

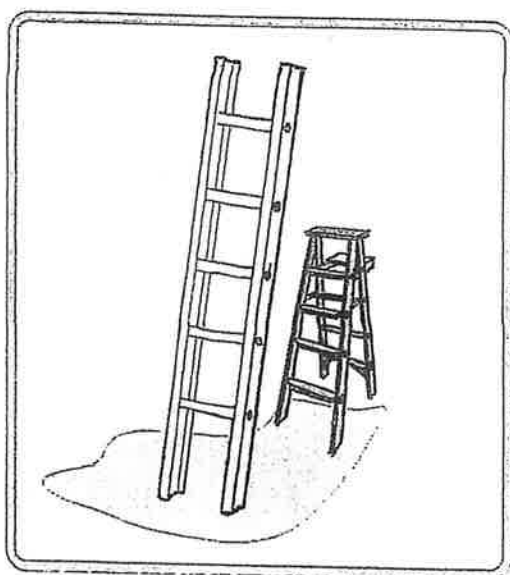
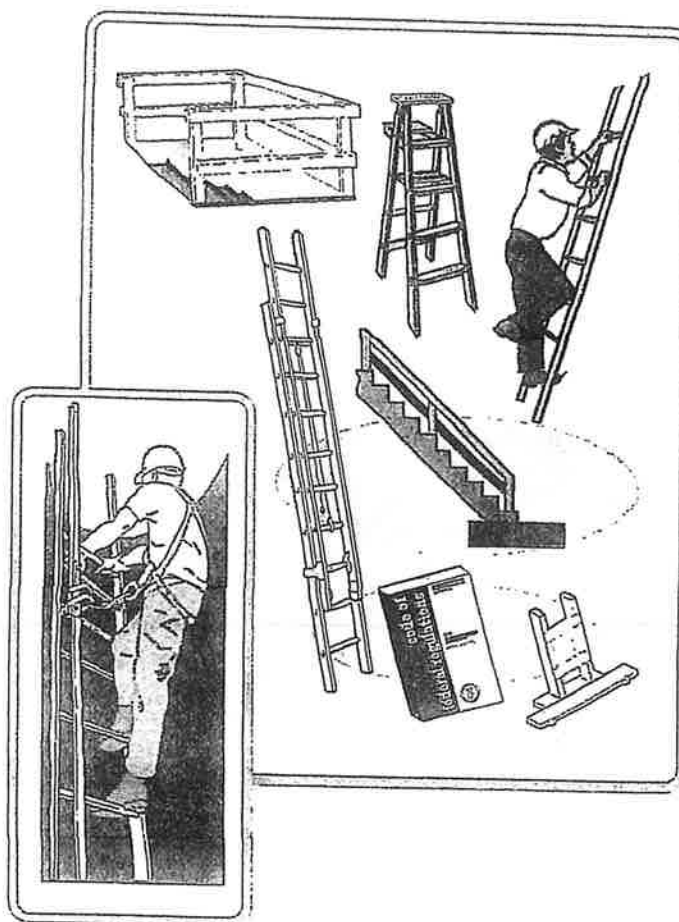
Stairways & Ladders

What Are Stairways and Ladders?

Stairways and ladders are two means of providing access at a construction site. Stairways and ladders are needed whenever movement from one level to another requires a step of more than 19 inches and no other means of access is provided.

What Are Fixed Ladders?

A *fixed ladder* cannot be readily moved or carried because it is a necessary part of a building or structure.



What Are Portable Ladders?

Portable ladders are straight ladders or step ladders that can be readily moved or carried.

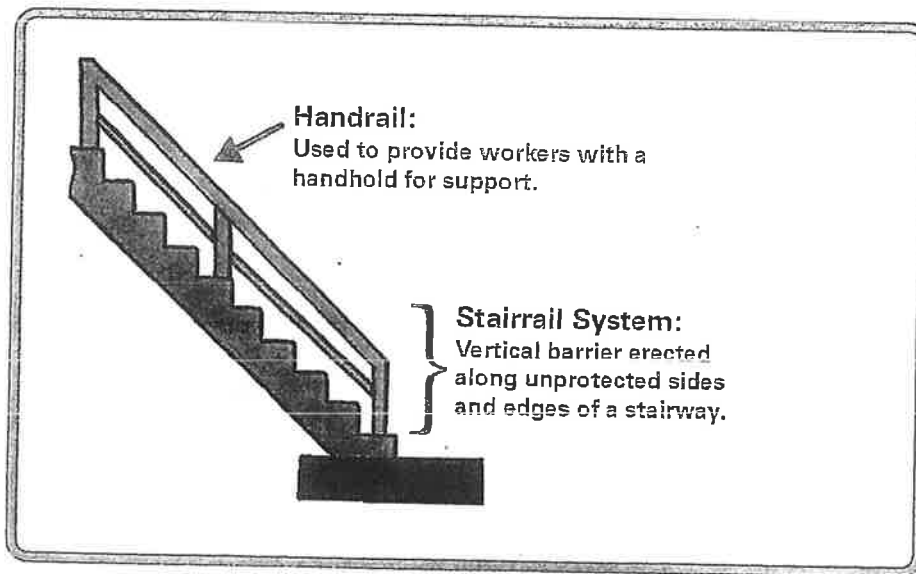
What Are Job-Made Ladders?

A *job-made ladder* is not commercially manufactured. A job-made ladder is fabricated by workers, typically at the construction site.

Stairways and Ladders

What Are Handrails?

A *handrail* is a rail that provides workers with a handhold for support.



