

WORKPLACE

Material Handling & Safety

Keeping Your Workers Safe in Construction

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Safety Best Practices: A Brief

INTRODUCTION:

Most companies consider safety on construction sites to be crucially important. It is good practice to protect your workers, thereby protecting your business and reputation. Safety practices are a key point to being successful in the construction industry, yet many of the best safety practices featured in the Contractor Use of Safety Best Practices SmartMarket Brief published by Dodge Data & Analytics in partnership with CPWR-The Center for Construction Research and Training are not currently used as standard practices by most firms. Additionally, various resources for information on said practices are underutilized, particularly when one considers the high level of value ascribed to them by the industry.

Clearly, more must be done to make contractors aware of the best safety practices, especially for smaller establishments. Leadership skills by supervisors and foremen can successfully inform onsite teams to help improve safety. (See article page 30 “Safety Leadership Best Practices”) In this article, *Workplace Material Handling and Safety* will be taking a closer look at the findings in this brief and outline the key information and major takeaways discovered in this research.

ABOUT THE STUDY:

So, what’s in this brief? Two online surveys conducted with the Dodge Contractor Panel were used to collect data for this study. The first survey was done in May of 2018. The topic was: “Lean construction and the impact of leadership skills on project safety.” The second survey, conducted in September, contained “Questions on materials handling, health and safety practices on-site and preferred communication methods.”

KEY FINDINGS:

Injury

Several of the key findings involved reducing injury rates related to lifting and falls. Reducing injuries on the job improves worker health and the company’s reputation and decreases impacts on project schedules. Three activities common on construction sites that make workers susceptible are:

- working at a height;
- moving heavy materials and;
- having to use tools in awkward positions.

The data took a close look at equipment used to protect against injury on worksites, and the four that were defined and featured in the study help address injury issues. They were:

1. Personal fall arrest systems
2. Lifting equipment for moving materials
3. Drill rigs for overhead drilling
4. Drill rigs for lateral drilling

“While use of personal fall arrest systems and lifting equipment for moving materials are relatively common, especially among large companies, there is still room for wider adoption among the 36 % of companies



that do not always use personal fall arrest systems and the 58 % that do not always use lifting equipment.” (See article page 23 “Raising Awareness of Best Practices to Prevent Falls in Construction.”)

However, drill rigs for overhead or lateral drilling are not commonly used amongst small firms. Only 7 % and 6 %, respectively, of the small firms that responded used them more than half of the time; less than one third of midsize firms used them half of the time.

Clearly, there is a difference in how small firms practice safety compared to bigger companies, but what about the practices/policies/fall protection gear used to help prevent injuries? What does the data look like? According to the study, safety practices that avoid injuries include rules and policies set by corporations about lifting. Additional safeguards, such as built-in anchors on existing structures for fall protection gear, can also be significant for fall injury deterrence. Built-in anchors on existing structures for fall protection gear are also significant for injury deterrence.

Again, the numbers point to large companies using practices and policies that help protect from injury more frequently. The data shows that setting weight

limits for lifting materials is only a shared practice among large companies. These companies also regularly use built-in anchors on existing structures compared to midsize/small businesses.

And, unfortunately, storing materials off the ground between knee and waist height to help with lifting is not normally practiced with any of the companies surveyed. The practice requires more preliminary setup and effort than the previous practices, which may be why it is less habitually accepted.

Noise

According to OSHA's website, "22 million workers are exposed to potentially damaging noise at work each year. Last year, U.S. business paid more than \$1.5 million in penalties for not protecting workers from noise."

This can be a serious risk to employees' health and well-being. Purchasing quieter equipment; doing some advanced planning to reduce noise exposure; and investing in hearing protection has been proven to help address and resolve these issues before the work onsite even begins.

The majority of contractors surveyed in this case (83%) invested in quieter equipment. "However, it is not a standard practice in the industry, because well over half of those report that their company could do this practice better. The same percentage (38%) of respondents from small and large companies report that their companies do a good job purchasing quieter equipment. It is midsize companies (29%) that lag for this activity."

It's also important to note that most contractors claimed to do some advanced planning to reduce noise exposure, but over half also believed that their company could be doing more.

Lastly, use of hearing protection onsite is widespread, but 85% of contractors claim that they use it more than 50% of the time. 43% of contractors say that they always use it. The findings advocate that substantial improvement is needed in the industry.

Online Tools and Mentorship

In the digital age, we are flooded with free resources to help with training, promotion and just general information that can be helpful to a variety of different industries. In this case, online material can help promote the top practices involving noise mitigation, avoiding musculoskeletal injuries and encouraging safer materials handling. Sadly, few contractors ever take advantage of these resources that are, literally, right at their fingertips.

According to this study, "large companies are far more likely to mentor subcontractors, with over half reporting that this is a widely used approach at their company. However, it is notable that even 29% of small companies will mentor subcontractors frequently, and another 57% mentor them on occasion, suggesting that many contractors realize that everyone needs to share the same knowledge and vision of safety to ensure a safe jobsite. However, the lower percentages among midsize and small companies also suggest that this is a practice that still can be more widely used in the construction industry."

Then businesses who said they mentored their subcontractors were asked to report their actions towards mentorship. Firms in every size category were likely to provide toolbox training resources, and previous studies from Dodge and CPWR agree that this is a popular way to convey information on jobsites.

Additionally, the study noted that small and midsize firms were more likely to offer actual safety equipment, "but midsize and large firms more frequently provide materials related to site-specific safety and

health hazards, and assistance on injury/illness-reporting procedures."

SUMMARY AND CONCLUSIONS:

The question is: What is the major takeaway from such a comprehensive study? It is clear that, though safety practices are definitely a concern in the industry, more can be done to help implement policies, practices and equipment correctly and with more frequency. The study clearly states that it "reveals important opportunities for greater implementation, especially among smaller contractors, as well as a need for more general awareness about their applicability and education about their benefits." Hopefully, this information will be a wake-up call to firms of all sizes and shapes to re-evaluate how they protect their workers' safety and well-being, as well as how they educate their staff and contractors to hazards that may occur onsite. **WMHS**

Data and material in this article originally appeared in a study released by Dodge Data & Analytics and CPWR, which was launched at the World of Concrete Conference this past year.



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Employee Safety: Stand Up (by Standing Down)

By: **Jessica Glass**, Assistant Editor

According to OSHA, falls from elevation continue to be a leading cause of death for construction employees, accounting for 366 of the 971 construction fatalities recorded in 2017. Yearly in the U.S., over 800 construction workers die, and approximately 137,000 are critically injured on the job.

Construction workers obviously participate in activities that will expose them to serious risks, such as falling from rooftops, unguarded machinery, being struck by heavy construction equipment, electrocutions, silica dust and asbestos. Workers who are 6ft or more above lower levels are at risk for serious injury or death, if they fall from a building. To protect these workers, employers must provide fall protection and the right equipment for the job; this includes the right types of ladders, scaffolds and safety gear.

The sad thing is those deaths were all preventable. That is why the sixth annual National Safety Stand-Down week is being held to prevent falls in construction on May 6-10, 2019. The purpose of the Stand-Down is to raise fall hazard awareness across the country, in an effort to stop fall fatalities and injuries in the construction industry.

This week focuses on employers talking directly to employees about safety. Workplaces participating in the Stand-Down week will take the time to address to fall hazards in the workplace and reinforce the importance of fall prevention.

Managers and employers may be wondering who can participate in the events going on during this special week. The good news: Anyone who wants to prevent hazards in the workplace can participate in the Stand-Down. Even businesses not exposed to fall hazards can use this opportunity to have a discussion with staff about other job dangers they face; protective methods; or a company's safety strategies and goals. It can also be an opportunity for employees to notify management about any new job hazards they might see in their daily routine.

In the past, participants in the Stand-Down comprised commercial construction companies of all sizes, residential construction contractors, sub- and independent contractors, highway construction companies, general industry employers, the U.S. Military, other government participants, unions, employer's trade associations, institutes, employee interest organizations and safety equipment manufacturers. All sorts of organizations can conduct a Safety Stand-Down by taking the time to host a toolbox talk or another safety activity, such as leading safety equipment inspections; creating rescue plans; or conversing about job specific hazards.

After the safety activity, employers can give feedback about their Stand-Down and download a certificate of participation following the Stand-Down event. Managers are encouraged to design

Stand-Down events that work best in their workplace environment. They can also check out the OSHA events page for happenings that are free and open to the public. This is a great resource to help employees find events to attend within the area.

Every worker should be trained and made aware of proper safety. It is an employer's responsibility to educate workers in identifying hazards on the job. OSHA encourages everyone who partakes in Stand-Down week events to share their story on social media with the hashtag: #StandDown4Safety. Individuals who plan to host a free, public event can visit OSHA's events page to submit the occasion's details and contact a Regional Stand-Down Coordinator.

For more information, visit: <https://bit.ly/1JHkVBf>. Find training materials, publications, events and safety videos to help come up with ideas and topics to help host your own Stand-Down week in your workplace. **WMHS**

See p. 23 for more information on the 2019 Stand-Down



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Construct a Plan during Safety Week 2019

By: **Jessica Glass**, Assistant Editor

According to OSHA, “Construction is a high hazard industry that comprises a wide range of activities involving construction, alteration and/or repair.” Clearly, there will always be risks and dangers that will threaten your employees’ safety in the workplace, but many organizations take initiative and plan events; use educational training and tools; and lead discussions talking about safety concerns in the industry. Be part of the discussion by partaking in National Safety Week 2019, starting May 6-10.

The Construction Industry Safety Initiative (CISI) contains 12 chief contractors who come together every alternate year for a two-day meeting to discuss safety concerns. Their official mission statement is: “We will strengthen our industry’s safety culture and performance by sharing best practices, tools and resources. We are focused on the impact our safe choices have on our team members, their families, and the communities in which we live and work. We are united in our commitment to continuously improve our safety culture and send each employee home safe every day.”

There are many benefits for companies who seek to participate in this event. Businesses will be granted use of a limited suite of materials to share with their employees, subcontractors and partners. Companies will also be highlighted as expert sources for trade and consumer media interviews about construction industry safety, and awarded speaking opportunities at signature Safety Week kickoff events/other industry conferences throughout the year. Lastly, a company logo will be listed on the official website and social media posts, along with any other PR opportunities.

