage needs. Connectors are designed for specific currents and voltages so that only matching plugs and receptacles will fit together. This safeguard prevents a piece of equipment, a cord and a power source with different voltage and current requirements from being plugged together. Standard configurations for plugs and receptacles have been established by the National Electric Manufacturers Association (NEMA)
- Use locking connectors — Use locking-type attachment plugs, receptacles, and other connectors to prevent them from becoming unplugged

USE AND MAINTAIN TOOLS PROPERLY

Your tools are at the heart of your craft. Tools help you do your job with a high degree of quality. Tools can do something else, too. They can cause injury or even death! You must use the right tools for the job. Proper maintenance of tools and other equipment is very important. Inadequate maintenance can cause equipment to deteriorate, creating dangerous conditions.

Inspect tools before using them — Check for cracked casings, dents, missing or broken parts and contamination (oil, moisture, dirt, corrosion). Damaged tools must be removed from service and properly tagged. Don't use these tools until they are repaired and tested.

Use the right tool correctly — Use tools correctly and for their intended purposes. Follow the safety instructions and operating procedures recommended by the manufacturer. When working on a circuit, use approved tools with insulated handles. **However, do not use these tools to work on energized circuits. Always shut off and de-energize circuits before beginning work on them.**

Protect your tools — Keep tools and cords away from heat, oil and sharp objects. These hazards can damage insulation. If a tool or cord heats up, stop using it! Report the condition to a supervisor immediately. If equipment has been repaired, make sure that it has been tested and certified as safe before using it. Never carry a tool by the cord. Disconnect cords by pulling the plug—not the cord!

Use double-insulated tools — Portable electrical tools are classified by the number of insulation barriers between the electrical conductors in the tool and the worker. The NEC permits the use of portable tools only if they have been approved by Underwriter's Laboratories (UL Listed). Equipment that has two insulation barriers and no exposed metal parts is called double insulated.

When used properly, double-insulated tools provide reliable shock protection without the need for a third ground wire. Power tools with metal housings or only one layer of effective insulation must have a third ground wire and three-prong plug.

Use multiple safe practices — Remember, A circuit may not be wired correctly. Wires may contact other "hot" circuits. Someone else may do something to place you in danger. Take all possible precautions.

ATTACHMENTS

The following pages contain a Safe Electrical Practices Checklist that can be reproduced and used by Aversa Bros Industrial Contractors and its employees to ensure any electrically related work is performed safely.

3 SAFE ELECTRICAL WORK PRACTICES 4 CHECKLIST (PAGE 1 OF 2)

- ☐ Are all employees required to report (as soon as practical) any obvious hazard to life or property observed in connection with electrical equipment or lines?
- ☐ Are employees instructed to make preliminary inspections and/or appropriate tests to determine what conditions exist before starting work on electrical equipment or lines?
- ☐ When electrical equipment or lines are to be serviced, maintained, or adjusted, are necessary switches opened, locked out and tagged?
- ☐ Are portable hand-held electrical tools and equipment grounded or are they of the double-insulated type?
- ☐ Do extension cords have a grounding conductor? Are multiple plug adaptors prohibited?
- ☐ Are ground-fault circuit interrupters installed on each temporary 15, 20, or 30 ampere, 125-volt AC circuit at locations where construction, demolition, modifications, alterations or excavations are being performed? OR…
- ☐ Do you have an assured equipment-grounding conductor program in place?
- ☐ Are all temporary circuits protected by suitable disconnecting switches or plug connectors at the junction with permanent wiring?
- ☐ Is exposed wiring and cords with frayed or deteriorated insulation repaired or replaced promptly?
- ☐ Are flexible cords and cables free of splices or taps?
- ☐ Are clamps or other securing means provided on flexible cords or cables at plugs, receptacles, tools, equipment, and are the cord jackets securely held in place?
- ☐ Are all cords, cable and raceway connections intact and secure?
- ☐ In wet or damp locations, are electrical tools and equipment appropriate for the use or locations (or otherwise protected)?
- ☐ Are electrical power lines and cables located (overhead, underground, underfloor, other side of walls) before digging, drilling, or similar work begins?
- ☐ Is the use of metal measuring tapes, ropes, hand lines or similar devices with metallic thread woven into the fabric prohibited where these could come into contact with energized parts of equipment or circuit conductors?
- ☐ Is the use of metal ladders prohibited in areas where the ladder or the person using the ladder could be exposed to energized parts of equipment, fixtures or circuit conductors?
- ☐ Are all disconnecting switches and circuit breakers labeled to indicate their use or equipment served?
- ☐ Are disconnecting means always opened before fuses are replaced?
- ☐ Are all energized parts of electrical circuits and equipment guarded against accidental contact by approved cabinets or enclosures?
- ☐ Is sufficient access and working space provided and maintained around all electrical equipment to permit ready and safe operations and maintenance?
- ☐ Are all unused openings (including conduit knockouts) of electrical enclosures and fittings closed with appropriate covers, plugs or plates?
- ☐ Are electrical enclosures such as switches, receptacles and junction boxes provided with tight-fitting covers or plates?

3 SAFE ELECTRICAL WORK PRACTICES 4 CHECKLIST (PAGE 1 OF 2)

- ☐ Are employees prohibited from working alone on energized lines or equipment more than 600 volts?
- ☐ Are employees forbidden (unless properly qualified/certified) from working closer than 10 feet from high-voltage (more than 750 volts) lines?
- ☐ Have all underground utilities been located prior to any excavation work?
- ☐ Is all digging within 4 feet of power lines done by hand?
- ☐ Are power lines de-energized? Has the utility company been consulted before digging?
- ☐ Has the power company been notified if work is to be done near overhead lines?
- ☐ Are live parts of electrical circuits de-energized before an employee works on or near them?
- ☐ Are all exposed energized parts in the temporary power supply protected from possible contact?
- ☐ Are all power-supply circuit disconnects marked according to their functions?
- ☐ Is splicing allowed on extension cords only if they are larger than size 12 and the splicing retains insulation protection equal to the original extension cord?
- ☐ Are all plug connections used with the voltage for which they were designed?
- ☐ Do you always ensure that flexible cords are not immersed in water or exposed to damage from vehicles?
- ☐ Are all junction boxes used in a wet environment waterproof?
- ☐ Are you using a GFCI, or has an AEGCP been established?

POLICY

This policy has been developed to protect our employees from the hazards associated with using abrasive grinding machines and wheels, and will comply with OSHA regulations 1910.215 and 1926.303.

HAZARDS

Grinding wheels are made up of individual particles that are bonded together to form a wheel. The hazard with abrasive wheels is that, if not properly mounted and used, the wheel can explode, sending sections of the wheel flying out at high speeds. The pieces of the wheel can strike the machine operator causing death or serious injury. Another hazard associated with abrasive wheel machinery is the rotating motion of the spindle end, nut, and flange projections. To protect employees against these hazards, the company has adopted the following policy.

To avoid injury from contact with these mechanical parts, the side of the wheel must be covered to enclose these parts (some exceptions are allowed and are listed in the “Usage – Guarding and Other Safety Precautions” section that follows.)

RESPONSIBILITIES

Preventing harm from abrasive wheels and grinders is a cooperative effort between this company and its employees.

EMPLOYEE RESPONSIBILITIES

Employees are expected to:

- Adhere to the recommended safe grinder usage guidelines
- Report potential hazards, including defective equipment, to a supervisor immediately
- Complete a grinder training program
- Report accidents to the supervisor immediately
- Wear proper personal protective equipment

TRAINING

All employees will complete a hand and power tool-training program prior to beginning their work assignment. Training must cover the grades, types, and markings of wheels; the use, hazards, speed controls, storage, handling, inspection, testing, dressing, and adjustments of wheels; and the functions of associated components such as flanges, blotters, bushes, locking nuts, etc. This training will be re-administered a minimum of once every year, and when employees are observed to be not following company safety policies or industry standards.

Training Records

Training records will be retained for all employees for the length of their employment and will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

SAFE PRACTICES

To protect the machine operator, as well as other employees in the area, machine safeguarding will be used. A good rule to remember is any machine part, function, or process that could cause injury must be safeguarded. Machine safeguarding can be done by using controls or by eliminating the hazard.

Three basic areas of machines require safeguarding:

1. At the point of operation – This is the point where work is performed on the material, such as grinding, gutting, or boring

2. At the power transmission apparatus – This consists of all components of the mechanical system that transmit energy to any part of the machine, performing the work. These components include flywheels, pulleys, belts, connecting rods, couplings, cams, spindles, chains, cranks, and gears

3. Other moving parts – This involves all parts of the machine that move while the machine is working. These can include reciprocating, rotating, and transverse moving parts, as well as feed mechanisms and auxiliary parts of the machine

Usage and Safety Precautions

Most grinding accidents are caused by improper wheel selection or usage. This company requires that employees follow these requirements when using abrasive wheels and grinders:

- Make sure the grinder is grounded and has its own on/off switches
- After mounting an abrasive wheel, run the machine with the guard in place or in an enclosure at operating speed for at least one minute before applying work. During this time, employees must not stand in front of or in line with the wheel
- Only use abrasive wheels on machines that have safety guards capable of containing all fragments in the event of the wheel bursting. The strength of the guard fastenings must exceed the strength of the guards. All wheel breakage incidents will be investigated to determine the cause, correct employee procedural deficiencies, and to prevent a recurrence

Guards must be used according to the manufacturer's instructions, and are required to be in place before starting the wheel, with the following exceptions:

- Wheels used for internal work while within the work being ground
- Mounted wheels, used in portable operations, 2 inches and smaller in diameter
- Type 16, 17, 18, 18r, and 19 cones, plugs, and threaded hole pot balls where the work provides a suitable measure of protection to the operator
- Metal diamond lapidary blades used within a coolant deflector, with speeds not more than 3,500 sfpm

Ensure that abrasive wheel safety guards cover the spindle end, nut, and flange projections except when:

- The object being ground provides a suitable measure of protection to the operator in the event that the wheel should break
- The work entirely covers the side of the wheel
- Machines are designed as portable saws

For offhand grinding machines (i.e., machines that require the operator to stand directly in front of them), adjustable work rests made of rigid construction must be used to support the work. The work rests must be kept adjusted closely to the wheel with a maximum opening of ⅛ inch to prevent the work from being jammed between the wheel and the rest, which could cause the wheel to break. Because the grinding wheel will likely decrease in size each time that you use it, it may be necessary to adjust the work rest after each use to ensure that the distance does not exceed ⅛ inch.

The safety guards for bench and floor stands, and for cylindrical grinders, must not expose the grinding wheel periphery more than 65 degrees above the horizontal plane of the wheel spindle. For example, if you have a six-inch grinding wheel, only a 5.1-inch section of the outside edge of the wheel may be exposed. A safety guard must enclose the remaining portion of the wheel. The exposed portion of the wheel must be above the horizontal plane, or top half of the wheel.

The protecting part of the abrasive wheel safety guard (tongue guard) must be adjusted so that the distance between the wheel and the adjustable tongue is less than ¼ inch. Because the grinding wheel will likely decrease in size each time that you use it, it may be necessary to check and/or adjust the tongue guard after each use to ensure that the distance does not exceed ¼ inch.

Side grinding will be performed only on an abrasive wheel that is designed for that purpose. A wheel designed for grinding on the outside edge must not be used for side grinding. This does not prohibit wheel use for applications such as shoulder form, and contour grinding where it's recognized that a limited amount of grinding with the side of the wheel is performed with a wheel that is designed for periphery grinding.

Before mounting a new wheel, check the spindle speed of the machine to see that it doesn't exceed the maximum operating speed of the wheel. All grinders must have their maximum spindle speeds marked on them.

Before mounting a grinding wheel, closely inspect and ring test it to make sure there's no damage.

Pedestal grinders are generally top heavy, and must be secured. As a rule, if your machine has holes in its base, anchor it. Note that you may secure your grinder to either the floor or a large dimension base plate.

Fabricated Guards

Fabricated guards for abrasive wheels must be made of steel and meet the standards in the following table. Column A also applies to cast guards. Column B applies where bolts hold an adjustable tongue. Any means of fastening will be considered satisfactory if, when assembled, it has strength at least equal to the members being joined.

TABLE 8
DIMENSIONAL REQUIREMENTS FOR CONSTRUCTION OF FABRICATED GUARDS
MAXIMUM WHEEL SPEED 10,000 SFPM

	A	B	C	D	E	F	G	H
Diameter of Wheel	Length of Tongue	Diameter of Bolts Medium Carbon Quenched & Tempered	Size of Angle Supports Tongue and Rest	Diameter of Rivets for Supports	Diameter of End Connecting Bolts	Thickness of Tongue	Maximum Space Between New Wheel and Guard at Periphery	Maximum Inside Width of Guard
Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Under 12	3 1/2	9/16	1 1/2 x 1 1/2 x 5/16	4 ea. @ 1/2	1/2	1/4	1 1/2	1 1/2 wider than wheel
16	5	5/8	2 x 2 x 5/16	4 ea. @ 5/8	9/16	5/16	1 1/2	2 wider than wheel
24	6	3/4	2 x 2 x 1/2	6 ea. @ 5/8	5/8	1/2	1 1/2	2 wider than wheel
30	7	11/16	2 1/2 x 2 1/2 x 1/2	6 ea. @ 11/16	11/16	1/2	1 1/2	2 wider than wheel

NOTE: Column D assumes low carbon steel (38,000 PSI tensile) rivets. Two rivets per bar 12 and 16" diameter. For rivets per bar 24 and 30" diameter.

Flanges – General Requirements

An abrasive wheel must be mounted between flanges, except as noted below, which must not be less than ⅓ the diameter of the abrasive wheel.

Exceptions: mounted wheel; portable cup, plug, and cone wheels with threaded inserts or studs; abrasive disc of the inserted nut, inserted washer, and projecting stud type; plate-mounted wheel; cylinder, cup, or segmented wheel mounted in a chuck; depressed-center wheel; internal wheel less than two inches in diameter; straight and flaring cup wheel for terrazzo use; cutting off wheel (see more info on cutting-off wheels just below); masonry and concrete saws.

A straight cutting-off wheel must be mounted between relieved flanges that are not less than ¼ the wheel diameter. A depressed center cutting-off wheel more than 16 inches in diameter must be mounted between flat unrelieved flanges and not less than ¼ the wheel diameter.

A masonry saw using a reinforced resinoid and steel-centered wheel may use 4-inch diameter flanges for wheels through 20 inches in diameter.

Concrete saws using a steel-centered wheel 20 inches and larger may use flanges measuring 1/6 the wheel diameter.

Flange Construction

When a wheel is mounted between flanges, the flange must be designed to transmit the driving torque from the spindle to the abrasive wheel.

A flange must be made of steel, cast iron, or materials of equal strength and rigidity so that when tightened, the radial width of the bearing surface of contact on the abrasive wheel is maintained.

Two flanges, between which an abrasive wheel is mounted, except when a special adaptor is used on a depressed-center wheel, must have the same dimensions and bearing surface.

Mounting Depressed Center Wheels

A depressed center wheel, except as prescribed above for a straight cutting-off wheel, must be mounted with specially designed adaptors.

The back flange must extend beyond the central hub or raised portion and contact the wheel to counteract the side pressure on the wheel in use.

The adaptor nut, which is less than the minimum ⅓ diameter of the wheel, must fit into the depressed side to prevent interference in side grinding and drive the wheel by its clamping force against the depressed portion of the back flange.

Adaptors affixed by the depressed center wheel manufacturer must not be reused.

SPEED PROVISIONS

Abrasive wheels must not be run in excess of the maximum permissible speed as recommended by the manufacturer. It is a legal requirement to clearly show minimum and maximum speeds on all power-driven machines, marked in rpm, for all wheels more than 55 mm in diameter. For smaller wheels, this information should be displayed on or adjacent to where the wheel is operated. This information must be available at all times.

A grinding machine with a vari-speed control must have the speed adjustment supervised by an authorized and trained employee.

Before mounting a wheel on a vari-speed grinder, an employee must adjust the speed of a machine to not more than the rated speed of the wheel.

Spindle Speeds

The spindle speed must be permanently marked on a grinding machine and maintained in a legible manner. The spindle speed must not exceed the rated speed of the grinding wheel. The wheel spindle speed on a single-speed grinding machine must be checked with a tachometer when a change is made that could affect the spindle speed.

The wheel spindle speed on an air-driven grinder must be checked with a tachometer as follows:

- After maintenance or repair
- When in use, with such checks being performed as often as necessary to assure that wheel overspeed will not occur

The wheel spindle speed of a vari-speed grinding machine must be checked with a tachometer as follows:

- When in use, with such checks being performed as often as necessary to assure that wheel overspeed will not occur
- After any change that could affect the spindle speed
- When a new wheel is mounted

Wheel Speeds

An abrasive wheel or its package must show the maximum operating speed as revolutions per minute. The use of a package for this marking must be limited to those shapes that make marking unfeasible.

An abrasive wheel must not be run at a speed greater than the rated speed on the wheel. The revolutions per minute may be increased as the wheel diameter decreases if the original surface-feet-per-minute speed is not exceeded. Wheel speed must be computed from the free-running speed of the machine spindle.

The company will purchase and use only abrasive wheels that have been speed tested by the manufacturer, with the following exceptions:

- A wheel that is less than 6 inches in diameter
- A diamond or cubic boron nitrate wheel that is bonded by metal or organic substances
- A segmental disc wheel and disc wheel
- A ball grinding wheel
- A regulating wheel for centerless grinders
- A mounted wheel
- A segment

Special Speeds

Wheels that are used on special applications at speeds higher than those listed in Table 21 below must be marked for high-speed application and the specific conditions of use. The marked maximum speed of the wheel must not be exceeded.

The machine and its components, such as the spindle, bearings, guards, flanges, and rated horsepower, must permit the entire unit to operate safely at the special speed.

An employer must assure that the machine is operated with safety guards as prescribed in this document, and that the machine and guards are maintained in good condition for continued safety.

TABLE 21
STANDARD MAXIMUM SPEEDS IN SURFACE FEET PER MINUTE

Classification Number	Types of Wheels (See Section 1 for Definitions)	Inorganic Bonds		Organic Bonds			
		Low Strength	Medium Strength	High Strength	Low Strength	Medium Strength	High Strength
		OPERATING SPEED SHALL NOT EXCEED:					
		SFPM	SFPM	SFPM	SFPM	SFPM	SFPM
1	Type 1 – Straight Wheels – except classifications 6, 7, 9, 10, 11, 12 and 13 below	5,500	6,000	6,500	6,500	8,000	9,500
	Type 4* – Taper Side Wheels						
	Types 5, 7, 20, 21, 22, 23, 24, 25, 26 Recessed, Dovetailed and/or relieved wheels. (Except Classification 7 below)						
	Type 12 – Dish Wheels						
	Type 13 – Saucer Wheels						
	Types 16, 17, 18, 19 – Cones and Plugs						
2	Type 2 – Cylinder Wheels including plate mounted, inserted nut and projecting stud – Segments	5,000	5,500	6,000	5,000	6,000	7,000
3	Cup Shape Tool Grinding Wheels (For Fixed Base Machines) Type 6 – Straight Side Cups Type 11 – Flaring Cups	4,500	5,000	6,000	6,000	7,500	8,500

SANDING MACHINES

Feed rolls of self-feed sanding machines must be protected with a semi-cylindrical guard to prevent the hands of the operator from coming in contact with the in-running rolls at any point. The guard must be constructed of not less than 18-gauge sheet metal or stronger material, preferably metal, and must be firmly secured to the frame carrying the rolls to remain in adjustment for any thickness of stock. The bottom of the guard should come down to within 3/8-inch of a plane formed by the bottom or contact face of the feed roll where it touches the stock.

Drum Sanding Machines

A drum sanding machine must have an exhaust hood or other guard if an exhaust system is not required, arranged to enclose the revolving drum, except for that portion of the drum above the table.

Disk Sanding Machines

A disk-sanding machine must have the exhaust hood, or other guard if an exhaust system is not required, arranged to enclose the revolving disk, except for that portion of the disk above the table. The distance between the disk and the table edge must not be more than ¼ inch.

Belt Sanding Machines

Belt sanders must have all pulleys enclosed, including sides and periphery, except the working end of an edge sander. An exhaust hood may be part of the guard.

The edges of the unused run of the belt must be guarded. These guards must effectively prevent the hands or fingers of the operator from coming in contact with the nip points.

CHOOSING THE CORRECT TYPE OF WHEEL

There are a myriad of abrasive wheel manufacturers and a seemingly endless variety of wheel types with different characteristics. There is a system of marking of abrasive wheels that specifies the type and nature of the abrasive material, grain size, grade and structure, as well as the nature of the bond. It's important to understand the marking system when selecting a wheel for a particular job.

As a rule, soft-grade wheels are most suitable for use on hard materials, and hard-grade wheels on soft materials. Coarse grains are for the rapid removal of material, and fine grains are for polishing.

The use of an unsuitable wheel may result in the wheel face becoming loaded as the pores become clogged by the material being removed. If the wheel is too hard or too fine, it may become glazed or polished. Both situations will reduce the efficiency of the wheel.

Only reinforced resin-bonded wheels should be used with portable grinding machines. Diamond blades can be used on hand-held machines at speeds up to 100 m/s if the machine is designed for this speed and the marked maximum permissible operating speed of the blade is not exceeded. Diamond blades are directional and must be mounted so that they rotate in the direction marked on the blade.

Multiple Wheel Mounting

When mounting more than one abrasive wheel between a pair of flanges, the wheels must be cemented together and separated by spacers having low compressibility, such as soft copper or brass, or the wheels must be specially manufactured for mounting without cement or the use of the prescribed spacers. The spacers must be equal in diameter to the flanges and have equal bearing surfaces.

MAINTENANCE AND INSPECTION

It is essential that an inspection of the equipment be carried out before and after use, every time.

In addition, every three months, all abrasive wheels will be the subject of an inspection and service by an appointed person with duties for abrasive-wheel maintenance.

The inspection and service will include:

- Checking the rotation direction
- Checking the mounting of the wheel
- Lubricating the moving parts
- General visual inspection of the equipment for damage or defects

Flanges with a worn, warped, sprung, or damaged bearing surface must be repaired or replaced.

An out-of-truth (crooked) abrasive wheel must be trued (straightened) by a trained employee. A wheel that cannot be trued must not be used.

STORAGE AND HANDLING

Follow the guidelines below when handling or storing an abrasive wheel:

- The wheel must be stored flat
- Store it in a rack, bin, box, or drawer in a manner to prevent damage
- Labels should be retained and kept in good condition
- Do not drop, bump, or roll the wheel
- Do not subject it to:
  - High humidity
  - Water or other liquids
  - Freezing temperatures or any temperature low enough to cause condensation on the wheel when moving it from storage to an area of higher temperature

PERSONAL PROTECTIVE EQUIPMENT

When an abrasive wheel is being used, there is an obvious risk of eye injuries caused by abrasive particles or hot sparks being thrown off. Therefore, it is essential that either goggles or a face shields or visors be worn during operation of the wheel.

Where dust cannot be adequately controlled by ventilation or suppression, an appropriate facemask should be worn.

Hearing defenders should be worn where noise exceeds the action levels set out in the Noise at Work Regulations.

FORMS AND ATTACHMENTS

The following section contains a standard checklist for Abrasive Wheel Equipment Grinders. The checklist references the applicable OSHA regulations for the inspection item, if additional information is needed.

CHECKLIST FOR ABRASIVE WHEEL EQUIPMENT GRINDERS

Description	Yes	No*
Do side guards cover the spindle, nut, and flange, and 75% of the wheel diameter?	☐	☐
Is the work rest used and kept adjusted to within ⅛-inch of the wheel?	☐	☐
Is the adjustable tongue guard on the top side of the grinder used and kept to within ¼-inch of the wheel?	☐	☐
Is the maximum RPM rating of each abrasive wheel compatible with the RPM rating of the grinder motor?	☐	☐
Before new abrasive wheels are mounted and used, are they visually inspected and ring tested?	☐	☐
Is cleanliness maintained around grinders?	☐	☐
Are dust collectors and powered exhausts provided on grinders used in operations that produce large amounts of dust?	☐	☐
Are goggles or face shields always worn when grinding?	☐	☐
Are bench and pedestal grinders permanently mounted?	☐	☐
Is each electrically operated grinder effectively grounded?	☐	☐
Are fixed or permanently mounted grinders connected to their electrical supply system with metallic conduit or another permanent method?	☐	☐
Does each grinder have an individual on and off control switch?	☐	☐

* A mark in the “No” column indicates a need for corrective action.

POLICY

Air compressors are used for a variety of applications. Storage tanks hold excess air that's generated from the compressor, providing a convenient and readily accessible air source. Because of the air pressure within these storage tanks, potential dangers can develop if certain practices and precautions are not followed.

This safety policy and program provides the safe practices for the safe use of air compressor storage tanks. It lists training requirements, guidelines for locating drains and traps, and requirements for gauges and valves.

EMPLOYER RESPONSIBILITIES

It is the responsibility of this company to:

- Provide training for affected employees
- Ensure proper use and maintenance of air compressor storage tanks and equipment
- Ensure that only those employees who have been trained to work with air compressor storage tanks are allowed to operate such equipment
- Ensure that equipment needed is available and is in good working condition
- Ensure damaged equipment is removed from service until repaired and tested
- Ensure that air compressor storage tanks are inspected every six months
- Provide employees with Personal Protective Equipment (PPE) necessary for their job

EMPLOYEE RESPONSIBILITIES

Employees are expected to:

- Inspect all hoses and equipment before connecting to any compressed air system
- Immediately report any damages or defects to their supervisors
- Empty manual drains and taps on a regularly scheduled basis
- Inspect air compressor storage tanks prior to use and note any damage or defects

TRAINING

We will ensure every employee is provided training on air compressors. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The safety coordinator or designee will verify that all employees working with air compressors are trained in the following minimum elements:

- The purpose of air compressor storage tanks
- The basic operation of air compressor storage tanks

- Maintenance requirements of drains and traps
- Reading gauges and operating valves
- Identifying damage and defects in the storage tanks, hoses, or air driven equipment

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

SAFE PRACTICES

Pneumatic Tools

Pneumatic tools include air compressors and a variety of tool attachments such as wrenches, nail guns, drills, and blowguns. Although they require some special handing, they can save a great deal of time and effort and are relatively easy to use.

Always inspect the tool, air hose, and fittings for damage, disrepair, or missing parts before using. Make sure air hoses and fittings are securely tightened. If a tool fails the pre-use inspection, notify your supervisor and remove it from service by attaching a red tag that states “DO NOT USE.”

Never point pneumatic impact tools, such as riveting guns, toward anyone. Turn off the air supply at the control valve and tool blade before disconnecting a pneumatic tool (unless it has quick disconnect plugs). Be especially careful when using pneumatic tools around fuel, flammable vapors, or explosive atmospheres. They can generate static electricity and must be grounded or bonded when these chemical hazards are present.

Compressed Air Systems

A compressed air system consists of an air receiver, air distribution lines, and a pressure regulatory device.

Air Receivers

Each air tank must have at least one pressure gauge and an American Society of Mechanical Engineers (ASME) safety valve. Use a spring-loaded safety release valve to prevent the receiver from exceeding the maximum allowable working pressure.

Consider the drainage issues associated with receivers. Fit air receivers with a drain cock on the bottom of the receiver. Drain receivers frequently to prevent accumulation of liquid inside the unit. Receivers having automatic drains are exempt from this requirement.

Testing air receivers: Only hydrostatically tested and approved tanks can be used as air receivers. The only time the maximum allowable pressure of an air receiver can be exceeded is when it’s being tested.

Whenever possible, install air tanks so that the entire outside surface can be easily inspected. Do not bury them or place them in hard to reach locations. The intake and exhaust pipes of small tanks must be removable for interior inspections. Tanks over 36 inches in diameter must have manholes. Inspection openings are sufficient for smaller tanks. Tanks with volumes of 5 cubic feet or less can have pipe lug openings.

Air Distribution Lines

Select airlines made of high quality materials with standard fittings and secure connections. Check hoses before use to make sure they're free of defects and properly connected to pipe outlets. Repair or replace defective equipment immediately.

Identify the maximum allowable pressures (psi) by tagging or marking pipeline outlets.

Air hoses are subject to damage and can become hazards. Avoid bending or kinking air hoses. Hose reels can help with this. Keep air hoses free of grease and oil to prevent deterioration. Secure hose ends to prevent whipping if an accidental cut or break occurs. Whenever possible, suspend hoses overhead for more efficient access and protection.

Pressure Regulation Devices

Use ASME approved cast iron seat or disk safety valves that are stamped for the intended service application. Always install valves, gauges, and other regulating devices so they can't be disabled. Never set the valve higher than the maximum allowable working pressure of the receiver.

The safety valves should be set to blow at pressures slightly above those necessary to pop the receiver safety valves. Settings must be no more than 10% above the standard operating pressure of the compressor. Shield blow-off valves to prevent personal injury and equipment damage from sudden blow-offs. Don't position stop valves on airlines running between the compressor and the receiver. If the design of a safety or a relief valve allows liquid to collect on the discharge side of the disk, equip the valve with a drain at the lowest point where liquid can collect.

PPE

The company requires employees to wear the appropriate personal protective equipment (PPE) for the task. Safety glasses, face guards or shields, and hearing protection are required with impact tools.

An air-impact wrench creates a noise exposure of about 103 dB, requiring hearing protection. Gloves and steel-toed shoes are also required.

Never wear loose clothing and always keep your shirt tucked into your pants when using pneumatic tools. Tie long hair back or secure under a cap. Respirators may be required when using compressed air for tasks such as painting.

MAINTENANCE

Keep equipment appropriately lubricated while avoiding over lubricating. Don’t use flammable lubricants on compressors because they often operate at high temperatures that could cause a fire or explosion.

Frequent cleaning with soapy water (e.g., lye solutions) is recommended to keep carbon deposits off compressor parts. Don’t use kerosene or other flammable substances to clean compressed air equipment. Be sure to purge air systems after each cleaning.

SCOPE

This chapter defines the procedures and safe practices to be followed by qualified persons when performing electrical work. This includes working near high voltages, on live circuits, and anywhere arc flash hazards may be present.

This policy will comply with the requirements of OSHA regulations 1926 Subpart K, 1910 Subpart S, NFPA 70E, and all applicable state or local regulations relating to construction or general industry electrical work.

This information does not include our Lockout/Tagout policy, which is contained in a separate chapter.

POLICY

This company has adopted this policy for the prevention of employee exposure to electrical hazards.

DEFINITIONS

Qualified Person: A qualified person is someone who has demonstrated the skills and knowledge of the construction and operation of electrical equipment and installations and has received safety training to identify and avoid the hazards involved.

Unqualified Person: An unqualified person is someone who has not been trained on the hazards and safe practices of working on or near energized electrical circuits or equipment.

EMPLOYER RESPONSIBILITIES

- Ensuring that safety inspections of the facility occur on regular basis
- Ensuring that only qualified personnel perform work on high-voltage circuits, live circuits and anywhere there is a risk of an arc flash incident
- Training personnel in how to perform a job hazard analysis
- Responding quickly to eliminate workplace hazards
- Ensuring all equipment is kept in good repair
- Ensuring employees follow safe job procedures
- Reviewing job hazard analysis whenever there is a significant change to any element of the job or when there has been an injury or illness

SUPERVISOR RESPONSIBILITIES

- Establishing and maintaining safe and healthful working conditions
- Familiar with the electric safety and health hazards that their employees are exposed to, how to recognize them, the potential effects these hazards have on the employees, and rules, procedures and work practices for controlling exposure to those hazards
- Setting good examples, instructing their employees, making sure they fully understand and follow safe procedures

EMPLOYEE RESPONSIBILITIES

- No employee is expected to undertake a job until he/she has received instructions on how to do it properly and safely and is authorized to perform the job

- No employees should undertake a job that appears to be unsafe
- Mechanical safeguards must always be in place and kept in place
- Employees are to report to a superior or designated individual all unsafe conditions encountered during work
- PPE must be used when and where required, and properly maintained

SAFE PRACTICES

De-Energized Electrical Equipment

Conductors and parts of electrical equipment that have been de-energized but not locked out will be treated as energized.

While any employee is exposed to fixed electric equipment or circuits, the energized parts will be de-energized, locked out and tagged.

Electrical Low Voltage

Low-Voltage Electrical Safety applies to all electrical installations and electrical equipment operating or intended to operate on systems of 600 volts, nominal, or less and to all work performed directly on or in proximity to such electrical installations, equipment or systems in all places of employment. Only qualified personnel are authorized to perform work, service or maintenance on electrical parts or systems.

All employees will treat the electrical equipment as energized until tested or otherwise proven to be de-energized.

LOCKOUT/TAGOUT PROCEDURES

Employees are responsible for following host employer's Lockout Tagout (LOTO) procedures. While any employee is exposed to contact with parts of fixed electric equipment or circuits that have been de-energized, the circuits energizing the parts will be locked out and/or tagged.

Employees will be responsible for the following before working on energized electrical equipment or systems unless the equipment is physically removed from the wiring system:

- Notifying all involved personnel
- Locking the disconnecting means in the "open" position with the use of lockable devices, such as padlocks, combination locks, or disconnecting of the conductor(s), or other positive methods or procedures which will effectively prevent unexpected or inadvertent energizing of a designated circuit, equipment, or appliance

Employees will not remove LOTO locks or tags, or energize electrical equipment or systems.

Safety Precautions:

Whenever there is access to opened enclosures containing exposed energized equipment that is not under the control of an authorized or certified person, suitable temporary barriers or barricades will be installed. These can be any one of the following:

- Barricades may be of a single placard, vertical type, a double placard, horizontal type
- A solid orange, plastic cone designed to be moved or rearranged quickly

- Barricades may be equipped with flashers for use at night and are often used with temporary signs which give specific directions to be followed
- Caution, Warning, or Danger Barricade Tape

Employees will have an authorized person remove temporary barriers and reinstall permanent barriers or covers.

Conductive Equipment

When working on or near exposed energized conductors or parts of equipment conductive measuring tapes, ropes, or similar measuring devices will not be used. Conductive fish tapes will not be used in raceways entering enclosures containing exposed energized parts unless such parts are isolated by suitable barriers.

ELECTRICAL HIGH VOLTAGE

All work locations will be safely accessible whenever work is to be performed.

All employees will inspect each safety device, tool or piece of equipment each time it is used and only use those items that are found to be in good condition. The company will require the use of all safety devices and safeguards where applicable.

Only qualified employees will work on energized conductors or equipment connected to energized high-voltage systems. Except for the following:

- Replacing fuses
- Operating switches
- Operations that don’t require the employee to contact energized high-voltage conductors or energized parts of equipment
- Clearing “trouble” or in emergencies involving hazard to life or property
- No employees will be assigned to work alone in the following situations:
- Employees in training, who are qualified by experience and training, will be permitted to work on energized conductors or equipment connected to high-voltage systems while under the supervision or instruction of a qualified electrical worker
- During the time work is being done on any exposed conductors or exposed parts of equipment connected to high-voltage systems, a qualified electrical worker, or an employee in training, will be in close proximity at each work location to:
    - Act primarily as an observer for the purpose of preventing an accident
    - Render immediate assistance in the event of an accident

The observer will not be required in connection with work on overhead trolley distribution circuits not exceeding 1,500 volts D.C. where there is no conductor of opposite polarity less than four feet (4ft) there from, or where such work is performed from suitable tower platforms or other similar structures.

Employees will not be permitted to approach or take any conductive object without an approved insulating handle closer to energized parts. To provide clearance distances as specified in Cal/OSHA table 2940.2-1: NOTE: These distances are the air, bare-hand and live-line tool distances.

ILLUMINATION

Illumination will be provided as needed to perform the work safely. This can be done by using any one of the following: droplights, floodlights, flashlights, etc.

Employees may not enter spaces containing exposed energized parts without illumination that enables employees to work safely.

PERSONAL SAFETY AND PROTECTIVE EQUIPMENT

Insulating equipment will be provided and designed for the voltage levels to be encountered.

The company will be responsible for the periodic visual and electrical re-testing of all insulating gloves, sleeves and blankets. The following maximum re-testing intervals according to the listed American Society for Testing and Materials (ASTM) standards:

- In–Service Care of Insulating Gloves and Sleeves ASTM F 496-97: six (6) Months
- In–Service Care of Insulating Blankets ASTM F 479-95: twelve (12) Months
- In–Service Care of Line Hose and Covers ASTM F 478-92: When to be found damaged or defective

All gloves, sleeves and blankets will be marked to indicate compliance with the re-test schedule and will be marked with either the date tested or the date of the next scheduled test.

All insulating equipment found to be defective or damaged will be immediately removed from service.

Test equipment (multi-meters, electrical leads, proximity testers) will be rated for the circuits and equipment on which they will be used. To check they are working properly, test equipment will be checked against a known voltage source to verify it's working properly, before and after determining a part is de-energized. In addition, a second method that includes listening to the transformer, checking lights and trying to operate the equipment will be used to confirm de-energization.

Calibration and Testing of equipment and tools will be performed according to the following schedule:

- Analog equipment – six months
- Digital equipment – 12 months
- Torque wrenches – 12 months
- Insulated tools – 24 months

Safety grounds will be checked before each use and installed with hot sticks while wearing PPE.

Shock protective tools and equipment will be inspected before every use and after each incident that could cause damage, looking for damage to the insulation that prevents it from working correctly, or could add to the risk. Electrical and safety equipment will meet the ANSI and ASTM standards.

OVERHEAD POWER LINES

Protective measures will be provided before starting work under or near overhead lines, such as de-energizing and grounding the power lines.

Vehicles or mechanical equipment that can be elevated near energized lines will always keep a 10 ft. clearance.

A qualified person working near energized overhead lines may not approach or take a conductive object without an approved insulating handle closer than five feet. An unqualified worker may not approach an energized overhead line or take a conductive object within 10 feet for voltages 50kV or below. For voltages over 50kV, the distance is 10 feet, plus 4 inches for every 10kV over 50kV.

WARNING SIGNS

Warning signs will be placed in areas where equipment is working around or near overhead power lines. The warning signs will be posted and maintained in plain view of the operator and driver on each of the following that may be in use: crane, derrick, power shovel, drilling rig, hay loader, hay stacker, pile driver or similar apparatus.

A durable warning sign legible at twelve feet (12ft) reading “Unlawful to Operate This Equipment within Ten Feet (10ft) Of High-Voltage Lines of 50,000 Volts or Less.”

CONFINED SPACES

When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the Company will provide, and the employee will use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts

PORTABLE LADDERS

Portable ladders will have nonconductive siderails if they are used where the employee or the ladder could contact exposed energized parts.

CONDUCTIVE APPAREL

Conductive articles of jewelry and clothing (such a watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) may not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping or other insulating means.

ENERGIZING EQUIPMENT

Opened enclosures and exposed energized equipment not under the control of an authorized person will have suitable temporary barriers installed by an authorized person. After the work is completed, the authorized person is responsible for removing temporary protective equipment and reinstalling all permanent barriers and equipment.

COMMUNICATING HAZARDS

The company will communicate to the host employer of unique hazards found or created and the steps taken to correct the hazards.

ENERGIZED WORK PERMITS

Only qualified employees can work on energized equipment. An energized work permit will be completed before starting any work on energized equipment including an explanation why the equipment can’t be de-energized, signed by a qualified person. Work that doesn’t require an energized work permit is: voltage or current testing, electrical troubleshooting, infrared thermography, and visual inspections where the plane of the cover will not be breached.

The energized work permit will include documentation of a job briefing before the job, where the employee in charge will discuss with affected workers the relevant hazards, work procedures, special precautions, energy source controls, PPE requirements and other information on the permit.

ARC FLASH AND SHOCK BOUNDARIES

Established shock and arc flash limited and restricted approach boundaries will be observed for uncovered and energized electrical equipment. Qualified persons can cross these boundaries to perform tasks such as testing, troubleshooting and voltage measuring if they follow the correct safety procedures, while unqualified persons must remain outside the boundaries.

The limited approach shock boundary requires workers to be trained according the Training section and be qualified to do the job to enter and carry out work like: testing, troubleshooting, and measure voltage.

The restricted approach shock boundary requires qualified workers entering the boundary to:

- Have a documented plan approved by management
- Use appropriate PPE
- Keep as much of the body out of the restricted space, using only protected body parts
- Verify they are properly insulated from live parts and conductive objects before taking a conductive object into the boundary

A hazard evaluation will be performed prior to work being done within the Limited Approach Boundary, in order to determine the safe practices to be employed. The Hazard Analysis should contain event severity, frequency, probability, and avoidance to determine the level of safe practices employed.

The first option for working on energized electrical equipment will be to shut it off, de-energize it, lock it out and verify it is locked out. All equipment will be treated as it is energized until it's proven de-energized. This means wearing the appropriate PPE while verifying the equipment.

TRAINING

Only qualified individuals are authorized to perform work, service, or maintain energized electrical parts or systems. Training and documentation is required for qualified individuals. Employees not qualified will be trained in electrically related safety practices necessary for their safety. All employees will be able to identify and understand electrical energy hazards.

Qualified persons (those permitted to work on or near exposed energized parts) will be trained in, and familiar with, the following at a minimum:

- Distinguishing exposed live parts from other parts of electric equipment
- The specific task they are going to perform and the safe work practices that related to their job assignment
- Determining the nominal voltage of exposed live parts
- The clearance distances and the corresponding voltages they will be exposed to
- The proper use of special precautionary techniques to prevent electric shock and injuries from direct or indirect contact when working near or on energized electrical equipment, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment (e.g., panels or equipment supplied from more than one source)

- Performing job related electrical tasks according to NFPA 70E, including the approach distances
- Determining the risk level of the hazard, job planning, and PPE needed to safely perform the task
- Personnel exposed to the presence of 50 volts or more will have formal documented electrical training in both the job related electrical tasks and electrical safety awareness
- Tasks that are performed less often than once per year will require retraining before the performance of the work practices involved
- An employee who is undergoing on-the-job training for the purpose of obtaining the skills and knowledge necessary to be considered a qualified person, and who in the course of such training demonstrates an ability to perform specific duties safely at his or her level of training, and who is under the direct supervision of a qualified person will be considered to be a qualified person for the performance of those specific tasks
- Documentation of qualifications will include records of academic courses, experience, on the job training, safety courses and task related certification. The employer will document that each employee has received the required training. This documentation will be made when the employee demonstrates proficiency in the work practices involved and will be maintained for the duration of the employee's employment. The documentation will contain the content of the training, each employee's name and dates of training.
- The Company requires retraining at least every three years and when workplace changes necessitate safety-related work practices that are different from what the employee normally uses. Different work practices may be new technology, types of equipment, or changes in procedures.

SCOPE

This chapter provides information on the steps the company will take to protect its assets from fraud, waste and theft. Although OSHA does not have any regulation specifically regarding asset protection, our practices and procedures will be based on best industry practices. This chapter does not provide procedures for security personnel, which is available in a separate chapter.

POLICY

This Company has established an asset protection policy to enforce controls and to aid in the prevention and detection of fraud, theft, waste or abuse against the company. This policy applies to any theft, waste, or abuse or suspected fraud, theft, waste, or abuse involving an employee (including management), a consultant, vendor, contractor, outside agency, or person doing business with the agency or in any other relationship with the agency.

Failure to comply with this policy subjects an employee (including management) to disciplinary action, including immediate termination. Failure to comply by a consultant, vendor, contractor, outside agency, or person doing business with the agency or in any other relationship with the agency could result in cancellation of the business or other relationship between the entity and the agency.

EMPLOYER RESPONSIBILITIES

It is the responsibility of this company to:

- Ensure all employees are appropriately trained to identify instances of and report fraud, theft, waste or other dishonest conduct
- Contact the appropriate authorities when unlawful activities are suspected
- Respond appropriately to suspected improprieties that do not rise to the level of fraud
- Protect the identity of an employee or complainant who reports suspicions of fraud to the maximum extent allowed by law

EMPLOYEE RESPONSIBILITIES

Employees are expected to:

- Participate actively in asset protection training
- Follow this policy, all training and supervisor instructions in regard to preventing theft, fraud or abuse
- Report suspicions of fraud, theft, waste or abuse to the safety coordinator

PROCEDURES

Handling Reported Employee Theft

Whenever a report of employee theft is made, follow these steps. Do not contact the suspected individual in an effort to determine facts or demand restitution.

- Allow the safety coordinator to conduct the investigation. Do not further investigate the allegations
- Observe strict confidentiality. Do not discuss the case, facts, suspicions, or allegations with anyone unless specifically asked to do so
- Retaliation will not be tolerated. The company will not tolerate any form of retaliation against individuals providing information concerning fraud or suspected fraud
- Every effort will be made to protect the rights and the reputations of everyone involved, including the individual who in good faith alleges perceived misconduct as well as the alleged violator(s)
- The identity of an employee or other individual who reports a suspected act of fraud will be protected as provided by this policy

On receiving a report of suspected fraud, the safety coordinator shall document the contact and conduct a preliminary investigation to determine the credibility of the report. If the report is credible, the person shall follow the investigation guidelines provided in this policy.

The investigator shall make every effort to protect the rights and the reputations of everyone involved in a report of suspected fraud, including the individual who in good faith alleges perceived misconduct, as well as the alleged violator(s). The investigator also shall make every effort to protect the identity of a person who in good faith reported the suspected fraud. However, disciplinary action may be taken as provided by this policy if a report is made in bad faith.

On determining that a report is not credible or is not a report of fraud, the safety coordinator shall document this determination. This documentation shall include support for the determination.

Customer Theft

Whenever, you suspect a customer is going to steal from the store notify a supervisor on duty. To prevent false arrest claims and establish probable cause for detaining a suspected shoplifter, the Company requires completion of these six universally accepted steps before approaching a suspect:

1. You must see the thief approach the merchandise or enter the store without any merchandise in their hand(s). This prevents the scenario of falsely detaining a customer who carried an item to be returned or exchanged into your store

2. You must see the customer pick up the merchandise. By being able to say without doubt that you saw the customer pick up your merchandise before putting it into a pocket or otherwise concealing it, you protect the store from a false accusation complaint

3. You must see the shoplifter conceal, carry away or convert the merchandise in question. Concealment can be in pockets, in shopping bags, in a child's stroller. It can even be accomplished in full view as in when tags are removed from articles of clothing

4. If you reach step four then alert management while maintaining continuous surveillance of the suspect. You must comply with this step in the strictest sense

5. During surveillance, you must observe the customer fail to pay for the merchandise. Sometimes the thief will walk directly out of the store, but sometimes they will pay for some items but not the concealed one. It is important to see that the concealed item is not retrieved and paid for. As a double check, ask the cashier if the specific item(s) has/have been paid for

6. You must see the shoplifter leave the store. Your approach to the thief should be outside the store. This eliminates all arguments that the shoplifter intended to pay for the item(s)

Detaining Suspected Thief

Once the final step has been observed immediately call 911 and report the crime. This lessens the time store personnel must control the situation and a possibly unruly or violent detainee.

If you decide to detain the suspect, they should be approached outside the store by a minimum of two employees.

Do not use or lay your hands on the person while talking to them.

The approach conversation should be firm, to the point, and polite. It's possible that there has been a mistake and/or a misunderstanding that can be explained. If the approach situation has been polite, and a sincere apology is given, most often a "non-productive" stop, can and will be forgotten.

Here is the companies suggested script for approaching the suspected thief.

"Sir/Ma'am – I am work here and I've been observing you. Perhaps I'm mistaken, but do you have something in your purse/wallet/coat that you haven't paid for? Would you please accompany me back into the store so we can clear this matter up?"

95 times out of 100, the person will respond to your request to go back into the store. In those few instances they do not, the "expert" must make an informed judgment as to whether or not to try to physically detain the person. IN MOST CASES, the potential for serious injury to store personnel would outweigh the benefits. In other words, let the person go if they put up a fight.

Once the suspect agrees to re-enter the store escort them to a secluded room. The designated detention room for the company is _____.

When escorting the person to this room, two store employees should walk closely to the suspect and use only the lightest pressure to guide the suspect to the desired location. On the slight chance that the suspect makes a run for it, many times grabbing loose clothing or a belt loop will restrain the person. If the person runs, and they make it into the clear, resist the temptation to chase him/her through the store, or outside, and certainly not in a car.

At least two store employees should be present in the room at all times until law enforcement officials arrive. One must be the same sex as the suspect.

Make a brief, discrete "pat down" search of the individual to ensure the safety of the detention room. This search MUST BE by a person of the same sex as the suspect. Avoid searching pockets and handbags. (Unless your local legal counsel informs that those procedures are legal in your state).

Separate handbags, purses and packages from the suspect.

While waiting for the police, begin creating a written record of pertinent facts, observations, and verbal exchanges or statements. [See Appendix]

Also, be sure to honor the suspects requests for water, requests to take prescription medications, or to use the restrooms, and, of course, any emergencies should be handled by calling “9-1-1.”

Once law enforcement arrives, turn the reins over to them. Cooperate fully, but at this point, it’s their show.

WHAT TO DO DURING A ROBBERY

Follow these tips if involved in a robbery:

- Try to stay calm. Say to yourself — “stay calm”
- Do exactly as you are told. No more, no less
- Use caution, being careful is not cowardice
- Alert the robber to any event or action you know is going to happen that may startle or upset the robber. (Ex. – someone is due to arrive soon)
- Be observant, make a conscious effort to get a description of the robber, but avoid making direct eye contact. (The perception is that eye contact promotes recognition)
- Do not make any sudden or quick movements
- When it is necessary to move or reach to comply with demands, tell the robber what you are going to do and why
- Listen carefully. Not only in order to obey commands but perhaps to hear a name used or something else said that can be used in the investigation
- Do not resist! Take a step back. Place your hands in front of you with palms held outward, turn your body sideways (reduces target area)
- Passively try to keep any note or written instructions the robber may have given you. If you can, turn this over to the police later
- Activate “panic button” or “toe kick” alarms only when you do it secretly. Take no chances!
- Give the robber adequate time to leave. Avoid the urge to give chase!
- Note the direction of travel when he /she leaves
- Try to get a description of any vehicle used in the getaway if you can do so without compromising your personal safety. Record the make, model, color, license number, distinguishing features (decals, dents, bumper stickers, hubcaps, etc.)

What to Do After a Robbery

Follow these steps after being involved in a robbery.

- Call the police – even if the alarm has been triggered
- Alert the dispatcher if there have been injuries so EMTs can be dispatched also
- Provide basic first aid or CPR to any injured employees or customers until paramedics arrive
- Lock the doors from the inside! Ask any witnesses to fill out a Robbery Report. If they cannot take the time to do that, at least get their names, addresses, and phone numbers so the police can follow up

- All employees and witnesses should begin filling out the Robbery Report independently
- Don't touch anything the robbers may have touched and block off any areas the robber(s) was to protect evidence they may have left behind
- When law enforcement arrives, go outside to greet them to show that the premises are secure
- At this point, turn the matter over to the law enforcement officials. Cooperate fully!
- Refer any inquiries from outsiders (media, etc.) to the responding law enforcement agency
- Do not discuss items or amounts taken with anyone other than law enforcement

Theft Discipline

An employee is subject to disciplinary action, including termination, if they:

- Have engaged in any form of fraud, waste, or abuse
- Suspect or discover fraudulent activity and fails to report his or her suspicions as required by this policy
- Intentionally reports false or misleading information

TRAINING

We will ensure every employee is provided training on asset protection. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Internal Shoplifting Loss Control Report
- Internal Robbery Report
- Asset Protection Training Documentation

These forms may be reproduced for the purposes of implementing and maintaining a safety and health program.

INTERNAL SHOPLIFTING LOSS CONTROL REPORT

Date		Store Address					
Police Report #				Officer in Charge			
Name of Suspect				Address of Suspect			
City				State		Zip	
Social Security #				Driver's Licence #			
Date of Birth		Photo Taken	☐ Yes ☐ No	Arrest Made	☐ Yes ☐ No		

Written Narative of Incident
Include any pertinent statements made by the suspect during the processing
Continue on back if necessary

Merchandise Stolen	Retail Value $	Recovered?	Where is it now
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	
		☐ Yes ☐ No	

INTERNAL ROBBERY REPORT (PAGE 1 OF 2)

Please Print or Type this Form

Date of Incident		Store Name			
Time of Incident		Store Address			
Police Report #					
Officer in Charge					
Vehicle Information					
Make (e.g. Chevy)		Model (e.g. Impala)		Color	# Doors
License (ST and #)		Features (dents bumper stickers, etc.)			
Weapon?	☐ Yes ☐ No ☐ Don't know/Didn't see ☐ Said he had one/Didn't see				
If yes	☐ Gun ☐ Knife	Type of gun or knife, if known		Other	
Description of Robber (use more than one sheet if multiple robbers)					
Height		Weight		Hair Color	
General Body Type	☐ Thin ☐ Fat ☐ Medium ☐ Large		☐ Male ☐ Female		
Color of Eyes		Eyeglasses?	☐ Yes ☐ No	Sunglasses?	☐ Yes ☐ No
Race	☐ Caucasian ☐ African-American ☐ Hispanic ☐ Asian ☐ American Indian ☐ Native Hawaiian or Pacific Islander ☐ Other (specify)				
Skin Color	☐ Pale ☐ Dark ☐ Light ☐ Black ☐ Brown				
Skin Type	☐ Good complexion ☐ Pimply ☐ Greasy ☐ Acne ☐ Pock marked				
Distinguishing marks: (tattoos, scars, etc.) (include body part) (e.g. dragon tattoo, left bicep)					

INTERNAL ROBBERY REPORT (PAGE 2 OF 2)

Please Print or Type this Form

Clothing				
Jacket/coat/color		Shirt/sweater/color		
Pants: type/color		Shoes: type/color		
Headgear: hat/cap/do-rag/color		Gloves	☐ Yes ☐ No	
Distinguishing personal mannerisms: (posture, accent, stutter, slurred or fast speech patterns, runny nose, facial tics, body twitches, etc.)				
Written Narrative of Incident				
Continue on back if necessary				
Person Filling Out This Report				
Print Name		Signature		
Home Phone Number		Date		

ASSET PROTECTION TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter provides information on the safe practices for working with compressed gas cylinders. Our safe practices will comply with the requirements of OSHA regulations 1910.101 and/or 1926.350 whichever is applicable.

POLICY

Compressed gas cylinders can be extremely hazardous when misused or abused. Compressed gas cylinders can present a variety of hazards due to their pressure and/or content. Because of the hazards posed by compressed gas cylinders in the workplace, employees must adhere to industry best practices and safety regulations applicable to the transportation, use, and storage of compressed gas cylinders.

EMPLOYER RESPONSIBILITIES

This company will:

- Train employees on compressed gas cylinder safety
- Procure and track pressurized gas cylinders to minimize quantity onsite
- Document procedures on safe pressurized cylinder handling and storage
- Train emergency response personnel to handle an emergency
- Label and identify every cylinder
- Ensure each cylinder has the hydrostatic test label
- Document procedures to dispose of cylinder and have them refilled
- Secure gas cylinders

EMPLOYEE RESPONSIBILITIES

Employees are expected to:

- Use appropriate PPE as needed
- Transport, store, and use compressed gas cylinders according to best safety practices
- Report any unexpected hazard that cannot safely be remedied immediately

SAFE PRACTICES

Depending on the particular gas, there is a potential for simultaneous exposure to both mechanical and chemical hazards. Gases used may be:

- Flammable or combustible
- Corrosive
- Explosive
- Poisonous
- Inert
- Acidic
- Reactive
- A combination of hazards

Without proper use and care, compressed gas cylinders can explode, killing workers and destroying equipment. Cylinders can become flying projectiles when cylinder valves are damaged or broken off. Regulators can become bullets that tear through workers if safety precautions are not taken.

- When the gas is flammable, flash points lower than room temperature compounded by high rates of diffusion present a danger of fire or explosion
- Additional hazards of reactivity and toxicity of the gas, as well as asphyxiation, can be caused by high concentrations of even "harmless" gases such as nitrogen
- Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas makes the cylinder a potential rocket or fragmentation bomb
- Careful procedures are necessary for handling the various compressed gases, the cylinders containing the compressed gases, regulators, or valves used to control gas glow, and the piping used to confine gases during flow
- Always use safety glasses (preferably with a face shield) when handling and using compressed gases, especially when connecting and disconnecting compressed gas regulators and lines

Careful procedures are necessary for handling the various compressed gases, cylinders, regulators or valves used to control gas flow, and the piping used to confine gases during flow.

Identifying Contents of Compressed Gas Cylinders

The contents of any compressed gas cylinder must be clearly identified. Gas identification should be stenciled or stamped on the cylinder or a label. Commercially available three-part tag systems may be used for identification and inventory.

No compressed gas cylinder should be accepted for use that does not legibly identify its contents by name. If the labeling on a cylinder becomes unclear, the cylinder should be marked “contents unknown” and returned to the supplier.

Do not rely on the color of the cylinder for identification, always read the label. Color-coding is not reliable because cylinder colors may vary with supplier. Also, never rely on labels on caps because they are interchangeable.

All gas lines leading from a compressed gas supply should be clearly labeled to identify the gas and the area served. The labels should be coded to distinguish hazardous gases such as flammable, toxic, or corrosive substances. Signs should be posted in areas where flammable compressed gases are stored or used, identifying the substance and appropriate precautions.

Transporting Gas Cylinders

- Never drag, slide, or roll a cylinder; use a cylinder cart or basket
- Always have the protective cap covering the valve when transporting the cylinder
- Never transport the cylinder with the regulator in place
- Make sure the cylinder is secured to the cart before moving it
- Do not drop cylinders or strike them against each other or against other surfaces violently
- Do not use valve covers to lift cylinders; they could be damaged and become unattached. If the cylinder is dropped on a hard surface, it can cause an explosion

Storage of Gas Cylinders

- Gas cylinders must be secured at all times to prevent tipping
- Use appropriate material, such as chain, plastic coated wire cable, commercial straps, etc., to secure cylinders
- Gas cylinders cannot be stored in public hallways or other unprotected areas
- Cylinders must be segregated in hazard classes while in storage. Oxidizers (oxygen) must be separated from flammable gases, and empty cylinders must be isolated from filled cylinders
- The proper storage for oxygen cylinders requires a minimum of 20 feet to be maintained between flammable gas cylinders and oxygen cylinders or the storage area be separated, at a minimum, by a firewall five (5) feet high with a fire rating of 30 minutes
- Store out of direct sunlight and away from sources of heat and ignition; temperatures must not exceed 125° F
- Acetylene cylinders must never be stored on their sides
- Always place valve protectors on gas cylinders when the cylinders are not connected for use
- Cylinders must be protected from damage. Do not store cylinders near elevators or gangways, or in locations where heavy-moving objects may strike or fall on them
- Cylinders must be stored where they are protected from the ground to prevent rusting
- Cylinders should be protected against tampering by unauthorized individuals
- Storage areas must be well-ventilated, cool, dry, and free from corrosive materials

Use of Compressed Gas Cylinders

Before first use:

- Make sure the cylinder is equipped with the correct regulator
- Inspect the regulator and cylinder valves for grease, oil, dirt, and solvent. Never use grease or oil to lubricate regulators or cylinder valves because they can cause an explosion
- The cylinder should be placed so that the valve handle at the top is easily accessible
- When using toxic or irritating gas, the valve should only be opened while the cylinder is in a working fume hood
- Only use wrenches or tools that are provided by the cylinder supplier to open or close a valve. Pliers should never be used to open a cylinder valve. Some regulators require washers; this should be checked before the regulator is fitted
- Refer to the Safety Data Sheet for the gas being used for information regarding use and toxicity
- Fire extinguishing equipment should be readily available when combustible materials can be exposed to welding or cutting operations using compressed cylinder gases

During use:

- Only properly trained personal should handle compressed gas cylinders
- Back off the pressure adjusting screw of the regulator to release spring force before opening the cylinder valve
- Open the valve slowly and only with the proper regulator in place. Stand with the cylinder between yourself and the regulator (cylinder valve outlet facing away) when opening the cylinder valve

- Acetylene or other flammable gas cylinder valves should not be opened more than ½ turns of the spindle, and preferably no more than ¾ of a turn. This reduces the risk of explosion and allows the cylinder valve to be closed quickly cutting off the gas flow
- Never heat a cylinder to raise the pressure of the gas (this can defeat the safety mechanisms built in by the supplier)
- Keep the cylinder clear of all electrical circuits, flame, and sparks
- Never leave the valve open when equipment is not in use, even when empty; air and moisture may diffuse through an open valve causing contamination and corrosion within the cylinder
- Do not refill a cylinder; mixing of residual gases in a confined area may cause a dangerous reaction
- Never use copper fittings or tubing on acetylene tanks – an explosion may result
- Never use compressed gas to dust off clothing; this could cause injury to the eyes or body and create a fire hazard. Clothing can become saturated and burst into flames if touched off by an ignition source such as a spark or cigarette
- Never leave pressure in a regulator when it is not in use
- Valve protection caps should remain in place until ready to withdraw gas or connect to a manifold
- Cylinder discharge lines should be equipped with approved check valves to prevent inadvertent contamination of cylinders connected to a closed system
- Do not force connections that do not fit
- Close the cylinder valve and release all pressure before removing the regulator
- Do not smoke when oxygen or fuel gases are present. Smoking can cause a fire or explosion
- Do not use acetylene at operating pressures above 15 psig
- Purge fuel and oxygen hoses individually before lighting up a torch tip
- Follow the equipment manufacturer's operating instructions at all times
- If an outlet valve becomes clogged with ice, thaw it with warm water (if the gas is not water reactive), applied only to the valve
- Use the cylinder valve for turning gas off, not the regulator
- Workers should wear safety glasses and face shields when handling and using compressed gases, especially when connecting and disconnecting regulators and lines
- Never use oxygen as a substitute as a "compressed air" to run pneumatic tools, in oil heating burners, to start internal combustion engines, to blow out pipelines, or to create pressure for ventilation
- Oxygen cylinder valves should be opened all of the way during use

Housekeeping Procedures

The following are housekeeping items to remember when working with all compressed gas cylinders:

When you're unsure about the proper handling of a compressed gas cylinder or its content, consult the manufacturer or supplier. Information about the gas is available from the safety coordinator, or on the Safety Data Sheet (SDS), kept in the Right-to-Know folder in your work area. It contains the material's identity; hazardous ingredients; and the name, address, and phone number of the manufacturer. The person handling the cylinder and connections is responsible for checking the identity of the gas by reading the label or other markings on the cylinder before using it. If the content is not clearly marked, do not use it.

Return it to the supplier as soon as possible. If a foreign substance enters a cylinder or the valves are damaged, notify the owner or manufacturer. Be prepared to provide details about the incident and serial number of the cylinder involved.

Keep oily substances away from cylinders, valves, coupling hoses, and other apparatus. Valves on empty cylinders should be kept closed at all times. Keep valve protection caps in place when cylinders are moved or not in use. Screw the protection cap all the way down.

Close cylinder valves when the job is finished.

When transporting compressed gas cylinders outside your work area:

- Make sure the valves are closed
- Remove the regulators
- Make sure the protection cap is in place
- Secure the cylinder on a cylinder cart

NEVER use compressed gases to dust off clothing or skin, as this may cause serious injury to the eyes and/or body in the form of an air embolism in the bloodstream, which can lead to heart failure. Compressed air used for cleaning purposes must be reduced to less than 30 psi, compressors must be visually inspected, and the safety valves must be tested. Compressed air used for cleaning is only permitted with effective chip guarding and personal protective equipment to protect the operator and other employees from the hazards of the release of compressed air and flying debris.

Cylinder Leaks

- If the cylinder contains a **flammable, inert, or oxidizing gas**, remove it to an isolated area, away from possible ignition sources. Allow it to remain isolated until the gas has discharged, making certain that appropriate warnings have been posted
- If the gas is a **corrosive**, remove the cylinder to an isolated, well-ventilated area. The stream of leaking gas should be directed into an appropriate neutralizing material
- For toxic material, the cylinder should be removed to an isolated, well-ventilated area but only if this is possible while maintaining personal safety. It may be necessary to evacuate the facility
- If the leak is at the junction of the cylinder valve and cylinder, do not try to repair it. Contact the supplier and ask for response instructions
- **Never** use a flame to detect a gas leak. Use soapy water

Empty Cylinders

- Do not completely empty the cylinder; always leave some residual pressure
- If the cylinder is empty, replace the cap and remove it to the empty cylinder storage area
- Label all empty cylinders with tags so that everyone will know their status. Empty cylinders can be marked with “MT” and date with chalk
- Handle empty cylinders as carefully as full ones; residual pressure can be dangerous
- Never refill a cylinder. This requires specialized equipment and techniques
- Never mix gases in a cylinder. The next person who draws from it may unknowingly cause an explosion

Piping, Hoses and Connections

Piping

- Polyvinyl chloride (PVC) plastic pipes cannot be used for transporting compressed gases aboveground unless they are completely enclosed in a conduit or casing of sufficient strength to provide protection from external damage and deterioration. The heat generated from compressed air can weaken the PVC pipe and create an explosion hazard. When PVC piping explodes, plastic shrapnel pieces can be thrown in all direction and injure workers or damage equipment
- Do not use copper piping for acetylene
- Do not use cast iron pipe for chlorine
- Distribution lines and their outlets need to be clearly labeled
- Inspect piping systems on a regular basis
- Pay attention to fittings as well as possible cracks that may have developed

Hoses and Connections

- Examine hoses regularly for leaks and set up an inspection schedule
- Do not use unnecessarily long hoses
- Keep hoses free from kinks and away from high traffic areas
- Repair leaks promptly and properly
- Store hoses in a cool place and protect them from hot objects and sparks
- Do not use a single hose having more than one gas passage

Engineering Controls

Listed below are some engineering controls that can be used in some cases to control the risk of compressed gas use:

- **Emergency Shutoff Switch** – can be used at a remote location to cause pneumatic valves to shut, stopping gas flow. Switches should be non-electric so that arcs or sparks are not created around flammable gases
- **Gas Cabinets** – hazardous gas cylinders should be housed in a gas cylinder cabinet. These cabinets can be equipped with sprinkler protection and ventilation

- **Flow Restrictors** – can be used to limit hazardous gas flow to just over maximum flow needed, must be installed immediately downstream of each hazardous gas cylinder
- **Emergency Eyewash** – must be present in areas were corrosive materials or gas is used

SPECIAL PRECAUTIONS

Flammable Gas

- Cylinders of flammable gas must be stored away from flammable liquids, combustible materials, oxidizers, open flames, sparks and other sources of heat or ignition. Maintain a distance of at least 20-feet from these materials unless separated by a noncombustible wall, not less than 5-feet high, having a fire-resistance rating of ½-hour
- All lines and equipment associated with flammable gas systems must be grounded and bonded
- Flash arrestors are designed to prevent a flashback, should it occur, in a line containing a flammable gas
- Portable fire extinguishers should be available in the area of use and storage
- Use spark-proof tools when working with flammable gas
- Do not leave “flow” experiments unattended
- Do not use acetylene at operating pressures over 15 psig
- Never use copper fittings or tubing on acetylene tanks

Oxidizing Gas

- Cylinders of oxygen and other oxidizers must be stored at least 20-feet from fuel-gas or other combustible materials unless separated by a noncombustible wall, not less than 5-feet high, having a fire-resistance rating of ½-hour
- All equipment used for oxidizing gases must be cleaned with oxygen-compatible materials free from oils, greases, and other contaminants
- Do not use oily hands or gloves when handling cylinders. The reaction between oxygen and hydrocarbons can be violent even when small quantities are involved

Corrosive Gas

- Avoid contact with skin and eyes
- An emergency shower and eyewash must be installed within 50 feet where corrosive materials are used
- Metals become brittle when used in corrosive gas service; check equipment and lines frequently for leaks

Inert Gases

Inert gases such as argon, carbon dioxide, helium, krypton, neon nitrogen, and xenon are simple asphyxiants that can displace oxygen in the air and can cause suffocation. When the normal amount of oxygen in the air is reduced by displacement with an inert gas, it is a potential hazard to employees. Reduced concentration of oxygen in the air causes sleepiness, fatigue, loss of physical coordination, even death.

Poisonous Gases

Storage of highly toxic or poisonous gases must be outdoors or in a separate non-combustible building without any other occupancy. Poison gases such as arsine, diorama, methyl bromide, nitric oxide, nitrogen dioxide, phosgene, and phosphine can cause potential hazards to personnel and requires special handling.

These products must never be handled except by specially trained personnel who are fully aware of the potential hazards involved and who are equipped with such special personal safety gear as is necessary in the handling of these products.

Top Safety Tips

- Cylinders must be secured
- Racks containing small cylinders must be secured by special attachments
- Storage areas must be labeled for the specific gases to be stored in those areas
- NO SMOKING signs must be posted and clearly visible
- Flammable gas cylinders and oxidizer cylinders must be separated by 20 feet or by a noncombustible barrier 5 feet high having a fire resistance rating of at least one half-hour. No ignition sources are allowed in the area
- Cylinders of all gases must be stored upright with the cylinder cap in place
- Empty and full cylinders must be segregated in the rack or otherwise clearly marked
- Cylinder storage areas must not be placed next to combustible materials or obstruct exit routes
- Storage areas must be well ventilated
- Take care in handling and storing compressed gas cylinders. If you have any questions about particular gases check the SDS, or speak to the manufacturer or senior safety officer in your area. Following safety procedures will minimize the risks involved with handling compressed gas cylinders

TRAINING

We will ensure every employee is provided training on compressed gas cylinder safety. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the Compressed Gas Cylinders Safety Training Document. This form may be reproduced for the purposes of implementing and maintaining a safety and health program.

COMPRESSED GAS CYLINDERS SAFETY TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter provides information on the safe practices for the operation and use of concrete buggies. These safe practices will comply with all applicable the requirements of OSHA 1926 Subpart Q - Concrete and Masonry Construction. This chapter does not include information of general concrete operations or concrete cutting and drilling, which are covered in separate chapters.

POLICY

This Company has established the following safety policies and procedures to protect its employees from the hazards of operating concrete buggies. These safety precautions must be followed at all times to prevent injury to yourself and others.

EMPLOYER RESPONSIBILITIES

This Company will:

- Allow only trained employees to operate concrete buggies
- Inform employees of the hazards associated with operating and/or working around concrete buggies
- Provide employees with all necessary PPE

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Follow all safe practices when using concrete buggies
- Wear and maintain all required PPE
- Report any unsafe conditions or act immediately

HAZARDS

Lethal Exhaust Gases

Engine exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled. Never operate a buggy in a confined area or enclosed structure that does not provide ample free flow air.

Explosive Fuel

Gasoline is flammable; vapors can cause an explosion if ignited.

- Do not start the engine near spilled fuel or combustible fluids
- Do not fill the fuel tank while the engine is running or hot
- Do not overfill tank
- Store fuel in approved containers, in well-ventilated areas and away from sparks and flames
- Never use fuel as a cleaning agent

Burns

Burn Hazards: Engine components can generate extreme heat. To prevent burns, do not touch these areas while the engine is running or immediately after operations. Never operate the engine with heat shields or heat guards removed

Rotating Parts

Never operate the buggy with covers, or guards removed. Keep fingers, hands, hair, and clothing away from all moving parts to prevent injury.

Accidental Starting

Always place the engine ON/OFF switch in the OFF position, and/or disconnect the spark plug lead before servicing the engine or equipment. Ground the lead to prevent sparks that could ignite a fire.

PERSONAL PROTECTIVE EQUIPMENT

This Company will provide all PPE determined to be necessary to employees, and will verify that they are capable of the proper care and use of the equipment. Required PPE can consist of, but is not limited to:

- Hardhats
- Safety shoes or boots
- Safety glasses or goggles
- Hearing protection (if needed)
- Respiratory protection when needed (e.g. NIOSH 95 Dust mask)

GENERAL SAFETY INFORMATION

- Know the rated load capacity, speed range, braking and steering characteristics, turning radius and operating clearances
- Remember that rain, snow, ice, loose gravel, soft ground, etc., can change the operating characteristics and capabilities of the concrete buggy
- Inspect the surface over which you will travel. Look for holes, drop offs and obstacles
- Look for rough spots. Look for weak spots on docks, ramps, or floor
- Look for oil spills, wet spots and slippery surfaces. Look for soft soil, deep mud and standing water. Watch for anything that might make you lose control or cause the Buggy to tip over
- When transporting the concrete buggy on a truck or trailer, know the overall height to avoid contacting overhead obstructions such as bridges, power lines, etc. Make sure all tie-downs and blocks are in place and the bucket is completely lowered and securely latched. If the Concrete buggy is to be hauled by truck, check the truck and ramp capacities
- Do not leave a concrete buggy near ovens, furnaces, or radiant heaters
- Heat could raise the pressure of the fuel and open the relief blow-off valve, so that vented gas could ignite
- The concrete buggy should be equipped with a spark arrestor/spark arresting muffler and cannot be operated in areas with flammable or explosive atmospheres

Job Planning

Inspect the surface over which you will travel. Look for holes, drop-offs and obstacles. Look for rough spots. Look for weak spots on docks, ramps or floor. Look for oil spills, wet spots and slippery surfaces. Look for soft soil, deep mud and standing water. Watch for anything that might make you lose control or cause the Buggy to tip over.

Clear away trash and debris. Pick up anything that might puncture the tires. Make sure aisles, ramps, doorways and passages are clear. Plan your work. Make sure you know where you will make your pickups, dumps and turns. Before you take a load, know where you will place it.

Check the clearances of doorways, canopies and overheads. Know exactly how much clearance you have under power and telephone cables. Also check clearances when trans- porting the Concrete buggy on a truck or trailer.

Hauling Capacities

Know the rated load capacities of your Concrete buggy and never exceed them.

Always refer to buggy's rated hauling capacity before loading. Keep in mind that Concrete buggy will normally operate on uneven, unpaved and often very bumpy or inclined surfaces. Operating conditions can reduce the amount that should be carried. Always exercise extreme caution when hauling to avoid tipping of the Concrete buggy.

WARNING: Never approach power lines with any part of the buggy unless all local, state and federal (OSHA) required safety precautions have been taken. Use extreme CAUTION when approaching high voltage power lines.

SAFE PRACTICES

Concrete buggies will be operated by trained and qualified personnel only. Failure to follow instructions may lead to serious injury or even death. Operators must always wear the appropriate PPE and clothing while operating a concrete buggy.

General Safe Practices

Never operate the buggy in any enclosed or narrow area where free flow of the air is restricted. If the airflow is restricted, it will cause serious damage to the buggy or engine and may cause injury to people.

- Always read, understand and follow procedures in the operator's manual before attempting to operate the buggy
- Stop the engine when leaving the buggy unattended
- Block the unit when leaving or when using on a slope
- Never run the engine without an air filter. Severe engine damage may occur
- Always store the buggy properly when it is not being used. The buggy should be stored in a clean, dry location out of the reach of children
- Do not operate the buggy unless all guards and safety devices are attached and in place
- Keep all inexperienced and unauthorized people away from the equipment at all times

- Do not make any unauthorized equipment modifications
- Test the engines ON/OFF and KILL switches before operating
- If the concrete buggy will be used over rough terrain, place the step plate (platform) in the upright position, and make sure that it sufficiently secure
- Do not stand on the Concrete buggy's "step plate" when working in rough terrain, walk behind the buggy
- Check the free speed control linkage located on the right handle bar. The speed control lever should work freely and return to the closed position if working correctly
- Do not start engine unless speed control linkage is working properly
- Check the buggy’s tire pressure. Make sure that the tires are inflated to the manufacturers recommended tire pressure
- Do not operate the buggy with bad or worn tires. Always replace defective tires with new ones
- Always make sure that the buggy's brakes are working properly
- Check brake linkage and adjust as required. Never operate the Concrete buggy with a defective braking system
- Never drive or tow the Concrete buggy in traffic or on public roads
- Check the hydraulic dumping mechanism of the tub and make sure that it’s working properly
- Never move the buggy with the tub in the DUMP position (vertical). When moving the buggy is required, always leave the tub in the flat (horizontal) position
- Operate the controls smoothly. Do not jerk the steering or any controls
- Avoid sudden stops, starts, turns or changes in directions
- Never attempt to work the control except from operator’s position
- Never leave the operator’s position without first setting the parking brake, and placing controls in neutral (or park)
- Do not touch, lean on or reach through the dump mechanism or allow others to do so
- Never climb on the Concrete buggy or dump mechanism
- Always keep all parts of your body in the operator's position (standing on the platform) while operating the buggy
- Never operate without the proper PPE required by the job
- Never use accessories or attachments, unless they are recommended by the manufacturer, damage to the equipment and/or injury to user may result
- When necessary, replace nameplate, operation and safety decals if they become hard to read
- Always check the machine for loosened hardware before starting
- Allow the engine to cool before adding fuel or performing service and maintenance functions
- Always refuel in a well-ventilated area, away from sparks and open flames
- Do not smoke around or near the machine. Fire or explosion could result from fuel vapors, or if fuel is spilled on a hot engine
- Do not operate the buggy in an enclosed area, the buggy's engine gives off carbon monoxide gas
- Never operate the buggy in an explosive atmosphere or near combustible materials. An explosion or fire could result causing severe bodily harm or even death
- Never use fuel as a cleaning agent

Pre-Check

- Engage the parking brake lever and attempt to rock the buggy back and forth. If the wheels turn during the rocking motion, adjust the brakes
- Place the engine's throttle control in the slow position, IDLE
- Check the speed control linkage located on the right side of the handle bar. The speed control should work freely when squeezed by hand, and return to the closed position when released

Before the Concrete buggy can be put into operational use, it is best to perform a test run to make certain that all components are functioning properly.

- Place the Concrete buggy on flat solid ground
- Set the parking brake lever
- Place the engine's throttle control in the slow position, IDLE
- Place the Concrete buggy's direction lever in the forward direction
- Slowly squeeze the speed control lever slightly for a short period to test the brake holding capacity. If the Concrete buggy moves forward, adjust the brakes as outlined in the maintenance section of this manual
- If the Concrete buggy does not move forward, release the speed control, and disengage the parking brake. If the Concrete buggy creeps forward while the parking brake is disengaged, adjust the pump control lever stop until the creeping is eliminated

Buggy Operation

Brakes

- With the engine running and parking brake released, place the direction lever in the forward direction
- Squeeze the speed control lever slightly until the Concrete buggy begins to move in a forward direction. Let the buggy travel at about 3 MPH
- With the right foot, step up and place it on the brake pedal. Gradually apply pressure to the brake pedal until the buggy comes to rest
- Try step 3 at different speeds until you are comfortable with stopping the Concrete buggy. If the brakes do not seem to stop the Concrete buggy adequately, refer to the maintenance section of this manual for brake adjustment instructions

Moving Loads

If possible, plan to load, unload and turn on flat level ground. When you travel with a load, keep the speed reasonable for the load and the terrain to be traveled. The Concrete buggy is less stable when traveling with a load.

- Avoid sharp turns at high speed
- If you cannot see where you are going, get someone to direct you
- When traveling over soft ground or wet/icy surfaces, slow down
- Travel only at speeds that permit stopping in a safe manner
- Never permit additional riders to stand on the platform or ride inside the tub

When traveling on inclines, slopes, ramps and downgrades exercise extreme caution. Always make sure you can see the dumpsite, use a signal person if you cannot see the placement point,

Be sure the landing point you intend to use can safely support the load. This may not always be true in the case of scaffolds or shallow floors. If there is any question of overloading, separate the load into two or more loads.

Use caution when placing or traveling near overhead electrical power lines. Water pipes, sprinklers, steam pipes, walkways or other potential hazards. Avoid weakened or incomplete scaffolding. Stay off structurally damaged floors, dock boards and ramps.

Tub (Bucket) Dumping

The hydraulic dump can be controlled by a hand lever or foot pedal.

- To activate the hydraulic dump, press down on the dump foot pedal or move the dump control lever forward. The tub will move to the vertical position as long as the lever is held in the forward position or pressure is continuously applied to the dump foot pedal
- To return the tub to its horizontal position, simply release the dump control lever or remove your foot from the dump pedal

Note: When dumping, keep the dump hand lever pushed forward or keep your foot pressed down on the dump foot pedal. Releasing either one (lever or pedal) will cause the dump cylinder to return to the horizontal position.

Shutdown

Follow these steps:

- Come to a full stop
- Set parking brake
- Idle engine for gradual cooling
- Shut off engine
- Cycle hydraulic controls to eliminate residual pressure
- Remove ignition key on electric start models
- Block wheels if on a slope or incline

Clean-Up

Keep work surfaces and engine compartments clean. Clean steps, pedals and floor. Remove any grease or oil. Brush away dirt or mud. During winter conditions, scrape away snow and ice. Remember, slippery surfaces can be hazardous.

- The entire Concrete buggy (tub, step stand, shroud, wheels etc.) should be cleaned after every use to prevent a buildup of concrete or other debris

Transporting Buggies

When lifting of the Concrete buggy is required, use a properly rated forklift to lift the buggy. Forklift pockets should be provided on the Concrete buggy's frame. Make sure the forklift arms are insert into the buggy's forklift pockets a minimum of 24-inches.

When transporting of the Concrete buggy is required, place the buggy on a flatbed truck or equivalent and securely tie down.

Emergencies

Always know the location of the nearest fire extinguisher and first aid kit. Know the location of the nearest telephone. Know the phone numbers of the nearest ambulance, doctor, and fire department.

EQUIPMENT MAINTENANCE

Adding Hydraulic Oil: Replace hydraulic oil after every 200 hours of operation. The hydraulic oil filter should be changed each time the hydraulic oil is changed.

- Caution must be exercised while servicing the buggy. Rotating and moving parts can cause injury if contacted
- Never lubricate components or attempt service on a running machine
- Always allow the machine a proper amount of time to cool before servicing
- Keep the machinery in proper running condition
- Service the air cleaner frequently to prevent carburetor malfunction
- The engine section of the concrete buggy requires an adequate free flow of cooling air
- Fix damage to the machine immediately and always replace broken parts
- Dispose of hazardous waste properly. Potentially hazardous waste is used motor oil, fuel and fuel filters

Machine Safety Decals: The buggy should be equipped with safety decals. Should any become un-readable; replacements can be obtained from the manufacturer.

NOTE: Buggy and Engine troubleshooting guides are provided at the end of this chapter.

TRAINING

Our Company will provide all necessary training for employees engaged in concrete buggy work. This training will include at a minimum:

- The safe practices to be followed
- The operation of the buggy type they will use
- The proper care and use of all required PPE

All employee training records will be retained for the length of their employment.

ATTACHMENTS

The following pages contain concrete buggy and engine troubleshooting guides that can be used by employees and/or maintenance personnel when making repairs.

CONCRETE BUGGY TROUBLESHOOTING

Symptom	Possible Problem	Solution
Loss of power.	Speed control cable out of adjustment?	Adjust speed control cable. Replace cable if necessary
	Hydraulic oil level low?	Check hydraulic oil level. Add oil if necessary.
	Contaminated hydraulic oil filter?	Replace hydraulic oil filter.
	Low engine RPM?	Check engine speed.
Loss of travel	Forward/Reverse lever in neutral position?	Place lever in either forward or reverse position. Check hydraulic motors.
	Parking brake partially engaged?	Release parking brake.
System operating hot	Hydraulic oil level low?	Check hydraulic oil level add hydraulic oil if necessary.
	Defective cooling fan?	Inspect cooling fan, replace if necessary.
Slow Dumping	Low engine speed?	Check engine speed. Adjust engine speed if necessary
	Dump cylinder is internally bypassing oil?	Replace dump cylinder.
System jerky when started.	Speed cable out of adjustment?	Adjust speed control cable.
	Defective drive motors?	Check drive motors, replace if necessary.
Difficult to steer.	Un-lubricated steering column?	Lubricate steering column.
Parking brake will not hold	Brake linkage out of adjustment?	Adjust parking brake linkage.
Difficulty stopping	Brakes out of adjustment?	Brake lining worn. Replace brake lining.
Engine will not start	Low on fuel or fuel tank empty?	Add fuel.
	Defective Kill Switch?	Check electrical kill switch. Replace if necessary
	Engine ON/OFF switch in OFF position?	Set engine ON/OFF switch to ON position.
	Fuel Shut-off valve CLOSED?	Open Fuel shut-off valve.

ENGINE TROUBLESHOOTING (PAGE 1 OF 2)

Symptom	Possible Cause	Solution
Difficult to start, "fuel is available, but no SPARK at spark plug".	Spark plug bridging?	Check gap, insulation or replace spark plug.
	Carbon deposit on spark plug?	Clean or replace spark plug.
	Short circuit due to deficient spark plug insulation?	Check spark plug insulation, replace if worn.
	Improper spark plug gap?	Set to proper gap.
Difficult to start, "fuel is available, and SPARK is present at the spark plug".	Console or engine ON/OFF switch is shorted?	Check switch wiring, replace switch.
	Ignition coil defective?	Replace ignition coil.
	Improper spark gap, points dirty?	Set correct spark gap and clean points.
	Condenser insulation worn or short circuiting?	Replace condenser.
	Spark plug wire broken or short circuiting?	Replace defective spark plug wiring.
Difficult to start, "fuel is available, spark is present and compression is normal"	Wrong fuel type?	Flush fuel system, and replace with correct type of fuel.
	Water or dust in fuel system?	Flush fuel system.
	Air cleaner dirty?	Clean or replace air cleaner.
Difficult to start, "fuel is available, spark is present and compression is low"	Suction/exhaust valve stuck or protruded?	Re-seat valves.
	Piston ring and/or cylinder worn?	Replace piston rings and or piston.
	Cylinder head and/or spark plug not tightened properly?	Torque cylinder head bolts and spark plug.
	Head gasket and/or spark plug gasket damaged?	Replace head and spark plug gaskets.

ENGINE TROUBLESHOOTING (PAGE 2 OF 2)

Symptom	Possible Cause	Solution
No fuel present at carburetor.	Fuel not available in fuel tank?	Fill with correct type of fuel.
	Fuel cock does not open properly?	Apply lubricant to loosen fuel cock lever, replace if necessary.
	Fuel filter clogged?	Replace fuel filter.
	Fuel tank cap breather hole clogged?	Clean or replace fuel tank cap.
	Air in fuel line?	Bleed fuel line.
"Weak in power" compression is proper and does not misfire.	Air cleaner not clean?	Clean or replace air cleaner
	Improper level in carburetor?	Check float adjustment, re- build carburetor.
	Defective Spark plug?	Clean or replace spark plug.
"Weak in power" compression is proper but misfires	Water in fuel system?	Flush fuel system, and replace with correct type of fuel.
	Dirty spark plug?	Clean or replace spark plug.
	Ignition coil defective?	Replace ignition coil.
Engine overheats.	Spark plug heat value improper?	Replace with correct type of spark plug.
	Correct type of fuel?	Replace with correct type of fuel
	Cooling fins dirty?	Clean cooling fins
Rotational speed fluctuates.	Governor adjusted correctly?	Adjust governor.
	Governor spring defective?	Replace governor spring
	Fuel flow restricted?	Check entire fuel system for leaks or clogs.
Recoil starter malfunction.	Recoil mechanism clogged with dust and dirt?	Clean recoil assembly with soap and water.
	Spring loose?	Replace spring.

SCOPE

This chapter provides the safe practices and requirements for performing the following types of concrete and asphalt work:

- Core Drilling
- Concrete Slab Cutting
- Concrete Wall Cutting
- Asphalt Cutting
- Safety Grooving and Texturing

It does not cover pouring, placing, or mixing concrete or asphalt; those topics are covered in separate chapters. Although OSHA does not have specific regulations regarding concrete and asphalt sawing and drilling, the Concrete Sawing and Drilling Association (CSDA) does provide recommended training and best practices, which will be followed by this Company whenever practical. We will also adhere to the OSHA Silica Dust exposure standard 1926.1153.

POLICY

This Company has instituted the following program to ensure its employees are aware of the safety and health risks arising from performing concrete cutting and drilling work. All employees are expected to use safe work practices when performing their jobs.

EMPLOYER RESPONSIBILITIES

This Company will:

- Verify that only trained employees are allowed to operate cutting and drilling equipment
- Keep all saws and drills in good working order
- Train all employees on the proper care and use of the required PPE
- Enforce all safe practices

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Attend all necessary training
- Follow all Company safe practices
- Report any unsafe conditions or acts immediately

MAJOR HAZARDS AND SUGGESTED CONTROLS

This section provides general information about the major hazards associated with concrete cutting and drilling operations. Following are some examples and suggested measures for controlling exposure to the risk associated with each hazard.

Airborne Hazards

Airborne hazards affecting the health and safety of concrete cutting and drilling operators can arise in several different ways:

- From dusts created from the cutting or drilling of the concrete itself
- From exhaust gases generated by machines powered by internal combustion engines
- From work conducted in confined spaces
- From hazardous substances (chemicals or additives) used in the process

Concrete cutting and drilling can generate large quantities of dust which can include respirable silica dust. Exposure to silica dust can result in silicosis, a stiffening and scarring of the lungs. It results in shortness of breath, coughing, and chest pain. The effects are irreversible and lead to degeneration in the person's health, invariably resulting in death. The coarser rock and cement dust particulates can cause upper respiratory irritation and symptoms, such as bronchitis, if extensively exposed over long periods.

Dry methods of concrete cutting and drilling produce the highest levels of respirable dust.

Control Measures

During operations where powered tools or equipment are used to cut, grind, core, or drill concrete or masonry materials, a dust reduction system will be applied to effectively reduce airborne particulate. Exceptions include: operations where it can be shown that permissible exposure limits are not exceeded; roofing operations with tile, pavers or similar materials; and during the first 24 hours of an emergency operation.

Wherever possible, concrete cutting and drilling equipment will be fitted with collection devices to eliminate generated dust at the source.

Where dust extraction is not practical, wet methods will be used to minimize dust generation. Ensure that enough water/coolant is supplied to the operation to adequately suppress the dust.

Whenever the above controls are not practical, or fail to achieve full compliance, respiratory protection must be used. An appropriate "N" series or "P" series particulate respirator will provide adequate protection for respirable quartz concentrations.

Where it is necessary to carry out the task dry, (e.g., due to the proximity of electrical fittings or machinery) ensure that particulate respirators with adequate protection are used.

Other people in the vicinity will also be protected from any dusts created by the cutting or drilling operation. Remove slurry before it dries, otherwise the dried dust can be re-dispersed to expose unprotected workers and others on the site.

If possible, workers will change into disposable or washable work clothes at the job site, shower (where available), and change into clean clothing after leaving the site to prevent contamination of cars, homes, and other areas. Workers must not eat, drink, smoke, or apply cosmetics (including sunscreen) in areas where there is dust containing crystalline silica.

Exhaust Gases from Machinery

Exhaust gases from equipment powered by internal combustion engines, including carbon monoxide, oxides of nitrogen, and aldehydes, are all toxic. Carbon monoxide is a chemical asphyxiant, which can cause rapid loss of coordination, unconsciousness, and death. Any engine operated in, or near, a poorly ventilated area can quickly produce dangerous levels of contaminants.

Control Measures

Because of the extreme risks from hazardous exhaust gases, equipment with an internal combustion engine will NOT be used in an enclosed or poorly ventilated space. Instead, use hydraulic, electric, or pneumatic machines in poorly ventilated spaces. Attempts to use general dilution ventilation to remove exhaust gases are rarely successful because of the large amounts of contaminants produced and physical difficulties in producing and directing the flow of adequate fresh air supplies.

Do not use conventional filtering type respirators to deal with general exhaust gases. There is NO filter to protect a wearer against carbon monoxide for regular respiratory protective equipment.

Working in Confined Spaces

Any work activity undertaken in a confined space can be hazardous. Hazards include:

- Inadequate air quality caused by lack of oxygen (e.g. displacement by carbon dioxide)
- Presence of toxic constituents of the atmosphere (e.g. hydrogen sulphide, carbon monoxide)
- Presence of explosive air contaminants (e.g. methane)

Further (as noted above), for concrete cutting or drilling, the operation of an internal combustion engine equipped machine may produce additional extremely toxic gases in the confined space.

Control Measures

For concrete cutting and drilling, where entry into or on a confined space is needed, the atmosphere must first be tested to check for adequate oxygen, absence of both toxic contaminants and explosive gases or vapors. Where the atmosphere is not suitable for entry, it must be ventilated until it is shown by test to be suitable for safe entry.

Use of machinery in a confined space will be restricted to hydraulic, pneumatic, or electric machines. All machines capable of causing sparks, particularly electric machines, can provide a source of ignition in an explosive atmosphere.

Hazardous Substances Used in the Process

In some instances, chemicals or other hazardous substances may be added as aids in the cutting or drilling operations. The nature of the hazard and the risks will depend on the hazardous substance used.

Control Measures

Relevant safety and health information can be obtained from the SDS for a hazardous substance.

Noise

Noise from concrete cutting and drilling is a serious issue. An operator's hearing may be damaged by very loud noise over a relatively short period or by exposure to a lower level of loud noise over a longer period. In a normal working day, noise from concrete cutting or drilling equipment will lead to exposure to excessive noise for the operator and other nearby workers. The hearing ability of the operators and workers will therefore be at risk if no control measures are implemented.

Control Measures

- There are currently no cutting and drilling equipment available that are quiet enough as not to create excessive noise with normal daily use. Modifications in the form of engineering noise control measures at the source also offer limited noise reduction
- Operators, nearby workers, and bystanders, therefore, must protect their hearing through the wearing of personal hearing protectors. Employers providing hearing protectors must also provide training and instruction in the proper use and maintenance of such personal hearing protectors (and any other protective equipment) the employer requires the worker to wear

Manual Tasks Including Manual Handling

Awkward or static working postures and forceful exertions repeated or maintained for long periods increase the risk of injury by increasing loads on the back, other joints, and soft tissues of the body.

Holding hand held equipment (such as hand held concrete cutting saws) over extended periods increases the loads on the body and the risk of injury.

Control Measures

Possible solutions include:

- Suspending or supporting equipment in a frame to reduce the forces and the awkward and static working postures needed to position it
- Reducing the range of movement of the equipment to minimize the effort or forces needed to guide and control it
- Training workers in safe methods of work and in principles for handling the equipment

Vibration of the Whole Body and/or Hand Arm

Vibration transmitted from concrete cutting and drilling machinery and equipment can affect the body as a whole or segments of the body such as the hands and arms of the operator. The harmful effects from whole body vibration are predominantly of a musculoskeletal nature, especially in the lower spine region. Other effects include fatigue, headaches, gastrointestinal problems, and a reduction in job efficiency.

Hand-arm vibration may cause disturbances in the peripheral nerve and vascular systems of the hands resulting in Raynaud's Syndrome (also known as vibration white finger) which causes the loss of senses of touch and heat, numbness, and loss of grip strength. Other effects can include: damage to tendons, bones, and joints in the hands, wrists, arms, elbows, and shoulders and carpal tunnel syndrome.

Control Measures

Choose equipment:

- That vibrates less or does not have to be held or supported
- That is well balanced, as light as possible, and able to be held with either hand and different sized hands
- With vibration absorbing handles or with an even surface on the handles to distribute gripping force

Covering of metal handles of existing equipment with a soft, resilient rubber can also be very effective in reducing vibration exposure.

Train workers in the use of the equipment with a minimum grip force while still able to perform the work safely.

The use of gloves has minimal effect on vibration exposure. The beneficial effects of the use of gloves are that they can improve grip on the equipment and can keep hands warm and thus increase blood flow to the fingers.

Working at Heights

Working at height with any concrete cutting or drilling equipment is dangerous. Heavy equipment cannot be used safely on an unstable platform and portable equipment should not be used from a ladder.

Control Measures

Do not use ladders when operating concrete cutting and drilling equipment. All work at heights must be done from safe working platforms, such as scaffolding and elevated working platforms.

Electrical Safety

There is a risk of electrocution if extension leads, plugs, and electric powered tools are used in the presence of water. Electrocution can also be caused by inverting hand held equipment when wet cutting.

Control Measures

Equipment operators must make sure:

- Double adaptors and piggyback plugs are not used
- Electrical equipment is inspected, tested, and tagged by a competent person at regular, prescribed intervals
- Electrical equipment is immediately withdrawn from use if it is not safe to use
- Electrical equipment is connected to a GFCI
- Portable GFCI devices are tested at regular, prescribed intervals
- GFCI devices are withdrawn from use if they are not working properly

In addition, suspend cords and extension leads on stands and use waterproof connectors where water may be present. Do not use electrical equipment for inverted cutting.

Damage to Structures

Operators risk injury and the safety of others on site by cutting through stressed components in buildings and any other components that could affect the integrity of the structure.

Control Measures

If components, such as stressing tendons, must be cut, the person responsible for workplace safety must assess the risk. Advice and supervision from a structural engineer must be obtained for all cuts to structural components. The relevant person responsible for workplace safety will locate and mark the location of all components that will affect the strength of a structure if cut as part of initial planning for safety.

Damage to Services

Operators risk injury and the safety of others on the site by cutting through gas, electricity, or water services.

Control Measures

The relevant person responsible for workplace safety on site will locate and mark the location of all services during initial planning for safety. If services are to be cut through, they must be disconnected and tagged. Disconnection will be confirmed and tagged by the relevant service personnel before the work begins. At conclusion of the work, the service personnel will remove their tags.

Loss of Vacuum

Operators using a vacuum assembly to anchor a core drill stand to the surface may risk injury if the vacuum pump fills with slurry. This can cause loss of vacuum, which can result in the drill stand breaking free and rotating around the drill.

Control Measures

Use bolt down stands where practical. Ensure that the surface to be cut is sound and monitor the equipment to ensure that vacuum pressure is being maintained.

Working Alone

When working alone it may be difficult to set up equipment on site

Control Measures

A second person will be available to assist in the set up and relocating equipment on site.

PERSONAL PROTECTIVE EQUIPMENT

The company will provide all necessary personal protective equipment (PPE) to minimize exposure to a risk, the person responsible for workplace safety and health will make sure that workers are properly trained and instructed in the correct use of the equipment, BEFORE starting any concrete cutting or drilling work.

All workers are required to use the PPE provided by the company and the Company will ensure the worker is properly instructed in its use.

The following PPE will be provided, where required:

- Safety Helmets/Hardhats
- Hearing Protection
- Eye Protection
- Safety clothing such as safety boots, waterproof clothing, aprons, gloves, and reflective safety vest
- Respirators
- Gloves to improve grip and reduce force

In addition, operators working outside for long periods will be protected from harsh sunlight and/or reflected light by applying a sunscreen with a SPF rating of at least 15+. They will also wear hats, eye protection, long sleeve shirts, and long trousers.

When selecting items of PPE, they must comply with relevant standards.

Operators will not wear loose clothing and long hair will be covered or tied back. All clothing needs to be comfortable and suitable for the work and the weather conditions.

Storage and Maintenance of PPE

PPE will be stored in a clean and operational condition and in a location that is safe from interference and damage. It must be easily accessible when needed. Employees will inspect PPE regularly to determine that they are in a serviceable condition. Any PPE found to be damaged or defective will be repaired or discarded.

SAFE PRACTICES

General Cautions for Using Hand-Held Concrete Cutting Saws

- ALWAYS follow the designer's recommendations for the safe use of the saw
- ONLY use correct blade size, as recommended by the saw manufacturer. Oversized blades are dangerous
- NEVER use the saw with the guards removed
- Do NOT hold hand-held concrete cutting saws any higher than shoulder height
- Do NOT use hand-held concrete cutting saws for inverted cutting

Preparing a Safe Site

- Those people responsible for workplace safety and health must ensure that the work site is safe, based on the results of the workplace health and safety risk management process, as recorded in the Job Hazard Analysis (JHA) or similar site evaluation
- Site preparation for concrete cutting and drilling operations will include consideration of:
  - Weather/environmental conditions that can create hazards (e.g. heat, rain)
  - Access to and from the work site
  - Barricades and warning signs

- Provisions for appropriate personal protective equipment
- Specific health and safety instructions for the site
- Whether the equipment is suitable for the work, is properly maintained, and will be used according to manufacturer's recommendations
- Provision for GFCI residual current devices for electrical equipment
- Safe removal of cut pieces and cores
- A method to collect residue to prevent the surface becoming slippery and to prevent residue entering storm water drains. Residue will be disposed of according to environmental protection requirements

Setting up Safely: Using a Site Checklist

When setting up the site safely for concrete cutting and drilling activities, a safety checklist, such as the one at the end of this section, will be used to make sure that:

- Work areas and/or work platform are suitable and safe
- Locations of all services are marked/disconnected
- Exact location of the cut or drilling is clearly marked
- The blade/equipment is of correct type and in good condition
- Appropriate barricading and warning signs are erected
- The work area is adequately ventilated
- Adequate lighting is provided, where necessary
- Specific site hazards have been identified and safe systems of work are in place
- There is a method of collecting residue from the operation to prevent surfaces becoming slippery
- There is a method for safe removal or support of cut pieces or cores

Using Cutting Equipment Safely

Before cutting with road, floor, wall, and hand-held saws, the operator will check that the equipment is safe. The operator will check the general condition of the equipment before commencing each job to ensure that the cutting tool, guards, leads, and hydraulic hoses are in good order.

The operator will ensure that:

- The cutting blade is the right size and right type for the machine
- The blade is in good working condition and is free from cracks and deterioration
- The specified blade speed matches the saw drive speed
- The shaft and flanges are clean and undamaged
- The blade fits securely over the shaft
- The shaft nut is tightened against the outside flange
- The blade guard is fitted and in good working order
- The drive belt is at the correct tension
- For wet cuttings, adequate coolant/water is available
- A trolley is used to support the cutting machine for horizontal work at low level, so that operators do not have to work on their knees

- Other people on the site are not at risk
- Safe removal or support of cut pieces or cores is provided
- The equipment is protected at the power outlet with a Ground Fault Circuit Interrupter
- The area behind the cut is barricaded and warning signs are posted when cutting through floors or walls to prevent people entering that area
- Safe operating procedures are in place when hand held saws are used in confined areas
- Appropriate personal protective equipment is provided, where required

During cutting, ensure that:

- The blade guard is in the lowered position
- When starting the machine, the operator and other people stand outside the path of the blade
- If the machine stalls, the blade is raised and the outside flange and nut are checked for tightness
- Wall cuts are performed with the operator's back close to vertical and the hands do not move above shoulder height
- Where possible, cut from a standing position with the feet braced and the body balanced. In some circumstances, it may be necessary to kneel on one knee to enable cuts to be made close to the floor. In such circumstances, protection for the knee will be necessary.
- When cutting horizontally across a wall, the operator's hand is at waist height
- The length of time the operator spends in a fixed position is minimized
- The throttle lock is only used when starting the equipment. If the throttle lock is used during normal operation then the ability to cut power will be reduced
- The equipment is stopped when changing grip to move between horizontal and vertical cuts
- When pre-cutting to 6 inches and changing to a second blade, the blade is aligned with the previous cut on resumption of cutting
- The handles provided (rather than the belt guard) are used to support the equipment
- When using electrical equipment, the leads will not be cut during operation
- Any person, who is providing assistance to the operator, is located where they will not be exposed to danger from sudden saw movement, ejection of material, a dropped machine, or falling offcuts
- The saw is only used with blade rotating in the opposite direction to the cut and not used for inverted cutting
- Plenty of water or coolant is used and that the coolant/water is suppressing dust at the point of generation (airborne dust is a health hazard)
- Appropriate personal protective equipment is being worn

In situations where the power pack for a hydraulic and compressed air wall saw is not easily accessible, or the machine is not remotely controlled at the working head, a second operator must be available.

Using Hand-Held Concrete Cutting Saws

Hand-held concrete cutting saws will only be used where the use of larger, self-supporting saws is not practical. When it is necessary to use a hand-held concrete cutting saw, select one which:

- Has handholds for the operator's non-trigger hand

- Is as light weight as is practical for the type of work, to reduce manual handling risks
- Has the best type of guarding around the blade
- Is well-balanced and has hand grips that are comfortable to use (poorly balanced machines might require operators to place their hands in dangerous positions near the blades to support the machine)
- Has the least vibration when in use, so as to reduce the risk of damage to the operator's blood circulation
- Can be used both left-handed and right-handed
- For horizontal cutting, can be used left-to-right and right-to-left without having to reposition the blade or guard

The operator must be instructed in, and competent at, operating the saw safely. Where possible, the saw will be used with the operator's hands at waist height when cutting horizontally and between shoulders to knee height when cutting vertically. When necessary, provide scaffolding or supports to ensure safe use of the saw. Always check to ensure that hand-held concrete cutting saws have not been modified.

General Cautions for Using Hand-Held Concrete Cutting Saws

- ALWAYS follow the designer's recommendations for the safe use of the saw
- ONLY use correct blade size, as recommended by the saw manufacturer
- Do NOT use oversized blades
- NEVER use the saw with the guards removed
- Do NOT hold hand-held concrete cutting saws any higher than shoulder height
- Do NOT use hand-held concrete cutting saws for inverted cutting

Using Concrete Drilling Equipment Safely

Operators drilling concrete will ensure that:

- Close fitting clothing is worn to avoid entanglement
- The drill is securely fastened to the work surface
- The area below or behind the operation is barricaded to prevent people entering during drilling
- Appropriate warning signs are posted
- The drilling equipment is connected to a GFCI
- Appropriate PPE is provided and being used
- Hydraulic, air, or flexible drive units and a drill stand are used for inverted drilling
- Supply of coolant/water is adequate to suppress dust

Protecting the Public

If cutting or drilling is carried out on a road, or in a public place, the public must be protected and a safe route around the work area must be provided.

Public safety measures include:

- Complying with local government requirements for road or footpath closure

- Barricading or screening the work area to protect pedestrians and to prevent vehicle entry
- Displaying warning signs and caution lighting where necessary lighting the area but ensuring there is no glare or shadows (where flood lighting is used, ensure it is positioned so as not to blind motorists)
- Providing wheelchair access around the area

MAINTAINING CONCRETE CUTTING AND DRILLING EQUIPMENT

Maintenance can prevent equipment from deviating from the design intention in a way that is a risk to safety and health.

Equipment will be maintained according to the manufacturer's specifications for maintenance or, in the absence of such specifications, in accordance with other proven and tested procedures. Regular inspection and routine maintenance undertaken by a competent person will help to ensure safe and efficient operation of equipment.

A suggested schedule is:

- The operator will check the general condition of the equipment daily, before use
- The equipment will be inspected and maintained by a qualified person at least every month or after 50 hours of operation

Defects and Repairs

Defects to concrete cutting and drilling equipment will be reported immediately to the person responsible for equipment maintenance. Because of their day-to-day experience, operators will be regularly consulted about the performance of equipment. Their suggestions for improvements should also be encouraged.

- A qualified person will carry out repairs
- Ensure that equipment with defects that could endanger people is not used

Keeping Records

Complete records of any inspections, services or repairs carried out will be kept for all concrete cutting and drilling equipment. These records will include any faults identified in normal use. Records must be up to date and retained for the life of the equipment.

TRAINING AND INSTRUCTING OPERATORS

All operators of concrete cutting and drilling equipment must know how to work safely and be able to demonstrate competency before using this equipment.

Employers must ensure their workers are trained in safe concrete cutting and drilling work practices and procedures, and are supervised by experienced people before carrying out this unsupervised work.

Training will be conducted at least annually, and will include information and instruction on:

- Dust, fumes, and air quality

- The hazards and risks associated with the work activities, including the potential health hazards of overexposure to airborne dust generated from concrete materials, including silicosis, lung cancer, chronic obstructive lung disease (COPD) and decreased lung function
- Recognition of poorly ventilated areas and confined spaces
- Methods to control exposure to airborne dust from concrete materials, including wet cutting, local exhaust ventilation systems, and process isolation, as applicable
- Proper use and maintenance of dust reduction systems, including the safe handling and disposal of waste materials
- The importance of good personal hygiene and housekeeping practices when working in proximity to dust from concrete, including: not smoking tobacco products, cleaning up appropriately before eating, cleaning clothes appropriately, avoiding other activities that could cause exposure to airborne dusts
- Additional safe work practices and procedures, including: the safe operation of equipment, the control measures in place, safe handling procedures (including lifting and moving), the safe use of hazardous substances, fire protection, emergency and first aid procedures, electrical safety, safety in confined spaces, proper sun protection, and other training required under hazard-specific regulations
- The correct use, fit, care, and storage of tools and personal protective equipment

The operator will be monitored, as necessary or required, to ensure safe work practices and procedures are being followed.

In addition, supervisors must be trained:

- To know and understand the information outlined above in this section
- To identify tasks that may result in employee exposure to dust or other hazards and, as necessary, initiate procedures that reduce employee exposure to dust or other hazards

Employee training records will be retained for the length of their employment.

ATTACHMENTS

- Concrete Cutting and Drilling Site Safety Checklist
- Concrete Cutting and Drilling Equipment Safety Checklist

CONCRETE CUTTING AND DRILLING SITE SAFETY CHECKLIST (PAGE 1 OF 3)

Company Name:			Operator's Name		
Site Location:		Type of Job		Date	

Check the site for safety — on arrival at the site, mark the correct answer where relevant to the job. If the answer is no the situation is unsafe. Alert the office.

	Yes	No	Comment
Site Evacuation			
Checked with Client	☐	☐	
Located First Aid/Accessible	☐	☐	
Scaffolding			
Erected as Required	☐	☐	
Services Located/Marked			
Electricity	☐	☐	
Gas	☐	☐	
Other	☐	☐	
Ventilation			
Adequate	☐	☐	
Lighting			
Lighting in Place	☐	☐	
Control/Public Safety			
Barricades in Position	☐	☐	
Warning Signs Displayed	☐	☐	
Traffic Control in Place	☐	☐	
Safety Equipment			
Safety Equipment is Functional, Clean and Safe	☐	☐	

CONCRETE CUTTING AND DRILLING EQUIPMENT SAFETY CHECKLIST (PAGE 2 OF 3)

Company Name:			Operator's Name		
Site Location:		Type of Job		Date	

Check the equipment for safety — on setting up, mark the correct answer where relevant to the job and equipment. If the answer is NO the situation is unsafe. Alert your supervisor.

	Yes	No	Comment
Floor Saw			
Shaft Nut Secure Belt	☐	☐	
Belt Tensioned and Undamaged	☐	☐	
Adequate Water and Waterways Clear	☐	☐	
Flaps In Place	☐	☐	
Guards In Place	☐	☐	
Hand Held Saw			
Belts Tensioned And Undamaged	☐	☐	
Flange Locking Nut Secure	☐	☐	
Water Supply Adequate	☐	☐	
Guards In Place	☐	☐	
Wall Saw			
Tracks Securely Fastened	☐	☐	
Blade Secured	☐	☐	
Job Wedged/Securely Supported	☐	☐	
Wire Saw			
Pulleys Secure	☐	☐	
Hydraulic Pressure Correct	☐	☐	

CONCRETE CUTTING AND DRILLING EQUIPMENT SAFETY CHECKLIST (PAGE 3 OF 3)

Company Name:			Operator's Name		
Site Location:		Type of Job		Date	

Check the equipment for safety — on setting up, mark the correct answer where relevant to the job and equipment. If the answer is NO the situation is unsafe. Alert your supervisor.

	Yes	No	Comment
Drills			
Electric Switch, Plug, And Lead Safe	☐	☐	
Water Collar Operable	☐	☐	
Carriage Clamp And Shims Operable	☐	☐	
Blade And Bits			
No Undercutting Evident	☐	☐	
Blades Free Of Cracks and Deterioration	☐	☐	
Blade Is Right Size And Type For The Machine	☐	☐	
All Segments Secure	☐	☐	
Electrical Leads			
Plugs In Good Condition	☐	☐	
Outer Casing Intact Correctly Tagged	☐	☐	
GFCIs Fitted	☐	☐	

Notes	

SCOPE

This chapter covers the safe work practices and requirements for performing concrete work. Our safe practices will comply with the applicable standards of OSHA 1926 Subpart Q, Concrete and Masonry Construction. This chapter does not cover concrete waste management or batch plant operations.

POLICY

This Company has implemented the following policy to protect employees performing concrete work from accident or injury.

An understanding of the potential risks of concrete construction and proper training is necessary for limiting the number of concrete construction-related injuries. Every worker in concrete construction must be aware of safety.

EMPLOYER RESPONSIBILITIES

This Company will:

- Provide all necessary training
- Provide all necessary PPE
- Plan jobs according to the safety program
- Ensure employees follow all safe practices
- Enforce the safety regulations and be prepared to halt unsafe actions

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Follow all safe practices
- Wear all required PPE
- Report all unsafe conditions and/or acts

HAZARDS

Cement can cause ill health by skin contact, eye contact or inhalation. Risk of injury depends on duration and level of exposure, and individual sensitivity.

Different cements have different ingredients that can be harmful. Many types of cement contain substances that can be hazardous, like silica, lime, gypsum, nickel, cobalt and chromium compounds. Hazardous materials in wet concrete and mortar include:

- Alkaline compounds such as lime (calcium oxide) that are corrosive to human tissue
- Trace amounts of crystalline silica that is abrasive to the skin and can damage lungs
- Trace amounts of chromium that can cause allergic reactions.

Skin Contact

The hazards of wet cement are due to its caustic, abrasive and drying properties.

- Wet concrete contacting the skin for a short period and then thoroughly washed off causes little irritation. Continuous contact between skin and wet concrete allows alkaline compounds to penetrate and burn the skin
- When wet concrete or mortar is trapped against the skin (e.g. by falling inside a worker's boots or gloves or by soaking through protective clothing) the result may be first, second, or third degree burns or skin ulcers. These injuries can take several months to heal and may involve hospitalization and skin grafts
- Severe cases can occur when personal protective clothing or equipment is worn
- Wet concrete may be trapped inside rubber boots or gloves, or gradually soak through coveralls. Concrete finishers kneeling on fresh concrete have had their knees severely burned. Corrosive bleed water from the concrete is absorbed by the worker's pants and held against the skin for prolonged periods
- Cement dust released during bag dumping or concrete cutting can also irritate the skin. Moisture from sweat or wet clothing reacts with the cement dust to form a caustic solution

Allergic skin reaction: Some workers become allergic to the hexavalent chromium in cement. A small yet significant percentage of all workers using cement will develop an allergy to chromium, with symptoms ranging from a mild rash to severe skin ulcers.

- In addition to skin reactions, hexavalent chromium can cause a respiratory allergy called occupational asthma. Symptoms include wheezing and difficulty breathing. Workers may develop both skin and respiratory allergies to hexavalent chromium
- It is possible to work with cement for years without any allergic skin reaction and then to suddenly develop such a reaction. The condition gets worse until exposure to even minute quantities triggers a severe reaction. The allergy usually lasts a lifetime and prevents any future work with wet concrete or powder cement

Eye contact: Exposure to airborne dust may cause immediate or delayed irritation of the eyes. Depending on the level of exposure, effects may range from redness to chemical burns and blindness.

Inhalation: Inhaling high levels of dust may occur when workers empty bags of cement. In the short term, such exposure irritates the nose and throat and causes choking and difficult breathing.

Sanding, grinding or cutting concrete can also release large amounts of dust containing high levels of crystalline silica and other particulates. Prolonged or repeated exposure can lead to health problems.

During operations in which powered tools or equipment are used to cut, grind, core or drill concrete or masonry materials, a dust-reduction system will be applied to effectively reduce airborne particulate. Exceptions include operations in which permissible exposure limits can be shown not to be exceeded, roofing operations with tile, pavers or similar materials, and during the first 24 hours of an emergency operation.

Silica Dust Exposure

Prolonged exposure to silica can cause a disabling and often-fatal lung disease called silicosis. Some studies also indicate a link between crystalline silica exposure and lung cancer.

Symptoms of silicosis:

- Acute silicosis can occur after a few weeks of very high exposure (for example, in sandblasters). Symptoms are shortness of breath, coughing, fever, and weight loss
- Chronic silicosis is rarely seen in workers with less than ten years of exposure. It permanently damages your lungs
- Silicosis also increases your chance of getting tuberculosis

How to determine the ingredients in cement

- Find a list of ingredients, a safety warning, or both
- Read the Safety Data Sheet (SDS) for the product. SDS are required by law. They will tell you the ingredients and possible health hazards. Everyone working on the site has a right to see SDS
- When you work with cement, you often use other chemicals (form oils, curing agents, bond breakers and retardants). Remember to check their SDS

Hygiene

- Clothing contaminated by wet cement should be quickly removed. Skin in contact with wet cement should be washed immediately with large amounts of cool clean water
- Do not wash your hands with water from buckets used for cleaning tools
- Provide adequate hygiene facilities on site for workers to wash hands and face at the end of a job and before eating, drinking, smoking or using the toilet. Facilities for cleaning boots and changing clothes should also be available

First Aid

- Wash skin contaminated with wet or dry cement using cold running water as soon as possible
- Cover any open sores or cuts with suitable dressings
- Get medical attention if discomfort persists
- Wash contaminated eyes with cold tap water for at least 15 minutes before taking the affected person to a hospital

Material

- Cement comprises 7-15% of total concrete volume. As an alkaline material, wet cement is caustic, and can cause severe chemical burns to exposed skin and eyes
- Working with fresh concrete presents an obvious risk. It is always important to wear waterproof gloves, a long-sleeved shirt, full-length trousers, and proper eye protection
- If you must stand in wet concrete, wear water-proof boots that are high enough to keep the concrete from flowing into your boots
- Wash wet concrete, mortar, cement, or cement mixtures from your skin immediately. Flush eyes with clean water immediately after contact. Indirect contact through clothing can be as serious as direct contact, so promptly rinse out wet concrete, mortar, cement or cement mixtures from clothing. Always seek immediate medical attention if you have persistent or severe discomfort

- 95% of cement particles are smaller than 45 µm (micrometer). The caustic nature of cement creates a danger from inhalation
- Workers opening bags or sacks of cement and cement products should always wear a dust mask in addition to their regular safety attire

Machinery

Early-entry saws, concrete/masonry saws, cut-off saws and power trowels pose a threat to appendages when used improperly.

Any sustained or sudden noise above 85 decibels emanating from machinery can be damaging to the ear.

Hydraulic jacks used in shoring, compressed air and hydraulic concrete pumps, belt conveyors, welding equipment, post-tensioning jacks, demolition devices, and other equipment also create potential hazards on a concrete construction site.

Tools

Sharp-edged trowels, hammers, chisels, utility knives, etc. can be dangerous when used carelessly or incorrectly.

Long-handled bull floats, when used near utility wires, can be dangerous.

Height

The number one leading cause of construction-related injuries and fatalities is attributed to falls from heights. Sources of height associated with concrete construction include but are not limited to scaffolding, ladders, bucket-trucks, catwalks, elevated or wall forms, and elevated floors. Owners, managers, contractors and laborers should be aware of specific height sources on a project as they are virtually unavoidable in construction.

PERSONAL PROTECTIVE EQUIPMENT

All employees will be trained on the use of the PPE required for their job, and are expected to wear their PPE at all times. This equipment can consist of, but is not limited to:

- Alkali-resistant gloves, cloth, leather, or rubber for wet conditions
- Coveralls with long sleeves and full-length trousers (pull sleeves down over gloves and tuck pants inside boots and duct-tape at the top to keep mortar and concrete out)
- Waterproof boots high enough to prevent concrete from flowing in when workers must stand in fresh concrete
- Ear plugs or muffs
- Respiratory protective equipment such as a P, N, or R 95 respirator when cement dust cannot be avoided
- Eye protection where mixing, pouring or other activities may endanger eyes (minimum—safety glasses with sideshields or goggles, under extremely dusty conditions, tight fitting unvented or indirectly vented goggles. Do not wear contact lenses when handling cement or cement products)

- Employees working more than six feet above any adjacent working surface must be provided with personal fall arrest systems, safety net systems, or positioning device systems
- Employees exposed to public vehicular traffic will be provided with, and wear; warning vests or other suitable garments marked with or made of reflectorized or high-visibility material

PERMITS

This Company will comply with all permit requirements. Permits may be required for:

- Trenches and excavations five feet or deeper where employee entry is required
- The erection/dismantling of vertical shoring systems more than three stories or 36 ft. high
- The construction/demolition of any building, structure, scaffolding, or falsework more than three stories or 36 feet high
- The use of fixed and mobile cranes

JOBSITE CONDITIONS

This Company will ensure that all employees are informed of hazards and protected when working in cramped, confined projects or sections of a project, locations exposed to traffic, utility wires, excavations, hazardous materials or weather conditions that could result in injury.

SAFE PRACTICES

- When laying concrete block, have different sizes on hand to avoid cutting or hammering to make them fit
- Work in ways that minimize the amount of cement dust released
- Where possible, wet-cut rather than dry-cut masonry products
- Mix dry cement in well-ventilated areas
- Make sure to work upwind from dust sources
- Where possible, use ready-mixed concrete instead of mixing on site
- When kneeling on fresh concrete, use a dry board or waterproof kneepads to protect knees from water that can soak through fabric
- Remove jewelry such as rings and watches because wet cement can collect under them
- Use power tools with HEPA filters when cutting or drilling concrete
- Use a special HEPA vacuum to clean up dust, not dry sweeping
- Wear a respirator with HEPA cartridges if there is a lot of dust in the air

Certain practices associated with concrete construction contribute to risks. The use of cranes for lifting and placing concrete buckets, for tilt-up concrete panels, and for lifting precast members present hazards to the finishers and erectors.

Concrete pumping, hydro-demolition or shotcreteing operations where high pressures are generated in hoses prompt safety concerns for the nozzlemen.

Reinforcement construction can involve heavy materials, protruding steel, oxyacetylene torches or welding equipment, and height sources, each of which introduces a safety hazard either singularly or in any combination.

Post-tensioning operations impart stresses nearly equal to the yield strength of pre-stressing tendons, which can be 250,000 psi. Such forces are dangerous to jack operators or on looking personnel. Precast plants with heavy table forms, consolidation equipment and curing rooms must follow safety procedures.

EQUIPMENT AND TOOLS

All equipment, material and construction techniques used in concrete construction and masonry work will meet the applicable requirements for design, construction, inspection, testing, maintenance and operations as prescribed in ANSI A10.9.

- The company will ensure that all equipment used at the jobsite is properly maintained and equipped with manufacturer recommended safety devices. Disabling or removing safety devices is prohibited
- All unsafe or inoperable equipment will be marked as such to prevent further use of the equipment
- No employee may operate equipment without being properly trained and alert to potential hazards. In training and in the worksite safety and health program, it also is important to include procedures for fast notification and investigation of accidents

Construction loads: No construction loads will be placed on a concrete structure or portion of a concrete structure unless the employer determines, based on information received from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads.

Vertical loads: Vertical loads consist of a dead load plus an allowance for live load. The weight of formwork together with the weight of freshly placed concrete is dead load. The live load consists of the weight of workers, equipment, runways and impact, and must be computed in pounds per square foot (psf) of horizontal projection.

Lateral loads: Braces and shores must be designed to resist all foreseeable lateral loads such as wind, cable tensions and inclined supports, impact of placement, and starting and stopping of equipment. The assumed value of load due to wind, impact of concrete, and equipment acting in any direction at each floor line shall not be less than one hundred pounds per lineal foot of floor edge or two percent of total dead load of the floor, whichever is greater. Wall forms must be designed for a minimum wind load of ten psf, and bracing for wall forms should be designed for a lateral load of at least one hundred pounds per lineal foot of wall, applied at the top. Walls of unusual height require special consideration.

Bulk cement storage: Bulk storage bins, containers and silos must be equipped with the following:

- Conical or tapered bottoms and mechanical or pneumatic means of starting the flow of material
- No employee shall be permitted to enter storage facilities unless the ejection system has been shut down and locked out
- Safety belts, harnesses, lanyards, lifelines or droplines, independently attached or attended, must be used properly

Special loads: Formwork must be designed for all special conditions of construction likely to occur, such as unsymmetrical placement of concrete, impact of machine-delivered concrete, uplift and concentrated loads. Form supports and wedges shall be checked during concrete placement to prevent distortion or failure.

Reinforcing steel: All protruding reinforcing steel, onto and into which employees could fall, must be guarded to eliminate the hazard of impalement.

Wire mesh rolls: Wire mesh rolls must be secured at each end to prevent recoiling action.

Guying: Reinforcing steel for walls, piers, columns and similar vertical structures must be guyed and supported to prevent overturning and to prevent collapse.

Concrete buckets

- Concrete buckets equipped with hydraulic or pneumatic gates are required to have positive safety latches or similar safety devices installed to prevent premature or accidental dumping
- Concrete buckets must be designed to prevent concrete from hanging up on top and the sides
- Riding of concrete buckets for any purpose is prohibited, and vibrator crews must be kept out from under concrete buckets suspended from cranes or cableways
- When discharging on a slope, the wheels of ready-mix trucks are required to be blocked and the brakes set to prevent movement
- No employee is permitted to work under concrete buckets while buckets are being elevated or lowered into position
- To the extent practical, elevated concrete buckets must be routed so that no employee, (or the fewest number of employees), are exposed to the hazards associated with falling concrete buckets

Tremies: Sections of tremies and similar concrete conveyances must be secured with wire rope (or equivalent materials in addition to the regular couplings or connections).

Bullfloats: If Bullfloats are used where the handles could contact energized electrical conductors, they must be made of nonconductive material or insulated with a nonconductive sheath whose electrical and mechanical characteristics provide the equivalent protection of a handle constructed of nonconductive material.

Lockout/tagout procedures: No employee shall be permitted to perform maintenance or repair activity on equipment (such as compressors, mixers, screens, or pumps used for concrete and masonry construction activities) where the inadvertent operation of the equipment could occur and cause injury, unless all potentially hazardous energy sources have been locked out and tagged.

Concrete mixers: Concrete mixers with one cubic yard or larger loading skips are required to be equipped a mechanical device to clear the skip of materials and guardrails installed on each side of the skip.

Power concrete trowels: Manually guided powered and rotating type concrete troweling machines must be equipped with a control switch that will automatically shut off the power whenever the hands of the operator are removed from the equipment handles.

Concrete buggies: Concrete buggy handles must not extend beyond the wheels on either side of the buggy. Installation of knuckle guards on buggy handles is recommended.

Foundations: After the foundation walls are constructed, take special precautions to prevent injury from cave-ins in the area between the excavation wall and the foundation wall.

- The depth of the foundation/basement trench cannot exceed 7½ feet deep unless you provide other cave-in protection
- Keep the horizontal width of the foundation trench at least 2 feet wide. Make sure no work activity vibrates the soil while workers are in the trench
- Plan the foundation trench work to minimize the number of workers in the trench and the length of time they spend there
- Inspect the trench regularly for changes in the stability of the earth (water, cracks, vibrations, spoils pile). Stop work if any potential for cave-in develops and fix the problem before work starts again

Runways

Runways will be constructed to carry the maximum contemplated load with a safety factor of four, have a smooth running surface and be of sufficient width for two buggies to pass.

Single runs will have a minimum width of forty-two inches with turnouts. Runways will have standard railings. Where motor driven concrete buggies are used, a minimum four inches by four inches wheel guard will be securely fastened to outside edge of runways.

All concrete buggy runways that are 12 inches or more above a work surface or floor, or ramps with more than 4 percent incline must be considered “elevated” runways.

Exception: Small jobs utilizing only one concrete buggy or larger jobs utilizing a one-way traffic pattern may be exempt from the requirements for turnouts or for sufficient width for two buggies to pass.

Exemption: Runways less than 12 inches above the floor or ground that are utilized by hard-powered buggies only, may be exempt from the guardrail and wheel guard requirements.

Stairways and ladders

- Install permanent or temporary guardrails on stairs
- Do not store materials on stairways that are used for general access
- Keep hazardous projections out of the stairs, treads, or handrails
- Correct any slippery conditions on stairways before they are used
- Inspect ladders before use for broken rungs or other defects. Discard or repair defective ladders
- Secure ladders near the top or at the bottom to prevent them from slipping

Safe walking surfaces on concrete structural members

- Structural members with studs, dowels or shear connectors installed on the top side must not be used as a walkway and/or means of access. If studs, dowels, or shear connectors are present, they must be covered with suitable material that will provide a walking surface as stable and free of hazards as one without obstructions
- Place ladders at the proper angle (1 foot out from the base for every 4 feet of vertical rise
- Extend ladders at least 3 feet above the landing to provide a handhold or for balance when getting on and off the ladder from other surfaces
- Do not set up a ladder near passageways or high traffic areas
- When ladders cannot be tied off, it must be located on a stable and level surface so it cannot be knocked over or the bottom of it kicked out
- Use ladders for their intended purpose only. Never use a ladder as a platform, runway, or as scaffold planks

Always face the ladder and maintain 3 points of contact when climbing a ladder

Welding and Cutting

- Perform Safety Check on all equipment
- Ensure tanks have gas and fittings are tight
- Ensure fire extinguisher is charged and available
- Inspect hoses for defects
- Ensure all PPE is available and in good condition
- All defective equipment must be repaired or replaced before use
- Remove flammables and combustibles
- Welding is not permitted on or near containers of flammable material, combustible material or unprotected flammable structures
- Place welding screen or suitable barricade around work area to provide a fire safety zone and prevent injuries to passersby (do not block emergency exits or restrict ventilation)
- Use an authorized Air Filtering Respirator, if required
- Ensure adequate ventilation and lighting
- Execute Hot Work Permit procedures
- Maintain fire watch for one hour after welding, and until all welds have cooled
- Perform final fire watch and terminate permit

TYPES OF CONCRETE WORK

The following sections will cover the safe practices for:

- Concrete pumping
- Foundation work
- Rebar and working at heights
- Cast in place
- Tilt-up operations

- Lift slab operation
- Post-tensioning operations
- Finishing
- Masonry work

CONCRETE PUMPING

Personal Protective Equipment:

- Hard hat
- Safety goggles or glasses
- Heavy duty work shoes or boots
- Rubber boots (for clean outs)
- Work gloves (rubber when necessary)
- Long sleeved shirt (when necessary)
- Ear plugs or muffs

Equipment inspection

- Read and understand the manufacturer's operating manual
- Check engine oil, hydraulic oil, and radiator water before operations begin
- Inspect all safety covers, instruments, gauges, grates, outriggers, and other equipment for safe and proper operating procedures
- Inspect safety slings, cables and chains. All clamps should be pinned at all times, including the boom system
- In the cab of the truck should be a:
  - Fire extinguisher
  - Safety flares
  - Safety reflector
  - First-aid kit

General rule: One safety sling for every item hanging from the boom. The anchor point for a safety sling should be the boom itself, not the pipeline.

- Only one worker is to give directions to the pump operator
- Pump operators' and the ground worker must know the proper hand signals
- Keep a minimum of 17 feet away from all electrical lines
- Water boxes must be in place when the machine is in operation
- Never reach into the valve or water box

Trailer Pumps

The following items will be checked prior to using a trailer pump:

- The condition of the truck and trailer
- The hitch is closed and secured
- The safety chain is connected

- All air and electric connections are working
- All safety pins are in place
- All equipment is secure
- All emergency shut off buttons are labeled

Set up

- Locate pump in an area for easy access to ready mix trucks and pour
- Locate wash out area and water access
- Placing line should be short and straight
- A 90 degree bend creates as much pressure as nine ft. of straight pipe
- Clamp the steel pipeline directly to the pump reducer whenever possible
- Avoid using a rubber hose between the pump and the placing line
- It is three times as hard to pump through rubber hose as opposed to steel
- Check the pipes thickness and inspect for wear
- Frayed or worn hoses can cause kinking, which builds up unwanted pressure, causing the hose to jerk and rupture. Kinking can cause a hydraulic line to burst and can blow the end off a hose or burst a clamp
- Know the pump piston face pressure and the placing line working pressure
- Concrete poured on high rises wears out the standpipe faster than the upper line
- Raised ends on the placing line will withstand higher pressure
- Prime the pump and placing line with a mixture of slurry

During the pour

- Grease the pumps seals and bearings. Manufacturers recommend greasing every hour or every 50 yards during the day

Remember:

- Pumping up 200 ft. is equal to pumping 800 ft. straight out
- A 10 ft. section of 5 inch pipe contains 200 pounds of concrete

High-rise pumping

- Secure the placing line or pour a concrete thrust block
- Use a shut off or switching valve in the line right after the pump
- The pipe from the valve to the clean out area must include a slurry tee
- Everyone on site needs to know who is responsible for checking and maintaining the placing line and clean out procedures
- Be aware of any admixtures in the concrete

Lightweight concrete

- Concrete is porous and may absorb water under the pressure of the pumping
- Person responsible for the pour should add any needed water
- Too much water can cause the rock and sand to separate, causing a plug (segregation)

- Never reach into the concrete pump valve. Use special tools
- Do not remove the grate from the hopper or operate the pump without a grate on the hopper
- Never reach into the hopper when the pump engine is running or the agitator is turning

Clean Out (compressed air)

- Clean out should begin within 5 minutes after pumping is complete
- Verify with pump operator that the shut off valve is closed
- All pipe added to a discharge end must be lubricated
- No one is allowed near the discharge end
- Attach a catch basket to the discharge end or use established control methods
- Position the pipe high enough to allow easy discharge
- The sponge or plug must be tight to prevent airflow around the plug into the concrete
- Connect blow out cap onto the placing line
- Connect the air hose to the blow out cap
- Open the bleeder valve
- Once the concrete is moving, close the bleeder valve and slowly add air
- After the blow out is completed, retrieve all disconnected hoses and pipe
- Insure that the air pressure has been completely relieved before working on the line

Multiple section boom pumps

- Clean set up area of debris and position pump so obstructions do not interfere
- Extend outriggers fully and lock. If the area is cramped, the outriggers on the side of the pump away from the pour should be jacked down
- All outriggers that feel the weight of the boom must be fully extended
- The boom must not rotate beyond an extended outrigger toward a non-extended outrigger
- Use pads and dunnage for stabilization. Make sure pads do not sink
- All truck mounted boom pumps are required to be level for safe operation. Make sure tires are blocked

One to One Rule: For every 1 foot of vertical drop, stay back from the base edge 1 foot. Make sure the base is not undercut.

- Unfold the boom sections in the proper sequence
- Make sure safety hooks or straps used for transport are not bent or binding
- Never force the boom when it is in a bind. Eliminate the problem
- Never over rotate the boom
- Never drag the hoses sideways with the boom
- Never move the truck concrete pump without folding the boom fully and placing the outrigger in the proper travel position

Electrical Hazards

Lightning: Lower or fold the boom and seek shelter.

Power lines: Power lines cause electrocutions.

- Assign a spotter to watch the boom to warn if the boom comes within 17 feet of lines
- Take all necessary precautions to rectify the situation. Move to a safer area

Small line pumps: A small-line pump is defined as a pump that pumps grout or a 3/8" pea gravel mix through pipe and hose that has a diameter of 2 inches, 2-1/2 inches or 3 inches. The size of any coarse aggregate and the proportioning of the mix will dictate the diameter of the pipe or hose that is required.

It is recommended that the diameter of the placing line be at least 3 times and, preferably, 4 times the size of the largest aggregate in the mix.

Grout may contain as little as 5 sacks of cement (470 pounds), or as much as 10 sacks (940 pounds) of cement per cubic yard. It may be desirable to request a retarder be added to the mix if a slow pour with high cement content is anticipated.

- When using a high cement content and a high ambient temperature, extreme care should be taken to prevent the mix from setting in the placing line
- The pump operator may make recommendations concerning the mix design or slump, but the contractor has the final responsibility for mix design and slump
- The pump operator should never add any water without the contractor or superintendent's approval
- Check all fluid levels of the truck and concrete pump before starting the truck or pump engine
- On the pump, check the engine oil, hydraulic oil, radiator water, and flush box water

Hose and pipe: When selecting hose and pipe size, it is recommended that you remember the rule concerning the diameter of the largest aggregate in relation to the diameter of the placing line.

- When it is necessary to pump a long distance, it is recommended that steel pipe be used for as much of the distance as is practical; then rubber hoses for distribution at point or placement
- Use only raise-end fittings for pipe or hoses. The clamps must be properly adjusted to give a tight fit and gaskets must be used in all clamps
- Make sure all your clamps are complete with gaskets and they are clean. A clamp without a gasket leaks slurry and may cause a plug. It will also leak air, giving you trouble when you try to suck a ball back

Inspect hoses daily: Any frayed or worn hoses should be taken out of service because of the increased danger of kinking or bursting. Kinking can be dangerous because it almost instantly builds pressure to the maximum pressure that the pumps can produce.

- When starting to pump, it is important that the first material through the placing line have the ability to lubricate the placing line
- If a high slump, wet grout is pumped, it may be adequate to lubricate the placing line
- When a low slump or low cement content grout is pumped, it may be necessary to add additional water to the first hopper full of concrete
- When a pea gravel mix is to be pumped, it is recommended that a line lubrication mixture be put into the hopper ahead of the concrete. This lubricating mix may be cement and water or any of several commercial priming products available on the market

- A number of problems may cause a plug in the line. It may be caused when starting to pump by a lack of lubrication in front of the grout or pea gravel. It may be caused by dirty placing lines that were not properly cleaned on the previous day
- A plug can be caused by the mix bleeding for segregation of the sand and aggregate. A plug may occur when larger stones or aggregates that are not designed to be in the mix are dropped into the pump hopper. It is recommended when using small diameter line that a grate with smaller holes be placed on the hopper to prevent large stones or other contaminants from entering the pump
- If plugging conditions in the pump or hose occur for and reason at all, do not attempt to use more power or correct the condition. Reverse the pump or release the line pressure, determine the cause of the plug, correct it, clean the plug, and resume pumping
- Trying to force material through under jammed conditions may result in serious injury to people or damage to the pump or placing line. If the hose or pipe connected to the reducer and hose starts to move or rise up as pressure is applied, the blockage is down the line
- Check the system until you locate a soft spot in the hose or a hollow sound with a hammer if it is pipe. If the reducer rises up, but the hose is soft, you know the plug is in the reducer
- Never open a coupling when the placing line is pressurized. Consult the manufacturer's operation manual for the method releasing pressure from the pipeline or hose. Extreme caution must be taken when this condition occurs
- Plugs usually occur in reducers, and sometimes in hoses as they have more friction than pipe. To remove a plug when reversing does not work, first relieve the line pressure, then disconnect the plugged system, elevate it and tap on the plugged area with a hammer. Break down the plug and shake it out the end of the hose or pipe. Do not re-hook the system until the plug is removed

Clean out: Immediately upon completion of placing operation, attention must be given to clean out. During some pours, hose and pipes can be cleaned out as they are being removed from the system. Do not leave your machine to help drag hose during the pour.

When the pour is complete, there are several ways to clean out the placing line depending on the pump you are operating.

- Clean out the hopper, dump the hopper, or pump the hopper down, and re-hook the hose to the pump with a sponge inside of the hose. Fill the hopper with water and pump the water through the hose until the sponge comes out. Never handle concrete with your bare hands, as it contains lime and can burn your skin
- Drain all hoses and place long hoses with one end uphill and fill lowest end with water
- After the hose is full of water, walk the hose in a rolling direction until empty, and then repeat using opposite end
- When cleaning inside the hopper, make sure the grate is in place and properly secured, or the engine is shut off, and the accumulator circuit is bled

When pumping and clean-out operations are completed, make sure your unit is safe and ready for travel back to your yard.

- Check to make sure that the safety chains are properly fastened and the tongue jack and outriggers are raised and locked in position
- Do a final walk around the truck and pump to be certain there are no loose objects that may fall off during travel

Pumps with placing booms: Make sure all warning labels and signs are visible and in good shape. When missing, replace immediately. Safety reminders are important.

Spreaders: Always communicate with your fellow workers.

- Wear the proper protective equipment. (Rubber boots, goggles, gloves)
- Plan the layout ahead of beginning operations
- Hold the pipe firmly. Pumping pressures can cause injury
- Keep moving. Do not let the concrete build up to overflow in one area
- Do not let the pipe whip
- Do not work during strong winds
- Have a spotter keep you appraised of where you are
- Only one tip hose may be safely hung from the tip of the placing boom
- The safety cable or strap between the boom pipeline and the end of the hose must be in place, attached, and in good working order
- All connections must be capable of handling the pressure of the pump being used

FOUNDATION WORK

Truck Placement

Effective immediately and until further notice, 29 CFR 1926.652 will not apply to house foundation/basement excavations when all the following conditions are present.

- The house foundation/basement excavation is less than seven and one-half feet in depth or is benched at least (2) feet horizontally for every five (5) feet or less of vertical height
- The minimum horizontal width (excavation face to formwork/wall) at the bottom of the excavation is as wide as practicable but not less than two (2) feet
- There is no water, surface tension cracks, nor other environmental conditions present that reduce the stability of the excavation
- There is no heavy equipment operating in the vicinity that causes vibration to the excavation while employees are in the excavation
- All soil, equipment, and material surcharge loads are no closer in distance to the top edge of the excavation than the excavation is deep
- However, when front end loaders are used to dig the excavations, the soil surcharge load must be placed as far back from the edge of the excavation as possible, but never closer than two (2) feet
- Work crews in the excavation are the minimum number needed to perform the work
- The work has been planned and is carried out in a manner to minimize the time employees are in the excavation

Concrete Trucks, Drivers, Spotters

Safety: Federal regulations require every driver to record a pre-trip and post-trip inspection report.

- All drivers need a commercial driver's license
- Stay alert to all traffic movements
- Look for workers, vehicles, or obstacles that may be in the trucks path
- Check for flat, low, or damaged tires. Repair or replace immediately
- Check for fluid leaks
- Keep chutes cleaned and stowed properly to avoid dropping concrete or stones while traveling
- The circle of safety is a perimeter check around the entire vehicle. Do this daily
- Maintain a current medical card
- Use the three point rule for getting on and off the vehicle
- Stay alert to pinch point hazards (e.g. rotating parts, chutes)
- Keep hands away from pivot points
- Do not let anyone stand or walk under the chutes or near the discharge end of the mixer

Backing up to pump operators: Drive slowly. Know the conditions of the brakes.

- Designate a spotter. Maintain visual contact all times
- Take direction from only one spotter. The spotter and truck driver must know hand signals. Make sure to agree on the signal used. Stop immediately if you do not understand. (See the signal charts at the end of this section)
- Use only one rear view mirror (the one on the spotter) while backing up
- Never get closer than 10 ft. to the pump unless there is a clear view of the spotter
- When the spotter is not visible, stop the truck immediately. Wait until the spotter can be seen
- Do not allow any worker to move, raise, lower, adjust, or unfold the discharge chute while backing up

Outside of the truck: Set the parking brake before leaving the cab.

- Make sure the transmission is in neutral
- Put on a hard hat and safety glasses or goggles before leaving the cab
- Never get between the pump and the truck
- When more than one truck is delivering to the hopper, keep communicating to all workers to stay out

Delivering the Concrete: Learn where all E-stop switches are.

- Put the concrete into the pump hopper only when directed to do so by the pump operator
- When there is foreign matter coming from the truck into the hopper, signal the operator to stop the pump or hit the emergency stop switch (E-stop)
- Never reach into the hopper, while it is running, to retrieve objects
- Remember; even when the pump is stopped, the pump is remote controlled and can start up at any time
- Stay in direct communication with the pump operator at all times

- Some pumps are equipped with horns. Learn how to use them
- Stand away from a hopper that has to have trapped air removed from the delivery system. Wait for the go ahead from the pump operator
- The release of trapped air can cause hose whipping and spewing hazards
- Never stand on the hopper grate
- Never lift or move the hopper grate
- Avoid walking under any boom or outrigger
- Do not overfill the hopper. Excess concrete causes tripping hazards

Clean up: Do not wash out the truck into the pump hopper.

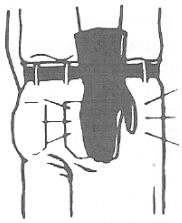
- Do not allow the level of material in the hopper to become so low that air is sucked into the material cylinders
- If concrete is being pumped back into the truck, stay away from the hopper or stay in the cab.
- Let the pump operator handle the end hose
- Do not drive under the boom when pulling away. Have the operator move the boom or take a different path off the job
- Make sure all workers are a safe distance before pulling away

Electrocution: When a boom becomes energized by touching an electrical wire, the electricity passing through the concrete going into the hopper will energize the truck. A worker touching the truck can be electrocuted.

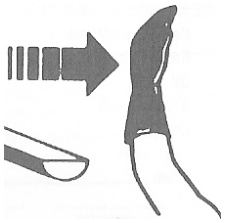
- Monitor boom movements
- Alert operator when boom moves closer than 17 ft. to any electrical wire
- Never stand on a concrete pipeline when it is in use. Never touch the pipe, clamps, or hoses
- Move away from pipelines that are being worked on. When pressure is still in the line and the line is opened, concrete will be spewed at a high velocity
- Use the 3 point rule for getting on and off the truck. The three point rule is one foot and two hands or vice versa
- Never carry loads or objects that could cause you to lose your balance and fall
- Keep a safe distance when monitoring the hopper
- Never look into the end of a connected pipe or hose

The spotter and driver must know the following hand signals:

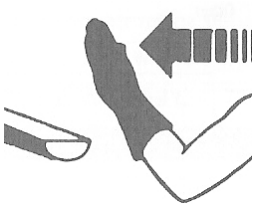
DRIVE IN



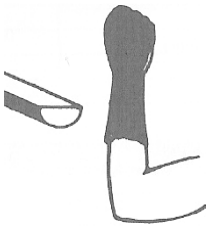
BACK IN



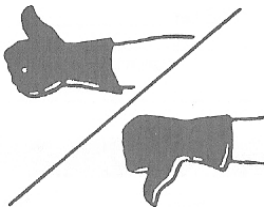
BACK UP



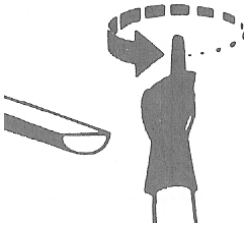
PULL FORWARD



STOP



RAISE CHUTE/LOWER CHUTE



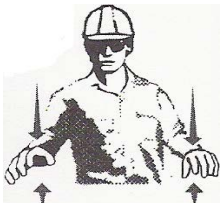
START POURING

MORE WATER

STOP POURING

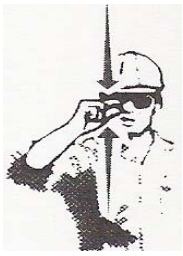
Signals: The spotter and truck driver must know hand signals. Make sure to agree on the signal used. Stop immediately if you do not understand. Only one spotter gives signals.

START PUMP
(SPEED UP)



SLOW PUMP

STOP PUMP



LITTLE BIT

ADD WATER
(FOUR GALLONS)

ALL DONE
(CLEAN UP)

BOOM UP

BOOM LEFT

BOOM RIGHT

OPEN

CLOSE

STOP BOOM

BOOM DOWN

RELIEVE (TWO TAPS)

REBAR AND WORKING AT HEIGHTS

Handling Rebar

- Cut rebar will always have sharp chisel ends that can cause lacerations and puncture wounds. Rebar often has scale, rust or burs that can cause abrasions or lacerations. Wear proper personal protective equipment such as heavy leather gloves when working with rebar
- When manually bending rebar, make sure you have a firm footing and a firm grip on the bar. Do not place your entire weight on the bar being bent, to prevent falling, if the bar should slip or break
- Use mechanical hoists or lifts to handle heavy bundles of rebar
- When carrying full lengths of rebar, lift the load forward of center, letting the trailing end drag, if necessary, to prevent the front end from whipping and possibly catching on the ground, coworkers, or other objects

Fall-Protection for Rebar and Concrete Formwork

Workers on the face of formwork or reinforcing steel are required to use fall protection if they are six feet or more above a lower level. Workers and employers can choose from among the following types of fall protection: personal fall-arrest systems, safety nets, or positioning-device systems.

Personal fall-arrest systems: Personal fall-arrest systems are designed to stop a worker from free falling to a lower level. A personal fall arrest system consists of an anchorage, connectors and a full body harness.

- Other system components may include a lanyard, a lifeline and a deceleration device. These components must be used only for fall protection and not for any other purpose
- If the system, or any system component, is subjected to a fall, it must be immediately removed from service and cannot be used again until a competent person determines it is undamaged

Competent person: A competent person is capable of identifying existing and predictable hazards in the work environment and who has authorization to take prompt measures to eliminate the hazards.

- Use a personal fall-arrest system as fall protection when you are constructing standard forms or doing dismantling work, exterior building work, or erecting precast concrete members

Safety-net systems: Safety-net systems consist of mesh nets, panels, connectors and other impact-absorbing components. Use safety nets as fall protection for doing standard formwork, slipform work, and erecting precast concrete members. Rebar and

Positioning-device systems: Positioning-device systems are the most appropriate type of personal fall-protection for working on and placing rebar. A positioning-device system enables one person to work on a vertical surface with both hands free and it limits free-fall distance to two feet or less.

- The difference between a positioning device system and a personal fall-arrest system is that a positioning-device system supports a worker on an elevated surface and limits a fall to two feet

- A personal fall arrest system, on the other hand, prevents a worker from free falling more than six feet

The major components of a positioning-device system are:

- Body support: a body belt or full body harness
- Connectors and connecting assemblies: a chain/ web rebar assembly or rope/web lanyard, snaphooks, and D-rings
- Anchorage connector: a carabiner or snaphook
- Anchorage: a rebar or other support structure

Positioning-device systems must meet the following requirements:

Body support: A body belt must limit the maximum arrest force on a worker to 900 pounds and cannot be used for any purpose other than personal fall protection. A body harness must limit the maximum arrest force to 1,800 pounds and must be used only for fall protection.

- Make sure the body belt or harness has side D-rings, or a single front D-ring for positioning. (Rear D-rings are for fall arrest only)
- Use a body belt or full body harness that is properly fitted; belts and harnesses come in different sizes. Body belts must not ride up and compress the rib cage

Connectors and connecting assemblies: Connecting assemblies must have a minimum tensile strength of 5,000 pounds. Snaphooks and D-rings must be proof-tested to a minimum tensile load of 3,600 pounds without cracking, deforming, or breaking.

- They must be made of dropforged steel or equivalent materials, the finish must be corrosion-resistant, and the surfaces smooth. The dimensions of snaphooks must be compatible with the members to which they are connected or the snaphooks must be of the double-locking type to prevent roll out

Anchorage: Positioning-device systems must be secured to an anchorage that can support at least twice the potential impact load of a worker's fall or 3,000 pounds, whichever is greater.

- Be sure to inspect positioning device systems for wear, damage or deterioration before using them. Remove defective components from service

Climbing rebar: Workers may free-climb concrete forms and rebar to reach work areas. The maximum free-climbing height is 24 feet. The horizontal bars must be spaced not less than six inches, or more than 16 inches on center.

- When rebar spacing is more than 16 inches on center, use a ladder or lift to reach work areas. Upon reaching a work area, you must use a personal fall-arrest system, safety net, or positioning-device system for fall protection
- Check the rebar's rigidity before climbing it. If it's not rigid, brace it to meet the required 3,000-pound anchor load requirement
- Avoid climbing overhanging rebar or forms. This type of climbing increases your risk of falling and overexerting your muscles and joints
- If you have to work on overhanging objects, use a powered elevated lift or ladder

Capping rebar: Whenever you work above rebar that protrudes from the floor, cover the rebar with protective caps that will prevent you from being impaled if you fall. Cap rebar protruding horizontally to prevent scrapes, cuts, or eye injuries.

Standard formwork: When you work on standard forms more than six feet above a lower level, you must use appropriate fall protection (personal fall-arrest, safety net, or positioning- device systems) or work from a platform such as a carpenter bracket scaffold. Railings on work platforms must be 42 inches high. Include midrails and toeboards if people are working below.

- When you climb standard forms with walers or crossties to gain access to a work area, make sure the climbing members are no more than 16 inches apart. Use a ladder or lift to reach the work area if the climbing members are spaced more than 16 inches apart. Ladder rungs must offer reliable footing. Tie off an unstable ladder so that it is anchored at the access to the work area and at the ladder's base

Note: Walers have depths ranging from 1 1/2 inches to 3 1/2 inches. The smaller walers do not offer much toehold. Use caution when you climb walers with narrow depths.

- If you are doing dismantling or erecting work outside protective guardrails, you must use a personal fall-arrest system
- When rebar protrudes from wall forms that you are dismantling, you may tie off to the exposed rebar if it's strong enough and if you can't slide off the end. A number three, grade 60, bar (0.375-inches diameter) has ultimate shear strength of about 6,000 pounds. A number-four grade 60 bar (0.500 in diameter) has a shear strength of 8,000 pounds
- Do not walk, sit, or stand on top of wall forms

Slipforms: Workers using slipforms are usually protected from falls by safety-net systems or catch platforms attached to the forms by carpenter brackets. Special hooks that anchor directly to slipforms are available, too. Follow the manufacturer's recommendations and instructions if you use these hooks.

CAST IN PLACE CONCRETE

Requirements for Formwork

- Formwork must be designed, fabricated, erected, supported, braced, and maintained so that it will be capable of supporting without failure all vertical and lateral loads that may reasonably be anticipated to be applied to the formwork
- Formwork that is designed, fabricated, erected, supported, braced, and maintained will be deemed to meet all requirements
- Any form, regardless of size, must be planned, designed, and constructed with an adequate factor of safety
- In addition to computable loading, additional form pressures may result from impact during concrete placement, sudden lowering of temperatures retarding the set and increasing the liquid head or static pressure, vibrations of the form or concrete, uneven stressing resulting from failure or weakening of form members, or impact from concrete buckets or placing equipment

- As a result, an adequate factor of safety is required to offset these unpredictable conditions
- The thoroughness of planning and design shall be governed by the size, complexity, and intended use of the form
- Formwork which is complex in nature or which will be subjected to unusually high concrete pressures must be designed or approved for use by an engineer or experienced form designer
- Drawings or plans, including all revisions, for the jack layout, formwork (including shoring equipment), working decks, and scaffolds, shall be available at the jobsite

Shoring and reshoring: All shoring equipment must be inspected prior to erection to determine that it is as specified in the shoring layout.

- A shoring layout must be prepared or approved by a person qualified to analyze the loadings and stresses that are induced during the construction process
- A copy of the shoring layout is required to be available at the jobsite
- The shoring layout shall include all details of the specification, including unusual conditions such as heavy beams, sloping areas, ramps, and cantilevered slabs, as well as plan and elevation views
- Shoring equipment found to be damaged such that its strength is reduced to less than that required must not be used for shoring
- Erected shoring equipment shall be inspected immediately prior to, during, and immediately after concrete placement
- Upon inspection, shoring equipment that is found to be damaged or weakened must be immediately removed and replaced
- The sills for shoring shall be sound, rigid, and capable of carrying the maximum intended load without settlement or displacement
- All base plates, shore heads, extension devices, and adjustment screws must be in firm contact, and secured when necessary, with the foundation and the form
- Eccentric loads on shore heads and similar members are prohibited unless these members have been designed for such loading
- The minimum total design load for any shoring used in slab and beam structures must be at least one hundred pounds per square foot for the combined live and dead load regardless of slab thickness; however, the minimum allowance for live load and formwork must be not less than twenty pounds per square foot in addition to the weight of the concrete
- Additional allowance for live load will be added for special conditions other than when placing concrete for standard-type slabs and beams
- Shoring must also be designed to resist all foreseeable lateral loads such as wind, cable tensions, inclined supports, impact of placement, and starting and stopping of equipment
- The assumed value of load due to wind, impact of concrete, and equipment acting in any direction at each floor line shall not be less than one hundred pounds per lineal foot of floor edge or two percent of total dead load of the floor, whichever is greater
- When motorized carts are used, the design load is required to be increased twenty-five pounds per square foot
- The design stresses for form lumber and timbers shall be within the tolerance of the grade, condition, and species of lumber used

- The design stresses used for form lumber and timber must be shown on all drawings, specifications, and shoring layouts
- All load-carrying timber members of scaffold framing shall be a minimum of 1500 f (stress grade) construction grade lumber. All dimensions are nominal sizes except where rough sizes are noted, only rough or undressed lumber of the size specified will satisfy minimum requirements
- When shoring from soil, an engineer or other qualified person must determine that the soil is adequate to support the loads that are to be placed on it
- Precautions must be taken so that weather conditions do not change the load-carrying conditions of the soil below the design minimum
- When shoring from fill, or when excessive earth disturbance has occurred, an engineer or other qualified person must supervise the compaction and reworking of the disturbed area and determine that it is capable of carrying the loads that are to be imposed upon it
- Suitable sills are required to be used on a pan or grid dome floor or any other floor system involving voids where vertical shoring equipment could concentrate an excessive load on a thin concrete section
- When temporary storage of reinforcing rods, material, or equipment on top of formwork becomes necessary, these areas must be sufficient to meet the loads
- If any deviation in the shoring plan is necessary because of field conditions, the person who prepared the shoring layout must be consulted for approval of the actual field setup before concrete is placed
- The shoring setup must be checked to ensure that all details of the layout have been met
- The completed shoring setup must be a homogenous unit or units and is required to have the specified bracing to give it lateral stability
- The shoring setup must be checked to make certain that bracing specified in the shoring layout for lateral stability is in place
- All vertical shoring equipment must be plumb. Maximum allowable deviation from the vertical is one eighth inch in three feet. If this tolerance is exceeded, the shoring equipment must not be used until readjusted within this limit
- Upon inspection, shoring equipment that is found to be damaged or weakened must be immediately removed and replaced
- Shoring equipment must not be released or removed until the approval of a qualified engineer has been received
- Removal of shoring equipment must be planned so that the equipment that is still in place is not overloaded
- Slabs or beams, which are to be reshored, should be allowed to take their actual permanent deflection before final adjustment of reshoring equipment is made
- While the reshoring is underway, no construction loads are to be permitted on the partially-cured concrete
- The allowable load on the supporting slab must not be exceeded when reshoring
- The reshoring must be thoroughly checked to determine that it is properly placed and that it has the load capacity to support the areas that are being reshored

Tubular Welded Frame Shoring

- Metal tubular frames used for shoring must have allowable loads based on tests conducted according to the Recommended Procedure for Compression Testing of Scaffolds and Shores, of the Scaffolding and Shoring Institute
- Design of shoring layouts must be based on allowable loads that were obtained using test procedures and on at least a two and one-half to one safety factor
- All metal frame shoring equipment will be inspected before erection
- Metal frame shoring equipment and accessories must not be used if heavily rusted, bent, dented, re-welded, or having broken weldments or other defects
- All locking devices on frames and braces must be in good working order, coupling pins must align the frame or panel legs, pivoted cross braces must have their center pivot in place, and all components are required to be in a condition similar to that of original manufacture
- When checking the erected shoring frames with the shoring layout, the spacing between towers and crossbrace spacing must not exceed that shown on the layout and all locking devices are required to be in the closed position
- Devices for attaching the external lateral stability bracing must be securely fastened to the legs of the shoring frames
- All base plates, shore heads, extension devices, or adjustment screws are required to be in firm contact with the footing sill and the form material, and shall be snug against the legs of the frames
- Eccentric loads on shore heads and similar members must be prohibited unless the shore heads have been designed for such loading
- When formwork is installed at an angle, or sloping, or when the surface shored from is sloping, the shoring must be designed for such loading
- Adjustment screws will not be adjusted to raise formwork after the concrete is in place

Tube and Coupler Shoring

- Tube and coupler towers used for shoring must have allowable loads based on tests conducted according to the Recommended Procedure for Compression Testing of Scaffolds and Shores, of the Scaffolding and Shoring Institute
- Design of shoring layouts must be based on working loads that were obtained using the test procedures on at least a two and one-half to one safety factor
- All tube and coupler components must be inspected before being used
- Tubes of shoring structures that are heavily rusted, bent, dented, or having other defects will not be used
- Couplers (clamps) must not be used if deformed, broken, or having defective or missing threads on bolts, or other defects
- The material used for the couplers (clamps) must be of a structural type such as dropforged steel, malleable iron, or structural grade aluminum. Gray cast iron cannot be used
- When checking the erected shoring towers with the shoring layout, the spacing between posts must not exceed that shown on the layout, and all interlocking of tubular members and tightness of couplers should be checked

- All base plates, shore heads, extension devices, or adjustment screws must be in firm contact with the footing sill and the form material, and shall be snug against the posts
- Eccentric loads on shore heads and similar members must be prohibited unless the shore heads have been designed for such loading
- Special precautions must be taken when formwork is at angles, or sloping, or when the surface shored from is sloping
- Adjustment screws must not be adjusted to raise formwork after the concrete is in place

Single Post Shores

- When checking erected single post shores with the shoring layout, the spacing between shores in either direction must not exceed that shown on the layout, and all clamps, screws, pins, and all other components must be in the closed or engaged position
- For stability, single post shores must be horizontally braced in both the longitudinal and transverse directions. Diagonal bracing must also be installed. Such bracing will be installed as the shores are being erected
- Devices that attach to the external lateral stability bracing must be securely fastened to the single post shores
- All base plates or shore heads of single post shores must be in firm contact with the footing sill and the form material
- Whenever single post shores are used in more than one tier, the layout must be designed and inspected by a structural engineer
- Eccentric loads on shore heads is prohibited unless the shore heads have been designed for such loading
- When formwork is at an angle, or sloping, or when the surface shored from is sloping, the shoring must be designed for such loading

Adjustment of single post shores to raise formwork must not be made after concrete is in place.

Fabricated Single Post Shores

- The clamp used for adjustable timber single post shores must have working load ratings based on tests conducted according to the standard test procedures for fabricated single post shores in the Recommended Procedure for Compression Testing of Scaffolds and Shores, Scaffolding and Shoring Institute, and on at least a three to one safety factor
- Shoring layouts are required to be made using working loads which were obtained using test procedures and on at least a three to one safety factor
- All fabricated single post shores must be inspected before being used
- Fabricated single post shores cannot be used if heavily rusted, bent, dented, rewelded or having broken weldments or other defects. If they contain timber, they must not be used if timber is split, cut, has sections removed, is rotted, or otherwise structurally damaged
- All clamps, screws, pins, threads, and all other components are required to be in a condition similar to that of original manufacture

Adjustable Timber Single Post Shores

- The clamp used for adjustable timber single post shores must have working load ratings based on tests conducted according to the standard test procedures for fabricated single post shores in Recommended Procedure for Compression Testing of Scaffolds and Shores, Scaffolding and Shoring Institute, and on at least a three to one safety factor
- Timber used must have the safety factor and allowable working load for each grade and species as recommended in the Tables for wooden columns in the Wood Structural Design Data Book, National Forest Products Association
- The shoring layout must be made using the allowable load obtained by using the test procedure for the clamp or Tables for timber
- All timber and adjusting devices to be used for adjustable timber single post shores must be inspected before erection
- Timber must not be used if it is split, cut, has sections removed, is rotted, or otherwise structurally damaged
- Adjusting devices may not be used if heavily rusted, bent, dented, rewelded, or having broken weldments or other defects
- All nails used to secure bracing on adjustable timber single post shores must be driven home and the point of the nail bent over

Timber Single Post Shores:

- Timber used as single post shores must have the safety factor and allowable working load for each grade and species as recommended in the Tables for wooden columns in the Wood Structural Design Data Book, National Forest Products Association
- The shoring layout must be prepared using working loads obtained from the tables referred to above
- All timber to be used for single post shoring must be inspected before erection
- Timber must not be used if it is split, cut, has sections removed, is rotted, or is otherwise structurally damaged
- All nails used to secure bracing on timber single post shores must be driven home and the point of the nail bent over

Tiered Single Post Shores

Whenever single post shores are used one on top of another (tiered), the employer must comply with the following specific requirements in addition to the general requirements for formwork:

- The design of the shoring must be prepared by a qualified designer and the erected shoring will be inspected by an engineer qualified in structural design
- The single post shores are required to be vertically aligned
- The single post shores must be spliced to prevent misalignment
- The single post shores will be adequately braced in two mutually perpendicular directions at the splice level. Each tier must also be diagonally braced in the same two directions

- Adjustment of single post shores to raise formwork must not be made after the placement of concrete
- Reshoring must be erected, as the original forms and shores are removed, whenever the concrete is required to support loads in excess of its capacity

Vertical Slip Forms

- Slip forms will be designed, constructed, and the form movement carried out, under the immediate supervision of a person or persons experienced in slip form design and operation. Drawings prepared by a qualified engineer, showing the jack layout, formwork, working decks, and scaffolding, must be available at the jobsite, and followed
- The steel rods or pipe on which the jacks climb, or by which the forms are lifted, must be designed for this purpose. Such rods must be adequately braced where not encased in concrete
- Forms must be designed to prevent excessive distortion of the structure during the jacking operation
- All vertical slip forms must be provided with scaffolding or work platforms completely encircling the area of placement
- Jacks and vertical supports must be positioned in such a manner that the loads do not exceed the rated capacity of the jacks
- The jacks or other lifting devices are required to be provided with mechanical dogs or other automatic holding devices to support the slip forms whenever failure of the power supply or lifting mechanism occurs
- The form structure must be maintained within all design tolerances specified for plumbness during the jacking operation
- Lifting must proceed steadily and uniformly and must not exceed the predetermined safe rate of lift. A jacking system, which provides precise, simultaneous movement of the entire form in small preselected increments, is recommended for large structures
- Workers placing reinforcing steel must comply with the requirements when working above the scaffold level
- The total allowable load on slip form platforms is required to be determined by the design engineer and enforced by the field supervisor
- Lateral and diagonal bracing of the forms must be provided to prevent excessive distortion of the structure during the sliding operation
- While the slide is in operation, the form structure must be maintained in line and plumb
- A field supervisor experienced in slip form construction is required to be present on the deck at all times

Placing and removal of forms: When moved or raised by crane, cableway, A-frame or similar mechanical device, forms must be securely attached to slings having a minimum safety factor of five. Use of No. 9 tie wire, fiber rope and similar makeshift lashing is prohibited

- Taglines must be used when moving panels or other large sections of forms by crane or hoist
- All hoisting equipment, including hoisting cable used to raise and move forms must have a minimum safety factor incorporated in the manufacturer's design, and the manufacturer's recommended loading cannot be exceeded

- Field-fabricated or shop-fabricated hoisting equipment must be designed or approved by a registered professional engineer, incorporating a minimum safety factor of five in its design. panels and built-up form sections shall be equipped with metal hoisting brackets for attachment of slings
- Forms intended for use where there is a free fall of over ten feet must be equipped with adequate scaffolding and guardrails, or employees working on the forms will be protected from falls during forming and stripping operations
- Vertical forms being raised or removed in sections, must not be released until adequately braced or secured. Overhead forms may not be released until adequately braced or secured
- Workers or others at lower levels must be protected from falling materials. Appropriate warning signs must be erected along walkways
- Forms must not be removed until the concrete is cured. The concrete is required to be adequately set in order to permit safe removal of the forms, shoring, and bracing
- Engineer's specifications and local building codes will be adhered to in determining the length of time forms should remain in place following concrete placement. In addition, tests will be made on field-cured concrete specimens in order to insure that concrete has obtained sufficient strength to safely support the load prior to removal of forms

PRECAST CONCRETE AND TILT-UP OPERATIONS

- It must be the responsibility of the contractor to use compatible accessories
- The design capacity of all lifting devices and accessories must be known and only devices and accessories with the appropriate capacity will be used
- Prior to pouring the panels of a tilt-up type construction job, a set of plans or job specifications, including lifting procedures, must be drawn up
- These plans are required to be at the job site and made available upon request
- Any changes made in the rigging procedure of a tilt-up panel or slab must provide the same degree of safety as required by the original plans

The plans or specifications must contain the following information:

- The type, size, and location of all lifting inserts
- The type, size, and location of all brace inserts or fittings for guy wires in each panel and floor or support
- The size of braces or guys to be used
- The compression strength that concrete panels must attain prior to being lifted

The following conditions must be included in the erection process and will be incorporated in the design plan:

- Braces and all associated components of the bracing system must be designed to incorporate a safety factor of one and one-half to resist any normal stresses to which they may be subjected, including normal high wind velocity pressures for the area
- Precast concrete wall units, structural framing, and tilt-up wall panels will be adequately supported to prevent overturning and to prevent collapse until permanent connections are completed

- Floor braces used to secure panel sections must be placed at an angle of not less than forty-five degrees or more than sixty degrees from horizontal when physically possible to install in this manner
- The bracing on all panel sections will be installed prevent the panel from accidentally rotating
- Each panel section not secured by other means must have a minimum of two braces. The braces must be installed in such a manner as to evenly distribute the load or guy wires, when properly installed, may be used in lieu of stiff leg braces
- If braces are attached to a panel or slab by bolts tightened into inserts installed in holes drilled in concrete, the type of inserts used and method of installation must be such as to develop the required strength to be maintained for the bracing system
- Inserts to be installed for lifting sections of tilt-up precast panels will be designed mechanically to maintain a safety factor of three
- Lifting inserts which are embedded or otherwise attached to precast concrete members, other than the tilt-up members, must be capable of supporting at least four times the maximum intended load applied or transmitted to them
- The compression strength of the concrete shall be such that when the proper type, size, and amount of inserts are installed a minimum safety factor of two will be maintained
- Lifting hardware must be capable of supporting at least five times the maximum intended load applied or transmitted to the lifting hardware
- Lifting bolts or other lifting devices that have been bent, worn, or are defective are required to be discarded
- The upper and lower sections of telescoping type braces must be secured by high tensile steel pins or bolts which provide adequate shear strength and which will positively secure against accidental removal
- Manufactured products must not be altered in any manner that would reduce the safe working load to less than its original value
- Inserts shall be positioned so that bolts, or lifting devices, when inserted, will be perpendicular to the face on which they are placed

Design of the panels and layout of the pour must be made in such a manner so that when picking, the top of the panel will be away from the crane.

If this is not possible, the contractor must consult with a representative of the department and the crane company involved, determining the procedure to be followed in lifting and placing it in its permanent position, safely.

- Panels must be lifted and handled so that they will not strike the hoisting equipment, in case of failure
- Physical stops will be provided which will prevent the bottom edge of a panel being set from slipping off the edge of its supporting structure
- Tilt-up panels must not be set when there is a possibility that wind velocity would create a hazardous condition

- A qualified signalperson must be designated, and must consult with the crane operator on lifting procedures, prior to making the pick. The signalperson shall be located in such a position during the pick of the panel that they can observe both the crane operator and the employees working in the immediate area
- During the lifting process, workers must keep clear of the underside of the panel
- Persons not involved in the lifting process must be kept clear of the hazardous area near where panels are being raised, moved, or placed
- If braces must be removed temporarily during construction, other effective means will be provided to safely support the panel during the interim period
- Each panel is required to be properly braced or otherwise secured prior to removal of the hoisting equipment
- Short panels or sections not otherwise supported by floor, footings, columns or other structure, will be properly shored

When doing tilt-up work:

- Make sure wall anchors are cast in the wall when it is formed on the ground
- Attach braces to the wall before the lift
- Install appropriately sized bolts and shackles to do the lift
- After the wall is tilted into place, secure the braces at an appropriate angle before the lifting cables are released
- Stand clear of the wall and out of its drop zone until it is securely braced
- Use appropriate fall-protection equipment to walk or straddle upper wall areas
- Use ladders to gain access to the upper wall area

Precast concrete: When you erect precast concrete members such as wall panels and columns, or do related work such as grouting precast members and you are six feet or more above a lower level: you must be protected from falling by one of the following methods:

- Guardrail systems
- Safety-net systems
- Personal fall-arrest systems
- A written fall protection plan and a controlled-access zone

A fall protection plan allows workers doing precast concrete erection work to use alternative fall-protection systems or methods when conventional systems are infeasible.

However, the employer must be able to show that conventional systems aren't practical or that they pose a greater safety hazard to workers than other alternatives.

Employers must make sure these plans meet other requirements as well.

A controlled-access zone is created by erecting a control line, or lines, to restrict access to a work area. The control line warns others that access to the zone is limited to authorized workers. You must have a safety monitor to warn workers of fall hazards within the controlled- access zone.

Exterior building work: If you work on an unguarded surface or an exterior wall six or more feet above a lower level, you must use ladders, lifts or appropriate fall protection (such as a personal fall-arrest system, safety-net system or positioning-device system).

Ladders: Falls from ladders occur frequently among workers doing rebar and exterior building work. Most ladder falls involve portable ladders that move, tilt or shift while a worker is climbing or descending.

Keep in mind the following points when using a ladder:

- If the ladder is not stable, tie it off (at the top and bottom) before climbing it
- Stay within the side rails when climbing or working from a ladder. You can reach out from a ladder, but your torso must remain within the side rails
- Face the ladder when climbing or descending it. Don't try to carry objects that could cause you to lose your balance. Keep hands free to grasp the ladder

Protective equipment: When working with concrete, wear protective clothing and equipment appropriate for the task. Important items are gloves, safety glasses, leatherwork shoes and a hard hat.

Employers must be aware of workplace fall hazards and take appropriate action to eliminate or minimize those hazards. They should select appropriate fall protection for a particular area or operation and train workers to use it correctly.

LIFT-SLAB OPERATIONS

- Lift-slab operations must be designed and planned by a registered professional engineer who has experience in lift-slab construction
- Such plans and designs must be implemented by the employer and shall include detailed instructions and sketches indicating the prescribed method of erection
- These plans and designs must also include provisions for ensuring lateral stability of the building/structure during construction
- Jacks/lifting units must be marked to indicate their rated capacity as established by the manufacturer
- Jacks/lifting units must not be loaded beyond their rated capacity as established by the manufacturer
- Jacking equipment must be capable of supporting at least two and one-half times the load being lifted during jacking operations and the equipment shall not be overloaded. For the purpose of this provision, jacking equipment includes any load bearing component which is used to carry out the lifting operation(s)

Such equipment includes, but is not limited to, the following: Threaded rods, lifting attachments, lifting nuts, hook-up collars, T-caps, shear heads, columns and footings.

