DAY 3

WEDNESDAY | SEPT 15, 2021

FABTECH

NORTH AMERICA'S LARGEST METAL FORMING, FABRICATING, WELDING AND FINISHING EVENT

AWS FMA sme PMA CI

SHOW DAILY

THE OFFICIAL FABTECH PUBLICATION

TODAY'S EVENTS

Keynote: David Ankin, CEO of ToyMakerz, Inc.
8:30 – 9:30 AM
Lakeside Center Ballroom

Leadership Exchange: Why Can't They Just Work Together? Importance of Mobile Robot and Standard Robot Interoperability to Increase Adoption
12:30 – 1:30 PM
Lakeside Center Ballroom

3D/Additive Manufacturing Showcase
During Show Hours
Booth A1220

Careers in Welding Exhibit
During Show Hours
Booth B20084

State of the Industry: Navigating into 2022

The manufacturing industry is in a constant state of transformation. Manufacturers are faced with pressing questions as they strive to satisfy needs in supply, labor, and new technologies.

Tuesday's Leadership Exchange Panel featured experts spanning the areas of software, hardware, and fabrication. Moderated by Dan Davis, Editor-in-Chief of *The FABRICATOR,* panelists included Adria Haines, Regional Head of Smart Factory Solutions, Bystronic, Todd Ludlow, President, Ludlow Manufacturing and Bryan Tice, Senior Partner, Metal Edge Partners.

The panel covered a lot of ground, answering questions such as:

- What does the state of steel look like as we wrap up 2021 and head into 2022, including prices, capacity, and tariffs?
- What strategies can be implemented?
- What can shops do to maintain material inventories and minimize risk?

- How can manufacturers streamline quoting activities, eliminate redundancies and manual intervention when it comes to front office activities and shop floor production?
- What challenges are manufacturers facing finding and keeping a qualified workforce?
- How is automation changing the workforce manufacturers are seeking?

Digitalization and Competitive Advantage

Haines of Bystronic tackled the thorny subject of steel prices. She noted that the state of steel is largely out of the realm of control of fabricators.

"Shortages, fluctuating costs, and tariffs are part of doing business now and will be for the foreseeable future," said Haines. "It is critical that fabricators and manufacturers increase their visibility to survive in this ever-changing arena."

Bystronic is a technology company operating in sheet metal processing. Its focus is on the automation of the complete material and data flow to empower smart factory solutions. The connectivity of its

continued on p. 24

TOTAL CONTROL. INCREDIBLE RESULT.

FABTECH BOOTH

A4402

Mazak leads the way with Variable Beam Shaping technology on the OPTIPLEX NEXUS 3015 FIBER S7, high-speed productivity on the FT-150 FIBER tube laser and the high power of the OPTIPLEX 3015 FIBER III 10kW. For information visit **www.mazakoptonics.com.**

Mazak
OPTONICS CORP.

OPTIPLEX NEXUS FIBER S7

HIGH POWER VARIABLE BEAM SHAPING

BEAM SHAPING
Programmable beam shaping offers enhanced edge quality and speed with users selecting from a preset range of beam sizes and heat intensity profiles.

H.P. AIR CUTTING
High Performance Air Cutting can dramatically reduce monthly operating costs, increase throughput and expand cutting range in particular applications.

LIVE CAMERA NESTING
Active live camera nesting is a user-friendly solution for an operator to quickly and easily process additional parts on demand, without delay.

IIoT SMART CONTROL
The PreviewG control can provide real-time cutting metrics and maintenance data maximizing machine utilization and reducing unexpected down time.

EAGLE®

FIBER LASER

NOTHING FASTER.

WHAT CAN 20kW DO FOR YOU?

HIGHEST **POWER** • QUICKEST **ACCELERATION** • FASTEST **MATERIAL HANDLING**

Scan this code to watch Eagle's 20kW fiber laser on six different applications, or visit:
fairmontmachinery.com/videos

FABTECH BOOTH
A5731

Come see our 20kW iNspire 5x10 ft Fiber Laser with 6g acceleration

"The eVa® cutting head is the key – unheard of power, throughput, and reliability."

GLEN ZIMMERMAN, OWNER
RAYTEC FABRICATING, NEW HOLLAND, PA

Fairmont MACHINERY

fairmontmachinery.com • (833) 667-7889
information@fairmontmachinery.com

iT can only be **EAGLE**

Attracting & Preparing the Next Generation of Manufacturing Talent

The skills gap could lead to a shortage of as many as 2.4 million manufacturing workers in the next decade. Why? Manufacturing has changed dramatically in recent times. No longer is it a dirty, grimy job. It has shifted into a career path where technical skills are very much at the forefront.

