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Construction Safety

Training – Fall Protection – Jobsite Lighting - Work Zone – Focus Four

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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 individual 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.

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 %¹ of all organizational changes are unsuccessful, so this has to be handled delicately.

Critical steps in the change management process include:

- Preparing the organization 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. ■

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 (hcss.com).

¹ <https://www.gartner.com/en/human-resources/insights/organizational-change-management>

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What Every Workplace Should Know About Proper Fall-Protection Equipment

By: **Nicole Randall**, Contributor



In November 2021, a worker in New York City¹ fell while painting the Manhattan Bridge. In December 2021, a roofer in his early 20s fell while working on an apartment building in New Orleans², and a 24-year-old man lost his life when he fell from an Arlington, Washington³ 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

1 <https://www.usnews.com/news/best-states/new-york/articles/2021-11-17/construction-worker-falls-to-death-from-manhattan-bridge>

2 https://www.nola.com/news/crime_police/article_5b9b4d7c-53a3-11ec-a9cc-3704f673130c.html

3 <https://www.heraldnet.com/news/man-24-identified-after-fatal-fall-from-arlington-cell-tower/>

4 [Top Work-Related Injury Causes – Injury Facts \(nsc.org\)](#)

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 Council⁴ cited falls, slips, and trips as the second most common workplace injury involving days away from work.

EQUIPMENT INSIGHTS

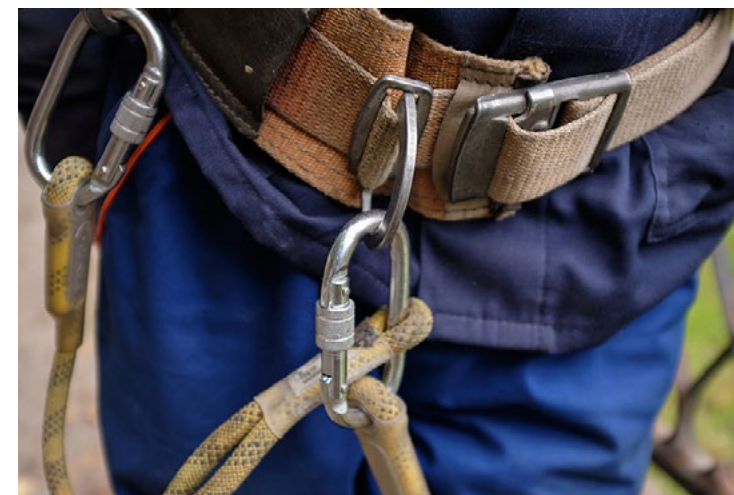
In other words, being diligent about construction safety at heights can help save lives, as well as protect the bottom line from catastrophic delays and losses. That's why the International Safety Equipment Association (ISEA) believes it's vital that every workplace has access to proper fall-protection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



