Fall Protection

Safe practices for setting floor joists, sheathing/decking, and constructing exterior walls

Photo credit: *Integrated Building Solutions of Oregon*

Oregon Occupational Safety & Health Division

About this publication

"Fall protection: Safe practices for setting floor joists, sheathing/decking, and constructing exterior walls" is an OR-OSHA Standards and Technical Resources publication.

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How can you minimize fall hazards for employees who set floor joists, do sheathing/decking work, or construct exterior walls?

If you're a construction employer, you must make a reasonable effort to anticipate and protect your employees from fall hazards.

Planning is the first step in anticipating fall hazards. When you consider fall hazards during the planning stage of your project, you can develop fall protection methods that enhance the work, rather than interfere with it. A job-hazard analysis (JHA) is an excellent method of identifying, assessing, and controlling fall hazards. A JHA breaks a job down into tasks; each task is evaluated to determine if there is a better, safer way to do it. In the process of completing a JHA, you may even be able to eliminate fall hazards.

Subdivision 3M of OR-OSHA's safety and health standards contains the requirements for fall protection in construction workplaces.

However, your duty to protect your employees goes beyond the requirements of Subdivision 3M. If you can't protect your employees with one of the fall-protection systems described in Subdivision 3M, you must use another method to protect them.

Training is critical. Regardless of the fall-protection system or method you use, you must ensure that your employees know how to recog-

nize fall hazards and follow practices that minimize the hazards. You can't assume your employees know how to protect themselves from falls. On a new job site, for example, they may not be familiar with the fall hazards or know how to protect themselves until you train them. *Your employees must be trained before they begin tasks that could expose them to fall hazards and before they use fall-protection systems or methods*. You must certify in writing that your employees know what fall-protection systems or methods to use, how to use them, and when to use them, regardless of their experience.

Employees must be retrained for the following reasons:

- They don't recognize fall hazards.
- They don't understand the procedures that minimize the hazards.
- Changes in the workplace or the fall protection systems or methods make their previous training obsolete.

Fall-protection training requirements are in Subdivision 3M, 437-003-0503.

This guide can help you decide which fall-protection systems or methods to use. The examples help you think about how to protect your employees when you are planning your project.

With adequate planning and the right equipment, a physical means of protecting employees from falls is usually possible.

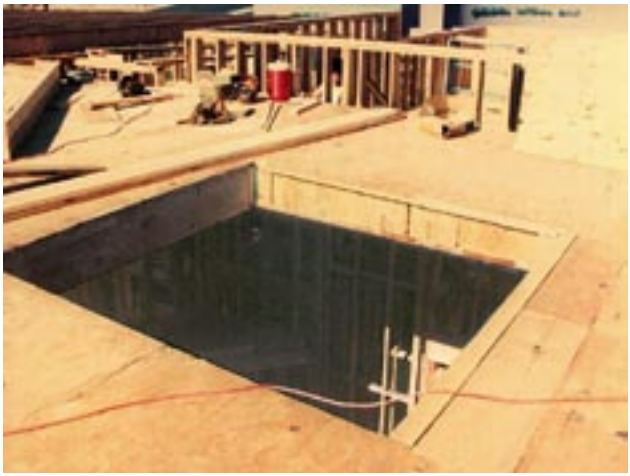
When must employees be protected from falls?

Photo credit: *Scott Collins, Time Frame, Inc.*

Employees doing sheathing/decking work and constructing exterior walls must be protected

from falls when they work *10 feet* or more above a lower level. They must be protected from falling through floor holes or wall openings when they are *six feet* or more above a lower level.

Whenever a hole large enough to fall through is created, such as a stairway or elevator shaft, and it's six feet or more above the lower level, ensure that employees are protected from falling through the hole.



Use guardrails or covers to prevent workers from falling through floor holes.

Covers or guardrails are usually your best option. Small holes that employees could step into or that objects could fall through must have covers, regardless of their height above a lower level.

Photo credit: *Troy Grotel, Tall Pine Contractors, Inc.*

Nail two-by-four guardrails across window openings.

When you stand a wall that has a window opening six or more feet above ground or an outside lower level — and the sill is less than 39 inches above the floor — nail a two-by-four guardrail across the opening, 39 to 45 inches above the floor. A midrail is required if the sill is less than 20 inches above the floor. Once the exterior walls are in place, the deck is considered an established floor and fall protection is required for all unprotected floor edges such as mezzanines and balconies that are six feet or more above a lower level.

If you are not sure how to construct guardrails or cover floor holes, review the requirements in Subdivision 3M, 1926.502.

Modify your construction methods

Can you modify construction methods to eliminate a fall hazard or minimize exposure to the hazard? Is there another way to do the work that would enable you to use aerial lifts, scaffolding or one of the fall protection systems listed in Subdivision 3M?