Thursday's FABTECH panel, Attracting & Preparing the Next Generation of Manufacturing Talent, promises to be one of the highlights of the entire event. It examines our responsibility to support individuals in discovering their interest in manufacturing and to encourage the pursuit of a manufacturing career. It will answer questions such as:

- How to get involved and share awareness to encourage the younger generation to pursue manufacturing careers?
- What should companies be doing now to prepare the next generation of the manufacturing workforce.
- What kind of technical skills will be most in demand?
- What other talents will the workforce need to succeed?

Moderated by Sheila Lamothe, Executive Director of the CCAI Finishing Foundation, the panel consists of a team of experts who know the industry intimately.

- Rob Luce, Vice President, SME Education Foundation.
- Monica Pfarr, Executive Director, AWS Foundation.
- Ed Dernulc, Director – Foundation, FMA.
- Nichol Lopriore, Executive Director, PMA Education Foundation.

Engaging with High Schools

Rob Luce is Vice President of the SME Education Foundation, an organization committed to addressing the talent shortage by building manufacturing and engineering programs/labs inside of high schools across the country via the SME PRIME program. These programs are led by local manufacturers to ensure that students are being taught skill sets and earning industry credentials that employers in their community demand. PRIME schools receive equipment, curriculum, teacher development, scholarships, and funding for STEM-related extracurricular activities free of charge. The schools bear no cost. Luce noted that 84% of PRIME students pursue a career in manufacturing or engineering upon graduation.

In addition, the SME Education Foundation manages a Student Summit Event Series and Scholarship Program. Student Summits provide high school students with a one-day curated experience at SME trade shows, participating in hands-on competitions and technology demonstrations as well as hearing from keynote speakers. The scholarship program annually awards millions to several hundred students across the country pursuing a post-secondary education in manufacturing or engineering.

"The next generation need to see first-hand that manufacturing isn't dirty and boring," said Luce. "Industry and the companies that comprise it need to tout the high-tech nature of the work they do and expose as many young people to that technology as possible. Companies can engage with schools/students directly or through various nonprofit organizations."

To engage, inspire, and prepare the next generation, the magic word is exposure. The more kids exposed to manufacturing and engineering, the more likely they will be to consider their place within industry. Luce believes training is the easy part; engaging and motivating teenagers is much more difficult, and timely. Moreover, diversity is key. Minority and female participation with manufacturing and engineering is low. The more industry can do to promote a

continued on p. 25

September 13-16, 2021 / Booths A2904, B18005, B16004

Your challenges, our solutions.

Visit TRUMPF at FABTECH

Fabricators today are facing more challenges than ever. Lower order quantities, shorter lead times, higher material costs and a shortage of skilled labor combine to make your challenges seem overwhelming. TRUMPF understands those challenges and provides innovative and productive solutions for the entire spectrum of sheet metal fabricators. Whether your needs are stand-alone machines or smart factory solutions of any scale, TRUMPF has the machines, software, experience and manpower to determine, produce and support the best solution to fit your needs. We invite you to visit our FABTECH booths to see a sampling of our products, speak with our experts and develop a roadmap to solving your challenges today.

www.trumpf.com

Meaningful Proclamations Enable Latinas Welding Guild to Bloom Even More

Like their logo that reflects a welding helmet surrounded by bright yellow, orange, red, purple, and blue flowers, the Latinas Welding Guild Inc., Indianapolis, Ind., blossoms.

Most recently, the City of Indianapolis joined the Latinas Welding Guild (weldingguild.com) in recognizing Women in Welding Month as April 2021 as well as Latinas in Welding Week from April 4 to 10, 2021 (Figure 1).

Signed by Mayor Joseph H. Hogsett, the proclamations point out welding careers play an integral role in keeping people/residents safe, advancing the quality of life across the globe/for those in Indianapolis; the guild's history, including its establishment in 2017 as a nonprofit organization of Latina women in central Indiana who share a common interest in welding for creative or career opportunities; welding careers offer women, especially Latina women, economic mobility; the guild is a need-based program focused on creating barrier-less education and the advancement of women in a field that has been less accessible to them; and more.

"I think it's important to shine a light on the welding industry and help show the community all the opportunities that can come from entering the industry, whether that's traditional or nontraditional routes," said Consuelo Poland, executive director of Latinas Welding Guild. "As women and minorities, we're easily overlooked or not given credit for the work we're doing or trying to do. These proclamations meant a lot to myself and our organization because we want to acknowledge that size, shape, color, ethnicity, education, and gender do not determine the ability to learn the skill. We also want to give lots of credit to not just the women in our group but [to] Indianapolis, Ind. Next year will be bigger and better for us and the proclamations!"