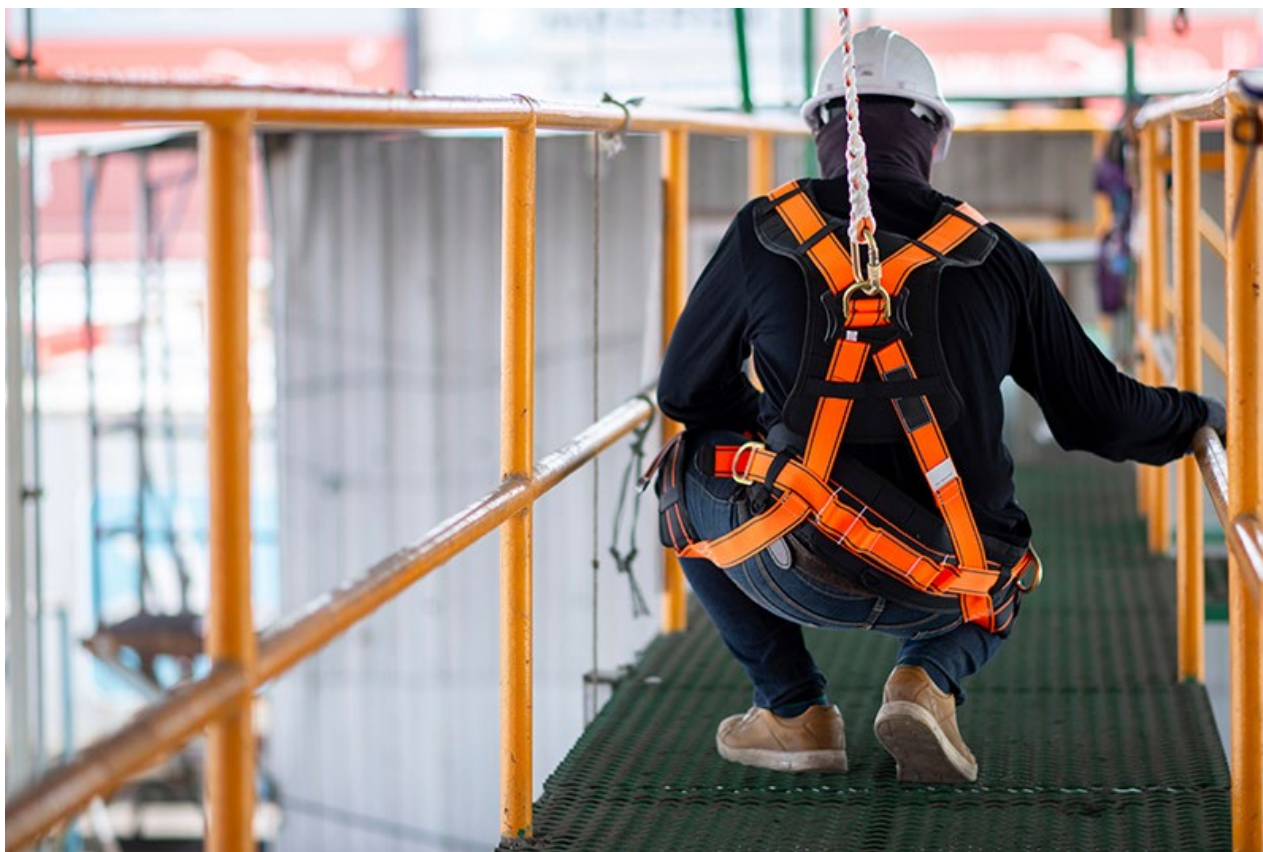
AWARENESS & TRAINING NEEDED

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, 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, OSHA'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." ■

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>).

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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. Below 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 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.

Foot-Candle Levels	Area of Operation*
5	General Construction Area Lighting
3	General Construction Areas, concrete placement, excavation 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 tunnel 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



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) into 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 – 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 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. ■

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.

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

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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 hazardous 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 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.
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

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	O Motor Vehicles, Mechanized Equipment, and Marine Operations
B General Interpretations	P Excavations
C General Safety and Health Provisions	Q Concrete and Masonry Construction
D Occupational Health and Environmental Controls	R Steel Erection
E Personal Protective and Life Saving Equipment	S Underground Construction, Caissons, Cofferdams, and Compressed Air
F Fire Protection and Prevention	T Demolition
G Signs, Signal, and Barricades	U Blasting and the Use of Explosives
H Materials Handling, Storage, Use, and Disposal	V Power Transmission and Distribution
I Tools—Hand and Power	W Rollover Protective Structures; Overhead Protection
J Welding and Cutting	X Ladders
K Electrical	Y Commercial Diving Operations
L Scaffolds	Z Toxic and Hazardous Substances
M Fall Protection	CC Cranes and Derricks in Construction
N Helicopters, Hoists, Elevators, and Conveyors	

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

FATAL FOUR - 2020



FALLS

805 Deaths



STRUCK BY

468 Deaths



ELECTROCUTION

126 Deaths



CAUGHT IN OR BETWEEN

142 Deaths

2020 data, from December 2021 BLS report.

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. ■

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.

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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 understanding 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

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.

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



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.

- Long duration work zones (e.g., 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



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.