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What Is a Stairrail System?

A *stairrail system* means a vertical barrier erected along the unprotected sides and edges of a stairway. This prevents workers

from falling to lower levels.

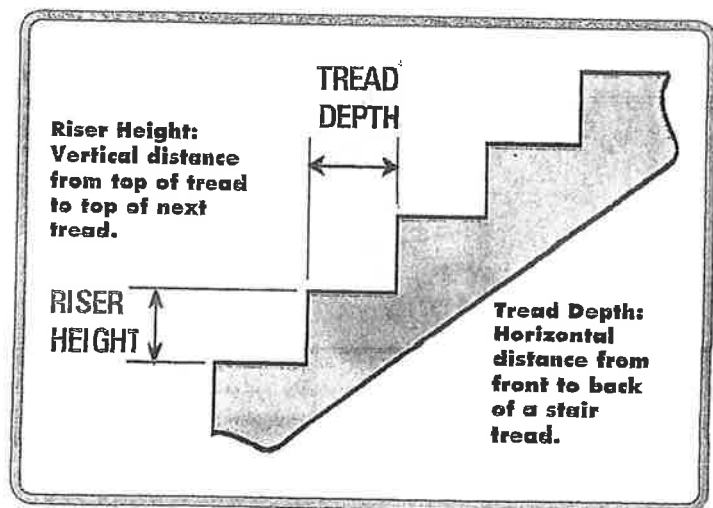
The top surface of a stairrail system may be called a 'handrail.'

What Is Riser Height?

Riser height means the vertical distance from the top of a stair tread to the top of the next tread or platform/landing. Or the distance from the top of a platform/landing to the top of the next tread or platform/landing.

What Is Tread Depth?

Tread depth means the horizontal distance from the front to the back of a stair tread.

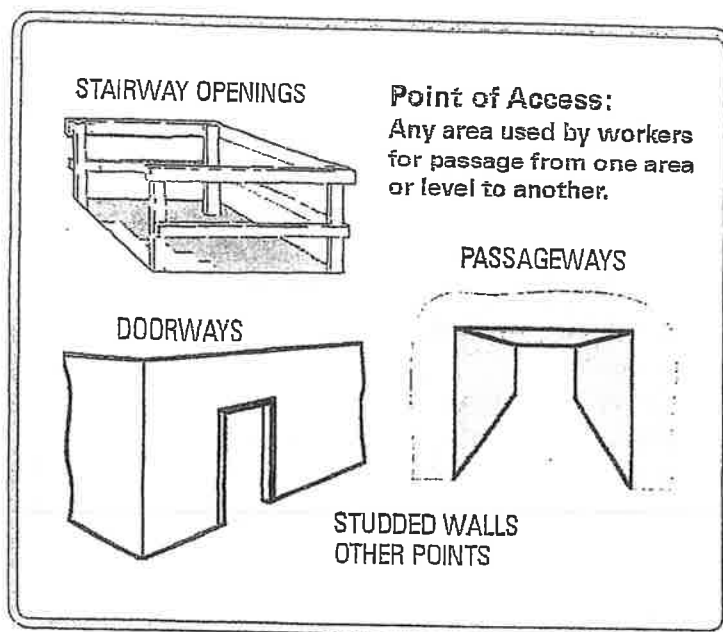


What Is a Point of Access?

Point of access means any area used by employees for work-related passage from one area or level to another.

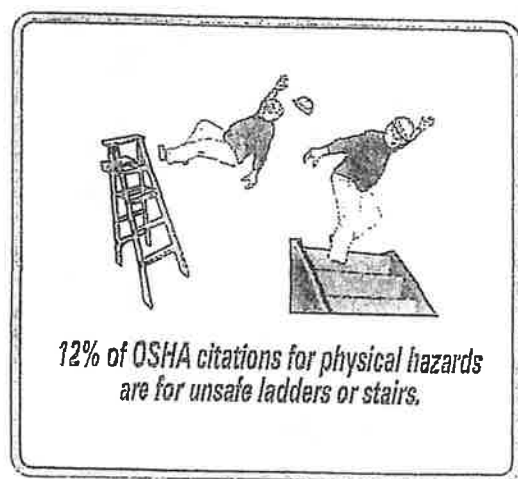
Points of access include but are not limited to:

- doorways,
- passageways,
- stairway openings,
- studded walls, and
- various other permanent or temporary openings used for travel.



What Are the Dangers of Stairways and Ladders?

The biggest danger on stairs and ladders is *falling*. Most deaths involving ladders happen from 10 feet or lower. About 12% of OSHA citations for physical hazards are unsafe stairs or ladders.



What Are the Hazards of Stairways and Ladders?

OSHA has identified the seven most common hazardous conditions on stairways and ladders:

- No handrails or guardrails on stairs,
- Uneven risers,
- Portable ladders not secured from movement,
- Ladder not extended 3 feet above landing,
- Defective portable ladders,
- Ladders within 10 feet of power lines, and
- Fixed ladders without fall protection.

