Portable Ladders

Types, Use & Care

DEPARTMENT OF CONSUMER & BUSINESS SERVICES

Oregon Occupational Safety
& Health Division (OR-OSHA)

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Introduction

Ladders are indispensable tools. We take them for granted in our day-to-day work and use them extensively in virtually all industries. Though they come in many sizes, shapes, and styles, they all serve the same purpose: to help us move vertically. They're simply built and easy to use, but they're not *always* user friendly. Each year in Oregon, about 500 workers are seriously injured when they fall from ladders. You don't have to fall far to get hurt; most workers injured in falls from ladders are less than 10 feet above the ladder's base of support.

Why do people fall from ladders if they're so easy to use? In general, most ladder falls involve *portable* ladders that move, tilt, or shift while a worker is climbing or descending. Unstable or slippery base surfaces are the primary reasons ladders fail. Other reasons include a misstep or a slip of the foot, loss of balance, an overreach, and being struck by a vehicle or other object.

Workers can reduce ladder fall risks by doing the following:

- Frequently inspect and maintain ladders
- Match tasks to appropriate ladders
- Set up ladders correctly
- Climb and descend ladders properly

Employers, too, have a responsibility for training workers so they understand these safe work practices and can use them effectively.

We created this guide to promote safe work practices for portable ladders, and we encourage you to use it as a basic reference. However, it does not replace OR-OSHA's requirements for portable ladders. The table below shows where you'll find the requirements in OR-OSHA rules.

Safety requirements for portable ladders

Division	Subdivision	Subparagraph
Division 2, General	Subdivision D Walking/working Surfaces	437-002-0026
Division 3, Construction	Subdivision X, Stairways and Ladders	1926.1053 & 437-003-0065
Division 4, Agriculture	Subdivision D Ladders and Scaffolds	437-004-0340 through 437-004-0370

If you have questions about these requirements, call the OR-OSHA Standards & Technical Resources Section, (503) 378-3272, or visit the OR-OSHA Web site, www.orosha.org.

Ladder Ratings

There are many types of portable ladders, but they all receive one of four ratings, based on their maximum working load (the maximum weight they can safely support). The ratings:

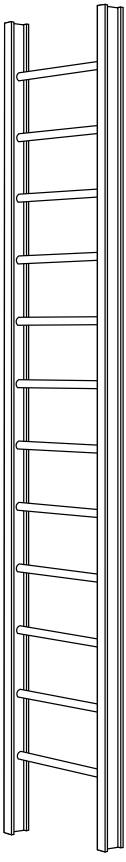
Rating	Working load
Extra heavy duty (I-A)	300 pounds
Heavy duty (I)	250 pounds
Medium duty (II)	225 pounds
Light duty (III)	200 pounds

Before you use a ladder, check its rating. And be sure not to subject it to a load greater than its rated capacity.

Types of Portable Ladders

Workers climb up or down to do all sorts of tasks, so it's not surprising that ladders come in different types to help them accomplish those tasks. Portable ladders are either non-self-supporting (such as the straight ladder) or self-supporting (such as the standard step ladder). Within one of these two categories, you're likely to find the right size, shape, and type of ladder to accomplish your task.

Non-self-supporting ladders



Straight ladder

Single portable or straight ladder

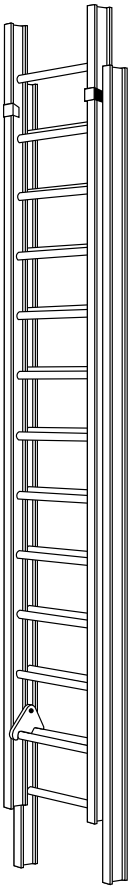
The single portable or straight ladder is indispensable for general use. It's the most common type of portable ladder and has the widest range of applications.

When used on slippery surfaces, this ladder must have slip-resistant feet or be secured to prevent it from sliding. Rubber or neoprene ladder shoes are recommended for smooth, dry surfaces, and spikes are recommended for snow or ice.

