Millerick Engineering, Inc.

Safety Program

Prepared by:
Millerick Engineering, Inc.
in association with:
U.S. Compliance Systems, Inc.
dba OWYN Safety

This Safety Program is current as of: **4/5/2024**

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Millerick Engineering, Inc.

Policy Statements

Millerick Engineering, Inc.
Safety and Health Policy Statement

It is the policy of Millerick Engineering, Inc. to provide a work environment that is inherently safe. The safety and health of our employees is of primary importance as they are our most important resource. Safety takes a commitment from all personnel within our organization.

Millerick Engineering, Inc. has developed a comprehensive safety program that addresses specific safety concerns and provides guidance for the performance of our individual job tasks within the framework of appropriate Occupational Safety & Health Administration (OSHA) standards.

There also may be times when Millerick Engineering, Inc. requires its employees to meet safety policies that are specific to our company. If we implement these additional policies, they must have more stringent safety requirements than what OSHA has developed. These policies can be found listed in the Safety Program Addendum at the end of this safety program when applicable.

All employees will receive interactive safety training using the information contained in this safety program. For this training, we may have safety meetings, on-the-job training, on-line courses, formal instruction, and/or any other relevant methods needed.

Safety training needs will be identified by continual reassessment of work methods, equipment, and work stations; as well as employee and management input.

Frequent and regular workplace inspections will be conducted by supervisory personnel and/or other competent persons. Employees in violation of the established safety procedures of Millerick Engineering, Inc. will be subject to our disciplinary procedures. Observation of unsafe acts will be addressed immediately.

At every workplace, there will be a competent person, by virtue of training or experience, who will have the authority to stop work. Additionally, all employees have stop work authority for their immediate task if they are aware of a safety hazard that cannot be immediately corrected. If an employee stops work for an unresolved safety hazard, the supervisor will be contacted immediately.

Equipment operator/owner manuals will be readily available and the safety procedures contained therein will be followed. Equipment will be inspected prior to use and, if defective, tagged out of service. Manufacturer's warning labels on all equipment will not be removed, painted over or defaced.

Emergency medical response will be available at the workplace either by an emergency rescue service within reasonable distance, by time, or an assigned emergency responder.

Safety requires not only that each person understand and perform individual tasks in a safe manner, but also that each individual is aware of his surroundings and is actively involved in the safety of others.

Each Employee is encouraged to contact their supervisor immediately should a safety or health risk exist so that corrective action may be taken immediately.

This Policy Statement will be conspicuously posted.

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Christopher Millerick
Safety Director

Millerick Engineering, Inc.

New Hire Safety Orientation Policy Statement

Christopher Millerick, the safety director at Millerick Engineering, Inc., or a designated competent person, will ensure that all new hires are aware of the accessibility of the safety program and, through interactive discussion or practical demonstration, be assured that the new hire understands the safety policies and procedures that pertain to the actual work the new hire will perform.

Further, each new hire will read (or have explained) the contents of our employee handbook and **sign** the Employee Acknowledgement form which states:

> I have read and understand the contents of the Millerick Engineering, Inc. Employee Handbook.
>
> I will, to the best of my ability, work in a safe manner and follow established work rules and procedures.
>
> I will ask for clarification of safety procedures of which I am not sure **prior** to performing a task.
>
> I will report to the workplace supervisor or competent person any unsafe acts or procedures and will ensure they are addressed and resolved before continuing work.
>
> I understand that the complete safety program is located at the address below and is available for my review:
>
> PO Box 3338
>
> Turlock, CA, 95381
>
> 2099857750

It will be explained to all new hires that safety training and safety performance is an on-going process. Depending on circumstances, training will take the form of some or all of the following: safety meetings, on-the-job instruction, formal and informal training.

Lastly, all new hires will be informed of the importance of the inspection and enforcement policies and procedures of Millerick Engineering, Inc..

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Christopher Millerick
Safety Director

Millerick Engineering, Inc.

Stop Work Authority and Workers' Right to Refuse Dangerous Work Policy Statement

As referenced in the New Hire Safety Orientation, each employee is:

a. To work in a safe manner and follow established work rules and procedures to the best of their ability.
b. To ask for clarification of safety procedures of which they are not sure prior to performing a task.
c. To report to the job site supervisor or competent person any unsafe acts or procedures and will ensure they are addressed and resolved before continuing work.

Specific procedures have been established to ensure that all employees understand the importance of **<u>not</u>** performing a job task if it cannot be performed safely and in accordance with appropriate standards.

Stop Work Authority Procedures training will be given during the new hire safety orientation before initial assignment to any job task. Training will be documented and include the employee’s name, dates of training, and subject.

All employees not only have the authority to stop work when control of a health, safety, or environment hazard or risk is not clearly established or understood, they have an obligation to stop work.

<u>Procedures:</u>

a. Upon discovery or realization that control of a health, safety, or environment hazard or risk is not clearly established or understood, the employee will immediately stop work.
b. Employees with whom he/she is working will be immediately informed so a health, safety, or environment hazard or risk does not impact them or their work.
c. The supervisor/competent person will be notified as soon as possible so the situation may be addressed (corrected).
d. If the supervisor/competent person can successfully address the issue, work will resume. If it is not resolved, work will remain stopped until it is. Most stop work procedures can be resolved in a timely manner at the job site. On occasion, it may require additional investigation to determine the root cause of the problem and the proper procedures to proceed.
e. The stop work will be documented with a stop work report.

<u>Supervisor Review:</u>

Supervisors reviewing stop work reports can determine employee participation in the program, the quality of the interventions, trend common issues, and identify opportunities for improvement and establish new safety procedures to preclude a reoccurrence.

Follow-up:

After the stop work intervention has been initiated and closed, the supervisory review has been completed, all safety issues have been resolved in a timely manner at the job site to the satisfaction of all persons concerned prior to the resumption of work (or, if needed, after additional investigation and corrective actions required to identify and address root causes have been completed), the **importance of follow-up** can be demonstrated by:

a. providing a learning tool for developing improved training.
b. establishing new safety procedures.
c. facilitating sharing of learning.

Responsibilities:

Employee: Initiate a stop work intervention when warranted.

Supervisor/competent person: notify all affected personnel and supervision of the stop work issue, correct the issue, and resume work when safe to do so.

Management: Establish a culture where stop work authority is exercised freely.

Employees, while fulfilling their **obligation** to stop work when warranted, are reminded that under no circumstances will fulfilling this obligation result in any form of retribution or intimidation from our company or the company for whom we are working

This Policy Statement will be conspicuously posted.

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Christopher Millerick
Safety Director

Millerick Engineering, Inc.
Section I
General Policies & Procedures

Standards:
29 CFR 1926.16 - Rules of Construction
29 CFR 1926.20 - General Safety and Health Provisions
29 CFR 1926.21 - Safety Training and Education
29 CFR 1926.34 - Means of Egress
29 CFR 1926.35 - Employee Emergency Action Plans
29 CFR 1904 – Recordkeeping

Safety Program Overview

This comprehensive safety & health training program has been developed to address specific safety concerns of Millerick Engineering, Inc. and to provide guidance for the performance of individual job tasks within the framework of appropriate Occupational Safety & Health Administration (OSHA) standards.

Safety demands a commitment from all personnel within Millerick Engineering, Inc.. As an employer, we have an obligation to ensure that all our employees are afforded the protection of an appropriate safety & health program.

This program contains policies and procedures to deal with common job site place hazards, specific job-related hazards, and potential hazards that may arise.

Hazard assessment, project pre-planning, and engineering controls, where feasible, will be the preferred method of providing a safe job site. Hazards that remain will be minimized or eliminated through training which provides employees the ability to recognize job site hazards and understand the proper procedural and/or personal protective equipment requirements.

Each employee is encouraged to contact their supervisor immediately should a safety or health risk exist so that corrective action may be taken to eliminate the hazard entirely or deal with the hazard in a safe manner through modified work procedures, PPE, and/or other appropriate action.

On all job sites, at least one person will be designated a **"competent person"** by virtue of experience or training. This person will have the ability to identify work related hazards, know the corrective procedures, and have the responsibility, ability and authority to stop work if the job site cannot be made safe.

Christopher Millerick, the safety director at Millerick Engineering, Inc., or a designated competent person will make routine and random job site inspections to both identify new hazards and to monitor the effectiveness of our safety & health program.

In the final analysis, the success of the safety effort by Millerick Engineering, Inc. depends on all employees, from senior management to the newest hire, demonstrating a commitment to safety by working in a safe manner. Safe job performance is how our safety effort is ultimately measured.

Accident/Injury Prevention

This safety program is designed so that employees at Millerick Engineering, Inc. do not work in conditions that are unsanitary, hazardous, or dangerous to their health or safety.

One lax moment in terms of safety may result in a lifetime of needless pain and suffering. Disregarding safety standards may even be fatal. While an accident may happen in an instant, the consequences may last for years.

Accident prevention requires a commitment from all personnel within Millerick Engineering, Inc. to actively participate in our safety program. All personnel should be aware of job site hazards and follow procedures to eliminate these hazards by using proper work methods, use of personal protective equipment, and proper use of tools and equipment. All persons are encouraged to ask questions and make positive suggestions for safety improvement.

Competent persons will be designated to provide job site expertise, as well as regular inspections of equipment, materials, and procedures.

Competent persons will have the authority to stop work if a safety hazard is identified and it cannot be corrected immediately.

All machinery, tools, materials, and equipment deemed unsafe will be taken out of service by physically removing, tagging, or locking controls to render them inoperable.

Only persons qualified by training or experience will be allowed to operate equipment or machinery.

All tools and items of equipment will be used for the purpose for which they were designed. For example, a wrench is not a hammer, a ladder is not a horizontal plank, and a fire extinguisher is not a cooler!

Never take chances or attempt any job without being aware of the proper procedures, the potential safety hazards, and the methods to reduce or eliminate risk.

Company Personnel

The following are descriptions of the different roles and expectations for all personnel of Millerick Engineering, Inc..

Safety Director

The safety director at Millerick Engineering, Inc. is Christopher Millerick and has overall responsibility for the implementation of our program. Christopher Millerick will ensure each employee has appropriate safety training for the tasks to be performed.

Additionally, Christopher Millerick will perform hazard assessments of job sites to determine if hazards are present, or are likely to be present, which will necessitate the use of personal protective equipment (PPE).

Identified hazards which cannot be eliminated through engineering controls or changes in procedures will be addressed by the use of selected PPE.

While the responsibilities of Christopher Millerick cannot be further delegated, most of the duties can be assigned to those who are competent persons by virtue of training or experience.

Safety Program Administrator

Tayla Millerick, the safety program administrator, has been deemed competent by our Safety Director and may perform the below duties:

a. The actual training of personnel.
b. Maintenance of training records.
c. Random inspections to verify adherence to safety rules and policies.
d. Completion of specific tasks identified within our OSHA compliance programs.
e. Hazard assessments.

Note: The safety director and the safety program administrator may or may not be the same person.

Employees

All employees are required to participate actively in the safety & health program at Millerick Engineering, Inc.. Do not hesitate to point out perceived safety deficiencies to your supervisor or the competent person – you may prevent an injury to yourself or a fellow worker. With the goal of providing a safer job site for all of us, employee suggestions for improving safety management are welcomed and encouraged. Never perform a task when you don't understand all of the safety procedures. If in doubt, ask your immediate supervisor for guidance.

Subcontractor Involvement & Responsibilities

It is the responsibility of Millerick Engineering, Inc. to review the safety efforts made by subcontractors who may be working with us.

Prior to initiation of work on multi-subcontractor job sites, a meeting will be held to explain to all subcontractors the protective measures we have determined to be appropriate. Input and suggestions from subcontractors will be solicited. Attention will be given to hazards one subcontractor may create and the measures they will take to prevent other subcontractors from these exposures. One measure that will always be taken is the sharing of appropriate Safety Data Sheet information.

The four major elements of safety management below apply to the operations of Millerick Engineering, Inc. and they also apply to our subcontractors:

a. Management commitment and employee involvement.
b. Worksite analysis.
c. Hazard prevention and control.
d. Safety & health training.

It is expected that our subcontractors work within the framework of OSHA Standards.

Hazard Assessment

Prior to work on any project, as well as the introduction of new substances, procedures or processes, a hazard assessment will be made by Christopher Millerick, or authorized representative, to identify and evaluate these possible workplace hazards. Employees will be informed, before performing work, of any special precautions or changes in procedures that must be taken to negate these hazards.

Daily job site inspections will be conducted using our job site inspections forms to identify not only lack of safety compliance, but the introduction of new safety hazards that must be addressed. Copies of these job site inspection forms will be maintained in Christopher Millerick's office.

Additionally, Christopher Millerick or a designated competent person will make routine and random job site inspections to both identify new hazards and to monitor the effectiveness of our safety & health program.

While all hazards identified by inspection (or other means) will be corrected in the order of their severity [the most serious corrected first], all hazards will be eliminated before work proceeds.

Job Hazard Analysis

OSHA Booklet 3071 Job Hazard Analysis

All employees and all subcontractors will read the above OSHA Booklet 3071, Job Hazard Analysis and use the information contained therein to complete our Job Task Safety Analysis Forms.

Using the above referenced booklet and other training materials, employees and subcontractors will be trained in the hazard identification process.

The formal process to identify potential hazards is as follows:

A Certificate of Workplace Hazard Assessment will be prepared, signed and dated, by Tayla Millerick, our safety program administrator, indicating that a hazard assessment of our job sites and methods of operations has been accomplished. This hazard assessment will focus on the need for PPE which cannot be eliminated through engineering or administrative controls.

Because they have insight to the hazards involved, employees and subcontractors who actually perform job tasks will be included in job hazard analysis.

A review will be made of previous accidents and injuries as well as “near-misses” to determine if existing hazard controls are adequate or need improvement.

In discussion with employees and subcontractors, ideas to eliminate hazards will be discussed and formalized for inclusion on our job task safety analysis form which follows this page.

Hazards associated with various tasks will be ranked and prioritized with the jobs that possess hazards that present unacceptable risks, based on those most likely to occur and with the most severe consequences identified for first priority for analysis.

The job task safety analysis form will be completed for each task and, as a matter of course, hazard identification will be performed on all job tasks, both routine and non-routine, before actual work is performed. Hazard identification would be prepared for new processes, changes in operation, products or services, as applicable.

Through frequent and routine job site inspection, review of incidents [or lack thereof], and employee and subcontractor feedback, the above will insure that the identified hazards are mitigated. Should problems occur or a potential risk/hazard be discovered, work will stop until the job task hazard analysis form is adjusted to correct any deficiencies found.

The above review process will take place on all job tasks to ensure that new hazards were not created while eliminated others.

Safety Meetings

Scheduled safety meetings provide an opportunity for reinforcing the importance of general safety as well as specific work-related procedures applicable to the work at hand. Properly prepared safety meetings will focus on one or two topics and be direct and to the point. All safety questions will be addressed, and interactive participation is encouraged.

Housekeeping

Housekeeping? On a job site? What's that all about? It's about safety!

Employees are to maintain a neat and orderly work area *as far as practical*. Housekeeping and general cleanliness have a direct effect on safety and health. Proper housekeeping can prevent slips and falls, allow easy egress in the event of an emergency, prevent falling object injuries, and enhance fire safety. Below listed are general housekeeping rules:

a. Walking/working surfaces will be kept clean and dry.
b. Do not allow construction debris to accumulate.
c. Stored materials will be neatly stacked at the job site.
d. Containers, when not in use, will be sealed.
e. No objects will be left unattended on stairways.
f. Entrances and exits will be properly marked and not blocked.
g. Tools will be properly cleaned and put away after use.

Sanitation

29 CFR 1926.51 - Sanitation

Potable Water:

From a safety standpoint, you must not neglect your need for potable (drinkable) fluids. Water is not only the most abundant of all compounds found on the earth; it is the most abundant part of you – actually about 65% of you is water.

On construction sites, exertion and heat dictate the need for plenty of water.

Potable water will be available on job sites. If portable containers are used, they will be clearly marked (Potable Water), capable of being tightly closed, and equipped with a tap. These containers will be used for no other purpose than supplying drinking water. Non-reusable (single service) cups in a sanitary container will be provided for drinking as well as a receptacle for disposing of used cups. Employees are reminded of their need for adequate amounts of water.

Non-Potable Water:

Outlets of non-potable water should be clearly identified as such, through appropriate signage, and non-potable water may never be used for drinking, washing, or cooking.

Toilets:

Note: The following doesn't apply to mobile crews having readily available transportation to nearby toilet facilities.

Toilets will be provided at job sites according to the below table:

Number of Employees	Minimum Number of Facilities
20 or less	1
20 or more	1 toilet seat and 1 urinal per 40 workers
200 or more	1 toilet seat and 1 urinal per 50 workers

Toilet facilities would include, unless prohibited by local law:

a. Privies (where their use will not contaminate ground or surface water)
b. Chemical Toilets
c. Recirculating toilets
d. Combustion toilets

Washing Facilities:

Adequate washing facilities will be provided in near proximity to the job site if employees are working with contaminants that may be harmful to their health such as paint, coatings, or other chemical products. Paper towels and cleansing agents will be provided.

Showers and change rooms will be dictated by specific standards dealing with specific toxic materials (i.e., lead; asbestos).

Eating and Drinking Areas:

No employee will be allowed to consume food or beverages in any area exposed to toxic material.

Lifting, Pushing, and Pulling

Back injuries are often caused by the obvious – putting excessive strain on the lower back by lifting an object that is too heavy or awkward, or by bending and/or twisting while lifting.

However, lifting injuries are also caused by less obvious reasons:

a. Poor physical condition
b. Poor posture
c. Poor judgment (lifting, pulling, pushing an object that is obviously too heavy or awkward without seeking assistance or a mechanical lifting device.)
d. Lack of exercise
e. Excessive body weight

Proper lifting techniques are important for employee safety. Below are lifting techniques that will reduce the likelihood of injury:

a. Lift objects comfortably, not necessarily the quickest or easiest way.
b. Lift, push, and pull with your legs, not your arms or back.
c. When changing direction while moving an object, turn with your feet, not by twisting at the waist.
d. Avoid lifting higher than your shoulder height.
e. When standing while working, stand straight.
f. When walking, maintain an erect posture; wear slip-resistant, supportive shoes.
g. When carrying heavy objects, carry them close to the body and avoid carrying them in one hand.
h. When heavy or bulky objects need to be moved, obtain help or use a mechanical aid such as a dolly, hand truck, forklift, etc.
i. When stepping down from a height of more than eight inches, step down backwards, not forward.
j. Handle heavy objects close to the body – avoid reaching out.
k. Lift gradually and smoothly. Avoid jerky motions.
l. Maintain a clear line of vision.

Slips, Trips, and Falls

Slips, trips, and falls are among the most common job site accidents and they are easily preventable. Below are some of the causes of slips, trips, and falls:

a. Running on the job site.
b. Engaging in horseplay.
c. Working off a ladder that is not firmly positioned.
d. Carrying an object that blocks line of vision.
e. Work boots not laced or buckled.
f. Working off a scaffold without safety rails.
g. Using ladders that have oil and grease on the rungs.
h. Not using a handrail on steps.
i. Messy work areas with debris strewn about.
j. Not paying attention to what one is doing.

This list can go on and on, but all of the above are easily preventable by adherence to common safety procedures, common sense, and awareness of potential hazards on the job site.

Drugs, Alcohol, and Other Prohibited Behaviors

Drug Free Job Sites

The type of work we perform can result in serious injury if employees are not capable of focusing not only on their job task, but their surroundings and others with whom they work. With the exception of over the counter drugs such as aspirin or drugs prescribed by a physician, there will be no drugs or alcohol at the workplace. Alcohol and drug abuse cause an unacceptable level of safety hazard not only for the offending employee, but for others in the vicinity.

Note: OSHA has determined that drug testing after injuries or illnesses that occur at the workplace can be considered retaliatory or discriminatory, and thus discourage employees from properly reporting the injury or illness. This can be the case in situations where the injury or illness wouldn't have been reasonably expected to be the result of being under the influence of drugs or alcohol.

Example: A bee sting that results in an allergic reaction and leads to a stay at the hospital. There is not a reasonable belief that a bee sting would be caused by impairment and thus drug testing would be considered retaliatory or discriminatory.

Those found to be under the influence of drugs and/or alcohol will be immediately removed from the work area by the competent person and further disciplinary action will be taken by Christopher Millerick, our Safety Director.

Chemical dependency is a devastating problem for not only the employee, but also the employee's family and co-workers. For obvious safety reasons, it cannot be tolerated in the workplace. Those with such a problem should seek professional help. Christopher Millerick will assist any employee in finding appropriate treatment should they voluntarily come forward.

Smoking

There will be no smoking except in designated smoking areas.

Under no circumstances will there be smoking during refueling of vehicles or within 50 feet of flammable materials.

Prohibited Behaviors

The use, bringing onto company property or job site, possession, concealment, transportation, promotion or sale of the following substances or items by any employee as well as the subcontractors that Millerick Engineering, Inc. might hire, and their employees, of the below items is prohibited:

a. Illegal drugs, unauthorized controlled substances, look-a-likes, designer, synthetic or any other drug which may affect an employee's motor functions or alter a person's working perception.
b. Prescription drugs/over the counter medication except under the following conditions:
    1. The employee will inform his supervisor prior to using any prescription drug or over the counter medication and receive written permission to possess such drug while working on the job.
    2. The prescription vial will be labeled by the dispensing pharmacy and the label will show the employees name, physician, prescription number, date the prescription was filled and the dosage rate. Prescriptions more than 30 days old will not be allowed.
    3. The over the counter medication will be in its original package or container and the employee may only possess enough medication for their normal shift.
c. Alcoholic beverages.
d. Firearms, weapons, explosives, and ammunition.
e. Unauthorized items such as stolen property or drug paraphernalia.

Workplace Violence

Although OSHA does not have any standards concerning workplace violence, to comply with Section 5(a)(1) of the Occupational Safety and Health Act (OSHA) of 1970, which requires us to provide our employees with a place of employment that is free from recognizable hazards that are causing or likely to cause death or serious harm to our employees, we are employing this policy regarding workplace violence.

Workplace violence can be defined as: "any act or threat of physical violence, harassment, intimidation, or other threatening disruptive behavior that occurs at the work site." Keep in mind actions such as shouting, swearing, and destroying or throwing items could be considered workplace violence if the complaining employee feels their safety is in jeopardy.

The CDC identifies 4 types of workplace violence:

a. Criminal Intent - workplace violence occurring during the process of criminal activity (e.g., robbery)
b. Customer/Client - workplace violence targeting an employee of a business by a customer/client
c. Worker-on-Worker - workplace violence occurring between two (2) employees
d. Personal Relationship - workplace violence occurring between an employee and a personal acquaintance who has no ties to the workplace.

When possible and applicable, we will implement recommended engineering and administrative controls to prevent or reduce the likelihood of all types of workplace violence. Some of these controls may include, but are not limited to:

a. Lighting controls
b. Surveillance (e.g., cameras, mirrors)
c. Establishing a good relationship with local police
d. Training on specific workplace violence events, such as responding to an active shooter
e. Performing appropriate background checks and reference verification on new hires

In the event that our employees are exposed to workplace violence instigated by acts of our employees or others, the following steps will be taken immediately:

a. Those not directly threatened or exposed to the violent acts will immediately warn others and remove themselves from the area. Call 911, or local police authorities, when you've reached a point of safety.
b. If you feel you are about to become a victim of workplace violence and you do not have the opportunity to flee, try to remain calm. Do nothing threatening. At the first opportunity, seek safety and call 911 or local police authorities.

Any employee who is a victim of any type of workplace violence, physical or verbal, is to immediately notify his or her supervisor. If an employee's direct supervisor is the offender, the employee should go to the next level of management. Violent actions that result in injury will be reported to the police without exception.

An internal investigation will begin immediately and will include interviews with involved parties, including potential witnesses. When possible, we will do our best to maintain privacy during the investigation and follow-up response. Our company expressly prohibits retaliation of any kind against any employee bringing a complaint or assisting in the investigation of a complaint. Such employees may not be adversely affected in any manner related to their employment. Retaliation is also illegal under federal law.

Any breach of workplace behavior that leads to a violent action against another employee will be treated as a serious safety violation subject to extreme corrective action, up to and including termination.

Emergency Action Plan

An Emergency Action Plan, if appropriate, will be posted at the job sites, along with emergency telephone numbers and an escape route diagram.

After a hazard assessment of a job site, Christopher Millerick, the Safety Director, will determine if conditions may develop that could possibly warrant an evacuation. In this case, an emergency action plan will be developed to address the threat. Certainly, if work is being done at a hazardous chemical plant, for example, an emergency action plan is required and coordination will be made with the facility operator.

Events may occur which dictate the evacuation of a job site, such as a fire, explosion, power failure, etc. Additionally, events may occur which dictate the need for emergency medical responders. These sets of events fall under the Emergency Action Plan and a multitude of objectives must be met.

The first and foremost objective is the safety of all personnel of Millerick Engineering, Inc.. To achieve this level of safety, our plan is designed to get personnel away from danger, treat injury, and provide for a thorough and accurate accounting of all employees.

There may be situations where certain employees, trained in first aid and/or firefighting procedures, may prevent a small emergency situation from becoming a major disaster. In these types of situations, specifically identified employees will remain to perform the function for which they are trained, provided they may perform these duties in a safe manner. At no time will any employee put himself/herself at risk.

To the extent possible, job sites will have clear, direct egress.

The actual implementation of this plan must be direct and carried out without confusion. Employees must know how to alert others, how to call for assistance, the location of fire extinguishers and first aid kits, the escape route, and the rendezvous point (being accounted for so that others do not put themselves at risk looking for a person who has already reached safety).

Emergency Medical Response

Should an injury occur that requires an emergency medical responder, the below listed actions will be taken in the order given:

a. Call 911 or the emergency response number posted on the job site.
    1. In the absence of 911 services, the telephone numbers of physicians, hospitals, or ambulances will be conspicuously posted with our emergency phone numbers. The method of contacting emergency services must be effective at the required location and should be tested to ensure reliability.
    2. In remote areas that do not have automatic location capability for 911, we will post either the latitude and longitude of the worksite or other location identification information that effectively communicates the location of the worksite in a conspicuous location.

b. Provide any medical assistance you are trained and certified to do. **DO NOT** provide any medical assistance you are not trained to do.

c. Designate an individual to direct the emergency responders to the injured person and provide Safety Data Sheets if applicable.

d. Notify the competent person who, in turn, will notify the office.

Fire Protection

The phone number of the local fire department will be posted with other emergency numbers.

If a fire should occur, all personnel and the local fire department will be notified. As in all emergency situations, per the American Trauma Society, people calling the fire department should:

a. Remain calm
b. Speak clearly and slowly
c. Give the exact location
d. Describe the situation
e. Give the phone number from where you are calling.
f. Do not hang up until told to do so

Fire Prevention Plan

Fire Prevention deals not with handling a fire emergency, but rather preventing a fire in the first place.

To reduce the likelihood of a fire, personnel are to adhere to the following rules:

a. Smoking is allowed only in designated areas and smoking materials will be totally extinguished and placed in the appropriate receptacles.
b. All chemical products will be handled and stored in accordance with the procedures noted on their individual SDS.
c. Heat producing equipment will be properly maintained and operated per the manufacturer's instructions to prevent accidental ignition of combustible materials.
d. Precautions will be taken when working with an open flame (such as welding) and those areas will be made fire safe by removing or protecting combustibles from ignition.
e. Combustible liquids must be stored in approved containers.
f. Chemical spills must be cleaned up immediately. This is particularly important for combustible and reactive liquids. Damaged chemical containers and cleanup materials must be properly disposed.
g. Combustible liquids and trash must be segregated and kept from ignition sources.

   Note: Information on appropriate personal protective equipment, proper disposal, proper cleanup procedures, required ventilation, etc. is found on the product's SDS.

h. Keep clear access to fire hydrants as well as portable fire extinguishers.
i. Personnel will be notified by their Supervisor or the competent person of any unusual fire hazard conditions existing on a job site.
j. Good housekeeping, good housekeeping!

Portable Fire Extinguishers

29 CFR 1926.150 Fire protection

All personnel will receive instruction on portable fire extinguishers to include general principles of use, the hazards involved in the incipient state of firefighting, inspection, maintenance, and location. This training will be given during orientation with refresher training to occur annually thereafter.

a. Fire extinguishers will be visually inspected monthly for general condition and adequate charge. They will be serviced and certified by qualified personnel at least annually. We shall record the annual maintenance date and maintain the maintenance record for one (1) year after the last entry or life of the shell, whichever is less.
b. Portable fire extinguisher locations will be clearly identified and easily accessible.

Class	Distribution	Notes
A “A” on a green triangle	75 feet or less travel distance between the employee and the extinguisher	For use on wood, paper, trash, etc.
B “B” on a red square	50 feet or less travel distance between hazard area and the extinguisher	For use on flammable liquid, gas, etc.
C “C” on a blue circle	Based on the appropriate pattern for the existing Class A or Class B hazards	For use on electrical fires
D “D” on a yellow star	75 feet or less travel distance between the combustible metal working area and the extinguisher or other containers or Class D extinguishing agent	For use on combustible metals

Appropriate portable fire extinguishers will be used, as noted above. Supervisors will ensure that at least one extinguisher is on each floor of a project near the stairway.

Using the wrong fire extinguisher on some fires can actually spread the fire. Using a Type-A extinguisher on an electrical fire, for example, could cause serious injury. When a fire occurs, it is imperative to use the proper extinguisher.

First Aid and First Aid Kits

Should a medical emergency occur, other than minor scrapes and bruises, and it is serious enough to call for professional medical assistance, you should call the Emergency Response Number posted on the job site bulletin board. Before the first aid providers arrive, to the extent possible, clear the way so they can reach the injured employee in the most direct way possible.

If any employees of Millerick Engineering, Inc. are working at a location that is more than 3 or 4 minutes from medical assistance, we will utilize designated first aid providers who are trained and licensed in CPR/first aid and also is a designated first aid provider, as an additional job, as part of the company bloodborne pathogen program. Employees will not expose themselves to blood or other bodily fluids of other employees at any time.

Per OSHA, first aid is limited to:

a. Using a non-prescription medication, such as aspirin, at non- prescription strength.
b. Cleaning, flushing or soaking wounds on the surface of the skin;
c. Using wound coverings such as bandages, Band-Aids™, gauze pads, etc., or using butterfly bandages or Steri-Strips™.
d. Using hot or cold therapy.
e. Using any non-rigid means of support, such as elastic bandages, wraps, non-rigid back belts, etc.
f. Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.).
g. Draining fluid from a blister.
h. Using eye patches.
i. Removing foreign bodies from the eye using only irrigation or a cotton swab.
j. Removing splinters or foreign material from areas other than the eye by irrigation, tweezers, cotton swabs or other simple means.
k. Using finger guards.
l. Using massages.
m. Drinking fluids for relief of heat stress.

If an employee is injured and emergency responders have been called, stay calm and reassure the injured employee that help is coming.

Below is basic first aid for various common job site injuries. Mostly, it is what **not** to do. When dealing with any injury, stay calm and never do anything unless you know what you are doing.

MINOR BURNS

(Redness or blisters over a small area)

Flush with cold water; apply a sterile dressing.

Do not use butter on any burn.

Do not break open blisters.

MAJOR BURNS

(White or charred skin; blisters and redness over a large area; burns on face, hands, or genital area)

Cover with sterile dressing and seek medical attention promptly.

Do not apply salves, ointments or anything else.

Do not break blisters.

CHEMICAL BURNS

(Spilled liquid or dry chemical on skin)

Liquid: Flush with large amounts of water immediately (Keep water flow gentle).

Dry: Brush as much off as possible before flushing with water. After flushing at least 5 minutes, cover with sterile dressing.

Seek medical attention promptly.

Do not use anything but water on burned area.

Do not break open blisters.

EYE - FOREIGN OBJECT

(Object visible; feeling of something in the eye)

Have patient pull upper eyelid over lower eyelid.

Run plain water over eye.

If object does not wash out, cover both eyes with a gauze dressing.

Seek medical attention promptly.

Do not rub the eye.

EYE - WOUNDS

(Wound on eyelid or eyeball; pain; history of blow to eye area; discoloration)

Apply loose sterile dressing over both eyes.

Seek medical help immediately.

For bruising, cold compress or ice pack may relieve pain and reduce swelling.

Do not try to remove any embedded object.

Do not apply pressure to eye.

EYE - CHEMICAL BURN

(Chemical splashed or spilled in eye)

Flush immediately with water over open eye for at least 10 minutes

(20 minutes if alkali). It may be necessary to hold patient's eyelid open.

Note: In work situations where a possibility of eye (or body) exposure to corrosive materials exists, suitable facilities for quick-drenching or flushing will be provided in the immediate work area.

Cover both eyes with sterile dressing.

Seek medical help immediately.

Do not put anything but water in eye.

HEAT EXHAUSTION

(Fatigue; weakness; profuse sweating; normal temperature;
pale clammy skin; headache; cramps; vomiting; fainting)

Remove from hot area.

Have victim lay down and raise feet. Apply cool wet cloths.

Loosen or remove clothing.

Allow small sips of water if victim is not vomiting.

HEAT STROKE

(Dizziness; nausea; severe headache; hot dry skin;
confusion; collapse; delirium; coma and death)

Call for immediate medical assistance.

Remove victim from hot area.

Remove clothing. Have victim lay down.

Cool the body (shower, cool wet cloths)

Do not give stimulants.

<u>First Aid Kits:</u>

First aid kits are worthless if not readily accessible. Therefore, they will not be locked up on job sites. They're also not very valuable if the items you need are missing. It's very important that the kits have the proper items and that they are replenished as they are used.

OSHA defers to ANSI for determining what qualifies as an acceptable first aid kit for the workplace. The ANSI standard that addresses first aid kits is ANSI/ISEA Z308.1-2015. Two important topics covered in this standard are what items are required to be included in a first aid kit: Class, and in what kind of container the kit is kept: Type.

<u>Class</u>

There are two classes of first aid kits: Class A and Class B. The two classes are divided based on the type of first aid items included and the number of those items available in the kit. ANSI has defined the classes as follows:

Class A first aid kits are intended to provide a basic range of products to deal with the most common types of injuries encountered in the workplace including: major wounds, minor wounds (cuts and abrasions), minor burns and eye injuries.

Class B first aid kits are intended to provide a broader range and quantity of supplies to deal with injuries encountered in more populated, complex and/or high risk work environments.

The biggest difference between the classes of first aid kits is the amount of items included in the kit. Class B kits have more of each item and are needed at a workplace that has many workers.

Keep in mind that sterile items will be individually wrapped, sealed, and used only once. Other items, such as tape or scissors, can be reused and should be kept clean.

The supplies consumed in first aid kits can actually be used as a measure of safety. For example, if a kit constantly needs replacement of bandages used for minor cuts, there is an obvious problem. Why are cuts happening in the first place? Actual trends can be established and corrective procedures initiated, such as a protective glove requirement or improved handling practices.

Remember, improper medical treatment can be more dangerous than no treatment at all. Only provide care that you have been trained and certified to do.

Below are the required contents, items and quantities of Class A and B first aid kits:

Class A	Class B
16 Adhesive Bandage 1 x 3 in.	50 Adhesive Bandage 1 x 3 in.
1 Adhesive Tape 2.5 yd (total)	2 Adhesive Tape 2.5 yd (total)
10 Antibiotic Application 1/57 oz	25 Antibiotic Application 1/57 oz
10 Antiseptic 1/57 oz	50 Antiseptic 1/57 oz
1 Breathing Barrier	1 Breathing Barrier
1 Burn Dressing (gel soaked) 4 x 4 in.	2 Burn Dressing (gel soaked) 4 x 4 in.
10 Burn Treatment 1/32 oz	25 Burn Treatment1/32 oz.
1 Cold Pack 4 x 5 in.	2 Cold Pack 4 x 5 in.
2 Eye Covering w/ means of attachment 2.9 sq. in.	2 Eye Covering w/ means of attachment 2.9 sq. in.
1 Eye/Skin Wash 1 fl oz total	1 Eye/Skin Wash 4 fl. oz. total
1 First Aid Guide	1 First Aid Guide
6 Hand Sanitizer 1/32 oz	10 Hand Sanitizer 1/32 oz
2 pr Medical Exam Gloves	4 pr Medical Exam Gloves
1 Roller Bandage 2 in. x 4 yd	2 Roller Bandage 2 in. x 4 yd
1 Scissors	1 Roller Bandage 4 in. x 4 yd
2 Sterile pad 3 x 3 in.	1 Scissors
2 Trauma pad 5 x 9 in.	1 Splint
1 Triangular Bandage 40 x 40 x 56 in.	4 Sterile pad 3 x 3 in.
	1 Tourniquet
	4 Trauma pad 5 x 9 in.
	2 Triangular Bandage 40 x 40 x 56 in.

Type

As important as the contents are, the first aid kit won't be very useful if it's not properly protected from the workplace environment. If the supplies are soaked from rain or smashed from being tossed around, they just won't be able to provide any help when needed. ANSI has addressed this by providing guidelines for the containers that first aid kits can be stored in at the workplace.

They are broken down into four categories: **Type I, Type II**, **Type III**, & **Type IV.** Here are the descriptions that ANSI provides for each type.

Type I first aid kits are intended for use in stationary, indoor settings where the potential for damage of kit supplies due to environmental factors and rough handling is minimal. Type I first aid kits will have a means for mounting in a fixed position and are generally not intended to be portable.

Note: Typical applications for Type I first aid kits may include, but are not limited to, the following: general indoor use, an office setting or a manufacturing facility. First aid cabinets would generally fall into the Type I classification.

Type II first aid kits are intended for portable use in indoor settings where the potential for damage of kit supplies due to environmental factors and rough handling is minimal.

Note: Typical applications for Type II first aid kits may include, but are not limited to, the following: general indoor use, an office setting or a manufacturing facility.

Type III first aid kits are intended for portable use in mobile, indoor and/or outdoor settings where the potential for damage of kit supplies due to environmental factors is not probable. Type III kits will have a means to be mounted in a fixed position and will have a water resistant seal.

Note: Typical applications for Type III first aid kits may include general indoor use and sheltered outdoor use.

Type IV first aid kits are intended for portable use in the mobile industries and/or outdoor settings where the potential for damage to kit supplies due to environmental factors and rough handling is significant. Type IV kits will have a means to be mounted in a fixed position and will meet the performance requirements set forth by ANSI.

Note: Typical applications for Type IV first aid kits may include, but are not limited to, the following: the transportation industry, the utility industry, the construction industry, and the armed forces.

Accident Investigation

The purpose of Accident Investigation is to prevent the same type of accident from reoccurring. An accident investigation will begin immediately after the medical crisis is resolved. The competent person/supervisor on the job site will complete an Accident Investigation Form as soon as feasible. The five questions that must be answered are: Who? What? When? Where? And most importantly - Why did the accident happen?

Apparently simple accidents may actually be caused by many complex reasons. Example: a worker is using a claw hammer on a working surface more than six feet above the ground. The hammer head breaks off and strikes a worker below who is not wearing a hard hat. Why did this accident happen? How can it be prevented? With just the facts presented, the fault would seem to rest with the worker who was struck by the falling object.

The accident investigation may reveal other contributing factors by answering questions like:

a. Were hard hats required on the project, were they available, and was this policy enforced by the supervisors?
b. Were precautions taken to prevent objects from falling from above, such as a controlled access zone (CAZ)?
c. Did the worker inspect his hammer before use? Was he driving nails – the job for which a claw hammer is designed – or pounding metal beams?

After determining the cause of the accident, steps can be taken to prevent a reoccurrence. Near-miss mishaps, events which result in no injury or damage, should be investigated because even though the outcomes are different, the causes are the same.

OSHA Forms 300; 300A & 301

As a matter of law, all employers with 11 or more employees **at any one time** in the previous year must maintain OSHA Form 300, *Log of Work- Related Injuries and Illnesses*, OSHA Form 301, *Injury and Illness Incident Report*, and OSHA Form 300A, *Summary of Work-Related Injuries and Illnesses*.

OSHA Forms 300 and 301 are used to record and classify occupational injuries and illnesses. The information on the OSHA Form 300 is related to employee health and must be used in a manner that protects the confidentiality of the employees to the extent possible. Recordable injuries and illnesses must be entered on OSHA Forms 300 and 301 within seven (7) days of receiving information that a recordable injury or illness has occurred.

Electronic Submission of Records

Effective February 25th, 2019, certain employers are required to electronically submit injury and illness data from their OSHA Form 300A Summary of Work-Related Injuries and Illnesses to OSHA. This includes all employers with 250 or more employees and employers with 20-249 employees who have a NAICS code listed in Appendix A to Subpart E of Part 1904 - Recording and Reporting Occupational Injuries and Illness. *Click here to see Appendix A*.

Note: Contact your local worker's compensation office if you're uncertain of your NAICS code.

If Millerick Engineering, Inc. is required to submit records electronically, the information from our 300A must be submitted by March 2 of the following year (for example, 2018 data must be submitted by March 2, 2019).

OSHA provides a secure website that offers three options for data submission:

a. Users will be able to manually enter data into a webform.
b. Users will be able to upload a CSV file.
c. Users will have the ability to transmit data electronically via an API if they have an automated recordkeeping system.

   Click Here to Access the Injury Tracking Application

Effective January 1st, 2024, if our company exceeds 100 or more employees at any time during the year, we will be required to submit our OSHA Form 300 Log and OSHA Form 301 Incident Report to OSHA the following year, no later than March 2nd. (Example: If we had 107 employees at some point during 2023, we would be required to submit the OSHA 300 LOG and 301 no later than March 2nd, 2024)

The information is to be uploaded to the same OSHA Injury Tracking Application as the OSHA 300 Log Summary, using the link above.

Information that should be included in the OSHA 300 Log and 301 are date, physical location, and severity of the injury or illness; details about the worker who was injured; and details about how the injury or illness occurred.

Retention of Forms:

Old OSHA Forms 101 and 200, as well as OSHA Forms 300, 300A, and 301, will be retained for five years following the year to which they relate.

Items to be Recorded on OSHA Forms 300, 300A and 301:

Work related injuries and illnesses and fatalities are to be recorded using the criteria found in Part 1904, *Recording and Reporting Occupational Injuries and Illnesses*.

Injuries and illnesses must be recorded if they result in death, days away from work, restricted work or transfer to another job, medical treatment beyond first aid, loss of consciousness, or if the injury or illness involves a significant injury diagnosed by a physician or licensed health care professional even if it does not meet the forgoing conditions.

Note: First aid (which is not reportable) is defined in 29 CFR 1904.7(b)(5)ii.

Employee Involvement:

As an employee of Millerick Engineering, Inc., you have the right and responsibility to report all work-related injuries and illness without the fear of being retaliated against, discriminated against, or terminated from employment.

Note: OSHA has determined that drug testing after injuries or illnesses that occur at the workplace can be considered retaliatory or discriminatory, and thus discourages employees from properly reporting the injury or illness. This can be the case in situations where the injury or illness wouldn't have been reasonably expected to be the result of impairment.

Example: A bee sting that results in an allergic reaction and leads to a stay at the hospital. There is not a reasonable belief that a bee sting would be caused by impairment and thus drug testing would be considered retaliatory or discriminatory.

As a matter of policy, all employees are to report all work-related accidents and injuries immediately to the competent person/supervisor on a job site. The competent person/supervisor will complete an accident investigation form and will forward it to Christopher Millerick, the Safety Director.

Christopher Millerick will extrapolate appropriate information for completion of the OSHA Form 300 and complete a review of our policies and procedures to help ensure that there isn't a reoccurrence of the reported injury or illness.

Failure to report injuries or illnesses would be a violation of our company's reporting policy and is not acceptable.

Catastrophic Reporting Requirements:

The following events have to be reported to OSHA:

a. All work-related fatalities
b. All work-related in-patient hospitalizations of one or more employees
c. All work-related amputations
d. All work-related losses of an eye

Millerick Engineering, Inc. must report work-related **fatalities within 8 hours of finding out about it.** For any in-patient hospitalization, amputation, or eye loss, we **must report the incident within 24 hours of learning about it.**

Only fatalities occurring within 30 days of the work-related incident must be reported to OSHA. Further, an inpatient hospitalization, amputation or loss of an eye incident must be reported to OSHA only if they occur within 24 hours of the work-related incident.

There are three options for reporting the event:

a. By telephone to the nearest OSHA Area Office during normal business hours. The phone numbers can be found at the following website: https://www.osha.gov/html/RAmap.html.
b. By telephone to the 24-hour OSHA hotline (**1-800-321-OSHA or 1-800-321-6742**).
c. By using OSHA's new means of reporting events electronically. This can be done online at the following website: https://www.osha.gov/pls/ser/serform.html.

Information to Be Reported:

When reporting a fatality, in-patient hospitalization, amputation or loss of an eye to OSHA, following information must be reported:

a. Establishment name
b. Location of the work-related incident
c. Time of the work-related incident
d. Type of reportable event (i.e., fatality, in-patient hospitalization, amputation or loss of an eye)
e. Number of employees who suffered the event
f. Names of the employees who suffered the event
g. Contact person and his or her phone number
h. Brief description of the work-related incident

Note: An event does not have to be reported if it:

a. Resulted from a motor vehicle accident on a public street or highway, except in a construction work zone; employers must report the event if it happened in a construction work zone.

b. Occurred on a commercial or public transportation system (airplane, subway, bus, ferry, street car, light rail, train).

c. Occurred more than 30 days after the work-related incident in the case of a fatality or more than 24 hours after the work-related incident in the case of an in-patient hospitalization, amputation, or loss of an eye.

Note: A report must be made for an in-patient hospitalization due to a heart attack, if the heart attack resulted from a work-related incident.

Location of OSHA Forms 300 and 301:

As a general rule, the OSHA Forms 300 and 301 will be maintained in the main office. However, in the event that a project is to last more than one year, that job site will be considered a fixed establishment and maintain its own OSHA Forms 300 and 301.

Incident Rate:

One indication of the success of the safety effort put forth by Millerick Engineering, Inc. is our "incidence rate". When bidding a job, our incidence rate could be a determining factor in a successful bid. The incidence rate is determined by the following formula:

N/EH X 200,000 where:

N = number of injuries and/or illnesses

EH = total hours worked by all employees during the calendar year.

200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year).

To find the "Lost Workday Injury Rate" (LWDI), the following formula is used:

WDI Rate = (# LWDI's X 200,000)/# employee hours worked

LWDI = sum of LWDI's in reference years

employee hours worked = sum of employee hours in reference years

200,000 = base for 100 full-time equivalent workers (working 40 hours per week, 50 weeks per year)

When accidents and injuries occur, they have an immediate detrimental impact on those employees involved. Additionally, they have a potential lingering negative impact on our company and our ability to get work.

Postings

On every job site there will be a prominently displayed bulletin board or area for postings. Every employee must be aware of this policy. Certain postings are required as a matter of law in all cases and other postings are required depending on circumstances and types of work being done.

In all cases, the following must be posted to meet OSHA requirements:

a. OSHA Form 3165, It's the law!
b. During the period from 1 February through to April 30, OSHA Form 300A, Summary of Work-Related Injuries and Illnesses, must be posted for work-related injuries and illnesses which have occurred during the previous year.
c. Emergency phone numbers and site address for emergency response.

If appropriate, the following must be posted:

a. OSHA citations.
b. Notice of informal hearing conference.
c. Names and location of assigned first aid providers.
d. Air or wipe sampling results.
e. Emergency action plan.

<u>Digital Postings</u>

We will only use digital postings to meet the continuous posting requirement when the following criteria is met:

a. Employees strictly work remotely.
b. Employees typically receive information from our company via electronic means.
c. All employees always have access to digital postings.

If the above requirements cannot be met, a hard-copy posting will be required. All digital postings will be identical in content and as effective as a hard-copy posting.

Access to Employee Medical Records & Exposure Records

29 CFR 1910.1020 - Access to employee exposure and medical records

All employee exposure records and medical records are under the control of the safety program administrator, .

Exposure Records must be retained for 30 years.

Medical Records must be retained for the duration of employment plus 30 years.

An employee’s medical record means: “a record concerning the health status of an employee which is made or maintained by a physician, nurse, or other health care personnel, or technician.”

This would include:

a. Medical and employment questionnaires or histories (including job description and occupational exposures).
b. The results of medical examinations (pre-employment, pre- assignment, periodic, or episodic) and laboratory tests (including chest and other X-ray examinations taken for the purpose of establishing a base-line or detecting occupational illnesses and all biological monitoring not defined as an "employee exposure record".
c. Medical opinions, diagnoses, progress notes, and recommendations.
d. First aid records.
e. Descriptions of treatments and prescriptions.
f. Employee medical complaints.

Note: An employee’s medical record does not include:

a. Physical specimens (e.g., blood or urine samples) which are routinely discarded as a part of normal medical practice, or

b. Records concerning health insurance claims if maintained separately from the employer's medical program and its records, and not accessible to the employer by employee name or other direct personal identifier (e.g., social security number, payroll number, etc.).

c. Records created solely in preparation for litigation which are privileged from discovery under the applicable rules of procedure or evidence.

d. Records concerning voluntary employee assistance programs (alcohol, drug abuse, or personal counseling programs) if maintained separately from the employer's medical program and its records.

An employee’s employee **exposure record** means a record containing any of the following kinds of information:

a. Environmental (job site) monitoring or measuring of a toxic substance or harmful physical agent, including personal, area, grab, wipe, or other form of sampling, as well as related collection and analytical methodologies, calculations, and other background data relevant to interpretation of the results obtained.
b. Biological monitoring results which directly assess the absorption of a toxic substance or harmful physical agent by body systems (e.g., the level of a chemical in the blood, urine, breath, hair, fingernails, etc.) but not including results which assess the biological effect of a substance or agent or which assess an employee's use of alcohol or drugs.

c. Safety data sheets, indicating that the material may pose a hazard to human health.
d. In the absence of the above, a chemical inventory or any other record which reveals where and when used and the identity (e.g., chemical, common, or trade name) of a toxic substance or harmful physical agent.
e. Objective Data for Exemption from Requirement for Initial Monitoring.

Employee Information

Upon first entering into employment, and at least annually thereafter, each employee will be informed of the following:

a. The existence, location, and availability of any records covered by 29 CFR 1910.1020.
b. The person responsible for maintaining and providing access to records (Christopher Millerick, the Safety Director).
c. The employee's rights of access to his/her records.
d. That a copy of 29 CFR 1910.1020 and its appendices will be maintained in the office of Christopher Millerick and made readily available upon request.

Informational materials concerning access to medical records received from or provided by the Assistant Secretary of Labor for Occupational Safety and Health will be distributed to all current employees.

Access to Records

Employees or their designated representatives will have access to their medical or exposure records within 15 working days of their request, or, if this is not possible, will provide, within 15 working days, the reason for the delay and provide a best estimate of when the records will be available.

Copies of employee medical or exposure records will be provided in a reasonable time, place, and manner and **at no cost to the employee**.

Upon request, Christopher Millerick will provide access to representatives of the Assistant Secretary of Labor for Occupational Safety and Health employee exposure and medical records and to analysis using exposure or medical records.

Analysis Using Medical or Exposure Records

"Analysis using exposure or medical records" means any compilation of data or any statistical study based at least in part on information collected from individual employee exposure or medical records or information collected from health insurance claims records, provided that either the analysis has been reported to the employer or no further work is currently being done by the person responsible for preparing the analysis.

Before access is granted to an analysis using medical or exposure records, all personal identifiers must be removed that could directly identify the employee. Identifiers would include: name, SSN, address, etc. Identifiers that could indirectly identify the employee will also be removed. These would include date of hire, sex, job title, etc.

Confidentiality

Nothing in the OSHA standards is intended to affect existing legal and ethical obligations concerning the maintenance and confidentiality of employee medical information, the duty to disclose information to a patient/employee or any other aspect of the medical-care relationship, or affect existing legal obligations concerning the protection of trade secret information.

Transfer of Records

Should we cease to do business, the successor employer will receive and retain all the above medical and exposure records.

Should we cease to do business and there is no successor employer to receive and retain the above medical and exposure records, they will be transmitted to the Director of the National Institute for Occupational Safety and Health (NIOSH).

At the expiration of the retention period for the above medical records, we will notify the Director of the NIOSH at least 3 months prior to the disposal of such records and will transmit those records to the Director of the NIOSH if he requests them within that period.

Enforcement

It is expected that all employees will abide by the safety rules and guidelines that Millerick Engineering, Inc. has in place, not only to protect themselves, but also to protect their fellow workers from harm. If a safety violation occurs, the following steps will be taken by the employee's immediate supervisor:

<u>Minor Safety Violations</u>: Violations which would **not** reasonably be expected to result in serious injury.

a. The hazardous situation will be corrected.
b. The employee will be informed of the correct procedures to follow and the supervisor will ensure that these procedures are understood.
c. The supervisor will make a written report of the occurrence using the Enforcement Documentation Form and inform the employee that this documentation will be forwarded to Christopher Millerick, our Safety Director, for a retention period of one year.
d. A repeat occurrence of the same minor safety violation is considered substantially more serious than the first.

<u>Major Safety Violations</u>: Violations which would reasonably be expected to result in serious injury or death.

a. The hazardous situation will be corrected.
b. The employee will be informed of the correct procedures to follow and their supervisor will impress upon the individual the severity of the violation and the likely consequences should this type of violation be repeated. The supervisor will ensure that the individual understands the correct procedures and will be cautioned that a reoccurrence could result in disciplinary action up to and including discharge.
c. The supervisor will make a written report of the occurrence using the Enforcement Documentation Form and inform the employee that this documentation will be forwarded to Christopher Millerick for a retention period of one year.

<u>Willful Major Safety Violations</u>: Intentional violation of a safety rule which would reasonably be expected to result in serious injury to the employee or a fellow worker.

a. The hazardous situation will be corrected.
b. The employee will be removed from the job site, the event will be documented and forwarded to Christopher Millerick, and the employee will be discharged.

Employees are to understand that the primary purpose of documenting safety violations is to ensure that the important business of employee safety is taken seriously and that the potential for injury is reduced to the lowest possible level.

Schedule of Enforcement Actions

Violations Occurring within a 1 Calendar Year Period

Minor Violation

Offense	Action	Repeat of Same Offense	Action
1st	Written Notice	1st	1 Day Off
2nd	Written Notice	2nd	3 Days Off
3rd	1 Day Off	3rd	Dismissal
4th	2 Days Off		
5th	3 Days Off		
6th	Dismissal		

Major Violation

Offense	Action	Repeat of Same Offense	Action
1st	Written Notice	1st	4 Days Off
2nd	2 Days Off	2nd	Dismissal
3rd	4 Days Off		
4th	Dismissal		

Millerick Engineering, Inc.
Section II
Site/Job Specific Policies and Procedures

Abrasive Blasting

29 CFR 1926.57 - Ventilation

29 CFR 1926.302 - Power-operated hand tools

When performing abrasive blasting operations, from a safety standpoint, there are numerous hazards that must be addressed.

First and foremost are respiratory hazards. During blasting operations, dust hazards are created as the abrasive materials and the surface coatings are shattered and pulverized to particles of respirable size. The composition and **toxicity of the abrasive dust** as well as the coating must be known to determine the:

a. specific respiratory hazards.
b. appropriate respirator to be selected to negate these hazards.

The many types of abrasive materials have varying degrees of hazard – silica sand being probably the most hazardous mineral abrasive used. Whenever possible, its use should be limited and, if possible, a substitute material used. Other types of abrasives include: synthetic or natural mineral grains; metallic shot or hard grit (made of steel or chilled cast iron); and organic abrasives such as ground corncobs and walnut shells. These and other engineering controls such as containment and ventilation are important for employee safety.

The hazards of steel or cast iron dust are relatively minimal, however, combustible organic abrasives may be pulverized fine enough to be capable of forming explosive mixtures with air.

The coatings that are being blasted may, for example, contain lead (in paints); arsenic (in furnaces); cadmium (plating); and even silica sand (embedded in the surface of castings). All these types of hazards require specific respiratory protection and are serious health hazards.

Surprisingly, construction standards do not address abrasive blasting as an "all-encompassing" topic – each hazard must be dealt with on its own.

In addition to respiratory hazards, the following safety concerns, which apply to both abrasive blasting workers and those who may be exposed to hazards they create, depending on the job, need to be addressed during abrasive blasting operations:

a. Protective clothing and equipment must provide protection to the eyes, face, and body of the **operator**.

   Note: Equipment for the protection of the eyes and face will be supplied to the operator when the respirator design does not provide such protection.

b. Protective clothing and equipment must provide protection to the eyes, face, and body of all personnel working in the vicinity of abrasive blasting operations.

   Note: Equipment for the protection of the eyes and face will be supplied to any other personnel working in the vicinity of abrasive blasting operation.

c. Fall protection.
d. Scaffold & ladder safety.
e. Release of toxic dust.
f. **Potentially explosive mixtures:** The blast nozzle must be bonded and grounded to prevent the buildup of static charge.

   Note: Organic abrasives which are combustible will only be used in automatic systems. Reference NFPA 68-1954.

g. High pressure hoses and couplings.
h. Securing the work area to deny unauthorized entry.
i. Working in a permit-required confined space.
j. Injury from the blast, itself. To reduce the likelihood of injury, the **blast cleaning nozzles must be equipped with an operating valve that must be held open manually**. A support will be provided on which the nozzle may be mounted when it is not in use.

There may be times during sandblasting operations that hazardous dusts are released into the atmosphere that exceed the concentrations specified in Table 2 of 29 CFR 1926.55 - Mineral Dusts, listed below:

Table 2 - Mineral Dusts	
Substance	**mppcf(j)**
SILICA:	
Crystalline	250(k)
Quartz. Threshold Limit calculated from the formula(p)	% SiO_2 + 5
Cristobalite	
Amorphous, including natural diatomaceous earth	20
SILICATES (less than 1% crystalline silica)	
Mica	20
Portland cement	50
Soapstone	20
Talc (non-asbestiform)	20
Talc (fibrous), use asbestos limit	--
Graphite (natural)	15
Inert or Nuisance Particulates:(m)	50 (or 15 mg/m^3 whichever is the smaller) of total dust <1% SiO_2
[Inert or Nuisance Dusts includes all mineral, inorganic, and organic dusts as indicated by examples in TLV's appendix D]	
Conversion factors	
mppcf × 35.3 = million particles per cubic meter = particles per c.c.	

[j] Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

[k] The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

[m] Covers all organic and inorganic particulates not otherwise regulated. Same as Particulates Not Otherwise Regulated.

[p] This standard applies to any operations or sectors for which the respirable crystalline silica standard, 1926.1153, is stayed or otherwise is not in effect.

Operational Procedures and General Safety: Dust will not be permitted to accumulate on the floor or on ledges outside of an abrasive-blasting enclosure, and dust spills will be cleaned up promptly. Aisles and walkways will be kept clear of steel shot or similar abrasive which may create a slipping hazard.

The PEL for particles not otherwise regulated is 5.0 mg/m³. The PEL for respirable dust containing crystalline silica is determined by the below formula:

PEL = 10 mg/m³ ÷ (%SiO2+2), where %SiO2+2 refers to the amount of crystalline silica measured in the sample.

Below the above threshold limits, no action is required, however, employees may wear dust masks for personal comfort.

As always, engineering controls are preferred to personal protective equipment to deal with job site hazards. Therefore, local exhaust ventilation is a preferred method of maintaining atmospheres that have dust levels below the concentrations noted in the Dust Table, above.

If it is necessary to use respiratory protection equipment [when effective engineering controls are not feasible or while they are being instituted] as defined in paragraph 1910.134(a) and (b), we will follow the provisions of our respiratory protection program as defined as described in 1926.103. Respirators will be selected that prevent atmospheric contamination of harmful dust, fogs, fumes, mists, gases, smokes, sprays, or vapors.

Per NIOSH:

Type CE abrasive-blast supplied-air respirators are the only respirators suitable for use in abrasive-blasting operations. * Currently, there are four kinds of Type CE abrasive-blast respirators certified by NIOSH. These four kinds of respirators and the NIOSH recommended assigned protection factors (APF) are:

a. A continuous-flow respirator with a loose-fitting hood and an APF of 25;
b. A continuous-flow respirator with a tight-fitting facepiece and an APF of 50;
c. A positive-pressure respirator with a tight-fitting half-mask facepiece and an APF of 1000;
d. A pressure-demand or positive-pressure respirator containing a tight-fitting full facepiece and an APF of 2000.

Note: Air purifying and powered-air purifying respirators are not recommended for abrasive blasting operations but may be suitable for auxiliary work such as outside clean-up operations.

Also, per NIOSH:

a. Silica sand should NOT be used as an abrasive medium.
b. Respirators should not be used as the only means of preventing or minimizing exposures to airborne contaminants. Dust source controls such as containment systems, local exhaust systems, and good work practices should be implemented as the primary means of protecting workers. When dust source controls cannot keep exposures below the recommended exposure limits, controls should be supplemented with the use of respiratory protection.

c. Environmental monitoring by trained personnel should be conducted in all abrasive-blasting applications. This is necessary to select the proper respirator (APF) and insure that workers are not overexposed (i.e., measured contaminant concentration is less than the exposure limit multiplied by the respirator APF).
d. Anytime environmental conditions, airborne contaminants, or their concentrations are highly variable or poorly defined, high level respiratory protection should be used, even if silica is not the abrasive agent.
e. If silica sand is used, despite its much greater hazard relative to other abrasive agents, only the highest-level protection respirators (i.e., respirators certified by NIOSH as pressure-demand or positive pressure and with NIOSH recommended APFs of 1000 or 2000) should be used.
f. Respirators will only provide a satisfactory level of protection when they are selected, fitted, used, and maintained according to the manufacturer's written instructions, NIOSH approval limitations and guidelines, and OSHA regulatory requirements.

If a compressor is used for supplying breathable air by way of air line hoses to an abrasive blasting respirator, it is a Type "C" system. The hose couplings used on these systems must not be compatible with any other gas systems. Breathable air -- not pure oxygen -- is used in these systems. **By definition, this breathable air must and will be free from harmful quantities of dust, mist, and noxious gases**.

An abrasive-blasting respirator will be used which covers the wearer's head, neck, and shoulders to protect the wearer from rebounding abrasive.

All safety and standby devices, such as alarms that warn of compressor failure or overheating, will be maintained in working order. Compressors will be located so that contaminated air does not enter the system and suitable in-line filters will be installed. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of a compressor failure will be in place. If an oil lubricated system is used, it will have a high temperature and carbon monoxide alarm.

Additionally, we will ensure that compressed air does not have oxygen concentrations that are greater than 23.5%.

Compressors used to supply breathing air to respirators must be constructed and situated so as to:

a. Prevent entry of contaminated air into the air-supply system;
b. Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;
c. Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters will be maintained and replaced or refurbished periodically following the manufacturer's instructions.
d. Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag will be maintained at the compressor.

For compressors that are not oil-lubricated, we will ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

For oil-lubricated compressors, we will use a high temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply will be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

If cylinders are used to supply breathing air to respirators, they will meet the following requirements:

a. Cylinders will be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);
b. Cylinders of purchased breathing air will have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and
c. The moisture content in the cylinder will not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

Note: Under no circumstances are employees to use compressed air for cleaning unless the pressure is reduced to less than 30 p.s.i. [10 p.s.i. in California]. Flying debris can injure the employee or a fellow worker.

Symptoms of Silicosis:

Silicosis (especially the acute form) is characterized by shortness of breath, fever, and cyanosis (bluish skin); it may often be misdiagnosed as pulmonary edema (fluid in the lungs), pneumonia, or tuberculosis. Severe mycobacterial or fungal infections often complicate silicosis and may be fatal in many cases.

Three Types of Silicosis:

Chronic Silicosis:	Usually occurs after 10 or more years of exposure to crystalline silica at relatively low concentrations.
Accelerated Silicosis:	Results from exposure to high concentrations of crystalline silica and develops 5 to 10 years after the initial exposure.
Acute Silicosis:	Occurs where exposure concentrations are the highest and develops after a few months or as long as 2 years following exposures to extremely high concentrations of respirable crystalline silica.

NIOSH Safety Recommendations:

NIOSH recommends the following measures to reduce crystalline silica exposures in the workplace and prevent silicosis and silicosis-related deaths:

a. Prohibit silica sand (or other substances containing more than 1% crystalline silica) as an abrasive blasting material and substitute less hazardous materials.
b. Conduct air monitoring to measure worker exposures.
c. Use containment methods such as blast-cleaning machines and cabinets to control the hazard and protect adjacent workers from exposure.
d. Practice good personal hygiene to avoid unnecessary exposure to silica dust.
    1. Wash hands and face before eating.
    2. No eating, drinking or tobacco products in the blasting area.
    3. Shower before leaving work site.
    4. Vehicles parked away from contaminated area.
e. Wear washable or disposable protective clothes at the worksite; shower and change into clean clothes before leaving the worksite to prevent contamination of cars, homes, and other work areas.
f. Use respiratory protection when source controls cannot keep silica exposures below the NIOSH REL.
g. Provide periodic medical examinations for all workers who may be exposed to crystalline silica.
h. Post signs to warn workers about the hazard and to inform them about required protective equipment.
i. Provide workers with training that includes information about health effects, work practices, and protective equipment for crystalline silica.
j. Report all cases of silicosis to the state health department as well as OSHA.

Abrasive Wheels

29 CFR 1926.303 - Abrasive wheels and tools

An abrasive wheel is defined as a cutting tool consisting of abrasive grains held together by organic (resin, rubber, shellac or similar bonding agent) or inorganic bonds. Hazards that present themselves during abrasive wheel operations include physical contact with the rotating wheel; destruction of the wheel itself; inhalation of the bonding particles; being struck by flying fragments. All these hazards can be eliminated through adherence to appropriate machine guarding principles, appropriate PPE, and/or respiratory protection.

Immediately before mounting, wheels must be inspected and sounded (ring test) to ensure they have not been damaged. Ensure the spindle speed does not exceed the maximum operating speed noted on the wheel.

Ring Test: The wheel to be tested must be dry and free from sawdust. Wheels should be tapped gently with a light, nonmetallic implement; such as the handle of a screwdriver, or a wooden mallet for heavier wheels. If they sound cracked (dead), they may not be used. It should be noted that organic bonded wheels do not emit the same clear metallic ring as do vitrified and silicate wheels. Tap the wheels about 45° each side of the vertical centerline and about one or two inches from the periphery. Rotate the wheel about 45° and repeat the test. A sound, undamaged wheel will give a clear metallic tone.

Guarding: Abrasive Blades in Portable Circular Saws:

It is important to distinguish between a saw and an abrasive blade because they have different guarding requirements. An abrasive wheel, as defined by 29 CFR 1910.211(b)(14) and American National Standards Institute (ANSI) B7.1-1970, as "a cutting tool consisting of abrasive grains held together by organic or inorganic bonds."

If a wheel is, for example, constructed with bonded, steel fragments arranged in intermittent clusters around the periphery of a steel disc, the steel fragments are too large and sharp to be considered abrasive grains. If these fragments remove material primarily by severing rather than by abrasion, then this would be considered a saw blade and the guarding requirements would be found in *General Requirements,* located here 29 CFR 1926.300.

If, in fact, cutting is done by the abrasive action of the abrasive grains, guarding requirements are found in *Abrasive Wheels and Tools,* located here 29 CFR 1926.303(b).

ANSI B7.1 requires the upper half of the abrasive blade to be guarded when abrasive wheels are installed on portable power-driven circular saws.

Aerial Lifts & Live-Line Bare-Hand Work

29 CFR 1926.950 - General Requirements

29 CFR 1926.955 - Overhead lines

Before using the live-line bare-hand technique on energized high-voltage conductors or parts, a check will be made of:

a. The voltage rating of the circuit on which the work is to be performed.
b. The clearances from ground to the lines and other energized parts on which work is to be performed.
c. The voltage limitations of the aerial lift equipment to be used.

Only equipment designed, tested, and intended for live-line bare-hand work will be used.

All work will be personally supervised by a person trained and qualified to perform live-line bare-hand work.

The automatic reclosing feature of circuit interrupting devices will be made inoperative where practical before working on any energized line or equipment.

Work will not be performed during the progress of an electrical storm in the immediate vicinity.

A conductive bucket liner or other suitable conductive device will be provided for bonding the insulated aerial device to the energized line or equipment.

a. The employee will be connected to the bucket liner by use of conductive shoes, leg clips, or other suitable means.
b. Where necessary, adequate electrostatic shielding for the voltage being worked on or conductive clothing will be provided.

Only tools and equipment intended for live-line bare-hand work may be used. Tools and equipment must be kept clean and dry.

Before the boom is elevated, the outriggers on the aerial truck will be extended and adjusted to stabilize the truck and the body of the truck will be bonded to an effective ground or barricaded and considered as energized equipment.

Before moving the aerial lift into the work position, all controls (ground level and bucket) will be checked and tested to determine that they are in proper working condition.

Arm current tests must be made before starting work each day, each time during the day when higher voltage is going to be worked on, and when changed conditions indicate a need for additional tests. Aerial buckets used for bare-hand live-line work will be subjected to an arm current test. This test will consist of placing the bucket in contact with an energized source equal to the voltage to be worked upon for a minimum time of three (3) minutes. The leakage current will not exceed 1 microampere per kilo-volt of nominal line-to-line voltage. Work operations will be suspended immediately upon any indication of a malfunction in the equipment.

All aerial lifts to be used for live-line bare-hand work will have dual controls (lower and upper).

The upper controls will be within easy reach of the employee in the basket. If a two-basket type lift is used, access to the controls will be within easy reach from either basket.

The lower set of controls will be located near base of the boom; that will permit over-ride operation of equipment at any time.

Ground level lift control will not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

Before the employee contacts the energized part to be worked on, the conductive bucket liner will be bonded to the energized conductor by means of a positive connection which will remain attached to the energized conductor until the work on the energized circuit is completed.

The minimum clearance distances for live-line bare-hand work will be as specified in the table below. These minimum clearance distances will be maintained from all grounded objects and from lines and equipment at a different potential than that to which the insulated aerial device is bonded unless such grounded objects or other lines and equipment are covered by insulated guards. These distances will be maintained when approaching, leaving, and when bonded to the energized circuit.

When approaching, leaving, or bonding to an energized circuit, the minimum distances in the table below will be maintained between all parts of the insulated boom assembly and any grounded parts (including the lower arm or portions of the truck).

Minimum Clearance Distances for Live Line Bare-Hand Work
(Alternating Current)

Voltage range	*Distance in feet & inches for maximum voltage*	
Kilovolts	*Phase to Ground*	*Phase to Phase*
2.1 to 15	2'0"	2'0"
15.1 to 35	2'4"	2'4"
35.1 to 46	2'6"	2'6"
46.1 to 72.5	3'0"	3'0"
72.6 to 121	3'4"	4'6"
138 to 145	3'6"	5'0"
161 to 16	3'8"	5'6"
230 to 242	5'0"	8'4"
345 to 362	7'0" [1]	13'4" [1]
500 to 552	11'0" [1]	20'0" [1]
700 to 765	15'0" [1]	31'0" [1]

Footnote[1]: **For 345-362 kV, 500-552 kV, and 700-765 kV, the minimum clearance distance may be reduced provided the distances are not made less than the shortest distance between the energized part and the grounded surface.**

When positioning the bucket alongside an energized bushing or insulator string, the minimum line-to-ground clearances of the above table must be maintained between all parts of the bucket and the grounded end of the bushing or insulator string.

a. Hand-lines between buckets, booms, and the ground are prohibited.
b. No conductive materials over 36 inches long will be placed in the bucket; except for appropriate length jumpers, armor rods, and tools.
c. Nonconductive-type hand-lines may be used from line to ground when not supported from the bucket.

The bucket and upper insulated boom will not be overstressed by attempting to lift or support weights in excess of the manufacturer's rating.

a. A minimum clearance table, as shown in the above table, must be printed on a plate of durable nonconductive material; and mounted in the bucket, or its vicinity, so as to be visible to the operator of the boom.
b. Insulated measuring sticks should be used to verify clearance distances.

Aerial Lifts

29 CFR 1926.453 - Aerial lifts

Aerial lifts acquired for use which were manufactured on or after January 22, 1973 will have a placard or label affixed which indicates that the lift is designed and constructed in accordance with ANSI standard A92.2-1969. Aerial lifts acquired for use prior to January 22, 1973 may not be used unless modified to meet this standard. Aerial lifts may be modified to perform other than originally designed tasks provided the modifications are certified by the manufacturer or a nationally recognized testing laboratory that the aerial lift conforms with ANSI standard A92.2-1969 and is as safe as before modifications.

Aerial lifts include the following types of vehicle-mounted aerial devices to elevate personnel to job-sites above the ground:

a. Extensible boom platforms
b. Aerial ladders
c. Articulating boom platforms
d. Vertical towers
e. A combination of any of the above

Only authorized persons may operate an aerial lift.

Lift controls and equipment must be inspected and tested each day, prior to use, to determine that they are in a safe working condition.

When working from an aerial lift, you must stand firmly on the floor of the basket or cage, and **use (wear) an approved fall restraint system**. The fall restraint system must be attached to the boom or basket – it may not be attached to any adjacent pole, structure, or other equipment. You may not sit or climb on the edge of the basket; also **do not** use planks, ladders, or other devices for a work position.

Load limits set by the manufacturer must never be exceeded.

The brakes must be set. When outriggers are used, they will be positioned on pads or a solid surface.

Aerial lifts must not be moved with personnel in the basket unless it is designed for this type of operation. Aerial lifts designed as personnel movers must have controls that are clearly marked as to their use and the lower controls must be able to override the upper controls. Except in an emergency, the lower controls will not be used unless permission has been granted by the persons in the lift.

It is required that the vehicle have a “reverse signal alarm” audible above the surrounding noise level **or** a ground-guide (spotter), using standard hand signals, when backing up. The vehicle will be backed up only when the spotter signals that it is safe to do so. Using a ground-guide provides a substantially higher level of safety than a “reverse signal alarm” because the vehicle can be guided to an exact location with assurance that there is sufficient clearance from objects, and, most importantly, no person is in harm’s way. Special attention will be given to avoiding contact with electrical lines.

Combustible & Flammable Liquid Handling

29 CFR 1926.152 - Flammable and combustible liquids

Only approved containers and portable tanks will be used for storage and handling of flammable and combustible liquids. Approved safety cans or Department of Transportation approved containers will be used for handling and use of flammable liquids in quantities of 5 gallons or less.

Note: The above does not apply to flammable liquid materials which are highly viscid (extremely hard to pour) which may be used and handled in their original shipping containers.

Note: For quantities of one gallon or less, the original container may be used for storage, use and handling.

Flammable or combustible liquids may not be stored in areas used for exits, stairways, or normally used for the safe passage of people.

Inside a facility, no more than 25 gallons of flammable or combustible liquids may be stored in a room outside of an approved storage cabinet.

GASOLINE: General Information

Because most persons use or indirectly handle gasoline on a regular basis – from filling up automobiles to lawn mowers – the hazards presented by this product may have become obscure. Just because you are familiar with gasoline, never lose sight of the lethal hazards that it may contain.

Gasoline is a flammable liquid which means it has a flash point of less than 100ºF. The actual flash point – lowest temperature at which a liquid gives off enough vapor to form a flammable mixture with air – of gasoline is -45ºF. The auto-ignition temperature – the temperature at which, with sufficient oxygen, gasoline will ignite on its own and burn – is 536ºF.

Gasoline has a specific gravity – the weight of the gasoline compared to the weight of an equal volume of water – of 0.73. Further, gasoline has a negligible solubility in water. Basically, what the above means is that if water is used to extinguish a gasoline fire, it will only spread it because the gasoline will float on the water and continue to give off a vapor and form a flammable mixture with air. Gasoline fires must be fought with an extinguisher that is rated for Class B fires such as carbon dioxide, dry chemical, or foam. It should be noted that water spray may be used to cool containers that may be exposed to the heat of the fire to prevent an explosion.

Conditions to Avoid: heat, flame, & sources of ignition

Materials to Avoid: strong oxidizers

Health Hazard Information: routes of entry: inhalation, skin, ingestion

Signs & Symptoms of Overexposure: headache, nausea, drowsiness, breathlessness, fatigue, convulsions, loss of conscience, dermatitis

If there is a spill, notify emergency response personnel, evacuate area, remove ignition sources, and build a dike to contain flow – do not flush to sewer or open water. Pick up with inert absorbent and place in closed container for disposal.

Gasoline is a carcinogen – a cancer causing agent.

General Rules: Post “No Smoking” signs around gasoline storage and ensure that it is enforced. Use only approved plastic or metal containers for portable gasoline carriers. They must not contain more than 5 gallons.

Double check with local ordinances for storage requirements.

Combustible Gas Indicators

The below information is extracted from OSHA Hazard Information Bulletin, dated, January 18, 1990, subject: *The Use of Combination Oxygen and Combustible Gas Detectors*.

In tank removal operations, it is common practice to purge a tank containing flammable vapors with either carbon dioxide or an inert gas, such as nitrogen. When the oxygen content falls to about 10% or below, a false combustible gas indicator reading can occur.

The combination oxygen and combustible gas meter is used to test atmospheres for sufficient oxygen content for life support and/or the presence of combustible gases or vapors posing a potential flammability/ explosion hazard. Common examples of locations where this instrument is used include storage tanks, confined spaces, manholes, tank cars, ships and shipyards, tunneling, pumping stations and hazardous waste sites.

The combustible gas indicator is designed to measure combustible gas or vapor content in air. This instrument is capable of detecting the presence of any gas or vapor which, when combined with oxygen in free air, presents a potential hazard due to flammability/explosion. The combustible gas indicator will not indicate the combustible gas content in atmospheres containing less than 10% oxygen.

Each instrument has its own set of operating procedures and instructions, however:

a. The instrument should not be used where the oxygen concentration exceeds that of fresh air (oxygen enriched atmosphere) when sampling for gases like acetylene and hydrogen.
b. Certain materials such as silicon, silicates (such as in certain hydraulic fluids) and organic lead (such as in leaded gasoline) will poison the combustible gas sensor thereby giving erroneously low readings.
c. Combustible gas readings, either negative or greater than 100% LEL, may indicate an explosive concentration of gas beyond the accurate response range of the combustible gas sensor.
d. Pressurized or low pressure samples will give erroneous oxygen percent readings.
e. Acid gases, such as carbon dioxide, will shorten the service life of the oxygen sensor.
f. The instrument will not indicate the presence of combustible airborne mists or dusts such as lubricating oils, coal dust or grain dust.

The safe and effective performance of any oxygen/combustible gas detector requires that the operator know the correct use of the instrument to detect explosive concentrations of combustibles. It is important that the instrument response be appraised in light of the limitations and guidelines given in the instrument manual. The instrument should be operated only after the instructions, labels, cautions and warnings, and all other literature accompanying the instrument are carefully read and understood.

Company Vehicles

Note: The below applies only to employees who <u>DO NOT</u> operate a commercial motor vehicle (CMV) in interstate or intrastate commerce.

Only authorized employees may operate, in the course of their work, any company-owned motor vehicle.

Texting while driving is prohibited and hands-free mode should be used when possible, or as required by federal, state, & local laws.

Prior to authorization, the employee must possess a valid and current license to operate the vehicle. Christopher Millerick, our Safety Director, or authorized representative, will ensure that the employee has demonstrated his/her ability to operate the motor vehicle in a safe and competent manner.

Under no circumstances may any motor vehicle be operated under the influence of alcohol, illegal drugs, or prescription or over-the-counter drugs medications that may impair their driving skills.

When driving over the road vehicles, employees will ensure that the vehicle registration and proof of insurance is within the vehicle. In the event of an accident, Christopher Millerick will be notified **<u>immediately</u>** after all potential injuries are addressed and a police report is filled out. Employees must report all traffic violations to Christopher Millerick and they (employees) are responsible for paying all penalties imposed by law.

Loads in vans and trucks will be properly secured (strapped or blocked) to prevent any shift or movement and care will be taken to not exceed the vehicles weight limits.

All company motor vehicles will be maintained in safe operating condition and in accordance with the manufacturer's recommended maintenance schedule.

Before use, a walk around inspection will be performed by the operator checking tires (tread depth and pressure), glass (chips and cracks), horn and lights, and general vehicle condition. **<u>No vehicle will be operated that is not in safe mechanical condition.</u>**

It is expected that the below safe vehicle operation/driving procedures will be followed at all times:

a. Seat belts will be worn by all occupants at all times while the vehicle is in motion
b. Safe distance (one vehicle length per 10 MPH) will be maintained
c. Posted speed limits will not be exceeded
d. During fuel stops, all fluids will be checked and the windows, headlights and taillights will be cleaned
e. Constant attention will be maintained by always being aware of road conditions and surrounding vehicles

   Note: Unnecessary distractions will not be permitted such as using hands to dial or receive cell phone calls or changing radio stations while the vehicle is in motion.

f. Before backing up any vehicle, check behind and blow horn for the safety of others.

Compressed Air

29 CFR 1910.101 - Compressed gases (general requirements)

29 CFR 1910.242 - Hand and Portable Powered Tools and Other Hand-Held Equipment

29 CFR 1910.169 - Air Receivers

29 CFR 1926.302 - Tools - Power-operated hand tools

29 CFR 1926.306 - Air Receivers

Prior to using compressed air, employees will receive training in:

a. Safe use of compressed air.
b. Pneumatic power tools.
c. Inspection of compressed gas cylinders

Safe Use of Compressed Air:

The below applies to compressed air receivers, and other equipment used in providing and utilizing compressed air for performing operations such as cleaning, drilling, hoisting, and chipping.

a. Air receivers will be so installed that all drains, handholes, and manholes therein are easily accessible. Under no circumstances will an air receiver be buried underground or located in an inaccessible place.
b. A drain pipe and valve will be installed at the lowest point of every air receiver to provide for the removal of accumulated oil and water. Adequate automatic traps may be installed in addition to drain valves. The drain valve on the air receiver will be opened and the receiver completely drained frequently and at such intervals as to prevent the accumulation of excessive amounts of liquid in the receiver.
c. Every air receiver will be equipped with an indicating pressure gauge (so located as to be readily visible) and with one or more spring-loaded safety valves. The total relieving capacity of such safety valves will be such as to prevent pressure in the receiver from exceeding the maximum allowable working pressure of the receiver by more than 10 percent.
d. No valve of any type will be placed between the air receiver and its safety valve or valves.
e. Safety appliances, such as safety valves, indicating devices and controlling devices, will be constructed, located, and installed so that they cannot be readily rendered inoperative by any means, including the elements.
f. All safety valves will be tested frequently and at regular intervals to determine whether they are in good operating condition.

Compressed Gas Cylinders

29 CFR 1926.350 - Gas Welding and Cutting

29 CFR 1910-253 - Oxygen-Fuel Gas Welding and Cutting

Compressed Gas Cylinders Use:

Compressed gas cylinders are used at many workplaces – the most common being oxygen and acetylene for welding.

Failure to follow basic safety procedures could result in serious injuries such as:

a. Flash burn - due to explosion.
b. Fragment impalement - due to explosion.
c. Compression of the foot - due to mishandling of tanks.
d. Inhalation of hazardous gases - due to leakage.

