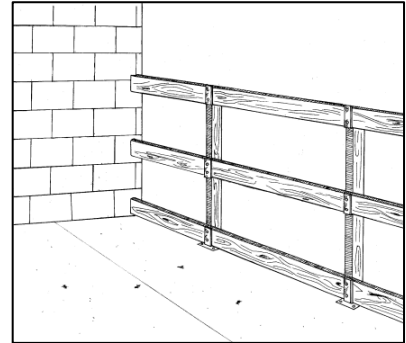


Guardrail and Safety Net Systems Summary

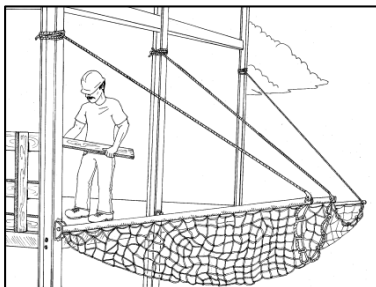
Guardrail and safety net systems are two ways to protect workers from falls on the job. If you are more than 6 feet above the lower surface, some type of fall protection must be used by your employer.

If your employer uses **guardrails**:

- Toprails must be at least $\frac{1}{4}$ inch thick to prevent cuts and lacerations; and they must be between 39 and 45 inches from the working surface;
- If wire rope is used, it must be flagged at least every six feet with highly visible materials;
- Midrails, screens or mesh must be installed when there are no walls at least 21 inches high. Screens and mesh must extend from the toprail to the working level.
- There can be no openings more than 19 inches;
- The toprail must withstand at least 200 lbs. of force; the midrail must withstand 150 lbs. of force;
- The system must be smooth enough to protect workers from cuts and getting their clothes snagged by the rail.
- If guardrails are used around holes at points of access, like a ladderway, a gate must be used to prevent someone from falling through the hole, or be offset so that a person cannot walk directly into the hole.



If your employer uses **safety nets**:



- The nets must be as close as practicable under the working surface, but never more than 30 feet below;
- The safety net must be inspected every week for damage;
- Each net must have a border rope with a minimum strength of 5,000 lbs.;
- The safety net must extend outward a sufficient distance, depending on how far the net is from the working surface (OSHA has a formula to follow);
- The safety net must absorb the force of a 400-pound bag of sand dropping on to the net ("the drop test");
- Items in the net that could be dangerous must be removed as soon as possible.

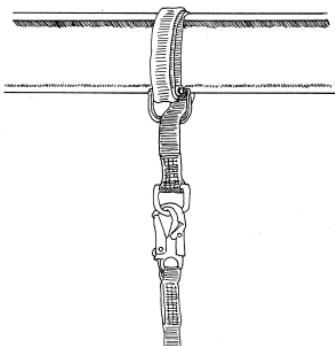
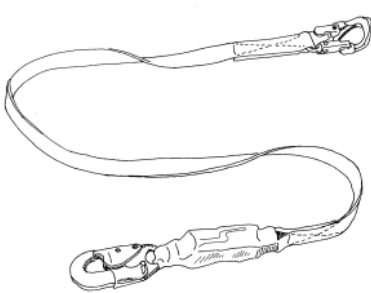

SOURCE: Construction Safety & Health Fall Hazards, Central New York COSH, 2007, OSHA grant product

Personal Fall Arrest Systems Summary

Personal fall arrest systems are one way to protect workers from falls. In general, workers must have fall protection when they could fall 6 feet or more while they are working.

OSHA **requires** workers to wear a full-body harness, (one part of a *Personal Fall Arrest System*) when they are working on a *suspended scaffold* more than *10 feet* above the working surface, or when they are working in *bucket truck or aerial lift*. Employers may also choose to use a Personal Fall Arrest System, instead of a guardrail, when workers are working on a *supported scaffold* more than 10 feet above the working surface.

There are **three** major components of a Personal Fall Arrest System (PFAS):

		
• the anchor and the anchorage connector	• the connecting device, which is a lanyard or a retractable lifeline, with snaphooks	• the full-body harness

The following are some things to remember about personal fall arrest systems:

1. A personal fall arrest system is made up of an **anchorage, connecting device, and a full-body harness**. The connecting device may be a lanyard with snaphooks, or a self-retracting lifeline. A lanyard could also include a deceleration device. Make sure you are using components from the same manufacturer to ensure that the system works as it should. If not, any substitution or change must be evaluated or tested by a competent person to ensure that it meets the standard.
2. **Body belts cannot be used** for fall arresting service. However, a body belt is allowed as part of a positioning system. A positioning system is one way to prevent falls from occurring. It involves equipment for keeping your body in a position where you are not able to fall. For all situations where you could actually fall, you need to wear a full-body harness.
3. Your personal fall arrest system must be **inspected for damage** each time before you wear it. [If there are defects, or if someone has taken a fall using the equipment, it must be removed from service.]

4. The **attachment location** of the body harness must be in the center of your back, near the shoulder level or above your head.
5. **Vertical lifelines or lanyards** must have a minimum breaking strength of 5,000 lbs., and be protected against being cut or abraded.
6. Each worker must be attached to a **separate vertical lifeline**. [There is a special exception when constructing elevator shafts.]
7. The **webbing**, which is the materials used for ropes and straps of lifelines, lanyard and harnesses, must be made of **synthetic** fibers.
8. **An anchorage** for workers' personal fall arrest equipment must be **independent of any anchorage** used to support or suspend platforms, and it must be able to support at least 5,000 lbs. per worker attached to it.
9. **Connectors** must be made from **steel or equivalent** materials, with a corrosion-resistant finish and the edges must be smooth.
10. **D-rings and snaphooks** must have a **minimum tensile strength** of 5,000 lbs.
11. **Snaphooks** must be a **locking-type** (they are generally double-locking) and designed to prevent the snaphook from opening and slipping off the connector.
12. **Snaphooks cannot be directly connected** to the webbing, rope or wire, to each other, to a D-ring to which another snaphook or other connector is attached, to a horizontal lifeline, or to any other object that could cause the snaphook to open.

Source: Construction Safety & Health Fall Hazards, Central New York COSH, 2007, OSHA grant product

Preventing Ladder Falls - *Construction Safety*

Why construction falls?

Here are few basic facts about falls in construction:

- Every day, four construction workers die on the job.
- Falls are the most common cause of fatal injuries to construction workers.
- The consequences of a fall affect not only the worker, but also his or her family and community.
- Construction falls can be prevented. Contractors and foreman can do many things to organize the worksite to be safer for their employees. But workers themselves can also make some inexpensive, simple changes to the way they work that can save their lives.
- Ladders are one of the most common pieces of equipment on a construction site. But that doesn't mean they are safe. There are construction workers who are injured or killed falling from a height every day. Using ladders more safely is one way to start preventing falls at your work site.



Set an example at work

Your co-workers can learn a lot from you. At first, you might be the only one who is concerned with safety at your worksite. But over time, other workers will see that the foreman will give you the time you need to be safe. They will see how many little things add up to big effects on safety. And they will see how they, too, can help to make your worksite safer.

So, set an example. Don't worry about being the first—they'll thank you for it later.

How can I prevent a fall from a ladder?

There are many ways you can prevent a fall from a ladder—here are just three suggestions to get you started.

- **Choose the right ladder for the job.**
- **Tie the top and bottom of the ladder to fixed points when necessary.**
- **Don't carry tools or other materials in-hand while climbing the ladder.**

1. Choose the right ladder for the job.

- First you need to make sure that a ladder is the best equipment for what you need to do. Would scaffolding or a mechanical lift be better?
- Many times, the ladder is the only physical support you have while you are working. If it fails, you can fall. That's why it is so important to find the right ladder when you do need to use one. The three main types of ladders—step ladders, straight ladders, and extension ladders—are used in different situations for different tasks.
- Before you start using a ladder, ask yourself two questions.
- **Is the ladder long enough?** It should be long enough for you to set it at a stable angle and still extend at the top to give you something to hold on to when you get

on the ladder to descend. Setting the ladder at the right angle helps you keep your balance on the ladder. It also helps keep the ladder from falling backwards.

