Intro to OSHA

Why OSHA Exists

- OSHA began because, until 1970, there were no national laws for safety and health hazards.
- On average, 15 workers die every day from job injuries
- Over 5,600 Americans die from workplace injuries annually
- Over 4 million non-fatal workplace injuries and illnesses are reported

OSHA stands for the Occupational Safety and Health Administration, an agency of the U.S. Department of Labor. OSHA's responsibility is worker safety and health protection

- On December 29, 1970, President Nixon signed the OSH Act
- This Act created OSHA, the agency, which formally came into being on April 28, 1971

OSHA's Mission

The mission of OSHA is to save lives, prevent injuries and protect the health of America's workers. Some of the things OSHA does to carry out its mission:

- Developing job safety and health standards and enforcing them through worksite inspections,
- Maintaining a reporting and recordkeeping system to keep track of job-related injuries and illnesses, and
- Providing training programs to increase knowledge about occupational safety and health.

What Rights Do You Have Under OSHA?

You have the right to:

- A safe and healthful workplace
- Know about hazardous chemicals
- Information about injuries and illnesses in your workplace
- Complain or request hazard correction from employer
- Training
- Hazard exposure and medical records
- File a complaint with OSHA
- Participate in an OSHA inspection
- Be free from retaliation for exercising safety and health rights

Section 5(a)(1) of the OSH Act states: "Each employer shall furnish to each of his 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."

Employers must have a written, complete hazard communication program that includes information on:

- Container labeling,
- Safety Data Sheets (SDSs), and
- Worker training. The training must include the physical and health hazards of the chemicals and how workers can protect themselves; including specific procedures the employer has implemented to protect workers, such as work practices, emergency procedures, and personal protective equipment.

OSHA's Recordkeeping rule requires most employers with more than 10 workers to keep a log of injuries and illnesses.

Workers have the right to review the current log, as well as the logs stored for the past 5 years.

Workers also have the right to view the annually posted summary of the injuries and illnesses (OSHA 300A).

Workers may bring up safety and health concerns in the workplace to their employers without fear of discharge or discrimination, as long as the complaint is made in good faith.

OSHA regulations [29CFR 1977.9(c)] protect workers who complain to their employer about unsafe or unhealthful conditions in the workplace.

Workers have a right to get training from employers on a variety of health and safety hazards and standards that employers must follow.

Some required training covers topics such as, lockout-tagout, bloodborne pathogens, noise, confined spaces, fall hazards in construction, personal protective equipment, along with a variety of other subjects.

You have a right to examine & copy records

Examples of toxic substances and harmful physical agents are:

- Metals and dusts, such as, lead, cadmium, and silica.
- Biological agents, such as bacteria, viruses, and fungi.
- Physical stress, such as noise, heat, cold, vibration, repetitive motion, and ionizing and non-ionizing radiation.

Workers may file a complaint with OSHA if they believe a violation of a safety or health standard, or an imminent danger situation, exists in the workplace.

Workers may request that their name not be revealed to the employer.

If a worker files a complaint, they have the right to find out OSHA's action on the complaint and request a review if an inspection is not made.

Employee representative can accompany OSHA inspector

Workers can talk to the inspector privately.

Workers may point out hazards, describe injuries, illnesses or near misses that resulted from those hazards and describe any concern you have about a safety or health issue.

Workers can find out about inspection results, abatement measures and may object to dates set for violation to be corrected.

Workers have the right to be free from retaliation for exercising safety and health rights.

Workers have a right to seek safety and health on the job without fear of punishment.

This right is spelled out in Section 11(c) of the OSH Act.

Workers have 30 days to contact OSHA if they feel they have been punished for exercising their safety and health rights.

Employer Responsibilities

- Workers have the right to be free from retaliation for exercising safety and health rights.
- Workers have a right to seek safety and health on the job without fear of punishment.
- This right is spelled out in Section 11(c) of the OSH Act.
- Workers have 30 days to contact OSHA if they feel they have been punished for exercising their safety and health rights.

Employers must:

- Report each worker death
- Report each incident that hospitalizes 3 or more workers
- Maintain injury & illness records
- Inform workers how to report an injury or illness to the employer
- Make records available to workers
- Allow OSHA access to records
- Post annual summary of injuries & illnesses
- Determine if PPE should be used to protect their workers.

OSHA standards fall into four categories: General Industry, Construction, Maritime, and Agriculture.

OSHA issues standards for a wide variety of workplace hazards

Where there are no specific OSHA standards, employers must comply with The General Duty Clause, Section 5(a)(1)

The OSH Act authorizes OSHA compliance safety and health officers (CSHOs) to conduct workplace inspections at reasonable times.

OSHA conducts inspections without advance notice, except in rare circumstances (e.g. Imminent Danger)

In fact, anyone who tells an employer about an OSHA inspection in advance can receive fines and a jail term.

Priority	Category of Inspection
1st	**Imminent Danger:** *Reasonable certainty an immediate danger exists*
2nd	**Fatality/Catastrophe:** *Reported to OSHA; inspected ASAP*
3rd	**Complaints/Referrals:** *Worker or worker representative can file a complaint about a safety or health hazard*
4th	**Programmed Inspections:** *Cover industries and employers with high injury and illness rates, specific hazards, or other exposures.*

Electrical Safety

About 5 workers are electrocuted every week and causes 12% of young worker workplace deaths. It takes very little electricity to cause harm and is a significant risk of causing fires.

There are four main types of electrical injuries:
Direct:

- Electrocution or death due to electrical shock
- Electrical shock
- Burns

Indirect - Falls

An electrical shock is received when electrical current passes through the body.

You will get an electrical shock if a part of your body completes an electrical circuit by…

- Touching a live wire and an electrical ground, or
- Touching a live wire and another wire at a different voltage.

Severity of the shock depends on the path of current through the body, amount of current flowing through the body (amps) and duration of the shocking current through the body,

LOW VOLTAGE DOES NOT MEAN LOW HAZARD

Currents above 10 mA* can paralyze or "freeze" muscles. Currents more than 75 mA can cause a rapid, ineffective heartbeat -- death will occur in a few minutes unless a defibrillator is used 75 mA is not much current – a small power drill uses 30 times as much

* mA = milliampere = 1/1,000 of an ampere

Burns are the most common shock-related injury. Usually occurs when you touch electrical wiring or equipment that is improperly used or maintained. Typically occurs on hands and is a very serious injury that needs immediate attention.

Electrical accidents are caused by a combination of three factors:

- Unsafe equipment and/or installation,
- Workplaces made unsafe by the environment, and
- Unsafe work practices.

Control:

- Use guards or barriers
- Replace covers
- Guard live parts of electric equipment operating at 50 volts or more against accidental contact
- Junction boxes, pull boxes and fittings must have approved covers
- Unused openings in cabinets, boxes and fittings must be closed (no missing knockouts)

Overhead Power Lines are usually not insulated. Examples of equipment that can contact power lines:

- Crane

- Ladder
- Scaffold
- Backhoe
- Scissors lift
- Raised dump truck bed
- Aluminum paint roller

Stay at least 10 feet away. Post warning signs and assume that lines are energized. Use wood or fiberglass ladders, not metal. Power line workers need special training & PPE.

750 V to 50 kV	10
50 kV to 200 kV	15
200 kV to 350 kV	20

Inadequate Wiring Hazards

- **Hazard** - wire too small for the current
- **Example** - portable tool with an extension cord that has a wire too small for the tool
  - The tool will draw more current than the cord can handle, causing overheating and a possible fire without tripping the circuit breaker
  - The circuit breaker could be the right size for the circuit but not for the smaller-wire extension cord
- Wire used depends on operation, building materials, electrical load, and environmental factors
- Use fixed cords rather than flexible cords
- Must be 3-wire type and designed for hard or extra-hard use
- Use the correct extension cord
- Cords can be damaged by:
  - Aging
  - Door or window edges
  - Staples or fastenings
  - Abrasion from adjacent materials
  - Activity in the area
- Improper use can cause shocks, burns or fire

Best Practice:

- Insulate live wires
- Check before use
- Use only cords marked for hard or extra-hard usage
- Use only cords, connection devices, and fittings equipped with strain relief
- Remove cords by pulling on the plugs, not the cords
  - Cords not marked for hard or extra-hard use, or which have been modified, must be taken out of service immediately
  - Tools plugged into improperly grounded circuits may become energized
  - Broken wire or plug on extension cord

DO NOT use flexible wiring where frequent inspection would be difficult or where damage would be likely.

Flexible cords must not be . . .

- run through holes in walls, ceilings, or floors;
- run through doorways, windows, or similar openings (unless physically protected);
- hidden in walls, ceilings, floors, conduit or other raceways.

- Ground power supply systems, electrical circuits, and electrical equipment
- Frequently inspect electrical systems to insure path to ground is continuous
- Inspect electrical equipment before use
- Don't remove ground prongs from tools or extension cords
- Ground exposed metal parts of equipment
- Protects you from shock
- Detects difference in current between the black and white wires
- If ground fault detected, GFCI shuts off electricity in 1/40th of a second
- Use GFCI's on all 120-volt, single-phase, 15- and 20-ampere receptacles, or have an assured equipment grounding conductor program.

Program must cover:

- All cord sets
- Receptacles not part of a building or structure
- Equipment connected by plug and cord

Program requirements include:

- Specific procedures adopted by the employer
- Competent person to implement the program
- Visual inspection for damage of equipment connected by cord and plug

Hazards may result from:

- Too many devices plugged into a circuit, causing heated wires and possibly a fire
- Damaged tools overheating
- Lack of over current protection
- Wire insulation melting, which may cause arcing and a fire in the area where the overload exists, even inside a wall
- Automatically opens circuit if excess current from overload or ground-fault is detected – shutting off electricity
- Includes GFCI's, fuses, and circuit breakers
- Fuses and circuit breakers are <u>over current</u> devices.

Power Tool Requirements

- Have a three-wire cord with ground plugged into a grounded receptacle, or
- Be double insulated, or
- Be powered by a low-voltage isolation transformer
- Inspect tools before use
- Use the right tool correctly
- Protect your tools
- Use double insulated tools

Tool Safety Tips

- Use gloves and appropriate footwear
- Store in dry place when not using
- Don't use in wet/damp conditions
- Keep working areas well lit
- Ensure not a tripping hazard
- Don't carry a tool by the cord
- Don't yank the cord to disconnect it
- Keep cords away from heat, oil, & sharp edges
- Disconnect when not in use and when changing accessories such as blades & bits
- Remove damaged tools from use

Clues Electrical Hazards Exists

- Tripped circuit breakers or blown fuses
- Warm tools, wires, cords, connections, or junction boxes
- GFCI that shuts off a circuit
- Worn or frayed insulation around wire or connection
- Apply locks to power source after de-energizing
- Tag deactivated controls
- Tag de-energized equipment and circuits at all points where they can be energized
- Tags must identify equipment or circuits being worked on

To protect workers from electrical shock:

- Use barriers and guards to prevent passage through areas of exposed energized equipment
- Pre-plan work, post hazard warnings and use protective measures
- Keep working spaces and walkways clear of cords
- "Bunny Hop"
- Use special insulated tools when working on fuses with energized terminals
- Don't use worn or frayed cords and cables
- Don't fasten extension cords with staples, hang from nails, or suspend by wire

Preventing Electrical Hazards

- Plan your work with others
- Plan to avoid falls
- Plan to lock-out and tag-out equipment
- Remove jewelry
- Avoid wet conditions and overhead power lines
- Damaged insulation, equipment, or tools can expose you to live electrical parts.
- Improperly grounded metal switch plates & ceiling lights are especially hazardous in wet conditions.
- Wet clothing, high humidity, and perspiration increase your chances of being electrocuted.

PPE

- Proper foot protection (not tennis shoes)
- Rubber insulating gloves, hoods, sleeves, matting, and blankets
- Hard hat (insulated - nonconductive)
- Use and test GFCI's

- Check switches and insulation
- Use three prong plugs
- Use extension cords only when necessary & assure in proper condition and right type for job
- Use correct connectors

Train employees working with electric equipment in safe work practices, including:

- Deenergize electric equipment before inspecting or repairing
- Using cords, cables, and electric tools that are in good repair
- Lockout / Tagout recognition and procedures
- Use appropriate protective equipment

Fall Protection

Competent person means an individual knowledgeable of fall protection equipment, including the manufacturers recommendations and instructions for the proper use, inspection, and maintenance; and

who is capable of identifying existing and potential fall hazards; and who has the authority to take prompt corrective action to eliminate those hazards; and who is knowledgeable of the rules regarding the installation, use, inspection, and maintenance of fall protection equipment and systems.

Ensure that all surfaces on which employees will be working or walking on are structurally sound and will support them safely prior to allowing employees to work or walk on them.

Inspection criteria. All Components, of personal fall arrest systems, personal fall restraint systems and positioning device systems shall be inspected prior to each use according to manufacturer's specifications for mildew, wear, damage, and other deterioration.