- Jacks/lifting units must be designed and installed so that they will neither lift nor continue to lift when they are loaded in excess of their rated capacity
- Jacks/lifting units will have a safety device installed which will cause the jacks/lifting units to support the load in any position in the event any jack/lifting unit malfunctions or losses [loses] its lifting ability
- Jacking operations will be synchronized to ensure even and uniform lifting of the slab. During lifting, all points at which the slab is supported will be kept within 1/2 inch of that needed to maintain the slab in a level position

- If leveling is automatically controlled, a device will be installed that will stop the operation when the ½ inch tolerance is exceeded, or where there is a malfunction in the jacking (lifting) system
- If leveling is maintained by manual controls, the controls must be located in a central location and attended by a competent person while lifting is in progress. The competent person must be experienced in the lifting operation and with the lifting equipment being used
- The maximum number of manually controlled jacks/lifting units on one slab shall be limited to a number that will permit the operator to maintain the slab level within specified tolerances, but in no case shall that number exceed 14
- No employee, except those essential to the jacking operation, is permitted in the building/structure while any jacking operation is taking place unless the building/structure has been reinforced sufficiently to ensure its integrity during erection
- The phrase “reinforced sufficiently to ensure its integrity” means that a registered professional engineer, independent of the engineer who designed and planned the lifting operation, has determined from the plans that if there is a loss of support at any jack location, that loss will be confined to that location and the structure as a whole will remain stable

Under no circumstances, will any employee who is not essential to the jacking operation be permitted immediately beneath a slab while it is being lifted.

Jacking operations begin when a slab or group of slabs is lifted and ends when they are secured (with either temporary connections or permanent connections).

- When making temporary connections to support slabs, wedges must be secured by tack welding, or an equivalent method of securing the wedges to prevent them from falling out of position. Lifting rods may not be released until the wedges at that column have been secured
- All welding on temporary and permanent connections must be performed by a certified welder, familiar with the welding requirements specified in the plans and specifications for the lift-slab operation
- Load transfer from jack/lifting units to building columns must not be executed unit the welds on the column shear plates (weld blocks) are cooled to air temperature
- Jacks/lifting units shall be positively secured to building columns so that they do not become dislodged or dislocated
- Equipment must be designed and installed so that the lifting rods cannot slip out of position, or the Company will institute other measures to provide positive connection between the lifting rods and attachments and will prevent components from disengaging during lifting operations

Non-mandatory lift-slab operations: Operations may require the removal of employees from the building/structure during jacking operations unless an independent registered professional engineer, other than the engineer who designed and planned the lifting operation, has determined that the building/structure has been sufficiently reinforced to insure its integrity.

One method to comply with this provision is to ensure that continuous bottom steel is provided in every slab and in both directions through every wall or column head area.

Column head area means the distance between lines that are one and one half times the thickness of the slab or drop panel. These lines are located outside opposite faces of the outer edges of the shearhead sections.

The amount of bottom steel must be established by assuming loss of support at a given lifting jack and then determining the steel necessary to carry, by catenary action over the span between surrounding supports, the slab service dead load, plus any service dead and live loads likely to be acting on the slab during jacking.

The surrounding supports must be capable of resisting any additional load transferred to them because of the loss of support at the lifting jack.

PRE-STRESSED AND POST-STRESSED CONCRETE OPERATIONS

Anchor fitting: In utilizing anchor fittings for tensioned strands, the recommendations and instructions of the supplier concerning installation, maintenance and replacement will be followed. Tools and strand vices must be kept clean and in good repair.

Safety Factor

- Expendable strand deflection devices used to pretension concrete members must have a minimum safety factor of two
- Reusable strand deflection devices shall have a minimum safety factor of three

Jacking Operations

- During jacking operations of any tensioning element or group of tensioning elements, the anchors must be kept turned up close to the anchor plate
- No one is permitted to stand in line or directly over the jacking equipment during tensioning operations
- Employees shall not stand behind the jack during tensioning operations
- Deadheads used in post tensioning of tendons must be the type that will increase the grip on the cable as the tension is increased
- Proper means and equipment will be used to prevent over-tensioning of the tendons
- Only qualified workers are required to perform this type work

Jacking and pulling equipment: Pulling headers, bolts and hydraulic rams will be inspected frequently for indication of fatigue, and the threads on bolts and nuts inspected for diminishing cross section.

Storage: Stressed members must be stored on a level base and adequately supported during storage and transportation to prevent tipping.

Rigging

- Stressed members must be handled at pick points specifically designated on the manufacturer's drawings
- Stressed members will be lifted with lifting devices recommended by the manufacturer or the engineer in charge
- No one is allowed under stressed members during lifting and erection

- No employee (except those essential to the post-tensioning operations) is permitted to be behind the jack during tensioning operations
- Signs and barriers will be erected to limit employee access to the post- tensioning area during tensioning operations

CONCRETE FINISHING

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding or high pressure water blasting. Groundwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals and fines.

Proper procedures will be and implemented to minimize the impact that concrete-finishing methods may have on groundwater.

- Scaffolds for use of cement finishers must comply with all scaffolding requirements
- Where grinders, chippers, and other equipment is used which creates a thrust force while working on scaffolding, such scaffold must be securely tied to a structure or held in with weighted drop lines
- Grinding and dressing operations carried on within closed rooms, stairwells, elevator shafts, etc., must be provided with forced air ventilation
- Grinding machine operators are required to wear respirators whenever machines are in operation or where a dust hazard exists
- Workers engaged in grinding, chipping, or sacking concrete must wear eye protection

Implementation

These procedures apply to all construction locations where concrete finishing operations are performed.

- Collect and properly dispose of water from high-pressure water blasting operations
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal
- Protect inlets during sandblasting operations
- Concrete Waste Management for disposal of concrete based debris
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface
- When blast residue contains a potentially hazardous waste

Inspection and Maintenance

- Sweep or vacuum up debris from sandblasting at the end of each shift
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area

MASONRY CONSTRUCTION

Whenever a masonry wall is being constructed, a limited access zone must be established and meet the following requirements. The limited access zone must:

- Be established prior to the start of construction of the wall
- Be equal to the height of the wall to be constructed plus four feet, and will run the entire length of the wall
- Be established on the side of the wall that will be unscaffolded
- Restricted to entry by employees actively engaged in constructing the wall. No other employees will be permitted to enter the zone
- Remain in place until the wall is adequately supported to prevent overturning and to prevent collapse unless the height of wall is over eight feet, in which case, the limited access zone shall remain in place until the requirements have been met

All masonry walls over eight feet in height must be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing must remain in place until permanent supporting elements of the structure are in place.

The following practices will be followed when constructing stonewalls:

- Employees engaged in cutting or chipping will wear suitable eye protection
- Masonry saws will be constructed, guarded, and operated properly
- Persons charged with operation of derricks used for stone setting must be qualified in that type of work
- Stone will be set directly on the wall by the derrick
- Breast derricks when used in setting stone will be secured against a slip or kick back and guyed with wire cables. Provide hold down line to prevent derrick from falling back
- Stone cutters will wear goggles while trimming stone or cutting holes
- Pins will be tested for security before stone is hoisted
- Hoisting cables must be protected from chafing and wearing over corners
- Mason's mortar mixers must have a bar-type grill installed over the mixer opening. The guard will be installed with an automatic disconnect switch to stop the mixer tub rotation and prevent the mixer from starting if the guard is not in place

Hand tools: Sharp-edged trowels, hammers, chisels, utility knives

- Maintain all hand tools and equipment in a safe condition, check them regularly for defects, and follow these safe practices
- Use double insulated tools, or ensure that the tools are grounded
- Keep cutting tools sharp
- Make sure guards are in place before using power saws
- Keep hand tools in a tool belt or toolbox. When hand tools are worn, replace them
- Do not use impact tools with mushroomed heads. Replace them
- Keep wooden handles free of splinters or cracks and be sure the handles stay tight in the tool
- Workers using powder-activated tools must receive proper training prior to using the tools

- Never leave cartridges for pneumatic or powder-actuated tools unattended
- Always be sure that hose connections are secure when using pneumatic tools
- Keep equipment in a safe place, according to the manufacturer's instructions
- Require proper eye and hand protection for workers

CUTTING AND DRILLING

All operators of concrete cutting and drilling equipment must know how to work safely and should be able to demonstrate competency before using this equipment.

Employers must ensure workers are trained in safe concrete cutting and drilling work practices and procedures, and are supervised by experienced people before carrying out this unsupervised work.

Training will be conducted at least annually, and must include information and instruction on:

- Dust, fumes, and air quality
- The hazards and risks associated with the work activities, including the potential health hazards of overexposure to airborne dust generated from concrete materials, including silicosis, lung cancer, chronic obstructive lung disease (COPD) and decreased lung function
- Recognition of poorly ventilated areas and confined spaces
- Methods to control exposure to airborne dust from concrete materials, including wet cutting, local exhaust ventilation systems, and process isolation, as applicable
- Proper use and maintenance of dust reduction systems, including the safe handling and disposal of waste materials
- The importance of good personal hygiene and housekeeping practices when working in proximity to dust from concrete, including not smoking, cleaning up before eating, cleaning clothes appropriately
- Additional safe work practices and procedures, including: the safe operation of equipment; the control measures in place; safe handling procedures (including lifting and moving); the safe use of hazardous substances; fire protection; emergency and first aid procedures; electrical safety; safety in confined spaces; and other training required under hazard-specific regulations
- The correct use, fit, care, and storage of tools and personal protective equipment

The operator should be monitored, as necessary or required, to ensure safe work practices and procedures are being followed.

MISCELLANEOUS CONCRETE WORK

Concrete Curing

Concrete curing includes the use of both chemical and water methods. Discharges of water exposed to concrete during curing may have a high pH and may contain chemicals, metals and fines.

Proper procedures will be implemented to reduce or eliminate the contamination of groundwater during concrete curing.

Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

Chemical Curing

- Avoid over spray of curing compounds
- Minimize the drift of chemical cure as much as possible by applying the curing compound close to the concrete surface
- Apply an amount of compound that covers the surface, but does not allow any runoff of the compound
- Use proper storage and handling techniques for concrete curing compounds. Protect drain inlets prior to the application of curing compounds

Water Curing for Bridge Decks, Retaining Walls, and Other Structures

- Direct cure water away from inlets and watercourses to collection areas for infiltration or other means of removal in accordance with all applicable permits
- Collect cure water at the top of slopes and transport or dispose of water in a non- erodible manner
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water

Inspection and Maintenance

- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds
- Inspect cure containers and spraying equipment for leaks

TRAINING

The Company will ensure that all workers are trained on the safe work practices associated with their jobs, the use of required PPE and any applicable emergency procedures.

Fall Protection

Employers are required to provide training for all workers exposed to fall hazards. The training must be provided by a competent person and will ensure that workers can:

- Recognize fall hazards in their work area
- Use appropriate procedures to minimize their exposure to fall hazards
- Workers who use or intend to use a personal fall-arrest system also should know:
  - How to inspect the equipment before they use it
  - How to wear the equipment
  - Proper hook-up and attachment methods for the equipment
  - Anchoring and tie-off techniques appropriate for the work

- How to estimate free-fall distances
- Equipment care and storage procedures
- Rescue procedures and techniques

In addition, supervisors must be trained:

- To know and understand the information outlined above in this section
- To identify tasks that may result in employee exposure to dust or other hazards, and, as necessary, initiate procedures that reduce employee exposure to dust or other hazards

Workers who are required to work in excavations or confined spaces must receive additional training before being allowed to work in those areas. Refer to the Excavation and Confined Spaces chapters of this manual for additional information.

Retraining

Workers who do not recognize hazards at a particular work area must be retrained. Workers may need retraining because of changes at a worksite that make earlier training obsolete, changes in the types of equipment used, and failure to demonstrate the necessary skills for using equipment effectively.

Training Records

The Company will retain written records of all worker training for the length of their employment. The records will document the worker's name, the date the worker was trained and the trainer's signature.

EMERGENCY RESPONSE

Emergencies: The Company is responsible for establishing emergency response procedures to ensure that workers receive prompt emergency and medical attention. Emergency procedures should identify key rescue and medical personnel, equipment available for rescue, emergency communications procedures, retrieval methods and primary first-aid requirements.

The company should also establish rescue procedures for personal fall-arrest systems before workers use the systems. Fall-protection systems are designed to minimize workers' exposure to fall hazards and to reduce their risk of injury if they do fall.

NOTE: Workers in 911 service areas can use the 911 number for ambulance service; however, most 911 responders are not trained to rescue an injured worker suspended in a personal fall- arrest system. Rescue procedures must assure prompt rescue of a suspended worker. The 911 number does not ensure prompt rescue.

Use the guidelines below to develop your own emergency-response procedures.

Before on-Site Work Begins

- Make fire department or emergency-response units aware of the job specifications at the site and any factors that may slow response time
- Document the rescue plan and make sure it's posted at the worksite

- Post emergency responder phone numbers and addresses at the worksite
- Mark the worksite with signs and note the easiest access routes in and out of the site
- Make sure you have quick access to rescue and retrieval equipment

As on-Site Work Progresses

- Identify on-site equipment that can be used for rescue and retrieval, such as lifts and ladders
- Maintain a current equipment inventory at the worksite. Equipment may change frequently as the job progresses
- Reevaluate and update the emergency-response plan if on-site work tasks change

Respond to emergencies: If the worker is injured, call 911 or other emergency numbers indicated on the emergency-response plan for ambulance service.

Remember, 911 responders are not trained to rescue an injured worker suspended in a personal fall-arrest system. First responders should clear a path to the victim. Others should be sent to direct emergency personnel to the scene.

- Make sure only qualified personnel attempt a technical rescue
- Prohibit all nonessential personnel from the fall/rescue site
- Talk to the fall victim
- Determine the victim's condition if possible
- If the victim is accessible, provide comfort and check vital signs
- If necessary, administer chest compressions, and attempt to stop bleeding

Investigating Accidents

- Report fatalities within eight hours, and report injuries requiring overnight hospitalization and medical treatment other than first aid within 24 hours
- Identify all equipment associated with the accident and place it out of service until the accident investigation is complete
- Document step by step what went wrong and what went right
- Review the emergency response plan. Determine how the plan could be changed to prevent similar accidents. Revise the plan accordingly
- Have a competent person examine equipment associated with the accident. If it contributed to the accident, determine how and why. Replace it if necessary

For additional information on this topic, see the Accident Investigation chapter of this manual.

EQUIPMENT MAINTENANCE

- Equipment should be maintained to prevent fluid leaks and spills
- Maintain adequate supplies of spill cleanup materials and train staff to respond to spills

Inspection and Maintenance

- Inspect and repair equipment (for damaged hoses, fittings, and gaskets)
- Inspect and maintain stabilized haul roads as needed
- Inspect and maintain materials and waste storage areas as needed

ATTACHMENTS

The following pages contain driver inspection and vehicle accident reporting forms. These may be reproduced for company and employee use.

DRIVER INSPECTION REPORT

Truck No		Mileage	| | | | | | |

Truck

General Condition

☐ Cab/Doors/Windows
☐ Body/Doors
☐ Oil Leak _____
☐ Grease Leak _____
☐ Coolant
☐ Fuel Leak _____
☐ Other _____

Engine Compartment

☐ Oil Level
☐ Coolant Level
☐ Belts
☐ Other _____

In-Cab

☐ Gauges/Warning Indicators
☐ Windshield Wipers/Washers
☐ Horn(s)
☐ Heater/Defroster
☐ Mirrors
☐ Steering
☐ Clutch
☐ Service Brakes
☐ Parking Brake
☐ Emergency Brakes
☐ Seat
☐ Radio
☐ Radio Antenna
☐ Other _____

Exterior

☐ Lights
☐ Reflectors
☐ Suspension
☐ Tires
☐ Wheels/Rims/Lugs
☐ Battery
☐ Exhaust
☐ Brakes
☐ Air Lines
☐ Mud Flaps
☐ Overall Appearance
☐ Cleanliness
☐ Paint
☐ Other _____

☐ No Defects

Mixer

☐ Chutes
☐ Hold Downs
☐ Lifts
☐ Controls

☐ Counter
☐ Water Hose
☐ Water Line
☐ Water Tank

☐ Oil Leak
☐ Hydraulic Leak
☐ Air Leak
☐ Other _____

☐ No Defects

Remarks			
Reporting Driver		Date	
Name		Emp. No.	
Maintenance Action		Date	
☐ Repairs Made	☐ No Repairs Made		
Certified By			
Location			
Shop Remarks			

MOTOR VEHICLE ACCIDENT REPORT

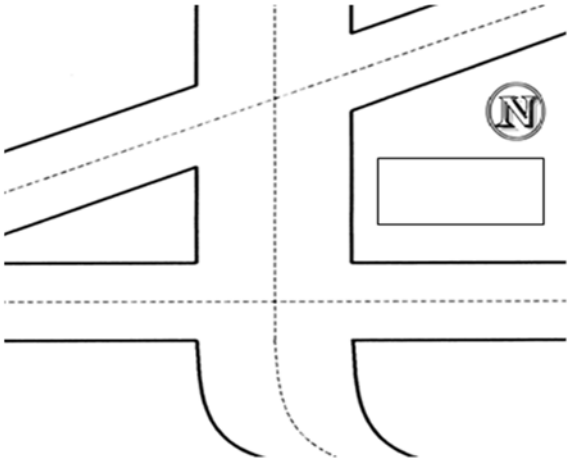
AFTER AN ACCIDENT: 1 Stay Calm 2 If the vehicles are drivable and it is safe to do so, move them safely out of traffic 3 Apply first aid (if properly trained) 4 Call police, and if necessary, ambulance 5 Take brief notes

Vehicle Driver Name	Other Vehicle Driver Name
Address	Address
Phone Driver License #	Phone Driver License #
Vehicle Type	Other Vehicle Type
Vehicle License Plate #	Vehicle License Plate #
Owner's Name	Owner's Name
Address	Address
Vehicle Insurance Co. Name	Other Vehicle Insurance Co. Name
Name Policy is Under Policy #	Name Policy is Under Policy #

Passenger Info				

Accident Detail

Date of Accident	Explain how the accident happened
Time of Accident ☐ am ☐ pm	
Street	
City	
State/Province	
Approx. Speed: Your MPH Other MPH	Describe your vehicle's damage
Describe any Injuries	
	Describe other vehicle's damage

Investigating Officer Name	
Phone Badge #	
Police Department	
Investigating Officer Name	
Phone Badge #	
Police Department	
Witness Info	
Witness Info	
Report Completed By	
Signature	

SKETCH OF ACCIDENT SCENE

SCOPE

This chapter provides information on the hazards of confined spaces in both Construction and General Industry work. It also covers the current OSHA regulations for both industries and the actions the Company will take to protect employees from those hazards.

POLICY

This confined space policy is designed to ensure the safety and health of employees by limiting exposure to the hazards present while performing construction or general industry work in and around confined spaces.

The OSHA construction confined space regulations do not apply to work already governed by excavation, underground work, or diving regulations.

Although the OSHA confined space regulations for General Industry (1910.146) and for construction (1926 Subpart AA) are similar, there are new components that reflect different challenges present in construction work, including higher employee turnover, changing worksites and multiple contractors (controlling and subcontractors).

DEFINITION

Confined spaces have the following attributes:

- They are enclosed spaces that are large enough to work in
- Existing (natural) ventilation is insufficient to remove dangerous air contamination, or to improve any oxygen deficiency/enrichment that may exist or develop
- They are difficult to enter and exit, and the removal of a suddenly disabled employee is difficult due to the location and/or size of the opening(s)
- They are not designed to be occupied continuously by any employee or person

For these reasons, a confined space can present life-threatening hazards that a qualified person must evaluate, and that must be controlled, before workers may enter the space.

STANDARDS AND REGULATIONS

Except where applicable state regulations specify more stringent requirements, this confined space policy will comply either the OSHA general industry or construction regulations, depending on which is applicable, and will be followed whenever and wherever the Company’s employees could be exposed to confined space hazards.

This program will be available to any employee and their representative at any time.

Working in confined spaces requires close coordination and communication between contractors, companies and employees. Written policies and procedures defining responsibilities are essential for protecting workers.

EMPLOYER RESPONSIBILITIES

This Company will create and implement the following measures to protect its and other employees both inside and outside confined spaces.

- Identify all confined spaces that employees could enter, inform all affected employees of their presence
- Involve affected employees on this policy, ensuring they are educated on the elements of confined space safety and trained in worksite specific procedures
- Document training and keep training records for all current employees
- Complete all confined space entry permits
- Keep cancelled permits until an annual review can be conducted
- Prevent unauthorized entry by using covers, posting signs or an attendant at the entrance
- Enforce safe permit space entry procedures
- Provide the necessary equipment
- Evaluate permit spaces during entry
- Provide attendants outside permit spaces during entry
- Describe how the attendant assigned to monitor multiple spaces will respond to emergencies
- Assign a role to every person in an entry, identify their duties and provide required training
- Arrange for rescue and emergency services for PRCS
- Coordinate entry operations
- Review this policy annually and following any incidents or near misses
- Provide all documents to the Secretary of Labor upon request

ENTRY SUPERVISOR RESPONSIBILITIES

For every permit-required confined space entry, the entry employer will assign an entry supervisor who has the ability to complete the following responsibilities:

- Knowing the hazards of the confined space
- Verifying the permit is completed correctly
- Ordering evacuation and cancelling or suspending the permit
- Communicating with and verifying the availability of emergency and rescue services
- Removing anyone unauthorized who tries to go into a permit space
- Assessing the permit-confined space when taking over responsibility and periodically as needed

Entry supervisors will know and understand the potential hazards of each confined space such as how entrants could be exposed, signs, symptoms and consequences. The entry supervisor will be someone who knows at least as much as the authorized entrants and attendants, and should be someone who knows even more about the space and hazards.

Before signing it, the supervisor will check the completed permit to be sure everything identified in the permit is correct: tests completed, procedures followed, and equipment in place.

The entry supervisor is responsible for deciding when there are unsafe conditions for an ongoing permit entry, terminating the entry and then cancelling or suspending the permit. A permit can be cancelled when the entry permit is completed or when a new condition not addressed in the permit occurs. The supervisor can also suspend a permit if a condition requires temporary evacuation, and the space soon returns to acceptable conditions in the permit. After reevaluating the permit space, the entry supervisor can remove the suspension but will record it on the permit.

The entry supervisor will check that needed emergency and rescue services are available; can be reached, and can themselves respond in a timely manner during the permit-required confined space entry.

When taking over responsibility of a permit space entry, the new entry supervisor will check the confined space conditions to make sure they are within safe levels and consistent with the permit. The entry supervisor is also responsible for periodically assessing the hazards and work within a confined space as often as deemed necessary according to the nature of the possible hazards and expected change of conditions.

ATTENDANT RESPONSIBILITIES

An attendant's primary responsibility is to evaluate and protect authorized entrants inside a PRCS. These responsibilities include:

- Knowing the hazards of the confined space
- Keeping track of authorized entrants
- Remaining outside permit spaces during entry and communicating with entrants
- Assessing the confined space conditions
- Ordering necessary evacuations
- Calling emergency services
- Non-entry rescues
- Keeping unauthorized entrants out
- Focusing exclusively on primary responsibility

Attendants will know and understand the potential hazards of the confined space such as, how entrants could be exposed, signs, symptoms and consequences. This includes knowing how the hazard could affect entrants' behavior.

Attendants will also continuously track authorized entrants in the permit space, and accurately document it on the permit.

An attendant must stay outside the permit space during an entry, even during emergencies regardless of whether entrants can escape, until relieved by another attendant. Once another attendant is on the scene, the attendant still can only try an entry rescue if they have the necessary equipment, are trained to do so and the entry permit allows for it.

Communication includes working with the entrant to make sure they are aware of the potential hazards of the confined space conditions, and understand when to evacuate.

The attendant is responsible for determining when a confined space is no longer safe and ordering entrants to evacuate whenever: there is a prohibited condition, the entrant is showing behavioral effects of exposure, something outside the confined space could be dangerous to entrants or if the attendant can't focus on all required responsibilities.

As soon as the attendant assesses that entrants need help to evacuate the permit space, he/she will immediately call rescue and emergency services as described in the permit and start non-entry rescue established in the permit.

When an unauthorized person approaches a confined space, the attendant will tell he/she to exit immediately. The attendant will tell the entrants and supervisor there is an unauthorized person in the permit space.

Attendants will not be assigned or allowed to do any work that takes their attention away from their focus on the confined space and the safety of people inside and outside it. This means attendants can do tasks that add to their knowledge of permit space conditions, like monitoring atmospheric conditions or passing tools to entrants from outside the space. Although this knowledge can be part of the job description, tasks that do not require continued attention away from or leaving the permit-required confined space are not included.

AUTHORIZED ENTRANTS

Authorized entrants will know and understand the potential hazards of the confined space such as how they could be exposed, signs, symptoms and consequences.

Entrants are expected to properly use all equipment, communicate with attendant and be ready to exit any permit space quickly.

Communication includes working with the attendant to share information attendant about any symptoms, warning signs or prohibited conditions.

The entrant must exit permit spaces when told to by the attendant or entry supervisor, there is an exposure warning sign or symptom, they detect a prohibited condition or an evacuation alarm is activated.

CONFINED SPACES IN CONSTRUCTION

Confined space hazards in construction work differ from those in general industry work mostly due to changing worksites and multiple contractor involvement. These differences require additional communications between employers and more stringent training.

Communicating Between Employers

The host employer will communicate all details about confined spaces at the worksite to the controlling contractor before and after entry. Where the Company has contracted with the property owner to manage it and transmit all confined space details, this Company will be considered both the controlling contractor and the host employer.

As the controlling contractor, all details about confined spaces at the worksite will be communicated with the host employer and all entry employers (i.e. subcontractors) before and after entry, ensuring that information is transferred to the different entry employers before and during entry so they don't create additional hazards for other entry employers' workers. Details will be communicated with other non-entry employers so that their workers do not create hazards or go into the confined space.

The entry employer will communicate all details about the confined space with the controlling contractor before and after entry.

A non-entry employer will communicate with the controlling contractor to determine where the confined spaces, are and the necessary steps to prevent employees from accessing them or creating hazards for other workers. Employees will be instructed not to enter the identified confined space.

IDENTIFYING CONFINED SPACES AND HAZARDS

A confined space is an area a worker can enter, but isn't designed for continuous occupancy and doesn't have an unrestricted entry or exit. A PRCS has a serious health or safety hazard, such as a hazardous atmosphere, material that can engulf a person or is in a shape that can trap or asphyxiate a person (e.g. converging or sloping walls or floor).

The Company will ensure that a competent person will identify all confined spaces an employee might work in, before the work begins, and determine which require permits. Employees and the controlling contractor will be informed directly of the location and danger in each permit space. Signs that warn of the danger and prohibit entry will be placed at permit space entrances.

As an entry employer, a competent person will re-evaluate non-permit spaces and determine if they are a permit spaces whenever there's an indication that the use or configuration has changed increasing the danger, or the original evaluation is incorrect.

Work will be scheduled as much as reasonably possible to avoid confined spaces by finishing tasks in areas before they become confined spaces.

Permit Required Confined Spaces include:

Oxygen-Deficient Atmospheres

An atmosphere with an oxygen concentration below 19.5% has insufficient oxygen for an employee and is a hazardous atmosphere. Such spaces require an approved breathing apparatus and a permit.

Flammable Atmospheres

An atmosphere is flammable, and hazardous, if any of the following conditions are true:

- Flammable gas, vapor, or mist is present in excess of 10% of its lower flammable limit (LFL)
- Airborne combustible dust is present at a concentration at or above its LFL
- Atmospheric oxygen concentration exceeds 23%

Toxic Atmospheres

An atmospheric concentration of any substance in excess of its permissible exposure limit (PEL) creates a hazardous atmosphere, as does any other atmospheric condition that is immediately dangerous to life or health.

Engulfing Potential

Any liquid or flowable solid that can kill by suffocation, strangulation, constriction or crushing has engulfing potential. A confined space that contains a material that can engulf an entrant is hazardous and requires a confined-space entry permit.

Trapping or Asphyxiation Risk

If the walls of a confined space converge inwardly or the floor of a confined space slopes downward to taper to a smaller cross-section an entrant runs the risk of becoming trapped and can face an asphyxiation risk. Confined spaces with such hazards are permit spaces.

Temperature Extremes

Extremely hot or cold temperatures can present problems for workers. Confined spaces can trap heat to create a condition dangerous to the life or health of a worker entering the space.

Noise

The design and acoustic properties in a confined space can amplify noise. Excessive noise can not only damage hearing and reduce reaction time to hazards, but can also affect communication. This can cause a shouted warning to go unheard.

Slippery Surfaces

Slips and falls can occur on a slick, wet, or icy surface, causing injury or death to workers. Further, wet environments can increase the likelihood of electric shock.

Falling Objects

Many confined spaces have openings above the worker that introduce hazards from objects falling from above onto a worker below. Before any worker may enter a confined space, appropriate barriers must protect entrants from falling objects.

CONFINED SPACES WITH ONLY ATMOSPHERIC HAZARDS

The following procedures and conditions are for entering a confined space with only atmospheric hazards that can be made safe to enter through forced air ventilation during entry.

To be more specific, all physical hazards have to be eliminated or isolated through engineering controls, the forced air ventilation has to keep the space safe for entry and entrants must be able to exit safely if ventilation stops working.

If the above can be proven and documented with monitoring and inspection where the data is available to each entrant, the space can be entered without a permit, attendant, or rescue and emergency equipment once the Company certifies that:

- Entrance covers can be safely removed
- Entrance openings are immediately guarded by a railing, temporary cover or barrier that prevents accidental falls into the opening and protects entrants from foreign objects falling into the space
- The internal atmosphere is tested with a calibrated direct-reading instrument in the following order: oxygen content, flammable gases and vapors, and potential toxic air contaminants. The testing procedure is evaluated to ensure it's appropriate for the possible atmospheric hazards. This may mean identifying the possible toxic air contaminants and ensuring the gas detector can detect it, and testing at the top, middle, and bottom of the space to account for different gases' density
- Testing and continuous monitoring ensures there is no hazardous atmosphere
- Continuous forced air ventilation from a clean source directed to the lowest spot or furthest corner, so that it eliminates any hazardous atmosphere from the space while anyone is in the space
- Continuous monitoring of the atmosphere in the space with monitoring equipment that will sound an alarm notifying all entrants if a hazard exceeds the atmospheric thresholds
- Where the preferred continuous monitoring is not used because of equipment limitations, or periodic monitoring is shown to be sufficient, periodic monitoring will be done often enough to detect a hazardous atmosphere is building up and make sure entrants have time to exit
- Once a hazard is observed, everyone will immediately leave the space. The hazard source is then found, and the Company will take steps that protect employees before they enter that space again
- There is a safe way to enter and exit the space, including a personnel hoist made for that purpose, or a job hoist approved ahead of time in writing by a registered professional engineer

The written certificate must contain the date, location of the space and the signature of the person certifying the above conditions have been met. The certification must be made before anybody enters and be available to every employee entering the space. The employer will re-evaluate the space if there is a change to the space that may increase hazards or there is indication the current evaluation is incorrect.

RECLASSIFYING PERMIT REQUIRED CONFINED SPACES FOR ENTRY

Permit required confined spaces without any potential atmospheric hazard can be reclassified as non-permit required once the entry employer certifies that:

- The hazards can be eliminated or isolated without entering the space
- If the entry employer can show they have to enter the space to remove the hazard, then they can do that following the permit process

The written certificate must contain how all the hazards have been eliminated or isolated, the date, location of the space, and the signature of the person certifying the above conditions have been met. The certification must be made before anybody enters and be available to every employee entering the space. If new hazards are identified everyone must leave the space, and the entry employer will reevaluate.

ENTRY PERMIT SYSTEM

Before any employee may enter a PRCS, the employer/entry supervisor must follow the measures outlined in the “Pre-Entry” and “Additional Requirements” sections of this chapter.

The employer must also complete and sign documentation of the measures used to render the space safe for entry and maintain control over potential hazards to workers (an entry permit). The permit must be readily available to all authorized entrants or their representatives, posted at the entry. If the nature of the space prevents permit posting at the entry, the permit must remain available by an equally effective means.

The entry permit that documents compliance with this section and authorizes entry to a permit space will include a written description of:

- The location of permit space to be entered
- The purpose of the entry, including the type of work that will be done
- The time, date and authorized duration of the permit (the duration of the permit can’t exceed one shift or 12 hours; the permit may be extended for another 12-hour period pending recertification of acceptable conditions)
- The names of authorized entrants within the permit space
- The personnel, by name, currently serving as attendants
- The name and signature of the entry supervisor, and if different, the names and signatures of the qualified person responsible for securing the permit, and of the qualified person responsible for reviewing conditions prior to entry
- The hazards of the permit space to be entered
- The measures used to isolate the permit space and eliminate or control permit space hazards before entry, including all means of isolation, cleaning, purging, or inserting
- The minimum acceptable environmental conditions for entry/work in the space
    - See the NIOSH standards for the current permissible exposure/IDHL levels for the chemicals that can be found in confined spaces
- The personal protective equipment required, including respiratory protection, clothing or harnesses required for entry and rescue
    - The results of initial and periodic (at least hourly) atmospheric tests performed to ensure safe entry/work conditions, accompanied by the names of the testers, as well as when the tests were performed
    - The last calibration dates for the oxygen detector and combustible gas indicator being used
- Additional permits needed to complete the task in the confined space
    - The rescue and emergency services that can be summoned and the means of summoning those services
    - The communication procedures used by authorized entrants and attendants to maintain contact during the entry

  - Equipment to be provided for compliance with this section
  - Special work practices or procedures, or any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety
- Any additional permits, such as for hot work, that have been issued to authorize work in the permit space

AFTER ENTRY

Cancel Permit

The entry supervisor will terminate entry and cancel the permit as soon as a condition that is not allowed occurs in or near the confined space, or upon completion of operations requiring permit-space entry.

Retain Permit

Entry permits (and in particular canceled permits) will be retained for at least a year to help in the required regular evaluation of the confined space program. If entry or work presented any problems, the entrant, attendant, or supervisor will note them on the permit to facilitate necessary revisions to the permit space program.

No Entrant

If no employee or contractor will enter a permit-required confined space, effective measures must prevent anyone from entering the permit space.

SAFE PERMIT SPACE ENTRY OPERATIONS

The employer will take the following steps to check out the PRCS before entry.

Test the Air

Before entry, the air must be tested by a qualified individual to determine whether an oxygen enrichment and/or an oxygen deficiency exists, if potential flammable hazards (gases and vapors) exist, and if there is the presence or potential for toxic air contaminants—in that order. Oxygen levels must remain between 19.5% and 23%. A written record of such testing results will be made and kept at the work site during work, and for at least one year afterward. Affected employees or their representative may review and record the testing results.

Testing is not necessary if a toxic material is known to exist, and appropriate PPE is worn.

If interconnected spaces are blinded off as separate units, each space must be tested and the results recorded. In this case, the most hazardous condition that is found will determine the procedures to be followed.

If the space is part of a larger continuous system and can’t be isolated, pre-entry testing will be done, and conditions will be continuously monitored unless necessary monitoring equipment isn’t commercially available. Work in large or continuous system also requires a sufficient early-warning system continuously monitoring for engulfment hazards.

Air Contamination/Hazard Does Not Exist

If an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination don't exist within the space, entry into and work within the space may proceed subject to the following provisions:

The air must continue to be tested and documented by a qualified individual at least hourly if continuous monitoring devices are not used, to ensure that an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination don't occur within the space during the performance of any operation.

Air Contamination/Hazard Exists

Where the existence of an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination is confirmed, existing ventilation must be improved by the use of additional mechanical ventilation or other appropriate means. Work may begin/resume only when air tests reveal that an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination has been eliminated. Ventilation will continue as long as the recurrence of the hazards is possible, or appropriate PPE must be worn by all employees.

Mechanical and Electrical Devices

All fixed mechanical devices and equipment that are capable of causing injury must be placed at zero mechanical state. Electrical equipment, excluding lighting, must be locked out with a key-type padlock and the key will remain with the person working inside the confined space, in cases where locking is impossible, equipment must be properly tagged. Installations under the exclusive control of electric utilities or companies performing the same functions, on their own/leased or public properties, may be exempt.

Continuously monitor the atmosphere in the space with monitoring equipment that will sound an alarm notifying all entrants if a hazard exceeds the atmospheric thresholds.

Pre-Entry

A competent person will identify and evaluate permit space hazards before any employees enter it and establish all the following elements to ensure safe work in the area have been met, especially:

- Citing the acceptable entry conditions
- Authorized entrants can observe space testing and monitoring
- Isolating the space and its hazards
- Controlling atmospheric hazards through purging, inerting, flushing or ventilating
- Reducing the atmosphere to below 10 percent of its Lower Flammable Limit (LFL) or inerting the atmosphere so that it is entirely non-combustible and addressing the other atmospheric hazards like oxygen deficiency through PPE
- Ensuring monitoring procedures will detect atmospheric hazard level increases quickly enough for entrants to exit, in case ventilation stops working
- Having necessary barriers to protect entrants from outside hazards

- Conditions continue to allow safe entry the entire time
- The necessary PPE effectively protects every employee, and that they have the PPE before entering a hazardous atmosphere
- Conditions, like high pressure, that can make removing an entrance cover unsafe are eliminated

Prevent Dangerous Air Contamination

Before any employee enters the permit space, the space must be emptied, flushed or otherwise purged of flammable, injurious or incapacitating substances to the greatest extent possible. In short, the space must be isolated from hazards (which may require lockout/tagout).

Pumps and lines must be disconnected, blinded or blocked off by other positive means to prevent the development of dangerous air contamination, as well as oxygen enrichment and/or oxygen deficiency. The disconnection or blind should be located or performed in a manner that prevents the inadvertent reconnection of the line or removal of the blind. The closing of valves alone, or the closing of valves and locking or tagging them, is not considered effective protection. Initial cleaning must be done from outside the confined space to the extent feasible.

Exceptions: This does not apply to public utility gas distribution systems, and it does not necessarily require blocking of all laterals to sewers or storm drains.

Additional Requirements

When oxygen-consuming equipment such as salamanders, plumbers' torches, furnaces and similar equipment will be used, measures must be taken to ensure adequate combustion air and exhaust gas venting.

No sources of ignition are permitted in a confined space until procedures have been implemented to ensure that oxygen enrichments and/or oxygen deficiencies, flammable hazards, or toxic air contamination do not exist. Fans or other equipment used for removing flammable gases or vapors must not create an ignition hazard. Never take cylinders of compressed gases into a confined space, except for cylinders that are part of self-contained breathing apparatus or resuscitation equipment. When left unattended, a torch and hose must be removed from a confined space. Open-end fuel gas and oxygen hoses must be immediately removed from an enclosed space when they are disconnected from the torch or other gas-consuming device.

All electrical cords, tools and equipment must be inspected for defects before use in a confined space. In the absence of low voltage circuits and equipment or double-insulated tools, equipment must be of the heavy-duty insulation type, or ground-fault circuit interrupters must be used. Temporary lighting must be operated at 12 volts or less. However, 120-volt lights may be used if protected by a ground-fault circuit interrupter.

Efforts must be made to permit ready entry and exit to the confined space, to the greatest extent feasible. Where it’s not feasible to provide for ready exit from spaces equipped with automatic fire-suppression systems that use harmful concentrations of toxic or oxygen-displacing gases, or total foam flooding, these systems must be deactivated. Where it is not practical or safe to deactivate such systems, the use of respiratory protective equipment will apply during entry into, and work within, such confined spaces.

Measures such as posting warning signs or erecting barriers will be implemented to prevent unauthorized entry into permit spaces, and to protect entrants from falling objects and other hazards from outside of the space.

Smoking is prohibited in confined spaces or within 20 feet of a confined space opening.

Confined Space Entry

The following provisions apply to the entry into, and work within a PRCS. A confined space is considered to be permit-required if, through the steps outlined in the "Pre-Entry" subsection above, an atmosphere is found to contain, or can't be verified to be free of, an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination.

Safe Practices

- Tanks, vessels, or other confined spaces with side and top openings must be entered from side openings when practicable. For the purposes of this requirement, side openings are those within 3½ feet of the bottom
- Appropriate, approved respiratory protective equipment must be provided and worn
- If entry into a confined space is through a top opening, an approved safety belt with an attached line must be used. The free end of the line will be secured outside the entry opening. The line must be at least ½ inch in diameter and 2,000-pounds test. The exception to this requirement is where it can be shown that a safety belt and attached line would further endanger the life of the employee
- At least one standby employee/attendant must stand by outside of, in near proximity to, and within view of the entry of the confined space ready to give assistance in case of emergency. The standby employee must maintain visual, voice or single-line communications with all individuals in the confined space and must have means available to summon assistance. At least one additional employee who may have other duties must be within sight or call of the standby employee(s)
- The standby employee(s) will have appropriate training, as well as approved respiratory protective equipment, including an independent source of breathing air available for immediate use
- The protected standby employee(s) may enter the confined space, but only in case of an emergency, and only after alerting at least one other trained rescue worker or emergency response team (fire department) of the existence of an emergency and of their intent to enter the confined space
- Entry into a confined space without an attendant is allowed only when there is no potential for engulfment or IDHL atmospheres. In that case, at least one entrant must wear a continuous monitoring device equipped with an alarm and capable of evaluating oxygen concentrations and combustible gas concentrations in the confined space. When large confined spaces are entered, a sufficient number of monitoring devices must either be worn or located in the work area to monitor the atmosphere adequately

When entry must be made through a top opening, the following requirements will also apply:

- The safety belt will be a harness type that suspends a person in an upright position
- The lifeline must be strung from the employee overhead and back down to the employee, where it must be tied to the employee's "D" ring, keeping the lifeline reasonably taut at all times
- A hoisting device or other effective means must be provided for lifting employees out of the space
- Work involving the use of a flame, arc, spark or other source of ignition is prohibited within a confined space (or any adjacent space having common walls, floor or ceiling with the confined space) that contains, or is likely to develop, oxygen enrichment or dangerous air contamination due to flammable and/or explosive substances
- When gases such as nitrogen are used to provide an inert atmosphere for preventing the ignition of flammable gases or vapors, no flame, arc, spark or other source of ignition is permitted unless the oxygen concentration is maintained at less than 20 percent of the concentration that will support combustion
- Testing of the oxygen content must be conducted with sufficient frequency to ensure conformance with this oxygen concentration
- A written record of the results of such testing must be made and kept at the work site for the duration of the work
- Only approved lighting and electrical equipment may be used in confined spaces subject to oxygen enrichment or dangerous air contamination by flammable and/or explosive substances
- Employees working in confined spaces that contain, or contained, substances corrosive to the skin or substances that can be absorbed through the skin, must be provided with, and will be required to wear, appropriate personal protective clothing or devices. Eyewashes and safety showers may also be required
- The Company requires a second employee be available to help in an emergency when an employee enters a manhole, unless the employee can safely enter for a brief period to perform inspections and housekeeping, take readings, or some other task that can safely be done

When a host employer arranges to have employees of another employer (contractor) perform work that involves a confined space entry, the host employer must:

- Inform the contractor that the workplace contains a confined space and that confined space entry is allowed only through compliance with this confined space program, as they apply to the project/contractor
- Inform the contractor of the elements, including the hazards identified and the host employer's experience with the confined space, that make the space in question a confined space
- Inform the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near the confined space where the contractor's personnel will be working
- Coordinate entry operations with the contractor, when both host employer and contractor personnel will be working in or near the confined space, so that operations of one employer won't endanger the employees of any other employer

- Debrief the contractor at the conclusion of the confined space operation regarding the confined space program followed, and any hazards confronted or created in the confined space during entry, or other, operations

In addition to complying with the confined space requirements that apply to all employers, each contractor retained to perform confined space entry operations must:

- Obtain any available information regarding confined space hazards and entry operations from the host employer
- Coordinate entry operations with the host employer, when both host employer personnel and contractor personnel will be working in or near a confined space, so that operations of one employer will not endanger the employees of any other employer
- Inform the host employer of the confined space program that the contractor will follow, and of any hazards confronted or created in the confined space, either through a debriefing or during the entry operation

EQUIPMENT

The Company will provide suitable equipment needed to safely enter, exit from and conduct rescues in confined spaces. The equipment will be properly maintained and all employees will know how to use it correctly. Equipment requirements can include:

- Adequate testing and monitoring equipment
- Ventilating equipment that makes entering possible
- Communication equipment that allows attendant to talk to entrants
- PPE that meets any other applicable requirements where engineering and administrative controls don't give enough protection
- Lighting that meets the minimum illumination requirements, that won't ignite any gas, vapor, dust or fiber present, and that enables employees to work safely and exit during emergencies
- Barriers and shields that effectively isolate the confined space
- Ladders needed to enter and exit the confined space
- Rescue and emergency equipment that is called for in the Company's emergency rescue policy

TRAINING

Employees will be trained in a vocabulary and language they understand so that they are proficient in their expected responsibilities. This training will occur:

- Before they are first assigned duties that involve confined-spaces work
- Before there is a change in their assigned duties, as applicable to confined spaces
- When there is a change in permit-space operations that warrants training
- When any new hazard on which the employee has not been trained is, or may become, introduced to a confined space
- When the employee does not follow or understand entry procedures

Assigned duties include authorized entrant, attendant, entry supervisor and emergency rescue. Employees not authorized to enter confined spaces will be trained on the hazards of the confined spaces at the worksite, and how to avoid them.

The training and determination of proficiency will be documented and kept for all current employees. This documentation will be available to all employees who ask for it, and the Secretary of Labor upon request.

Training Components

All employees will be trained in the following minimum elements:

- How to identify a confined workspace
- The need for safe, confined-space entry procedures
- Hazard recognition, including inherent or possible hazards presented by confined spaces in the workplace
- The use of respiratory protection equipment, if it is required or may be needed
- The use of atmospheric testing devices, if employees are required to use them, training will cover field checks as specified by the manufacturer, normal use and specific limitations of the equipment
- Lockout/tagout procedures
- The use of any special equipment and tools
- The roles of individuals involved in the safe entry into, and work in, confined spaces
- Emergency and rescue procedures and methods

Employees expected to perform duties as an entry supervisor, hazardous confined space entry attendant or authorized entrant will receive specific training and demonstrate the understanding, knowledge and skills necessary to participate safely in the confined space entry program, including, but not limited to the following:

- The specific hazards of all confined spaces in the workplace
- Conditions under which a confined space may or must be reclassified under the confined space entry program
- Conditions required to participate in alternate confined space entry procedures and the alternate procedures for permit space entry
- Pre-entry procedures for confined space entry
- Any equipment provided or used as part of the confined space entry program
- Plans and procedures for response or rescue in case of an emergency in a permit space and permit-space evacuation
- The contents and requirements of a confined-space entry permit
- The roles and responsibilities of each employee involved in confined space entry and operations
- The importance of atmospheric monitoring, and how to perform such monitoring
- The steps that are required following permit space entry
- The permit space program review process

Rescue Teams

- Rescue teams, if applicable, must be trained to use the equipment they may need to perform the rescue functions that are assigned to them
- At least annually, rescue teams will practice removing victims through openings and portals of the same size, configuration and accessibility as those of spaces from which an actual rescue could be required
- The attendant or at least one member of each rescue team must hold current certifications in basic first aid and CPR

Training Records

Training will be certified by recording the following:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment, and will be made available to employees and their representatives.

PRECAUTIONS FOR EMERGENCIES IN CONFINED SPACES

At least one person trained in first aid and cardiopulmonary resuscitation (CPR) must be immediately available when the use of respiratory protective equipment is required in a confined space. Standards for CPR training will follow the principles of the American Heart Association or the American Red Cross.

An effective means of communication between employees inside a confined space and a standby employee will be used when the use of respiratory protective equipment is required, and when employees inside a confined space are out of sight of the standby employee(s). All affected employees must be trained in the use of the communication system, and the system must be tested before each use.

RESCUE AND EMERGENCY SERVICES FOR PRCS

Rescue and emergency service procedures are a necessary component of the permit and include the preferred non-entry and entry rescues. The non-entry can be initiated immediately by the attendant and entry supervisor who remains outside the PRCS. Entry rescues need to be either from a designated outside source or a team of selected employees, and each has their own requirements. Unauthorized personnel must not attempt a rescue.

Any injured entrant that is exposed to a hazardous substance at the worksite will bring the associated Safety Data Sheet (SDS) and provide it to the facility where the medical treatment takes place.

Any injured entrant that is exposed to a substance with a SDS at the worksite will be given to the medical facility where he is treated.

Outside Rescue and Emergency Services

Outside rescue and emergency services will be evaluated to ensure they can respond quickly, and have both the equipment and ability to provide rescue when considering each PRCS and the identified hazards.

The Company will provide hazard information about its confined spaces and allow the service to go to the PRCS and develop rescue plans. The service selected must have the training, equipment, ability and willingness to perform rescues. The service also has to agree to tell the Company when it will be unable to perform rescues.

The time it takes the service to reach the permit space, enter and retrieve entrants will also be considered, along with the rescue requirements of other regulations. In particular, if the PRCS could have an atmosphere that is immediately dangerous to life or health (IDLH), the respiratory protection standard requires standby rescue personnel equipped with respiratory protection. A response time of 15 minutes may be determined adequate for mechanical hazards that could cause broken bones or abrasions.

Employee Rescue and Emergency Services

When selecting a team of employees to provide rescue and emergency services, they will: have the necessary equipment and PPE; be trained to be proficient as entrants and rescuers, correct PPE use, basic first aid and cardiopulmonary resuscitation (CPR); and practice attempting the type of rescue needed at least once every 12 months. At least one member of the rescue team will have current basic first aid and CPR certifications.

If a rescue operation is correctly performed in the last 12 months, then practice is not necessary.

Non-Entry Rescue and Retrieval Equipment

Authorized entrants who enter a permit space must wear a chest or full body harness with a retrieval line attached to the center of their backs near shoulder level or above their heads. Wristlets may be used if the employer can demonstrate that the use of a chest or full body harness is not feasible or creates a greater hazard.

The other end of the retrieval line must be secured outside of the permit space, either by another person holding the line, or by attaching it to a mechanical device or a fixed point. A mechanical device must be available to retrieve someone from vertical-type permit spaces deeper than five feet deep. When entry is made through a top opening, a hoisting device such as a tripod must be provided for lifting employees out of the space.

The line will be attached outside the permit space so that it can be used to pull entrants out as soon as they need to be rescued. This can either be a mechanical device like a block and tackle or winch system, or a fixed point. Vertical entrances more than five feet deep call for a mechanical device to assist rescue.

Circumstances described by OSHA that increase risk of or hamper rescue include anything that can catch onto or entangle the retrieval line like physical obstructions, airlines, electric cords and additional retrieval lines from multiple entrants. The distance entrants have to go into the space and how much they will have to move around can also affect the decision that a retrieval system is too dangerous.

Additional Management Responsibilities

Management is also required to adhere to the following requirements, as applicable to the job at hand:

- Evaluate the workplace to determine whether any spaces are permit-required confined spaces
- Inform exposed employees of the presence of permit-required confined spaces with signs or equally effective means
- Take measures to prevent employees from entering permit spaces without permit
- Develop and implement a written permit space program — available for inspection by employees or their representatives — if employees are permitted to enter permit spaces
- Reevaluate, and reclassify as necessary, a non-permit confined space when there are changes in use or configuration of that space that may increase hazards to entrants
- Abide by all applicable standards and regulations when work with a contractor involves permit space entry
- Provide and keep in good repair all equipment necessary for the written permit space program
- Evaluate permit space conditions when entry operations are concluded
- Provide at least one attendant outside of a permit space during entry operations in order to respond to an emergency
- Designate individuals with active roles in entry operations, identify their duties, and provide appropriate training
- Develop and implement all other elements of a permit space program including, but not limited to:
  - A system for preparing, issuing, using and cancelling entry permits
  - Procedures for summoning rescue and emergency services
  - Procedures for concluding entry/operations
- Review entry operations and the permit space program to ensure employees are protected from permit space hazards
- Consult with affected employees or their representatives in the development and implementation of all elements of the permit space program, and make available to them all information required for the program

POLICY REVIEW

This policy will be reviewed annually and when measures may not protect employees, such as after any incidents or near misses. Any deficiencies will be corrected before entering any additional PRCS.

Some examples of situations that may require a review are:

- An unauthorized person enters a PRCS

- A new hazard not covered by the permit is detected in a PRCS
- A new condition prohibited by the permit is detected in a PRCS
- An injury takes place during entry
- A change in the PRCS configuration or use
- An employee issues a complaint

The annual review will ensure that all cancelled permits are included in the review within one year after entry. This review will evaluate the policy's effectiveness of providing protection to all affected employees.

FORMS AND ATTACHMENTS

Evaluate the documents on the following pages along with their source material from the General Industry Regulation's appendixes, and consider using them to implement and maintain your safety program.

- Confined-Space Entry Permit
- Confined Space Entry Training Record Sheet
- Initial Evaluation of Confined Space Rescue Plans
- Evaluation of Confined Space Rescue Program
- Planning Confined Space Rescue Drills

CONFINED SPACES ENTRY PERMIT (1 OF 3)

GENERAL INFORMATION					CONTROLS AND EQUIPMENT
Permit Space Location					☐ ISOLATION ☐ Lockout/Tagout ☐ Blanking/Blinding ☐ Double Block and Bleed ☐ Line Breaking/Misalignment ☐ Other: _____ ☐ INERTING ☐ PURGE/CLEAN ☐ METHOD FOR SAFE COVER REMOVAL AND SECURING AREA ☐ ATMOSPHERIC TESTING ☐ Periodic (give interval) _____ ☐ Continuous ☐ VENTILATION ☐ Natural ☐ Continuous Forced Air ☐ Local Exhaust ☐ ENTRY EQUIPMENT ☐ Ladders ☐ Other: _____ ☐ PERSONAL PROTECTIVE EQUIPMENT ☐ Respiratory (SCBA, SAR, air purifying) ☐ Clothing ☐ Eye and Face Protection ☐ Hearing Protection ☐ RESCUE and RETRIEVAL EQUIPMENT ☐ Full Body Harness ☐ Lifeline ☐ Tripod w/Mechanical Wench ☐ Explosion-Proof Lighting ☐ NON-SPARKING TOOLS ☐ SAFE ELECTRICAL EQUIPMENT and GFCI ☐ COMMUNICATION EQUIPMENT ☐ Radio ☐ Phone ☐ Other:_____ ☐ HOT WORK PERMIT ☐ FIRE EXTINGUISHERS
Purpose of Entry					
Permit Valid For	Date		To		
	Time		To		
PERMIT SPACE HAZARDS				**Y N**	
ATMOSPHERIC	Oxygen Deficient			☐ ☐	
	Oxygen Enriched			☐ ☐	
	Explosive (Gas/Vapor)			☐ ☐	
	Explosive Dust			☐ ☐	
	Carbon Monoxide			☐ ☐	
	Hydrogen Sulfide			☐ ☐	
	Other Toxic Vapors			☐ ☐	
ENGULFMENT				☐ ☐	
CONFIGURATION (ENTRAPMENT)				☐ ☐	
MECHANICAL				☐ ☐	
ELECTRICAL				☐ ☐	
SUBSTANCE HAZARD TO SKIN/EYES				☐ ☐	
HEAT STRESS				☐ ☐	
OTHER POTENTIAL HAZARDS (radiation, noise, etc, list)				☐ ☐	
				☐ ☐	
				☐ ☐	

CONFINED SPACES ENTRY PERMIT (2 OF 3)

PERSONNEL								
Entrant(s)			Time In		Time Out			
Attendant(s)								
Entry Supervisor(s)								
COMMUNICATION PROCEDURES								
Visual	☐	Voice	☐	Rope	☐	Radio	☐	
Other								

RESCUE AND EMERGENCY SERVICES				RESCUE PROCEDURES
Name		Phone		
Name		Phone		
Summoning Procedure				

CONFINED SPACES ENTRY PERMIT (3 OF 3)

ATMOSPHERIC TESTING RECORD										
Condition	Acceptable Level	Record continuous monitoring results every 2 hours								
OXYGEN	19.5% - 23%									
EXPLOSIVE (GAS/VAPOR)	<10% LFL									
EXPLOSIVE DUST	<LFL (5ft Visibility)									
CARBON MONOXIDE	50ppm									
HYDROGEN SULFIDE	10ppm									
OTHER (Specify)										
NAME(S) OF TESTER(S)										
TESTING EQUIPMENT	Type									
	Serial #									

ENTRY AUTHORIZATION (ENTRY AUTHORIZED BY)					
Signature		Date		Time	

ENTRY SUSPENSION (ENTRY SUSPENDED BY)					
Signature		Date		Time	
Resumed after Reevaluation		Date		Time	
Description					

ENTRY CANCELLATION (ENTRY CANCELLED BY)					
Name				Date	
Signature				Time	
Reason for Cancellation	☐	Entry Operations Completed	☐	Prohibited Condition Arose	
Problems Encountered					

RESCUE AND EMERGENCY SERVICES

Name	Rescue Duties	Rescue Equipment and PPE Authorized For Use	Training		Certified (Y/N)	Rescue Practice Date	Rescue Practice Session Description	Name of Trainer	Date of Training
			First Aid	CPR					

TRAINING RECORD

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name:	**Signature:**

INITIAL EVALUATION OF CONFINED SPACE RESCUE PLANS

Use this worksheet to determine if a permit-required confined space rescue plan is sufficient. This plan could be a response team of employees trained by the employer or calling 911. Both must pass muster. Answering "no" to any question means an alternative must be considered to satisfy the requirements in this guide.

Tasks	Results
1. Determine the rescue response time needed for permit-required confined spaces. In other words, how long can a person remain trapped in the confined space? Consider any PEL, REL time limits (e.g. H_2S has an NIOSH REL 10 ppm ceiling for 10 minutes) If there is a possible IDLH, a rescue team needs to be standing by. If the hazards are only physical (e.g. broken bones, abrasions) a longer response time can be tolerated.	Needed rescue response time _____ minutes
2. Calculate the time required for the rescue service by adding the needed time to: get the notification, arrive at the scene, set-up and be ready to enter. Consider the rescue team's distance from each worksite, quality of roads and traffic, reliability and training of the drivers. Then subtract the needed response time. The answer must be a positive number to continue.	Receive notification _____ minutes + Arrive at the scene _____ minutes + Set up and be ready for entry _____ minutes - Needed rescue response time _____ minutes = _____ minutes Must result in a positive number
3. Determine the rescue response service availability: a) Is the rescue service available when workers will enter the permit-required confined space? b) Are key rescue members available at these times? c) Can the rescue service notify the attendant when they are unavailable so entries can be prevented or stopped?	☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO
4. Has the rescue service passed the most recent performance requirement evaluations?	☐ YES ☐ NO
5. Is the planned 911 service willing to perform rescues: a) If you call 911, is a responder available? b) Is the 911 responder willing to perform rescue and first aid? c) Are the 911 responders able to perform rescues at the worksite?	☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO
6. Can the attendant immediately request a rescue?	☐ YES ☐ NO

EVALUATION OF CONFINED SPACE RESCUE PLANS

Follow this checklist to determine if a permit-required confined space rescue plan meets all performance requirements. This critique should occur during any periodic drills or following a successful rescue. Answering “no” to any question, means an appropriate corrective action must be considered.

Tasks	Results
1. Has the entire team been trained as entrants, and know the potential hazards of at least the types of spaces they may have to perform a rescue?	☐ YES ☐ NO
2. Can the team recognize signs, symptoms, and consequences of hazardous atmospheres possible in the permit confined space?	☐ YES ☐ NO
3. Is every team member: a) Provided with and trained in PPE necessary to perform rescues? b) Trained to perform rescues and use rescue equipment (e.g. ropes, backboards)?	 ☐ YES ☐ NO ☐ YES ☐ NO
4. Is every team member trained in first-aid and medical skills to treat victims injured or overcome by possible hazards?	☐ YES ☐ NO
5. Do team members perform duties safely and efficiently?	☐ YES ☐ NO
6. Do team members focus on their own safety before the victim’s?	☐ YES ☐ NO
7. If necessary, can the rescue service test the air identifying entry conditions?	☐ YES ☐ NO
8. Can team members find information that applies to rescues? a) Entry permits b) Hot work permits c) Safety Data Sheets	 ☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO
9. Does the rescue service know of any hazards from outside the permit area (e.g. nearby construction)?	☐ YES ☐ NO
10. If necessary, can the rescue service safely rescue victims from: a) A limited size opening (less than 2 ft. in diameter)? b) Limited internal space? c) Internal obstacles or hazards?	 ☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO
11. If necessary, can the rescue service safely perform an elevated rescue?	☐ YES ☐ NO
12. Does the rescue service have a plan for each type of rescue needed? a) A plan for each kind of permit space rescue operation at the worksite? b) Does the plan cover all types of possible necessary rescue operations?	 ☐ YES ☐ NO ☐ YES ☐ NO

PLANNING CONFINED SPACE RESCUE DRILLS

Follow this worksheet to check off that the rescue team's periodic drills – at least once every 12 months when a successful rescue has not been completed – covers all possible scenarios and worksite characteristics. Practices may occur in representative spaces or in the "worst-case" environment with the most restrictive access, entrance size, and configurations.

Tasks	Results
1. **Horizontal Access**. The entrance is located on the side of the permit space. Using retrieval lines may be difficult.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
2. **Vertical Access**. The entrance is located: a) On the top of the permit space so rescuers must climb down, or b) On the bottom of the permit space so rescuers must climb up to enter.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
3. **Restricted Entrance Size**. Smallest diameter entrance is 2 ft. or less. These are too small for rescuers to enter with a SCBA, or allow normal spinal immobilization of an injured employee.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
4. **Unrestricted Entrance Size**. Smallest diameter entrance is 2 ft. or more, and allows relatively free movement into and out of the permit space.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
5. **Open Internal Configuration**. The space has no barriers, obstacles, or obstruction (e.g. a water tank).	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
6. **Obstructed Internal Configuration**. The space has an obstacle that requires the rescuer to maneuver around it (e.g. baffle, mixing blades). Equipment brought into the space (e.g. ladder, scaffold) can be an obstruction if its position or size increases the rescue difficulty.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
7. **Elevated Entrance Configuration**. The entrance is 4 ft. or more above grade, requiring high angle rescue procedures because of the difficulty transporting victims from the entrance to the ground.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
8. **Non-elevated Entrance Configuration**. The entrance is less than 4 ft. above grade, and the rescue team can normally transport victims.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐

SCOPE

This chapter defines the requirements for ensuring cranes and crane operators are fully qualified to protect the safety of all employees according to OSHA regulation 1926 Subpart CC Cranes and Derricks in Construction. The information included here is general in nature and applies to all cranes, hoists and mobile lifting devices. Always refer to the manufacturers' information for specific requirements of the equipment being used.

POLICY

This policy applies to crane operators, cranes, and other material handling equipment for the movement of material by hoisting.

EMPLOYER RESPONSIBILITIES

A Competent Person designated by the Company will have the authority over all crane and hoisting operations. The competent person will ensure that all safety measures and systems are in place; all safety procedures are adhered to, and make sure regular inspections of the crane, operational site and rigging equipment are made.

- An employer must limit the use of a crane to the following personnel:
  - An employee who has been trained and qualified in safe operating procedures for the type of crane they will be using
  - A trainee who is under the direct supervision of a designated operator
  - Designated maintenance personnel while performing their duties
- Employers must maintain a crane and its accessories in good condition
- The original safety factor of equipment must not be reduced if modifications or changes are made to the equipment. Modifications or changes must be certified by a qualified registered engineer. The capacity, operation and maintenance instruction plates, tags or decals must be changed accordingly to reflect any modifications or changes
- The manual provided by the crane manufacturer must be readily accessible for the crane operator's reference at the work site
- A load-rating chart must be permanently mounted in the cab of each crane, easily readable from the operator's normal operating station
- Certified written operational and rated load tests will be obtained from the manufacturer and kept available with the equipment. Equipment will be re-tested after any structural repairs or modifications which may only be made by the manufacturer or technician certified by the manufacturer
- The Company will comply with the manufacturer's specifications and limitations. If specifications are not available, a qualified engineer will determine the equipment's limitations, which must be documented and recorded. Attachments used with cranes must not exceed the capacity, rating, or scope recommended by the manufacturer

- Obtain all necessary permits and operator certifications for using fixed and mobile cranes. These will depend on the size and rated capacity of the crane, as well as the regulatory agency with jurisdiction (state or federal OSHA)
- A preventive maintenance program based on the crane manufacturer's recommendations will be established, and performed
- Any unsafe condition found during an inspection must be corrected by a trained and qualified employee or crane Service Company before the crane is put into operation. Designated repair personnel must have a permit to operate the type of crane being serviced. Maintenance records will be kept of all repairs and replacements
- Before any servicing or maintenance of equipment is done, personnel will perform proper applicable lockout/blockout/tagout procedures to ensure the safety of all workers

OPERATOR RESPONSIBILITIES

An employee selected to operate a crane must possess all of the following minimum physical qualifications and be examined for the qualifications at least once every 3 years:

- Have corrected vision that meets the same requirements as for the applicable state’s driver's license (possession of a state driver's license or doctor's certificate covers this requirement)
- Have effective use of all four limbs
- Be of a height sufficient to operate the controls and to have an unobstructed view over the controls into the work area
- Have coordination between eyes, hands, and feet
- Be free of known convulsive disorders and episodes of unconsciousness
- Be able to understand signs, labels, and instructions

INSPECTIONS

The Company requires a visual crane inspection before each shift by a designated competent person to ensure that the crane is working properly. Required crane inspections include initial, pre-use, monthly, quarterly and annual. Supporting inspection logs will be kept to satisfy this requirement. The following will be checked:

- Control mechanisms for wear and malfunction, each daily use
- Deterioration or leakage of air or hydraulic systems, each daily use
- Hydraulic system for oil level, each daily use
- Hydraulic hoses and fittings for leaks and deterioration
- All running ropes, each daily use
- Replace a hook having a crack, a throat opening of more than 15% of normal or more than 10-degree twist from the plane of an unbent hook
- Rope reeving in conformance with the original installation
- Electrical apparatus for malfunction, wear, dirt, and moisture accumulations
- Tires for specified pressure
- The ground conditions

Monthly inspections will be made and documented by a designated competent person. The things to be inspected monthly include the following:

- Structural members and boom for cracks, deformation, and corrosion
- Bolts and rivets for tightness
- Sheaves, drums, pins, bearings, shafts, gears, rollers, locking and clamping devices for wear, distortion, and cracks
- Power sources for performance
- Brake and clutch system parts, linings, pawls, and ratchets for excessive wear
- Load, boom angle, and other indicators for inaccuracies over their full range
- Travel, steering, braking, and locking devices for malfunction
- Tires for wear or damage
- Radiators and oil coolers for leakage, blockage of air passages, and improper performance
- Rust on piston rods and control valves
- Oil strainers and filters for blockage

The documentation of monthly inspections must include the parts of the crane checked, the results of the inspection and the name and signature of the inspector with the date of the inspection.

Records of the documentation must be kept for at least 3 months.

Occasional and Out of Service Inspections

- A crane which has been idle more than 1 month, but less than 6 months will receive an inspection before being placed in service
- A crane, which has been idle more than 6 months, will receive an inspection before being placed in service
- A standby crane will be inspected at not less than 6-month intervals

ASSEMBLY AND DISASSEMBLY OF CRANES

Employer procedures must be developed by a qualified person and satisfy specific requirements: providing adequate support and stability for all parts of the equipment, and positioning employees involved to minimize exposure to any unintended movement or collapse.

Follow all manufacturer established procedures when assembling and disassembling cranes. You must follow manufacturer procedures when using synthetic slings during assembly or disassembly rigging. Synthetic slings must be protected from abrasive, sharp or acute edges and configurations that might reduce the sling’s rated capacity.

Procedures

All assembly/disassembly work will be supervised by an A/D (Assembly/Disassembly) director. The A/D director must meet the criteria for both a competent person and a qualified person or be a competent person assisted by a qualified person.

The A/D director must:

- Understand the applicable procedures
- Review procedures immediately prior to beginning work unless they understand the procedures and has used them before for that equipment type and configuration
- Ensure that each crew member understands their tasks, the hazards, and any hazardous positions or locations to avoid
- Verify all capacities of any equipment used, including rigging
- Address hazards associated with the operation, including 12 specified areas of concern: site and ground conditions, blocking material, proper location of blocking, verifying assist crane loads, boom and jib pick points, center of gravity, stability upon pin removal, snagging, struck by counterweights, boom hoist brake failure, loss of backward stability and wind speed and weather

Inspection

Before using the completed assembly, the qualified person will inspect the assembly to ensure it is configured in accordance with the manufacturer equipment criteria. If the criterion is unavailable, the qualified person, with the assistance of a registered professional engineer, must develop the appropriate configuration criteria and ensure they are met.

Tests for Cranes

A crane, prior to initial use and after modification, will be given an operational test to insure compliance, including the following:

- Load hoisting and lowering mechanisms
- Boom hoisting and lowering mechanisms
- Travel mechanism
- Safety devices
- Boom extension mechanisms for a mobile hydraulic crane

A test load will not exceed 110% of the rated load at any working radius.

Results of operational tests and load tests will be kept at the job site.

Where re-rating is necessary, it will not be in excess of the original load rating unless a letter of approval is obtained from the manufacturer and maintained at the job site.

SAFE PRACTICES

The Company will verify that before operations begin, the proper safety devices are installed on the crane and in proper working order. If any of the safety devices such as but not limited to; the crane level indicator, boom stops, jib stops, foot pedal brake locks or horns are not in proper working order, the crane must be taken out of service and operation will not be used until it’s deemed in proper working order.

- Our Company will comply with the manufacturer's procedures, specifications and limitations applicable to the operation of all cranes and derricks. Where manufacturer's specifications are not available, the limitations assigned to the equipment will be based on the determinations of a qualified engineer competent in this field and those determinations will be documented and recorded. Attachments used with cranes will not exceed the capacity, rating or scope recommended by the manufacturer
- Rated load capacities, recommended operating speeds, special hazard warnings or instructions and the operations manual for the crane will be kept in the cab of the crane at all times
- Hand signals to crane and derrick operators will be those prescribed by the applicable American National Standards Institute (ANSI) standard for the type of crane in use. An illustration of the signals will be posted at the job site
- The designated competent person will inspect all machinery and equipment before each use, and during use, to make sure it’s in safe operating condition. Any deficiencies will be repaired, or defective parts replaced, before being returned to use
- The Company will maintain a crane and its accessories in a safe condition
- A thorough, annual inspection of the hoisting machinery will be made by the designated competent person, a government or private agency recognized by the U.S. DOL. The Company will keep all dates and results of inspections for each hoisting machine and piece of equipment
- Whenever internal combustion engine powered equipment exhausts in enclosed spaces, tests will be made and recorded to see that employees are not exposed to unsafe concentrations of toxic gases or oxygen deficient atmospheres
- A portable dry powder fire extinguisher with at least a 5 BC rating, or higher, will be available in the cab, in the operating enclosure, or on the unit. The operator and maintenance employees will be trained in its use
- Modifications or additions that affect the safe operation of the equipment may not be made without the manufacturer's written approval. The original safety factor of the equipment must not be reduced if modifications or changes are made to the equipment. Modifications or changes will be certified by a qualified registered engineer. The capacity, operation and maintenance instruction plates, tags or decals will be changed accordingly to reflect any modifications or changes

Operators have the authority to stop or refuse to handle loads if they feel that the operation jeopardizes safety concerns. The operations must not proceed until a qualified person deems that the safety is assured.

Hazard Identification and Risk Assessment

The Company will ensure that a competent person conducts hazard identification and a designated risk assessment before work begins. Boundaries of the work zone must be identified by marking with flags and range limiting devices. The work zone must be defined using a 360-degree radius around the crane or the max radius of the crane.

Where the assessment identifies that the crane has the potential to hit and injure or pin/crush a worker against an object, the hazardous areas of the crane swing radius will be marked with warning lines or railings.

If the assessment identifies that the crane, load line, load or any part of the crane could get closer than 20 feet to an electrical power line, the following measures must be followed:

- Any overhead wire will be considered an energized line until a representative of the owner or utility has checked and indicated otherwise
- Before any crane operation is started closer than 20 feet to a power line the owner or utility representative will be notified
- Arrangements will be made with the utility operator/owner to de-energize and ground them.
- Except where electrical power lines and equipment have been de-energized and visibly grounded at the point of work or where an insulating barrier, not a part of the crane has been erected, or the employee is insulated or isolated from the crane, a crane will maintain the following clearances:

Voltage (KV)	Minimum Clearance Distance (Feet)
Up to 50	10
50 to 200	15
200 to 350	20
350 to 500	25
500 to 750	35
750 to 1000	45
Over 1000	As established by the line owner

Signal Person

A signal person is required when:

- The point of operation is not in full view of the operator
- The operator's view is obstructed in the direction the equipment is traveling
- Either the operator or the person handling the load determines that a signal person is needed because of site-specific safety concerns

The signal person is considered qualified if they:

- Know and understand the type of signals used at the worksite
- Are competent in using these signals
- Understand the operations and limitations of the equipment, including the crane dynamics involved in swinging, raising, lowering and stopping loads and in boom deflection from hoisting loads
- Know and understand the relevant signal person qualification requirements specified in 1926 subpart CC
- Passes an oral or written test and a practical test

Employers must use one of the following options to ensure a signal person is qualified

- Third party qualified evaluator. The signal person has documentation from a third party qualified evaluator showing that he or she meets the qualification requirements
- The employer's qualified evaluator (not a third party) assesses the individual, determines the individual meets the qualification requirements and provides documentation that specifies each type of signaling for which the signal person is qualified under the requirements of the standard

An operator will respond to signals only from the employee directing a lift. However, they must obey at all times an emergency stop signal from any employee. When two or more cranes are used to lift a load, a designated employee will give all signals.

General Crane Operations

An equipment operator will be familiar with the equipment and its proper care. If adjustments or repairs are necessary or if any defects are known, the operator will report the needed adjustments or repairs or the defects to the responsible supervisor and, upon changing shifts, notify the next operator of the defects.

An operator will test all controls before beginning a new shift. Any controls that do not operate properly will be adjusted or repaired before operations are begun.

No one under eighteen years of age will be employed to operate any power-driven hoisting equipment or assist in hooking on, loading slings or rigging operations.

Operators will not engage in any practice that will divert their attention while operating equipment. The operator will not eat, smoke or read while operating of the crane, or when physically unfit.

Equipment operators will be responsible for all operations under their direct control. When there is any doubt as to safety, an operator will stop operations and consult with the supervisor before continuing work.

Equipment operators will not leave a crane unattended unless the responsible supervisor notifies them that it is safe to do so. Before leaving, the operator will:

- Land any attached load
- Disengage clutches
- Put the controls in the off or neutral position
- Open the main switch or stop the engine
- Engage manual locking devices, in the absence of automatic holding equipment, and the crane is secured against accidental travel

When a tag or lock is on the switch or engine starting controls, the operator will not close the switch or the person who placed it there has removed start operations until the lock or tag.

Before closing the switch or starting the equipment, an operator will put all controls in the off or neutral position and will make sure that all personnel are in the clear.

If power fails during operation, an equipment operator will do all of the following:

- Set all brakes and locking devices

- Move all clutch or other power controls to the off or neutral position
- Communicate with the responsible supervisor in charge of equipment operations
- If practical, and applicable, land the load under brake control

An operator will respond to signals only from the designated signalman using appropriate signals, except where voice communications equipment is used. An operator will obey a stop signal from anyone. Operating signals will follow an established standard. Whistle signals can be used where only one crane is in operation.

A crane will be equipped with an audible signaling device that will be actuated before traveling without a signalperson and intermittently during travel. When moving a crane, the following signals will be used:

- Stop, 1 audible signal
- Go ahead, 2 audible signals
- Back up, 3 audible signals
- The operator, or maintenance personnel, will properly lubricate all working parts of the crane
- Cranes will be kept clean
- Whenever the operator finds the main or emergency switch open, it will not be closed; even when starting on regular duty, until it is determined that, no one is on or near the crane. The crane will not be oiled or repaired unless the main switch is open
- If the power goes off, the operator will immediately throw all controllers to the “OFF” position until the power is again available
- Before closing the main switch, the operator will make sure that all controllers are in the “OFF” position until the power is again available
- When lowering a load, the operator will proceed carefully and make sure the load is under safe control
- When leaving the cage, the operator will throw all controllers to the “OFF” position and open the main switch
- All necessary operator clothing and personal belongings will be stored so that they don’t interfere with access or operation
- Tools, oil cans, waste, extra fuses and other necessary articles will be stored in the tool box, and will not be permitted to lie loose in or about the cab
- The safety coordinator will ensure that operators are trained in the operation and care of the fire extinguishers provided
- A legible rating chart will be provided at the operator station showing the following information:
  - Load capacity relating to corresponding boom angles and operating radii for all boom lengths, jib lengths and angles. Where optional equipment, such as outriggers or extra counterweights are provided by the manufacturer, alternate ratings will be provided
  - Where structural competence limits the ratings, such information will be shown on the chart
  - The required parts of line for hoist reeving, including the size and construction of rope will be on the rating chart or in the operating manual
- A crane will not be operated with more than the designed amount of ballast or counterweight. The amount of ballast or counterweight will not be changed without authorization of the manufacturer in writing and making corresponding changes in the rating chart

- When assembling or disassembling a boom on the ground, it will be blocked to prevent dropping the boom and boom sections
- When a boom section is manually telescoped it will be positioned so through and through pinning of the cylinder eye may be accomplished and will be checked in a horizontal position
- When 2 or more cranes are used to lift a single load, one designated employee will direct the rigging, lift, and movement
- A locomotive crane will not be rotated into a position where other rail cars on an adjacent track might strike it, except when it has been verified that cars are not moving on the adjacent track and flag protection has been provided
- Specified tire pressures will be maintained

Outriggers and Stabilizers

- Outriggers and stabilizers must be fully extended or, if permitted by manufacturer procedures, deployed as specified in the load chart
- Set outriggers to remove equipment weight from the wheels, except for locomotive cranes. Outrigger floats, if used, must be attached to the outriggers, stabilizer floats, if used, must be attached to the stabilizers
- Each outrigger or stabilizer must be visible to the operator or to a signal person during extension and setting
- Place outrigger and stabilizer blocking under the float/pad of the jack or, if there is no jack, under the outer bearing surface of the outrigger or stabilizer beam. Blocking must be sufficient to sustain the loads and maintain stability and must be properly placed

Tower Cranes

Tower cranes are subject to additional requirements for erecting, climbing and dismantling, including a pre-erection inspection (29 CFR 1926.1435).

Attaching and Holding a Load

A load will be attached to the hook by means of a sling or other lifting device. The hoist rope will not be wrapped around a load except when setting or removing a pole.

Before starting to hoist, the operator will make sure:

- The hoist rope is not kinked
- The multiple part lines are not twisted around each other
- The hook is not swinging when brought over the load

No employees are permitted to pass or stand under a suspended load.

An operator will not load a crane beyond the rated load. A load that’s limited by structural competence rather than by stability will be checked by the operator to determine that the weight does not exceed the rated load.

Moving a Load

- When moving a load, an operator will avoid sudden acceleration and deceleration of a movements that would cause a swinging action by the load
- An operator will not move a load or hook if an employee is on it
- A load will be secured and balanced before it is lifted more than 6 inches
- An operator will test the hoisting brakes before moving a near rated load by raising the load a few inches and applying the hoisting brakes. This requirement applies to both single or multiple line reeving
- A load or boom will not be lowered below a point where less than 2 full wraps of rope remain on the drum
- A load will not be moved in a manner that would allow it to contact obstructions
- The rotational speed of a crane must not allow the center of the load to swing out beyond the radius of the point sheave in use
- A tag line will be used when rotation of the load would be hazardous
- A crane will not be used for dragging a load sideways
- Loads will not be lifted over the front area of a truck crane, unless it is within the capacity of the rating chart for the front area of the truck crane
- Floats or pads secured to outriggers will be used when the load to be handled at a particular radius exceeds the rated load without outriggers. A wood block used to support an outrigger will be:
  - Large enough to prevent shifting and toppling of the load
  - Strong enough to resist crushing
  - Free of knots and cracks that could affect its ability to support the load
  - Before moving with a load, a designated employee will determine the position to carry the load, boom location, ground conditions, travel route, speed of movement and location of overhead wires
- A crane, while moving, from one location to another, will have:
  - The boom carried in line with the direction of movement
  - The superstructure secured against rotation, except when negotiating a turn with an operator in the cab or the boom on a dolly
  - An empty hook restrained against movement
  - A crane with or without a load will not travel with the boom at a height that would allow it to bounce back over the cab
  - A crane operating at a fixed radius will have the boom-hoist pawl or other positive locking device engaged

Refueling

A crane fuel tank will not be refueled while the engine is running.

When refueling is done with portable containers, the containers will be safety cans having automatic closing caps and be labeled as approved by underwriters' laboratories, Inc., factory mutual laboratory or other nationally recognized laboratory.

Smoking or other sources of sparks and flame will be kept at least 25 feet from a refueling operation.

WIRE ROPE AND SLING INSPECTION

Running ropes in continuous service will have an inspection at least once a month. The inspection will include: measurement of diameter of rope; count of broken wires in 1 lay when concentrated; end connections for broken wires; corrosion, kinking, crushing, cutting, or other conditions affecting the capability of the rope; cracked, bent, worn, corroded, or improperly applied end connectors.

For rope in contact with equalizer sheaves or saddles, or on sheaves where rope travel is limited, the inspection will include moving the rope from its normal position on the sheave and examining the rope at the rope contact point.

Inspection of a non-rotating type rope will include verifying that the wires are not broken or worn within the rope.

A rope that has been idle more than 1 month will be given a complete inspection before being placed in service.

GENERAL MAINTENANCE

The Company will establish and maintain a preventative maintenance program under the supervision of an authorized and trained employee or outside service.

Before adjustments and repairs to a crane are started, the following steps will be taken:

- The crane will be placed where it does not interfere with other operations
- A "warning" or "out of order" sign will be placed at the controls, and the controls will be in the "off" position. The sign is not needed if the energy source is locked out
- The power plant will be disconnected, locked out, or made safe by other means
- The boom will be lowered to the ground or otherwise secured against dropping
- All hydraulic cylinders used for boom hoist and boom telescope on a mobile hydraulic crane will be retracted
- Hydraulic oil pressure from all hydraulic circuits will be relieved before loosening or removing hydraulic components of a mobile hydraulic crane
- The load block will be lowered to the ground or otherwise secured against dropping, except when operation is necessary for the adjustment
- After adjustments and repairs have been completed, the crane will not be returned to operations until all guards have been installed, safety devices activated, trapped air removed from the hydraulic system of a mobile hydraulic crane and maintenance equipment and warning signs or locks are removed
- Hazardous conditions identified by the inspection requirements will be corrected before operation of the crane is resumed

- Adjustments will be maintained to assure correct functioning of operating mechanisms, safety devices, control systems, power plants and brakes and clutches
- The original safety factor will be maintained when repairs and replacements are made. Hooks showing defects will be replaced. Pitted or burned electrical contacts affecting their operations will be replaced in sets
- A crane or its wire rope will not be used as a ground or to carry current. The ground will be attached to the part being welded while welding

Wire Rope and Sling Maintenance

Running wire ropes will be replaced when they show:

- 6 random broken wires in 1 rope lay or 3 broken wires in 1 strand of a rope lay
- Wear of 1/3 of the original diameter of outside individual wires
- Kinking, crushing, or bird caging
- Heat damage
- Reduction in nominal diameter of 3/64 inch for ropes to 3/4 inch, 1/16 inch for ropes 7/8 inch to 11/8 inch, 3/32 inch for ropes 11/4 inch to 11/2

A standing wire rope will be replaced if it has:

- More than 2 broken wires in 1 lay section beyond an end connection
- 1 broken wire at an end connection

A wire rope having more than one broken wire at a socketed fitting will be re-socketed.

Wire rope will be stored in a way that prevents damage or deterioration, and handled in a manner to prevent kinking or twisting.

Before cutting preformed rope, a seizing will be placed on each side of the cut to prevent unlaying of the strands. On non-preformed rope 7/8 inch in diameter or smaller, 2 seizings will be placed on each side of the cut, and for non-preformed rope more than 7/8 inch in diameter, 3 seizings on each side will be used.

During installation, do not drag wire rope in dirt or around sharp objects.

TRAINING

The Company will verify that only certified employees are allowed to operate cranes. All employees that were certified prior to November 10th, 2017 must be recertified within 4 years of this date through one of the following:

- An accredited crane operator testing organization
- An audited program provided by the Company
- Have U.S. military licensing by a government authority

Operators not certified prior to November 10th, 2017 must be certified through one of these programs prior to being allowed to operate cranes for our Company.

Crane operators will be designated based on their experience and training, which must include the minimum amounts of classroom sessions and hands-on training including lubricating points, adjustments, principles of crane operators, load charts, hand signals and inspections. Training will include use of fire extinguishers.

Crane operator qualifications must be maintained and refreshed every five years and may include vision and medical condition evaluations.

Crane Operator Requirements and Qualifications

Operators must pass a written examination, understand and be able to use a load chart, as well as calculate loads for the crane type.

While the OSHA operator qualification regulation does not include physical requirements for operators, ASME B30-5 has established physical requirements for operators. These ASME requirements have endorsed by several professional organizations and may be included in some state regulations. Always check with the governing authority to determine the requirements for your worksite.

ASME B30-5 identifies the following minimum physical requirements for crane operators and trainees:

- Have corrected vision that meets the same requirements as vision for a valid driver's license. Possession of a driver's license or a doctor's certificate is evidence of meeting this requirement
- Be able to read and understand signs, labels, and instruction manuals
- They will be able to distinguish colors, regardless of position of colors, if color differential is required for operation
- Have depth perception be able to distinguish between red, yellow, and green
- Their hearing, with or without hearing aid, must be adequate for a specific operation
- Have vision of at least 20/30 Snellen in one eye and 20/50 in the other eye with or without glasses
- No history of disabling medical condition which may be sufficient reason for disqualification

Qualifications for crane operators will be maintained every four years and will include medical and vision evaluations.

SITE-SPECIFIC CRANE OPERATION PLAN

A site-specific operation plan must be created prior to any crane work. This plan will be developed by a competent person and reviewed by all involved parties. Employers should refer to the OSHA standard 1926.1400-1442 for specific crane requirements.

Please see below for the following documents:

- Site-Specific Crane Operation Plan Checklist
- Crane/Boom Inspection Report
- Recommended Hand Signals for Controlling Crane Operations

SITE-SPECIFIC CRANE OPERATION PLAN AND CHECKLIST (PAGE 1 OF 2)

Company		Job Name and Location	
Job Supervisor		Dates on Site	
Project Engineer		Qualified Person	
Crane Operator		Qualified Rigger	

Scope of Work					
Roofing	☐	Sq. Ft.		Tons	
Siding	☐	Sq. Ft.		Tons	
Decking	☐	Sq. Ft.		Tons	
General Miscellaneous	☐	Sq. Ft		Tons	

General Description of Work

Site Layout	Yes	No
1. Has controlling contractor provided adequate access to site?	☐	☐
2. Is laydown area firm, properly graded, well drained, and accessible?	☐	☐

Pre-Construction Site Conference	Yes	No
Has a Pre-Construction Site Conference been held?	☐	☐

Please list those attending:	

SITE-SPECIFIC CRANE OPERATION PLAN AND CHECKLIST (PAGE 2 OF 2)

Sequence of Crane Activity	
• Give a general sequence of crane activities:	
• Material delivery date	
• How will activities be coordinated with other trades:	
Cranes	
• Crane type:	
• Crane brand:	
• Crane capacity:	
• How is the site prepared for the crane?	
• How many different locations will the crane have and where are they?	
• What is the path for overhead loads?	
• How will employees be notified of overhead loads?	
• Are there any critical lifts? (75% of capacity or dual crane) How many?	Yes ☐ No ☐
• Describe critical lifts:	
• Are lift permits attached for critical lifts?	Yes ☐ No ☐
• Are lift permits attached for all lifts over 5,000 lbs.	Yes ☐ No ☐

Crane Inspection Report

Use only equipment which is in safe working condition. DO NOT operate equipment if any inspected items need repair.

	Time:	Date:
Job Site Location:		
Operator's Name:	**Supervisor's Name:**	
Inspector(s) Name:	**Hour Meter Reading:**	
Subcontractors On-Site (List Name and Trade):		
Equipment Type:	**Equipment I.D. Numbers:**	**Manufacturer:**

OK	REPAIR	N/A	GENERAL SITE INFORMATION:
☐	☐	☐	Safety Program Manual on site?
☐	☐	☐	Are required OSHA Posters posted?
☐	☐	☐	Emergency Phone numbers posted?
☐	☐	☐	Tailgate/Toolbox talks up-to-date?
☐	☐	☐	Site Lift Plan completed?

OK	REPAIR	N/A	GENERAL SITE INFORMATION:
☐	☐	☐	Hazard assessment of work area?
☐	☐	☐	Controls in place for identified hazards?
☐	☐	☐	Crane swing areas signed and barricaded?
☐	☐	☐	Operator's manual on lift?
☐	☐	☐	Prelift meeting completed?

OK	REPAIR	N/A	CARRIER VEHICLE:
☐	☐	☐	Motor
☐	☐	☐	Crank case oil is clean and full
☐	☐	☐	Clutch /Converter
☐	☐	☐	Drive Line
☐	☐	☐	Transmission fluid at proper level
☐	☐	☐	Frame
☐	☐	☐	Brakes
☐	☐	☐	Differentials
☐	☐	☐	Outriggers
☐	☐	☐	Engine coolant is about 2" below cap

OK	REPAIR	N/A	CARRIER VEHICLE:
☐	☐	☐	Cab
☐	☐	☐	Steering
☐	☐	☐	Lights
☐	☐	☐	Fire Extinguisher
☐	☐	☐	Glass
☐	☐	☐	Warning Lights
☐	☐	☐	Access
☐	☐	☐	Rims & Bolts
☐	☐	☐	Cuts or bulges in the tires
☐	☐	☐	Tires properly inflated (look on load charts for MFGR recommendations)

OK	REPAIR	N/A	HYDRAULICS:
☐	☐	☐	Relief Valve(s)
☐	☐	☐	Restrictor Valves
☐	☐	☐	Pipe Lines
☐	☐	☐	Hose Lines
☐	☐	☐	Outrigger Cylinders
☐	☐	☐	Boom Hoist Cylinder
☐	☐	☐	Boom Crowd Cylinder
☐	☐	☐	Control Valves
☐	☐	☐	Swing Motor

OK	REPAIR	N/A	HYDRAULICS:
☐	☐	☐	Hoist Motor
☐	☐	☐	Pumps
☐	☐	☐	Bearings
☐	☐	☐	Check hydraulic oil level
☐	☐	☐	Mounting Bolts
☐	☐	☐	Swing Gear
☐	☐	☐	Swing Pinion
☐	☐	☐	Seals - Hydraulic

OK	REPAIR	N/A	BOOM:
☐	☐	☐	Shipper Welds
☐	☐	☐	Boom Welds
☐	☐	☐	Pins - Boom Pivot
☐	☐	☐	Support Roller
☐	☐	☐	Boom Pins

OK	REPAIR	N/A	BOOM:
☐	☐	☐	Bearing Sheave
☐	☐	☐	Load Block Sheave
☐	☐	☐	Load Block Hook
☐	☐	☐	Boom Main Section

OK	REPAIR	N/A	WEDGE SOCKETS:
☐	☐	☐	Wire rope size and wedge socket is a proper match?
☐	☐	☐	Dead end of wire rope extends at least 9 inches beyond wedge socket?
☐	☐	☐	Dead end of the wire rope is secured properly?

OK	REPAIR	N/A	SHEAVES:
☐	☐	☐	The wire rope is seated properly in the sheaves?
☐	☐	☐	The wire rope keepers (keeps cable from coming out of the sheaves) are in good shape?
☐	☐	☐	Check the bolts on the sheave plates for tightness?
☐	☐	☐	Check for any weld cracks?
☐	☐	☐	Signs of bent or buckled panels or parts?
OK	**REPAIR**	**N/A**	**OPERATIONAL CHECKS:**
☐	☐	☐	Crane operators' logs up-to-date and on-site?
☐	☐	☐	Operators familiar with load charts?
☐	☐	☐	Load chart is in cab?
☐	☐	☐	Hand signal charts on crane?
☐	☐	☐	Handrails leading into crane cab are good condition?
☐	☐	☐	Out riggers are extended out; working properly?
☐	☐	☐	Out rigger pads not cracked?
☐	☐	☐	Outriggers extended & swing radius barricades in place?
☐	☐	☐	Hydraulic hoses in good condition?
☐	☐	☐	The drum cable is properly spooled?
☐	☐	☐	Boom angle indicator is available and working?
☐	☐	☐	Swing through 360 degrees, does boom angle indicator stay the same throughout rotation?
☐	☐	☐	Does boom swing brake work properly?
☐	☐	☐	Back-up alarm is working?
☐	☐	☐	Does the horn work?
☐	☐	☐	Engine started, gauges are checked & working properly?
☐	☐	☐	Crane is leveled, working properly?
☐	☐	☐	Boom up, unlock the swing break, does it swing when level?
☐	☐	☐	Extend out the boom, are all sections extending evenly?
☐	☐	☐	Brakes & brake systems check out?
☐	☐	☐	Safety pressure relief valves check out?
☐	☐	☐	Is equipment a safe distance from edge of trench or excavation?
OK	**REPAIR**	**N/A**	**MATERIALS HANDLING:**
☐	☐	☐	Chains and slings inspected and tagged as required?
☐	☐	☐	Employees kept from under suspended loads?
☐	☐	☐	Materials properly stored or stacked?
☐	☐	☐	Employees using proper lifting methods?
☐	☐	☐	Tag lines used to guide loads?
OK	**REPAIR**	**N/A**	**HOOKS – Replace If:**
☐	☐	☐	If hook throat opening has increased by 15%
☐	☐	☐	If load-bearing point (throat) has been worn by 10%, the hook must be replaced.
☐	☐	☐	If hook tip is twisted by 10° or more, the hook must be replaced.
☐	☐	☐	Check for excessive damage from chemicals and for deformation and cracks.
☐	☐	☐	Check for and replace damaged, inoperative, or missing hook latches.

Unsafe Conditions, Situations, Acts, or Practices Observed: _____

_____

Comments: _____

_____

_____ _____

Signature (person performing inspection/evaluation if different from operator) **Date**

_____ _____

Operator's Signature **Date**

TRAINING RECORD

Trainer:	
Signature:	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

Demolition is an inherently hazardous process that requires careful planning. This chapter provides information on the safe work practices and requirements for all employees performing demolition work. The practices and procedures in this chapter will comply with the OSHA regulations contained in 1926 Subpart T, and the applicable regulations of Subpart U.

POLICY

This policy has been established to prevent injury and illnesses for employees engaged in demolition activities, and protect the public from potential hazards involved.

EMPLOYER RESPONSIBILITIES

This Company will:

- Provide all available descriptions of building to be demolished
- Obtain necessary approvals and permits. A permit may be required for the demolition/dismantling of any building, structure, scaffolding, or falsework more than three stories or 36 feet high
- Define extent of work
- Notify owners of neighboring structures before demolition
- Locate services
- Identify and notify employees and contractors of any hazardous materials or hazardous conditions onsite
- Plan work, select method of demolition, define appropriate means of material disposal and provide for adequate supervision of workers
- Notify the state OSHA division at least 24 hours before beginning any asbestos-related demolition work in which more than 100 sq. ft. of asbestos-containing material (greater than 0.1 percent asbestos by weight) will be disturbed.
- Secure worksite against unauthorized entry
- Ensure every employee is working in a safe environment and has the necessary training, equipment and supervision to perform their job safely

EMPLOYEE RESPONSIBILITIES

Employees are expected to:

- Follow all safety precautions, training and supervisor instructions
- Use appropriate PPE
- Make sure all equipment and machinery is guarded before use
- Keep tools in good repair
- Report any hazardous conditions or unsafe acts to a supervisor
- Verify all co-workers are clear before beginning work that may endanger others
- When uncertain, verify location of utilities with supervisor

- Keep unauthorized individuals from work site
- Report accidents immediately
- Understand all emergency procedures and know the location of exits, fire extinguishing equipment, and communication means before beginning work

HEALTH HAZARDS

The following are examples of health hazards that may be found during demolition that may require additional safety precautions as dictated by OSHA regulations and industry best practices:

- Asbestos dust
- Lead paint
- Fumes from gas cutting galvanized steel
- Polychlorinated biphenyls
- Synthetic mineral fibers
- Toxins from previous industrial processes
- Silica dust

PERSONAL PROTECTIVE EQUIPMENT

All employees engaged in demolition work will be provided with the necessary PPE, which will include, but is not limited to:

- Suitable non tear clothing
- Gloves appropriate for the task
- Safety glasses or goggles
- Hardhat
- Hearing protection
- Dust mask

PLANNING

Before demolition, an engineering survey of the structure must be conducted by a competent person to determine the condition of the framing, floors, and walls so measures can be taken, if necessary, to prevent the premature collapse of any portion of the structure. The demolition contractor must maintain a written copy of this survey.

Adjoining Buildings

When necessary, any adjacent structure(s) or improvements should also be surveyed. Nearby buildings may be susceptible to damage, and care must be taken to ensure adjacent buildings are unharmed by demolition activities. Photographing existing damage in neighboring structures is advisable.

Hazard Identification

The engineering survey allows evaluation of the entire job. The contractor should plan for the wrecking of the structure, the equipment to do the work, work force requirements and the protection of the public. The safety of all employees on the job site is be a prime consideration. During the preparation of the engineering survey, the contractor will plan for potential hazards such as fires, cave-ins and injuries.

Damaged Structures

If the structure to be demolished has been damaged by fire, flood, explosion or some other cause, appropriate measures, including bracing and shoring of walls and floors will be taken to protect workers and any adjacent structures.

Hazardous Substances

The presence of any type of hazardous chemicals, gases, explosives, flammable material or similar dangerous substances that have been used or stored on the site will be determined before any work begins. If the nature of a substance cannot be easily determined, samples will be taken and analyzed by a qualified person prior to demolition.

Safety Planning

During the planning stage of the job, all safety equipment needs will be determined. The required number and type of respirators, lifelines, warning signs, safety nets, special face and eye protection, hearing protection and other worker protection devices will be determined during the preparation of the engineering survey. A comprehensive plan is necessary for any confined space entry.

Utility Location

All electric, gas, water, steam, sewer and other service lines will be shut off, capped or otherwise controlled, at or outside the building before demolition work is started. Any utility Company involved must be notified in advance, and its approval or services, if necessary, will be obtained.

If it is necessary to maintain any power, water or other utilities during demolition, such lines will be temporarily relocated as necessary and/or protected. The location of all overhead power sources will also be determined, as they can prove especially hazardous during machine demolition. All employees will be informed of the location of existing or relocated utility services.

MEDICAL SERVICES AND FIRST AID

Before starting work, provisions will be made for prompt medical attention in case of serious injury. The nearest hospital, infirmary, clinic, or physician shall be located as part of the engineering survey. The job supervisor will be provided with instructions for the most direct route to these facilities. Proper equipment for prompt transportation of an injured worker, as well as a communication system to contact any necessary ambulance service, must be available at the job site. The telephone numbers of the hospitals, physicians or ambulances must be conspicuously posted.

First Aid Training

In the absence of an infirmary, clinic, hospital or physician that is reasonably accessible in terms of time and distance to the work site, a person who has a valid certificate in first aid training from the American Red Cross or equivalent training will be available at the work site to render first aid.

First Aid Equipment

A properly stocked first aid kit as determined by an occupational physician must be available at the job site. The contents of the kit will be checked before being sent out on each job and at least weekly to ensure the expended items are replaced. Provisions will also be made to provide for quick drenching or flushing of the eyes should any person be working around corrosive materials.

Police and Fire Contact

The telephone numbers of the local police, ambulance, and fire departments should be available at each job site. This information can prove useful to the job supervisor in the event of any traffic problems, such as the movement of equipment to the job, uncontrolled fires or other police/fire matters. The police number may also be used to report any vandalism, unlawful entry to the job site, or accidents requiring police assistance.

FIRE PREVENTION AND PROTECTION

A "fire plan" should be set up prior to beginning a demolition job. This plan should outline the assignments of key personnel in the event of a fire and provide an evacuation plan for workers on the site. Common sense should be the general rule in all fire prevention planning, as follows:

- All potential sources of ignition should be evaluated and the necessary corrective measures taken
- Electrical wiring and equipment for providing light, heat, or power should be installed by a competent person and inspected regularly
- Equipment powered by an internal combustion engine should be located so that the exhausts discharge well away from combustible materials and away from workers
- When the exhausts are piped outside the building, a clearance of at least six inches should be maintained between such piping and combustible material
- All internal combustion equipment should be shut down prior to refueling. Fuel for this equipment should be stored in a safe location
- Sufficient firefighting equipment should be located near any flammable or combustible liquid storage area
- Only approved containers and portable tanks should be used for the storage and handling of flammable and combustible liquids

Heating devices should be situated so that they are not likely to overturn and shall be installed in accordance with their listing, including clearance to combustible material or equipment. Temporary heating equipment, when utilized, should be maintained by competent personnel.

Smoking should be prohibited at or near hazardous operations or materials. Where smoking is permitted, safe receptacles will be provided for smoking materials.

Roadways between and around combustible storage piles should be at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other materials. When storing debris or combustible material inside a structure, such storage shall not obstruct or adversely affect the means of exit.

A suitable location at the job site should be designated and provided with plans, emergency information and equipment, as needed. Access for heavy fire-fighting equipment should be provided on the immediate job site at the start of the job and maintained until the job is completed.

Fire Extinguishing Preparation

Free access from the street to fire hydrants and to outside connections for standpipes, sprinklers, or other fire extinguishing equipment, whether permanent or temporary, should be provided and maintained at all times, as follows:

- Pedestrian walkways should not be so constructed as to impede access to hydrants
- No material or construction should interfere with access to hydrants, Siamese connections, or fire-extinguishing equipment

A temporary or permanent water supply of volume, duration and pressure sufficient to operate the fire-fighting equipment properly should be made available. Standpipes with outlets should be provided on large multi-story buildings to provide for fire protection on upper levels. If the water pressure is insufficient, a pump should also be provided.

An ample number of fully charged portable fire extinguishers should be provided throughout the operation. All motor-driven mobile equipment should be equipped with an approved fire extinguisher.

Alarm System

An alarm system, e.g., telephone system, siren, two-way radio, etc., shall be established in such a way that employees on the site and the local fire department can be alerted in case of an emergency. The alarm code and reporting instructions will be conspicuously posted and the alarm system should be serviceable at the job site during the demolition. Fire cutoffs must be retained in the buildings undergoing alterations or demolition until operations necessitate their removal.

OTHER SITE CONSIDERATIONS

- Illuminate all work areas appropriately, especially stairs, ladders, scaffolds and other areas where tripping hazards would pose significant hazard
- Guard wall openings to a height of 42 inches
- Cover and secure floor openings with material able to withstand the loads likely to be imposed
- If debris will be dropped through holes in the floor without the use of chutes, it must be completely enclosed with barricades not less than 42 inches high and not less than 6 feet back from the projected edge of the opening above
- Floor openings used for material disposal must not be more than 25% of the total floor area
- Use enclosed chutes with gates on the discharge end to drop material to the ground
- Design and construct chutes that will withstand the loads likely to be imposed without failing.
- Post signs at each level of structures, warning of the hazard of falling materials
- Protect entrances to multi-story structures with sidewalk sheds or canopies for a minimum of 8 feet. Canopies must be at least 2 feet wider than the structure entrance and be able to hold a load of 150 lbs. /sq. ft.

- Storage of material and debris must not exceed the allowable floor load
- Scaffolds must be equipped with appropriate means to protect passersby and workers from falling debris according to OSHA regulations
- Ensure scaffolds do not rely on the structural integrity of parts of the building that will be demolished
- Remove all glass from the site (windows, doors, skylights, fixtures) before demolition commences
- Remove combustible material and debris before demolition begins as well

SAFE PRACTICES

All employees are expected to follow these safe practices when performing demolition work.

Removing Walls and Masonry Sections

Demolition of exterior walls and floors must begin at the top of the structure and proceed downward. Masonry walls must not be permitted to fall on the floors of a building in masses that would exceed the safe carrying capacities of the floors.

No wall section, one story in height or higher, will be permitted to stand alone without lateral bracing, unless the wall was designed and constructed to stand without such support, and is safe enough to be self-supporting. All walls must be left in a stable condition at the end of each work shift. Employees shall not work on the top of a wall when weather conditions create a hazard.

Structural or load-supporting members on any floor must not be cut or removed until all stories above such a floor have been removed. In buildings of “skeleton-steel” construction, the steel framing may be left in place during the demolition of masonry. Walkways or ladders must be provided to enable workers to safely reach or leave any scaffold or wall.

Walls, which serve as retaining walls to support earth or adjoining structures, must not be demolished until the supporting earth has been properly braced or until adjoining structures have been properly underpinned. Walls, which will serve as retaining walls against which debris will be piled, must not be used unless they are capable of supporting the imposed load.

Dismantle steel construction column length by column length, and tier by tier.

Mechanical Demolition

No workers are permitted in any area when using a crane’s headache ball or clamshell to remove debris. Only workers necessary to perform such operations will be permitted in this work area at any time.

The weight of the demolition ball must not exceed 50 percent of the crane’s rated load. The crane boom and load-line must be as short as possible. The ball must be attached to the load-line with a swivel-type connection to prevent twisting of the load-line, and it must be attached by positive means in such a manner that the weight cannot become accidentally disconnected.

Ensure the cab of the crane used for mechanical demolition protects the operator from flying debris

Pulling Over Walls

When pulling over walls or portions thereof, all steel members affected must have previously been cut free. All roof cornices or other such ornamental stonework must be removed prior to pulling walls over.

Continued Inspections

During demolition, continuing inspections by a competent person will be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, or walls, or loosened material. No employee will be permitted to work where such hazards exist until they are corrected by shoring, bracing or other effective means.

Other Precautions during Demolition

- Do not leave structures in a condition where they are susceptible to collapse from ambient vibration, or natural forces like wind or earthquake
- Ensure unauthorized people are kept from the site during demolition. If people are permitted to remove or purchase materials from the site, ensure their safety
- Ensure necessary precautions are taken against harmful noise
- Keep dust under control by watering down debris frequently

SPECIAL STRUCTURES

When preparing to demolish any chimney, stack, silo or cooling tower, the first step must be a careful, detailed inspection of the structure by an experienced person. If possible, architectural/engineering drawings should be consulted. Particular attention should be paid to the condition of the chimney or stack. Workers should be on the lookout for any structural defects such as weak or acid-laden mortar joints, and any cracks or openings. The interior brickwork in some sections of industrial chimney shafts can be extremely weak. If stack has been banded with steel straps, these bands will be removed only as the work progresses from the top down. Sectioning of the chimney by water, etc. should be considered.

- When hand demolition is required, it should be carried out from a working platform
- Experienced personnel must install a self-supporting tubular scaffold, suspended platform or knee-braced scaffolding around the chimney. Particular attention should be paid to the design, support, and tie-in (braces) of the scaffold
- A competent person should be present at all times during the erection of the scaffold
- It is essential that there be adequate working clearance between the chimney and the work platform
- Access to the top of the scaffold should be provided by means of portable walkways
- The platforms should be decked solid and the area from the work platform to the wall should be bridged with a minimum of two-inch thick lumber
- A back rail 42 inches above the platform, with a mid-rail covered with canvas or mesh should be installed around the perimeter of the platform to prevent injury to workers below. Debris netting may be installed below the platform

- Excess canvas or plywood attachments can form a wind-sail that could collapse the scaffold
- When working on the work platform, all personnel should wear hard hats, long-sleeve shirts, eye and face protection (such as goggles and face shields), respirators, and safety belts, as required
- Care should be taken to assign the proper number of workers to the task. Too many people on a small work platform can lead to accidents

An alternative to the erection of a self-supporting tubular steel scaffold is to "climb" the structure with a creeping bracket scaffold. A competent person must make careful inspection of the masonry and a decision as to the safety of this alternative. It is essential that the masonry of the chimney be in good enough condition to support a bracket scaffold.

The area around the chimney should be roped off or barricaded and secured with appropriate warning signs posted. No unauthorized entry will be permitted to this area. It is also good practice to keep a worker, i.e., a supervisor, operating engineer, another worker or a "safety person", on the ground with a form of communication to the workers above.

Special attention should be paid to weather conditions when working on a chimney. No work should be done during inclement weather such as during lightning or high wind situations. The work site should be wetted down, as needed, to control dust.

Debris Clearance

If debris is dropped inside the shaft, it can be removed through an opening in the chimney at grade level.

- The opening at grade must be kept relatively small in order not to weaken the structure. If a larger opening is desired, a professional engineer should be consulted
- When removing debris by hand, an overhead canopy of adequate strength should be provided. If machines are used for removal of debris, proper overhead protection for the operator should be used
- Excessive debris should not be allowed to accumulate inside or outside the shaft of the chimney as the excess weight of the debris can impose pressure on the wall of the structure and might cause the shaft to collapse
- The foreman should determine when debris is to be removed, halt all demolition during debris removal, and make sure the area is clear of cleanup workers before continuing demolition

Demolition by Deliberate Collapse

Another method of demolishing a chimney or stack is by deliberate collapse. Deliberate collapsing requires extensive planning and experienced personnel, and should be used only when conditions are favorable. There must be a clear space for the fall of the structure of at least 45 degrees on each side of the intended fall line and 1½ times the total height of the chimney. Considerable vibration may be set up when the chimney falls, so there should be no sewers or underground services on the line of the fall. Lookouts must be posted on the site and warning signals must be arranged. The public and other workers at the job site must be kept well back from the fall area.

The use of explosives is one way of setting off deliberate collapse. Only qualified persons should undertake this type of demolition. The entire work area must be cleared of nonessential personnel before any explosives are placed. Though the use of explosives is a convenient method of bringing down a chimney or stack, there is a considerable amount of vibration produced, and caution should be taken if there is any likelihood of damage.

Demolition of Pre-Stressed Concrete Structures

The different forms of construction used in a number of more or less conventional structures built during the last few decades will give rise to a variety of problems when the time comes for them to be demolished. Pre-stressed concrete structures fall in this general category. The most important aspect of demolishing a pre-stressed concrete structure takes place during the engineering survey. During the survey, a qualified person should determine if the structure to be demolished contains any pre-stressed members.

There are four main categories of pre-stressed members. The category or categories should be determined before attempting demolition, bearing in mind that any pre-stressed structure may contain elements of more than one category.

Category 1

Members are pre-stressed before the application of the superimposed loads, and all cables or tendons are fully bonded in the concrete or grouted within ducts.

Category 2

Like Category 1, but the tendons are left ungrouted. This type of construction can sometimes be recognized from the access points that may have been provided for inspection of the cables and anchors. More recently, unbonded tendons have been used in the construction of beams, slabs, and other members; these tendons are protected by grease and surrounded by plastic sheathing, instead of the usual metal duct.

Category 3

Members are pre-stressed progressively as building construction proceeds and the dead load increases, using bonded tendons as in Category 1.

Category 4

Like Category 3, but using unbonded tendons as in Category 2.

Examples of construction using members of Categories 3 or 4 are relatively rare. However, they may be found, for example in the podium of a tall building or some types of bridges. They require particular care in demolition.

It is the responsibility of the demolition contractor to inform all workers on the demolition job site of the presence of pre-stressed concrete members within the structure. They should also instruct them in the safe work practice which must be followed to safely perform the demolition. Workers should be informed of the hazards of deviating from the prescribed procedures and the importance of following their supervisor's instruction.

Pre-Tensioned Members

Pre-tensioned members usually do not have any end anchors, the wires being embedded or bonded within the length of the member. Simple Pre-tensioned beams and slabs of spans up to about 7 meters (23 feet) can be demolished in a manner similar to ordinary reinforced concrete. Pre-tensioned beams and slabs may be lifted and lowered to the ground as complete units after the removal of any composite concrete covering to tops and ends of the units. To facilitate breaking up, the members should be turned on their sides. Lifting from the structure should generally be done from points near the ends of the units or from lifting point positions. Reuse of lifting eyes, if in good condition is recommended whenever possible. When units are too large to be removed, consideration should be given to temporary supporting arrangements.

Pre-Cast Units Stressed Separately from The Main Frames of the Structure, With End Anchors and Grouted and Ungrouted Ducts

Before breaking up, units of this type should be lowered to the ground, if possible. It is advisable to seek the counsel of a professional engineer before carrying out this work, especially where there are ungrouted tendons. In general, this is true because grouting is not always 100% efficient. After lowering, the units can be turned on their side with the ends up on blocks, after any composite concrete is removed. This may suffice to break the unit and release the pre-stress; if not, a sand bag screen, timbers, or a blast mat as a screen should be erected around the ends and demolition commenced, taking care to clear the area of any personnel. It should be borne in mind that the end blocks may be heavily reinforced and difficult to break up.

Monolithic Structures

The advice of the professional engineer experienced in pre-stressed work should be sought before any attempt is made to expose the tendons or anchorages of structures in which two or more members have been stressed together. It will usually be necessary for temporary supports to be provided so that the tendons and the anchorage can be cautiously exposed. In these circumstances it is essential that indiscriminate attempts to expose and de-stress the tendons and anchorages not be made.

Progressively Pre-Stressed Structures

In the case of progressively pre-stressed structures, it is essential to obtain the advice of a professional engineer, and to demolish the structure in strict accordance with the engineer's method of demolition. The stored energy in this type of structure is large. In some cases, the inherent properties of the stressed section may delay failure for some time, but the presence of these large pre-stressing forces may cause sudden and complete collapse with little warning.

Safe Work Practices When Working In Confined Spaces

Demolition contractors often encounter confined spaces when demolishing structure at industrial sites. These confined spaces can be generally categorized in two major groups: those with open tops and a depth that restricts the natural movement of air, and enclosed spaces with very limited openings for entry. Examples of these spaces include storage tanks, vessels, degreasers, pits vaults, casing and silos.

The hazards encountered when entering and working in confined spaces are capable of causing bodily injury, illness and death. Accidents occur among workers because of failure to recognize that a confined space is a potential hazard. It should therefore be considered that the most unfavorable situation exists in every case and that the danger of explosion, poisoning, and asphyxiation will be present at the onset of entry.

SAFE BLASTING PROCEDURES

Prior to the blasting of any structure or portion thereof, a complete written survey must be made by a qualified person of all adjacent improvements and underground utilities. When there is a possibility of excessive vibration due to blasting operations, seismic or vibration tests should be taken to determine proper safety limits to prevent damage to adjacent or nearby buildings, utilities, or other property.

The preparation of a structure for demolition by explosives may require the removal of structural columns, beams or other building components. This work should be directed by a structural engineer or a competent person qualified to direct the removal of these structural elements. Extreme caution must be taken during this preparatory work to prevent the weakening and premature collapse of the structure.

The use of explosives to demolish smokestacks, silos, cooling towers or similar structures should be permitted only if there is a minimum of 90 of open space extended for at least 150% of the height of the structure or if the explosives specialist can demonstrate consistent previous performance with tighter constraints at the site.

Fire Precautions

The presence of fire near explosives presents a severe danger. Every effort should be made to ensure that fires or sparks do not occur near explosive materials. Smoking, matches, firearms, open flame lamps, and other fires, flame, or heat-producing devices are prohibited around explosive magazines or in areas where explosives are being handled, transported or used. In fact, persons working near explosives should not even carry matches, lighters, or other sources of sparks or flame. Open fires or flames should be prohibited within 100 feet of any explosive materials. In the event of a fire, which is in imminent danger of contact with explosives, all employees must be removed to a safe area.

Electrical detonators can be inadvertently triggered by stray RF (radio frequency) signals from two-way radios. RF signal sources should be restricted from or near to the demolition site, if electrical detonators are used.

Personnel Selection

A blaster is a competent person who uses explosives. A blaster must be qualified by reason of training, knowledge or experience in the field of transporting, storing, handling and using explosives. In addition, the blaster should have a working knowledge of state and local regulations that pertain to explosives. Training courses are often available from manufacturers of explosives and blasting safety manuals are offered by the Institute of Makers of Explosives (IME) as well as other organizations.

Blasters shall be required to furnish satisfactory evidence of competency in handling explosives and in safely performing the type of blasting required. A competent person should always be in charge of explosives and should be held responsible for enforcing all recommended safety precautions in connection with them.

TRANSPORTATION OF EXPLOSIVES

Vehicles used for transporting explosives shall be strong enough to carry the load without difficulty, and shall be in good mechanical condition. All vehicles used for the transportation of explosives shall have tight floors, and any exposed spark-producing metal on the inside of the body must be covered with wood or some other non-sparking material. Vehicles or conveyances transporting explosives may only be driven by, and be under the supervision of, a licensed driver familiar with the local, state and Federal regulations governing the transportation of explosives. No passengers should be allowed in any vehicle transporting explosives.

Explosives, blasting agents, and blasting supplies will not be transported with other materials or cargoes. Blasting caps may not be transported in the same vehicle with other explosives. If an open-bodied truck is used, the entire load should be completely covered with a fire and water-resistant tarpaulin to protect it from the elements. Vehicles carrying explosives must not be loaded beyond the manufacturer's safe capacity rating, and in no case, should the explosives be piled higher than the closed sides and ends of the body.

Every motor vehicle or conveyance used for transporting explosives shall be marked or placarded with warning signs required by OSHA and the DOT. Each vehicle used for transportation of explosives shall be equipped minimally with at least a ten-pound rated, serviceable ABC fire extinguisher. All drivers should be trained in the use of the extinguishers on their vehicle.

In transporting explosives, congested traffic and high-density population areas should be avoided, where possible, and no unnecessary stops should be made. Vehicles carrying explosives, blasting agents, or blasting supplies shall not be taken inside a garage or shop for repairs or servicing. No motor vehicle transporting explosives will be left unattended.

STORAGE OF EXPLOSIVES

All explosives must be accounted for at all times and all not being used must be kept in a locked magazine. A complete detailed inventory of all explosives received and placed in, removed from, and returned to the magazine should be maintained at all times. Appropriate authorities must be notified of any loss, theft, or unauthorized entry into a magazine.

Manufacturers' instructions for the safe handling and storage of explosives are ordinarily enclosed in each case of explosives. The specifics of storage and handling are best referred to these instructions and the aforementioned IME manuals. They should be carefully followed. Packages of explosives should not be handled roughly. Sparking metal tools should not be used to open wooden cases. Metallic slitters may be used for opening fiberboard cases, provided the metallic slitter does not come in contact with the metallic fasteners of the case.

The oldest stock should always be used first to minimize the chance of deterioration from long storage. Loose explosives or broken, defective or leaking packages can be hazardous and should be segregated and properly disposed of in accordance with the specific instructions of the manufacturer. If the explosives are in good condition, it may be advisable to repack them. In this case, the explosives supplier should be contacted. Explosives cases should not be opened or explosives packed or repacked while in a magazine.

Storage Conditions

Providing a dry, well-ventilated place for the storage of explosives is one of the most important and effective safety measures. Exposure to weather damages most kinds of explosives, especially dynamite and caps. Every precaution should be taken to keep them dry and relatively cool. Dampness or excess humidity may be the cause of misfires resulting in injury or loss of life. Explosives should be stored in properly constructed fire and bullet-resistant structures, located according to the IME American Table of Distances and kept locked at all times except when opened for use by an authorized person. Explosives should not be left, kept, or stored where children, unauthorized persons or animals have access to them, nor should they be stored in or near a residence.

Detonators should be stored in a separate magazine located according to the IME American Table of Distances.

DETONATORS SHOULD NEVER BE STORED IN THE SAME MAGAZINE WITH ANY OTHER KIND OF EXPLOSIVES.

Ideally, arrangements should be made whereby the supplier delivers the explosives to the job site in quantities that will be used up during the workday. An alternative would be for the supplier to return to pick up unused quantities of explosives. If it is necessary for the contractor to store his explosives, he should be familiar with all local requirements for such storage.

PROPER USE OF EXPLOSIVES

Blasting operations will be conducted between sunup and sundown, whenever possible. Adequate signs should be sounded to alert to the hazard presented by blasting. Blasting mats or other containment will be used when there is a danger of rocks or other debris being thrown into the air, or when there are buildings or transportation systems nearby. Care should be taken to make sure mats and other protection does not disturb the connections to electrical blasting caps.

- Radio, television, and radar transmitters create fields of electrical energy that can, under exceptional circumstances, detonate electric blasting caps
- Certain precautions must be taken to prevent accidental discharge of electric blasting caps from current induced by radar, radio transmitters, lightning, adjacent power lines, dust storms, or other sources of extraneous or static electricity. These precautions shall include:
    - Ensuring that mobile radio transmitters on the job site that are less than 100 feet away from electric blasting caps, in other than original containers, will be de-energized and effectively locked
    - The prominent display of adequate signs, warning against the use of mobile radio transmitters, on all roads within 1,000 feet of the blasting operations

- Maintaining the minimum distances recommended by the IME between the nearest transmitter and electric blasting caps
- The suspension of all blasting operations and removal of persons from the blasting area during the approach and progress of an electric storm

After loading is completed, there should be as little delay as possible before firing. Each blast should be fired under the direct supervision of the blaster, who should inspect all connections before firing and who should personally see that all persons are in the clear before giving the order to fire. Standard signals, which indicate that a blast is about to be fired and a later all-clear signal shall have been adopted. It is important that everyone working in the area be familiar with these signals and that they be strictly obeyed.

Procedures After Blasting

Inspection after the Blast

Immediately after the blast has been fired, the firing line shall be disconnected from the blasting machine and short-circuited. Where power switches are used, they shall be locked open or in the off position. Sufficient time shall be allowed for dust, smoke and fumes to leave the blasted area before returning to the spot. An inspection of the area and the surrounding rubble will be made by the blaster to determine if all charges have been exploded before employees are allowed to return to the operation. All wires should be traced and the search for unexploded cartridges made by the blaster.

Disposal of Explosives

Explosives, blasting agents, and blasting supplies that are obviously deteriorated or damaged should not be used; they should be properly disposed of. Explosives distributors will usually take back old stock. Local fire marshals or representatives of the United States Bureau of Mines may also arrange for its disposal. Under no circumstances should any explosives be abandoned.

Wood, paper, fiber, or other materials that have contained high explosives should not be used again for any purpose, but should be destroyed by burning. These materials should not be burned in a stove, fireplace, or other confined space. Rather, they should be burned at an isolated outdoor location, at a safe distance from thoroughfares, magazines, and other structures. It is important to check that the containers are entirely empty before burning. During burning, the area should be adequately protected from intruders and all persons kept at least 100 feet from the fire.

TRAINING

We will ensure every employee is provided training on demolition safety. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The safety coordinator will ensure that every employee will be trained in the following minimum elements:

- OSHA regulations for demolition activities
- Pre-demolition activities
- Different types of building structures and materials and how to safely demolish structures of various materials
- Safety precautions for manual demolition and all expected mechanical demolition means
- Explosive safety
- HAZMAT assessment and safety
- Asbestos
- Noise, dust and other public nuisances
- Common demolition hazards and how to prevent injuries and illnesses from them

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Table of Distances for Storage of Explosive Materials
- Demolition Work Plan Outline
- Sample Demolition checklist
- Demolition Training Documentation

These forms may be reproduced for the purposes of implementing and maintaining a safety and health program.

TABLE OF DISTANCES FOR STORAGE OF EXPLOSIVE MATERIALS (PAGE 1 OF 4)

Quantity of explosives		Distances in feet							
Pounds over	Pounds not over	Inhabited buildings		Public highways with traffic volume of 3000 or fewer vehicles/day		Passenger railways— public highways with traffic volume of more than 3,000 vehicles/day		Separation of magazines	
		Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded
0	5	70	140	30	60	51	102	6	12
5	10	90	180	35	70	64	128	8	16
10	20	110	220	45	90	81	162	10	20
20	30	125	250	50	100	93	186	11	22
30	40	140	280	55	110	103	206	12	24
40	50	150	300	60	120	110	220	14	28
50	75	170	340	70	140	127	254	15	30
75	100	190	380	75	150	139	278	16	32
100	125	200	400	80	160	150	300	18	36
125	150	215	430	85	170	159	318	19	38
150	200	235	470	95	190	175	350	21	42
200	250	255	510	105	210	189	378	23	46
250	300	270	540	110	220	201	402	24	48
300	400	295	590	120	240	221	442	27	54
400	500	320	640	130	260	238	476	29	58
500	600	340	680	135	270	253	506	31	62
600	700	355	710	145	290	266	532	32	64
700	800	375	750	150	300	278	556	33	66
800	900	390	780	155	310	289	578	35	70
900	1,000	400	800	160	320	300	600	36	72
1,000	1,200	425	850	165	330	318	636	39	78
1,200	1,400	450	900	170	340	336	672	41	82

TABLE OF DISTANCES FOR STORAGE OF EXPLOSIVE MATERIALS (PAGE 2 OF 4)

Quantity of explosives		Distances in feet							
Pounds over	Pounds not over	Inhabited buildings		Public highways with traffic volume of 3000 or fewer vehicles/day		Passenger railways— public highways with traffic volume of more than 3,000 vehicles/day		Separation of magazines	
		Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded
1,400	1,600	470	940	175	350	351	702	43	86
1,600	1,800	490	980	180	360	366	732	44	88
1,800	2,000	505	1,010	185	370	378	756	45	90
2,000	2,500	545	1,090	190	380	408	816	49	98
2,500	3,000	580	1,160	195	390	432	864	52	104
3,000	4,000	635	1,270	210	420	474	948	58	116
4,000	5,000	685	1,370	225	450	513	1,026	61	122
5,000	6,000	730	1,460	235	470	546	1,092	65	130
6,000	7,000	770	1,540	245	490	573	1,146	68	136
7,000	8,000	800	1,600	250	500	600	1,200	72	144
8,000	9,000	835	1,670	255	510	624	1,248	75	150
9,000	10,000	865	1,730	260	520	645	1,290	78	156
10,000	12,000	875	1,750	270	540	687	1,374	82	164
12,000	14,000	885	1,770	275	550	723	1,446	87	174
14,000	16,000	900	1,800	280	560	756	1,512	90	180
16,000	18,000	940	1,880	285	570	786	1,572	94	188
18,000	20,000	975	1,950	290	580	813	1,626	98	196
20,000	25,000	1,055	2,000	315	630	876	1,752	105	210
25,000	30,000	1,130	2,000	340	680	933	1,866	112	224
30,000	35,000	1,205	2,000	360	720	981	1,962	119	238
35,000	40,000	1,275	2,000	380	760	1,026	2,000	124	248
40,000	45,000	1,340	2,000	400	800	1,068	2,000	129	258

TABLE OF DISTANCES FOR STORAGE OF EXPLOSIVE MATERIALS (PAGE 3 OF 4)

Quantity of explosives		Distances in feet							
Pounds over	Pounds not over	Inhabited buildings		Public highways with traffic volume of 3000 or fewer vehicles/day		Passenger railways— public highways with traffic volume of more than 3,000 vehicles/day		Separation of magazines	
		Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded
45,000	50,000	1,400	2,000	420	840	1,104	2,000	135	270
50,000	55,000	1,460	2,000	440	880	1,140	2,000	140	280
55,000	60,000	1,515	2,000	455	910	1,173	2,000	145	290
60,000	65,000	1,565	2,000	470	940	1,206	2,000	150	300
65,000	70,000	1,610	2,000	485	970	1,236	2,000	155	310
70,000	75,000	1,655	2,000	500	1,000	1,263	2,000	160	320
75,000	80,000	1,695	2,000	510	1,020	1,293	2,000	165	330
80,000	85,000	1,730	2,000	520	1,040	1,317	2,000	170	340
85,000	90,000	1,760	2,000	530	1,060	1,344	2,000	175	350
90,000	95,000	1,790	2,000	540	1,080	1,368	2,000	180	360
95,000	100,000	1,815	2,000	545	1,090	1,392	2,000	185	370
100,000	110,000	1,835	2,000	550	1,100	1,437	2,000	195	390
110,000	120,000	1,855	2,000	555	1,110	1,479	2,000	205	410
120,000	130,000	1,875	2,000	560	1,120	1,521	2,000	215	430
130,000	140,000	1,890	2,000	565	1,130	1,557	2,000	225	450
140,000	150,000	1,900	2,000	570	1,140	1,593	2,000	235	470
150,000	160,000	1,935	2,000	580	1,160	1,629	2,000	245	490
160,000	170,000	1,965	2,000	590	1,180	1,662	2,000	255	510
170,000	180,000	1,990	2,000	600	1,200	1,695	2,000	265	530
180,000	190,000	2,010	2,010	605	1,210	1,725	2,000	275	550
190,000	200,000	2,030	2,030	610	1,220	1,755	2,000	285	570
200,000	210,000	2,055	2,055	620	1,240	1,782	2,000	295	590

TABLE OF DISTANCES FOR STORAGE OF EXPLOSIVE MATERIALS (PAGE 4 OF 4)

Quantity of explosives		Distances in feet							
Pounds over	Pounds not over	Inhabited buildings		Public highways with traffic volume of 3000 or fewer vehicles/day		Passenger railways— public highways with traffic volume of more than 3,000 vehicles/day		Separation of magazines	
		Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded	Barricaded	Unbarricaded
210,000	230,000	2,100	2,100	635	1,270	1,836	2,000	315	630
230,000	250,000	2,155	2,155	650	1,300	1,890	2,000	335	670
250,000	275,000	2,215	2,215	670	1,340	1,950	2,000	360	720
275,000	300,000	2,275	2,275	690	1,380	2,000	2,000	385	770

Notes

DEMOLITION WORK PLAN OUTLINE

Basic Information

- ☐ Contractor Name
- ☐ Project Name
- ☐ Project Location

Material-Handling Methods

- ☐ Hazardous Materials
- ☐ Utilities
- ☐ Emergency Response
- ☐ Transportation

Preparation

- ☐ Temporary Power and Water
- ☐ Site Security
- ☐ Temporary Shoring
- ☐ Work Impact Analysis

During Demolition

- ☐ Scaffolding
- ☐ Dust
- ☐ Fire Protection
- ☐ Vibration, Noise
- ☐ Adjacent Structures
- ☐ Traffic
- ☐ Soft Demolition Materials
- ☐ Steel, Machinery, Piping
- ☐ Concrete, CMU, Brick, Asphalt Paving
- ☐ Recycling
- ☐ Disposal
- ☐ Storage of Salvage Materials

DEMOLITION CHECKLIST

Once the demolition has commenced onsite, here are some recommended checks that should be completed by the demolition contractor and site supervisor and maintained throughout the course of the job.

	Requirement	Yes	No
1	Has a competent supervisor, experienced in demolition work, been appointed?	☐	☐
2	Are all onsite employees sufficiently trained and competent to complete their tasks and duties safely?	☐	☐
3	Is on-going hazard management being conducted onsite, and communicated through to employees and contractors effectively?	☐	☐
4	Are all site personnel wearing the correct personal protective clothing and equipment for the work at all times, and is the clothing/equipment being maintained effectively?	☐	☐
5	Is the site properly enclosed and are protective screens erected?	☐	☐
6	Have danger notices been erected? Is all access to the site by the public barred?	☐	☐
7	If required, is there sufficient propping to prevent premature structural collapse or damage to adjacent property?	☐	☐
8	Are all ladders and other equipment in good order?	☐	☐
9	Are any floors in danger of being overloaded?	☐	☐
10	If a crane is in use:	☐	☐
	(a) Are all non-essential personnel (except the crane operator and dogman) clear of the danger area when the crane is being used?	☐	☐
	(b) Are all crane windows properly protected, and does the crane require a FOPS canopy fitted?	☐	☐
11	Are pedestrians adequately protected?	☐	☐
12	Is sufficient watering taking place to keep down dust?	☐	☐
13	Are there sufficient fire extinguishers or other fire-fighting equipment onsite, and are they readily accessible?	☐	☐
14	Are good housekeeping practices being maintained, for example: are floors and access pathways clear of unnecessary debris and materials/equipment?	☐	☐
15	Does all electrical equipment have current test certification and tagging to verify safety for use?	☐	☐
16	Do plant and equipment being used onsite have daily checks conducted by the operator(s) to ensure proper running conditions and safety for use?	☐	☐
17	Do all onsite elevated work platforms and cranes have current certification to verify safety for use?	☐	☐

DEMOLITION TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter provides the safe practices and requirements for employees authorized to drive a Company vehicle or personal car on Company business. It does not include information on vehicle inspections, maintenance or load securement, which are addressed in other chapters of this manual.

POLICY

Driving any vehicle presents significant risks to workers. This Company is committed to reducing traffic-related deaths and injuries. As part of this commitment, this Company maintains a driver safety policy designed to support a culture of safety and reduce accidents.

EMPLOYER RESPONSIBILITIES

This Company will:

- Establish and maintain policies and rules in accordance with applicable regulations and best industry practices to promote safety and prevent injuries and illnesses
- Ensure that every employee asked to drive a Company car or personal car on Company business has been trained in the Company's driver safety policy and safe driving practices
- Record and maintain documents pertaining to the eligibility and qualification of an employee to drive a Company car or a personal vehicle on Company business
- Ensure vehicles driven on Company business are in good repair and adhere to all legal regulations and requirements
- Encourage and respect the involvement of employees in the planning and implementation of safe driving policy
- Ensure drivers participate in regular safety meetings to promote a continued culture of safety and address safety concerns
- Devise and implement a system of disciplinary action and rewards to encourage safe driving habits, as appropriate
- Prevent unnecessary travel by employees

EMPLOYEE RESPONSIBILITIES

Company employees who, as part of their job, drive a Company vehicle or their own on Company business are expected to:

- Complete a driver safety course that addresses general driver safety as well as hazards specific to the job being done
- Ensure the roadworthiness of his or her vehicle before operation
- Operate the vehicle according to best safety practices
- Respond to accidents and near misses according to established Company policies and procedures
- Inform a supervisor of any changes to their Motor Vehicle Record that may impact their eligibility to drive

- Maintain a driver's license that permits them to perform their job in compliance with the law
- Demonstrate awareness and understanding of the Company driver safety policy
- Make recommendations to improve the Company's driver safety policy

SAFE PRACTICES

This Company recognizes that its greatest assets are its employees, a fact demonstrated by a commitment to their safety.

A driver safety program saves lives and reduces injuries. It also prevents material losses and helps this Company guard against the range of liabilities that may emerge from a vehicular accident.

Accordingly, management will provide resources needed to support a culture of safety and will actively encourage employees to participate in planning and implementation of the driver safety program.

If the Company operates any of the following types of commercial motor vehicles in interstate commerce, it will comply with applicable U.S. Department of Transportation (DOT) safety regulations, many of which may not be detailed in this chapter.

- A vehicle with a gross vehicle weight rating or gross combination weight rating of 10,0001 lbs. or more
- A vehicle designed or used to transport between 9 and 15 passengers for compensation
- A vehicle designed or used to transport 16 or more passengers
- Any size vehicle used in the transportation of materials classified as hazardous under the Hazardous Materials Transportation Act and are required to be placarded under the Hazardous Materials Regulations

FLEET

This Company will maintain a fleet of vehicles if necessary for business in accordance with relevant regulatory standards and vehicle manufacturer's advice.

Fleet Selection

The safety coordinator will work with this Company's insurance Company to establish guidelines for the selection of Company vehicles, and will include the following:

- The appropriate vehicle type for expected use
- Required safety equipment
- Maintenance procedures
- Inspection procedures
- Protections against unauthorized use
- Record-keeping procedures
- Insurance

The National Highway Transportation Administration provides information on vehicle safety according to make and model.

Preventive Maintenance

All Company vehicles will be maintained according to a regular schedule to ensure their safety and roadworthiness. All maintenance will be performed by a qualified individual or automotive shop according to the manufacturer's recommended service schedule.

In addition to regularly scheduled maintenance, fleet upkeep should include, but not be limited to:

- Basic inspections of the vehicle by the driver before every trip
- Immediate removal from service of any vehicle with mechanical problems
- Managerial certification of requested repairs before return to service

Recordkeeping

All vehicle maintenance, repair certification and driver review will be recorded and kept through the life of the vehicle.

Vehicle Inspection

The operator will inspect each vehicle or piece of equipment on a daily basis before and after operation. Each operator is responsible for the safe condition of the equipment. No employee may drive a vehicle having steering, brake or other safety problems until a mechanic has made repairs. Drivers will report any other unsafe conditions to their supervisor as soon as safely possible.

DRIVER SELECTION, QUALIFICATION AND EVALUATION

The safety coordinator will work with management and the Company's insurance Company to determine the qualification standards for motor vehicle operators.

Employment History

The evaluation for any new employee anticipated to drive a vehicle on Company business will include a reference check and review of driving history through past employers.

Licenses

Any driver of a Company vehicle or a personal vehicle on Company business will possess a valid driver's license appropriate for the vehicle that will be driven and the circumstances in which the vehicle will be driven. All government regulations and insurance Company requirements will be followed concerning driver qualification.

A driver will only operate a vehicle that requires a commercial driver's license (and any endorsement) if he or she is in possession of the appropriate license.

Motor Vehicle Records

This Company will check the driving records of any employee expected to drive for work. Further, periodic review of a motor vehicle record (MVR) for employees expected to drive for work reasons will indicate if they remain eligible to drive a Company vehicle or their own on Company business.

Initial Assignment

The Company will request and review an MVR for new applicants or current employees expected to add driving to existing responsibilities, whether operating their own vehicle or a Company vehicle. The MVR review will consider the most recent three years of driving and should include motor vehicle records from all states in which the applicant has lived in that time.

MVRs and the information contained therein will remain as confidential as possible. Discussions of motor vehicle records will be restricted to individuals with a legitimate “need to know.”

Any qualification standard may entail a multi-tiered or point system approach to driver eligibility based on the frequency of the employee’s anticipated work driving and the severity of traffic convictions recorded in the MVR

Following are some examples of violations that, having occurred in the past 3 years, may warrant ineligibility to drive on Company business:

- DWI/DUI
- Negligent motor vehicle homicide
- Operating with a suspended license
- Using a motor vehicle for commission of a felony
- Aggravated assault with a motor vehicle
- Operating a motor vehicle without the owner’s consent
- Reckless, careless or negligent driving, including speeding more than 15 MPH over limit
- Hit and run or leaving the scene of an accident with injury or death resulting, or property damage in excess of $1,000

Following are examples of violations that, having occurred more than three times in two years, may warrant ineligibility to drive:

- Minor moving violations
- Accidents

Annual Review

Employees cited for a violation that may affect their eligibility to drive on Company business will inform their supervisor.

In addition to the initial MVR review, a review of an employee’s MVR will occur annually to confirm the driver’s continued eligibility to drive for work.

Defensive Driver Training

The Company may consider or require the completion of a driver safety course or defensive driving course in determining eligibility to drive a Company vehicle or a personal vehicle while on Company business.

Driver Agreements

Employees who will operate a motor vehicle as part of their job are required to confirm awareness and understanding of the Company’s driver safety policy.

The safety coordinator, with the safety committee, will create a “driver agreement” that allows a driver to confirm his or her awareness and understanding of this policy, driver expectations, vehicle maintenance and care requirements, and the procedures for reporting moving violations and accidents.

Driver Qualification File

The Company will maintain a driver qualification file for every driver including all documents required to verify his or her qualifications.

Meetings

The safety coordinator, with the safety committee, will determine whether or under what conditions an employee may permit another individual to drive a Company vehicle.

A driver or other employee who permits an unauthorized individual to operate a Company vehicle faces disciplinary action and financial accountability for any costs incurred by allowing unauthorized personnel to operate a Company vehicle.

Securing Materials

The driver will prevent the unsafe movement of any materials such as tools or equipment by securing it appropriately. Drivers should secure anything that may present a hazard outside the passenger compartment.

Vehicle Occupancy

No Company vehicle transport more passengers than safely possible. Every adult in the vehicle must have a seatbelt. If children must be transported, each must have the appropriate child safety restraint. Vehicles may be operated only if each passenger is safely restrained in their seat.

Seat Belts

The Company recognizes that seat belts effectively prevent injuries and loss of life in an automotive accident.

All Company employees will wear seatbelts when operating a Company-owned vehicle or any vehicle on Company premises or on Company business. Any occupant of a vehicle owned by this Company, on Company premises, or in a vehicle on Company business will wear a seatbelt or, if required, an appropriate child restraint system.

This Company encourages its employees to always wear a seatbelt when driving or riding in an automobile, to ensure child restraints are used properly, and to encourage other passengers or drivers do the same.

Alcohol and Drug Use

The Company forbids employees from consuming or being under the influence of alcohol or illegal drugs during “duty hours.” Duty hours include working hours, break periods and on-call periods. The consumption of alcohol or illegal drugs while performing Company business or while in a Company facility may result in disciplinary action up to and including termination.

If an employee takes prescribed medication or over-the-counter medication known to affect the ability to operate a motor vehicle or other heavy machinery, the employee will inform his or her immediate supervisor and refrain from such duties until able to do so safely.

Drivers will remain aware of driving behaviors that indicate impairment such as weaving, inappropriate speed and erratic or abrupt driving. Staying a safe distance from drivers who may be impaired and bringing dangerous drivers to the attention of the authorities helps keep roads safe.

Drivers who operate a commercial motor vehicle as defined by the federal highway administration (FHA) must possess a CDL and are subject to FHA's regulations on alcohol and drug use and testing.

A drug free workplace policy and supporting procedures must be in place and communicated to all employees before drug testing. The rule requires pre-employment, reasonable suspicion, random, post-accident, return-to-duty and follow-up testing. For details on the program, refer to the Federal Motor Carrier Safety Regulations, Title 49, Part 382.

Distracted Driving

Driving skills rely on the focus of the vehicle operator. Every driver will devote his or her full attention to the task of driving while behind the wheel. Text messaging while driving is strictly prohibited. Distractions come in many forms and contribute to 25 to 30 percent of all traffic accidents. Distractions include, but are not limited to the following:

- Text messaging and other cell phone use (even with hands-free headset)
- Reaching for an object inside the vehicle
- Looking at an object, person or event outside the vehicle
- Eating and drinking
- Reading
- Grooming and hygiene
- Electronics use (computer, tablet, GPS)
- Adjusting non-critical controls
- Horseplay
- Emotional distractions

Fatigued Driving

Drowsy driving greatly increases the risk of an accident. All drivers will be trained in the dangers of driving drowsy and the importance of sufficient rest before operating a motor vehicle.

Aggressive Driving

The Company prohibits aggressive driving while operating a Company vehicle or a personal vehicle on Company business. Aggressive driving behaviors include, but are not limited to the following:

- Excessive Speed
- Tailgating
- Failure to signal lane change

- Running a red light
- Passing on the right
- Any offensive, rude, or hostile act or gesture directed at another driver

Young Drivers

Teenage drivers are the most likely to engage in risky driving behaviors, and vehicle crashes are the leading cause of death for 15-20-year-olds. Federal law prohibits drivers under 17 to operate a vehicle as part of their job, and it is at the discretion of the safety coordinator to prohibit driving for any employee based on a lack of driving experience.

Driving in Work Zones

All drivers in work zones must take special care. Patience and care goes a long way to contribute to driving safely around construction. Heavy machinery and workers can slow everything down, but driving rushed makes it difficult to observe other workers and leads to poor decision making. Workers must be vigilant and minimize distractions to respond quickly to the unexpected when behind the wheel, especially when driving where others are working.

MONITORING

As part of our driver safety policy, every work-related accident and near miss involving motor vehicles will be handled in a way to reduce risk and encourage future safe behaviors in the future.

Additionally, the Company's driver safety policy requires periodic review of the policy itself and its impact on the safety and health of employees.

Incident, Accident Analysis, and Reporting

If an employee experiences a vehicular accident while driving a Company car or a personal car on Company business, he or she will do the following:

- Stop the vehicle. If it can be done safely, move the vehicle off the road
- Call appropriate law enforcement authority if damage is done to another vehicle or property that does not belong to this Company For an emergency, call 911 to summon both police and emergency medical services
- Mark the scene as necessary for safety
- Gather the names of other drivers and witnesses
- Diagram the accident, noting vehicles involved, where vehicle occupants were seated at the time of the accident, the date, time and weather conditions
- Exchange the following information with other drivers involved: License plate number, registration information and insurance information
- Document the name and badge number of the responding law enforcement professional.
- Notify the supervisor as soon as safely possible
- Cooperate with law enforcement professionals and participate in the Company's accident investigation

Do not assume blame or apologize. Only give statements about what happened to police or an appropriate member of Company management.

Any accident will be investigated according to the Company's accident investigation policy. (See chapter on "Accident Investigation" for more details.) Use the Motor Vehicle Accident Report at the end of this chapter to accompany the Company's Accident/Incident Report.

This Company will comply with all recordkeeping requirements of our safety policy and any applicable regulatory authority.

Disciplinary Actions

Safety incidents involving an employee and a violation of our safety policy in a Company vehicle (or personal vehicle used on Company business) may result in disciplinary actions up to termination, including the revocation of driving privileges as determined by management.

Reward Program

It is at the discretion of the safety coordinator and, if appropriate, the safety committee to devise and implement a safe driver reward program to encourage safe driving habits and reward safe driving behaviors.

Policy Review

All aspects of this policy and the Company's driver safety program are subject to annual review by the safety coordinator and the safety committee to ensure the effectiveness of the policy to guarantee a safe working environment for Company employees.

TRAINING

This Company will train every employee who will drive for work related reasons on driver safety at no cost to the employee during working hours.

The Company will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

DRIVER TRAINING

The driver safety program focuses on training and prevention. All new drivers must complete an orientation to cover:

- Policies and procedures for drivers
- Governmental regulations
- Maintenance guidelines and inspection procedures
- Driver training that encourages safe, defensive road behavior

Training Components

The safety coordinator will ensure any employee at this Company who drives on work business is qualified and capable to drive. Drivers will complete training in the following minimum elements for driver safety:

- Defensive driving
- Safe distances

- Intersection driving
- Poor driving conditions
- Split-second decision making
- Distracted driving
- Driving in Work Zones
- Safety restraints

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of the employees attending the training

The Company will retain employee training records for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- Motor Vehicle Accident Report
- Driver Safety Training Documentation

MOTOR VEHICLE ACCIDENT REPORT

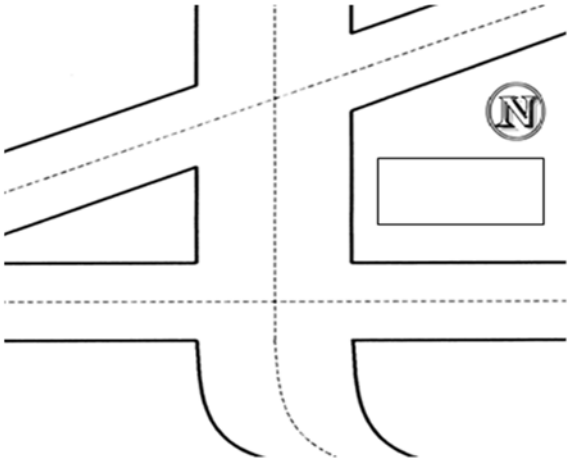
AFTER AN ACCIDENT: 1 Stay Calm 2 If the vehicles are drivable and it is safe to do so, move them safely out of traffic 3 Apply first aid (if properly trained) 4 Call police, and if necessary, ambulance 5 Take brief notes

Vehicle Driver Name	Other Vehicle Driver Name
Address	Address
Phone Driver License #	Phone Driver License #
Vehicle Type	Other Vehicle Type
Vehicle License Plate #	Vehicle License Plate #
Owner's Name	Owner's Name
Address	Address
Vehicle Insurance Co. Name	Other Vehicle Insurance Co. Name
Name Policy is Under Policy #	Name Policy is Under Policy #

Passenger Info				

Accident Detail

Date of Accident	Explain how the accident happened
Time of Accident ☐ am ☐ pm	
Street	
City	
State/Province	
Approx. Speed: Your MPH Other MPH	Describe your vehicle's damage
Describe any Injuries	
	Describe other vehicle's damage

Investigating Officer Name	
Phone Badge #	
Police Department	
Investigating Officer Name	
Phone Badge #	
Police Department	
Witness Info	
Witness Info	
Report Completed By	
Signature	

SKETCH OF ACCIDENT SCENE

DRIVER SAFETY TRAINING

Trainer (include qualifications):	
Signature:	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter contains the safe practices and requirements for performing drywall, plastering and insulation work. The procedures in this chapter will comply with all applicable OSHA regulations regarding:

- Working from ladders or scaffolds
- Respiratory protection
- Electrical safety
- Hand and power tools use

Included here are the procedures for installing, finishing and repairing or replacing drywall, plaster and insulation. This chapter does not include information on performing mold remediation work or spraying polyurethane insulation, which are covered in other chapters.

POLICY

This Company has developed this policy to protect employees from the hazards of drywall, plastering and insulation work.

EMPLOYER RESPONSIBILITIES

This Company will:

- Train all affected employees on the hazards of drywall, plaster and insulation work
- Train all affected employees on the safe practices of performing their jobs
- Provide all necessary PPE, and train its employees on the proper care and use of their equipment
- Verify that employees can safely operate any tools or equipment they will use

EMPLOYEE RESPONSIBILITIES

All Company employees are expected to:

- Follow all safe practice procedures
- Wear all necessary PPE
- Report any unsafe conditions or acts immediately

HAZARDS

There are a number of hazards associated with the installation, finishing and repairing or replacing drywall, plaster and insulation. These can include:

- Falls from working at heights
- Exposure to materials and substances that can cause respiratory problems including:
  - Asbestos
  - Silica

- Injuries from the improper use of tools or equipment
- Musculoskeletal injuries from improper lifting or material handling

PERSONAL PROTECTIVE EQUIPMENT

- Wear steel-toed boots when handling panels and in material handling environments designated by your supervisor
- Make sure you wear work gloves when handling fiberglass batts, sprayed on finishes, rough textured gypsum board panels, metal lath, or when sanding surfaces
- Wear your safety glasses and dust mask when handling or mixing plaster ingredients and additives, or applying mud, finishing ceilings, or sanding
- Always wear your safety glasses when snipping metal pieces such as corner beads, trims, and wire mesh
- Do not continue to work if your safety glasses become fogged. Stop work and clean the glasses until the lenses are clear and defogged
- Wear chemical goggles when using, applying, or handling chemical liquids or powders from containers labeled caustic or corrosive
- Wear your safety glasses when mixing plaster ingredients and additives, applying spackling, finishing ceilings, or sanding
- Wear dust mask or respirator when emptying sacks of dry material such as additives for fireproofing or plaster ingredients
- Use lifelines, safety harnesses or lanyards when you are working higher than 6 feet off the ground
- Wear safety glasses while plastering, applying mud or sanding
- Wear safety goggles when using power tools or when applying a finishing material
- Wear earplugs or earmuffs when the minimum noise level is exceeded

Respiratory Protection

When employees are required to use respirators to prevent exposure to hazardous dusts or materials, they will be provided with approved respirators. Those employees will follow these practices to protect themselves.

- Shave daily to prevent facial hair from interfering with the face seal of the respirator
- Clean and return respirators to their carrying cases or cartons. Store them in your locker or in a designated storage area as instructed by your employer when the work is completed
- Only use the respirator that has been fitted and issued to you

Infection Control

- Wash your hands (after removing your gloves) with soap or mild detergent and water before eating, smoking, using the toilet, or on any areas of the body that may have contacted cementitious mixtures, pastes, or spray-on insulation at the end of each workday
- Use a mechanic's cream hand cleaner where water is not readily available

SAFE PRACTICES

It is the duty of each worker to obey all Company safety rules and to use all required safety equipment. If you are unsure of the safe method to do your job, stop and ask your supervisor. Ignorance is no excuse for a safety violation.

- Bring any new hazards you observe to the attention of your supervisor
- Develop a daily routine of checking your job area and equipment for any potential hazards or deficiencies
- Maintain a clean and orderly work place
- Wear all personal protective devices (i.e. safety eyewear, safety footwear, protective gloves, etc.) as required by your position or the job task
- Become familiar with the performance limitations of your tools and equipment
- Know the location of fire and safety exits
- Learn the location of first aid kits and fire extinguisher equipment in your work area
- Each employee is expected to be responsible for his/her own safety and at the same time to exercise care to avoid injury to his fellow workers and others
- Always perform your job task in a safe manner. No horseplay or practical jokes
- Lift correctly and safely, with your legs, not your back. Ask for help whenever in doubt
- Observe all warning, caution, and danger signs as well as safety and health notices
- Smoking is not permitted inside the building
- All employees will wear fall protection equipment when applicable

Job Site

- Do not walk under partially demolished walls or floors
- Stop working outdoors and seek shelter during lightning storms
- Do not begin working until barricades, warning signs, or other protective devices have been installed to isolate the work area
- Never throw or toss debris outside barricaded areas
- Stay clear of all trucks, forklifts, cranes, and other heavy equipment when in operation
- Do not approach any heavy equipment until the operator has seen you and has signaled to you that it is safe to approach
- Keep shirts on to avoid dehydration and sunburn

Barriers and Signs

- Place signs (lights) well in advance of the work area to permit upcoming pedestrians and motorists time to react
- Erect protective barriers or guards and warning signs prior to demolition work where accessible by vehicular or pedestrian traffic
- Position the work vehicle to guard the work area while work is in progress
- Do not work on open sided floors, elevated walkways, or elevated platforms if there are no guardrails in place
- Stand clear of floor openings if guardrails or covers are removed or displaced

Housekeeping

- Never place trash in walkways and passageways
- Do not kick objects out of your pathway; pick them up or push them aside and out of the way
- Never throw matches, cigarettes, or other smoking materials into trash bins
- Do not store or leave items on stairways
- Never block or obstruct stairwells, exits, or accesses to safety and emergency equipment such as fire extinguishers or fire alarms
- Do not leave loose tools, lunch boxes, or other items on a ledge or lying around on the floor. Return tools to their storage places after use
- Keep walking surfaces of elevated working platforms, such as scaffolds and aerial lifts, clear of tools and materials that are not being used
- Do not use gasoline for cleaning purposes
- Sweep up scraps and debris from wallboard installation such as screws, mesh, and tape by using a broom and a dustpan
- Use a vacuum to eliminate dust and small particles

Lifting

- Plan the move before lifting; remove obstructions from your chosen pathway
- Test the weight of the load before lifting by pushing the load along its resting surface
- If the load is too heavy or bulky, use lifting and carrying aids such as hand trucks, dollies, pallet jacks and carts. Get assistance from a co-worker when necessary
- When assistance is required to perform a lift, coordinate and communicate your movements with those of your co-worker
- Never lift anything if your hands are greasy or wet
- Wear protective gloves when lifting objects with sharp corners or jagged edges
- Do not lift an object from the floor to a level above your waist in one motion. Set the load down on a table or bench and then adjust your grip before lifting it higher

MATERIAL STACKING AND HANDLING

- When stacking panels by hand, position the panels sideways slightly in front of you, so you do not have to reach over your head or twist your body to lift the materials
- Position panels to lean flat against a wall so they do not wobble or slide
- Push and slide panels along their edge or get assistance from a co-worker
- Store all wallboard flat
- Do not store boards vertically; this will damage the edges creating unstable stacks
- Stand each board vertically on its side as close to the edge of the pile as possible, tilt the board toward the stack, and let the board drop freely on top of the stack
- Do not allow boards to overhang more than an inch. Align flush all boards, to keep the boards from becoming unstable and topple on someone while restacking
- Use a co-worker to assist handling the boards when stocking. Coordinate and communicate your movements with those of your co-worker

Drywall Access Hatch

- Proper access to all projects over one story is a major concern. Drywall delivery at many construction projects, particularly up to four stories tall, has become more difficult in recent years. Often access to the upper levels is limited to interior staircases requiring delivery workers to carry the drywall up manually
- A safety access hatch will ensure a safe and efficient means of placing drywall on the upper levels when there is no safe alternative. The use of window openings that meet the 2 ft. wide by 5 ft. high minimums is an acceptable alternative
- Without an access, the possibility of back and shoulder injury increases when deliveries have to be made up the stairs. A Company's time loss due to job related injuries is a concern
- Safety regulations clearly place responsibility for worker safety on all employers responsible for the site to arrange the work area to allow the safe movement of workers, equipment, and materials

Opening

- Delivery can be facilitated by the prime contractor providing an unobstructed opening in the exterior wall at each floor level. An appropriately framed exterior-wall delivery hatch opening that is 24 inches wide and 60 inches high will meet the minimum requirements. An existing opening can be used if it meets the minimum hatch size, and does not have the door or window installed
- If the opening needs to be covered, the prime contractor can tack temporary sheathing material over the opening on the inside. The supplier removes the cover, the drywall is delivered through the opening, and the cover can be replaced from the inside
- Unobstructed access for equipment to reach the building is required, and should not exceed a distance of 18 feet from the delivery entrance

WORKING AT HEIGHTS

Employees will use the following safe practices when working from ladders of scaffolds.

Ladders and Step Ladders

- Do not use ladders that have loose rungs, cracked, or split side rails, missing rubber footpads, or are otherwise visibly damaged
- Keep ladder rungs clean of grease. Remove any buildups of plaster, dirt, or mud
- Secure the ladder in place by having another employee hold it
- Face the ladder when climbing up or down
- Maintain a three-point contact by keeping both hands and one foot, or both feet and one hand on the ladder at all times when climbing up or down
- Do not carry items in your hands while climbing up or down a ladder
- Read and follow the manufacturer's instructions label on the ladder if you're not sure of the maximum weight allowance
- Do not use a metal ladder on rooftops or within 50 feet of electrical power lines
- Never jump from rooftops, platforms, scaffolds, or ladders

- Do not use building materials as improvised climbing devices
- Never use electrical tools while working on a metal ladder unless the ladder has rubber feet.
- Do not stand on the top two rungs of any ladder
- One person must be on the ladder at a time
- Face the ladder and do not lean backward or sideways from the ladder
- Never use a ladder that wobbles or that leans to the left or right
- Do not try to "walk" a ladder by rocking it. Climb down the ladder, and then move it

Scaffolding

- Inspect the scaffold prior to use. Do not use a scaffold if any pulley, block, hook or fitting is visibly worn, cracked, rusted or otherwise damaged. Do not use a scaffold if any rope is frayed, torn, or visibly damaged
- Do not use any scaffold tagged "Out of Service”
- Never use unstable objects, such as barrels, boxes, loose brick, or concrete blocks to support scaffolds or planks
- Do not work on platforms or scaffolds unless they are fully planked
- Never use a scaffold unless the guardrails and all flooring are in place
- Level the scaffold after each move. Do not extend adjusting leg screws more than 12 inches
- Do not walk or work beneath a scaffold unless a wire mesh has been installed between the mid rail and the toeboard or planking
- Use your safety belts and lanyards when working on scaffolding at a height of 10 feet or more above ground level (Cal/OSHA is 7 ½ feet). Attach the lanyard to a secure anchor on the scaffold
- Do not climb the cross braces for access to the scaffold. Use the ladder
- Never jump from, to, or between scaffolding
- Do not slide down cables, ropes, or guys used for bracing
- Keep both feet on the decking. Do not sit or climb on the guardrail
- Do not lean out from the scaffold. Do not rock the scaffold
- Keep the scaffold free of scraps, loose tools, tangled lines, and other obstructions
- Do not throw anything overboard unless a spotter is available. Use a debris chute or lower things by hoist or by hand
- Never move a mobile scaffold if anyone is on the scaffold
- Chock the wheels of the rolling scaffold, using the wheel blocks, and lock the wheels by using your foot to depress the wheel lock, before using the scaffold
- Do not work on scaffolds outside during stormy or windy weather
- Never climb on scaffolds that wobble or lean to one side

POWER TOOL USE

Use these safe practices when working with any type of powered tool.

Electric Powered Tools

- Do not use power equipment or tools on which you have not been trained
- Never carry plugged in equipment or tools with your finger on the switch
- Do not leave tools running or unattended
- Disconnect the tool from the outlet by pulling on the plug, not the cord
- Do not raise or lower a tool by its cord
- Make sure the tool is off before plugging or unplugging it
- Turn off the electrical tool and unplug it from the outlet before attempting repairs or service work. Tag the tool: Out of Service
- Wear rubber-soled or insulated work boots when operating electrical equipment
- Do not operate a power hand tool or portable appliance while holding a part of the metal casing or while holding the extension cord in your hand
- Hold all portable power tools by the plastic handgrips
- Never handle or operate electrical tools when your hands are wet or when you are standing on wet floors

Do not operate a power hand tool or portable appliance:

- That has a frayed, worn, cut, improperly spliced or damaged cord
- That has a two-pronged adapter or a two-conductor extension cord
- If the ground prong from the three-pronged power plug is missing or has been removed
- If its housing is cracked

Electrical Cords

- Keep power cords away from the path of drilling and cutting equipment
- Do not use cords that have splices, exposed wires, or cracked or frayed ends
- Never remove the ground prong from electrical cords
- Do not use an adapter such as a cheater plug that eliminates the ground
- Never plug multiple electrical cords into a single outlet

Power Saws

- Wear safety goggles, protective gloves, a dust mask, and hearing protection when operating a power saw
- Do not wear loose clothing or jewelry
- Clean any residue from the blade or cutting head before making a new cut with the power saw
- Do not use a power saw that has cracked, broken, or loose guards
- Keep your hands away from the exposed blade
- Operate the saw at full cutting speed, with a sharp blade, to prevent kickbacks
- Do not alter the anti-kickback device or blade guard
- Never perform cutting operations with the power saw while standing on a wet or slippery floor

- When using the power saw, do not reach across the cutting operation
- Cut away from your body and below your shoulder level when you are using a power saw
- If the saw becomes jammed, turn the power switch of the saw to "Off" before pulling out the incomplete cut

Pneumatic Tools

- Do not point a compressed air hose at bystanders
- Never use compressed air to clean your clothing
- Do not use tools that have handles with burrs or cracks
- Turn the tool "off" and let it come to a complete stop before leaving it unattended
- Disconnect the tool from the airline before making any adjustments or repairs to the tool
- Do not use compressors if their belt guards are missing. Replace the belt guards before use
- Engage positive locks on hoses and attachments before use
- Shut off pressure valve and disconnect airline when not in use
- Tag damaged or defective pneumatic tools "Out of Service" to prevent usage of the tool by other employees

Powder Actuated Tools

- Wear impact resistant safety goggles or face shields when operating any powder actuated tools.
- Do not attempt to fasten through a pre-drilled hole unless the powder actuated tool has a hole locator
- Keep your head and body behind the powder-actuated tool when firing it
- Before using powder-actuated tools, do not alter, bypass or remove the shield or guard at the muzzle end of the powder-actuated tool
- Do not load a powder-actuated tool until you are ready to fire it

Hand Tools

- Use tied off containers to keep tools from falling off elevated work platforms
- Never use a tool if its handle has splinters, burrs, cracks, splits, or if the head of the tool is loose
- Do not use tools while your hands are oily, greasy, or wet
- When handing a tool to another person, direct sharp points and cutting edges away from yourself and the other person
- Never carry sharp pointed hand tools such as screwdrivers in your pocket unless the tool or your pocket is sheathed
- Do not perform makeshift repairs to tools
- Never throw tools from one location to another, from one employee to another, or from scaffolds and other elevated platforms
- Do not carry tools in your hand when climbing. Carry tools in tool belts or hoist the tools to the work area with a hand line

- Transport hand tools only in toolboxes or tool belts. Do not carry tools in your clothing
- When you are performing electrical work, use tools with rubber sleeves covering the handle, these are insulated

Hammers

- Do not strike nails or other objects with the cheek of the hammer
- Never strike one hammer against another hammer
- Do not use hammers with mushroomed heads

Pliers

- Never attempt to force pliers by using a hammer on them
- Do not use pliers that are cracked, broken, or sprung
- When using diagonal cutting pliers, shield the loose pieces of cut material from flying into the air by using a cloth or your gloved hand

Hand Saws

- Keep control of saws by releasing downward pressure at the end of the stroke
- Make sure your hands and fingers are away from the saw blade while using
- When using a handsaw, hold your panel firmly against the worktable
- Do not use a saw that has dull saw blades
- Never carry a saw by the blade
- Oil saw blades after each use of the saw

Snips

- Wear safety glasses or safety goggles when cutting lath or corner beads
- Make sure you wear your work gloves when cutting materials with snips
- Do not use straight cut snips to cut curves
- Keep the blade aligned by tightening the nut and bolt on the snips
- Do not use snips as a hammer, screwdriver, or pry bar
- Engage the locking clip on the snips after use
- Keep your snips in a sheath or toolbox when not in use

Knives/Sharp Instruments

- When handling knife blades and other cutting tools, direct sharp points and edges away from you
- Always cut in the direction away from your body
- Carry all sharp tools in a sheath or holster. Store knives in knife blocks or in sheaths after using them
- Do not use knives that have dull blades. Use the knife that has been sharpened
- Never use knives as screwdrivers
- Do not pick up knives by their blades
- Carry knives with the tips pointed towards the floor

Tool Boxes/Chests/Cabinets

- Tape over or file off sharp edges on toolboxes, chests, or cabinets
- Do not stand on toolboxes, chests, or cabinets to gain extra height
- Lock the wheels on large toolboxes, chests, or cabinets to prevent them from rolling
- Push large chests, cabinets, and toolboxes; do not pull
- Do not open more than one drawer of a toolbox at a time
- Close and lock all drawers and doors before moving the tool chest to a new location
- Never use a toolbox or chest as a workbench
- Do not move a toolbox, chest, or cabinet if it has loose tools or parts on the top

LATHING WORK

When performing lath and plaster work employees will use the following safe practices.

Lifting Bags, Cans, Buckets

- Position your feet 6 to 12 inches apart with one foot slightly in front of the other
- Face the load
- Bend at the knees, not at the back
- Keep your back straight
- Get a firm grip on the object with your hands and fingers. Use handles when present
- Perform lifting movements smoothly and gradually; do not jerk the load
- Hold objects as close to your body as possible
- If you must change direction while lifting or carrying the load, pivot your feet and turn your entire body. Do not twist at the waist
- Set down objects in the same manner as you picked them up, except in reverse
- Slide materials to the end of the tailgate before attempting to lift them off a pick-up truck. Do not lift over the walls or tailgate of the truck bed

SANDBLASTING

Follow the safe practices when removing plaster.

- Do not perform asbestos removal operations, unless you have been trained, qualified, and certified in asbestos removal procedures
- Use the respirator that has been fit tested and assigned to you by your supervisor
- Always assume that materials used prior to 1976, such as plaster and blown insulation, contain asbestos
- Never use sanders or power devices that may create dust or airborne particles
- Do not dry scrape, bead blast, or mechanically pulverize any existing plaster or blown insulation
- Notify the state OSHA division at least 24 hours before beginning any asbestos-related demolition work in which more than 100 sq. ft. of asbestos-containing material (greater than 0.1 percent asbestos by weight) will be disturbed

FIBERGLASS BATTS AND SPRAYED-ON INSULATION

- Do not take work clothes home when exposed to sprayed-on insulation or fiberglass batts
- Change your work clothes before leaving the job site
- Place work clothes contaminated with fiberglass or sprayed-on insulation in a closed labeled container approved by your employer
- Use your respirator when working with sprayed-on insulation or fiberglass

FINISHING

When performing finishing work using plaster or cement based materials:

- Apply Vaseline to exposed skin surfaces on your arms and hands prior to handling plaster, lime, or any cementitious mixtures
- Do not handle lime or cementitious mixtures if you have open cuts or scratches on exposed skin surfaces such as your arms or hands
- Use personal protective clothing or equipment such as canvas gloves and protective eyewear to avoid cement poison or burns
- Open doors and windows, and make sure exhaust fans are turned on when working indoors

Applying Exterior Finishes (Scratch Coats, Coquina, And Stucco)

- Never use a metal ladder on rooftops or within 50 feet of electrical power lines
- Do not block the walking surfaces of elevated working platforms, such as scaffolds, with tools or materials that are not being used
- When working outdoors, drink plenty of fluids and keep shirts on to avoid dehydration and sunburn

Using Joint Compounds

- Wear protective gloves when handling compounds or chemicals from containers labeled flammable, toxic, caustic or poisonous. Wash your hands after removing the gloves
- Follow the instructions on the label and in the corresponding Safety Data Sheet for each joint compound or chemical product used in your workplace
- Each time you use your gloves, wash your gloves before removing them. Use cold tap water and normal hand washing motion. Always wash your hands after removing the gloves
- Do not use joint/filler compounds or chemicals from unlabeled containers
- Do not store chemical containers labeled oxidizer with containers labeled corrosive or caustic
- Always use goggles and gloves when handling joint/filler compounds or chemicals labeled corrosive or caustic

Applying Interior Finishes (Plaster, Coquina, Popcorn or Other)

- Do not smoke or eat while performing stucco or popcorn finishes
- Stand clear of mixing or blowing operations
- Do not stand, work, or operate pneumatic equipment such as blowers with hoses within three feet of any unprotected roof opening or within five feet of any unprotected roof edge

Drywall Mold Inspection/Testing

When preparing to work in an area where there's a possibility of mold, follow these procedures to inspect for mold:

- Do not enter or work in an area where mold is suspected without wearing proper respiratory and other personal protection. Molds are known allergens and may be toxic
- Always wear PPE when investigating a mold problem. The minimum PPE includes an N-95 respirator, gloves, and eye protection
- Many different types of mold can be found growing on the same or nearby sections of drywall. Different molds appear at different locations according to variations in moisture level. Attics, basements, and outdoor environments contract many molds
- Crawl spaces can have high levels of airborne mold spores and mold spores in settled dust. Do not assume that because there is no visible mold on surfaces that there is not a problem mold reservoir in exposed insulation
- Inspect ceilings, wall and ceiling cavities, floors, carpeting, backsides of stairs, exposed sides of all framing, joists, girders, posts, and exposed fiberglass insulation as a possible mold reservoir for moisture
- For larger areas of mold, look for the dominant mold present
- Collect one sample per location using clear adhesive tape. Do not use the same tape to sample from multiple locations. Put the sample into a clear Ziploc bag. Look for variations in appearance, texture, growth surface, or mold growing in different areas for reasons to sample more than one. Dust samples need to be taken where there is no visible mold. Collect settled dust particles from a horizontal surface. If you are going to collect a single dust-screening sample, collect it from the area you are most suspicious of, or from the area where building occupants spend the most time. Where the tape sample is collected can make a big difference in what you find. Send the mold samples to a reputable tester
- If you suspect there's a mold problem, call a professional testing Company. The tester will take air and physical samples and incubate them
- Different molds may be found growing in the same building on the drywall room side, drywall cavity side, plywood sheathing, wood stud or joist framing, painted surfaces, exposed fiberglass insulation, and paper vapor barrier
- Water-loving molds grow closest to the floor, molds on drywall grow a little higher on a vertical wall
- When in doubt go on-line to: www.epa.gov/iaq/molds/preventionandcontrol.html, or call 800-490-9198
- Indoor Air Quality Association is at: www.IAQA.org

NOTE: only qualified persons may develop a mold remediation plan and perform mold remediation. See the Mold Remediation chapter of this manual for more information.

After Remediation Is Complete

- Make sure outside problems have been fixed that are causing wet conditions such as the roof, roof gutter, or downspout spillage by the building foundation
- Make sure inside conditions such as plumbing leaks or improper ventilation have been fixed

TRAINING

This Company will provide training for all employees engaged in drywall, plastering and insulation work. This training will include:

- The proper use of tools and equipment
- The proper care and use of all necessary PPE
- The hazards associated with drywall, plastering and insulation work
- How to recognize potential mold contaminated areas

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

Retraining

Retraining will reestablish proficiency and introduce new or different control measures whenever the following occur:

- A change in job assignment, equipment or process present a new hazard
- There is a change in the procedures
- A periodic inspection reveals deviations from or inadequacies in employee knowledge or use of the safe practices

POLICY

This company has implemented the following earth moving policy to ensure the safety of its employees. All workers engaged in earth moving operations will follow these procedures and safe practices when operating or working around earth-moving equipment safely.

EMPLOYER RESPONSIBILITIES

This company will ensure that:

- All heavy equipment operators are trained and competent to operate their equipment safely
- All employees will be provided, and trained on the use of, the PPE necessary for their jobs
- All heavy equipment will be inspected and maintained in good working order
- Designate a competent person to implement this written earth moving policy

EMPLOYEE RESPONSIBILITIES

- Attend all required earth moving training
- Follow all safe practices established by the company
- Use and maintain all necessary PPE provided by the company
- Report any unsafe conditions or acts immediately

HAZARDS

The most common causes of injuries and fatalities when working around earthmoving equipment are:

- Falls – When climbing on and off the equipment
- Rollovers
- Workers struck by equipment
- Workers struck by material
- Electrocution
- Burns

You should always follow safe work practices and be aware of the hazards around you. It is also a good idea to be trained on the first aid techniques for treating common injuries; it could save a life.

PERSONAL PROTECTIVE EQUIPMENT

All employees are expected to be familiar with and use the necessary PPE associated with their job functions. This PPE can include, but is not limited to:

- Hardhats
- Safety shoes
- Safety gloves
- Reflective vests or clothing
- Safety glasses
- Hearing protection
- Fall protection devices
- Dust masks, or other respiratory protection

EQUIPMENT REQUIREMENTS

Requirements exist for all mechanized equipment used in construction and industry. All earth moving and mobile industrial equipment have common features and must follow the same safety requirements regardless of the specific type, intended purpose or configuration of the equipment.