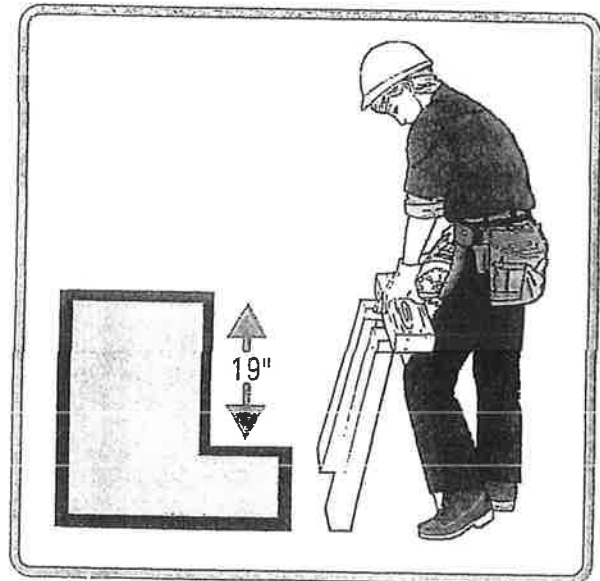


Stairways and Ladders

What Are OSHA's Basic Requirements for Stairways and Ladders?

OSHA has several common sense requirements:

- A change in elevation of 19 inches or more requires a stairway or ladder where no ramp, runway, sloped embankment, or personnel hoist is provided.
- The employer must provide safe stairways or ladders prior to any other work at the elevated areas.
- Two or more ladders or a double-cleated ladder are needed at an access point for a work area for 25 or more employees.
- At least one access point between levels must be kept clear at all times.
- No temporary spiral stairs can be used in construction.



What Are OSHA's Training Requirements?

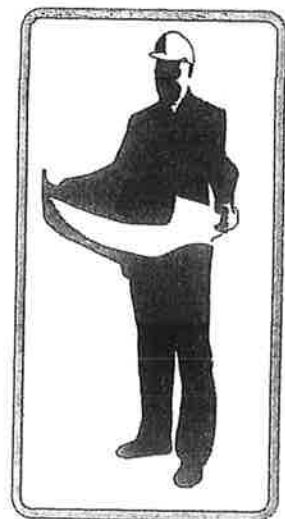
OSHA requires employers to provide training for each employee in recognizing and minimizing the hazards of stairways and ladders.



Each worker must be trained by a competent person in these specific topics:

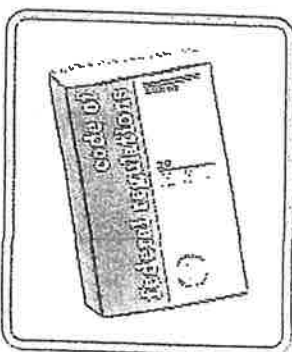
- the nature of fall hazards,
- the correct procedures for erecting, maintaining, and disassembling the fall protection systems,

- proper construction, use, placement, and care in handling of all stairways and ladders,
- the maximum intended load-carrying capabilities of ladders used, and
- OSHA standards covering stairways and ladders—Subpart X.



This also means that a worker has a responsibility to learn the information and to follow the procedures.

What Are the Requirements for Stairways?

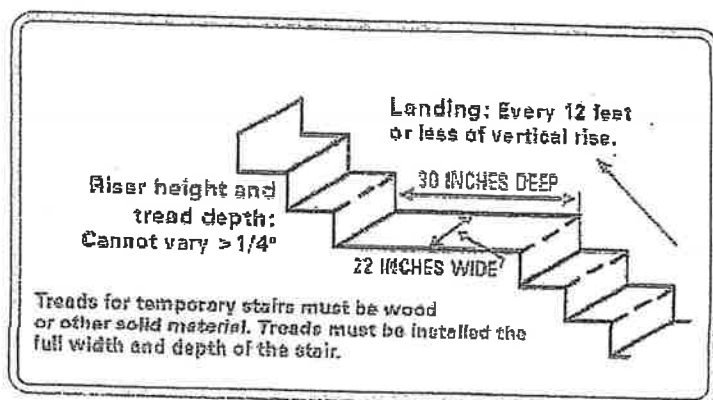


OSHA's key requirements for stairways cover these items:

- landings,
- uniform riser height and tread depth,
- slippery conditions and protruding objects,

- temporary service, and
- handrails, midrails, and guardrails.

Let's discuss each requirement and ask why it's needed.



What About Landings?

Stairs that will not be a permanent part of the structure must have landings at least 30 inches deep and 22 inches wide at every 12 feet or less of vertical rise.

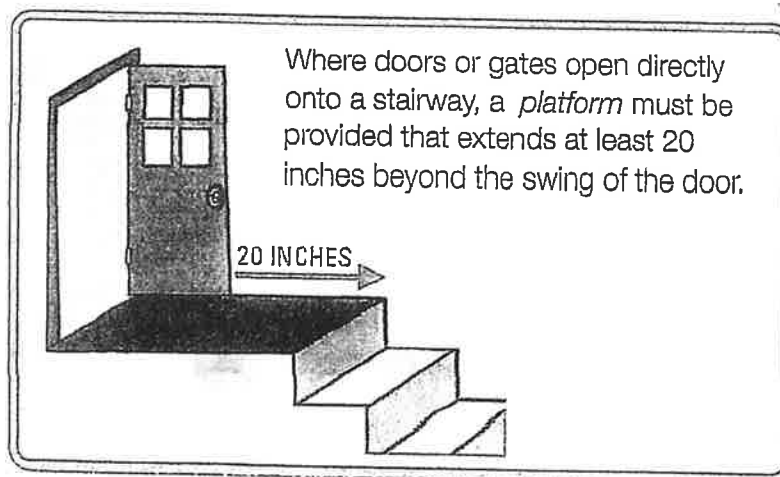
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What About Uniform Risers and Tread?

Riser height or stair tread depth cannot vary more than $1/4$ -inch in any stairway system, including any foundation structure used as one or more treads of the stairs.

