

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.

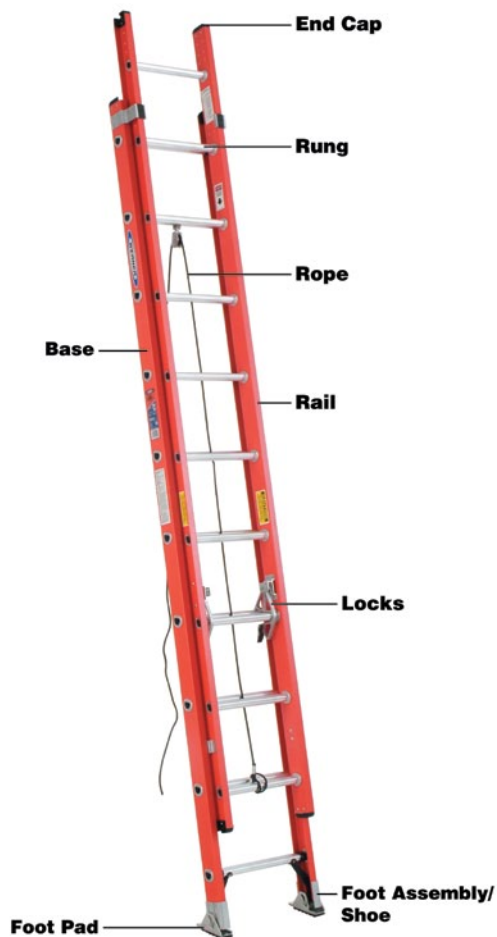


Figure 1: Extension Ladder

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.



**PLAN.
PROVIDE.
TRAIN.**

Three simple steps to prevent falls.

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.



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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.)

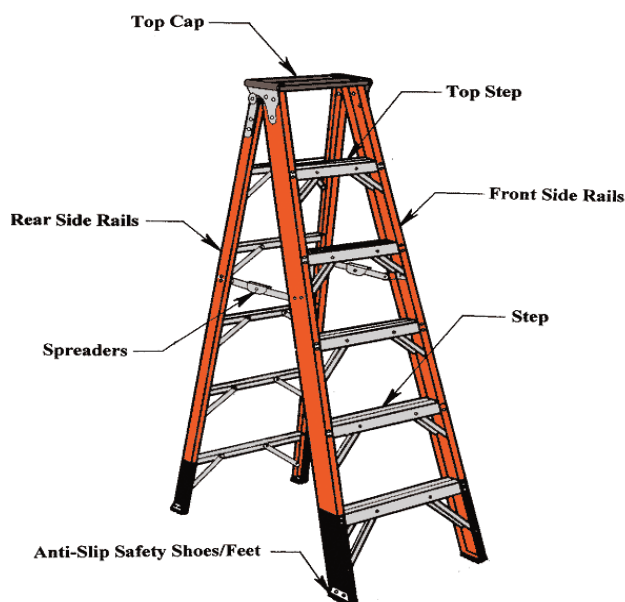


Figure 1: Stepladder

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.
1	Heavy Duty	Industrial	250 lbs.
II	Medium Duty	Commercial	225 lbs.
III	Light Duty	Household	200 lbs.

Source for Types 1A, 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 1AA: 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/dcspp/osp/statesstandards.html.

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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.

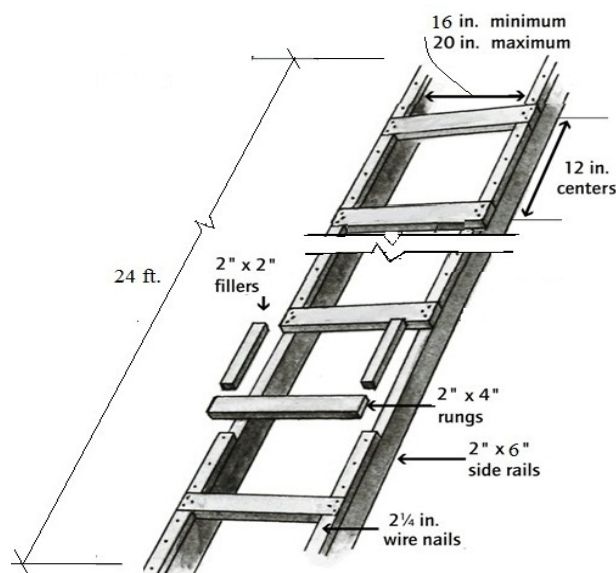


Figure 1: Single-Cleat Ladder

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.

