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3M Personal Safety Division

# 3M Protecting Workers from Falls and Falling Objects

by Raymond Mann and Travis Betcher

**364**

DEATHS FROM FALLS IN 2015



% OF DEATHS FROM FALLS IN 2015



**454**

LIVES MAY HAVE BEEN SAVED

For decades, the leading causes of death on construction sites have been “Falls” and “Struck by Object,” according to the Bureau of Labor Statistics (BLS). In 2015, the Occupational Health and Safety Administration (OSHA) recorded 364 deaths from falls (38.8% of the total construction deaths) and 90 workers were struck by objects (9.6% of the total construction deaths). **That’s a total of 454 workers whose lives may have been saved in 2015 alone if these risks were eliminated.<sup>1</sup>**

This white paper will look at two of the most persistent dangers to workers, illustrate the risks of each, and outline safety solutions and equipment to protect all workers on the job site.

## The Current Regulatory State

In the United States, workers at height are in most applications mandated by OSHA to wear a fall protection harness and be tied off. It is well understood across the general construction industry that workers must utilize a primary safety system to prevent a worker from falling or an active personal fall arrest system (PFAS) to arrest a fall when it occurs. Currently, in regards to objects, protection is addressed with debris nets, toeboards and personal protective equipment (PPE) to eliminate or limit potential damage. Here is a quick comparison for how the two risks are addressed.

People are not designed to work at height: People don’t have a natural connection point to tie off to, which is why they wear a fall protection harness—to provide a connection point and keep them at height.

Tools are not designed to be used at height: Tools also lack a connection point to tie off to, but are allowed to fall with hope that secondary safety measures—hard hats and debris nets—will prevent injury or damage.

While currently these risks are regulated very differently, the difference between a fall protection program for humans and a fall protection program for objects is only a matter of perspective: one helps save you; the other helps save others. The question to ask is—why the difference? Why do we allow anything to fall?



<sup>1</sup> United States Department of Labor. Commonly Used Statistics. Retrieved from <http://bit.ly/1rTLTGX>



## Dropped Objects – A Known and Present Danger

According to the BLS, there were 157,490 “struck by object or equipment” cases in 2015 in the United States. That’s nearly 18 injuries caused by a dropped object every hour.<sup>2</sup>

When an object falls from height, it gathers energy and force. Heavier tools, some up to 80 pounds (36.28 kg), can be particularly dangerous. Tools that have pointed attributes, like a nail, screwdriver or spud wrench, can also cause fatal injuries given their ability to penetrate upon impact. Even something as light and blunt as a nut fastener has the potential to cause damage, injury or death if it was to fall from a great enough height.

To better understand the potential danger, look at the speed at which a falling tool can travel. For example, a three-pound tool falling from 200 feet will travel at a speed of 80 miles per hour when it hits the ground. When this tool finally impacts, hard hats and drop zones are of little consequence when an object with this amount of speed makes a direct impact or deflects off another object.

Incidents and accidents proving the damage potential have made the news for over a century. *The New York Times* published an article on August 2, 1903, about dropped objects where it was reported, “with a series of kerchunks extending over the three years during which the new East River bridge has been built, nearly \$3,000 worth of tools have fallen from the hands of the workmen into the river.” The equivalent of that financial loss today would be nearly \$78,000. It’s fortunate that these tools were dropped into a body of water.



Nearly 111 years later, on November 2014, *The New York Times* reported that a 58-year-old man had died in Jersey City after being struck in the head by a tape measure that fell 50 stories on a job site. While the story was labeled a “freakish accident,” the troubling reality is that this type of incident is more common than people realize. Workers who witnessed the Jersey City incident referenced an ongoing concern of equipment falling from height.<sup>3</sup>

With the prevalence of these injuries, companies like 3M have been changing how they view and safeguard against falls for both workers and equipment.

<sup>2</sup> Bureau of Labor Statistics (2016, November 10). Nonfatal Occupational Injuries and Illnesses Requiring Days Away from Work, 2015. Retrieved from <http://bit.ly/2p4k0Fo>

<sup>3</sup> New York Times (2014, November 3). Falling Tape Measure Kills Man at Jersey City Construction Site. Retrieved from <http://nyti.ms/2oJBldY>

**“According to the BLS, there are more than 50,000  
“struck by falling object” OSHA recordable  
incidents every year in the United States”**



## A Broader Definition of Fall Protection Leads to New Standards and Regulations

Historically, “fall protection” referred to preventing people from falling. With the increased awareness of danger of “struck by objects” and the growing number of accidents and injuries that have been reported, the industry is shifting to a broader definition of fall protection. “Fall Protection” refers to anything that can fall, whether it’s a person, debris, tool or piece of equipment. For all objects at height—including humans—it’s not about catching the object (a reactive action), it’s about preventing things from falling (a preventative measure).