Treads for temporary stairs must be made of wood or other solid material. Treads must be installed the full width and depth of the stair.

What About Doors/Gates Opening onto Stairways?



Stairways and Ladders

What About Hazardous Projections and Slippery Conditions?



You must keep all parts of a stairway free of *hazardous projections*.

You must eliminate *slippery conditions* before a stairway can be used to reach upper levels.

What About Handrails, Midrails, and Guardrails?

Stairways with 4 or more risers or rising more than 30 inches in height, whichever is less, must have at least *one handrail*.

Thirty inches may seem like a short distance to fall. But as you fall, you *accelerate*. Soon you are falling very fast. As you pick up speed, your *potential impact force* increases.

The *potential impact force* is about 16 times greater for a 0.4-second fall of 31 inches than for a 0.1-second fall of 2 inches. So if you fall 31 inches, the *potential impact force* is about 4,096 pounds.

Would you like to be hit by a 4,096-pound object? Of course not. That's why OSHA

requires a handrail when a stairway has 4 or more risers or rises 30 inches in height, whichever is less.

FALL DISTANCE	TIME (SEC)	IMPACT FORCE 200 lb WORKER
2.0 inches	0.1	256 lbs
7.6 inches	0.2	1,024 lbs
17.0 inches	0.3	2,304 lbs
31.0 inches	0.4	4,096 lbs

200-pound worker falling 31" = 4,096 pounds.

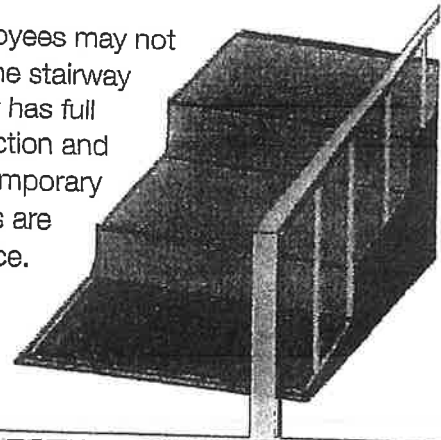
What Are the Requirements for Temporary Service?

During a stairway's construction, metal pan landings and treads must be temporarily filled with wood or other material.

All treads and landings must be replaced when worn below the top edge of the pan.

During a stairway's construction, skeleton metal frame structures and steps must be fitted with secured temporary treads and landings long enough to cover the entire tread and/or landing area.

Employees may not use the stairway until it has full protection and the temporary treads are in place.



How Do We Use Ladders Safely?

You can control how you use a ladder.

These are the safety requirements you must follow.

- Use ladders only for intended purpose.
- Extend ladders 3 feet above upper landings.
- Secure all ladders in traffic areas.
- Use proper angle of lean or pitch.
- Keep tops and bottoms clear.
- Use 3-point climbing.
- Do not move a ladder while it is occupied.
- Do not climb cross-braces or stand on top step.
- Maintain the ladder.
- Do not overload the ladder.
- Do not use on slippery surfaces.
- Use non-conductive ladders near electrical contacts.

