



THE Field Data Collection
& Labor Productivity Tool
for **Trade Contractors.**

The Ultimate Guide to Construction **SITE SAFETY**



Overview

Construction safety is one of the most important areas of project planning for subcontractors, with implications for project scheduling and budget success, legal liability, and compliance and the well-being of workers. This eBook offers a comprehensive overview of construction site safety that can help subcontractors in the construction industry prepare to meet and exceed OSHA requirements for workplace safety.

In Part One, we make the case for the importance of construction safety by highlighting the most engaging statistics, key regulators and the history of construction safety in the USA.

In Part Two, we will take a deeper look at the most common hazards on construction job sites - what the biggest ones are, and how subcontractors should identify and mitigate them in the risk assessment phase of project planning.

Finally, in Part Three, we discuss an organizational approach to improving construction safety and how organizations can adopt new policies, procedures and tools like eSUB construction project management to help comply with OSHA and improve safety outcomes within their organizations.



Part One: Safety in the Global Construction Industry

Building the Case for Construction Site Safety

The implementation of appropriate safety measures with respect to each job site is a critical requirement for subcontractors. When subcontractors implement the appropriate safety measures, they make the industry safer for everyone, avoid the harsh fines and penalties associated with OSHA non-compliance and help reduce the frequency of workplace accidents and injuries.

When OSHA was first established in 1971, 38 workers died in the United States each day. Today, that number is down to 14. OSHA maintains accountability for workplace accidents and injuries through an investigatory process that can find any employer on the job site guilty of violating an OSHA standard. This means that while the general contractor is responsible for the overall safety of the job site, subcontractors who exercise supervisory authority on the job site (typically by supplying labor) are considered "controlling employers" and are still responsible for detecting and preventing unsafe work conditions. A subcontractor whose employees are exposed to hazardous conditions on a job site may be designated as an "exposing employer", resulting further liability exposure under the OSHA framework.

It all boils down to this. Whether you're a general contractor; a subcontractor that supplies labor to a project; a subcontractor with supervisory authority over a work site; you could be held financially responsible for an OSHA citation or legally liable for a workplace accident or injury.

Before we offer our best tips and advice for ensuring workplace safety, we want to make the strongest case we



want to make the strongest case we can for the importance of construction safety. We'll start with a brief history of how construction safety regulations have improved conditions for workers. Then, we'll assess the benefits of workplace safety for employees, employers and the construction industry as a whole, and the biggest safety risks that construction workers face on the job site.

Ultimately, we hope you'll share our opinion that the majority of construction accidents and injuries can be prevented and that it's worth the effort to control hazards that put employees on the job site at risk each day.

A Brief History of Construction and Workplace Safety

To understand the tremendous impact that modern construction site safety practices have had on the welfare of workers, we need to look at the way construction safety, and workplace safety, in general, was treated in the past. As America entered its own industrial revolution in the early 1900's, labor jobs in industries such as construction, mining, farming, fishing, and manufacturing were extremely unsafe for workers.

There were no regulatory bodies that set policies for how employers should protect their workers on the job site, and the introduction of new technology like engines, elevators, and mechanical tools created new risks on the job site. Workers compensation laws were not yet enacted at the federal level, which meant that employers could usually avoid liability when a worker was harmed on their job site.

In 1908, the United States federal government passed the first federal employers' liability law, targeted specifically at the railroad industry. By 1921, forty-four state governments had enacted workers' compensation laws in response to high accident rates, ensuring that workers who were injured on the job would receive compensation from their employers. These changes increased the cost of workplace injuries, which led to increased interest in driving down the number of workplace accidents through the implementation of workplace safety standards. Statistics from the United States Bureau of Labor indicate that between 1919 and 1921, the accident rate for workers in building construction was at 15.65/100 people.



Construction foremen and site managers began to institute safety requirements, ensuring that workers took basic precautions like wearing a hard hat and safety glasses. This led to the long-term reduction of workplace injury rates across industries, a trend that persisted through to 1970 when the Occupational Safety and Health Administration (OSHA) was established to create and enforce guidelines for workplace safety.