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. ■

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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Safety Helmet: Better Protection More Comfort

Head protection is a safety staple on the jobsite and is used across many trades, and recently there has been a shift from standard hard hats that have been around for over 100 years to climbing style helmets that provide top and side protection. These climbing-style helmets, derived from those used in extreme sports such as rock climbing or even whitewater rafting, attach more closely on the head and have built-in chin straps.

Remote Medical International (RMI) states that slips and falls cause most head injuries within the construction and manufacturing industry. According to the Occupational Safety and Health Association, OSHA, in 2016, 38% of all fatalities in the workplace were caused by falls, making it the leading cause of fatalities in the workplace. The increase in safety helmet adoption on jobsites has led to design innovation in head protection to offer ANSI/ISEA Type 2, top and side protection, safety helmets that include padded suspension with an adjustable swinging ratchet for quick adjustment, and comfortably fitting adjustable buckle chin straps. This design innovation means crews do not need to trade-off safety for comfort.

Similar to other PPE, head protection per OSHA must comply with the minimum criteria established by the American National Standards Institute (ANSI) and the International Safety Equipment Association (ISEA). Some safety helmet manufacturers in the U.S. test certain clauses within the European (EN) Standard. Head protection classification is referred to by a "Type" and a "Class," and PPE manufacturers produce helmets in various configurations to meet the various hazards on construction sites.

The Type refers to the level of protection from impact.

- **ANSI Type I:** reduces the force of impact resulting from a blow only to the top of the head.
- **ANSI Type II:** reduces the force of impact resulting from a blow which may be received off center, from the side, or to the top of the head.

The Class refers to the different levels of protection from electricity.

- **Class G – General:** Unvented, Limited voltage testing up to 2,200 volts
- **Class E – Electrical:** Unvented, proof tested at 20,000 volts. Commonly used by electrical and utility trades.
- **Class C – Conductive:** Vented, No protection against electrical hazards. Lightweight and comfortable with vents for temperature reduction.

Disclaimer: The head protection (class E) is proof tested at 20,000 volts, but this number is not intended as an indication of the voltage at which the helmet protects the wearer.

EN 12492 is the European Standard for Mountaineering Helmets.

- **The most common clauses called out from this standard for safety helmets in the U.S. are:**
 - **Energy Absorption Capacity Clauses:** 4.2.1.2 (Front), 4.2.1.3 (Side), & 4.2.1.4 (Rear)
 - **Retention System Clauses:** 4.2.3 (Strength) & 4.2.4 (Effectiveness)

Milwaukee Tool is dedicated to keeping users safe by introducing Type 2 Safety Helmets to their PPE line up, delivering users better protection and more comfort. Each helmet is constructed with a comfortable padded suspension that includes an adjustable swinging ratchet for quick adjustment and better comfort. The climbing style helmet also has a comfortable fitting, adjustable buckle chin strap for security. The new helmet is designed with an anti-microbial sweatband and helmet liner that prevents odor and bacteria build up and can be removed to be machine washed. The safety helmets are ANSI type 2 and meets energy absorption capacity clauses 4.2.1.2 (front), 4.2.1.3 (side), and 4.3.1.4 (rear), and Retention System clauses 4.2.3 (Strength) and 4.2.4 (Effectiveness) of EN12492:2012. They are offered in 7 colors. These helmets are also available for Milwaukee® Customization, allowing users to add their company logo to their helmets. For more information on Milwaukee® Personal Protective Equipment or to view the entire line, please visit www.milwaukeetool.com/ppe. ■

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SAFETY HELMET

BETTER PROTECTION MORE COMFORT

ANSI/ISEA Z89.1

TYPE I, TYPE II

Meets Energy Absorption Capacity clauses 4.2.1.2 (Front), 4.2.1.3 (Side), & 4.2.1.4 (Rear), and Retention System clauses 4.2.3 (Strength) & 4.2.4 (Effectiveness) of EN12492:2012



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Comfortable fit

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& Helmet Liner
Prevents odor
causing bacteria

Moisture Wicking
Sweat Band &
Helmet Liner
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Extended wear

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PowerPusher's E-750 Electric Wheelbarrow™ is the Perfect Partner for Concrete, Demolition and Hauling Needs!