This company will ensure that all earth moving equipment will comply with all applicable federal, state and local equipment requirements including:

General Requirements

The following are general safety requirements for earthmoving equipment:

- Levers that control hoisting or dumping devices on load hauling vehicles will have a latch or other device that prevents accidental starting or tripping of the mechanism
- Trip handles for tailgates of dump trucks must be located so that the operator is in the clear when dumping occurs
- All rubber-tired motor vehicle equipment is equipped with fenders, mud flaps may be used instead of fenders if the vehicle isn't designed for fenders

Seat Belts

- Seat belts must be provided on all equipment listed above, and must meet all safety requirements
- The tractors listed above must have seat belts for the operators when seated in the normal seating arrangement for tractor operation, even though back-hoes, breakers, or other similar attachments are used on these machines for excavating or other work

Brakes

- All earthmoving equipment must have a service braking system capable of stopping and holding the equipment fully loaded

Fenders

- Pneumatic-tired earth-moving haulage equipment (trucks, scrapers, tractors, and trailing units) whose maximum speed exceeds 15 miles per hour must be equipped with fenders on all wheels

Rollover Protective Structures (Rops)

- Rollover protective structures must meet all governmental requirements for rollover protective structures for designated scrapers, loaders, dozers, graders, and crawler tractors

Audible Alarms

- All bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers, and similar equipment, must have a working horn, distinguishable from the surrounding noise level, which can be operated as needed when the machine is moving in either direction
- No earthmoving or compacting equipment with an obstructed view to the rear can be used in reverse gear unless the equipment has an operating reverse signal alarm, or a ground guide signals that it is safe to do so

Scissor Points

- Scissor points on all front-end loaders or articulating equipment, that present a pinch or crush hazard to the operator during normal operation, must be guarded

Lift Trucks, Stackers, Etc.

- Equipment of this type must have the rated capacity clearly posted on the vehicle and be clearly visible to the operator
- When auxiliary removable counterweights are provided by the manufacturer, the alternate rated capacities of the vehicle must also be clearly posted. These ratings can't be exceeded

Modifications or Additions

- No modifications or additions that affect the capacity or safe operation of the equipment may be made without the manufacturer's written approval. If such modifications are made, the capacity, operation and maintenance instruction plates, tags or decals will be changed accordingly. In no case can the original safety factor of the equipment be reduced

Steering or Spinner Knobs

- Steering or spinner knobs must not be attached to the steering wheel unless the steering mechanism design prevents road reactions from causing the steering wheel to spin. The steering knob must be mounted within the periphery of the wheel

INSPECTIONS

All equipment will be checked at the beginning of each shift to ensure that the following parts, equipment and accessories are in safe operating condition and free of any damage that could cause failure:

- Any Trailer Brake Connections
- Emergency Stopping System (brakes)
- Steering Mechanism
- Seat Belts
- Safety Devices
- Parking System (hand brake)
- Tires
- Coupling Devices
- Operating Controls
- Horn

Any defects that are found must be repaired before the equipment can be used. These requirements also apply to secondary equipment such as Lights, reflectors, windshield wipers, defrosters and fire extinguishers.

These rules apply to the following types of earthmoving equipment:

- Scrapers
- Crawler (track) or wheel tractors
- Off-highway trucks
- Agricultural and industrial tractors
- Loaders
- Bulldozers
- Graders
- Similar equipment

JOBSITE SAFETY

The productivity and safety of heavy equipment operations are increased by using well-trained employees, along with properly maintained and serviced equipment. A well laid out worksite and work-plan always improves efficiency and safety on the jobsite.

General

Wherever possible, site planners should arrange for drive-through operations to reduce the need for vehicles to back up.

Keep foot traffic to a minimum in areas where trucks and equipment are operating. Where feasible, use barricades to protect workers.

Jobsite

- All underground utilities in the work area must be located prior to digging. Utility companies must be notified in advance of your intention to excavate. (Check local codes for notification time requirements)
- When nearing an estimated location of underground utilities, the exact location must be determined and marked
- All equipment will comply with the safety requirements when working or being moved in the vicinity of power lines or energized transmitters
- Wherever equipment operations encroach on a public thoroughfare, a system of traffic controls must be used
- Flaggers are required where barricades or warning signs cannot control moving traffic
- Never use an elevating part of heavy equipment as a man-lift

Access Roadways and Grades

- No construction equipment or vehicles can be moved on any access roadway or grade unless the roadway or grade is constructed and maintained to handle the safe movement of that equipment
- Every emergency access ramp and berm used by an employer must be built to restrain and control runaway vehicles

Site Training

Instruction for drivers, operators, signalers and workers on foot is essential to reduce the hazards created by reversing vehicles and equipment.

All construction personnel must be made familiar with blind spots – the areas around every vehicle that are invisible to the operator or driver, even with the help of mirrors.

Site Clearing Requirements

Employees involved in site clearing must be protected from hazards of irritant and toxic plants and suitably instructed in the first aid treatment available.

All equipment used in site clearing operations must be equipped with rollover guards. In addition, rider-operated equipment will be equipped with an overhead and rear canopy guard meeting the following requirements:

- The overhead covering on this canopy structure must at least 1/8-inch steel plate or 1/4-inch woven wire mesh with openings no greater than 1 inch, or equivalent
- The opening in the rear of the canopy structure will be covered with at least 1/4-inch woven wire mesh with openings no greater than 1 inch

Environment

This company will ensure that all equipment operators understand the factors at the workplace that affect their job, these include:

- Ramps, slopes, and other surface conditions at the jobsite
- Composition and stability of the loads
- Maneuvering for loading and unloading of trucks and hoppers
- Pedestrian traffic in the area
- Confined, restricted, or hazardous places where equipment will be operated
- Material, utility, and overhead hazards

Site-Specific Information

- Always know where to get assistance in case of an accident or other emergency
- Know where to find the first aid kits
- Know where to find a fire extinguisher

SAFE PRACTICES

All company employees are expected to follow these safe practices and procedures when operating or working near earth moving equipment.

Equipment Knowledge

- Read the operators manual and operate the machine only if trained and considered competent to do so
- Make sure the machines controls are identifiable and clearly marked
- Wear appropriate clothing and PPE for your job
- Do a walk around to make sure the area is clear before moving the machine
- Don’t climb on the machine where hand and foot holds have not been provided. Use a three point climbing technique
- Start machine only while sitting in the operator’s seat and all personnel are clear
- Ensure all controls are in the neutral position before starting the machine
- Keep tires properly inflated, improper inflation may cause the machine to tip over under load
- Heavy equipment machines are required to have a seat belt and rollover protection (ROPS). Always use the seat belt

Basic Operation

Authorized operators must be able to demonstrate the ability to perform the following equipment tasks:

- Steering and maneuvering
- Digging and loading
- Refueling
- Moving
- Implement and attachment and operation
- Equipment inspections or maintenance as required

For additional information regarding the safe operation of a specific type of equipment, refer to manufacturer’s instructions and/or the applicable chapter of this manual.

Backing Up

Reversing vehicles and equipment on construction projects present serious hazards for workers on foot. Fatal accidents caused by workers being backed over by dump trucks and other equipment occur all too frequently. Anyone on foot near reversing vehicles and equipment is at risk.

Blind Spots

When working around earth moving equipment all ground workers need to be aware of equipment blind spots and swing areas. Around dump trucks and heavy equipment such as bulldozers and graders there are blind spots where the operator has no view or only a very limited view. The operator may not see someone standing in these blind spots. Anyone kneeling or bending over in these areas would be even harder to see. Consequently, the driver or operator must rely on mirrors and signalers to back up.

Dump trucks and other equipment that could contact overhead power lines must keep a minimum distance from them. The company will ensure that all operators and spotters/signalers know what the minimum distance requirement is for the power lines in the area.

Idle Equipment

- Whenever the equipment is parked, the parking brake will be set
- Equipment parked on inclines will have the wheels chocked and the parking brake set
- When equipment is left unattended, implements must be fully lowered, controls neutralized, power shut off, and brakes set
- Heavy equipment is considered unattended when the operator is 25 ft. or more away even if it's still in their view
- When the equipment operator is dismounted and within 25 ft. of the machine still in his view, the implements will be fully lowered, controls neutralized, and the brakes set to prevent movement
- All equipment left unattended at night, next to a highway or a construction area where work is in progress, must have appropriate lights, reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of the equipment

Equipment in Use

- Don't drive equipment up to anyone standing in front of an excavation or a fixed object
- Don't stand or walk under the elevated portion of any equipment, whether loaded or empty
- Don't hitch a ride on heavy equipment
- Don't put your arms or legs between the moving parts of the equipment, or outside the running lines of the vehicle
- Always maintain a safe distance from the edge of ramps or elevated platforms and from the edge of any excavation
- Brakes will be set and wheel blocks will be in place to prevent movement of trucks, trailers, or railroad cars while loading or unloading
- Make sure there is enough headroom under overhead installations, lights, pipes, sprinkler system, etc. for the safe passage of equipment

Equipment Guards

- An overhead guard will be used as protection against falling objects. This guard is intended to offer protection from the impact of small objects, not to withstand the impact of a falling capacity load
- A load backrest extension must be used, whenever necessary, to reduce the risk of the load or part of it from falling rearward
- Only approved heavy equipment can be used in hazardous locations

Spotters/Signalers

Any employee operating a vehicle or equipment with an obstructed view or near overhead power lines will have a designated spotter/signaller to protect against incidents or injuries.

- Operators and spotter/signalers will understand and use an approved set of signals to control equipment movement
- Operators will always obey the signaler or spotter
- Only one person will be designated as a signaler or spotter
- If possible, remain in the cab in areas where other equipment is likely to be backing up
- Make sure that all mirrors are in good condition and properly adjusted
- Blow the horn twice before backing up
- Stop the vehicle when a spotter, co-worker or anyone else disappears from view

Operating

When operating earthmoving equipment, drivers will:

- Keep the load as low as possible while traveling; always reduce speed when turning
- Keep speeds low on rough terrain to prevent bouncing, bucking, or side hopping
- Check for overhead lines or obstructions before raising any overhead implement
- Not drive across a steep slope
- Not allow the tires to spin when picking up or pushing a load
- Always look in the direction of, and keep a clear view of the path of travel
- Ascend or descend grades slowly
- When ascending or descending grades over 10 percent, loaded equipment will be driven with the load upgrade
- Keep the load and load carrying implement tilted back on grades
- Operate at a speed that will permit the equipment to be brought to a stop in a safe manner
- Avoid stunt driving and horseplay
- Always slow down for wet and slippery surfaces
- Ensure that ramps or bridge plates are properly secured before they are driven over, and their rated capacity never exceeded
- Run over loose objects on the roadway surface
- Not use heavy equipment to demolish structures that are taller than the machine unless it has overhead protection to prevent debris from striking the cab
- Not under-cut a bank which is higher than the machine
- Use extreme caution when approaching or operating near excavations
- Use dust suppression and control when required

- Pre-wet soil to make loading easier and to aid in dust control
- Rip tight soil before scraping or excavating to improve speed and efficiency
- Always load buckets or hoppers down grade to increase the speed of operation, lessen wear on equipment, and reduce the need for a push tractor
- Not use heavy equipment as a battering ram
- Make sure the machine has clearance in front and rear if equipped with rear implements
- Never place any body part under a raised implement unless it is properly blocked

Loading

When operating a loader, drivers will:

- Strike the bucket to avoid scattering loads before traveling with equipment
- Handle only loads that are within the rated capacity of the equipment
- Ensure the load is securely within the bucket or hopper as far as possible, and tilt the bucket backward to stabilize the load
- Use extreme care when tilting a load forward or backward when it's elevated
- Never tilt the bucket forward while it's elevated except to pick up a load
- Not tilt an elevated load forward except when it's in a deposit position over a hopper or stack
- Ensure all personnel not within a guarded enclosure, including truck drivers, stay clear of loading operations

Mounting & Dismounting

Safety regulations require that construction equipment have a means of access to the operator's station that will not endanger the operator, and must have skid-resistant walking, climbing, and work surfaces.

Ensure that your equipment complies with the law. Keep all running boards, treads, steps, footholds and platforms clear of mud, ice, snow, grease, debris and other hazards. Always use three point contact techniques when entering or exiting equipment.

Workers on Foot

Ground workers involved in earth moving operations will:

- Know how to work safely around trucks and operating equipment
- Understand and avoid entering or standing in blind spots
- Make eye contact with the driver or operator before approaching equipment
- Signal your intentions to the driver or operator
- When possible, avoid using vehicle ramps to enter and exit the site
- Not stand near vehicle paths, grading operations and other locations where heavy equipment is moving

Housekeeping

- Keep operator's compartment free of clutter and controls free of oil and grease
- Personal tools or equipment must be secured

TRAVELING/MOVING (ROADING) HEAVY EQUIPMENT

Traffic Rules

- All traffic regulations must be observed, including authorized site speed limits. Keep back at least three vehicle lengths from the vehicle ahead of you, and keep the equipment under control at all times
- Yield the right of way to ambulances, fire trucks, or other emergency vehicles
- Don't pass other vehicles traveling in the same direction at intersections, blind spots, or other dangerous locations
- Slow down and sound the horn at intersections of roadways, paths, and other locations where vision is obstructed. If the load being carried obstructs your forward view, travel with the load trailing (to the rear)
- Wherever possible, cross railroad tracks diagonally. Parking closer than 8 feet from the center of railroad tracks is prohibited

EQUIPMENT MAINTENANCE

General

Any time heavy equipment needs repair, is found to be defective, or unsafe in any way, the machine will be taken out of service until it has been restored to safe operating condition.

- Fuel tanks must not be filled while the engine is running
- Spilled oil or fuel must be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine
- No equipment can be operated with a leak in the fuel system
- Never use an open flame to check electrolyte level in storage batteries or gasoline level in fuel tanks
- All repairs will be made by authorized personnel
- No repairs will be made in Class I, II, and III locations

Class 1 locations	Class 2 locations	Class 3 locations
Locations where easily ignitable fibers are present but not likely to be in the air in quantities sufficient to produce ignitable mixtures	Locations in which flammable gases or vapors are, or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures	Locations which are hazardous because of the presence of combustible dust

Repair Guidelines

- Repairs to the fuel and ignition systems of equipment that involve fire hazards can be only performed in designated locations
- Equipment in need of repairs to the electrical system will have the battery disconnected prior to the start of those repairs
- All parts of any heavy equipment need replacement can only be replaced with parts having safety ratings equal to the original part

- Equipment will not be altered so that the location of parts differs from the manufacturers original configuration, nor will they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts, except for fuel system conversions

Conversions

Heavy equipment originally approved to use gasoline for fuel may be converted to liquefied petroleum gas fuel provided the complete conversion results in a vehicle that meets the features for LP or LPS designated equipment.

Routine Maintenance

- Water mufflers must be filled daily, or as frequently as necessary, to prevent depletion of the supply of water below 75 percent of the filled capacity
- Equipment will be inspected daily before being placed in service, and will not be used if the examination shows any condition that affects the safety of the vehicle
- Where heavy equipment is used on a round-the-clock basis, it must be examined after each shift
- Heavy equipment will be kept in a clean condition, free of excess oil and grease. Noncombustible agents should be used for cleaning equipment. Solvents with a low flash point (below 100° F.) can't be used
- High flash point (at or above 100° F.) solvents may be used. The appropriate precautions for toxic fumes, ventilation, and fire hazard for the agent or solvent used must be followed

Repair Requirements

If, during inspection, defects are found, they must be immediately reported and corrected.

- Vehicles with mufflers having screens or other parts that may become clogged can't be operated if those screens or parts are clogged
- Any vehicle that emits hazardous sparks or flames from the exhaust system must immediately be removed from service until the cause of the sparks and flames has been eliminated
- When the temperature of any part of any equipment is found to be in excess of its normal operating temperature, thus creating a hazardous condition, the equipment will be removed from service and not returned until the cause of the overheating has been eliminated

Repair Safety

When repairing earthmoving equipment it's important to follow these guidelines:

- Heavy machinery, equipment, or any of their parts, which are suspended by slings, hoists, or jacks, must be properly blocked or cribbed to prevent falling or shifting before employees can work under or between them
- Bulldozer and scraper blades, end-loader buckets, dump bodies or other elevating part, will be either fully lowered or blocked, while being repaired or when not in use. All controls will be in a neutral position, with motors stopped, and brakes set unless work being performed requires otherwise
- A safety tire rack, cage, or equivalent protection must be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices

Batteries

The use, care and charging of all batteries will conform to the following:

- Ventilation will be provided to ensure diffusion of the gases from the battery and to prevent the accumulation of an explosive mixture
- Face shields, aprons, and rubber gloves will be provided for workers handling acids or batteries
- Facilities for quick drenching of the eyes and body will be provided within 25 feet of battery handling areas
- Facilities will be provided for flushing and neutralizing spilled electrolyte and for fire protection

Gasoline & Diesel Refueling

Most types of earthmoving equipment are powered by diesel fuel or gasoline. Although diesel fuel isn't as volatile as gasoline, use the same precautions with each.

REFUELING SAFETY MEASURES

Refueling Station

- Refueling stations must be located outside, never refuel a vehicle indoors
- Turn off your vehicle engine. Put your vehicle in park and/or set the emergency brake
- If you experience a fire when refueling, leave the nozzle in the fill pipe and back away
- Leaving the nozzle in the vehicle will prevent the fire from becoming more dangerous
- Know where the pumping stations emergency shutdown button is located. In case of fire hit this shut off to prevent the fire from becoming any worse
- Use only the refueling latch provided on the gasoline dispenser nozzle. Never jam the refueling latch on the nozzle in the open position

When Refueling

- Don't smoke, light matches, or lighters when refueling
- Don't over-fill or top-off your vehicle tank, which can cause gasoline spillage
- Avoid prolonged breathing of gasoline vapors. Use gasoline only in open areas
- Keep your face away from the nozzle or container opening
- Before starting any equipment make sure the fuel cap is screwed on tightly, and that any spilled gas has evaporated or been cleaned up
- Never siphon gasoline by mouth for any reason. Gasoline can be harmful or fatal if swallowed. If someone swallows gasoline, do not induce vomiting. Contact an emergency medical service provider immediately

Fuel Safety

- Keep gasoline away from your eyes and skin; it may cause irritation. Remove gasoline-soaked clothing immediately
- Use gasoline as a fuel only. Never use it to wash your hands or as a cleaning solvent
- Rags or other material used to clean spilled fuel should be disposed of immediately in a metal container. Never carry a fuel soaked rag in your pocket
- Remember, gasoline vapors are highly flammable and explosive. Never assume that because there is no puddle of gas that there is no danger

Carbon Monoxide Hazards

Carbon monoxide (CO) is an odorless, colorless, highly poisonous gas created when any fuel is burned. Breathing high concentrations of Carbon Monoxide can be lethal in minutes. Even low concentrations over a long period are dangerous. Long-term exposure can cause permanent heart and brain damage.

When using fuel-powered equipment, there is a serious danger of carbon monoxide build up. For this reason, don't operate gasoline or diesel powered equipment indoors unless there is proper ventilation to prevent a buildup of carbon monoxide.

TRAINING

This company will provide training to all affected employees on the following topics:

- General equipment requirements
- Personal protective equipment & injuries
- General equipment operations
- General equipment and site safety
- Basic maintenance

Training will be provided by persons who have the knowledge, training and experience to train operators and evaluate their competence.

Trainees may operate heavy equipment only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence
- In areas where the operation does not endanger the trainee or other employees

Training will consist of a combination of the following:

- Formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material)
- Practical training (demonstrations performed by the trainer and practical exercises performed by the trainee)
- Evaluation of the operator's performance on the job-site

Refresher Training

Refresher training will be conducted:

- At least annually
- Whenever jobsite conditions, equipment or procedures and safe practices are changed
- When employees demonstrate a lack of understanding of company safe practices

Training Records

The company will create and maintain records of all employee training. These records will be kept for the length of their employment.

POLICY REVIEW

The company will review this policy at least annually, and whenever there are changes to our processes that can affect the procedures and safe practices.

SCOPE

This chapter covers the safe use of elevating work platforms (EWPs), also known as either aerial work platforms (AWPs) or mobile elevating work platforms (MEWPs). This category of equipment includes articulating aerial devices (cherry pickers) and scissor lifts. These devices can be vehicle mounted, self-propelled or unpowered, and are intended to provide workers access to work areas above ground.

The designs and styles of the devices vary greatly, ant the manufacturer's information should always be referenced before using a particular model.

POLICY

This Company has adopted this program for the safety of employees when working on or around "Vehicle Mounted Elevating and Rotating Work Platforms" from OSHA regulations.

The safety coordinator is designated by this Company as the competent person in authority over all aerial device work procedures. The Safety Coordinator, or designee, will ensure that all safety measures and systems are correctly installed, all safety procedures are adhered to, and ensure regular inspections of the operational site and aerial equipment are made. This Company has implemented, and will enforce, the following work practices and procedures to assure that no employee will be exposed to hazards during aerial lifting operations:

RESPONSIBILITIES

Because Elevated Work Platforms (EWPs) are often rented from an equipment supplier, there can be confusion as to the responsibilities of the parties involved. Generally, the responsibilities can be summarized in the following ways:

Equipment Owner or Supplier

The owner or supplier must ensure that the machine:

- Is maintained in good operating condition
- Conforms to appropriate regulations and standards
- Includes the operator's manual and correct load rating charts

The Employer

The Company and/or safety coordinator will:

- Make sure that the operator is fully trained to operate the particular equipment being used
- Verify that the machine has the correct load rating capacity for the job
- Maintain the equipment and all its protective devices
- Maintain a daily inspection log for each platform
- Require all workers to use the necessary PPE
- Keep the manufacturer's operating instructions and safety rules with the equipment

- Confirm and verify that all employees follow all safety procedures to protect all employees involved in aerial lifting operations or who work near aerial lifting operations
- Keep all work platform proper working order according to the manufacturer's instructions
- Remove any unsafe work platform from service until it is repaired
- Ensure all repairs are made by a qualified service person according to the manufacturer's instructions
- Make no modifications or alterations to work platforms without the written permission of the manufacturer or any other equivalent entity
- Ensure each work platform has a mechanical parking brake that will hold the unit on any slope it's capable of climbing
- Use wheel chocks, whenever possible, when installing or using an aerial lift on an incline

Employee Responsibility

An employee must:

- Operate an aerial device only after being trained and authorized by the Company
- Report known defects and hazards concerning an aerial device to the supervisor
- Operate the machine in a safe manner as prescribed by the manufacturer and according to Company safety and health policies
- Inspect the equipment each day or each shift before use
- Perform function tests before use
- Report any defects to the supervisor
- Read, understand, and obey the manufacturer's safety rules, including the operating manual and warning decals

Osha Regulations and Responsibilities

OSHA Regulations include the following requirements:

- EWPs must be engineered and tested to meet the applicable standards for that equipment
- Aerial devices must be checked each day before use by a trained worker
- The owner or supplier must keep a log of all inspections, tests, repairs, modifications, and maintenance
- The log must be kept up to date and include names and signatures of persons who performed inspections and other work
- Workers must be given oral and written instruction before using the platform for the first time. Instruction must include items to be checked daily before use

VEHICLE MOUNTED ELEVATING AND ROTATING WORK PLATFORMS

There are two basic types of elevating work platforms (EWP) – boom and scissor. Both types come in:

1. "On-Slab" models for use on smooth hard surfaces such as concrete or pavement

2. "Rough-Terrain" models for use on firm level surfaces such as graded and compacted soil or gravel

Both types share three major components: base, lifting mechanism, and platform assembly.

Scissor-Type Machines

These are raised and lowered by hydraulic pistons and an expanding scissor mechanism. Platforms are available in various configurations with different capabilities for extension and movement. Some have extendable platforms or platforms that can rotate. Extendable platforms should be retracted before raising or lowering the device. Typical machines are illustrated in Figure 1.

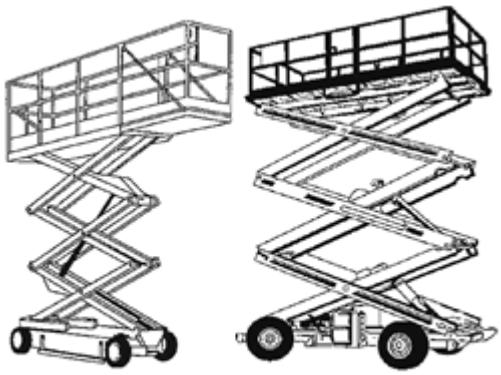


FIGURE 1: Scissor-type Powered

On-Slab Units

- Not designed for uneven or sloping ground
- Normally have solid rubber tires
- Generally powered by rechargeable DC battery
- Some are powered by internal combustion engine, either gasoline or propane
- Most have “pothole protection” – a metal plate lowered close to the ground to afford some protection against inadvertent movement into depressions or debris
- Lifting mechanism is hydraulic
- Normally have wider wheelbases, larger wheels, and pneumatic tires
- Some fitted with outriggers for extra stability
- Usually powered by internal combustion engines: gasoline, diesel, or propane
- DC Battery powered units are also available, but are not common

Rough-Terrain Units

- Similar in design to on-slab machines
- Built to handle rigorous off-slab challenges

Scissor-lifts range in capacity from 500 to several thousand pounds. They’re available with platform heights often reaching 50 feet or more. Scissor-lifts must be set up on stable, level ground, even with outriggers deployed. A slight imbalance or instability is amplified when the machine is raised.

EWP HAZARDS

The following are some of the basic hazards to be aware of during operations:

- Machine Tipping or Overturning – Many factors can cause instability sudden stops, depressions, drop-offs, overreaching and overloading. Overturning and tipping result in many fatalities and injuries
- Overriding Safety Features – Defective or disabled features such as the tilt or level warnings or a deadman switch; can prevent operators from knowing when they are in a dangerous situation. Overriding a deadman switch has resulted in fatalities; so has the malfunction of the tilt warning
- Overhead Powerline Contact – Contacting overhead wires can cause electrocution. This can happen with any type of machine – and with the loads carried by or overhanging the machine
- Falls from Elevated Platforms – Many falls occur because workers get in a hurry and fail to use standard fall protection procedures

- Makeshift Extensions – If an EWP can't reach the desired working height, don't compensate by using scaffold planks, ladders, blocks of wood or other makeshift arrangements, these practices lead to falls and machine instability
- Overloading the Platform – Elevating work platforms overloaded or loaded unevenly can become unstable and fail. Articulating type machines are especially sensitive to overloading. Always stay within the operating range specified by the manufacturer
- Failure to Cordon Off:
  - EWPs can be struck by other construction equipment or oncoming traffic if the work area isn't properly marked or cordoned off. Make sure there's enough clearance for all aerial work platforms
  - Workers have been injured when they inadvertently entered an unmarked area and were struck by falling material, tools, or debris
  - Workers have also been injured in unmarked areas by swinging booms and pinched by scissor mechanisms
- Accidental Contact – Many work platforms have blind spots. Moving the machine or platform can cause contact with workers or with obstacles. Use a designated signaler on the ground to guide the operator when the path of travel is not clear or access is tight
- Improper Blocking During Maintenance – Failing to block, or improperly blocking the machine, boom, or platform can cause serious crushing injuries and property damage
- Improper Access – Never enter or leave the platform by climbing the scissors or the boom. Don't use extension ladders to gain access. Ladders exert lateral loads on the platform and can cause it to overturn. For the safest access, lower the machine completely
- Moving with Platform Raised – Lower the platform before moving the machine unless:
  - The machine is designed to move with platform raised
  - The supporting surface is smooth and level. Slight dips and drops are amplified when the platform is raised and can cause the machine to overturn
- Improper Refueling – Take care when refueling. Gasoline, for instance, should be kept in approved containers and dispensed to prevent spills and sparking
- Pinch Points – Clothing, fingers and hands can get caught in scissor mechanisms. As platforms are raised, machines may sway. Workers can be pinched between guardrails and the structure. Position the platform so that work takes place above guardrail height

FALL PROTECTION REQUIREMENTS

The fall protection required for persons who work on aerial lifts depends on the type of aerial lift used. The table below shows acceptable fall protection.

Type of Lift	Fall Protection Required
Vehicle-Mounted Elevating and Rotating Work Platforms (ANSI A92.2 devices)	Platforms other than buckets or baskets must include guardrail systems – guardrails, a midrail and toeboards. Each person who works on a boom-supported platform must wear a body harness and lanyard attached to the boom or basket.
Manually Propelled Elevating Aerial Platforms (ANSI A92.3 devices)	The platform must have a guardrail at least 42 inches ±3 inches above the floor, a midrail and toeboards at least 4 inches high.
Boom-Supported Elevating Work Platforms (ANSI A92.5 devices)	The platform must have a guardrail at least 42 inches ±3 inches above the floor, a midrail and toeboards at least 4 inches high. Each worker on the platform must wear a body harness and lanyard attached to the boom or platform.
Self-Propelled Elevating Work Platforms (ANSI A92.6 devices)	The platform must have a guardrail 42 inches ±3 inches above the floor, a midrail and toeboards at least 4 inches high.

- Employees must maintain firm footing on the platform while working on the platform. The use of railings, planks, ladders or any other devices on the platform for achieving additional height is prohibited
- The Company will provide employees with a safety harness that has an approved lanyard that's affixed to attachment points provided and approved by the manufacturer. A fall arrest system will only be used when the aerial lift is designed to withstand the vertical and lateral loads caused by an arrested fall
- A body belt may be used with a restraint device with the lanyard and the anchor arranged so that the employee is not exposed to any fall distance. A restraint device is required where the aerial lift cannot withstand the vertical and lateral loads imposed by an arrested fall
- Belting off to an adjacent pole, structure, or equipment while working from an aerial work platform is prohibited
- The Company will not allow employees to exit an elevated aerial work platform, except where elevated work areas are inaccessible or hazardous to reach. When employees exit to unguarded work areas, adequate fall protection will be provided and used

Fall Protection for Aerial Devices

- Employees must always stand firmly on the floor of the basket, and must not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position
- Boom and basket load limits specified by the manufacturer must not be exceeded
- A safety belt or harness must be used with a lanyard attached to the boom or basket when working from an aerial lift. The employer must provide the safety belt, harness and lanyard. An in-plant, industrial-type aerial device used on a level surface and equipped with a platform with approved railings is exempt from this rule

- Body belts are not acceptable as part of a personal fall arrest system. The use of a body belt in a tethering system or in a restraint system is acceptable
- A boom platform must have a rail or other structure around its upper periphery that's at least 38 inches above the floor of the platform and with a toeboard at least 4 inches high. A basket of a cherry picker is considered to meet this requirement. A platform may have the guardrail removed from the working side if a safety belt and lanyard is worn by the employee on the platform

STABILITY AND TIPPING

In general, elevating work platforms are well manufactured and are safe to use within their specific limitations. However, as with any equipment or tool, there are rules to follow. One of the most dangerous hazards in operating elevating work platforms is tipping over. This can be caused by one or more of the following factors:

- Sudden movement of the unit or parts of the unit when elevated
- Making sudden stops while in motion with platform elevated
- Uneven or overloading of the platform
- Traveling or operating on a slope or uneven terrain
- Changing the weight distribution of the machine by replacing parts with others of a different weight or adding attachments not approved by the manufacturer
- Holes or drop-offs in the floor surface causing one wheel to drop suddenly
- Operating the equipment in windy conditions

FACTORS AFFECTING STABILITY

Dynamic Forces

Dynamic forces are forces generated by movement or change of movement. For example, applying the brakes suddenly or traveling too fast around corners can cause instability – as in a car or van. Sudden stops while raising or lowering the platform can also cause instability.

Traveling

Traveling the platform over rough or uneven ground can also cause instability. Figure 10 shows how a tire dropping 4 inches can cause the boom to sway 2 feet. It is important to lower the platform fully or to retract telescoping sections while traveling, particularly on uneven surfaces.

Stability on Inclined Surfaces

Unless recommended for such use by the manufacturer, no elevating work platform must be used on an inclined surface. Procedures for maintaining stability must be clearly outlined in the special warnings section of user's manual. The user must not deviate from the manufacturer's instructions.

EQUIPMENT INFORMATION

EWPs are designed for different uses. It is essential to select the appropriate equipment for the job.

Typical Mistakes

- Using an on-slab machine on rough terrain
- Using a unit undersized with respect to height, reach, and lifting capacity
- Lifting large materials that overhang the platform
- Using a scissor lift where the reach of a boom-type machine is needed
- Extending the platform with planks, ladders, or other devices because the machine cannot reach the required height

Factors to Consider

- Capacity – Does the machine have the lifting capacity, the reach and the height to complete the task?
- Surface Conditions – Are the surface conditions hard or soft, sloped or level? Will the ground have an effect on the type of machine selected?
- Platform Size and Configuration – Do you need a regular or extendable platform? Is rotation required? Are there space restrictions to consider?
- Mobility – Is a boom type better suited than a scissor lift for the job?
- Material to be Lifted – Will the machine be able to lift the size and weight of material required for the job?
- Access – Will the machine be able to travel around the workplace safely? Are there obstructions or depressions that will restrict the use of certain machines?
- Operator Skill or Training – Are the people on site competent to operate the machine? If a propane-powered engine is used, has the operator received propane training?
- Work Environment – If the work is to be done indoors, or in a poorly ventilated area, will an electrically powered machine be required?

Construction

- Aerial work platforms must be designed, constructed and tested to comply with the requirements of ANSI standards A92.2, A92.3, A92.5, and A92.6
- Aerial work platforms must not be field-modified for uses other than those intended by the manufacturer, unless the modification has been certified in writing by the manufacturer or by any other equivalent entity, to comply with the applicable ANSI standard, and to be at least as safe as the equipment was before modification
- Directional controls must be in compliance with all of the following provisions:
  - Be of the type that will automatically return to the off or neutral position when released
  - Be protected against inadvertent operation
  - Be clearly marked as to their intended function
- The platform must have a working overriding control that's continuously activated for platform directional controls, and which automatically returns to the off position when released
- Aerial work platforms must be equipped with emergency controls at ground level
- Emergency ground level controls must be clearly marked as to their intended function and be capable of overriding the platform controls

- All of the following information must be clearly and permanently marked on each work platform
  - Special workings, cautions, or restrictions necessary for operation
  - Rated workload
  - A clear statement of whether or not the aerial work platform is electrically insulated
- Rotating shafts, gears and other moving parts that are exposed to contact must be guarded
- Attachment points must be provided for fall protection devices for personnel who occupy the platform on aerial work platforms

Elevating Work Platform Equipment

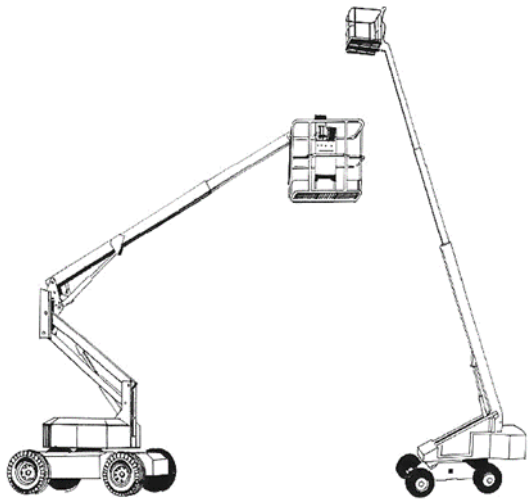
- The platform deck must be equipped with a guardrail or other structure around its upper periphery that must be 42 inches high, plus or minus 3 inches, with a midrail. (Chains or the equivalent may be substituted where they give equivalent protection.) Where the guardrail is less than 39 inches high, an approved personal fall protection system must be used
- The configuration of an elevating work platform may include a ladder for employees to use in reaching the platform deck. Any ladder device used in this way must have rungs located on uniform centers not to exceed 12 inches
- Any elevating work platform equipped with a powered elevating assembly and having a platform height exceeding 60 inches must be supplied with safe emergency lowering means compatible with the specific elevating assembly employed
- Elevating Work Platforms must include:
  - Toeboards at sides and ends, which must be at least 4 inches high
  - Exception: Toeboards may be omitted at the access openings
  - A hinged trap access door, if applicable
  - A platform with a minimum width of 16 inches

Guarding of Moving Parts

All rotating shafts, gearing and other moving parts must be guarded.

Self-Propelled Boom-Supported Platforms

- Normally fitted with rough-terrain undercarriages
- Some smaller on-slab units
- Platforms have lifting capacity of about 500 pounds or two workers
- Lack capacity of scissor-type machines; not intended for lifting materials
- Usually powered by an internal combustion engine: gasoline, diesel, or propane



Booms can be:

- Telescopic, articulating, or combination of both
- Raised and extended by hydraulic cylinders
- Can reach up to 150 feet

Platforms can extend well beyond the wheelbase

Although the controls of boom machines are fixed in position, operators can become disoriented by the machines rotation, and must remain aware of the direction of its movement. Many machines have color-coded directional arrows to help the operator move the machine in the right direction.

As with mobile cranes, stability decreases with length of boom and boom angle as the center of gravity moves in relation to the platform position. The machine will overturn if the center of gravity moves outside the machine's base.

Machines come with load charts that show safe operating configurations. Machines with booms long enough to cause overturning at low boom angles are required to have radius- limiting interlocks to prevent operation in unstable configurations.

Users must be familiar with the operating range of the individual make and model of the equipment they are using. This knowledge is essential in order to position the machine correctly and reach the work location safely.

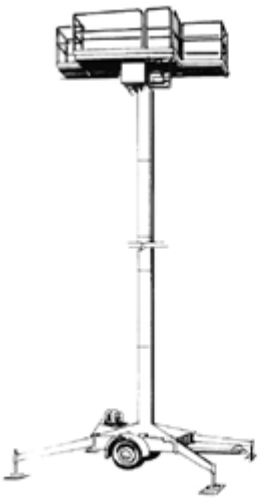
Non-Self-Propelled or Push-Arounds

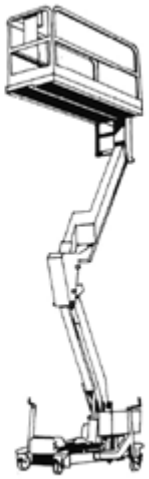
As the name indicates, these units are not self-propelled and must be transported from one location to another with an independent power source or manually in the case of the smaller devices.

The machines are intended primarily for use on smooth, level, hard surfaces or on- slab conditions. Some trailer-mounted units are available. Many of the smaller models can be folded up to pass through standard doorways, and can be transported by pick-up trucks. As a result, they are suitable for maintenance or renovation work.

Push-Arounds

- Raising mechanism normally powered by gasoline or propane engine or by electric motors, either AC or DC
- Normally raised and lowered by hydraulic cylinders
- Platform capacities vary from 300 to 1000 pounds or more but are generally less than 500 pounds
- Devices with capacity less than 500 pounds are Not Recommended for construction—this type is better suited to maintenance activities
- Platforms usually do not exceed 36 feet in height
- As platform is raised, risk of overturning increases
- Extra care required when operating at maximum height





Factors of Safety in Design of Work Platform Assembly

- Where the platform is supporting its rated workload by a system of wire ropes or lift chains, or both, the safety factor of the wire or chain must not be less than 6 to 1

- All critical components of a hydraulic or pneumatic system used in a work platform must have a bursting strength that exceeds the pressure attained when the system is subjected to the equivalent of four times the rated workload. Critical components are those in which a failure would result in a free fall or free rotation of the boom. All noncritical hydraulic components must have a bursting safety factor of at least 2 to 1
- Automatic safety devices or systems must be provided to prevent free fall of the work platform should a failure of the power supply or elevating system occur

Construction and Modification

All aerial devices and elevating work platforms must be assembled and erected in accordance with these rules and must be maintained in safe operating condition.

- ANSI A92.2 — Vehicle Mounted Elevating and Rotating Aerial Devices
- ANSI A92.3 — Manually Propelled Elevating Work Platforms
- ANSI A92.5 — Boom Supported Elevating Work Platforms
- ANSI A92.6 — Self-Propelled Elevating Work Platforms

All electrical tests must conform to the requirements of the applicable NFPA 70 Standard or equivalent DC voltage test approved by the equipment manufacturer or equivalent entity.

Mobile elevating devices must be mounted on a vehicle capable of handling the imposed load. The vehicle must be a stable support for the aerial device.

The lifting and outrigger system of an aerial device must have a means to ensure that the system will not permit the work platform to drop in a free fall in event of a power or hydraulic line failure.

In addition to the welding requirements prescribed in ANSI A92.2, an aerial device must conform to the AWS D2.0, Specifications for Welding Highway and Railway Bridges standard.

Controls

- Any powered elevating work platform must have both upper and lower control devices
- An emergency stopping device must be provided at the upper controls of elevating work platforms
- Upper controls must be located within reach of the operator
- Lower controls must be capable of overriding the upper controls. Except in case of an emergency, the lower controls must not be operated unless approved by the employee in the basket or on the work platform
- Controls must be designed, guarded and oriented so that the operator doesn’t inadvertently move the machine in the wrong direction. Many machines have color-coded directional arrows on the chassis to aid the operator in moving the machine

Stability Requirements for New or Modified Aerial Devices

Each new or modified aerial device must be inspected and tested before initial use to assure compliance with all of the following requirements.

- Each aerial device mounted on a vehicle that meets the manufacturer's minimum vehicle specifications must be capable of sustaining a static load 1 ½ times its rated load capacity in every position where the load can be placed when the vehicle is on a firm and level surface. If having the outriggers extend to a firm footing is part of the definition of the configuration, they must be extended to provide leveling for determining whether the mobile unit meets the stability requirements
- Each aerial device mounted on a vehicle that meets the manufacturer's minimum vehicle specifications must be capable of sustaining a static load 1 1/3 times its rated load capacity in every position in where the load can be placed when the vehicle is on a slope of 5 degrees downward in the direction most likely to cause overturning
- If having the outriggers extended to a firm footing is part of the definition of the configuration, they must be extended to provide leveling for determining whether the mobile unit meets the stability requirements. If other facilities, such as a means of turntable leveling, are provided to minimize the effect of the sloping surface, then those facilities must be used to determine whether the mobile unit meets the stability requirements. Vertical towers designed specifically for operation only on a level surface must be excluded from this requirement
- None of the stability tests described must produce instability of the mobile unit, or cause permanent deformation of any component. The lifting of a tire or outrigger on the opposite side of the load does not necessarily indicate a condition of instability

Verification by the manufacturer or an equivalent entity that the stability of an aerial device meets the requirements may be used to demonstrate compliance

MANUALS, SIGNS, AND DECALS

Signs Clearly Visible to the Operator at the Controls Must Indicate:

- The equipment's rated working load
- All limiting operating conditions, including the use of outriggers, stabilizers and extendable axles
- The specific firm, level surface conditions required for use in elevated position
- All warnings that are specified by the manufacturer
- Other than for a boom-type elevating work platform, the direction of machine movement for each operating control
- The name/number of the ANSI standard that the platform was designed to meet
- The name and address of the owner

Ansi Standards Required Information

- Caution or restrictions of operation or both
- Operating instructions
- A permanently affixed plate containing the designed rating capacity

- The make, model, serial number and manufacturer's name and address
- The maximum platform height
- The maximum travel height, if not equal to the maximum platform height
- Maximum recommended operating pressure of hydraulic or pneumatic system(s) or both
- The nominal voltage rating of the batteries, if battery-powered
- A warning to study the operating manual before using the equipment
- A statement identifying whether or not the platform is insulated
- A notice outlining the required inspections
- Diagrams/description of various platform configurations and its capacity in each configuration
- Warnings against replacing, without the manufacturer's consent, components critical to the machine's stability

Each unit must have a manual containing instructions for maintenance and operations. If a unit can be operated in different configurations, then these must be clearly described, including the rated capacity in each configuration.

Many of these signs are vital to the operation of the machine and the protection of workers. All signs and decals must be kept clear of dust and grease so they can be easily read. Torn or damaged signs must be replaced.

PROCEDURES

This section provides for the safe operation and maintenance by the employer and the safe use by the employee of vehicle mounted elevating and rotating work platforms in, around and about a place of employment. Firefighting equipment and powered industrial trucks are not included in these rules.

Elevating Work Platforms

These rules apply to equipment that has a primary function of elevating personnel, together with their tools and necessary materials, on a platform that is mechanically positioned. The following units are covered:

- ANSI Standard A92.2, "Vehicle-Mounted Elevating Work Platforms," which applies to vehicle-mounted devices installed on commercial chassis and covers the following type of units:
  - Extensible boom aerial devices
  - Aerial ladders
  - Articulating boom aerial devices
  - Vertical towers
  - A combination of any of the equipment specified
- ANSI Standard A92.3, "Manually Propelled Elevating Work Platforms," which is adopted by applies to work platforms that are manually propelled, vertically adjustable by manual or powered means, and which may be towed or manually moved horizontally on wheels or casters that are an integral part of the work platform base
- ANSI Standard A92.5, "Boom-Supported Elevating Work Platforms," which applies to all integral frame, boom-supported elevating work platforms which telescope, articulate, rotate or extend beyond the base dimensions

- ANSI Standard A92.6, "Self-Propelled Elevating Work Platforms," which applies to self-propelled vertically adjustable integral chassis work platforms. Such work platforms are power operated with primary controls for all movement operated from the platform,

Equipment Not Covered

- Equipment that has a primary function other than elevating personnel, such as fork trucks or cranes that are adapted to elevating personnel, are not covered by these rules
- Also excluded from coverage of these rules is firefighting equipment that's covered by the provisions of the publication entitled "American National Practices for the Maintenance, Care, Testing and Use of Fire Department Aerial Ladders and Elevating Platforms"

SAFE PRACTICES

Operators must be familiar with the requirements for the specific machine they will use:

- The manufacturer's operating manual
- The manufacturer's warning and caution signs on the machine
- The location of all emergency controls and emergency procedures
- The daily maintenance checks to perform

General Safety Guidelines

- Always check for overhead power lines before moving the machine or operating the platform. The limits of approach from overhead power lines must be observed. If work must be done within these limits, make arrangements with the owner of the utility to have the power line de-energized. Allow for movement or sway of the lines as well as the platform. Be aware of overhanging tools or equipment
- Wear a full body harness and tie off to a designated tie-off point while the machine is moving
- Never leave the machine unattended without locking it or otherwise preventing unauthorized use
- Don't load the platform above its Rated Working Load (RWL). Wherever possible, keep the load below 2⁄3 of the RWL
- Make sure that all controls are clearly labeled with action and direction
- Keep guardrails in good condition and ensure that gate is securely closed before moving the platform. Don't remove guardrails while the platform is raised
- Shut off power and insert the required blocking before maintenance or servicing
- Deploy stabilizers or outriggers according to the manufacturer's instructions
- Position the boom in the direction of travel where possible
- Keep ground workers away from the machine and out from under platform
- Never access the platform by walking on the boom
- Don't try to push or move the machine by telescoping the boom
- Don't use the machine as a ground for welding
- Don't use a boom-supported platform as a crane
- Don't operate the EWP in windy conditions. For safe wind speeds, refer to the operator's manual

- Don't place the boom or platform against any structure to steady either the platform or the structure
- Secure loads and tools on the platform so that machine movement will not dislodge them
- Make sure that extension cords are long enough for the full platform height and won't be pinched or severed by the scissor mechanism
- Use three-point contact and proper climbing techniques when mounting or dismounting the machine
- Stunt driving and horseplay is prohibited
- Employees must keep a firm footing while working on the platform unless they are secured by safety harness and lanyard devices fixed to manufacturer-approved anchor points. Don't railings or planks, ladders or any other device on the work platform to achieve additional height
- The operator will immediately report defects or malfunctions that become evident during operation and must stop use of the work platform until correction has been made
- Altering or disabling of safety devices or interlocks is prohibited

Important Note: Never operate equipment that you haven't been trained on, or that you're not comfortable operating. Your safety and that of others on site depends on competent, knowledgeable operation of the equipment.

Vehicles

Before a vehicle supporting an aerial ladder, is moved for highway travel:

- The ladders must be secured in the lower position, and the manually operated device at the base of the ladder, or other effective means, must be used to prevent elevation or rotation of the ladder
- The boom must be inspected to make sure that it's properly cradled and the outriggers are in the stowed position

A vehicle supporting an aerial device must not be moved at the job site when the boom is elevated with employees in working position, unless the equipment is specifically designed for this type of operation and.

Pre-Operation Procedures

Before operating elevating work platforms and aerial devices, check the work area for:

- Drop-offs or holes in the ground
- Slopes
- Bumps or floor obstructions
- Debris
- Overhead obstructions
- Overhead wires, power lines, or other electrical conductors
- Hazardous atmospheres
- Adequate operating surface – ground or floor

- Sufficient ground or floor support to withstand all forces imposed by the platform in every operating configuration
- Wind and weather conditions

Before each elevation of the work platform, the operator must:

- Make sure the brakes are set and outriggers, when used, are positioned on pads or a solid surface
- Install wheel chocks before using an aerial device on an incline
- Check for overhead obstructions and high-voltage conductors. A minimum distance of ten feet from energized high-voltage conductors must be maintained at all times between the conductors and the operator and platform equipment
- Make sure that the load and its distribution on the platform meet the manufacturer's rated capacity. The manufacturer's recommended load limits must never be exceeded
- Operate all platform and ground controls to verify that they perform their intended function
- Make sure that guardrails are properly installed and gates are closed

Before and during driving while the platform is elevated, the operator will:

- Be required to look in the direction of, and keep a clear view of, the path of travel and assure that the path of travel is firm and level
- Keep a safe distance from obstacles, debris, drop-offs, holes, depressions, ramps or other hazards to safe elevated travel
- Maintain a safe distance from overhead obstacles
- The operator must limit travel speed according to conditions. Conditions to be observed are ground surface, congestion, slope, location of personnel and other factors that may create a hazard of collision or injury to personnel

Before use on each work shift, an aerial work platform must be given a visual inspection by the operator for defects that would affect its safe operation and use. The visual inspection will be done for all of the following:

- Cracked welds
- Bent or broken structural members
- Hydraulic or fuel leaks
- Damaged controls and cables
- Loose wires
- Tire condition
- Fuel and hydraulic fluid levels
- Slippery conditions on the platform

All unsafe items found because of the inspection of the aerial work platform or work area must be corrected before further use of the aerial work platform.

When the specified clearances can’t be maintained, the owner of electrical lines, the authorized representative or the utility must be notified and provided with all pertinent information before the commencement of operations near electrical lines.

Any overhead wire must be considered an energized line until the owner of the line or the authorized representative states that it is de-energized/visibly grounded, or the line is insulated for the system voltages and the task will not compromise the insulation of the conductor and/or cause an electrical hazard.

Operating Procedures

- The aerial work platform must be used according to the manufacturer's operating instructions and safety rules
- The manufacturer's rated load capacity for any given angle of elevation must not be exceeded. The Company will ensure that the load and its distribution on the platform comply with the manufacturer's specifications. The aerial work platform's rated load capacity must not be exceeded when loads are transferred to the platform at elevated heights
- Only personnel, their tools and necessary materials must be on or in the platform
- The guardrail system of the platform must not be used to support any of the following:
  - Materials
  - Other work platforms
  - Employees
- Personnel must maintain firm footing on the platform while working on the platform. The use of railings, planks, ladders or any other devices on the platform to achieve additional height is prohibited
- Fuel gas cylinders must not be carried on platforms that would allow the accumulation of gases
- A safety harness with a lanyard, that meets the construction Fall Protection safety standard and is affixed to attachment points provided and approved by the manufacturer will be provided by the Company and used by any employee using an aerial work platform. A fall arrest system must only be used if the aerial lift is designed to withstand the vertical and lateral loads caused by an arrested fall
- A body belt with a lanyard may be used as a restraint device when anchored so that the employee is not exposed to any fall distance. A restraint device is required where the aerial lift cannot withstand the vertical and lateral loads imposed by an arrested fall
- The Company does not allow employees to exit an elevated aerial work platform, except where elevated work areas are inaccessible or hazardous to reach. Employees may exit the platform with the knowledge and consent of the employer. When employees exit to unguarded work areas, fall protection must be provided and used as required
- Only aerial work platforms that are equipped with a manufacturer's installed platform controls for horizontal movement must be moved while in the elevated position
- Before and during driving while elevated, an operator of a platform must do both of the following:
  - Look in the direction of, and keep a clear view of, the path of travel and make sure that the path is firm and level

  - Maintain a safe distance from all of the following:
    - Obstacles
    - Drop-offs
    - Depressions
    - Overhead obstructions
    - Other hazards to safe elevated travel
    - Debris
    - Holes
    - Ramps
    - Overhead electrical lines
- Outriggers or stabilizers, when provided, will be used according to the manufacturer's instruction. Outriggers and stabilizers must be placed on pads or a solid surface
- Aerial work platforms must be elevated only when on a firm and level surface or within the slope limits allowed by the manufacturer's instructions
- Platform gates must be closed while the platform is in an elevated position
- Stunt driving and horseplay are prohibited
- Altering, modifying, or disabling safety devices or interlocks is prohibited
- Ropes, cords, and hoses must be prevented from becoming entangled in the aerial work platform
- A platform operator must ensure that the area surrounding the EWP is clear of personnel and equipment before lowering the platform
- Before and during travel, except as provided for horizontal movement, an operator must do all of the following:
  - Inspect to see that booms, platforms, aerial ladders, or towers are properly cradled or secured
  - Ensure that outriggers are in a stored position
  - Limit travel speed according to the following factors:
    - ☐ Condition of the surface
    - ☐ Congestion
    - ☐ Slope
    - ☐ Location of personnel
    - ☐ Other hazards
- Do not positioned the work platform against another object to steady the platform
- The aerial work platform must not be operated from a position on a truck, trailer, railway car, floating vessel, scaffold or similar equipment
- Do not use the boom and platform of the aerial work platform to move or jack the wheels off the ground unless the machine is designed for that purpose by the manufacturer
- If the platform or elevating assembly becomes caught, snagged or otherwise prevented from normal motion by adjacent structures or other obstacles, and control reversal does not free the platform, all employees must be removed from the platform before attempts are made to free it

Operating Instructions (Elevating Work Platforms)

- No employee will ride, or tools, materials, or equipment be allowed on a traveling elevated platform unless the following conditions are met:
  - The travel speed at Maximum Travel Height does not exceed 3 feet per second
  - Self-propelled units must have an electrical or other interlock means to prevent driving them with the platform height greater than the Maximum Travel Height or at speeds greater than permitted at Maximum Travel Height

  - The operating surface of the unit is level with no hazardous irregularities or accumulation of debris that might cause a moving platform to overturn
- Units must be assembled, used and disassembled according to the manufacturer's instructions
- Units must be assembled, and used only by employees who have been trained in their use. Units must be inspected for damaged and defective parts before use
- Units must not be loaded in excess of their working load and must be taken out of service when damaged or weakened from any cause. They must not be used until repairs are completed
- Employees must not sit, stand or climb on the guardrails of an elevating work platform or use planks, ladders, or other devices to gain greater working height or reach
- Employees must not work on units when exposed to high winds, storms or when they are covered with ice or snow (unless provisions have been made to ensure the safety of the employees)
- Employees climbing or descending vertical ladders must have both hands free for climbing
- Where moving vehicles are present, the work area must be marked with warning flags, roped-off or other effective means of traffic control must be provided
- Unstable objects such as barrels, boxes, loose brick, tools, debris, must not be allowed to accumulate on the work level
- Screens must be installed that extend along the entire opening between toeboards and guardrails, when the work being performed creates small debris or involves the use of small tools and materials if persons are will work or pass under the equipment,

Pin-On Platforms

- Pin-on platforms must be securely pinned to the boom or boom extension
- Employees on the elevated pin-on platform must be secured to the boom by a safety belt and lanyard or a body belt and safety strap

Operating Instructions (Aerial Devices)

- Aerial baskets or platforms must not be supported by adjacent structure(s) when workers are on the platform or in the basket while in an elevated position
- Lift controls must be tested before use to determine that they are in safe working condition
- Only authorized persons must operate an aerial device
- Belting off to an adjacent pole, structure, or equipment while working from an aerial device is not be permitted
- Employees must not sit or climb on the edge of the basket or use planks, ladders or other devices to gain greater working height
- Boom, basket and platform load limits specified by the manufacturer must not be exceeded
- When elevating personnel with the vehicle stationary the braking systems must be set
- Provided they can be safely installed, wheel chocks must be installed before using an aerial device on an incline
- When used, outriggers must be positioned on pads or a solid surface. All outriggers must be equipped with hydraulic holding valves or mechanical locks at the outriggers
- Climbers must not be worn while performing work from an aerial device

- When an insulated aerial device is required, the aerial device must not be altered in any manner that might reduce its insulating value
- An aerial device truck must not be moved when the boom is elevated in a working position with employees in the basket or platform except when all of the following are complied with:
  - The equipment is specifically designed for this type of operation
  - All controls and signaling devices are tested and are in good operating condition
  - An effective communication system must be maintained at all times between the basket or platform operator and where applicable, the vehicle operator
  - The route to be traveled is surveyed immediately prior to the work trip, checking for overhead obstructions, traffic, holes in the pavement, ground or shoulder, ditches, slopes, etc., for areas other than paved, a survey should be made on foot
  - The speed of the vehicle does not exceed three (3) miles per hour
  - Only one employee is in the basket
  - Both the driver and/or the elevated employee have been specifically trained for this type of work
- Lower level controls must not be operated unless authorized by the employee in the device, except in case of emergency
- Before moving an aerial device for travel, the boom(s) must be inspected to see that it is properly cradled and outriggers are in stowed position
- An employee, while in an elevated aerial device, must be secured to the boom, basket or tub of an aerial device by a safety belt, body belt or body harness equipped with safety strap or lanyard
  - Safety belts/body belts are prohibited for use in personal fall arrest systems, but may be used as part of a fall restraint or positioning device system
  - Safety belts/body belts used as part of a positioning device system must be rigged to prevent an employee from free falling more than 2 feet
  - A body harness may be used in a personal fall restraint, positioning or fall arrest system. When a body harness is used in a fall arrest system, the lanyard must be rigged with a deceleration device to limit maximum arresting force on an employee to 1,800 pounds and prevent the employee from hitting any levels or objects below the basket or platform, and must limit free fall to a maximum of 6 feet

Use – Near Power Lines

- Any overhead line must be considered energized until the owner, owner representative or utility indicates otherwise and the line has been visibly grounded
- Except as prescribed, or where insulating barriers not a part of, or an attachment to the aerial device, have been erected to prevent physical contact with the lines, an aerial device must maintain the distances from energized distribution and transmission power lines and equipment shown in Table 1
- A qualified lineman or a qualified line clearance tree trimmer, working on or near an exposed power transmission or distribution line from an aerial lift, must maintain the clearance distances shown in Table 2, unless they are insulated or guarded from the energized part by gloves or gloves and sleeves, or insulated, isolated, or guarded from any other conductive part or the energized part is insulated from the employee

- A qualified telecommunications employee must maintain the clearance distances shown in Table 3 when working from an aerial lift, unless they are insulated, isolated, or guarded from any other conductive part or the energized part is insulated from the employee

TABLE 1

Minimum Clearance Distances for Equipment		
Voltage	Clearance with Boom Raised	Clearance Boom Lowered and no Load in Transit
To 50kV	10 feet	4 feet
Over 50kV	10 feet + .4 inch per each 1 kV over 50 kV	10 feet
50 to 345kV		10 feet
346 to 750 kV		15 feet

TABLE 2

Minimum Working Distances for Qualified Line Clearance Tree Trimmers and Qualified Linemen	
Voltage Range Phase to Phase (KV)	Minimum Working Distance
2.1 to 15.0	2′0″
15.1 to 35.0	2′4″
35.1 to 46.0	2′6″
46.1 to 72.5	3′0″
72.6 to 121.0	3′4″
138.0 to 145.0	3′6″
161.0 to 169.0	3′8″
230.0 to 242.0	5′0″
345.0 to 362.0	7′0″
550.0 to 552.0	11′0″
700.0 to 765.0	15′0″
*NOTE: For 345 — 362 kV., 500 — 552 kV., and 700 — 765 kV., the minimum working distance and the minimum clear hot stick distance may be reduced that such distances are not less than the shortest distance between the energized part and a grounded surface.	

TABLE 3

Minimum Approach Distances for Qualified Telecommunications Employees	
Voltage Range (Nominal Phase to Phase)	Minimum Approach Distances
300 V and less	12″
Over 300 V, not over 750 V	18″
Over 750 V, not over 2 kV	24″
Over 2 kV, not over 15 kV	36″
Over 15 kV, not over 37 kV	42″
Over 37 kV, not over 87.5 kV	48″
Over 87.5 kV, not over 121 kV	54″
Over 121 kV, not over 140 kV	--″

- The clearance requirements of this rule do not apply to the following situations:
  - Where work is performed from an insulated aerial device that is insulated for the work and the work is performed in accordance with the provisions of construction safety standard "Power Transmission and Distribution" and "Telecommunications"
  - Where the owner, authorized representative, or utility representative have ensured that the conductor is insulated for the system voltages and the task will not compromise the insulation of the conductor and/or cause an electrical hazard
  - Where the electric power transmission or distribution lines have been de-energized and visibly grounded at the point of work or where insulating barriers that are not a part of an attachment to the aerial work platform have been erected to prevent physical contact with the line
  - Where work is being performed by journeymen electricians on equipment up to .5kV. Two journeymen electricians will be required for work within the minimum clearance on equipment over .5kV
- The insulated bucket, gloves and sleeves used to comply must be rated at more than the voltage to be worked on, or that with which they might come into contact

INSPECTION, TESTING, AND MAINTENANCE

The Company will comply with all of the following requirements:

- Each aerial work platform must be inspected, maintained, repaired, and kept in proper working condition in accordance with the manufacturer’s operating, maintenance, and repair manuals

- Any aerial work platform found not to be in a safe operating condition must be removed from service until repaired
- All repairs must be made by an authorized person in accordance with the manufacturer's operating, maintenance, and repair manuals
- If the aerial work platform is rated and used as an insulated aerial device, the electrical insulating components must be tested for compliance with the rating of the aerial platform in accordance with ANSI standard A92.2

Inspection and Tests

- An aerial device must be inspected and tested at least annually for permanent deformation and cracks by using 1 ½ times the rated load and for defects by visual inspection during and following the load test
- Written, dated and signed test reports must be made available by the employer for examination by regulatory agencies
- The insulated part of an EWP must not be altered in any way that might reduce its insulating value
- An annual electrical test of insulated aerial devices must be made. An equivalent DC voltage test may be used in place of the prescribed AC voltage
- Field inspection and tests must be performed only by an authorized and trained employee or outside service
- Lift controls must be tested daily before use to determine they are in safe working condition. An aerial device with defective controls must not be used until repaired
- All danger, caution and control markings and operational plates must be legible and not obscured

Equipment Inspection

All components that affect the safe operation of the EWP, and can change from day to day, must be inspected daily.

Users must check the operator's manual for a complete list of pre-operational checks. See the end of this section for Daily Inspection Checklists for Elevating Work Platforms and Aerial Devices.

Minimum Requirements

Before climbing onto a work platform, check:

- Tires for proper pressure and wheels for loose or missing lug nuts
- Steer cylinder, linkage, and tie rods for loose or missing parts, damage, and leaks
- Hydraulic oil for leaks and fluid level. Hydraulic hoses, lift cylinder(s), and connections for leaks or loose connections
- Fuel supply – adequate fuel, filler cap in place, no damage, leaks, or spills
- Battery for fluid level and state of charge
- Proper connection of all quick-disconnect hoses
- Structural components for damage, broken parts, cracks in welds, including scissor arms, outrigger arms, and pads

- Ladder or steps for damage and debris (ladder must be firmly secured to the platform and relatively free of grease, mud, and dirt)
- Beacon and warning lights for missing and defective lenses or caps
- Ground controls (manual and powered) – including emergency stop switch and platform lower/lift switch – for proper function and damaged and missing control sticks/switches
- Decals and warning signs to make sure they are clean, legible, and conspicuous

After mounting the platform, check:

- Platform assembly for missing or loose parts, missing or loose lock pins and bolts
- Platform floor for structural damage, holes, or cracked welds and any dirt, grease, or oil that can create a hazard
- Operator's manual to make sure it is in place
- Extendable platform deck for ease of extension/retraction and proper function of locking position of platform
- Guardrails to make sure they are in place and secure
- Access gate for ease of movement, missing parts, latch, and locking capabilities
- All fall protection anchorage points
- All control mechanisms for broken or missing parts
- All emergency controls for proper function – stopping, descending, master OFF switch
- All safety devices such as tilt and motion alarms for malfunction
- Swivels for freedom of rotation
- Scissors for smooth movement up and down
- Brakes for stopping capabilities
- Horn for proper function

Maintenance and Repairs

- The materials used to repair aerial devices and elevating work platforms must meet the standard specifications of strength, dimensions, and weights and must be able to support the rated workload
- Electrical wiring and equipment must meet NFPA 70 provisions
- All exposed surfaces must be free from sharp edges, burrs, or other hazardous projections

Electrical Ratings

- The EWP rating plate must indicate whether the aerial device is insulated or non-insulated and, if insulated, the rated line voltage for which the aerial device was designed and tested
- The insulating portion of an aerial device must not be altered in any manner that might reduce its insulating value

TRAINING AND PERMITS

Training Requirements

The Company will provide employees who will operate an aerial work platform with instruction and training regarding the equipment before a required permit is issued or reissued. Such instruction and training must include the following:

- Instruction by a qualified person in the intended purpose and function of each of the controls
- Proper use and care of all necessary PPE
- Training by a qualified person, or reading and understanding the manufacturer's or owner's operating instructions and safety rules
- Understanding by reading, or by having a qualified person explain, all decals, warnings, and instructions displayed on the aerial work platform
- Reading and understanding all of the following provisions of this "Training and Permits" standard, or being trained by a qualified person on their content

Employees who will use fall protection equipment must receive additional training specific to the type of equipment used.

Permits

The Company will provide operators of aerial work platforms with an operators permit. The operator must carry the permit or have it available at the jobsite/workplace, and must be displayed upon request by a regulatory agency. The permit must indicate the type of work platforms an operator has been trained on, and is qualified to operate. A permit to operate an aerial work platform is valid only when performing work for the Company who issued the permit.

The Company will certify that their employees are competent to operate applicable aerial work platforms at least once every three years. Permits will be issued at the time of certification or recertification.

A permit will contain the following information:

- The Company's name
- The operator's name
- The name of the issuing authority
- The types of aerial work platforms the operator is authorized to operate. These include:
  - Vehicle-mounted elevating work platform such as: extensible boom aerial devices, aerial ladders, articulating boom aerial devices, and vertical towers
  - Manually propelled elevating work platforms
  - Boom-supported elevating work platforms
  - Self-propelled elevating work platforms
- The date issued
- The expiration date

Training Records

The Company will maintain employee-training records for three years. These records will include the name of the employee, the type of training received, the date of the training, and the name of the instructor.

Retraining

Employees operating aerial devices and elevated work platforms should receive training annually, and any time there is a change in operating procedures or equipment. In addition, employees must be retrained anytime there is an accident or near miss, or they demonstrate a lack of understanding of safe work procedures, equipment operation or the use of PPE.

ATTACHMENTS

The following pages contain a sample inspection checklist that can be reproduced for Company use.

SCISSOR LIFT OPERATOR DAILY INSPECTION/CHECKLIST (PAGE 1 OF 2)

Company Name:				Site Location:			
Date				Time			
Person(s) Making Inspection:				Job Foreman/Supervisor			
Equipment Type:				Equipment #s:		Manufacturer:	
OK	Repair	N/A	**Mechanical**				
☐	☐	☐	Structural damage or cracked welds – Visual walk-around inspection.				
☐	☐	☐	Parking brake – Check operation.				
☐	☐	☐	Tires/wheels and fasteners – Visually inspect, check operation and tightness.				
☐	☐	☐	Guides/rollers and slider pads – Visually inspect, check operation, and ensure there is no metal to metal contact with slider, slider side, or running surface. Check for free movement of surface. Also check for free movement of the slider pin through the slider.				
☐	☐	☐	Railings and railing lock pins – Visually inspect and check tightness.				
☐	☐	☐	Entry chains or gates – Check operation and tightness.				
☐	☐	☐	Bolts and fasteners – Check tightness.				
☐	☐	☐	Safety Bar – Check operation.				
☐	☐	☐	Wheel Bearings and Kingpins – Visually inspect, check operation and lubricate.				
☐	☐	☐	Pothole Protection – Visually inspect and check operation.				
☐	☐	☐	Steering cylinder and tie rod – Visually inspect, check operation and lubricate.				
OK	Repair	N/A	**Electrical**				
☐	☐	☐	Battery fluid level – Visually inspect.				
☐	☐	☐	Control switches – Visually inspect and check operation.				
☐	☐	☐	Cables and wiring harnesses – Visually inspect.				
☐	☐	☐	Battery Terminals – Visually inspect and check tightness.				
☐	☐	☐	Terminals and Plugs – Check tightness.				
☐	☐	☐	Generator/receptacle – Visually inspect and check operation.				
☐	☐	☐	Limit switches – Check operation.				

SCISSOR LIFT OPERATOR DAILY INSPECTION/CHECKLIST (PAGE 2 OF 2)

OK	Repair	N/A	**Hydraulic**
☐	☐	☐	Hydraulic oil reservoir level – Check oil level.
☐	☐	☐	Hydraulic Hoses/Fittings – Visually inspect and check for leaks.
☐	☐	☐	Lift/lowering time – Check operation and refer to specification tables.
☐	☐	☐	Cylinders – Visually inspect and check operation.
☐	☐	☐	Emergency lowering – Check operation.
☐	☐	☐	Lift capacity – Check relief valve setting and refer to specification tables.
OK	Repair	N/A	**Miscellaneous**
☐	☐	☐	Manual – Visually check that proper manual is in box.
☐	☐	☐	Placards, I.D. plates, warnings and control labels – Replace if missing/illegible.
OK	Repair	N/A	**Prestart Checks**
☐	☐	☐	Ensure that there are no obstacles around the work platform and in the path of travel such as holes, drop offs, ditches, soft fill, or debris.
☐	☐	☐	Check overhead clearances.
☐	☐	☐	Make sure the batteries are fully charged. Disconnect the AC charger cord from the external power source.
☐	☐	☐	Make sure that the Free-Wheeling Valve is fully closed.
☐	☐	☐	Make sure all guardrails and lock-pins are in place and locked in position
☐	☐	☐	Make sure both side battery and hydraulic trays are closed and locked.

NOTE: At any point during this inspection there are any deficiencies, do not operate lift any further. Notify the proper personnel or repair unit as needed. Do not operate equipment without proper authorization and training.

Signature (person(s) performing inspection/evaluation)	Date

GENERAL ELEVATING WORK PLATFORM INSPECTION LIST

Items to check during the daily inspection:

- ☐ Tires for proper pressure and wheels for loose or missing lug nuts.
- ☐ Steer cylinder, linkage, and tie rods for loose or missing parts, damage, and leaks.
- ☐ Hydraulic oil for leaks and fluid level. Hydraulic hoses, lift cylinder(s), and connections for leaks or loose connections.
- ☐ Fuel supply – adequate fuel, filler cap in place, no damage, leaks, or spills.
- ☐ Battery for fluid level and state of charge.
- ☐ Proper connection of all quick-disconnect hoses.
- ☐ Structural components for damage, broken parts, cracks in welds, including scissor arms, outrigger arms, and pads.
- ☐ Ladder or steps for damage and debris (ladder must be firmly secured to the platform and relatively free of grease, mud, and dirt).
- ☐ Beacon and warning lights for missing and defective lenses or caps.
- ☐ Ground controls (manual and powered) – including emergency stop switch and platform lower/lift switch – for proper function and damaged and missing control sticks/switches
- ☐ Decals and warning signs to make sure they are clean, legible and conspicuous.

After mounting the platform, check:

- ☐ Platform assembly for missing or loose parts, missing or loose lock pins and bolts.
- ☐ Platform floor for structural damage, holes, or cracked welds and any dirt, grease, or oil that can create a hazard.
- ☐ Operator's manual to make sure it is in place.
- ☐ Extendable platform deck for ease of extension/retraction and proper function of locking position of platform
- ☐ Guardrails to make sure they are in place and secure.
- ☐ Access gate for ease of movement, missing parts, latch and locking capabilities.
- ☐ All fall protection anchorage points.
- ☐ All control mechanisms for broken or missing parts.
- ☐ All emergency controls for proper function – stopping, descending, master OFF switch.
- ☐ All safety devices such as tilt and motion alarms for malfunction.
- ☐ Swivels for freedom of rotation.
- ☐ Scissors for smooth movement up and down.
- ☐ Brakes for stopping capabilities.
- ☐ Horn for proper function.

SCOPE

This chapter provides information on the U.S. Department of Labor and Office of Federal Contract Compliance Programs that this Company will follow regarding Equal Employment and Affirmative Action business practices.

EEO/AA POLICIES

The purpose of this Company's Equal Employment and Affirmative Action Plan (the "Plan") is to describe the application of key policies and procedures designed to assure the right of all persons to work and to advance based on ability. This Plan has been developed for the following purposes:

- To achieve full equal treatment of minority groups and women at all levels and in all sectors of the work force
- To ensure compliance with applicable equal employment laws and government regulations
- To set forth mandatory steps to be taken at all Company office locations to maintain and implement equal employment and affirmative action policies throughout the Company

Protected Classes - The federal government defines the follow persons as protected classes, and may not be discriminated based on:

- Race
- Color
- Age
- Handicap status
- Disabled veterans
- Genetic information
- Religion
- Sex
- National origin
- Vietnam era veterans
- Pregnancy status
- Any other basis prohibited by law

Equal Employment – Our employment policy will make no distinctions in treatment, hiring or advancement of applicants or employees who are identified as a member of a protected class.

Affirmative Action – The Board of Directors, President and all officers of the Company will affirmatively implement the policies and procedures in this plan with regard to protected classes and will regard those policies and procedures as contract requirements.

DISSEMINATION OF THE PLAN AND POLICIES

Internal

The Company will communicate to each executive, manager and supervisor this Plan and its equal employment and affirmative action policies through the following procedures:

- Upon request, the Company will give to any employee a copy of this Plan
- The existence and requirements of the Plan will be communicated to all employees from time to time through such internal publications as may be appropriate
- A copy of the Statement of Policies will be given to all applicants for employment upon their request for an employment application
- Implementation of the Plan will be discussed during management staff meetings

- Periodically, the Equal Opportunity Officer will meet with each manager and the manager's immediate staff to give them assistance in implementing the Plan
- The Company will communicate to union officials this Plan and its equal employment and affirmative action policies and procedures
- Posters and policies relevant to the Plan will be displayed in conspicuous places where employees are located and particularly, in employment areas

External

The Company will communicate the Plan and the Statement of Policies to the public by the following procedure:

- Recruiting sources, such as personnel agencies, community organizations, colleges and training institutes, will be informed of the basic aims of the Plan and the Statement of Policies and will be requested to include minorities, females, and handicapped persons in their referrals
- Advertisements for employment will be placed in news media chosen to reach all qualified applicants, including minorities, women, and handicapped persons. All employment advertisements will contain the phrase "An Equal Opportunity Employer"
- The Company will, in all solicitations or advertisements for employees placed by or on behalf of the Company; state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, handicap status, or disabled Veterans status
- The Company will send each labor union or representative of workers with which they have a collective bargaining agreement or other contract or understanding, a notice advising the labor union or workers' representative of the Plan and policies. The Company's recruitment and hiring practices will include:
  - The avoidance of any help-wanted advertising in sex-segregated columns in newspapers or other publications
  - The avoidance in recruitment letters, or other materials of any reference to "male" or "female" or any indication of preference for men or women in certain jobs

RESPONSIBILITY

The Company's Board of Directors has the overall responsibility for the policies included in the Plan. The President of the Company has the primary responsibility for the successful implementation of the Plan. The President has appointed, , to be the Company's Equal Opportunity Officer with delegated responsibility for program planning, direction, and operation.

Duties of the Equal Opportunity Officer

- Manages, coordinates, supervises, and integrates day-to-day operations and activities in implementing the Plan at all offices of the Company
- Develops programs and policies for securing compliance at all the Company locations with equal employment opportunity and affirmative action policies of the Company
- Reviews employment practices as required to determine whether any current policies serve to bar handicapped individuals from employment

- Reviews all qualification requirements to assure that they are job- related, are consistent with job necessity and safe performance on the job
- Directs compliance reviews and investigations of complaints of discrimination
- Prepares and issues statistical data and evaluation of progress to measure the success of the program and to identify areas where minorities, women, and handicapped persons are underutilized

UTILIZATION AND WORK FORCE ANALYSIS

Utilization Analysis

The purpose of the utilization analysis is to identify job classifications within the Company's work force in which minorities and women are being under-utilized. The utilization analysis will include an examination of the Company's work force and a comparison of the availability of minorities, women and handicapped persons in the job classification and geographic areas where the Company can recruit.

In determining if minorities and women are underutilized in any of the Company's job classifications, the Equal Opportunity Officer shall evaluate the following factors:

- The minority and female populations of the area surrounding the Company and their proportion to the total
- The size of the minority and female unemployment force in the area surrounding the Company
- The general availability of minorities and women having requisite skills in an area from which the Company can recruit
- The minorities and women employed by the Company with the requisite skills for the job classifications involved
- The number and percentage of minorities and women applying for employment

Work Force Analysis

The Equal Opportunity Officer will develop an analysis of job titles and job classifications held by minorities and women that will include a listing of each job title, the wage rate or salary range ranked from the lowest paid to the highest paid within each organizational unit, and the total number of employees by sex and minority group in each job title.

IDENTIFICATION OF PROBLEM AREAS

The Equal Opportunity Officer will be responsible for the periodic analysis of the entire employment process in order to identify problem areas. Among the subjects covered will be:

- The recruitment process
- Concentration of women and minorities in various job titles and job classifications
- Selection standards and procedures
- Transfer and promotion policies
- Provisions and practices regarding seniority in union contracts
- Administration and validity of all tests for employment and promotional purposes

- Upward mobility systems, promotions, and training
- Termination and disciplinary actions
- Utilization of qualified handicapped persons

GOALS AND TIMETABLES

The final process in the utilization and work force analysis is the formulation of goals and timetables for employment of minorities and women. The Company will use the following process in establishing goals and timetables:

- A goal will be established when the percentage of total minorities and women in a job classification within the Company is lower than the total percentage of minorities and women available in that job classification within the surrounding labor market area
- The goal will be stated as a percentage of the total employees in the job classification and will be equal to the percentage of minorities and women available for work in the job classification in the surrounding labor market area
- For each job classification with a goal, a specific timetable will be established for reaching the goal in the minimum feasible time

EXECUTION OF THE EEO/AA

Recruitment

The Company will actively seek minorities, women and handicapped persons for employment. The following techniques will be used to ensure that personnel practices of the Company are not discriminatory:

- The Company will analyze and review recruitment procedures for each job title to identify and eliminate discriminatory barriers
- The Company will establish objective measures to analyze and monitor the recruitment process. These shall include application records, including for each job applicant, name, race, sex, handicap status, Vietnam era or disabled veterans status, referral source, date of application, position applied for, and whether a job offer was made
- Prior to filling any position for which goals and timetables have been established, the Equal Opportunity Officer will review the number of minority and women applicants who applied for the position
- Recruitment sources will be listed to ensure that the Company is making contact with recruitment sources that provide the widest range of applicants

Selection Standards and Procedures

- The Company will carefully review and evaluate every step of its hiring process to ensure that the job requirements, hiring standards, and methods of selection and placement do not discriminate, are job related, and contribute toward the goals of this Plan
- Having identified handicap status, reasonable accommodation to the known physical or mental limitations of an otherwise qualified handicapped applicant will be made, unless it can be shown that such accommodation would impose an undue hardship for the project

Upward Mobility, Promotions, Training

In order to assure the absence of discrimination against the employment of minorities, women, and handicapped persons in all positions, the Company will review all practices – both formal and informal – affecting promotions and training opportunities to ensure that minorities, women and handicapped persons are promoted and given training opportunities. The following records and procedures will be used, developed and implemented in order to ensure compliance:

- The number and percentage of minorities, women and handicapped persons in all training programs for employees of the Company
- Employees will be informed of all job opportunities

Layoffs, Discharges, Demotions, Disciplinary Action

The standards for deciding when an employee will be terminated, demoted, or disciplined, will be the same for all employees of the Company and will not be applied differently for minorities, women and handicapped persons. The Company will keep a record of:

- All Terminations, indicating total, name, date, number of members of minority group, handicapped persons, and women by job category and reason for termination
- All Layoffs and Demotions, indicating total, name, date, number of members of minority group, handicapped persons, and women by job category and reasons for action

AUDITS AND REPORTS

The Company will monitor appropriate personnel records and reports to ensure a policy of equal opportunity and to ensure compliance with the Company goals and timetables. The Company will develop and implement a reporting procedure that will provide for the continued auditing, monitoring and evaluation of the Company offices. A formal audit of the Company will be made at least annually with periodic checks as deemed appropriate.

SUBCONTRACTORS, CONSULTANTS, SERVICES

The Company recognizes its responsibilities in the areas of equal opportunity and affirmative action with respect to subcontractors, consultants and companies that supply materials and services to the Company. The Equal Opportunity Officer will develop and implement policies and procedures to ensure that those responsibilities are being met.

Use of Women and Minority Business Enterprises

Our Company will ensure that women and minority business enterprises have the maximum practicable opportunity to participate in the performance of Company contracts.

The Company will establish policies and procedures that will enable women and minority business enterprises to be considered fairly as subcontractors and suppliers under contracts.

These policies and procedures will ensure that:

- The Company will develop and implement policies and procedures to recruit and give equal consideration to women and minority firms and consultants to provide personnel services or supplies to the Company
- The Company will develop a listing of women and minority firms and consultants that provide services for which the Company normally contracts
- The Equal Opportunity Officer will periodically review and monitor the Company use of subcontractors, suppliers, consultants and services in order to assure fair use, consideration, and treatment of women and minority suppliers, subcontractors, consultants and services
- The Company will notify all subcontractors and suppliers that its Affirmative Action Plan is on file before bidding on the contract
- The Company will endeavor to cause nondiscrimination clauses in collective bargaining agreements and endeavor to discover any present discriminatory provisions in collective bargaining agreements and to modify and delete same
- When the Company contemplates subcontracting activities, a good faith effort will be made to employ women and minority firms or subcontractors
- The Company will not use a facility or any portion thereof that segregates because of race, religion, color, age, national origin or sex. Further, the Company will not sponsor, endorse or contribute to any association or establishment that excludes minorities, women, and handicapped persons

STATEMENT OF COMMITMENT

This Company will provide equal employment opportunity in all employment practices, including but not limited to, recruitment, advertising, hiring, layoff, rate of pay, training, termination, upgrading, demotion, transfer, fringe benefits and use of facilities; without discrimination because of race, color, sex, age, religion, national origin, handicap status, veteran status or on any other basis prohibited by law. This Plan will be updated and revised to reflect experience, changes in laws and regulations, and better understanding of effective approaches that will assure equal employment opportunities for all.

President (Print Name)	
Signature	Date

OR

Equal Opportunity Officer (Print Name)	
Signature	Date

AFFIDAVIT OF CONTRACTOR'S POLICIES AND COMMITMENTS TO EQUAL EMPLOYMENT OPPORTUNITY AND UTILIZATION OF WOMEN AND MINORITY-OWNED BUSINESS

I, _____, do hereby solemnly swear and affirm under the penalty of perjury that _____. (Hereinafter referred to as "the Company"),

1. Has a policy to provide equal employment opportunities to all employees and applicants for hiring without regard to race, color, religion, age, sex, national origin, handicap status, Vietnam era or disabled veterans status or on any other basis prohibited by law and to make all personnel decisions to further this policy of equal employment opportunity;

2. That the aforementioned Company has a written Affirmative Action Plan, Contractor's Qualification Committee and that the above-described Affirmative Action Plan reflects the true attitude and intent of the Company regarding equal employment opportunities;

3. That the contents of the Affirmative Action Plan are true and correct;

4. That each executive, officer, supervisor, and manager of the Company has received a copy of the Affirmative Action Plan and has been expressly instructed that he or she has the obligation to act in accordance with our policy to provide equal employment opportunity at all times to all employees and all applicants for hiring;

5. That _____has been appointed to administer and implement our Affirmative Action Plan and otherwise carry out our commitment to equal employment opportunity; and,

6. _____. will take affirmative steps to employ minority and female-owned businesses as subcontractors and suppliers on any and all contract awards received; and, finally that all information and data furnished regarding use of minorities, females and the handicapped

7. Minority-owned businesses and female-owned businesses are true and correct and that if at any time such information may no longer reflect the true composition of our work force and use of minority-owned businesses and female-owned businesses, that the changes will be reported.

Witness Name	Signature	
	Title	
	Company	
Seal	Date	

WORK FORCE ANALYSIS REPORT

Name of Company											
Report all permanent, temporary or part-time employees including apprentices and on-the-job trainees. Enter the appropriate figures on all lines and all columns. All blank spaces will be considered zero.											
Number of employees		☐ Male					☐ Female				
Job Categories	**Overall Totals**	White	Black	Hispanic	Asian	Amer. Indian	White	Black	Hispanic	Asian	Amer. Indian
Officials and Managers											
Professionals											
Technicians											
Sales Workers											
Office and Clerical											
Craft Workers (skilled)											
Operatives (semi- skilled)											
Laborers (unskilled)											
Service Workers											
Other											
Totals											
Trainees	(The Trainees below should be included in the figures for the appropriate occupational categories above).										
Formal on-the-job Trainees	Skilled Unskilled										
Apprentices											

ESTABLISHMENT INFORMATION

What is the major activity of the establishment? Be specific, e.g. manufacturing, construction, maintenance, repair, demolition of physical facilities, etc. Include the specific type of product or type of service provided, as well as the principal business or industry activity.

Remarks:					
Certification					
All reports are accurate and were prepared in accordance with instruction.				Yes	
Name of Certifying Official		Title		Date	
Address					
City and State		Zip		Telephone	

All reports and information will be kept confidential.

SCOPE

This chapter contains the safe practices to protect employees from the hazard of musculoskeletal disorders (MSDs). Although OSHA does not currently have any regulations governing ergonomics, NIOSH provides guidelines to reduce the risk of these disorders from occurring. Our Company will make every practical effort to ensure workers are not exposed to ergonomic hazards.

POLICY

Some of the tasks workers perform such as lifting, reaching and repeating the same movements can strain our bodies. These tasks can result in an injury to the muscles, tendons, ligaments, nerves, blood vessels and joints of the neck, shoulders, arms, wrists, legs and back. This type of injury is called either musculoskeletal disorders (MSDs), or respective motion injuries (RMIs). MSDs are a common workplace injury in all industries. For these reasons, this Company has developed the following safe work practices to prevent employee injury.

EMPLOYER RESPONSIBILITIES

- Perform a job hazard analysis to identify particular jobs that pose a risk of MSDs to workers
- Consult with the safety committee or worker health and safety representative about risk identification
- Investigate any reported injury requiring medical attention or an unsafe condition that could lead to injury
- Implement controls to eliminate or minimize the risk factors

EMPLOYEE RESPONSIBILITIES

- Assist in the process of identifying risk factors
- Report any work-related injuries and signs or symptoms of an MSD immediately

JOB HAZARD ANALYSIS

The Company will perform an ergonomic assessment of all jobs and duties. For each task, it will identify which, if any, of the four primary risk factors (force, repetition, work posture, local contact stress) are present. These questions will be examined:

- Does the length of time spent doing a particular task increase the physical demands on an employee?
- Do any of the following increase the physical demands on the employee?
    - Layout of the workplace or workstation (such as work surfaces that are too high or too low or that result in excessive reaching distances)
    - Characteristics of the objects being handled (objects that are too large to handle or that their weight is unevenly distributed)
    - Environmental conditions (an atmosphere or objects cold enough to make a workers hands cold while the objects)
    - Organization of the work duties (a lack of variety of task resulting muscles not having a chance to rest and recover)

WHAT IS MSD?

An MSD is a disorder of the muscles, tendons, ligaments, joints, nerves, blood vessels or related soft tissue including a sprain, strain and inflammation that may be caused or aggravated by work.

Signs and Symptoms of MSD

It's important for the Company and workers to recognize the early signs and symptoms of MSDs. If treatment is needed, it can be started right away. You can also take steps in the workplace and outside it to avoid making the condition worse.

Signs and symptoms of MSDs can:

- Swelling
- Redness
- Difficulty moving a particular body part
- A symptom can be felt, for example:
  - Numbness
  - Tingling
  - Pain

If employees are experiencing signs or symptoms of an MSD, they need to inform their supervisor immediately.

Signs and symptoms of MSD may appear suddenly, from a single incident that causes an injury, or they may appear gradually over a longer period. Don't ignore early signs and symptoms of an MSD. Treatment may be needed to prevent the injury from getting worse.

POTENTIAL HEALTH EFFECTS

MSDs can affect an employee's ability to perform tasks at work. Early signs or symptoms of MSD's can progress into conditions that can have long-term effects, such as the following:

- Muscle strains to the neck, back, shoulders, or legs
- Tendonitis (swelling of a tendon)
- Carpal tunnel syndrome (pressure on a nerve in the wrist, resulting in numbness, tingling, pain, or weakness in the hand, wrist, or forearm

CUMULATIVE TRAUMA DISORDERS

Musculoskeletal injuries caused by working are common. The majority of these injuries are not accident related broken bones or strained ligaments. They usually develop over time as a result of repeated stress on a particular body part. The condition is often ignored until the symptoms become chronic and permanent injury occurs. Cumulative trauma disorders (CTDs) and repetitive motion injuries are terms used to refer to certain musculoskeletal injuries.

Carpal Tunnel Syndrome

Carpal Tunnel Syndrome (CTS) is a common nerve CTD. It's a progressively disabling and painful condition of the hand. CTS results from injury to the median nerve, which is located in the wrist. Since musculoskeletal strain from repeatedly flexing the wrist or applying arm-wrist-finger force doesn't cause observable injuries, it often takes months or years for workers to detect damage.

Symptoms of CTS include weakness, clumsiness, numbness, pain, tingling and a lack of sweating in parts of the hand innervated by the median nerve. CTS has been reported to occur from two to ten times more frequently in women than in men. The condition is progressive and can lead to compensable hand disabilities.

Tests Used to Determine the Presence of CTS:

- **Phalen's wrist-flexion test** - The patient props his or her elbows on a table and allows the wrists to drop into complete flexion for 30 to 60 seconds. If paresthesia and numbness occur almost immediately, the test is considered positive.
- **Forced wrist-flexion test** - The patient props his or her elbows on the table, one wrist is held and the other is in complete flexion for 20 to 30 seconds. If the patient has CTS, symptoms should occur immediately.
- **Tinel's sign test** - A percussion hammer is used to tap the patient at the wrist crease. If the patient feels a tingling in the hand along the median nerve distribution, the test is positive.
- **Electroneuromyography** - A physician performs this test, which requires an electromyograph and related equipment. Its purpose is to measure the median nerve's conduction velocity, the speed at which nerve impulses translate into muscle responses. If the velocity measures 5 milliseconds or more below normal, chances are, the median nerve is compressed in the carpal tunnel. A negative result, however, does not rule out CTS since a median nerve may be compressed yet its conduction velocity may remain normal. Electroneuromyography is the most reliable of these tests used to determine the presence of CTS.

Other CTDs Include:

Although CTS is the best known of repetitive motion disorders, other disorders can also be disabling.

- **Tenosynovitis** - Tenosynovitis is the inflammation of the tendons and sheaths. It is often associated with tasks demanding extreme wrist deviation. For example, wrist deviation is required to hold an in-line nut-runner in a horizontal position.
- **Trigger finger** - Trigger finger is a form of tenosynovitis that results when any finger must be frequently flexed against resistance. It may be avoided by designing tool handles for operation by the thumb, by more than one finger, with lower force requirements, or by not requiring constant pressure.
- **De Quervain's Disease** - In De Quervain's Disease, the tendon sheath of both the long and the short abductor muscles of the thumb narrows. The disease is common among workers, who perform repetitive manual tasks involving radial or inward hand motion and firm grips.

- **Tennis Elbow** - Also called epicondylitis, this form of tendinitis is an inflammatory reaction of tissues in the elbow region. In an industrial environment, tennis elbow may follow effort requiring palm-upward hand motion against resistance, such as using a screwdriver, or the violent upward extension of the wrist with the palm down. The condition may be avoided by ensuring that the rotation axis of the tool or machine coincides with the rotation axis of the forearm.
- **White Finger** - White Finger Disease or Raynaud's Syndrome occurs when blood vessels and nerves in the hands constrict from conditions such as cold temperature or vibration. The hands, fingers or fingertips may become cold, blue, numb, and lose fine manipulative ability. Upon recovery, the hands become red, accompanied by a burning sensation. It can be confused with the one-sided numbness of carpal tunnel syndrome.

TREATMENT

Treatment will vary according to the type of MSD. Treatment can include the application of cold or heat, medication, physical therapy and even surgery. MSDs are treated more effectively they're discovered and reported early.

Corrective Actions to Prevent CTDS

Based on risk assessment results, the Company will implement as many of the following actions as are warranted and feasible:

- Adjusting the height of work tables, conveyors, and seats
- Automating tasks to eliminate manual handling
- Reducing the frequency of tasks or increasing the frequency to a point where automation is necessary
- Reducing the size or weight of loads
- Providing arm rests
- Redesigning hand tools so that the axis of rotation or application of force coincides with the axis of rotation of the arm
- Providing operator training
- Using careful pre-placement screening to identify high risk employees
- Changing load positions in relation to the body or hands
- Minimizing the time that a load is held in the hands
- Eliminating gloves if they cause a problem or trying different gloves

Recommendations to help prevent the development of CTS include:

- Use of Low frequency vibration in hand tools should be eliminated or reduced
- Wrist deviation from the straight position should be minimized especially where a great deal of force must be exerted
- Where possible, a closed fist (rather than a pinch) should be used to reduce tendon tension

RISK FACTORS

The factors that contribute to the risk of MSDs are called risk factors. A risk factor is something that may cause or contribute to an injury. Two or more risk factors can be present at one time, increasing the risk of injury.

Workers may not always be able to identify all the risk factors in a task. However, it is important for workers to recognize situations when they are at higher risk. If a worker must bend awkwardly to lift a heavy object in a cramped area, the worker will be exposed to a greater risk of MSD than a worker who uses a mechanical lifting device or one who has enough room to follow safe lifting procedures.

The primary risk factors for MSDs are the physical demands of a task:

- Force
- Repetition
- Work posture
- Local contact stress

Other risk factors that can affect these physical demands include:

- Layout and condition of the workplace or workstation, for example, a workstation that is too high or too low can create awkward working postures
- Characteristics of objects handled- for example, and object that is slippery or has no handles may cause awkward postures and require greater force to handle the object in a stable manner
- Environmental conditions of the workplace- for example, cold temperatures or drafts reduce blood flow to the hands and arms, requiring more grip force
- Organization of work tasks- for example, a worker performing a variety of different tasks throughout the day is likely at less risk of injury than a worker who has little variety in their job, and is exposed to the same risk factor for a longer time

FORCE

The force that a worker exerts on an object is a primary risk factor. Muscles and tendons can be overloaded when you apply a strong force against an object. Holding a lighter object for long periods can also expose workers to a risk of MSD.

Three types of activity that require force:

- Force involved in lifting, lowering, or carrying
- Force involved in pushing or pulling
- Grip force

Lifting, Lowering, or Carrying

Lifting, lowering, or carrying an object or person requires force. A worker needs to exert more force to lift a heavy object than a light one.

Pushing or Pulling

Force is needed for pushing or pulling an object. Pushing may be less of a risk than pulling because it uses stronger back muscles.

Grip Force

Additional grip force is needed in situations such as the following:

- The worker is gripping a small tool
- The worker is handling slippery or odd- shaped objects that are difficult to hold
- Objects are too large for a comfortable grip
- Objects are grasped or handled using a pinch grip instead of a power grip
- Vibrating tools or equipment are used
- The worker is wearing heavy or bulky gloves that make gripping more difficult
- Handles or grip spans are too large or too small
- The handles on tools have an awkward shape
- The workers hands are cold

REPETITION

Repeatedly doing a task that uses the same muscles with little chance for rest or recovery, puts workers at a higher risk of injury when other risk factors are also present (such as an awkward posture or heavy force). This applies to both large and small muscles.

Situations that increase the risk of MSD include the following:

- There is not enough variety in the worker's tasks to give muscles a rest or opportunity to recover
- The worker is unaccustomed to the task, for example, when starting a new job or returning from a prolonged absence from work, or when the equipment or workstation has changed

WORK POSTURE

Posture refers to the position of different parts of your body. Muscles, tendons and ligaments must work harder, and can be stressed, when you're in an awkward posture. Awkward posture occurs when any joint of your body bends or twists excessively, outside a comfortable range of motion. If the position is held long enough for you to feel aches and pains, then your muscles have been held in one position for too long. A posture held for a long time is called a static posture.

Various work activities can result in awkward postures:

- Leaning sideways, such as when reaching into a low drawer to one side (awkward back posture)
- Bending down to work at a low level (awkward back posture)
- Reaching overhead (awkward shoulder posture)
- Flaring the elbows out to the side (awkward shoulder posture)
- Bending the wrist when moving objects or keyboarding (awkward wrist posture)
- Bending the neck down, such as looking at small components in poor lighting conditions (awkward neck posture)
- Twisting part of the body, such as twisting the neck to view documents while keyboarding for a long time (awkward neck posture)

The effects of awkward posture can be made worse by:

- Applying force in an awkward position, such as lifting a heavy object with arms above the body or using a strong grip with a bent wrist
- Holding an awkward position for a prolonged period (static posture), such as holding a telephone between the head and shoulder

LOCAL CONTACT STRESS

Local contact stress occurs when a hard or sharp object meets the skin. The pressure can injure the nerves and the tissues beneath the skin.

Here are some examples of activities that can result in local contact stress:

- Ridges and hard edges on tool handles digging into the hand
- Edges of work surfaces digging into the forearm or wrist
- Striking objects sharply with the hand, foot, or knee (such as striking the carpet stretcher with the area above the knee when laying carpet

The effects of local contact stress can be made worse if:

- The hard object contacts an area without much protective tissue, such as the wrist, palm, or fingers
- Pressure is applied repeatedly or held for a long time

Duration and Magnitude

Duration should be considered along with the four primary risk factors rather than separate from them. The amount of risk depends on how long the worker is exposed to the risk factor.

The person looking at risk factors should consider questions about duration for each:

- How long is the worker using force (for example, to lift or grip an object)?
- How long does the worker perform a repeated task?
- How long does the worker perform a task with an awkward body posture?
- How long is one part of the body exposed to the local contact stress?
- Magnitude, or “how much,” should also be considered for each risk factor:
- How much force is the worker using?
- How fast is the worker doing the repeated movements?
- How severe is the awkward posture?
- How hard is the edge digging into the skin, causing local contact stress?

Multiple Risk Factors

More than one risk factor can occur at the same time. The more risk factors in the task, the greater the risk of injury. This example is used to show how several risk factors might occur at one time.

TRAINING

This Company will ensure that employees who may be exposed to the risk of musculoskeletal injuries are trained on the following:

- The employer's program
- The exposures which have been associated with MSDs
- The symptoms and consequences of injuries caused by repetitive motion
- The importance of reporting symptoms and injuries to the employer
- Methods used by the employer to minimize MSDs
- The safe work procedures for some tasks, such as adjusting their workstation to fit the task correctly
- The proper use of any mechanical aids or PPE provided to them

IMPLEMENTING A REPETITIVE MOTION INJURY PREVENTION PROGRAM

Our Company will implement a prevention program when MSDs have occurred to more than one employee under all of the following conditions:

- The MSDs were predominantly caused) by a work-related repetitive job or operation
- The employees incurring the MSDs were performing a job process, or operation of identical work activity. Identical work activity means that the employees were performing the same repetitive motion task, such as but not limited to word processing, assembly or, loading
- The MSDs were identified and diagnosed by a licensed physician
- The MSDs were reported by the employees to the employer in the last 12 months

The program will include a worksite evaluation, control of exposures that have caused MSDs and training.

(1) Worksite evaluation—each job, process, or operation of identical work activity covered by this section, or a representative number of such jobs, processes, or operations of identical work activities, must be evaluated for exposures that have caused MSDs.

(2) Control of exposures that have caused MSDs—any exposures that have caused MSDs must be corrected in a timely manner, or if they are not capable of being corrected, the exposures must be minimized to the extent feasible. The employer must consider engineering controls, such as workstation redesign, adjustable fixtures or tool redesign, and administrative controls such as job rotation, work pacing or work breaks.

The Company will implement controls that cause the greatest reduction in MSDs, unless those controls would impose unreasonable costs.

Work Area Design

A work area should be designed to accommodate the person who actually works on a given job. For example, workstations should not force workers into awkward body positions. Workstations should be easily adjustable and selected to fit specific tasks, so that they are comfortable for the workers using them. The workspace should be large enough to allow for the full range of required movements, especially where knives, saws, hooks and similar tools are used.

The equipment used should be suited to the job. It should be organized so that:

- Forced air exhausts are not directed toward the user
- Workstation adjustment controls are convenient and easy to use
- Equipment with the longest and/or most frequent eye contact lies in the center of the work field
- Equipment used the most is located closest to the worker
- Glare is avoided
- Pronounced visual contrast differences between important subjects is avoided

Methods for Reducing Extreme and Awkward Postures Include:

- Adjustable fixtures and rotating tables so that the position of the work can be easily manipulated
- Workstations and bins that can accommodate the heights and reach limitations of a wide range of workers
- Work platforms that move up and down for certain operations

Hand and Wrist Postures

Some hand tools may force the wrist into awkward positions. The wrist position affects the effective strength of the contracting muscles. Therefore, as the angle of the joint increases or decreases from the neutral position, there is more stress on the tendons.

Examples of Methods to Reduce the Need to Use Excessive Force Include:

- Adjustable fixtures that allow operations and movements to be easily made
- Properly located bins so that workers do not have to toss products and by-products
- Mechanical or powered devices that eliminate the need for extreme manual force
- The suspension of heavy tools

MINIMIZING MANUAL MATERIALS HANDLING

Manual materials handling is another area in which injuries to employees can occur. This type of work entails lifting, bending and twisting, which can cause great damage to the human body if done improperly.

Lifting puts stress on two main body systems. One is the musculoskeletal system and the other is the cardiovascular system. Since the problem associated with the cardiovascular system deals with oxygen consumption or increased heart rate, the focus of most information regarding lifting has been the musculoskeletal system.

Mechanical Aids

One way to reduce manual materials handling problems is by using self-leveling dispensers, such as the spring-loaded tray dispensers used in many cafeterias.

The way these mechanisms work is that when a load is removed, the platform rises in order to maintain the top layer at a constant level. A worker does not have to bend over or stretch upward to receive work. Instead, work can be reached at a constant height. These dispensers can eliminate unnecessary motion and thereby reduce worker fatigue.

Many other types of mechanical aids are available to assist employees during manual materials handling.

Hooks, bars, rollers, jacks, platforms and trestles are examples of simple job aids. Drum handling units are in common use and exist as either a trestle or lever. In most cases, the engineer or ergonomist can find off-the-shelf aids readily available to fit the lifting task and to minimize the amount of manual lifting.

Other available equipment which will minimize, if not eliminate, manual materials handling includes the standard industrial equipment classes of conveyors, hoists and cranes, industrial vehicles (such as tow-motor or forklift trucks), and positioners. The International Material Management Society defines positioners as equipment used to transfer material from workplace to materials handling equipment, or vice versa. Positioners include manipulators, dumpers, up-enders, positioning tables, lifts, jacks, and transfer machines.

Today, with so much equipment available to the plant engineer or ergonomist, manual materials handling can be reduced, if not eliminated, for most tasks.

COMPUTER WORKSTATIONS

Work involving the extended use of computer workstations can be repetitious and confining, special attention must be paid to the user's comfort. Traditional ergonomic considerations include chair and table selection, rest breaks, office noise, light, and temperature. However, VDT use poses unique questions, such as:

- What type of screen image, character size and screen brightness is optimal for the task?
- How can screen glare and reflections be eliminated?
- What type of keyboard is best for the user and the task?
- Where should the screen, document holder and accessories be placed?

Visual Display Terminals (VDTs)

A hidden toll is taken on employees who daily sit in front of their flickering display screens. They pay this price with sore necks and shoulders, cramped fingers, tired eyes, strained backs, numb buttocks, and aching legs and feet. Tension headaches are common. It may be possible to trace these ailments directly to improper workspace layout.

A standard visual display terminal is an electronic device that displays information on a screen and works on a principle similar to that of a television set. It contains a source of electrons which, when beamed across the phosphor- coated screen, produces a visible image. The operator manipulates the image through specific commands entered through a keyboard or a pointing device such as a mouse.

The primary viewing area should be between 0 and 60 degrees below the horizontal line of sight. The screen should be tilted so that the middle of the screen is perpendicular to the viewing angle. The top row of data should not lie above eye level, and observation angles greater than 40 degrees should be avoided. To avoid distracting reflections, it may be necessary to tilt the screen or to use screen filters.

The recommend observation distance between the eye and cursor is between 17 and 24 inches in an upright sitting position. ANSI recommends that the minimum viewing distance be 12 inches. ANSI also specifies several optical quality requirements.

- The contrast ratio between the characters and the background should be at least 3:1
- Small characters must have a higher minimum contrast
- “Jittering” displays should be eliminated
- The discrete dots that make up the characters should not be perceptible, the characters must appear solid to the viewer
- Saturated blue on a dark background, thin lines or high-resolution information for text should be avoided
- Pure red in displays should also be avoided to help color-blind people read displays

Workstation Accessories

Workstation accessories are available to help provide a comfortable workstation and reduce fatigue.

Keyboards

ANSI recommends that keyboards be positioned to allow the user to keep an angle between the upper arm and forearm at 70 to 90 degrees. The angle may increase if the operator is leaning back, but the maximum angle should not exceed 135 degrees. The keyboard should consist of the standard QWERTY layout.

The keyboard should be stable for normal keying functions. A number keypad should be provided if the main task involves numerical data input from the keyboard. To reduce user discomfort, alternative keyboards may be needed, such as split-fixed or split and vertical inclined styles.

There a number of keyboard accessories, that can reduce the risk of MSD’s. One such accessory is the keyboard armrest. Because typists frequently rest their wrists on the keyboard or tabletop while typing, excessive strain is placed on tendons controlling the fingers and hands. The wrist rest elevates and rests the wrists and reduces tendon stress. (The usual recommendation is to use the wrist rest during pauses in typing.)

The keyboard drawer slides under a desk when not in use, allowing efficient use of desk space. When the drawer is extended, the keyboard can be raised or lowered.

The extension arm allows the operator to place the monitor in a comfortable location for maximum efficiency. The extension arm rotates, extends, and retracts a swiveling monitor platform for viewer comfort and glare reduction.

Workers should alternate computer work with other tasks that don’t require similar, close- work skills. Managers should be conscious of this work routine when planning a day’s work schedule. Frequent breaks should be provided to allow the operator to stretch, move and other non-hand intensive tasks.

Document Holders; Footrests

Document holders and footrests should be provided, if needed by individual operators. The document holder should be adjustable and extensible.

Work Surfaces

The work surface should provide adequate legroom so that the legs are not cramped. The height of the leg clearance should be at least equivalent to the highest point on the thigh or knee. ANSI recommends that when the leg is perpendicular to the floor, minimum leg clearance depth under the work surface is 60 percent of the buttocks-to-knee length. The size of the work surface should also accommodate the task.

Work Chairs

The height of a chair should allow the user to place the feet firmly on a support surface. The maximum seat depth should allow contact with the seat back at the lumbar region while allowing clearance behind the knees. Minimum seat width should be 18 inches or the thigh breadth of the seated user, whichever is greater.

If the chair design requires the user's feet to be flat on the floor, the seat pan angle should keep the angle between the upper and lower leg between 60 and 100 degrees. In addition, the angle between the seat pan and back should allow the user to maintain a working posture in which the torso-thigh angle is not less than 90 degrees (100 degrees is preferred). Chairs should have backrests with lumbar support.

If the chairs have arms, the distance between the armrests should be at least 18.2 inches. Appropriate chair castors should be provided.

Noise and Temperature

Noise should be reduced to a maximum of 55 decibels and sporadic noises above normal ambient sound levels should be prevented. ANSI recommends that surface temperatures of equipment intended to be touched not exceed 95° F. Air drafts should not be allowed to flow under desks. Care should be taken to see that heat does not build up under desks as well.

LIGHTING

Sufficient Lighting is essential to reduce worker fatigue and allow them to perform visual tasks. How a space is used and what it is used for influences how lighting should be applied. Other factors that influence lighting design for a task include appearance, economics, building costs, energy consumption, and the quality of lighting desired. Factors affecting the visual environment include lighting fixtures, visual tasks, lighting maintenance, lighting system design and the individuals' eyesight.

Lighting Quantity

The quantity of light is the amount of light that exists or is required at a workplace. The amount of light necessary for effective work depends on the type of the work, the quality of a worker's vision, and the environment where the work is done.

The absolute minimum amount of light required for reading, writing and many manual tasks is approximately one foot-candle. As a reference point, a light in an indoor exit sign has at least five foot-candles.

In the design of good lighting, safety and welfare should be taken into account as well as visual efficiency.

In some jobs where visual demands are not great, it is normal for recommended levels of illumination to be based on safety and the creation of a pleasant environment. The minimum lighting level for a workplace is 20 foot-candles. When light levels fall below 20 foot-candles, workers usually have a negative reaction to the lighting.

Too much light can be as damaging as too little. The quantity of lighting needed depends on the age of a person performing the task, the reflecting characteristics present, the amount of light needed to do a task, and the speed and accuracy required of the person performing the task. As the amount of lighting provided for a task increases, so does the luminance (light reflected upward) and, as a result, the accuracy and speed of vision improves. The best ergonomic solution for these varying needs is to provide general workplace lighting and supplement it with specific task lighting.

Lighting systems should be designed to provide a uniform distribution of light over the entire work area. To ensure that a given lighting level will be maintained, give more light initially than is minimally required. The reason for this is that such factors as dirt, use and time deteriorate lighting.

Over time, most lights will become dull, this generally happens when 80 percent of the stated life of the bulb or light has been used. The best ergonomic solution is to replace it at this point.

Quality of Lighting

The quality of lighting relates to the distribution of brightness in an environment. A good quality of lighting means that all brightness contributes favorably to visual performance, visual comfort, ease of seeing, safety, and aesthetics for the specific task.

A worker can normally see the task itself, the immediate background to the task, and the general surroundings.

The eyes tend to be attracted to brighter and more colorful parts of the field of vision. Therefore, light and color can be used to direct the focus of attention to the task. Lighting should be directed to the work, or special local lighting should be provided to match the needs of the work and the general lighting levels.

The level of brightness required for a task is determined by the degree of detail the operator has to meet, the time allowed for seeing, and the reflection characteristics of the task. The general level of brightness in the room also contributes to the level of brightness required for a task. In practice, it’s best to plan the lighting first in relation to what the operator needs to accomplish the task and then to plan the brightness of the other parts of the room to provide proper emphasis, visual comfort, and interest.

Poor quality industrial lighting is easy to recognize. It creates uncomfortable and hazardous situations.

Certain tasks, such as distinguishing fine details, require higher quality illumination than do others.

In addition, work areas where visual tasks are demanding, and are performed over a prolonged period require higher quality illumination.

Slight glare conditions may result in a loss of seeing efficiency and undue fatigue. Some factors that affect the quality of light include glare, shadows, colors, veiling, reflections and luminance distribution.

The Effect of Glare on the Quality of Light

Glare is a disturbance of the eye's ability to adapt to amounts of light. It can cause discomfort or reduce the ability to see, or both. It occurs when some parts of the field of view are excessively bright in relation to the general level of brightness. A common example is presented by a person who is trying to watch a television set in a bright room. The ergonomic solution is to lower the lighting in the room.

The degree of glare resulting directly from light sources depends on such factors as the brightness and sizes of the sources, their position in the operator's field of view, and the average brightness of the surroundings against which they are seen. Glare can cause discomfort without affecting the operator's ability to see the work, especially in very bright surroundings. Ensuring that lights are placed above the line of sight will help eliminate glare.

There are three major types of glare. They are absolute, adaptive and relative glare. Absolute glare exists when luminosity is so high that adaptation is impossible. Adaptive glare exists when adaptation to a certain amount of light has not yet been reached.

Relative glare is present when there is too much of a contrast in the visual field. In addition, glare can be classified as direct or specular. Direct glare results from a light source, whereas specular glare is created by reflection from a bright surface.

Direct glare can be reduced by:

- Avoiding bright light sources within 60 degrees of the center of the visual field
- Using shields, hoods, and visors to keep the direct light source out of the viewers' eyes
- Using indirect lighting
- Using several low intensity sources of light rather than one high intensity source

Specular glare can be reduced by:

- Using diffuse light
- Using a dull matte surface (flat paints, desk blotters) rather than polished surfaces
- Arranging direct light sources so that the viewing angle to the work is not equal to the angle of incidence from the source

Light Sources Used in the Industrial Environment

Daylight and electrical light are the two major sources of light used in industrial sites. Artificial light is commonly used in industrial buildings during daytime to provide additional local lighting on the work.

There are many instances where the amount of daylight in a building is inadequate or obstructed, and artificial lighting is required as permanent supplement to daylight. Daylight, however, is by far the best light source if it's available.

Work Areas with Nominal Lighting

Intensity at 750 lux must be individually tested to determine whether the area is suited for display workstations. In rooms with nominal lighting intensity of 1,000 lux or higher, there should not be any display workstations, unless special precautions are taken, such as using micromesh or glare filters (polarized and/or non-reflective coating should also be considered). See table

Recommended Work/Break Intervals

One break (5–10 minutes) for every hour of keying moderate workloads, with more frequent, short mini breaks or pauses (30–60 seconds) for more intense VDT use.

The key to a comfortable and productive office environment is recognizing each worker as an important individual with individual needs. This recognition will increase morale and heighten productivity.

ERGONOMIC SAFETY ANALYSIS

Contributing Factors (CF)	Reason for CF	Comments	Ergonomic Improvements

SCOPE

This chapter provides information on the safe practices and fall protection requirements of OSHA 1926 Subpart M and 1910 Subpart D. Included is information on fall protection equipment, the types of fall protection systems and limitations regarding alternative fall protection methods.

POLICY

This company has implemented this policy to ensure that proper safe work practices and procedures are followed to protect employees from the fall hazards. A Program Administrator will be designated as the responsible person for managing and supervising the Fall Protection Program.

EMPLOYER RESPONSIBILITIES

This company will:

- Provide adequate and timely resources to support the fall protection program
- Identify fall hazards and implement procedures to eliminate or control them
- Develop and maintain written fall protection procedures wherever an active fall protection system is being used
- Inform authorized employees about a foreseeable fall hazard before exposure
- Provide continuous fall protection or ensure that such protection is available to employees and within regulations
- Provide training to operate any active fall protection systems
- Ensure supervision of employees exposed to fall hazards
- Verify all fall protection procedures are understood and followed

FALL PROTECTION PROGRAM ADMINISTRATOR

The program administrator will:

- Develop and implement the managed fall protection program
- Be knowledgeable of current fall protection regulations, standards, equipment, and systems
- Advise and provide guidance to managers, employees, and other departments on all managed fall protection program matters
- Establish and assign all duties and responsibilities outlined in this policy to trained and qualified individuals
- Provide or verify that the personnel have the necessary resources to accomplish their duties and responsibilities
- Establish and implement a system to identify, eliminate, or control new and existing fall hazards
- Ensure that written procedures for fall protection, rescue, and evacuation are developed for every foreseeable fall hazard to which persons are exposed
- Develop training programs for all Authorized Persons
- Verify that all Authorized Persons are provided with training

- Measure and evaluate the effectiveness of the managed fall protection program by: conducting periodic program evaluations and making improvements
- Participate, either personally or through a designated qualified person, in the investigation of all incidents related to falls from heights, including:
  - Reviewing incident reports
  - Taking corrective action to eliminate causes
  - Making necessary reports to management
  - Maintaining an incident report system

COMPETENT AND QUALIFIED PERSONNEL

Effective fall protection relies on the efforts of all personnel. However, each worksite that demands fall protection measures must have personnel onsite with the knowledge and authority to prevent injury as hazards arise.

Qualified Person Responsibilities

A qualified person has successfully demonstrated his or her ability to solve problems relating to the project by possession of a recognized degree, certificate or professional standing or by extensive knowledge, training and experience.

Company employees who are identified as “a qualified person” are expected to:

- Analyze and design all anchor points for structural engineering strength requirements as set by this standard and also be in compliance with local and state building code requirements
- Analyze and design all horizontal lifeline systems for structural engineering strength requirements and also be in compliance with local and state building code requirements
- Establish the clearance requirements for each fall protection system selected
- Verify the fall protection equipment system is adequate for the specific fall hazards
- Verify that available clearance is adequate before allowing persons to work at heights
- Maintain a safety factor of 2.0 against failure of the structural system for both anchor points and horizontal lifeline systems
- Establish adequate vertical and horizontal clearance requirements for each fall protection system. Analyze swing fall consideration and establish limitation requirements for each fall protection system
- Supervise design, installation, and use of horizontal lifeline systems to ensure that they can maintain a safety factor of at least twice the impact of a worker free-falling six feet
- Supervises design, installation, and use of personal fall-restraint anchorages
- Supervises design, installation, and use of personal fall-arrest anchorages
- Verify that fall protection systems have been installed and inspected in compliance with this standard and all applicable federal, state, and local regulations
- Identify, evaluate, and impose limits on the workplace activities to control fall hazard exposures and swing falls
- Communicate limits to all Authorized Persons who use the fall protection systems
- Prepare, update, and approve written fall protection, rescue, and evacuation procedures

- Specify that written fall protection rescue, and evacuation procedures include:
  - Anchorage locations
  - Connecting means
  - Body supports
  - Other required fall protection equipment
- Review the written procedures as workplace activities change for needed additional practices, procedures, or training
- Verify that Authorized Persons:
  - Are trained and have reviewed the fall protection, rescue, and evacuation procedures reviewed before work begins
  - Provide or ensure that a prompt rescue can be accomplished with the rescue and evacuation procedures
  - Participate in the investigation of all incidents related to falls from heights
  - Immediately remove from service all damaged equipment or components (and equipment or components that have experienced a fall arrest)
  - Inspect for damage and follow the manufacturer's instructions for damaged equipment and equipment that has experienced a free-fall arrest
  - Periodically inspect all fall protection equipment as per the manufacturer's requirements and applicable regulations

Competent Person Responsibilities

A competent person can identify existing hazards as well as potential hazards. Furthermore a competent person has the authority to take prompt corrective actions to eliminate such hazards and ensure employees are out of harm's way until the hazards can be eliminated.

The competent person:

- Serves as the monitor in a safety-monitoring system, is responsible for recognizing hazards that cause falls, and warns workers about hazards
- Determines whether safety nets meet requirements
- Inspects a personal fall-arrest system after it arrests a fall and determines whether the system is damaged
- Evaluates alteration to a personal fall-arrest system and determines if it is safe to use
- Supervises installation of slide-guard systems
- Trains employees how to recognize fall hazards and follow safety procedures

Authorized Person Responsibilities

Company employees who are identified as "an authorized person" are expected to:

- Follow the instructions of the program administrator and the Competent Person regarding the use of fall protection systems
- Understand and adhere to the fall protection procedures
- Notify the Competent Person of unsafe or hazardous conditions or acts that may cause injury before proceeding with workplace activities

- Correctly use, inspect, maintain, store, and care for fall protection equipment and systems
- Inspect any fall protection equipment, prior to use, for defects or damage
- Notify the Competent Person of defects and damage found from inspections
- Use only equipment free of defects or damage

FALL PROTECTION REQUIREMENTS

Fall protection may be required in areas and activities including, but not limited to, the following:

- Ramps, runways, and other walkways
- Excavations
- Hoist areas
- Holes
- Formwork and reinforcing steel
- Leading edge work
- Unprotected sides
- Edges
- Overhand bricklaying and related work
- Roofing work
- Precast concrete erection
- Wall openings
- Residential construction
- Other walking/working surfaces

Employees will be protected from fall hazards and falling objects whenever an affected employee is above the established threshold height (6 feet for construction or 4 feet for general industry) above a lower level. Typical fall protection systems are shown in this table.

FALL PROTECTION SYSTEMS

Type of fall protection system	What it does
Personal fall-arrest system	Controls a fall
Personal fall-restraint system	Prevents a fall
Positioning-device system	Positions and limits fall to 2 feet
Guardrail system	Prevents a fall
Safety-net system	Controls (arrests) a fall
Warning line	Warns of fall hazard

FALL PROTECTION PLAN

Planning Fall Protection

Methods, systems, and procedures to control exposure to fall hazards must be established before work commences. Careful preparation lays the groundwork for an accident-free workplace. A site-specific fall protection plan must reflect all anticipated fall hazards at the worksite. The nature and scope of the planning effort depend on the complexity and size of the project.

Planning must at least identify fall hazards and the systems and procedures to control the hazards. Effective planning reduces exposure risks for workers during a project and for others after the project is finished. For example, anchor points used by construction workers on a project might also be used to protect window cleaners or other maintenance personnel.

Use the plan will:

- Identify all fall hazards that workers are likely to encounter during the project
- Describe how workers will gain access to the worksite (by ladders or stairs, for example)
- Describe how workers will prevent tools and materials from dropping to lower levels
- Establish procedures for inspecting, maintaining, and storing fall protection equipment
- Identify the tasks that expose workers to fall hazards
- Make sure workers use fall protection systems appropriate for their tasks
- Identify anchor point locations
- Describe the methods for setting anchors and securing lifelines
- Identify areas where workers may be exposed to falling objects and how they will be controlled
- Describe emergency-response procedures for rescuing workers who fall
- Post emergency responders' phone numbers and make sure workers know them
- Describe all equipment that will be available for rescuing workers who fall

Assign supervisory responsibility to a competent person: A competent person must know the site-specific fall protection plan, how to perform work tasks safely and the hazards associated with those tasks. You must designate a competent person to implement the fall protection plan.

Document accountability: Your fall protection plan must describe how workers and supervisors will comply with its requirements.

Establish a training program: Everyone covered by a fall protection plan must be trained by a competent person. Be sure to document the names of those who receive fall protection training and their training dates.

The training program must cover:

- Fall hazards that workers will encounter
- Types of systems that will protect workers from falls
- Workers' responsibilities under the fall protection plan
- Procedures for assembling, maintaining, and dissembling personal fall arrest systems

- How workers should comply with the plan
- Retraining procedures when the plan changes, tasks change or when workers are not following the plan

Update the plan when site conditions change: When worksite conditions change and affect how workers are protected from falling, you must update your fall protection plan so that it addresses the changes. An on-site qualified person must approve the changed plan.

The updated plan must:

- Describe the site-condition changes that required the update
- Include the qualified person's reasons for the update
- Include the date the qualified person approved the plan changes and the person's signature

Investigate accidents: If a worker falls or has a near miss incident, you must investigate the accident and, if necessary, change the plan so that similar events don't occur.

Keep the plan at the job site: You must keep a copy of the fall protection plan, with all approved changes, at the job site.

Other Fall Protection Requirements

If activities at height include any of the following, consult the appropriate regulation and/or policy for more information on appropriate fall protection:

- Scaffolds
- Cranes and derricks
- Steel erection work
- Tunneling operations
- Electric transmission lines/equipment
- Stairways and ladders

Covers for Roof Openings or Holes

Roof Openings are fall hazards and must either be covered or surrounded by a guardrail. Skylights will usually break unless guarded or screened.

A cover is necessary regardless of the fall distance and includes any rigid object used to overlay openings in floors, roofs, and other walking and working surfaces. Covers must be able to support at least twice the maximum anticipated load of workers, equipment, and materials. Covers should have full edge bearing on all four sides. All covers must be color-coded or marked with the word "Hole" or "Cover" and must be secured to prevent accidental displacement.

CONVENTIONAL FALL PROTECTION

Personal Fall Arrest System

These consist of an anchorage, connectors and a body harness and may include a deceleration device, lifeline, or suitable combinations. If a personal fall arrest system is used for fall protection, it must do the following:

- Limit maximum arresting force on an employee to 900 pounds used with a body belt
- Limit maximum arresting force on an employee to 1,800 pounds used with a body harness
- Be rigged so that an employee can neither free fall more than 6 feet nor contact any lower level
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet
- Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet or the free fall distance permitted by the system, whichever is less

The use of body belts for fall arrest is prohibited; however, the use of a body belt in a positioning device system is acceptable.

Personal fall arrest systems must be inspected before each use for wear, damage, and other deterioration. Defective components must be removed from service.

Anchorage - a fixed structure or structural adaptation, often including an anchorage connector, to which the other components of the PFAS are rigged

Body Wear - a full body harness worn by the worker

Connector - a subsystem component connecting the harness to the anchorage, such as a lanyard

Deceleration Device - a subsystem component designed to dissipate the forces associated with a fall arrest event

Anchor

An anchor provides a secure point of attachment for a lifeline, lanyard, or deceleration device and is perhaps the most important personal fall arrest system component. It must support a minimum load of 5,000 pounds – a challenging requirement, particularly on wood framed and residential-type structures. If you don’t know how much weight an anchor will hold, you should have a qualified person design a complete fall protection system. The system must be installed under the supervision of the qualified person and it must maintain a safety factor of at least two – twice the impact force of a worker free-falling six feet.

Never use hoists or guardrails as anchors. They are not built to withstand the forces generated by a fall.

In addition to anchor strength, consider the following:

- Anchorage connector: Unless an existing anchorage has been designed to accept a lanyard or lifeline, you'll need to attach an anchorage connector — a device that provides a secure attachment point. Examples include tie-off adapters, hook anchors, beam connectors and beam trolleys. Be sure the connector is compatible with the lanyard or lifeline and appropriate for the task
- Attachment point: The anchorage can be used only as the attachment point for a personal fall-arrest system; it can't be used to support or suspend platforms
- Location: The anchorage should be located directly above the worker, if possible, to reduce the chance of a swing fall
- Fall distance: Because a personal fall-arrest system doesn't prevent a fall, the anchorage must be high enough above a worker so that the arrest system, rather than a lower level, stops the fall. Consider free-fall distance, lanyard length, shock-absorber elongation, and body-harness stretch in determining the height of an anchorage

Body Harness

The full-body harness has straps that distribute the impact of a fall over the thighs, waist, chest, shoulders and pelvis. Before you purchase harnesses, make sure that they fit those who will use them, they're comfortable and they're easy to adjust.

A full-body harness should include a back D-ring for attaching lifelines or lanyards and a back pad for support. Never use a body belt as part of a personal fall-arrest system.

Full-body harnesses must:

- Be made from synthetic fibers
- Have an attachment point, usually a D-ring, in the center of the back at about shoulder level. The D-ring should be large enough to easily accept a lanyard snap hook
- Have chest straps that are easy to adjust and strong enough to withstand a fall without breaking
- Are made for industrial use, not recreational climbing
- They meet ANSI and CSA standards

Connectors

An anchorage, a lanyard and a body harness are not useful until they're linked together. Connectors do the linking; they make the anchorage, the lanyard and the harness a complete system. Connectors include carabiners, snap hooks and D-rings. Connectors must be dropforged, pressed or made from formed steel or equally strong material. They must be corrosion-resistant, with smooth surfaces and edges that will not damage other parts of the personal fall arrest system.

Carabiner

This high-tensile alloy steel connector has a locking gate and is used mostly in specialized work such as window cleaning and high-angle rescue. Carabiners must have a minimum tensile strength of 5,000 pounds.

Snap hook

A hook-shaped member with a keeper that opens to receive a connecting component and automatically closes when released. Snap hooks are typically spliced or sewn into lanyards and self-retracting lifelines. Snap hooks must be high-tensile alloy steel and have a minimum tensile strength of 5,000 pounds. Use only locking snap hooks with personal fall-arrest systems; locking snap hooks have self-locking keepers that won't open until they're unlocked.

D-ring

D-rings are the attachment points sewn into a full-body harness. D-rings must have a minimum tensile strength of 5,000 pounds.

Deceleration Devices

Deceleration devices protect workers from the impact of a fall. Any mechanism with a maximum length of 3.5 feet, such as a rope grab, rip stitch lanyard, tearing or deforming lanyards, self-retracting lifelines, etc. which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest may be used as a deceleration device.

Shock Absorbing Lanyard

Because a shock-absorbing lanyard extends up to 3.5 feet, it's critical that the lanyard stops the worker before the next lower level. Allow about 20 vertical feet between the worker's anchorage point and the level below the working surface. Always estimate the total distance of a possible fall before using a shock-absorbing lanyard.

Remember: Never use a shock-absorbing lanyard if the shock absorber is even partially extended or if the lanyard has arrested a fall.

Self-Retracting Lanyards or Lifelines

Self-retracting lanyards and lifelines offer more freedom to move than shock-absorbing lanyards. Each has a drum-wound line that unwinds and retracts as the worker moves. If the worker falls, the drum immediately locks, which reduces free-fall distance to about two feet — if the anchorage point is directly above the worker. Some self-retracting lanyards will reduce free-fall distance to less than one foot. Self-retracting lanyards are available in lengths up to 20 feet. Self-retracting lifelines, which offer more freedom, are available in lengths up to 250 feet.

Rope Grab

A rope grab allows a worker to move up a vertical lifeline but automatically engages and locks on the lifeline if the worker falls.

When using a rope grab, keep the following in mind:

- The rope grab must be compatible with the lifeline
- The rope grab must be correctly attached to the lifeline (not upside down)
- Keep the lanyard (between the rope grab and the body harness) as short as possible
- Keep the rope grab as high as possible on the lifeline

Lifelines

A lifeline is a cable or rope that connects to a body harness, lanyard or deceleration device, and at least one anchorage. There are two types of lifelines, vertical and horizontal.

Vertical Lifeline: A vertical lifeline is attached to an overhead anchorage and must be connected directly to a worker's full-body harness, lanyard, retractable device, or rope grab; it must have a minimum breaking strength of 5,000 pounds. When a worker needs to move horizontally, however, a vertical lifeline can be hazardous due to the potential for a swing fall — the pendulum motion that results when the worker swings back under the anchor point. A swing fall increases a worker's risk of striking an object or a lower level during the pendulum motion.

Horizontal Lifeline: Unlike a vertical lifeline, the horizontal lifeline stretches between two anchorages. When you connect a lanyard or rope grab to a horizontal lifeline, you can move about freely, thus reducing the risk of a swing fall. However, horizontal lifelines are subject to much greater loads than vertical lifelines. Horizontal lifelines can fail at the anchorage points if they're not installed correctly. For this reason, horizontal lifelines must be designed, installed and used under the supervision of a qualified person.

Sag Angles: Any load on a horizontal lifeline will cause it to deflect or sag. The sag angle is a horizontal lifeline's angle of deflection when it's subjected to a load, such as a falling worker. Reducing the sag angle (making a horizontal lifeline too tight) actually increases the force on the line during a fall. As you tighten a horizontal lifeline, you increase the impact load dramatically!

For example, when the sag angle is 15 degrees, the force on the lifeline and anchorages subjected to a load is about 2:1. However, if you decrease the sag angle to five degrees, the force increases to about 6:1.

Fall Arrest Rules

When using personal fall arrest systems:

- If you fall, the impact force to the body has to be less than 1800 pounds, achieved by using shock absorbing lanyards and a harness
- Minimize fall distance; the maximum free fall distance can only be 6 feet
- There cannot be any structures below in your fall distance
- Maximum weight of an individual w/tools is 310 pounds

OTHER FALL PROTECTION SYSTEMS AND METHODS

Those who work on elevated surfaces must be familiar with systems and methods that control their exposure to fall hazards; they must also ensure that their equipment and tools don't endanger workers below them.

Common methods for protecting workers from falling objects include the following:

- Canopies suspended above the work area
- Barricades and fences to keep people from entering unsafe areas
- Screens, guardrail systems, and toeboards to prevent materials from falling to lower levels

The following guidelines will help you keep your tools and equipment where they belong:

- If you use toeboards, they must be strong enough to withstand a force of at least 50 lbs. applied in any downward or outward direction and be at least 3½" high
- If you need to pile material higher than the top edge of a toeboard, install panels or screens to keep the material from dropping over the edge
- If you use canopies as falling object protection, make sure they won't collapse or tear from an object's impact
- You can use guardrails with toeboards as falling object protection if the guardrail openings are small enough to keep the objects from falling through
- When you do overhand bricklaying work, keep material and equipment – except masonry and mortar – at least four feet from the working edge. Remove excess mortar and other debris regularly
- When you do roofing work, keep materials and equipment at least six feet from the roof edge unless there are guardrails along the edge. All piled, grouped, or stacked material near the roof edge must be stable and self-supporting

Fall Restraint System

OSHA allows the use of a fall restraint system instead of a personal fall arrest system. The fall restraint system must be rigged to prevent a worker from reaching a fall hazard and falling over the edge. A fall restraint system can consist of a full body harness or body belt that's connected to an anchor point at the center of a roof by a lanyard of a length that will not allow a worker to physically reach the edge of the roof.

A personal fall-restraint system prevents a worker from reaching an unprotected edge and thus prevents a fall from occurring. The system consists of an anchorage, connectors, and a body harness or a body belt. The attachment point to the body belt or full-body harness can be at the back, front, or side D-rings.

The anchorage for a fall-restraint system must support at least 3,000 pounds or be designed and installed by a qualified person and have a safety factor of at least two — twice the impact force of a worker free-falling six feet.

Positioning Device System

Positioning-device systems make it easier to work with both hands free on a vertical surface such as a wall or concrete form. Positioning-device systems are also called "class II Work-positioning systems" and "work-positioning systems."

The components of a positioning-device system — anchorage, connectors, and body support — are similar to those of a personal fall arrest system. However, the systems serve different purposes. A positioning-device system provides support and must stop a free fall within two feet; a personal fall arrest system provides no support and must limit free-fall distance to six feet.

- Anchorage. Positioning-device systems must be secured to an anchorage that can support at least twice the potential impact of a worker's fall or 3,000 pounds, whichever is greater

- Connectors. Connectors must have a minimum strength of 5,000 pounds. Snap hooks and D-rings must be proof-tested to a minimum load of 3,600 pounds without deforming or breaking
- Body support. A body belt is acceptable as part of a positioning-device system. However, it must limit the arresting force on a worker to 900 pounds and it can only be used for body support. A full-body harness is also acceptable but must limit the arrest force to 1,800 pounds. Belts or harnesses must have side D-rings or a single front D-ring for positioning

Guardrails

A guardrail system consists of a top rail, midrail, and intermediate vertical member. Guardrail systems can also be combined with toeboards that prevent materials from rolling off the walking/working surface.

Guardrail systems must be free of anything that might cut a worker or snag a worker's clothing. Top rails and midrails must be at least ¼-inch thick to reduce the risk of hand lacerations; steel and plastic banding cannot be used for top rails and midrails.

Other requirements for guardrails include:

- Wire rope used for a top rail must be marked at least every six feet with high-visibility material
- The top rail of a guardrail must be 42 inches (plus or minus three inches) above the walking/working surface. The top-edge height can exceed 45 inches if the system meets all other performance criteria
- Midrails must be installed midway between the top rail and the walking/working surface unless there is an existing wall or parapet at least 21 inches high
- Screens and mesh are required when material could fall between the top rail and midrail or between the midrail and the walking/working surface
- Intermediate vertical members, when used instead of midrails between posts, must be no more than 19 inches apart
- A guardrail system must be capable of withstanding a 200-pound force applied within two inches of its top edge in any outward or downward direction
- Midrails, screens, and intermediate structural members must withstand at least 150 pounds of force applied in any downward or outward direction

Safety Nets

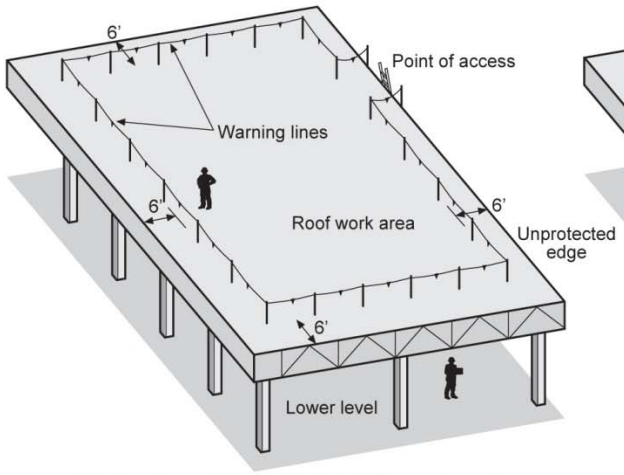
Safety-net systems consist of mesh nets and connecting components.

- Safety-net openings can't be more than six inches on a side, center to center
- Safety nets must not be installed more than 30 feet below the working surface
- An installed net must be able to withstand a drop test consisting of a 400-pound sandbag, 30 inches in diameter, dropped from the working surface
- Inspect safety nets regularly and remove debris from them no later than the start of the next work shift

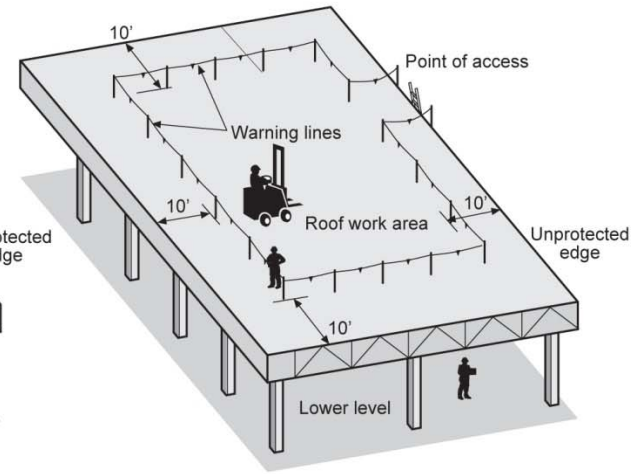
Warning Line System

Warning line systems consist of ropes, wires, or chains, and supporting stanchions that form a barrier to warn those who approach an unprotected roof side or edge. The lines mark off an area within which one can do roofing work without using guardrails or safety nets; warning line systems can be combined with guardrail systems, personal fall arrest systems, or safety monitoring systems to protect those doing roofing work on low slope roofs (4:12 or less, 2:12 in some jurisdictions).

When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet from the roof edge. When mechanical equipment is being used, the warning line shall be erected not less than 6 feet from the roof edge that is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 m) from the roof edge that is perpendicular to the direction of mechanical equipment operation



Warning-line system where no mobile equipment is used



Warning-line system where mobile equipment is used

Safety Monitoring System

A safety monitoring system is a set of procedures assigned to a competent person for monitoring and warning workers who may be unaware of fall hazards. A safety monitoring system used in conjunction with a controlled access zone and a fall protection plan is also appropriate in situations where conventional fall protection is not feasible.

Controlled Access Zones

The controlled access zone is best thought of as a combination of a warning line system and a safety monitoring system.

It defines an area where workers can do leading edge, overhand bricklaying and related work, or work under a fall protection plan without using conventional fall protection. All others are prohibited from entering a controlled access zone. The zone is created by erecting a control line, or lines, to restrict access to the area. The control line warns workers that access to the zone is limited to authorized persons.

Control lines must meet the following criteria:

- Consist of ropes, wires, tapes, or equivalent materials and supporting stanchions
- Be flagged at least every 6 feet with high visibility material
- Be no less than 39 inches from the working surface at its lowest point and no more than 45 inches from the working surface at its highest point (50 inches in overhand bricklaying operations)
- Have a minimum breaking strength of 200 lbs.
- For work such as overhand bricklaying, the control lines should be 10-15 ft. from the unprotected edge

ALTERNATIVE FALL PROTECTION METHODS

If leading edge, precast concrete erection or residential-type construction work is being performed, an alternative fall protection system can be used provided the company can demonstrate that using the conventional systems aren't feasible or would create a fall hazard.

Alternative Fall Protection Plan

If implemented, an alternative fall protection plan used by this company will meet the following requirements:

- The fall protection plan will be prepared and maintained by a qualified person for the site where the work is being performed
- A copy of the fall protection plan and changes will be maintained at the job site
- A competent person will implement the fall protection plan
- The fall protection plan will document the reasons why the use of conventional fall protection systems are infeasible or why their use would create a greater hazard
- The fall protection plan will include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who can't be provided with protection from the conventional fall protection systems. For example, the employer must discuss the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling
- The fall protection plan will identify each location where conventional fall protection methods can't be used. These locations will then be classified as controlled access zones and adhere to all appropriate policies and regulations
- Where no other alternative measure has been implemented, the company will implement a safety monitoring system
- The fall protection plan must include a statement that provides the name or other method of identification for each employee designated to work in controlled access zones. No other employees may enter controlled access zones
- In the event an employee falls, or some other related, serious incident occurs, the company will investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and will implement those changes to prevent similar types of falls or incidents

In addition, you must:

- Describe access to controlled-access zones will be limited, including procedures that authorize workers to enter controlled-access zones
- Describe how controlled-access zones will be identified and separated from other work areas
- Identify all workers who will enter controlled-access zones

INSPECTING AND MAINTAINING FALL PROTECTION EQUIPMENT

Employees will inspect fall protection systems and equipment regularly for wear or damage.

- Inspect manila, plastic, or synthetic rope used for top rails or midrails or a guardrail system frequently
- Inspect safety nets at least once a week, removing defective nets from service
- Inspect PFAS or positioning device systems every time they are used
- A PFAS that has been subjected to a fall must not be used again until a competent person determines it is safe

Lanyard Inspections

Snaps

Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should seat into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks must prevent the keeper from opening when the keeper closes.

Thimbles

The thimble must be firmly seated in the eye of the splice and the splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion, or cracks.

Wire Rope (Steel) Lanyard

Always wear gloves when inspecting a wire rope lanyard because broken strands can cause injury. To inspect, rotate the wire rope lanyard while watching for cuts, frayed areas or unusual wearing patterns on the wire. Broken strands will separate from the body of the lanyard.

Web Lanyard

While bending webbing over a pipe, observe each side of the webbed lanyard. This will reveal any cuts, snags or breaks. Swelling, discoloration, cracks and charring are obvious signs of chemical or heat damage. Observe closely for any breaks in stitching.

Rope Lanyard

Rotate the rope lanyard while inspecting from end-to-end for any fuzzy, worn, broken or cut fibers. Weakened areas from extreme loads will appear as a noticeable change in original diameter. The rope diameter should be uniform throughout, following a short break-in period.

Shock Absorber Pack

The outer portion of the pack should be examined for burn holes and tears. Stitching on areas where the pack is sewn to D-rings, belts or lanyards should be examined for loose strands, rips, deterioration or other signs of activation.

Shock-Absorbing Lanyard

Shock-absorbing lanyards should be examined as a web lanyard. However, also look for the warning flag or signs of deployment. If the flag has been activated, remove this shock-absorbing lanyard from service.

Common Types of Damage to Webbing and Lanyards

Heat

In excessive heat, nylon becomes brittle and has a shriveled brownish appearance. Fibers will break when flexed and must not be used above 180 degrees Fahrenheit.

Chemical

Change in color usually appears as a brownish smear or smudge. Transverse cracks appear when belt is bent over tight. This causes a loss of elasticity in the belt.

Ultraviolet Rays

Do not store webbing and rope lanyards in direct sunlight, because ultraviolet rays can reduce the strength of some material.

Molten Metal or Flame

Webbing and rope strands may be fused together by molten metal or flame. Watch for hard, shiny spots or a hard and brittle feel. Webbing will not support combustion, nylon will.

Paint and Solvents

Paint will penetrate and dry, restricting movements of fibers. Drying agents and solvents in some paints will appear as chemical damage.

Self-Retracting Lines

Check Housing

Before every use, inspect the unit’s housing for loose fasteners and bent, cracked, distorted, worn, malfunctioning or damaged parts.

Lifeline

Test the lifeline retraction and tension by pulling out several feet of the lifeline and allow it to retract back into the unit. Maintain a light tension on the lifeline as it retracts. The lifeline should pull out freely and retract all the way back into the unit. Do not use the unit if the lifeline does not retract. Also, check for signs of damage. Inspect for cuts, burns, corrosion, kinks, frays or worn areas. Inspect any sewing (web lifelines) for loose, broken or damaged stitching.

Braking Mechanism

Test the braking mechanism by grasping the lifeline above the load indicator and applying a sharp steady pull downward to engage the brake. There should be no slippage of the lifeline while the brake is engaged. Once tension is released, the brake should disengage and the unit should return to the retractable mode. Do not use the unit if the brake does not engage.

Snap Hook

Check the snap hook to be sure it operates freely, locks, and the swivel operates smoothly. Inspect the snap hook for any signs of damage to the keepers and any bent, cracked or distorted components.

Anchorage Connection

Make sure the carabiner is properly seated and in the locked position between the attachment swivel/point on the device and the anchor point

Self-Retracting Lines

Webbing

Grasp the webbing with your hands 6 to 8 inches apart. Bend the webbing in an inverted “U.” The surface tension resulting makes damaged fibers or cuts easier to detect. Follow this procedure the entire length of the webbing, inspecting both sides of each strap. Look for frayed edges, broken fibers, pulled stitches, cuts, burns and chemical damage.

D-Rings/Back Pads

Check D-rings for distortion, cracks, breaks, and rough or sharp edges. The D-ring should pivot freely. Inspect for any unusual wear, frayed or cut fibers, or broken stitching of the D-ring attachments. Pads should also be inspected for cracks, excessive wear, or other signs of damage.

Buckles

Inspect for any unusual wear, frayed or cut fibers, or broken stitching of buckle attachments.

Tongue Buckles/Grommets

Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on frame. Check for distortion or sharp edges. Inspect for loose, distorted, or broken grommets. Webbing should not have additional punched holes.

Friction and Mating Buckles

Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points at the center bar.

Quick-Connect Buckles

Inspect the buckle for distortion. The outer bars and center bars must be straight. Make sure buckles engage properly.

Harness Fall Arrest Indicators

Inspect fall arrest indicators (located on the back D-ring pad) for signs of activation. Remove from service if broken or stretched between any of the four pairs of arrows.

Cleaning of Equipment

Basic care for fall protection safety equipment will prolong the life of the equipment and contribute to its safety performance. Proper storage and maintenance after use is as important as cleaning dirt, corrosives or contaminants off the equipment. The storage area should be clean, dry, and free of exposure to fumes or corrosive elements.

Nylon and Polyester

Wipe off all surface dirt with a sponge dampened in plain water. Squeeze the sponge dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather with a vigorous back and forth motion. Then wipe the belt dry with a clean cloth. Hang freely to dry but away from excessive heat.

Housing

Periodically clean the unit using a damp cloth and mild detergent, and towel dry.

Drying

Harness, belts, and other equipment should be dried thoroughly without exposure to heat, steam, or long periods of sunlight.

EMERGENCY PLANNING

The best strategy for protecting workers from falls is to eliminate the hazards that cause falls. If you can't eliminate the hazards, you must protect workers with an appropriate fall protection system or method. If a worker is suspended in a personal fall-arrest system, you must provide for a prompt rescue.

The emergency response plan outlines key rescue and medical personnel, equipment available for rescue, emergency communications procedures, retrieval methods, and primary first-aid requirements. Please see the chapter on Emergency Action Plans for more information.

Before Work Begins

- Identify emergencies that could affect your work site
- Establish a chain of command
- Document procedures for responding to emergencies and make sure they're available on-site
- Post emergency-responder phone numbers and addresses at the work site
- Identify critical resources and rescue equipment
- Train on-site responders
- Identify off-site responders and inform them about any conditions at the site that may hinder a rescue effort

- Identify emergency entry and exit routes
- Make sure responders have quick access to rescue and retrieval equipment, such as lifts and ladders

During Work

- Identify on-site equipment that can be used for rescue and retrieval, such as extension ladders and mobile lifts
- Maintain a current rescue-equipment inventory at the site. Equipment may change frequently as the job progresses
- Re-evaluate and update the emergency-response plan when on-site work tasks change

When an Emergency Occurs

- First responders should clear a path to the victim. Others should direct emergency personnel to the scene. You can use 911 for ambulance service; however, most 911 responders are not trained to rescue a worker suspended in a personal fall-arrest system
- Make sure only trained responders attempt a technical rescue
- Prohibit all nonessential personnel from the rescue site

After an Emergency

- Report fatalities to OSHA within eight hours
- Report injuries requiring overnight hospitalization with medical treatment (other than first aid) to OSHA within 24 hours
- Identify equipment that may have contributed to the emergency and put it out of service
- Have a competent person examine equipment. If the equipment is damaged, repair or replace it. If the equipment caused the accident, determine how and why
- Document in detail the cause of the incident and describe how it can be prevented from happening again
- Review emergency procedures. Determine how the procedures could be changed to prevent similar events. Revise the procedures accordingly

TRAINING

This company will ensure every employee is provided training on Fall Protection. This training will be provided at no cost to the employee during working hours.

The company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training Components

The program administrator will ensure that every employee will be trained in the following minimum elements:

- The nature of fall hazards in the work area
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used

- The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used
- The role of each employee in the safety monitoring system when this system is used
- The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection
- The role of employees in fall protection plans

Training Records

Training records will include the following information as a written certification:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of the attendees

Employee training records will be maintained for the duration of the employee's employment.

Retraining

If the company has reason to believe that any employee who has already been trained doesn't have the understanding and skill required, the employee must be retrained. Examples where such retraining may be required include, but are not limited to, the following:

- Changes in the workplace render previous training obsolete
- Changes in the types of fall protection systems or equipment to be used render previous training obsolete
- Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill

FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- Fall Hazard Assessment
- Employee Training for Fall Protection Certification

FALL HAZARD ASSESSMENT

Job Name:		Location:		Date Assessed:	
Related Operating Procedures Reviewed:		Yes ☐ No ☐	Location Marked and Entry Controlled		Yes ☐ No ☐

Fall Hazard Assessment Checklist	Yes	No
1. Can an employee enter the area without restriction and perform work?	☐	☐
2. Are fall prevention systems such as cages, guardrails, toeboards and manlifts in place?	☐	☐
3. Have slipping and tripping hazards been removed or controlled?	☐	☐
4. Have visual warnings of fall hazards been installed?	☐	☐
5. Can the distance a worker could fall be reduced by installing platforms, nets etc.?	☐	☐
6. Are any permanently installed floor coverings, gratings, hatches or doors missing?	☐	☐
7. Does the location contain any other recognized safety and or health hazards?	☐	☐
8. Is the space designated as a Permit Required Confined Space?	☐	☐
9. Have anchor points been designated and load tested?	☐	☐

Assessment Information

Initials	Hazard	Remarks/Recommendations
	Total potential fall distance:	
	Number of workers involved:	
	Frequency of task:	
	Obtainable anchor point strength:	
	Required anchor point strength: (not less than 5000 lbs.)	

Additional Requirements

Potential environmental conditions that could impact safety:

Initials	Condition	Remarks/Recommendations

Possible required structural alterations:		
Initials	Alteration	Remarks/Recommendations
Possible task modification that may be required:		
Initials	Task	Remarks/Recommendations
Training requirements:		
Initials	Requirement	Remarks/Recommendations
Personal protective equipment required:		
Initials	Requirement	Remarks/Recommendations
Comments:		

Authorization	☐Approved
I certify that I have conducted a Fall Hazard Assessment of the above designated location and have detailed the findings of the assessment on this form. * Further detailed on attachment: Yes ☐ No ☐	

Title:		Name		
Signature			Date	Time

EMPLOYEE TRAINING FOR FALL PROTECTION

The Company certifies that the following employee has been trained in the understanding, knowledge, and skills necessary for the safe performance of duties assigned in areas of fall protection hazards.

_____ has demonstrated proficiency in the following areas of fall protection:

- ☐ The nature of fall hazards in the work area.
- ☐ The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.
- ☐ The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, personal fall restraint systems, slide guard systems, positioning devices, and other protection to be used.
- ☐ The role of each employee in the safety monitoring system when this system is used.
- ☐ The limitations on the use of mechanical equipment during the performance of roofing work.
- ☐ The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.
- ☐ The role of employees in the fall protection work plan.

Employee Tranied by	Date of Training
Signature of Trainer	Date
Employee Signature	Date

cc: Employee Personnel File

POLICY

The Company has adopted this policy to inform employees of the Fit for Duty Policy. This ensures the safety and health of the employees.

EMPLOYER RESPONSIBILITIES

- Ensuring all employees are physically fit and capable to perform the job duties assigned
- Training personnel to perform assigned tasks safely
- Responding quickly to eliminate workplace hazards
- Ensuring all equipment is kept in good repair
- Ensuring employees follow safe job procedures
- Reviewing job hazard analysis whenever there is a significant change to any element of the job or there has been an injury or illness

SUPERVISOR RESPONSIBILITIES

- Establishing and maintaining safe and healthful working conditions
- Monitoring employee work behaviors using behavior based safety tools to determine if they should be removed from the worksite
- Ensuring employees are not impaired by illness or medication use
- Setting good examples, instructing their employees, making sure they fully understand and follow safe procedures

EMPLOYEE RESPONSIBILITIES

- Notifying their supervisors if they are fatigued to the point of not being able to perform their duties safely
- Ensuring they are physically and mentally fit to perform their job functions safely; they must take responsibility for their own safety as well
- Notifying their supervisor if they are taking prescription or over-the-counter medications
- No employee is expected to undertake a job until he/she has received instructions on how to do it properly and safely, and is authorized to perform the job
- No employee should undertake a job that appears to be unsafe
- Employees are to report to a superior or designated individual all unsafe conditions encountered during work
- Personal protective equipment must be used when and where required, and properly maintained

TRAINING

It is the determination of the Company to ensure all employees will be properly trained for their assigned task. Before any employee starts a new assigned task, the employee must receive specific training. Examples might include:

- Forklift operation
- Instrumentation
- Heavy equipment operation
- Scaffold building, etc.

PROCEDURES

Drug and Alcohol Testing

It is the policy of the Company that drug and alcohol testing for pre-employment, post-accident or random will be conducted by only a laboratory certified by the U.S. Department of Health and Humans Services (HHS) under the National Laboratory Certification Program (NLCP).

Testing Procedures – Pre-Employment

Any offer of employment is deemed conditional upon the potential employee having a negative test result for drugs.

Pre-employment Drug testing will be scheduled by the hiring supervisor directly with the third-party service provider immediately upon acceptance by the candidate of a conditional offer of employment. Testing should be done in a location most likely to ensure timely receipt of the results. Pre-employment test results will be reported by the Medical Review Officer.

Testing Procedures - Employees

Any person who requires an employee to be tested for Alcohol or Drugs must tell the employee beforehand why the test is being requested. Any employee who refuses a request to be tested is in breach of this policy and may be subject to disciplinary action that may include termination of employment.

When testing for either Alcohol or Drugs is to occur, the Company will direct the employee to a sample collection site designated by a third-party service provider and provide transportation to the site. At the Company's discretion, a qualified technician may be brought to the worksite to conduct the testing.

Prescription and Over-the-Counter Medications

It is the policy of the Company that all employees must notify their supervisor when taking any prescription or over-the-counter medication that could impair their ability to work safely.

Over-the Counter medications such as allergy or cold and flu medications could also impair one's ability to perform safely and must be reported to their supervisor.

SAFE WORK PRACTICES

It is the determination of the Company that all employees will be informed of the safe work practices and procedures in the work place. Examples might include:

- Lockout/Tagout
- Process Safety Management
- Asbestos Awareness
- Electrical safety, etc.

EMPLOYEE MONITORING

To determine if an employee should be removed from the work site, the Company will monitor employee behaviors and activities based on the Behavior Based Safety Policy.

SCOPE

This chapter provides the requirements and safe practices for performing floor installation work. It covers the installation of hardwood, carpet, vinyl and tile flooring. It does not cover flooring or asbestos removal. These safe practices will comply with all applicable federal, state and local regulations.

POLICY

In order to protect the health and safety of its employees, this Company has established the following policies and procedures for all workers engaged in the installation of flooring.

EMPLOYER RESPONSIBILITIES

This Company will:

- Train all employees on the safe practices for flooring
- Provide employees with all necessary PPE
- Ensure all tools and equipment are maintained in good condition
- Verify that employees are trained on the use of the tools and equipment they will operate

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Follow all Company flooring safe practices
- Use and maintain all required PPE
- Communicate with other trades before, during and after operations
- Keep the work area clear of debris
- Clean up all spills immediately
- Use tape, signs, or barricades (when needed) to contain work area
- Use safe lifting techniques. Ask for assistance when needed
- Store all equipment in a safe place
- Cleanup work area when operations are completed
- Report all unsafe conditions and acts immediately

HAZARDS

Employees engaged in flooring installation work can be exposed to the hazards of:

- Eye injuries from flying debris
- Hearing damage caused by equipment noise
- Respiratory damage from dust and finishing materials
- Musculoskeletal injuries from working in kneeling positions
- /Shocks or burns from electric hazards

PERSONAL PROTECTIVE EQUIPMENT

This Company will provide employees with the necessary PPE depending on the tasks being performed. This can include, but is not limited to:

- Safety glasses or goggles
- Safety shoes or boots and kneepads
- Work gloves appropriate for the hazards present
- Dust masks or respirators, if necessary
- Earmuffs or earplugs where noisy equipment is in use
- Hardhats when required

OSHA regulations require eye protection when using power tools. A piece of wood, metal or a drop of finishing material can fly from the work area to your face and cause minor injuries or permanent disabilities. Normal eyeglasses or contact lenses do not qualify as protective eyewear.

Always wear the proper work clothes. Do not wear loose clothing that could get caught up in the machines. Keep long hair tied back. Do not wear loose jewelry.

SAFE PRACTICES

- Always refer to the finishing manufacturer's safety data sheet (SDS) before beginning operations when using stains, sealers, strippers and polishes
- Always inspect all air hoses and fittings on pneumatic nailers for cracks, worn threads, and damaged or loose quick disconnect couplings in order to prevent injury resulting from a whipping air hose. Never change parts or any accessories without disconnecting the air supply and relieving the hose of air pressure. Inspect the air compressor before operations begin
- Make sure to use the right speed when operating floor machines. Too high a speed can throw dusts, stripper and polish around a room. Make sure that the automatic shut off handle is working, and keep the electric cord away from hazards
- Ensure that the sanding belt on belt sanders is tracking properly to prevent it from coming loose while working. Check the condition of the belt before sanding
- Do not work on a cluttered floor. Always use the proper lighting
- Make sure there is adequate ventilation to keep dust particles, and vapors from finishing operations, to a minimum. Dust particles can be microscopic hazards

WOOD FLOORING PROCEDURES

- Stay alert. Wood flooring procedures involve the use of belt sanders, edgers, miter saws, table saws, circular saws, drills, pneumatic nailers, an air compressor, flooring nailers and floor machines that sand, strip, scrub, wax and polish floors
- Always read and follow the manufacturer's manuals that are supplied with all machines and finishing equipment
- Always inspect all tools for damage or wear before they are used. Tools are to be used for their intended purpose

- Make sure all machine safety guards are in place and are operational. Keep all electric cords in good working condition
- Always turn off and unplug all electrical tools and machines when making adjustments and when attaching accessories
- Make sure there are ground fault circuit interrupters (GFCIs) for all electrical tools and machines.
- Make sure that the electrical power and wiring at the jobsite is sufficient to operate all machines safely
- Turn off all sources of ignition (furnace and hot water) when working with flammables such as finishes, sealers, and fillers
- Always wear safety glasses, goggles or a face shield to reduce the risk of an eye injury

Pneumatic Nailers And Staplers

- Read, understand, and follow all instructions and warnings in the instruction manual as well as those provided with recommended accessories
- Wear safety glasses/goggles at all times
- Wear hearing protection during extended periods of operation
- Keep work area clean. Cluttered areas and benches invite accidents. Floor must not be slippery due to sawdust
- All visitors should be kept a safe distance from the work area
- Secure the work. Make sure tongue and groove of the flooring strips are properly interlocked and secured into place before nailing
- Stay alert. Watch what you are doing. Use common sense
- Pneumatic tools must be inspected prior to use to insure proper use of power supply and proper working order. An improperly functioning tool must not be used
- Keep your hands, feet, and body parts away from the nail ejection area
- Always assume that the tool contains fasteners. Do not activate the tool unless it is placed firmly against the work piece
- Do not point the tool toward yourself or anyone whether it contains fasteners or not
- Never disengage or render the safety inoperable
- Never transport the tool while depressing the trigger mechanism
- Disconnect the tool from the air supply when moving the tool to a new location, performing any maintenance or repair, or clearing a jam
- Make sure you disconnect the tool from the air supply when the tool is left unattended
- Do not remove, tamper with, or otherwise cause the tool operating controls to become inoperable
- Disconnect tool from power source if safety trigger or operating controls are not working properly
- Use only fasteners recommended by the manufacturer. Use of other fasteners may cause serious injury, jamming, or improper operation

- Use only clean, dry compressed air from a pressure regulated source. Never exceed manufacturer's recommended working pressures and never use more pressure than necessary. Always follow the manufacturer's recommendations
- The tool airline should be connected to the power source through an airline pressure regulator and airline filter. The airline regulator should never be set higher than as marked on the tool. Lower pressures may be used as recommended by the manufacturer
- Hazardous power sources including, but not limited to, oxygen, combustible gases, sources whose pressure can exceed 200 psi if the pressure regulator fails, bottled gases, including air should never be used

Remember; pneumatic powered tools must be secured to the hose by some positive means to prevent the tool from becoming accidentally disconnected. Safety clips or retainers must be securely installed and maintained to prevent attachments from being accidentally expelled. All pneumatically powered equipment with automatic feed, which operate at over 100 psi at the tool, must have a safety device on the muzzle to prevent the tool from cycling and ejecting fasteners, unless the muzzle is in contact with the work surface.

Compressors

- Every air receiver must be equipped with a pressure indicator gauge with one or more spring-loaded safety valves. Pressure gauges must be located to be readily visible
- The pressure relief safety valves may not exceed the rated working pressure of the air receiving tank
- No valve of any type may be placed between the safety valve and the air receiver
- All safety valves must be tested at frequent intervals to determine proper operating condition
- If pressure gauges or pressure relief valves are damaged, replace them with compatible equipment before using the compressor
- If a compressed air storage tank is dented, deeply gouged, or badly rusted, the compressor must be removed from service
- If an air receiver is equipped with a quick connect/release fitting, make sure the lock collar is fully engaged when hose is connected. When the hose is released from the fitting, firmly grasp the hose close to the fitting before releasing the lock collar
- Before servicing a compressor, disconnect it from the power source and bleed the pressure from the tank
- Pulleys and belts on compressor motors and pumps must be properly guarded
- If using a gas or diesel fueled compressor, engine must be shut off before refueling
- If an electric powered compressor, check power cord for cuts and abrasions, if the cord, plug, or any components are damaged, replace before use

Sanding/Finishing Floor Machines

- Read and understand the Operator's Manual before operating or servicing a machine
- Operators of sanding machines must be trained before using them. Injury can occur if the necessary PPE is not used while sanding. Hearing protection should be worn when noise levels exceed 90 decibels

- Read all machine labels before attempting to operate the machine. Make sure all of the labels and instructional information are attached or fastened to the machine. Get replacement labels and decals from your authorized distributor
- Operating a machine that is not fully assembled can cause injury or property damage. Do not operate the machine until it is completely assembled
- Keep all fasteners tight. Keep adjustments according to machine specifications
- Sanding/finishing wood floors can create an explosive or combustible environment. Do not operate the machine around solvents, thinners, fuels or any other flammable materials
- Read the manufacturer's label on all chemicals used to determine combustibility. Keep work area well ventilated. Do not use on wet surfaces
- Dust generated from sanding wood floors can spontaneously ignite or explode. Promptly dispose of any sanding dust in a metal container clear of any combustibles. Remove the contents of the dust bag when the bag is 1/3 full. Remove the contents of the dust bag each time you finish using the machine. Never leave a dust bag unattended with sanding dust in it
- Hitting a nail while sanding can cause sparks and create an explosion or fire. Always use a hammer and punch to countersink all nails before sanding floors
- Electrocution can occur if the machine is being serviced while connected to a power source. Disconnect the power supply before servicing
- Always remove the electrical plug from the power source before changing any attachment
- Always disconnect the power supply before leaving the machine
- Electrocution or fire could occur if the machine is being operated with a damaged power cord. Keep the power cord clear of the sandpaper/pad. Always lift the cord over the machine. Do not move the machine by the power cord
- Electrocution could occur if the machine is used on an ungrounded electrical circuit
- Always use a three-wire electrical system connected to the electrical ground. Never remove or disable the grounding supply conductor on the electrical cord
- For maximum protection against electric shock, use a circuit that is protected by a GFCI
- To avoid injury, keep hands, feet, and loose clothing away from all moving parts
- Disconnect the power cord before changing the abrasive, or when servicing
- Do not operate the machine unless all guards are in place
- Do not perform belt-tracking adjustments while sanding equipment is running. Never leave the machine unattended while connected to a power source
- Electrical components can “short out” if exposed to water or moisture. Keep the electrical components of the machine dry. Wipe the machine down after each use
- For storage, keep the machine in a dry building
- Do not alter or modify a machine unless approved by the manufacturer
- The machine is heavy, and can cause injury unless lifted properly. Ask for assistance when necessary

CARPET INSTALLATION

- Prior to any carpet installation, all other trades must be out of the area to be carpeted and their work must be completed

- On remodels check for mold, mildew, and any cracks that need to be sealed (cracks may harbor insects, rodent feces, droppings, or other contaminants)
- Ensure that the carpet and adhesive are stored in a secure, dry area having a maximum temperature and relative humidity of 90º F and 65% relative humidity (RH), respectively
- The carpet must be stored on a flat, smooth surface and should not be stacked over three rolls in height
- Make sure when handling carpet to use only tow motors and lift trucks equipped with carpet booms. Do not use forklifts unless where necessary
- Always use safe lifting procedures when handling carpet by hand. Ask a fellow worker to help when the carpet weighs more than you can handle
- Use a carpet cart or hand truck to move the carpet from one area to another when necessary
- Use the proper adhesives. It is extremely important to control the environmental conditions of the installation site. The temperature and relative humidity must be continually maintained at 65° to 95° F and 10% to 65% RH for a minimum of forty-eight hours prior to installation. These conditions should be constantly maintained during, and at least 72 hours after installation
- Do not use space heaters as an alternate to a central heating system
- Ensure heating and air conditioning systems are in working order, to maintain the temperature and relative humidity, and reduce adhesive odors
- Make sure installers are aware that whenever possible, carpet should be allowed to ventilate with the induction of fresh air
- Avoid recirculation of indoor air; air should be exhausted to the outside
- During installation, maintain fresh-air ventilation by using fans, by operating the building's ventilation fan system, and by opening windows and doors
- After installation, continue to fresh-air ventilate for 48 to 72 hours at normal room temperatures by operating the ventilation fan system at full capacity and by opening windows and doors, when possible. This will minimize odors and speed up the airing out process. Most emissions drop significantly within 48 hours

Operations

- Personal protective equipment may include work boots, kneepads, gloves, and a back brace
- Use a floor machine to remove paint over spray, joint compound, or any other construction related contaminants before installation begins
- Wear a dust mask when making floors free of dust, existing adhesives, curing agents, oil, sweeping compound residue, and any other contaminant
- CAUTION: Do not sand or use a floor machine and disc on any product containing asbestos
- Remember, painted concrete slabs are hazardous to work with because so many different types of paint are on the market. Always wet sand the concrete to keep dust to a minimum
- Ensure the mixture stays wet and doesn't create any dust. Ensure that the concrete slab is thoroughly dry before installing the carpet to eliminate possible future mold growth
- All existing wood surfaces must be free of chemicals applied under pressure

- Always use a power stretcher or stair stretcher properly. Avoid all pinch points on the stretchers. Teeth on the stretchers are dangerous and can cause punctures. Use caution when working with stay-nails, tack strips, and tackless strips with angular pins
- Make sure you are trained in the proper usage of a kneekicker. Injuries occur when your knee contacts the carpet or the side of the kneekicker
- Knee Kickers must be pushed, rather than kicked, to stretch carpet into place. Place the padded end of the tool a few centimeters above your knee and apply pressure. To properly adjust a knee kicker, begin with a setting of 3½ and adjust as necessary. Be sure to remove any lint from between the teeth so the tool grabs properly. Never use the knee kicker on one side of the carpet if the other side has been installed on a tack strip
- Ensure you know how to use a large needle and syringe for the removal of air bubbles
- Make sure you have been trained in the safe use of the awl, the slotted blade knife, the cushion-back cutter, and all seam cutting tools
- When a finger or hand has been cut by a knife, wash out the affected area immediately
- Carpet fibers can act as splinters in a wound
- Make sure you are trained in the usage of electric staplers and hammer tackers
- Do not cover a direct glue-down installation with a moisture barrier protection such as plastic, as it will cause possible mildewing by trapping moisture in the adhesive
- Installers must have prior hot melt tape seaming experience. Ensure that the seaming iron is equipped with a heat shield to avoid the possibility of self-inflicted burns. Set the heat regulator on the seaming iron at the lowest possible temperature that will still give full adhesive melt. The temperature control on seaming irons is often far from precise. To eliminate temperature deviations, either determine the proper temperature setting in the shop, or test the iron on a small piece of the carpet to be installed
- Make sure all power tools use a GFCI outlet. Check cords for fraying or damage, and replace immediately if damaged
- Wear protective boots when using a 75-100 lb. roller on the carpet
- Always make sure there is enough manpower available to complete the installation, eliminating injuries to the back, shoulders, and knees
- Recycle used and cut carpet materials. Contact the Carpet and Rug Institute for recyclers in your area

VINYL FLOORING INSTALLATION

- Vinyl floor installation includes adhesives, cutting knives, specialized tools, kneeling, and lifting. Keep cutting tools sharp and holstered when not in use
- Tape and tie down flooring when transporting. Inspect the vinyl flooring for any damage that may have occurred in shipping and handling
- Allow the flooring to warm to room temperature
- Store the flooring, adhesives, and solvents in a secure, dry area
- Read and understand the warning labels on the adhesives and solvents you use
- SDS must be available to all employees

- For remodels, a qualified person must check the old flooring and adhesive to see if it contains asbestos before it's removed. Asbestos containing material must be removed by an asbestos abatement crew before any work begins. Asbestos is hazardous!
- Remember, new flooring is only as good as the subfloor it is installed over
- Make sure you are trained in the use of any power tool that is to be used on the job
- Guards must be in place. Wear safety glasses at all times. Use the proper extension cord for the tool
- Ensure power tools use a GFCI outlet. Check for fraying or damage. Replace immediately. Remember, cords are tripping hazards
- When laying flooring over an old subfloor, the flooring must be prepared to provide a satisfactory surface for proper adhesion. Flooring must be thoroughly stripped of waxes and foreign substances. Wear a dust mask and safety glasses for these procedures
- Make sure all screw heads, nails and other hard-edged protrusions on wood flooring are removed or covered before installation. All minor imperfections, damaged areas, and knotholes must be filled and made flush
- New concrete subfloors should be properly cured and thoroughly dry before installation
- Adhesives are subject to deterioration resulting in bond failure under alkaline conditions. Use rubber gloves, an apron, boots, respirator (if needed) and safety goggles for this procedure. Flood the floor with a neutralizing solution and allow it to remain at least one hour before rinsing off. Be sure that all neutralizing solution is removed with the rinse water. Allow concrete to dry thoroughly
- Before installing any vinyl flooring, all other trades should be out of the area
- Always use safe lifting procedures when handling flooring by hand. Ask for assistance when the flooring weighs more than you can handle. Use a hand truck (dolly) to move the flooring from one area to another when necessary. Watch where you place your feet
- Practice good housekeeping. Keep the work area free of debris that could create a slip, trip, or fall. Wear kneepads when needed
- Use the proper adhesives. Read the labels when unfamiliar with a new product. Read the manufacturer's specifications for temperature and relative humidity. Ensure heating and air conditioning systems are working. Read the SDS when needed. Whenever possible, flooring should be allowed to ventilate with the induction of fresh air to help reduce adhesive odors
- Avoid recirculation of indoor air; air should be exhausted to the outside. During installation, maintain fresh-air ventilation by using fans, by operating the building's ventilation fan system, and by opening windows and doors
- The correct adhesive is important and is governed by the substrate. Know the proper spread of the adhesive (by trowel size) in order to prevent excessive or inadequate coverage. Excessive adhesive will result in exudations around the edges of rolled flooring, whereas insufficient coverage, caused by spreading too thin or using worn trowels will prevent proper adherence of the floor
- Keep a bucket of warm water and a sponge or rag available, and clean up all excess adhesive immediately. Once the adhesive starts to dry, it is very difficult to remove without a special solvent. Solvents must be handled properly. Wear your protective equipment

- When in doubt on seaming a floor, check with the manufacturer or flooring supplier for instructions
- When using a seam and strip cutter to trim the factory seam edge, check the instructions on how to configure the machine
- Make sure you have been trained in the safe use of all cutting tools. Keep all cutting tools sharp. Sharp tools make clean cuts and help to avoid excessive applied pressure. When a finger or hand has been cut by a knife, wash out the affected area immediately and treat. Keep your trowels in good condition. Clean and store after each use. Keep all your tools in a secure location
- Stay alert when rolling the floor. Make sure flooring is firmly bonded to subfloor. Use care when removing bubbles
- Recycle used and cut vinyl materials. Vinyl can be remade into many useful materials including new flooring

TILE INSTALLATION

- Communicate with other trades before work begins. Use caution tape to barricade area to allow time for drying
- Depending on the job location, make sure to wear the proper protective equipment
- Always wear safety glasses/goggles. A full-face shield will add protection when cutting tile
- Always wear a dust mask when mixing grout/cement

Wet Tile Saws

- To cut a tile using a wet tile saw, measure the exact space in which the tile will fit. Mark the line on the full-sized tile in grease pencil
- Most saws will accommodate tiles up to 12 inches in size, but oversized saws can be used for huge floor tiles
- Wearing safety glasses, place the tile on the moveable platform, and line up the mark with the edge of the saw
- With the motor running, slide the platform toward the blade with an even but gentle pressure. Since you are grinding the tile apart, ensure that the water has sufficient time to cool everything
- Inspect the saw for excessive wear. Check for defects to the blade and electrical cord, and replace immediately if damaged
- Ensure the wet saw is positioned on a solid level surface prior to use
- Do not over reach while operating the wet saw. Do not remove the safety guard. The guards are there to protect you, use them
- Always ensure that water is flowing freely over the blade before beginning to cut any material. This will increase blade life, cutting efficiency and dust control. Make sure the water is clean and free of debris
- Always keep fingers free and clear of the cutting wheel or wet saw
- When using a diamond saw blade, make sure that it is mounted on the correct diameter blade arbor between proper blade flanges, and is securely tightened by hand with a wrench

- Do not force the wet saw to cut faster. This will lead to breaking the blade, material, or cause an injury. Cutting material while the wet saw operates at the proper speed will ensure a good cut
- Wear eye and face protection when working with the wet saw to prevent injury
- Hearing protection should be used during cutting operations
- Due to electrical hazards, do not operate a wet saw in damp or wet locations, or when it is raining
- Keep your area clean of hazards and clear of any loose material that may be lying around
- To reduce the risk of electrocution when using an extension cord, keep all connections dry and off the ground. Make sure all outlets have GFCIs installed

Marking, Nipping, and Finishing Circular Shaped Tile Cuts

- Tile nippers are used to make circular cuts in ceramic tile. They can also be used to make straight or angled cuts although you will find it much easier to use a tile cutter or wet saw to make these types of cuts
- Always wear eye protection as very sharp fragments of the tile can shoot from the cut as it is being made
- Mark the tile to have cut. Once the tile has been marked, hold it firmly over an empty container and proceed to take small "nips" or "bites" out of it using the tile nippers. Take your time and keep the "bites" small, otherwise you risk breaking the tile and having to start all over again
- Tools are equipped with a sharp carbide or tungsten-steel wheels; watch your fingers. A lever handle allows you to drag the wheel across the glazed finished surface of the tile. The wheel scratches and cuts into the glazed finish creating a plane of weakness. When you press down on the handle of the tool, pressure is applied equally to the tile on each side of the cut line
- Straight ceramic tile cutters are designed to score fired clay ceramic tiles that have a thin glaze on their surface. Stone, fully vitrified porcelain tiles, and some types of unglazed clay tiles may not cut properly with this type of cutter. Use a quality wet saw to make these types of cuts
- Align the marked tile with the arrow on the tile cutter. Place the guide into position and tighten securely to hold tile in place. Keep the guide in place if you need to make multiple cuts of the same size
- Clean after each use. Store indoors so that it does not rust

Powered Tile Cutter (Circular Saw-Type)

- Keep your hands away from the cutting area. Kickback could cause the tile cutter to jump backwards. Do not reach underneath the work
- Never hold the piece being cut in your hands or across your leg. Support the work properly to minimize body exposure
- Hold the tile cutter by the insulated gripping surfaces when performing an operation where the cutting tool may contact hidden wiring or its own cord. Contact with a “live” wire will make the exposed metal parts of the tool “live”
- Always use wheels with correct size and shape arbor holes. Never use damaged or incorrect wheel washers or bolts. The wheel washers and bolt were specially designed for the cutter

- Never use the tile cutter with wood cutting blades or other saw blades. Such blades when used on this tool frequently kick and cause loss of control. Keep pressure regulator and water pipe away from the cutting edge
- Check the wheel carefully for cracks or damage before operation. Replace the cracked or damaged wheel immediately
- Use only flanges designed for the tile cutter. Be careful not to damage the spindle, flanges or bolt
- Make sure the wheel is not contacting the work piece before the switch is turned on
- Wait until the wheel attains full speed before cutting
- Stop operation immediately if you notice anything abnormal
- Never attempt to cut with the tile cutter held upside down in a vise. This can lead to serious accidents and is extremely dangerous. Do not stop the wheel by lateral pressure on the disc
- If the plug or receptacle gets wet, don't unplug the cord. Disconnect the fuse or circuit breaker that supplies power to the tool, unplug and check for water in the receptacle
- When operating a tile cutter outside, use outdoor extension cords marked W-A or W that are rated for outdoor use. Make sure the cord is heavy enough to carry the current the cutter will draw
- Maintain the tile cutter with care. Keep the cutting blades sharp and clean. Properly maintained tools with sharp cutting edges are less likely to bind and are easier to control. Keep the inside covers free of dust accumulation, which causes malfunctions. Check for misalignment, or binding of moving parts, breakage of parts, and any other condition that may affect the tools operation. If damaged, have the tile cutter serviced before using. Many accidents are caused by poorly maintained tools
- Full-face shields will protect the entire face from flying debris and injury
- Always wear a dust mask when using a tile cutter, the dust created by the tile cutter can contain microscopic particles or chemicals
- Boots with a non-skid tread should be worn
- Wear heavy leather or nitrile coated work gloves to protect your hands while cutting tile with the tile cutter

INSTALLING TILE DIRECTLY TO WOOD SURFACES

- Chip board, cushioned vinyl flooring, particle boards of any type, luan plywood, OSB (Oriented Strand Board), tongue and groove planking, and hardwood floors are unsuitable substrates to directly install ceramic tile over
- Although it can be done successfully, many experts believe that ceramic tile installed directly to plywood surfaces should be avoided whenever possible. Plywood has a smooth surface and tends to swell, warp, and delaminate when it is exposed to moisture
- Subfloor construction should consist of a double layered, 1-1/8" thick, exterior grade plywood installed over floor joists spaced a maximum of 16" on center. Face grains of first plywood layer should be installed perpendicular to joists for maximum stiffness and staggered with a 1/8" wide gap between each sheet. Install plywood panel edges 1/4" away from restraining surfaces, including perimeter walls, cabinetry, and door jambs

- To prevent moisture from damaging the plywood substrate a waterproofing membrane should be installed per the manufacturer's instructions over all plywood surfaces to be tiled
- Install ceramic tile using a latex modified thin set mortar approved for use over plywood substrates

INSTALLING TILE OVER VINYL OR LINOLEUM FLOOR COVERINGS

- Installing ceramic tile directly to vinyl or linoleum surfaces should be avoided whenever possible
- If your vinyl or linoleum flooring may contain asbestos fibers, have it tested before attempting to remove it
- In any case, vinyl or linoleum flooring must be a non-cushioned type and securely attached to the subfloor. Subfloor construction should consist of double layered, 1-1/8" thick, exterior grade plywood installed over floor joists spaced a maximum of 16" on center
- If the floor covering does not contain asbestos fibers, the surface should be scarified or sanded to provide a rougher surface for the thinset mortar to bond to
- Install ceramic tile using a latex modified thinset mortar approved by the manufacturer for installation over vinyl and linoleum surfaces

INSTALLING TILE OVER CERAMIC TILE BACKERBOARDS

- Cement ceramic tile backerboards may also be installed over plywood subfloors and should be secured using 1-1/4" corrosion resistant roofing nails or 1-1/4" ribbed wafer head screws in combination with a thinset mortar bed. Screws or nails should be installed every 6" to 8" on center
- Ceramic tile backerboards will add to the height of the floor and may require height reducing thresholds or transition strips where tile meets carpet, vinyl, etc. Doors may also need to be trimmed. Refer to the backerboard manufacturer for specific product recommendations and limitations
- To prevent moisture from damaging the plywood subfloor, use a waterproofing membrane applied per the manufacturer's instructions over all ceramic tile backerboard surfaces installed in wet areas

INSTALLING TILE DIRECTLY TO CONCRETE SLABS

- Paint, cutback adhesives, gypsum based fillers or levelers, sealers, or chemically treated cement substrates are unsuitable surfaces to install ceramic tile over and should be removed by non-chemical methods whenever possible
- Concrete substrates must be thoroughly cleaned prior to the installation of tile. To remove dust, mop cement slab using clean water only and allow drying completely. Very smooth concrete may be roughened up or etched using an acid based solution designed for this purpose

- Make sure to fill in and float off any dips, humps, or waves on the concrete foundation using a Portland cement based floor leveler. For dips, this product may be used to fill the cavity and screed off using a level or straight edge. For humps, apply the floor leveler around the base of the protrusion, then, using the top of the hump as a guide, screed the floor around the base of the hump in a circular motion. This will help to lessen the impact the protrusion will have on the finished floor
- Most Portland cement based floor levelers need to cure for at least 24 hours before the tile can be installed

SILICOSIS (TILE GROUT)

- Tile installers can develop silicosis, emphysema, and asthma when exposed to dust from cutting, drilling, and working with grout over an extended period of time
- Silicosis is lung damage caused by breathing dust containing fine particles of crystalline silica. If silica particles are inhaled, they become embedded in the lungs, the lung tissues react by developing fibrotic nodules and scarring around the trapped particles. The scar tissue makes the lungs hard and stiff. The scarring can greatly reduce the function of the lungs making it difficult and sometimes painful to breathe
- Not only does silica tear up the lungs, but it also reduces the body's ability to fight off infections making workers more susceptible for developing other lung illnesses and infections. If workers smoke, silica exposure may greatly increase the risk of developing lung cancer
- Warning: Wear your dust mask when exposed to tile or grout dust

HOUSEKEEPING

- Remove dust on overhead ledges, on floors, and equipment before it becomes airborne due to traffic, vibration, and random air current
- Never dry sweep or use compressed air for clean-up of dust that may contain silica
- Use wet methods or vacuums with a HEPA filter for clean-up. Gentle wash down of surfaces is preferable if practical
- Personal Hygiene: Practice good personal hygiene to avoid unnecessary exposure
- Hand-washing facilities should be conveniently located throughout a worksite
- Workers should change out of work clothes contaminated with silica dust before they leave the jobsite
- Wearing work clothes home covered in silica dust can expose your family to the hazard
- Work clothes should not be cleaned by blowing or shaking. They should be vacuumed with a HEPA filter vacuum before removal
- Locate eating/lunch areas away from exposed areas

POLICY

This Company is committed to creating a safe and healthy work environment. Forklifts (also known as Powered Industrial Trucks) can help employees move material safely, but create hazards that must be controlled. This forklift safety program will ensure the safe use and service of such equipment.

