Safety

Robots Can Make Workplaces Safer But They Bring New Risks, Too

Kellie Escoto | Jul 13, 2023

No longer the stuff of science fiction, robots are helping manufacturers work smarter, and their use is surging as businesses invest in Industry 4.0 capabilities.

More than 34,000 new robots were installed in the United States in 2021, a 14 percent increase over the previous year, and the metal and machinery industry increased its new robotics installations by 66 percent, ***according to the International Federation of Robotics***.

It's no wonder that their use is on the rise: Since automakers began using industrial robots to streamline vehicle assembly lines ***in the middle of the 20th century***, the machines have evolved to do significantly more—and cost less.

Today, robots can handle repetitive tasks with great speed and precision while reducing the chance of injury to workers but having them labor side-by-side with humans can create new hazards, too.

The Future of Robotics Safety

Industrial robots are here to stay in the manufacturing world—***since 2010, at least 150,000*** a year have been installed in workplaces worldwide. With collaborative and autonomous robots on the rise, how can manufacturing companies and regulators ensure that workers stay safe?

- As robots evolve—and safety concerns follow suit—OSHA continues to collaborate with the National Institute for Occupational Safety and Health and the Association for Advancing Automation to assess risks and update ***guidelines***.
- New technology and programs are emerging to monitor and eliminate hazards. ***FreeMove***, for example, uses 3D monitoring to sense when a human is near a robot and can override its operating system to slow movement or stop it completely.
- Advances in autonomous robots make them safer for human-robot collaboration, such as sensors to stop motion when robots make contact with a person or foreign object.

Here's what you need to know about the risks and rewards:

How Robots Protect Workers

Eliminating Ergonomic Injuries

Using robots for tasks that require repetitive motions, such as twisting or hammering, reduces injuries to human workers from wear on muscles, tendons, joints and other body parts. These musculoskeletal disorders, or MSDs, can include sprains, strains, tears, hernias, carpal tunnel syndrome and back pain. ***In 2020***, over 247,000 work-related MSDs were reported to the U.S. Bureau of Labor Statistics. The median time away from work for these cases was 14 days, compared with 12 days on average for non-MSD workplace injuries.

Reducing Injuries from Falls and Heavy Lifting

Employees often have accidents while lifting heavy objects or working at elevated heights. In fact, businesses reported more than 255,000 injuries and seven deaths related to lifting, pulling and ***other types of overexertion*** in 2020. Robots, however, can lift and move considerably heavier objects than a single human can. And when work is needed high above the ground, robots can often do it, reducing the chance of ***falls***, which have accounted for nearly 50,000 workplace injuries and 680 deaths in a single year, according to the National Safety Council.

Handling Hazardous Environments

When humans work in dangerous locations, they risk all kinds of injuries if they don't take proper safety precautions, such as wearing ear plugs in loud environments or wearing the proper gloves to protect their hands from caustic chemicals. Robots can work with chemicals, extreme temperatures, high noise levels, dust and other hazards without risk of bodily harm, freeing workers for less hazardous roles.

When do robots pose a safety risk?

Workers often don't need to be stationed near robots that are functioning properly. They can be monitored, programmed and managed remotely in many cases.

However, when they need to be installed, maintained, repaired or tested, the situation changes.

According to a study of 369 industrial robot operator accidents in South Korea from 2009-2019, over half occurred when workers were trapped under or between parts of a robot's mechanisms.

> **Every workplace has hazards, but "being unaware of them when dealing with robotics can be fatal."**
> U.S. Occupational Safety and Health Administration

If an improperly locked robot activates during maintenance, for instance, it can lead to severe injury or even death. That happened in ***a 2022 case*** when an employee was crushed to death while working on a spot-welding robot.

The same study found that one-third of the accidents were impact or collision injuries, which occur when a robot moves unexpectedly or malfunctions. Most cases "related to workers' irresponsible approaches to the robot or the sudden start-up of the robot," the study found.

How to reduce robotic safety risks

The first step in reducing safety hazards for robots in the workplace is awareness. Every workplace has hazards, but "being unaware of them when dealing with robotics can be fatal," ***the U.S. Occupational Safety and Health Administration*** says.

Risks differ based on a robot's functionality and abilities, so ***do a risk assessment*** to identify potential hazards related to the robots your workplace uses.

It's critical that your workers take the steps needed to protect themselves when working with robots. Implement a training program that follows ***OSHA standards*** applicable to robotics.

The program should include specific guidelines such as ***machine guarding*** to protect employees from moving parts, ***lockout/tagout procedures*** to prevent the release of hazardous energy during servicing or repair, and best practices for proper installation and programming to avoid malfunctions.

What steps are you taking to help employees and robots work together safely? Tell us in the comments below.