It’s 3M’s viewpoint that all objects—whether they are people or tools—need protection to help prevent falls. Many other manufacturers, safety managers and professionals agree with this direction. 3M is working closely with regulating bodies such as OSHA, ANSI and ISEA to help create regulations and a product performance standard for dropped object prevention.

Currently, there is an OSHA General Duty Clause (Section 5(a)(1) of a law requiring employers to maintain a workplace “free from recognized hazards that are causing or are likely to cause death or series physical harm” to employees. OSHA’s criteria for issuing a General Duty Clause Violation include:

- There must be a hazard
- The hazard must be recognized
- The hazard causes or is likely to cause injury or death
- The hazard must be correctable

Additionally, OSHA requires that if you work in an environment where you’re at risk of being hit by something that falls, you must do the following:

- Secure tools and materials to prevent them from falling on people below
- Barricade hazard areas and post warning signs
- Use toeboards, screens on guardrails or scaffolds to prevent falling objects
- Use debris nets, catch platforms or canopies to catch or deflect falling objects<sup>4</sup>

<sup>4</sup> Safety and Health Topics: Fall Protection. Retrieved from <http://bit.ly/1KABPOC>

**“Fall Protection” refers to anything that can fall, whether it’s a person, debris, tool or piece of equipment.”**

## Fall Protection for Tools—What Can Employers and Safety Managers Do?

While we work toward enacting an official standard for dropped objects, there are many steps employers and safety managers can take to ensure their crew is protected. The most effective step is to add a dropped object prevention program for tools and equipment to their existing fall protection program. When creating a safety plan or outlining the safety needs of the worksite, a safety manager needs to identify and evaluate all potential dangers. If fall protection is identified as a danger, they need to implement the ABCDEFs of Fall Protection:

### ABCDEF's of Fall Protection:

- Anchors
- Body Harness
- Connectors
- Descent & Rescue
- Education
- Fall Protection for Tools

A positive first step toward implementing the ABCDEFs of fall protection is to conduct—or enlist a safety expert to conduct—a risk assessment. Personal Protection Equipment (PPE) works best when it complements all other safety equipment used. An overall risk assessment will help identify all hazards workers must be protected against and the best PPE “package” to deploy.

## Implementing Fall Protection for Tools



### ATTACHMENT POINTS

Attachment Points make it possible to tether virtually any tool in a matter of second.



### TOOL LANYARDS

Tool lanyards and tethers are suitable for virtually any tool.



### TOOL HOLSTERS

Safe Buckets are designed specifically for drop prevention.



### TOOL POUCHES

Tool Pouches are built specifically to prevent dropped objects.



### SPILL CONTROL BUCKETS

Safe Buckets are designed specifically for drop prevention.



### WRISTBANDS

Wristbands are designed specifically for tool drop prevention and to facilitate work at height.



### TOOL BELTS

Tool Belts are designed with tool drop prevention in mind.

With all PPE, it's vital that the activities of each worker be considered. If the PPE constricts or negatively impacts job performance it is less likely to be worn properly, or worn at all. This is especially important to consider when adding PPE to the tools that perform the work.

One of the more common methods to help prevent tools and equipment from falling is tethering tools and equipment with connectors, connection points and anchors. Many manufacturers are beginning to incorporate built-in connection points in tools for tethering to help maintain the effectiveness and function of the tool. Additionally, tools and other equipment can be retrofitted with connection points. These tools are then connected to an attachment point via a lanyard.

Depending on the shape, size and use of a tool, they can either be connected to a worker through a tool belt, harness or wristband (recommended for tools under five pounds), or anchored to a fixed structure (recommended for tools over five pounds). Tools that weigh more than five pounds should never be tied off to a person. If a heavy object becomes uncontrolled, the weight and force could dislocate a wrist or shoulder, or even pull a worker over a ledge or off scaffolding.

To ensure that the deployment and adoption of a broader, all-encompassing fall protection program succeeds in protecting and supporting workers, it's important to assign and train a competent person to manage the program and equipment.



## Conclusion

It is the responsibility of every safety manager, construction superintendent, overseer and worker to make sure they understand the dangers they face when working at-height. Fall prevention means preventing things from falling, whether they be people, tools or equipment. For more information about a complete fall protection program, visit [3M.com/workersafety](https://www.3m.com/workersafety)

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