Each forklift operator must be competent to operate the equipment safely, as demonstrated by the successful completion of the training and evaluation specified in OSHA regulations.

EMPLOYER RESPONSIBILITIES

It is the responsibility of this Company to:

- Select and purchase equipment compliant with relevant regulations and safety standards
- Ensure safe operation of forklifts in the workplace
- Designate areas to store fuel and batteries, change and charge batteries, and maintain forklifts safely, including equipment to prevent and respond to hazard exposure
- Ensure operators and those maintaining forklifts are: 18 or older, fully trained and re-tested not less than every three years, mentally and physically competent, in receipt of a state-issued driver's license, and knowledgeable in safe practices regarding forklifts. Exceptions for trainees over 18 are permitted
- Provide a safe work environment free from hazards to employees

EMPLOYEE RESPONSIBILITIES

Company employees are expected to:

- Be aware of hazards associated with forklifts
- Store and handle fuel and batteries in a safe manner, according to established safe procedures
- Actively participate in all training relevant to their position
- Operate forklifts safely, according to all relevant standards and regulations
- Report potentially hazardous situations or maintenance concerns as soon as safely possible
- Load and unload forklifts in a safe manner

TRAINING

The Company will ensure every employee is provided training on forklifts. This training will be provided at no cost to the employee during working hours.

The Company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Trainees may operate a forklift only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence
- Where such operation does not endanger the trainee or other employees

Training Components

Training for forklift operation will include formal instruction, practical training and evaluation. Trainers will be competent, and demonstrate the knowledge and experience necessary to both train and evaluate operators.

The Safety Coordinator will ensure that every employee who works with forklifts will be trained in the following minimum elements:

- Truck-related topics
- Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate
- Differences between the truck and the automobile
- Controls and instrumentation: where they are located, what they do, and how they work
- Engine or motor operation
- Steering and maneuvering
- Visibility (including restrictions due to loading)
- Fork and attachment adaptation, operation, and use limitations
- Vehicle capacity
- Vehicle stability
- Any vehicle inspection and maintenance that the operator will be required to perform
- Refueling and/or charging and recharging of batteries
- Operating limitations
- Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle operated
- Workplace-related topic
- Surface conditions where the vehicle will be operated
- Composition of loads to be carried and load stability
- Load manipulation, stacking, and unstacking
- Pedestrian traffic in areas where the vehicle will be operated
- Narrow aisles and other restricted places where the vehicle will be operated
- Hazardous (classified) locations where the vehicle will be operated
- Ramps and other sloped surfaces that could affect the vehicle's stability
- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust
- Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation

Refresher Training

Refresher training in relevant topics will be provided to operators under any of the following conditions:

- They operate the vehicle in an unsafe manner
- They are involved in an accident or a near-miss incident

- They receive an evaluation that reveals they are not operating the truck safely
- They are assigned to a different type of truck
- A condition in the workplace changes that could affect safe operation of the truck

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be maintained for three years from the date on which the training occurred.

Testing

All employees must successfully pass a test no less than every three years in order to operate a forklift, except a motorized hand truck.

The test will assess the employees:

- Operating ability
- Knowledge of the equipment
- Knowledge of state safety standards
- Knowledge of daily checks

The assessment will include a performance test to determine whether the employee can operate the assigned forklift through the functions necessary to perform the required work.

Employees who have a valid permit to operate a forklift issued by another employer may be tested without receiving the training outlined above. They must receive the training, however, if they do not pass their test.

Permits

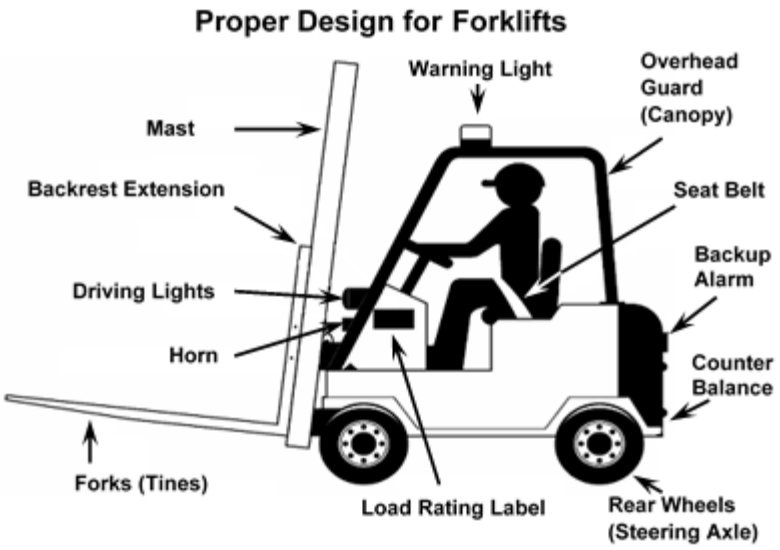
If employees meet the training/testing requirements, the employer may issue those employees permits to operate applicable forklifts. Permits must be carried by employees, and the employer must keep a list of permits issued. Permits must list the specific truck(s) that the named employee is qualified to operate. Also included should be the name of the issuing Company/employee, and the issue/expiration dates.

Trainees are exempt from the permit requirement for a period of not more than 30 days if they are under the supervision of an authorized, competent individual.

SAFE PRACTICES

Design and Construction Requirements

Forklifts and attachments will be selected based on the work performed, with utmost concern for the safety and wellbeing of employees. All forklifts will meet OSHA-approved design and construction requirements for trucks of their type.



Labels, Nameplates, Markings

Any forklift in use will bear a label that indicates approval by a nationally recognized testing lab. This durable, corrosion-resistant nameplate must be inscribed with the following information:

- Truck model and serial number
- Truck weight
- designation of compliance with the mandatory requirements of ASME B56.1, "Safety Standard for Low and High Lift Trucks," applicable to the manufacturer
- Type designation to show conformance with the requirements, such as those prescribed by Underwriters Laboratories, Inc., and Factory Mutual Research Corporation; and Capacity

Before employees operate a forklift, they must demonstrate the ability to read and interpret truck nameplates to prevent overloading or other improper use.

Modifications and Attachments

Any modification or addition to industrial trucks used that will affect their capacity or safe operation requires the written approval of the original manufacturer of that truck. If equipped with an after-market attachment, the truck will be marked to indicate the approximate weight of the truck with the attachment.

SAFETY GUARDS AND OTHER COMPONENTS

Overhead Guard

An end control, reach, narrow aisle, order picker high-lift, order picking and stacking, and motorized hand rider truck must be equipped with an overhead guard that extends beyond the operator's position on each side. The guard must be able to withstand a compression load equal to impact of the maximum load capacity. The guard must permit rapid and unobstructed access to and from the truck. All high-lift rider trucks, order-picker trucks and rough-terrain forklift trucks must be equipped with an overhead guard in accordance with OSHA regulations and ANSI B56.1, "Safety Standard for Low and High-Lift Trucks".

Seat Belts

If the forklift is equipped with a seat belt or any operator restraint system designed to contribute to the safety of truck operation, the operator is required to use the restraint.

Handling Controls and Guards

With regard to levers or handle-type controls, including toggle switches, the sense of rotation of the control handle should be in the same direction as the desired motion of the mast or load (if the load should go forward, the control should go forward, etc.).

Moving parts that represent a hazard from the operator's position must be protected by suitable guards.

Vertical Load Backrest

A load backrest extension prevents the load from shifting back when the carriage is lifted to full height and will be used when necessary to prevent any part of a load from falling rearward.

Steering Controls

Except on a motorized hand and motorized hand or rider truck, the steering controls of a forklift are best suited to be contained inside the truck. If they are not, the steering controls must be guarded to prevent injury to the operator's hands during movement of the truck.

On a motorized hand and motorized hand or rider truck, the steering handle must be provided with a guard or device to protect the operator's hands from injury when passing obstacles.

A spinner knob must not be attached to a steering hand wheel of a truck unless: it was originally equipped with such; the truck is equipped with power steering or the truck is equipped with an anti-kickback device on the steering mechanism. If installed, the knob must be placed within the periphery of the hand wheel.

Platforms

An employee must not be lifted or transported on a forklift, except when a platform is attached to the forks by enclosed sleeves, a safety chain or a mechanical device that prevents the platform from tipping or slipping.

Personnel on a platform must have a means to shut off power to the truck. Protection from falling objects must be provided to personnel on a platform as necessitated by the environment and operating conditions.

A platform must be equipped with a railing not less than 36 inches or more than 42 inches high, and a toeboard. The railing must consist of one of the following materials:

- Wood posts of at least 2x4-inch nominal stock; the top rail must be made of two right-angle pieces of not less than 1x4-inch nominal stock and an intermediate rail of 1x4-inch nominal stock
- Steel or aluminum pipe posts and rails of not less than one inch inside diameter, and an intermediate rail of ¾-inch inside diameter pipe
- Structural steel or aluminum posts, rails, and an intermediate rail of angle iron of not less than 1x1x 3/16 inch size, or other shapes of equal strength

The intermediate rail may be omitted from one side.

A toeboard must be made of not less than 1x4-inch nominal wood stock, or a material of equal strength.

Other Safety Guards

Forklifts may be equipped with a range of other devices designed to contribute to safe operation. Employees will maintain all safety equipment in good repair, and all operators must understand the use of such safety equipment and devices. These include, but are not limited to the following: horns, flashing warning lights, backup alarms, directional signals, fire extinguisher and mirrors.

Forklift Classes

Forklifts come in a range of sizes and configurations; the industrial truck association classifies industrial trucks into eight categories that suggest the utility of the truck. Each class is subdivided by lift codes. Table 1 outlines the classifications and lift codes of forklifts.

TABLE 1: FORKLIFT CLASSES AND LIFT CODES

Classes	Lift codes	Description
Class I: electric motor rider trucks	1	Counterbalanced rider type, stand up
	4	Three wheel electric truck, sit down
	5	Counterbalanced rider type, cushion tires, sit down
	6	Counterbalanced rider, pneumatic or either tire type, sit down
Class II: electric motor narrow aisle trucks	1	High lift straddle
	2	Order picker
	3	Reach type outrigger
	4	Side loaders, turret trucks, swing mast and convertible turret/stock pickers
	6	Low lift pallet and platform (rider)
Class III: electric motor hand trucks	1	Low lift platform
	2	Low lift walkie pallet
	3	Tractors
	4	Low lift walkie/center control
	5	Reach type outrigger
	6	High lift straddle
	7	High lift counterbalanced
	8	Low lift walkie/rider pallet
Class IV: internal combustion engine trucks (cushion tires only)	3	Fork, counterbalanced (cushion tire)
Class V: internal combustion engine trucks (pneumatic tires only)	4	Fork, counterbalanced (pneumatic tire)
Class VI: electric and internal combustion engine tow tractors	1	Sit-down rider
Class VII: rough terrain fork lift trucks	1	All rough-terrain lift trucks
Class VIII: personnel and burden carriers	1	All personnel and burden carriers

High-Lift, Order-Picker Trucks

All of the following apply to high-lift, order- picker trucks:

- A removable operator platform (device) must directly attach to the lifting means (the forks themselves or unattached boards, planks, etc. are prohibited from serving as a platform)
- The operator platform must be equipped with side guardrails
- When the platform is elevated, the horizontal travel speed of the truck must be automatically reduced to a degree necessary to maintain stability under maximum braking load and turning

When the high-lift truck is equipped with vertical-only or vertical and horizontal controls traveling with the lifting carriage or forks for lifting an employee, employers must assure that the following is provided:

- A platform equipped with a railing or other limiting device, including but not limited to a chain, strap, or tether
- A control device that allows the employee on the platform to shut off power to the truck
- Protection from falling objects, as indicated necessary by the operating conditions

INDUSTRIAL TRUCK DESIGNATIONS AND OPERATING LOCATIONS

Workplace hazards may limit the types of forklifts permitted in the workplace. Internal combustion engines and electric motors may ignite flammable atmospheres. This Company will follow all restrictions on trucks in potentially hazardous environments. OSHA provides guidelines based on NFPA standards to establish the types of safeguards that must be present in trucks used in such environments.

Designations

In addition to classification based on the configuration, use and features of the truck, forklifts are categorized based on safety features and power sources to indicate in which potentially hazardous locations the truck may be used. Table 2 lists the designations of industrial trucks based on their power sources and safeguards.

TABLE 2: DESIGNATIONS OF FORKLIFTS

Power Source	Class	Safeguards
Diesel	D	minimum
	DS	exhaust, fuel and electrical systems
	DY	exhaust, fuel and electrical systems; no electrical equipment including the ignition; temperature limitation features
Electric	E	minimum
	ES	electrical system (prevent emission of hazardous sparks, limit surface temperatures)
	EE	electrical system; electric motors and all other electrical equipment completely enclosed
	EX	electrical system; electric motors and all other electrical equipment completely enclosed; electrical fittings and equipment designed, constructed and assembled to be used in certain atmospheres containing flammable vapors or dusts
Gasoline	G	minimum
	GS	exhaust, fuel and electrical systems
Liquefied Petroleum Gas	LP	minimum
	LPS	exhaust, fuel and electrical systems

Internal Combustion Engines

Forklifts powered by internal combustion engines run on a variety of fuels, including gasoline, diesel fuel, liquid petroleum gas (LPG), and compressed natural gas. Forklifts with internal combustion engines can be quickly refueled but require regular maintenance checks for leaks of fuel or oil and worn parts to keep systems working properly. Forklifts powered by internal combustion engines used indoors may increase worker exposure to exhaust and noise.

Safeguards to exhaust, fuel and electrical systems, as well as electrical equipment limitations and temperature limitation features allow internal combustion engine trucks in certain designated locations.

Electric

Electric-powered forklifts are most commonly used indoors in warehouses. Unlike internal combustion forklifts, electric forklifts are quiet and generally non-polluting but present other hazards to address, specifically related to batteries and their charging.

Safeguards to the electrical system, motors, fittings and equipment, and special construction must still be in place for operation of such trucks in certain locations.

Locations

OSHA and NFPA classify environments to define which designations of industrial trucks are appropriate to use with the hazards present. Table 3 indicates hazardous location classifications and indicates which types of industrial trucks have sufficient safeguards for such locations.

OTHER OPERATING ENVIRONMENT CONCERNS

Any environment where employees operate forklifts will provide the necessary protection to allow safe use.

Lighting

If lighting is less than two lumens/ft^2, the truck will be equipped with directional lighting.

Noxious Gases and Fumes

Trucks with internal combustion engines produce exhaust and fumes that may be hazardous to forklift operators and other employees. The concentration of carbon monoxide gas must not exceed 50ppm or the levels specified by OSHA, whichever is less. Trucks powered by an internal combustion engine require well-ventilated areas.

Loading Trucks, Trailers, and Railroad Cars

Operators must take the following precautions when loading or unloading from trucks or railroad cars to ensure safety:

- The brakes of highway trucks must be set and wheel chocks placed under the rear wheels to prevent the trucks from rolling when boarded with forklifts
- Wheel stops or other recognized positive protection must prevent railroad cars from moving during loading or unloading operations (including while dockboards or bridge plates are in position)
- Provisions must be made to isolate rail cars during switching operations
- Fixed jacks may be necessary to support a semitrailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor
- The landing gear of all semi-trailers must be visually inspected immediately before the trailer is uncoupled from the tractor to assure the landing gear is fit to support the imposed load
- Employers must ensure that the flooring of trucks, trailers, and railroad cars is safe, free from breaks and weakness, before it is driven onto

SUMMARY TABLE ON USE OF INDUSTRIAL TRUCKS IN VARIOUS LOCATIONS

Classes	Unclassified	Class I Locations				Class II Locations			Class III Locations	
Description of classes	Locations not possessing atmospheres as described in other columns	Locations in which flammable gases or vapors are, or may be, present in the air in quantities sufficient to produce explosive or ignitable mixtures				Locations which are hazardous because of the presence of combustible dust			Locations where easily ignitable fibers or flyings are present but not likely to be in suspension in quantities sufficient to produce ignitable mixtures	
Groups	None	A	B	C	D	E	F	G	None	
Examples of locations or atmospheres in classes or groups	Piers and wharves inside and outside general storage, general industrial or commercial properties	Acetylene	Hydrogen	Ethyl ether	Gasoline, Naptha, Alcohols, Acetone, Lacquer solvent Benzene	Metal dust	Carbon black coal dust, coke dust	Grain dust, flour dust, starch dust, organic dust	Baled waste, cocoa fiber, cotton, excelsior, hemp, istle, jute, kapok, oakum, sisal, Spanish moss, synthetic fibers, tow	
Classes		Class I Locations				Class II Locations			Class III Locations	
Divisions		1		2		1		2	1	2
Nature of hazardous conditions		Above condition exists continuously, intermittently, or periodically under normal operating conditions.		Above condition may occur accidentally as due to a puncture of a storage drum.		Explosive mixture may be present under normal operating conditions, or where failure of equipment may cause the condition to exist simultaneously with arching or sparking of electrical equipment, or where dusts of an electrically conducting nature may be present.		Explosion mixture not normally present, but where deposits of dust may cause heat rise in electrical equipment, or where such deposits may be ignited by arcs or sparks from electrical equipment.	Locations in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used	Locations in which easily ignitable fibers are stored or handled (except in the process of manufacture)

Authorized uses of trucks by types in groups of classes and divisions

Classes	Unclassified	Class I Locations							Class II Locations						Class III Locations	
Divisions	None	1				2			1			2			1	2
Groups		A	B	C	D	A	B	C	D	E	F	G	E	F	G	None	None
Diesel:																	
Type D	D**																
Type DS									DS						DS		DS
Type DY									DY						DY	DY	DY
Electric:																	
Type E	E**														E		E
Type ES									ES						ES		S
Type EE									EE						EE	EE	EE
Type EX					EX				EX		EX	EX			EX	EX	EX
Gasoline:																	
Type G	G**																
Type GS									GS						GS		GS
LP-Gas																	
Type LP	LP**																
Type LPS									LPS						LPS		LPS
Para. Ref. in No. 505	210.211	201(a)		203(a)		209(a)			204(a) (b)	202(a)		205(a)		209(a)	206(a) (b)	207(a)	208(a)

** Trucks conforming to these types may also be used — see subdivision (c)(2)(x) and (c)(2)(xii)

Dockboards and Bridgeplates

Dockboards and bridgeplates must:

- Be strong enough to carry the load driven over them
- Include a carrying capacity that is clearly marked
- Be secured in position by anchoring or devices that will prevent it from slipping
- Include handholds or other means for placement that will protect the employee during handling; where a fork truck is used, fork loops, pockets, or lugs will be provided for safe handling
- Have a slip-resistant surface, such as a tread plate
- Be designed so that the edges have sufficient contact with the dock or loading platform to prevent the board or plate from rocking or sliding out of position
- Have curbs if it is used by a forklift to bridge an opening more than 18 inches wide; the height of the curbs must be at least 15% the diameter of the largest tire of the truck, but need not exceed three inches

A positive means such as, but not limited to, chocks, blocks or brakes must be used to restrict a vehicle or rail car from moving while a dockboard/plate is in position

MAINTENANCE AND RELATED CONCERNS

Policy requires all equipment to remain in good repair and for operators to use equipment in an always-safe manner. Any power-operated industrial truck not in safe operating condition must be removed from service so authorized personnel may repair it. All maintenance, refueling and battery charging will be performed in a way to ensure the safety of employees.

Pre-Operation Inspection

Industrial trucks must be examined daily or after each shift if used around the clock, and before being placed in service. Operators must report any defects immediately after they are found so that an authorized person can service the truck appropriately. An example pre-operation daily checklist is included at the end of this chapter, but one specific to the truck in service should be available from its manufacturer.

Visual Check

Before starting the vehicle, an operator must conduct a pre-operation (or pre-start) inspection to check a variety of items, including but not limited to:

- Fluid levels — oil, water, and hydraulic fluid
- Leaks, cracks or any other visible defect including hydraulic hoses and mast chains. Operators should not place their hands inside the mast. Use a stick or other device to check chain tension
- Tire condition and pressure including cuts and gouges
- Condition of the forks, including the top clip retaining pin and heel
- Load backrest extension
- Finger guards

- Safety decals and nameplates. Ensure all warning decals and plates are in place and legible. Check that information on the nameplate matches the model and serial numbers and attachments
- Operator manual and legible nameplate
- Operator compartment. Check for grease and debris
- All safety devices are working properly including the seat belt

In addition to this general inspection, operators must check forklift-specific (electric or internal combustion, including liquid propane) features.

Operational Check

After completing the pre-operation inspection, operators should conduct an operational inspection with the engine running. This inspection includes:

- Accelerator linkage
- Brakes
- Drive control: forward and reverse
- Hoist and lowering control
- Horn (mandatory, except for motorized hand trucks)
- Back-up alarm (if equipped)
- Inch control (if equipped)
- Steering
- Tilt control: forward and back
- Attachment control
- Lights
- Hour meter

REPORTING

Employees/operators must report to their supervisor immediately:

- All defects, physical or operational, related to forklifts, including unusual noises or vibrations, leaks, broken parts, deficiencies in operation, etc.

Note: The defect must be fully repaired before the forklift is returned to service.

- All accidents or near misses, regardless of whether or not they were the cause of injury or death. A review of these incidents must take place, and employees must be instructed on safe operating procedures in order to prevent the same or similar events from happening again
- All damage to Company property or the property of others, including the forklift itself, buildings, trailers, rail cars, equipment, products or inventory, etc.

GASOLINE, DIESEL, AND LIQUID PETROLEUM GAS

Handling and Storage

Liquid petroleum gas: Liquid petroleum gas (LPG) is a commonly used fuel for forklifts. It is a safe fuel when handled properly. However, LPG is extremely flammable and extremely cold when exposed to atmosphere. When handled improperly, it can cause serious injury or death. Areas to refuel LPG-powered trucks must permit vapors to dissipate and must be away from heat sources. Only authorized personnel will replace LPG containers. LP gas must be used and stored as specified in 1910.110, “Storage and Handling of Liquefied Petroleum Gases.”

Gasoline and diesel fuel: Refueling with gasoline or diesel presents the potential hazard of exposure to explosive fumes. Handling and storage of gasoline and diesel fuel must adhere to the provisions in 1910.106, “Flammable and Combustible Liquids.”

Refueling

Refueling will be restricted to safe, designated locations that are posted as such, preferably outdoors, and not less than 25 feet from a source of open flame or spark. Safety fuel cans must be provided where forklifts are refueled with gasoline at any location other than a gas pump area.

Forklift operators will adhere to the following requirements and recommended practices:

- Stop the engine during refueling
- Don’t smoke while refueling, and do not check the fuel level with an open flame
- Don’t allow the forklift to become low on fuel or run out of fuel. Sediment or other impurities in the tank drawn into the fuel system can cause difficulties in starting and damage internal components
- Fill the fuel tank at the end of each day
- Don’t fill the tank to the top; it may overflow because fuel expands as it is heated
- Follow correct refueling procedures:
  - Park the forklift in the designated refueling area
  - Place the transmission in neutral
  - Lower the forks to the ground
  - Engage the parking brake
  - Shut off the engine
  - Open the filler cap
  - Fill the tank slowly (if spillage occurs, wipe off and wash area with water)
  - Close the filler cap

Employers must ensure that employees are protected from exposure to airborne contaminants created in exhaust gases (e.g., carbon monoxide) of fossil fuel forklifts when levels approach permissible exposure limits.

CHANGING AND CHARGING BATTERIES

The lead-acid batteries that power electric trucks require routine charging and infrequent changing. If battery-powered forklifts are used, the Safety Committee or the safety coordinator will work with the appropriate personnel to develop facility-specific safety procedures based on manufacturer’s recommendations and the following guidelines:

- The operator will position the truck and apply breaks before the battery may be changed or charged
- Appropriate lifting equipment must be used to lift the battery (a conveyor, overhead hoist, or equivalent), ensuring the safe handling and servicing of the battery
- An employee must not place their body under a forklift or its component(s) unless the truck or component(s) is supported by properly arranged blocks or jack stands capable of supporting, in total, a minimum of 1½ times the weight of the truck or component(s) that is above the employee

- Authorized personnel should only pour acid into water when charging batteries, never the other way around
- Care must be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) must be open to dissipate heat
- Individuals should remove metal jewelry before charging or servicing batteries, and keep all other metallic objects from the top of uncovered batteries
- Appropriate PPE should be worn
- Check the water level. Do not add water before recharging. Record in service log
- Check the voltage. If the battery has sealed vents, do not recharge with a current greater than 25 amperes
- Unplug and turn off the charger before connecting or disconnecting the clamp connections
- Attach the positive clamp (+, usually colored red) to the positive terminal first and then the negative clamp (–, usually colored black) to the negative terminal, keeping the proper polarity
- Turn off the charger if the battery becomes hot or the electrolyte fluid comes out of the vents. Restart charging at a lower charging rate
- Check water level after charging. Add distilled water or de-ionized water if water level is below level indicator. Record in service log
- Return battery to forklift with lifting beam and secure in place after charging
- Check the indicator on the hour meter to see if the battery is fully charged

A spreader bar or equivalent must be used with any overhead battery hoist so that the lifting stresses are vertical.

When a chain-type or hand hoist is used, the battery must be covered to prevent the cell connectors or terminals from shorting on the chain, or on other tools and metallic objects.

Under normal operating conditions, forklift batteries remain in service for 2,000 charge/discharge cycles. The battery maintenance program is designed to increase the life of the batteries and help protect employees.

Battery failure could lead to mechanical breakdowns and possible accidents involving forklift operators and/or other personnel. Therefore:

- Don’t continue a battery in service merely because it continues to deliver power
- Don’t exceed the service hours in the manufacturer’s recommendations
- Don’t overcharge or undercharge batteries
- Avoid discharging batteries beyond the manufacturer’s discharge level. This can result in permanent battery damage and shorten battery life considerably
- Observe and act upon the warning signs of a low battery, including slow starting, dim headlights, and the ammeter indicating discharge at high RPM
- Recycle or properly dispose of batteries. Spent batteries are a hazardous waste unless properly reclaimed at a lead smelter or battery recycler

Appropriate precautions to control the hazards from battery acid include personal protective equipment and a detailed safety procedure formulated by the safety committee to respond to an acid splash or spill.

Battery Charging and Changing Areas

Trained and authorized employees will charge and change batteries only in designated areas. Smoking and other ignition source are forbidden in battery charging areas, including but not limited to open flames, sparks or electric arcs.

Facilities will be provided as needed for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

Employers will assure that their properly equipped battery charging area will have:

- No smoking
- Warning signs posted
- Adequate fire protection
- Ample and readily available water supply for flushing and neutralizing spilled electrolyte
- Adequate protection from corrosive electrolyte solutions, if present, including: any necessary PPE such as eye protection, suitable facilities for the quick drenching or flushing of the eyes and body (an eyewash station should be able to provide a 15-minute flow, and large installations should include a plumbed drench shower) within the work area
- Any necessary PPE, as well as to provide protection from electrolyte solutions
- A phone or other means of communication in the event of an emergency
- Adequate ventilation to avoid the buildup of hydrogen gas during battery charging
- Soda ash or other neutralization materials in the immediate area
- A dry chemical, CO_2 or foam fire extinguisher
- Means to protect charging apparatus from damage from trucks
- Chock blocks, support blocks, or safety/jack stands, for use when there is a hazard from movement, or for support when forklifts are elevated by a hoist or chain

Other Maintenance Concerns

Following are requirements of OSHA regarding the maintenance of forklifts:

- Make repairs to forklifts only in designated locations, away from fire hazards, never in class I, II or III locations
- Replacement parts for trucks must be equivalent to the original parts in terms of safety and the truck's configuration will not be altered
- Keep open flames away from batteries and fuel tanks and disconnect the battery before making any electrical system repair
- Any alteration, removal or addition of parts, or change in their configuration must be in accordance with manufacturer recommendations, and should generally not be undertaken
- The truck manufacturer must approve additional counterweighting of fork trucks
- Water mufflers must be filled daily or as frequently as is necessary to prevent depletion of the supply of water below 75 percent of the filled capacity
- Vehicles with mufflers having screens or other parts that may become clogged will not be operated while such screens or parts are clogged

- Personnel will immediately remove from service (and repair) any vehicle if:
  - It emits hazardous sparks or flames from the exhaust system
  - The service and parking brakes do not perform their intended function
  - The fuel system leaks
  - A lift cylinder of a load-engaging means allows a downward drift of the load-engaging means, loaded or unloaded, in excess of 5 inches in 5 minutes
  - A tilt cylinder of a mast allows a forward drift of the mast in excess of 2 degrees in 5 minutes with the mast in a vertical position and a capacity load on the fork or load engaging means
  - The steering mechanism allows free play of the steering wheel of more than ¼ turn on trucks capable of speeds up to 8 miles per hour and more than ⅛ turn on trucks capable of speeds over 8 miles per hour
  - A hydraulic system leaks and creates a hazard for employees or equipment in the area
  - It exhibits a part for which the temperature exceeds normal operating temperature (allow the part to cool)
  - It is found to have any part in need of repair, or if the truck exhibits any defect that would render it unsafe or unfit for efficient and capable use
- Employees must keep trucks in a clean condition, free of lint, excess oil and grease. Employees will use only noncombustible agents to clean trucks
- Industrial trucks approved for gasoline may be converted to use liquefied petroleum gas fuel provided the complete conversion results in a truck that embodies the features specified for LP or LPS designated trucks

TRUCK OPERATIONS

OSHA requires forklift operators of to safeguard other employees at all times and to adhere to the following rules to ensure safe operation.

- Don’t drive trucks up to anyone standing in front of a bench or other fixed object
- Don’t stand or pass under the elevated portion of any truck, whether loaded or empty
- Don’t permit unauthorized personnel to ride on forklifts. Regulations permit passengers only when there is a seat under an overhead guard
- Keep arms and legs away from between the uprights of the mast or outside the running lines of the truck
- Maintain a safe distance from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Don’t use trucks to open or close freight doors
- Ensure that there is sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.
- Keep fire aisles, access to stairways, and fire equipment clear
- Don’t use a forklift to tow or push railroad cars, unless it is specifically designed for it. Don’t open or close freight car doors with a forklift unless it’s equipped with attachments designed for that purpose
- When operating a forklift in a hazardous area, only a truck specifically equipped for those types of operations will be used

Maneuvering and Traveling

- Observe all traffic regulations, including speed limits, and maintain a safe distance (approximately three truck lengths) from the truck ahead. Keep the truck under control at all times
- Yield right of way to ambulances, fire trucks, or other vehicles in emergencies
- Do not pass other vehicles traveling in the same direction at intersections, blind spots, or other dangerous locations
- Slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load obstructs forward view, the driver must travel with the load trailing
- Cross railroad tracks diagonally where possible. Park no closer than 8½ feet from the center of railroad tracks

SLOW YOUR ROLL!

Forklift operators must slowdown in the following situations:

- When approaching within three truck lengths of another truck
- At cross aisles and anywhere vision is obstructed
- On grades
- When going too fast to come to a safe stop
- On wet or slippery floors
- On dockboards or bridgeplates
- Approaching elevators
- Negotiating turns.

- Look in the direction of, keep a clear view of, and survey the path of travel before moving and stacking in order to` avoid obstacles
- Ascend or descend grades slowly
- When ascending or descending grades in excess of 10 percent, drive at a speed no more than 2 miles per hour
- When ascending or descending grades in excess of 10 percent, or if the grade exceeds the back-tilt of the mast, loads must face upgrade
- On grades, tilt back the load-engaging means and safely raise the load to clear the road surface
- Unloaded trucks must be driven, on all grades, with the load-engaging means downgrade, tilted back, and raised only as far as necessary to clear the floor or road surface
- Under all travel conditions, operate the truck at a speed that will permit it to be brought to a stop in a safe manner
- Don’t engage in stunt driving or horseplay
- Slow down for wet and slippery floors
- Drive over dockboard or bridgeplates carefully and slowly, maintaining a safe distance from the edges of ramps and platforms, especially on elevated docks
- Approach elevators slowly, entering them squarely only after the elevator car is properly leveled. Once on the elevator, neutralize controls, shut off power and set brakes. Ensure the weight of the load and truck does not exceed the load capacity of the elevator
- Avoid running over loose objects on the roadway surface

- While negotiating turns, reduce speed to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, turn the hand steering wheel only at a moderate, even rate
- Motorized hand trucks must enter confined areas with load end forward

Load Handling

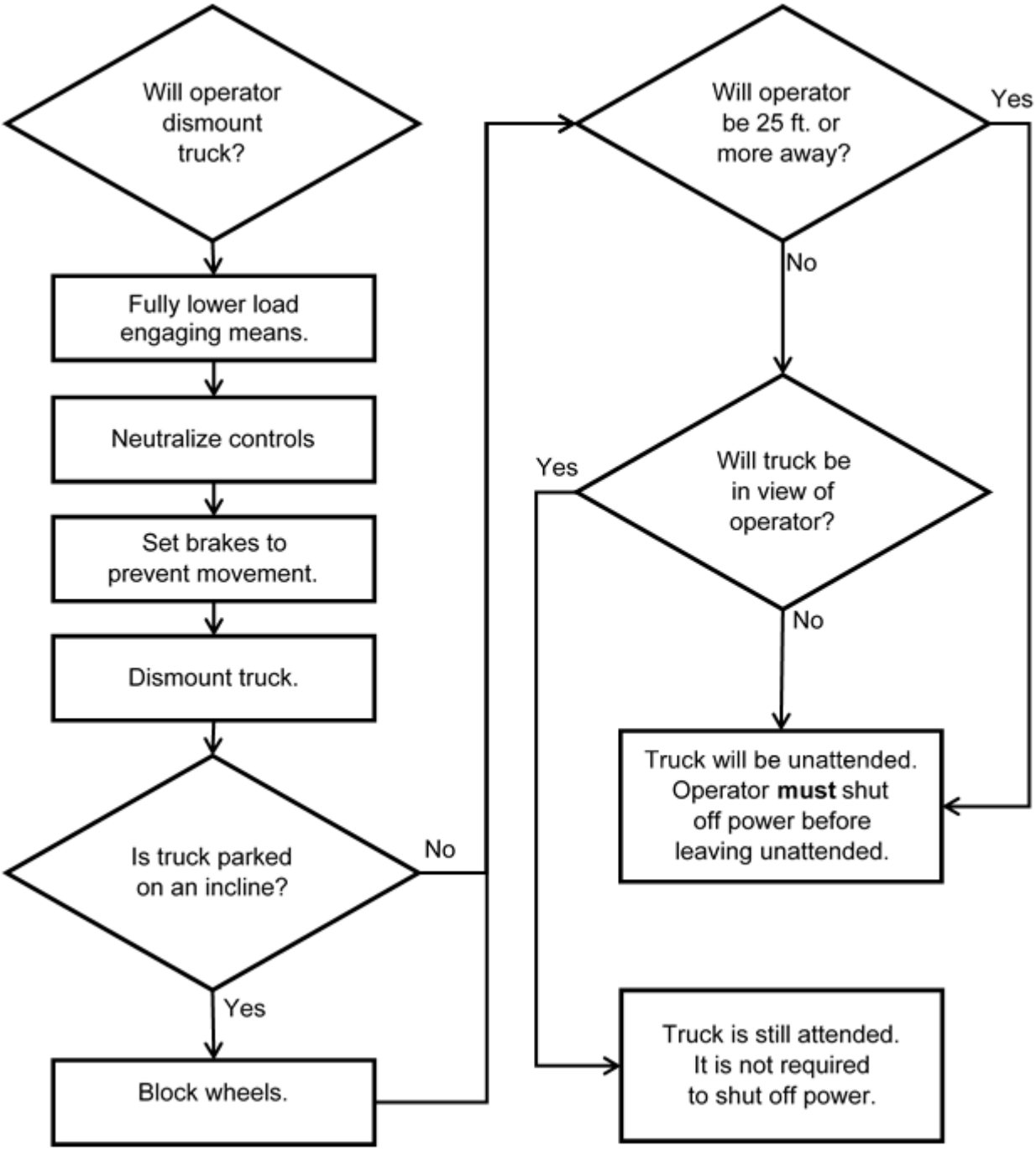
- All loads will be within the rated capacity of the truck. Never exceed rated capacity
- Handle only stable or safely arranged loads. Exercise caution when handling off-center loads which cannot be centered
- Long or high loads that may affect vehicle load capacity when lifted beyond a certain height must be handled with care. Divide the load into smaller quantities or use heavier equipment as necessary
- Ensure that operational safety is maintained when carrying larger loads
- When not handling a load, operate trucks with attachments as partially loaded trucks
- Place the load engaging means under the load as far as possible; carefully tilt the mast backward to stabilize the load
- Use extreme care when tilting the load forward or backward, particularly when high tiering. Don't tilt load-engaging means forward while elevated except to pick up a load. Don't tip an elevated load forward unless the load is in a deposit position over a rack or stack. When stacking or tiering, use only enough backward tilt to stabilize the load

Parking

A forklift operator will adhere to the following procedures (see Figure 1) to dismount the truck:

- A forklift is unattended when the operator is 25 ft. or more away from the vehicle in his view, or whenever the operator leaves the vehicle and it is not in his view
- When the operator of an industrial truck is dismounted and within 25 ft. of the truck still in his view, the load engaging means must be fully lowered, controls neutralized (shut off), and the brakes set to prevent movement. The wheels must be blocked if the truck is parked on an incline
- The parking brake must be capable of holding the truck on the maximum grade that the truck can negotiate with a rated load, or on a 15% grade, whichever is less

PARKING YOUR FORKLIFT



FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- Performance Evaluation for Forklift Operators
- Forklifts Training Record Sheet

PERFORMANCE EVALUATION FOR FORKLIFT OPERATORS

Employee		Date		Time	
Evaluator		Equipment Type			

- ☐ Shows familiarity with truck controls.
- ☐ Gave proper signals when turning.
- ☐ Slowed down at intersections.
- ☐ Sounded horn at intersections.
- ☐ Obeyed signs.
- ☐ Kept a clear view of direction of travel.
- ☐ Turned comers correctly—was aware of rear-end swing.
- ☐ Yielded to pedestrians.
- ☐ Drove under control and within proper traffic aisles.
- ☐ Approached load properly.
- ☐ Lifted load properly.
- ☐ Maneuvered properly.
- ☐ Traveled with load at proper height.
- ☐ Lowered load smoothly/slowly.
- ☐ Stops smoothly/completely.
- ☐ Load balanced properly.
- ☐ Forks under load all the way.
- ☐ Carried parts/stock in approved containers.
- ☐ Checked bridge-plates/ramps.
- ☐ Did place loads within marked area.
- ☐ Did stack loads evenly and neatly.
- ☐ Did drive backward when required.
- ☐ Did check load weights.
- ☐ Did place forks on the floor when parked, controls neutralized, brake on set, power off.
- ☐ Followed proper instructions for maintenance—checked both at beginning and end.

Comments					
Total Rating	☐ Excellent	☐ Good	☐ Fair	☐ Poor	☐ Fair
Evalutor Signature			Date		
Operator Signature			Date		

DAILY INSPECTION CHECKLIST FOR FORKLIFTS

Key-Off Procedures

- ☐ Overhead guard
- ☐ Hydraulic cylinders
- ☐ Mast assembly
- ☐ Lift chains and rollers
- ☐ Forks
- ☐ Tires
- ☐ Gas gauge
- ☐ Check the engine oil level
- ☐ Examine the battery
- ☐ Inspect the hydraulic fluid level
- ☐ Check the engine coolant level

Key-On Procedures

- ☐ Front, tail, and brake lights
- ☐ Fuel gauge (if diesel)
- ☐ Windshield wiper
- ☐ Heater

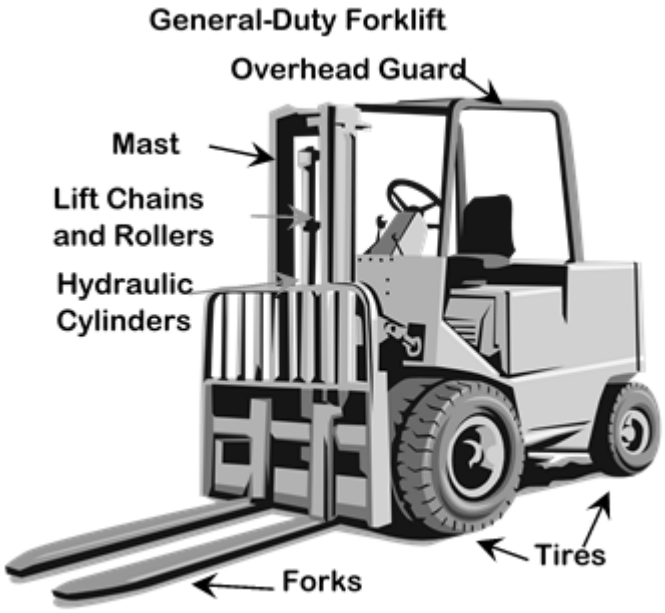
Engine Running Procedures

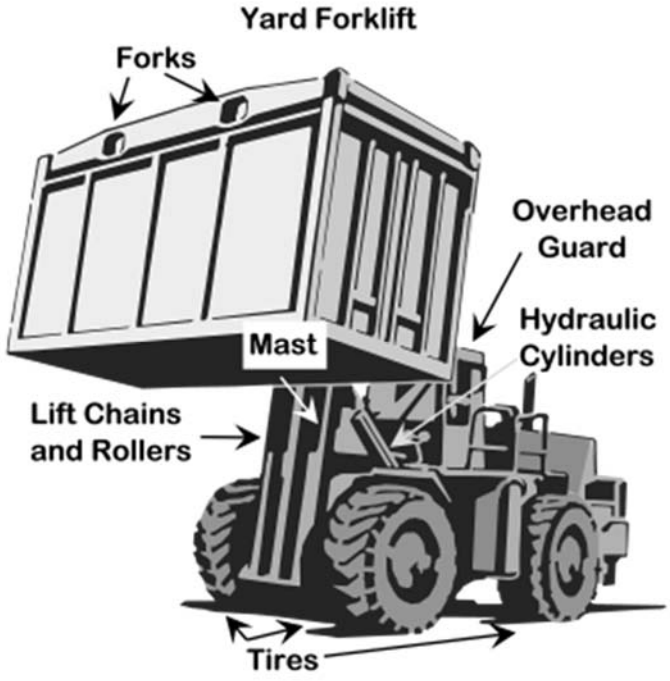
Gauges

- ☐ Oil pressure indicator lamp
- ☐ Ammeter indicator lamp
- ☐ Ammeter
- ☐ Hour Meter
- ☐ Water Temperature Gauge

Standard Equipment

- ☐ Steering
- ☐ Brakes
- ☐ Horn
- ☐ Safety seat (if equipped)
- ☐ Check the operation of load-handling attachments
- ☐ Check the transmission fluid level





FORKLIFT TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

(Retain at least 3 years)

SCOPE

This chapter covers the use of hand tools, portable electric tools, and fuel powered tools. This information complies with the requirements of OSHA 1910, Subpart P for general industry, or for the construction industry 1926, Subpart I. It does not cover hydraulic, pneumatic or powder-actuated tools; information on these tools are provided in separate chapters.

NOTE: This chapter does not cover electric or fuel powered lawn mowers, chainsaws, or other landscaping equipment. These are covered in separate chapters.

POLICY

The company, to ensure the safe use of tools, has created this policy. This policy is intended to ensure safety for employees who use power and hand tools, and must be followed.

EMPLOYER RESPONSIBILITIES

It is the company's responsibility to:

- Maintain all tools and equipment used by employees in safe, working condition
- Remove unsafe equipment from the worksite
- Ensure employees are properly trained in the safe use and operation of tools and equipment before using or operating the tools and equipment on the job
- Provide personal protective equipment to prevent injury and adverse health effects
- Select and use only tools with appropriate safety guards
- Ensure every job hazard analysis and safe job procedure considers the hazards introduced by power tools and hand tools

EMPLOYEE RESPONSIBILITIES

All company employees are expected to:

- Be aware of hazards presented by tools where they work
- Follow company safety policy and the instructions of the supervisor
- Comply with safe operating procedures for all equipment
- Properly use and maintain personal protective equipment
- Attend and participate in appropriate safety training
- Inspect tools and equipment daily to ensure they are in proper working order
- Report defective tools and equipment, and other safety concerns, and provide safety recommendations as appropriate

SAFE PRACTICES

- All hand and electrically power tools, whether furnished by the employer or the employee, will be maintained in a safe condition
- When power-operated tools are designed to have safety guards, the guards must be installed while the tool is in use

- Never carry a tool by its cord
- Never yank the cord of a tool to disconnect it from the receptacle
- Don't raise or lower a power tool by its cord
- Keep cords away from heat, oil, and sharp edges
- Disconnect tools when not using them, before servicing and cleaning them, and when changing accessories such as blades, bits, and cutters
- Keep all people not involved with the work at a safe distance from the work area
- Secure work with clamps or a vise, freeing both hands to operate the tool
- Avoid accidental starting. Do not hold fingers on the switch button while carrying a plugged-in tool
- Maintain tools with care; keep them sharp and clean for best performance
- Follow instructions in the user's manual for lubricating and changing accessories
- Be sure to keep good footing and maintain good balance when operating power tools
- Follow good housekeeping procedures to keep floors free of debris and hazards
- Don't allow dust, shavings, or other scraps to accumulate on or near machines, causing an operational hazard
- Wear proper apparel for the task. Do not wear loose clothing, sleeves, neckties, scarves, and jewelry that can become caught in moving parts
- Sharp tools such as chisels, drill bits, and awls must be carried in one of the following ways: with the edges or points protected; in a tool tray; in a cart; in a sheath; in the hand with the sharp edges turned away from the body
- Sharp or pointed tools, when stored in a rack or bin, must have the sharp edges or points inward or otherwise protected or stored to prevent injury
- Anti-kickback aprons must be provided to employees at no expense to the employees, and must be used where material can be kicked back
- Gloves should not be worn while operating machines
- Stationary tools and machines must be located where there is enough space for workers to handle material without interference from, or to, employees or machines. Operators should never have to stand in an aisle while operating a machine unless protection is provided
- Machines designed for a specific location must be secured to a floor, foundation, bench, table, or stand of sufficient strength and design to prevent overturning or unintentional movement
- Tools and machinery must be located so that light with the intensity of at least 50-foot candles from both natural and artificial light falls on the work. Supplementary illumination at the point of operation must be provided where necessary
- Any tool or machine, or component of a tool or machine that is not in proper working order must be immediately removed from service
- Tools and machines must be inspected at regular intervals and will be repaired in accordance with the manufacturer's specifications. Untrained or unauthorized people must not modify them, and they cannot be returned to service until properly repaired
- Utilize a machine only if it is appropriate for the given task

- Employers must ensure that the height of tables and working surfaces of machines, auxiliary tables, and supports are appropriate and promote the safety of the operator; tables and supports must be large enough so that unwieldy pieces can be handled safely
- All circular saws 20 inches or more in diameter must be etched or otherwise permanently marked to include the manufacturer's designated operating speed; a saw blade must not be operated at a higher speed than shown on the blade. When a marked saw blade is re-tensioned for a different speed, the marking must be corrected to show the new speed

Guards

The exposed moving parts of power tools must be safeguarded. All tools must be used with the correct shield, guard, or attachment recommended by the manufacturer. Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains or other reciprocating, rotating or moving parts of equipment must be guarded.

Guards, as appropriate, must be provided to protect the operator and others from the following:

- Point of operation
- In-running nip points
- Rotating parts
- Flying chips and sparks

Safety guards must never be removed or made inoperable when a tool is being used. Machines must not be used for operations of such variety as to necessitate the removal of safeguards.

Portable circular saws must be equipped at all times with guards. They must have guards above and below the base plate or shoe. The upper guard must cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard must cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard must immediately return to the covering position.

Switches and Controls

The following hand-held power tools must be equipped with a constant-pressure switch or control that shuts off the power when pressure is released:

- Drills
- Tappers
- Fastener drivers
- Disc sanders with discs greater than 2 inches
- Horizontal, vertical, and angle grinders with wheels more than 2 inches in diameter
- Belt sanders
- Reciprocating saws
- Saber saws, scroll saws, and jigsaws with blade shanks greater than ¼-inch wide
- Other similar tools

These tools also may be equipped with a “lock-on” control, provided it allows the worker to shut off the control in a single motion using the same finger or fingers.

The following hand-held power tools must be equipped with either a positive “on-off” control switch, a constant pressure switch, or a “lock-on” control:

- Grinders with wheels 2 inches or less in diameter
- Disc sanders with discs 2 inches or less in diameter
- Platen sanders, routers, planers laminate trimmers, nibblers, shears, and scroll saws
- Jigsaws, saber and scroll saws with blade shanks a ¼-inch (+/- .05 in.) or less in diameter

A constant-pressure control switch is the preferred device. Other hand tools such as the following hand-held power tools must be equipped with a constant-pressure switch:

- Circular saws having a blade diameter greater than two inches
- Chain saws
- Percussion tools with no means of holding accessories securely

PERSONAL PROTECTIVE EQUIPMENT

Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases must be provided with the particular personal protective equipment necessary to protect them from the hazard. All personal protective equipment (PPE) will meet NIOSH protective, maintenance requirements and OSHA regulations.

The required PPE when working with hand and power tools can include, but is not limited to:

- Snug-fitting clothing
- Hearing protection
- Eye and face protection
- Heavy-duty leather gloves
- Respiratory protection

HAND TOOLS

Wrenches, including adjustable, pipe, end and socket wrenches must not be used when jaws are sprung, cracked, or distorted to the point that slippage occurs. Impact tools, such as drift pins, wedges and chisels, must be kept free of mushroomed heads.

The wooden handles of tools must be kept free of splinters or cracks and must be kept tight in the tool. When hammering, use a hammer, not a tool designed for other purposes. All damaged or cracked tools, including saws, will be removed from service. Knives and scissors must be kept sharp.

When using saw blades, knives or other tools, direct tools away from aisle areas and other employees in close proximity.

Iron or steel hand tools may produce sparks that can ignite nearby flammable substances. Spark-resistant tools made of non-ferrous materials must be used where flammable gases, highly volatile liquids, and other explosive substances are stored or used.

- Try to avoid prying, pulling, wedging, or lifting at sharp angles or overhead
- Wear eye protection and, where necessary, face protection

Use the following safe practices when working with hand tools.

Axes and Hatchets

- Unless it has a striking face, don't use the hatchet as a hammer. The head or the wooden handle can crack and break
- Hatchets with striking faces will only be used for driving common nails, not for striking chisels, punches, drills, or other hardened metal tools
- Never use an axe or hatchet as a wedge or chisel and strike it with a hammer
- Most carpenters prefer a hatchet with a solid or tubular steel handle and a hammerhead with a slot for pulling nails

Claw Hammers

- Start with a good quality hammer of medium weight (16 ounces) with a grip suited to the size of your hand
- Rest your arm occasionally to avoid tendinitis. Avoid overexertion in pulling out nails. Use a crow bar or nail puller when necessary
- When nailing, start with one "soft" hit, that is, with fingers holding the nail. Then let go and drive the nail in the rest of the way
- Strike with the hammer face at right angles to the nail head. Glancing blows can lead to flying nails. Clean the face with sandpaper to remove glue and gum. Don't use nail hammers on concrete, steel chisels, hardened steel-cut nails, or masonry nails
- Discard any hammer with a dented, chipped, or mushroomed striking face or with claws broken, deformed, or nicked inside the nail slot

Crow Bars

The tools include pry bars, pinch bars and wrecking bars. Shorter ones usually have a curved claw for pulling nails and a sharp, angled end for prying. Loads levered, lifted, or shifted by bars can land on fingers and toes.

- Make sure to clear the area and maintain control of the load
- Have enough rollers and blocking ready
- Never put fingers or toes under the load

Cold Chisels

Cold chisels are used to cut or shape soft metals as well as concrete and brick. In time the struck end will mushroom. This should be ground off. Don't use chisels with mushroomed heads. Fragments can fly off and cause injury.

Hand Planes

- Use only a plane that is suited to the job, and keep the iron sharp

- For long surfaces like door edges, use a fore plane 18" long and 2 ⅜" wide or a jointer plane 24" long and 2 ⅝" wide
- Square cutting heads must not be used on jointers and planers
- For shorter surfaces, use a jack plane 15" long and 2 ⅜" wide or a smoothing plane 10" long and 2 ⅜" wide
- Remember that sharp tools require less effort and reduce the risk of fatigue, overexertion, and back strain
- Work can also be easier with a door jack and supports on your workbench

Hand Saws

- Select the right saw for the job
- A 9 point is not meant for crosscutting hardwood. It can jump up and severely cut the worker's hand or thumb. Use an 11 point (+) saw for this kind of work
- When starting a cut, keep your thumb up high to guide the saw and avoid injury
- For cutting softwood, select a 9 point (-). The teeth will remove sawdust easily and keep the saw from binding and bucking
- Ripping requires a ripsaw

Plumb Bobs

- Designed for use in windy conditions, a mercury-filled plumb bob has considerable weight in proportion to its surface area
- The weight and point of the bob can make it dangerous
- Ensure that all is clear below when you lower the bob
- Don't let it fall out of your pocket, apron, or tool bag

Screwdrivers

- Do not use screwdrivers for prying, scraping, chiseling, scoring, or punching holes
- Only use a screwdriver that fits or matches the fastener
- Do not hold an object being worked on with a screwdriver in your hand, in your lap, or under your arm, except when protection is afforded by the object or other means
- A screwdriver used for electrical work must be equipped with a nonconductive handle
- Always make a pilot hole before driving a screw. Power drivers present obvious advantages when screws must be driven frequently or repeatedly

Sledgehammers

- When using a sledgehammer to drive thick tongue-and-groove planking tightly together, use a block of scrap wood to prevent damage to the planks
- Use sledgehammers carefully, serious bruises and broken bones have been caused by sledgehammers off-target and out of control
- Always check handle and head. Make sure head is secure and tight. Replace damaged handles
- Always wear eye protection

Utility Knives

- Use knives with retractable blades only. If used, fixed-blade knives must be carried in a protective sheath or equivalent
- Always cut away from your body, especially away from your free hand. When you're done with the knife, retract or sheathe the blade at once. A blade left exposed is dangerous, particularly in a toolbox

Wood Chisels

- Keep your hand that holds the work behind, not in front of, the chisel
- Keep chisels sharpened
- Keep chisels stored in a toolbox with protective caps when not in use
- Never use a chisel for prying
- Repeatedly striking the chisel with the palm of your hand may lead to repetitive strain injury
- With chisels and other struck tools, always wear eye protection
- Gloves are recommended to help prevent cuts and bruises

ELECTRIC TOOLS

- Operate electric tools within their design limitations according to manufacturer's instructions
- Use gloves and appropriate safety footwear when using electric tools
- Store electric tools in a dry place when not in use
- Do not use electric tools in damp or wet locations unless they are approved for that purpose
- Keep work areas well lighted when operating electric tools
- Ensure that cords from electric tools do not present a tripping hazard
- Unplug the tool before making adjustments or changing attachments
- The use of electric cords for hoisting or lowering tools must not be permitted
- Remove all damaged portable electric tools from use and tag them: "Do Not Use"

Electric Safety Features

To protect the user from shock and burns, electric tools must have a three-wire cord with a ground and be plugged into a grounded receptacle, be double insulated, or be powered by a low-voltage isolation transformer. Three-wire cords contain two current-carrying conductors and a grounding conductor. Any time an adapter is used to accommodate a two-hole receptacle, the adapter wire must be attached to a known ground. The third prong must never be removed from the plug.

Double-insulated tools are available that provide protection against electrical shock without third-wire grounding. On double-insulated tools, an internal layer of protective insulation completely isolates the external housing of the tool.

In the construction industry, employees who use electric tools must be protected by ground-fault circuit interrupters (GFCI) or an assured equipment-grounding conductor program (AEGCP).

SAWS

The general safe practices listed below must be followed when operating any type of saw.

General Safety

The practice of inserting wedges between the saw disk and the collar to form what is commonly known as a wobble saw is prohibited.

Blade Guards

All portable, power-driven circular saws having a blade diameter greater than 2 in. must be equipped with guards above and below the base plate or shoe. The upper guard must cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard must cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard must automatically and instantly return to covering position.

Never operate an electric saw with the lower guard tied or wedged open. The saw may kick back and cut you, or another worker who uses the saw.

An exposed blade, still in motion, will force the saw to move, cutting anything in its path. Make sure that the lower guard returns to its proper position after a cut. Never operate a saw with a defective guard-retracting lever.

On most saws, the lower guard is spring-loaded and correct tension in the spring will automatically close the guard. However, a spring weakened by use and wear can allow the guard to remain open after cutting. Maintain complete control of the saw until the blade stops turning. Note: The guard may also be slow to return after 45° cuts.

Brake

An electric brake on some circular saws stops the blade from coasting once the switch is released. This greatly reduces the danger of accidental contact.

Trigger Safety

On some light-duty saws, a latch prevents the operator from accidentally starting the motor. The trigger on the inside of the handle cannot be pressed without first pressing a latch on the outside of the handle. On heavy-duty saws, a bar under the trigger switch helps to prevent accidental starting.

Clutch

Some worm-drive saws are equipped with a clutch to prevent kickback. Kickback occurs when a saw meets resistance and violently backs out of the work. The clutch action allows the blade shaft to continue turning when the blade meets resistance. The blade stud and friction washer can be adjusted to provide kickback protection for cutting different materials. Check friction washers for wear.

Blades

Understand the different designs, types and uses of blades, and only use blades suited for the job.

Blades should be sharpened or changed frequently. The teeth on a dull or abused blade will turn blue from overheating. Cutting will create a burning smell. Such blades should be discarded or reconditioned.

Re-sharpened blades can be substantially reduced in diameter. Make sure that the blade diameter and arbor diameter are right for the saw.

- Before changing or adjusting blades, disconnect the saw from the power source
- Ensure that arbor diameter and blade diameter are right for the saw
- Make sure it is clean and free of nails, concrete and other foreign objects. This precaution not only prolongs blade life but may also prevent serious injury
- Ensure that blades are installed in the proper rotational direction
- Do not strike metal when using a carbide-tipped blade. The tips can come loose and fly off, ruining the blade and injuring the operator. Inspect the blade regularly for cracked or missing tips

Changing, Adjusting, and Setting Blades: when changing blades, take the following precautions:

- Disconnect the saw from the power source
- Place the saw blade on a piece of scrap lumber and press down until the teeth dig into the wood. This prevents the blade from turning when the locking nut is loosened or tightened
- Make sure that keys and adjusting wrenches are removed before operating the saw

Proper adjustment of cutting depth keeps blade friction to a minimum, removes sawdust from the cut and results in cool cutting.

- The blade should project the depth of one full tooth below the material to be cut
- Carbide-tipped blades or miter blades should project only half a tooth below the material

If the blade is to run freely in the kerf (saw cut), teeth must be set properly, that is, bent alternate. The setting of teeth differs from one type of blade to another. Finer toothed blades require less set than rougher-toothed blades. Generally, teeth should be alternately bent ½ times the thickness of the blade. Sharp blades with properly set teeth will reduce the chance of wood binding. They will also prevent the saw from overheating and kicking back.

Safe Saw Practices

- Place the material to be cut on a rigid support such as a bench or two or more sawhorses
- Make sure that the blade will clear the supporting surface and the power cord
- The wide part of the saw shoe should rest on the supported side of the cut if possible
- Plywood is one of the most difficult materials to cut with any type of saw. The overall size of the sheet and the internal stresses released by cutting are the main causes of difficulty
    - Large sheets should be supported in at least three places, with one support next to the cut
    - Short pieces of material should not be held by hand. Use some form of clamping to hold the material down when cutting it

- NEVER use your foot or leg to support the material being cut
- Place the material to be cut with its good side down, so that if any splintering occurs, will be on the upper side
- Use just enough force to let the blade cut without laboring
- Never place a handheld saw in a fixed, upside-down position and feed material into it. Use a table saw instead
- When cutting, don't force the saw back onto line. Withdraw the blade and either start over on the same line or begin on a new line
- Keep the cord on the same side of your body as your cutting hand
- Stand to one side of the cutting line
- Never reach under the material being cut
- Always keep your free hand on the long side of the lumber and clear of the saw
- Maintain a firm, well-balanced stance, particularly when working on uneven footing

Plywood, wet lumber and lumber with a twisted grain tend to tighten around a blade and may cause kickback. Kickback occurs when an electric saw stalls suddenly and jerks back toward the operator. The momentarily exposed blade may cause severe injury.

Pocket Cutting

- Tilt saw forward
- Rest front of shoe on wood
- Retract lower guard
- Lower saw until front teeth almost touch wood
- Release guard to rest on wood
- Switch on the saw
- Keep the saw tilted forward, push it down, and forward with even pressure gradually lowering it until shoe rests flat on wood

DRILLS

Types

- Light duty drills are usually ¼ or ⅜ inch trigger-controlled variable speed drill
- Heavy duty drills are usually select the slower but more powerful one- or two-speed reversible ½ or ¼ inch drill
- Size of the drill is determined by the maximum opening of the chuck. For instance, a ⅜ inch drill will take only bits or attachments with a shank up to ⅜ inch wide
- For drywall screws, a drywall screw gun should be used. The driving bit should be replaced when worn

Attachments

Attachments such as speed-reducing screwdrivers, disk sanders and buffers can help prevent fatigue and undue muscle strain. A right-angle drive attachment is very useful in tight corners and other hard-to-reach places.

- Cutting and drilling attachments must be kept sharp to avoid overloading the motor
- Never crowd or push the tool beyond capacity
- Some attachments, such as hole saws, spade bits, and screwdrivers, require considerable control by the operator. If you do not feed the attachment slowly and carefully into the material, the drill can stop and severely twist or break your arm
- Stock should be clamped or otherwise secured to prevent it from moving
- Restrain the drill just before the bit or cutting attachment emerges through the material, especially when oversized spade bits are used
- Select the bit or attachment suitable to the size of the drill and the work to be done
- Make sure that the bit or attachment is properly seated and tightened in the chuck

Some operations require the use of an impact or hammer drill. For instance, drilling large holes in concrete or rock with a carboloy bit should be done with an impact drill

Follow manufacturer's instructions when selecting and using a bit or attachment, especially when working with drills or performing unfamiliar work.

SAFE DRILL PRACTICES

General Safety

Working with Small Pieces

- If a small piece starts to twist or spin with the drill, you can be injured
- Small work pieces should be properly secured and supported
- Never try to drill with one hand and hold a small piece of material with the other

Drilling from Ladders

- The top and bottom of the ladder must be secured to prevent the ladder from slipping or sliding
- Never reach out to either side. Overreaching can cause the ladder to slide or tip
- Never stand on the top step or paint shelf of a stepladder. Stand at least two steps down from the top
- When working from an extension ladder, stand no higher than the fourth rung from the top
- Never support yourself by holding onto a pipe or any other grounded object

Operation

- Always plug in the drill with the switch OFF
- Before starting to drill, turn on the tool for a moment to make sure that the shank of the bit or attachment is centered and running true
- Punch a layout hole or drill a pilot hole in the material so that the bit won't slip or slide when your start drilling. A pilot hole is particularly important for drilling into hard material such as concrete or metal
- With the drill OFF, put the point of the bit in the pilot hole or punched layout hole
- Hold the drill firmly in one hand or two hands, as necessary, at the correct drilling angle

- Turn on the switch and feed the drill into the material with the pressure and control required by the size of the drill and the type of material
- Don't enlarge a hole by reaming it out with the sides of the bit. Switch to a larger bit
- While drilling deep holes, especially with a twist bit, withdraw the drill several times with the motor running to clear the cuttings
- Never support material on your knee while drilling. Material should be firmly supported on a bench or other work surface for drilling
- Unplug the drill and remove the bit as soon as the work is finished
- When drilling into floors, ceilings, and walls, beware of wiring and plumbing
- Rotary and hammer drills generate extreme torque and must be handled with caution. Take occasional breaks to relax your arms and shoulders

Drilling Timbers

- When drilling timbers with a self-feeding auger bit, use a heavy-duty, low-rpm drill, ½ or ¼ inch in size
- Never attempt to drill heavy timbers by yourself, especially when working on a scaffold or other work platform

Other Materials

The main hazard in drilling materials other than wood is leaning too heavily on the tool. This can not only overload and burn out the motor but also cause injury.

- Always use a drill powerful enough for the job and a bit or attachment suited to the size of the drill and the nature of the work
- Punch a layout hole or drill a pilot hole can make the job safer and more efficient
- Use a drill press stand for drilling holes in metal accurately and safely
- Clamp small pieces in a vise and bolted to the table
- A drill press can also be used for cutting large holes in wood with a hole saw or speed bit

PLANES

Electric planes are available in various types and sizes, and are operated in similar ways. Depending on specific features, adjustments between models may differ.

Planes may be equipped with:

- Outfeed tables (back shoes) that are either fixed or movable
- Infeed tables (front shoes) that move straight up and down or move up and down on an angle to keep the gap between cutter head and table as small as possible
- Cutter heads with two or more straight blades (also called knives or cutter blades) or cutter heads with two curved blades

Never operate an electric plane while wearing a scarf, open jacket, or other loose clothing. Keep long hair tied up. Always wear eye protection and practice good housekeeping.

Standard Plane

- Hold with both hands to avoid contact with cutter blades
- Always keep both hands on the plane until motor stops
- Use the edge guide to direct the plane along the desired cut
- Never try to guide the plane with your fingers

Block Plane (Electric)

Designed for use on small surfaces, the block plane is operated with only one hand. It is more dangerous than the larger, standard plane. Keep your free hand well out of the way, in case the plane slips accidentally.

Plane Maintenance

- Make sure the work is free of obstructions: staples, nails, sand, or other foreign objects
- Keep blades in good condition and sharp
- Use a fine-grit oilstone when sharpening blades. Blades can be re-sharpened several times if they are not nicked or cracked

Changing Blades

Time and patience is required when raising or replacing cutter blades. Blades must be the same weight and seated at the same height to prevent the cutter head from vibrating. Any deviation can cause the head to run off balance. Blades can fly out and injure you or fellow workers.

Removing Blades

- Disconnect the plane from the power source. Turn the plane upside down and secure it in a fixed position
- Hold the cylinder head stationary by tapping a softwood wedge between the cutter head and the bearing (some tools are equipped with a locking device)
- Loosen all the screws and lift out one blade and throat piece. Turn the cutter head and repeat this procedure with other blades
- If necessary, clean parts thoroughly with recommended solvent

Installing Blades

- Replace one throat piece and blade. Tighten the two end screws lightly
- Take a hardwood straight edge and use the outfeed table (back shoe) as a gauge. Raise or lower the blade until both ends are level with the outfeed table at the blade’s highest point of revolution
- Tighten up the remaining screws. Set the rest of the blades in the same way. Turn the cylinder head and make sure that all blades are the same height
- Tighten up all the screws. Double-check the height of all blades. Tightening can sometimes shift the set. Double-check all the screws
- Turn the tool right side up and plug it in. Hold the tool in both hands with the cutter blades facing away from you and switch it on

Safe Plane Practices

- Always disconnect the plane from the power source before adjusting or changing blades or the cutter head
- For safe operation, make sure that blades (at their highest point of revolution) are exactly flush with the outfeed table
- Make sure to support work securely for safety and accuracy
- Use a jack (e.g. when planing doors and large pieces of plywood) to secure material and keep edges clear of dirt and grit
- When using an electric block plane, clamp or fasten the workpiece whenever possible. Keep your free hand well away from plane and material
- When using the standard power plane, adjust edge guide to desired guidance
- Adjust depth of cut to suit the type and width of wood to be planed
- To start a cut, rest the infeed table (front shoe) firmly on the material with cutter head slightly behind the edge of the material
- After finishing a cut, hold both hands on the plane until motor stops

RADIAL ARM SAWS

The motor and blade of the radial arm saw are suspended above the table. Because the motor and blade assembly can be locked in different positions, and can travel during the cut, you must pay special attention to keeping fingers and hands clear.

Injuries involving radial arm saws tend to be serious. By using appropriate guards and procedures, however, you can safely use the saw for crosscuts, miter cuts, ripping and dadoes.

Set-Up

- The saw must be adequately powered for the work
- Only use a radial arm saw in a well-lit area out of the way of traffic, with enough space to store and handle long lengths of wood
- Mark the floor with yellow warning lines to keep other personnel back from the saw
- Make sure all safety guards and devices are in place
- Choose the right blade for the job. A sharp tungsten carbide combination blade is good for both crosscutting and ripping without frequent re-sharpening

General Procedures

- Follow basic saw safety
- If you don’t have someone to help with long stock, use a roller stand or extension table to support the work
- Always return the motor head to the column stop
- When crosscutting or mitering, keep hands at least six inches away from the blade. Do not adjust length of cut until the motor is back at column
- Slope the tabletop back slightly to keep the blade at the column, to prevent it from contacting stock being placed in position

- Do not allow the blade to cut too quickly when crosscutting or mitering
- Avoid drawing the blade completely out of the cut. The cut piece, whether large or small, often moves. When the saw is rolled back towards the column, the teeth can grab the piece and shoot it in any direction
- Do not cut by pushing the saw away from you into the stock. The material can lift up and fly over the fence

Ripping and Crosscutting

- For regular ripping, turn the motor away from the column to the in-rip position. Feed stock into the saw from the right side
- To cut wide stock, change the saw to the out-rip position. Feed stock into the saw from the left side. Remember – the blade must turn up and toward you when feeding the stock
- Do not force the cut. Allow the blade through the wood at its own pace
- To avoid kickback, take the following precautions:
  - Maintain proper alignment of the blade with the fence
  - Adjust the anti-kickback device to ⅛ inch below the surface of stock being fed
  - Use a sharp blade, free of gum deposits and with teeth properly set
- When binding occurs, stop the saw and open the kerf with a wedge
- After completing the cut, remove the stock from the rotating blade to prevent overheating and possible kickback
- Always push the stock all the way through past the blade
- Do not leave the machine with the motor running
- Use a push stick when ripping narrow pieces. Have suitably sized and shaped push sticks for other jobs as well. See more information on push sticks and feather boards under “Table Saws”

Jigs

- Keep commonly used jigs on hand. Jigs such as those for making stair and doorframe wedges and tapers are designed to carry stock past the blade with the saw locked in the rip position
- When you are drawing the saw into the stock, clamp or nail jigs to the table to prevent slipping

Re-Sawing with Blade Horizontal

The rip fence on the radial arm saw is too low to support material to be re-sawn on edge. Therefore, the material must be placed flat on the table and the motor must be turned so the blade is parallel to the table. The closeness of the arbor requires an auxiliary tabletop and fence to re-saw thin stock.

Because the kickback fence can’t be used, and controlling stock is sometimes difficult, re-sawing on the radial arm saw can be hazardous.

- If no other equipment is available, rip the stock halfway through, then turn it around, and complete the cut
- On the second cut, be sure to push the two halves well past the blade once they have been cut apart. Push sticks and feather boards clamped to the table can reduce hazards

Dadoes

A dado head is an essential tool for cutting grooves, rabbets and dadoes. A groove is cut with the grain; a dado is cut across the grain; and a rabbet is a shoulder cut along the edge of a board.

- Dado heads do not run at the peripheral feed speed on a big radial arm saw. Which can result in either stopping the motor or lifting the work and throwing it back
- To prevent this, make several light passes, lowering the dado head ⅛ to ¼ inch each time
- Always make sure guards are in place before starting dado work
- Proper rotation of the teeth is up and toward you

Other Accessories

Rotary accessories of various types are advertised as turning the radial arm saw into a multi-function machine. Remember that the saw has its limitations.

Possible problems include the following:

- Shaper heads run too slowly for safe and smooth work. Templates, jogs, and fixtures that remove the operator's hands from the points of operation of shapers must be used when the nature of the work permits such use
- Grinding stones may run too fast or slow, and are not recommended
- Sanding drums tend to run too fast and may burn the wood

ROUTERS

A portable electric router can be used to cut dadoes, grooves, mortises, dovetail joints, moldings and internal or external curves. The router motor operates at very high speed (up to 25,000 rpm) and turns clockwise.

General Safety

- When starting a router with a trigger switch in the handle, keep both hands on the tool to absorb the starting torque
- When starting a router with a toggle switch on top of the motor, hold the router firmly with one hand and switch on power with the other, then put both hands on the tool for control and accuracy
- Always wear eye protection. Hearing protection may also be required. Remember, the speed and power of a router requires that it be operated with both hands
- The pulleys, spindles and cutting tools on routers must be guarded. Turn plates, jigs, and fixtures requiring the operator's hands to be removed from the point of operation may be used as a point of operation guard

Safe Router Practices

- Always support and secure the work with a vise or clamps. Never try to hold the work down with your hand or knee. Never rely on a second person to hold the material
- Make sure that the bit is securely mounted in the chuck and the base is tight

- Set the base on the work, template, or guide and make sure that the bit can rotate freely before switching on the motor
- Make sure that the cutting edge of the router bit contacts the material to the left of the cutting direction. Otherwise, the router will kick back or fly away from you
- Guide the router around the work counter-clockwise. Splinters left at corners by routing across the grain will be removed by the next pass with the grain
- Feed the router bit into the material at a firm but controllable speed appropriate to the type of material being cut

SABER, SCROLL AND JIGSAWS

The saber saw (or portable jigsaw) is designed for cutting external or internal contours. The saw should not be used for continuous or heavy cutting that can be done more safely and efficiently with a circular saw.

The reciprocating saw is a heavier type of saber saw with a larger and more rugged blade. This tool is often used by drywall and acoustical workers to cut holes in ceilings and walls. Equipped with a small swivel base, the saw can be used in corners or free hand in hard-to-reach places. The reciprocating saw must be held with both hands to absorb vibration and to avoid accidental contact.

Eye protection is required. Depending on conditions, you may also need respiratory protection.

Choosing the Proper Blade

Various blades, ranging from 7 to 32 teeth per inch, are available for cutting different materials. For the rough cutting of stock such as softwood and composition board, a blade with 7 teeth per inch will cut the fastest. For all-round work with most types of wood, a blade with 10 teeth per inch is satisfactory.

Safe Jigsaw Practices

Cutting

- Clamp the material as close to the cutting line as possible
- Before starting a cut, make sure that the saw will not contact the clamps, vise, workbench, or other support
- Never reach under the material being cut. Never lay down the saw until the motor has stopped
- Do not try to cut curves so tight that the blade will twist and break
- Always hold the base or shoe of the saw in firm contact with the material being cut

Note: When sawing into floors, ceilings, or walls, always check for plumbing and wiring.

External Cut

To start an external cut (from the outside in):

- Place the front of the shoe on the material
- Make sure that the blade is not in contact with the material or the saw will stall when the motor starts

- Hold the saw firmly and switch it on
- Feed the blade slowly into the material and maintain an even pressure
- When the cut is complete, do not lay down the saw until the motor has stopped

Inside Cuts

To start an inside cut (pocket cut):

- Drill a lead hole slightly larger than the saw blade
- With the saw switched off, insert the blade into the hole until the shoe rests firmly on the material
- Do not let the blade touch the material until the saw has been switched on

It is possible to start an inside cut without drilling a lead hole first — but only when it's necessary. To do this:

- Rest the front edge of the shoe on the material with the saw tipped backward. Keep the blade out of contact with the material
- Switch on the saw and slowly feed the blade into the material while lowering the back edge of the shoe
- When the shoe rests flat on the material and the blade is completely through, proceed with the cut
- Never try to insert a blade into, or withdraw a blade from, a cut or a lead hole while the motor is running
- Never reach under the material being cut

TABLE SAWS

The table saw most often used in construction is the 10-inch belt-driven tilting arbor saw. The dimension refers to the diameter of the saw blade recommended by the manufacturer.

General Safety

Basket Guards

- Basket guards may be fastened to the splitter, or hinged to either side of the saw on an L-shaped or S-shaped arm
- Keep the basket guard in place for normal operations such as straight and bevel ripping and miter cutting
- When the guard is removed to permit cutting of tenons, finger joints, rabbets, and similar work, use accessories such as feather boards, holding jigs, push sticks, and saw covers
- Some split basket guards have a see-through cover. Sheet metal baskets fastened to the splitter are less effective because you cannot see the saw blade

Kickback

To avoid kickback of the stock when cutting:

- Never stand directly behind the blade when cutting. Stand to one side. See that other workers stand clear as well

- Make sure the rip fence is aligned for slightly more clearance behind the blade than in front. This will help prevent binding
- Use a sharp blade with teeth properly set for the wood being cut. A dull or badly gummed blade will cause friction, overheating, and binding
- Install a splitter to keep the kerf (cut) open behind the blade. Also effective are anti-kickback fingers attached to the splitter

Splitters

Splitters prevent the kerf from closing directly behind the blade. Ideally, they should be slightly thinner than the saw blade and manufactured from high tensile steel. Splitters are not always needed with carbide-tipped saw blades, whose relatively wide kerf may provide the desirable clearance.

Disappearing splitters with anti-kickback fingers can be pushed down when in the way of a workpiece and pulled up if necessary after the machine has been shut off.

Roller Stand

A roller stand provides support when working with long pieces of stock. When using a roller stand:

- Adjust the height slightly lower than the saw table to allow for sagging of the material
- Set up the stand so the roller axis is at 90 degrees to the blade

Whatever the design, a support stand should be standard equipment in every carpentry and millwork shop. It can be used as an extension to a workbench, jointer or band saw and is especially important with the table saw.

Extensions

Made of wood or metal, tabletop extensions installed behind and to both sides of the machine can make the cutting of large sheets of plywood and long stock safer and more efficient.

In most cases, a space must be provided between extension and saw top for adjusting the basket guard and allowing scrap to fall clear.

Rip Fence

The rip fence is used mainly to guide the stock and maintain correct width of cut.

Adjust the fence slightly wider at the back to let the wood spread out behind the cut and reduce the risk of kickback.

You can add a piece of hardwood to the rip fence in order to rip thin pieces of wood and make dadoes and rabbets. The auxiliary fence can be set close to the cutters without the risk of contact between the blade and the steel fence.

Push Sticks and Feather Boards

Push sticks and feather boards are used when cutting narrow pieces of stock.

- Push sticks should be painted or otherwise marked to prevent loss

- The heel of the push stick should be deep enough to prevent it from slipping and strong enough to feed the stock through the saw
- A feather board clamped immediately in front of the saw blade will provide side pressure to the stock without causing binding and kickback. Use a push block to feed stock all the way through the saw

Safe Table Saw Practices

- Follow basic saw safety
- Keep the floor around the saw clear of scrap and sawdust to prevent slipping and tripping
- Always stop the machine before making adjustments. Before making major adjustments, always disconnect the main power supply
- Select a sharp blade suitable for the job
- Use the safety devices such as push sticks and feather boards
- Make sure nobody stands in line with a revolving blade
- Don't let anyone or anything distract you when you are operating the saw
- Keep your fingers folded in a fist rather than extended as you feed work into the saw
- Never reach around, over, or behind a running blade to control the stock
- Follow the manufacturer's recommendations in matching the motor size to the saw.
- Table saws must be properly grounded
- Check the power supply for ground and always use a ground fault circuit interrupter
- Extension cords must be of sufficient wire gauge for the voltage and amperage required by the saw and for the length of the run

JOINTERS

Jointers, also known as planers, used to make flat edges on boards are generally hand feed devices, and for that reason, use extreme care when feeding stock into or out of the cutting area.

Safe Jointer Practices

- Hand-fed planers and jointers with a horizontal or vertical head must have a cylindrical cutting head, and the knife projection must not extend more than 1/8-inch beyond the body of the head
- Square cutting heads must not be used on jointers and planers
- The opening in the jointer table must be kept as small as possible. The clearance between the edge of the rear table and the cutter head must not be more than 1/8 inch
- The table throat opening must not be more than 2½ inches when tables are set for zero cut
- A proper push block must be used when jointing short or narrow stock
- A hand-fed jointer with a horizontal or vertical cutting head must have an automatic guard covering all the sections of the cutting head on the working side of the fence or gauge; it must also have a guard covering the section of the head in back of the gauge or fence
- Each wood jointer with vertical head must have either an exhaust hood or other guard to enclose the revolving head, except for a slot wide enough for the application of the material to be jointed

- The minimum length of the piece jointed must not be less than four times the distance between the two tables. Neither half of the jointer table should be adjusted horizontally so that the clearance between the edge of the table and revolving knives is more than ¼ inch

QUICK-CUT SAWS

Hand-held portable circular cut-off saws are commonly known as “quick-cut saws.” They are widely used for cutting concrete, masonry products, sheet metal products (both steel and aluminum), and light steel sections such as angles and channels.

Hazards

Quick-cut saws are high-powered compared to similar tools. Hazards include high-speed blade rotation, blade exposure during operation, and exhaust from the internal combustion engine (the usual power source).

The saws create clouds of dust when dry-cutting masonry and showers of hot sparks when cutting metal products, especially steel.

These hazards can result in cuts, kickbacks, exposure to carbon monoxide fumes, exposure to dusts (silica from concrete and masonry products in particular), burns, flying particles hitting the eye, and other injuries from flying material when work is not secured for cutting or when blades fly apart.

These hazards can be controlled by:

- Using quick-cut saws properly and wearing the right protective equipment such as eye, hearing, and respiratory protection as well as face shields and gloves
- Securing work to keep it from shifting during cutting
- Being cautious around sharp edges left by cuts
- Keeping saws in good working condition, equipped with proper blades or disks, and used with all guards in place

A cut-off saw that strokes automatically without the operator’s control of each stroke must have a guard to keep the operator’s hands from coming in contact with a blade.

Care

- Quick-cut saws must be serviced and maintained in accordance with the manufacturers’ instructions
- Replacement parts should be those recommended by the manufacturer
- Cracked, broken, or worn parts should be replaced before the saw is used again
- Guards and air-intakes should be cleaned regularly and often
- Abrasive disks should be checked before installation and frequently during use
- Correct any excessive blade vibration before trying to make a cut
- In confined areas, make sure that ventilation is adequate

Safe Quick-Cut Saw Practices

Most of the following procedures are for gasoline-powered quick-cut saws.

Fueling

- Always shut off saw before fueling. Keep fuel container clear of work area
- Use caution when preparing the oil/gasoline mixture and when fueling the saw
- No smoking or ignition sources are allowed in the area where fuel is mixed or tanks are filled
- Fill the tank outdoors in a well ventilated space at least 10 feet from the area where the saw will be used. Spilled fuel should be wiped off the saw
- Avoid fueling the saw on or near formwork
- Don’t overfill the saw or run it without securing the fuel tank cap
- Check the saw for leaks

Starting

- Start the saw in an area clear of people and obstacles
- Put the saw on a smooth hard surface for starting
- Set the guard for the type of cut before starting
- Assume a solid well-balanced stance
- Set one foot on the rear handle
- Put one hand on the top handle to lift the blade off the surface, and use the other hand to pull the starter cord
- Once the saw is running, release the throttle and make sure the engine drops to idle without the disk or blade moving
- Run the engine at full throttle and let the disk or blade run freely to make sure it turns on the arbor without wobbling or vibrating

Operation

One of the major hazards with quick-cut saws is failure to support and secure the work to be cut.

The saw is powerful enough to throw material around unless it is securely held and supported. Standing on material to hold it down is not recommended.

For repeated cuts of masonry or metal pieces, a jig is ideal for efficiency and safety. The jig should be designed and built to hold material in place after measurement without further manual contact.

Stance and Grip

- The quick-cut saw is a heavy, powerful tool that must be held by hand
- Operators need a secure stance with legs apart for balance and support
- Hold the saw at a comfortable, balanced location in front of you
- Grip the saw firmly with one hand on each handle
- Hold your forward arm straight to keep the saw from kicking back or climbing out of the cut

Cutting

- Support the material being cut so that the disk or blade will not bind
- Support heavy materials on both sides of the cut so the cut piece will not drop or roll onto the operator's foot
- Make cuts as close as possible to the supporting surface
- When cutting, keep the throttle wide open. Ease the blade down onto the cut line. Don't drop or jam the blade down hard. Move the saw slowly back and forth in the cut
- Hold the saw so that disk or blade is at right angles to the work and use only the cutting edge of the disk or blade
- Beware of blade run-on. The blade may continue to rotate after the cut and run away with a saw set down too soon
- Don't force the saw to one side of the cut. This will bend the disk or blade and cause it to bind, possibly to break
- Water cooling is recommended for cutting masonry materials
- Keep pressure on the saw reasonably light
- Don't carry the saw any distance with the engine running
- Stop the engine and carry the saw with the muffler away from you

Disks and Blades

Disks and blades for quick-cut saws are available in three basic types:

- Abrasive disks
- Diamond-tipped blades
- Carbide-tipped blades

Use only the disks and blades compatible with the saw and rated for its maximum rpm. Blades or disks may fly apart if their rpm is not matched to saw rpm. If you have any doubts, consult the operating manual or a reputable supplier.

ABRASIVE DISKS – TYPES AND USES

Type	Uses	Materials
Concrete	All-around use, most economical for cutting concrete and masonry. Water-cooling recommended to increase disk life and to reduce dust.	Concrete, stone, masonry products, cast iron, aluminum, copper, brass, cables, hard rubber, plastics
Metal	Primarily for steel, not suited for masonry products. Water-cooling is not recommended with metal abrasive disks	Steel, steel alloys, other hard metals such as cast iron

Diamond Disks and Blades – Types and Uses

Diamond disks are normally used with water-cooling. They are now available for dry cutting, which may be necessary to avoid staining some masonry products.

When dry cutting with a diamond blade, let the blade cool for 10-15 seconds every 40-60 seconds. This can be done simply by pulling the saw out of the cut.

DIAMOND DISKS AND BLADES — TYPES AND USES

Type	Uses	Materials
Diamond Abrasive Disk	Cuts faster than other abrasive disks and creates less dust. Water-cooling is necessary to prevent heat build-up that can make disk disintegrate.	Stone, all masonry and concrete products. Not recommended for metal
Dry-Cut Diamond Blade	Fast cuts, lots of dust, very expensive. Let blade cool for 10-15 seconds every 40-60 seconds. Continuous cutting will damage the blade.	Stone, all masonry and concrete products. Not recommended for metal.

Carbide-Tipped Blades

These blades must be used with care. If a carbide-tipped blade encounters material harder than what it is designed to cut, the tips may fly off.

A carbide-tipped blade used with a quick-cut saw must be designed for that purpose. It must also be used only to cut the materials specified by the manufacturer.

Inspection / Installation

- Inspect disks and blades before installing them
- Make sure that contact surfaces are flat, run true on the arbor, and are free of foreign material
- Check that flanges are the correct size and not warped or sprung
- Check the label to make sure that the disk or blade is approved for use on high-speed quick-cut saws and has a rated rpm suitable to the saw being used
- Inspect the disk or blade for damage. Abrasive disks tapped lightly with a piece of wood should ring true. If the sound is dull or flat, the disk is damaged and should be discarded
- Make sure that diamond or carbide tips are all in place. Do not use diamond or carbide-tipped blades or disks if any tips are missing
- Do not drop abrasive disks. Discard any disk that has been dropped
- Use the proper bushing on the arbor so that the disk runs true on the shaft without wobbling or vibrating
- Discard badly worn disks that are uneven or “out of round”

TRAINING

The company will ensure every employee who uses hand and power tools is provided proper training on those tools before using them on the job. This training will be provided during working hours at no cost to the employee.

Training Components

The company's safety coordinator will ensure every employee will be trained on, and adhere to the requirements of, the following minimum elements:

- Proper storage, maintenance and use of any tool the employee will use in his or her job
- A description and identification of the hazards associated with tools
- The safeguards, including PPE, to protect the employee from tools and the hazards for which they are intended
- How to use tool safeguards and why
- Safety precautions necessary for working with the tool
- How to inspect tools for damage and what to do (e.g., contact the supervisor) if a tool is damaged, missing safeguards or other pieces, or otherwise unable to provide adequate protection
- Limitations of tools being used and the how to select the right tool for the job
- How to replace blades, change accessories, lubricate, charge and other similar activities associated with using power tools
- Where to find the manufacturer's instructions for power tools the employee is expected to use

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

HAND AND POWER TOOLS SAFETY TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

(Retain at least 3 years)

SCOPE

This chapter covers the requirements and safe practices for providing our employees with hearing protection. It complies with OSHA regulations 1926.101 and 1910 .95, whichever is applicable.

POLICY

This Company is committed to ensuring a safe, healthy work environment. This commitment includes monitoring the workplace for noise levels that may damage hearing and includes protecting the hearing of those who work in high-noise environments and implementing a hearing conservation program (HCP) if necessary.

EMPLOYER RESPONSIBILITIES

This Company will:

- Protect employees from work-related hearing loss
- Use engineering and/or administrative controls to keep noise levels below the OSHA action level (AL) and permissible exposure level (PEL) whenever possible
- Implement an HCP when necessary

EMPLOYEE RESPONSIBILITIES

Company employees are expected to:

- Participate in training
- Wear hearing protection devices when appropriate
- Report any problems or concerns about noise levels
- Report any injuries or loss of hearing to appropriate supervisor

NOISE CONTROL

When employees are exposed to noise level above the PEL of 90 dBA or more over an 8-hour time weighted average, noise controls must be in place.

Before requiring hearing protection for workers, other control systems using engineering and administrative controls need to be in place to reduce exposure to hazardous noise levels.

Noise Measurement

Where noise exposure levels are reasonably expected to be above the OSHA action level of 85 dBA, over an 8-hour time weighted average, exposure measurements will be taken to determine the extent of hearing protection necessary and identify tools or processes where sound abatement opportunities exist.

Identifying high-noise activity, tools and equipment at a work site is the first step to lowering site-wide noise levels and reducing noise exposure.

Engineering Controls

Engineering controls can abate noise hazards whenever practicable. Examples include, but are not limited to the following:

- Low-noise tools and machinery
- Appropriate maintenance of all equipment
- Barriers between noise sources and employees
- Enclosure or isolation of noise sources

Strategy Overview

Applying effective, practical, affordable engineering controls to a noise problem is challenging because there are no ready-to-order solutions. You are more likely to find an engineering-control solution when you have accomplished the following:

- Understand what is causing the noise
- Determine how the noise is reaching the listener
- Identify the most appropriate point, or points, at which to control the noise: at the source, along the sound path, or at the listener
- Establish acoustical enclosures and barriers around generators
- Use sound absorbing material and vibration isolation systems on hand tools
- Quiet work practices — use rubber mallets to erect and dismantle formwork

Administrative Controls

Administrative controls also can reduce worker exposure to noise. Examples of such controls include, but are not limited to:

- Scheduling regular maintenance activities
- Operating noisy machines in shifts when fewer workers are present
- Limiting time employees are exposed to a noise

Administrative and work-practice controls are usually less expensive to carry out than engineering controls; that is because there are no significant capital costs involved in changing or modifying equipment. In some cases, administrative controls have reduced employee exposure to noise and increased productivity by rotating employees through a demanding, noisy task. Work-practice controls also improve employee performance by emphasizing safe work practices.

On the other hand, administrative controls and work-practice controls usually are not as effective as engineering controls because they don’t control the noise source. Noisy machines are still noisy and the hazard is still present.

Applying Administrative Controls

Examples of administrative and work-practice controls include the following:

- Reducing the time employees spend working in noisy areas — for example, rotating two or more employees so that each is exposed to noise levels less than 85 decibels, averaged over an eight-hour day

- Shutting down noisy equipment when it is not needed for production
- Ensuring that employees maintain their equipment to keep it running smoothly and quietly
- Ensuring that employees know how to perform tasks and operate equipment at safe noise levels
- Using warning signs to identify work areas where noise exceeds safe levels
- Teaching employees appropriate methods for eliminating or controlling noise
- Encouraging employees to report noise hazards to supervisors

SAFE PRACTICES

Any workplace sound that is not wanted is noise. Workplace noise may be present in a number of ways, each of which has a different potential impact on workers' hearing, and demands different controls to prevent damage to hearing.

TABLE 1: PERMISSIBLE NOISE EXPOSURE

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
≤ ¼	115
Footnote: When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each.	

Unacceptable levels of noise that may warrant a hearing conservation program are often present on construction sites. OSHA mandates an effective hearing conservation program when sound levels exceed the values shown in table 1.

If a worker needs to raise his voice for someone within arm's reach to hear, the site is probably noisy enough to require workers to wear hearing protection.

Further, exposure to impulsive or impact noise needs to stay below 140 dB peak sound pressure level.

The following trades are routinely overexposed to noise and should practice hearing protection as a matter of course: carpenters, plumber pipefitters, sprinkler installers, mobile equipment operators, welders/fabricators, sandblasters, drillers, electricians, steel erectors, drywallers shooting tracks or boarding.

Engineering and administrative noise controls should be implemented to reduce sound sufficiently. Where such controls fail to sufficiently reduce sound levels, The Company will provide appropriate personal protective equipment for hearing.

HEARING CONSERVATION PROGRAM

If an acceptable noise level can't be maintained through engineering and/or administrative controls, this Company will implement an HCP that will include noise monitoring, the use of hearing protection devices (HPD) and audiometric testing.

- Ensure employee participation in hearing protection training program
- Ensure proper initial fitting of hearing protection devices
- Make hearing protectors available, and replace them as necessary
- Ensure hearing protectors are worn
- Notify employees exposed to high-noise activities and equipment
- Employ an audiologist, otolaryngologist or physician if audiometric evaluations and follow-up are provided
- Maintain and retain all records necessary for proper implementation of the HCP
- Review the hearing protection program according to changes in workplace noise levels, personnel changes and technological changes to ensure that the hearing protection program is providing the most possible protection to employees

Noise Monitoring

Sound level measurement and dosimetry are valuable tools to measure possible exposure over the course of the day and for specific equipment, but they have their limitations on a construction site.

Attaching the sound level information for a piece of equipment onto the equipment itself can help inform workers about the hazards they face when working with or around that equipment.

Sound monitoring should be repeated when there has been a change that may increase noise exposures and:

- More employees may be exposed
- Hearing protectors in use may no longer provide adequate protection to hearing

Sound Level Meter and dosimeter can be used to perform exposure monitoring according to manufacturer's instructions should be calibrated to ensure accuracy, and operators should follow manufacturer's instructions to conduct sampling.

Hearing Protection

HPDs are the least preferred option to control problematic noise exposure. HPDs will be used in the time it takes to establish engineering or administrative noise controls, or if these controls fail to provide sufficient protection.

This Company will provide and replace HPDs at no cost to all employees who work in the following situations:

- Where other controls fail to reduce noise exposure below an 8-hour TWA of 90 dBA
- Where employees are exposed to noise at or above an 8-hour TWA of 85 dBA, and have experienced hearing loss

In-ear protective devices may not be plain cotton and must be fitted or determined by a competent person to ensure adequate fit.

When using hearing protectors it is important that workers not overprotect. Devices shouldn't lower noise levels below 70 dBA to ensure workers can hear instructions and ambient sounds to ensure safety.

There are many types of hearing protection. Each type is designed for certain noise conditions. However, remember – unless worn properly and all the time in high noise areas, the devices will not be effective. The Company will consider the "three c's" of hearing protection selection — comfort, convenience and compatibility — to ensure the devices will be worn correctly 100% of the time when needed.

Hearing protectors available on the market will be labeled with a noise reduction rating (NRR), which indicates how much noise the protective device can block according to laboratory testing. Workers in trades subject to more noise should wear a HPD with a higher NRR.

Audiometric Testing

Audiometric testing monitors an employee's hearing over time. It also provides an opportunity for employers to educate employees about their hearing and the need to protect it.

Although OSHA does not require it for construction activities, all employees exposed to an 8-hour TWA of 85 Db or more should have free audiometric testing as part of the hearing conservation program.

The difficulty in establishing a baseline hearing threshold level and tracking hearing over time for employees in the construction industry, even with the availability of mobile testing facilities, is a well-known challenge in the construction industry. Still, preventing damage to the hearing of employees is of paramount importance, and all appropriate steps should be taken to provide employees the protection they need.

A licensed or certified audiologist, otolaryngologist or other physician should be responsible for the audiometric testing program and oversee all aspects of such testing. Trained technicians may conduct testing without immediate physician oversight if they are appropriately qualified to conduct such tests and they are accountable to an audiologist, otolaryngologist or physician.

Audiogram

A baseline audiogram should be established for each employee within 6 months of his or her first exposure at or above the 85-dBA 8-hour TWA action level.

Baseline audiograms should be preceded by 14 hours free of workplace noise exposure (or hearing protector use) and be conducted according to NIOSH or OSHA guidelines by a competent technician or doctor. Audiometric testing should be performed in an appropriate setting with a calibrated, ANSI-approved audiometer.

Evaluation

A physician or appropriate technician should compare each employee's annual audiogram to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred.

A standard threshold shift according to OSHA is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear (excepting an allowance for age as specified by OSHA in 1910.95 Appendix F: Calculation and Application of Age Correction to Audiograms). However, guidelines that are more stringent may also be followed.

The audiologist, otolaryngologist or physician will review problem audiograms and shall determine whether there is a need for further evaluation.

Audiogram Evaluation Follow-Up

This Company will inform the employee in writing within 21 days of an annual audiogram indicating a standard threshold shift to the baseline audiogram.

Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the Company shall ensure the following steps when a standard threshold shift occurs:

- Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them
- Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary
- We will refer the employee for a clinical audiological evaluation or an otological examination as appropriate if additional testing is necessary or if the employer suspects a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors
- Inform the employee of the need for an otological examination with suspicion of a medical pathology of the ear unrelated to the use of hearing protectors

If later audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, the Company:

- Shall inform the employee of the new audiometric interpretation
- May discontinue the required use of hearing protectors for that employee

An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram:

- The standard threshold shift revealed by the audiogram is persistent
- The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram

RECORDKEEPING

The Company should maintain accurate records of employee exposure measurements and audiometric test records pursuant to this policy. This audiometric test record should include the following:

- Name and job classification of the employee
- Date of the audiogram
- Examiner's name
- Date of the last acoustic or exhaustive calibration of the audiometer
- Employee's most recent noise exposure assessment

The following records will be maintained for at least the following periods:

- Noise exposure measurement records for two years
- Audiometric test records for the duration of the affected employee's employment

All HCP records should be maintained for the duration of the affected worker's employment and be provided upon request to employees, former employees, representatives designated by the individual employee, and any authorized government official.

If the Company ceases to do business, it will transfer HCP records to the successor employer.

Record a hearing loss on the OSHA 300 log if the following are true:

- A standard threshold shift is indicated by an audiometric examination
- The employee's overall hearing level is at 25 dB or more above audiometric zero averaged at 2000, 3000 and 4000 Hz in the affected ear(s)
- The hearing loss is work related

TRAINING

The Company will ensure every employee is provided training on hearing protection. This training will be provided at no cost to the employee during working hours.

The Company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training will be repeated annually with an updated training program that reflects changes in protective equipment and work processes.

Training Components

The Safety Coordinator will ensure that every employee will be trained in the following minimum elements:

- Use and care of all hearing protectors provided
- Effects of noise on hearing
- Purpose of hearing protectors, advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use and care
- The purpose of audiometric testing and an explanation of test procedures (if offered)
- Steps an employee can take in the workplace and outside of the workplace to protect hearing

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

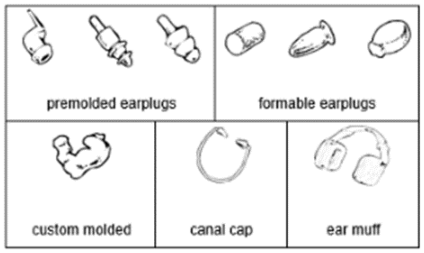
FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- Audiometric and Identification Information
- Hearing Conservation Program Employee Enrollment
- Hearing Protection Training Record Sheet

AUDIOMETRIC AND IDENTIFICATION INFORMATION

Name					
ID#		Birth Date		Gender	
Test Date		Time		Time since last exposure	hrs
Exposure Level	dBA	**Hearing Protection Devices Used (choose)**			

Hearing Protector Activity	
☐ Issue ☐ Reissue ☐ Training ☐ Retraining	

Hearing Protector Activity		
☐ Medical history ☐ Diabetes ☐ Ear Surgery ☐ Head Injury ☐ High Fever ☐ Measles ☐ Mumps ☐ Hypertension ☐ Ringing in Ears ☐ Ear Infection ☐ Other:	☐ Hobby/Military ☐ Hunt/Shoot ☐ Car Racing ☐ Motorcycles ☐ Other Loud Vehicles ☐ Loud Music/Band ☐ Power Tools ☐ Other Noisy Hobbies ☐ Military Service ☐ Other:	☐ Additional Information ☐ Noisy 2nd Job ☐ Noisy past job ☐ Exposure to Solvents ☐ Exposure to Metals ☐ Difficulty Hearing ☐ Hearing Aid ☐ Recent Change in Hearing ☐ See Physician about Ears ☐ Other:

Audiogram

Test Frequency	500	1000	2000	3000	4000	6000	8000
Right Ear							
Left Ear							

Audiometer		Serial Number	
Exhaustive Cal. Date		Biological Cal. Date	
Tester ID		Test Reliability	☐ Good ☐ Fair ☐ Poor
Review ID		Audiogram Classification	
Comments			

HEARING CONSERVATION PROGRAM EMPLOYEE ENROLLMENT RECORD

Employee Name	Date enrolled	Reason for Enrolling		Date Audiometric Testing First Offered	Date of Initial Conservation Training	Removal from Hearing Conservation Program	
		Noise exposure at or above action level	Enrolled w/o exposure monitoring			Date Employee Removed from HCP	Date of Employee Separation

HEARING PROTECTION TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

OSHA does not have its own heat illness regulation but has interpretations that refer to the General Duty Clause and a technical manual (OTM Sect. III Ch. 4) that has heat illness information and guidelines.

Employers that have work environments with recognizable heat-related hazards can be cited for ignoring a recognized hazard like heat illness. This chapter provides information on Cal/OSHA's heat illness prevention program, which is recognized as an industry standard across the country

POLICY

Operations, indoor and outdoor, that involve working where there are high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, or strenuous physical activities, have a high potential for causing heat-related illness.

This policy is the written plan to establish, implement, and maintain heat illness protection. It will be available at the worksite so that any employee can see it upon request.

This policy has been developed to address these issues. All employees will receive training relating to the causes and effects of, the personal and environmental factors that may lead to, and the prevention measures to fight, heat-related illnesses.

STANDARDS AND REGULATIONS

This company will ensure that all procedures and safe work practices adhere to the following applicable rules and regulations:

- OSHA General Duty Clause, Section 5(a)(1)
- OSHA sanitation regulation CFR 1926.51
- Title 8 of California Code of Regulations Section 3395

RESPONSIBILITIES

Preventing heat-related illness is a cooperative effort between this company and its employees.

This policy incorporates Cal/OSHA's updates of its heat-related illness regulations effective May 1, 2015 and addresses: training, shade, water, preventative breaks, first-aid response, acclimatization, and emergency procedures.

. The following provides appropriate steps for both employers and employees.

General Responsibilities – Employer

It is the responsibility of the company to:

- Conduct a risk assessment for all worksites to identify heat risks and safe work procedures
- Establish and implement safe work practices to lessen the effects of heat stress as much as reasonably practical

- Establish and implement supervisor and employee training so everyone can recognize and respond to heat illness symptoms
- Ensure that all relevant risk factors, health, first aid, and emergency response procedures are communicated to all employees and supervisors
- Adjust work practices as necessary when workers complain of heat illness
- Use engineering controls as the primary means of limiting employees' exposure to high heat conditions wherever possible;
- Oversee heat illness prevention training and acclimatization for new workers and for workers who have been off the job for a while
- Establish and implement emergency communication procedures to ensure quick access to first aid and emergency responders

Employee Responsibilities

Employees are expected to:

- Follow established safe work policy and procedures
- Know about and recognize initial heat illness symptoms in yourself and others
- Know how to appropriately respond to heat illness symptoms
- Participate in all required training
- Find out whether any prescription medications you are required to take can increase the risk of heat illness
- Get adequate rest and sleep
- Drink small amounts of water regularly to maintain fluid levels and avoid dehydration
- Report signs and symptoms of heat-related illness to supervisor immediately

HAZARDS

The body regulates its temperature through sweat and circulating blood to the skin; however, high temperatures and high humidity make this process more difficult. As the body’s ability to cool itself decreases, it must store the excess heat, raising the body’s core temperature. If the body’s temperature becomes too high, it ceases to be able to regulate itself which could result in death.

This company will ensure that all relevant risk factors, health, first aid, and emergency response procedures are communicated to all employees and supervisors. These include, but are not limited to, heat illness prevention (drinking fluids, rest, acclimatization, heat stress factors) and heat illness symptoms; procedures (high heat procedures).

Employees are expected to report symptoms to their supervisor, designated first aid responder, or outside emergency response personnel.

Risk Factors

Many factors determine the total risk a worker faces from excessive heat while at work. At the core of temperature-related risk factors is the basic question of how hot a worker feels. The factors that must be considered when assessing a worker's risk of heat illness include:

- **Temperature -** The apparent temperature can be affected by:
  - The season
  - Reflected heat
  - Heat from equipment
  - Working in direct sunlight

Keeping track of the temperature at the workplace is a critical element of any program to prevent heat-related illness

- **Humidity -** As humidity rises, sweat tends to evaporate less. As a result, body cooling decreases and body temperature increases.
- **Air Movement -** As long as the air temperature is less than the worker's skin temperature, air movement can help workers stay cooler by increasing both the rate of evaporation and the heat exchange between the skin and the air.
- **Job-specific Exertion –** The body generates more heat during heavy physical work. Heavy physical work requires careful evaluation, even at temperatures as low as 75° F, to prevent heat disorders. This is especially true for workers who are not acclimated to the heat
- **Clothing and PPE -** Heat illness can be caused or aggravated by wearing PPE such as fire or chemical retardant clothing. Coated and non-woven materials used in protective garments block the evaporation of sweat and can lead to substantial heat stress. The more or heavier clothing worn, the longer it takes evaporation to cool the skin
- **Time -** Working for long stretches of time and during the heat of the day exposes workers to a higher risk of heat illness. Workers should cycle through light work and heavy work, taking breaks as necessary.

Work According to Level of Exertion	
Light Work	Using a table saw Some walking about Operating a crane, truck, or other vehicle Welding
Moderate Work	Laying brick Walking with moderate lifting or pushing Hammering nails Tying rebar Raking asphalt Sanding drywall
Heavy Work	Carpenter sawing by hand Shoveling dry sand Laying block Ripping out asbestos Scraping asbestos fireproofing material
Very Heavy Work	Shoveling wet sand Lifting heavy objects

Equipment and Processes

Equipment and processes at the work site contribute greatly to the heat stress a worker faces.

Hot engines and work that involves high temperature processes can significantly raise temperature and put workers at risk. Contact with hot surfaces can also present the danger of burns.

Personnel-Specific

It is difficult to predict who will be affected by a heat illness and when, because individual susceptibility varies. There are, however, certain physical conditions that can reduce the body's natural ability to withstand high temperatures.

Age

As the body ages, its sweat glands become less efficient. Workers over the age of 40 may therefore have trouble with hot environments. Acclimatization to the heat and physical fitness can offset some age-related problems.

Weight

Workers who are overweight lose heat less efficiently and are more easily subject to heat-related illness.

Skin Pigmentation

Persons with lighter complexions are at a higher risk of sunburn and heat illnesses than those with higher levels of skin pigmentation, because skin with less pigmentation absorbs approximately 20% more heat.

Fitness

Being physically fit increases your ability to cope with the increased demands that heat places on your body.

Caffeine and Alcohol

Alcohol consumption within 24 hours of work leads to dehydration and increased risk of heat illness. While recent research suggests that caffeine may not be as detrimental to hydration as formerly believed, in large amounts it does act as a diuretic and can contribute to dehydration.

Medical Conditions

In order to pump blood to the skin and cool the body, the heart rate increases. This can cause stress on the heart, which is particularly hazardous to those with heart disease or high blood pressure.

Certain medications may cause heat intolerance by reducing sweating or increasing urination. People who work in a hot environment should consult their physician or pharmacist before working while taking certain medications.

Workers with recent illnesses involving diarrhea, vomiting, or fever have an increased risk of dehydration and heat illnesses because their bodies have lost salt and water.

HEAT ILLNESS HAZARDS

There are varying degrees of heat related illness and all company employees and supervisors will be trained on the symptoms of them and the procedures to follow in case of an emergency.

The effects of heat illnesses can range from mild discomfort to life threatening and consist of the following types. All company employees will be trained to recognize the symptoms of each.

Sunburn

Although sunburn is not classified as a heat illness, it can make it more difficult for the body to release heat in addition to causing pain and discomfort. A severe sunburn can cause blistering and become infected. Sunscreen and appropriate clothing can prevent sunburn.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.

Workers experiencing heat rash should:

- Try to work in a cooler, less humid environment when possible
- Keep the affected area dry
- Dusting powder may be used to increase comfort

Heat Cramps

Heat cramps usually affect workers who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

Workers with heat cramps should:

- Stop all activity, and sit in a cool place
- Drink clear juice or a sports beverage
- Not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke
- Seek medical attention if any of the following apply:
  - The worker has heart problems
  - The worker is on a low-sodium diet
  - The cramps do not subside within one hour

Heat Syncope

Heat syncope is a fainting (syncope) episode or dizziness that usually occurs in a warm environment when the body's blood pressure drops while attempting to dissipate heat. The result is less blood to the brain, causing light-headedness and fainting when a person stands up quickly or stands for a long period. Those who perform strenuous work outside in warm climates are at particular risk.

Workers with heat syncope should:

- Sit or lie down in a cool place when they begin to feel symptoms
- Slowly drink water, clear juice, or a sports beverage

Heat Exhaustion

Heat exhaustion is the body's response to an excessive loss of the water and salt, usually through excessive sweating. Workers most prone to heat exhaustion are those that are elderly, have high blood pressure, and those working in a hot environment.

Heat Stroke

Heat stroke is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature, the body's temperature rises rapidly, the sweating mechanism fails and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

Take the following steps to treat a worker with heat stroke:

- Call 911 and notify their supervisor
- Move the sick worker to a cool shaded area
- Cool the worker by either:
  - Soaking their clothes with water
  - Spraying, sponging, or showering them with water
  - Fanning their body

HEAT ILLNESS SYMPTOMS

Symptoms of Sunburn

Typically, there is initial redness, followed by varying degrees of pain, depending on the duration and intensity of exposure. Other symptoms can include swelling, itching, peeling skin, rash, nausea, fever, chills and fainting. Sunburns may be first or second degree burns.

Symptoms of heat rash include:

- A red cluster of pimples or small blisters
- More likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases

Symptoms of Heat Cramps Include:

- Muscle pain or spasms usually in the abdomen, arms, or legs
- Severe, sometimes disabling, cramps that typically begin suddenly in the hands, calves, or feet
- Hard, tense muscles

Symptoms of Heat Syncope Include:

- Light-headedness
- Dizziness
- Fainting

Symptoms of Heat Exhaustion Include:

- Heavy sweating and/or cold, clammy skin
- •Excessive thirst
- •Nausea
- Pale or flushed complexion
- Slightly elevated body temperature
- Chills
- High body temperature
- Extreme weakness or fatigue
- Dizziness, confusion, or hallucinations
- Slowed or weakened heartbeat
- Muscle aches and cramps
- Fast and shallow breathing
- Throbbing headache
- Slurred speech

NOTE: Pesticide poisoning has similar symptoms as heat exhaustion.

Symptoms of Heat Stroke Include:

- Nausea and vomiting
- Dizzyness and fainting
- Hot, flushed, dry skin
- Decreased sweating
- Decreased urination
- Increased body temperature (104 to 106ºF)
- Convulsions
- Headache
- Fatigue
- Rapid or slowed heart rate
- Shortness of breath
- Blood or urine in stool
- Confusion, delirium, loss of conciousness

Heat stroke can occur suddenly, without any symptoms of heat exhaustion. If a person is experiencing any symptoms of heat exhaustion or heat stroke, GET MEDICAL CARE IMMEDIATELY. Any delay could be fatal.

Emergency Response

The company will provide emergency medical services as quickly as possible if a worker suffers from heat illness.

All employees may contact 9-1-1 when necessary, but at least one accessible person for each crew will be designated responsible for initiating an emergency response. The emergency response can include immediate first aid, continued monitoring, contacting 9-1-1 and transporting the victim to emergency responders. An appropriately trained and equipped first aid provider at the worksite can decide on the appropriate response. If that person does not exist, then 9-1-1 will be called for any employee showing heat related illness symptoms.

A risk assessment will be conducted for all worksites that consider heat illness a risk factor: if 9-1-1 can be accessed from the worksite, whether the work site is served by the 9-1-1 system, and ensure emergency responders can access any victims. All employees will have access to a map of their location or clear, detailed and precise directions.

Employees and supervisors will know the basic first aid to stop the progression of heat illness.

REQUIREMENTS

Access to Shade

- When the outdoor temperature in the work area is expected to exceed 80 degrees Fahrenheit, the company must provide and maintain one or more shaded areas for employees that are either open to the air or supplied with ventilation or cooling. The amount of shade present must be at least enough to accommodate all of the employees on rest or recovery periods, allowing them to sit in a normal posture, fully in the shade, without being in physical contact with each other. The shaded area will be located as close as practicable to the employees work area
- Shaded areas must also be available during meal periods and be capable of accommodating all employees on meal periods who remain onsite
- When the outdoor temperature in the work area does not exceed 80 degrees, employers will either provide shade or provide timely access to shade if requested by an employee
- Employees will be allowed and encouraged to take a preventative cool-down rest in the shade when they feel the need to do so to protect themselves from overheating. Access to shade must be permitted at all times
- Employees who take a preventative cool-down rest will be:
  - Monitored and asked if they are experiencing any symptoms of heat illness
  - Encouraged to remain in the shade
  - Not ordered back to work until any signs of heat illness have subsided, or for at least five minutes once they have accessed the shade
- Employees who exhibit or report signs or symptoms of heat illness will take a cool-down period and will be provided with the necessary first aid or emergency response

- Exceptions
  - Where the company can demonstrate that it is infeasible or unsafe to have a shade structure, or otherwise to have shade present on a continuous basis, the employer may utilize alternative equivalent procedures for providing access to shade
  - Except for employers in the agricultural industry, cooling measures other than shade (e.g., use of misting machines) may be provided instead of shade if the employer can demonstrate that these measures are at least as effective as shade in allowing employees to cool

High-Heat Procedures

The company will implement high-heat procedures when the temperature equals or exceeds 95 degrees Fahrenheit. These procedures will include the following:

- Observing employees for alertness and signs or symptoms of heat illness by one of the following:
  - Having a supervisor or designated person observe employees for groups of 20 or less
  - Implementing a mandatory buddy system
  - Having regular communication with an employee by radio, phone, or other reliable method
- Authorizing at least one employee at the worksite to summon emergency services if no qualified first aid provider is available
- Reminding employees throughout the work shift to drink plenty of water
- Conducting pre-shift meetings before the start of work to review the high heat procedures with employees, including the need to drink water frequently and the right to take cool-down rests

Potable Water

An adequate supply of potable water will be provided continuously in all places of employment, along with single-service cups (unless the source is a drinking fountain). The water should be kept cool or cold if supplied in a hot environment. Potable water is defined as water that meets the drinking water standards of the state or local authority having jurisdiction, or water that meets the quality standards prescribed by the EPA’s drinking water regulations.

Fluid Intake

In a day's work in the heat, a worker may produce as much as 2 to 3 gallons of sweat. Because so many heat disorders involve excessive dehydration of the body, it’s essential that water intake during the workday be about equal to the amount of sweat produced. Most workers exposed to hot conditions drink less than needed because of an insufficient thirst drive.

A worker, therefore, should not depend on thirst to signal when and how much to drink. Instead, the worker should drink 5 to 7 ounces of fluids every 15 to 20 minutes to replenish the necessary fluids in the body. There is no optimum temperature of drinking water, but most people tend not to drink warm or very cold fluids as readily as they will cool ones. Whatever the temperature of the water, it must be agreeable and readily available to the worker. Individual drinking cups should be provided, unless a drinking fountain is used. OSHA sanitation standards prohibit the use of a common drinking cup.

Heat acclimatized workers lose much less salt in their sweat than do workers who are not adjusted to the heat. The average American diet contains sufficient salt for acclimatized workers even when sweat production is high. If, for some reason, salt replacement is required, the best way to compensate for the loss is to add a little extra salt to the food. Salt tablets **should not** be used.

Number and Duration of Exposures

Rather than be exposed to heat for extended periods during the course of a job, workers should, wherever possible, be permitted to distribute the workload evenly over the day and incorporate work-rest cycles. Work-rest cycles give the body an opportunity to rid itself of excess heat, slow down the production of internal body heat, and provide greater blood flow to the skin.

Workers employed outdoors are especially subject to weather changes. A hot spell or a rise in humidity can create overly stressful conditions. The following practices can help reduce the risk of heat illness:

- Postponement of nonessential tasks
- Permit only those workers acclimatized to heat to perform the more strenuous tasks
- Provide additional workers to perform the tasks keeping in mind that all workers should have the physical capacity to perform the task and that they should be accustomed to the heat

Engineering Controls

A variety of engineering controls can be introduced to minimize exposure to heat. For instance, improving the insulation on a furnace wall can reduce its surface temperature and the temperature of the area around it. In a laundry room, exhaust hoods installed over those sources releasing moisture will lower the humidity in the work area. In general, the simplest and least expensive methods of reducing heat and humidity can be accomplished by:

- Opening windows in hot work areas
- Using fans
- Using other methods of creating airflow such as exhaust ventilation or air blowers

Rest

Providing cool rest areas in hot work environments considerably reduces the stress of working in those environments. There is no conclusive information available on the ideal temperature for a rest area. However, a rest area with a temperature near 76° F appears to be adequate and may even feel chilly to a hot, sweating worker, until acclimated to the cooler environment.

The rest area should be as close to the workplace as possible. Individual work periods should not be lengthened in favor of prolonged rest periods. Shorter but frequent work-rest cycles are the greatest benefit to the worker.

The revised Cal-OSHA heat Illness regulation requires agricultural employers to ensure that employee takes a minimum ten minute net preventative cool-down rest period every two hours when temperatures reach 95 degrees or above.

Acclimatization

A supervisor or designee will closely observe employees who have been newly assigned to a high heat area or job for the first 14 days of the employee's employment

When exposed to heat for a few days, the body will adapt and become more efficient in dealing with raised environmental temperatures. This process is called acclimatization. Acclimatization can take from 4 to 14 days, depending on the individual, of working at least two hours a day in the heat.

Acclimatization may be lost in as little as three days away from work. Employees, and supervisors, who return to work after a holiday or long weekend, need to understand this. Workers should be allowed to re-acclimatize to work conditions gradually.

PROCEDURES

This policy is the written plan to establish, implement and maintain heat illness protection. This policy will also be made available at the worksite so that any employee, who requests to, can see it.

Each worksite will have procedures in place that document how to provide:

- Enough refreshing, pure, and cool drinking water for all employees
- Available shade to encourage preventative cool down rests
- Acclimatization in high heat
- Weather condition monitoring and associated safety precautions
- Adjustments needed in high temperatures
- Training employees and supervisors
- Communicating this policy
- First Aid
- Emergency response
- Specific knowledgeable person(s) designated to implement these procedures

HIGH-HEAT PLANNING

The National Weather Service issues heat-related notifications that can help ensure work planning includes appropriate controls and processes to prevent heat-related illness and treat them as they arise:

Excessive Heat Outlook

Excessive Heat Outlooks are issued when the potential exists for an excessive heat event in the next 3-7 days.

Excessive Heat Watch

Excessive Heat Watches are issued by the National Weather Service when the heat is expected to be in excess of 105º F during the day combined with nighttime low temperatures of 80º F or higher are forecast to occur for two consecutive days.

Excessive Heat Warning and Advisories

Excessive Heat Warning/Advisories are issued within 12 hours of when the heat index is expected to be at least 105° F for more than 3 hours per day for 2 consecutive days, or more than 115° F for any length of time. These notices are issued when an excessive heat event is occurring, is imminent or has a very high probability of occurring. The warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life and/or property.

Outdoor Working Procedures

When employees are working outdoors during high heat periods, steps will be taken to limit the effects of heat exposure when temperatures exceed an action level depending on the type of clothing being worn.

All other clothing	89° F
Double-layer woven clothes including coveralls, jackets and sweatshirts	77° F
Non-breathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	52° F

These steps include

- Supplying at least one quart of drinking water per employee per hour throughout the shift
- Encouraging workers to frequently drink water and other hydrating beverages
- Monitoring workers for heat illness symptoms
- Hold pre-shift meeting to remind workers of high heat hazards

Workers with heat related illness symptoms will be relieved from duty and given a way to reduce their body temperature and monitored to determine if they need medical attention.

Workers are considered to be working outdoors when they are outside for more than 15 minutes in an hour. Work environments are considered outdoors when the factors affecting the temperature are not managed by engineering controls (e.g. air conditioning). Some examples include vehicle cabs, sheds, and tents.

Heat Protection

Employees working in areas that present heat hazards should follow these recommendations:

- When working in the heat, clothing should be loose fitting, lighter color to reflect sun, and should contain as much cotton as possible.
- Wear sunscreen
- Wear a hat
- Use UV eye protection (if possible)
- Change out of wet clothing when working in high humidity conditions

PPE

Employees who are required to wear specific types of PPE in high heat environments should consider the use of the following additional equipment:

- Cooling pad inserts for hardhats
- Insulated gloves
- Insulated suits
- Reflective clothing
- Infrared reflecting face shields

For extremely hot conditions, thermally conditioned clothing is available. One such garment carries a self-contained air conditioner in a backpack, while another is connected to a compressed air source that feeds cool air into the jacket or coveralls through a vortex tube. Another type of garment is a plastic jacket that has pockets that can be filled with dry ice or containers of ice.

Employees should discuss these options with their supervisor to determine if the provision of the items by the company is warranted.

BUDDY SYSTEM

A worker may not recognize his own signs and symptoms of heat-related illness. Workers should be encouraged to look after each other to ensure the team stays safe and healthy. A buddy system assigns each worker to one other worker to ensure there is at least one other person monitoring the heat health of every worker.

ACTIONS TO PREVENT HEAT-RELATED ILLNESS BASED ON TEMPERATURE

OSHA-Suggested Heat Index Thresholds		
Temperature	**Risk Level**	**Protective Measures**
<91° F	Lower Caution	Basic heat safety and planning
91° F – 103° F	Moderate	Implement precautions and heighten awareness
103° F – 115° F	High	Additional precautions to protect workers
>115° F	Very high/Extreme	Even more aggressive measures

As temperatures rise, managers and supervisors need to take responsibility for ensuring appropriate procedures are being followed to reduce the ill effects of heat on workers.

Lower Caution

- Adequate drinking water
- Available medical services
- Acclimatize new and returning workers who perform strenuous work
- Check forecast regularly

- Encourage workers to wear sunscreen and use other protections from direct sunlight
- Depending on site conditions, take actions for moderate risk conditions

Moderate Caution

- Follow “Lower Caution” precautions.
- Alert workers to index, identify additional precautions necessary
- Remind workers to drink small amounts of water through the day
- Respond to heat-related illnesses and medical emergencies immediately
- Review heat-related illness symptoms and signs and the established site- specific precautions
- Schedule frequent breaks in cool, shaded areas
- Acclimatize new and returning workers
- Set up a buddy system
- Instruct supervisors to watch workers for signs of heat-related illness

High Caution

- Follow “Moderate” precautions
- Have a knowledgeable person onsite to modify work activities and the work/rest schedule as necessary
- Establish and enforce work/rest schedules
- Adjust work activities
- Take extra precautions for workers in clothing that may add to a heat hazard
- Maintain effective communication with crew

Very High to Extreme

- Follow “High” precautions
- Reschedule non-essential outdoor work
- Move essential outdoor work to coolest part of work shift
- Stop work if necessary

EMERGENCY RESPONSE PROCEDURES

Our company has implemented heat illness emergency response procedures that include:

- Ensuring there is reliable communication method between employees and supervisors and/or emergency services in the event assistance for heat illness is needed
- Responding to the signs and symptoms of heat illness, including the procedures for providing first aid and additional emergency services as needed. These procedures will include:
    - Authorizing qualified supervisors or designated employees to provide first aid and/or contact emergencies services
    - Implement emergency procedures in cases of severe heat illnesses
    - Monitoring any employee displaying the signs and symptoms of heat illness, and not leaving them unattended or releasing them to leave the worksite without offering to provide first aid or emergency services

- Contacting emergency medical services, and/or transporting the employee to a medical provider or facility
- Ensuring that the personnel responsible for contacting emergency services are capable of providing the responders with clear and precise directions to the worksite

TRAINING

We will ensure every employee is provided training on preventing heat-related illness. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Elements

Training will be provided to employees and supervisors before being assigned to any outdoor work for the first time and then at least annually on the following topics:

Employee Training Components

The safety coordinator will ensure all employees are trained in the following minimum elements:

- Heat related illness environmental factors
- Personal factors that increase susceptibility (e.g. age, acclimatization, medical conditions, water consumption, alcohol, caffeine, nicotine, and medical conditions)
- The company's heat illness procedures including but not limited to:
  - The company's methods of providing water, shade, cool-down rests and access to first aid
  - The employees right to request heat illness relief without fear of retaliation
- The importance of frequent consumption of small quantities of water, up to four cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties
- The importance of acclimatization (the body's ability to adjust to high temperatures over time), how it is developed, and how worksite procedures address it
- Symptoms of types of heat related illness, and the treatment for them
- The procedures that can be taken to prevent heat-related illness
- The importance of removing heat retaining PPE during breaks
- The importance of immediately reporting to the employer/supervisor, symptoms or signs of heat illness in themselves, or in co-workers
- The danger of rapid progression of heat illness form mild to life threatening
- The employer's procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary
- The employer's procedures for contacting emergency medical services, and if necessary, for transporting employees to an emergency medical service provider
- The employer's procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site will be provided as needed to emergency responders. These procedures must include designating a person to be available to ensure that emergency procedures are initiated when appropriate

Supervisor Training

Supervisor training will cover:

- What employees need to know
- Procedures to implement this program
- Emergency response procedures (e.g. transportation, reaching an emergency medical service provider)

When it's reasonable to expect that workers will be exposed to the risk of heat illness, supervisors will be trained on the following topics before being permitted to supervise those workers.

- The information required to be provided to employees in the section immediately above
- The procedures the supervisor is to follow to implement the applicable provisions in this chapter
- The procedures the supervisor is to follow when an employee exhibits symptoms of possible heat illness, including emergency response procedures
- How to monitor weather reports and how to respond to hot-weather advisories

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

Please find the following document on the pages below:

- Heat Illness Training Documentation

This form may be reproduced for the purposes of implementing and maintaining a safety and health program.

HEAT ILLNESS TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

(Retain at least 3 years)

SCOPE

This chapter provides information on the regulations, requirements and safe practices associated with operating heavy equipment. The policy defined here will comply with OSHA 1926 Subparts O, Motor Vehicles, Mechanized Equipment and Marine Operations, W, Rollover Protection and all other federal, state and/or local regulations.

For the purposes of this document, heavy equipment is defined as all free moving mobile equipment propelled by gasoline, propane, diesel or electricity, however it does not include automobiles and similar motor vehicles used by licensed motor vehicle operators on public roads and highways.

POLICY

This policy applies to excavating, earth moving, paving and logging equipment. It does not cover forklifts, elevating work platforms or cranes, which are addressed in separate chapters.

Only competent personnel may operate heavy equipment/mobile equipment. An individual's competency must be demonstrated by successful completion of the training and evaluation process specified in this policy. This policy establishes requirements to work in or around all types of mobile equipment.

EMPLOYER RESPONSIBILITIES

This Company is responsible for:

- Ensuring each employee is trained in the appropriate skills needed to do his or her job/operate their vehicles and equipment safely
- Ensuring training occurs under people qualified and experienced with the type of equipment used
- Allowing only trained and competent operators to operate heavy equipment
- Ensuring heavy equipment at the worksite has rollover protective structures (ROPS) and seatbelts as required
- Identifying and informing workers of the hazards of power lines and utilities during a storm
- Ensuring efficacy of all safety features on any piece of machinery or equipment onsite
- Establishing limited access zones to keep workers away from heavy machinery
- Obtaining all required permits for the use of heavy equipment, when necessary

EMPLOYEE RESPONSIBILITIES

Heavy equipment operators are expected to:

- Review all safe operating procedures in the operator's manual before working with a new piece of equipment
- Inspect equipment daily
- Maintain all walking and working surfaces free of grease and fluids
- Keep equipment away from unstable soil, steep grades or embankments to prevent rollovers
- Avoid heavy equipment without rollover protective structures (ROPS)

- Always put the transmission in park, shut off the motor, set the brakes, and perform any other needed shutdown procedures/lockout of controls and/or attachments before working on or around the equipment
- Ensure no one is behind the vehicle before backing up
- Keep unauthorized personnel and vehicles safe with barriers
- Ensure only essential workers are anywhere near the equipment
- Keep coworkers off equipment and out from under suspended loads
- Drive equipment safely

SAFE PRACTICES

All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, will have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of the equipment.

A safety tire rack, cage or equivalent protection will be provided and used when inflating, mounting, dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

Heavy machinery, equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists, or jacks will be substantially blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between them. Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment, must be either fully lowered or blocked when being repaired or not in use. All controls must be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.

Whenever the equipment is parked, the parking brake must be set. Equipment parked on inclines will have the wheels chocked and the parking brake set.

The use, care and charging of all batteries will meet OSHA requirements.

All cab glass (if present) will be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of any machine.

Working Near Power Lines

All equipment covered under this policy will comply with the following requirements when being moved near power lines or energized transmitters.

- For lines rated 50 kV or below, minimum clearance between the lines and any part of the equipment is 10 feet
- For lines rated over 50 kV, minimum clearance between the lines and any part of the equipment will be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 feet
- In transit with no load and all attachment or dump beds lowered, the equipment clearance will be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV, and 16 feet for voltages up to and including 750 kV
- A spotter will be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means

- Any overhead wire will be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate it is not energized, and it has been visibly grounded
- Before working near transmitting towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter must be de-energized or tests made to determine if electrical charge is induced on the equipment. The following precautions will be taken when necessary to dissipate induced voltages:
  - The equipment will be provided with an electrical ground
  - Ground jumper cables will be attached to materials being handled when an electrical charge is induced while working near energized transmitters. Crews will be provided with nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load
- Combustible and flammable materials will be removed from the immediate area before operations

Exception: These requirements don't apply if the electrical distribution and transmission lines have been de-energized and visibly grounded at point of work or where insulating barriers, which are not a part of (or an attachment to) the equipment or machinery, have been erected to prevent physical contact with the lines:

MOTOR VEHICLES

Motor vehicles as covered by this section are those vehicles that operate within an off-highway jobsite, not open to public traffic. The requirements of this section do not apply to equipment that is covered later in this chapter.

- All vehicles will have a service brake system, an emergency brake system and a parking brake system. These systems may use common components, and must be kept in good working condition
- Whenever visibility conditions warrant additional light, all vehicles, or combinations of vehicles, in use will be equipped with at least two headlights and two taillights in operable condition
- All vehicles, or combination of vehicles, will have brake lights in operable condition regardless of light conditions
- All vehicles will be equipped with an adequate audible warning device at the operator's station and in an operable condition
- All vehicles with cabs will be equipped with windshields and powered wipers. Cracked and broken glass will be replaced. Vehicles operating in areas or under conditions that cause fogging or frosting of the windshields will be equipped with operable defogging or defrosting devices
- All haulage vehicles, whose payload is loaded by means of power shovels, loaders or similar equipment, must have a cab shield and/or canopy adequate to protect the operator from shifting or falling materials
- Tools and material must be secured to prevent movement when transported in the same compartment with employees

- Vehicles used to transport employees will have seats firmly secured and adequate for the number of employees to be carried
- Seat belts and anchorages meeting the DOT requirements are required on all motor vehicles
- Trucks with dump bodies must have a positive means of support, be permanently attached, and be capable of being locked in position to prevent accidental lowering of the body while maintenance or inspection work is being done
- Operating levers controlling hoisting or dumping devices on haulage bodies will be equipped with a latch or other device that will prevent accidental starting or tripping of the mechanism
- Trip handles for tailgates of dump trucks will be so arranged that, in dumping, the operator will be in the clear
- Mud flaps may be used in lieu of fenders whenever motor vehicle equipment is not designed for fenders

Correct all defects corrected before placing the vehicle in service. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, fire extinguishers, etc., where such equipment is necessary.

All vehicles in use will be checked at the beginning of each shift to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use:

- Service brakes, including trailer brake connections
- Parking system (hand brake)
- Steering mechanism
- Emergency stopping system (brakes)
- Tires
- Horn
- Coupling devices
- Seat belts
- Operating controls
- Safety devices

EARTHMOVING EQUIPMENT

The rules under this heading apply to these types of earthmoving equipment:

- Scrapers
- Crawler or wheel tractors
- Agriculture
- Off-highway trucks
- Loaders
- Graders
- Bulldozers
- Similar equipment

Seat Belts

Earthmoving equipment, unless designed only for standup operation or it has no roll-over protection structure, must have seatbelts that meet Society of Automotive Engineers (SAE) specifications

Access Roadways and Grades

Any access road or grade must be constructed and maintained to accommodate construction equipment or vehicles permitted upon them.

Emergency access ramps and berms must restrain and control runaway vehicles.

Brakes

Earthmoving equipment must have a breaking system capable of stopping and holding the equipment, as specified by the appropriate SAE standard.

Fenders

Pneumatic-tired earth-moving haulage equipment, whose maximum speed exceeds 15 miles per hour, will be equipped with fenders on all wheels to meet the requirements of SAE J321a, Fenders for Pneumatic-Tired Earthmoving Haulage Equipment.

Audible Alarms

Bidirectional machines, such as rollers, compacters, front-end loaders, bulldozers and similar equipment, will be equipped with a horn, distinguishable from the surrounding noise level, which will be operated as needed, when the machine is moving in either direction. The horn must be kept in operating condition.

Earthmoving or compacting equipment with an obstructed view to the rear may not be used in reverse gear unless the equipment has in operation a reverse signal alarm distinguishable from the surrounding noise level or an employee signals that it is safe to do so.

Scissor Points

Scissor points on all front-end loaders are a hazard to the operator during normal operation and must be guarded.

Excavating and Other Equipment

Tractors must have seatbelts for operators when seated in the normal seating arrangement for tractor operation, regardless of whether they are being used with attachments for excavating.

OPERATING IN REVERSE

The following applies to all general industry and construction industry vehicles, machinery, or equipment capable of operating in reverse, and with an obstructed view to the rear (which may be caused by the vehicle itself, its load, its height, damage to windows/mirrors, weather conditions, or work done after dark in insufficient lighting.

An employer must not use any motor vehicle equipment having an obstructed view to the rear unless:

- The vehicle has a reverse signal alarm audible above the surrounding noise level
- The vehicle is operated in reverse only when a designated observer/ground guide signals that it is safe to do so

- Before operating the covered vehicle in reverse, the driver visually determines that no person is in the path of the vehicle
  - If a vehicle's reverse signal alarm is defective, the vehicle must either: be operated in reverse only when a designated observer or ground guide signals that it is safe to do so; or, be removed from service until the reverse signal alarm is repaired
  - A vehicle with operable video or similar technology that provides the driver with a full view behind the vehicle is exempt from this section

Reverse Signaling Operation Activities

While an employee is functioning as the designated observer/ground guide during reverse signaling activities (e.g., giving verbal instructions to drivers, signaling to drivers once reverse operation of the covered vehicle has begun, collecting tickets, etc.), the designated observer/ground guide must:

- Not engage in any activities other than those related to the vehicle being signaled
- Not use personal cell phones, personal head phones, or similar items that could pose a distraction for the designated observer/ground guide
- Be provided with and wear, during daytime operations, a safety vest or jacket in orange, yellow, strong yellow/green or fluorescent versions of these colors
- Be provided with and wear, during nighttime operations, a safety vest or jacket with retroreflective material in orange, yellow, white, silver, strong yellow/green or a fluorescent version of these colors
- Be visible at a minimum distance of 1,000 feet
- Not cross behind, in close proximity to a covered vehicle, while it is operating in reverse
- Always maintain visual contact with the driver of the covered vehicle while it is operating in reverse (if visual contact is lost, the driver must immediately stop the vehicle until visual contact is regained and a positive indication is received from the designated observer/ground guide to restart reverse operations)
- Maintain a safe working distance from the covered vehicle

PILE DRIVING EQUIPMENT

- Boilers and piping systems that are a part of, or used with, pile driving equipment must meet the applicable requirements of the American Society of Mechanical Engineers, Power Boilers
- Pressure vessels part of, or used with, pile driving equipment must meet applicable requirements of the American Society of Mechanical Engineers
- Overhead protection, which will not obscure the vision of the operator and which meets OSHA requirements, must be provided. Protection will be the equivalent of 2-inch planking or other solid material of equivalent strength
- Stop blocks must be provided for the leads to prevent the hammer from being raised against the head block
- A blocking device, capable of safely supporting the weight of the hammer, will be provided for placement in the leads under the hammer at all times while employees are working under the hammer

- Provide guards across the top of the head block to prevent the cable from jumping out of the sheaves
- When the leads must be inclined in the driving of batter piles, provisions must be made to stabilize the leads
- Fixed leads must have a ladder, and adequate rings, or similar attachment points, so the loft worker may engage his safety belt lanyard to the leads. If the leads are provided with loft platforms(s), protect such platform(s) by standard guardrails
- Steam hoses leading to a steam hammer or jet pipe must be securely attached to the hammer with at least ¼-inch diameter chain or cable to prevent whipping if the joint at the hammer breaks. Air hammer hoses must have the same protection as required for steam lines
- Safety chains, or equivalent means, are required for each hose connection to prevent the line from thrashing around in case the coupling becomes disconnected
- Steam line controls will consist of two shutoff valves, one of which will be a quick-acting lever type within easy reach of the hammer operator
- Guys, outriggers, thrustouts or counterbalances will be provided as necessary to maintain stability of pile driver rigs

Equipment

- Engineers and winchmen will accept signals only from the designated signalmen
- All employees must keep clear when piling is being hoisted into the leads
- When piles are being driven in an excavated pit, the walls of the pit must be sloped to the angle of repose or sheet-piled and braced
- When steel tube piles are being “blown out”, employees must be kept well beyond the range of falling materials
- When it’s necessary to cut off the tops of driven piles, pile driving operations will be suspended unless the cutting operations are located at least twice the length of the longest pile from the driver
- When driving jacked piles, all access pits must have ladders and bulkheaded curbs to prevent material from falling into the pit

SITE CLEARING

Protect employees engaged in site clearing from hazards of irritant and toxic plants and ensure each is suitably instructed in the first aid treatment available.

All equipment used in site clearing operations will be equipped with rollover guards meeting OSHA requirements.

Rider-operated equipment will be equipped with an overhead and rear canopy guard meeting the following requirements:

The overhead covering on this canopy structure will be ⅛-inch or greater steel plate or ¼-inch woven wire mesh with openings no greater than 1 inch, or equivalent.

The opening in the rear of the canopy structure must be covered with not less than ¼-inch woven wire mesh with openings no greater than 1 inch.

TRAINING

The Company will ensure that every Company driver and every designated observer/ground guide is trained in the requirements of this section. Re-training must take place if an employee is observed to be in violation of the requirements of this chapter, if an accident or near miss occurs, or if employees are not operating in a safe manner.

Additionally, we will only use training material that is appropriate in content and vocabulary to educational level, literacy and language of employees.

Implementation

Trainees may operate heavy equipment only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence
- Where such operation does not endanger the trainee or other employees

Training will consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance on the job-site.

All operator training and evaluation will be conducted by persons who have the knowledge, training and experience to train heavy equipment operators and evaluate their competence.

Training Components

The Company's safety coordinator will ensure that every employee will be trained in the following minimum elements:

Equipment-Related Topics

- The equipment's safe operations and limitations
- Operating instructions, warnings, and precautions for the types of equipment the operator will be authorized to operate
- Differences between the equipment and an automobile
- Equipment controls and instrumentation: where they are located, what they do, and how they work
- Engine or motor operation
- Steering and maneuvering
- Visibility (including restrictions due to loading)
- Implement and attachment adaptation, operation, and use limitations
- Equipment capacity
- Vehicle stability
- Any equipment inspection and maintenance that the operator will be required to perform
- Refueling and/or charging and recharging of batteries
- Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of equipment that the employee is being trained to operate

Workplace-Related Topics

- Surface conditions and special hazards where the equipment will be operated
- Composition of loads to be carried and load stability
- Load maneuvering, loading, and unloading. (Includes trucks, hoppers, etc.)
- Pedestrian traffic in areas where the equipment will be operated
- Confined areas and other restricted places where equipment will be operated
- Hazardous (classified) locations where the equipment will be operated
- Ramps and other sloped surfaces that could affect the vehicle's stability
- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause buildup of carbon monoxide or diesel exhaust
- Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation

Duplicative Training

If an operator has previously received training in a topic specified in this section, and such training is appropriate to the equipment and working conditions encountered, additional training in that topic is not required if the operator has been evaluated and found competent to operate the equipment safely.

Training Records

Training records will be kept for each employee to certify each operator has been trained and evaluated and will include the following information:

- The dates of the training sessions and evaluation
- A written description of the training program
- The names and qualifications of persons conducting the training or evaluation
- The names and job titles of all persons attending the training sessions
- Where the employee received safety training

FORMS AND ATTACHMENTS

On the following pages, please find the following document:

- Heavy Equipment Checklist

This form may be reproduced freely for the purposes of implementing and maintaining a safety and health program.

HEAVY EQUIPMENT SAFETY CHECKLIST INSPECT DAILY AND BEFORE USE ONSITE

Date		Time	☐ am ☐ pm	Equipment Type	
Location				Inspector	

Item	Good	Need Repair	N/A	Item	Good	Need Repair	N/A
Tires/Tracks				Blade/ Boom/ Ripper condition			
Hydraulic Oil				Exhaust system			
Hose Condition				Transmission fluid			
Oil leak/lube				Brake fluid			
Cab, mirrors, seat belt and glass				Cooling system fluid			
Horn				Windshield wipers and fluid			
Gauges				Coupling devices and connectors			
Lights				Fan belts/ hoses			
Turn signals				Cables / lines / etc.			
Backup lights and alarm				Notes			
Brakes							
Fire extinguisher							
Engine oil							

SCOPE

This chapter provides the requirements and safe practices for employees performing hot tar roofing work. These practices will comply with all applicable OSHA regulations regarding asphalt fumes and fall protection. This information includes working with kettles, tankers and luggers. It does not provide information on fall protection and respirator use, which are covered in separate chapters.

POLICY

The safety and health of each employee is of primary importance to us. This Company is committed to maintaining a safe and healthful working environment. Management will provide all necessary safeguards, programs, and equipment required to reduce the potential for accidents and injuries.

EMPLOYER RESPONSIBILITIES

- The foreman or supervisor at every jobsite is responsible for compliance with the safety, health, and environmental regulations
- Fully-equipped first aid kits are available at each jobsite
- Firefighting equipment and instruction on its use is provided to deal with possible coal tar, asphalt, or torch applied material fires
- This Company gives new employees a safety orientation when they are hired. The orientation covers several safety topics, including a review of the employer's total safety program
- After the initial orientation, safety meetings will be held at the beginning of each job and weekly thereafter

EMPLOYEE RESPONSIBILITIES

Conduct yourself in a manner that reflects favorably on yourself, your employer, and your industry at all times. Extreme care must always be taken to avoid exposing the public to any danger from hoisting, fire, or trip hazards. Be aware of the public, because they are often attracted to construction sites during the day and after hours.

PERSONAL PROTECTIVE EQUIPMENT

Wear the proper personal protective equipment to protect against personal injury, including head, eye, face, foot, hand, hearing, and body protection. Listed below are PPE requirements by job type.

Built-Up Roofing:

- Long pants with no cuffs that cover the top of the boot
- A long-sleeved shirt, buttoned at the cuff and within one button of the collar
- Boots with thick rubber or composite soles
- Gloves with a snug-fitting cuff
- Goggles or safety glasses
- Full face shield when using a kettle or when handling a hot lugger

Modified Bitumen:

- Long pants with no cuffs that cover the top of the boot
- Cotton or leather gloves with a snug-fitting cuff
- A long-sleeved shirt buttoned at the cuff and within one button of the collar
- Goggles or safety glasses
- Full face shield for kettle use or when handling a hot lugger
- Boots with thick rubber or composite soles

In addition, remember the following:

- Wear a hard hat whenever there is a hazard from above
- Do not wear rings on fingers or any other type of jewelry
- Do not wear earphones because you will not be alert to verbal warnings or requests for help from other workers

Check with your supervisor on each job to find out if you will need to use any of following:

- Rubber gloves when working with chemicals, solvents, or adhesives
- A respirator
- Goggles or a face shield
- Eye protection

An eye injury or worse yet, the loss of eyesight are something everyone fears. That is why it is so important to use proper eye protection. You can minimize the risk of eye injury by wearing proper eye protection.

Eye Protection:

- Safety glasses (clear, prescription or tinted) with side shields
- Goggles
- Face shields

Avoiding eye injuries:

- Hot materials, chemicals, power tools, flying nails and tear off debris are some of the biggest hazards to the eyes. Always wear the proper eye protection when around these hazards
- Face shields and goggles should be carefully adjusted for fit and comfort. Your eye protection should be clean and available for immediate use
- Kettle operators must wear a full-face shield. For additional safety, it is recommended that goggles be worn under the shield
- A welding face shield with appropriate shaded lenses should be worn during any welding operations
- Goggles must be worn during roof cutting, spudding (remove with a sharp spade-like tool), tear off, and roof vacuuming operations
- Plan ahead; make sure the operators around you are not exposed to eye hazards
- Learn basic first aid treatment for an eye injury

- Always know where the eye wash bottle and first aid kit are located
- Tinted safety glasses, where appropriate, may reduce stress on the eyes
- Remember: Eye protection does not do any good unless you use it

Protective Clothing

Full length industrial type work clothing protects against splashing and drippage burns; safeguards against sunburn and contributes to more comfortable working conditions by insulating the skin from high or low ambient temperatures.

Full-length clothing should be worn at all times. Wear long-sleeved shirts buttoned over the glove cuff. Wear long pants with close-fitting cuffs, with trouser length extending below top of work boots. Gloves should be tight cuffed since hot bitumen may spill inside gauntlet or flared cuff gloves.

Protective heavy-soled, above-ankle height work boots minimize the severity of spillages or the possibility of heat transfer when accidentally walking in hot bitumen. Safety shoes or metal foot protectors are recommended when handling heavy tools and equipment. Slip resistant soles are recommended.

Kettlemen, lugger, and bucket handlers and others exposed to the possibility of splashing and spurting of hot coal tar should wear safety glasses with side shields or full face protective equipment.

For jobs with high potential for product contact (spills, etc.), disposable coveralls or aprons should be considered.

Two important factors to remember when selecting protective clothing for work with any roofing product are:

- Generally, no item of personal protective clothing is impermeable
- No protective clothing material is a barrier to all chemicals. When selecting protective clothing/gloves, specify chemical resistant classification materials
- Obtain permeation/ degradation values from your protective equipment supplier to ensure maximum protection against chemical breakthrough

Protective Creams

Coal tar-based roofing and waterproofing products have the potential to produce a phototoxic reaction on the unprotected skin. Workers handling coal tar based materials in the presence of sunlight (ultraviolet radiation) where the potential for skin contact with fumes, liquid or dust is present, may experience an enhanced sunburn reaction on uncovered skin surfaces.

A protective cream specifically formulated for coal tar products or a general-purpose cream should be applied in conjunction with a sunscreen lotion with a minimum sunscreen rating (SPF) of 25. Application should include all potentially exposed skin areas, i.e. face, neck, ears, hands, wrists, etc. prior to initial entry into the product handling area. Then, each time the skin areas are washed for personal hygiene reasons, i.e., use of tobacco products, food, drink, rest rooms, etc., a reapplication should be made prior to entering the product handling area(s).

SAFE PRACTICES

- Ask if you do not understand something
- Do not take chances or shortcuts
- Help others learn safe work practices
- Watch out for the safety of other workers
- Plan your work to avoid injuries
- Always limber up by stretching before starting work
- Keep your mind on your job
- All injuries must be reported immediately
- Do not smoke on the job when flammables are present
- No horseplay is allowed on the job
- Remember: If you are unsure of something, contact your supervisor
- Whenever you arrive at a new job site, make sure someone knows the location of area hospitals and emergency centers and the local emergency telephone number

Make the Jobsite safe

- Safety should always be on your mind. Many hazardous conditions can be eliminated when you set up safely and if you think safety
- Minimize the exposure to the building and pedestrians by using barricades, flashing lights, and signs when necessary
- Locate equipment where fumes and dust will not be drawn into fresh air intakes and windows of nearby buildings
- Check to be sure that you have a first aid kit and fully charged fire extinguisher. Know their locations
- Maintain proper clearance from all power lines. Notify the electric Company so that overhead wires can be covered or de-energized, if necessary
- Find out where the nearest hospital, infirmary, or ambulance service is located. Post the telephone numbers where you will be able to find them in a hurry

Safe Lifting Techniques

Reduce loads when necessary, less weight or smaller bundles. Often an awkward load is as damaging as a heavy one.

Sometimes a simple relocation action such as storing heavy stuff at waist level, with lighter loads above or below will prevent unwarranted stress on the back.

Use team lifts for the heavier items.

HOT ASPHALT

Kettle

- The dangers associated with kettles and tankers are very real. These vessels contain materials, such as hot asphalt or coal tar, that need to be handled with extreme care. It is important to always follow safety requirements

- Always wear the proper personal protective equipment
- The propane tanks should be secured in an upright position at least 10 feet (3.05 m) from the kettle
- The kettle should be on level ground with the tongue leveled and wheels blocked
- Make sure the kettle lid opens away from the building. Also, check to see that the lid fits tightly
- A warning line should be set up around the kettle area to keep people away
- Make sure the kettle is free of ice and water. Water inside the kettle can pop or flash once the asphalt is heated
- Before firing up the kettle, make sure all the vents are open. Check all hoses, gauges, burners and other equipment for defects
- Cut the bitumen into hand-sized pieces and place them carefully into the kettle. Always wear the appropriate PPE when loading the kettle
- Never light a torch with a disposable lighter or matches. Use a spark lighter
- Increase kettle temperature and add bitumen slowly. Never allow kettle tubes to be exposed. This can result in a fire or explosion
- Keep any debris, discarded packaging, or any combustibles neatly away from the kettle area.
- If there is a fire inside the kettle, close the lid and turn off the burners immediately
- Open spigots and valves slowly. Be careful on windy days because hot bitumen can easily be blown around, causing burns
- When carrying buckets of hot asphalt or bitumen on sloped surfaces, do so with the bucket on the downhill side
- To avoid splashes, never fill a bucket more than three-quarters full
- Have a 20-pound (9.07 kg) ABC-rated dry chemical fire extinguisher on the roof and two 10-pound (4.54 kg) ABC-rated dry chemical fire extinguishers on the ground, within 30 feet (9.1 m)

Provide protection by:

- Securing the lid and spigot or outflow valve on the kettle at night
- Locking or securing trucks and hoisting equipment
- Removing the ladder to prevent access to the roof
- Removing or securing chemicals, adhesives, solvents and flammables
- Looking around the job site for other potential hazards and ways to prevent them

A worker who is not safety conscious is a danger to himself and everyone around him. Leaving tools, equipment, and materials lying around, particularly near the roof edge, is inviting someone to trip and fall. A worker who treats hot stuff carelessly can splash himself and others.

Tanker Safety

- Always make sure the tanker is water-free
- The tanker should be set on level ground. Setting the tanker on an incline could cause the tubes to become exposed; this may result in a fire or explosion
- When filling the tanker, allow enough room inside for the expansion of the bitumen during heating

- Never fire the burners while the tanker is being filled
- Stand clear of the manhole when filling
- After filling, make sure the manhole cover is securely closed before moving the tanker
- When firing up the tanker, there should be at least 6 inches (15.2 cm) of bitumen covering the tubes
- Verify the accuracy of the automatic thermostat manually with a hand-held thermostat
- Heat the tanker slowly, especially if there is cold bitumen inside
- Never allow the vent pipe to become plugged. A building of vapors could cause an explosion
- When transporting a tanker that has recently been emptied, allow time for the tubes to cool
- Have two 20-pound (9.07 kg) ABC-rated fire extinguishers on hand

Hot Pipes

- Hot pipes should be set up as vertically as possible to avoid bowing
- Make sure the pipes are clean and dry, all joints and unions are in good condition and secure
- Insulating the pipes, especially during cold weather or where the pipe is extended a substantial distance, helps to maintain proper bitumen temperature and control excess fumes
- The end of the pipe should be connected to a 120-degree elbow pipe and a flexible discharge hose
- Never clean a pipe by heating it with a propane torch. The pipe can explode
- Hot pipes that must be extended a substantial distance should be supported
- Tie off the pipe to a guardrails or other support immediately after placing it on the roof
- Guardrails should be erected at least 4 feet (1.22 m) on either side of the pipeline
- If possible, it is a good idea to place a tarp on the side of the building next to the pipe to prevent leakage from hitting the building

Luggers

- Always make sure there is no water or moisture in the lugger. Keep the filler neck covered when not in use
- Never fill a lugger or mop bucket more than three-quarters full. Anything over this limit is easy to splash or spill
- Always chock the wheel or set the brakes while filling the lugger
- Always check the path of travel and make sure it is level and clear of debris before moving the lugger
- Be sure the lugger’s wheels are free of debris and can turn easily to minimize the possibility of it overturning
- Operators must wear appropriate PPE

Hoisting

- Roofers hoisting jack must be constructed to withstand the contemplated load to be hoisted. The beam from counter balance point to heel of jack must be at least 3/4 the length of the entire beam

- Hoisting jack must be counterweighted with a minimum of three times the contemplated maximum load to be lifted
- Counterweight must be securely fastened to heel of jack to prevent displacement, or the jack must be fastened by means of lashing, bolting, or other means to prevent displacement
- A steel collar or U-bolt and shackle on head of the hoisting jack must be provided for attachment of pulley
- Hoisting pulleys must be of steel construction
- Where materials are hoisted by hand, the hoist line must be not less than five-eighths manila rope, or the equivalent. Where machine hoist is used the hoist line must be wire rope
- Hoisting hooks must be of cast or forged steel heavy enough to prevent straightening under a load
- Workers must not stand under load when material or hot asphalt is being hoisted
- Hot asphalt must be kept at a safe level in buckets for carrying and hoisting

Asphalt Fumes

- Asphalt fumes can be an irritant of the eyes, nose, throat, and lungs. Use safe work practices. Reduce exposure to asphalt fumes
- If possible, the kettle should be placed downwind of roofing employees and any occupied building
- Keep the kettle and tanker openings closed as much as possible. This will allow the asphalt to heat quicker and keep fumes to a minimum
- Use insulated hot pipes and luggers
- Never overheat asphalt. Maintaining the kettle at the proper temperature (between 425 °F [218° C] and 550° F [288° C]) prevents the emission of excessive amounts of fumes. Verify proper equiviscous temperature (EVT) ranges for the type of bitumen used
- As a rule of thumb, check the asphalt packaging or manifest from the supplier if you are using a tanker, for the EVT and the flash point. You may heat the asphalt 50 degrees higher than the EVT, if necessary, as long as you stay 25 degrees below the flash point
- It is important for rooftop workers to periodically check the temperature of the asphalt to ensure the proper EVT. Depending on the outcome, the rooftop worker must inform the kettlemen to raise or lower the temperature accordingly
- Remember, the lower the temperature, the fewer fumes is produced
- If possible, air intakes and windows of buildings downwind of the kettle should be closed
- Work upwind of the asphalt operation whenever possible

Propane Torches

- Torches are extremely dangerous tools. Torch heads reach temperatures of 2,000° F (1093° C). A moment of carelessness can result in serious injury or property damage
- Make sure you completely understand how to operate a torch before using one
- Always inspect the torch head, valves, hoses, gauges, connections and fittings for any defects. Never use any equipment, including LP gas cylinders, unless they are in good working order
- Observe all of the manufacturer’s guidelines

- Do not use torches near combustible materials. Be especially cautious on structures with wood decks or large amounts of lint and dust, such as laundries or paper mills
- Never leave a lit torch unattended
- Never point a torch at anyone
- Always keep propane cylinders at least 10 feet (3.05 m) away from any torch
- Only use a spark lighter to ignite the torch; never use a match or cigarette lighter
- When you are finished with the torch, close the propane container valve and allow the propane remaining in the hose to burn off
- The supervisor or his designee should walk the roof for at least one hour after the last torch has been turned off to check for hot spots and smoldering fires. It is also a good idea to check inside the building; especially the underside of the deck whenever possible; for early signs of fire
- Wear leather gloves and eye protection when working with torches
- Liquefied Petroleum (LP) Gas Cylinders
- Cylinders should be marked “flammable gas”
- Cylinders should not be dropped or allowed to strike each other
- When storing, using or transporting cylinders, keep them securely fastened in an upright position and be sure that the container valve is closed and covered with a safety cap or collar
- Do not store LP cylinders indoors
- Never hoist cylinders by attaching lines to valves or collars
- Cylinders should be moved by means of a hand truck. If it is absolutely necessary to move one by hand, roll it on its edge; never drag it
- Make sure the pressure regulator is properly adjusted and is not damaged
- Check the hose prior to use for cuts, cracks or worn places
- When in doubt, always consider cylinders to be full and handle them accordingly
- When not in use, turn off the fuel supply at the tank
- When in use, keep all LP gas tanks at least 10 feet (3.048 m) away from the kettle
- Keep bulk propane and storage tanks at least 25 feet (7.620 m) away from the kettle, tanker or building
- If a propane cylinder frosts, it means the cylinder is too small. Never turn it on its side or use a torch to defrost the cylinder

Torch-Applied Modified Bitumen Membranes

- When applying torch-applied modified bitumen membranes, be aware of the fire danger. Because of the amount of heat used for application, there is a greater fire hazard than in most other types of operations
- Always wear the proper personal protective equipment. Check with your supervisor before starting
- Make sure to have dry chemical or foam fire extinguishers readily available at every work area. Also, make sure everyone is trained in their operation

- A supervisor should always conduct a fire watch for at least one hour after the last torch has been turned off. The supervisor should be looking for hot spots in the areas worked on that day. It is also a good idea to check the inside of the building for early warning signs of fire
- Use extreme caution when torching around wood framing or wood substrates. Never torch directly to a flammable substrate
- Remember to store the propane tanks and torches safely and securely at the end of the workday
- Never direct a propane torch into a blind area

Fire Safety

A fire can be deadly. By incorporating a few commonsense principles, fire hazards can be reduced significantly.

Remember: Fires start when the three elements of the fire triangle are present. These elements are heat, fuel (wood, paper, gas or other flammables) and oxygen. Avoiding fires means; not allowing all three to combine.

Handling an Emergency

- Know how to exit a roof in case of fire
- Know where the fire extinguishers are located
- If you are trained in first aid or CPR, you may want to offer assistance in an emergency

Storage of Flammables

- Always keep flammables away from any ignition sources, such as heat, flames or smoking materials
- Make sure there is good ventilation in the storage area
- Always keep fire doors and walkways clear
- Do not store flammable and combustible liquids near stairways or exits
- No more than 25 gallons (94.75 l) of flammables or combustible liquids may be stored indoors in a room outside of an approved storage cabinet
- No more than 60 gallons (227.4 l) of flammable and no more than 120 gallons (454.8 l) of combustible liquids may be stored in a single cabinet, and no more than three cabinets may be located in a single storage area
- Outdoor portable storage tanks containing flammable or combustible liquids must be stored at least 20 feet (6.1 m) from any building
- Always keep flammable liquids in an approved safety container when not in use
- Always bond and ground containers when transferring materials to prevent a buildup of static electricity, which potentially could create a spark
- The bond wire connecting the two containers should be set up prior to the transfer. The ground wire should be connected to one of the containers and to a proper ground. The ground will eliminate any static electrical charges created

Fire Extinguishers

Fire classes are based upon the item that is burning:

A—for fires involving wood or paper

B—for flammable liquids and gas fires

C—for electrical fires

D—for combustible metals, such as magnesium or sodium

- Be sure to use the right type of extinguisher. An ABC-rated fire extinguisher is the best to have on hand because it will put out almost all types of fire encountered in the roofing workplace
- All fire extinguishers must be inspected monthly and records maintained indicating the date of inspection and the inspector's name or initials
- Know where the fire extinguishers are located on each job and how to use them
- Familiarize yourself with the operation of the fire extinguisher(s) on the job by reading the instruction labels

Memorize the PASS system for extinguishing a fire.

P—Pull the pin

A—Aim the nozzle at the base of the fire

S—Squeeze the handle

S—Sweep from side to side to cover the entire fire

Housekeeping

- One of the easiest ways to prevent accidents is to maintain a neat and orderly job site. Take pride in maintaining a clean work site
- Materials must be neatly stacked and placed away from foot traffic
- Materials and equipment should not be stored within 6 feet (1.83 m) from the edge of the roof
- Tools and equipment must be put away after use
- Where necessary, wheels on rolling equipment should be blocked
- Trash and scraps are fire hazards and must be collected and disposed of immediately
- All flammable liquids must be stored in an approved safety can
- The kettlemen must give particular attention to the orderliness of the kettle area
- Place a large sheet of plywood or cardboard under the kettle
- Dispose of wrappers and tins promptly
- Keep the materials stacked and organized
- Make sure propane cylinders are tied or chained upright at least 10 feet (3.05 m) from the kettle
- Clean up any spilled fuel or flammable liquids
- Kettle lids should open away from buildings to help keep fumes away from the buildings

Walking/Working Surface

- Before tearing off, check the underside for dangerous areas
- A good faith survey to determine the presence of asbestos may be required; verify if it has been done and follow proper procedures if asbestos is present
- Frost, snow, and rain can make a surface very slippery. Proceed with caution
- Floor holes and openings must be covered and marked, guardrails must be erected around it, or workers must wear personal fall arrest equipment
- A cover must be secured and able to withstand twice the intended load of workers and equipment
- Do not remove a cover without the okay of your supervisor. Immediately re-cover the hole when the roofing or flashing work is complete
- Always properly secure any loads stored on the roof deck

WEATHER

During outdoor work, such as roofing, weather is always a concern. If severe weather strikes, know what to do to protect yourself, your coworkers, equipment, and materials. Watch for changing weather. If possible, listen to weather forecasts on the radio; this can provide you with advance warning of severe wind or rain. Most importantly, listen to your supervisor. If he or she tells you to come off the roof, do not wait; make your way to shelter immediately.

Your first responsibility is to ensure the safety of yourself and your fellow employees. However, if possible, try to prevent property damage to equipment, materials, and the building itself. This may require placing a tarp over equipment or exposed areas of the roof before a storm hits. Taking the time to prevent water or wind damage can save thousands of dollars in property damage.

