

How to Redesign Site Safety With Devices to Reduce Worker Risk & Eliminate Hazards

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PUTTING WEARABLE TECHNOLOGY TO THE TEST

Personal protective equipment (PPE) is going to look radically different for construction workers in the years ahead.

Picture a future where wearable technology in construction is as essential as hard hats, hi-visibility vests, and steel-toed boots.

It's already on track to happen. Why? Construction safety wearables, which include augmented reality (AR) glasses, smart boots and helmets, and clip-on devices, can point out risks that are otherwise challenging to assess. By sensing a user's motions or biometrics, wearable technology then connects to an internet platform for detailed tracking and analysis.

"These devices create awareness for underlying issues where we currently have no visibility until it's too late," said Ashley Metz, safety manager for JLG Industries. Put this way: Wearables create windows into how you can measurably improve site safety moving forward. So how can you tap into the benefits of construction safety wearables? Read on to find out how wearables can help your construction company reduce worker injuries and eliminate site hazards.

COMBATING WORKPLACE INJURIES WITH WEARABLE TECHNOLOGY

Overexertion in both construction and industrial environments is a big problem. According to the National Safety Council, overexertion causes 35% of all work-related injuries, and it's



the leading factor for workers' compensation costs.

Overexertion from improper lifting or reaching can cause ergonomic injuries, which damage soft tissues, including muscles, tendons, joints, and more. These injuries include strains, sprains, and tears.

Eric Oakman, senior architect for the digital technology group at JLG's parent-company Oshkosh Corporation, says shoulder and back injuries from overexertion are one of the most frequent and expensive types of worker's compensation claims the original equipment manufacturer (OEM) sees.

And in construction, strains and sprains make up 27% of all nonfatal injuries that result in days off from work.

The good news is that ergonomic injuries can be prevented with proper movement and planning.

This is where construction wearables can provide more

insights into the behavior of your laborers, skilled tradespeople, and equipment operators.

One wearable that targets high-risk movements is the Reflex device by Kinetic, which is designed for construction and industrial applications.

The ruggedized device looks like an old-school pager and clips onto a waistband or belt. It warns users about risky movements and teaches them how to self-correct, says Haytham Elhawary, CEO and co-founder of Kinetic.

“When you bend oddly or twist your spine, the device will vibrate,” said Elhawary.

Users notice what kinds of movements trigger an alert, like if they lift or reach for materials or parts incorrectly. They then can try to figure out what to do in order to eliminate the device’s response.

A display at the top of the Reflex device also tracks steps and real-time counts of high-risk movements.

Activity data uploads to the Kinetic platform when devices are docked in their charging stations at the end of a shift. Online dashboards highlight trends and areas of concern for management, who then can intervene to help resolve any issues.

STUDYING THE EFFICACY OF WEARABLE TECH

Preventing overexertion on construction sites in the past primarily involved demonstrating how to lift heavy materials or reach for tools. And then hoping your crews remember.

Wearable technology lets crews feel what they are doing right or wrong.

So how effective can wearables be at reducing injuries?

Just take a look at the results of a six-week study of the Reflex device.

The pilot, which had a goal of reporting a 20% improvement of high-risk postures, saw behaviors improve 38%, Oakman says.

Construction companies could see similar safety benefits from wearables for reducing awkward lifting and postures that use too much force.

But how do you get your crews on board? Initially, Metz says she did face some questions from employees about the Reflex

devices and how they would be used.

“One of the first things they asked was, ‘Is this Big Brother watching us?’” she said. “They wanted to know if they were going to get in trouble for standing still and stuff like that. That is far from what this device does.”

The Reflex, which crews report is comfortable and easy to wear, does not use GPS or any cameras or microphones.

Once crews understand the technology is designed to protect them, Metz says they embrace it. JLG now uses 400 devices between its McConnellsburg and Shippensburg equipment manufacturing facilities in Pennsylvania.

“Our messaging to employees is you’re not going to get punished for any sort of data,” said Oakman. “This is really all about helping make employees safer and healthier.”

