Fall Protection

Safe practices for setting and bracing wood trusses and rafters

Oregon Department of Consumer & Business Services
Occupational Safety & Health Division

About this publication

"Fall protection: Safe practices for setting and bracing wood trusses" is an OR-OSHA Standards and Technical Resources publication. Thanks to the following individuals for sharing their ideas and technical expertise:

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How can you eliminate or minimize fall hazards for workers who are setting and bracing wood trusses and rafters?

If you're a construction employer, you must make a reasonable effort to anticipate the fall hazards that your employees may be exposed to during their work and protect them from falls.

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 or interrupt it.

Subdivision 3M of OR-OSHA's safety and health standards sets the requirements for fall protection in construction workplaces. Your duty to protect your employees goes beyond the requirements of Subdivision 3M, however. If you can't protect your employees with one of the fall-protection systems in Subdivision 3M, you must use another method to protect them.

Training. Regardless of the method you use, you must train your employees to recognize fall hazards and to follow safe practices that minimize the hazards. Fall-protection training requirements can be found in Subdivision 3M (see 437-003-0503).

This fall-protection guide is designed to help you decide which fall-protection systems or methods to use for setting trusses. The examples listed in this document are not exclusive of

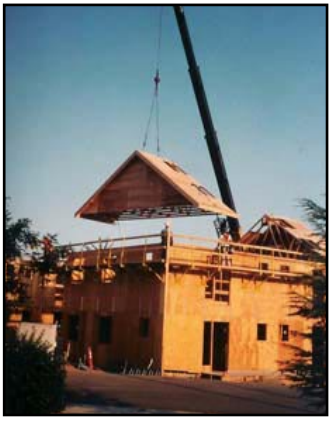
other measures you might take to protect your employees; they are merely examples for you to consider when planning your project. With adequate planning and use of correct equipment, a *physical means* of protecting employees from falls is almost always feasible and can almost always be provided.

Modify your construction methods

Can you modify your construction methods so that you can eliminate or minimize exposure to fall hazards? Consider:

- Setting the hip rafter in place to mark it, then taking it down to saw the plumb cut.
- Erecting and sheeting a series of trusses on the ground and then lifting the unit into place with a crane.

Hip rafter plumb cut: Is there a safer way to do this?



Can you modify your construction methods so that you can use conventional fall-protection systems, aerial lifts, or scaffolding? One example: Wait to erect nonbearing/nonsupporting interior walls until *after* the trusses are set to allow room for scaffolding or aerial lifts.

Consider conventional fall-protection systems

Can you use one of the fall-protection systems described in Subdivision 3M, 1926.502? It is unlikely you will be able to set up one of the fall-protection systems listed in 1926.502 and use it for the entire truss-setting process. However, it may be feasible to use one or more of these systems for certain truss-setting tasks, so they need to be considered.

The anchor and lifeline were installed on this roof section before it was lifted into place.

If you decide to use one of these systems, you must be certain that you install and use it correctly. A fall-protection system used incorrectly can introduce additional hazards into the workplace. Read *Fall Protection Systems Criteria and Practices* (1926.502) in Subdivision 3M to see if you can use one of these systems.

Think about the hazards your employees would be exposed to when installing and removing the system. Is that exposure greater than the exposure to the fall hazards associated with the truss-setting task? If so, consider other fall-protection options.

Warning! *Wood trusses are not designed to support fall-arrest systems. Do not tie off to wood trusses unless a qualified person has determined that the truss or series of trusses will meet the strength requirements of a fall-arrest anchor.*

Use scaffolding

Can you use scaffolding as a work platform to roll out, set, and brace the trusses?

Many companies are successfully using carpenter's bracket or top plate bracket scaffolding attached to the inside or outside of the exterior walls. Two 2" x 6" planks or a 12-inch-wide fabricated scaffold plank can be used for the platform.

Interior scaffold brackets designed by the home builder.

Manufactured exterior carpenter's bracket scaffolding.

Guardrails are required when the scaffold platform is 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 2" x 4" across door and window openings when the distance between the bottom of the header and the scaffold platform is greater than 20 inches. Guardrails can be installed on the opposite side and ends of the scaffold platform or another type of fall protection can be used.

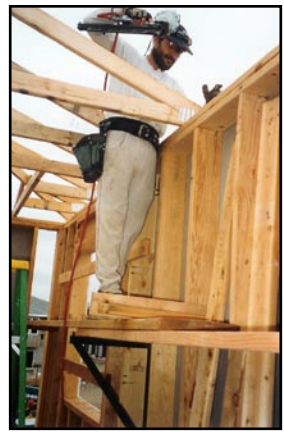
Make sure door and window openings are properly guarded.