Rain

- Wear shoes/boots that will not slip in wet weather
- Wear appropriate rain gear that will keep you dry
- If you encounter lightning, high winds, hail or heavy rain, seek shelter immediately
- If possible, cover any materials, tools, or equipment with plastic sheeting, tarps, or other waterproof material to prevent water damage. Have enough to cover any exposed areas of the roof to prevent water damage to the roof or the interior of the building
- Make sure any roof drains are clear of debris and unplugged. Good housekeeping will help roof drains remain clear of debris

Wind

- Wind can be the most dangerous element you will face in roofing. It is important that you understand the hazards and know how to avoid injury
- If possible, secure any materials on the ground and those that could be blown off the roof
- If your supervisor warns you to leave the roof, do so immediately; do not wait to finish another duty
- Watch for severe weather approaching
- Leave the roof if excessive winds pick up. Seek shelter immediately

FALL PROTECTION

One of the greatest hazards that a roofer faces is falling. This Company will have a site-specific fall protection plan at the jobsite. The fall protection plan will:

- Identify all fall hazards in the work area
- Eliminate and control the fall hazards
- Correct procedures for assembly, maintenance, inspection and disassembly of fall protection systems used
- Correct procedures for handling, storage, and securing of tools and materials used
- Overhead protection provided

For additional information on our fall protection policy, please refer to the Fall Protection chapter.

Ladders

- Portable ladder side rails must extend 3 feet (90 cm) above the landing surface and be secured at the top to prevent slipping
- Always inspect the ladder, rungs and rails at regular intervals for any cracks, defects, or corroded materials. Any ladders found to have defects must be taken out of service and tagged “Do Not Use”
- Never use a ladder with split or missing rungs
- Never use a ladder with grease, oil or any other slippery substance on the rungs or rails
- Ascend and descend while facing the ladder
- Do not carry anything up or down a ladder that could cause a fall. Both hands must be free to hold the ladder
- Check to make sure you don’t exceed the manufacturer’s intended load limitations
- The area around the top and bottom of the ladder must be kept clear
- Do not use a step ladder as a straight ladder
- All ladders must be equipped with safety (non-skid) feet
- The ladder base should be 1 foot (.3 m) away from the building for every 4 feet (1.2 m) in vertical height

EQUIPMENT SAFETY

The proper use of equipment and tools will make your job safer and more efficient. Before using tools, make sure you have been properly trained and fully understand their operation. Improperly maintained tools and equipment lead to accidents, so please take the time to learn how to properly care for them.

- Inspect tools and equipment before and after each use for defects or problems
- Immediately remove from service any tagged item that needs attention
- Always lock-out and tag-out a machine before repairing or cleaning it
- Always select the right tool or equipment for the job; don’t take shortcuts
- Always use appropriate personal protective equipment
- Always be sure that the guards are properly in place and working properly

Hand Tools

- Hand tools are those that are manually powered, including everything from screwdrivers to handsaws
- Do not use any tool with a cracked, loose or splintered handle
- Wear appropriate personal protective equipment, such as safety glasses and gloves
- Never use a tool as a pry bar (unless it is intended for that purpose)
- Maintain tools in good condition, e.g., properly sharpened, cleaned and lubricated
- Be aware that sparks caused by metal hand tools can be an ignition source for nearby flammables
- Do not use chisels with mushroomed heads

Power Tools

- Consult the owner's manual for proper use, maintenance and repair instructions
- Never carry a tool by its cord or hose
- Wear eye and hearing protection, as required
- Never operate power tools while wearing loose clothing, jewelry or anything else that could catch in moving parts
- Never remove safety guards, except during maintenance and cleaning. When you do remove a guard, immediately replace it upon completion. Never turn the tool on while the guard is removed
- Never modify safety guards
- Keep your fingers away from moving parts. Always turn off the equipment before removing any debris
- Do not use or store tools in wet or damp locations
- Operate gasoline tools only in a well-ventilated area or outdoors
- Always use safety cans for flammable and combustible liquids
- Turn off gasoline-powered equipment before refueling
- Be aware of and warn others while operating a tool or piece of equipment that can shoot objects at very high speeds, such as pneumatic or powder actuated tools

Cranes

- It is important to remember that anyone operating a crane must be competent and thoroughly trained. The operator must always know the weight of the load before lifting and whether it is within the weight capacity of the crane. A competent person must inspect all cranes on a regular basis. Critical parts such as slings, chains, ropes, hooks, hydraulic system components and other operating components must be inspected before each use. Inspection records must also be maintained
- Load rating charts must be conspicuously posted on all equipment. Instructions or warnings must be visible to the operator while at the control station
- Remember, if a crane has a telescoping boom, the load rating will change according to the boom length and angle: The load rating will decrease as the boom is extended and brought closer to the horizontal plane

- Maintain a minimum distance of 10 feet (3.05 m) around power lines
- Review all hand signals between the crane operator and other personnel responsible for transporting materials or equipment from ground to roof. An illustration of the hand signals must be posted on the job site. If a view is totally obstructed, the use of wireless headsets or other two-way communications may be appropriate
- Always plan a lift so that obstacle clearance is maintained and load restrictions are not exceeded
- Outriggers on mobile cranes must be deployed onto a firm surface to level the crane.
- Slings, hoisting wires, chains and ropes must always be free of kinks
- Check that the load is well-secured and balanced by lifting just off the ground for a moment before the lift
- Never carry a load over people
- Ground personnel must wear hard hats and stay out from under overhead loads
- Be aware of any ground-level weight constraints from underground parking areas, basements or subway systems
- Make sure the crane is resting on a surface that can handle the weight

Hoists

- Inspect the hoist daily. Look for frayed cables, broken welds, bent struts, or faulty mechanical parts. Make sure guards are intact and in place
- If possible, set materials on a pallet to make handling them easier
- Never leave a suspended load unattended
- Slings, hooks and rigging should be inspected prior to each use
- Check to make sure the hoisting area is free of debris
- Use barricades to limit pedestrian travel near the hoisting area
- Do not exceed the rated capacity of the hoist
- Do not assume that your equipment is in the same condition as when you last used it
- Rig loads with properly rated slings and safety hooks. Safety hooks must be equipped with a spring-loaded latch. Lift the load momentarily to check the securement of the load and its balance
- Always use enough counterweight. As a rule of thumb, use 2 pounds (0.90 kg) of counterweight for every 1 pound (0.45 kg) of load. Do not use construction materials as counterweight, or materials that flow, such as water or sand. Always follow the manufacturer’s specifications
- All ground personnel must wear hard hats. Stay out from under suspended loads

Conveyors

All conveyors must have an emergency shutoff, such as a pull cord. Before operating the conveyor, make a mental note of where the emergency shutoff is located in case of an emergency.

- Do not wear loose clothing, jewelry or other items that can become caught in conveyors
- Never ride or climb a conveyor

- Do not operate a conveyor unless you have been trained in its operation
- Never load a conveyor beyond its capacity

Maintenance

It is important to follow all proper maintenance procedures for tools and equipment. When maintenance procedures are not followed, the equipment wears out quickly and can become hazardous.

- Do not allow saws, blades, and cutting tools to become dull. Sharpen them periodically, especially after heavy use
- Check electrical equipment cords prior to each use for cut or frayed wires or loose or missing ground plugs
- Consult and follow the manufacturer's owner's manual for instructions on proper maintenance
- Make sure all moving parts are properly oiled and greased
- Any broken or defective equipment must be immediately tagged and taken out of service until it is properly repaired
- Gasoline engines should have their oil changed at frequent intervals
- Air-cooled engines must have their cooling fins kept free of asphalt and other debris. Make sure they are cleaned regularly

Forklifts

- OSHA requires all forklift operators to be trained before driving a forklift
- Make sure the backup signals, horns and lights are working properly before operating
- Forklift drivers should always be aware of overhead structures
- Be aware of electrical lines and maintain a distance of at least 10 feet (3.05 m)
- Never allow anyone to ride on the forks or anyplace else where a seat has not been provided
- Only stable or safely arranged loads should be handled
- Turn off the engine when refueling
- Never drive up to anyone standing in front of fixed objects, such as benches or walls. If you do not stop fast enough, you could pin them against the object
- All ground personnel must wear hard hats and stay out from under loads
- Do not place arms or legs between the mast and the forklift
- Never leave a forklift with an elevated load unattended. You should lower the load, set the brakes and turn off the engine before leaving
- Always block the wheels of the forklift and set the parking brake when not in use
- All forklifts must have falling object protection (FOPS) for the driver
- Wear the seat belt at all times if the forklift is equipped with one

Hazard Communication

Always:

- Maintain a list of all hazardous chemicals available on the job
- Ensure that containers are labeled

- Recognize and safely handle hazardous materials
- Know what to do in case of an accident
- Read and understand the safety data sheets (SDS)

Safety Data Sheets

The information you will need for the safe handling of chemicals and hazardous materials is contained on the safety data sheets (SDS). OSHA requires an SDS for every product containing a hazardous substance. The SDS must be centrally located for easy access. The purpose of the SDS is to:

- Identify the product
- Explain the physical and chemical characteristics of the hazardous material
- Explain the health hazards of the hazardous material
- Provide general precaution for safe handling
- Advise on the appropriate personal protective equipment
- Provide procedures for spills, cleanups and proper disposal of material and/or containers
- Explain emergency and first aid procedures
- List the name, address and telephone number of the manufacturer or responsible party that can explain additional information, including emergency procedures

Container Labeling

All hazardous substance containers are required to be labeled. This should be provided by the manufacturer or by the supplier. If there is no label, report this to your supervisor, who will notify the supplier. Refer to the MSDS for information, regarding the properties and safe handling of the chemical. Substances placed in temporary containers such as gasoline cans also need to be labeled. The label should be prominently displayed and contain the following information:

- The identity of the hazardous materials
- Appropriate hazard warnings, such as “danger,” “warning”, or “caution”
- The name and address of the manufacturer or the responsible party

Solvents and adhesives are some of the most hazardous substances that roof mechanics encounter. Because these materials are used so frequently, workers do not always realize the dangers they present. If proper precautions are not used, a worker can easily be overcome by their fumes or vapors or be severely burned. Remember to think through a task before you perform it. In most cases, common sense will be your best guide to avoiding problems.

Storage

- Read the manufacturer’s label or Material Safety Data Sheet (MSDS) for the required storage specifications
- Fire extinguishers must be accessible at all times
- Make sure that the containers are securely stored where the labels are easy to read
- Post “No Smoking” signs. If several containers of the same material are stored in an area, one large and easy-to-read label may be placed in an obvious location

- Always make sure the lids and tops of all solvents and adhesives are tightly closed before storing
- Store the different solvents and adhesives separately and away from other chemicals
- Immediately and promptly dispose of all empty pails and containers
- Flammable materials should not be stored near building stairways or exits

Safe Handling

- When working with solvents or adhesives, always wear the proper personal protective equipment
- Always check SDS for proper gloves
- Make sure the work area is well ventilated. If the area is not well-ventilated, use fans to help circulate the air
- Wear respiratory protection when required
- Read the label and follow the manufacturer's recommendations for applications and handling.
- Never smoke around solvents and adhesives; the vapors can ignite
- Avoid open flames
- Always be aware of other trades in the work area. Acetylene, electric welders and other flame-producing equipment may ignite solvent vapors
- Check to see that fire extinguishers are easily accessible

When cleaning tools, use non-solvent-based cleaners if possible. If you use solvents, remember to check the SDS and wear gloves, goggles and any other personal protective equipment required. Work in a well-ventilated area. Wear respiratory protection when required. Properly dispose of the rags used for cleaning.

ELECTRICAL

The use of electrical tools is common. They make many jobs easier and more efficient.

Electricity presents additional hazards. Not only are electrical tools and power cords a hazard, everyone must also be aware of power lines and other sources of electricity found on a job site. It only requires a split second of carelessness for an electrocution to occur. All electrical tools must be protected by either a ground fault circuit interrupter (GFCI) or an assured grounding program.

Ground Fault Circuit Interrupter

A ground fault circuit interrupter (GFCI) is designed to trip or interrupt electrical current very quickly to prevent shock or electrocution. Check the GFCI regularly with the "Test" and "Reset" buttons.

If a GFCI is found to be defective, it should be immediately removed from service and replaced. A GFCI must be used to protect all electrical tools and extension cords. To accomplish this, it must be placed at the power source.

Assured Grounding Program

An assured grounding program covers all receptacles that are not part of the permanent wiring of the building or structure, including all cord sets and any equipment connected by cord and plug. OSHA requires two tests. The first is a continuity test to ensure that the equipment grounding conductor is continuous. The second is performed on receptacles and plugs to make sure the equipment grounding conductor is connected to its proper terminal. These tests must be conducted quarterly for tools and cords, and every six months for receptacles.

- All extension cords are to be inspected before each day's use
- Any cords that are frayed, cut or have exposed wires must be removed from service and tagged
- Only use three-prong double-insulated extension cords
- Make sure the grounding pin is present and connected. If not, the extension cord must be taken out of service
- Extension cords should not be attached to the surface of any building
- The following are safety requirements for tools:
  - All power tools must be the three-pronged type, unless the tool is double-insulated and clearly marked as such
  - Tools that are not double-insulated must be included in the assured grounding program
  - Make sure the ground wire on any three-prong, non-double insulated power tool is present and functioning properly. This can be checked with continuity testing
  - Check all cords. If the insulation is exposed in any way, the power tool or extension cord must be taken out of service

Vehicle Operations

- Always check the load before you drive to ensure proper distribution, tie down and securement. If you are transporting LP gas cylinders, they must be secured in an upright position
- Always have a fire extinguisher and a first aid kit in the cab of the truck
- Be sure the backup alarm is functioning properly
- When backing up, have an outside observer direct the truck if you are unable to see behind you
- If you a towing a trailer, make sure the hitches and safety chains are in good condition and securely attached. Test the taillights and brakes to ensure that all are operational
- When towing, remember to allow an extra margin of distance to stop
- Use extra caution in adverse weather conditions
- Close the kettle lid securely before towing
- If you involved in an accident, report it to your office immediately
- Learn and follow the requirements for record keeping and maintenance as specified by the DOT's Federal Motor Carrier Safety Regulations
- Report all traffic violations to your Company
- Always wear your seatbelt
- Observe all posted speed limits
- When driving, always maintain a proper stopping distance between your vehicle and the car in front of you

HEALTH AND HYGIENE

Personal health and hygiene is an important part of your daily routine, both on and off the job. Improper hygiene could cause illness, which may result in lost productivity.

- Change and wear clean clothing on a daily basis
- Always wash your hands before eating or smoking and immediately following work
- Keep your shoes dry and wear clean socks daily. In the summer, wear cotton socks; wear layers in winter
- Do not reuse any disposable ear plugs
- Keep all personal protective equipment, such as face masks, respirators, goggles and reusable ear plugs clean and in good working condition
- Do not trade or lend your personal safety equipment to others
- Get plenty of rest on work nights
- If you are sick, stay home until you have recovered. Going to work will only worsen your condition and you could infect other employees
- Potable (Drinkable) Water
- An adequate supply of potable (drinkable) water is required at all job sites
- You must have a marked, dedicated and clean container to use for dispensing potable water
- The container must be equipped with a tap to dispense fresh water.
- The container must have a lid that can be closed to prevent dipping cups into the water.
- Never drink directly out of the tap.
- Individual drinking cups should be provided. The cups must be stored in a sanitary container. The cups must be disposed of in a trash receptacle.
- Empty the waste container each day. Allow container to dry before using it the next day.
- Never use the container to store tools or anything else at the end of the day.

Burn Prevention and Treatment

Any material maintained at elevated temperatures must be handled carefully to prevent burns. The following can be of assistance in burn prevention:

- To prevent spillage, do not overload kettles, luggers, buckets, or double stack pallet
- Instruct employees on the necessity of keeping skin covered and be alert for carelessness and safety violations such as rolled-up sleeves, removing shirts, wearing tennis shoes or failure to wear gloves
- Maintain fresh water in close proximity to kettles, tankers and work areas in order to promptly saturate and cool any bitumen spillage on the skin
- For contact with molten product, do not remove contaminated clothing. Flush skin immediately with large amounts of cold water. If possible, submerge area in cold water. Pack with ice. Seek medical aid

- For eye burns, immediately flush with large amounts of water for at least 15 minutes. Immediately seek medical aid
- In the event of extensive burns, treat as for shock by assisting the victim to a prone position; head slightly lower than the feet. Victim should be taken immediately to the nearest hospital for treatment

FIRST AID

Accidents and injuries require some type of first aid. If needed, call for medical assistance as soon as possible. Remember; always notify your supervisor of all accidents or injuries.

OSHA requires that all crew leaders, supervisors, or persons in direct charge of one or more employees must have a valid first-aid certificate. In addition, each employer must have a person holding a valid first-aid certificate at all worksite where a crew is present. (A crew is defined as two or more employees working at any worksite.)

First aid supplies must be available at every job site. The supplies must be appropriate to the work setting and easily accessible to all employees. Additionally, every vehicle used to transport work crews must be equipped with first aid supplies.

RESPIRATOR TRAINING AND INFORMATION

Our Company will provide effective training to employees who are required to use respirators. The training will be comprehensive, understandable, and recur annually and more often if necessary. This Company will also provide the basic information on respirators to employees who wear respirators when not required by this section or by the Company to do so.

For additional information on respirator use, please refer to the Respiratory Protection chapter of this manual.

HOT TAR AND BITUMINOUS ROOFING PROGRAM

Employee Sign-off Sheet			
Company Name			
Jobsite			
Date		Supervisor	
Safety Suggestions			
My signature attests and verifies my understanding of, and agreement to comply with, the Hot Tar and Bituminous Roofing Program and all Company safety policies.			
Employee Signatures			
Instructor/Supervisor Signature			

SCOPE

This chapter provides information on the requirements and safe practices for housekeeping and sanitation. This includes the requirements regarding potable water, toilet and washing facilities, food and eating areas and temporary sleeping areas, if applicable. All Company work practices will comply with OSHA regulations 1910.22 and/or 1926.25, whichever is applicable, as well as any state or local regulations.

POLICY

This Company has established a rigorous sanitation and housekeeping policy to ensure a safe, healthy, productive work environment Good housekeeping reflects employee pride in the workplace, and it must be practiced to ensure a safe working environment.

EMPLOYER RESPONSIBILITIES

The Company will:

- Train all employees on our safe housekeeping and sanitation practices
- Provide and maintain proper sanitation facilities to promote worker health
- Maintain all necessary waste removal and storage procedures and facilities
- Provide employees with the necessary tools and supplies to maintain a safe working environment
- Provide any needed PPE

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Adhere to this Company's safe housekeeping practices
- Maintain a clean work area
- Report any hazardous or unsafe conditions or acts immediately
- Use and maintain any required PPE

HOUSEKEEPING

There are several common workplace hazards that are avoidable, if proper housekeeping practices are followed. These include, but are not limited to:

- Tripping on items left on floors or stairs and slipping on soiled surfaces
- Being struck by falling objects
- Running into piles of material or protrusions
- Health hazards presented by unsanitary conditions
- Impeded access to exit routes in case of a fire or other emergency
- Fire hazards presented by improper disposal of flammable or combustible materials

By ensuring good housekeeping practices at the worksite, the employer reduces certain hazards, and provides a range of benefits, including:

- More efficient materials handling
- Greater control over workplace materials and inventory
- Streamlined maintenance routines and reduced janitorial workload
- Efficient use of space
- Greater employee morale and productivity

HAZARDS

The hazards associated with poor housekeeping and sanitation include:

- Injuries from slips, trips and falls
- Illnesses from unsanitary workplace conditions
- Exposure to hazardous materials and/or vermin

Good Housekeeping Planning

To be effectively implemented, good housekeeping practices must be built into everyday work procedures and be complemented by a work environment that encourages organization, cleanliness and a systematic, efficient means to store, move, use and dispose of materials.

Poor housekeeping can block exits and access to emergency equipment. Failure to remove trash and other debris also increases the risk of fire/explosion, and the presence of pests.

In the interest of safe housekeeping, the following requirements will be met by this Company's housekeeping plan:

- Workers will participate in jobsite cleanup during their shift
- Workers will dispose of rubbish quickly and properly
- Materials, tools, and equipment will be stored to prevent tipping, and away from walkways, ceilings, and power lines
- Work and travel areas must remain tidy, well lit, and well ventilated
- Any hazardous areas or conditions must be marked with a sign to prevent injury or illness

Daily, weekly and monthly cleaning procedures should be implemented to help establish routines that maintain workplace cleanliness and organization.

Housekeeping Safe Practices

- All aisles, passageways, storerooms, and service rooms must be kept clean and orderly
- Aisles and passageways will be marked or otherwise identified, and when mobile equipment and employees use the same aisle or passageway, clearances must be provided and maintained to ensure safe passage
- Materials, including scrap and debris, will be piled, stacked or placed in a container to prevent creating hazards to employees, and as often as necessary, to keep work and travel areas orderly

- Loose materials not being used will not be allowed to accumulate
- Keep equipment and areas around equipment clear of scrap and waste
- Do not drop material or rubbish freely from any level; use chutes or other approved devices
- Sufficient inventories of cleaning supplies will be kept on-site. Cleaning chemicals must be stored in spill-proof containers away from toxic or reactive chemicals
- Workplaces and passageways that are slippery from oil or grease, other substances, or other causes will be cleaned or covered with sand, sawdust, or other material to prevent slipping
- Where any wet process, such as food processing or car washing, is performed, adequate drainage will be maintained or false floors, platforms, or mats used
- Where an employee is required to work on a wet surface in a wet process, the surface will be slip resistant
- Guardrails temporarily removed for materials delivery will be immediately replaced when work is done and involved workers must wear fall protection until guardrails are back in place
- Keep electrical cords away from areas where people could trip over them
- Keep electrical cords away from wet areas. Never let a cord sit in water
- Keep floors and passageways free from protruding nails, electrical cords, splinters, holes, or loose boards
- Kitchens must be furnished with sufficient trash receptacles
- Garbage capable of rotting or becoming putrid must be placed in a covered container. Container contents will be disposed of at frequent and regular intervals
- Refrigerators must be cleaned out each week, and counters, microwaves, and sinks should be cleaned each day
- Workers are discouraged from eating at desks or anywhere not designated for eating
- Ensure restrooms are cleaned and sanitized daily. Adequate stock of paper goods and soap must be maintained at all times to ensure a hygienic workplace
- Hose and electric conductors must be elevated over or placed under the walkway or working surfaces or be covered by adequate crossover planks
- Access to exits, fire alarm boxes and fire-extinguishing equipment will be maintained at all times
- Oils, paints thinners, solvents, waste, rags or other flammable substances must be kept in fire-resistant covered containers when not in use
- During construction, alteration or repairs, form and scrap lumber with protruding nails, and all other debris, must be kept cleared from work areas, passageways and stairs, in and around buildings or other structures
- Combustible scrap and debris must be removed at regular intervals during construction. Safe methods will be provided for such removal
- Containers must be provided for the collection and separation of waste, trash, oily and used rags and other refuse
- Containers used for garbage and other oily, flammable or hazardous wastes, such as caustics, acids or harmful dusts must be equipped with covers

- Garbage and other waste must be disposed of at frequent and regular intervals
- Where vegetation is a hazard, employees will be protected by vegetation control or other means of protection, such as, but not limited to, a barrier, PPE or medication

SANITATION

The Company will ensure that all requirements regarding potable water, toilet and washing facilities, food and eating areas and temporary sleeping areas (if applicable) will meet the required relevant regulations.

Potable Water

Potable water must be provided and placed in locations readily accessible to all employees. The water must be suitably cool and available continuously in sufficient amounts to keep all workers hydrated, taking into account the air temperature, humidity and nature of the work performed. The water will be dispensed in sanitary single-use drinking cups, or by fountains. Common drinking cups are prohibited.

Portable containers used to dispense drinking water must be tightly covered, regularly cleaned and refilled at least daily. Containers must have a tap, and water must not be dipped from containers. The containers must be clearly marked as to the nature of their contents, made of a material that maintains water quality, and not used for any other purpose.

Potable drinking water, as well as toilet and hand-washing facilities, must be maintained in accordance with appropriate public health sanitation practices.

Non-Potable Water

Outlets for non-potable water, such as water for industrial or firefighting purposes only, will be identified by signs that clearly indicate the water is unsafe, and is not to be used for drinking, washing or cooking purposes. There will be no cross-connection, open or potential, between a system that furnishes potable water and a system that furnishes non-potable water.

Jobsite Toilets

Toilets at construction jobsites must be provided for employees according to the table below table. Toilet facilities must be adequately ventilated, readily accessible, and maintained in a clean and sanitary condition. Mobile crews may be provided transportation to nearby toilet facilities.

Number of Employees	Facilities Required
20 or less	1
20 or more	1 toilet seat and 1 urinal per 40 employees
200 or more	1 toilet seat and 1 urinal per 50 employees

Job sites, not provided with a sanitary sewer, shall be provided with one of the following toilet facilities unless prohibited by local codes:

- Privies (where their use will not contaminate ground or surface water)
- Chemical toilets
- Recirculating toilets
- Combustion toilets

Gender Considerations

Access to sanitary facilities can be challenging on some construction sites. Temporary facilities are usually unisex, and often not very well maintained or over used. Where practicable, employers should consider establishing gender specific facilities, or facilities with internal and external locking systems

Permanent Work Location Toilets

Employees working in a permanent location (factory or office) must be provided toilet facilities, in toilet rooms separate for each sex according to the table below. The number of facilities to be provided for each sex shall be based on the number of employees of that sex for whom the facilities are furnished.

Where toilet rooms can only be occupied by one person at a time, can be locked from the inside, and contain at least one water closet, separate toilet rooms for each sex are not required. Where such single-occupancy rooms have more than one toilet facility, only one such facility in each toilet room will be counted.

Number of employees	**Minimum number of facilities (1)**
1 to 15	1
16 to 35	2
36 to 55	3
56 to 80	4
81 to 110	5
111 to 150	6
Over 150	(2)
1. Where toilet facilities will not be used by women, urinals may be provided instead of water closets, except that the number of water closets in such cases may not be reduced to less than 2/3 of the minimum specified 2. Additional fixture for each additional 40 employees	

Each lavatory must have:

- Hot and cold running water, or tepid running water
- Hand soap or similar cleansing agents
- Individual hand towels or sections thereof, of cloth or paper, air blowers or clean individual sections of continuous cloth toweling, convenient to the lavatories

Washing Facilities

Employers must provide onsite general washing facilities (one per 20 employees) for construction projects, must keep them in sanitary condition, and must provide suitable cleaning agents/single-use towels for the removal of hazardous and other substances.

Whenever showers are required by a particular standard, the showers will provide:

- One shower for each 10 employees of each sex, or numerical fraction thereof, who are required to shower during the same shift
- Body soap or other appropriate cleansing agents convenient to the showers
- Hot and cold water feeding a common discharge line
- individual clean towels for all employees who use the showers

Eating and Drinking Areas

No employee will be permitted to consume food or beverages in a toilet room or in any area exposed to a toxic material.

All employees' food service facilities and operations shall meet the applicable laws, ordinances and regulations of the jurisdictions in which they are located.

Receptacles constructed of smooth, corrosion resistant, easily cleanable or disposable materials will be provided and used for the disposal of waste food. The number, size and location of such receptacles must be adequate to encourage their use and not result in overfilling. These receptacles must be emptied at least once each working day, unless unused, and shall be maintained in a clean and sanitary condition. Receptacles will have a solid tight-fitting cover unless sanitary conditions can be maintained without use of a cover.

No food or beverages shall be stored in toilet rooms or in an area exposed to a toxic material.

All employee food service facilities and operations shall be carried out in accordance with sound hygienic principles. In all places of employment where all or part of the food service is provided, the food dispensed shall be wholesome, free from spoilage, and shall be processed, prepared, handled, and stored in such a manner as to be protected against contamination.

Vermin Control

Every enclosed workplace will be constructed, equipped and maintained, so far as reasonably practicable, as to prevent the entrance or harborage of rodents, insects and other vermin. A continuing and effective extermination program will be instituted where their presence is detected.

TRAINING

This Company will verify that all employees are trained on:

- Our housekeeping and sanitation policy
- How to avoid slips, trips and falls
- Proper waste disposal procedures and storage locations

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

SCOPE

This chapter defines the requirements and safe practices to follow when using hydraulically powered tools and equipment. It covers both hand-held tools and permanently installed equipment. These practices will comply with the applicable OSHA regulations of 1926 Subpart I and/or 1910 Subpart P.

POLICY

This policy is intended to ensure safety for employees who use hydraulically powered tools, and must be followed by all employees.

Hydraulic tools are similar in concept to pneumatic tools except one supplies power using a fluid while the other uses compressed air or gas. There are advantages to both types of tools and the preference depends on the application.

EMPLOYER RESPONSIBILITIES

It is the Company's responsibility to:

- Maintain all tools and equipment used by employees in safe, working condition
- Remove unsafe equipment from the worksite; Ensure employees are properly trained in the safe use and operation of tools and equipment before using or operating the tools and equipment on the job
- Provide personal protective equipment to prevent injury and adverse health effects
- Select and use only tools with appropriate safety guards
- Ensure every job hazard analysis and safe job procedure considers the hazards introduced by hydraulically powered tools

EMPLOYEE RESPONSIBILITIES

All Company employees are expected to:

- Be aware of hazards presented by tools where they work
- Follow Company safety policy and the instructions of the supervisor
- Comply with safe operating procedures for all equipment
- Properly use and maintain personal protective equipment
- Attend and participate in appropriate safety training
- Inspect tools and equipment daily to ensure they are in proper working order
- Report defective tools and equipment, and other safety concerns immediately

SAFE PRACTICES

Hydraulic systems can be dangerous. Fluid can escape when adjusting or removing equipment. Fluid can be trapped in the hydraulic system even when the engine and hydraulic pump are stopped.

The pressure of trapped fluid can be more than 2,000 pounds per square inch (psi). Pressurized fluid can penetrate the skin. You would need surgery to remove the fluid.

General Safety

The fluid used in hydraulic powered tools must be fire-resistant fluids approved under Schedule 30 of the U.S. Bureau of Mines, Department of the Interior, and must retain its operating characteristics at the most extreme temperatures to which it will be exposed.

The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings must not be exceeded.

- All hydraulic tools and similar equipment, whether furnished by the employer or the employee, will be maintained in a safe condition
- When tools have safety guards, the guards must be installed when the tool is in use
- Never carry a tool by its hose
- Never yank the hose of a tool to disconnect it from the receptacle
- Keep hoses away from heat, oil, and sharp edges
- Disconnect tools when not using them, before servicing and cleaning them, and when changing accessories such as blades, bits, and cutters
- Keep all people not involved with the work at a safe distance from the work area
- Follow instructions in the user's manual for lubricating and changing accessories
- Be sure to keep good footing and maintain good balance when operating power tools
- Follow good housekeeping procedures to keep floors free of debris and hazards
- Do not allow dust, shavings or other scraps to accumulate on or near machines, causing an operational hazard
- Wear proper clothing for the task. The wearing of loose clothing, sleeves, neckties, scarves, and jewelry is prohibited because it can become caught in moving parts
- Do not wear gloves while operating machines with rotating parts
- Tools and machines must be located where there is enough space for workers to handle material without interference from, or to, co-workers or other machines
- Operators will not to stand in an aisle while operating a machine unless protection is provided
- Except for portable hand tools, machines designed for a specific location must be secured to a floor, foundation, bench, table or stand strong enough to prevent overturning or unintentional movement
- Tools and machinery must be located so that light with the intensity of at least 50-foot candles from both natural and artificial light falls on the work. Supplementary illumination at the point of operation must be provided where necessary
- Any tool or machine that is not in proper working order must be immediately removed from service
- Tools and machines must be inspected at regular intervals and will be repaired in according to the manufacturer's specifications. Untrained or unauthorized people must not modify them, and they cannot be returned to service until properly repaired
- Use tools and machines only for their intended purpose

Guards

The exposed moving parts of power tools must be safeguarded. All tools must be used with the correct shield, guard, or attachment recommended by the manufacturer. Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains or other reciprocating, rotating or moving parts of equipment must be guarded.

Guards, as appropriate, must be provided to protect the operator and others from the following:

- Point of operation
- In-running nip points
- Rotating parts
- Flying chips and sparks

Safety guards must never be removed or made inoperable when a tool is being used. Machines must not be used for operations of such variety as to necessitate the removal of safeguards.

TOOLS

Hand held hydraulically powered tools commonly used in construction include, but are not limited to:

- Jacks
- Saws
- Drills

Jacks

Jacks are frequently used for lifting and supporting structures and structural components. They are available in a variety of types and sizes, but the basic use and maintenance are the same.

Jack Safety

- The operator must make sure the jack used has a rating sufficient to lift and sustain the load
- The rated load must be legibly marked in a prominent location on the jack by casting, stamping, or other suitable means
- All jacks must have a positive stop to prevent over travel
- Hydraulic jacks exposed to freezing temperatures must be supplied with an adequate antifreeze liquid
- In the absence of a firm foundation, the base of the jack must be blocked. If there is a possibility of slippage of the cap, a block must be placed in between the cap and the load
- The operator must watch the stop indicator, which will be kept clean, in order to determine the limit of travel
- After the load has been raised, it must be cribbed, blocked, or otherwise secured at once
- Hydraulic jacks exposed to freezing temperatures must be supplied with an adequate antifreeze liquid
- All jacks must be lubricated at regular intervals

- Each jack must be inspected based on the service conditions. Inspections must be not less frequent than the following:
  - For constant or intermittent use at one locality, once every 6 months
  - For jacks sent out of shop for special work, when sent out and when returned
  - For a jack subjected to abnormal load or shock, immediately before and immediately thereafter
- Repair or replacement parts must be examined for possible defects
- Jacks that are defective or damaged must be tagged and not be used until repairs are made

Saws

Circular, chain, cut-off hydraulic saws can be used for tree trimming, general construction, and concrete cutting. While hydraulic tools offer the advantage of lighter weight for the operator, the same care, maintenance and safe practices apply and must be followed.

Saw Safety

- Never operate a saw with missing or defective guards
- Before changing or adjusting blades, disconnect the saw from the power source
- Ensure that arbor diameter and blade diameter are right for the saw
- Because not all lumber is new, make sure it is clean and free of nails, concrete and other foreign objects. This precaution not only prolongs blade life but may also prevent serious injury
- Ensure that blades are installed in the proper rotational direction
- Do not strike metal when using a carbide-tipped blade. The tips can come loose and fly off, ruining the blade and injuring the operator. Inspect the blade regularly for cracked or missing tips
- Place the material to be cut on a rigid support such as a bench or two or more sawhorses
- Make sure that the blade will clear the supporting surface and hoses
- Never reach under the material being cut
- Maintain a firm, well-balanced stance, particularly when working on uneven footing

Drills

Hydraulic drills (hammer drills) are used for concrete or rockwork and auguring. Smaller units can be used for masonry work and posthole digging, while larger models, usually equipment mounted, are used for excavation, quarry work and well drilling.

Drill Safety

- Hold the drill firmly in one hand or two hands, as necessary, at the correct drilling angle
- Disconnect the drill and remove the bit as soon as the work is finished
- When drilling into floors, ceilings, and walls, beware of wiring and plumbing
- Rotary and hammer drills generate extreme torque and must be handled with caution. Take occasional breaks to relax your arms and shoulders

Operation

- Operators will inspect hydraulic hoses before using equipment
- Tighten all connectors before applying pressure. Cracked hoses may have pinhole leaks. Keep hands and body away from leaks and nozzles that might eject fluid under high pressure. Use a piece of cardboard or paper to search for leaks. Relieve pressure before disconnecting a hydraulic line
- Do not cross-hydraulic lines. If the lines are not coupled correctly, equipment will not operate properly. Tape or color-code lines to prevent an accident
- Heat causes the fluid to expand, increasing the pressure. Always relieve hydraulic pressure before loosening hydraulic fittings. The hot, high-pressure spray of the hydraulic fluid can cause injury

Maintenance

- Shut off hydraulic pump power
- Make certain that pressure is relieved before working on any hydraulic circuit
- Follow the instructions in the operator's manual for specific procedures for servicing hydraulic systems and safety guidelines
- Stay away from cracked hoses, leaks, and nozzles that might eject fluid under pressure

TRAINING

The Company will ensure all employees who use hydraulically powered tools are provided proper training on those tools before using them on the job. This training will be provided during working hours at no cost to the employee.

Training Components

The Company's safety coordinator will ensure every employee will be trained on, and adhere to the requirements of, the following minimum elements:

- Proper storage, maintenance and use of any tool the employee will use in his job
- A description and identification of the hazards associated with tools
- The safeguards, including PPE, to protect the employee from tools, the hazards for which they are intended
- How to use tool safeguards and why
- Safety precautions necessary for working with the tool
- How to inspect tools for damage and what to do (e.g., contact the supervisor) if a tool is damaged, missing safeguards or other pieces, or otherwise unable to provide adequate protection
- Limitations of tools being used and the how to select the right tool for the job
- How to use and maintain the tools properly
- Where to find the manufacturer's instructions for the tools the employee is expected to use

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for length of their employment.

SCOPE

This chapter provides information on our safe practices and requirements for maintaining indoor air quality (IAQ). Although OSHA does not have IAQ standards, it does have standards regarding ventilation and on some air contaminants that can be involved in IAQ problems.

In addition, California and New Jersey have implemented indoor air quality regulations; always check with state and local agencies to determine there are any applicable regulations that affect your workplace.

POLICY

This Company has implemented an Indoor Air Quality (IAQ) program to protect employees from potential health risks at the workplace. Although control of airborne contaminants is the focus of these guidelines, ventilation, temperature and humidity are also important.

EMPLOYER RESPONSIBILITIES

In an effort to protect employees this Company will:

- Maintain a good working relationship with building management on indoor environmental issues
- Place office furniture and equipment in locations based on the adequate air circulation, temperature control, and pollutant removal functions of the HVAC system
- Coordinate with building management when responsibility for design, operation, and maintenance of the ventilation system is shared
- Avoid procedures and products that can cause IAQ problems
- Integrate IAQ concerns into purchasing decisions
- Ensure use of only necessary and appropriate pest-control practices; use nonchemical methods when possible
- Work with building management and/or contractors, before starting to remodel or renovate to identify ways of minimizing building-occupant exposure, and to ensure that the air-distribution system is not disrupted
- Develop a preventive IAQ management program following guidance issued by the EPA and the National Institute for Occupational Safety and Health

A sample HVAC inspection sheet is attached to the end of this chapter that can be used for regular inspections and maintenance.

EMPLOYEE RESPONSIBILITIES

All Company employees are expected to follow these procedures to reduce or eliminate workplace air pollution:

- Do not block air vents or grilles
- Water and maintain office plants properly
- Dispose of garbage promptly and properly

- Store food properly
- Avoid bringing products into the building that could release harmful odors or contaminants
- Notify the building or facility manager immediately if you suspect an IAQ problem

HAZARDS

The greatest challenge posed by IAQ investigations is that the reported symptoms and health complaints are generally diverse and usually not suggestive of any particular medical diagnosis or readily associated with a causative agent. A typical spectrum of symptoms includes headaches, unusual fatigue, itching or burning eyes, skin irritation, nasal congestion, dry or irritated throats and other respiratory irritations. It is often difficult to prove a cause that would substantiate an OSHA violation. However, in some instances, specific illnesses can be associated with identifiable exposures in the indoor environment and employers may be subject to an OSHA citation. Examples of such illnesses include Legionnaires disease, histoplasmosis, carbon monoxide poisoning, and certain allergic reactions associated with exposure to molds.

Serious Air Quality Hazards

Examples of IAQ problems that normally indicate a “Serious” hazard may exist include the following:

- Complaints of headaches, nausea, lethargy, and/or dizziness (especially if onset was sudden and/or severe) and carbon monoxide poisoning from combustion sources is suspected
- Complaints of fever/chills and fatigue, or cough and shortness of breath (especially severe or widespread complaints), other symptoms, or physician-diagnosed disease (e.g., Legionnaires’ disease, histoplasmosis) consistent with exposure to airborne microorganisms
- Wheezing or other indications, where chemicals are present, that might prompt or aggravate asthma in a worker
- Complaints of significant mold growth within a building

Physician-Diagnosed Illnesses Associated with Microbial Contamination INCLUDE:

- Allergic rhinitis or sinusitis
- New-onset asthma
- Hypersensitivity pneumonitis
- Pneumonia
- Fever/flu-like illness
- Recurrent airborne infections

Symptoms Associated with Microbial Contamination Include:

- Dry, irritated or sore throat
- Wheezing
- Difficulty breathing or shortness of breath
- Chronic postnasal drip

- Chronic cough
- Continual throat clearing
- Frontal headaches or facial pain that increases with bending over or straining
- Eustachian tube dysfunction (ear pain)
- Altered hearing, smell and/or taste
- Recurrent fevers or chills in addition to general malaise and muscle ache

SOURCES OF INDOOR AIR POLLUTION

Indoor air quality is affected by pollution from inside and outside of buildings and by poor ventilation. Human metabolic activity, smoking, structural components of the building, building contents, biological contamination, office and mechanical equipment, and outside air pollutants that enter the building—all are sources of indoor air pollution.

Inside Air Contaminants

Indoor sources of air pollutants due to chemicals can be attributed to building materials and products used in the building. Formaldehyde vapors can be emitted from urea-formaldehyde foam insulation, particleboard, plywood, and some glues and adhesives commonly used during construction. Other contaminants include fibrous glass, various organic solvents from glues and adhesives, and acetic acid used as a curing agent in silicone caulking.

Chemicals and emissions from equipment also contribute to indoor air pollution. These include, for example, methyl alcohol from spirit duplicators, butyl methacrylate from signature machines, ammonia and acetic acid from blueprint copiers, and ozone from photocopiers. Other inside contaminants include:

- Improperly applied pesticides
- Boiler additives such as n, n-diethylethanolamine
- Improperly diluted cleaning agents such as rug shampoo
- Tobacco smoke of all types (also commonly referred to as environmental tobacco smoke)
- Combustion gases from sources common to cafeterias and laboratories
- Cross-contamination from poorly ventilated sources that leak into other air zones

Indoor air problems due to biological pollutants often involve some type of microbiological contamination. Three conditions are necessary for microbial contamination to occur: high humidity (over 60 percent), appropriate temperatures and suitable growth media. Such contamination can result from water damage to carpets or furnishings or from standing water in ventilation system components. A respiratory problem known as hypersensitivity pneumonitis can result from bacteria and microbiological products that may originate in ventilation system components.

Outside Air Contaminants

Pollutants from outside the building or office space can also contribute heavily to indoor air problems. Examples of these contaminants are motor vehicle exhaust, boiler gases and previously exhausted air. Major sources are improperly located exhaust and intake vents and periodic changes in wind conditions.

One of the most common contaminants from outside is carbon monoxide gas from basement parking garages, recirculated through the building ventilation system. Other outside contaminants include the by-products of construction or renovation, such as asphalt, solvents and dusts. Gasoline vapors can also infiltrate basements and sewage systems and are usually caused by leaks from ruptured underground tanks at nearby service stations.

Inadequate Ventilation

Inadequate ventilation is a key factor associated with poor indoor air quality. Ventilation problems commonly encountered include:

- Insufficient outdoor air supplied to the office space
- Poor air distribution and mixing, which causes stratification, draftiness and pressure differences between office spaces
- Extremes of fluctuations in temperature and humidity (sometimes caused by poor air distribution)
- Air filtration problems caused by improper or inadequate maintenance to the building ventilation system

In many cases, these ventilation problems have been created or exacerbated by energy conservation measures. Such measures include reducing or eliminating outdoor air; reducing infiltration and exfiltration; lowering thermostats in winter and raising them in summer; eliminating humidification or dehumidification systems; and early shutdown and late start-up of ventilation systems.

CONTROL STRATEGIES

There are four control strategies this Company has established to protect employees, they are education and training; dilution ventilation; modifying processes and equipment; and air cleaning.

Education and Training

The Company will provide all employees with timely information on the health and physical hazards associated with products and materials. Employers are required to develop and implement a hazard communication program where any hazardous chemicals are known to be present and to which employees may be exposed. If required, this Company's' hazard communication program is covered in the Hazcom chapter of this manual.

Engineering Controls

This Company will incorporate all practicable engineering controls to eliminate or reduce air contaminants by using any of the following methods.

Dilution Ventilation

The Company will ensure that ventilation systems are designed to supply sufficient oxygen for normal respiration, to dilute contaminants in occupied spaces, remove contaminants emitted from work areas and to control odors. This Company also will ensure that its ventilation systems comply with The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) standards.

The primary method of controlling air contaminants in most buildings is general ventilation. General dilution ventilation requires a clean air supply to dilute all the contaminants of concern and exhaust openings located near the contaminant source or work area.

Recirculation of exhausts will be avoided by locating the intake and outlet remotely. The Company will ensure that reentry of exhaust air is avoided by discharging exhaust above the roof away from openings and air intakes.

Modifying Processes and Equipment

Pollution emission rates will be reduced, where practical, by modifying processes and equipment. The Company will strive to remove polluting substances that are part of the work process, and will substitute less toxic materials for contaminating substances. If the elimination of contaminating substances cannot be eliminated, we will attempt to reduce the quantity being used.

Equipment may be subject to modification that would reduce contamination. Using equipment differently or installing barriers may also reduce emissions at their source.

Air Cleaning

This Company will implement control strategies that involve removing air contaminants before the air is recirculated. Filters, electronic air cleaners, adsorption and absorption techniques will be employed for the removal techniques for pollutant gases where feasible.

Administrative Controls

In the event that adequate air quality cannot be achieved through engineering controls, the Company will implement all practicable administrative controls to protect workers. These may consist of any of the following:

Work Schedule: Through scheduling, managers can significantly reduce the amount of pollutant exposure in their buildings by:

- Eliminating or reducing the amount of time a worker is exposed to a pollutant (i.e., scheduling maintenance or cleaning work to be accomplished when other building occupants are not present)
- Reducing the amount of chemicals being used by or near workers (i.e., limit the amount of chemicals being used by the worker during maintenance or cleaning activities)
- Controlling the location of chemical use (i.e. perform maintenance work on moveable equipment in a maintenance shop as opposed to the general area, or locate the equipment (e.g., printers, copiers) in a separate room)

Housekeeping: Housekeeping practices should include

- Preventing dirt from entering the environment (using, for example, walk-off mat systems), removing dirt once it is in the building
- Disposing of garbage
- Storing food properly
- Choosing cleaning products and methods that minimize the introduction of pollutants into the building

EVALUATING MICROBIOLOGICAL CONTAMINATION

The Company will investigate potentially serious hazards when the following three criteria are met:

- **A Source:** The building is significantly water damaged, contaminated with molds, or reservoirs of other microorganisms (e.g., Histoplasma, Legionella) exist
- **An Exposure Pathway:** An exposure pathway is likely
- **Illness and Symptoms:** A physician has diagnosed a building-related illness or building occupants are suffering from symptoms consistent with exposure to the potential source

Evaluating the Source

Consideration should be made of the possible extent of contamination. Small areas of contamination (i.e., traces of mold on a wall or ceiling tile) may not necessarily warrant classification as a serious hazard (although it may be a superficial indicator of hidden problems), as opposed to a contaminated air plenum or an extensively water-damaged wall.

Normally, mold contamination is easily recognizable due to moldy odors and their unique visual characteristics. Other specialized sampling may be required if Legionella or any other pathogenic (disease-causing) microorganism is suspected.

Evaluating the Potential for an Exposure Pathway

Bio-aerosol sampling has been used by many investigators to demonstrate the existence of exposure pathways. However, the numerous technical limitations and difficulties associated with this method make the sampling results extremely difficult to interpret. In general, bio-aerosol sampling should not be performed, unless there are special circumstances that warrant this approach. You should qualitatively evaluate factors such as the magnitude and proximity of the contaminated materials and potential exposure pathways. See Table for potential sources and pathways for consideration.

Evaluating Illnesses and Symptoms

Examples of illnesses and symptoms consistent with exposure to molds and other microorganisms are indicated below. You must recognize that many of the listed symptoms are relatively common complaints and are not necessarily reflective of a workplace exposure or serious illness.

ATTACHMENTS

The following page contains a sample HVAC maintenance checklist that may be reproduced and used for performing maintenance and inspections.

HVAC SYSTEM MAINTENANCE CHECKLIST

The following checklist can be used to investigate the HVAC system to make sure it is operating properly (e.g., the right mix of fresh air, proper distribution, and filtration systems are working, etc.)

Cooling Towers

- ☐ Written maintenance and inspection program
- ☐ Operated in accordance with manufacturer specifications
- ☐ Inspected regularly (monthly, or as required).
- ☐ Treatment of waste to control microorganisms, as required.
- ☐ Recordkeeping of biocide use – brand, volume, and results
- ☐ Training of workers for hazards involved.

Humidifiers

- ☐ Written maintenance and inspection program
- ☐ Inspected weekly during operation
- ☐ Cleaned and disinfected as required.
- ☐ No visual buildup of mold or slime
- ☐ Disinfectants removed before reactivating humidifiers.

Cooling Coils

- ☐ Written maintenance and inspection program
- ☐ Monthly (or, as required) inspections during operation
- ☐ Removal of dirt, slime, and mold, as required
- ☐ Upstream filters operating properly

Drain Pans, Drainage Systems

- ☐ Written maintenance and inspection program
- ☐ Monthly inspection (or, as required)
- ☐ Drains maintained in free-flowing condition.
- ☐ No accumulation of stagnant water
- ☐ No buildup of slime, mold, or dirt
- ☐ Removal of dirt, slime, and mold, as required
- ☐ Sample water for microbes, as required

Duct and Plenum Equipment

- ☐ Written inspection and maintenance program
- ☐ Supply, exhaust, return grilles, and ducts clear and clean.
- ☐ Routine inspection of ducts, debris, and microbial growth (e.g., semi-annually)
- ☐ Provisions of cleanout (e.g., within four feet downstream of duct expansions, supply air openings, or where particulate deposition may occur).
- ☐ Ductwork attached, not dented.
- ☐ Insulation intact, not wet, and no microbial growth
- ☐ Ductwork properly balanced.

Filtration Systems

- ☐ Written maintenance, operating, and inspection programs
- ☐ Routine inspection
- ☐ Provision for measuring pressure drops across the filtration system

SCOPE

This chapter provides information on the safe practices when working with ladders and/or stairs. The policy and procedures covered where will comply with the requirements of the OSHA ladder and stairway regulations in 1926 Subpart X and/or 1910 Subpart D, whichever is applicable.

It does not address working at elevations or fall protection, those items are addressed in separate chapters.

POLICY

Ladders are valuable tools, but they present a range of hazards that workers need to understand in order to use them safely. This Company has created this policy to ensure employees understand how to use ladders safely, how to select the right ladder for a job, how to store and maintain ladders and how to recognize ladders that may be hazardous.

EMPLOYER RESPONSIBILITIES

This Company is responsible for:

- Making sure all ladders meet safety requirements and are maintained in safe, working condition
- Selecting ladders to purchase according to needs of operations
- Ensuring employees are trained in safe ladder selection and use
- Removing ladders from service when they are no longer safe to be used
- Requiring employees use ladders as safely as possible

EMPLOYEE RESPONSIBILITIES

Employees will:

- Participate actively in ladder safety training
- Recommend safety improvements and report safety hazards to supervisor, safety team or other appropriate personnel
- Report damaged or otherwise unsafe ladders
- Follow safe practices when using ladders
- Transport and store ladders according to best safe practices

HAZARDS

Most ladder falls involve portable ladders that move, tilt or shift while a worker is climbing or descending. Unstable or slippery base surfaces are the primary reasons ladders fail. Other reasons include a misstep or a slip of the foot, loss of balance, an overreach and being struck by a vehicle or another object.

LADDER TYPES

Portable Ladders

Workers can reduce ladder fall risks by doing the following:

- Frequently inspecting and maintaining ladders
- Matching tasks to appropriate ladders
- Setting up ladders correctly
- Climbing and descending ladders properly

Any portable ladder used during construction activities: must be meet the following specifications

- Non-self-supporting and self-supporting portable ladders must support at least four times the maximum intended load; extra heavy-duty type 1A metal or plastic ladders must be able to support 3.3 times the maximum intended load. The ability of a self-supporting ladder to sustain loads must be determined by applying the load to the ladder in a downward vertical direction. The ability of a non-self-supporting ladder to sustain loads must be determined by applying the load in a downward vertical direction when the ladder is placed at a horizontal angle of 75.5 degrees
- The minimum clear distance between side rails for portable ladders must be 11.5 inches
- The rungs and steps of portable metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant material, or treated to minimize slipping

Non-Self-Supporting Ladders

Single Portable or Straight Ladders

The single portable or straight ladder is indispensable for general use. It is the most common type of portable ladder and has the widest range of applications. When used on slippery surfaces, this ladder must have slip-resistant feet or be secured to prevent it from sliding.

Rubber or neoprene ladder shoes are recommended for smooth, dry surfaces, and spikes are recommended for snow or ice. Single portable ladders must not be longer than 30 feet and be used by only one worker at a time.

Extension or Section Ladder

Extension ladders consist of two or more sections that travel in guides or brackets, allowing adjustable lengths. The sections must be assembled so that the sliding upper section is on top of the lower section. Each section must overlap its adjacent section a minimum distance, based on the ladder's overall length. See Table 2.

The overall length of an extension ladder is determined by adding the lengths of the individual sections, measured along the side rails.

Note: Install positive stops on individual ladder sections to ensure the required overlap.

TABLE 1

Number of Sections for metal ladders	Maximum Length (in feet)
one section (or any section of a multiple-section ladder)	30
two-section ladder	48
more than two sections	60

TABLE 2

Normal Length of Ladder (in feet)	Overlap (in feet)
Up to and including 36	3
Over 36, up to and including 48	4
Over 48, up to 60	5

Extension ladders are made of wood, metal, or reinforced fiberglass. Wood ladders cannot have more than two sections and must not exceed 60 feet. Metal and fiberglass ladders can have as many as three sections; however, the overall length must not exceed 72 feet. See Table 1. Individual sections of any extension ladder must not be longer than 30 feet.

Extension ladders are for use by only one person at a time.

Make sure extension ladders have non-slip bases if there is a chance the ladder can slip. Cord-face ladder shoes are recommended for wet surfaces, rubber or neoprene ladder shoes for smooth dry floor surfaces, and steel spikes for ice or snow. Be careful if you use an extension ladder on oily, metal or concrete surfaces. Place the ladder securely and tie it off to prevent it from slipping.

Self-Supporting Ladders

Standard Stepladder

The standard stepladder, a general-purpose ladder, has flat steps and a hinged back. It is self-supporting and nonadjustable. An industrial model, designed for heavy service demands, has oversize back legs, heavy-duty flat steps, and knee braces that increase rigidity and durability.

Standard stepladders should be used only on surfaces that offer firm, level footing such as floors, platforms and slabs. They are available in metal, wood, or reinforced fiberglass versions, and are intended to support only one worker at a time. Remember not to stand on, or work from, the top step. The ladders must have a metal spreader or locking arms. They cannot be longer than 20 feet, measured along the front edge of the side rails.

Two-Way Stepladder

The two-way stepladder is similar to the industrial standard stepladder; however, each side of this ladder has a set of steps. The extra set of steps offers convenience and versatility: One person can work from either side or two people can work from the ladder at the same time — one on each side.

Platform Ladder

The platform ladder is a special-purpose ladder that has a large stable platform from which you can work at the highest standing level. The ladder's length is determined by the length of the front edge of the side rail from the bottom of the ladder to the base of the platform. The length of a platform ladder cannot exceed 20 feet.

Trestle Ladder

A trestle ladder is a self-supporting portable ladder that has two sections hinged at the top, forming equal angles with the base. A variation of the trestle ladder, the extension trestle ladder, includes a vertically adjustable single ladder that can be locked in place. (The single extension section must lap at least three feet into the base section.) Trestle ladders are used in pairs to support planks or staging. The rungs are not intended to be used as steps.

The angle of spread between open front and back legs must be 5 ½ inches per foot of length. The length cannot be more than 20 feet, measured along the front edge of the side rails. Rails must be beveled at the top and have metal hinges to prevent spreading. Metal spreaders or locking devices are also required to keep the rails in place.

Ladder Storage

The storage area should be well ventilated. Wood ladders should not be exposed to moisture or excessive heat. Avoid storing ladders near stoves, steam pipes or radiators.

Store straight or extension ladders in flat racks or on wall brackets. Make sure there are enough brackets to support the ladder so that it does not sag. If the ladder rails have a lateral curve, the wall brackets should match the curve.

Store stepladders vertically, in a closed position, to reduce the risk of sagging or twisting. Secure stored ladders so that they will not tip over if they are struck.

Store ladders, especially wood ladders, promptly after using them. Exposure to moisture and sun will shorten the life of a wood ladder.

Transporting Ladders

When you hand-carry a ladder, keep the front end elevated, especially around blind corners, in aisles, and through doorways. You will reduce the chance of striking another person with the front of the ladder.

When you transport a ladder in a truck or trailer, place it parallel to the bed. Avoid tossing, throwing or dropping it in the bed. If you transport a long ladder on a short truck bed over long distances, support the ladder so it will not sag or bend.

Drive slowly over rough terrain. Tie the ladder securely to eliminate nicking, gouging, chafing and road shock.

Fixed Ladders

A fixed ladder must be capable of supporting at least two loads of 250 pounds each, concentrated between any two consecutive attachments. Fixed ladders also must support added anticipated loads caused by ice buildup, winds, rigging and impact loads resulting from the use of ladder safety devices.

Individual rung/step ladders must extend at least 42 inches above an access level or landing platform, either by the continuation of the rung spacing as horizontal grab bars, or by providing vertical grab bars that must have the same lateral spacing as the vertical legs of the ladder rails.

Each step or rung of a fixed ladder must be capable of supporting a load of at least 250 pounds applied in the middle of the step or rung.

The minimum clear distance between the sides of individual rung/step ladders and between the side rails of other fixed ladders must be 16 inches.

The rungs of individual rung/step ladders must be shaped to prevent slipping off the end of the rungs. The rungs and steps of fixed metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant material or treated to minimize slipping.

The minimum perpendicular clearance between fixed ladder rungs, cleats and steps, and any obstruction behind the ladder must be 7 inches, except that the clearance for an elevator pit ladder must be 4.5 inches.

The minimum perpendicular clearance between the centerline of fixed ladder rungs, cleats and steps, and any obstruction on the climbing side of the ladder must be 30 inches. If obstructions are unavoidable, clearance may be reduced to 24 inches, provided a deflection device is installed to guide workers around the obstruction.

The step-across distance between the center of the steps or rungs of fixed ladders and the nearest edge of a landing area must be no less than 7 inches and no more than 12 inches. A landing platform must be provided if the step-across distance exceeds 12 inches.

Fixed ladders must have cages, wells, ladder safety devices or self-retracting lifelines where the length of climb is less than 24 feet but the top of the ladder is at a distance greater than 24 feet above lower levels. Fixed ladders without cages or wells must have at least a 15-inch clear width to the nearest permanent object on each side of the centerline of the ladder.

If the total length of a climb on a fixed ladder equals or exceeds 24 feet, at least one of the following items is required:

- Ladder safety devices
- Self-retracting lifelines, and rest platforms at intervals not to exceed 150 feet
- A cage or well, and multiple ladder sections, each ladder section not to exceed 50 feet in length, these ladder sections must be offset from adjacent sections, and landing platforms must be provided at maximum intervals of 50 feet

The side rails of through or side-step fixed ladders must extend 42 inches above the top level or landing platform served by the ladder. For a parapet ladder, the access level must be at the roof if the parapet is cut to permit passage through it; if the parapet is continuous, the access level is the top of the parapet.

Steps or rungs for through-fixed-ladder extensions must be omitted from the extension; and the extension of side rails must be flared to provide between 24 inches (61 cm) and 30 inches clearance between side rails.

When safety devices are provided, the maximum clearance between side rail extensions must not exceed 36 inches.

Cages for Fixed Ladders

Horizontal bands must be fastened to the side rails of rail ladders, or directly to the structure, building or equipment for individual-rung ladders.

Vertical bars must be on the inside of the horizontal bands and must be fastened to them.

The inside of the cage must be clear of projections.

Horizontal bands must be spaced at intervals not more than 4 feet apart measured from centerline to centerline.

The bottom of the cage must be between 7 feet and 8 feet above the point of access to the bottom of the ladder.

The top of the cage must be at least 42 inches above the top of the platform, or the point of access at the top of the ladder.

Wells for Fixed Ladders

- Wells must completely encircle the ladder
- Wells must be free of projections
- The inside face of the well on the climbing side of the ladder must extend between 27 inches and 30 inches from the centerline of the step or rung
- The inside width of the well must be at least 30 inches
- The bottom of the well above the point of access to the bottom of the ladder must be between 7 feet and 8 feet

SAFE PRACTICES

Anytime there is a break in elevation of 19 inches or more, and no ramp, runway, embankment or hoist is provided, the Company will provide either a stairway or a ladder.

The point of access between levels must always allow free passage. If there is work being performed that limits free access, another point of access must be provided.

All employees will use the following safe practices when working with or on ladders:

- Inspect ladders for damage or wear before use
- Ladders must be maintained free of oil, grease, and other slipping hazards

- Ladders will not be loaded beyond the maximum intended load or the manufacturer's rated capacity
- Ladders may only be used for the purpose for which they were designed
- If a work area for 25 or more employees can be accessed only by a ladder (or anytime two-way traffic relies on a ladder), the Company will provide either a double-cleated ladder or two or more separate ladders to serve two-way traffic
- Ladder rungs, cleats and steps must be parallel, level, and uniformly spaced when the ladder is in position for use
- Ladders must not be tied or fastened together to create longer sections unless they are specifically designed for such use
- A metal spreader or locking device must be provided on each stepladder to hold the front and back sections in an open position when the ladder is being used
- When splicing side rails, the resulting side rail must be equivalent in strength to a one-piece side rail made of the same material
- Two or more separate ladders used to reach an elevated work area must be offset with a platform or landing between the ladders, except when portable ladders are used to gain access to fixed ladders
- Ladder components must be constructed to prevent injury from punctures or lacerations, and prevent snagging of clothing
- Wood ladders must not be coated with any opaque covering, except for identification or warning labels, which may be placed only on one face of a side rail
- Ladders with conductive metal sides will be marked with the words "WARNING — Do not use around energized electrical equipment" and must not be used around energized electrical equipment.
- Non-self-supporting ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder. Wood job-made ladders with spliced side rails must be used at an angle where the horizontal distance is one-eighth the working length of the ladder
- Fixed ladders must be used at a pitch no greater than 90 degrees from the horizontal, measured from the backside of the ladder
- Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement
- Ladders may not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces
- Ladders placed in areas such as passageways, doorways, or driveways, or where they can be displaced by workplace activities or traffic, must be secured to prevent accidental movement, or a barricade must be used to keep traffic or activities away from the ladder
- The area around the top and bottom of the ladders must be kept clear
- The top of a non-self-supporting ladder must be placed with two rails supported equally unless it is equipped with a single support attachment
- Ladders must not be moved, shifted, or extended while in use

- Ladders must have nonconductive side rails if they are used where the worker or the ladder could contact exposed energized electrical equipment
- The top or top step of a stepladder must not be used as a step
- Cross bracing on the rear, section of stepladders must not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.
- Ladders must be inspected by a competent person for visible defects on a periodic basis and after any incident that could affect their safe use
- Single-rail ladders must not be used
- When ascending or descending a ladder, the worker must face the ladder
- Each worker must use at least one hand to grasp the ladder
- A worker on a ladder must not carry any object or load that could cause the worker to lose balance and fall

Structural Defects of Ladders

Portable ladders with structural defects-such as broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or defective components-must immediately be marked defective, or tagged with "Do Not Use" or similar language and withdrawn from service until repaired.

Fixed ladders with structural defects-such as broken or missing rungs, cleats, or steps, broken or split rails, or corroded components-must be withdrawn from service until repaired. Ladder repairs must restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.

Defective fixed ladders are considered withdrawn from use when they are:

- Immediately tagged with "Do Not Use" or similar language
- Marked in a manner that identifies them as defective
- Blocked (such as with a plywood attachment that spans several rungs)

STAIRWAYS

Landings for stairways that will not be a permanent part of the structure must be at least 30 inches in the direction of travel and extend at least 22 inches in width at every 12 feet or less of vertical rise.

Stairs will be installed between 30 deg. and 50 deg. from horizontal. Riser height and tread depth shall be uniform within each flight of stairs, including any foundation structure used as one or more treads of the stairs. Variations in riser height or tread depth shall not be over ¼-inch in any stairway system.

Where doors or gates open directly on a stairway, a platform must be provided, and the swing of the door cannot reduce the width of the platform to less than 20 inches.

Metal pan landings and metal pan treads, when used, will be secured in place before filling with concrete or other material.

All parts of stairways must be free of hazardous projections, such as protruding nails.

Slippery conditions on stairways must be eliminated before the stairways are used to reach other levels.

Temporary Service

Except during construction of the actual stairway, stairways with metal pan landings and treads will not be used where the treads and/or landings have not been filled in with concrete or other material, unless the pans of the stairs and/or landings are temporarily filled in with wood or other material. All treads and landings must be replaced when worn below the top edge of the pan.

Except during construction of the actual stairway, skeleton metal frame structures and steps must not be used (where treads and/or landings are to be installed later) unless the stairs are fitted with secured temporary treads and landings. Temporary treads must be made of wood or other solid material and installed the full width and depth of the stairs.

Stair Rails

Stairways having four or more risers, or rising more than 30 inches in height, whichever is less, must have at least one handrail. A stair rail also must be installed along each unprotected side or edge. When the top edge of a stair rail system also serves as a handrail, the height of the top edge must not be more than 37 inches nor less than 36 inches from the upper surface of the stair rail to the surface of the tread.

- Winding or spiral stairways must be equipped with a handrail to prevent using areas where the tread width is less than 6 inches
- Stair rails must not be less than 36 inches in height
- Screens or mesh, when used, must extend from the top rail to the stairway step, and along the opening between top rail supports
- Intermediate vertical members, such as balusters, when used, must not be more than 19 inches apart
- Other intermediate structural members, when used, must be installed so that there are no openings of more than 19 inches wide

Handrails

- Handrails and the top rails of the stair rail systems must be capable of withstanding, without failure, at least 200 pounds of weight applied within 2 inches of the top edge in any downward or outward direction, at any point along the top edge
- The height of handrails must not be more than 37 inches nor less than 30 inches from the upper surface of the handrail to the surface of the tread
- The height of the top edge of a stair rail system used as a handrail must not be more than 37 inches nor less than 36 inches from the upper surface of the stair rail system to the surface of the tread
- Stair rail systems and handrails must be surfaced to prevent injuries such as punctures or lacerations and to keep clothing from snagging

- Handrails must provide an adequate handhold for employees to grasp to prevent falls
- The ends of stair rail systems and handrails must not have dangerous projections such as rails protruding beyond the end posts of the system
- Temporary handrails must have a minimum clearance of 3 inches between the handrail and walls; stair rails systems, and other objects
- Unprotected sides and edges of stairway landings must have a standard 42-inch guardrail system

Midrails

Midrails, screens, mesh, intermediate vertical members or equivalent intermediate structural members must be installed between the top rail and stairway steps of the stair rail system.

Midrails, when used, must be located midway between the top of the stair rail system and the stairway steps.

TRAINING

The Company will ensure every employee receives training on ladder and stair safety. This training will be provided at no cost to the employee during working hours.

This Company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of its employees.

Training Components

Our safety coordinator will ensure that employees receive training from a competent person in the following:

- Nature of fall hazards in the work area
- Correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used
- Proper construction, use, placement, and handling of stairways and ladders;
- Maximum load-carrying capacities of ladders used. In addition, retraining must be provided for each employee, as necessary, so that the employee maintains the understanding and knowledge acquired through compliance with the standard

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

The Company will maintain all employee training records for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- General Ladder Setup Procedure
- Ladders and Stairs Safety Training Documentation

GENERAL LADDER SETUP PROCEDURE

- Move the ladder near your work. Get help if it is too difficult to handle alone
- Make sure there are no electrical wires overhead
- Carefully “walk” the ladder up until it is vertical. Keep your knees bent slightly and your back straight
- The ladder should be closed. Position the ladder with the base section on top of the fly section. Block the bottom of the ladder against the base of the structure
- Set up the ladder on a secure, level surface or secure it so that it can’t be displaced
- Firmly grip the ladder, keep it vertical and carefully move back from the structure about one quarter the distance of the ladder’s working length. This allows you to place it at the correct angle against the structure.
- Lock the spreaders on a stepladder. Secure the lock assembly on extension ladders
- Use traffic cones or other barriers to protect the base of the ladder if vehicles or pedestrians could strike it
- Make sure that a non-self-supporting ladder extends at least three feet above the top support point for access to a roof or other work level

1. Raise the fly section. After the bottom rung of the fly section clears the bottom rung of the base section, place one foot on the base rung for secure footing
2. Lean the ladder against the structure. The distance from the base of the ladder to the structure should be one quarter the distance of the ladder’s working length. Both rails should rest firmly and securely against the structure.

Quick tip — 4:1 Ladder Setup

A non-self-supporting ladder should have a set-up angle of about 75 degrees — a 4:1 ratio of the ladder’s working length to setback distance.

Here’s how to achieve it: Stand at the base of the ladder with your toes touching the rails. Extend your arms straight out in front of you. If the tips of your fingers just touch the rung nearest your shoulder level, the angle of your ladder has a 4:1 ratio.

LADDERS AND STAIRS SAFETY TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

(Retain at least 3 years)

SCOPE

This chapter addresses the requirements and safe practices for performing landscaping work. All safe practices covered here will adhere to the applicable OSHA regulations regarding the use of hand and power tools, ladders, heavy equipment and personal protective equipment. It does not cover the safe practices for operating skid steer loaders or chainsaws, which are covered in separate chapters.

POLICY

This Company has established the following policy to protect employees from the hazards associated with landscaping work.

EMPLOYER RESPONSIBILITIES

This Company will:

- Train all employees on the safe practices associated with their job assignments
- Verify that employees are capable of operating all powered tools and/or equipment before being allowed to use them
- Train employees on the proper care and use of all PPE they will be required to wear

EMPLOYEE RESPONSIBILITIES

All employees performing landscaping work will:

- Follow all Company safe practices
- Wear and maintain all PPE provided to them
- Report all unsafe conditions and acts immediately

HAZARDS

Employee's performing landscaping work may be exposed to:

- Back injuries from lifting, bending, and twisting motions
- Cuts or lacerations
- Eye injuries
- Burns
- Respiratory problems
- Bites from wild or poisonous animals

PERSONAL PROTECTIVE EQUIPMENT

This Company requires employees to wear all necessary personal protective equipment (PPE) based on their job assignments.

The PPE may consist of, but is not limited to:

- Earplugs or earmuffs
- Sturdy protective clothing
- High visibility safety vests when working near traffic
- Safety shoes or boots with non-slip soles
- Safety goggles or glasses
- Long pants
- Respirators or dust mask as required
- Non-slip, heavy-duty work gloves
- Long sleeves shirts
- Hats and sunscreen
- Fall protection equipment when working at heights

GENERAL SAFE PRACTICES

- Always communicate with your fellow workers. Let them know where you are working
- Know where they are working. Awareness is essential. Stay alert
- Communicate with an equipment operator prior to entering their work area. Let the operator know what you are going to do and where you will do it
- Get confirmation that he/she heard you and understands your intentions. Wear a high visibility vest to increase your visibility in the work area
- Be aware of other individuals who may be in the work area and communicate your intentions with them

Barricades and warning signs: Areas where health or safety hazards exist that are not immediately obvious to employees must be barricaded or warning signs must be posted at all approaches. Warning signs must be readily visible, legible, and display the nature of the hazard and any protective action required.

- Make sure appropriate signage is placed where all workers can read them. Your safety and the safety of your co-workers depend on it

Potable water: An adequate supply of potable drinking water must be provided at all active working areas. Potable water outlets must be posted.

Back Injury Prevention

An employee's physical ability to lift loads should never be stressed by any lift. Using your maximum strength to make a lift is inappropriate.

Rather, lifting should be guided by loads you can handle without undue physical stress. For most individuals, this is a load of approximately 45-55 pounds.

Try to minimize the need to move materials manually. Proper planning and good job design can eliminate much lifting. Use mechanical lifting aids whenever possible.

When lifting and carrying a load: Ask for assistance when needed!

To prevent the possibility of back injuries, the following general lifting guidelines have been developed.

- Examine the load for grease, oil, sharp edges, and other hazards
- Know your limit and halve it; estimate the weight and divide the load or get help if the weight is more than you can comfortably handle

- Plan your path and make sure that it is free of obstructions. Consider how you will set down the load-- before you lift it
- Stand close to the load with your feet spread apart about shoulder width, with one foot in front of the other for balance. Do not twist your body to get into position
- Squat down and tuck in your chin, while keeping your back as straight as possible
- Grasp the load firmly
- Lift with your legs by slowly straightening them. Return your back to a vertical position
- Turn only with your feet; do not twist your torso while you are lifting or carrying a load

Avoid, if possible, lifting a load from below your knee level or from above your shoulder level; both maneuvers, unless done carefully, create great stress on the disks in the lumbar region.

Carry the load close to your body. Avoid, if possible, any lift where the loads' center of gravity is more than a few inches out from your belly; the stress on the lumbar region multiplies quickly as the center of gravity moves out from the spine.

TOOL AND EQUIPMENT SAFE PRACTICES

The following sections provide the safe practices for the types of tools, materials and equipment workers are expected to use when performing landscaping work.

HAND TOOLS

- Select the right tool for the job
- Do not use tools that are damaged or defective
- When climbing a tree, workers will not carry tools in their hands other than tools that are used to assist them in climbing
- Workers must maintain a safe working distance from co-workers when using hand tools
- Tools will be properly stored or placed in plain sight out of the immediate work area when not in use
- Workers will not throw or drop tools from trees unless warning has been given and the ground area is clear, and the act of dropping will not endanger personnel

Shovels and Rakes

- Do not overload shovels
- Bend your knees and hips
- Keep your back in reasonably straight alignment
- Use a long-handle tool if space permits

Pruners and Hand Saws

- Pole pruners, pole saws, and other similar tools will be equipped with wood or nonmetallic poles. Actuating cord will be of non-conducting material
- When inserting a blade in a bow-saw frame, workers will keep their hands and fingers in the clear when the tension lever snaps into or against the saw frame. When removing a bow-saw blade from the frame, the operator will stay clear of the blade

Injector Tools for Applying Herbicides

- The bit of injector tools will be covered with a shield when not in use. Injectors will be laid flat on the ground when not in use
- The injector will not be carried on the shoulders but will be carried by the loop handle on the downhill side, with the bit properly shielded and facing to the rear

Grub Hoes, Mattocks, And Picks

- The blade eye will be tight-fitting and wedged so that it cannot slide down the handle
- When swinging grub hoes, mattocks, and picks, the worker will have a secure grip and firm footing

Cant Hooks, Cant Dogs, Tongs, And Carrying Bars

- Hooks will be firmly set before applying pressure
- Tools with cracked, splintered or weakened handles will not be used. Workers will be warned and will be in the clear before logs are moved. The points of hooks will be at least 2 inches long and kept sharp. Workers will stand to the rear and uphill when rolling logs

Wedges, Chisels, And Gauges

- Wedges, chisels, and gouges will be inspected for cracks and flaws before use
- Wedges and chisels will be properly pointed and tempered. Tools with mushroomed heads will not be used
- Only wood, plastic or soft-metal wedges will be used with power saws. Wood-handled chisels will be protected with a ferrule on the striking end

Axes, Hatchets, And Machetes

- Always wear the proper protective equipment for the job that you are performing
- Keep your free hand away from the blade when cutting and chopping
- Keep plenty of potable water available to drink
- Learn about the type of plants that you will be cutting. Some plants, brush, and trees are potentially harmful to the skin and lungs
- Always use the proper tool for the job you are to perform. Use a hand saw or chain saw for thicker limbs or trunks
- Never use a tool that has splinters, burrs, cracks, or splits in the handle. Do not use the tool when the head is loose or damaged
- Carry all sharp tools in a sheath, holster or scabbard. Axes and hatchets have a covering for the head of the tool; keep the head covered when not in use. Do not carry the tool in your hand when climbing steep hills without the cover on
- Keep a safe working distance from co-workers when swinging a tool toward the brush, limb, or tree
- Swing away from your hands, torso, legs, and feet

- When handing the tool to a co-worker, pointy the sharp points and cutting edges down, with the handle up
- Do not throw tools to one another. Communicate with your co-workers at all times. Let them know where you are working
    - Stay alert. Snakes, spiders, and other poisonous critters use brush for shade and hidden living areas. Get immediate medical help when bitten. Keep a first aid kit nearby. Make sure the kit has EMT, ambulance, and hospital phone numbers readily available
    - Keep the first aid kit well supplied with needed bandages, gauze, tape and other necessities to clean and cover a wound until the wound can be attended to by a physician

Axes can be used for making stakes or wedges and splitting or shaping rough timbers. Use shin protection where the chance of kickback from the ax. Unless it has a striking face, do not use the hatchet as a hammer. The head or the wooden handle can crack and break. Hatchets with striking faces are meant only for driving common nails, not for striking chisels, punches, drills or other hardened metal tools. Never use an axe or hatchet as a wedge or chisel and strike it with a hammer.

- Always wear eye protection. Check the work area for obstructions that would hinder the free and clear stroke of the ax
- Make sure the ground is stable where you are working. When you go into a tree to cut limbs, do not let anyone stand below you
- Use the ax only for its intended purpose. Do not use an ax or hatchet on metal or stone
- Remember; hatchets should have a steel head flattened at one end for striking or driving. Use caution when striking the head
- Put up tape or barricades in high traffic areas to avoid accidents or injuries to others

Machetes are designed for cutting and chopping plant vegetation. The machete's long blade is dangerous. Use with caution.

- Always wear eye protection to prevent chips, or any other flying debris from entering or puncturing your eye
- Make sure the machete is clean, sharp, and free from any type of damage before using
- Inspect the handle. Repair or replace before use. Carry the machete in a scabbard when not in use. Store in an area that children do not have access to
- Keep your free hand well away from the target area when bracing for a chop. Make sure you are standing on stable ground
- Strike only with the cutting face of the tool. Make sure there are no other workers in the immediate area of your swing
- When cutting (chopping) thicker branches, strike at an angle no less than 45 degrees in order to avoid glancing blows
- Do not use the machete for prying or hammering. Do not hammer on the back edge of the blade to facilitate your cut
- Wear a dust mask when the work area is dry. Dry conditions will stir up dust. Asthma sufferers need to wear the mask

Sharpening: Learn how to sharpen your tool. A sharp tool will cut clean and reduce kickback. Handle your tool with caution. Store it in the proper place when not in use.

Pry Bars

Slate bars, scaling bars, rock bars, pry bars, whatever you call them, bars account for a number of hand tool accidents.

- The most common accident occurs when the bar slips, either from the hands or from the object being pried. Injuries include deep gashes and punctures, lost and broken teeth, broken bones, and concussion
- The second most common accident is strain resulting from using the bar to pry. Strained backs, necks, arms, shoulders, groins and legs account for many lost time injuries
- Third on the list are injuries that occur when the pried object suddenly breaks free causing the worker to fall onto the ground or into a piece of equipment. This has resulted in broken bones and in a few instances, the bar being driven into body parts

You can avoid most of these accidents by remembering the following:

- If you are prying something heavy, get help. When "something's got to give," it might be your back!
- Get good footing, and avoid working in awkward positions. Anticipate when something might “break free,” and be prepared. Avoid using bars when your gloves are wet, oily, or greasy
- If you need a bar, get one. Use the proper tool for the job. Never use drill steels or bolts

Maul Hammers

- The most common accident occurs when workers are struck by chips flying from the hammer or the struck object.
- Your fingers and hands can also be smashed by misusing hammers and you can hit your co-workers
- You can avoid most accidents by remembering the following:
- Use the proper hammer and do not use an ax as a hammer
  - Always wear eye protection when hammering
  - When possible, use a holder, instead of your hand, to hold an object
  - Avoid using hammers with “mushroomed” or damaged head
  - Do not wear gloves that are wet, oily or greasy
  - Warn others in the area of the danger of flying metal chips

LADDERS

- Always inspect any ladder for damage or defect prior to use
- Inspect for broken or missing rungs or steps, broken or split side rails, defective or missing safety feet, corrosion, securely fitting components between steps and side rails, rungs that are free of grease and oil, and no splinters or sharp points
- If upon inspection, faulty or defective components are discovered, the ladder must be immediately tagged “Do Not Use” or “Defective,” and removed from service. The ladder may not be returned to service until repairs equal to original manufacturer’s specifications are made

Use only ladders meeting length and load limit requirements for the given application. Never use metal ladders near electrical lines, equipment, or switch gear.

- Always set up a ladder on stable, solid surfaces. Never place ladders on boxes, blocks, or crates to extend reach
- Never stand on the 4 top rungs of a straight or extension ladder, or on the top 2 steps of a step ladder
- Hoist tools and other material up after reaching the top of the ladder
- Always observe the 3-point rule when ascending or descending a ladder; keep 2 hands and 1 foot, or 1 hand and 2 feet in position at all times
- Rungs or steps on metal ladders must be treated to prevent slipping. Treatment may include being corrugated, dimpled, knurled, or coated with non-skid, slip-resistant material
- Check that moving parts operate freely without binding or excessive play, wheels or pulleys are properly lubricated, and any frayed or worn ropes on extension ladders are replaced
- Ladder side rails must extend 3 feet above the top landing. If this is not feasible due to the ladder's length, then the ladder must be securely tied off at the top to a non- moveable support and grab rails must be provided for access
- Never tie different ladders together to make them longer unless designed for this purpose
- Extension ladders must be set at a four to one angle, with the base one foot out from the wall for every four feet of height. Extension Ladders must not be shifted, repositioned or extended while being used
- Always secure the ladder when it is placed in areas (passageways, doorways or driveways) where the ladder can be displaced by workplace activities or traffic. Securement will prevent accidental movement. Use a barricade to keep activity away from the ladder
- Never carry your tools in your hand. Use a tool belt, or a belt that is designed for the type of tools you will be using
- Do not attempt to use an extension ladder when wind or other weather conditions make it unsafe to work

Always be extremely cautious when working around overhead-energized electrical lines. The minimum safe distance is 10 feet or more. When the power line is 50 kV or less, stay at least 10 feet away. Stay at least 35 feet away from higher voltage.

Aluminum, and wet or dirty wood, or fiberglass ladders can conduct electricity. Metal ladders should be marked with tags or stickers reading "Caution-Do Not Use Around Electrical Equipment" or similar wording. Use the proper ladder for the job.

Remember: When traveling up or down ladders, always observe safe ladder techniques. Always face the ladder, use the three-point contact (one foot and two hands or vice versa), and never carry loads or objects that could cause you to lose your balance and fall.

WHEELBARROWS

Safety Inspection: Before attempting to move objects or materials using a wheelbarrow, employees must do a safety inspection of all the different parts. All of the parts must be in good condition and in good working order.

- Safety requires employees to properly maintain all parts of the wheelbarrow
- All of the nuts, bolts, and washers must be in place and tight
- Frames must not be bent, or cracked, and all of the bracing must be is in place and in good condition
- Handles must not be cracked, and the grips must be in good condition. Buckets or tipping bodies must not have any cracks, holes, or bends in them
- All dried concrete, or other debris, must be cleaned out of the bucket or tipping body
- Stands and legs must not be missing, cracked, bent, or broken
- Wheels must be clean and straight. Axle shafts must be straight and tight
- Wheel bearings must be kept clean, lubricated, and tight
- Tires and tubes must not be low on air, worn out, or weather cracked
- Valve stems must not be weather cracked, and they must have a cap in place. The paint and other coatings must be kept in good condition to prevent rusting

Safely using a wheelbarrow will require employees to start the job with the correct wheelbarrow before attempting to haul heavy objects, or materials on the job site. Employees must never attempt to use a broken, defective, dirty or unsafe wheelbarrow. Broken, defective or unsafe wheelbarrows must be taken out of service, and repaired or replaced.

- Make sure that the wheelbarrow has the proper capacity rating for the material being hauled. Do not over-load the wheelbarrow
- Clear all debris away from the area where the wheelbarrow will be loaded
- Inspect the path where the wheelbarrow will be moved to ensure that the surface is free of pot-holes, or grading problems
- Ramps must be clean, and strong enough to carry the anticipated loads that will be moved over them
- All ramps must have adequate blocking under them sufficient to eliminate any deflection that may occur when they become loaded
- Any section of ramp six feet or more above the surface, or spanning a trench that is six feet deep or more below the ramp, must have toe boards and railings on those sections to prevent employees, tools, and materials from falling on workers below
- Ensure that all ramps are wide enough so that employees will have a sure footing while hauling loads over them
- Doorways must be sufficiently wide so that free movement through them with a loaded wheelbarrow will not be hindered
- Keep all unnecessary employees, equipment, and traffic out of the path that will be used to move material across the job site

HAND OPERATED RATCHET HOISTS (COME-A-LONGS)

- Come-a-longs (red-devils, guy pullers and pull jacks) account for about 1 in 10 hand tool accidents. These tools may seem harmless, but accidents can occur

- Injuries include deep gashes; lost teeth; concussions; and fractured hands, arms, legs and ribs. The most common cause of come-a-long accidents occur when the hook slips, or something in the system fails. This causes the chain or wire rope to suddenly “whip”, striking miners with considerable force
- The system includes bolts, eyes, and other anchor points; cleats, clamps and other objects used to attach to items such as chains, cables, conveyor belts, or the come-a- long itself

You can avoid accidents by following these simple rules:

- Do not use a come-a-long if it has any damaged parts. Make sure the throatlatch works properly and is in good condition. Do not forget to check the cable, chain or strap for any type of damage (fraying, splitting, etc.)
- Do not exceed the rated load capacity. Use appropriate end clamps and connectors
- Do not use a come-a-long in lieu of blocking raised equipment. Never straddle the tool and keep your body out of harm's way
- Be certain that all parts of the system can take the load. Do not forget to check anchor points
- Do not use a cheater bar to exert more force on the come-a- long than it is designed for
- Wear appropriate PPE

POWER TOOLS

- Know your power tool applications and limitations. Always use the proper tool for the job
- Inspect cords and tools prior to use. Do not use tools that are faulty in any way. Exchange them for safe tools immediately
- Power tools must be grounded or double insulated. All power tools are to be plugged into a grounded GFCI outlet
- Do not use power tools in damp, wet, or explosive atmospheres
- Do not lift, lower, or carry portable electrical tools by the power cord. Keep all safety guards in place and in proper working order
- Use clamps or vises to secure work pieces
- Do not force power tools. Apply only enough pressure to keep the unit operating smoothly
- Return all tools and other equipment to their proper place after use. Unplug all power tools before changing bits and/or grinding disks. Never leave chuck keys in the tool during operation

For additional information on the use of hand and power tools, see the Hand and Power Tool chapter.

LAWNMOWER OPERATIONS

Common mowing accidents include cuts, lacerations, or amputations from whirling mower blades, bruises or broken bones from flying projectiles, burns from hot equipment parts, electrical shock from faulty grounding or defective electrical cords (electric mowers), and back strain from improper equipment usage.

Do not operate, lubricate or provide maintenance of any equipment until trained in all mower procedures.

Make sure that all guards are in place and in good condition. Always report to the supervisor any equipment or safeguard which is found defective. Never remove a guard except for authorized maintenance purposes. The guard must be replaced before the machine is returned to operation.

- Read the manufacturer's manual for the mower
- Use the right personal protective equipment for the job
- Inspect the mower and attachments before each use
- Know how to control and stop the equipment quickly

Mower Safety

To avoid injury with power mower equipment, you must pay close attention to your surroundings.

- Always conduct a pre-mowing inspection and remove any debris, rocks, limbs or other items that could become a projectile. Look for concealed hazards such as holes or sprinkler heads
- Make sure all positions of the operating controls are clearly identified. Warning and caution labels must be readable. Replace when necessary
- Do not bypass the safety device that stops the blade when releasing the grip on the handle. Keep hands and feet away from all moving parts
- Fill the tank with gas before beginning work. Clean up spills, leaks or overflows immediately. Keep the gas cap on when the engine is running. Shut off the engine before refueling. Allow hot equipment to cool before refueling. Do not smoke when operating and refueling
- Do not refuel the mower indoors. Do not run the engine in areas where carbon monoxide can collect. Replace loud or faulty mufflers
- Collection bags should be securely connected to prevent flying debris. All parts should be checked for tight connections. The discharge of material must not be directed at another person. Use safe lifting techniques, when emptying the grass bag, to avoid back problems
- Slow down when turning and when working on slopes. Mow across slopes rather than up and down slopes. A mower must be moved across the face of a slope of more than 17 degrees, never up and down, except by use of a rope to raise and lower the mower while standing at the top of the slope. Always look behind you before backing. Keep hands and feet away from moving blades
- If you hit a rock, stop the mower and inspect the blades and shaft. Replace damaged blades
- Work slowly and patiently when mowing tall grass or tough weeds. Forcing the mower may cause repeated clogs and engine stalls
- Never leave a running mower unattended. If you stop momentarily, cut the throttle to idle and make sure the mower will not roll away
- Mowers must not be left running if the operator is out of sight or more than 25 feet away from the equipment
- Shut off the engine before unclogging, servicing or adjusting the mower and before removing the grass bag. For added protection, remove the ignition wire before working on the machine. The spark plug should be disconnected before servicing or making an adjustment
- Do not adjust an engine or motor governor to create an over speed condition

Self-Propelled Mowers

The operator must maintain direct control of a self-propelled, walk behind mower. The operator must adjust the ground speed to their gait for proper control. The drive mechanism of self-propelled mowers must be disengaged before starting a motor or engine.

Electric Mowers

Electric mowers should be properly grounded, with properly insulated and rated electrical cords. Electrical equipment should not be used in wet conditions to avoid the risk of electrocution. Connect electrical power equipment to ground fault interrupted circuits.

- Electric mowers, without approved double insulation and powered by 110 volts or more, must be connected to a grounded service outlet
- Unless equipment is an approved double insulated device, its cord and any extension cords are required to be of 3-wire grounded type and of a contrasting color to the foliage such as, but not limited to, orange or yellow. Shut off and disconnect when cleaning, repairing, or adjusting
- Inspect the cord for cuts, frays, defects, or other damage. Replace immediately. Take care not to accidentally cut the cord while mowing
- Always wear the proper PPE

LAWNMOWER REQUIREMENTS

- All power-driven chains, belts, and gears must be positioned or otherwise guarded to prevent the operator's accidental contact during normal starting and operation of the mower
- Make sure a shutoff device is provided to stop operation of the motor or engine. The shutoff device must require manual and intentional reactivation to restart the motor or engine. Make sure all positions of the operating controls are clearly identified
- Be sure the operating control(s) is in neutral before starting the engine. The word "Caution” or similar wording is required to be clearly visible at an engine starting control point on self-propelled mowers
- The horizontal angle of the opening(s) in the blade enclosure, intended for the discharge of grass, must not contact the operator area

There must be one of the following at all openings in the blade enclosure intended for the discharge of grass:

- A minimum unobstructed horizontal distance of 3 inches from the end of the discharge chute to the blade tip circle
- A rigid bar fastened across the discharge opening, secured to prevent removal without the use of tools
- Mowers with a swing over handle are to be considered as having no front in the blade enclosure. The mower handle is required to be fastened to the mower to prevent loss of control by unintentional uncoupling while in operation
- Make sure a positive upstop or latch is provided for the mower handle in the normal operating position(s)

- The upstop must not be subject to unintentional disengagement during normal operation of the mower
- Make sure the upstop or latch does not allow the center or the handle grips to come closer than 17 inches horizontally behind the closest path of the mower blade(s) unless manually disengaged. A swing-over handle that complies with these requirements, will be permitted
- Wheel drive disengaging controls, except deadman controls, must move opposite to the direction of the vehicle motion in order to disengage the drive
- Deadman controls must automatically interrupt power to a drive when the operator's grip is removed, and may operate in any direction to disengage the drive
- Make sure the mower blade is enclosed except on the bottom and the enclosure extends to or below the lowest cutting point of the blade in the lowest blade position

Guards that must be removed to install a catcher assembly must comply with the following:

- Warning instructions must be attached to the mower near the opening stating that the mower must not be used without either the catcher assembly or the guard in place
- Make sure the word "Caution" or stronger wording is placed on the mower at or near each discharge opening
- Blade(s) must stop rotating from the manufacturer's specified maximum speed within 15 seconds after declutching, or shutting off power
- In a multi-piece blade, the fasteners of the cutting members must be designed so that they will not wear out before the cutting members themselves are worn beyond use

MOWING AND BRUSH-CUTTING EQUIPMENT

Mowing and brush-cutting equipment has many sharp moving parts that can be extremely dangerous if operated in a careless manner.

It is vital that all operators of such equipment are fully trained for the safe operation and use of the equipment that will be used.

Most accidents involving machinery of this type are due to inadequate training. Mowing and cutting implements are either PTO-driven (driveshaft) or hydraulic motor driven.

There are several types of mowing and cutting implements including the sickle bar, rotary deck, flail and the reel type. Careful inspection of the equipment must be done prior to use to ensure that shrouds and shields are in place and that all reciprocating assemblies are intact and secure.

Open cutting equipment such as the sickle bar and the reel must be operated without obstructions or spectators. In case of jamming, the cutting assembly must be bled of any stored power (such as pressurized hydraulic pumps and lines) before attempting to clear the bind. All mowing and cutting equipment must be fully shrouded or shielded, according to manufacturer’s specifications, before commencing operations.

For safe operation of mowing and brush-clearing equipment:

- Machines must be started and operated only by authorized personnel
- Operators must receive instruction and comply with the manufacturer's recommendations for machine operation, maintenance, safe work practices, and site operating procedures

- Before starting or moving any machine, make sure other personnel are in the clear
- Operators must inspect their machines each day before starting work
- Machine operations must be a sufficient distance from personnel and other machines to not create a hazard for any person
- No one, other than the operator, may ride on a machine unless seated and seat belts are provided
- Never operate machines with defective steering, braking, or other parts/components that are necessary for safe operation
- Defective hydraulic hoses, lines and fittings that affect the safe operation of the machine must be immediately replaced
- Never operate machines until all guards are reinstalled, safety devices reactivated, and equipment removed after adjustments, or repairs are made

Machine operators must start and operate machines only from the operator's station.

- Before dismounting, the machine operator must apply the parking brake, brake locks, or other equivalent means to hold the machine stationary
- Blades or cutting implements must be turned off and lowered to the ground if the operator leaves the work station
- If a hydraulic or pneumatic storage device can move machine elements, such as, but not limited to, blades, sickle bars, or shears, after the machine is shut down, the pressure or stored energy from the element must be discharged as specified by the manufacturer
- Machine decks, drums and other surfaces where workers walk or stand must be constructed of or covered with a non-slip material
- Guards must be provided on machines to protect employees from flying chunks, chips, bark, limbs and other material
- All exposed moving parts, such as shafts, pulleys, belts, conveyers and gears on machinery and equipment must be guarded
- Machines must be kept free of excess flammable and combustible material that may create a fire. (Clean any fuel spills prior to operation.)

Guard all power take-off shafts with a master shield or by other protective guarding.

- Tractors must have a master shield or guard strong enough to support the operator if they get on or off the tractor using the shield as a step
- Equipment driven by a power take-off must be guarded to protect against employee contact with rotating parts of the power drive system. Where power take-off driven equipment requires removal of the tractor master shield, ensure the equipment includes protection from that portion of the tractor power take-off shaft that protrudes from the tractor
- There must be signs on tractors and power take-off driven equipment to remind operators to keep safety shields in place
- Guard the mesh or nip points of all power driven gears, belts, chains, sheaves, pulleys, sprockets, and idlers with protective shield

- Guard all revolving shafts, including projections such as bolts, keys, or set screws to protect against employee contact with rotating parts
- All machine engines must be off during inspection or repair except where necessary for adjustment or checking fluids. When a moving machinery part presents a hazard during servicing or maintenance, stop the engine, disconnect the power source, and wait for all machine movement to stop before proceeding

LEAF BLOWERS AND BLOWER VACUUMS

Leaf blowers and vacuums can be hand-held or attached to your back. Both types are powered by either a 2-stroke or a 4-stroke engine. Read the operator's manual before you use the leaf blower and vacuum. All workers need to know how the leaf blower works and how to use it properly before operations begin. Untrained employees will not use a leaf blower.

- Stay mindful and alert when using a leaf blower or vacuum
- Do not point an operating blower in the direction of people or animals
- Make sure bystanders, including other operators, are at least 50 feet away. Stop blowing and vacuuming when you are approached
- Do not use a blower indoors or in poorly ventilated areas
- Inspect the blower and vac before and during use to make sure controls, parts, and safety devices are not damaged and are working properly
- Never modify a blower or vac that has not been authorized by the employer
- Do not operate a blower or vac while standing on a ladder, rooftop, tree, or other unstable surface
- Use the nozzle attachments to reach hard to get at spaces and high places

Work carefully. You need to be safe, courteous and responsible when working in public.

Handling and Storage of Fuel:

- Be careful not to spill any gas when fueling
- If fuel has spilled on the blower or vac, wipe dry before using
- Use the correct fuel/oil mix. Check the operator's manual
- When refueling during work, turn off the engine, and allow it to cool before fueling. Loosen the cap slowly to relieve the pressure in the tank
- Always retighten the fuel cap securely
- Start the blower at a minimum 10 feet away from the fuel. Store all fuel in a well- ventilated area.
- Store all fuel in a properly marked safety container
- Make sure the spark plug boot is secure to avoid sparks and possible ignition of fuel vapors
- Never smoke while handling fuel, or during operations. Keep bystanders away while refueling

Operating a leaf blower and vacuum:

- Do not use early in the morning or late in the day. Do not operate the blower in heavy winds
- Never point the nozzle, or blow debris, toward people. Do not blow debris toward open windows or doors

- Do not leave the blower running when unattended
- Do not use a blower or vac to spread or pick-up chemicals, or other toxic substances. Use the leaf vacuum or power broom with water
- Use the lowest possible throttle speed to do the job to reduce noise. Use nozzle attachments that help reduce sound
- Avoid using more than one blower at a time, especially in neighborhoods or around buildings, where the sound can be intensified
- Inspect the condition of the leaf blower muffler, air intakes, and air filter to make sure they are in good operating condition

Dust Awareness:

- Start with the nozzle close to the ground. Then raise it to a height where it does not generate dust
- Use the full lower nozzle extensions to minimize dust. Pay attention to what you are moving and picking up
- Practice moving other objects such as clippings, or paper, without moving dust, to ensure safe operations
- Always water dusty areas before using a blower
- Never use a leaf blower to move excessively dusty materials
- Do not use a leaf blower and vac to clean up large amounts of gravel or gravel dust, construction dirt, plaster dust and cement or concrete dust. Check your local zoning laws for statutes concerning two-stroke engine pollution
- Remember to always be aware of the hazards of dust

EDGERS (LINE TRIMMERS)

Whether gas or electric powered, the working head of line trimmers moves at a high rate of speed and can present several hazards to the operator or to bystanders.

- The Company will ensure that employees assigned to operate line trimmers are trained in proper safety requirements, handling, and use of the tool
- Operators should read and thoroughly understand the operator’s manual for the trimmer they will be operating
- Operators must ensure that the work area is clear of personnel who are not properly protected from hazards of flying debris, bystanders, and animals before beginning work with the trimmer
- If pedestrian traffic approaches the work area, stop cutting with the trimmer, and let the machine idle until traffic is well clear of the work area
- Eye protection, heavy duty non-slip work boots, and sturdy long pants are required protective wear for operating line trimmers, work gloves, long sleeve shirts, and hearing protection is recommended (hearing protection may be required with gasoline powered line trimmers)
- Do not remove the guard from the trimmer for any reason before operating. Inspect the guard to ensure that it is secure before each use
- Ensure that the power head is securely tightened on the shaft before use

- Inspect the work area before beginning for electrical hazards, loose objects, small stones and debris that could be thrown by the trimmer. Remove such hazards from the work area and mark any electrical hazards to stay clear with the trimmer
- Mix two-stroke fuel for gas trimmers according to the manufacturer's directions. Never mix, handle, or store fuel around an open flame, heat source, or when smoking. Always store fuel in an NFPA approved container
- Mix the two-stroke fuel thoroughly before each use
- Do not fuel gas powered line trimmers around open flames or ignition sources, or while the engine is running or hot. Let the engine cool down before refueling. Do not smoke while fueling line trimmers. Remove the fuel cap slowly to relieve pressure when fueling a line trimmer
- Always use two hands when operating a line trimmer. Use the shoulder strap on large jobs to help prevent fatigue
- Keep the power cord clear of the trimmer head, any moisture and traffic when using an electric line trimmer. Inspect the power cord for any damage or wear before use. Avoid water when using an electric trimmer
- Never attempt to adjust the power head while the engine is running, or while the power source is connected on electric models. The spinning attachments may cause severe lacerations
- Any attachments used on the line trimmer must be approved for use on your particular model by the manufacturer. Employees must be trained in the use of any attachments used
- Do not use rigid blade attachments around fences, electrical hazards, structures, or tree trunks
- Do not replace the nylon trimmer line with wire
- Always ensure that your footing is secure when operating the line trimmer. Slipping, tripping, or falling while operating the trimmer, or any power tool, could cause severe injury
- Do not attempt to cut woody material with a line trimmer, unless using an attachment designed for that purpose
- Never leave the trimmer unattended

Do not use line trimmers for any purpose for which they are not intended or designed.

HEDGE TRIMMERS

A hedge trimmer is a high-speed, fast-cutting power tool. Special safety precautions must be observed to reduce the risk of personal injury

- Read the owner's manual and the safety instructions periodically. Careless or improper use of any hedge trimmer may cause serious or fatal injury
- Never let the hedge trimmer run unattended, it's extremely sharp and will cut you if it contacts your body. Keep children and animals clear when a hedge trimmer is in use
- Prolonged use of a hedge trimmer (or other machines) exposing the operator to vibrations may cause carpal tunnel syndrome These conditions reduce the hand's ability to feel, as well as produces numbness, burning sensations, and may cause nerve and circulation damage, as well as tissue necrosis

- Keep the anti-vibration (AV) system well maintained. A hedge trimmer with loose components, and damaged, or worn AV buffers, will tend to have higher vibration levels. Do not use a hedge trimmer with an incorrect idle adjustment. At correct idle speed, the cutting blade should not move

Maintain a firm grip at all times, but do not squeeze the handles with excessive pressure. Take frequent breaks.

- Never carry or transport the hedge trimmer with the cutter blades running. Always engage the starting lock before transporting the machine
- Always switch off the engine and fit the scabbard over the cutter blades before transporting the hedge trimmer over long distances
- Always check the throttle trigger, throttle trigger interlock, stop switch, cutting tool, and starting lock, before operating the hedge trimmer
- The cutting tool must be properly tightened and in safe operating condition. Inspect for loose parts (nuts, screws, etc.), and for cracked, bent, warped or damaged blades. Regularly check the condition and tightness of the cutter blades — with the engine stopped! Service damaged cutter blades immediately
- Always keep the blades sharp and the handles clean and dry at all times
- Use extreme caution when handling gasoline or fuel mix. Do not smoke, or bring any fire or flame near the fuel
- Fuel your hedge trimmer outside and/or in well-ventilated areas. Remove the fuel filler cap on your hedge trimmer carefully, to allow any pressure build-up in the tank to release slowly. Do this to reduce the risk of burns, or other personal injury, from escaping gas vapor and fumes

Wipe off any spilled fuel and check for leakage before starting your hedge trimmer. Check for fuel leakage while refueling and during operation.

- Do not start or run the engine, until the leak is fixed, and spilled fuel has been wiped away. Never attempt to fuel a running, or hot engine
- Do not attempt to "drop start" your hedge trimmer. Place the hedge trimmer on firm ground or any other solid surface in an open area. Maintain a good balance and secure footing
- Start and operate your hedge trimmer outdoors in a well-ventilated area, to reduce the risk of injury from inhalation of poisonous fumes
- Before you start work, examine the hedge for stones, fence wire, metal, or other solid objects which could damage the hedge trimmer
- Always hold your hedge trimmer firmly with both hands while you are working
- Switch off the engine immediately, if the cutter blades become jammed by thick branches, or any other obstruction, before attempting to free the blades
- Never repair damaged cutting attachments by welding, straightening or modifying the shape. This may cause parts of the cutting tool to come off and result in serious or fatal injuries
- Replace damaged or dull cutting tools immediately. Always clean dust and dirt off the machine after finishing work
- Spray the cutter blades before and after work. Start and run the hedge trimmer briefly, so the resin solvent is evenly distributed over the blades

- Do not operate your hedge trimmer if the muffler is damaged, missing or modified. This will increase the risk of fire and hearing loss
- Keep the engine and muffler free from cuttings, chips, leaves, fibers and excess lubricant. Never attempt to clean the trimmer while operating
- Store the hedge trimmer in a high, or locked location, out of reach of children. Always empty the fuel tank when storing for longer than a few days

CHAINSAWS

Regulations require that chainsaws are equipped with a chain brake and anti-kickback chains. These chains incorporate design features intended to minimize kickback while maintaining cutting performance

Since most chainsaws develop a high decibel rating (between 95 and 115 dBA depending on age and condition), adequate hearing protection must be worn, especially during prolonged exposure.

To minimize the risk of kickback:

- Use a low-profile safety chain
- Sharpen the chain to correct specifications
- Maintain correct chain tension
- Don't allow the cut to close on the saw
- Run the saw at high rpm when cutting
- Set depth gauges to manufacturers' settings
- Hold the saw securely with both hands know where the bar tip is at all times
- Make sure the chain brake is functioning

For additional information on the safe use of chainsaws, please refer to the Chainsaw chapter of this manual.

SOD CUTTERS (WALK BEHIND)

Read and understand the manufacturer's manual for operations and maintenance. Never run the engine in an unventilated area. Always inspect the machine for wear, defects, and damage before operations begin. Replace with parts specific to the machine.

- Warning labels must be in place and readable. Replace the label when it is no longer readable
- Sod cutters can be heavy. Use a ramp to unload and load, from the transporting truck or trailer, whenever possible. When no ramp is available, use safe lifting techniques. Ask for assistance from co-workers
- When moving the machine up and down the ramp, place the blade in transport position before starting. Push the blade engagement lever forward to raise the blade. Pull the throttle while maintaining a firm grip on the handlebar
- To make turns, push down on the handlebar, then turn. Always load or unload by driving up and down the ramp in low gear
- Fuel the engine before operations begin. Let the cutter's engine cool down before refueling. Do not smoke during fueling
- Always refer to the manual for oil type, viscosity, weight and capacity for the engine and clutch/gear box. Make sure the engine oil is at the engine manufacturer's recommended level
- Sod cutters are designed for cutting sod only. Do not use the machine for any other purpose

- Check the area to be cut. Remove any rocks, wire and other objects that present a hazard before starting. Make sure to identify and mark sprinkler heads and water valves. Never use the machine on any surface other than grass
- Always wear the necessary PPE
- Always start with the shift lever in neutral. Never start the machine in gear. Do not place your hands or feet near any moving parts
- Never remove any guards from the machine when operating. Always replace the guards after doing maintenance work
- Stop before shifting gears. Do not shift with throttle engaged. To engage the reverse gear, you may have to push the machine back and forth while pulling the shift lever. Never put your hands or feet near the cutter
- End your cuts by pushing the blade engagement lever forward while still holding the throttle to cut the end of the sod strip as the blade rises. Readjusting the blade depth may be required as you move from hard soil to soft or moist soil conditions
- Do not attempt sharp turns while cutting. Do not cut at high speeds. Loss of control has caused severe injuries
- Test the ground's hardness. Push a tool (screwdriver) into the ground 2 to 3 inches
- When you are unable to do so, water the sod the day before cutting. The soil should absorb the moisture. Allow the grass to dry before cutting
- Do not run the engine while performing maintenance work. Remove the spark plug wire to ensure safety

Operations

Position the sod cutter at your starting point with the blade out of the ground.

- Pull the blade engagement lever toward you with one hand while lifting the handlebar with the other hand
- Place the shift lever in slow gear. Pull the throttle while maintaining a slight down pressure on the handlebar and cut a short distance, then stop
- Put shift lever in neutral. Lift the edge of the sod to check the cut depth
- To change the depth, push the blade engagement lever forward, unlock the depth lock knob, and turn the depth adjustment knob clockwise for less depth, or counterclockwise for more depth; then lock the depth lock knob
- Repeat as necessary to set depth of cut
- Proper machine settings will help ensure safe operations. Do not turn the machine on its side. This can cause gas spillage

Keep all unnecessary persons out of the work area. When approached, disengage the cutter.

Operating on Hills

When operating on hills there will be a need to exert greater effort to steer and maintain the balance of the machine. Do not operate on hills exceeding 35% grade to prevent the machine from rolling over.

- There may be an uneven cutting depth, when operating across a hill. The shifted center of gravity may cause the downhill side of the blade to penetrate to the maximum depth, while the uphill side may not. Operate the machine cutting down rather than across hills
- Avoid hillside turns. Always back up hills in reverse gear; then cut, going down

ROTARY TILLERS (WALK BEHIND)

Rotary tiller operations can cause injuries to the back, hands, feet and eyes when safety precautions are not utilized. Read and understand the manufacturer's manual. Follow the inspection and maintenance recommendations and schedules.

- Learn the proper operation and usage of all tiller controls. Operate the machine in an open area to get the feel of the machine and its controls. Do not fight the tiller. Let the tiller do the work. Do not hurry. Proceed at a slow walk. Give the machine time to do its job
- Avoid possible serious bodily injury by keeping hands and feet away from tines and belts before and after starting the engine
- Inspect the tiller each day for wear, damage or defects. Repair or replace parts immediately. Make sure all nuts, bolts, and screws are properly tightened. Make sure the clutch lever engages and disengages properly. Ensure the throttle cable is in good working order. Make all necessary drive belt adjustments. Check tire pressure. Refer to manual for proper inflation specifications
- All safety labels and messages (caution, warning, danger) should be in place and visible
- Clean the labels when covered with dirt. Replace the label when damaged. Check local laws to see if you need to have a spark arrester. Service the arrester every 100 hours of tiller operations. Replace when there are breaks, holes, or any other signs of damage
- Replacement or repair of emission control devices should be performed using parts that are certified to EPA standards
- Fill the tank before operations begin. Refuel outdoors. Turn the engine off. Let the engine cool down when possible. Use care. Do not overfill. Wipe up any spilled fuel immediately before starting up. Remember, spilled fill fuel is an environmental hazard
- Never smoke near gasoline. Always store gasoline in an approved container and store in a safe place
- Inspect the work area for stones, wood, wire, sprinkler heads or any other visible objects. Remove all debris
- Make sure all guards and shields are in place before starting the engine. Any guards or shields that have been removed during maintenance operations must be put back in the proper place
- When the tiller has a handlebar height adjuster, use it. Most manufacturers recommend keeping the handlebar at waste height
- Use all necessary precautions when operating the tiller in reverse. Learn the specific handling procedures for attachments
- Always keep a firm hold on the handlebars. Handlebars may have a tendency to lift when the clutch is engaged

- Make sure the drag bar is in place and properly adjusted for the tilling depth. Remember, tines are sharp and spin fast. The rotating tines of a tiller can cause serious cuts and loss of body parts.
- Always keep body parts away from the tine and belt area when the engine is running
- Never leave the tiller running while unattended. Turn it off even when inspecting future tilling surfaces
- Shut off the engine and disconnect the spark plug before removing any debris from the tines
- Carbon monoxide gas is toxic. Do not run the tiller in a confined area. Make sure there is adequate ventilation when performing maintenance operations indoors. Keep all unauthorized persons away from the working area
- An exhaust system can get hot enough to ignite flammable material. Never touch the muffler during or immediately after work
- When operating on sloped ground, make sure the fuel tank will not cause spillage by having too much fuel in the tank. It is better to till across the slope than up and down it. The slope should not be more than 10 degrees

Maintenance

Improper disposal of engine oil can be harmful to the environment. Dispose of used oil properly. Place it in a sealed container and take to a recycling center. Never dump oil on the ground. Make sure fasteners are tight on the tine cover and side cover, transmission case, rear shield, stiffening plate, and tine hub. Use a non- flammable solvent to clean engine parts.

Transport

Allow the engine to cool before loading onto a truck or trailer. Fuel valve must be in the off position. Use a load ramp. When a ramp is not available, use proper lifting techniques. Ask for assistance when necessary. Tie the tiller down with rope or straps to prevent movement. Improperly secured tools have fallen off vehicles, killing other motorists. Take the time to do it right.

Always know how to stop the tiller in case of an emergency.

ROTARY TILLERS (TRACTOR MOUNTED)

Always read and understand the instructions given in the manufacturer's manual. Do not allow anyone to operate the tractor and tiller that has not been properly trained in the operating procedures. Disconnect and lockout power source for maintenance.

Make sure you are familiar with all controls and functions of the tiller and tractor. Ask for advice when unsure.

Always engage the tiller from the driver's seat only.

- Do not leave tractor unattended with the engine running
- Dismounting from a moving tractor can cause serious injury. Do not let anyone ride on the tractor
- Do not stand between the tractor and the tiller during hitching. Tractor should have rollover protection

- Keep hands, feet and clothes away from tines and power-driven parts. A driveline guard must be in place
- Watch out for wires and trees when raising the tiller. Make sure all persons are clear of working area
- Read the safety labels and messages that the manufacturer has attached. These indicate there is a potential hazard to personal safety. Extra safety precautions must be taken in these areas. Keep all safety labels clean and legible. Replace when worn or damaged
- Keep a first aid kit and fire extinguisher handy. Keep emergency phone numbers inside the kit. Restock as necessary

Never travel at a speed that does not allow adequate control of steering and stopping. Wear your seat belt.

Some rough terrains require a slower speed. Sudden braking can cause a towed load to swerve and upset. Turning the tractor too tight may cause the tiller to ride up on the wheels. In order to maintain steering control, ballast may have to be added to your tractor.

Before Tilling

Handle gasoline safely and store it in a proper container. Relieve pressure before disconnecting hydraulic lines.

- Check oil level in gearbox and chain case
- Make sure all plugs have been replaced properly in the gearbox and chain case. Check the drive chain tension
- Make sure all tiller tines, bolts, and nuts are tight
- Ensure all guards and shields are in place and secure. Grease driveline shaft and all other grease fittings
- Clear the area to be tilled of rocks, branches, and other foreign objects
- Tall grass and weeds may need to be mowed before tilling

Tilling

Do not engage PTO with machine in the fully raised or lowered position.

- Begin tilling at a slow forward speed and shift up as ground conditions warrant. Keep front deflector in place
- Tiller should be operated with the tiller deck level to the ground
- Tiller tines will cut better at a faster rotor speed than at reduced throttle. Tilling should not be done in wet conditions as soil will stick to tines
- Do not engage PTO at full throttle
- After tilling the first 50 to 100 feet, stop and check to see that the tiller is adjusted properly
- Do not make turns, or attempt to back up, while the tiller is in the ground
- Periodically check for foreign objects wrapped around the rotor shaft and remove them after disengaging PTO, turning off tractor, and removing ignition key

- If you are tilling too willow or too deep, adjust the skid shoes accordingly. If the soil texture is too coarse, lower the leveling door and reduce your ground speed. If the soil texture is too fine, you will need to raise your leveling door and increase your ground speed
- When you are done tilling for the day, make sure you use proper tractor shut down procedures before you get off the tractor. Stop engine, set brake and wait for all moving parts to stop. If you are detaching your tiller, make sure you park it on a level surface

Transport

When raising the tiller to the transport position, the driveline must not contact tractor or tiller. Reduce tractor ground speed when turning; and, leave enough clearance so the tiller does not make any contact with obstacles such as buildings, trees or fences.

- Select a safe ground travel speed when transporting from one area to another. When traveling on roadways, transport in such a way that faster moving vehicles may pass you safely. When traveling over rough or hilly terrain, shift tractor to a lower gear
- When traveling on public roads, use your lights and signals to give adequate warning to operators of other vehicles

LAWN AERATORS (WALK BEHIND)

There are hazards involved in the operation of this machine. Recently a groundskeeper was seriously injured when the hand-operated aerator she was using pinned her against a wall.

Safety and Operation

All employees must be trained according to recommendations provided in the manufacturers' manual before operating the machine or attachments. Learn the proper use of the machine and the purpose of all controls and gauges before starting.

- Always inspect the machine for defects or missing guards, shields, discharge deflectors, decals (i.e. instructional, warning, danger or caution stickers) or other protective devices. Make sure all safety equipment is securely fastened in place before beginning
- Inspect the area to be aerated. Remove any rocks, wire, string or other debris that might present a hazard. Soft, moist ground is best for aerating. Water the area one day prior to aerating to provide optimum working conditions
- Identify and mark all ground objects and other obstructions (such as sprinkler heads, pipes, stakes, tree roots, and water valves)
- Do not cross hard objects or surfaces (such as driveways, sidewalks and stepping-stones) with the tines (teeth) down. Hard objects and surfaces can damage the tines and cause you to lose control of the machine
- Make sure the tines are disengaged and in the up position when moving from one location to another
- Stay alert and watch for overhead obstructions such as low tree limbs and electrical wires
- Always practice safe lifting and handling techniques when loading, unloading, or moving the equipment

- Check the tine assembly for obstructions or other debris before starting the engine
- Watch for possible pinch points
- Do not operate the aerator in an enclosed space where exhaust fumes can collect

Remember that carbon monoxide is odorless and colorless and can be fatal if inhaled. Run the aerator where there is plenty of fresh air to prevent carbon monoxide poisoning.

- Avoid operating in areas where there is explosive dust or fumes. Electrical and exhaust system sparks can cause ignition
- Before refueling, allow adequate engine cooling time to avoid ignition of fumes. Never refuel while the machine is running

Aerating Operations

- Start engine and adjust the engines speed control to allow for a comfortable walking speed, and to help maintain control
- Adjust depth control knob to desired depth
- Push down rear wheel control handle to lower aerating tines into the ground
- Engage clutch control. Release clutch control to stop
- When engaging the aerator, maintain a firm grip on handlebars, keeping the pelvis away to avoid injury in case of a kickback
- Keep hands and feet at a safe distance away from the tines or any other revolving or moving parts
- Never operate on slopes exceeding 25% grade. When aerating on slopes, run the machine up and down (vertically) the face of the slope, never across the face (horizontally). Use caution when changing direction to prevent tipping or loss of control
- There are two recommended methods for reversing direction or making sharp turns:
  - Release the clutch control handle, pull up rear wheel control handle, then pivot the machine on the rear wheels to turn
  - Release the clutch control handle, lift handle bar, and pivot the machine on the front wheel
- Remember to keep the aerator close to your body when turning; this will prevent the machine from jerking your body haphazardly around, and causing you to lose control, or your grip, of the aerator
- If service is required, shut off the engine and remove the spark plug before performing any maintenance on the machine
- Inexperienced workers must be familiar with the manufacturer's manual and receive instruction from someone familiar with the equipment before being allowed to operate the machine. Employer's should train and retrain employees periodically to ensure safety

LAWN AERATORS (RIDING)

- These machines pose hazards not unlike those of riding lawn mowers. Operators must be aware of the hazards involved (such as crushing and discharge dangers) and take preventative measures to protect themselves and anyone in the vicinity of aerating operations

- Before operating or servicing, read the manufacturer's manual to become familiar with operation, maintenance, engine, accessories and attachments. Learn the proper use of the machine and purpose of controls and gauges before starting. Do not disconnect or bypass switches
- Never allow inexperienced persons to operate or service the machine without proper training and instructions from a knowledgeable person
- Inspect the machine before aerating begins. Check for any defects, missing decals, shields, discharge deflectors or guards. Always remember to replace a guard after performing maintenance procedures
- Never operate aerating equipment without the discharge deflector securely fastened in place.
- Check the area where the equipment will be used. Remove any debris that might become lodged in, or cause damage to the tine assembly
- Identify and mark all ground objects and other obstructions (such as sprinkler heads, pipes, stakes, tree roots and water valves). Make certain the operating area is free of any bystanders and pets that could be injured by discharge from the machine
- Make sure discharge is not directed toward anyone, and do not allow anyone near the machine while in operation
- For optimum soil penetration and working conditions, it is recommended that the area be watered one day prior to aerating operations
- Handle flammables with care. When refueling, allow the engine adequate cooling time to avoid possible ignition of fumes
- Do not smoke or allow open flame near the machine when refueling. Do not use starter fluids. Use of such fluids in the air intake system may be potentially explosive
- When the machine requires maintenance, do not search for leaks with your hands. Use a piece of cardboard. Fluids under pressure (such as hydraulic fluid) can penetrate the skin and cause serious injury. Keep the engine clean and free of oil, grass, and dirt buildup
- Disengage all drives and set parking brake before starting the aerator. Start the engine only when sitting in the operator's seat
- Never start the engine with the aeration head lowered. Keep your foot away from the directional/speed pedal when starting the engine
- Clear any obstructions from the aeration mechanism before attempting to start the engine. Operate the machine during daylight hours.
- Do not operate in poorly ventilated areas where exhaust fumes will collect. Carbon monoxide poisoning is fatal because it is odorless and colorless. Stay clear of areas where there is a potential for electrical or exhaust sparks igniting explosive dust or fumes in the air.
- Keep hands, feet and clothing away from moving parts. When cleaning, adjusting or servicing the machine wait for all movement to stop.

Operators must keep legs, arms and body inside the seating compartment while the vehicle is in motion. If the operator must leave this position for any reason, they must first:

- Return traction pedal to neutral
- Disengage all drives

- Lower all implements to the ground
- Engage parking brake and shut off the engine.

Do not forget to remove the ignition key. Always practice safe lifting and handling techniques when loading, unloading or moving the equipment. Watch for pinch points.

When aerating on slopes operate the machine up and down (vertically) the face of the slope, never across the face (horizontally). Use caution when changing direction to prevent tipping or loss of control. Never start or stop suddenly; reduce speed when making sharp turns.

When backing the unit use extreme care. Never back up with the aerator engaged (down). Do not allow passengers to ride on machine.

Make sure equipment complies with the latest federal, state and local requirements when driven or transported on public roads.

TREE FELLING

Cutting down trees can be dangerous work when there are buildings and power lines nearby. Proper preparation and weather conditions are to be taken into serious consideration.

- Clear out a space around the tree where you can get a firm footing and have enough space to work with the chain saw
- Lop off any lower branches that are in the way. Pay close attention to the top of the tree
- Which way is it leaning? What side are the majority of the branches on? Which way is the wind blowing?
- Check the trunk of the tree at waist height. Look for holes or rot. Check for nails
- Remove any objects that are imbedded
- Look for a clear space, or bed, into which to drop the tree, where it will not cause damage, or get caught up in another tree
- Never try to drop a tree up a slope. The tree could kick back at you when it hits the ground
- Tie a rope or cable as high on the tree as possible, if there are high winds, or the tree is to drop in a specific spot. Make sure that the rope is long enough, so that whoever is pulling does not end up under the tree
- Create two escape routes, so you can move away quickly, as soon as the tree begins to fall
- Before operating the chain saw, read and study the operator's manual. Even if you are an experienced operator, it is good practice to review the manual before each use. Make sure that all safety features work
- The undercut should be made on the side where you want the tree to fall. Begin at waist height with a horizontal cut. Cut about one-third of the way through the tree. Place the saw above the first cut, angle it downward, and cut out a 45° wedge of wood
- Make sure the horizontal cut is perpendicular to the direction of the fall
- Opposite the undercut, backcut into the tree about two inches above the base of the undercut. Keep the cut horizontal. Do not angle it down. Keep sawing while paying attention to the hinge, which is the piece of uncut wood between the backcut and the undercut

- Keep the hinge uniformly thick to prevent the tree from twisting and falling in a different direction than intended. Keep sawing until the tree begins to drop to the ground. Step back, in case the butt of the tree kicks back
- While cutting, keep a close watch on the kerf, which is the space that the saw leaves behind as you cut through the trunk. The kerf should get bigger as you cut further into the trunk
- Remove the saw immediately if the kerf is closing up instead of getting bigger; you have misjudged the lean, or balance of the tree
- Put tension on the rope, and put some wedges into the final cut, to open the space if the kerf is closing. Saw some more, and drive the wedge in further. Make sure the rope is taught, and have a co-worker pull the tree forward
- Wrap a cable around the butt end of the tree and use a winch, come-along, or truck to pull the tree free, if the tree becomes lodged in another tree. After the tree has been felled, trim off the limbs, size for removal, and remove from the job site

Tree Trimming and Climbing

Large trees will require the worker to manually climb, or be elevated by an aerial lift, into a position from which the required work may be accomplished. Safety is a primary concern for workers involved in tree maintenance, and training along with proper techniques are required to ensure worker safety.

An employer must provide training to each new employee regarding the requirements of the job, job hazards, and safeguards before starting his/her assigned job.

A job briefing should be conducted before any tree job involving any unique or unusual hazards.

Limbing

- If another employee is present, a verbal warning must be given by the employee aloft before dropping a limb
- A separate work rope, controlled by an employee on the ground, will be used to lower limbs that cannot be dropped. The work rope will not use the same crotch over which the climbing rope is run
- A cut branch or limb may not be left aloft overnight or for an extended period unless the limb is secured to the tree or the area under the tree is roped off or barricaded
- Whenever an employee is aloft in excess of 15 feet, a second employee or supervisor will be within vocal hearing distance of the treed employee
- When possible, an employee cutting a limb must work from the side opposite and uphill of the cut
- Branches bent under tension must be considered hazardous and the situation corrected

Topping

- When topping, equipment such as a crane, will be used to lower branches and limbs if the tree cannot stand the strain
- When lowering large limb sections, the employee aloft will position himself, whenever possible, above the limb being lowered

Special Note: Proper training on the tools used to perform maintenance work on trees is necessary for safety on the job. Using chain saws while suspended at heights can be extremely hazardous and all precautions possible should be taken to ensure the safety of workers. Training on ladders and any mechanical lifts used is required. Keep your ground workers advised at all times of your plans and actions.

STUMP GRINDERS

Stump grinder injuries have included the eyes, hands and feet.

Read and understand the stump grinder manual for the machine you will be operating. Grinders vary in size and safety components.

- Always make sure that the operator has the appropriate training in how to operate the stump grinder before grinding begins

Prepare the site: Put up warning signs indicating a hazardous worksite. In areas of high public access, additional controls (e.g. barrier tape, barriers/screens, etc.) may be needed.

- Stop work if the working area is compromised by traffic
- Ensure all operations near to highways are adequately signed with the appropriate notices
- Use as level a surface as possible to stabilize the machine
- When this is not possible consider creating a level site or an alternative means of stump removal
- Make sure the grinder's parking brake is applied, if the machine is detached from the tow vehicle
- When working roadside, position the cutting head to direct wood chips away from passing pedestrians and traffic
- Always use supplementary screening to protect people and property at risk from flying debris

Operations

Ensure any belts, shafts, and fan blades are guarded on both the machine and power source.

- Make sure the debris curtains around the cutting head are present, intact, and adequate
- There must be a clearly marked, working engine-stopping device readily accessible to the operator at the normal working position
- Make sure a fire extinguisher is readily accessible. Check the site for underground services. Check the stump(s) to be ground
- Stumps should be free from stones and metal
- Manually excavate and reveal buttress roots
- Operate from a point that gives a clear view of the cutting. Ensure the cutting mechanism rotates freely without fouling
- Never approach the cutting mechanism until it has come to a complete stop
- Clear wood chips as necessary to ensure safe and efficient operation of the grinder
- Ensure any excavations do not create a tripping hazard to pedestrians once the operation is completed

- Always remove the engine start key, when leaving the machine unattended
- Disengage the drive to the cutting mechanism and wait for the cutter mechanism to stop rotating before repositioning on site
- Stop the engine and remove the start/stop key before repositioning to a new site. Allow cooling before refueling. Replace the fuel cap securely. Place all guards and operating panels into the transport position before towing or securing to a trailer
- Check the towing bracket, attach, then lift and secure the jockey wheel
- Connect the electrics and the safety chain(s) to the towing vehicle and check the lights before moving off

Ensure the load is secure and people are in a safe position before moving off. For machines driven by a power take-off (PTO) shaft, make sure:

- The PTO shaft is fitted with a suitable guard that encloses the shaft along its full length from tractor to machine
- The guard is correctly fitted and in effective working order on the power take-offs and power take-off drive shafts
- The PTO speed is suitable for the machine

Maintenance

Make sure that all maintenance is carried out in accordance with the manufacturer's manual.

- Ensure the engine-stopping device is applied, the key has been removed from the ignition and the cutter mechanism secured, before working on the cutting mechanism. Check the cutters each day for damage and wear
- Replace as necessary during the working period if damaged, or if worn beyond the manufacturer's recommended tolerances
- Replacement cutters should be machined to match the existing cutters to ensure appropriate cutter mechanism balance

The first aid kit must have emergency phone numbers in case of an accident. Know your machine before operations begin.

DITCH WITCH

Jobsite hazards include death or serious injury from electrocution, poisonous gases, tip- over's, loss of limb and crushing accidents.

All employees must complete proper training as well as read and understand the operator's manual before using equipment.

Before operating any equipment, review the emergency procedures and check that all safety precautions have been taken.

Identify Hazards: Use correct equipment and work methods. Use and maintain proper safety equipment.

- Wear the necessary PPE

- Do not wear jewelry or loose clothing. These items can become entangled in the machinery and cause serious injury or death
- Verify location of previously marked underground hazards. Make sure they are clearly visible to all workers
- Mark jobsite clearly and keep children, spectators, and animals away

Inspect Jobsite: Inspect jobsite and perimeter for evidence of underground hazards, such as: “buried utility” notices, utility facilities without overhead lines, gas or water meters, junction boxes, drop boxes, light poles, manhole covers, and sunken ground.

- Follow U.S. Department of Labor regulations on excavating and trenching (Part 1926, Subpart P) and other similar regulations
- Contact your local One-Call (811 in USA) or the One-Call referral number (888-258-0808 in USA and Canada) to have underground utilities located before digging. Also contact any utilities that do not participate in the One-Call service
- Have an experienced locating equipment operator sweep area within 20 feet (6 meters) to each side of work path. Verify previously marked line and cable locations. Mark location of all buried utilities and obstructions
- Classify the jobsite based on its hazards and use correct tools and machinery, safety equipment, and work methods for the jobsite

Jobsite Classification: Jobsites are classified according to underground hazards present. If working:

Working Distance (Once classified, apply appropriate precautions)	**Classification**
within 10 feet of a buried electric line	electric
within 10 feet of a natural gas line	natural gas
in sand or granite capable of producing crystalline silica (quartz) dust	crystalline silica
within 10 feet of any other hazard	other

Electric Jobsite Precautions - Use one or both of these methods:

- Expose line by careful hand digging or soft excavation
- Have service shut down while work is in progress. Have electric Company test lines before returning them to service

Natural Gas Jobsite Precautions - In addition to positioning equipment upwind from gas lines, use one or both of these methods:

- Expose lines by careful hand digging or soft excavation
- Have gas shut off while work is in progress. Have gas Company test lines before returning them to service

Crystalline Silica (Quartz) Dust Precautions - Follow OSHA or other guidelines for exposure to crystalline silica when trenching, sawing or drilling through material that might produce dust containing crystalline silica (quartz).

Other Jobsite Precautions - You may need to use different methods to safely avoid other underground hazards. Talk with those knowledgeable about hazards present at each site to determine which precautions should be taken or if job should be attempted.

Check Supplies and Accessories	Check Fluid Levels	Check Condition and Function
fuel	fuel	parking brake pins
lubricants	hydraulic fluid	filters (air, oil, hydraulic)
Fire Extinguisher - Mount near the power unit but away from possible points of ignition. Classification oil/electric fires.	battery charge	pumps and motors
	engine oil	hoses and valves
	leaks	signs, guards, and shields

- Replace missing or damaged safety shields and safety signs. Never remove any safety devices. Watch for pinch points
- Know how to operate the controls on your machine. Improper use of machine controls could cause injury or death. If the controls do not work as described in the instructions, stop the machine, and have it serviced. Be aware of a possible runaway. Only operate from the operator's position
- Use equipment carefully. Watch for possible tip-over hazards. Incorrect procedures could result in death, injury, or property damage
- Stop operation and investigate anything that does not look or feel right. Communicate with co-workers
- To avoid tip-overs always operate with load (heavy) end uphill. Avoid starting, stopping, or turning on slopes. If you must turn, keep the heavy end of the unit uphill
- Avoid parking unit on a slope. If parking on a slope cannot be avoided, lower front end, engage parking brake, and turn ignition switch to OFF
- Carry load low. High loads can cause tipping, loss of load, or loss of visibility. Never jerk control levers. Use a steady even motion.

When trenching keep everyone at least 6 feet from machine, digging boom, and its range of movement. The machine may move when chain starts to dig. Allow 3 feet between end of chain and obstacle. Operate unit only while standing on platform. Note: Trenching movement is toward you.

Operating Tips

For easier turning, lower boom to full depth. If an object becomes lodged in chain, move digging chain control to neutral and raise boom slightly. Reverse chain direction. If the object must be removed manually, stop the engine. Wear gloves to protect against cuts and abrasions.

- Be aware of flying objects. Wear an approved hard hat and safety glasses or goggles
- To avoid hearing loss wear hearing protection
- Keep hands and feet away from moving parts, especially the cutting teeth and the shaft
- These parts can cut, crush, or cause death
- The weight of the machine can crush you. Watch for fall hazards. Slips or trips may result in injury. Remove obstacles that could cause a fall
- When beginning trench near a wall or fence, allow enough distance between boom and footings, drains, and cables
- When cutting across asphalt roads; start the trench in soil at the edge of the road and dig with the boom at full digging depth
- Avoid moving vehicles, wear high visibility clothing, and post appropriate warning signs
- When straight trenching across a slope, it can be helpful to stake a wooden beam parallel to intended course and just far enough from trench to guide downslope wheels
- Hot parts may cause burns or fire hazard. Do not touch or refuel the unit until cool. Wear gloves and proper protective clothing
- Confined areas: Make sure the work area is properly ventilated. Lack of oxygen or presence of exhaust gases will cause sickness or death
- Battery acid may cause burns. Avoid contact. Never smoke around flammables or when refueling the machine

Electrical Lines

Indications of an electrical strike include power outage, smoke explosion, popping noises or arcing electricity.

If an electric, line has been damaged and you are On Platform, Do Not Move. Remain on platform and take the following actions: Warn people nearby that an electric strike has occurred. Instruct them to leave the area and contact utility. Raise front end and attachments and drive from immediate area. Contact the utility Company to shut off the power. Do not return until given permission by utility Company.

Off Platform Procedures

Do Not Touch the unit. Leave the area. The ground surface may be electrified, so take small steps with feet close together to reduce the hazard of being shocked from one foot to the other. Contact the utility Company to shut off the power. Do not return until given permission.

Gas Lines

Never operate the unit where flammable gas is present. If a gas line is damaged, shut down the unit immediately and remove any ignition sources. Warn others of the break and instruct them to stay back.

Leave the jobsite as quickly as possible and contact emergency services and the utility Company. Do not return until permission is given by emergency services and the utility Company.

If a fiber optic cable is damaged, do not look into cut ends of fiber optic or unidentified cable. Vision damage can occur.

If a machine catches on fire, shut down immediately. Move battery disconnect switch (if equipped) to disconnect position. If fire is small, attempt to extinguish. If fire cannot be extinguished, leave area as quickly as possible and contact emergency personnel. Hauling: For trailer information, see the trailer manufacturer's manual. Never remove front end from Interchange connection before loading or unloading power unit. After the unit is loaded, loop tie-downs around unit at tie-down points, and make sure they are tight before transporting.

To tie down the unit with any other front end, see appropriate front end operation sheet. Use a crane or hoist if loading additional front ends onto trailer. Never tow the unit unless a breakdown warrants it. (See operator's manual).

CHIPPERS

Equipment Design

- Enclose chipper rotating components in a housing capable of retaining broken chipper knives or foreign material
- Chipper feed chutes and side members must be designed to prevent operator contact with rotating blades during normal operation
- Chippers without a mechanical infeed system must have:
  - An infeed hopper that measures at least 85 inches from the blades or knives to ground level at the centerline of the hopper
  - A flexible ant kickback device in the feed hopper to protect the operator and other persons in the area from flying chips and debris
  - A shut-off switch within convenient reach of the worker feeding the chipper

Chippers with a mechanical infeed system must have a quick stop reversing device on the infeed. The quick stop reversing device control lever must be across the top and along each side of the hopper, as close to the feed end of the hopper as practicable within easy reach of the operator.

Safe Practices

- Prevent accidental restart of equipment shut down for adjustment or repair as required by Lockout/Tagout
- Guard exposed adjacent blades when replacing chipper blades. Close and secure all access panels before operating the chipper
- The chipper operator must have a coworker in the immediate vicinity when feeding chipper
- Do not feed foreign objects into chipper
- Feed chippers from the side of the centerline. The operator must immediately turn away from the feed table as brush is drawn into the rotor. Feed chippers from curbside whenever practical
- Feed and discharge chutes must be in place to prevent contact with rotating blades during chipper operation
- Chipper operators must be familiar with the manufacturer's operating instructions, maintenance and safe work practices

- When trailer chippers are detached from trucks they must be chocked or otherwise secured
- Before towing chipper, cross safety chains under the tongue of the chipper and attach them to the towing vehicle

MULCH BLOWERS

- Hazards include injury due to flying objects, unsecured loads, backing, and mounting or dismounting
- Pre-operations equipment check: Make sure the engine is turned off. Make sure all guards are in place
- Inspect for and remove any foreign objects in the blower hopper and transition. Follow all lockout/tag out procedures
- Inspect all hydraulic hoses and tubes for cracks, bulges or damage. Replace any damaged part immediately
- Inspect the material discharge hose and connections for cracks or damage. When damage is found, replace the part(s) immediately

Operations

Do not override or tamper with the safety shutdown switches on the folding door or discharge.

- If switches fail, use lockout/tagout procedure until switches are repaired or replaced. Do not run machine without all guards in place
- Never attempt to connect or disconnect the discharge hose while the engine is running
- Make sure that no one is working in or on the machine. Make sure the discharge is clear of all persons. Signal “All Clear” before starting the engine. Keep unauthorized personnel away from the machine and discharge hose at all times
- Remember, the driver of the towing vehicle is responsible for the safety of the operators and feeder(s) of the machine
- Make sure the driver is aware of and avoids all possible hazards, such as tree limbs and low power lines
- Do not allow anyone to ride on the trailer or any other part of the blower for any reason
- Never operate machine in an enclosed area without venting the exhaust (carbon monoxide) of both the equipment and tow vehicle
- Never modify the machine. Never remove any part of the machine (except for service and then reinstall before operating)
- Always establish and maintain good footing and hold the hose firmly. Extra personnel may be required to help direct and hold the hose, especially when working on slopes. Firmly grasp the hose under both arms. Do not hold the hose between your legs
- Never aim the discharge at other workers; blower discharge can cause severe injuries.
- Keep hands away from discharge stream
- Do not open any doors or access panels while machine is in operation. Severe injury may result from rotating parts

- Do not attempt to pull anything out of the blower hopper when machine is in operation. Shut down the engine, using lockout/tagout procedures before removing any foreign objects. Signal “All Clear” before restarting the machine

When leaving the blower unattended for any reason, be sure to:

- Shut off conveyor drive
- Shut off vehicle engine and blower engine
- Place transmission of the vehicle in “neutral” or “park”
- Set parking brake firmly
- Lock ignition and take keys with you
- Lock vehicle cab
- If on a steep grade, block the wheels
- Do not read, eat, or lose your focus, in any manner, while operating the blower

Operating is a full-time job.

- Be careful getting on and off the blower, especially in bad weather. Clean mud, snow, or ice from steps, fenders, and footwear
- Remember; all personnel operating and/or around the machine must be aware that the blower can be controlled via remote control
- For safety reasons and to prevent accidental starting, always keep the power switch on the remote receiver in the “OFF” position when the remote control is not being used
- Be careful when operating the tarp near power lines. Raising the tarp into power lines may cause severe electrical shock
- Always have the tarp either fully open or retracted when transporting the machine. Turn slowly and travel on rough surfaces and side slopes carefully, especially with a loaded blower body

Maintenance

- Before servicing the machine, turn off the engine and allow all moving parts to stop
- Watch for any possible pinch points
- Always disconnect the battery cables before maintenance to prevent accidental starting of the machine
- Tag the engine operating area to show that the machine is being serviced
- Take extreme care when adjusting or replacing knives. Check for wear, chips and proper clearance. Always adjust the knives one at a time. Knife-edges are very sharp and can cause severe bodily injury. Wear appropriate protective gloves to avoid injury

Radiator: Before removing the radiator cap, stop the engine and let the system cool. Remove the radiator cap only after the coolant is cool. Be sure to wear appropriate eye and face protection. A face shield and safety goggles or glasses are recommended.

Battery

- Lead-acid batteries contain sulfuric acid which may damage eyes or skin on contact

- Always wear a face shield to avoid acid in the eyes. If acid contacts eyes, flush immediately with clean water and get medical attention
- Wear rubber gloves and protective clothing to keep acid off skin. Check any pertinent SDS for exact PPE
- Keep arcs, sparks, flames, and lighted tobacco away. Lead-acid batteries produce flammable and explosive gasses

Refueling

- Never fill the fuel tank with the engine running or while smoking or when near an open flame
- Never smoke while handling fuel or working on the fuel system. The fumes in an empty container are explosive
- Never cut or weld on fuel lines, tanks, or containers unless they have been properly cleaned and are free of any residue
- Move at least 10 feet (3 m) away from fueling point before starting engine. Wipe off any spilled fuel and let dry before starting engine

NOTE: Be careful not to allow fuel, lubricant, hydraulic fluid, or cooling fluids to penetrate into the ground or be discharged into the water system. All used fluids must be disposed of properly. Check the regulations in your area for proper waste disposal site.

- It is recommended that only authorized genuine replacement parts be used. Do not use ether cold start fluid if engine is equipped with glow plug type pre-heater or other intake manifold type pre-heater. It could cause an explosion or fire and severe injury or death
- Diesel fuel or hydraulic fluid under pressure can penetrate the skin or eyes and cause injury, blindness or death. To check for such leaks, use a piece of cardboard or wood instead of your hand. Pressure may build up in the hydraulic system so use caution when removing the cap
- Remember; some parts and assemblies are quite heavy. Before attempting to unfasten any heavy part or assembly, arrange to support it by means of a hoist, by blocking, or by use of an adequate arrangement to prevent it from falling, tipping, swinging or moving in any manner which may damage it or injure someone
- If repairs require use of a torch or electric welder, be sure that all flammable and combustible materials are removed
- Fuel or oil reservoirs must be emptied, steam cleaned, and filled with clean water before any cutting or welding on them is attempted
- Do not weld or cut on any tank containing oil, gasoline or their fumes or other flammable material, or any container whose contents or previous contents are unknown

SKID-STEER LOADERS

Skid-steer loaders put workers at risk of rollover and run-over incidents. Workers who operate or work near skid-steer loaders may be crushed or caught by the machine or its parts. Skid-steer loaders have features that expose workers to other risks of injury.

For the safe practices regarding the use of skid steer loaders, please refer to the Skid Steer Loader chapter of this manual.

PLUMBING GLUES

Different types of pipe such as ABS, PVC or CPVC will require specific types of glue that can be hazardous.

Hazardous Properties

Plumbing glues are toxic and highly flammable liquids that evaporate very rapidly and can release excessive amounts of fumes when exposed to the atmosphere. Plumbing glues have a very low flashpoint. Even at a low temperature, they will ignite very easily. A spark can ignite plumbing glue in open-air settings where the dissipation rate of fumes is higher than in an enclosed space.

Application Hazards

Pipe cleaning and priming solutions are toxic and highly flammable.

Plumbing glue, cleaning, and priming solutions applied onto parts in hot or warm weather will release substantially more fumes. Using plumbing glues, cleaning, or priming solutions indoors or in enclosed spaces will cause excessive amounts of fumes to build up in those areas.

- Always use caution when using, handling, or dispensing plumbing glues and related chemicals
- Make sure you wear safety glasses, goggles or a full-face shield, safety gloves, long pants, and a long shirt that will protect your arms. Wear a respirator when vapors and fumes are exposed to your nose and mouth. Safety shoes that do not absorb spillage are required

Safety data sheets (SDS) must be available to all workers and personnel. Always read the SDS and take the appropriate cautionary measures.

- Avoid getting plumbing glues and other related chemicals on or into your body. Wash thoroughly after handling plumbing glues and other related chemicals
- Do not eat, drink, or smoke while handling plumbing glues and related chemicals
- Post no smoking signs at storage areas
- Avoid breathing vapors or mists generated by PVC glues and related chemicals
- All workers who handle PVC glues and related chemicals must be trained to handle them safely. Containers of these chemicals must be properly labeled. When these chemicals are used in other types of containers, only use portable containers approved for flammable liquids
- Always use non-sparking tools when working with glues and chemicals
- Keep containers tightly closed when not in use. Empty containers may contain residual flammable liquid or vapors. Empty containers must be handled with care. Do not expose containers to welding arcs, torches or any other sources of ignition
- Make sure proper ventilation controls are utilized when using plumbing glues, cleaning solutions and primers during indoor or enclosed space application. Explosion proof or local exhaust systems may be needed to ensure that exposure to toxic and flammable vapors is minimized. Ensure that respiratory protection is available at the job site
- Make sure plumbing glues are stored in a cool dry place. Do not store glues in direct sunlight, or other sources of intense heat

- Make sure containers of plumbing glue and related chemicals are stored away from incompatible chemicals that include caustic soda, organic acids and oxidizing agents. Avoid storing in places where freezing is possible
- Storage facilities where large volumes of plumbing glues and chemicals are dispensed and handled may require the continued use of respiratory protection when adequate ventilation of the facility is not available
- Make sure that when a chemical spill occurs, respiratory protection is on site for clean- up operations
- Always avoid overexposure to these chemicals. Symptoms of overexposure can include coughing, sneezing, and shortness of breath
- Emergency eyewash stations must be available for workers and personnel in areas where there is any possibility of chemical exposure to the eyes. Hold the eyes open while flushing with an adequate amount of gently flowing water until the eyes have been completely flushed out. When irritation of the eyes persists, seek medical attention
- An emergency shower station must be available to all employees and personnel in areas where large volumes of plumbing glues and related chemicals are stored, handled and dispensed. Remove contaminated clothing immediately and place them in an approved metal container that can be sealed until they have been properly cleaned or disposed of
- Place contaminated clothing, rags or empty chemical containers in sealed metal containers. Dispose of at an approved disposal site

WORKING AROUND OR ON WATER

Always wear a Personal Flotation Device when working around or on water. The following can prevent such accidents:

- Boats, like any other equipment, should be of adequate size and power to properly perform in the anticipated task
- Remember that weight capacity includes persons, motor, gear and any other load. If a retrieval operation is undertaken, the weight of the retrieved item must be considered
- Boats should be operated by qualified individuals who have adequate experience or training to perform the expected task
- If personnel operate a boat, they should, as a minimum, take a safety course such as those offered by the Red Cross or Coast Guard Auxiliary
- Establish and enforce policies for wearing Personal Flotation Devices (PFD’s). Like seat belts on equipment, PFD’s are effective only when they are worn
- Provide quality PFD’s of the proper type that are appropriate for each employee's size and weight. Types I and V PFD’s are the only types that should be considered for a working environment

Type V: Flotation aids such as boardsailing vests, deck suits, work vests, and inflatable PFD’s marked for commercial use.

Commercially available PFD's are marked or imprinted with the type of PFD. Retroreflective tape must be provided to and properly worn (zipped, tied, latched, etc., in closed fashion) by all persons in the following circumstances:

- On floating pipelines, pontoons, rafts, or stages
- On structures or equipment (including heavy operating equipment that is not secured to the structure) extending over or next to water except where guardrails, personal fall protection system, or safety nets are provided for employees
- Working alone at night where there are drowning hazards, regardless of other safeguards provided
- In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit
- Wherever there is a drowning hazard

Maintain the PFD's in serviceable condition and replace them if they become worn or damaged.

TRAINING

All employees will be trained on the proper use of the tools, materials and equipment, and are expected to follow all safe practices when performing landscaping work. Depending on their assigned duties, employees will be trained on:

- Hand tools
- Wheelbarrows
- Brush cutting equipment
- Hedge trimmers
- Rotary tillers
- Stump grinders
- Mulch blower
- Working around or on water
- Hand held power tools
- Hand operated ratchet hoists
- Leaf blowers and blower vacuums
- Chainsaws
- Lawn aerators
- Ditch witch
- Skid steer loaders
- Ladders
- Lawn mowers
- Line trimmers
- Sod cutters
- Tree felling
- Chippers
- Plumbing glues

Retraining

Workers who do not recognize hazards at a particular work area must be retrained. Workers may need retraining because of changes at a worksite that make earlier training obsolete, changes in the types of equipment used, and failure to demonstrate the necessary skills for using equipment effectively.

Training Records

The Company will retain written records of all worker training for the length of their employment. The records will document the worker's name, the date the worker was trained and the trainer's signature.

SCOPE

This chapter provides the safe practices and regulations regarding the transportation of cargo on all highways and thoroughfares. It covers the practices to be followed for securing loads on commercial vehicles. These practices will comply with the Department of Transportation (DOT) and Federal Motor Carrier Safety Administration (FMCSA) Subpart 393.100. This chapter does not address the operation, inspection or maintenance of commercial vehicles.

POLICY

This Company has developed this policy to ensure that all employees work safely when loading, securing and transporting cargo on a commercial motorized vehicle (CMV). The Safety Coordinator is responsible for implementing and enforcing this policy.

EMPLOYER RESPONSIBILITIES

This Company will:

- Verify that all CSV operators and employees responsible for loading and securing cargo are trained on the safe practices to be used
- Provide all necessary securement equipment as necessary

EMPLOYEE RESPONSIBILITIES

All employees involved with the loading, unloading and securing of cargo on commercial vehicles will:

- Follow all Company safe practices regarding load securement
- Demonstrate a working knowledge on the proper use of securement equipment
- Inspect and report any unsafe or overweight cargo loaded by others
- Report all unsafe conditions or acts immediately

HAZARDS

Improperly or unsecured loads can result in:

- Citations/fines to driver/carrier
- Loss of load
- Damage to the cargo
- Damage to the vehicle
- A crash
- The vehicle being placed Out-of-Service
- Loss of life

SECUREMENT SYSTEMS

A securement system will be used to keep the cargo stationary and must be done carefully to protect the truck operator and the motorists traveling on the same roadway.

Cargo securement devices and systems will be designed, installed and maintained to ensure that the maximum forces acting on the devices or systems don't exceed the working load limit (WLL) for the devices.

Vehicle structures, floors, walls, decks, tiedown anchor points, headerboards, bulkheads, stakes, posts and associated mounting pockets used to contain or secure articles of cargo must not have any cracks or cuts, and must be strong enough to meet the performance criteria. These items will not have any damaged or weakened components that will adversely affect their performance for cargo securement purposes, including reducing the WLL.

A securement system is a securement method that uses one or a combination of the following elements:

- Vehicle structure
- Securing devices
- Blocking and bracing equipment

VEHICLE STRUCTURE

The vehicle portion of a securing system can consist of any or all of the following:

- Floors
- Tiedown anchor points
- Stakes
- Walls
- Headboards
- Posts
- Decks
- Bulkheads
- Anchor points

Trucks should be provided with headboards (headache racks) to protect the driver from the load moving forward, and a tailboard to protect other drivers from loose material.

Generally, the cab shield is not part of the cargo-securement system. However, a front-end structure could be used to provide some restraint against forward movement if the cargo is in contact with it.

Anchor Points

All elements of the vehicles structure and anchor points must meet the requirements of the FMCSA standard.be strong enough to withstand the forces listed below:

If loads are not contained within the vehicle, the securement system must provide a downward force equivalent to at least 20 percent of the weight of the article of cargo. If the article is fully contained within the vehicle, it can be secured by securement equipment of adequate strength, dunnage or dunnage bags, shoring bars, tiedowns or a combination of these.

All elements of the vehicle structure and anchor points must be in good working order and have no signs of:

- Obvious damage
- Weakened parts
- Distress
- Weakened sections

SECURING DEVICES

Securing devices include a variety of specifically manufactured equipment used to attach or secure cargo to a vehicle or trailer. These are often grouped under the category called tiedowns and can consist of:

- Synthetic webbing
- Manila rope
- Clamps and latches
- Grab hooks
- Winches
- Pocket
- Friction mat
- Chain
- Synthetic rope
- Blocking
- Binders
- Stake pockets
- Webbing ratchet
- Wire rope
- Steel strapping
- Front-end structure
- Shackles
- D-rings
- Bracing

TIEDOWNS

The cargo securement system used to restrain loads against movement must meet the requirements for the minimum number of tiedowns. This requirement is in addition to the rules concerning the minimum WLL.

Tiedowns are used to:

- Attach cargo to, or restrain cargo on, a vehicle
- Attach to anchor point(s)

Tiedown Assemblies

Tiedown assemblies (including chains, wire rope, steel strapping, synthetic webbing and cordage) and other attachment or fastening devices must conform to the following applicable standards:

Assembly Component Materials	Must Conform to
Steel strapping 1,2	Standard Specifications for Strapping, Flat Steel, and Seals, American Society for Testing and Materials (ASTM) D3953-97
Chain	National Association of Chain Manufacturers' Welded Steel Chain Specifications
Webbing	Web Sling and Tiedown Association's Recommended Standard Specification for Synthetic Web Tiedowns, WSTDA-T1
Wire rope 3	Wire Rope Technical Board's Wire Rope User's Manual
Cordage	Cordage Institute rope standard: • PETRS-2, Polyester Fiber Rope, 3-Strand and 8-Strand Constructions • PPRS-2, Polypropylene Fiber Rope, 3-Strand and 8-Strand Constructions • CRS-1, Polyester/Polypropylene Composite Rope Specifications, 3-Strand and 8-Strand Standard Construction • NRS-1, Nylon Rope Specifications, 3-Strand and 8-Strand Standard Construction • C-1, Double Braided Nylon Rope Specifications

1. Steel strapping not marked by the manufacturer with a WLL will be considered to have a WLL equal to ¼ of the breaking strength listed in ASTM D3953-97.

2. Steel strapping 1 inch or wider must have at least two pairs of crimps in each seal and, when an end-over-end lap joint is formed, must be sealed with at least two seals.

3. Wire rope not marked with a WLL by the manufacturer will be considered to have a WLL equal to ¼ of the nominal strength listed in the manual.

When an article of cargo is not blocked or positioned to prevent movement in the forward direction, the number of tiedowns needed depends on the length and weight of the articles. There must be one tiedown for articles 5 ft. or less in length, and 1,100 lbs. or less in weight and two tiedowns if the article is:

- 5 ft. or less in length and more than 1,100 lbs. in weight
- Greater than 5 ft. but less than 10 ft., regardless of weight

When an article of cargo is not blocked or positioned to prevent movement in the forward direction, and the item is longer than 10 ft. in length, it must be secured by two tiedowns for the first 10 ft. of length, and one additional tiedown for every 10 ft. of length, or fraction thereof, beyond the first 10 ft.

If an article is blocked, braced or immobilized to prevent movement in the forward direction by a headerboard, bulkhead, other articles that are adequately secured, it must be secured by at least one tiedown for every 10 ft. of article length, or fraction thereof.

Exceptions to The Minimum Tiedown Requirements

Vehicles carrying one or more articles of cargo such as machinery, steel or concrete beams, crane booms or girders and trusses may need to be fastened by special methods. However, any article of cargo carried on that vehicle must be securely fastened to the vehicle.

Attaching Tiedowns

Tiedown placement

- Place the tiedown as close as possible to the spacer
- Position the tiedowns as symmetrically as possible over the length of the article
- Position the tiedowns to preserve the integrity of the article

Tiedowns can be used in two ways:

- Attached to the cargo
  - Tiedowns attached to the vehicle and attached to the cargo
  - Tiedowns attached to the vehicle, pass through or around an article of cargo, and then are attached to the vehicle again
- Pass over the cargo
  - Tiedowns attached to the vehicle, passed over the cargo, and then attached to the vehicle again

Tiedowns Attached to The Cargo

- Tiedowns attached to the cargo work by counteracting the forces acting on the cargo
- The angle where the tiedown attaches to the vehicle should be shallow, not deep (ideally less than 45°
- To counteract forward movement, attach the tiedown so it pulls the cargo toward the rear of the vehicle
- To counteract rearward movement, attach the tiedown so it pulls the cargo toward the front of the vehicle
- To counteract movement to one side, attach the tiedown so it pulls the cargo toward the opposite side of the vehicle

Tiedowns That Pass Over the Cargo

- Tiedowns that pass over the cargo work by increasing the effective weight of the cargo (make the cargo seem heavier). This increases the pressure of the cargo on the deck or friction mat and keeps the cargo from shifting
- Tension these tiedowns to as high an initial tension as possible
- The steeper the tiedown angle, the less shifting (ideally more than 45)

Tiedown Construction and Maintenance

Except for steel strapping, tiedowns must be designed, constructed and maintained so that the driver can tighten it.

All components of a tiedown must be in proper working order and have no:

- Knots and obvious damage
- Weakened parts
- Distress
- Weakened sections

Tiedown Use

All tiedowns and other components of a cargo securement system used to secure loads on a trailer equipped with rub rails must be located inboard of the rub rails whenever practical. This requirement does not apply when the width of the load extends to or beyond the rub rails.

If a tiedown is repaired, it must be repaired according to the applicable standards or the manufacturer's instructions.

Edge Protection

Edge protection must be used if a tiedown could be cut or torn when touching an article of cargo. The edge protection itself must also resist crushing, cutting and abrasion.

BLOCKING AND BRACING EQUIPMENT

Equipment in this category can include:

- Dunnage
- Cradles
- Blocking and bracing
- Chocks
- Shoring bars

Material used as dunnage or dunnage bags, chocks, cradles, shoring bars or used for blocking and bracing, must not have damage or defects that would compromise the effectiveness of the securement system.

The material used for blocking or bracing, and as chocks and cradles, must be strong enough to withstand being split or crushed by the cargo or tiedowns.

This requirement also applies to any material used for dunnage.

If wood is used:

- Hardwood is recommended
- It should be properly seasoned
- It should be free from rot or decay, knots, knotholes, and splits
- The grain should run lengthwise when using wood for blocking or bracing

LOADING CARGO PROPERLY

When articles of cargo are placed beside each other and secured by side-to-side tiedowns, they must either be placed in direct contact with each other or prevented from shifting toward each other during transit by using blocking, friction mats or filling the space with dunnage or other cargo.

Articles of cargo that are likely to roll must be restrained by chocks, wedges, a cradle, or other equivalent means to prevent rolling. The means of preventing rolling must not be capable of becoming unintentionally unfastened or loose while the vehicle is in transit.

Containing, Immobilizing, And Securing Cargo

To correctly contain, immobilize or secure cargo, you need to know about:

- The three ways to transport cargo
- Loading cargo properly
- Restraining the cargo correctly
- Using adequate securing devices
- The Aggregate WLL

These requirements cover all types of cargo except:

- Commodities in bulk that lack structure or fixed shape (for example, liquids, gases, grain, sand, gravel, aggregate, liquid concrete)
- Commodities that are transported in the structure of a commercial motor vehicle, such as a tank, hopper, or box

The FMCSA standard identifies specific securement requirements for certain loads. When transporting these commodities, you must use the specific requirements for that commodity.

- Logs
- Metal coils
- Concrete pipe loaded crosswise on a platform vehicle
- Flattened or crushed vehicles
- Large boulder
- Dressed lumber and similar building products
- Paper rolls
- Autos, light trucks, and vans, heavy vehicles, equipment, and machinery
- Roll-on/roll-off and hook-lift containers

Three Ways to Transport Cargo

All types of cargo that are transported must meet one of three conditions:

- Condition 1: The cargo is fully contained by structures of adequate strength
  - Cargo cannot shift or tip
  - Cargo is restrained against horizontal movement by vehicle structure or by other cargo. Horizontal movement includes forward, rearward, and side to side
- Condition 2: Cargo is immobilized by structures adequate in strength, or a combination of structure, blocking, and bracing, to prevent shifting or tipping
- Condition 3: To prevent shifting or tipping, the cargo is secured on or within a vehicle by tiedowns along with:
  - Blocking
  - Bracing
  - Friction mats
  - Other cargo
  - Void fillers
  - Combination of these

Transporting Compressed Gas Cylinders

If employees are required to transport compressed gas cylinders, the Company will determine that the cylinders are in a safe condition by performing a visual inspection. Visual and other inspections are required by the Hazardous Materials Regulations of the Department of Transportation. Where those regulations are not applicable, visual and other inspections will be conducted according to the Compressed Gas Association requirements.

- When transporting cylinders in a horizontal position, special compartments, racks or adequate blocking must be provided to prevent cylinder movement. Regulators must be removed or guarded before a cylinder is transported unless the cylinders are secured on a special truck
- Cylinders must not be dropped, struck, or permitted to strike each other violently
- All portable cylinders used for the shipment of compressed gases must be constructed and maintained according to the U.S. Department of Transportation regulations
- When loading or moving cylinders by crane or derrick, a cradle or suitable platform must be used, slings or electric magnets must not be used for this purpose
- Valve-protection caps must not be used for lifting cylinders from one vertical position to another. Bars must not be used under valves or valve-protection caps to pry cylinders loose when frozen to the ground or otherwise fixed. The use of warm (not boiling) water is recommended
- Valves of all cylinders, whether empty and full, must be closed before moving cylinders
- Never use cylinders as rollers or supports, whether full or empty

Cargo articles that have a tendency to tip must be secured by bracing.

ADEQUATE SECURING DEVICES

WLL for Cargo Securement Devices and Systems

The aggregate WLL of any securement system used to secure a load against movement must be at least one-half the weight of the article or group of articles.

WLL for Tiedowns

The WLL of a tiedown, associated connector, or attachment mechanism is the lowest WLL of any of its components (including tensioner), or the WLL of the anchor points to which it is attached, whichever is less.

The WLL of tiedowns can be determined either by using the tiedown manufacturer’s markings or by using the tables contained in the FMCSA regulations.

The WLL listed in the tables are to be used when the tiedown material is not marked by the manufacturer.

Synthetic cordage (e.g., nylon, polypropylene and polyester) that’s not marked or labeled will be considered to have a WLL equal to that for polypropylene fiber rope.

Welded steel chain that is not marked will be considered to have a WLL equal to that for grade 30 proof coil chain.

Wire rope that is not marked by the manufacturer will be considered to have a WLL equal to ¼ of the nominal strength listed in the Wire Rope User's Manual.

Wire that is not marked or labeled with its construction type will be considered to have a WLL equal to that for 6 x 37-fiber core wire rope.

Manila rope that is not marked by the manufacturer will be considered to have a WLL based on its diameter.

Friction mats not marked with their rating will be considered to provide a resistance to horizontal movement equal to 50 percent of the weight placed on the mat.

Stanchion pins suitable to the load must be placed in the rail-post pockets to guard against sideways movement.

Trucks used to transport steel will have a catwalk that has grab rails between the cab and the headboard to provide a safe vantage point to direct loading and unloading operations.

Chains used to secure the load and tiedown the steel material for transport must be properly load rated.

WLL for Blocking Systems

The WLL of all components used to block cargo from forward movement must be 50% (or more) of the weight of the article being blocked.

WLL Unmarked Components

Any securing device, not marked by the manufacturer, is considered to have a WLL equal to that of grade 30 proof coil, and other types of unmarked tiedowns are considered to have a WLL equal to the lowest rating for that type in the table of WLLs in the FMCSA regulations.

This Company will purchase and use components that are rated and marked by the manufacturer, so that driver, shipper and inspector can all verify that the proper equipment is being used for the job.

SAFE PRACTICES

The Company will ensure that all personnel involved in the loading of trucks are trained in the procedures for safe loading, and securing loads using binders, chains, straps and accessories.

- Do not load heavy equipment on transports unless trained to operate the particular loading machine
- Tie-down methods used must provide adequate means to prevent the load from moving during transit
- Chains or binding straps must not be thrown over the load until personnel are clear
- Ensure that the binder is firmly locked in the secured position before releasing the extension
- Do not use a binder with a bent handle, which may prevent it from locking down
- Binder handles should be wired in the locked position when transporting loads
- Cargo should have at least one tie-down every 10 feet of length. At least two tie-downs are required on all loads

- If securing a load over 27 feet long, such as pipe or logs, a minimum of 4 equally spaced binders must be used, with two bindings near the ends of the load
- Machines must be loaded, secured, and unloaded so they do not create a hazard for personnel
- Within 15 minutes of leaving the loading area with a bound load, the operator should recheck the binders, chains, or straps, to ensure that the load is secure and no shifting of the load or loosening of the bindings has occurred. Bindings should be checked regularly in transit to ensure the security of the load
- Ensure that hooks, shackles, and other accessories used to secure loads are not bent, gapped, or cracked
- The combined strength of all tie-downs must be strong enough to lift 1 ½ times the weight of the load being hauled
- Do not exceed the rated weight limit for accessories, chains, straps, or binders

Requirements for chains and binding straps:

- Do not use straps that have broken stitching, are frayed, or show any signs of wear, damage, or deterioration
- Ensure that all straps used are rated to handle the weight of load they are securing
- Chains used in securing loads must be inspected before initial use and weekly thereafter
- Chains must be normalized or annealed periodically as recommended by the manufacturer
- If at any time any 3-foot length of chain is found to have stretched one-third the length of a link it must be discarded
- Bolts or nails must not be placed between two links to shorten or join chains
- Broken chains will not be spliced by inserting a bolt between two links with the head of the bolt and nut sustaining the load, or by passing one link through another and inserting a bolt or nail to hold it
- Required chains or straps and binders must be in place and hooked prior to tightening any of the binders

Proper Securement Requirement

- Cargo must be restrained in all directions (forward, side-to-side, rearward, vertically) using a minimum of four (4) tiedown systems
- Tie-downs attached to the cargo must be attached at the front and rear of the vehicle, or at mounting points on the cargo
- Accessory equipment (blades, buckets, etc.) must be completely lowered to the deck and secured with a separate system
- Articulated vehicles must be secured with a separate system that prevents articulation while in transit
- Accessories that are not attached must also be properly secured to the deck with a separate system
- Any tiedown system used to secure heavy equipment must have a minimum WLL of at least 4,700 lbs.
- Tiedowns preventing forward movement must be strong enough to restrain 80% of the cargo's weight

- The calculated aggregate WLL of all systems used to secure cargo against movement during transit must be at least 50% of the weight of the cargo
- Direct Attachment (vehicle to cargo) calculates at 50% of the WLL of the tiedown system used
- Indirect Attachment (vehicle to cargo to opposite-side vehicle) calculates at 100% of the WLL of the tiedown system used
- At least 80% of a transported vehicle's tire or track must be supported on the transporting vehicle, utilizing deck wideners or extensions for proper support as necessary

INSPECTIONS

The driver is responsible for the following cargo-securement inspection activities.

Driver Action Required	Pre-Trip	Within first 50 mi	When Duty Status of Driver Changes	At 3-Hour Intervals or Every 150 mi, Whichever Is First
Inspect Cargo and Securing Devices	Yes	Yes	Yes	Yes
Inform Carrier if Packaging Is Not Adequate	Yes			
Adjust Cargo and/or Securing Devices	As Necessary	As Necessary	As Necessary	As Necessary
Add Additional Securing Devices	As Necessary	As Necessary	As Necessary	As Necessary

These inspection rules do not apply to the driver of a sealed commercial motor vehicle who has been ordered not to open it to inspect its cargo, or to the driver of a commercial motor vehicle that has been loaded in a manner that makes inspection of its cargo impracticable.

Pre-Trip

- Make sure that cargo is properly distributed and adequately secured
- Make sure that all securement equipment and vehicle structures are in good working order and used consistent with their capability
- Stow vehicle equipment
- Make sure that nothing obscures front and side views or interferes with the ability to drive the vehicle or respond in an emergency
- Inform carrier if packaging is not adequate. For example:
  - Banding is loose or not symmetrical on package
  - Banding attachment device(s) are inefficient
  - Wrapping is broken or ineffective
  - Pallets are broken

Periodic Inspections During Transit

- Inspect cargo and securing devices
- Adjust cargo or load securement devices as necessary to ensure that cargo cannot shift on or within, or fall from, the commercial motor vehicle
- As necessary, add more securing devices

NOTE: Failure to follow instructions and warnings, and/or proper use, care and inspection criteria may result in cargo damage, severe personal injury or death. The Safety Coordinator will ensure that all employees responsible for loading, securing or transporting cargo have an understanding of the risks involved.

Never unload material with the transport truck parked on an uneven surface. If the facilities at the destination are not suitable for unloading, the driver should notify supervision and ensure that safe arrangements can be made for unloading.

When unloading steel, especially pipe or coil, stanchion pins should be left in place and binders loosened slowly, one at a time, but not entirely removed, until all binding chains are loosened and there are no signs that shifting of the load has occurred. While unloading, material should be re-secured between lifts to prevent load-shift hazards.

Chains

- Inspect the entire chain before each use. Do not use the chain if it is elongated or has nicks, cracks, and gouges in any link
- Do not expose the chains to temperatures outside the -40 °F to 400 °F temperature range or to chemically active environments such as acids and corrosive liquids
- Remove the chain from service if the material thickness at any location of the chain link is less than the minimum thickness listed in the National Association of Chain Manufacturers (NACM) welded-chain specifications
- Each chain is only as strong as its weakest link, including the point of attachment
- Never exceed the WLL

Load Binders

Load-binding systems store energy that can release suddenly, causing serious injury or death. Stay clear of binders, as they may suddenly release with force.

- Inspect before use. Remove from service if cracked, worn or deformed. Do not repair or attempt to repair; immediately remove the binder from service
- Do not use binder components for overhead lifting
- Operate only by hand from a firm standing point
- Operate handle cautiously. Stay clear of handle path. Handle may release suddenly. Secure handle down with a positive retaining method. Release handle/load with extreme care. Make sure everyone is clear. Lever binder handle can snap back over center. Use open palm under handle and push up
- Follow DOT Federal Motor Carrier Safety Regulations S392.9, S393.100 and S393.102.

- Do not operate with anyone on the load
- Always apply binder in a straight-line, hook-to-hook manner without bending, and such that handle goes down when securing load
- Tighten binders before moving and re-check frequently
- Follow manufacturer's instructions
- Select the load binder that meets the WLL, grade of the chain, grab hook, and anchor point intended to be used with the binder
- Do not use lever bars, "cheater bars" or extenders when tightening chain binders. Hand tightening will load the binder to its specified WLL
- Load binders must be secured in a manner that prevents them from becoming loose, opened, or released while vehicle is in transit. Latches, chain wrap, or other means should be used to secure the load binder handle
- Periodically clean and lubricate all moving parts of the chain binder

Overhead Lifting Slings

- Synthetic slings can fail if damaged, misused or overloaded. Inspect slings before each use. Slings are NOT for use by untrained personnel
- Synthetic slings can be cut if contacted by load edges. Use padding or protection of sufficient strength and thickness to protect the sling from damage
- Do not use slings to pull on objects in a snagged or constrained condition
- Keep your body out of the path between the sling and the load. Stand clear of suspended loads
- Never use slings when the load may possibly slip or slide. This loss of control can result in sling failure, serious injury or death. Always control the load
- Do not use if the red core warning yarns or any inner core fibers are visible. Do not use if cuts, abrasions, knots, or other defects are present
- Never overload the sling beyond the WLL. Always take into account the effect that angles have on reducing sling capacity
- Never expose slings to alkalis, acids, caustics, or temperatures above 194 ° F or below -40 ° F
- Do not expose slings to extensive sunlight or ultraviolet light. Store slings in a cool and dry place when not in use
- Do not use slings if the attached fittings are damaged, stretched, distorted or corroded

Rubber or EPDM Tarp Straps

Tarp straps are designed solely to hold tarps in place. Tarp straps must not be used for restraining or securing cargo.

- Do not use tarp straps for any lifting, raising, or lowering applications
- Discard all tarp straps with nicks, cuts, cracks or if the "S" hooks are bent, damaged, or corroded
- Eye protection during connection and disconnection of tarp straps is required. Keep both feet firmly on the ground and position body out of the potential strap rebound path
- Tarp strap should not be stretched to more than 50% of the original length. Over tensioning may cause the tarp strap to break, causing serious injury, or death

- Do not anchor tarp straps around sharp edges or pulled over any abrasive surfaces
- Sudden rupture or sudden disconnection of a tarp strap while it is in the stretched position may cause serious personal injury or death
- Protect tarp straps from exposure to heated environments and hot surfaces
- Always fasten tarp straps to a load in a clear space that is free of any moving vehicles or objects

Tracks

To achieve optimal WLL of a complete tie-down system that includes a sliding winch track, the track must be attached to a structurally sound frame element.

Webbing Strap Assemblies

Inspect webbing strap assemblies before each use. Do not use if hardware is defective; if webbing is burnt, melted, cut, frayed, abraded or altered; or if any damage to assembly is seen.

NOTE: Do not exceed the WLL. Do not use for lifting, towing or personal restraint.