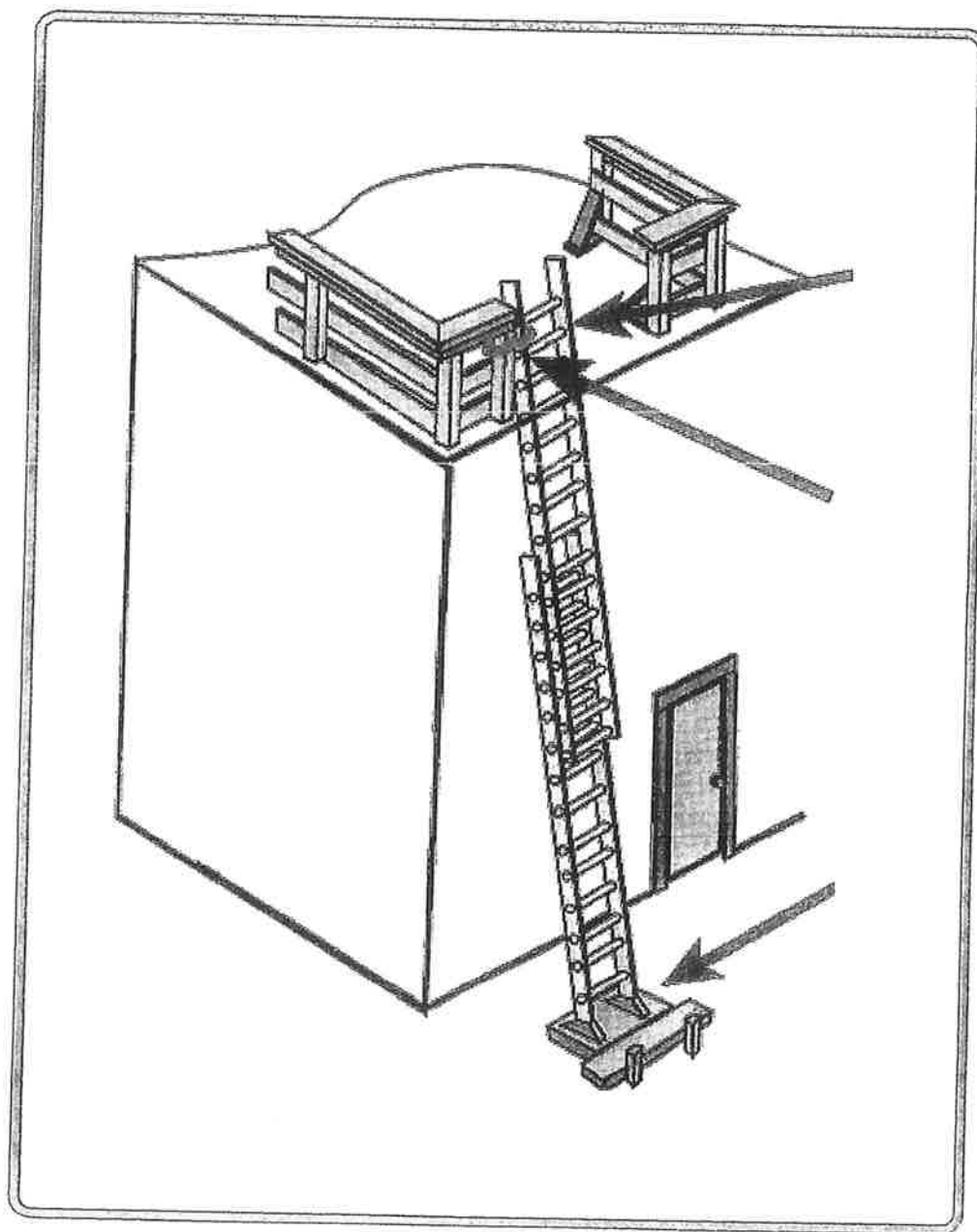


Finally, OSHA requires a *competent person* to inspect ladders on a periodic basis and to tag and remove defective ladders.

Why Should We Use a Ladder Only for Its Intended Purpose?

Use ladders only for the purpose for which they were designed. Have you ever seen someone climb a closed step ladder leaned against a wall? How about using a metal ladder near electricity? Most of the time, nothing may happen. But it only takes once to kill or maim. Carelessness in one area also will make you careless in other areas.

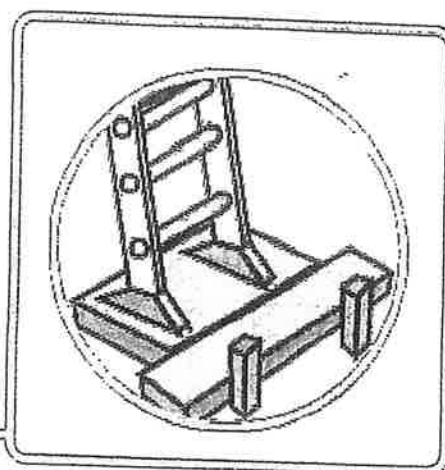
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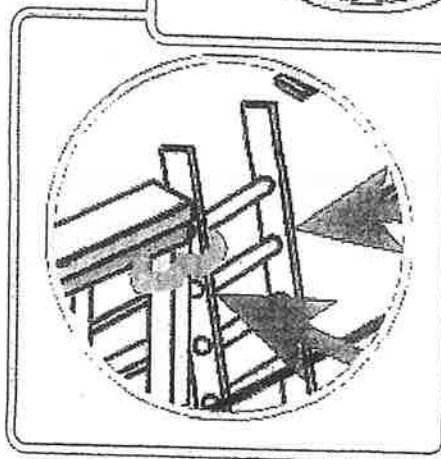
Why Should We Extend a Ladder 3 Feet Above an Upper Landing?

When you use a portable straight ladder for access to an upper landing, the ladder side rails must extend at least 3 feet above the landing. When this is not possible, then you have to *secure the ladder* at its top to a rigid support and provide a grab rail. By extending the ladder above the upper landing and securing it, you prevent movement of the ladder which might cause an accident.



Why Should We Secure Ladders in Busy Areas?

Ladders placed in any location where they can be displaced by workplace activities or traffic must be secured or barricaded. Some examples are: passageways, doorways, or driveways. The chance for ladder movement in a busy area is too great to allow work with an unsecured ladder.

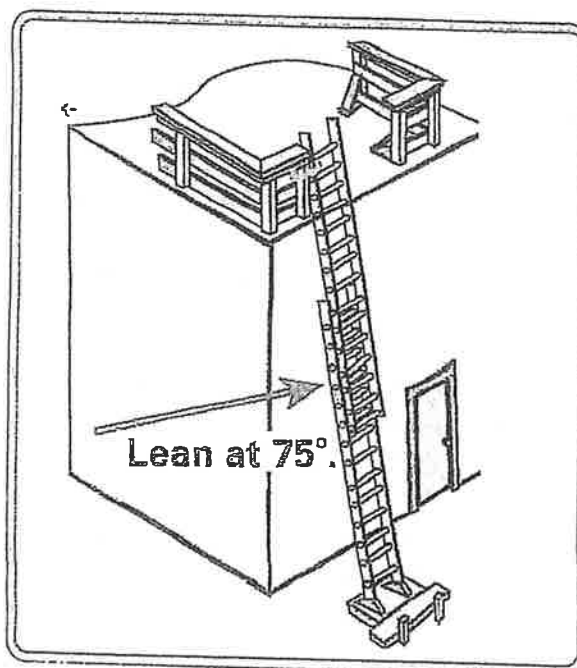


Why Should We Lean Ladders at About 75°?

Lean a ladder so the horizontal distance from the top support to the foot of the ladder is about one-fourth of the working length of the ladder—about 75°. This gives workers a comfortable angle for going up and down the ladder.

Why Keep the Tops and Bottoms of Ladders Clear?

You must keep the areas around the top and bottom of a ladder clear. Do not let debris or materials accumulate there. Materials and debris can create a tripping or falling hazard for workers climbing up or down the ladder.