Anyone in the industry can get involved and contribute to the conversation during this special week. The Safety Week official website provides visitors with

lots of online toolkits, playbooks, news release templates, PowerPoint templates, event planning topics and ideas to you get your team more involved with safety on the job site. The website additionally suggests planned work events you can host in the office or on job sites. The events include:

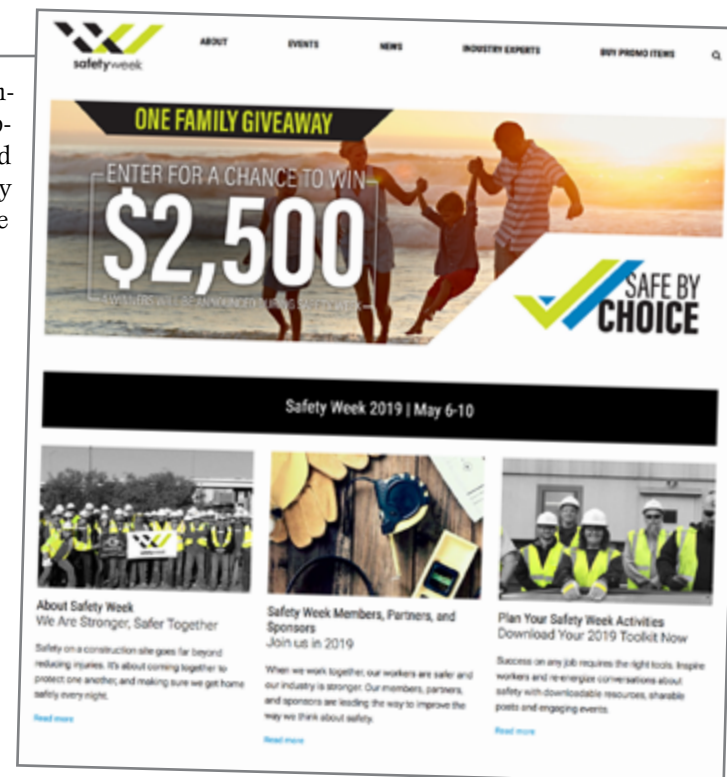
JOB SITE

- Kick-off / mass safety meetings
- Kick-off / mass safety meetings with client and local stakeholder representation
- Toolbox talks
- Project tours with company leadership
- Safety demonstrations
- Appreciation barbecues and lunches
- Sample week-long agenda

OFFICE SETTING

- Warm up to safety / stretch & flex
- Management talks
- Site-specific safety training
- Project or first responder visits
- Sample week-long agenda

Website users can also access industry experts’ tips and tricks for incorporating safety into the work place. Hear from industry leaders and use their experience in dealing with safety concerns in the workforce. Find



out how to motivate employees and increase awareness on a daily basis. Access up-to-date coverage of safety week events by visiting the news section on the website as well. **WMHS**

Celebrate your commitment to working safe by choice. Download education materials and start planning your events here: <http://www.construction-safetyweek.com/events/plan-your-safety-week-activities/>

Improving a Construction Site, One Safety Measure at a Time

By: **Dr. Kevan Orvitz**, *Founder & President of MEGAComfort*

They say, “time is money,” and this can be taken quite literally in the construction industry. The constant pressure that crews and project managers face to meet deadlines, all while staying in budget, often causes safety to fall to the wayside once boots hit the ground. As it is such a dangerous profession, employers need to concentrate on mitigating hazards for their construction workers. Workers also need to keep in mind that they are responsible for taking precautions when working under hazardous conditions, as well.

Construction industry leaders must strive to guard their employees—not just to protect their budgets, but for the moral obligation they have to keep employees’ safe. Here are ways and tools businesses can implement to reduce workplace accidents and promote construction site safety.

LEAD BY EXAMPLE

OSHA’s Safety and Health Regulations for Construction: OSHA 29 CFR 1926 serves as a baseline for safety requirements. Construction managers must reinforce these regulations and go above and beyond, by continuously leading by example and making protection a priority, even before breaking ground.

By setting clear expectations from the very beginning, managers can set the tone to ensure workers understand their own personal responsibility for their safety, as well as the safety of those around them. As a manager, it’s important to “walk the walk” when it comes to workplace health and wellness. This helps everyone work together towards the common goal of completing a job, injury-free.

Pro tip: An informal safety talk at the start of each work day can make managers’ jobs easier by improving

workers’ understanding of expectations; preventing wasted time on inconsistencies; and minimizing the chances for errors. Kicking off each morning with these discussions helps spark valuable dialogue on general safety and information about tools, equipment, materials and processes. Doing so allows for a better understanding on protection, on all levels.

TRAIN FOR PROTECTION

Many of the common construction hazards seen today can be identified and avoided if proper training has been provided by management. Aside from the obvious need of keeping workers safe, a secure workplace will reduce overall construction costs. For example, proper training courses that happen annually, or even quarterly, can help reduce insured losses, administrative penalties, fines and litigation, as well as costly attorney fees.

Regardless of delays or looming deadlines, safety training should never be viewed as a disposable or secondary task. It is critical that every employee, even seasoned veterans, attend safety meetings and trainings on a regular basis. Regular meetings that keep proper protocol on employees’ minds can be beneficial. Managers and supervisors need to invest the time in providing relevant, useful instruction and guidance. By making safety a priority, contractors can significantly reduce worksite injuries and deaths.



PERSONAL PROTECTION EQUIPMENT

Although Personal Protection Equipment (PPE) is valuable, there are a few tips and tricks on finding the right type of PPE, based on their features. Here are a few key items to look for when choosing PPE:

- **Safety toe overshoes:** when working on a construction site, having protective footwear is imperative, as there are greater risks involved than stubbing one’s toes.
 - Ensure employees are comfortable wearing safety toe overshoes by selecting ones with composite toe caps, which are 25 % lighter than steel.
 - Composite toe overshoes are great options for temporary protection where there is risk of toe damage or where toe protection is required. Composite toe overshoes protect workers from stepping on something sharp and reduce the risk of damage due to crushing or falling objects.

- Offer composite toe overshoes to all managers, inspectors and plant visitors to ensure everyone who visits the construction site is protected from falling or sharp objects on the ground.
- **Insoles:** Anti-fatigue insoles represent a unique and cost-effective way for workers to ensure their feet have enough support and comfort to get them through the day.
 - Spending long hours standing, moving heavy equipment and doing repetitive movement all day can be extremely taxing physically.
 - Anti-fatigue Insoles made from 100 % dual-layer memory foam have been shown to reduce pain and fatigue, which may boost energy and productivity.
 - Dual-layer memory foam insoles have direct contact with the body and may help reduce muscle strain, improve balance reactions and increase blood circulation.
 - Anti-fatigue insoles with unique qualities, such as puncture resistance, can further ensure worker safety, protecting from nails and other sharp objects while still promoting comfort and support.
- **Hardhats:** when choosing the right hardhats to get the job done, there are a few things to keep top of mind:
 - Comfortable fit: The more comfortable, the more likely it will stay on a worker's head. Consider looking for hats that have ample webbing built into the suspension and some sort of padding to offer maximum support.
 - Made from lighter, newer materials: composite materials, and even Acrylonitrile Butadiene

Styrene (ABS) plastics, are durable enough to exceed impact requirements, yet they offer the added benefit of being lightweight.

- Adjustable and personalized fit: the number one factor to user acceptance is comfort. The less it fits, the more time it will spend off one's head and in the locker or on the workbench. The hardhat you decide on should always allow for personalization—adjusting the size and position for optimum comfort and performance.
- Accessory ready: Many hardhats include accessory slots that can be used for those needed accessories. Selecting hardhats that are accessory-ready is crucial as many users are required to include face or hearing protection while on the job.
- **Eyewear:** Just like hardhats, eyewear comes in many types; here are a few key indicators to look for when choosing eyewear protection:
 - Fog-resistant glasses: perfect for workers that require protective eyewear on the job. Fogging occurs often due to changing temperatures, humidity and lack of air flow caused by tight-fitting eyewear. Even in cold weather, the temperature difference between a worker's sweating body and the frigid outdoor air can produce condensation and eventually cause fogging—impeding their sight and impacting their well-being.
 - Comfort: just like hardhats, if eyewear isn't comfortable, it won't be used—the role of comfort in eye protection cannot be underestimated. Comfort-enhancing features include cushioned brows, comfortable gel nosepieces or padded nose bridges, vented frames, flexible or ratcheted temples, and lenses with adjustable angles.

ORGANIZED JOBSITE

Many people don't realize that unorganized jobsites are costly. Not only should a jobsite be clean and organized; it should be efficient as well. Sometimes, it's as simple as stacking material on one side of the workspace to another, which can make a difference. A few things to look for when planning out the jobsite:

- **Access:** are all areas easily accessible; can things be moved around to help the flow of work?
- **Do areas look ready:** is it acceptable for workers; are there uneven areas in the ground that need to be addressed?
- **Material staging:** is the material in the best, most efficient spot for the workers to access?
- **Equipment:** do we have all the necessary equipment; are we missing anything; are there items that need to be replaced?
- **Workers:** are there too many people or not enough people in one working area at a time?

While organization may be broad, anything from on-site logistics to the paperwork plays a huge role in how employees operate. It only takes a few minutes of preparation to ensure each jobsite is secure for employees to get the job done.

Thoughtfully implementing each of these strategies will help prevent downtime, chances of injury and improve overall safety—from head to toe—on a construction site. It's the responsibility of the company to lead by example and ensure employees are given the proper training, equipment and oversight to remain efficient and injury-free on the job. **WMHS**

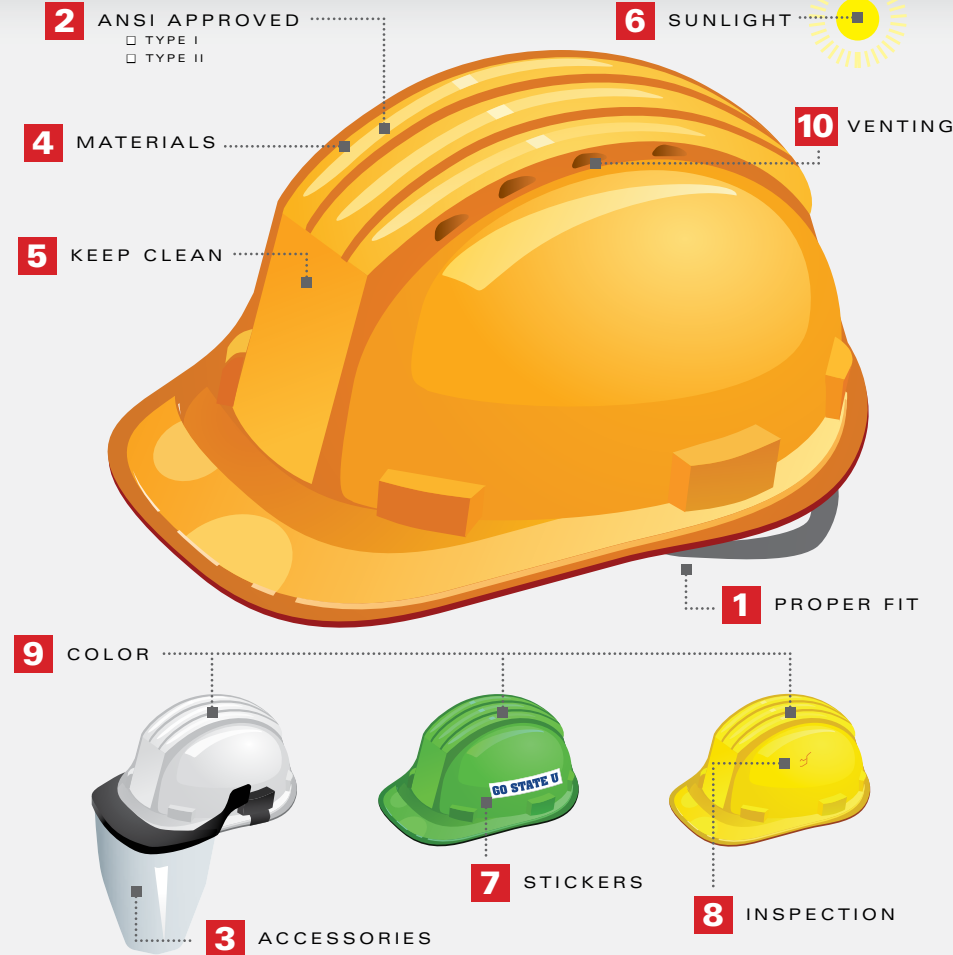
10 Things to Consider: Selecting the Right Hard Hat

1 If the hard hat is comfortable for the worker, it is more likely to remain on the workers head. The seasoned worker who has been on the worksite longer is accustomed to wearing a hard hat for long durations without issue. It is very important to address the **proper hard hat fit** for those new trainees who are statistically a higher onsite safety liability, and potentially unaccustomed to PPE/head protection. This is a key reason fit is probably the most critical factor outside of selecting the appropriate ANSI Class/Type for the work application.

