

WELDING JOURNAL



FEBRUARY 2024

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Dan Allford
President and owner,
ARC Specialties

“We don’t miss plowing fields behind a mule, washing dishes by hand, or weaving cloth and sewing all of our clothes. Robots and automation free humans to live longer, better, and more creative lives.”

Thank a Robot for Helping U.S. Manufacturing

Recently, there were news stories about a failed hand tool factory in Texas (one is at [foxbusiness.com/economy/craftsman-factory-texas-shows-challenges-reshoring-manufacturing](https://www.foxbusiness.com/economy/craftsman-factory-texas-shows-challenges-reshoring-manufacturing)). The articles focused on the failure of Americans to build things in the United States and the failure of robotic systems.

As a career roboticist, I am compelled to comment. There are 12 million of us working in manufacturing in the United States. Manufacturing is the fifth leading employer and the only segment in the top five that produces goods. All the others are in the service sector (www.bls.gov/emp/tables/employment-by-major-industry-sector.htm). I am proud to have spent my career making U.S. manufacturing more competitive with robots and automation. I love visiting U.S. plants that make bicycles, valves, drill bits, jet engines, light poles, power plants, cars, trucks, and airplanes.

The good news is that U.S. manufacturing is growing. The 2008 Great Recession accelerated the reshoring trend when everyone realized that strong economies are built on manufacturing, not financial services. In 2020, COVID-19 reinforced that manufacturing is a critical part of U.S. infrastructure and that overseas trade is vulnerable to interruption.

I do not blame robots for the failed factory in Texas. Bad robot integration is the cause of robot system failures and results in malfunctioning and unused automation projects collecting dust in the back of many shops. There are only 36 U.S. robot integrators certified by the Association for Advancing Automation (automate.org/robotics/robotic-integrator-certification-program/meet-the-a3-certified-robot-integrators). Robot integration is tough, and qualified integrators are seldom the lowest bidders. ARC Specialties has a full-time laboratory to test ideas and confirm solutions. Sometimes you have to tell a customer that technology has not advanced sufficiently to solve their problem and no-bid the job. Certified integrators are experts in the field; they understand the limits of technology and always do a safety assessment before taking on a project.

One of the first automation success stories is in agriculture. In 1900, half of all U.S. labor was worked on farms. Today less than 2% does (ers.usda.gov/data-products/ag-and-food-statistics-charting-the-essentials/ag-and-food-sectors-and-the-economy). Machines have been weaving cloth and manufacturing clothing since the 1700s. Machines have also been washing clothes and dishes since the late 1800s. Everyone has benefited from plentiful, affordable food and clothing, all produced by machines. We don’t miss plowing fields behind a mule, washing dishes by hand, or weaving cloth and sewing all of our clothes. Robots and automation free humans to live longer, better, and more creative lives.

Our current level of prosperity is directly attributable to the improved efficiency that comes with automation. In 1960, one transistor cost \$1, which is a billion times more than today’s cost (spectrum.ieee.org/how-much-did-early-transistors-cost), making cell phones and computers affordable. Much of this astounding reduction is a result of automation. Progress is not just inevitable, it is desirable.

Cost reduction due to improved efficiency is not recessionary; it is revolutionary. In this global economy, the most efficient producer of a product prospers while inefficient producers go out of business. Personal computers with word-processing software have made business more efficient and productive while eliminating more than half the typists in the United States, but we wouldn’t go back.

Over the last 40 years, I have had the pleasure of successfully integrating hundreds of robots and automated machines in every industry from food to nuclear power. It is gratifying to return to see these companies thriving and people working with the systems we installed. Robots keep U.S. industry competitive and our standard of living high. Taxing robots in the United States will simply move jobs overseas, not save jobs. I know this because I install robots in 33 countries.

Robots are labor-saving tools that make businesses more efficient and productive. So, don’t give up on U.S. manufacturing and robots. Instead, thank a robot for doing the dull, dirty, and dangerous jobs efficiently so that U.S. manufacturing remains competitive in a global market. **WJ**

Nevada Department of Transportation Receives \$3-Billion Grant for Brightline West

The Nevada Department of Transportation (NDOT) has received \$3 billion in funding from the Federal-State Partnership for Intercity Passenger Rail Grant Program for Brightline West, which will connect Las Vegas, Nev., and Southern California. President Joe Biden joined elected officials from Nevada and California to announce the news. According to Brightline West, it will be the nation's first true high-speed rail system and the first project of its kind to be built with American union labor. The fully electric, zero-emission system will become one of the greenest forms of transportation in the United States.

The 218-mile passenger rail service will reach speeds up to 200 mph with no grade crossings, and the alignment is within the median of the I-15 highway. The system will feature three full-service stations in Las Vegas; Victor Valley, Calif.; and Rancho Cucamonga, Calif.