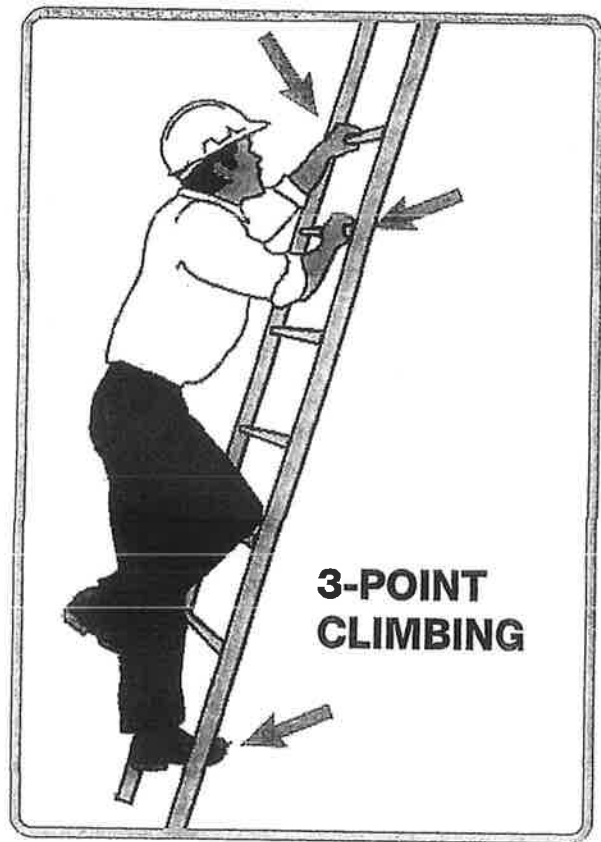


Stairways and Ladders

Why Should We Use 3-Point Climbing?

When you climb up or down a ladder, you must face the ladder. You must have at least one hand on the ladder at all times. You cannot carry any load that could cause you to lose your balance.

Three-point climbing means you have two hands and one foot or one hand and two feet in contact with the ladder at all times. It is the safest and most sensible way to climb a ladder.



Why Can't We Move a Ladder When It's Occupied?

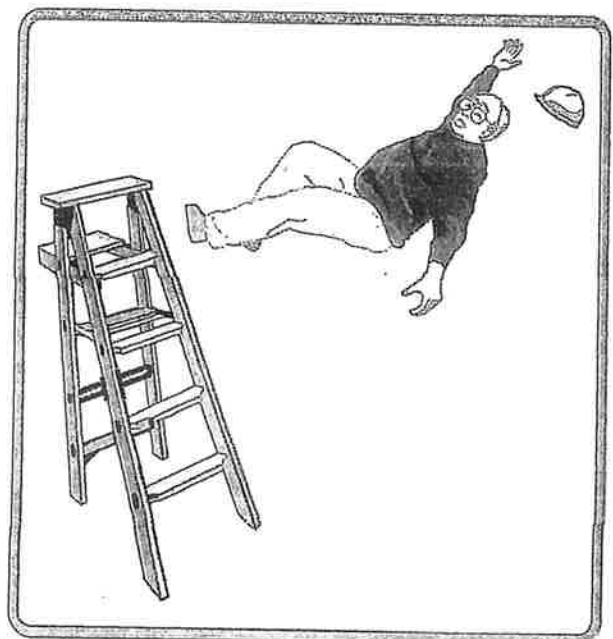
This may seem obvious but you never know what some people will try to do. Moving a ladder when it is occupied may seem like a good way to save 5 minutes. But in the long run, it's a recipe for disaster.

Why Can't We Climb Step Ladder Cross-Bracing?

Cross-bracing is much too flimsy to hold a worker.

Why Can't We Stand on the Top Step of a Step Ladder?

Standing on the *top step* of a step ladder may be a common mistake. Professional construction workers don't do it much now. Homeowners sometimes do it and end up falling.

