



Safety Training- Construction

Heavy Equipment Safety

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Learning Objectives

After this training program, participants will understand:

- The OSHA standards that apply to heavy equipment
- Different types of heavy equipment
- Common heavy equipment safety risks
- Operator responsibilities
- Hazard prevention methods

Please note that this resource provides an overview of heavy equipment safety and is not intended to act as in-depth training on the above topics.



The OSHA Standard

OSHA's Motor Vehicles, Mechanized Equipment and Marine Operations Standard explains the minimum safety requirements for the use of construction equipment, including the general safety requirements for using equipment around power lines or at night.

Different Types of Heavy Equipment

- Articulated trucks
- Off-highway trucks
- Asphalt pavers
- Dozers
- Derricks and cranes
- Backhoe loaders
- Trenchers
- Boring machines
- Forklifts
- Side booms
- Utility vehicles (UTVs)
- Excavators
- Graders
- Skid Steers

Articulated Trucks

Articulated trucks consist of both a cab and a narrow trailer connected by a pivoting hinge.

They are ideal on worksites with little to no paved roads, slippery or sandy surfaces, steep slopes or low ceiling height.



Off-highway Trucks

Off-highway trucks offer heavy-duty hauling power for harsh work environments.

They can be used in:

- Mines
- Quarries
- Large-scale construction sites



Asphalt Pavers

Asphalt pavers disperse asphalt across a leveled surface, then roll it flat to create a solid, stable place to drive or walk.



Dozers

Dozers are a critical piece of machinery for farming, land clearing, road construction, demolition and home renovation.

They can push rocks, building materials, debris, sand, snow or dirt.



Derricks and Cranes

- A crane is a machine that lifts and lowers loads horizontally.
- A derrick is an apparatus used with a hoisting mechanism and operating ropes.



OSHA often refers to these two lifting machines together.

Backhoe Loaders

A backhoe loader can function as a backhoe, a tractor or a loader.

It can be used for:

- Farming
- Excavation
- Construction
- Hauling
- Digging



Trenchers

Trenchers tear into the ground to lift and move massive amounts of earth.



Boring Machines

A boring machine can excavate tunnels in a single operation.



Forklifts

Forklifts can safely move items short distances in warehouses or on worksites.



Side Booms

Side booms lift and move pipes to keep them in place during aboveground and underground installations.



UTVs

UTVs function similarly to a small truck and can help with:

- Hauling materials across construction sites
- Farming and landscaping
- Hauling and transportation across narrow work areas



Excavators

- Mini excavators can navigate small, hard-to-reach areas, making them ideal for home-based or small-scale projects.
- Medium excavators can assist in large-scale renovations, home improvement projects and medium- to large-scale construction.
- Large excavators are best suited for high-volume, large-scale operations.



Graders

Graders are commonly used in the construction and maintenance of dirt and gravel roads.



Skid Steers

Skid steers can assist in a range of projects, including small-scale home projects or large-scale land management jobs, depending on which attachment is used.



Common Heavy Equipment Safety Risks

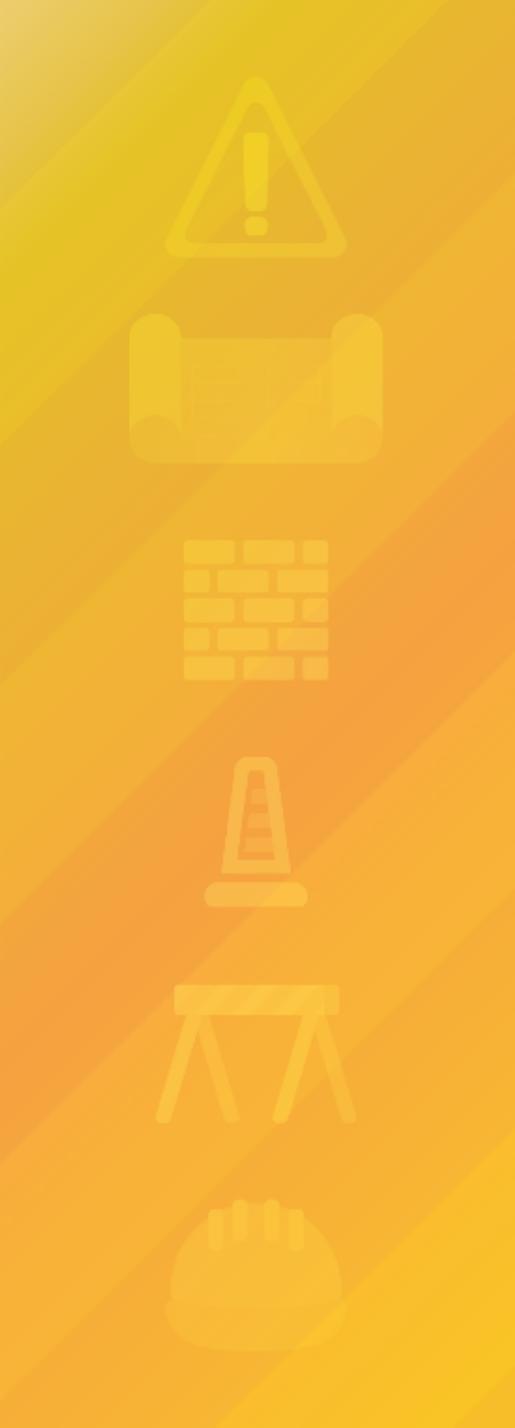
- There were 716 fatalities caused by contact with objects and equipment in 2020, according to the latest information from the Bureau of Labor Statistics.
- Of those, 89 were due to being caught in running equipment or machinery, and 93 were due to being struck, caught or crushed in collapsing structures, equipment or material.