- Ratchets, buckles cams, or other tensioning or locking devices must be closed and in locked position when used
- Strength is significantly reduced if load path is not in a straight line
- Avoid sharp edges. Use corner protectors per federal law
- Protect webbing from heat, hot surfaces and acids. Do not store in sunlight
- Do not repair webbing, hardware or stitching. Remove from service immediately if any damage or defect is discovered
- Anchor points must be rated equal to or greater than the cargo control assembly strength
- Do not use 'cheater bars' or lever bars on hardware when tensioning
- The aggregate WLL of tiedowns used to secure an article or group of articles against movement must be at least one-half times the weight of the article or group of articles

Winch Bars

- Inspect winch, chain binder and winch bar for defects and damage before each use. Do not use if defective, broken, worn, cracked, or deformed. Do not repair; remove from service immediately
- Never extend or alter the winch bar. Position the body properly and keep both feet flat on ground during use
- Refer to the applicable federal, provincial, state, and local regulations for loading and transportation procedures and requirements

Using A Winch Bar with Winches

- Winch bar must be properly engaged or the winch bar point must be inserted through two holes in the winch cap during use. Failure to properly engage the winch bar or insert the winch bar point through two holes may cause damage or failure of the winch or winch bar

- Position the body out of the rotation path in case of winch bar slippage. Maintain control of the winch bar to keep bystanders out of the winch bar handle rotation path
- During tightening and before releasing the tiedown assembly, the winch pawl must be checked for correct engagement

Using A Winch Bar with Optional Chain Binder Cradle with Chain Binders

- Follow chain binder manufacturer's recommendations
- Chain binder handle must be fully inserted and securely locked in winch bar cradle. Failure to properly secure chain binder handle in the winch bar may cause damage or failure of the winch bar or chain binder
- Position the body out of the winch bar handle rotation path in case of winch bar slippage

Winches

Winches will be installed so the pawl can readily be seen, to ensure proper engagement. Do not install winches where the user must hold the pawl to engage the gear/sprocket tooth. All winches except bolt on, portable and slider winch designs must be welded to the trailer frame or sound structural element. Minimum welding requirements are 1/4- inch fillet weld, 4 inches long on both sides of the winch frame and 1/8-inch penetration.

To ensure user safety when tightening or loosening winches, always keep a firm grip on the winch-tightening bar. Never release a winch bar from its leveraged position without checking the pawl to make sure it’s fully engaged into the gear/sprocket teeth. Releasing a winch bar without the pawl being properly engaged can cause serious injury to the user or bystanders.

Use a slip-resistant handle winch bar to tighten or loosen winches. Winches should never be used as pulling or lifting devices.

All binders should be checked frequently during cargo transit and re-tensioned as required by DOT Regulations, 49 CFR Part 392.9(b) and the FMCSA Part 396 396.3.

GENERAL DRIVER SAFETY

- Stay alert when driving. Make sure there is enough room ahead and behind to pass or stop safely. Leave enough space between you and the vehicle ahead of you to allow for a sudden stop. If you are following too closely, you may not be able to stop in time
- Remember, you can help the driver behind you maintain a safe following distance by driving at a constant speed and using your signaling maneuvers in advance
- Inspect each vehicle prior to performing any transporting operations and ensure that it is maintained in serviceable condition. Repair any defect or damage or replace the vehicle before use. Check the brakes, lights, signal indicators and tires daily before heading out on the road
- Position the transport vehicle to provide working clearance between the vehicle and the deck
- Ensure that only the loading, or unloading machine operator, and other necessary personnel, are in the loading, or unloading work area
- Vehicle operators will not remain in the cab during loading and unloading where loads are moved over the truck cab, unless the employer demonstrates that it is necessary for the operator to do so

- If the transport vehicle operator remains in the cab, the employer must provide the operator protection, such as cab reinforcement
- Determine that the operating and maintenance instructions are available in each vehicle
- All operators and maintenance employees will follow the operating and maintenance instructions
- All vehicle operators must have a valid license for the class of vehicle being operated
- These safety requirements apply to all vehicles used to transport any employee for job purposes, including any vehicle provided by an employee
- Inspect vehicles for functioning audible warning signals and, where practicable, spark arrestors
- Inspect vehicles that operate at night to make sure they're equipped with working head and tail lights
- All vehicles operating where overhead hazards exist will be equipped with an overhead guard
- Where the operator is exposed to hazards from backing the vehicle into objects, a platform guard must be provided, and so arranged, so that it doesn't impede the exit of the driver from the vehicle
- Never operate a vehicle with loads exceeding its safe load capacity. Check the brakes before proceeding down any steep incline
- Make sure all loads are positioned to prevent slippage, or loss, during handling and transport. (Stakes and chocks used to trip loads must be built so that the tripping mechanism is activated on the side opposite the release of the load)
- Verify that each tiedown is tight before transporting the load. While en-route, the operator shall check and tighten the tiedowns whenever there is reason to believe that the tiedowns have loosened, or the load has shifted

TRAINING

This Company will ensure that all employees engaged in cargo loading, unloading and securement have been trained on the following:

- How to determine the WLL of securing equipment
- How to determine load placement and balancing requirements
- The safe installation and removal on securing devices
- The methods of securement to be used based on the type of load being transported

SCOPE

This Company is committed to protecting the safety and health of all employees, and to complying with OSHA 1910.147 (The control of hazardous energy) and all applicable state and/or local regulatory requirements, laws and industry best practices in the effort to provide an accident, injury and illness free workplace.

POLICY

Accordingly, the Company has adopted this Lockout/Tagout Program (also referred to as Hazardous Energy Control) to establish engineering controls and work practices to prevent the unintentional release of hazardous energy during maintenance and servicing of machinery and equipment.

EMPLOYER RESPONSIBILITIES

This Company will:

- Establish a program for affixing lockout or tagout devices to energy isolating devices and otherwise disable equipment to prevent unexpected release of energy
- Ensure the use of safe lockout/tagout procedures by authorized employees
- Provide all hardware for isolating, securing or blocking equipment from energy sources
- Conduct and certify inspections of the lockout/tagout procedures at least annually
- Provide training to ensure the purpose and function of the lockout/tagout program are understood by employees and the knowledge and skills required for the safe application, use, and removal of the energy controls are acquired by authorized employees
- Ensure training includes limitations of tags in the energy control program (if applicable)
- Inform outside employers who may have employees engaged in activities involving hazardous energy about the lockout or tagout procedures
- Certify that employees complete and repeat training as needed

EMPLOYEE RESPONSIBILITIES

Authorized employees (employees who perform maintenance or servicing on equipment that must be locked out or tagged out) are expected to:

- Participate in training related to lockout/tagout procedures
- Comply with all lockout/tagout procedures when maintaining or servicing equipment that requires such controls
- Review lockout/tagout procedure with inspector during periodic evaluation

Affected employees (employees who operate or use equipment for which maintenance and servicing requires lockout or tagout) must participate and comply with the following:

- Training on the purpose and use of the lockout/tagout procedure
- Training about the procedure and the prohibition to attempt to restart or reenergize equipment that has been locked out or tagged out

SAFE PRACTICES

Intended Use of Procedure

This procedure establishes the minimum requirements for the lockout of energy-isolating devices on machines or equipment. Any main electrical power disconnect that controls a source of power or material flow must be locked out with a lockout device when employees are maintaining, cleaning, adjusting, or servicing machinery or equipment, if the disconnect is not in clear sight of the employee. Employees must also affix a "Do Not Start" tag to all operating controls.

The process stops, isolates from potentially hazardous energy sources, and locks out equipment before employees proceed with their work. It also prevents unexpected the start-up or energizing of the machine or equipment from causing injury.

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. Authorized employees must perform the lockout in accordance with this procedure. No employee will attempt to start, energize or use a piece of locked out equipment.

These procedures do not apply when servicing or maintaining equipment during normal production operations unless:

- The activity involves removing guards or other safety devices
- An employee places him/herself in an area where work is actually being performed
- An employee places him/herself in a dangerous area during the normal operating cycle

Authorized Employees

Any employee whose job requires him or her to perform lockout/tagout to service or maintain a piece of equipment is an “authorized employee” and must comply with all expectations of authorized employees regarding safe lockout/tagout procedures.

Other employees who use equipment that require lockout/tagout for maintenance and service, work in areas where such work is being performed, or will be affected by lockout/tagout procedures will require training regarding lockout/tagout procedures, but are forbidden to perform the work of an authorized employee. They may not implement lockout/tagout procedures without appropriate training authorized by management.

Lockout/Tagout Procedures

See Figure 1 for an outline of the lockout/tagout procedure.

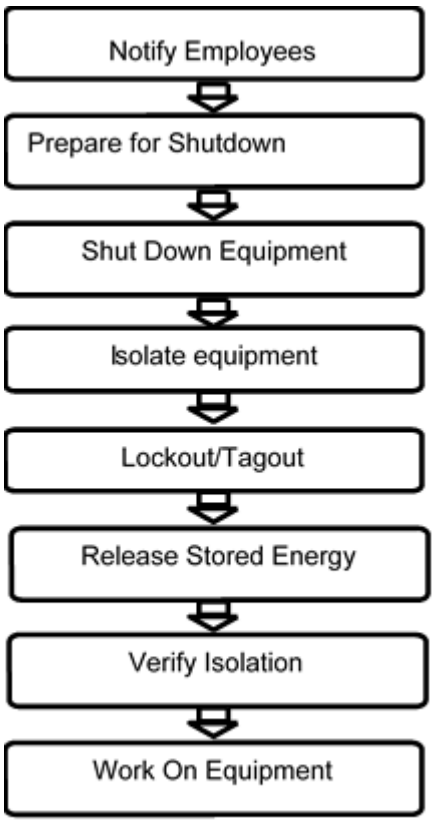


Figure 1

Notify Employees

Before an authorized employee applies lockout or tagout devices, he or she must notify affected employees to prevent unexpected changes to work conditions that could introduce needless risk and to allow affected employees to clear areas that may be hazardous.

Prepare for Shutdown

Before any employee turns off any equipment, the authorized employee will be aware of the type and magnitude of the energy, the hazards of the energy and the means to control it.

Authorized personnel will review lockout/tagout procedures for the piece of equipment and all the possible hazardous energy sources to help ensure an understanding of the controls that are necessary to prevent an injury.

The authorized employee will be especially mindful of energy that can be stored or accumulated after a shutdown.

Equipment Shutdown

Shutdown of machinery and equipment must occur in an orderly manner using the shutdown procedures on the lockout/tagout procedures associated with each machine or piece of equipment.

Equipment Isolation

All energy isolation devices necessary to control energy to the equipment will be located and operated to completely de-energize the equipment and isolate it from energy sources. The authorized employee or team leader will verify operation of each energy isolation device.

- Disconnect or shut down engines or motors
- De-energize electrical circuits
- Eliminate the pressure from the line and lock out the valve holding back the activating substance in hydraulic or pneumatic systems
- Block machine parts against motion

Lockout/Tagout

The authorized employee will affix a lockout and tagout device to each energy-isolating device. Lockout devices will hold the energy-isolating device in a “safe” position, and the authorized employee must affix tag-out devices to indicate the prohibition on moving energy isolating devices from a safe position. If it is possible to lock the device, but only tags are used, attach the tag where the lock would have been; otherwise, locate the tag as close as possible so that it is clear to anyone who might want to operate the equipment.

OSHA has stated that companies must have adequate lockout/tagout procedures for each specific machine or piece of equipment. These should be written procedures that are on site and readily available to employees. Training must be provided on lockout/tagout to both authorized and affected employees. Interlocks may not be used as lockout or as equivalent lockout protection.

Release Stored Energy

Immediately after applying lockout or tagout devices, the authorized employee will ensure all potentially hazardous stored or residual energy is relieved, disconnected, restrained and otherwise rendered safe.

- Discharge capacitors
- Block, clamp, secure in position, or totally relieve the compression or tension in applicable mechanisms
- Lower to the lowest position all suspended mechanisms or parts that normally cycle to a lower position, and clamp, block, or otherwise secure the mechanism or parts in position
- Vent fluids from pressure vessels, tanks, or accumulators — but never vent toxic, flammable, or explosive substances directly into the atmosphere

If stored energy can be re-accumulated, the authorized employee will verify that the energy is isolated until maintenance is complete or the energy no longer exists.

Verify Isolation

The authorized employee will verify the machinery or equipment is actually isolated and de- energized before starting work on locked out or tagged out equipment.

Steps for Release from Lockout/Tagout

See Figure 2 for an outline of the steps to release equipment from lockout/tagout.

Check Equipment

Make sure machinery or equipment is properly re-assembled. Inspect machinery or equipment to ensure removal of nonessential items.

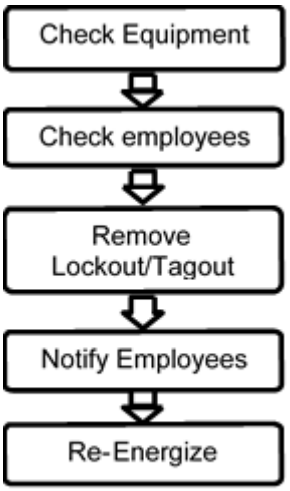


Figure 2

Check Employees

Make sure all employees are safely outside danger zones. Notify affected employees about the removal of lockout/tagout devices and that energy is going to be re-applied.

Remove Devices

Only the authorized employee who applied the lockout/tagout device may remove the device.

Notify Employees

The authorized employee will notify all affected employees that the lockout or tagout devices have been removed from the equipment.

SPECIAL CASES

Employee Leaves Before Releasing Lockout/Tagout Device

If the authorized employee isn't available to remove their lockout/tagout device, another authorized employee may begin the following procedure:

1. Verify that authorized employee who applied the device is off premises

2. Make all reasonable efforts to inform them that their lockout or tagout device has been removed

3. Ensure the authorized employee is aware of the removal of the device before they resume work

Temporary Lockout/Tagout Removal

Whenever authorized employees remove lockout/tagout devices to test or position machines and equipment, or their components, the authorized employee will complete the following procedures in the sequence presented:

- Clear the machine or equipment of tools and materials
- Remove employees from danger zones
- Remove lockout/tagout devices
- Energize and proceed with testing or positioning
- De-energize all systems and re-apply lockout/tagout devices

Outside Personnel

Employees of another Company engaged in servicing or maintenance of equipment that requires lockout or tagout will follow lockout/tagout procedures that provide at least as much protection as our Company's established procedures for that equipment. To ensure safety, management from our Company and representatives from the outside employer will inform one another of their respective lockout or tagout procedures.

The owner also will ensure employees understand and comply with contracted personnel lockout/tagout procedures as appropriate.

Group Lockout/Tagout

When a group performs servicing, the group will use a procedure that provides protection equivalent to the protection provided by the personal lockout or tagout.

Shift Changes

Procedures during shift changes or changes to personnel will provide for an orderly transfer of lockout or tagout device protection and minimize exposure to hazards from the unexpected energizing or start-up of the machine or equipment, or the release of stored energy for both the oncoming and off-going personnel.

PROTECTIVE MATERIALS

Employees will be provided with any device or hardware for isolating, securing or blocking equipment from energy sources. If a device is altered, damaged or destroyed in a way that compromises its ability to protect the authorized employee, the authorized employee will inform a supervisor immediately and not attempt to use the device.

Singularly Identified

Devices used in lockout and tagout procedures will not be used for any purpose other than for isolating, securing or blocking equipment from energy sources, and no devices other than those specified in the lockout/tagout procedure will be used to that end.

Durable

The devices used for lockout/tagout will be able to withstand the environmental and weather conditions present during use. Tagout devices need to remain legible and not deteriorate regardless of weather conditions or corrosive environments.

Standardized

At the worksite, devices used to isolate, secure or block equipment from energy sources will be consistent in color, shape or size. Tagout devices will have a standardized design.

Substantial

Lockout devices must have structural integrity to require excessive force or specialized tools to remove them. Tagout devices and their means of attachment need to prevent inadvertent removal. The means of attachment will not be reusable, and need to have an unlocking strength of at least 50 lbs. The general design and basic characteristics of tagout attachment means will be at least equivalent to a one-piece, all environment-tolerant nylon cable tie.

Identifiable

Any device used to isolate, secure or block equipment from energy sources will indicate the identity of the employee applying the device.

PERIODIC INSPECTIONS AND PROGRAM REVIEW

The safety coordinator, or designee, will conduct regular inspections of the lockout/tagout procedure to ensure the employees are following procedure and meeting all applicable standards. If the safety coordinator uses the inspected energy control procedure, another authorized employee who does not use the energy control procedure will perform the inspection.

The inspector will review with each authorized employee that employee's responsibilities under the lockout/tagout procedure and correct any identified deviation or inadequacy in the procedure.

Where tagout systems are used, the review will include a detail of the limitations of tags relative to locks in hazardous energy control.

Certification

Each periodic inspection must be certified. The certification shall identify the following:

- The machine or equipment on which the Lockout/Tagout procedure was used
- The date of the inspection
- The employees included in the inspection
- The person performing the inspection

TRAINING

Every employee will be trained on lockout/tagout procedures as appropriate to the employee's duties at no cost to the employee during working hours.

All training material will be appropriate in content and vocabulary to the educational level, literacy and language of employees.

Training Components

Employees whose work operations are in an area where energy control procedures may be used must be trained in the following minimum elements:

- The purpose and function of the lockout/tagout program
- The prohibition of attempts to restart or reenergize locked out or tagged out equipment
- When tag-out systems are used, the following limitations of tags for hazardous energy control must be considered:
    - Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock
    - When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated
    - Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective

- Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace
- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program
- Tags must be attached securely to energy isolating devices so that they cannot be inadvertently or accidentally detached during use

Training for employees authorized to service and maintain equipment will include the following:

- The recognition of hazardous energy sources
- The type and magnitude of energy available in the workplace
- The methods and means necessary for energy isolation and control

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment

Retraining

Retraining will reestablish proficiency and introduce new or different control measures whenever the following occur:

- A change in job assignment, equipment or process present a new hazard
- There is a change in the lockout/tagout procedures
- A periodic inspection reveals deviations from or inadequacies in employee knowledge or use of the lockout/tagout procedures

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Lockout/Tagout Procedure
- Lockout/Tagout Inspection Certification Form
- Lockout/Tagout Training Record Sheet

These forms may be reproduced freely for the purposes of implementing and maintaining a safety and health program.

LOCKOUT/TAGOUT (PAGE 1 OF 2)

Company:	This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.
Equipment:	

1. Notify Employees: Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance. (Document name or job title of authorized and affected employees)

Authorized Employees	Affected Employees	

2. Prepare for Shutdown: The authorized employee shall refer to the Company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.		3. Equipment Shutdown: If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).
Type(s) of Energy	Magnitude	Type of Operating Controls:
□ Mechanical		
□ Potential		Location of Operating Controls:
□ Electrical		
□ Thermal		Shutdown Procedure:
□ Chemical		

4. Equipment Isolation: Set the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).		5. Lock out the energy isolating device(s) with individual locks
Type(s) of energy isolating device(s)	Location(s) of energy isolating device(s)	

LOCKOUT/TAGOUT (PAGE 1 OF 2)

Company	Equipment
6. Release Stored Energy: Stored or residual energy (such as that in capacitors, springs, elevated machine members, hydraulic systems, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.	
Type(s) of Energy	Method(s) to dissipate or restrain
□ Mechanical	
□ Potential	
□ Electrical	
□ Thermal	
□ Chemical	
7. Verify Isolation: Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.	
Method to verify isolation:	
Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.	
8. The machine or equipment is now locked out.	

RESTORING EQUIPMENT TO SERVICE

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps will be taken:

- **Check the machine or equipment** and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact
- **Check the work area** to ensure that all employees have been safely positioned or removed from the area
- **Verify** that the controls are in neutral
- **Remove the lockout devices** and reenergize the machine or equipment

Note: The removal of some forms of blocking may require re-energizing of the machine before safe removal

- **Notify affected employees** that the servicing or maintenance is completed and the machine or equipment is ready for use

LOCKOUT/TAGOUT INSPECTION CERTIFICATION

I certify that _____ was inspected on this date using lockout/tagout procedures. The inspection was performed while working on _____.

Authorized Employee (Print)	Signature	Date
Inspector (Print)	Signature	Date

LOCKOUT/TAGOUT TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

People's susceptibility to paint chemicals varies widely. Additionally, the types and amounts of chemical emitted from paint vary widely, especially between oil-based and latex paints. This chapter provides information on the hazards associated with painting work, and the safe practices to follow to avoid them.

POLICY

This company has established the following policies and procedures to reduce possible adverse reactions to the paints and/or chemicals used by its employees and/or clients.

EMPLOYER RESPONSIBILITIES

This company will:

- Ensure employees are trained on the hazards associated with painting work
- Provide employees with all necessary protective equipment (PPE), and make sure they are trained on its proper care and use
- Only allow trained personnel to operate spraying equipment

EMPLOYEE RESPONSIBILITIES

All company employee performing painting work will:

- Follow all company established procedures and safe practices
- Use and maintain all required PPE
- Report all unsafe conditions or actions, and any unsafe equipment immediately

Failure to comply with all company procedures and safe practices may result in disciplinary actions, up to and including termination

HAZARDS

Most paints contain chemicals that evaporate in the air and can cause health problems. As with any chemical, the likelihood of a reaction and the extent and type of health effect will depend on many factors.

These factors include the amount of chemical in the indoor air, the length of time a person is exposed to the chemical, and a person's age, pre-existing medical conditions, and individual susceptibility.

Eye and throat or lung irritation, headaches, dizziness, and vision problems are among the immediate symptoms that some people have experienced soon after exposure to some chemicals.

Professional painters who are exposed to high levels of paint vapors for long periods can receive damage to their nervous system, liver or kidneys.

Some chemicals cause cancer or reproductive and developmental effects, because of these concerns, susceptible people, such as young children and individuals with breathing problems, should avoid paint vapors. To avoid any health risks for themselves and their unborn babies, pregnant women should not participate in painting projects and should limit their time in freshly painted rooms, especially when oil-based paints are being used.

PPE

Because of the hazards of spray painting and surface preparation, employees may be required to wear:

- Hearing protection when working with air-powered tools
- Safety glasses or goggles
- A dust mask or a respirator, if required and qualified to do so
- Slip-resistant shoes /boots
- Gloves
- Full body coveralls
- Fall protection devices, if required

SAFE PRACTICES

These steps include reading the label to select products that do not emit harmful vapors, and providing ventilation.

Painters must be aware that harmful gases can move through common walls, through gaps, around pipes and electrical outlets.

Property managers are expected to give advance notice to neighbors when a unit is to be painted, and inspect painted units to ensure that ventilation is maintained during painting and for at least 2 to 3 days afterwards. Box fans may need to be provided to residents who are painting their apartments.

Problems may be reduced if all apartments being painted, as well as neighboring apartments, are vented to the outdoors with box fans.

- Try to schedule painting for dry periods in the fall or spring, when windows are more easily left open for ventilation
- Keep windows wide-open, as weather permits, for about 2 to 3 days after painting to avoid unwanted exposure to paint vapors
- Use securely mounted window box fans to exhaust vapors from the work area. If fans can’t be used, make sure the area being painted has adequate cross-ventilation
- Provide advance notice to neighbors in adjacent units that painting is to begin
- Take frequent fresh air breaks while painting. Avoid freshly painted rooms for 2 to 3 days, whenever possible
- Keep young children and individuals with breathing problems from freshly painted rooms. Leave painted areas if you experience eye watering, headaches, dizziness, or breathing problems

Selecting Paint

- First, make sure you select paints that are for indoor use
- Do not use exterior paints indoors
- There are two categories of interior paints, water-based and oil-based
- Water-based paints are referred to as “latex” paints
- The oil-based paints are referred to as “alkyd” paints. In general, water-based paints will emit fewer chemicals and lower levels of chemical vapors

- Short-term exposure to solvents from alkyd paints can be significantly higher than from latex paints. When selecting paint or contracting for painting services, read the label for information about the potential health effects of the paints or ask the paint supplier.

Paints contain different chemicals and the potential hazards are different for various products. Each product has specific safety precautions given on the label. However, there are some basic safety steps to keep in mind when using any paint.

- Always read and follow all the instructions and safety precautions on the label
- Do not assume you already know how to use the product. The hazards may be different from one product to another. Some ingredients in individual products may also change over time
- The label tells you what actions you need to take to reduce hazards and the first aid measures to use if there is a problem
- There must be plenty of fresh air where you paint. Open all doors and windows to the outside (not to hallways)
- Push back curtains and blinds so that there is nothing blocking the airflow, to ensure cross-ventilation. Place a box fan securely in the window blowing out to ensure air movement. Do not point the fan directly at someone else's space
- Secure the fan in the window frame so that it can't fall out or be tipped over by children. If it rains or snows, turn the fan off and remove it from the window to avoid an electrical shock hazard
- An air conditioning unit must not be substituted for the use of a fan. In addition, bathroom/kitchen exhaust fans do not always vent out-of-doors and must not be relied upon to increase ventilation
- Continue to provide fresh air after painting
- Some paints may have only a small quantity of volatile materials that evaporate quickly, other paints may have a significant amount of organic solvents or drying oils that take several days to go away. Provide continued ventilation for 2 or 3 days
- Follow paint can directions for the safe cleaning of brushes and other equipment
- Latex paint usually cleans up with soap and water
- For alkyd paints, you will need to purchase specific products as listed on the label
- Never use gasoline to clean paintbrushes. Gasoline is extremely flammable. Read the label to find out if the paint cleaner is flammable. All flammable products will be used away from ignition sources such as water heaters, furnaces, electric motors and fans
- Keep a properly rated and charged fire extinguisher available at all times when spraying flammable material
- Buy only what you need, and store or throw away the unused amount. Since paints are used only occasionally, buy only as much as you will use right away
- If you have leftover paint, be sure to close the container tightly. Vapors can leak from improperly sealed containers
- Follow the directions on the can on how to dispose of the product. Latex paint and its containers can often be thrown out with regular household trash
- In some communities, there are special recycling programs for paints. To find out about these, contact your local government

- Do not perform work in a heavily populated area, including building air intake areas, until appropriate warnings are posted and occupants notified. If possible, rope off the immediate work area to prevent injury to bystanders
- Protect your working area with warning flags and traffic cones when painting parking lot, road, and traffic lines
- When spraying roofs or building exteriors, have adequate barricades and signs to detour traffic
- Eye protection is required whenever rust or loose paint is removed from surfaces with a wire brush. A hard hat is required if the work area is exposed to falling objects
- To avoid splinters, always observe the condition of the wood before sanding
- Store and dispense flammable solvents from approved safety cans only
- Follow the manufacturer's instructions for handling all epoxy materials, thinners, catalysts, paint removers, etc. Gloves and respirators may be required
- Clean all working areas after each job and/or shift
- Make sure that you wash your hands thoroughly with soap and water before handling food
- Inspect all ladders and scaffolds before you begin work
- Make a safety check of all equipment such as staging tools, spray pots, hoses or fitting hooks
- Employees must wear an approved life line fastened to the building, if they are required to perform exterior work 6 feet or more above ground level
- Make sure that planks or ladder stages are long enough to extend well beyond the supports
- Do not climb onto or use rolling-type scaffolds unless wheels are fully locked
- Inspect all rope before use. Rope used around acid or caustics must be inspected frequently during use
- Do not use fiber rope that cannot easily be bent or worked, or if fibers seem to be dry or brittle
- Do not use fiber rope near sandblasting, or where there is exposure to chemical washing solutions

Spraying

- An approved respirator will be worn when spray painting is being done
- Do not spray paint in shops, storage rooms, or similar locations without specific instructions from the supervisor of such locations
- Do not perform spray painting in confined spaces without specific permission from your supervisor. Appropriate breathing equipment, and/or controls are required for such work to assure that the atmosphere is safe
- Do not break connections in pressurized air hose lines
- Airless spraying with flammable materials must not be performed in confined areas unless there is sufficient ventilation to keep the atmosphere below the lower explosive limit of the material
- Airless spraying with flammable materials may cause generation of static electricity. This will require grounding of both the spraying equipment and the object to be sprayed
- Do not point an airless spray gun at any part of the body. Do not clean airless spray guns while there is pressure in the system
- Inspect and clean all gauges, gaskets, and valves on all spray equipment to ensure that they are in good working order
- Do not interfere with the mechanical operation of safety devices designed to protect you from contact with the spray under pressure

- Do not leave rags saturated with paint or thinner lying around in a pile. In order to avoid a fire, keep these rags unfolded until they are properly aired out, and then discard them in approved containers. Storage in a water filled container is recommended
- Spontaneous ignition can occur if certain types of spray paint residues are permitted to mix or accumulate
- Dispose of surplus paints and solvents by approved methods only
- Removal of lead-based paint requires additional personal protective equipment, and air sampling to determine lead exposure

HIGH VOLUME LOW PRESSURE SPRAY SYSTEMS (HVLP)

Two types of high volume low-pressure (HVLP) spray systems dominate the painting market, portable turbines and direct hook-up guns. The two systems use completely different air sources, but atomize material in similar manners. Hazards include eye injury, possible inhalation of paint fumes, and fire.

- Read and understand the manufacturer's manual before operating the HVLP spray system. Read all cautions and warnings
- Designate a competent person to demonstrate, to new painters, how the HVLP spray system works
- Inspect the equipment for damage. Use manufacturer approved parts when making any repairs or replacements on the spray system
- Always spray in a well-ventilated area. Wear a NIOSH dust mask to protect your lungs from microscopic particles
- Know the paints you are spraying. Read all Safety Data Sheets (SDS) for paints and solvents being used. The SDS will tell you when you need to wear a half or full face respirator to protect your lungs
- Never spray near sparks, open flames, or hot surfaces. Certain coating materials are highly flammable. Do not smoke while spraying
- Keep a properly rated and charged fire extinguisher available at all times when spraying flammable material
- Check all material hoses for cuts, leaks, abrasions, cover bulging or movement of couplings before each operation. If any of these conditions exist, replace the hose immediately. Do not attempt to repair a paint hose
- Never point the spray gun at yourself or co-workers. Keep all unauthorized personnel out of the work area
- Remember to identify confined spaces. Painting in a confined space produces oxygen deficiency, and a flammable or toxic atmosphere. The area must be kept well-ventilated throughout the entire period you will be painting
- Keep the work area free of debris that could cause trips and falls. Do not leave the spray system unattended while it is running
- Clean your spray gun thoroughly after each use. Remember; your safety may depend on the condition of the equipment you are working with. Empty the spray material from the cup. Pour a small amount of the appropriate solvent in the cup and attach the cup to the spray gun. Make sure you are wearing your protective equipment
- Shake and spray the gun in a well-ventilated area. Back flushing of the system is not necessary, so do not restrict the nozzle when cleaning. Repeat these steps until the solvent appears clear. Keep spray to area to a minimum

- Wipe the exterior of the cup and the spray gun with the appropriate solvent until it is clean. Dispose of all rags properly
- Make sure the air holes and material passages are completely clean. Never use metal tools or picks to clean the air cap or nozzle
- Thoroughly clean the check valve and hoses. Do not soak check valve hoses in hot solvents
- Lubricate any threaded parts on the sprayer with petroleum jelly when you put them back together. This will keep them working properly. However, do not use any lubricants containing silicone, which can cause problems when used with some paints
- Inspect the cup gasket during each cleaning. Normal wear requires the gasket to be replaced periodically
- Check for leaks. If material leaks from around or through the packing nut, tighten the packing nut slightly. Squeeze the trigger to see if the leaking has stopped. If it has not, continue to tighten the packing nut until the leaking stops. Be careful not to over-tighten the packing nut or the needle will stick in the packing. If adjusting the packing nut does not stop the leak, replace the packing.
- Keep the filter clean. Remove the filter. Use air to blow material residue from the filter, or tap the particles out
- Remember, for material that is not easily blown or knocked loose, use soapy water or mineral spirits
- Allow the filter to dry before placing it back into the unit. Filters must not be cleaned with highly flammable solvents
- Once cleaned, insert it back into the end from which it was removed. If the filter cannot be cleaned, install a new filter
- Workers must be constantly aware of the health risks involved when spraying in a confined area. Remember to use proper respiratory and eye protection

SPRAY PAINTING PROCEDURES

Spray painting allows coverage of large areas with even coats of primer, paint, sealers and other coatings. However, workers in spray painting operations need to recognize and guard against the hazard associated with spray painting processes.

Exposure to chemicals can occur during mixing of the coating, spraying the material, and grinding or sanding it. Even some surface preparation and cleanup solvents can pose a hazard, if not handled properly. Workers will avoid using solvents for cleaning paint from hands or skin. Use water-based cleansers that are meant for personal cleanup.

Hazardous chemicals in coatings and solvents can enter the body several ways. Workers can inhale chemical vapors from spraying, absorb the chemical by skin contact or inject the chemical with high-pressure spray painting equipment. Symptoms of overexposure to hazardous chemicals include nausea, rashes and long-term illnesses like asthma, lung cancer and sensitization (becoming severely allergic to the paint). Before work begins, employees will read the Safety Data Sheet (SDS) of the chemical they'll be using then wear the appropriate PPE to protect themselves against its hazards.

Employees will use a spray booth whenever possible to remove spray paint vapors and debris from their breathing zone. Many coatings contain flammable substances that are aerosolized when sprayed through powered equipment and without proper ventilation, such as in a spray booth, these vapors can build up and create an explosion and fire danger. All spray booths must be properly maintained, including regular cleaning of filters and overspray.

To prevent sparking a flammable substance, smoking and other sources of flame near spray painting operations are prohibited and tools must be properly rated and grounded for work in a spray painting area.

Consider ergonomics when spraying coatings. Employees may be required to hold full paint pots and maneuver heavy, awkward objects while spraying. Balanced spray guns that fit comfortably in the hand or using hoists and dollies to move objects can reduce the chance of accidents and injuries. Workers will take frequent breaks and stretch often to avoid strains and sprains.

PROTECTION

Protect all exterior and interior surfaces and areas, including landscaping, walks, drives, all adjacent building surfaces, equipment and any labels and signage from painting operations and damage by using drop cloths, shields, masking, templates, or other suitable protective.

Erect barriers or screens and post signs to warn of or limit or direct traffic away or around work area as required.

CLEAN-UP

Remove all paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.

Remove combustible rubbish materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.

Clean equipment and dispose of wash water/solvents as well as all other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers / strippers in accordance with the safety requirements of authorities having jurisdiction.

REPAINTING OF EXISTING FINISHES

Use a finish coat of new surface paint system for minor repairs of existing finishes. Use system primer where existing finishes are damaged down to bare surface.

WASTE MANAGEMENT AND DISPOSAL

Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Obtain information on these controls from applicable state and local government departments having jurisdiction.

All waste materials will be separated and recycled. Where paint recycling is available, collect waste paint by type, and provide for delivery to recycling or collection facility. Materials that can’t be reused must be treated as hazardous waste and disposed of in an appropriate manner.

Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures will be strictly adhered to:

- Retain cleaning water for water-based materials to allow sediments to be filtered out. Never clean equipment using free draining water
- Keep used cleaners, thinners, solvents and excess paint in designated containers for proper disposal
- Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal or appropriate cleaning and laundering
- Dispose of contaminants in an approved manner according to all applicable hazardous waste regulations
- Make sure all empty paint cans are dry before disposal or recycling (where available)
- Close and seal tightly partly used cans of materials including sealant and adhesive containers and store in a well ventilated fire-safe area at moderate temperature

Set aside and protect surplus and uncontaminated materials not required, and deliver or arrange collection for re-use or re-manufacturing.

TRAINING

All employees involved in painting operations will be trained on:

- The hazards associated with painting work
- The safe practices to be used when painting
- The safe operations of all tools and equipment they will be required to use
- The proper care and use of all required PPE
- How to read and understand SDS for paints and chemicals

Refresher Training

Refresher training will be conducted:

- At least annually
- Whenever there are changes to the procedures and safe practices, equipment or materials being used
- Anytime employees demonstrate a lack of knowledge to perform their work safely

Training Records

This company will record and maintain information on the training received by employees for the length of their employment.

POLICY REVIEW

The management of this company will review this policy to ensure its accuracy at least annually, or whenever there are changes to equipment or materials used.

SCOPE

This chapter provides information on the safe practices regarding the operation, maintenance and repair of rock crushing equipment. Rock crushers are used primarily in mining and quarry work, and will comply with all applicable Mining Safety and Health Administration (MSHA) regulations.

POLICY

This Company has implemented the policy for safe rock crushing procedures at all job sites to protect employees and avoid the recognized potential hazards.

ROCK CRUSHERS AND SCREENS

Crushers

There are six types of rock crushers:

- Jaw crusher
- Gyratory crusher
- Cone crusher
- Hammermill
- Impact breaker
- Double-roll crusher

The jaw crusher, gyratory crusher and cone crusher are compression crushers, while the hammermill, impact breaker and roll crushers are impact crushers.

Screens

Screens sort material by at least two sizes as the undersized material passes through the screen openings. The four most common types of screens are Grizzly Screens, Shaking Screens, Vibrating Screens, and Revolving Screens.

ROCK CRUSHING SAFE PRACTICES

Practice the elements of good housekeeping that will keep walkways clear and clean up spills to prevent slips, trips, and falls when starting oil pumps for crushers and hydraulic pumps.

Visually inspect crusher for leakage, loose bolts and nuts or cracks in housing or supports to prevent slips, trips, and falls when inspecting the crusher for grease and oil leaks.

Make sure non-essential workers have left the area and periodically check belts for wear to prevent belt breakage when starting and feeding material into the crusher.

Make sure non-essential workers have left the area and stand behind a door or screen guard to protect against material projectiles when watching trucks or loaders dump material in the feeder or crusher.

To prevent the detonation of explosives that have been dumped into the feeder or crusher, do not attempt to remove them. Shut off the crusher and feeder and notify the supervisor.

Assure all material clears the crusher and belts before shutting down to prevent jamming of material left in the crusher when shutting down or signaling loaders to start dumping.

When trying to free a large stone in crusher or feeder, whether using a pry bar hammer and wedge, hydraulic hammer, grappling or crane hook or dynamite to free a large stone in the crusher or feeder take the following safety procedures:

- Turn off and lockout/tagout all switches before going into the crusher or feeder to prevent equipment starting
- Make sure non-essential workers have cleared the area and use safety belt and line to prevent slips, trips, and falls
- Beware of pry bar pinch points to prevent pry bar slippage
- Barricade the area around the truck dump to prevent injury from falling rock. Attach slings and hooks securely to a rock to prevent struck by or caught injuries between slings and hooks
- Wear safety glasses and goggles to prevent eye injury
- Use only approved wedge device to prevent wedge fly back
- Use short-handled hammers in close places to prevent sledgehammer glancing injuries

DUST PREVENTION

Dust generated when processing minerals through shattering and breaking, dumping, loading, transferring, and handling puts workers at danger of developing respiratory illnesses such as silicosis.

Proper design, selection and operation of equipment to minimize dust such as providing enclosures (covers or shrouds) around a source helps contain emissions and allow dust control systems to operate efficiently.

This Company will also use other dust prevention steps like water sprays and respirators approved for protection against silica. Workers must not eat, drink or smoke near dust, and must wash hands and face before eating, drinking or smoking.

Enclosures

Enclosures contain emissions around a dust source and lower the exhaust volume requirements of a dust collection system improving its efficiency.

An enclosure will be large enough to permit internal air circulation. It will have removable sections allowing easy maintenance, with a hinged access door for inspection. Where possible, enclosures should have curtains at the open ends to contain dust while reducing airflow.

Crushers

Dust emission points are at the crusher feed and discharge

Dust prevention measures will include:

- Use shrouds or enclosures around the crushers to contain the dust
- Install a crusher feedbox with a minimum number of openings. Use rubber curtains to minimize dust escape and air flow
- Choke feed the crusher to reduce air entrainment and dust emissions
- Properly designed and installed transfer chutes minimize dust escape at crusher discharge

Screens

Screens sort material by at least two sizes as the undersize material passes through openings. Dust is created in the dry screening process, and the amount depends on particle size, moisture content and the type of screening equipment. Screens process finer materials and agitate faster to produce more dust.

Dust emission points:

- The top one third of the screen surface where incoming material hits
- Openings between moving parts and stationary parts like discharge chutes. Discharge chutes are dust emission points

Dust prevention measures:

- A complete enclosure that can easily be removed for maintenance and inspection
- A tight sealing system, such as a rubber cover that can be attached to the screen, reduces dust emissions and minimizes air flow, reducing the exhaust volume after the screening process
- Sheet metal covers provided by manufacturers need to be properly maintained in order to be effective

JAW CRUSHER MAINTENANCE

Following are safety procedures for specific tasks of jaw crusher maintenance that protects workers against recognized hazards. These procedures include prepare to replace jaw dies, remove the jaw dies, jaw prep and cleaning, install the stationary die, install the moveable die, flip jaw dies, flip the stationary die, and flip the moveable die, adjusting closed side setting (CSS), work area cleanup, jaw startup.

Prepare to Replace Jaw Dies

Workers must be able to demonstrate how to safely prepare the jaw dies and explain why the job dies are replaced, associated risks, and how to implement appropriate controls.

Obtain and inspect all necessary equipment, tools, and materials needed for the job. Including inspecting the pins, condition of the cables and condition of the D-Ring of the Die Lifting Apparatus

Conduct crew meetings, discussing the required tasks and potential hazards. Discuss and assign job tasks, review the maintenance manual and specific training documents

Workers must have the necessary PPE for the tasks they will be doing this could include full body harness with retractable lanyard, safety glasses, face shield or goggles, heavy leather gloves and cutting goggles.

If necessary, coordinate with the blasting crew so no worker is working in and around a jaw crusher at the same time as blasting operations.

Barricade the feed hopper so a haul truck does not inadvertently dump rocks into the hopper during maintenance.

Conduct a dry run, discussing the tasks to be conducted so every worker is aware of who, why, when, where and how of every task. Crane operators and riggers need to be present.

Stage the new dies and related hardware, remove paint from machined surfaces, stage and supervise crane operation and the service truck (ensuring the wheels are chocked).

Remove the Jaw Dies

Workers must be able to demonstrate how to safely remove jaw dies and explain why the job duties are conducted, associated risks, and how to implement appropriate controls.

Open the jaw as far as it will go and clean the toggle rod threads, loosen the toggle spring to remove tension and back adjusting wedges out to the end of the threads.

Workers need to wear a harness with the lanyard attached to designated tie off points. A properly sized working platform that is the full width of the jaw die may serve as a safe working surface and restrain the liner from unintended movement.

Clean the lifting holes and attach lifting tool to crane hook that is positioned over the moveable die. Insert lifting tool into the holes and signal to the crane operator to take up the slack on the cables. Remove the nuts from the moveable die retaining bolts from the backside of the pitman. If a torch is needed, ensure that all proper PPE is used during the cutting, including an immediately available fire extinguisher.

Remove the retaining bolts and wedges, and then clear the working platform and immediate area of all non-essential personnel, except the signalmen and one worker to pry and guide the die.

Pry the moveable die from the pitman, ensuring the crane hook is centered over the jaw die so the jaw die doesn’t swing and damage the front frame or create a serious hazard for workers.

Remove the Moveable Die

- Signal the crane operator to hoist slowly. If the dies do not move freely, release the tension and repeat the previous step
- Guide the die out of the jaw by pushing or pulling the hoist cables, taking extra care to ensure the die doesn’t get hung up or snagged
- Signal the crane operator to stop the hoist when the die clears the hopper. Attach the tag line to the bottom of the die, making sure not to stand under the hoisted die
- Drop the other end of the tag line over the edge of the hopper, unhook the lanyard from your body harness, get to the ground, and grab the end of the tag line while signaling the crane operator to resume the lift. Guide the die to the predetermined spot, set it down, and disconnect the lifting device
- Attach the lanyard harness to the tie off and insert the working platform. Clean the stationary die and gaps along the sides of the die. Wash with a water hose and remove compacted material, using a pry bar and needle gun while wearing proper PPE. Clean lifting holes with needle gun
- Position the crane hook over the stationary die and ensuring the lifting device is correctly attached to the crane hook, insert lifting tool into the lifting holes and signal the crane operator to take up the slack on the cables

- Remove the nuts and washers from the stationary die retaining bolts, the washers and nuts are removed from the backside of the frame. If a torch is needed, ensure all proper PPE is used during the cutting, including an immediately available fire extinguisher
- Remove the retaining bolts and wedges, then the working platform and clear all non- essential personnel from the area except the signalman and one worker to pry and guide the die
- Pry the stationary die from the frame, ensuring the crane hook is centered over the jaw die so the jaw doesn't swing and damage the front frame or create a serious hazard for workers

Remove the Stationary Die

- Signal the crane operator to hoist slowly, if the die does not move freely, release the tension, and repeat the previous step
- Guide the die out of the jaw by pushing or pulling the hoist cables, taking extra care to ensure the die doesn't get hung up or snagged
- Signal the crane operator to stop the hoist when the die clears the hopper. Attach the tag line to the bottom of the die, making sure to not stand under the hoisted die
- Drop the other end of the tag line over the edge of the hopper, unhook your lanyard from the body harness, get to the ground, and grab the end of the tag line while signaling the crane operator to resume the lift. Guide the die to the predetermined spot, set it down, and disconnect the lifting device

Jaw Prep and Cleaning

- Workers must be able to demonstrate how to safely prep and clean the jaw and explain why the job duties are conducted, associated risks, and how to implement appropriate controls
- Hose the inside of the jaw with water
- Attach the lanyard to your body harness, install the working platform inside the jaw, and climb inside the jaw and onto the working platform to clean machined surfaces with a wire wheel. Check the machined surfaces with a straight edge and grind off the high spots with a grinder. Use a face shield when using the wire wheel and grinder
- After disconnecting the lanyard from your body harness go under the jaw belt to the bottom of the jaw and inspect the lower wedges for debris and wear ensuring the lower wedge bolts on both sides are tight, and replace if necessary

Replace Lower Wedge 4

To replace lower wedges, remove the nuts and washers from the backside of the frame and pitman. If a torch is needed, ensure that all proper PPE is used during the cutting, including an immediately available fire extinguisher.

- Remove the bolts from the wedges and pry the wedge out with a pry bar
- Clean wedge and seat with a wire brush and check seat for a proper fit to avoid premature wear
- Install new wedge into the seat, brush anti-seize on the bolts and insert bolt though wedge and frame. Install the nuts and washers and tighten nuts with spline drives

Install the Stationary Die

- Workers must be able to demonstrate how to safely install the stationary die and explain why the job duties are conducted, associated risks and how to implement appropriate controls
- Check the part numbers to ensure it is the stationary die and not the moveable die and position the crane hook over it
- Inspect the lifting device and then attach it and the tag line to the stationary die and, ensure that everyone is clear of the lifting area before signaling to the crane operator to hoist the die
- Center the die over the jaw opening, attach your lanyard to the hammer frame, climb on top of the pitman, and remove the tag line from the die
- Lower the die into the jaw while guiding it into position, center the die, ensuring it is seated properly on the lower wedges, and install upper wedges into the correct position, the chisel side toward the die
- Brush anti-seize on the bolts and insert before installing the washers and nuts from the backside of the frame
- Remove the lifting device from the die and reposition the crane hook over the moveable die. Tighten the nuts with spline drive impact

Install the Moveable Die

- Workers must be able to demonstrate how to safely install the moveable die and explain why the job duties are conducted, associated risks and how to implement appropriate controls
- Visually inspect the lifting device for any defects and then attach to the moveable die and, ensuring all persons are clear from the lifting area, signal the operator to hoist the die. Only the pre-assigned person will give the crane operator signals
- Center the die over the jaw openings and signal crane operator to pause and lower the die into the jaw while guiding into position. Make sure to use the proper fall protection
- Climb into the jaw, onto the work platform and center the die ensuring it is properly seated on the lower wedges, then install the upper wedges into position
- Brush anti-seize onto the bolts, insert the bolts and install the washer and nuts from the backside of the pitman. Then remove the lifting device from the die, move the crane hook away and tighten the nuts

Flip Jaw Dies

- Workers must be able to demonstrate how to safely flip jaw dies and explain why the job duties are conducted, associated risks, and how to implement appropriate controls
- Open the jaw as far as it will go and clean the toggle rod threads, loosen the toggle spring to remove tension and back adjusting wedges out to the end of the threads
- Workers need to wear a harness with the lanyard attached to designated tie off points. A properly sized working platform that is the full width of the jaw die may serve as a safe working surface and restrain the liner from unintended movement

- Clean the lifting holes and attach lifting tool to crane hook that is positioned over the moveable die. Insert lifting tool into the holes and signal to the crane operator to take up the slack on the cables. Remove the nuts from the moveable die retaining bolts from the backside of the pitman. If a torch is needed, ensure that all proper PPE is used during the cutting, including an immediately available fire extinguisher
- Remove the retaining bolts and wedges, then the working platform and clear all non- essential personnel from the area except the signalmen and one worker to pry and guide the die
- Pry the moveable die from the pitman, ensuring the crane hook is centered over the jaw die so the jaw die doesn't swing and damage the front frame or create a serious hazard for workers

Remove the Moveable Die

- Signal the crane operator to hoist slowly. If the die does not move freely, release the tension and repeat the previous step
- Guide the die out of the jaw by pushing or pulling the hoist cables, taking extra care to ensure the die doesn't get hung up or snagged
- Signal the crane operator to stop the hoist when the die clears the hopper. Attach the tag line to the bottom of the die, making sure to not stand under the hoisted die
- Drop the other end of the tag line over the edge of the hopper, unhook the lanyard from the body harness, get to the ground, and grab the end of the tag line while signaling the crane operator to resume the lift. Guide the die to the predetermined spot, set it down, and disconnect the lifting device
- Making sure to attach lanyard of the harness to the tie off and inserting the working platform, clean the stationary die and gaps along the sides of the die. Wash with a water hose and remove compacted material, using a pry bar and needle gun while wearing proper PPE. Clean lifting holes with needle gun
- Position the crane hook over the stationary die and ensuring the lifting device is correctly attached to the crane hook, insert lifting tool into the lifting holes and signal the crane operator to take up the slack on the cables
- Remove the nuts and washers from the stationary die retaining bolts, the washers and nuts are removed from the backside of the frame. If a torch is needed, ensure all proper PPE is used during the cutting, including an immediately available fire extinguisher
- Pry the stationary die from the frame, ensuring the crane hook is centered over the jaw die so the jaw doesn't swing and damage the front frame or create a serious hazard for workers

Remove the Stationary Die

- Signal the crane operator to hoist slowly, if the die does not move freely, release the tension, and repeat the previous step
- Guide the die out of the jaw by pushing or pulling the hoist cables, taking extra care to ensure the die doesn't get hung up or snagged
- Signal the crane operator to stop the hoist when the die clears the hopper. Attach the tag line to the bottom of the die, making sure to not stand under the hoisted die

- Drop the other end of the tag line over the edge of the hopper, unhook the lanyard from the body harness, get to the ground, and grab the end of the tag line while signaling the crane operator to resume the lift. Guide the die to the predetermined spot, set it down, and disconnect the lifting device

Flip the Stationary Die

- Workers must be able to demonstrate how to safely flip the stationary die and explain why the job duties are conducted, associated risks and how to implement appropriate controls
- Clean the die and check die machine surface with a straight edge. Bent dies can damage the crusher, and must be replaced
- Trim the edge of your die with torch to original dimension if necessary. Ensure that all proper PPE is used during the cutting, including an immediately available fire extinguisher
- Check the part numbers to ensure it is the stationary die and not the moveable die and position the crane hook over it. Inspect the lifting device for defects that could result in a lifting failure
- Ensuring all persons are clear from the lifting area, signal the operator to hoist the die. Only the pre-assigned person will give the crane operator signals
- Attach the lifting device to the opposite end of the stationary die with the worn end up, and attach the tag line to the bottom of the stationary die (opposite of lifting device)
- Center the die over the jaw opening, and attaching lanyard to the hammer frame, climb on top of the pitman and remove the tag line from the die
- Lower the die into the jaw while guiding it into position, center the die, ensuring it is seated properly on the lower wedges, and install upper wedges into the correct position, the chisel side toward the die
- Brush anti-seize on the bolts and insert before installing the washers and nuts from the backside of the frame
- Remove the lifting device from the die and reposition the crane hook over the moveable die. Tighten the nuts with spline drive impact

Flip the Moveable Die

- Workers must be able to demonstrate how to safely flip the moveable die and explain why the job duties are conducted, associated risks and how to implement appropriate controls
- Clean the die and check die machine surface with a straight edge. Bent dies can damage the crusher, and must be replaced
- Trim the edge of die with torch to original dimension if necessary. Ensure that all proper PPE is used during the cutting, including an immediately available fire extinguisher
- Check the part numbers to ensure it is the movable die, and not the stationary die, and position the crane hook over it. Inspect the lifting device for defects that could result in a lifting failure
- Ensuring all persons are clear from the lifting area, signal the operator to hoist the die
- Only the pre-assigned person will give the crane operator signals
- Attach the lifting device to the opposite end of the stationary die with the worn end up, and attach the tag line to the bottom of the moveable die (opposite of lifting device)
- Center the die over the jaw openings and signal crane operator to pause and lower the die into the jaw while guiding into position. Make sure to use the proper fall protection

- Climb into the jaw, onto the work platform and center the die ensuring it is properly seated on the lower wedges, then install the upper wedges into position
- Brush anti-seize onto the bolts, insert the bolts and install the washer and nuts from the backside of the pitman. Then you can remove the lifting device from the die, move the crane hook away, and tighten the nuts

Adjusting Closed Side Setting (CSS)

- Workers must be able to demonstrate how to safely flip the closed side setting of the jaw (CSS) and explain why the job duties are conducted, associated risks, and how to implement appropriate controls
- Slide under the jaw on the belt and measure the current opening between the stationary and moveable jaw dies from die ridge to ridge. Not having the correct opening means excessive stress on bearing, and damage to belts and other crushers
- Tighten the adjustment wedges as needed
- Inspect the toggle rod and springs, looking for cracks and visible wear on the rods, and replace cracked or worn equipment
- The toggle rod can come loose, resulting in equipment damage so check and tighten as needed

Work Area Cleanup

Workers must be able to demonstrate how to safely cleanup the work area and explain why the job duties are conducted, what the associated risks are and how to implement appropriate controls. Cleanup steps include:

- Gather and account for all tools
- Wrap all hoses and put into proper places
- Scrap old jaw dies with the loader
- Conduct general housekeeping cleanup around the crusher

Jaw start-up

Workers must be able to demonstrate how to safely start up the jaw crusher and explain why the job duties are conducted, associated risks and how to implement appropriate controls.

Assemble all team members at the main power, and then remove all lockout/tagout procedures according to Company policy.

Take a head count and turn main power on, standing to the side and facing away from the switch.

Push the start button and listen for unusual noises like knocking which may indicate a loose toggle plate. If there is knocking and a toggle spring must be tightened, follow appropriate lockout/tagout procedure.

Remove barricade and release the jaw crusher to the operator.

If a blasting crew has ceased work during operations, notify crew that job is complete. Conduct follow up during the next shift to check the die bolts are tight and there is not knocking noise.

CONE CRUSHER REPLACEMENT

This Company requires workers to be able to explain why each step of the job of replacing a cone liner is needed, associated risks and how to implement appropriate controls.

Preparation

Workers need to know the following safety procedures crane hand signals, lockout tagout procedures, cutting and grinding safety, overhead load safety, ventilation, current weather conditions, and emergency response procedures.

Refer to the manufacturer's manual to ensure all parts, equipment, and tools are available. Check component weights and refer to crane load charts.

Ensure there is there an appropriate crane operated by certified crane personnel.

Riggers need the appropriate gloves, tag lines, and rigging checked for defects: inspect wire rope for defects, frays, kinks, and broken wires; inspect nylon straps for tears, oil, frays, cuts, and weather damage.

Make sure the appropriate loader is in good operating condition.

A service truck must have the appropriate materials: cutting torch and full bottles (inspect gauges, hoses, flash back arrestor, tips and torch head for defects); hand tools; welder (all connections are guarded, inspect leads, electrode holder, and grounding); compressor (check for fuel, hoses, gauges, pressure relief valve, and oil. Drain the moisture from the air tank).

Everyone must have the necessary PPE for the tasks they will be doing: face shield, cutting goggles, leathers, welding hood, welding gloves, respirator, fall protection, long sleeve shirts, safety glasses, hearing protection, hard hats, safety shoes, and latex or rubber gloves.

Assign Jobs, ensuring each person knows how to safely perform their tasks: upper, lower, crane operator, loader operator.

Dismantle crusher

Workers must be able to demonstrate how to properly dismantle a cone crusher, explaining why the job duties are conducted, and how to implement appropriate controls.

First, run the crusher for 10 minutes to prevent the socket from sticking to the shaft.

Follow the Company Lock out Tagout policy for crusher, feed conveyor, discharge conveyor, oil systems including heaters, and neighboring circuits around the work area.

Stage the crane in a safe location, being mindful of overhead power lines, exceeding the load limit, counterweight clearance, and proper crane operation.

Remove conveyors, chutes, and hoppers, plug oil drain plug, cut distributor plate bolts, remove distributor plates, and relieve pressure on locking post.

Use the crane to lift the cap and relieve hydraulic pressure. Disconnect the hydraulic lines before lowering the cap, disconnecting, and raising the two-way cable out of the work area.

When unscrewing the crusher bowl with the loader, raise the loader bucket to protect the loader operator and ensure all workers are in a safe location if the cable fails. Designate only one person to make hand signals to avoid loader operator confusion.

For hydraulic crushers, lift the basket out of the bowl and place on the ground.

Lift the bowl out of the main frame, slowly, ensuring all personnel are in a safe location and place the bowl on the ground. Disconnecting hold down rams and lift the cap with the crane to inspect the hydraulic ram shaft for defects.

Lift the shaft out of the main frame slowly, ensuring all workers are in a safe location, and the end of the shaft does not gouge socket liner

Lift the socket-sealing ring out of the main frame and remove the O-Ring or valves and springs from the top of the socket.

Inspect all elements including the: root clearance, back lash and condition of the bushing, socket liner, step washers, main frame arms, main frame liners, counter shafts liners and counter shaft box breathers.

Finally cover crusher parts with a plastic tarp to prevent environmental damage.

Dismantle and rebuild bowl

Workers must be able to demonstrate how to safely dismantle and rebuild the crusher bowl and explain why the job duties are conducted, associated risks, and how to implement appropriate controls.

Attach the loader bucket to bowl with a cable and after securing transport the bowl to wash area to wash outside threads, cover plates, and U-bolts before transferring bowl to rebuild area.

Remove U-bolt covers and nuts to clean, inspect and (if necessary) replace. Then separate the lift bowl assembly from the liner and place assembly to the side. Inspect seat area per manufacturer’s specifications for cracks and excess wear.

Buff seat area and replace bowl liner with silicone and insulation, lift the bowl assembly and place it over the lugs on the new bowl liner. To prevent backing material from leaking into the U-bolt chamber, pack insulation firmly around lugs and U-bolts. Install bottom plate, rubbers, top plate, nuts on U-bolts, locking plates and U-bolt covers. Be sure to position steel and rubber plates so U-bolts are upright when reassembled. Also, make sure the liner stays centered and level with the bowl, so that both seating surfaces are aligned and nuts are properly tightened to manufacturer’s specifications.

After reinstalling locking plates, insulation and U-bolt covers, pour backing materials when you pour backing material with the mantle.

Disassemble and rebuild the mantle

Workers must be able to demonstrate how to safely disassemble and rebuild the mantle and explain why the tasks are conducted, associated risks, and how to implement appropriate controls.

Attach the loader to the lifting eye on the stem and lift the shaft so it does not contact the ground. Move the shaft to the work area and lower it into the assembly hole.

Remove splined nut, clean and inspect it, and set aside for reassembly before removing the remainder of the torch ring from the shaft and silicone from eyebolt holes in the shaft sleeve.

Lift and remove the shaft sleeve using the crane, and clean and inspect. Lift mantle liner off the shaft and discard. Clean the old backing materials from the shaft and the seat of the shaft and oil the shaft where the backing is to be installed. Clean and inspect the threads at the top of the shaft with a wire brush where the splined nut goes.

Watch for unexpected movement when lifting the mantle liner and turning it over so the seat side is up. Inspect and clean the seat with a wire brush, gator pad, or wire wheel, then turn the mantle over so the seat is down, lift the new mantle liner up and center on it the shaft then lower.

Lift and place the sleeve over shaft and lower into position on top of mantle liner. Lift the splined nut onto the shaft threads.

Finally pour backing materials into the pour holes of the mantle liner at the same time as the rebuilt bowl.

Pouring backing material

Workers must be able to demonstrate how to safely pour backing material and explain why the job duties are conducted, associated risks and how to implement appropriate controls.

Ensure the proper tools, equipment, PPE and SDS/MSDS are at the pour site, and the backing material is warmed to a proper temperature for easy pouring. Place in a hot water bath, near a radiant heat source, inside or in the sun, but not near open flames. Ensure the mantle and bowl are on a level surface before pouring.

Install necessary ventilation fans and don proper PPE before removing the lids and mixing the epoxy to ensure a consistent blend. Slowly add the hardener to the epoxy to avoid chemical splashes until the material is mixed to a consistent color. Always refer to manufacturer’s mixing procedures and quantity specifications.

Pour into the mantle and bowl liner cavities while mixing new batches as needed. Ensure proper backing levels, pouring material to the bottom of pour holes in the mantle and to the top of the bowl liner.

Leave the mantle and bowl to stand until the backing has completely cured, so the backing will not crack or the liner will not shift, causing premature wear. The manufacturer’s recommendations will have material on how long it will take until completely cured.

Reassemble and test crusher

Workers must be able to demonstrate how to safely reassemble and test the crusher and explain why the job duties are conducted, associated risks, and how to implement appropriate controls.

Conduct a pre-shift inspection on all mobile equipment for defects, inspecting the backing for hardness and leakage.

Clean off socket assembly, removing excess oil, dirt, and grease. Clean the surface of the O-ring, valves, springs, and spring holes. Clean bronze with rags to prevent damaging scratches.

Remove the lid from the hole, ensure that no debris is inside, and install the oil drain plug. If valves and springs are used, lubricate with oil then install O-ring, valves, and springs.

Pick up socket sealing ring with the crane, clean out the cavity with scraper and gloved hand, and wipe top surface with solvent and rags. Remove the old felt, dunk new felt in oil and install, cutting off excess while ensuring you do not work under a suspended load.

Pack grease cavity ensuring that no air pockets exist to ensure proper sealing of mantle and socket assembly. Slowly lower the socket-sealing ring, aligning locking keys with the keyways until seated, ensuring that the socket-sealing ring has non-binding movement.

Lower the mantle shaft on cribbing or on its side, onto a soft clean surface. Clear the oil passage with water or compressed air. Raise the shaft, keeping the surface clean, transport mantle to the crusher, and lower onto cribbing or clean surface. Raise the mantle, remove the lid from the socket, visually inspecting for cleanliness, and ensure all bronze surfaces are coated with oil.

Position the shaft over the main frame and slowly lower the mantle all the way down until it sits on the socket, leaving slight tension on the cable. Position a worker outside of the main frame to guide the process and ensure the shaft end doesn't contact the bronze socket liner.

Remove the lockout/tagout and any interlocked systems on the crusher so the crusher can be started with oil pressure. Remove all tools, materials and unnecessary workers from the crusher's immediate area and start the motor to bump the crusher ensuring the mantle is seated on the socket liner, referring to the manufacturer's manual.

Now, lower the crane, removing tension on the cable and energize the motor, according to manufacturer's manual to ensure the shaft is seated in the socket liner. Lockout/tagout all crusher systems again and seat the mantle.

Attach the cable to the eyebolts on the bowl to the loader. Mechanical crushers will need to have the hold down bolt holes and threads in the crusher bowl to be cleaned with a wire wheel.

Lift the bowl, apply grease to outside threads, and clean the surface, before detaching the cable from the bowl. Attach the crane hook to the adjustment cap and lower the adjustment cap onto the bowl, and connect the adjustment cap to the bowl before raising the bowl and positioning over the crusher main frame.

Lower the bowl to 6 inches above the main frame and align the starter threads on the bowl and mainframe before lowering the bowl and spinning simultaneously into threads onto the main frame. See manufacturer's manual for how far to thread the bowl and disconnect the cable and tighten adjustment cap bolts. Lower and attach basket into place. Lower the distributor plate, aligning bolt holes with the holes in the shaft and tighten all bolts, welding or double nutting the hardware.

Finally reinstall chutes, belts, conveyors, hoppers, remove the lockout/tagout, interlocked systems, and start the crusher. Verify PSI clamping pressure, and check oil pressure for leaks ensuring proper oil return. Inspect and listen for unusual noises and conditions, check head spin ensuring that it's spinning in accordance with manufacturer's specifications. Turn off crusher and check coast down time.

Lockout/tagout all crusher systems and recheck the crusher adjustment tolerance by observing gap on the closed side.

Remove all lockout/tagout equipment, start the crusher and take an amp reading, then start all related feed and discharge belts and take another load amp reading after waiting for crusher to fill up with material.

Gather all tools, equipment and materials, ensuring the area is clean and everything is accounted for and stored in its proper place.

EQUIPMENT GUARDING

Contact with machine parts may result in serious accidents or death. Proper equipment guarding is essential to reduce this risk of injury.

Workers need to understand the types of guards and systems at the mine. Specific training is a crucial part of any effective equipment guarding system.

Training

Training should involve instruction and/or hands-on training in the following:

- Identify and describe the hazards associated with specific equipment
- How do the equipment guards provide protection for this specific equipment? How, and under what circumstances, can the equipment guards be safely removed and when the guards must be replaced
- What to do if an equipment guard is damaged or missing

This kind of safety training is necessary for new workers and maintenance personnel.

Additional training or retraining is necessary when changes are made to guarding systems. Training may be required when workers are assigned to different equipment and/or locations.

Guarding Considerations

- Does the design, construction, selection of materials and guard installation prevent contact with all moving machine part hazards?
- Does the guard provide protection by itself, and not rely on visual or tactile awareness of a hazard, administrative controls, or procedures such as warnings, signs, lights, training, supervision, or personal protective equipment?
- Are the guard material(s), fastening methods, and construction suitable to withstand the wear, corrosion, vibration, and shock of normal operations?
- If drive belts inside a guard fail, will the whipping action of broken belts be contained? Is the guard recognizable as a guard?

- Is the guard installed securely?
- Is the guard design adequate for the application and specific hazard(s)?
- Are openings in the guard material such that contact with the hazard is prevented by the distance between the guard and the hazard?
- Does the guard interfere with the normal operation, inspection, lubrication or servicing of the equipment?
- Is the guard designed and constructed so that adjustments to the guarded components can be made without loss of protection or modifying the guard?
- Do the design, materials and guard construction prevent the guard from being a hazard itself (i.e. free of burrs, sharp edges, pinch points, etc.)?
- Is the guard of a size, shape, weight, and balance that permits safe manual handling when it is removed or replaced? If it is too large for manual handling, is it accessible and amenable for safe handling with mechanical tools or equipment? Is the guard constructed so that it cannot be circumvented?
- Can the guarded components be inspected without removing the guard? Is the guard constructed and located so as not to hinder clean-up efforts? Is the guard maintained in serviceable condition?
- Have you considered the use of new technology, if applicable?

Area Guarding

An area guard is a barrier, which prevents worker entry into an area containing moving machine parts. Effective area guards may require additional practices and provisions such as signage, locks, color coding, etc., in addition to the physical barrier. When designing, installing and/or using area guards, consider:

- Does the guard prevent entry into the area and is the guard difficult to defeat?
- How will the moving machine parts be shut down before entry?
- Will the guard be interlocked with the hazardous equipment so entry will automatically shut down the moving parts?
- Will manual shutdown be used?
- Is the area guard easily recognized as a guard? Are warning signs or color-coding in use? Security of the area
- Are guards difficult to defeat?
- Is it locked or bolted?

SCOPE

This chapter describes the procedures that will be followed to accommodate employees, to the extent practicable, with modified work responsibilities until they are able to return to regular duties. It also is designed to reintegrate employees into the workforce, in modified duty capacities, who are unable to return to their regular duties.

POLICY

The Company has adopted this Modified and Safe Return to Work Program for employees who suffer a work-related injury or illness.

This program will provide workers with modified duties or other practicable accommodation to help the worker return to meaningful work as quickly as medically possible and within the treatment provider's work restrictions.

EMPLOYER RESPONSIBILITIES

- The Company will maintain a list of available jobs for employees working under specific restrictions on modified duty.
- The Company will prioritize assigning modified duties that allows the worker to maintain a connection with their pre- injury job.
- The Company will ensure the modified duties are consistent with the health care provider's medical restrictions.
- It is the Workers responsibility to ensure the modified work continues to adhere to the medical restrictions.
- The Safety Coordinator is responsible for making available a temporary, "alternative" duty assignment for injured employees who are temporarily partially disabled and have been released back to work with restrictions by their treating physician.

EMPLOYEE RESPONSIBILITIES

All employees will:

- Abide by all procedures and requirements of this program
- Notify the Company of any changes in their health conditions or willingness to meet the requirements of the program

MODIFIED WORK PROGRAM

When a worker is cleared to return to work, they will be assigned to work from the list of available jobs that follows the physician's work restrictions that will be provided to supervisors to ensure the modified work meets the physician's orders.

Modified work assignments at this Company will adhere to the following principles:

- Productive: The work provided must contribute to the Company's success

- Safe: Any modified work assignment must not aggravate or threaten to reinjure the employee or present additional hazard to any coworker
- Reintegrates: Modified work must help the employee in a transition back to pre-injury employment as far as possible and will respond to changes in the functional abilities of the worker as determined by the physician

If the safety coordinator cannot provide an alternative duty assignment due to a lack of work, a danger to the health, safety, and welfare of the employee or fellow employees, or due to legal restrictions preventing such an alternative duty assignment, it will be the responsibility of the employing department to provide alternative duty assignments.

The Company will make all appropriate accommodations to support an employee returning to modified duty work. These accommodations may include:

- Shortened hours
- More frequent breaks
- Assistance from co-workers for specific tasks and sharing work responsibilities
- Workplace modifications and devices to assist in work
- Temporary assignment changes and special project work

Employees who are offered temporary alternative duty assignments are expected to report for duty and to fulfill their alternative duty assignment during the period of time they are temporarily disabled as they would their regular position.

Temporary alternative duty means all periods of time when the employee's physician has determined that the injured employee may return to some form of restricted duty.

Temporary alternative duty assignment(s) continue until released by the treating physician; until the injured employee reaches maximum medical improvement; until a permanent restriction is assigned. Temporary alternative duty takes into account and accommodates those restrictions, which have been placed upon the injured employee by their treating physician.

As restrictions or limitations change during the recovery process, the supervisor will continue to modify the work environment to accommodate the employee. During this alternative duty assignment, the employee will continue to receive their normal rate of pay for the hours worked.

Once an employee has reached maximum medical improvement, they are responsible to report this to their supervisor. Upon reaching maximum medical improvement, the employee's medical condition must be assessed as to their permanent medical restrictions and their ability to perform the duties of the position to which they were hired. If the injured employee cannot return to their regular position, the Human Resources Department must find available alternative employment within the Company.

INJURY RESPONSE PROCEDURE

The following procedures will be used whenever there is a workplace incident resulting in an employee injury or illness:

1. Make sure that the injured worker has had the appropriate first aid/ medical treatment.

2. If injury requires further attention, the onsite supervisor will provide transportation to the local medical center either by driving them or calling an ambulance. If transported by ambulance on site supervisor is to follow employee to clinic. The supervisor will stay and advocate on behalf of employee with assistance from the safety coordinator until the employee is released or the responsible Company representative directs otherwise.

3. The on-site supervisor will report incident to safety coordinator as soon as possible.

4. The safety coordinator must report the incident to the Corporate Safety Manager immediately.

5. The supervisor will ensure that the Company's Modified Work Information Package is taken to the medical center.

6. The safety c coordinator will ensure that the attending physician understands the requirements of the Company's' modified return to work program

7. The supervisor will complete the information package and have the attending physician fill out a modified work plan. The modified work plan will be dependent on the severity of the injuries and the recommendation of the attending doctor.

8. The safety coordinator will complete the Incident/Accident Form, the Employers Workers' Compensation report, and notify the Workers Compensation Board (WCB).

9. All reports will be delivered to the Corporate Safety Manager as soon as possible.

MODIFIED WORK PROCEDURES

Provide Information Package

When an injury occurs that requires medical treatment, the on-site supervisor will accompany injured employee taking with them an Information Package. The on-site supervisor and injured employee will work to with physician to complete package. The completed package should be sent immediately to the safety coordinator. The safety coordinator will now become the case coordinator working closely with Supervisor until case is closed.

Create a File

The safety coordinator will create a Workers' Compensation Board (WCB) file that will include all documents related to the claim, and identify the WCB case manager. This file will be kept separate from personnel files. The safety coordinator will review the documents from the information package and will develop a return-to-work plan.

The safety coordinator will maintain contact with the WCB Case Manager, at least every two weeks to obtain and document the condition of the injured employee; what the treatment or rehabilitation plan is, the likely date of a return-to-work and, identify any work restrictions. The amount and type of benefits provided to the injured employee should also be discussed.

Employee Communication

The Company is committed to ensuring that all injury claims are effectively managed in order to promote an early and safe return-to-work. Communications will be maintained regularly with the injured employee, their families, health care providers, and Worker's Compensation Board. Physical Demands Analysis and job descriptions are required for modified work positions within the Company.

If the employee is unable to return-to-work, the safety coordinator will contact the employee, at least once a week, to obtain and record information about the general condition of the employee, the nature of the treatment, what doctor they are seeing, and the date of all appointments.

The following procedures will be used to facilitate and track communication between the Company, the local health care provider, and employees.

- If the worker remains unable to return to work, even on a temporary basis, he or she must call in at least weekly to report medical status, and update contact information as appropriate.
- If there is any change to medical condition, the worker must inform the worker’s compensation coordinator accordingly.
- As recovery continues, the worker and/or supervisor will notify appropriate management to changes regarding the transitional work assignment. Changes must only be made with a common understanding between the employer, the worker, the physician, and the insurance carrier. Under no circumstances may a worker perform work that is outside of the functional abilities established by the treating physician.
- If the employee faces restrictions that result in his or her permanent inability to perform the essential functions of his or her job, the Americans with Disabilities Act (ADA) and applicable laws will be applied to determine suitability for employment.

Determine Fitness to Return-to-Work

Prior to any return-to-work, whether to regular job duties or to modified work, the safety coordinator will obtain medical clearance from the treating physician.

Make Offer of Modified Work

The Company will present a written offer of modified work to the employee. This offer will state the following information (See Modified Work Offer Form):

- Specific job duties to be performed
- Pay rate - This will be the same rate of pay as their accident employment
- Hours of employment
- Length of placement - This will be stated and made clear to the employee
- The offer will be signed by the employee and the supervisor, and will be forwarded to the WCB immediately

Complete Performance Limits Agreement (Forms Section)

Employees must agree to perform duties within documented limits and follow physician orders.

Refusal of Offer

Any refusal by an employee to participate in the modified work program will be dealt with immediately. The safety coordinator will interview the employee, record the reasons for not participating, and inform the WC Case Manager immediately.

Monitor Return-to-Work

When an employee returns to work, whether on regular or on modified duties, the supervisor and the Case Coordinator will monitor the progress of the employee, and address any concerns immediately. This ensures that any problems or concerns that may arise can be addressed immediately. The safety coordinator is to follow-up daily during the first week of the return-to-work. This follow-up period can be increased depending on the extent of the injury and projected recovery date. Keep notes on any contact made with the employee during this time. Employees on modified work must follow all physician restrictions and or guidelines.

Return to Regular Duties

- When medical clearance for return to regular duties is received, the Company will inform the WCB. The safety coordinator will continue to monitor the employee's return to regular duties.

Recordkeeping

- The Company will maintain all written records: incident details; incident investigation records; injured employee communications on modified work; and where applicable, Workers Compensation and medical records.
- The Company will keep all forms and medical records of injured employees confidential in a locked file and only provide records when necessary.

TRAINING

Training on this policy will be given to new employees as part of orientation, and will be available to all employees upon request.

The Company will provide this policy, the applicable forms, and a contact log of local health care providers before work begins, and use them with the employee and physician to record the return to work process.

FORMS

In order to ensure proper documentation of the Modified and Safe Return to Work program, the forms included in the Company's' information package are defined and included here. These forms may be duplicated for future use.

The forms included in the package are:

- First Aid Record form
- Contact Log
- Physicians Information Package
- Physicians Modified Work form
- Return to Work Plan
- Modified Work Offer
- Performance Limits Agreement
- Modified Duty Agreement
- Return to Work Progress Report
- Return to Work Closure/Evaluation Report

FIRST AID RECORD FORM

Employee Name	
Date and Time of Illness/Injury/Incident	
Date and Time Illness/Injury/Incident was reported	
Location where incident occurred	
Description of Injury/Illness	
First Aid Treatment Rendered:	
Name and Qualifications of First Aid Provider	
Work related cause of incident (if any)	
Employee Signature	Date
Supervisor Signature	Date

CONTACT LOG

Claim #:		RTW Plan Start Date:	
Worker Name:		Phone #:	
Supervisor Name:		Phone #:	
Treating Medical Professional:		Phone #:	
Case Manager:		Phone #:	
Expected RTW Date:		RTW Plan End Date:	

Contacts		
Date	Person Contacted	Conversation Details

PHYSICIAN INFORMATION PACKAGE

Our goal is to have injured workers return to employment, without sacrificing an employee's safety or well-being.

The following is a classification of modified duties available at our Company.

Also attached is a copy of the "Employee Physical Demands Analysis for their Regular Job Duties.

Name: _____

is employed as a (position) _____

We ask that you review these classifications and, with these in mind, please complete the attached form so that we can enroll our employee in our modified work program that is in keeping with this individual's current capability at this point in their recovery. We also have shop and office facilities where they can do sedentary and light duties. Should an administration fee be associated with completing the form, the Company will pay the fee upon receiving your bill.

Sedentary

- ☐ No lifting
- ☐ Primarily sitting with occasional walking/standing
- ☐ Clerical Work - Photocopying, filing, etc.
- ☐ Training –classroom, lecture, etc.

Light

- ☐ Lifting maximum 20 pounds
- ☐ Frequent lifting and/or carrying of up to 10 pounds
- ☐ May require walking and standing to a significant degree
- ☐ May involve sitting with pushing and pulling of arm and/or leg controls
- ☐ Painting

Medium

- ☐ Lifting 50 lbs.
- ☐ Frequent lifting and/or carrying of up to 20 lbs.
- ☐ May involve sitting with pushing and pulling of arm and/or leg controls
- ☐ Small machine repair and maintenance
- ☐ Driving vehicles or forklifts

Heavy

- ☐ Heavy Lifting 100 lbs. maximum
- ☐ Frequent lifting and/or carrying of up to 50 lbs.

Very Heavy

- ☐ Occasional lifting over 100 lbs.
- ☐ Frequent lifting and/or carrying in excess of 50 lbs.

Thank you for your cooperation and assistance in helping to rehabilitate our employees.

PHYSICIAN MODIFIED WORK FORM

Personal Information					
Employee Name		Phone			
Address:					
City		State		Zip	
DOB		Date of Injury			
Injury Description					

Modified Work Classification	
May employee return to pre-injury duty?	□Yes □ No
May employee perform modified duty	□ Yes □ No
Sedentary Duty	Light Duty
• Occasional lifting and/or carrying up to 10 lbs • Primarily sitting with occasional walking/standing	• Occasional lifting and/or carrying up 20 lbs. • Frequent lifting and/or carrying up to 10 lbs. • May involve sitting with pushing and/or pulling of arm or leg controls • May require walking/standing to a significant degree
Moderate Duty	Heavy Duty
• Occasional lifting and/or carrying up to 50 lbs. • Frequent lifting and/or carrying up to 20 lbs. • May involve sitting with pushing and/or pulling of arm or leg controls • May require walking/standing to a significant degree	• Occasional lifting and/or carrying up to 100 lbs. • Frequent lifting and/or carrying up to 50 lbs. • May involve sitting with pushing and/or pulling of arm or leg controls • May require walking/standing to a significant degree
Indicate any restriction and/or limitations:	

Physician Evaluation	
Employee treatment plan and follow-up	
Next appointment	
Name of Physician	

RETURN TO WORK PLAN (PAGE 1 OF 2)

Worker Name:		Claim #:	
Pre-Injury Job:		Injury Date:	
Pre-Injury Worksite:			

Pre-Injury Job

Attach the following:	☐	Job description	☐	Job tasks and demands

RTW Goal

RTW Plan Start Date:			Plan End Date:			
Return to Work Plan Goal:	☐	Pre-Injury Job	☐	Pre-Injury Job with Accommodation	☐	Alternate Work (details attached)

Attach summary of physician's report of functional abilities or appropriate form

Accommodations

Required? □Yes □ No	□ Temporary	□ Permanent	Expected duration:	

Treatment

Health Professional		Phone	
Type of Treatment:			
Appointment Date(s) and Times			

Work Schedule

Work Period		Days scheduled each week and numbers of hours per day							Comments
From	To	Sun	Mon	Tues	Wed	Thurs	Fri	Sat	

Pay Plan (hourly rate, full regular wages, etc.):	

RETURN TO WORK PLAN (PAGE 2 OF 2)

Statement of Agreement		
I agree to this plan:		
Worker Name	Worker Signature	Date
Supervisor Name	Supervisor Signature	Date

MODIFIED WORK OFFER

Date: _____

Dear: _____

In keeping with our policy to provide suitable employment to any employee unable to perform their regular duties, we are offering the following modified work placement.

The modified position is _____

The duties that you will be required to perform will accommodate your medical restrictions, and are as follows:

MODIFIED DUTIES AT THE OFFICE OR SHOP:

- ☐ Training
- ☐ Photocopying
- ☐ Office and Shop Cleaning
- ☐ Painting
- ☐ Other: _____

Hours of work at the office will be from Monday through Friday ____ A.M.to _____ P.M.

Your rate of pay will be _____

The length of this modified work placement will be from _____ to

_____. We will continually review your progress and adjust the length of this placement as required, based on relevant medical information.

During this modified work placement, you will be supervised by _____

If you have any concerns or difficulties, please notify us immediately. Your supervisor will also ensure that you are only performing the duties outlined above.

We also request that you meet with _____, your case coordinator, “once every week” to review your progress.

Employee Signature	Date
Case Coordinator Signature	Date

PERFORMANCE LIMITS AGREEMENT

I understand that the following limits have been set for me. I agree not to exceed these limits.	
Performance Limits	
Sitting	
Standing	
Walking	
Lifting	
Bending	
Stooping	
Kneeling	
Crawling	
Other	
Should any change be required to these established limits, a new form will be completed.	
Employee Signature	Date
Supervisor Signature	Date
Safety Coordinator Signature	Date

MODIFIED DUTY AGREEMENT

I have been advised by my doctor that my physical activities at work are to be restricted on a temporary basis on my return to work. I understand that these physical limitations are as follows:

By co-signing this agreement with me, my Manager/Supervisor acknowledges the above temporary restrictions and is able to temporarily modify my usual job or provide temporary alternative work for me as long as I continue with medical treatment. My pay will remain the same and modified duty will temporarily continue until my restrictions are lifted. When my doctor assesses maximum medical improvement, any permanent restrictions imposed by my doctor will be used to evaluate my ability to meet the essential functions of my regular job.

I understand that it is my personal responsibility to follow my doctor's restrictions at all times. Therefore, if I am asked to perform a task at work that is outside the restrictions outlined above, I must notify my Manager/Supervisor immediately.

This agreement is in effect until _____, at which time I will return to Dr. _____ for recheck. After my appointment, I will return to the Health and Safety office with an updated list of restrictions or a full medical release.

Employee Signature	Date
Treating Physician Signature	Date
Manager/Supervisor Signature	Date
Safety Coordinator Signature	Date

RETURN TO WORK PROGRESS REPORT (PAGE 1 OF 2)

Date:		Claim #:	
Worker:		Manager/Supervisor:	
RTW Goal			
Return to Work Plan Goal:	□ Pre-Injury Job	□ Pre-Injury Job with Accommodation	□ Alternate Work (details attached)
Week 1			
Review Period (From/To):			
Precautions:			
Duties:			
Dates and Hours Worked:			
Week 1 Review			
RTW Coordinator Observations:			
Worker Comments/Concerns:			
Supervisor Comments/Concerns:			
Action(s) to Address Concerns:			
Date Review Completed:		Review Completed By:	

RETURN TO WORK PROGRESS REPORT (PAGE 2 OF 2)

Week 2					
Review Period (From/To):					
Precautions:					
Duties:					
Dates and Hours Worked:					
Week 2 Review					
RTW Coordinator Observations:					
Worker Comments/Concerns:					
Supervisor Comments/Concerns:					
Action(s) to Address Concerns:					
Date Review Completed:		Review Completed By:			
Are accommodations/solutions resulting in anticipated RTW goals?					
☐ Yes	☐ No	If no, why not?			
Is RTW Plan still current?					
☐ Yes	☐ No	If no, why not?			
Next Steps:	☐ Continue w/ RTW plan ☐ Revise RTW Plan ☐ Close RTW Plan				
Next Follow up		Completed by		Date	

RETURN TO WORK CLOSURE/EVALUATION REPORT

Date:		Claim#:	
Worker:		Supervisor:	
RTW Plan Outcomes			
Duration of time between injury/illness report to final return to work:			
Original RTW Goal		Actual RTW Goal Achieved	
☐ Pre-Injury Job ☐ Pre-Injury Job with Accommodation ☐ Alternate Work		☐ Pre-Injury Job ☐ Pre-Injury Job with Accommodation ☐ Alternate Work	
Comments:			
What worked well in return to work process?			
What opportunities are there for improvement? (For example, what would you change about the process if you could?)			
Completed By:		Date:	

SCOPE

This chapter provides information for working on scaffolds and elevated walking and working surfaces. The information contained here will comply with OSHA 1926 Subpart L – Scaffold Specifications and 1910 Subpart D Walking-Working Surfaces.

POLICY

This Company has implemented this policy to ensure that employees are not exposed to hazards while working on or with scaffolding or elevated work platforms. The Company's designated competent scaffolding person is responsible for ensuring the following engineering controls, training requirements, and safe work practices are enforced to protect our employees from hazards associated with the erecting, use, and dismantling of scaffolds.

EMPLOYER RESPONSIBILITIES

It is the responsibility of the Company to:

- Ensure employees are trained appropriately to their level of responsibility regarding scaffolds
- Acquire appropriate scaffolding for the job to be performed
- Keep all equipment, including scaffolds, safe for use by employees
- Have at least one qualified person at every job that requires scaffolding

QUALIFIED PERSON RESPONSIBILITIES

It is the responsibility of the qualified person to:

- Be competent in fall protection
- Review work plans to determine if scaffolds are necessary
- Design scaffolds to the required specifications
- Ensures the onsite scaffolding meets requirements of the job and all safety guidelines
- Train employees who perform work on scaffolds and work platforms to recognize the hazards specific to that type of work and understand the procedures necessary to control them

COMPETENT PERSON

It is the responsibility of the competent person to:

- Take prompt measures to eliminate conditions that may pose harm to employees
- Ensure scaffold components from different manufacturers do not intermix
- Evaluate direct connections and confirm the supporting surfaces are capable of supporting the loads imposed on them
- Inspect all suspension scaffold ropes before each shift and after anything that might affect a rope's integrity
- Supervise the erection, moving, dismantling, and altering of scaffolds

EMPLOYEE RESPONSIBILITIES

All Company employees are expected to:

- Complete all requisite training before using scaffolds
- Follow Company safety policy and best industry practices
- Perform pre-use inspection before accessing the scaffold
- Report any unsafe condition to the appropriately qualified person

SCAFFOLD PLATFORM CONSTRUCTION

Capacity

Scaffolds and their components must be able to support their own weight and 4 times the maximum intended load.

Counterweights used to balance adjustable suspension scaffolds, must be able to resist at least four times the tipping moment imposed by the scaffold operating at either the rated load of the hoist, or one-and-a-half (minimum) times the tipping moment imposed by the scaffold operating at the stall load of the hoist, whichever is greater.

Suspension rope and connecting hardware must be able to support 6 times the maximum intended load of non-adjustable suspension scaffolds.

On adjustable suspension scaffolds, the suspension rope and connecting hardware must support twice the stall load of the hoist if that is greater than 6 times the maximum intended load of the scaffold.

Planking and Decking

Platforms on working levels of scaffolds must be planked or decked between the front uprights and the guardrail supports as follows:

- Platforms will be entirely planked and decked with space not more than one-inch wide between the platforms and uprights
- The platform will not deflect more than 1/60 of the span when loaded
- All platforms will be kept clear of debris or other obstructions
- Wood planks will be inspected to see that there are graded for scaffold use, are sound and in good condition, straight grained, free from saw cuts, splits and holes
- Platforms and walkways will be at least 18 inches in width. When the work area is less than 18 inches wide, guardrails and/or personal fall arrest systems will be used
- Where platforms are overlapped to create a long platform, the overlap will occur only over supports, and will not be less than 12 inches unless the platforms are nailed
- The front edge of all platforms will not be more than fourteen inches from the face of the work without guardrails or PFAS
- A platform greater than 10 feet in length will not extend over its support more than 18 inches, unless it is designed and installed so that the cantilevered portion of the platform is able to support employees without tipping, or has guardrails which block employee access to the cantilevered end

- Don’t cover wood with opaque finishes, other than the edges for making identification
- Coatings will not obscure the top or bottom wood surfaces
- Each end of the platform, unless cleated or otherwise restrained by hooks or equivalent means, will extend over the centerline of its support at least six inches
- Scaffold components manufactured by different manufacturers will not be intermixed unless the components fit together without force and the scaffold's structural integrity is maintained. Scaffold components made of dissimilar metals will not be used together unless a competent person has determined that galvanic action will not reduce the strength of any component

Distance from Work Face

The front edge of all platforms must be within 14 inches of the face of the work unless guardrail and/or personal fall arrest systems are used to prevent employees from falling, except the following:

- Outrigger scaffolds may be no more than 3 inches from the face of work
- For plastering and lathing operations, the maximum distance from the face is 18 inches

SUPPORTED SCAFFOLDS

Supported scaffolds are platforms supported by legs, outriggers beams, brackets, poles, uprights, posts, frames or similar rigid support. The structural members, poles, legs, posts, frames and uprights, must be plumb and braced to prevent swaying and displacement.

Supported scaffolds with a height to base width ratio of more than 4:1 must be restrained by guying, tying, bracing or an equivalent means.

The following placements must be used for guys, ties and braces;

- Install guys, ties, or braces at the closest horizontal member to the 4:1 height and repeat vertically with the top restraint no further than 4:1 height from the top
- Vertically – every 20 feet or less for scaffolds less than three feet wide and every twenty-six feet or less for scaffolds more than three feet wide
- Horizontally – at each end; at intervals not to exceed 30 feet from one end

Supported scaffold poles, legs, posts, frames and uprights will bear on base plates and mudsills or other adequate firm foundation and will include the following;

- Footings will be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement
- Unstable objects will not be used to support working platforms
- Front-end loaders and similar pieces of equipment will not be used to support scaffold platforms unless specifically designed by the manufacturer for such use
- Forklifts will not be used to support scaffold platforms unless the platform is attached to the fork and the fork-lift is not moved horizontally while the platform is occupied

Supported scaffold poles, legs, posts, frames, and uprights will be plumb and braced to prevent swaying and displacement.

Erection and Dismantling

- A safe means of access must be provided for employees erecting or dismantling a scaffold where the provision of safe access is feasible and does not create a greater hazard. A competent person will determine whether it is feasible or would pose a greater hazard to provide, and have employees use a safe means of access. This determination must be based on site conditions and the type of scaffold being erected or dismantled
- Hook-on or attachable ladders must be installed as soon as scaffold erection has progressed to a point that permits their safe installation and use
- When erecting or dismantling tubular welded frame scaffolds, (end) frames, with horizontal members that are parallel, level and are not more than 22 inches apart vertically may be used as climbing devices for access, provided they are erected in a manner that creates a usable ladder and provides good hand hold and foot space

SUSPENSION SCAFFOLDS

A suspension scaffold contains one or more platforms suspended by ropes or other non-rigid means from an overhead structure such as single-point, multi-point, multi-level, two-point, adjustable, boatswain's chair, catenary, chimney hoist, continuous run, elevator false car, go-devils, interior hung, masons' and stone setters' scaffolds.

- All support devices must rest on surfaces that can support four times the scaffold load when operating at the rated load of the hoist, or at least one-and-a-half times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater
- A competent person must evaluate all direct connections prior to use to confirm that the supporting surfaces are able to support the imposed load
- Suspension scaffolds must be secured to prevent them from swaying
- Guardrails, a personal fall-arrest system or both must protect employees more than 10 feet above a lower level from falling
- A competent person must inspect ropes for defects before each shift and after every occurrence that could affect a rope's integrity
- When scaffold platforms are more than 24 inches above or below a point of access, ladders, ramps, walkways, or similar surfaces must be used
- When using direct access, the surface must be less than 24 inches above or 14 inches horizontally from the surface
- When lanyards are connected to horizontal lifelines or structural members on single-point or two-point adjustable scaffolds, the scaffold must have additional independent support lines equal to the suspension lines and have automatic locking devices
- Outrigger beams must be placed perpendicular to their bearing support
- Emergency escape and rescue devices must not be used as working platforms, unless designed to function as suspension scaffolds and emergency systems

- Tiebacks must be secured to a structurally sound anchorage on the building or structure. Sound anchorages do not include standpipes, vents, other piping systems or electrical conduit. A single tieback must be installed perpendicular to the face of the building or structure. Two tie-backs installed at opposing angles are required when a perpendicular tieback cannot be installed
- Only those items specifically designed as counterweights must be used
- Counterweights must be secured by mechanical means to the outrigger beams
- Vertical lifelines must not be fastened to a counterweight
- Sand, masonry units or rolls of roofing felt may not be used for counterweights
- The suspension ropes must be long enough to allow the scaffold to be lowered to the level below without the rope passing through the hoist, or the end of the rope configured to prevent the end from passing through the hoist
- Repaired wire may not be used
- Drum hoists must contain no less than four wraps of the rope at the lowest point
- The Company will replace wire rope when the following conditions exist:
    - Six randomly broken wires in one rope lay or three broken wires in one strand in one lay
    - One third of the original diameter of the outside wires is lost
    - Evidence that the secondary brake has engaged the rope
    - Kinks
    - Heat damage
    - Any other physical damage that impairs the function and strength of the rope
- Suspension ropes supporting adjustable suspension scaffolds must be a diameter large enough to provide sufficient surface area for the functioning of brake and hoist mechanisms
- Suspension ropes must be shielded from heat-producing processes
- Power-operated hoists used to raise or lower a suspended scaffold must be tested by a qualified testing laboratory
- The stall load of any scaffold hoist must not exceed three times its rated load
- The stall load is the load at which the motor or engine of a power-operated hoist stalls or the power to the prime-mover is automatically disconnected
- The use of gasoline power-operated hoists or equipment are not permitted
- Drum hoists must have at least four wraps of suspension rope at the lowest point of scaffold travel
- Gears and brakes must be enclosed
- An automatic braking and locking device, in addition to the operating brake, must engage when a hoist makes instantaneous change in momentum or an accelerated overspeed.
- Manually operated hoists used to raise or lower a suspended scaffold must be tested an listed by a qualified testing laboratory
- These hoists require a positive crank force to descend

Welding Safety

To reduce the possibility of welding current arcing through the suspension wire rope when performing welding from suspended scaffolds, the following precautions must be taken, as applicable:

- An insulated thimble must be used to attach each suspension wire rope to its hanging support. Excess suspension wire rope and any additional independent lines that is in contact with the scaffold must be insulated
- The suspension wire rope must be covered with insulating material extending at least 4 feet above the hoist. If there is a tail line below the hoist, it must be insulated to prevent contact with the platform. The portion of the tail line that hangs free below the scaffold must be guided or retained, or both, so that it does not become grounded
- Each hoist must be covered with insulated protective covers
- If the scaffold grounding lead is disconnected at any time, the welding machine must be shut off
- An active welding rod or uninsulated welding lead must not be allowed to contact the scaffold or its suspension system
- A grounding conductor is connected from the scaffold to the structure and is at least the size of the welding lead
- The grounding conductor is not attached in series with the welding process or the work piece
- The tail line is guided, retained, or both, so that it does not become grounded
- Each suspension rope and any other independent lines are insulated from grounding

ACCESS TO ALL SCAFFOLDS

When scaffold platforms are more than 2 feet above or below a point of access, portable ladders, hook-on ladders, attachable ladders, stair towers (scaffold stairways/towers), stairway-type ladders, ramps, walkways, integral pre-fabricated scaffold access, or direct access from another scaffold, structure, personnel hoist, or similar surface must be used. Do not use crossbraces as a means of access.

Type of accesses that are permitted: portable ladders tied off to the structure; hook-on ladders; attachable ladders; stairways; stair towers; ramps and walkways; or integral prefabricated frames.

When erecting or dismantling supported scaffolds, a safe means of access will be provided when a competent person has determined the feasibility and analyzed the site conditions.

FALL PROTECTION

Fall protection includes guardrail systems and personal fall arrest systems.

Guardrails

All scaffolds more than six feet above the lower level will protect employees with guardrails on each open side of the scaffold. Guardrails will be installed along the open sides and ends before releasing the scaffold for use by the employees, other than erection or dismantling crews.

Guardrails are not required when:

- The front end of all platforms are less than 14 inches from the face of the work
- When employees are plastering and lathing 18 inches or less from the front edge

Materials such as steel or plastic banding will not be used for toprails or midrails.

Fall Arrest Systems

Personal fall arrest systems include harnesses, components of the harness/belt such as Dee-rings, and snap hooks, lifelines, and anchorage point. Employees working on scaffolds 10-feet or more above ground/floor level will use fall protection in accordance with the Company's Fall Protection Program.

The following chart illustrates the type of fall protection required for specific scaffolds.

Type of Scaffold	Fall Protection Required
Aerial lifts	Personal fall-arrest system
Boatswains' chair	Personal fall-arrest system
Catenary scaffold	Personal fall-arrest system
Crawling board (chicken ladder)	Personal fall-arrest system, or a guardrail system, or a ¾ inch diameter grabline or equivalent handhold securely fastened beside each crawling board
Float scaffold	Personal fall-arrest system
Ladder jack scaffold	Personal fall-arrest system
Needle beam scaffold	Personal fall-arrest system
Self-contained scaffold	Both a personal fall-arrest system and a guardrail system
Single-point and two-point suspension scaffolds	Both a personal fall-arrest system and a guardrail system
Supported scaffold	Personal fall-arrest system or guardrail system
All other scaffolds not specified above	Personal fall-arrest system or guardrail systems that meet the required criteria

Fall Protection for Scaffold Erectors and Dismantlers

The Company will have a competent person determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds, and will provide fall protection where the installation and use of such protection is feasible and does not create a greater hazard.

SAFE PRACTICES

Scaffolds will be constructed and loaded according to the design of a qualified person.

- Stationary scaffolds over 125 feet in height and rolling scaffolds over 60 feet in height will be designed by a professional engineer
- All scaffolding systems, components and fall protection systems will be inspected by a qualified person before first use, before each work shift begins, after erecting or moving and periodically through the work day to ensure the system is erected properly, that there is no damage to components of the system and that the system is being used properly and safely
- Damaged or deteriorated equipment will not be used
- Modifications of scaffold by non-qualified employees are prohibited. Only qualified and competent personnel are permitted to modify scaffolding systems. Disciplinary action for non-qualified modifications will be enforced
- Any system or component of a system that is found to have a defect in manufacturing or design, damage, excessive wear, weathering or corrosion, will be immediately removed from service and tagged to indicate that it is not to be used with a prominent tag, as shown below, which states:

- Any repairs or modifications to a scaffold system or component of a system must be approved by the designated qualified person before implementation
- Any violation of the above policy, misuse of scaffolds or misconduct while working on scaffolds will be subject to disciplinary action within the scope of Company policy, up to and including termination of employment

Use of Scaffolds

- Never load scaffolds or their components in excess of their maximum intended loads or rated capacities, whichever is less
- Don’t use shore or lean-to scaffolds
- A competent person must inspect scaffolds and scaffold components for visible defects before use and after any occurrence that could affect a scaffold’s structural integrity
- Unless a registered professional engineer designed the scaffolds specifically for movement, no scaffold may be moved horizontally while employees are on them
- Only experienced and trained employees will erect, move or dismantle scaffolds, and only under the supervision and direction of a competent person

- Employees may not work on scaffolds covered in slippery material like ice or snow (except as needed to remove it)
- Use tag lines to control swinging loads from making unintentional contact while being hoisted
- Ropes that support adjustable suspension scaffolds must be large enough in diameter to provide enough surface area for the functioning of brake and hoist mechanisms
- Employees may not work on or from scaffolds during storms or high winds, unless a competent person has determined it is safe, and the employees are protected by a personal fall arrest system or wind screens
- Stationary manufactured scaffolding must be tied to and braced against a building at least every 30 feet horizontally and 26 feet vertically, unless otherwise guyed
- Adjusting screws on stationary manufactured scaffolding must have an adjustment of less than 18 inches from baseplate to bottom of frame with a minimum of 6 inches retained within the frame
- Suspension ropes must be shielded from heat-producing processes and corrosive substances
- No debris can be allowed to accumulate on platforms to cause a hazard

Clearance Distances Between Scaffolds and Powerlines

The following table provides the clearance distances between scaffolds and powerlines, or any other conductive material, while being erected, used, dismantled, altered or moved.

Insulated Lines Voltage	**Minimum Distance**	**Alternatives**
Less than 300 volts	3 feet	
300 to 50 kv	10 feet	
More than 50 kv	10 feet plus 0.4 inches for each 1 kv over 50 kv	Two times the length of the line insulator, but never less than 10 feet
Uninsulated Lines Voltage	**Minimum Distance**	**Alternatives**
Less than 50 kv	10 feet	
More than 50 kv	10 feet plus General Rule: 0.4 inches for each 1 kv over 50 kv	Two times the length of the line insulator, but never less than 10 feet

However, scaffolds can be moved closer if necessary to perform the work, provided the power lines are de-energized or protective coverings are installed to help prevent accidental contact.

Ladder Safety on Scaffolds

Employees may not increase the working level on top of scaffold platforms with makeshift devices like boxes or barrels.

Ladders may not be used to increase the working level height of an employee unless the following criteria are met:

- When the ladder is placed against a structure that's not a part of the scaffold, the scaffold must be secured against the sideways thrust exerted by the ladder
- The platform units must be secured to the scaffold to prevent their movement
- The ladder legs must be on the same platform or other means must be provided to stabilize the ladder against unequal platform deflection
- The ladder legs must be secured to prevent them from slipping or being pushed off the platform

Falling Object Protection

Where there is a danger of tools, materials or equipment falling from a scaffold and striking employees below, the following provisions apply:

- The area below the scaffold to which objects can fall must be barricaded, and employees must not be permitted to enter the hazard area
- A toeboard must be erected along the edge of platforms more than 10 feet above lower levels for a distance sufficient to protect employees below, except on float (ship) scaffolds where an edging of ¾ x 1 ½ inch wood or equivalent may be used in lieu of toeboards
- Where tools, materials, or equipment are piled to a height higher than the top edge of the toeboard, paneling or screening extending from the toeboard or platform to the top of the guardrail must be erected for a distance sufficient to protect employees below
- A guardrail system must be installed with openings small enough to prevent passage of potential falling objects
- A canopy structure, debris net, or catch platform strong enough to withstand the impact forces of the potential falling objects must be erected over the employees below

Canopies, when used for falling object protection, must comply with the following criteria:

- Canopies must be installed between the falling object hazard and the employees
- When canopies are used on suspension scaffolds for falling object protection, the scaffold must be equipped with additional independent support lines equal in number to the number of points supported, and equivalent in strength to the strength of the suspension ropes
- Independent support lines and suspension ropes must not be attached to the same points of anchorage

Where used, toeboards must be:

- Capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or horizontal direction at any point along the toeboard
- At least three and ½ inches high from the top edge of the toeboard to the level of the walking/working surface. Toeboards must be securely fastened in place at the outermost edge of the platform and have less ¼-inch clearance above the walking/working surface. Toeboards must be solid or with openings not over one inch in the greatest dimension

Stilts

OSHA does not prohibit the use of stilts for scaffold work; however, some states have limitations and requirements for their use. Companies should consult state and local authorities to ensure compliance with all regulations.

An employee may wear stilts on a scaffold only if it is a large area scaffold.

When an employee is using stilts on a large area scaffold where a guardrail system is used to provide fall protection, the guardrail system must be increased in height by an amount equal to the height of the stilts being used by the employee.

Surfaces on which stilts are used must be flat and free of pits, holes and obstructions, such as debris, as well as other tripping and falling hazards.

Stilts must be properly maintained. Any alteration of the original equipment must be approved by the manufacturer.

POWERED PLATFORMS

Powered platforms must comply with the design and manufacturing requirements prescribed in ASME standard A120.1, “Safety requirements for powered platforms for exterior building maintenance.”

Powered platforms must comply with the requirements of OSHA 1910.66, “Powered platforms for building maintenance,” in addition to the following:

Intermittent Stabilization Systems

- A powered platform must be suspended by 2 or more cables. Where 2 cables are used, each employee on the work platform must use a safety harness and lanyard that is attached to an individual lifeline. The lifeline must be secured to the building structure and must be independent of any cable and structures that support the powered platform
- Where thrustouts are used in place of a roof car, they must be anchored to the building structure with fasteners that are capable of sustaining the imposed load

Roof Cars

- A roof car must be used when it is necessary to move a working platform horizontally to a work or storage position
- Movements of a roof car must be restricted to a designated path of travel. Mechanical stops must be provided to prevent the roof car from travelling outside the intended path of travel. The stops must be capable of withstanding a force equal to 100% of the inertial effect of the roof car under power and must be designed to prevent a crushing or shearing hazard
- The stability factor against overturning must not be less than 5 for horizontal traversing of the carriage, including the effects of impact and wind
- Where a roof car is used, safety interlocks must be provided to ensure that the working platform will not leave the stored position until the required positive position anchor is engaged and to ensure that the roof car cannot move when the working platform is not in the stored position

Safety Factors

All the parts of a powered platform that are subject to stress, except for the wire rope, must have a design safety factor of not less than 5. Wire rope must have a design safety factor of not less than 10.

Working Platforms

A working platform that is used on the exterior of a building must be equipped with rollers that will be in contact with the building face. Where the vertical working travel of a working platform is more than 130 feet, the platform must be equipped with guide rollers or guide shoes, which must positively engage guides, such as "t" rails or indented mullions. The guide rollers or guide shoes must enter the guides at the lowest possible speed and must not require any manual assistance from an employee while the work platform is in motion.

Inspections and Tests

An employer that has a powered platform under the employer's control must do all of the following:

- Provide operating instructions and a checklist for a visual inspection that must be used by the operator before each daily use of the platform. The visual inspection must include a check of the platform controls and safety interlocks
- Provide for a physical inspection and service and repair when required, of the platform by a trained and authorized employee or an outside service every 30 days, or before each use cycle if the equipment is used less often than every 30 days. The inspection, service, or repair must be logged to show the date and the signature of the authorized employee or outside service and the work done
- Provide for inspections and operating tests not less than annually or after major alterations to determine that all components of the platform, including safety and operating equipment, comply with the provisions of these rules. Such inspections and operating tests must be made by a trained and authorized employee or outside service

A special inspection of platform governors and secondary brakes must be made at least annually by an authorized and trained employee or outside service to verify that the initiating device for the secondary brake operates at the proper overspeed. If a test can’t be made in the field, the initiating device or hoisting machine, or both, must be sent to a shop that’s equipped to perform the test. When the tested parts are reinstalled, the powered platform must be re-inspected before returning it to service

MAINTENANCE

The following maintenance must be performed, as required, during the regular, 30-day inspection:

- Replacement of any worn or defective parts noted during the inspections noted above
- Electrical connections must be tightened and controller contacts and relays must be cleaned
- Gears, shafts, bearings, brakes, and hoisting drums must be aligned

In addition:

- Hoisting ropes must be inspected, and replaced when there are 6 or more broken wires in any 1 lay or when the wire rope becomes damaged or deteriorated
- Hoisting ropes must be reshackled at the non-drum ends at least once every 2 years. In reshackling a rope, enough must be cut from the end to remove damaged or fatigued portions. The rope must be retagged and the limit switches reset, if necessary

Wire Rope

Wire rope for a scaffold must be replaced if any of the following conditions exists:

- In any length of 8 diameters, the total number of visible broken wires is more than 6 in 1 rope lay or 3 wires in 1 strand
- It has been kinked, crushed, or bird-caged or has sustained any other damage that distorts the wire rope structure
- It shows heat or corrosive damage
- It contains a broken wire within 18 inches (460.8 mm) of the end attachment
- It shows evidence of core failure. A lengthening of rope lay, protrusion of the rope core, and a reduction in rope diameter suggests core failure.
- Outer wire wear is more than 1/3 of the original outer wire diameter
- Any other condition that a competent person determines has significantly affected the integrity of the rope

In addition:

- Wire rope that is bent to form an eye over a bolt or rod, which has a diameter that is less than 4 times the rope diameter, must be equipped with a metal thimble
- End fittings should be swaged or zinc-poured sockets
- Where wire clips are used, industry safety standards must be followed and the U-bolts must be installed on the dead end or short end of the wire rope
- Wire rope must be stored in a manner to prevent damage or deterioration.
- Before cutting wire rope, a seizing must be placed on each side of the cut on preformed wire rope, 2 seizings must be placed on each side of 718-inch size or smaller non-preformed wire rope, and 3 seizings must be placed on each side of 1-inch or larger size non-preformed wire rope
- Wire rope must be maintained in a lubricated condition over its entire length with the same type of lubricant that is used by the manufacturer

Fiber Rope

A fiber rope must be inspected visually before the start of each daily use as follows (a rope that has any of the conditions specified below must be replaced or returned to the manufacturer for repair):

- Externally for any of the following conditions:
  - Abrasions
  - Decay
  - Lack of strength
  - Variation in size or roundness of the strands
  - Cut or broken fibers
  - Burns
  - Softness
- Internally, by separating the strands at 3-foot intervals, for any of the following conditions:
  - Broken fibers
  - Mildew or mold
  - Powdering
  - Presence of grit
  - Color change of the fibers
  - Short loose fibers
- A fiber rope that is subjected to an impact load that is equal to or more than its rated capacity must also be replaced
- A fiber rope must be stored in a dry room in coils or on a reel
- A wet fiber rope must be dried by placing it in the sunshine or a warm room hanging loosely over a rounded peg or hook
- A fiber rope must not be kinked or run over sharp corners, must not be used when frozen, and must not be left in freezing temperatures when wet
- A thimble must be used with fiber rope if the rope is bent to form an eye over a bolt or rod that has a diameter that is less than 4 times the rope diameter

Synthetic Rope

A synthetic rope shall be inspected visually before the start of each job for all of the following conditions (a rope that has any of these conditions shall be replaced or returned to the manufacturer for repair):

- Abrasions
- Cut or broken fibers
- Burns
- Melted fibers
- Variation in size or roundness of the strands
- Because of the variance in manufacturing methods, the manufacturer's recommendations will be followed
- A synthetic rope shall not be kinked, run over sharp corners, used when frozen, or left in freezing temperatures when wet
- A synthetic rope that is subjected to an impact load that is equal to or more than its rated capacity shall be replaced
- A thimble shall be used with synthetic rope if the rope is bent to form an eye over a bolt or rod that has a diameter that is less than 4 times the rope diameter

AERIAL LIFTS

Aerial lifts include the following types of vehicle-mounted aerial devices used to elevate personnel to job-sites above ground:

- Extensible boom platforms
- Aerial ladders
- Articulating boom platforms
- Vertical towers
- A combination of any such devices

Aerial equipment may be made of metal, wood, fiberglass reinforced plastic (FRP), or other material; may be powered or manually operated; and are deemed to be aerial lifts whether or not they are capable of rotating about a substantially vertical axis

For additional information on the use of aerial lifts, please refer to the Elevating Work Platforms chapter (if applicable) in this manual.

TRAINING

The Company will ensure all employees are trained on scaffold safety. This training will be provided at no cost to the employee during working hours.

Only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees will be used.

Training Components

The Company's designated competent scaffolding person will ensure that every employee who performs work from a scaffold receives training in the following minimum elements:

- The nature of any electrical hazards, fall hazards, and falling object hazards in the work area
- The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used
- The proper use of the scaffold and the proper handling of materials on the scaffold
- The maximum intended load and the load-carrying capacities of the scaffolds used
- Any other safety topics deemed pertinent to the particular work-site, scaffold system, or fall protection systems being used

The Company's designated competent scaffolding person will ensure that all employees involved in erecting, disassembling, moving, operating, repairing, maintaining or inspecting a scaffold will be trained in the following minimum elements:

- The nature of scaffold hazards
- The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold being used
- The design criteria, maximum intended load-carrying capacity, and intended use of the scaffold
- Any other safety topics deemed pertinent to the particular work-site, scaffold system, or fall protection systems being used

Retraining is required when the Company's designated competent scaffolding person has reason to believe an employee lacks the skill or understanding needed to perform work that involves the erection, use, or dismantling of scaffolds safely. The employee will be retrained so that the required proficiency is regained. Retraining is required in all the following situations:

- When changes at the worksite create new hazards about which an employee has not been previously trained
- When changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained
- Where inadequacies in an affected employee's work involving scaffolds indicate that the employee has not retained the required skill, knowledge, and proficiency for the work involved

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

The Company will retain all employee training records for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Summary of Training Requirements for Scaffold users
- Fall Hazard Assessment Checklist
- Scaffolds and Work Platforms Training Record Sheet

These forms may be reproduced freely for the purposes of implementing and maintaining a safety and health program

SUMMARY OF TRAINING REQUIREMENTS FOR SCAFFOLD USERS

	Those Who Work from Scaffolds	Those Who Erect and Dismantle Scaffolds
Critical Scaffold Issues	• Falling objects • Fall protection • Material handling on scaffolds • Scaffold load capacities	• Scaffold design criteria • Scaffold erecting, disassembling, moving, and maintenance procedures • Scaffold erecting, disassembling and, moving hazards • Scaffold load capacities
What They Need to Know	• How to use appropriate fall protection systems • How to control scaffold hazards • How to use scaffold walkways, platform components, and access areas • Maximum-intended and load-carrying capacities of scaffolds	• Hazards involved in erecting/dismantling • Erection/dismantling planning procedures • How to deal with electrical hazards • How to inspect components • Appropriate design criteria • Maximum-intended and load-carrying capacities of scaffolds
Who Can Train Them	Any qualified person who has training and experience in the above critical scaffold issues and who can teach the issues to scaffold users.	Any competent person who has training and experience in the above critical scaffold issues who can teach the issues to erectors/dismantlers, and who has authority to control scaffold hazards.
How Often to Train Them	• Before beginning a new job • Whenever changes at the worksite present new hazards • Whenever they fail to demonstrate skills related to any of the critical scaffold issues	• Before they begin a new job • Whenever changes at the worksite present new hazards • Whenever they fail to demonstrate skills related to any of the critical scaffold issues

Fall Hazard Assessment

Job Name:		Location:	
Date Assessed:	Related Operating Procedures Reviewed: ☐ YES ☐ NO	Location Marked and Entry Controlled: ☐ YES ☐ NO	

FALL HAZARD ASSESSMENT CHECKLIST		
1. Can an employee enter the area without restriction and perform work?	☐ YES	☐ NO
2. Are fall prevention systems such as cages, guardrails, toeboards, and manlifts in place	☐ YES	☐ NO
3. Have slipping and tripping hazards been removed or controlled?	☐ YES	☐ NO
4. Have visual warnings of fall hazards been installed?	☐ YES	☐ NO
5. Can the distance a worker could fall be reduced by installing platforms, nets etc.?	☐ YES	☐ NO
6. Are any permanently installed floor coverings, gratings, hatches, or doors missing?	☐ YES	☐ NO
7. Does the location contain any other recognized safety and or health hazards?	☐ YES	☐ NO
8. Is the space designated as a Permit Required Confined Space?	☐ YES	☐ NO
9. Have anchor points been designated and load tested?	☐ YES	☐ NO

Assessment Information: (indicate specifics with initials)

Initials	Hazard	Remarks/Recommendations
	Total potential fall distance:	
	Number of workers involved:	
	Frequency of task:	
	Obtainable anchor point strength:	
	Required anchor point strength: (not less than 5000 lbs)	

Additional Requirements:

Potential environmental conditions that could impact safety:

Initials	Condition	Remarks/Recommendations

Possible required structural alterations:

Initials	Alteration	Remarks/Recommendations

Possible task modification that may be required:

Initials	Task	Remarks/Recommendations

Training requirements:

Initials	Requirement	Remarks/Recommendations

Personal protective equipment required:

Initials	Requirement	Remarks/Recommendations

Comments:

☐ **Approved** **AUTHORIZATION:**

I certify that I have conducted a Fall Hazard Assessment of the above designated location and have detailed the findings of the assessment on this form. * Further detailed on attachment: ☐ YES ☐ NO

Title:	Date:	Time:
Name:	Signature:	

SCAFFOLDS AND WORK PLATFORMS TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This Silica Dust policy meets the new Silica regulation requirements for both General Industry and Construction work, including the compliance timetables from 2016 up to 2021.

The policy covers occupational risk, health effects, and symptoms training for employees to understand how to take control of their own health.

Also covered are the permissible exposure levels (PEL) with air monitoring and medical surveillance to identify hazards and employee exposure.

Engineering and administrative controls along with safe work practices to be employed to protect workers such as: dust reduction, restricted areas and personal hygiene. Also included are personal protective equipment (PPE) steps, especially respiratory protection to be used when necessary, along with: first aid, spill and disposal procedures, recordkeeping requirements, and the table to control common construction tasks without monitoring workers' silica exposure.

POLICY

This company policy implements the necessary procedures for employees, safety personnel and supervisors to provide the OSHA required protection for employees who could be exposed to an unsafe level of airborne silica.

EMPLOYER RESPONSIBILITIES

- Prevent employees from being exposed to an airborne silica level above the Permissible Exposure Level (PEL) of 50 (µg/ m^3) Establish a written exposure control plan to identify high exposure tasks and protection methods.
- Designate a competent person to implement the written exposure control plan
- Enforce housekeeping practices that limit workers silica exposure.
- Offer medical exams—including chest X-rays and lung function tests—every three years for workers who are required by the standard to wear a respirator for 30 or more days per year
- Appropriately train workers and supervisors before starting work.
- Keep records of workers' silica exposure and medical exams

EMPLOYEE RESPONSIBILITIES

- Attend all silica exposure training
- Follow all safe practices established by the company
- Use and maintain all necessary PPE provided by the company
- Report any unsafe conditions or acts immediately

SILICA INFORMATION

Crystalline silica, also called alpha silica or free silica, is silicon dioxide (SiO_2). In pure, natural form, SiO_2 crystals are tiny, very hard, translucent and colorless. The most common types of crystalline silica encountered in industry are quartz and cristobalite.

Quartz content can vary greatly among different rock types. Granite can contain anywhere from 10 to 40% quartz; shales have been found to average 22%, and sandstone averages almost 70% quartz.

Silicates, composed of SiO_2, are also a source of silica. Silicates include mica, soapstone, talc, tremolite and Portland cement.

OCCUPATIONAL RISK

Silica is present in almost every process where natural minerals are handled. In construction work, employees who are handling rock, brick, sand or drilling, quarrying or tunneling through the earth's crust may be exposed to silica.

In general industry work, employees are exposed to silica dusts from cleaning, etching, polishing or the manufacture of asphalt or cement.

HEALTH EFFECTS

Silicosis: Silicosis is lung damage caused by breathing dust containing fine particles of crystalline silica that become embedded in the lungs, causing the lungs to develop fibrotic nodules and scarring. The scar tissue makes the lungs hard and stiff. The scarring can greatly reduce the function of the lungs making it difficult and sometimes painful to breathe.

Silica also reduces the body's ability to fight off infections making workers more susceptible for developing other lung illnesses and infections. If workers smoke, silica exposure may greatly increase the risk of developing lung cancer. The incidence of tuberculosis is high among silicosis victims.

Silica dust can also irritate a worker's eyes. Goggles or safety glasses should be worn if eye irritation is a problem.

SYMPTOMS

Early stages of the disease may go unnoticed, but symptoms can include: shortness of breath during physical exertion; fever; occasionally bluish skin at the ear lobes or lips.

Progression of silicosis can lead to:

- Fatigue
- Labored breathing
- Loss of appetite
- Pain in the chest
- Respiratory failure, which may cause death

In severe cases, fibrous tissue can hinder the flow of blood in vessels of the lung, and the heart can enlarge in an effort to pump more blood.

Types of Silicosis

Chronic silicosis: The most common form of the disease; may go undetected for years in the early stages. Chest x-rays may not reveal an abnormality until after 15 or 20 years of exposure. If you believe you are overexposed to silica dust, visit a doctor who knows about lung diseases. The progress of silicosis can only be stopped; but cannot be cured.

Accelerated silicosis: A form of silicosis that shows symptoms within five to 10 years.

Acute silicosis: A form of silicosis that develops in workers exposed to very high levels of crystalline silica. Symptoms may appear within only a few weeks of an initial exposure.

EXPOSURE LEVELS

On June 23, 2016 two new OSHA regulations, (1910.1053 for General Industry work and 1926.1153 for Construction work) and exposure limits took effect.

This new silica regulation establishes the following provisions:

- Establishes an action level for airborne respirable crystalline silica of 25 micrograms per cubic meter of air (µg/ m^3) averaged over an 8-hour shift
- Reduces the permissible exposure limit (PEL) for respirable crystalline silica to 50 (µg/ m^3), averaged over an 8-hour shift
- Requires employers to: use engineering controls (such as water or ventilation) to limit worker exposure to the PEL; provide respirators when engineering controls cannot adequately limit exposure; limit worker access to high exposure areas; develop a written exposure control plan, offer medical exams to highly exposed workers, and train workers on silica risks and how to limit exposures
- Requires medical exams to monitor highly exposed workers and gives them information about their lung health

After this date, companies will have one to five years to comply with most requirements, based on the following schedule:

Construction - June 23, 2017, one year after the effective date.

General industry and maritime - June 23, 2018, employers must comply with all requirements of the standard, except for the following:

- Medical surveillance must be offered to employees who will be exposed at or above the action level for 30 or more days a year starting on June 23, 2020. (Medical surveillance must be offered to employees who will be exposed above the PEL for 30 or more days a year starting on June 23, 2018.)

Hydraulic Fracturing - June 23, 2018, two years after the effective date for all provisions except

- Engineering Controls, which have a compliance date of June 23, 2021

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE) will only be used when engineering and administrative controls do not provide adequate worker protection and reduce to at least the PEL. PPE is the last line of defense for limiting silica exposure and may include:

- Hardhats
- Gloves
- Coveralls

- Eye Protection
- Safety Shoes or Boots
- Dust Masks or Respirators

Respiratory Protection

Only when all engineering or administrative controls have been implemented, and the level of respirable silica still exceeds the PEL, may an employer rely on a respirator program to protect workers.

When respirators are required to protect employees for silica dust exposure the company's Respirator Program will be strictly followed.

Copies of the Respirator Program will be made available to all employees upon request.

- The respirator program will comply with the OSHA standards for respiratory protection, this includes proper respirator selection, medical evaluations, fit testing, cleaning and maintenance procedures, and training
- The company must select and provide an appropriate respirator that will effectively protect their employees
- Respirators must be approved by NIOSH for protection against the silica PEL and provide the require APF
- When abrasive blasting is done, the type C supplied-air, positive pressure, demand type abrasive blasting respirator will be worn
- An abrasive-blasting respirator must cover the wearer's head, neck, and shoulders to protect from rebounding abrasives

EMERGENCY FIRST AID

Eye Exposure

If crystalline silica dust gets into the eyes, wash immediately with large amounts of water, lifting the lower and upper lids occasionally.

If irritation is present after washing, get medical attention.

Portable eyewashes will be kept at jobsites in the field away from the company locations.

Breathing

- If a person breathes in large amounts of crystalline silica dust, move the exposed person to fresh air immediately
- If breathing has stopped, perform chest compressions (if trained)
- Keep the person warm and at rest
- Get medical attention as soon as possible

SPILL AND DISPOSAL PROCEDURES

If crystalline silica is spilled or released in hazardous concentrations, the following steps will be taken:

- Ventilate the area
- Wear respirators during clean-up
- Collect spilled material in the most convenient and safe manner for reclamation or disposal in a secured sanitary landfill

RECORDKEEPING

Training, medical records, air monitoring, engineering control maintenance records, and injury records will be kept by the company and made available upon request.

The site safety coordinator or their designee is responsible for the recordkeeping program.

CONTROL OF SILICA DUST IN CONSTRUCTION WORK

The table below lists some of the most common construction tasks and dust control methods, so employers know exactly what they need to do to limit worker exposures to silica. The dust control measures listed in the table include methods known to be effective, like using water to keep dust from getting into the air or using ventilation to capture dust. In some operations, respirators may also be needed.

Employers who follow the recommendations shown in Table 1 (below) correctly do not need to monitor workers' silica exposure and get it below the PEL.

TABLE 1: JOB/TASK SPECIFIC SILICA EXPOSURE CONTROL METHODS

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	When used outdoors	None	APF 10
	When used indoors or in an enclosed area	APF 10	APF 10
Handheld power saws for cutting fiber- cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	When used outdoors	None	APF 10
	When used indoors or in an enclosed area	APF 10	APF 10
Drivable saws	For tasks performed outdoors only: Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	None	None
Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	APF 10	APF 10
Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector. OR Operate from within an enclosed cab and use water for dust suppression on drill bit.	None None	None None

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.		
	When used outdoors.	None	APF 10
	When used indoors or in an enclosed area.	APF 10	APF 10
	OR Use tool equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.		
	When used outdoors.	None	APF 10
	When used indoors or in an enclosed area.	APF 10	APF 10
Handheld grinders for mortar removal (i.e., tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	APF 10	APF 25
Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions. OR Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	None	None
	When used outdoors.	None	None
	When used indoors or in an enclosed area.	None	APF 10

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. OR	None	None
	Use machine equipped with dust collection system recommended by the manufacturer. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.	None	None
Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None	None
Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. Operate and maintain machine to minimize dust emissions.	None	None
	For cuts of four inches in depth or less on any substrate: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. Operate and maintain machine to minimize dust emissions. OR	None	None None
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None	

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab. When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None None	None None
Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions. OR When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None None	None None

The key to preventing silicosis is preventing silica dust from being in the air. Employers are required to provide and assure the use of appropriate controls for dusts containing crystalline silica.

When implementing the control measures specified in Table 1 above, the company will ensure:

- Tasks performed indoors or in enclosed areas have an exhaust method that minimizes the accumulation of visible airborne dust
- Tasks performed using wet methods will have enough water at flow rates to minimize release of visible dust
- Methods used for work performed in a cab or booth will:
  - Be maintained as free as practicable from settled dust
  - Have door seals and closing mechanisms that work properly
  - Have gaskets and seals that are in good condition and working properly
  - Be maintained with by continuous delivery of fresh air
  - Have intake air that is filtered through an approved filter
  - Have heating and cooling capabilities

If the company does not use the control methods in the above table, they must:

- Measure the amount of silica that workers are exposed to if it may be at or above an action level of 25 µg/ m^3 averaged over an eight-hour day
- Protect workers from respirable crystalline silica exposures above the permissible exposure limit of 50 µg/ m^3, averaged over an eight-hour day

- Use dust controls to protect workers from silica exposures above the PEL
- Provide respirators to workers when dust controls cannot limit exposures to the PEL

If employees use a respirator 30 or more days a year, they will need to be offered a medical exam.

The company will reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, or when the employer has any reason to believe that new or additional exposures at or above the action level have occurred.

CONTROLLING SILICA DUST IN GENERAL INDUSTRY WORK

The Table below lists some of the most common general industry businesses where employees may be exposed to silica dust

- Abrasive blasting
- Cement/Concrete product manufacturing
- Foundries
- Mineral Processing
- Pottery manufacturing
- Refractories
- Asphalt Paving Products
- Cut Stone
- Glass work
- Paint and Coatings
- Railroads
- Shipyard work
- Asphalt Roofing Materials
- Dental Laboratories
- Jewelry
- Porcelain Enameling
- Ready Mix Concrete
- Structural Clay

These tasks generally involve the use of pressurized abrasives, grinders, drills and saws. The dust control methods include the use of dust collection, ventilation, wetting methods (streaming water and misting), and if necessary respirators.

Where it can be shown that the action level will not be exceeded, no respiratory protection is required. When working in an enclosed area or when the length of exposure exceeds 4 hours, respiratory protection with an Assigned Protection factor (APF) of 10 may be required. This can be provided by a NIOSH approved N95 dust mask or another respirator type.

When performing general industry work, the company will use air monitoring test results to determine the level of respiratory protection necessary.

The key to preventing silicosis is to develop and enforce controls to prevent airborne silica dust.

When implementing a silica exposure program the company must:

- Measure the amount of silica that workers are exposed to if it might be at the action level of 25 µg/ m^3.
- Protect workers from respirable crystalline silica exposures above the PEL (50 µg/ m^3)
- Enforce controls to protect workers from silica exposures above the PEL
- Provide respirators to workers when dust controls cannot limit exposures to the PEL

If employees use a respirator 30 or more days a year, they will need a medical exam.

The company will reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, and when any exposure at or above the action level have occurred.

SILICA DUST EXPOSURE CONTROL PROGRAM

The Occupational Silica Dust Control Program includes the following parts:

- Hazard Identification
- Worksite Air Monitoring
- Respiratory Protection
- Engineering Controls
- Administrative Controls
- Safe Work Practices
- Medical Examinations and Evaluation
- Training and Informing Workers on Hazards of Silica Dust
- Personal Protective Equipment
- Recordkeeping
- Emergency First Aid Procedures for Silica Dust
- Spill and Disposal Procedures

HAZARD IDENTIFICATION

When a task presents a potential silica exposure hazard, the Safety Coordinator, or designee, is responsible for identifying silica dust exposure hazards and controls prioritizing feasible engineering and then administrative controls.

WORKSITE AIR MONITORING

When a silica dust hazard is identified, the process and the workers' breathing zone will be monitored for silica dust concentrations. Employee exposure measurements will represent actual breathing zone exposure conditions for a representative sample of each affected job description.

Hazardous tasks identified will be monitored at least every four months and whenever a change is made to the process. Engineering controls will be monitored for efficacy immediately after implementation and quarterly thereafter.

The company will ensure that all monitoring equipment is maintained in good working order, and that any analyzing laboratory meets OSHA regulations.

Employees will be able to view all air monitoring records; copies of the records can be obtained from the Safety Coordinator upon request.

Employees should be monitored, as necessary or required, to enforce developed administrative controls and safe work practices.

RESPIRATORY PROTECTION

When implementing respiratory protection measures, we will ensure:

- Tasks performed indoors or in enclosed areas have an exhaust method that minimizes the accumulation of visible airborne dust

- Wet method controls have enough water to minimize visible dust.
- Work performed in a cab or booth will:
  - Be maintained as free as practicable from settled dust
  - Have door seals and closing mechanisms that work properly
  - Have gaskets and seals in good condition and working properly
  - Have a continuous supply of fresh air
  - Have intake air filtered through an approved filter
  - Have heating and cooling capabilities

ENGINEERING CONTROLS

The company will use engineering controls whenever possible to control silica dust exposures. The company will not use abrasives that contain more than 1% crystalline silica during blasting.

The Safety Coordinator is responsible for inspecting and maintaining engineering controls at all jobs/tasks where silica exposure hazards have been identified.

Substitute with less hazardous materials: Do not use silica sand or other substances containing more than 1% crystalline silica as abrasive blasting materials.

Dust-reduction systems: When using powered tools or equipment to cut, grind, core, or drill concrete or masonry materials, a dust-reduction system will be used to effectively reduce airborne particulate. Exceptions include operations where it can be shown the PEL is not exceeded, roofing operations with tile, pavers or similar materials; and during the first 24 hours of an emergency operation.

Dust Extraction: Wherever possible, concrete cutting and drilling equipment should be fitted with collection devices to eliminate dust at the source. A vacuum with a high-efficiency particle air (HEPA) filter can be used to clean dust from work areas. Wear an appropriate respirator when exposure approaches PELs.

Wet work: Where dust extraction is not practical, airborne silica dust can be minimized or reduced by using water in the process Such as using saws and drills that provide water to the point of action. A respirator may still need to be worn during wet work.

Wet clean up may also be used to remove dust. Waste material will be stored at designated, clearly marked location and will be removed at least weekly.

Isolation: Use containment methods such as blast-cleaning cabinets when sandblasting. Cabs of vehicles or machinery cutting or drilling through rock that might contain silica should be enclosed and sealed.

Ventilation: Use local exhaust systems to remove silica dust from industrial processes at the point of operation. Dilution ventilation may be used to reduce the silica dust concentration to below the PEL in large areas.

Adequate measures will be taken to ensure that discharge does not produce health hazards to the outside environment. A dust collector will be set up so that accumulated dust can be removed without contaminating work areas.

- Ventilation systems will be inspected and maintained by a designated competent person
- Ventilation systems will be checked at least weekly to determine if they are functioning properly

ADMINISTRATIVE CONTROLS

Air Monitoring

Air monitoring is used to determine exposures, evaluate engineering controls, select respiratory protection, evaluate the efficacy of safe work practices, and determine the need for medical surveillance.

- Exposure measurements should be made in the employee's breathing zone
- Long-term or short-term respirable samples can be used
- Total sampling time must be at least 7 hours
- Monitoring should be repeated at least quarterly

Restricted Areas

- Post warning signs in areas where silica exposure already exists or is possible restricting unauthorized employees
- Warning signs should contain one of the following:
  - WARNING SILICA DUST HAZARD: RESPIRATOR REQUIRED
  - SILICA DUST CAN CAUSE SILICOSIS: RESPIRATOR REQUIRED

SAFE WORK PRACTICES

Whenever practical, working where silica dust may be created should be done:

- In non-enclosed areas
- Downwind from other employees
- In regulated/restricted areas
- When other workers are not around

Housekeeping Procedures

Dry sweeping and using compressed air are prohibited for removing dust in jobs/tasks identified with silica exposure hazards.

Supervisors are responsible for ensuring that work areas are dust free at the end of each shift.

- Remove dust on overhead ledges, floors and equipment before it becomes airborne due to traffic, vibration and random air current
- Gentle wash down of surfaces is preferable if practical
- Never dry sweep or use compressed air for cleanup of dust that may contain silica
- Use wet methods or vacuums with a HEPA filter for clean-up

Personal Hygiene

Employees working at hazardous jobs/tasks will practice good personal hygiene to avoid unnecessary exposure.

- Hand-washing facilities will be conveniently located throughout a worksite.
- Lockers will be provided for employees to store uncontaminated street clothes. Eating/lunch areas will be located away from exposure areas
- Employees will eat, smoke, or use smokeless tobacco in designated areas only
- Workers should park their cars where they will not be contaminated with silica
- Workers should shower (if possible) and change out of work clothes contaminated with silica dust before they leave the jobsite
- Work clothes must not be cleaned by blowing or shaking. They should be vacuumed with a HEPA filter vacuum before removal

Contaminated clothing will be vacuumed with a HEPA filter vacuum to remove silica dust.

Lockers or containers will be provided to store clean clothes at the jobsite. Employees are required to wash their hands and shower (when feasible) before leaving the worksite.

When worksites are located in the field away from normal operation the Company will provide water in portable containers to hand washing

MEDICAL SURVEILLANCE

Employees who will work in hazardous jobs will be given free and reasonably convenient medical exams by an approved health care provider.

Initial Testing

An initial medical examination to establish a baseline will be given within 30 days of assignment unless they have received an acceptable examination within the last three years.

This examination will include:

- A medical and work history regarding exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system
- A history of respiratory system dysfunction, including signs and symptoms of respiratory disease history of tuberculosis; and smoking status and history
- A physical examination with special emphasis on the respiratory system
- A chest X-ray
- A pulmonary function test
- Testing for latent tuberculosis infection
- Any other tests deemed appropriate by the health care provider

Periodic Testing

Employees who use a respirator for at least 30 days a year will have a medical examination when they start the job, and then every three years.

Medical examinations will include:

- Chest X-rays
- Pulmonary function tests
- Tuberculosis evaluation

Employees whose chest X-rays show the development of silicosis will be transferred or removed from the hazardous situation. Input from the attending physician will be considered in making this decision.

Medical records will be given to employees or their representatives who ask for them.

Silicosis cases will be reported to state health departments and recorded on OSHA logs.

TRAINING

Employees working in hazardous jobs will be trained to understand and recognize the risks of airborne silica exposure and how to control those risks by following safe work procedures before starting the work and then at least annually.

Training for Occupational Silica Dust Exposure Will Include the Following Topics:

- Health hazards of silica dust exposure (including signs and symptoms of silicosis, lung cancer, chronic obstructive lung disease (COPD) and decreased lung function)
- Operations and materials that can produce silica dust exposures
- Engineering and work practice controls used to protect employees from exposures
- The importance of proper use and maintenance of equipment, including dust-reduction systems, and other controls
- The importance of good personal hygiene and housekeeping practices when working near dust from concrete, cleaning up appropriately before eating, cleaning clothes appropriately, avoiding other activities that could cause exposure to airborne dusts
- Additional safe work practices and procedures, including: safe handling and disposal procedures; the safe use of hazardous substances; fire protection; emergency and first aid procedures; electrical safety; safety in confined spaces; and other training required under hazard-specific regulations
- Proper use of respirators and the respirator standard
- Recognition of poorly ventilated areas and confined spaces
- The details of the Occupational Silica Dust Exposure Program

In addition, supervisors must be trained:

- To know and understand the employee-related information outlined above in this section
- To identify tasks that may result in employee exposure to dust or other hazards, and, as necessary, initiate procedures that reduce employee exposure to dust or other hazards

Training will be performed by a competent person. Records of attendance, dates of training, and training material will be documented and retained by the company.

Additional training or reference material on silica dust exposure will be given to employees who ask for them.

ATTACHMENTS

The following page contains an agreement form that must be completed by all affected employees indicating their commitment to this program. Completed copies of this document will be retained by the Company for the length of employment.

EMPLOYEE AGREEMENT

I have read and understand the requirements of this Silica safety program and will participate in all training and safety precautions.

Employee Signature	Employee Signature
Employee Signature	Employee Signature
Employee Signature	Employee Signature
Employee Signature	Employee Signature
Date	Time

SCOPE

This chapter defines the requirements and safe practices to be used for the safe operation of skid steer loaders. The current Occupational Safety and Health Administration (OSHA) regulations for the construction industry do not specifically address skid-steer loaders, however. OSHA does have regulations that apply to the operation of motor vehicles and mechanized equipment. They address operator restraints, operating procedures, rollover protection, machine guarding and maintenance procedures. The information in this chapter addresses skid steer loader specifically, for information on other types of equipment, please refer to the heavy equipment chapter of this manual.

POLICY

This Company has implemented the following policies and procedures to protect employees responsible for operating skid-steer loaders or working near skid-steer loaders Employees are at risk may of being crushed or caught by the machine or its parts. Skid-steer loaders have features that expose workers to other risks of injury.

EMPLOYER RESPONSIBILITIES

This Company will:

- Train all designated employees before allowing them to operate a loader
- Provide all employees operating or working around skid steer loaders with the necessary PPE

EMPLOYEE RESPONSIBILITIES

All affected employees are expected to:

- Follow all Company safe practices when working on or around skid steer loaders
- Wear and maintain all required PPE
- Report any unsafe condition or acts immediately

HAZARDS

The operator’s seat and controls are located between the lift arms and in front of the arm pivot points. As a result, operators must enter and exit from the loader through the front of the machine and over the bucket. If the operator doesn’t enter or exit properly, a foot or hand control can be activated and cause movement of the lift arms, bucket or other attachment. Such an incident could cause death or serious injury. The skid-steer loader is very compact and places the operator close to the zone of movement for the lift arms.

Deaths have occurred from:

- Pinning between the bucket and frame of the machine or between the lift arms and frame
- Crushing incidents
- Rollovers
- Pinning between the loader and another object
- Being run over

Fatalities involving pinning between the bucket and frame or between the lift arms and frame resulted from the following activities:

- Working or standing under a raised loader bucket
- Leaning out of the operator's compartment into the path of the moving lift arms (pinned against frame)
- Entering or exiting (pinned between bucket and frame)
- Unknown (pinned between bucket and frame)

PERSONAL PROTECTIVE EQUIPMENT

This Company will provide employees with the PPE necessary to protect them from injury. This includes, but is not limited to:

- Hardhats
- Safety shoes or boots
- Safety glasses or goggles
- Hearing protection
- Respiratory protection (if required)

ANSI/SAE STANDARD

The SAE has developed a standard for the American National Standards Institute (ANSI) addressing skid-steer loaders. The SAE standard SAE J1388 contains design guidelines that address machine rollovers and the hazards of being pinned between the lift arms and frame and between the bucket and frame.

To conform to this recommended practice, manufacturers must do the following:

- Provide warnings, operator instructions, and service procedures
- Equip the machine with seat belts
- Provide a means to prevent the lift arm from lowering when the operator is entering or exiting from the machine
- Provide handholds and steps to facilitate entry and exit from the loader
- Provide ROPS with side screens
- Provide two openings for emergency exit
- Provide safety signs and instructions to warn of hazards during normal operations and servicing

The Company will comply with OSHA regulations, maintain equipment in accordance with ANSI/SAE standards and take the following measures to prevent injury when operating or working near skid steer loaders:

- Always use and maintain the safety devices provided by manufacturers:
- Liftarm supports
- Interlocked controls
- Seat belts
- ROPS
- Follow safe operating procedures

- Follow safe mounting and dismounting procedures
- Follow proper maintenance procedures
- Train workers to read and follow the manufacturer's procedures for operating and servicing skid steer loaders

SAFE PRACTICES

OSHA requires this Company to protect workers from the hazards associated with operating and maintaining heavy equipment. The regulations that apply to skid-steer loaders are summarized as follows:

- Seat belts that meet the requirements of the Society of Automotive Engineers (SAE) standard will be provided on all Construction Equipment
- All bi-directional machines will be equipped with a horn, distinguishable from the surrounding noise level, and will be operated as needed when the machine is moving in either direction
- Scissors points on all front-end loaders, that constitute a hazard to the operator during normal operation, will be guarded
- End loader buckets and similar equipment must be either fully lowered or blocked when being repaired or when not in use
- All controls must be in a neutral position, with the motors stopped and the brakes set, unless work being performed requires otherwise
- All equipment manufactured after September 1972, must be equipped with a Roll Over Protection System (ROPS) that meets the minimum performance standards prescribed in 29 CFR 1926.1001 and 1926.1002 or must have a system that is designed, fabricated and installed to support at least two times the weight of the equipment applied at the point of impact
- No modifications or additions that affect the capacity or safe operation of the equipment may be made without the manufacturer's written approval. If modifications or changes are made, the capacity, operation and maintenance instruction plates, tags or decals must be changed accordingly

USING AND MAINTAINING SAFETY DEVICES

Regularly inspect and maintain all safety devices provided by manufacturers.

Liftarm Supports

Use the liftarm supports provided by or recommended by the manufacturer when it is necessary to work or move around the machine with the bucket in a raised position while the controls are unattended.

- Machines now being manufactured have either the pin-type supports (which can be operated from inside the operator's cab) or the strut-type supports (which may also be operated from inside the cab or may require the help of a coworker)
- If the machine is not equipped with lift arm supports, contact the equipment dealer or manufacturer's representative for help in selecting proper support procedures
- Never use concrete blocks as supports. They can collapse under even light loads
- Hoists and jacks used for support must be free of defects such as bent, cracked or twisted parts or pinched, frayed, or twisted cable. They must also be capable of supporting the load

Interlocked Controls

Regularly inspect and maintain interlocked controls in proper operating condition. These systems require the operator to be properly positioned and restrained before the loader can be used.

- Never bypass or defeat interlocked controls
- Make sure that the seat belt is always securely fastened around the operator when the loader is in operation

Always use restraint bars if they are provided. Although workers and employers may perceive safety features such as interlocked controls and seat belts as obstacles to efficient machine operation, bypassing these devices increases the risk of death or serious injury.

Seat Belts

Make sure that the seat belt is secured around the operator whenever the seat is occupied.

- The seat belt protects the operator in several ways. If seat belts are part of the interlocked control system, they protect workers from being caught and crushed between the lift arms and frame
- During rollovers, the seat belt maintains the operator within the protective envelope of the ROPS
- The seat belt can also protect the operator from leaning or being jostled into the operating zone of the lift arms and bucket

Retrofit Packages

If side screens, interlocks, ROPS and seat belts are not present, contact the equipment dealer or manufacturer's representative about the availability of retrofit packages or replacement parts.

SKID-STEER OPERATIONS

- Make sure that you understand all manufacturers' warnings and instructions before you operate your skid steer loader
- Operate the loader from the operator's compartment, never from the outside
- Stay seated when operating the loader controls
- Work with the seat belt fastened and the restraint bar in place
- Keep your arms, legs, and head inside the cab while operating the loader
- When possible, plan to load, unload, and turn on level ground
- For maximum stability, travel and turn with the bucket in the lowest position possible
- Never exceed the manufacturer's recommended load capacity for the machine
- Operate on stable surfaces only
- Avoid traveling across slopes; travel straight up or down with the heavy end of the machine pointed uphill
- Always face the direction of travel
- Keep bystanders away from the work area
- NEVER modify or bypass safety devices

Entering and Exiting from the Loader Safely

- Enter only when the bucket or other attachment is flat on the ground, or when the lift-arm supports are in place. Use supports supplied or recommended by the manufacturer
- When entering the loader, face the seat and keep a three-point contact with handholds and steps
- Never use foot or hand controls for steps or handholds
- Keep all walking and working surfaces clean and clear of debris

Before leaving the operator's seat:

- Lower the bucket or other attachment flat to the ground
- Set the parking brake
- Turn off the engine

If you are unable to exit through the front of the machine, use the emergency exit through the roof or across the back.

Maintaining the Loader in Safe Operating Condition

- Follow the manufacturer's instructions for maintaining the loader
- Keep the foot controls and the operator's compartment free of mud, ice, snow, and debris

Before servicing the loader:

- Set the parking brake
- Lower the bucket or other attachment flat to the ground
- Turn off the engine
- Remove the key from the switch

If the machine cannot be serviced with the bucket on the ground, use the lift arm supports recommended or provided by the manufacturer. If the machine is not equipped with lift arm supports, contact the equipment dealer or manufacturer's representative for help in selecting proper supports.

Never work on the machine with the engine running unless directed to do so by the operator's manual. Follow the manufacturer's safety recommendations to complete the task. If the adjustments require that the engine be in operation, use two persons to perform the task.

TRAINING

The Company will ensure every operator is competent to operate the equipment safely through successfully completing training and evaluation.

Training must at least inform employees on the safe operation including:

- Applicable standards
- The equipment’s limitations and use
- Rated load capabilities
- Special workplace hazards

Training Records

Training records will be kept for each employee to certify each operator has been trained and evaluated and will include the following information:

- The dates of the training sessions and evaluation
- A written description of the training program
- The names and qualifications of persons conducting the training or evaluation
- The names and job titles of all persons attending the training sessions
- Where the employee received safety training

SKID-STEER LOADER POSTER

Do:

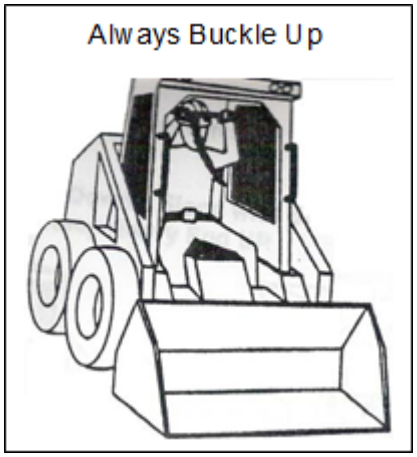
- Read and follow the manufacturer's operating manual.
- Use the safety treads and grab handles to get on and off the loader. Remember to always maintain three points of contact.
- Use the seat bar and fasten the seat belt.
- Keep feet on the pedals when operating the loader.
- Only use approved attachments and buckets.
- Keep other people away from the work area.
- Carry bucket or attachments as low as possible.
- Load, unload and turn on level ground.
- Wear hearing and head protection

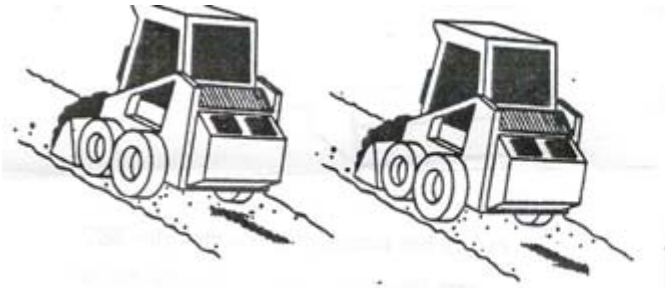
Do Not:

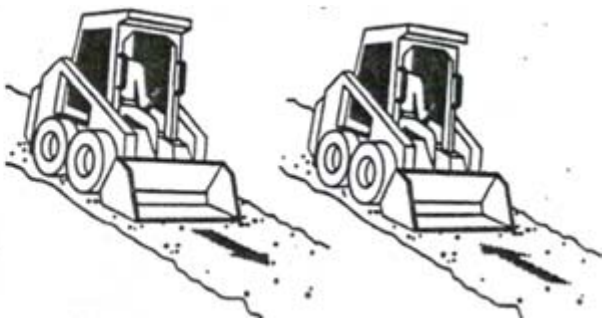
- Do not use loader without approved Roll-Over Protection (ROP) and Falling Object Protection (FOP) cab.
- Do not exceed rated operating capacity.
- Do not carry passengers.
- Do not travel or turn with the lift arms up.
- Do not leave the loader with the engine running or with the lift arms up.
- Do not travel across a grass slope.
- Do not approach overhead electrical wires

Check the Following Before Starting the Engine:

- Fuel and oil
- Hydraulic fluid
- Cooling system
- Operator cab, seat belt and seat bar
- Lift arm and cylinder pivot points
- Tires
- GO straight up and down slopes with the heavy end of the loader uphill.







SCOPE

This chapter provides the safe work practices and requirements for performing rigging operations, and complies with OSHA regulations 1910.184, 1926.251, and 1926.753 as applicable. This chapter does not cover crane use or operator certification, which are covered in a separate chapter.

POLICY

This Company has implemented the following policy to protect its employees from the hazards of working with and/or around slings, rigging, and hoisting equipment.

EMPLOYER RESPONSIBILITIES

This Company will:

- Ensure that cranes and crane operators are certified and qualified for the work being performed
- Verify that employees performing rigging operations are trained
- Enforce all rigging and lifting safe practices
- Provide all employees with the necessary PPE

EMPLOYEE RESPONSIBILITIES

- Follow all safe practices
- Use all required PPE
- Report any unsafe conditions or acts immediately

HAZARDS

The primary hazards associated with rigging and lifting operations include:

- Falling loads
- Electrocution from overhead power lines

PPE

All employees engaged in rigging and lifting operations will wear the necessary PPE, which will include:

- Hardhats
- Steel toes safety shoes or boots
- Heavy duty leather gloves
- Safety glasses or goggles
- Approved clothing

EQUIPMENT

This section provides information on the use of the tools and equipment associated with rigging and lifting operations.

LIFTING DEVICES

Cranes, derricks, hoists and other lifting devices will only be operated by trained qualified personnel.

Chain Falls and Hoist and Pullers

A chain fall or hoist and puller must be used at not more than its rated capacity, which must be permanently labeled or marked on it. An accessory, such as a chain or cable used to secure or support a chain fall or hoist and puller, will have a capacity of not less than the chain fall or hoist and puller. An object subject to a lift or pull by a chain fall will have the capacity to absorb the lift or pull without creating a hazard to an employee in the area.

A chain fall or hoist and puller must be secured to an anchorage, and the load must be attached to the chain fall or hoist and puller in a manner that will prevent inadvertent disengagement. When a chain fall or hoist and puller are under the tension of a load, a positive action must be required to release the tension.

In addition, the chain fall or hoist and puller must be visually inspected for observable defects before each shift by the employee using the tools. A hoist and puller lever handle must not be operated with an extension handle except as furnished by the manufacturer.

SLINGS

This Company will determine that all employees involved with rigging and lifting operations are trained on the proper use of sling and hitches before being allowed to their assigned tasks.

Cranes, derricks and hoists rely upon slings to hold their suspended loads; slings are the most commonly used materials-handling apparatus. This section provides information on the proper selection, maintenance and use of slings.

Slings can be made of chain, wire rope, metal mesh, natural fiber rope, synthetic fiber rope or synthetic web. In general, use and inspection procedures tend to place these slings into three groups: chain, wire rope and mesh, and fiber rope web. Each type has its own particular advantages and disadvantages. The determination of what sling to use for a lift will be based on the size, weight, shape, temperature and sensitivity of the material to be moved, as well as the environmental conditions under which the sling will be used.

Chain Slings

Alloy steel chain slings will have permanently affixed durable identification stating size, grade, rated capacity and reach.

Sling Use

Chain slings will be used because of their strength and ability to adapt to the shape of the load. Care must be taken, however, when using alloy chain slings because sudden shocks will damage them. Misuse of chain slings can damage the sling, resulting in sling failure and possible injury to an employee.

Alloy steel chain slings will not be used with loads in excess of the rated capacities. Slings will be used according to the manufacturer's recommendations.

Safe Operating Temperatures

Alloy steel chain slings will be permanently removed from service if they are heated above 1000° F. When exposed to service temperatures in excess of 600° F, the maximum working load limits will be reduced according to manufacturer's recommendations.

Inspection

Chain slings must be inspected before each use for stretching, binding, wear, or nicks and gouges. If a sling has stretched more than three percent of its original length, it is unsafe and must be discarded.

In addition to the regular inspection, a thorough periodic inspection of alloy steel chain slings in use will be made based on the frequency of use, the severity of service conditions the nature of lifts being made and the experience gained on the service life of slings used in similar circumstances. These periodic inspections will be conducted at least annually, and a record of the most recent inspection will be kept, and made available for examination upon request.

Deformed Attachments

- Steel chain slings with cracked or deformed master links, coupling links or other components will be removed from service
- Slings will be removed from service if hooks are cracked, have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook

Repairing and Reconditioning Steel Chain Slings

- Worn or damaged chain slings or attachments will not be used until repaired
- When welding or heat testing is performed, slings will not be used unless repaired, reconditioned and proof tested by the sling manufacturer or an equivalent entity
- Mechanical coupling links or low carbon steel repair links will not be used to repair broken lengths of chain

Attachments

- Hooks, rings, oblong links, pear shaped links, welded or mechanical coupling links or other attachments will have a rated capacity at least equal to that of the alloy steel chain with which they are used or the sling will not be used in excess of the rated capacity of the weakest component
- Makeshift links or fasteners formed from bolts or rods, or other such attachments, will not be used

Proof Testing

The employer will verify that each new, repaired or reconditioned alloy steel chain sling, including all welded components in the sling assembly, will be proof tested by the sling manufacturer or equivalent entity according to the ASTM Specification A391-65 and/or ANSI G61.1 before use. The employer will retain a certificate of the proof test and will make it available for examination.

Wire Rope

A second type of sling is made of wire rope. Wire rope is made of individual wires that have been twisted to form strands. Strands are then twisted to form a wire rope. Wire ropes with a fiber core are more flexible but are less resistant to environmental damage. Conversely, a core that is made of a wire rope strand has a greater strength and is more resistant to heat damage.

Sling Use

Wire rope slings will not be used with loads in excess of the rated capacities. Slings will be used according to the manufacturer's recommendations.

Minimum Sling Lengths

- Cable laid and 6 x 19 and 6 x 37 slings will have a minimum clear length of wire rope 10 times the component rope diameter between splices, sleeves or end fittings
- Braided slings will have a minimum clear length of wire rope 40 times the component rope diameter between the loops or end fittings
- Cable laid grommets, strand laid grommets and endless slings will have a minimum circumferential length of 96 times their body diameter

Safe Operating Temperatures

Fiber core wire rope slings of all grades will be permanently removed from service if they are exposed to temperatures exceeding 200° F. When non-fiber core wire rope slings of any grade are used at temperatures above 400° F or below minus 60° F, recommendations of the sling manufacturer regarding use at that temperature will be followed.

Safety Factors

- The designed safety factor for the hoisting cable on:
  - A hot metal crane must not be less than 8
  - Any other crane must not be less than 5

End Attachments

- Welding of end attachments, except covers to thimbles, will be performed before the assembly of the sling
- Welded end attachments will not be used unless proof tested by the manufacturer or equivalent entity at twice their rated capacity prior to initial use. The employer will retain a certificate of the proof test, and make it available for examination

Requirements

- Wire rope for a crane bent to form an eye will be equipped with a metal thimble
- An eye in a wire rope sling must not be formed by using a knot. Michigan prohibits the use of wire rope clips to form an eye in a wire rope sling. Check state and local standards for specific provisions
- A wire rope end fitting must be a clamp, swage or a zinc or equivalent poured socket

- Before cutting wire rope, seizings must be placed as follows:
  - 1 seizing on each side of the cut on preformed wire rope
  - 2 seizings on each side of ⅞ inch size or smaller non-preformed wire rope
  - 3 seizings on each side of 1 inch or larger size non-preformed wire rope
- Wire rope that has an independent wire rope core must be used on all molten metal applications and in areas where the environmental atmosphere will cause deterioration of a hemp center
- The unreeling or uncoiling of wire rope must be done as recommended by the rope manufacturer and with care to avoid kinking or inducing a twist
- Rope clips attached with U-bolts must have the U-bolts on the dead or short end of the rope. The spacing and number of all types of clips must adhere to manufacturer recommendations. Clips must be dropforged steel in all sizes manufactured commercially. When a newly installed rope has been in operation for an hour, all nuts on the clip bolts must be retightened
- If a load is supported by more than one part of rope, then the tension in the parts must be equal

Removal from Service

Wire rope slings will be immediately removed from service (and not used again for load-carrying service) if any of the following conditions are present:

- In running ropes, there are 6 randomly distributed broken wires in 1 lay, or 3 broken wires on 1 strand in 1 lay
- In rotation-resistant ropes, 2 randomly distributed broken wires in 6 rope diameters or 4 randomly distributed broken wires in 30 rope diameters
- In standing ropes, there are more than 2 broken wires in 1 lay in sections beyond end connections or more than 1 broken wire at an end connection
- There are reductions from nominal diameter of more than the following:
  - One sixty-fourth of an inch for a diameter to and including 5/16 of an inch
  - One thirty-second of an inch for a diameter ⅜ of an inch to and including ½ of an inch
  - Three sixty-fourths of an inch for a diameter 9/16 of an inch to and including ¾ of an inch
  - One sixteenth of an inch for a diameter ⅞ of an inch to and including 1⅛ inches
  - Three thirty-seconds of an inch for a diameter 1¼ inches to and including 1½ inches
  - Wear or scraping of one-third the original diameter of outside individual wires
  - Kinking, crushing, bird caging or any other damage resulting in distortion of the running portion of the wire rope structure
  - Evidence of heat damage
  - Corrosion of the rope or end attachments
  - End attachments that are cracked, deformed, or worn
  - Hooks that have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook

Wire Rope Sling Inspection

Wire rope slings must be visually inspected before each use. The operator and/or rigger will check the twists or lay of the sling. If ten randomly distributed wires in one lay are broken, or five wires in one strand of a rope lay are damaged, the sling must not be used. End fittings and other components will also be inspected for any damage that could make the sling unsafe.

Field Lubrication

Although every rope sling is lubricated when manufactured, it also must be lubricated in the field to increase the sling's useful service life. There is no set rule on how much or how often this should be done. It depends on the conditions under which the sling is used. The heavier the loads, the greater the number of bends, or the more adverse the conditions under which the sling operates, the more frequently lubrication is required.

Storage

Wire rope slings will be stored in a well-ventilated, dry building. To avoid corrosion and rust, never store wire rope slings on the ground or allow them to be continuously exposed to the elements. If it is necessary to store wire rope slings outside, make sure that they are kept off the ground and protected.

Discarding Slings

Wire rope slings can provide a margin of safety by showing early signs of failure. The following factors indicate when a wire sling needs to be discarded:

- Severe corrosion
- Localized wear (shiny worn spots) on the outside
- A one-third reduction in outer wire diameter
- Damage or displacement of end-fittings by overload or misapplication
- Distortion, kinking, bird caging or other evidence of damage to the wire rope structure
- Excessive broken wires

Wire rope slings, like chain slings, must be cleaned before inspections because they are subject to damage hidden by dirt or oil. In addition, they must be lubricated according to manufacturer's instructions. Lubrication prevents or reduces corrosion and wear due to friction and abrasion. Before applying any lubricant, however, make sure the sling is dry. Applying lubricant to a wet or damp sling traps moisture against the metal and hastens corrosion.

Corrosion may be indicated by pitting, but it is sometimes hard to detect. If a wire rope sling shows any sign of significant deterioration, that sling must be removed until it can be examined by a person who is qualified to determine the extent of the damage.

Many operating conditions affect wire rope life. They are bending, stresses, loading conditions, speed of load application (jerking), abrasion, corrosion, sling design, materials handled, environmental conditions and history of previous usage.

In addition to the above operating conditions, the weight, size and shape of the loads to be handled also affect the service life of a wire rope sling. Flexibility also is a factor, use ropes when smaller radius bending is required. Less flexible ropes will be used when the rope must move through or over abrasive materials.

Metal Mesh Slings

Metal mesh slings will be used for lifting objects with sharp edges, such as sheet metal. Metal mesh slings also make it easier to balance loads because of their wide load bearing surfaces.

Sling Marking

Each metal mesh sling will have permanently affixed to it a durable marking that states the rated capacity for vertical basket hitch and choker hitch loadings.

Handles

Handles will have a rated capacity at least equal to the metal fabric and exhibit no deformation after proof testing.

Attachments of Handles to Fabric

The fabric and handles will be joined so that:

- The rated capacity of the sling is not reduced
- The load is evenly distributed across the width of the fabric
- Sharp edges will not damage the fabric

Sling Coatings

Coatings that diminish the rated capacity of a sling will not be applied.

Sling Testing

No new and repaired metal mesh slings, including handles, will be used unless proof tested by the manufacturer or equivalent entity at a minimum of 1½ times their rated capacity. Elastomer impregnated slings will be proof tested before coating.

Proper Use of Metal Mesh Slings

Metal mesh slings will not be used to lift loads in excess of their rated capacities based on the manufacturer's recommendations.

Safe Operating Temperatures

Metal mesh slings that are not impregnated with elastomers may be used in a temperature range from minus 20° F to plus 550° F without decreasing the working load limit.

Metal mesh slings impregnated with polyvinyl chloride or neoprene may be used only in a temperature range from zero degrees to plus 200° F. For operations outside these temperature ranges or for metal mesh slings impregnated with other materials, the sling manufacturer's recommendations will be followed.

Repairs

- Metal mesh slings that have been repaired will not be used unless repaired by a metal mesh sling manufacturer or an equivalent entity
- Once repaired, each sling will be permanently marked or tagged, or a written record maintained, to indicate the date and nature of the repairs and the person or organization that performed the repairs
- Records of repairs will be made available for examination

Removal from Service

Metal mesh slings will be immediately removed from service if any of the following conditions are present:

- A broken weld or broken brazed joint along the sling edge
- Reduction in wire diameter of 25 percent due to abrasion or 15 percent due to corrosion
- Lack of flexibility due to distortion of the fabric
- Distortion of the female handle so that the depth of the slot is increased more than 10 percent
- Distortion of either handle so that the width of the eye is decreased more than 10 percent
- A 15 percent reduction of the original cross-sectional area of metal at any point around the handle eye
- Distortion of either handle out of its plane

Fiber Rope Web Slings

Fiber rope and synthetic web slings are used primarily for temporary work, such as construction and painting jobs, and in marine operations. They also are the best choice for use on expensive loads, highly finished parts, fragile parts and delicate equipment.

Fiber rope deteriorates on contact with acids and caustics. Fiber rope slings will not be used around these substances unless the manufacturer recommends them for that use.

Sling Use

- Fiber rope slings made from conventional three strand construction fiber rope will not be used with loads in excess of their rated capacities
- Fiber rope slings will have a diameter of curvature meeting at least the minimums specified
- Slings will be used only according to the manufacturer's recommendations

Sling Operating Temperatures

Natural and synthetic fiber rope slings, except for wet frozen slings, may be used in a temperature range from minus 20° F to plus 180° F without decreasing the working load limit. For operations outside this temperature range and for wet frozen slings, the sling manufacturer's recommendations will be followed.

Splicing

- Spliced fiber rope slings will not be used unless they have been spliced according to the following minimums:
  - In manila rope, eye splices will consist of at least three full tucks, and short splices will consist of at least six full tucks, three on each side of the splice center line
  - In synthetic fiber rope, eye splices will consist of at least four full tucks, and short splices will consist of at least eight full tucks, four on each side of the center line
  - Strand end tails will not be trimmed flush with the surface of the rope immediately adjacent to the full tucks. This applies to all types of fiber rope and both eye and short splices.
  - For fiber rope under one inch in diameter, the tail will project at least six rope diameters beyond the last full tuck.

  - For fiber rope one inch in diameter and larger, the tail will project at least six inches beyond the last full tuck.
  - Where a projecting tail interferes with the use of the sling, the tail will be tapered and spliced into the body of the rope using at least two additional tucks (which will require a tail length of approximately six rope diameters beyond the last full tuck)
- Fiber rope slings will have a minimum clear length of rope between eye splices equal to 10 times the rope diameter
- Knots will not be used in lieu of splices
- Clamps not designed specifically for fiber ropes will not be used for splicing
- For all eye splices, the eye will large enough to provide an included angle of less than 60 º at the splice when the eye is placed over the load or support requirements, and according to any additional recommendations of the manufacturer

End Attachments

Fiber rope slings will not be used if end attachments in contact with the rope have sharp edges or projections.

Removal from Service

Natural and synthetic fiber rope slings will be immediately removed from service if any of the following conditions are present:

- Abnormal wear
- Powdered fiber between strands
- Broken or cut fiber
- Variations in the size or roundness of strands
- Discoloration or rotting
- Distortion of hardware in the sling

Repairs

Only fiber rope slings made from new rope will be used. Use of repaired or reconditioned fiber rope slings is prohibited.

Inspection

When inspecting a fiber rope sling, look first at its surface. Look for cuts, gouges or worn surface areas; dry, brittle, scorched or discolored fibers; or melting or charring of any part of the sling. If any of these conditions are found, the supervisor must be notified and a determination made regarding the safety of the sling. If the sling is found to be unsafe, it must be discarded.

Next, check the sling's interior. It should be as clean as when the rope was new. A buildup of powder-like sawdust on the inside of the fiber rope indicates excessive internal wear and that the sling is unsafe.

Synthetic Web Slings

Each sling will be marked or coded to show the rated capacities for each type of hitch and type of synthetic web material.

Webbing

Synthetic webbing will be of uniform thickness and width and selvage edges will not be split from the webbing's width.

Fittings

Fittings will be:

- Of a minimum breaking strength equal to that of the sling
- Free of all sharp edges that could in any way damage the webbing

Attachment of End Fittings to Webbing and Formation of Eyes

Stitching will be the only method used to attach end fittings to webbing and to form eyes. The thread will be in an even pattern and contain a sufficient number of stitches to develop the full breaking strength of the sling.

Sling Use

Synthetic web slings will not be used with loads in excess of the rated capacities.

Environmental Conditions

When synthetic web slings are used, the following precautions will be taken:

- Nylon web slings will not be used where fumes, vapors, sprays, mists or liquids of acids or phenolics are present
- Polyester and polypropylene web slings will not be used where fumes, vapors, sprays, mists or liquids of caustics are present
- Web slings with aluminum fittings will not be used where fumes, vapors, sprays, mists or liquids of caustics are present

Safe Operating Temperatures

Synthetic web slings of polyester and nylon will not be used at temperatures in excess of 180° F. Polypropylene web slings will not be used at temperatures above 200° F.

Repairs

- Synthetic web slings that have been repaired will not be used unless repaired by a sling manufacturer or an equivalent entity
- Each repaired sling will be proof tested by the manufacturer or equivalent entity to twice the rated capacity prior to its return to service. The employer will retain a certificate of the proof test and make it available for examination
- Slings, including webbing and fittings, which have been repaired in a temporary manner will not be used

The most commonly used synthetic web slings are made of nylon, polypropylene and polyester. They have the following properties in common:

- Strength – can handle a load of up to 300,000 pounds

- Convenience – can conform to any shape
- Safety – will adjust to the load contour and hold it with a tight, non-slip grip
- Load protection – will not mar, deface, or scratch highly polished or delicate surfaces
- Long life – are unaffected by mildew, rot, or bacteria; resist some chemical action; and have excellent abrasion resistance
- Economy – have a low initial cost plus a long service life
- Shock absorbency – can absorb heavy shocks without damage
- Temperature resistance – are unaffected by temperatures up to 180˚ Fahrenheit

Because each synthetic material has unique properties, it must be used according to the manufacturer's instructions, especially when dealing with chemically active environments.

Synthetic web slings must be removed from service if any of the following defects exist:

- Acid or caustic burns
- Melting or charring of any part of the surface
- Snags, punctures, tears, or cuts
- Broken or worn stitches
- Wear or elongation exceeding the amount recommended by the manufacturer
- Distortion of fittings

Fiber ropes and synthetic webs are generally discarded rather than service or repaired. Operators must always follow the manufacturer's recommendations.

Hitches

Hitches are used to attach slings to the load to be lifted. There are three basic type of hitches vertical, choker and basket.

The type of hitch used will affect the working load limit (WLL) of the sling. The WLL is the maximum weight that the sling can handle, and is determined by the angle of the sling in reference to the load line.

Vertical: A vertical hitch is a single sling that attaches directly from the load line to the load. This hitch provides a lifting capability that matches the WLL of the sling, and is used for loads that have secure attachment points.

Choker: A choker hitch wraps around the load and through itself. The must be tightened around the load before the lift is attempted. Due to the stress created at the choke point, slings rigged with a choker hitch can only handle about 75% of their WLL.

Basket: Basket hitches can be used as a single or double lifting device. The cradle configuration of this hitch allows the two extending ends (legs) of the sling to function as if they were two separate slings. The capacity of the sling in this hitch is twice that of the same sling in a vertical hitch, but only if the sling angle of each leg is 90°. Lifting with both legs at 90° would normally require two lifting devices or a spreader bar.

Reduction Factor (RF)	Angle From Horizontal	Tension Factor (TF)
1.000	90°	1.000
0.996	85°	1.004
0.985	80°	1.015
0.966	75°	1.035
0.940	70°	1.064
0.906	65°	1.104
0.866	60°	1.155
0.819	55°	1.221
0.766	50°	1.305
0.707	45°	1.414
0.643	40°	1.555
0.574	35°	1.742
0.500	30°	2.000

When slings or sling legs are used at an angle during a lift, the sling capacity is reduced. How much it is reduced depends on the sling angle (see table.

Note that the rated capacity of a 30° Basket is only one half that of a 90° Basket. Sling angles below 30° will not be used. A sling angle of 60° or more is preferred

GENERAL SAFE PRACTICES

Cranes being used in steel erection activities will be visually inspected prior to each shift by a competent person, the inspection will include observation for deficiencies during operation.

If any deficiency is identified, an immediate determination will be made by the competent person as to whether the deficiency constitutes a hazard. If the deficiency is determined to constitute a hazard, the hoisting equipment will be removed from service until the deficiency has been corrected

Whenever there is any doubt as to safety, the operator will have the authority to stop and refuse to handle loads until safety has been assured.

- A qualified rigger will inspect the rigging prior to each shift
- The headache ball, hook, or load will not be used to transport personnel
- Cranes or derricks may be used to hoist employees on a personnel platform provided that all provisions are met
- Safety latches on hooks will not be deactivated or made inoperable except:
  - When a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so
  - When equivalent protection is provided in a site-specific erection plan

Working Under Loads

Routes for suspended loads will be pre-planned to ensure that no employee is required to work directly below a suspended load except for:

- Employees necessary for the hooking or unhooking of the load
- When working under suspended loads, the following criteria will be met:
  - Materials being hoisted will be rigged to prevent unintentional displacement
  - Hooks with self-closing safety latches or their equivalent will be used to prevent components from slipping out of the hook
  - All loads will be rigged by a qualified rigger

Multiple Lift Rigging Procedure

A multiple lift will only be performed if the following criteria are met:

- A multiple lift rigging assembly is used
- A maximum of five members are hoisted per lift
- Only beams and similar structural members are lifted
- All employees engaged in the multiple lift have been trained in these procedures
- No crane will be used for a multiple lift unless approved by the manufacturer's specifications

The components of the multiple lift rigging assembly will be designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, will be based on the manufacturer's specifications with a 5-to-1 safety factor for all components.

The total load will not exceed:

- The rated capacity of the hoisting equipment specified in the hoisting equipment load charts
- The rigging capacity specified in the rigging rating chart

SAFE OPERATING PRACTICES

The operator and rigger will select slings based on their intended use, the size and type of load and the environmental conditions of the workplace. All slings must be inspected before use.

