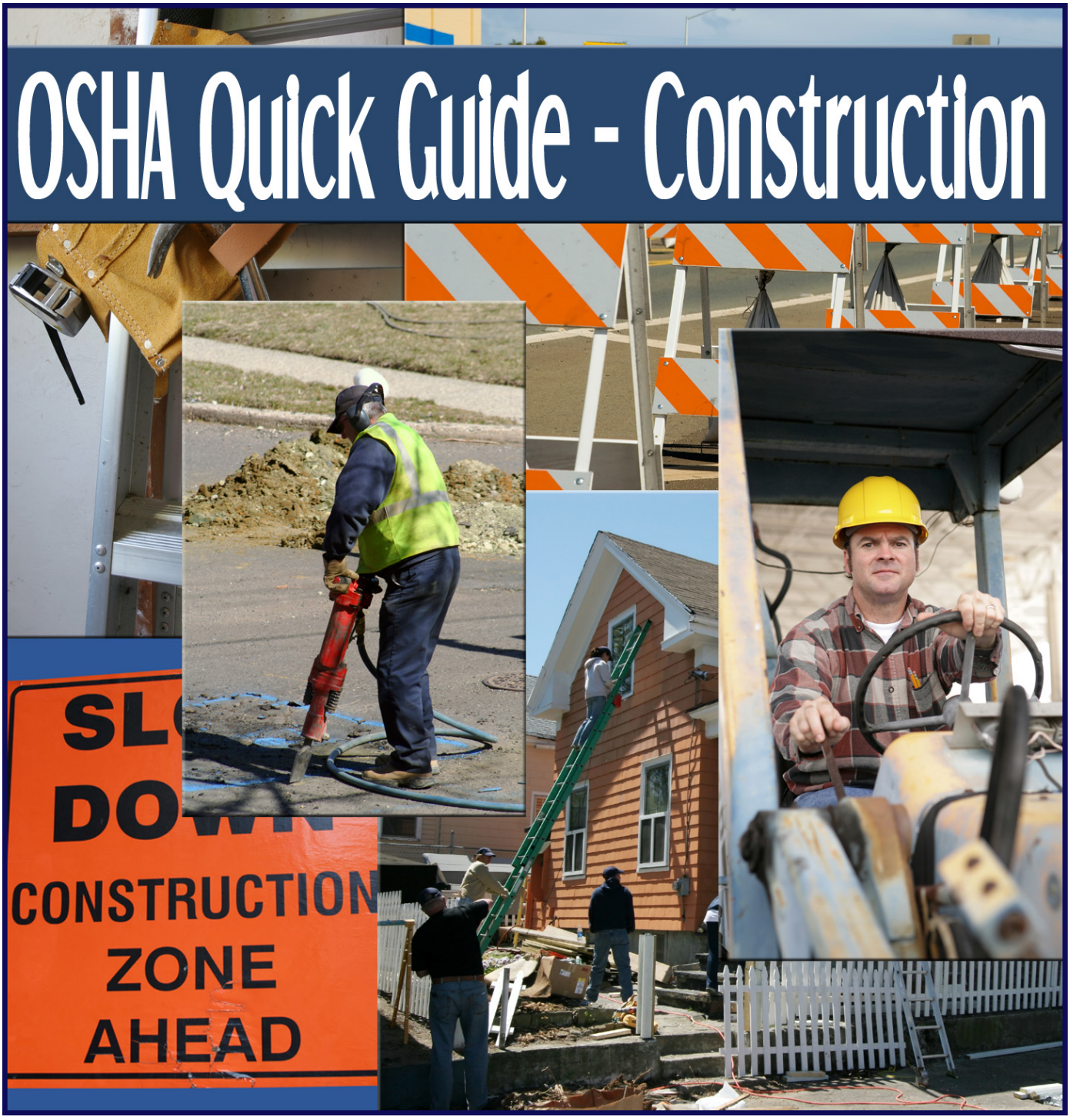
OSHA Quick Guide - Construction



Brought to you by:

Winters-Oliver Insurance Agency

WINTERS-OLIVER
INSURANCE AGENCY, INC.

The Facts

Millions of people work on construction sites across the nation every day. Despite this, the fatal injury rate for the construction industry is higher than the national average for all industries.

