



OSHA's Focus Four Mitigating Jobsite Hazards

By Pete Rice, CSP, CIH, REHS

Construction is among the most dangerous industries in the country. In 2010, data from the Bureau of Labor Statistics (BLS) indicate that there were 774 fatal on-the-job injuries to construction workers – more than in any other single industry sector and nearly one out of every five work-related deaths in the U.S. that year.

According to OSHA and the BLS, overall in the U.S., workplace fatalities and injury have actually come down. “Last August, the BLS released final updates to the 2010 Census of Fatal Occupational Injuries (CFOI) and within the private construction sector, the final fatal work injury total was down 7 percent from 2009 and 2010, the fourth consecutive year that fatal work injury totals declined in construction. Not only are fatalities declining, but they are declining at a rate greater than the rate at which construction activity has slowed over the past several years.” (FROM July/August 2012, Constructor)

These reductions are outstanding and in part due to the hard work and dedication of safety and health professionals throughout the country. However, the bottom line is there are still construction workers dying on the job every day. And this is unacceptable.

The leading causes of worker deaths on construction sites are referred to as OSHA's Focus Four. They are falls, electrocution, struck-by object, and caught-in/between.

These "Fatal Four" were responsible for nearly three out of five (56 percent) construction worker deaths in 2010, BLS reports.

The actual breakdown of these causes of fatalities on construction sites in 2010 is as follows (numbers are a percentage of the 774 total construction related fatalities that occurred in 2010):

- Falls – 264 (34 percent)
- Electrocutions – 76 (10 percent)
- Struck-by Object – 64 (8 percent)
- Caught-in/between – 33 (4 percent)

To mitigate these fatality statistics, OSHA and other professional safety and health organizations, both in the private and public sectors, are targeting the contributing factors. This article attempts to summarize essentials of OSHA's Focus Four. Also, it is important to recognize that resources have been brought to bear to combat these focus four incidents. Principally through outreach, training helps inform and enable employees and employers to better recognize, evaluate and control falls, electrocutions, struck-by objects and caught-in/between hazards on construction sites and related activities. For more information, see https://www.osha.gov/dte/outreach/construction/focus_four/index.html.

FALL HAZARDS

On most construction sites, there is no greater chance of death or serious injury than when working at height. Fall hazards are present at most worksites and many workers are exposed to these hazards on a daily basis. A fall hazard is any exposure condition at the worksite that could cause a worker to lose their balance or lose bodily support and result in a fall. Any walking or



working surface can be a potential fall hazard.

A worker is at risk any time they are working at a height of four feet or more. OSHA generally requires that fall protection be provided for an employee working at a height of four feet in general industry, five feet in maritime and six feet in construction. However, regardless of the fall distance, fall protection must be provided when working over dangerous equipment and machinery. This includes impalement hazards (e.g., rebar). The importance of fall protection cannot be stressed enough.

Nearly half (48 percent) of all fatal falls in private industry involve construction workers. In the period between 1992 and 2005, about one-third of the fatal falls in construction were from roofs, 18 percent were from scaffolding or staging, 16 percent were from ladders, and 8 percent were from girders or structural steel. The other 25 percent of fatal falls includes falls through existing floor openings, from nonmoving vehicles, from aerial lifts, etc.

Each year, on average, between 150 and 200 workers are killed and more than 100,000 are injured as a result of falls at construction sites. OSHA recognizes that accidents involving falls are generally complex events frequently involving a variety of factors. Consequently the standard for fall protection deals with both the human and equipment-related issues in protecting workers from fall hazards.

The three generally accepted methods of protection for workers on a construction site who are exposed to vertical drops of six feet or more are: guardrails, safety net systems and personal fall arrest systems.

- Guardrails are considered prevention systems, as they stop the employee from having a fall in the first place.
- Safety net systems are designed to catch the employee and break their fall. They must be placed as close as attainable under the working surface, but never more than 30 feet below.
- A personal fall arrest system consists of an anchorage, connectors, and a full-body harness that work together to break the employee's fall.

Additionally, employers have certain responsibilities specific to fall protection that include:

- Providing fall protection
- Ensuring proper scaffold construction
- Ensuring safe ladder use and condition
- Conducting daily worksite equipment maintenance and personal protective equipment (PPE) inspections by an authorized competent person
- Providing training

ELECTRICAL HAZARDS

The numbers of deaths by electrocution clearly show that exposure to electricity is a major hazard to construction workers. Electrocution results when a person is exposed to a lethal amount of electrical energy.

An electrical hazard can be defined as a serious workplace hazard that exposes workers to the following (BESAFE):

- **B**urns
- **E**lectrocution



- Shock
- Arc Flash/Arc Blast
- Fire
- Explosions

An average of 143 construction workers are killed each year by contact with electricity (based on government data for 12 years, 1992 through 2003). Electrical workers had the most electrocutions per year with the most serious concern being working “live” or near live wires. Proper protocol is using de-energizing and using lockout/tag-out procedures. Among non-electricians (e.g., construction laborers, carpenters, supervisors of non-electrical workers and roofers), failure to avoid live overhead power lines and a lack of basic electrical safety knowledge are the major concerns.

The major types of electrocution incidents come from:

- Contact with overhead power lines;
- Contact with energized sources (e.g., live parts, damaged or bare wires, defective equipment or tools); and
- Improper use of extension and flexible cords.