Single portable ladders must not be longer than 30 feet and are intended for use by only one worker at a time. Such ladders are available in wood, metal, and reinforced fiberglass.

Extension or section ladder

Extension ladders offer the greatest length in a general purpose ladder. The ladder consists of two or more sections that travel in guides or brackets, allowing adjustable lengths. The sections must be assembled so that the sliding upper section is on top of the lower section. Each section must overlap its adjacent section a minimum distance, based on the ladder's overall length. The overall length is determined by the lengths of the individual sections, measured along the side rails. The table below shows the minimum overlap for ladders up to 60 feet long.



Extension ladder

Ladder length	Overlap
Up to and including 36 feet	3 feet
Over 36 through 48 feet	4 feet
Over 48 through 60 feet	5 feet

Note: Install positive stops on individual ladder sections to ensure the required overlap.

Extension ladders are made of wood, metal, or reinforced fiberglass. Wood ladders can't have more than two sections and must not exceed 60 feet. Metal and fiberglass ladders can have as many as three sections; however, the overall length must not exceed 72 feet. Individual sections of any extension ladder must not be longer than 30 feet. Extension ladders are for use by only one person at a time.

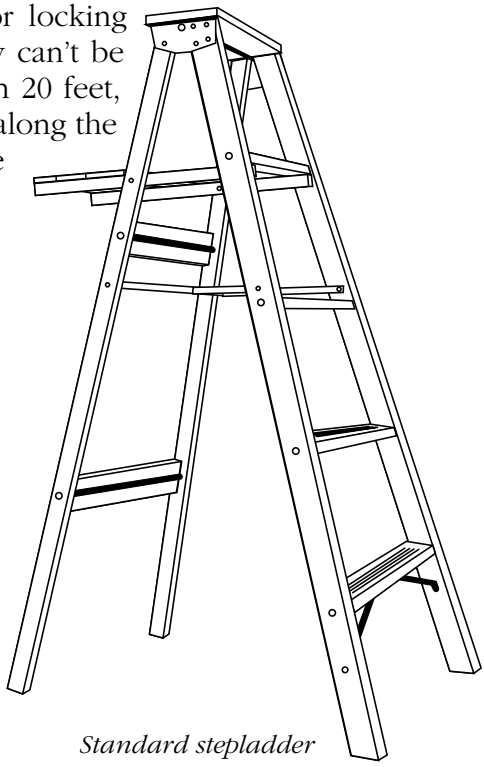
Make sure extension ladders have nonslip bases if there's a chance the ladder can slip. Cord-face ladder shoes are recommended for wet surfaces, rubber or neoprene ladder shoes for smooth dry floor surfaces, and steel spikes for ice or snow. Be careful if you use an extension ladder on oily, metal, or concrete surfaces. Place the ladder securely and tie it off to prevent it from slipping.

Self-supporting ladders

Standard stepladder

The standard stepladder, a general purpose ladder, has flat steps and a hinged back. It is self-supporting and nonadjustable. An ***industrial*** model, designed for heavy service demands, has oversize back legs, heavy-duty flat steps, and knee braces that increase rigidity and durability.

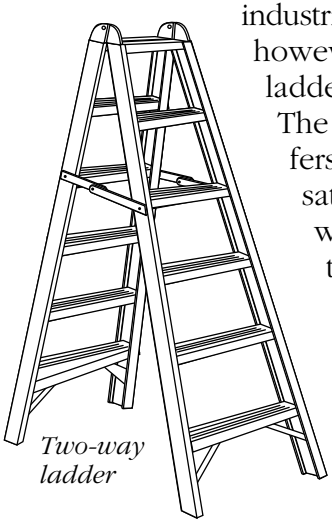
Standard stepladders should be used only on surfaces that offer firm, level footing such as floors, platforms, and slabs. They are available in metal, wood, or reinforced fiberglass versions, and are intended to support only one worker at a time. Remember not to stand on, or work from, the top step. The ladders must have a metal spreader or locking arms. They can't be longer than 20 feet, measured along the front edge of the side rails.