Top hazards for workers in construction include:

- Falls (from heights)
- Trench collapse
- Scaffold collapse
- Electric shock and arc flash/arc blast
- Failure to use proper personal protective equipment (PPE)
- Repetitive motion injuries

Hazards and Solutions

This quick guide will go over some solutions to the top hazards in the construction industry today. The OSHA standards most frequently included in the industry's citations in fiscal year 2013 were:

1. Fall protection (scope, application and definitions as well as training requirements)
2. Hazard communication
3. Scaffolding
4. Respiratory protection
5. Electrical (wiring methods, design and protection)
6. Powered industrial trucks
7. Ladders
8. Lockout/Tagout
9. Electrical (general requirements)
10. Machine guarding

Scaffolding

Hazard: When scaffolds are not erected or used properly, fall hazards can occur. Protecting construction workers from scaffold-related accidents can prevent thousands of injuries and dozens of fatalities each year.

Solutions:

- Scaffold must be sound, rigid and sufficient to carry its own weight plus *four times* the maximum intended load without settling or displacement. It must be erected on solid ground.
- Unstable objects, such as barrels, boxes, loose bricks or concrete blocks, must not be used to support scaffolds or planks.
- Scaffold must not be erected, moved, dismantled or altered except under the supervision of a competent person.
- All scaffolding must be equipped with guardrails, midrails and toeboards.
- Scaffold accessories, such as braces, brackets, trusses, screw legs or ladders, that are damaged or weakened must be immediately repaired or replaced.
- Scaffold platforms must be tightly planked with scaffold plank-grade material or equivalent. A competent person must inspect the scaffolding, and, at designated intervals, re-inspect it.
- Rigging on suspension scaffolds must be inspected by a competent person before each shift and after any occurrence that could affect structural integrity to ensure that all connections are tight and that no damage to the rigging has occurred since its last use.
- Synthetic and natural rope used in suspension scaffolding must be protected from heat-producing sources.
- Employees must be instructed about the hazards of using diagonal braces as fall protection.
- Scaffold can be accessed by using ladders and stairwells.
- Scaffolds must be at least 10 feet from electric power lines at all times.

Fall Protection

Hazard: Each year, falls consistently account for the greatest number of fatalities in the construction industry. A number of factors are often involved in falls, including unstable working surfaces, misuse or failure to use fall protection equipment and human error. Studies have shown that using guardrails, fall arrest systems, safety nets, covers and restraint systems can prevent many deaths and injuries from falls.

Solutions:

- Consider using aerial lifts or elevated platforms to provide safer elevated working surfaces.
- Erect guardrail systems with toeboards and warning lines, or install control-line systems to protect workers near the edges of floors and roofs.
- Cover floor holes.
- Use safety net systems or personal fall arrest systems (body harnesses).

Ladders

Hazard: Ladders and stairways are another source of injuries and fatalities among construction workers. OSHA estimates that there are more than 20,000 injuries and dozens of fatalities each year due to falls on stairways and ladders used in construction. Many of these injuries are serious enough to require time off the job.

Solutions:

- Use the correct ladder for the task.
- Have a competent person visually inspect a ladder for any defects before use, including:
  - Structural damage, split/bent side rails, broken or missing rungs/steps/cleats and missing or damaged safety devices;
  - Grease, dirt or other contaminants that could cause slips or falls; and
  - Paint or stickers (except warning labels) that could hide possible defects.
- Make sure that ladders are long enough to safely reach the work area.
- Mark or tag damaged or defective ladders with “Do Not Use” for repair or replacement, or destroy them immediately.

- Never load ladders beyond the maximum intended load or beyond the manufacturer's rated capacity.
- Be sure the load rating can support the weight of the user, including materials and tools.
- Do not use ladders with metallic components near electrical work and overhead power lines.

Stairways

Hazard: Slips, trips and falls on stairways are a major source of injuries and fatalities among construction workers.

Solutions:

- Stairway treads and walkways must be free of dangerous objects, debris and materials.
- Slippery conditions on stairways and walkways must be corrected immediately.
- Make sure that treads cover the entire step and landing.
- Stairways having four or more risers or rising more than 30 inches must have at least one handrail.

Trenching

Hazard: Trench collapses cause dozens of fatalities and hundreds of injuries each year.

