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A Supplement to Workplace Material Handling & Safety

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# Managing safety in today's growing construction industry

Welcome to the first issue of *Construction Safety* in 2022. According to Associated Builders and Contractors, construction businesses will need to hire 1 million more workers over the next two years in order to keep up<sup>1</sup>; that is a tremendous number of people to keep safe.

To shine a light on what Rick Pedley said, one of our authors in this issue: "The construction industry is one of the most dangerous in the U.S. Workers face the risk of injury when completing various tasks and working with or around industrial equipment."

This publication is well-positioned to cover as many topics as we can this year including the #1 most-cited OSHA violation: Fall Protection – General Requirements (1926.501). Plus, our broad focus allows us to cover a tremendous range of topics including head protection, heat stress, highway work zone safety, respiratory protection, eye and face protection, confined spaces in construction, reducing hand and arm vibration injuries, demolition safety, trenching safety, and so many more. Whether your responsibilities involve Infrastructure and Heavy Construction, Specialized Industrial Construction, Institutional and Commercial Building or some other type of related business, you'll find tips, trends, recommendations and even new products in each issue of *Construction Safety*.

In this first issue of 2022, here are some of the articles you will read:

- OSHA's Focus Four (This is so key we actually have two articles in this issue on this topic)
- Words to win by for a successful culture and practice of safety
- Choosing appropriate high-visibility safety gear to protect workers on winter roadways
- An interesting article on infectious diseases on the jobsite
- Construction safety training best practices

I hope the content in this issue provides critical information to keep your construction workers safe and even offers you best practices that you can share with your teams.

Look for this quarterly publication again in May, July, and September. As always, your comments and questions are welcome. And if you want to contribute a story on keeping construction workers safe, drop me an email at randy@rdgmedia.net.

Randy Green Publisher Direct Line: 586-227-9344

<sup>1</sup>America desperately needs 1 million more construction workers - CNN





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# Four Steps to Creating Safer Work Zones

**BY: SCOTT FOWLER, ASSP CONTENT SPECIALIST** 

Roadway work zones are some of the busiest, and potentially most hazardous, work environments you can find, as workers perform tasks in close proximity to vehicles that are often traveling at high speeds.

According to the Federal Highway Administration, 842 work zone fatalities took place in the U.S. in 2019, an 11% increase over 2018. Furthermore, from 2010 to 2019, there were 1,249 construction worker fatalities at road construction sites according to the Center for Construction Research and Training.

From distracted driving to a lack of awareness of the work being performed, to motorists traveling at excessive speeds, work zone incidents are caused by a variety of reasons. With all of this in mind, contractors, safety professionals, workers, and others can take several steps to help prevent work zone incidents. In addition, emerging technologies can notify workers when a workplace intrusion has occurred. These four actions can help your organization improve highway work zone safety.

#### 1. Develop a Traffic Control Plan

Protecting workers and motorists on roadways of any size requires an un-



derstanding of the regular traffic flow on a particular roadway and how construction activities will disrupt that flow. This forms the basis of the plan for how you will control traffic over the course of a construction project.

The recently updated ANSI/ ASSP A10.47 standard, Work Zone Safety for Highway Construction, establishes requirements for construction and maintenance of highways and roads to help prevent injuries and fatalities through safe work practices, which includes developing a traffic control plan.

According to the standard, the project constructor should establish a traffic control plan for the entire work zone that addresses four key areas:

**The advance warning area:** This is the section of the highway where road users are informed about the upcoming work zone or incident area.

The transition area: In this section, road users are directed out of their normal path.

**The activity area:** This area is where work activity occurs. It is made up of the work space, the traffic space, and the buffer space.

**The termination area:** In this area, users return to their normal path.

#### 2. Implement Protective Safety Measures

Creating a protective barrier between motorists and workers is an essential step. This enables workers to perform their tasks safely while motorists move about the roadway. Based on the established traffic control plan, decision-makers must determine which barriers will best protect motorists and workers.

A10.47 states that positive protection measures need to be considered for each of these working conditions:

- Working zones that provide no means of escape (e.g., tunnels, bridges) from external motorized traffic intruding into the workspace
- Long duration work zones (e.g.,

Protecting workers and motorists on roadways of any size requires an understanding of the regular traffic flow on a particular roadway and how construction activities will disrupt that flow.

two weeks or more) resulting in substantial employee exposure to motorized traffic

- Projects with high anticipated operating speeds (e.g., at least 45 mph or 72 km/h), especially when combined with high traffic volumes (more than 20,000 vehicles per day)
- Work operations that place employees within one-lane-width of travel lanes open to traffic
- Roadside hazards, such as drop-offs or unfinished bridge decks, that will remain in place overnight or longer

Protective measures take many forms, from electronic signage and arrow panels, to rumble strips and pavement markings. Depending on the project, one or a combination of these methods may help improve safety. Safety professionals working with these hazards and exposures should determine the most appropriate controls for a particular project based on site-specific circumstances.

#### 3. Improve Worker Visibility

For motorists to operate safely around workers on the roadway, they must be aware of their presence. A10.47 states that all workers, including emergency responders, within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to work vehicles and construction equipment within the work zone wear high-visibility safety apparel that meets the Performance Class 2 or 3 performance requirements of ANSI/ISEA 207.

This type of apparel takes on added importance in any nighttime construction work when overall visibility is diminished. A10.47 also explains illumination requirements to develop an illumination plan for night work so that workers are clearly visible, and to help control glare in such working situations.

Along with PPE, flaggers often play a major role in alerting motorists to the presence of workers, as well as controlling traffic flow through the use of hand signals, signs, or automated devices. A10.47 provides guidance on how to best employ and position flaggers, as well as how to ensure they are visible and have an escape path should an intrusion occur.

