

APPENDIX 5

Ladders- Portable Safety

WAC 296-155-480

Introduction:

A portable ladder is a useful tool for accessing objects and equipment that are out of our reach. Portable ladders include both stepladders and single or extension straight ladders. Ladders may be made of wood, metal or fiberglass. Extension ladders can place the user up to 50 feet off the ground.

Since ladders are in common use in today's society, employees often do not recognize their injury potential. Improper use of ladders results in numerous accidents occurring in the workplace each year. Falling from a ladder can result in bruises, cuts, broken bones and, in the extreme cases, death.

In general, most ladder falls involve portable ladders that move, tilt or shift while a worker is climbing or descending. Workers who fall from ladders are usually less than 10 feet above the ladder's base.

Why do people fall from ladders? Some of the most prevalent reasons include:

- Improper use of the ladder
- Using a damaged or defective ladder
- Placing a ladder on an unstable, uneven or slippery surface
- Missing a ladder step while climbing or descending
- Having a foot slip off of a step because the ladder rungs or the user's shoes are slippery
- Using a ladder that is not long enough for the task
- Loss of balance caused by overreaching or leaning too much to one side while on the ladder
- The ladder is struck by a moving vehicle, person or other object while someone is working on the ladder

Practicing ladder safety, which includes proper training in the selection, inspection, use and storage of ladders, is an integral part of reducing these types of accidents. Following are recommended practices that might improve ladder safety for those using manufactured ladders. For additional information about ladders, please consult WAC 296-800-290.

Workers can reduce portable ladder fall risks by:

- Choosing the right ladder for the job
- Inspecting the ladder before use
- Transporting the ladder safely
- Using the ladder appropriately

- Storing the ladder properly

Reducing Portable Ladder Risks from Falls and/or Failure:

1. Choosing the Right Ladder

Ladders are easier and safer to use when you match them with the appropriate task. Be sure to use a ladder of proper length that will reach beyond the working height that is needed. If working on a roof, the ladder must extend three feet above the roofline. If using an extension ladder, make sure that the sections overlap enough to prevent buckling.

Select a ladder that has a working load that exceeds the combined weight of the climber and the load being carried. The rating can be found on a label located on the side of the ladder. (See "Duty Ratings")

Make sure that ladder steps and rungs have a skid resistant surface that will help minimize the risk of slipping. ("Skid resistant" means corrugated, knurled, dimpled or coated with skid-resistant material.)

Avoid using any ladder with conductive (metal) side rails near exposed, energized equipment; such ladders must be permanently, legibly marked with the words, "WARNING – Do Not Use Around Energized Electrical Equipment".

2. ANSI Duty Ratings

A ladder's duty rating tells you the maximum weight capacity of the ladder. The American National Standards Institute (ANSI) determines the standard for the categories of duty ratings. A ladder must be rated to carry the combined weight of the climber and the load being carried.

<input type="checkbox"/>	Type IAA	Industrial Special Duty Use	Duty rating	375 pounds.
<input type="checkbox"/>	Type IA	Industrial Extra Heavy Use	Duty rating	300 pounds.
<input type="checkbox"/>	Type I	Industrial Heavy Use	Duty rating	250 pounds.
<input type="checkbox"/>	Type II	Commercial Medium Use	Duty rating	200 pounds.
<input type="checkbox"/>	Type III	Household Light Use	Duty rating	200 pounds.

Note: Type III ladders are NOT approved for use in workplaces regulated by WISHA. Only Type I and Type II ladders are allowed on parish property.

Ladders are readily available that are not rated. Never purchase or use any ladder that is not a rated ladder.

WISHA requires that all ladders in the work place must bear ANSI and OSHA labels.

3. Inspecting the Ladder before Each Use

Check the condition of the ladder before each use. Make sure the ladder is in good condition before climbing on it. Avoid working on ladders that are covered with ice, snow, mud or other slippery materials. Rungs should be clean and dry.

Inspect ladders to find defects, such as:

- loose or broken steps or rungs
- damaged base, shoe or foot of the ladder
- loose joints or bolts
- cracks, rot or splinters
- hardware fittings in poor condition; sharp edges, rough burrs, faulty welds
- hooks and locks in poor condition
- ropes or cables in poor condition

A ladder that is broken, damaged or bent should not be used - discard it. Do not make temporary repairs to a ladder that has broken or missing parts unless you are qualified to do so. Inspect any ladder that has collapsed or tipped over for structural defects.