Defective components shall be removed from service if their function or strength has been adversely affected.

Safety nets shall be inspected at least once a week according to manufacturer's specifications for wear, damage, and other deterioration. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system such as high winds or person falling into net.

Defective components shall be removed from service. Defective nets shall not be used.

Personal fall arrest systems, personal fall restraint system, positioning device systems, and their components shall be used only for employee protection and not to hoist materials.

Exemptions. Employees are exempt from sections WAC 296-155-24509 and WAC 296-155-24511 only under the following conditions:

During initial installation of the fall protection anchor (prior to engaging in any work activity), or the disassembly of the fall protection anchor after the work has been completed.

An employee directly involved with inspecting or estimating roof-level conditions only on low-pitched roofs prior to the actual start of construction work or after all construction work has been completed.

Examples of activities the department recognizes as inspecting or estimating include:

- Measuring a roof to determine the amount of materials needed for a project
- Inspecting the roof for damage without removing equipment or components
- Assessing the roof to determine what method of fall protection will be provided to employees

Examples the department does not recognize as inspecting or estimating under this exemption include:

- Delivering, staging or storing materials on a roof
- Persons estimating or inspecting on roofs that would be considered a "Hazardous Slope," by definition.

Fall Protection at 0 feet- Guard Rail

Open sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, such as rock crushing equipment and material handling equipment,

Falling into or onto impalement hazards, such as: reinforcing steel (rebar), or exposed steel or wood stakes used to set forms.

Holes into which an employee can trip, step into, or step through but not completely fall through.

Fall Protection Required at 4 Feet or More.

Ensure that the appropriate fall protection system is provided, installed, and implemented when employees are exposed to fall hazards of 4 feet or more to the ground or lower level when on a walking/working surface including holes large enough to fall through.

Walking/working surface means any area including but not limited to floors, a roof surface, bridge, the ground, and any other surfaces through which workers can pass or conduct work excluding scaffolds.

Walking working surfaces are protected by a standard guardrail system, or the equivalent on all open sides, except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a standard toe board wherever, beneath the open sides, persons can pass, there is moving machinery, or there is equipment with which falling materials could create a hazard.

Where employees are working on platforms above the protection of the guardrail system, increase the height of the guardrail system or select another fall protection system

When guardrails must be temporarily removed to perform a specific task, the area shall be constantly attended by an employee until the guardrail is replaced. The only duty the employee shall perform is to prevent exposure to the fall hazard by warning persons entering the area of the fall hazard.

Types of Fall Protection

Elimination*: Remove the hazard from work areas or change task, process, controls or other means to eliminate the need to work at heights with its subsequent exposure to fall hazards

Examples would be:

- Assembling a structure then raising to a position
- Filling in a hole rather than using PFAS

Prevention (passive or same-level barrier): isolate and separate fall hazards from work areas by erecting same level barriers such as guardrails, walls, covers or parapets

Fall Restraint: Securing the authorized person to an anchorage using a lanyard short enough to prevent the person's center of gravity from reaching the fall hazard.

Administrative Controls: Introduce new work practices that reduce the risk of falling from heights, or to warn a person to avoid approaching a fall hazard (i.e. warning systems, warning lines, audible alarms, signs or training of workers to recognize specific fall hazards).

Guardrails

- Top rails between 39 and 45 inches tall and resist 200lbs of force
- Midrails resist 150lbs of force

- Toeboards at least 3 1/2 inches high (50lbs of force)

Maximum spacing 8 ft.

Top Rail force is an outward/ downward force within 2 inches of the top anywhere along the rail. Cannot deflect below 39 inches.

Top rail to be made of:

- 2 by 4 stock
- 1 ½ steel schedule 40 OD
- Minimum ¼ inch steel cable flagged every 6 feet with less than 3 inch deflection

Midrail to withstand an outward downward force and is to be half way between the top and walking surface

Midrail to be made of:

- 1 by 6 minimum stock
- 1 ½ steel schedule 40 OD
- ¼ inch steel cable
- Screen mesh or solid panels meeting the 150lb strength test

Toeboards are to be securely fastened in place and have not more than 1/4 inch clearance above floor level

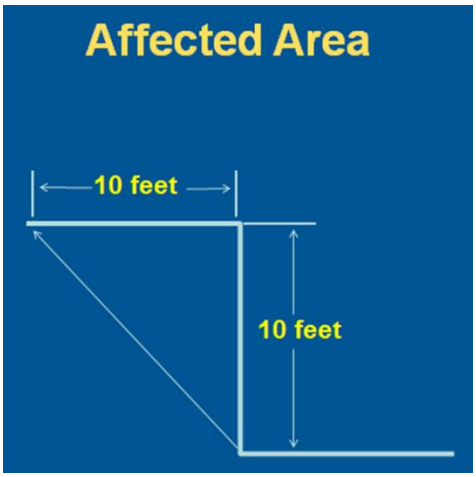
Toeboard to be made of:

- 1 by 4 minimum stock
- Screen mesh or solid panels meeting the 150lb strength test

No gaps greater than 1 inch between boards

When is Fall Protection Needed?

Washington. When the distance away from the edge of an excavation equal to the depth of the excavation up to a maximum distance of 15ft. Employees standing or working in the affected area, who are not directly involved with the excavation process; or employees who are on a protective system or other structure in the excavation are required to have fall protection.



Floor holes- 2 inch up to 12 inches 200 pounds resistance force

Floor opening- 12 inches or more where a person may fall through 4 times intended force.

Secured with cleats or hinges, marked “Hole” or “Cover”, hole must be attended if the cover is removed.

Common hole hazards:

- Holes recently made
- Weak skylights (minimum 6 inch by 6 inch grid for permanent installations)
- Holes just uncovered
- HVAC stack just removed

Washington

Hazardous slope-is a slope where normal footing cannot be maintained (roofs greater than 4/12 pitch, Oregon 2:12)

Walking or working surfaces- means any area including, but not limited to, floors, a roof surface, bridge, the ground, and any other surfaces whose dimensions are forty-five inches or more in all directions, through which workers can pass or conduct work.

A walking /working surface does not include vehicles or rolling stock on which employees must be located in order to perform their job duties.

A leading edge is the advancing edge of a floor, roof or formwork as additional sections are placed, formed or constructed. The edge of a finished roof is not a leading edge.

A plumber installing a pipe boot is NOT exempt from fall protection. He must be protected at 4 feet as it is not leading edge work.

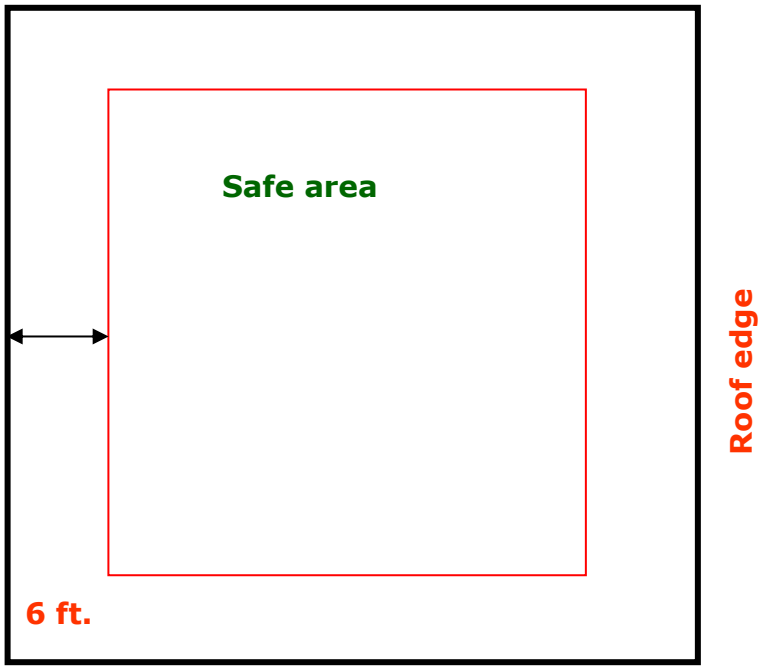
A roof with a slope of 4:12 or less is a low-pitched roof. Oregon 2:12

Fall protection is required on low-pitched roofs where the fall distance is 10 feet or more such as at the gable end. Fall protection is not normally required on low-pitched roof edge work below 10 feet (Washington State changing to 4 feet).

Fall restraint system

A system in which all necessary components function together to restrain/prevent an employee from falling to a lower level. Types of fall restraint systems include standard guardrail systems, personal fall restraint systems, warning line systems, or a warning line system and safety monitor.

The warning line is installed six feet from the roof edge at a height of 36-42 inches. Line is flagged every six feet. Work outside the safe area requires a safety monitor. Equipment cannot be used or stored outside safe area.



Safety Monitor System-Not allowed by some General Contractors

- May not be used in adverse weather
- Must use competent person trained in function of safety monitor and warning lines
- Must be distinguishable from other crew members
- Must be able to clearly see and use normal voice to communicate
- May not supervise more than eight people
- Warn employees of unsafe condition or fall hazard
- People working in the control zone shall be distinguishable from other crew members by wearing highly visible material
- Employees shall promptly comply with warnings given by safety monitor regarding hazards

You must be tied off so that you can never go past the roof edge, no matter where you work on the roof. Anchorage points used for fall restraint shall be capable of supporting 4 times the intended load.

Fall Arrest

Unless otherwise designed, the fall arrest system must arrest the fall in 6 feet or less.

Fall arrest must arrest the fall before the user reaches the lower surface.

Safety Nets

Vertical Distance	Horizontal Distance
Up to 5 feet	8 feet
5 feet up to 10 feet	10 feet
more than 10 feet	13 feet
Test with 400lb at 42 inches above max fall height	

Personal Fall Protection Systems

Do not make connections where the hook locking mechanism can come into contact with a structural member or other equipment and potentially release the hook.

Do not connect a snap hook into a loop or thimble of a wire rope or attach in any way to a slack wire rope.

The snap hook must be free to align with the applied load as intended

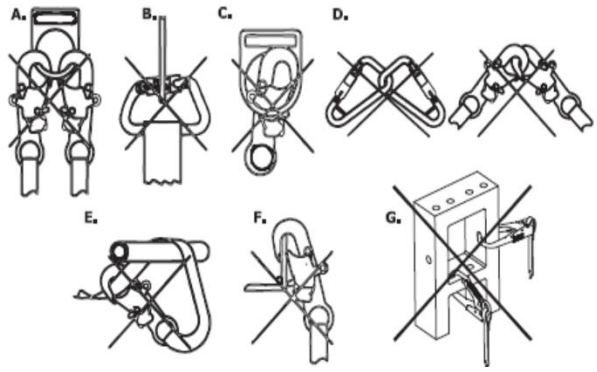
Tensile loads that a snap hook and carabiner must withstand remain the same as the existing Standard – 5,000 lbs.

Gate face strength requirements have changed from 220 lbs. (1kN) (old Standard) to 3,600 lbs. (16kN) (new Standard).

Do not make connections where the hook locking mechanism can come into contact with a structural member or other equipment and potentially release the hook.

Do not connect a snap hook into a loop or thimble of a wire rope or attach in any way to a slack wire rope.

The snap hook must be free to align with the applied load as intended



Unless the snap hook is designed for the following connections, snap hooks shall not be engaged:

- Directly to the webbing, rope or wire rope
- To each other
- To a D-ring to which another snap hook or other connector is attached
- To a horizontal lifeline or
- To any object which is incompatibly shaped or dimensioned in relation to the snap hook such that unintentional disengagement could occur

WAC 296-155-24613

Do's and Don't's

Do inspect for wear and damage before use.

Do remove from service after a fall for inspection.

Don’t use to lift materials.

Don’t attach to guardrails or hoists.

Harness, lanyard, SPR, these items must not be damaged, broken, distorted, and must be free of sharp edges, burrs, cracks, worn parts, or corrosion.

PVC coated hardware must be free of cuts, rips, tears, holes, etc. in the coating to ensure non-conductivity.

Ensure that release tabs on buckles work freely and that a click is heard when the buckle engages.

Inspect vertical torso adjusters for proper operation. Ratchet knobs should turn with ease in a clockwise direction and should only turn counterclockwise when the knob is pulled out.

Webbing

Material must be free of frayed, cut, or broken fibers. Check for tears, abrasions, mold, burns, or discoloration.

Inspect stitching; check for pulled or cut stitches. Broken stitches may be an indication that the harness has been impact loaded and must be removed from service.

When performing the annual formal inspection, unsnap and open the back pad to facilitate inspection of the webbing.

All labels should be present and fully legible

Fall Protection Work Plan

You are required to prepare a fall protection plan for every job where the fall hazard is over 10 feet (WA State will be changing this 2019 or 2020). Be prepared to go over this plan with your crew boss or lead worker at the beginning of the job.