- Make sure the ladder extends 3 feet (3 rungs; 0.9 meters) above the surface you will be working on.
 - Make sure the ladder is placed at a stable angle. For every four feet (1.2 m) high the ladder is, the base should be 1 foot (.3 m) out from the wall
 - For example, if you will be working on a 10 foot-high roof (3 m), you need a ladder that is at least 14 feet (4.25 m) long. The base should be 2 ½ feet (.75 m) from the wall.
- **Is the ladder in good working condition?** It shouldn't be missing pieces or be cracked or otherwise damaged. Check the duty rating on extension ladders – is it high enough for the weight you will be putting on it? Longer ladders don't always have higher duty ratings, so be sure to check. In construction, the most common ratings are:
- Heavy Duty (I) supports up to 250 pounds (113 kg).
 - Extra heavy duty (IA) supports up to 300 pounds (136 kg).
 - Special duty (IAA) supports up to 375 pounds (170 kg).

2. Tie the top and bottom of the ladder to fixed points when necessary: if it doesn't extend 3' above the landing, on slippery surfaces, and where it could be displaced by work activities or traffic.

- Tie both sides of the top of the ladder to a fixed point on the roof or other high surface near where you are working. The bottom should be tied to a fixed point on the ground. Securing the ladder in this way prevents the ladder from sliding side-to-side or falling backwards and prevents the base from sliding.
- Tying the ladder off at the beginning of the day and untying it at the end will only take you about 5 minutes. It can make all the difference for your safety. If you need to move the ladder around, allow extra time for this important step, or consider using something else, such as a scaffold.

3. Don't carry tools or other materials in-hand while climbing the ladder.

- Take precautions when you are going up or down a ladder. Instead of carrying tools, boards, or other materials in your hands, use a tool belt, install a rope and pulley system, or tie a rope around your materials and pull them up once you have reached the work surface. Ask for help if you need to use more than one hand to pull them up.
- Carrying tools or anything else in your hands as you climb the ladder can throw you off balance. When you climb a ladder, always use at least one hand to grasp the ladder when going up or down.

Source: CDC/NIOSH in partnership with CPWR-The Center for Construction Research and Training, Hollywood, Health and Society, and the Spanish-language network Telemundo.

Scaffold Work Can Be Dangerous: Know the Basics of Scaffold Safety

There are thousands of scaffold-related injuries – and about 40 scaffold-related deaths – every year in the U.S. If you are doing work on scaffolds, know how to work on them safely – it could save your life!

Here are some rules about scaffolds that must be followed if you want to work safely:



1. A **competent person** must be available to direct workers who are constructing or moving scaffolds. The competent person must also train workers, and **inspect** the scaffold and its components **before every work shift, and after any event that could affect the structural integrity of the scaffold**. The competent person must be able to identify unsafe conditions, and be authorized by the employer to take action to correct unsafe conditions, to make the workplace safe. And a **qualified person**, someone who has very specific knowledge or training, must actually design the scaffold and its rigging.

2. Every **supported** scaffold and its components must **support, without failure, its own weight and at least four times the intended load**. The intended load is the sum of the weights of all personnel, tools and materials that will be placed on the scaffold. Don't load the scaffold with more weight than it can safely handle.

3. On **supported** scaffolds, working platforms/decks must be planked close to the guardrails. Planks are to be overlapped on a support at least 6 inches, but not more than 12 inches.

4. Inspections of **supported** scaffolds must include:

- Checking metal components for bends, cracks, holes, rust, welding splatter, pits, broken welds and non-compatible parts.
- Covering and securing floor openings and labeling floor opening covers.

5. Each rope on a **suspended** scaffold must support the scaffold's weight and at least **six times** the intended load.

6. Scaffold **platforms** must be at least **18 inches wide, (there are some exceptions)**, and guardrails and/or personal fall arrest systems must be used for fall protection any time you are working 10 feet or more above ground level. **Guardrails** must be between 39 and 45 inches high, and **midrails** must be installed approximately halfway between the toprail and the platform surface.

7. OSHA standards require that workers have **fall protection when working on a scaffold 10 or more feet above the ground**. OSHA requires the following:

- The use of a **guardrail OR a personal fall arrest system** when working on a ***supported scaffold***.
- **BOTH a guardrail AND a personal fall arrest system** when working on a ***single-point or two-point suspended scaffold***.
- A **personal fall arrest system** when working on an ***aerial lift***.

8. Your lifeline must be tied back to a **structural anchorage** capable of withstanding **5,000 lbs** of dead weight **per person** tied off to it. Attaching your lifeline to a guardrail, a standpipe or other piping systems will not meet the 5,000 lbs requirement and is not a safe move.

9. Wear hard hats, and make sure there are toeboards, screens and debris nets in place **to protect other people from falling objects**.

10. **Counterweights** for ***suspended scaffolds*** must be able to resist at least **four times the tipping moment**, and they must be made of materials that cannot be easily dislocated (no sand, no water, no rolls of roofing, etc.). [This would be calculated by the **qualified person** who designs the scaffold.]

11. Your employer must provide safe access to the scaffold when a platform is more than two (2) feet above or below the point of access, or when you need to step across more than 14 inches to get on the platform. **Climbing on cross braces is not allowed!** Ladders, stair towers, ramps and walkways are some of the ways of providing safe access.

12. All workers must be **trained** on:

- how to use the scaffold, and how to recognize hazards associated with the type of scaffold they are working on;
- the maximum intended load and capacity;
- how to recognize and report defects;
- fall hazards, falling object hazards and any other hazards that may be encountered, including electrical hazards (such as overhead power lines); and,
- having proper fall protection systems in place.

SOURCE: Construction Safety & Health Fall Hazards, Central New York COSH, 2007, OSHA grant product

Reducing Falls in Construction: Safe Use of Extension Ladders

Workers who use extension ladders risk permanent injury or death from falls and electrocutions. These hazards can be eliminated or substantially reduced by following good safety practices. This fact sheet examines some of the hazards workers may encounter while working on **extension ladders** and explains what employers and workers can do to reduce injuries. OSHA's requirements for extension ladders are in Subpart X—Stairways and Ladders of OSHA's Construction standards.

What is an Extension Ladder?

Also known as "portable ladders," extension ladders usually have two sections that operate in brackets or guides allowing for adjustable lengths. (See Figure 1, below.) Because extension ladders are not self-supporting they require a stable structure that can withstand the intended load.

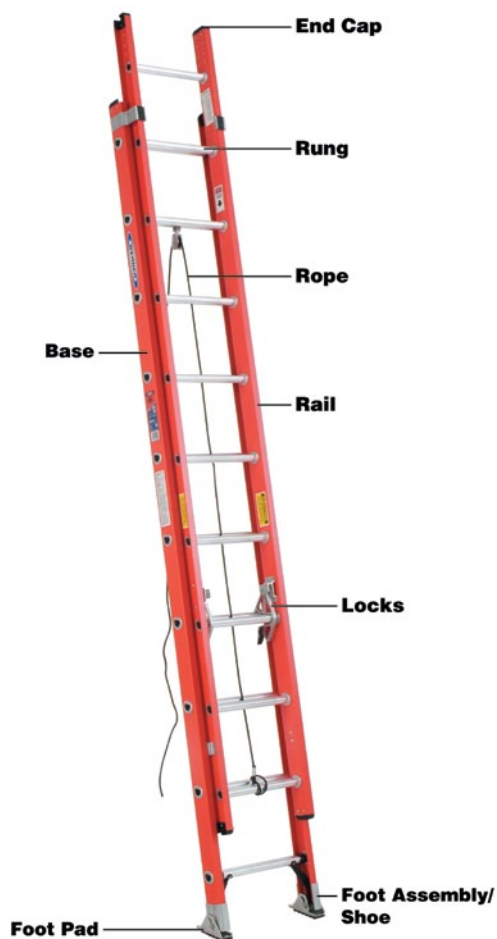


Figure 1: Extension Ladder

PLAN Ahead to Get the Job Done Safely.

- Use a ladder that can sustain at least four times the maximum intended load, except that each extra-heavy duty type 1A metal or plastic ladder shall sustain at least 3.3 times the maximum intended load. Also acceptable are ladders that meet the requirements set forth in Appendix A of Subpart X. Follow the manufacturer's instructions and labels on the ladder. To determine the correct ladder, consider your weight plus the weight of your load. Do not exceed the load rating and always include the weight of all tools, materials and equipment.
- A competent person must visually inspect all extension ladders before use for any defects such as: missing rungs, bolts, cleats, screws and loose components. Where a ladder has these or other defects, it must be immediately marked as defective or tagged with "Do Not Use" or similar language.
- Allow sufficient room to step off the ladder safely. Keep the area around the bottom and the top of the ladder clear of equipment, materials and tools. If access is obstructed, secure the top of the ladder to a rigid support that will not deflect, and add a grasping device to allow workers safe access.
- Set the ladder at the proper angle. When a ladder is leaned against a wall, the bottom of the ladder should be one-quarter of the ladder's working length away from the wall. For access to an elevated work surface, extend the top of the ladder three feet above that surface or secure the ladder at its top.
- Before starting work, survey the area for potential hazards, such as energized overhead power lines. Ladders shall have

nonconductive side rails if they are used where the worker or the ladder could contact exposed energized electrical equipment. Keep all ladders and other tools at least 10 feet away from any power lines.