Figure 1: Consuelo Poland, executive director of Latinas Welding Guild, proudly poses with proclamations from the City of Indianapolis declaring April 2021 as Women in Welding Month and April 4–10, 2021, as Latinas in Welding Week. (Photo courtesy of Consuelo Poland.)

In addition, Poland, who also teaches welding at Arsenal Technical High School (ATHS), and Jonathan Garmany, a Certified Welding Inspector/ATHS welding instructor, assisted in achieving another City of Indianapolis proclamation. Youth in Welding Week, from April 19 to 26, 2021, honors the students and educators in the ATHS welding program. Here, Indianapolis Public School students have access to the training and education necessary for a welding career. By providing them entry to this program in high school, Indianapolis is hopeful to build a diverse talent pipeline for the welding field.

By continuing to provide a safe space to learn welding, seek scholarships, and get language support, the Latinas Welding Guild empowers students to take control of their careers as they enter the industry. The blooms are aplenty on many fronts. ■

This article was written by Kristin Campbell (managing editor of the Welding Journal) for the American Welding Society.

FABTECH
Visit us at Booth #A4475

FORWARD
INNOVATIVE SOLUTIONS

Drilling, Plasma Cutting, Scribing and Milling in One Comprehensive Production Cell

- Drilling of typical bolt holes in 25% of the time required for thermal production of holes.
- Drill holes in all three surfaces simultaneously versus one surface at a time with thermal production.
- Milling of weld preps to eliminate the clean-up generated from thermal cutting.
- Mill two rat holes simultaneously flush with the flanges to eliminate manual grinding if they were thermally produced.
- Scribe all four surfaces simultaneously versus one side at a time when plasma generated.

VALIANT + NOZOMI

FICEP has totally integrated into one CNC system the capabilities of all the typical required fabrication routines. Compromises are eliminated as the most efficient fabrication processes are performed.

www.ficepcorp.com
Get on board, navigate the future with FICEP!

FICEP
STEEL THINKING

FICEP Corporation
2301 Industry Court, Forest Hill, Maryland 21050
Phone (410) 588-5800 - Fax (410) 588-5900 - info@ficepcorp.com

On the Precipice of the Smart Pressroom

By Brad F. Kuvin, Editorial Director

MetalForming magazine

Metal forming challenges continue to increase in complexity, and so does the technology available to help stampers overcome them. Manufacturers of presses, coil lines and other pressroom equipment continue to leverage motor, drive and digital-communication tools to create new, flexible, high-performance machines.

At the forefront are servo-based technologies found in nearly every motion-control device in the pressroom, including presses, straighteners and feeders. The key enabler to all of this continues to be further development of servo motors and drives, along with the coming adoption in pressrooms of state-of-the-art digital-communication technology, including robust sensors, IO-Link platforms and Internet of Things connectivity.

Synchronizing the Feed to the Press Motion Profile

The result of this constant flow of real-time data to the human-machine interface (HMI, or press control in many cases) allows, then, for timely and automated corrective actions — ensuring, for example, that the feed line remains synchronized with the complex motion profile of the servo-press ram.

"Paying close attention to the timing of the servo feed is important when aligning it with a servo press," says David Diaz-Infante, servo press application engineer at Nidec Minster, "due to shorter pendulum and faster return strokes decreasing the amount of time available to insert the required amount of material into the die space. For example, let's consider hypothetical differences in production rates and press-open times between a conventional flywheel and a servo press for a progressive-die application. Producing a given part on a flywheel press at 22 strokes/min., we're allowing 1.9 sec. for feeding the material and for the critical stopping angle, should a die-protection fault occur. With a servo press, we might run this job at 43 strokes/min. (full revolution) using a faster return during the nonworking portion of the stroke."

Moving the material precisely when and where it needs to go, especially challenging with the often-complex motion profiles used with servo presses, has placed pressure squarely on feed-equipment manufacturers, says Willie Chacko, CEO at Dallas Industries. "With Ethernet technology now prevalent on most newer feed lines," Chacko says, "we can monitor ram position in real time and signal the feed line as ram speed and position changes. This maintains precise synchronization."

"Using new sensor and communication protocols, the feed is always aware of press-ram position," concurs Reid Coe, president of Coe Press Equipment. "This enables highly repeatable and accurate straightening and feeding compared to using a rotary cam switch on the press, as in the past, and performing speed calculations based on the start/stop of these signals.

"The feed equipment used to be a separate entity, each piece on an island," adds John Kwiatkowski, regional sales manager at Coe, "receiving some signals and minimal handshaking, but from a controls standpoint they were separate pieces of equipment. The advent of servo presses and their requirements has forced press lines to function as one machine from a communications standpoint—a system, if you will."