The **PowerPusher E-750 Electric Wheelbarrow's** "Slurry Tub" and "**Concrete Funnel Cap**" attachments meet the unique application needs of the concrete industry. The poly **Slurry Tub** with powder-coated steel rim holds a true ¼ yard of liquid concrete, or up to 12 cu ft. dry material minimizing material loss during transport. The **Concrete Funnel Cap** fits on the Slurry Tub and funnels the slurry into narrow spaces like post holes and other tight areas. This state-of-the-art equipment is durable and easy to clean.

You can quickly change-over to the **Galvanized Steel Tub** that is perfect for demolition or the **Poly Tub** that is great for material handling and hauling. All the tubs have a weight capacity of 1,000 pounds improving safety and efficiency by eliminating ergonomic challenges and production delays associated with manual wheelbarrows.



The **E-750 Electric Wheelbarrow** can move at speeds reaching 4 miles per hour, faster than standard wheelbarrows. Created to minimize stress and strain, the E-750 provides push-button powered-dump capability. Its silent motor with zero emissions is suitable for indoor or outdoor use fitting through standard doors.

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Nu-Star Inc., parent company of PowerPusher is a global manufacturer of engineered solutions for material handling needs, with facilities in the US and UK. The company operates out of Shakopee, Minnesota. Years of experience as a leading innovator, designer and manufacturer in the industry has given them the competitive edge in providing reliable and cost-effective load-moving solutions that deliver tangible productivity and safety benefits in a wide variety of applications.

Contact Dennis Wight at dwight@nustarinc.com or 630-561-2467 or www.powerpusher.com for more information. ■





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3 Steps for Controlling Hazardous Energy in Construction and Demolition

Of the many risks and hazards in construction and demolition work, hazardous energy is one that often gets overlooked. Hazardous energy sources in these environments can be wide and varied, including electrical conductors, power tools, pipelines, conveyor belts and rotating shafts.

Keeping these three points in mind can help you protect construction and demolition workers from exposure to hazardous energy.

1. PLAN AHEAD

In many cases, the hazardous energy sources on construction and demolition sites are not directly related to the work being performed. That's why preplanning is crucial to identify any hazardous energy sources present at the site before work begins so that they can be properly mitigated.

Hazardous energy sources that may be on or around the job site include overhead power lines or underground utilities that are near the construction work being performed. Concrete-encased electrical duct banks can be struck by construction excavation activities and may also be located within buildings scheduled for demolition.

2. ESTABLISH CONTROL PROCEDURES

Once you've identified the types of hazardous energy present, focus on implementing the proper energy isolation controls.

In addition to the hazardous energy sources that exist in and around the job site, contractors will use various energy sources, such as temporary power, throughout

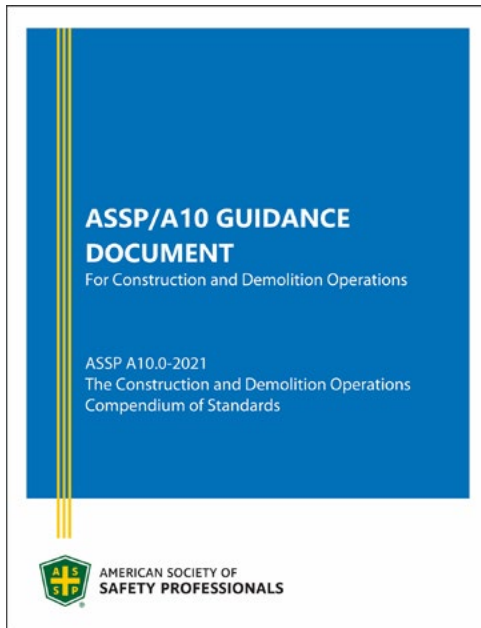
the project. In such cases, using ground fault circuit interrupters (GFCIs) will cut power in the event that the energized equipment connected to it has a short circuit.