Common Heavy Equipment Safety Risks (Continued)

There are two types of safety risks:

- Situational risk
- Systemic risk





Situational Risks

Situational risks are the inherent risks of a situation or the proximate cause of injury.

These risks seem to cause the majority of heavy equipment-related injuries and fatalities.

Examples of Situational Risks

- Crushing risk
- Strike by vehicle
- Tipped or overturned equipment
- Electrical shock
- Strike by equipment part
- Strike by debris

Systemic Risks

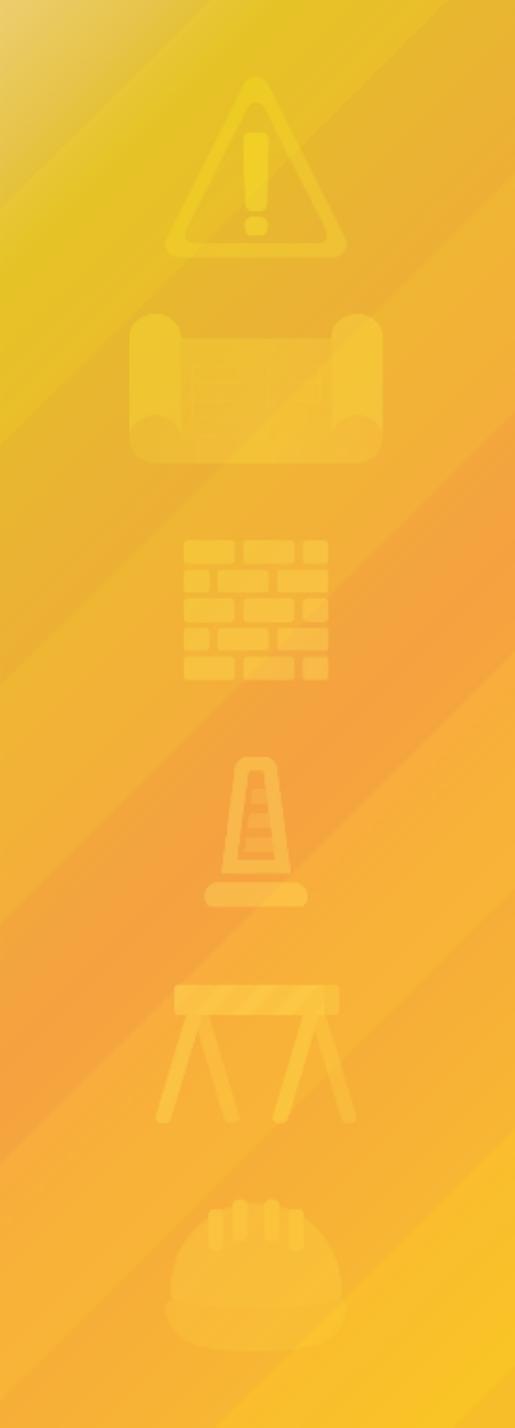
Systemic risks are factors that can contribute to injury in a hazardous situation but are not the direct cause.





Examples of Systemic Risks

- Lack of workplace awareness
- Lack of training
- Hazardous terrain
- Poorly secured loads
- Machine guard failure
- Faulty equipment
- Unknown hazardous materials and debris



Operator Responsibilities

Operators can help reduce the risk of injury or fatality by being trained and familiar with the equipment they're operating.

Operator Responsibilities (Continued)

Operators should:

- Inspect the equipment at the start of each shift.
- Adjust all side and back mirrors to help with blind spots.
- Ensure workers and pedestrians are clear of equipment.
- Turn off the engine and engage brakes before leaving equipment.
- Face the equipment and maintain three points of contact while getting on and off.
- Always wear the seat belt.

Ground Worker Responsibilities

Ground workers, including spotters, can also help minimize the risk of heavy equipment-related injury by:

- Wearing high-visibility clothing
- Avoiding positioning themselves in a blind spot
- Avoiding walking or working under a suspended load
- Alerting the operator before approaching a vehicle
- Riding only in approved seats and wearing a seat belt

Preventing Hazards: Administrative Controls

Administrative controls should consist of:

- A written quality assurance or quality control program
- Inspection, evaluation and documentation confirming that materials comply with building codes, design specifications and national standards
- A complete and approved set of contract drawings and specifications
- Reviewed, tested, approved and documented installations

Preventing Hazards: Spotters

Spotters should:

- Never walk behind the equipment while spotting.
- Agree on hand signals with the operator before the task begins.
- Review the work area for any additional hazards, such as trip hazards or fixed objects.



Preventing Hazards: Technology Solutions

Proximity sensors are devices that detect nearby objects without physical contact.

These devices can help mitigate struck-by and caught-between injuries.

They can also:

- Protect pedestrians from vehicle and equipment strikes
- Protect vehicles and equipment operators from accident strikes
- Reduce vehicle-on-vehicle accidents



Preventing Hazards: Technology Solutions (Continued)

According to the National Safety Council, 40% of workers said fatigue caused or contributed to a serious workplace injury or fatality.

Workplace fatigue symptoms include:

- Difficulty focusing
- Impaired memory
- Impaired concentration
- Greater distractibility
- Lack of muscle coordination

Fatigue monitoring and wearable technology can monitor fatigue and other health issues to help keep workers safe.

Preventing Hazards: Technology Solutions (Continued)

Location geofencing uses location tracking to warn employees when they have entered hazardous or restricted sites.





Questions?