



Safety

With More Humans and Robots Working Side by Side, How Do You Keep Your Workers Safe?

Kip Hanson | Jan 27, 2022

As automation in the workplace increases, robots will continue to take over boring, often hazardous manual processes, allowing their human co-workers to perform safer and more interesting tasks. How can we be sure the two will safely coexist?

Machine shops and fabricating houses struggled to find qualified workers even before the Great Resignation. Now, the situation is downright dismal. According to a *report* on the National Association of Manufacturers (NAM) website, “77 percent of manufacturers say they will have ongoing difficulties in attracting and retaining workers in 2021 and beyond, with a projected 2.1 million manufacturing jobs going unfilled by 2030.”

The solution, it seems, is automation, and plenty of it. That might seem like bad news for machinists and sheet metal workers who fear losing their jobs, but the reality is just the opposite. Even in those seemingly ancient times before COVID-19 impacted our economy, manufacturers who’d embraced automation were enjoying *significant growth*; going forward, it will be the only way for shops to prosper. And as with other Industry 4.0-powered manufacturing trends, opportunities abound for anyone willing to pick up a book or attend a training class.

“Companies everywhere are looking for ways to reshore their products, and collaborative automation is the best way to accomplish that. It’s easy to deploy, cost-effective, quite flexible, and given the proper risk assessment and safety protocols, can be used alongside humans in practically any environment.”

Joe Campbell
Universal Robots

Many of those jobs will involve robots. In the past, these and other automated devices were largely isolated from human contact in manufacturing settings via physical guards and locked access.

Now, with collaborative robots, aka cobots, working alongside people in facilities everywhere, there’s a need for higher safety standards. The question then becomes: How to keep them safe?

Cobot vs. Robot



ABB's FlexLoader M offers a flexible and expandable solution for a wide variety of machine tending applications including lathes, mills, CNC and machining centers. (Image courtesy of ABB Robotics)

Eric Potter knows. The general manager of the General Industry and Automotive Segment at FANUC America Corporation, he notes that the leap to automation is much easier than some might expect. "Our latest power and force limited robot, the CRX-series, is geared toward shops that don't have a lot of automation experience," he says.

"A great example is installing the robot in front of an existing machine to handle the load and unload process. With its easy-to-use drag-and-drop programming and large collection of collaborative safety features, you don't need to have big fences surrounding the robot as there are with traditional industrial robots. It's a great solution for smaller shops where you don't have a lot of floor space, or if you're doing production that's more mixed volume and need the robot to be moved to multiple areas depending on what the production needs are for the day."

Palletizing is another application. Here, the manufacturer places a cobot at the end of an assembly or packaging line, where it moves boxes from a conveyor to a pallet for shrink-wrapping before distribution. As with other collaborative scenarios, there's usually no need for guarding, and the cobot can also be equipped with on-board vision systems, allowing for more random inbound object placement—because fixtures and other workpiece positioning devices are unnecessary, it ultimately reduces overall integration costs and simplifies everyday use.

Yet Potter is quick to point out that collaborative doesn't always mean "no guarding necessary."

Even though cobots can sense collisions and generally move more slowly than their traditional

counterparts, any robot that handles sharp objects—sheet metal parts are one good example—should be segregated from its flesh-and-blood colleagues.

Read more: OSHA Recordable vs. Reportable Incidents: How to Tell the Difference

Bringing a Gripper to a Knife Fight



Seattle-based aerospace manufacturer Tool Gauge deployed Universal Robots' UR5 cobot in a plastics assembly and dispensing application with close human-robot collaboration. (Image courtesy of Universal Robots)

"It's really important to understand this topic," Potter says. "The example we always give is, 'What if it's carrying a knife?' There are still cases where people put a cobot into an application, but then place area scanners or even fencing around it to protect people during parts of the application that might be potentially harmful. In the first example, the cobot can transition from higher speeds to lower collaborative speeds based on somebody coming near it, and in the second, the robot can be made to stop if a human enters the restricted area after the robot has picked up an object that has sharp corners."