#### 4. Use Intrusion Alert Technologies

The first three steps can help prevent workplace intrusions. However, when intrusions occur, workers need enough time to react and get to safety. That's where work zone intrusion alert technology (WZIAT) comes in.

In the peer-reviewed article, "Work Zone Intrusion: Technology to Reduce Injuries & Fatalities," published in the April 2018 issue of Professional Safety, Chukwuma Nnaji, John Gambatese, and Hyun Woo Lee examine different WZIAT technologies and discuss how they can alert workers of a work zone intrusion. Here are a few of the recent developments they highlight:

#### Intellicone

The Intellicone is much like a traditional safety cone in terms of design, with the notable exception that it includes a wireless audio-visual alarm system with audible tones of different pitches and oscillating cues. It features a portable site alarm and strobe lamps that are fitted onto safety cones and can communicate with one another. These devices can notify workers of a work zone intrusion up to 65 feet away.

#### Intellistrobe

The Intellistrobe offers both audio and visual alerts for work zone intrusions. The technology includes audio alerts, a gate arm signal light, and a pneumatic hose. An operator can control the unit from a safe distance. An audio alert is triggered when a vehicle pressurizes the hose.

#### SonoBlaster

A Sonoblaster is a carbon-dioxide-powered alert technology that is active when the traffic cone supporting the unit is tilted. One advantage of this device is that it can be attached to different types of barriers including cones, barrels and drums, security fences, barricades, and delineators. It also can determine the direction of an intruding vehicle. *Traffic Guard Worker Alert System* The Traffic Guard Worker Alert System is a pneumatic, trigger-based alarm system comprised of a lightweight visual-audio alarm unit, audio-vibratory personal safety device and a portable activation hose. The system transmits intrusion information via microwaves, whereby the pneumatic tube is placed along the cones and audio. Flashing lights and alerts are triggered when a vehicle compresses the tube.

The authors encourage manufacturers to ensure that future WZIAT produce sounds greater than 93 dB within 50 feet in addition to limiting false alarms. CS

Learn more about the widely adopted A10 voluntary consensus safety standards, and how they can help prevent worker injuries, illnesses, and fatalities at https://www. assp.org/standards/standards-topics/construction-and-demolition-operations-a10.



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# Beyond ANSI Type R

Why Choosing Better High-Visibility Solutions for Winter Work Zones Matters

BY AMANDA MIELKE, CONTRIBUTOR

Winter highway conditions can be dangerous, but premium high-visibility safety wear with unique features to enhance visibility can help protect work zone crews from injuries.

As if highway work zones weren't dangerous enough, adding winter conditions like slippery roads, blowing rain or snow, and cold temperatures can increase the risks for safety workers. All reasonable measures should be taken to limit or eliminate hazards before depending on PPE to protect workers, but appropriate high-visibility safety gear can help protect workers on winter roadways. In addition to meeting minimum safety guidelines and saving lives, the right high-visibility work gear can provide additional features to assist workers in performing

their jobs - heightening safety and increasing job satisfaction.

#### Type R - Understanding the ANSI Standard for Roadway Workers

High-visibility safety wear that meets the official ANSI/ISEA 107-2020 standard for roadway workers is called a Type R garment. These garments may provide adequate visibility for workers near roadways or areas with moving vehicles and machinery.

ANSI/ISEA 107-2020 divides Type R garments into Class 2, Class 3, and Class E.

- Class 2 garments define workers' shapes from the front and back and should be worn with roadways above 25 mph.
- Class 3 safety garments add re-

flective to sleeves, so workers are easily identifiable from 360 degrees of viewing. Workers must wear class 3 garments near roadways that may exceed 50 mph.

**Class E** garments include high-visibility pants and gaiters. When a Class E garment is combined with a Class 2 garment, the combined ensemble is considered Class 3. These pants and gaiters increase visibility in any ensemble by highlighting the worker's form, especially in low light conditions.

#### Beyond High Visibility -Why Other Features Matter

Meeting minimum guidelines for high visibility may help protect roadway workers from injuries, but they do little to increase comfort and functionality on the job. PPE is often regarded as a nuisance and interference with productivity on the job. Safety managers find compliance reduced and workers choosing to work in unsafe conditions because their PPE hinders them from reaching their full potential on the job.

Whether workers face freezing rain, snow, wind, or a combination of all of them, PPE that combines the required ANSI standard requirement for visibility with protection from cold and moisture prevents workers from wearing multiple garments to fight numerous hazards. In addition, hard-working gear that is reliable, comfortable, and provides additional features like pockets, mic tabs, and more help keep workers happy, comfortable, and safe.

#### Features of Premium High-Visibility Solutions for Cold Weather

Expand productivity and lower costs by providing high visibility with flexible functionality. Reduce PPE costs and hassle in cold weather by incorporating jackets and coats with multiple wearing configurations and using ANSI-compliant rainwear into roadway safety programs.

#### **Multiple Wearing Configurations**

Choosing jackets and coats with multiple wearing configurations can be the most efficient way to provide your workers with cold-weather gear that meets high-visibility standards. For example, an eightin-one winter bomber jacket like the FrogWear GLO-B2 features a removable inner shell and removable sleeves, with a hood optional for each configuration. Some of these configuration options are:

- ANSI Class 2 fleece vest
- ANSI Class 3 fleece jacket
- ANSI Class 2 wind and water-resistant vest
- ANSI Class 3 jacket with



As if highway work zones weren't dangerous enough, adding winter conditions like snow, slippery roads, and cold temperatures can increase the risks for safety workers.

fleece sleeves and wind & water-resistant vest ANSI Class 3 windproof

and waterproof bomber

Depending on how it is worn, the GLO-B2 can include up to 10 pockets, mic tabs at the shoulder for using a radio hands-free, and dual closure (zipper and snaps). All seams are sealed for added cold weather protection and to prevent moisture or wind from entering the jacket. Providing one garment that can be a vest, fleece jacket, and bomber jacket distills the need for three different garments into one combination.