While GFCIs are not allowed to be used for energy isolation, they can supplement recognized energy control

procedures, such as locking out circuit breakers and safely removing fuses.

Regardless of the source of hazardous energy, it's important to remember that the steps of energy isolation must proceed in a systematic and logical sequence. Furthermore, hazardous energy control should include





verification procedures to ensure that equipment has been deenergized and isolated.

3. EDUCATE YOUR WORKERS

After you've identified sources of hazardous energy and determined which control measures will be used, you must ensure your workforce understands the risks associated with those hazards and how they can safely perform their duties on a project.

For instance, workers who operate on hydraulic pressurized systems or pressurized hydraulic lines should know that if those systems are not properly deenergized, pressurized fluid may get injected into someone's skin. In the event of such an incident, workers must know to seek immediate medical attention because such an injury could lead to amputation of a limb.

Training can involve elements such as toolbox talks or other focused hands-on or

classroom training where hazards are communicated to workers along with detailed discussion of procedures and precautions. Furthermore, you must plan for adequate supervision to verify that the training was effective and that workers are applying the skills and knowledge they learned in the field.

It's important to remember that workers may encounter hazardous energy in situations beyond construction or demolition activities, such as during installation or adjusting activities, inspection operations, cleaning operations and servicing and maintenance. Therefore, all involved must be diligent about understanding the hazards present and ensuring that equipment is properly deenergized.

These steps can help construction and demolition companies plan properly and implement procedures to protect construction and demolition workers from hazardous energy sources.

The [ANSI/ASSP A10.44-2020](#) standard provides a framework for the sequential steps of hazardous energy isolation and can aid construction companies in developing their own energy control procedures.

Learn more about ANSI/ASSP A10 Construction and Demolition safety standards in the ASSP A10 Guidance Document. [Download now](#)

ASSP's Construction Safety Toolbox provides free resources and the expert support you need to reduce worker injuries and improve productivity. [Learn more](#) ■

NEW AND UPDATED A10 STANDARDS

Safety professionals can use the ANSI/ASSP A10 standards to help prevent worker injuries, illnesses and fatalities that harm workers and their families, carry high costs and damage a company's reputation. A10 standards apply directly to field operations to help all involved recognize and prevent hazards related to construction and demolition operations. The [ASSP A10.0-2021 Guide is a free download](#) that provides an overview of the individual standards. ASSP is Secretariat for the A10 standards writing committee. [Learn more about A10](#)

[ANSI/ASSP A10.33-2020 Safety and Health Program Requirements for Multi-Employer Projects](#) standard identifies key elements an organization should use to create and manage a safety program in a shared construction project. The standard assists project owners, construction supervisors, contractors and equipment manufacturers.

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. The [ANSI/ASSP A10.47-2021 Work Zone Safety for Highway Construction](#) standard establishes requirements for construction and maintenance of highways and roads to establish safe work practices and prevent injuries and fatalities, which includes developing a traffic control plan.

Construction projects happen in different environments, and you have to consider the people and property in those environments and how the work may impact them. The recently updated [ANSI/ASSP A10.34-2021 Protection of the Public on or Adjacent to Construction Sites](#) standard provides best practices for protecting the public on or adjacent to construction sites, and identifies different construction hazards that can endanger the people, property and environment surrounding the job site.

Moving materials to different areas of a work site safely often requires the use of a material hoist. [ANSI/ASSP A10.5-2020 Safety Requirement for Material Hoists](#) establishes minimum safety requirements for material hoists. The standard's scope applies to material hoists used to raise or lower materials during construction, alteration, maintenance or demolition. It is not applicable to the temporary use of permanently installed personnel elevators as material hoists.

The [ANSI/ASSP A10.38-2021, Basic Elements of an Employer's Program to Provide a Safe and Healthful Work Environment](#), assists employers by providing an outline of the minimum elements required to create a program for protecting employees in construction and demolition. ■

TO KEEP CONSTRUCTION WORKERS SAFE, **YOU NEED THE RIGHT TOOLS.**

Working at height is hazardous and a leading cause of injuries in the construction industry. Our resources can help you address this challenge by understanding how to properly design, implement and use fall protection systems.