2 Select a hard hat that is **ANSI approved**. All hard hats shells must be ANSI Z89.1-2014 approved. You may need more protection if you work in an industrial setting requiring a Type I or Type II classification. Type I is certified tested for top of head impact, Type II is certified tested for lateral impact. In addition, there are several class ratings including "G" for general, "E" for electrical and "C" for conductive.

3 There are many types of hard hats and each hat has unique features that make it **accessory ready**. Do you need face protection? Do you need hearing protection? Are you working on a raised platform? Do you lean forward/bent to fasten? You get the idea. Many hard hats include accessory slots designed to accept those needed accessories.

4 Hard hat **materials** are changing. Newer, lighter materials – composite materials and ABS plastics are strong enough to meet ANSI requirements and have the added benefit of being lightweight and comfortable but the suspension underneath the helmet is just as important. The suspension is known as the headgear and it is the real hero absorbing the energy of the potential impact when an object strikes the outer shell. In addition, the suspensions



can have a pin lock, slip or wheel type adjustments to fit around the circumference of the head, and some headgear are height adjustable – influencing shell height on the top of the head.

5 Keeping the hard hat **clean** is very important in some work conditions. If you work around paints, paint thinners or solvents the shell may weaken over time reducing ability to provide optimal or "designed for" head protection safety. These same materials can reduce electrical resistance.

6 Do you work outside in the **sun**? Where do you store your hat after work? Direct sunlight exposure over time or extreme heat can damage the components of a hard hat. If you consider the heat of your vehicle can reach 130+ degrees in some locations, paying close attention to storage can prolong a hard hats shelf life.

7 Have you ever applied **stickers**, or drill holes in your hard hat? Visit any worksite and you'll likely find all types of personalization

and customization going on. Some workplaces have strict restrictions/policy against this because modification of any type can damage a hard hat protective capability. It is difficult to inspect a hard hat for defects with stickers.

8 Speaking of **inspection** take time to look it over before each use. If you neglect a simple inspection you can miss cracks or indentions. Hard hats with cracks, perforations or other deformities should be removed from service and replaced immediately.

9 What does **color** indicate? Color designations vary from company to company and work site to work site. In large scale projects that involve several separate companies, employees of the same company may have a common colored hard hat. White is a color often reserved for site managers, engineers, architects, foremen or supervisors. Green is a color commonly used by safety inspectors, or new workers. Machinery operators often use hi-vis colors like yellow or orange to help others monitor machinery position.

10 **Vented** or not vented? Overheating in the sun is extremely dangerous and common. A vented hard hat is one with small openings on the crown of the hat that encourage air flow. The vents improve the air flow which helps reduce the heat inside the hard hat. At the same time, consider a situation where you may encounter chemicals or chemical spray/deflection. Ventilated hard hats will allow chemicals to penetrate past the shell onto the workers head and face whereas a non-vented hard hat provide more protection in those situations.

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Fabric Structures:

Engineered Solution for Any Construction Site

By: **Nicole Pulyado**, Contributing Editor

Construction sites can be full of potential dangers and uncertainty, especially when taking into consideration weather conditions, site location and the equipment being used. That is why it's imperative that construction companies and the equipment they use are always kept safe and secure.

Job site injuries can occur, if better safety options haven't been considered. Since these sites are a temporary place of work, equipment can be left in a disorganized manner or stacked up to save space. These can be serious tripping or falling hazards for workers.

Equipment can also be ruined or damaged if not secured during less-than-ideal weather conditions. Integrating a fabric structure into a company's plans can solve these issues.



Fabric structures have the room, strength, capacity and safety that's required for any major jobsite. (Photo provided by Clearspan Fabric Structures)

In fact, fabric structures are the perfect, engineered building solution for just about any construction company, because they promote safety and security; can be customized to meet any company's most specific needs; and, when utilized correctly, can actually increase profitability.

SAFETY AND SECURITY

The safety of workers is paramount when considering how hazardous job sites can be. Although it may seem like these structures are not as sturdy or permanent as steel buildings, this couldn't be farther from the truth. Fabric structures are meant to be long-lasting and especially advantageous for any long-term projects spanning different seasons. Many companies offer structures that are strong enough to be permanent, but can easily move as projects dictate. This allows them to benefit from both the safety and security of a permanent structure and the benefits of a temporary, mobile structure.

Fabric structures have the room, strength, capacity and safety that's required for any major jobsite, especially if they need to adhere to any regional building and safety codes. These structures can be engineered to follow any municipal codes, snow loads and wind requirements. This ensures a dependable workspace that provides workers the utmost structural safety.

Besides the ability to engineer these structures, they are also often designed to deter wear and tear. Take the fabric cover for example; any reputable company will offer a rip-stop, weaved cover that eliminates



deterioration and provides a 20-30 year warranty on the cover.

For the frame, companies should look for galvanized steel. This will allow the structure to withstand corrosive environments. Users should also look for a warranty of 50 years. Following these guidelines will allow companies to feel secure in their investment.

Back to safety; many fabric structures feature flame-retardant covers that should be an industry standard but aren't offered by some companies. These are especially convenient when it comes to jobs on construction sites that use flames, other extreme heat sources or maybe just have a number of workers that regularly smoke. Welding or using flammable tools in a fabric structure doesn't have to be a safety concern at all, since the flame-retardant material cannot catch fire.

CUSTOMIZED STRUCTURES

Fabric structures can be customized for any kind of construction site. From sizing to special tools and accessories, like conveyor systems, companies can meet their precise needs with a fabric structure.

One aspect of fabric structures that appeals to construction companies is the number of available foundations. Such options let companies customize the structure to their unique needs; perhaps the most widely used foundation for construction companies is the helical anchor foundation. Helical anchors drill directly into the ground and create a secure foundation

that can be used permanently. To utilize helical anchors, very little sitework is required, so they are the most versatile foundation option and can be used just about anywhere.

The best part of helical anchors is that they create a structure that is strong and dependable enough to be permanent but, since they can easily be removed from the ground, the structure can be quickly moved as projects dictate. This allows companies to benefit from the safety and security of a permanent structure and the mobility of a temporary structure. Thus, fabric buildings make a great option for companies with long-term projects.

A number of companies also opt to customize their structures by building on container foundations. Often, construction sites can be hectic and disorganized, with equipment being left around, making it vulnerable to potential theft. Container foundations are a practical choice for construction sites, because expensive equipment can be locked away safely at the end of the day, mitigating the occurrence of stolen equipment.



Container foundations are a practical choice for construction sites, because expensive equipment can be locked away safely at the end of the day. (Photo provided by Clearspan Fabric Structures)

Construction companies might choose container foundations, because they add extra clearance within the structure at little extra cost. Instead of being mounted to the ground, the structure is mounted to the top of the container. This allows larger machinery and vehicles to be stored or operated within the structure's threshold.

Of course, foundations are just the beginning of customizing a fabric structure for construction sites. Fabric structures can also be customized to include required entryways, HVAC systems, insulation, artificial lighting, fans and much more.

MAXIMIZING PROFITS

Creating a more profitable company is always the end goal. Fabric structures allow construction companies to lower costs and increase efficiency simultaneously, leading to a more profitable company.

Let's start with how they can lower costs. First and foremost, many fabric structures don't require artificial lighting during the daytime hours. The fabric cover lets natural light filter through, creating a well-lit environment in which it's easy to work. By eliminating the need for artificial lighting, companies can save significantly on their electrical costs. Most companies will also be able to save time and money by not having to spend the man-hours wiring the building for lighting.

Garrison and Lauren Engineers & Constructors, Inc. have been using a ClearSpan Fabric Structure for their business for nearly 10 years. Facilities Coordinator Glenn Garrison said, "The natural lighting is perfect, even on cloudy days."

Garrison also went on to explain another benefit. "The inside temperature in the summer is a minimum of 10 degrees cooler, which is good



Fabric structures are meant to be long-lasting and especially advantageous for any long-term projects spanning different seasons. (Photo provided by Clearspan Fabric Structures)

when you have the 100-degree summer days we experience here," he said.

Some fabric structures have climate-sensitive covers. These covers create a superior working and storage environment, because they actually make the building's interior cooler in the summer and warmer in the winter. This, combined with the natural ventilation that fabric structures provide, allows companies to reduce the money spent on HVAC costs.

Fabric structures are also a great way to improve efficiency on any jobsite. Choosing a structure that doesn't rely on internal support posts allows for the interior to be laid out in a way that most benefits the jobsite. This enables managers to create an efficient workflow, where more gets done in a shorter time.

Fabric structures really are the perfect engineered solution for construction companies. No matter how they are utilized, they can inevitably solve some of the jobsite's most common problems. Since fabric buildings can improve safety, be customized to meet any construction need and help companies increase their profitability, business owners and managers should strongly consider integrating one into their business plans. **WMHS**

Anchors: Fall Protection vs. Material Handling

By: **Stuart Moore**, Pure Safety Group (PSG)

The standard fall protection anchorage connector is designed for one purpose; it works in combination with a full-body harness and a connecting device (such as a lanyard or self-retracting lifeline) to arrest a fall and stop the user from hitting the ground. Pretty simple. With that function in mind, ask yourself, can the same anchorage connector be used in a system intended to gradually raise or lower people and/or materials? Very commonly the answer is no, and suddenly the conversation gets a bit more complicated.

There are many industries and practices where routine personnel and material hoisting happen every day. Whether working in window washing, where often large platforms are suspended over long periods of time, to confined space access, where workers need assistance with descent and ascent due to the cramped conditions, there is high demand for fixed and secure connection points. When working at heights, if the tie-off point fails, nothing else matters.

does its job right, as much of the force as possible is directed away from the user and to the equipment. Harnesses stretch, shock absorbers deploy and anchor points deform. The equipment sacrifices itself for the sake of the user. However, anchors used for work like window washing, for example, are designed for more regular and sustained use, and are consequently engineered for such performance.