- Set the base of the ladder so that the bottom sits securely and so both side rails are evenly supported. The ladder rails should be square to the structure against which it is leaning with both footpads placed securely on a stable and level surface.
- Secure the ladder's dogs or pawls before climbing.
- When using a ladder in a high-activity area, secure it to prevent movement and use a barrier to redirect workers and equipment. If the ladder is placed in front of a door, always block off the door.



Figure 2: Ladder extending three feet above the landing area.

PROVIDE the Right Extension Ladder for the Job with the Proper Load Capacity.

Select a ladder based on the expected load capacity (duty rating), the type of work to be done and the correct height. There are five categories of ladder duty ratings.

Type	Duty Rating	Use	Load
IAA*	Special Duty	Rugged	375 lbs.
IA	Extra Duty	Industrial	300 lbs.
I	Heavy Duty	Industrial	250 lbs.
II	Medium Duty	Commercial	225 lbs.
III	Light Duty	Household	200 lbs.

Source for Types IA, I, II, III: Subpart X—Stairways and Ladders, Appendix A (American National Standards Institute (ANSI)) 14.1, 14.2, 14.5 (1982) of OSHA's Construction standards. Source for Type IAA: ANSI 14.1, 14.2, 14.5 (2009), which are non-mandatory guidelines.

TRAIN Workers to Use Extension Ladders Safely.

Employers must train each worker to recognize and minimize ladder-related hazards.



Safe Ladder Use—DO:

- Maintain a 3-point contact (two hands and a foot, or two feet and a hand) when climbing/ descending a ladder.
- Face the ladder when climbing up or descending.
- Keep the body inside the side rails.
- Use extra care when getting on or off the ladder at the top or bottom. Avoid tipping the ladder over sideways or causing the ladder base to slide out.
- Carry tools in a tool belt or raise tools up using a hand line. Never carry tools in your hands while climbing up/down a ladder.
- Extend the top of the ladder three feet above the landing. (See Figure 2.)
- Keep ladders free of any slippery materials.

Safe Ladder Use—DO NOT:

- Place a ladder on boxes, barrels, or unstable bases.
- Use a ladder on soft ground or unstable footing.
- Exceed the ladder's maximum load rating.
- Tie two ladders together to make them longer.
- Ignore nearby overhead power lines.
- Move or shift a ladder with a person or equipment on the ladder.
- Lean out beyond the ladder's side rails.
- Use an extension ladder horizontally like a platform.

OSHA standard: 29 CFR 1926 Subpart X—Stairways and Ladders

American National Standards Institute standard: ANSI A14.1, A14.2, A14.5—Ladder Safety Requirements
(Not an OSHA standard, included to be used as guidance to meet OSHA's requirements)

Employers using extension ladders must follow the ladder requirements set forth in 29 CFR 1926 Subpart X. Per Appendix A to Subpart X of Part 1926—Ladders, ladders designed in accordance with the following ANSI standards will be considered in accordance with 29 CFR 1926.1053(a)(1): ANSI A14.1-1982—American National Standard for Ladders—Portable Wood—Safety Requirements, ANSI A14.2-1982—American National Standard for Ladders—Portable Metal—Safety Requirements, and ANSI A14.5-1982—American National Standard for Ladders—Portable Reinforced Plastic—Safety Requirements.

State plan guidance: States with OSHA-approved state plans may have additional requirements for avoiding falls from ladders. For more information on these requirements, please visit: www.osha.gov/dcsp/osp/statesstandards.html.

Most OSHA offices have compliance assistance specialists to help employers and workers comply with OSHA standards. For details call 1-800-321-OSHA (6742) or visit: www.osha.gov/htm/RAmap.html.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It's confidential.



U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

Reducing Falls in Construction: Safe Use of Stepladders

Workers who use ladders in construction risk permanent injury or death from falls and electrocutions. These hazards can be eliminated or substantially reduced by following good safety practices. This fact sheet examines some of the hazards workers may encounter while working on **stepladders** and explains what employers and workers can do to reduce injuries. OSHA's requirements for stepladders are in Subpart X—Stairways and Ladders of OSHA's Construction standards.

What is a Stepladder?

A **stepladder** is a portable, self-supporting, A-frame ladder. It has two front side rails and two rear side rails. Generally, there are steps mounted between the front side rails and bracing between the rear side rails. (See Figure 1, below.)

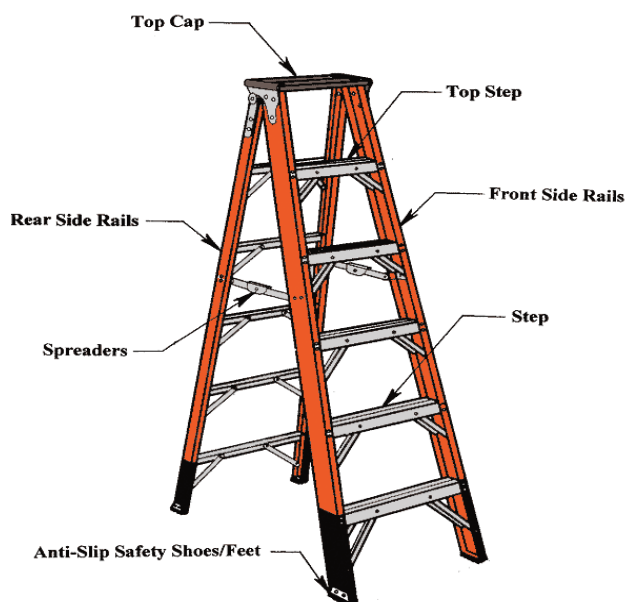


Figure 1: Stepladder

PLAN Ahead to Get the Job Done Safely.

A competent person must visually inspect stepladders for visible defects on a periodic basis and after any occurrence that could affect their safe use. Defects include, but are not limited to:

- Structural damage, split/bent side rails, broken or missing rungs/steps/cleats and missing or damaged safety devices.

- Grease, dirt or other contaminants that could cause slips or falls.
- Paint or stickers (except warning or safety labels) that could hide possible defects.

PROVIDE the Right Stepladder for the Job with the Proper Load Capacity.

- Use a ladder that can sustain at least four times the maximum intended load, except that each extra-heavy duty type 1A metal or plastic ladder shall sustain at least 3.3 times the maximum intended load. Also acceptable are ladders that meet the requirements set forth in Appendix A of Subpart X. Follow the manufacturer's instructions and labels on the ladder. To determine the correct ladder, consider your weight plus the weight of your load. Do not exceed the load rating and always include the weight of all tools, materials and equipment.

Type	Duty Rating	Use	Load
1AA	Special Duty	Rugged	375 lbs.
1A	Extra Heavy Duty	Industrial	300 lbs.
I	Heavy Duty	Industrial	250 lbs.
II	Medium Duty	Commercial	225 lbs.
III	Light Duty	Household	200 lbs.

Source for Types IA, I, II, III: Subpart X—Stairways and Ladders, Appendix A (American National Standards Institute (ANSI) 14.1, 14.2, 14.5 (1982)) of OSHA's Construction standards. Source for Type IAA: ANSI 14.1, 14.2, 14.5 (2009), which are non-mandatory guidelines.

TRAIN Workers to Use Stepladders Safely.

Employers must train each worker to recognize and minimize ladder-related hazards.



PLAN. PROVIDE. TRAIN.

Three simple steps to prevent falls.

Common Stepladder Hazards

- Damaged stepladder
- Ladders on slippery or unstable surface
- Unlocked ladder spreaders
- Standing on the top step or top cap
- Loading ladder beyond rated load
- Ladders in high-traffic location
- Reaching outside ladder side rails
- Ladders in close proximity to electrical wiring/equipment

Safe Stepladder Use—DO:

Read and follow all the manufacturer's instructions and labels on the ladder.

