Robotics

Getting Robot-Ready in Metalworking with Cobots

Kip Hanson | Mar 01, 2017

What You Need To Know

Look at the bigger picture to determine if robots are worth the trouble.
Collaborative robots work hand in hand with humans.
Consider what it is you want robots to do in your shop.

How adding automation to industrial production tasks can escalate your competitive edge.

Humans have had a long-term fascination with robotics and autonomous systems. Somewhere between "Return of the Jedi" in 1983 and "Star Wars: The Force Awakens" in 2015, the thought of using robotics to automate various industries started to blossom into reality. Unfortunately, once realism kicked in, we also learned that robots are expensive to implement and require complex machine interfaces and a level of proficiency in obscure programming languages. Instead of looking like R2-D2, these robots can take up a huge amount of space with conveyor systems, grippers and end-of-arm tooling as well as require protective guarding to avoid damage to their human counterparts. The question then remains: Are robots really worth the hassle?

The answer is in looking at the bigger picture. With intense global competition and a general scarcity of skilled labor, robots are becoming an acceptable way to reduce costs, increase productivity and improve the bottom line for manufacturers of all sizes. Robots don't take breaks or vacations. They can easily carry heavy loads and are happy to do boring, repetitive and even dangerous tasks without complaint. Furthermore, robots are much easier to implement than one might think.

Why Robots Are Now a Game Changer

Global office furniture manufacturer Steelcase agrees. The company recently installed several computer-controlled collaborative robots (cobots) from Rethink Robotics at its Grand Rapids, Michigan, facility—machines that Steelcase IT Innovations Leader Edward Vander Bilt has said are "game changers." These cobots work hand in hand with humans to support the completion of their shared work process, which in this instance includes manufacturing office, hospital and classroom furniture.

Steelcase manufacturing engineer Walter Adams agrees, explaining in a ***Rethink Robotics*** vlog that the company is being driven to find new ways to introduce advanced technology and automation. "We'll be implementing 'Sawyer' in areas where it has a highly repetitive or mundane task, to help free up our operators to do more important functions in their work cells," he says.

Robots at Work

Terry Taggart, owner of job shop Tag Team Manufacturing, and his team also turned to Rethink's Sawyer cobot for their after-hours and weekend production needs. The result? The company delivered a 20,000-piece job in a little over four months during the summer of 2016, and is now looking forward to its next big order.

Cobots such as Sawyer use a patented "Robot Positioning System" to landmark and tell them where they are relative to the conveyor, the machine, a box of parts, etc. And their arms are equipped with force-sensing mechanisms that slow down or stop before an inadvertent collision. Much like a human hand, it helps them wiggle or rotate objects into position. The bottom line is that cobots work in "unstructured" environments and require little teaching to do their jobs.

Jim Lawton, chief product and marketing officer at Rethink Robotics, says examples like these are typical.

"It's why people are coming to us saying, 'I need a smart, capable robot that can be set in front of a machine and shown what to do just like a human,'" says Lawton. "Cobots are, however, designed for you to interact with them. If you want to make an improvement to the process, you grab the arm and show it a different way of doing it. Then when you're done, it will repeat whatever you've showed it."

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It's Just You and the Machines

Cobots are clearly cool, but that doesn't preclude the necessity of traditional "behind the fence" robots. Geoffrey Dawson, account manager at automation solution provider FANUC America Corp., in Rochester Hills, Michigan, says that, technically, all of the company's industrial robots can be considered "collaborative."

"There are robots that apply speed and distance separation to keep humans safe by using area scanners or similar devices to determine when to slow down or stop," explains Dawson. "Then there are the newer force-and power-limited collaborative industrial robots, which are designed to work alongside humans. These are generally slower than industrial-style robots, but will stop upon contact. Both styles of equipment, though, can be used in close proximity to workers."

Dawson explains that if you're ready to integrate a robot into your shop, you should first consider what it is you want it to do. A robot being used to load and unload parts from a CNC machine tool will require an electrical interface to the control. An automatic door opener may also be needed, as well as various workpiece grippers. You may want a way to transport raw material to the machine and then a way to take finished parts away once done. Depending on the make and model of the robot, you will likely also need some kind of programming software to control it, although many robots today can be placed into "teach mode" and taught how to do their jobs.

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What a Price to Pay

As their name implies, force-sensing cobots use integrated force sensors to detect the world around them and require similar accessories, software and levels of integration. If, however, all you need is someone to package parts or insert a component into an assembly, it's likely you can teach the cobot to do what you want and walk away. Shops can purchase an entry-level, new industrial robot starting at $50,000, but added software can run the equipment up to $150,000. Used robots go for about $25,000, and the price can go up to $75,000 based on the necessary tooling and software. RobotWorx, which sells an inventory of high-tech robots for various needs, offers a ***profit calculator*** to help its customers determine the return-on-investment after purchasing a robot. The price, which is directly related to the application performed, is a small cost to pay considering the value that robots bring to the manufacturing table. Innovation, productivity, flexibility and greater profitability could be so much more within your reach than ever before.

Key Takeaways

- Take the right steps when integrating a robot into your shop.
- You can successfully combine a human and cobot workforce.
- Evaluate the price of an industrial robot versus the ROI.

What do you think of cobots, and where do you think they fit in manufacturing?

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