Since its inception, OSHA's oversight of construction and workplace safety has had a profound effect on the number of workers that go home safely to their families each day. By 1989, the accident rate for construction workers had fallen to 8.2/100 people. In 2017, the rate is closer to 3 accidents per 100 people and is continuing to fall.

Why is Construction Safety Important?

Now that we've seen how changes in legislation and the establishment of real regulations and oversight of worker safety impact injury rates, it should be easy to understand why construction safety is so important for workers, employers and for the industry. When employers and employees do their fair share to ensure a safe and OSHA-compliant job site, everybody benefits. Here's how:

Construction Safety is Good for Workers

In the calendar year 2017, 20.7% of worker fatalities in the United States happened in the construction industry, a total of 971 deaths. While the industry has gotten safer over the past decades as OSHA has increased its knowledge and advanced new guidelines and requirements for employees, the tragedies of workplace accidents, injuries and fatalities are still avoidable and far too common.

Every single worker deserves to return home safely to their family after a day of labor. Through the effective implementation of construction job site safety, contractors and subcontracting firms can do their part to ensure that all of their workers have access to the necessary safety equipment and training to perform their jobs with an appropriate level of risk.



Construction Safety is Good for Employers

The introduction of workers compensation, employer liability, and the rigorous guidelines set forth by OSHA have made workplace injuries and the ensuing litigation process increasingly expensive for employers. When employers fail to comply with OSHA by inadequately ensuring the safety of the job site, they can be hit with massive fines and penalties in the thousands, hundreds of thousands, or even millions of dollars. The largest ever OSHA fine cost BP Products North American \$87 million.

Data from the 2016 Liberty Mutual Workplace Safety Index reveals that workplace accidents and injuries that caused employees to miss six or more days of work had a massive financial impact on employers - to the tune of \$62 billion. When employers implement OSHA-compliant safety measures on their job sites, they can avoid OSHA fines and penalties along with the massive financial liabilities associated with workplace injuries.

Construction Safety is Good for the Construction Business

In recent years, the construction industry has been negatively impacted by labor shortages. During the 2008 recession, the industry lost 600,000 jobs and contractors today are struggling to replace those employees due to a lack of available skilled laborers in the job market. As we transition toward a more service-oriented economy, it's easy to understand why more workers are gravitating towards low-risk employment opportunities. Still, the construction industry offers a rewarding career path and high wages - features with plenty of appeal for young people today.



What are the Biggest Safety Risks in Construction?

Every construction job site is unique, but if we carefully analyze the most common working situations for subcontractors, laborers, and tradespeople, we can start to see trends that indicate the most common types of safety risks that workers need to be aware of on the job site. OSHA has identified a "Fatal Four" for the construction industry - the four leading causes of private sector worker deaths that together account for nearly 60% of fatalities:

- **Falling** - Of the 971 worker deaths in the construction industry in 2017, a total of 381 were caused by an injury sustained when a worker fell. That's 39.2% of the total, making falls the leading accident type and cause of construction workplace fatalities in the United States.
- **Struck by Object** - The next leading cause of construction fatalities is when workers are struck by objects on the job site. This category contributed 80 deaths in 2017 or 8.2% of the total. Importantly, this category does not include highway collisions (where the object is a car), but refers to incidents where an employee was struck by a falling or otherwise propelled object on the job site.
- **Electrocutions** - Of the 971 total construction fatalities in 2017, 71 were caused by electrocution.
- **Caught-in/Between** - A total of 50 construction fatalities in 2017 were caused when a worker was caught in or compressed by a piece of equipment or objects on the job site, or struck, caught or crushed in a collapsing structure, equipment or material.