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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.

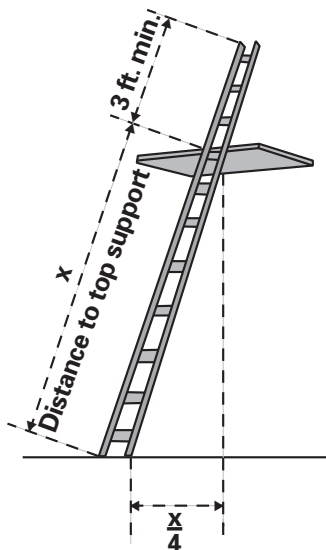


3-Point Contact

- 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:

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.

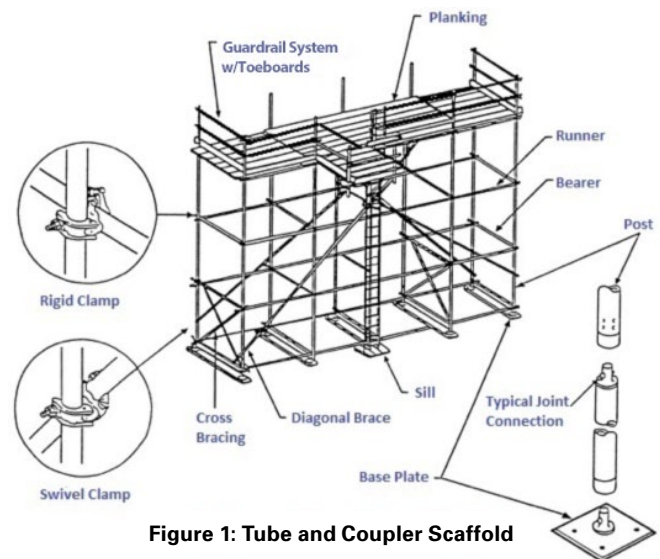


Figure 1: Tube and Coupler Scaffold

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



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



Worker Safety Series

Warehousing

Think Safety

- More than 145,000 people work in over 7,000 warehouses.
- The fatal injury rate for the warehousing industry is higher than the national average for all industries.
- Potential hazards for workers in warehousing:
 - Unsafe use of forklifts;
 - Improper stacking of products;
 - Failure to use proper personal protective equipment;
 - Failure to follow proper lockout/tagout procedures;
 - Inadequate fire safety provisions; or
 - Repetitive motion injuries.

Think Safety Checklists

The following checklists may help you take steps to avoid hazards that cause injuries, illnesses and fatalities. As always, be cautious and seek help if you are concerned about a potential hazard.

General Safety

- Exposed or open loading dock doors and other areas that employees could fall 4 feet or more or walk off should be chained off, roped off or otherwise blocked.
- Floors and aisles are clear of clutter, electrical cords, hoses, spills and other hazards that could cause employees to slip, trip or fall.
- Proper work practices are factored into determining the time requirements for an employee to perform a task.
- Employees performing physical work have adequate periodic rest breaks to avoid fatigue levels that could result in greater risk of accidents and reduced quality of work.
- Newly-hired employees receive general ergonomics training and task-specific training.
- The warehouse is well ventilated.
- Employees are instructed on how to avoid heat stress in hot, humid environments.
- Employees are instructed on how to work in cold environments.
- The facility has lockout/tagout procedures.

Materials Handling Safety

- There are appropriately marked and sufficiently safe clearances for aisles and at loading docks or passageways where mechanical handling equipment is used.
- Loose/unboxed materials which might fall from a pile are properly stacked by blocking, interlocking or limiting the height of the pile to prevent falling hazards.

