

# OSHA's Construction eTool Addresses the Top Four Hazards that Cause the Most Fatalities

By Cari Elofson-Callahan

Construction can be a safe occupation when workers are aware of potential hazards and when employers implement an effective safety and health program, including ongoing training in hazard awareness and prevention. There are numerous hazards that can lead to serious injury in the construction industry. OSHA created its [Construction eTool](#) to address four hazards – electrical incidents, falls, struck-by and trenching and excavation – that statistics have shown cause most construction-related fatalities. Focusing on these four key areas can help ensure that potentially fatal accidents are prevented.

OSHA's Construction eTool provides a practical how-to in hazard identification and prevention and a roadmap for worker training to address the top four high-fatality hazards. An overview of each topic provides information and resources to help you identify and control the hazards that commonly cause the most serious construction injuries.

The following is a brief summary of the four high-fatality hazards, with an example of how the information and resources are presented for one aspect of each hazard:

## ELECTRICAL INCIDENTS

Safety and health programs must address electrical incidents and the variety of ways electricity becomes a hazard. In general, OSHA requires that employees not work near any part of an electrical power circuit unless protected. The following hazards cause the most frequent electrical injuries:



- Contact with Power Lines
- Lack of Ground-fault Protection
- Path to Ground Missing or Discontinuous
- Equipment Not Used in Manner Prescribed
- Improper Use of Extension and Flexible Cords

### Contact with Power Lines

Overhead and buried power lines at your site are especially hazardous because they carry extremely high voltage. Fatal electrocution is the main risk but burns and falls from elevations are also hazards. Using tools and equipment that can contact power lines increases the risk.

### How to Avoid Contact with Power Lines

- Look for overhead power lines and buried power line indicators. Post warning signs.
- Contact utilities for buried power line locations.
- Stay at least 10 feet away from overhead power lines.
- Unless you know otherwise, assume that overhead lines are energized.
- Use non-conductive wood or fiberglass ladders when working near power lines.

## FALLS

Falls are the leading cause of fatalities in the construction industry. It is vital that safety and health programs contain provisions to protect workers from falls on the job. The following hazards cause the most fall-related injuries:



- Unprotected Sides, Wall Openings and Floor Holes
- Improper Scaffold Construction
- Unguarded Protruding Steel Rebars
- Misuse of Portable Ladders

### **Unprotected Sides, Wall Openings and Floor Holes**

Almost all sites have unprotected sides and edges, wall openings or floor holes at some point during construction. If these sides and openings are not protected at your site, injuries from falls or falling objects may result, ranging from sprains and concussions to death.

### **How to Avoid Hazards of Unprotected Sides, Wall Openings and Floor Holes**

- Use at least one of the following whenever employees are exposed to a fall of 6 feet or more above a lower level:
  - Guardrail Systems
  - Safety Net Systems
  - Personal Fall Arrest Systems
- Cover or guard floor holes as soon as they are created during new construction.
- For existing structures, survey the site before working and continually audit as work continues. Guard or cover any openings or holes immediately.
- Construct floor hole covers so they will effectively support two times the weight of employees, equipment and materials that may be imposed on the cover at any one time.

## **STRUCK-BY**

Struck-by objects is another leading cause of construction-related deaths. Approximately 75% of struck-by fatalities involve heavy equipment such as trucks or cranes. Safety and health programs must account for the many ways struck-by accidents can occur. The following related hazards cause the most struck-by injuries:



- Vehicles
- Falling/Flying Objects
- Constructing Masonry Walls

### **Vehicles**

If vehicle safety practices are not observed at your site, workers risk being pinned between construction vehicles and walls, struck by swinging backhoes, crushed beneath overturned vehicles or being struck by trucks or cars.

### **How to Avoid Hazards from Vehicles**

- Check vehicles before each shift to assure that all parts and accessories are in safe operating condition.
- Do not drive a vehicle in reverse gear with an obstructed rear view, unless it has an audible reverse alarm, or another worker signals that it is safe.
- Drive vehicles or equipment on roadways or grades safely constructed and maintained.
- Make sure that all personnel are in the clear before using dumping or lifting devices.
- Do not exceed a vehicle's rated load or lift capacity.
- Do not carry personnel unless there is a safe place to ride.
- Use traffic signs, barricades or flaggers when construction site is near public roadways.

## TRENCHING AND EXCAVATION

Cave-ins are perhaps the most feared trenching hazard, but other potentially fatal hazards include asphyxiation due to lack of oxygen in a confined space, inhalation of toxic fumes, drowning or electrocution or explosions if workers contact underground utilities. Safety and health programs must address all these potential hazards. The following hazards cause the most trenching and excavation injuries:



- No Protective System
- Failure to Inspect Trench and Protective Systems
- Unsafe Spoil-Pile Placement
- Unsafe Access/Egress

### No Protective System

All excavations are hazardous because they are inherently unstable. If protective systems or equipment are not being used while working in trenches or excavations, workers are in danger of suffocating, inhaling toxic materials, fire, drowning or being crushed by a cave-in.

### How to Avoid Hazards Due to Lack of Protective Systems

- Pre-job planning is vital to accident-free trenching. The following concerns must be addressed by a competent person:
  - Evaluate soil conditions and select appropriate protective systems.
  - Construct protective systems in accordance with the standard requirements.
  - Contact utilities (gas, electric) to locate underground lines, plan for traffic control if necessary and determine proximity to structures that could affect the choice of protective system.
  - Test for low oxygen, hazardous fumes and toxic gases, especially when gasoline engine-driven equipment is running, or the dirt has been contaminated by leaking lines or storage tanks. Insure adequate ventilation or respiratory protection.
  - Provide safe access into and out of the excavation.
  - Inspect the site daily at the start of each shift, following a rainstorm or after any other hazard-increasing event.

The above examples are only a small sampling of the information and resources OSHA offers in its eTool. For more information about how to use OSHA's Construction eTool to develop a safety and health program, visit <https://www.osha.gov/SLTC/etools/construction/index.html>.

Cari Elofson-Callahan is the Assistant Director of the OSHA Training Institute Education Center at Chabot-Las Positas Community College District. OTIEC at CLPCCD has been authorized by OSHA since 2008 to deliver high quality OSHA standards-based training for construction, maritime, disaster site and general industries at our San Francisco Bay Area (Dublin) location as well as other locations in Northern, Central and Southern California, Nevada, Hawaii, Guam and Arizona. The recommendations in this article are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. For information on OSHA Standards and Regulations, visit <https://www.osha.gov/laws-regs/regulations/industry>. For more information about the OTIEC at CLPCCD, visit our website at <https://osha4you.com/> or email [otc@clpccd.org](mailto:otc@clpccd.org).



## **Do the OSHA Construction standards apply to me?**

- OSHA Construction standards apply to:
  - All contractors who enter into contracts which are for construction, alteration, and/or repair, including painting and decorating.
  - All subcontractors who agree to perform any part of the labor or material requirements of a contract.
  - All suppliers who furnish any supplies or materials, if the work involved is performed on or near a construction site, or if the supplier fabricates the goods or materials specifically for the construction project, and the work can be said to be a construction activity.
- The controlling contractor assumes all obligations under the standards, whether or not he subcontracts any of the work.
- To the extent that a subcontractor agrees to perform any part of the contract, he assumes responsibility for complying with the standards with respect to that part.
- With respect to subcontracted work, the controlling contractor and any subcontractors are deemed to have joint responsibility.