

Which Building Materials Are Responsible for Most Construction Accidents?

By Neil Flynn, Esq.

Each year, American construction workers sustain approximately two hundred thousand injuries that are serious enough to cost them at least one day of work. This number leads all fields of endeavor, representing almost ten percent of all workplace injuries. In examining these accidents and their frequency, most studies look to the mechanism of the occurrence, most prominently the *fatal four*: falls from heights, strikes from objects, being crushed between objects, and electrical shocks. Combined, these types of accidents cause six of every ten fatal construction workplace accidents. Less frequently considered are the materials involved in construction accidents.

Perhaps most prominent among this category of objects is the most ubiquitous on any construction site: tools. Although not always considered in the category of “materials,” tools are involved in many construction accidents, especially when the term is used to encompass devices such as forklifts and man lifts. However, even setting those aside, as well as elevation devices such as ladders and scaffolds, construction equipment – ranging from hand tools, such as pipe wrenches, nail guns, and welding torches, to large, stationary equipment, such as table saws and pipe threaders – cause thousands of injuries each year.

These injuries include unsecured tools falling from atop ladders (where they were left for “just a minute”), trips and falls over improperly stored tools in walkways, burns, lacerations, and even amputations resulting from the removal of safety devices or other improper use of inherently dangerous equipment. Devices intended to cut iron pipes make short work of flesh and bone when safety practices are not strictly followed. In addition, the materials that these tools are used to shape, alter, and mold are also involved in a significant number of construction workplace accidents.

While many of these events remain outside the power of the structural engineer to affect, this is not universally true. For instance, the seemingly common-sense requirement to bolt new steel instead of welding it in pre-existing wood structures can significantly reduce the risk of costly and dangerous fires.

Whether made of steel, lead, cast iron, or copper, pipes are invariably denser, heavier, and capable of making short work of the human body. Required safety precautions, most notably hard hats, have significantly reduced the number of injuries caused by construction workers coming into unintended contact with metal pipes. Unfortunately, however, these materials are still the source of a significant percentage of workplace accidents.

Due to their weight and unyielding nature, pipes are inherently dangerous whether they fall onto an unsuspecting worker or, when improperly stored, cause an impact injury or a trip and fall. Improper storage is also the cause of many injuries from cladding materials, drywall, roofing (shingles, tar paper, etc.), or flooring. Something as simple as an unevenly stacked rebar or improperly stored floor tiles can easily cut a worker or cause one to trip and fall. Given the nature of construction sites, where almost everything is sharp, hard, and/or heavy, what might otherwise be a benign occurrence can quickly become a career or an even life-ending event. Other dangerous materials invariably found on commercial and residential construction sites are electrical wiring, conduit, and fixtures.

Of course, the most obvious source of injury from such materials is the risk of electrical shock. While most closely associated with injuries to electricians, a significant number of electrification injuries are sustained by construction workers in every trade ([electrical injuries](#)). In addition, wiring by its very nature creates a high risk of trip and fall injuries stemming from the ease of becoming entangled in loosely or otherwise improperly stored materials.

Another example of inherently dangerous materials that pose an everyday risk of catastrophic injuries is those that are inherently flammable. Solvents, liquid petroleum gas, and adhesives pose multiple risks ranging from flammability and combustion to



inhalation dangers. As the general public has become inured over the last two years to wear masks due to the COVID pandemic, construction workers and especially safety officers have long been aware of proper breathing protection procedures.

Such materials must be stored and used in adequately ventilated spaces to prevent the accrual of toxins' harmful and often lethal levels. Fire or even explosions are the most obvious risk associated with combustible and/or flammable substances. However, they pose additional risks that are often overlooked.

These materials can frequently cause injury simply from dermal contact but are often more dangerous when inhaled due to the lack of or failure to use proper respiratory protection. Damage to the lungs and respiratory system overall can range from immediate to long-term and can, in many cases, be fatal. Of course, this type of injury is also associated with perhaps the most well-known worksite hazard: asbestos.

Asbestos, mesothelioma, and other respiratory diseases have claimed the lives of thousands of construction workers and resulted in some of the most high-profile workplace-related litigations ([asbestos litigations](#)). Entire law firms exist solely to represent workers who have been sickened and/or killed by asbestos.

Gypsum, vermiculite, and other dangerous inhalable substances are used in everything from floor tiling, to wallboards, electrical casing, pipe insulation, and roof shingles. Unfortunately, these materials are silent killers without proper safety training and

equipment, causing their damage over time without a single notable occurrence as the source of their harm. The risks associated with these materials have been well known for decades, but they remain in use for various reasons ranging from financial to efficacy. Thankfully, safety equipment and practices have improved exponentially over time, but the number of construction and other workers who fall victim to chronic inhalation risks is still staggering.

As we can see, the risks associated with construction work are not limited to the most obvious culprits. Whether environmental or situational, the risk of exposure to construction equipment, tools, and materials bears its own risk level ranging from minor injury to death. While many jurisdictions provide legislative frameworks designed to compensate

the victims of such risks, the goal is, of course, to make such compensation unnecessary. Strictly enforced site safety practices, OSHA regulations, and, quite often, simple common sense can all play significant roles in reducing injuries on construction sites and should all be pursued as aggressively as possible. By collecting and monitoring information about the project, increasingly in real-time, structural engineers can anticipate problems before they reach the critical stage and can be managed before someone gets hurt.

Frequent site inspections, regular safety meetings, and rigorously enforced site safety standards are now being supplemented with real-time data collection systems. Comprised of wireless on-site sensors coupled with data collection nodes, such systems streamline the structural engineer's ability to monitor the

entire building site and anticipate problems before they arise. These systems can be customized to monitor material storage and the location and movement of workers throughout the site, thereby giving the engineer the ability to anticipate and prevent dangerous or even deadly accidents before they happen.▪



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