- Identify fall hazards in the work area
- Describe the method of fall arrest or restraint to be used
- Correct procedures for assembly, maintenance, inspection and disassembly of fall protection system
- Proper procedures for handling, storing and securing of tools and materials
- What type of overhead protection for workers working below
- What method of removal or rescue for injured workers
- Must be available for inspection by L&I

Ladders

Common causes of falls

- Improperly getting on or off the ladder
- Loss of balance
- Setting up the ladder improperly
- Overreaching while on the ladder
- Mis-stepping or slipping while climbing or descending
- Lack of training on safe ladder use
- Using the wrong type ladder for the job

- Exceeding the ladder weight capacity
- Climbing ladder with tools or material in hands
- Climbing or descending not facing the ladder
- Oil, grease or mud on ladder rungs
- Ladder not secure at the base or top
- Ladder not set up at the proper angle
- Ladder not extended 3 feet above upper surface
- Using the top step of a step ladder
- Placing ladder on unstable surfaces
- Over-reaching beyond the side rails of the ladder

Ensure the following:

- Side rails aren't bent, broken, or split
- Rungs, cleats, or steps aren't bent, broken, or missing
- All bolts and rivets are in place and securely tighten
- Joint between the side rails and the individual rungs/steps is tight
- Safety feet are not excessively worn
- Hardware and fittings are securely attached and working properly
- Ropes aren't frayed or badly worn
- Moveable parts operate freely without binding or excessive play.
- Metal components aren't corroded.
- No other faulty or defective components exist.
- Any auxiliary equipment is securely attached, not excessively worn and functions properly.

Position ladders so that they are:

- Not in the paths of workers walking through,
- Not in front of unblocked exits,
- Not in front of doors that can open out into the ladder,
- Not on boxes, barrels or other unstable surfaces,
- On solid footing and level at the bottom,
- Stable at the top with each rail supported equally,
- Against a structure capable of supporting the intended load,
- Away from debris and other hazards.

Additional items:

- Don't test a ladder by jumping on it.
- Don't paint a wood ladder.
- Don't use any ladder that has been exposed to fire or other strong chemicals.
- Protect ladders from environmental elements such as: excessive heat or cold.
- Don't drop or throw ladders.
- Store ladders out of the way of other employees.
- Secure ladders firmly when transporting on vehicles.

Above or adjacent to dangerous equipment Holes into which an employee can trip, step into, or step through, but not completely fall through. Falling into or onto impalement hazards (such as rebar)	0 feet
When on a walking/working surface Ramps, runways, and inclined walkways Holes where work is being performed (walking/working surfaces) and can fall completely through by using one of the following: • Guardrail • Cover • PFA • Warning line at 15 feet • Monitor-temporary Skylights, Hatchway and chute holes Ladderways -access to ladder Pits and trap door holes Manholes, openings • Guarding • Monitor Steep pitch roof - Regardless of task or Low pitch for non-roofing or not constructing a leading edge Hazardous slopes Vehicles and rolling stock - If suitable anchorages cannot be provided or creates a greater hazard	4 feet
Roofing work on a low pitch roof Constructing a leading edge	6 feet
Engaged in the erection or placement of structural members Engaged in excavation and trenching operations (Directly involved are exempt) Working off scaffolds Cranes assembly and disassembly	10 feet

Hazard Communication

The HasCom is called the right to know standard because employees have both a need and right to know the identities and hazards of the chemicals they are exposed to when working.

Hazard Communication (HazCom) is the communication of chemical hazards to workers.

We have a standard because:

- 32 million workers work with, and are potentially exposed to, one or more chemicals hazards- OSHA
- Over 69 million chemicals are commercially available- CHEMCATS
- Over 600 new chemicals are introduced every year
- Roughly 22% of workplace diseases and injuries are caused by chemicals
- 2011 Report on occupational disease identified 41 known occupational diseases caused by chemical agents

OSHA describes the HCS as largely a performance-orientated standard that gives employers the flexibility to adapt the rule to the needs of the workplace, instead of having to follow specific, ridged requirements. Therefore, there are categories of information to be included in the SDS including physical and chemical characteristics, physical hazards, and applicable precautions and/or measures for handling materials safely.

Employers that don't produce or import chemicals need only focus on those parts of the rule that deal with establishing a workplace program and communicating information to their workers.

Requirements in the HazCom standard

- Written HazCom Program
- Chemical inventory and control
- Hazard classification of chemical
- SDSs available for hazardous substances in the workplace
- Labeling of hazardous chemicals
- Training workers
- Makes required information available

A new addition to the HazCom standard is the Globally Harmonized System. The original standard aimed to give workers the "right to know' but the new system aims to give the workers the "right to understand".

Benefits of the new standard:

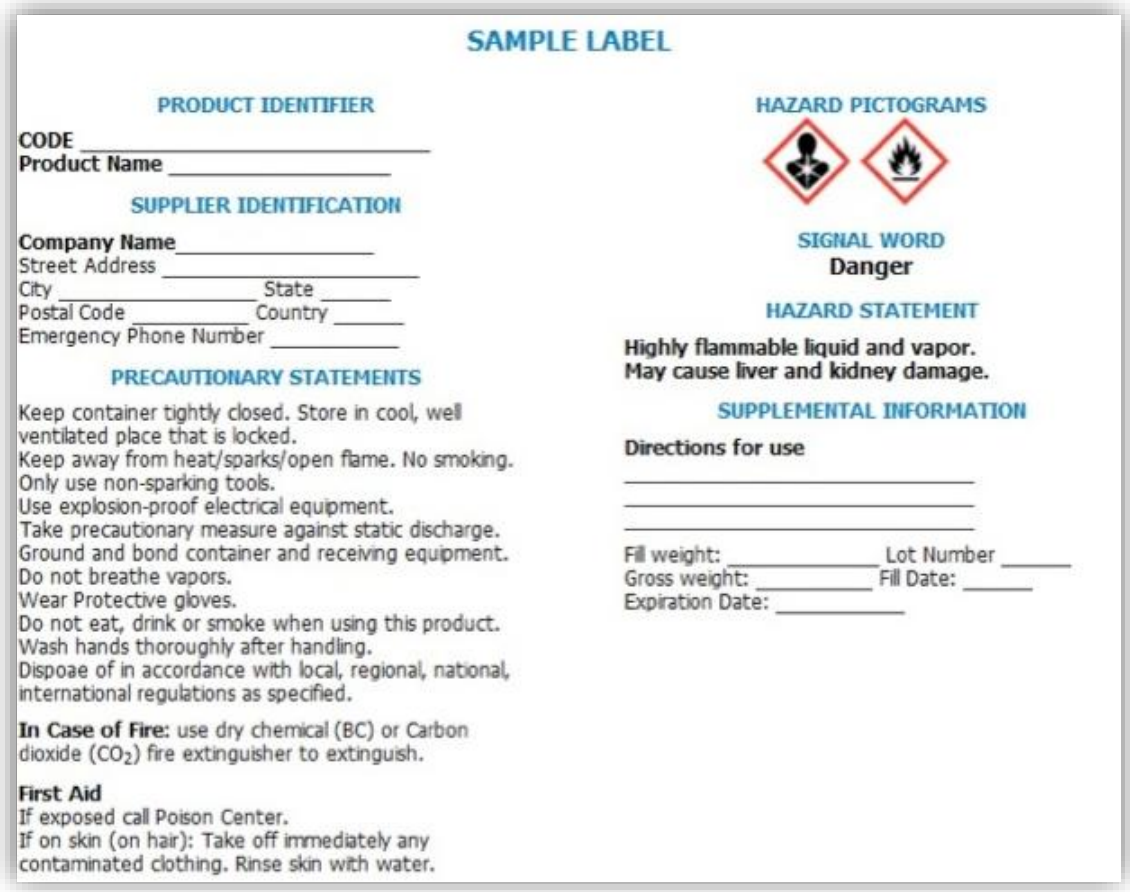
- Enhanced worker comprehension of hazards, especially for low and limited-literacy workers
- Provide workers quicker and more efficient access to information on the safety data sheets
- Reduce trade barriers by harmonizing with systems around the world

Major changes

- Hazard classification: Chemical manufacturers and importers are required to determine the hazard of the chemicals they produce or import

- Labels: Chemical manufacturers and importers must provide a label that includes a signal word (DANGER or WARNING) , pictogram, hazard statement, and precautionary statement for each hazard class and category
- Safety Date Sheets: The new format requires 16 specific sections, ensuring consistency
- Information and training: To facilitate understanding of the new system, the new standard
- requires that workers be trained on the changes

Hazard Communication Label Example



SAMPLE LABEL

PRODUCT IDENTIFIER

CODE _____
Product Name _____

SUPPLIER IDENTIFICATION

Company Name_____
Street Address _____
City _____ State _____
Postal Code _____ Country _____
Emergency Phone Number _____

PRECAUTIONARY STATEMENTS

Keep container tightly closed. Store in cool, well ventilated place that is locked.
Keep away from heat/sparks/open flame. No smoking.
Only use non-sparking tools.
Use explosion-proof electrical equipment.
Take precautionary measure against static discharge.
Ground and bond container and receiving equipment.
Do not breathe vapors.
Wear Protective gloves.
Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Dispoae of in accordance with local, regional, national, international regulations as specified.

In Case of Fire: use dry chemical (BC) or Carbon dioxide (CO_2) fire extinguisher to extinguish.

First Aid
If exposed call Poison Center.
If on skin (on hair): Take off immediately any contaminated clothing. Rinse skin with water.

HAZARD PICTOGRAMS

SIGNAL WORD
Danger

HAZARD STATEMENT

Highly flammable liquid and vapor.
May cause liver and kidney damage.

SUPPLEMENTAL INFORMATION

Directions for use
_____
_____
_____

Fill weight: _____ Lot Number _____
Gross weight: _____ Fill Date: _____
Expiration Date: _____

Health Hazard

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity

Health Hazard chemicals pose a risk to your health if used improperly.

Flame

- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides

The Flame pictogram indicates there is a fire risk, and you should be especially concerned about ignition sources and combustible materials.

Exclamation Mark

- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity
- Narcotic Effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer (Non-Mandatory)

Gas Cylinder

Gases Under Pressure

The Gas Cylinder pictogram alerts you to the physical hazards inherent in the use and storage of compressed gas.

Corrosion

- Skin Corrosion/Burns
- Eye Damage
- Corrosive to Metals

The Corrosion label should prompt you to be

Exploding Bomb

- Explosives
- Self-Reactives
- Organic Peroxides

Chemicals marked with an Exploding Bomb pose a

Flame Over Circle

- Oxidizers

Chemicals labeled with a Flame over Circle can create an increased fire risk in your work or storage environment.

Skull and Crossbones

- Acute Toxicity (fatal or toxic)

The Skull and Crossbones pictogram will usually be used in combination with a Health Hazard pictogram to signify particularly hazardous chemicals.

Chemicals with Acute Toxicity (fatal or toxic) are chemicals that will produce adverse effects following a single dose of the substance. These effects are more serious than the Acute Toxicity (harmful) listed under the Exclamation Point pictogram

Safety Data Sheets

Section 1: Identification

- Common names or synonyms
- Name, address, phone numbers of manufacturer or importer
- Recommended use of the chemical and any restrictions on use

Section 2: Hazard Identification

- Hazard classification of the chemical
- Signal word
- Hazard statement
- Pictograms
- Precautionary statements
- Description of any hazards

Section 3 Composition or Ingredients

- Identification of ingredients
- Chemical names
- Common names and synonyms
- Chemical Abstract Services
- Impurities and stabilizing additive
- Mixtures

Section 4: First Aid Measures

- Initial care
- Necessary first-aid instructions
- Important symptoms or effects of any symptoms
- Recommendations for immediate medical care

Section 5: Fire Fighting Measures

- Recommendations of suitable extinguishing equipment
- Advice on specific hazards that develop from the chemicals during the fire
- Any special protective equipment or precautions for firefighters

Section 6: Accidental Release Measures

- Appropriate response to spills, leaks, or releases, including containment and cleanup
- Emergency Procedures, including instructions for evacuations
- Use of personal precautions and protective equipment
- Cleanup procedures

Section 7: Handling and Storage

- Guidance on the safe handling practices for safe storage of chemicals
- Precautions for safe handling, incompatible chemicals, hygiene practices
- Safe storage and incompatibilities

Section 8: Exposure Controls/PPE

- OSHA PEL's and any other recommendations or limits
- Appropriate engineering controls
- Recommendations for any personal protective measures such as PPE
- Any special PPE such as type of gloves and breakthrough time

Section 9: Physical and Chemical Properties

This section identified physical and chemical properties with the substance or mixture. Below are a few

- Odor
- Flash points
- Flammability
- Upper/lower flammability limits
- Vapor density

Section 10: Stability and Reactivity

- Reactivity hazards
- Chemical stability

Section 11: Toxicological Information

- Routes of exposure
- Description of delayed, immediate, or chronic effects
- Measure of toxicity
- Description of symptoms

Section 12: Ecological Information

- Data of effects on environment and wildlife
- Results on test of soil and ground water

Section 13: Disposal Considerations (non-mandatory)

This section gives guidance on proper disposal practices, recycling or reclamation of the chemical and safe handling practices

Section 14: Transport Information

This section provides guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea.

