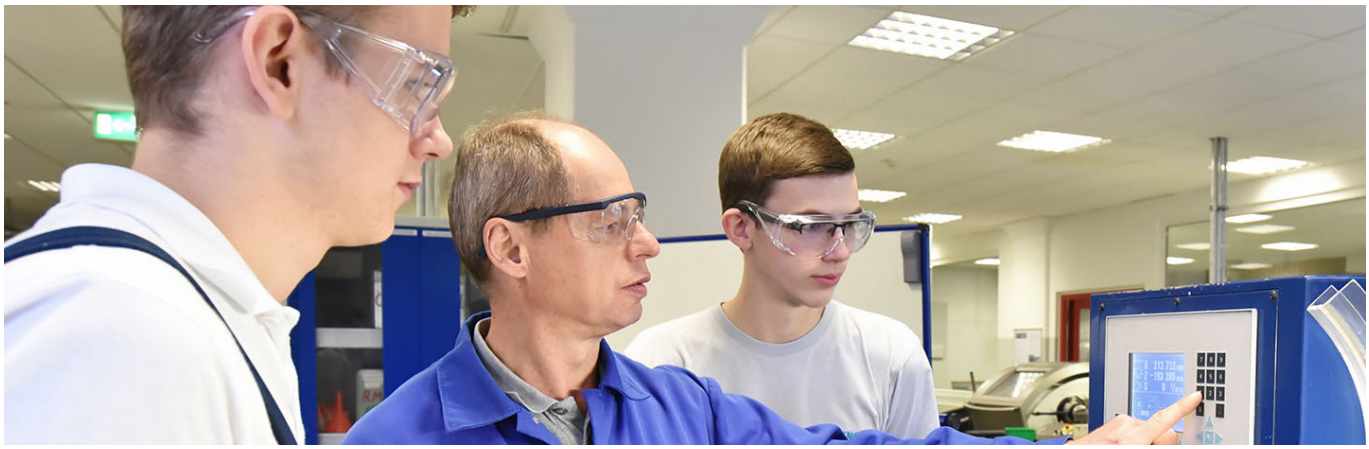

Metalworking

Tech Upgrades Join Career Opportunities to Make Trade School Cool Again

Kip Hanson | Feb 13, 2024

American manufacturing is growing at a rate rarely seen since the country's founding nearly 250 years ago.

To keep it up, however, the companies behind the economic boon must find ways to reverse a shortage of industrial workers that may reach 2.1 million by 2030. Among their strategies is developing new training programs and highlighting previously unimagined career options.

Just over two years ago, for example, ***MSC Industrial Supply Co.*** partnered with the University of Tennessee Knoxville to create the ***MSC Machining Research Laboratory***, whose mandate is to "bring industry professionals, suppliers, educators and students together, offering unprecedented opportunities for collaboration and innovation."

Such efforts are opening educational doors that have long been shut, and in many cases never existed.

Refilling the Labor Pipeline With VoTech Graduates

"One of the primary goals for anybody in this field has to be workforce development," says Michael Gomez, a principal engineer with MSC's manufacturing research and technology team who plays a leading role in the laboratory's development and day-to-day operations. "It's our responsibility to teach the next generation—to show them the awesome opportunities that exist today and then help them pursue a meaningful career in manufacturing."

In vocational-technical schools, modern manufacturers can introduce educators and their students to the latest technology and help ensure that young graduates can hit the ground running in the most productive way possible.

A sense of urgency is essential. "A good friend of mine is a journeyman machinist," Gomez says. "He needed nearly 10 years to earn that certification. The problem is, we don't have that much time to refill the pipeline. The industry needs people now."

STEM Education and iSchool

While pursuing his doctorate under Tony Schmitz, director of the University of Tennessee, Knoxville's Machine Tool Research Center, Gomez worked as a research assistant at nearby Oak Ridge National Laboratory.

Coincidentally, Mark Buckner was also an Oak Ridge employee, albeit not at the same time as Gomez. Buckner served as a research scientist there for more than three decades and during that time, he began working with the ***FIRST Robotics*** community, which promotes STEM (science, technology, engineering and mathematics) education and helps "prepare young people for the future."

"I'm coming up on 13 years with that program, during which I've had the chance to instruct kids on everything from advanced manufacturing controls to artificial intelligence, generative design, lean manufacturing, and more," Buckner says. "And then a couple of years ago, the Tennessee Department of Education put out a call for an Innovative High School Model as part of their Career, College & Technical Education program, so I took what I know about manufacturing and applied for the grant."