Basic safety procedures for compressed gas cylinders:

a. Cylinders must remain upright and chained to a substantial support or cart when in use.
b. Wear appropriate personal protective equipment for the job – such as steel toed shoes, apron, goggles, gloves, helmet, etc.
c. Read and understand the SDS for the gas being used and know the location of the SDS in case of an emergency.
d. Have appropriate fire extinguisher readily available
e. To release the gas, open the cylinder valve slowly – standing away from the face and back of the gage – and leave the opening tools in place (on the valve stem) for quick shut-off in the event of an emergency.
f. Ensure cylinder valves, regulators, couplings, and hose are free of oil and grease and ensure all connections are tight.
g. When using oxygen-fuel systems, use flashback arrestors and reverse-flow check valves to prevent flashback.
h. Keep cylinders away from open flames and sources of heat.
i. Cylinders are never allowed in confined spaces.
j. Do not alter or attempt to repair safety devices or valves.
k. Remove the regulators when: a) moving cylinders; b) work is completed; and c) cylinders are empty.
l. Take care to prevent combustible materials from exposure to welding or cutting operations.

All employees who use compressed gas cylinders will be trained in their proper storage, handling, and use.

Specific requirements for compressed gas cylinder use include:

a. Compressed gas cylinders will be clearly marked to identify the gas contained therein. Gas identification must be stamped or stenciled on the gas cylinder or a label affixed. No gas cylinder will be accepted for use that does not legibly identify its content by name.
b. Visual or other inspections will be performed by the competent person on site to ensure the compressed gas cylinders are in a safe condition.

c. Compressed gas cylinders will be inspected to ensure they are equipped with the correct regulator. Before use, regulators and cylinder valves will be inspected to ensure they are free from oil, dirt, and solvents.

d. Compressed gas cylinders will have valve protectors in place when not in use **<u>or</u>** connected for use.

   1. When a cylinder cap cannot be removed by hand, the cylinder will be tagged **"Do Not Use"** and returned to the designated storage area for return to the vendor.

e. The user of the compressed gas cylinders will use **only the tools supplied by the provider** to open and close cylinder valves.

f. Valves will be closed before the cylinder is moved, when the cylinder is empty, and at the completion of each job.

g. Leaking cylinders will be moved to an isolated, well-ventilated area, away from ignitions sources.

   Note: Soapy water will be used to detect the exact location of the leak. If the leak is at the junction of the cylinder valve and cylinder, do not attempt to repair it. The supplier will be contacted and asked for proper response instructions.

h. Gasses may never be mixed in a cylinder. **Only professionals may refill gas cylinders.**

i. Hoses and connections will be inspected regularly for damage. Hoses should be stored in cool areas and protected from damage.

<u>Transportation of Compressed Gas Cylinders</u>

a. Compressed gas cylinders must be transported in a vertical secured position using a cylinder basket or cart.

b. Regulators should be removed, and cylinders capped before movement.

c. Cylinders may never be rolled. Cylinders should not be dropped or permitted to strike violently.

d. Protective caps are not to be used to lift cylinders.

<u>Compressed Gas Cylinders Storage</u>

a. Cylinders must be secured at all times in such a way as to avoid them being knocked over or damaged. They must be stored in a vertical position. They must be segregated based on contents. 20 feet should be maintained between oxidizers and flammables or firewalls erected at least 5 feet high with a fire rating of 30 minutes.

b. Cylinders must be protected from damage, corrosion, sunlight.

c. Cylinders must be stored in well protected, well ventilated, dry locations away from sunlight. Cylinders will never be kept in unventilated enclosures such as lockers or cupboards.

d. Cylinders must be stored away from stairs, elevators, and gangways.

e. Clearly designated and labeled **separate storage area** will be provided for **full and empty** cylinders.

f. Empty cylinders that are no longer needed must be marked as "MT" and dated when empty. Empty cylinders must be handled as carefully as full cylinders.

g. Cylinders will be capped when they are not being used.

Inspection of Compressed Gas Cylinders:

We will determine that compressed gas cylinders under the control of Millerick Engineering, Inc. are in a safe condition to the extent that this can be determined by visual inspection. Visual and other inspections will be conducted as prescribed in the Hazardous Materials Regulations of the Department of Transportation (49 CFR parts 171-179 and 14 CFR part 103).

Where those regulations are not applicable, visual and other inspections will be conducted in accordance with Compressed Gas Association Pamphlets C-6-1968 and C-8-1962, which is incorporated by reference as specified in Sec. 1910.6.

Note: Compressed gas cylinders, portable tanks, and cargo tanks will have pressure relief devices installed and maintained in accordance with Compressed Gas Association Pamphlets S-1.1-1963 and 1965 addenda and S-1.2-1963, which is incorporated by reference as specified in Sec. 1910.6.

Concrete and Masonry Construction

29 CFR 1926.701 - General requirements

29 CFR 1926.702 - Requirements for equipment and tools

29 CFR 1926.703 - Requirements for cast-in-place Concrete

29 CFR 1926.704 - Requirements for precast concrete

29 CFR 1926.705 - Requirements for lift-slab operations

29 CFR 1926.705 App - Lift Slab Operations

29 CFR 1926.706 - Requirements for masonry construction

Concrete and masonry construction, more so than most trades, are highly skilled activities that require numerous specialized abilities including, but not limited to, an understanding of chemistry, building techniques, specialized tools, and a unique language. The definitions below are extracted from OSHA standards; however, they barely scratch the surface. Words and phrases such as: Adiabatic Curing, Hand Float, and Water-Cement Ratio are peculiar to these trades.

Definitions

Listed below are terms, with accompanying OSHA notes, which must be understood when dealing with concrete and masonry construction:

Bull Float means a tool used to spread out and smooth concrete.

Note: Bull float handles that might contact energized electrical conductors must be constructed of nonconductive materials or insulated with a nonconductive sheath.

Formwork means the total system of support for freshly placed or partially cured concrete, including the mold or sheeting (form) that is in contact with the concrete as well as all supporting members including shores, re-shores, hardware, braces, and related hardware.

Note: Formwork must be designed, fabricated, supported, braced and maintained so that it will be capable of supporting without failure all vertical and lateral loads that may reasonably anticipated to be applied to the formwork.

Note: Drawings with all revisions for the jack layout, formwork (including shoring equipment), working decks, and scaffolds must be available at the job site.

Lift Slab means a method of concrete construction in which floor and roof slabs are cast on or at ground level and, using jacks, lifted into position.

Limited Access Zone means an area alongside a masonry wall, which is under construction, and which is clearly demarcated to limit access by employees.

Precast Concrete means concrete members (such as walls, panels, slabs, columns, and beams) which have been formed, cast, and cured prior to final placement in a structure.

Re-shoring means the construction operation in which shoring equipment (also called re-shores or re-shoring equipment) is placed, as the original forms and shores are removed, in order to support partially cured concrete and construction loads.

Note: All Shoring equipment must be inspected prior to erection to determine that the equipment meets the requirements specified in the formwork drawings.

Note: Shoring equipment found to be damaged such that it is not capable of supporting without failure all vertical and lateral loads that may reasonably anticipated to be applied to them must not be used.

Note: Erected shoring equipment will be inspected immediately prior to, during, and immediately after concrete placement.

Note: **Shoring equipment that is found to be damaged or weakened after erection, such that its strength is reduced to the point where it is not capable of supporting without failure all vertical and lateral loads that may reasonably anticipated to be applied to them will be immediately reinforced.**

Note: **The sills for shoring must be sound, rigid, and capable of carrying the maximum intended load.**

Note: **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.**

Note: **Eccentric loads on shore heads and similar members will be prohibited unless these members have been designed for such loading.**

Note: **Whenever single post shores are used one on top of another (tiered), the below will apply:**

a. **The design of the shoring will be prepared by a qualified designer and the erected shoring will be inspected by an engineer qualified in structural design.**
b. **The single post shores will be vertically aligned.**
c. **The single post shores will be spliced to prevent misalignment.**
d. **The single post shores will be an adequately braced in two mutually perpendicular directions at the splice level. Each tier will also be diagonally braced in the same two directions.**

Note: **Adjustment of single post shores to raise form work will not be made after the placement of concrete.**

Note: **Re-shoring will be erected, as the original forms and shores are removed, whenever the concrete is required to support loads in excess of its capacity.**

Shore means a supporting member that resists a compressive force imposed by a load

Tremie means a pipe through which concrete may be deposited under water

Note: **Sections of tremies and similar concrete conveyances must be secured with wire rope (or equivalent materials) in addition to the regular couplings or connections.**

Vertical Slip Forms means forms which are jacked vertically during the placement of concrete

Jacking Operation means the task of lifting a slab (or group of slabs) vertically from one location to another (e.g., from the casting location to a temporary location, or to its final location in the structure), during the construction of a building/ structure where the lift-slab process is being used

<u>Rebar Protection</u>

All protruding reinforcing steel bars which employees could fall onto or into, will be guarded to eliminate the hazard of impalement. Protection from impalement on protruding rebar is primarily a function of fall protection when employees are working above rebar or other impalement hazards.

When working at the same grade as rebar protruding 4 to 6 feet, there is not, for all practical purposes, an impalement hazard. In these instances, acceptable rebar caps are appropriate to prevent cuts, abrasions or other minor injuries.

At grade, the lower the rebar sticks up, the greater the impalement hazard due to tripping. If there is any chance for impalement, acceptable rebar caps are mandatory.

Major Hazards

Both concrete and masonry construction require skilled, trained personnel to produce quality work performed in a safe manner. Serious accidents, including wall collapse, can happen in an instant due to premature removal or actual failure of the formwork. Additionally, failure to brace masonry walls, failure to support precast panels, overloading, etc., can cause serious mishaps.

No construction loads will be placed on a concrete structure unless the competent person 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.

Prior to construction of a masonry wall, a limited access zone will be established as follows:

a. It must be equal to the height of the wall to be constructed plus 4 feet and it must run the entire length of the wall
b. On the side of the wall that will not have scaffolding, the limited access zone must be:
    1. Restricted to entry only by employees actively engaged in constructing the wall
    2. If the wall is 8 feet or less, the limited access zone will be kept in place until the wall is adequately supported to prevent overturning and collapse
    3. If the height of the wall is more than 8 feet and unsupported, the wall must be braced and the bracing must remain in place until permanent supporting elements of the structure are in place

Concrete and masonry work are performed in such a variety of circumstances and conditions – under the ground, over ground, on sides of structures, on top of structures, inside confined spaces, precast and cast in-place concrete, etc. Each circumstance presents specific hazards which must be addressed. The competent person on site will point out unusual, specific hazards and means to deal with them.

Safety Procedures

The competent person will ensure that all equipment is inspected as required and defective equipment is removed from service.

The competent person will ensure the drawings or plans, with revisions, for all equipment and procedures to be used in concrete or masonry construction are available at the job site.

For the safety of all employees, the following safety rules are established:

a. Limited or controlled access zones will be restricted to employees who have actual job responsibilities within the established zones.
b. Employees will not work under concrete buckets while they are being elevated or lowered into position.
c. Employees, except those required for the job, are not allowed under precast concrete members while they are being lifted or tilted into position.
d. Personal protective equipment, determined by the competent person on the job site, will be used without exception. It should be noted that when cement is mixed with water, a highly alkaline solution is produced by the dissolution of calcium, sodium, and potassium hydroxides. Gloves should be worn to protect the skin. Hands should be washed after contact. OSHA requires head and face equipment for employees applying a mixture of cement, sand, and water through a pneumatic hose.

e. Employees will not be allowed to perform maintenance on any equipment where the unexpected activation of that equipment could cause harm without following the procedures in our Control of Hazardous Energy Program.

f. When fastening other materials to a concrete surface (such as a wooden 2” X 4”), only a fastener of 7/32-inch shank diameter or less will be driven in and it may be no closer than 2 inches from the unsupported edge or corner of the work surface.

g. Fasteners will not be driven directly into brick or concrete closer than 3” from the unsupported edge of corner unless a special guard, fixture, or jig is used.

Note: Exception to the above: Low-velocity tools may drive no closer than 2” from an edge in concrete.

h. Concrete mixers with one cubic yard or larger loading skips will be equipped with a:

1. Mechanical device to clear the skip of materials
2. Guardrail installed on each side of the skip

Note: Regardless of the size of the skip, point of operation guarding must be utilized.

Concrete Cutting

Only trained and authorized personnel will operate concrete cutting equipment. The following guidelines will be used during all concrete cutting operations.

a. Follow the manufacturer's recommendations for the safe use of the equipment.
b. Use the correct blade (size, type, speed) for the job, properly tightened. Inspect the blade and all equipment before use.
c. Ensure all safety guards are functioning properly.
d. Never operate a hand held saw above shoulder height.
e. Wear proper safety equipment including eye, hand and skin protection. Depending on the job, respiratory protection or dust masks may be required.
f. Establish a control zone and keep others out who are not directly involved with the work at hand.
g. Ensure there is adequate coolant/water when appropriate.
h. Never operate an internal combustion saw in a confined space.

Concrete Pumps and Placing Booms

OSHA has little to say about concrete pumping systems. Essentially, OSHA says that pumping systems using discharge pipes will be provided with pipe supports designed for 100% overload and compressed air hoses used on concrete pumping systems will be provided with positive fail-safe joint connectors to prevent separation of sections when pressurized.

Concrete pumping systems have the potential for serious mishaps due to the machinery, the weight, the set-up, and the operation. Coordination is required between all persons involved in concrete pumping operations.

One type of mishap is a blowout. Blowouts expose workers to serious injuries such as broken bones, face and eye injuries, internal injuries, and severe cuts and lacerations. Serious injuries like these are preventable by using transition shields and by implementing an inspection procedure to ensure proper installation of the shields.

Only qualified, authorized, employees may operate concrete pumps and place booms. The equipment owner/operator manual must be on site and readily available.

Prior to use, the equipment will be inspected per the manufacturer's instructions and defective equipment will be taken out of service. This includes regularly inspecting pipes and clamps, especially the wall thickness of the pipes; and replace when conditions warrant.

Appropriate PPE must be worn including hard hats, face protection, and steel toed work boots.

Extreme care must be exercised in keeping the boom clear of electrical power lines. Safety distances from various electrical currents are found in *Power Line Safety*, located at 29 CFR 1926.1408.

If maintenance is required, and there is potential stored energy within the system, it will be performed under the provisions of *The Control of Hazardous Energy (Lockout/Tagout)*, located at 29 CFR 1910.147.

Delivery Crane Trucks

Note: The below information is applicable to the following crane types and operations:

a. Articulating/knuckle-boom truck cranes that deliver material to a construction site when used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting.

b. Articulating/knuckle-boom truck cranes that deliver material to a construction site when the crane is used to transfer building supply sheet goods or building supply packaged materials from the truck crane onto a structure, using a fork/cradle at the end of the boom, but only when the truck crane is equipped with a properly functioning automatic overload prevention device. Such sheet goods or packaged materials include but are not limited to: sheets of sheet rock, sheets of plywood, bags of cement, sheets or packages of roofing shingles, and rolls of roofing felt.

Note: The above articulating/knuckle-boom crane exclusion does not apply when it is used to 1) hold, support or stabilize the material to facilitate a construction activity, such as holding material in place while it is attached to the structure; 2) when the material being handled is a prefabricated component such as precast concrete members or panels, roof trusses, prefabricated building sections such as, but not limited to: floor panels, wall panels, roof panels, roof structures, or similar items; and, 3) when the material being handled by the crane is a structural steel member (for example, steel joists, beams, columns, steel decking (bundled or unbundled) or a component of a systems-engineered metal building.

All other crane operations fall under *Subpart CC—Cranes and Derricks in Construction*, located here 29 CFR 1926.1400

Cranes, like all pieces of heavy equipment, if not properly operated, inspected and maintained, have a potential for causing major bodily injury or property damage. Care must be taken in all facets of crane operation.

Not only do cranes require a thorough annual inspection (a record of the dates and results of these inspections must be maintained) they require inspection prior to each use and even during use by a competent person.

All rated load capacities, recommended operating speeds, and special hazard warnings or instructions must be readily visible to the operator of the crane.

While cranes easily have the lifting ability to hoist employees on a personnel platform, this is **absolutely prohibited** except in cases when the erection, use, and dismantling of conventional means of reaching the worksite would be more hazardous or is not possible because of structural design or worksite conditions. A conventional means would include: a personnel hoist, ladder, stairway, aerial lift, and elevating work platform or scaffold.

It is absolutely imperative that the possibility of electrocution be totally eliminated. This can be accomplished by adhering to the safe distances from various currents noted in *The Control of Hazardous Energy (Lockout/Tagout)*, located at 29 CFR 1910.147.

Dangers associated with cranes include numerous moving parts. These dangers can be minimized or eliminated by ensuring that all guards are in place and not tampered with.

Care must be taken to ensure that areas within the swing radius, of the rear of the rotating superstructure of the crane, are barricaded to prevent a person from being struck or crushed.

All employees must keep clear of loads that are about to be lifted as well as suspended loads.

When using slings made from alloy steel chain, wire rope, metal mesh, natural or synthetic fiber rope (conventional three strand construction), and synthetic web (nylon, polyester, and polypropylene), the following safe operating practices will be observed:

a. Slings will not be shortened with knots or bolts or other makeshift devices.
b. Sling legs will not be kinked.
c. Slings used in a basket hitch will have the loads balanced to prevent slippage.
d. Slings will be padded or protected from the sharp edges of their loads.
e. Hands or fingers will not be placed between the sling and its load while the sling is being tightened around the load.

Hand signals used to guide the crane operator will be consistent with the ANSI standard for the type of crane in use and an illustration of the signals must be posted at the job site.

Care must be taken while actually operating the crane in hoisting applications as well as when relocating the crane superstructure.

The competent person on site will ensure that the flooring on which equipment may be placed is substantial enough to safely hold the weight of the load. If the strength of the floor is unknown and/or cannot be determined, a professional engineer will determine the pounds per square foot required and, if necessary, the appropriate shoring to be installed to sustain the weight.

Demolition

29 CFR 1926.850 - Preparatory operations
29 CFR 1926.851 - Stairs, passageways, and ladders
29 CFR 1926.852 - Chutes
29 CFR 1926.853 - Removal of materials through floor openings
29 CFR 1926.854 - Removal of walls, masonry sections, and chimneys
29 CFR 1926.855 - Manual removal of floors
29 CFR 1926.856 - Removal of walls, floors, and material with equipment
29 CFR 1926.857 - Storage
29 CFR 1926.858 - Removal of steel construction
29 CFR 1926.859 - Mechanical demolition
29 CFR 1926.860 - Selective demolition by explosives

General Requirements:

a. Proper Permits will be obtained prior to the commencement of any demolition activities.
b. Demolition Permits are to be readily available on site for review.
c. Protection of adjacent structures, property, and sidewalks is to be accomplished prior to commencement of demolition activities.
d. Proper personal protective equipment is to be worn throughout demolition process including but not limited to hard hats, work boots, glasses, and fall protection.
e. Dust control should be implemented to eliminate hazards where dust presents a health hazard, environmental hazard, damage to property.
f. Any entry point or gate openings are to be closed and secured during all demolition activities.
g. Demolition debris is not to remain on any portion of a roof top or sidewalk bridge structure. These areas are to be cleaned daily.

Preparatory Operations:

a. Prior to permitting employees to start demolition operations, an engineering survey will be made by a competent person, of the structure to determine the condition of the framing, floor, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed will also be similarly checked. Written evidence that such a survey has been performed should be available on the job site.
b. When employees are required to work within a structure to be demolished which has been damaged by fire, flood, explosion or other cause, the walls or floor will be shored or braced.
c. All electric, gas, water, steam, sewer, and other service lines will be shut off, capped, or otherwise controlled, outside the building line before demolition work is started. In each case, any utility company, which is involved, will be notified in advance.
    1. If it is necessary to maintain any power, water or other utilities during demolition, such lines will be temporarily relocated, as necessary, and protected.

2. It will also be determined if any type of hazardous chemicals, gases, explosive, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging will be performed, and the hazard eliminated before demolition is started.

d. Where a hazard exists from fragmentation of glass, such hazards will be removed.

e. Where a hazard exists to employees falling through wall openings, the opening will be protected to a height of approximately 42 inches.

f. When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped will 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. Signs, warning of the hazard of falling materials, will be posted at each level. Removal will not be permitted in this lower area until debris handling ceases above.

g. All floor openings, not used as material drops, will be covered over with material substantial enough to support the weight of any load, which may be imposed. Such material will be properly secured to prevent its accidental movement. ALL COVERS WILL BE MARKED "FLOOR HOLE DO NOT REMOVE COVER."

h. Except for the cutting of holes in floors for chutes, holes through which to drop materials, preparation of storage space, and similar necessary preparatory work, the demolition of exterior walls and floor construction will begin at the top of the structure and proceed downward. Each story of exterior wall and floor construction will be removed and dropped into the storage space before commencing the removal of exterior walls and floors in the story next below.

i. Employee entrances to multi- story structures being demolished will be completely protected by sidewalk sheds or canopies, or both, providing protection from the face of the building for a minimum of 8 feet. All such canopies will be at least 2 feet wider than the building entrances or openings (1 foot wider on each side thereof) and will be capable of sustaining a load of 150 pounds per square foot.

Stairs, Passageways and Ladders:

a. Only those stairways, passageways and ladders, designated as means of access to the structure of a building, will be used. Other access ways will be entirely closed at all times.

b. All stairs, passageways, ladders and incidental equipment thereto, which are covered by this section, will be periodically inspected and maintained in a clean, safe condition.

c. In a multistory building, when a stairwell is being used, it will be properly illuminated by either natural or artificial means, and completely and substantially covered over at a point not less than two floors below the floor on which work is being performed, and access to the floor where the work is in progress will be through a properly lighted, protected and separate passageway

Chutes:

a. No material will be dropped to any point lying outside the exterior walls of the structure.
b. All materials chutes or sections thereof, at an angle of more than 45 degrees from the horizontal, will be entirely enclosed except for the openings equipped with closures at or about floor level for the insertion of materials. The openings will not exceed 48 inches in height measured along the wall of the chute. At all stories below the top floor, such openings will be kept closed when not in use.
c. A substantial gate will be installed in each chute at or near the discharge end. A competent employee will be assigned to control the operation of the gate, and the backing and loading of trucks.
d. When operations are not in progress, the area surrounding the discharge end of a chute will be securely closed off.
e. Any chute opening into which employees dump debris will be protected by a substantial guardrail that is approximately 42 inches above the floor or other surface on which they stand to dump the material. Any space between the chute and the edge of openings in the floors through which it passes will be solidly covered over.
f. Where the material is dumped from mechanical equipment or wheel barrows, a securely attached toeboard or bumper, not less than four inches (4”) thick and six inches (6”) high, will be provided at each chute opening.
g. Chutes will be designed and constructed of such strength as to eliminate failure due to impact of materials or debris loaded therein.
h. Every chute used to convey material from a building will be rigidly supported at its top and braced midway in its height.
i. All chutes constructed of combustible material will be covered on the exterior with corrugate steel sheeting having a minimum thickness of 24 gauge through the entire height. Alternatively, chutes will be constructed of non-combustible material.
j. All structural supports of material chutes will be of noncombustible material.

Removal of Debris through Floor Openings:

Any openings cut in a floor for the disposal of materials will be no larger in size than 25 percent of the aggregate of the total floor area. Floors weakened or otherwise made unsafe by demolition operations will be shored or braced to carry safely the intended imposed load from demolition operations.

Removal of Walls, Masonry Section and Chimneys:

a. Masonry walls, or other sections of masonry, will not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors.
b. No wall section, which is more than one story in height will be permitted to stand alone without lateral bracing, unless such wall was originally designed and constructed to stand without such lateral support, and is in a condition safe enough to be self-supporting. All walls will be left in a stable condition at the end of each shift.

c. Employees will not be permitted to work on the top of a wall when weather conditions constitute a hazard.
d. Structural or load supporting members on any floor will not be cut or removed until all stories above such a floor have been demolished and removed. This provision will not prohibit the cutting of floor beams for the disposal of materials or for the installation of equipment provided the terms addressed under manual removal of floors [Manual removal of floors. - 1926.855] is followed.
e. Floor openings within 10 feet of any wall being demolished will be planked solid, except when employees are kept out of the area below.
f. In building of "skeleton-steel" construction, the steel framing may be left in place during the demolition of masonry. Where this is done, all steel beams, girders, and similar structural supports will be cleared of all loose material as the masonry demolition progresses downward.
g. Walkways or ladders will be provided to enable employees to safely reach or leave any scaffold or wall.
h. Walls, which serve, as retaining walls to support earth or adjoining structures, will not be demolished until such earth has been properly braced or adjoining structures have been properly underpinned.

Manual Removal of Floors:

a. Openings cut in a floor will extend the full span of the arch between supports.
b. Before demolishing any floor arch, debris and other material will be removed from such arch and other adjacent floor area. Planks not less than two inches (2") by ten inches (10") in cross section, full size undressed, will be provided for, and will be used by employees to stand on while breaking down floor arches between beams. Such planks will be so located as to provide a safe support for employees should the arch between the beams collapse. The open space between planks will not exceed sixteen inches (16").
c. Safe walkways, not less than eighteen inches (18") wide, formed of planks not less than two inches (2") thick if wood or of equivalent strength if metal, will be provided and used by employees when necessary to enable them to reach any point without walking upon exposed beams.
d. Stringer of ample strength will be installed to support the flooring planks and the ends of such stringers will be supported by floor beams or girders, and not by floor arches alone.
e. Planks will be laid together over solid bearings with the ends overlapping at least one foot (1').
f. When floor arches are being removed, employees will not be allowed in the area directly underneath, and such an area will be barricaded to prevent access to it.
g. Demolition of floor arches will not be started until they, and the surrounding floor area for a distance of twenty feet (20'), have been cleared of debris and any other unnecessary materials.

Removal of Walls, Floor and Material with Equipment:

a. Mechanical equipment will not be used on floors or working surfaces unless such floors or surfaces are of sufficient strength to support the imposed load.
b. Floor openings will have curbs or stop logs to prevent equipment from running over the edge.

Storage:

a. The storage of waste material and debris on any floor will not exceed the allowable floor loads.
b. In buildings having wooden floor construction, the flooring boards may be removed from not more than one floor above grade to provide storage space for debris, provided falling material is not permitted to endanger the stability of the structure.
c. When wood floor beams serve to brace interior walls or free standing exterior walls, such beams will be left in place until other equivalent support can be installed to replace them.
d. Floor arches, with an elevation of not more than twenty-five feet (25') above grade, may be removed to provide storage area for debris; *provided, that such removal does not endanger the stability of the structure.*
e. Storage space into which material is dumped will be locked off; except for openings necessary for the removal of material. Such openings will be kept closed at all times when material is not being removed.
f. Storage spaces will not interfere with access to any stairway or passageway.

Disposable Respirators

OSHA requires that employees who voluntarily use disposable respirators in situations where respiratory protection is not specifically required by OSHA standard (in atmospheres where exposures are below the permissible exposure limit) essentially for personal comfort or additional, though not required, respiratory protection be informed of 29 CFR 1910.134 Appendix D, printed below.

> **Standard Number: 1910.134 App D**
>
> **Standard Title: (Mandatory) Information for Employees Using Respirators When Not Required Under Standard.**
>
> Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, of if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard. You should do the following: 1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations. 2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you. 3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke. 4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
>
> [63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

All disposable respirators, such as Moldex, 3M, Wilson, North Safety, etc. must be marked with the manufacturer's name, the part number, the protection provided by the filter, and "NIOSH".

Disposable filters are actually negative pressure respirators. They protect the user by filtering particles out of the air breathed.

Though disposable filters cannot be fit-tested in the traditional sense, they must be fit-tested in accordance with the manufacturer's instructions.

Electric & Distribution Lines

29 CFR 1926.950 - General
29 CFR 1926.951 - Medical services and first aid
29 CFR 1926.952 - Job briefing
29 CFR 1926.953 - Enclosed spaces
29 CFR 1926.954 - Personal protective equipment
29 CFR 1926.955 - Portable ladders and platforms
29 CFR 1926.956 - Hand and portable power equipment
29 CFR 1926.957 - Live-line tools
29 CFR 1926.958 - Materials handling and storage
29 CFR 1926.959 - Mechanical equipment
29 CFR 1926.960 - Working on or near exposed energized parts
29 CFR 1926.961 - Deenergizing lines and equipment for employee protection
29 CFR 1926.962 - Grounding for the protection of employees
29 CFR 1926.963 - Testing and test facilities
29 CFR 1926.964 - Overhead lines and live-line barehand work
29 CFR 1926.965 - Underground electrical installations
29 CFR 1926.966 - Substations
29 CFR 1926.967 - Special conditions
29 CFR 1926.968 - Definitions

When erecting new electric and distribution lines, as well as when altering, converting, or improving them, we will follow the guidelines contained in 29 CFR 1926, subpart V, which contains the standards list above. All persons are encouraged to read this standard and resolve any questions regarding safety with Tayla Millerick, our safety program administrator.

The competent person will ensure that all persons are aware of the major hazards that present themselves on any job site. The two most common hazards involve:

a. Electrical shock/electrocution
b. Falls

Below are guidelines to eliminate the above hazards. No person is to perform any task involving electric and distribution lines unless they are absolutely sure of the safety procedures to follow. If in doubt, get clarification from the competent person. All employees are encouraged to review the safety standards that apply to electric & distribution lines.

Electrical Shock/Electrocution

Electrical equipment and lines must be assumed to be energized until proven to be de-energized. Operating voltages of equipment and lines must be determined before working on or near energized parts.

One can avoid the hazards of electricity by:

Determining, prior to starting work, the voltages one will be working with, the condition of equipment, de-energizing the line or equipment, wearing the appropriate PPE, maintaining the prescribed distance, and using the appropriate tools.

No employee is permitted to approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown below unless:

a. The employee is insulated or guarded from the energized part (gloves or gloves with sleeves rated for the voltage involved will be considered insulation of the employee from the energized part), **or**
b. The energized part is insulated or guarded from the employee and any other conductive object at a different potential, **or**
c. The employee is isolated, insulated, or guarded from any other conductive object(s), as during live-line bare-hand work.

Minimum Clearance Distances for Live Line Bare-Hand Work (Alternating Current)	
Voltage range in kilovolts	Minimum working and clear hot stick distance [1]
2.1 to 15	2'0"
15.1 to 35	2'4"
35.1 to 46	2'6"
46.1 to 72.5	3'0"
72.6 to 121	3'4"
138 to 145	3'6"
161 to 16	3'8"
230 to 242	5'0"
345 to 362	7'0" [2]
500 to 552	11'0" [2]
700 to 765	15'0" [2]
Footnote[1]: The minimum clear hot stick distance is that for the use of live-line tools held by linemen when performing live-line work.	
Footnote[2]: For 345-362 kV, 500-552 kV, and 700-765 kV, the minimum clearance distance may be reduced provided the distances are not made less than the shortest distance between the energized part and the grounded surface.	

When de-energizing lines & equipment operated in excess of 600 volts, and the means of disconnecting from electric energy is not visibly open or visibly locked out, a control of hazardous energy program will be implemented which, at the minimum, includes:

a. Clearly identifying and isolating all sources of voltage (hazardous energy).
b. Notification and assurance from the designated employee will be obtained assuring that:
    1. All switches and disconnectors through which electric energy may be supplied to the particular section of line or equipment to be worked have been de-energized.
    2. All switches and disconnectors are plainly tagged indicating that employees are at work and, if design allows, they are rendered inoperable.

3. After all designated switches and disconnectors have been opened, rendered inoperable, and tagged, visual inspection or tests will be conducted to ensure that equipment or lines have been de-energized.
4. Protective grounds will be applied on the disconnected lines or equipment to be worked on.
5. Guards or barriers will be erected as necessary to adjacent energized lines.
6. When more than one independent crew requires the same line or equipment to be de-energized, a prominent tag for each such independent crew will be placed on the line or equipment by the designated employee in charge.
7. Upon completion of work on de-energized lines or equipment, each designated employee in charge will determine that all employees in his crew are clear, that protective grounds installed by his crew have been removed, and he will report to the designated authority that all tags protecting his crew may be removed.

When a crew working on a line or equipment can clearly see that the means of disconnecting from electric energy are visibly open or visibly locked-out, then:

a. Guards or barriers will be erected as necessary to adjacent energized lines.
b. Upon completion of work on de-energized lines or equipment, each designated employee in charge of a crew will determine that all employees in the crew are clear, the protective grounds installed by the crew have been removed, and he/she will report to the designated authority that all tags protecting his crew may be removed.

All live-line tools will be visually inspected before use each day. Prior to use, tools must be wiped clean. Tools with apparent hazardous defects must be tagged and removed from service until tested with portable or laboratory testing equipment.

All rubber insulating equipment will be visually inspected prior to use and an "air test" will be performed on rubber gloves prior to use.

Hard hats for those who have possible exposure to electrical shock or burns must be manufactured in accordance with the provisions of ANSI Z89.2-1971, Industrial Protective Helmets for Electrical Workers, Class B.

Tools, tape, straps, life lines, belts, hoses, and ladders must be non-conductive.

Only live-line tool poles having a manufacturer's certification to withstand the following minimum tests will be used:

a. 100,000 volts per foot of length for 5 minutes when the tool is made of fiberglass
b. 75,000 volts per foot of length for 3 minutes when the tool is made of wood

When working on energized lines with live-line tools, insulating high voltage gloves must be worn (and other insulating protective equipment, as required) during the operation of switching, fusing, or disconnecting devices and energizing or de-energizing oil filled electrical equipment that is being worked on. Proper cross-arm extensions or ropes will be used to hold an energized conductor clear.

When ropes or blocks and ropes are used under strain, they must be securely tied off. When tied off to a vehicle, the vehicle must be chocked with the brakes set.

Portable electric hand tools will be:

a. Equipped with a three-wire cord having the ground wire permanently connected to the tool frame and means for grounding the other end, **or**
b. Of the double insulated type and permanently labeled as "Double Insulated", **or**
c. Connected to the power supply by means of an isolating transformer, or other isolated power supply

Pneumatic tools which are used on or around energized lines or equipment will have an accumulator on the compressor to collect moisture.

Hydraulic tools may have a switch that has a lock-on control, provided that the "on-off" switch may be turned off by a single motion of the finger that turned it on, similar to drills and other equipment.

Chain saws, circular saws, and similar equipment will have switches that turn off when released.

Aerial lift trucks, when working near energized lines or equipment, must be grounded or barricaded and be considered as energized equipment, or the aerial lift truck must be insulated for the work being performed.

Equipment or material will not be passed between a pole or structure and an aerial lift while an employee working from the basket is within reaching distance of energized conductors or equipment that are not covered with insulating protective equipment.

Mechanical equipment, including derrick trucks, cranes, and other lifting equipment, unless certified for work on the proper voltage, must not operate any closer to energized line or equipment as stated in the "Alternating Current - Minimum Distances" chart unless:

a. An insulated barrier is installed between the energized part and the mechanical equipment, or
b. The mechanical equipment is grounded, or
c. The mechanical equipment is insulated, or
d. The mechanical equipment is considered as energized

In all cases, conductors and equipment will be treated as energized until tested, or otherwise determined to be de-energized, or until grounded. Ensure there is no possibility of induce voltages or contact with energized lines.

When attaching grounds, the ground end will be attached first, and the other end will be attached and removed by means of insulated tools or other suitable devices. When removing grounds, the grounding device will first be removed from the line or equipment using insulating tools or other suitable devices. Grounds will be placed between the work location and all sources of energy and as close as practicable to the work location. Grounds may be temporarily removed only when necessary for test purposes and extreme caution will be exercised during the test procedures.

When grounding electrodes are utilized, such electrodes will have a resistance to ground low enough to remove the danger of harm to personnel or permit prompt operation of protective devices.

Grounding to tower will be made with a tower clamp capable of conducting the anticipated fault current.

A ground lead, to be attached to either a tower ground or driven ground, will be capable of conducting the anticipated fault current and will have a minimum conductance of No. 2 AWG copper.

Falls:

Body belts with straps or lanyards used for working on poles, towers or other structures will be inspected daily before use.

Prior to climbing poles, ladders, scaffolds, or other elevated structures, an inspection will be made to determine that the structures are capable of sustaining the additional or unbalanced stresses to which they will be subjected.

Where poles or structures may be unsafe for climbing, they will not be climbed until made safe by guying, bracing, or other adequate means.

Before installing or removing wire or cable, strains to which poles and structures will be subjected will be considered and necessary action taken to prevent failure of supporting structures.

Gaffs on climbers must be kept within safe length limits (1¼”, minimum), properly shaped, and sharp.

Safety straps must be secured to both D-rings on the body belt before weight is placed. Never attach one safety strap to the D-ring and the other to another object for support.

When two or more employees are to work on the same pole, the first must reach a secure position before the second climbs. They must descend the pole one at a time.

29 CFR 1910.332 - Training
29 CFR 1910.333 - Selection and use of work practices
29 CFR 1926.402 - Applicability
29 CFR 1926.403 - General requirements
29 CFR 1926.404 - Wiring design and protection
29 CFR 1926.408 - Special systems
29 CFR 1926.416 - General requirements
29 CFR 1926.449 - Definitions applicable to this subpart
29 CFR 1926.960 - Working on or near exposed energized parts
Appendix B to Subpart V of Part 1926-Working on Exposed Energized Parts
NFPA 70E - Standard for Electrical Safety in the Workplace

No electrical work will be performed on electric distribution circuits or equipment, except by a qualified person or by a person trained to perform electrical work and to maintain electrical equipment under the direct supervision of a qualified person. Disconnecting devices will be locked out and suitably tagged by the persons who perform such work, except that in cases where locking out is not possible, such devices will be opened and suitably tagged by such persons. Locks or tags will be removed only by the persons who installed them or, if such persons are unavailable, by persons authorized by the operator or his agent.

Reference our Personal Protective Equipment Program, as well as 29 CFR 1910.335. Each employee who may need to wear PPE must be properly trained. Retraining will be conducted when the workplace changes make the earlier training obsolete; the type of PPE changes; or when the employee demonstrates lack of use, improper use, or insufficient skill or understanding.

The alerting techniques we will use to warn and protect employees from hazards which could cause injury due to electric shock, burns or failure of electric equipment parts include the use of safety signs and tags, barricades & attendants.

As mentioned in our PPE Program, such protective equipment will be periodically inspected and/or tested.

If the insulating capability of protective equipment may be subject to damage during use, the insulating material will be protected, example: an outer covering of leather used for the protection of rubber insulating material.

Employees will wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts.

Employees will wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.

Each employee will use insulated tools or handling equipment if they might make contact with conductors or parts. If the insulating capability of insulated tools or handling equipment is subject to damage, the insulating material will be protected. Ropes and handlines used near exposed energized parts will be nonconductive. Protective shields, protective barriers, or insulating materials will be used to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts. When normally enclosed live parts are exposed for maintenance or repair, they will be guarded to protect unqualified persons from contact with the live parts.

Only qualified or trained personnel may perform electrical work.

All electrical work will be done according to the latest adopted National Electrical Code as well as established local codes.

Only qualified persons may work on electric circuit parts or equipment that has not been de-energized. These persons must be made familiar with the use of special precautionary techniques, PPE, insulating & shielding materials and insulated tools.

Note: When dealing with safety related work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, a Qualified Person is defined as one who: "is permitted to work on or near exposed energized parts" and who, at a minimum, has been trained in and is familiar with:

a. The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, and

b. The skills and techniques necessary to determine the nominal voltage of exposed live parts, and

c. The clearance distances specified in 29 CFR 1926.960 and the corresponding voltages to which the qualified person will be exposed.

TABLE V-5-ALTERNATIVE MINIMUM APPROACH DISTANCES FOR VOLTAGES OF 72.5 KV AND LESS [1]				
Nominal voltage (kV) phase-to-phase	Distance			
	Phase-to-ground exposure		Phase-to-phase exposure	
	m	ft	m	ft
0.50 0.300 [2]	Avoid contact		Avoid contact	
0.301 to 0.750 [2]	0.33	1.09	0.33	1.09
0.751 to 5.0	0.63	2.07	0.63	2.07
5.1 to 15.0	0.65	2.14	0.68	2.24
15.1 to 36.0	0.77	2.53	0.89	2.92
36.1 to 46.0	0.84	2.76	0.98	3.22
46.1 to 72.5	1.00	3.29	1.20	3.94

Note: The minimum approach distance may be the shortest distance between the energized part and the grounded surface.

Note 1 Employers may use the minimum approach distances in this table provided the worksite is at an elevation of 900 meters (3,000 feet) or less. If employees will be working at elevations greater than 900 meters (3,000 feet) above mean sea level, the employer will determine minimum approach distances by multiplying the distances in this table by the correction factor in Table V-4 (next page) corresponding to the altitude of the work.

Note 2 For single-phase systems, use voltage-to-ground.

TABLE V-6-ALTERNATIVE MINIMUM APPROACH DISTANCES FOR VOLTAGES OF MORE THAN 72.5 KV [1, 2, 3]				
Voltage range phase to phase (kV)	Phase-to-ground exposure		Phase-to-ground exposure	
	m	ft	m	ft
72.6 to 121.0	1.13	3.71	1.42	4.66
121.1 to 145.0	1.30	4.27	1.64	5.38
145.1 to 169.0	1.46	4.79	1.94	6.36
169.1 to 242.0	2.01	6.59	3.08	10.10
242.1 to 362.0	3.41	11.19	5.52	18.11
362.1 to 420.0	4.25	13.94	6.81	22.34
420.1 to 550.0	5.07	16.63	8.24	27.03
550.1 to 800.0	6.88	22.57	11.38	37.34

Note 1 Employers may use the minimum approach distances in this table provided the worksite is at an elevation of 900 meters (3,000 feet) or less. If employees will be working at elevations greater than 900 meters (3,000 feet) above mean sea level, the employer will determine minimum approach distances by multiplying the distances in this table by the correction factor in Table V-4 (next page) corresponding to the altitude of the work.

Note 2 Employers may use the phase-to-phase minimum approach distances in this table provided that no insulated tool spans the gap and no large conductive object is in the gap.

Note 3 The clear live-line tool distance will equal or exceed the values for the indicated voltage ranges.

TABLE V-7-DC LIVE-LINE MINIMUM APPROACH DISTANCE (IN METERS) WITH OVERVOLTAGE FACTOR [1]					
Maximum anticipated per-unit transient overvoltage	distance (m) maximum line-to-ground voltage (kV)				
	250	400	500	600	750
1.5 or less	1.12	1.60	2.06	2.62	3.61
1.6	1.17	1.69	2.24	2.86	3.98
1.7	1.23	1.82	2.42	3.12	4.37
1.8	1.28	1.95	2.62	3.39	4.79

Note [1] The distances specified in this table are for air, bare-hand, and live-line tool conditions. If employees will be working at elevations greater than 900 meters (3,000 feet) above mean sea level, the employer will determine minimum approach distances by multiplying the distances in this table by the correction factor in Table V-4 (below) corresponding to the altitude of the work.

TABLE V-4-ALTITUDE CORRECTION FACTOR	
Altitude above sea level (m)	*A*
0 to 900	1.00
901 to 1,200	1.02
1,201 to 1,500	1.05
1,501 to 1,800	1.08
1,801 to 2,100	1.11
2,101 to 2,400	1.14
2,401 to 2,700	1.17
2,701 to 3,000	1.20
3,001 to 3,600	1.25
3,601 to 4,200	1.30
4,201 to 4,800	1.35
4,801 to 5,400	1.39
5,401 to 6,000	1.44

Note: No later than April 1, 2015, for voltages over 72.5 kV, the employer will determine the maximum anticipated per-unit transient overvoltage, phase-to-ground, through an engineering analysis or assume a maximum anticipated per-unit transient overvoltage, phase-to-ground, in accordance with Table V-8. When the employer uses portable protective gaps to control the maximum transient overvoltage, the value of the maximum anticipated per-unit transient overvoltage, phase-to-ground, must provide for five standard deviations between the statistical sparkover voltage of the gap and the statistical withstand voltage corresponding to the electrical component of the minimum approach distance. The employer will make any engineering analysis conducted to determine maximum anticipated per unit transient overvoltage available upon request to employees and to the Assistant Secretary or designee for examination and copying.

TABLE V-8-ASSUMED MAXIMUM PER-UNIT TRANSIENT OVERVOLTAGE		
Voltage range (kV)	Type of current (ac or dc)	Assumed maximum per-unit transient overvoltage
72.6 to 420.0	ac	3.5
420.1 to 550.0	ac	3.0
550.1 to 800.	ac	2.5
250 to 750	dc	1.8

Note: No later than April 1, 2015 all approach distances will be computed using information, tables, formulas, assumptions, notes found in Working on or near exposed energized parts. - 1926.960 and Appendix B to Subpart V of Part 1926-Working on Exposed Energized Parts. Appendix B contains information on how to calculate the maximum anticipated per-unit transient overvoltage, phase-to-ground, when the employer uses portable protective gaps to reduce maximum transient over voltages.

We will ensure that no employee approaches or takes any conductive object closer to exposed energized parts than our established minimum approach distance, unless:

a. The employee is insulated from the energized part (rubber insulating gloves or rubber insulating gloves and sleeves worn as described in Type of Insulation, below, constitutes insulation of the employee from the energized part upon which the employee is working provided that the employee has control of the part in a manner sufficient to prevent exposure to uninsulated portions of the employee's body), or
b. The energized part is insulated from the employee and from any other conductive object at a different potential, or
c. The employee is insulated from any other exposed conductive object in accordance with the requirements for live-line barehand work.

<u>Electrical Safety Measures</u>

a. Daily, prior to use, all electrical equipment – including extension cords – will be inspected and defective items will be tagged out of service and not used.
b. With the exception of double insulated tools (with UL approval), all electrical tools and equipment will be grounded.
c. Tools will not be hoisted by their flexible electrical cords.
d. Except in an emergency, load rated switches and circuit breakers will be used for the opening and closing of circuits under load conditions as opposed to fuses and splice connections.
e. While working on electrical equipment, unauthorized persons will be kept clear by barriers or other means of guarding.
f. Temporary wiring and extension cords will be kept off of walking working surfaces and vehicle traffic areas or covered to prevent tripping and vehicle damage.
    1. Electrical cords will not be suspended with staples, hung from nails, or suspended by wire.
    2. Worn or frayed electric cords or cables will not be used.
g. Hands will be dry when working on electrical equipment including plugging in extension cords.
h. Areas in which electrical work is to be done must be adequately illuminated and temporary lighting must:
    1. Have guards in place.
    2. Not be suspended by its cords unless specifically designed for such installation.
i. A competent person, before work commences, will inform all employees in the work area of both exposed and concealed electrical hazards. If appropriate, warning tags will be used to prevent accidental contact with electrical energy.

j. When working around any electrical power circuit, employees will:
   1. Protect themselves by de-energizing the circuit and grounding it or by establishing insulation between themselves and the current.
   2. Ensure that any conductive materials and equipment that are in contact with any part of their body will be handled in a manner that will preclude contact with exposed energized conductors or circuit parts.
   3. Use portable ladders that have non-conductive siderails.
   4. Remove or insulate conductive articles of jewelry and clothing that might contact exposed energized parts.

k. All 15, 20, or 30-amp receptacle outlets that are not part of the permanent wiring of the building or structure and that are used by personnel will have ground-fault circuit interrupter protection for personnel. GFCI pigtails may be used to meet this requirement if properly sized. Remember, extension cords are considered temporary wiring.
   1. Ground fault circuit interrupters will be tested before use.

l. Only qualified persons may perform testing work on electric circuits or equipment.

m. Sufficient access and working space must be maintained about all electric equipment to permit ready and safe operation and maintenance. This space must be kept clear, i.e., it cannot be used for storage.

n. If any work is to take place under overhead lines, the lines must be de-energized and grounded or other protective measures taken such as physically preventing approach such as using a barrier.

o. Portable ladders must have non-conductive side rails.

p. Conductive items of jewelry or clothing must not be worn around electricity unless rendered non-conductive by covering, wrapping, or other insulating means.

q. The dimension of the working space in the direction of access to live parts likely to required examination, adjustment, service, or maintenance must not be less that noted below:

Working Clearances

Minimum clear distance for the below conditions [1]			
Nominal voltage to ground	Feet(a)	Feet(b)	Feet(c)
0-150	3	3	3
151-600	3	3 1/2	4

Footnote[1] **Conditions (a), (b), and (c) are as follows:**

(a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating material. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts.

(b) Exposed live parts on one side and grounded parts on the other side.

(c) Exposed live parts on both sides of the workplace [not guarded as provided in Condition (a) with the operator between.

Minimum Depth of Clear Working Space in Front of Electric Equipment			
Nominal voltage to ground	Feet(a)	Feet(b)	Feet(c)
601 to 2,500	3	4	5
2,501 to 9,000	4	5	6
9,001 to 25,000	5	6	9
25,001 to 75 kV	6	8	10
Above 75 kV	8	10	12

Footnote[1] **Conditions (a), (b), and (c) are as follows:**

(a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating material. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts.

(b) Exposed live parts on one side and grounded parts on the other side.

(c) Exposed live parts on both sides of the workplace [not guarded as provided in Condition (a) with the operator between.

The importance of working clearances cannot be overstated. At any time, when working with live electrical systems, there is the possibility of an arcing fault causing an arc flash where the current explosively flows through ionized air at 35,000 °F causing incurable burns, hearing loss, collapsed lungs, or even death from the electricity of flying metal shrapnel.

As an electrical contractor working in a facility where the possibility of arc flash exists, check to see if an arc flash assessment has been performed on electrical equipment on which you will be working. If it has, follow that specific guidance. If it has not, perform (or have a qualified vendor perform) the arc flash assessment. Refer to NFPA 70E (NFPA 70E is a National Consensus Standard which is incorporated by reference within the OSHA standards) for specific guidance appropriate to the facility's specific electrical equipment.

Electrical Shock/Electrocution

When working near or on de-energized parts, they will be considered energized **unless** they are locked out or tagged out in accordance with 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*.

Electrical equipment and lines must be assumed to be energized until proven to be de-energized. Operating voltages of equipment and lines must be determined before working on or near energized parts.

One can avoid the hazards of electricity by:

Determining, prior to starting work, the voltages one will be working with, the condition of equipment, de-energizing the line or equipment, wearing the appropriate PPE, maintaining the prescribed distance, and using the appropriate tools.

No employee is permitted to approach or take any conductive object without an approved insulating handle closer to exposed energized parts than shown below unless:

a. The employee is insulated or guarded from the energized part (gloves or gloves with sleeves rated for the voltage involved will be considered insulation of the employee from the energized part), **or**
b. The energized part is insulated or guarded from the employee and any other conductive object at a different potential, **or**
c. The employee is isolated, insulated, or guarded from any other conductive object(s), as during live-line bare-hand work.

When de-energizing lines and equipment operated in excess of 600 volts, and the means of disconnecting from electric energy is not visibly open or visibly locked out, a control of hazardous energy program will be implemented which, at the minimum, includes:

a. Clearly identifying and isolating all sources of voltage (hazardous energy).
b. Notification and assurance from the designated employee will be obtained assuring that:
    1. All switches and disconnectors through which electric energy may be supplied to the particular section of line or equipment to be worked have been de-energized.
    2. All switches and disconnectors are plainly tagged indicating that employees are at work and, if design allows, they are rendered inoperable.
    3. After all designated switches and disconnectors have been opened, rendered inoperable, and tagged, visual inspection or tests will be conducted to insure that equipment or lines have been de-energized.
    4. Protective grounds will be applied on the disconnected lines or equipment to be worked on.
    5. Guards or barriers will be erected as necessary to adjacent energized lines.
    6. When more than one independent crew requires the same line or equipment to be de-energized, a prominent tag for each such independent crew will be placed on the line or equipment by the designated employee in charge.
    7. Upon completion of work on de-energized lines or equipment, each designated employee in charge will determine that all employees in his crew are clear, that protective grounds installed by his crew have been removed, and he will report to the designated authority that all tags protecting his crew may be removed.

When a crew working on a line or equipment can clearly see that the means of disconnecting from electric energy are visibly open or visibly locked-out, then:

a. Guards or barriers will be erected as necessary to adjacent energized lines.
b. Upon completion of work on de-energized lines or equipment, each designated employee in charge of a crew will determine that all employees in the crew are clear, the protective grounds installed by the crew have been removed, and he/she will report to the designated authority that all tags protecting his crew may be removed.

All live-line tools will be visually inspected before use each day. Prior to use, tools must be wiped clean. Tools with apparent hazardous defects must be tagged and removed from service until tested with portable or laboratory testing equipment.

All rubber insulating equipment will be visually inspected prior to use and an “air test” will be performed on rubber gloves prior to use.

Hard hats for those who have possible exposure to electrical shock or burns must be manufactured in accordance with the provisions of ANSI Z89.2-1971, Industrial Protective Helmets for Electrical Workers, Class B.

Tools, tape, straps, life lines, belts, hoses, and ladders must be non-conductive.

Only live-line tool poles having a manufacturer's certification to withstand the following minimum tests will be used:

a. 100,000 volts per foot of length for 5 minutes when the tool is made of fiberglass
b. 75,000 volts per foot of length for 3 minutes when the tool is made of wood

When working on energized lines with live-line tools, insulating high voltage gloves must be worn (and other insulating protective equipment, as required) during the operation of switching, fusing, or disconnecting devices and energizing or de-energizing oil filled electrical equipment that is being worked on. Proper cross-arm extensions or ropes will be used to hold an energized conductor clear.

When ropes or blocks and ropes are used under strain, they must be securely tied off. When tied off to a vehicle, the vehicle must be chocked with the brakes set.

Portable electric hand tools will be:

a. Equipped with a three-wire cord having the ground wire permanently connected to the tool frame and means for grounding the other end, **or**
b. Of the double insulated type and permanently labeled as "Double Insulated", **or**
c. Connected to the power supply by means of an isolating transformer, or other isolated power supply

Pneumatic tools which are used on or around energized lines or equipment will have an accumulator on the compressor to collect moisture.

Hydraulic tools may have a switch that has a lock-on control, provided that the “on-off” switch may be turned off by a single motion of the finger that turned it on, similar to drills and other equipment.

Chain saws, circular saws, and similar equipment will have switches that turn off when released.

Aerial lift trucks, when working near energized lines or equipment, must be grounded or barricaded and be considered as energized equipment, or the aerial lift truck must be insulated for the work being performed

Equipment or material will not be passed between a pole or structure and an aerial lift while an employee working from the basket is within reaching distance of energized conductors or equipment that are not covered with insulating protective equipment.

In all cases, conductors and equipment will be treated as energized until tested, or otherwise determined to be de-energized, or until grounded. Ensure there is no possibility of induce voltages or contact with energized lines.

When attaching grounds, the ground end will be attached first, and the other end will be attached and removed by means of insulated tools or other suitable devices. When removing grounds, the grounding device will first be removed from the line or equipment using insulating tools or other suitable devices. Grounds will be placed between the work location and all sources of energy and as close as practicable to the work location. Grounds may be temporarily removed only when necessary for test purposes and extreme caution will be exercised during the test procedures.

When grounding electrodes are utilized, such electrodes will have a resistance to ground low enough to remove the danger of harm to personnel or permit prompt operation of protective devices.

Grounding to tower will be made with a tower clamp capable of conducting the anticipated fault current.

A ground lead, to be attached to either a tower ground or driven ground, will be capable of conducting the anticipated fault current and will have a minimum conductance of No. 2 AWG copper.

Confined and Enclosed Spaces

When working in confined and/or enclosed spaces containing exposed energized parts, adequate illumination will be provided to ensure that work may be performed safely.

When working in confined and/or enclosed spaces containing exposed energized parts, employees will be protected from inadvertent contact with these parts with company provided protective shields, barriers, or other insulating materials.

Training:

All employees who face electrical hazards that are not reduced to a safe level by the applicable electrical installation requirements will be trained in safety-related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with their respective job assignments. Employees will be trained to identify and understand the relationship between electrical hazards and possible injury.

Training will be in a classroom and/or on-the-job and the degree of training will be determined by the risk to the employee. Training will include applicable requirements of 1910.331 through 1910.335 that pertain to their respective job assignments.

Employees will receive training in emergency procedures including methods of release from contact with exposed energized electrical conductors or circuit parts; methods of first aid; and CPR if the duties warrant such training. Christopher Millerick, our Safety Director, will certify that employees have been trained in approved methods of resuscitation annually.

Training for Qualified Persons:

See **NFPA 70E**

Note: A qualified person has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.

a. Qualified persons must be trained and knowledgeable of the construction and operation of equipment or a specific work method and to recognize and avoid the electrical hazards with respect to the equipment or work methods.

1. Qualified persons will be familiar with the proper use of special precautionary techniques, PPE, including arc-flash, insulating and shielding materials, and insulated tools and test equipment.

   Note: A person can be qualified with respect to certain equipment and methods but still be unqualified for others.

2. Qualified persons will be permitted to work within the Limited Approach Boundary of exposed energized electrical conductors and circuit parts operating at 50 volts or more and will be trained in the following:

   I The skills and techniques necessary to distinguish exposed energized electrical conductors and circuits parts from other parts of electrical equipment

   II The skills and techniques necessary to determine the nominal voltage of exposed energized electrical conductors and circuit parts.

   III The approach distances specified in Table 130.2(c) and the corresponding voltages to which the qualified person will be exposed.

   IV The decision-making process necessary to determine the degree and extent of the hazard and the PPE and job planning necessary to perform the task safely.

3. If undergoing OJT and, in the course of the OJT has demonstrated an ability to perform duties safely under the direct supervision of a qualified person, this person will be considered qualified for the performance of these duties.
4. Tasks performed less often that once per year will require retraining before performance of the work practices involved.
5. Qualified persons will be trained to select an appropriate voltage detector and demonstrate how to use a device to verify the absence of voltage, including interpreting indications provided by the device. They will be trained to understand all limitations of each specific voltage detector that may be used.

Training for Unqualified Persons:

Unqualified persons will be trained in and be familiar with any of the electrical safety related practices that are necessary for their safety.

Note: Unqualified persons will not be permitted to enter spaces that are required to be accessible to qualified employees only unless the electric conductors and equipment involved are in an electrically safe work condition.

Retraining:

Retraining will be given when.

a. Supervisors or annual inspections indicate that the employee is not complying with the safety-related work practices.
b. New technology, new types of equipment, of changes in procedures necessitate the use of safety-related work practices that are different than those the employee would normally use.
c. If the employee must employ safety-related work practices that are not normally used during regular job duties.

Training Documentation:

The company will document that each employee has received the training above **after** the employee demonstrates proficiency in the work practices involved and will be maintained for the duration of the employee's employment. Training documentation will contain the employee's name and dates of training.

Elevated Work Platforms and Aerial Devices

Only trained and authorized employees may operate elevated work platforms and aerial devices.

Training:

Employees who use elevated work platforms and aerial devices will be instructed by a qualified person in the safe use of the elevated work platforms and aerial devices in accordance with the manufacturer's operating instructions.

Additionally, for employees who erect, disassemble, move, operate, use, repair, maintain, or inspect elevating work platforms and aerial devices, training will include, but not be limited to the following:

a. The provisions of elevated work platforms and aerial devices section.
b. The correct procedures for performing their assigned duties.
c. The nature of hazards associated with the equipment, including electrical hazards, fall hazards and falling object hazards in the work area and correct procedures for dealing with those hazards.
d. The safe operation and use of elevating work platforms and the proper handling of materials on the work platform.
e. The maximum load capacity of the work platform based upon installed configuration.

Note: Aerial lifts may be "field modified" for uses other than those intended by the manufacturer provided the modification has been certified in writing by the manufacturer or by any other equivalent entity, such as a nationally recognized testing laboratory, to be in conformity with all applicable provisions of ANSI A92.2-1969 and this section and to be at least as safe as the equipment was before modification.

Elevated Work Platforms:

Elevating work platforms include such items as vertical towers, scissor lifts, and mast-climbing work platforms and are used to position employees and materials.

General safety requirements:

a. The platform deck will be equipped with a guardrail or other structure around its upper periphery. Where the guardrail is less than 39 in. high, a personal fall protection system is required.
b. The platform will have toeboards at sides and ends.
c. No employee will ride, nor tools, materials, or equipment be allowed on a traveling elevated platform.
d. Units will not be loaded in excess of the design working load.

Aerial Devices:

Aerial devices, such as cherry pickers and boom trucks, may be vehicle-mounted or self-propelled and are used to position employees.

General Safety Requirements:

a. Only authorized persons may operate aerial devices
b. Aerial devices must not rest on any structure
c. Controls must be tested before use
d. Workers must stand only on the floor of the basket. No planks, ladders, or other means are allowed to gain greater heights.

e. A fall protection system must be worn and attached to the boom or basket.
f. Brakes must be set when employees are elevated.
g. An aerial lift truck must not be moved when an employee is on the elevated boom platform except when:
    1. The equipment is specifically designed for this type of operation.
    2. All controls and signaling devices are tested and are in good operating condition.
    3. An effective communication system will be maintained at all times between the basket or platform operator and where applicable, the vehicle operator.
    4. 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.
    5. The speed of the vehicle does not exceed three (3) miles per hour.
    6. Only one employee is in the basket.
    7. Both the driver and/or the elevated employee have been specifically trained for this type of work (towering) in accordance with the manufacturer's recommendations.

The following information must be displayed on the aerial device:

a. Manufacturer’s name, model, and serial number.
b. Rated capacity at the maximum platform height and maximum platform travel height.
c. Operating instructions.
d. Cautions and restrictions.

Aerial devices must be designed to applicable American National Standards Institute (ANSI) standards.

<u>Additional Aerial Device Operating Procedures:</u>

a. Aerial baskets or platforms will not be supported by adjacent structure(s) when workers are on the platform or in the basket while in an elevated position.
b. Lift controls will be tested in accordance with the manufacturer’s recommendations or instructions prior to use to determine that such controls are in safe working condition.
c. Only authorized persons will operate an aerial device.
d. Belting off to an adjacent pole, structure, or equipment while working from an aerial device will not be permitted.
e. Employees will not sit or climb on the edge of the basket or use planks, ladders or other devices to gain greater working height.
f. Boom and basket and platform load limits specified by the manufacturer will not be exceeded.
g. When elevating personnel with the vehicle stationary, the braking systems will be set.
h. Provided wheel chocks can be installed safely, they will be used before operating an aerial device on an incline.

i. When used, outriggers will be positioned on pads or a solid surface. All outriggers will be equipped with hydraulic holding valves or mechanical locks at the outriggers.
j. Climbers will not be worn while performing work from an aerial device.
k. When an insulated aerial device is required, the aerial device will not be altered in any manner that might reduce its insulating value.
    1. An aerial device truck will 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:
    2. The equipment is specifically designed for this type of operation.
    3. All controls and signaling devices are tested and are in good operating condition.
    4. An effective communication system will be maintained at all times between the basket or platform operator and where applicable, the vehicle operator.
    5. 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.
    6. The speed of the vehicle does not exceed three (3) miles per hour.
    7. Only one employee is in the basket.
    8. Both the driver and/or the elevated employee have been specifically trained for this type of work (towering) in accordance with the manufacturer's recommendations.
l. Lower level controls will not be operated unless permission has been obtained from the employee in the device, except in case of emergency.
m. Before moving an aerial device for travel, the boom(s) will be inspected to see that it is properly cradled and outriggers are in stowed position.
n. An employee, while in an elevated aerial device, will be secured to the boom, basket or tub of the aerial device through the use of a safety belt, body belt or body harness equipped with safety strap or lanyard.
    1. 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.
    2. Safety belts/body belts used as part of a positioning device system will be rigged such that an employee cannot free fall more than 2 feet.
    3. 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 will 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 will limit free fall to a maximum of 6 feet.

Additional Elevated Work Platform Procedures:

a. No employee will ride, nor tools, materials, or equipment be allowed on a traveling elevated platform unless the following conditions are met:
    1. The travel speed at Maximum Travel Height does not exceed 3 feet per second.
    2. Self-propelled units will be equipped with electrical or other interlock means which will prevent driving them with the platform height greater than the Maximum Travel Height or at speeds greater than permitted at Maximum Travel Height.
    3. The surface upon which the unit is being operated is level with no hazardous irregularities or accumulation of debris which might cause a moving platform to overturn.

b. Units will be assembled, used, and disassembled in accordance with the manufacturer's instructions.

c. Units will be inspected for damaged and defective parts before use.

d. Units will not be loaded in excess of the design working load and will be taken out of service when damaged or weakened from any cause. They will not be used until repairs are completed.

e. Employees will 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.

f. Employees will 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).

g. Employees climbing or descending vertical ladders will have both hands free for climbing.

    Note: Employees should remove foreign substances, such as mud or grease from their shoes.

h. Where moving vehicles are present, the work area will be marked with warnings such as flags, roped off areas or other effective means of traffic control will be provided.

i. Unstable objects such as barrels, boxes, loose brick, tools, debris, will not be allowed to accumulate on the work level.

j. In operations involving production of small debris, chips, etc., and the use of small tools and materials, and where persons are required to work or pass under the equipment, screens will be required between toeboards and guardrails. The screen will extend along the entire opening and will consist of No. 18 gage U.S. Standard Wire 1/2-inch mesh, or equivalent.

k. Mast-climbing work platforms will not be used as construction personnel hoists or material hoists.

l. Each unit will have a manual containing instructions for maintenance and operations. If a unit is able to be operated in different configurations, then these will be clearly described, including the rated capacity in each configuration.
    1. The required manual(s) will be maintained in a weather resistant storage location on the elevating work platform or aerial device.

Excavating, Trenching, & Shoring

29 CFR 1926.650 - Scope, Application, and Definitions
29 CFR 1926.651 - Specific Excavation Requirements
29 CFR 1926.652 - Requirements for Protective Systems
Soil Classification - 1926 Subpart P App A
Sloping and Benching - 1926 Subpart P App B
Timber Shoring for Trenches - 1926 Subpart P App C
Aluminum Hydraulic Shoring for Trenches - 1926 Subpart P App D
Alternatives to Timber Shoring - 1926 Subpart P App E
Selection of Protective Systems - 1926 Subpart P App F

Overview

Excavating involves any earth removal which creates a cut, cavity, trench, or depression in the earth's surface. A trench is a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Prior to excavating, obstructions that may create a hazard to employees will be removed or supported and utility companies will be contacted, advised of the proposed work, and asked to establish the location of underground installations.

If the utility company cannot respond to this request within 24 hours and/or the exact location of the underground installations cannot be determined, actual work may begin provided that:

a. Extreme caution is observed.
b. Detection equipment or other acceptable means are used to locate the approximate location of the utility installation.
c. As the approximate location is approached, the exact location will be determined by safe and acceptable means before proceeding.

In open excavations, underground installations will be protected, supported or removed as necessary to protect employees.

To ensure employee safety, the competent person will ensure that during excavating work in trenches there is:

a. Appropriate access and egress for personnel and/or equipment; such as stairs, ramps and ladders, so as to require no more than 25 feet of lateral travel for employees in trenches four (4) feet or more deep.
b. Employee protection for head injury. All employees must wear hard hats.
c. No spoil pile or equipment within two (2) feet of the edge of the excavation.
d. Employee protection from vehicular traffic such as barricades, ground guides for operators of equipment with a limited view, away sloping grades, etc.
e. No exposure to falling loads.
f. No danger to employees from water accumulation.

g. No danger from cave-in. Shoring, a structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation, will prevent cave-ins.
    1. Shoring is not required for trenches less than five (5) feet deep if an examination by a competent person determines the soil has no potential for a cave-in. In this situation, vertical sides are allowed.
    2. Once a trench is over 20 feet deep, protective systems, which may include shoring, must be designed by a registered professional engineer.
    3. There are other methods of protection from cave-ins such as sloping or benching the adjacent ground according to specific criteria dependent on the soil conditions, weather, and adjacent structures.
    4. The total number of cave-in accidents is relatively small, however, the accidents which do occur are generally very serious and are much more likely to be fatal than other types of accidents in the construction industry.

h. A method to prevent mobile equipment from falling into the excavation such as barricades. Ground guides will be used if the equipment operator does not have a clear view of the edge. If possible, the grade should slope away from the excavation.

If the atmosphere is dangerous or likely to be dangerous, testing will be done as often as needed and emergency rescue equipment – such as breathing apparatus, safety harness and line, or a basket stretcher – must be available.

When a hazardous atmosphere does exist, appropriate respiratory protection will be used and a rescue plan developed which includes having an attendant outside the hazardous area with appropriate equipment and training.

Protective Systems

Except when an excavation is made entirely in stable rock, or it is less than 5 feet in depth and a competent person finds no indication of potential cave-in, employees in an excavation will be protected from cave-in by protective systems designed in accordance with paragraphs (b) or (c) of *Requirements for Protective Systems*, found here 29 CFR 1926.652.

All employees involved with excavating are to review these standards and understand, in general terms:

a. The extensive degree of basic data, design, and knowledge that goes into employee protection during excavating projects.
b. The types of soils and how to identify them on the job site.
c. The soil condition – specifically moisture content – and how that impacts on stability during excavations.
d. The absolute need for a competent person to be on site at all times during excavating work to, visually and manually, test soil conditions as work progresses and to maintain a safe site.

Daily Inspections

Prior to work and as needed throughout the shift, a competent person will conduct daily inspections of excavations, adjacent areas and protective systems to find evidence of a developing cave-in situation, failure of protective systems, hazardous atmosphere, or other hazardous conditions.

After every rainstorm or event which would affect the safety of employees within an excavation, an inspection will be made by a competent person.

Fall Protection

Walkways must be provided where employees or equipment are required or permitted to cross over excavations. If these walkways are 6 feet or more above a lower level, guardrails must be used. Specific criteria for guardrails is found in *Fall Protection Systems Criteria and Practices*, located at 29 CFR 1926.502(b).

Definitions

Accepted Engineering Practices means those requirements which are compatible with standards of practice required by a registered professional engineer.

Aluminum Hydraulic Shoring means a pre-engineered shoring system comprised of aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (wales). Such system is designed specifically to support the sidewalls of an excavation and prevent cave-ins.

Bell-bottom Pier Hole means a type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

Benching (Benching System) means a method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent Person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Cross Braces mean the horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Faces or **Sides** means the vertical or inclined earth surfaces formed as a result of excavation work.

Failure means the breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

Hazardous Atmosphere means an atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Kickout means the accidental release or failure of a cross brace.

Protective System means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Ramp means an inclined walking or working surface that is used to gain access to one point from another and is constructed from earth or from structural materials such as steel or wood.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

Sheeting means the members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shield (Shield System) means a structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either premanufactured or job-built in accordance with 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

Shoring (Shoring System) means a structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Sides see "Faces."

Sloping (Sloping System) means a method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Stable Rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Structural Ramp means a ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

Support System means a structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Tabulated Data means tables and charts approved by a registered professional engineer and used to design and construct a protective system.

Trench (Trench Excavation) means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Trench Box see "Shield.

Trench Shield see "Shield."

Uprights means the vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

Wales means horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

Specific Excavation Requirements

Surface Encumbrances

All surface encumbrances that create a hazard to employees must be removed or supported, as necessary, to safeguard employees

Underground Installations

The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, must be determined prior to opening an excavation.

Utility companies or owners will be contacted within established or customary local response times, advised of the proposed work, and asked to establish the location of the utility underground installations prior to the start of actual excavation.

If the utility company cannot respond to this request within 24 hours and/or the exact location of the underground installations cannot be determined, actual work may begin provided that:

a. Extreme caution is observed.
b. Detection equipment or other acceptable means are used to locate the approximate location of the utility installation.
c. As the approximate location is approached, the exact location will be determined by safe and acceptable means before proceeding.

In addition to calling the specific utility company, the competent person will call: **“811”** which is a One Call before you dig information service.

The below universal color indicates what utility is buried below ground:

Red – Electric

Orange – Communications, Telephone/CATV

Blue – Potable Water

Green – Sewer/Drainage

Yellow – Gas/Petroleum Pipe Line

Purple – Reclaimed Water

White – Premark site of intended excavation

Caution must be exercised because:

a. Many underground utilities are not recorded.
b. Many that are recorded are not accurate.
c. Many are at different depths below ground than indicated.

Utilities must be physically identified to ensure they are not hit.

Once utilities are found, use signage incorporating the universal color codes, above.

Note: After we put in an underground item, we must report it, so the next contractor does not hit it.

Additionally, while the excavation is open, we must protect, support, or remove if necessary, any underground installations that will present a hazard to our employees.

Access and Egress

<u>Structural Ramps</u>

Structural ramps that are used solely by employees as a means of access or egress from excavations must be designed by a competent person. If structural ramps are used for access or egress of equipment, they must be designed by a competent person who is qualified in structural design, and they must be constructed in accordance with their design.

The follow are design and construction requirements:

a. All the structural members of ramps and runways must be fastened together to prevent displacement.
b. Structural members used for ramps and runways must be uniform in thickness to prevent a tripping hazard.
c. Cleats or other means used to connect runway structural members must be attached to the bottom of the runway or in a manner that prevents tripping.
d. Structural ramps used in place of steps must be provided with cleats or other surface treatments on the top surface to prevent slipping.

<u>Means of Egress from Trench Excavations</u>

A stairway, ladder, ramp or other safe means of egress must be in trench excavations that are 4 feet or more in depth. The means of egress must be place at least every 25 feet of lateral travel for employees.

Exposure to Vehicular Traffic

Employees exposed to public vehicular traffic will be provided with, and must wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

Exposure to Falling Loads

Employees are not permitted underneath loads handled by lifting or digging equipment and they are 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, in accordance with 29 CFR 1926.601(b)(6), to provide adequate protection for the operator during loading and unloading operations.

While in an excavation, employees must wear hard hats to them protection from head injuries.

Warning Systems for Mobile Equipment

A warning system must be used when mobile equipment is operated adjacent to an excavation, or when equipment is required to approach the edge of an excavation and the operator does not have a clear or direct view of the edge of the excavation. Warning systems may include barricades, hand or mechanical signals, or stop logs.

If possible, the surrounding area of the excavation should be graded with the slope going away from the edge of the excavation.

Hazardous Atmospheres

Testing and Controls

In addition to the requirements of 29 CFR 1926 Subparts D & E used to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements also apply:

a. Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation will be tested before employees enter excavations greater than 4 feet in depth.
b. Adequate precautions must be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation in accordance with 29 CFR 1926 Subparts D & E.
c. Adequate precautions must be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas more than 20 percent of the lower flammable limit of the gas.
d. When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing must be conducted as often as necessary to ensure that the atmosphere remains safe.

Emergency Rescue Equipment

Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, must be readily available when hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment must be attended when in use.

Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, must wear a harness with a life-line securely attached to it. The lifeline must be separate from any line used to handle materials, and be individually attended all times the employee wearing the lifeline is in the excavation.

Protection from Water Accumulation

Employees will not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

If water is controlled or prevented from accumulating using water removal equipment, the water removal equipment and operations must 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 adjacent to the excavation. Additionally, excavations subject to runoff from heavy rains require an inspection by a competent person before being entered.

Stability of Adjacent Structures

When the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning will be provided to ensure the stability of those structures.

Excavating below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees is not permitted except under the following conditions:

a. A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or
b. The excavation is in stable rock; or
c. A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation that there is no risk; or
d. A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

Additionally, any sidewalks, pavements, and appurtenant structure must not be undermined unless a support system or another method of protection is provided.

Protection from Loose Rock or Soil

Adequate protection will be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection will consist of scaling to remove loose material; installation of 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 by placing and keeping such materials or equipment at least 2 feet from the edge of excavations or using retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both when necessary.

Inspections

Daily inspections of excavations, the adjacent areas, and protective systems will be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection will be conducted by the competent person prior to the start of work and as needed throughout the shift.

Inspections must also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees must be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

Walkways

Walkways will be provided if employees or equipment are required or permitted to cross over an excavation. Guardrails that comply with 29 CFR 1926.502(b) will be provided if the walkways are 6 feet or more above the excavation.

Requirements for Protective Systems

Protection of Employees in Excavations

Each employee in an excavation will be protected from cave-ins by an adequate protective system designed as described on the following pages covering sloping & benching systems and support & shielding systems, except when:

a. Excavations are made entirely in stable rock; or
b. Excavations are less than 5 feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

Protective systems must 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.

Design of Sloping and Benching Systems

If Millerick Engineering, Inc. uses sloping and benching systems, the design and configuration will be selected and constructed in accordance with 1 of the following 4 options:

Option 1 - Allowable Configurations & Slopes

Using option 1, excavations must be sloped at 34 degrees or less, which is equal to 1 ½ horizontal to 1 vertical, unless the employer uses one of the other options listed below. Slopes must be excavated to form configurations that are in accordance with the slopes for Type C soil in 29 CFR 1926 Subpart P Appendix B.

Option 2 - Allowable Slopes & Configurations from Appendices A & B.

With option 2, the maximum allowable slopes, and allowable configurations for sloping and benching systems, must be determined in accordance with the conditions and requirements set forth in 29 CFR 1926 Subpart P Appendices A and B.

Option 3 - Designs using Tabulated Data.

For option 3, the designs of sloping or benching systems must be selected from and be in accordance with tables and charts approved by a registered professional engineer. This tabulated data must be in written form and include all the following:

a. Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;
b. Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;
c. Explanatory information as may be necessary to aid in making a correct selection of a protective system from the data.

We will maintain at least one copy of the tabulated data that identifies the registered professional engineer who approved the data at the jobsite during construction of the protective system. After that time, the data can be stored off the jobsite, but a copy must be made available upon request.

Option 4 - Design by a Registered Professional Engineer

Sloping and benching systems not utilizing Option 1, Option 2, or Option 3 must be approved by a registered professional engineer and designs must be in written form and include at least the following:

a. The magnitude of the slopes that were determined to be safe for the project;
b. The configurations that were determined to be safe for the project; and
c. The identity of the registered professional engineer approving the design.

We will maintain at least one copy of the design at the jobsite while the sloping and/or benching system is being constructed. After that time, the design does not need to be kept at the jobsite, but a copy must be made available upon request.

Design of Support, Shield, & Other Protective Systems

If Millerick Engineering, Inc. uses support, shield, and other protective systems, they will be selected and constructed in accordance with the following requirements:

Option 1 - Designs using Appendices A, C & D

With option 1, designs for timber shoring in trenches must be determined in accordance with the conditions and requirements of 29 CFR 1926 Subpart P Appendices A & C. Option 1 designs for aluminum hydraulic shoring will be in accordance with option 2 below and use manufacture's tabulated data. If manufacturer's tabulated data cannot be utilized, designs must be made in accordance with 29 CFR 1926 Subpart P Appendix D.

Option 2 - Designs using Manufacturer's Tabulated Data.

For option 2, design of support, shield, or other protective systems that are drawn from manufacturer's tabulated data must be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

Deviation from the specifications, recommendations, & limitations issued or made by the manufacturer will only be allowed if the manufacturer issues specific written approval.

Manufacturer's specifications, recommendations, and limitations, & manufacturer's approval to deviate from the specifications, recommendations, & limitations must 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 upon request.

Option 3 - Designs using Other Tabulated Data

Using option 3, designs of support, shield, or other protective systems will be selected from and be in accordance with tables and charts approved by a registered professional engineer. This tabulated data must be in written form and include all the following:

a. Identification of the parameters that affect the selection of a protective system drawn from such data;
b. Identification of the limits of use of the data;

Explanatory information as may be necessary to aid in making a correct selection of a protective system from the data.

We will maintain at least one copy of the tabulated data that identifies the registered professional engineer who approved the data at the jobsite during construction of the protective system. After that time, the data can be stored off the jobsite, but a copy must be made available upon request.

Option 4 - Design by a Registered Professional Engineer

Support, shield, and other protective systems not utilizing Option 1, Option 2 or Option 3, above, must be approved by a registered professional engineer and the designs must be in written form and include the following:

a. A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and
b. The identity of the registered professional engineer approving the design.

We will maintain at least one copy of the design at the jobsite while the protective system is being constructed. After that time, the design does not need to be kept at the jobsite, but a copy must be made available upon request.

Materials and Equipment

Materials and equipment used for protective systems must 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 in a manner that is consistent with the recommendations of the manufacturer, and in a way that will prevent employee exposure to hazards.

When material or equipment that is used for protective systems is damaged, a competent person must examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then it will be removed from service. It must be evaluated and approved by a registered professional engineer before being returned to service.

Installation and Removal of Support Systems

Members of support systems must be securely fastened together to prevent sliding, falling, kick-outs, or other predictable failures.

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. Additionally, installation of a support system must be closely coordinated with the excavation of trenches.

Individual members of support systems cannot be subjected to loads exceeding those which they were designed to withstand.

Before temporary removal of individual members begins, additional precautions must be taken to ensure the safety of employees. This might include installing other structural members to carry the loads imposed on the support system.

Removal must begin at the bottom of the excavation and progress toward the top. Members must be released slowly to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation. We will be sure to backfill the excavation as supports are removed.

The excavation below the bottom of the members of a support system is permitted to a depth of 2 feet or less and only if the system is designed to resist the forces calculated for the full depth of the trench. There must be no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

Sloping and Benching Systems

Employees are not permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

Shield Systems

The following are requirements of shield systems.

a. They will not be subjected to loads exceeding those which the system was designed to withstand.
b. They must be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.
c. Employees must be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.
d. Employees are not allowed in shields when shields are being installed, removed, or moved vertically.

Additionally, when shield systems are used in trench excavations, excavating is permitted to a depth of 2 feet or less below the bottom of a shield and only if the shield is designed to resist the forces calculated for the full depth of the trench. There can be no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

Soil Classification

General

The following information describes methods for classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. It contains definitions, requirements, and acceptable visual & manual tests for classifying soils.

Definitions

The definitions and examples given below are based on, in whole or in part, the following:

a. American Society for Testing Materials (ASTM) Standards D653-85 and D2488;
b. The Unified Soils Classification System;
c. The U.S. Department of Agriculture (USDA) Textural Classification Scheme; and
d. The National Bureau of Standards Report BSS-121.

Cemented soil means a soil in which the particles are held together by a chemical agent, such as calcium carbonate, such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

Cohesive soil means clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical side slopes, and is plastic when moist. Cohesive soil is hard to break up when dry and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

Dry soil means soil that does not exhibit visible signs of moisture content.

Fissured means a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Granular soil means gravel, sand, or silt (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

Layered system means two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

Moist soil means a condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Plastic means a property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

Saturated soil means a soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or sheer vane.

Soil classification system means, for the purpose of this subpart, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the characteristics of the deposits and the environmental conditions of exposure.

Stable rock means natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

Submerged soil means soil which is underwater or is free seeping.

Type A means cohesive soils with an unconfined, compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, no soil is Type A if:

a. The soil is fissured; or
b. The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or
c. The soil has been previously disturbed; or
d. The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or
e. The material is subject to other factors that would require it to be classified as a less stable material.