Section 15: Regulatory Information (non-mandatory)

- Information not otherwise given

Section 16: Other Information

- Date when SDS was prepared or updated

Person Protective Equipment

Employers must protect employees from hazards such as falling objects, harmful substances, and noise exposures that can cause injury

- Employers must:
  - Use all feasible engineering and work practice controls to eliminate and reduce hazards.
  - Use personal protective equipment (PPE) if the controls don't eliminate the hazards.
- PPE is the last level of control!
- It is possible to over protect worker.

If the work environment can be physically changed to prevent employee exposure to the potential hazard, then the hazard can be eliminated with an engineering control

Examples:

- Initial design specifications
- Substitute less harmful material
- Change process
- Enclose process
- Isolate process

If employees can change the way they do their jobs and the exposure to the potential hazard is removed, then the hazard can be eliminated with a work practice control.

Examples:

- Job rotation
- Wet method
- Personal hygiene
- Housekeeping and maintenance

Employer

- Assess workplace for hazards
- Provide PPE
- Determine when to use
- Provide PPE training for employees and instruction in proper use

Employee

- Use PPE in accordance with training received and other instructions
- Inspect daily and maintain in a clean and reliable condition
- Bring to attention any problems or issues with PPE

Program
Includes procedures for selecting, providing and using PPE
First -- assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of PPE.
After selecting PPE, provide training to employees who are required to use it. A well ran program protects the worker from safety and health hazards and protects worker from incorrect use or malfunction of the PPE

Program is reviewed every year. Review includes:

- Survey of each site
- Accident and illness experiences,
- Training and recordkeeping

Training includes:

- Why it is necessary
- How it will protect them
- What are its limitations
- When and how to wear
- How to identify signs of wear
- How to clean and disinfect
- What is its useful life & how is it disposed

Head Protection

- Falling objects such as tools
- Bumping head against objects, such as pipes or beams
- Contact with exposed electrical wiring or components

Types

- Class A-General service (building construction, shipbuilding, lumbering). Good impact protection but limited voltage protection
- Class B-Electrical / Utility work. Protects against falling objects and high-voltage shock and burns
- Class C-Designed for comfort, offers limited protection. Protects against bumps from fixed objects, but does not protect against falling objects or electrical shock

Eye Protection

- Dust and other flying particles, such as metal shavings or sawdust
- Corrosive gases, vapors, and liquids
- Molten metal that may splash
- Potentially infectious materials such as blood or hazardous liquid chemicals that may splash
- Intense light from welding and lasers

Criteria for eyewear

- Protects against specific hazard(s) (i.e. dust, liquid, vapor)
- Comfortable to wear
- Does not restrict vision or movement
- Durable and easy to clean and disinfect
- Does not interfere with the function of another required PPE

Ordinary glasses do not provide the required protection. Proper choices include:

- ANSI Z87 Prescription glasses with side shields and protective lenses
- Goggles that fit comfortably over corrective glasses without disturbing the glasses
- Goggles that incorporate corrective lenses mounted behind protective lenses

- Most operations require at a minimum, safety glasses with side shields and are used for moderate impact from particles produced by jobs such as carpentry, woodworking, grinding, and scaling
- Laser and welding requires more protection

Hearing Protection

The table below shows noise levels and how long a person can be exposed without hearing protection before there is damage to the ear.

Noise Level	Allowable Exposure Time
85 decibels	8 hours
90 decibels	4 hours
100 decibels	1 hour
105 decibels	30 minutes
110 decibels	15 minutes
115 decibels	0 minutes

Hearing Protection must be worn:

- After implementing engineering and work practice controls and the noise level cannot be reduced below applicable noise standard
- When an employee's noise exposure exceeds an 8-hour time-weighted average (TWA) sound level of 85 dBA

In addition, annual hearing test must be conducted if 8hr exposure last more than 30 days

Foot Protection when any of these are present:

- Heavy objects such as barrels or tools that might roll onto or fall on employees' feet
- Sharp objects such as nails or spikes that might pierce ordinary shoes
- Molten metal that might splash on feet
- Hot or wet surfaces
- Slippery surfaces
- Impact-resistant toes and heat-resistant soles protect against hot surfaces common in roofing and paving
- Some have metal insoles to protect against puncture wounds
- May be electrically conductive for use in explosive atmospheres, or nonconductive to protect from workplace electrical hazards

Hand Protection

Hazards

- Burns
- Bruises
- Abrasions
- Cuts
- Punctures
- Fractures
- Amputations
- Chemical Exposures

- Nitrile protects against solvents, harsh chemicals, fats and petroleum products and also provides excellent resistance to cuts and abrasions.
- Butyl provides the highest permeation resistance to gas or water vapors
- Kevlar protects against cuts, slashes, and abrasion
- Stainless steel mesh protects against cuts and lacerations

Chemical Resistance of Gloves – Quick guide

Nitrile gloves:

- Acetone - fair
- Ethanol - excellent
- Isobutyl - alcohol excellent
- Isopropyl - alcohol excellent
- Methanol - fair

Latex gloves:

- Acetone - good
- Ethanol - excellent
- Isobutyl - alcohol poor
- Isopropyl - alcohol excellent
- Methanol - fair

PVC gloves:

- Acetone - poor
- Ethanol - excellent
- Isopropyl alcohol - good
- Methanol - good

Viton gloves & Butyl gloves:

- Acetone good
- Cuts
- Hazardous chemicals
- Radiation

Trenching and Excavation

Benching–excavating the sides of an excavation to form one or a series of horizontal levels or steps

Competent Person-One who can identify existing or predictable hazards in the surroundings that are unsanitary, hazardous, or dangerous to employees. Also has authorization or authority by the nature of their position to take prompt corrective measures to eliminate them.

Excavation – a man-made cut, cavity, trench, or depression formed by earth removal.

Hazardous Atmosphere - an atmosphere which may be explosive, flammable, poisonous, or oxygen deficient

Ramp - An inclined surface that is constructed from earth or from structural materials

Trench – a narrow excavation. The depth is greater than the width, but not wider than 15 feet.

Sheeting – Members of a shoring system that retain earth in position

Shield - a structure able to withstand a cave-in and protect employees

Shoring - a structure that supports the sides of an excavation and protects against cave-ins

Sloping - a technique that employs a specific angle of incline on the sides of the excavation. The angle varies based on assessment of impacting site factors.

Structural Ramp – A ramp built of steel or wood, usually used for vehicle access

Uprights - the vertical members of a trench shoring system placed in contact with the earth

Wales - horizontal members of a shoring system

Appoint Competent Person to do:

- Soil evaluations
- Daily Inspections
- Shoring and sloping evaluations and have
- Stop Work Authority

Qualifications

- Knowledge of soils and soil classification
- Understands design and use of protective systems
- Ability to recognize and test hazardous atmospheres
- Documented training
- Prior excavation experience

Responsibilities

- Site safety briefings on excavation safety
- Daily excavation inspections
- More frequent if conditions change (e.g. freeze/thaw, rain, vibration)
- Physically at the excavation site anytime worker are exposed
- Classifications of soils

A cave in can weigh as much as two Full size trucks. Workers die from being crushed.

Locates

- Locates for Washington and Oregon expire 45 days after "Ticket life" means the 45 calendar day period after an excavator provides notice to the Oregon Utility Notification Center. RCW 19.122.030 states locate marks expire 45 days from the date the excavator provides notice.
- Aboveground Utilities
- De-energize or
- Isolation from power lines
- Minimum 10’ 50v to 50,000v

Hazardous Atmosphere

Test @ 4’ if suspected

- LEL 10% of explosive level
- Oxygen 19.5 – 23.5
- CO 35 ppm - Biggest Hazard
- H2S 10 ppm
- Petroleum
- Other toxics

Vehicular Traffic

Wear High Visibility garments or Class 2 as required

Class 2 or 3 required working on or near roads

Walkways

Walkways or bridges with standard guardrails must be provided where employees or equipment are permitted to cross over excavations.

- 6 feet Oregon - when walking over trenches
- 4 feet Washington - when walking over trenches

All remotely located excavations must be barricaded, covered, or backfilled. pedestrians must be protected from all excavations and trenches

Egress

No more than 25 feet of travel to a ladder or ramp

Fall protection for workers in the trench is 10 ft WA and 6 ft Federally

Fall protection is not required for persons directly involved in the excavation process (foreman; signal person; employee hooking on pipe or other material; grade person; state, county, or city inspectors; engineer or other professional conducting a QA inspection)

Affected Area is the distance away from the edge of an excavation equal to the depth of the excavation up to a maximum distance of 15 ft. Affected area starts at 10 feet.

Protection from hazards associated with water accumulation

- Protection against cave-in
- Water removal (pumping)
- Run-off protection
- Consider temporary shut-off of water lines

Protection of employees from loose rock or soil

- Scaling
- Protective barriers
- Placing material at least 2' from edge
- No work on slopes above workers

Protection from cave-in requires a systematic approach including:

- Soil classification
- Protective systems
- Inspection
- Employee training

Spoils piles are too placed 2 feet or more away from trench if no protection

Keep equipment ideally same distance as trench if no protection Debris kept cleared from work areas

Soil Classification

Soil Classification (Type A,B,or C) determines construction of protective system:

- Type A means: Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay
- Type B means: Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf. Some examples are: granular soils including angular gravel, silt, silt loam, sandy loam or previously disturbed soils
- Type C means: Cohesive soil with an unconfined compressive strength of 0.5 tsf or less. Examples include: gravel, and sand. Also included may be submerged soil or soil from which water is freely seeping, and submerged rock that is not stable.

Classification of the deposits is to be based on the results of at least one visual and one manual analysis. These tests must be conducted by a Competent Person.

Visual Test

Soil that is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

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

Layered System

In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

Manual Test

Plasticity and Pat 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 soil can be successfully rolled into threads without crumbling. If at least a 2 inch length of 1/8 inch thread can be held on one end without tearing, the soil is cohesive.

Spread a 1/8 or 1/4 inch thick sample of wet soil on the palm of the hand. Wipe the surface of the sample with a finger to remove visible water. With the palm facing up, slap the back of the hand moderately 5 to 10 times. If water rises to the surface of the sample (surface will appear shiny), then the soil is mostly cohesion less silt or sand. If no water appears, then the soil is mostly cohesive clay.

Manual Test – Dry Strength

Fissured clay, when dry, falls into clumps which break up into smaller clumps on its own or with some force. Smaller clumps, though, are hard to break up.

Unfissured soil, when dry, can be broken up into clumps which do not break into smaller clumps with pressure. The soil can only be broken with great difficulty. There are also no signs of fissuring on the trench wall or around the area adjacent to the trench.

Granular soil, when dry, crumbles on its own or with some force into individual grains or fine soil.

Manual Test – Thumb Penetration

The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. This test should be conducted on an undisturbed soil clump as soon as practical after excavating to reduce the chance of air drying the sample. If later the trench is exposed to moisture (rain, flooding, etc.), the soil classification must also be changed

- Type A soils can be readily indented by the thumb. However, they can be penetrated by the thumb only with very great effort.
- Type B soils can be readily indented by the thumb, however it requires effort.
- Type C soils can be easily penetrated several inches by the thumb and can be molded by light finger pressure.

Manual Test – Drying Test

The drying test can show the difference between fissured cohesive soils, unfissured cohesive soils, and granular material. Obtain an undisturbed sample of soil approximately 1 inch thick and 6 inches in diameter.

If the sample develops cracks as it dries, fissures are indicated.

Break up samples by hand that dry without cracking. If much force is necessary to break a sample, the soil is cohesive. This soil can be classified as unfissured cohesive material and the unconfined compressive strength should be tested.

If a sample breaks easily by hand, it is either fissured cohesive or a granular material.

Protective Systems

Required unless:

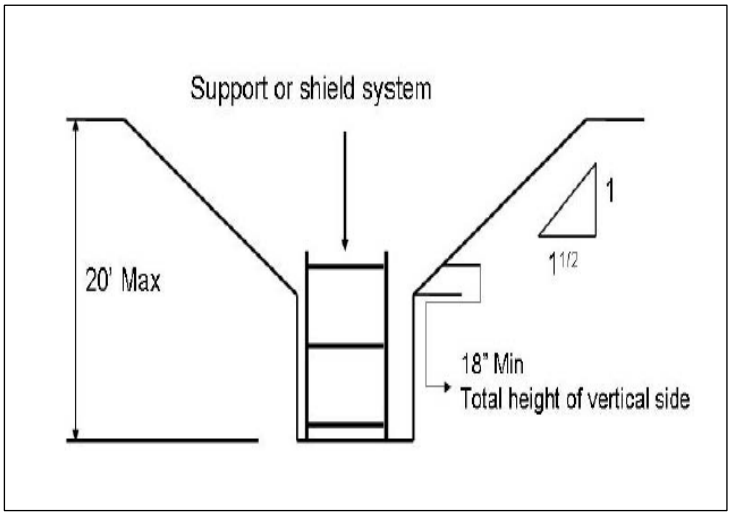
- Excavation in stable rock
- Excavation less than 5’ (4 feet for WA) and examination by Competent Person determines no potential for cave-in

Options:

- Sloping and benching
- Shoring/sheet piling/ shielding (e.g.trench boxes)
- Designed by P.E. if deeper than 20’

Maximum Allowable Slope

- For Stable Rock is vertical (90)
- For Type A soil is 3/4:1 (53)
- For Type B soil is 1:1 (45)
- For Type C soil is 11/2:1 (34)



Shoring

- Securely connected
- Employees clear of area under shields during installation
- Installed to prevent movement
- Must protect employees while entering excavation

Protective systems

Trench Box- does not prevent a collapse of soil but provides protection if a collapse occurs.