- Look for overhead power lines before handling or climbing a ladder.
- Maintain a 3-point contact (two hands and a

foot, or two feet and a hand) when climbing/descending a ladder.

- Stay near the middle of the ladder and face the ladder while climbing up/down.
- Use a barricade to keep traffic away from the ladder.
- Keep ladders free of any slippery materials.
- Only put ladders on a stable and level surface that is not slippery.

Safe Stepladder Use—DO NOT:

- Use ladders for a purpose other than that for which they were designed. For example, do not use a folded stepladder as a single ladder.
- Use a stepladder with spreaders unlocked.
- Use the top step or cap as a step.
- Place a ladder on boxes, barrels or other unstable bases.
- Move or shift a ladder with a person or equipment on the ladder.
- Use cross bracing on the rear of stepladders for climbing.
- Paint a ladder with opaque coatings.
- Use a damaged ladder.
- Leave tools/materials/equipment on stepladder.
- Use a stepladder horizontally like a platform.
- Use a metal stepladder near power lines or electrical equipment.

OSHA standard: 29 CFR 1926 Subpart X—Stairways and Ladders

American National Standards Institute standard: ANSI A14.1, A14.2, A14.5—Ladder Safety Requirements
(Not an OSHA standard, included to be used as guidance to meet OSHA's requirements)

Employers using stepladders must follow the ladder requirements set forth in 29 CFR 1926 Subpart X. Per Appendix A to Subpart X of Part 1926—Ladders, ladders designed in accordance with the following ANSI standards will be considered in accordance with 29 CFR 1926.1053(a)(1): ANSI A14.1-1982—American National Standard for Ladders-Portable Wood-Safety Requirements, ANSI A14.2-1982—American National Standard for Ladders—Portable Metal—Safety Requirements, and ANSI A14.5-1982—American National Standard for Ladders—Portable Reinforced Plastic—Safety Requirements.

State plan guidance: States with OSHA-approved state plans may have additional requirements for avoiding falls from ladders. For more information on these requirements, please visit: www.osha.gov/dcsp/osp/statesstandards.html.

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U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

Reducing Falls in Construction: Safe Use of Job-made Wooden Ladders

Workers who use job-made wooden ladders risk permanent injury or death from falls and electrocutions. These hazards can be eliminated or substantially reduced by following good safety practices. This fact sheet lists some of the hazards workers may encounter while working on **job-made wooden ladders** and explains what employers and workers can do to reduce injuries. OSHA's requirements for job-made ladders are in Subpart X—Stairways and Ladders of OSHA's Construction standards.

What is a Job-made Wooden Ladder?

A job-made wooden ladder is a ladder constructed at the construction site. It is not commercially-manufactured. A job-made wooden ladder provides access to and from a work area. It is not intended to serve as a work platform. These ladders are temporary, and are used only until a particular phase of work is completed or until permanent stairways or fixed ladders are installed. A 24-ft. job-made ladder built to the American National Standards Institute (ANSI) A14.4-2009 non-mandatory guidelines is shown below.

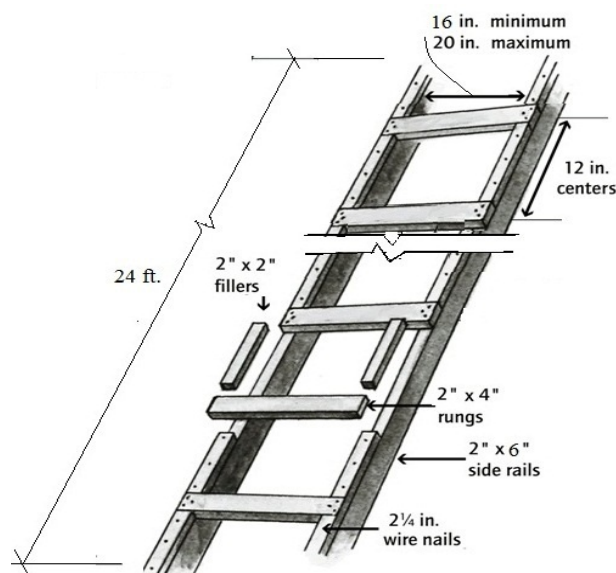


Figure 1: Single-Cleat Ladder

Training Requirements

Employers must provide a training program for employees using ladders and stairways. The training must enable each worker to recognize ladder-related hazards and to use ladders properly to minimize hazards.

Constructing a Safe Job-made Wooden Ladder

Side rails:

- Use construction-grade lumber for all components.
- Side rails of single-cleat ladders up to 24 ft. (7.3 m) long should be made with at least 2 in. (3.8 cm) x 6 in. (14 cm) nominal stock lumber.
- Side rails should be continuous, unless splices are the same strength as a continuous rail of equal length.
- The width of single-rung ladders should be at least 16 in. (41 cm), but not more than 20 in. (51 cm) between rails measured inside to inside.
- Rails should extend above the top landing between 36 in. (91.5 cm) and 42 in. (1.1 m) to provide a handhold for mounting and dismounting, and cleats must be eliminated above the landing level.
- Side rails of ladders which could contact energized electrical equipment should be made using nonconductive material. Keep ladders free of any slippery materials.
- Only put ladders on a stable and level surface that is not slippery.

Cleats:

- Cleats should be equally spaced 12 inches on center from the top of one cleat to the top of the next cleat.
- Cleats should be fastened to each rail with three 12d common wire nails which are nailed directly onto the smaller surfaces of the side rails.
- Making cuts in the side rails to receive the cleats is not advisable.
- Cleats should be at least 1 in. (2.5 cm) x 4 in. (8.9 cm) for ladders 16 ft. (41 cm) to 24 ft. (7.3 m) in length.

Filler Blocks:

- Filler should be 2 in. (3.8 cm) x 2 in. (3.8 cm) wood strips.
- Insert filler between cleats.
- Nail filler at the bottom of each side rail first. Nail the ends of a cleat to each side rail with three 12d common nails. One nail is placed 1-1/2 inch in from each end of the filler block.
- Nail the next two fillers and cleat, and then repeat. The ladder is complete when filler is nailed at the top of each rail.
- Make all side rails, rungs and fillers before the ladder is assembled.

Inspecting Ladders

- A competent person must visually inspect job-made ladders for defects on a periodic basis and after any occurrence that could affect their safe use.
- Defects to look for include: structural damage, broken/split side rails (front and back), missing cleats/steps, and parts/labels painted over.
- Ladders should be free of oil, grease and other slipping hazards.



Safe Ladder Use—DO:

To prevent workers from being injured from falls from ladders, employers are encouraged to adopt the following practices:

- Secure the ladder's base so that it does not move.
- Smooth the wood surface of the ladder to reduce injuries to workers from punctures or lacerations and to prevent snagging of clothing.
- Use job-made wooden ladders with spliced side rails at an angle so that the horizontal distance from the top support to the foot of the ladder is one-eighth the working length of the ladder.
- Ensure that job-made wooden ladders can support at least four times the maximum intended load.
- Only use ladders for the purpose for which they were designed.
- Only put ladders on stable and level surfaces unless secured to prevent accidental movement.
- Ensure that the worker faces the ladder when climbing up and down.
- Maintain a 3-point contact (two hands and a foot, or two feet and a hand) when climbing a ladder.
- Keep ladders free of any slippery materials.
- Maintain good housekeeping in the areas around the top and bottom of ladders.

Safe Ladder Use—DO NOT:

- Paint a ladder with nontransparent coatings.
- Carry any object or load that could cause the worker to lose balance and fall.
- Subject a job-made wooden ladder to excessive loads or impact tests.

OSHA standard: 29 CFR 1926 Subpart X—Stairways and Ladders

American National Standards Institute standard: ANSI A14.4-1979, ANSI A14.4-2009

Employers constructing job-made ladders must follow the ladder requirements set forth in 29 C.F.R. 1926 Subpart X. They are encouraged to consult the non-mandatory guidelines set forth in ANSI A.14.4-1979—Safety Requirements for Job-Made Ladders (referenced in Appendix A to Subpart X of Part 1926—Ladders) and ANSI A.14.4-2009—Safety Requirements for Job-Made Wooden Ladders.

State plan guidance: States with OSHA-approved state plans may have additional requirements for avoiding falls from ladders. For more information on these requirements, please visit: www.osha.gov/dcsp/osp/statesstandards.html.

Most OSHA offices have compliance assistance specialists to help employers and workers comply with OSHA standards. For details call 1-800-321-OSHA (6742) or visit: www.osha.gov/htm/RAmap.html.