Delivering Detailed Line Data to One HMI

Helping to integrate press-line equipment seamlessly into a unified line, according to Bob Southwell, executive vice president at Aida-America, is its move to implement Allen-Bradley drives and controls from Rockwell Automation. "One press HMI," says Southwell, "that integrates all of a line's peripheral equipment — transfer system, coil line, destacker, etc.— helps greatly with maintenance faults, providing detailed information to the line operator in one place."

When it comes to maximizing the performance of servo motors, and in particular motors on stamping presses, enemy number one is heat, says Jim Landowski, vice president of Komatsu America. "With the next generation of servo presses," he explains, "emphasis has been placed on efficiently capturing and removing heat from the motor and drive systems. And we now minimize current drawn off of the line by using more efficient and liquid-cooled capacitor banks."

Protecting Assets by Monitoring Motor Torque

Also new with the latest motor drives in servo presses is the ability to monitor servo-motor torque throughout the press stroke, and to instantaneously stop the motor, and even reverse direction, if there's a load outside of the set parameters. "Historically," says Southwell, "you monitor force either with a hydraulic overload system, a load monitor or with interlocking die-protection signals. By capturing the motor-torque signature in real time, we quickly can stop the motor and slightly reverse it to relieve the load — a step beyond hydraulic overload."

"The hydraulic overload is there only to protect the press," Landowski adds. "We monitor motor torque and heat, but also monitor the signature path of the process itself throughout the stroke and allow the customer to input high and low force limits through the stroke. Stampers can create a programmable signature through the process, and an acceptable process window that allows for hardness variations in the material and thickness variations in the coil."

Digital Communication Unifies Press Lines into Systems

Other pressroom concerns, with servo-based and any other equipment, focus on optimizing overall equipment effectiveness and uptime. Stampers must ensure that equipment remains healthy and operational, and work to minimize setup times and develop efficient maintenance activities — often by developing proactive- (preventive and predictive) rather than reactive-maintenance plans.

Of course, technology comes at a cost, and recovering that investment relies on high uptime — not just of the press, but of the entire system. "In today's pressrooms," shares Joel Wuebker, general manager of Nidec Minster, "it is critical not only to have the correct equipment for the task but also be able to integrate each piece of equipment into one optimized system. More and more, metal formers seek turnkey solutions."

"Also gaining traction," Landowski says: "continuous on-demand circuits. Here, the press stays 'armed' in a continuous mode and when parts begin to stack up on the exit conveyor, the press must temporarily stop production and the feed stops too, until the conveyor or parts area is cleared. Then the press will restart automatically… we're seeing a lot more of this."

"Automation along the press line, and in particular the feed line, also is critical now," says Dallas Industries' Chacko, "so that setups are developed as part of each job recipe."

IO-Link Allows Drilling Down into the Details

The next big thing coming to automated press lines: the evolution from huge I/O boards to IO-Link, where troubleshooting of a line increases in ease "by multiples," says Reid Coe. "Operators can immediately see, from the HMI, exactly which device is faulting and details about the fault. Also, advanced equipment monitoring is attainable because you can consolidate the I/O using IO-Link technology."

