Worker Safety

Whitepaper: Automated Bodyguard: Safety Technology Adds Protection for Workers

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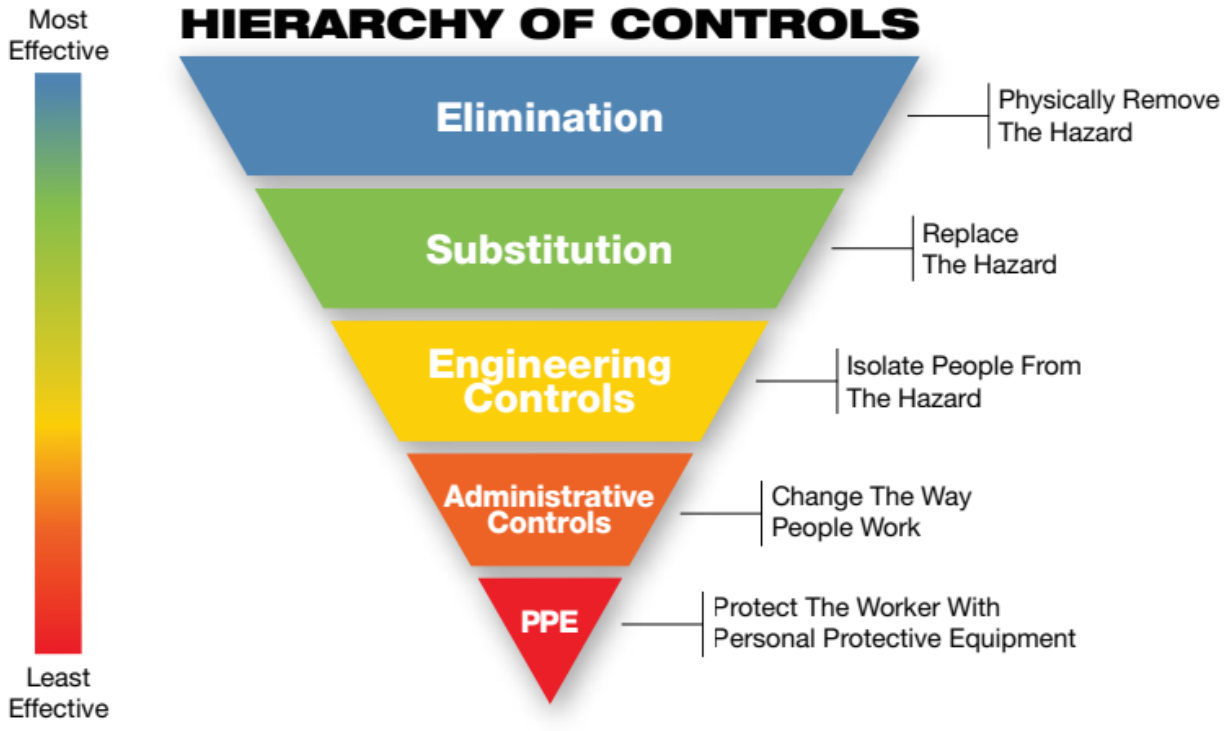
Safety Technology in tool design is like a personal bodyguard that stands between a worker and a hazard 24/7 to prevent injuries. In tool design, Safety Technology physically reduces workers' risk of exposure with very little change to their workflow. Unlike a seatbelt, where the operator still must actively think about putting it on, the Safety Technology designed and built into the next generation of many solutions will protect workers whenever the equipment is running.

On jobsites, safety professionals address the hazards and risks of a job through application of the Hierarchy of Controls issued by the National Institute of Occupational Safety and Health (NIOSH). Within the Hierarchy of Controls, Safety Technology is considered an Engineering Control. In this paper, Milwaukee will use the term, "Safety Technology."



NIOSH says, "Engineering controls are favored over administrative and personal protective equipment (PPE) for controlling existing worker exposures in the workplace because they are designed to remove the hazard at the source, before it comes in contact with the worker. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection."[1]

Advances in technology

In general, Safety Technology encompasses all new technologies now being applied to workplace safety. They include: Machine sensors, mobile apps, wearables, cloud-based software, predictive analytics, robotics, real-time employee monitoring and tracking, PPE tracking with embedded sensors, and others.