Like a multifunctional bomber jacket, a three-in-one parka like the FrogWear GLO-P3 has flexible wearing options, but this garment extends protection past the waist. In addition, this longer jacket features a D-ring slot in the back, allowing workers at heights or on lifts to secure and release themselves from harnesses without removing their parka.

#### **ANSI-Compliant Rainwear**

For workers in areas where winter doesn't mean freezing temperatures and snow, adequate rain protection is essential for comfort and safety. Instead of wearing an ANSI Class 2 or 3 vest over rainwear, or clear rainwear over ANSI-compliant garments, employers can incorporate ANSI-rated rainwear to address both visibility and rain protection for roadway workers.

For most roadway workers, an allin-one rain suit will meet or surpass visibility standards and protect from the weather in one ensemble. Other flexible options include individually sold ANSI Class 3 rain jackets or dusters and Class E rain bibs.

Other lighter jackets like give roadway workers ANSI Class 3 visibility and warmth in cooler but not quite frigid temperatures.

#### Why Going Above and Beyond Matters

Providing basic high-visibility vests for road workers is required. But vests over jackets can be cumbersome and hinder work and efficiency. By considering the needs of roadway workers and choosing PPE garments that offer protection from multiple hazards, employers and safety managers can increase job satisfaction while saving time and money. When workers work efficiently without unnecessary bulk and load, everybody wins. CS

Amanda Mielke is the Safety Consultant for Global Glove and Safety Manufacturing, Inc., which offers a full lineup of personal protective equipment ranging from hand and eye protection to safety wear, head protection, ice traction, accessories, and more (www.globalglove.com).



## How To Avoid OSHA's Focus Four Construction Hazards

#### BY RICK PEDLEY, CONTRIBUTOR

The construction industry is one of the most dangerous in the U.S. Workers face the risk of injury when completing various tasks and working with or around industrial equipment. The U.S. Occupational Safety and Health Administration (OSHA) has created the Focus Four Construction Hazards to help workers and managers prevent certain types of accidents in the field.

Managers and workers should learn about these four hazards and how they occur, so they can do everything they can to prevent them from occurring in the first place.

#### 1. Falls

Workers are at risk of falling when working at height. This is the number one cause of construction-related fatalities. Everyone on site should wear and use personal fall arrest equipment in case they fall off an elevated surface. The equipment should come with a safety harness and lanyard that keeps the person tethered to the surface in question.

It's also important to install and maintain perimeter protection around the elevated surface to help workers avoid getting too close. All floor openings should be covered and labeled whenever possible. Workers should also use ladders and scaffolds properly to avoid injuries.

#### 2. Struck By Objects

Workers also face the risk of getting struck by falling, swing-

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opportunity to be part of influencing the next 50 years of the Association.



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Workers are at risk of falling when working at height. This is the number one cause of construction-related fatalities.

ing, misplaced, or moving objects like an oncoming vehicle or piece of equipment. Cranes, trucks, and lifts are often used to move equipment and raw materials. If equipment failure or malfunction occurs and one of these loose or shifting objects strikes a worker, it could be fatal. Even a bolt or nut falling from above can cause severe injury, and a hard hat may not offer adequate protection.

Workers and other team members should never position themselves between moving and fixed objects. Everyone should also wear high-visibility clothing near equipment and vehicles, so the driver or operator can see everyone in the construction zone.

#### 3. Caught In/Between

Workers also face the risk of getting caught in confined spaces, crevices, or between machines, devices, or tools. Those on-site should never enter an unprotected trench or excavation 5ft. or deeper without an adequate protective system in place. Some trenches under 5ft. deep may also need such a system.

It's also important to make sure the trench or excavation is protected either by sloping, shoring, benching, or trench shield systems to make sure the person can escape.

#### 4. Electrocutions

Construction workers risk getting electrocuted by exposure to wiring and outlets during wet conditions, overhead power lines, or energized conductors or circuit parts in electrical panels, poorly maintained power tools and extension cords, and lightning strikes.

Managers should always locate and identify utilities before starting work, including overhead power lines when operating equipment. Everyone on-site should maintain a safe distance from power lines according to the industry's safe distance requirements. No one should operate portable electric tools unless they are grounded or double insulated. Teams can also use ground-fault circuit interrupters that stop electric currents for added protection. Everyone should be alert to electrical hazards when working on ladders, scaffolding, and other elevated surfaces.

Construction workers should be able to focus on their work without putting their health and safety at risk. Managers need to invest in the right safety equipment to make sure everyone can do the job safely. They should also properly educate and train their employees on these hazards, so everyone has the information they need to keep themselves and their colleagues safe from these hazards on site. CS

Rick Pedley is PK Safety's President and CEO. PK Safety, a supplier of occupational safety and personal protective equipment, has been operating since 1947 and takes OSHA, ANSI, PPE, and CSA work safety equipment seriously (www.pksafety.com).

## The Matter Of Safety In The History Of The Construction Industry

BY JOE EGAN, CONTRIBUTOR

The construction industry is one of the oldest activities created by human beings. It started at the beginning of mankind thousands of years ago when we developed the ability to reason: the cognitive ability to draw a conclusion based on the experience or use of tools or other available material. With such new brainpower, the conscious early man reasoned that rocks could be transformed and used as a tool and thus built the first condominiums, then called caves.