As a result, he can list iSchool founder on his extensive resume. Part of Oak Ridge High School, Buckner's Advanced Digital Design and Manufacturing Center boasts an impressive array of machine tools and technology, among them CNC lathes and five-axis machining centers, abrasive water jet machines, fiber and CO_2 lasers, and commercial 3D printers—equipment that Buckner says is "what you would find in any advanced machine shop."

"The American Society of Mechanical Engineers (ASME) conducted a study recently on the ***talent gap and the workforce of the future***," says Buckner. "Their assessment was that current education is woefully ill-equipped to provide the necessary skills and that the traditional roles of machinist, design engineer, CNC programmer and so on are blurring. So people not only need broader skill sets, but must also have a good handle on newer technologies like automation and the Industrial Internet of Things. A key takeaway from that study was the need to reduce time to talent for these students. I'm trying to build a program to deliver that."

Going From Unskilled to Job-Ready at Vocational Schools

Learning to program and operate machining equipment is only part of the curriculum. To give students a taste of the real world, Buckner also started Wildcat Manufacturing.

Here, students are paired with local companies to do design work and just-in-time manufacturing of low-volume production runs. "They're responsible for design, quoting, prototyping, fabrication, machining and final delivery, and participate in profit-sharing as a part of the company," he says. "It's a great experience."

Adding to that experience, Buckner has partnered with Oak Ridge National Laboratory's ***Manufacturing Demonstration Facility***, where students can learn about wire arc additive metal 3D printing and other advanced technologies.

"We're taking kids from basically nothing all the way through to getting them job-ready," he says. "My vision offers them three options after graduation: start their own business, fast-track into an engineering program or go into the workforce with the problem-solving skills to deliver value."

Composite Careers

Another Tennessee-based resource that's leading workforce development is IACMI-The Composites Institute, whose mission is to increase the capacity of U.S. manufacturing capabilities through an agile,

available skilled workforce trained in the latest technologies.

IACMI is one of more than a dozen such public-private collaboratives under the ***Manufacturing USA*** umbrella. Others include the ARM (Advanced Robotics for Manufacturing), CESMII – The Smart Manufacturing Institute, America Makes and MxD (Manufacturing times Digital). All enable the commercialization of new technologies and provide vocational-technical training or collaborate with the schools to provide and deliver curriculum aligned with those advancements.

Each institute is sponsored by either the Department of Defense, the Department of Commerce or the Department of Energy, says Joannie Harmon, vice president of workforce development at IACMI. Industry and other entities provide matching funding.

All have recognized that the United States needs to bring manufacturing back to its shores and that failing to do so jeopardizes national security strategy.

The Composites Institute, for its part, is "focused on the use of advanced composites, whether that's for lightweighting of cars and airplanes or for greater strength in aerospace and energy components," Harmon says.

Reaping those technological benefits requires that people know how to work with the materials, however. As Harmon explains, there's not a lot of information available on composite machining, and for most people going into the field, training happens on the job.

While she and her team are working to remedy that situation, "you can't bring back manufacturing the same way it left," Harmon says. "It's become much more advanced, and the training must mirror that."

So must the mindset. Harmon adds another D-word to the "dark, dirty, dangerous" misnomer that has led many young people away from the trades: dead end. "Despite what people have been hearing about the trades over the past few decades, there's tremendous career potential throughout manufacturing, now more so than ever," she adds.

Forget What You Think You Know

Harmon has firsthand experience with the "must go to college" mindset. Born to blue-collar parents who saw their factory jobs go overseas, she was told from an early age to get a good education. And while that remains excellent advice, the type of education needed to excel in today's world has changed significantly.

"Even before the pandemic disrupted global supply chains and made the workforce situation even worse, the government had begun to realize the risks associated with offshored manufacturing and was taking steps to correct the situation," she says. "But it's a lot like a big naval ship—it takes a long time and a lot of effort to shift it."

Fortunately, the U.S. has made significant investments in workforce development, she points out, as have many large manufacturers.

"It's up to young people and those looking for a career change to take advantage of these investments, whether that's through participation in one of the many available training programs, apprenticeships, or technical education at a community college or university," Harmon says. "The opportunities are out there. It's just a matter of pursuing them."