Examples:

- Backfill the foundation wall and other exterior grades and infill interior grades so that the distance an employee could fall is less than that for which Subdivision 3M requires fall protection. When you do this before framing, it's easier to erect scaffolding, use ladders, and handle material.
- Set enough joists to establish the first row of sheathing. This could provide a place to anchor a fall-restraint or fall-arrest system. Continue alternately setting joists and sheathing so there will be anchor points nearby.
- Wait to erect non-bearing and non-supporting interior walls until the joists and decking/sheathing are set so there is room for scaffolding or aerial lifts.
- Attach a guardrail system to the outside wall sections before lifting them into place to provide perimeter fall protection on the next level for sheathing/decking and for framing the walls. Review Subdivision 3M if you're unfamiliar with the requirements for guardrail systems.

Photo credit: *Scott Collins, Time Frame, Inc.*

- Build wall sections horizontally on the ground and use a crane to place them. The requirements for cranes and rigging equipment are in Subdivisions 3H and 3N.

Photo credit: *Integrated Building Solutions of Oregon*

Consider conventional fall-protection systems

Can you use one or more of the conventional fall-protection systems described in Subdivision 3M, 1926.502? It is unlikely you will be able to use one fall-protection system for setting floor joists, decking/sheathing, and constructing the exterior walls. For example, guardrail systems work well for decking/sheathing and constructing walls but not for setting joists.

If you decide to use a conventional fall-protection system, you must install and use it correctly. A fall-protection system used incorrectly can create additional hazards. Review Subdivision 3M, 1926.502, to determine if you can use a conventional fall-protection system.

Workers must be protected from falls even as they set up a fall-protection system. For example, use a fall-arrest system to protect employees who are constructing a guardrail system at the second floor perimeter. Think about the hazards your employees may be exposed to when they install and remove a fall-protection system; would that exposure be greater than the exposure to the fall hazards associated with the actual work? If so, consider other fall-protection options.

If you are going to use a fall-arrest system, make sure the structure you are working from will support the force of a fall arrest. If you're not sure, have a qualified person verify the strength of the anchor or chose another fall-protection option such as fall restraint. The requirements for fall-arrest and fall-restraint anchors are in Subdivision 3M, 1926.502.

Use scaffolding

Photo credit: *Troy Grotel, Tall Pine Contractors, Inc.*

Carpenter's bracket scaffolding can be used for setting floor joists and attaching the first row of decking.

Many companies are successfully using carpenter's bracket or top plate bracket scaffolding attached to walls. The scaffolding can be used for setting floor joists and attaching the first row of decking/sheathing.

Subdivision 3L requires guardrails on the open sides and ends of scaffold platforms 10 feet or more above the floor or ground. When the scaffold brackets are set so that the platform is at least 38 inches below the top plate, the top plate becomes a guardrail. Don't forget to place a two-by-four across door and window openings when the distance between the bottom of the header and the scaffold platform is greater than 20 inches. You can make the scaffold from material at the job site or you can use a manufactured scaffold bracket.

Job-made scaffolds and manufactured scaffold brackets must be designed by a qualified person and must support four times the anticipated load applied to them. Make sure that the scaffold platform does not sag more than 1/60 the distance between the brackets or supporting members when supporting the weight of employees, tools, and materials. For example, when scaffold brackets are four feet apart, the sag of the scaffold planks must be less than one inch, loaded.

Illustration credit: *Patricia Young, OR-OSHA*

Job-made scaffolds must be capable of supporting at least four times the anticipated load applied to them. The scaffold platform must not sag more than 1/60 the distance between the brackets or supporting members.

A qualified person must determine that the wall is supported and braced so that it will support the scaffold.

You may be able to use fabricated frame scaffolds or mobile scaffolds; if you are going to use scaffolding, erect and use it according to the requirements of Subdivision 3L. Review Subdivision 3L to determine if one of these scaffold systems will work for you. If the hazards of installing and dismantling scaffolding equal or exceed the hazards involved during construction, consider other fall protection.

Use aerial lifts

You may be able to reach some elevated work with an aerial lift. For example, with enough room and a solid level surface, you can use a scissor lift to set joists or assist in the decking/sheathing process. Follow operating and maintenance instructions and manufacturer's recommendations when using an aerial lift.

Warning! Aerial lifts are designed to operate on level, solid surfaces where they will not sink or slide.

Consider ladders

Choose the right ladder for the job and use it correctly. Avoid using ladders to position heavy objects. Standing on a ladder while pulling or pushing a sheet of plywood or floor beam can cause the ladder to slide and become unstable or cause you to lose your balance. Requirements for selecting and using ladders are in Subdivision 3X; review them to determine if ladders are appropriate for your work. Employees must also be trained to recognize the hazards of using ladders and know how to minimize those hazards.