Solutions:

- Never enter an unprotected trench.
- Always use a protective system for trenches deeper than 5 feet.
- Employ a registered professional engineer to design a protective system for trenches deeper than 20 feet.
- Protective systems:
  - Use sloping to protect workers by cutting back the trench wall. Angle away from the excavation, but not steeper than a height/depth ratio of 11/ 2:1, depending on the sloping requirements for the type of soil.
  - Use shoring to protect workers by installing supports that prevent soil movement for trenches that do not exceed 20 feet in depth.
  - Use shielding to protect workers by using trench boxes or other types of supports to prevent soil cave-ins.
- Always provide a way to exit a trench – such as a ladder, stairway or ramp – that is no more than 25 feet away for employees in the trench.
- Keep spoils at least 2 feet back from the edge of a trench.

- Make sure that trenches are inspected by a competent person prior to entry and after any hazard-increasing event such as a rainstorm, vibrations or excessive surcharge loads.

Sloping. Maximum allowable slopes for excavations less than 20 feet (6.09 m), based on soil type and angle to the horizontal, are as follows:

Soil Type	Height/Depth Ratio	Slope Angle
Stable Rock (granite or sandstone)	Vertical	90°
Type A (clay)	3/4 : 1	53°
Type B (gravel, silt)	1:1	45°
Type C (sand)	11/ 2:1	34°
Type A (short-term) (For a maximum excavation depth of 12 feet)	1/ 2:1	63°

Source: OSHA Technical Manual, Section V, Chap. 2, Excavations: Hazard Recognition in Trenching and Shoring (Jan. 1999)

Cranes

Hazard: Significant and serious injuries may occur if cranes are not inspected before use and if they are not used properly. OSHA estimates that nearly 100 crane fatalities occur per year in construction work. Often, these injuries occur when a worker is struck by an overhead load or caught within the crane's swing radius. In addition, many crane fatalities occur when the boom of a crane or its load line contact an overhead power line.

Solutions:

- Check all crane controls to ensure proper operation before use.
- Inspect wire rope, chains and hook for any damage.
- Know the weight of the load that the crane is to lift.
- Ensure that the load does not exceed the crane's rated capacity.
- Raise the load a few inches to verify balance and the effectiveness of the brake system.
- Check all rigging prior to use; do not wrap hoist ropes or chains around the load.
- Fully extend outriggers.
- Do not move a load over workers.
- Barricade accessible areas within the crane's swing radius.
- Watch for overhead electrical distribution and transmission lines, and maintain a safe working clearance of at least 10 feet from the energized electrical lines.

Hazard Communication

Hazard: Failure to recognize the hazards associated with chemicals can cause burns, respiratory problems, fires and explosions.

Solutions:

- Maintain a Safety Data Sheet (SDS) for each chemical in the facility.
- Make this information accessible to employees at all times in a language or in formats that are clearly understood by all affected personnel.
- Train employees on how to read and use the SDS.
- Follow manufacturer's SDS instructions for handling hazardous chemicals.
- Train employees about the risks of each hazardous chemical being used.
- Provide spill clean-up kits in areas where chemicals are stored.
- Have a written spill control plan.
- Train employees to clean up spills, protect themselves and properly dispose of used materials.
- Provide PPE and enforce its use.
- Store chemicals safely and securely.

Forklifts

Hazard: Almost 100,000 employees are injured – around 100 fatally – every year while operating powered industrial trucks. Forklift turnover accounts for a significant number of fatalities.

Solutions:

- Train and certify all operators to ensure that they operate forklifts safely.
- Do not allow any employee under 18 years old to operate a forklift.
- Properly maintain haulage equipment, including tires.
- Do not modify or make attachments that affect the capacity and safe operation of the forklift without written approval from the forklift's manufacturer.
- Examine forklift truck for defects before using.
- Follow safe operating procedures for picking up, moving, putting down and stacking loads.
- Drive safely; never exceed 5 mph, and slow down in congested or slippery areas.
- Prohibit stunt driving and horseplay.
- Do not handle loads that are heavier than the capacity of the industrial truck.
- Remove unsafe or defective forklift trucks from service immediately.
- Require operators to wear seat belts at all times.
- Avoid traveling with elevated loads.
- Assure that rollover protective structure is in place.
- Make certain that the reverse signal alarm is operational and audible above the surrounding noise level.

Head Protection

Hazard: Serious head injuries can result from blows to the head, which can occur in a number of ways on a construction site.