OSHA has identified the leading causes of construction job site injuries and fatalities through data collection and reporting within the industry, but do these risks match up with OSHA's enforcement activities in regard to construction safety? Actually, they do. When we take a look at the 10 most frequently cited OSHA standards violations for construction job sites, the Fatal Four are all clearly reflected:

- 1 Fall protection, construction**
- 2 Hazard communication standard**
- 3 Scaffolding**
- 4 Respiratory protection**
- 5 Control of hazardous energy (this common citation is connected to electrocution fatalities in the construction industry. Employers must adequate service and maintain machines and equipment that could expose employees to hazardous energy)**
- 6 Ladders, construction**
- 7 Powered industrial trucks (under OSHA, powered industrial trucks includes many types of vehicles on the job site, including forklifts. Improper safety behaviors and handling of forklifts can lead to "caught-in/between" accidents)**
- 8 Fall protection, training requirements**
- 9 Machinery and machine guarding (connected to caught-in/between incidents)**
- 10 Eye and face protection (along with head protection, these critical safety measures offer some protection against being struck by objects on the job site)**



Who Regulates Construction Site Safety?

Contractors and subcontractors in the construction industry, especially those operating at the multinational or global enterprise level, must maintain a working knowledge and familiarity with the major construction safety regulators in each market where they do business.

Occupational Safety and Health Administration (OSHA, USA)

As we've already mentioned, United States employers in the construction industry fall under the regulatory purview of OSHA and the United States Department of Labor. These regulatory bodies establish and maintain legal guidelines for the construction industry, conduct scheduled and impromptu inspections and investigations of construction job sites, and may levy fines and penalties against subcontractors that fail to comply with the legislated safety requirements.

Occupational Health and Safety (OHS, Canada)

Regulation of safety in the construction industry works differently in Canada, where employers are accountable to the federal government via the Canada Labor Code, but each individual province and territory is permitted to establish its own legal requirements for construction safety. Projects in Ontario would fall under the Occupational Health and Safety Act (Ontario Regulation 231/91 Construction Projects), while a project in Alberta might face different regulations under their Occupational Health and Safety Code (Alberta Regulation 87/2009). Subcontractors operating in Canada must understand the specific requirements of the jurisdiction where their project is located.

Health and Safety Executive (HSE, UK)

The health and safety requirements for construction companies and subcontractors operating in the United Kingdom are provided by the Health and Safety Executive (HSE). The organization released a document in 2015 entitled Construction (Design and Management) Regulations that set out precisely what construction employers and employees must do to protect themselves and their colleagues from harm on the job site.



European Agency for Safety and Health at Work (Europe)

The European Agency for Safety and Health at Work is essentially the European Union's version of OSHA. The stated aim of the organization is to make European workplaces safer, healthier and more productive by promoting a culture of risk prevention. The European Commission has established the safety requirements for temporary and mobile construction sites in the Directive 92/57/EEC.



Part Two: Construction Safety on the Job Site

At this point, we've established quite a strong case for the importance of construction safety on the job site. We know that increased safety measures have significantly reduced workplace injuries and fatalities over the past centuries and we know who the major regulators are that set the requirements for construction safety in today's biggest global markets. We've even identified the biggest safety gaps at most construction sites through OSHA's ten most common infractions, and we've highlighted the Fatal Four - the industry's four leading causes of workplace injury.

Now it's time to take a comprehensive look at how you can secure the safety of your job site. Subcontractors are responsible for assessing potential hazards on the job site and implementing the appropriate safety measures to:

- A Comply with job site safety requirements in the jurisdiction where the project is located**
- B Ensure the safety of workers on the job site**
- C Limit the financial risk associated with employer liability claims that could result from a workplace injury**

Let's look at the most common types of hazard that could be present on your construction job site.

Scaffolding

According to OSHA, 2.3 million construction workers use scaffolds on a regular basis. Improper or unsafe scaffolding is the third-most-common type of standards violation reported by OSHA. When scaffolding is not constructed or used properly, dangerous falls can occur that account for 4,500 workplace injuries and 50 preventable deaths



each year. Scaffolding must be erected on solid footing and equipped with guardrails, mid-rails, and toeboards to prevent falls.

Vehicular Hazards

The deployment of vehicles on the construction job site creates additional hazards for employees. According to OSHA, 100 workers are fatally injured and 95,000 injured each year while operating powered industrial trucks, a category of work vehicles that includes forklifts, one of the most common vehicles on the job site and a major cause of accident and injury. Employers must provide proper training and oversight to ensure that forklift operators follow the appropriate safety guidelines to prevent accidents and injury.