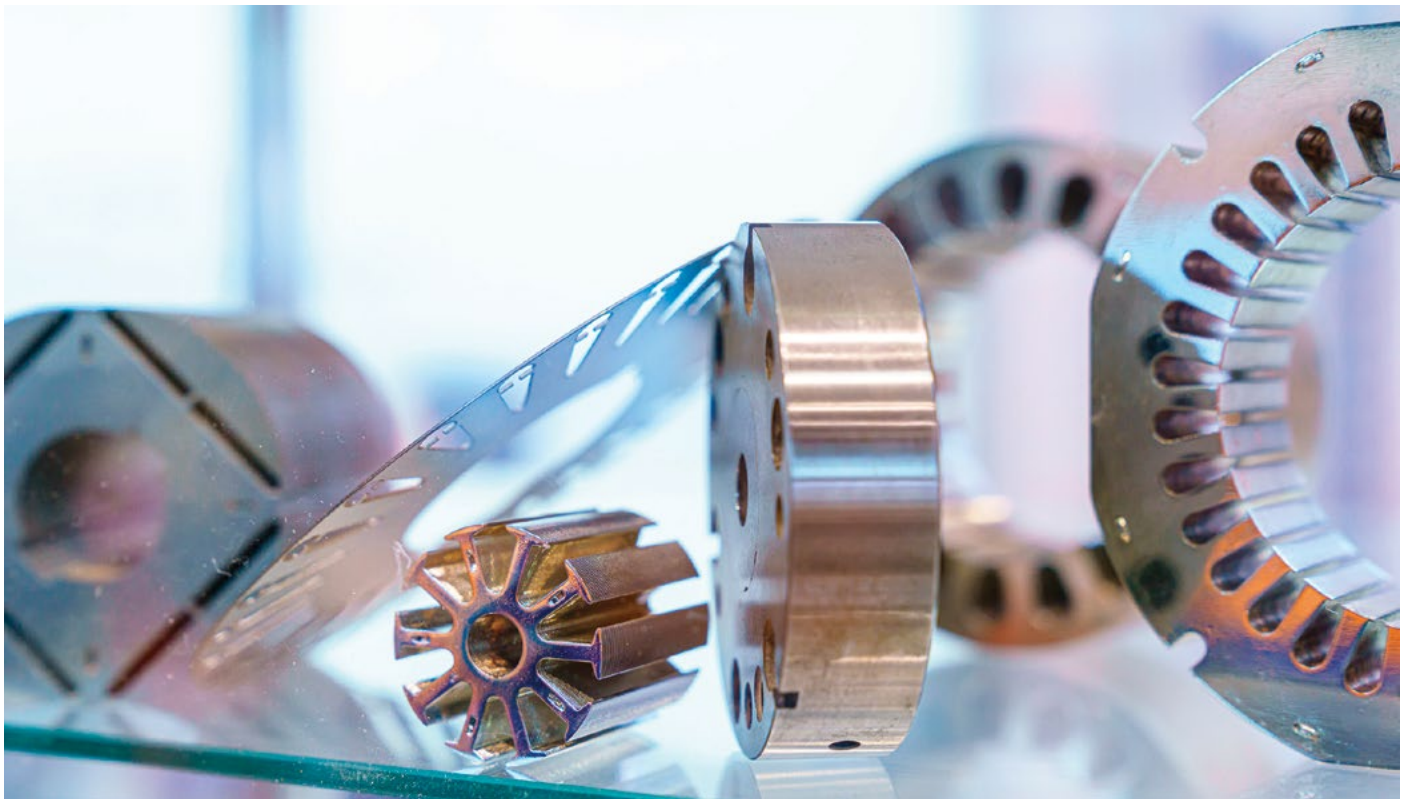
"IO-Link also quickens implementations," says Chacko. "We can have distributed control set up on each section of the machine. With IO-Link, we'll be able to reduce the size of the remote junction boxes and give some of that brain that used to be in the remote junction box to IO Link blocks, and have less wiring coming back to the junction boxes."

IoT Initiatives Enable the Move to Predictive Maintenance

It's been said that "data is king," and that sentiment will hold true for the foreseeable future—maybe forever. That's why the pressrooms of tomorrow must implement technology that allows for gathering, processing and acting on data is a critical success factor moving forward.

"There's a lot of investment being made in IoT initiatives," says Aida's Southwell, "to allow more integrated sensor interfaces and to download not just production information but also maintenance information from the press, for use at the HMI level and also on a remote basis. We see a 5-yr. window for significant implementation of IoT in press shops, although we do have several OEM and Tier One customers using this technology.

"The goal is to develop this capability for more standardized products," he continues, "a laundry list of data sets we can provide to stampers at different levels of sensors and interfaces, and price." MF



Creating Prestige Around Skilled Trades with YouTube Competition Series

Ray Dick of Project MFG discusses the National Skilled Trade Challenge, YouTube series, and the state of U.S. manufacturing

By Amanda Carlson, Editor,
The WELDER

Most people immediately think of the NCAA basketball tournament when they hear the phrase "The Final Four." But if Ray Dick had his way, he would have you thinking of welding, fabricating, machining, and the ingenuity of young people.

Instead of lamenting your busted bracket or fawning over which NBA franchise might draft these rising college stars, he'd have you wait with bated breath to find out which industry trade school graduates will end up in, be it aerospace, automotive, structural, or production work.

It's a nice thought, but one that would require people to view manufacturing careers in the same way they view a career in professional sports.

Enter the National Skilled Trade Challenge, the marquee event of the Project MFG initiative. The competition endeavors to celebrate the skill and commitment of young people training to enter manufacturing and the skilled trades. It's also a way for communities to get excited about manufacturing trades and those who choose to enter them.

The final four teams are featured on the streaming series "Clash of Trades," which premiered in late April on Project MFG's YouTube channel. The show provides an engaging look at each team and their approach to completing the challenge. The result is then brought in front of a panel of expert judges and woven into the show format.

A program of the nonprofit Global Learning Accelerator Inc., Project MFG was founded by Dick and financially funded by the Department of Defense (DOD) to shine a light on the need and opportunities for skilled trades by focusing on the development of new talent. Dick has a doctorate in mechanical engineering and spent a chunk of his career in capital equipment design and automation design. As program manager at the Department of Energy's Kansas City plant, he learned how the health and well-being of U.S. manufacturing directly influenced our national security.