MOVING IN A NEW DIRECTION

With wearable technology, crews are further motivated to change behaviors by meeting daily goals, Kinetic’s Elhawary says.

“It creates a friendly competition,” said Elhawary. “The combination of the real-time feedback plus the gamification process makes workers really get engaged with the product, and so we rapidly see a drop in these high-risk motions, which tends to lead to injury reduction.”

The data from the devices can also help management better assess the setup of jobsite environments.

For example, Metz says one crew member was recording far more high-risk movements than others who performed similar tasks. When she talked to the employee, she learned that he had some difficulty bending his knees when accessing parts.

That information led to a redesign of the workstation. The parts bin and skid dolly presentation were replaced with a slide-out cart configuration to make access easier.

“We were able to get a few changes implemented in Shippensburg that essentially became our standards going forward,” said Oakman.

Another benefit for construction organizations is that the wearable devices give employees a voice to any problems they are experiencing.

“It creates an environment where it’s really easy to talk about where there are opportunities for improvement, because the employees can be very specific about what’s happening,” said Oakman.

Metz agrees. “As our team becomes more aware of ergonomic concerns, they’re taking a more proactive approach,” she said. “These devices are such a fantastic tool for measuring improvements and just validating their efforts.”

The value of wearable technology also extends beyond a shift at the work site.

“I’ve had team members tell me I even do things differently now when I’m at home because of things that I’ve learned here,” said Metz.

And it’s not just bends and lifts that the wearable technology alters, Oakman says. Crews avoid rushing and cutting corners, which can be hazardous. They are more aware about how they are working as a whole.

“They see injuries reduced overall, not just back injuries,” he said.

REDUCING PANDEMIC RISKS

The pandemic has introduced another use for construction safety wearables. The devices can assist with social distancing measures to mitigate the spread of COVID-19.

This summer, Kinetic added proximity alerts to its existing devices. By communicating through Bluetooth, a device will vibrate when it comes within a certain range of another. It also starts a timer to register how long team members are nearby.

“It captures that information in real time, so it allows workers to not only monitor but also motivate them to reduce their daily interactions,” said Metz. “People are staying farther apart from each other. We’re having fewer contacts because that’s what the data from week to week is showing.”

And if an employee tests positive for COVID-19, Metz says wearables ease contact-tracing efforts. The contact reports allow the company to more quickly and accurately know if any other employees should quarantine.

This sets the stage for a more targeted approach to control a potential exposure.

“It really helps to support and minimize the amount of

business disruption,” said Metz.

FUTURE OF WEARABLE TECHNOLOGY

The overarching effects of wearable technology span far beyond strains, sprains, and social distancing.

“What you’re doing is you’re affecting the safety culture,” said Elhawary. “People start thinking about risk in a different way – safety is much more top of mind. So, you start to see improvements in areas of injuries that have nothing to do with that device.”

The data from the devices proves to be a powerful tool.

It allows management to better justify investments to improve work site environments from a design perspective. It also empowers crews to take responsibility for their own health and safety.

“It teaches them that not everything is process related, not everything is material presentation related,” said Metz. “The team has personal influence in their behaviors with how they are approaching a lift or a reaching posture.”

Oakman says Oshkosh is now looking into other areas that could benefit from monitoring through wearable technology. For example, certain wearables can reduce hand injuries as a result of excessive vibration from drills or grinders.


Kinetic is also about to launch sudden height change detection on its devices. This feature will alert when wearers fall or even jump off machines or platforms.

“All those things we can start to detect pretty easily with the sensors we have,” said Elhawary.

Elhawary says the adoption of wearable technology has taken off during the pandemic, and he believes it will continue to accelerate.

“I think going forward, wearables are going to become super prevalent, just because people have realized, actually, it’s not such a big deal to have these things on you,” he said.

All signs are pointing to wearable technology becoming a game-changer in improving safety culture for construction moving forward.

“We’re able to support decision-making through that data,” said Metz. “It’s just going to drive a safer work environment in the long run.” 



About the Author

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