Ever since, construction has been a reflection of a society's technology and values. We know that much has changed and much has not. Tools, equipment, knowledge, and the considerations for safety are in a constant state of change. There have been major leaps in technology. Slide rules have been replaced by calculators. Blueprints have been replaced by computer-aided design (CAD) and building information modeling (BIM). The plumb bob and tape measure have been replaced by laser beams.

Safety has advanced from being a low priority to a primary concern. The Federal Occupational Safety and Health Act was not signed into law until 1970 and many contractors considered some rules just a burdensome cost increase. Prior to OSHA, construction companies and employees were on their own regarding the importance and practice of safety. Today, successful companies don't treat their safety representative as a detective who exposes dangerous conditions and scolds workers. Instead, the position is high on the organization chart because of the respect they have earned and the realization that safety is about affecting human behavior in the wise (safe) or unwise (dangerous)



https://commons.wikimedia.org/wiki/File:Seattle\_-\_University\_Bridge\_under\_construction,\_1932.jpg

decisions that are made.

Words to win by for a successful culture and practice of safety

- 1. Attitude about safety is a matter of personal choice. It is the key that either locks success away from you or opens it up to you.
- 2. Leadership cannot be faked or granted; it is earned and based on the ability to inspire willing followers.
- Rely on hope to show your potential, but also realize that hope itself is not a reliable strategic plan.
- 4. Hard work is not a guarantee of result, just as education is not a guarantee of wisdom
- 5. Honesty is external truth-telling and the internal willingness to recognize your

strengths and weaknesses

- 6. Behavior is a function of your decisions, not your conditions.
- 7. Problem solvers look for answers, not errors.
- 8. If you can control the solution, you can control the problem. cs

Joe Egan is President of Egan Connection Inc., a construction consulting, coaching, and training company, and also President of Egan Publications Inc. for the authorship and publication of his three books: (1)The General Contractor – How to be a Great Success or Failure (2) Construction Project Management – How the Great Ones do it and (3) Building Positive Character – 50 Tips on Empowerment, Overcoming and Success. Egan is also an adjunct professor at Minnesota State University School of Construction Management.





## Ten Steps to Reduce the Focus Four and Increase Construction Jobsite Safety

BY JAMES STROHECKER, CONTRIBUTOR

OSHA construction compliance is a key element for maintaining a safe jobsite. According to OSHA, nearly 6.5 million people work at over 250,000 construction sites each day.

With the inherently hazard-

ous work, it's no surprise that the construction industry has a fatality rate that is higher than the national average among all other industries. To help reduce fatalities OSHA has developed a series of comprehensive standards. These standards are included in 29 CFR 1926, Safety and Health Regulations for Construction.

The goal for construction safety managers and the industry should be to improve the safety culture and

# FOCUS FOUR 2020Image: Description of the second second

Data from Department of Labor News Release, Dec. 16, 2021

### What Are OSHA Construction Site Requirements?

CFR 1926 includes 27 subparts, covering topics ranging from general safety to crane safety. The subparts are arranged in the following categories:

- A General
- **B** General Interpretations
- C General Safety and Health Provisions
- D Occupational Health and Environmental Controls
- E Personal Protective and Life Saving Equipment
- F Fire Protection and Prevention
- G Signs, Signal, and Barricades
- H Materials Handling, Storage, Use, and Disposal
- I Tools-Hand and Power
- J Welding and Cutting
- K Electrical
- L Scaffolds
- M Fall Protection
- N Helicopters, Hoists, Elevators, and Conveyors
- O Motor Vehicles, Mechanized Equipment, and Marine Operations

#### P Excavations

- Q Concrete and Masonry Construction
- R Steel Erection
- S Underground Construction, Caissons, Cofferdams, and Compressed Air
- T Demolition
- U Blasting and the Use of Explosives
- V Power Transmission and Distribution
- W Rollover Protective Structures; Overhead Protection
- X Ladders
- Y Commercial Diving Operations
- Z Toxic and Hazardous Substances
- CC Cranes and Derricks in Construction

Looking at the topics covered by CFR 1926, maintaining a safe jobsite begins with identifying and correcting the most frequent construction safety issues.

climate while reducing occupational injuries and illnesses on worksites.

## Frequent Construction Safety Issues

Part of improving safety includes understanding the most frequent hazards and training employees how to recognize, avoid, and even mitigate those hazards. This is the first line of defense when it comes to your workers' health and safety.

In construction, there are four major hazards that account for most fatalities, according to the Bureau of Labor (BLS). These hazards are commonly referred to as the Focus Four and include falls, electrical hazards, falling objects, and crush hazards. These hazards can be encountered from numerous sources, some of which include:

- **Falls** working from ladders, scaffolding, lifts, and roofs.
- Electrical hazards overhead power lines, conduits, underground power lines, and equipment that has not been properly de-energized using Lockout/ Tagout (LO/TO) procedures.
- Falling objects tools and equipment left on roofs, equipment, ladders, lifts, and more.
- **Crush hazards** swing zones of heavy equipment (excavators, drilling equipment, etc.), crush zones under lifts, between equipment and fixed objects, and much more.



Of these hazards, falls alone account for nearly 39% of construction fatalities.

## 10 Steps for Maintaining a Safe Jobsite

There are important steps that must be taken to maintain a safe jobsite to help you identify and prevent incidents because of common construction safety issues. These include:

- 1. Conduct a complete walkthrough of the site to identify hazards before breaking ground. Identify all hazardous materials and areas in the jobsite.
- 2. Train all employees about the hazards they may face, paying special attention to the Focus Four.
- 3. Make note of these hazards, so you can work to mitigate them by using engineer controls, safe work practices, PPE, or regular maintenance.
- 4. Create a site safety plan that accounts for all potential hazards as well as provides a means to respond to any accident.