Depending on the robustness of the design and acceptable installation methods, there are actually a select number of fall protection anchorage connectors that are indeed rated for rigging and suspension. *Photo courtesy of Pure Safety Group.*

So, why can't all anchorage connectors that are rated for use in fall protection also be rated for rigging and suspension work? The primary answer is this: there is a big difference between withstanding a single, dynamic load, as opposed to withstanding a constant load for much longer durations. Ask someone to catch a medicine ball and they can probably do it, but ask them to hold it over their head all day and see how long they last. The same idea holds true for fall protection anchors, which in nearly all cases are required by the manufacturer to be completely removed from service, if they are subjected to the forces caused by arresting a fall. When fall protection

We can expand the conversation beyond anchorage connectors, as well. Consider the descent control device and other similar types of equipment. In the world of fall protection, we will commonly find that manufacturers place specific requirements on the total length of rope or cable that can pass through these devices before they must be temporarily removed from service and be fully recertified. Other times manufacturers will entirely restrict use against routine personnel or material hoisting, requiring that the device must only be used during the rescue or retrieval of a fallen worker. While there are certainly some similarities between these types of restrictions and those found for equipment more specifically designed for rigging and suspension, the limitations placed on fall protection equipment are generally the first to be confronted.

There is one underlying theme throughout this discussion, which is to always refer to the manufacturer's instructions when determining what a given piece of equipment is rated and for what purpose. Depending on the robustness of the design and acceptable installation methods, there are actually a select number of fall protection anchorage connectors that are indeed rated for rigging and suspension. Those anchors may be more limited in respect to their permitted working load, but will achieve the necessary safety factors and

be sufficiently durable for multi-purpose use. Always pay special attention to the difference between a maximum permitted user capacity and maximum permitted working load for these types of anchors, since the forces generated by the dynamic drop of a worker must be accounted for differently than the forces generated by suspension. However, provided the conditions of the job fall are within the rated parameters of the anchorage connector, a single product may be the perfect solution for both tasks.

ABOUT THE AUTHOR:

Stuart Moore is Product Communications Manager at Pure Safety Group (PSG), the largest dedicated fall protection company in the world, providing high-performance and professional height safety equipment, tool tethering products, textile lifting & lashing products and services such as training, engineering and onsite consultation.



There is a big difference between withstanding a single, dynamic load, as opposed to withstanding a constant load for much longer durations. Photo courtesy of Pure Safety Group.

When fall protection does its job right, as much of the force as possible is directed away from the user and to the equipment. Photo courtesy of Pure Safety Group.



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Don't Stress About Heat Stress

By: **Paul Moomjean**, *Improv Learning*

Each year, thousands of employees suffer the adverse effects of heat stress. Employers and employees need to know how to recognize and prevent heat stress, as well as their rights to work in a safe and productive workplace. Heat-related health problems can vary from dehydration to potential skin cancer. Understanding the impact and the solutions are crucial to all involved and must be taken seriously before irreversible trends take place.

It is important to be aware of the illnesses and conditions, as well as be aware how to treat the symptoms. Not only are there ethical and moral concerns, there are protentional legal issues as well. Don't sweat it though, as here is a clear breakdown of what needs to be looked out for and how to prevent the workers you care about from being affected.

ILLNESSES AND CONDITIONS TO LOOK OUT FOR

Heat Stroke

Heat stroke is considered one of the gravest heat-related illnesses. When the body becomes unable to control its temperature, the body's temperature rises rapidly. Some of the scariest effects include the sweating mechanism in the body failing, and pretty soon the body is unable to cool down. The body temperature can rise to 106°F or higher within 10-15 minutes.

Symptoms of heat stroke include:

- Confused mental status, slurred speech
- Potential coma
- Hot, dry skin
- Excessive sweating
- Seizures
- High body temperature

Heat Syncope

Heat syncope can create fainting episodes or dizziness that occurs with lengthy jobs requiring standing or sudden rising from the sitting or lying position. Dehydration and lack of acclimatization are other warning signs.

Symptoms of heat syncope include:

- Short fainting spurts
- Dizziness
- Light-headedness

Heat Cramps

Workers who sweat a lot during activities can be most prone to heat cramps. This type of excessive sweating depletes the body's salt and moisture levels. In case you didn't know, low salt levels in muscles cause painful cramps. Just be aware: Heat cramps may also be a symptom of heat exhaustion.

Symptoms of heat cramps include:

- Muscle cramps
- Muscle pain or spasms
- Abdomen, arm or leg pain

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather. This will be visible, for the most part. Make sure workers are covered properly while working in the heat. Most often, heat rash symptoms appear on the neck, the groin, under the breasts, upper chest areas and elbow creases.

Symptoms of heat rash include:

- Red cluster of pimples
- Small blisters



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While you might not think your company will be affected by heat stress, every company should have a heat stress plan.

Now that you know what to look for, let's look at the proper equipment for preventing heat-related conditions.

PROPER PPE

While working in extreme heat or even moderate heat environments, using proper PPE is a way to provide supplemental protection. While each industry has their own regulated personal protective equipment, there are certain resources that can reduce heat stress.

- Fire proximity suits
- Water-cooled garments
- Air-cooled garments
- Cooling vests
- Wetted over-garments
- Sun hats
- Light-colored clothing
- Sunscreen

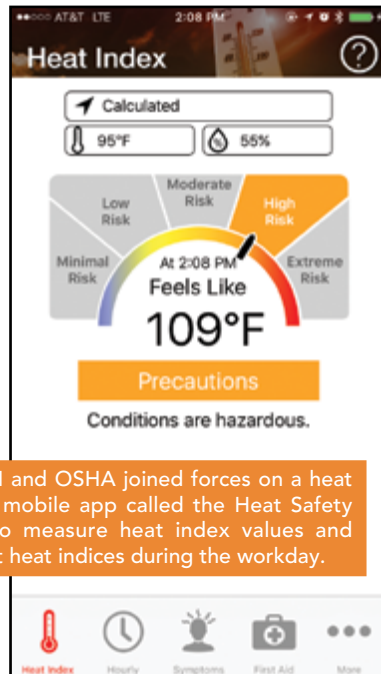
While you might not think your company will be affected by heat stress, every company should have a heat stress plan. Beside the ethical and moral reasons, one main reason is that lawsuits and fines can destroy a company.

LAWSUITS AND OSHA

Even though OSHA doesn't have a heat stress standard, you can still be cited for failing to have a heat stress plan. There is a very frightening story about Sturgill Roofing Inc. of Ohio. Back in 2012, the company was hired to replace a roof. To cut back on costs, Sturgill hired a crew of employees from a temp agency to fill out the required amount of workers.

One temp, a 60-year-old man, was sent to fix a bank roof. He had only been working in an air-conditioned indoor environment for about three years. But, he lied and told the foreman he had roofing experience. Believing him, the foreman didn't request references

or ask where he'd worked before. This was a recipe for disaster.



On that hot, 90-degree day, the temp showed up a 6:30 a.m. The foreman showed him where water coolers were located, and it was suggested to use the stacked roofing materials as shade during the day.

The foreman was a decent guy; in fact, he also told the temp if he wanted a break it would be fine and that he wouldn't be upset. While well-intentioned, the foreman provided no additional training on how to handle heat stress.

One thing the foreman didn't address was that the temp was wearing all-black clothing. He allowed him to continue working, even though he told the temp later he was supposed to wear "light clothing" in this type of work.

Even though the foreman appointed him to less strenuous work on the roof, like taking materials in a cart; lifting them over a 39-in-high parapet wall; and tossing them into a dump truck, disaster was on the horizon. After the employees got a 15-minute morning break around 9 a.m., another worker offered a 44-oz cup of ice water to the temp; the man rejected the offering.

Right after the morning break, the 60-year old temp showed signs of heat-related illness. The foreman noted him sweating excessively, but the temp brushed it off, saying he was fine.

Later during the day, the other workers asked the foreman to check in on him. Unfortunately, the foreman said he seemed fine. However, 15 minutes later, the foreman saw the older worker's body tell a different story as he observed him walk clumsily.

By 11:40 a.m. the temp collapsed on the roof, shaking. Quickly, the foreman called 911. One co-worker began CPR, and the foreman wet down the shaking man's clothing.

The emergency responders found the temp in the direct sunlight. He was rushed to the nearby hospital with a body temperature of 105.4°. He remained in the hospital for 21 days and died on Aug. 22, 2012. The coroner's report stated he died from heat stroke.

When the man's death was reported, OSHA fined Sturgill a total fine of \$8,820. OSHA discovered the company had a very relaxed break and hydration plan.

SOLUTIONS AND BEST PRACTICES

Getting fined should not be one's main motivation to reduce fatalities, but those fines can prevent businesses from growing. Solutions and resources are available. OSHA has a lot of valuable resources about the dangers of working in hot weather, through its "Water. Rest. Shade." campaign. Here are four clear objectives to meet every time workers are in the heat:

- Drink water every 15 minutes
- Rest in the shade to cool down periodically
- Make sure workers wear a hat and light-colored clothing
- Managers must monitor co-workers for any signs of problems

NIOSH and OSHA joined forces on a heat safety mobile app called the Heat Safety Tool to measure heat index values and project heat indices during the workday.

"Safety first" sounds like a cliché to many. However, it is the cliché most needed on the job site to maintain a workplace that protects the company, the managers and the workers. **WMHS**

Preventing Heat Stress with a Fabric Building

By: **Nicole Pulyado**, Contributor

Heat-related illnesses range from mild cramps all the way to potentially deadly heat stroke, and they are possible in a wide variety of industries and professions. When it comes to heat stress, prevention is key and always easier than treatment after the fact.

To protect workers exposed to the outside elements, businesses can increase safety by offering shaded areas to act as cooling stations. Within these designated spaces, there should be an opportunity to hydrate, re-apply SPF and rest in a cooler setting periodically throughout the day.

However, many who are at the highest risk for heat stress, such as workers in the outdoor construction industry, work on temporary jobsites and relocate often. This can become problematic, as brick-and-mortar

structures are not feasible to relocate, and businesses would lose all sustainability if they tried to construct a new, traditional building at every site. In these situations, a temporary tension fabric structure can become the safety solution companies need. Although many of these buildings feature temporary foundations to ensure easy transportation to different locations, they are also sturdy enough to use for long-term or permanent projects, making them ideal for every kind of job site.

Perhaps the biggest advantage to a fabric structure is the ability to provide a shaded area for protection from dangerous outdoor weather conditions. Customers should look for buildings that feature temperature-regulating fabrics to enclose the structure. These specially designed materials are a key factor in escaping the heat, as they shield workers from constant exposure to direct sunlight.

According to Geoffrey Ching, Director of Sales with ClearSpan Fabric Structures, “Fabric covers are ideal for maintaining a comfortable interior environment. Fabric covers can keep the interior cooler than outside. Most customers report an inside temperature approximately 20 degrees cooler in summer.”