Dick spoke to The WELDER and discussed the competition, how COVID-19 forced organizers to regroup and retool, and why the healthy growth of manufacturing should be top of mind for everyone.

What is Project MFG, and what's the mission behind it?

Project MFG is an initiative funded by the Department of Defense. It was stood up under the office of the Secretary of Defense's Industrial Base Analysis and Sustainment Program. The director there is Adele Ratcliff, and we've worked together for many years and had a lot of conversations about the state of the trade workforce talent pipeline. Between historical offshoring and the loss of jobs and the aging out of the workforce, the state of trade skills is a critical national security issue. If we can't get things made where we need them and when we need them, it's an economic issue for the U.S.; it's a national security issue too.

Our mission is to elevate the skill level so that the rising tide lifts all ships. We want to provide pathways for training and education so that young people or trainees who enter the workforce are better prepared. And then we want to tell the story as loud and as proud as we can that the skilled trades today are a very viable career path and a long-term profession.

How did the idea of the National Skilled Trade Challenge evolve from concept to reality?

Adele had this idea of a "Top Chef"-style competition that would promote, elevate, and accelerate the workforce pipeline. So, through those conversations, we started to develop this hands-on, integrated, advanced manufacturing competition where teams from community colleges, trade schools, and other training facilities would have the opportunity to really demonstrate a full range of skills by making a product.

We were originally supposed to have our 2020 national finals in Chicago at IMTS last fall, but COVID-19 took over and we had to step back and retool things. We did single-site competitions in a round-robin format. That allowed us to finish our state competitions, move into our regional round of

continued on p. 22

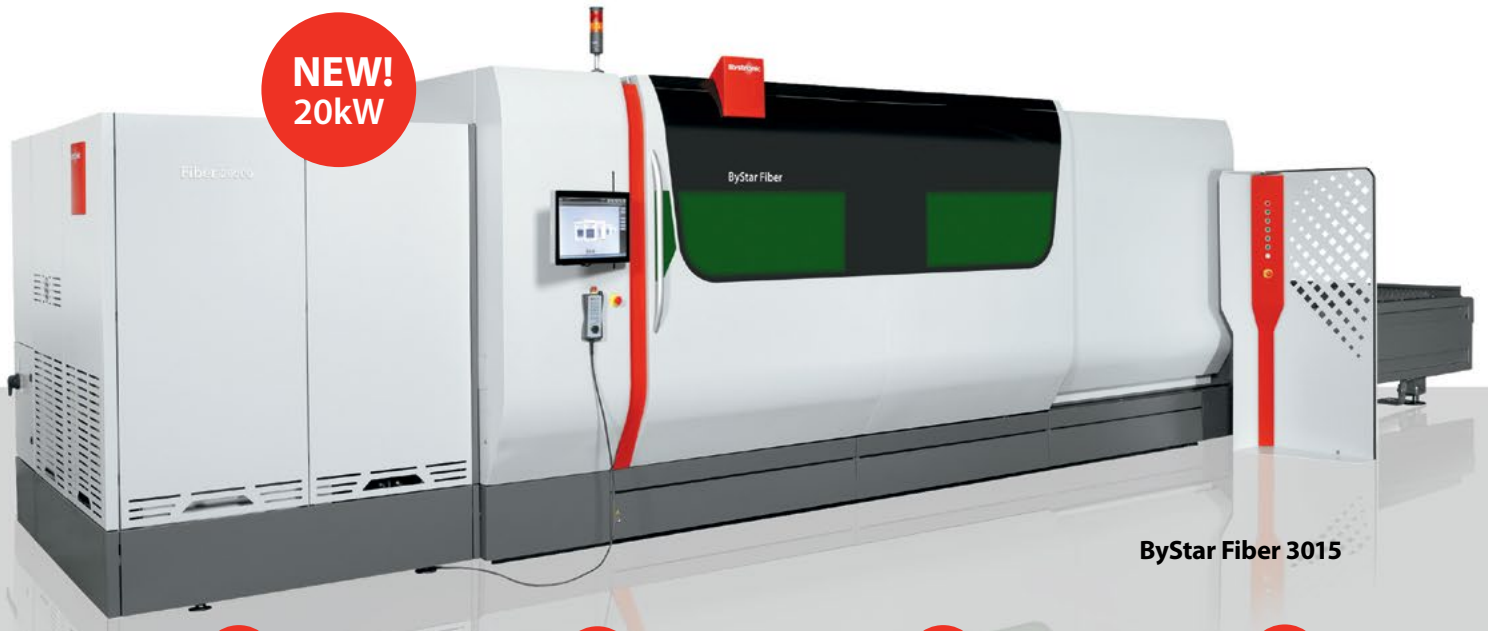
Bystronic

Best choice.