In construction, there are four major hazards that account for most fatalities, according to the Bureau of Labor. These hazards are commonly referred to as the Focus Four and include falls, electrical hazards, falling objects, and crush hazards.

- 5. Identify all hazardous materials and label them according to HazCom 2012.
- 6. Inspect the worksite on a daily basis to identify new hazards and malfunctioning equipment. Immediately report and fix any issues found.
- 7. Ensure employees have the necessary PPE to perform work safely. This includes hard hats, eye protection, gloves, work boots, hearing protection, respiratory protection, fall protection, and more.
- 8. Develop an injury and illness

**prevention program.** Programs should include first aid training, supplies needed to treat common workplace injuries, and a means to contact local emergency services.

- 9. Regularly check with the foreman, contractors and workers to find out if there have been any changes in equipment or procedures that need to be addressed with new safety PPE, signage or training.
- **10. Identify hazards** and communicate safe work practices using vivid labels and signs.



To ensure your construction site is meeting OSHA standards, it's important to understand the requirements in OSHA 1926, as well as other standards. For example, there may be cases where you encounter a hazard that is not covered by 1926. In these cases, the hazard may fall under the General Industry Standard (29 CFR 1910) or Section 5 of the Occupational Safety and Health Act, known as the General Duty Clause.

The General Duty Clause provides an all-inclusive safety requirement that requires employers to mitigate or remove recognized hazards that have caused or may cause injury or death.

To summarize, employers and companies who take a proactive approach to safety perform better. Sacrificing safety to make a deadline will ultimately cost more than it's worth. Besides providing a safe and healthy workplace for employees, all construction safety managers must:

- Meet all applicable state and federal regulations as well as Occupational Safety and Health Administration (OSHA) laws.
- Collaborate with contractors, subcontractors, and temporary staffing agencies to ensure protection of each worker on the job.
- Provide and administer consistent safety inspections of worksites, equipment, and materials by competent employees.
- Have an emergency plan and procedures in place for when incidents occur on projects on-site and off-site.

Once you are familiar with OSHA standards, you will be able to quickly identify most hazards by performing daily walk-around inspections of your site. Learn how to create safety signs that meet OSHA requirements with the DuraLabel Best Practice Guide to OSHA Safety Signs. This helpful guide breaks down all the requirements, from text size to color and graphics so that your safety signs are seen and compliant. **CS** 

James Strohecker is Director, Growth Marketing, Graphic Products+DuraLabel. For more than 16 years, he has led the development of issue-driven, value-based product solutions that reduce worksite incidents, lower risk, and increase efficiency, productivity and safety. He introduced award-winning protection solutions for Industrial, oil & gas, rendering/food production, public event, first responder/hazmat, environmental and utilities operations. For more information about Graphic Products+DuraLabel, visit www.graphicproducts.com.

#### SAFE LIGHTING

Understanding the atmosphere of the space to be lit, as well as the minimum lighting levels for safe and efficient working conditions is essential to selecting the right lighting.



## Shedding a Light on Safe and Compliant Jobsite Lighting in Hazardous Locations

BY BRIAN EARL, CONTRIBUTOR

Proper light levels on construction sites are critical to worker productivity and jobsite safety. Safe light levels are outlined in OSHA Standard 1926.56 where safe minimum light levels for various areas of operation within a jobsite. To the right is a brief extract from OSHA Standard 1926.56(a).

Now that we know the minimum light levels how do we design our work sites to meet those minimums in hazardous area?

First, we need to know about the space or atmosphere from a hazardous location perspective, we are lighting. Through rigorous

Foot-Candle Levels	Area of Operation*
5	General Construction Area Lighting
3	General Construction Areas, concrete placement, excava- tion and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas
5	Indoors: warehouses, corridors, hallways, and exit ways
5	Tunnels, shafts, and general underground work areas: (Exception: minimum of 10fc is required at tuna and shaft heading during drilling, mucking and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading)
10	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts, and active store rooms, mess halls and indoor toilets and workrooms.)
30	First aid stations, infirmaries, and offices

SUMMART OF CLASSES I, II, III HAZARDOUS LOCATIONS				
CLASSES	CROURS	DIVISIONS		
CLASSES	GROUPS	1	2	
I: Gases, vapors and liquids	A: Acetylene B: Hydrogen, etc. C: Ether, etc. D: Hydrocarbons, fuels, solvents, etc.	Normally explosive and hazardous	Not normally present in an explosive concentration (but may accidentally exist)	
II: Dusts	E: Metal dusts (conductive* and explosive) F: Carbon dusts (some are conductive,* and all are explosive) G: Flour, starch, grain, combustible plastic or chemical dusts (explosive)	Ignitable quantities of dust normally are or may be in suspension, or conductive dust may be present	Dust not normally suspended in an ignitable concentration (but may accidentally exist). Dust layers are present.	
III: Fibers and flyings	Textiles, wood-working, etc. (easily ignitable, but not likely to be explosive)	Handled of used in manufacturing	Stored or handled in storage (exclusive of manufacturing)	

\*Ref: OSHA Regulations, 1926.56 - Illumination. NEC 500 & UL Hazardous Fixture Standards

testing, UL has developed environmental classifications around hazardous atmospheres these spaces might contain. Understanding these atmospheres is critical to hazardous lighting fixture selection and wiring methods necessary to power these fixtures.