Falling Objects

Falling objects on the job site can pose a significant hazard to workers, with serious injuries possible when a worker receives a blow to the head from a falling object. This is especially significant on high-rise construction projects where equipment or materials are being lifted by cranes and large loads can potentially fall hundreds of feet before hitting workers.

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Workers should be equipped with hard hats when there is potential for objects to fall from above.



Hazard Communication

When it comes to worker safety, the biggest threat is sometimes the one that workers are not aware of, typically due to poor communication and inadequate flow of information on the job site. Workers must understand the hazards associated with all work they perform, especially when they are expected to handle chemicals that may have corrosive, flammable or explosive properties.

Employers are required to maintain a Material Safety Data Sheet (MSDS) for each chemical that employees come into contact with on the job site, and it should be accessible to employees at all times. Chemicals should be safely and securely stored, and employers must provide spill clean-up kits and a written spill control plan to ensure that chemical spills are safely contained and managed.

Subcontractor can use eSUB's Project Management software solution to ensure that field workers have consistent and ready access to all relevant project documents, including risk and hazard documentation and data sheets for potentially hazardous chemicals on the job site.

Ladders and Stairways

OSHA estimates that in each calendar year there are nearly 25,000 workplace injuries and as many as 30-40 fatalities that involve falls from ladders and on stairways. Employees and employers share equal responsibility for these types of accidents. Employees need to ensure that they use the proper equipment for each task, including the correct ladder that is long enough to reach the work area and that supports the weight of the user. Employers must provide the appropriate ladders for the intended task.

Before using a ladder, users should check for any structural damage to the equipment, environmental hazards like dirt or grease that could cause the ladder to slip, and any paint or stickers on the ladder that could hide possible defects. Stairways must be kept clean and free of any debris or other materials that would pose a tripping/slipping hazard. Stairways with more than four risers require at least one handrail.



Electrical Hazards

Electrocutions are one of the leading causes of workplace fatalities in the construction industry. All too often, electricians know the risks of doing work on live electrical circuits, but the need for haste takes precedence over the need for safety and a tragedy happens. Construction workers who deal with electrical systems must follow OSHA guidelines rigorously to avoid these types of injuries.

Work on energized electrical circuits should only be conducted when all power has been turned off and the circuit has been grounded. An effective lockout/tagout system should be in place, and any frayed or damaged wiring on the job site should be reported and immediately replaced. Under OSHA, employers are prohibited from bypassing any protective system or device whose purpose is to protect employees from possible contact with electrical energy.

Mitigating Construction Job Site Hazards

Subcontractors should implement a hazard control program whose goal is to ensure worker safety by taking all steps necessary to identify and control hazards on the job site. This process is usually initiated during the risk management stage of project design, but should also be engaged on the job site where unexpected hazards could be present. Here's what subcontractors should do to make sure that they're adequately controlling hazards on the job site:

- 1 **Identify Hazards** - the most dangerous hazards on the job site are ones that have not been directly acknowledged or addressed by either employees or management. An effective strategy for mitigating hazards begins with the identification of hazards on the job site, which can begin during the planning phase of a project. A project manager should consider the parameters and requirements of the project and what kinds of hazards will be present on the job site. It may be appropriate to perform a quantitative risk assessment to evaluate and prioritize risks and hazards.



- 2 Communicate Hazards to Employees** - Employees need to be made aware of hazards that are present at the job site. They should have access to risk assessments that include evaluations of hazards, and they should possess a clear understanding of how each hazard is being controlled.

- 3 Control Hazards** - Employers are responsible for implementing hazard controls to protect workers from accident or injury. Some hazards and their controls are specifically outlined in legislation, while others may require the employer to innovate or implement a novel solution to control a hazard. There are four main ways for employers in construction to control hazards:
 - A Eliminate the hazard** by removing it from the job site.

 - B Engineer modifications** to equipment or materials that mitigate the hazard.