- Bags, containers, bundles, etc. are stored in tiers that are stacked, blocked, interlocked and limited in height so that they are stable and secure to prevent sliding or collapse.
- Storage areas are kept free from accumulation of materials that could lead to tripping, fire, explosion or pest infestations.
- Excessive vegetation is removed from building entrances, work or traffic areas to prevent possible trip or fall hazards due to visual obstructions.
- Derail and/or bumper blocks are provided on spur railroad tracks where a rolling car could contact other cars being worked on and at entrances to buildings, work or traffic areas.
- Covers and/or guardrails are provided to protect personnel from the hazards of stair openings in floors, meter or equipment pits and similar hazards.
- Personnel use proper lifting techniques.
- Elevators and hoists for lifting materials/ containers are properly used with adequate safe clearances, no obstructions, appropriate signals and directional warning signs.

Hazard Communication Safety

- All hazardous materials containers are properly labeled, indicating the chemical's identity, the manufacturer's name and address, and appropriate hazard warnings.
- There is an updated list of hazardous chemicals.
- The facility has a written program that covers hazard determination, including Material Safety Data Sheets (MSDSs), labeling and training.
- There is a system to check that each incoming chemical is accompanied by a MSDS.
- All employees are trained in the requirements of the hazard communication standard, the chemical hazards to which they are exposed, how to read and understand a MSDS and chemical labels, and on what precautions to take to prevent exposure.
- All employee training is documented.
- All outside contractors are given a complete list of chemical products, hazards and precautions.
- Procedures have been established to maintain and evaluate the effectiveness of the current program.
- Employees use proper personal protective equipment when handling chemicals.
- All chemicals are stored according to the manufacturer's recommendations and local or national fire codes.

Forklift Safety

- Powered industrial trucks (forklifts) meet the design and construction requirements established in American National Standard for Powered Industrial Trucks, Part II ANSI B56.1-1969.
- Written approval from the truck manufacturer has been obtained for any modifications or additions that affect the capacity and safe operation of the vehicle.
- Capacity, operation and maintenance instruction plates, tags or decals are changed to specify any modifications or additions to the vehicle.
- Nameplates and markings are in place and maintained in a legible condition.
- Forklifts that are used in hazardous locations are appropriately marked/approved for such use.
- Battery charging is conducted only in designated areas.
- Appropriate facilities are provided for flushing and neutralizing spilled electrolytes, for fire extinguishing, for protecting charging apparatus from damage by trucks and for adequate ventilation to disperse fumes from gassing batteries.
- Conveyors, overhead hoists or equivalent materials handling equipment are provided for handling batteries.
- Reinstalled batteries are properly positioned and secured.

- Carboy tilters or siphons are used for handling electrolytes.
- Forklifts are properly positioned and brakes applied before workers start to change or charge batteries.
- Vent caps are properly functioning.
- Precautions are taken to prevent smoking, open flames, sparks or electric arcs in battery charging areas and during storage/changing of propane fuel tanks.
- Tools and other metallic objects are kept away from the top of uncovered batteries.
- Concentrations of noxious gases and fumes are kept below acceptable levels.
- Forklift operators are competent to operate a vehicle safely as demonstrated by successful completion of training and evaluation conducted and certified by persons with the knowledge, training and experience to train operators and evaluate their performance.
- The training program content includes all truck-related topics, workplace related topics and the requirements of 29 CFR 1910.178 for safe truck operation.
- Refresher training and evaluation is conducted whenever an operator has been observed operating the vehicle in an unsafe manner or has been involved in an accident or a near-miss incident.
- Refresher training and evaluation is conducted whenever an operator is assigned to drive a different type of truck or whenever a condition in the workplace changes in a manner that could affect safe operation of the truck.
- Evaluations of each operator's performance are conducted at least once every three years.
- Load engaging means are fully lowered, with controls neutralized, power shut off and brakes set when a forklift is left unattended.
- Operators maintain a safe distance from the edge of ramps or platforms while using forklifts on any elevated dock, platform or freight car.
- There is sufficient headroom for the forklift and operator under overhead installations, lights, pipes, sprinkler systems, etc.
- Overhead guards are provided in good condition to protect forklift operators from falling objects.
- Operators observe all traffic regulations, including authorized plant speed limits.
- Drivers are required to look in the direction of and keep a clear view of the path of travel.
- Operators run their trucks at a speed that will permit the vehicle to stop in a safe manner.
- Dock boards (bridge plates) are properly secured when loading or unloading from dock to truck.
- Stunt driving and horseplay are prohibited.
- All loads are stable, safely arranged and fit within the rated capacity of the truck.
- Operators fill fuel tanks only when the engine is not running.
- Replacement parts of trucks are equivalent in terms of safety with those used in the original design.
- Trucks are examined for safety before being placed into service and unsafe or defective trucks are removed from service.