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Z359 Fall Protection and Fall
Restraint Standards.

Access Fall Protection Resources at
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Fall Protection: Protect Your People

Every year since 2012, fall protection violations have earned the top spot on OSHA's Top 10 list of most cited violations. In 2017, there were 6,887 total violations cited by OSHA, highlighting the need for warehouse companies to improve their fall protection measures. Failure to make fall protection a top

priority can result in harsh penalties and fines for your construction company. Even more important, inadequate fall protection can put your business at a higher risk for employee injury and death.

The path to effective fall protection begins with a top-notch

safety training program. When properly organized, safety training will effectively engage employees and prime them for safe and productive employment. With OSHA citing falls as one of the most common causes of work injuries and deaths, it is paramount that employees receive in-depth training on fall protection strategies. Employees should have a strong working knowledge of the most common causes of falls and the specific measures they can take to avoid high-risk situations.

Establishing a culture of safety starts with the active participation of senior management and stakeholders. Senior managers must then secure the buy-in of supervisors, who must secure a commitment to safety from front-line employees.

Once you have established a culture of safety and identified the high-risk areas in your construction site, it is time to focus on your fall protection equipment. By investing in robust, dependable fall protection systems, you can reduce the risk of injury on site.

Not all manufacturers are created equal, so it is important

to carefully evaluate equipment providers to ensure that the systems you purchase are both reliable and cost-effective. Fortunately, Gorbel offers a host of ergonomic fall protection systems that are ideal for use on construction sites. Here are a few of the products that can help you optimize fall protection:

- **Overhead fall arrest system:** Gorbel's Tether Track™ Rigid Rail Fall Arrest System offers workers mobility and flexibility while helping to prevent them from falling to lower levels. Most systems are made to accommodate multiple workers who weigh up to 310 pounds with their tools.
- **Free standing systems:** Gorbel's free standing monorail fall protection systems are ideal for facilities with workers who maintain, inspect, and unload flatbed trucks and tankers. You can choose from heights up to 26 feet to provide adequate protection for workers.
- **Mobile or portable fall protection systems:** Mobile or portable systems are ideal for busy warehouse

environments where workers are highly mobile. A Mobile Fall Arrest System is an active means of protecting workers from injury due to falls. A complete personal fall arrest system includes an anchor, a body harness and a connector- such as a shock-absorbing fall arrest lanyard or self-retracting lanyard (SRL). Gorbel's Ranger Mobile Fall Protection anchor is Fall Protection on-the-go. Gorbel offers 5 day quick shipping on most of their mobile systems.

There are many ways for construction sites to safeguard against falls. However, the single best way to protect against falls is to contact an [expert in the fall protection industry](#). With over 40 years of experience protecting the lives of employees, Gorbel has established itself as an international leader in the fall protection arena. The fall protection specialists with Gorbel are eager to assist you in your mission to protect your employees and look forward to assisting you. ■



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Occupational Health Professionals Call on Construction Contractors to Put Health in “Safety and Health”



HEALTHIER WORKPLACES | A HEALTHIER WORLD

In a national survey¹, more than 50 percent of construction workers report exposure to vapors, gas, dust or fumes at work twice a week or more – twice the average of all US workers. To reduce health risks, AIHA, an association for occupational health and safety science professionals, has free resources to educate construction industry leaders

about the health risks associated with construction work. Occupational health professionals (industrial hygienists) work alongside construction safety experts to reduce health risks to workers and organizations, ultimately increasing productivity and improving a company's bottom line.

Construction contractors who want to protect the health of their workers, who are seeking resources, or want to hire an occupational health professional can find help at: www.workerhealthsafety.org/construction. A free resource on the website, the guidance document, *Focus Four for Health, an Initiative to Address Four Major Construction Health Hazards* gives straightforward, practical ways for construction employers to identify and control these hazards. The document was developed by the AIHA Construction Committee to raise awareness about health hazards in the construction industry.