Warning! Each year in Oregon, about 130 construction workers are injured when they fall from ladders. Take care to position ladders so that they're stable every time.

Alternative methods

When you anticipate fall hazards during your project's planning stage, you can eliminate most hazards or provide a physical means of protecting employees from falls. "Physical means" do not allow employees to fall or prevent employees from hitting the ground or lower level if they do fall. In some situations, however, a physical means of protecting employees from falls may not be feasible or may create a greater hazard. For those situations, you must develop alternative methods that minimize the risk of falling.

A ***qualified person*** must determine what circumstances prevent using a physical means to protect employees and develop the alternative methods. A ***competent person*** must supervise the employees who will use the alternative methods. All procedures, tasks, and positioning of employees must ensure that the work is done with minimum exposure to fall hazards.

Remember that alternative methods are the least acceptable option for protecting employees from falls. They are allowed only after a qualified person has determined that a physical means of fall protection is infeasible or would create a greater hazard. If you use alternative methods, you must be able to show why they are more appropriate than providing a physical means of protecting employees from falls.

Planning is critical! It is not acceptable to use alternative fall-protection methods to protect employees when a physical means of fall protection could have been provided by planning. If you believe that you can't provide a physical means of protecting employees from falls — conventional systems, scaffolds, or aerial lifts, for example — talk to your local OR-OSHA office to determine if alternative methods are appropriate.

Frequent questions

How close to the edge of a deck or floor can employees work before fall protections is required?

A safe distance must eliminate the potential for an employee to stumble and fall over the unprotected edge. Is the walking/working surface sloped, uneven, or slippery? Are there tripping hazards? Is there wind, ice, snow, or rain? Could pulling, pushing, or carrying material cause employees to lose their balance? Are employees working from ladders placed next to the edge? Will employees be walking parallel or perpendicular to an unprotected edge? Could they stumble and fall over the edge? Employers need to evaluate all relevant factors to determine a safe working distance.

Can I use a warning line to protect employees working next to an unprotected floor edge?

No. A physical means of fall protection must be provided when employees are working next to an unprotected floor edge; a warning line will not physically stop a worker's momentum toward the unprotected edge. Using warning lines for fall protection is allowed only on roofs with slopes of 2:12 or less. However, you can use ribbon, barrier lines, or other means to alert employees to a fall hazard so they won't walk into the area. You must prohibit employees from going into such an area unless they are protected by a physical means of fall protection.

How should job-made scaffolds be constructed?

A job-made scaffold must be designed by a *qualified* person and be capable of supporting its own weight plus at least four times the maximum intended load. A *competent* person must ensure that the scaffold is constructed so that it meets or exceeds the general requirements for scaffolds in Subdivision 3L, 1926.451.

I'm an electrician. What fall-protection requirements do I follow?

The fall-protection requirements for all construction work are in Subdivision 3M.

Important terms

Alternative methods —Methods developed by a qualified person that minimize the risk of falling. All procedures, tasks, and positioning of employees must ensure that the work is done with minimum exposure to fall hazards. Alternative methods can only be used after a qualified person has determined that providing a physical means of fall protection is infeasible or would create a greater hazard.

Competent person — One who is capable of identifying existing and predictable hazards to employees in surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate the hazards.

Established floor — Any floor in a building where the exterior walls have been erected.

Floor hole — A gap or void two inches or more in its smallest dimension.

Infeasible — Technologically impossible to provide a physical means of protecting employees from falls or doing so would prevent the performance of the work.

Job hazard analysis (JHA) — Job-hazard analysis is a method of identifying, assessing, and controlling hazards associated with a specific job. A JHA breaks a job down into tasks; each task is evaluated to determine if there is a better, safer way to do it. A job-hazard analysis works well for jobs with difficult-to-control hazards and those with histories of accidents or near misses.

Opening — A gap or void 30 inches or more high and 18 inches or more wide in a wall or partition.

Physical means of fall protection — A fall-protection system or method that will not allow an employee to fall or will prevent the employee from hitting the ground or lower level if he or she does fall.

Qualified person — One who by possession of a recognized degree, certificate, or professional standing or who by extensive knowledge, training, and experience has successfully demonstrated his or her ability to solve or resolve problems relating to the subject matter, the work, or the project.

Important rules

Subdivision 3M — 1926.501, Duty to have fall protection

Subdivision 3M — 1926.502, Fall protection systems criteria and practices

Subdivision 3M — 437-003-0503, Training requirements

Subdivision 3L — Scaffolding

Subdivision 3X — Stairways and ladders

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.

Standard & 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; 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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