CONN-OSHA QUARTERLY

Connecticut Department of Labor - Division of Occupational Safety and Health

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Top Stories

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Fall Protection - Guardrails

By Darlene Cookson, Safety Consultant

When reducing fall hazards, OSHA expects employers to follow the Hierarchy of Controls. When the fall hazard cannot be eliminated, the next step is to install guardrails before utilizing a personal restraint or fall arrest system.

When Are Guardrails Needed? [1910 Subpart D and 1926 Subpart M]

1. **In general industry:** In work areas 4 feet or more above lower levels (e.g. Mezzanines, etc.).
2. **In construction:** When any employee is exposed to sides or edges that are 6 feet or more above a lower level.
3. If wall openings (>18 inches in width and >30 inches in height) are 6 feet or more above a lower level.
4. Around holes or depressions (including skylights/roof hatches) that are 2 inches or more in their least dimension, regardless of the depth of the hole or depression, unless the holes and/or depressions are properly covered, secured, and labeled.
5. At hoisting areas, a chain, gate, or removable guardrail section must be placed across the access opening between guardrail sections during those times when hoisting operations are not taking place. In addition, a personal fall arrest system must be utilized when the removable chain, gate, or guardrail system is removed during hoisting activities.
6. At point-of-access holes (roof hatches, mezzanine access, ladderways, chutes, etc.)

Criteria for All Guardrails [1910.28 & 1926.502]

- The guardrail system must have a top rail and a mid-rail present. Toe boards are only necessary on scaffolds over 10 feet, on mezzanines, chutes, and when there is the potential for falling objects, tools, equipment etc. to lower levels.
- The guardrail top rail must be able to withstand 200 lbs. of downward and outward force. The top edge of the guardrail shall not deflect to a height less than 39 inches above the walking/working level.
- The top rail must be 42 inches, plus or minus 3 inches tall as measured from the walking and working surface to the top edge of the rail and not from the top of a concrete parapet or curb.
- The mid-rails should be midway between the top rail and walking and working surface. (Example: if top rail measures 42 inches, then the mid rail is 21 inches to the top edge of mid rail from walking and working surface.)

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- Mid-rails must be able to withstand 150 lbs. of downward and outward force.
- Other equivalent intermediate members (such as additional mid-rails and architectural panels) are installed so that the openings are not more than 19 inches (48 cm) wide.
- The maximum distance between posts shall not exceed 8 feet apart on centers.
- The ends of all top rails and mid-rails shall not overhang the terminal posts.
- Guardrail systems should be so surfaced as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.

Installation of All Guardrails [1910.28 & 1926.501]

- Installation of guardrails requires fall protection for workers installing the system if the worker(s) is exposed to an unprotected side or edge 6-feet or more above a lower level (4-feet or more in general industry).
- When removing a top or mid rail to perform work, workers shall utilize another form of fall protection, the rails must be immediately replaced after work has been performed or prior to leaving the area for breaks, lunch, or to obtain other equipment or tools to complete the work.

Inspection/Maintenance of All Guardrails [1910.28 & 1926.502]

- Inspect guardrail systems daily and immediately repair guardrail systems that are damaged or have splinters, protruding nails or screws.
- A broken or damaged component(s) of a wooden, pre-manufactured, or wire rope system (top rail, mid rail, or toe boards) must be immediately fixed or replaced to ensure the integrity of the system.

Guardrails at Point-of-Access Holes, Mezzanines Access Points, Ladderways, Chutes & Flat Roof Access by Ladder [1910.28 & 1926.501]

- When used around holes that serve as points of access (such as ladderways, roof hatches, any access to flat roof by a ladder, etc.), the guardrail system opening needs to have a self-closing gate that slides or swings away from the hole with a top and mid rail.
- Alternative option: Offset the guardrail system around the point-of-access hole by utilizing a corral-type guardrail system to prevent an employee from walking or falling into the hole.