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For assistance, contact us. We can help. It's confidential.



**U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)**

Portable Ladder Safety



Falls from portable ladders (step, straight, combination and extension) are one of the leading causes of occupational fatalities and injuries.

- Read and follow all labels/markings on the ladder.
- Avoid electrical hazards! – Look for overhead power lines before handling a ladder. Avoid using a metal ladder near power lines or exposed energized electrical equipment.
- Always inspect the ladder prior to using it. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.

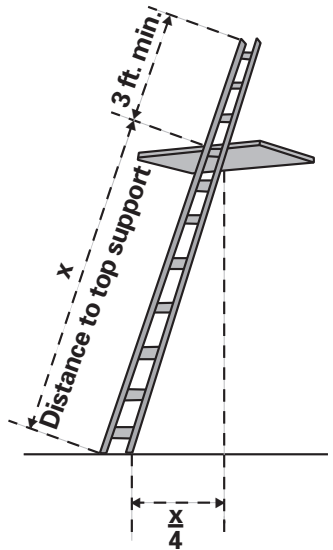


3-Point Contact

- Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing (see diagram).
- Only use ladders and appropriate accessories (ladder levelers, jacks or hooks) for their designed purposes.
- Ladders must be free of any slippery material on the rungs, steps or feet.
- Do not use a self-supporting ladder (e.g., step ladder) as a single ladder or in a partially closed position.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.

(continued on reverse)

- Use a ladder only on a stable and level surface, unless it has been secured (top or bottom) to prevent displacement.
- Do not place a ladder on boxes, barrels or other unstable bases to obtain additional height.
- Do not move or shift a ladder while a person or equipment is on the ladder.
- An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support (see diagram). Do not stand on the three top rungs of a straight, single or extension ladder.
- The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface (see diagram).
- A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to keep traffic away from the ladder.
- Be sure that all locks on an extension ladder are properly engaged.
- Do not exceed the maximum load rating of a ladder. Be aware of the ladder's load rating and of the weight it is supporting, including the weight of any tools or equipment.



For more information:



**Occupational
Safety and Health
Administration**

U.S. Department of Labor

www.osha.gov (800) 321-OSHA (6742)

Name: _____

Date: _____

Knowledge Check: Stairways and Ladders

1. When portable ladders are used for access to an upper landing surface, how many feet above the upper landing must the side rails extend?
 - a. 2 feet
 - b. 3 feet
 - c. 4 feet
 - d. 5 feet
2. You can use a metal ladder around power lines or exposed energized electrical equipment.
 - a. True, but ONLY if there is no other option to get the work done.
 - b. False, you should NEVER use a metal ladder in this circumstance.
3. Handrails must be able to withstand, without failure, how many pounds of weight applied within 2 inches of the top edge in any direction or outward direction?
 - a. 300 pounds
 - b. 250 pounds
 - c. 200 pounds
 - d. 175 pounds
4. Stairways that have four or more risers MUST have a stair rail.
 - a. True
 - b. False
5. A non-self-supporting ladder should be set up at _____ (horizontal distance/working length of ladder).
 - a. 90 degree angle
 - b. 30 degree angle
 - c. 1:2 angle
 - d. 1:4 angle

Tube and Coupler Scaffolds — Erection and Use

Workers building scaffolds risk serious injury from falls and tip-overs, being struck by falling tools and other hazards, and electrocution from energized power lines. Before starting any scaffold project, the employer should conduct a hazard assessment to ensure the safety of workers.

A tube and coupler scaffold has a platform(s) supported by tubing, and is erected with coupling devices connecting uprights, braces, bearers, and runners (see Fig. 1). Due to their strength, these scaffolds are frequently used where heavy loads need to be carried, or where multiple platforms must reach several stories high. These scaffolds can be assembled in multiple directions, making them the preferred option for work surfaces with irregular dimensions and/or contours.

When Erecting a Scaffold

- Use footings that are level, sound, rigid and capable of supporting the load without settlement or displacement.
- Plumb and brace poles, legs, posts, frames, and uprights to prevent swaying and displacement.
- Position the first level of bracing as close to the base as possible.
- Plumb and level the scaffold as it is being erected.
- Fasten all couplers and/or connections securely before assembling the next level.
- Install guys, ties, and braces according to the manufacturer's recommendations.
- Do not intermix scaffold components from different manufacturers, unless you can do so while maintaining the scaffold's structural integrity.
- When platform units are abutted together to create a long platform, each abutted end must rest on a separate support surface.
- Once erected, provide toeboards on all railed sides to prevent falling object hazards.

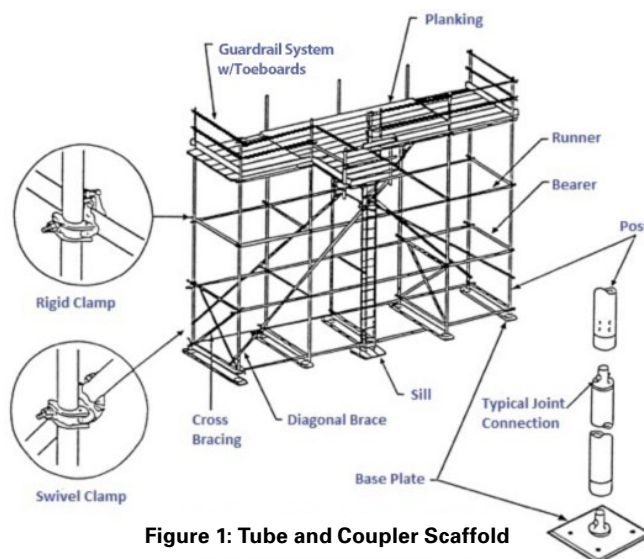


Figure 1: Tube and Coupler Scaffold

When Using a Scaffold

- Make sure that a competent person inspects the scaffold before each work shift.
- If during the inspection a defect or damage to the scaffold is discovered, the scaffold must be tagged out and not used until repairs are made. Attach tags at the access point to the scaffold.

One common tagging system uses the following tags:

Red tag indicates: unsafe, do not use.

Green tag indicates: ready to use.

- Use scaffolds according to the manufacturer's instructions.
- Never load a scaffold beyond its maximum intended load or rated capacity.
- Do not use makeshift methods to increase the working height of the scaffold platform, such as with ladders, buckets or blocks.

- Employees must not work on platforms covered with snow, ice, or other slippery material.
- The employer must provide suitable access to and between scaffolds, such as portable ladders, hook-on ladders, attachable ladders and stairway-type ladders.

When Dismantling a Scaffold

Check to ensure that the scaffold has not been structurally altered in a way which would make it unsafe. Before beginning dismantling procedures, reconstruct and/or stabilize the scaffold as necessary.

Training Workers

Only trained and authorized persons should be allowed to use a scaffold. This training must be provided by a qualified person who understands the hazards associated with the type of scaffold being used and who knows the procedures to control or minimize those hazards. Training must include how to safely:

- Use the scaffold, handle materials on the scaffold and determine the maximum load limits when handling materials.
- Recognize and avoid scaffolding hazards such as electric shock, falls from heights, and being hit by falling objects.
- Erect, maintain and disassemble fall and falling object protection systems.

Erectors and dismantlers of tube and coupler scaffolds are at particular risk because their work starts before ladders, guardrails and platforms are completely installed. These workers must also be trained to:

- Recognize scaffold hazards.
- Properly erect, move, operate, repair, inspect, maintain and disassemble the scaffold;
- Identify the maximum load-carrying capacity and intended use of the scaffold.

Employers should train workers on the following safety factors:

- The shape and structure of the building to be scaffolded.

- Distinctive site conditions and any special features of the building structure in relation to the scaffold (i.e., overhead electric power lines or storage tanks). Also consider the proximity and condition of surrounding buildings.
- Weather and environmental conditions.
- Fall protection requirements for workers using scaffolds, such as guardrail systems or personal fall arrest systems.
- The type and amount of scaffold equipment needed to access all areas to be worked on.
- Proper storage and transporting of scaffolding components, materials and equipment.
- How to access the scaffold, (i.e., via ladders, stair rail systems, etc.).

Workers building scaffolds risk serious injury from falls and tip-overs, being struck by falling tools and other hazards, and electrocution from energized power lines.