The Las Vegas station will include mobility connections and easy access to the Las Vegas Strip, the Las Vegas Raiders football team's Allegiant Stadium, and the Las Vegas Convention Center. The Victor Valley and Rancho Cucamonga stations will have direct connectivity via California Metrolink to key points in Los Angeles, such as Union Station.

Brightline West's \$12-billion project is expected to bring more than \$10 billion in economic impact to Nevada and California. Economic studies show the project will create more than 35,000 direct and indirect jobs, including 10,000 direct union construction jobs and nearly 1,000 permanent jobs for operations and maintenance. Brightline West's investment also includes more than \$800 million in roadway improvements to the I-15 corridor. The company has agreements in place with several unions for the use of highly skilled union labor in critical jobs required to build, operate, and maintain the project.

The project's environmental benefits are designed to support Nevada's and California's climate strategies by promoting a no-emission mobility option that lowers greenhouse gases by more than 400,000 tons of CO₂ each year. The diversion of people from auto and air travel to the high-speed rail system reduces vehicle miles traveled by more than 700 million each year and short-haul flights by 16,000 annually.

The \$3-billion grant award marks the largest in NDOT's history and is the culmination of more than two decades of planning and coordination to build a high-speed rail line between Las Vegas and Southern California. NDOT, as the grant administrator, will continue to play an important oversight role as Brightline West constructs the rail system. Additionally, NDOT will be responsible for the design, construction, and oversight of any NDOT infrastructure that requires modification as a result of Brightline West's work.



A rendering of Brightline West's Rancho Cucamonga, Calif., station.

ESAB and NYC Constructors Celebrate Building Collaboration

A topping off ceremony for the new JPMorgan Chase headquarters in New York, N.Y., was held November 29, 2023. NYC Constructors, New York, N.Y., a subsidiary of DBM Global Inc. and a steel erector for high-rise construction, and ESAB, North Bethesda, Md., a provider of welding filler metals and welding and cutting equipment, collaborated on the construction of the building at 270 Park Avenue and were present for the event. Executives signed the final steel beam before it was hoisted into place on top of the 1388-ft, 60-story-tall building.



Barry King (left), president of NYC Constructors, and Eleanor Lukens, ESAB president of the Americas, celebrate during the topping off ceremony for 270 Park Avenue, a 1388-ft-tall building that is the new headquarters for JPMorgan Chase.

“We are proud to have partnered with ESAB to successfully complete another high-rise in New York City,” said Barry King, president of NYC Constructors. “At just under 94,000 tons of structural steel, 270 Park Avenue required 170,000 pounds of field welds, a staggering amount we could not have achieved without the support of ESAB. We look forward to a continued partnership with ESAB on future projects.”

Previous collaborations include World Trade Center Tower 1, One Vanderbilt, the Javits Center’s 1.2-million-sq-ft expansion, The Spiral at Hudson Yards, and The New Terminal One at JFK International Airport.

“NYC Constructors is renowned for the quality of its welds, which directly relates to its reputation for keeping projects on or ahead of schedule,” said Eleanor Lukens, president of the Americas, ESAB. “ESAB helps make that possible with a custom quality control program that includes testing every lot of Coreshield filler metal they use.”

To further improve welding uptime on the 270 Park Avenue project, the two companies also collaborated with NYC Gloves to custom develop a flux cored gas metal arc welding gun with components that better resist the heat and wear of high-volume welding.

Machina Labs Secures \$32-Million Investment to Develop AI-Driven Manufacturing

Machina Labs, an advanced composite and metal products manufacturing company based in Los Angeles, Calif., has closed a Series B investment in the amount of \$32 million. This latest funding brings the total raised by the company to \$45 million.

The investment will be used to meet accelerating customer demand, further intensify research initiatives, and continue delivering manufacturing solutions.

“This Series B funding underscores the transformative potential of merging robotics and artificial intelligence,” said Edward Mehr, CEO and cofounder of Machina Labs. “With this support, we are poised to develop the next generation of manufacturing floors, ones that can easily remake production with no hardware or tooling changes but only requiring software modification.”

The company frees factories from being tied to specific products and allows them to be configured via software to power on-demand manufacturing. The combination of AI and robotics results in the delivery of finished metal products in days. Investing partner Innovations Endeavors expects the company to play an important role in domestic reindustrialization, defense innovation, electrification, and commercial space in the next decade.

Kennametal Partners with American Precision Museum

Kennametal Inc., Pittsburgh, Pa., a machinery parts manufacturer, has partnered with the American Precision Museum (APM), Windsor, Vt., home to a large collection of historically significant machine tools.