Per Article 500 of the National Electrical Code (NEC), an area is considered a hazardous location when there are (or may be) ignitable concentrations of combustible substances in the air. These substances include vapors, dust, certain fibers, and flammable gasses. Through rigorous testing UL has separated the atmospheres (spaces) in to three distinct categories which list the primary hazardous material in each space:

#### I. Gases, Vapors, or Liquids II. Dusts

#### III. Fibers and Flyings

Next there are Groups, (A-G) which list the specific hazardous material present in a space and then Divisions (1 or 2) which list the conditions in which these hazardous materials existing in the atmosphere

**Proper light levels** on construction sites are critical to worker productivity and jobsite safety.



- essentially Normally present, Suspended or Used or Not Normally present, Suspended or Stored.

Below is a summary of Classes I, II, and III Hazardous locations. Explosion proof lighting is a

special type of product designed to withstand the toughest environments, specifically hazardous locations. To be considered explosion proof, a lighting fixture must be able to contain an internal combustion by

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#### SAFE LIGHTING

preventing it from propagating outside the unit.

Many people assume that these fixtures work via a seal around the bulb (and its other components), which prevents flammable compounds from entering the device. However, that's only half the story. Explosion proof lighting contains a unique feature called a flame path, which is a special type of joint between different parts of the enclosure. This flame path is essentially a controlled leak that allows expanding gasses from an internal explosion to cool and safely vent to the outside, without igniting any explosive atmosphere that may be outside the lamp. The class, division, and group that the enclosure is rated for determines the allowable leak rate (flame path gap and length) to prevent external ignition. For example, a Group A enclosure for acetylene has a much smaller leak rate than a Group D enclosure for propane.

It is worth noting that products that are appropriate in hazardous areas are not always explosion proof. There are many other methods to mitigate explosion risk. Other techniques include intrinsic safety, encapsulation, oil immersion, pressurization, and so on, depending on each application's specific needs. Project managers should review a product's certifications prior to bringing it to the job site to ensure the equipment is appropriate for their specific application

Now that we've determined the minimum amount of lighting for a given space and that space's atmospheric condition, here is where the science of lighting is applied. The IES (Illuminating Engineering Society) has recommendations for several workspaces and has developed requirements and standards on which fixture manufacturers test their fixtures and publish their fixtures data. Lighting designers use this data with lighting software to design a particular space, considering the size the area to be illuminated, mounting height, surface reflectance, and minimum light levels. These figures combined with fixture performance will give the number of selected fixtures and spacing to achieve the desired light level in the selected area.

Understanding the atmosphere of the space to be lit, as well as the minimum lighting levels for safe and efficient working conditions is essential to selecting, designing, and applying lighting to achieve a safe and productive workspace. cs

Brian Earl is VP Sales and Marketing at Ericson (ericson. com). He has over 25 years' experience in the industrial power and lighting industry including IES Certifications for Lighting Design in demanding spaces.

## Infectious Diseases on the Jobsite: It's Not All About COVID

BY ROBERT LAHEY, CHICAGOLAND CONSTRUCTION SAFETY COUNCIL

The past two years has witnessed an increase in awareness about the risks - and tragedies - associated with a public health crisis. The impact has been monumental and measurable in so many ways. How ironic that the hazard we cannot see can have such a widespread and long-lasting impact on our economies, our cultures, and our lives.

So it goes with infectious diseases; sometimes the invisible can do the most harm. This is true both in the home and in the workplace. Construction jobsites are susceptible to three types of threats:

- **Fungi** spore-producing organisms that feed on organic matter
- **Bacteria** microscopic living organisms that can be found anywhere
- Viruses infective agents within living cells of a host organism

In the construction industry, exposure to mold (a fungus) is a primary concern. The prevention challenge is great, however, because mold is everywhere, including in the air, in soils, and in building materials. And while the environment will never be mold-free, residential and commercial projects should be free from visible and odor-producing mold. When inhaled or ingested, fungi present a health concern, especially to persons who are immune compromised.

Bacteria are living organisms that also are a threat to construction employees because they are contagious, most often by air (e.g., tuberculosis), water (e.g., Legionnaires' disease), and point-of-contact (e.g., tetanus). Preventative measures can be implemented on jobsites to reduce these risks of infection. However, even in the most active of work zones, these threats are



highest to those with compromised immune systems.

Unlike bacteria, viruses are not living organisms, but they still present a significant risk to workers via bloodborne or airborne exposure. COVID-19 is the most common present-day example, but not the only one of this kind of infectious disease. Others include influenza, measles, polio, hepatitis, and rabies. Due to the communal nature of construction work and the reliance upon close, personal interaction, the threat of virus infections is real - and ongoing – especially for "novel" (i.e., new) strains, such as the coronavirus.

So, with these threats ever-present, what is an employer to do to protect employees? After all, the federal law that requires businesses to provide a safe and healthful workplace is as important today as it was 50 years ago when OSHA was created as a governmental agency. A proactive approach by construction companies, large and small, can limit the risks inherent in their work. It is essential for employers to implement protocols that govern personal hygiene, site safety, and use of personal protective equipment. A successful exposure control plan commonly includes these elements:

- Statement of purpose
- Definition of responsibilities of key personnel
- Identification of jobsite health hazards and risk categories
- Documented work procedures and practices
- Required engineering controls, administrative safety controls, and measures
- Frequent education and training
- Process of annual review

Most importantly, an exposure control plan must be customized to each specific construction work environment. This represents the most effective way to safeguard employees and enhance business productivity. cs

For more information, visit the Construction Safety Council (buildsafe.org)



## What Every Workplace Should Know About Proper Fall-Protection Equipment

BY NICOLE RANDALL, CONTRIBUTOR

In November 2021, a worker in New York City<sup>1</sup> fell while painting the Manhattan Bridge. In December 2021, a roofer in his early 20s fell while working on an apartment building in New Orleans<sup>2</sup>, and a 24-year-old man lost his life when he fell from an Arlington, Washington<sup>3</sup> cell tower.