To avoid scaffold hazards, employers must:

- Ensure that a competent person supervises and directs workers erecting, moving, dismantling, or altering a scaffold.
- Provide a safe means of access for each worker erecting or dismantling the scaffold. As early as possible, install hook-on or attachable ladders.
- Ensure that workers do not climb diagonal braces to reach the scaffold platform.
- Provide fall protection for workers erecting or dismantling the scaffold.
- Secure scaffolds to the structure during erection and dismantling.

For more information on scaffolding, see OSHA's Safety and Health Topics page at www.osha.gov/SLTC/scaffolding.

Contact OSHA

For more information, to report an emergency, fatality or catastrophe, to order publications, to file a confidential complaint, or to request OSHA's free on-site consultation service, contact your nearest OSHA office, visit www.osha.gov, or call OSHA at 1-800-321-OSHA (6742), TTY 1-877-889-5627.

Worker Rights

Workers have the right to:

- Working conditions that do not pose a risk of serious harm.
- Receive information and training (in a language and vocabulary the worker understands) about workplace hazards, methods to prevent them, and the OSHA standards that apply to their workplace.
- Review records of work-related injuries and illnesses.
- File a complaint asking OSHA to inspect their workplace if they believe there is a serious hazard or that their employer is not following OSHA's rules. OSHA will keep all identities confidential.
- Exercise their rights under the law without retaliation, including reporting an injury or raising health and safety concerns with their employer or OSHA. If a worker has been retaliated against for using their rights, they must file a complaint with OSHA as soon as possible, but no later than 30 days.

For more information, see [OSHA's Workers page](#).

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For assistance, contact us. We can help. It's confidential.



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U.S. Department of Labor

Name: _____

Date: _____

Knowledge Check: Scaffolds

1. Who trains employees that work on scaffolds?
 - a. Employees do not need training
 - b. Employees are responsible for their own training
 - c. Fellow employees who have experience
 - d. Employer-designated competent person

2. Scaffold plans must be developed by a _____.
 - a. competent person
 - b. construction site manager
 - c. qualified person
 - d. experience scaffold worker

3. Which of the following is NOT an example of proper access?
 - a. Ladders
 - b. Crossbraces
 - c. Stair towers
 - d. Walkways

OSHA FactSheet

Protecting Workers from Asbestos Hazards

Cleaning up after a flood requires hundreds of workers to renovate and repair, or tear down and dispose of, damaged or destroyed structures and materials. However, repair, renovation, and demolition operations often generate airborne asbestos, a mineral fiber that can cause chronic lung disease or cancer. The Occupational Safety and Health Administration (OSHA) has developed regulations designed to protect cleanup workers from asbestos hazards.

How You Can Become Exposed to Asbestos

Before it was known that inhalation of asbestos fibers causes several deadly diseases—including asbestosis, a progressive and often fatal lung disease, and lung and other cancers—asbestos was used in a large number of building materials and other products because of its strength, flame resistance, and insulating properties. Asbestos was used in asbestos-cement pipe and sheeting, floor and roofing felts, dry wall, floor tiles, spray on ceiling coatings, and packing materials. When buildings containing these materials are renovated or torn down, or when the asbestos-containing materials themselves are disturbed, minute asbestos fibers may be released into the air. The fibers are so small that they often cannot be seen with the naked eye; the fact that you can inhale these fibers without knowing it makes asbestos an even more dangerous hazard.

OSHA's Standards for Asbestos

The work of flood cleanup personnel involves the repair, renovation, removal, demolition, or salvage of flood-damaged structures and materials. Such materials may contain or be covered with asbestos, and cleanup personnel are protected by OSHA's construction industry asbestos standard (Title 29 Code of Federal Regulations (CFR), Part 1926.1101). This standard requires employers to follow various procedures to protect their employees from inhaling

asbestos fibers. The standard contains many requirements that vary depending on the kind of work being undertaken, the amount of asbestos in the air, and other factors. You and your employer can obtain a copy of this standard and the booklet, *Asbestos Standards for Construction* (OSHA 3096) describing how to comply with it, from OSHA Publications, P.O. Box 37535, Washington, DC 20013-7535, (202) 693-1888(phone), or (202) 693-2498(fax); or visit OSHA's website at www.osha.gov.

Major Elements of OSHA's Asbestos Standard

The following include some of the major requirements of the asbestos standard. For complete information on all requirements, see 29 CFR 1926.1101.

- A permissible exposure limit (PEL) of 0.1 fiber of asbestos per cubic centimeter of air as averaged over an 8-hour period, with an excursion limit of 1.0 asbestos fibers per cubic centimeter over a 30-minute period.
- Requirements for an initial exposure assessment to ascertain expected exposures during that work operation, and periodic exposure monitoring in certain instances.
- Use of engineering controls, to the extent feasible, to meet the PEL. Where this is not possible, engineering controls must be used to reduce exposures to the lowest levels possible and then supplemented by the use of appropriate respiratory protection.

- Use of regulated areas to limit access to locations where asbestos concentrations may be dangerously high.
- No smoking, eating, or drinking in asbestos-regulated areas.
- Requirements for warning signs and caution labels to identify and communicate the presence of

hazards and hazardous materials; recordkeeping; and medical surveillance.

Additional Information

For more information on this, and other health-related issues impacting workers, visit OSHA's Web site at www.osha.gov.

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For more complete information:



U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

DSTM 9/2005



OSHA **FACT** Sheet

Crystalline Silica Exposure Health Hazard Information

What is crystalline silica?

Crystalline silica is a basic component of soil, sand, granite, and many other minerals. Quartz is the most common form of crystalline silica. Cristobalite and tridymite are two other forms of crystalline silica. All three forms may become respirable size particles when workers chip, cut, drill, or grind objects that contain crystalline silica.

What are the hazards of crystalline silica?

Silica exposure remains a serious threat to nearly 2 million U.S. workers, including more than 100,000 workers in high risk jobs such as abrasive blasting, foundry work, stonecutting, rock drilling, quarry work and tunneling. The seriousness of the health hazards associated with silica exposure is demonstrated by the fatalities and disabling illnesses that continue to occur in sandblasters and rockdrillers. Crystalline silica has been classified as a human lung carcinogen. Additionally, breathing crystalline silica dust can cause **silicosis**, which in severe cases can be disabling, or even fatal. The respirable silica dust enters the lungs and causes the formation of scar tissue, thus reducing the lungs' ability to take in oxygen. There is no cure for silicosis. Since silicosis affects lung function, it makes one more susceptible to lung infections like **tuberculosis**. In addition, smoking causes lung damage and adds to the damage caused by breathing silica dust.

What are the symptoms of silicosis?

Silicosis is classified into three types: chronic/classic, accelerated, and acute.

Chronic/classic silicosis, the most common, occurs after 15–20 years of moderate to low exposures to respirable crystalline silica. Symptoms associated with chronic silicosis may or may not be obvious; therefore, workers need to have a chest x-ray to determine if there is lung damage. As the disease progresses, the worker may experience shortness of breath upon exercising and have clinical signs of poor oxygen/carbon dioxide exchange. In the later stages, the worker may experience fatigue, extreme shortness of breath, chest pain, or respiratory failure.

Accelerated silicosis can occur after 5–10 years of high exposures to respirable crystalline silica. Symptoms include severe shortness of breath, weakness, and weight loss. The onset of symptoms takes longer than in acute silicosis.

Acute silicosis occurs after a few months or as long as 2 years following exposures to extremely high concentrations of respirable crystalline silica. Symptoms of acute silicosis include severe disabling shortness of breath, weakness, and weight loss, which often leads to death.

Where are construction workers exposed to crystalline silica?

Exposure occurs during many different construction activities. The most severe exposures generally occur during abrasive blasting with sand to remove paint and rust from bridges, tanks, concrete structures, and other surfaces. Other construction activities that may result in severe exposure include: jack hammering, rock/well drilling, concrete mixing, concrete drilling, brick and concrete block cutting and sawing, tuck pointing, tunneling operations.

Where are general industry employees exposed to crystalline silica dust?

The most severe exposures to crystalline silica result from abrasive blasting, which is done to clean and smooth irregularities from molds, jewelry, and foundry castings, finish tombstones, etch or frost glass, or remove paint, oils, rust, or dirt from objects needing to be repainted or treated. Other exposures to silica dust occur in cement and brick manufacturing, asphalt pavement manufacturing, china and ceramic manufacturing and the tool and die, steel and foundry industries. Crystalline silica is used in manufacturing, household abrasives, adhesives, paints, soaps, and glass. Additionally, crystalline silica exposures occur in the maintenance, repair and replacement of refractory brick furnace linings.