Full document available at: <https://www.osha.gov/Publications/warehousing.html>

Name: _____

Date: _____

Knowledge Check: Materials Handling, Storage, Use, and Disposal

1. How old do you have to be to operate a forklift, regardless of training?
 - a. 16 years old
 - b. 18 years old
 - c. 21 years old
 - d. 25 years old

2. One good way to prevent materials handling hazards is to _____.
 - a. refuse to allow personnel to ride equipment without a seat and seatbelt
 - b. report all damaged equipment immediately
 - c. operate within manufacturer's specifications
 - d. All of these

3. Which of the following is a method for eliminating or reducing crane operation hazards?
 - a. Operators should know how much they are lifting as well as the rated capacity of the crane.
 - b. A competent person should visually inspect the crane once a year.
 - c. Never exceed the load limit by more than 10%.
 - d. All of these.

4. Employers must comply with OSHA standards related to materials handling, including training and _____.
 - a. equipment
 - b. operations
 - c. inspection
 - d. All of these

OSHA[®] FactSheet

Trenching and Excavation Safety

Two workers are killed every month in trench collapses. The employer must provide a workplace free of recognized hazards that may cause serious injury or death. The employer must comply with the trenching and excavation requirements of 29 CFR 1926.651 and 1926.652 or comparable OSHA-approved state plan requirements.

An excavation is any man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.

Trench (Trench excavation) means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 meters).

Dangers of Trenching and Excavation

Cave-ins pose the greatest risk and are much more likely than other excavation-related accidents to result in worker fatalities. Other potential hazards include falls, falling loads, hazardous atmospheres, and incidents involving mobile equipment. One cubic yard of soil can weigh as much as a car. An unprotected trench is an early grave. Do not enter an unprotected trench.

Trench Safety Measures

Trenches 5 feet (1.5 meters) deep or greater require a protective system unless the excavation is made entirely in stable rock. If less than 5 feet deep, a competent person may determine that a protective system is not required.

Trenches 20 feet (6.1 meters) deep or greater require that the protective system be designed by a registered professional engineer or be based on tabulated data prepared and/or approved by a registered professional engineer in accordance with 1926.652(b) and (c).

Competent Person

OSHA standards require that employers inspect trenches daily and as conditions change by a competent person before worker entry to ensure elimination of excavation hazards. A competent person is an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers, soil types and protective systems required, and who is authorized to take prompt corrective measures to eliminate these hazards and conditions.

Access and Egress

OSHA standards require safe access and egress to all excavations, including ladders, steps, ramps, or other safe means of exit for employees working in trench excavations 4 feet (1.22 meters) or deeper. These devices must be located within 25 feet (7.6 meters) of all workers.

General Trenching and Excavation Rules

- Keep heavy equipment away from trench edges.
- Identify other sources that might affect trench stability.
- Keep excavated soil (spoils) and other materials at least 2 feet (0.6 meters) from trench edges.
- Know where underground utilities are located before digging.
- Test for atmospheric hazards such as low oxygen, hazardous fumes and toxic gases when > 4 feet deep.
- Inspect trenches at the start of each shift.
- Inspect trenches following a rainstorm or other water intrusion.
- Do not work under suspended or raised loads and materials.
- Inspect trenches after any occurrence that could have changed conditions in the trench.
- Ensure that personnel wear high visibility or other suitable clothing when exposed to vehicular traffic.

Protective Systems

There are different types of protective systems.