Type B means:

a. Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or
b. Granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.
c. Previously disturbed soils except those which would otherwise be classed as Type C soil.

d. Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or
e. Dry rock that is not stable; or
f. Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C means:

a. Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or
b. Granular soils including gravel, sand, and loamy sand; or
c. Submerged soil or soil from which water is freely seeping; or
d. Submerged rock that is not stable, or
e. Material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

Unconfined compressive strength means the load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

Wet soil means soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

Requirements

<u>Classification of Soil & Rock Deposits</u>

Any time there is an excavation that employees must enter, each soil and rock deposit must be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the preceding definitions.

The classification of the deposits must be made based on the results of at least one visual and at least one manual analysis. A competent person will conduct this analysis by using tests described below, or another recognized method of soil classification and testing such as those adopted by the American Society for Testing Materials or the U.S. Department of Agriculture textural classification system.

Acceptable visual and manual analyses must be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to properly identify the properties, factors, and conditions affecting the classification of the soil and rock deposits.

Layered Soil Systems

With layered soils and rock deposits, the classification must be based on the weakest layer. However, each layer may be classified individually when a more stable layer is under a less stable layer.

Reclassification

If, after classifying soil, the properties, factors, or conditions affecting its classification change in any way, the changes will be evaluated by a competent person. The soil must be reclassified as necessary to reflect the changed circumstances.

Acceptable Visual Tests

Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material. The following observations must be made:

a. Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.
b. Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.
c. Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.
d. Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.
e. Observed the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.
f. Observe the area adjacent to the excavation and the sides of the opened excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.
g. Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

Acceptable Manual Tests

Manual analysis of soil samples must be conducted to determine quantitative as well as qualitative properties of soil and to provide more information to properly classify soil.

Plasticity Test

Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two-inch length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.

Dry Strength Test

If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt).

If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt.

If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered un-fissured.

Thumb Penetration Test

The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. This test is based on the thumb penetration test described in ASTM Standard D2488 - "Standard Recommended Practice for Description of Soils (Visual - Manual Procedure).

For example, Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be penetrated by the thumb only with very great effort.

Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb and can be molded by light finger pressure.

This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

Other Strength Tests

Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shearvane.

Drying Test

The basic purpose of the drying test is to differentiate between cohesive material with fissures, un-fissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately one inch thick and six inches in diameter until it is thoroughly dry. The following explains how to interrupt the results:

a. If the sample develops cracks as it dries, significant fissures are indicated.
b. Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as an un-fissured cohesive material and the unconfined compressive strength should be determined.
c. If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

Sloping and Benching

General

The following contains specifications for sloping and benching when used as methods of protecting employees working in excavations from cave-ins. These requirements apply when the design of sloping and benching protective systems is to be performed using Option 2 described in 29 CFR 1926.652(b)(2).

Definitions

Actual slope means the slope to which an excavation face is excavated.

Distress means that the soil is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phenomena as the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slumping of material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the face of an excavation; and raveling, i.e., small amounts of material such as pebbles or little clumps of material suddenly separating from the face of an excavation and trickling or rolling down into the excavation.

Maximum allowable slope means the steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

Short term exposure means a period of time less than or equal to 24 hours that an excavation is open.

Requirements

Soil Classification Soil and rock deposits must be classified in accordance with the preceding information from Appendix A of 29 CFR 1926 Subpart P as stable rock.

Maximum Allowable Slope

The maximum allowable slope for a soil or rock deposit are determined using Table B-1 - Maximum Allowable Slopes from Appendix B from 29 CFR 1926 Subpart P:

Table B-1 - Maximum Allowable Slopes	
Soil or Rock Type	Maximum Allowable Slope (H:V)(1) for Excavations Less than 20 feet deep (3)
Stable Rock	Vertical (90º)
Type A (2)	3/4:1 (53º)
Type B	1:1 (45º)
Type C	1 ½:1 (34º)
Footnote 1:	**Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.**
Footnote 2:	**A short-term maximum allowable slope of 1/2H:1V (63º) is allowed in excavations in Type A soil that are 12 feet (3.67 m) or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet (3.67 m) in depth will be 3/4H:1V (53º).**
Footnote 3:	**Sloping or benching for excavations greater than 20 feet deep will be designed by a registered professional engineer.**

Actual Slope

The actual slope must not be steeper than the maximum allowable slope, except when there are signs of distress. Then actual slope must be less steep than the maximum allowable slope. If that situation occurs, the slope will be cut back to an actual slope that is at least ½ horizontal to 1 vertical (½H:1V) less steep than the maximum allowable slope.

If surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person will determine the degree to which the actual slope must be reduced below the maximum allowable slope and will assure that such reduction is achieved. Surcharge loads from adjacent structures must be evaluated in accordance with 29 CFR 1926.651(i).

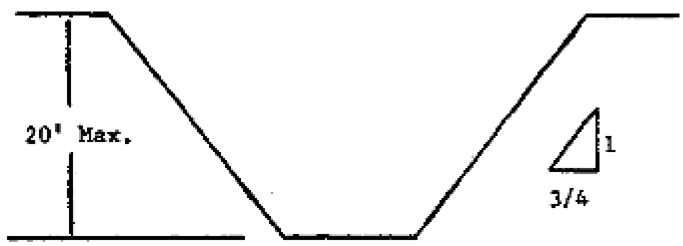
Configurations

Configurations of sloping and benching systems must be as follows.

Note: All slopes stated below are in the horizontal to vertical ratio.

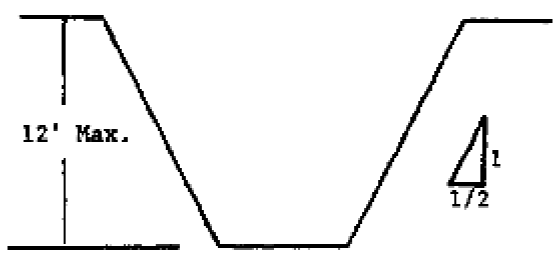
Excavations Made in Type A Soil:

All simple slope excavation 20 feet or less in depth will have a maximum allowable slope of ¾:1:



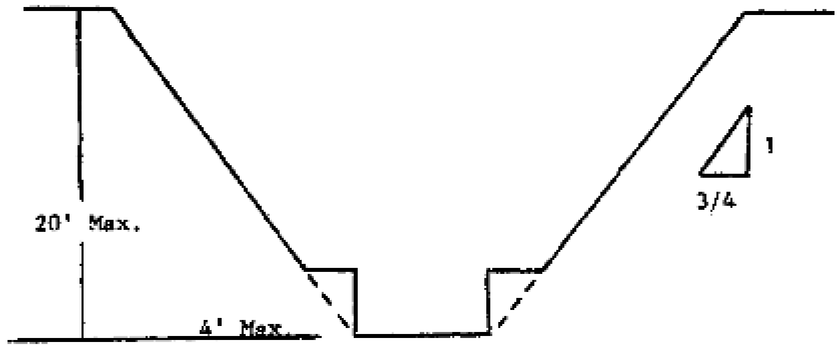
SIMPLE SLOPE -- GENERAL

Simple slope excavations which are open 24 hours or less (short term) and which are 12 feet or less in depth will have a maximum allowable slope of ½:1:

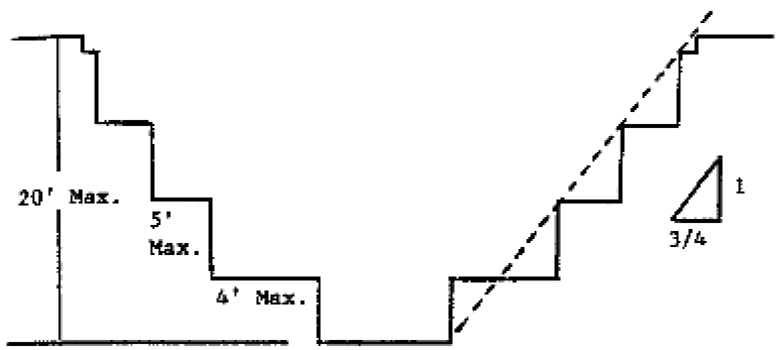


SIMPLE SLOPE -- SHORT TERM

All benched excavations 20 feet or less in depth will have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions as follows:

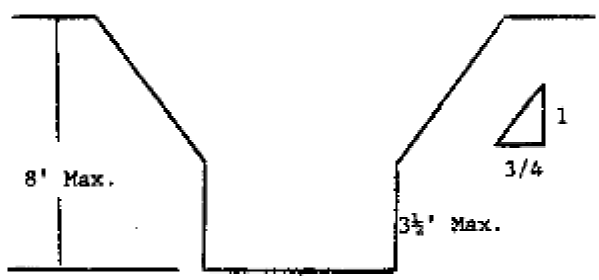


SIMPLE BENCH



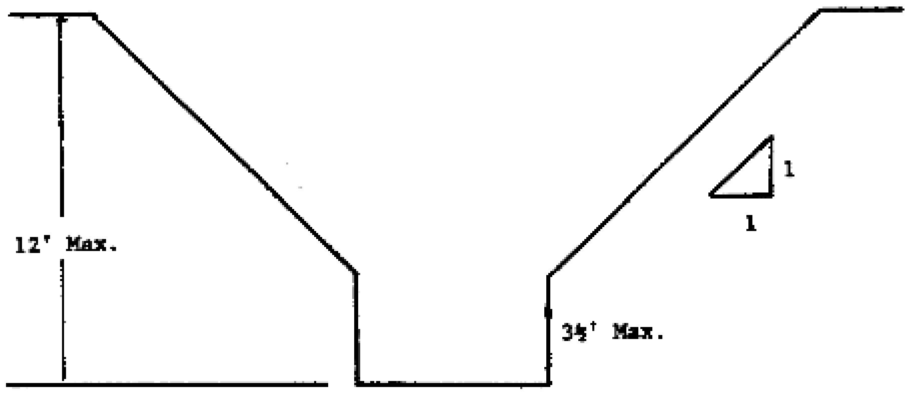
MULTIPLE BENCH

All excavations 8 feet or less in depth which have unsupported vertically sided lower portions will have a maximum vertical side of 3½ feet:



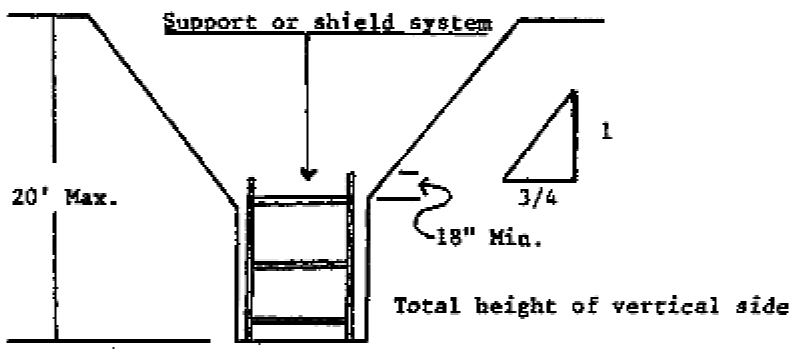
UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 8 FEET IN DEPTH

All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions will have a maximum allowable slope of 1:1 and a maximum vertical side of 3½ feet:



UNSUPPORTED VERTICALLY SIDED LOWER PORTION -- MAXIMUM 12 FEET IN DEPTH

All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded will have a maximum allowable slope of ¾:1. The support or shield system must extend at least 18 inches above the top of the vertical side:

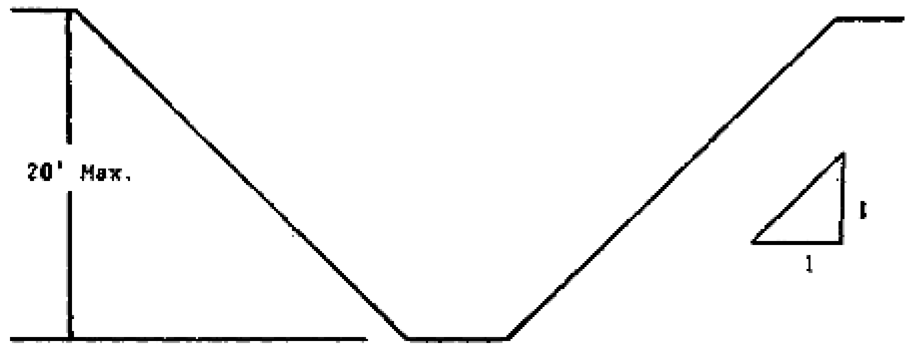


SUPPORTED OR SHIELDED VERTICALLY SIDED LOWER PORTION

All other simple slope, compound slope, and vertically sided lower portion excavations must be in accordance with the other options permitted under 29 CFR 1926.652(b).

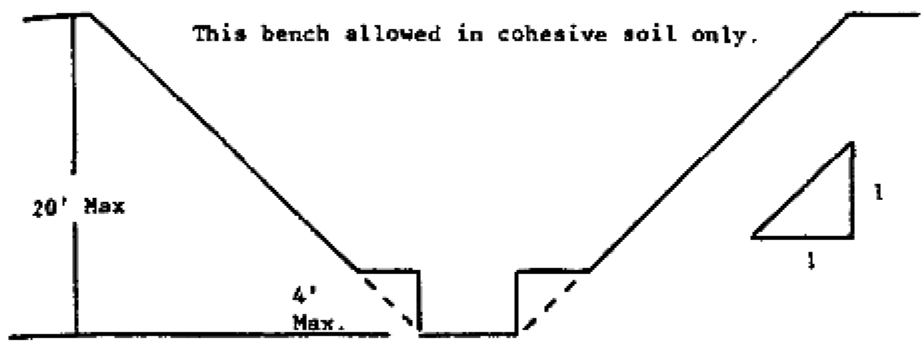
Excavations Made in Type B Soil

All simple slope excavations 20 feet or less in depth will have a maximum allowable slope of 1:1:

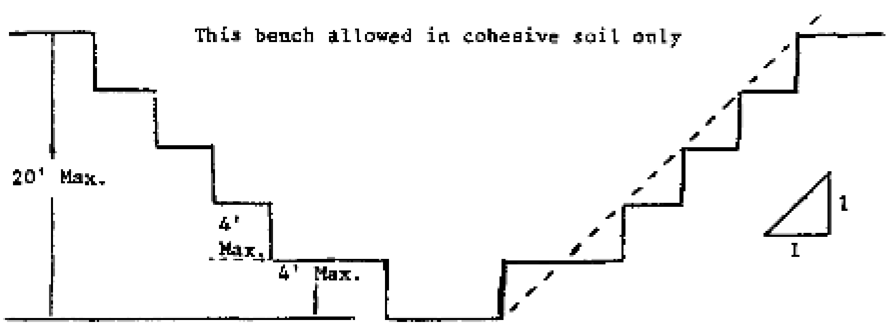


SIMPLE SLOPE

All benched excavations 20 feet or less in depth will have a maximum allowable slope of 1:1 and maximum bench dimensions as follows:

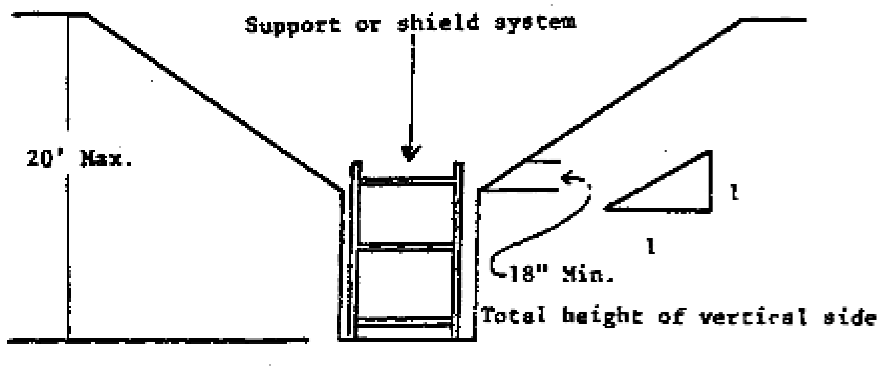


SINGLE BENCH



MULTIPLE BENCH

All excavations 20 feet or less in depth which have vertically sided lower portions will be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations will have a maximum allowable slope of 1:1.

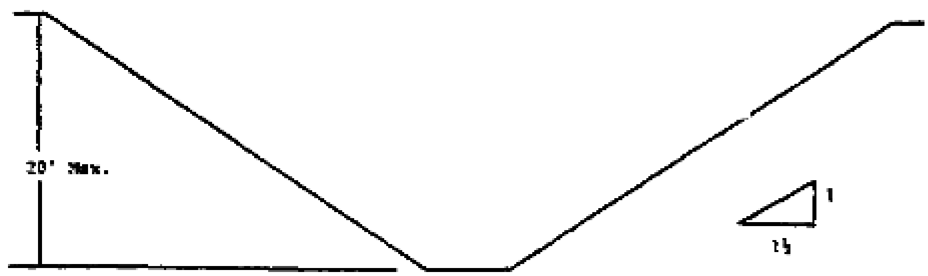


VERTICALLY SIDED LOWER PORTION

All other sloped excavations will be in accordance with the other options permitted in 29 CFR 1926.652(b).

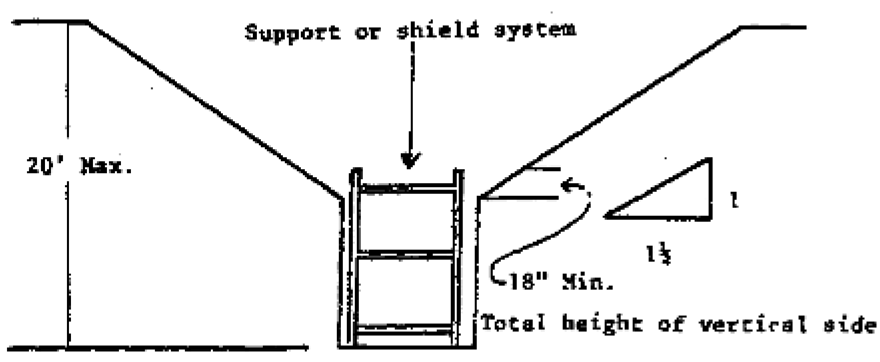
Excavations Made in Type C Soil

All simple slope excavations 20 feet or less in depth will have a maximum allowable slope of 1½:1:



SIMPLE SLOPE

All excavations 20 feet or less in depth which have vertically sided lower portions will be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations will have a maximum allowable slope of 1½:1.

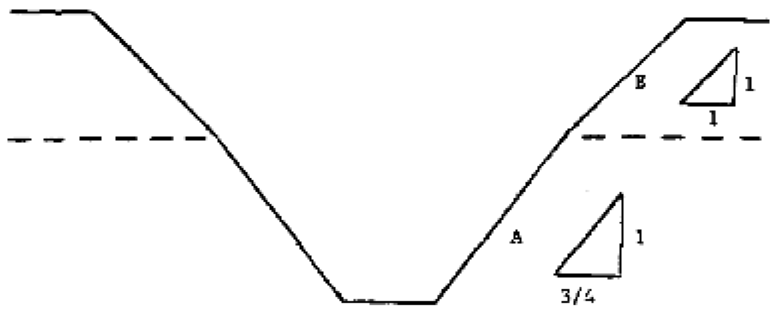


VERTICAL SIDED LOWER PORTION

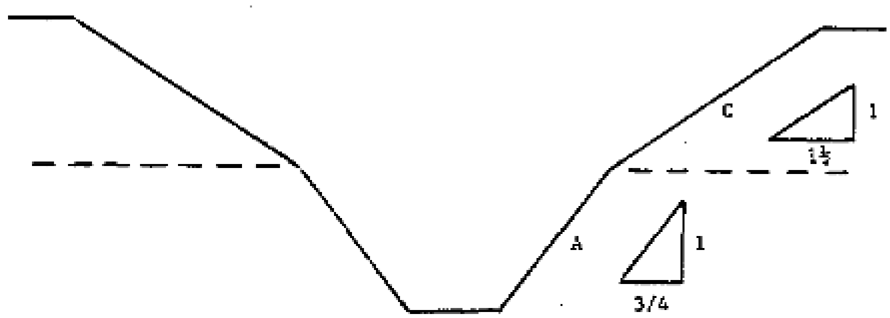
All other sloped excavations will be in accordance with the other options permitted in 29 CFR 1926.652(b).

Excavations Made in Layered Soils

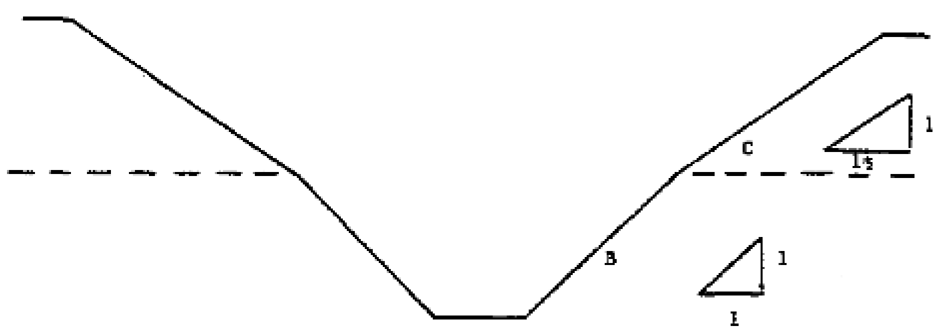
All excavations 20 feet or less in depth made in layered soils will have a maximum allowable slope for each layer as set forth below:



B OVER A



C OVER A



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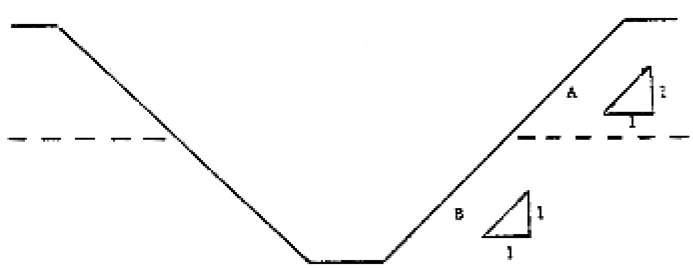

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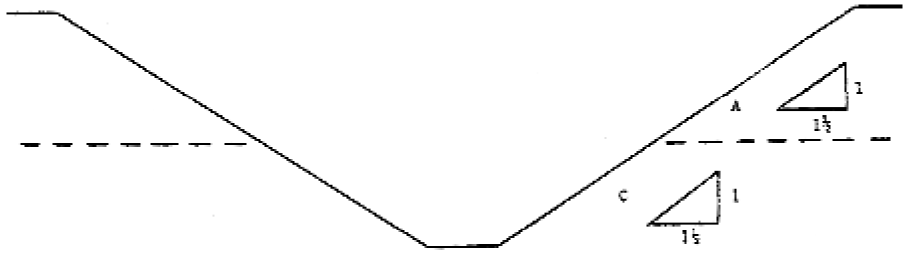

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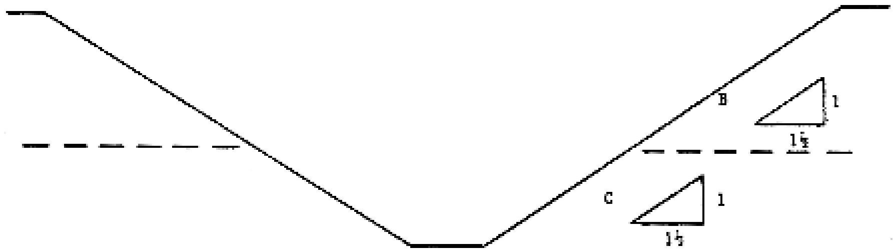


B OVER C

All other sloped excavations will be in accordance with the other options permitted in 29 CFR 1926.652(b).

Timber Shoring for Trenches

If timber shoring must be used as a method of protection from cave-ins in trenches, it cannot be used in trenches that exceed 20 feet in depth. We will reference Appendix C of 29 CFR 1926 Subpart P when design of timber shoring protective systems is to be performed using Option 1 in accordance with 29 CFR 1926.652(c)(1). Any other timber shoring configurations, other systems of support such as hydraulic and pneumatic systems, and other protective systems such as sloping, benching, shielding, and freezing systems must be designed in accordance with the requirements set forth in 29 CFR 1926.652(b) and 29 CFR 1926.652(c).

Aluminum Hydraulic Shoring for Trenches

If, aluminum hydraulic shoring must be used as a method of protection from cave-ins in trenches, it cannot be used in trenches that exceed 20 feet in depth. We will reference Appendix D of 29 CFR 1926 Subpart P when design of the aluminum hydraulic protective system cannot be performed in accordance with 29 CFR 1926.652(c)(2).

Responsibilities of Competent Person

The competent person's responsibilities include:

a. Conducting inspections of the excavations, adjacent areas, and protective systems before the start of work; and, as needed throughout the shift; and at least daily for potential cave ins, failures, hazardous atmospheres, or other hazards.
b. Taking prompt corrective action or remove employees from recognized hazards.

Additionally, the competent person must be able to demonstrate the following:

a. The ability to recognize all possible hazards associated with excavation work and to test for hazardous atmospheres. If appropriate, test will be conducted for air contaminants (oxygen, flammable gases, etc.) and provide ventilation when necessary.
b. Knowledge of the current safety orders pertaining to excavation and trenching.
c. The ability to analyze and classify soils.
d. Knowledge of the design and use of protective systems.
e. The authority and ability to take prompt corrective action when conditions change.

Before work begins, the competent person will ensure that employees are protected from hazards associated with water accumulation.

Employees are not work allowed in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.

The precautions necessary to protect employees adequately vary with each situation but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations will be monitored by the competent person to ensure proper operation.

Lastly, 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 adjacent to the excavation.

Excavations subject to runoff from heavy rains will require an inspection by a competent person.

Extension Cords

29 CFR 1926.405 - Wiring methods, components, and equipment for general use

29 CFR 1926.416 - General requirements

Extension cords will not replace permanent wiring and the following safety precautions will be adhered to:

a. Inspect the cord for cracks and cuts.
b. Cord must have a three prong plug for grounding.
c. Use the shortest continuous length of cord possible. Cords may not be spliced together.
d. Make certain the cord does not lay in water.
e. Ensure cord is properly rated for the job.
f. Secure and route cords out of the traffic flow to prevent tripping.
g. Defective cords will be tagged and removed from service.
h. Most importantly, an extension cord used on a job site MUST be used with a ground fault circuit interrupter (GFCI).

Fall Protection on Communication Towers

29 CFR 1926.1053 - Ladders

Note: All climbers will have received training and must be certified in Tower Climbing Safety and Rescue.

The preferred method of accessing towers is by the use of fixed ladders with attached climbing devices. Continuous fall protection is assured using this method. However, because this can be physically demanding over time and this can lead to stress and other physical ailments, OSHA has allowed that employees may ride a hoist line to work stations on towers. As a matter of policy, we do not allow riding of the line, free climbing or repelling practices.

When climbing the tower during construction activities regardless of height, employees must be protected from falls using a fall arrest system meeting the criteria of our fall protection plan or a ladder assist safety device meeting the requirements of 29 CFR 1926.1053(a). Employees must be trained in the recognition of fall hazards and the use of fall protection systems used.

Under current OSHA standards fall protection is **required** at heights of more than 25 feet. **We require** that each employee **six (6) feet** or more above a lower level be protected from falling by a guardrail system, safety net system, ladder safety device, fall arrest system, or positioning device system.

Forms for pre-climb meetings and pre-use inspections of fall protection equipment must be completed before tower access.

Below is OSHA Directive number **CPL 02-01-056**, *Inspection Procedures for Accessing Communication Towers by Hoist*, which contains the procedures for tower access by hoist.

Note: Reference below, Hoist Operator: "Whenever there is any doubt as to safety, the operator will have the authority to stop and refuse to handle the load until safety has been assured."

Appendix A

Compliance Guidelines for Employee Access by Hoist During Communication Tower Work Activities

Definitions

Anti-Two Block Device: A positive acting device that prevents contact between the load block or overhaul ball and the top block (two-blocking), or a system that deactivates the hoisting action before damage occurs in the event of a two-block situation.

Maximum Intended Load: The total load of all employees, tools, materials, load lines and other loads reasonably anticipated to be applied to the hoist apparatus when an employee is hoisted.

Competent Person: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate the hazard(s).

Qualified Person: One who, by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated the ability to solve or resolve issues relating to the subject matter, the work, or the project.

Gin Pole: A device attached to the tower that is used to raise sections of tower steel or equipment into position.

Engineered Hoist System: A hoist system is the complete system for hoisting, including: the frame, mounts and/or anchorages, prime mover (winch assembly), motors, drums, truck chassis (if used as the base for the hoist), wheel chocks, wire rope, hour meter, foot blocks, gin pole (if used), and rooster head or cat head, as applicable.

Hoisting Personnel

Employees may only be hoisted on the hoist line to reach or depart from workstations in accord with the guidelines set forth in this Appendix.

Training

Before allowing an employee to perform any job related to hoisting employees aloft for tower work, ensure that the employee receives effective training on the fall protection equipment used and how to safely access and depart from communication towers. The operator of the hoist needs to have a thorough understanding of the guidelines in this Appendix that pertain to hoisting employees on the hoist line. Ensure that the operator is effectively trained on the entire engineered hoist system and its capabilities, safe operating procedures, and emergency procedures.

Equipment

Use an anti-two block device on all hoists, except where it can be demonstrated that the ambient radiation frequency (RF) precludes that use. In such case, establish and maintain on site a site-specific personnel hoisting operations plan to ensure that two blocking cannot occur and that effective communication is maintained between the hoist operator and personnel being hoisted. This program could provide for a cable marking system, an employee to be situated on the tower in a position to observe the top block, or any other system that will adequately ensure communication.

a. Engineered Hoist Systems: Have a registered professional engineer approve/stamp the engineered hoist system design. Engineered system specifications are to include the size and type of rope to be used, the ratio of rope diameter to sheave size, and inspection and maintenance procedures and schedules.
b. Ensure that the rigging, hoist line and slings have a safety factor of 10 against failure during personnel lift(s). Make sure that the hoist line used to raise or lower employees is equipped with a swivel to prevent any rotation of the employees. Do not use spin-resistant wire rope to hoist employees.
c. When hoisting personnel (versus material), de-rate the hoist’s specified rated capacity by a factor of 2 (reduced by half). (This is referred to herein as the “personnel load capacity.”) Provide all employees with, and require employees to use, the proper personal protective equipment (including fall protection equipment). Inspect the protective equipment before each lift.
d. Use a guide line (tag line) to prevent the employees or the platform from contacting the tower during hoisting, except where it can be demonstrated that specific circumstances or conditions preclude its use.

e. Use a foot block and ensure that the specifications of the foot block (including its construction, its rating for personnel and/or materials hoisting, and its placement) are in accord with the specifications of the engineered hoist system as prescribed by a registered professional engineer.
f. Ensure that a competent person thoroughly inspects the gin pole before use to determine that it is free from defects, including but not limited to: damaged and/or missing members; corrosive damage; missing fasteners and broken welds at joints; and general deterioration.
g. Attach the gin pole to the tower as designed by a registered professional engineer. Ensure that the engineered hoist system specifications identify the type, number and location of attachment points.
h. Post the personnel load capacity and specified rated capacity of the lifting system in use at the site near the location of the hoist operator. If the system is changed, update the posted capacity accordingly.

Trial Lift and Proof Testing

Conduct a trial lift of the Maximum Intended Load from ground level to the location to which personnel are to be hoisted.

a. Conduct the trial lift immediately prior to placing personnel on the hoist line.
b. Have the hoist operator determine that all systems, controls and safety devices are activated and functioning properly.
c. A single trial lift may be performed for all locations that are to be reached from a single set-up position.
d. Have the hoist operator determine that no interference exists and that all configurations necessary to reach the work locations remain under the limit of the hoist's specified rated capacity, and ensure that the hoist operator maintains a 10:1 factor of safety against failure.
e. Whenever the hoist is moved and set up in a new location or returned to a previously used position, repeat the trial lift prior to hoisting employees.
f. Do not lift employees after the trial lift unless the following conditions are met:
    1. hoist wire ropes are determined to be free of damage (see 29 CFR **1926.1413** for guidance);
    2. multiple part lines are not twisted around each other; and,
    3. proof testing was completed successfully.
g. If the hoist wire rope is slack, inspect the hoisting system to ensure that all wire ropes are properly seated on drums and in sheaves.
h. Have a competent person do a visual inspection of the hoist, rigging, base support and foundation immediately after the trial lift to determine whether testing has exposed any defect or adverse effect upon any component of the structure. Correct any defects found during the inspection that may create a safety hazard, and then perform another trial lift before hoisting personnel.

i. Prior to hoisting employees, and after any repair or modification, proof test the personnel rigging to 125% of the specified rated capacity by holding it in a suspended position for five minutes with the test load evenly distributed (this may be done concurrently with the trial lift). Use a test weight.

j. After proof testing, have a competent person inspect the rigging. Correct any deficiencies found, and then conduct another proof test.

Pre-Lift Meeting

Hold a pre-lift meeting prior to the trial lift at each location. Ensure that the hoist operator and employees to be lifted are in attendance at the meeting. At the meeting, review the procedures to be followed and all appropriate guidelines from this Appendix. Repeat the meeting for any employee newly assigned to the operation.

Documentation

Document all trial lifts, inspections, proof tests, and pre-lift meetings, and keep the documentation on site at a readily accessible location during the entire length of the project.

Hoisting Employees To or From the Workstation

For hoisting one employee, use a personnel platform, as prescribed by the platform manufacturer or a registered professional engineer, or a boatswain chair or boatswain chair-type full body harness in accord with the guidelines in this Appendix. For hoisting two or more employees at a time, use a personnel platform, as prescribed by the platform manufacturer or a registered professional engineer, unless the employer can demonstrate that specific circumstances or conditions preclude its use. (Note that it is important to follow any guidelines from the platform manufacturer regarding the maximum number of employees that can be hoisted at any one time.) The personnel platform should satisfy the criteria at 29 CFR **1926.1431**(e). If the use of a personnel platform is infeasible, use a boatswain chair or boatswain chair-type full body harness in accord with the guidelines in this Appendix.

a. Hoisting personnel and materials concurrently: When using a personnel platform, small, incidental materials and personal tools may be hoisted concurrently with personnel in a manner consistent with 29 CFR **1926.1431** (f). When a boatswain chair or boatswain chair-type full body harness is used, hoist personnel and materials separately.

b. When a boatswain chair or boatswain chair-type full body harness is used to hoist employees, the following will apply:
    1. do not hoist more than two employees at a time;
    2. attach the employee's harness to the hook by a lanyard satisfying the strength requirements at 29 CFR **1926.502**(d)(9);
    3. use only locking-type snap hooks;
    4. use a harness equipped with two side rings and at least one front and one back D ring.
    5. use a hoist line hook equipped with a safety latch that can be locked in a closed position to prevent loss of contact.

c. Hoisting Guidelines: Line speed, free-spooling, and hoisting materials.
   1. When a personnel platform is not used, ensure that the maximum rate of travel does not exceed 200 feet per minute when a guide line is used to control the personnel hoist. When a guide line cannot be used, ensure that the rate of travel of the employee being hoisted does not exceed 100 feet per minute.
   2. In all personnel hoisting situations, ensure that the maximum rate of travel does not exceed 50 feet per minute when personnel being lifted come within 50 feet of the top block.
   3. Do not use free-spooling (friction lowering).
   4. When the hoist line is being used to raise or lower personnel, ensure that there is no other load attached to any hoist line, and that no other load is raised or lowered at the same time on the same hoist.

d. Capacity:
   1. Ensure that as-built drawings approved by a registered professional engineer provide the lifting capacity of the gin pole and are available at the job site. Make sure that the gin pole is included in the system designed by the registered professional engineer.
   2. Do not use the gin pole raising line to raise or lower employees. Ensure that employees maintain 100 percent tie-off while moving between the hoist line and the tower.

Communication between the Hoist Operator and Hoisted Employees

Except as provided below, ensure that employees being hoisted remain in continuous sight of the operator or signal person.

a. In situations where direct visual contact with the operator is not possible and the use of a signal person would create a greater hazard for the person being hoisted, direct communication alone (such as by radio) may be used.
b. When radios are used, ensure that they are non-trunking, closed, 2-way selective frequency radio systems. When hand signals are used, have the employees use industry standardized hand signals as illustrated in Appendix A to Subpart CC of Part **1926**.

Falling Object Hazards

Take all necessary precautions to avoid falling object hazards, including, but not limited to, securing tools and materials to prevent them from falling to the ground. Some examples of such methods are: using tethers for tools, or exclusion zones or barricades to control unnecessary work in hazard zones.

Weather Conditions

Do not hoist employees during adverse weather conditions (high winds, electrical storms, snow, ice, sleet) or other impending danger, except in the case of emergency employee rescue. This determination is to be made by a competent person using recognized good practices. High winds are defined in 29 CFR **1910.269**(x)(5) as: winds “of such velocity that the following hazards would be present: [1] An employee would be exposed to being blown from elevated locations, or [2] An employee or material handling equipment could lose control of material being handled, or [3] An employee would be exposed to other hazards not controlled by the standard involved.”

Energized Power Lines

Do not use the hoist system to raise and lower employees on the hoist line unless the following clearance distances are maintained at all times during the lift:

Power line voltage phase to phase (kV)	Minimum safe clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

Hydraulic Hoists (Drum Hoists)

Ensure that the hoist used for personnel lifting meets the applicable provisions for design, construction, installation, testing, inspection, maintenance, modification, repair and operations in this Appendix and as prescribed by the manufacturer or engineered hoist system specifications.

a. Ensure that hoist systems meet all applicable requirements for the design, construction, installation, testing, inspection, maintenance, and operation of hoists as prescribed by the manufacturer or a registered professional engineer. A hoist system is the complete system for hoisting, including: the frame, mounts and/or anchorages, prime mover (winch assembly), motors, drums, truck chassis (if used as the base for the hoist), wheel chocks, wire rope, hour meter, foot blocks, gin pole (if used), and rooster head or cat head, as applicable. Whether the hoist system is designed by a manufacturer or a registered professional engineer, ensure that an operating manual is developed that includes system capacity, maintenance requirements, and inspection criteria. Where individual components have such manuals, they are to be incorporated into the system manual. Maintain all documentation and manuals at the work site.
b. Where manufacturers' specifications are not available, base the limitations assigned to the equipment on the determinations of a registered professional engineer.
c. Position the hoist so that it is level and the distance between the drum and the foot block at the base of the tower will allow proper spooling of wire rope. Anchor the foot block to prevent displacement and support the foot block to maintain proper alignment.
d. Ensure that the hoist is designed to lift materials and personnel with the same drum or drums. Proof test any hoist that has been modified or repaired to 125 percent of its specified rated capacity. See Trial Lift and Proof Testing for more information.
e. Rated load capacities, recommended operating speeds, and special hazard warnings or instructions are to be conspicuously posted on all hoists.

f. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains or other rotating parts, where exposed, are to be totally enclosed.
g. Post the personnel load capacity for the current configuration of the gin pole within sight of the hoist operator.
    1. Ensure that the hoist has an hour meter and a line speed limiter and that the hoist is designed for and uses powered lowering.
    2. Maintain the alignment of hoist components within manufacturer's or engineered hoist system specifications' limits that prevent premature deterioration of gear teeth, bearings, splines, bushings, and any other parts of the hoist mechanism.
h. Guard all exhaust pipes where they are exposed. Ensure that an accessible fire extinguisher of 5BC rating or higher is available at the operator's station.
i. Service and maintain the hoist as per the manufacturer's or registered professional engineer's recommendations.
    1. The operating manual developed by the manufacturer or registered professional engineer for the specific make and model hoist being used is to be maintained at the site at all times.
    2. Use a hoist log to record all hoist inspections, tests, maintenance, and repair. Update the log daily as the hoist is being used and have the operator and/or crew chief sign the log. Have service mechanics sign the log after conducting maintenance and repair. Maintain the log at the site.

Hoist Mounting

Ensure that the hoist is installed following the mounting specifications of the manufacturer or the engineered hoist system specifications to prevent excessive distortion of the hoist base as it is attached to the mounting surface.

a. Make sure that the flatness of the mounting surface is held to tolerances specified by the hoist manufacturer or engineered hoist system specifications.
b. Anchor the hoist so that it resists at least two times the force or weight of any reaction induced at the maximum attainable line pull and so that the hoist will not twist or turn.
c. If the hoist is mounted to a truck chassis, ensure that it is properly aligned and anchored in at least two corners to prevent movement, and that the wheels are properly chocked.

Drums

The hoist drum is to be capable of raising or lowering 125 percent of the specified rated capacity of the hoist.

a. Ensure that the hoist drum has a positive means of attaching the wire rope to the drum.
b. Ensure that there are always at least three full wraps of wire rope on the hoist drum when personnel are being hoisted.
c. During operation, the flange is to be two times the wire rope diameter higher than the top layer of wire rope at all times.

Brakes and Clutches

Brakes and clutches need to be capable of arresting any over-speed descent of the load.

a. Ensure that the hoist has a primary brake and at least one independent secondary brake, each capable of stopping and holding 125 percent of the specified rated capacity of the hoist.
b. The primary brake is to be directly connected to the drive train of the hoisting machine, and is not to be connected through belts, chains, clutches or screw-type devices.
c. The secondary brake is to be an automatic emergency-type brake that, if actuated during each stopping cycle, cannot engage before the hoist is stopped by the primary brake. When a secondary brake is actuated, it needs to stop and hold the load within a vertical distance of 24 inches.
d. Adjust brakes and clutches where necessary to compensate for wear and to maintain adequate force on springs where used. Always use powered lowering.
e. When power brakes having no continuous mechanical linkage between the actuating and braking mechanism are used for controlling loads, an automatic means is to be provided to set the brake to prevent the load from falling in the event of a loss of brake actuating power.
f. Provide static brakes to prevent the drum from rotating in the lowering direction and ensure that the static brakes are capable of holding the specified rated capacity indefinitely without attention from the operator. Brakes are to be automatically applied upon return of the control lever to its center (neutral) position.
g. Brakes applied on stopped hoist drums need sufficient impact capacity to hold 1.5 times the rated torque of the hoist.

Hoist Controls

Ensure that power plant controls are within easy reach of the operator and include a means to start and stop, a means to control the speed of internal combustion engines, a means to stop the prime mover under emergency conditions, and a means to shift selective transmissions.

a. All controls used during the normal operation of the hoist are to be located within easy reach of the operator at the operator's station.
b. Ensure that controls are clearly marked (or are part of a control arrangement diagram) and are easily visible from the operator's station. Foot-operated pedals, where provided, are to be constructed and maintained so that the operator's feet will not readily slip off and so the force necessary to move the pedals can be easily applied.
c. The controls are to be self-centering controls (i.e., "deadman" type) that will return the machine to neutral and engage the drum brakes if the control lever is released.

Wire Rope and Rigging

Inspect all wire rope and rigging daily before use.

a. Ensure that rope is of the size and type specified as part of the engineered hoist system.
b. Ensure that all eyes in wire rope slings are fabricated with thimbles.
c. Ensure that all eyes in wire rope slings are:
    1. made with swaged-type fittings; and
    2. field fabricated by a qualified person or factory made.

Hoist Operator

Ensure that the hoist operator has classroom training in hoist operations, a minimum of 40 hours experience as a hoist operator, not less than 8 hours experience in the operation of the specified hoist or one of the same type, and has demonstrated the ability to safely operate the hoist.

a. Do not allow an employee to operate a hoist when that employee is physically or mentally unfit.
b. The hoist operator is responsible for those operations within the area of potential influence of the hoist system.
c. Whenever there is any doubt as to safety, the operator is to have the authority to stop and refuse to handle the load until safety has been assured.
d. The hoist operator is to remain at the controls at all times when personnel are on the hoist line.
e. Before starting the hoist, the operator needs to ensure that:
    1. all necessary inspections have been conducted;
    2. all controls are in the "off" position; and
    3. all personnel are in the clear.

Hoist Inspections

Ensure that all hoists are visually inspected by a competent person each day before use.

a. Ensure that a competent person thoroughly inspects all hoists at three-month intervals. Such inspection will include a hands-on operation of all moving parts to ensure that they are intact and will function properly.
b. Ensure that all hoists undergo a tear-down inspection annually unless conditions exist (as described below) that allow for less frequent tear-down inspections:
    1. A hoist that has been idle for more than six months is not to be used until it has a tear-down inspection, which includes completely disassembling, cleaning and inspecting the hoist. Before the hoist is used, replace parts such as pins, bearings, shafts, gears, brake plates, etc. found worn, cracked, corroded, distorted or otherwise non-functional.

2. Hoists with infrequent to moderate usage (hoists that have been used for 50 hours or less per month and normally operate at considerably less than the specified rated capacity based on the average use over a month) may go up to 36 months between tear-down inspections if serviced under a preventive maintenance program (as directed by the manufacturer or engineered hoist system specifications) that includes annual hydraulic oil sample analysis. An oil sample analysis, meaning a laboratory analysis, is used to evaluate the mechanical integrity of the hoist. At a minimum, change oil in these hoists at least once a year, just after the oil analysis is performed. Hoists not subjected to an annual oil sample analysis need an annual tear-down inspection.
3. Hoists that experience heavy usage (hoists that are used for more than 50 hours per month) may go up to 24 months between tear-down inspections if serviced under a preventive maintenance program as in (b)(2) above.
4. ~~Any rebuilt hoist assembly needs to be line pull tested to the specified rated capacity. The hoist drum needs to be rotated several times in both raising and lowering directions under full capacity load, while checking for smooth operation.~~

*** End of OSHA Directive CPL 02-01-056. ***

Flagmen - Traffic Control

Manual on Uniform Traffic Control Devices, Millennium Edition

The primary function of traffic control procedures is to move vehicles and pedestrians safely and expeditiously through or around temporary traffic control zones while protecting on-site workers and equipment.

Construction areas will be posted with legible traffic signs at points of hazard and protected by traffic control devices. All traffic control signs or devices used for protection of construction workers must conform to Part VI of the *Manual on Uniform Traffic Control Devices, Millennium Edition*; 2009, revised May 2012.

For daytime work, the flagger's vest, shirt, or jacket will be orange, yellow, strong yellow green or fluorescent versions of these colors.

For nighttime work, similar outside garments will be retroreflective. The retroreflective material will be orange, yellow, white, silver, strong yellow-green or a fluorescent version of one of these colors and will be visible at a minimum distance of 1,000 feet. The retroreflective clothing will be designed to identify clearly the wearer as a person and be visible through the full range of body motions.

Uniformed law enforcement officers may be used as flaggers in some locations, such as an urban intersection, where enforcement of traffic movements is important. Uniformed law enforcement officers may also be used on freeways where traffic is channeled around work sites and it is necessary to assure that advisory and regulatory speeds are being enforced. For night time work and in low-visibility situations, a retroreflective garment as described above should be worn.

Hand-signaling devices, such as STOP/SLOW paddles, lights, and red flags are to be used to control traffic through temporary traffic control zones. The STOP/SLOW paddle, which gives drivers more positive guidance than red flags, should be the primary hand-signaling device. The standard STOP/ SLOW sign paddle will be 18 inches square with letters at least 6 inches high. A rigid handle should be provided. This combination sign should be fabricated from light semi-rigid material and will have an octagonal shape. The background of the STOP face will be red with white letters and border. To be better seen, the STOP/SLOW paddles may be supplemented by one or two symmetrically positioned alternately flashing white high-intensity lamps on each side. The background of the SLOW face will be orange with black letters and border. When used at night, the STOP/ SLOW paddle will be retro reflectorized in the same manner as signs.

Flag use should be limited to emergency situations and at low-speed and/or low-volume locations which can best be controlled by a single flagger. Flags used for signaling will be a minimum of 24 inches square, made of a good grade of red material, and securely fastened to a staff about 3 feet long. The free edge should be weighted so the flag will hang vertically, even in heavy winds. When used at night, flags will be retroreflective red.

Flash Fire Hazards

A flash fire is a fire that spreads rapidly through a diffused fuel, such as dust, gas, or the vapors of an ignitable liquid, without the production of damaging pressure. The intensity of a flash fire depends on the size of the gas or vapor cloud. Hydrocarbon (oil and gas) flash fires generate temperatures of 1,000 to 1,900 degrees Fahrenheit. The duration of a flash fire can last up to five seconds. NFPA 2112 Edition, *National Fire Protection Association Standard on Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*, 2007 Edition and NFPA 2113, *Standard on Selection, Care, Use, and Maintenance of Flame-Resistant Garments for Protection of Industrial Personnel Against Flash Fire*, 2007 applies to gas and oil drilling operations. There is an inherent flash fire hazards associated with oil and gas well drilling.

When engineering and administrative controls fail, there is an increased possibility of a flash fire and, without the use of flame-resistant clothing (FRC), there strong possibility of severe burn injuries and fatalities. Additionally, our industry has a history of burn-related injuries and fatalities due to flash fire hazards when engineering and administrative controls have failed.

Note: FRC includes both “flame-resistant clothing” and “flame retardant clothing”.

Note: The use of FRC greatly improves the chance of a worker surviving and regaining quality of life after a flash fire. FRC can significantly reduce both the extent and severity of burn injuries to the body.

Note: Employees will be trained in the use of FRC and it will be available for use on the job site.

For a flash fire to occur there must be oxygen, an ignition source, and a fuel source such as hydrocarbon or an atmosphere containing combustible, finely divided particles with a concentration greater than the lower explosive limit of the chemical. Ignition sources present in gas and oil drilling include, but not limited to: electrical systems, handheld electrical tools, motors, generators, hot work activities, and static electricity.

There is a lower potential for flash fires during rig-up operations and during drilling operations that have not reached gas and hydrocarbon-producing zones. The potential for flash fires increases when the drilling process hits formations or zones of hydrocarbons and gas. Potential exposures to flash fires occur when drilling accesses an active gas or hydrocarbon zone, because the pressure from underground gas or hydrocarbon could "kick" the well fluids up the hole to the drilling rig floor or platform. If this kick is not contained or controlled by the blowout preventers or rig engineering controls, there is a high potential of flash fire due to the presence of ignition sources on or in the vicinity of the drilling platform.

Engineering and administrative controls reduce, but do not eliminate, the potential for flash fires occurring during drilling. Flammable liquids or gas could be released and migrate to ignition sources because of an inadequacy or failure in the engineering and administrative controls. Examples of failures of engineering controls would include blowout preventer malfunction, hydraulic failure, gauge or indicator equipment error or malfunction, power disruption, and valve failure.

Every effort will be made to **prevent** engineering control failure due to inadequate design, installation, inspection, testing, and maintenance.

Every effort will be made to **prevent** administrative control failures by not deviating from standard operating procedures, not failing to close valves, not failing to activate the emergency shutdown system, and not failing to activate the blowout preventer when required. Administrative controls will be adequately developed, implemented, audited, and enforced.

The use of FRC in oil and gas drilling operations OSHA information:

a. FRC is usually not needed during initial rig set-up and normal drilling operations prior to reaching active hydrocarbon zones, unless other activities warrant their use; e.g., fracking a previously drilled well while rigging a well in close proximity.
b. A potential for flash fire exists once active gas or hydrocarbon zones are reached. Appropriate FRC will be worn by exposed employees working on the well site **prior** to drilling into identified gas or hydrocarbon zones. Employees are to wear FRC **in advance** of reaching gas or hydrocarbon zones.
c. Appropriate FRC should also be worn when there is a history of fluid or gas kicks from underground producing zones.

Glass & Glazing

From a safety standpoint, the handling and installation of glass presents potential hazards that are relatively easy to control through proper use of personal protective equipment, the adherence to safe lifting procedures, and the compliance with our ladder, scaffold, aerial and scissor lift safety procedures.

To prevent damage in the first place, glass, particularly on construction sites, should be stored, to the extent possible, in its original packing containers in a clean, dry, secure area away from other activities.

Never allow glass sheets (lites) from sliding against each other or allow tools or equipment to rest on the sheets. Permanent damage may result.

Extreme care must be exercised when moving panes of glass from storage to placement to prevent breakage and injury to others.

Eye protection and gloves designed for glass handling should be used. Additional PPE, such as steel toed work boots and hard hats would be dictated by the job site and the potential hazards present.

Specialized glass installation and carrying tools will be kept in good condition.

Broken glass will be cleaned up immediately.

Ground Fault Circuit Interrupters

29 CFR 1926.404 - Wiring design and protection

A ground fault circuit interrupter (GFCI) provides protection for all 120-volt, 15-, 20-, and 30-ampere receptacle outlets that are not a part of the permanent wiring by detecting lost current resulting from a short, overheating, and/or ground fault. It should be noted that an extension cord into which electrical devices are plugged are not part of the permanent wiring; therefore, GFCI's are required.

A GFCI will "trip" when the amount of current amperes going to an electrical device in the hot conductor and the amount of current returning from an electrical device differs by approximately 5 milliamps. The GFCI can interrupt the current within as little as 1/40th of a second.

The current that is missing is being lost through a ground fault, whether it is in the actual grounding, a short in the equipment, or electricity going through the employee to the ground.

A GFCI will not protect an employee who comes in contact with two hot wires or a hot wire and a neutral wire. A GFCI will provide protection against fires, overheating, damage to insulation, and, the most common form of electrical shock hazard -- the ground fault. GFCI’s must be tested before use.

Hazardous Job Site Chemical Awareness and Exposure

As part of process safety management of highly hazardous chemicals, our employees will be given training on negating the hazards relating to possible chemical exposures in the areas in which we are working.

This training on the facility operator's emergency/contingency plan would include identification of the various hazardous chemicals, their location, specific actions to take should there be an inadvertent spill, leak, or release of hazardous chemical gases. Also, during this pre-work training, all facility safety rules would be explained.

Actions would include notification of personnel, evacuation of personnel in the area to a safe zone, training on the specific chemicals that may be released: the importance of wind direction, whether the gas is heavier or lighter than air, flammable or explosive, corrosive, means to detect the gas such as odor (and use of personal gas monitors), means to protect the employees through PPE, especially respiratory protection and the use of full-face respirator (gas mask) with an organic vapor canister or self-contained breathing apparatus or airline respirator escape SCBA.

Per *Hazard Communication*, located at **29 CFR 1910.1200**, we will keep on site a readily available SDS for each chemical to which we may be exposed. This information will be provided by the facility operator.

Ammonia Awareness

NIOSH Pocket Guide to Chemical Hazards – Ammonia

Ammonia is found in chemical plants, pharmaceutical, and industrial plants as well as refineries. Some of its uses are as a refrigerant, fertilizer, a chemical for making nitrogen containing compounds, and scrubbing SO_2 from the burning of fossil fuels.

Ammonia is a colorless gas with a pungent, suffocating odor.

Ammonia can cause harm if inhaled and/or it comes into contact with the eyes or skin.

Health Effects:

Respiratory Effects: Acute lung damage/edema; Asthma, pulmonary fibrosis, bronchiolitis.

Irritation: Eye, Nose, Throat, Bronchi, Skin.

Temporary Blindness.

Affected Organs:

Respiratory system, eyes, & skin.

Potential Symptoms:

Eye, nose, throat irritation; corneal burns, increased intraocular pressure; coughing; laryngeal edema; dyspnea, bronchospasm; chest pain; pulmonary edema or pneumonitis; pink frothy sputum; & skin burns.

First Aid:

Eye: Irrigate immediately (solution/liquid)

Skin: Water flush immediately (solution/liquid)

Breathing: Respiratory support

Swallow: Medical attention immediately (solution)

Personal Protective Equipment:

Appropriate personal protective equipment that will adequately protect employees during routine operations and anticipated emergencies when the is a possibility of contact with liquid ammonia or vessels containing liquid ammonia would include, at a minimum, the following which should be easily accessible: gloves, protective slicker or protective pants and jacket (impervious to ammonia); goggles and/or face shield; and full-face respiratory protection with appropriate cartridges.

Install, inspect, and maintain easily accessible emergency shower and plumbed eyewash or at least 150 gal. of clean water in an open top container.

A Self-Contained Breathing Apparatus (SCBA) may be required if there is potential for entry into an atmosphere that contains ammonia concentrations in excess of the immediately dangerous to life or health (IDLH) value [300 ppm].

Respiratory Protection:

Per 29 CFR 1910.1000 Z-1 Table, the OSHA Permissible Exposure Limit (PEL) for Ammonia is: 50 ppm; 35 mg/m^3 TWA

Up to 250 ppm:

(APF = 10) Any chemical cartridge respirator with **green** cartridges.

(APF = 10) Any supplied-air respirator*

Up to 300 ppm:

(APF = 25) Any supplied-air respirator operated in a continuous-flow mode.

(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern.

(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern.

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern.

(APF = 50) Any self-contained breathing apparatus with a full facepiece.

(APF = 50) Any supplied-air respirator with a full facepiece.

Emergency or planned entry into unknown concentrations or IDLH conditions:

(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus.

Escape:

(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern.

Any appropriate escape-type, self-contained breathing apparatus.

The below is extracted from 29 CFR 1910.119, App A, List of Highly Hazardous Chemicals, Toxics and Reactive (Mandatory). This Appendix contains a listing of toxic and reactive highly hazardous chemicals which present a potential for a catastrophic event at or above the threshold quantity.

Chemical Name	CAS	Threshold Quantity
Ammonia, Anhydrous	**7664-41-7**	**10000 Pounds**
Ammonia solutions (greater than 44% ammonia by weight)	**7664-41-7**	**15000 Pounds**
Ammonium Perchlorate	**7790-98-9**	**7500 Pounds**
Ammonium Permanganate	**7790-98-9**	**7500 Pounds**

Anhydrous means without water.

Because of the potential for a catastrophic event, the release of ammonia at the threshold quantities above would be covered under both Process Safety Management as well as HAZWOPER Response.

As part of process safety management of highly hazardous chemicals, prior to actual work in a facility where possible exposures to highly hazardous chemicals exist, our employees will be given training on negating the hazards relating to possible chemical exposures in the areas in which we are working by the facility operator.

The training on the facility operator's **emergency/contingency plan** would include identification of the various hazardous chemicals, their location, specific actions to take should there be an inadvertent spill, leak, or release of hazardous chemical gases.

Also during this pre-work training, all facility safety rules would be explained. This would include notification of personnel, evacuation of personnel in the area to a safe zone, and training on the specific chemicals that may be released.

The chemical specific training must include: the importance of wind direction; whether the gas is heavier or lighter than air, flammable or explosive, corrosive; means to detect the gas such as odor (and use of personal gas monitors); means to protect the employees through PPE, especially respiratory protection and the use of full face respirator (gas mask) with an organic vapor canister or self-contained breathing apparatus or airline respirator escape SCBA.

Per our Hazard Communication Plan, we will keep on site, and readily available, SDS for each chemical to which we may be exposed. This information will be provided by the facility operator.

If a monitor alarm sounds, the employee will follow the emergency procedures in place by the host contractor which would include donning an appropriate respirator, vacating the area, and notifying others. If there is a potential for an uncontrolled release of ammonia, this situation could represent an emergency. Such an emergency release would be covered under 29 CFR 1910.120, the Hazardous Waste and Emergency Response (HAZWOPER) standard [and the employee will follow the host's established procedure for emergency evacuation and response], unless it were an incidental release, as defined in the standard, 29 CFR 1910.120(a)(3), where there is no potential safety or health hazard. Paragraph (q) of 29 CFR 1910.120 covers emergency responses regardless of location.

Employees must be aware of the owner's specific contingency/emergency plans.

Arsenic Awareness

This program applies to all occupational exposures to arsenic except that this section does **not apply** to employee exposures in agriculture or resulting from pesticide application, the treatment of wood with preservatives or the utilization of arsenically preserved wood.

Exposures to arsenic may occur:

a. during weighing and transfer operations.
b. during maintenance operations. Arsenic-containing contaminants may accumulate in pump oil, the nitrogen trap, oil-bubbler, furnace, or exhaust vent line systems.
c. as a result of ampoule explosion/implosion.
d. while cleaning crystal growers.
e. during ampoule breakout.
f. during loading, unloading, or failure of the glove-box system.
g. during loading or unloading of the reactor.
h. during back lapping.

The health hazard to arsenic is high. Acute exposures to arsenic compounds by ingestion may result in burning lips, throat constriction, abdominal pain, dysphagia, nausea, vomiting, diarrhea, convulsions, coma, and death. Irritation of the respiratory tract, skin, and eyes may result from inhalation exposures.

Chronic exposure to arsenic compounds may result in dermatitis, anemia, leukocytopenia, or the effects associated with several forms of cancer.

The Permissible Exposure Limit [PEL] is: Employee is exposure to arsenic at concentrations greater than **10 ug/m^3** of air averaged over any 8-hour period

Action Level: a concentration of arsenic of **5 ug/m^3** of air averaged over any eight (8) hour period.

No employee may be exposed to any skin or eye contact with arsenic trichloride or to skin or eye contact likely to cause skin or eye irritation.

Note: Even though the airborne PEL for arsenic trichloride is 0.01 mg/m^3, when skin contact occurs, overexposure may occur.

Asbestos Awareness

NIOSH Pocket Guide to Chemical Hazards - Asbestos

On some job sites, employees may have potential exposure to asbestos if precautionary steps noted below are not taken. Asbestos can be found in older tile flooring, pipe and mechanical insulation, plaster, fireproofing, soundproofing, roofing materials, and in sprayed-on materials located on beams, in crawl spaces, and between walls. Undisturbed, it is perfectly safe.

Asbestos is not a specific mineral, but rather a fibrous form of various minerals. It is a remarkable product because it is resistant to corrosive chemicals, it is a nonconductor of electricity, it has a high tensile strength (equal to that of steel wire), and is resistant to heat (it will not burn, but will disintegrate at extremely high temperatures). Some forms of asbestos, such as chrysotile, can be spun into thread. In fact, one pound of chrysotile can produce 30,000 feet of thread -- it is that fine.

Other types of asbestos have fibers which cannot be spun but are excellent for their frictional properties (brakes) and their insulation and sound deadening properties. The actual minerals found in asbestos include iron, magnesium, silica, and water. Asbestos is a truly remarkable product which has been serving mankind since the ancient Greeks and Romans.

Unfortunately, asbestos has a downside that has been discovered and statistically documented in recent years – it is hazardous to your health.

There are two types of asbestos: friable and non-friable.

Friable asbestos can be crumpled with hand pressure and is likely to emit minute fibers can cause serious long-term health effects. Fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable.

Non-friable asbestos, undisturbed, poses no health risk. Vinyl-asbestos floor tile or roofing felt are considered non-friable if intact and generally do not emit airborne fibers unless subjected to sanding, sawing and other aggressive operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut or sawed, or if they are broken.

The health hazards associated with asbestos are caused by the microscopic fibers which, when released, enter the deepest portion of the lung (past your natural defenses such as hairs, mucus, cilia, and macrophages). Scar tissues can develop, and the lung stiffens thus reducing gas exchange. This is called asbestosis. Another disease associated with asbestos is lung cancer.

High exposure levels of asbestos increase one's chance of lung cancer by a factor of five. Mesothelioma, a disease caused primarily by exposure to amosite and crocidolite, can be fatal. Lastly, though not likely, it is possible to get cancer of the stomach and colon. The health hazards associated with asbestos are chronic and, as such, present themselves after a long period of time.

Asbestos Awareness Training is required for all employees who work in areas that contain or may contain asbestos. This training will be documented.

Steps to avoid asbestos exposure:

a. Under no circumstances will asbestos containing material (ACM) or presumed asbestos containing material (PACM) be disturbed during work activities.
b. If you believe the materials you will be working with contain asbestos, do not disturb the material and contact your supervisor.
c. Obey all asbestos warning signs and labels. ACM and PACM will not be disturbed.
d. If our employees are working on a multi-contractor worksite adjacent to a Class I asbestos abatement job and possible exposure occurs because of inadequate containment (an unlikely scenario because not only would the containment be faulty, the negative pressure system would have to fail), they are to immediately remove themselves from the area until the breach and containment systems is repaired.
e. All exposure to thermal system insulation, sprayed-on, and troweled-on surfacing material will be assumed to be asbestos exposure unless results of laboratory analysis show that the material does not contain asbestos.

For the record, permissible exposure to airborne asbestos fibers may not exceed 0.1 fibers per cubic centimeter of air (0.1 f/cc) averaged over the 8-hour workday, and 1 fiber per cubic centimeter of air (1.0 f/cc) averaged over a 30-minute work period.

Benzene Awareness

NIOSH Pocket Guide to Chemical Hazards - Benzene

Benzene is a toxic, flammable, colorless liquid or gas that has an aromatic odor. It is not soluble in water.

Short term health effects include eye and skin irritation. More acute effects include headache, vertigo, and depression of the central nervous system. Chronic health effects include poisoning and damage to the central nervous system. Medical aid should be sought immediately.

PPE would include gloves, goggles, protective clothing, protective boots, aprons and face shields.

Respiratory protection would include:

a. Self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive pressure mode.
b. Supplied air respirator that has a full facepiece and is operated in a pressure-demand other positive-pressure mode in combination with an auxiliary self-contained positive–pressure breathing apparatus.
c. Air-purifying, full-facepiece respirator (gas mask) with a chin style, front or back-mounted organic vapor canister.
d. An appropriate escape-type, self-contained breathing apparatus.

Because Benzene liquid is highly flammable and vapors are explosive, no smoking is allowed in areas when Benzene is used of stored. Fire extinguishers must be readily available.

Cadmium Awareness

NIOSH Pocket Guide to Chemical Hazards – Cadmium

Cadmium, a noncombustible solid metal, is an odorless, yellow/brown, finely divided particulate dispersed in air.

Health Effects:

Acute: Metal fume fever may result from acute exposure with flu-like symptoms of weakness, fever, headache, chills, sweating and muscular pain. Acute pulmonary edema usually develops within 24 hours and reaches a maximum by three days. If death from asphyxia does not occur, symptoms may resolve within a week.

Chronic: The most serious consequence of chronic cadmium poisoning is cancer (lung and prostate). The first observed chronic effect is generally kidney damage, manifested by excretion of excessive (low molecular weight) protein in the urine. Cadmium also is believed to cause pulmonary emphysema and bone disease (osteomalcia and osteoporosis). Cadmium may also cause anemia, teeth discoloration (Cd forms CdS) and loss of smell (anosmia).

Workers should wash daily at the end of each work shift, and prior to eating, drinking, smoking, etc.

Workers whose clothing may have become contaminated should change into uncontaminated clothing before leaving the work premises.

Because the route of exposure is inhalation, respiratory protection is critical.

The below chart is extracted from NIOSH Pocket Guide to Chemical Hazards, Appendix E, OSHA Respirator Requirements for Selected Chemicals. This chart indicates the required respiratory protection as it relates to the airborne concentration or condition of use:

Cadmium (1910.1027 & 1926.1127)

Airborne Concentration or Condition of Use	**Required Respirator**
< or = 50 μg/m^3 (micrograms per cubic meter)	Half-mask, air-purifying respirator equipped with a high-efficiency filter*.
< or = 125 μg/m^3	**(1)** Powered air-purifying respirator with a loose-fitting hood or helmet equipped with a high-efficiency filter*; or **(2)** Supplied-air respirator with a loose-fitting hood or helmet facepiece operated in continuous-flow mode.
< or = 250 μg/m^3	**(1)** Full-facepiece air-purifying respirator equipped with a high-efficiency filter*; **(2)** Powered air-purifying respirator with a tight-fitting half-mask equipped with a high-efficiency filter*; or **(3)** Supplied-air respirator with a tight-fitting half-mask operated in continuous-flow mode.
< or = 1,250 μg/m^3	**(1)** Powered air-purifying respirator with a tight-fitting full facepiece equipped with a high-efficiency filter*; or **(2)** Supplied-air respirator with a tight-fitting full facepiece operated in continuous-flow mode.
< or = 5,000 μg/m^3	Supplied-air respirator with half-mask or full facepiece operated in pressure-demand or other positive-pressure mode.
> 5,000 μg/m^3 or unknown concentration	**(1)** Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive-pressure mode; or **(2)** Supplied-air respirator with a full facepiece operated in pressure-demand or other positive-pressure mode and equipped with an auxiliary escape-type self-contained breathing apparatus operated in pressure-demand mode.
Firefighting	Self-contained breathing apparatus with full facepiece operated in pressure-demand or other positive-pressure mode.

Note: Quantitative fit testing is required for all tight-fitting air-purifying respirators where airborne concentration of cadmium exceeds 10 times the TWA PEL (10 X 5 μg/m^3 = 50 μg/m^3). A full-facepiece respirator is required when eye irritation is expected.

A high-efficiency filter means a filter that is at least 99.97% efficient against mono-dispersed particles of 0.3 μm (micrometers) in diameter or higher.

Chromium (VI) Awareness

NIOSH Pocket Guide to Chemical Hazards – Chromium

Welding, cutting, and heating of metals of toxic significance like Chromium (lead, zinc, cadmium, mercury, beryllium, or exotic metals or paints) in enclosed spaces will require either general mechanical ventilation of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits **or** local exhaust ventilation consisting of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system will be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

This would include inert-gas metal-arc welding performed on stainless steel to protect against dangerous concentrations of nitrogen dioxide.

When performing welding operations on stainless steel and there is exposure to airborne chromium (VI) above its action level of 2.5 micrograms per cubic meter of air (2.5 µg/m^3) calculated as an 8-hour time-weighted average (TWA), the provisions of 29 CFR 1926.1126 must be adhered to. The PEL is 5 µg/m^3. If air monitoring, as described in 29 CFR 1926.1126 is below .5 µg/m^3, the provisions of this standard do not apply.

Crystalline Silica Awareness

Silica, Crystalline (Respirable Size), National Institute of Health

Crystalline Silica can be readily found on many job sites in rocks, as well as many concrete and masonry products. Crystalline Silica can be released in the air when employees are performing such tasks as:

a. Chipping, hammering, drilling, crushing, or hauling rock.
b. Abrasive blasting.
c. Sawing, hammering, drilling, or sweeping concrete or masonry.

Unprotected respiratory exposure to crystalline silica may cause a lung disease called silicosis as well as cancer and death.

Occupational silica exposure is completely preventable through employee training, use of a silica substitute, use of engineering controls, improved work practices, and, lastly, use of personal protective equipment.

Employees who are potentially exposed to an environment containing airborne concentrations of silica will receive training prior to working with silica and receive periodic refresher training after work has started.

Silica training will include the following.

a. Exposure monitoring for respirable silica:
    1. Full shift personal samples will be taken that are representative of the employee’s regular, daily exposure to silica. A certified industrial hygienist will use a combination device, called a cyclone assembly, and a sampling pump to trap tiny respirable silica particles from the air in the work environment.
    2. The cyclone assembly and sampling pump will be placed on an employee who will wear the device throughout the work shift for up to 8 hours.
    3. Sampling requires that just a select few employees who are closest to the silica source be fitted. The industrial hygienist can help you determine who will be most appropriate.

4. At the end of the sampling period, the hygienist will de-activate the sampling pump and remove the filters, which will be sent to a certified laboratory for analysis.
5. Employee exposures to concentrations of silica must be kept below the permissible exposure limits found in 1910.1000 - Table Z-3, below:

Table Z-3 Mineral Dusts

Substance	***mppcf a***	***mg/m3***
Silica:		
Crystalline		
Quartz (Respirable)	*250b*	*10 mg/m3 e*
	%SiO2+5	*%SiO2+2*
Quartz (Total Dust)	*. . . . .*	*30 mg/m3*
		%SiO2+2
Cristobalite: Use ½ the value calculated from the count or mass formulae for quartz.		
Tridymite: Use ½ the value calculated from the formulae for quartz.		
Amorphous, including natural diatomaceous earth	*20*	*80 mg/m3*
Substance	***mppcf a***	***mg/m3***
		%SiO2
Silicates (less than 1% crystalline silica):		
Mica	*20*	
Soapstone	*20*	
Talc (not containing asbestos)	*20c*	
Talc (containing asbestos) Use asbestos limit		
Tremolite, asbestiform (see 29 CFR 1910.1001)		
Portland cement . . .	*50*	
Graphite (Natural)	*15*	
Coal Dust:		
Respirable fraction less than 5% SiO2	*. . . . .*	*2.4 mg/m3 e*
Respirable fraction greater than 5% SiO2 . . .	*. . . . .*	*10 mg/m3 e*
		%SiO2+2
Inert or Nuisance Dust:		
Respirable fraction	*15*	*5 mg/m3*
Total dust	*50*	*15 mg/m3*

Note: Conversion factors - mppcf X 35.3 = million particles per cubic meter = particles per c.c.

[a]Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

[b]The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

[c]Containing less than 1% quartz; if 1% quartz or more, use quartz limit.

[d]All inert or nuisance dusts, whether mineral, inorganic, or organic, not listed specifically by substance name are covered by this limit, which is the same as the Particulates Not Otherwise Regulated (PNOR) limit in Table Z-1.

[e]Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this note refer to the use of an AEC (now NRC) instrument. The respirable fraction of coal dust is determined with an MRE; the figure corresponding to that of 2.4 mg/m3 in the table for coal dust is 4.5 mg/m3.

b. The health hazards associated with respirable silica are silicosis, lung cancer, pulmonary tuberculosis and other airway diseases.

Silicosis is caused by exposure to respirable crystalline silica dust. Crystalline silica is a basic component of soil, sand, granite, and most other types of rock, and it is used as an abrasive blasting agent. Silicosis is a progressive, disabling, and often fatal lung disease. Cigarette smoking adds to the lung damage caused by silica.

Symptoms of Silicosis:

Silicosis (especially the acute form) is characterized by shortness of breath, fever, and cyanosis (bluish skin); it may often be misdiagnosed as pulmonary edema (fluid in the lungs), pneumonia, or tuberculosis. Severe mycobacterial or fungal infections often complicate silicosis and may be fatal in many cases

Three types of Silicosis:

Chronic Silicosis:	Usually occurs after 10 or more years of exposure to crystalline silica at relatively low concentrations
Accelerated Silicosis:	Results from exposure to high concentrations of crystalline silica and develops 5 to 10 years after the initial exposure.
Acute Silicosis:	Occurs where exposure concentrations are the highest and develops after a few months or as long as 2 years following exposures to extremely high concentrations of respirable crystalline silica.

c. The exposure limits for respirable silica:

See **1910.1000 Table Z-3.**

Permissible Exposure Limit (PEL) = Crystalline Quartz (respirable): 250 mppcf (millions of particles per cubic feet of air)/(%SiO2 +5); 10 mg/m3/(%SiO2 + 2);

Quartz (total dust): 30 mg/m3/(%SiO2 + 2);

Cristobalite and Tridymite: Use 1⁄2 the value calculated from the count or mass formula for quartz

d. Acceptable substitutes for silica.

The many types of abrasive materials have varying degrees of health hazards – silica sand being probably the most hazardous mineral abrasive used.

Whenever possible, its use should be limited and, if possible, a substitute material used. Other types of abrasives include synthetic or natural mineral grains, metallic shot or hard grit (made of steel or chilled cast iron), and organic abrasives such as ground corncobs and walnut shells. These and other engineering controls such as containment and ventilation are important for employee safety.

e Engineering controls.

It is important to note that silica is only hazardous in its airborne form. Engineering controls would include local exhaust ventilation and blasting cabinets and establishing a clearly identified exposure area.

f. Work practice controls.

   Use of water sprays, wet methods for cutting, chipping, drilling, sawing, grinding, etc.

   Eating, drinking, or smoking near crystalline silica dust is prohibited.

   Employees will wash hands and face before eating, drinking or smoking away from silica exposure area.

g. Personal protective equipment.

   The **only health hazard from silica is respiratory**, therefore appropriate half-face or full face respiratory will be used.

   1. Up to 0.5 milligrams per cubic meter of air (mg/m^3) of airborne exposures to crystalline silica:

      Half-facepiece particulate respirators with N95 or better filters

   2. Up to 1.25 milligrams per cubic meter of air (mg/m^3) of airborne exposures to crystalline silica:

      Any powered, air-purifying respirator with a high-efficiency particulate filter.

      Any supplied-air respirator operated in a continuous-flow mode

   3. Up to 2.5 milligrams per cubic meter of air (mg/m^3) of airborne exposures to crystalline silica:

      Any air-purifying, full-facepiece respirator with an N100, R100, or P100 filter.

      Any powered, air-purifying respirator with a tight-fitting facepiece and a high-efficiency particulate filter.

   4. Up to 2.5 milligrams per cubic meter of air (mg/m^3) of airborne exposures to crystalline silica.

Any supplied-air respirator operated in a pressure-demand or other positive-pressure mode.

However, when working with respirable silica, there are many physical hazards and appropriate PPE will be worn to address the hazards presented by the work at hand.

a. Eye protection: Goggles; safety glasses with side shields
b. Head protection: Hard hat
c. Hand protection: Gloves
d. Foot protection: Steel toed work boots
e. Body protection: Tyvek suits/coveralls

Following are NIOSH recommendations for reducing crystalline silica exposures.

NIOSH Safety Recommendations:

NIOSH recommends the following measures to reduce crystalline silica exposures at the job site and prevent silicosis and silicosis-related deaths:

a. Prohibit silica sand (or other substances containing more than 1% crystalline silica) as an abrasive blasting material and substitute less hazardous materials.
b. Conduct air monitoring to measure worker exposures.
c. Use containment methods such as blast-cleaning machines and cabinets to control the hazard and protect adjacent workers from exposure.

d. Practice good personal hygiene to avoid unnecessary exposure to silica dust.
    1. Wash hands and face before eating.
    2. No eating, drinking or tobacco products in the blasting area.
    3. Shower before leaving work site.
    4. Vehicles parked away from contaminated area.
e. Wear washable or disposable protective clothes at the job site; shower and change into clean clothes before leaving the job site to prevent contamination of cars, homes, and other work areas.
f. Use respiratory protection when source controls cannot keep silica exposures below the NIOSH REL.
g. Provide periodic medical examinations for all workers who may be exposed to crystalline silica.
h. Post signs to warn workers about the hazard and to inform them about required protective equipment.
i. Provide workers with training that includes information about health effects, work practices, and protective equipment for crystalline silica.
j. Report all cases of silicosis to the state health department.

Hydrogen Sulfide – H2S Awareness

NIOSH Pocket Guide to Chemical Hazards – Hydrogen Sulfide H2S

Where our employees may have potential exposure to gas hazards such as hydrogen sulfide, training will be given to ensure that these hazards are understood. Hydrogen Sulfide exposures are possible in the following drilling operations or situations: a) recycled drilling mud, b) water from sour crude wells, c) tank gauging (tanks at producing, pipeline & refinery operations), d) field maintenance, and, e) tank batteries and wells, etc..

Hydrogen Sulfide – H2S is toxic, and colorless with the odor of rotten eggs at low concentrations. It is soluble in water and is flammable.

Over time at low concentrations, the ability to smell Hydrogen Sulfide –H2S may diminish therefore, depending on the facility at which we are working a personal or area monitors may be required. These alarms will be pre-set to go off when the PEL exceeds 20 PPM, 1910 (Industry) or 10 PPM (Construction). **When monitor alarms sound, employees are to evacuate the area and no re-enter without proper respiratory protection.**

Exposure routes are inhalation, eye or skin. Health effects include irritation to the eyes, respiratory system distress, damage to the nerve centers of the brain which controls breathing, apnea, coma, convulsions, eye pain dizziness, and headache. As a liquid, the health effect would be frostbite.

Respiratory protection would include:

a. Self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive pressure mode.
b. Supplied air respirator that has a full facepiece and is operated in a pressure-demand other positive-pressure mode in combination with an auxiliary self-contained positive–pressure breathing apparatus.
c. Air-purifying, full-facepiece respirator (gas mask) with a chin style, front or back-mounted organic vapor canister for hydrogen sulfide.
d. An appropriate escape-type, self-contained breathing apparatus.

Lead Hazard Awareness

Pure lead (Pb) is a heavy metal at room temperature and pressure and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.

OSHA standard **29 CFR 1926.62**, addresses occupational exposure to lead in the construction industry. The word "lead" within this standard refers to elemental lead, all inorganic lead compounds, and a class of organic lead compounds called lead soaps. This standard does not apply to other organic lead compounds.

There may be times when employees are working within the vicinity of lead or lead-containing materials.

Under no circumstances will employees be exposed to lead above the action level which, for lead, is 30 micrograms of lead per cubic meter of air (30 μ/m^3), averaged over an 8-hour workday. As a matter of interest, the permissible exposure limit (PEL) for lead is 50 micrograms of lead per cubic meter of air (50 μ/m^3), averaged over an 8-hour workday.

Lead found in paints, coatings, and compounds that are undisturbed, pose no risk of hazard exposure and work around these items do not require respirators, special clothing, or negative pressure enclosures.

Care will be taken by all employees to not abrade, remove, touch, or in any way disturb lead or lead containing compounds within the work area.

Contractors who actually abate lead do so under the provisions of the above lead standard which precludes lead from escaping into the surrounding areas by negative pressure enclosures and other methods.

As a point of interest, persons who perform lead abatement have to have received special training, be licensed, and be part of medical surveillance program.

To drive home the point of the importance of leaving lead at the job site undisturbed and avoided, employees must be aware of the health hazards associated with lead exposure.

The below is extracted from **29 CFR 1910.1025 App A**, *Substance data sheet for occupational exposure to lead*:

II. HEALTH HAZARD DATA

A. "Ways in which lead enters your body". When absorbed into your body in certain doses, lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed. Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume, or mist it can be inhaled and absorbed through you lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion. A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

B. "Effects of overexposure to lead" - (1) "Short term (acute) overexposure". Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

(2) "Long-term (chronic) overexposure". Chronic overexposure to lead may result in severe damage to your blood - forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain. Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy. Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible. Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in

men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders or die during the first year of childhood. Overexposure to lead also disrupts the blood - forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood.

(3) "Health protection goals of the standard". Prevention of adverse health effects for most workers from exposure to lead throughout a working lifetime requires that a worker's blood lead level (BLL, also expressed as PbB) be maintained at or below forty micrograms per deciliter of whole blood (40 ug/dl). The blood lead levels of workers (both male and female workers) who intend to have children should be maintained below 30 ug/dl to minimize adverse reproductive health effects to the parents and to the developing fetus. The measurement of your blood lead level (BLL) is the most useful indicator of the amount of lead being absorbed by your body. Blood lead levels are most often reported in units of milligrams (mg) or micrograms (ug) of lead (1 mg=1000 ug) per 100 grams (100g), 100 milliliters (100 ml) or deciliter (dl) of blood. These three units are essentially the same. Sometime BLLs are expressed in the form of mg percent or ug percent. This is a shorthand notation for 100g, 100 ml, or dl. (References to BLL measurements in this standard are expressed in the form of ug/dl.)

BLL measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues. BLL measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead - related diseases, however, has focused heavily on associations between BLLs and various diseases. As a result, your BLL is an important indicator of the likelihood that you will gradually acquire a lead - related health impairment or disease.

Once your blood lead level climbs above 40 ug/dl, your risk of disease increases. There is a wide variability of individual response to lead, thus it is difficult to say that a particular BLL in a given person will cause a particular effect. Studies have associated fatal encephalopathy with BLLs as low as 150 ug/dl. Other studies have shown other forms of diseases in some workers with BLLs well below 80 ug/dl. Your BLL is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated BLLs. The longer you have an elevated BLL, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage. The best way to prevent all forms of lead - related impairments and diseases -- both short term and long term -- is to maintain your BLL below 40 ug/dl. The provisions of the standard are designed with this end in mind.