Potter and others will tell you that shops should undertake a safety assessment before any automation investment, collaborative or not, and that the appropriate industry guidelines must always be followed (see sidebar). One of these is Joe Chudy, vice president and general manager of ABB Robotics U.S., who explains that a safe working environment is easy to achieve with the right tools.

"Our SafeMove software suite gives operators greater freedom to collaborate with robots in a limited space," he says. "It uses configurable electronic motion detection and prevention measures that restrict a robot's speed, motion and position when a person comes near. This can include slowing the robot to allow a worker to safely add new materials to a parts feed or stopping the robot for direct interaction. What's more, it can be used across the entire range of industrial ABB robots, making every robot a cobot."

It's important to note that other automation manufacturers offer similar tools and that—knife-wielding or not—robots and cobots of all kinds can be made safe. Stefan Drakensjo, global marketing and sales manager for general industry at ABB, thinks this is very good news for manufacturers wishing to attract workers. "There's no doubt that the small to medium enterprise (SME) workforce is aging, and by investing in automation, those who manage these companies can entice a younger, more tech-savvy group of people into entering the industry."

Stability Is Key



Collaborative robots are a great option for mundane tasks like assembly line work and pallet loading. The one shown here is equipped with a camera for greater flexibility. (Image courtesy of FANUC America Corporation)

Before doing so, however, Drakensjo says the company's manufacturing processes should be predictable and stable. "Those are the ones you should look to automate, because automation will not mend a broken manufacturing process. After that, look for areas where you want to increase productivity, with a focus on the processes that are dirty, unsafe or repetitive. Automating these is good for everyone, but especially the operator."

Universal Robots' (UR) Joe Campbell agrees on all points but suggests that training is an often overlooked component of a safe robotic environment. The senior manager for strategic marketing and applications development at UR, he says this is the idea behind the company's UR Academy, which offers virtual, in-class, and self-guided e-learning classes, although he adds that operating and programming of UR's collaborative robots is easy enough that most people can cover the basics in a half-day or less.

The UR Academy is part of a broader company ecosystem, Campbell says. It includes application kits for common manufacturing tasks and UR+ certified plug-and-play components; on the safety side, it includes products like sensor manufacturer SICK's "sBot Stop" safety laser scanner system, which monitors the ground level around a cobot and can detect whenever a person enters or leaves the area.

Whatever the solution and however you implement it, Campbell offers the following advice to manufacturers considering a robotic solution to their labor problems. "COVID showed us what we should have realized much earlier—that our global supply chain is much more fragile than anyone thought," he says. "As a result, companies everywhere are looking for ways to reshore their products, and collaborative automation is the best way to accomplish that. It's easy to deploy, cost-effective, quite flexible, and given the proper risk assessment and safety protocols, can be used alongside humans in practically any environment."

By the Book

Get out your credit card. For the bargain price of \$1,599, nonmembers can download the **IEC 61508 - Electronic Functional Safety Package** from the ANSI Webstore. It contains "techniques and measures for implementing electrical, electronic, and programmable electronic safety-related systems as well as software requirements." There's also ISO 13849 Safety of machinery — Safety-related parts of control systems, **Part 1: General principles for design** and **Part 2: Validation**, available for 198 and 178 Swiss francs respectively (around \$200 each).

Each of these seems like a lot to spend for some dry, humorless reading, but for those implementing a shopwide automation strategy, it might be money well spent. In lieu of these fine publications, however, there's always YouTube. For instance, Pennsylvania-based industrial safety firm **Exida** has done a good job of publishing a series of instructional videos on this and other safety topics, most notably its **Introduction to Robot Functional Safety (IEC 61508)**. The **Association for Advancing Automation (A3)**, OSHA's **Robotics webpage**, and **TÜV Rheinland** are additional resources, as are the companies who participated in this article.

Get automating.

What steps are you taking to make sure your employees are free from injuries—especially from robots and cobots—at work? What steps are you taking to improve workplace ergonomics? Share your thoughts in the comments below.