When exposed to taxing outdoor conditions, a 20-degree difference could be the change needed to prevent heat-related illnesses and, while the temperature adjustment is certainly an enjoyable feature of fabric covers for comfort reasons, it can become a necessary life-saving benefit as well.

Fabric structures are also a great option, because of their impressive natural ventilation, a feature often lacking within conventional buildings. With customizable solutions, fabric buildings can be designed based on specific needs. To create a dedicated cooling



Photo courtesy ClearSpan

Fabric structures can be a great option to help employees beat the heat because of their impressive natural ventilation, a feature often lacking within conventional buildings.

environment, customers can opt for a structure with just overhead coverage for maximum ventilation or include two side walls to create a shaded area that encourages air flow. Numerous opportunities to increase ventilation within the shaded coverage of a fabric building create the perfect escape from the heat.

These ventilation features are also perfect for saving money. With so many options to reduce the building's temperature naturally, there is less need to run costly, inefficient air conditioning units used in traditional buildings. This is supplemented by the sunlight filtered through translucent fabric covers, which creates



Photo courtesy ClearSpan

Perhaps the biggest advantage to a fabric structure is the ability to provide a shaded area for protection from dangerous outdoor weather conditions. Customers should look for buildings that feature temperature-regulating fabrics to enclose the structure.

a well-lit environment without the need for artificial daytime lighting, further reducing monthly expenses.

Ching noted that such cost-saving features are often the reason customers choose to purchase a fabric building. “We are passionate about creating interior environments ideal for designated uses, such as creating a cool environment for workers. We begin by maximizing the amount of natural light and ventilation inside each structure. This is why so many industries now prefer tension-fabric structures to steel or wood-frame construction,” he said.

While inside a fabric building, workers will experience soft lighting without the damaging effects of direct sunlight, especially when fabric covers are UV-resistant for additional protection. Natural lighting and temperature regulation are the easiest way to

reduce energy usage and lower monthly maintenance costs within the cool environment of a fabric building.

Workers across many industries, including construction, agriculture, mining and more, are susceptible to the sneaky dangers of heat-related illnesses. Businesses can invest in the safety of their employees the economical way with a fabric building. Increased ventilation, shelter from sunlight and the opportunity to take regular breaks during the day all contribute to maintaining health and preventing unnecessary illness. **WMHS**

About the Author: Nicole Pulyado is a PR and Digital Content Specialist for ClearSpan, which specializes in fabric structures for the material handling industry. For more information on ClearSpan, visit www.clearspan.com or call 1-866-643-1010 to speak with a ClearSpan specialist.



Photo courtesy ClearSpan

Businesses can increase workers' safety by offering shaded areas to act as cooling stations. Within such designated spaces, there should be an opportunity to hydrate, reapply SPF and rest in a cooler setting.

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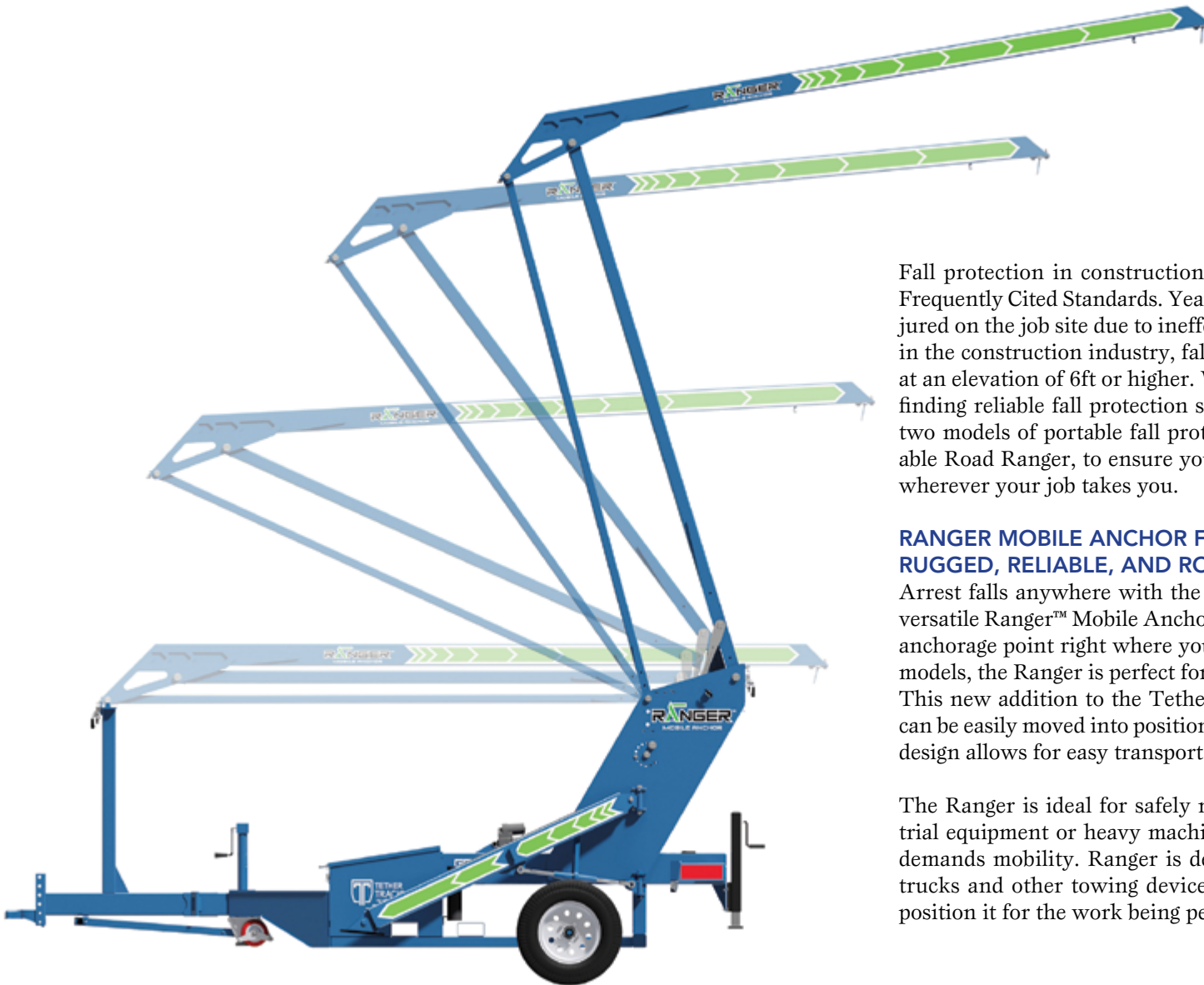
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The Mobile Anchor: An Essential in Fall Prevention

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A C L A S S A B O V E



Fall protection in construction is consistently in OSHA's Top 10 Most Frequently Cited Standards. Year after year, thousands of employees are injured on the job site due to ineffective fall protection. According to OSHA, in the construction industry, fall protection must be provided for workers at an elevation of 6ft or higher. When your job site is constantly changing, finding reliable fall protection systems can be challenging. Gorbel® offers two models of portable fall protection, the Ranger and the highway towable Road Ranger, to ensure your workers are being protected at heights, wherever your job takes you.

RANGER MOBILE ANCHOR FALL ARREST THAT'S RUGGED, RELIABLE, AND ROAD READY.

Arrest falls anywhere with the new Ranger Mobile Anchor system. The versatile Ranger™ Mobile Anchor line from Gorbel® provides the necessary anchorage point right where you need it, indoors or out. Available in two models, the Ranger is perfect for use when your job site changes regularly. This new addition to the Tether Track™ brand of fall protection systems can be easily moved into position and erected. The Ranger's sleek, balanced design allows for easy transport to and around the job site.

The Ranger is ideal for safely maintaining and repairing aircraft, industrial equipment or heavy machinery, or for any elevated application that demands mobility. Ranger is designed for quick attachment to forklifts, trucks and other towing devices. Simply move it into place and quickly position it for the work being performed.

All Ranger components are easily accessible at ground level for quick adjustments, and the mast extends in a single plane for precise placement. The D-ring provides a convenient attachment point for self-retracting lanyards, which are used in conjunction with a full-body harness for a complete fall arrest system.

- Adjustable to 18, 20, and 22ft heights
- Allows single workers to move freely within a 30° work area in all directions
- Battery powered with electromechanical actuator for smooth raising and lowering
- Maximum towing speed of 25 mph

ROAD RANGER – THE ONLY MOBILE ANCHOR RATED FOR HIGHWAY TOWING.

The new Road Ranger Mobile Anchor systems delivers all the benefits of the traditional Ranger, with one key difference: it's rated for highway travel. The Road Ranger's sleek, balanced design allows for easy towing and transport to and around the job site and on the highway, allowing you to take your fall protection systems with you wherever your job takes you. The system's adjustable-height 2-inch ball coupler attaches easily to trucks and other towing devices. All components are easily accessible at ground level for quick adjustment.

- Rated for highway towing up to 65 mph
- Easy to position with mast folded or fully deployed
- Fully extends to 18, 20, and 22ft
- Allows single user to move freely within a 30° work angle in all directions
- Rugged steel construction for superior strength
- Resilient finish for harsh environments





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- ▶ Easy to position with mast in folded position or fully deployed
- ▶ Fully extends to 18, 20, or 22 ft. height to address a wide range of jobs
- ▶ Allows single user to move freely within a 30 degree work angle in all directions
- ▶ Rugged steel construction and components for superior strength
- ▶ Resilient finish to withstand harsh outdoor and indoor environments
- ▶ Rated for highway towing up to 65 mph (Road Ranger model)



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Raising Awareness of Best Practices to Prevent Falls in Construction

By: **Jessica Bunting**, CPWR

Falls, particularly falls to a lower level, are the leading cause of injuries and fatalities in the construction industry. According to CPWR-The Center for Construction Research and Training's (CPWR) 6th Edition of the Construction Chart Book, "in 2015, 96% of deaths related to falls (including slips and trips) were attributed to falls to a lower level.¹ More than a third ("38%") of fatal falls to a lower level between 2011 and 2015 were from a height of 15ft or less." (Chart 1)

The primary cause of fatal falls in construction was falling from roofs, followed by falls from ladders (Chart 2) and a disproportionate share occurred in establishments with ten or fewer employees (Chart 3).



In 2012, the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and CPWR set out to address this by working together to launch the National Campaign to Prevent Falls in Construction with the goal of raising awareness of the

risks and prevalence of falls, along with solutions and best practices to prevent them.