Solution:

- Be sure that workers wear hard hats where there is a potential for objects falling from above, bumps to their heads from fixed objects or accidental head contact with electrical hazards.

SAFETY CHECKLISTS

The following checklists may help you take steps to avoid hazards that cause injuries, illnesses and fatalities. As always, be cautious and seek help if you are concerned about a particular hazard.

Personal Protective Equipment (PPE)

Eye and Face Protection

- ✓ Safety glasses or face shields are worn any time work operations can cause foreign objects getting into the eye, such as during welding, cutting, grinding, nailing, when working with concrete and harmful chemicals or when exposed to flying particles.
- ✓ Eye and face protectors are selected based on anticipated hazards.
- ✓ Safety glasses or face shields are worn when exposed to any electrical hazards, including work on energized electrical systems.

Foot Protection

- ✓ Construction workers should wear work shoes or boots with slip-resistant and puncture-resistant soles.
- ✓ Safety-toed footwear is worn to prevent crushed toes when working around heavy equipment or falling objects.

Hand Protection

- ✓ Gloves should fit snugly.
- ✓ Workers must wear the right gloves for the job (for example, heavy-duty rubber gloves for concrete work, welding gloves for welding, insulated gloves and sleeves when exposed to electrical hazards, etc.)

Head Protection

- ✓ Workers shall wear hard hats where there is a potential for objects falling from above, bumps to their heads from fixed objects or of accidental head contact with electrical hazards. Be sure that:
- ✓ Hard hats are routinely inspected for dents, cracks or deterioration.

- ✓ Hard hats are replaced after a heavy blow or electrical shock.
- ✓ Hard hats are maintained in good condition.

Scaffolding

- ✓ Scaffolds should be set on solid ground.
- ✓ Damaged parts that affect the strength of the scaffold are taken out of service.
- ✓ Scaffolds are not altered.
- ✓ All scaffolds should be fully planked.
- ✓ Scaffolds are not moved horizontally while workers are on them unless they are designed to be mobile and workers have been trained on the proper procedures.
- ✓ Employees are not permitted to work on scaffolds when covered with snow, ice or other slippery materials.
- ✓ Scaffolds are not erected or moved within 10 feet of power lines.
- ✓ Employees are not permitted to work on scaffolds in bad weather or high winds unless a competent person has determined that it is safe to do so.
- ✓ Ladders, boxes, barrels, buckets or other makeshift platforms are not used to raise work height.
- ✓ Extra material is not allowed to build up on scaffold platforms.
- ✓ Scaffolds should not be loaded with more weight than they were designed to support.

Electrical Safety

- ✓ Work on new and existing energized (hot) electrical circuits is prohibited until all power is shut off and grounds are attached.
- ✓ An effective lockout/tagout system is in place.
- ✓ Frayed, damaged or worn electrical cords or cables are promptly replaced.
- ✓ All extension cords have grounding prongs.
- ✓ Protect flexible cords and cables from damage. Avoid sharp corners and projections.
- ✓ For portable electric tools and appliances, use extension cord sets that are the three-wire type and designed for hard or extra-hard service. (Look for some of the following letters imprinted on the casing: S, ST, SO, STO.)

- ✓ All electrical tools and equipment are maintained in safe condition, are checked regularly for defects and are taken out of service if defective.
- ✓ Do not bypass any protective system or device designed to protect employees from contact with electrical energy.
- ✓ Locate and clearly identify overhead electrical power lines.
- ✓ Ensure that ladders, scaffolds, equipment or materials never come within 10 feet of electrical power lines.
- ✓ All electrical tools must be properly grounded unless they are of the double-insulated type.
- ✓ Multiple plug adapters are prohibited.

Floor and Wall Openings

- ✓ Floor openings (12 inches or more) are guarded by a secure cover, a guardrail or equivalent on all sides (except at entrances to stairways).
- ✓ Toeboards are installed around the edges of permanent floor openings where persons may pass below the opening.

Elevated Surfaces

- ✓ Signs are posted, when appropriate, showing the elevated surface load capacity.
- ✓ Surfaces elevated more than 48 inches above the floor or ground have standard guardrails.
- ✓ All elevated surfaces (beneath which people or machinery could be exposed to falling objects) have standard 4-inch toeboards.
- ✓ A permanent means of entry and exit with handrails is provided to elevated storage and work surfaces.
- ✓ Material is piled, stacked or racked in a way that prevents it from tipping, falling, collapsing, rolling or spreading.