Benching means a method of protecting workers from cave-ins by excavating the sides of an

excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels. *Benching cannot be done in Type C soil.*

Sloping involves cutting back the trench wall at an angle inclined away from the excavation.

Shoring requires installing aluminum hydraulic or other types of supports to prevent soil movement and cave-ins.

Shielding protects workers by using trench boxes or other types of supports to prevent soil cave-ins. Designing a protective system can

be complex because you must consider many factors: soil classification, depth of cut, water content of soil, changes caused by weather or climate, surcharge loads (e.g., spoil, other materials to be used in the trench) and other operations in the vicinity.

Additional Information

Visit OSHA's Safety and Health Topics web page on trenching and excavation at www.osha.gov/SLTC/trenchingexcavation/index.html
www.osha.gov/dcsp/statestandard.html

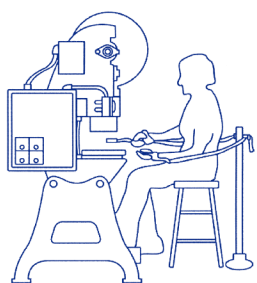
This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This 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)

DOC FS-3476 9/2011



Restraint Device on Power Press

OSHA **FACT** Sheet

Amputations

What are the sources of amputations in the workplace?

Amputations are some of the most serious and debilitating workplace injuries. They are widespread and involve a variety of activities and equipment. Amputations occur most often when workers operate unguarded or inadequately safeguarded mechanical power presses, power press brakes, powered and non-powered conveyors, printing presses, roll-forming and roll-bending machines, food slicers, meat grinders, meat-cutting band saws, drill presses, and milling machines as well as shears, grinders, and slitters. These injuries also happen during materials handling activities and when using forklifts and doors as well as trash compactors and powered and non-powered hand tools. Besides normal operation, the following activities involving stationary machines also expose workers to potential amputation hazards: setting-up, threading, preparing, adjusting, cleaning, lubricating, and maintaining machines as well as clearing jams.

What types of machine components are hazardous?

The following types of mechanical components present amputation hazards:

- **Point of operation**—the area of a machine where it performs work on material.
- **Power-transmission apparatuses**—flywheels, pulleys, belts, chains, couplings, spindles, cams, and gears in addition to connecting rods and other machine components that transmit energy.
- **Other moving parts**—machine components that move during machine operation such as reciprocating, rotating, and transverse moving parts as well as auxiliary machine parts.

What kinds of mechanical motion are hazardous?

All mechanical motion is potentially hazardous. In addition to in-running nip points (“pinch points”)—which occur when two parts move together and at least one moves in a rotary or circular motion that gears, rollers, belt drives,

and pulleys generate—the following are the most common types of hazardous mechanical motion:

- **Rotating**—circular movement of couplings, cams, clutches, flywheels, and spindles as well as shaft ends and rotating collars that may grip clothing or otherwise force a body part into a dangerous location.
- **Reciprocating**—back-and-forth or up-and-down action that may strike or entrap a worker between a moving part and a fixed object.
- **Transversing**—movement in a straight, continuous line that may strike or catch a worker in a pinch or shear point created between the moving part and a fixed object.
- **Cutting**—action generated during sawing, boring, drilling, milling, slicing, and slitting.
- **Punching**—motion resulting when a machine moves a slide (ram) to stamp or blank metal or other material.
- **Shearing**—movement of a powered slide or knife during metal trimming or shearing.
- **Bending**—action occurring when power is applied to a slide to draw or form metal or other materials.

Are there any OSHA standards that cover amputation hazards in the workplace?

Yes. The Occupational Safety and Health Administration (OSHA) has the following standards in *Title 29 of the Code of Federal Regulations (CFR)* to protect workers from amputations in the workplace:

- 29 *CFR* Part 1910 Subparts O and P cover machinery and machine guarding.
- 29 *CFR* 1926 Subpart I covers hand tools and powered tools.
- 29 *CFR* Part 1928 Subpart D covers agricultural equipment.
- 29 *CFR* Part 1915 Subparts C, H, and J; 29 *CFR* Part 1917 Subparts B, C, and G; and 29 *CFR* Part 1918 Subparts F, G, and H cover maritime operations.