Heavy Construction Equipment

29 CFR 1926.600 - Equipment

All heavy equipment must be inspected prior to use and operated only by authorized personnel.

Heavy construction equipment would include:

a. Bulldozers, Compactors, Front-end loaders, Graders, Haulage Vehicles (Trucks/Dump Trucks), Scrapers, Skid-Steer Machines, and Tractors.

Bi-directional machines such as front-end loaders and bulldozers will have an audible alarm, distinguishable from the surrounding noise level which will be used if the operator does not have a clear, unobstructed view or a ground guide indicating that the line of travel is safe.

Scissors points on all front-end loaders which may harm the operator will be guarded as well as all parts exposed to employees such as belts, gears, pulleys, sprockets, spindles, drums, flywheels, chains and other moving parts.

Equipment that is operated from the seated position and has roll over protection will have seat belts and their use is required. If there is no roll over protection, seat belts will not be used.

All trucks into which earth is dumped will have protection for the driver of that vehicle or the driver must exit the vehicle before loading.

Vehicle operators will not operate heavy equipment on any access roadway or grade that is not suitable for the vehicle.

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 blades, loader buckets, dump bodies and similar equipment will be fully lowered or blocked to prevent movement during maintenance or when not in use.

All controls will be in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.

When equipment is parked, the parking brake will be set. Additionally, on inclines, wheeled vehicles will be chocked. Equipment left unattended at night, adjacent to either a highway or construction area in use, will be clearly visible with reflectors, lights, or illuminated (with reflectors or lights) barricades.

Safety Requirements for Heavy Construction Equipment:

a. General repairs must not be made to powered equipment until workers are protected from movement of the equipment or its parts.
b. Before repairs are made workers must comply with lock-out/tag-out requirements, if applicable, of our Control of Hazardous Energy Program.
c. A system of traffic controls must be used wherever mobile equipment operation encroaches on a public thoroughfare.
d. Flaggers are required at all locations where barricades and warning signs cannot control the moving traffic.
e. Job-site vehicles must be equipped with the following, if so designed:
    1. Operable service, emergency, and parking brakes.
    2. Two operable headlights and taillights for night operation.
    3. Windshield wipers and defogging equipment as required.
    4. Seat belts if the vehicle has rollover protection structures.
    5. Fenders or mud flaps.
    6. Adequate seating if the vehicles are used to transport employees.
f. Vehicles and systems must be checked for proper operation at the start of each shift.
g. Vehicles operating when rear vision is blocked must be equipped with an automatic backup alarm or its equivalent.
h. Haulage vehicles in operation must be under operator control and must be kept in gear when descending grades.
i. Engines must be stopped during refueling
j. Lights are required for night operation.
k. A safety tire rack, cage, or equivalent protection will be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings, or similar devices.
l. All equipment passenger cab window glass must be safety glass, or equivalent, and must not cause any vision impairment that may affect the safe operation of the vehicle.

Equipment Batteries

General Requirements

Batteries that are unsealed are to be located in enclosures with outside vents or in well ventilated rooms. They must be arranged so that fumes, gases, or electrolyte spray doesn't escape into surrounding areas. Ventilation will also be provided to ensure that the gases from the batteries diffuse into the air and prevent the accumulation of an explosive mixture.

Storage racks and trays must be strong enough to support the batteries and be treated to make them resistant to the electrolyte.

Floors will be of acid resistant construction unless protected from acid accumulations.

Face shields, aprons, and rubber gloves will be available and must be used by employees who handle acids or batteries. Facilities for quick drenching of the eyes and body will also be available within 25 feet of battery handling areas.

There will also be a flushing and neutralizing station and fire protection equipment available

Charging Requirements

Battery charging stations are to be located in an area designated specifically for that purpose and not used for other purposes.

All charging equipment will be placed so that it is protected from damage by trucks and other equipment.

When batteries are being charged, the vent caps will be kept in place to avoid electrolyte spray. Vent caps must be maintained in good working condition.

Maintenance

Heavy machinery, equipment, or any of their parts that must be suspended or held in the air by using a slings, hoists, or jacks will be substantially blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between those parts.

Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment, will be fully lowered or blocked when being repaired or when not in use. All controls will be left in a neutral position, with the motors stopped and brakes set, unless work being performed requires otherwise.

Heavy Equipment and Electrical Power Lines

Except where electrical distribution and transmissions lines have been de-energized and visibly grounded at the point of work or where insulating barriers (not attached to the vehicle) have been erected to prevent physical contact with the lines, the following clearance – between any part of the equipment, load line, or load **and** the power line – will be observed:

a. For lines rated 50 kV or below the minimum clearance between the lines and any part of the equipment or load will be at least 10 feet;
b. For lines rated over 50 kV the minimum clearance between the lines and any part of the equipment or load will be at least 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).
c. When in transit without a load and equipment lowered, the equipment clearance will be a minimum of 4 feet for voltages less than 50 kV, 10 feet for voltages 50 kV up to and including 345 kV, and 16 feet for voltages up to and including 750 kV.

A ground guide will be designated to observe clearance of the equipment and give warning to the equipment operator in situations where it is difficult for the equipment operator to maintain the desired clearances by visual means.

An overhead wire will be considered energized unless the owner of the line, or the electrical utility authorities, indicate that it is not energized 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 must be de-energized or tests must be made to determine if electrical charge is induced on the equipment. The following precautions will be taken when necessary to dissipate induced voltages:

a. The equipment must have an electrical ground directly to the upper rotating structure supporting the equipment; and
b. Ground jumper cables have to be attached to materials being handled by the equipment when electrical charge is induced while working near energized transmitters.

   Note: Crews will be provided with non-conductive poles having large alligator clips or other similar protection to attach the ground cable to the load.

c. Combustible and flammable materials need to be removed from the immediate area prior to beginning operations.

Hoists

29 CFR 1926.552 - Material hoists, personnel hoists, and elevators

A hoist is a useful mechanical device which gives one the ability to lift and move heavy objects – not people. No person is to ride on a hoist. As with all mechanical devices, improper use may lead to injury. You must know what you are doing and you must be careful.

Before use, hoists must be inspected for bent or damaged components. Particular attention should be paid to guarding. Fingers and loose clothing could be snagged in exposed mechanisms. Chains, cables, or rope slings must not be kinked, twisted, or frayed.

Loads must be properly rigged with hooks or slings, and they must never exceed the hoist's rated capacity.

Ensure that the area around the hoist is free from debris and, most importantly, people. Do not allow yourself or others to be under a hoisted load.

Horizontal Directional Drilling (HDD)

Only employees qualified by training or experience may perform HDD work. Further, HDD equipment may be used only by authorized employees.

Prior to use, all HDD equipment will be inspected in accordance with the Operator's Manual which must be maintained on the job site with the equipment.

PPE

The Association of Equipment Manufacturers (AEM) recommends that all employees wear properly rated electrically insulated footwear at all times.

Other appropriate PPE would include eye protection, hearing protection, highly visible clothing, and insulated rubber gloves depending on the work situation.

UNDERGROUND UTILITIES

The greatest hazard in HDD work involves hitting an underground utility.

Call "811" which is a call before you dig information service.

The below universal color indicates what utility is buried below ground:

Red – Electric
Orange – Communications, Telephone/CATV
Blue – Potable Water
Green – Sewer/Drainage
Yellow – Gas/Petroleum Pipe Line
Purple – Reclaimed Water
White – Premark site of intended excavation

Caution must be exercised because:

a. Many underground utilities are not recorded.
b. Many that are recorded are not accurate.
c. Many are at different depths below ground than indicated.

Utilities must be physically identified to ensure they are not hit.

Once utilities are found, use signage incorporating the universal color codes.

Note: After we put in an underground item, we must report it, so the next contractor does not hit it.

With the horizontal location known and the utilities exposed to determine their depth at regular intervals along the drill path, drilling may start with the drill head tracked by an experienced employee using a tracking device to direct the operator to steer the drill over, under, or around existing utilities.

Check and double check as you work. There may be loops, valves, tees and other items protruding into the drill path. Remember, **many utility items underground are not reported or improperly reported.**

The drill operator and the tracking equipment operator must be in constant contact either with two-way radios or hand signals.

If the tracker reading is not "normal", stop work and determine the problem. When working near an existing utility, slow down and use extra care.

Hot Tap Operations

Hot tap operations refer to a procedure used in the repair, maintenance and service activities which involves welding on a piece of equipment (pipelines, vessels, or tanks) under pressure in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Because, by definition, continuity of service is essential, it is impossible to use standard control of hazardous energy procedures.

Only trained employees working under the supervision of a competent person (by virtue of training or experience) will perform hot tap operations following documented procedures for the specific job.

Coordination with the facility operator will allow an exact determination of the metal involved, its thickness, the pressures, and, of course, the type of fluid/gas within the piece of equipment. While continuity of service is required, it may be possible to reduce pressures/flow during the hot tap operations.

A control zone will be established to keep workers (and others) not involved with the operations at a safe distance. Care will be taken to assure that all necessary permits and an emergency rescue plan, if deemed necessary, are in place. Attention will be given to the specialized tools and PPE requirements for hot tap operations.

29 CFR 1926.302 - Power-operated hand tools

Hydro-Blasting:

Hydro-blasting uses the action of water under extremely high pressure to clean surfaces. Hydro-blasting is used for tank, vessel, and pipe cleaning as well as surface preparation. Hydro-blasting equipment may be powered by internal combustion engines (diesel) or electricity. The size of the equipment can vary from small portable units to the size of a tractor trailer. The pressures are enormous, up to 40,000 psi (Ultra High Pressure).

The advantage of hydro-blasting over abrasive blasting is that it can more safely be used in hazardous areas where a spark could cause an ignition of gases or other flammable substances.

While dust is certainly not a problem with hydro-blasting, consideration must be given to the disposal of waste water if it is contaminated with toxic or hazardous materials.

Training:

Prior to performing hydro-blasting work, employees must be trained on the hazards (including penetration of the skin by high pressure water), operating procedures, and maintenance of hydro-blasters.

Training must include a demonstration of the cutting action of the high-pressure water and of its ability to cut and penetrate the skin. This live demonstration will emphasize the potential hazard to the human body by actually cutting through a piece of lumber, concrete block, or rubber boot.

Because of the infinite variable uses for hydro-blasting and the combinations of hydro-blasting equipment and the inherent dangers involved with hydro-blasting operations, all hydro-blasting operators must have received training on each type of equipment used. Only authorized personnel may operate hydro-blasting equipment.

Obviously, if an accident should occur and water penetrates the skin, medical attention must be given immediately.

Information and training also will address the tremendous force of the water, shock and electrical hazards, noise hazards, chemical release hazards, slip hazards, fall hazards, kick-back hazards, and visibility hazards.

At a minimum, a hydro-blasting team will consist of a pump operator and a nozzle operator.

Personal Protective Equipment (PPE):

All employees performing hydro-blasting work should wear, at a minimum, waterproof body protection, eye protection, head protection including full face shield, waterproof foot protection with steel toe caps, appropriate hand protection, and hearing protection. Depending on circumstances, metatarsal protective boots may be required.

Hydro-Blasting Permits:

A Pre-Operational, Operation, and Post-Operation Permits will be developed by the site (or the contractor performing the work) that contains, at least, the below information:

a. Job Description and equipment being cleaned.
b. Precautions taken to protect electrical equipment.
c. Maximum operating pressure.
d. A list of qualified personnel.

Establishment of a Control Zone:

A control zone will be established to protect personnel when approaching all ends of the equipment being cleaned. The control zone will be identified by barricades and signage.

Equipment and Procedures:

a. The operator will inspect all hydro-blast equipment prior to use for defects, proper fluid levels, filters, and properly sized/rated fittings. This inspection will cover the high-pressure unit, hoses and fittings. **Defective equipment will be tagged out of service and not used.**
b. All blast cleaning nozzles must be equipped with an operating valve (on the gun or foot pedal) which must be held open manually and **always under control of the operator.**
c. Objects to be cleaned will never be held manually.
d. The minimum total length of a hydro-blasting gun (hand-operated control valve, lance and nozzle resembling a gun layout) will be 66 inches from the shoulder pad to the nozzle.
e. A properly sized anti-reversal device (stinger assembly attached to a nozzle to prevent it from turning around inside a pipe or large tube) will be used throughout the task. The combined length of the hose connection, stinger, and nozzle will be a minimum of 1.5 times the diameter of the pipe being cleaned unless the pipe being cleaned has a "T", then the combined length will be 3 times the diameter of the largest pipe.
f. Molding device or lance will require a minimum of 2 feet end identification when a pipe flange is available. If no flange or other means to secure the anti-reversal device is used, the hose/flange will require a 2 feet end identification marking and a 4 feet end identification marking of a different color or different pattern.
g. A hydro-blasting system is not to be operated above the lowest working pressure (40% of the burst pressure) of any of its components.
h. All hydro-blasting must be completed from a stable work surface.
i. When operating hydro-blasting equipment, no ladders, step stools, benches, etc. are to be used. Approved scaffolding or platforms that are job specific may be used.

System Shut Down Events:

The system will be shut down and depressurized any time one of the below events occur:

a. The barricade is violated.
b. The equipment malfunctions (special attention should be given to the dump control valve).
c. Repairs need to be made.
d. The system is to be left unattended.

Kettle Operations

Only trained and authorized persons will be involved with kettle operations. All operations will be performed within a control zone that prohibits entrance by unauthorized persons.

During kettle operations, employees will wear appropriate PPE including hand protection: gloves; skin protection: long sleeves and long pants; foot protection: steel toed work boots; eye protection: safety goggles; and head protection: hard hat, as necessary.

While our work generally has material within the kettle at 450° F, at no time will the material within the kettle exceed 500° F.

The kettle lids will not be opened except for loading the kettle with solid roofing material or unless the material in the roofing kettle is less than 150° F.

Ladders

29 CFR 1926.1050 - Scope, application, and definitions applicable to this subpart

29 CFR 1926.1051 - General requirements

29 CFR 1926.1053 - Ladders

29 CFR 1926.1060 - Training requirements

All employees using ladders are required by OSHA standard to receive training and understand proper procedures for ladder use before using a ladder in a work situation.

All ladders will be inspected periodically, and defective ladders will be tagged and placed out of service.

American National Standards Institute (ANSI) and NIOSH approval labels should never be covered with paint or tape. Having ladders that are constructed to standard will prevent collapse and resultant falls.

Specific operational procedures for ladders directly relating to the elimination of fall hazards are listed below:

a. A stairway or a ladder will be provided at all personnel points of access where there is a break in elevation of 19 inches or more.
b. Ladders will never be overloaded.
c. Ladder rungs, cleats, and steps must be parallel, level, and uniformly spaced when a ladder is in position for use.
d. Ladders will not be tied or fastened together unless they are so designed.
e. Portable ladders used for gaining access to an upper level will extend at least 3 feet above the upper landing surface or the ladder will be secured at its top.
f. Ladders must be free of oil, grease, or other slipping hazards.
g. Ladders must be used for the purpose for which they were designed.
h. Non-self-supporting ladders will be used at such an angle so that the horizontal distance from the top support to the foot of the ladder is approximately ¼ of the working length of the ladder.
i. Ladders will only be used on stable and level surfaces unless secured to prevent displacement.
j. Ladders will not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement.
k. Ladders placed in any location where they can be displaced by job site activities or traffic will be secured to prevent accidental displacement, or a barricade will be used to keep the activities or traffic away from the ladder.
l. The area around the top and bottom of the ladder will be kept clear.
m. Ladders will not be moved, shifted, or extended while occupied.
n. The top step of a stepladder will not be used as a step.
o. Portable ladders with structural defects will be immediately marked in a manner that readily identifies them as defective and removed from service until repaired.
p. When ascending or descending a ladder, one must face the ladder.
q. Employees must use at least one hand to grasp the ladder when progressing up and/or down the ladder.
r. Employees are not to carry any object or load that could cause loss of balance and a resultant fall.

Fixed ladders where the length of climb is less than 24 feet but the top of the ladder is greater than 24 feet above the lower level must have cages, wells, ladder safety devices, or self-retracting lifelines.

Fixed ladders where the length of climb equals or exceeds 24 feet will have at least one of the following:

a. Ladder safety devices.
b. Self-retracting lifelines and rest platforms not exceeding 150 feet.
c. A cage or well, and multiple ladder sections not exceeding 50 feet in length. At the maximum interval of 50 feet, ladder sections will be offset on landing platforms.

Lighting

29 CFR 1926.56 - Illumination

A competent person will ensure that all work areas have adequate lighting. Adequate lighting serves a two-fold purpose – allowing tasks to be more readily performed as well as providing the additional safety factor of being seen by persons not involved with the work – especially vehicular traffic.

If generators are used for auxiliary lighting, they will be operated and maintained by authorized persons who are competent by training or experience.

Minimum Illumination Intensities for Areas of Operation

a. 33 Lumens – General construction areas, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling and field maintenance areas.
b. 54 Lumens - General construction area lighting
c. 54 Lumens – Indoors: Warehouses, corridors, hallways and exitways
d. 54 Lumens – Tunnels, shafts, and general underground work. Exception: A minimum of 108 Lumens is required at tunnel and shaft heading during drilling, mucking and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading.
e. 108 Lumens – General construction plant and shops (i.e. batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active store rooms, mess halls and indoor toilets and workrooms).
f. 323 Lumens – First aid stations, infirmaries and offices.

For illumination requirements for areas or operations not covered above, refer to the American National Standard A11.1-1965, R1970, Practice for Industrial Lighting.

LP - Gas Storage

29 CFR 1926.153 - Liquefied petroleum gas (LP-Gas)

Liquefied petroleum gas (LP-Gas) is sometimes used on job sites to provide fuel for temporary heating devices.

LP-Gas systems must have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type. All cylinders must be DOT approved.

Rules for inside storage (under construction standards) are simple -- **it is not allowed!**

Note: Under industry standards, up to 300 pounds of LP-Gas may be stored, with adherence to specific safety procedures, is allowed.

Rules for outside storage requires that containers be in a suitable ventilated enclosure or otherwise protected against tampering. At least one approved portable fire extinguisher having a rating of not less than 20-B:C must be readily available.

The distances from buildings or groups of buildings that containers must be stored are as follows:

Quantity of LP-Gas Stored	Distance in Feet
500 lbs. or less	0
501 to 6,000 lbs.	10
6,001 to 10,000 lbs.	20
over 10,000 lbs.	25

Storage must not be near building openings or vehicular traffic.

LP - Gas Temporary Heating

29 CFR 1926.153 - Liquefied petroleum gas (LP-Gas)

When LP-Gas is used for temporary heating on units that provide over 7,500 BTU per hour or use containers greater than 2.5-pound maximum water capacity [nominal 1-pound LP-Gas capacity], the following will apply:

a. Container valves, connectors, regulators, manifolds, piping and tubing must not be used as structural supports for the heaters.
b. The LP-Gas containers and all associated equipment including hoses must be located so as to minimize exposure to high temperatures or physical damage.
c. The maximum water capacity of individual containers must be 245 pounds [nominal 100-pound LP-Gas capacity].

Heaters that are not integral heater-container units, which are connected by hose to the LP-Gas, must be at least 6’ from the container. Blower and radiation type heaters must not be directed toward the container or any other unit within 20 feet. Heaters specifically designed for attachment to the container are permitted as long as the heat is not directed to the LP-Gas container.

Machine Guarding

29 CFR 1926.307 - Mechanical power-transmission apparatus

Most injuries that occur when operating a machine happen at the point of operation – the point on a machine where the actual work (cutting, bending, and spinning) occurs. This is also the point where guards can protect fingers and hands exposed to that danger. Machine guarding also protects employees from other dangers such as flying pieces of metal, sparks, gears, belts, and rotating parts.

The most common types of machines on job sites are power tools which often have guards to prevent injury.

Accident prevention in this area is a function of machine design – engineering controls – and operator training. Types of machine guarding are almost as numerous as types of machines – the most common being a physical barrier to prevent accidental insertion of body parts. Guards are vital for safety reasons and machine guards designed into a machine should never be altered or removed. The speed and tremendous forces involved in modern machines are such that severe injury or even death could occur without warning and without even slowing the machine down.

Training and proper work methods go a long way toward reducing machine accidents. Like all safeguards, there is generally a way to bypass safety features that are engineered into machines. This is sometimes done to increase speed or just to make one's job easier. This could result in a tragic, avoidable accident. The few seconds saved could cause a lifetime of grief. **Do not bypass safety systems.**

Operate all machines according to the instructor's manual and follow all safety procedures.

Machinery

Spinning, pounding, and moving – gears, pulleys, levers – electricity, fuel, and hydraulics – action, reaction, force: danger! Machinery takes energy and performs a task or a multitude of tasks. Machinery, from a safety standpoint, is a collection of individual, simple machines (pulleys, gears, etc.) combined to work in harmony to accomplish a specific job.

The danger is obvious: the power, speed, movement, and momentum of machinery is not going to be altered by something as insignificant as an employee's finger, hand, or even body.

How does one deal with the dangers of machinery?

a. **Never** operate any machinery until you have received proper training and you thoroughly understand safety procedures as well as procedures to follow for adjustments, power interruption, jamming, lubrication, and inspection.
b. Ensure the guarding systems are in place, functioning properly, and have not been altered or removed.
c. If a hazard assessment of the machinery operation dictates specific personal protective equipment (PPE), wear it!
d. From purely a safety standpoint, think of any power operated item with moving parts as machinery. This would include items as diverse as a small electric drill to an 80,000-pound tractor-trailer.

Material Storage

29 CFR 1926.250 - General requirements for storage

General Requirement for Storage

All materials stored in tiers will be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling or collapse.

Maximum safe load limits of floors within buildings and structures, in pounds per square foot, will be conspicuously posted in all storage areas, except for floor or slab on grade. Maximum safe loads will not be exceeded.

Note: Posting is not required for storage areas in all single-family residential structures and wood-framed multi-family residential structures

Aisles and passageways will be kept clear to provide for the free and safe movement of material handling equipment or employees. Such areas will be kept in good repair.

When a difference in road or working levels exist, means such as ramps, blocking, or grading will be used to ensure the safe movement of vehicles between the two levels.

Material Storage

Material stored inside buildings under construction will not be placed within 6 feet of any hoist way or inside floor openings, nor within 10 feet of an exterior wall which does not extend above the top of the material stored.

Each employee required to work on stored material in silos, hoppers, tanks, and similar storage areas will be equipped with personal fall arrest equipment meeting the requirements of Fall Protection of this Safety Manual.

Noncompatible materials will be segregated in storage.

Bagged materials will be stacked by stepping back the layers and cross-keying the bags at least every 10 bags high.

Materials will not be stored on scaffolds or runways in excess of supplies needed for immediate operations.

Brick stacks will not be more than 7 feet in height. When a loose brick stack reaches a height of 4 feet, it will be tapered back 2 inches in every foot of height above the 4-foot level.

When masonry blocks are stacked higher than 6 feet, the stack will be tapered back one-half block per tier above the 6-foot level.

Used lumber will have all nails withdrawn before stacking.

Lumber will be stacked on level and solidly supported sills and will be so stacked as to be stable and self-supporting.

Mold & Mildew

Molds and mildew are fungi that can be found inside any building in which employees of Millerick Engineering, Inc. are working. Within the United States, there are about 1,000 species of mold.

Problems may arise when mold starts eating away at materials, affecting the look, smell, and possibly, with the respect to wood-framed buildings, affecting the structural integrity of the buildings.

Molds can grow on virtually any substance, as long as moisture or water, oxygen, and an organic source, **such as wood**, are present. Molds reproduce by creating tiny spores (viable seeds) that usually cannot be seen without magnification. In fact, mold spores continually floating through both the indoor and outdoor air and these spores, alone, **do not create a problem**.

The problem occurs when mold spores land on a damp spot and begin growing. They digest whatever they land on in order to survive. Molds can grow on wood, paper, carpet, foods, insulation, and even dust and dirt that gathers in moist areas a building.

From a contractor standpoint, over time, molds can gradually damage building materials and furnishings. If left unchecked, mold can eventually cause structural damage to a wood framed building, weakening floors and walls as it feeds on moist wooden structural members.

Most molds do not present a true health hazard in the general population. Molds can, however, cause adverse effects by producing allergens and the allergic reactions to mold can be either immediate or delayed. Allergic responses would include hay fever-type symptoms such as runny nose and red eyes.

The work Millerick Engineering, Inc. performs as a contractor will not introduce molds into the workplace.

Should mold be discovered on any of our job sites, we will notify the owner and advise the owner to seek a professional mold remediation contractor.

Should mold exist on a job site where our employees are working, the following precautionary steps will be taken:

a. Dust mask may be used for personal employee comfort.
b. Items damaged by mold may be discarded a general waste with no special precautions needed.

NFPA 70E

Standard for Electrical Safety in the Workplace

OSHA has adopted by reference NFPA 70E-2000, *Standard for Electrical Safety Requirements for Employee Workplaces.*

A national consensus standard, such as NFPA 70E-2015, however, can sometimes be relevant to a general duty clause citation in the sense that the consensus standard may be used as evidence of hazard recognition and the availability of feasible means of abatement. The general duty clause, Section 5(a)(1) of the Occupational Safety & Health Act, is violated if an employer has failed to furnish a job site that is free from recognized hazards causing or likely to cause death or serious physical harm. The general duty clause is used where there is no standard that applies to the particular hazards involved.

All electrical work will be done in compliance with the National Electric Code (NEC), OSHA standards, and NFPA 70E. Both OSHA standards and NFPA 70E deal with worker safety, while the NEC deals with the design, installation, and inspection of electrical installations.

A copy of NFPA 70E will be readily available for reference, training, and employee use.

Training:

All employees who face electrical hazards that are not reduced to a safe level by the applicable electrical installation requirements will be trained in safety-related work practices and procedural requirements as necessary to provide protection from the electrical hazards associated with the job assignments. Employees will be trained to identify and understand the relationship between electrical hazards and possible injury.

Training will be in a classroom and/or on-the-job and the degree of training will be determined by the risk to the employee.

Employees will receive training in emergency procedures including methods of release from contact with exposed energized electrical conductors or circuit parts, methods of first aid, and CPR if the duties warrant such training. Christopher Millerick, our Safety Director, will certify that employees have been trained in approved methods of resuscitation annually.

Training for Qualified Persons:

Note: A qualified person has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.

Qualified persons must be trained and knowledgeable of the construction and operation of equipment or a specific work method and to recognize and avoid the electrical hazards with respect to the equipment or work methods.

a. Qualified persons will be familiar with the proper use of special precautionary techniques, PPE, including arc-flash, insulating and shielding materials, and insulated tools and test equipment.

   Note: A person can be qualified with respect to certain equipment and methods but still be unqualified for others.

b. Qualified persons will be permitted to work with the Limited Approach Boundary of exposed energized electrical conductors and circuit parts operating at 50 volts or more and will be trained in the following:
    1. The skills and techniques necessary to distinguish exposed energized electrical conductors and circuits parts from other parts of electrical equipment
    2. The skills and techniques necessary to determine the nominal voltage of exposed energized electrical conductors and circuit parts.
    3. The approach distances specified in Table 130.2(c) and the corresponding voltages to which the qualified person will be exposed.
    4. The decision-making process necessary to determine the degree and extent of the hazard and the PPE and job planning necessary to perform the task safely.
c. If undergoing OJT and, in the course of the OJT has demonstrated an ability to perform duties safely under the direct supervision of a qualified person, this person will be considered qualified for the performance of these duties.
d. Tasks performed less often that once per year will require retraining before performance of the work practices involved.
e. Qualified persons will be trained to select an appropriate voltage detector and demonstrate how to use a device to verify the absence of voltage, including interpreting indications provided by the device. They will be trained to understand all limitations of each specific voltage detector that may be used.

Training for Unqualified Persons:

Unqualified persons will be trained in and be familiar with any of the electrical safety related practices that are necessary for their safety.

Note: Unqualified persons will not be permitted to enter spaces that are required to be accessible to qualified employees only unless the electric conductors and equipment involved are in an electrically safe work condition.

Retraining:

Retraining will be given when.

a. Supervisors or annual inspections indicate that the employee is not complying with the safety-related work practices.
b. New technology, new types of equipment, or changes in procedures necessitate the use of safety-related work practices that are different than those the employee would normally use.
c. If the employee must employ safety-related work practices that are not normally used during regular job duties.

Training Documentation:

The company will document that each employee has received the training above after the employee demonstrates proficiency in the work practices involved and will be maintained for the duration of the employee’s employment. Training documentation will contain the employee’s name and dates of training.

Host Employer Responsibilities:

The host employer will inform contract employers of:

a. Known electrical hazards that are related to the contract employer's work that might not be recognized by the contract employer or its employees.
b. Information about the employer's installation that the contract employer needs to make assessments.

The host employer will report observed contract employer related violations (dealing with electrical work) to the contract employer.

Contract Employer Responsibilities:

a. The contract employer will ensure that each of its employees is instructed in the hazards communicated to the contractor employer by the host employer. This instruction is in addition to the basic instruction required by NFPA 70E.
b. The contract employer will ensure that each of its employees follow the work practices required by NFPA 70E and safety-related work rules required by the host employer.
c. The contractor employer will advise the host employer of:
    1. Any unique hazards presented by the contract employer's work.
    2. Any unanticipated hazards found during the contract employer's work that the host employer did not mention.
    3. The measures the contractor took to correct any violations reported by the host employer and prevent such violations from recurring in the future.

Electrical Safety Program:

The employer will implement and document an overall safety program that directs activity appropriate for the voltage, energy level, and circuit conditions.

Safety related work practices are only one component of an overall an electrical safety program.

Electrical Safety Program Procedures:

The program will address safety related work practices for working within the Limited Approach Boundary. Program elements found in Annex E to NFPA 70E would be included such as evaluations, anticipating unexpected events, electrical flash arc hazard analysis, and the fact that all electrical parts are considered live until proven otherwise.

Risk/Hazard Evaluation Procedures:

Risk/hazard evaluation procedures are to be used before work is started within the Limited Approach Boundary of energized electrical conductors and circuit parts operating at 50 volts or more or where an electrical hazard exists. An example of Hazard/Risk Evaluation Procedures as well an example of a Hazard Risk Analysis Evaluation Flow Chart is found in Annex F to NFPA 70E. It would contain event severity, frequency, probability and avoidance to determine the level of safe practices to be employed.

Pre-Job Briefings for Routine Work:

Prior to performing routine work (routine work is not complicated or particularly hazardous and the employee should be able to recognize and avoid hazards presented), a job briefing will be held before each job and include all employees involved. Topics would include hazards associated with the job, work procedures involved, special precautions, energy source controls, and PPE requirements.

Test Instruments and Equipment:

All test instruments, equipment, and their accessories will be rated for the circuits and equipment to which they will be connected. Further they will meet the requirements of ANSI/ISA-66010-1, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1*: *General Requirements*, for rating and design requirements for voltage measurement and test instruments intended for use on electrical systems 1000 volts and below.

Operations Verification:

When test instruments are used for the testing for the absence of voltage on conductors or circuit parts operating at 50 volts or more, the operation of the test instrument will be verified before and after an absence of voltage test is performed.

Insulating PPE Maintenance and Use:

Electrical protective equipment will be maintained in a safe, reliable condition. Insulating equipment will be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves will be given for an air test along with the inspection.

Maximum test intervals for rubber insulating equipment will be in accordance with NFPA 70E Table 130(c)(6)(c). Time frames for testing would include: 1) Blankets-before first issue/every 12 months, thereafter, 2) Gloves-before first issue and every 6 months, and, 3) Sleeves-before first issue and every 12 months. Covers and line hose will be tested if insulating value is suspect.

Energized Electrical Work Permit:

Reference Annex J to NFPA 70E. Energized Electrical Work Permits **are not** part of NFPA 70E. Within Annex J, however, are both an example of an Energized Electrical Work Permit and a Flow Chart to illustrate items to consider when determining the need for the permit.

In every case, if the voltage level is **≥** 50 volts **AND** there are exposed live parts, an Energized Electrical Work Permit is required.

In Part I [to be completed by the Requester] of the Energized Electrical Work Permit will include:

a. Job/Work Order Number.
b. Description of the work to be done.
c. Justification of why the circuit/equipment cannot be de-energized or the work deferred until the next scheduled outage.
d. Requester Name, Title, and Date.

In Part II (to be completed by the Electrically Qualified persons ***doing*** the work) of the Energized Electrical Work Permit will include:

a. Detailed job description procedure to be used in performing the above detailed work.
b. Description of the Safe Work Practices to be employed.
c. Results of the Shock Hazard Analysis.
d. Determination of the Shock Protection Boundaries.
e. Results of the Arc Flash Hazard Analysis.
f. Determination of the Arc Flash Protection Boundary.
g. Necessary personal protective equipment to safely perform the assigned task.
h. Means employed to restrict the access of unqualified persons from the work area.
i. Evidence of completion of a Job Briefing including discussion of any job-related hazards.
j. A signed and dated agreement by each Electrical Qualified Person that the above work can be done safely.

In Part III of the Energized Electrical Work Permit will include:

Signed and dated approval(s) by persons such as:

a. Manufacturer Manager
b. Safety Manager
c. General Manager
d. Maintenance/Engineering Manager
f. Electrically Knowledgeable Person

<u>Illumination of Work Areas:</u>

Employees will not enter spaces containing electrical hazards unless illumination is provided that enables the employees to perform the work safely. Where lack of illumination or an obstruction precludes observation of the work to be performed, employees will not perform any task with the Limited Approach Boundary of energized electrical conductors or circuit parts operating at 50 volts or more or where an electrical hazard exists.

Non-Ionizing Radiation Hazards

Note: **All climbers, as well as any other employees with potential exposure to non-ionizing radiation hazards, must be trained for working in radio frequency environments and must use RF monitors.**

Non-ionizing radiation is electromagnetic radiation that does not have enough energy to completely remove an electron from an atom when passing through matter.

Ionizing radiation is high-energy radiation capable of producing ionization in substances through which it passes, i.e., electromagnetic waves that are energetic enough to detach electrons from atoms or molecules.

Radiofrequency (RF) and microwave (MW) radiation are non-ionizing electromagnetic radiation.

Electromagnetic radiation is restricted to that portion of the spectrum commonly defined as the radio frequency region, which for our purposes also includes the microwave frequency region.

RF in the frequency ranges 3 kilohertz (kHz) - 300 Megahertz (MHz) and MW is in the frequency ranges 300 MHz - 300 gigahertz (GHz).

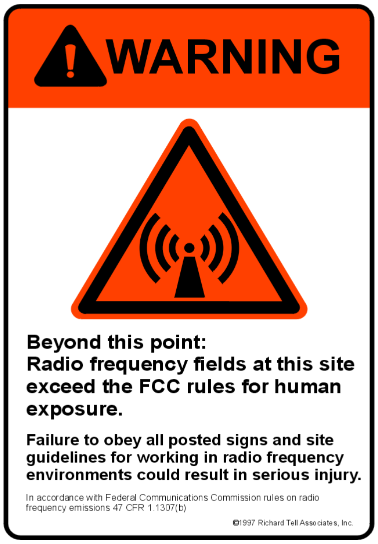
The hazards associated with RF and MW are limited to heating of tissue and/or cells in the body, damage to the eyes (cataracts), reduced sperm count, and shocks or burns. The preceding hazards will only be possible at ten times the exposure limit.

Per 29 CFR 1926.54, *Nonionizing Radiation*, employees will not be exposed to microwave power densities in excess of 10 milliwatts per square centimeter.

To prevent unnecessary RF and MW exposures at any level, access to the work site will be controlled by signage and fences, and access will be allowed only to persons trained in RF and MW safety procedures.

If the possible exposure is between the action level and the PEL, the signage must be as follows:

If the possible exposure is above 10 times the PEL, the signage must be as follows:



Engineering controls will be utilized before the required use of PPE.

Engineering controls would include, if possible, turning off and locking out transmitters both on the tower on which we are working, as well as nearby towers which would expose the employees of Millerick Engineering, Inc. to unacceptable radiation exposures.

If the transmitters cannot be completely shut down (locked-out), an attempt will be made to lower their output to put create a safe working space.

If the above cannot be accomplished, employees will be provided, and required to use, specialized protective clothing and eye wear specifically designed to prevent RF radiation from reaching the skin and eyes of employees.

Following is a link to Federal Communications Commission, Office of Engineering & Technology, OET Bulletin 56, August 1999, Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields: Click Here

Pile Driving

General Requirements:

Boilers and piping systems which are a part of, or used with, pile driving equipment will meet the applicable requirements of the American Society of Mechanical Engineers, Power Boilers (section I). Additionally, all pressure vessels which are a part of, or used with, pile driving equipment will meet the applicable requirements of the American Society of Mechanical Engineers, Pressure Vessels (section VIII).

Overhead protection, which will not obscure the vision of the operator, will be provided. This overhead protection will be the equivalent of 2-inch planking or other solid material of equivalent strength.

Stop blocks will be provided for the leads to prevent the hammer from being raised against the head block. Also, 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. Guards will also be provided 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 will be made to stabilize the leads.

Fixed leads will be provided with a ladder, and adequate attachment points, so that the loft worker may engage his safety belt lanyard to the leads. If the leads are provided with loft platforms, such platform will be protected by standard guardrails.

Steam hose leading to a steam hammer or jet pipe will be securely attached to the hammer with an adequate length of chain or cable to prevent whipping in the event the joint at the hammer is broken. Air hammer hoses will also be provided with the same protection as required for steam lines. This safety chain or cable must be at least 1/4-inch in diameter and will also be provided for each hose connection to prevent the line from thrashing around in case the coupling becomes disconnected.

Steam line controls will have two shutoff valves. One must be a quick-acting lever type within easy reach of the hammer operator.

Guys, outriggers, thrust outs, or counterbalances must be provided as needed to maintain stability of pile driver rigs.

Pile Driving from Barges and Floats:

Barges or floats supporting pile driving operations will meet the applicable requirements of CFR 29 1926.605 - Marine Operations and Equipment.

Pile Driving Equipment:

Engineers and winch operators will accept signals only from the designated signalmen.

All employees must be 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 will be kept well beyond the range of falling materials.

When it is necessary to cut off the tops of driven piles, pile driving operations need to be suspended. The exception is when the cutting operations are located at least twice the length of the longest pile from the driver.

When driving jacked piles, all access pits will be provided ladders and bulkheaded curbs to prevent material from falling into the pit.

Pipe Tie-Ins

Prior to a pipe tie-in, the flow of gas, steam, vapor, and liquid must be halted. It is absolutely vital to know the ramifications of halting the flow within the pipe, particularly in hazardous facilities such as chemical plants, refineries, and other facilities which have a higher degree of hazard than normal work sites. In these types of facilities, **prior** to any blocking of flow through pipes, permission will be obtained from the facility operator. Failure to follow this specific rule could result in a major catastrophe.

Before actual tie-in is attempted, the original pipe that has been taken out of service (by positive means such as valve, block, or tag) will be purged of contaminants, and gas tested, if appropriate.

At the completion of the tie-in, the facility operator will be notified **before** flow is restored to the pipe.

It is vital to know the chemical and physical properties of the material within the pipe so an appropriate fire extinguisher can be selected and available. This information will also allow for hazard assessment and PPE selection.

Post-Tensioning Operations

29 CFR 1926.701 - General requirements

OSHA has little to say about post-tensioning operations other than that which is found in CFR 1926.701(c) which states that:

a. No employee (except those essential to the post-tensioning operations) will be permitted to be behind the jack during tensioning operations.
b. Signs and barriers will be erected to limit employee access to the post-tensioning area during tensioning operations.

However, by following the below guidelines and procedures, the hazards of post-tensioning operations can be controlled.

a. Concrete pre-stressing and post-tensioning operations should be done according to the specifications and instructions of a professional engineer, and a copy of these plans and instructions will be available on site while the work is being done if required by the Safety Manager or General Contractor.
b. Stressing operations must be carried out under the direction of a competent person.
c. Employees involved in pre-stressing or post-tensioning must be instructed in and follow safe work procedures.
d. Appropriate eye protection must be worn by all employees involved in grouting, stressing and cable trimming operations.
e. Tendons, including bars, strands and wires, used for tensioning purposes must be protected against physical damage and corrosion during handling, transportation and storage.
f. Strand couplers must not be reused until they have been inspected by a qualified person and determined to be safe for reuse.
g. Welding, burning, or other work is not permitted on any surface where strands have been strung or tensioned unless proper care is taken to protect the strands from sparks or other heat sources and from stray electric currents.
h. Visual or audible signaling devices must be provided and used in the area of tensioning operations to warn approaching employees.
i. Employees not directly involved in tensioning or de-tensioning operations must be kept clear of the danger area and must remain clear until operations are completed, and the visual and/or audible warning signals are turned off or removed.
j. Strand elongation and strand deflection must be measured in a way that does not expose the employee to a risk of injury.
k. During pre-stressing operations employees must be protected by guards or other suitable devices at the tensioning ends and anchoring points to contain the flying strands and the strand vises in the event of strand failure.
l. Guards must be fabricated from mild steel plate, not less than ¼” thick, or ¾” thick or better plywood that provides at least equivalent strength.
m. Deflecting devices must be designed to prevent slip-out and to allow backing off of strands from the deflected position.

n. Written de-tensioning procedures should be prepared by a professional engineer and followed so that employees are not exposed to danger from equipment or strand failure or structural failure. These procedures would include methods to safeguard the operator and other employees from hazards while cutting strands.
o. Strand vises and hydraulic equipment and components must be used and maintained in accordance with the manufacturer's instructions.
p. Strand vises must not be reused until they have been inspected by a competent person and determined to be safe for reuse.
q. Damaged or worn vises and hydraulic equipment will be removed from service.
r. The supervisor or competent person must ensure that operators are given the maximum allowable values for both stretch of the tendon and hydraulic pressure at the pump.
s. If there is a significant difference between the expected value and the measured value for either stretch of a tendon or hydraulic pressure at the pump, the employees must stop operations on that particular tendon and consult with the professional engineer in charge to obtain instructions on how to proceed.
t. Each jack pressure gauge must be checked at frequent intervals against a master gauge, and the site engineer must be furnished with a calibration chart.
u. Only hydraulic pressure hoses with self-seating couplings should be used, and care must be taken to ensure that end connections are not subjected to bending stresses at any time.
v. Hydraulic equipment must have a bypass valve which is adjusted and maintained to limit the hydraulic pressure so that the tension exerted by the jack on the tendon does not exceed 90% of the minimum specified ultimate strength of the tendon.
w. Hydraulic hoses must be inspected for leaks or bubbles after each stressing operation and any damaged hoses should be immediately removed from service.
x. The hydraulic system must be regularly inspected for oil leaks and other damage and necessary corrective action taken.
y. Where adequate clearance exists, the platform width at jacking locations must be at least 32”.
z. Each blowout must be reported to the structural design engineer, investigated and logged.
aa. A copy of the logged entry must be available on site for reference purposes.
ab. If there is risk of injury from handling coiled post-tensioning tendons, a suitable coil handling device must be used.
ac. All jacks must be secured to suitable anchors before they are installed on a cable for tensioning and must not be unsecured before they are removed from the cable, if a falling jack could endanger employees.

Rigging for Material Handling

29 CFR 1926.251 - Rigging equipment for material handling

Note: The below information is applicable to the following crane types and operations:

a. Articulating/knuckle-boom truck cranes that deliver material to a construction site when used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting.

b. Articulating/knuckle-boom truck cranes that deliver material to a construction site when the crane is used to transfer building supply sheet goods or building supply packaged materials from the truck crane onto a structure, using a fork/cradle at the end of the boom, but only when the truck crane is equipped with a properly functioning automatic overload prevention device. Such sheet goods or packaged materials include but are not limited to: sheets of sheet rock, sheets of plywood, bags of cement, sheets or packages of roofing shingles, and rolls of roofing felt.

1. The above articulating/knuckle-boom crane exclusion does not apply when it is used to 1) hold, support or stabilize the material to facilitate a construction activity, such as holding material in place while it is attached to the structure; 2) when the material being handled is a prefabricated component such as precast concrete members or panels, roof trusses, prefabricated building sections such as, but not limited to: floor panels, wall panels, roof panels, roof structures, or similar items; and, 3) when the material being handled by the crane is a structural steel member (for example, steel joists, beams, columns, steel decking (bundled or unbundled) or a component of a systems-engineered metal building.

c. Other rigging requirements are found in the applicable provisions of Cranes and Derricks in Construction, found in Section III of this program, specifically, 1926.1401, 03, 04, 07, 08, 23, 27, 31, & 33.

Prior to use on each shift, rigging equipment, including slings and all fastenings and attachments, will be inspected for damage or defects by a qualified person. Additional inspections will be performed during sling use and where service conditions warrant, to ensure that it is safe.

Defective/damaged equipment including slings and rigging will not be used and will be immediately removed from service.

Per 1926.251(a)(3), rigging equipment, when not in use, will be removed from the immediate work area and stored properly so as not to present a hazard to employees.

Under no circumstances may any employee be under a suspended load.

29 CFR 1926.251, *Rigging Equipment for Material Handling*, contains Tables H-1 to H-2 which indicate rated capacities for various types of slings and grommets, safe working loads for shackles, number and spacing of U-Bolt Wire Rope Clips, and maximum allowable wear at any point of link.

Welded alloy steel chain slings must have permanently affixed durable identification stating size, grade, rated capacity, and sling manufacturer. Of course, hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments, when used with alloy steel chains, will have a rated capacity at least equal to that of the chain.

Rigging equipment will **not be loaded in excess** of its recommended safe working load and load identification will be attached to the rigging.

Specific requirements for use and inspection of alloy steel chains, wire rope, natural rope and synthetic fiber, synthetic webbing, and shackles are found in the above standards.

Scissor-Lift Fall Protection

What type of fall protection is required for scissor-lifts? This apparently simple question has a relatively simple answer. However, how it is derived is somewhat complicated because OSHA does not have a standard to deal with this issue.

Clearly, there is a hazard – falling from height. However, fall protection while using a scissor-lift is not covered in the fall protection, scaffold and ladder fall protection, nor aerial lift fall protection standards.

Section 5(a)(1) of the Occupational Safety and Health Act, commonly referred to as the General Duty Clause is a “catch all clause” which states: "Each employer will furnish to each of its employees’ employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

In the absence of a specific standard relating to a safety or health risk, the above is the reference OSHA will cite.

When assessing compliance efforts, OSHA considers the requirements of pertinent national consensus standards. In the case of scissor-lifts, ANSI A92.20-2018, *Design, Calculations, Safety Requirements and Test Methods for MEWPs,* ANSI A92.22-2018, *Safe Us of MEWPs*, and ANSI A92.24-2018, *Training Requirements for Operators of MEWPs* are used.

Fall protection is provided by employees maintaining firm footing on the lift and using guardrails. Under no circumstances are employees to place ladders or other items on the lift to extend their reach. Per ANSI/SIA standards, with which OSHA concurs, "Use of planks, ladders, or any other device on the aerial platform for achieving additional height or reach will be prohibited.” Use of these items negates the value of the guardrail system and may possibly exceed the scissor-lift’s design limits for stability.

Further, personnel are not to tie off to items adjacent to the lift – the most obvious reasons are: the anchorage point may not be sufficient and movement of the lift would pull the employee out of and off of the lift.

If, for some reason, guardrails are not being provided for specific operational reasons, then a personal fall protection system may be used which would include an anchorage point, lanyard and safety harness.

However, this option is severely limited because its design would have to be approved by a registered engineer or the scissor-lift manufacturer would have to approve the use of the lift as an anchorage.

Under ideal conditions, rarely found on a construction site, scissor-lifts may be moved with the lift extended. However, should obstacles, debris, drop-offs, holes, depressions, ramps or other hazards be present, the lift must be lowered prior to movement.

Finally, if the employee leaves the safety of the scissor-lift platform while working at height, some sort of approved fall protection system must be employed.

Signs & Tags

29 CFR 1926.200 - Accident prevention signs and tags

When appropriate, signs and tags will be used to warn of specific hazards. Types of signs are classified according to their use, and their design is regulated by OSHA standard. All personnel will be instructed in the meaning of the various types of signs. Sign usage includes:

Type of Sign	Sign Coloring	Sign Warning
Danger Signs	Red, Black & White	Indicates immediate danger and denotes that special precautions are necessary.
Caution Signs	Yellow Background	Warns of a potential hazard or cautions against an unsafe practice.
Safety Instruction Signs	White Background	Used to provide general instructions and suggestions relative to safety measures.

The wording on signs must be positive, clear, concise, and easy to understand or the sign loses its value.

Accident prevention tags are to warn of hazardous or potentially hazardous conditions that are out of the ordinary, unexpected, or not readily apparent. They are not used where signs, guarding or other positive means of protection are used. All tags must have both:

A signal word: “Danger,” “Caution,” “Warning,” “BIOHAZARD” (or its symbol)

A major message: “High Voltage” or “Do not start”. (Major messages indicate the specific hazardous condition.)

Type of Tag	Tag Coloring	Tag Warning
Danger Tags	Red	Indicate an immediate hazard that presents a threat of death or serious injury.
Caution Tags	Yellow	Indicate a non-immediate hazard or unsafe practice that presents a lesser threat of injury.
Warning Tags	Orange	Indicate a hazard between “Danger” and “Caution”.

Pay attention to signs and tags and realize that they are in place for only one reason – your safety.

Silica Exposure

29 CFR 1926.1153 Respirable Crystalline Silica

Construction employers must comply with all requirements of the standard by September 23, 2017, except requirements for laboratory evaluation of exposure samples, which begin on June 23, 2018.

Overview

Our Silica program applies to all work place exposures to respirable crystalline silica. The only exception is when employee exposure will remain below 25 micrograms per cubic meter of air (25 μg/m3) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

Definitions

The following definitions apply to our silica program will help ensure that our employees fully understand the information provided.

Action Level means a concentration of airborne respirable crystalline silica of 25 μg/m3, calculated as an 8-hour TWA.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Director means the Director of the National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, or designee.

Competent Person means an individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them. The competent person must have the knowledge and ability necessary to fulfill the responsibilities set forth in paragraph (g) of 29 CFR 1926.1153.

Employee Exposure means the exposure to airborne respirable crystalline silica that would occur if the employee were not using a respirator.

High-Efficiency Particulate air [HEPA] Filter means a filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter.

Objective Data means information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to respirable crystalline silica associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

Physician or other Licensed Health Care Professional [PLHCP] means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by paragraph (h) of 29 CFR 1926.1153.

Respirable Crystalline Silica means quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle-size-selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality – Particle Size Fraction Definitions for Health-Related Sampling.

Specialist means an American Board-Certified Specialist in Pulmonary Disease or an American Board Certified Specialist in Occupational Medicine.

This Section means this respirable crystalline silica standard, 29 CFR 1926.1153.

Specified Exposure Control Methods

If any of our employees are engaged in a task identified on Table 1 below, we will fully and properly implement the engineering controls, work practices, and respiratory protection specified for the task.

Exception: **We must assess and limit the exposure of our employees to safe levels of respirable crystalline silica using the alternative exposure control methods following Table 1.**

Table 1: Specified Exposure Control Methods when Working with Materials Containing Crystalline Silica

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 air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None

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	None
	− 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 air flow 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	None	None
	Operate from within an enclosed cab and use water for dust suppression on drill bit.	None	None
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 air flow 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.	None	None
	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.		
	− When used outdoors.	None	None
	− When used indoors or in an enclosed area.	None	APF 10
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 air flow 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
	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	None
Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points). Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions. Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.	None	None

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.	None	None
	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
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	None	None
	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None	None

When implementing the control measures specified in Table 1, we must:

a. Provide a method of exhaust to minimize the accumulation of visible airborne dust for tasks performed indoors or in enclosed areas.
b. Apply water at flow rates sufficient to minimize release of visible dust for tasks performed using wet methods
c. If an enclosed cab or booth is used, we must ensure that it:
    1. Is maintained as free as practicable from settled dust;
    2. Has door seals and closing mechanisms that work properly;
    3. Has gaskets and seals that are in good condition and working properly;
    4. Is under positive pressure maintained through continuous delivery of fresh air;
    5. Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0 μm range (e.g., MERV-16 or better); and
    6. Has heating and cooling capabilities.

If one of our employees performs more than one task on Table 1 during the course of a single work shift, the total time for all tasks will be considered. If it's more than 4 hours in total, the employees must use the respiratory protection specified in the > 4 hours/shift column. If combined it's less than four hours, employee will follow the guidelines in the ≤ 4 hours/shift column.

Alternative Exposure Control Methods

If we are unable to fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1, we must ensure the following requirements are in place.

Permissible Exposure Limit (PEL)

We must ensure that none of our employees are exposed to an airborne concentration of respirable crystalline silica in excess of 50 μg/m3, calculated as an 8-hour TWA.

Exposure Assessment

We have to assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level. This can be accomplished using one of the following options:

Performance Option:

The performance option requires that we must assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.

Scheduled Monitoring Option:

If we use the scheduled monitoring option, we have to have provide initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, and in each work area.

Where several employees perform the same tasks on the same shift and in the same work area, we may sample a representative fraction of these employees. If we use representative sampling, we must sample the employees who are expected to have the highest exposure to respirable crystalline silica.

If initial exposure monitoring indicates that certain employee's exposures are below the action level, we may discontinue monitoring for those employees.

If the most recent exposure monitoring indicates that our employee's exposures are at or above the action level but at or below the PEL, we will ensure that the monitoring is repeated within six months of those results.

If the most recent exposure monitoring indicates that our employee's exposures are above the PEL, we will be sure to repeat the monitoring within three months of those results.

If the most recent exposure monitoring results (after the first round of monitoring) indicates that our employee's exposures are below the action level, then we will repeat the monitoring within six months of those results to determine if we need to continue monitoring.

If our repeat monitoring results indicate two consecutive measurements, taken seven or more days apart, are below the action level, we may discontinue monitoring for our employees whose exposures are represented by the monitoring.

Reassessment of Exposures:

It is our responsibility as the employer to provide a hazard free work place for our employees and if we have any reason to believe that new or additional exposures at or above the action level have occurred, we will reassess employee exposures.

We will reassess exposures whenever we have 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.

Methods of Sample Analysis:

We will ensure that all of our exposure monitoring samples are evaluated by a laboratory that analyzes air samples for respirable crystalline silica in accordance with the procedures in 1926.1153 - Appendix A.

Note: Requirements for laboratory evaluation of exposure samples are require to begin on June 23, 2018.

Employee Notification of Assessment Results:

We will individually notify each affected employee in writing of the results of that assessment or post the results in an appropriate location accessible to all affected employees within five working days after completing an exposure assessment.

If an exposure assessment indicates that an employee is exposed to respirable crystalline silica above the PEL, we will provide them with a description of the corrective action being taken to reduce their exposure to within the PEL in the written notification.

Observation of Monitoring:

We will provide all affected employees, or their designated representatives, an opportunity to observe any monitoring of employee exposure to respirable crystalline silica.

When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, we must provide the observer with protective clothing and equipment at no cost and must ensure that the observer uses such clothing and equipment correctly.

Methods of Compliance

Engineering and Work Practice Controls:

We must use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless we can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, we will still use them to reduce our employee's exposure to the lowest feasible level. We will then supplement those controls with the use of respiratory protection in accordance with our Respiratory Protection Program.

Abrasive Blasting:

We must also comply with other OSHA standards, in addition to the engineering and work practice controls previous discussed, if abrasive blasting is conducted using crystalline silica-containing blasting agents or if abrasive blasting is conducted on substrates that contain crystalline silica.

Respiratory Protection

Respiratory Protection Program

When respiratory protection is required by 29 CFR 1926.1153, we will use our respiratory protection program to provide each of our employee's an appropriate respirator that complies with the requirements of 29 CFR 1910.134.

Respiratory protection is required:

a. Where specified by Table 1 - Specified Exposure Control Methods when Working with Materials Containing Crystalline Silica.

b. For tasks not listed in Table 1, or where we do not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:
    1. Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;
    2. Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering, and work practice controls are not feasible; and
    3. During tasks for which we have implemented all feasible engineering and work practice controls and those controls are not sufficient to reduce exposures to or below the PEL.

Specified Exposure Control Methods

If we are able to fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1 - Specified Exposure Control Methods when Working with Materials Containing Crystalline Silica, we will be considered to be in compliance with paragraph (e)(1) of 29 CFR 1926.1153 and the requirements for selection of respirators in 29 CFR 1910.134(d)(1)(iii) and (d)(3) with regard to exposure to respirable crystalline silica.

Housekeeping

We will not allow dry sweeping or dry brushing when it could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming, or other methods that minimize the likelihood of exposure are not feasible.

Our employees are not permitted to use compressed air to clean clothing or surfaces when it could contribute to employee exposure to respirable crystalline silica unless:

a. The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or
b. No alternative method is feasible.

Written Exposure Control Plan

We will establish and implement a written exposure control plan that contains at least the following elements:

a. A description of the tasks in the workplace that involve exposure to respirable crystalline silica;
b. A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task;
c. A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica; and
d. A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other employers or sole proprietors.

We will review and evaluate the effectiveness of the written exposure control plan at least annually and update it as necessary.

We will make the written exposure control plan readily available for examination and copying, upon request, to each employee covered by this program, their designated representatives, the Assistant Secretary, and the Director.

We will designate a competent person to implement the written exposure control plan and to make frequent and regular inspections of job sites, materials, and equipment.

Medical Surveillance

We will make medical surveillance available to our employees at no cost and at a reasonable time and place for each who will be required under this program to use a respirator for 30 or more days per year.

We will ensure that all medical examinations and procedures required by this program are performed by a Physician or other licensed health care professional or PLHCP.

Initial Examination

We must make available an initial baseline medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of 29 CFR 1926.1153 within the last three years. The examination must consist of:

a. A medical and work history, with emphasis on: past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;
b. A physical examination with special emphasis on the respiratory system;
c. A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film, no less than 14 x 17 inches and no more than 16 x 17 inches, or digital radiography systems), interpreted and classified according to the International Labor Office (ILO) International Classification of Radiographs of Pneumoconiosis by a NIOSH-certified B Reader;
d. A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;
e. Testing for latent tuberculosis infection; and
f. Any other tests deemed appropriate by the PLHCP.

Periodic Examinations

We will make medical examinations available that include the procedures described in paragraph (h)(2) of 29 CFR 1926.1153 (except paragraph (h)(2)(v)) at least every three years, or more frequently if recommended by the PLHCP.

Information Provided to the PLHCP

We will ensure that the examining PLHCP has a copy of this standard, and must provide the PLHCP with the following information:

a. A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;
b. The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;
c. A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and
d. Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer.

PLHCP's Written Medical Report for the Employee

We must ensure that the PLHCPs explain to our employees the results of the medical examination and provides them with a written medical report within 30 days of the medical examination performed. The written report must contain:

a. A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;
b. Any recommended limitations on the employee's use of respirators;
c. Any recommended limitations on the employee's exposure to respirable crystalline silica; and
d. A statement that the employee should be examined by a specialist (pursuant to paragraph (h)(7) of 29 CFR 1926.1153) if the chest X-ray provided in accordance with 29 CFR 1926.1153 is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

PLHCP's Written Medical Opinion for the Employer

We must also obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion will contain **only** the following:

a. The date of the examination;
b. A statement that the examination has met the requirements of 29 CFR 1926.1153; and
c. Any recommended limitations on the employee's use of respirators.

If the employee provides written authorization, the written opinion can also contain either or both of the following:

a. Any recommended limitations on the employee's exposure to respirable crystalline silica;
b. A statement that the employee should be examined by a specialist (pursuant to paragraph (h)(7) of 29 CFR 1926.1153) if the chest X-ray provided in accordance with 29 CFR 1926.1153 is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

We must ensure that each employee receives a copy of that written medical opinion within 30 days of each medical examination performed.

Additional Examinations

If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, we must make a medical examination by a specialist available within 30 days after receiving the PLHCP's written opinion.

We must ensure that the examining specialist is provided with all of the information that we provided to the PLHCP.

We must ensure that the specialist explains the results of the medical examination to the employee and provides them with a written medical report within 30 days of the examination that meets the requirements of paragraph (h)(5) (except paragraph (h)(5)(iv)) of 29 CFR 1926.1153.

We will also obtain a written opinion from the specialist within 30 days of the medical examination that meets the requirements of paragraph (h)(6) (except paragraph (h)(6)(i)(B) and (ii)(B)) of 29 CFR 1926.1153.

Communication of Silica Hazards to Employees

Hazard Communication

We will include respirable crystalline silica in Hazard Communication program. This requires that we ensure that our employees have access to labels on containers of crystalline silica and safety data sheets. Additionally, we will ensure our employees are trained in accordance with the provisions of HCS and the below information.

Employee Information and Training

We will ensure that at least the following hazards are addressed: Cancer, lung effects, immune system effects, and kidney effects.

Additionally, we must ensure that our employees can demonstrate knowledge and understanding of at least the following:

a. The health hazards associated with exposure to respirable crystalline silica;
b. Specific tasks in the workplace that could result in exposure to respirable crystalline silica;
c. Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
d. The contents of 29 CFR 1926.1153;
e. The identity of the competent person designated by the employer in accordance with paragraph (g)(4) of 29 CFR 1926.1153; and
f. The purpose and a description of the medical surveillance program required by paragraph (h) of 29 CFR 1926.1153.

We will make a copy of 29 CFR 1926.1153 readily available and without cost to our employees covered by this program.

Recordkeeping

Air Monitoring Data

We will make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica. This record will include at least the following information:

a. The date of measurement for each sample taken;
b. The task monitored;
c. Sampling and analytical methods used;
d. Number, duration, and results of samples taken;
e. Identity of the laboratory that performed the analysis;
f. Type of personal protective equipment, such as respirators, worn by the employees monitored; and
g. Name and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

Objective Data

We will make and maintain an accurate record of all objective data relied upon to comply with the requirements of 29 CFR 1926.1153. This record will include at least the following information:

a. The crystalline silica-containing material in question;
b. The source of the objective data;
c. The testing protocol and results of testing;
d. A description of the process, task, or activity on which the objective data were based; and
e. Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

Medical Surveillance

We will make and maintain an accurate record for each employee covered by medical surveillance under paragraph (h) of 29 CFR 1926.1153. The record will include the following information about the employee:

a. Name;
b. A copy of the PLHCPs' and specialists' written medical opinions; and
c. A copy of the information provided to the PLHCPs and specialists.

Medical Record Retention

We will maintain medical records and make them available in accordance with 29 CFR 1910.1020, including that medical record for each employee be preserved and maintained for at least the duration of employment plus thirty (30) years.

Slings

29 CFR 1926.251 - Rigging equipment for material handling

A sling is the assembly which connects a load to the material handling equipment. There are many types of slings including, but not limited to:

a. Bridle wire rope sling
b. Cable laid endless sling-mechanical joint sling
c. Cable laid grommet-hand tucked sling
d. Cable laid rope sling-mechanical joint sling
e. Strand laid endless sling-mechanical joint sling
f. Strand laid grommet-hand-tucked sling

Additionally, slings are made of various materials such as alloy steel chain, wire rope, and natural and synthetic fiber rope. Each of these materials has their own operating limits which include not only capacity, but temperature, kinks, cuts, and specific conditions.

29 CFR 1926.251, *Rigging Equipment for Material Handling*, gives detailed instructions on the use of each type of sling.

All slings, regardless of type, must be inspected each day before use and all fastenings and attachments must be inspected for damage or defects by a competent person. Depending on work conditions, additional inspections may be required. Damaged or defective slings will be immediately removed from service. Below are safe operating practices which must be followed:

a. Slings may not be shortened with knots or bolts or other makeshift devices.
b. Sling legs may not be kinked.
c. Slings may not be loaded in excess of their rated capacities.
d. Slings used in a basket hitch must have the load balanced to prevent slippage.
e. Slings must be securely attached to their loads.
f. Slings must be padded or protected from the sharp edges of their loads.
g. Suspended loads must be kept clear of all obstructions.
h. All employees must be kept clear of loads about to lifted and of suspended loads.
i. Hands or fingers may not be placed between the sling and its load while the sling is being tightened around the load.
j. Shock loading is prohibited.
k. A sling may not be pulled from under a load when the load is resting on it.

Stairs

29 CFR 1926.1052 - Stairways

Stairways that are not a permanent part of the structure on which construction work is being performed must have landings of 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. Additionally:

a. Riser height and tread depth must be uniform within each flight of stairs.
b. Where doors or gates open directly on a stairway, a platform will be provided, and the swing of the door must not reduce the effective width of the platform to less than 20 inches.
c. Metal pan landings and metal pan treads, when used, must be secured in place before filling with concrete or other material.
d. All parts of stairways will be free of hazardous projections, such as protruding nails.
e. Slippery conditions on stairways will be eliminated before use.
f. Except during stairway construction:
    1. Foot traffic is prohibited on stairways with pan stairs where the treads and/or landings are to be filled at a later date, unless the stairs are temporarily fitted with solid material at least to the top edge of each pan. Temporary treads and landings will be replaced when worn below the level of the top edge of the pan.
    2. Foot traffic is prohibited on skeleton metal stairs where permanent treads and/or landings are to be installed at a later date unless the stairs are fitted with secured temporary treads and landings long enough to cover the entire tread and/or landing area.

Treads for temporary service will be made of wood or other solid material and installed the full width and depth of the stair.

Stairways having four or more risers or rising more than 30 inches will be equipped with:

a. At least one handrail
b. One stair rail system along each unprotected side or edge.

Steel Erection Activities

29 CFR 1926.750 - Scope
29 CFR 1926.751 - Definitions
29 CFR 1926.752 - Site layout, site-specific erection plan and construction sequence
29 CFR 1926.753 - Hoisting and rigging
29 CFR 1926.754 - Structural steel assembly
29 CFR 1926.755 - Column anchorage
29 CFR 1926.756 - Beams and columns
29 CFR 1926.757 - Open web steel joists
29 CFR 1926.758 - Systems-engineered metal buildings
29 CFR 1926.759 - Falling object protection
29 CFR 1926.760 - Fall protection
29 CFR 1926.761 - Training
29 CFR Subpart R App A - Guidelines for establishing the components of a site-specific erection plan
29 CFR Subpart R App C - Illustrations of Bridging Terminus Points
29 CFR Subpart R App D - Illustration of the Use of Control Lines to Demarcate Controlled Decking Zones
29 CFR Subpart R App E - Training
29 CFR Subpart R App F - Perimeter Columns
29 CFR Subpart R App G - 1926.502 (b)-(e) Fall Protection Systems Criteria and Practices
29 CFR Subpart R App H - Double Connections: Illustration of a Clipped End Connection and a Staggered Connection

Overview

This program sets forth requirements to protect our employees from the hazards associated with steel erection activities involved in the construction, alteration, and/or repair of single and multi-story buildings, bridges, and other structures where steel erection occurs. The requirements of this program apply to employees who are engaged in steel erection unless otherwise specified.

This does not cover electrical transmission towers, communication and broadcast towers, or holding tanks.

Examples of structures where steel erection may occur include but are not limited to the following: Single and multi-story buildings; systems-engineered metal buildings; lift slab/tilt-up structures; energy exploration structures; energy production, transfer and storage structures and facilities; auditoriums; malls; amphitheaters; stadiums; power plants; mills; chemical process structures; bridges; trestles; overpasses; underpasses; viaducts; aqueducts; aerospace facilities and structures; radar and communication structures; light towers; signage; billboards; scoreboards; conveyor systems; conveyor supports and related framing; stairways; stair towers; fire escapes; draft curtains; fire containment structures; monorails; aerialways; catwalks; curtain walls; window walls; store fronts; elevator fronts; entrances; skylights; metal roofs; industrial structures; hi-bay structures; rail, marine and other transportation structures; sound barriers; water process and water containment structures; air and cable supported structures; space frames; geodesic domes; canopies; racks and rack support structures and frames; platforms; walkways; balconies; atriums; penthouses; car dumpers; stackers/reclaimers; cranes and craneways; bins; hoppers; ovens; furnaces; stacks; amusement park structures and rides; and artistic and monumental structures.

Steel erection activities include hoisting, laying out, placing, connecting, welding, burning, guying, bracing, bolting, plumbing and rigging structural steel, steel joists and metal buildings; installing metal decking, curtain walls, window walls, siding systems, miscellaneous metals, ornamental iron and similar materials; and moving point-to-point while performing these activities.

The following activities are covered by this program when they occur during and are a part of steel erection activities: rigging, hoisting, laying out, placing, connecting, guying, bracing, dismantling, burning, welding, bolting, grinding, sealing, caulking, and all related activities for construction, alteration and/or repair of materials and assemblies such as structural steel; ferrous metals and alloys; non-ferrous metals and alloys; glass; plastics and synthetic composite materials; structural metal framing and related bracing and assemblies; anchoring devices; structural cabling; cable stays; permanent and temporary bents and towers; falsework for temporary supports of permanent steel members; stone and other non-precast concrete architectural materials mounted on steel frames; safety systems for steel erection; steel and metal joists; metal decking and raceway systems and accessories; metal roofing and accessories; metal siding; bridge flooring; cold formed steel framing; elevator beams; grillage; shelf racks; multi-purpose supports; crane rails and accessories; miscellaneous, architectural and ornamental metals and metal work; ladders; railings; handrails; fences and gates; gratings; trench covers; floor plates; castings; sheet metal fabrications; metal panels and panel wall systems; louvers; column covers; enclosures and pockets; stairs; perforated metals; ornamental iron work, expansion control including bridge expansion joint assemblies; slide bearings; hydraulic structures; fascias; soffit panels; penthouse enclosures; skylights; joint fillers; gaskets; sealants and seals; doors; windows; hardware; detention/security equipment and doors, windows and hardware; conveying systems; building specialties; building equipment; machinery and plant equipment, furnishings and special construction.

Definitions

Anchored bridging means that the steel joist bridging is connected to a bridging terminus point.

Bolted diagonal bridging means diagonal bridging that is bolted to a steel joist or joists.

Bridging clip means a device that is attached to the steel joist to allow the bolting of the bridging to the steel joist.

Bridging terminus point means a wall, a beam, tandem joists (with all bridging installed and a horizontal truss in the plane of the top chord) or other element at an end or intermediate point(s) of a line of bridging that provides an anchor point for the steel joist bridging.

Choker means a wire rope or synthetic fiber rigging assembly that is used to attach a load to a hoisting device.

Cold forming means the process of using press brakes, rolls, or other methods to shape steel into desired cross sections at room temperature.

Column means a load-carrying vertical member that is part of the primary skeletal framing system. Columns do not include posts.

Competent person (also defined in § 1926.32) means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Connector means an employee who, working with hoisting equipment, is placing and connecting structural members and/or components.

Constructability means the ability to erect structural steel members in accordance with subpart R without having to alter the over-all structural design.

Construction load (for joist erection) means any load other than the weight of the employee(s), the joists and the bridging bundle.

Controlled Decking Zone (CDZ) means an area in which certain work (for example, initial installation and placement of metal decking) may take place without the use of guardrail systems, personal fall arrest systems, fall restraint systems, or safety net systems and where access to the zone is controlled.

Controlled load lowering means lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

Controlling contractor means a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project -- its planning, quality and completion.

Critical lift means a lift that (1) exceeds 75 percent of the rated capacity of the crane or derrick, or (2) requires the use of more than one crane or derrick.

Decking hole means a gap or void more than 2 inches (5.1 cm) in its least dimension and less than 12 inches (30.5 cm) in its greatest dimension in a floor, roof or other walking/working surface. Pre-engineered holes in cellular decking (for wires, cables, etc.) are not included in this definition.

Derrick floor means an elevated floor of a building or structure that has been designated to receive hoisted pieces of steel prior to final placement.

Double connection means an attachment method where the connection point is intended for two pieces of steel which share common bolts on either side of a central piece.

Double connection seat means a structural attachment that, during the installation of a double connection, supports the first member while the second member is connected.

Erection bridging means the bolted diagonal bridging that is required to be installed prior to releasing the hoisting cables from the steel joists.

Fall restraint system means a fall protection system that prevents the user from falling any distance. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment. The other components typically include a lanyard, and may also include a lifeline and other devices.

Final interior perimeter means the perimeter of a large permanent open space within a building such as an atrium or courtyard. This does not include openings for stairways, elevator shafts, etc.

Girt (in systems-engineered metal buildings) means a "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting wall material.

Headache ball means a weighted hook that is used to attach loads to the hoist load line of the crane.

Hoisting equipment means commercially manufactured lifting equipment designed to lift and position a load of known weight to a location at some known elevation and horizontal distance from the equipment's center of rotation. "Hoisting equipment" includes but is not limited to cranes, derricks, tower cranes, barge-mounted derricks or cranes, gin poles and gantry hoist systems. A "come-a-long" (a mechanical device, usually consisting of a chain or cable attached at each end, that is used to facilitate movement of materials through leverage) is not considered "hoisting equipment."

Leading edge means the unprotected side and edge of a floor, roof, or formwork for a floor or other walking/working surface (such as deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed.

Metal decking means a commercially manufactured, structural grade, cold rolled metal panel formed into a series of parallel ribs; for this subpart, this includes metal floor and roof decks, standing seam metal roofs, other metal roof systems and other products such as bar gratings, checker plate, expanded metal panels, and similar products. After installation and proper fastening, these decking materials serve a combination of functions including, but not limited to: a structural element designed in combination with the structure to resist, distribute and transfer loads, stiffen the structure and provide a diaphragm action; a walking/working surface; a form for concrete slabs; a support for roofing systems; and a finished floor or roof.

Multiple lift rigging means a rigging assembly manufactured by wire rope rigging suppliers that facilitates the attachment of up to five independent loads to the hoist rigging of a crane.

Opening means a gap or void 12 inches (30.5 cm) or more in its least dimension in a floor, roof or other walking/working surface. For the purposes of this subpart, skylights and smoke domes that do not meet the strength requirements of § 1926.754(e)(3) will be regarded as openings.

Permanent floor means a structurally completed floor at any level or elevation (including slab on grade).

Personal fall arrest system means a system used to arrest an employee in a fall from a working level. A personal fall arrest system consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combination of these. The use of a body belt for fall arrest is prohibited.

Positioning device system means a body belt or body harness rigged to allow an employee to be supported on an elevated, vertical surface, such as a wall or column and work with both hands free while leaning.

Post means a structural member with a longitudinal axis that is essentially vertical, that: (1) weighs 300 pounds or less and is axially loaded (a load presses down on the top end), or (2) is not axially loaded, but is laterally restrained by the above member. Posts typically support stair landings, wall framing, mezzanines and other substructures.

Project structural engineer of record means the registered, licensed professional responsible for the design of structural steel framing and whose seal appears on the structural contract documents.

Purlin (in systems-engineered metal buildings) means a "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting roof material.

Qualified person (also defined in § 1926.32) means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

Safety deck attachment means an initial attachment that is used to secure an initially placed sheet of decking to keep proper alignment and bearing with structural support members.

Shear connector means headed steel studs, steel bars, steel lugs, and similar devices which are attached to a structural member for the purpose of achieving composite action with concrete.

Steel erection means the construction, alteration or repair of steel buildings, bridges and other structures, including the installation of metal decking and all planking used during the process of erection.

Steel joist means an open web, secondary load-carrying member of 144 feet (43.9 m) or less, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses or cold-formed joists.

Steel joist girder means an open web, primary load-carrying member, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses.

Steel truss means an open web member designed of structural steel components by the project structural engineer of record. For the purposes of this subpart, a steel truss is considered equivalent to a solid web structural member.

Structural steel means a steel member, or a member made of a substitute material (such as, but not limited to, fiberglass, aluminum or composite members). These members include, but are not limited to, steel joists, joist girders, purlins, columns, beams, trusses, splices, seats, metal decking, girts, and all bridging, and cold formed metal framing which is integrated with the structural steel framing of a building.

Systems-engineered metal building means a metal, field-assembled building system consisting of framing, roof and wall coverings. Typically, many of these components are cold-formed shapes. These individual parts are fabricated in one or more manufacturing facilities and shipped to the job site for assembly into the final structure. The engineering design of the system is normally the responsibility of the systems-engineered metal building manufacturer.

Tank means a container for holding gases, liquids or solids.

Unprotected sides and edges means any side or edge (except at entrances to points of access) of a walking/working surface, for example a, floor, roof, ramp or runway, where there is no wall or guardrail system at least 39 inches (1.0 m) high.

Site Layout, Site Specific Erection Plan & Construction Sequence

Before authorizing the commencement of steel erection, the controlling contractor must ensure that the steel erector is provided with the following written notifications:

a. The concrete in the footings, piers and walls and the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.
b. Any repairs, replacements and modifications to the anchor bolts.

A steel erection contractor cannot erect steel unless it has received written notification that the concrete in the footings, piers and walls or the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.

The controlling contractor must ensure that the following is provided and maintained:

a. Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the material to be erected and means and methods for pedestrian and vehicular control. Exception: this requirement does not apply to roads outside of the construction site.
b. A firm, properly graded, drained area, readily accessible to the work with adequate space for the safe storage of materials and the safe operation of the erector's equipment.

All hoisting operations in steel erection must be pre-planned to ensure that there are no workers under loads except during the initial connection of steel or for hooking and unhooking.

When we elect, due to conditions specific to a site, to develop alternate means and methods that provide employees protection, a site-specific erection plan will be developed by a qualified person and be available at the work site.

Hoisting and Rigging

All the provisions of our Cranes apply to hoisting and rigging with the exception that cranes or derricks may be used to hoist employees on a personnel platform when performing steel erection.

In addition, the following applies regarding the hazards associated with hoisting and rigging.

<u>Pre-shift Visual Inspection of Cranes</u>

Cranes being used in steel erection activities must be visually inspected prior to each shift by a competent person. The inspection must include observation for deficiencies during operation. At a minimum this inspection will include the following:

a. All control mechanisms for maladjustments;
b. Control and drive mechanism for excessive wear of components and contamination by lubricants, water or other foreign matter;
c. Safety devices, including but not limited to boom angle indicators, boom stops, boom kick out devices, anti-two block devices, and load moment indicators where required;
d. Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation;
e. Hooks and latches for deformation, chemical damage, cracks, or wear;
f. Wire rope reeving for compliance with hoisting equipment manufacturer's specifications;
g. Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation;
h. Hydraulic system for proper fluid level;

i. Tires for proper inflation and condition;
j. Ground conditions around the hoisting equipment for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions;
k. The hoisting equipment for level position; and
l. The hoisting equipment for level position after each move and setup.

If any deficiency is identified, an immediate determination must 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.

The operator is responsible for the operations under the operator's direct control. Whenever there is any doubt as to safety, the operator has the authority to stop and refuse to handle loads until safety has been assured.

A qualified rigger (a rigger who is also a qualified person) must inspect the rigging prior to each shift.

The headache ball, hook or load cannot be used to transport personnel, except that cranes or derricks may be used to hoist employees on a personnel platform.

Safety latches on hooks cannot be deactivated or made inoperable except:

a. When a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so; or
b. When equivalent protection is provided in a site-specific erection plan.

<u>Working Under Loads</u>

Routes for suspended loads must be pre-planned to ensure that no employee is required to work directly below a suspended load except for:

a. Employees engaged in the initial connection of the steel; or
b. Employees necessary for the hooking or unhooking of the load.

When working under suspended loads, the following criteria must be met:

a. Materials being hoisted will be rigged to prevent unintentional displacement;
b. Hooks with self-closing safety latches or their equivalent will be used to prevent components from slipping out of the hook; and
c. All loads will be rigged by a qualified rigger

<u>Multiple Lift Rigging Procedure</u>

A multiple lift can only be performed if the following criteria are met:

a. A multiple lift rigging assembly is used;
b. A maximum of five members are hoisted per lift;
c. Only beams and similar structural members are lifted; and
d. All employees engaged in the multiple lift have been trained in these procedures.
e. No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations.

Components of the multiple lift rigging assembly must be specifically 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, must be based on the manufacturer's specifications with a 5 to 1 safety factor for all components.

The total load cannot exceed:

a. The rated capacity of the hoisting equipment specified in the hoisting equipment load charts;
b. The rigging capacity specified in the rigging rating chart.

The multiple lift rigging assembly must be rigged with members:

a. Attached at their center of gravity and maintained reasonably level;
b. Rigged from top down; and
c. Rigged at least 7 feet (2.1 m) apart.

The members on the multiple lift rigging assembly must be set from the bottom up.

Controlled load lowering must be used whenever the load is over the connectors.

Structural Steel Assembly

Structural stability must be maintained at all times during the erection process.

Note: Federal Highway Administration (FHWA) regulations incorporate by reference a number of standards, policies, and standard specifications published by the American Association of State Highway and Transportation Officials (AASHTO) and other organizations. (*See* 23 CFR 625.4). Many of these incorporated provisions may be relevant to maintaining structural stability during the erection process. For instance, as of May 17, 2010, in many cases FHWA requires a Registered Engineer to prepare and seal working drawings for falsework used in highway bridge construction. (*See* AASHTO Specifications for Highway Bridges, Div. II, §3.2.1, 15th edition, 1992, which FHWA incorporates by reference in 23 CFR 625.4). FHWA also encourages compliance with AASHTO Specifications that the FHWA regulations do not currently incorporate by reference.

The following additional requirements apply for multi-story structures:

a. The permanent floors must be installed as the erection of structural members progresses, and there cannot be more than eight stories between the erection floor and the upper-most permanent floor, except where the structural integrity is maintained as a result of the design.
b. At no time can there be more than four floors or 48 feet (14.6 m), whichever is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor, except where the structural integrity is maintained as a result of the design.
c. A fully planked or decked floor or nets will be maintained within two stories or 30 feet (9.1 m), whichever is less, directly under any erection work being performed.

<u>Walking/Working Surfaces - Shear Connectors and Other Similar Devices</u>

Shear connectors (such as headed steel studs, steel bars or steel lugs), reinforcing bars, deformed anchors or threaded studs are tripping hazards. They cannot be attached to the top flanges of beams, joists or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking, or other walking/working surface, has been installed.

When shear connectors are used in construction of composite floors, roofs and bridge decks, employees must lay out and install the shear connectors after the metal decking has been installed, using the metal decking as a working platform. Shear connectors cannot be installed from within a controlled decking zone (CDZ).

Plumbing-Up

When deemed necessary by a competent person, plumbing-up equipment can be installed in conjunction with the steel erection process to ensure the stability of the structure.

When used, plumbing-up equipment must be in place and properly installed before the structure is loaded with construction material such as loads of joists, bundles of decking or bundles of bridging.

Plumbing-up equipment can only be removed with the approval of a competent person.

Metal Decking

Bundle packaging and strapping cannot be used for hoisting unless specifically designed for that purpose.

If loose items such as dunnage, flashing, or other materials are placed on the top of metal decking bundles to be hoisted, such items must be secured to the bundles.

Metal decking bundles must be landed on framing members so that enough support is provided to allow the bundles to be unbanded without dislodging the bundles from the supports.

