

# Chapter 6 CONSTRUCTION SAFETY

## Introduction

The following sections provide general guidelines and procedures for construction safety. This chapter covers the following topics:

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## General Construction Guidelines

Construction work can be particularly hazardous. Personal protective equipment, fire safety, electrical safety, and other precautions are essential for safe construction work. Refer to other chapters in this manual for more information and OSHA regulations. Follow these guidelines when visiting or working at construction sites:

- Do not walk, stand, or work under suspended loads. If you raise a load, be sure to crib, block, or otherwise secure the load as soon as possible.
- Avoid placing unusual strain on equipment or materials.
- Be prepared for unexpected hazards. BE ALERT!

## Barriers and Guards

University employees must use barriers and guards as necessary to protect employees, students, contractors, and visitors from physical hazards. If you suspect a hazard is not sufficiently protected, notify the attending workers or the Safety & Health Office immediately.

### NOTE:

*Barriers, guards, and warning signs are required to ensure safety against existing hazards.*

### Types of Barriers and Guards

Standard types of barriers and guards include the following:

- Guardrails and handholds
- Saw horses
- Tape
- Toeboards
- Cones
- Other physical barriers and solid separators (dust barriers, hazard barriers, temporary walkways, etc.)

**NOTE:**

*Signs that state DANGER, WARNING, or CAUTION are also important when barriers or guards are necessary. Remember to make signs legible, visible, and brief.*

Areas that Need Barriers or Guards

Any area that poses a physical threat to workers and/or pedestrians requires barriers or guards. Areas that typically require permanent or temporary protection include the following:

- Stairways
- Hatches
- Chutes
- Open Manholes
- Elevated platforms
- Areas with moving machinery
- Excavation sites
- Construction sites
- Temporary wall or floor openings

Using Barriers and Guards

The following list provides guidelines for using barriers and guards:

- When necessary, reroute pedestrian and vehicular traffic to completely avoid a construction site.
- Guard any permanent ground opening into which a person could fall with a guardrail, load-bearing cover, or other physical barrier.
- Ensure that temporary floor openings, such as pits and open manholes, are guarded by secure, removable guardrails. If guardrails are not available, have someone guard the opening.
- Ensure that all stairways, ladderways, hatchways, or chute floor openings have handrails or hinged covers.
- Ensure that enclosed stairways with four or more steps have at least one railing, and that open stairways with four or more steps have two railings.
- Ensure that all platforms and walkways that are elevated or located next to moving machinery are equipped with handrails, guardrails, or toeboards.
- Barricade any wall openings through which a person or tools could fall. Use gates, doors, guardrails, or other physical barriers to block the opening.
- Mark and guard any excavation that is deeper than 12 inches.
- Mark and/or guard potholes and sidewalk damage as appropriate.
- Protect smoke detectors with some type of cover when construction work, such as dust or fume producing activities, may affect smoke detectors. Remove protectors immediately at the end of the activity or at the end of the each day.

**Heavy Equipment Safety**

Employees need to receive Physical Plant Departmental approval prior to operating certain equipment. When using heavy equipment, there are five basic guidelines that employees must always follow to ensure safety:

1. Know how to properly operate the equipment you are using.
2. Do not use heavy machinery when you are drowsy, intoxicated, or taking prescription medication that may affect your performance.

3. Use only equipment that is appropriate for the work to be done.
4. Inspect your equipment to ensure that it is in good working condition before beginning a job. In addition, ensure that regular inspections and maintenance are conducted as appropriate.
5. Do not stress or overload your equipment.

Accidents do not just happen, they are caused. Therefore, employees should also follow these guidelines:

Ensure the following before leaving equipment unattended:

- All buckets, blades, etc. are on the ground.
- Transmission is in neutral
- Engine is off.
- Equipment is secure against movement.
- Never get on or off moving equipment
- Do not attempt to lubricate or adjust a running engine.
- Turn the engine off before refueling.
- Keep all shields and safety guards in place.
- Avoid underground utilities and overhead power lines.

The following sections provide basic guidelines for working with forklifts, front-end loaders, and backhoes. Refer to the product documentation that accompanied your equipment for more information and specific instructions.

### Forklifts

Only authorized employees may operate forklifts. The following list provides general safety guidelines:

- Do not allow riders.
- Do not raise people on a forklift.
- Do not speed.
- Drive up and back down ramps.
- Do not walk, stand, or work under the elevated portion of a forklift (even if it is not loaded).
- Ensure that the forklift has an overhead barrier to protect the operator from falling objects.