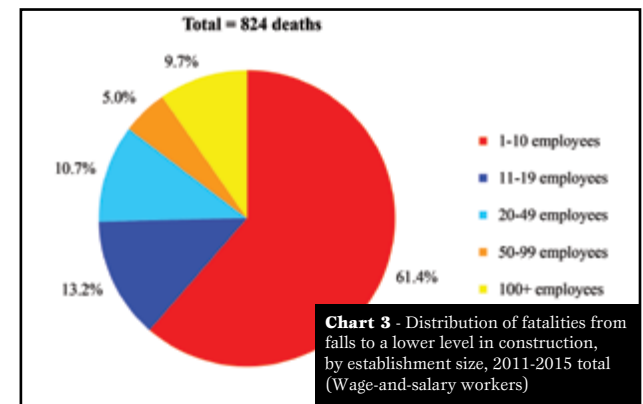
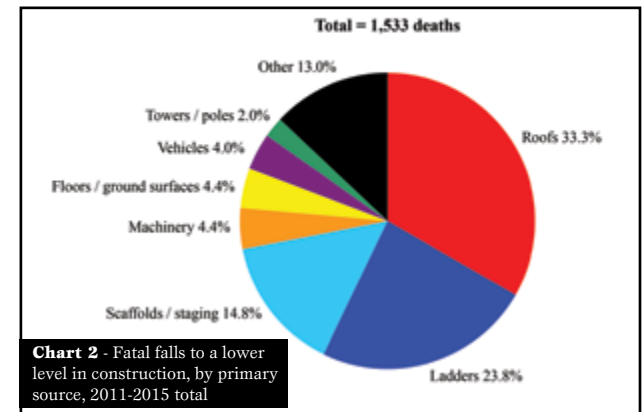
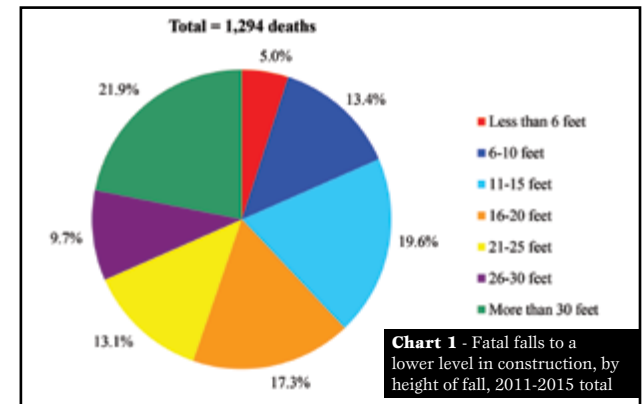
In support of this effort, CPWR established the website stopconstructionfalls.com to provide industry stakeholders with ready access to information on Campaign activities, such as the National Safety Stand-Down, and materials employers can use to:

- PLAN ahead to get the job done safely.
- PROVIDE the right equipment.
- TRAIN everyone to use the equipment safely.

Recognizing that conditions vary by work situation, the site includes training and other resources for employers and workers, including: instructor guides, videos, toolbox talks, infographics, handouts, activities and presentations to use in a training program; Toolbox Talks to focus attention on potential fall hazards workers may face on a specific project; and information on solutions to prevent falls.

The site also includes several resources geared toward the National Safety Stand-Down week – the annual Campaign event that invites employers to pause work in order to focus on fall prevention – such as a daily planner with activity ideas and an online ordering form for materials and hardhat stickers. There is also a year-round plan to help keep the focus on falls throughout the year and a Fatality Map that serves as a reminder of the number of lives lost each year in construction and specifically due to falls.

Companies and organizations of all sizes worldwide have joined the Campaign and reported back on ways they successfully engaged employees in fall prevention activities. OSHA estimates that tens of thousands of



¹ U.S. Bureau of Labor Statistics. 2011-2015 Census of Fatal Occupational Injuries, <http://www.bls.gov/data/#injuries> (Accessed November 2017).



Falls: Extension Ladders

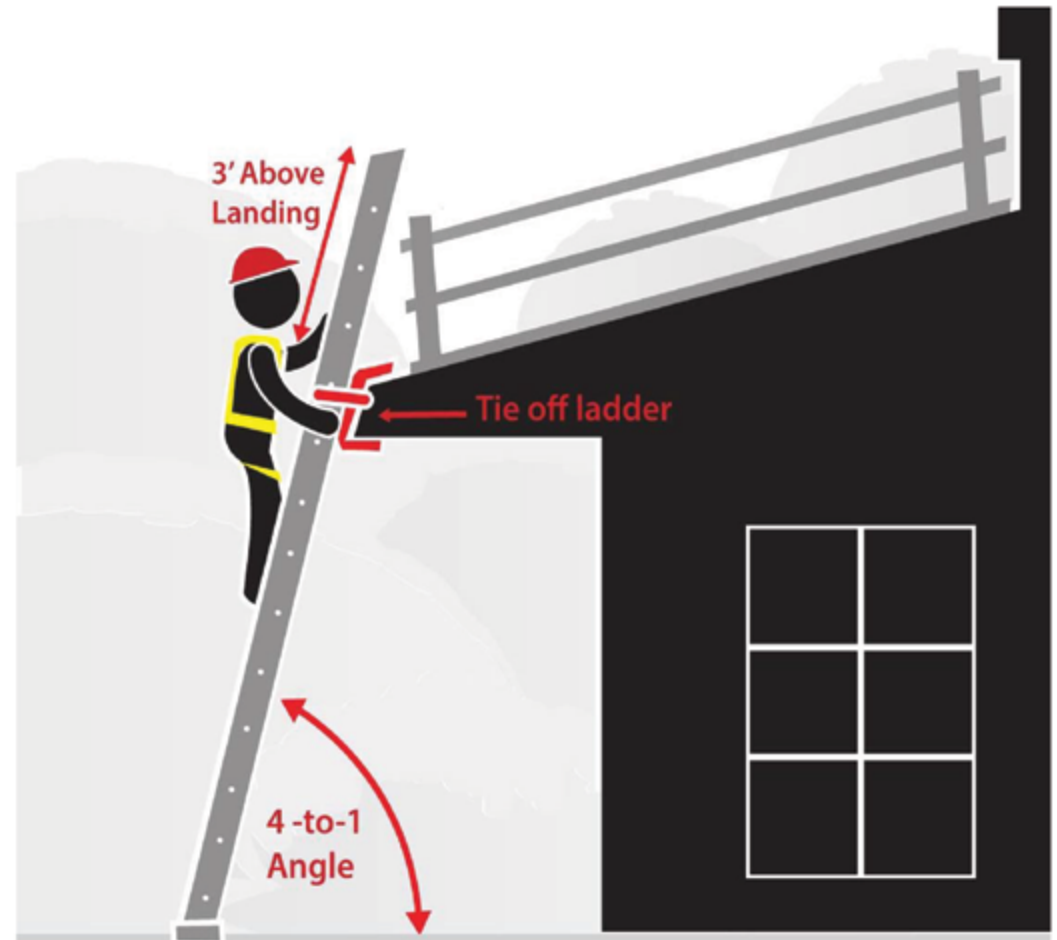
companies have participated, reaching millions of employees since the Campaign began. The following are just three examples of activities that took place during the 2017 National Safety Stand Down:

- More than 1,500 UCOR employees at five different worksites participated in fall prevention activities, including demonstrations on proper use of personal fall arrest systems and ladders and presentations from OSHA Compliance Officers.
- TA Loving Company, a general contractor in North Carolina, held stand-downs at all 23 of its project locations to review fall hazards at each site and, among other things, to teach workers about harness safety including suspension trauma, rescue and how to use relief straps.
- Milicia Electric Corporation held a stand-down with 20 workers at its New York Power project, including holding daily toolbox talks focused on topics including ladder safety and fall protection.

Stopconstructionfalls.com is updated regularly with new resources from all three lead organizations – CPWR, NOISH, and OSHA. Visit stopconstructionfalls.com to join the Campaign and find ways to prevent falls in construction.

For more information about the National Campaign to Prevent Falls in Construction and the resources available, contact Jessica Bunting, Program Associate at CPWR — The Center for Construction Research and Training (jbunting@cpwr.com).

See p. 5 for more information on the 2019 Stand-Down



- ✘ Inspect your ladder for damage before use. If damaged, do not use it and ask for another.
- ✘ Set your ladder at the correct 4-to-1 angle.
- ✘ Tie off the top of the ladder to prevent it from slipping sideways.
- ✘ Extend the ladder 3 feet above the landing.

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Tools to Measure & Strengthen Job Site Safety Climate

By: **Dr. Linda M. Goldenhar**, CPWR

Over the past few decades, the construction industry has made significant progress towards improving worker safety and health. Despite this, 2016 Bureau of Labor Statistics data show that construction workers still experience an injury rate 44 % higher than the national average. In an effort to reduce this percentage, many in the industry have started looking for additional ways to proactively address safety-related issues before they cause future harm. One approach has been to measure their job site safety climate - **employees' perceptions of how well company prioritizes and implements safety policies, practices, and procedures** - and use that information to make improvements, especially in areas that receive low scores.

While larger companies may be able to hire outside safety consultants to conduct a safety climate assessment and provide improvement ideas, many small and medium sized firms may not have the resources to do the same. To address this gap, CPWR - The Center for Construction Research and Training has been working closely with industry stakeholders and other subject matter experts to work on these three goals:

1. Identify the key safety climate leading indicators specifically for construction,
2. Create tools companies can easily use to learn how they are doing with respect to these indicators and
3. Provide ideas for how to strengthen them.

To achieve the first goal, industry stakeholders and other experts who participated in a 2013 safety climate/ culture workshop (<https://www.cpwr.com/safety-culture/workshop-safety-culture-and-climate-construction>) identified 8 key leading indicators of job site safety climate. While they aren't listed in rank order, Demonstrating Management Commitment is first because without it, a company won't be able to effectively address the other seven (see figure p 26). (<https://www.cpwr.com/safety-culture/workshop-safety-culture-and-climate-construction>)

Next, to meet goal #2, we developed the Safety Climate Assessment Tool or S-CAT (www.safetyclimateassessment.org)

The 37-item S-CAT has descriptors that employees use to anonymously evaluate their company's level of safety climate maturity for each leading indicator. After all the employees (who want to) complete the S-CAT, the computer program combines their responses and prepares a company-level report, containing composite scores

benchmarked against other companies in the S-CAT database. The figure below is an example of the rubric scales for the indicator Empowering and Involving Employees.

Since smaller companies are often at the beginning of their safety climate journey, we also created the Safety Climate Assessment Tool for Small Contractors or S-CATsc, which is more of a safety climate needs

Safety Climate Assessment Tool (S-CAT)

Empowering and Involving Employees

Organizations empower and involve employees by engaging in the following activities:

1. Empowering employees to invest in safety for themselves and fellow co-employees.
2. Seeking employee input on hazard reduction and safety improvement.
3. Relying on joint employee-management committees to address specific safety and health concerns.

For each item below, carefully read the descriptions in each box going from inattentive all the way to exemplary. Circle the one that best describes the degree to which employees in your company participate and are empowered to improve safety.