Best practice is to backfill ¼ to 1/3 of box height or secure from displacement. Also provide protection at ends of the box

Inspect and maintain box in accordance with manufacturer’s guidelines.

Speed Shoring- prevents sides of excavation from caving in by putting force on wall of excavation. End protection is not required.

Excavation Inspections

Daily Inspections of ALL excavations by Competent Person

Start of shift, as needed, following rainstorms or other hazard-increasing event

- Possible cave-ins
- Protective system failure
- Water accumulation
- Hazardous atmospheres

Competent person has authority to remove workers from the excavation

Public Safety

Walkways or bridges with standard guardrails must be provided where pedestrians are needing to cross over excavations

All remotely located excavations must be barricaded, covered, or backfilled.

Traffic control methods must have a certified flagger onsite. Only a certified flagger can control traffic and pedestrians

Excavation Rescue

1. Call 911 immediately. Know the address of the site.
2. Be clear if this is a trench rescue which involves an employee buried, or if it is an employee that has suffered an injury and the employee needs help to be brought out of the trench and/or medical assistance. If 911 is not clear on what type of rescue, it will delay the dispatch of the technical trench rescue team.
3. DO NOT TRY TO PERFORM A RESCUE IN AN UNSTABLE TRENCH YOURSELF. ONE VICTIM IS ENOUGH.
4. Do what you can to protect the victim from secondary cave in, this may mean installing additional shoring, using an excavator to hold back a secondary cave in.
5. Shut off all equipment. Stop traffic and any activities that may cause vibrations in the affected area to prevent further caving.
6. Make an analysis of what equipment might be needed for the rescue team and get it at the ready or start making the needed calls to other projects or the shop to get it delivered.
7. Send out a worker or workers to help direct the rescue team into the site.
8. Designate one person to assist the Incident Commander.

Most importantly, Trench Rescues are rarely successful. Therefore, we want to eliminate the need for the rescue in the first place.

Fire Prevention

General Requirements

Fire Protection Program

Access to fire fighting equipment at all times

Conspicuously located fire fighting equipment

Periodic Inspection and regular maintenance of fire fighting equipment

A fire Extinguisher rated 2A or higher for every 3,000 square feet of combustible building area. Travel distance from any point to the nearest extinguisher shall not exceed 100 feet.

A 55-gallon open drum of water and two fire pails or a garden-type hose with ½ inch diameter and output of 5 gallons per minute can be used as a substitute for a 2A Fire Extinguisher.

You must have a 10B or greater rated Fire Extinguisher within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on a jobsite. Except for vehicle fuel tanks.

Appropriate Use

- Alarm has been sounded
- Building has been evacuated
- Fire is small and confined
- You can fight the fire with your back toward an escape route
- The extinguisher matches the fire type
- The extinguisher works effectively
- You are properly trained in the use of the extinguisher
- You are confident you can put the fire out

Inappropriate Use

- The fire is large and has grown beyond its original confined space
- Your escape path is threatened
- You are not sure if you have the correct type of fire extinguisher
- Smoke and noxious fumes
- Smoke and fumes cause unconsciousness
- Death may result

PASS

- Hold the extinguisher upright
- Pull the pin
- Aim at the base of the fire
- Squeeze the handle
- Sweep the base of the fire
- Do not aim high at the flames

Prevention

- Keep work areas clean and clutter-free
- Know how to handle and store chemicals
- Know what you are expected to do in an emergency
- Know about the chemicals you work with
- Become familiar with emergency action plan for fires
- Combustion engines, sources of ignition, and exhausts shall be kept at a 6 foot distance from fuels and combustibles.
- Smoking shall be prohibited at or near operations that constitute a fire hazard by means of posting signs conspicuously.
  "No Smoking or Open Flames"
- Nothing shall be built or placed that will interfere with any means of exit.

Open Yard Storage

- Combustible materials shall not be stacked higher than 20 feet.
- Driveways between combustibles shall be at least 15 feet wide.
- Driveways shall be spaced to allow for a maximum 50 by 150 foot grid system.
- Yard shall be kept free from accumulation of unnecessary combustibles.
- Weeds and grass shall be kept low.
- Regular procedures for clean-up of area must be provided.

Indoors

- Storage cannot interfere with exits
- All materials must be stored with due regard to their fire characteristics
- Clearance of 36 inches shall be maintained from top of storage stacks to sprinkler deflectors
- Clearance of 24 inches shall be maintained around paths of travel to exits.

Flammable Liquids

- Must be stored in metal, safety-rated cans or DOT approved containers when in quantities of 5 gallons or less.
- Cannot be stored in areas used as exits or stairways.
- Containers must be legibly marked. For containers with 50 gallon capacity or more, signage/ label must be made to indicate contents with 3 inch minimum height. Post at both discharge valve and fill point.

Confined Space

It is a space that meets all of the following requirements:

- Large enough and shaped so someone can fully enter and do work AND
- Entry and/or exit is limited or restricted AND
- Is not designed for continuous human occupancy

Pipe in Excavation:

- The work is covered by the Confined Space rule if you have to bodily enter the sewer space, which is an existing sewer pipe or manhole, or new construction connected to an existing sewer.
- The work does not fall under the Confined Space Rule if the sewer space is large enough to bodily enter but entry is not required. Excavation rules apply.
- If work is performed in an underground pipe that is not part of or connected to a sanitary sewer and is not part of excavation work, then the work is covered by the Confined Space Rule.

In the Confined Space Rule there are two main types of hazards: physical and atmospheric. They may be present or have the potential to be present.

Prior to entry, hazards should be anticipated, identified, evaluated, eliminated if a physical hazard, and controlled or eliminated if an atmospheric hazard.

Entry- The action by which 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

A physical hazard is defined as an existing or potential hazard that can cause death or serious physical harm. It includes but is not limited to:

- Explosives
- Radiation
- Inwardly converging surfaces
- Noise, if it prevents the ability to communicate or hear warnings
- Mechanical, electrical, hydraulic and pneumatic energy
- Chemicals that can cause death or serious physical harm through skin or eye contact
- Engulfment
- Temperature extremes

An atmospheric hazard is an existing or potential atmosphere that may expose employees to the risk of:

- Death
- Incapacitation
- Impairment of ability to escape without help
- Injury
- Acute illness

As a result of one or more of the following conditions:

- A flammable gas, vapor, or mist in excess of 10 percent of its lower flammable limit
- An airborne combustible dust
- An airborne concentration of a substance that exceeds the dose or exposure limit specified by an Oregon OSHA requirement (dust that obscures vision at a distance of 5 feet is included)
- An atmosphere that presents an immediate danger to life or health (IDLH)

- An atmospheric oxygen concentration below 19.5 percent or above 23.5 percent (oxygen deficiency and oxygen enrichment)

In other words, any atmosphere that could result in death or serious injury to a worker as caused by oxygen deficiency or enrichment, toxic materials, and flammable or explosive materials. The emphasis is on acute hazards, not chronic.

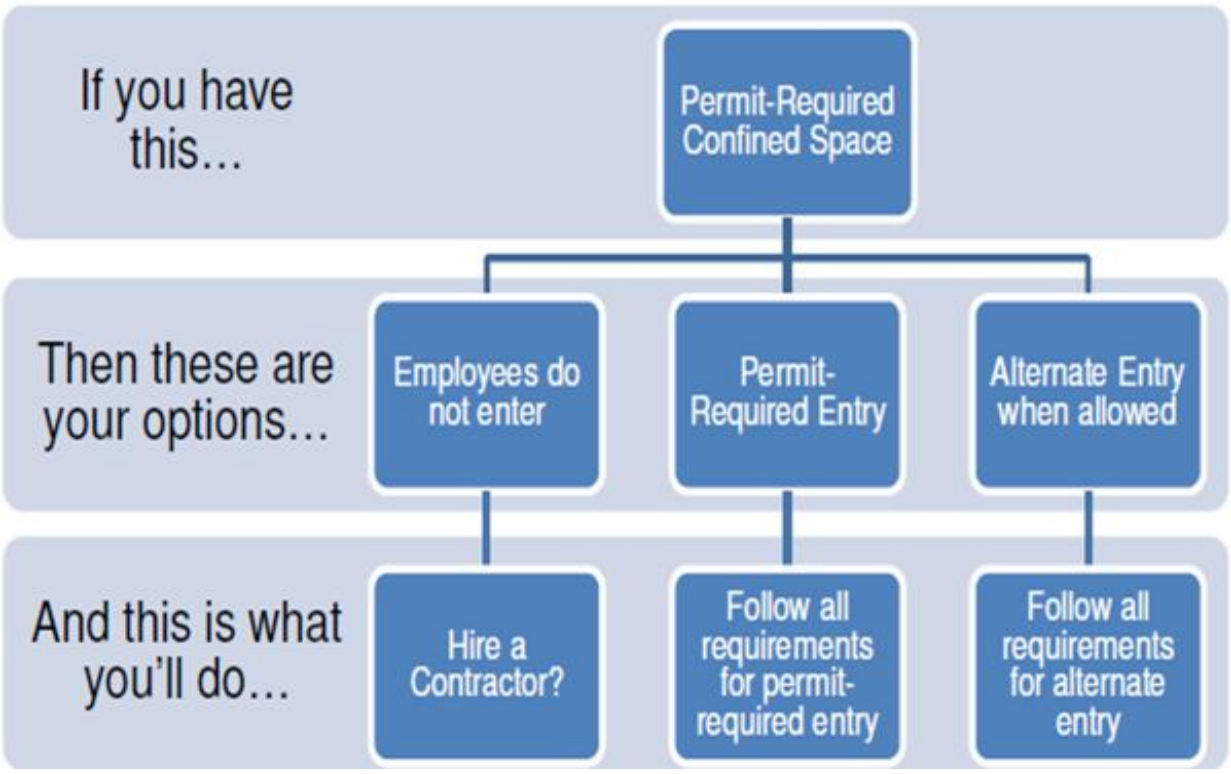
While welding, noise, falls asbestos, lead and silica may be hazards in a confined space, they are all covered under specific rules. For example, if lead is the only hazard, then the Lead Rule applies, not the confined Space Rule

For the purpose of this rule, tagout is allowed for the permit entry, but lockout is required for an alternate entry.

In some cases, such as with painting and welding, exhaust ventilation should be used as well as forced or ventilation to control the hazard

You must have a way for employees to recognize your permit-required confined spaces. In addition to training, you can use signs, labels or tags. The rule does not require each space to have its own sign—it's acceptable to identify a group of similar spaces, such as manholes, in a general way.

After you have identified and evaluated your permit-required confined spaces, you'll need to make some decisions about how those spaces will be entered.



Employees Do Not Enter-Employees must know how to identify permit-required confined spaces, and that they are not allowed to enter.

If you have someone else enter your permit-required confined spaces, such as a sub-contractor, then you are required to provide them any information you have about the hazards of the space (e.g. why you consider the space to be a permit-required confined space).

Entry with a Permit – Procedures-You must have the following in place to enter a permit space:

- Space to be entered
- Purpose of the entry
- Date, start, and stop times of the permit
- Hazards of the space
- Acceptable entry conditions
- Results of initial tests and periodic monitoring, or the period for continuous monitoring, and the names or initials of the testers and when the tests were performed

Entry with a Permit- To enter a permit-required confined space with a full permit, do or have the following:

Evaluations

- Permit entry procedures
- Equipment
- Personnel
- Rescue
- Training
- Multi-employer worksite procedures
- Records
- Permit-required confined space written entry program and permits
- Measures to isolate the space and eliminate or
- controls hazards before entry
- Names of entrants and current attendants
- Signature of the original supervisor authorizing entry
- Current entry supervisor
- Communication procedures for entrants and attendants
- Equipment provided for entry
- Rescue services available and how to contact them
- Other information needed for safety
- Additional permits for work in the space, such as for hot work
- Any problems encountered during entry
- Procedures for issuing permits
- Testing for atmospheric hazards before entry
- Provide results of atmospheric testing to entrants
- Maintain safe entry conditions for the duration of the entry
- Follow all actions and precautions on the permit
- If you have to evacuate, re-assess the conditions of the space to ensure it is safe for re-entry and ensure the permit reflects the evacuation and subsequent re-assessment.