Discover the World of Smart Manufacturing Solutions

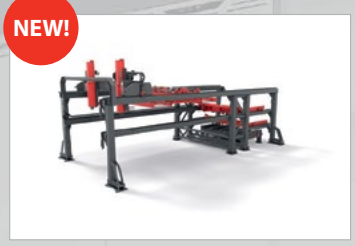
Accelerate your productivity and workflows. With our modular system solutions, we combine 'world class' machines, automation, and software to create a flexible network of intelligent components that allow you to stay ahead of your customers' growing requirements.

Visit us at FABTECH Booth A2126



ByStar Fiber 3015

BySmart Fiber with 10kW



ByTrans Modular with BySort

ByTube 130

Robotic Welding Cell powered by CLOOS

N2 Generation powered by MSS

Xpert Pro 150

Xact Smart 225

Smart Factory Solutions

Xpress 50

Mobile Bending Cell 40

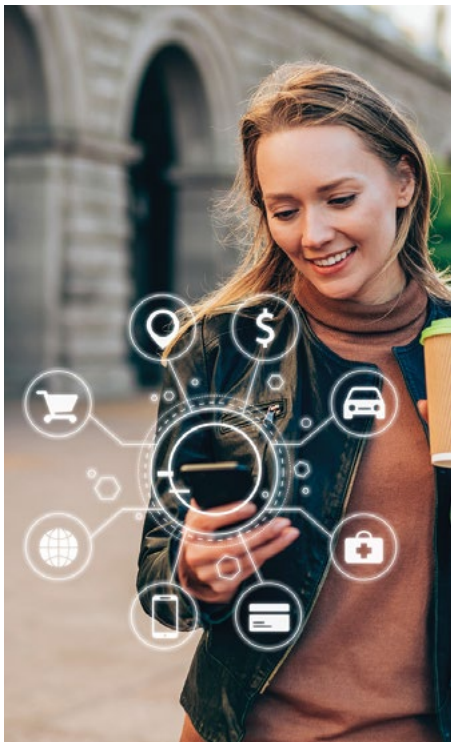
Bystronic: Best choice.
Cutting. Bending. Automation.
800-247-3332 | bystronicusa.com

Click. Tap. Fabricate. Ship.

How Industry 4.0 might evolve and forever change the fab shop

By: Tim Heston, Senior Editor, FMA Communications

Click. Tap. Click. That is the sound of money in the 21st century. Big Tech has turned into one of the world's most profitable and culturally dominant industries, and it's done it by tracking, harnessing, and profiting from our attention. Every time we click or tap



our laptops or phones, Big Tech, through its mysterious algorithms, knows something about us that it didn't before.

Those clicks and taps are analogous to industrial sensors; the former opens a window into human behavior, the latter measures the performance of machinery and systems. Sensors on machinery, from the smallest press brake to the most expansive flexible manufacturing system, have been around for years. But what about sensors that can work together to measure and autonomously improve an entire fab shop, tracking everything from the receiving dock to the shipping dock?

Sure, plenty of shops scan bar codes on order tickets, job travelers, or (in an entirely paperless environment) on the parts themselves. And a few operations might actually track the motion of work-in-process (WIP) as carts or fork trucks (or perhaps automated guided vehicles, or AGVs) go from machine to machine and station to station. So the plant gathers all this data. Now what?

I equate the state of Industry 4.0 to my first computer sporting Windows 95 and a web browser. That browser meant I could access all this information that I couldn't before, at least not easily. With

continued on p. 20

THANK YOU TO OUR INDUSTRY SUPPORTERS

3D PRINT.COM
AEROSPACE & DEFENSE TECHNOLOGY — The Engineer's Guide to Design & Manufacturing Advances
AEROSPACE MANUFACTURING and DESIGN
ASSEMBLY
AUTOMOTIVE ENGINEERING
CFCM — CANADIAN FINISHING & COATINGS MANUFACTURING MAGAZINE
DESIGN 2 PART MAGAZINE
Design World
The Electrocoat Association
the fabricator
FFJournal — The magazine for today's metal fabricating & forming technologies
FABRICATING METALWORKING
INDUSTRIAL MACHINERY DIGEST IMD
ipcm — INTERNATIONAL PAINT&COATING MAGAZINE
PF PRODUCTS FINISHING
POWDER COATED TOUGH — The Official Publication of the Powder Coating Institute®
ALIA — LASER INSTITUTE OF AMERICA
MACHINE TOOLS.COM
Manufacturing ENGINEERING
SW SOUTHWEST SE SOUTHEAST NE NORTHEAST MW MIDWEST W WEST
MANUFACTURING NEWS
MANUFACTURING TOMORROW
Metal Center News
MetalForming Magazine
Modern Metals — The magazine for metal service centers, fabricators & OEMs/end users
Rollforming Magazine
TRUCK & OFF-HIGHWAY ENGINEERING
TUBE & PIPE 管道技術 Technology
WELDING Journal
WORKPLACE Material Handling & Safety