 - C Administrative controls** modify the timing of work, policies and other procedures that determine how the work is completed. Administrative controls change the way that employees interact with the hazard and can include things like training, equipment maintenance and other policies that increase worker safety with respect to a specified hazard.

 - D Personal protective equipment** can be deployed to the job site to protect workers from certain hazards. Hard hats, respirator masks, ear plugs, and safety glasses are all hazard controls that protect the employee from various types of harm on the job site.



Part Three: An Organizational Approach to Construction Safety

Construction companies and subcontractors that embrace the need for construction site safety have adopted an organizational approach to construction safety, fostering strong safety cultures and ensuring that workers and their foremen have the tools and training necessary to stay safe on the job site.

A strong safety culture means a job environment where safety is accepted as a number-one priority. Organizations that place profits before the safety of workers, or who cultivate a fear-based managerial culture where workers are afraid to report known problems, are more vulnerable to preventable safety-related incidents. Meanwhile, organizations that establish an effective safety culture that includes executives, managers, and workers, can reduce preventable accidents and injuries, avoid OSHA fines and penalties and enjoy the benefits of safe work.

If your goal is to implement an organized approach to safety, you'll have to go beyond the risk assessment and mitigation protocols described in the previous section. Here are just a few actions you can start taking to improve your organization's safety culture and outcomes.

Subcontractor Management Activities for a Safer Job Site

Worker Education and Training

An effective safety culture that reduces workplace accidents and injuries begins with appropriate worker education and training with respect to hazard identification, proper safety procedures and protocols, and reporting requirements for safety issues.



Employees need to know what hazards are present on the job site so they can take the appropriate steps to protect themselves. They also need to understand how those hazards are being mitigated by their employer, and what participation is required from them to minimize the risk. Workers may be responsible for specific aspects of safety procedures, such as wearing a harness properly when working on high scaffolding, or safely handling a forklift or other equipment. Employers must ensure that workers are adequately educated on all safety requirements that are relevant to their role on the job site.

Regular Job Site Inspections

As a construction foreman, regulation inspections of the job site are one of the principal ways of ensuring the safety of crew members. The best subcontractors, however, encourage all of their workers to perform regular inspections of their surrounding work area to detect any unmitigated hazards before they can cause or contribute to an accident or injury.

Regular inspections of the job site can allow foremen and construction site managers to detect potential issues before they trigger an accident and identify opportunities to correct the behavior and practices or habits of workers through education and training.

Daily Accident/Incident reports

The on-site foreman or construction manager must be held responsible for submitting daily activity documentation that includes accident and injury reports for all incidents where a worker is injured. Even near-misses should be reported, as they can expose hazards on the job site that were previously overlooked and lead to preventive actions.

A construction project manager should review accident and injury reports from the job site to identify hazards that should be mitigated, as well as education and training opportunities for staff. When workers and site managers fail to report incidents and near-misses, management is deprived of a crucial feedback mechanism that is needed to



correct safety issues in a timely fashion.

Software solutions like eSUB Construction Project Management can help streamline the flow of information between the back office and the field, ensuring that daily reports are submitted on time and that every worker has a direct line of communication for reporting safety incidents to management.

Daily Safety Meetings

Subcontractors that wish to increase their organizational emphasis on safety can implement daily safety meetings. These meetings occur on the job site at the beginning of each shift, involve all workers, and their purpose is to communicate the most important safety information that pertains to the specific job, including workplace hazards and safe work practices.

Daily safety meetings should be short and informative. They should help workers to refresh their knowledge, remind workers to conduct important safety checks before beginning work and create a platform for workers to address any questions or concerns related to job safety. Daily safety meetings send a message that your organization:

- Treats safety as a priority
- Views workplace safety as an investment, not a cost
- Is continually making an effort to protect workers
- Does its due diligence to prevent accidents and injuries



Statistical Monitoring of Safety Incidents

Subcontractor organizations should engage in the statistical monitoring of safety incidents to determine which types of accidents are most common and the most common causes or triggers for workplace accidents. These metrics will vary depending on your organization and specific work, but the goal of statistical monitoring is to help you understand where safety issues arise for your organization and how you can allocate resources strategically to reduce these incidents over time.