INATTENTIVE → REACTIVE → COMPLIANT → PROACTIVE → EXEMPLARY					
1. In my company...					
Employees feel no sense of responsibility for their co-employees' or their own safety.	Employees aren't engaged in promoting safety until after an accident occurs.	Employees are engaged in promoting safety to the extent that is required.	Employees participate in all aspects of ensuring a safe jobsite, beginning at the planning and design stages.	Employees are empowered and rewarded for going above and beyond to ensure a safe jobsite. Employees always feel responsible for their and their co-employees' safety.	NA
2. In my company...					
Employee feedback regarding safety conditions and hazard reduction is not sought. They just want employees to "get the job done."	Employees are asked for safety advice and feedback after an injury or adverse safety event has occurred.	Employee feedback regarding safety is sought only when initiated by employees or during mandatory safety meetings.	Management actively involves employees in identifying hazards and solving safety problems by including them in daily pre-job safety and crew task/ hazard analysis.	Management actively seeks employee input on safety. Safety and even non-safety meetings and walk-arounds focus on solving specific problems identified by employees and others.	NA
3. In my company...					
There are no safety committees.	Safety committees are created only after an incident occurs and do not remain active very long.	Standing safety committees may exist but they don't carry much weight; meetings may last only a few minutes.	There is an active management-employee safety committee that provides suggestions and makes recommendations.	The management-employee safety committee actively solicits suggestions from all employees on the jobsite and ensures that recommendations are seen through to completion.	NA



8 Safety Climate Leading Indicators for Construction

Demonstrating management commitment	<ul style="list-style-type: none"> Adequate resources are available to effectively implement safety activities Safety is a top agenda item at all meetings Management is visible to workers and practices proper onsite safety behaviors
Aligning & integrating safety as a value	<ul style="list-style-type: none"> Safety expectations are clearly defined in policies, procedures, and guidelines, and communicated across the company Different departments and groups are able to discuss project-related safety strategies Safety is considered in hiring and promotion decisions
Ensuring accountability at all levels	<ul style="list-style-type: none"> Enforcement of safety policies and procedures is fair and consistent People at all levels are held accountable for their safety responsibilities Everyone is recognized and included in safety awards based on leading vs. lagging indicators
Improving site safety leadership	<ul style="list-style-type: none"> Front line leaders use safety leadership skills Senior leaders are visible on safety issues Supervisors are provided with, and required to take training in safety communication, motivation, preplanning
Empowering & involving workers	<ul style="list-style-type: none"> Joint walk-arounds are regularly conducted and focus on addressing specific problems raised by workers and others Workers are frequently solicited to share perceptions about job site safety Workers are encouraged and unafraid to report potential hazards, close-calls and/or injuries
Improving communication	<ul style="list-style-type: none"> Regular company-wide safety communications reinforce the culture of safety as a value (e.g., newsletters, alerts, leadership messages, safety topics, etc.) There is a formal system for sharing close call and incident information There is a formal transparent process for how employee safety concerns are addressed
Training at all levels	<ul style="list-style-type: none"> On-going safety training is provided at all levels of the company Prevention through Design training is provided to in-house architects and engineers Field personnel help identify training needs, and develop materials
Encouraging owner/client involvement	<ul style="list-style-type: none"> Owners participate in employee orientation, daily planning meetings, and wear PPE (as appropriate) Owner regularly come onsite to connect with and learn from employees Owners use safety performance as a prequalification for bids

assessment rather than a maturity assessment. https://cpwr.az1.qualtrics.com/jfe/form/SV_3x6RhwceVP6A2z3

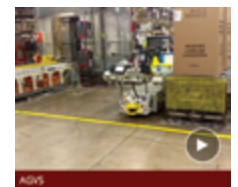
As mentioned above, our third goal was to provide companies with safety management ideas that they could use to help them achieve an exemplary safety climate. This table contains a few examples for each indicator. More complete lists can be found in the Safety Climate Workbook: https://www.cpwr.com/sites/default/files/research/Safety_Climate_Workbook_and_SCAT_092116.pdf and the Safety Climate for Small Contractor Workbook: <https://www.cpwr.com/sites/default/files/publications/SCAT-SC.pdf>

We invite you to visit all of the websites listed in this article, and also check out www.cpwr.com to find many more resources you can use to strengthen your safety program and improve worker safety and health outcomes.

For more information, you can contact the Safety Culture/Climate project lead: Dr. Linda M. Goldenhar, Director of Research and Evaluation at CPWR — The Center for Construction Research and Training (lgoldenhar@cpwr.com).

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Are You Prepared to Work Safely with Silica?

Free Resources from CPWR Can Help

By: **Eileen Betit**, CPWR

The Occupational Safety and Health Administration (OSHA) estimates that roughly 2 million construction workers in the U.S. are exposed to respirable crystalline silica.¹ Overtime, breathing in even small amounts of silica dust can cause silicosis, lung cancer, or COPD. It has also been linked to other diseases, including kidney disease. In March 2016, after decades of research, OSHA responded to growing concerns about the health risks by issuing a comprehensive silica standard for the construction industry (29 CFR 1926.1153).

The new standard, which OSHA began to enforce in September 2017, includes a more protective permissible exposure limit of 50 micrograms per cubic meter

($\mu\text{g}/\text{m}^3$) and other provisions to ensure that workers performing silica-generating tasks and those working nearby are protected. OSHA estimates that the new standard will prevent 600 deaths from silica-related diseases and more than 900 new cases of silicosis each year.²

CPWR-The Center for Construction Research and Training's *Work Safely with Silica* website (www.silica-safe.org) is a one-stop source of free tools and information to help contractors comply with the standard and both workers and contractors work safely. The site was developed with input from stakeholders in 2011 and launched in 2012 to raise awareness of the hazard and ways to protect workers. Since then, it has been updated with new training materials, answers to frequently asked questions, guides and tools. A 2018 survey conducted by Dodge Data Analytics found that all of those surveyed who had used the website found it to be useful. The majority found it moderately (35.6%) or very (47.5%) useful.

The following are examples of free resources available on the site to help contractors comply with the standard.

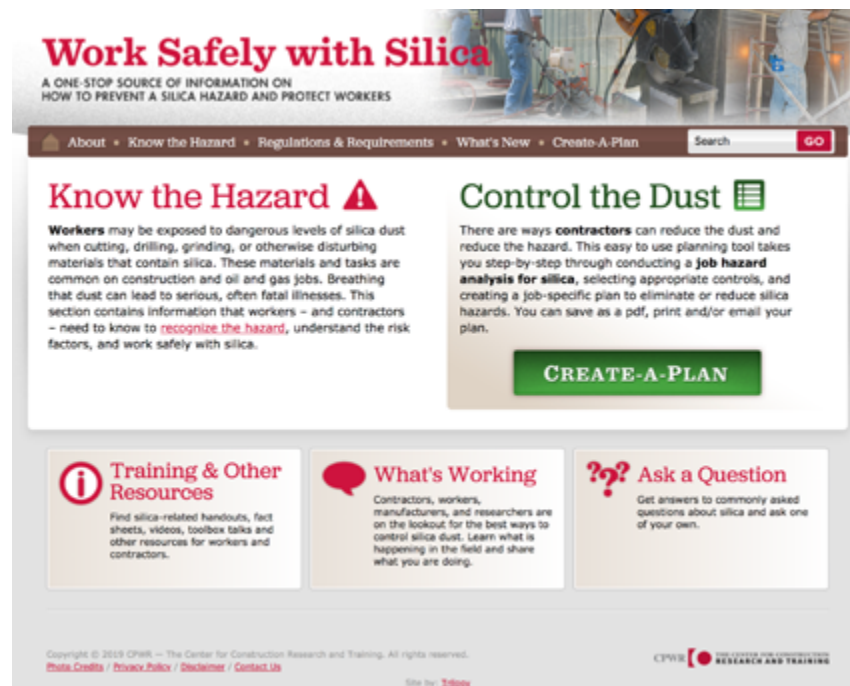
Create-A-Plan. This unique online planning tool is recognized in OSHA's compliance documents as a resource to help with the requirement in the standard for a written

exposure control plan (paragraph g). This planning tool walks a contractor through the development of their plan in three easy steps:

- Step 1 – Select the materials and tasks that will generate silica dust on the job. A contractor can select multiple materials and more than one task for each material.
- Step 2 – Select the equipment and dust control method for each material-task combination selected in Step 1. There are examples of commercially available equipment-control options, and space to add specific details about where the task will take place and how the equipment-controls selected will be used on the project.
- Step 3 – This final step includes space for the other items that must be included to comply with the written exposure control plan requirement.

Each step includes additional information to help a contractor find out if a material contains silica, determine exposure levels, and find controls. While registering is not required to use the planning tool, contractors that register can confidentially save their plans and retrieve and edit them in the future. Once Step 3 is completed, the final written exposure control plan can be emailed, saved as a PDF, printed—and if the contractor has registered—saved for future use.

Medical Monitoring Under the OSHA Silica Standard for the Construction Industry: Guide for Employers. This Guide is designed to help contractors understand the medical monitoring requirements



1 Occupational Safety and Health Administration [OSHA], 2017. OSHA's Respirable Crystalline Silica Standard for Construction. <https://www.osha.gov/Publications/OSHA3681.pdf>

2 OSHA. Frequently Asked Questions: Respirable Crystalline Silica Rule. https://www.osha.gov/silica/Silica_FAQs_2016-3-22.pdf



Silica



- ✖ Use vacuums and/or water to reduce the dust at the source, before it becomes airborne.
- ✖ Vacuum the dust from your clothes and change into clean clothing before leaving the work site.
- ✖ Do not brush or blow the dust off! Avoid bringing dust home!

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(paragraph h) in the standard and set up a medical surveillance program. It provides information on 1) which employers are covered by the medical surveillance requirement, 2) when and how often employees should have a medical examination, and 3) how to set up a medical monitoring program.

Table 1 – Equipment Names and Best Practice Tips. The Specified Exposure Control Methods (paragraph c (1)), or Table 1, matches 18 tasks with effective dust control methods and, in some cases, respirator requirements. Employers that fully and properly implement the engineering controls, work practices, and respiratory protection listed on Table 1 do not have to conduct an exposure assessment for employees engaged in those tasks. This document is intended to help contractors understand and meet the Table 1 requirements. It includes, for example, OSHA’s requirements, guidance and videos related to each Table 1 entry, information from equipment manufacturers’ documents, and input from users on how to use the controls. Individual entries in the Planning tool link to the appropriate tip sheet in this document.

Finally, the resources in the “Training and Other Resources” section of the website can help fulfill the Communications requirement in the standard (paragraph i). This section of the site includes training manuals, presentations, videos, and other resources such as a Hazard Alert Card and Toolbox Talk.

The site is updated regularly to reflect new resources available and industry needs, and the “Ask a Question” section and many of the training materials, including the Hazard Alert Card and Toolbox Talk are available in English and Spanish. One of the latest updates is the addition of information and resources for construction employers and workers in the oil & gas industry who are covered by OSHA’s silica standard for general industry (29 CFR 1910.1053).

For more information about the Work Safely with Silica website and resources, contact Eileen Betit, Director of Research to Practice at CPWR — The Center for Construction Research and Training (ebetit@cpwr.com).

Safety Leadership as a Best Practice By: Dr. Linda M. Goldenhar, CPWR

What comes to mind when you hear the term ‘Best Safety Practices’? You probably envision a variety of control measures that experts recommend using to prevent falls, reduce silica exposure, eliminate musculoskeletal injuries and mitigate other job site hazards. Of course it makes perfect sense that you would think of these first, since it’s well known that they do, in fact, improve job site safety. But, there are other things you might not automatically think of as a best practice that can help reduce adverse outcomes. One of these is strengthening jobsite safety climate.