#### **Stats Snapshot**

According to the latest Census of Fatal Occupational Injuries, released by the U.S. Bureau of Labor Statistics (BLS) in December 2021, a worker dies every 111 minutes from a work-related injury in the U.S. While total worker deaths fell more than 10% from 2019 to 2020 (5,333 to 4,764) roofers, helpers, and construction trade workers were high on the list of the types of workers who died — exceeded only by workers in fishing, hunting, and logging jobs.

The BLS census also showed that falls, slips, and trips were the second most common cause of workplace deaths, after transportation incidents. Similarly, the National Safety Council<sup>4</sup> cited falls, slips, and trips as the second most common workplace injury involving days away from work.

#### **Equipment Insights**

In other words, being diligent about construction safety at heights can help save lives, as well as protect the bottom line from catastrophic delays and losses. That's why the International Safety Equipment Association (ISEA) believes it's vital that every workplace has access to proper fall-protection equipment.

Not all fall-protection equipment is created equal. As ISEA's *Personal Fall Protection Equipment Use and Selection Guide* (PDF) explains, a complete fall protection system is comprised of three vital components:

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- Falls and dropped objects result in the <u>4th</u> most injuries and fatalities in the work place internationally
- These accidents cost the construction industry millions of dollars in lawsuits, lost time, and equipment damage
- 645 fatalities occurred in the US due to falls, and 217 due to falling objects
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- 45,000 falling objects accidents were reported, which resulted in 22,000 injuries

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#### **FALL PROTECTION**

anchorage, body support, and means of connection — literally the ABCs of fall protection.

"Each one must be in place and properly used to provide maximum worker protection," according to the guide. "While each of these components is vital to worker safety, the connecting device is the critical link in assembling a safe fall protection system since it bears the greatest force during a fall. Careful consideration must be given to the selection, materials, construction, and inspection/maintenance of fall protection equipment before, during, and after a connecting device has been selected."

Another ISEA publication, *Frequently Addressed Topics in Fall Protection* (PDF), addresses 14 common topics that arise in the thousands of calls from employers, end-users, and others ISEA-member companies collectively receive asking about different aspects of fall protection, from anchorage issues to various fall protection applications.

#### **Awareness & Training Needed**

In addition to the proper equipment, awareness and training choices also play a critical role in fall protection. ISEA's ongoing Safety at Heights campaign points out that fall protection encompasses a wide range of equipment and systems, including overhead anchorage and anchorage strength, horizontal lifeline systems, harness attachments, self-retracting line positioning, twin-leg lanyards, tie-back applications, post-fall suspension, and more.

The content of a free webinar ISEA produced in 2019 is still on-target for employers striving to prevent fatalities and injuries from falls. The webinar featured leading fall protection and dropped objects experts from ISEA and the National Association of Tower Erectors (NATE), who presented ways to implement a successful safety-at-heights program, outlined fall protection product innovations,



Not all fall-protection equipment is created equal.

and discussed the most recent ANSI/ ISEA 121 standard to prevent dropped objects, to keep workers safer and their tools secured while working at heights.

The National Institute for Occupational Safety and Health (NIOSH), part of the Centers for Disease Control & Prevention (CDC), maintains an online resource center pertaining to workplace fall protection, with particular information focused on ladder safety, mast climbing work platforms, and aerial lifts.

Industry standards likewise are crucial to helping construction and other industries maintain safety at heights. ISEA is officially represented on ANSI-accredited standards committee Z359, Fall Protection Equipment. Additionally, a host of other ISEA standards help to advance workplace safety.

From a regulatory standpoint, OS-HA's Safety and Health Regulations for Construction includes standards that specifically address fall protection. Standard Number 1926.501 lays out requirements for employers to provide fall protection systems. And Standard Number 1926.503 requires employers to "provide a training program for each employee who might be exposed to fall hazards. The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards." CS

Nicole Randall is the Director of Marketing and External Affairs for ISEA (International Safety Equipment Association). Headquartered in Arlington, Virginia, ISEA is the trade association in the U.S. for personal protective equipment and technologies. Its member companies are world leaders in the design, manufacture, testing, and distribution of protective clothing and equipment used in factories, construction sites, hospitals and clinics, farms, schools, laboratories, emergency response, and in the home. Since 1933, ISEA has set the standard for the personal protective equipment industry, supporting member companies united in the goal of protecting the health and safety of people worldwide (https://safetyequipment.org).

- https://www.usnews.com/news/beststates/new-york/articles/2021-11-17/ construction-worker-falls-todeath-from-manhattan-bridge
- https://www.nola.com/news/ crime\_police/article\_5b9b4d7c-53a3-11ec-a9cc-3704f673130c.html
- 3. https://www.heraldnet.com/news/ man-24-identified-after-fatalfall-from-arlington-cell-tower/
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# Construction Safety Training Best Practices

BY MELODY HOLLIS, EDUCATION SERVICES MANAGER & MAUREEN MALLACH, MANAGER OF PROFESSIONAL SERVICES, HCSS

Construction sites and work can be hazardous if safety measures are not correctly put in place and if workers at the jobsite are not adequately trained. Skimping on safety training is not a good idea as it can lead to significant liability for the contractor. Even if your firm is under pressure to meet deadlines, putting safety training on the back burner is not wise.

Safety training is a whole new ballpark. It involves more than just selecting a software tool to manage safety. It involves detailed training from certified professionals, change management, and developing a safety culture.

#### Some Safety Management Software

Safety management software providers contract with certified safety professionals to deliver training on their software. These certified professionals are senior safety officials with decades of industry experience who can go beyond just reviewing a checklist of features of the product. They will address the company's safety culture, working with employees to instill a corporate culture that focuses on safety.