- Slings that are damaged or defective will not be used
- Slings will not be shortened with knots or bolts or other makeshift devices
- Sling legs will not be kinked
- Slings will not be loaded in excess of their rated capacities
- Slings used in a basket hitch will have the loads balanced to prevent slippage
- Slings will be securely attached to their loads
- Slings will be padded or protected from the sharp edges of their loads
- Suspended loads will be kept clear of all obstructions
- All employees will be kept clear of loads about to be lifted and of suspended loads
- Hands or fingers will out from between the sling and its load while the sling is being tightened
- Shock loading is prohibited
- A sling will not be pulled from under a load when the load is resting on the sling

SAFE LIFTING PRACTICES

There are four primary factors to consider when safely lifting a load:

- The size, weight, and center of gravity to the load
- The number of legs and the angle the sling makes with the horizontal line
- The rated capacity of the sling
- The history of the care and usage of the sling

Size, Weight, and Center of Gravity of the Load

The center of gravity of an object is that point where the entire weight is considered balanced. To make a level lift, the crane hook must be directly above this point. While slight variations are usually permissible, if the crane hook is too far to one side of the center of gravity, dangerous tilting will result causing unequal stresses in the different sling legs. This imbalance must be compensated for at once. No lift will be performed if the load angle is more than 10º.

Number of Legs and Angle with the Horizontal

As the angle formed by the sling leg and the horizontal line decreases, the rated capacity of the sling also decreases. In other words, the smaller the angle between the sling leg and the horizontal, the greater the stress on the sling leg and the smaller (lighter) the load the sling can safely support. Larger (heavier) loads can be safely moved if the weight of the load is distributed among more sling legs.

Rated Capacity of the Sling

The rated capacity of a sling varies depending upon the type of sling, the size of the sling and the type of hitch. Operators must know the capacity of the sling. Charts or tables that contain this information generally are available from sling manufacturers. The values given are for new slings. Older slings must be used with additional caution. Under no circumstances will a sling's rated capacity be exceeded.

Sling Care and Usage

The mishandling and misuse of slings are the leading cause of sling-related accidents. The majority of injuries and accidents, however, can be avoided by becoming familiar with the essentials of proper sling care and use.

Proper care and use are essential for maximum service and safety. Slings must be protected with cover saddles, burlap padding or wood blocking as well as from unsafe lifting procedures such as overloading to prevent sharp bends and cutting edges.

Before making a lift, check that the sling is properly secured around the load and that the weight and balance of the load have been accurately determined. If the load is on the ground, do not allow the load to drag along the ground. This could damage the sling. If the load is already resting on the sling, make sure there's no sling damage before making the lift.

Make sure the hook is positioned directly over the load, and seat the sling squarely within the hook bowl. This will prevent bending of the hook or overstressing the sling.

Wire rope slings are subject to damage from contact with sharp edges of the loads being lifted. These edges can be blocked or padded to minimize damage to the sling.

After the sling is properly attached to the load, use these lifting techniques.

- Make sure that the load is not lagged, clamped or bolted to the floor
- Guard against shock loading by taking up the slack in the sling slowly. Apply power cautiously to prevent jerking at the beginning of the lift, and slowly accelerate or decelerate
- Check the tension on the sling. Raise the load a few inches, stop and check for proper balance and that all items are clear of the path of travel
- Keep all personnel clear while the load is being raised, moved or lowered. Crane or hoist operators must watch the load at all times when it is in motion

- Never allow more than one person to control a lift or give signals to a crane or hoist operator except to warn of a hazardous situation
- Never raise the load higher than necessary
- Never leave the load suspended in the air
- Never work under a suspended load or allow anyone else to

Once the lift has been completed, clean the sling, check it for damage and store it in a clean, dry, airy place. It is best to hang it on a rack or wall.

Remember, damaged slings cannot lift as much weight as new or older well cared for slings. Proper and safe use and storage of slings will increase their service life.

If using load blocks, they must be enclosed and guarded against rope jamming during normal operations.

Never allow anyone to ride on the hook or load. A hook must be equipped with a latch, unless the application makes the use of a latch impractical as determined by a qualified person. When required, a latch must be provided to bridge the throat opening of the hook for the purpose of retaining slings, chains, or other equipment, under slack conditions.

INSPECTIONS

Each day before being used, the sling and all fastenings and attachments will be inspected for damage or defects by a competent person designated by the employer. Additional inspections will be performed during sling use, where service conditions warrant. Damaged or defective slings will be immediately removed from service.

TRAINING

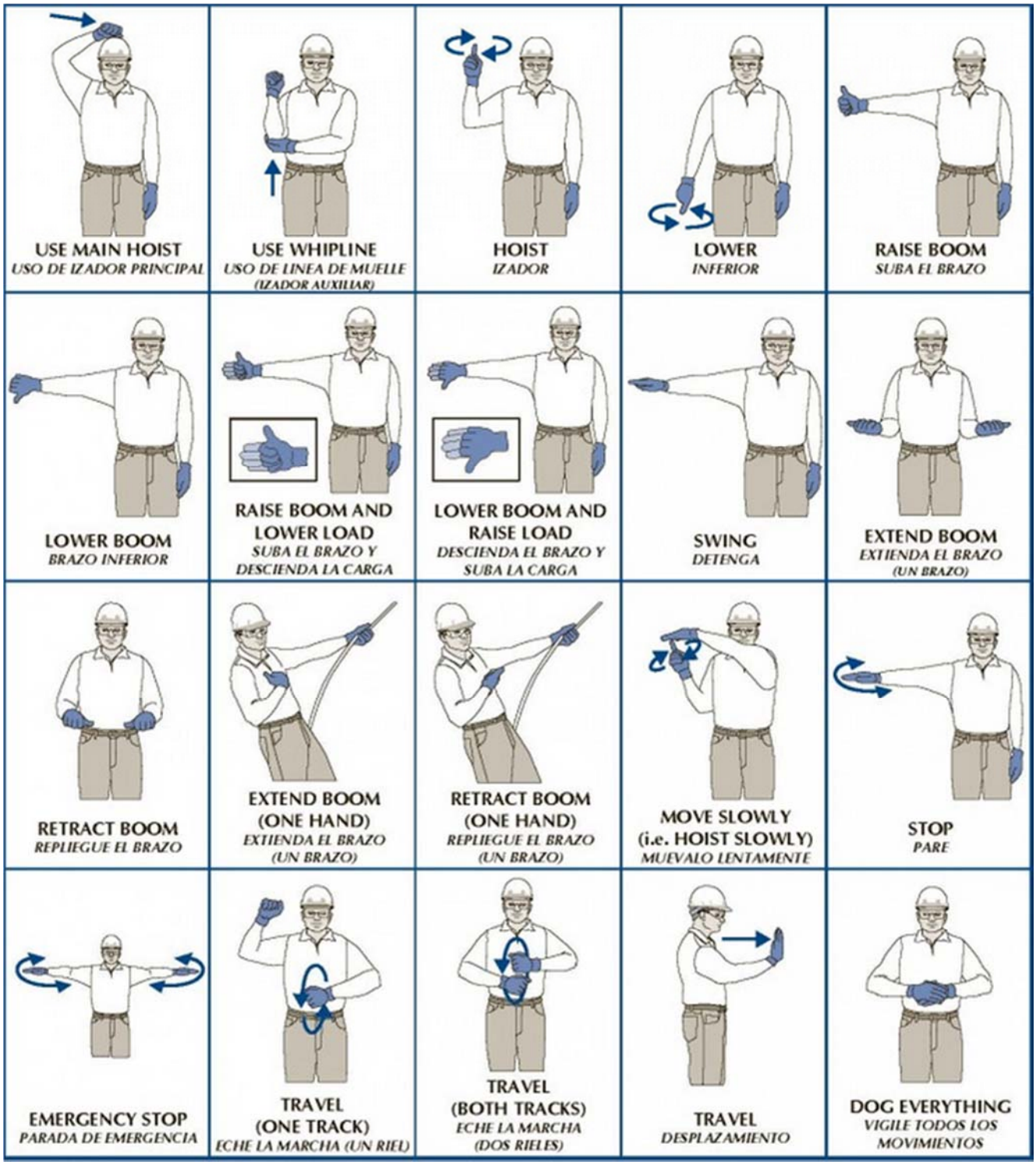
This Company will ensure that all employees engaged in rigging and lifting operations understand:

- The use of approved hand signals (see attachment)
- How to perform hook inspections
- The basics of weight capacity
- The different sling types
- The types of hitches and their use
- The use of padding
- The basics of sling and load angles

ATTACHMENTS

The following page illustrates the recommended hand signals for controlling cranes and other lifting devices.

RECOMMENDED HAND SIGNALS FOR CONTROLLING CRANE OPERATIONS



SCOPE

This chapter provides information on the hazards of slips, trips and falls, as well as the safe practices that will be used to prevent them. These practices will comply with the parts of OSHA Walking and Working Surfaces regulation 1910 Subpart D that apply to slip, trip and fall hazards. This chapter does not specifically cover working at elevations or fall protection systems; please refer to the Fall Protection and Walking and Working Surfaces chapters for information on those policies and safe practices.

POLICY

This company has established the following policies and practices to reduce the number of injuries and deaths due to slips, trips and falls.

EMPLOYER RESPONSIBILITIES

- Owners, managers, and supervisors must make a commitment to prevent accidental slips, trips, and falls
- Regular, frequent inspections of working and walking areas will be conducted to identify environmental and equipment hazards that could cause slips, trips, and falls. Special attention will be given to the working and walking surfaces, housekeeping, lighting, vision, stairways and ladders. Immediate corrective action will be taken to correct any problems that are identified
- Safety training on the prevention of slips, trips, and falls will be provided for all new employees
- Regular retraining will be provided for all employees
- Special attention will be given to proper techniques for walking, carrying loads, climbing and descending stairways, using ladders, mounting and dismounting vehicles and other equipment, etc. Unsafe practices will be corrected immediately
- All slips, trips, and falls, with or without injury, will be recorded and thoroughly investigated. Corrective action to prevent repeat occurrences will be taken immediately

EMPLOYEE RESPONSIBILITIES

- Are required to wear proper footwear for their work and environment whether in the office or field
- All slips, trips, and falls, with or without injury, must be reported immediately
- Will use proper tools, hand trucks, dollies, carts and hoists to lift and move heavy objects. Do not exceed the rated capacity of a hoist or lifting device
- Inspect items to be handled for slivers, jagged edges, burrs, and rough or slippery surfaces. Wear protective gloves
- Wipe off oily, wet, slippery or dirty items before trying to handle them. To adjust your grip, set the object down
- Never carry an object they cannot see over or around, plan your route of travel and be sure it is clear of obstacles
- When moving items on dollies or hand trucks, push rather than pull whenever possible
- Will avoid extreme and awkward postures by using adjustable fixtures and rotating tables, workstations, and delivery bins

SLIPS, TRIPS, AND FALLS

Slips and trips can happen anywhere, can result in falls, possible disability or death and can be very costly to both the company and the worker.

Slips, trips and falls are a leading cause of general industry accidents, ranking second behind motor vehicle accidents. Listed below are some basic definitions of slips, trips and falls.

Slips

Slips occur when there is too little friction or traction between feet (footwear) and a walking/working surface, resulting in loss of balance. Most slips are caused by:

- Wet product or spills on smooth floors or walking surfaces
- Dry product or spills making walking surfaces slippery
- Highly-polished or freshly waxed floors
- Transitioning from one surface to another such as carpet to vinyl or grid to smooth concrete
- Loose, irregular surfaces such as gravel
- Sloped, uneven or muddy terrain
- Weather hazards
- Leaves, pine needles and other plant debris (wet or dry)

Trips

Trips occur when a worker's foot or lower leg hits an object and their upper body continues moving, resulting in loss of balance. Trips can be caused by:

- Uncovered hoses, cables, wires or extension cords across aisles or walkways
- Clutter, obstacles in aisles, walkway and work areas
- Open cabinet, file or desk drawers and doors
- Changes in elevation or levels
- Unmarked steps or ramps
- Rumpled or rolled-up carpets/mats or carpets with curled edges
- Irregularities in walking surfaces, such as thresholds or gaps
- Missing or uneven floor tiles and bricks
- Damaged steps
- Non-uniform, improper or irregular steps
- Debris, accumulated waste materials
- Trailing cables, pallets, tools in gangways
- Objects protruding from walking surface
- Sidewalk/curb drops
- Speed bumps
- Tire bumpers
- Wheelchair ramps and curbs
- Driveways

Falls

A fall occurs when a worker's body becomes too far off its center of balance. There are two basic types of falls, same-level falls and elevated falls.

- Same-level falls: high frequency and low severity
- Elevated falls: lower frequency and high severity

Same-level falls are generally slips or trips. Injuries result when the individual hits a walking or working surface or strikes some other object during the fall.

Same-Level Falls

The force that allows you to walk without slipping is commonly referred to as traction or friction. The coefficient of friction (COF) is a measure of the traction workers have when working. Common experience shows that dry concrete sidewalks have good traction, while icy surfaces or freshly waxed floors can have low traction. A higher COF means more friction, and therefore more traction. The COF depends on two things, the quality of both the walking surface and the soles of your shoes. Slips are primarily caused by a slippery surface and compounded by wearing the wrong footwear. In normal walking, two types of slips occur:

- The first of these occurs as the heel of the forward foot contacts the walking surface. Then, the front foot slips forward, and the person falls backward
- The second type of fall occurs when the rear foot slips backward. The force to move forward is on the sole of the rear foot. As the rear heal is lifted and the force moves forward to the front of the sole, the foot slips back and the person falls
- To prevent slips and falls, a high COF between the shoe and walking surface is needed. On icy, wet and oily surfaces, the COF can be as low as 0.10 with shoes that are not slip-resistant. A COF of 0.40 to 0.50 or more is needed for good traction. To put these figures in perspective, a brushed concrete surface and a rubber heel will often show a COF greater than 1.0. Leather soles on a wet, smooth surface, such as ceramic tile or ice, may have a COF as low as 0.10
- Shoes with soft, rubber soles and heels with rubber cleats provide a high COF
- Providing dry walking and working surfaces, and slip-resistant footwear, will prevent slips and their resultant falls and injuries. In work areas where the walking and working surface is likely to be slippery, non-skid strips or floor coatings will be used. If the working surface is very slippery, no footwear will provide a safe COF
- "Fall-trips" occur when a worker's front foot strikes an object and suddenly stops. The upper body is then thrown forward, and a fall occurs
- As little as a 3/8" rise in a walkway can cause a person to "stub" their toe, resulting in a trip and fall. The same thing can occur when going up a flight of stairs: only a slight difference in the height of subsequent steps, and a person can trip and fall
- Another type of working and walking surface fall is the "step and fall". This occurs when the front foot lands on a surface lower than expected, such as when unexpectedly stepping off a curb in the dark. In this type of fall, the person normally falls forward. A second type of "step and fall" occurs when a person steps forward or down, and either the inside or outside of the foot lands on an object higher than the other side. The ankle turns and one tends to fall forward and sideways

Elevated Falls

Most elevated falls occur when employees working on ladders or scaffolds lose their balance. More than 60 percent of elevated falls are from less than 10 feet.

Elevated falls, or falls from height, are normally due to:

- A lack of, or improper use of, fall protection
- Poor housekeeping practices
- Improper PPE
- Improper climbing techniques
- Accidental contact with objects or electricity

These accidents are avoidable if safe work practices are used.

Falls from Ladders

Ladders may be fixed or portable. They may be straight, extension or stepladders, and may be made of wood, metal, plastic or fiberglass. They can be light, medium, heavy or extra heavy-duty.

The materials from which ladders are constructed have advantages and disadvantages in weight, durability, flexibility, conductivity and strength. The intended use of the ladder should determine the type purchased, and only American National Standards Institute (ANSI)-approved ladders will be used.

Don’t use metal ladders in locations where the ladder or its user could contact electrical equipment or circuits.

The lower ends of the siderails will be equipped with slip-resistant pads, particularly if the ladder is to be used on hard surfaces. The same is true for the upper ends of the siderails if they are to rest against a surface.

Ladders will be set at a 4:1 angle, or as near to that angle as possible. For each four feet of rise from the base to the upper resting edge of the ladder, the base should be one foot out from a vertical line from the upper resting edge of the ladder to the working surface.

The base of the ladder must be set so that it won’t slip or settle into soft ground. The resting edge of the ladder will have both siderails in contact with the supporting wall. Whenever there’s any question about the stability of the ladder, additional precautions will be taken to stabilize the ladder as it’s being climbed. Tying the top of the ladder to the supporting structure can also keep the ladder from slipping or sliding.

Ladders must be inspected before use: check for cracks, loose rungs, slivers and sharp edges.

Never paint ladders, as the paint can hide potentially dangerous conditions. Wooden ladders can be coated with linseed oil or an oil-based wood preservative to keep them from drying out and cracking. Allow ladders to dry thoroughly before using them or the rungs will be slippery.

The rungs and siderails of ladders must be kept free of oil, grease, and mud and must be kept dry.

Since the shoe has limited contact with the rung or step of a ladder, it is very important that both rungs and shoes have a high COF. Only shoes with heels may be worn when climbing ladders; users should be taught that the rung or step of the ladder should be just in front of the heel, under the arch of the foot. Stepping or standing on a ladder with the front part of the shoe is inviting a slip and fall. Always face the ladder when climbing or descending.

Falls from Vehicles and Equipment

Death or serious injury is a frequent result of extra riders falling from the bed of a truck.

Far too many injuries occur in the simple process of getting in and out of trucks or truck beds. When the steps are metal, there is a low COF which becomes even lower if they are wet, muddy, or oily. Keep the steps clean and dry.

Whenever mounting or climbing on a vehicle or machine, have a good handhold before stepping up. Pulling yourself up reduces the force between your shoe and the step and reduces the danger of a slip. As with a ladder, the foot should be placed on the step or rung just in front of your heel, under the arch.

Always face the vehicle or equipment when mounting and dismounting. When stepping down backward, one steps down on the ball of the foot, which is best; when stepping down forward, however, one lands on the heel, thus increasing the chances of falling, twisting an ankle or knee, or suffering some other injury.

Practice the "Three-Point System”. This system can significantly reduce the chances of injuring yourself through a slip or fall while climbing ladders or while entering or exiting a vehicle. The Three-Point System means that three of your four limbs are in contact with the ladder or vehicle at all times, either one hand and two feet, or two hands and one foot, only one limb is in motion at any one time.

Falls from Loading Docks

- Loading docks and ramps are dangerous areas. They are frequently congested, heavy- traffic areas, and working and walking surfaces are often wet. Metal dock plates can wear smooth and become very slippery; in particular, the edge of a dock plate invites trips and falls
- Accidental backward steps can result in a fall from the dock. Portable railings, which can be easily removed from the edge of the dock, could prevent many dangerous falls. They are removed when a truck is at the dock, and replaced as soon as the truck or trailer leaves
- Proper housekeeping, well-designed traffic patterns, and the use of abrasive, skid-resistant surface coatings will reduce the risk of slips, trips, and falls
- Ramps and gangplanks have hazards similar to loading docks. The slopes should be as gradual as possible, as wide as possible, and as dry as possible. They should also have skid-resistant surfaces

Falls on Stairs

Stairwells will be well lighted, with sturdy handrails on both sides. Persons using the stairwell should have one hand free to be able to use the handrail.

All the steps will have the same rise and depth, with visible edges. They must be kept free of grease, oil and obstacles that could cause slips and trips. Avoid carrying heavy or bulky objects that obscure your vision and/or require the use of both hands. Carry smaller, lighter loads, and make more trips, or obtain help with the load.

Fixed Ladders

Fixed ladders are mounted on buildings and other tall structures that require workers to climb to high levels to perform some functions. Such ladders must be securely attached to the structure and be capable of supporting a minimum of 250 pounds of concentrated live weight. The rungs should be a minimum of 16 inches wide and a maximum of 12 inches apart. There will be seven inches of toe space between the rung and the structure to which it is attached. Fixed ladders extending more than 20 feet above the ground or floor level will be surrounded by a cage, beginning at 7 to 8 feet above the ground.

If a catwalk or working area is provided at the top of the ladder, it must have a protective railing at least 42 inches high. A toeboard, four-inches high, around the edge of the work area will be provided.to reduce the risks of a person stepping off the edge or having tools fall from the work area.

Workers climbing or descending a fixed ladder must have both hands free. Small tools can be carried in a tool belt; rope and pulleys or some other mechanical system must raise other tools and materials.

INJURIES

The most common injuries resulting from slips trips and falls are:

- Sprains and strains
- Bruises and contusions
- Fractures
- Abrasions and lacerations

These injuries usually occur to workers:

- Knee, ankle and/or foot
- Wrist and /or elbow
- Back and /or shoulder
- Hip
- Head

ENVIRONMENTAL FACTORS

Proper housekeeping in work and walking areas can contribute to safety and the prevention of falls. Not only is it important to maintain a safe working environment and walking surface, these areas must be kept free of obstacles that can cause slips and trips. One method that promotes good housekeeping in work environments is the painting of yellow lines to identify working and walking areas. Objects of any kind should never obstruct these areas.

Adequate lighting to ensure proper vision is also important in the prevention of slips and falls. Moving from a light to a dark area, or vice versa, could cause temporary vision problems that might cause a person to slip on an oil spill, or trip over a misplaced object.

Carrying an oversized object can also obstruct one's vision and result in a slip or a trip. This is a particularly serious problem on stairs.

HUMAN FACTORS

Slips, trips and falls can also be caused by a number of physical factors such as:

- Failing eyesight and /or visual perception
- Age
- Physical condition and fatigue
- Stress or illness
- Medications, alcohol and drug effects

BEHAVIORS THAT LEAD TO FALLS

In addition to wearing the wrong footwear, there are specific behaviors that can lead to slips, trips and falls.

- Walking too fast or running can cause major problems. In normal walking, the most force is exerted when the heel strikes the ground, but in fast walking or running, one can land harder on the heel of the front foot and push harder off the sole of the rear foot; thus, a greater coefficient of friction (COF) is required to prevent slips and falls. Rapid changes in direction create a similar problem
- Other problems that can lead to slips, trips and falls are: distractions, not watching where one is going, carrying materials that obstruct the view of the pathway, wearing sunglasses in low-light areas, and failure to use handrails. These and other behaviors, caused by lack of knowledge, impatience, or bad habits developed over time, can lead to falls, injuries, or even death

SAFE PRACTICES

All Company employees are expected to follow these safe practices to avoid slip, trip and fall injuries:

- Wear footwear that is appropriate for the conditions inside and outside. On smooth or wet surfaces, wear slip-resistant soles. On snowy, icy, and rainy days, wear boots to work and change after arriving
- Clean footwear of mud, snow, etc., when entering a building
- Be aware of changes in elevation and changes in walking surfaces. When moving from carpet to tile or dry tile to wet tile, etc., the friction (grip) between the sole of the shoe and the floor surface lessens. Alter your stride to take shorter, slower steps
- Walk; don’t run through work areas. When possible, stay on marked travel aisles and paths. Don’t take shortcuts around machinery and equipment. Avoid areas that are cluttered or dimly lit
- When carrying a load, make sure you can see over and around it. Scan the area ahead and plan your travel path. Get help to carry heavy or awkward objects. Use carts or other mechanical aids

- Clean up, correct, remove or report unsafe conditions such as spills, electric cords, frayed carpets, worn stairs and other hazards that could result in a slip/trip/fall injury
- Warn others that a hazard exists by placing signs or cones, or by isolation with caution tape or barricades
- Do not allow equipment, tools, materials or other obstacles to accumulate in aisles or walkways. Never store or place items on stairs
- Keep desk and file cabinet drawers closed when they are not being used, or when unattended
- Always use a ladder or step stool. Never stand on a chair, desk, shelf, crate, box or any other unstable items to try to reach something. If you must routinely reach items in high locations, purchase a ladder or steps to allow it to be done safely
- Walk erect using even strides and good balance. Always use handrails when available
- Use “three-point positioning” when entering or exiting trucks, equipment, or construction vehicles. Maintain three points of attachment at all times, both hands and one foot or both feet and one hand
- Enter and exit equipment while facing it. Use all of the steps, never jump
- Keep floors clean and free of water, oil or grease. Areas such as mechanics bays may be periodically steam-cleaned. Tiled floors that have been worn or filled smooth can be etched to restore a rougher surface
- Apply non-slip surfacing such as adhesive-backed sheets, anti-slip paint, open-spaced grates, or mats to ramps, docks, platforms, or stairways recognized as hazardous
- Paint edges where elevation changes occur with “caution-yellow” paint. Post signs to warn of dangerous areas
- During winter months, remove snow and ice, and apply sand and salt before work and frequently after work begins. Note areas that drain poorly, retain snow, or are habitually slippery, and initiate permanent changes to eliminate the hazard

Safe Climbing

Workers will have both hands free to hold the ladder's siderails, not the rungs, when climbing or descending. Small tools can be carried in a tool belt, but a better choice is to raise tools and supplies with a rope. Never raise or lower power tools by the cord or while they are plugged into an electrical source.

Makeshift ladders, chairs, boxes and barrels may not be used as substitutes for a ladder.

SLIP, TRIP AND FALL PROTECTION

Our Company will take all practical measures to protect employees from slip, trip and fall hazards depending on the environment and the type of work being performed.

Signs and Markings

Safety signs of slip, trip and fall hazards will be posted to remind workers of the hazards, particularly where hazards cannot be removed or corrected.

Yellow striping to identify walking and working areas will be installed. Striped areas will indicate that no objects may be placed in these areas. Dropped and spilled materials must be removed immediately.

Slip-Resistant Materials

Slip resistant coatings will be applied to concrete, metal and wood surfaces to increase the COF and reduce the risks of slips and falls. These materials can consist of:

- Abrasive coatings formulated to resist grease, oil, water, and other chemicals
- Skid-resistant products for use on stair treads, ramps, and other hazardous walking and working surfaces
- Rubber or rubber-like mats

Fall Protective Devices

Workers at high elevations, such as ladders, platforms or catwalks, will be protected from falling by a fall protective device. This can be a protective cage, a lifeline, lanyard or safety harness.

The system will provide maximum protection, but will also be reasonably comfortable and not restrict a worker's necessary work activity. This Company will also provide instruction on the safe use of this protective equipment.

For additional information on the use of fall protection equipment, please refer to the Fall Protection chapter of this manual.

Shoes and Boots

It is very important to wear the proper footwear for your work and environment. Shoes or boots should provide three major types of protection:

- The soles and heels should be slip-resistant
- The toe of the shoe should resist crushing injuries
- The shoe should support the ankle

ANSI sets standards for shoes and boots. Never purchase work shoes that don’t meet these standards. A typical ANSI rating could be 1-75 C-25. This means the toe will withstand 75-foot pounds of impact and 2,500 pounds of compression.

Chevron-pattern or cleat-designed soles are best for slippery situations because of the suction or squeezing action they provide. The softer soles are better for slippery indoor conditions; the harder, more rugged cleat-type sole is preferred for tough outdoor use.

Leather that covers the foot and ankle portion of the foot is preferred in most work environments. Rubber is satisfactory for wet conditions, but not with pesticides or petroleum However, when working in wet environments or around chemicals, oils, greases or pesticides, boots made of polyvinyl chloride (PVC), a blend of PVC and polyurethane, or neoprene will be used.

LEARNING HOW TO FALL

Naturally, the goal is not to slip, trip, and fall; however, the possibility of a fall still exists. There are correct ways to fall.

Recommended procedures are:

- Tuck your chin in, turn your head and throw an arm up/out. It is better-to land on your arm than on your head
- While falling, twist or roll your body to the side. It is better to land on your buttocks and side than on your back
- Keep your wrists, elbows and knees bent. Do not try to break the fall with your hands or elbows. When falling, the objective is to have as many square inches of your body contact the surface as possible, thus, spreading out the impact of the fall

SAFE LIFTING

Manually moving material can often be the cause of slips and falls. Attempting to move heavy or awkward shaped items can alter your center of gravity and result in slips or falls. These types of accidents often result in painful back injuries. In order to avoid these problems always follow safe lifting techniques.

POLICY

The company has adopted this policy to inform employees of the Spill Prevention and Response procedures. This ensures the safety and health of the employees.

EMPLOYER RESPONSIBILITIES

This Company will provide all affected employees with:

- Training on the company spill response procedures
- All necessary PPE
- Information on the proper disposal of spill clean-up materials

EMPLOYEE RESPONSIBILITIES

All employees will:

- Follow all spill response procedures
- Use and maintain the necessary PPE
- Report all spills, injuries, unsafe conditions or acts immediately

Failure to comply with this company procedure may result in disciplinary actions, up to and including termination.

PROCEDURES

Storage

This company requires that all chemical substances will be stored in the proper containers to minimize the potential for a spill. Whenever possible, chemicals will be kept in closed containers and stored so they are not exposed to storm water or adverse weather conditions.

SUBSTANCE IDENTIFICATION

The Company will ensure all chemicals used that could be spilled or released are recorded on the chemicals with potential spill or release list provided at the end of this chapter. The chemicals list will consist of both liquid chemicals used at the facilities of the Company or brought on to the sites of the owner client.

SPILL KITS

Spill kits must contain the appropriate supplies for the materials that that may be spilled. The supplies will be easily accessible when required and considerations will be made for both the type and quantity of materials.

Spill kits will include, but are not limited to, at least the following:

10 white absorbents for oil	Vermiculite or other absorbent
10 gray absorbents for all chemical spills	Broom and pan
Plastic bags with waste labels	Personnel protective equipment (gloves, goggles,dust/mist mask)
6 gallon empty recovery drum	

The company will ensure the availability of adequate spill response supplies by periodic inspection to assess their availability and adjust inventory as necessary.

SAFE PRACTICES

At all times, there will be one person on call (and available to respond to an emergency, who will be responsible for coordinating all hazardous waste emergency response measures.

This individual will be designated the On-Scene Coordinator, and will have the authority to mobilize all resources necessary to carry out procedures outlined in the plan. He or she will have knowledge of all hazardous waste generating operations and activities at the location and characteristics of hazardous waste, the location of records, and location of all emergency response and spill cleanup and control equipment.

In the event of a hazardous waste release the On-Scene Coordinator, or alternate, must be contacted immediately. A mobile communication system (i.e., telephone, radio, walkie-talkie, or cellular phone) will be available near the storage locations during transfer operations.

The On-Scene Coordinator must be informed of the nature and location of the spill and will direct the resources of manpower and equipment for the spill response action. The On-Scene Coordinator will remain in control for the duration of the response.

The Need of outside support (Larger Spills): The On-Scene Coordinator, or individual directed by the on- Scene Coordinator, will make the necessary contact with outside support and regulatory agencies.

Spill Events: In the event of an incident involving a large spill (greater than 1 gallon of hazardous material or 1 pint of acutely hazardous)

Alert the On-Scene Coordinator

The On-Scene Coordinator will immediately notify the Environmental Health and Safety Department. The On-Scene Coordinator will summon additional assistance, if necessary (local or state emergency response teams, Fire Depts. etc.). The On-scene coordinator will obtain the Material’s Safety Data Sheet (SDS) to determine the hazards and appropriate response activities. The SDS will be provided to emergency responders.

APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE)

Determine exact source of leak or spill, amount, and area affected by the release. After putting on personal protective equipment and after assessing the nature of the hazards and hazardous chemicals, remedy and stop the point source spill, if safe to do so. Stop spill material with standard industrial absorbent. Take the necessary action to keep the spill from spreading. Spread absorbent to surround and absorb the spilled material. Collect contaminated material (absorbent, rags, disposal suits, etc.) into a recovery drum and label for proper disposal.

DISPOSAL OF SPILL MATERIALS

Oil Spill Waste

Oil Spill Waste will be cleaned up using spill absorbent material, and drummed for off-site disposal. Free liquid is pumped into UN approved 30 or 55-gallon drums. The UTPA Environmental Protection Division, using an approved UT System Vendor, disposes of generated waste.

Hazardous Waste Releases

Immediately after an emergency The On-Scene Coordinator must provide for the treatment, storage or disposal of recovered waste, contaminated soil or surface water or any other material that results from a fire, explosion or other release at the facility.

HOUSEKEEPING

Areas where chemicals are used or stored must be maintained using good housekeeping best practices. This includes, but is not limited to clean and organized storage, labelling and secondary containment where necessary.

COMMUNICATION MEASURES

The emergency contacts will be summoned by telephone or directly in the event of a spill of any quantity either indoors or outdoors.

Emergency Contact Numbers will be posted at telephones located throughout the facility. The following information should be provided when reporting a spill:

- Identity of the caller
- Contact phone number
- Location of spill
- Type of product spilled
- Quantity spilled
- Extent of actual and/or potential water pollution
- Date and time of spill
- Cause of spill

TRAINING

The company will ensure that all employees will be instructed on the proper response procedures for spilled materials. This training will be provided by a person who is knowledgeable in the spill clean-up procedures and familiar with the chemicals used at the site, and their hazards. This training will include:

- Explanations of the chemicals on-site and their hazards
- The procedures and safe practices for performing a spill clean up
- The roles and responsibilities of the spill response program
- The proper care and use of all necessary PPE

Refresher Training

Refresher training will be conducted whenever:

- There are changes in workplace operations
- There are changes in equipment
- A worker can benefit from additional training because of a lack of knowledge or skill

Employees will be retrained whenever there is reason to believe they don't have the understanding and skill to avoid fall hazards and safely use the equipment.

Training Records

This company will create and maintain records of all employee training. These records will be retained for the length of their employment.

POLICY REVIEW

The company will review this policy at least annually, and whenever there are changes to our processes that can affect the procedures and safe practices.

ATTACHMENTS

- List of Chemicals with Potential of Spill or Release

LIST OF CHEMICALS WITH POTENTIAL OF SPILL OR RELEASE

Product or Brand Name	Manufacturer	Hazardous Ingredient

SCOPE

This chapter contains the requirements and safe practices for performing steel frame construction work. These safe practices will comply with all applicable regulations contained in OSHA 1926 Subpart R and/or any state and local regulations.

This chapter does not cover the construction of electrical transmission towers, communication and broadcast towers or tanks, or provide detailed information on fall protection, which are covered in separate chapters.

POLICY

This Company has adopted the following policy to protect employees engaged in steel framing construction work.

EMPLOYER RESPONSIBILITIES

This Company will:

- Train all employees on the safe practices of steel construction
- Provide all necessary PPE
- Develop a fall protection plan as required

EMPLOYEE RESPONSIBILITIES

All employees involved in steel frame construction will:

- Follow all Company safe practices
- Wear and maintain all required PPE
- Understand and follow the fall protection procedures as required
- Repost all unsafe conditions and acts immediately

HAZARDS

Employee engaged in steel construction work can be exposed to the following hazards:

- Cuts and abrasions – caused by sharp edges of burrs on material
- Flying particles – from saw or grinding operations
- Electrical shock – created by electrical sources encountering materials handled
- Noise – caused by drills, saws, and screw guns

PPE

Personal Protective Equipment (PPE) is required when performing steel framing work. This PPE may include:

- Gloves
- Hearing protection
- Safety glasses or goggles
- Rubber-soled work shoes or boots

- Hard hats
- Fall protection devices

SAFE PRACTICES

This Company requires all employees to follow our safe work practices when performing steel framing work.

Steel framing is a practical solution for many environmental conditions that builders can face when using traditional building materials. The strength and flexibility of structural cold-formed steel (CFS) framing make it ideal for construction in difficult environmental conditions.

Metal framing studs offer several benefits over conventional wooden construction studs, such as non-combustibility, termite resistance and dimensional stability. The steel studs are lightweight, strong, and uniformly straight and true. Metal-framed walls use a track or channel at the top and bottom to hold the studs in place, but the basic wall frame construction is the same.

Planning

Planning and layout design are key elements in steel framing. Only a structural engineer or other qualified person is permitted to develop the structural design.

All designs for steel framing will comply with the International Code Council's (ICC) International Building Code (IBC) and International Residential Code (IRC). The building codes also reference standards that have been developed by the American Iron and Steel Institute (AISI) to provide additional information for the design of steel structures.

NOTE: Commercial designs require an engineer's review and seal regardless of the material used for the construction.

MATERIALS

CFS Parts

Employees responsible for ordering steel framing materials must be knowledgeable regarding the specifications, applications and the various shapes of available components. All materials used must meet the requirements defined in the American Society for Testing and Materials (ASTM) documents: A653/653M, C645, C754, E488 and E1190.

Standard CFS parts are generally identified by the acronym STUFL, which stands for Stud, Track, U-channel, Furring and L-header.

- Stud includes wall studs, joists and rafters because they are all of the same shape
- Track is the top and bottom "plates" of a steel wall, or the rim of floors and rafters
- U-channel can be used for bridging and blocking, and customized for cabinet backing
- Furring channel is used as purlins, bridging, backing, and sound separation
- L-headers are brake metal-shaped members that can be doubled and used as headers

Fasteners

Unlike wood framing, the fasteners used for steel framing work are specialized. There are three head types and two-point styles commonly used for steel framing. They consist of:

- Head Types:
  - Hex heads are used if they won't be covered by drywall or sheathing
  - Pan heads are typically used where drywall or sheathing will be applied
  - Bugle heads are designed to countersink into material; these are ideal for installing drywall
- Point Styles:
  - Self-piercing when working with thinner material (like interior drywall studs)
  - Self-drilling when penetrating into the thicker, structural steel studs

Don't try nailing trim into steel studs. It will not hold. Instead, use specially designed trim screws for the job.

NOTE: Other specialized types of fasteners are available for certain applications and may require the use of pneumatic or powder-actuated tools. Please refer to the chapters on the use of those tools if necessary.

TOOLS

When working with CFS, the commonly used tools include:

- Screw gun (adjustable torque, 0-2500 rpm)
- Bits and bit holders for structural steel to steel connections
- Chop saw
- Pneumatic pin nailer for steel-to-steel connections and sheathing-to-steel connections
- Clamps
- Aviation snips
- Swivel-head electric shear
- Magnetic level
- Collated screw gun (if installing drywall)

NOTE: Always exercise caution when using power tools around framing materials. These items can have sharp edges that can cut electrical cords and create a shock hazard.

INSTALLATION

Steel framing may consist of different types of work ranging from light- gauge work to heavy-duty structural and roof that's performed at elevations. The Company will ensure that all necessary equipment, materials and PPE are present at the jobsite before work begins. Employees must wear eye protection when cutting steel and driving screws.

The Safety Coordinator will further ensure that all employees have been trained in the use of these of tools and equipment, including scaffolding and fall protection if required.

Layout

The job supervisor will review the design drawings at the site and establish how the layout and marking will be done. Layout will be done by a competent person who is:

- Capable of reading the design drawing
- Familiar with layout procedures to ensure all measurements are square

Track Placement

Once layout is complete, track installation can begin. Installers must ensure that the flooring surface is free of debris. Track installation will begin with the bottom track of outside walls and the interior walls of the greatest length. Top tracks will be plumbed and installed next.

Stud Layout

When track layout is complete, the next step is placement of the studs. Studs must be placed according to plan specifications and applicable building codes. When framing around door or window openings, ensure that drywall breaks meet the building design requirements.

NOTE: When working on scaffolding, the layout and installation of upper studs will be done in coordination with the lower studs, this will reduce the amount of scaffold movement required.

Stud Installation

Installing vertical studs consists of three steps:

- Insert the studs diagonally into the bottom and top track
- Slide the stud close to layout and twist into position with the soft (open) side facing the direction from which the layout was pulled
- Tap the stud into position, plumb with magnetic level, clamp and fasten to the track top and bottom on one side

Studs will be fastened to the top and bottom tracks on both sides. Studs must be installed in the same direction (open sides facing the same way), and the punch-outs will be lined up horizontally to allow plumbing or electrical routing.

NOTE: When installing wall framing that extends above the ceiling level, as seen in office structures with drop ceilings, temporary diagonal support of the framing may be required.

Ancillary Component Installation

During stud installation, it may be necessary to install other steel framing components such as:

- Deflection tracks – used to protect the wall finish from damage due to vertical deflection
- Sliders, bypass locking, or slap studs – used to frame inside corners where two walls meet
- Headers and sills – framing pieces for windows and doorways
- Flex-track – track pieces with predetermined relief cuts that allow the track to be bent to accommodate curved wall surfaces

NOTE: When framing, be sure to check design plans for places where toilet accessories, heavy cabinets or other items will be placed as these may require additional framing, blocking or strapping to support their weight, even with drywall on them.

TRAINING

This Company will provide training to employees on the following topics as required:

- Safe steel construction practices
- Care and use of all required PPE

- Safe practices for working on scaffolds (if required)
- Fall protection

Retraining

Employees will be retrained on the safe work practices at least annually, or as often required by applicable regulations. Additionally, employees will be required to attend retraining if observed violating the Company's' safe work practices.

Training Records

Training records will be kept for each employee to certify their completion of training and evaluation and will include the following information:

- The dates of the training sessions and evaluation
- A written description of the training program
- The names and qualifications of persons conducting the training or evaluation
- The names and job titles of all persons attending the training sessions
- Where the employee received safety training

All employee training records will be retained for the length of their employment.

POLICY

A SWPPP must be prepared before construction begins, ideally during the project planning and design phases. This is because much of the information required by the SWPPP is already part of the project design documentation, and because the design may need to be modified to incorporate controls during construction and post-construction. It may be completed at the end of the design phase or at the initiation of the construction phase prior to any activity with the potential to cause water pollution.

Implementation of the SWPPP begins when construction begins, typically before the initial clearing, grubbing, and grading operations, since these activities can usually increase erosion potential on the site. During construction, the SWPPP should be referred to frequently, and amended by the owner and contractors as changes occur in construction operations, which could have significant effects on the potential for discharge of pollutants.

SCOPE

Construction projects that disturb one acre or more of soil, or the project results in the disturbance of less than one acre but is part of a larger common plan of development or sale of one or more acres.

A local municipality may require a SWPPP for projects that require a grading permit or if it is determined that the project poses a significant water quality risk threat.

ASSESS CONSTRUCTION SITE AND PLANNED ACTIVITIES

The planning phase is the source of much of the information needed for the SWPPP. The basis for stormwater pollution control decisions is also made at this phase via the normal review process with the local municipality. Information to be collected includes contractor activities, disturbed areas and erosion potential, and site history.

CONTRACTOR ACTIVITIES

Information about contractor activities is required for the selection of proper BMPs. Details that should be recorded include:

- Equipment storage, cleaning and maintenance areas and activities
- Points of ingress and egress to the construction site
- Material loading, unloading, and storage practices and areas, including construction materials, building materials and waste materials
- Materials, equipment, or vehicles that may come in contact with stormwater

DISTURBED AREAS AND EROSION POTENTIAL

The physical condition of the site and adjacent areas should be reviewed. A project layout showing what is being constructed, limits of construction, project schedule, and existing features should be developed. Site characteristics including drainage patterns, soils, vegetation, surface water bodies, and steep or unstable slopes should be noted. A hydrology report, soils report, and a grading/drainage plan should be prepared

Physical conditions at the site will change as construction progresses. The SWPPP must be amended to address conditions as activities change at the site.

The hydrology reports should assess information such as drainage areas and patterns, rainfall information and expected run-on and runoff volumes and flow rates, etc. A soil report will identify soil constraints, design criteria, and soil stability. Both of these reports are used in the preparation of the preliminary grading and drainage plan. The grading and drainage plan should identify areas of cut and fill, slope during and after grading, protection of existing vegetation, and areas of soil disturbance. They also form the technical basis for selection of erosion and sediment control BMPs.

SITE HISTORY

Existing site characteristics such as vegetation, environmental features, and areas of historic contamination (natural and/or industrial or agricultural) should also be recorded on the project layout. Soil laboratory analysis may be required should prior contamination be suspected. The selection and implementation of construction BMPs will be affected by what existing features need to be protected or mitigated during construction.

IDENTIFY AND SELECT BMPS

The owner, the owner's design consultant, or the contractor, may select BMPs at the discretion of the owner. The contract between the owner and contractor should specify the responsibilities of the owner and contractor with regards to stormwater pollution control during construction. Owners must be aware that regardless of the contractual agreement between the owner and contractor with respect to BMP selection and SWPPP implementation, the owner is ultimately responsible for compliance with the General Permit.

A guide to selecting BMPs for construction activities is presented in the following sections.

BMPs are generally selected in a three-step process:

- Define BMP Objectives
- Identify BMP category
- Select appropriate BMPs

DEFINE BMPS OBJECTIVES

Selection and implementation of BMPs is based on the pollution risks associated with the construction activity. The pollution prevention objectives of BMPs are defined based on a review of information gathered during the assessment of the site and planned activities. Once defined, BMP objectives are developed and BMPs selected. The BMP objectives for construction projects are as follows:

CONTROL OF EROSION, AND DISCHARGE OF SEDIMENT:

Minimize Disturbed Areas: Only clear land which will be actively under construction in the near term (e.g., within the next 6-12 months), minimize new land disturbance during the rainy season, and avoid clearing and disturbing sensitive areas (e.g., steep slopes and natural watercourses) and other areas where site improvements will not be constructed.

Stabilize Disturbed Areas: Provide temporary stabilization of disturbed soils whenever active construction is not occurring on a portion of the site. Provide permanent stabilization during finish grade and landscape the site.

Protect Slopes and Channels: Safely convey runoff from the top of the slope and stabilize disturbed slopes as quickly as possible. Avoid disturbing natural channels. Stabilize temporary and permanent

channel crossings as quickly as possible and ensure that increases in runoff velocity caused by the project do not erode the channel.

Control Site Perimeter: Delineate site perimeter to prevent disturbing areas outside the project limits. Divert upstream run-on safely around or through the construction project. Local codes usually state that such diversions must not cause downstream property damage, or be diverted into another watershed. Runoff from the project site should be free of excessive sediment and other constituents. Control tracking at points of ingress to and egress from the project site.

Retain Sediment: Retain sediment-laden waters from disturbed, active areas within the site.

MANAGE NON-STORMWATER DISCHARGES AND MATERIALS:

Practice Good Housekeeping: Perform activities in a manner to keep potential pollutants from coming into contact with stormwater or being transported off site to eliminate or avoid exposure.

Contain Materials and Wastes: Store construction, building, and waste materials in designated areas, protected from rainfall and contact with stormwater runoff. Dispose of all construction waste in designated areas, and keep stormwater from flowing onto or off of these areas. Prevent spills and clean up spilled materials.

IDENTIFY BMP CATEGORIES

Once the BMP objectives are defined, identify the category of BMP best suited to meet each objective. The particular BMP selected from each category depends on specific site conditions, construction activities, and cost considerations.

There are six BMP categories available for selection. They are:

- Erosion Control (EC)
- Sediment Control (SE)
- Wind Erosion Control (WE)
- Tracking Control (TR)
- Non Stormwater Management (NS)
- Waste Management and Materials Pollution Control (WM)

BMPs for contractor activities are listed in the TR, NS, and WM categories. BMPs for erosion and sediment control are listed in the EC, SE, WE, and TR categories.

SELECT BMPS

BMPs for Erosion and Sediment Control

BMPs for erosion and sediment control are selected to meet the BMP objectives based on specific site conditions, construction activities, and cost. Various BMPs may be needed at different times during construction since activities are constantly changing site conditions.

Selection of erosion control BMPs should be based on minimizing disturbed areas, stabilizing disturbed areas, and protecting slopes and channels. Selection of sediment control BMPs should be based on retaining sediment on-site and controlling the site perimeter. Erosion and sediment control BMPs are listed in the EC, SE, WE, and TC categories.

BMPs for Contractor Activities

Certain contractor activities may cause pollution if not properly managed. BMPs should be selected based on the contractor activities information collected in the SWPPP. The materials and BMP objectives for contractor activities are practicing good housekeeping and containing materials and waste. BMPs for contractor activities are selected from the TR, NS and WM categories.

CONSIDERATIONS FOR SELECTING A BMP

Is it expected to rain? Selection of a BMP is different for the rainy season versus the dry season. What activities can be postponed or re-scheduled until after the rains or performed during the dry season?

How much water is being used? The more water used and wastewater generated, the more likely that pollutants transported by this water will reach the drainage system or be transported off site

What are the site conditions? BMPs may differ depending on whether the activity is conducted on a slope or flat ground near a drainage structure or watercourse. Conducting activities away from certain sensitive areas will reduce the cost and inconvenience of implementing BMPs

What about accidents? Controls for common activities should be established, and preparations should be made to allow for quick response to accidents or spills. In the event of a spill or exposure of construction compounds, what are the contingency plans for sampling the contaminated stormwater? Can the analysis be done in the field or should laboratory analysis be required? Are sample bottles available on-site, appropriate test strips, etc.?

SWPPP PREPARATION

The General Permit requires that the owner prepare a SWPPP for projects that will create one acre or more of soil disturbance. The General Permit also requires that the SWPPP applies to all areas that are directly related to the construction activity, including but not limited to staging areas, storage yards, material borrow areas, and access roads, etc. In some cases, the owner may enter into agreements with the contractor or stormwater quality professionals for preparation and implementation of the SWPPP.

However, owners must be aware that regardless of the contractual agreement between the owner and contractor with respect to BMP selections and SWPPP implementation, the owner is ultimately responsible for compliance with the General Permit. It is highly recommended that the owner and contractor jointly review the SWPPP during its development or during a pre-construction conference.

- The SWPPP is a document that addresses water pollution control during construction
- The SWPPP must be prepared and available on the project site before the project owner, developer, or contractor begins any activity with the potential to cause water pollution. The SWPPP must be available on site at all times and must be implemented year-round throughout the duration of the construction project
- The SWPPP must be completed before any construction activity starts. No construction activity having the potential to cause water pollution shall be performed until the SWPPP has been completed, certified, and appropriate BMPs have been implemented. Construction activities that will not threaten water quality, such as traffic control, may proceed without a complete SWPPP if allowed by the local agency
- The SWPPP should be directed at personnel on the construction project (e.g., supervisor, foreman, and inspectors). The SWPPP should provide specific guidance on actions to be taken by these personnel and should be presented in a format that accommodates day-to-day use (e.g., loose leaf, pullout sections, and checklists)
- The SWPPP should provide a simple narrative and diagram that locates the construction site, identifies potential pollutant sources on site, and shows the location of the BMPs to be used to minimize erosion and sedimentation during construction. It should also describe measures which eliminate or reduce pollution of stormwater runoff by any chemicals and materials used during the construction process. The level of detail will vary with the intensity, size, and type of construction

SWPPP IMPLEMENTATION: STAFF TRAINING

Training is imperative to the success of the BMPs identified in the SWPPP. Adequate training is required if these BMPs are to be installed and maintained properly. These BMPs will fail if not properly installed and maintained. Thus, only trained personnel should be assigned these responsibilities. A construction stormwater pollution prevention training program should be held for all construction personnel.

A good program will include:

- SWPPP Preparation Training. This training is geared towards owners, engineers, contractors, and water quality professionals involved in preparation and certification of SWPPPs. The training must cover all aspects of construction site water pollution control, including, SWPPP documentation and BMP selection
- SWPPP Implementation Training. This training is geared towards owners, contractors, superintendents, foremen, and key staff designated in the SWPPP as being responsible for certifications, inspections, monitoring, and project oversight

- The first training element must familiarize the individuals with the content and organization of the SWPPP, pollution control objectives, and responsibilities for pollution control, BMPs, inspection procedures, and monitoring procedures. The second training element must focus on the SWPPP for the particular project site for which the individual is responsible, including site-specific responsibilities, BMPs, and other measures
- BMP Implementation Training. This training is geared towards owners, contractors, superintendents, foremen, tradesmen, laborers, and for other staff that work on the construction site including subcontractors. The training should cover responsibilities for BMP implementation, how to implement BMPs, general good housekeeping, and protection of BMPs in place

Construction water pollution control training typically includes off-site and on-site training. Off- site training is most appropriate for SWPPP Preparation training with instruction provided by trade associations, colleges, Regional Boards, County, or other water quality professionals. SWPPP Implementation training can be conducted through a combination of off-site training for the general subjects, and on-site training for a site specific SWPPP, with instruction provided by trade associations, colleges, Regional Boards, Counties, water quality professionals, and experienced owner and contractor superintendents. BMP implementation training is usually conducted on the project site with instruction provided by experienced owner and contractors' superintendents and foremen.

Subcontractor employees can impact water quality and potentially jeopardize compliance with the General Permit, thus subcontractor staff must also receive appropriate training. The owner may wish to contractually require that subcontractors employ trained staff.

SITE INSPECTIONS

The General Permit requires inspections before and after a storm event, and once each 24-hour period during extended storm events, to identify BMP effectiveness and implement repairs or BMP changes as soon as feasible. At the onset of a construction project (e.g., clearing, grubbing, or earth movement) it may be more appropriate to perform inspection of the BMPs on a regular basis instead of just before and after a storm. This will allow sufficient time for any corrections or improvements to be made before the storm. An inspector should be identified in the SWPPP. Inspection can usually be performed as part of a regular oversight and inspection of the project site.

According to the General Permit, a tracking or follow-up procedure must follow an inspection that identifies deficiencies in the BMPs. The result of the inspection and assessment must be written. Include the date of the inspection, weather information, the person(s) who performed the inspection, observations, and descriptions of inadequate BMPs, and the corrective actions that were taken, such as BMPs that were fixed or additional BMPs that were implemented. Inspection records must be retained for three years from the date they were generated. It is highly recommended that records be retained for at least three years following the date coverage is terminated under the General Permit; even longer retention of records is recommended where sites have been subject to enforcement actions or are involved in litigation regarding issues covered by the permit.

BMP MONITORING

The type of BMP monitoring depends on which BMP is implemented. In the case of contractor activity BMPs, the monitoring consists of visual inspection to ensure that the BMP was implemented and maintained according to the SWPPP.

Such inspection would include:

- Looking for evidence of spills and resulting clean-up procedures (e.g., supplies of spill cleanup materials)
- Verifying adequacy of trash receptacles
- Verifying waste disposal practices (e.g., recycle vs. hazardous waste bins)
- Examining integrity and use of containment structures
- Verifying use of employee education programs for the various activities
- Noting the location of activity (e.g., outdoor vs. indoor, concrete vs. grass)
- BMPs for any chemicals or fuels not addressed in the SWPPP must be developed

In the case of erosion and sediment control BMPs, the monitoring program should consist of regular inspection to determine the following:

Are erosion and sediment control BMPs installed properly? The SWPPP BMPs should include details or references to allow for the proper construction of structural or vegetative erosion and sediment control devices. The inspector should ensure that these systems are installed according to the SWPPP in the proper locations

Are the BMPs effective? The effectiveness of the BMP would be based on the presence of sediment behind or within control devices, the presence of sediment downstream of the site, and signs of erosion in stabilized areas after a storm event

Have drainage patterns changed? If the site has undergone significant grading operations, resulting in a change of drainage patterns, adjustment to the BMPs will likely be required to address this change. The inspector shall determine the extent of changes to the drainage pattern and the necessity for additional or reconfigured BMPs

Are areas stabilized as quickly as possible after completion of construction activities in an area? Disturbed active and inactive construction areas (inactive construction areas may be defined as areas in which no construction activity will occur for a period of 30 days or longer) should be stabilized as soon as practical. If construction, climatological, or other site conditions do not allow stabilization, the SWPPP should define alternative approaches

Are the BMPs properly maintained? Maintenance of erosion and sediment control BMPs is critical. Erosion controls should be installed as soon as practical after an area becomes inactive, and before the onset of rain. The capacity of sediment controls must be restored prior to the next rain event

BMP MAINTENANCE

The inspector should inspect the site on a regular basis, during and after any storm generating runoff to determine maintenance requirements and general condition of the installed system. The local agency may also inspect the site on a routine basis to assess the maintenance performed on the systems. All maintenance related to a storm event should be completed within 48 hours of the storm event. The following maintenance tasks should be performed on a regular basis:

- Removal of sediment from barriers and sedimentation devices
- Replacement or repair of worn or damaged silt fence fabrics
- Replacement or repair of damaged structural controls
- Repair of damaged soil stabilization measures.
- Other control maintenance as defined in each BMP fact sheet.

STORMWATER POLLUTION CONTROL DOCUMENTATION

Records of inspections, compliance certifications, and non-compliance reporting are to be retained for at least three years by the owner. It is suggested that records of incidents such as spills or other releases be kept. Analyzing a history of this information can provide insight into modifying the BMPs. Photographs should also be kept.

Keep a record of maintenance activities or any other BMPs that are of an action nature. Activity based BMPs such as Good Housekeeping must be documented in each inspection; often, this documentation is the only evidence that the BMPs have been implemented.

EROSION CONTROL

Scheduling EC-1

Developing a written plan sequencing construction activities and other BMPs while considering the local climate to reduce the amount and duration of exposed soil through activities such as vehicle use.

Preservation of Existing Vegetation EC-2

Carefully planned preservation of existing vegetation such as trees, vines, shrubs and grasses to protect the soil from erosion.

Hydraulic Mulch EC-3

Applying a mixture of shredded wood fiber or a hydraulic matrix, and a stabilizing emulsion or tackifier with hydro-mulching equipment, which temporarily protects exposed soil from rain or wind.

Hydroseeding EC-4

Applying a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydro-mulch equipment, to temporarily protect exposed soils from erosion by water and wind.

Soil Binders EC-5

Applying and maintaining a soil stabilizer to exposed soil surfaces to temporarily prevent water and wind erosion of exposed soils on construction sites.

Straw Mulch EC-6

Placing a uniform layer of straw and incorporating it into the soil with a studded roller or anchoring it with a tackifier stabilizing emulsion. Straw mulch protects the soil surface from the impact of raindrops, preventing soil particles from becoming dislodged.

Geotextiles and Mats EC-7

Mattings of natural materials are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Matting may be used to stabilize soils until vegetation is established.

Wood Mulching EC-8

Applying a mixture of shredded wood mulch, bark, or compost to disturbed soils. The primary function of wood mulching is to reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff.

Earth Dikes and Drainage Swales EC-9

A temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dikes and drainage swales are used to divert off site runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

Velocity Dissipation Devices EC-10

Rock, grouted riprap, or concrete rubble, which placed at the outlet of a pipe or channel to prevent scour of the soil caused by concentrated, high velocity flows.

Slope Drains EC-11

A pipe that directs surface runoff or groundwater into a stabilized watercourse, trapping device, or stabilized area. Slope drains are used with earth dikes and drainage ditches to intercept and direct surface flow away from slope areas to protect cut or fill slopes.

Streambank Stabilization EC-12

Stream channels, stream banks, and associated riparian areas are dynamic and sensitive ecosystems that respond to changes in land use activity. Stream bank and channel disturbance resulting from construction activities can increase the stream's sediment load, which can cause channel erosion or sedimentation and have adverse effects on the biotic system. BMPs can reduce the discharge of sediment and other pollutants to minimize the impact of construction activities on watercourses. Streams may require numerous measures to prevent any increases in sediment load to the stream.

Polyacrylamide EC-13

Polyacrylamide (PAM) can be applied to disturbed soils at construction sites to reduce erosion and improve settling of suspended sediment.

PAM increases the soil's available pore volume, increasing infiltration and reducing the quantity of stormwater runoff that can cause erosion. Suspended sediments from PAM treated soils exhibit increased flocculation over untreated soils. The increased flocculation aids in their deposition, thus reducing stormwater runoff turbidity and improving water quality.

SEDIMENT CONTROL

Sediment control uses passive systems to filter or settle already detached soil particles out of the water or wind.

These BMPs intercept and slow or detain the flow of stormwater so sediment can settle and be trapped.

Sediment control practices can consist of installing linear sediment barriers (such as silt fence, sandbag barrier, and straw bale barrier); providing fiber rolls, gravel bag berms, or check dams to break up slope length or flow; or constructing a sediment trap or sediment basin. Linear sediment barriers are typically placed below the toe of exposed and erodible slopes, down-slope of exposed soil areas, around soil stockpiles, and at other appropriate locations along the site perimeter.

A few BMPs may control both sediment and erosion, for example, fiber rolls and sand bag barriers. These BMPs are either erosion control (EC) or sediment control (SC) based on the BMPs most common and effective use.

Sediment control BMPs are most effective when used in conjunction with erosion control BMPs. The combination of erosion control and sediment control is usually the most effective means to prevent sediment from leaving the project site and potentially entering storm drains or receiving waters.

Under limited circumstances, sediment control, alone may be appropriate. For example, applying erosion control BMPs to an area where excavation, filling, compaction, or grading is currently under way may not be feasible when storms come unexpectedly. Using sediment controls to establish a perimeter controls may be appropriate provided the following conditions are met:

- Weather monitoring is under way
- Inactive soil-disturbed areas have been protected with an effective combination of erosion and sediment controls
- An adequate supply of sediment control materials is stored on-site and there are sufficient forces of labor and equipment available to implement sediment controls on the active area prior to the onset of rain
- A Stormwater Pollution Prevention Plan (SWPPP) adequately describes the methods to protect active areas

Silt Fence SE-1

A filter fabric that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

Sediment Basin SE-2

A temporary basin formed by excavation or by constructing an embankment so that sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out before the runoff is discharged.

Sediment Trap SE-3

A containment area where sediment-laden runoff is temporarily detained under quiescent conditions, allowing sediment to settle out or before the runoff is discharged. Sediment traps are formed by excavating or constructing an earthen embankment across a waterway or low drainage area.

Check Dams SE-4

A small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or reusable products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing the velocity of flowing water, allowing sediment to settle and reducing erosion.

Fiber Rolls SE-5

Straw, flax, or other similar materials bound into a tight tubular roll. When fiber rolls are placed at the toe and on the face of slopes, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff. By interrupting the length of a slope, fiber rolls can also reduce erosion.

Gravel Bag Berm SE-6

A series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flows, preventing erosion.

Street Sweeping and Vacuuming SE-7

Self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

Sandbag Barrier SE-8

A series of sand-filled bags placed on a level contour to intercept sheet flows. Sandbag barriers pond sheet flow runoff, allowing sediment to settle out.

Straw Bale Barrier SE-9

A series of straw bales placed on a level contour to intercept sheet flows. Straw bale barriers can pond sheet runoff, which allows sediment to settle out.

Storm Drain Inlet Protection SE-10

A sediment filter or an impounding area around or upstream of a storm drain, drop inlet, or curb inlet. Storm drains inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction.

Chemical Treatment SE-11

The application of chemicals to stormwater to aid in the reduction of turbidity caused by fine suspended sediment.

WIND EROSION CONTROL

Applying water or other dust palliatives to prevent or alleviate dust nuisance. In addition to the following Wind Erosion Control WE-1, the following erosion controls also control wind erosion.

- Preservation of existing vegetation EC-2
- Hydraulic Mulch EC-3
- Hydroseeding EC-4
- Soil Binders EC-5
- Straw Mulch EC-6
- Geotextiles and Mats EC-7

Wind Erosion Control WE-1

Wind erosion or dust control consists of applying water or other dust palliatives as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

TRACKING CONTROL

Preventing or reducing the tracking of sediment off-site by vehicles leaving the construction area. Dirty streets and roads near a construction site create a public nuisance.

Stabilized Construction Entrance/Exit TC-1

A point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

Stabilized Construction Roadway TC-2

Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion, and control dust.

Entrance/Outlet Tire Wash TC-3

An area located at stabilized construction access points to remove sediment from tires and under carriages and to prevent sediment from being transported onto public roadways.

NON-STORMWATER MANAGEMENT

Only stormwater and authorized non-stormwater discharges should be discharge from the construction site. Necessary non-stormwater discharges include: irrigating vegetative control measures, pipe flushing and testing, and street cleaning.

Non-stormwater BMPs are source controls that prevent pollution by limiting or reducing potential pollutants at their source or eliminating off-site discharge. They also minimize or eliminate the discharge of pollutants from vehicle and equipment cleaning, fueling, and maintenance operations to stormwater drainage systems or watercourses.

These BMPs will be implemented according to the conditions and applicability.

Water Conservation Practices NS-1

Activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

- Keep water equipment in good working condition
- Stabilize water truck filling area
- Repair water leaks promptly
- Washing of vehicles and equipment on the construction site is discouraged
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required
- Direct construction water runoff to areas where it can soak into the ground or be collected and reused
- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs
- Lock water tank valves to prevent unauthorized use

Dewatering Operations NS-2

Managing the discharge of pollutants when non- stormwater and accumulated precipitation must be removed from a work location so that construction work may be accomplished.

- Sediment Basin (See also SE-2). A temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are generally larger than Sediment Traps (SE-3).
- Sediment Trap (See also SE-3). A temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are generally smaller than Sediment Basins (SE-2).
- Weir Tanks. Separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

- Dewatering Tanks. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.
- Gravity Bag Filter. Also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects sand, silt, and fines.
- Sand Media Particulate Filter. Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.
- Pressurized Bag Filter. A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.
- Cartridge Filter. Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Paving and Grinding Operations NS-3

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent run-on and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

Temporary Stream Crossing NS-4

A temporary stream crossing is a temporary culvert, ford or bridge placed across a waterway to provide access for construction purposes for a period of less than one year. Temporary access crossings are not intended to maintain traffic for the public. The temporary access will eliminate erosion and downstream sedimentation caused by vehicles.

Clear Water Diversion NS-5

Clear water diversion consists of a system of structures and measures that intercept clear surface water runoff upstream of a project, transport it around the work area, and discharge it downstream with minimal water quality degradation from either the project construction operations or the construction of the diversion.

Clear water diversions are used in a waterway to enclose a construction area and reduce sediment pollution from construction work occurring in or adjacent to water. Structures commonly used as part of this system include diversion ditches, berms, dikes, slope drains, rock, gravel bags, wood, aqua barriers, cofferdams, filter fabric or turbidity curtains, drainage and interceptor swales, pipes, or flumes.

- Filter Fabric Isolation Technique. A filter fabric isolation structure is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in or adjacent to water. This structure is composed of filter fabric, gravel bags, and steel t-posts.

- Turbidity Curtain Isolation Technique. A turbidity curtain is a fabric barrier used to isolate the near shore work area. The barriers are intended to confine the suspended sediment. The curtain is a floating barrier, and thus does not prevent water from entering the isolated area; rather, it prevents suspended sediment from getting out.
- K-Rail River Isolation. This temporary sediment control or stream isolation method uses K-rails to form the sediment deposition area, or to isolate the in-stream or near-bank construction area. Barriers are placed end-to-end in a pre-designed configuration and gravel-filled bags are used at the toe of the barrier and at their abutting ends to seal and prevent movement of sediment beneath or through the barrier walls.
- Stream Diversions. The selection of which stream diversion technique to use – pumped diversion, excavated channels and flumes - will depend upon the type of work involved, physical characteristics of the site, and the volume of water flowing through the project.

Illicit Connection/Discharge NS-6

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Potable Water/Irrigation NS-7

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Vehicle and Equipment Cleaning NS-8

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

Vehicle and Equipment Fueling NS-9

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

Vehicle and Equipment Maintenance NS-10

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a “dry and clean site”. The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

Pile Driving Operations NS-11

The construction and retrofit of bridges and retaining walls often include driving piles for foundation support and shoring operations. Driven piles are typically constructed of precast concrete, steel, or timber. Driven sheet piles are also used for shoring and cofferdam construction. Proper control and use of equipment, materials, and waste products from pile driving operations will reduce or eliminate the discharge of potential pollutants to the storm drain system, watercourses, and waters of the United States.

Concrete Curing NS-12

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. Proper procedures reduce or eliminate the contamination of stormwater runoff during concrete curing.

Concrete Finishing NS-13

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

Material Over Water NS-14

The proper use, storage, and disposal of materials and equipment on barges, boats, temporary construction pads, or similar locations that minimize or eliminate the discharge of potential pollutants to a watercourse.

Demolition Adjacent To Water NS-15

Protecting water bodies from debris and wastes associated with structure demolition or removal over or adjacent to watercourses.

Temporary Batch Plants NS-16

The construction of roads, bridges, retaining walls, and other large structures in remote areas, often requires temporary batch plant facilities to manufacture Portland Cement Concrete (PCC) or asphalt cement (AC). Temporary batch plant facilities typically consist of silos containing fly ash, lime, and cement; heated tanks of liquid asphalt; sand and gravel material storage areas; mixing equipment; above ground storage tanks containing concrete additives and water; and designated areas for sand and gravel truck unloading, concrete truck loading, and concrete truck washout.

Proper control and use of equipment, materials, and waste products from temporary batch plant facilities will reduce the discharge of potential pollutants to the storm drain system or watercourses, reduce air emissions, and mitigate noise impacts.

WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL

Waste management and materials pollution control BMPs, like non-stormwater management BMPs, are source control BMPs that prevent pollution by limiting or reducing potential pollutants at their source before they come in contact with stormwater. These BMPs also involve day-to-day operations of the construction site, are under the control of the contractor, and are additional “good housekeeping practices” which involve keeping a clean, orderly construction site.

Waste management consists of implementing procedural and structural BMPs for handling, storing, and disposing of generated waste including: solid, sanitary, concrete, hazardous, and equipment related waste.

Materials pollution control consists of implementing procedural and structural BMPs in the handling, storing, and the use of construction materials. The BMPs are intended to prevent the release of pollutants during stormwater and non-stormwater discharges.

The objective is to prevent or reduce the opportunity for contamination of stormwater runoff from construction materials by covering and/or providing secondary containment of storage areas, and by taking adequate precautions when handling materials. These controls must be implemented for all applicable activities, material usage, and site conditions.

Material Delivery and Storage WM-1

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in a designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

Material Use WM-2

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

Stockpile Management WM-3

Stockpile Management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, paving materials such as Portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called “cold mix” asphalt), and pressure treated wood.

Spill Preventions and Control WM-4

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

- Vehicle and Equipment Maintenance
  - If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills
  - Regularly inspect onsite vehicles and equipment for leaks and repair immediately
  - Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite
  - Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids
  - Place drip pans or absorbent materials under paving equipment when not in use
  - Use absorbent materials on small spills rather than hosing down or burying the spill
  - Remove the absorbent materials promptly and dispose of properly
  - Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
  - Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater
  - Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters
  - Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking
- Vehicle and Equipment Fueling
  - If fueling must occur, onsite, use designated areas, located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills
  - Discourage "topping off" of fuel tanks
  - Always use secondary containment, such as a drain pan, when fueling to catch spills/leaks

Solid Waste Management WM-5

Prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

Hazardous Waste Management WM-6

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

Contaminated Soil Management WM-7

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

Concrete Waste Management WM-8

Prevent or reduce the discharge of pollutants to stormwater from concrete waste by conducting washout offsite, performing onsite washout in a designated area, and training employee and subcontractors.

Sanitary/Septic Waste Management WM-9

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

Liquid Waste Management WM-10

Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.

SCOPE

This chapter contains information on the requirements and safe practices to be followed when working on or around forklifts, including variable reach trucks, known as telescoping handlers or telehandlers telehandlers. These practices will comply with OSHA regulation 1910.178 regarding Powered Industrial Truck operations. This information covers the use of telehandlers, it does not cover the safe practices for other types of forklifts, which are covered in a separate chapter.

POLICY

This Company has established this policy to protect its employees engaged in the use of telehandlers. Telehandlers resemble forklifts, but work as a cross between a forklift and a crane. Each operator must be competent to operate the equipment safely, as demonstrated by the successful completion of the training and evaluation specified in regulations.

EMPLOYER RESPONSIBILITIES

It is the responsibility of the employer to:

- Select and purchase equipment compliant with relevant regulations and safety standards
- Ensure safe operation of telehandlers in the workplace
- Designate areas to store fuel and batteries, change and charge batteries, and maintain telehandlers safely, including equipment to prevent and respond to hazard exposure
- Ensure operators and those maintaining the equipment are 18 or older, trained and competent in safety practices. Exceptions for trainees over 18 are permitted
- Provide a safe work environment, free from hazards to employees

EMPLOYEE RESPONSIBILITIES

Company employees are expected to:

- Be aware of hazards associated with telehandlers
- Store and handle fuel and batteries in a safe manner, according to established safe procedures
- Actively participate in all training relevant to their position
- Operate telehandlers safely, according to all relevant standards and regulations
- Report potentially hazardous situations or maintenance concerns as soon as safely possible
- Load and unload telehandlers in a safe manner

SAFE PRACTICES

Design and Construction Requirements

All telehandlers will meet approved design and construction requirements for trucks of their type.

Labels, Nameplates, Markings

Any telehandler in use will bear a label that indicates approval by a nationally recognized testing lab. This durable, corrosion-resistant nameplate must be inscribed with the following information:

- Model and serial number
- Weight
- Designation of compliance with the mandatory requirements applicable to the manufacturer
- Type designation to show conformance with requirements
- Capacity

Before employees operate a telehandler, they must demonstrate the ability to read and interpret the nameplate to prevent overloading or other improper use.

Modifications and Attachments

Any modification or addition to telehandlers that will affect capacity or safe operation requires written approval from the original manufacturer. If equipped with an after-market attachment, changes to capacity plates, decals, tags, manuals, etc. must reflect the changes.

SAFETY GUARDS

Overhead Guard

An overhead guard helps protect the operator against falling objects, but is likely not to protect the user from the impact of a falling capacity load.

Vertical Load Backrest Extension

A load backrest extension prevents the load from shifting back when the carriage is lifted and will be used when necessary to prevent any part of a load from falling rearward.

Seat Belts

If the vehicle is equipped with a seat belt or any operator restraint system designed to contribute to the safe operation will be used by the operator.

Longitudinal Load Moment Indicator or Longitudinal Load Moment Control

The Longitudinal Load Moment Indicator (LLMI) senses the load imposed on the back axle and warns the operator when forward stability is approaching its limits, but not lateral stability or stability to the rear. Newer telehandlers may be equipped with a Longitudinal Load Moment Control (LLMC). An LLMC works similarly to a LLMI, but an LLMC will block motion that will further destabilize the handler.

Other Safety Guards

Telehandlers may be equipped with a range of other devices designed to contribute to safe operation. Employees will maintain all safety equipment in good repair, and operators must understand their use. These devices include, but are not limited to the following:

- Horns
- Flashing warning lights
- Backup alarms
- Directional signals
- Fire extinguisher
- Mirrors

TYPES OF TELEHANDLERS

Telehandlers come in a range of configurations, with different power sources, safety features and means of operation. The cab and boom on some telehandlers are mounted on a rotating superstructure. Some are equipped with stabilizers or outriggers to help ensure stability. Workers must be trained on the equipment they will be using to ensure they are familiar with all of the controls and the safe work procedures specific to the equipment.

Telehandler Designations and Operating Locations

Workplace hazards may limit where the telehandler may be operated at the worksite. Internal combustion engines and electric motors may ignite flammable atmospheres. This Company will follow restrictions on units in potentially hazardous environments. Only approved handlers may be operated in hazardous environments.

Designations

In addition to classification based on its configuration, use and features, telehandlers are categorized based on safety features and power sources to indicate the potentially hazardous locations where the handler may be used. Any environment where employees operate telehandlers must allow for safe use.

Internal Combustion Engines

Telehandlers powered by internal combustion engines run on a variety of fuels, including gasoline, diesel fuel, liquid petroleum gas (LPG), and compressed natural gas. Telehandlers with internal combustion engines can be quickly refueled but require regular maintenance checks for leaks of fuel or oil and worn parts to keep systems working properly. Equipment powered by internal combustion engines used indoors may increase worker exposure to exhaust and noise.

Safeguards to exhaust, fuel and electrical systems, as well as electrical equipment limitations and temperature limitation features allow internal combustion engine units in certain designated locations.

Electric

Electric-powered telehandlers are most commonly used indoors in warehouses. Unlike internal fuel powered handlers, electric powered units are quiet and generally non-polluting but present other hazards to address, specifically related to batteries and their charging.

Safeguards to the electrical system, motors, fittings and equipment, and special construction must still be in place for operation of such handlers in certain locations.

OPERATING ENVIRONMENT CONCERNS

Lighting

If lighting is less than two lumens/ft^2 the handler will be equipped with directional lighting.

Noxious Gases and Fumes

Telehandlers with internal combustion engines produce exhaust and fumes that may be hazardous to forklift operators and other employees. The concentration of carbon monoxide gas must not exceed 50ppm or the levels specified by OSHA, whichever is less. Units powered by an internal combustion engine require well-ventilated areas.

Trucks and Railroad Cars

Operators must take the following precautions when loading or unloading from trucks or railroad cars to ensure safety:

- The brakes of highway trucks will be set and wheel chocks placed under the rear wheels to prevent the trucks from rolling when boarded by a telehandler
- Wheel stops or other recognized positive protection must prevent railroad cars from moving during loading or unloading operations
- Fixed jacks may be necessary to support a semitrailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor
- Positive protection must prevent railroad cars from moving while dockboards or bridge plates are in position

Dockboards or bridgeplates in use must be strong enough to carry the load driven over them.

Maintenance and Related Concerns

Policy requires all equipment to remain in good repair and for operators to use equipment in an always-safe manner. Any telehandler not in safe operating condition must be removed from service so authorized personnel may repair it. All maintenance, refueling and battery charging will be performed in a way to ensure the safety of employees.

Pre-operation Inspection

Telehandlers will be examined daily or after each shift and before being placed in service. Operators must report any defects when found so an authorized person can service the unit appropriately. A pre-operation daily checklist should be available from its manufacturer.

Visual Check

Before starting the vehicle, an operator must conduct a pre-operation inspection to check a variety of items, including but not limited to:

- Fluid levels — oil, water, and hydraulic fluid
- Leaks, cracks or any other visible defect including hydraulic hoses and mast chains. Operators should not place their hands inside the mast. Use a stick or other device to check chain tension
- Tire condition and pressure including cuts and gouges
- Condition of the forks, including the top clip retaining pin and heel
- Load backrest extension
- Finger guards

- Safety decals and nameplates. Ensure all warning decals and plates are in place and legible. Check that information on the nameplate matches the model and serial numbers and attachments
- Operator manual and legible nameplate
- Operator compartment. Check for grease and debris
- All safety devices are working properly including the seat belt

In addition to this general inspection, operators must check forklift-specific features for safety.

Operational Check

After completing the pre-operation inspection, operators should conduct an operational inspection with the engine running. This inspection includes:

- Accelerator linkage
- Inch control (if equipped)
- Brakes
- Steering
- Drive control: forward and reverse
- Tilt control: forward and back
- Hoist and lowering control
- Attachment control
- Horn
- Lights
- Backup alarm (if equipped)
- Hour meter

Operators must report unusual noises or vibrations, leaks and unusual operating behavior immediately for repair.

GASOLINE, DIESEL AND LIQUID PETROLEUM GAS

Handling and Storage

Gasoline, diesel fuel and liquefied petroleum gases on premises will be stored and handled according to regulations and NFPA standards.

Refueling

Gas and Diesel: Refueling with gasoline or diesel presents the potential hazard of exposure to explosive fumes. Refueling will be restricted to designated safe locations, preferably outdoors, and the operator will adhere to the following requirements and recommended practices:

- Stop the engine during refueling
- Do not smoke while refueling
- Do not allow the forklift to become low on fuel or run out of fuel. Sediment or other impurities in the tank drawn into the fuel system can cause difficulties in starting and damage internal components
- Fill the fuel tank at the end of each day
- Do not fill the tank to the top; it may overflow because fuel expands as it is heated

Follow correct refueling procedures:

- Park the forklift in the designated refueling area
- Place the transmission in Neutral
- Lower the forks to the ground
- Engage the parking brake

- Shut off the engine
- Open the filler cap
- Fill the tank slowly (if spillage occurs, wipe off and wash area with water)
- Close the filler cap

Liquid petroleum gas: Liquid petroleum gas (LPG) is a commonly used fuel for forklifts. It is a safe fuel when handled properly. However, LPG is extremely flammable and extremely cold when exposed to atmosphere. When handled improperly, it can cause serious injury or death.

Areas to refuel LPG-powered units must permit vapors to dissipate and must be away from heat sources. Only authorized personnel should replace LPG containers.

Changing and Charging Batteries

The lead-acid batteries that power electric handlers require routine charging. If battery-powered handlers are used, the safety coordinator will work with the appropriate personnel to develop facility-specific safety procedures based on manufacturer's recommendations and the following guidelines:

- The operator will position the telehandler and apply breaks before the battery may be changed or charged
- Appropriate lifting equipment must be used to lift the battery
- Authorized personnel should only pour acid into water when charging batteries, never the other way around
- Care will be taken to assure that vent caps are functioning. The battery (or compartment) cover(s)will be open to dissipate heat
- Individuals should remove metal jewelry before charging or servicing batteries, and keep all other metallic objects from the top of uncovered batteries
- Appropriate PPE should be worn
- Check the water level. Do not add water before recharging. Record in service log
- Check the voltage. If the battery has sealed vents, do not recharge with a current greater than 25 amperes
- Unplug and turn off the charger before connecting or disconnecting the clamp connections
- Attach the positive clamp (+, usually colored red) to the positive terminal first and then the negative clamp (–, usually colored black) to the negative terminal, keeping the proper polarity
- Turn off the charger if the battery becomes hot or the electrolyte fluid comes out of the vents. Restart charging at a lower charging rate
- Check water level after charging. Add distilled water or de-ionized water if water level is below level indicator. Record in service log
- Return battery to forklift with lifting beam and secure in place after charging
- Check the indicator on the hour meter to see that battery is fully charged

Under normal operating conditions, forklift batteries remain in service for 2,000 charge/discharge cycles. The battery maintenance program is designed to increase the life of the batteries and help protect employees.

Battery failure could lead to mechanical breakdowns and possible accidents involving forklift operators and/or other personnel.

- Do not continue a battery in service merely because it continues to deliver power
- Do not exceed the service hours in the manufacturer's recommendations
- Do not overcharge or undercharge batteries
- Avoid discharging batteries beyond the manufacturer's discharge level. This can result in permanent battery damage and shorten battery life considerably
- Warning signs of a low battery include slow starting, dim headlights, and the ammeter indicating discharge at high RPM
- Recycle or properly dispose of batteries. Spent batteries are a hazardous waste unless properly reclaimed at a lead smelter or battery recycler

Appropriate precautions to control the hazards from battery acid include appropriate PPE and a detailed safety procedure to respond to an acid splash or spill.

Facilities

Only charge batteries in areas designated for that purpose, which will be equipped with any material handling equipment necessary for safe handling and servicing of batteries. Smoking and any other ignition source are forbidden in battery charging areas, including but not limited to open flames, sparks, or electric arcs.

Facilities will be provided as needed for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by vehicles, and for adequate ventilation for dispersal of fumes from gassing batteries.

A fully equipped battery charging area will have:

- No smoking
- Warning signs posted
- Adequate fire protection
- Ample and readily available water supply for flushing and neutralizing spilled electrolyte
- An eyewash able to provide a 15 minute flow
- (For large installations, there should be a plumbed drench shower and an eyewash.)
- A phone or other means of communication in the event of an emergency
- Adequate ventilation to avoid the buildup of hydrogen gas during battery charging
- Soda ash or other neutralization materials in the immediate area
- A dry chemical, CO_2 or foam fire extinguisher
- Means to protect charging apparatus from damage from vehicles

Other Maintenance Concerns

- Make repairs only in designated locations, away from fire hazards, never in class I, II or III locations
- Replacement parts for handlers must be equivalent to the original parts in terms of safety and not alter the units configuration
- Keep open flames away from batteries and fuel tanks and disconnect the battery before making any electrical system repair
- Any alteration, removal or addition of parts, or change in their configuration must be in accordance with manufacturer recommendations, and should generally not be undertaken

- The telehandler manufacturer must approve additional counterweighting
- Water mufflers will be filled daily or as frequently as is necessary to prevent depletion of the supply of water below 75 percent of the filled capacity
- Vehicles with mufflers having screens or other parts that may become clogged must not be operated while such screens or parts are clogged
- Personnel will immediately remove from service any vehicle that emits hazardous sparks or flames from the exhaust system until appropriate service and repair eliminates the cause for the emission of sparks or flames
- Personnel will remove a telehandler from service when the temperature of any part exceeds normal operating temperature until appropriate service and repair eliminates the cause for overheating
- Employees must keep handlers in a clean condition, free of lint, excess oil, and grease. Employees will use only noncombustible agents to clean handlers
- Telehandlers approved for gasoline may be converted to use liquefied petroleum gas fuel provided the complete conversion results in a unit that embodies the features specified for LP or LPS designated vehicles
- Ensure tires are inflated to the appropriate pressure. Only replace tires with tires from the same manufacturer, of the same rating and size

SLOW YOUR ROLL!

Telehandler operators must slow down in the following situations:

1. When approaching within three vehicle lengths of another unit
2. At cross aisles and anywhere vision is obstructed
3. On grades
4. When going too fast to come to a safe stop.
5. On wet or slippery floors
6. On dockboards or bridgeplates
7. Approaching elevators
8. Negotiating turns

TELEHANDLER OPERATIONS

Operators must adhere to the following rules to ensure safe operation.

General Safe Operations

- Do not drive handlers up to anyone standing in front of a fixed object
- Do not stand or pass under the elevated portion of any handler, whether loaded or empty
- Do not permit unauthorized personnel to ride. Regulations only permit passengers when they have a safe place to ride
- Keep arms and legs away from between the uprights of the mast or outside the running lines of the handler
- Maintain a safe distance from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Do not use telehandlers to open or close freight doors
- There must be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.
- Keep fire aisles, access to stairways, and fire equipment clear

Maneuvering and Traveling

- Operators will observe all traffic regulations, including speed limits, and will maintain a safe distance (approximately three vehicle lengths) from a unit ahead. Keep the handler under control at all times
- Operators must yield right of way to ambulances, fire trucks, or other vehicles in emergencies
- Do not pass other vehicles traveling in the same direction at intersections, blind spots, or other dangerous locations
- The driver will slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load obstructs forward view, the driver must travel with the load trailing
- Cross railroad tracks diagonally wherever possible. Park no closer than 8 feet from the center of railroad tracks
- Look in the direction of, and keep a clear view of the path of travel
- Ascend or descend grades slowly
- When ascending or descending grades in excess of 10 percent, drive loaded handlers with the load upgrade
- On grades, tilt back load engaging means and raise the load to clear the road surface
- Under all travel conditions, operate the handler at a speed that will permit it to be brought to a stop in a safe manner
- No stunt driving or horseplay
- The driver must slow down for wet and slippery floors
- Drive over dockboard or bridgeplates carefully and slowly, never exceed rated capacity
- Approach elevators slowly, entering them squarely only after the elevator car is properly leveled. Once on the elevator, neutralize controls, shut off power, and set brakes
- Enter confined areas with load end forward
- Avoid running over loose objects on the roadway surface
- While negotiating turns, reduce speed to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, turn the hand steering wheel only at a moderate, even rate

Stability

The stability of a telehandler is impacted by a range of factors, including, but not limited to the following:

- Condition of the ground
- Vehicle speed
- Load arrangement, attachments
- Tires, wheels
- Operator capability
- Stabilizers and outriggers

Telehandlers should only be used on firm ground where stabilizers (if so equipped) and wheels will not sink. When lifting, telehandlers should be on level ground or be stabilized with a frame-leveling feature.

Load Handling

- Handle only stable or safely arranged loads. Exercise caution when handling off-center loads which cannot be centered
- All loads will be within the rated capacity of the handler

- Long or high loads that may affect capacity will be adjusted
- Operate telehandlers with attachments as partially loaded when not handling a load
- Place the load engaging means under the load as far as possible; carefully tilt the mast backward to stabilize the load
- Use extreme care when tilting the load forward or backward, particularly when high tiering. Do not tilt load engaging means forward while elevated except to pick up a load. Do not tip an elevated load forward unless the load is in a deposit position over a rack or stack. When stacking or tiering, use only enough backward tilt to stabilize the load

Elevating Personnel

Telehandlers must not be used to lift personnel unless no other practicable option is available, an approved personnel platform is used, and necessary safety precautions must be followed:

- Ensure personnel lifted with the handler are protected from moving parts, overhead hazards, and fall hazards
- Ensure the platform is horizontal, boom is vertical, and the handler has secure footing
- Before lifting personnel, check that the controls are in neutral and the brakes set
- Notify others in the area of the elevated personnel doing work with signs or barricades
- Make sure there are no hazards in the lift's path of travel
- Lifting and lowering of personnel should be done in a smooth motion. The platform may only be moved after the personnel to be lifted have been notified
- Personnel may only exit or enter the platform from ground-level

When a telehandler is used as a mobile work platform, the operator must follow the safety rules for vehicle-mounted work platforms.

Suspended Loads

Suspended loads may only be moved on a telehandler that is equipped with a specifically designed attachment. When a telehandler is operated with such an attachment, the operator must follow the safety rules for mobile cranes, and appropriate training must be in place.

Parking

An operator will adhere to the following procedures (see Figure 1) to dismount the telehandler:

- When leaving telehandler unattended, fully lower load engaging means, neutralize controls, shut off power, and set brakes. Block wheels if the handler is parked on an incline
- The telehandler is unattended when the operator is 25 ft. or more away from the vehicle in his view, or whenever the operator leaves the vehicle and it is not in his view
- When the operator of a telehandler is dismounted and within 25 ft. of the unit, which is still in his view, the load engaging means will be fully lowered, controls neutralized, and the brakes set to prevent movement

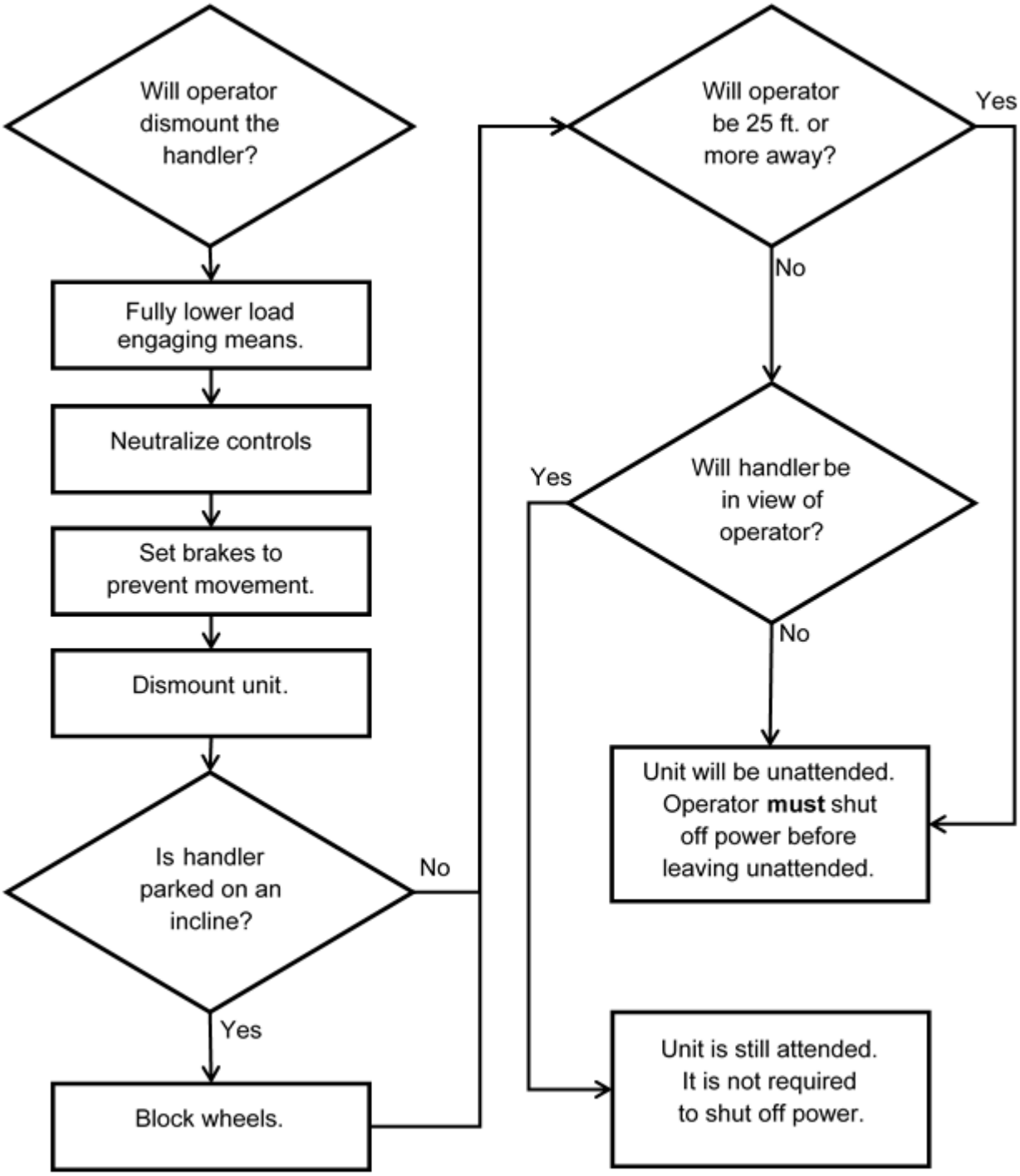


Figure 1 — Parking Your Telehandler

TRAINING

The Company will ensure every employee is provided training on the operation and maintenance of telehandlers. This training will be provided at no cost to the employee during working hours.

The Company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Trainees may operate a telehandler only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence
- Where such operation does not endanger the trainee or other employees

Training Components

Training for telehandler operation will include formal instruction, practical training, and evaluation. Trainers will demonstrate knowledge, training and experience necessary to deliver said training and evaluate operator performance.

The safety chair will ensure that every employee who works with telehandlers will be trained in the following minimum elements:

- Telehandler related topics
- Operating instructions, warnings, and precautions for the types of telehandler the operator will be authorized to operate
- Differences between the telehandler and the automobile
- Controls and instrumentation: where they are located, what they do, and how they work
- Engine or motor operation
- Steering and maneuvering
- Visibility (including restrictions due to loading)
- Attachment adaptation, operation, and use limitations
- Vehicle capacity
- Vehicle stability
- Any vehicle inspection and maintenance that the operator will be required to perform
- Refueling and/or charging and recharging of batteries
- Operating limitations
- Any other operating instructions, warnings, or precautions listed in the operator’s manual for the types of vehicle operated
- Workplace-related topics
- Surface conditions where the vehicle will be operated
- Composition of loads to be carried and load stability
- Load manipulation, stacking, and unstacking
- Pedestrian traffic in areas where the vehicle will be operated
- Narrow aisles and other restricted places where the vehicle will be operated
- Hazardous (classified) locations where the vehicle will be operated
- Ramps and other sloped surfaces that could affect the vehicle’s stability

- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust
- Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be maintained for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- Performance Evaluation for Forklift Operators
- Telehandler Training Record Sheet

PERFORMANCE EVALUATION FOR FORKLIFT OPERATORS

Employee		Date		Time	
Evaluator		Equipment Type			

- ☐ Shows familiarity with the vehicle controls
- ☐ Gave proper signals when turning
- ☐ Slowed down at intersections
- ☐ Sounded horn at intersections
- ☐ Obeyed signs
- ☐ Kept a clear view of direction of travel
- ☐ Turned comers correctly - was aware of rear end swing
- ☐ Yielded to pedestrians
- ☐ Drove under control and within proper traffic aisles
- ☐ Approached load properly
- ☐ Lifted load properly
- ☐ Maneuvered properly
- ☐ Traveled with load at proper height
- ☐ Lowered load smoothly/slowly
- ☐ Stops smoothly/completely
- ☐ Load balanced properly
- ☐ Forks under load all the way
- ☐ Carried parts/stock in approved containers
- ☐ Checked bridge-plates/ramps
- ☐ Did place loads within marked area
- ☐ Did stack loads evenly and neatly
- ☐ Did drive backward when required
- ☐ Did check load weights
- ☐ Did place forks on the floor when parked, controls neutralized, brake on set, power off
- ☐ Followed proper instructions for maintenance — checked both at beginning and end

Comments					
Total Rating	☐ Excellent	☐ Good	☐ Fair	☐ Poor	☐ Fail
Evaluator's Signature				Date	
Operator's Signature				Date	

TELEHANDLER TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter contains the requirements and safe practices to be followed when establishing and maintaining a temporary traffic control zone. These practices will comply with all requirements of the applicable federal, state or local Manual of Uniform Traffic Devices (MUTCD.) This chapter does not include all diagrams of Traffic Control configurations and Traffic Control device specifications. Please refer to the applicable MUTCD for that information.

POLICY

The control of traffic in and around work areas must be a first-priority safety issue in planning any roadwork where the possibility of vehicle hazards exists. Many trades are required to establish some form of traffic control when their work approaches, is adjacent to, or encroaches on, a public thoroughfare.

OSHA Part 29 CFR 1926.200 states that “Construction areas must be posted with legible traffic signs at points of hazard”, and “All traffic control signs or devices used for protection of construction workers will conform to Part 6 of the Federal Highway Administration (FHWA) Manual of Uniform Traffic Control Devices (MUTCD).”

The Company has adopted this policy to protect its employees and the public from the hazards associated with temporary traffic control.

DEFINITIONS

STANDARD - The uniform traffic control regulation from the MUTCD that applies to the part of this chapter being discussed

OPTION - An acceptable alternative method that may be applied to a specific regulation of the MUTCD referenced

EMPLOYER RESPONSIBILITIES

This Company will:

- Designate a Traffic Control Supervisor to design and manage temporary traffic control (TTC) zones
- Ensure all employees engaged in construction work in or near roadways will be knowledgeable of the hazards associated with their work, follow the safe practices of this policy, and be trained on the applicable regulations governing that work
- All traffic control devices, signs and barriers will meet the applicable MUTCD and FHWA requirements

EMPLOYEE RESPONSIBILITIES

Traffic Control Supervisor

The Company designated traffic control supervisor is responsible for:

- Completing MUTCD and FHWA training and demonstrating an understanding of the requirements
- Designing and managing temporary traffic control (TTC) zones
- Providing road user education and oversee TTC zone enforcement
- Ensuring all necessary traffic control devices are in good condition and available at the jobsite
- Notifying all applicable Federal, State, and local agencies and law enforcement departments, and obtaining authorization to implement TTC plans

Flaggers

All person assigned flagging duties by the Company will be:

- Be trained on flagging operations
- Be able to demonstrate an understanding their duties
- Follow all safe practices regarding flagging operations

Construction Personnel

All employees operating equipment or performing groundwork in or around a public roadway will:

- Follow all safe practices as defined in this policy
- Wear all necessary PPE appropriate for their job
- Understand the TTC zones and signage
- Report any unsafe conditions to the TTC supervisor

GENERAL INFORMATION

When the normal function of a roadway is suspended, TTC planning provides for continuity of the movement of motor vehicle, bicycle, and pedestrian traffic (including accessible passage); transit operations; and access to property and utilities. The primary function of TTC is to provide for the reasonably safe and efficient movement of road users through or around TTC zones while reasonably protecting workers, responders to traffic incidents, and equipment.

TTC zones present constantly changing conditions that are unexpected by the road user. This creates an even higher degree of risk for the workers and incident management responders on or near the roadway. At the same time, the TTC zone provides for the efficient completion of whatever activity interrupted the normal use of the roadway.

Consideration for road user safety, worker, responder safety, and the efficiency of road user flow is an integral element of every TTC zone, from planning through completion. A concurrent objective of the TTC is the efficient construction and maintenance of the highway and the efficient resolution of traffic incidents.

No one set of TTC devices can satisfy all conditions for a given project or incident. As a result, defining details that would be adequate to cover all applications is not practical. Instead, this chapter covers typical applications of TTC devices. The TTC selected for each situation depends on type of highway, road user conditions, duration of operation, physical constraints, and the nearness of the workspace or incident management activity to road users.

Improved road user performance may be realized through the use a well-prepared public relations effort that covers the nature of the work, the time and duration of its execution, the anticipated effects upon road users, and possible alternate routes and modes of travel. Such programs have resulted in a significant reduction in the number of road users traveling through the TTC zone, which, in turn, reduces the possible number of conflicts.

The TTC plan should start in the planning phase and continue through the design, construction, and restoration phases. The TTC plans and devices should follow the principles set forth in this chapter, or Part 6 of the MUTCD. TTC plans may deviate from the typical applications described in this chapter to allow for conditions and requirements of a particular site or jurisdiction.

The criteria of this chapter apply to both rural and urban areas.

A rural highway is normally characterized by lower volumes, higher speeds, fewer turning conflicts, and less conflict with pedestrians.

An urban street is typically characterized by relatively low speeds, wide ranges of road user volumes, narrower roadway lanes, frequent intersections, and driveways, significant pedestrian activity, and more businesses and houses.

It should be noted that several states have created supplements to the FHWA manual or created their own manual. It is essential that the Company and/or the responsible party determine if there are any additional or different State or local requirements that must be met when developing a temporary traffic control plan.

TEMPORARY TRAFFIC CONTROL PLANNING

A TTC plan describes the measures that will be used for directing road users through a work zone or an incident area. TTC plans play a vital role in providing a reasonably safe and efficient road user flow when a work zone, incident, or other event that temporarily disrupts normal road use.

TTC plans range in scope from being very detailed to simply referencing typical drawings contained in this MUTCD or specific drawings contained in the contract documents. The degree of detail in the TTC plan depends entirely on the nature and complexity of the situation.

The designated traffic control supervisor, who is knowledgeable about the fundamental principles of TTC and work activities to be performed, will prepare TTC plans. The design, selection, and placement of TTC devices for a TTC plan should be based on engineering judgment.

Coordination between adjacent or overlapping projects should be made to prevent duplicate signing and to check compatibility of traffic control between the projects.

Traffic control planning should be completed for all highway construction, utility work, maintenance operations, and incident management, including minor maintenance and utility projects, before occupying the TTC zone. Planning for all road users should be included in the process, and include:

- Continuous access to circulation paths for pedestrians, if existing pedestrian routes are blocked or detoured, information about alternative routes, usable by pedestrians with disabilities will be provided
- Access to temporary bus stops, reasonably safe travel across intersections with accessible pedestrian signals, and other routing issues

- Where temporary pedestrian routes are channelized, barriers and channelizing devices, detectable by people with visual disabilities, should be provided
- Provisions that enable contractors to develop an alternate TTC plan based on project needs
- Modifications of TTC plans may be necessary because of changing conditions or a determination of better methods of safely and efficiently handling road users
- This alternate or modified plan must have the approval of the responsible highway agency prior to implementation
- Continuity of transit service should be incorporated into the TTC planning process. The TTC plan should provide for features such as accessible temporary bus stops, pullouts, and satisfactory waiting areas for transit patrons, including persons with disabilities, if applicable
- Continuity of railroad service and acceptable access to abutting property owners and businesses should also be incorporated into the TTC planning process
- Reduced speed limits should be used only in the specific portion of the TTC zone where conditions or restrictive features are present
- Frequent changes in the speed limit should be avoided. A TTC plan should be designed so that vehicles can reasonably safely travel through the TTC zone with a speed limit reduction of no more than 10 mph, and should be used only when required
- If a speed reduction of more than 10 mph is required, additional driver notification should be provided. The speed limit should be stepped down in advance of the location requiring the lowest speed, and additional TTC warning devices should be used.

TEMPORARY TRAFFIC CONTROL ZONES

A **TTC zone** is an area of a highway where road user conditions are changed because of a work zone or an incident using TTC devices, uniformed law enforcement officers, or other authorized personnel.

A **work zone** is an area of a highway with construction, maintenance, or utility work activities. Signs, channelizing devices, barriers, pavement markings, and/or work vehicles typically mark a work zone. It extends from the first warning sign or high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle to the END ROAD WORK sign or the last TTC device.

An **incident area** is an area of a highway where authorized officials in response to a traffic incident, natural disaster, or special event impose temporary traffic controls. It extends from the first warning device (such as a sign, light, or cone) to the last TTC device or to a point where road users return to the original lane alignment and are clear of the incident.

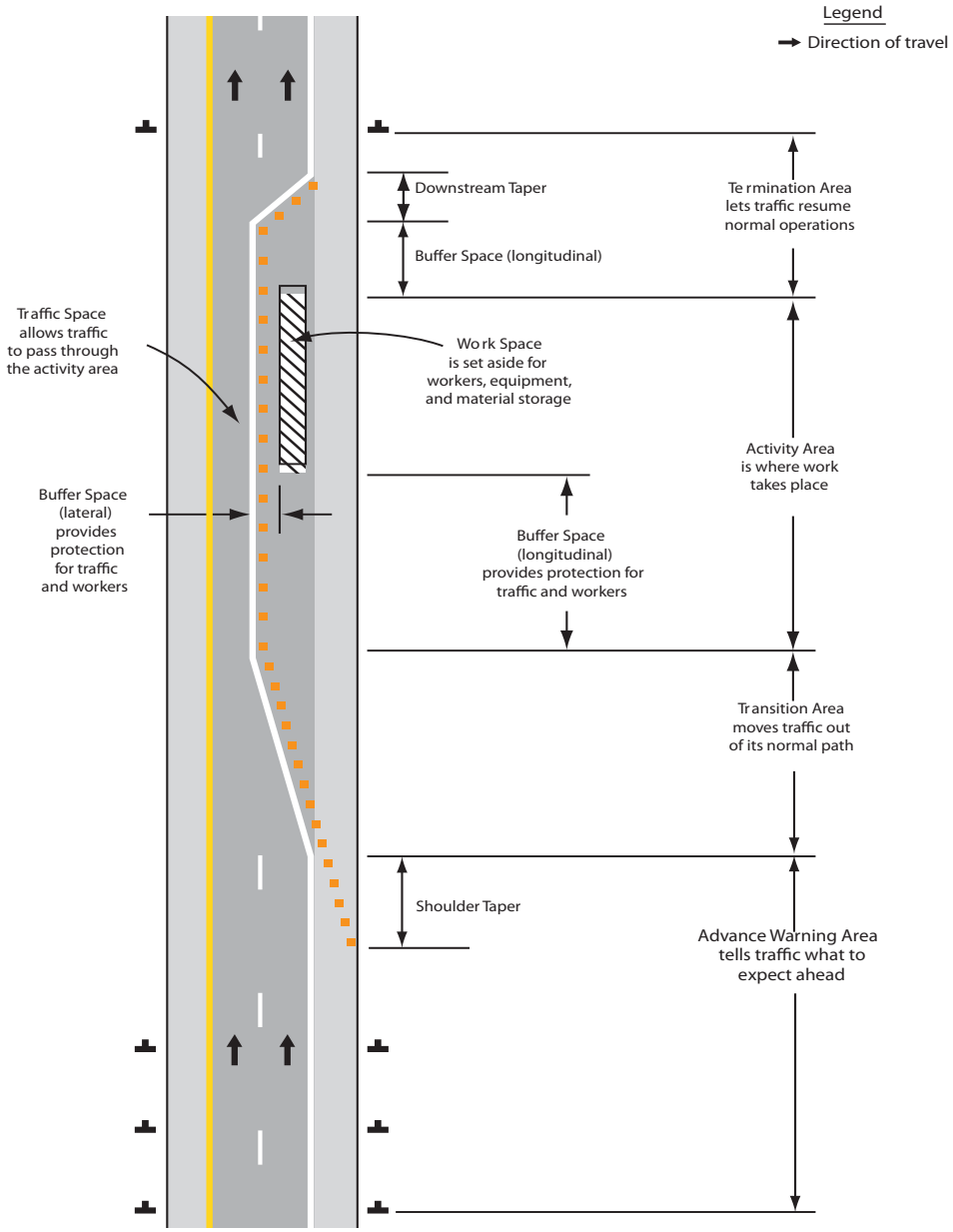
Components of Temporary Traffic Control Zones

Most TTC zones are divided into four areas:

- The advance warning area
- The transition area
- The activity area
- The termination area

The figure below illustrates these four TTC areas and the spaces contained within them.

Figure 6C-1. Component Parts of a Temporary Traffic Control Zone



Advance Warning Area

Standard: The advance warning area is the section of highway where road users are informed about the upcoming work zone or incident area.

The advance warning area may vary from a single sign or high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle to a series of signs in advance of the TTC zone activity area.

Typical distances for placement of advance warning signs on freeways and expressways should be longer because drivers are conditioned to uninterrupted flow. Therefore, the advance warning sign placement should extend on these facilities as far ½ mile or more.

On urban streets, the effective placement of the first warning sign in feet should range from 4 to 8 times the speed limit in mph, with the high end of the range being used when speeds are relatively high. When a single advance warning sign is used (in cases such as low-speed residential streets), the advance warning area can be as short as 100 ft. When two or more advance warning signs are used on higher-speed streets, such as major arterials, the advance warning area should extend a greater distance as shown in the following table.

SUGGESTED ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs**		
	A	B	C
Urban (low speed)*	100	100	100
Urban (high speed)*	350	350	350
Rural	500	500	500
Expressway / Freeway	1,000	1,500	2,640

* Speed Category to be determined by highway agency

** Distances are shown in feet. The A dimension is the distance from the transition or point of restriction to the first sign. The B dimension is the distance between the first and second signs. The C dimension is the distance between the second and third signs. (The third sign is the first one in a three-sign series encountered by a driver approaching a TTC zone.)

Since rural highways are normally characterized by higher speeds, the effective placement of the first warning sign should be substantially longer. Since two or more advance warning signs are normally used for these conditions, the advance warning area should extend 1,500 ft. or more for open highway conditions.

Option: Advance warning may be eliminated if the activity area is far enough away from the road users' path so that it does not interfere with the normal traffic flow.

Transition Area

The transition area is that section of highway where road users are redirected out of their normal path. Transition areas usually involve strategic use of tapers, which because of their importance are discussed separately in detail.

Standard: When redirection of the road users' normal path is required, they will be channelized from the normal path to a new path.

In mobile operations, the transition area moves with the workspace.

Activity Area

The activity area is the section of the highway where the work is being performed. It consists of a workspace, a traffic space, and a buffer space.

The workspace is the part of the highway closed to road users and set aside for workers, equipment, material, and a shadow vehicle, if one is used, upstream. Workspaces are usually identified to road users by channelizing devices or, to exclude vehicles and pedestrians, by temporary barriers.

The **workspace** may be stationary or may move as work progresses.

Since there may be several workspaces (some even separated by several miles) within the project limits, each workspace must be adequately marked to inform road users and reduce confusion.

The **traffic space** is the part of the highway where road users are routed through the activity area.

The **buffer space** is the area that separates the traffic flow from the workspace or an unsafe area, and may provide some recovery space for an errant vehicle. No work activity or storage of equipment, vehicles, or material is permitted within a buffer space.

Typically, the buffer space is formed as a traffic island and defined by channelizing devices. When a shadow vehicle, arrow panel, or changeable message sign is placed in a closed lane in advance of a workspace, only the area upstream of the vehicle, arrow panel, or changeable message sign constitutes the buffer space.

The buffer space may be used to separate the traffic space from the workspace, or such areas as excavations or pavement-edge drop-offs. A lateral buffer space also may be used between two travel lanes, especially those carrying opposing flows. The width of the lateral buffer space should be determined by engineering judgment.

When work occurs on a high-volume, highly congested facility, a vehicle storage or staging space may be provided for incident response and emergency vehicles (for example, tow trucks and fire apparatus) so that these vehicles can respond quickly to road user incidents. If used, an incident response and emergency-vehicle storage area should not extend into any portion of the buffer space.

Termination Area

Standard: The termination area is used to return road users to their normal path. The termination area will extend from the downstream end of the work area to the last TTC device such as END ROAD WORK signs, if posted.

An END ROAD WORK sign, a Speed Limit sign, or other signs may be used to inform road users that they can resume normal operations.

Tapers

Tapers may be used in both the transition and termination areas. Whenever tapers are to be used in close proximity to an interchange ramp, crossroads, curves, or other influencing factors, the length of the tapers may be adjusted.

There four types of tapers commonly used in TTC zones:

- Shoulder taper – A shoulder taper might be beneficial on a high-speed roadway where shoulders are part of the activity area and are closed, or when improved shoulders might be mistaken as a driving lane
- Shifting taper - A shifting taper is used when a lateral shift of the traffic flow is needed
- Downstream taper - A downstream taper is optional and might be useful in termination areas to provide a visual cue to the driver that access is available back into the original lane or path that was closed
- Merging taper - A merging taper is used when lane reductions are necessary, and require the longest distance because drivers are required to merge into common road space

Tapers are created by using a series of channelizing devices and/or pavement markings to move traffic out of or into the normal path. Longer tapers are not necessarily better than shorter tapers (particularly in urban areas with characteristics such as short block lengths or driveways) because extended tapers tend to encourage drivers to delay lane changes unnecessarily. The test concerning adequate lengths of tapers involves observation of driver performance after TTC plans are implemented.

Detours and Diversions

A detour is a temporary rerouting of road users onto an existing highway in order to avoid a TTC zone. Detours must be clearly marked over their entire length so that road users can easily use existing highways to return to the original highway.

A diversion is a temporary rerouting of road users onto a temporary highway or alignment placed around the work area.

TRAFFIC CONTROL METHODS

One Lane, Two-Way Traffic Control

Standard: When traffic in both directions must use a single lane for a limited distance, movements from each end must be coordinated.

Provisions will be made for alternate one-way movement through the constricted section using methods such as flagger control, a flag transfer, a pilot car, traffic control signals, or stop or yield control. Control points at each end should be chosen to permit easy passing of opposing lanes of vehicles. If traffic on the affected one-lane roadway is not visible from one end to the other, then flagging procedures, a pilot car with a flagger, or a traffic control signal should be used to control opposing traffic flows.

Flagger Method of One-Lane, Two-Way Traffic Control

When a one-lane, two-way TTC zone is short enough to allow a flagger to see from one end of the zone to the other, traffic may be controlled by either a single flagger or by a flagger at each end of the section.

When a single flagger is used, the flagger should be stationed on the shoulder opposite the constriction or workspace, or in a position where good visibility and traffic control can be maintained at all times. When good visibility and traffic control cannot be maintained by one flagger station, a flagger at each end of the section should control traffic. One of the flaggers should be designated as the coordinator. Flaggers should be able to communicate with each other orally, electronically, or with manual signals. These manual signals should not be mistaken for flagging signals.

Flag Transfer Method of One-Lane, Two-Way Traffic Control

The driver of the last vehicle proceeding into the one-lane section is given a red flag (or other token) and instructed to deliver it to the flagger at the other end. The opposite flagger, upon receipt of the flag, then knows that it is reasonably safe to allow traffic to move in the other direction. A variation of this method is to replace the use of a flag with an official pilot car that always follows the last road user vehicle proceeding through the section. The flag transfer method should be employed only where the one-way traffic is confined to a relatively short length of a road, usually not more than one mile in length.

Pilot Car Method of One-Lane, Two-Way Traffic Control

A pilot car may be used to guide a line of vehicles through the TTC zone or detour.

The operation of the pilot vehicle should be coordinated with flagging operations or other controls at each end of the one-lane section. The pilot car should have the name of the contractor or contracting authority prominently displayed.

Standard: The PILOT CAR FOLLOW ME sign must be mounted at a conspicuous location on the rear of the vehicle.

Traffic control signals may be used to control vehicular traffic movements in one-lane, two-way TTC zones.

Stop or Yield Control Method of One-Lane, Two-Way Traffic Control

STOP or YIELD signs may be used to control traffic on low-volume roads at a one-lane, two-way TTC zone when drivers are able to see the other end of the one-lane, two-way operation and have sufficient visibility of approaching vehicles.

If the STOP or YIELD sign is installed for only one direction, then the STOP or YIELD sign should face road users who are driving on the side of the roadway that is closed for the work activity area.

PEDESTRIAN AND WORKER SAFETY

Pedestrian Considerations

Standard: The needs and control of all road users (motorists, bicyclists, and pedestrians within the highway, through a TTC zone shall be an essential part of highway construction, utility work, maintenance operations, and the management of traffic incidents.

A wide range of pedestrians can be affected by TTC zones, including the young, elderly, and people with disabilities such as hearing, visual, or mobility. These pedestrians need a clearly defined travel path. Provisions must be made for pedestrians with visual disabilities. Devices that provide speech messages in response to passive pedestrian actuation are the most desirable. Other devices that continuously emit a message, or that emit a message in response to use of a pushbutton, are also acceptable. Audible information devices might not be needed if detectable channelizing devices make an alternate route of travel evident to pedestrians with visual disabilities.

Standard: The TTC provisions for pedestrian and worker safety defined in this section will be applied by knowledgeable, trained, and/or certified persons after appropriate evaluation and engineering judgment.

Advance notification of sidewalk closures must be provided to the maintaining agency. Where pedestrians with visual disabilities normally use the closed sidewalk, a barrier detectable by a person with a visual disability traveling with the aid of a long cane, must be placed across the full width of the closed sidewalk.

It must be noted that pedestrians are reluctant to retrace their steps to a prior intersection for a crossing or to add distance or out-of-the-way travel to a destination. Adequate provisions should be made for persons with disabilities as determined by an engineering study or by engineering judgment.

The following three items should be considered when planning TTC zones for pedestrians:

- Pedestrians should not be exposed to the dangers of work site vehicles, equipment, and operations
- Pedestrians should not be exposed to the hazards of vehicles moving through or around the work site
- Pedestrians should be provided with a reasonably safe, convenient, and accessible path that replicates as nearly as practical the most desirable characteristics of the existing sidewalk(s) or footpath(s). Where pedestrians who have visual disabilities encounter work sites that require them to cross the roadway to find an accessible route, instructions should be provided using an audible information device
- A pedestrian route should not be blocked or moved for non-construction activities such as parking for vehicles and equipment

Every effort should be made to keep pedestrian movements separate from both work site activity and vehicular traffic. Unless a reasonably safe route that does not involve crossing the roadway can be provided, pedestrians should be directed with advance signing encouraging them to cross to the opposite side of the roadway.

In urban and suburban areas with high vehicular traffic volumes, these signs should be placed at intersections (rather than mid-block locations) so that pedestrians are not confronted with mid-block work sites that will induce them to attempt skirting the work site or making a mid-block crossing.

When pedestrian movement through or around a work site is necessary, a separate usable footpath should be provided. If the previous pedestrian facility was accessible to pedestrians with disabilities, the footpath provided during temporary traffic control should also be accessible. There should not be any abrupt changes in grade or terrain that could cause a tripping hazard or could be a barrier to wheelchair use. Barriers and channelizing devices should be detectable to pedestrians who have visual disabilities.

Whenever it is feasible, closing off the work site from pedestrian intrusion may be preferable to channelizing pedestrian traffic.

Maintaining a detectable, channelized pedestrian route is much more useful to pedestrians who have visual disabilities than closing a walkway and providing audible directions to an alternate route involving additional crossings and a return to the original route.

Fencing should not create sight distance restrictions for road users. Fences should not be constructed of materials that would be hazardous if impacted by vehicles.

Wooden railing, fencing, and similar systems placed immediately adjacent to motor vehicle traffic should not be used as substitutes for crashworthy temporary traffic barriers.

Standard: TTC devices used to define a TTC zone pedestrian walkway must be crashworthy and, when struck by vehicles, present a minimum threat to pedestrians, workers, and occupants of impacting vehicles.

Ballast for TTC devices should be kept to the minimum amount needed and should be mounted low to prevent penetration of the vehicle windshield.

Movement by work vehicles and equipment across designated pedestrian paths should be kept to minimum and, when necessary, should be controlled by flaggers or TTC. Staging or stopping of work vehicles or equipment along the side of pedestrian paths should be avoided, since it encourages movement of workers, equipment, and materials across the pedestrian path.

Access to the workspace by workers and equipment that crosses pedestrian walkways should be minimized because the access often creates changes in grade, and rough or muddy terrain, and pedestrians will tend to avoid these areas by attempting non-intersection crossings where no curb ramps are available.

A canopied walkway may be used to protect pedestrians from falling debris, and to provide a covered passage for pedestrians. Covered walkways should be sturdily constructed and adequately lighted for nighttime use.

When pedestrian and vehicle paths are rerouted closer to each other than normal, consider separating them by a temporary traffic barrier.

If a temporary traffic barrier is used to shield pedestrians, it should be designed to accommodate site conditions.

Depending on the possible vehicular speed and angle of impact, temporary traffic barriers might deflect upon impact by an errant vehicle.

NOTE: Information for locating and designing temporary traffic barriers can be found in Chapter 9 of the American Association of State Highway and Transportation Officials (AASHTO) Roadside Design Guide.

Standard: Short intermittent segments of temporary traffic barriers must not be used because they defeat the containment and re-directive capabilities of the temporary traffic barrier, increase the potential for serious injury to both vehicle occupants and pedestrians, and encourage the presence of blunt, leading ends. All upstream leading ends that are present must be flared or protected with properly installed and maintained crashworthy cushions. Adjacent temporary traffic barrier segments must be properly connected in order to provide the overall strength required for the temporary traffic barrier to perform properly.

Normal vertical curbing must not be used as a substitute for temporary traffic barriers when temporary traffic barriers are clearly needed.

Temporary traffic barriers or longitudinal channelizing devices may be used to discourage pedestrians from unauthorized movements into the workspace. They may also be used to inhibit conflicts with vehicular traffic by minimizing the possibility of mid-block crossings.

A major concern for pedestrians is urban and suburban building construction encroaching onto the sidewalks, which forces pedestrians off the curb into direct conflict with moving vehicles.

If a significant potential exists for vehicle incursions into the pedestrian path, pedestrians should be rerouted or temporary traffic barriers should be installed.

TTC devices, jersey barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.

Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities, and should not be used as a control for pedestrian movements.

The extent of pedestrian needs should be determined through engineering judgment for each TTC zone situation. In general, pedestrian routes should be preserved in urban and commercial suburban areas. Alternative routing should be discouraged.

The highway agency in charge of the TTC zone should regularly inspect the activity area so that effective pedestrian TTC is maintained.

Accessibility Considerations

Pedestrian needs should be determined through engineering judgment or by the individual responsible for each TTC zone situation. This individual should be aware that the absence of a continuous pathway, including curb ramps and other accessible features, might prevent the use of the facility by pedestrians with disabilities.

Standard: When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities must be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.

To accommodate the needs of pedestrians, including those with disabilities, the following considerations should be addressed when temporary pedestrian pathways in TTC zones are designed or modified:

- Provisions for continuity of accessible paths for pedestrians should be incorporated into the TTC process. Pedestrians should be provided with a reasonably safe, convenient, and accessible path that replicates as much as practical the desirable characteristics of the existing pedestrian facilities
- Access to temporary transit stops should be provided
- Blocked routes, alternate crossings, and sign and signal information should be communicated to pedestrians with visual disabilities by using devices such as audible information devices, accessible pedestrian signals, or barriers and channelizing devices. Where pedestrian traffic is detoured to a TTC signal, engineering judgment should be used to determine if pedestrian signals or accessible pedestrian signals are needed for crossings along an alternate route
- When channelization is used to delineate a pedestrian pathway, a continuous detectable edging should be provided throughout the length of the facility such that pedestrians with visual disabilities can follow it. These detectable edgings should adhere to the provisions of Part 6 of the MUTCD
- A smooth, continuous hard surface should be provided throughout the entire length of the temporary pedestrian facility. There should be no curbs, abrupt changes in grade, or terrain that could cause tripping, or be a barrier to wheelchair use. The geometry and alignment of the facility should meet the applicable requirements of the “Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities
- The width of the existing pedestrian facility should be provided for the temporary facility if practical. Traffic control devices and other construction materials and features should not intrude into the usable width of the sidewalk, temporary pathway, or other pedestrian facility. When it is not possible to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60 inch passing space should be provided at least every 200 ft., to allow individuals in wheelchairs to pass
- Signs and other devices mounted lower than 7 ft. above the temporary pedestrian pathway should not project more than 4 inches into accessible pedestrian facilities

Worker Safety Considerations

Maintaining TTC zones with minimal road user flow disruption by using TTC devices that get the road user's attention and provide positive direction are of particular importance. Likewise, equipment and vehicles moving within the activity area create a risk to workers on foot. When possible, the separation of moving equipment and construction vehicles from workers on foot provides the operator of these vehicles with a greater separation clearance and improved sight lines to minimize exposure to the hazards of moving vehicles and equipment.

The following are the key elements of worker safety and TTC management that should be considered to improve worker safety:

- Training—all workers should be trained on how to work next to motor vehicle traffic in a way that minimizes their vulnerability. Workers having specific TTC responsibilities must be trained in TTC techniques, device usage, and placement

- Worker Safety Apparel—all workers exposed to the risks of moving roadway traffic or construction equipment will wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Safety Apparel". A competent person designated by the employer to be responsible for the worker safety plan within the activity area of the job site should make the selection of the appropriate class of garment
- Temporary Traffic Barriers—temporary traffic barriers should be placed along the work space depending on factors such as lateral clearance of workers from adjacent traffic, speed of traffic, duration and type of operations, time of day, and volume of traffic
- Speed Reduction—reducing the speed of vehicular traffic through regulatory speed zoning, funneling, lane reduction, or the use of uniformed law enforcement officers or flaggers, should be considered
- Activity Area—planning the internal work activity area to minimize backing-up maneuvers of construction vehicles should be considered to minimize the exposure to risk
- Worker Safety Planning—a competent person designated by the employer should conduct a basic hazard assessment for the work site and job classifications required in the activity area. This safety professional should determine whether engineering, administrative, or personal protection measures need to be implemented. This plan should be in accordance with OSHA "General Duty Clause", and with the requirement to assess worker risk exposures for each job site and job classification, as per OSHA 29 CFR 1926.20

The following are additional elements of TTC management that may be considered to improve worker safety:

- Shadow Vehicle—in the case of mobile and constantly moving operations, such as pothole patching and striping operations, a shadow vehicle, equipped with lights and warning signs, may be used to protect the workers from impacts by errant vehicles
- Road Closure—if alternate routes are available to handle road users, the road may be closed temporarily. This may also reduce project completion time, which will further reduce worker vulnerability
- Law Enforcement Use—in highly vulnerable work situations, particularly those of relatively short duration, law enforcement units may be used to heighten the awareness of passing vehicular traffic and to improve safety through the TTC zone
- Lighting—for nighttime work, the TTC zone and approaches may be lighted
- Special Devices—these include rumble strips, changeable message signs, hazard identification beacons, flags, and warning lights. Intrusion warning devices may be used to alert workers to the approach of errant vehicles

Use of the special devices might be helpful for certain difficult TTC situations, but misuse or overuse of special devices or techniques might lessen their effectiveness.

FLAGGER CONTROL

Qualifications for Flaggers

Because flaggers are responsible for public safety and make the greatest number of contacts with the public of all highway workers, they must be trained in safe traffic control practices and public contact techniques. Flaggers should be able to demonstrate the following abilities:

- Ability to receive and communicate specific instructions clearly, firmly, and courteously
- Ability to move and maneuver quickly in order to avoid danger from errant vehicles
- Ability to control signaling devices (such as paddles and flags) in order to provide clear and positive guidance to drivers approaching a TTC zone in frequently changing situations
- Ability to understand and apply safe traffic control practices, sometimes in stressful or emergency situations
- Ability to recognize dangerous traffic situations and warn workers in sufficient time to avoid injury

High-Visibility Safety Apparel

Standard: For daytime and nighttime activity, flaggers will wear safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel" and labeled as meeting the ANSI 107-1999 standard performance for Class 2 risk exposure

For nighttime activity, safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel" and labeled as meeting the ANSI 107-1999 standard performance for Class 3 risk exposure should be considered for flagger wear instead of Class 2 safety apparel.

When uniformed law enforcement officers are used, high-visibility safety apparel as described in this Section should be worn by the law enforcement officer.

Hand-Signaling Devices

Hand-signaling devices, such as STOP/SLOW paddles, lights, and red flags, are used to control road users through TTC zones. The STOP/SLOW paddle should be the primary and preferred hand-signaling device because the STOP/SLOW paddle gives road users more positive guidance than red flags. Use of flags should be limited to emergencies.

The STOP/SLOW paddle may be modified to improve visibility by incorporating either white or red flashing lights on the STOP face, or either white or yellow flashing lights on the SLOW face.

Standard: If flashing lights are used on the STOP face of the paddle, their colors must be all white or all red. If flashing lights are used on the SLOW face of the paddle, their colors must be all white or all yellow.

If more than eight flashing lights are used, the lights will be arranged so that they clearly convey the octagonal shape of the STOP face of the paddle and/or the diamond shape of the SLOW face of the paddle.

If flashing lights are used on the STOP/SLOW paddle, the flash rate shall be at least 50, but not more than 60, flashes per minute.

Flags, when used, must be a minimum of 24 in square, made of a good grade of red material, and securely fastened to a staff that is approximately 36 in in length.

The free edge of a flag should be weighted so the flag will hang vertically, even in heavy winds.

Standard: When used at nighttime, flags shall be retro-reflectorized red.

Flagger Procedures

The use of paddles and flags by flaggers is illustrated in Figure E-1.

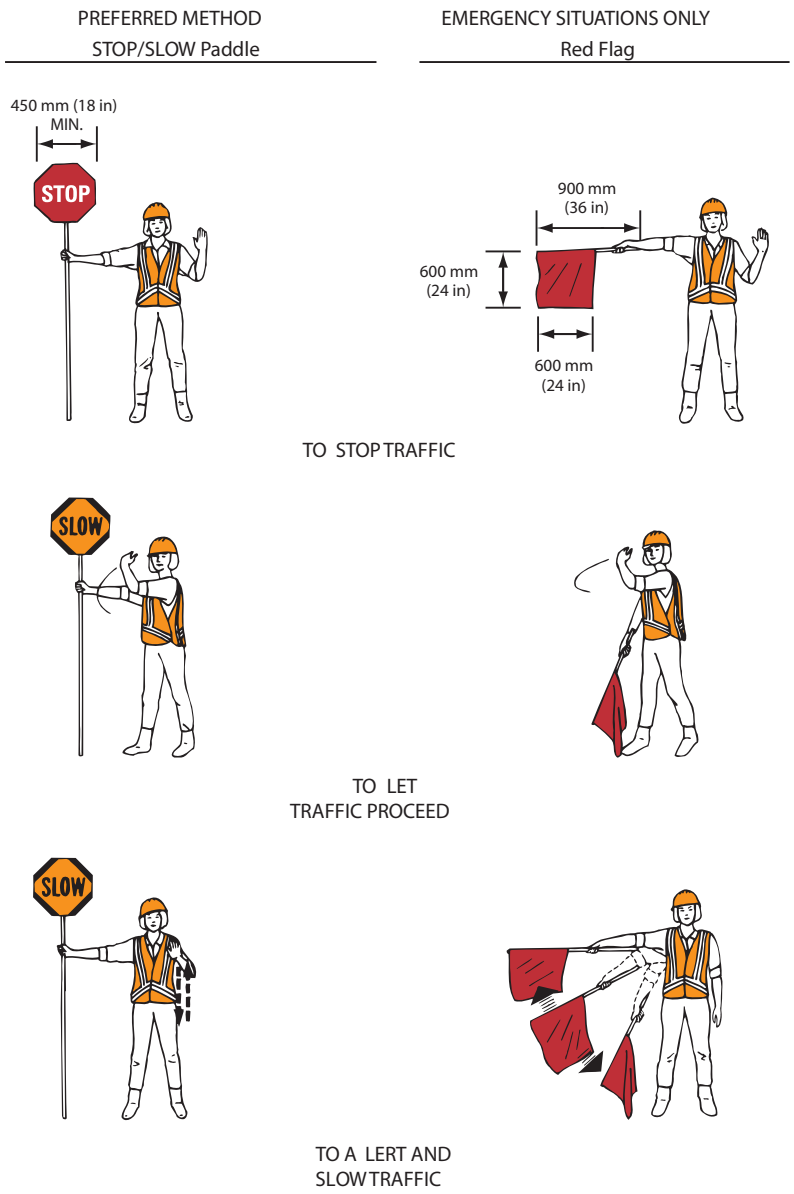
STANDARD: The following methods of signaling with paddles shall be used:

- To stop road users, the flagger shall face road users and aim the STOP paddle face toward road users in a stationary position with the arm extended horizontally away from the body. The free arm will be held with the palm of the hand above shoulder level toward approaching traffic
- To direct stopped road users to proceed, the flagger will face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body. The flagger shall motion with the free hand for road users to proceed
- To alert or slow traffic, the flagger shall face road users with the SLOW paddle face aimed toward road users in a stationary position with the arm extended horizontally away from the body
- To further alert or slow traffic, the flagger holding the SLOW paddle face toward road users may motion up and down with the free hand, palm down.

Standard: The following methods of signaling with a flag will be used:

- To stop road users, the flagger will face road users and extend the flag staff horizontally across the road users' lane in a stationary position so that the full area of the flag is visibly hanging below the staff. The free arm will be held with the palm of the hand above the shoulder level toward approaching traffic
- To direct stopped road users to proceed, the flagger will stand parallel to the road user movement and with flag and arm lowered from the view of the road users, and motion with the free hand for road users to proceed. Flags must not be used to signal road users to proceed.
- To alert or slow traffic, the flagger will face road users and slowly wave the flag in a sweeping motion of the extended arm from shoulder level to straight down without raising the arm above a horizontal position. The flagger must keep the free hand down.

Figure E-1. Use of Hand-Signaling Devices by Flaggers



Flagger Stations

Standard: Flagger stations will be located so that approaching road users will have sufficient distance to stop at an intended stopping point.

The distances shown in the table below, provide information regarding the stopping sight distance as a function of speed, may be used for the location of a flagger station. These distances may be increased for downgrades and other conditions that affect stopping distance. Flagger stations should be located so that an errant vehicle has additional space to stop without entering the workspace.

Speed*	Distance
20 mph	115 feet
25 mph	155 feet
30 mph	200 feet
35 mph	250 feet
40 mph	305 feet
45 mph	360 feet
50 mph	425 feet
55 mph	495 feet
60 mph	570 feet
65 mph	645 feet
70 mph	730 feet
75 mph	820 feet

Standard: except in emergencies, an advance warning sign or signs will precede flagger stations. Except in emergencies, flagger stations will be illuminated at night.

The flagger should stand either on the shoulder adjacent to the road user being controlled or in the closed lane prior to stopping road users. A flagger should only stand in the lane being used by moving road users after road users have stopped. The flagger should be clearly visible to the first approaching road user at all times. The flagger also should be visible to other road users. The flagger should be stationed far enough in advance of the workers to warn them (for example, with audible warning devices such as horns or whistles) of approaching danger by out-of-control vehicles. The flagger should stand alone, never permitting a group of workers to congregate around the flagger station.

At a spot constriction, the flagger may have to take a position on the shoulder opposite the closed section in order to operate effectively.

At spot lane closures where adequate sight distance is available for the reasonably safe handling of traffic, the use of one flagger may be sufficient.

TEMPORARY TRAFFIC CONTROL ZONE DEVICES

Types of Devices

The design and application of TTC devices used in TTC zones should consider the needs of all road users (motorists, bicyclists, and pedestrians), including those with disabilities.

The Federal Highway Administration (FHWA) policy requires that all roadside devices such as traffic barriers, barrier terminals and crash cushions, bridge railings, sign and light pole supports, and work zone hardware used on the National Highway System meet the crashworthy performance criteria contained in the National Cooperative Highway Research Program (NCHRP) Report 350.

Standard: Traffic control devices will be defined as all signs, signals, markings, and other devices used to regulate, warn, or guide road users, placed on, over, or adjacent to a street, highway, pedestrian facility, or bikeway by authority of a public body or official having jurisdiction. All traffic control devices used on street and highway construction, maintenance, utility, or incident management operations will conform to the provisions of Part 6 of the MUTCD.

General Characteristics of Signs

TTC zone signs convey both general and specific messages by means of words or symbols and have the same three categories as all road user signs: regulatory, warning, and guide.

Standard: The colors for all signs will follow the standards defined in Part 6 of the MUTCD.

Sign design details are contained in the FHWA “Standard Highway Signs” book (see Section 1A.11).

Standard: All signs used at night will be either retroreflective with a material that has a smooth, sealed outer surface or illuminated to show the same shape and similar color both day and night. Street, highway, or strobe lighting is not considered adequate to meet the requirement for sign illumination.

Sign illumination may be either internal or external. Signs may be made of rigid or flexible material.

Sign Placement

Signs should be located on the right side of the roadway unless otherwise specified by the MUTCD.

Where special emphasis is needed, signs may be placed on both the left and right sides of the roadway. Signs mounted on portable supports may be placed within the roadway itself. Signs may also be mounted on or above barricades.

Neither portable nor permanent sign supports should be located on sidewalks, bicycle facilities, or areas designated for pedestrian or bicycle traffic. Signs mounted lower than 7 ft. should not project more than 4 inches into pedestrian facilities.

Where the color orange is required, fluorescent red-orange or fluorescent yellow-orange colors may also be used.

The fluorescent versions of orange provide higher conspicuity than standard orange, especially during twilight.

Warning and guide signs used for TTC incident management situations may have a black legend and border on a fluorescent pink background.

Existing warning signs that are still applicable may remain in place.

In order to maintain the systematic use of yellow or fluorescent yellow-green background for pedestrian, bicycle, and school warning signs in a jurisdiction, the yellow or fluorescent yellow-green background for pedestrian, bicycle, and school warning signs may be used in TTC zones.

Standard orange flags or flashing warning lights may be used in conjunction with signs.

Standard: When standard orange flags or flashing warning lights are used in conjunction with signs, they must not block the sign face. The sizes for TTC signs will be in accordance with Part 6 of the MUTCD requirements.

The dimensions of signs listed in the MUTCD may be increased wherever necessary for greater legibility or emphasis, such as on freeways and expressways.

Sign design details are contained in the “Standard Highway Signs” book.

Sign Maintenance

Standard: Signs will be properly maintained for cleanliness, visibility, and correct positioning. Signs that have lost significant legibility will be promptly replaced.

Regulatory Sign Authority

Regulatory signs are used to inform road users of traffic laws or regulations and indicate the applicability of legal requirements that would not otherwise be apparent.

Standard: the public agency or official having jurisdiction will authorize regulatory signs.

Regulatory Sign Design

Standard: TTC regulatory signs will conform to the standards for regulatory signs presented in Part 2 and in the FHWA’s “Standard Highway Signs” book.

Regulatory signs are generally rectangular with a black legend and border on a white background. Exceptions include the STOP, YIELD, DO NOT ENTER, WRONG WAY, and ONE-WAY signs.

The ONE-WAY sign may be either a horizontal or a vertical rectangular sign.

Regulatory Sign Applications

Standard: If a TTC zone requires regulatory measures different from those existing, the existing permanent regulatory devices must be removed or covered and replaced by the appropriate temporary regulatory signs. This change will be made in conformance with applicable ordinances or statutes of the jurisdiction.

Special Regulatory Signs

Special regulatory signs may be used based on engineering judgment consistent with regulatory requirements.

Special regulatory signs should conform to the general requirements of color, shape, and alphabet size and series. The sign message should be brief, legible, and clear.

Warning Sign Function, Design, and Application

TTC zone warning signs notify road users of specific situations or conditions on or adjacent to a roadway that might not otherwise be apparent.

Standard: TTC warning signs shall conform to the Standards for warning signs presented in Part 2 of the federal MUTCD and in FHWA's "Standard Highway Signs" book.

Position of Advance Warning Signs

Where highway conditions permit, warning signs should be placed in advance of the TTC zone at varying distances depending on roadway type, condition, and posted speed. Where a series of two or more advance warning signs is used, the closest sign to the TTC zone should be placed approximately 100 ft. for low-speed urban streets, to 1,000 ft. or more for freeways and expressways.

Various conditions, such as limited sight distance or obstructions that might require a driver to reduce speed or stop, might require additional advance warning signs.

As an alternative to a specific distance on advance warning signs, the word AHEAD may be used.

At TTC zones on lightly traveled roads, not all of the advance warning signs prescribed for major construction may be needed.

Utility work, maintenance, or minor construction can occur within the TTC zone limits of a major construction project, and additional warning signs may be needed. Utility, maintenance, and minor construction signing and TTC should be coordinated with appropriate authorities so that road users are not confused or misled by the additional TTC devices.

Portable Changeable Message Signs

Standard: Portable Changeable Message signs will be TTC devices with the flexibility to display a variety of messages. Each message will consist of either one or two phases. A phase will consist of up to three lines of eight characters per line. Each character module must use at least a five wide and seven high pixel matrix.

Portable Changeable Message signs are used most frequently on high-density urban freeways, but have applications on all types of highways where highway alignment, road user routing problems, or other pertinent conditions require advance warning and information.

Portable Changeable Message signs have a wide variety of applications in TTC zones including roadway, lane, or ramp closures, crash or emergency incident management, width restriction information, speed control or reductions, advisories on work scheduling, road user management and diversion, warning of adverse conditions or special events, and other operational control.

The primary purpose of Portable Changeable Message signs in TTC zones is to advise the road user of unexpected situations. Some typical applications include the following:

- Where the speed of vehicular traffic is expected to drop substantially
- Where significant queuing and delays are expected
- Where adverse environmental conditions are present
- Where there are changes in alignment or surface conditions
- Where advance notice of ramp, lane, or roadway closures is needed
- Where crash or incident management is needed
- Where changes in the road user pattern occur

The components of a Portable Changeable Message sign should include a message sign panel, control systems, a power source, and mounting and transporting equipment.

Portable Changeable Message signs should subscribe to the principles established in Section 2A.07 of the Federal MUTCD.

Portable Changeable Message signs should be visible from ½ mile under both day and night conditions.

The message panel should have adjustable display rates (minimum of 3 seconds per phase), so that the entire message can be read at least twice at the posted speed.

Messages should be designed considering the following factors:

- Each phase should convey a single thought
- If the message can be displayed in one phase, the top line should present the problem, the center line should present the location or distance ahead, and the bottom line should present the recommended driver action
- The message should be as brief as possible

- When a message is longer than two phases, additional Portable Changeable Message signs should be used
- When abbreviations are used, they should be easily understood

The message sign panel may vary in size.

Smaller letter sizes may be used on a Portable Changeable Message sign mounted on a trailer or large truck if the message is legible from at least 650 ft., or mounted on a service patrol truck if the message is legible from at least 330 ft.

Two Portable Changeable Message signs may be used for allowing the entire message to be read twice at the posted speed.

Standard: Portable Changeable Message signs must automatically adjust their brightness under varying light conditions, to maintain legibility. The control system will include a display screen where messages can be reviewed before being displayed on the message sign. The control system must be capable of maintaining memory when power is unavailable.

Portable Changeable Message signs will be equipped with a power source and a battery back up to provide continuous operation if failure of the primary power source occurs.

Portable Changeable Message signs mounted on a trailer, a large truck, or a service patrol truck must be placed so that the bottom of the message sign panel is at least 7 ft. above the roadway in urban areas and 5 ft. above the roadway in rural areas when it is in the operating mode.

The text of the messages may not scroll or travel horizontally or vertically across the face of the sign.

Portable Changeable Message signs should be used as a supplement to, and not as a substitute for, conventional signs and pavement markings.

When Portable Changeable Message signs are used for route diversion, they should be placed far enough in advance of the diversion to allow road users enough time to perform necessary lane changes, to adjust their speed, or to exit the affected highway.

The Portable Changeable Message signs should be sited and aligned to provide maximum legibility. Multiple Portable Changeable Message signs should be placed on the same side of the roadway.

Portable Changeable Message signs should be placed on the shoulder of the roadway or, if practical, further from the traveled lane. They should be identified with retroreflective TTC devices.

When Portable Changeable Message signs are not being used, they should be removed or shielded. If the previous two options are not feasible, retro-reflective TTC devices should mark them.

Portable Changeable Message sign trailers should be marked on a permanent basis by affixing retroreflective material in a continuous line on the face of the trailer as seen by oncoming road users.

Arrow Panels

Standard: An arrow panel shall be a sign with a matrix of elements capable of either flashing or sequential displays. This sign will provide additional warning and directional information to assist in merging and controlling road users through or around a TTC zone.

An arrow panel in the arrow or chevron mode should be used to advise approaching traffic of a lane closure along major multi-lane roadways in situations involving heavy traffic volumes, high speeds, and/or limited sight distances, or at other locations and under other conditions where road users are less likely to expect such lane closures.

If used, an arrow panel should be used in combination with appropriate signs, channelizing devices, or other TTC devices.

An arrow panel should be placed on the shoulder of the roadway or, if practical, further from the traveled lane. It should be marked with retroreflective TTC devices. When an arrow panel is not being used, it should be removed, shielded, or marked with retroreflective TTC devices.

Standard: Arrow panels will meet the required minimum size, legibility distance, number of elements, and other specifications.

Standard: Type A, B, and C arrow panels will have solid rectangular appearances. A Type D arrow panel will conform to the shape of the arrow. All arrow panels must be finished in non-reflective black. The arrow panel will be mounted on a vehicle, a trailer, or other suitable support.

Type A arrow panels are appropriate for use on low-speed urban streets. Type B arrow panels are appropriate for intermediate-speed facilities and for maintenance or mobile operations on high-speed roadways. Type C arrow panels are for use on high-speed, high-volume motor vehicle traffic control projects. Type D arrow panels are for use on authorized vehicles.

The minimum mounting height of an arrow panel should be 7 ft. from the roadway to the bottom of the panel, except on vehicle-mounted panels, which should be as high as practical. A vehicle-mounted arrow panel should be provided with remote controls.

Standard: Arrow panel elements must be capable of at least a 50 percent dimming from full brilliance. The dimmed mode will be used for nighttime operation of arrow panels.

Full brilliance should be used for daytime operation of arrow panels.

Standard: The arrow panel shall have suitable elements capable of the various operating modes. The color presented by the elements will be yellow.

Standard: The minimum element on time will be 50 percent for the flashing mode, with equal intervals of 25 percent for each sequential phase. The flashing rate will be not less than 25 nor more than 40 flashes per minute. An arrow panel shall have the following three mode selections:

- A Flashing Arrow, Sequential Arrow, or Sequential Chevron mode
- A flashing Double Arrow mode
- A flashing Caution mode

An arrow panel in the arrow or chevron mode will be used only for stationary or moving lane closures on multi-lane roadways. For shoulder work, blocking the shoulder, for roadside work near the shoulder, or for temporarily closing one lane on a two-lane, two-way roadway, an arrow panel may be used only in the caution mode.

For a stationary lane closure, the arrow panel should be located on the shoulder at the beginning of the merging taper. Where the shoulder is narrow, the arrow panel should be located in the closed lane.

Standard: When arrow panels are used to close multiple lanes, a separate arrow panel must be used for each closed lane.

When arrow panels are used to close multiple lanes, and the first arrow panel is placed on the shoulder, the second arrow panel should be placed in the first closed lane at the beginning of the second merging taper. When the first arrow panel is placed in the first closed lane, the second arrow panel should be placed in the second closed lane at the downstream end of the second merging taper.

For mobile operations where a lane is closed, the arrow panel should be located to provide adequate separation from the work operation to allow for appropriate reaction by approaching drivers.

Standard: A vehicle displaying an arrow panel must be equipped with high-intensity rotating, flashing, oscillating, or strobe lights.

A portable changeable message sign may be used to simulate an arrow panel display.

High-Level Warning Devices (Flag Trees)

A high-level warning device (flag tree) may be used in addition with other TTC devices in TTC zones.

A high-level warning device is designed to be seen over the top of typical passenger cars.

Standard: A high-level warning device will consist of a minimum of two flags with or without a high intensity flashing warning light. The distance from the roadway to the bottom of the lens of the light and to the lowest point of the flag material must be at least 8 ft. The flag must be at least 16 inch square be orange or fluorescent red-orange in color.

An appropriate warning sign may be mounted below the flags.

High-level warning devices are most commonly used in high-density road user situations to warn road users of short-term operations.

Channelizing Devices

The function of channelizing devices is to warn road users of conditions created by work activities in or near the roadway and to guide road users. Channelizing devices include cones, tubular markers, vertical panels, drums, barricades, and temporary raised islands.

Channelizing devices provide for smooth and gradual vehicular traffic flow from one lane to another, onto a bypass or detour, or into a narrower traveled way. They are also used to separate vehicular traffic from the workspace, pavement drop-offs, pedestrian or shared-use paths, or opposing directions of vehicular traffic.

Standard: Devices used to channelize pedestrians must be detectable to users of long canes and visible to persons having low vision. Where barricades are used to channelize pedestrians, there must be continuous detectable bottom and top rails with no gaps between individual barricades. The bottom of the bottom rail will be no higher than 6 inches above the ground surface. The top of the top rail must be at least 36 inches above the ground surface.

A gap of no more than 6 inches between the bottom rail and the ground surface may be used to allow drainage.

Standard: If drums, cones, or tubular markers are used to channelize pedestrians, they must be located so that there are no gaps between the bases of the devices, in order to create a continuous bottom, and the height of each individual drum, cone, or tubular marker must be at least 36 inches in height to be detectable to users of long canes.

Channelizing devices should be constructed and ballasted to perform in a predictable manner when inadvertently struck by a vehicle. Channelizing devices should be crashworthy. Fragments or other debris from the device or the ballast should not pose a significant hazard to road users or workers.

When channelizing devices have the potential of leading vehicular traffic out of the intended vehicular traffic space, the channelizing devices should be extended a distance in feet of 2.0 times the speed limit in mph beyond the end of the transition area.

Warning lights may be added to channelizing devices in areas with frequent fog, snow, or severe roadway curvature, or where visual distractions are present.

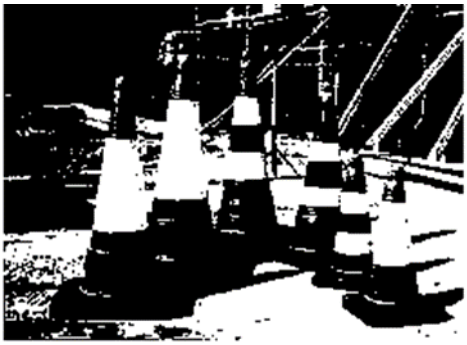
Standard: Warning lights will flash when placed on channelizing devices used alone or in a cluster to warn of a condition. Warning lights placed on channelizing devices used in a series to channelize road users must be steady-burn.

The retroreflective material used on channelizing devices will have a smooth, sealed outer surface that will display a similar color day or night.

Particular attention should be given to maintaining the channelizing devices to keep them clean, visible, and properly positioned at all times.

Standard: Devices that are damaged or have lost a significant amount of their retro-reflectivity and effectiveness must be replaced.

Cones



Standard: Cones will be predominantly orange and must be made of a material that can be struck without causing damage to the impacting vehicle. For daytime and low-speed roadways, cones must be at least 18 inches in height. When cones are used on freeways and other high-speed highways or at night on all highways, or when guidance that is more conspicuous is needed, cones must be at least 28 inches in height.

For nighttime use, cones must be retro-reflectorized or equipped with lighting devices for maximum visibility.

Traffic cones may be used to channelize road users, divide opposing vehicular traffic lanes, divide lanes when two or more lanes are kept open in the same direction, and identify short duration maintenance and utility work.

Steps should be taken to minimize the possibility of cones being blown over or displaced by wind or moving vehicular traffic. Cones should not be used for pedestrian channelization or as pedestrian barriers in TTC zones on or along sidewalks unless they are continuous between individual devices and detectable to users of long canes.

Cones may be doubled up to increase their weight.

Some cones are constructed with bases that can be filled with ballast. Others have specially weighted bases, or weight such as sandbag rings that can be dropped over the cones and onto the base to provide added stability. Ballast should be kept to the minimum amount needed.

Tubular Markers

Standard: Tubular markers will be predominantly orange and at least 18 inches high and 2 inches wide facing road users. They will be made of a material that can be struck without causing damage to the impacting vehicle. Tubular markers are used on freeways and other high-speed highways, on all highways during nighttime, or whenever additional guidance is needed, they must be at least 28 inches in height.

For nighttime use, tubular markers must be retro-reflectorized.

Tubular markers should not be used for pedestrian channelization or as pedestrian barriers in TTC zones on or along sidewalks unless they are continuous between individual devices and detectable to users of long canes.

Tubular markers have less visible area than other devices and should be used only where space restrictions do not allow for the use of other more visible devices. Tubular markers should be stabilized by affixing them to the pavement, by using weighted bases, or weights such as sandbag rings that can be dropped over the tubular markers and onto the base to provide added stability. Ballast should be kept to the minimum amount needed.

Tubular markers may be used effectively to divide opposing lanes of road users, divide vehicular traffic lanes when two or more lanes of moving motor vehicle traffic are kept open in the same direction, and to delineate the edge of a pavement drop off where space limitations do not allow the use of larger devices.

Standard: When a non-cylindrical tubular marker is used, it must be attached to the pavement so that the width facing road users is at least 2 inches wide.

Vertical Panels

Standard: Vertical panels will be 8 to 12 inches in width and at least 24 inches in height. They will have orange and white diagonal stripes and be retro-reflectorized. Vertical panels must be mounted with the top at least 36 inches above the roadway. Where the height of the vertical panel itself is 36 inches or greater, a panel stripe width of 6 inches will be used.

Where the height of the vertical panel itself is less than 36 inches, a panel stripe width of 4 inches may be used.

Standard: Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward at an angle of 45 degrees in the direction vehicular traffic are to pass.

Where space is limited, vertical panels may be used to channelize vehicular traffic, divide opposing lanes, or replace barricades.

Drums

Standard: Drums used for road user warning or channelization shall be constructed of lightweight, deformable materials. They will be at least 36 inches in height and be at least 18 inches wide regardless of orientation. Metal drums may not be used. The markings on drums will be horizontal, circumferential, alternating orange and white retroreflective stripes 4 to 6 inches wide. Each drum must have a minimum of two orange and two white stripes with the top stripe being orange. Any spaces between the horizontal orange and white stripes that are not retro-reflectorized may not be more than 3 inches wide. Drums must have closed tops that will not allow collection of construction or other debris.

Drums are highly visible, give the appearance of being formidable obstacles, and, therefore, command the respect of road users. They are portable enough to be shifted from place to place within a TTC zone in order to accommodate changing conditions, but are generally used in situations where they will remain in place for a prolonged period of time.

Although drums are most commonly used to channelize or define road user flow, they may also be used alone or in groups to mark specific locations.

Drums should not be used for pedestrian channelization or as pedestrian barriers in TTC zones on or along sidewalks unless they are continuous between individual devices and detectable to users of long canes. Drums should not be weighted with sand, water, or any material to the extent that would make them hazardous to road users or workers when struck. Drums used in regions susceptible to freezing should have drain holes in the bottom so that water will not accumulate and freeze causing a hazard if struck by a road user.

Standard: Ballast may not be placed on the top of a drum.

Type I, II, or III Barricades

A barricade is a portable or fixed device having from one to three rails with appropriate markings and is used to control road users by closing, restricting, or delineating all or a portion of the right-of-way. Barricades are classified as either Type I, Type II, or Type III.

Standard: Stripes on barricade rails will be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass.

Standard: The minimum length for Type I and Type II Barricades will be 24 inches, and the minimum length for Type III Barricades will be 48 inches. Each barricade rail will be 8 to 12 inches wide.

Where barricades extend entirely across a roadway, the stripes should slope downward in the direction toward which road users must turn. Where both right and left turns are provided, the barricade stripes should slope downward in both directions from the center of the barricade or barricades.

Where no turns are intended, the stripes should be positioned to slope downward toward the center of the barricade or barricades.

Barricade rails should be supported in a manner that will allow them to be seen by the road user, and in a manner that provides a stable support that is not easily blown over or displaced.

The width of the existing pedestrian facility should be maintained for the temporary facility if practical. Traffic control devices and other construction materials and features should not intrude into the usable width of the sidewalk, temporary pathway, or other pedestrian facility. When it is not possible to maintain a minimum width of 60 inches throughout the entire length of the pedestrian pathway, a 60 x 60 inch passing space should be provided at least every 200 ft. to allow individuals in wheelchairs to pass.

Barricade rail supports should not project into pedestrian circulation routes more than 4 inches.

For Type I Barricades, the support may include other unstriped horizontal panels necessary to provide stability.

Barricades should be crashworthy as they are located adjacent to vehicular traffic flow and are subject to impact by errant vehicles. On high-speed expressways or in other situations where barricades may be susceptible to overturning in the wind, ballasting should be used.

Sandbags may be placed on the lower parts of the frame or the stays of barricades to provide the required ballast.

Standard: Ballast must not be placed on top of any striped rail. Non-deformable objects such as rocks or chunks of concrete must not ballast barricades. Ballast may not extend into the accessible passage width 60 inches.

Type I or Type II Barricades are intended for use in situations where road user flow is maintained through the TTC zone.

Barricades may be used alone or in groups to mark a specific condition, or they may be used in a series for channelizing road users.

Type I Barricades may be used on conventional roads or urban streets.

Type II or Type III Barricades should be used on freeways and expressways or other high-speed roadways. Type III Barricades should be used to close or partially close a road.

Type III Barricades used at a road closure may be placed completely across a roadway or from curb to curb.

Where provision is made for access of authorized equipment and vehicles, the responsibility for Type III Barricades should be assigned to a person who will provide proper closure at the end of each workday. When a highway is legally closed but access must still be allowed for local road users, barricades usually are not extended completely across the roadway.

Standard: A sign must be installed with the appropriate legend concerning permissible use by local road users. Adequate visibility of the barricades from both directions must be provided.

Signs may be installed on barricades.

Direction Indicator Barricades

Standard: The Direction Indicator Barricade will consist of a One-Direction Large Arrow sign mounted above a diagonal striped, horizontally aligned, retroreflective rail. The One-Direction Large Arrow sign will be black on an orange background. The stripes on the bottom rail will be alternating orange and white retroreflective stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. The stripes will be 4 inches wide. The One-Direction Large Arrow sign will be 24 x 12 inches. The bottom rail will be 24 inches and 8 inches in height.

The Direction Indicator Barricade, including any associated ballast or lights, should be crashworthy.

The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.

If used, Direction Indicator Barricades should be used in series to direct the driver through the transition and into the intended travel lane.

Temporary Traffic Barriers as Channelizing Devices

Temporary traffic barriers are not TTC devices in themselves; however, when placed in a position identical to a line of channelizing devices and marked and/or equipped with appropriate channelization features to provide guidance and warning both day and night, they serve as TTC devices.

Standard: Temporary traffic barriers serving as TTC devices will conform to requirements for those devices. Temporary traffic barriers will not be used solely to channelize road users, but also to protect the workspace. If used to channelize vehicular traffic, the temporary traffic barrier must be supplemented with delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility.

- Temporary traffic barriers should not be used for a merging taper except in low-speed urban areas
- Temporary traffic barriers should not be used for a constricted/restricted TTC zone

When it is necessary to use a temporary traffic barrier for a merging taper in low-speed urban areas or for a constricted/restricted TTC zone, the taper must be marked and the taper length should be designed to optimize road user operations considering the available geometric conditions.

When used for channelization, temporary traffic barriers should be of a light color for increased visibility.

Longitudinal Channelizing Barricades

Longitudinal channelizing barricades are lightweight, deformable channelizing devices that can be used singly as Type I, II, or III barricades, or connected so they are highly visible. When used as a barricade, longitudinal channelizing barricades should conform to the general size, color, stripe pattern, retro-reflectivity, and placement characteristics established for other barricades.

Longitudinal channelizing barricades may be used instead of a line of cones, drums, or barricades. Longitudinal channelizing barricades may be hollow and filled with water as a ballast.

If used, longitudinal channelizing barricades should be interlocked to define or channelize the flow including pedestrian traffic control. The interlocking barricade wall should not have gaps that allow pedestrians or vehicles to stray from the channelizing path. Longitudinal channelizing barricades are often located adjacent to traffic and therefore are subject to impact by errant vehicles.

Because of their vulnerable position, longitudinal channelizing barricades should be constructed of lightweight materials and be crashworthy. Although longitudinal channelizing barricades might give the appearance of being formidable obstacles, they have not met the crashworthy requirements for temporary traffic barriers and, therefore, should not be used to shield pedestrians, including workers, from vehicle impacts or obstacles.

Longitudinal channelizing barricades may be used to channelize pedestrians.

Other Channelizing Devices

Channelizing devices other than those described in this chapter may be used in special situations based on an engineering study.

Other channelizing devices should conform to the general size, color, stripe pattern, retro-reflection, and placement characteristics established for the devices described in this chapter.

Detectable Edging for Pedestrians

Individual channelizing devices, tape, or rope used to connect individual devices, other discontinuous barriers and devices, and pavement markings are not detectable by persons with visual disabilities and are incapable of providing detectable path guidance on temporary or realigned sidewalks or other pedestrian facilities.

When it is determined that a facility should be accessible to and detectable by pedestrians with visual disabilities, a continuously detectable edging should be provided throughout the length of the facility so that it can be followed by pedestrians using long canes for guidance. This edging should protrude at least 6 inches above the surface of the sidewalk or pathway, with the bottom of the edging a maximum of 2.5 inches above the surface. This edging should be continuous throughout the length of the facility except for gaps at locations where pedestrians or vehicles will be turning or crossing. This edging should consist of a prefabricated or formed-in-place curbing or other continuous device that is placed along the edge of the sidewalk or walkway.

This edging should be firmly attached to the ground or to other devices. Adjacent sections of this edging should be interconnected so that the edging is not displaced by pedestrian or vehicular traffic or work operations, and such that it does not constitute a hazard to pedestrians, workers, or other road users.

Examples of detectable edging for pedestrians include:

- Prefabricated lightweight sections of plastic, metal, or other suitable materials that are interconnected and fixed in place to form a continuous edge
- Prefabricated lightweight sections of plastic, metal, or other suitable materials that are interconnected, fixed in place, and placed at ground level to provide a continuous connection between channelizing devices located at intervals along the edge of the sidewalk or walkway
- Sections of lumber interconnected and fixed in place to form a continuous edge
- Formed-in-place asphalt or concrete curb
- Prefabricated concrete curb sections that are interconnected and fixed in place to form a continuous edge
- Continuous temporary traffic barrier or longitudinal channelizing barricades placed along the edge of the sidewalk or walkway that provides a pedestrian edging at ground level
- Chain link or other fencing equipped with a continuous bottom rail

Detectable pedestrian edging should be orange, white, or yellow and should match the color of the adjacent channelizing devices or traffic control devices, if any are present.

Temporary Raised Islands

Standard: Temporary raised islands will be used only in combination with pavement striping and other suitable channelizing devices.

A temporary raised island may be used to separate vehicular traffic flows in two-lane, two-way operations on roadways having a vehicular traffic volume range of 4,000 to 15,000 average daily traffic (ADT) and on freeways having a vehicular traffic volume range of 22,000 ADT to 60,000 ADT.

Temporary raised islands also may be used in other than two-lane, two-way operations where physical separation of vehicular traffic from the TTC zone is not required.

Temporary raised islands should have the basic dimensions of 4 inches high by at least 18 inches wide and have rounded or chamfered corners. The temporary raised islands should not be designed in such a manner that they would cause a motorist to lose control of the vehicle if the vehicle inadvertently strikes the temporary raised island. If struck, pieces of the island should not be dislodged to the extent that they could penetrate the occupant compartment or involve other vehicles.

Standard: At pedestrian crossing locations, temporary raised islands will have an opening or be shortened to provide at least a 60-inch wide pathway for the crossing pedestrian.

Opposing Traffic Lane Divider

Opposing traffic lane dividers are delineation devices used as center lane dividers to separate opposing vehicular traffic on a two-lane, two-way operation.

Standard: Opposing traffic lane dividers must not be placed across pedestrian crossings. The Opposing Traffic Lane Divider sign is an upright, retroreflective orange-colored sign placed on a flexible support and sized at least 12 inches wide by 18 inches high.

Pavement Markings

Standard: The provisions of this Section are not applicable for short-term, mobile, or incident management TTC zones.

Pavement markings will be maintained along paved streets and highways in all long- and intermediate-term stationary TTC zones. Pavement markings will match the markings in place at both ends of the TTC zone. Pavement markings must be placed along the entire length of any surfaced detour or temporary roadway prior to the detour or roadway being opened to road users.

Warning signs, channelizing devices and delineation will be used to indicate required road user paths in TTC zones where it is not possible to provide a clear path by pavement markings. All pavement markings and devices used to delineate road user paths must be carefully reviewed during daytime and nighttime periods.

For long-term stationary operations, pavement markings in the temporary traveled way that are no longer applicable must be removed or obliterated as soon as practical. Pavement marking obliteration must leave a minimum of pavement scars and must remove old marking material. Painting over existing pavement markings with black paint or spraying with asphalt is not acceptable as a substitute for removal or obliteration.

Road users should be provided pavement markings within a TTC zone comparable to the pavement markings normally maintained along such roadways, particularly at either end of the TTC zone. The intended vehicle path should be visible in day, night, and twilight periods under both wet and dry pavement conditions.

Removable, non-reflective, preformed tape may be used where markings need to be covered temporarily.

Temporary Pavement Markings

Temporary pavement markings are those that are allowed to remain in place until the earliest date when it is practical and possible to install pavement markings that meet the Part 3 standards for pavement markings. Temporary pavement markings should not be in place for more than 2 weeks unless justified by an engineering study.

Standard: All temporary pavement markings, including pavement markings for no-passing zones, will conform to the requirements of this chapter. All temporary broken-line pavement markings must use the same cycle length as permanent markings and be at least 2 ft. long.

Half-cycle lengths with a minimum of 2 ft. stripes may be used on roadways with severe curvature (see Section 3A.05 of the federal MUTCD) for centerlines in passing zones and for lane lines. For temporary situations of three calendar days or less, for a two- or three-lane road, no-passing zones may be identified by using DO NOT PASS, PASS WITH CARE, and NO PASSING ZONE signs (see Section on pavement markings Fed. MUTCD) rather than pavement markings. In addition, DO NOT PASS, PASS WITH CARE, and NO PASSING ZONE signs may be used instead of pavement markings on roads with low volumes for longer periods in accordance with the State's or highway agency's policy.

If used, the DO NOT PASS, PASS WITH CARE, and NO PASSING ZONE signs should be placed according to MUTCD standards. The temporary use of edge lines, channelizing lines, lane reduction transitions, gore markings, and other longitudinal markings, and the various non-longitudinal markings (such as stop lines, railroad crossings, crosswalks, words or symbols) should be in accordance with the State's or highway agency's policy.

Raised Pavement Markers

Standard: If raised pavement markers are used to substitute for broken line segments, at least two retroreflective markers must be placed, one at each end of a segment of 2 to 5 ft. in length. For segments longer than 5 ft., a group of at least three retroreflective markers must be equally spaced according to Section 3B.11 of the MUTCD.

Raised pavement markers should be considered for use along surfaced detours or temporary roadways, and other changed or new travel-lane alignments.

Retroreflective or internally illuminated raised pavement markers, or non-retroreflective raised pavement markers supplemented by retro-reflective or internally illuminated markers, may replace or supplement markings prescribed in Chapters 3A and 3B, MUTCD.

Delineators

Standard: When used, delineators will combine with or supplement other TTC devices. They must be mounted on crashworthy supports so that the reflecting unit is approximately 4 ft. above the near roadway edge. The standard color for delineators used along both sides of two-way streets and highways and the right side of one-way roadways shall be white. Delineators used along the left side of one-way roadways shall be yellow.

Spacing along roadway curves should be such that several delineators are always visible to the driver.

Delineators may be used in TTC zones to indicate the alignment of the roadway and to outline the required vehicle path through the TTC zone.

Lighting Devices

Lighting devices should be provided in TTC zones based on engineering judgment. When used to supplement channelization, the maximum spacing for warning lights should be identical to the channelizing device spacing requirements.

Four types of lighting devices are commonly used in TTC zones. They are floodlights, flashing warning beacons, warning lights, and steady-burn electric lamps.

Lighting devices may be used to supplement retro-reflectorized signs, barriers, and channelizing devices.

During normal daytime maintenance operations, the functions of flashing warning beacons may be provided by high-intensity rotating, flashing, oscillating, or strobe lights on a maintenance vehicle.

Standard: Although vehicle hazard warning lights are permitted to be used to supplement high-intensity rotating, flashing, oscillating, or strobe lights, they may not be used instead of high-intensity rotating, flashing, oscillating, or strobe lights.

Floodlights

Utility, maintenance, or construction activities on highways are frequently conducted during nighttime periods when vehicular traffic volumes are lower. Large construction projects are sometimes operated on a double-shift basis requiring night work. When nighttime work is being performed, floodlights should be used to illuminate the work area, equipment crossings, and other areas.

Standard: Except in emergencies, flagger stations must be illuminated at night. Floodlighting must not produce a disabling glare condition for approaching road users, flaggers, or workers.

The adequacy of the floodlight placement and elimination of potential glare should be determined by driving through and observing the floodlighted area from each direction on all approaching roadways after the initial floodlight setup, at night, and periodically.

Desired illumination levels vary depending upon the nature of the task involved. An average horizontal luminance of 50 lux (5-foot candles) can be adequate for general activities. Tasks requiring high levels of precision and extreme care can require an average horizontal luminance of 216 lux (20-foot candles).

Flashing Warning Beacons

Flashing warning beacons are often used to supplement a TTC device.

Standard: Flashing warning beacons will comply with MUTCD provisions, and will be a flashing yellow light with a minimum diameter of 8 inches.

Flashing warning beacons should be operated 24 hours per day. The temporary end of a freeway is an example of a location where flashing warning beacons alert drivers to the changing roadway conditions and the need to reduce speed in transitioning from the freeway to another roadway type.

Warning Lights

Type A, Type B, Type C, and Type D 360-degree warning lights are portable, powered, yellow, lens-directed, enclosed lights.

Standard: Warning lights will be in accordance with the current ITE "Purchase Specification for Flashing and Steady-Burn Warning Lights" (see Section 1A.11, MUTCD). When warning lights are used, they must be mounted on signs or channelizing devices in a manner that, if hit by an errant vehicle, they will not be likely to penetrate the windshield.

The maximum spacing for warning lights should be identical to the channelizing device spacing requirements. The lightweight and portability of warning lights are advantages that make these devices useful as supplements to the retro-reflectorized signs and channelizing devices. The flashing lights are effective in attracting road users' attention.

Warning lights may be used in either a steady-burn or a flashing mode.

Standard: Flashing warning lights must not be used for delineation, as a series of flashers fails to identify the desired vehicle path. Type A Low-Intensity Flashing warning lights, Type C Steady-Burn warning lights, and Type D 360- degree Steady-Burn warning lights will be maintained to be capable of being visible on a clear night from a distance of 3,000 ft.

Type B High-Intensity flashing warning lights will be maintained to be capable of being visible on a sunny day when viewed without the sun directly on or behind the device from a distance of 1,000 ft. Warning lights will have a minimum mounting height of 30 inches to the bottom of the lens.

Type A Low-Intensity Flashing warning lights are used to warn road users during nighttime hours that they are approaching or proceeding in a potentially hazardous area.

Type A warning lights may be mounted on channelizing devices.

Type B High-Intensity Flashing warning lights are used to warn road users during both daylight and nighttime hours that they are approaching a potentially hazardous area.

Type B warning lights are designed to operate 24 hours per day and may be mounted on advance warning signs or on independent supports. Type C Steady-Burn warning lights and Type D 360-degree Steady-Burn warning lights may be used during nighttime hours to delineate the edge of the traveled way.

When used to identify a curve, Type C and Type D 360-degree warning lights should only be used on devices on the outside of the curve, and not on the inside of the curve.

Steady-Burn Electric Lamps

Steady-Burn electric lamps are a series of low-wattage, yellow, electric lamps, generally hard-wired to a 110-volt external power source.

Steady-Burn electric lamps may be used in place of Type C Steady-Burn warning lights.

Temporary Traffic Control Signals

Standard: Temporary traffic control signals used to control road user movements through TTC zones and in other TTC situations, shall meet the applicable provisions of Section 4D.20 of the MUTCD.

Temporary traffic control signals are typically used in TTC zones such as temporary haul road crossings; temporary one-way operations along a one-lane, two-way highway; temporary one-way operations on bridges, reversible lanes, and intersections.

Standard: One-lane, two-way vehicular traffic flow (see Chapter 4G, MUTCD) requires an all-red interval long enough for road users to clear the portion of the TTC zone controlled by the traffic control signals. Safeguards must be incorporated to avoid the possibility of conflicting signal indications at each end of the TTC zone.

Where pedestrian traffic is detoured to a temporary traffic control signal, engineering judgment should be used to determine if pedestrian signals or accessible pedestrian signals (see Section 4E.06, MUTCD) are needed for crossing along an alternate route.

Temporary traffic control signals may be portable or temporarily mounted on fixed supports.

Standard: The supports for temporary traffic control signals must not encroach into the minimum required width of a “pedestrian access route” of 48 inches or an “alternate circulation path” of 36 inches.

Temporary traffic control signals should only be used in situations where temporary traffic control signals are preferable to other means of traffic control, such as changing the work staging or work zone size to eliminate one-way vehicular traffic movements, using flaggers to control one-way or crossing movements, using STOP or YIELD signs, and using warning devices alone.

Factors related to the design and applications of temporary traffic control signals include the following:

- Safety and road user needs
- Work staging and operations
- The feasibility of using other TTC strategies (for example, flaggers, providing space for two lanes, or detouring road users, including bicyclists and pedestrians)

- Sight distance restrictions
- Human factors considerations (for example, lack of driver familiarity with temporary traffic control signals)
- Road-user volumes including roadway and intersection capacity
- Affected side streets and driveways
- Vehicle speeds
- Parking
- Turning restrictions
- Pedestrians
- The nature of adjacent land uses (such as residential or commercial)
- Legal authority
- Signal phasing and timing requirements
- Full-time or part-time operation
- Actuated, fixed-time, or manual operation
- Power failures or other emergencies
- Inspection and maintenance needs
- Need for detailed placement, timing, and operation records
- Operation by contractors or by others

Although temporary traffic control signals can be mounted on trailers or lightweight portable supports, fixed supports offer superior resistance to displacement or damage by severe weather, vehicle impact, and vandalism. Other TTC devices should be used to supplement temporary traffic control signals, including warning and regulatory signs, pavement markings, and channelizing devices.

The design and placement of temporary traffic control signals should include interconnection to other traffic control signals along the subject roadway. Temporary traffic control signals not in use should be covered or removed.