Standard stepladder

Two-way stepladder

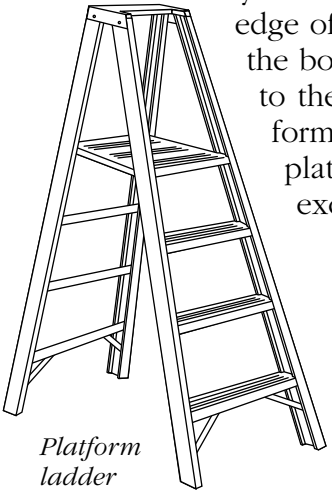
The two-way stepladder is similar to the industrial standard stepladder; however, each side of this ladder has a set of steps. The extra set of steps offers convenience and versatility: One person can work from either side or two people can work from the ladder at the same time — one on each side.



Two-way ladder

Platform ladder

The platform ladder is a special-purpose ladder that has a large stable platform from which you can work at the highest standing level. The ladder's length is determined by the length of the front edge of the side rail from the bottom of the ladder to the base of the platform. The length of a platform ladder can't exceed 20 feet.



Platform ladder

Orchard ladder

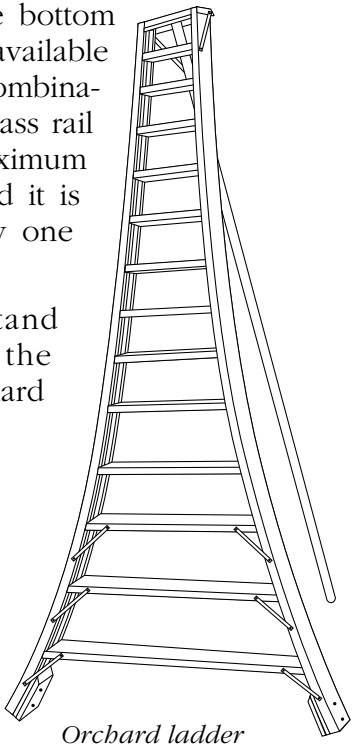
The orchard ladder is a special-purpose ladder for pruning and harvest work. It has a flared base and a single back leg that offers support on soft, uneven ground. A doubled base on the rails controls penetration in soft soil.

Spreaders, locking devices, steep points, or safety shoes are not required on orchard ladders.

Orchard ladders are intended for use by only one person at a time and can't be longer than 16 feet. Metal and reinforced fiberglass versions are available.

A more rigid orchard ladder, the so-called ***double base*** version, incorporates a triangular box brace with stub rails attached to the bottom step. The ladder is available in wood or with a combination wood or fiberglass rail and metal step. Maximum length is 16 feet and it is intended for use by one person.

You should not stand on or work from the top step of an orchard ladder.

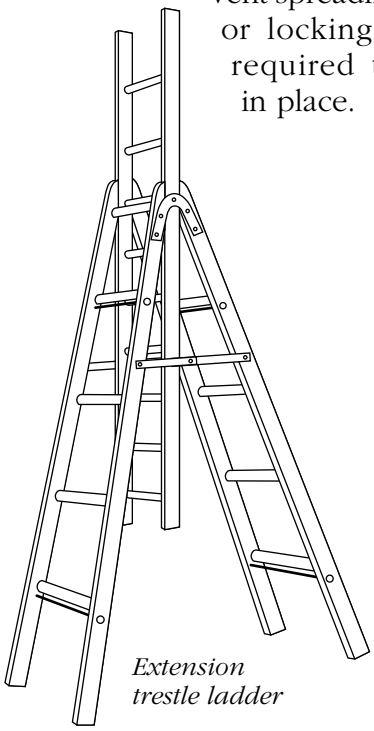


Orchard ladder

Trestle ladder

A trestle ladder is a self-supporting portable ladder that has two sections hinged at the top, forming equal angles with the base. A variation of the trestle ladder, the ***extension trestle ladder***, includes a vertically adjustable single ladder that can be locked in place. (The single extension section must lap at least three feet into the base section.) Trestle ladders are used in pairs to support planks or staging. The rungs are not intended to be used as steps.