At the end of the shift or when environmental or jobsite conditions require, metal decking must be secured against displacement.

Metal decking at roof and floor holes and openings must be installed as follows:

a. Framed metal deck openings will have structural members turned down to allow continuous deck installation except where not allowed by structural design constraints or constructability.
b. Roof and floor holes and openings will be decked over. Where large size, configuration or other structural design does not allow openings to be decked over (such as elevator shafts, stair wells, etc.) employees will be protected in accordance with § 1926.760(a)(1).
c. Metal decking holes and openings will not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use and which meets the strength requirements of paragraph (e)(3) of this section, or will be immediately covered.

Covering Roof and Floor Openings

Covers for roof and floor openings must be capable of supporting, without failure, twice the weight of the employees, equipment and materials that may be imposed on the cover at any one time.

All covers have to be secured when installed to prevent accidental displacement by the wind, equipment or employees.

All covers must be painted with high-visibility paint or be marked with the word "HOLE" or "COVER" to provide warning of the hazard.

Smoke dome or skylight fixtures that have been installed, are not considered covers for the purpose of this section unless they are design for that purpose.

Decking Gaps Around Columns

Wire mesh, exterior plywood, or equivalent, must be installed around columns where planks or metal decking do not fit tightly. The materials used must be of sufficient strength to provide fall protection for personnel and prevent objects from falling through.

Installation of Metal Decking

Metal decking must be laid tightly and immediately secured upon placement to prevent accidental movement or displacement.

During initial placement, metal decking panels must be placed to ensure full support by structural members.

Derrick Floors

A derrick floor will be fully decked and/or planked and the steel member connections completed to support the intended floor loading.

Temporary loads placed on a derrick floor will be distributed over the underlying support members so as to prevent local overloading of the deck material.

Column Anchorage

All columns must be anchored by a minimum of 4 anchor rods (anchor bolts).

Each column anchor rod (anchor bolt) assembly, including the column-to-base plate weld and the column foundation, must be designed to resist a minimum eccentric gravity load of 300 pounds (136.2 kg) located 18 inches (.46m) from the extreme outer face of the column in each direction at the top of the column shaft.

Columns must be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs which are adequate to transfer the construction loads.

All columns must be evaluated by a competent person to determine whether guying or bracing is needed; if guying or bracing is needed, it will be installed.

Repair, Replacement or Field Modification of Anchor Rods (Anchor Bolts)

Anchor rods (anchor bolts) cannot be repaired, replaced or field-modified without the approval of the project structural engineer of record.

Prior to the erection of a column, the controlling contractor must provide written notification to the steel erector if there has been any repair, replacement or modification of the anchor rods (anchor bolts) of that column.

Beams and Columns

During the final placing of solid web structural members, the load cannot be released from the hoisting line until the members are secured with at least two bolts per connection, of the same size and strength as shown in the erection drawings, drawn up wrench-tight or the equivalent as specified by the project structural engineer of record, except when used as diagonal bracing.

A competent person must determine if more than two bolts are necessary to ensure the stability of cantilevered members; if additional bolts are needed, they must be installed.

Diagonal Bracing

Solid web structural members used as diagonal bracing will be secured by at least one bolt per connection drawn up wrench-tight or the equivalent as specified by the project structural engineer of record.

Double Connections at Columns and/or at Beam Webs Over a Column

When two structural members on opposite sides of a column web, or a beam web over a column, are connected sharing common connection holes, at least one bolt with its wrench-tight nut must remain connected to the first member unless a shop-attached or field-attached seat or equivalent connection device is supplied with the member to secure the first member and prevent the column from being displaced.

If a seat or equivalent device is used, the seat (or device) must be designed to support the load during the double connection process. It must be adequately bolted or welded to both a supporting member and the first member before the nuts on the shared bolts are removed to make the double connection.

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Column Splices

Each column splice must be designed to resist a minimum eccentric gravity load of 300 pounds (136.2 kg) located 18 inches (.46 m) from the extreme outer face of the column in each direction at the top of the column shaft.

Perimeter Columns

Perimeter columns will not be erected unless:

a. The perimeter columns extend a minimum of 48 inches (1.2 m) above the finished floor to permit installation of perimeter safety cables prior to erection of the next tier, except where constructability does not allow.
b. The perimeter columns have holes or other devices in or attached to perimeter columns at 42-45 inches (107-114 cm) above the finished floor and the midpoint between the finished floor and the top cable to permit installation of perimeter safety cables, except where constructability does not allow.

Open Web Steel Joists

Where steel joists are used and columns are not framed in at least two directions with solid web structural steel members, a steel joist must be field-bolted at the column to provide lateral stability to the column during erection. For the installation of this joist:

a. A vertical stabilizer plate must be provided on each column for steel joists. The plate will be a minimum of 6 inch by 6 inch (152 mm by 152 mm) and will extend at least 3 inches (76 mm) below the bottom chord of the joist with a 13/16 inch (21 mm) hole to provide an attachment point for guying or plumbing cables.
b. The bottom chords of steel joists at columns must be stabilized to prevent rotation during erection.
c. Hoisting cables cannot be released until the seat at each end of the steel joist is field-bolted, and each end of the bottom chord is restrained by the column stabilizer plate.

Where constructability does not allow a steel joist to be installed at the column:

a. An alternate means of stabilizing joists that provides an equivalent level of stability must be installed on both sides near the column and must:
    1. be designed by a qualified person;
    2. be shop installed; and
    3. be included in the erection drawings.
b. Hoisting cables must not be released until the seat at each end of the steel joist is field-bolted and the joist is stabilized.

Where steel joists at or near columns span 60 feet (18.3 m) or less, the joist must be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging.

Where steel joists at or near columns span more than 60 feet (18.3 m), the joists must be set in tandem with all bridging installed unless an alternative method of erection, which provides equivalent stability to the steel joist, is designed by a qualified person and is included in the site-specific erection plan.

A steel joist or steel joist girder cannot be placed on any support structure unless such structure is stabilized.

When steel joist(s) are landed on a structure, they must be secured to prevent unintentional displacement prior to installation.

No modification that affects the strength of a steel joist or steel joist girder can be made without the approval of the project structural engineer of record.

Except for steel joists that have been pre-assembled into panels, connections of individual steel joists to steel structures in bays of 40 feet (12.2 m) or more must be fabricated to allow for field bolting during erection. These connections must be field-bolted unless constructability does not allow.

Steel joists and steel joist girders cannot be used as anchorage points for a fall arrest system unless written approval to do so is obtained from a qualified person.

A bridging terminus point must be established before bridging is installed.

Attachment of Steel Joists and Steel Joist Girders

Each end of "K" series steel joists must be attached to the support structure with a minimum of two 1/8-inch (3 mm) fillet welds 1 inch (25 mm) long or with two 1/2-inch (13 mm) bolts, or the equivalent.

Each end of "LH" and "DLH" series steel joists and steel joist girders must be attached to the support structure with a minimum of two 1/4-inch (6 mm) fillet welds 2 inches (51 mm) long, or with two 3/4-inch (19 mm) bolts, or the equivalent.

Each steel joist must be attached to the support structure, at least at one end on both sides of the seat, immediately upon placement in the final erection position and before additional joists are placed.

Panels that have been pre-assembled from steel joists with bridging must be attached to the structure at each corner before the hoisting cables are released.

Erection of Steel Joists

Both sides of the seat of one end of each steel joist that requires bridging under Tables A and B must be attached to the support structure before hoisting cables are released.

For joists over 60 feet, both ends of the joist must be properly attached before the hoisting cables are released.

On steel joists that do not require erection bridging under Tables A and B, only one employee is allowed on the joist until all bridging is installed and anchored.

Table A -- Erection Bridging for Short Span Joists

Joist	Span
8L1	NM
10K1	NM
12K1	23-0
12K3	NM
12K5	NM
14K1	27-0
14K3	NM
14K4	NM
14K6	NM
16K2	29-0
16K3	30-0
16K4	32-0
16K5	32-0
16K6	NM
16K7	NM
16K9	NM
18K3	31-0
18K4	32-0
18K5	33-0
18K6	35-0
18K7	NM
18K9	NM
18K10	NM
20K3	32-0
20K4	34-0
20K5	34-0
20K6	36-0
20K7	39-0
20K9	39-0
20K10	NM
22K4	34-0
22K5	35-0
22K6	36-0
22K7	40-0
22K9	40-0
22K10	40-0
22K11	40-0
24K4	36-0
24K5	38-0
24K6	39-0
24K7	43-0
24K8	43-0
24K9	44-0
24K10	NM
24K12	NM
26K5	38-0
26K6	39-0
26K7	43-0
26K8	44-0
26K9	45-0
26K10	49-0
26K12	NM
28K6	40-0
28K7	43-0
28K8	44-0
28K9	45-0
28K10	49-0
28K12	53-0
30K7	44-0
30K8	45-0
30K9	45-0
30K10	50-0
30K11	52-0
30K12	54-0
10KCS1	NM
10KCS2	NM
10KCS3	NM
12KCS1	NM
12KCS2	NM
12KCS3	NM
14KCS1	NM
14KCS2	NM
14KCS3	NM
16KCS2	NM
16KCS3	NM
16KCS4	NM
16KCS5	NM
18KCS2	35-0
18KCS3	NM
18KCS4	NM
18KCS5	NM
20KCS2	36-0
20KCS3	39-0
20KCS4	NM
20KCS5	NM
22KCS2	36-0
22KCS3	40-0
22KCS4	NM
22KCS5	NM
24KCS2	39-0
24KCS3	44-0
24KCS4	NM
24KCS5	NM
26KCS2	39-0
26KCS3	44-0
26KCS4	NM
26KCS5	NM
28KCS2	40-0
28KCS3	45-0
28KCS4	53-0
28KCS5	53-0
30KC53	45-0
30KCS4	54-0
30KCS5	54-0

Note: NM = diagonal bolted bridging not mandatory.

Table B -- Erection Bridging for Long Span Joists	
Joist	**Span**
18LH02	33-0
18LH03	NM
18LH04	NM
18LH05	NM
18LH06	NM
18LH07	NM
18LH08	NM
18LH09	NM
20LH02	33-0
20LH03	38-0
20LH04	NM
20LH05	NM
20LH06	NM
20LH07	NM
20LH08	NM
20LH09	NM
20LH10	NM
24LH03	35-0
24LH04	39-0
24LH05	40-0
24LH06	45-0
24LH07	NM
24LH08	NM
24LH09	NM
24LH10	NM
24LH11	NM
28LH05	42-0
28LH06	46-0
28LH07	NM
28LH08	NM
28LH09	NM
28LH10	NM
28LH11	NM
28LH12	NM
28LH13	NM
32LH06	47-0 through 60-0
32LH07	47-0 through 60-0
32LH08	55-0 through 60-0
32LH09	NM through 60-0
32LH10	NM through 60-0
32LH11	NM through 60-0
32LH12	NM through 60-0
32LH13	NM through 60-0
32LH14	NM through 60-0
32LH15	NM through 60-0
36LH07	47-0 through 60-0
36LH08	47-0 through 60-0
36LH09	57-0 through 60-0
36LH10	NM through 60-0
36LH11	NM through 60-0
36LH12	NM through 60-0
36LH13	NM through 60-0
36LH14	NM through 60-0
36LH15	NM through 60-0

Note: NM = diagonal bolted bridging not mandatory.

Employees are not be allowed on steel joists where the span of the steel joist is equal to or greater than the span shown in Tables A and B above except for approved bridging work.

When permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points are required to provide stability.

Erection Bridging

Where the span of the steel joist is equal to or greater than the span shown in Tables A and B above, the following applies:

a. A row of bolted diagonal erection bridging must be installed near the midspan of the steel joist;
b. Hoisting cables cannot be released until this bolted diagonal erection bridging is installed and anchored; and
c. No more than one employee is allowed on these spans until all other bridging is installed and anchored.

Where the span of the steel joist is over 60 feet (18.3 m) through 100 feet (30.5 m), the following applies:

a. All rows of bridging must be bolted diagonal bridging;
b. Two rows of bolted diagonal erection bridging must be installed near the third points of the steel joist;
c. Hoisting cables cannot be released until this bolted diagonal erection bridging is installed and anchored; and
d. No more than two employees are allowed on these spans until all other bridging is installed and anchored.

Where the span of the steel joist is over 100 feet (30.5 m) through 144 feet (43.9 m), the following will apply:

a. All rows of bridging must be bolted diagonal bridging;
b. Hoisting cables cannot be released until all bridging is installed and anchored; and
c. No more than two employees are allowed on these spans until all bridging is installed and anchored.

For steel members spanning over 144 feet (43.9 m), the erection methods used must be in accordance with Beams and Columns above.

Where any steel joist is a bottom chord bearing joist, a row of bolted diagonal bridging must be provided near the support(s). This bridging must be installed and anchored before the hoisting cable(s) is released. When bolted diagonal erection bridging is required, the following applies:

a. The bridging must be indicated on the erection drawing;
b. The erection drawing must be the exclusive indicator of the proper placement of this bridging;
c. Shop-installed bridging clips, or functional equivalents, must be used where the bridging bolts to the steel joists;
d. When two pieces of bridging are attached to the steel joist by a common bolt, the nut that secures the first piece of bridging cannot be removed from the bolt for the attachment of the second; and
e. Bridging attachments cannot protrude above the top chord of the steel joist.

Landing and Placing Loads

During the construction period, the employer placing a load on steel joists must ensure that the load is distributed so as not to exceed the carrying capacity of any steel joist.

No construction loads or bundles of decking are allowed on the steel joists until all bridging is installed and anchored and all joist-bearing ends are attached, unless all of the following conditions are met:

a. The employer has first determined from a qualified person and documented in a site-specific erection plan that the structure or portion of the structure is capable of supporting the load;
b. The load is placed on a minimum of three steel joists;
c. The joists supporting the load are attached at both ends;
d. At least one row of bridging is installed and anchored;
e. The total weight of the load does not exceed 4,000 pounds (1816 kg); and
f. The load is placed within 1 foot (.30 m) of the bearing surface of the joist end.

The weight of a bundle of joist bridging cannot exceed a total of 1,000 pounds (454 kg). A bundle of joist bridging must be placed on a minimum of three steel joists that are secured at one end. The edge of the bridging bundle will be positioned within 1 foot (.30 m) of the secured end.

Systems-Engineered Metal Buildings

All of the following requirements apply to the erection of systems-engineered metal buildings except Column Anchorage and Open Web Steel Joists.

Each structural column must be anchored by a minimum of four anchor rods (anchor bolts).

Rigid frames must have 50 percent of their bolts or the number of bolts specified by the manufacturer (whichever is greater) installed and tightened on both sides of the web adjacent to each flange before the hoisting equipment is released.

Construction loads cannot be placed on any structural steel framework unless such framework is safely bolted, welded or otherwise adequately secured.

In girt and eave strut-to-frame connections, when girts or eave struts share common connection holes, at least one bolt with its wrench-tight nut must remain connected to the first member unless a manufacturer-supplied, field-attached seat or similar connection device is present to secure the first member so that the girt or eave strut is always secured against displacement.

Both ends of all steel joists or cold-formed joists must be fully bolted and/or welded to the support structure before:

a. Releasing the hoisting cables;
b. Allowing an employee on the joists; or
c. Allowing any construction loads on the joists.

Purlins and girts cannot be used as an anchorage point for a fall arrest system unless written approval is obtained from a qualified person.

Purlins may only be used as a walking/working surface when installing safety systems, after all permanent bridging has been installed and fall protection is provided.

Construction loads may be placed only within a zone that is within 8 feet (2.5 m) of the center-line of the primary support member.

Falling Object Protection

All materials, equipment, and tools, which are not in use while aloft, must be secured against accidental displacement.

The controlling contractor must bar other construction processes below steel erection unless overhead protection for the employees below is provided.

Fall Protection

Except for Connectors and in Controlled Decking Zones, each employee engaged in a steel erection activity who is on a walking/working surface with an unprotected side or edge more than 15 feet (4.6 m) above a lower level must be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.

On multi-story structures, perimeter safety cables must be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed.

Connectors and employees working in controlled decking zones must be protected from fall hazards as provided below, respectively.

<u>Connectors</u>.

Each connector will:

a. Be protected from fall hazards of more than two stories or 30 feet (9.1 m) above a lower level, whichever is less;
b. Have completed connector training; and
c. Be provided, at heights over 15 and up to 30 feet above a lower level, with a personal fall arrest system, positioning device system or fall restraint system and wear the equipment necessary to be able to be tied off; or be provided with other means of protection from fall hazards.

<u>Controlled Decking Zone (CDZ).</u>

A controlled decking zone may be established in that area of the structure over 15 and up to 30 feet above a lower level where metal decking is initially being installed and forms the leading edge of a work area. In each CDZ, the following applies:

a. Each employee working at the leading edge in a CDZ must be protected from fall hazards of more than two stories or 30 feet (9.1 m), whichever is less.
b. Access to a CDZ is limited to only those employees engaged in leading edge work.
c. The boundaries of a CDZ are designated and clearly marked. The CDZ cannot be more than 90 feet (27.4 m) wide and 90 (27.4 m) feet deep from any leading edge. The CDZ must be marked by the use of control lines or the equivalent.
d. Each employee working in a CDZ will have completed CDZ training.
f. Unsecured decking in a CDZ will not exceed 3,000 square feet (914.4 m^2).
g. Safety deck attachments must be performed in the CDZ from the leading edge back to the control line and must have at least two attachments for each metal decking panel.
h. Final deck attachments and installation of shear connectors cannot be performed in the CDZ.

Criteria for Fall Protection Equipment

Guardrail systems, safety net systems, personal fall arrest systems, positioning device systems and their components must conform to the criteria in our Fall Protection program.

Fall arrest system components only can be used in fall restraint systems. Either body belts or body harnesses can be used in fall restraint systems.

Perimeter safety cables will meet the criteria for guardrail systems in our Fall Protection program.

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Custody of Fall Protection

Fall protection provided by the steel erector can remain in the area where steel erection activity has been completed, to be used by other trades, only if the controlling contractor or its authorized representative has:

a. Directed the steel erector to leave the fall protection in place; and
b. Inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area.

Training

All required training must be provided by a qualified person(s).

Fall Hazard Training

Millerick Engineering, Inc. will institute a training program and ensure participation by all employees exposed to a fall hazard. The program must include training and instruction in the following areas:

a. The recognition and identification of fall hazards in the work area;
b. The use and operation of guardrail systems (including perimeter safety cable systems), personal fall arrest systems, positioning device systems, fall restraint systems, safety net systems, and other protection to be used;
c. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
d. The procedures to be followed to prevent falls to lower levels and through or into holes and openings in walking/working surfaces and walls; and
e. The fall protection requirements of this subpart.

In addition to the training required above, Millerick Engineering, Inc. provide special training to employees engaged in the following activities.

Multiple Lift Rigging Procedure:

The employer will ensure that each employee who performs multiple lift rigging has been provided training in the following areas:

b. The nature of the hazards associated with multiple lifts; and
c. The proper procedures and equipment to perform multiple lifts.

Connector Procedures

The employer will ensure that each connector has been provided training in the following areas:

a. The nature of the hazards associated with connecting; and
b. The establishment, access, proper connecting techniques and work practices.

Controlled Decking Zone Procedures

Where CDZs are being used, the employer will assure that each employee has been provided training in the following areas:

a. The nature of the hazards associated with work within a controlled decking zone; and
b. The establishment, access, proper installation techniques and work practices.

Tools - Hand

29 CFR 1926.300 - General requirements

29 CFR 1926.301 - Hand tools

All hand and power tools and similar equipment, whether furnished by the employer or the employee, will be maintained in a safe condition.

Here are basic procedures for the use of hand tools:

a. Hand tools will be used only for the purpose for which they are designed.
b. Hand tools will be kept clean and, where appropriate, oiled.
c. Hand tools which are damaged will not be used.
d. Hand held cutting tools will be kept sharp and will be sheathed or retracted when not in use.
e. When using a striking tool such as a hammer or chisel, safety glasses or safety goggles will be used.
f. Do not force tools.
g. If you are unfamiliar with the proper procedure for using a tool, ask your Supervisor for instruction.
h. Power tools may be operated only by those persons who are qualified by training or experience.
i. Do not alter guards on power tools; wear appropriate PPE.
j. Electrical tools must be grounded, and, in the absence of permanent wiring, a Ground Fault Circuit Interrupter must be used.
k. Electric tools will not be lifted by their cords and pneumatic tools will not be lifted by their hoses.

Tools - Pneumatic Powered

29 CFR 1926.102 - Eye and face protection

29 CFR 1926.300 - General requirements

29 CFR 1926.302 - Power-operated hand tools

Pneumatic powered tools must be safeguarded whenever there are hazardous employee exposures. This is especially important for point of operation guarding.

Three specific hazards associated with pneumatic powered tools which are unique to their use are noise levels, tool retention, and air hose pressure.

Care must be taken to assure that noise levels are within acceptable limits (noise monitoring may be necessary) and, if required, engineering controls and/or ear protection will be employed.

Eye protection will be worn when using pneumatic powered tools in accordance with the owner/operator's manual.

a. Pneumatic power tools will be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
b. Safety clips or retainers will be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.
c. All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, which operate at more than 100 p.s.i. pressure at the tool, will have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.
d. Compressed air will not be used for cleaning purposes except where reduced to less than 30 p.s.i. & then only with effective chip guarding & personal protective equipment which meets the requirements of 29 CFR 1926 Subpart E. This would include eye, face, hand, head, & foot protection. The 30 p.s.i. requirement does not apply for concrete form, mill scale & similar cleaning purposes.
e. The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings will not be exceeded.
f. The use of hoses for hoisting or lowering tools will not be permitted.
g. All hoses exceeding 1/2-inch inside diameter will have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.
h. Airless spray guns of the type which atomize paints and fluids at high pressures (1,000 pounds or more per square inch) will be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released.

   Note: In lieu of the above, a diffuser nut which will prevent high pressure, high velocity release, while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection, will be provided.
i. Lastly, abrasive blast cleaning nozzles will be equipped with an operating valve which must be held open manually. A support will be provided on which the nozzle may be mounted when it is not in use.

Care must be taken to ensure that employees are not exposed to unsafe levels of respirable dust or crystalline silica.

The PEL for particles not otherwise regulated is 5.0 mg/m³. Our operations would not exceed these PEL's and respiratory protection is not required.

Tools - Powder-Actuated

29 CFR 1926.102 - Eye and face protection

29 CFR 1926.300 - General requirements

29 CFR 1926.302 - Power-operated hand tools

A powder-actuated fastening tool propels a nail, pin, or fastener through an object to fasten it to another object. These tools, if misused, are extremely dangerous because essentially, they are similar to a pistol or rifle.

The speed of the projectile may range from 300 ft./second to 1290 ft./second.

Only trained and authorized persons may operate a powder actuated tool, and, for safety, these tools should be kept secured when not in use.

Prior to use, the tool must be inspected and tested according to the manufacturer's instruction manual which should be kept with the tool.

Defective tools must not be used, and they must be taken out of service.

Use of appropriate personal protective equipment – including, at least, eye/face and ear protection – is required not only for the operator, but also those employees in the vicinity. PPE will be in accordance with the owner/operator's manual.

On the job site, each tool should be accompanied by: 1) its container; 2.) the operator's instruction & service manuals; 3) the tool inspection record; and 4) service tools & accessories.

Tools must not be loaded until just before firing and, under no circumstances, are they to be pointed at any person. Hands must be kept clear of the open barrel end. A powder activated tool must never be left unattended – loaded or empty – for safety and security reasons.

Fasteners must not be driven into very hard or brittle materials such as cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick or hollow tile; easily penetrated materials unless these materials are backed by a substance; nor a damaged area caused by an unsatisfactory fastening. Of course, these tools must never be used in an explosive or flammable atmosphere.

Before fastening questionable material, the operator can determine its suitability by using a fastener as a center punch. If the fastener point does not easily penetrate, is not blunted, and does not fracture the material, initial test fastenings will be made in accordance with the manufacturer's instructions.

The tool must be held perpendicular to the work surface and in the event of a misfire, the operator must hold the tool firmly against the work surface and follow, exactly, the manufacturer's instructions.

Tools must be used with the correct shield, guard, or attachments recommended by the manufacturer.

Because the case and load are color coded, it is imperative that the operator can distinguish the colors of brass and nickel as well as gray, brown, green, yellow and red and purple.

Ventilation

29 CFR 1926.57 - Ventilation

There may be times in the course of work, such as grinding, cutting, sawing, sanding, etc. that hazardous dusts are released into the atmosphere that exceed the concentrations specified in Table 2 of 29 CFR 1926.55 - Mineral Dusts, listed below:

Table 2 - Mineral Dusts	
Substance	**mppcf[j]**
SILICA:	
Crystalline	250[k]
Quartz. Threshold Limit calculated from the formula[p]	% SiO_2 + 5
Cristobalite	
Amorphous, including natural diatomaceous earth	20
SILICATES (less than 1% crystalline silica)	
Mica	20
Portland cement	50
Soapstone	20
Talc (non-asbestiform)	20
Talc (fibrous), use asbestos limit	--
Graphite (natural)	15
Inert or Nuisance Particulates:[m]	50 (or 15 mg/m^3 whichever is the smaller) of total dust <1% SiO_2
[Inert or Nuisance Dusts includes all mineral, inorganic, and organic dusts as indicated by examples in TLV's appendix D]	
Conversion factors	
mppcf × 35.3 = million particles per cubic meter = particles per c.c.	
[j]Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.	
[k]The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.	
[m]Covers all organic and inorganic particulates not otherwise regulated. Same as Particulates Not Otherwise Regulated.	
[p]This standard applies to any operations or sectors for which the respirable crystalline silica standard, 1926.1153, is stayed or otherwise is not in effect.	

Below these threshold limits, no action is required; however, employees may wear dust masks for personal comfort.

Note: OSHA requires that employees who voluntarily use disposable respirators in situations where respiratory protection is not specifically required by OSHA standard (in atmospheres where exposures are below the permissible exposure limit) essentially for personal comfort or additional, though not required, respiratory protection be informed of 29 CFR 1910.134 Appendix D.

As always, engineering controls are preferred to personal protective equipment to deal with job site hazards. Therefore, local exhaust ventilation is a preferred method of maintaining atmospheres that have dust levels below the concentrations noted in the Mineral Dusts Table, above.

Local exhaust ventilation must be designed so that they prevent dispersions of dust in concentrations causing harmful exposure and that dusts are not drawn through the work area of employees.

The dust collected by an exhaust or ventilating system will be discharged to the outside atmosphere.

If concentrations are so great that a dust separator is used, the dust and refuse will be disposed of in such a manner as to not harm employees.

Of course, if the above ventilation procedures do not reduce the dust levels to acceptable limits, respirators will be used.

Welding, Cutting, & Brazing

29 CFR 1926.350 - Gas welding and cutting
29 CFR 1926.351 - Arc welding and cutting
29 CFR 1926.352 - Fire prevention
29 CFR 1926.353 - Ventilation and protection in welding, cutting, and heating
29 CFR 1926.354 - Welding, cutting, and heating in way of preservative coatings
29 CFR 1926.1126 - Chromium (VI)
29 CFR - Table Z-1 – Limits for Air Contaminants

Employees assigned to operate arc welding, cutting, and oxygen-fuel welding and/or brazing equipment, **and their supervisors**, must be properly trained and instructed in the operation of such equipment. Proper PPE will be worn by all welders.

Before welding, cutting, or brazing, the supervisor or competent person will inspect the area with emphasis on fire prevention and authorize welding or cutting using our Hot Work Permit noting special precautions that must be taken.

An appropriate fire extinguisher and first aid equipment will be readily available for immediate use.

Compressed Gas Cylinders Use:

Compressed gas cylinders are used at many workplaces – the most common being oxygen and acetylene for welding.

Failure to follow basic safety procedures could result in serious injuries such as:

a. Flash burn – due to explosion.
b. Fragment impalement – due to explosion.
c. Compression of the foot – due to mishandling of tanks.
d. Inhalation of hazardous gases – due to leakage.

Basic safety procedures for gas cylinder use:

a. Cylinders must remain upright and chained to a substantial support or cart when in use.
b. Wear appropriate personal protective equipment for the job – such as steel toed shoes, apron, goggles, gloves, helmet, etc.
c. Read and understand the SDS for the gas being used and know the location of the SDS in case of an emergency.
d. Have appropriate fire extinguisher readily available.
e. To release the gas, open the cylinder valve slowly – standing away from the face and back of the gauge – and leave the opening tools in place (on the valve stem) for quick shut-off in the event of an emergency.
f. Ensure cylinder valves, regulators, couplings, and hoses are free of oil and grease and ensure all connections are tight.
g. When using oxygen-fuel systems, use flashback arrestors and reverse-flow check valves to prevent flashback.
h. Keep cylinders away from open flames and sources of heat.
i. **Cylinders are never allowed in confined spaces.**
    1. When welding or cutting in a confined space, the tanks must remain outside the confined space.
    2. Appropriate ventilation must be assured, portable equipment must be secured to prevent movement, if appropriate, and a rescue plan should be prepared.

3. If the rescue plan involves pulling the person out, attachment of the lifelines should be so the person’s body does not jam in the exit and prevent his extraction.
4. If arc welding is suspended for a substantial period of time, the electrodes must be removed to prevent accidental contact and the machine must be disconnected from the power source.
5. If gas cylinder work is suspended, the torch valves must be closed and the fuel-gas and oxygen supply must be positively shut off or disconnected outside the confined space.
6. After welding operations are completed, the welder must mark the hot metal or provide some other means of warning other workers

j. Do not alter or attempt to repair safety devices or valves.

k. Remove the regulators when: a) moving cylinders; b) work is completed, and/or c) cylinders are empty.

Compressed Gas Cylinders will:

a. Have valve protectors in place when not in use or connected for use.

b. be legibly marked to identify the gas contained therein.

c. Have the valves closed before the cylinder is moved, when the cylinder is empty, and at the completion of each job.

d. Be stored in areas away from intense heat, electric arcs, and high temperature lines.

e. Be secured upright (chained in portable dolly), in storage or transportation, to prevent tipping, falling, rolling, and damage from passing or falling objects. Oxygen cylinders must be kept 20 feet from any flammable gases or petroleum products.

f. Be marked "EMPTY" when appropriate.

g. Be removed from service if the regulators or gauges are defective.

h. Be used only for the purpose for which they are designed -- for example, cylinders will not be used as rollers or supports.

i. Be kept away from stairs.

j. Workers in charge of oxygen or fuel-gas supply equipment (including distribution piping systems and generators) must be instructed and judged competent for such work.

Regulators and gauges will be inspected daily.

All cylinders, cylinder valves, couplings, regulators, hoses and apparatus will be kept free of oily or greasy substances.

Operators of welding equipment will report any equipment defect or safety hazards and discontinue use of equipment until its safety has been assured. Repairs will be made only by qualified personnel.

Persons performing arc welding and cutting must be properly instructed and qualified to operated such equipment and, if performing gas shielded arc welding, must be familiar with *Recommended Safe Practices for Gas-Shielded Arc Welding*, A6.1-1966, American Welding Society, as well as 29 CFR 1910.252.

Electric welders will be inspected daily before use with emphasis on the cables. All splicing of cables must maintain the insulated protection with no exposed metal parts. Cables in need of repair will not be used.

The competent person will ensure that ventilation within a confined space is adequate to negate the possibility of a respiratory or explosion hazard.

A fire watch will be assigned when there is potential a fire might develop. Of course, any person assigned to fire watch must have received training in the specific fire extinguishing equipment being used. When welding, cutting, or brazing an object near a fire hazard that is not readily movable, the fire hazard will be removed. If any fire hazards remain, shields will be used to confine the sparks, heat, and slag. If the provisions of this paragraph cannot be met, welding and/or cutting **may not** take place. In fact, as a company policy, if welding cannot be conducted safely, it may not be conducted.

Fire watchers are required in all locations where other than a minor fire might develop and any of the below conditions exist:

a. Appreciable amounts of combustible materials closer than 35 feet to point of operation.
b. Appreciable combustibles are 35 feet or more away but are easily ignited by sparks.
c. Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
d. Combustible materials are adjacent to the opposite side of metal partitions, ceilings, or roofs that are likely to be ignited by conduction or radiation.

The fire watch must be maintained at least one-half hour after welding or cutting operations have ceased to detect, and extinguish, possible smoldering fires.

When performing operations capable of producing heat at chemical plants, refineries, or other facilities which have a higher degree of hazard than normal work sites, a hot work permit is generally required. Included in these types of operations are burning, cutting, heating, and welding.

Located with our Hot Work Permit are fire safety instructions that must be read and understood by the persons identified on the permit.

Welding, cutting, and heating of metals of toxic significance (lead, zinc, cadmium, mercury, beryllium, or exotic metals or paints) in enclosed spaces will require either general mechanical ventilation of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits **or** local exhaust ventilation consisting of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system will be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

This would include inert-gas metal-arc welding performed on stainless steel to protect against dangerous concentrations of nitrogen dioxide.

When performing welding operations on stainless steel and there is exposure to airborne chromium (VI) above its action level of 2.5 micrograms per cubic meter of air (2.5 μg/m^3) calculated as an 8-hour time-weighted average (TWA), the provisions of 29 CFR 1926.1126 must be adhered to. The PEL is 5 μg/m^3. If air monitoring, as described in 29 CFR 1926.1126 is below .5 μg/m^3, the provisions of this standard do not apply.

Working Over or Near Water

29 CFR 1926.106 - Working over or near water

Employees working over or near water, where the danger of drowning exists, will be provided with U.S. Coast Guard-approved life jackets or buoyant work vests.

Prior to and after each use, the buoyant work vests or life preservers will be inspected for defects which would alter their strength or buoyancy. Defective units will be removed from service and not be used.

It is important to note that the provisions of our fall protection program require that fall protection (guardrail system, safety net system, or personal fall arrest system) be provided when working 6 or more feet above a lower level and this would include water. If fall protection is being used then the danger of drowning does not exist and life jackets or buoyant work vests are not required.

If a safety net system, alone, is used for fall protection, then the life preservers are required because of the remote possibility that heavy material falling into the safety net may damage the net.

In addition to the above, and in all cases irrespective of fall protection, the following applies:

a. Ring buoys with at least 90 feet of line will be provided and readily available for emergency rescue operations. Distance between ring buoys may not exceed 200 feet.
b. At least one lifesaving skiff will be immediately available at locations where employees are working over or adjacent to water.
    1. Medical response: Because emergency medical response is required to be available within a reasonable time (3 to 4 minutes), either medical personnel or an employee certified in first aid must be on the skiff. A first aid kit will be on the skiff.

       Note: If the water is extremely cold, the required response time may be shorter.
    2. The skiff must be capable of providing rescue dependent on the specific hazards, for example, rocks or rapids.

Millerick Engineering, Inc.
Section III
Specific Compliance Programs

29 CFR 1910.1030 - Bloodborne Pathogens

Note: Per CPL 2-2.69, *Enforcement Procedures for the Occupational Exposure to Bloodborne Pathogens*, the bloodborne pathogens standard does not apply to the construction industry. OSHA has not, however, stated that the construction industry is free from the hazards of bloodborne pathogens. Exposure to bloodborne pathogens would fall under Section 5(a)(1) of the OSH Act which states that "each employer will furnish to each of his employees' employment and a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

Providing first aid or other medical assistance is not the primary job assignment of the designated first aid providers of Millerick Engineering, Inc.. Any first aid rendered by them is rendered only as a collateral duty, responding solely to injuries resulting from job site incidents and only at the job site where the incident occurred.

Recordkeeping: all work-related injuries from needle-sticks and cuts, lacerations, punctures and scratches from sharp objects contaminated with another person's blood or other potentially infectious materials (OPIM) are to be recorded on the OSHA 300 as an injury.

a. To protect the employee's privacy, the employee's name may not be entered on the OSHA 300.
b. If the employee develops a bloodborne disease, the entry must be updated and recorded as an illness.

Note: The first aid kits that Millerick Engineering, Inc. uses do not contain sharps or needles. However, a contaminated sharp, such as a broken pair of glasses, may trigger the above.

Policy Statement

This Exposure Control Plan has been developed to eliminate or minimize the risk of exposure to bloodborne pathogens and other potentially infectious materials. This Plan presents methods and procedures to eliminate and/or minimize the hazards associated with occupational exposure to bloodborne pathogens or other infectious materials.

As a matter of policy, universal precautions will be used.

Additional components of this Plan include exposure determinations by job classification, standard operating procedures to eliminate or reduce the likelihood of disease transmission, the methods of disease transmission, definitions of terms, post exposure procedures and follow-up, training documentation, and recordkeeping.

Compliance with this Plan not only fulfills the requirements of the Occupational Safety and Health Administration, more importantly, it fulfills of desire of Millerick Engineering, Inc. to maintain a safe working environment and safeguard the health of our employees.

All affected employees should feel free to review this Plan at any time and are encouraged to consult with Tayla Millerick, our Exposure Control Plan Administrator, to resolve any issues affecting its implementation. Our Plan is to be made available to the Assistant Secretary of Labor for Occupational Safety and Health or designated representative.

Definitions

All employees should know the "language" of this plan. Because some of the words and/or terms are not used in everyday life, each person must be aware of the definitions so that we are all "reading off the same page."

Below are OSHA definitions:

Assistant Secretary means Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.

Blood means human blood, human blood components, and products made from human blood.

Bloodborne Pathogens means pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Clinical Laboratory means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

Contaminated means the presence, or the reasonably anticipated presence, of blood or other potentially infectious materials on an item or surface.

Contaminated Laundry means laundry which has been soiled with blood or other potentially infectious materials or may contain sharps.

Contaminated Sharps means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

Decontamination means the use of a physical or chemical procedure to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

Director means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designated representative.

Engineering Controls means controls (e.g., sharps disposal containers, self-sheathing needles, safer medical devices, such as sharps with engineered sharps injury protections and needleless systems) that isolate or remove the bloodborne pathogens hazard from the work area.

Exposure Incident means a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

Hand-Washing Facilities means a facility providing an adequate supply of running potable water, soap, and single use towels or hot air-drying machines.

Licensed Healthcare Professional means a person whose legally permitted scope of practice allows him or her to independently perform the activities required by 29 CFR 1910.1030(f), *Hepatitis B Vaccination and Post-exposure Evaluation and Follow-up*.

HBV means hepatitis B virus.

HIV means human immunodeficiency virus.

Needleless Systems means a device that does not use needles for:

a. The collection of bodily fluids or withdrawal of body fluids after initial venous or arterial access is established,
b. The administration of medication or fluids, or
c. Any other procedure involving the potential for occupational exposure to bloodborne pathogens due to percutaneous injuries from contaminated sharps.

Occupational Exposure means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Other Potentially Infectious Materials:

a. The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids;
b. Any unfixed tissue or organ (other than intact skin) from a human (living or dead);
c. HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions, and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Parental means piercing mucous membranes or the skin barrier through such events as needle-sticks, human bites, cuts, and abrasions.

Personal Protective Equipment means specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

Production Facility means a facility engaged in industrial-scale, large-volume or high concentration production of HIV or HBV.

Regulated Waste means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

Research Laboratory means a laboratory producing or using research-laboratory-scale amounts of HIV or HBV. Research laboratories may produce high concentrations of HIV or HBV but not in the volume found in production facilities.

Sharps with Engineered Sharps Injury Protection means a non-needle sharp or a needle device used for withdrawing body fluids, accessing a vein or artery, or administering medications or other fluids, with a built-in safety feature or mechanism that effectively reduces the risk of an exposure incident.

Source Individual means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the developmentally disabled; trauma victims; clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains; and individuals who donate or sell blood or blood components.

Sterilize means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

Universal Precautions means is an approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Work Practice Controls means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

Exposure Control Plan

This Exposure Control Plan is provided for all personnel who, as a result of the performance of their duties, would have reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials.

This Plan will be reviewed and updated annually and whenever necessary as new or modified tasks and procedures are introduced which affect occupational exposure to bloodborne pathogens or other potentially infectious materials. The review and update of this plan will:

a. Reflect changes in technology that eliminate or reduce exposure to bloodborne pathogens.
b. Annually document consideration and implementation of appropriate commercially available and effective safer medical devices designed to eliminate or minimize occupational exposure.

First aid providers are employees responsible for direct trauma victim care, who are potentially exposed to injuries for contaminated sharps, will be asked for input on the identification, evaluation, and selection of effective engineering and work practice controls.

This Exposure Control Plan, with a copy of 29 CFR 1910.1030, *Bloodborne Pathogens*, will be made accessible to all employees as well as the Assistant Secretary and the Director (see definitions) who may examine and copy this plan.

Exposure Determination

Three (3) lists will be prepared and they will be maintained at the end of this exposure control plan for bloodborne pathogens & other infectious material, located **here.**

List I: A list of all job classifications in which all employees have occupational exposure.

List II: A list of job classifications in which some employees have occupational exposure.

List III: A list of all tasks and procedures, or groups of closely related tasks and procedures, in which occupation exposure occurs and are performed by employees in job classifications noted in List II.

Note: The above exposure determinations are to be made without regard to the use of personal protective equipment.

Methods of Compliance

Universal precautions will be used. We will treat all trauma victims' blood, bodily fluids, and other potentially infectious materials as if they are known to be infectious. Unfortunately, there is no immediate, practical way to determine if HIV, HBV, and other bloodborne pathogens are present so, to be safe, we will assume they are. Traditionally, isolation of infectious materials has been diagnosis-driven. This meant that if a person were diagnosed to have HIV or HBV infection, for example, then isolation precautions would be taken. Because the infection status of each trauma victim cannot be immediately known, it makes sense to treat all trauma victims and their body fluids as if they were infected. The precautions to take depend on the procedures being performed. For example, if one's hands will be in contact with body substances, disposable gloves will be worn. If there is risk of one's eyes being splashed with body fluids, eye protection will be worn. An impermeable barrier must be placed between yourself and the potentially infectious bodily fluids. Overkill is not necessary. Cleaning up a minor spill on a counter top does not require a mask, eye protection, and plastic apron. It does, however, require disposable gloves.

All employees will strictly adhere to the below engineering and work practice controls to eliminate or reduce the possibility of occupational exposure to bloodborne pathogens or other potentially infectious materials. Specific controls and procedures, noted below, will be used to eliminate or minimize employee exposure. If occupational exposure is:

Eating, Drinking, and Smoking:

There will be no eating, drinking, smoking, applying cosmetics, lip balm, or handling contact lenses in areas where there is a likelihood of occupational exposure to bloodborne pathogens or other potentially infectious materials.

Furthermore, food and drink will not be kept in refrigerators, freezers, shelves, cabinets, on countertops, or benches where blood or other potentially infectious materials are present.

Handwashing Equipment and Procedures:

Hand-washing facilities are provided which are readily accessible to all employees.

Employees will wash their hands and any other skin area exposed to blood or other potentially infectious materials with soap and water immediately or as soon as feasible:

a. After removal of gloves or other personal protective equipment.
b. Following contact with blood or other potentially infectious materials.

Particular attention will be given to fingernails and between fingers and rings under which infectious material may lodge. Furthermore, one should be aware that rings and jewelry are a good hiding place for bloodborne pathogens and other potentially infectious materials.

Examples of situations where hand-washing is appropriate:

a. Before and after examining any trauma victim.
b. After handling any soiled waste or other materials.
c. After handling any chemicals or used equipment.

If for some reason hand-washing facilities are not functioning, appropriate antiseptic hand cleaner and clean cloth/paper towels (antiseptic towelettes) will be provided and used. If antiseptic hand cleaner and clean cloth/paper towels are used, hands will be washed with soap and water as soon as feasible.

Contaminated needs and other Contaminated Sharps:

Contaminated needles will not be sheared or broken.

Furthermore, all contaminated needles and other contaminated sharps will not be bent, recapped, or removed unless:

a. It can be demonstrated that no alternative is feasible or that it is required by a specific medical procedure.
b. Recapping or needle removal may be accomplished through the use of a mechanical device or a one-handed method.

Contaminated **reusable** sharps will be placed in appropriate containers immediately or as soon as possible after use until properly reprocessed. These containers will:

a. Be puncture resistant.
b. Be leak proof on the sides and bottom.
c. Have warning labels affixed to containers potentially infectious material and contain the following legend:

Note: The above label will be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color.

Labels will be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

Red bags or red containers may be substituted for labels.

Reusable sharps that are contaminated with blood or other potentially infectious materials will not be stored or processed in a manner that requires employees to reach by hand into the containers where these sharps have been placed.

Contaminated **non-reusable** sharps will be discarded immediately or as soon as feasible and placed in containers that:

a. Are closable
b. Are puncture resistant
c. Are leak proof on sides and bottom
d. Have warning labels affixed that contain the following legend:

Note: The above label will be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color.

Labels will be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

Red bags or red containers may be substituted for labels.

Contaminated **non-reusable** sharps will not be stored or processed in such a manner that requires employees to reach by hand into the containers where these sharps have been placed.

During use, containers for contaminated sharps must be:

a. Easily accessible to the employees of Millerick Engineering, Inc..
b. Located as close as feasible to the immediate area where sharps are used or can be reasonably anticipated to be found.
c. Maintained upright throughout use.
d. Replaced routinely and not be allowed to overfill.

If leakage is possible when removing a container of contaminated sharps, it will be placed in a second container with the following container requirements:

a. It will be closable,
b. It will be constructed to contain all contents and prevent leakage during handling, storage, transport, or shipping, and
c. Colored coded red or labeled as noted above.

Reusable containers will not be opened, emptied, or cleaned manually or in any other manner which would expose employees to the risk of percutaneous (introduced through the skin such as a cut) injury.

Other Regulated Waste – Containment:

The provisions that apply to contaminated sharps, above, apply to other regulated waste.

Disposal of Contaminated Sharps & Other Regulated Waste:

The actual disposal of all regulated waste will be in compliance with applicable state laws.

Specimens of Potentially Infectious Materials:

Specimens of blood and potentially infectious materials will be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

Splashing, Spraying or Potentially Infectious Materials:

All procedures involving blood or other potentially infectious materials will be performed in such a manner as to minimize splashing, spraying, spattering, and the generation of droplets of these substances.

Mouth Pipetting:

Mouth pipetting and mouth suction of blood or other potentially infectious materials is prohibited.

Exposure Control Plan Administrator

Tayla Millerick, our designated Exposure Control Plan Administrator, will be knowledgeable in all aspects of this Plan as it relates to our operations and be available to answer questions raised by our first aid providers. Tayla Millerick may call upon professionals in the Medical Arts to field questions that are of technical nature outside of their area of expertise.

Tayla Millerick will:

a. Ensure this Plan is kept current.
b. Ensure training is provided as required.
c. Maintain all records associated with this plan.

Designated First Aid Provider

Before one may be designated as a first aid provider, he/she must have a valid certificate in first aid training from the U.S. Bureau of Mines, the Red Cross, or equivalent training that can be verified by documentary evidence. No person is to administer any medical assistance for which they are not appropriately trained. It is noted that the rendering of first aid is not the primary job of the designated first aid providers at Millerick Engineering, Inc..

Personal Protective Equipment (PPE)

In spite of work practice and engineering controls, there is a requirement for appropriate personal protective equipment to provide an impermeable barrier between potentially infectious materials and the employee’s work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used.

Employees will use appropriate personal protective equipment when there is a possibility of occupational exposure to bloodborne pathogens or other potential infectious materials.

Personal protective equipment will be provided in appropriate sizes and at no cost to the employees. Further, maintenance and replacement of personal protective equipment will be provided at no cost to the employee.

Personal protective equipment will be discarded immediately if its ability to function as a barrier is compromised.

Most importantly, employees must understand that personal protective equipment is useless unless it provides an impermeable barrier between bloodborne pathogens and other potentially infectious materials and the employee's clothes, skin, eyes, mouth, or other mucous membranes.

Personal Protective Equipment is considered appropriate if it prevents potentially infectious materials from reaching work/street clothing or body surface when used under normal conditions.

Disposable Gloves:

Disposable, single use gloves, such as surgical or examination gloves will be worn when it can be reasonably anticipated that the employee may have hand contact with blood or other potentially infectious materials and when handling or touching contaminated items or surfaces. Disposable gloves will always be used when there is a possibility of contact with bloodborne pathogens or other potentially infectious materials.

Disposable gloves will never be washed, decontaminated, or reused.

Disposable gloves will be replaced as soon as practical when contaminated or as soon as feasible if they are torn, punctured, or their ability to function as a barrier is compromised.

Should any employee be allergic to the normal gloves provided, an appropriate alternative (such as hypoallergenic and/or powderless gloves) will be provided in the proper size at no cost to the employee.

Utility Gloves:

Utility gloves may be used for general cleanup (not for any trauma victim procedure) when there is anticipated exposure to bloodborne pathogens or other potentially infectious materials. Utility gloves may be decontaminated for re-use if the integrity of the gloves is not compromised. They will be discarded if they are cracked, peeling, torn, punctured, or exhibit signs of deterioration or when their ability to function as a barrier is compromised.

Eye and Respiratory Protection:

Eye (goggles, glasses, face shield, etc.) and respiratory (mask, etc.) protection will be used when it can reasonably be expected that bloodborne pathogens or other potentially infectious materials may splash or spray in or around the eyes, nose, mouth, and general head area of the employee.

Protective Body Clothing:

Protective body clothing such as gowns, aprons, lab coats, etc. will be worn as determined by the professional judgment of the employee in relation to task. The protective body clothing will certainly be worn where there can reasonably be expected exposure to bloodborne pathogens or other potentially infectious materials to the body area.

Laundry:

Personal protective equipment will be cleaned, laundered, and disposed of at no cost to the employee.

Note: **In rare and extraordinary circumstances, an employee, in her/his professional judgment, may decline to temporarily and briefly wear personal protective equipment if he/she deems that the equipment would prevent the delivery of health care or would have increased the hazard of occupational exposure to the employee or his/her co-workers. Should this event occur, it will be documented, investigated, and procedures will be developed to prevent a reoccurrence.**

Housekeeping

Housekeeping is an ongoing, never ending, procedure which not only enhances the work environment of Millerick Engineering, Inc. but also eliminates health risk to our personnel. In the area of bloodborne pathogens and other hazardous materials, to ensure proper cleaning, decontamination, sterilization, and disinfecting of surfaces within our work area, cleaning will be accomplished only by employees who have received training in universal precautions and the provisions of this plan. The documented Housekeeping Schedule & Checklist is found at the end of this exposure control plan for bloodborne pathogens & other infectious material. This Schedule will be adhered to following an incident that results in the potential exposure to bloodborne pathogens or other potentially infectious materials.

Broken, potentially infected glassware should be picked up and disposed of using mechanical means such as a brush and dust pan or forceps.

All sharps will be stored in a manner that allows easy access and safe handling.

Infectious waste will be placed in containers that are color coded red. These containers will be decontaminated as soon as practical.

Subsequent to rendering any procedures, employees will ensure that all surfaces on which blood, body fluids, bloodborne pathogens, or other infectious materials may be present are cleaned with an appropriate disinfectant.

Hepatitis B Epidemiology

Hepatitis B (serum hepatitis) routes of infection include parenteral, oral, or direct contact. The virus can also spread by contact with the respiratory tract. Its sources include contaminated needles and surgical instruments as well as contaminated blood products. Hepatitis B virus has also been found in urine. Further, the hepatitis B virus can live for up to seven (7) days on a dry surface and can be easily be transmitted by a single needle stick. Its incubation period is quite lengthy, generally between 45 and 180 days. It affects all age groups. Recovery from hepatitis B does provide immunity. Generally, one can expect a complete recovery from viral hepatitis; however, it is potentially fatal depending on many factors including the virulence (aggressiveness) of the virus, prior hepatic damage, and natural barriers to damage and disease of the liver. It is possible for viral hepatitis to lead to fulminating viral hepatitis and sub-acute fatal viral hepatitis both of which are fatal. Onset symptoms may include headache, elevated temperature, chills, nausea, dyspepsia, anorexia, general malaise, and tenderness over the liver. These types of symptoms will last about one (1) week, and then subside, and jaundice will occur. Jaundice is caused by damaged liver cells. The convalescent stage begins with the disappearance of the jaundice and may last several months. Recovery is expected in six (6) months.

Risk of Exposure

Per the Department of Human Services of the Center for Disease Control, below is the risk of infection after occupational exposure:

HBV:

First aid providers who have received hepatitis B vaccine and have developed immunity to the virus are at virtually no risk for infection. For an unvaccinated person, the risk from a single needle-stick or cut exposure to HBV-infected blood ranges from 6-30% and depends on the hepatitis B e antigen (HBeAg) status of the source individual. Individuals who are both hepatitis B surface antigen (HBsAG) positive and HBeAg positive have more virus in their blood and are more likely to transmit HBV.

HCV:

Based on limited studies, the risk for infection after a needle-stick or cut exposure to HCV-infected blood is approximately 1.8%. The risk following a blood splash is unknown, but is believed to be very small; however, HCV infection from such an exposure has been reported.

HIV:

The average risk of HIV infection after a needle stick or cut exposure to HIV-infected blood is 0.3% (i.e., three-tenths of one percent, or about 1 in 300). Stated another way, 99.7% of needle-stick/cut exposures do not lead to infection.

The risk after exposure of the eye, nose, or mouth to HIV-infected blood is estimated to be, on average, 0.1% (1 in 1,000).

The risk after exposure of the skin to HIV-infected blood is estimated to be less than 0.1%. A small amount of blood on intact skin probably poses no risk at all. There have been no documented cases of HIV transmission due to an exposure involving a small amount of blood on intact skin (a few drops of blood on skin for a short period of time). The risk may be higher if the skin is damaged (for example, by a recent cut) or the contact involves a large area of skin or is prolonged (for example, being covered in blood for hours).

All employees with occupational exposure are encouraged to accept the hepatitis B vaccination.

Hepatitis B Vaccination

The hepatitis B vaccination series will be provided, at no cost, to all unvaccinated first aid providers as soon as possible (within 24 hours of initial exposure). All exposed first aid provider employees are encouraged to take this vaccination series unless they have previously received the complete hepatitis B vaccination series; antibody testing has revealed that the employee is immune; or the vaccine is contraindicated (not recommended) for medical reasons. Post-exposure evaluation, prophylaxis (prevention of or protection from disease), & follow-up will be provided at no cost to the employee.

The Hepatitis B vaccination will be performed under the supervision of a licensed physician or other licensed healthcare professional.

All laboratory tests will be conducted by an accredited laboratory at no cost to the employee.

Should routine booster dose(s) of hepatitis B vaccine (as recommended by the U.S. Public Health Service at a future date) be required, they will be provided at no cost as long as the employee remains a first aid provider.

An employee may decline the Hepatitis B vaccination and this declination will not reflect unfavorably upon him/her; however, this declination must be in writing. See the Hepatitis B Declination Form.

It is important to note that if a first aid provider initially declines the hepatitis B vaccination series, he/she may decide at a later date to accept the vaccination series and it will be provided at no cost assuming he/she is still occupationally exposed to bloodborne pathogens or other potentially infectious materials.

Sharps Injury Log

A Sharps injury log will be maintained for the recording of percutaneous injuries from contaminated sharps.

The information on the log will be recorded and maintained in such manner as to protect the confidentiality of the injured employee.

The sharps injury log will contain:

a. The type and brand of device involved in the incident.
b. The department or work area where the exposure incident occurred.
c. An explanation of how the incident occurred.

The sharps injury log will be maintained for the period of five years.

First Aid Provider Input

As a matter of policy, all first aid providers who are responsible for first aid delivery as an additional job are encouraged to suggest methods to improve the engineering and job site controls for Millerick Engineering, Inc.. This input may be made verbally to Tayla Millerick at any time. Additionally, during the annual refresher training, suggestions will be solicited.

Plan Review

This plan will be reviewed, and if necessary, updated annually to reflect new or modified tasks and procedures which affect occupational exposure and to reflect new or revised employee positions with occupational exposure. As new medical devices are developed which reduce employee exposure, they will be introduced into our practice. A review of the “Sharps Log” will help identify problem areas and/or ineffective devices which may need replacement.

Post-Exposure Evaluation and Follow-Up

The information that has preceded *Post-Exposure Evaluation and Follow-up* has dealt with the methods to restrict occupational exposure to bloodborne pathogens and other infectious materials. Post-exposure evaluation and follow-up deals with the steps to take immediately following a potential exposure incident and the steps that will be taken over time to protect the employees of Millerick Engineering, Inc. from further health risk.

All incidents involving exposure to blood or other potentially infectious materials will be reported to Tayla Millerick, in writing, before the end of the shift in which the incident occurred using the Exposure Incident Report, located at the end of this exposure control plan for bloodborne pathogens & other infectious material. This Report will be prepared regardless of whether or not there has been an "Exposure Incident" as defined in this Plan and in 29 CFR 1910.1030. A separate Exposure Incident Report will be completed for each employee who was occupationally exposed.

Information in this Report will include:

a. The date and time the incident occurred.
b. A brief description of the events leading up to the exposure (what happened).
c. The name of the individual exposed.
d. The route of exposure.
e. “Source individual” and “exposed individual” information, including the acceptance or rejection of hepatitis B vaccination series.
f. A determination of whether or not an actual "exposure incident" occurred. Refer to Definitions in this Plan or 29 CFR 1910.1030.

Tayla Millerick, or his authorized representative, will review the Exposure Incident Report and determine if methods or procedures may be altered to prevent a reoccurrence of the incident.

Further, an occupational bloodborne pathogens exposure incident which results in the recommendation for hepatitis B vaccination would be recorded on OSHA Form 300 as an injury. See Recordkeeping.

All unvaccinated employees who have assisted in any situation involving blood will be afforded the opportunity to receive the hepatitis B vaccination series as soon as possible but not later than twenty-four (24) hours after the situation.

A confidential medical evaluation and follow-up will be provided immediately, at no cost, to the employee. The healthcare professional evaluating an employee after an exposure incident will be provided a copy of 29 CFR 1910.1030.

Further, the healthcare professional will be provided a description of the exposed employee's duties as they relate to the exposure incident; documentation of the route(s) of exposure; the circumstances under which the exposure occurred; the results of the source individual's blood testing, if available; and all medical records relevant to the appropriate treatment of the employee including vaccination status which is maintained in our office. See Recordkeeping.

The confidential medical evaluation and follow-up will include:

a. Documentation of the route(s) of exposure.
b. The circumstances under which the exposure incident occurred.
c. The identification and documentation of the source individual, unless it can be established that the identification is not feasible or prohibited by state or local law.
d. The exposed employee's blood will be collected as soon as feasible and tested after consent is obtained.

   Note: If the employee consents to baseline blood collection but does not consent at that time for HIV serologic testing, the sample will be preserved for at least 90 days. If, within 90 days of the exposure incident, the employee elects to have the baseline sample tested, such testing will be done as soon as feasible.

e. The source individual's blood will be tested as soon as feasible to determine HBV and HIV infectivity unless it is already known, in which case this procedure is not necessary.

If consent to test the source individual's blood cannot be obtained the following will occur:

a. It will be established and documented that legally required consent cannot be obtained.
b. When the source individual's consent is not required by law, the source individual's blood will be tested and the results documented.

The results of the source individual's testing will be made available to the exposed employee and the employee will be informed of applicable laws and the identity and infectious status of the source individual.

The employee will be provided post-exposure prophylaxis, when medically indicated, and counseling.

The employee will be provided with a copy of the healthcare professional's written opinion within 15 days of the completion of the evaluation. The written opinion will be limited to:

a. Whether Hepatitis B vaccination is indicated and if the employee has received such vaccination.
b. An indication that the employee has been informed of the results of the evaluation.
c. An indication that the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.

All other findings or diagnoses will remain confidential and will not be included in the written report.

Recordkeeping

Complete and accurate medical records will be maintained for each employee with occupational exposure. These records will remain confidential and will not be disclosed or reported, without the employee's express written consent, to any person within or outside the job site, except as required by law.

Medical records will be maintained for at least the duration of employment plus 30 years.

Included in the employee's medical record will be:

a. The employee's name.
b. A copy of the employee's hepatitis B vaccination status including the date of all the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination.

   Note: If the employee has declined to receive the hepatitis B vaccination series when appropriate, this declination will be included in the person's medical records.

c. A copy of all results of examinations, medical testing, and follow-up procedures as required following an exposure incident.
d. The employer's copy of the healthcare professional's written opinion following an exposure incident.
e. A copy of all information provided to the healthcare professional following an exposure incident.

All work-related injuries from needle-sticks and cuts, lacerations, punctures and scratches from sharp objects contaminated with another person's blood or other potentially infectious materials are to be recorded on the OSHA 300 as an injury.

a. To protect the employee's privacy, the employee’s name may not be entered on the OSHA 300.
b. If the employee develops a bloodborne disease, the entry must be updated and recorded as an illness.

Training

All of the first aid providers at Millerick Engineering, Inc. must have current certificates of first aid and CPR training on file. These records will be maintained by Tayla Millerick.

Initial training, training at the introduction of a new or altered task affecting exposure to bloodborne pathogens or other potentially hazardous materials, and annual training will be provided by a person knowledgeable in the subject matter contained in this Plan.

Training will be interactive between the instructor and employee. An opportunity to ask questions will be provided. Further, this Plan as well as 29 CFR 1910.1030, *Bloodborne Pathogens*, will be readily available for review.

All training will be documented and will be maintained for a period of three (3) years from the date on which the training occurred.

Training will include, but not be limited to, the following topics and materials:

a. A complete review of our Exposure Control Plan and its accessibility.
b. An accessible copy of 29 CFR 1910.1030 and an explanation of its contents.
c. A general explanation of the epidemiology and symptoms of bloodborne diseases.
d. An explanation of the modes of transmission of bloodborne pathogens.
e. An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.
f. An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment.
g. Information on the types, proper use, location, removal, handling, decontamination and disposal of personal protective equipment.
h. An explanation of the basis for selections of personal protective equipment.
i. Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge.
j. Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials.
k. An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.
l. Information on the post-exposure evaluation and follow-up that is provided after an exposure incident.
m. An explanation of the color coding required by 29 CFR 1910.1030(g)(1).
n. A request for input from employees in the identification, evaluation, and selection of effective engineering and work practice controls.

Waste Management

Waste management, if necessary, will comply with State EPA standards regarding handling, storage, and shipping of medical wastes.

Summary

The whole thrust of the exposure control plan for bloodborne pathogens & other infectious material Plan is to provide an awareness of the dangers of bloodborne pathogens, provide a means of reducing the possibility of occupational exposure, and, should occupational exposure occur, provide a means of reducing health risk.

Exposure Determination Form - List I

All job classifications in which all employees have occupational exposure.

1. **First Aid Providers .**
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________

Note: The above exposure determinations are to be made without regard to the use of personal protective equipment.

Note: The primary job assignment of our designated first aid providers is not the rendering of first aid or other medical assistance. Any first aid rendered by them is rendered only as a collateral duty, responding solely to injuries resulting from job site incidents and only at the location where the incident occurred.

Millerick Engineering, Inc.

Exposure Determination Form - List II

Job classifications in which some employees have occupational exposure:

1. **None**________________________.
2. ______________________________
3. ______________________________
4. ______________________________
5. ______________________________
6. ______________________________

Note: **The above exposure determinations are to be made without regard to the use of personal protective equipment.**

Note: **The primary job assignment of our designated first aid providers is not the rendering of first aid or other medical assistance. Any first aid rendered by them is rendered only as a collateral duty, responding solely to injuries resulting from job site incidents and only at the location where the incident occurred.**

Exposure Determination Form - List III

All tasks and procedures or groups of closely related tasks and procedures in which occupation exposure occurs and are performed by employees in job classifications noted in List II.

Job Classification	Tasks
1. ______________________________	______________________________________
	______________________________________
	______________________________________
	______________________________________
2. ______________________________	______________________________________
	______________________________________
	______________________________________
	______________________________________
3. ______________________________	______________________________________
	______________________________________
	______________________________________
	______________________________________
4. ______________________________	______________________________________
	______________________________________
	______________________________________
	______________________________________

Note: The above exposure determinations are to be made without regard to the use of personal protective equipment.

Note: The primary job assignment of our designated first aid providers is not the rendering of first aid or other medical assistance. Any first aid rendered by them is rendered only as a collateral duty, responding solely to injuries resulting from job site incidents and only at the location where the incident occurred.

Housekeeping Schedule & Checklist

Schedule

Following every incident where there is a possibility of the presence of residual bloodborne pathogens or other potentially infectious materials.

Checklist

Only personnel who have had training in our Exposure Control will ensure that all surfaces are decontaminated and that cleaning materials are properly disposed of. Areas to consider include, but are not limited to:

	YES	NA
Floors	☐	☐
Walls	☐	☐
Equipment	☐	☐
Product	☐	☐
Waste Containers	☐	☐
Tools	☐	☐

Broken, potentially infected glassware should be picked up and disposed of using mechanical means such as a brush and dustpan or forceps.

All sharps will be stored in a manner that allows easy access and safe handling.

Infectious waste will be placed in containers that are color coded red. These containers will be decontaminated as soon as practical.

Subsequent to rendering any procedures, employees will ensure that all surfaces on which blood, body fluids, bloodborne pathogens, or other infectious materials may be present are cleaned with an appropriate disinfectant.

Millerick Engineering, Inc.

Hepatitis B Declination Form

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 V vaccine, at no charge to myself. However, I decline hepatitis B 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.

____

(Witness)

____

(Employees Signature)

____

(Printed Name)

____

(Date)

Millerick Engineering, Inc.

Sharps Injury Log

Note: **A sharps injury log will be maintained for the recording of percutaneous injuries from contaminated sharps.**

The information on the log will be recorded and maintained in such manner as to protect the confidentiality of the injured employee.

This sharps injury log will be maintained for the period of five years.

______________________________ ______________________________

(Incident Date) **(Employee SSN)**

Type and brand of device involved in the incident:

____

Work area where the exposure incident occurred:

____

Explanation of how the incident occurred:

____

____

____

____

____

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____

Tayla Millerick
Safety Program Administrator

Millerick Engineering, Inc.

Annual Exposure Control Plan Review

This Exposure Control Plan was prepared by:

At least annually, this program will be reviewed and, if necessary, updated to reflect innovations in procedures and technological developments that eliminates or reduces exposure to bloodborne pathogens.

As part of the annual review, the below will be considered:

a. Employee Input
b. Sharps Injury Log
c. Exposure Incident Reports
d. Professional Journals

Date Reviewed:	Signature	Title

Millerick Engineering, Inc.

Exposure Incident Report

All Information on this form is to remain CONFIDENTIAL

This form will be completed as soon as feasible after an exposure incident but under NO CIRCUMSTANCES, after the shift on which the incident occurred!

Date: ______________________ Time: _________________

Name of Employee: ____

Route of Exposure: ____

Source Individual's Name: ____

a. Above individual did / did not consent to be tested for HBV or HIV.

b. Testing was done by: ____

Results: ____

Employee was offered & accepted:	**NO**	**YES**	
a. Hepatitis Vaccination Series. **[Date(s)]** **If "NO", written declination was signed.**	☐	☐	___________
b. Post Exposure Evaluation & follow-up.	☐	☐	
c. Employee consents to baseline blood collection.	☐	☐	____________ **(Signature)**

Description of events leading to this exposure incident:

____
____
____
____

Corrective Measures to Prevent a Reoccurrence:

____
____
____
____

________________________________ ________________________

(Tayla Millerick) **(Employee Signature)**

Confined Spaces in Construction

29 CFR 1926 Subpart AA – Confined Spaces in Construction

This Confined Spaces in Construction Program identifies the requirements for the practices and procedures to protect our employees engaged in construction activities at a worksite with one or more confined spaces.

Note: This Confined Spaces in Construction Program does not apply to (1) construction work regulated by §1926 subpart P—Excavations. (2) Construction work regulated by §1926 subpart S—Underground Construction, Caissons, Cofferdams and Compressed Air. 3) Construction work regulated by §1926 subpart Y—Diving.

Note: If Millerick Engineering, Inc. is performing work covered by another OSHA standard and that standard addresses a confined space issue, we will comply with both that requirement and the applicable provisions of this Confined Spaces in Construction Program.

Definitions

The following terms are defined for the purposes of this Confined Spaces in Construction Program only.

Acceptable Entry Conditions means the conditions that must exist in a permit space, before an employee may enter that space, to ensure that employees can safely enter into, and safely work within, the space.

Attendant means an individual stationed outside one or more permit spaces who assesses the status of authorized entrants and who must perform the duties specified in §1926.1209.

Authorized Entrant means an employee who is authorized by the entry supervisor to enter a permit space.

Barrier means a physical obstruction that blocks or limits access.

Blanking *or* **blinding** means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Competent Person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate the hazards.

Confined Space means space that:

a. Is large enough and so configured that an employee can bodily enter it;
b. Has limited or restricted means for entry and exit; and
c. Is not designed for continuous employee occupancy.

Control means the action taken to reduce the level of any hazard inside a confined space using engineering methods (for example, by ventilation), and then using these methods to maintain the reduced hazard level. Control also refers to the engineering methods used for this purpose. Personal protective equipment is not a control.

Controlling Contractor means the employer that has overall responsibility for construction at the worksite.

Note: If the controlling contractor owns or manages the property, then it is both a controlling employer and a host employer.

Double Block and Bleed means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

Early-Warning Systems means the method used to alert authorized entrants and attendants that an engulfment hazard may be developing. Examples of early-warning systems include but are not limited to: alarms activated by remote sensors; and lookouts with equipment for immediately communicating with the authorized entrants and attendants.

Emergency means any occurrence (including any failure of power, hazard control or monitoring equipment) or event, internal or external, to the permit space that could endanger entrants.

Engulfment means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, crushing, or suffocation.

Entry means the action by which any part of a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space, whether or not such action is intentional, or any work activities are actually performed in the space.

Entry Employer means any employer who decides that an employee it directs will enter a permit space.

Note: An employer cannot avoid the duties of the standard merely by refusing to decide whether its employees will enter a permit space, and OSHA will consider the failure to so decide to be an implicit decision to allow employees to enter those spaces if they are working in the proximity of the space.

Entry Permit (Permit) means the written or printed document that is provided by the employer who designated the space a permit space to allow and control entry into a permit space and that contains the information specified in §1926.1206 of this standard.

Entry Rescue means occurs when a rescue service enters a permit space to rescue one or more employees.

Entry Supervisor means the qualified person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this standard.

Note: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this standard for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Hazard means a physical hazard or hazardous atmosphere. See definitions below.

Hazardous Atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

a. Flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit (LFL);
b. Airborne combustible dust at a concentration that meets or exceeds its LFL;

   Note: This concentration may be approximated as a condition in which the combustible dust obscures vision at a distance of 5 feet (1.52 meters) or less.

c. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;
d. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart D - Occupational Health and Environmental Control, or in Subpart Z - Toxic and Hazardous Substances, of this part and which could result in employee exposure in excess of its dose or permissible exposure limit;

   Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this definition.

e. Any other atmospheric condition that is immediately dangerous to life or health.

   Note: For air contaminants for which OSHA has not determined a dose or permissible exposure limit, other sources of information, such as Safety Data Sheets that comply with the Hazard Communication Standard, 29 CFR 1910.1200 of this chapter, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Host Employer means the employer that owns or manages the property where the construction work is taking place.

Note: If the owner of the property on which the construction activity occurs has contracted with an entity for the general management of that property, and has transferred to that entity the below information:

Before entry operations begin, the host employer must provide the following information, if it has it, to the controlling contractor:

a. The location of each known permit space;
b. The hazards or potential hazards in each space or the reason it is a permit space; and
c. Any precautions that the host employer or any previous controlling contractor or entry employer implemented for the protection of employees in the permit space.

OSHA will treat the contracted management entity as the host employer for as long as that entity manages the property. Otherwise, OSHA will treat the owner of the property as the host employer. In no case will there be more than one host employer.

Hot Work Permit means operations capable of providing a source of ignition (for example, riveting, welding, cutting, burning, and heating).

Immediately Dangerous to Life or Health (IDLH) means any condition that would interfere with an individual's ability to escape unaided from a permit space and that poses a threat to life or that would cause irreversible adverse health effects.

Note: Some materials—hydrogen fluoride gas and cadmium vapor, for example—may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The victim "feels normal" after recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Inerting means displacing the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Note: This procedure produces an IDLH oxygen-deficient atmosphere.

Isolate or **Isolation** means the process by which employees in a confined space are completely protected against the release of energy and material into the space, and contact with a physical hazard, by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; blocking or disconnecting all mechanical linkages; or placement of barriers to eliminate the potential for employee contact with a physical hazard.

Limited or Restricted means for Entry or Exit means a condition that has a potential to impede an employee's movement into or out of a confined space. Such conditions include, but are not limited to, trip hazards, poor illumination, slippery floors, inclining surfaces and ladders.

Line Breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Lockout means the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lower Flammable Limit or Lower Explosive Limit means the minimum concentration of a substance in air needed for an ignition source to cause a flame or explosion.

Monitor or **Monitoring** means the process used to identify and evaluate the hazards after an authorized entrant enters the space. This is a process of checking for changes that is performed in a periodic or continuous manner after the completion of the initial testing or evaluation of that space.

Non-Entry Rescue means occurs when a rescue service, usually the attendant, retrieves employees in a permit space without entering the permit space.

Non-Permit Confined Space means a confined space that meets the definition of a confined space but does not meet the requirements for a permit-required confined space, as defined in this subpart.

Oxygen Deficient Atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen Enriched Atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume.

Permit Required Confined Space (Permit Space) means a confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing an entrant; (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) Contains any other recognized serious safety or health hazard.

Permit Required Confined Space Program (Permit Space Program) means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

Physical Hazard means an existing or potential hazard that can cause death or serious physical damage. Examples include but are not limited to: explosives (as defined by paragraph (n) of §1926.914, definition of "explosive"); mechanical, electrical, hydraulic and pneumatic energy; radiation; temperature extremes; engulfment; noise; and inwardly converging surfaces. Physical hazard also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than through inhalation).

Prohibited Condition means any condition in a permit space that is not allowed by the permit during the period when entry is authorized. A hazardous atmosphere is a prohibited condition unless the employer can demonstrate that personal protective equipment (PPE) will provide effective protection for each employee in the permit space and provides the appropriate PPE to each employee.

Qualified Person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Representative Permit Space means a mock-up of a confined space that has entrance openings that are similar to, and is of similar size, configuration, and accessibility to, the permit space that authorized entrants enter.

Rescue means retrieving, and providing medical assistance to, one or more employees who are in a permit space.

Rescue Service means the personnel designated to rescue employees from permit spaces.

Retrieval System means the equipment (including a retrieval line, chest or full body harness, wristlets or anklets, if appropriate, and a lifting device or anchor) used for non-entry rescue of persons from permit spaces.

Serious Physical Damage means an impairment or illness in which a body part is made functionally useless or is substantially reduced in efficiency. Such impairment or illness may be permanent or temporary and includes, but is not limited to, loss of consciousness, disorientation, or other immediate and substantial reduction in mental efficiency. Injuries involving such impairment would usually require treatment by a physician or other licensed health-care professional.

Tagout means (1) Placement of a tagout device on a circuit or equipment that has been deenergized, in accordance with an established procedure, to indicate that the circuit or equipment being controlled may not be operated until the tagout device is removed; and (2) The employer ensures that (i) tagout provides equivalent protection to lockout, or (ii) that lockout is infeasible <u>and the employer has relieved, disconnected, restrained and otherwise rendered safe stored (residual) energy</u>.

Test or **Testing** means the process by which the hazards that may confront entrants of a permit space are identified and evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Note: Testing enables us both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

Ventilate or **Ventilation** means controlling a hazardous atmosphere using continuous forced-air mechanical systems that meet the requirements of §1926.57—Ventilation.

General Requirements

Before beginning work at a worksite, we must ensure that a competent person both identifies all confined spaces in which one or more of the employees that we direct may work **<u>and</u>** identifies each space that is a permit space, through consideration and evaluation of the elements of that space, including testing as necessary.

If the workplace contains one or more permit spaces (or if we receive notice of a permit space from another contractor) we must:

a. Inform exposed employees by posting danger signs or by any other equally effective means, of the existence and location of, and the danger posed by, each permit space; and

   Note: A sign reading "DANGER – PERMIT- REQUIRED CONFINED SPACE, DO NOT ENTER" or using other similar language would satisfy the requirement above for a sign.

b. Inform, in a timely manner and in a manner other than posting, employees' authorized representatives and the controlling contractor of the existence and location of, and the danger posed by, each permit space.

If we identify, or receive notice of, a permit space and do not authorize employees of Millerick Engineering, Inc. to work in that space, we must take effective measures to prevent those employees from entering that permit space, in addition to complying with all other applicable requirements of 29 CFR 1926, subpart AA, *Confined Spaces in Construction*.

If we decide that employees of Millerick Engineering, Inc. will enter a permit space, we must have a written permit space program that complies with §1926.1204, see below, implemented at the construction site. Our written permit space program must be made available prior to and during entry operations for inspection by our employees and their authorized representatives.

We may use the **<u>alternate procedures</u>**, see below, for entering a permit space only under the conditions below:

Note: If employees of Millerick Engineering, Inc. enter a permit space using alternate procedures, we do not have to comply with the requirements of:

§§1926.1204 Permit-required confined space program.

§§1926.1205 Permitting process.

§§1926.1206 Entry permit.

§§1926.1208 Duties of authorized entrants.

§§1926.1209 Duties of attendants.

§§1926.1210 Duties of entry supervisors.

§§1926.1211 Rescue and emergency services.

Conditions Required to Use Alternate Procedures

a. We can demonstrate that all physical hazards in the space are eliminated or isolated through engineering controls so that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;
b. We can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry, and that, in the event the ventilation system stops working, entrants can exit the space safely;
c. We develop monitoring and inspection data that supports the demonstrations required by preceding two paragraphs (a & b);
d. If an initial entry of the permit space is necessary to obtain the data required by paragraph preceding paragraph above (3), the entry will be performed in compliance with:

§§1926.1204	Permit-required confined space program.
§§1926.1205	Permitting process.
§§1926.1206	Entry permit.
§§1926.1207	Training.
§§1926.1208	Duties of authorized entrants.
§§1926.1209	Duties of attendants.
§§1926.1210	Duties of entry supervisors.
§§1926.1211	Rescue and emergency services.

e. The above determinations and supporting data required by the above paragraphs are documented and are made available to each employee who enters the permit space under the terms of the alternate procedures or to that employee’s authorized representative; and
f. Entry into the permit space using the alternate procedures must be performed following the requirements of 29 CFR 1926.1203(e)(2).

Classification/Reclassification of a Space

When there are changes in the use or configuration of a non-permit confined space that might increase the hazards to entrants, or some indication that the initial evaluation of the space may not have been adequate, as an entry employer, we must have a competent person reevaluate that space and, if necessary, reclassify it as a permit-required confined space.

A space that we have classified as a permit-required confined space may only be **reclassified as a non-permit confined space** when a competent person determines that all of the below applicable requirements have been met:

a. If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated or isolated without entry into the space (unless we can demonstrate that doing so without entry is infeasible), the permit space may be reclassified as a non-permit confined space for as long as the non-atmospheric hazards remain eliminated or isolated;

b. As the entry employer, we eliminate or isolate the hazards without entering the space, unless it can demonstrate that this is infeasible. If it is necessary to enter the permit space to eliminate or isolate hazards, the entry will be performed in compliance with:

§§1926.1204 Permit-required confined space program.

§§1926.1205 Permitting process.

§§1926.1206 Entry permit.

§§1926.1207 Training.

§§1926.1208 Duties of authorized entrants.

§§1926.1209 Duties of attendants.

§§1926.1210 Duties of entry supervisors.

§§1926.1211 Rescue and emergency service

If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated or isolated, the permit space may be reclassified as a non-permit confined space for as long as the hazards remain eliminated or isolated;

Note: Control of atmospheric hazards through forced air ventilation does not constitute elimination or isolation of the hazards. These alternate procedures cover permit space entry where it can be demonstrated that forced air ventilation alone will control all hazards in the space.

c. As the entry employer, we must document the basis for determining that all hazards in a permit space have been eliminated or isolated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification must be made available to each employee entering the space or to that employee's authorized representative; and

d. If hazards arise within a permit space that has been reclassified as a non-permit, each employee in the space must exit the space. As the entry employer, we must then reevaluate the space and reclassify it as a permit space as appropriate in accordance with all other applicable provisions of Confined Spaces in Construction standard.

Permit-Required Confined Space Program

As an entry employer, we must:

a. Implement the measures necessary to prevent unauthorized entry;

b. Identify and evaluate the hazards of permit spaces before employees enter them;

c. Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:

1. Specifying acceptable entry conditions;
2. Providing each authorized entrant or that employee's authorized representative with the opportunity to observe any monitoring or testing of permit spaces;

3. Isolating the permit space and physical hazard(s) within the space;
4. Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;

   Note: When we are unable to reduce the atmosphere below 10 percent LFL, we may only enter if we inert the space so as to render the entire atmosphere in the space non-combustible, and we use PPE to address any other atmospheric hazards (such as oxygen deficiency), and we eliminate or isolate all physical hazards in the space.

5. Determining that, in the event the ventilation system stops working, the monitoring procedures will detect an increase in atmospheric hazard levels in sufficient time for the entrants to safely exit the permit space;
6. Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards;
7. Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry, and ensuring that employees are not allowed to enter into, or remain in, a permit space with a hazardous atmosphere unless we can demonstrate that personal protective equipment (PPE) will provide effective protection for each employee in the permit space and provides the appropriate PPE to each employee; and
8. Eliminating any conditions (for example, high pressure) that could make it unsafe to remove an entrance cover.

d. Provide the following equipment at no cost to each employee, maintain that equipment properly, and ensure that each employee uses that equipment properly:

1. Testing and monitoring equipment needed to comply with paragraph (e) of this section;
2. Ventilating equipment needed to obtain acceptable entry conditions;
3. Communications equipment including any necessary electronic communication equipment for attendants assessing entrants' status in multiple spaces;
4. Personal protective equipment insofar as feasible engineering and work-practice controls do not adequately protect employees;

Note: The requirements of subpart E [Personal Protective and Life Saving Equipment] and other PPE requirements continue to apply to the use of PPE in a permit space. For example, if employees of Millerick Engineering, Inc. use respirators, then the respirator requirements in §1926.103 (Respiratory Protection) must be met.