Here are just some of the things we can do to better protect against electrocution hazards:

- Locate and identify utilities before starting work;
- Look for overhead power lines when operating any equipment;
- Maintain a safe distance away from power lines; learn the safe distance requirements;
- Do not operate portable electric tools unless they are grounded or double insulated;
- Use ground-fault circuit interrupters for protection; and
- Be alert to electrical hazards when working with ladders, scaffolds or other platforms

STRUCK-BY HAZARDS

Struck-by injuries are produced by forcible contact or impact between the injured person and an object or piece of equipment.

Struck-by hazards are categorized as follows:

- Struck by flying object
- Struck by falling object
- Struck by swinging object
- Struck by rolling object

An example of a struck-by hazard can be illustrated by one real life event – four workers were installing signs on a highway when a pick-up truck changed several lanes and entered the work area. The truck struck one of the workers, knocking him off the road and over a bridge rail. He fell approximately 18 ft. and died from his injuries. Another example would be when an employee was struck by a nail from a nail gun fired by another employee thru a wall made of wallboard.

In 2010, there were 402 occupational fatalities caused by struck-by hazards. This statistic represents a serious concern.

To better prevent struck-by incidents:



- Never position yourself between moving and fixed objects;
- Stay alert of heavy equipment and stay clear of lifted or suspended loads;
- Check vehicles before each shift to assure that all parts and accessories are in safe operating condition and 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; and
- Wear appropriate PPE to include eye and face, head and high visibility clothing.

CAUGHT-IN / BETWEEN HAZARDS

Events (examples) that should be classified as caught-in include:

- Cave-ins (trenching)
- Being pulled into or caught in machinery and equipment (this includes strangulation as the result of clothing caught in running machinery and equipment)
- Being compressed or crushed between rolling, sliding, or shifting objects such as semi-trailers and a dock wall, or between a truck frame and a hydraulic bed that is lowering

The number of fatalities involving caught-in or between hazards in the private construction industry has actually decreased by about 20 percent since 2003. The biggest decrease in caught-in or between fatalities in the private construction industry has been in excavation or trench cave-ins. However, there were still 92 construction fatalities in 2008 as a result of caught-in or between hazards.

To prevent caught-in / between hazards:

- Use machinery that is properly guarded;
- Use other methods to ensure that machinery is sufficiently supported, secured or otherwise made safe (e.g., de-energize equipment and use lockout / tag-out and block-out procedures);
- Use protection to prevent from being pinned between equipment, materials or other objects;
- Avoid entry and working in unsafe excavations and only after inspection of a competent person;
- Seek and take advantage of safety training opportunities; and
- Take extra precautions and considerations before entering into confined or enclosed spaces.

The leading causes of worker deaths on construction sites have recently been given the title of OSHA's Focus (or Fatal) Four. Being sure not to lose sight of other workplace hazards, we must focus our attention on the Focus Four to further reduce the trend in workplace fatalities.

To help us in that effort, OSHA has developed a number of tools to include training presentations, handouts, and tailgate and toolbox topics. Learn more at www.osha.gov or contact those occupational safety and health resources available to you which may include your employer's safety department, insurance broker, loss control representative, industry association(s) and/or accredited safety and industrial hygiene professionals.

Although those of us that practice construction safety and health have done a decent job in minimizing worker deaths, we can do so much more.



¹ BLS Census of Fatal Occupational Injuries released final data for the 2010 reference year on April 25, 2012.

References:

- The U.S. Department of Labor, OSHA
- The Bureau of Labor Statistics
- The Center for Construction Research and Training
- ClickSafety, 2012 Focus Four Modules

About the Author: Pete Rice, CSP, CIH, REHS, has over 35 years of experience with occupational safety, industrial hygiene, and environmental health programs. He is a certified safety professional, certified industrial hygienist and registered environmental health specialist who is part of the course development team at ClickSafety.com, the nation's premier on-line safety training provider to the construction industry.

He can be reached at: price@clicksafety.com Learn more about ClickSafety at www.clicksafety.com.

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- *“Since 1970, workplace fatalities have been reduced by more than 65 percent and occupational injury and illness rates have declined by 67 percent. At the same time, U.S. employment has almost doubled.*
- *Worker deaths in America are down — from about 38 worker deaths a day in 1970 to 13 a day in 2010; and*
- *Worker injuries and illnesses are down — from 10.9 incidents per 100 workers in 1972 to fewer than 4 per 100 in 2010.”*

TIP: In general, it is better to use fall prevention systems (e.g., guardrails) than fall protection systems, such as safety nets/fall arrest devices, because prevention systems provide more positive safety means.

TIP: Reference OSHA 1926 Construction Regulations, Subpart M (or state equivalent), as well as applicable Letters of Interpretation for regulatory specific information.

TIP: Working on or around live electrical circuits should be avoided whenever possible. Employers should reference 2012 NFPA70E standards for additional information.

TIP: According to OSHA, “struck” is defined as: injuries produced by forcible contact or impact between the injured person and an object or piece of equipment.

TIP: According to OSHA, caught-in or between hazards are defined as: injuries resulting from a person being squeezed, caught, crushed, pinched, or compressed between two or more objects, or between parts of an object. This includes individuals who get caught or crushed in operating equipment, between other mashing objects, between a moving and stationary object, or between two or more moving objects.