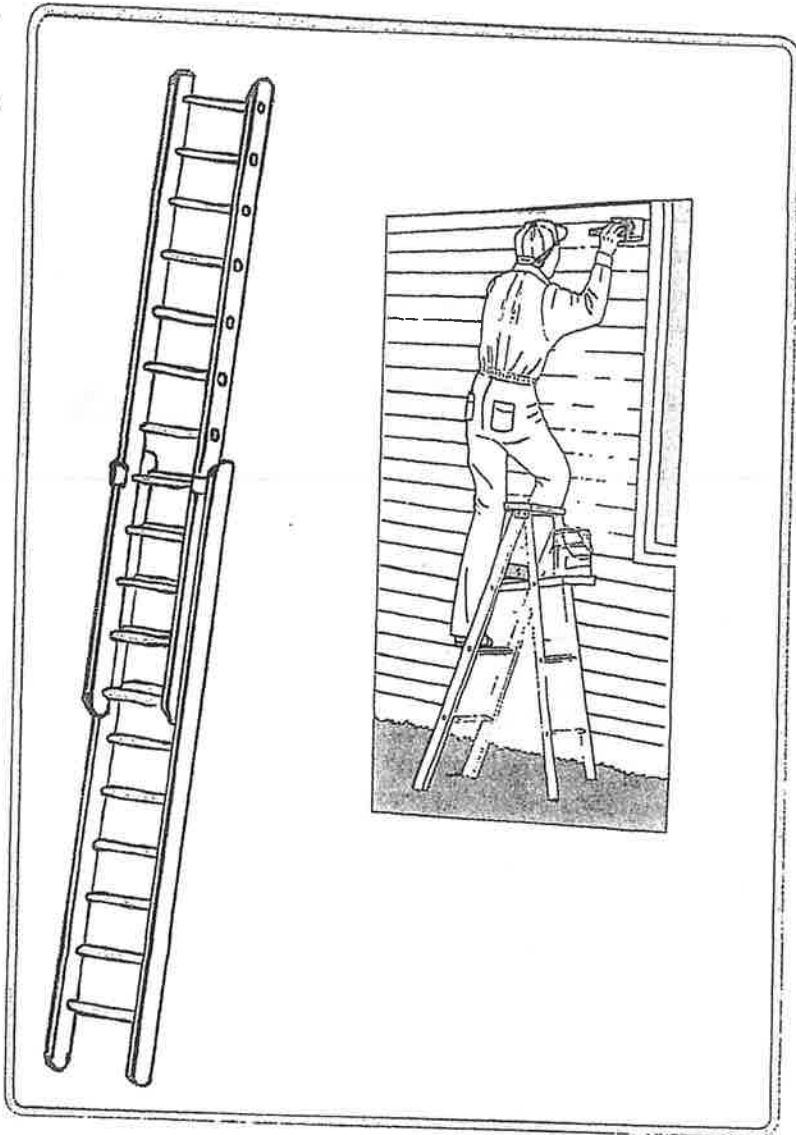


Why Not Use Conductive Ladders Near Possible Electrical Contact?

This is very serious. Every year too many people are killed when their metal ladders come into contact with electrical lines.

Why Can't We Overload a Ladder?

Does it seem like it should be okay to *overload* a ladder just once? You cannot load a ladder beyond the maximum intended load or the manufacturer's rated capacity at any time.



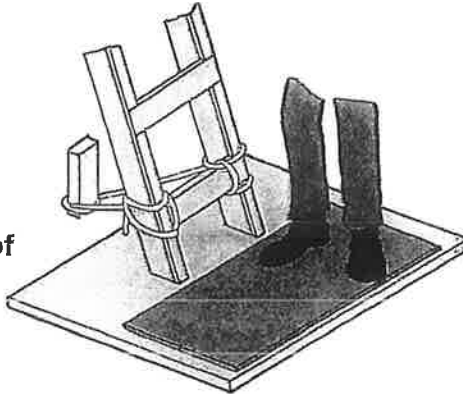
Stairways and Ladders

Why Can't We Use a Ladder on Slippery Surfaces?

Use ladders only on stable, level, clean surfaces unless the ladder is secured or provided with slip-resistant feet. Slippery

surfaces lead to slips or falls. Slips or falls from ladders frequently result in lost-time injury.

- On slippery surfaces, provide slip resistant feet and a place to wipe work boots.
- Maintain ladder free of oil, grease, and other slipping hazards.



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Why Do We Have to Maintain Ladders?

You must maintain ladders free of oil, ice, and other slipping hazards. Slipping hazards cause slips. Slips cause accident and injury.

Why Does OSHA Require Inspection of Ladders by a Competent Person?

A *competent person* must inspect ladders on a periodic basis and after any event that might affect their safe use. Ladders with defects must be immediately marked or tagged "DO NOT USE."

REMEMBER:

A *competent person* is one who is capable of identifying and predicting hazardous conditions and is *authorized* by the employer to take corrective action.



What Are OSHA's Requirements for the Condition of Ladders?

In addition to requirements for safe use, OSHA has requirements for the *condition* of ladders. These include load requirements, basic requirements for appearance and construction, and specific requirements for spacing between rungs, cleats, steps, and side rails.

Portable ladders must be capable of supporting 4 times the intended load. Heavy-duty type 1A metal or plastic portable ladders must be capable of supporting 3.3 times the intended load. Each step or rung of fixed ladders must be capable of supporting a single concentrated load of at least 250 pounds.

OSHA specifies measurements for spacing between rungs, cleats, steps and side rails for fixed and portable ladders.

Rungs, cleats, and steps of portable ladders and fixed ladders must be spaced not less than 10 inches and not more than 14 inches apart. Rungs, cleats, and steps of step stools must be not less than 8 inches and not more than 12 inches apart. All rungs, cleats, and steps must be parallel, level, and uniformly spaced.

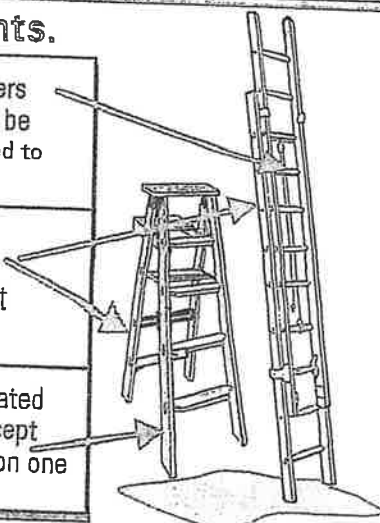


Basic Requirements.

Rungs of portable metal ladders and fixed metal ladders must be corrugated, dimpled, or coated to prevent slipping.

Ladders must be surfaced to prevent injury to workers from punctures and to prevent snagging of clothing.

Wood ladders must not be coated with any opaque covering except for identification or warnings on one face of a side rail.



OSHA also sets these minimum clearance distances: 16 inches between the sides of rung and step ladders, 11½ inches between the side rails of portable ladders, and 30 inches clearance from the center of a fixed ladder.

Finally, ladders must not be tied (spliced) to provide longer sections unless specifically designed for such use.