Chutes [1926.501 & 1926.852]

- Any chute opening, into which workmen dump debris, shall be protected by a substantial guardrail approximately 42 +/- 3 inches above the floor or other surface with a lockable gate. Assign control of when the gate can be unlocked and used by a trained employee. Cover any space between the chute and the edge of openings in the floors through which the chute passes.
- Material dumped from mechanical equipment or wheelbarrows, requires a securely attached toe board or bumper, not less than 4 inches thick and 6 inches high.

Guardrail Requirements Based on Type of Construction Material [1926.502 & 1926 Subpart M, Appendix B]

Wood

- Use construction grade lumber (1500 lb.-ft/in2 stress grade).
- Do not use damaged, cracked, splintering, or broken lumber as this will result in a reduction of its integrity.
- Posts shall be 2-inch by 4-inch (2x4) lumber, and space not more than 8 feet apart on centers.
- Top rail shall be at least 2-inch by 4-inch (2x4) lumber at 42 inches, plus or minus 3 inches; capable of withstanding 200 lbs. of force.
- Mid-rail shall be at least 1-inch by 6-inch (1x6) lumber and capable of withstanding 150 lbs. of force.
- Both rails shall be at least ¼ inch nominal diameter or thickness.
- Splicing of two pieces of 2x4 lumber should occur at a post and not a point in between posts.
- Anchor posts to walking and working surface appropriately. Use bolt-down post holders or boot base to secure posts to substrate.
- Secure top rails, mid-rails, and toe boards onto the front side of post (as you stand on the walking - working surface facing the post). Attaching the rails to the posts in this fashion will prevent nails from pushing out of the posts due to forces applied on the railings over time.

Wire Rope

- Posts shall be at least 2-inch by 2-inch by ⅜-inch angles.
- Ensure angles are properly attached to substrate using boot base.
- Flagged top rail at not more than 6-feet intervals with high-visibility material.
- Top rail and mid-rails shall be at least ½-inch nominal diameter or thickness (National Safety Council recommends ⅜-inch or larger nominal diameter or thickness).

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- Follow the manufacturer's recommendations for the number of clips to be used on wire ropes of different diameters. If use ½-inch or greater can also follow Table H-2 from 1926.251.
- Minimum deflection is not defined although 3 inches of deflection for wire rope after force is applied is a guideline.
- Apply strength criteria to all structural members of the system, including post anchorages.
- The wire rope shall be free of sharp edges, burrs, or projections which may be a hazard.
- Wire rope shall be secured to each support and taut at all times.

Pre-Manufactured Systems

- Use these systems on flat, level surfaces only. Most are not meant to be used on gravel, metal or slippery surfaces. Consult the manufacturer.
- Ensure metal components are not broken, rusted, bent, or damaged as this will result in a reduction of the system's integrity.
- Pins must be used to secure the railing to each baseplate and shall not be rusted or damaged.
- Use only pins recommended by the manufacturer of the system.
- Check with the manufacturer's instructions: Most require posts to be set a minimum of 12 inches from the unprotected side or edge.
- Don't interchange manufacturer's components by splicing together two different manufactured systems (baseplates & railings). The systems are not designed to share components without the consent of each manufacturer.
- Always use outriggers at both ends of a continuous rail system. An outrigger is a 5, 6, 8 or 10-foot-long railing installed at a 90-degree angle to a continuous run with a baseplate connected to it. Note: Depending on wind speeds, some systems require a 5-foot outrigger and base installed at 90-degrees from the run after every 20-30 feet of placed rail guard.

Scaffold Cross-bracing [1910.27(a) & 1926.451(g)(4)(xv)]

- Cross-bracing can be used as either the top rail or the mid-rail, but NOT both.
- Mid-rail: when the crossing point is between 20" and 30" above the work platform.
- Top rail: when the crossing point is between 38" and 48" above the work platform.
- The end points at each upright shall be no more than 48" apart.

Structural Steel & Pipe Railing Requirements

- Consult Appendix B of 1926 Subpart M for these requirements.

Preventing Heat Illness in Employees

By Marigrace Riley, Occupational Hygienist

Heat is a recognized occupational hazard for outdoor and indoor workers that can cause serious or fatal illness when they are not provided with the necessary protection and training. Thousands of workers every year become sick from occupational heat exposure, with some resulting in fatalities. Heat is the leading cause of death among all weather-related deaths in the United States. New employees whose bodies have not had time to adjust to working in the heat are most vulnerable. Nearly 3 out of 4 workers who die from heat-related causes die in their first week on the job.