Temporary Traffic Barriers

Temporary traffic barriers are devices designed to help prevent penetration by vehicles while minimizing injuries to vehicle occupants, and are designed to protect workers, bicyclists, and pedestrians. The four primary functions of temporary traffic barriers are:

- To keep vehicular traffic from entering work areas, such as excavations or material storage sites
- To separate workers, bicyclists, and pedestrians from motor vehicle traffic
- To separate opposing directions of vehicular traffic
- To separate vehicular traffic, bicyclists, and pedestrians from the work area such as false work for bridges and other exposed objects

Temporary traffic barriers, including shifting portable or movable barrier installations to accommodate varying directional vehicular traffic demands, may be used to separate two-way vehicular traffic.

Because the protective requirements of a TTC situation have priority in determining the need for temporary traffic barriers, their use should be based on an engineering study. When serving the additional function of channelizing vehicular traffic (see Section Temporary traffic barriers as channelizing devices), temporary traffic barriers should be light colored for increased visibility.

Standard: Temporary traffic barriers will be supplemented with standard delineation, pavement markings, or channelizing devices for improved daytime and nighttime visibility if they are used to channelize vehicular traffic. The delineation color will match the applicable pavement marking color. In order to minimize the effect of striking the end of a temporary traffic barrier, the end must be installed in accordance with AASHTO's "Roadside Design Guide" by flaring until the end is outside the acceptable clear zone or by providing crashworthy end treatments.

Warning lights or steady-burn electric lamps may be mounted on temporary traffic barrier installations.

A movable barrier is a linear system of connected barrier segments that can rapidly be shifted laterally by using a specially designed transfer vehicle. The transfer is accomplished in a manner that does not interfere with vehicular traffic in adjacent lanes. Applications of movable barriers include the following:

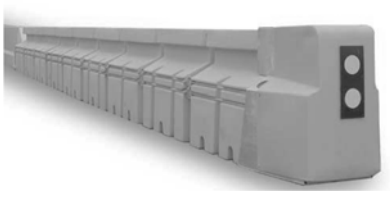
- Closing an additional lane during work periods while maintaining the advantage of having the travel way separated from the work space by a barrier
- Closing an additional lane during off-peak periods to provide extra space for work activities without adversely impacting vehicular traffic flow
- Creating a temporary reversible lane, thus providing unbalanced capacity favoring the major direction of vehicular traffic flow

More specific information on the use of temporary traffic barriers is contained in Chapters 8 and 9 of AASHTO's "Roadside Design Guide".

Crash Cushions

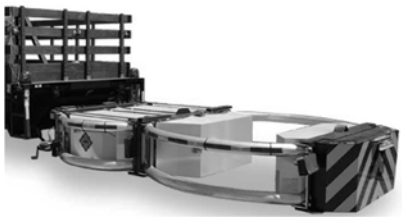
Crash cushions are systems that reduce the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide".

Standard: Crash cushions will be crashworthy. They will also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions must be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions must be promptly repaired or replaced to maintain their crashworthiness.



Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

Standard: Stationary crash cushions will be designed for the specific application intended. Truck-mounted attenuators will be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator must be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.



Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators.

The shadow truck should be positioned far enough in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Chapter 9 of AASHTO's "Roadside Design Guide" contains additional information regarding the use of shadow vehicles. If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

Vehicle-Arresting Systems

Vehicle-arresting systems are designed to prevent penetration into activity areas while providing for smooth, reasonably safe deceleration for the errant vehicles. They can consist of portable netting, cables, and energy absorbing anchors.

When used, a vehicle-arresting system should be used in accordance with the manufacturer's specifications, and should be located so that vehicles are not likely to penetrate the location that the system is designed to protect.

Rumble Strips

Transverse rumble strips consist of intermittent narrow areas of rough-textured or slightly raised or depressed road surface that extend across the travel lanes to alert drivers to unusual vehicular traffic conditions. Through noise and vibration, they attract the driver's attention to such features as unexpected changes in alignment and to conditions requiring a stop. Longitudinal rumble strips consist of a series of rough-textured or slightly raised or depressed road surfaces located along the shoulder to alert road users that they are leaving the travel lanes.

Standard: If it is desirable to use a color other than the color of the pavement for a longitudinal rumble strip, the color of the rumble strip will be the same color as the longitudinal line the rumble strip supplements. If the color of a transverse rumble strip used within a travel lane is not the color of the pavement, the color of the rumble strip will be white.

Intervals between transverse rumble strips may be reduced as the distance to the approached conditions is diminished in order to convey an impression that a closure speed is too fast and/or that an action is imminent. A sign that warns drivers of the onset of rumble strips may be placed in advance of any transverse rumble strip installation.

Transverse rumble strips should be placed transverse to vehicular traffic movement. They should not adversely affect overall pavement skid resistance under wet or dry conditions.

In urban areas, even though a closer spacing might be warranted, transverse rumble strips should be designed in a manner that does not promote unnecessary braking or erratic steering maneuvers by road users.

Transverse rumble strips should not be placed on sharp horizontal or vertical curves. Rumble strips should not be placed through pedestrian crossings or on bicycle routes. Transverse rumble strips should not be placed on roadways used by bicyclists unless a minimum clear path of 4 ft. is provided at each edge of the roadway or on each paved shoulder as described in AASHTO's "Guide to the Development of Bicycle Facilities".

Longitudinal rumble strips should not be placed on the shoulder of a roadway that is used by bicyclists unless a minimum clear path of 4 ft. is also provided on the shoulder.

SCREENS

Screens are used to block the road users' view of activities that can be distracting. Screens might improve safety and motor vehicle traffic flow where volumes approach the roadway capacity because they discourage gawking and reduce headlight glare from oncoming motor vehicle traffic.

Screens should not be mounted where they could adversely restrict road user visibility and sight distance and adversely affect the reasonably safe operation of vehicles.

Screens may be mounted on the top of temporary traffic barriers that separate two-way motor vehicle traffic.

Design of screens should be in accordance with Chapter 9 of AASHTO's Roadside Design Guide.

TYPE OF TEMPORARY TRAFFIC CONTROL ZONE ACTIVITIES

Typical Applications

Each TTC zone is different. Many variables, such as location of work, highway type, geometrics, vertical and horizontal alignment, intersections, interchanges, road user volumes, road vehicle mix (buses, trucks, and cars), and road user speeds affect the needs of each zone. The goal of TTC in work zones is safety with minimum disruption to road users. The key factor in promoting TTC zone safety is proper judgment.

Typical applications of TTC zones are organized according to duration, location, type of work, and highway type. These typical applications include the use of various TTC methods, but do not include a layout for every conceivable work situation.

Work Duration

Work duration is a major factor in determining the number and types of devices used in TTC zones. The duration of a TTC zone is defined relative to the length of time a work operation occupies a spot location.

Standard: The five categories of work duration and their time at a location will be:

- **Long-term stationary is work that occupies a location for more than 3 days**
- **Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than 1 hour**
- **Short-term stationary is daytime work that occupies a location for more than 1 hour within a single daylight period**
- **Short duration is work that occupies a location up to 1 hour**
- **Mobile is work that moves intermittently or continuously**

At long-term stationary TTC zones, there is ample time to install and realize benefits from the full range of TTC procedures and devices that are available for use. Generally, larger channelizing devices, temporary roadways, and temporary traffic barriers are used.

Standard: Since long-term operations extend into nighttime, retroreflective and/or illuminated devices will be used in long-term stationary TTC zones.

Inappropriate markings in long-term stationary TTC zones should be removed and replaced with temporary markings.

In intermediate-term stationary TTC zones, it might not be feasible or practical to use procedures or devices that would be desirable for long-term stationary temporary traffic control zones, such as altered pavement markings, temporary traffic barriers, and temporary roadways. The increased time to place and remove these devices in some cases could significantly lengthen the project, thus increasing exposure time. In other instances, there might be insufficient payback time to economically justify more elaborate TTC measures.

Standard: Since intermediate-term operations extend into nighttime, retroreflective and/or illuminated devices will be used in intermediate-term stationary TTC zones.

Most maintenance and utility operations are short-term stationary work.

As compared to stationary operations, mobile and short-duration operations are activities that might involve different treatments. Devices having greater mobility might be necessary such as signs mounted on trucks. Devices that are larger, more imposing, or more visible can be used effectively and economically. The mobility of the TTC zone is important.

Maintaining reasonably safe work and road user conditions is a paramount goal in carrying out mobile operations.

Safety in short-duration or mobile operations should not be compromised by using fewer devices simply because the operation will frequently change its location.

Appropriately colored or marked vehicles with high-intensity rotating, flashing, oscillating, or strobe lights may be used in place of signs and channelizing devices for short-duration or mobile operations. These vehicles may be augmented with signs or arrow panels.

During short-duration work, it often takes longer to set up and remove the TTC zone than to perform the work. Workers face hazards in setting up and taking down the TTC zone. In addition, since the work time is short, delays affecting road users are significantly increased when additional devices are installed and removed. Considering these factors, simplified control procedures may be warranted for short-duration work.

A reduction in the number of devices may be offset by the use of other more dominant devices such as high intensity rotating, flashing, oscillating, or strobe lights on work vehicles.

Mobile operations often involve frequent short stops for activities such as litter cleanup, pothole patching, or utility operations, and are similar to short-duration operations.

Warning signs, high-intensity rotating, flashing, oscillating, or strobe lights on a vehicle, flags, and/or channelizing devices should be used and moved periodically to keep them near the mobile work area.

Flaggers may be used for mobile operations that often involve frequent short stops.

Mobile operations also include work activities where workers and equipment move along the road without stopping, usually at slow speeds. The advance warning area moves with the work area.

When mobile operations are being performed, a shadow vehicle equipped with an arrow panel or a sign should follow the work vehicle, especially when vehicular traffic speeds or volumes are high. Where feasible, warning signs should be placed along the roadway and moved periodically as work progresses. Under high-volume conditions, consideration should be given to scheduling mobile operations work during off-peak hours.

If there are mobile operations on a high-speed travel lane of a multi-lane divided highway, arrow panels should be used.

For mobile operations that move at speeds less than 5 km/h (3 mph), mobile signs or stationary signing that is periodically retrieved and repositioned in the advance warning area may be used.

At higher speeds, vehicles may be used as components of the TTC zones for mobile operations. Appropriately colored and marked vehicles with signs, flags, high-intensity rotating, flashing, oscillating, or strobe lights, truck-mounted attenuators, and arrow panels or portable changeable message signs may follow a train of moving work vehicles.

For some continuously moving operations, such as street sweeping and snow removal, a single work vehicle with appropriate warning devices on the vehicle may be used to provide warning to approaching road users.

Standard: Mobile operations that move at speeds greater than 30 km/h (20 mph), such as pavement marking operations, will have appropriate devices on the equipment (that is, high-intensity rotating, flashing, oscillating, or strobe lights, signs, or special lighting), or will use a separate vehicle with appropriate warning devices.

Location of Work

The choice of TTC needed for a TTC zone depends upon where the work is located. As a rule, the closer the work is to road users (including bicyclists and pedestrians), the greater the number of TTC devices that are needed. Procedures are described later in this Chapter for establishing TTC zones in the following locations:

- Outside the shoulder
- On the shoulder with no encroachment
- On the shoulder with minor encroachment
- Within the median
- Within the traveled way

Standard: When the workspace is within the traveled way, except for short-duration and mobile operations, advance warning will provide a general message that work is taking place and will supply information about highway conditions. TTC devices will indicate how vehicular traffic can move through the TTC zone.

Modifications to Fulfill Special Needs

Other devices may be added to supplement the devices indicated in the typical applications, and device spacing may be adjusted to provide additional reaction time. When conditions are less complex than those depicted in the typical applications, fewer devices may be needed.

When conditions are more complex, typical applications should be modified by giving particular attention to the provisions set forth in Chapter 6B of the MUTCD and by incorporating appropriate devices and practices from the following lists:

A. Additional devices:

- Signs
- Arrow panels
- More channelizing devices at closer spacing (see Section 6F.68 for information regarding detectable edging for pedestrians)
- Temporary raised pavement markers
- High-level warning devices
- Portable changeable message signs
- Temporary traffic control signals (including pedestrian signals and accessible pedestrian signals)
- Temporary traffic barriers
- Crash cushions
- Screens
- Rumble strips
- More delineation

B. Upgrading of devices:

- A full complement of standard pavement markings
- Brighter and/or wider pavement markings
- Larger and/or brighter signs
- Channelizing devices with greater conspicuity
- Temporary traffic barriers in place of channelizing devices

C. Improved geometrics at detours or crossovers

D. Increased distances:

- Longer advance warning area
- Longer tapers

E. Lighting:

- Temporary roadway lighting
- Steady-burn lights used with channelizing devices
- Flashing lights for isolated hazards
- Illuminated signs
- Floodlights

Where pedestrian or bicycle usage is high, typical applications should also be modified by giving particular attention to the provisions set forth in Part 6 of the MUTCD related to accessibility and detectability provisions in TTC zones.

Work Affecting Pedestrian and Bicycle Facilities

It is not uncommon, particularly in urban areas, that roadwork and the associated TTC will affect existing pedestrian or bicycle facilities. It is essential that the needs of all road users, including pedestrians with disabilities, be considered in TTC zones.

In addition to the specific provisions identified in the following Work Outside of Shoulder through Work within the Traveled Way at an Intersection sections, there are a number of provisions that might be applicable for all of the types of activities identified in this Chapter.

Where pedestrian or bicycle usage is high, the typical applications should be modified by giving particular attention to the provisions set forth in section G, detectable edging for pedestrians, and in other Sections of Part 6, MUTCD related to accessibility and detectability provisions in TTC zones.

Pedestrians should be separated from the worksite by appropriate devices that maintain the accessibility and detectability for pedestrians with disabilities.

Bicyclists and pedestrians should not be exposed to unprotected excavations, open utility access, overhanging equipment, or other such conditions.

Except for short duration and mobile operations, when a highway shoulder is occupied, a SHOULDER WORK sign should be placed in advance of the activity area. When work is performed on a paved shoulder 8 ft. or more in width, channelizing devices should be placed on a taper having a length that conforms to the requirements of a shoulder taper. Signs should be placed such that they do not narrow any existing pedestrian passages to less than 48 inches.

Pedestrian detours should be avoided since pedestrians rarely observe them and the cost of providing accessibility and detectability might outweigh the cost of maintaining a continuous route. Whenever possible, work should be done in a manner that does not create a need to detour pedestrians from existing routes or crossings.

Standard: Where pedestrian routes are closed, alternate pedestrian routes must be provided. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities must be detectable and will include accessibility features consistent with the features present in the existing pedestrian facility.

Work Outside of Shoulder

When work is being performed off the roadway (beyond the shoulders, but within the right-of-way), little or no TTC might be needed. TTC generally is not needed where work is confined to an area 15 ft. or more from the edge of the traveled way. However, TTC is appropriate where distracting situations exist, such as vehicles parked on the shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform the work operations (for example, mowing).

For work beyond the shoulder where the above situations exist, a single warning sign, such as ROAD WORK AHEAD, should be used. If the equipment travels on the roadway, the equipment should be equipped with appropriate flags, high-intensity rotating, flashing, oscillating, or strobe lights, and/or a SLOW-MOVING VEHICLE sign.

If work vehicles are on the shoulder, a SHOULDER WORK sign may be used. For mowing operations, the sign MOWING AHEAD may be used.

Where the activity is spread out over a distance of more than 2 miles, the SHOULDER WORK sign may be repeated every 1 mile. A supplementary plaque with the message NEXT X MILES may be used.

A general warning sign like ROAD MACHINERY AHEAD should be used if workers and equipment must occasionally move onto the shoulder.

Work on the Shoulder with No Encroachment

The provisions of this Section apply to short-term through long-term stationary operations.

Standard: When paved shoulders having a width of 8 ft. or more are closed, at least one advance warning sign will be used. In addition, channelizing devices will be used to close the shoulder in advance to delineate the beginning of the work space and direct motor vehicle traffic to remain within the traveled way.

When paved shoulders having a width of 8 ft. or more are closed on freeways and expressways, road users should be warned about potential disabled vehicles that cannot get off the traveled way. An initial general warning sign (such as ROAD WORK AHEAD) should be used, followed by a RIGHT or LEFT SHOULDER CLOSED sign. Where the end of the shoulder closure extends beyond the distance that can be perceived by road users, a supplementary plaque bearing the message NEXT X FEET or MILES should be placed below the SHOULDER CLOSED sign. On multi-lane, divided highways, signs advising of shoulder work or the condition of the shoulder should be placed only on the side of the affected shoulder.

When an improved shoulder is closed on a high-speed roadway, it should be treated as a closure of a portion of the road system because road users expect to be able to use it in emergencies. Road users should be given ample advance warning that shoulders are closed for use as refuge areas throughout a specified length of the approaching TTC zone. The sign(s) should read SHOULDER CLOSED with distances indicated. The workspace on the shoulder should be closed off by taper or channelizing devices.

When the shoulder is not occupied but work has adversely affected its condition, the LOW SHOULDER or SOFT SHOULDER sign should be used, as appropriate.

Where the condition extends over a distance in excess of 1 mile, the sign should be repeated at 1-mile intervals.

In addition, a supplementary plaque bearing the message NEXT X MILES may be used. Temporary traffic barriers may be needed to inhibit encroachment of errant vehicles into the workspace and to protect workers.

Standard: When used for shoulder work, arrow panels will operate only in the caution mode.

Work on the Shoulder with Minor Encroachment

When work takes up part of a lane, vehicular traffic volumes, vehicle mix (buses, trucks, cars, and bicycles), speed, and capacity should be analyzed to determine whether the affected lane should be closed. Unless the lane encroachment permits a remaining lane width of 10 ft., the lane should be closed.

Truck off-tracking should be considered when determining whether the minimum lane width of 10 ft. is adequate.

A lane width of 9 ft. may be used for short-term stationary work on low-volume, low-speed roadways when vehicular traffic does not include longer and wider heavy commercial vehicles.

Work Within the Median

If work in the median of a divided highway is within 15 ft. from the edge of the traveled way for either direction of travel, TTC should be used using advance warning signs and channelizing devices.

Work Within the Traveled Way of Two-Lane Highways

Detour signs are used to direct road users onto another roadway. At diversions, road users are directed onto a temporary roadway or alignment placed within or adjacent to the right-of-way. Channelizing devices and pavement markings are used to indicate the transition to the temporary roadway.

When a detour is long, detour signs should be installed periodically to remind and reassure road users that they are still successfully following the detour.

When an entire roadway is closed, a detour should be provided and road users should be warned in advance of the closure, which in this example is a closure 10 miles from the intersection. If local road users are allowed to use the roadway up to the closure, the ROAD CLOSED AHEAD, LOCAL TRAFFIC ONLY sign should be used. The portion of the road open to local road users should have adequate signing, marking, and delineation.

Detours should be signed so that road users will be able to traverse the entire detour route and back to the original roadway.

Techniques for controlling vehicular traffic under one-lane, two-way conditions are described in Section 6C.10, MUTCD.

STOP/YIELD sign control may be used on roads with low traffic volumes. A temporary traffic control signal may also be used.

Work Within the Traveled Way of Urban Streets

In urban TTC zones, decisions are needed on how to control vehicular traffic, such as how many lanes are required, whether any turns need to be prohibited at intersections, and how to maintain access to business, industrial, and residential areas.

Standard: If the TTC zone affects the movement of pedestrians, adequate pedestrian access and walkways must be provided. If the TTC zone affects an accessible and detectable pedestrian facility, the accessibility and detectability will be maintained along the alternate pedestrian route. If the TTC zone affects the movement of bicyclists, adequate access to the roadway or shared-use paths will be provided. Where transit stops are affected or relocated because of work activity, access to temporary transit stops will be provided.

If a designated bicycle route is closed because of the work being done, a signed alternate route should be provided. Bicyclists should not be directed onto the path used by pedestrians. Work sites within the intersection should be protected against inadvertent pedestrian incursion by providing detectable channelizing devices.

Utility work takes place both within and outside the roadway to construct and maintain services such as power, gas, light, water, or telecommunications. Operations often involve intersections, since that is where many of the network junctions occur. The work force is usually small, only a few vehicles are involved, and the number and types of TTC devices placed in the TTC zone is usually minimal.

Standard: All TTC devices shall be retro-reflective or illuminated if utility work is performed during nighttime hours.

As discussed under short-duration projects, however, the reduced number of devices in utility work zones should be offset by the use of high-visibility devices, such as high-intensity rotating, flashing, oscillating, or strobe lights on work vehicles or high-level warning devices.

Work Within the Traveled Way of Multi-Lane, Non-Access Controlled Highways

Work on multi-lane (two or more lanes of moving motor vehicle traffic in one direction) highways is divided into right-lane closures, left-lane closures, interior-lane closures, multiple-lane closures, and closures on five-lane roadways.

Standard: When a lane is closed on a multi-lane road for other than a mobile operation, a transition area containing a merging taper will be used.

When justified by an engineering study, temporary traffic barriers should be used to prevent incursions of errant vehicles into hazardous areas or work space.

Standard: When temporary traffic barriers are placed immediately adjacent to the traveled way, they must be equipped with appropriate channelizing devices, delineation, and/or other TTC devices. For lane closures, the merging taper will use channelizing devices and the temporary traffic barrier will be placed beyond the transition area.

It must be recognized that although temporary traffic barriers are used in several of the typical applications, they are not considered TTC devices in themselves.

If morning and evening peak hour vehicular traffic volumes in the two directions are uneven and the greater volume is on the side where the work is being done in the right lane, consideration should be given to closing the inside lane for opposing vehicular traffic and making the lane available to the side with heavier vehicular traffic.

If the larger vehicular traffic volume changes to the opposite direction at a different time of the day, the TTC should be changed to allow two lanes for opposing vehicular traffic by moving the devices from the opposing lane back to the centerline. When it is necessary to create a temporary centerline that is not consistent with the pavement markings, channelizing devices should be used and closely spaced.

When closing a left lane on a multi-lane undivided road, as vehicular traffic flow permits, the two interior lanes may be closed to provide drivers and workers additional lateral clearance and to provide access to the workspace.

Standard: When only the left lane is closed on undivided roads, channelizing devices will be placed along the centerline as well as along the adjacent lane.

When an interior lane is closed, an adjacent lane should also be considered for closure to provide additional space for vehicles and materials and to facilitate the movement of equipment within the workspace.

When multiple lanes in one direction are closed, a capacity analysis should be made to determine the number of lanes needed to accommodate motor vehicle traffic needs. Vehicular traffic should be moved over one lane at a time.

Standard: When a directional roadway is closed, inapplicable WRONG WAY signs and markings, and other existing traffic control devices at intersections within the temporary two-lane, two-way operations section must be covered, removed, or obliterated.

When half the road is closed, or both interior lanes are closed on an undivided highway, both directions of vehicular traffic may be accommodated by reducing traffic flow to one lane in each direction and using a combination temporary traffic controls such as temporary line markings, tapers, signs, and arrow panels

When a roadway must be closed on a divided highway, a median crossover may be used.

Work Within the Traveled Way at an Intersection

The typical applications for intersections are classified according to the location of the workspace with respect to the intersection area (as defined by the extension of the curb or edge lines). The three classifications are near side, far side, and in the intersection. Workspaces often extend into more than one portion of the intersection. For example, work in one quadrant often creates a nearside workspace on one street and a far-side workspace on the cross street. In such instances, an appropriate TTC plan is obtained by combining features shown in two or more of the intersection and pedestrian typical applications.

TTC zones near intersections might block movements and interfere with normal road user flows. Such conflicts frequently occur at more complex intersections having features such as traffic signal heads over particular lanes, lanes allocated to specific movements, multiple signal phases, signal detectors for actuated control, and accessible pedestrian signals, and detectors.

The effect of the work upon signal operation should be considered, such as signal phasing for ensuring adequate capacity, maintaining or adjusting signal detectors, and ensuring the appropriate visibility of signal heads.

Standard: When work will occur near an intersection where operational, capacity, or pedestrian accessibility problems are anticipated, the highway agency having jurisdiction must be contacted.

For work at an intersection, advance warning signs, devices, and markings should be used on all cross streets, as appropriate. The typical applications depict urban intersections on arterial streets. Where the posted speed limit, the off-peak 85th-percentile speed prior to the work starting, or the anticipated speed exceeds 40 mph, additional warning signs should be used in the advance warning area.

Pedestrian crossings near TTC sites should be separated from the worksite by appropriate barriers that maintain the accessibility and detectability for pedestrians with disabilities.

Nearside workspaces are simply handled as a midblock lane closure. A problem that might occur with nearside lane closure is a reduction in capacity, which during certain hours of operation could result in congestion and backups.

When nearside workspaces are used, an exclusive turn lane may be used for through vehicular traffic.

Where space is restricted in advance of near-side work spaces, as with short block spacing, two warning signs may be used in the advance warning area, and a third action-type warning or a regulatory sign (such as Keep Left) may be placed within the transition area.

Far-side workspaces involve additional treatment because road users typically enter the activity area by straight-through and left- or right-turning movements.

When a lane through an intersection must be closed on the far side, it should also be closed on the nearside approach to preclude merging movements within the intersection.

If there are a significant number of vehicles turning from a nearside lane that is closed on the far side, the nearside lane may be converted to an exclusive turn lane.

If the work is within the intersection, any of the following strategies may be used:

- A small work space so that road users can move around it
- Flaggers or uniformed law enforcement officers to direct road users
- Work in stages so the work space is kept to a minimum
- Road closures or upstream diversions to reduce road user volumes

Depending on road user conditions, a flagger(s) and/or a uniformed law enforcement officer(s) should be used to control road users.

Work Within the Traveled Way of Freeways and Expressways

Problems of TTC might occur under the special conditions encountered where vehicular traffic must be moved through or around TTC zones on high-speed, high-volume roadways. Although the general principles outlined in the previous Sections of this chapter are applicable to all types of highways, high-speed, access controlled highways need special attention in order to reasonably safely and efficiently accommodate vehicular traffic while also protecting work forces. The road user volumes, road vehicle mix (buses, trucks, cars, and bicycles, if permitted), and speed of vehicles on these facilities require that careful TTC procedures be implemented, for example, to induce critical merging maneuvers well in advance of work spaces and in a manner that creates minimum turbulence and delay in the vehicular traffic stream. These situations often require more conspicuous devices than specified for normal rural highway or urban street use. However, the same important basic considerations of uniformity and standardization of general principles apply for all roadways.

The roadway design and operational features complicate work under high-speed, high-volume vehicular traffic on a controlled access highway. The presence of a median that establishes separate roadways for directional vehicular traffic flow might prohibit the closing of one of the roadways or the diverting of vehicular traffic to the other roadway. Lack of access to and from adjacent roadways prohibits rerouting of vehicular traffic away from the workspace in many cases. Other conditions exist where work must be limited to night hours, thereby necessitating increased use of warning lights, illumination of workspaces, and advance warning systems.

Two-Lane, Two-Way Traffic on One Roadway of a Normally Divided Highway

Two-lane, two-way operation on one roadway of a normally divided highway is a typical procedure that requires special consideration in the planning, design, and work phases, because unique operational problems (for example, increasing the risk of head-on crashes) can arise with the two-lane, two-way operation.

Standard: When two-lane, two-way traffic control must be maintained on one roadway of a normally divided highway, opposing vehicular traffic will be separated with temporary traffic barriers either (concrete safety-shape or approved alternate) or with channelizing devices throughout the length of the two-way operation. The use of markings and complementary signing, by themselves, must not be used.

Crossovers

The following are considered good guiding principles for the design of crossovers:

- Tapers for lane drops should be separated from the crossovers, as shown in Figure H-39.
- Crossovers should be designed for speeds no lower than 10 mph below the posted speed
- A good array of channelizing devices, delineators, and full-length, properly placed pavement markings should be used to provide drivers with a clearly defined travel path
- The design of the crossover should accommodate all vehicular traffic, including trucks and buses

Temporary traffic barriers and the excessive use of TTC devices cannot compensate for poor geometric and roadway cross-section design of crossovers.

Interchanges

Access to interchange ramps on limited-access highways should be maintained even if the workspace is in the lane adjacent to the ramps. Access to exit ramps should be clearly marked and delineated with channelizing devices. For long-term projects, conflicting pavement markings should be removed and new ones placed. Early coordination with officials having jurisdiction over the affected cross streets and providing emergency services should occur before ramp closings.

If access is not possible, ramps may be closed by using signs and Type III barricades. As the workspace changes, the access area may be changed.

When a workspace interferes with an entrance ramp, a lane may need to be closed on the freeway. A TTC zone in the entrance ramp may require shifting ramp vehicular traffic.

Movable Barriers

If the work activity permits, a movable barrier may be used and relocated to the shoulder during non-work periods or peak-period vehicular traffic conditions.

Work in the Vicinity of Highway-Rail Grade Crossings

Standard: When highway-rail grade crossings exist either within or near a TTC zone, lane restrictions, flagging, or other operations must not create conditions where vehicles can be lined up across the railroad tracks. If the backlog of vehicles across the tracks cannot be avoided, a uniformed law enforcement officer or flagger must be provided at the crossing to prevent vehicles from stopping on the tracks, even if automatic warning devices are in place.

Early coordination with the railroad Company should occur before work starts.

Temporary Traffic Control During Nighttime Hours

Conducting highway construction and maintenance activities during night hours could provide an advantage when traditional daytime traffic control strategies cannot achieve an acceptable balance between worker and public safety, traffic and community impact, and constructability. The two basic advantages of working at night are reduced traffic congestion and less involvement with business activities. However, the two basic conditions that must normally be met for night work to offer any advantage are reduced traffic volumes, easy set up, and removal of the traffic control patterns on a nightly basis.

Shifting work activities to night hours, when traffic volumes are lower and normal business is less active, might offer an advantage in some cases, as long as the necessary work can be completed and the work site restored to essentially normal operating conditions to carry the higher traffic volume during non-construction hours.

Although working at night might offer advantages, it also includes safety issues. Reduced visibility inherent in night work impacts the performance of both drivers and workers. Because traffic volumes are lower and congestion is minimized, speeds are often higher at night necessitating greater visibility at a time when visibility is reduced. Finally, the incidence of impaired (alcohol or drugs), fatigued, or drowsy drivers might be higher at night.

Working at night also involves other factors, including construction productivity and quality, social impacts, economics, and environmental issues. A decision to perform construction or maintenance activities at night normally involves some consideration of the advantages to be gained compared to the safety and other issues that might be impacted.

Considering the safety issues inherent to night work, consideration should be given to enhancing traffic controls (see Modifications to fulfill special needs) to provide added visibility and driver guidance, and increased protection for workers.

In addition to the enhancements listed in Modifications to fulfill special needs, consideration should be given to providing additional lights and retro-reflective markings to workers, work vehicles, and equipment.

Where reduced traffic volumes at night make it feasible, the entire roadway may be closed by detouring traffic to alternate facilities, thus removing the traffic risk from the activity area.

Because typical street and highway lighting is rarely adequate to provide sufficient levels of illumination for work tasks, temporary lighting should be provided where workers are active to supply sufficient illumination to reasonably safely perform the work tasks.

Temporary lighting for night work should be designed such that glare does not interfere with driver visibility, or create visibility problems for truck drivers, equipment operators, flaggers, or other workers.

Consideration should also be given to stationing uniformed law enforcement officers and lighted patrol cars at night work locations where there is a concern that high speeds or impaired drivers might result in undue risks for workers or other drivers.

Standard: Except in emergencies, temporary lighting will be provided at all flagger stations.

Desired illumination levels vary depending upon the nature of the task involved. An average horizontal luminance of 50 lux (5-foot candles) can be adequate for general activities. An average horizontal luminance of 108 lux (10-foot candles) can be adequate for activities around equipment. Tasks requiring high levels of precision and extreme care can require an average horizontal luminance of 216 lux (20-foot candles).

CONTROL OF TRAFFIC THROUGH TRAFFIC INCIDENTS

A traffic incident is an emergency road user occurrence, a natural disaster, or other unplanned event that affects or impedes the normal flow of traffic. It is a type of TTC zone and extends from the first warning device (such as a sign, light, or cone) to the last TTC device or to a point where vehicles return to the original lane alignment and are clear of the incident.

Traffic incidents can be divided into three general classes of duration, each of which has unique traffic control characteristics and needs. These classes are:

- Major—expected duration of more than 2 hours
- Intermediate—expected duration of 30 minutes to 2 hours
- Minor—expected duration under 30 minutes

The primary functions of TTC at a traffic incident management area are to move road users reasonably safely and expeditiously past or around the traffic incident, to reduce the likelihood of secondary traffic crashes, and to preclude unnecessary use of the surrounding local road system. Examples include a stalled vehicle blocking a lane, a traffic crash blocking the traveled way, a hazardous material spill along a highway, and natural disasters such as floods and severe storm damage.

In order to reduce response time for traffic incidents, highway agencies, appropriate public safety agencies (law enforcement, fire and rescue, emergency communications, emergency medical, and other emergency management), and private sector responders (towing and recovery and hazardous materials contractors) should mutually plan for occurrences of traffic incidents along the major and heavily traveled highway and street system.

On-scene responders should be trained in safe practices for accomplishing their tasks in and near traffic. Responders should always be aware of their visibility to oncoming traffic and take measures to move the traffic incident as far off the traveled roadway as possible or to provide for appropriate warning.

Responders arriving at a traffic incident should, within 15 minutes of arrival on-scene, estimate the magnitude of the traffic incident, the expected time duration of the traffic incident, and the expected vehicle queue length, and then should set up the appropriate temporary traffic controls for these estimates.

While some traffic incidents might be anticipated and planned for, emergencies and disasters might pose more severe and unpredictable problems. The ability to quickly install proper temporary traffic controls might greatly reduce the effects of an incident, such as secondary crashes or excessive traffic delays.

An essential part of fire, rescue, spill clean-up, highway agency, and enforcement activities is the proper control of road users through the traffic incident management area in order to protect responders, victims, and other personnel at the site while providing reasonably safe traffic flow. These operations might need corroborating legislative authority for the implementation and enforcement of appropriate road user regulations, parking controls, and speed zoning.

It is desirable for these statutes to provide sufficient flexibility in the authority for, and implementation of, TTC to respond to the needs of changing conditions found in traffic incident management areas.

For traffic incidents, particularly those of an emergency nature, TTC devices on hand may be used for the initial response as long as they do not themselves create unnecessary additional hazards.

Major Traffic Incidents

Major traffic incidents are typically traffic incidents involving hazardous materials, fatal traffic crashes involving numerous vehicles, and other natural or man-made disasters. These traffic incidents typically involve closing all or part of a roadway facility for a period exceeding 2 hours.

If the traffic incident is anticipated to last more than 24 hours, applicable procedures and devices set forth in other sections of this Chapter should be used.

A road closure can be caused by a traffic incident such as a road user crash that blocks the traveled way. Road users are usually diverted through lane shifts or detoured around the traffic incident and back to the original roadway. A combination of traffic engineering and enforcement preparations is needed to determine the detour route, and to install, maintain or operate, and then to remove the necessary traffic control devices when the detour is terminated. Large trucks are a significant concern in such a detour, especially when detouring them from a controlled-access roadway onto local or arterial streets.

During traffic incidents, large trucks might need to follow a route separate from that of automobiles because of bridge, weight, clearance, or geometric restrictions. In addition, vehicles carrying hazardous material might need to follow a different route from other vehicles.

Some traffic incidents such as hazardous material spills might require closure of an entire highway. Through traffic must have adequate guidance around the traffic incident. Maintaining good public relations is desirable. The cooperation of the news media in publicizing the existence of, and reasons for, traffic incident management areas and their TTC can be of great assistance in keeping road users and the general public well informed.

The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by interagency planning that includes representatives of highway and public safety agencies. All traffic control devices needed to set up the TTC at a traffic incident should be available so that they can be readily deployed for all major traffic incidents. The TTC should include the proper traffic diversions, tapered lane closures, and upstream warning devices to alert approaching traffic of the end of a queue. Attention should be paid to the end of the traffic queue such that warning is given to road users approaching the end of the queue.

If manual traffic control is needed, qualified flaggers or uniformed law enforcement officers should provide it. If flaggers are used to provide traffic control for an incident management situation, the flaggers may use appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene on short notice.

When flares are used to initiate TTC at traffic incidents, more permanent traffic control devices should replace them as soon as practical. Both the flare and its supporting device should then be removed from the roadway.

On-scene responders should be trained in safe practices for accomplishing their tasks in and near traffic. Responders should always be aware of their visibility to oncoming traffic and take measures to move the traffic incident as far off the traveled roadway as possible or to provide for appropriate warning.

Intermediate Traffic Incidents

Intermediate traffic incidents typically affect travel lanes for a time period of 30 minutes to 2 hours, and usually require traffic control on the scene to divert road users past the blockage. Full roadway closures might be needed for short periods during traffic incident clearance to allow traffic incident responders to accomplish their tasks.

The establishment, maintenance, and prompt removal of lane diversions can be effectively managed by interagency planning that includes representatives of highway and public safety agencies.

All traffic control devices needed to set up the TTC at a traffic incident should be available so that they can be readily deployed for intermediate traffic incidents. The TTC should include the proper traffic diversions, tapered lane closures, and upstream warning devices to alert approaching traffic of the end of a queue. Attention should be paid to the end of the traffic queue such that warning is given to road users approaching the end of the queue. If manual traffic control is needed, qualified flaggers or uniformed law enforcement officers should provide it.

If flaggers are used to provide traffic control for an incident management situation, the flaggers may use appropriate traffic control devices that are readily available or that can be brought to the traffic incident scene on short notice.

When flares are used to initiate TTC at traffic incidents, more permanent traffic devices should replace them as soon as practical. Both the flare and its supporting device should then be removed from the roadway.

On-scene responders should be trained in safe practices for accomplishing their tasks in and near traffic. Responders should always be aware of their visibility to oncoming traffic and take measures to move the traffic incident as far off the traveled roadway as possible or to provide for appropriate warning.

Minor Traffic Incidents

Minor traffic incidents are typically disabled vehicles and minor crashes that result in lane closures of less than 30 minutes. On-scene responders are typically law enforcement and towing companies, and occasionally highway agency service patrol vehicles.

Diversion of traffic into other lanes is often not needed or is needed only briefly. It is not generally possible or practical to set up a lane closure with traffic control devices for a minor traffic incident. Traffic control is the responsibility of on-scene responders.

When a minor traffic incident blocks a travel lane, it should be removed from that lane to the shoulder as quickly as possible.

Use of Emergency-Vehicle Lighting

The use of emergency-vehicle lighting (such as high-intensity rotating, flashing, oscillating, or strobe lights) is essential, especially in the initial stages of a traffic incident, for the safety of emergency responders and persons involved in the traffic incident, as well as road users approaching the traffic incident. Emergency-vehicle lighting, however, provides warning only and provides no effective traffic control. It is often confusing to road users, especially at night. Road users approaching the traffic incident from the opposite direction on a divided facility are often distracted by emergency-vehicle lighting and slow their vehicles to look at the traffic incident posing a hazard to themselves and others traveling in their direction.

The use of emergency-vehicle lighting can be reduced if good traffic control has been established at a traffic incident scene. This is especially true for major traffic incidents that might involve a number of emergency vehicles. If good traffic control is established through placement of advanced warning signs and traffic control devices to divert or detour traffic, then public safety agencies can perform their tasks on scene with minimal emergency-vehicle lighting.

Public safety agencies should examine their policies on the use of emergency-vehicle lighting, especially after a traffic incident scene is secured, with the intent of reducing the use of this lighting as much as possible while not endangering those at the scene. Special consideration should be given to reducing or extinguishing forward facing emergency-vehicle lighting, especially on divided roadways, to reduce distractions to on-coming road users.

Vehicle headlights not needed for illumination, or to provide notice to other road users of the incident response vehicle being in an unexpected location, should be turned off at night.

TRAINING

This Company will ensure all employees working in temporary traffic control areas are trained in all regulations and safe practices appropriate to their job functions. This includes but is not limited to:

Traffic Control Supervisor

- Successful completion of MUTCD and FHWA training and can demonstrate an understanding, and proper application of, temporary traffic control requirements including:
  - Identification and use of the necessary traffic control devices
  - The placement and location of all required TTC devices for the work zone to be established
- Knowledge of how to control road user movement

Flaggers

- Proper flagging operations
- Be able to demonstrate an understanding their duties
- Follow all safe practices regarding flagging operations

Equipment Operators

- Understand the meaning and purpose of TTC devices and the required safe practices

Ground Workers

- Proper use of all necessary PPE
- Knowledge of the meaning of all the TTC zones and signage

SCOPE

This chapter covers the safe practices and procedures to be used when performing trenching, excavation and shoring work.

A trench is a narrow excavation made below the surface of the ground where the depth is greater than the width – the width not exceeding 15 feet.

An excavation is any man-made cut, cavity trench or depression in the earth's surface formed by earth removal. This can include excavations for anything from cellars to highways.

POLICY

This Company has adopted this program for the safety of employees when working in or around trenches and excavations

REFERENCES

This policy will comply with the following OSHA regulations:

- 1926.651 – Specific Excavation Requirements
- 1926.652 – Requirements for Protective Systems

RESPONSIBILITIES

This Company will provide the resources necessary to will implement and enforce the engineering controls, procedures and work practices to ensure that no employees are exposed to hazards of excavation work being performed or existing at the jobsite.

The Site Safety Coordinator is designated as the Competent Person for the Company, with authority over all excavation operations. The Site Safety Coordinator, or designee, will verify that all safety measures and systems are correctly installed; all safety procedures are adhered to; and will make regular inspections of excavations, trenches and the general worksite.

Competent Person Responsibilities

The competent person(s) at the worksite will:

- Have a comprehensive knowledge of OSHA's Excavation Standards, and a general knowledge of all applicable construction standards
- Conduct a pre-job site review to develop a job plan that ensures a safe, efficient job process. A competent person will evaluate difficult sloping and shoring problems before the start of work
- Perform daily inspections of equipment and trench conditions at the start of each shift or as needed by changing conditions, examining for possible cave-ins, failures and protective systems problems
- Have the authority to remove all employees from hazardous conditions and effect all changes necessary to ensure safety
- Categorize soil conditions, conduct visual and manual tests to determine the stability of soil and surrounding trench conditions.

NOTE: If visual and manual tests are not performed, soils will be classified as type “C.”

- Maintain on-site records of protection systems
- Determine the appropriate protection system to be used and oversee installation
- Verify proper design of structural equipment ramps and walkways, or will contact an registered Professional Engineer (RPE) to design structural equipment ramps and walkways
- Hold tailgate safety meetings with all affected employees before starting trenching and shoring operations. Subsequent meetings will be held as conditions warrant
- A competent person will be on-site at all times during excavation/trenching operations
- Assure that appropriate emergency rescue equipment is available to meet existing or potential conditions
- Monitor use of water removal equipment
- Test for oxygen presence and air quality in excavations as necessary. Competent persons will be qualified in identifying confined/hazardous spaces due to the presence of flammable or combustible gases, toxics oxygen deficiency and oxygen enriched environments
- A competent person will consult with an RPE for trenches over 20' deep, specially designed shoring bracing or underpinning or when excavation endangers nearby structures

NOTE: Competent persons will ensure that all trenches are properly classified, sloped or shored according to the appendices of 29 CFR 1926- Subpart "P," or with manufacturer’s tabulated data. Furthermore, competent persons will consult with an RPE to obtain written guidance whenever the work exceeds 20 feet in depth, or the work will require control measures not specified in the standard.

Supervisor Responsibilities

Supervisors are responsible for:

- Establishing and maintaining safe and healthful working conditions
- Being familiar with excavation safety and health hazards their employees are exposed to, how to recognize them, the potential effects of those hazards and rules, procedures and work practices for controlling exposure to those hazards
- Setting good examples, instructing their employees, making sure they fully understand and follow safe procedures

Employee Responsibilities:

- No employees are permitted to undertake a job until they have received instructions on how to do it properly and safely, and are authorized to perform the job
- No employees will undertake a job that appears to be unsafe
- Mechanical safeguards must always be in place and kept in place
- Employees are to report to a superior or designated individual, all unsafe conditions encountered during work
- PPE must be used when and where required, and properly maintained

HAZARDS

OSHA requires that workers in trenches and excavations are protected, and that safety and health programs address the variety of hazards they face. The following are hazards employees can be exposed to during trenching and excavation work.

- Cave-ins
- Unsafe Spoil-Pile Placement
- Unsafe Access/Egress
- Falls and Equipment
- Confined Spaces
  - Toxic
  - Oxygen-deficient
  - Oxygen-enriched
  - Explosive
- Respiratory hazards
  - Fumes from welding or patching compounds
  - Chemicals from waste disposal sites
  - Engine exhaust
  - Heavier than air explosive gases that collect in the bottom of the trench
  - Leaks from underground storage tanks
  - Decomposing material in landfill sites
- Falling Loads
- Loose Rock or Soils
- Utilities – underground and overhead
- Materials handling and housekeeping
- Traffic Control

SAFE PRACTICES

This Company will implement and enforce the following engineering controls, procedures and work practices to ensure that no employee is exposed to hazards from excavations being performed or existing at the jobsite:

- The safety coordinator or designee, will ensure that all employees are trained in and familiar with required work practices and excavation procedures to safeguard personnel involved in trenching operations or who work in the vicinity of excavation operations
- Employees conducting trenching and excavation operations will be protected from cave-in hazards through benching, sloping, shoring, scaling loose material, or trench shields/boxes
- Utility operators will be contacted at least 48 hours before work is to begin, and underground installations located before the start of any excavation work. When excavations are approaching any located utility line, equipment operations will be stopped at least 3 feet from the suspected location, and the utility will be positively located by careful hand digging, before resuming machine operations
- Any utilities that are uncovered as a result of excavation operations will be protected and supported during work progress, prominently marked for location and hazard and will be carefully backfilled as soon as possible

- Trench excavations will have access and egress ladders, ramps or stairs provided for employees on any excavation that's 4 feet or more in depth. Ladders will be located within 25 feet of the workers and will extend to a height of at least 3 feet above the excavation. Lateral travel along the wall of a trench to a ladder or other means of egress will not exceed 25 feet
- Walkways will be provided where employees or equipment are required or permitted to cross over excavations. Regulation guardrails will be installed where walkways are elevated 6 feet or more above lower levels
- Employees are not permitted underneath loads handled by lifting or digging equipment. Personnel will be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any equipment, spillage or falling materials. Operators can remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped with adequate overhead protection for the operator during loading and unloading operations
- Tests will be conducted for hazardous atmospheres and air contaminants (oxygen, flammable gases, etc.) and provide ventilation where necessary
- In excavations where a hazardous or oxygen deficient atmosphere exists or could reasonably be expected to exist, the atmospheres in the excavation will be tested before employees enter excavations greater than 4 feet in depth
- Proper respiratory protection will be provided where necessary for employees exposed to hazardous atmospheres above Permissible Exposure Limits (PEL). Where ventilation is used to control exposure to hazardous atmospheres, continued testing will be used to monitor levels of hazardous atmospheres
- Employees are not permitted to work in excavations where there's accumulated water, or in excavations where water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation
- A system of shoring, benching or sloping will be provided for any excavation over 5 feet in depth, or any excavation that's been inspected and is believed unsafe to enter without a protective system. Inspections and determination of the type of protective system used will be done based on soil type, density, moisture content, and other factors which might affect the performance of protective systems
- Protection of employees with regard to soil classifications includes:
    - The determination of soil types and special considerations will be done in specific measures
    - Shoring, sloping, shield, and excavation will be installed as needed
    - Shoring equipment will not be subjected to excessive forces and be installed to protect employees from lateral loads
    - Timber shoring or aluminum hydraulic shoring will be determined according to appendices A and C of the OSHA standard
    - The devices used will be properly maintained and in good repair. If inspection reveals damage or defect, shoring equipment will be tagged and immediately removed from service
    - Employees will be protected from hazards of falling, rolling, or sliding materials or equipment
    - Personnel are prohibited from being within the shield when installing or removing the shield.
    - All shields used will be designed to resist calculated trench forces

Permits

This Company will comply with all permit requirements. For instance, permits may be required for any trenches and excavations five feet or deeper where employee entry is required. Permits may also be required for the erection/dismantling of vertical shoring systems more than three stories or 36 feet high.

Inspections

- A competent person designated by the safety coordinator will conduct inspections of worksites to ensure that safety measures are in place and proper procedures for safety are being observed. These inspections of the excavation site will be made daily before the start of work, regularly during work operations, in the event of inclement weather that could pose a hazard and at the end of work to ensure barricades and appropriate safety measures are in place before leaving the site
- If an inspection reveals the possibility of a cave-in, failure of a protective system, hazardous atmosphere or any threat to the safety of personnel, the excavation will immediately be evacuated until corrections are made

Locating Underground Utility Installations

- This Company will not excavate in a street, highway, public place, a private easement of a public utility or near the location of a public utility facility owned, maintained or installed on a customer's premises, without having first obtained the location of all underground facilities of a public or private utility in the proposed area of excavation
- After receiving the information from the public utility, Company employees will exercise reasonable care when working in close proximity to the underground utilities. If the utilities are or are likely to be exposed, only hand digging will be used and the utilities will be supported for the protection of the construction site.
- When any contact with or damage to any pipe, cable or any other underground utility occurs, the Company will immediately notify the utility Company. If an energized electrical cable is severed, an energized conductor is exposed or dangerous fluids or gases are escaping from a broken line, employees will be evacuated from the immediate area until the utility Company representative arrives
- While an excavation is open, underground utilities will be protected, supported, or removed as necessary to safeguard employees

Surface Encumbrances

- All surface encumbrances such as trees, boulders, rock fragments or other obstructions whose movement could cause injury to an employee will be removed or supported
- Excavations that employees are required to enter will have spoil piles and other material stored and retained at least 2 feet from the excavation edge
- When a shoring system is used, the system will be designed and used to resist the added pressure when heavy equipment, material handling equipment or material is located near an excavation
- When mobile equipment is used near an excavation where the operator's vision is restricted, stop logs, barricades, or a signal person will be used

Access and Egress

- Lateral travel along the wall of a trench to a ladder or other means of egress will not exceed 25 feet
- An excavation of four feet or more in depth and occupied by an employee will be provided with either a ladder extending not less than 3 feet above the top as a means of access or with a ramp meeting the following requirements:
  - Structural ramps that are used only for employee access or egress from excavations will be designed by a competent person. Structural ramps used for access or egress of equipment will be designed by a competent person qualified in structural design, and will be constructed in accordance with the design
  - Ramps and runways constructed of two or more structural members will have the members connected together to prevent displacement. Structural members used for ramps and runways will be of uniform thickness
  - Cleats or other appropriate means used to connect runway structural members will be attached to the bottom of the runway or will be attached in a manner to prevent tripping
  - Structural ramps used in lieu of steps will be provided with cleats or other surface treatments on the top surface to prevent slipping
- An earth ramp may be used in place of a ladder if:
  - The ramp material will be stable
  - The sides of the excavation above the ramp will be maintained to the maximum allowable slope or sheeted or shored along the means of egress
  - The degree of angle of the ramp will not be more than 45 degrees
  - Vertical height between the floor of the trench and the toe of the ramp will not exceed 30 inches

Exposure to Vehicle Traffic

- Employees exposed to public vehicular traffic will be provided with, and required to wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material
- A sidewalk will not be undermined unless it's shored to support a live load of at least 125 pounds per square foot
- Employees who are routed from a sidewalk or walkway into a roadway to detour excavations will be protected on all sides by regulation guardrails or barricades
- If an employee or equipment is required or permitted to cross a trench or ditch, a walkway, ramp or bridge will be provided and will have a designed capacity of not less than 3 times the imposed load. Regulation guardrails will be installed
- If equipment is routed across or onto a roadway, protection will be provided using regulation signals, signs, or barricades
- An open cut into a roadway will be provided with a regulation barricade on all sides. Warning lights will be provided during hours of darkness

Walkways

- Walkways will be provided where employees or equipment are required or permitted to cross over excavations. Regulation guardrails will be provided where walkways are 6 feet or more above lower levels
- A walkway or sidewalk will be kept clear of excavated material and other obstructions
- The walkways and sidewalks will be lighted if used during hours of darkness
- A walkway or sidewalk that's next to an excavation will be separated from the excavation and protected by an appropriate guardrail

Exposure to Falling Loads

Employees are not permitted under loads being handled by lifting or digging equipment. Employees will be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped with regulation protection for the operator during loading and unloading operations.

Mobile Equipment Warning Systems

When mobile equipment is operated next to an excavation, or is required to approach the edge of an excavation, and the operator doesn't have a clear and direct view of the edge of the excavation, a warning system will be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade will be away from the excavation.

Hazardous Atmospheres

To prevent exposure to hazardous atmospheres and to assure acceptable breathing conditions, all of the following requirements will apply:

- Where an oxygen deficiency or a hazardous atmosphere exists, the atmosphere will be tested before employees enter excavations that are more than 4 feet deep
- Precautions will be taken to prevent employee exposure to atmospheres that contain less than 19.5% oxygen and any other hazardous atmosphere. These precautions include providing regulation respiratory protection or ventilation
- Precautions will be taken, such as providing ventilation, to prevent employee exposure to an atmosphere that contains a concentration of a flammable gas in excess of 20% of the lower flammable limit of the gas
- When using controls intending to reduce levels of atmospheric contaminants to acceptable PEL, testing will be conducted as often as necessary to ensure that breathing air remains safe
- Emergency rescue equipment will be readily available and attended where atmospheric conditions exist or could develop
- Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, will wear a harness with a lifeline securely attached to it. The lifeline will be separate from any line used to handle materials, and will be individually attended at all times while employee wearing it is in the excavation

Protection from Water Accumulation Hazards

- Employees will not work in excavations where water has or is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by such water accumulation including support and shield systems, water removal, and safety harnesses and lifeline
- If water is controlled or prevented from accumulating by the use of water pumps, the pumping equipment and operations will be monitored by a competent person to ensure proper operation
- If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes or other suitable means will be used to prevent surface water from entering the excavation and to provide adequate drainage of the area near the excavation
- Excavations subject to runoff from heavy rains will require an inspection by a competent person
- An ongoing inspection of an excavation or trench will be made by a qualified person. After every rainstorm or other hazard-producing occurrence, an inspection will be made by a competent person for evidence of possible slides or cave-ins. Where these conditions are found, all work will stop until additional precautions, such as additional shoring or reducing the slope, have been accomplished

Stability of Adjacent Structures

- Excavation below the level of the base or footing of any foundation or retaining wall that could pose a hazard to employees will not be permitted except when:
  - Shoring, bracing or underpinning is provided to ensure the safety of employees and the stability of the structure
  - The excavation is in stable rock
  - An RPE has determined that the structure is far enough away from the excavation that it won't be affected by the excavation activity or that the excavation work won't pose a hazard to employees
- Sidewalks, pavements and appurtenant structures will not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures
- The shoring, bracing and underpinning will be inspected by a competent person, daily or more often, as conditions warrant

Employee Protection from Loose Rock or Soils

- Employees will be protected from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. This protection will consist of scaling to remove loose material; installing protective barricades at intervals as necessary on the face to stop and contain falling material or other means that provide equivalent protection
- Employees will be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection will be provided by placing and keeping such materials or equipment at least 2 feet from the edge of excavations, or by the use of retaining devices that will prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary

- If different textured soils are encountered in the side of an excavation, each soil type of the excavation will be cut to the proper maximum allowable slope, except that the slope will not steepen between the toe of the slope and the ground level where soft clay or running soil is encountered in the lower cut
- If the excavation is a trench, a trench shoring system will be used, or the sides will be properly benched or sloped to protect against a cave-in
- An excavation that's cut into a rock formation will be scaled to remove loose material
- When installed forms, walls or similar structures create a trench between the form, wall or structure and the side of the excavation, it will be treated as a trench

SOIL CLASSIFICATION

- Each soil and rock deposit will be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with OSHA definitions
- The classification of the deposits will be made based on the results of at least one visual and at least one manual analysis. Such analyses will be conducted by a competent person using approved methods of soil classification and testing
- The visual and manual analyses will be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits
- Layered systems will be classified according to its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer
- If after classifying a deposit, the properties, factors or conditions affecting its classification change in any way, the changes will be evaluated by a competent person. The deposit will be reclassified as necessary to reflect the changed circumstances

Protection of Employees in Excavations

- Employees in an excavation will be protected from cave-ins by an adequate protective system designed in accordance with OSHA requirements, except when: excavations are made entirely in stable rock; excavations are less than 5 feet deep and examination of the ground by a competent person provides no indication of a potential cave-in
- Protective systems will have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system
- The slopes and configurations of sloping and benching systems will be selected and constructed by Aversa Bros Industrial Contractors and will be in accordance with OSHA requirements, or the following alternative options

Option 1 - Allowable configurations and slopes

- Excavations will be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless Aversa Bros Industrial Contractors uses one of the other options listed below
- Specified slopes will be excavated to form configurations that are in accordance with the slopes shown for Type C soil.

Option 2 - Maximum allowable slopes, and allowable configurations for sloping and benching systems, will be determined according to the conditions and requirements defined in 1926 Subpart P – Appendices A and B.

Option 3 - Designs using other tabulated data.

- Designs of sloping or benching systems will be selected from and in accordance with tabulated data, such as tables and charts
- The tabulated data will be in written form and will include all of the following:
  - Identification of the parameters that affect the selection of a sloping or benching system drawn from such data
  - Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe
  - Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data
  - At least one copy of the tabulated data that identifies the RPE, who approved the data, will be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data will be made available to OSHA upon request

Option 4 - Design by an RPE

- Sloping and benching systems not using Options 1, 2, or 3 will be approved by an RPE
- Designs will be in written form and will include at least the following:
  - The magnitude of the slopes that were determined to be safe for the particular project
  - The configurations that were determined to be safe for the particular project
  - The identity of the RPE approving the design
- At least one copy of the design will be maintained at the jobsite while the slope is being constructed. After that time, the design need not be at the jobsite, but a copy will be made available to OSHA upon request

Design of Support Systems

Designs of support systems, shield systems, and other protective systems will be selected and constructed according to OSHA requirements, or the following alternative options:

Option 1 - Designs for timber shoring in trenches will be determined in accordance with the conditions and requirements set forth in 1926 Subpart P – Appendices A and C. Designs for aluminum hydraulic shoring will be in accordance with Option 2 below, but if manufacturer's tabulated data cannot be utilized, designs will be in accordance with Appendix D.

Option 2 - Designs Using Manufacturers Tabulated Data.

Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data will be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer will only be allowed after the manufacturer issues specific written approval.

Manufacturer's specifications, recommendations, and limitations, and manufacturer's approval to deviate from the specifications, recommendations, and limitations will be in written form at the jobsite during construction of the protective system. After that time, this data may be stored off the jobsite, but a copy will be made available to the Secretary upon request.

Option 3 - Designs using other tabulated data.

Designs of support systems, shield systems, or other protective systems will be selected from and be in accordance with tabulated data, such as tables and charts.

The tabulated data will be in written form and include all of the following:

- Identification of the parameters that affect the selection of a protective system
- Identification of the limits of use of the data
- Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data
- At least one copy of the tabulated data, which identifies the RPE who approved the data, will be maintained at the jobsite during construction of the protective system. After that time, the data may be stored off the jobsite, but a copy of the data will be made available to OSHA upon request

Option 4 - Design by an RPE

An RPE will approve support systems, shield systems and other protective systems not using Options 1, 2, or 3.

Designs will be in written form and will include the following:

- A plan indicating the sizes, types, and configurations of the materials to be used in the protective system
- The identity of the RPE approving the design
- At least one copy of the design will be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design will be made available to OSHA upon request.

Protective Systems Materials and Equipment

- Materials and equipment used for protective systems will be free from damage or defects that might impair their proper function
- Manufactured materials and equipment used for protective systems will be used and maintained according to the recommendations of the manufacturer, and in a way that will prevent employee exposure to hazards
- When equipment used for protective systems is damaged, a competent person will examine the equipment and evaluate its suitability for continued use. If the competent person can’t assure the equipment is able to support the intended loads or is otherwise suitable for use, then it will be removed from service, evaluated and approved by an RPE before being returned to service

- General installation and removal of support systems:
  - Members of support systems will be securely connected together to prevent sliding, falling kickouts or other predictable failure
  - Support systems will be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system
  - Individual members of support systems will not be subjected to loads exceeding those which those members were designed to withstand
- Excavation of material more than 2 feet below the bottom of the members of a support system will be permitted only if the system is designed to resist the forces calculated for the full depth of the trench, and there are no indications of a possible loss of soil from behind or below the bottom of the support system
- Installation of a support system will be closely coordinated with the excavation of trenches
- Before temporary removal of individual members begins, additional precautions will be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system
- Loads will be released slowly to monitor any possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation
- Backfilling will progress together with the removal of support systems from excavations
- Employees will not be permitted to work on the faces of sloped or benched excavations at levels above other employees unless the employees at the lower levels are protected from the hazard of falling, rolling or sliding material or equipment
- General shield systems requirements:
  - Shield systems will not be subjected to loads exceeding those it was designed to withstand
  - Shields will be installed to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads
  - Employees will be protected from cave-ins when entering or exiting the protected areas
  - Employees will not be allowed inside the shields when they’re being installed, removed or moved vertically
  - Excavations of earth more than 2 feet below the bottom of a shield will be permitted only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications of a possible loss of soil from behind or below the bottom of the shield
- Guardrails or barricades will be provided at all remotely located excavations. All wells, pits and shafts, temporary or otherwise, will be barricaded or covered. Temporary wells, pits and shafts will be backfilled when operations are completed

TRAINING

Employees who are involved in the excavation operation and exposed to excavation operation hazards will be trained in the excavator notification and excavation practices. When Aversa Bros Industrial Contractors has reason to believe that an employee lacks the skill or understanding needed for safe work involving excavation practices, Frank Aversa will retrain each such employee so that the requisite proficiency is regained. Retraining is required in at least the following situations:

- Where changes at the worksite present a hazard about which an employee has not been previously trained
- Where inadequacies in an affected employee's work involving excavations indicate that the employee has not retained the requisite proficiency

The employer will document that each employee has received the training. This documentation will be made when the employee demonstrates proficiency in the work practices involved and will be maintained for the duration of the employee's employment. The documentation will contain the content of the training, each employee's name and dates of training.

ATTACHMENTS

- Trench and Excavation Inspection Form
- Trenching, Shoring and Excavation Training form

Inspection of Trenches & Excavations Form

Project:	Date:	Weather:	Soil Type:
Trench Depth:	Length:	Width:	Type of Protective System:
Project Supervisor:			
Assigned **Competent Person**:			
Crew Members:			
Excavation equipment type(s):			
Equipment Operator(s):			

Yes	No	N/A	Excavation
☐	☐	☐	Excavations and Protective Systems inspected by **Competent Person** daily, before start of work.
☐	☐	☐	**Competent Person** has authority to remove workers from excavation immediately.
☐	☐	☐	Surface encumbrances supported or removed.
☐	☐	☐	Employees protected from loose rock or soil.
☐	☐	☐	Hard hats worn by all employees.
☐	☐	☐	Spoils, materials, and equipment set back a minimum of 2' from edge of excavation.
☐	☐	☐	Barriers provided at all remote excavations, wells, pits, shafts, etc.
☐	☐	☐	Ingress/egress within excavation provided at 25' intervals.
☐	☐	☐	Walkways and bridges over excavations 6' or more in depth equipped with guardrails.
☐	☐	☐	Warning vests, or other highly visible PPE provided and worn by all employees exposed to vehicular traffic.
☐	☐	☐	Employees prohibited from working or walking under suspended loads.
☐	☐	☐	Employees prohibited from working on faces of sloped or benched excavations above other employees.
☐	☐	☐	Warning system established and used when mobile equipment is operating near edge of excavation.

Yes	No	N/A	Utilities
☐	☐	☐	Utility companies contacted and/or utilities located.
☐	☐	☐	Exact location of utilities marked when near excavation.
☐	☐	☐	Underground installations protected, supported, or removed when excavation is open.

Yes	No	N/A	Wet Conditions
☐	☐	☐	Precautions taken to protect employees from accumulation of water.
☐	☐	☐	Water removal equipment monitored by **Competent Person**.
☐	☐	☐	Surface water controlled or diverted.
☐	☐	☐	Inspection made after each rainstorm.

Yes	No	N/A	Hazardous Atmosphere
☐	☐	☐	Atmosphere tested when there is a possibility of oxygen deficiency or build-up of hazardous gases.
☐	☐	☐	Oxygen content is between 19.5% and 21%.
☐	☐	☐	Ventilation provided to prevent flammable gas build-up to 20% of lower explosive limit of the gas.
☐	☐	☐	Testing conducted to ensure that atmosphere remains safe.
☐	☐	☐	Emergency Response Equipment readily available where a hazardous atmosphere could or does exist.
☐	☐	☐	Employees trained in the use of Personal Protective and Emergency Response Equipment.
☐	☐	☐	Safety harness and life line individually attended when employees enter deep confined excavation.

Comments:
Signature of **Competent Person**: Date:

TRAINING RECORD

Trainer:	
Signature	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter provides the requirements and safe practices to be followed by employees performing water well work. These practices will comply with all applicable federal, state and local regulations regarding water well work. The chapter includes information on the use of top-head rotary style, table rotary or cable tool drilling machines. This chapter does not contain information on water well maintenance or oil and gas well operations.

POLICY

This Company has established the following policy to protect employees from the risks associated with drilling water wells. The following are general machine drilling methods:

- Rotary use of rotary drill bits that chew away at the rock percussion use of percussion bits that smash the rock down the hole hammer
- If the ground is soft, large auger bits are used instead. Most shallow well drilling machines are mounted on large trucks, trailers, or tracked vehicle carriages. The following are general types:
  - Skid-mounted drilling rigs
  - Mobile or truck-mounted drilling rigs
  - Trailer-mounted drilling rigs

Water wells typically range from 20 to 600 feet (180 m), while some wells can go deeper than 3,000 feet (910 m).

DRILLING MACHINES

Rotary Drilling Machines

- Use a segmented steel drilling string, typically made up of 20-foot (6.1 m) sections of steel tubing that are threaded together, with a bit or other drilling device at the bottom end
- Some rotary drilling machines are designed to install (by driving or drilling) a steel casing into the well in conjunction with the drilling of the actual borehole
- Air and/or water are used as circulation fluid to displace cuttings and to cool bits during the drilling

Another form of rotary style drilling, termed ‘mud rotary’, makes use of a specially made mud (or drilling fluid) which is constantly being altered during the drill so it can consistently create enough hydraulic pressure to hold the side walls of the bore hole open, regardless of the presence of a casing in the well.

Cable Tool

- The oldest form of drilling machinery that is still used to this day
- Specifically designed to raise and lower a bit into the bore hole, the ‘spudding’ of the drill causes the bit to be raised and dropped onto the bottom of the hole. The design of the cable causes the bit to twist at approximately ¼ revolution per drop, thereby creating a drilling action
- Unlike rotary drilling, cable tool drilling requires the drilling action to be stopped so that the borehole can be bailed or emptied of drilled cuttings

DRILLING METHODS

Mud Rotary Drilling

Rotary drilling with mud is the most widely used method for water-well construction. A rotary drill rig has three functions:

- Rotating the drill string
- Hoisting the drill string
- Circulating the drilling fluid

A bit is rotated against the formation while mud is pumped down the drill pipe, through ports in the bit, and back to the ground surface through the well bore hole. This is why larger drill pipe and mud pumps make drilling faster. Drill pipes or rods are joined to a bit to form the drill string. The drill pipe is the link transmitting torque from the rig to the bit, and the pipe carries the drilling fluid down the hole. Hydraulic motors capable of variable speeds, rather than positive constant rotation like post hole digger conversion rigs power the best top- head drives. Smaller drilling rigs and hydra drill types work best with smaller bits because of the small watercourse swivel and drill pipe.

Drilling Rig Classification

There are many types and designs of drilling rigs, with many drilling rigs capable of switching or combining different drilling technologies as needed. Drilling rigs can be described using any of the following attributes:

By Power Used

- Mechanical - the rig uses torque converters, clutches, and transmissions powered by its own engines, often diesel
- Electric - the major items of machinery are driven by electric motors, usually with power generated on-site using internal combustion engines hydraulic - the rig primarily uses hydraulic power
- Pneumatic - the rig is primarily powered by pressurized air
- Steam - the rig uses steam-powered engines and pumps

By Pipe Used

- Cable - a cable is used to raise and drop the drill bit
- Conventional - uses metal or plastic drill pipe of varying types
- Coil tubing - uses a giant coil of tube and a down-hole drilling motor vertical drilling machine and horizontal drilling machine

By Height

- Single - can drill only single drill pipes; the presence or absence of vertical pipe racking
- “fingers” varies from rig to rig
- Double - can hold a stand of pipe in the derrick consisting of two connected drill pipes, called a “double stand”
- Triple - can hold a stand of pipe in the derrick consisting of three connected drill pipes called a “triple stand”

By Method of Rotation or Drilling Method98

- No rotation includes direct push rigs and most service rigs
- Rotary table - rotation is achieved by turning a square or hexagonal pipe (the kelly) at drill floor level
- Top-drive - rotation and circulation is done at the top of the drill string, on a motor that moves in a track along the derrick
- Sonic - uses primarily vibratory energy to advance the drill string hammer - uses rotation and percussive force

By Position of Derrick

- Conventional - derrick is vertical
- Slant - derrick is slanted at a 45-degree angle to facilitate horizontal drilling

DRILL BIT TYPES

Tricone Roller Bits

- For use with larger rigs with hydraulic power and more available torque
- Small rigs don’t have the power or weight to use these properly
- The bit consists of three cone-shaped rollers that are best suited for brittle or friable materials; the tricone with steel teeth are for milling into the surfaces
- Tooth locations are designed so that as the cone rotates, each tooth strikes
- the bottom of the hole at a different location
- Drilling fluid is jetted on each roller to clean and cool it
- The cutting action is a progressive crushing under the point load of each tooth Roller bits designed for rock, rocky soil (gravel), and soft formations (shale) have long teeth, while the bits for harder formations have smaller and stronger teeth
- The gauge teeth on bits designed for very hard rock are reinforced with webs
- These work fairly well with smaller and lighter rigs
- These bits are used in soft or hard soils and other unconsolidated materials
- The blades are designed so that they cut into the formation with a carving or scraping action

Drag Bits

- Drag bits may have multi-blade, hardened-steel, finger-shaped teeth, or may have connected carbide-reinforced cutting edges
- The bit weight required to cut rock depends on the design of the bit and the strength of the rock
- Before drilling hard rock, add drill collars (heavy, thick wall pipe for weight) instead of drill pipe until the load is sufficient for reasonable cutting
- Smaller rigs with drill collars are too heavy for the gear case to hold (they do not have weight-bearing swivels)
- As you dig deeper and add drill pipe, you may have to hold back on the drill string
- Regulate mud-pump pressure by varying the RPM of the pump

- Pressure from the weight of the fluid column in the annulus (or from a restriction in the annulus) is caused by an accumulation of cuttings and indicates insufficient cleaning; this type of pressure can cause formation damage, resulting in lost circulation and wall damage

Drilling Fluids

- Drilling fluid (bentonite clay) is circulated in rotary drilling to:
  - Cool, clean, and lubricate the drill string
  - Flush cuttings from the hole
  - Stabilize the borehole wall

Water is the basic fluid and is satisfactory for lubricating and cooling the tools. Water, however, has limited abilities to carry cuttings and stabilize the borehole wall. This is why bentonite clay is added to drilling water.

Mud cools and lubricates through heat absorption from the bit and reduction of drill-string abrasion against the borehole wall. Heat is generated as the bit scrapes and grinds. Without the cooling fluid, the bit would overheat and be useless.

Removing the cuttings around and under the bit is an important factor in keeping the bit cool. Requirements for cooling fluid are less than those for removing the cuttings. Therefore, if you keep the borehole clean with the fluid as you drill, you also cool and lubricate. This is true with clay mud and polymer fluids. Bentonite clay mud suspends cuttings and flushes them up to top and to mud pit.

Casing

Typically, boreholes drilled into solid rock are not cased until after the drilling process is completed, regardless of the machinery used.

Drilled wells are usually cased with a factory-made pipe, typically steel (in air rotary or cable tool drilling) or plastic/PVC (in mud rotary wells and in wells drilled into solid rock). The casing is constructed by welding either chemically or thermodynamically segments of casing together. If the casing is installed during the drilling, most drills will drive the casing into the ground as the borehole advances, while some newer machines will actually allow the casing to be rotated and drilled into the formation in a similar manner as the bit advancing just below.

PVC or plastic is typically welded and then lowered into the drilled well, vertically stacked with their ends nested and either glued or splined together. The sections of casing are usually 20’ or more in length, and 6”-12” in diameter, depending on the intended use of the well and local groundwater conditions

DRILLING

Rigging Up Safely

Rigging up is placing and assembling the various parts of equipment that make up the rig, and preparing the rig for drilling. During assembly of the rig, some equipment may be handled and set with crane, rig up trucks, or forklift, depending on the size of the rig. There may be two or more crews (teams) working together in the rigging up process.

The rigging up process includes the following steps, some of which are done simultaneously. This part will also include safety points you can use.

Setting Up the Substructure

- Equipment is unloaded and positioned at or near the exact location that it will occupy during operations
- The substructure is assembled, pinned together, leveled, and made ready for other rig components on the floor
- Equipping the cellar begins but can be done throughout the rigging up process. This includes welding on a drilling nipple to the conductor pipe and attaching a flow line

Potential Hazards:

- Being struck by the crane, load, truck, or the forklift tipping
- Pinched fingers when assembling equipment
- Burns from cutting and welding on the drilling nipple
- Temporary eye irritation from welding light flash
- Falling from heights

Possible Solutions:

- Instruct all workers in safety procedures and ensure that they are knowledgeable about job hazards. This can be done during pre-job safety meetings or briefings
- Instruct workers to stand clear and keep hands and other body parts away from pinch points
- Wear proper long sleeve clothing to protect from burns. Wear proper welding eye/face protection
- Avoid looking directly at the flame or arc when welding
- Wear fall protection when working from heights. [29 CFR 1926 Subpart M]

SETTING UP THE RIG FLOOR AND MAST OR DERRICK

Once the substructure is set in place, the process of setting up the rig floor begins. Begin by installing stairways and guardrails to allow access to the rig floor. Then, the drawworks is set in place and secured to the substructure. On mechanical rigs, the engines are set in place and the compound and associated equipment connected to the drawworks. On electric rigs, the electric cables (lines) are strung to the drawworks.

The bottom of the mast is raised to the rig floor and pinned in place. The crown section is then raised into place on the derrick stand. The “A legs” are raised and pinned into place. The monkeyboard is pinned in place on the mast and all lines and cables are laid out to prevent tangling when the mast is raised. A thorough inspection of the mast should be made before raising the mast/derrick. The mast is now ready to be raised. The engines are started and the drilling line is spooled onto the drawworks drum. Once the mast has been raised and pinned, the remaining floor equipment can be set into place. If the rig has safety guylines, they must be attached to the anchors and properly tensioned prior to continuing the rigging up process. A derrick emergency escape device is installed on the mast.

Potential Hazards:

- Falling or tripping during rigging up
- Falling from rig floor
- Being struck by swinging equipment
- Being struck by falling tools
- Being crushed or struck by equipment due to failure or overloading of hoisting equipment
- Getting entangled in lines during raising of the derrick or mast
- Failure to properly install derrick emergency escape device

Possible Solutions:

- Install, inspect, and secure stairs and handrails. [29 CFR 1926.1052]
- Do not use guardrails for anchor points or for lifting or supporting loads. Use fall protection when installing or removing guardrails
- Use a tag line to guide equipment, rather than positioning yourself under suspended loads.
- Check the derrick for unsecured tools before raising it
- Allow only the operator raising the mast to be on the rig floor
- Uncoil all lines so that they are clear of all workers when the mast or derrick is raised
- Attach safety lines to all tools hanging from the rig. Keep a safe distance from moving equipment
- Install derrick emergency escape device properly in accordance with the manufacturer's recommendations

HANDRAILS, GUARDRAILS, STAIRS, WALKWAYS, AND LADDERS

Handrails, guardrails, stairways, walkways, and ladders are installed where they are needed for safety and access.

Potential Hazards:

- Falls from ladders
- Falls or slips from ladders and stairs due to damaged or missing rungs or steps
- Slips or falls on walkways due to debris or uneven surfaces
- Falls from heights
- Falling into the mud pit or mixing tank

Possible Solutions:

- Follow established procedures and best work practices
- Instruct workers on proper procedures for using and installing ladders
- Use only ladders in good repair and those that do not have missing rungs
- Do not install stairs with missing or damaged steps. Repair them before installing them
- Keep walkways clean and free of debris and tripping hazards. [29 CFR 1910.22]
- Use proper fall protection
- Place guardrails in place prior to working in elevated areas. [29 CFR 1910.23]

Installing the Power System

Installing the power system is usually done simultaneously with setting up the rig floor, because power is needed to operate the equipment. Today there are generally two types of rigs being used on land. A mechanical rig is powered by engines and compound. An electric rig is powered by engines and generators.

- This type supplies power to electric motors, which drive the machinery
- All power cords, belts, and chains need to be connected to the machinery from their associated power source. Simultaneously, the fuel lines and tanks need to be hooked up. Then, the engines are started

Potential Hazards:

- Tripping on power cords and hoses Slips and falls on slick walking services Getting caught in pinch points
- Exposure to chemical hazards
- Being shocked or electrocuted

Possible Solutions:

- Keep all cords and hoses orderly and clear of walking spaces
- Clear and clean all walkways and walking surfaces of slipping hazards
- Use caution around all chain and belt pinch point areas. Install all guards. Use proper PPE when working with chemicals. [29 CFR 1910.1200]
- Use proper lockout/tag-out procedures. [29 CFR 1910.147]

RIGGING UP THE CIRCULATING SYSTEM

While one crew finishes preparing the rig floor, another crew might be rigging up the circulating system. The mud tanks and mud pumps are set into the predetermined location; the mud lines are then connected and the electric cords are strung.

Potential Hazards:

- Being struck or crushed by equipment being set into place
- Getting caught in pinch points
- Being struck by crane, load, truck or forklift tipping
- Being struck by hammer when connecting mud line unions

Possible Solutions:

- Keep a safe distance from equipment that is coming together or moving
- Maintain a safe distance from all pinch points
- Stand clear of workers that may be swinging hammers

Installing the Auxiliary Equipment

- All remaining drilling and auxiliary equipment must be set into place and installed where needed. The catwalk and pipe racks are positioned and the pipe and drill collars are set on the racks

Potential Hazards:

- Getting struck or pinched by, or caught in between, tubulars being loaded onto racks
- Having feet pinched or crushed when setting up the pipe racks and catwalk

Possible Solutions:

- Keep a safe distance from equipment that is coming together
- Use a tag line to guide the pipe racks and catwalks into position

Inspecting the Rig

Perform a complete inspection of the rig before operating. The driller and/or rig superintendent, tool-pusher, or manager should walk around the entire rig and inspect for missing or loose pins and bolts, equipment guards, adequate guard railings, proper line and cable placement, and unclear walkways.

Potential Hazards:

- Falling from the rig
- Tripping on power cords and hoses
- Slipping and falling on slick walking surfaces

Possible Solutions:

- Use proper fall protection. [29 CFR 1926 Subpart M]
- Keep all cords and hoses orderly and clear of walking spaces
- Clear and clean all walkways and walking surfaces of slipping hazards

Rigging Down

After production casing is run and cemented, the rig is taken down and moved to another site. The rigging down process is the reverse of rigging up. Thus, the hazards and solutions for rigging down are similar to those for rigging up.

DRILLING PROBLEMS

Lost Circulation

This refers to a loss in volume of drilling fluid returning to the surface. The implication is that some fluid pumped down the drill pipe is entering the formations. The mud pit will lower (watch your mud pit water level) since some of the mud is used in forming a mud cake on the borehole wall. Increased lowering, however, can indicate circulation loss.

Losses can occur through open- graded sand or gravel or open joints in rock. A loss can occur when cuttings are not washed out and the borehole annulus becomes restricted, resulting in increased down-hole pressure. Spudding or raising and lowering the drill string is important, but spudding the hole too violently can cause loss also.

Spudding helps wash cuttings, but down-hole pressures increase momentarily. Experienced drillers can estimate when spudding is safe. When fluid accumulation is lost and a driller continues to drill, he is drilling blind. An experienced driller knows the rig can often drill blind successfully, but re-establishing circulation is always safer especially with smaller hydra drill type rigs.

Fall-In

This refers to material that accumulates in the bottom of the borehole after you stop drilling and connect another drill pipe. Once you get to bottom, add more drill pipe, and then run the bit up and down 2 feet in both directions to ensure all cuttings are washed up well. This material is borehole-wall material that results from sloughing or caving, or cuttings previously carried in suspension.

Fall-in also occurs when you encounter a loose, unstable formation, and when the drilling- fluid weight is insufficient to stabilize the formation. If you anticipate or suspect fall-in, raise the drill bit off the bottom of the hole (20-foot minimum) each time drilling is interrupted. This will prevent the cuttings and fall-in from settling back around the bit until the problem is solved.

Stuck Drill String

The drill bit and any collar just above the bit are larger in diameter than the drill pipe. The string becomes stuck when cuttings collect on the bit and collar shoulder. This condition is called “sanded in”. Be careful because you can break the drill pipe while trying to remove the drill string. Regaining circulation and working the sand out are seldom successful, the formation will not take the fluid when you engage the pump. Little can be done to free the drill string except to wash a small pipe down the annulus to the bit and jet the settled sand back into suspension.

When the annulus is too small to pass a jet pipe, a part of the drill string may be lost. When the annulus is small, excessive up-hole velocity can promote erosion of the filter cake in granular zones and allow caving against the drill pipe. If this occurs, try to maintain circulation and rotation, even if circulation is slight. Where the grains are angular, the drill pipe can become locked while being rotated. This situation is similar to a sanded-in bit. With smooth pipe (not upset pipe), hammering up and down will sometimes dislodge the string. You can re-establish circulation and continue drilling.

Be careful because hammering up and down can produce unfavorable compacting of the sand. In a hole of fine-grained soil or shale, where the alignment has significantly deviated (crooked hole) and the drill pipe has wallowed into the wall, the pipe can become wall stuck. Pipe friction and relatively high borehole pressure can move the pipe tighter into the wallowed groove as you pull the string. An alert driller should recognize early stages of deviation and take measures to re-align the hole.

String Failure

When the drill string parts, leaving a portion in the borehole, the drill string is rung off. This happens more with larger powerful rigs, as smaller rigs with 6 hp and less usually don’t have the power to do this. The portion in the borehole is a fish, and attempts to retrieve the portion are called fishing. Fishing tools include a tapered tap and an overshot die or homemade tools.

Ringing off is normally fatigue failure in the drill-rod joints caused by excessive torque or thrust (repeated flexing and vibration that crystallizes heat-treated tool joints) or by borehole deviation (with flexing of the string). Examine drill rods for signs of failure.

Deviation

A deviated borehole is called “going crooked”. If you make the initial setup without plumbing and leveling the rig, you can expect the borehole to go crooked. A crooked borehole usually amplifies other problems later and can make a borehole unsuitable for a well. You should always anticipate deviation, since the borehole naturally tends to spiral from bit rotation. Variations in the formation badness may start deviation. Excessive bit load magnifies minor initial deviation. Use all available guides and collars and a reduction in bit load to minimize deviation.

SCOPE

To ensure the safety and health of our employees, this Company has developed a comprehensive emergency action plan to prepare for weather emergencies likely in its geographic location. This chapter includes information on weather conditions that may require special emergency planning and specific workplace training.

POLICY

This Company has developed this weather emergency policy plan to prepare for natural disasters likely in its geographic location. The policy provides information on the following weather conditions and the actions the Company and its employees will need to take in the event of their occurrence:

- Hurricanes and tropical storms
- Tornadoes
- Electrical storms

Other weather emergencies that may require planning include blizzards, dust storms, and flooding. This Company will consider the likelihood and potential severity of harm of adverse weather and implement appropriate procedures to ensure the safety and well-being of all employees.

HURRICANES AND TROPICAL STORMS

The best time to address emergency plans for tropical weather and ensure appropriate preparations are being made is before the hurricane season starts in late spring.

PREPAREDNESS

Risk Assessment

A business in a coastal area should know whether it is located in an evacuation zone or contingency zone. If a business owner is uncertain of the level of threat at a place of business, the local emergency management office and the National Weather Service can provide information to determine the workplace's vulnerability to strong winds and storm surges during a tropical weather event.

A business in the evacuation zone or contingency zone may need to be evacuated and should include as part of its emergency plans the specific evacuation routes and approximate travel times along those routes.

A number of other factors influence the risk a place of business faces as a hurricane approaches, including the building's elevation, quality of construction and state of repair.

HURRICANE PREPARATIONS

Employees

Preparation for tropical weather events (and all emergencies) should include updating the list of employees and their contact information and assigning specific duties to personnel in the event of a hurricane watch or warning. Keep in mind that employees may not be familiar with their hurricane preparation tasks, and may require training accordingly.

While employees will want to spend the time leading up to a significant weather event preparing their own families and homes, some staff will be needed to ready the workplace for an approaching storm.

Determining who is responsible for what and how the tasks will be completed is best done before the start of the hurricane season to ensure readiness when an actual storm is likely to impact business.

Facility and Equipment

If evacuation of the facility is likely, be sure appropriate preparations are made for the safety of the business's records, equipment and furniture. Preparations, depending on the outlook for the storm and the place of business, may include disconnecting power, securing equipment and storing items safely at a different location, perhaps offsite. Moving and securing equipment can be a cost- and labor-consuming process. Adequate planning helps ensure sufficient protection.

Each business has unique needs in this regard, and it is up to business owners and safety management to address these needs.

Another concern for hurricane preparation is collecting an appropriate stock of emergency supplies.

Consider including the following in a business' hurricane preparation kit:

- Non-perishable food (don't forget a can opener) and a gallon of water per person per day
- Flashlights and batteries
- Battery-powered or hand crank radio
- First aid kit
- Tools, lumber, sheeting, sandbags, etc. as needed to secure the facility
- Water cleanup supplies

It may be difficult to procure such supplies after a hurricane watch has been issued, so it is best to gather and restock the stockpile at the start of the hurricane season.

STORM CATEGORIZATION AND TROPICAL STORM ADVISORIES

The National Weather Service issues weather alerts to advise affected areas about approaching storms.

Hurricanes are assigned a category number based on their severity, shown in the table below.

SAFFIR-SIMPSON HURRICANE SCALE

Scale Number (Category)	Sustained Winds (MPH)	Damage
1	74-95	**Minimal**: Unanchored mobile homes, vegetation and signs.
2	96-110	**Moderate**: All mobile homes, roofs, small crafts, flooding
3	111-130	**Extensive**: Small buildings, low-lying roads cut off.
4	131-155	**Extreme**: Roofs destroyed, trees down, roads cut off, mobile homes destroyed. Beach homes flooded
5	>155	**Catastrophic**: Most buildings destroyed. Vegetation destroyed. Major roads cut off. Homes flooded.

Hurricane Watch

When the National Weather Service issues a hurricane watch for a coastal area, it means that tropical-storm-force winds are possible there within 48 hours.

As soon as a watch is issued, preliminary preparations should be made while monitoring the news for more information as it becomes available.

Make sure the hurricane supply stockpile is completely stocked, and begin securing and protecting equipment and data according to hurricane readiness plans as soon as possible. After a warning has been issued, or an evacuation order made, supplies and fuel may be difficult to come by in the affected area.

Hurricane Warning

A hurricane warning is issued 36 hours in advance of tropical-storm-force winds and indicates that the affected coastal area may expect hurricane conditions.

If your business is in an evacuation zone, evacuation should occur according to the recommendation of local officials. Evacuation for businesses in a contingency zone may also be called for in the event of a stronger storm. It is imperative to keep up to date with storm information as the storm progresses to ensure your response is appropriate to the threat.

While it is important to take the appropriate steps to secure objects, it is more important to ensure the safety of personnel. All preparations must be completed in time for employees to evacuate before storm conditions make evacuation routes impassable.

If an evacuation is not called for, wind/rain damage and utility loss is still a possibility. Be ready to follow appropriate emergency protocols and make necessary repairs as needed.

RESPONSE AND RECOVERY

Hurricane Landfall

During the storm, when evacuation isn't called for, employees should take shelter in interior rooms and hallways. Lower floors are safer, but basements may be subject to flooding. Some locations may not be suitable to provide workers shelter, and hurricane preparation plans must keep this in mind.

Monitor newscasts to respond appropriately as conditions change, and make sure everyone stays safely inside until dangerous conditions have passed.

Hurricane Aftermath

Returning to areas subject to evacuation may pose dangers and delays to drivers, as floods and high winds can leave roads in bad shape and officials may limit travel through the area for recovery efforts. Make sure to follow newscasts to hear official instructions.

When the worksite is reoccupied, it may be necessary to assess damage and identify hazardous situations that the storm may have caused.

Hazards that may be present include the following:

- Flooding
- Unsanitary water supply (use emergency water until officials give the okay to drink tap water)
- Structural damage and utility line breaks
- Hazardous wildlife
- Looting and similar crime

The emergency plan should include a process for handling the insurance Company after significant damage to facilities. Be sure to document storm damage thoroughly and wait until the adjuster has a chance to see damage before repairing it. Damages that create a hazard or subject the building to additional weather exposure, however, must be addressed to prevent further harm or damage.

TORNADOES

A tornado is a violently rotating column of air with circulation reaching the ground. They most often form from severe thunderstorms, beginning as a funnel cloud. On a local scale, it is the most destructive of all atmospheric phenomena. The wind in a tornado can reach speeds up to 300 miles per hour and can uproot trees, destroy buildings, and turn harmless objects into deadly missiles. Damage paths can be in excess of one mile wide and 50 miles long.

Just like hurricanes, tornadoes are assigned a Number based on their severity. The tornado scale, called the Fujita scale, is shown below.

FUJITA SCALE OF TORNADO INTENSITY

Scale	Wind Speed Range (MPH)
F0	< 72
F1	73-112
F2	113-157
F3	158-206
F4	207-260
F5	261-318

While tornadoes can occur at any time during the year, they are most likely to occur between the April and July. “Tornado Alley” spans across the middle of the United States, but storms that spin off tornados can occur anywhere depending on weather conditions.

Tornadoes strike suddenly, often with little warning. It is important to prepare before weather conditions spawn a twister.

PREPAREDNESS

Ask your local emergency management office or the American Red Cross chapter about the tornado threat in your area. Ask about community warning signals.

- Purchase a NOAA Weather Radio with a battery backup and tone-alert feature that automatically alerts you when a Watch or Warning is issued (tone alert not available in some areas). Purchase a battery-powered commercial radio and extra batteries as well
- Know the county or parish in which you live. Counties and parishes are used in Watches and Warnings to identify the location of tornadoes. Determine places to seek shelter, such as a basement or storm cellar
- If an underground shelter is not available, identify an interior room or hallway on the lowest floor
- Know the locations of designated shelters in places where you, your family and your fellow workers work or live such as public buildings, nursing homes and shopping centers. Practice going to your shelter with your fellow workers or family
- Ask local officials whether a registered engineer or architect has inspected public and private schools for shelter space
- Ask your local emergency manager or American Red Cross chapter if there are any public safe rooms or shelters nearby
- Assemble a disaster supplies kit. Keep a stock of food and extra drinking water
- Make a record of your personal property. Take photographs or videotapes of the exterior and interior of your home, including personal belongings. Store these documents in a safe place, such as a safe deposit box
- Tornadoes strike with some warning, but not usually enough for a full evacuation. Do your best to get to safety

- Tornadoes are typically accompanied by hail. Hail travels very fast, and a moderately sized hailstone can put out your eye or break your finger. Large hailstones have killed livestock and other large animals
- If you must go outside, wear your hard hat. It can protect your head from most hailstones. Downed hail presents a slipping hazard

Safe Room and Shelter

If you are concerned about wind hazards where you live, especially if you live in high-risk areas, you should consider building a shelter.

- Extreme windstorms in many parts of the country pose a serious threat to buildings and their occupants
- Your residence may be built to code, but that does not mean that it can withstand winds from extreme events like tornadoes
- The purpose of a wind shelter or safe room is to provide a space where you and your household can seek refuge that provides a high level of protection. You can build a shelter in your basement, beneath a concrete slab-on-grade foundation or garage floor, or in an interior room on the first floor
- Shelters built below ground level provide the greatest protection, but a shelter built in a first-floor interior room can also provide the necessary protection
- Belowground shelters must be designed to avoid accumulating water during the heavy rains that often accompany severe windstorms
- To protect its occupants, an in-house shelter must be built to withstand high winds and flying debris, even if the rest of the residence is severely damaged or destroyed
- The shelter must be adequately anchored to resist overturning and uplift
- The walls, ceiling, and door of the shelter must withstand wind pressure and resist penetration by windborne objects and falling debris
- The connections between all parts of the shelter must be strong enough to resist the wind
- If sections of either interior or exterior residence walls are used as walls of the shelter, they must be separated from the structure of the residence, so that damage to the residence will not cause damage to the shelter

TORNADO ADVISORIES AND RESPONSES

When a tornado weather advisory is issued, appropriate steps must be taken to make sure workers are safe should a tornado strike.

Tornado Watch

When the National Weather service issues a tornado watch, it means tornadoes are possible. Remain alert for approaching storms.

Communicate with your fellow workers. All information should be related to one another.

- Listen to NOAA Weather Radio, commercial radio, or television newscasts for the latest information
- Be alert for approaching storms. When you see any revolving funnel shaped clouds, report them immediately by telephone to your local police department or sheriff’s office

Danger signs of a possible tornado include:

- Dark, often greenish sky
- Large hail
- A large, dark, low-lying cloud (particularly if rotating)
- Loud roar, similar to a freight train

Some tornadoes are clearly visible, while rain or nearby low-hanging clouds obscure others.

- Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible
- Before a tornado hits, the wind may die down and the air may become very still
- A cloud of debris can mark the location of a tornado even if a funnel is not visible
- Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind them
- Avoid places with wide-span roofs such as auditoriums, cafeterias, large hallways, supermarkets, or shopping malls
- Be prepared to take shelter immediately. Assemble supplies to take to the shelter such as a flashlight, battery powered radio, water, and first aid kit. Do not forget about pets and what they will need
- Determine where you would take shelter in case a Tornado Warning was issued. Storm cellars or basements provide the best protection. If underground shelter is not available seek shelter in an interior room or hallway on the lowest floor

Tornado Warning

When the National weather service issues a Tornado Warning, A tornado has been sighted or has been indicated by weather radar. Take shelter immediately.

When a tornado has been sighted, go to your shelter immediately.

- In a small building, move to a pre-designated shelter, such as a basement, storm cellar, or safe room
- If there is no basement, go to an interior room on the lower level (closets, interior hallways). Put as many walls as possible between you and the outside. Get under a sturdy table and use arms to protect head and neck. Stay there until the danger has passed
- Stay away from windows, doors, and outside walls. Go to the center of the room. Stay away from corners. Corners attract debris
- In a school, nursing home, hospital, factory, or shopping center, go to predetermined shelter areas
- Interior hallways on the lowest floor are usually safest. Stay away from windows and open spaces
- In a high-rise building, go to a small, interior room or hallway on the lowest floor possible
- Locations of exits, assembly points and equipment (first aid kits) should be clearly identified and mapped. Exit routes should be clearly marked and well lit, wide enough to accommodate the number of evacuating personnel, unobstructed, and clear of debris at all times
- Get out of vehicles, trailers and mobile homes immediately and go to the lowest floor of a sturdy nearby building or a storm shelter. Mobile homes, even if tied down, offer little protection from tornadoes

- If caught outside with no shelter, lie flat in a nearby ditch or depression, and cover your head with your hands. Be aware of the potential for flooding. Do not get under an overpass or bridge. You are safer in a low, flat location
- Never try to out drive a tornado in a car or truck. Tornadoes can change direction quickly and can lift up a car or truck and toss it through the air. Get out of the car immediately and take shelter in a nearby building or safe shelter. If there is no time to get indoors, get out of the car and lie in a ditch or low-lying area away from the vehicle. Remember, stay alert to the potential for flooding
- Tornadoes are erratic and move swiftly. Watch out for flying debris. Flying debris from tornadoes causes most fatalities and injuries

After Tornado

- Monitor weather reports for further developments
- Wait until dangerous weather advisories end to travel
- Shut off gas at the main switch. Keep your nose open to the smell of natural gas, and listen for a hissing noise. Use flashlights rather than candles if possible. Gas line breaks can be very dangerous
- Watch out for downed wires and potentially hazardous debris
- Photograph damage for insurance claims and repair damage that would allow further wear, leave other damage for investigation by insurance adjusters
- Stay off the telephone except for emergencies
- Provide first aid as needed if you are sufficiently trained. Summon emergency help as appropriate

LIGHTNING HAZARDS

The most immediately dangerous hazard faced by workers during a lightning storm is the passing of the electrical current from a lightning bolt through the worker's body. Burns and cardiopulmonary arrest (heart and lungs stopping) as a result of a lightning strike can be deadly.

Direct Strike

When a cloud–to-ground strike hits a worker directly (or an item they are holding), it often results in cardiac arrest and unconsciousness or death. A direct strike typically happens when the victim is on open ground. The current moving over the skin can cause burns, but the flow of the current through the body causes the most damage, disrupting cardiovascular and nervous system function.

Sideflash

When lightning strikes a taller object near the victim, the taller object will conduct most of the current, but some of the energy is discharged through the worker as well. Sideflashes are most likely to occur when a person takes shelter from precipitation under a tree.

Step Voltage

When lightning strikes a tall object, the flow of electrical energy is dispersed out from the site of the strike. If a worker is near enough to the location of the strike, the ground current flows between the points of contact the person's body makes with the ground. The wider the distance between these points, the more damage a lightning strike will do to the victim. Most injuries and deaths from lightning occur because of ground current.

Conducted Current

Metal provides a path for the electrical current in a lightning strike to easily flow. Conduction injuries cause most indoor lightning injuries. During an electrical storm, workers must avoid touching metal items or objects connected to metal items to prevent injury from conducted current. Cables, cords, plumbing and fences all conduct the electricity from lightning and should be avoided during an electrical storm.

30-30 for Lightning Safety

- **30 seconds:** Measure the seconds between seeing lightning and hearing thunder. 30 seconds or less means to seek shelter immediately.

30 Minutes: Wait an entire half-hour after the last visible lightning strike or audible thunderclap before leaving the shelter. Most lightning deaths occur after the storm has seemingly passed

Streamer

Streamers from the ground rise through objects and the atmosphere to meet leaders and equalize the charge between the ground and clouds. Even when these streamers fail to connect with the leader, the current can cause significant harm.

Secondary Effects

In addition to lightning striking individuals, electrical storms cause damage that otherwise pose hazards to workers.

Fires

Fires can result from lightning strikes in one of two ways. The heat from a lightning bolt can ignite combustible matter at the site of the lightning strike. Further, electrical fires can ignite along circuits and flammable or combustible materials in containers can ignite causing explosive blazes. Response to fires caused by a lightning strike depends on the location and general nature of the fire. Consult the fire prevention plan and the emergency action plan for more information on appropriate emergency response to such a fire.

Fallen Branches

When a tree is struck by lightning, damaged branches can collapse and crush anything below. Fallen tree branches can also block roadways and break electric wires.

Fallen Power Lines

Report fallen power lines immediately to the local utility Company or emergency responders. Workers should never attempt to touch or move fallen electric wires unless it is an explicit part of their job and appropriate steps have been taken to ensure the line is not energized. If an electric wire falls on a vehicle, it is best to drive the vehicle away, or wait until the line is moved if driving away is not possible.

Equipment Damage

Lightning can cause power surges that can damage equipment or cause harm to employees. The best way to prevent potentially dangerous surges is to prevent them with proper circuit design and protecting equipment. Equipment must be grounded and bonded appropriately and any facility where workers will be present must be wired according to applicable standards and regulations.

CONTROLS

Storm Preparedness

An important step in avoiding harm from lightning strikes is to be prepared for an electrical storm before one approaches the worksite.

Weather Monitoring

It is the responsibility of the safety coordinator of this Company to ensure monitoring of the weather in preparation for any expected outdoor work activity. Employees will receive a weather report as part of a daily worksite safety analysis before any work outdoors. This report will include a reminder of expected response to lightning whenever there is a thunderstorm watch issued by the local weather service, or there is a possibility that employees will encounter an electrical storm during the workday.

All weather service warnings and watches, and the recommendations of the weather service will be conveyed to workers as soon as practicable and followed.

Shelter Provision

It is the policy of this Company to provide access to adequate shelter for workers whenever possible in the event of potentially harmful weather. A safe building must have a roof, walls and floor.

If employees must work at a remote site where a quick-moving storm may prevent workers from reaching ideal shelter, there must be sufficient room in a fully enclosed vehicle for all workers at the site. It is important that workers note the distance between the worksite and shelter so that there is a clear understanding of how long it will take to reach the shelter versus the speed of a storm’s approach.

Detecting and Predicting Electrical Storms

Knowing where a storm is and its approximate rate of approach, helps determine when outdoor work needs to cease so workers can seek shelter.

Storm Detector

This Company may use a storm detector at worksites, especially remote ones, to detect an incoming storm. These devices detect severe weather activity many miles away, approximate its distance fairly accurately and precisely, and warn the user of its approach.

Flash to Bang Method

A method to approximate the distance to a lightning strike that requires no equipment involves counting the seconds between the strike and the sound of the thunder that accompanies it. After witnessing a lightning strike, count the seconds until the thunder reaches the worksite.

It takes sound about 5 seconds to travel a mile.

Subsequent counts can help workers and/or supervisors have a better understanding of the storm's speed of approach.

Clouds

Dark threatening clouds — especially where meteorological prediction models point to a likely electrical storm — indicate an approaching hazard. Ominous clouds are a good indicator that workers need to wrap up the job they are doing and begin moving toward shelter as soon as safely possible.

RESPONDING TO LIGHTNING

It is always best to err on the side of caution in matters of safety. It is advisable to begin moving to shelter upon auditory detection of thunder. If you can hear an electrical storm, you are close enough to be struck by its lightning. Avoid all bodies of water when an electrical storm approaches.

Suspending Activity

All outdoor work must cease when an electrical storm moves within six miles of the worksite. If a storm detector is in use, this limit can be expanded significantly. Work must also be suspended when the weather service issues a storm warning for the work location. Upon notification of work cessation for severe weather, employees will seek shelter as soon as safely possible.

Taking Shelter

Buildings

Enclosed buildings are the safest place to be during an electrical storm. Employees must take shelter in a building whenever one can be reached safely. It is safest to unplug or turn off electrical appliances and avoid corded equipment and plumbing fixtures. Any object in contact with pipes (plumbing or gas) and cables (especially electrical, but also communications) can conduct electricity and poses a hazard during an electrical storm. Stay away from windows and doors as much as possible until the danger of a lightning strike passes.

Cars

If employees cannot reach a safe building during an electrical storm, the next best solution is to take shelter in an enclosed car. A convertible car or open cab of heavy equipment does not provide protection from lightning. Employees must ensure all the windows are rolled up and avoid touching the doors or metal in the interior until the storm has passed.

Shelterless Response

If it is impossible for an employee to reach the shelter of an enclosed building or vehicle, he or she should take the following precautions to ensure safety:

- Stay off and away from tall things, especially solitary tall things surrounded by flat terrain; avoid being the highest point in an open field
- Get off and away from vehicles or machinery that are not enclosed
- Avoid standing in groups
- Avoid conductors like metal fences, rails, poles, etc.
- Put down any item that may conduct electricity
- Move to low ground like a ditch or a gully if one is near (but not one with water)
- Get to land if on water and avoid streams or lakes
- Avoid any flammable, explosive or combustible materials

If you feel tingles or your hair stand on end, or otherwise fear you are in immediate danger of being struck by lightning, take the following steps to reduce harm from a potential strike:

- If possible, find some kind of insulating material upon which you can crouch (e.g. a coil of rope, plank of wood, sleeping bag, woolen shirt)
- Remove metal objects or objects that contain metal that may touch your skin (including a baseball cap)
- Squat down as low as possible on the balls of your feet
- Place your hands over your ears or on the back of your neck, with your head between your knees
- Make yourself as small and low as possible and do your best to keep your heels off the ground and together

DO NOT LIE DOWN FLAT ON THE GROUND.

Responding to a Coworker Being Struck by Lightning

In addition to the measure of current moving through the victim, the speed of medical response after being struck determines the likelihood of the victim surviving a strike. Call for emergency responders immediately.

A lightning victim does not carry an electrical charge and can be safely touched. First aid should be rendered as quickly as possible. Common injuries that result from a lightning strike include burns, wounds and fractures.

Check breathing and pulse if the victim has lost consciousness, begin CPR according to your level of training. Check for broken bones and cover burns with a dry sterile dressing, there may be two areas burned by where the lightning entered and exited the body.

Even if a lightning strike victim seems unhurt, they should receive medical attention promptly. When there are multiple victims, treat those who are unconscious first.

Do not render first aid beyond your level of training.

Resuming Activity

Work activities may not resume until the designated supervisor determines it is safe from severe weather.

All workers must wait 30 minutes from hearing the last thunderclap or wait for the end of a weather-service issued warning before leaving shelter from an electrical storm to return to work.

SCOPE

This chapter provides the safe practices and requirements for performing welding, cutting and brazing, also known as hotwork. Our safe practices will comply with OSHA regulations 1910.254 and/or 1926.350, whichever is applicable. This chapter does not include information about the installation and/or maintenance of gas distribution piping and manifold systems.

POLICY

We are committed to preserving the safety of employees and maintaining a place of employment free from recognized hazards. Accordingly, only properly trained employees, authorized to perform such operations may perform welding, cutting, brazing, grinding and other hotwork. If it is impossible to eliminate fire hazards from such work, appropriate control steps will be taken to ensure the safety of workers, including engineering and administrative controls and personal protective equipment.

This welding, cutting and brazing program is designed to protect life and property from fire, atmospheric contaminants and other associated hazards during these operations, and will be enforced rigorously.

EMPLOYER RESPONSIBILITIES

It is our responsibility to:

- Ensure the safe use of cutting and welding equipment on site, including the use of required PPE
- Establish areas for cutting and welding and establish procedures based on the fire potentials of facilities
- Designate a person to authorize cutting and welding operations if they are done outside of designated areas
- Ensure that cutters, welders and their supervisors are trained to operate their equipment according to safe processes; rules and instructions covering the operation and maintenance of oxygen or fuel-gas supply equipment, including generators, and oxygen or fuel-gas distribution piping systems, must also be readily available
- Inform contractors of fire hazards

SUPERVISOR RESPONSIBILITIES

Supervisors of employees who must perform welding are expected to:

- Be responsible for the safe handling and use of equipment to cut or weld
- Determine fire hazards and combustibles that are or may arise at the work location
- Prevent ignition of combustibles by the following:
  - Move work away from combustibles or install guards to prevent fire hazards
  - Ensuring cutting or welding work is done at a time when nearby operations will not expose combustibles to ignition from such work
  - Secure authorization from management before any cutting or welding is begun

- Ensure the cutter or welder does not go ahead without approval of safe conditions;
- Determine that fire protection and extinguishing equipment are located at the site
- Ensure the availability of a fire watch as required

EMPLOYEE RESPONSIBILITIES

Employees who, as part of their work responsibilities engage in welding, brazing, cutting, grinding or any other activity that can produce spark, heat or atmospheric toxicants are expected to:

- Perform only job activities for which they are trained and competent
- Perform hotwork in designated, appropriately ventilated areas unless authorized otherwise
- Refrain from welding or other hotwork without appropriate authorization
- Refrain from tampering with safety devices
- Follow all other safe work practices as outlined in this policy

HAZARDS

The hazards associated with welding cutting and brazing include:

- Fire
- Burns
- Vision Hazards
- Respiratory hazards
- Falls (if working at heights)

PERSONAL PROTECTIVE EQUIPMENT

Employers must provide all of the following to protect employees from injuries likely to be caused by the assigned task of welding, cutting and hotwork (more specific information is provided later in this document):

- Face and eye protection, such as safety glasses or face shields
- Foot protection
- Additional necessary clothing or equipment, such as gloves, aprons, hearing protection devices, respirators, lifelines, safety belts, lanyards, and curtains
- Ventilation, where necessary to protect an employee against toxic materials
- Except for long-sleeve shirts required to protect the employee from ultraviolet rays to the arms, and ankle length trousers, clothing and equipment will be provided without expense to employees

Effective safeguards will protect workers on platforms, scaffolds or other spaces that present a falling hazard. Welding cable and equipment will remain clear of passageways, ladders and stairways to ensure safe travel.

After welding operations are completed, the welder will mark the hot metal or provide some other means of warning other workers.

Eye Protection

Welders must use helmets or hand shields during all arc welding or arc cutting operations, excluding submerged arc welding. The Company also will provide helpers or attendants with proper eye protection.

Goggles or other suitable eye protection must be worn during all gas welding or oxygen cutting operations. Employees may use spectacles without side shields, with suitable filter lenses during gas welding operations on light work, for torch brazing or for inspection.

All operators and attendants of resistance welding or resistance brazing equipment must use transparent face shields or goggles, depending on the particular job, to protect their faces or eyes, as required. The Company will provide eye protection in the form of suitable goggles where needed for brazing operations other than arc welding and brazing, or resistance welding or brazing.

Welders must use helmets or hand shields during all arc welding or arc cutting operations, excluding submerged arc welding. The Company also will provide helpers or attendants with proper eye protection.

Goggles or other suitable eye protection must be worn during all gas welding or oxygen cutting operations. Employees may use spectacles without side shields, with suitable filter lenses during gas welding operations on light work, for torch brazing or for inspection.

Welding Operation	Shade No.
Shielded metal-arc welding - 1/16-, 3/32-, 1/8-, 5/32- inch electrodes	10
Gas-shielded arc welding (nonferrous) - 1/16-, 3/32-,	11
Gas-shielded arc welding (ferrous) - 1/16-, 3/32-, 1/8-	12
Shielded metal-arc welding:	
3/16-, 7/32-, 1/4-inch electrodes	12
5/16 -, 3/8-inch electrodes	14
Atomic hydrogen welding	10-14
Carbon arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, 6 inches and over	5 or 6
Gas welding (light) up to 1/8 inch	4 or 5
Gas welding (medium) 1/8 inch to 1/2 inch	5 or 6
Gas welding (heavy) 1/2 inch and over	6 or 8

NOTE: In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter or lens that absorbs the yellow or sodium line in the visible light of the operation.

All operators and attendants of resistance welding or resistance brazing equipment must use transparent face shields or goggles, depending on the particular job, to protect their faces or eyes, as required.

The Company will provide eye protection in the form of suitable goggles where needed for brazing operations other than arc welding and brazing, or resistance welding or brazing.

The specifications for such protectors are as follows:

- Helmets and hand shields must be made of material that insulates for heat and electricity

- Helmets, shields, and goggles must be not readily flammable and must be capable of withstanding sterilization
- Helmets and hand shields must be arranged to protect the face, neck, and ears from direct radiant energy from the arc
- Helmets must be provided with filter plates and cover plates designed for easy removal
- All parts must be constructed of a material that will not readily corrode or discolor the skin
- Goggles must be ventilated to prevent fogging of the lenses as much as practicable
- All glass for lenses must be tempered, substantially free from air bubbles, waves and other flaws. Except when a lens is ground to provide proper optical correction for defective vision, the front and rear surfaces of lenses and windows must be smooth and parallel
- Lenses must bear some permanent distinctive marking by which to identify the source and shade
- Filter lenses must meet the test for transmission of radiant energy prescribed by any of the following consensus standards:
  - ANSI Z87.1, "American National Standard Practice for Occupational and Educational Eye and Face Protection"
  - ANSI Z87.1, "American National Standard Practice for Occupational and Educational Eye and Face Protection"
  - ANSI Z87.1, "American National Standard Practice for Occupational and Educational Eye and Face Protection”
- Where work permits, enclose the welder in an individual booth painted with a finish of low reflectivity such as zinc oxide and lampblack or enclose with noncombustible screens similarly painted. Booths and screens must permit circulation of air at floor level
- Protect workers or other persons adjacent to the welding areas from the rays by noncombustible or flameproof screens or shields or must be required to wear appropriate goggles

Protective Clothing

Protect employees exposed to the hazards created by welding, cutting or brazing operations with personal protective equipment as required to ensure safety and meet regulatory requirements. Appropriate protective clothing required for any welding operation will vary with the size, nature and location of the work.

SAFE PRACTICES

All employees engaged in welding, cutting and brazing are expected to follow these safe practices.

Fire Prevention and Protection

Cutting or welding may only occur in fire-safe areas.

If the object to be welded or cut cannot be moved, movable fire hazards need to be moved at least 35 feet away. If it is impossible to move them, safeguards to confine heat, sparks and slag must protect the immovable fire hazards.

Where combustible materials are on the floor, employees must sweep the floor clean for a radius of 35 feet. Combustible floors must be kept wet (protect welder form shock if arc welding), covered with damp sand, or protected by fire-resistant shields.

Floor openings or cracks in the floor that cannot be closed, as well as holes in walls, open doorways and open or broken windows must be guarded to prevent sparks from reaching readily combustible material. Employees must shutdown ducts that could carry sparks to combustibles, or emplace appropriate safeguards before hotwork.

Fire extinguishing equipment appropriate to the present hazard will be ready for instant use during hotwork.

An inspector will inspect the worksite and designate precautions before granting authorization to proceed with cutting or welding in the form of a written permit.

Fire Watch

Firewatchers must be present for welding or cutting in locations where an unplanned flame might develop or when any of the following is true:

- Appreciable combustible material is within 35 feet to the point of operation
- Sparks may easily ignite appreciable combustibles more than 35 feet away
- Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas (including concealed spaces in walls or floors)
- Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation

Welding and cutting by gas utility firms on live mains is exempt from this rule when the main if is filled under positive pressure with natural or manufactured gas and air movers are used to ventilate areas where fumes might accumulate.

Firewatchers must have fire-extinguishing equipment readily available and training in its use. They must be familiar with facilities for sounding an alarm in the event of a fire and will watch for fires in all exposed areas. Firewatchers must try to extinguish flames only when within the capacity of the equipment available. Otherwise, they must sound the alarm.

The fire watch will continue for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

Prohibited Areas

Cutting or welding is prohibited in the following situations:

- In areas not authorized by management
- In sprinklered buildings where the sprinkler’s ability to stop fire have been impaired
- In explosive atmospheres, including those that may develop inside uncleaned or improperly prepared spaces that contained explosive materials, or where there is an accumulation of combustible dusts
- In an area nearer than 35 feet to the storage of large quantities of exposed, readily ignitable materials such as bulk sulfur, baled paper, or cotton

- In a metal partition, wall, ceiling or roof that has a combustible covering or walls of sandwich-type construction
- In pipes or other metal near enough to combustible walls, partitions, ceilings, or roofs to ignite them by conduction

Containers

Welding or cutting must not be performed on drums, barrels, tanks, or other containers until they have been cleaned of all flammable combustible or toxic materials or fumes.

All pipelines or other connections to drums, barrels or tanks must be disconnected or blanked.

Hollow spaces or cavities must be vented and either filled with water or purged with an inert gas before preheating, cutting, or welding.

An opening must be maintained during welding and cutting to vent gases or vapors.

Confined Spaces

Ventilation is required to work in any confined space.

Leave gas cylinders and welding machines outside of confined spaces. Before starting operations, block the wheels of heavy portable equipment to prevent movement.

A welder will only enter a confined space with Company-provided means to be removed in case of emergency. When using safety belts and lifelines for this purpose, they need to be attached to the welder's body so that his body cannot be jammed in a small exit opening.

As with any work done in a hazardous confined space, the worker will have an attendant stationed outside with a preplanned rescue procedure. The attendant must be able to observe and/or communicate with the welder at all times and put rescue plans promptly into effect.

See the “Confined Spaces” chapter for specific information on working in those areas.

Health Protection and Ventilation

The factors that govern the amount of contamination to which welders may be exposed are the dimensions of the workspace, the number of welders working, and the evolution of hazardous fumes, gases or dust.

When the welding area is screened on all sides, the screens need to be arranged to allow sufficient ventilation — mounted about 2 feet from the floor, unless the work being done is near enough to the ground to require them to be lower to prevent harm to nearby workers.

Ventilating systems must ensure toxic fumes, gases, or dusts remain under permissible levels for all workers.

First-aid equipment remains available according to the emergency action plan. Report all injuries immediately. Trained personnel will provide first aid until professional medical attention is available.

Precautionary Labels

Fluxes, coatings, coverings and filler metals used in welding and cutting may employ potentially hazardous materials, including, but not limited to the following:

- Fluorine compounds
- Lead
- Beryllium
- Mercury
- Zinc
- Cleaning compounds
- Cadmium
- Chlorinated hydrocarbons

Appropriate ventilation or respirator equipment must control hazards presented by these chemicals and oxygen cutting stainless steel. Find more detail on controlling hazards these chemicals present in CFR 1910.252.

Welding material suppliers are responsible for determining hazards associated with a given material used for welding or cutting. Materials used in hotwork must be labeled with safety warnings according to the hazards the materials present and all workers must understand what the warnings mean.

Ventilation for General Welding and Cutting

Mechanical ventilation for welding or cutting on metals other than those listed above and any of the following is true:

- The space is less than 10,000 cubic feet per welder
- The room has a ceiling height of less than 16 feet
- The space is confined
- The welding space has structural barriers that significantly obstruct cross ventilation

Natural ventilation is sufficient for welding or cutting operations where these restrictions are not present.

Ventilation will be at least 2,000 cubic feet per minute per welder, except where workers have local exhaust hoods and booths or have airline respirators approved for such purposes.

Mechanical local exhaust ventilation may be by means of either of the following:

- Freely movable hoods near the work provided with a rate of airflow in the direction of the hood of 100 linear feet per minute in the zone of welding when the hood is at its most remote distance from the point of welding. The rates of ventilation required to accomplish this velocity using a 3-inch wide flanged suction opening are shown in table 0-2
- A fixed enclosure with a top and at least two sides that surround the welding or cutting operations with a rate of airflow sufficient to maintain a velocity away from the welder of at least 100 linear feet per minute

Welding Zone	Minimum air flow cubic feet / minutes	Duct Diameter, inches
4 to 6 inches from arc or torch	150	3
6 to 8 inches from arc or torch	275	3 ½
8 to 10 inches from arc or torch	425	4 ½
10 to 12 inches from arc or torch	600	5 ½

Confined Spaces Ventilation

Adequate ventilation for all welding and cutting operations in confined spaces must prevent the accumulation of toxic materials or oxygen deficiency. This applies not only to the welder but also to helpers and other personnel in the immediate vicinity. All air replacing used for ventilation must be clean and respirable.

If such ventilation can't be provided, the Company will provide airline respirators or hose masks approved by the National Institute for Occupational Safety and Health (NIOSH) for this purpose.

Areas immediately hazardous to life require a full-facepiece, pressure-demand, self-contained breathing apparatus or a combination full-facepiece, pressure-demand supplied-air respirator with an auxiliary, self-contained air supply approved by NIOSH.

Where welding operations occur in confined spaces requiring hose masks, hose masks with blowers, or self-contained breathing equipment, a worker stationed on the outside of such confined spaces will ensure the safety of those working within.

Never use oxygen for ventilation.

See the Confined Spaces chapter for specific information on working in those areas.

Industrial Applications

Observe OSHA requirements where field shop operations are involved for fabrication of fittings, river crossings, road crossings and pumping and compressor stations.

Special protection against electric shock for arc welding will be provided in wet conditions, or under conditions of high humidity.

In pressure testing of pipelines, protect workers and the public against injury by blowing out closures or other pressure restraining devices. Ensure protection against expulsion of loose dirt trapped in the pipe.

Employees will follow the appropriate standard for the following welding applications:

- Conduct the welded construction of transmission pipelines in accordance with the Standard for Welding Pipe Lines and Related Facilities, API Std. 1104
- The connection, by welding, of branches to pipelines carrying flammable substances must be performed in accordance with Welding or Hot Tapping on Equipment Containing Flammables, API Std. PSD No. 2201
- The use of X-rays and radioactive isotopes for the inspection of welded pipeline joints must be carried out in conformance with the American National Standard Safety Standard for Non-Medical X-ray and Sealed Gamma-Ray Sources, ANSI Z54.1

OXYGEN-FUEL GAS WELDING AND CUTTING

Mixtures of fuel gases and air or oxygen may be explosive and require appropriate guards.

Mixing air or oxygen with flammable gases will occur only at the burner or in a standard torch. Unapproved attachments or devices to mix air and fuel gasses are forbidden.

Acetylene may not be generated, piped (except in approved cylinder manifolds), or used at a pressure in excess of 15 psi. Liquid acetylene is also forbidden.

Only approved apparatus such as torches, regulators or pressure-reducing valves, acetylene generators, and manifolds must be used.

Anyone in charge of the oxygen or fuel-gas supply equipment, and oxygen or fuel-gas distribution piping systems must be instructed and judged competent by their employers before being left in charge.

Rules and instructions covering the operation and maintenance of oxygen or fuel-gas supply equipment including generators, and oxygen or fuel-gas distribution piping systems must be readily available

CYLINDERS AND CONTAINERS

Marking

All portable cylinders used for the storage and shipment of compressed gases must be constructed and maintained according to the regulations of the U.S. Department of Transportation, 49 CFR Parts 171-179.

Compressed gas cylinders must be legibly marked, with either the chemical or the trade name of contents. The cylinder marking must not be readily removable. Whenever practical, the marking will be located on the shoulder of the cylinder. Unlabeled cylinders will not be used. Cylinders must be marked as empty at the time of depletion.

Compressed gas cylinders connections must will ANSI B57.1 requirements.

All cylinders with a water weight capacity of over 30 pounds must be equipped with means of connecting a valve protection cap or with a collar or recess to protect the valve.

Storage

Keep cylinders away from radiators and other sources of heat and at least 20 feet from combustible materials. Do not store cylinders in areas where the temperature is excess of 125° F.

Cylinders stored inside of buildings must be in a well-protected, well-ventilated and dry location. Keep cylinders out of unventilated areas such as lockers, cupboards, basements or pits unless approved ventilation is provided to keep the area purged of any accumulation of gases.

Keep cylinders in designated spaces away from elevators, stairs or gangways. The storage spaces must be located where cylinders will not be knocked over or damaged by passing or falling objects.

Storage must be set up to ensure first-in, first-out usage.

A cylinder storage area must be posted with the names of the individual gases stocked, and the different gases must be grouped by type. Groupings must separate the flammable gases from the oxidizing gases.

Store cylinders in a secure area, with a warning posted against tampering by unauthorized individuals.

Empty cylinders must have their valves closed. Valve protection caps, where a cylinder accepts a cap, must always be in place, hand-tight, except when cylinders are in use or connected for use.

Fuel-Gas Cylinder Storage

Cylinders, except those in actual use or attached ready for use, stored inside a building, must be limited to a total gas capacity of 2,000 cubic feet or 300 pounds of liquefied petroleum gas.

When storing cylinders in excess of 2,000 cubic feet total gas capacity of cylinders or 300 pounds of liquefied petroleum gas inside of a building, a separate room or compartment must be used with the following specifications:

- Noncombustible construction having a fire resistance rating of at least one hour
- Walls or partitions continuous from floor to ceiling and securely anchored
- At least one wall must be an exterior wall

Special buildings, rooms or compartments used to store cylinders, must not have any open flames and must be well ventilated. They may also be used for storage of calcium carbide in quantities not to exceed 600 pounds, when contained in metal containers with the following specifications:

- Of sufficient strength to prevent rupture
- With a screw top or equivalent
- Water- and air-tight
- No solder used in a manner that the package would fail in a fire. Acetylene cylinders must be stored valve end up

Oxygen Storage

Oxygen cylinders must not be stored near highly combustible material, especially oil and grease; or near reserve stocks of carbide and acetylene or other fuel-gas cylinders, or near any other substance likely to cause or accelerate fire; or in an acetylene generator compartment.

Oxygen cylinders stored in outside generator houses must be separated from the generator or carbide storage rooms by a noncombustible partition having a fire-resistance rating of at least 1 hour. This partition must be without openings and must be gastight.

Oxygen cylinders in storage must be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.

If a liquid oxygen system is used to supply gaseous oxygen for welding or cutting and the system stores more than 13,000 cubic feet of oxygen connected in service or ready for service, or more than 25,000 cubic feet of oxygen, including unconnected reserves on hand at the site, it must comply with the provisions of NFPA No. 566.

Handling Procedures

- A chain, bracket, or other restraining device must be used at all times to prevent cylinders from falling

- Cylinders, cylinder valves, couplings, regulators, hose and apparatus must be kept free from oily or greasy substances. Oxygen cylinders or apparatus must not be handled with oily hands or gloves. A jet of oxygen must never be permitted to strike an oily surface, greasy clothes, or enter a fuel oil or other storage tank
- When transporting cylinders by a crane or derrick, a cradle, boat, or suitable platform must be used. Slings or electric magnets must not be used for this purpose. Valve- protection caps, where cylinder is designed to accept a cap, must always be in place
- Cylinders must not be dropped, struck, or permitted to strike each other violently
- Valve-protection caps must not be used for lifting cylinders from one vertical position to another. Bars or another force must not be used under valves or valve-protection caps to pry cylinders loose when frozen to the ground or otherwise fixed. A frozen or ice-clogged valve must be thawed by either warm air or use of warm water, and dried, before using. Boiling water or a flame must not be used. Valve-protection caps are designed to protect cylinder valves from damage
- Unless cylinders are secured on a special truck, regulators must be removed and valve-protection caps, when provided for, must be put in place before cylinders are moved
- Cylinders not having fixed hand wheels must have keys, handles, or nonadjustable wrenches on valve stems while these cylinders are in service. In multiple cylinder installations, only one key or handle is required for each manifold
- Cylinder valves must be closed before moving cylinders
- Cylinder valves must be closed when work is finished
- Valves of empty cylinders must be closed
- Cylinders must be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them, or fire-resistant shields must be provided
- Cylinders must not be placed where they might become part of an electric circuit
- Contacts with third rails, trolley wires, etc., must be avoided. Cylinders must be kept away from radiators, piping systems, layout tables, etc., that may be used for grounding electric circuits such as for arc welding machines. Any practice such as the tapping of an electrode against a cylinder to strike an arc must be prohibited
- Cylinders must never be used as rollers or supports, whether full or empty
- The numbers and markings stamped into cylinders must not be tampered with
- No person, other than the gas supplier, must attempt to mix gases in a cylinder. No one, except the owner of the cylinder or person authorized by him, must refill a cylinder
- No one must tamper with safety devices in cylinders or valves
- Cylinders must not be dropped or otherwise roughly handled
- Unless connected to a manifold, oxygen from a cylinder must not be used without first attaching an oxygen regulator to the cylinder valve. Before connecting the regulator to the cylinder valve, the valve must be opened slightly for an instant and then closed. Always stand to one side of the outlet when opening the cylinder valve
- A hammer or wrench must not be used to open cylinder valves. If valves cannot be opened by hand, notify the supplier

- Do not tamper with cylinder valves and do not attempt to repair them. If trouble is experienced, send the supplier a report promptly indicating the character of the trouble and the cylinder's serial number. Follow the supplier's instructions
- A cylinder’s regulator, gauge, or hose must never be interchanged between fuel gas, oxidizing gas, or inert gas
- Complete removal of the stem from a diaphragm-type cylinder valve must be avoided
- Fuel-gas cylinders must be placed with valve end up whenever they are in use. Liquefied gases must be stored and shipped with the valve end up
- Cylinders must be handled carefully. Rough handling, knocks, or falls are liable to damage the cylinder, valve, or safety devices and cause leakage
- Before connecting a regulator to a cylinder valve, the valve must be opened slightly and closed immediately. The valve must be opened while standing to one side of the outlet, never in front of it. Never crack a fuel-gas cylinder valve near other welding work or near sparks, flame, or other possible sources of ignition
- Before a regulator is removed from a cylinder valve, the cylinder valve must be closed and the gas released from the regulator
- Nothing must be placed on top of a cylinder when in use which may damage the safety device or interfere with the quick closing of the valve
- If cylinders are found to have leaky valves or fittings that cannot be stopped by closing of the valve, the cylinders must be taken outdoors away from sources of ignition and slowly emptied
- Place a warning tag on cylinders having leaking fuse plugs or other leaking safety devices not to approach them with a lighted cigarette or other source of ignition. Notify the supplier promptly and follow his instructions as to their return
- Safety devices must not be tampered with
- Fuel-gas must never be used from cylinders through torches or other devices equipped with shutoff valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold
- The cylinder valve must always be opened slowly
- An acetylene cylinder valve must not be opened more than one and one-half turns of the spindle, and preferably no more than three-fourths of a turn
- Where a special wrench is required, it must be left in position on the stem of the valve while the cylinder is in use so that the fuel-gas flow can be quickly turned off in case of emergency. In the case of manifolded or coupled cylinders, at least one such wrench must always be available for immediate use

ARC WELDING AND CUTTING

Workers designated to operate arc-welding equipment must have been properly instructed and qualified to operate such equipment.

Application of Arc Welding Equipment

Arc welding equipment will comply with the National Electrical Manufacturers Association (NEMA) EW-1 requirements, or the ANSI C33.2 and Underwriters’ Laboratories.

Environmental conditions

Standard machines for arc welding service must carry their rated load with rated temperature rises where the temperature of the cooling air does not exceed 104° F and where the altitude does not exceed 3,300 feet. Arc welding machines must be suitable for operation in atmospheres containing gases, dust and light rays produced by the welding arc.

Unusual service conditions may exist, and in such circumstances, machines must be especially designed to meet the requirements of the service. Chief among these conditions are:

- Exposure to unusually corrosive fumes
- Exposure to excessive oil vapor
- Exposure to abnormal vibration or shock
- Exposure to weather
- Exposure to steam or excessive humidity
- Exposure to flammable gases
- Exposure to excessive dust
- Exposure to unusual seacoast or shipboard conditions

Voltage

When an arc-welding machine is operated without being connected to a load, the open circuit voltage must not exceed the values shown in the table below when rated voltage is applied to the primary winding or when a generator type arc-welding machine is operating at maximum rated no-load speed.

Welding Current	**Max. Open Circuit (no-load) Voltage**	
	Manual and Semiautomatic Machines	**Automatic Machines**
AC	80 rms	100 rms
DC > 10% ripple voltage	80 rms	100 average
DC > 10% ripple voltage	100 average	100 average

When special welding and cutting processes require values of open circuit voltages higher than the ones shown above, adequate insulation or other means must be provided to prevent the operator from making accidental contact with the high voltage.

For AC welding under wet conditions or warm surroundings where perspiration is a factor, the use of reliable automatic controls for reducing no load voltage is recommended to reduce the shock hazard.

Design

A controller that is part of an electric motor driven welder must have the capacity for carrying rated motor current and be capable of making and interrupting stalled rotor current of the motor. It may serve as the running overcurrent device if provided with the number of overcurrent units as approved.

On all types of arc welding machines, control apparatus must be enclosed except for the operating wheels, levers or handles.

Input power terminals, tap change devices and live metal parts connected to input circuits must be completely enclosed and accessible only by using tools.

Terminals for welding leads must be protected from accidental electrical contact by personnel or by metal objects i.e., vehicles, crane hooks, etc. Protection may be obtained by use of: Dead- front receptacles for plug connections; recessed openings with non-removable hinged covers; heavy insulating sleeving or taping or other equivalent electrical and mechanical protection. If a welding lead terminal that is intended to be used exclusively for connection to the work is connected to the grounded enclosure, a conductor at least two AWG sizes smaller than the grounding conductor must be used and the terminal must be marked to indicate that it is grounded.

No connections for portable control devices such as push buttons to be carried by the operator must be connected to an AC. circuit of higher than 120 volts. A grounding conductor in the control cable must ground exposed metal parts of portable control devices operating on circuits above 50 volts. Autotransformers or AC reactors must not be used to draw welding current directly from any AC power source having a voltage exceeding 80 volts.

Installation of Arc Welding Equipment

Installation including power supply must be in accordance with the requirements of OSHA electrical regulations. In addition, a welding cable must be protected against damage, entanglement or contact with power supply or high-tension wires.

Grounding

The frame or case of the welding machine (except engine-driven machines) must be grounded according to the methods prescribed in OSHA electrical regulations.

- Conduits containing electrical conductors must not be used for completing a work-lead circuit
- Pipelines must not be used as a permanent part of a work-lead circuit, but may be used during construction, extension or repair providing current is not carried through threaded joints, flanged bolted joints, or caulked joints, and that special precautions are used to avoid sparking at connection of the work-lead cable
- Chains, wire ropes, cranes, hoists and elevators must not be used to carry welding current
- Where a structure, conveyor or fixture is regularly employed as a welding current return circuit, joints must be bonded or provided with adequate current collecting devices
- All ground connections must be checked to determine that they are mechanically strong and electrically adequate for the required current

Supply Connections and Conductors

A disconnecting switch or controller must be provided at or near each welding machine that is not equipped with such a switch or controller mounted as an integral part of the machine. The switch must be in accordance with OSHA electrical regulations. Overcurrent protection must be provided as specified in OSHA electrical regulations. A disconnect switch with overload protection or equivalent disconnect and protection means, permitted by OSHA electrical regulations, must be provided for each outlet intended for connection to a portable welding machine.

For individual welding machines, the rated current-carrying capacity of the supply conductors must be not less than the rated primary current of the welding machines.

For groups of welding machines, the rated current-carrying capacity of conductors may be less than the sum of the rated primary currents of the welding machines supplied. The conductor rating must be determined in each case according to the machine loading based on the use of each welding machine and the allowance permissible in the event that not all the welding machines supplied by the conductors will be in use at the same time.

In operations involving several welders on one structure, DC welding process requirements may require the use of both polarities; or supply circuit limitations for AC welding may require distribution of machines among the phases of the supply circuit. In such cases, no load voltages between electrode holders will be 2 times normal in DC or 1, 1.41, 1.73, or 2 times normal on AC machines. Similar voltage differences will exist if both AC. and DC welding are done on the same structure.

- All DC machines must be connected with the same polarity
- All AC machines must be connected to the same phase of the supply circuit and with the same instantaneous polarity

Operation

Workers assigned to operate or maintain arc-welding equipment must be acquainted with the requirements for safe arc welding and cutting.

Before starting operations all connections to the machine must be checked to make certain they are properly made. The work lead must be firmly attached to the work; magnetic work clamps must be freed from adherent metal particles of spatter on contact surfaces. Coiled welding cable must be spread out before use to avoid serious overheating and damage to insulation.

Grounding of the welding machine frame must be checked. Special attention must be given to safety ground connections of portable machines.

There must be no leaks of cooling water, shielding gas or engine fuel. A welder must not let live electrodes or holders touch his or her bare skin or damp clothing. When arc welding is performed in wet conditions or under a condition of high humidity, the welder must be protected against electric shock.

It must be determined that proper switching equipment for shutting down the machine is provided. Printed rules and instructions covering operation of equipment supplied by the manufacturers must be strictly followed.

Electrode holders not in use must be placed so they cannot make electrical contact with persons, conducting objects, fuel, or compressed gas tanks. Electrode holders must not be cooled by immersion in water. Cables with splices within 10 feet of the holder must not be used. The welders must not coil or loop welding electrode cable around parts of his body.

A welding machine must be disconnected when moved and turned off when not in use.

Maintenance

The operator will report any equipment defect or safety hazard to his supervisor and the use of the equipment must be discontinued until its safety has been assured. Repairs must be made only by qualified personnel.

Machines that have become wet must be thoroughly dried and tested before being used.

Spliced welding cable must not be used within 10 feet of an arc-welding machine.

Cables with damaged insulation or exposed bare conductors must be replaced. Joining lengths of work and electrode cables must be performed by using a connecting means that is specifically intended for the purpose. The connecting means must have insulation adequate for the service conditions.

RESISTANCE WELDING

All equipment must be installed by a qualified electrician in conformance with regulatory requirements. There must be a safety-type disconnecting switch or a circuit breaker or circuit interrupter to open each power circuit to the machine, conveniently located at or near the machine, so that the power can be shut off when the machine or its controls are to be serviced.

Ignition tubes used in resistance welding equipment must be equipped with a thermal protection switch.

Workers designated to operate resistance-welding equipment must have been properly instructed and judged competent to operate such equipment.

Controls of all automatic or air and hydraulic clamps must be arranged or guarded to prevent the operator from accidentally activating them.

Spot and Seam Welding Machines

An external weld initiating control circuit for a non-portable spot or seam welding machine must operate at not more than 120 volts for stationary equipment and not more than 36 volts for portable equipment.

Stored energy or capacitor discharge type of resistance welding equipment and control panels involving high voltage (over 550 volts) must be suitably insulated and protected by complete enclosures, all doors of which must be provided with suitable interlocks and contacts wired into the control circuit (similar to elevator interlocks). Such interlocks or contacts must be designed to interrupt power and short circuit all capacitors when the door or panel is open. A manually operated switch or suitable positive device must be installed, in addition to the mechanical interlocks or contacts, as an added safety measure assuring absolute discharge of all capacitors.

All doors and access panels of all resistance welding machines and control panels must be kept locked and interlocked to prevent access by unauthorized persons to live portions of the equipment. A door or access panel will be considered locked if a key or wrench is required to open it.

All press welding machine operations, where there is a possibility of the operator's fingers being under the point of operation, must be effectively guarded by the use of a device such as an electronic eye safety circuit, two hand controls. Adequate guards must protect all chains, gears, operating bus linkage and belts. One or more safety emergency stop devices must be provided on all multi-spot welding machines with a minimum of one stop device at each operator position.

The hazard of flying sparks must be eliminated, wherever practical, by installing a shield guard of safety glass or suitable fire-resistant plastic at the point of operation. Additional shields or curtains must be installed as needed to protect passing persons from flying sparks.

All foot switches must be guarded to prevent accidental operation of the machine.

Two or more safety emergency stop buttons must be provided on all special multi-spot welding machines, including 2-post and 4-post weld presses.

On large machines, four safety pins with plugs and receptacles (one in each corner) must be provided so that when safety pins are removed and inserted in the ram or platen, the press becomes inoperative.

Where technically practical, the secondary of all welding transformers used in multi-spot, projection and seam welding machines must be grounded. This may be done by permanently grounding one side of the welding secondary current circuit. Where not technically practical, a center tapped grounding reactor connected across the secondary or the use of a safety disconnect switch in conjunction with the welding control are acceptable alternates. Safety disconnect must be arranged to open both sides of the line when welding current is not present.

Portable Welding Machines

All portable welding guns must have suitable counterbalanced devices for supporting the guns, including cables, unless the design of the gun or fixture makes counterbalancing impractical or unnecessary.

All suspended portable welding gun equipment, except the gun assembly, must be equipped with a safety chain or cable capable of supporting the total shock load in event of failure of any component of the supporting system.

When a trolley is used to support a portable welding machine with a clevis for attachment to a safety chain, the clevis must be made of wrought or forged steel and capable of supporting the shock load if the trolley fails.

All initiating switches, including retraction and dual schedule switches, located on the portable welding gun must be equipped with suitable guards capable of preventing accidental initiation through contact with fixtures, operator's clothing, etc. Initiating switch voltage must not exceed 24 volts.

The movable holder, where it enters the gun frame, must have sufficient clearance to prevent the shearing of fingers carelessly placed on the operating movable holder.

The secondary and case of all portable welding transformers must be grounded. Secondary grounding may be by center tapped secondary or by a center tapped grounding reactor connected across the secondary.

Flash Welding Equipment

Flash welding machines must be equipped with a hood to control flying flash. In cases of high production, where materials may contain a film of oil and where toxic elements and metal fumes are given off, ventilation must be provided.

For the protection of the operators of nearby equipment, fire-resistant curtains or suitable shields must be set up around the machine and in such a manner that the operators' movements are not hampered.

Maintenance

Periodic inspection must be made by qualified maintenance personnel, and a certification record maintained. The certification record must include the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, for the equipment inspected. The operator must be instructed to report any equipment defects to his supervisor and the use of the equipment must be discontinued until safety repairs have been completed.

TRAINING

Hotwork training for employees, appropriate to their duties, and the related hazards will be provided at no cost to the employee and will be conducted during working hours.

Training material will be appropriate in content and vocabulary to the educational level, literacy and language of employees.

Training Components

Employees who work with or around welding, brazing, cutting or similar operations will be trained in the following minimum elements:

- Compressed gas hazards and cylinder safety and storage
- Fire hazards in the workplace
- The roles and responsibilities for a fire watch while welding
- Location and use of fire extinguishers
- Housekeeping efforts around welding
- Personal protective equipment selection, fitting and use;
- Welding in confined spaces
- Basic rules for any welding technique used at work
- Protective devices like valves, backflow preventers, etc.
- Hazards associated with chemicals used in welding
- Hazards associated with light and non-visible spectrum radiation in welding

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions

- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Welding, Cutting and Brazing Checklist
- Ventilation Requirements for Welding and Cutting
- Sample Hotwork Permit
- Welding, Cutting and Brazing Training Record Sheet

These forms may be reproduced freely for the purposes of implementing and maintaining a safety and health program.

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 1 OF 5)

(A negative answer to any question indicates an area of safety or health concern.)

Company Name		Date / Time	
Supervisor		Inspector	
Physical Address of Worksite			

Installation and Operation of Oxygen-Fuel Gas Systems for Welding and Cutting				
Yes	No	N/A	Date Corrected	Question
				Is acetylene generated, piped or used at a pressure of 30 p.s.i. or less?
				Have personnel in charge of the oxygen or fuel gas supply equipment been instructed and judged competent before being left in charge?
				Is the gas content of compressed gas cylinders marked with either the chemical or the name of the gas?
				Are cylinders stored away from radiators and other sources of heat?
				Are cylinders stored inside kept in a well-ventilated, dry location at least 20 feet from highly combustible material?
				Are cylinders stored in assigned places away from elevators, stairs, or gangways and where they will not be knocked over or damaged?
				Are the valves of empty cylinders kept closed?
				Are valve protection caps in place and hand-tight except when in use or connected for use?
				Are fuel gas cylinders except those in use or attached for use, which are stored inside a building, limited to a total gas capacity of 2,000 cubic feet or 300 pounds of liquefied petroleum gas?
				Are acetylene cylinders stored valve end up?
				If oxygen cylinders are stored in outside generator houses, are they separated from the generator or carbide storage rooms by a gastight, noncombustible partition having a fire-resistance rating of at least one hour?
				Are stored oxygen cylinders separated from fuel gas cylinders or combustible material by a minimum of 20 feet, or by a noncombustible barrier at least five feet high with a fire-resistance rating of at least one-half hour?
				Are cylinders, cylinder valves, couplings, regulators, hose and apparatus kept free from oily or greasy substances?
				Do you ensure that cylinders are not dropped, struck or permitted to strike each other violently?
				Do you ensure that valve-protection caps are not used for lifting cylinders from one vertical position to another?
				Do you ensure that cylinders that do not have fixed hand wheels, have keys, handles or nonadjustable wrenches on the valve stems while the cylinders are in service?
				Are cylinder valves closed before moving a cylinder, and when work is finished?

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 2 OF 5)

				Are cylinders kept away from sparks, hot slag, or flames produced by welding or cutting operations, or are fire-resistance shields provided?
				Are cylinders placed where they will not become part of an electric circuit?
				Do you insure that cylinders are not used as rollers or supports, and that only proper tools are used to open cylinder valves?
				Are fuel gas cylinders placed valve end up while in use?
				Are cylinders with leaky valves or fittings taken outdoors and slowly emptied?
				Are warning signs posted which prohibit open flame or other sources of ignition near cylinders with leaking fuse plugs or other leaking safety devices, and are the cylinders tagged?
Manifold Systems				
Yes	No	N/A	Date Corrected	Question
				Do you ensure that oxygen manifolds are not located in an acetylene generator room?
				Do you ensure that portable outlet headers are used indoors only for temporary service where conditions preclude a direct supply from outlets located on the service piping system?
				Is each outlet on the service piping which supplies a portable outlet header equipped with a readily accessible shutoff valve?
				Are master shutoff valves for both oxygen and fuel gas provided at the entry end of the portable outlet header?
				Are portable outlet headers provided with frames to support the equipment securely in the correct operating position?
				When acetylene cylinders are coupled in a manifold, are flash arresters installed between each cylinder and the coupler block?
				In service piping systems, are distribution lines installed and maintained in a safe operating condition?
				Are emergency gas cocks or valves provided for all buildings?
				Is underground pipe and tubing and outdoor ferrous pipe and tubing protected against corrosion?
General Requirements				
Yes	No	N/A	Date Corrected	Question
				Is flashback protection provided by an approved device that will prevent flame from passing into the fuel gas systems?
				Are hoses showing defects repaired or replaced?
				Are pressure-reducing regulators used only for the gas and pressures for which they are intended?
				Is the repair of regulators performed by properly instructed, skilled mechanics?
				Are gauges on oxygen regulators marked “USE NO OIL”?
				Are union nuts and connections on regulators inspected before use to detect faulty seats?

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 3 OF 5)

Acetylene Generators (if applicable)				
Yes	No	N/A	Date Corrected	Question
				Is ample space provided around the generator for operation and maintenance?
				Are generators placed where water will not freeze, and is the use of sodium chloride to prevent freezing prohibited?
				Are portable generators located at a safe distance from the welding position?
				Are the walls, floors and roofs of outside generator houses constructed of noncombustible materials?
				Are exit doors readily accessible in case of emergency?
				Are generators installed inside buildings enclosed in a separate room?
				Are the walls, partitions, floors, and ceilings of inside generator rooms of noncombustible construction with a fire-resistance rating of at least one hour?
				Are generator rooms or buildings well ventilated with vents located at floor and ceiling levels?
				Do generator rooms or buildings have natural light during daylight hours or artificial light restricted to electric lamps installed in a fixed position?
				Are operating instructions posted in a conspicuous place near the generator or available for ready reference?
				Is the generator room electrically wired in accordance with 1910.307 (hazardous locations)?
				Do you ensure that the water-carbide residue mixture drained from the generator is not discharged into sewer pipes or stored in areas near open flames?
				Do you ensure that calcium carbide is kept in metal packages strong enough to prevent rupture?
				Are the packages marked “Calcium Carbide - Dangerous If Not Kept Dry”?
				Do you ensure that the calcium carbide stored indoors does not exceed 600 pounds and that the storage area is dry, waterproof and well-ventilated?
				Are carbide containers that are stored outside periodically examined for conditions that could affect water or air tightness?
Application, Installation and Operation of Arc welding and Cutting Equipment				
Yes	No	N/A	Date Corrected	Question
				Have employees who are designated to operate arc-welding equipment been properly instructed and qualified?
				Are open circuit (no load) voltages of arc welding and cutting machines as low as possible, consistent with satisfactory welding?
				When open circuit voltages must be higher, are means provided to prevent the operator from making accidental contact with the higher voltages?
				Is control apparatus enclosed on all types of arc welding machines?

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 4 OF 5)

				Are terminals for welding leads protected from accidental electrical contact by personnel or metal objects?
				Do you ensure that no connections for portable control devices, such as push buttons carried by the operator, are connected to an AC. circuit of higher than 120 volts?
				Is the frame or case of the welding machine effectively grounded and the grounding checked?
				Is a separate disconnecting switch or controller provided at or near each welding machine?
				Are electrode holders placed so that they cannot make electrical contact with persons, conducting objects, fuel, or compressed gas tanks?
				Has the operator been instructed to report any equipment defect or safety hazard to his supervisor, and is use of the equipment discontinued until repaired by qualified personnel?
				Are work and electrode lead cables frequently inspected for wear and damage, and are cables with damaged insulation or exposed bare conductors replaced?
Installation and Operation of Resistance Welding Equipment				
Yes	No	N/A	Date Corrected	Question
				Have personnel who are designated to operate resistance-welding equipment been properly instructed and judged competent to operate such equipment?
				Are all doors and access panels of all resistance-welding machines and control panels kept locked and interlocked?
				Has a shield guard of safety glass or suitable fire-resistant plastic been installed at the point of operation?
				Are foot switches guarded to prevent accidental operation of the machine?
				Are two or more safety emergency stop buttons provided on all special, multisport welding machines, including 2-post and 4-post weld presses?
				Are flash welding machines equipped with hoods to control flying flash?
				Are periodic inspections of the machines made by qualified maintenance personnel, and are records of the inspections maintained?
Fire Prevention and Protection				
Yes	No	N/A	Date Corrected	Question
				Is suitable fire extinguishing equipment maintained in a state of readiness for instant use?
				Are fire watches on duty whenever welding or cutting is performed in locations where a major fire might develop?
				Before cutting or welding is permitted, is the area inspected by the individual responsible for authorized cutting and welding operations?
				Where practicable, are all combustibles relocated at least 35 feet from the work site?
				Does management recognize its responsibility for the safe usage of cutting and welding equipment on its property?

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 5 OF 5)

				Do supervisors recognize their responsibilities in the safe management of welding and cutting operations?
				Are welders or helpers who are working on platforms, scaffolds, or runways protected against falling by railings, safety belts or lifelines?
				Is welding cable and other equipment kept clear of passageways, ladders and stairways?
				Are helmets, hand shields and goggles worn during all arc welding or cutting operations?
				Has a hazard assessment been performed to determine if hazards are present or likely to be present?
				Are employees who are exposed to the hazards created by welding, cutting, or brazing operations protected by personal protective equipment as?
				When welding or cutting is being performed in any confined space, are gas cylinders and welding machines left outside?
				Before operations are started, is heavy, portable, wheel-mounted equipment securely blocked to prevent accidental movement?
Health Protection and Ventilation				
Yes	No	N/A	Date Corrected	Question
				Where a welder must enter a confined space through a manhole or other small opening, have means been provided for his quick removal in case of emergency?
				Are ventilation or respiratory protective devices provided where necessary and do they meet OSHA requirements?
				Are employees trained to render first aid, and is first aid equipment available at all times?

VENTILATION REQUIREMENTS FOR WELDING AND CUTTING

Metal Compound	Requirements Confined Space	Requirements Indoors	Requirements Outdoors
Fluorine Compound	Air replacement or airline respirator or self-contained breathing apparatus needed	Air sample tests to determine if exhaust hood, booth, and airline respirator are required	Same as indoors
Lead Zinc (Galvanized Metals)	Air replacement or airline respirator or self-contained breathing apparatus	Exhaust hood or booth	Combination particulate and vapor and gas removing type respirator if tests indicate need
Beryllium	Exhaust hood or booth and airline respirator if air sample tests indicate need	Exhaust hood or booth and airline respirator if air sample tests indicate need	Exhaust hood or booth and airline respirator if air sample tests indicate need

- Airline or self-contained breathing apparatus are required in confined areas that are immediately hazardous to life.
- Local exhaust hoods or booths must provide airflow of 100 linear feet per minute.
- Mechanical ventilation at 2,000 cubic feet of air per minute per welder is required when:
  - Welding or cutting on metals other than described above
  - When there is less than 10,000 cubic feet of space per welder
  - Where the ceiling height is less than 16 feet
  - In confined spaces or where structural barriers such as partitions or balconies significantly obstruct cross ventilation

Note: Mechanical ventilation is necessary when an exhaust hood or fixed booth provide for a rate of airflow sufficient to maintain a velocity away from the welder or not less than 100 linear feet per minute.

HOTWORK PERMIT

This permit is required for operations that involve open flames or that produce sparks or heat outside of designated areas, including, but not limited to brazing, cutting, welding and grinding.

Date	
Task	
Location	
Person doing Hotwork	

Precautions have been taken to prevent fire and to control hazards present in the above location for the job described, and hotwork may commence.

Authorizing Individual (sign please)

Person Doing Hotwork (sign please)

Fire Watch (sign please)

Start Date:	Start Time:
Finish Date:	Finish Time:

OK	PRECAUTION	N/A
	Area is fire safe	
	Moveable fire hazards moved	
	Unmoveable fire hazards guarded	
	Openings, cracks, doorways, windows guarded or closed	
	Fire extinguisher available	
	Fire watch	
	Floors clean for 35' radius	
	Combustible floors wetted or	
	In authorized area	
	Ducts and conveyer systems to	
	Worker trained appropriately	
	Contractors informed of hazards	
	Containers cleaned and ventilated	
	Pipelines to containers disconnected or blocked	
	PPE available and used	
	Hot metal warning sign	
	Ventilation provided	
	Confined spaces permit	
	Other:	

Fire Watch Signoff

Work was fire safe through the entire watch period. The area was monitored for _____minutes (at least 30) to ensure fire safety.

Fire Watch (sign please

SCOPE

This chapter covers the requirements and safe practices for performing wood frame construction work. These practices will comply with all applicable OSHA regulations and any state or local requirements. This chapter does not address our fall protection or scaffolding policies, which are defined in separate chapters.

POLICY

This Company has implemented the following policy for all employees engaged in the construction of structural wood framing systems.

EMPLOYER RESPONSIBILITIES

This Company will:

- Train employees on the safe practices of wood frame construction work
- Implement a fall protection plan, if required
- Ensure that only qualified personnel will erect, modify, inspect and dismantle scaffolding
- Ensure that only qualified personnel are permitted to operate mobile work platforms and aerial lifts
- Verify that only trained employees are permitted to work at heights
- Provide employees with all necessary PPE

EMPLOYEE RESPONSIBILITIES

All employees will:

- Follow all wood frame construction safe practices
- Use and maintain all required PPE
- Report all unsafe conditions and acts immediately

HAZARDS

Employees performing wood frame construction are exposed to the following hazards:

- Cuts and lacerations from the use of hand and power tools
- Musculoskeletal injuries from manual material handling and working in awkward positions
- Falls caused by working from elevated platforms, scaffolds, ladders, on roofs or near unguarded openings
- Respiratory problems from exposure to dusts
- Hearing problems from working with or around noisy equipment

PERSONAL PROTECTIVE EQUIPMENT (PPE)

This Company will provide employees with all necessary PPE for their assigned tasks. This can include, but is no limited to:

- Hardhats

- Safety shoes or boots
- Sturdy work gloves
- Dust masks or other respiratory protection, as required
- Hear protection, in needed
- Fall protection device and systems, if necessary

SAFE PRACTICES

This Company requires that all employees follow the safe practices and procedures listed below when performing wood framing construction work.

STRUCTURAL WOOD FRAMING SYSTEMS

Exposure and Protection

Employees will be protected from falls by guardrails or a safety net, personal fall arrest systems, or other methods, while walking/working on surfaces that are 6 feet or more above a lower level.

Employees working at leading edges will be provided with either fall protection or be protected by parapets at least 2 feet high.

Use of Lift Trucks and Elevated Platforms

When it is necessary to elevate employees using an industrial truck, the requirements for Transporting and Elevating Personnel will be followed.

Employees and/or loads will not be on an elevated work platform when the operator is not at the lift controls unless:

- The operator is able to see the lift
- The operator is within 25 feet of the lift and has an unobstructed return access path
- The lift is powered off, the brakes are set, and the lift is on a level surface

NOTE: Where it is necessary to tilt the mast of the lift truck to allow an employee to accomplish a necessary activity at an elevated location, the operator may tilt the mast forward, no more than 3 feet from vertical if, the work is of short duration and competent supervision is immediately present during the operation. Before elevating and tilting the mast, the operator will inspect and verify the work platform is secure to the lift forks.

Roof and Floor Openings

Roof or floor openings that exist during the construction of a structural wood framing system are to be guarded by a standard railing and toeboard, or by a cover. The covering will be secured in place and identified as an opening cover in letters not less than one-inch high.

Temporary openings will be covered or guarded as soon as the lift operation reasonably permits.

Erection Procedures

A site-specific, written erection procedure will be prepared by a qualified person, and will be implemented under the direct supervision of a competent person.

A copy of the erection procedure must be available at the jobsite.

Raising Walls

Before manually raising framed walls that are 15 feet or more in height, temporary restraints such as cleats on the foundation/floor system, or straps on the wall bottom plate, must be installed to prevent inadvertent horizontal sliding or uplift of the framed wall bottom plate.

Anchor bolts alone will not be used for blocking or bracing when raising framed walls 15 feet or more in height.

Stabilization of Structures

Employees will not work from, or walk on, top plates, joists, rafters, trusses, beams, or other structural members until they are securely braced and supported.

Work on Top Plate, Joists and Roof Structure Framing

When employees are walking/working on top plates, joists, rafters, trusses, beams, or other similar structural members over 15 feet above the surrounding grade or floor level below, fall protection will be provided by scaffolding, guardrails, a personal fall protection system, or by other means prescribed by fall protection regulations.

Exceptions:

- When employees are walking/working on securely braced joists, rafters, or roof trusses on center spacing not exceeding 2 feet, and more than 6 feet from an unprotected side or edge, they will be considered protected from falls between the joists, rafters, or roof trusses
- When installing floor joists, employees are considered protected from falls up to and including 15 feet above the surrounding grade or floor level below when they are standing on, or working from joists laid on their sides on the top plate. The center spacing will exceed 2 feet when walking/working within 2 feet of the top plate or other structural support

Truss Support Plate

When a truss support plate is used during the installation of trusses, it must be made of a 2x6 inch plank laid flat, secured to a 2x6 plank laid on edge, supported with 2x4 inch wood members (legs) spaced no more than 6 feet on center and attached to diagonal bracing capable of supporting its intended load.

Work on Floors and Other Walking/Working Surfaces

When working on floors and other walking/working surfaces over 15 feet above the surrounding grade or floor level below, employees involved with the layout and construction of framed stud walls will be protected from falling by standard guardrails around all unprotected sides or edges, or by other means prescribed by fall-protection regulations.

Work on Starter Board, Roof Sheathing and Fascia Board

When installing starter board, roof sheathing, and fascia board, employees must be protected from falling by scaffolding, guardrails, personal fall protection systems, or other means prescribed by fall protection-regulations as follows:

- For structures taller than one story in height where the fall height exceeds 15 feet above the surrounding grade or floor level below
- When working on roofs sloped greater than 7:12

EXCEPTION: For roofs sloped up to 12:12, slide guards may be used as fall protection up to and including 15 feet as measured from the eaves to the surrounding grade or floor level below.

Employees working inside the gable end truss or rafter must be considered protected from falls where the gable end truss has been installed and braced to withstand a lateral force of 200 lbs., and the employee installs fascia or starter board working from within the gable end truss or rafter.

When work must be performed outside the gable end truss or rafter, the employee must be protected from falling by scaffolding, or a personal fall protection system, or other means.

EXCEPTION: When the work is of short duration and limited exposure, and the hazards involved in rigging and installing the safety devices required equal or exceed the hazards involved in the actual construction, these provisions may be suspended provided a qualified person performs the work.

Installation of Windows

Wall openings must be guarded. The guardrail may be removed immediately before the installation of the window components if removal of the guardrail is necessary to install the window(s).

Scaffolding

Where scaffolding is used, it must be constructed in accordance with all applicable requirements.

Where scaffolds are installed parallel and adjacent to framed structure walls, the interior railing may be omitted for installing joists, rafters or trusses if the scaffold platform is 15 feet or less from the interior floor level below and the top plate is higher than the adjacent work platform.

When a scaffold is used as an edge protection platform:

- The platform must not be more than 2 feet below the top plate, and must be fully planked
- The distance between the inboard edge of the platform and the building or structure wall cannot be more than 16 inches

Additional provisions where a metal frame scaffold is used as an edge protection platform:

- A 2x6-inch or larger toeboard will be secured on edge parallel to the outer rail
- Scaffolds will be secured to the structure at or near the top of the scaffold at each end and at every other frame not to exceed 20 feet intervals
- Guard railings must extend at least 42 inches above the eaves if the outboard edge of the platform extends less than 12 inches horizontally beyond the eaves

TRAINING

Employees will be trained of the following topics, as applicable to their job tasks:

- Safe wood frame construction practices
- Proper use of hand and power tools
- Proper care and use of all provided PPE
- Safe practices of working at heights
- Proper use of fall protection devices, in required

All employee training records will be retained for the length of their employment.

SCOPE

This chapter provides the requirements and safe practices regarding working near overhead power lines when performing construction, tree trimming, communication tower work or any other work where elevating work platforms or scaffolds are used near power lines. These practices will comply with OSHA regulations 1910.333 and/or 1926.964 as applicable.

This information does not include the installation and/or maintenance of overhead lines, which are covered in the electrical Safety and/or Electrical Power Generation chapters. The following policy has been adopted to minimize the hazards to employees performing non-electrical work near overhead power lines.

POLICY

All employees of this Company who work in the proximity of overhead lines will conform to our Overhead Powerline Proximity Policy.

Note: “Working near the proximity” is defined as working within a distance from any overhead power line that is less than combined length of the lifting device, the associated load length and the required minimum clearance distance.

EMPLOYER RESPONSIBILITIES

The Company is responsible for:

- Authorizing all work near overhead power lines within the defined distance for working near overhead power lines
- Ensuring that only qualified personnel are authorized to work within the minimum clearance distances of live power lines
- Inspecting the worksite before work starts
- Notifying the local power provider of the planned work
- Obtaining all necessary permits allowing work to proceed

EMPLOYEES RESPONSIBILITIES

All Company employees will:

- Be trained to recognize the hazards associated with overhead power lines and to understand the provisions of this standard
- Be properly trained on the operation of any mobile equipment such as cranes, boom trucks and earthmovers
- Know the purpose and limitations of any safety devices used during the job
- Use all required PPE
- Follow all safe work practices defined by this overheard power line policy

Supervisors are responsible for:

- Complying with this policy during field activities

- Stopping work if the conditions of the planned work changes
- Notifying the safety coordinator of any work stoppage and reason for it
- Re-briefing the work crew if the changes to planned work allow the job to proceed safely

Qualified personnel are responsible for:

- Attending all scheduled training
- Performing work in compliance with the live-line barehand work near overhead lines policy

Unqualified personnel are responsible for:

- Performing this work only when being trained by a qualified person or trainer
- Under the direct supervision of a qualified person or trainer

HAZARDS

Working of near overhead power lines presents the risk of electrical shock or burns, and can contribute to additional hazards such as fires, falls and even death. All employees are required to use safe practices when working near power lines, and observe the established safe distance limits established by all applicable regulations.

Using Mobile Equipment Near Power Lines

Where aerial lifts, cranes, boom devices, dump trucks or other elevating devices will operate near overhead power line, and there is potential for proximity or contact with the lines or other electrical equipment, work will not begin until a safety meeting is conducted and appropriate steps taken to identify, mark and warn against accidental contact. The supervisor will review operations daily to ensure compliance.

All equipment covered under this policy will comply with the following requirements when being moved near power lines or energized transmitters, unless the electrical distribution and transmission lines have been de-energized and visibly grounded at point of work.

These requirements do not apply if insulating barriers, which are not a part of (or an attachment to) the equipment or machinery, have been erected to prevent physical contact with the lines:

- For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load will be 10 feet
- For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load will be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 feet
- In transit with no load and boom lowered, the equipment clearance will be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV, and 16 feet for voltages up to and including 750 kV
- A person will be designated to observe clearance of the equipment and give warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means
- Cage-type boom guards, insulating links, or proximity warning devices may be used on cranes, but the use of such devices will not alter the requirements of any other regulation of this part even if such device is required by law or regulation

- Any overhead wire will be considered to be energized, unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded
- Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter will be de-energized or tests will be made to determine if electrical charge is induced on the crane. The following precautions will be taken when necessary to dissipate induced voltages:
  - The equipment will be provided with an electrical ground directly to the upper rotating structure supporting the boom
  - Ground jumper cables will be attached to materials being handled by boom equipment when electrical charge is induced while working near energized transmitters. Crews will be provided with nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load
- Combustible and flammable materials will be removed from the immediate area prior to operations

SAFE WORK PRACTICES

Our Overhead Power Line Policy applies to all employees and contractors working near energized power line, regardless of voltage. The Company will:

- Ensure employees are not placed near overhead power lines
- Inform employees of the hazards and precautions when working near Overhead lines
- Post warning decals on cranes and similar equipment regarding **10-foot minimum clearance**
- Ensure that when equipment is working near overhead lines a 'spotter' is designated and observes for safe working clearances around all overhead lines and directs the operator accordingly
- Use warning cones as visible indicators of the **10-foot safety zone** when working near overhead power lines
- Notify the local power provider at least 24 hours before any work begins that requires the provider to identify voltages and clearances, or de-energize, apply safety grounds, or relocate lines

General

Before starting operations where potential contact with overhead electrical systems is possible, the safety coordinator, supervisor, head operator or person leading the work will identify overhead lines or equipment, and reference their location to prominent physical features, or physically mark the area directly in front of the overhead lines with safety cones, survey tape or other means.

Electrical line location will be discussed at a pre-work safety meeting of all employees on the job. All Company employees and contractors must attend this meeting.

New/transferred employees will be informed of electrical hazards and proper procedures during orientations. On construction projects, overhead electrical lines or equipment will be conspicuously marked and workers will be reminded of their location by the project supervisor. New employees will be informed of electrical hazards and proper precautions and procedures.

Where there is potential for proximity or contact with overhead electrical systems, the local area power provider will be called to decide the need to de-energize, safety ground, remove, or otherwise protect against accidental contact.

Where there is a suspicion of low wires (under 20 feet), the local area power provider will be notified to verify, and take appropriate action. All electrical contact incidents, including 'near-misses', must be reported to the local area safety coordinator.

All Heavy Equipment, or similar equipment, will display a warning decal regarding electrical contact. Independent truck drivers delivering materials to field locations will be cautioned about overhead electrical wires before beginning work, and a properly trained Company employee will assist in the loading/offloading operation. Trucks that have emptied their material may not leave the work location until the boom, lift or box is down and safely secured.

- Any overhead line must be considered energized until the owner, owner representative, or utility indicates otherwise and the line has been visibly grounded, and the owner, owner representative, or utility must be notified and provided with all pertinent information of the job before the commencement of operations near electrical lines
- Where an equipment operator or delivery driver's visibility is impaired, a spotter is required to guide the operator. Predefined hand signals will be used and clearly understood between operator and spotter
- When visual contact is impaired, the spotter and operator will be in radio contact. Aerial lifts, cranes and boom devices will have appropriate warning decals, and will use warning cones or similar devices to indicate the location of overhead lines and identify the 10-foot minimum safe working boundary
- Except as prescribed, or where insulating barriers not a part of or an attachment to the aerial device have been erected to prevent physical contact with the lines, an aerial device must maintain the distances from energized distribution and transmission power lines and equipment prescribed in Table 1
- No equipment or vehicles are permitted to move under electrical lines without a 4' clearance unless the line is removed, de-energized, safety grounded, or otherwise protected
- The local area power provider must issue a general permit detailing the specific measures employed to ensure safe operations

TABLE 1: MINIMUM CLEARANCE DISTANCES FOR EQUIPMENT

Voltage	Clearance with Boom Raised	Clearance Boom Lowered and no Load in Transit
To 50kV	10 feet	4 feet
Over 50kV	10 feet + .4 inch per each 1 kV over 50 kV	10 feet
50 to 345kV		10 feet
346 to 750 kV		15 feet

The clearance requirements of this rule do not apply to the following situations:

- Where work is performed from an insulated aerial device that is insulated for the work, and the work is performed according to the provisions of construction "Power Transmission and Distribution" and "Telecommunications" safety standard
- Where the owner, authorized representative, or utility representative have ensured that the conductor is insulated for the system voltages and the task will not compromise the insulation of the conductor and/or cause an electrical hazard
- Where the electric power transmission or distribution lines have been de-energized and visibly grounded at the point of work or where insulating barriers that are not a part of an attachment to the aerial work platform have been erected to prevent physical contact with the line
- Where work is being performed by qualified electricians on equipment up to .5kV. Two qualified electricians will be required for work within the minimum clearance on equipment over .5kV
- The insulated bucket, gloves, and sleeves used to comply must be rated at more than the voltage to be worked on, or that with which they might come into contact

TABLE 2: MINIMUM WORKING DISTANCES FOR QUALIFIED LINE CLEARANCE TREE TRIMMERS AND QUALIFIED LINEMEN

Voltage Range Phase to Phase (KV)	Minimum Working Distance
2.1 to 15.0	2´0″
15.1 to 35.0	2´4″
35.1 to 46.0	2´6″
46.1 to 72.5	3´0″
72.6 to 121.0	3´4″
138.0 to 145.0	3´6″
161.0 to 169.0	3´8″
230.0 to 242.0	5´0″
345.0 to 362.0	7´0″
550.0 to 552.0	11´0″
700.0 to 765.0	15´0″
***NOTE**: For 345 — 362 kV., 500 — 552 kV., and 700 — 765 kV., the minimum working distance and the minimum clear hot stick distance may be reduced that such distances are not less than the shortest distance between the energized part and a grounded surface.	

TABLE 3: MINIMUM APPROACH DISTANCES FOR QUALIFIED TELECOMMUNICATIONS EMPLOYEES

Voltage Range (Nominal Phase to Phase)	Minimum Approach Distances
300 V and less	12″
Over 300 V, not over 750 V	18″
Over 750 V, not over 2 kV	24″
Over 2 kV, not over 15 kV	36″
Over 15 kV, not over 37 kV	42″
Over 37 kV, not over 87.5 kV	48″
Over 87.5 kV, not over 121 kV	54″
Over 121 kV, not over 140 kV	--″

- A qualified lineman or a qualified line clearance tree trimmer, working on or near an exposed power transmission or distribution line from an aerial lift, must maintain distances prescribed in Table 2, unless the employee is insulated or guarded from the energized part by gloves or gloves and sleeves, or insulated, isolated, or guarded from any other conductive part or the energized part is insulated from the employee
- A qualified telecommunications employee must maintain the distances prescribed in Table 3 when working from an aerial lift, unless the employee is insulated, isolated, or guarded from any other conductive part or the energized part is insulated from the employee

EMERGENCY RESPONSE

If an overhead line falls or is contacted:

- Keep everyone at least 10 feet away
- Use flagging to protect motorists, spectators and other individuals from fallen or low wires
- Call the local area Electrical Department or utility immediately
- Place 'guards' around the area
- Do not attempt to move the wire(s)
- Do not touch anything that is touching the wire(s)
- Be alert to water or other types of conductors present
- Crews will have emergency numbers readily available. These numbers will include local area electrical, utility, police/fire and medical assistance
- If an individual becomes energized, **DO NOT TOUCH** the individual or anything in contact with the person. Call for emergency medical assistance and the local area electrical power provider immediately. If the individual is no longer in contact with the energized conductors, CPR, rescue breathing or first aid should be administered immediately, but only by a trained person. It is safe to touch the victim once contact is broken or the source de-energized

- Wires that contact vehicles or equipment will cause arcing, smoke, and possibly fire. Occupants should remain in the cab, and wait for utility or rescue personnel. Should it become necessary to exit the vehicle, leap, with both feet, as far away from the vehicle as possible, without touching the vehicle, jumping free of the vehicle is the last resort
- If operating equipment and an overhead wire is contacted, stop the equipment immediately and if safe to do so, jump free and clear of the equipment. Maintain your balance, keep your feet together and either shuffle or bunny hop away from the vehicle another 10 feet or more. Do not return to the vehicle or allow anyone else to return to the vehicle for any reason until the local area electrical utility has removed the power line from the vehicle and has confirmed that the vehicle is no longer in contact with the overhead lines

TRAINING

All Company employees who are required to work near overhead power lines will receive specialized electrical safety training. This training will be provided before employees are permitted to work near power lines.

Training Components

The Company's safety coordinator will ensure that every employee will be trained in the following minimum elements:

- Hazards of working near overhead power line
- Required Personal Protective Equipment
- Minimum safe working distances
- Procedures for operating elevated work equipment near power lines
- Emergency response and first aid for electrical injuries

Retraining

Employees will be retrained on the safe work practices of working around power lines at least annually, or as often required by applicable regulations. Additionally, employees will be required to attend retraining if observed violating the Company's' safe work practices.

Training Records

Training records will be kept for each employee to certify their completion of training and evaluation and will include the following information:

- The dates of the training sessions and evaluation
- A written description of the training program
- The names and qualifications of persons conducting the training or evaluation
- The names and job titles of all persons attending the training sessions
- Where the employee received safety training

These employee records will be retained for the length of their employment.

DISCLAIMER

OSHA's "Safety and Health Regulations" are continuously being reinterpreted. Therefore, Safety Services Company is unable to completely guarantee the exactness of the information conveyed in this publication. Safety Services Company assumes no responsibility and shall be held harmless for any inaccuracies or omissions contained within this pocket manual and shall not be held liable to any extent or form for any injury or loss resulting from the manner in which this information is interpreted and/or applied.

Careful effort has been dedicated in order to provide a simplified, understandable explanation of OSHA regulations based on currently available information. This "Injury & Illness Prevention Program" is distributed with the agreement that Safety Services Company is not employed in providing legal or other specialized business services. Should expert assistance be required, retain the services of a competent professional.

NOTES

NOTES

EMPLOYEE SIGNOFF

This is to certify that I have received a copy of the Company Injury & Illness Prevention Manual.

I have read these instructions, understand them, and will comply with them while working for the Company.

I understand that failure to abide by these rules may result in disciplinary action and possible termination of my employment with Aversa Bros Industrial Contractors

I also understand that I am to report any injury to my foreman or superintendent immediately and report all safety hazards.

I further understand that I have the following “Safety Rights”:

- I am not required to work in any area I feel is not safe.
- I am entitled to information on any hazardous material or chemical I am exposed to while working.
- I will not be discriminated against for reporting safety concerns.

Employee Name	Signature	Date

Supervisor Name	Signature	Date

cc: Employee File