The angle of spread between open front and back legs must be 5½ inches per foot of length. The length can't be more than 20 feet, measured along the front edge of the side rails. Rails must be beveled at the top and have metal hinges to prevent spreading. Metal spreaders or locking devices are also required to keep the rails in place.



Extension trestle ladder

Selecting Ladders

Ladders come in different types because workers who use them have different needs. In the previous section, we identified major types of portable ladders and the tasks for which they are appropriate. However, we omitted many of the special-purpose ladders, which are usually variations of general purpose ladders, designed to meet a special need.

Examples include: platform, trolley, side-rolling, shaft, and manhole ladders. The important point: You are likely to save time and energy and reduce your risk of injury if you choose the right ladder for your task or job. The two examples below illustrate what can happen when a ladder and task are mismatched.

Warning

Example 1: A medium-duty, four-legged stepladder is designed for use on firm, level footing. If you use it frequently on soft, uneven ground — typical in orchard work — it will eventually twist and fail to support a load. You risk becoming a victim of the most common ladder accident — a ladder that tips over.

Example 2: An orchard ladder lacks locking arms or spreaders. When used on a firm, smooth footing, the tripod leg or pole tends to creep forward. The result is another common accident scenario — the ladder is likely to collapse.

Using Ladders

Ladders are easier and safer to use when you match them with the appropriate task. Still, most portable-ladder accidents happen when workers do one or more of the following: fail to inspect ladders regularly, place ladders inappropriately, or ignore safe practices when climbing or descending. The guidelines below address each of these issues.

At the beginning of each job

- Select the appropriate ladder for your task or job.
- Inspect the ladder before you use it. Make sure it's in sound condition — clean and undamaged.

Placing a ladder

- Move the ladder near the work you're doing.
- Angle the ladder properly. The base should extend not less than one-fourth the ladder's length. The minimum slope should be 50 degrees.
- Place a solid rest for the rail tops across window openings.
- Protect the base of a tall, occupied ladder if it could be struck by vehicles or pedestrians.
- Make sure the leg or pole of an orchard ladder doesn't rest on a limb or in the crotch of a tree.

Avoid

- *Placing a ladder in front of an unlocked, unguarded door.*
- *Placing a ladder on boxes, tables, trucks, or other moveable objects.*

Securing a ladder

- Nail or lash a ladder in place if it will be used repeatedly in the same spot.
- Select a ladder that will extend at least 36 inches above the access area it's serving.

Avoid

- *Working on ladders in exposed areas during a severe storm or strong wind.*
- *Working on ladders covered with ice or snow.*
- *Using a portable ladder if an approved stairway could be used instead.*

Ascending and descending

- Face the ladder at all times.
- Grasp the side rails with both hands; you have a better chance of avoiding a fall if a rung or step fails.
- Raise and lower heavy, awkward loads with a hand line or hoist.
- Attach light, compact tools or materials to the ladder or to yourself.

Avoid

- *Sliding down the ladder.*
- *Climbing when your hands or shoes are slippery.*
- *Using your hands for carrying items.*
- *Carrying awkward loads when ascending or descending a ladder.*

Securing equipment

- Use a strong bail hook on a picker bucket.
- When you are not using a limb hook, secure it firmly to the ladder or to an adjoining limb.

Avoid

Placing tools or materials on a ladder if they could fall off.

Metal ladders

- Make sure steps and rungs have a skid-resistant surface that minimizes the risk of slipping.

