Modern Machine Shop

Rise of Industrial Robots Places New Demands on Machinists

Kip Hanson | May 23, 2023

Machinists and sheet metal fabricators, listen up: It's well and good to know how to measure parts, touch off tools and write CNC programs, but it might be time to put one more skill in your vocational toolbox.

Robotics, specifically.

Industrial droids are coming to shop floors everywhere and if you want to stay competitive in tomorrow's workplace, learning how to operate, set up, and program them is essential. Best of all, it may pay quite a bit more than you're earning now.

Likewise, shop owners and managers grappling with a shortage in skilled labor that may reach 2.1 million workers by 2030 stand to benefit from investing in robotic technology and automation.

Meeting the Upskilling Challenge

For it to pay off, however, they need to ensure that the available workers—including mid-career employees—get the training they need to take full advantage of the technological advances.

"There are zero jobs in today's manufacturing industry that don't require significant skill levels, and increasingly, those skills include knowledge of robotics," says Paul Aiello, executive director of education for FANUC America.

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Though only four syllables long, the word automation covers a vast expanse of technical territory.

There are PLCs (programmable logic controllers) to contend with. There's communication with CNC machine tools, which is typically but not always accomplished via an Ethernet network (an asset that far too many shops have yet to install).

In addition, robotic experts must know about gripper design, conveyors, and increasingly, vision systems as well as programming, simulation software and pendant operation.

A Key Differentiator—For Companies and Workers

It's a lot to master, but as Aiello points out, it's crucial that companies invest in their employees' education if they wish to succeed in this brave new world.

"It is essential for anyone striving for productivity, efficiency and competitiveness to deploy modern technology, with automation high on the list," he says. "But equally important is a talented, trained workforce. That will continue to be the ultimate differentiator in both global and national economies."

For small and medium-sized manufacturers, spending time and money on employee training not only improves the company but also builds loyalty, he adds.

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"It may be challenging for manufacturers to find time for employee development, but taking a shortsighted approach by not investing in automation and personnel will ultimately leave them lagging," he says.

Fortunately, there's no shortage of training options.

FANUC offers a ***range of classes*** at its headquarters in Rochester Hills, Michigan, as well as its regional offices. Instructor-led virtual training and self-paced e-learning, both of which help workers get up to speed quickly, are also available.

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> Joe Campbell
> Universal Robots

Additionally, FANUC America works with more than 1,500 schools offering hands-on, real-world automation training as well as with many community-based programs, such as FOCUS: Hope in Detroit, which trains people in underserved and underrepresented areas.

ABB, KUKA, Motoman, Mitsubishi, Epson and other robotic equipment makers also train customers on their products.

Generalized Robotics Training

For those in search of a more generic curriculum, the American Society of Mechanical Engineers (ASME) provides classes on ***industrial automation***, as does SME—formerly the Society of Manufacturing Engineers—through its ***Tooling U-SME*** program.

The Association for Advancing Automation (A3) has a wealth of resources on its website at ***www.automate.org***, and a vast number of vocational-technical schools and community colleges offer functional training and even two- or four-year degrees in automation technology.

Finally, for would-be robotic welders, Lincoln Electric offers a mobile ***Robotic Welding Education Cell*** to train its customers, as well as a virtual reality environment (VRTEX) for students wishing to perfect their manual skills.

Collaborative robot users will likewise benefit from training says Corey Adams, education program manager at Universal Robots (UR), which provides a slew of online resources.

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“We developed an online training resource called the UR Academy several years ago, which helps users to master the fundamentals of setup, programming, and operation within a few hours,” he says. “So far, it has trained approximately 180,000 people.”

The academy has made a significant impact by allowing companies, especially small ones, to access a well-structured training curriculum that quickly brings their teams up to speed at little or no cost, he says.

FANUC America works with more than 1,500 schools offering hands-on, real-world automation training. | Image courtesy of FANUC America.

And that’s not all, says Joe Campbell, UR’s senior manager for strategic marketing and application development.

“Because we kept getting requests from customers who either wanted to go deeper into the technology or wanted more training around their application, we started offering in-person training, first at our facilities and then with our certified partners,” he says. “Today, we have 120 sites around the world.”

Prioritizing Process Stability

As more and more robots make their way onto the factory floor (and more and more people become trained), the question becomes which tasks are best suited to machines and which ones should be left to humans.

Successful robot deployment has as much to do with the manufacturing process and its many variables as it does with electromechanical capabilities and training, says UR’s Adams.

“I worked with a customer a while back who couldn’t figure out why their robot was randomly dropping boxes,” he recalls. “As it turned out, it was summertime and the humidity was just high enough that the cardboard was getting a little soft. We switched him to a bigger gripper and the problem went away.”

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The experience illustrates why mastering robots takes more than bookwork and lesson plans. It also

requires some real-world experience.

That's why Adams and FANUC's Aiello agree that robot newbies should pick the brains of their provider's applications and service people—and never hesitate to phone a friend for helpful advice.

They should also be aware of a fundamental truth about industrial robots: They're only as good as the manufacturing process.

For a robot to successfully operate a CNC lathe or machining center, a welding cell, a press brake or any of a variety of other operations, the underlying process must be both stable and predictable.

That's especially true for shops pursuing a lights-out manufacturing strategy, which, after all, is the Holy Grail of automation.

"Whether lights-out, lightly attended, or working side by side, it's critical to the U.S. economy and the success of manufacturers large and small that we develop an industry-wide competency around automation," Campbell says. "Accomplishing this is not only crucial to our country's well-being, but that of its most important asset, the American worker."