Construction-related health hazards include noise, heat, air contaminants, and manual material handling.

- Noise induced hearing loss is the most common work-related illness in the US. While it does not lead to death, it causes problems communicating, which can contribute to increased risk of accidents and injuries. It also causes permanent damage to the quality of life.
- Heat can kill. People doing heavy labor in the summer often do not notice that they are suffering heat stroke or exhaustion until they collapse.

- Breathing in air contaminants such as dusts, fumes, and vapors can cause long-term damage to the lungs, nervous system, and other organs. Those clouds of dust you see when driving by someone cutting concrete are exposing the worker to the risk of lung cancer and severe scarring of the lungs (silicosis).
- The physically demanding work of many construction tasks push workers beyond their bodies' natural capacity, damaging soft tissues, muscles, and tendons. Over time, that can lead to chronic pain and lifelong problems, including limiting the ability to work.

Occupational health professionals evaluate exposures to help determine if there should be concern about exposures to health risks, including noise and air contaminants such as welding fumes or solvent vapor as well as assess exposure to harmful chemical, biological, physical, and ergonomic hazards, advise on training and the use of personal protective equipment, and provide practical recommendations to reduce exposure to construction health risks. ■



Photo courtesy of Earl Dotter

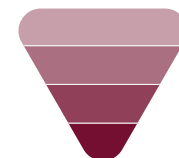
¹ 2010 National Health Interview Survey Occupational Health Supplement Construction Sector conducted by the CDC.

Protecting the health
of construction
workers is even more
of a challenge than
protecting them
from injury.



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**Focus Four for Health:
An Initiative to Address Four
Major Construction Health
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Help reduce risk to workers and
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workerhealthsafety.org/construction

Milwaukee Tool™: Reducing Noise and Emissions on Jobsites Everywhere



Milwaukee revolutionizes the light equipment market by delivering the performance, run-time, and durability demanded by the trades, while operating on one completely compatible battery platform. The groundbreaking battery-powered technology of the MX FUEL™ Equipment System goes beyond the limitations of gas or corded solutions, and eliminates the hazards associated with emissions, noise, vibration, or equipment maintenance.

Users often work in confined spaces, such as tunnels, crawlspaces, and basements, where exposure to Carbon Monoxide (CO) emissions is not only common, but a serious hazard. Referred

to as the silent killer, this is a deadly gas which cannot be seen, tasted, or smelled. Gas-powered equipment increases the risk of CO exposure, which can cause users to experience headaches, dizziness, and sometimes death.

Fortunately, through innovation and advancements in technology, battery-powered equipment has eliminated the CO hazard. The Milwaukee MX FUEL™ CARRY-ON™ 3600W/1800W Power Supply offers efficient 15A power while eliminating the common frustrations with generators. Delivering 3600 starting watts, 1800 running watts of pure sine wave technology, users are able to use this power supply indoors and outdoors without concerns of Carbon Monoxide (CO). Crews are more productive and save time and money throughout the job by not having to stop and prep ventilation prior to starting work.

Eliminating gas engines means reduced vibration and less wear on workers' bodies. Battery power brings quieter operation, sparing workers'



hearing, allowing crews to work during the day without disturbing clients and communicating better between crew members.

Delivering instant starts with zero emissions and requiring less maintenance, the MX FUEL™ 14" Cut-Off Saw gives users the same power and cut speed as a 2-cycle gas saw, while delivering up to 50% less noise and reduced vibration. The push-button start eliminates the repetitive motions of a pull start and gives users the ability to cut materials faster

from start to finish, reducing downtime and allowing jobs to get done faster.

Milwaukee is committed to providing the best user experience through their advanced safety solutions. The MX FUEL™ battery-powered light equipment system delivers the performance, run-time, and durability demanded by the trades without the hazards associated with emissions, noise, vibration, and the frustrations of gas maintenance. To learn more, visit <https://www.milwaukee-tool.com/Innovations/MX-FUEL> ■



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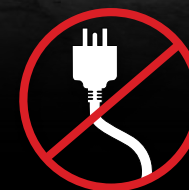
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