Hazard Communication

- ✓ A list of hazardous substances used in the workplace is maintained and readily available at the worksite.
- ✓ There is a written hazard communication program addressing Safety Data Sheets (SDS), labeling and employee training.
- ✓ Each container of a hazardous substance (vats, bottles, storage tank, etc.) is labeled with product identity and hazard warning(s) that effectively communicate the specific health and physical hazards.
- ✓ SDSs are readily available at all times for each hazardous substance used.
- ✓ There is an effective employee training program for hazardous substances.

Crane Safety

- ✓ Cranes and derricks are restricted from operating within 10 feet of any electrical power line.
- ✓ Any other hazards in the work zone or swing radius have been addressed.
- ✓ The ground is sufficient to support the weight of hoisting equipment.
- ✓ The upper rotating structure supporting the boom and materials being handled is provided with an electrical ground while working near energized transmitter towers.
- ✓ All employees in the work zone are trained to recognize hazards associated with equipment use and related duties.
- ✓ Rated load capacities, operating speed and instructions are posted and visible to the operator.
- ✓ Cranes are equipped with a load chart.
- ✓ The operator understands and uses the load chart.
- ✓ The operator can determine the angle and length of the crane boom at all times.
- ✓ Crane machinery and other rigging equipment is inspected daily prior to use to make sure it is in good condition. Initial and annual inspections of all hoisting and rigging equipment are performed and reports are maintained.
- ✓ Accessible areas within the crane's swing radius are barricaded.
- ✓ Tag lines are used to prevent dangerous swing or spin of materials when raised or lowered by a crane or derrick.
- ✓ Illustrations of hand signals to crane and derrick operators are posted on the job site.
- ✓ The signal person uses correct signals for the crane operator to follow.

- ✓ Crane outriggers are extended when required.
- ✓ Crane platforms and walkways have antiskid surfaces.
- ✓ Broken, worn or damaged wire rope is removed from service.
- ✓ Guardrails, hand holds and steps are provided for safe and easy access to and from all areas of the crane.
- ✓ Load testing reports/certifications are available.
- ✓ Tower crane mast bolts are properly torque to the manufacturer's specifications.
- ✓ Overload limits are tested and correctly set.
- ✓ The maximum acceptable load and the last test results are posted on the crane.
- ✓ Only properly trained and qualified operators are allowed to work with hoisting and rigging equipment.

Forklifts

- ✓ Forklift truck operators are competent to operate these vehicles safely as demonstrated by their successful completion of training and evaluation.
- ✓ No employee under 18 years old is allowed to operate a forklift.
- ✓ Forklifts are inspected daily for proper condition of brakes, horns, steering, forks and tires.
- ✓ Powered industrial trucks (forklifts) meet the design and construction requirements established in American National Standards Institute (ANSI) for Powered Industrial Trucks, Part II ANSI B56.1-1969.
- ✓ Written approval from the truck manufacturer is obtained for any modification or additions which affect capacity and safe operation of the vehicle.
- ✓ Capacity, operation and maintenance instruction plates, tags or decals are changed to indicate any modifications or additions to the vehicle.
- ✓ Battery charging is conducted in areas specifically designated for that purpose.
- ✓ Material handling equipment is provided for handling batteries, including conveyors, overhead hoists or equivalent devices.
- ✓ Reinstalled batteries are properly positioned and secured in the truck.
- ✓ Smoking is prohibited in battery charging areas.
- ✓ Precautions are taken to prevent open flames, sparks or electric arcs in battery charging areas.
- ✓ Refresher training is provided, and an evaluation is conducted whenever a forklift operator has been observed operating the vehicle in an unsafe manner and when an operator is assigned to drive a different type of truck.

- ✓ Load and forks are fully lowered, controls neutralized, power shut off and brakes set when a powered industrial truck is left unattended.
- ✓ There is sufficient headroom for the forklift and operator under overhead installations, lights, pipes, sprinkler systems, etc.
- ✓ Overhead guards are in place to protect the operator against falling objects.
- ✓ Trucks are operated at a safe speed.
- ✓ All loads are kept stable, safely arranged and fit within the rated capacity of the truck.
- ✓ Unsafe and defective trucks are removed from service.

Notes