In the maritime industry, shipyard employees are exposed to silica primarily in abrasive blasting operations to remove paint and clean and prepare steel hulls, bulkheads, decks, and tanks for paints and coatings.

How is OSHA addressing exposure to crystalline silica?

OSHA has an established Permissible Exposure Limit, or PEL, which is the maximum amount of crystalline silica to which workers may be exposed during an 8-hour work shift (29 CFR 1926.55, 1910.1000). OSHA also requires hazard

communication training for workers exposed to crystalline silica, and requires a respirator protection program until engineering controls are implemented. Additionally, OSHA has a National Emphasis Program (NEP) for Crystalline Silica exposure to identify, reduce, and eliminate health hazards associated with occupational exposures.

What can employers/employees do to protect against exposures to crystalline silica?

- Replace crystalline silica materials with safer substitutes, whenever possible.
- Provide engineering or administrative controls, where feasible, such as local exhaust ventilation, and blasting cabinets. Where necessary to reduce exposures below the PEL, use protective equipment or other protective measures.
- Use all available work practices to control dust exposures, such as water sprays.
- Wear only a N95 NIOSH certified respirator, if respirator protection is required. Do not alter the respirator. Do not wear a tight-fitting respirator with a beard or mustache that prevents a good seal between the respirator and the face.
- Wear only a Type CE abrasive-blast supplied-air respirator for abrasive blasting.
- Wear disposable or washable work clothes and shower if facilities are available. Vacuum the dust from your clothes or change into clean clothing before leaving the work site.
- Participate in training, exposure monitoring, and health screening and surveillance programs to monitor any adverse health effects caused by crystalline silica exposures.
- Be aware of the operations and job tasks creating crystalline silica exposures in your workplace environment and know how to protect yourself.
- Be aware of the health hazards related to exposures to crystalline silica. Smoking adds to the lung damage caused by silica exposures.
- Do not eat, drink, smoke, or apply cosmetics in areas where crystalline silica dust is present. Wash your hands and face outside of dusty areas before performing any of these activities.
- Remember: If it's silica, it's not just dust.

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How can I get more information on safety and health?

OSHA has various publications, standards, technical assistance, and compliance tools to help you, and offers extensive assistance through workplace consultation, voluntary protection programs, strategic partnerships, alliances, state plans, grants, training, and education. OSHA's *Safety and Health Program Management Guidelines* (*Federal Register* 54:3904-3916, January 26, 1989) detail elements critical to the development of a successful safety and health management system. This and other information are available on OSHA's website.

- For one free copy of OSHA publications, send a self-addressed mailing label to OSHA Publications Office, 200 Constitution Avenue N.W., N-3101, Washington, DC 20210; or send a request to our fax at (202) 693-2498, or call us toll-free at (800) 321-OSHA.
- To order OSHA publications online at www.osha.gov, go to **Publications** and follow the instructions for ordering.
- To file a complaint by phone, report an emergency, or get OSHA advice, assistance, or products, contact your nearest OSHA office under the U.S. Department of Labor listing in your phone book, or call toll-free at **(800) 321-OSHA (6742)**. The teletypewriter (TTY) number is (877) 889-5627.
- To file a complaint online or obtain more information on OSHA federal and state programs, visit OSHA's website.

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

2002



OSHA HOJA Informativa

Exposición a la sílice cristalina
Información sobre riesgos de la salud

¿Qué es la sílice cristalina?

La sílice cristalina es un componente básico de tierra, arena, granito y muchos otros minerales. El cuarzo es la forma más común de la sílice cristalina. La cristobalita y la tridimita son dos otras formas de la sílice cristalina. Las tres formas pueden convertirse en partículas que se pueden inhalar cuando los trabajadores, tallan, cortan, perforan o trituran objetos que contienen sílice cristalina.

¿Qué son los peligros de la sílice cristalina?

La exposición a la sílice sigue siendo un grave peligro para casi 2 millones de trabajadores en los Estados Unidos, incluyendo a más de 100,000 trabajadores en trabajos de gran riesgo como las limpiezas abrasivas, el trabajo de fundición, tallar piedra, perforar rocas, el trabajo de canteras y los túneles. Las muertes y enfermedades incapacitadoras que ocurren entre los trabajadores que limpian con chorros de arena o que perforan rocas son indicadoras de la gravedad de los riesgos de salud asociados con la exposición a la sílice. La sílice cristalina ha sido clasificada como carcinógena para el pulmón humano. Además, el hecho de respirar el polvo de sílice cristalina puede causar **silicosis**, que en sus aspectos más severos puede resultar en la discapacidad o la muerte. El polvo de sílice respirable entra en los pulmones y crea la formación de tejido de cicatriz reduciendo la capacidad de absorción de oxígeno por los pulmones. La silicosis no tiene cura. Dado que la silicosis afecta el funcionamiento de los pulmones, uno es más susceptible de contraer infecciones pulmonares como la **tuberculosis**. Además el hecho de fumar puede dañar los pulmones y empeorar el daño que causa la inhalación de polvo de sílice.

¿Qué son los síntomas de la silicosis?

Existen tres tipos de silicosis: silicosis crónica/clásica, acelerada y aguda.

La **silicosis crónica/clásica**, la más común, ocurre con 15 a 20 años de exposiciones moderadas o bajas a la sílice cristalina respirable. Los síntomas asociados con la silicosis crónica pueden ser o no ser evidentes; por lo tanto, los trabajadores necesitan hacerse una radiografía del pecho para determinar si se han dañado los pulmones. A medida que avanza la enfermedad, el trabajador puede perder el aliento cuando hace un esfuerzo o tener indicaciones clínicas de un intercambio insuficiente de oxígeno y dióxido de carbono. En las fases posteriores, el trabajador puede sentirse cansado, tener poco aliento, dolor de pecho o insuficiencia respiratoria.

La **silicosis acelerada** puede ocurrir con 5 a 10 años de exposición elevada a la sílice cristalina respirable. Los síntomas incluyen tener muy poco aliento, debilidad y pérdida de peso. El inicio de los síntomas tarda más tiempo que en el caso de la silicosis aguda.

La **silicosis aguda** ocurre en unos cuantos meses o hasta 2 años después de la exposición a muy altas concentraciones de sílice cristalina respirable. Los síntomas de la silicosis aguda incluyen una pérdida de aliento severa e incapacitadora, debilidad y pérdida de peso y suele resultar en la muerte.

¿Dónde se exponen los trabajadores de la construcción a la sílice cristalina?

La exposición ocurre durante varias actividades diferentes de la construcción. Las exposiciones más severas suelen ocurrir durante la limpieza abrasiva con chorros de arena para quitar pintura y derrumbe de puentes, tanques, estructuras de hormigón y de otras superficies. Otras actividades de construcción que pueden resultar en exposiciones graves se asocian con las perforadoras de martillo, la perforación de rocas o pozos, la mezcla de hormigón, la perforación de hormigón, con cortar y serrar ladrillos y bloques de hormigón, con los rejuntados salientes y las operaciones de excavación de túneles.

¿Dónde se exponen los empleados de la industria general al polvo de sílice cristalina?

Las más serias exposiciones a la sílice cristalina son el resultado de la limpieza abrasiva, que se realiza para limpiar y pulir las irregularidades de los moldes, las joyas y los moldes de fundición, del acabado de lápidas sepulcrales, el grabado o esmerilado de vidrio, y de la remoción de pintura, aceites, derrumbes o suciedad de objetos que se deben pintar o tratar. Otras exposiciones a la sílice ocurren en la fabricación de cemento o de ladrillos, la fabricación de pavimentos de asfalto, la fabricación de porcelana o cerámica, y en las industrias de matrices de herramientas, de acero y de fundición. Se utiliza la sílice cristalina en la fabricación, en los productos de limpieza abrasivos caseros, en los adhesivos, las pinturas, los jabones y el vidrio. Además las exposiciones a la sílice cristalina ocurren en tareas de mantenimiento, reparación y reemplazo de revestimientos de hornos de ladrillo refractario.

En la industria marítima, los empleados de astilleros se exponen a la sílice principalmente en las tareas de limpieza abrasiva para quitar pintura y limpiar y preparar tanques, cubiertas, mamparos y cascos metálicos para que se pinten o revistan.

¿Qué medidas ha iniciado OSHA frente a la exposición de sílice cristalina?