What is Heat Illness?

When outdoor and indoor temperatures increase, a person's core body temperature may rise. The body regulates temperature by sweating and increasing its heart rate, to help keep the body's core temperature from rising to dangerous levels. Heat illness can occur when these mechanisms cannot keep the core body temperature from rising.

There are several types of heat illness, with some being more severe than others. Heat rash often occurs on the neck, upper chest, and skin folds. It is characterized by red bumps on the skin. Heat syncope causes fainting and dizziness. Heat cramps, which often occur in the legs, arms, and stomach, are painful muscle spasms. Heat exhaustion symptoms include nausea and/or vomiting, dizziness, weakness, excessive sweating, irritability, thirst, and elevated body temperature. Heat stroke is a medical emergency and symptoms include confusion, slurred speech, unconsciousness, seizures, heavy sweating or hot, dry skin, very high body temperature, and rapid heart rate.

What Contributes to Heat Illness?

There are environmental factors that can contribute to heat illness including ambient air temperature, humidity, radiant heat from the sun, and air velocity. Occupational risk factors include: temperature and humidity in the work environment, time spent near heat sources, and direct sunlight encountered in the work environment. Other occupational risk factors include the physical exertion or workload required, being unaccustomed to or not used to working in the

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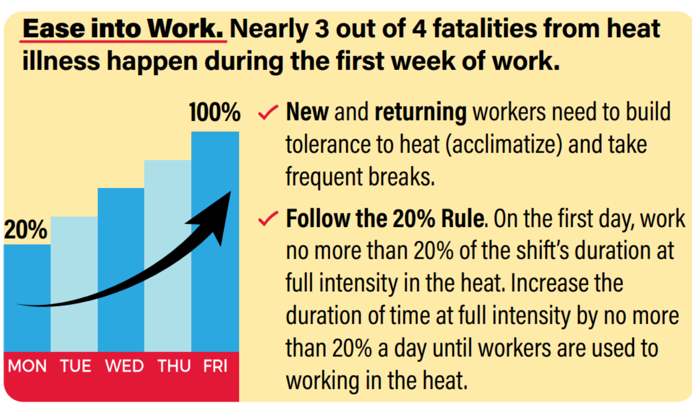
heat, and the clothing and or personal protective equipment being worn. There are also personal risk factors that can contribute to heat illness. These include the use of certain medications, such as antihistamines and diuretics; physical characteristics of the worker including age and fitness level; health conditions such as obesity, heart disease, high blood pressure, or diabetes; and recent alcohol or drug use.

How Can Employers Prevent Heat Illness?

Employers can take certain steps to prevent heat illness. These include ensuring that workers take breaks in the shade or in a cooler location, drink water, (1 cup every 15 minutes); reduce physical demands during hot weather and wear hats and loose -fitting, light-colored clothing, if possible. Workers should be allowed to acclimatize to working in hot environments. In addition, workers should be encouraged to monitor themselves and others for signs of heat illness and take appropriate action if anyone begins experiencing symptoms.

Engineering controls can also help prevent heat illness. Examples of engineering controls include the use of air conditioning in construction equipment cabs, cooling fans, local exhaust ventilation, and insulation of hot surfaces.



What is Federal OSHA Doing to Help Prevent Heat Illness?

In April of 2022, OSHA initiated a National Emphasis Program (NEP) on heat and continues to focus enforcement efforts in geographic areas and industries with the most vulnerable workers. In July of 2024, OSHA published a proposed rule for Heat Injury and Illness Prevention in Outdoor and Indoor Work Settings that would require employers to create a plan to evaluate and control heat hazards in their workplace. This rule would require employers to develop and implement a heat injury and illness prevention plan, identify heat hazards for each work site, implement control methods when the worksite is at or above a heat index of 80 degrees, implement additional controls when the worksite is at or above heat index of 90 degrees, take steps if employee experiences signs and symptoms of heat illness and develop a response plan, and provide training to employees. More information on this proposed rule can be found in this Fact Sheet: [Proposed Rule: Heat Injury Prevention in Outdoor and Indoor Work Settings.]