5. Lighting equipment that meets the minimum illumination requirements in §1926.56, [*Click here* to access Minimum Illumination Intensities in Foot-Candles] that is approved for the ignitable or combustible properties of the specific gas, vapor, dust, or fiber that will be present, and that is sufficient to enable employees to see well enough to work safely and to exit the space quickly in an emergency;
6. Barriers and shields for isolation of the space;
7. Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;

8. Rescue and emergency equipment needed to comply with paragraph (9) of this section, except to the extent that the equipment is provided by rescue services; and
9. Any other equipment necessary for safe entry into, safe exit from, and rescue from, permit spaces.

e. When entry operations are conducted, we must evaluate the permit space conditions both <u>before and during operation</u> as follows:

1. Test conditions in the permit space to determine if acceptable entry conditions exist before changes to the space's natural ventilation are made, and before entry is authorized to begin, except that, if we demonstrate that isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), we must:
    i. Perform pre-entry testing to the extent feasible before entry is authorized; and,
    ii. If entry is authorized, continuously monitor entry conditions in the areas where authorized entrants are working, except that we may use periodic monitoring for monitoring an atmospheric hazard if we can demonstrate that equipment for continuously monitoring that hazard is not commercially available;
    iii. Provide an early-warning system that continuously monitors for non-isolated engulfment hazards. The system must alert authorized entrants and attendants in sufficient time for the authorized entrants to safely exit the space.
2. Continuously monitor atmospheric hazards unless we can demonstrate that the equipment for continuously monitoring a hazard is not commercially available or that periodic monitoring is of sufficient frequency to ensure that the atmospheric hazard is being controlled at safe levels. If continuous monitoring is not used, periodic monitoring is required with sufficient frequency to ensure that acceptable entry conditions are being maintained during the course of entry operations;
3. When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.
4. Provide each authorized entrant or that employee's authorized representative an opportunity to observe the pre-entry and any subsequent testing or monitoring of permit spaces;
5. Reevaluate the permit space in the presence of any authorized entrant or that employee's authorized representative who requests that we conduct such reevaluation because there is some indication that the evaluation of that space may not have been adequate; and
6. Immediately provide each authorized entrant or that employee's authorized representative with the results of any testing conducted in accordance with this section.

f. Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations:
   1. Attendants may be assigned to more than one permit space provided all the duties of the attendant, see Duties of Attendants, below, can be effectively performed for each permit space.
   2. Attendants may be stationed at any location outside the permit space as long as the duties can be effectively performed for each permit space to which the attendant is assigned.
g. Designate each person who is to have an active role (such as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the required training. See Training, below.
h. Develop and implement procedures for summoning rescue and emergency services (including procedures for summoning emergency assistance in the event of a failed non-entry rescue), for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;
i. Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this standard, including the safe termination of entry operations under both planned and emergency conditions;
j. Develop and implement procedures to coordinate entry operations, in consultation with the controlling contractor, when employees of more than one employer are working simultaneously in a permit space or elsewhere on the worksite where their activities could, either alone or in conjunction with the activities within a permit space, foreseeably result in a hazard within the confined space, so that employees of one employer do not endanger the employees of any other employer;
k. Develop and implement procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed;
l. Review entry operations when the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and

   Note: Examples of circumstances requiring the review of the permit space program include, but are not limited to: Any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

m. Review the permit space program using the canceled permits we retain for at least 1 year after each entry and revise the program as necessary to ensure that employees participating in entry operations are protected from permit space hazards.

   Note: We may perform a single annual review covering all entries performed during a 12-month period. If no entry is performed during a 12-month period, no review is necessary.

Permitting Process

Before entry is authorized, as an entry employer, we must **document** the completion of measures required by paragraph 3 of our **Permit-required confined space program**, above, by preparing an entry permit.

Before entry begins, the entry supervisor identified on the permit must sign the entry permit to authorize entry.

The completed permit must be made available at the time of entry to all authorized entrants or their authorized representatives, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that pre-entry preparations have been completed.

The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit.

The entry supervisor must terminate entry and take the following action when any of the following apply:

a. Cancel the entry permit when the entry operations covered by the entry permit have been completed; or
b. Suspend or cancel the entry permit and fully reassess the space before allowing reentry when a condition that is not allowed under the entry permit arises in or near the permit space and that condition is temporary in nature and does not change the configuration of the space or create any new hazards within it; and
c. Cancel the entry permit when a condition that is not allowed or covered under the entry permit arises in or near the permit space.

The entry employer must retain each canceled entry permit for at least one (1) year to facilitate the required (within 1 year **after** each entry) review of the permit-required confined space program. Any problems encountered during an entry operation must be noted on the pertinent permit so that appropriate revisions to the permit space program can be made.

Entry Permit:

The entry permit that documents our compliance requirements and authorizes entry to a permit space must identify:

a. The permit space to be entered;
b. The purpose of the entry;
c. The date and the authorized duration of the entry permit;
d. The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

   Note: This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

e. Means of detecting an increase in atmospheric hazard levels in the event the ventilation system stops working;
f. Each person, by name, currently serving as an attendant;

g. The individual, by name, currently serving as entry supervisor, and the signature or initials of each entry supervisor who authorizes entry;
h. The hazards of the permit space to be entered;
i. The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

Note: Those measures can include, but are not limited to, the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

j. The acceptable entry conditions;
k. The results of tests and monitoring performed under the provisions of our Permit-required confined space program, above, accompanied by the names or initials of the testers and by an indication of when the tests were performed;
l. The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;
m. The communication procedures used by authorized entrants and attendants to maintain contact during the entry;
n. Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this standard;
o. Any other information necessary, given the circumstances of the particular confined space, to ensure employee safety; and
p. Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

Training

We will provide training to each employee whose work is regulated by Subpart AA—Confined Spaces in Construction, at no cost to the employee, and ensure that the employee possesses the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this standard. This training must result in an understanding of the hazards in the permit space and the methods used to isolate, control or in other ways protect employees from these hazards, and for those employees not authorized to perform entry rescues, in the dangers of attempting such rescues.

Training required must be provided to each affected employee:

a. In both a language and vocabulary that the employee can understand;
b. Before the employee is first assigned duties under this standard;
c. Before there is a change in assigned duties;
d. Whenever there is a change in permit space entry operations that presents a hazard about which an employee has not previously been trained; and
e. Whenever there is any evidence of a deviation from the permit space entry procedures required permit-required confined space program or there are inadequacies in the employee's knowledge or use of these procedures.

The training must establish employee proficiency in the duties required by this standard and must introduce new or revised procedures, as necessary, for compliance with this standard.

We will maintain training records to show that the training required above has been accomplished. The training records must contain each employee's name, the name of the trainers, and the dates of training. The documentation must be available for inspection by employees and their authorized representatives, for the period of time the employee is employed by that employer.

Duties of Authorized Entrants

As the entry employer, we must ensure that all authorized entrants:

a. Are familiar with and understand the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
b. Properly use equipment as required by permit-required confined space program, above;
c. Communicate with the attendant as necessary to enable the attendant to assess entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required duties of attendants, below;
d. Alert the attendant whenever:
    1. There is any warning sign or symptom of exposure to a dangerous situation;
    2. The entrant detects a prohibited condition; and
e. Exit from the permit space as quickly as possible whenever:
    1. An order to evacuate is given by the attendant or the entry supervisor;
    2. There is any warning sign or symptom of exposure to a dangerous situation;
    3. The entrant detects a prohibited condition; or
    4. An evacuation alarm is activated.

Duties of Attendants

As the entry employer, we must ensure that each attendant:

a. Is familiar with and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
b. Is aware of possible behavioral effects of hazard exposure in authorized entrants;
c. Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under entry permit accurately identifies who is in the permit space;
d. Remains outside the permit space during entry operations until relieved by another attendant;

    Note: Once an attendant has been relieved by another attendant, the relieved attendant may enter a permit space to attempt a rescue when our permit space program allows attendant entry for rescue and the attendant has been trained and equipped for rescue operations as required by our rescue and emergency services procedures, below.

e. Communicates with authorized entrants as necessary to assess entrant status and to alert entrants of the need to evacuate the space as quickly as possible;

f. Assesses activities and conditions inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:
   1. If there is a prohibited condition;
   2. If the behavioral effects of hazard exposure are apparent in an authorized entrant;
   3. If there is a situation outside the space that could endanger the authorized entrants; or
   4. If the attendant cannot effectively and safely perform all the duties required under this section;
g. Summons rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;
h. Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:
   1. Warns the unauthorized persons that they must stay away from the permit space;
   2. Advises the unauthorized persons that they must exit immediately if they have entered the permit space; and
   3. Informs the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;
i. Performs non-entry rescues as specified by our rescue procedure; and
j. Performs no duties that might interfere with the attendant's primary duty to assess and protect the authorized entrants.

Duties of Entry Supervisors

As the entry employer, we must ensure that each entry supervisor:

a. Is familiar with and understands the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;
b. Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;
c. Terminates the entry and cancels or suspends the permit as required by our permitting process;
d. Verifies that rescue services are available and that the means for summoning them are operable, and that we will be notified as soon as the services become unavailable;
e. Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and
f. Determines, whenever responsibility for a permit space entry operation is transferred, and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

Rescue and Emergency Services

When designating our rescue and emergency services per our permit-required confined space program, we must:

a. Evaluate a prospective rescuer's ability to respond to a rescue summons in a timely manner, considering the hazard(s) identified;

   Note: What will be considered timely will vary according to the specific hazards involved in each entry. For example, §1926.103 (Respiratory protection) requires that employers provide a standby person or persons capable of immediate action to rescue employee(s) wearing respiratory protection while in work areas defined as IDLH atmospheres.

b. Evaluate a prospective rescue service's ability, in terms of proficiency with rescue-related tasks and equipment, to function appropriately while rescuing entrants from the particular permit space or types of permit spaces identified;

c. Select a rescue team or service from those evaluated that:

   1. Has the capability to reach the victim(s) within a time frame that is appropriate for the permit space hazard(s) identified;
   2. Is equipped for, and proficient in, performing the needed rescue services;
   3. Agrees to notify us immediately in the event that the rescue service becomes unavailable;
   4. Inform each rescue team or service of the hazards they may confront when called on to perform rescue at the site; and
   5. Provide the rescue team or service selected with access to all permit spaces from which rescue may be necessary so that the rescue team or service can develop appropriate rescue plans and practice rescue operations.

If the employees of Millerick Engineering, Inc. have been designated to provide permit space rescue and/or emergency services, we must take the following measures and provide all equipment and training at no cost to those employees:

a. Provide each affected employee with the personal protective equipment (PPE) needed to conduct permit space rescues safely and train each affected employee so the employee is proficient in the use of that PPE;

b. Train each affected employee to perform assigned rescue duties. We must ensure that such employees successfully complete the training required and establish proficiency as authorized entrants;

c. Train each affected employee in basic first aid and cardiopulmonary resuscitation (CPR). We must ensure that at least one member of the rescue team or service holding a current certification in basic first aid and CPR is available; and

d. Ensure that affected employees practice making permit space rescues before attempting an actual rescue, and at least once every 12 months, by means of simulated rescue operations in which they remove dummies, manikins, or actual persons from the actual permit spaces or from representative permit spaces, except practice rescue is not required where the affected employees properly performed a rescue operation during the last 12 months in the same permit space the authorized entrant will enter, or in a similar permit space. Representative permit spaces must, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

Non-entry rescue is required unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. We must designate an entry rescue service whenever non-entry rescue is not selected. Whenever non-entry rescue is selected, the entry employer must ensure that retrieval systems or methods are used whenever an authorized entrant enters a permit space, and must confirm, prior to entry, that emergency assistance would be available in the event that non-entry rescue fails. Retrieval systems must meet the following requirements:

a. Each authorized entrant must use a chest or full body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, above the entrant's head, or at another point which we can establish presents a profile small enough for the successful removal of the entrant. Wristlets or anklets may be used in lieu of the chest or full body harness if we can demonstrate that the use of a chest or full body harness is infeasible or creates a greater hazard and that the use of wristlets or anklets is the safest and most effective alternative.
b. The other end of the retrieval line must be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device must be available to retrieve personnel from vertical type permit spaces more than 5 feet (1.52 meters) deep.
c. Equipment that is unsuitable for retrieval must not be used, including, but not limited to, retrieval lines that have a reasonable probability of becoming entangled with the retrieval lines used by other authorized entrants, or retrieval lines that will not work due to the internal configuration of the permit space.

If an injured entrant is exposed to a substance for which a Safety Data Sheet (SDS) or other similar written information is required to be kept at the worksite, that SDS or written information must be made available to the medical facility treating the exposed entrant.

Employee Participation

We will consult with affected employees and their authorized representatives on the development and implementation of all aspects of our permit space program.

We will make available to each affected employee and his/her authorized representatives all information required to be developed by the Confined Spaces in Construction standard.

Provision of Documents to Secretary

For each document required to be retained in the Confined Spaces in Construction standard, as the retaining employer, we must make the document available on request to the Secretary of Labor or the Secretary's designee.

Millerick Engineering, Inc.

Emergency Phone Numbers

(To be accessible to attendant)

Main Office: 2099857750

Police: 911 [__________________]
(If no 911 Service Available)

Fire: 911 [__________________]
(If no 911 Service Available)

Ambulance: 911 [__________________]
(If no 911 Service Available)

Hospital Name: ___________________________

EMERGENCY RESCUE SERVICE NAME: _______________________
PHONE: _______________________

Christopher Millerick Work: 2099857750
Safety Director Cell: _________________

Other:

___________________________ Work: _________________
(Name/Title) Cell: _________________

___________________________ Work: _________________
(Name/Title) Cell: _________________

___________________________ Work: _________________
(Name/Title) Cell: _________________

___________________________ Work: _________________
(Name/Title) Cell: _________________

When calling for EMERGENCY RESPONSE, this location is:___________________

Millerick Engineering, Inc.

Confined Space/Permit Space Evaluation Survey

Name/Description of this space: ________________________________

Location of this space: ______________________________________

Person performing this survey: _________________________________

Date of this survey: ____

Section 1 – Use this section to determine if the space is a Confined space.

Yes ☐ No ☐ Is the space large enough and so configured that an employee can enter and perform assigned work?

Yes ☐ No ☐ Does the space have restricted means for entry or exit? Doorways and other portals through which a person can walk are normally not considered restricted means for entry or exit.

Yes ☐ No ☐ Is the space **not** designed for continuous occupancy?

If all three answers above are yes, this is a confined space. Proceed to Section 2.

Section 2 – Use this section to determine if the space is a Permit space.

Yes ☐ No ☐ Does the space contain or have a potential to contain a hazardous atmosphere? Examples: combustible dust, flammable mixtures, or oxygen deficiency that may expose employees to risk of death, incapacitation, or acute illness.

Yes ☐ No ☐ Does the space contain a material that has the potential for engulfing an entrant? Examples: liquids or granular solids.

Yes ☐ No ☐ Does the space have an internal configuration such as inwardly converging walls or a sloping floor that could trap or asphyxiate an entrant?

If any answer is yes, this is a permit space. An entry permit is required for entry.

Millerick Engineering, Inc.

Permit-Space Information & Attendant Designation

Confined Space Date: _______________

Space Identification: ____

Space Location: ____

Client: ____

1. Reasons the above confined space is designated a Permit-Required Confined Space:

____

____

____

2. Special precautions taken to protect personnel in or around the above space:

____

____

____

3. Specific hazards and experience with the above confined space:

____

____

____

Client Understanding

I, ____, have been provided the above
(Client Representative)

information and understand that permit space entry is allowed only through compliance with a Permit Space Program meeting the requirements of 29 CFR 1926.1204

In the event our employees and your company's employees are working near or in the same Permit-Required Confined Space, the below listed person is designated as the one and only Senior Attendant. The person, listed below, will have authority over other Attendants.

____

(Designated Senior Attendant)

____ ___________________________

(Client Representative Signature/Title) **(Date)**

____ ___________________________

Christopher Millerick **(Date)**

Safety Director

[A copy of this form will be kept at the job site during all operations.]

Millerick Engineering, Inc.

Entry Roster

Confined Space Date: ______________

Space Identification: ____

Space Location: ____

Client: ____

Authorized Entrant	TIME IN	TIME OUT	TIME IN	TIME OUT	TIME IN	TIME OUT	TIME IN	TIME OUT

Millerick Engineering, Inc.

Entry Permit

Permit-Required Confined Space

Note: This Entry Permit must be used with the attached Pre-Entry Checklist. Additional pages may be added as necessary.

PERMIT VALID FOR ________ HOURS

CONFINED SPACE-HAZARDOUS AREA:

CONFINED SPACE IDENTIFICATION: ________________________ START DATE: __________________

SPACE LOCATION: _____________________________________ TIME: ___________________

PURPOSE OF ENTRY: ____

SUPERVISOR(S) in charge of crew:

____

____

AUTHORIZED ATTENDANTS:

____

____

____

____

ATMOSPHERE (GAS) TESTER'S SIGNATURE & INITIALS: ______________________ __________

ATMOSPHERE TESTING EQUIPMENT USED:

(Type)	(Model and/or Serial Number)	(Calibration date)
(Type)	(Model and/or Serial Number)	(Calibration date)
(Type)	(Model and/or Serial Number)	(Calibration date)

_______________________________________ _______________________________________

(Signature of Entry Supervisor/Date) **(Signature of Program Administrator/Date)**

REVIEWED BY: (Confined Space Operations Personnel)

Note: The below listed persons, or their representative, have had the opportunity to observe the pre-entry atmospheric testing as well as any periodic testing that may be deemed necessary for employee safety.

(Print Name)	(Signature)	(Print Name)	(Signature)
(Print Name)	(Signature)	(Print Name)	(Signature)
(Print Name)	(Signature)	(Print Name)	(Signature)
(Print Name)	(Signature)	(Print Name)	(Signature)

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Pre-Entry Checklist

This checklist is an integral part of our Permit System and MUST be maintained with the Entry Permit.

All items on the Pre-Entry Checklist must be completed before entry, for items that do not apply enter N/A.

Initial Atmospheric Check (before ventilation)

		Acceptable Parameters	Tester's Initials
Date:____________	**Time: ________**		
Oxygen: ______%	**______%**	**>19.5% <23.5%**	_________

Flammable Gases & Vapors Present:

Name			
1. _________________	______% LEL	<10.0%	_________
2. _________________	______% LEL	<10.0%	_________
3. _________________	______% LEL	<10.0%	_________

Potential Toxic Air Contaminants:

Name			
1. _________________	______ PPM	<_____ PPM	_________
2. _________________	______ PPM	<_____ PPM	_________
3. _________________	______ PPM	<_____ PPM	_________

Note: mg/m^3_may be substituted for PPM. For further reference see 1926.57(f)-(i)

Method of Isolation (atmospheric conditions): ____

____

Means of Ventilation (to control atmospheric conditions): ______________________________

____

Atmospheric Check (after ventilation & isolation and immediately prior to initial entry)

		Acceptable Parameters	Tester's Initials
Time: ________			
Oxygen: ______%	**______%**	**>19.5% <23.5%**	_________

Flammable Gases & Vapors Present:

Name			
1. _________________	______% LEL	<10.0%	_________
2. _________________	______% LEL	<10.0%	_________
3. _________________	______% LEL	<10.0%	_________

Potential Toxic Air Contaminants:

Name			
1. _________________	______ PPM	<_____ PPM	_________
2. _________________	______ PPM	<_____ PPM	_________
3. _________________	______ PPM	<_____ PPM	_________

Note: mg/m^3_may be substituted for PPM. For further reference see 1926.57(f)-(i)

Other Hazards:

(Type, i.e., configuration, engulfment, unacceptable atmosphere, any recognized serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

(Type, i.e., configuration, engulfment, unacceptable atmosphere, any recognized serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

(Type, i.e., configuration, engulfment, unacceptable atmosphere, any recognized serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

(Type, i.e., configuration, engulfment, unacceptable atmosphere, any recognized serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

(Type, i.e., configuration, engulfment, unacceptable atmosphere, any recognized serious safety or health hazard)

(Engineering controls to control or eliminate the hazard to the extent feasible.)

HAZARDS NOT COMPLETELY ELIMINATED BY ENGINEERING CONTROLS AND SAFETY GEAR REQUIRED (i.e., respirators (specific type), special boots, gloves, suits, eye protection, etc.):

(HAZARD) (SAFETY GEAR)

(HAZARD) (SAFETY GEAR)

(HAZARD) (SAFETY GEAR)

COMMUNICATIONS PROCEDURES:

Note: Acceptable, non-electrical, suggestions include, but are not limited to, predetermined rapping sounds, tugs on a rope or line, air horn signals, voice communications

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BELOW LISTED ITEMS MUST BE COMPLETED AND REVIEWED PRIOR TO ENTRY:

NOTE: For items that do not apply, enter N/A.

REQUIREMENT COMPLETED	DATE	TIME	REQUIREMENT COMPLETED	DATE	TIME
Lock Out/De-energize/Try Out	_____	_____	Full Body Harness w/"D" ring	____	____
Lines Broken/Capped/blanked	_____	_____	Emergency Escape Retrieval Equipment	____	____
Purge-Flush & Vent	_____	_____			
Ventilation	_____	_____	Lifelines	____	____
Secure Area (Post & Flag)	_____	_____	Fire Extinguishers	____	____
Breathing Apparatus	_____	_____	Lighting (Explosion Proof)	____	____
Resuscitator-Inhalator	_____	_____	Protective Clothing	____	____
Standby Safety Personnel	_____	_____	Respirator(s) (Air Purifying)	____	____
Hoisting Equipment	_____	_____	Direct reading gas monitor tested	____	____
All electric equipment listed Class I, Division I, Group D	_____	_____			
			Non-Sparking Tools	____	____
SCBA's for entry & standby	_____	_____	Powered Communications	____	____
Other: ____________________	_____	_____	Burning & Welding Permit	____	____
Other: ____________________	_____	_____	Other: ____________________	____	____

EMERGENCY AND RESCUE PROCEDURES

	YES	NO	N/A
Rescue Procedures will be implemented by Company Employees.	☐	☐	☐
Company Rescue Personnel have had training in:			
a. Use of Personal Protective Equipment.	☐	☐	☐
b. Use of Rescue Equipment.	☐	☐	☐
c. Practiced simulated permit space rescue within the past 12 months for a space representative of the space for which this permit is issued.	☐	☐	☐

Each member of the Rescue Team has had training in basic First Aid and cardiopulmonary resuscitation (CPR) and at least one (1) member is currently certified.

NAME OF CERTIFIED PERSON (CPR): ____

NAME OF CERTIFIED PERSON (1st AID): ____

	YES	NO	N/A
Appropriate Safety Data Sheets, are at the job site.	☐	☐	☐
The retrieval line is affixed to the entrants and a fixed point outside the space or a mechanical device should the space be a vertical type more than five (5) feet deep.	☐	☐	☐
All entrants will wear a chest or full body harness with a retrieval line attached at the center of the entrant's back neat shoulder level, or above the entrant's head.	☐	☐	☐
Entrants will wear wristlets, in lieu of the above, should they create a lesser danger to the entrants.	☐	☐	☐
Rescue procedures will be implemented by a rescue service consisting of persons who are not employees.	☐	☐	☐
This rescue service has been provided with:			
a. information on all hazards or potential hazards they may confront.	☐	☐	☐
b. access to all permit spaces from which rescue may be necessary to enable the rescue service to develop appropriate rescue plans and practice rescue procedures.	☐	☐	☐

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SPECIFIC RESCUE PLAN FOR AN EMERGENCY IN THIS CONFINED SPACE:

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Record of Continuous Monitoring

[The results of continuous monitoring, if applicable, are to be recorded below every two (2) hours.]

TESTS TO BE TAKEN	Permissible Entry Level	TIME/ RESULTS	TIME/ RESULTS	TIME/ RESULTS	TIME/ RESULTS	TESTER'S INITIALS	DATE
PERCENT OF OXYGEN	19.5 to 23.5%	_____/_____	_____/_____	_____/_____	_____/_____	________	________
LOWER EXPLOSIVE LIMIT	Under 10%	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________
____________________	*______ **______	_____/_____	_____/_____	_____/_____	_____/_____	________	________

***8 Hour Time Weighted Average: Employee can work in area 8 hours (longer with appropriate protection).**

****Short term exposure limit: Employee can work in area up to 15 minutes.**

This six (6) page Entry Permit and Pre-Entry Checklist as been prepared by the Entry Supervisor and reviewed by all personnel involved in this Permit-Required Confined Space Entry Operation.

Entry Supervisor: ________________________________
(Name)

Entry Supervisor: ________________________________ __________
(Signature) **(Date)**

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Cranes and Derricks in Construction

29 CFR 1926 Subpart CC - Cranes and Derricks in Construction

1926 Subpart CC - Cranes and Derricks in Construction, applies to power-operated cranes and derricks, and their attachments, that can hoist, lower and horizontally move a suspended load.

Exclusions to this standard include, but are not limited to:

a. Power-operated cranes and derricks that have been converted or adapted for a non-hoisting/lifting use.
b. Power shovels, excavators, wheel loaders, backhoes, loader backhoes, track loaders.
c. Machinery originally designed as vehicle-mounted aerial devices (for lifting personnel) and self-propelled elevating work platforms.
d. Powered industrial trucks (forklifts), except when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load.
e. Articulating/knuckle-boom truck cranes that deliver material to a construction site when used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting.
f. Articulating/knuckle-boom truck cranes that deliver material to a construction site when the crane is used to transfer building supply sheet goods or building supply packaged materials from the truck crane onto a structure, using a fork/cradle at the end of the boom, but only when the truck crane is equipped with a properly functioning automatic overload prevention device. Such sheet goods or packaged materials include, but are not limited to: sheets of sheet rock, sheets of plywood, bags of cement, sheets or packages of roofing shingles, and rolls of roofing felt.

Note: The above articulating/knuckle-boom crane exclusion does not apply when it is used to 1) hold, support or stabilize the material to facilitate a construction activity, such as holding material in place while it is attached to the structure; 2) when the material being handled is a prefabricated component such as precast concrete members or panels, roof trusses, prefabricated building sections such as, but not limited to: floor panels, wall panels, roof panels, roof structures, or similar items; and, 3) when the material being handled by the crane is a structural steel member (for example, steel joists, beams, columns, steel decking (bundled or unbundled) or a component of a systems-engineered metal building.

Actions Required Prior to Assembly

Prior to assembly of a crane, care must be taken to ensure ground conditions are appropriate for the crane and other hazards, specifically, electrical hazards, are eliminated.

Ground Conditions:

Note: Ground conditions means the ability of the ground to support the crane or derrick (including slope, compaction, and firmness).

The controlling entity must ensure that the crane is not assembled **or used** unless the ground conditions are firm, drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the manufacturer’s specifications for adequate support and degree of level are met.

Note: The requirement for the ground to be drained does not apply to marshes/wetlands.

The controlling entity must inform the user of the crane and the operator of the location of hazards beneath the set-up area (such as voids, tanks, utilities) if those hazards are identified in documents (such as site drawings, as-built drawings, and soil analyses) that are in the possession of the controlling entity (whether at the site or off-site) or the hazards are otherwise known to that controlling entity.

Note **If there is no controlling entity for the project, the requirements above must be met by the employer that has authority at the site to make or arrange for ground preparations for crane operations.**

If the Assembly/Disassembly director **or the operator** determines that ground conditions do not meet the above requirements, that person's employer **must** have a discussion with the controlling entity regarding the ground preparations that are needed so that, with the use of suitable supporting materials/devices (if necessary), the above requirements are met.

<u>Electrical Hazards:</u>

We will assume that all power lines are energized unless the power line operator confirms that the power line has been, and continues to be, deenergized and visibly grounded at the worksite.

When working near transmitter/communication towers where the crane is close enough for an electrical charge to be induced in the crane or materials being handled, the transmitter must be deenergized or the following precautions must be taken:

a. The crane must be provided with an electrical ground.
b. If we must use a tag line, it must be nonconductive.

Note: **The following are requirements for all power lines voltages, except when the "20 feet" distance is referenced. For power lines that range from 351 kV up to 1000 kV, the distance "20 feet" must be substituted with 50 feet. For power lines over 1000 kV, the minimum clearance distance must be established by the power line operator or a registered professional engineer who is a qualified person with respect to electrical power transmission and distribution.**

We must determine if any part of the crane, load line, or the load including the rigging and lifting accessories could get closer than 20 feet to a power line during the assembly/disassembly process. If it is possible, we will choose one of the requirements of Option 1, Option 2, or Option 3.

Option 1: De-energize and ground the power lines. We must confirm with the power line operator that the power lines have been de-energized and visibly grounded at the worksite.

Option 2: 20-foot clearance. Ensure that no part of the crane, load line, or the load including rigging and lifting accessories, can get closer than 20 feet to the power lines.

Option 3: Use Table A - Minimum Clearance Distances. We have to determine the line's voltage and the minimum approach distance permitted under Table A.

Note: **When Option 3 is used, the power line operator must provide the requested voltage information within two working days of the employer's request.**

Table A - Minimum Clearance Distances	
Voltage (nominal, kV, alternating current)	**Minimum clearance distance (feet)**
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).
Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200 kV.	

When we use Option 2 or Option 3, we must use the following procedures to prevent any part of the crane or load from becoming too close to the live power lines.

We will conduct a planning meeting with the Assembly/Disassembly director, crane operator, assembly/disassembly crew, and the other workers who will be in the assembly/disassembly area, to review the location of the power lines and the steps that will be implemented to prevent encroachment/electrocution, including the use of nonconductive tag lines when needed.

We will select at least one measure from this list that will be effective in preventing encroachment. The measures are as follows:

a. Use a dedicated spotter who is in continuous contact with the crane operator.
b. Use a proximity alarm that is set to give the crane operator sufficient warning to prevent encroachment.
c. Use a device that automatically warns the crane operator when to stop movement, such as a range control warning device. The device will be set to give the crane operator sufficient warning to prevent encroachment.
d. Use a device that automatically limits range of movement and have it set to prevent encroachment.
e. Use an elevated warning line, barricade, or line of signs that are in view of the crane operator and that are equipped with flags or similar high-visibility markings.

It is prohibited for any part of a crane, load line, or the load including the rigging and lifting accessories, whether partially or fully assembled, to be under a power line, or be closer than the minimum approach distance under Table A to a power line. The only exception to this is if we have confirmed that the power line operator has deenergized and visibly grounded the power line at the job site.

We will also post at least one electrocution hazard warning conspicuously in the cab so that it is in view of the crane operator. Additionally, at least two signs will be posted on the outside of the crane, except for overhead gantry and tower cranes.

Dedicated Spotter Requirements

When a dedicated spotter is used, they must:

a. Be equipped with a visual aid to assist in identifying the minimum clearance distance.

Note: Examples of a visual aid include but are not limited to: A clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).

b. Be positioned to effectively gauge the clearance distance.

c. When necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

d. Give timely information to the operator so that the required clearance distance can be maintained.

Assembly/Disassembly

When assembling or disassembling a crane and/or its attachments, the Assembly/Disassembly director must comply with all applicable manufacturer prohibitions and will select to use the manufacturer's procedures applicable to the crane and/or attachments.

Assembly/disassembly must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons ("Assembly/ Disassembly director").

Where the assembly/disassembly is being performed by only one person, that person must meet the criteria for both a competent person and a qualified person. This person will be considered the Assembly/Disassembly director.

The Assembly/Disassembly director must understand the applicable assembly/disassembly procedures.

The Assembly/Disassembly director must review the applicable assembly/disassembly procedures immediately prior to the commencement of assembly/disassembly, unless they understand the procedures and have applied them to the same type and configuration of crane, including possible accessories.

Before commencing assembly/disassembly operations, the Assembly/Disassembly director must ensure that the crew members understand all of the following:

a. Their tasks.

b. The hazards associated with their tasks.

c. The hazardous positions/locations that they need to avoid.

Note: If a crew member takes on a different task during assembly/disassembly operations, or if new personnel is added during the assembly/disassembly operations, the Assembly/Disassembly director must complete the above three steps.

Before a crew member goes to a location where they could be injured by movement and that is out of view of the operator, the crew member must inform the crane operator that he/she is going to that location.

Where the operator knows that a crew member went to a location noted above, the operator must not move any part of the crane or load until the operator is informed in accordance with a prearranged system of communication that the crew member is in a safe position.

When pins (or similar devices) are being removed, employees must not be under the boom, jib, or other components, except where Addressable/Disassembly director demonstrates that site constraints require one or more employees to be under the boom, jib, or other components when pins (or similar devices) are being removed. The Assembly/Disassembly director must implement procedures that minimize the risk of unintended dangerous movement and minimize the duration and extent of exposure under the boom.

During all phases of assembly/disassembly the rated capacity limits for loads imposed on the crane, crane components, the rigging, lifting lugs, and accessories must not be exceeded for the crane being assembled/disassembled.

The Assembly/Disassembly director supervising the assembly/disassembly operation must address the hazards associated with the operation, which include:

a. Site and ground conditions must be adequate for safe assembly/disassembly operations and to support the crane during assembly/disassembly.
b. The size, amount, condition and method of stacking the blocking must be sufficient to sustain the loads and maintain stability.
c. When used to support lattice booms or components, blocking must be appropriately placed to:
    1. Protect the structural integrity of the crane, and
    2. Prevent dangerous movement or collapse.
d. When using an assist crane, the loads that will be imposed on the assist crane at each phase of assembly/disassembly must be verified in accordance with 29 CFR 1926.1417(o)(3) before assembly/disassembly begins.
e. The point(s) of attachment of rigging to a boom (or boom sections or jib or jib sections) must be suitable for preventing structural damage and facilitating safe handling of these components.
f. The center of gravity of the load must be identified if that is necessary for the method used for maintaining stability.

    Note: Where there is insufficient information to accurately identify the center of gravity, measures designed to prevent unintended dangerous movement resulting from an inaccurate identification of the center of gravity must be used.

g. The boom sections, boom suspension systems (such as gantry A-frames and jib struts), and components must be rigged or supported to maintain stability upon the removal of the pins.
h. Suspension ropes and pendants must not be allowed to catch on the boom or jib connection pins or cotter pins (including keepers and locking pins).
i. The potential for unintended movement from inadequately supported counterweights and from hoisting counterweights.
j. Each time reliance is to be placed on the boom hoist brake to prevent boom movement during assembly/disassembly, the brake must be tested prior to such reliance to determine if it is sufficient to prevent boom movement. If it is not sufficient, a boom hoist pawl, other locking device/back-up braking device, or another method of preventing dangerous movement of the boom (such as blocking or using an assist crane) from a boom hoist brake failure must be used.
k. Backward stability before swinging the upper works, travel, and when attaching or removing crane components.
l. The effect of wind speed and weather on the crane.

Additionally, the following must be addressed, if applicable:

a. Manufacturer limitations on the maximum amount of boom supported only by cantilevering must not be exceeded. Where these are unavailable, a registered professional engineer familiar with the type of crane involved must determine in writing this limitation, which must not be exceeded.
b. The weight of each of the components must be readily available.
c. The selection of components, and configuration of the equipment, that affect the capacity or safe operation of the crane must be in accordance with manufacturer instructions, prohibitions, limitations, and specifications.
    1. Where these are unavailable, a registered professional engineer familiar with the type of crane involved must approve, in writing, the selection and configuration of components; or
    2. Approved modifications that meet the requirements of 29 CFR 1926.1434 - Equipment Modifications.
d. Upon completion of assembly, the crane must be inspected to ensure compliance with the above.

Post-Assembly

Upon completion of assembly, the crane must be inspected by a qualified person to assure that it is configured in accordance with manufacturer criteria.

Where manufacturer criteria are unavailable, a qualified person must:

a. Determine if a registered professional engineer (RPE) who is familiar with the type of crane involved is needed to develop criteria for the configuration. If an RPE is not needed, we will ensure that the criteria are developed by the qualified person. If an RPE is needed, we will ensure that they are developed by an RPE.
b. Determine if the crane meets the criteria developed in accordance with paragraph a. above.

The crane must not be used until an inspection demonstrates that it is configured in accordance with the applicable criteria.

Note: Reusable shipping pins, straps, links, and similar equipment must be removed. Once they are removed, they must either be stowed or otherwise stored so that they do not present a falling object hazard.

Rigging

In addition to following the requirements in 29 CFR 1926.251 and other requirements in this and other standards applicable to rigging, when rigging is used for assembly/disassembly, the employer must ensure that:

a. The rigging work is done by a qualified rigger.
b. Synthetic slings are protected from: abrasive, sharp or acute edges, and configurations that could cause a reduction of the sling’s rated capacity, such as distortion or localized compression.

    Note: Requirements for the protection of wire rope slings are contained in 29 CFR 1926.251(c)(9).

c. When synthetic slings are used, the synthetic sling manufacturer’s instructions, limitations, specifications and recommendations must be followed.

Inspections

Any part of a manufacturer's procedures regarding inspections that relate to safe operation (such as to a safety device or operational aid, critical part of a control system power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) that is more comprehensive or has a more frequent schedule of inspection than the requirements of 29 CFR 1926.1412 must be followed.

All inspection documents must be available, during the applicable document retention period, to all persons who conduct inspections.

<u>Modified Equipment Inspection:</u>

Equipment that has had modifications or additions which affect the safe operation of the crane (such as modifications or additions involving a safety device or operational aid, critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) or capacity must be inspected by a **qualified person** after such modifications/additions have been completed, prior to initial use. The inspection must meet all the requirements of 29 CFR 1926.1412(a).

<u>Repaired/adjusted Equipment Inspection:</u>

Equipment that has had a repair or adjustment that relates to safe operation (such as: a repair or adjustment to a safety device or operator aid, or to a critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism), must be inspected by a **qualified person** after such a repair or adjustment has been completed, prior to initial use. The inspection must meet all the requirements of 29 CFR 1926.1412(b).

<u>Equipment Not in Regular Use Inspection:</u>

Equipment that has been idle for 3 months or more must be inspected by a qualified person in accordance with the requirements of the Monthly Inspection, below.

<u>Post-assembly Inspection:</u>

Upon completion of assembly, the crane must be inspected by a **qualified** person to assure that it is configured in accordance with the criteria as described previously. The inspection must meet all the requirements of 29 CFR 1926.1412(c).

<u>Each Shift Inspection:</u>

A **competent person** must begin a visual inspection prior to each shift the crane will be used, which must be completed before or during that shift. The inspection must consist of observation for apparent deficiencies. Taking apart components and booming down is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further investigation necessitating taking apart components or booming down is needed. Determinations made in conducting the inspection must be reassessed in light of observations made during operation. Some of the items include control mechanisms, pressurized lines, hooks and latches, wire rope, electrical apparatus, tires (when used), and ground conditions.

The inspection must meet all the requirements of 29 CFR 1926.1412(d).

Daily (each shift) inspections will be documented and include the following: items checked, results of the inspection, and name and signature of the inspector. Documentation of daily (each shift) inspections will be retained for 3 months.

Monthly Inspection:

Per 29 CFR 1926.1412(e), each month the crane is in service it must be inspected by **competent person.** The inspection must meet all the requirements of 29 CFR 1926.1412(d). See “Each Shift” inspection, above.

Note: Documented monthly inspection is not required if the daily (each shift) inspection is documented, and records are retained for 3 months.

Annual/Comprehensive Inspection:

At least every 12 months the crane must be inspected by a qualified person in accordance with 29 CFR 1926.1412(d) except that the corrective action set forth in paragraphs (f)(4), (f)(5), and (f)(6) of 29 CFR 1926.1412 must apply in place of the corrective action required by paragraphs (d)(2) and (d)(3) of 29 CFR 1926.1412.

In addition, at least every 12 months, the crane must be inspected by a qualified person. Disassembly is required, as necessary, to complete the inspection. The inspection must meet all the requirements of 29 CFR 1926.1412(f).

Documentation of Annual/Comprehensive Inspection:

The following information must be documented, maintained, and retained for a minimum of 12 months, by the employer that conducts the inspection:

a. The items checked and the results of the inspection.
b. The name and signature of the person who conducted the inspection and the date.

Severe Service Inspection:

Where the severity of use/conditions is such that there is a reasonable probability of damage or excessive wear (such as loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, prolonged exposure to a corrosive atmosphere), the crane will stop being used and a **qualified** person must inspect it the inspection must meet all the requirements of 1926.1412(g).

Wire Rope Inspection

Wire Rope Shift Inspection:

A competent person must begin a visual inspection prior to each shift the crane is used, which must be completed before or during that shift. The inspection must consist of observation of wire ropes (running and standing) that are likely to be in use during the shift for apparent deficiencies, including those listed in 29 CFR 1926.1413(a)(2). Untwisting (opening) of wire rope or booming down is not required as part of this inspection.

Daily (each shift) inspections will be documented and include the following: items checked, results of the inspection, and name and signature of the inspector. Documentation of daily (each shift) inspections will be retained for 3 months.

Wire Rope Monthly Inspection:

Each month an inspection must be conducted in accordance shift inspection, above, and 29 CFR 1926.1413(b).

Note: Documented monthly inspection is not required if the daily (each shift) inspection is documented, and records are retained for 3 months.

Wire Rope Annual/Comprehensive Inspection:

At least every 12 months, wire ropes in use on cranes must be inspected by a qualified person in accordance with shift inspection, above, and 29 CFR 1926.1413(c).

In addition, at least every 12 months, the wire ropes in use on cranes must be inspected by a qualified person in accordance with 29 CFR 1926.1413(c)

Documentation of Annual/Comprehensive Wire Rope Inspection:

The following information must be documented, maintained, and retained for a minimum of 12 months, by the employer that conducts the inspection:

a. The items checked and the results of the inspection.
b. The name and signature of the person who conducted the inspection and the date.

Safety Devices

Operations must not begin unless all of the devices listed below are in proper working order. If a device stops working properly during operations, the operator must safely stop operations. If any of the devices are not in proper working order, the crane must be taken out of service and operations must not resume until the device is again working properly.

a. Crane level indicator.

   Note: This requirement does not apply to portal cranes, derricks, floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation.

b. Boom stops, except for derricks and hydraulic booms.
c. Jib stops (if a jib is attached), except for derricks.
d. Cranes with foot pedal brakes must have locks.
e. Hydraulic outrigger jacks and hydraulic stabilizer jacks must have an integral holding device/check valve.
f. Cranes on rails must have rail clamps and rail stops, except for portal cranes.
g. Horn

Crane Operations

Operators must comply with all manufacturer procedures applicable to the operational functions of the crane, including its use with attachments.

Operators must have access to procedures applicable to the operation of the crane and these items must be readily available in the cab at all times for use by the operator. These items include rated capacities (load charts), recommended operating speeds, special hazard warnings instructions, and operator's manual.

Note: Where rated capacities are available in the cab only in electronic form: in the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

The operator must not engage in any practice or activity that diverts his/her attention while engaged in operating the crane, such as the use of cellular phones (other than when used for signal communications).

The operator has the authority **and responsibility** to stop and refuse to handle loads whenever there is a safety concern. A qualified person, at this point, must determine that safety has been assured.

Power Line Safety

We will assume that all power lines are energized unless the power line operator confirms that the power line has been, and continues to be, deenergized and visibly grounded at the worksite.

When working near transmitter/communication towers where the crane is close enough for an electrical charge to be induced in the crane or materials being handled, the transmitter must be deenergized or the following precautions must be taken:

a. The crane must be provided with an electrical ground.
b. If we must use a tag line, it must be nonconductive.

Note: The following are requirements for all power lines voltages, except when the "20 feet" distance is referenced. For power lines that range from 351 kV up to 1000 kV, the distance "20 feet" must be substituted with 50 feet. For power lines over 1000 kV, the minimum clearance distance must be established by the power line operator or a registered professional engineer who is a qualified person with respect to electrical power transmission and distribution.

Hazard Assessment and Precautions:

Before beginning crane operations, we must

a. Identify the work zone by either:
    1. Demarcating boundaries with flags or a range limit device and prohibit the operator from operating the crane past those boundaries, or
    2. Define the work zone as the area 360 degrees around the crane, up to the maximum working radius.

b. Determine if any part of the crane, load line, or the load including rigging and lifting accessories could get closer than 20 feet to a power line if operated at the maximum working radius in the work zone. If so, the requirements of Option 1, Option 2, or Option 3 must be met.

   Option 1: De-energize and ground the power lines. We must confirm with the power line operator that the power line has been de-energized and visibly grounded at the worksite.

   Option 2: 20-foot clearance. Ensure that no part of the crane, load line, or the load including rigging and lifting accessories, can get closer than 20 feet to the power lines.

   Option 3: Use Table A - Minimum Clearance Distances. We have to determine the line's voltage and the minimum approach distance permitted under Table A.

   Note: When Option 3 is used, the power line operator must provide the requested voltage information within two working days of the employer's request.

Preventing Encroachment/Electrocution:

When we use Option 2 or Option 3, we must use the following procedures to prevent any part of the crane or load from becoming too close to the live power lines.

First, we will conduct a planning meeting with the crane operator and the other workers who will be in the area of the crane and/or load to review the location of the power lines, and the steps that will be implemented to prevent encroachment/electrocution.

We will erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator and equipped with flags or similar high-visibility markings. If we use Option 2 it will be placed 20 feet from the power line. If we use Option 3 it will be placed at the minimum approach distance under Table A.

If the operator is unable to see the elevated warning line, then we must use a dedicated spotter and implement one of the following measures:

a. A proximity alarm set to give the operator sufficient warning to prevent encroachment.
b. A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.
c. A device that automatically limits range of movement that is set to prevent encroachment.
d. An insulating link/device installed at a point between the end of the load line and the load.

Operations Below Power Lines:

No part of the crane, load line, or the load including the rigging and lifting accessories is allowed below a power line unless we have confirmed that the power line operator has de-energized the lines and we can see that the power line has been grounded at the job site.

Exceptions: Work can be performed under live power lines if we meet one of the following:

a. The work is covered by 1926 Subpart V - Electric Power Transmission and Distribution.
b. We are using a crane with non-extensible booms and the uppermost part with the boom at true vertical, would be more than 20 feet below the plane of the power line, or more than the Table A minimum clearance distance below the plane of the power line.
c. We are using a crane with articulating or extensible booms and the uppermost part, with the boom in the fully extended position at true vertical, would be more than 20 feet below the plane of the power line or more than the Table A minimum clearance distance below the plane of the power line.
d. We can demonstrates that it is infeasible to de-energize the overhead power lines and we meet the requirements of 1926.1410 - Power Line Safety (All Voltages) Equipment Operations Closer than the Table A Zone.

Operations Closer than Specified in Table A

It is prohibited for any part of the crane, load line, or the load including rigging and lifting accessories to get closer to an energized power line than the minimum approach distances specified under Table A - Minimum Clearance Distances.

If it has been determined that work operations must be performed closer than allowable under Table A, we must consult the power line operator to de-energize the line.

If, after consultation with the utility operator, it is determined that it is infeasible to de-energize and ground the power line or move it then work can only be performed under closely monitored conditions.

First the power line operator, or a registered professional engineer who is a qualified person with respect to electrical power transmission and distribution, must determines what the minimum clearance distance that must be maintained on that site to prevent electrical contact.

After that minimum clearance distance is established, we will hold a planning meeting with the power line operator, or a registered professional engineer, to held to determine the procedures that will be followed to prevent electrical contact and electrocution. At a minimum these procedures must include:

a. If the power line is equipped with a device that automatically reenergizes the circuit in the event of a power line contact, the device must be made inoperative before work begins.
b. A dedicated spotter must be used and must be in continuous contact with the operator.
c. We must us an elevated warning line or barricade to prevent electrical contact. It cannot be attached to the crane, must be equipped with high-visibility markings, and be in view of the operator either directly or through video equipment.
d. We must install an insulating link/device above the load up until passed the point of possible contact.
e. We will use nonconductive rigging if it may come within the minimum distance from Table A during the operation.

f. If the crane has a device that automatically limits range of movement, it must be used and set to prevent any part of the crane, load line, or load including the rigging and lifting accessories from coming closer than the minimum approach distances set for that specific job site.
g. If we must use a tag line, it must be nonconductive.
h. Barricades must be put up forming a perimeter at least 10 feet away from the crane to prevent unauthorized personnel from entering the work area. If obstacles prevent the barricade from being at least 10 feet away, then they must be as far from the crane as possible.
i. Workers other than the operator are prohibited from touching the load line above the insulating link/device and crane. Operators remotely operating the crane from the ground must use wireless controls that isolate the operator from the crane or insulating mats that insulate the operator from the ground.
j. Only personnel essential to the operation are permitted to be in the area of the crane and load.
k. The crane must be properly grounded.
l. An insulating line hose or cover-up must be installed by the power line operator except when such devices are unavailable for the line voltages involved.

All the procedures developed in the planning meeting will be documented and made immediately available on-site.

Before work begins, Millerick Engineering, Inc. and power line operator, or registered professional engineer, will meet with the crane operator and the other workers who will be in the area of the crane or load to review and implement the procedures developed to prevent breaching the minimum approach distance.

We must work with the power line operator or registered professional engineer to identify one person who will direct the implementation of the procedures. This person will direct the implementation of the procedures and has the authority to stop work at any time to ensure safety.

If a problem occurs while implementing these procedures, or something indicates that those procedures are inadequate to prevent electrocution, we will safely stop operations and either develop new procedures.

Signals:

A signal person must be provided in each of the following situations:

a. The point of operation, meaning the load travel or the area near or at load placement, is not in full view of the operator.
b. When the crane is traveling, the view in the direction of travel is obstructed.
c. Due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.

Hooks:

Use

When employees are engaged in hooking, unhooking, or guiding the load, or in the initial connection of a load to a component or structure and are within the fall zone, all the following criteria must be met:

a. The materials being hoisted must be rigged to prevent unintentional displacement.
b. Hooks with self-closing latches or their equivalent must be used.

   Exception: "J" hooks are permitted to be used for setting wooden trusses.

c. The materials must be rigged by a qualified rigger.

Design

Hooks must be equipped with latches, except when the following requirements from 29 CFR 1926.1433(d)(4)(ii) are met:

a. Hooks without latches, or with latches removed or disabled, must not be used unless:
   1. A qualified person has determined that it is safer to hoist and place the load without latches (or with the latches removed/tied-back).
   2. Routes for the loads are pre-planned to ensure that no employee is required to work in the fall zone except for employees necessary for the hooking or unhooking of the load.
b. The latch must close the throat opening and be designed to retain slings or other lifting devices/accessories in the hook when the rigging apparatus is slack.

Work Control Area:

Swing Radius Hazards:

The requirements below apply where there are accessible areas in which the crane's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

a. Striking and injuring an employee; or
b. Pinching/crushing an employee against another part of the crane or another object.

To prevent employees from entering these hazard areas, the below procedures will be accomplished:

a. Train each employee assigned to work on or near the crane ("authorized personnel") in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure.
b. Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas. Exception: When the employer can demonstrate that it is neither feasible to erect such barriers on the ground nor on the crane, the hazard areas must be clearly marked by a combination of warning signs (such as "Danger – Swing/Crush Zone") and high visibility markings on the crane that identify the hazard areas. In addition, the employer must train each employee to understand what these markings signify.

Protecting Employees in the Hazard Area:

Before an employee goes to a location in the hazard area that is out of view of the operator, the employee (or someone instructed by the employee) must ensure that the operator is informed that he/she is going to that location.

Where the operator knows that an employee went to a location within the swing area radius, the operator must not rotate the superstructure until the operator is informed in accordance with a prearranged system of communication that the employee is in a safe position.

Where any part of a crane is within the working radius of another crane, the controlling entity must institute a system to coordinate operations. If there is no controlling entity, the employer (if there is only one employer operating the multiple pieces of crane), or employers, must institute such a system.

Equipment Modifications:

Modifications or additions which affect the capacity or safe operation of the crane are prohibited except when one of the below requirements have been met.

a. Manufacturer review and approval.
    1. The manufacturer approves the modifications/additions in writing.
    2. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.
    3. The original safety factor of the equipment is not reduced.
b. Manufacturer refusal to review request.

    The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, but it declines to review the technical merits of the proposal or fails, within 30 days, to acknowledge the request or initiate the review, and all of the following are met:
    1. A registered professional engineer who is a qualified person with respect to the equipment involved:
        i. Approves the modification/addition and specifies the equipment configurations to which that approval applies,
        ii. Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.
    2. The original safety factor of the equipment is not reduced.
c. Unavailable manufacturer.

    The manufacturer is unavailable and the below is met.
    1. A registered professional engineer who is a qualified person with respect to the equipment involved:
        i. Approves the modification/addition and specifies the equipment configurations to which that approval applies,
        ii. Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.
    2. The original safety factor of the equipment is not reduced.

d. Manufacturer does not complete the review within 120 days of the request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/addition, agrees to review the technical merits of the proposal, but fails to complete the review of the proposal within 120 days of the date it was provided the detailed description of the proposed modification/addition, and the below is met.
   1. A registered professional engineer who is a qualified person with respect to the equipment involved:
      i. Approves the modification/addition and specifies the equipment configurations to which that approval applies,
      ii. Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.
   2. The original safety factor of the equipment is not reduced.

e. Multiple manufacturers of equipment designed for use on marine work sites. The equipment is designed for marine work sites, contains major structural components from more than one manufacturer, and the below is met.
   1. A registered professional engineer who is a qualified person with respect to the equipment involved:
      i. Approves the modification/addition and specifies the equipment configurations to which that approval applies,
      ii. Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.
   2. The original safety factor of the equipment is not reduced.

Modifications or additions which affect the capacity or safe operation of the crane are prohibited where the manufacturer, after a review of the technical safety merits of the proposed modification/addition, rejects the proposal and explains the reasons for the rejection in a written response.

Traveling Under or Near Overhead Powerlines without a Load

The following are procedures and criteria for cranes traveling under or near a power line on a construction site **without** a load. Millerick Engineering, Inc. will ensure that following requirements are met.

The boom/mast and boom/mast support system are lowered sufficiently to meet the clearances specified in Table T - Minimum Clearance Distances while Traveling with no Load.

Table T—Minimum Clearance Distances While Traveling With No Load	
Voltage (nominal, kV, alternating current)	**While traveling—minimum clearance distance (feet)**
up to 0.75	4
over .75 to 50	6
over 50 to 345	10
over 345 to 750	16
over 750 to 1,000	20
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

While moving, the operator must take consider the terrain and drive a speed that doesn't allow the crane to move within the minimum clearance distances specified in Table T.

If any part of the crane will get closer than 20 feet to the power line while moving, the employer must ensure that a dedicated spotter is in continuous contact with the operator. The dedicated spotter must:

a. Be positioned to effectively gauge the clearance distance.
b. When necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
c. Give timely information to the operator so that the required clearance distance can be maintained.

When traveling at night, or in conditions of poor visibility, we must also ensure that:

a. The power lines are illuminated, or another means of identifying the location of the lines is used.
b. A safe path of travel is identified and used.

Operator Training, Qualification and Certification

Crane operators are required to be certified or licensed and receive ongoing training as necessary to operate new equipment.

Note: A state or local license is required if:

- **a. Working within a state or locality that has licensing requirements, and**
- **b. The licensing program meets the licensing and certification criteria listed in subpart CC.**
- **c. A state or local license is valid for the period of time stipulated by the licensing office, but no longer than 5 years. It is portable only within the jurisdiction of the issuing agency.**

Note: Written tests may be administered in a language understood by the operator candidate. When an operator's testing is based on a language other than English, it must be noted on the certificate.

All costs associated with training will be at no expense to the employee.

As of December 10, 2018, all operators must be certified or licensed.

Accredited Crane Operator Testing Organization

An operator will be deemed qualified to operate a particular crane if they are certified for that type and capacity of crane, or the type only. If no accredited testing agency offers certification examinations for a particular type and capacity of crane, or the type only, an operator will be deemed qualified to operate that crane if they have been certified for the type and capacity of crane, or the type only, that is most similar to that crane and for which a certification examination is available.

The operator's certificate must state the type and capacity of crane, or the type only, of crane for which the operator is certified.

To achieve the above qualification, the operator must have received certification by an **accredited crane operator testing organization**.

Certification issued by an accredited crane operator testing organization is both portable and valid for 5 years.

Audited Employer Program

Currently this option will not be used because:

- a. It is not portable.
- b. It is time and manpower consuming.
- c. It requires monitoring and outside approvals.

If this is used in the future, it will be in accordance with 1926.1427(c).

Operator-in-Training:

An employee who is not qualified or certified is permitted to operate a crane only as an operator-in-training and only where the below requirements are met:

a. The employer must provide each operator-in-training with sufficient training prior to operating the crane to enable the operator-in-training to operate it safely under limitations established by 29 CFR 1926.1430 (including continuous monitoring) and any additional limitations established by the employer.
b. The tasks performed by the operator-in-training while operating the crane must be within the operator-in-training's ability.
c. While operating the crane, the operator-in-training must be continuously monitored by an individual ("**operator's trainer**") who meets all of the following requirements:
    1. The operator's trainer is the employee or agent of Millerick Engineering, Inc..
    2. The operator's trainer is either a certified operator under 29 CFR 1926.1430 or has passed the written portion of a certification test, and is familiar with the proper use of the crane's controls.
    3. While monitoring the operator-in-training, the operator's trainer performs no tasks that detract from the trainer's ability to monitor the operator-in-training.
    4. For cranes other than tower cranes: the operator's trainer and the operator-in-training must be in direct line of sight of each other. In addition, they must communicate verbally or by hand signals. For tower cranes: the operator's trainer and the operator-in-training must be in direct communication with each other.

Rigger Training, Qualification and Certification

All costs associated with training will be at no expense to the employee.

Riggers must be qualified. A qualified person means a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

Signal Person Training, Qualification and Certification

All costs associated with training will be at no expense to the employee.

Signal persons must be qualified by either:

a. A third-party evaluator - Documentation is Portable, or
b. An employer qualified evaluator - Documentation is not Portable.

The training must include either a verbal or written test, PLUS a practical test. A certificate of completion will be provided upon successful completion of the training.

Training will include, but not be limited to, the following types of signals.

Hand Signals:

Note: Hand signal charts must be either posted on the crane or conspicuously posted in the vicinity of the hoisting operations. These charts will comply with the instructions found in Appendix A to Subpart CC of Part 1926–Standard Hand Signals.

When using hand signals, the Standard Method must be used (see Note, above).

Exception: Where use of the Standard Method for hand signals is infeasible, or where an operation or use of an attachment is not covered in the Standard Method, non-standard hand signals may be used in accordance with 29 CFR 1926.1419 (c)(2).

Non-Standard Hand Signals:

When using non-standard hand signals, the signal person, operator, and lift director (where there is one) must contact each other prior to the operation and agree on the non-standard hand signals that will be used.

Radio, Telephone or Other Electronic Transmission of Signals:

The device(s) used to transmit signals must be tested on site before beginning operations to ensure that the signal transmission is effective, clear, and reliable.

Signal transmission must be through a dedicated channel, except:

a. Multiple cranes/derricks and one or more signal persons may share a dedicated channel for the purpose of coordinating operations.
b. Where a crane is being operated on or adjacent to railroad tracks, and the actions of the crane operator need to be coordinated with the movement of other equipment or trains on the same or adjacent tracks.

The operator's reception of signals must be by a hands-free system.

New Signals:

Signals other than hand, voice, or audible signals may be used where it may be demonstrated that:

a. The new signals provide at least equally effective communication as voice audible, or Standard Method hand signals, or
b. The new signals comply with a national consensus standard that provides at least equally effective communication as voice, audible, or Standard Method hand signals.

Voice Signals:

If voice signals are used, prior to beginning operations, the operator, signal person and lift director (if there is one), must contact each other and agree on the voice signals that will be used. Once the voice signals are agreed upon, these workers need not meet again to discuss voice signals unless another worker is added or substituted, there is confusion about the voice signals or a voice signal is to be changed.

Each voice signal must contain the following three elements, given in the following order: function (such as hoist, boom, etc.), direction; distance and/or speed; function stop command.

The operator, signal person and lift director (if there is one), must be able to effectively communicate in the language used.

Additional Signal Information:

a. The signals used (hand, voice, audible, or new), and means of transmitting the signals to the operator (such as direct line of sight, video, radio, etc.) must be appropriate for the site conditions.
b. During operations requiring signals, the ability to transmit signals between the operator and signal person must be maintained. If that ability is interrupted at any time the operator must safely stop operations requiring signals until it is reestablished, and a proper signal is given and understood.

c. If the operator becomes aware of a safety problem and needs to communicate with the signal person, the operator must safely stop operations. Operations must not resume until the operator and signal person agree that the problem has been resolved.
d. Only one person may give signals to a crane/derrick at a time, except in circumstances covered by the below:
    1. Anyone who becomes aware of a safety problem must alert the operator or signal person by giving the stop or emergency stop signal.

    Note: 29 CFR 1926.1417(y) requires the operator to obey a stop or emergency stop signal.
e. All directions given to the operator by the signal person must be given from the operator's direction perspective.

Where a signal person(s) is in communication with more than one crane/derrick, a system must be used for identifying the crane/derrick each signal is for, as follows:

a. For each signal, prior to giving the function/direction, the signal person must identify the crane/derrick the signal is for, or
b. Must use an equally effective method of identifying which crane/derrick the signal is for.

<u>Power Lines Training</u>

We must ensure that each operator and crew member assigned to work with cranes receive the necessary training. The training must cover the following:

a. The procedures to be followed in the event of electrical contact with a power line. Such training must include:
    1. Information regarding the danger of electrocution from the operator simultaneously touching the crane and the ground.
    2. The importance to the operator's safety of remaining inside the cab except where there is an imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.
    3. The safest means of evacuating from a crane that may be energized.
    4. The danger of the potentially energized zone around the crane (step potential).
    5. The need for crew in the area to avoid approaching or touching the crane and the load.
    6. Safe clearance distance from power lines.
b. Power lines are presumed to be energized unless the utility owner/operator confirms that the power line has been and continues to be deenergized and visibly grounded at the worksite.
c. Power lines are presumed to be uninsulated unless the utility owner/operator or a registered engineer who is a qualified person with respect to electrical power transmission and distribution confirms that a line is insulated.
d. The limitations of an insulating link/device, proximity alarm, and range control (and similar) device, if used.
e. The procedures to be followed to properly ground the crane and the limitations of grounding.
f. Employees working as dedicated spotters must be trained to enable them to effectively perform their task.

29 CFR 1926 Subpart M – Fall Protection

Policy Statement

Compliance with 29 CFR 1926.502(d)(20)

29 CFR 1926.502(d)(20) states: "The employer will provide for prompt rescue of employees in the event of a fall or will assure that employees are able to rescue themselves."

Per OSHA interpretation letters [J. Nigel Ellis (May 11, 1999) & Charles Hill (August 14, 2000)], the hazard being addressed by 29 CFR 1926.502(d)(20) is being suspended by the fall arrest system after an arrested fall.

Prompt rescue is not defined, but it does imply that rescue be performed quickly – in time to prevent serious injury to the suspended worker.

As a matter of policy, under no circumstances will employees of Millerick Engineering, Inc. attempt to perform a self-rescue.

The rationale for this policy is as follows:

a. Expecting a suspended employee to perform self-rescue presupposes that the employee is:
    1. Of clear mind after the fall, and
    2. In excellent physical condition, and
    3. Has not sustained any injuries from the fall arrest, and
    4. Did not have a medical event that caused the fall in the first place (fainting, for example).
b. Because employees at Millerick Engineering, Inc. are not professional rescue persons, in depth self-rescue training would be required and practice self-rescue exercises performed for each possible combination of fall scenarios.
c. Specialized self-rescue equipment and training on that equipment would be required.
d. Self-rescue is not required by 29 CFR 1926.502(d)(20).

Prompt Rescue Procedures:

As a matter of policy, an employee performing work requiring a personal fall arrest system **will not work alone**. He/she will be in sight of another employee using a personal fall arrest system or be monitored by a safety monitor whose sole job will be to ensure there is not a fall event that goes unnoticed.

Prior to performing work requiring a personal fall arrest system, Tayla Millerick, our Safety Program administrator, or a designated competent person, will:

a. Assess the possible fall scenarios; and
b. Take inventory of in-house equipment that is readily available for possible rescue (ladders, forklifts, mobile scaffold, etc.); and
c. Be prepared to implement a plan of action utilizing our in-house equipment should a fall occur; or
d. Call an emergency rescue service and give them:
    1. Our exact location.
    2. A quick synopsis of what happened.
    3. The height of the suspended person.
    4. Known or suspected injuries.

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Christopher Millerick
Safety Director

Overview

One of the most serious hazards faced by the employees of Millerick Engineering, Inc. is falls from heights. Our Fall Protection Program has been developed to prevent injury from falls of six (6) feet or more from a walking/working surface to a lower level, to prevent objects falling from above and striking persons below, and to prevent job site persons from falling into holes.

Within the context of this program, the term “fall hazard” does not refer to tripping and falling, which is addressed in our general safety & health program, nor does it apply to falling off a ladder or scaffold. Scaffold and ladder safety is addressed within its own program.

A copy of our Fall Protection **Program** can be found readily accessible to our employees on appropriate job sites.

A copy of our Fall Protection **Plan** will be found on every applicable job site.

On all job sites where fall hazards exist, there will be at least one competent person who has the training and ability to identify fall hazards and the authority to ensure that proper fall protection systems are properly implemented.

The following areas of concern are addressed by this Program:

a. The need to know where fall protection is required.
b. Selection of fall protection systems which are appropriate for given situations.
c. Construction and installation of safety systems.
d. Supervision of employees.
e. Implementation of safe work procedures.
f. Training in selection, use, and maintenance of fall protection systems.

Our Fall Protection Program may be reviewed at any time by employees at Millerick Engineering, Inc.. Should a question arise concerning this Program, personnel are encouraged to consult with their supervisor, or Tayla Millerick, our Fall Protection Program Administrator.

Duties of the Program Administrator

The duties of Tayla Millerick include:

a. Training of personnel.
b. Maintenance of training records.
c. Random, unannounced job site inspections to assure compliance with both OSHA standards and company safety policies.
d. Resolution of specific problems that may present themselves regarding a particular job site situation.
e. Designating a competent (by training or experience) person at each applicable job site who will ensure:
    1. A copy of our fall protection program/plan is readily accessible on appropriate job sites.
    2. Subcontractors with whom we may work are appropriately trained in fall protection.
    3. A written certification record has been prepared documenting that employees who have potential exposure to fall hazards at the job site have received the required training in protection.
    4. The fall protection system(s) utilized at the job site are appropriate for the hazard(s) present.
    5. That, before any work is initiated, the walking/working surfaces at the job site are capable of supporting both our personnel and equipment.

Tayla Millerick will be familiar with all applicable standards and will keep up-to-date of developments in the field of fall protection.

Pre-Project Planning

Fall protection requires a joint effort by personnel Millerick Engineering, Inc., and the specialty subcontractors who may be working with us, to identify work situations in which fall hazards exist, determine the most appropriate fall protection system to be utilized, and to ensure that all persons understand the proper methods of utilizing the selected fall protection systems. A pre-construction survey by a competent person will often provide the information needed to make these determinations.

Fall protection system requirements may change during a project and the competent person on site will ensure that fall protection is maintained at all times. Care will be taken to assure that load limits are not exceeded on walking/working surfaces and attachment points and hardware is capable of withstanding (with the appropriate safety factor) the potential forces that may be generated during an actual fall incident.

Fall protection hardware and equipment owned, rented, or leased will be NIOSH/ANSI approved and it is assumed that the manufacturer’s technical specifications and capabilities are accurate.

From the very inception of a potential project (pre-bid) to completion, fall protection needs and costs will be factored in.

Definitions

There are a number of terms and phrases, not common in everyday life, which must be understood to grasp the thrust of this Fall Protection Program. For those employees directly involved with this Program or affected by it, there are specific requirements and procedures which would be meaningless without an understanding of the "language" of our Fall Protection Program.

Note: Words used within the definitions which are themselves defined are printed in bold italic.

Anchorage means a secure point of attachment for *lifelines*, *lanyards* or *deceleration devices*.

Body Harness means straps which may be secured about the employee in a manner that will distribute the fall arrest over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a *personal fall arrest system*.

Buckles means any device for holding the *body harness* closed around the employee's body.

Carabiner means an oval metal ring with a snap link used to fasten a rope to the piton [a spike (attachment) with an eye to which a rope can be secured.]

CFR means Code of Federal Regulations.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees; and who has authorization to take prompt corrective measures to eliminate them.

Connector means a device which is used to couple (connect) parts of the ***personal fall arrest system*** and ***positioning device systems*** together. It may be an independent component of the system, such as a ***carabineer***, or it may be an integral component of part of the system (such as a ***buckle*** or d-ring sewn into a self-retracting ***lanyard***).

Controlled Access Zone (CAZ) means an area in which certain work (e.g., ***overhand bricklaying***) may take place without the use of ***guardrail systems***, ***personal fall arrest systems***, or safety net systems; access to the zone is controlled.

Dangerous Equipment means equipment (such as pickling or galvanizing tanks, degreasing units, machinery, electrical equipment, and other units) which, as a result of form or function, may be hazardous to employees who fall onto or into such equipment.

Deceleration Device means any mechanism, such as a ***rope grab***, rip-stitch ***lanyard***, specially-woven ***lanyard***, tearing or deforming ***lanyards***, automatic self-retracting ***lifelines***/***lanyards***, 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.

Deceleration Distance means the additional vertical distance a falling employee travels from the point at which the ***deceleration device*** begins to operate before stopping, excluding ***lifeline*** elongation & ***free fall distance***. It is measured as the distance between the location of an employee's ***body harness*** attachment point at the moment of activation (at the onset of fall arrest forces) of the ***deceleration device*** during a fall, & the location of that attachment point after the employee comes to a full stop.

Equivalent means alternative designs, materials, or methods to protect against a hazard which the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials or designs specified in the standard.

Failure means load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Free Fall means the act of falling before a ***personal fall arrest system*** begins to apply force to arrest the fall.

Free Fall Distance means the vertical displacement of the fall arrest attachment point on the employee's ***body harness*** between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes ***deceleration distance***, and ***lifeline***/***lanyard*** elongation, but includes any ***deceleration device*** slide distance of ***self-retracting lifeline/lanyard*** extension before they operate and fall arrest forces occur.

Guardrail System means a barrier erected to prevent employees from falling to ***lower levels***.

Hole means a gap or void 2 inches (5.1 cm) or more in its least dimension, in a floor, ***roof***, or other ***walking/working surface***.

Infeasible means it is impossible to perform the construction work using a conventional fall protection system (i.e., ***guardrail system***, safety net system, or ***personal fall arrest system***) or that it is technologically impossible to use any one of these systems to provide fall protection.

Lanyard means a flexible line of rope, wire rope, or strap which generally has a ***connector*** at each end for connecting the ***body harness*** to a ***deceleration device***, ***lifeline***, or ***anchorage***.

Leading Edge means the edge of a floor, ***roof***, or formwork for a floor or other ***walking/working surface*** (such as the deck) which changes location as additional floor, ***roof***, decking, or formwork sections are placed, formed, or constructed. A leading edge is considered to be an "unprotected side and edge" during periods when it is not actively and continuously under construction.

Lifeline means a component consisting of a flexible line for connection to an ***anchorage*** at one end to hang vertically (vertical lifeline), or for connection to ***anchorages*** at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of ***personal fall arrest system*** to the ***anchorage*****.**

Low-Slope Roof means a ***roof*** having a slope less than or equal to 4 in 12 (vertical to horizontal).

Lower Levels means those areas or surfaces to which an employee can fall. Such areas or surfaces to include, but are not limited to, ground levels, floors, platforms, ramps, runways, excavations, pits, tanks, material, water, equipment, structures, or portions thereof.

Mechanical Equipment means all motor or human propelled wheeled equipment used for ***roofing work***, except wheelbarrows and mop carts.

Opening means a gap or void 30 inches or higher and 18 inches or wider, in a wall or partition through which employees can fall to a ***lower level***.

Overhand Bricklaying and Related Work means the process of laying bricks and masonry units such that the surface of the wall to be jointed is on the opposite side of the wall from the mason, requiring the mason to lean over the wall to complete the work. Related work includes mason tending and electrical installation incorporated into the brick wall during the overhand bricklaying process.

Personal Fall Arrest System means a system used to arrest an employee in a fall from a working level. It consists of an ***anchorage***, ***connectors***, a ***body harness,*** and may include a ***lanyard***, ***deceleration device***, ***lifeline***, or suitable combination of these. **The use of body belts for fall arrest is prohibited.**

Positioning Device System means a *body belt* or ***body harness*** system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Qualified Person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Rope Grab means a ***deceleration device*** which travels on a ***lifeline*** and automatically, by friction, engages the ***lifeline*** and locks so as to arrest the fall of an employee. A rope grab usually employs the principle of inertial locking, cam/level locking, or both.

Roof means the exterior surface on the top of a building. This does not include floors or formworks which, because a building has not been completed, temporarily become the top surface of a building.

Roofing Work means the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the ***roof*** deck.

Safety Monitoring System means a safety system in which a competent person is responsible for recognizing and warning employees of fall hazards.

Self-Retracting Lifeline/Lanyard means a ***deceleration device*** containing a drum-wound line which can be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which, after onset of a fall, automatically locks the drum and arrests the fall.

Snaphook means a ***connector*** comprised of a hook-shaped member with a normally closed keeper of similar arrangement which may be opened to permit the hook to receive an object and, when released, automatically closes to retain the object. Snaphooks are generally one of two types:

a. The locking type with a self-closing, self-locking keeper which remains closed and locked until unlocked and pressed open for connection or disconnection; or
b. The non-locking type with a self-closing keeper which remains closed until pressed open for connection or disconnection. <u>The use of a non-locking snaphook as part of ***personal fall arrest systems*** and ***positioning device systems*** is prohibited.</u>

Steep Roof means a ***roof*** having a slope greater than 4 in 12 (vertical to horizontal).

Toeboards mean a low protective barrier that will prevent the fall of material and equipment to ***lower levels*** and provide protection from falls for personnel.

Unprotected Sides and Edges means any side or edge (except at entrances to points of access) of a ***walking/working surface***, e.g., floor, ***roof***, ramp, or runway where there is no wall or ***guardrail system*** at least 39 inches high.

Walking/Working Surface means any surface, whether horizontal or vertical, on which an employee walks or works, including, but not limited to, floors, roofs, ramps, bridges, runway, formwork and concrete reinforcing steel; not including ladders, vehicles, or trailers on which employees must be located in order to perform their job duties.

Warning Line System means a barrier erected on a ***roof*** to warn employees that they are approaching an unprotected ***roof*** side or edge, and which designates an area in which ***roofing work*** may take place **without** the use of a guardrail, ***body belt***, or safety net systems to protect employees in the area.

Work Area means that portion of a ***walking/working surface*** where job duties are being performed.

Where Fall Protection is Required

The "key" distance is six (6) feet. All employees must be aware that if there is a possibility of falling six (6) feet or more at least one (1) fall protection system will be implemented. Further, protection from being struck by falling objects from above will be provided on all job sites.

All areas identified by OSHA are included because, over time, most of these areas will present themselves on job sites even if the exposures are the result of another contractor's work.

Below listed are specific situations where fall protection systems will be utilized.

Unprotected Sides and Edges:

Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge, which is 6 feet or more above a lower level, will be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

Leading Edges:

Each employee who is constructing a leading edge 6 feet or more above lower levels will be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems.

Hoist Areas:

Each employee in a hoist area will be protected from falling 6 feet or more to lower levels by guardrail systems or personal fall arrest systems.

If a guardrail system is utilized in a hoist area and portions of the system are removed to facilitate the hoisting operation, and an employee must lean through the access opening or out over the edge of the access opening, that employee must be protected by a fall arrest system.

Holes:

Each employee on walking/working surfaces will be protected from falling through holes (including skylights) more than 6 feet above lower levels by personal fall arrest systems, covers, or guardrail systems.

a. Each employee on a walking/working surface will be protected from tripping in or stepping into or through holes (including skylights) (regardless of height) by covers.
b. Each employee on a walking/working surface will be protected from objects falling through holes (regardless of height) by covers.

Formwork and Reinforcing Steel:

Each employee on the face of formwork or reinforcing steel will be protected from falling 6 feet or more to lower levels by personal fall arrest systems, safety net systems, or positioning device systems.

Ramps, Runways and other Walkways:

Each employee on ramps, runways, and other walkways will be protected from falling 6 feet or more to lower levels by guardrail systems.

Excavations:

Each employee at the edge of an excavation 6 feet or more in depth will be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barriers.

Further, each employee at the edge of a well, pit, shaft, and similar excavation 6 feet or more in depth will be protected from falling by guardrail systems, fences, barricades, or covers.

Dangerous Equipment:

Each employee less than 6 feet above dangerous equipment will be protected from falling into or onto the dangerous equipment by guardrail systems or by equipment guards.

Each employee 6 feet or more above dangerous equipment will be protected from fall hazards by guardrail systems, personal fall arrest systems, or safety net systems.

Overhand Bricklaying and other Related Work:

Each employee performing overhand bricklaying and related work 6 feet or more above lower levels will be protected from falling by guardrail systems, safety net systems, personal fall arrest systems, or will work in a controlled access zone.

Each employee performing overhand bricklaying and related work who is required to reach more than 10 inches below the level of the walking/working surface on which he/she is working will be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

Roofing Work on Sloped Roofs:

Each employee engaged in roofing activities on low-sloped roofs with unprotected sides and edges 6 feet or more above lower levels will be protected from falling by guardrail systems, safety net systems, personal fall arrest systems or a combination of a warning line system and a safety net system or a warning line system and a safety monitoring system.

Note: On roofs 50 feet or less in width, the use of a safety monitoring system alone (without the warning line system) is permitted.

Steep Roofs:

Each employee on a steep roof with unprotected sides and edges 6 feet or more above lower levels will be protected from falling by guardrail systems with toeboards, safety net systems, or personal fall arrest systems.

Precast Concrete Erection:

Each employee, engaged in the erection of precast concrete members (including, but not limited to the erection of wall panels, columns, beams, and floor and roof "tee") and related operations such as grouting of precast concrete members, who is 6 feet or more above lower levels will be protected from falling by guardrail systems, safety net systems, or personal fall arrest systems.

Residential Construction:

Each employee engaged in residential construction activities 6 feet or more above lower levels will be protected by guardrail systems, safety net systems, or personal fall arrest systems.

Wall Openings:

Each employee working on, at, above, or near wall openings (including those with chutes attached) where the outside bottom edge of the wall opening is 6 feet or more above lower levels and the inside bottom edge of the wall opening is less than 39 inches above the walking/working surface, will be protected from falling by the use of a guardrail system, a safety net system, or a personal fall arrest system.

Walking/Working Surfaces Not Otherwise Addressed:

Each employee on a walking/working surface 6 feet or more above a lower level that is not addressed in the preceding categories will be protected from falling by a guardrail system, a safety net system, or a personal fall arrest system except when:

a. Working on scaffolds, fall protection requirements are covered by 29 CFR 1926 Subpart L.
b. Working on certain cranes and derricks, fall protection requirements are covered by 29 CFR 1926 Subpart N.
c. Performing steel erection work in buildings, fall protection requirements are covered by 29 CFR 1926 Subpart R.
d. Working on certain types of equipment used in tunneling operations, fall protection requirements are covered by 29 CFR 1926 Subpart S.
e. Engaged in the construction of electric transmission and distribution lines, equipment fall protection requirements are covered by 29 CFR 1926 Subpart V.
f. Working on stairways and ladders fall protection requirements are covered by 29 CFR 1926 Subpart X.

Note: On multi-employer work sites, employees of all contractors and subcontractors must understand the fall protection hazards that exist and be aware of the various methods of fall protection even if they are NOT directly exposed to fall hazards in their particular work area. For example, a contractor may have a controlled access zone in place and all persons on the job site, regardless of their employer, must understand the importance of remaining outside that CAZ.

Pre-Construction Survey

Prior to the initiation of any construction project, the job site will be surveyed by a competent/qualified person to determine:

a. If fall protection systems will be required.
b. If fall hazards exist, the types of conventional fall protection systems to be utilized. Particular attention will be given to anchorage points, location of warning lines, etc.
c. Rescue procedures to be used if a fall actually occurs.
d. The load-carrying capabilities of the walking/working surface.
e. Assuring that all personnel utilizing a fall protection system have training in that system.

This survey may be made without the use of fall protection because no work will be accomplished during this survey and installing fall protection systems would create a greater hazard.

If it is determined that certain areas within the overall worksite have fall hazards that cannot be addressed with conventional fall protection systems (those areas being limited to leading edge work, residential construction work, and precast concrete work), **then** a Fall Protection Plan must be prepared to specifically protect employees from these hazards.

Fall Protection Systems

Guardrail System:

A guardrail system is a physical barrier erected to prevent employees from falling to lower levels.

Specific guardrail systems criteria are found in 29 CFR 1926.502(b) and we will erect guardrail systems that comply with the cited criteria.

The main advantage of a guardrail system is that it is a "passive" system which, once installed, requires no employee involvement in its function. A guardrail will stop an employee who inadvertently walks into it.

A guardrail system is an acceptable fall protection system in each of the OSHA designated work areas, except one: "Formwork and Reinforcing Steel."

Guardrail Systems at Hoisting Areas:

When guardrail systems are used at hoisting areas, a chain, gate or removable guardrail section will be placed across the access opening between the guardrail sections when hoisting operations are not taking place.

Note: If a portion of the guardrail system is removed at a hoisting area to facilitate the hoisting operations and an employee must lean out over the opening, then that employee must be protected by a personal fall arrest system. In this instance it is important to remember that the personal fall arrest system may not be attached to the guardrail system.

Guardrail Systems at Holes:

Guardrail systems used at holes will be erected on all unprotected sides of the edges of the hole.

When the hole is to be used for the passage of materials, the hole will not have more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it will be closed over with a cover or protected with a guardrail system on all unprotected sides or edges.

Note: Guardrails need not be erected around holes while employees are working at the hole, passing materials through the hole, etc. When work is completed around the hole, the hole must be protected by guardrails on all sides of the hole or by covers.

Guardrail systems used around holes which are used as points of access (such as ladder ways) will be provided with a gate or be offset so that a person cannot walk directly into the hole.

Guardrail Systems on Ramps and Runways:

Guardrail systems used on ramps and runways will be erected along each unprotected side or edge. Ramps, runways, and other walkways on which employees need protection from falling 6 feet or more to a lower level must be protected by a guardrail system and only a guardrail system.

Person Fall Arrest System:

A personal fall arrest system is, as the name implies, a means of safely decelerating a falling body before a lower level is hit. The three (3) main components of a personal fall arrest system are the:

a. Anchorage point
b. Lanyard
c. Body harness

Note: Body belts will not be used in a personal fall arrest system.

Specific personal fall arrest systems criteria are found in 29 CFR 1926.502(d) and we will use personal fall arrest systems that comply with the cited criteria.

The tie-off attachment point must be at or above the connection point on the harness to prevent additional free fall distance.

As are guardrails, personal fall arrest systems are “passive” and require no employee involvement once they are properly rigged.

For all practical purposes, d-rings and locking type snaphooks will have a minimum tensile strength of 5,000 pounds and lanyards and vertical lifelines will have a minimum breaking strength of 5,000 pounds. Anchorages must be capable of supporting 5,000 per employee.

Anchorages used in personal fall arrest systems must be independent of any anchorage being used to support or suspend platforms.

Note: Knots in a rope lanyard or lifeline can reduce its strength by as much as 50% and having a lanyard go over or around sharp edges can completely destroy its effectiveness.

With the exception that harnesses, and components may be used as positioning device systems, personal fall arrest system components may not be used for purposes other than that for which they were designed.

Positioning device system components will be inspected prior to each use for wear, damage, and other deterioration and defective components will be removed from service.

Should a personal fall arrest system actually be used to stop a fall, it will be removed from service and not used again until inspected and determined to be undamaged and suitable for reuse by a competent person.