Safety professionals who train others know and understand OSHA's

laws and regulations and other safety standards. They know how to create an effective safety program built around a safety culture and processes. They know what information to collect and how to use and analyze it to improve safety across the board.

Some safety management software offers pre-built safety meetings and inspections to promote ownership of safety within construction crews. Crew leaders can verify and update crew member skills and certifications, use relevant inspections as teaching tools, record safety meeting attendance and topics, track individ-



ual employee safety education goals, and track near misses, incidents, and observations to help spot leading indicators of potentially unsafe behavior.

#### **Best Practices for Training**

Deliver training that mirrors a company's real-life business with all its complexities. In other words, provide real-world challenges that the participants can solve using their newfound knowledge and skills.

Don't try to include too many things in training at once. For many students, complicated technology training can be a nightmare. Use the 80/20 rule, where training is focused on 20% of the main functions that employees will use 80% of the time. This focus speeds the training process and provides the most significant usage of the new system.

Keep communications flowing freely with employees to understand how the new software implementation is going, who benefits, and the overall impact on the business' growth and competitive advantages. The more each employee understands how their efforts to change processes affect the company, the more likely they will invest time and energy into making those changes.

Offer training incentives for employees to encourage them to use the new software. These incentives can range from certificates and plaques to Starbucks gift cards or cash.

Provide a variety of training formats, from online to in class. Give employees the choice of when to take the training, allowing them to consider their current schedules. Give them plenty of advance notice of when training must be complete.

Ask for feedback from the trained people by sending out a survey throughout the implementation and training processes to ensure the vendor is on the right track. Then rely on the surveys to guide how the vendor is doing and what they can do better. Deliver training that mirrors a company's real-life business with all its complexities. In other words, provide real-world challenges that the participants can solve using their newfound knowledge and skills.

Offer virtual or in-person workshops monthly, which can be a forum for advanced users to pick the brain of the vendor engineers and other power users. A vendor may also offer introductory courses that cover all the essentials. For example, a workshop on construction bidding software would cover estimating, bidding, quoting, pricing, and reporting.

Ongoing online learning allows employees to train at their own pace. Giving each employee access to this learning environment will provide them with as-needed refreshers on performing specific actions with the new software.

Once the software is in place and the team trained, how do you know that the team will use it? This is where change management enters the picture.

#### **Change Management**

Change management is vital because it helps your workers gradually accept changes because of the new software. Even with a formal change management process, approximately 50%<sup>1</sup> of all organizational changes are unsuccessful, so this has to be handled delicately.

Critical steps in the change management process include:

Preparing the organi-

zation for change

- Crafting a vision and plan for change
- Implementing the changes
- Embedding the changes within the company culture
- Reviewing progress and analyzing results

J.F. Brennan, a marine construction, environmental remediation, and harbor services company with job sites in all 50 states, implemented a safety program that accepts voluntary field observations submitted by employees from job sites and work areas. These observations are then distributed to the whole company to discuss.

Each week, the company has weekly, corporation-wide safety meetings to discuss the safety department's observations. Everyone from the field workers to the CEO can call into the session. Because these observations can be submitted via mobile devices in real-time, discussions about what happened and the solution to the issue can occur quickly. Plus, people are more likely to take photos and submit them along with the write-up, providing more details on an incident or observation.

#### Creating a Safety Management Culture

Foremen and Safety Managers are always prepared for the unexpected when you use a safety management solution with hundreds of toolbox talks, comprehensive inspection reports, crew skill tracking, and safety trend reports that recommend if any specific training topics are needed. When you empower your crews to take on-site ownership of safety, you're able to go beyond compliance and build a strong safety culture.

Additionally, by creating a strong safety culture, you can reduce your exposure to a fine, reduce workers' comp costs, and eliminate costly claims while improving your EMR.

#### **Building a Safety Culture**

There are several steps a company should follow to start to build a safety culture within its organization. The steps are:

**1. Practice, practice, practice.** Have supervisors practice reporting incidents into a safety management program to coach their teams on how to fill out quality incident reports without the stress of an actual incident. The more practice employees have done, the more comfortable they feel doing it.

2. Be proactive, not reactive. Develop a process for communication about a safety issue. For example, with COVID-19, some contractors developed an approach to help employees who needed to support a sick child, provide them with places to go and get tested, and determine what to do to help. Whether giving a toolbox talk about watching out for school zones or staying six feet apart, the goal is to be proactive, not reactive.

3. Teach crews how to advocate for themselves. Empower your construction crews to suggest safety processes and ensure they know how to advocate for themselves at work and in life. For example, in the case of COVID, teams should feel comfortable asking questions about the precautions being taken at the jobsite to keep workers safe from contamination, such as how to maintain safe distances, wear masks, and use hand-washing stations frequently.

4. Recognize exceptional safety behavior. Recognize employees in front of their peers when they perform an unprecedented safety act. The public recognition empowers crew members to become safety experts in their way.

Software training is essential. When businesses invest in employee software education, they get a better return on the software they purchase. However, safety training is different and involves training on the features and functions of the software and a culture shift of the entire organization. Everyone within the organization needs to focus on safety for success. **CS** 

HCSS is the trusted leader in construction software for estimating, field entry, project management, safety, digital plans, 3-D drone imaging, fleet management, and telematics. For 35 years, the company has used annual user's group meetings to listen to customers resulting in innovative software to manage every part of the project lifecycle. With 24/7 instant support and a proven implementation process, HCSS has helped improve operations for over 3,500 companies ranging from \$1M to billions in revenue across the United States and Canada (bcss.com).

<sup>1</sup>https://www.gartner.com/en/humanresources/insights/organizatioal-changemanagement



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