Employees can work from scaffolding to roll out the trusses, set them in place, attach the lateral bracing, nail freeze blocks, cut rafter tails, attach the fascia board, and nail the first row of roof deck sheeting. This keeps them off the top plate and is safer and faster than using a ladder. The scaffold can be made from materials on the job, or you can use a manufactured scaffold bracket.

- Job-made scaffold and manufactured scaffold brackets must be designed by a *qualified person* and be able to support four times the anticipated load.
- 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 4 feet apart, the scaffold planks must sag less than 1 inch.

- If you attach a carpenter's bracket scaffold or a top plate bracket scaffold to a wall, make sure the wall is adequately supported and braced to withstand four times the scaffold load.



You may also be able to use scaffolding such as 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 in the actual construction, consider other fall-protection options.

Use aerial lifts

Can you use scissor lifts or boom-supported elevating work platforms? You may be able to reach some elevated work with an aerial lift. Be sure to follow all operating and maintenance instructions and manufacturer's recommendations.

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

Consider ladders

You may be able to use ladders for some truss-setting tasks. Choose the right ladder for the job and

use it correctly. Avoid using ladders to position trusses. Standing on a ladder while pulling or pushing a heavy truss 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 truss-setting tasks. Your 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. A ladder must be carefully positioned so that it's stable. When employees continually move and position a ladder to set each truss, adequate attention may not be given to its stability.*

Alternative methods

When you anticipate fall hazards during the planning stage of your construction project, in most cases you can eliminate the hazards or provide a physical means of protecting employees from falls. A physical means of fall protection will either not

allow an employee to fall or will prevent the employee from hitting the ground or lower level if she or he does fall. However, there may be some workplace situations in which providing a physical means of protecting employees from falls is *infeasible* or would create a *greater hazard*. For those situations, you must develop alternative methods that minimize the risk of falling.

A qualified person and a competent person must be involved in the decision to use alternative methods.

- A *qualified person* must determine the worksite-specific circumstances that prevent the installation of a physical means of protecting employees and develop the alternative methods that minimize the risk of a fall.
- A *competent person* must supervise the employees who will use the alternative methods.
- The *alternative methods* must reduce the risk of falling. All truss-setting procedures and tasks and the positioning and movement of employees must be deliberate and designed to get the work done with minimum exposure to fall hazards.

The alternative methods listed below are examples only and may not be appropriate for your situation.

- Develop methods of truss installation that minimize the risk of falling and instruct workers in those methods.
- Require employees to maintain three points of contact when they are moving point-to-point in the trusses — one hand and both

feet or one foot and both hands in contact with truss members.

- Adequately brace trusses and rafters before employees stand on them or use them for support.
- Require employees working at the peaks or in the webs of trusses, or on top of the ridge beam or interior top plates, to work from a stable position such as locking one leg around a truss member.

Working at the peak from the top plate of an interior wall.

- Place a plank on the bottom cord of the trusses for employees to stand on while they are working.
- Position an employee at each end of the truss, eliminating the need for one to travel the length of the truss to attach bracing.

Remember! Alternative methods are the least acceptable option for protecting employees from falls. They are allowed only after a qualified person has determined that providing 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.

Need help? 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.

Important terms

Alternative methods – Methods developed by a qualified person to minimize the risk of falls.

The alternative methods must reduce the risk of falling. All truss-setting procedures and tasks and the positioning and movement of employees must be deliberate and designed to get the work done with minimum exposure to fall hazards.

Alternative methods are appropriate only when a qualified person has determined that providing a physical means of protecting employees from falls is infeasible or would create a greater hazard.

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

Greater hazard – When the installation or use of a physical means of fall protection poses a greater hazard than that to which employees performing the work would otherwise be exposed.

Infeasible – When it is technologically impossible to provide a physical means of protecting employees from falls or when doing so would prevent the performance of the work in question.

Physical means of fall protection – A fall protection system or method that will either 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 workplace safety and health problems.
- Provides consultations in the areas of safety, industrial hygiene, ergonomics, occupational safety and health programs, assistance to new businesses, 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 hazards and investigates workplace complaints and accidents.

Appeals, Informal Conferences

- Provides the opportunity for employers to hold informal meetings with OR-OSHA on concerns about workplace safety and health.
- 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 such as confined space, ergonomics, lockout/tagout, and excavations.
- Provides workshops covering management of basic safety and health programs, 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 training materials in occupational safety and health for Oregon workers.

For more information, call the OR-OSHA office nearest you. *(All phone numbers are voice and TTY.)*

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