OSHA ha establecido un límite permisible de exposición (Permissible Exposition Limit—PEL) que es la cantidad máxima de sílice cristalino a los que se puedan exponer los trabajadores en un turno de trabajo de 8 horas (29 *CFR* 1926.55, 1910.1000). OSHA también requiere formación de comunicación de peligros para los trabajadores expuestos a la sílice cristalina, y requiere un programa de protección respiratoria hasta que se implementen controles de ingeniería. Además, OSHA ha creado un programa de énfasis nacional (National Emphasis Program—NEP) para la exposición a la sílice cristalina con el fin de identificar, reducir y eliminar los riesgos de salud asociados con las exposiciones ocupacionales.

¿Qué pueden hacer los empleadores y empleados para protegerse contra las exposiciones a la sílice cristalina?

- Reemplazar materiales de sílice cristalina con sustancias seguras, cuando sea posible.
- Brindar controles de ingeniería y administración, en la medida de lo posible, tales como ventilación en la zona y contenedores para la limpieza abrasiva. Donde se requiera reducir las exposiciones a niveles inferiores al límite permisible de exposición, utilizar equipo de protección u otras medidas de protección.
- Utilizar todas las prácticas de trabajo disponibles para controlar las exposiciones al polvo, tales como rociadores de agua.
- Utilizar solamente un respirador certificado “N95 NIOSH,” si se requiere protección respiratoria. No se debe modificar el respirador. No se debe utilizar un respirador apretado con una barba o con un bigote que impida un buen encaje entre el respirador y la cara.
- Utilizar solamente un respirador con alimentación de aire para limpieza abrasiva de tipo “Type CE” para la limpieza abrasiva.
- Utilizar ropa de trabajo que se pueda tirar o lavar y ducharse si se hallan duchas disponibles. Utilizar una aspiradora para limpiarse el polvo de la ropa o ponerse ropa limpia antes de salir del lugar de trabajo.
- Participar en la formación, la supervisión de exposición y los programas de análisis y vigilancia con el fin de monitorear cualquier efecto negativo en la salud debido a exposiciones de sílice cristalina.

- Tomar conciencia de las operaciones y tareas que crean exposiciones a la sílice cristalina en el lugar de trabajo y aprender cómo protegerse a uno mismo.
- Tomar conciencia de los peligros de salud asociados con las exposiciones a la sílice cristalina. El hecho de fumar empeora el daño a los pulmones que causan las exposiciones a la sílice.
- No comer, beber, fumar o utilizar productos cosméticos en zonas donde existe polvo de sílice cristalina. Limpiarse las manos y la cara fuera de las zonas que contienen polvo antes de realizar cualquiera de estas tareas.
- ¡No se olvide! Si es sílice no es tan sólo polvo.

¿Cómo obtener más información sobre la seguridad y la salud?

OSHA ofrece varias publicaciones, normas, ayuda técnica y herramientas de conformidad para ayudarlo. Asimismo, ofrece una ayuda extensa mediante consultas en el lugar de trabajo, programas voluntarios de protección, subvenciones, asociaciones estratégicas, planes estatales, formación y educación. *Las Directivas de Gestión del Programa de Seguridad y Salud de OSHA (Registro Federal 54:3904-3916, 26 de enero de 1989)* presentan información detallada esencial para el desarrollo de un buen sistema de gestión de seguridad y salud. Esta y demás datos se hallan disponibles en el Website de OSHA.

- Para obtener una copia gratis de las publicaciones de OSHA, envíe una etiqueta de correo rotulada con su propia dirección a OSHA Publicaciones Office, P.O. Box 37535, Washington, DC 20013-7535, o envíe una solicitud por fax marcando el (202) 693-2498, o bien llámenos al (202) 693-1888.
- Para pedir publicaciones de OSHA en línea en **www.osha.gov**, diríjase a **Publicaciones** y siga las instrucciones para realizar su pedido.
- Para presentar una demanda por teléfono, comunicar una emergencia u obtener consejos, ayuda o productos de OSHA, contacte a su oficina de OSHA más cercana listada bajo “U.S. Department of Labor” en su anuario telefónico o llame gratis marcando el **(800) 321-OSHA (6742)**. El número de teleprinter (TTY) es (877) 889-5627.
- Para presentar una demanda en línea u obtener mayor información sobre los programas federales y estatales de OSHA, visite el Website de OSHA.

Este texto forma parte de una serie de hojas de datos que enfocan programas, políticas o normas de OSHA y no impone ningún requisito de conformidad nuevo. Para obtener una lista completa de los requisitos de conformidad de las normas y de los reglamentos de OSHA, consulte el *Título 29 del Código de Reglamentos Federales*. Esta información se halla disponible a personas con discapacidad sensorial cuando se solicite. El teléfono de voz es (202) 693-1999. Véase también el Website de OSHA en **www.osha.gov**.

OSHA FactSheet

Protecting Workers from Lead Hazards

Cleaning up after a flood requires hundreds of workers to renovate and repair, or tear down and dispose of, damaged or destroyed structures and materials. Repair, renovation and demolition operations often generate dangerous airborne concentrations of lead, a metal that can cause damage to the nervous system, kidneys, blood forming organs, and reproductive system if inhaled or ingested in dangerous quantities. The Occupational Safety and Health Administration (OSHA) has developed regulations designed to protect workers involved in construction activities from the hazards of lead exposure.

How You Can Become Exposed to Lead

Lead is an ingredient in thousands of products widely used throughout industry, including lead-based paints, lead solder, electrical fittings and conduits, tank linings, plumbing fixtures, and many metal alloys. Although many uses of lead have been banned, lead-based paints continue to be used on bridges, railways, ships, and other steel structures because of its rust- and corrosion-inhibiting properties. Also, many homes were painted with lead-containing paints. Significant lead exposures can also occur when paint is removed from surfaces previously covered with lead-based paint.

Operations that can generate lead dust and fumes include:

- Demolition of structures;
- Flame-torch cutting;
- Welding;
- Use of heat guns, sanders, scrapers, or grinders to remove lead paint; and
- Abrasive blasting of steel structures

OSHA has regulations governing construction worker exposure to lead. Employers of construction workers engaged in the repair, renovation, removal, demolition, and salvage of flood-damaged structures and materials are responsible for the development and implementation of a worker protection program in accordance with Title 29 Code of

Federal Regulations (CFR), Part 1926.62. This program is essential to minimize worker risk of lead exposure. Construction projects vary in their scope and potential for exposing workers to lead and other hazards. Many projects involve only limited exposure, such as the removal of paint from a few interior residential surfaces, while others may involve substantial exposures. Employers must be in compliance with OSHA's lead standard at all times. A copy of the standard and a brochure—Lead in Construction (OSHA 3142)—describing how to comply with it, are available from OSHA Publications, P.O. Box 37535, Washington, D.C. 20013-7535, (202) 693-1888(phone), or (202) 693-2498(fax); or visit OSHA's website at www.osha.gov.

Major Elements of OSHA's Lead Standard

- A permissible exposure limit (PEL) of 50 micrograms of lead per cubic meter of air, as averaged over an 8-hour period.
- Requirements that employers use engineering controls and work practices, where feasible, to reduce worker exposure.
- Requirements that employees observe good personal hygiene practices, such as washing hands before eating and taking a shower before leaving the worksite.
- Requirements that employees be provided with protective clothing and, where necessary, with respiratory protection accordance with 29 CFR 1910.134.

- A requirement that employees exposed to high levels of lead be enrolled in a medical surveillance program.

Additional Information

For more information on this, and other health-related issues impacting workers, visit OSHA's Web site at www.osha.gov.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For more complete information:



U.S. Department of Labor

www.osha.gov

(800) 321-OSHA

DSTM 11/2005

Name: _____

Date: _____

Knowledge Check: Health Hazards in Construction

1. Which of the following is a common type of health hazard?
 - a. Chemical hazards
 - b. Economic hazards
 - c. Electrical hazards
 - d. Fall hazards

2. Which of the following is an example of a physical health hazard?
 - a. Asbestos
 - b. Noise
 - c. Silica
 - d. Lead

3. Which is an appropriate engineering control for protection against noise exposures?
 - a. Audiograms
 - b. Earplugs
 - c. Increasing distance between source
 - d. Constructing sound barriers

4. Which is a requirement of the employer?
 - a. Determine if workers exposures exceed OSHA PELs
 - b. Perform medical evaluations on all employees
 - c. Develop silica training programs for all employees
 - d. Provide workers with steel-toed boots