“Our partnership with APM is a natural fit to tell Kennametal’s 85-year story of expertise and innovation across industries while also showcasing where we’re headed next,” said Keith Mudge, Kennametal vice president of sales — Americas.

As part of this collaboration, APM is showcasing the company’s tools in its makerspace, where visitors can explore and learn about different machining solutions. Kennametal will also contribute to historical exhibits showcasing the work of the company’s founder, metallurgist Philip McKenna, and its longstanding legacy in the manufacturing industry overall.

“It is particularly fulfilling to be supported by a world-class innovator of machining solutions,” said APM Chair Lee Morris. “We look forward to presenting the story of Philip McKenna’s development of tungsten carbide, and we are very fortunate to have Kennametal’s ongoing support as we attempt to inspire next generations to develop careers in manufacturing.”

Universal Robots Doubles Cobot Production ahead of Schedule

Universal Robots, Novi, Mich., a collaborative robotics manufacturer, has accelerated production timelines for its new UR20 cobot due to high demand.

“We are thrilled by the tremendous response to the UR20,” said Bryan Bird, president of Americas at Universal Robots. “The rapid adoption by manufacturers speaks volumes about the impact this cobot is having on the industry. In response

to the demand, we have made the strategic decision to ramp up production faster than initially anticipated.”

The next-generation cobot features a 69-in. reach and 44-lb payload in a 9.6-in. footprint. It enables manufacturers to automate more applications where heavy objects need to be lifted over a longer distance. [WJ](#)

Washington Watchword

BY HUGH K. WEBSTER

Defense Bill Includes Buy American Requirements

The National Defense Authorization Act (NDAA) for fiscal year 2024 contains key domestic content requirements for major defense programs. Specifically, any manufactured articles, materials, or supplies procured in connection with a “major defense acquisition program” are to be manufactured substantially in the United States. Substantially is defined as 60% initially, though this would increase on a graduated scale until January 1, 2029, at which time at least 75% of each component article, material, or supply cost must be attributable to U.S. sources.

This requirement does not apply to countries that are members of the national technology and industrial base (i.e., Australia, Canada, New Zealand, and the United Kingdom).



Universal Robots is ramping up production of its UR20 cobot.

NIST Establishes AI Consortium

The National Institute of Standards and Technology (NIST), an agency of the United States Department of Commerce, in support of efforts to create safe and trustworthy AI, is establishing the Artificial Intelligence Safety Institute Consortium. According to NIST, the consortium is intended to “help equip and empower the collaborative establishment of a new measurement science that will enable the identification of proven, scalable, and interoperable techniques and metrics to promote development and responsible use of safe and trustworthy AI.”

NIST is inviting nonprofit organizations, universities, other government agencies, and technology companies to indicate their interest in participating in the consortium.

SBA Comments on Proposed Overtime Regulations

The U.S. Small Business Administration’s (SBA’s) Office of Advocacy has submitted comments on the U.S. Department of Labor’s proposed rule *Defining and Delimiting the Exemptions for Executive, Administrative, Professional, Outside Sales, and Computer Employees*.

To qualify for the executive, administrative, and professional (EAP) exemptions from the overtime pay requirements of the Fair Labor Standards Act, employees must be paid on a salary basis at a minimum salary level. The proposed rule would increase the minimum salary threshold for the EAP exemption from \$35,568 to \$55,068 annually. This threshold will be increased in the final rule, up to \$60,209. The SBA said it is generally opposed to the increases because they will create an undue burden on small business.

OSHA Issues Report on Severe Injuries

The U.S. Occupational Safety and Health Administration (OSHA) has issued a report titled *Severe Injury Report: A Seven Year Lookback*, which summarizes hospitalizations, amputations, and eye losses reported by employers to OSHA from 2015 to 2021 with analysis by geographic region and industry sectors. According to this report, the mining, quarrying, and oil and gas extraction category had the highest average rate of severe injuries overall during this period (45.3 per 100,000 employees), followed by the general manufacturing category at 26.5 per 100,000 employees. [WJ](#)

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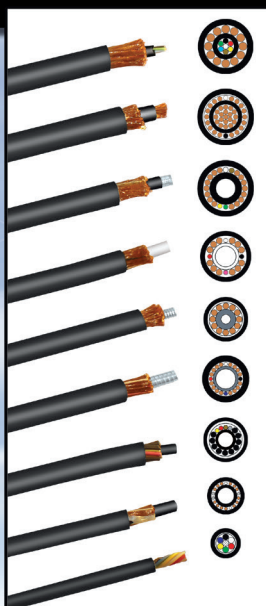
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Approachable technology and self-guided training are enticing the next-generation workforce into the manufacturing industry. (All photos are courtesy of CM Welding & Machine and Joe Cobb.)

