

APPENDIX 4

Ladders- Construction Safety

Overview of Topic

Ladders are indispensable for so many jobs like painting, repairing roofs, reaching storage areas, or changing light bulbs. People think more about the task at hand than the ladder that will get them there. Similarly, stairs can also be taken for granted. Workers who are aware of ladder and stairway safety are less likely to get hurt.

Hazards involved with using ladders and stairs

The main hazard involved with ladder use is falls. A fall can be the result when a ladder fails due to overloading or damage. Employees can fall if they slip or lose their balance while climbing on the ladder. Employees also risk a fall if they reach too far while working on top of a ladder. Weather can be a factor when ladders are used outside. Oil or grease on a ladder can also contribute to a fall. Ladders that are not set up securely can shift, causing the person on the ladder to fall. Ladders that are not protected from traffic can be accidentally hit at the base to cause a fall.

Falls on stairways result when employees slip or trip. Clutter, slippery surfaces, damage, poor lighting, and unsafe work practices can contribute to stairway fall hazards.

WISHA regulations for general industry

WISHA standards on portable wood ladders are contained in WAC 296-45-275 and WAC 296-800-290. These standards apply to the construction, care, and use of the common types of portable wood ladders. Other types of special ladders (fruit picker's ladders, combination step and extension ladders, stockroom stepladders, aisle-way stepladders, shelf ladders, and library ladders) are not specifically covered.

The WISHA construction standard for ladders is WAC 296-155-Part-J.

Employees who use ladders should have training to help meet the WISHA requirements.

Construction

The construction regulations (WAC 296-155-Part-J) apply to all ladders used in construction, alteration, repair (including painting and decorating), and demolition at worksites covered by WISHA construction standards. These regulations do not apply to ladders that are specifically manufactured for scaffold access and egress, but any general purpose ladders which are also used with scaffolds. The rules detail ladder and stairway construction, care, and use.

The construction regulations include requirements for training and retraining. Employees who use ladders and stairs for construction work must receive training by a competent person.

In construction, a stairway or ladder is required at access points having a break in elevation of 19 inches or more when there is no ramp, runway, sloped embankment, or personnel hoist provided. Either a double-cleated ladder or two or more separate ladders must be used when the ladder must serve two-way traffic (or when 25 or more employees must use the same ladder for access or exit from a work area). At least one point of access to the work area must be kept clear for employee use.

A few precautions for safe ladder use

- Inspect the ladder for defects before you use it.
- Select a ladder with adequate length and load limits.
- Do not use metal ladders near electrical lines.
- Don't tie ladders together to make them longer.
- Set up the ladder on a firm, solid surface. Don't place a ladder on boxes or blocks to make it taller.
- Hoist tools or other materials up to you after you've reached the top of the ladder. Wear a tool belt to help you manage tools while you're working on a ladder.
- Work within the side rails. If your belt buckle goes past the side rail, you are leaning too far. Descend and move the ladder as needed to stay close to your work.

Some examples of ladder inspection points

With all the effort that goes into designing a ladder to make it safe, be sure to follow-up and inspect the ladder.

Follow the manufacturer's inspection guidelines. In general, inspect ladders for: broken or missing rungs or steps, broken or split side rails, corrosion, a tight fit between steps and side rails, rungs that are free of grease or oil, no splinters or sharp points, secure hardware and fittings, moveable parts that operate freely without binding or excessive play, proper lubrication on wheels or pulleys, and any frayed or badly worn rope on extension ladders.

A few good rules for stairway safety

- Eliminate any slippery conditions on stairways. Clean up any spills on stairs. When stairs are outside, keep them free of snow and ice.
- Stairways should be kept free of any clutter and have proper lighting.
- Stairs are required to have a handrail. Using the handrail helps you keep your balance and can prevent a fall.

Employee training

The general industry standards include requirements for safe use—they do not have specific training requirements for ladders and stairs. A good way to ensure that the safe use requirements are being met is to provide training for your

employees. The construction regulations have training requirements specified at WAC 296-155-48060.

Training tips

Meet with the trainees in an area where you have room to set up several portable ladders: stepladders, straight ladders, extension ladders, etc. Demonstrate how employees should inspect ladders before use.

WAC 296-155-48060 - Training requirements

The following training provisions clarify the requirements of WAC 296-155-100(1)c) regarding the hazards addressed in chapter 296-155 WAC, Part J.

- The employer shall provide a training program for each employee using ladders and stairways. The program shall enable each employee to recognize hazards related to ladders and stairways, and shall train each employee in the procedures to be followed to minimize these hazards.
- The employer shall ensure that each employee has been trained by a competent person in the following areas, as applicable:
 - The nature of fall hazards in the work area;
 - The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used;
 - The proper construction, use, placement, and care in handling of all stairways and ladders;
 - The maximum intended load-carrying capacities of ladders used; and
 - The standards contained in this part.
- Retraining shall be provided for each employee as necessary so that the employee maintains the understanding and knowledge acquired through compliance with this section.