Safety climate - workers’ perceptions of how well safety policies, procedures, and practices are implemented on the jobsite - is a key indicator of injury outcomes and foremen and other lead workers are the linchpins to creating a strong jobsite safety climate. Now

ask yourself what is the most common reason that a worker gets promoted to the foreman position? The typical answer is because he or she does good work and gets things done. These are important qualities for foremen to have to be successful in their new jobs, however, they will also need to know about the best safety leadership practices recommended by effective safety leaders. While it’s true that some newly promoted foremen will already have these important leadership skills, others will benefit from learning what they are and how to use them on the construction site.

To address this need, researchers at CPWR-The Center for Construction Safety and Health brought together a team of experts to develop a best practice safety leadership training program. This curriculum team included OSHA 10- and 30-hour outreach trainers,

FIVE CRITICAL SAFETY LEADERSHIP SKILLS

01	02	03	04	05
LEADS BY EXAMPLE <ul style="list-style-type: none"> Establishes safety expectations as a core value Shares safety vision with team members Demonstrates a positive attitude about safety ‘Walks the Talk’ 	ENGAGES AND EMPOWERS TEAM MEMBERS <ul style="list-style-type: none"> Engages, encourages, and empowers crew members to identify and act upon unsafe situations by... <ul style="list-style-type: none"> Reporting hazards and safety concerns Providing solutions Reporting near misses Stopping work if necessary 	ACTIVELY LISTENS AND PRACTICES 3-WAY COMMUNICATION <ul style="list-style-type: none"> Actively listens to hear what team members are saying Practices 3-way communication by having a person repeat the message they heard 	DEVELOPS TEAM MEMBERS THROUGH TEACHING, COACHING, AND FEEDBACK <ul style="list-style-type: none"> Respectfully teaches and coaches workers Watches the learner fix the hazardous situation or perform the task to make sure it’s done correctly Focuses on potential consequences rather than on the team member Uses the FIST principle: Facts, Impact, Suggestions, Timely 	RECOGNIZES TEAM MEMBERS FOR A JOB WELL DONE <ul style="list-style-type: none"> Privately and/or publicly acknowledges team members for going above and beyond for safety

HERE’S WHAT FSL PARTICIPANTS ARE SAYING

Since its official roll-out, over 60,000 individuals have participated in the FSL training. The following are some typical comments from participants: *[Note: Comments appear as written.]*

“I never took it as seriously as I do now ... You know, having the people explain back to you what you told them. I mean, that really has helped a lot. Instead of just giving somebody some information, sending them off blindly to do the job, and then you know, getting mad ‘cause they didn’t do it right. That way you know, they can explain to you back exactly what you said to them and if they didn’t get it the first time, you know, you can talk about it, have an opportunity to get it right.”

“It also makes them feel like they’re, part of the, you know, the planning. So for the specific task, I think that it is a great tool. Something I’ve done a little bit of but really try to do a lot more of ‘cause of the training.”

“I used to say, ‘you need to do this and that, you need to have this and that on,’ but I wasn’t doing it myself. I was always a firm believer that earplugs hurt my ears. I would wear a bandana and kept it below my ears, so no one could tell if I was wearing earplugs or not. After the training, I stopped that and now I wear them.”

Contractors whose foremen have participated in the FSL training also have positive things to say:

“I would have to say just the participation in the class lets the foremen know that the owners and upper management are on-board with safety, by

(Cont., page 31)

construction workers, safety and health professionals from small and large companies, representatives of building trade unions, consultants, and researchers. After working together for 1.5 years, they had created the Foundations for Safety Leadership or FSL training program.

The 2.5 hour FSL teaches foreman and lead workers about 5 critical leadership skills shown earlier and provides concrete ideas for how to put them into practice on the jobsite. In Section 1, students learn about the costs of ineffective safety leadership, the benefits of effective safety leadership and how frontline leaders directly influence safety climate. The majority of Section 1 focuses on these five best practice safety leadership skills and how students can use them on the jobsite.

In Section 2, students have the opportunity to see the leadership skills in action by working through a few real-world construction scenarios. The scenarios are divided into 3 parts. The first one sets the stage by showing the characters dealing with a particular safety situation on a job site. Next, Outcome A is presented

with leaders not using any of the 5 leadership skills and followed by Outcome B where they do. The discussion questions ask students to consider the differences in these outcomes, including the crew members' morale and likely future engagement in safety practices. Instructors use one of three teaching methods to present the scenarios: show video, have students read the script, or participate in a role-play.

On January 1, 2017 the FSL became an official elective in the OSHA 30-hour course. When you send your foremen and lead workers to take the 30-hour, encourage them to ask their instructor to select and teach it. Or, you can download all of the teaching and supporting materials **at no cost** and incorporate the FSL into your company's ongoing training. Go to: <https://www.cpwr.com/foundations-safety-leadership-fsl>

For more information, you can contact the FSL project lead: Dr. Linda M. Goldenhar, Director of Research and Evaluation at CPWR — The Center for Construction Research and Training (lgoldenhar@cpwr.com).

(Cont. from page 30)

actually giving them the time to do what they have to do to perform the job safely.”

“I think they’re more aware when they do their morning huddle.... I also see them take a little more time when they’re talking about the work that they also cover the safety implications of that work. [They] try to get more input from the employees on their crew instead of just giving instructions.”

“It’s a rare occurrence that construction leaders thank us for training, but that’s what we received from our supervisors after the FSL training. What’s even better is that they have been able to improve their communication and engagement with their team.”

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Planning & Training Tools to Promote the Use of Safe Material Handling Practices

By: **Eileen Betit**, CPWR



Back and shoulder injuries and other overexertion or soft-tissue injuries result in days away from work, and lost wages, productivity and profits. These types of injuries are a leading cause of disabling injuries and are estimated to cost businesses billions of dollars each year.^{1,2} Injuries resulting from manual materials handling, in particular, are among “the most frequent and expensive causes of compensable workplace injuries.”³

While there is a growing body of research on how these injuries occur and how to prevent them, use of the research findings and solutions has not been widespread. To address this gap between research and practice, CPWR-The Center for Construction Research and Training worked with industry stakeholders, insurers and researchers to identify the barriers to use of safe materials handling practices and to develop resources to overcome them. The resulting program, “*Best Built Plans: Build Safety into Every Job*,” underscores the importance of integrating planning for safe materials handling into every stage of a construction project and a contractor’s overall operation. The message: *Planning to reduce manual materials handling throughout a project’s life-cycle is a good business practice.*

FREE PROGRAM RESOURCES AVAILABLE AT BESTBUILTPLANS.ORG

The program resources, which were developed and continue to be improved and added to based on stakeholder input, include materials for everyone in the company – from the new worker entering the industry to the contractor, as well as for companies of every size.

The Site Planning Tool includes materials to help **contractors** think through and plan for how materials will be stored, lifted, and moved at each project stage. (See image at the top of page 33.) This tool reinforces why planning is a good business practice and raises questions every contractor should consider as they prepare to bid on a project, once they are awarded the work, when the project is underway, and once it is completed. In addition, there are resources to answer these questions, including planning spreadsheets to help a contractor decide how materials will be stored, lifted and moved, and a checklist to make sure materials are being handled as outlined in their plan once a project starts.

The Site Planning Tool also has training materials contractors can use with their employees, including:



- Use mechanical equipment like a dolly to lift heavy objects, if at all possible.
- Never try to lift an item weighing over 50 pounds by yourself.
- Plan your lifts; make sure the path is clear prior to lifting.

1 2017 Liberty Mutual Workplace Safety Index.

2 CPWR Construction Chart Book, 5th edition, pages 47 & 48.

3 Ciriello, V., et.al. (2008). Secular changes in psychophysically determined maximum acceptable weights and forces over 20 years for male industrial workers. *Ergonomics*, 15(5), 593-601.



- Training for supervisors and foreman on the safety leadership skills needed to engage workers in speaking up and addressing potential lifting hazards. (See Safety Leadership article on page 30.)
- A toolbox talk and a hazard alert card to use with employees at the start of a workday to focus attention on the materials that will be lifted and moved on the job and the lifting equipment and safe practices that should be used.
- Games to play on smartphones that are linked to the toolbox talk and hazard alert card. The games are intended for use by **workers** during lunch breaks or after work hours and reinforce safe practices. A contractor would distribute the materials, or post the toolbox talk image in a central location so that workers can scan the QR Code to download and play the games. The games are available for iPhone and Android users. (See toolbox talk image on page 32 and images from one of the games, right.)

In addition, the Program includes a series of one page infographics with messages to remind **everyone** of the

positive impact engaging in safe materials handling practices can have on the individual and the company. One message reminds everyone to “Talk through your work plan every morning. Leave safe every night,” and there are five “Contractor Tips” that focus on specific actions for reducing the risk of an injury. These infographics can be printed and distributed as handouts, blown up and posted on job sites, or used in newsletters and other company communications.

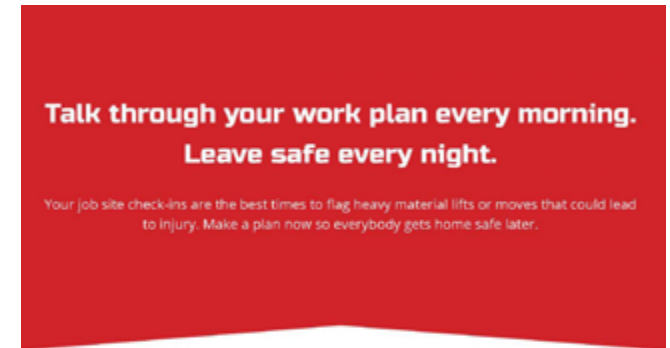
INTERACTIVE TRAINING & COACHING RESOURCES

Finally, there is a PC-based version of the program, which includes a series of interactive training and coaching resources. The training and coaching activities can be used by **trainers and safety staff** in a classroom setting or by a worker on their own. Building on the elements in the Planning Tool, the interactive activities reinforce safe lifting practices by introducing workers to the importance of planning for materials handling, storing materials off the ground and close to where they will be used, setting weight limits for lifting, and using lifting equipment. The activities demonstrate safe practices and show how different practices increase or reduce the risk for injuries.

All of the Site Planning Tool resources are available directly online in English and Spanish. (The English version of the Site Planning Tool is also part of the downloadable PC-based version of the program).

WHAT'S NEXT?

CPWR is currently piloting the program with a small group of contractors who have agreed to use some or all of the resources over a period of several months and provide feedback on what worked, what needs to be improved, and what else is needed. Modifications are being made or planned based on feedback. In addition to the pilot, all of the program resources (and new ones as they are developed) are available to anyone in the industry. This group of “organic” users can provide feedback by completing an anonymous online survey that can be found on the Best Built Plans website.



For more information about the Best Built Plans program and resources, contact Eileen Betit, Director of Research to Practice or Grace Barlet, Research Assistant at CPWR – The Center for Construction Research and Training (ebetit@cpwr.com or gbarlet@cpwr.com).

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