Frequency of Atmospheric Testing

- Before every entry. This includes the beginning of the shift and breaks
- Gas Monitor should be placed inside the space to provide a continuous read of conditions
- Before entry the space entered should be checked at all levels. Top, Middle and Bottom.
    - Methane is lighter than air
    - Carbon Monoxide is the same as air
    - Hydrogen Sulfide is heavier than air

All equipment must be maintained and used in accordance with the instructions from the manufacturer. For example, if the manufacturer's directions say to perform a factory calibration, then that's what you need to do. Bump testing of air monitoring equipment is recommended prior to every use.

Entrants must:

- Know about hazards that they may face during entry and the signs, symptoms and consequences of exposure
- Communicate with the attendant so the attendant can monitor their status and warn them when they need to evacuate
- Alert the attendants about hazardous conditions in the space or symptoms of exposure

Exit the space immediately when:

- An order to evacuate is given by the attendant or the entry supervisor
- An entrant recognizes any warning sign or symptom of exposure to a dangerous situation
- An entrant detects a dangerous or hazardous condition
- An evacuation alarm is activated

Attendants must:

- Know the hazards entrants may face during entry and the signs, symptoms, and consequences of exposure
- Be aware of the behavioral effects of hazards on entrants
- Keep an on-going count of entrants and ensure that the count identifies who is in the space
- Remain outside the space during entry operations until relieved by another attendant
- Communicate with entrants to monitor their status and to alert them if they need to evacuate
- Communicate with entrants to monitor their status and to alert them if they need to evacuate
- Monitor activities inside and outside the space and order entrants to evacuate immediately under the following conditions:
  - ✓ A dangerous or hazardous condition is detected
  - ✓ If the behavioral effects of hazard exposure are detected
  - ✓ If there is a dangerous situation outside the space
  - ✓ If the attendant cannot perform all required duties

- Summon emergency services as soon as entrants need to escape from the space
- Warn unauthorized persons to stay away if they approach the space
- Perform non-entry rescues following your established rescue procedure
- Do nothing that would interfere with monitoring and protecting an entrant even while monitoring another space.)

When entrance covers are removed, promptly guard the opening with a railing, temporary cover, or other temporary barrier to prevent accidental falls through the opening and protect entrants from objects falling into the space. WAC 296-809-60004*

Must be guarded by standard covers which need not be hinged in place. While the cover is not in place, the manhole opening shall be protected by a standard guardrail system. WAC 296-155-246009-4-f*

* LnI Does allow the attendant to use administrative controls to keep workers out of area

Entry Supervisors must:

- Know the hazards that entrants may face during entry, including the signs, symptoms, and consequences of exposure
- Understand how to control or eliminate hazards associated with the space
- Verify that all tests, procedures and equipment specified by the permit are in completed or in place before signing the permit and allowing entry to begin

Non-entry rescue

This means nobody beyond the entrant goes in. It also typically means the entrant is wearing a harness that is attached to a retrieval device that is designed to allow them to be pulled them out of the space by somebody else, such as the attendant.

Entry rescue

This means somebody goes in. They must have equipment and training and follow all requirements in the rule.

Third-party rescue

This means somebody else goes in, with whom you have made arrangements to do so. The third-party must follow entry requirements. Simply planning to rely on 911 services does not meet requirements of the rule.

Whatever option you choose, rescue procedures must include :

- A process for summoning rescue services
- A process for summoning emergency medical services or transporting injured entrants to a medical facility.
- A way for the Safety Data Sheet (SDS) or other similar written information be kept at the worksite, and be made available to the medical facility treating an exposed entrant.
- They must also have practiced performing a rescue before the entry, but no more than 12 months before.

When workers are mobile, they do not need to do the annual practice (either entry or non-entry) if the rescue team does a practice rescue in the space that needs to be entered, before the actual entry.

Training is required:

- Before an employee is assigned permit-space duties
- Before there is a change in an employee's assigned duties
- When there is a hazard for which an employee has not been trained
- When there are changes to the permit program
- When the permit audit shows deficiencies
- When there is a deviation from established procedures or an employee's knowledge of the procedures is inadequate

Awareness training is required for employees who work or may work in areas where permit spaces are present.

It must explain the permit-space program, the entry permit system, the alternate entry procedures, if used, and how to recognize permit spaces in their work area.

It provides a basic overview of the permit space program.

Record each employee's training, including the employee's name, the trainer's signature, the training date, and the employee's responsibilities.

Employees must be able to inspect their training records.

Alternate Entry

Alternate entry is a specific procedure for entering a permit space without a full permit.

An attendant is not required; rescue procedures are not required; and there are fewer documentation requirements.

You need to do the following:

- Eliminate all hazards

OR

- Eliminate all physical hazards in the space and control all hazardous atmospheres with continuous ventilation

Alternate entry cannot be used to enter a continuous system unless you can isolate the area to be entered from the rest of the space, or can demonstrate the conditions that caused the hazard or potential hazard no longer exist within the system during the entry, or can demonstrate that engulfment cannot occur and continuous ventilation in the area to be entered is sufficient to control atmospheric hazards.

Develop and implement alternate entry procedures that address the following:

- Who can authorize alternate entry procedures and is responsible for ensuring safe entry conditions
- The hazards associated with the space
- The methods used to eliminate the hazards
- The methods used to ensure the hazards have been eliminated
- The methods used to test the space for all hazardous atmospheres
- The methods used to determine if unsafe conditions occur before or during entry

The criteria and conditions used for evacuating the space

- The methods for training employees in these procedures
- The methods for ensuring employees follow these procedures

Alternate entry procedures do not have to be in writing, but you may find it beneficial to do so.

When using ventilation to control atmospheric hazards:

- Use only properly calibrated direct-reading meters to test the atmosphere.
- Test the atmosphere for all identified atmospheric hazards before entering the space.
- Do not allow employees to enter until testing verifies that all identified atmospheric hazards are adequately controlled by the ventilation.

- Perform continuous monitoring for all atmospheric hazards during the entry.

Immediately evacuate the space:

- When monitoring indicates the return of atmospheric hazards.
- Upon any failure with the direct-reading instrument.
- Upon any failure with the ventilation.
- When a new hazard is introduced or conditions within the space change.

If a space is evacuated, it cannot be re-entered as an alternate entry unless:

- The conditions that necessitated the evacuation are corrected; and
- The re-entry is treated and documented as a new entry.

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- The conditions that necessitated the evacuation are corrected; and
- The re-entry is treated and documented as a new entry.

There are ten items that must be documented, if they apply:

- The location of the space
- The hazards of the space
- Measures taken to eliminate the hazards
- Measures taken to control the atmospheric hazards
- The identity of the direct-reading instruments used to test the atmosphere
- The results of the atmospheric testing
- The date of entry
- The duration of the entry
- Any and all conditions that required the evacuation of the space
- The name, title, and signature of the person responsible for ensuring the safe entry conditions

Maintain this documentation for the duration of the entry at the location of the entry.

The rule does not require the documentation to be kept after the entry is complete, but it would be a best practice to do so. It would allow you to evaluate your alternate entry procedures for effectiveness and to make improvements.

Multi-employer Worksites

Let them know about the hazards of the spaces and about any precautions you require to protect your own employees.

- When your employees are working in a space and someone else's employees are working in or around that space, coordinate entry with the other employers so your employees are not exposed to hazards created or discovered by the other employees, and vice-versa.
- Discuss any hazards created or encountered, after the operation is finished.

After a permit entry, keep cancelled permits for at least one year from the date the permit expires.

After an alternate entry, keep the entry document where the space is located for the duration of the entry. There is no requirement to keep it after the entry. It would be a best practice to keep it for review of the effectiveness of the procedure.

If an air monitor is used that data logs, and the monitoring is associated with a specific person, then the logged data can be used as an exposure record. If so, then it must be kept in an accessible form for 30 years.

Scaffold Training

Scaffold is a temporary elevated work platform

Supported Scaffold-Platforms supported by poles, frames outriggers or other rigid structural material

Suspended Scaffold-Platforms suspended by ropes or other non-rigid supports

Cantilevered portion of a platform meets at least one of the following:

- Is designed and installed to support employees or material without tipping
- Has guardrails which block employee access to the cantilevered end
- Extends over its support not more than:
  - 12 inches if the platform length is 10 feet or less or
  - 18 inches (46 cm) if the platform length is greater than 10 feet.

Hazards-Falls

- While climbing on or off the scaffold
- Working on unguarded scaffold platforms
- When scaffold platforms or planks fail
- If a worker on a scaffold can fall more than 10 feet, protect them by
  - Guardrails or
  - Personal Fall Arrest Systems

Guardrails

- Install along open sides & ends
- Front edge of platforms not more than 14 inches from the work, unless using guardrails and/or PFAS
- Top rails - 38 to 45 inches tall
- Midrails halfway between toprail and platform
- Toeboards at least 3-1/2 inches high

Anchorage Point-Must be capable of withstanding at least 5000lbs of force for fall arrest

Fall Protection Work Plans

- Identify fall hazards in the work area
- Describe the method of fall arrest or restraint to be used
- Correct procedures for assembly, maintenance, inspection and disassembly of fall protection system

Electrical Safety

- Maintain a safe distance from electrical
- Lines can be re-routed or insulated. Check with utility company. Sometimes this can take weeks
- Scaffold company not responsible to ensure this for your employees

Clearances

- Uninsulated 10 feet for 50 kv and below
- Insulated > 300 volts 10 feet
- Insulated < 300 volts 3 feet

Hazards/Scaffold Construction

- Scaffold Collapse/Bad Planking-
- Is ground support adequate?
- Use only Trained Scaffold Erectors
- Must have a Competent Person onsite at all times

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

Platforms must be:

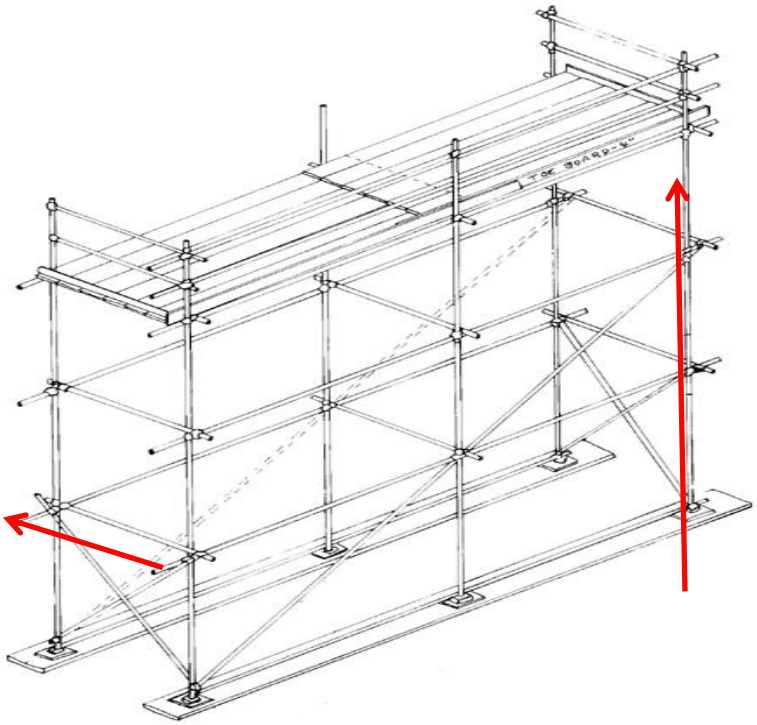
- fully planked or decked with no more than 1 inch gaps
- able to support its weight & 4 times maximum load
- at least 18 inches wide (12 for ladder jacks and scaffold)
- have no more than 1 inch sag in 60 inches
- Each end of a platform, unless cleated or otherwise restrained by hooks, must extend over its support by at least 6 inches