Ladders should not be painted because paint can conceal defects that affect the integrity of the ladder. Use a transparent preservative to protect the surface of wooden ladders.

4. Transporting the Ladder Safely

Whenever moving a ladder, carry the ladder correctly. Ladders should be carried parallel to the ground. Step-ladders should be carried in the closed position. Be sure to hold the side rail in the middle of the ladder so the load can be balanced. Always use two or more persons when moving a long (more than 20 feet) ladder.

Properly support a ladder when transporting it on or in a vehicle, and make sure to tie it down securely.

5. Using the Ladder Appropriately

- a. Always read the use instructions affixed to the ladder before using the ladder.
- b. Place the ladder with your safety in mind. Put the ladder near the work you are performing. Before using a ladder outside, make sure it will not hit electrical wires, tree limbs or any other obstructions when it is being set up or in place. Avoid placing a ladder in front of a door that could be opened into the ladder. If working in high traffic areas, protect the base of the ladder so that it will not be struck by passing vehicles or pedestrians.
- c. Place a straight or extension ladder using a 4:1 ratio: for every four feet of height of the ladder, move the base of the ladder one foot away from the wall. Tie off extension ladders securely to ensure stability. If you intend to climb onto a roof or platform from a ladder, be sure the ladder extends at least three feet above the edge of the roof or platform.

- d. Ensure that the ladder is stable for use by placing the feet of the ladder on firm, even ground. All four points of a ladder must be secure - placed to prevent slipping, or tied in place, or braced. When working from a ladder over 25 feet from the ground or floor, secure the ladder at both the top and the bottom.
- e. When using a stepladder, make sure it is fully open with the braces between the two sections fully extended and locked. Never stand on the top rung of any ladder.
- f. Climb the ladder carefully - most falls occur when a worker is ascending and descending the ladder. Be sure to place both feet firmly on the ladder rungs and steps. Grasp the side rails with both hands so you will be able to avoid a fall if a rung fails or your foot slips. A good rule of thumb is to maintain three points of contact with the ladder at all times - two feet and one hand or two hands and one foot. Always face the ladder when climbing up and down.
- g. Do not lean over the side of the ladder or reach beyond your arm's normal extension while working on the ladder. Remember the "Belt Buckle Rule": Keep your belt buckle positioned between the side rails at all times, which will maintain your center of gravity on the ladder. Do not allow more than one worker on the ladder at a time. Never attempt to "jog" or "walk" the ladder to a new location while standing on it - climb down to the ground and reposition the ladder.
- h. Wear appropriate clothing when using ladders. Wear rubber soled (non-slip) shoes that are clean and dry. Make sure that your shoelaces are tied securely and be sure that your pant legs aren't so long that they extend under your shoes and cause you to slip.
- i. If you need to use toolboxes or materials, raise and lower those types of heavy, awkward loads with a hand line or hoist. Attach light, compact tools or materials to the ladder or to yourself using a tool belt. Protect the area underneath your ladder to reduce the chance of an object accidentally being dropped on someone below.

Storing the Ladder Properly

1. Take proper care of your ladder. Proper storage of the ladder will help reduce damage to the ladder. Straight ladders are best stored in racks or on wall brackets, and should be supported to prevent sagging and warping. Stepladders should be stored in the upright, closed position. As moisture and sun exposure are the two main enemies of wood ladders, these should be protected from moisture, insect damage and excessive heat.
2. Using ladders safely will help protect you from the risk of falling when you work off the ground. The injury you prevent by taking the time to use the ladder correctly may be your own.