Safety Net System:

Specific safety net systems criteria are found in 29 CFR 1926.502(c).

Safety nets will be installed as close as practical under the walking/ working surface on which employees are working and in no case will they be more than 30 feet below such level.

Safety nets will be inspected at least once per week and after an occurrence which could affect the integrity of the system. Defective nets will not be used.

All items that have fallen in a safety net will be removed as soon as possible and at least before the next work shift.

Safety nets will be drop-tested at the job site after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at six-month intervals if left in one place.

Note: If it is demonstrably unreasonable to perform a drop-test, a designated competent person will prepare a certification in accordance with 29 CFR 1926.502(c)(4)ii.

Warning Line System:

A warning line system is a barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body harness, or safety net systems to protect employees in the area.

A warning line system is to be used only during roofing work on low-sloped roofs over 50-feet in width with unprotected sides and edges 6-feet or more above lower levels (on a simple rectangular roof, width is the lesser of the two primary overall dimensions. This is also the case with roofs which are sloped toward or away from the roof center). Most importantly, warning line systems must be used in conjunction with either a guardrail system, a safety net system, a personal fall arrest system, or a safety monitoring system.

Note: In the above scenario, either a guardrail system, a safety net system, or a personal fall arrest system alone provides adequate fall protection.

Specific warning line systems criteria are found in 29 CFR 1926.502(f) and we will use warning line systems that comply with the cited criteria.

As a general rule, warning line systems will be used in conjunction with a safety monitoring system.

A warning line made of ropes, wires, chains, and supporting stanchions will be flagged at no more than 6-feet intervals with high-visibility material. As the name implies, this line will only “warn” employees that they are approaching an unprotected side or edge. The horizontal resisting force of a warning line is 16 pounds versus 200 pounds for a guardrail system.

No personnel are allowed in the area between a roof edge and a warning line unless they are performing roofing work in that area.

Mechanical equipment on roofs will only be used in areas that are protected by either a warning line system, a guardrail system, or a personal fall arrest system.

The warning line will be erected around all sides of the roof work area not less than 6-feet from the roof edge unless mechanical equipment is being used. In that case, the warning line will be erected not less than 6-feet from the roof edge which parallels the mechanical operation and not less than 10 feet from the roof edge which is perpendicular to the direction of the mechanical operation.

Points of access, material handling areas, storage areas, and hoisting areas will be connected to the work area by an access path formed by two warning lines. When the aforementioned areas are not in use, the warning line will be adjusted to completely seal off the work area so that a person cannot inadvertently enter the area.

Safety Monitoring System:

Specific safety monitoring systems criteria are found in 29 CFR 1926.502(h) and we will use safety monitoring systems that comply with the cited criteria.

A safety monitoring system used in conjunction with a warning line system is not considered a “passive system” because it takes active employee involvement and, as such, both the Safety Monitor and the employee(s) being monitored must be alert for fall hazards.

A competent person will perform the duties of Safety Monitor. These duties include:

a. Recognizing fall hazards,
b. Warning the employee when it appears the employee is unaware of a fall hazard or is acting in an unsafe manner,
c. Remaining on the same walking/working surface and within visual sighting of the employee being monitored, and
d. Remaining close enough to communicate orally with the employee being monitored.

The Safety Monitor will have no other responsibilities which could take the monitor’s attention from the monitoring function.

Only the employee engaged in roofing work on low-sloped roofs or an employee covered by a fall protection plan [29 CFR 1926.502(k)] is allowed in the area being protected by the Safety Monitor.

When a safety monitoring system is being used, mechanical equipment will not be used or stored in that controlled zone.

Of course, the employee being monitored is required to comply promptly with the fall hazard warnings from the Safety Monitor.

Positioning Device System:

A positioning device system consists of a body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning. It is used during formwork and steel reinforcing.

Specific positioning device systems criteria are found in 29 CFR 1926.502(e) and we will use positioning device systems that comply with the cited criteria.

Positioning device systems must be inspected prior to each use for wear, damage, and other deterioration. Defective components must be removed from service. Components of positioning device systems must never be used for purposes other than that for which they were designed -- specifically fall protection and/or positioning on a vertical surface.

Controlled Access Zone (CAZ):

A controlled access zone is an area in which certain work activity may take place without the use of guardrail systems, personal fall arrest systems, or safety net systems and access to the zone is controlled.

Specific controlled access zone criteria are found in 29 CFR 1926.502(g). A controlled access zone will be created when appropriate.

Controlled access zones will only be used as part of a fall protection plan (reference 29 CFR 1926.502(k) and Fall Protection Plan, below) or when an employee is performing overhand bricklaying and related work. Persons performing overhand bricklaying or related work that requires reaching more than 10 inches below the walking/working surface may not be afforded fall protection by working in a controlled access zone.

Controlled access zones are work areas that have limited access to only authorized personnel by means of control lines or other means that restrict access.

Covers:

Covers can prevent an employee from stepping into a hole, tripping over a hole, falling through a hole, or being injured by objects falling through a hole.

Note: When work is completed around a hole, the hole must be protected by guardrails on all sides of the hole or by covers.

Specific cover criteria are found in 29 CFR 1926.502(i) and we will use covers that comply with the cited criteria.

Covers must be capable of supporting, without failure, twice the weight of the employees, equipment, and/or materials that may be imposed upon them.

Covers, when used, must be secured to prevent accidental displacement by wind, equipment, or employees.

All covers must be color coded or marked with the word: "HOLE" or "COVER" to identify the hazard.

Note: The above does not apply to cast iron manhole covers or roadway steel grates.

Covers, and only covers, will be used on walking/working surfaces to protect employees from tripping or stepping into or through a hole (including skylights). This provision is **regardless of the height** of the hole above a lower surface.

Covers, and only covers, will be used to protect employees from objects falling through holes (including skylights). This provision is **regardless of the height** of the hole above a lower surface.

Protection from Falling Objects:

Specific protection from falling objects criteria are found in 29 CFR 1926.502(j) and we will use that criteria to protect employees of Millerick Engineering, Inc. from falling objects.

Covers are to be used to protect employees from objects falling through holes (including skylights) from upper surfaces regardless of heights.

Toeboards, used to prevent objects from falling on employees on a lower level must be at least 3½ inches high with not more than a ¼ inch clearance between the toeboard and the walking/working surface. When tools, materials, or equipment are piled higher than the top edge of the toeboard, paneling or screening will be erected from the top of the toeboard to the appropriate mid or top rail of the guardrail system to provide adequate protection to employees below.

Fall Protection Plan

The foregoing Fall Protection Program is not a Fall Protection Plan per se. However, implementing the preceding guidelines for conventional fall protection systems coupled with certified formal and hands-on training will provide appropriate fall protection for the employees at Millerick Engineering, Inc..

There may be occasions where conventional fall protection systems just will not work. OSHA has determined that these occasions will be limited to:

a. Leading edge work

   Note: Leading edge work involves construction which moves the location of the edge forward (backward). Working at the edge of a walking/working surface (such as a roof) is not leading-edge work - it is (roofing) work at an unprotected side or edge.

b. Precast concrete construction work

c. Residential construction work

The criteria for determination that conventional fall protection systems are infeasible are: 1) it is impossible to perform construction work using conventional fall protection systems, or 2) it is technologically impossible to use conventional fall protection systems. Inconvenience and cost are not acceptable considerations.

Specific Fall Protection Plan criteria are found in 29 CFR 1926.502(k) and, if necessary, a Fall Protection Plan will be completed that complies with the cited criteria.

Fall Protection Plans must be prepared by a qualified person and developed specifically for the site where the work is to be performed. All changes to the Plan must be approved by a qualified person.

Note: A qualified person is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project. OSHA has indicated that an employer may use the services of more than one qualified person to comply with these requirements as long as (1) those persons, collectively, are qualified to prepare the fall protection plan and approve any changes; and (2) the resulting plan complies with the applicable requirements of the standards.

Fall Protection Plans must be maintained at the job site and be up to date.

The implementation of the fall protection plan must be under the supervision of a competent person.

A Fall Protection Plan must document reasons why conventional fall protection systems are infeasible and/or offer a detailed explanation why conventional fall protection systems create a greater hazard in their use than non-use.

All measures taken to reduce or eliminate fall hazards (in lieu of conventional fall protection systems) such as the use of ladders or scaffolds will be discussed.

In each area where a conventional fall protection system cannot be used, a safety monitoring system must be utilized that conforms to the requirements of 29 CFR 1926(h).

Either the names of the employees or some other means of employee identification (such as armbands or color coded hard hats) will be used to control access to the controlled access zone.

In the event an employee falls or a serious incident occurs, the circumstances will be investigated and changes to the Fall Protection Plan will be made to prevent a reoccurrence of a similar incident.

After completion of all work, and after all fall protection systems have been removed, a competent/qualified person may survey the work areas for inspection purposes without the use of fall protection systems. Care will be taken to assure solid footing and focused attention to potential fall hazards.

There are only two (2) instances where employees may be exposed to fall hazards without the use of fall protection systems. Those times are: pre-construction activities (inspecting, investigating, or assessing the job site) and post-construction activities. During these times, no actual construction work may take place.

Accidents and Near Accidents

Accidents and near accidents involving fall hazards will be investigated by Tayla Millerick to determine the cause of the incident and a method of preventing a reoccurrence. Questions to be considered are:

a. Was the fall protection system selected appropriate for the hazard?
b. Was the system properly installed?
c. Was the person involved in the accident following proper procedures?
d. Were there contributing factors such as ice, wind, debris, etc.?
e. Is retraining or a change of the Fall Protection Plan required?

Training/Retraining

Training, which must be certified, will include the following topics:

a. The nature of fall hazards in the work area.
b. The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection to be used.
c. 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.
d. The role of the Safety Monitor and the role of the employee when a safety monitoring system is used.
e. The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs.
f. The correct procedures for handling and storage of equipment and materials and the erection of overhead protection.
g. The role of employees in fall protection plans.

Training will be conducted by competent person(s) using the below listed items as resource materials:

a. This Fall Protection Program.
b. The manufacturer's instruction manuals that come with fall protection equipment.
c. OSHA standards pertaining to fall protection which are included in 29 CFR 1926 Subpart M.
d. The competent person's work experiences.

Should the competent person, a supervisor, or Tayla Millerick suspect that an employee lacks the skills needed for proper fall protection, that employee will be retrained.

Changes in the job site, types of fall protection systems, and equipment will also necessitate retraining.

Only the latest Training Certificate will be kept on file.

Fall Protection at the Job Site

A quick glance through this Fall Protection Program may leave the reader with the impression that fall protection requires an inordinate amount of attention to small details which, in practice, would render the fall protection provisions of 29 CFR 1926 Subpart M unworkable in real work situations.

The opposite is true. OSHA has gone to great lengths to make subpart M user friendly by incorporating performance-oriented criteria (as opposed to specification-oriented criteria) into their standards. Following a hazard assessment, we will select the most advantageous fall protection system that is compatible with our task needs and our protection requirements.

Lastly, while time, equipment, training, and money are devoted to fall protection systems which either physically prevent persons from falling from height, control the rate of deceleration during an actual fall, prevent objects from falling onto persons below, or warn personnel of restricted areas, we must never forget that it is important not to fall in the first place.

Accidents are more likely to occur as we become “adjusted” to working at height. Most slips, trips and falls are preventable. Proper footwear, wearing hard hats when there is a possibility of falling objects, cleaning up of debris, and paying attention to footing, hand holds, and edges is as important as the fall protection systems themselves.

Residential Construction

Significant Changes from the Enhanced Enforcement Program (EEP)

This Instruction cancels OSHA Instruction STD 03-00-001, dated June 18, 1999, the Agency's interim enforcement policy on fall protection for specified residential construction activities, and replaces it with new compliance guidance.

Employers engaged in residential construction who wish to use alternative fall protection measures must meet the requirements in 29 CFR 1926.501(b)(13) and 29 CFR 1926.502(k).

Fall protection plans used to comply with 29 CFR 1926.501(b)(13) and 29 CFR 1926.502(k) must be documented and site-specific.

This instruction interprets "residential construction" for purposes of 29 CFR 1926.501(b)(13) to include two elements: (1) a residence requirement; and (2) a wood frame construction requirement.

ENFORCEMENT DATE : June 16, 2011

29 CFR 1926.501(b)(13) :

Each employee engaged in residential construction activities 6 feet (1.8 m) or more above lower levels will be protected by guardrail systems, safety net system, or personal fall arrest system unless another provision in paragraph (b) of this section provides for an alternative fall protection measure. Exception: When the employer can demonstrate that it is infeasible or creates a greater hazard to use these systems, the employer will develop and implement a fall protection plan which meets the requirements of paragraph (k) of 1926.502.

Note: **There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the above-listed fall protection systems. Accordingly, the employer has the burden of establishing that it is appropriate to implement a fall protection plan which complies with 1926.502(k) for a particular job site situation, in lieu of implementing any of those systems.**

29 CFR 1926.502(k):

"Fall protection plan." This option is available only to employees engaged in leading edge work, precast concrete erection work, or residential construction work (See 29 CFR 1926.501(b)(2), (b)(12), and (b)(13)), who can demonstrate that it is infeasible, or it creates a greater hazard to use conventional fall protection equipment. The fall protection plan must conform to the following provisions.

a. The fall protection plan will be prepared by a qualified person and developed specifically for the site where the leading-edge work, precast concrete work, or residential construction work is being performed and the plan must be maintained up to date.
b. Any changes to the fall protection plan will be approved by a qualified person.
c. A copy of the fall protection plan with all approved changes will be maintained at the job site.
d. The implementation of the fall protection plan will be under the supervision of a competent person.
e. The fall protection plan will document the reasons why the use of conventional fall protection systems (guardrail systems, personal fall arrest systems, or safety nets systems) are infeasible, or why their use would create a greater hazard.
f. 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 cannot be provided with protection from the conventional fall protection systems. For example, the employer will 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.
g. The fall protection plan will identify each location where conventional fall protection methods cannot be used. These locations will then be classified as controlled access zones and the employer must comply with the criteria in 29 CFR 1926.502(g) of this section.
h. Where no other alternative measure has been implemented, the employer will implement a safety monitoring system in conformance with 29 CFR 1926.502(h).
i. The fall protection plan must include a statement which provides the name or other method of identification for each employee who is designated to work in controlled access zones. No other employees may enter controlled access zones.
j. In the event an employee falls, or some other related, serious incident occurs, (e.g., a near miss) the employer 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.

Millerick Engineering, Inc.

Fall Protection Plan

(Required when standard fall protection systems are not feasible)

With changes: ______________________________

(If no changes, enter "None")

This Fall Protection Plan is specific for the following project:

Project Name: ____

Location of Job: ____

____

Date Plan Prepared:______________ by: ________________________

(Must be a Qualified Person)

Date Plan Modified: ______________ by: ________________________

(Must be a Qualified Person)

Date Plan Modified: ______________ by: _________________________

(Must be a Qualified Person)

Plan Approved by: _____________________________

Plan Supervised by:_____________________________

Policy Statement

Our Fall Protection Program has been developed to protect our employees from the easily identifiable danger associated with working at height: falling. While the general concept of Fall Protection is straight forward, those employees to whom this Program applies must have specific training applicable to their individual jobs. It is recognized that the nature of fall hazards may vary from project to project and even change during a specific project. Training will be on-going to reflect the various existing work situations.

A copy of our Fall Protection Program can be found in the main office at:

PO Box 3338

Turlock, CA, 95381

2099857750

A copy of our Fall Protection Plan will be found on every applicable Job Site.

Fall Protection Systems to be used on this Job

All employees on this job/project will be protected from fall hazards by the use of one or more conventional fall protection systems. These systems include guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, warning line systems, controlled access zones, safety monitoring systems, covers, and protection from falling objects.

Further, the conventional fall protection system used in each required circumstance will be in compliance with 29 CFR 1926.502 which addresses which systems are appropriate (allowed) for specific types of work.

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Training

All our personnel working on this job/project have received training in our Fall Protection Program and are able to recognize fall hazards and understand procedures to minimize these hazards. Further, they have been trained, as necessary, by a competent person qualified in the following areas using both formal and hands on training:

a. The nature of fall hazards in the work area.
b. The procedures for erecting, maintaining, disassembling, and inspecting the fall protections to be used.
c. 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.
d. Their role in the safety monitoring system when this system is used.
e. The limitations on the use of mechanical equipment during the performance of roofing work on low sloped roofs.
f. The procedures for handling and storage of equipment and materials and the erection of overhead protection.
g. The roll of employees in fall protection plans.

Enforcement

Awareness of and respect for fall hazards, and compliance with all safety rules are of great importance. Appropriate disciplinary action will be taken should an employee disregard our safety guidelines.

Accident Investigation

All accidents that result in injury to employees, regardless of their nature, will be investigated and reported. It is important that documentation of accidents take place as soon as possible so that the cause may be determined, and steps may be taken to prevent a reoccurrence.

Changes to this Plan

Changes to this plan, specifically a deviation from conventional fall protection systems, will be documented by a qualified person whose name appears on the front of this fall protection plan.

Changes will be limited to:

a. Leading edge work

Note: Leading edge work involves construction which moves the location of the edge forward (backward). Working at the edge of a walking/working surface (such as a roof) is not leading-edge work - it is (roofing) work at an unprotected side or edge.

b. Precast concrete construction work
c. Residential construction work

The criteria for determination that a conventional fall protection is infeasible is that it is impossible to perform construction work with a conventional fall protection system or it is technologically impossible to use a conventional fall protection system. Inconvenience and cost are not acceptable considerations. Specific Fall Protection Plan criteria are found in 29 CFR 1926.502(k) and we will, if necessary, create a Fall Protection Plans that comply with the cited criteria. A separate change will be made for each situation where conventional fall systems cannot be used.

Millerick Engineering, Inc.

Changes to Fall Protection Plan

CHANGE NUMBER: ____________

This change to the Fall Protection Plan for the below listed project will be attached to the original Fall Protection Plan and a copy will be available at the job site.

Project Name: ____

Location of Job: ____

Date Change Prepared: ____________ by: ________________________
(Must be a Qualified Person)

Date Change Modified: ____________ by: ________________________
(Must be a Qualified Person)

Change Approved by: ______________________________

Change Supervised by: ______________________________

Reference the above.

Changes to this Fall Protection Plan for this specific project are required for the following reason(s):

Specific work that requires fall protection other than conventional fall protection:

____
____
____
____
____
____
____
____
____

Specific work areas where the above work will take place:

____
____
____
____
____
____
____
____
____

Before any non-conventional fall protections are used as part of the work plan, a controlled access zone (CAZ) will be clearly defined by the competent person____ as an area where a

(Name(s) of Competent Person)

recognized hazard exists. The demarcation of the CAZ will be communicated by the competent person in a recognized manner such as:

Circle one or more of the below:

a. signs
b. wires
c. tapes
d. ropes
e. chains
f. other : ____________________

All access to the CAZ will be restricted to authorized entrants. Those entrants will be identified by ____

(Color hard hats; arm bands, etc.)

and are listed below:

______________________ ______________________ ______________________

______________________ ______________________ ______________________

______________________ ______________________ ______________________

The competent person will ensure the protective elements of the CAZ are implemented prior to the beginning of work.

Specific reasons why conventional fall protection is either infeasible or creates a greater hazard:

____

Specific measures to be taken to reduce or eliminate fall hazards for personnel who cannot be provided conventional fall protection:

In the above CAZ, a safety monitoring system will be implemented in conformance with 29 CFR 1926.502(h).

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Millerick Engineering, Inc.

Safety Net Installation Certification

This is to certify that the Safety Net identified below was installed with sufficient clearance under it to prevent contact with the surface or structures below when subjected to an impact force equivalent to the drop test specified in 29 CFR 1926.502(c)(4)(i).

Safety Net Make: ______________________

Safety Net Model: ______________________

Safety Net Location: ______________________

It was found to be unreasonable to perform the below listed drop test for the following reasons:

____

____

____

____

____

Drop Test (Circle appropriate drop test to which the certification applies):

a. After initial installation and before using drop test.

b. After relocation drop test.

c. After major repair drop test.

d. After remaining in the same location for 6 months drop test.

________________________________ ________________________

(Competent Person) (Date)

Forklifts

29 CFR 1910.178 - Powered Industrial Trucks

Overview

Forklifts are designed to move items quickly, safely, and cleanly. Forklift training would also apply to numerous types of powered industrial trucks such as: tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines.

While many safety features are designed into forklifts, accidents still happen, and they are generally the result of operator error.

There is a general agreement among safety professionals, as well as OSHA, that requiring training for all persons (including part-time, seasonal, and temporary employees) who operate forklifts will significantly reduce the accident and injury rates.

This program has been developed to make the truck operators at Millerick Engineering, Inc. aware of the hazards associated with motorized truck use as well as to provide guidance for safe truck operations.

Persons will be authorized to operate the forklifts owned by Millerick Engineering, Inc. only after they have successfully demonstrated their understanding of proper procedures for truck inspection, use, and refueling/recharging. Operators will demonstrate their truck knowledge and abilities by passing a written test and performing designated truck maneuvers. All truck operators will be evaluated by , our Forklift Program Administrator, or a designated competent person.

Regulations of the Fair Labor Standards Act prohibit individuals younger than 18 years of age from engaging in specified hazardous occupational activities. 29 CFR 570.58 – Occupations involved in the operation of power-driven hoisting apparatus (Order 7), paragraph (a) (5), specifically prohibits employees under 18 years of age from operating forklifts in non-agricultural employment.

Because of their power, weight, size, restricted visibility, and, often, high center of gravity, operation of industrial trucks takes skill and attention to detail. One moment of inattention can lead to a major mishap in an instant. Additionally, the load presents potential hazards if not properly secured, balanced, and/or properly placed on the truck.

In accordance with 29 CFR 1910.178(b)12, , or another competent person will determine whether the atmosphere or location in which the trucks will operate is hazardous or non-hazardous and, after further assessing our needs, will determine which types of trucks are appropriate and allowed for our specific operations.

In the unlikely event that unsafe industrial motor truck operations are observed, retraining will be given with emphasis on correcting the improper behavior. To prevent the possibility of severe injury to the operator (or a bystander), forklifts must be operated in a professional manner and anything less will not be tolerated.

All truck operators will have ready access to this program, appropriate OSHA standards, and the truck owner/operator manuals.

All modifications to trucks may only be performed with written consent from the manufacturer. If consent from the manufacturer is not possible, a Qualified Registered Professional Engineer is required to approve modifications.

General Requirements

All truck operators must be thoroughly familiar with the truck, itself. This includes knowing:

a. Instinctively, what each and every control does.
b. How to perform a truck safety check.
c. The truck's limitations such as maximum load, height and width, visibility, stability, and surface requirements.
d. The truck's stopping and turning ability and its effect on loads.

The below safety rules and guidelines to which one must adhere while operating a forklift have been established. These rules are designed to protect the operator and/or persons adjacent to truck operations.

Specifically:

a. No person will operate one of trucks unless authorized in writing.
   1. Prior to authorization, the operator will have read this program, received training, passed a quiz on truck operations, and been evaluated on operational skills.
   2. Authorization to operate one type of truck does not automatically authorize a person to operate all trucks. Different power sources, visibility restrictions, controls, and capacities may dictate, in the judgment of Tayla Millerick, that a separate certification process may be required for a different type of truck. There may be instances where a new vehicle does not necessitate new training and a demonstration of proficiency. A newer model of a currently used truck may be identical to the truck the operator is qualified on as far as safety and operations are concerned. As a general rule, each **type** of truck has its own characteristics, limitations, and idiosyncrasies -- each **model** of a type of truck may or may not be unique.
b. No riders are allowed on forklift unless:
   1. The truck is specifically designed for such use.
   2. The rider is authorized by Tayla Millerick.

   Note: Forklifts are generally designed to move product, supplies and equipment, not personnel.
c. Tayla Millerick will revoke the authority to operate a truck if unsafe acts are observed or it is apparent that the operator as not retained the knowledge and job skills necessary to safely perform truck operations.
   1. An operator who has lost his authorization to operate a truck will be retrained, reevaluated, and, if appropriate, re-certified.
d. At the beginning of each shift, the operator will inspect the truck using our Forklift Daily Checklist.
   1. If deficiencies relating to safety are found, the deficiencies will be noted on the Checklist and reported to Tayla Millerick, or other designated person. The vehicle will not be used until safety defects are repaired.
   2. If cosmetic damage is discovered during the daily check, it will be noted on the Checklist, but the truck will be used. Cosmetic faults will not delay our operations.

Hazards

The major personal safety hazards involved in truck operation include:

a. Physically hitting a person/object with the truck or load.
b. Having a load fall and hit the operator or other person.
c. Having the truck tip and crush the operator or other person.
d. Fire or explosion during refueling/recharging.

Below are rules and guidelines to control the hazards identified and reduce the likelihood of accident/injury. While some of the procedures may seem too obvious to mention or just plain common sense, remember this —serious, even fatal, accidents have occurred because for one split second an operator forgot or ignored a basic safety rule.

Falling/Hitting a Person/Object:

a. Never drive up to a person standing in front of a fixed object.
b. When possible, stay within delineated travel lanes or aisles.
c. Be seen and/or heard.
d. Ensure that adequate lighting is available.
e. Maintain a clear view of travel. If the load blocks or restricts the view, the operator will drive with the load trailing (backwards).
f. Slow down, sound horn, and do not pass where vision is restricted.
g. Operate the truck at speeds that will allow it and the load to be stopped in a safe, smooth, manner.
h. Be aware of floor conditions. Remove loose objects that have found their way to the truck travel lanes. Operate the truck at slower speeds on wet or slippery floors.
i. Of course, stunt or reckless driving is prohibited.
j. Be aware of the height of the truck and, if equipped, its mast and load. Carelessness can damage ceiling, lights, pipes, etc.
k. Never allow anyone to stand or pass under an elevated portion of any truck at any time.

Falling Loads:

a. Know your load – do not “over stack.” Because practically all loads lifted or hauled by a forklift are not secured to the truck, ensure the load is properly stacked. Cartons generally should be interlaced or banded.
b. If lifting a load or pallet, get the forks (or other engaging means) as far under the load as possible.
c. Travel with the load in the lowest position for stability as well as prevention of hitting objects overhead. If using forks, tilt the load backward for stabilization.
d. Do not exceed the truck’s rated capacity or stack loads too high.
e. Do not make “jerky” movements such as slamming the brakes or high speed turns.
f. A load backrest extension will reduce the possibility of part of the load falling rearward.
g. When using a fork lift, the forks may be tilted forward only for picking up or setting down a load.

Tipping:

Forklifts are, by design, narrow allowing them greater access within the work setting. Unfortunately, a narrow track offers less stability. Tipping or falling off an edge (or dock) is a preventable accident by following the guidelines below. If your truck tips, keep your body and limbs within the safety of the cage. Wear a seat belt if the truck is so equipped.

a. Stay within travel lanes.
b. If entering a trailer, ensure:
    1. The trailer brakes are engaged.
    2. The trailer is secured from movement by means of chocks and/or a locking mechanism.
    3. The tractor is either shut off or removed from the trailer.
    4. The trailer is squared up with the dock opening and dock plates are secure.
    5. The trailer floor is capable of supporting the forklift and its load.
    6. The lighting within the trailer is adequate.

    Note: Falling off a dock edge because a trailer has moved is invariably a serious accident. Do not count on the tractor-trailer driver to lock his brakes or even trust that his brakes work. Physically check and ensure that the trailer into which you are taking your forklift is flush against the dock. If possible, the trailer should be actually attached to the dock, but in all cases, it should be chocked.
c. Travel with the load in the lowest possible position and avoid sharp turns at higher speeds as well as abrupt truck movements.
d. Be aware of the surface on which you are traveling -- its traction, ability to hold weight, slope, and surface.

Fire/Explosion during Refueling/Recharging:

Refueling accidents are not common experiences, however should they occur, they would be sudden and possibly catastrophic. Follow the manufacturer's owner's manual and local fire laws.

a. There is absolutely NO SMOKING or open flame during any portion of the refueling/recharging process.
b. Per 29 CFR 1910.110, *Storage and handling of liquefied petroleum gases*, paragraph (f)(7), at least one approved portable fire extinguisher having a minimum rating of 8-B, C must be readily available when refueling propane.
c. Facilities for quick drenching of the eyes and body must be readily available.

Other Concerns

The program deals primarily with the personal safety of forklift operators at Millerick Engineering, Inc.. However, when discussing truck operations, we would be remiss if it were not pointed out that improper truck operations could also result in physical damage to products, trucks, and/or facilities. Proper truck operation will reduce personal injury accidents, and, as an added benefit, prevent general damage.

Operator Protection

A hazard assessment of forklift operations will be conducted by . Particular attention will be given to hand, head, eye, and foot protection, as well as environmental conditions such as atmospheres, heat, or cold. If the truck is equipped with a seat belt, it must be worn when the truck is moving.

Keep your limbs within the running lines of the truck and keep your hands and fingers away from moving parts -- particularly the mast on a fork lift truck.

 will perform a hazard assessment of the truck operations and determine what, if any, personal protective equipment (PPE) requirements are appropriate. If PPE (examples: steel toed boots, leather gloves, hard hat, eye protection, etc.) is required, it must be worn.

Forklift Operations

In addition to safety operating practices previously identified in this manual, the following will be considered general operating procedures:

a. Fire aisles, access to stairways, and fire equipment must be kept clear.
b. Operators leaving their trucks must ensure the load is fully lowered, controls neutralized, and brakes set. On an incline, the wheels must be blocked. If the operator is 25 feet or more from the truck or does not have a clear view of the truck, the power to the truck must be shut off.
c. A safe distance will be maintained from the edge of ramps or platforms while on any elevated dock, platform, or freight car.
d. Trucks will not be used for opening or closing freight doors.
    1. Trucks, like all items of equipment, will be used for the purpose for which they were designed.
e. Be aware that if the operator of a semi-trailer has placed the rear wheels in a far forward position, the trailer may act as a "teeter-totter" when a heavy forklift enters the trailer. When a trailer is not coupled to a tractor, fixed jacks may be necessary to support the semi-trailer during loading or unloading.
f. Be aware that the overhead guard (used as protection against falling objects) is designed to prevent injury from the impact of small packages, boxes, bagged material, etc. -- it is not necessarily designed to withstand the impact of a falling capacity load.
g. In the event persons are lifted by a truck, a lifting platform must be securely attached to the lifting mechanism and the persons on the safety platform must have means of shutting off power to the truck.
h. If more than one truck is operated, they must be separated by a safe distance (at least three truck lengths) and they may not pass each other in intersections, blind spots, or other dangerous locations. The right of way will be yielded to other trucks in emergency situations.
i. Trucks traveling in the same direction will not be passed at all.
j. Driving on grades:
    1. Grades will be ascended or descended slowly.
    2. When ascending or descending grades in excess of 10 percent, loaded trucks will be driven with the load upgrade.
k. Motorized hand trucks must enter confined areas with the load end forward.

Maintenance

While the operator is responsible for checking the truck before use, actual mechanical maintenance must be performed by an authorized person.

a. If at any time a forklift is found to be in need of repair, defective, overheating, or in any way unsafe, the truck will be taken out of service until it has been restored to safe operating condition.
b. Forklifts should be kept reasonably clean and free of excess oil and grease.

Duties of the Forklift Program Administrator

The duties of Tayla Millerick, our Forklift Program Administrator include:

a. Operator training and certification.
b. Hazard assessment of our truck operations.
c. Identification of truck operators who, through their performance have demonstrated a lack of retained knowledge or ability to safely operate a powered truck. These people will receive retraining.
d. Keeping up-to-date of developments in the materials handling field with an emphasis on safety.

Additionally, the administrator will ensure that all truck operators have ready access to 29 CFR 1910.178, *Powered Industrial Trucks*, this program, and the individual truck's Operator/Owner Manual.

Training

Tayla Millerick will administer the training portion of this program.

Interactive training will be given by a competent (one with knowledge, training, and experience) person with ample opportunity to ask questions and clarify all aspects of truck operation relating to safety.

Prior to actual truck operation on the job, all truck operators will become familiar with the contents of this program as well as the operator's manual applicable to the specific powered truck they will operate. Each operator will demonstrate an understanding of truck operations and complete a driving test which will include truck inspection, maneuvering, and fueling/charging.

New truck operators may operate powered trucks in a training capacity:

a. When they are under the direct supervision of persons who have the knowledge, training, and experience to train and evaluate their competence.
b. Where such operation does not endanger themselves or others.

Tayla Millerick will ensure that all truck operators have a complete understanding of the below listed topics:

Truck-Related Topics:

a. Operating instructions, warnings, and precautions for the type of truck the operator will be authorized to operate.
b. Differences between the truck and the automobile.
c. Truck controls and instrumentation: where they are located, what they do, and how they work.
d. Engine or motor operation.
e. Steering and maneuvering.
f. Visibility (including restrictions due to loading).
g. Fork and attachment adaptation, operation, and use limitations.
h. Vehicle capacity.
i. Vehicle stability.
j. Any vehicle inspection and maintenance that the operator will be required to perform.
k. Refueling and/or charging and recharging of batteries.
l. Operating limitations.
m. Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate.

Work-Related Topics:

a. Surface conditions where the vehicle will be operated.
b. Composition of loads to be carried and load stability.
c. Load manipulation, stacking, and unstacking.
d. Pedestrian traffic in areas where the vehicle will be operated.
e. Narrow aisles and other restricted places where the vehicle will be operated.
f. Hazardous (classified) locations where the vehicle will be operated.
g. Ramps and other sloped surfaces that could affect the vehicle's stability.
h. Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust.
i. Other unique or potentially hazardous environmental conditions in the work area that could affect safe operation.

Refresher Training in relevant topics will be provided to the operator when:

a. If unsafe truck operations are observed.
b. After an accident or near-accident.
c. Operator has received an evaluation that reveals that the operator is not operating the truck safely
d. If the operator is to be assigned to drive a different type of truck.
e. If work area changes could affect safe operation of the truck.

An evaluation of each powered industrial truck operator's performance must be conducted at least once every three years and refresher training will be provided as needed.

Use of Forklifts to Support Scaffold Platforms

Per 29 CFR 1926.451(c)(2)(v), if deemed appropriate, forklifts may be used to support scaffold platforms with the following conditions:

a. The forklift will be designed for such use as indicated either:
   1. In the owner's manual, or
   2. By a letter from the manufacturer allowing such use, or
   3. Certification by a registered engineer that the forklift is so designed.
b. The entire scaffold platform is securely attached to the forks.
c. The fork lift is not moved horizontally while the platform is occupied.
d. The platform (and machine) meets the requirements of 29 CFR 1926.451 for capacity, construction, access, use, and fall protection.
   1. If the platform is not designed by the manufacturer of the forklift, it must be designed by a qualified person.
   2. The forklift must be capable of supporting, without failure, its own weight and at least four times the maximum intended load.
e. The platform for elevating personnel must not extend more than 10 inches beyond the wheelbase of the machine in use.
f. The employees on the platform must be able to have travel and power controls at the platform level.
   1. This requirement is fulfilled by having the forklift operator remain with the forklift while personnel are on the platform.
g. The use of a forklift to support a scaffold platform will be used only after a determination that the use of other equipment such as scaffolds, scissor lifts, aerial lifts, and ladders is not practical.

Hazard Communication

29 CFR 1910.1200, Hazard Communication
29 CFR 1910.1200 Appendix A, Health Hazard Criteria (Mandatory)
29 CFR 1910.1200 Appendix B, Hazard Determination (Mandatory)
29 CFR 1910.1200 Appendix C, Allocation of Label Elements (Mandatory)
29 CFR 1910.1200 Appendix D, Safety Data Sheets (Mandatory)
29 CFR 1910.1200 Appendix E, Definition of "Trade Secret" (Mandatory)

Purpose

The purpose of this hazard communication program is to ensure that the hazards of all chemicals produced or imported are classified, and that information concerning the classified hazards is transmitted to our employees.

The provisions of this hazard communication program are consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS), Revision 3. The transmittal of information is to be accomplished by means of our comprehensive hazard communication program.

We will develop, implement, and maintain **at each workplace** a comprehensive written hazard communication program for the employees at Millerick Engineering, Inc., which includes container labeling and other forms of warning, safety data sheets, and employee training.

Note: Where employees must travel between workplaces during a work shift, *i.e.*, their work is carried out at more than one geographical location, the safety data sheets may be kept at the primary workplace facility. In this situation, the employer will ensure that employees can immediately obtain the required information in an emergency.

Hazard communication applies to any hazardous substance which is known to be present in the work place in such a manner that employees may be exposed under normal conditions of use or in a reasonably foreseeable emergency resulting from work place operations.

We will maintain a list of the hazardous substances known to be present using an identity that is referenced on the appropriate safety data sheet (SDS). This list may be compiled for the workplace as a whole or for individual work areas.

Manufacturers and importers will obtain or develop a safety data sheet for each hazardous substance they produce or import. We will obtain from the manufacturer or seller an SDS of each hazardous substance which we use and maintain these SDS on the job site.

As a matter of course, before a new product is purchased, we will review its SDS to determine the presence of carcinogenic or other extremely hazardous chemicals. Using this information from the SDS, we will be able to inform employees how they will be protected from carcinogens at the workplace.

Prior to performing a non-routine task (for example, the cleaning of reactor vessels), an employee will be given information by a competent person or supervisor concerning the hazardous chemicals to which he may be exposed. This information will include:

a. Specific chemical hazards
b. Protective/safety measures the employee is to use.
c. Measures taken to lessen the hazards including ventilation, respirators, presence of another employee and emergency procedures.

Should work activities be performed in areas where chemicals are transferred through unlabeled pipes, the employee will be informed by the competent person or supervisor of:

a. The chemical in the pipes.
b. Viscosity, pressure, heat.
c. Potential Hazards.
d. Safety precautions to be taken.

In multi-employer workplaces, the written hazard communication program of Millerick Engineering, Inc. will include the methods we will use to inform any other employers sharing the same work area of the hazardous chemicals to which their employees may be exposed while performing their work, and any suggestions for appropriate protective measures, including the following:

The competent person on the job site will inform those with whom we work of any hazardous chemical products we are using and will provide them with the appropriate SDS for their review. SDS for all chemical products used on the job site will be readily available.

Should we introduce a new chemical product to the job site that contains a physical or health safety hazard, the product's SDS will accompany that product and, before use, employees will be given instruction on the products hazards. This information will be shared with other contractors with whom we may be working. Employees are to be kept informed of the chemical products being used by other contractors if they pose a safety hazard.

Safety data sheets will also be made readily available, upon request, to designated representatives, the Assistant Secretary, and the Director, in accordance with the requirements of 29 CFR 1910.1020(e).

Labels and Other Forms of Warning

The manufacturer, importer, or distributor will ensure that each container of hazardous chemicals leaving the workplace is labeled, tagged or marked. Where the manufacturer or importer is required to label, tag or mark the following information will be provided:

a. Product identifier;
b. Signal word;
c. Hazard statement(s);
d. Pictogram(s);
e. Precautionary statement(s); and,
f. Name, address, and telephone number of the manufacturer, importer, or other responsible party.

The manufacturer or importer preparing the safety data sheet will ensure that the information provided accurately reflects the scientific evidence used in making the hazard determination. If the manufacturer or importer, become aware of any significant information regarding the hazards of a chemical, or ways to protect against the hazards, this new information will be added to the safety data sheet within three months. If the chemical is not currently being produced or imported, the manufacturer or importer will add the information to the safety data sheet before the chemical is introduced into the workplace again. We will replace safety data sheets with updated copies as they are received.

Product identifier and words, pictures, symbols, or combination thereof, which provide at least general information regarding the hazards of the chemicals, and which, in conjunction with the other information immediately available to employees under the hazard communication program, will provide employees with the specific information regarding the physical and health hazards of the hazardous chemical.

Example below for labeling:

HS85
Batch number: 85L6543

Warning
Harmful if swallowed

Wash hands and face thoroughly after handling. Do not eat, drink or smoke when using this product. Dispose of contents/container in accordance with local, state and federal regulations.

First aid:
If swallowed: Call a doctor if you feel unwell. Rinse mouth.

GHS Example Company, 123 Global Circle, Anyville, NY 130XX Telephone (888) 888-8888

We may use signs, placards, process sheets, batch tickets, operating procedures, or other such written materials in lieu of affixing labels to individual stationary process containers, as long as the alternative method identifies the containers to which it is applicable and conveys the information required by the above to be on a label. The written materials will be readily accessible to the employees at Millerick Engineering, Inc. in their work area throughout each work shift. We may use such written materials in lieu of affixing labels to individual containers as long as the alternative method identifies and accompanies the containers to which it is applicable and conveys the information required to be on a label.

We **are not required** to label portable containers into which hazardous chemicals are transferred from labeled containers, and which are intended only for the immediate use of the employee who performs the transfer.

We will not remove or intentionally deface existing labels on incoming containers of hazardous chemicals, unless the container is immediately marked with the required information.

We will ensure 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 we have employees who speak languages other than English, we will add the information to the presented material translated to the appropriate language and the information will be presented in their language.

Note: OSHA pictograms do not replace the diamond shaped labels that the U.S. Department of Transportation (DOT) requires for the transport of chemicals, including chemical drums, chemical totes, tanks, or other containers. Those labels must be on the external part of a shipped container and meet the DOT requirements set forth in 49 CFR 172, Subpart E.

Employee Information and Training

We will provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new chemical hazard is introduced into their work area. Information and training may relate to general classes of hazardous chemicals to the extent appropriate and related to reasonably foreseeable exposures of the job. Chemical-specific information must always be available through labels and safety data sheets.

Information and training will consist of at least the following topics:

a. Employees at Millerick Engineering, Inc. will be informed of the requirements of 29 CFR 1910.1200, Hazard Communication, and its appendices.
b. Employees at Millerick Engineering, Inc. will be informed of any operations in their work area where hazardous chemicals are present.
c. Employees at Millerick Engineering, Inc. will be informed of the location and availability of the written hazard communication program, including the list(s) of hazardous chemicals and safety data sheets required by this section.
d. Employees at Millerick Engineering, Inc. will be trained in the methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as conducting specific monitoring, using continuous monitoring devices, learning the visual appearance or odor of hazardous chemicals when being released, etc.).
e. Employees at Millerick Engineering, Inc. will be trained in the physical, health, simple asphyxiation, combustible dust and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area, and the measures they can take to protect themselves from these hazards, including specific procedures the we have implemented to protect our employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used.
f. Employees at Millerick Engineering, Inc. will be trained in the details of our hazard communication program, including an explanation of the labels received on shipped containers and the workplace labeling system used by their employer and the safety data sheet, and how our employees can obtain and use the appropriate hazard information.

Documentation of Training

Documentation of safety and health training will be maintained for at least one (1) year.

Documentation will include:

a. employee name or another identifier
b. training dates
c. type(s) of training
d. training providers

Employees will be informed employees of the right:

a. To personally receive information regarding hazardous substances to which they may be exposed, according to the provisions of this section;
b. For their physician or collective bargaining agent to receive information regarding hazardous substances to which the employee may be exposed according to provisions of this section;
c. Against discharge or other discrimination due to the employee's exercise of the rights afforded pursuant to the provisions of the Hazardous Substances Information and Training Act.

Whenever we receive a new or revised safety data sheet, such information will be provided to employees on a timely basis not to exceed 30 days after receipt, if the new information indicates significantly increased risks to, or measures necessary to protect, employee health as compared to those stated on a safety data sheet previously provided.

Millerick Engineering, Inc.

Request for Safety Data Sheets

To:

Millerick Engineering, Inc.

PO Box 3338
Turlock, CA, 95381
2099857750

____
(Date)

____
(Supplier)

____
(PO Box/Street Address)

____
(City, State, ZIP)

To whom it may concern:

On __________________ **(Date)**, we received a shipment of ______________________ **(Product Name)**, reference invoice: _______________________ **(Invoice Number)**.

The above product was received without an accompanying Safety Data Sheet (SDS). Per 29 CFR 1910.1200, we are unable to use this product without its SDS.

Please furnish the appropriate SDS as soon as possible to:

Thank you,

____
Christopher Millerick
Safety Director

List of Hazardous Chemicals

The Safety Data Sheets for the below listed Hazardous Chemicals will follow this list. The Safety Data Sheets are arranged in the order listed below:

Chemicals

Lockout/Tagout - Control of Hazardous Energy

29 CFR 1910.147 - The Control of Hazardous Energy (Lockout/Tagout)

29 CFR 1910.333 - Selection and Use of Work Practices

Overview

As a contractor, we would not be involved in normal production operations. We could, however, be involved in the constructing, installing, setting up, adjusting, inspecting, modifying, maintaining, or servicing with the possibility of injury due to the unexpected energization, start up, or release of stored energy. During these situations, we will comply with the provisions of 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)* and 29 CFR 1910.333, *Selection and Use of Work Practices,* the standards on which this program is based.

Coordination will be established between the client and, if appropriate, subcontractors to clearly indicate who is responsible for what function of the program, as well as the identifying characteristics of the lockout/tagout devices, shape, color, color codes for locks and tags, if used.

Coordination is required because – for example: an employee of Millerick Engineering, Inc. may complete lockout/tagout procedures and perform maintenance on a fixed piece of equipment while a client's employee is affected by that work. All employees at Millerick Engineering, Inc. affected by this program will be "authorized employees" by virtue of their work (see "Definitions" below.)

Definitions

There are a number of terms and phrases which must be understood by all employees to grasp the general thrust of this Program. For those employees directly involved with this Program or affected by it, there are specific requirements and procedures which would be meaningless without an understanding of the "language" of Control of Hazardous Energy.

Affected Employee means an employee whose job requires him/her to operate or use a machine or equipment on which servicing, or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized Employee means a person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing service or maintenance covered under 29 CFR 1910.147, *The Control of Hazardous Energy (Lockout/Tagout)*.

Note: An authorized employee is authorized to service only machines and equipment with which he/she is familiar by training and/or experience.

Capable of being Locked Out means an energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized means connected to an energy source or containing residual or stored energy.

Energy Isolating Device means a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy Source means any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Fixed Equipment means equipment fastened in place or connected by permanent wiring methods.

Hot Tap means a procedure used in the repair, maintenance and service activities which involves welding on a piece of equipment (pipelines, vessels, or tanks) under pressure in order to install connections or appurtenances. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

Lockout means the placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device means a device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in a safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Normal Production Operation means the utilization of a machine or equipment to perform its intended production function.

Other Employees means those employees whose work operations are or may be in an area where energy control procedures may be utilized.

Servicing and/or Maintenance means job site activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes where the employee may be exposed to the unexpected energization or startup of equipment or release of hazardous energy.

Setting Up means any work performed to prepare a machine or equipment to perform its normal production operation.

Tagout means the placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device means a prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Applicability

The provisions of this program apply when there is a possibility of injury due to the unexpected energization, start up, or release of stored energy while constructing, installing, setting up, adjusting, inspecting, modifying, maintaining, or servicing fixed machinery. Stored energy in an electro/mechanical system can be found in rotating flywheels, weights and counterweights, hydraulic and pneumatic pressure, thermal and chemical energy, springs, and unbalanced loads.

This program does not apply to:

a. Work on cord and plug connected electric equipment for which exposure to the hazards of unexpected energization or startup of the equipment is controlled by unplugging the equipment from the energy source and by the plug being under the exclusive control of the employee performing the servicing or maintenance.
b. Hot tap operations provided:
    1. Continuity of service is essential.
    2. Shut down of the system is impractical.
    3. Documented procedures are followed and special equipment is used which will provide proven effective protection for employees.

Procedures for Control of Hazardous Energy

The general procedures for lockout, tagout, or lockout and tagout are quite similar. Below are instructions which apply to all control of hazardous energy procedures. Exceptions and specific requirements for lockout without tagout; tagout without lockout; and lockout used in conjunction with tagout are noted in their own subchapters.

General Procedures

Note: Throughout this section, lockout/tagout refers to lockout without tagout; tagout without lockout; and lockout used in conjunction with tagout.

<u>Purpose and Scope</u>: Effective hazardous energy control procedures will protect employees during machine and equipment servicing and maintenance where the unexpected energization, start up or release of stored energy could occur and cause injury. Further, effective hazardous energy control procedures will protect employees when working near or on exposed de-energized electrical conductors and parts of electrical equipment. Hazards being guarded against include, but are not limited to, being cut, struck, caught, crushed, thrown, mangled, and/or shocked by live electrical circuits caused by the unexpected release of hazardous energy. One (1) piece of machinery can have more than one (1) real or potential source of hazardous energy that must be guarded against.

These procedures for the control of hazardous energy will ensure that machines and equipment are isolated properly from hazardous or potentially hazardous energy sources during servicing and maintenance and properly protected from re-energization as required by 29 CFR 1910.147.

While any employee is exposed to contact with parts of fixed electrical equipment or circuits which have been de-energized, the circuits energizing the parts will be locked out and/or tagged in accordance with the requirements of 29 CFR 1910.333 (b)(2).

Preparation for Shutdown: Prior to lockout/tagout, all energy isolating devices must be located which apply to the specific machine in question. **There may be more than one energy source**. While electrical is most common, other sources could be hydraulic, pneumatic, chemical, thermal, rotational, spring, etc. All must be isolated. The Energy Source Evaluation Form & the Control Procedures Form must be completed prior to isolation. These forms must be completed by an authorized employee. Once completed, it is recommended that these evaluations remain on file for future use. Any changes in design or energy hazard will require an update of these forms. Not only the energy source hazard, but its magnitude must be recorded on the Energy Source Evaluation Form. Example: Energy Source: Pneumatic. Magnitude: 125 psi.

Before an authorized or affected employee turns off the piece of equipment, the authorized employee must have knowledge of the type and magnitude of the energy to be controlled and the methods or means to control the energy. Refer to the Control Procedures Form for specific energy control procedures.

Machine or Equipment Shutdown: Before lockout/tagout controls are applied, all affected employees will be notified and given the reasons for the lockout/tagout.

If a machine or equipment is operating, it will be shut down by normal stopping procedures by either the affected or authorized employee.

Lockout/Tagout Device Application: Authorized employees will lockout/tagout the energy isolating devices with assigned individual locks. Locks or other lockout/tagout devices will be color coded and will be used for no other purpose. Lockout/tagout devices will indicate the identity of the authorized employee applying the device.

Lockout/tagout devices will be durable and capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected. They will be standardized in color and be substantial enough to prevent their removal without the use of excessive force or unusual techniques such as bolt cutters or other metal cutting tools. Key or combination locks are acceptable. Tagout device attachments will be non-reusable, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds. The tagout attachment will have the general design and basic characteristics of, at a minimum, a one-piece, all environmental tolerant nylon cable tie.

Lockout/tagout devices will be applied so that they will hold the energy isolating devices in a "Neutral" or "Off" position. Protective materials and hardware will be provided for isolating, securing or blocking of machines or equipment from energy sources. These protective materials and hardware include, but are not limited to, locks, tag chains, wedges, key blocks, adapter pins, self-locking fasteners, etc.

Release of Stored Energy: All stored energy will be blocked or dissipated. Types of stored energy include flywheels, springs, hydraulic or pneumatic systems, etc. Should there be a possibility of re-accumulation of stored energy, verification of isolation must be continued until servicing is complete.

Verification of Isolation: Prior to starting work on machines or equipment that have been locked out & after ensuring that no personnel are exposed to the release of hazardous energy, the authorized employee will operate the normal operating controls to verify that the machine or equipment has been de-energized & that it will not operate. After the above test, the operating controls will be returned to the "NEUTRAL" or "OFF" position. At this point, the machine/equipment is now locked out. The work may proceed.

Release from Lockout/Tagout: Before the lockout/tagout devices are removed and energy is restored to the machine or equipment, the following procedures will be implemented to ensure the safety of everyone involved:

a. The work area will be inspected to ensure that nonessential items have been removed and to ensure that the machine or equipment components are operationally intact.
b. The work area will be checked to ensure that all employees have been safely positioned or removed.

After the lockout/tagout devices have been removed and before the machine or equipment is started, affected employees will be notified that the lockout/tagout devices have been removed.

Each lockout/tagout device must be removed by the authorized employee who applied it.

Note: The one exception to the above is when the authorized employee who applied the lockout/tagout device is not available to remove it. That device may be removed under the direction of the competent person provided that the below specific procedures are followed:

a. Verification by the competent person that the authorized employee who applied the lockout/tagout device is not at the job site.
b. All reasonable efforts will be made to contact the authorized employee to inform him/her that his/her lockout/tagout device has been removed.
c. Ensuring that the Authorized employee has been informed of the above before resuming work.

The person who removes the device must be an authorized employee.

Each type of control of hazardous energy procedure will be documented using the Energy Source Evaluation Form and the Control Procedures Form **except** when all the below listed conditions exist:

a. The machine or equipment has no potential for stored or residual energy or re-accumulation of stored energy after shut down which could endanger employees; and
b. The machine or equipment has a single energy source which can be readily identified and isolated; and
c. The isolation and locking out of that energy source will completely de-energize and deactivate the machine or equipment; and
d. The machine or equipment is isolated from that energy source and locked out during servicing and maintenance; and
e. A single lockout device is under the exclusive control of the authorized employee performing the servicing and maintenance; and
f. The servicing and maintenance does not create hazards for other employees; and
g. No accidents have occurred involving the unexpected activation or re-energization of the machine or equipment during servicing or maintenance.

The above exceptions apply to documentation only. Whether using lockout, tagout, or lockout and tagout, the general procedures are the same.

Device Selection Criteria for Non-Electrical Hazardous Energy

A lock, color coded with either paint or tape and identifiable with the name of the employee who applied it, will be placed on each energy-isolating device where feasible. Lockout is the primary means of non-electrical hazardous energy isolation and, where possible, will always be used in lieu of tagout. In the event a machine or piece of equipment will not accept a lock on its energy isolating device(s), it will be modified to do so whenever it is replaced, renovated, or undergoes a major repair.

There are occasions where lockout cannot be accomplished and, in those instances, tagout alone may be used as long as it provides full employee protection as explained below:

a. A tag may be used without a lock if a lock cannot be physically applied. This procedure must be supplemented with at least one additional safety measure providing a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include, but are not limited to the:
    1. Removal of an isolating circuit element.
    2. Blocking of a controlling switch.
    3. Opening of an extra disconnecting device.

    Note: A tag may be used without a lock if it can be demonstrated that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock. This demonstration must be documented. This is an allowable, but not preferred, option.

All affected persons must be fully aware of the fact that tags used in tagout procedures are essentially a warning device affixed to energy isolating devices. Unlike locks, tags do not physically restrain. Tags will:

a. Be capable of withstanding the environment to which they will be exposed for the maximum period of time that exposure is expected.
b. Be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.
c. Be standardized in at least one (1) of the following:
    1. Color
    2. Shape
    3. Size
d. Be standardized in print and format.
e. In their method of attachment, be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment methods and means will be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum strength of no less than 50 pounds and have the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.
f. Indicate the identity of the employee applying the tag.
g. Warn against the hazardous conditions if the machine or equipment is energized and will include a legend such as the following: *Do Not Start, Do Not Open, Do Not Close, Do Not Operate,* etc.

Control of Electrical Hazardous Energy on Fixed Equipment

Electrical hazards associated with fixed equipment present a special hazard class and, in each case, a determination must be made whether lockout, tagout, or lockout used in conjunction with tagout is to be utilized.

The guidelines for this determination are found in 29 CFR 1910.333. 29 CFR 1910.333 makes no mention of maintenance or servicing. Its provisions apply to any possible exposure to contact with fixed electrical equipment or circuits which have been de-energized. Live parts that operate at less than 50 volts to ground need not be de-energized if there will be no increased exposure to electrical burns or to explosion due to electric arcs. Fixed equipment is defined as: "equipment fastened in place or connected by permanent wiring methods."

Before circuits and/or equipment are de-energized, safe procedures will be determined. At a minimum:

a. The circuits and equipment to be de-energized will be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, may not be used as the sole means for de-energizing circuits or equipment. Interlocks for electric equipment may not be used as a substitute for lockout and tagging procedures.
b. Stored electric energy which might endanger personnel will be released. Capacitors will be discharged, and high capacitance elements will be short-circuited and grounded if the stored electric energy might endanger personnel. Be aware of the shock potential of capacitors and associated equipment. If they are handled in meeting this requirement (discharging), they will be treated as energized until they have been totally discharged.
c. Stored non-electrical energy in devices that could reenergize electric circuit parts will be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

Device Selection Criteria for Electrical Hazardous Energy

Note: When dealing with safety related work practices to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, a Qualified Person is defined as one who: "is permitted to work on or near exposed energized parts" and who, at a minimum, has been trained in and is familiar with:

a. The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment, and
b. The skills and techniques necessary to determine the nominal voltage of exposed live parts, and
c. The clearance distances specified in 29CFR 1910.333(c) and the corresponding voltages to which the qualified person will be exposed.

A lock and tag will be placed on each disconnecting means used to de-energize circuits and equipment on which work is to be performed except:

a. A tag may be used without a lock if it can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock. This demonstration must be documented. This is an allowable, but not preferred, option. A tag may also be used without a lock, if a lock cannot be physically applied. Under either of the above two circumstances that a tag is used without a lock, the procedures must be supplemented with at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include:

1. The removal of an isolating circuit element.
2. The blocking of a controlling switch.
3. The opening of an extra disconnecting device.

b. A lock may be used without a tag if, and only if:
   1. Only one circuit or piece of equipment is being de-energized, and
   2. The lockout period does not extend beyond the work shift, and
   3. Employees exposed to the hazards associated with re-energizing the circuit are familiar with this procedure - utilizing a lock without a tag.

After electrical hazards are locked out, tagged out, or locked and tagged out, a Qualified Person must verify de-energization before work can proceed on de-energized equipment. Verification by the Qualified Person will include:

a. Operation of the equipment's operating controls, or otherwise verifying that the equipment cannot be restarted.
b. Using test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and verifying that the circuit elements and equipment parts are de-energized.
c. Using test equipment to determine if any energized condition exists as a result of inadvertently induced voltage or unrelated voltage back feed even though specific parts of the circuit have been de-energized and presumed to be safe.

   Note: If the circuit to be tested is over 600 volts, the test equipment will be checked for proper operation immediately before and immediately after this test.

Re-Energizing Electrical Equipment

The process of re-energizing electrical equipment, even temporarily, must be accomplished as noted below in the order listed:

a. A Qualified Person will conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuit and equipment can be safely energized.
b. Employees exposed to the hazards associated with re-energizing the circuit or equipment will be warned to stay clear of circuits and equipment.
c. Each lock and tag will be removed by the authorized employee (who must also be a Qualified Person when dealing with electrical hazards).
d. If the person who applied the lock or tag is absent from the job site, the competent person may designate another Qualified Person to remove the lock and/or tag provided that:
   1. It is assured that the Authorized Person who applied the lock or tag is not available at the job site, and
   2. It is assured that the Authorized Person who applied the lock and/or tag is aware that the lock and/or tag has been removed before he/she resumes work at the job site.
e. A visual determination will be accomplished to ensure all employees are clear of the circuits energized.

Special Considerations

Whether using lockout, tagout, or lockout and tagout procedures, the below special considerations apply.

There may be special circumstances where, during a lockout procedure, a machine or equipment must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine or equipment or components thereof. The below procedures will be followed to accomplish this task:

a. The machine or equipment will be cleared of tools and nonessential items and, if it is to be operated, all components will be operationally intact.
b. The work area will be checked to ensure that all employees have been safely positioned or removed.
c. The standard release from lockout procedures will be implemented.
d. The machine or equipment will be energized and testing or positioning will proceed.
e. After testing or positioning, de-energize all systems and reapply the energy control device following standard procedures.

Group Lockout and/or Tagout Procedures

In the event that servicing, or maintenance is performed by more than one individual, the following will be implemented:

a. One person will be designated as Group Leader and that person will have overall responsibility for a set number of employees working under his/her control.
b. The Group Leader will have exclusive control of a Master Group Lockout and/or Group Tagout device.
c. The Group Leader will ascertain the exposure status of individual group members with regard to the lockout and/or tagout of the machine or equipment.
d. Each authorized employee within the group will affix his personal lockout/tagout device to a group lockout box or comparable device before beginning work and will remove his/her personal lockout/ tagout device upon completion of work.

If there is more than one group of personnel working a machine or piece of equipment, an employee will be designated to coordinate and take responsibility for all the individual groups.

Shift and/or Personnel Changes

In the event that Energy Control Procedures must extend into the next shift or if there are individual or group personnel changes, the procedures listed below will be implemented in the order listed:

a. If the energy isolation device will accept two lockout/tagout devices:
    1. The authorized employee coming on duty will place his personalized lockout/tagout device in place, and
    2. After the above step has been completed, the employee going off duty will remove his lockout/tagout device.

b. If the energy isolation device will not accept two lockout/tagout devices, both the incoming and outgoing authorized employees will:
    1. Ensure that all affected employees are aware that a lockout/tagout change is about to take place, then
    2. Ensure that the area is clear of tools and affected employees, then
    3. The outgoing authorized employee will remove his lockout/tagout devices and immediately the incoming authorized employee will install his lockout/tagout devices, and
    4. The incoming authorized employee will inform the affected employees that the change has been completed.

Following the above procedure will ensure the energy isolating device is never disturbed and that complete control of hazardous energy is maintained. The above procedure provides for continuing protection for both incoming and outgoing employees from the potential hazards of the unexpected release of hazardous energy and an orderly transfer of lockout/tagout responsibilities.

Outside Personnel

Whenever our company's employees are to be engaged in activities requiring lockout/tagout in another company's facility, we must inform the on-site employer of our lockout or tagout procedures. The on-site employer will ensure that their employees understand & comply with our restrictions & prohibitions of our energy control program.

Periodic Inspections

Christopher Millerick, our Safety Director, will conduct periodic inspections of this Control of Hazardous Energy Program at least annually to ensure that the procedures and requirements of 29 CFR 1910.147 are being followed. The information gleaned from the periodic inspection will be used to correct any deviations or inadequacies identified. These inspections will be documented and certification will be prepared to identify the machine or equipment on which an energy control procedure was utilized, the date of the inspection, the employees included in the inspection, and the name of the person performing the inspection. It should be noted that all periodic inspections will be conducted by a competent person designated by the Christopher Millerick **other** than the person who actually used the energy control procedure being inspected.

Training & Retraining

Millerick Engineering, Inc. will provide training to ensure that the purpose and function of our Control of Hazardous Energy program is understood by our employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees. The training must include the following:

a. Each authorized employee will receive training in the recognition of applicable hazardous energy sources, the type & magnitude of the energy available in the workplace, & the methods & means necessary for energy isolation & control.
b. Each affected employee will be instructed in the purpose and use of the energy control procedure.
c. All other employees whose work operations are or may be in an area where energy control procedures may be utilized, will be instructed about the procedure, and about the prohibition relating to attempts to restart or reenergize machines or equipment which are locked out or tagged out.

When tagout systems are used, employees will also be trained in the following limitations of tags:

a. 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.
b. 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.
c. 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.
d. Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace.
e. Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
f. Tags must be securely attached to energy isolating devices so that they cannot be inadvertently or accidentally detached during use.

Retraining

Retraining will be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment or processes that present a new hazard, or when there is a change in the energy control procedures.

Additional retraining will also be conducted whenever a periodic inspection reveals, or whenever the employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

The retraining must reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

Training Documentation

Millerick Engineering, Inc. will certify that employee training has been accomplished and is being kept up to date. The certification must contain each employee's name and dates of training.

Millerick Engineering, Inc.

Machine/Equipment Identification: ____

Location of Machine Equipment: ____

Authorized Person Name: _____________________________ Date: ___________

Energy Sources Evaluation & Control Procedures Form

MACHINE OR EQUIPMENT NAME: ___________________ LOCATION: ________________________________

MODEL: _________________ SERIAL NUMBER: __________________ PROCEDURE NUMBER: __________

ENERGY SOURCE	MAGNITUDE (Volts; Amps; Phase; HP; Lbs.; RPM; Ft-lbs.; psi.; F/C; Highly Reactive)	LOCATION OF ISOLATING DEVICE	MEANS OF ISOLATION	COMMENTS
CAPACITOR				
CHEMICAL				
COUNTER WEIGHT				
ELECTRICAL				
ENGINE				
FLYWHEEL				
HYDRAULIC				
PNEUMATIC				
SPRING				
THERMAL				
OTHER				
OTHER				

Note: This form must be completed by an Authorized Employee.

Evaluation Conducted by: _________________________________

Name: ____ Date:_______________

(Must be an Authorized Employee)

1 of 3

Machine/Equipment Identification: ______________________________________

Location of Machine Equipment: ____

Authorized Person Name: _____________________________ **Date:** ___________

These Procedures must be accomplished in the order listed.

1. **PREPARATION FOR SHUTDOWN:** The Authorized Employee will be totally familiar with the first page of this form. The Affected Employees will be notified that the piece of equipment is about to be shut down and locked out.

Specific Instructions: ____

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2. **SHUTDOWN:** Affected Employees will be given the reason(s) for the lockout/tagout procedures. If the machine is running, it will be turned off using normal procedures. It may be shut down by either the Authorized Employee or the Affected Employee.

Specific Instructions: ____

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3. **MACHINE ISOLATION:** All real or potential hazardous energy listed on the first page of this form will be isolated from their source. The location of the isolation devices and the methods used are also found on the first page of the form.

Specific Instructions: ____

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4. **LOCKOUT/TAGOUT DEVICE APPLICATION:** Authorized Employees will (circle appropriate procedure): [lockout] [tagout] [lockout and tagout] the energy isolating devices. Lock and tag devices will be color coded and they will contain the identity of the Authorized Employee actually performing this procedure. The lockout/tagout devices will be applied so that they hold the energy isolating device in a "Neutral" or "Off" position.

Specific Instructions: ____

____

____

2 of 3

4a. If a tag is used in lieu of a lock because the energy isolating device will not accept a lock, the following additional safety precautions will be taken [29 CFR 1910.147 c(3)(ii) & 29 CFR 1910.333(2)(b)(iii)((D)]:

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Specific Instructions: ____

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5. **RELEASE OF STORED ENERGY:** All stored energy will be blocked or dissipated. Reference page one (1) of this form to ensure real or potential stored energy in a system is identified and controlled.

Specific Instructions: ____

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____

6. **VERIFICATION OF ISOLATION:** Prior to starting work on the piece of equipment and after ensuring that no personnel are exposed to the release of hazardous energy, the Authorized Employee will operate the controls to verify that there has been de-energization and that the equipment will not operate. After this verification, the operating controls will be returned to the "Neutral" or "Off" position.

Specific Instructions: ____

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7. **RELEASE FROM LOCKOUT/TAGOUT:** The Authorized Employee will 1.) Ensure that all Employees have been safely positioned or removed and the work area will be cleared of non-essential items, 2.) Ensure the equipment or equipment components are operationally intact; 3.) Ensure machine guards have been replaced; 4.) Inform the Affected Employees that lockout and or tagout devices are going to be removed; 5.) Remove the lockout and or tagout devices including all energy restraints such as blocks; and 6.) Inform the Affected Employees that the equipment is ready for operation.

Specific Instructions: ____

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____

3 of 3

Millerick Engineering, Inc.

Group Leader Documentation Form

One (1) person will be designated as Group Leader. The Group Leader will have overall responsibility for a set number of employees.

The Group Leader will have exclusive control of a Master (Group) Lockout and/or Group Tagout device.

The Group Leader will ascertain the exposure status of individual group members with regard to the lockout and/or tagout of the machine or equipment.

Each individual authorized employee within the group will affix his personal lockout/tagout device to a group lockout box or comparable device before beginning work and will remove his/her personal lockout/tagout device upon completion of work.

If there is more than one group of personnel working on a machine or piece of equipment, an employee will be designated to coordinate and take responsibility for all the individual groups.

Name of Designate Group Leader: ______________________________________

Equipment Requiring Control of Hazardous Energy

Name: ______________________ Serial Number: ______________________

Date: ________________________ Model Number: ______________________

Authorized (Qualified) Employees of the Group

_____________________________ _____________________________
(Name) **(Signature)**

_____________________________ _____________________________
(Name) **(Signature)**

_____________________________ _____________________________
(Name) **(Signature)**

_____________________________ _____________________________
(Name) **(Signature)**

____

Tayla Millerick

Program Administrator

Signature of Group Leader: ____

Millerick Engineering, Inc.

Periodic Inspection Documentation Form
Equipment on which Control of Hazardous Energy Procedures were Utilized

Name: ______________________ Serial Number: ______________________

Date: ________________________ Model Number: ______________________

Were all the Correct Procedures Correctly Applied? ☐ YES ☐ NO

If yes, sign the form and return to Christopher Millerick.
If no, complete the below section, sign the form and return to Christopher Millerick.

Employees Preforming the Procedure

______________________________ ______________________________
(Name) **(Signature)**

______________________________ ______________________________
(Name) **(Signature)**

______________________________ ______________________________
(Name) **(Signature)**

______________________________ ______________________________
(Name) **(Signature)**

Improper Procedures Noted

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______________________________ ______________________________
(Signature of Inspector) **(Date)**

Note: If improper procedures are noted, the above employees must have retraining or the Program must be modified.

Personal Protective Equipment - General

29 CFR 1926.28 - Personal Protective Equipment
29 CFR 1926.52 - Occupational Noise Exposure
29 CFR 1926.95 - Criteria for Personal Protective Equipment
29 CFR 1926.100 - Head Protection
29 CFR 1926.101 - Hearing Protection
29 CFR 1926.102 - Eye and Face Protection
29 CFR 1926.107 - Definitions Applicable to this Subpart
29 CFR 1910.132 - General Requirements
29 CFR 1910.133 - Eye and Face Protection
29 CFR 1910.135 - Head Protection
29 CFR 1910.136 - Occupational Foot Protection
29 CFR 1910.138 - Hand Protection

Overview

This Personal Protective Equipment (PPE) Program has been prepared to inform all employees of Millerick Engineering, Inc. of the potential hazards on the job site and to identify the proper PPE to be used to reduce or eliminate these hazards. This Program relies on a cooperative effort by all personnel to understand the reasons for PPE and to protect themselves from harm.

The use of PPE does not lessen an employee's obligation to use safe work practices and procedures. Employees are expected to be aware of the hazards within their area of responsibility and properly use prescribed PPE.

Our operations, work methods, and individual job sites present specific hazards which must be identified, analyzed, and matched with the appropriate PPE through a continuing hazard assessment process.

A Certificate of Hazard Assessment will be kept on the job site for inspection purposes.

Duties of the PPE Program Administrator

The primary duties of , our Program Administrator include: hazard assessment; PPE selection; PPE training; and monitoring of our PPE Program. Certain types of PPE may require hands-on training before on the job use (primarily for sizing and fitting) and this training may be further delegated to competent persons.

Hazard Assessment and PPE Selection

A careful, systematic personal protective equipment selection process is used to identify what, if any, protection is required to reduce or eliminate the possibility of eye, hand, foot, limb, or head injury.

Hazard assessment, performed by or a designated competent person, starts with a thorough knowledge of the job sites, work procedures, and methods of operation as well as the hazards that may be created by other contractors working in the vicinity of our employees. The basic hazard categories are: impact, penetration, compression, chemical, heat, harmful dust, and light radiation.

Identifying the source of the above hazards allows for consideration of administrative or engineering controls to eliminate the hazard as opposed to providing protection against it. Examples would include: redirecting traffic flow, ventilation, temporary weather barriers, non-slip surfaces, etc.

Because administrative and engineering controls are passive – no employee involvement is required – they are preferable to PPE.

A PPE selection is made by analyzing the above information and evaluating the type of risk, the level of risk, the potential for injury and the possible seriousness of that injury. PPE, which is compatible with the above risks and work situation, is considered. Actual selection involves all the above factors plus an attempt to provide a level of protection greater than the minimum required.

In all situations where it has been determined that a particular type of PPE is to be used, it will be used. There will be no exceptions, by virtue of position or rank, to this policy. Within an area on a job site where the possibility of falling objects exists, hard hats will be worn. It follows that once an item of PPE (hard hat, in this case) is selected, it must be used by all persons in the identified area regardless of job title or function.

Having , or a designated competent person, on a job site to determine the PPE requirements allows for knowledgeable selection and consistency, and eliminates chaos that would result if each individual were to decide when, where, and if PPE should be used.

29 CFR 1910 Subpart I - Appendix B, *Non-mandatory Compliance Guidelines for Hazard Assessment and Personal Protective Equipment Selection*, provides excellent selection guidelines for eye and face protection, head protection, foot protection, and hand protection.

Dissemination of PPE Selection Information

Employees must understand when PPE is necessary and what type(s) of PPE are necessary.

All persons for whom PPE will provide a measure of safety will be given appropriate training on that item of PPE as well as an explanation of the importance of its use.

ANSI Standards and PPE

Most items of PPE are manufactured in accordance with a specific American National Standards Institute (ANSI) standard. For example, protective eye and face devices purchased after 07/05/94 must comply with ANSI standard ANSI Z87.1-1989, *American National Standard Practice for Occupational and Educational Eye and Face Protection*; protective helmets purchased after 07/05/94 must comply with ANSI standard ANSI Z89.1-1986, *American National Standard for Personnel Protection-Protective Headwear for Industrial Employees-Requirements.*

PPE safety products are tested to ensure they meet ANSI standards. Because products are tested in the manner in which they are designed to be used, ANSI certification is valid only if the user follows the manufacturer’s instructions for proper sizing, fitting, wearing, and adjusting. A review of OSHA citations reveals that fines can be levied because employees were improperly using PPE. For example, a hard hat worn with the bill toward the rear may provide adequate protection from impact; however, because it is tested with the bill toward the front, this improper use is cause for a safety violation.

PPE will be provided to our employees at no cost to them. Prior to purchase, items of selected PPE will be checked to ensure they were manufactured in accordance with the proper ANSI standard.

The importance of hazard assessment takes on added significance when judgments are made matching the hazard to the protection desired in cases where ANSI certification is not available. What matters most is: does the selected PPE do what it is intended to do?

Employee owned PPE must be approved for use by Tayla Millerick. Further, such equipment must be properly maintained and cleaned in accordance with the manufacturer's instructions.

Sizing and Fitting

The word "personal" in the phrase "personal protective equipment" correctly implies that the equipment is for a specific person. As such, sizing and fitting are important for a variety of reasons.

Function: An improperly fitted piece of PPE may not do its job. For example, eye protection against dust must have an excellent face seal.

Comfort: The likelihood of continued use is increased if the PPE selected is comfortably fitted. Example: gloves that fit poorly and, over time, make a person's hands hot and clammy are likely to be removed exposing that person to the hazard for which the gloves were required in the first place.

Safety: Ill-fitting PPE may actually cause an accident. Example: loose hard hat may slip and block one's vision.

Most PPE comes in a variety of standard sizes like small, medium, & large, & within those sizes, small adjustments may be made to ensure a perfect fit. It is important to understand the procedures for donning, adjusting, using, & removing PPE. Each person who is required to use any type of PPE will be taught, before initial issue, the specific procedures for properly donning, adjusting, using, & removing the specific PPE. This instruction will generally be given by the employee's Supervisor. When available, the manufacturer's instructions will be issued with the PPE.

Care and Maintenance of PPE

PPE will be visually inspected before each use and if defects are noticed, it will not be used. Some types of PPE are expendable (cotton gloves) and have a limited life span after which they are discarded, and new PPE is reissued. Plastic safety glasses become scratched and they too must be exchanged for new ones when vision is impaired. Other types of safety equipment consist of both non-expendable and expendable components. A cartridge respirator is an example of this, with the respirator being non-expendable while the cartridges "wear out" and become expendable (discarded and replaced). PPE will be maintained in accordance with the manufacturer's instructions and, where appropriate, kept in a sanitary condition.

Cleanliness takes on an added importance when dealing with PPE designed to protect the eyes and face. Dirty or fogged lenses can impair vision and, rather than offer protection from a hazard, actually becomes a contributory factor in causing an accident.

Lastly, should PPE become contaminated with a chemical substance & decontamination is impossible, the PPE will be properly disposed of following the disposal instructions on the Safety Data Sheet for that substance.

Training

Most PPE requirements are obvious and wearing PPE is so simple that training is <u>almost</u> unnecessary.

What is important - vitally important - is actually using the proper PPE when it is required.

To ensure employee compliance with PPE requirements, we have opted to treat all employees as intelligent, responsible persons who, when reminded of what PPE actually protects, will enthusiastically endorse PPE use.

Affected employees will be given an understanding of:

a. When PPE is necessary?
b. What PPE is necessary?
c. How to properly put on, take off, adjust, and wear PPE?
d. The limitations of the PPE.
e. The proper care, maintenance, useful life and disposal of the PPE.

Retraining will be given in situations when changes in PPE requirements render the previous training obsolete or it is noticed that an employee is not following our PPE policies – specifically, not properly wearing the selected PPE in identified locations or work situations.

Eye and Face Protection

Your eyes are a marvel of engineering. Most of us take them for granted as we do all our senses, until an accident, injury, or disease forces us to realize the miracle we lost or almost lost. Can you imagine a system that can take (absorb) light and convert it to electrical signals (by way of the 120 million rods and 6 million cones on the retina) and transfer these signals through an optic nerve which has about one million fibers directly into the brain?

Most of us see the world in living color and with depth perception. The body itself does much to protect the eyes. Bony eye sockets in the skull protect the eye from many mechanical injuries. Orbital fluids and tissues cushion direct blows. Eyelids close reflexively from visual or mechanical stimuli. Eyes reflexively rotate upward with the lid closing to protect the cornea. Tears can flush away chemicals and foreign bodies. We all come with these safeguards. Sometimes, they are not enough.

Eye protection is required when there is a possibility of eye injury. Eye injury is not confined to flying objects. Eye injury can be caused by bright light, dust, chemicals, heat, and, literally, anything that can reach them. Different hazards require different types of protection.

Eye (and face) protection is required when one is exposed to flying particles, chemicals, or injurious light radiation. Types of eye protection include: impact resistant safety glasses, safety glasses with side shields, goggles, goggles with a face seal, face masks, and shaded goggles with varying degrees of darkness.

Affected employees who wear prescription lenses will wear eye protection over the prescription lenses without disturbing the proper positioning of the prescription lenses, or will wear eye protection that incorporates their prescription into the design.

All prescription glasses should be made with impact-resistant lenses. Hardened lenses, through a tempering process, are extremely hard and resistant to impact and breakage. Safety lenses are similar to hardened lenses but are 1 mm thicker. Safety lenses are used in goggles where there is a danger of flying glass or chips of metal.

All employees who wear contact lenses must also wear appropriate eye and face protection in hazardous environments.

Welding helmets and face shields, if required, should be worn over primary eye protection (spectacles or goggles).

An inexpensive pair of safety glasses can save your priceless eyesight.

Head Protection

Talking about head protection is really talking about brain protection. Your brain, either through divine providence, evolution, or quirk of nature, is you. The brain, that soft mass of gray and white convoluted matter, is what you are all about. Destroy your brain and you no longer exist.

Your brain is naturally protected by a cranium. Your skull actually has many bones which protect your brain and support your face. Obviously, there are other parts to your head which need protecting such as your eyes, ears, nose, tongue, skin, etc., but your brain is the most important.

Head protection is required when there is a possibility of injury to the head from falling objects and when working near exposed electrical conductors which could contact the head.

Brain injury is the second most common cause of major neurologic deficits and causes more deaths than injury to any other organ.

When the skull receives an impact, it actually can indent and deform. A fracture may occur and the fracture may be distant from the point of impact. A direct blow to the head can cause the brain to actually move within the skull. Surprisingly, there is often a reverse correlation between skull damage and brain damage. Just because there is no external visible injury to the skull does not preclude the possibility of brain injury.

Wearing head protection (a hard hat) accomplishes two major objectives: it reduces the rate of energy transfer and spreads out the area of energy transfer. Just as your head should be checked out at a hospital after a head impact, so should your hard hat. A hard hat can absorb energy by destructing and this destruction may be unnoticeable.

A head injury may occur after a blow to the head and the following symptoms may be present: unconsciousness or disorientation, confusion, nausea, vomiting, and/or double vision. Get medical help immediately. Cover open wounds lightly with sterile dressing. Keep victim still, warm, and reassured. DO NOT move the victim unless he/she would be in greater danger if you did not. DO NOT apply pressure to a head wound. DO NOT try to stop blood or clear fluid coming from ears, nose, or mouth.

Hearing Protection

Wherever it is not feasible to reduce the noise levels or duration of exposures to those specified in Table D-2, below, ear protective devices will be provided and used.

Ear protective devices inserted in the ear will be fitted or determined individually by competent persons.

Plain cotton is not an acceptable protective device.

TABLE D-2 - PERMISSIBLE NOISE EXPOSURES

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

Hearing damage is caused by noise level and duration of exposure to the noise. If, after using the formula below, the equivalent noise exposure exceeds unity (1), then a Hearing Conservation Program will be initiated.

F(e)=(T(1)divided by L(1))+(T(2)divided by L(2))+ ... + (T(n) divided by L(n)) where:

F(e) = The equivalent noise exposure factor.

T = The period of noise exposure at any essentially constant level.

L = The duration of the permissible noise exposure at the constant level (from Table D-2).

If the value of F(e) exceeds unity (1) the exposure exceeds permissible levels.

A sample computation showing an application of the formula in paragraph (d)(2)(ii) of this section is as follows. An employee is exposed at these levels for these periods:

110 db A 1/4 hour.

100 db A 1/2 hour.

90 db A 1 1/2 hours.

F(e) = (1/4 divided by 1/2)+(1/2 divided by 2)+(1 1/2 divided by 8)

F(e) = 0.500+0.25+0.188

F(e) = 0.938

Since the value of F(e) does not exceed unity, the exposure is within permissible limits.

Understanding some interesting facts about your hearing will emphasize the need for hearing protection.

Your outer ears on the side of your head are the least important part of your hearing system. Should you lose your ear, you would not necessarily lose your hearing. Your outer ear, made of cartilage, includes the external auditory canal which leads to the eardrum which is only 2/5" in diameter. The eardrum separates the outer ear from the middle ear. Within the middle ear are three (3) bones commonly called the hammer, anvil, and stirrup. The stirrup (stapes) is the smallest bone in your body -- thinner than a grain of rice. Also in the middle ear is the Eustachian tube which connects the middle ear to the back of the throat to maintain equal air pressure on both sides of the ear drum.

The inner ear, where sound waves are converted to electrical impulses, actually has a function unrelated to hearing. It contains the semicircular canals which completely control your balance. Also in the inner ear is the cochlea, a small spiral coil in which you would find the basilar membrane which has over 15,000 hair cells. These hair cells are the end of the auditory nerve which goes directly to the temporal lobe of the brain.

The hardest bone in your whole body is the temporal bone which protects two thirds of the auditory canal and all of the middle and inner ear. Nature, itself, seems to have placed a high priority on your hearing.

Protect your hearing. If you are issued hearing protection, use it!

Foot Protection

When purchasing new protective footwear, ensure that it complies with ASTM F-2412-2005, "Standard Test Methods for Foot Protection," and ASTM F-2413-2005, "Standard Specification for Performance Requirements for Protective Footwear."