Stairways and Ladders

What About Access/Egress (Coming and Going)?

OSHA has two main requirements for access and egress. On fixed ladders, the step-across distance must not be less than 7 inches or more than 12 inches.

If the step-across distance is more than 12 inches, a landing platform must be provided.



Access/Egress (Getting On and Off):
Step-across distance on fixed ladders not less than 7" and not more than 12".

Cages, Lifelines, Wells:
Fixed ladders must have cages, wells, ladder safety devices, or self-retracting lifelines where the length of climb is less than 24 feet but the top of the ladder is at a distance greater than 24 feet.

What About Safety Devices, Lifelines, Cages, and Wells?

Fixed ladders need the following when the climb is 24 feet or more:

- self-retracting safety lines or rest platforms at 150-foot intervals, or
- a cage or well and multiple ladder sections of 24 feet with landing platforms at 50-foot intervals.

Test yourself on this brief review:

1. Which one of the following is NOT an 'access point'?
 - a. a passageway
 - b. a ladder
 - c. a doorway
 - d. a stairway opening
2. What is the biggest danger of stairs and ladders?
 - a. falling objects
 - b. splinters
 - c. falling
 - d. back injury
3. Most deaths from falls off of ladders happen from what height?
 - a. at 30 feet or higher
 - b. at 20 feet
 - c. at 10 to 20 feet
 - d. at 10 feet or lower
4. 'Riser height' means:
 - a. vertical distance from bottom step to top step
 - b. vertical distance from top of a tread to top of next tread
 - c. height to which worker must raise each foot when climbing a stairway
 - d. length of toprail measured from the lowest to highest point

Test yourself on this brief review:

1. Temporary stairs must have landings at least 30 inches deep and 22 inches wide at every _____ feet or less of vertical rise.
 - a. 12 feet
 - b. 6 feet
 - c. 20 feet
 - d. 25 feet
2. Riser height and tread depth cannot vary more than _____.
 - a. ¼-foot
 - b. ¼-inch
 - c. ¼-yard
 - d. ¼-step
3. The platform on which a door opens must extend _____ beyond the swing of the door.
 - a. 5 inches
 - b. 10 inches
 - c. 20 inches
 - d. 30 inches
4. Stairs with 4 or more risers or _____ inches of height must have at least one handrail.
 - a. 19 inches
 - b. 45 inches
 - c. 30 inches
 - d. 60 inches

Stairways and Ladders

Test yourself on this brief review:

- 1. Ladder side rails must extend at least _____ above the upper landing or the ladder must be secured at its top to a rigid support.**
 - a. one foot
 - b. 2 feet
 - c. 3 feet
 - d. 4 feet
- 2. Ladders placed in any location where they can be displaced by workplace activities must be secured or _____.**
 - a. attended
 - b. moved
 - c. reinforced
 - d. barricaded
- 3. Lean a ladder at a _____ angle.**
 - a. 45°
 - b. 55°
 - c. 75°
 - d. 95°
- 4. The safest way to climb a ladder is by using _____.**
 - a. 2-point climbing
 - b. 3-point climbing
 - c. 4-point climbing
 - d. 5-point climbing

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Test yourself on this brief review:

- 1. Portable ladders must be capable of supporting _____ times the intended load.**
 - a. 4 times
 - b. 5 times
 - c. 6 times
 - d. 10 times
- 2. Fixed ladders must have each step or rung capable of supporting a load of at least:**
 - a. 100 pounds
 - b. 250 pounds
 - c. 500 pounds
 - d. 750 pounds
- 3. The step-across distance on fixed ladders at a point of access/egress should be not less than 7 inches and not more than _____.**
 - a. 12 inches
 - b. 36 inches
 - c. 54 inches
 - d. 72 inches

Ladder Safety Checklist

To prevent falls from ladders, make sure you have the following controls in place:

- Use only ladders that are in good condition and designed to handle the climbing job that needs to be done.
- Train employees on proper ladder use.
- Make proper ladder use a performance requirement for the job.
- Require employees to complete a ladder inspection before each use.



Criteria for Ladder Purchase and Care

- ☐ Check OSHA standards for the type of ladder you are using.
- ☐ Use only Underwriter's Laboratory approved ladders (will have the UL seal).
- ☐ Protect wood ladders with a clear sealer, such as varnish, shellac, linseed oil or wood preservative because paint can hide defects.

Ladder Usage

- ☐ Be sure step ladders are fully open and locked before climbing them.
- ☐ Place ladder on a flat, secure surface.
- ☐ Place ladder on a hard surface as it will sink into a soft surface.
- ☐ Place ladder on non-movable base.
- ☐ Lean ladder against a secure surface, not boxes or barrels.
- ☐ Do not place ladder in front of a door.
- ☐ Position base of ladder one foot away for every four feet of height to where it rests (1:4 ratio).
- ☐ Ladder rails should extend at least three feet above top landing.
- ☐ Check shoes to ensure they are free of grease or mud.
- ☐ Mount the ladder from the center, not from the side.
- ☐ Face ladder when ascending or descending, and hold on with both hands.
- ☐ Carry tools in pockets, in a bag attached to a belt, or raised and lowered by rope.
- ☐ Don't climb higher than the third rung from the top.
- ☐ Work facing the ladder.
- ☐ Do not overreach, always keep your torso between the ladder rails.
- ☐ When using ladder for high places, securely lash or fasten the ladder to prevent slipping.
- ☐ Avoid outdoor ladder use on windy days.
- ☐ Avoid aluminum ladders if work must be done around electrical wires or power lines.