What can employers do to help protect workers from amputations?

You should be able to recognize, identify, manage, and control amputation hazards commonly found in the workplace such as those caused by mechanical components of machinery, the mechanical motion that occurs in or near these components, and the activities that workers perform during mechanical operation.

Work practices, employee training, and administrative controls can help prevent and control amputation hazards. Machine safeguarding with the following equipment is the best way to control amputations caused by stationary machinery:

- **Guards** provide physical barriers that prevent access to hazardous areas. They should be secure and strong, and workers should not be able to bypass, remove, or tamper with them. Guards should not obstruct the operator's view or prevent employees from working.
- **Devices** help prevent contact with points of operation and may replace or supplement guards. Devices can interrupt the normal cycle of the machine when the operator's hands are at the point of operation, prevent the operator from reaching into the point of operation, or withdraw the operator's hands if they approach the point of operation when the machine cycles. They must allow safe lubrication and maintenance and not create hazards or interfere with normal machine operation. In addition, they should be secure, tamper-resistant, and durable.

You are responsible for safeguarding machines and should consider this need when purchasing machinery. New machinery is usually available with safeguards installed by the manufacturer. You can also purchase appropriate safeguards separately or build them in-house.

Are certain jobs particularly hazardous for some employees?

Yes. Under the *Fair Labor Standards Act*, the Secretary of Labor has designated certain non-farm jobs as especially hazardous for employees under the age of 18. These workers generally are prohibited from operating band saws, circular saws, guillotine shears, punching and shearing machines, meatpacking or meat-processing machines, paper products machines, woodworking machines, metal-forming machines, and meat slicers.

How can I get more information?

You can find more information about amputations, including the full text of OSHA's standards, on OSHA's website at www.osha.gov. In addition, publications explaining the subject of amputations in greater detail are available from OSHA. *Concepts and Techniques of Machine Safeguarding* (OSHA 3067) and *Control of Hazardous Energy (Lockout/Tagout)* (OSHA 3120) are available on OSHA's website. For other information about machine guarding see <http://www.osha-slc.gov/SLTC/machineguarding/index.html>.

A Guide for Protecting Workers from Woodworking Hazards (OSHA 3157) is available either on OSHA's website at www.osha.gov or from the Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954, or phone (202) 512-1800, or online at <http://bookstore.gpo.gov/index.html>.

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 us toll-free at **(800) 321-OSHA (6742)**; 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 at www.osha.gov.

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Name: _____

Date: _____

Knowledge Check: Tools – Hand and Power

1. Which of the following is an example of an unsafe practice regarding the use of tools?
 - a. Keeping cutting tools sharp
 - b. Wearing eye and face protection while operating a grinder
 - c. Using a screwdriver to carve or cut wood
 - d. Following manufacturer's instructions when using a tool

2. Which term describes a tool that is powered by compressed air?
 - a. Hydraulic
 - b. Powder-actuated
 - c. Electrical
 - d. Pneumatic

3. Which of the following actions may expose workers to electrical shock hazards and should be avoided?
 - a. Removing the grounding pin on a three-prong plug
 - b. Using double-insulated tools
 - c. Using a grounded adaptor to accommodate a two-prong receptacle
 - d. Removing damaged tools from service and tagging them "Do Not Use"

4. Which of the following statements about guarding techniques is true?
 - a. Guard the point of operation, in-running nip points, and rotating parts of tools.
 - b. Remove guard from tool while it is in use, then replace when the job is completed.
 - c. Adjust guard on abrasive wheel to allow maximum exposure of the wheel surface.
 - d. Wear PPE because guards will not protect operator from flying chips and sparks or moving parts of tools.

5. Employers must satisfy all of the following requirements, except:
 - a. Provide PPE necessary to protect employees who are operating hand and power tools and are exposed to hazards.
 - b. Comply with OSHA training and inspection standards related to hand and power tools.
 - c. Determine which manufacturer's requirements and recommendations for a tool shall be followed or ignored.
 - d. Do not issue or permit the use of unsafe hand tools.