Written Heat Illness Prevention Plan

Your written plan should address how you will:

1. Designate someone to oversee the Heat Illness Prevention Plan
2. Provide training on your Heat Illness Prevention Plan

Plan Work Schedules

3. Acclimatize Workers
4. Modify Work Schedules to Reduce Exposures
5. Allow Frequent Rest Breaks in Shaded Areas

Set Controls and Monitor Site Activity

6. Identify Heat Hazards
7. Check the Temperature Before Work
8. Monitor for Heat Illness Symptoms (including a buddy system)
9. Designate a Break Area and Encourage Hydration
10. Have Workers Dress for Heat
11. Be Prepared for an Emergency

More information on what should be included in a Heat Injury and Illness Prevention Plan can be found in this OSHA publication: [Protecting Workers from the Effects of Heat.]

Requesting a Consultation

To learn more or request your free consultation from CONN-OSHA:

Call us at 860-263-6900, or visit our webpage

Save the DATE

Virtual Training Schedule

OSHA Reporting and Recording Requirements *5/7/25*	The purpose of this workshop is to introduce the requirements and procedures related to OSHA Injury & Illness Recordkeeping, including the electronic reporting of injuries and illnesses requirements. The class will help develop skills to accurately report occupational injuries and illnesses. Resources and reference materials will be provided. If you are responsible for completing the documents required by this rule (OSHA 300, OSHA 300A and OSHA 301), or if you supervise the person that completes the forms, or if you are a safety committee member, this class is a must.
Fall Protection *6/5/25*	This class is being held in support of the National Safety Stand-Down to Prevent Falls in Construction! Falls are among the most common causes of serious work-related injuries and deaths. OSHA requirements for the various fall protection options will be covered. The special requirements for scaffolding and residential construction will also be touched upon.
Silica Awareness *7/31/25*	This course provides awareness training for employers and their workers who may be exposed to silica hazards in the workplace. Attendees will learn about respirable crystalline silica, silica hazards, compliance with OSHA's respirable crystalline silica standards (29 CFR 1926.1153 and 29 CFR 1910.1053), silica exposure prevention, and more.
Trenching and Excavation *8/21/25*	Studies show that excavation work is one of the most hazardous types of work done in the construction industry. Injuries from excavation work tend to be of a very serious nature and often result in fatalities. The primary concern in excavation-related work is a cave-in. Cave-ins are much more likely to be fatal to the employees involved than other construction-related accidents. This workshop will provide an overview of 29 CFR 1926.650 - 652, Excavations, including the role of the competent person.
New England Roundtable *Every Wednesday of the Month*	Bringing business together to network and share ideas in the occupational safety and health community. The roundtable meetings are held from 9:00 am to 10:15 am every Wednesday. For more information on the New England Roundtable visit: oshaedne.com/roundtables

[Visit this link for more info and to sign up.]()

Call Before You Dig:
6 Tips for Avoiding Buried Utilities

As temperatures rise and excavation projects increase, prioritizing safety is crucial. April is National Safe Digging Month, a time to raise awareness about excavation hazards and the risks of striking underground utilities and pipelines – also known as "dig-ins." In the U.S., more than **550 "dig-ins" occur every day*** – each posing serious dangers to workers and communities.

Did you know that every digging project – no matter the size – requires contacting 811 before work begins? Whether online or by phone, your state's 811 service will guide you through a simple process. After answering questions about the details and location of your project, you'll receive a free ticket number and information on how much time your local utilities have to mark their underground lines. Before you dig, it's important to confirm that all utilities have responded and marked their lines.