NIOSH Portable Wooden Ladders Checklist

1. Are all wooden ladder parts (a) sound, (b) free of sharp edges and splinters, and (c) on visual inspection, free from shake, wane, compression failure, decay, or other irregularities?
2. Are all portable wooden step ladders 20 feet or less in length?
3. Is the portable step ladder of uniform step spacing and less than 12 inches apart?
4. Is the inside width between side rails of each portable step ladder at least 11-1/2 inches?
5. Is the metal spreader or locking device of portable step ladders of sufficient size and strength to securely hold the front and back sections in the open position?
6. Are all single wooden ladders 30 feet or less in length?
7. Are all two-section wooden extension ladders 60 feet or less in length?
8. Are all wooden ladders in good condition with the joint between the step and side rails tight? Are all hardware and fittings securely attached? Are the movable parts operating freely without binding or undue play?
9. Are the metal bearings of locks, wheels, pulleys, etc. frequently lubricated?
10. Is frayed or badly worn rope replaced?
11. Are the safety feet or other auxiliary equipment kept in good condition?
12. Are wooden ladders inspected frequently? Are those with defects withdrawn from service for repair or destruction and tagged or marked as **“Dangerous, Do Not Use?”**
Note: Wooden ladders with missing steps, rungs, or cleats; broken side rails; or other faulty equipment must not be used. Discarded ladders should be cut down the center of the rungs.
13. Are rungs kept free of grease and oil?
14. Are wooden ladders used and placed so that the horizontal distance from the top support to the foot of the ladder is one quarter of the working length of the ladder (the length along the ladder between the foot and the top support)?
15. Is the ladder (a) placed to prevent slipping, (b) lashed, or (c) held in position?
16. Is the use of wooden ladders in the horizontal position prohibited?
Note: Ladders must never be used as platforms, runways, or scaffolds.
17. Is only one person allowed on the ladder at one time?
18. Are ladders placed away from the front of doors that open toward the ladder unless the door is blocked, locked, or guarded?
19. Are ladders always placed on stable bases?

Note: Ladders must never be placed on boxes, barrels, or other unstable bases.

20. Is the splicing of short ladders together prohibited?
21. Is the use of the tops of stepladders as steps prohibited?
22. When in use, do all 36-foot or less two-section extension wooden ladders have a minimum overlap of 3 feet between the two sections?
23. When in use, do all 36- to 48-foot two-section extension wooden ladders have a minimum overlap of 4 feet between the two sections?
24. When in use, do all 48- to 60-foot two-section extension wooden ladders have a minimum overlap of 5 feet between the two sections?
25. If ladders are used to gain access to a roof, are they extended at least 3 feet above the point of support?
26. Are all portable rung ladders equipped with non-slip bases where a hazard of slipping exists?

Note: Non-slip bases are not intended as a substitute for care in safely placing, lashing, or holding a ladder that is being used.

Portable Metal Ladders

27. Are metal ladders maintained in good usable condition at all times?
28. Are the rungs and steps of portable metal ladders corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize the possibility of slipping?
29. Are all portable metal single ladders 30 feet or less in length?
30. Are all portable metal two-section ladders 48 feet or less in length?
31. If a portable metal ladder tips over, is it inspected immediately for damage?

Note: The inspection must include looking for dents, bends, or excessively dented rungs; and checking all rungs to side rail connections, checking hardware connections, and checking rivets for shears.

32. If metal ladders are exposed to oil and grease, are they cleaned immediately?
33. Are metal ladders with defects marked and taken out of service until repaired by either the maintenance department or the manufacturer?
34. Are metal ladders placed at the proper angle?

Note: That is, the base distance from the vertical wall to the ladder is one-fourth the working length of the ladder or height at which the ladder touches the wall.

35. Is the use of a metal ladder as a brace, skid, guy or gin pole, gangway, or for other uses than that which the ladder was intended prohibited?
36. Has inspection been conducted to determine if metal ladders might contact energized conductors?

Note: The use of metal ladders should be prohibited wherever they might make contact with energized electrical conductors.