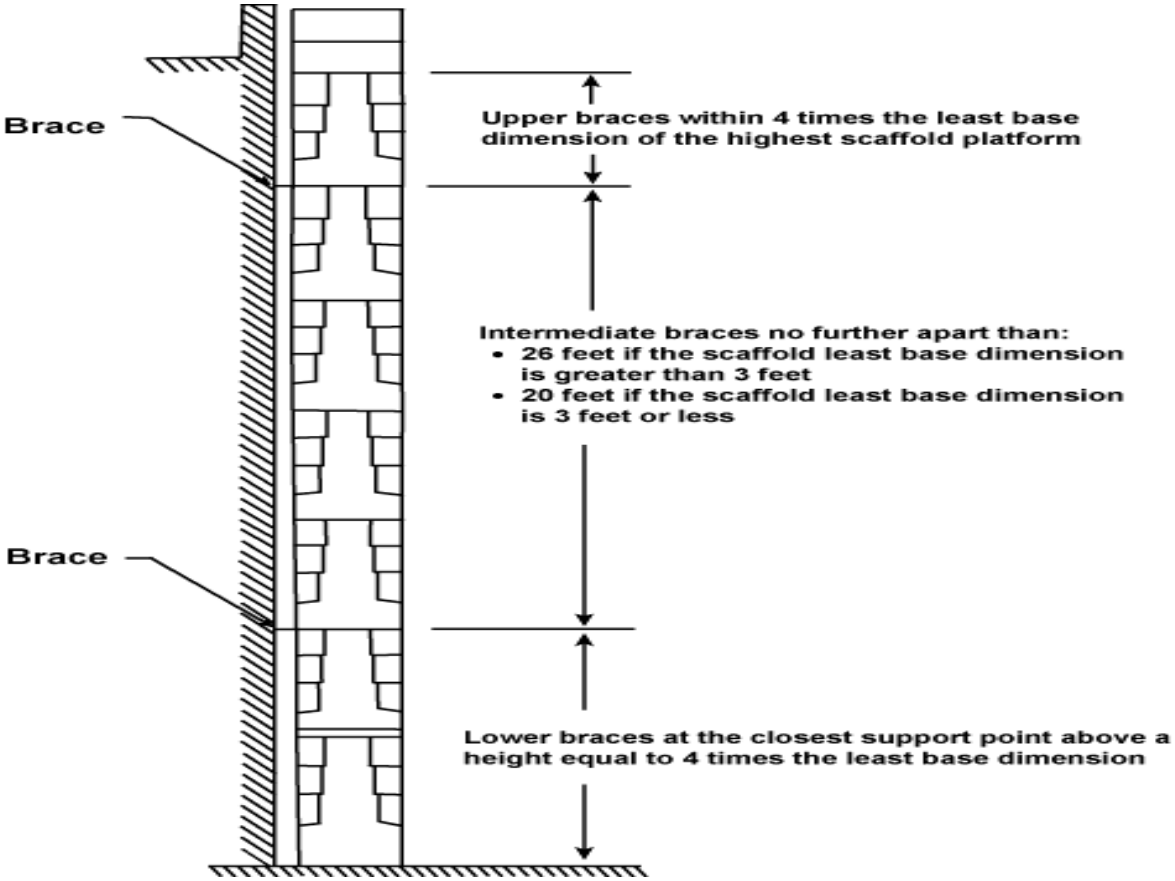
There may be more than one inch between platform units if all of the following are met:

- You can demonstrate that a wider space is necessary, such as to fit around uprights when side brackets are used to extend the platform width
- The platform is planked or decked as fully as possible
- The open space between the platform and the guardrail supports is 9-1/2 inches (24.1 cm) or less.

Maximum intended nominal load (lb/ft^2)	Maximum permission span using full thickness undressed lumber (ft)	Maximum permissible span using nominal thickness lumber (ft)
25	10	8
50	8	6
75	6	NA

The height of the scaffold should not be more than four times its minimum base dimension unless guys, ties, or braces are used




Brace
Upper braces within 4 times the least base dimension of the highest scaffold platform
Intermediate braces no further apart than:
• 26 feet if the scaffold least base dimension is greater than 3 feet
• 20 feet if the scaffold least base dimension is 3 feet or less
Brace
Lower braces at the closest support point above a height equal to 4 times the least base dimension

Hazards/Scaffold Access

- Provide access when scaffold platforms are more than 2 feet above or below a point of access
- May use building stairs and come out window
- Ladders, such as portable, hook-on, attachable, stairway type, and built-ins
- Stair towers
- Ramps and walkways
- Position portable, hook-on, and attachable ladders so they don't tip the scaffold
- Have rest platforms at vertical intervals not greater than 24 feet on supported scaffolds.
- Rungs at least 11-1/2 inches wide
- Stairway- Have rest platforms not more than 12 feet apart vertically
- Do not use cross braces for access
- When using ladders, bottom rung no more than 24 inches high
- Can use some end frames as ladders—if designed for that purpose

Cross braces may be used as a top-rail or mid-rail in a guardrail system if they meet the following requirements:

- The crossing point of the 2 braces is between:
- 20 inches and 30 inches above the work platform when used as a mid-rail
- 38 inches and 48 inches above the work platform when used as a top-rail
- The end points at each upright aren't more than 48 inches apart.

Other Hazards

- Scaffolds must be able to handle 4 times the intended load
- Use tag lines if needed to control load being hoisted
- Don’t use scaffold in high wind conditions
- Don’t work in stormy conditions
- Be careful of ice and snow, slippery conditions
- Is there any damage to the scaffold frames or planks
- Are all planks in proper placement with correct overlap
- Workers below may need delineation or Danger Tape if toe board not sufficient

Scaffold Inspection

- Scaffolds need to be inspected daily
- Are parts still connected
- Are pins holding frames together in place
- What are the weather conditions
- Are all sections guy and braced
- Electrical clearance maintained with working equipment
- Are working surfaces fully planked
- Are materials being stored in excess of scaffold capability
- Is guarding in place if not, fall protection may be required
- Have all new workers to the site received scaffold user training
- Any damaged parts shall be immediately be removed from service
- Any damaged parts shall be immediately be removed from service

General Scaffold Requirements

- All people working on scaffolds must be trained
- Retrain when work or scaffolding changes or when employee observation indicates
- Company using scaffold system erected by others is fully responsible to ensure that system is erected in compliance

Surfing

- Employees may not ride scaffolds greater in height than 2 to 1
- Wheels must be locked before work begins
- Force must be no more than 5 feet up from the ground

Asbestos and Lead Awareness

A naturally occurring mineral that is mined from the ground. Asbestos containing materials may only be removed by certified and trained workers

2 hour awareness training is required for those who may contact asbestos but do not disturb asbestos.

Types of Asbestos:

- Chrysotile – White or Grey 95% of what is used
- Amosite - Brown 2-4% of what is used
- Crocidolite – Blue 1% or less of what is used
- Tremolite
- Actinolite
- Anthophylite

Uses of Asbestos:

- Fire Proof
- Insulator
- Binder good tensile strength
- Friction resistant
- Chemical resistant
- Electrically non-conductive
- Acoustical characteristics
- Indestructible

Fibers that become airborne can take as long as 80 hours to settle 9 feet and fibers are microscopic. Materials that contain more than 1% asbestos.

History

4000 BC Asbestos used for wicks in lamps and candles. The substance was known as "asbestos", meaning inextinguishable or unquenchable.

2000-3000 BC Embalmed bodies of Egyptian pharaohs were wrapped in asbestos clothes to offset the ravages of time.

2500 BC Used in Finland to strengthen clay pots.

800-900 Anecdotal evidence of Charlemagne's table cloth being made from woven asbestos.

1000 Mediterranean’s used Chrysotile from Cyprus and Tremolite from upper Italy for the fabrication of cremation cloths, mats and wicks for temple lamps.

1300-1400 Marco Polo visited an asbestos mine in China in the latter half of the 13th Century. He concluded that asbestos was a stone and laid to rest the myth that asbestos was the hair of a woolly lizard.

Early 1700's Evidence that asbestos papers and boards were made as early as 1700 in Italy.

1712 Chrysotile mined in Russia during the reign of Peter the Great.

1724 Benjamin Franklin brought a purse made of asbestos to England. The purse is now in the Natural History Museum.

1805 Blue asbestos (Crocidolite) first discovered in Orange (South Africa) and was originally named "Wool stone".

1828 The first known US patent issued for asbestos insulating material used in steam engines.

1850 Chrysotile first discovered in Quebec, Canada at the Thedford mines.

Circa 1853 Asbestos helmet and jackets worn by Parisian Fire Brigade.

1860's Packings and gaskets were produced, as mixtures of asbestos and organic fibrous materials.

1866 Moulded lagging material made from water glass and asbestos.

1866 Italian asbestos industry based on Tremolite asbestos dates back to 1866.

Early 1870'sFounding of large asbestos industries in Scotland, Germany and England with the production of "asbestos boards",

1870's The "modern" asbestos industry commenced in Canada and USSR, when large deposits of Chrysotile were extensively exploited.

1880 The American asbestos industry is founded with the use of Italian asbestos to manufacture asbestos paper and board.

1886 Asbestos pipe lagging materials, based on 85% magnesia, were developed.

1896 First asbestos brake linings were made by Ferodo Limited in England. Made by impregnating woven asbestos brake bands with resin.

1897 Viennese physician wrote than emaciation and pulmonary problems left no doubt that (asbestos) dust inhalation was the cause.

1898 England, Lady Inspectors of factories wrote regarding the asbestos manufacturing processes ".... on account of their easily demonstrated danger to the heath of the workers, and because of ascertained cases of injury to bronchial tubes and lungs medically attributed to the employment of the sufferers".

1899 First patent for the manufacture of asbestos cement sheet in Germany.

1900 Initially patented in 1896, first high pressure asbestos gaskets made by Klinger in Austria.

1900 Commencement of mining of Anthophylite in Finland.

1906 Asbestos brake linings manufactured in the USA.

1907 Amosite (brown asbestos) discovered in Transvaal, South Africa. The word Amosite derived from an acronym of "Asbestos Mines of South Africa" from the Amosa mine.

1913 First asbestos pipes developed in Italy.

1915 Asbestos brake linings manufactured in Germany

1919 Standard corrugated sheet introduced in Australia by Hardies.

1920's Large asbestos companies experimented on ways of weaving asbestos. Succeeded, but Chrysotile and Crocidolite were the only fibers to be woven commercially. Crocidolite being almost exclusively used for manufacture of asbestos mattresses for steam trains.

1931 Asbestos industry regulations were passed in the UK to address concerns that asbestos exposure, particularly among textile factory workers led to lung damage.

1939 In the film 'The Wizard of Oz', the Wicked Witch of the West appeared on a broom made of asbestos.

1939-1945 Wartime paraphernalia including fireproof suits and parachute flares contained asbestos.

1945-1975 Post-war construction projects relied heavily on the use of asbestos reaching an all-time high in 1973.

1960s Health concerns began to surface in the US and UK after studies revealed that low levels of asbestos exposure could be more dangerous than previously thought

1990s The solid fuel boosters of the Space Shuttle are insulated with asbestos. One of the few remaining current uses.

Asbestos Containing Material

Thermal Systems Insulation (TSI)
Aircell sectional pipe insulation
Magnesium calcium silicate block sectional pipe insulation
Mudded elbows
HVAC ductwork
Tank and boiler insulation

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- Aircell sectional pipe insulation
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- Mudded elbows
- HVAC ductwork
- Tank and boiler insulation

Surfacing Materials (Sprayed-on or Troweled-on)
- Acoustical plaster on ceilings
- Spray on popcorn decorative ceilings
- Fireproofing of structural members
- Asbestos paper under floors and walls

Miscellaneous
- Flooring and mastics
- Roofing products
- Gaskets
- Ceiling tiles
- Window putty and caulking
- Adhesives
- Cement Asbestos Board

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Building Owners must have a survey of buildings to test for presence and location of ACM prior to maintenance, renovation or demolition activities (any type of disturbance). Notify all affected parties that may potentially disturb materials example= contractors

Health Effects

Pliny the Younger 1000BC- Slaves in mine

British Labor Inspectorate 1898-Banned asbestos dust

Asbestosis early 1900's

Cancer links first suspected mid 1930's

Mesothelioma – Causal link made in 1965

Dose Response Relationship- As the length of time one who is exposed increases the greater the effects of the exposure will increase

Latency Period

- Is the time between the first exposure and the onset of symptoms or disease
- In the case of asbestos exposure the latency period is from 10-30 years

Acute – short term exposure of seconds, minutes, or hours
Chronic – long duration, prolonged or repeated exposure

Medical Surveillance

Medical history questionnaire
Physical exam
Chest X-ray
Pulmonary function test

Employer is required to maintain all medical records. Minimum of employment plus 30 years

Worker protection regulations
Environmental protection regulations
Puget Sound Clean Air Agency Regulations

Occupational Safety and Health Act – Washington Industrial Safety and Health Act establishes a permissible exposure limit of – 0.1 f/cc or 100,000/ m^3

OSHA/ LnI Requires

- Engineering controls
- Work practices
- Protective clothing and respirators to reduce exposure
- Worker exposure monitoring with air monitoring and medicals

Classes of Asbestos Work

Class I- Thermal system insulation or surfacing ACM removal
Class II All other ACM (miscellaneous) removal of floors, roofs, siding, ceiling tiles, cement asbestos board, wiring, transite pipe, etc. Not TSI or surfacing
Class III- Disturbance or removal of small amount of ACM for purpose of maintenance or repair only. Must be able to fit in one 60"x 60" glove bag
Class IV- Custodial debris cleanup less than 1 square foot. Contact only, no disturbance

2 – Hour Asbestos Awareness workers can only perform Class IV work

Puget Sound Clean Air Agency

Requires removal prior to demolition
Requires adequate wetting of materials at all times during removal
Notification to agency
Proper labeling, shipping and disposal

PPE

Proper respirator
Proper protective clothing
Proper hygiene facilities – decontamination area
No dry sweeping
Wet methods
Use Only HEPA filtered vacuums
Prompt cleanup of waste and debris

Full protection during assessment
Initial air monitoring
Has to be representative of actual work activities

What is a Release?