By following a few key safety steps—including contacting 811 before every dig—you can help ensure smooth and incident-free excavations. Whether you're working on a large construction project or a routine dig, here are six must-follow excavation safety tips:

1. **Always Have a Valid 811 Ticket.** Contact 811 a few business days before every dig – no exceptions. Before starting work, double-check that your ticket is valid and includes the correct location, start and end dates, contractor details, and project type.
2. **Confirm Utility Responses Before Digging.** Before breaking ground, review your 811 ticket to ensure all utility companies have responded by marking your site or clearing your ticket. Physically inspect the area for any above-ground signs of unmarked underground utilities before proceeding, such as pedestals, manhole covers or meter boxes.
3. **Protect Utility Markings.** Once utilities are marked, it's your responsibility to preserve flags, stakes, and paint markings. If weather or site conditions make the markings unclear, request a remark from 811 before continuing work.
4. **Pothole or Test Dig to Expose Utilities.** Utility markings are approximate, and congested underground environments can lead to mismarks. To safely verify utility locations, use hand tools or soft-dig methods (such as vacuum excavation) within the "tolerance zone," the designated safety margin surrounding marked utilities that demands careful, non-mechanical excavation practices. This is the only way to accurately confirm underground utilities.
5. **Use Caution with Heavy Equipment.** Even after verifying utility locations, exercise extreme caution when operating heavy machinery near buried lines. Backhoes cause the most damage to underground utilities, so operators should designate an "observer" to help prevent dig-ins.
6. **OSHA's 3 S's: Slope it. Shore it. Shield It.** Soil is heavy, and trench collapses can be fatal. Always follow trench safety best practices**: slope trench walls at a safe angle or bench them in steps; shore trench walls with protective supports; and shield workers using trench boxes. These precautions protect workers inside and around excavations.

Remember, 811 helps protect you and your community by preventing utility strikes that can disrupt service, lead to costly repairs, or cause serious injuries and fatalities. Before any digging project, always contact your state's 811 center, wait for utilities to respond, and confirm that all utilities have marked their lines before you put a shovel in the ground.

The information above is also available at Common Ground Alliance, a member of OSHA's Partners for Safe Trenching and Excavation Operations Alliance. This alliance raises awareness and promotes best practices to reduce risks associated with trenching, excavation, and related construction hazards.

Visit OSHA's Trenching and Excavation safety and health topics page and read Common Ground Alliance Best Practices for more information.

*Common Ground Alliance's 2023 DIRT Report.
**Working Safely in Trenches, OSHA QuickCard™ (Publication 3243), (2018). (Also available in Español.)

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Hazard Corner: Work-Related Falls

OSHA has conducted multiple job site inspections after fall fatalities. These deaths could have been prevented had effective guardrail systems been in place.

Employee sits on rail, dies from fall when it breaks

At 1:45 p.m. on July 31, 2024, an employee working as a construction laborer for a commercial building contractor was sitting on the top rail of safety railing. The top rail gave way under the weight of the employee, and he fell 45 feet to the ground below. The employee died from blunt force trauma.

Employee is killed in fall from elevation

At 12:00 a.m. on January 31, 2024, a temporary/removable guardrail failed when a staffing agency employee leaned against it. The employee fell, resulting in fatal injuries. A mid-rail was not present, and the top rail was not secured against shifting or displacement.

Employee is killed in fall through skylight

At 4:57 p.m. on October 31, 2023, an employee working as a roofer for a roofing contractor had traveled up a low slope roof that had 8-flush mounted skylights. The employee was not using a personal fall protection system, and the skylights were not protected with either guardrails or covers. The employee was tasked with identifying leaking areas for resealing. While working on the roof the employee fell through the northeast skylight and was found on the concrete floor of the warehouse. He died from blunt force trauma to the head.

Employee dies from fall down elevator shaft

At 12:30 p.m. on May 2, 2023, an employee working as a carpenter on a residential construction project was walking near the entrance to an elevator shaft to go to lunch. The employee fell to the bottom of the elevator shaft. There was only one rail blocking the elevator shaft as fall protection. It is unknown if the employee fell over or under the rail. The employee fractured his skull from impact with the concrete floor below and was killed.

Fatality & Casualty Reporting

State & Town:

- **Report to CONN-OSHA**
- **(860) 263-6946**

Private Employers:

- **Report to Federal OSHA**
- **(800) 321-OSHA (6742)**