Here are some recent examples of Safety Technology designed to help protect workers:

- **Noise reduction:** Every year, thousands of construction workers suffer hearing loss from excessive noise exposure on the job.[2] "Noise-induced hearing loss" affects workers' quality of life and increases the risk of injury. Some manufacturers, like Milwaukee Tool, conduct product sound power tests in fully isolated Hemi-Anechoic Sound Chambers. The investment in this type of research allows Milwaukee® to collect objective noise data to positively influence product design. For instance, the MX FUEL™ Concrete Backpack Vibrator reduces noise when compared to a gas-engine backpack vibrator. *See chart below:*

	MX FUEL™ Backpack Vibrator	Gas Engine Backpack Vibrator
Vibration	.66 m/s²	1.69 m/s²
Sound	92.9 dB(A)	101.9 dB(A)

- **Self-cleaning vacuums:** Some HEPA vacuums feature automatic filter cleaning mechanisms that make them Table 1 compliant with the Occupational Safety and Health Administration (OSHA) regulation on respirable crystalline silica dust (29 CFR 1926.1153).[3] These filtration systems capture 99.97% of all particles greater than 0.3 microns and do not require the user to spend downtime cleaning them.
- **Motion stop:** Grinders, which may be set down and picked back up in a quick sequence, are among the most common tools involved in jobsite injuries. The safest way to set down a grinder is to bring the wheel to a stop – but on some grinders this can take up to 9 seconds. Milwaukee® RAPID STOP™ braking technology, available on some grinders, can stop the accessory in less than 3 seconds when a finger is lifted from a trigger.

Reducing risks in core drilling

On jobsites, of course, workers just want to feel physically confident and safe.

A special challenge, for both worker safety and confidence, comes in the job of core drilling. No matter how experienced a user is, the process is almost always dreaded. Tools such as rotary hammers and core drills may bind up when drilling through rebar or hard aggregate. This can cause the tool to rotate, resulting in loss of control and potentially serious injuries to members of the crew.

> **More than 20,000 annual MSDs require days away from work in construction and, on average across all construction, a rate of 37 per 10,000 full-time equivalent workers.**

The statement, “I hate coring” comes up when talking to contractors, including plumbers and electricians. Some subcontract big core projects to coring specialists while handling only jobs of a few holes themselves.

The power of the machine must be respected as failure to do so can make for dangerous situations, particularly when coring with a handheld drill.

Out in the field, site supervisors have examples of handheld coring injuries, from broken wrists to wounds needing stitches. In one case, a handheld core drill swung erratically near a worker’s jawline and knocked out teeth as he stood on a ladder. In the most serious category of outcomes, a worker lost his life using a corded core drill that threw him off a ladder.

Dust management

A mitigation step, dust management has become a standard core drill function in the construction industry.

Silica dust exposure remains a serious threat to U.S. workers, especially for construction workers who frequently perform tasks like core drilling. OSHA, which adopted its first Permissible Exposure Limit (PEL) for silica in 1971, released updated regulations for silica exposure in 2017. The new regulations include lowering the PEL for silica to 50 micrograms per meter cubed, averaged over an 8-hour day.[4]

In 2016, OSHA reported that of 2.3 million workers who are exposed to silica hazards in their workplaces, the majority – an estimated 2 million – work in construction.[5]

According to the American Lung Association, after pronounced lung scarring, silicosis symptoms such as persistent cough, shortness of breath and difficulty breathing begin. People also suffer from weakness, fatigue, fever, night sweats, swollen legs, and bluish discoloration of the lips. Because the disease affects the immune system, silicosis patients are vulnerable to developing tuberculosis, lung cancer, COPD, and kidney disease. There is no specific test for silicosis. It may take multiple doctor's visits and procedures, from chest X-rays to lung biopsies, to diagnose the condition.[6]

The MX FUEL™ Handheld Core Drill can help the jobsite comply with the OSHA regulation through two methods:

- Extracting dust with the 8 Gallon Dust Extractor and Dust Shroud, which are sold separately.
- Suppressing dust using the onboard water line; a Water Supply is available.

After a 2020 tryout of MX FUEL™ light equipment, including the connection to hook up a water hose, Nick Moses, Hardscape Manager at Koetter Construction commented, "The MX FUEL™ apparatus seems to be more durable, with quick connect hook-up. It doesn't seem to clog up or gum up where the water is distributed to cut the dust." Koetter Construction is one of the largest full-service, design-build general contractors and commercial developers in Southern Indiana and Greater Louisville, Kentucky.

Safety Technology in core drilling

Safety Technology helps protect workers so they can core with more confidence.