HOT JOB OPENING: Cobot Champion

Easy-to-learn cobot technology helps usher in the next generation of fabricators

We've all heard about the skilled labor gap that American manufacturers are facing. Many of us are living it. It remained pervasive at FABTECH 2023 last September. The aisles provided constant echoes of fabricators telling equipment providers they're turning away business because they can't find or keep employees. Worse still is the fact that we aren't near the end of the tunnel, with 155,000 welders approaching retirement in the coming years and a staggering 360,000 new welding professionals projected to be needed by 2027 (weldingworkforcedata.com).

Two major initiatives are attempting to solve this elusive challenge: 1) AWS and other organizations have enacted strategies to encourage more folks to join the trades as an excellent, tangible, and bill-paying career path that doesn't come with loads of student debt; 2) many businesses are deploying innovative new technologies to boost produc-

tivity on the shop floor, allowing one fabricator to leverage technology to perform many times the output they could do with manual methods alone.

Yet, even with these two initiatives, the labor gap remains the primary concern for the majority of manufacturing businesses. So, where do we go from here?

Over 2300 years ago, Aristotle introduced the idea that the whole is greater than the sum of its parts. This is proving true today as a symbiosis of these two initiatives; approachable technology is helping bring more people into the trades and providing those new team members with fulfilling opportunities to grow at their place of work while boosting their individual output.

"I got started by going after the work that nobody wanted to do. I did a lot of pipeline maintenance and agricultural

Easy-to-use automation creates pride and exciting challenges for the young cobot champions at CM Welding & Machine.



The cobot champions study videos to learn how to operate the Vectis cobot systems within hours.

maintenance to begin with,” said Corey Mays, founder, owner, and operator of CM Welding & Machine, Midland, Tex. Being in the Permian Basin naturally meant that CM would support the oil and gas industry, which currently makes up about half of its business, with the other half diversified in other contract manufacturing work. Mays has found a niche in creating products that help manage the so-called produced water output of oil fields and thus aid oil and gas operators in reducing their impact on the environment. Building this niche has also created the need for more team members and more productivity to handle the increased volume.

To meet the ever-increasing demand, Mays invests heavily in technology, which has simultaneously helped him attract new talent into the workforce. In the fabrication shop, Mays currently leverages three cobot welding and cutting tools with three “cobot champions” — a term coined by Vectis Automation, Loveland, Colo., to describe an individual responsible for making a piece of automation work — who are trained to use them along with one apprentice learning the ropes. The



Flexible cobot automation enables fabricators to leverage automation for medium-volume batches and helps to reduce monotony by offloading the “boring” arc-on time.

oldest champion is at the very beginning of his career at 20 years old. The youngest is a junior in high school. Bringing in this next-generation workforce has stabilized CM's ability to provide critical manufactured components to America well into the future. Employing young talent provides new welders with the ability to produce acceptable parts quickly while giving them the necessary time to hone the dexterity required for manual welding. As a bonus, young welders get to learn from experienced fabricators before they retire, an exchange that seasoned team members often find fulfillment in as well.

"One of my champions, Colton, is part of the iPad generation," said Mays. "Rather than combating this stigma, I recognized I needed to adapt in how I teach and the methods we use to teach [to] meet this young individual at their interests and skill sets. So, I gave him a crack at the Vectis [cobot welding tool], which is an iPad-like technology for manufacturing. That kid has since blown the doors off. I told him that he can't really break the thing, and then he went to town, watched the Vectis Academy videos, and started laying down welds the same day. I found that style of learning is his preferred method. They really gravitate toward the self-guided training and conversational-style programming, so I continued to encourage it."

Colton has since moved on to more difficult applications, and his progression benefits both the business and his personal growth by allowing him to tackle the wide variety of weldments that come through CM's doors.

Approachable technology like cobot welding and plasma cutting provides a stimulating challenge for the next generation of fabricators, who now want to join what is all-too-often perceived as a dull, dirty, and dangerous industry.

"If we didn't have this cobot technology in place, they'd be out there grinding. In six to eight months, they'd be bored out of their minds and looking to leave," said Mays. "Everyone seeks an attainable challenge to keep growing, and our cobots provide that at an accessible level."

Mays and his business culture embody the number one key to automation success: empowering the right internal champion. Vectis tools are drastically lowering the learning curve of welding and cutting automation, but customers still need the right champion to take ownership of automation's success on their applications and in their production workflow.

"There's nothing quite like seeing the light bulb 'aha' moment when your team member really connects with the cobot and tackles a challenge with it," said Mays. "Leveraging new technology is allowing us to attract new talent and boost our individual productivity to keep growing and serving customers, a win-win for all parties." 

JOSH PAWLEY (josh.pawley@vectisautomation.com) is vice president, business development, and founding partner of Vectis Automation, Loveland, Colo.



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