In addition, follow these guidelines for safe forklift operation:

- Always work within the capacity limits of your forklift. Consult with the manufacturer before modifying the operation or capacity limits of a forklift.
- Do not operate a forklift in areas with hazardous concentrations of acetylene, butadiene, hydrogen, ethylene, or diethyl ether, or other explosive environment.
- Never lift a load while moving. Wait until you are completely stopped before raising the mast.
- Be sure the top load sits squarely on the stack. An uneven load could topple.
- Travel with loads slightly tilted back to provide stability.
- Travel with loads at the proper height. A stable clearance height is usually 4 to 6 inches at the tips and 2 inches at the heels of fork blades.
- Lift stacked loads in the same manner as loads on the floor.

When preparing to leave the forklift unattended, lower the mast, neutralize the controls, shut the power off, and set the brakes. The forklift is "unattended" when the operator is more than 25 feet away or the forklift

is out of view. When ascending or descending a grade in excess of 10 percent, drive the forklift with the load up grade. If you cannot see over a load, drive in reverse. Do not try to look around a load and drive forward.

### Back Hoes

Only authorized employees may operate backhoes and front-end loaders. The following list offers general safety guidelines for both types of machinery:

- Always operate at a safe speed.
- Travel with the bucket low to the ground.
- Always lower the bucket before servicing the equipment or leaving the loader unattended.
- Use a rigid-type coupler when towing loads.
- Always check with the utility company before digging.
- Be extremely careful when operating near banks and slopes.
- When cutting a bank, be careful not to cause a cave-in. Do not drive on an overhang.
- Always use outriggers to stabilize the backhoe during operations.

### Hoists

Only authorized employees may use hoists to move heavy objects and equipment. When using hoists, remember to follow the five safety guidelines for working with heavy equipment. (Refer to the section on heavy equipment for more information.) In addition, follow the guidelines in the following sections.

#### Hoisting Guidelines

The following are general guidelines for working with hoists:

- Never walk, stand, or work beneath a hoist.
- Isolate hoisting area with barriers, guards, and signs, as appropriate.
- Never exceed the capacity limits of your hoist.
- Wear gloves and other personal protective equipment, as appropriate, when working with hoists and cables.
- Ensure that hoists are inspected regularly.
- Always hold tension on the cable when reeling it in or out.
- When the work is complete, always rig the hoist down and secure it.
- When the load block or hook is at floor level or its lowest point of travel, ensure that at least two turns of rope remain on the drum.
- Be prepared to stop operations immediately if signaled by the safety watch or another person.

#### Picking Up Loads with Hoists

Ensure that the hoist is directly above a load before picking it up. This keeps the hoist from becoming stressed. Picking up loads at odd angles may result in injury to people or damage to the hoist.

Do not pick up loads by running the cable through, over, or around obstructions. These obstructions can foul the cable or catch on the load and cause an accident.

#### Avoiding Electrical Hazards with Hoists

Do not hoist loads when any portion of the hoisting equipment or suspended load can come within 6 feet of high-voltage electrical lines or equipment.

If you need to hoist near high-voltage electrical lines or equipment, obtain clearance from your supervisor first.

## Inspecting Hoists

Hoists should be inspected daily. If there is any question about the working condition of a hoist, do not use it.

Hoist inspectors should note the following:

- The hooks on all blocks, including snatch blocks, must have properly working safety latches.
- All hooks on hoisting equipment should be free of cracks and damage.
- The maximum load capacity for the hoist must be noted on the equipment.
- Cables and wiring should be intact and free of damage.

## **Scaffolding**

When employees must conduct construction work above the ground and away from solid platforms, scaffolds may be appropriate. The following list provides guidelines for using small scaffolds. Larger scaffolds must be designed and erected in accordance with applicable standards.

- Ensure that scaffold anchors are sound, rigid, and capable of supporting the maximum intended load without shifting.

### **NOTE:**

*Scaffolds and their components should be capable of supporting at least four times their maximum load.*

- For freestanding, mobile scaffolds, the height should not exceed four times the minimum base dimension. If workers are riding the scaffolding, however, the base dimension should be at least one half the height.
- Do not use unstable objects such as barrels, boxes, bricks, or blocks to support scaffolds or planks.
- Keep floors free of debris where mobile scaffolds are used.
- Lock scaffolds with wheels into position.
- Install guardrails, midrails, or toeboards on the open sides and ends of platforms that are more than 4 feet above the ground or floor level. Use lifelines for scaffolds that are more than 10 feet off the ground.
- Either overlap multiple planking and platforms by 12 inches or secure them to ensure stability.

### **NOTE:**

*Planks must extend over end supports between 6 and 18 inches.*

- Secure scaffolds to permanent structures with anchor bolts or other means.
- Do not load scaffolds in excess of their maximum load limits.
- Repair damaged scaffolds immediately.
- Do not work on scaffolds in high winds or during storms.
- Remove ice or snow from scaffolds and apply sand to the wood before conducting work in winter weather.
- Do not allow tools, equipment, or other debris to accumulate on scaffolds.
- Dismantle and remove scaffolds when they are no longer needed. Do not use temporary scaffolding as a permanent installation.