The MX FUEL™ Core Drill AUTOSTOP™ technology delivers a safer coring experience. It provides the user with maximum control and reduced kickback during bind-up situations. The AUTOSTOP™ feature

contains an internal gyroscope that monitors angular momentum. Set points or limits are engineered into the Core Drill, which is designed to automatically stop running when thresholds are reached for specific amounts of time.

The AUTOSTOP™ feature uses onboard sensors to remove power from the motor before it rotates more than 45 degrees. At that engineered limit, the equipment will no longer fight the user.

This Safety Technology, along with the product's side handle, helps address the risk of rotation, reducing the chances workers will be thrown off a ladder, lose teeth, break bones, or need stitches. Along with greater safety for workers, productivity is boosted by fewer days away from work for injuries.

In addition:

- The Core Drill has the power to core 6-inch holes in reinforced concrete, adding productivity whether handheld or used on a stand.
- Freedom from cords adds more safety and productivity. Often, electricians need to core on a building exterior above a door. That used to mean stringing hundreds of feet of cords into a house, often up stairwells, causing a trip hazard. Or, it meant using a generator, so requiring both gas and corded support. Battery power means that the time once spent looking for a power source or resetting circuit breakers is now spent getting to work.

Building a company-wide safety culture to protect workers is a choice that is reinforced in daily decisions, such as equipment selection.

Safety Technology can support an organization's safety goals:

PROTECT WORKERS AND HELP BUILD A SAFETY CULTURE.

Safety Technology can become a cultural grounding point for an organization, letting workers know that the everyday risk is recognized and that they work for an organization that cares. Workers are a company's most important resource. Purchasing equipment with Safety Technology and educating workers on benefits and use is a responsible investment in future worker health.

USE EQUIPMENT BUDGETS TO STRATEGICALLY SUPPORT THE BUSINESS.

Organizations recognize that the ramifications for injuries on the job impact more than just the worker – they also have a domino effect on the company's bottom line. While it's not surprising that the upfront cost of new solutions can be an initial hurdle for some companies, the long-term cost savings, productivity improvements, and overall impact on worker morale can provide significant savings.

As NIOSH affirms: "The initial cost of engineering controls can be higher than some other control methods, but over the longer term, operating costs are frequently lower, and in some instances, can provide a cost savings in other areas of the process."[7]

SAVE THE DIRECT AND INDIRECT COST OF INJURIES.

Equipment featuring Safety Technology can help prevent insurance rate hikes due to claims, along with the productivity cost of days away from work. In 2016, musculoskeletal disorders (MSDs) of all types, which can be caused by core drilling injuries, comprised about 40% of all lost-time workplace injuries (356,910 of 902,200).[8] The numbers are likely low, as several studies have found that both workers and

employers may under-report MSDs, according to the NORA for Musculoskeletal Health.[9] Battery-powered light equipment featuring Safety Technology can help reduce claim costs and help avoid injuries, such as MSDs.

Download a PDF of the complete whitepaper here.

References

[1]National Institute of Occupational Safety and Health. *https://www.cdc.gov/niosh/engcontrols/*

[2]CPWR Construction Chart Book, Sixth Edition. 2018. Page 50. Occupational Diseases – Noise-Induced Hearing Loss in Construction and Other Industries.

[3] OSHA. *https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.1153*

[4]CPWR Construction Chart Book, Sixth Edition. 2018. Page 34. Exposure to Silica and Other Contaminants in Construction.

[5] Ibid.

[6] American Lung Association. *https://www.lung.org/lung-health-diseases/lung-disease-lookup/silicosis/* symptoms-diagnosis

[7]National Institute of Occupational Safety and Health. *https://www.cdc.gov/niosh/engcontrols/*

[8]BLS (Bureau of Labor Statistics) [2016]. Cited in National Occupational Research Agenda (NORA) for Musculoskeletal Health. October 2018. Developed by the NORA Musculoskeletal Health Cross-Sector Council. Page 4. *https://www.cdc.gov/nora/councils/mus/pdfs/National-Occupational-Researc...*

[9]National Occupational Research Agenda (NORA) for Musculoskeletal Health. October 2018. Developed by the NORA Musculoskeletal Health Cross-Sector Council. Page 5. *https://www.cdc.gov/nora/councils/mus/* pdfs/National-Occupational-Research-Agenda-for-Musculoskeletal-Health-October-2018.pdf