Damage and debris caused from an unintentional disturbance

Immediate actions steps to take in the event of a release
- Do not disturb material
- Communicate to others in the area
- Minimize access
- Contact those qualified to provide emergency cleanup

LEAD

Health Hazards of Lead

- Headaches, tiredness and insomnia
- Loss of appetite
- Stomach pain
- Pain, weakness or twitching in your muscle
- Reduced sex drive
- Birth defect
- Kidney damage
- Constipation
- Weight loss
- Muscle and joint pain
- Permanent brain and nerve damage
- Lead is harmful to the fetus of pregnant women

Children are the most susceptible to lead. The amounts harmful to children are much lower than for adults

- Reduced attention span/ Hyperactivity
- Slowed growth
- Behavior & learning problems
- Hearing Problems.

There is no real “safe” amount of lead. The airborne permissible exposure limit is 50μg/m3
The amount considered safe in the blood is 40 μg/dl
Lead gets into your body by:

- Inhaling lead dust or lead spray paint, lead fumes from welding or burning on lead based paint
- Ingesting lead dust on your hands from eating, drinking or smoking or applying makeup

Products Containing Lead

- Soil
- Lead fishing weights
- Car weights for tire balancing
- Reloading bullets
- Dust
- Drinking water
- Gas
- Abrasive Blast Media
- Used as a Sweetener for Wine in Roman Empire
- Air
- Food
- Folk-cure medications.
- Vinyl miniblinds
- Pottery
- Leaded glass
- Plumbing and Soldering
  Banned in 1988
- Grecian formula for men

Ethnic home remedies:
“Greta” & “azarcon” for upset stomachs.
“pay-loo-ah” a red powder used to treat skin rashes

The following products used or items found on this worksite contain lead:

- Interior painted surfaces
- Exterior painted surfaces
- Interior and exterior doors and jambs
- Interior and exterior trim for windows
- Painted wood trim both interior and exterior

You may be exposed to lead at this jobsite in the following activities or locations:

- Demolition of Painted Surfaces Interior and Exterior
- Preparation of Surfaces for Repainting
- Removal of Painted Doors or Windows
- Demolition Required for Seismic Upgrade
- Soils Previously Contaminated
- Bridge painting
- Removing lead-based paint on old buildings or houses
- Grinding or sandblasting lead paint on metal structures
- Cutting or removing lead pipe in old buildings

Airborne Action Level 30 ug/m3 8-hr TWA
At this Level Training is required and Blood Tests required to be offered. Required if exposed for more than 30 days a year

Airborne Permissible Exposure Limit 50 ug/m3 8-hr TWA

Respiratory protection may be required based on the work activity
The type of respirator will depend on your exposure Use of Respirators

- Respirators must be worn at all times when the amount of lead in the air is above the PEL.
- Respirators must fit properly to prevent leaks.
- You must have a respirator medical evaluation before you wear a respirator.
- You must have a respirator fit-test before you wear a respirator.
- You can’t have a beard when you wear a tight-fitting respirator.
- We will train you on how to use your respirator.

What and When is Medical Monitoring Required

Anyone who is exposed to lead above the “airborne action level” must be provided blood tests. Offered for those exposed more than 1 day and required for more than 30 days exposure per year. If the amount of lead in your blood is more than 40, we will send you for a medical exam. Blood tests will be routinely done if you are exposed to lead for 30 or more days per year. This will occur every 2 months until six months and then every 6 months after unless your blood lead level exceeds 40 ug/dl.

Medical Removal for Lead Exposure

- If the amount of lead your blood is above 50, you will be temporarily removed from the lead job.
- You can't return to that job until your blood level drops below 40.
- Your blood must be tested monthly until the lead level drops below 40.
- Medical removal is required is because of the serious health effects of lead.

Your body will gradually rid itself of lead over time. You do not lose any earnings, seniority or benefits and you can return to former job status.

Best Practices:

- Don't eat, drink or smoke in the area where there is lead
- When you take a break, wash your hands before eating drinking or smoking
- Always use separate protective clothing and boots
- Street Cloths need to be stored in a clean separate place
- Always make sure clothing used in the work area is laundered at work
- Do not wear any clothing home that has been exposed to lead
- Work Practices to Control or Reduce Lead Exposure
- Do not remove dust by blowing with air or shaking, only remove by hepa vac and then laundering
- Remember to always wash your hands before eating, smoking, drinking or applying makeup
- Always shower at the end of the shift
- Don't dry sweep or blow down lead dust unless you have a ventilation system designed to remove the airborne dust
- Whenever feasible always use a hepa vacuum to remove dust and debris
- Whenever possible use wet methods when grinding or sanding to reduce lead exposure
- Use natural or mechanical ventilation
- Use vacuum attachments for grinders and sanders when possible

"Chelation" is the taking of certain drugs that help rid the body of lead. It is a form of treatment for high lead levels in the body. It is not allowed on a routine basis. Only a doctor can authorize and supervise lead Chelation.

Medical and Air Sampling Records

- You have the right to see any of your medical records related to lead
- You also have the right to see results of air sampling for lead

Silica Exposure

Background Information

Estimated Annual Deaths Potentially Avoided Under New Rule 600

Estimated Disease Avoided Under New Rule 900

Cost to Implement Rule Annually $1 Billion

Annual Net Benefit of Rule Implementation $3.8 - $7.7 Billion

Annual Cost Estimate for Each Employer $1,524

Silica definition

A chemical compound that is the main constituent of most of the Earth's rocks. Silica occurs naturally in five crystalline forms (quartz, tridymite, cristobalite, coesite, and stishovite),

Health Hazards of Silica

Shortness of breath, Chest Pain, Fatigue, Kidney Cancer, COPD, Persistent Tiredness, Loss Of Appetite, Potential loss of cognitive ability, Weight Loss/Weight Gain, Reduced Attention Span, Difficulty Sleeping, High blood pressure, Kidney problems, Memory and concentration, Muscle and joint pain

Chronic Exposure -10 or more years with mild symptoms

Accelerated Exposure – 5-10 years of exposure with moderated symptoms

Acute Exposure – Significant exposure from a few months to 5 years with significant symptoms that could be fatal

Silica has no known cure. Once diagnosed it is a chronic progressive disease.

There is no real “safe” amount of Silica. The airborne permissible exposure limit is 50ug/m3. The action level for silica is 25ug/m3

Route of exposure is Inhalation – Respirable silica is generally less than 10 microns in size. It is not visible to the naked eye.

How exposed:

- Inhaling Silica dust or Silica spray paint
- Cutting, drilling, grinding on concrete surfaces
- Rock crushing
- Grinding or sandblasting concrete surfaces that contain silica
- Products Containing Silica (Mortar Mix, Concrete Mix)
- Dust
- Soil next to roadway
- Demolition of Concrete Surfaces Interior and Exterior
- Preparation of Concrete Surfaces for Repainting
- Demolition Required for Seismic Upgrade
- Soils Previously Contaminated

The following is required if Above PEL:

- Respirator -the type of respirator will depend on your exposure
    - 50-500 ug/m3 half mask air purifying
- Gloves
- Boots
- Coveralls

Respirators must be worn at all times when the amount of Silica in the air is above the PEL.

- Respirators must fit properly to prevent leaks.
- You must have a respirator medical evaluation before you wear a respirator.
- You must receive training on how to properly wear the respirator
- You must have a respirator fit-test before you wear a respirator. Qualitative or Quantitative
- You can't have a beard when you wear a tight-fitting respirator.

Gloves, Boots, Coveralls

- Gloves must be appropriate for the operation
- Boots that are separate from regular shoes
- Cloth coveralls may be laundered and reused

Medical Monitoring

- Anyone doing construction work and wears a respirator more than 30 days a year.
- Other than construction work with exposure to silica above the action level for more than 30 days a year
- Medical exam offered within 30 days of initial assignment unless a similar type exam has been done within the previous 3 years

Medical Monitoring

- Medical and work history emphasis in silica, dust and other respiratory agents exposure, signs of respiratory disease
- Chest X-ray
- Pulmonary Function Test
- TB or other tests PLHCP determines as appropriate
- Medical Exams done at least every 3 years
- Copy of the standard given to the PLHCP
- Employees duties that are anticipated to disturb silica
- Anticipated Exposure
- Protective Equipment to be used
- Prior medical information
- Written report back from the PLHCP within 30 days

Medical and Air Sampling Records

- You have the right to see any of your medical records related to Silica
- You also have the right to see results of air sampling for Silica
- Medical records kept for 30 years plus employment

Engineering Controls and Work Practices

- Work Practices to Control or Reduce Silica Exposure
- Always wear your respirator
- Don't eat, drink or smoke in the area where there is Silica
- When you take a break, wash your hands before eating drinking or smoking Always vacuum off coveralls of excessive dust
- Only eat in approved break areas
- Always use separate protective clothing and boots
- Street Clothes need to be stored in a clean separate place
- Always make sure clothing used in the work area is laundered at work or at an approved facility
- Make sure that dirty laundry is enclosed in leak proof containers and have the appropriate warning labels
- Do not wear any clothing home that has been exposed to Silica dust
- Do not remove dust by blowing with air or shaking, only remove by hepa vac and then laundering
- Remember to always wash your hands before eating, smoking, drinking or applying makeup
- Don't dry sweep or blow down Silica dust unless you have a ventilation system designed to remove the airborne dust
- Whenever feasible always use a hepa vacuum to remove dust and debris
- Whenever possible use wet methods when grinding or sanding to reduce Silica exposure
- Use mechanical ventilation
- Use vacuum attachments for grinders and sanders when possible

Examples of engineering controls:

- Dust collection systems
- Wet blasting methods
- Vacuum assisted tools
- Containment systems
- Signs
- Barrier tape

Air Monitoring

- Any time there is a disturbance of Silica based products for the purpose of alteration, modification, demolition, renovation and you are not able to comply with Table 1.
- You must do representative sampling that represents worst case scenario for each work task.
- Anytime that it is reasonable to assume exposure to at or above the Action Level
- Anytime you do not have solid exposure monitoring detail or historical data

Frequency

- Above the Action Level but below the PEL you must sample every 6 months.
- Above the PEL sampling must be repeated every 3 months
- Below the action level you may discontinue.
- If a sample is taken that shows you are now below the action level you must take two samples at least 7 days apart to be able to discontinue sampling
- You must sample when there is a new process or procedure method

A representative sample must be taken of each exposure producing task. Monitoring should be done on the employee that would have the highest level of exposure in that task to ensure it is an accurate representation. Tests need to be of full shift duration

- Make sure the air sample pump is fully charged
- Remove an air sample cassette from the box remove end caps and connect to tygon tubing
- Calibrate pump at the start of the shift and record the flow rate on the air sample data sheet
- Place pump on the worker so the air sample cassette is within 6 inches of the workers breathing zone and the cassette is pointing down.
- Check pump several times throughout the day to ensure it is operating properly.
- At the end of shift remove the pump and cassette from the worker
- Calibrate the pump and record the flow rate on the air sample data sheet
- Submit the sample to the lab for sample results

Information needed for sample collection:

- Air sample data sheet
- Employee name
- Type of sample
- Type of work activity
- Sample number-This should be a sequential number that goes throughout the whole job and is on the data sheet and the air cassette
- Date
- Time the sample started
- Flow rate at start
- Flow rate at the end of shift
- Supervisors signature
- Desired turnaround time

Sampling Results

- When results arrive they will determine the next course of action to be taken by the employer.
- Are the results above the action level
- Are the results above the PEL
- What will be needed as ppe based on the results
- Historical data may be used in lieu of air monitoring if it is the same type of activity processes and procedures and done

Employee Notification:

- The employer is required to give written notice to employees of the results of the air sample within five days of receiving the results.
- The employee has a right to have a designated person observe the monitoring. (i.e. union rep.)

Silica Compliance Plan- First you must institute engineering and work practice controls

The plan must contain the following:

- Description of each Silica producing activity
- Equipment used, job responsibilities, operating and maintenance procedures
  - What technology was considered in meeting the pel
  - Documented air monitoring results
  - Implementation of the program
  - A work practice program
  - Administrative control schedule if applicable
  - Frequent inspections by competent person
  - Program to be revised and updated every 12 months

Daily Checklist

Beginning at Shift

- Are all street cloths stored in a clean and separate change area?
- Clean Protective clothing worn?
- Respirator inspected for defects?
- Proper fits checks done on respirator?
- Supplied air respirators and systems checked and working properly?
- No food, cosmetics or tobacco in work area?
- Lunch areas designated

End of Shift

- Remove outer protective clothing and vacuum off surface dust?
- Remove and store protective clothing in separate storage area?
- Place protective clothing for laundering into sealed approved container?
- Leave all ppe and equipment on jobsite?
- Properly clean and store respirators?
- Properly wash before leaving the jobsite?
- Only wear clean clothing when leaving the jobsite?

DOSH/OSHA Silica regulations for construction is found in WAC 296-840.