Organizations with improper monitoring of safety incidents make poor risk mitigation decisions because they fail to understand how different types of risks and hazards impact their activities.

Equipment Logs and Maintenance Records

Each subcontractor organization must establish and maintain policies for updating equipment logs and maintenance records. Equipment on the job site should be cleaned and maintained regularly to ensure that it is in proper working order, and workers should never try to complete a job using broken or damaged equipment.

Workers should be encouraged to report damaged or destroyed equipment without fear of reprimands, and equipment maintenance records should be easily accessible for workers.

Subcontractor managers need to ensure that equipment maintenance is conducted and documented on a specified schedule. Any equipment that does not receive regular maintenance is more prone to a spontaneous malfunction that could cause a serious injury.

Emergency Response Drills

An emergency report can be generated from a variety of sources - outside agencies, a report from the public, or information from workers on the job site. Employers in construction should prepare for emergencies by establishing response procedures and practicing those procedures in emergency response drills that involve



employees on the job site.

Emergency response procedures should be clearly communicated to all site personnel. The procedures should be reviewed with subcontractor employees, suppliers and project owners to ensure that it covers all activities, materials, and hazards on the job site. Emergency procedures should be posted in a conspicuous location where they are available for all employees.

CPR and First Aid Training

Employers are responsible for ensuring that first aid supplies and trained workers are available to deliver immediate assistance in case of an injury. Every employer, whether a contractor or a subcontractor, is required to have their employees trained in first aid. For job sites with 100+ workers, there should be a first aid room and at least 1 person with advanced first aid training. Job sites with 20-99 workers require at least 1 worker with standard training, while job sites with 1-19 workers require at least 1 worker with emergency first-aid training. Any worker who performs their job in isolation must have training in emergency first aid.

As an employer, offering regular re-certification or skill refresher courses for workers can help establish and maintain a strong safety culture and ensure that competent first aid is available in case of an injury.

Personal Protective Equipment

Personal protective equipment (PPE) includes items such as respiratory face masks, steel-toed boots, and other protective footwear, gloves, face shields, eye protection, earplugs, and hard hats. There are many types of PPE available, but each item serves to reduce or limit the exposure of workers to a specified hazard (chemical, material, energetic, etc.)

Employers must understand what risks are present in the job site and provide the appropriate PPE that workers need to ensure their safety. PPE must also be fitted appropriately for each worker to ensure that it fulfills its



intended safety objective. Workers should never perform dangerous work without the appropriate protective equipment. A project manager should identify what articles of PPE are required as part of the project's overall risk assessment and mitigation plan.

Site Security

Beyond protecting workers from construction accidents and injuries, employers must also take steps to protect the public and other non-worker personnel on the job site. Adequate site security means ensuring that only authorized persons are permitted at the job site and that everyone who enters the job site or working area receives the appropriate orientation, information, and safety equipment needed to protect them from hazards during their stay.

Role of Workers and Management in Supporting Safety Initiatives

Construction site safety in your subcontracting company requires cooperation and engagement at three levels: **executive, managerial and workers.**

Workers are primarily responsible for the execution of safety procedures on the job site. Working safely, following the established safety protocols and reporting any recognized issues to management are among the most important safety initiatives for workers.

On-site foremen and construction managers play an important role in overseeing safe working conditions on the job site. Along with workers, foremen are responsible for monitoring the job site and ensuring that all workers are engaging in safe practices in a safe environment. The main responsibilities of management are oversight of work, incident and accident reporting, and the delivery of safety training as well as risk assessment planning.

Executive leadership supports construction site safety through the adoption of policies, procedures, and tools that drive exceptional safety outcomes for the entire organization. Policies such as emergency response drills, daily



safety meetings, and incident reporting are typically implemented at the executive level, executed at the managerial level and must be followed by workers. In this way, employees at every level of the subcontracting organization play a role in enhancing safety outcomes on the job site.



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