Specific hazards require specific types of protective footwear. Certain types of footwear can offer traction, crush protection, penetration protection, electrical protection, chemical resistance, heat and/or fire resistance, dryness, cushion, or ankle-protection. Further, certain activities may require a combination of these features.

Your foot is a remarkable piece of engineering which is composed of 26 bones, muscles, fatty tissue, nerves, tendons, skin and joints. The foot itself can absorb a tremendous amount of punishment without damage. But there are limits and it would be a shame to lose a foot, or part of a foot, because of failure to wear the prescribed protective footwear.

Hand Protection

Your hand is composed of 20 muscles, 3 major nerves, 27 bones (14 of which are in your fingers) plus skin, fatty tissue, tendons, and joints. There are 15 muscles in your forearm which provide power to your hand. Your hand is your gateway to the world. It lets you do what you think. Its function is feeling and grasping.

Try to pick up something while holding your thumb still. It is very difficult. If the nerve to the small muscles of the thumb is severed, 80% of the total hand function is lost.

There are numerous types of hand protection (gloves) available -- each with a specific purpose. The most common are general purpose cotton work gloves which provide protection from minor skin abrasions and cold. However, there are many other types of gloves. Hands need protection from chemicals, abrasions, cuts and lacerations, temperature extremes, germs, radiation, impact, punctures, electricity, and other hazards on the job site. Specific job requirements determine the type of hand protection needed. Proper hand protection must do more than protect your hand; it must allow you to accomplish your job assignment with efficiency as well as safety.

Wearing hand protection could prevent your hand and/or fingers from being severed, burned, crushed, punctured, lacerated, cut, or generally abused.

Respiratory Protection

Employees who, by nature of their work, are exposed to harmful aerosols, vapors, gases, contaminated air, or non-breathable air will be provided air purifying or air supplying respirators after training, medical evaluation, and fit testing per our Respiratory Protection Program. The one exception is dust masks worn solely for comfort and not for respiratory protection.

Miscellaneous Personal Protection

PPE immediately brings to mind eye, head, hand, and foot protective equipment. However, there may be other types of protective equipment which are readily available and which have the capability of protecting employees from identified hazards on the job site. Some of these items may not fall under a specific OSHA standard or may not be ANSI approved or disapproved; however, in the judgment of , they may be appropriate for use in our operations.

Summary

The true beneficiary of PPE utilization is the user. The whole thrust of this Program is to protect the employees of Millerick Engineering, Inc. from injury. This is accomplished by, among other things, explaining the process of hazard assessment, the reasons for PPE use, and the necessity of using the PPE selected.

What possible justification could there be for maiming, losing, or even slightly injuring a body part because available (and required) PPE was not used? “I forgot”; “I was in a hurry”; “I misplaced my PPE”; “I felt silly wearing PPE”; or “I really didn’t believe PPE was necessary” will not undo what could be a lifetime of regret.

Millerick Engineering, Inc.

Certificate of Job Site Hazard Assessment

I certify, this date, that I have performed a hazard assessment of the job site for Millerick Engineering, Inc. and our methods of operations.

This hazard assessment was accomplished to determine if hazards are present, or are likely to be present, which necessitate the use of personal protective equipment (PPE).

Identified hazards which cannot be eliminated through engineering controls or changes in procedures will be addressed by the use of selected PPE.

All affected employees will be informed of the required PPE for specific work locations or specific types of work to be performed and will receive initial training or retraining, if necessary, before being allowed to perform work requiring PPE.

If conditions or procedures change, a reassessment will be made.

____________________________________ __________________________

Tayla Millerick Date

Personal Protective Equipment Program Administrator

Personal Protective Equipment - Hearing Conservation

29 CFR 1910.95 - Occupational Noise Exposure
29 CFR 1926.52 - Occupational Noise Exposure
29 CFR 1926.101 - Hearing Protection

Overview

This Hearing Conservation Program is designed for one purpose – to prevent hearing damage caused by occupational noise exposure.

Most forms of personal protective equipment (PPE) are a response to an obvious hazard and are easy to understand. A hard hat will protect your head from falling objects, for example.

Hearing protection is different from most other types of PPE because loss of hearing generally occurs painlessly over a period of time and, when finally realized, the damage is permanent.

Because of the above, it is vital that cooperation between all affected employees and management be established to prevent occupational hearing loss. To achieve this goal, this Hearing Conservation Program focuses on the effects of noise on hearing as well as the selection and use of hearing protectors. Information is provided on how sound is transmitted to your brain, and lastly, the actual application of our Hearing Conservation Program.

While this Hearing Conservation Program has all the elements required of a complete safety program, it is not necessary to understand all the technical formulas and procedures that are required of licensed monitors, doctors, and hygienists. Individual employees are required to wear appropriate hearing protection when so directed and to understand the importance of protecting their hearing from damage. If workplace noise bothers you and those noises are below the threshold for required ear protection, you should bring this to the attention of for resolution.

Wherever it is not feasible to reduce the noise levels or duration of exposures to those specified in Table D-2, below, ear protective devices will be provided and used.

Table D-2 - Permissible Noise Exposure	
Sound Level Duration Hours/Day	**dBA Slow Response**
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

Hearing damage is caused by noise level and duration of exposure to the noise. If, after using the formula below, the equivalent noise exposure exceeds unity (1), then a Hearing Conservation Program will be initiated.

F(e)=(T(1)divided by L(1))+(T(2)divided by L(2))+ ... + (T(n) divided by L(n)) where:
F(e) = The equivalent noise exposure factor.
T = The period of noise exposure at any essentially constant level.
L = The duration of the permissible noise exposure at the constant level (from Table D-2).
If the value of F(e) exceeds unity (1) the exposure exceeds permissible levels.
A sample computation showing an application of the formula in paragraph (d)(2)(ii) of this section is as follows. An employee is exposed at these levels for these periods:
110 db A 1/4 hour.
100 db A 1/2 hour.
90 db A 1 1/2 hours.
F(e) = (1/4 divided by 1/2)+(1/2 divided by 2)+(1 1/2 divided by 8)
F(e) = 0.500+0.25+0.188
F(e) = 0.938
Since the value of F(e) does not exceed unity, the exposure is within permissible limits.

Hearing protection is different from most other types of PPE because loss of hearing generally occurs painlessly over a period of time and, when finally realized, the damage is permanent.

As one would reasonably expect, acoustic trauma to your hearing can cause instant and permanent damage.

The initial determination of excessive noise levels is generally subjective. Indications of excessive noise would include: actual information pertaining to specific machines, personal observation, complaints from employees, and noticed indications of hearing loss. It is requested that employees draw attention to work situations where there is an apparent loudness that possibly requires hearing protection.

Duties of the Program Administrator

The duties of , our Hearing Conservation Program Administrator include identifying work areas where the equivalent noise exposure factor exceeds unity, determining what types of noise level monitoring may be necessary, and ensuring that all personnel who are directed to wear hearing protection are trained in its proper use, cleaning, and storage.

will also be responsible for recordkeeping, testing, and training. Lastly, Tayla Millerick will keep abreast of developments in the hearing conservation field and he is encouraged to seek outside professional help when needed.

When a Hearing Conservation Program is Required

The industry standard that deals with occupational noise exposure, 29 CFR 1926.52, *Occupational Noise Exposure,* is what this program is based.

Hearing protection will be provided at 85 dBA or greater **or** when it is not feasible to reduce the noise levels or duration of exposures to those specified in Table D-2 below, ear protective devices will be provided and used.

Table D-2 - Permissible Noise Exposure	
Sound Level Duration Hours/Day	**dBA Slow Response**
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

Footnote[1] **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. If the sum of the following fractions: C(1)/T(1) + C(2)/T(2) C(n)/T(n) exceeds unity, then, the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and T(n) indicates the total time of exposure permitted at that level.**

C	**= total length of workday in hours**
T	**= period of noise exposure at any essentially constant level**
C(n)	**= total time of exposure at a specific noise level**
T(n)	**= total time of exposure permitted at that level**

Footnote[2] **When the daily noise exposure is composed of two or more periods of impulsive or impact noise should not exceed 140 dB peak sound pressure level.**

A continuing, effective hearing conservation program will be administered when employees are exposed to sound levels greater than 85 dBA on an 8 hour time-weighted average basis.

This Hearing Conservation Program must be implemented when the equivalent noise exposure exceeds unity (the number 1) using the below formula and example:

F(e)=(T(1)divided by L(1))+(T(2)divided by L(2))+(T(n) divided by L(n))

where:

F(e) = The equivalent noise exposure factor.

T = The period of noise exposure at any essentially constant level.

L = The duration of the permissible noise exposure at the constant level (from **T**ABLE D-12).

If the value of F(e) exceeds unity (1) the exposure exceeds permissible levels.

Because the action level is an 8-hour time-weighted average of 85 decibels measured on the A-scale, slow response, we will implement a monitoring program when this level is reached.

A sample computation showing an application of the formula is as follows.

An employee is exposed at these levels for these periods:

110 dBA	1/4	hour
100 dBA	1/2	hour
90 dBA	11/2	hours

F(e) = (1/4 divided by 1/2)+(1/2 divided by 2)+(1 1/2 divided by 8)

F(e) = 0.500+0.25+0.188

F(e) = 0.938

Since the value of F(e) does not exceed unity, the exposure is within permissible limits.

Definitions

There are certain words in our Hearing Conservation Program which are not used in everyday life. So that all may have a clearer understanding of this program, the below definitions are presented:

Action Level means an 8-hour time-weighted average of 85 decibels measured on the A-scale, slow response, or equivalently, a dose of fifty percent.

Attenuate means to lessen the intensity.

Audiogram means a chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

Audiologist means a professional, specializing in the study and rehabilitation of hearing, who is certified by the American Speech-Language-Hearing Association or licensed by a state board of examiners.

Baseline Audiogram means the audiogram against which future audiograms are compared.

Criterion Sound Level means a sound level of 90 decibels.

Decibel (dB) means a unit of measurement of sound level.

Dosimeter means an instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.

Hertz (HZ) means a unit of measurement of frequency, numerically equal to cycles per second.

Medical Pathology means a disorder or disease which should be treated by a physician specialist.

NIHL means a Noise Induced Hearing Loss.

Noise Dose means the ratio, expressed as a percentage, of:

a. the time integral, over a stated time or event, of the 0.6 power of the measured SLOW exponential time-averaged, squared A-weighted sound pressure and
b. the product of the criterion duration (8 hours) and the 0.6 power of the squared sound pressure corresponding to the criterion sound level (90 dB).

Otolaryngologist means a physician specializing in diagnosis and treatment of disorders of the ear, nose and throat.

Representative Exposure means measurements of an employee's noise dose or 8-hour time-weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.

Sound Level means ten times the common logarithm of the ratio of the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micro pascals. Unit: decibels (dB). For use with OSHA standard 29 CFR 1910.95, SLOW time response is required.

Sound Level Meter means an instrument for the measurement of sound level.

Time-Weighted Average means that sound level, which if constant over a SOUND LEVEL 8-hour exposure, would result in the same noise dose as is measured.

Noise Monitoring Procedures

Initially, the implementation of a noise monitoring program is the result of subjective reasoning by . Indications of excessive noise would include: actual information pertaining to specific machines, personal observation, complaints from employees, and noticed indications of hearing loss. It is requested that employees draw attention to work situations where there is an apparent loudness that possibly requires hearing protection.

The measure of a sound's strength is referred to as "sound level" and it is measured in units called "decibels" (dB).

To provide some idea of the loudness of 85 dB, the following comparisons are provided:

Sounds of:	**Approximate Decibels:**
Softest sound heard with normal hearing	0 dB
Ordinary speech at conversational distance	65 dB to 70 dB
Telephone dial tone	80 dB
Train whistle at 500 feet	90 dB
Power mower	107 dB
Jet engine at 100 feet	140 dB
Gun Shot	140 dB
Note: Sound levels above 80 dB may become uncomfortable; sound above 125 dB may be painful.	

Individual occupational sound exposures above 85 dB do not trigger the need for noise monitoring or a Hearing Conservation Program -- it is when the equivalent noise exposure factor exceeds unity. The two factors that cause occupational hearing loss are: 1) loudness and 2) the duration of time one is exposed to that loudness. **In spite of the above**, when information indicates employee exposure may equal/exceed the 8-hr. time-weighted avg. of 85 decibels, the monitoring program will be implemented to identify employees to be included in the hearing conservation program.

Hearing loss generally occurs over a lengthy period of time. Of course, as one would reasonably expect, acoustic trauma to your hearing can cause instant and permanent damage.

Our monitoring program is designed to identify:

a. Areas where feasible administrative controls may be implemented to reduce noise exposure. Example: shorter exposure times.
b. Areas where feasible engineering controls may be implemented to reduce noise exposure. Example: soundproofing.
c. Which employees should be included in our hearing conservation program.
d. The types of hearing protection to be used.

Noise monitoring equipment and procedures will be determined by employee mobility, variations in workplace sound levels, individual types of noise such as impact, impulse, or steady stream; and/or the noise type combinations.

Noise Level Monitoring

The monitoring equipment and procedures will be designed to determine the actual sound levels that reach the employee's ears and the length of time there is exposure to those levels.

Noise level monitoring is generally conducted by using a dosimeter, a sound level meter, or both. Because a sound level meter takes one measurement at one point in time, it is useful when sound is fairly constant, and the employee is not moving in and out of the noise area.

A dosimeter, on the other hand, stores sound level measurements and can produce an average noise exposure which can be calculated into an 8-hour time weighted average. When using a dosimeter in an area where employees are exposed to varying sound levels or they move in and out of the noise area, the dosimeter is actually worn, and the sound pick-up is placed close to the employee's ear to get an accurate measurement of the sound level exposure. Generally, a dosimeter is the best choice for the workplace.

Noise level monitoring results, as well as 29 CFR 1910.95, will be made available to affected employees and copies of these items be **posted** in the workplace.

Monitoring Plan

All continuous, intermittent and impulsive sound levels from 80 dB to 130 dB will be integrated into the noise measurements.

All instruments used to measure employee noise exposure will be calibrated to ensure measurement accuracy.

Representative personal sampling will be used, in lieu of area sampling, when there is high employee mobility, significant variations in sound levels, or a significant component of impulse noise.

Area sampling will be used when sound levels are relatively constant, and employees have a constant exposure to them.

When there is a change in workplace activity or equipment which would likely increase noise levels, additional monitoring will be undertaken.

a. All persons found to be exposed to sound levels at or above the action level will be notified.
b. Affected employees or their representatives will be allowed to observe the noise monitoring process.

Noise Level Monitoring Records

All noise level monitoring records will be kept for a period of two (2) years.

Audiometric Testing Program

Audiometric testing will be made available at no cost to affected employees.

When noise exposures reach the action level, **<u>8 hour time-weighted average of 85 dBA</u>**, the audiometric testing will be initiated.

Audiometric tests will be performed by a licensed or certified audiologist, otolaryngologist, physician, technician who is certified by the Council of Accreditation in Occupational Hearing Conservation, or who has satisfactorily demonstrated competence in administering audiometric examinations, obtaining valid audiograms, and properly using, maintaining, and checking calibration and proper functioning of the audiometers being used. A technician who operates microprocessor audiometers does not need to be certified. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist, or physician.

Baseline Audiogram

Within 6 months of an employee's first exposure at or above the action level, a valid baseline audiogram will be established against which subsequent audiograms can be compared. Hearing loss can occur as a result of age, trauma, drug reaction, and exposures that are not work related. However, with a baseline audiogram -- which measures the frequency (125 or 250 Hz to 8000 Hz) and loudness (-10 or 0 dB to 110 dB) -- it is possible from subsequent audiograms to determine with accuracy if hearing loss is due to occupational noise exposure or some other cause.

For the purposes of this program, audiograms must measure, in each ear, at least the frequencies of 500, 1000, 2000, 3000, 4000, and 6000 Hz.

Occupational hearing loss occurs within the inner ear in the cochlea. By using a bone-conduction vibrator, sounds can be carried directly to the inner ear and bypass the outside and middle ear areas.

An annual audiogram may be substituted for the baseline audiogram if the audiologist, otolaryngologist or physician who is evaluating the audiogram determines:

a. The standard threshold shift revealed by the audiogram is persistent.
b. The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

<u>Procedure</u>

To ensure an accurate test, employees must not be exposed to occupational noises for at least **<u>14 hours prior to the establishment of a baseline audiogram.</u>** To meet this requirement, if needed, hearing protectors may be worn during the preceding work shifts. This procedure is to factor out temporary hearing changes from the test.

Annual Audiogram

At least annually, after obtaining the baseline audiogram, a new audiogram will be obtained for each employee exposed at or above an 8-hour time-weighted average of 85 decibels. Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred. If a standard threshold shift has occurred, the employee will be notified **in writing within 21 days** of this determination.

A standard threshold shift would be a change in hearing of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

While audiograms may be compared by a technician, problem audiograms will be referred to an audiologist, otolaryngologist, or physician for further evaluation.

The person performing this evaluation will be provided the following:

a. A copy of this program including all standards.
b. The baseline audiogram and most recent audiogram of the employee to be evaluated.
c. Measurements of background sound pressure levels in the audiometric test room as required in Appendix D to 29 CFR 1910.95.
d. Records of audiometer calibrations.

Note: If the annual audiogram shows that an employee has suffered a standard threshold shift, the employee will be re-tested within 30 days and these results will be considered the annual audiogram.

If the physician determines that a standard threshold shift has occurred, the following steps will take place:

a. Those employees not using hearing protectors will wear them and be trained in their use and care.
b. Those employees using hearing protectors will be **re-evaluated and refitted** and provided with hearing protectors that offer greater attenuation. They will also be retrained using this program with emphasis on the need for hearing protection.
c. The employee will be referred for a clinical audiological evaluation or an otological examination if additional testing is necessary or if it is suspected that a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors.
d. The employee will be informed, **if necessary**, of the need for an **otological examination if a medical pathology of the ear** that is unrelated to the use of hearing protectors is suspected.

Audiometric Tests - Recordkeeping

Audiometric test records will be retained for the duration of the affected employees' employment.

These records will include:

a. The employee's name and job classification.
b. The date of the audiogram.
c. The examiner's name.
d. The date of the last acoustic or exhaustive calibration of the audiometer.
e. The employee's most recent noise exposure assessment.
f. Accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

Upon request, employees may have access to these records.

Hearing Protectors

At no cost, and replaced as necessary, hearing protectors will be provided to all employees exposed to an 8-hour time-weighted average of 85 dB or greater.

Ear protective devices inserted in the ear will be fitted or determined individually by competent persons.

Appropriate hearing protectors will be available in a variety of styles from which to choose to provide a comfortable fit and employees will be made aware of the proper use and care of the protectors selected.

In selecting appropriate hearing protectors, Tayla Millerick will consider the below factors:

a. The hearing protector's noise reduction rating (Subject Fit) [NRR(SF)].

   Note: The NRR(SF), measured in dB and found as a number on the hearing protector, can be used by subtracting that number from an A-weighted sound level or a time-weighted average noise exposure to determine the level of protection for most (84%) of the users.

   Note: The NRR(SF) is based on tests of continuous noise and may not be an appropriate indicator for protection against impulse or impact noise.

b. The user's daily equivalent noise exposure.
c. Variations in noise levels.
d. User preference.
e. Communication needs.
f. Hearing ability.
g. Compatibility with other safety equipment.
h. User's physical limitations.
i. Climate and other working conditions.
j. Replacement, care, and use requirements.

Training

Affected employees (those exposed to action level noise) will receive training in our Hearing Conservation Program and this training will be repeated annually. Training will be updated to be consistent with changes in the PPE and work processes. **An employee who is required to wear hearing protectors and fails to do so will be retrained** with emphasis on the needless and permanent damage to hearing caused by careless exposure to hazardous noises in the work environment.

Interactive training will include, but not be limited to:

a. The effects of noise on hearing.
b. The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, **fitting, use, and care.**
c. The purpose of audiometric testing and an explanation of the test procedures.
d. A review of the program including all appropriate standards.

Process of Hearing

Hearing involves, in its simplest terms, conducting sounds from outside your body to your brain. The ear is divided into three main sections:

a. EXTERNAL EAR — collects sounds and directs them to the tympanic membrane (ear drum).

<u>Major Components:</u>

- Pinna: the visible part of the ear.
- External auditory canal: approximately 1¼ inch tube to direct sound to the eardrum.
- Tympanic membrane: vibrates as it is hit with incoming sounds.

b. MIDDLE EAR — air filled space that connects outer ear to inner ear.

<u>Major Components:</u>

- Ossicles: three bones commonly called the "hammer", the "anvil", and the "stirrup". These bones collect the sound, amplify it, and transfer it to the fluid in the inner ear.
- Eustachian tube: small tube connected to the throat that brings air into the middle ear allowing pressure equalization of both sides of the ear drum.

c. INNER EAR — transfers sound vibrations to nerve impulses and sends them to the brain.

<u>Major Components:</u>

- Vestibule: helps maintain balance.
- Cochlea: takes vibrations of the middle ear bones and transfers them into nerve impulses that go the brain. The stirrup, in the middle ear, vibrates through a small opening in the cochlea. This opening is connected to fluid filled canals. The pressure waves in the fluid cause small hair type cells to bend. As they bend, they release a nerve impulse which is sent to the brain. The brain perceives these impulses as sound. This is where noise induced hearing loss occurs.
- Semicircular canals: involved with equilibrium (balance)
- Acoustic nerve:
    a. cochlear nerve: connects the cochlea to the brain.
    b. vestibular nerve: connects the semicircular canals to the brain.

Noise Induced Hearing Loss (NIHL)

Moderate exposure to loud noise (over 90 dB for one or more hours) may cause **reversible** changes within the inner ear such as: subtle intracellular changes in the hair cells or swelling of the auditory nerve endings. These temporary changes present themselves as temporary threshold shifts (TTS) 10 dB or more at various frequencies in either ear. This temporary hearing loss will go away within hours - 16-hours maximum.

How this loss may occur is as follows: continued sound may decrease the stiffness in the hair bundles at the top of the hair cells in the inner ear. This in turn would cause less vibration at a given sound level and an accompanying loss in hearing.

However, continued exposure to loud noise over time will result in permanent threshold shift (PTS) and the resultant permanent, **non-reversible** hearing loss.

Additionally, the most common cause of tinnitus (an annoying ringing in the ears) is damage to the ear from noise exposure resulting in hearing loss.

Because the loss of hearing is so gradual, so painless, so unnoticeable, there may be a tendency to not take hearing conservation seriously until it is too late and you have lost one of your major contacts with the world around you – your hearing.

Why bother with a Hearing Conservation Program? Why not just require hearing protectors at all times, in all situations?"

This misses the point. Your hearing – just as your sight, touch, and smell – is your means of contact and placement in the world around you. By wearing hearing protectors when not needed, you lessen your ability to hear and be in touch with your environment.

You certainly wouldn't want to save your hearing and lose your life because you didn't hear the warning "Watch out!", "Stop!" or you missed the sound of approaching danger.

Hearing Conservation Program Recordkeeping

The below records will be retained.

a. All noise level monitoring records.
b. All employee exposure measurements.
c. All employee audiometric test records which will include:
   1. The employee's name and job classification.
   2. The date of the audiogram.
   3. The examiner's name.
   4. The date of the last acoustic or exhaustive calibration of the audiometer.
   5. The employee's most recent noise exposure assessment.
   6. Accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

Record Retention:

The below records will be retained at least for the period indicated:

Noise exposure measurement records will be retained for two years.

Audiometric test records will be retained for the duration of the affected employee's employment.

Access to Records:

All the above records will be provided upon request to employees, former employees, representatives designated by the individual employee, and the Assistant Secretary.

Transfer of Records:

If we cease to do business, we will transfer to the successor employer all above records and the successor employer will retain them for the remainder of the period noted above.

Personal Protective Equipment - Respiratory Protection

29 CFR 1910.134 - Respiratory Protection

29 CFR 1910.134 App C - OSHA Respirator Medical Evaluation Questionnaire

Overview

The best respiratory protection one can have is clean, breathable air. Engineering controls are our first line of defense against contaminated or oxygen deficient air. These controls include, but are not limited to, using measures such as enclosure or confinement to keep atmospheric hazards away from employees, general or local ventilation to exhaust hazardous atmospheres, and/or substitution of less toxic materials to avoid hazardous atmospheres in the first place. When effective engineering controls are not feasible, or during the time frame they are being instituted, appropriate respirators will be used.

The concept of respiratory protection is quite simple. Certain types of atmospheric hazards are simply particles that can be filtered out of the air, through the use of an air-purifying respirator. Air-purifying respirators force the harmful particles into a filter specifically designed for the hazard(s) where they are trapped or absorbed. The air reaching the employee's lungs is essentially free of the hazard.

a. If the action of inhalation causes the ambient air to be sucked through the filter, the respirator is considered a negative pressure respirator.
b. If the ambient air is forced through the respirator filter (with a blower, for example), the respirator is considered a positive pressure respirator.

A respirator that removes harmful contaminants is of no value in an oxygen deficient (less than 19.5% oxygen) or oxygen enriched (more than 23.5 % oxygen) atmosphere.

An atmosphere-supplying respirator will be used in oxygen deficient atmospheres or in atmospheres where a filter cannot reduce the particulate hazard to an acceptable level. This type of respirator provides clean, breathable air from a source independent of the ambient atmosphere.

Different types of respirators provide different levels of protection. **Never** may an air-purifying respirator be substituted for a required atmosphere-supplying respirator.

Unfortunately, respiratory protection is more complicated than it first appears. Because of the variety and severity of respiratory hazards, the types of respirators and their limitations, the methods for fitting and testing, and, most importantly, the detrimental ramifications of respirator misuse, this respiratory protection program is required.

Proper respirator selection and use can prevent occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, and vapors. In atmospheres that are immediately dangerous to life or health, proper respirator selection and use will save your life.

When required, employees will be supplied appropriate respirators and all incidental costs associated with respirator use (fit testing, repair parts, filters, medical examinations, cleaning supplies, etc.) will be borne by the company.

Duties of the Program Administrator

Tayla Millerick, our Respiratory Protection Program Administrator, will keep abreast of developments in the respiratory protection field and ensure that our personnel are provided safe respiratory working conditions.

Additionally, will:

a. Measure, estimate, or review data on the concentration of airborne contaminants in the work area prior to respirator selection.
b. Select the appropriate type of respirator that will provide adequate protection from the airborne contaminants or provide clean, breathable air.
c. Maintain applicable records including:
    1. Fit test record
    2. Medical records
    3. Inspection records
    4. Evaluation records
    5. Training records

Definitions

There are a number of terms and phrases, not used in ordinary everyday life, which must be understood by affected employees.

Air-Purifying Respirator means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Atmosphere-Supplying Respirator means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or Cartridge means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand Respirator means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency Situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee Exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-Service-Life Indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-Only Respirator means a respirator intended to be used only for emergency exit.

Filter or Air-Purifying Element means a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering Facepiece (DUST MASK) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit Factor means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit Test means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual.

Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High Efficiency Particulate Air (HEPA) Filter means a filter that is at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately Dangerous to Life of Health (IDLH) means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Loose-Fitting Facepiece means a respiratory inlet covering that is designed to form a partial seal with the face.

Negative Pressure Respirator (Tight Fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen Deficient Atmosphere means an atmosphere with an oxygen content below 19.5% by volume.

Physician or Other Licensed Health Care Professional (PLHCP): an individual whose legally permitted scope of practice allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required medical evaluation.

Positive Pressure Respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered Air-Purifying Respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure Demand Respirator means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative Fit Test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative Fit Test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory Inlet Covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-Contained Breathing Apparatus (SCBA) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service Life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied-Air Respirator (SAR) or Airline Respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

Tight-Fitting Facepiece means a respiratory inlet covering that forms a complete seal with the face.

User Seal Check means an action conducted by the respirator user to determine if the respirator is properly sealed to the face.

Respirator Selection

Respirators will be selected on the basis of hazards to which the employee will be exposed. Using an inappropriate respirator is just as bad, if not worse, than using no respirator at all because it can evoke a false sense of security while offering no protection to the hazard at hand.

All respirators will be NIOSH approved.

Work area surveillance will be made by taking into consideration the actual work area conditions, the degree of exposure and employee stress.

Respirator selection will take into consideration the air quality, the contaminant, the amount of the contaminant, the time exposure to that contaminant, and the work area surveillance.

Oxygen-deficient atmospheres as well as atmospheres in which the respiratory hazard exposure cannot be determined are considered immediately dangerous to life or health and the use of one of the below listed respirators is required:

a. A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or
b. A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

Note: Respirators provided only for escape from IDLH atmospheres will be NIOSH-certified for escape from the atmosphere in which they will be used.

Generally, but not always, work area atmospheres that require respiratory protection are not IDLH and in these cases respirator selection offers more options. The respirator selected will be adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements under routine and reasonably foreseeable emergency situations. Of course, the respirator selected will be appropriate for the chemical state and physical form of the contaminant.

For protection against gases and vapors, the respirator provided will be:

a. Atmosphere-supplying.
b. Air-purifying, provided that:
    1. It is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or
    2. If there is no ESLI appropriate for conditions in respiratory hazard area, a change schedule for canisters and cartridges will be used that is based on objective data that will ensure that canisters and cartridges are changed before the end of their service life.

will rely on past experience and cartridge manufacturer recommendations. If the competent person on site or any respirator user notices that breathing becomes more strained, the change schedule will be modified.

For protection against particulates, the respirator provided will be:

a. Atmosphere-supplying; or
b. Air-purifying equipped with a filter certified by NIOSH under 30 CFR part 11 like a HEPA filter; or

    Note: Filters manufactured under 30 CFR part 11 standards may continue to be used, however, as of July 10, 1998, other than PAPR's, they are not to be purchased. Only 42 CFR part 84 type filters will be used.

c. Air-purifying equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

    Note: These respirators and filters, other than PAPR's are identified on the packaging with numbers that take the form: TC-84A-XXX.

    a. Filters will have an "N", "R", or "P" designation followed by "100", "99" or "95." Examples: N100 or R99
        1. "N" indicates the filter is for any solid or non-oil containing particulate contaminant.
        2. "R" indicates the filter is for any particulate contaminant. If used for an oil containing particulate, a one shift use limit applies.
        3. "P" indicates the filter may be used with any particulate contaminant.
    b. The number indicates the filter efficiency -- the higher the number, the more efficient. 100 = 99.97% efficiency; 99 = 99% efficiency; and 95 = 95% efficiency.
        1. Air-purifying equipped with any filter certified for particulates by NIOSH for contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers.

Often, the permissible exposure limit (PEL) and suggested respirator is listed on the Safety Data Sheet (SDS). Published exposure limits for the contaminant at hand will assist in determining respirator selection.

will select respirators based on:

a. The nature of the hazardous operation or process.
b. The type of respiratory hazard including permissible exposure limits.
c. The period of time for which respiratory protection must be worn.
d. The activities of workers in the hazardous area.
e. The respirator's characteristics, capabilities, and limitations.

Particulate Respirator Selection

Prior to respirator selection, the following factors must be known:

a. The identity and concentration of the particulates in the work area air.
b. The permissible exposure limit (PEL), the NIOSH recommended exposure limit (REL) or other occupational exposure limit.
c. The hazard ratio (HR). The (HR) is obtained by dividing the airborne particulate concentration by the exposure limit.
d. The assigned protection factor (APF) for the type of respirator to be used. The (APF) is the minimum anticipated level of protection provided by each type of respirator worn in accordance with an adequate respiratory protection program. For example, an APF of 10 means that the respirator should reduce the airborne concentration of a particulate by a factor of 10, or to 10% of the work area concentration.
e. The immediately dangerous to life or health (IDLH) concentration, including oxygen deficiency.

The APF should be greater than the HR and multiplying the occupational exposure limit by the APF gives the maximum work area concentration in which the respirator may be used.

All filters will have a 99.97% efficiency rating indicated by the number 100.

Service Life of Filters

If the selected filters have an end-of-service-life indicator (ESLI), the filters will be used until the indicator shows that it is time to be replaced.

In the absence of an ESLI, the following is the policy of Millerick Engineering, Inc. for service life of filters:

All HEPA filters manufactured under 30 CFR part 11 (for PAPR's) will be replaced at least daily (once each work shift) or if breathing resistance becomes excessive or if the filter suffers physical damage (tears, holes, etc.) If PAPR filters become available under 42 CFR part 84 standards, they will be used and fall under the below schedule:

All filters will be replaced whenever they are damaged, soiled, or causing noticeably increased breathing resistance.

N-series filters may be used and reused subject only to considerations of hygiene, damage, and increased breathing resistance. If the competent person determines the work area to be exceptionally dirty, the filters will be changed each work shift.

R-series filter will be changed every work shift if oil is present. If oil is not present, they may be used and reused subject only to considerations of hygiene, damage, and increased breathing resistance. If the competent person determines the work area to be exceptionally dirty, the filters will be changed each work shift.

P-series filters will be used and reused in accordance with the manufacturer's time-use limitations when oil aerosols are present.

P-series filters can be used and reused subject only to consideration of hygiene, damage, and increased breathing resistance if oil aerosols are not present.

Medical Approval for Respirator Use

Before respirator use – even before fit testing – it must be determined that one is physically capable to wear the type of respirator to be assigned. Wearing negative pressure respirators can place an increased strain on one's respiratory system, &, depending on the task and the environmental conditions (especially heat & cold), respirators can put an additional strain on your whole body. Prior to respirator use, an employee must have a medical examination. The actual medical tests, if any, depend on the hazards involved, the condition of the employee, & the judgment of the physician or other licensed health care professional (PLHCP). If respirators are used to prevent exposure to certain toxic & hazardous substances (for example, lead or asbestos), then additional medical tests & surveillance procedures are required appropriate for the hazard. A PLHCP will be identified to perform medical evaluations using the medical questionnaire with this program. The PLHCP will be given a copy of this program as well as the appropriate standards.

A follow-up medical examination will:

a. Be given to an employee who gives a positive response to any question among questions 1 - 8 in Section 2, Part A of Appendix C, or whose initial medical examination demonstrates the need for a follow-up medical examination.
b. Include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

The medical questionnaire & examinations will be given confidentially during normal working hours or at a time & place convenient to the employee. The employee will be given the opportunity to discuss the questionnaire & examination results with the PLHCP. The PLHCP will be provided the following information to be used in determining an employee's ability to use a respirator:

a. The type and weight of the respirator to be used by the employee.
b. The duration and frequency of respirator use.
c. The expected physical work effort.
d. Additional protective clothing and equipment to be worn.
e. Temperature and humidity extremes that may be encountered.

An annual review of medical status is not required, and additional medical evaluations are required only if:

a. An employee reports medical signs or symptoms that are related to ability to use a respirator.
b. a PLHCP, supervisor, or Tayla Millerick determines that the employee needs to be reevaluated.
c. Fit testing and work area program evaluation indicates a need.
d. A change occurs in work area conditions (e.g., physical work effort, protective clothing, and temperature) that may result in a substantial increase in the physiological burden placed on an employee.

A negative pressure respirator may place an undue burden on an employee's system and the PLHCP may recommend a PAPR be used instead. Medical records will be retained for 30 years. Once medical approval is received allowing the respirator use, fit testing may proceed. The employee will be provided with a copy of this determination.

Respirator Fit Test

There are various protocols for fit testing respirators and they can be found in 29 CFR 1910.134 App A. One (1) of the four (4) qualitative protocols listed below will be used:

Protocol/Fit Test Procedure	Appendix A to 29 CFR 1910.134
a. Isoamyl Acetate Fit Test Procedure	Paragraph B2 Paragraph B2(b)
b. Saccharin Solution Aerosol Fit Test Procedure	Paragraph B3 Paragraph B3(b)
c. BitrexTM Solution Aerosol Fit Test Procedure	Paragraph B4 Paragraph B4(b)
d. Irritant Smoke (Stannic Chloride) Fit Test Procedure	Paragraph B5 Paragraph B5(b)

The purpose of fit testing is to ensure that the respirator selected will actually do the job for which it was intended. Different manufacturers make different sizes of each model. Fit testing, following the OSHA approved protocols, will ensure that the specific make, model and size are appropriate for the user. An employee may only use the specific respirator(s) on which he/she has passed a fit test.

Eye glasses pose special problems when dealing with respirators. Normal eye glasses, while they do not interfere with the skin to facepiece seal of a ½ face respirator, will prevent a proper seal on a full face respirator and thus will not be worn. If glasses are needed, special adapters can be provided to hold lenses within the respirator.

Upon successful completion of respirator fit testing, a Record of Respirator Fit Test form will be completed and maintained with the employee's records. Only the latest fit test record need be retained. The Respirator Fit Test will be repeated at least annually or when:

a. A different respirator facepiece (size, style, model or make) is used.
b. There has been a weight change of at least 20 pounds.
c. There has been significant facial scarring in the area of the face piece seal.
d. There have been significant dental changes; i.e., multiple extractions without prosthesis or acquiring dentures.
e. Reconstructive or cosmetic surgery.
f. Any other condition that may interfere with facepiece sealing.

As explained in the protocols, the fit tests will not be conducted if there is any hair growth between the skin and the facepiece sealing surface. Further, there will not be mustaches that are so long as to interfere with the inlet or exhaust valves in the respirator. Of course, these requirements apply not only to fit testing procedures, but they also apply to actual on the job use where the seal between face and respirator must be maintained.

User Seal Check

A user seal check, performed in accordance with the manufacturer's instructions or 29 CFR 1910.134 App B, will be made prior to each use by the wearer of a tight-fitting respirator.

A user seal check is solely for respiratory protection of the employee and without this check there is no way of knowing if the selected respirator is actually working. Failure to perform a seal check may result in the use of a respirator which is of little or no value.

Hazard Communication & Emergency Procedures

One would not be wearing a respirator in the first place if there were not some detrimental health consequences of non-use. Often, these consequences are chronic (long term) and immediately unnoticeable.

If a respirator failure would lead to noticeable physical or mental impairment, then, in these situations, two (2) employees will be assigned in the same area and in view of each other. If one employee presents symptoms of physical or mental distress, the second employee will remove the first employee from the area. If there is not an immediate, total recovery, the affected employee will be provided medical care by emergency responders.

In the event work is being performed in an IDLH atmosphere, a safety harness and safety lines will be used so that the employee may be pulled to safety. Suitable rescue equipment will be available and a standby employee(s) with suitable self-contained breathing apparatus will be at the nearest fresh air base for emergency rescue.

All personnel should be aware of the appropriate SDS for the products they are working with, and particular attention should be given to acute and chronic health hazards; symptoms of overexposure; first aid measures; emergency procedures; and exposure limits.

Work Area Surveillance

The competent person at the work area where respirator use is required will maintain appropriate surveillance of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, Tayla Millerick or competent person will re-evaluate the continued effectiveness of the respirator.

Employees are to leave the respirator use area:

a. To wash their face and respirator facepiece as necessary to prevent eye or skin irritation associated with respirator use.
b. If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece.
c. To replace the respirator or the filter, cartridge, or canister elements.

Defective respirators will be repaired or replaced before returning to the respirator use area.

Air Quality

Atmosphere-supplying respirators, depending on the type (supplied-air or SCBA) use compressed air, compressed oxygen, liquid air or liquid oxygen. Compressed and liquid oxygen must meet the requirements of the United States Pharmacopoeia for medical or breathing oxygen. Compressed breathing air must meet the requirements of Grade "D" breathing air including: oxygen content (v/v) of 19.5-23.5%; hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less; carbon monoxide content of 10 ppm or less; carbon dioxide content of 1,000 ppm or less; and lack of noticeable odor. Compressed oxygen will not be used in supplied-air respirators or open circuit self-contained breathing apparatus that have previously used compressed air. Oxygen must never be used with airline respirators.

Breathing air may be supplied to respirators from cylinders or air compressors. If cylinders are used, they will be tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 178).

If a compressor is used for supplying breathable air by way of airline hoses to a respirator mask, it is a Type "C" system. The hose couplings used on these systems must not be compatible with any other gas systems. Breathable air -- not pure oxygen -- is used in these systems. All safety and standby devices will be maintained in working order such as alarms to warn of compressor failure or overheating. Compressors will be located so that contaminated air does not enter the system and suitable in-line filters will be installed. A receiver of sufficient capacity to enable the respirator wearer to escape from a contaminated atmosphere in the event of a compressor failure will be in place. If an oil lubricated system is used, it will have a high temperature and carbon monoxide alarm.

Cleaning, Inspection, and Maintenance

Respirators issued for the exclusive use of one worker will be cleaned and disinfected after each day's use or more often, if necessary. A respirator used by more than one person will be cleaned and disinfected after each use by the employee who used it. Cleaning should be done using the manufacturer’s recommendations or the guidelines in 29 CFR 1910.134 App B. Remove or protect the filters/cartridges before cleaning because moisture can defeat the effectiveness of a filter. During cleaning, an inspection of the respirator will be made to ensure it retains its original effectiveness. Valves, straps, canisters, elasticity, facepiece, if applicable, will be inspected per the manufacturer’s instructions. Defective parts will be replaced before reuse.

Employees who use respirators will be instructed in the replacement of parts as allowed by the manufacturer (such as valves and straps). Respirators that require a higher level of repair will be returned to the manufacturer. All replacement parts will be of the same manufacture as the respirator and all replacement parts will be NIOSH approved. Maintenance will be limited to replacing parts (straps, filters, valves, etc.) allowed by the manufacturer. Only respirators in 100% working order will be used.

Cleaning supplies and replacement parts will be provided at no cost. In the event a respirator is not used for thirty (30) days, it will be inspected by a competent person. Particular attention will be paid to SCBA apparatus and Type "C" connections. SCBA apparatus will be inspected monthly and air and oxygen cylinders will be fully charged according to the manufacturer’s instructions. All warning devices will be checked to ensure they are properly functioning.

Maintenance of Emergency/Unassigned Respirators

Emergency and unassigned respirators (respirators used by more than one person) will be cleaned and inspected for defects every thirty (30) days and after each use. Particular attention will be given to the elasticity of the respirator and ensuring that the respirator is defect free. Only the latest record of this inspection will be maintained. A tag showing the name of inspector, the date, and condition of the respirators will be attached to the respirator.

Storage of Respirators

Respirators will be stored in a convenient, clean, and sanitary location in such a manner as to protect them from dust, heat, sunlight, extreme cold, excessive moisture, and damaging chemicals. In the work area, a plastic bag can help protect a respirator from dust and moisture. Respirators will not be stored in lockers or tool boxes unless they are in cases or cartons. Respirators will be stored with the facepiece and exhalation valve resting in a normal position. This will also prevent the soft, pliable material of which respirators are made from setting in an abnormal position, changing shape, and reducing face to mask seal.

Program Evaluation

This Program will be evaluated on a continual basis and updated if the need arises. Reasons for upgrading would include new atmospheric hazards; new respiratory protection equipment; new or altered work procedures; the introduction of new engineering controls; the failure of employees to follow standard operating procedures.

Often, the effects of breathing contaminated atmospheres are chronic in nature and thus some employees may tend to become lax in using their respirators properly. Supervisors must be on alert for this tendency.

Employees must realize that they must use the provided respiratory protection in accordance with the instructions and training received.

Training

Training will be given by a competent person, prior to use, to ensure each affected employee can demonstrate knowledge of at least the following:

a. Why a respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator.
b. What the limitations and capabilities of the respirator are.
c. How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions.
d. How to inspect, put on and remove, use, and check the seals.
e. The procedures for maintenance and storage of the respirator.
f. How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators.
g. The general concepts of this program.

Retraining will be given annually and when:

a. Changes in the work area or the type of respirator render previous training obsolete.
b. Inadequacies in the employee's knowledge or use of the respirator indicate that the employee lacks the required understanding or skill.
c. A situation arises in which retraining appears necessary to ensure safe respirator use.

Dust Masks – Use of Respirators when Not Required

Tayla Millerick, or a competent person in the work area, will determine when respirator use is **required**. Dust masks may be used at any time to reduce annoying particles in the air in the work area.

An employee who wants to wear an actual respirator in the work area for comfort or an additional level of safety that is **not required** for health reasons according to standards, must obtain medical approval for respirator use according to the procedures outlined in this program.

Additionally, that employee should read this program (formal training is not required) and:

a. Read and heed all manufacturers' instructions on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.
b. Choose a respirator certified for use to protect against the contaminant of concern. The respirator must be NIOSH approved.
c. Not wear the respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. A respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
d. Not interchange the respirator with another employee.

Disposable Respirators:

OSHA requires that employees who voluntarily use disposable respirators in situations where respiratory protection is not specifically required by OSHA standard (in atmospheres where exposures are below the permissible exposure limit) essentially for personal comfort or additional, though not required, respiratory protection be informed of 29 CFR 1910.134 Appendix D.

All disposable respirators, such as Moldex, 3M, Wilson, North Safety, etc. must be marked with the manufacturer's name, the part number, the protection provided by the filter, and "NIOSH".

Disposable filters are actually negative pressure respirators. They protect the user by filtering particles out of the air breathed.

Though disposable filters cannot be fit-tested in the traditional sense, they must be fit-tested in accordance with the manufacturer's instructions.

Under no circumstances may any respirator other than the above disposable respirators be used without compliance with a respiratory protection program.

Standard Number: 1910.134 App D

Standard Title: (Mandatory) Information for Employees Using Respirators When not Required Under Standard.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, of if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard. You should do the following: 1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations. 2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you. 3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke. 4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]

Millerick Engineering, Inc.

Respiratory Protection Program Evaluation Form

The Respiratory Protection Program Administrator or a designated competent person will conduct job site and administrative evaluations to ensure the provisions of our respiratory protection program are being properly implemented. Discrepancies noted will be immediately corrected.

A random sampling of affected personnel addressed the below listed concerns and the responses are indicated below:

	Yes	No
Is the respiratory protection program understood?	☐	☐

Problem areas: ____________________

Corrective action: ____________________

____

	Yes	No
Do respirators fit without interfering with job performance?	☐	☐

Problem areas: ____________________

Corrective action: ____________________

____

	Yes	No
Are respirators being properly maintained?	☐	☐

Problem areas: ____________________

Corrective action: ____________________

____

	Yes	No
Are appropriate respirators selected for the hazard?	☐	☐

Problem areas: ____________________

Corrective action: ____________________

____

____ ____________

(Signature of Person performing evaluation) **(Date)**

Note: Retain only the latest evaluation.

Millerick Engineering, Inc.

Report of Medical Examination

____
(Date)

____
(Applicant's Name)

Job for which person is being examined: _____________________________

Reason for medical examination: Respirator use.

Type(s) of respirator to be used: _____________________________________

Atmospheric hazards for which the above respirators will be used:

____________________________ ___________________________

____________________________ ___________________________

Note: Circle the appropriate paragraphs and subparagraphs.

a. Based on the information available to me, it is my opinion that the above-named person may be placed in the job position with no restrictions in work assignments.

b. Based on all the information available to me, it is my opinion that the above-named person has a detected medical condition(s) or finding(s) which:
   1. Places this person or others at increased risk of material impairment of health from anticipated or potential occupational exposures or activities.
   2. May be aggravated by occupational exposures or activities.
   3. May interfere with safe and/or effective performance.
   4. Needs follow-up. This includes changes which may be with "normal limits" based on the current assessment and/or comparison with previous results. Based on available data, the casual relationship of these findings to occupational exposures appears to be positive/negative/ill defined.
   5. Other: (Explain)____

c. On the basis of the above, I recommend:
   1. No restrictions in work assignments for the above job.
   2. Restricted activities: (List)
      ____

1 of 2

3. Limited exposure: (Note) ______________________________

4. Special protective measures: (Note)______________________________

5. Medical follow-up: (Note) ______________________________

6 Limitation on the use of a negative pressure or air purifying respirator: (Explain) ______________________________

____

7. Other: (Note) ______________________________

d. I have advised the employee of any detected medical condition of finding which dictates further medical examination or treatment and have appropriate recommendations regarding medical follow-up and exposure. This will be documented in writing.

e. Additional comments: ______________________________

____

____

____

____

f I understand that a copy of this report will be given to the examinee by the person receiving it.

Date: ______________

____

(Physician's Signature)

____

(Address)

____

(City, State, ZIP)

____

Return this form to:

Millerick Engineering, Inc.
Christopher Millerick
PO Box 3338
Turlock, CA, 95381
2099857750

2 of 2

Millerick Engineering, Inc.

Medical Opinion for Respirator Use

____

(Date)

____

(Applicant's Name)

TO: Return this form to:
Millerick Engineering, Inc.
Christopher Millerick
PO Box 3338
Turlock, CA, 95381
2099857750

RE: Medical Opinion for Respirator Use

On this date, based on the employee medical questionnaire and/or further medical examination, the above-named applicant is found to be:

a. Eligible to use a respirator. ____
(Respirator type, i.e., ½ face; full face; PAPR; SCBA)

____
____
____

b. Eligible to use a respirator with the following restrictions:

____
____
____

(Respirator type, i.e., ½ face; full face; PAPR; SCBA)

c. Not eligible to use a respirator.

____

(Signature of physician or licensed healthcare professional)

____

(Typed or Printed Name)

____

(Street Address)

____

(City, State, ZIP)

Millerick Engineering, Inc.

Respirator Fit Test Summary

Name of Employee: ______________________

Date of Testing: ____________ Test Conducted By: ____________________

Respirator(s) Selected: __________________ ____________________

(Manufacturer) **(Model/Series)**

☐ Pass

__________________ ____________________

(Respirator Size) (NIOSH Certification #)

☐ Fail

Respirator(s) Selected: __________________ ____________________

(Manufacturer) **(Model/Series)**

☐ Pass

__________________ ____________________

(Respirator Size) (NIOSH Certification #)

☐ Fail

Respirator(s) Selected: __________________ ____________________

(Manufacturer) **(Model/Series)**

☐ Pass

__________________ ____________________

(Respirator Size) (NIOSH Certification #)

☐ Fail

Testing Agent (Protocol): Circle One

a. Isoamyl Acetate Protocol. (Banana Oil)
b. Saccharin Solution Aerosol Protocol. (Saccharin Taste)
c. BitrexTM Solution Aerosol Protocol (Denatonium Benzoate)
d. Irritant Smoke Protocol. (Irritant Smoke)

Signature of Person Conducting the Test: ______________________________

Signature of Employee: ____

The Respirator Fit Test will be repeated at least annually or when:

a. a different respirator facepiece (size, style, model or make) is used.
b. there has been a weight change of at least 20 pounds.
c. there has been significant facial scarring in the area of the face-piece seal.
d. there has been significant dental changes; i.e., multiple extractions without prosthesis or acquiring dentures.
e. reconstructive or cosmetic surgery.
f any other condition that may interfere with facepiece sealing.

Millerick Engineering, Inc.

Record of Inspection
EMERGENCY/UNASSIGNED RESPIRATORS

All emergency and unassigned respirators were inspected and cleaned on the date indicated. Any defects found were corrected or the respirator was removed from service. This inspection was performed after each use and/or monthly.

DATE	SIGNATURE OF INSPECTOR	NOTES

Note: Only the latest record must be retained.

Prevention of Heat and Cold Stress

Prevention of Cold Stress

Cold related work illness is a real threat to employees at Millerick Engineering, Inc. who work outside during months of cold weather. In order to lessen this threat, this program has been prepared.

All current employees will be given instruction in this program prior to working outside where the possibility of frostbite and hypothermia exist.

On days when applicable environmental conditions exist (**temperatures or wind chill factors equal to or less than 30 degrees F**), the site supervisor will, before the morning shift starts, remind workers of the danger of frostbite and hypothermia, the procedures to lessen its impact, and, in the worst case, the procedure for medical response.

All persons should recognize the symptoms of cold related illness.

Frostbite

Sensations of coldness; tingling, stinging or aching feeling of the exposed area followed by numbness of ears, fingers, toes, cheeks, and noses. Frostbitten areas appear white and cold to the touch.

Seek medical assistance immediately.

Frostbitten parts should be covered with dry, sterile gauze or soft, clean cloth bandages.

Do not massage frostbitten tissue.

Take measures to prevent further cold injury.

General Hypothermia

Shivering, an inability to do complex motor functions, lethargy, and mild confusion.

Conserving remaining body heat.

Providing additional heat sources.

Seek medical assistance for persons.

Severe Hypothermia

Unresponsive and not shivering.

Seek medical attention immediately.

Reduce heat loss by:

a. Obtaining shelter.
b. Removal of wet clothing.
c. Adding layers of dry clothing, blankets, or using a pre-warmed sleeping bag.

The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds, dampness and cold water. Wind chill, a combination of temperature and velocity, is a crucial factor to evaluate when working outside. For example, when the actual air temperature of the wind is 40°F (4°C) and its velocity is 35 mph, the exposed skin receives conditions equivalent to the still-air temperature being 11°F. A dangerous situation of rapid heat loss may arise for any individual exposed to high winds and cold temperatures.

The purpose of this program is to take definitive measures prior to the onset of cold related illnesses so that medical response will not be necessary. If the above conditions do present themselves, the supervisor, who will always have access to a mobile phone, will follow our standard emergency procedures.

Definitive measures to prevent cold related illness include:

a. Personal protective clothing is the most important step in fighting the elements is providing adequate layers of insulation from them. Wear at least three layers of clothing:
    1. An outer layer to break the wind and allow some ventilation (like Gore-Tex® or nylon);
    2. A middle layer of wool or synthetic fabric (Quallofil or Pile) to absorb sweat and retain insulation in a damp environment. Down is a useful lightweight insulator; however, it is ineffective once it becomes wet.
    3. An inner layer of cotton or synthetic weave to allow ventilation.

    Pay special attention to protecting feet, hands, face, and head. Up to 40% of body heat can be lost when the head is exposed. Footgear should be insulated to protect against cold and dampness. Keep a change of clothing available in case work garments become wet.
b. Engineering controls help reduce the risk of cold-related injuries.
    1. Use an on-site source of heat, such as air jets, radiant heaters, or contact warm plates.
    2. Shield work areas from drafty or windy conditions.
    3. Provide a heated shelter for employees who experience prolonged exposure to equivalent wind-chill temperatures of 20° F or less.
    4. Use thermal insulating material on equipment handles when temperatures drop below 30° F.
c. Safe work practices, such as changes in work schedules and practices, are necessary to combat the effects of exceedingly cold weather. Possible workable safe practices include:
    1. Allowing a period of adjustment to the cold before embarking on a full work schedule.
    2. Permitting employees to set their own pace and take extra work breaks when needed.
    3. Reducing, as much as possible, the number of activities performed outdoors. When employees must brave the cold, select the warmest hours of the day and minimize activities that reduce circulation.
    4. Ensuring that employees remain hydrated.
    5. Establishing a buddy system for working outdoors.
    6. Educating employees to the symptoms of cold-related stresses - heavy shivering, uncomfortable coldness, severe fatigue, drowsiness, or euphoria.

Provision of Water

Employees will have access to adequate quantities of potable drinking water.

Where the supply of water is not plumbed or otherwise continuously supplied, water will be provided in sufficient quantity.

Supervisor will provide frequent reminders to employees to drink frequently, and, if needed, more water breaks will be provided.

Drinking water will be dispensed in containers with a tight sealing lid and labeled as Drinking Water. Drinking water containers are to be cleaned daily. Water containers will be placed as close as possible to the workers.

Supervisors will monitor water consumption and water supply and ensure adequate levels are available to last the whole shift.

Disposable/single use drinking cups will be provided to employees.

Supervisors will remind employees that personal military style canteens may be worn containing water. In cold weather conditions, employees are encouraged to drink warm, sweet beverages (sugar water, sports-type drinks). They should avoid drinks with caffeine (coffee, tea, or hot chocolate). Employees are cautioned, however, that sharing water from a personal canteen is forbidden and, because of the health hazard to the user and the person with whom it is shared, disciplinary action will be taken against both employees if they drink out of the same container. This disciplinary action will be documented using our disciplinary enforcement form.

Training

All employees will read this program and be given interactive training in its provisions. A copy of this program will be kept at the work area during applicable periods of cold weather.

All supervisors will read the below informational items prior to utilization of this program and have an opportunity for discussion and clarification with Christopher Millerick, our Safety Director.

OSHA Cold Stress QuickCard 3156

Prevention of Heat Stress

Heat related work illness is a real threat to employees at Millerick Engineering, Inc. who work outside during months of high heat and humidity. In order to lessen this threat, this program has been prepared.

All current employees will be given instruction on this program prior to working in heat illness inducing environments or other severe environmental conditions.

On days when applicable environmental conditions exist - periods of hot weather (equal to or greater than 85ºF and 40% Relative Humidity) -the site supervisor will, before the morning shift starts, remind workers of the danger of heat illness, the procedures to lessen its impact, and, in the worst case, the procedure for medical response.

All persons should recognize the symptoms of heat related illness.

Heat Exhaustion

Fatigue; weakness; profuse sweating; normal temperature; pale clammy skin; headache; cramps; vomiting; fainting

Remove from hot area.

Have victim lie down and raise feet.

Apply cool wet cloths.

Loosen or remove clothing.

Allow small sips of water if victim is not vomiting.

Heat Stroke

Dizziness; nausea; severe headache; hot dry skin; confusion; collapse; delirium; coma and death

Call for immediate medical assistance.

Remove victim from hot area.

Remove clothing.

Have victim lay down.

Cool the body (shower, cool wet cloths)

Do not give stimulants.

The purpose of this program is to take definitive measures prior to the onset of heat exhaustion and heat stroke so that medical response will not be necessary. If the above conditions do present themselves, the supervisor, who will always have access to a mobile phone, will follow our standard emergency procedures.

Definitive measures to prevent heat related illness include:

a. Provision of water
b. Provision of shade
c. Provision of rest (recovery period)
d. Modified work procedures

Provision of Water

Water is a key preventive measure to minimize the risk of heat related illnesses. Employees will have access to adequate quantities of potable drinking water.

Where the supply of water is not plumbed or otherwise continuously supplied, water will be provided in sufficient quantity at the beginning of the work shift to provide about one quart per employee per hour for drinking for the entire shift.

Every morning during conditions where this program is applicable, there will be short tailgate meetings to remind workers about the importance of frequent consumption of water throughout the shift.

Supervisors or a designated person will monitor water supply and ensure adequate levels are available to last the whole shift. Water consumption will be monitored at a regular interval that is based on daily conditions, for example, higher temperatures require more frequent checks. Employees are encouraged to report bad tasting water or low levels of water immediately so the situation can be corrected.

Supervisors will provide frequent reminders to employees to drink water, and, if needed, more water breaks will be provided. During extreme conditions, the supervisor will require workers to take a water break at a predetermined interval based on daily conditions.

When water dispensers are used, the container will have a tight-sealing lid and be labeled as Drinking Water. Drinking water containers are to be cleaned daily. Water containers will be placed as close as possible to the workers.

Disposable/single use drinking cups will be provided to employees when necessary.

Supervisors will remind employees that personal military style canteens may be worn containing water. Employees are cautioned, however, that sharing water from a personal canteen is forbidden and, because of the health hazard to the user and the person with whom it is shared, disciplinary action will be taken against both employees if they drink out of the same container. This disciplinary action will be documented using our disciplinary enforcement form.

As a reminder of the importance of water to the human system, the following information is supplied:

<u>Fluids</u>

If you heard in advance that this safety meeting was on fluids, you may well have thought that the meeting would focus on the storage, use, clean-up, and possible emergency procedures involved with the liquid chemical products used on or near work areas. You'd be wrong. While the above are important topics and questions related to them should be addressed to the competent person, this safety meeting is about **your** bodily fluids.

From a safety standpoint, you must not neglect your need for potable (drinkable) fluids. Water is not only the most abundant of all compounds found on the earth, it is the most abundant part of you – actually about 65% of you is water.

Drink fluids! From a life process standpoint, what fluid intake is doing is keeping you healthy by allowing your body to maintain its core body temperature at its appropriate level. When your brain senses that cooling action is needed, your body circulates blood to your skin to allow it to cool with the outside temperature. If the water used for sweat is not replaced, a water deficit starts to occur. The millions of chemical reactions taking place in your body at every moment can only occur in the presence of water. The fluids in your body transport nourishment, gases, and waste.

Imagine your body as a water based chemical factory that functions only within a narrow temperature range. An average, healthy person, at rest, has an oral temperature of between 98.6º F and 100.4º F. If your body temperature reaches 105.8º F, convulsions may occur. Your whole central nervous system is impaired when your body temperature raises 9º F above normal. At 106.0º F, the thermoregulatory center in your brain fails and, because of damage to your central nervous system, the sweating (cooling) mechanism cuts off when you need it most. It is a vicious circle, the hotter you get, the more heat you generate through metabolism. In fact, at 107.6º F, cellular metabolism is 50% higher than at normal temperatures.

Without getting too graphic, here are some of the problems associated with extreme water loss: cells will shrink; the skin will lose its elasticity; skin and mucous membrane cells will dry out;

eyeballs will become soft; weight loss will occur; the body temperature will rise; apprehension, restlessness, and even coma may occur; urine will become concentrated; renal shutdown will occur; red blood cells will shrink; **death**.

Stay healthy! Drink water! Water is truly the stuff of life.

Provision of Shade

The supervisor will ensure that employees have access to shade to minimize the risk of heat related illnesses. If natural shade is not available, the supervisor will ensure that sun umbrellas or portable canopies are provided in adequate number. These umbrellas or canopies will be place in close proximity to the work activity (i.e., no more than 50-100 yards).

Ideally, if available, employees will be allowed to get out of the sun by entering an air-conditioned structure such as a building or job trailer. This not only provides shade, it provides a cool, less humid, atmosphere. Any employee who feels the need for shade will protect himself/herself from the sun for a period of not less than 5 minutes.

Lastly, but importantly, persons must provide personal shade in the form of shirts (preferably light colored to reflect the sun). Shirts are required to prevent sunburn, another health hazard.

Provision of Rest (Recovery Period)

While shade and rest often go hand in hand, they are two distinct activities. Any employee who, due to heat, humidity, or exertion under the provisions of this program, may rest for a period of not less than 5 minutes if that employee believes a preventative recovery period is required.

Modified Work Procedures

The supervisor will make every effort, consistent with our effort to properly perform our job tasks, to modify work procedures. A few examples would include performing work requiring heavy exertion during the cooler hours of the day, assigning more persons to a job task to lessen the effort required of each, and the use of machinery in lieu of physical effort.

All employees, but new employees in particular, should be allowed to acclimate to hotter weather. It takes a body four to fourteen days to acclimate to hotter weather. Reduced workloads and careful attention to new employees may be required.

Training

All employees will read this program and be given interactive training in its provisions. A copy of this program will be kept at the work area during applicable periods of heat and humidity.

All supervisors may wish to read the below informational items prior to utilization of this program and have an opportunity for discussion and clarification with Christopher Millerick, our Safety Director.

The American Red Cross Health & Safety Tips, Heat Related Illness

CAL OSHA Heat Illness Prevention etool

Scaffolds

29 CFR 1926.450 - Scope, Application and Definitions Applicable to this Subpart
29 CFR 1926.451 - General Requirements
29 CFR 1926.452 - Additional Requirements Applicable to Specific Types of Scaffolds
29 CFR 1926.454 - Training Requirements
29 CFR 1926 Subpart L App A - Scaffold Specifications
29 CFR 1926 Subpart L App D - List of Training Topics for Scaffold Erectors and Dismantlers
29 CFR 1926 Subpart L App E - Drawings and Illustrations

Overview

Scaffolds are everyday items on most construction sites and their use presents specific hazards – the most common being electrical shock, falls, and falling objects. This program addresses these hazards and provides safety rules for the use of this type of equipment.

Affected individuals must be aware of the specific hazards applicable to their work situation and the proper safety procedures for avoiding these hazards.

All scaffold applications require knowledge of: equipment inspection, load capacities, ground conditions, effects of weather, fall protection, potential electrical hazards, and protection from falling objects. It is expected that all personnel understand how to perform work in a safe manner while on a scaffold, recognize unsafe work situations, and effectively deal with them. If you are aware of a scaffold hazard (or any safety hazard), immediately bring it to the attention of your immediate Supervisor or the competent person on the job site.

Scaffold Safety

A scaffold, by definition, is any temporary elevated platform and its supporting structure used for supporting employees or materials or both. Because of the numerous types of scaffolds, the infinite possible combinations of uses, the various surface features on which the scaffold may rest, and the varying conditions in which scaffolds may be used, it would be impossible to detail what to do in every situation. The goal of any safety program – including scaffold safety – is to eliminate the possibility of harm to employees while they are performing their duties.

Only safety harnesses, not belts, will be used in fall protection.

Leading causes for scaffold accidents and injuries are plank slippage, being struck by falling objects, and the actual collapse of the support structure or plankage.

Definitions

There are a number of terms and phrases which must be understood by all employees when dealing with scaffolds. Below are listed important definitions to aid in the understanding of this Program, however they are not all-inclusive. A complete list of definitions, including the many types of scaffolds and their individual components is found in 29 CFR 1926.450.

Body Harness means a design of straps which may be secured about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders with means for attaching it to other components of a personal fall arrest system.

Competent Person means one who is capable of identifying existing and predictable hazards in the surrounding or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Exposed Power Lines means electrical power lines which are accessible to employees and which are not shielded from contact. Such lines do not include extension cords or power tool cords.

Failure means load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Guardrail System means a vertical barrier consisting of, but not limited to, toprails, midrails, and posts erected to prevent employees from falling off a scaffold platform or walkway to lower levels.

Landing means a platform at the end of a flight of stairs.

Lifeline means a component consisting of a flexible line that connects to an anchorage at one end to hang vertically (vertical lifeline), or that connects to anchorages at both ends to stretch horizontally (horizontal lifeline), and which serves as a means for connecting other components of a personal fall arrest system to the anchorage.

Lower Levels means areas below the level where the employee is located and to which an employee can fall. Such areas include, but are not limited to, ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, materials, water, and equipment.

Maximum Intended Load means the total load of all persons, equipment, tools, materials, transmitted loads, and other loads reasonably anticipated to be applied to a scaffold or scaffold component at any one time.

Open Sides and Ends means the edges of a platform that are more than 14 inches away horizontally from a sturdy, continuous, vertical surface (such as a building wall) or a sturdy, continuous, horizontal surface (such as a floor), or a point of access. Exception: For plastering and lathing operations, the horizontal threshold distance is 18 inches.

Personal Fall Arrest System means a system used to arrest an employee's fall. It consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or combinations of these.

Platform means a work surface elevated above lower levels. Platforms can be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms.

Qualified Person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

Rated Load means the manufacturer's specified maximum load to be lifted by a hoist or to be applied to a scaffold or scaffold equipment.

Scaffold means any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage) used for supporting employees or materials or both.

Unstable Objects means items whose strength, configuration, or lack of stability may allow them to become dislocated and shift and therefore may not properly support the loads imposed on them. Unstable objects do not constitute a safe base support for scaffolds, platforms, or employees. Examples include, but are not limited to, barrels, boxes, loose brick, and concrete blocks.

Guidelines for Scaffold Use

<u>All Scaffolds:</u>

Employees who work on any type of scaffold must follow the below listed guidelines:

a. Scaffolds and scaffold components will not be loaded in excess of their maximum intended loads or rated capacities, whichever is less.
b. Scaffolds and scaffold components will be inspected for visible defects by a competent person before each work shift and after any occurrence which could affect a scaffold's structural integrity.
c. Damaged or weakened parts will be immediately replaced.
d. Scaffolds will be erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffold erection, moving, dismantling, or alteration. Such activities will be performed only by experienced and trained employees selected for such work by the competent person.
e. Work on or from scaffolds is prohibited during storms or high winds unless a competent person has determined that it is safe for employees to be on the scaffold and these employees are protected by a personal fall arrest system or wind screens.
f. Personnel may not work on scaffolds covered with snow, ice or other slippery material except to remove the material with extreme care.
g. Where swinging loads are being hoisted onto or near scaffolds such that the loads might contact the scaffold, tag lines or equivalent measures to control the loads will be used.
h. Debris will not be allowed to accumulate on platforms.
i. Make-shift devices on top of scaffold platforms will not be used to increase the working level height of employees.
j. Guardrails should have smooth surfaces to prevent puncture, laceration, or snagging injuries.
k. Make-shift parts will not be used. A nail is not a substitute for a pin.
l. Toprails must be between 68 inches and 45 inches.
m Toprails must be capable of withstanding at least 200 lbs. of downward or horizontal force.

n. Midrails must be approximately midway between the top edge of the guardrail system and the platform surface.
o. Midrails must be capable of withstanding 150 lbs. of downward or horizontal force.
p. Toeboards must run the entire length on the scaffolding and be at least 3 ½ inches high.
q. Toeboard will be solid or have openings 1 inch or less.

Supported Scaffolds:

Employees who work on supported scaffolds must follow the below listed rules and guidelines. These guidelines cover most, but not all situations. The competent person will address unusual situations.

a. Each platform unit on all working levels of a scaffold will be fully planked or decked between the front uprights and the guardrail supports and each platform unit will be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide (where feasible.)
b. Supported scaffolds must have a height to base (including outrigger supports, if used) width ratio of no more than 4:1 unless restrained from tipping by guying, tying, bracing, or equivalent means. The competent person will direct the procedures for prevention of tipping.
c. Supported scaffold poles, legs, posts, frames, and uprights must rest on **base plates AND** mud sills or other adequate firm foundation.

   Note: Base plates must always be used on supported scaffolds

   1. Footings must be level, sound, rigid, and capable of supporting the loaded scaffold without settling or displacement.
   2. Unstable objects cannot be used to support scaffolds or platform units.
   3. Unstable objects will not be used as working platforms.
   4. Front-end loaders and similar pieces of equipment will not be used to support scaffold platforms unless they have been specifically designed by the manufacturer for such use.
   5. Forklifts will not be used to support scaffold platforms unless the entire platform is attached to the fork and the forklift is not moved horizontally while the platform is occupied.
d. Supported scaffold poles, legs, posts, frames, and uprights will be plumb and braced to prevent swaying and displacement.
e. Scaffolds will not be moved horizontally while employees are on them unless they have been designed by a registered professional engineer specifically for such movement or, in the case of mobile scaffolds:
   1. The surface on which the scaffold is being moved is within 3 degrees of level and free of pits, holes, and obstructions.
   2. The height to base width ratio of the scaffold during movement is two to one or less.
   3. Outrigger frames, when used, are installed on both sides of the scaffold.
   4. When power systems are used, the propelling force is applied directly to the wheels and does not produce a speed in excess of 1 foot per second.
   5. No employee is on any part of the scaffold which extends outward beyond the wheels, casters, or other supports.
   6. Before the scaffold is moved, each employee on the scaffold must be made aware of the move.

<u>Suspended Scaffolds:</u>

Employees who work on suspended scaffolds must follow the below listed rules and guidelines. These guidelines cover most, but not all situations. The competent person will address unusual situations.

a. All suspension scaffold devices will rest on surfaces capable of supporting at least 4 times the load imposed on them by the scaffold operating at the rated load of the hoist (or at least 1.5 times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater).
b. Direct connections on suspension scaffolds must be evaluated before use by a competent person who will confirm that the supporting surfaces are capable of supporting the loads to be imposed.
c. Counterweights will be made of non-flowable material. Sand, gravel and similar materials that can be easily dislocated may not be used as counterweights.
   1. Only items specifically designed as counterweights will be used as counterweights. Construction material will not be used as counterweights.
   2. Counterweights will not be removed from an outrigger beam until the scaffold is disassembled.
d. The use of repaired wire rope as suspension rope is prohibited.
e. Wire ropes will not be joined together except through the use of eye splice thimbles and secured by eye splicing or equivalent means.
f. Wire ropes will be inspected for defects by a competent person prior to each work shift and after every occurrence which could affect a wire rope's integrity. Wire ropes will be **replaced** if any of the following conditions exist:
   1. Any physical damage which impairs the function and strength of the rope.
   2. Kinks that might impair the tracking or wrapping of rope around the drum(s) or sheave(s).
   3. Six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay.
   4. Abrasion, corrosion, scrubbing, flattening or peeling causing loss of more than one third of the original diameter of the outside wires.
   5. Heat damage caused by a torch or any damage caused by contact with electrical wire.
   6. Evidence that the secondary brake has been activated during an overspeed condition and has engaged the suspension rope.
g. Gasoline-powered equipment and hoists will not be used on suspension scaffolds.
h. Gears and brakes of power-operated hoists used on suspension scaffolds will be enclosed.
i. Manually operated hoists will require a positive crank force to descend.

Guidelines for the Control of Electrical Hazards

To prevent the possibility of electrical shock, neither the scaffold nor any conductive material handled on the scaffold will come closer to exposed and energized power lines as noted below:

INSULATED POWER LINES		
Voltage	Minimum Distance	Alternatives
Less than 300 volts	3 feet	
300 volts to 50 kV	10 feet	
More than 50 kV	10 feet plus 0.4" for each 1 kV over 50 kV	2 X's the length of the line insulator, but never less than 10 feet

UNINSULATED POWER LINES		
Voltage	Minimum Distance	Alternatives
Less than 50 kV	10 feet	
More than 50 kV	10 feet plus 0.4" for each 1 kV over 50 kV	2 X's the length of the line insulator, but never less than 10 feet

Scaffolds may be closer to power lines if it is necessary to accomplish the work, but only after the utility company or electrical system operator has been notified of the need to work closer, and the utility company or electrical system operator has de-energized or relocated the lines or installed protective coverings to prevent accidental contact with the lines.

When using 110-volt electrical power tools or lights, ground fault circuit breakers must be used. Electrical extension cords must be inspected for cuts or cracks in the insulation before use.

Guidelines for the Control of Fall Hazards

Each employee working on a scaffold more than 10 feet above a lower level must be protected from falling to that lower level as noted below:

SCAFFOLD TYPE	FALL PROTECTION REQUIREMENTS
Boatswains' Chair, Catenary Scaffold, Float Scaffold, Needle Beam Scaffold, Ladder Jack Scaffold	Personal Fall Arrest System
Single-Point Adjustable, Suspension Scaffold, and a Two-Point Adjustable Suspension Scaffold	Personal Fall Arrest System and a *Guardrail System
Crawling Board (Chicken Ladder)	Personal Fall Arrest System; *Guardrail System or a ¾" diameter grabline or equivalent handhold securely fastened beside each crawling board.
Self-Contained Adjustable Scaffold	*Guardrail System when the platform is supported by the frame structure; by both a Personal Fall Arrest System and a *Guardrail System when the platform is supported by ropes.
Walkway Located within a Scaffold	*Guardrail System installed within 9½" of and along at least one side of the Walkway.
Supported Scaffolds used while performing Overhand Bricklaying	Personal Fall Arrest System or a *Guardrail System (except at the side next to the wall being laid.)
All Other Scaffolds not specified above	Personal Fall Arrest System and a *Guardrail System
*Guardrail Systems must have a minimum 200 pound toprail capacity.	

Special Precautions for the Prevention of Falling

Planking Requirements:

Plank slippage causes falls and falls cause injuries. Below are requirements for platforms and/or planks used on scaffolds and walkways:

a. Each platform unit (e.g., scaffold plank, fabricated plank, fabricated deck, or fabricated platform) will be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch wide.
    1. Exceptions to the above:
        i. When a wider space is necessary (for example, to fit around uprights when side brackets are used to extend the width of the platform). In this instance, the platform must be planked or decked as fully as possible and the remaining open space between the platform and the uprights will not exceed 9½", or
        ii. When planking or decking is used solely for walkways or solely for use by personnel erecting or dismantling the scaffold. In these instances, only the planking the competent person establishes as necessary to provide safe working conditions is required.

b. Each scaffold platform and walkway will be at least 18 inches wide.
    1. Exceptions to the above:
        i. Each ladder jack scaffold, top plate bracket scaffold, roof bracket scaffold, and pump jack scaffold will be at least 12 inches wide.
        ii. There is no minimum width for boatswain's chairs.
        iii. Where working areas are so narrow that platforms and walkways cannot be at least 18 inches wide, the platforms and walkways will be as wide as feasible. In these instances, personnel will be protected from fall hazards by the use of guardrails and/or personal fall arrest systems regardless of the height.

c. The front edge of all platforms will not be more than 14 inches from the face of the work unless guardrail systems are erected along the front edge and/or fall arrest systems are used.
    1. Exceptions to the above:
        i. For outrigger scaffolds, the maximum distance from the face of the work will be 3 inches.
        ii. For plastering and lathing operations, the maximum distance from the face of the work will be 18 inches.

d. Each end of a platform unless cleated or otherwise restrained by hooks or equivalent means, will extend over the centerline of its support by at least 6 inches and not more than:
    1. Twelve (12) inches for a platform 10 feet or less in length unless the platform is designed and installed so that the cantilevered* portion of the platform is able to support personnel and/or material without tipping or has guardrails which block access to the cantilevered end.
    2. Eighteen (18) inches for a platform greater than 10 feet in length unless it is designed and installed so that the cantilevered* portion of the platform is able to support personnel without tipping or has guardrails which block access to the cantilevered end.

    Note: Cantilevered portion of the platform is the portion of the platform which extends beyond the support by 12 or 18 inches.

e. On scaffolds where scaffold planks are abutted to create a long platform, each abutted end will rest on a separate support surface. The use of common support members such as “T” sections to support abutting planks or hook-on platforms designed to rest on common support is acceptable.

f. 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 together or otherwise restrained to prevent movement.

g. At points of a scaffold where the platform changes direction, such as turning a corner, any platform that rests on a bearer at an angle other than a right angle will be laid first; platforms which rest at right angles over the same bearer will be laid second on top of the first platform.

h. With the exception that the edges may be marked for identification, wood platforms will not be covered with opaque finishes. Platforms may be coated with wood preservatives, fire-retardant finishes, and slip-resistant finishes as long as the coatings allow the actual wood to be seen. This is so the wood platforms may be inspected for damage and/or deterioration.

i. Scaffold components manufactured by different manufacturers cannot be intermixed unless the components fit together without force and the scaffold’s structural integrity, as determined by a competent person, is maintained.

j. 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 below acceptable levels.

Fall Protection during Erection & Dismantling of Supported Scaffolds

Supported Scaffolds: The competent person must determine the feasibility and safety of providing fall protection for employees erecting and dismantling supported scaffolds.

Suspended Scaffolds: Fall protection for those erecting and dismantling suspended scaffolds is possible because the anchorage points used for supporting the scaffold would certainly support a fall protection system. Therefore, fall protection will be utilized for personnel erecting or dismantling suspended scaffolds.

Guidelines for the Control of Falling Objects

All personnel working on a scaffold must wear hard hats. Further protection from falling objects will be provided, if needed, by toeboards*, screens, or guardrail systems; or through the erection of debris nets, catch platforms, or canopy** structures that contain or deflect the falling objects.

Objects that are too heavy or massive to be prevented from falling by the above measures will be kept away from the edge of the scaffold and secured as necessary to prevent their falling.

Where there is a possibility of falling objects (tools, materials, or equipment), the below safeguards must be implemented:

a. The area below the scaffold to which objects can fall will be barricaded and employees will not be permitted to enter the hazard area, **or**

b. A toeboard will be erected along the edge of platforms more than 10 feet above lower levels for a distance sufficient to protect employees below.

When tools, material, or equipment are piled to a height higher than the top edge of the toeboard, the below listed safeguards must be implemented:

a. Paneling or screening extending from the toeboard or platform to the top of the guardrail will be erected for a distance sufficient to protect employees below, **or**

b. A guardrail system will be installed with openings small enough to prevent passage of potential falling objects, **or**

c. A canopy structure, debris net or catch platform strong enough to prevent passage of potential falling objects will be erected over the employees below.

Note: Toeboards must be capable of withstanding, without failure, a force of at least 50 pounds applied in any downward or horizontal direction and be at least 3½" high from the top edge of the walking/working surface. Further, toeboards must be secured to the outermost edge of the platform and not have more than ¼" clearance above the walking/working surface. Toeboards must either be solid or have openings not over 1" in the greatest dimension.

Note: Canopies used for falling object protection must be installed between the falling object hazard and the employees below.

Access

Two feet – 24 inches – is the height at which some sort of access is required to reach a scaffold platform. When a scaffold platform is two (2) feet above or below the point of access (often the ground level), portable ladders, hook-on ladders, ramps, walkways, ladder stands, etc. must be used. Never use a cross brace as a means of getting on or off a scaffold.

Hook-on and attachable ladders must:

a. Be positioned so they do not tip the scaffold.
b. Have the bottom rung within 24 inches of the supporting level.
c. Have rest platforms at least at 35-foot vertical intervals when used on supported scaffolds.
d. Be designed for use with the scaffold being used.
e. Have a minimum spacing between rungs of 16 ¾ inches and a minimum rung length of 11 ½ inches.

Stairway type ladders have essentially the same requirements except that:

a. The rest platforms must be at the 12 foot (maximum) vertical level.
b. The minimum step width is 16 inches (mobile scaffold stairway-type ladders: 11 ½ inches).
c. Slip-resistant treads are required on all steps and landings.

Stair towers, if used, must have the bottom step within 24 inches of the supporting level and have

a. A toprail and midrail (stairrail) on each side.
b. A landing platform at least 18 inches by 18 inches at each level.
c. A width of 18 inches between stair rails.
d. Slip-resistant surfaces on treads and landings.

Employees must be able to safely get on and off a scaffold platform and at 24 inches, you will need a specific method of access.

General Versus Specific Scaffold Safety Guidelines

General safety guidelines apply to all situations. In all situations, employees must be aware of:

a. Potential electrical hazards, fall hazards, and falling object hazards and how to eliminate them.
b. The proper use of scaffolds and the proper handling methods of materials on the scaffold being used.
c. The maximum intended load and the load-carrying capacities of the scaffold being used and never exceeding these limits.

Within the broad categories of suspended and supported scaffolds, there are many specific types of scaffolds – each with its own limitations and special characteristics. Each job site has its own unique ground composition on which a supported scaffold is erected, or unique attachment points for suspended scaffolds. The competent person on the job site will instruct affected employees on any unusual or unique items that must be known about a specific circumstance.

Training

Interactive training will be given to all employees who will be performing work on scaffolds by a competent person. It will focus on the hazards associated with the type(s) of scaffolding used on job sites, as well as the methods to minimize or eliminate those hazards.

For those employees who will be erecting, disassembling, moving, operating, repairing, inspecting, or maintaining scaffolds, the competent person will provide additional training applicable to their job requirements.

Retraining

Retraining will be provided should new types of scaffolding be introduced, conditions change, standards change, or on-the-job performance indicate that a particular employee has not retained the required proficiency in scaffold safety.

Additionally, retraining will be conducted when changes at the job site present a hazard about which an employee has not been previously trained; when changes in fall protection, falling objects protection, or equipment present a hazard which an employee has not been previously trained.

Millerick Engineering, Inc.
Safety Program Addendum

Company Specific Safety Requirements

There also may be times when Millerick Engineering, Inc. requires its employees to meet safety policies that are specific to our company. If we implement these additional policies, they must have more stringent safety requirements than what OSHA has developed.