  ("Skid resistant" means corrugated, knurled, dimpled, or coated with skid-resistant material.)

Avoid

Using any ladder with conductive side rails near exposed, energized equipment. (Such ladders must be permanently, legibly marked with the words, **"WARNING — Do Not Use Around Energized Electrical Equipment."***)*

Precautions

- Place both feet firmly on the ladder rungs and steps.
- Make sure only one person stands on, or works from, a standard ladder. (Use a scaffold or a second ladder if two or more people are doing the same task.)
- Immediately inspect any ladder that has collapsed, tipped over, or been exposed to oil or grease. Clean and repair the ladder if necessary.

- Remove defective ladders from service. Tag or mark defective ladders with the words: **"Dangerous, Do Not Use."**
- Make sure an extension ladder extends at least 36 inches above an access landing.
- Keep the area around the top and bottom of a ladder free of debris.
- Keep the load on the ladder (including yourself) below its maximum load capacity.

Don't

- Don't paint ladders. Paint conceals defects. Use transparent preservatives instead.
- Don't use ladders with broken, patched, oily, or cracked rails, rungs, or steps.
- Don't reach out over the side rails, lean, or turn excessively on a ladder.
- Don't use a ladder as guy, brace, or skid.
- Don't stand or sit on the top two steps of a stepladder.
- Don't use a self-supporting ladder without first opening it up and securing the metal spreader or locking device.
- Don't load a ladder beyond its maximum load capacity.

Transporting Ladders

Some ladders are easier to move than others. Here are a few guidelines to help you protect ladders and the people who use them.

- When you hand-carry a ladder, keep the front end elevated, especially around blind corners, in aisles, and through doorways. You'll reduce the chance of striking another person with the front of the ladder.
- When you transport a ladder in a truck or trailer, place it parallel to the bed. Avoid tossing, throwing, or dropping it in the bed.
- If you transport a long ladder on a short truck bed over long distances, support the ladder so it won't sag or bend.
- Drive slowly over rough terrain. Tie the ladder securely to eliminate nicking, gouging, chafing, and road shock.

Storing Ladders

Another way to prolong a ladder's life is to store it properly. Here are some useful storage tips:

- The storage area should be well ventilated.
- Wood ladders shouldn't be exposed to moisture or excessive heat. Avoid storing ladders near stoves, steam pipes, or radiators.
- Store straight or extension ladders in flat racks or on wall brackets. Make sure there are enough brackets to support the ladder so that it doesn't sag. If the ladder rails have a lateral curve, the wall brackets should match the curve.
- Store stepladders and orchard ladders vertically, in a closed position, to reduce the risk of sagging or twisting. Secure stored ladders so that they won't tip over if they are struck.
- Store ladders, especially wood ladders, promptly after using them. Exposure to moisture and sun will shorten the life of a wood ladder.

Maintaining and Repairing Ladders

Neglected ladders quickly become unsafe ladders. Step bolts slacken, step sockets and other joints work loose, hole sizes increase — eventually the ladder becomes twisted and unstable.

Periodic maintenance extends a ladder's life and saves replacement costs. Maintenance includes regular inspection of the ladder, repairing damage and tightening step bolts and other fastenings.

- Replace lower steps on wooden ladders when one-fourth of the step surface is worn away. Typically, the center of a step receives the most wear. (Mineral abrasive or other skid-resistant material reduces wear.)
- Don't use cleats to repair rung ladders.
- Don't paint a wood ladder — paint conceals defects.
- Consider stocking repair parts if you use different types of ladders. Typical parts include ladder bolts, related hardware, and lower steps or rungs (which wear out faster than upper steps or rungs).