NIOSH Construction Ladder Safety Checklist

1. Are ladders or stairways provided at all points of access that are elevated 19 inches or more, and no ramp, runway, sloped embankment, or personnel hoist is provided?
2. Does a competent person provide ladder training that teaches users how to recognize hazards and procedures for minimizing these hazards?
3. Is ladder retraining provided when necessary?
4. Can ladders support the load they are expected to carry?
5. Are ladder rungs, cleats, and steps parallel, level, and uniformly spaced when the ladder is in position for use?
6. Are rungs, cleats, and steps of portable ladders (other than step stools and extension trestle ladders) spaced at least 10 but not more than 14 inches apart (as measured between center lines of the rungs, cleats, and steps)?
7. Are rungs, cleats, and steps of step stools at least 8 but not more than 12 inches apart (as measured between center lines of the rungs, cleats, and steps)?
8. Are rungs, cleats, and steps of the base section of extension trestle ladders at least 8 but not more than 18 inches apart (as measured between center lines of the rungs, cleats, and steps)?
9. Are rungs, cleats, and steps of the extension section of extension trestle ladders at least 6 but not more than 12 inches apart (as measured between center lines of the rungs, cleats, and steps)?
10. Is the clear distance between side rails for all portable ladders at least 11-1/2 inches?
11. Are the rungs and steps of portable metal ladders corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping?
12. Are ladders prohibited from being tied or fastened together to provide longer sections (unless they are designed for such use)?
13. Is a metal spreader or locking device provided on each stepladder to hold the front and back sections in an open position when the ladder is being used?
14. Are ladders surfaced to prevent injury from punctures or lacerations, and to prevent snagging of clothing?
15. Is it prohibited to coat wood ladders with any opaque covering, except for identification or warning labels that are placed on only one face of a side rail?
16. Do portable ladders extend at least 3 feet above the upper landing surface for which the ladder is used to gain access?

Note: As an alternative, secure the ladder at its top to a rigid support that will not deflect. Use a grasping device (such as a grab rail) to mount and dismount the ladder. The extension should never be such that the ladder

deflection under load would, by itself, cause the ladder to slip off its support.

17. Are ladders maintained free of oil, grease, and other slipping hazards?
18. Are ladders loaded at or below the maximum intended load for which they were built, or at or below the manufacturer's rated?
19. Are ladders only used for the purpose for which they were designed?
20. Are non-self-supporting ladders used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately 1/4 of the working length of the ladder (the distance along the ladder between the foot and the top support)?
21. Are ladders used only on stable and level surfaces, unless secured to prevent displacement?
22. Are ladders used on slippery surfaces ONLY when they are secured or provided with slip-resistant feet to prevent displacement?

Note: Do not use slip-resistant feet as a substitute for care in placing, lashing, or holding a ladder on surfaces such as flat metal or concrete that cannot be prevented from becoming slippery.

23. Are ladders secured to prevent displacement, especially in busy, high-traffic areas?

Note: As an alternative, a barricade may be used to keep the activities or traffic away from the ladder.

24. Is the area around the top and bottom of ladders kept clear?
25. Is the top of a non-self-supporting ladder placed with the two rails supported equally, unless it has a single support attachment?
26. Is it prohibited to move, shift, or extend ladders while they are occupied?
27. Do ladders have nonconductive side rails if they are used where they could contact exposed energized electrical equipment?
28. Is standing on the top or top step of a stepladder prohibited?
29. Is climbing on the cross-bracing on the rear section of stepladders prohibited?

Note: This is allowed IF the ladder is designed and provided with steps for climbing on both front and rear sections.

30. Are ladders inspected periodically by a competent person and after any incident that could affect their safe use?
31. Are portable ladders with structural defects (a) immediately marked in a manner that readily identifies them as defective, (b) tagged with **DO NOT USE** or similar language, or (c) withdrawn from service until repaired?

Note: Structural defects include broken or missing rails, corroded components, or other faulty or defective components.

32. Does a ladder that is repaired meet its original design criteria, before it is returned to use?
33. Do all students and employees face the ladder when moving up or down the ladder?
34. Do all students and employees use at least one hand to grasp the ladder when moving up or down the ladder?

35. Is it prohibited to carry any object or load that could cause a person to lose balance and fall?

Definitions

Cleat: a ladder crosspiece of rectangular cross section placed on edge. A person steps on a cleat while ascending or descending a ladder.

Extension trestle ladder: a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together.

Portable ladder: a ladder that can be readily moved or carried.

Step stool (ladder type): a self-supporting, foldable, portable ladder, nonadjustable in length, 32 inches or less in overall size, with flat steps and without a pail shelf, designed to be climbed on the ladder top cap as well as all steps. The side rails may continue above the top cap.



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.