SAFETY PRINCIPLES FOR ALL LADDERS

I. SAFETY PRINCIPLES APPLICABLE TO ALL LADDER TYPES.

- A. Elements of ladder safety.
 - 1. Proper construction.
 - 2. Proper use.
 - 3. Proper maintenance.
- B. The type of accident most common with ladders is a fall to a lower level.
- C. Design and Materials.
 - 1. Uniformity and spacing of steps.
 - a. The rungs, cleats, or steps must always be parallel and level.
 - b. Even spacing of steps.
 - (1) Steps should be spaced evenly throughout the length of the ladder and not more than twelve inches apart.
 - (2) Reasons for this spacing.
 - (a) Without uniformity, climbers cannot be sure where the next step is.
 - (b) Some workers would have trouble reaching steps more than 12 inches apart.
 - 2. Wood ladders.
 - a. Wood may have weak places such as knots, pitch and bark pockets and green cracks which could cause a break.
 - b. After a wood ladder is inspected for these defects, it should be given a coat of clear wood preservative to protect the wood from rotting and to prevent splinters.
 - c. Even with a protective coating, wood reacts to temperature changes and dampness. For example, a wood ladder may warp.
 - 3. Metal ladders.
 - a. Metal ladders may have sharp edges or burrs which can hurt a worker's hands.
 - b. Metal may rust or become corroded, weakening the ladder.
 - c. To prevent these hazards, metal ladders should be painted or treated.
 - d. Metal ladders should never be used near electrical lines or equipment because they can become electrical conductors.

II. FIXED LADDERS.

- A. Dimensions
 - 1. The best angle is between 75 and 90 degrees from the horizontal.
 - 2. Side rails should be at least sixteen inches apart to allow safe and easy passage.
 - 3. Distance from the structure.
 - a. To insure a safe foothold, there should be at least seven inches clearance space between a fixed ladder's rungs and the structure it is attached to.
 - b. The step-across distance from the ladder to the structure must not be more than twelve inches.

B. Safety Features and Devices.

1. Cages

a. Where cages are needed.

- (1) All fixed ladders over twenty feet high must be equipped with cages.
- (2) For full protection, cages should be installed even on shorter fixed ladders.

b. A cage eliminates the possibility of a free fall in case a worker loses his balance.

c. Cage dimensions.

- (1) A cage should extend from seven to eight feet above ground level to a minimum of three and one-half feet above the top of the landing.
- (2) There should be room enough inside the cage to allow easy movement, but the cage must be close enough to the ladder to keep a fall against the cage itself from being dangerous.

2. Ladder safety devices.

a. If a climber slips while wearing a safety device, the friction brake catches and holds him by the belt, preventing a fall.

b. Since ladder safety devices do not eliminate human error, a cage is the better for of protection.

3. Landing platforms.

a. Landing platforms give workers a resting place on long climbs.

b. When required:

- (1) For a ladder more than thirty feet high with a cage or safety device, a platform is required for every thirty feet.
- (2) A ladder with no cage or safety device must have a platform for every 20 feet.

c. Platforms must be equipped with guardrails, including intermediate rails and toeboards.

d. Fixed ladders with platforms should have each section of ladder offset from the next.

C. Step-through Extensions

1. Side rails should extend at least three and one-half feet above roofs, parapets, or landing platforms so the climber has a safe handhold all the way to the top.

2. If rungs are omitted from the extension, side rails must be from eighteen to twenty-four inches apart to allow easy passage.

III. PORTABLE LADDERS

A. Step Ladders

1. Use only on firm and level surfaces to reduce the danger of tipping.

2. Never try to work from the top of a step ladder or consider it as a step.

B. Straight Ladders

1. Prevention of slipping or tipping.

a. Place the ladder at an angle so that the distance from the ladder base to the vertical of its support is about one-fourth the working length of the ladder.

b. One of the following measures must be taken to hold the ladder stable.

- (1) Equip with non-slip bases such as shoes, spikes or spurs. If the upper part of an extension ladder is used as a bottom section, it must also have a non-slip base.
- (2) A second person can hold the bottom of the ladder.
- (3) Tie, hook or otherwise anchor the ladder at the top.

2. Use of straight ladders

a. Never use in a horizontal position as a platform, runway, or scaffold. Because a straight ladder is not designed to support a side load, it could break.

b. If a straight ladder is used to gain access to a roof or other level, the ladder must extend at least three feet above that level.

3. Use of extension ladders

a. Sections should overlap enough to prevent buckling.

b. Adjust only when standing at the base in order to make sure locks are properly engaged

C. Use and Maintenance of All Types of Portable Ladders

1. Safe use
 - a. Weight limitations
 - (1) All portable ladders should be strong enough to support any expected load.
 - (2) Unless a ladder is specially designed, it should never be used by more than one person at a time.
 - b. Do not place in front of a door unless the door is blocked, locked or guarded.
 - c. Keep rungs free of slippery materials such as oil, grease, water, and paper.
2. Proper maintenance
 - a. Ladders should be kept dry to maintain strength.
 - b. All bearings, locks, wheels and pulleys should be lubricated frequently.
 - c. Inspect to ensure that:
 - (1) All hardware and fittings are securely attached.
 - (2) Moveable parts operate without catching or wobbling.
 - (3) The joints between steps and the side rail are tight.
 - d. Destroy ladders with any broken or faulty equipment to prevent someone taking them home or using them.
 - e. If stored in a horizontal position, ladders must be supported to prevent sagging.

IV. JOB-MADE LADDERS

A. Construction

1. Side rails should be as parallel as possible.
2. Cleats should be inset one-half inch into side rails, or filler blocks should be used on the rails between the cleats.

B. Use

1. If a job-made ladder is the only access to a working area, a double-cleat ladder should be used.
2. Height limitations
 - a. Double-cleat ladders may not be more than twenty-four feet high.
 - b. Single-cleat ladders can be thirty feet high.
3. If the working area is too high for one ladder, the safest access is two or more separate ladders, offset with a platform between each ladder.
 - a. Open sides of platforms should have guardrails with intermediate rails and toeboard.
 - b. Job-made ladders should be firmly secured to the platforms.