Improving Slip Resistance

Slip-resistant materials are often used on industrial-ladder treads. Notable is the anti-slip treatment on metal platform ladders used in file and parts rooms, tool cribs, and frozen-food lockers. The obvious benefit of slip-resistant material is that it reduces fall risks when a worker is climbing or descending. Common slip-resistant materials you can apply:

Cloth-backed mineral abrasive
Made in strips, panels, and large sheets. An adhesive-backed, pressure-sensitive type and a plain type requiring cement, are available. Both types can be applied to any clean, dry surface. Use an edge sealing (beading) compound over the application to make it last longer.

Anti-slip abrasive surfacer
A mastic-type compound containing mineral abrasive that is troweled on in a thin coat.

Coarse-ground walnut shells
A wall texture material used by decorators, available in most paint stores. Mixed into spar varnish, about one part shells to three or four parts varnish, it makes a good slip-resistant ladder tread surface. When applying the material to metal steps, use a damp-proof primer before applying the varnish.

Sand
When properly applied, sand can enhance slip resistance. The recommended procedure is to varnish steps or rungs, then sift dry sand onto the wet varnished surface. After allowing ample drying time, shake off surplus sand. (You can apply a thin coat of spar varnish over the sand to strengthen the bond.)

Re-dimpling
Metal ladder treads that have round dimples worn smooth can be redimpled with a tapered punch driven upward in same line as the original dimpling.

Ladder hazards

Begin your work with a ladder that won't let you down. Use the checklist below to make sure the ladders you use are hazard free. (Your answers to all checklist questions should be YES!)

- ☐ Are ladders kept in good condition?
- ☐ Are the joints between steps and side rails tight, all hardware and fittings securely attached, and movable parts operating freely without binding or excessive play?
- ☐ Are non-slip safety feet on each single or multiple-section portable rung-type ladder?
- ☐ Are ladder rungs and steps kept free of grease and oil?
- ☐ Are workers instructed to face the ladder when ascending/descending it?
- ☐ Are workers prohibited from using ladders that have missing steps, rungs, cleats, broken side rails, or other faulty parts?
- ☐ Are workers instructed not to stand or step on the top step of any portable ladder?
- ☐ When portable ladders are used to reach elevated platforms and roofs, does the ladder extend at least 36 inches above the elevated surface?

☐ Are portable metal ladders legibly marked with signs reading **"CAUTION — Do Not Use Around Electrical Equipment"** or equivalent wording?

☐ Are steps, rungs, or cleats of ladders spaced no more than 12 inches apart?

☐ Are portable ladders secured or lashed to prevent displacement when they are used?

☐ Are wood cleats attached to the side rails of job-made ladders in one of the following ways:

(1) by housing the cleats into the side rails by at least 1/2 inch

(2) by securing wood strips (same thickness as the cleats) to the side rails between each cleat

(3) by securing the cleats to the side rails with bolts

☐ Is there at least seven inches of space behind the cleats to allow secure footing?

Ladder training

Employers have a responsibility to ensure that their employees understand how to inspect and use ladders correctly. Use the following checklist to evaluate the training employees receive. (Your answers to these checklist questions should be YES!)

- ☐ Have you provided a training program for each employee who uses a ladder?
- ☐ Does the training enable each employee to recognize and minimize ladder hazards?
- ☐ Has each employee been trained by a **competent person** *(see definition on Page 26)* in the following areas, when applicable?
  - – The nature of fall hazards in the work area
  - – How to correctly use, place, handle, and maintain ladders
  - – The maximum load-carrying capacities of ladders used
  - – OR-OSHA requirements for the types of ladders that will be used

Definitions

Check
A lengthwise separation of the wood that occurs across the rings of annual growth.

Cleat
A rectangular ladder crosspiece placed on edge, upon which a person may step while ascending or descending.

Competent person
A person who can identify existing and predictable hazards in the work environment and who has authorization to take prompt measures to eliminate the hazards.

Decay
Disintegration due to action of wood-destroying fungi. Also known as dote or rot.

Extension ladder
A non-self-supporting portable ladder that is adjustable in length. It consists of two or more sections in guides or brackets that permit length adjustment. Length is designated by the sum of the lengths of each section, measured along the side rails. (*See illustration on Page 7.*)

Extension trestle ladder
A self-supporting portable ladder that is adjustable in length, consisting of a trestle ladder base and a vertically adjustable single ladder with means for locking the ladders together. Length is designated by the length of the trestle ladder base. (*See illustration on Page 12.*)

Fastening
A device that attaches a ladder to a structure, building, or equipment.

Ladder
An appliance usually consisting of two side rails joined at regular intervals by crosspieces called steps, rungs, or cleats on which a person steps when ascending or descending.

Platform ladder
A self-supporting ladder of fixed size with a platform at the working level. *(See illustration on Page 10.)*

Rungs
Ladder crosspieces of circular or oval cross-section on which a person steps when ascending or descending.

Sectional ladder
A non-self-supporting portable ladder, nonadjustable in length, consisting of two or more sections that function as a single ladder. Its length is designated by the overall length of the assembled sections.

Single (or straight) ladder
A single section non-self-supporting portable ladder, nonadjustable in length. Its length is measured along a side rail. (*See illustration on Page 6.*)

Special-purpose ladder
A general-purpose portable ladder with modified features for specific uses.

Stepladder
A self-supporting portable ladder, nonadjustable in length that has flat steps and a hinged back. Length is measured along the front edge of a side rail. *(See illustration on Page 9.)*

Steps
The flat crosspieces of a ladder on which a person steps when ascending or descending.

Tread
The horizontal member of a step.

Tread width
The horizontal distance from front to back of the tread, including nosing.

Trestle ladder
A self-supporting portable ladder, nonadjustable in length, that consists of two sections hinged at the top to form equal angles with the base. Length is measured along the front edge of a side rail.

OR-OSHA Services

OR-OSHA offers a wide variety of safety-and-health services to employers and employees:

Consultative Services

- Offers no-cost on-site safety and health assistance to help Oregon employers recognize and correct safety-and-health problems in their workplaces.
- Provides consultations in the areas of safety, industrial hygiene, ergonomics, occupational-safety-and-health programs, new-business assistance, the Safety and Health Achievement Recognition Program (SHARP), and the Voluntary Protection Program (VPP).

Enforcement

- Offers pre-job conferences for mobile employers in industries such as logging and construction.
- Provides abatement assistance to employers who have received citations and provides compliance and technical assistance by phone.
- Inspects places of employment for occupational-safety-and-health-rule violations and investigates workplace safety-and-health complaints and accidents.

Appeals, Informal Conferences

- Provides the opportunity for employers to hold informal meetings with OR-OSHA on workplace safety-and-health concerns.
- Discusses OR-OSHA's requirements and clarifies workplace safety or health violations.

- Discusses abatement dates and negotiates settlement agreements to resolve disputed citations.

Standards & Technical Resources

- Develops, interprets, and provides technical advice on safety-and-health standards.
- Provides copies of all OR-OSHA occupational-safety-and-health standards.
- Publishes booklets, pamphlets, and other materials to assist in the implementation of safety-and-health standards and programs.
- Operates a Resource Center containing books, topical files, technical periodicals, a video and film lending library, and more than 200 databases.

Public Education & Conferences

- Conducts conferences, seminars, workshops, and rule forums.
- Coordinates and provides technical training on topics like confined space, ergonomics, lockout/tagout, and excavations.
- Provides workshops covering basic safety-and-health-program management, safety committees, accident investigation, and job-safety analysis.
- Manages the Safety and Health Education and Training Grant Program, which awards grants to industrial and labor groups to develop occupational-safety-and-health training materials for Oregon workers.

For more information, call the OR-OSHA office nearest you.

(All phone numbers are voice and TTY.)

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(503) 229-5910
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1225 Ferry St. SE, U110
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(503) 378-3274
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(541) 686-7562
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