LAKESIDE BISTRO

The Lakeside Bistro is a convenient place for exhibitors and attendees to eat, meet and network. Located in the Lakeside Center Ballroom, the Lakeside Bistro will be open on event days from 11AM-2PM and feature a buffet menu that will change daily. Reservations are not required and credit cards are accepted.

CCAI Finishing Academy Launches Online Training Courses

Education is a primary focus for the Chemical Coaters Association International (CCAI). Over the past few years an initiative has been underway to develop training and education programs under the umbrella of the CCAI Finishing Academy, including a series of four online training courses created through the development of an industrial finishing curriculum based on CCAI's highly popular training manuals. The courses, targeting those currently employed in the industrial finishing industry as well as those who are just starting their finishing careers, enable participants to learn at their own pace in the comfort and convenience of their workplace or at home. Participants gain critical knowledge for their career in an easy online format.

In addition to the convenience of the online format, students benefit from weekly assignments, quizzes and interactive forum discussions with the instructor and other students. The self-paced courses provide a thorough understanding of industrial finishing technologies. Weekly quizzes and a final exam will be administered and graded by a CCAI instructor. Course fee includes the accompanying CCAI training manual, which is provided prior to course commencement. Only one course can be taken at a time and courses will be offered several times each year.

Currently two online courses, powder coating and liquid coating, are available and scheduled for October 4 – November 21, 2021. A pretreatment course and a system design course will be added in 2022.

Powder Coating Online Course

This course addresses all aspects of the powder coating process, including formulation, manufacturing of powder coatings, powder coating materials, material handling, surface preparation, powder application equipment and systems, curing technology, quality, maintenance, troubleshooting, and overall costs for operating a powder coating line. The course includes a copy of *CCAI's Powder Coating for Industrial Finishing Applications (Sixth Edition)* training manual and an industry expert as the instructor.

Liquid Coating Online Course

This course addresses all aspects of the liquid coating process including material handling, hanging methods, surface preparation, and curing. Students will learn about the benefits and various types of liquid coatings, including formulating and testing. The course will also cover the operational cost of a liquid coating system, health and safety, and maintenance and troubleshooting of liquid coating equipment. The course includes a copy of *CCAI's Liquid Coatings & Equipment for Industrial Finishing Applications* training manual and an industry expert as the instructor.

Who should attend:

- People currently working in industrial finishing that want to better understand the process and the technology utilized in successfully coating products.
- People who are interested in joining a finishing operation and require a background in the processes to qualify for the position.
- People in manufacturing who are interested in increasing their basic knowledge of finishing processes.

Based upon the course selection, here's what you are going to learn:

- Basic powder coating or liquid coating process steps.
- Benefits of powder coating or liquid coating.
- Substrates that are powder coated or liquid coated.
- Quality testing and coating performance.
- Various types of coatings/specialty coatings.
- The coating manufacturing process.
- Industrial finishing safety.
- Different types of equipment used to apply powder coatings or liquid coatings.
- Curing methods for powder coatings or liquid coatings.
- Operational costing of a powder coating or liquid coating system.
- Finishing system maintenance.
- Troubleshooting.

What will you come away with:

- A thorough knowledge of the powder coating or liquid coating process from beginning to end.
- An understanding of how to evaluate your existing process and recommend areas for improvement.
- An understanding of the powder coating or liquid coating process and what is required to recommend a new system.
- A certificate of course completion after passing the final exam.

Recommended Job Titles for Taking a Course:

- Painter
- Paint/Powder Coating Technician
- Quality Inspector
- Paint/Powder Coating Line Supervisor
- Paint/Powder Coating Line Engineer
- Paint/Powder Coating Line Technician
- Paint/Powder Coating Line Operator
- Manufacturing Engineer
- Production Engineer
- Production Lead

Qualifications/Prerequisites

- Basic manufacturing background.
- Use of digital technology – internet access/ word processing/spreadsheets/email.
- Basic math skills.

For more information and to register visit, www.ccaiweb.com/academy and visit CCAI in Booth D45329.

Workforce Development for Global Competitiveness

By Harry Moser, Founder/President, Reshoring Initiative

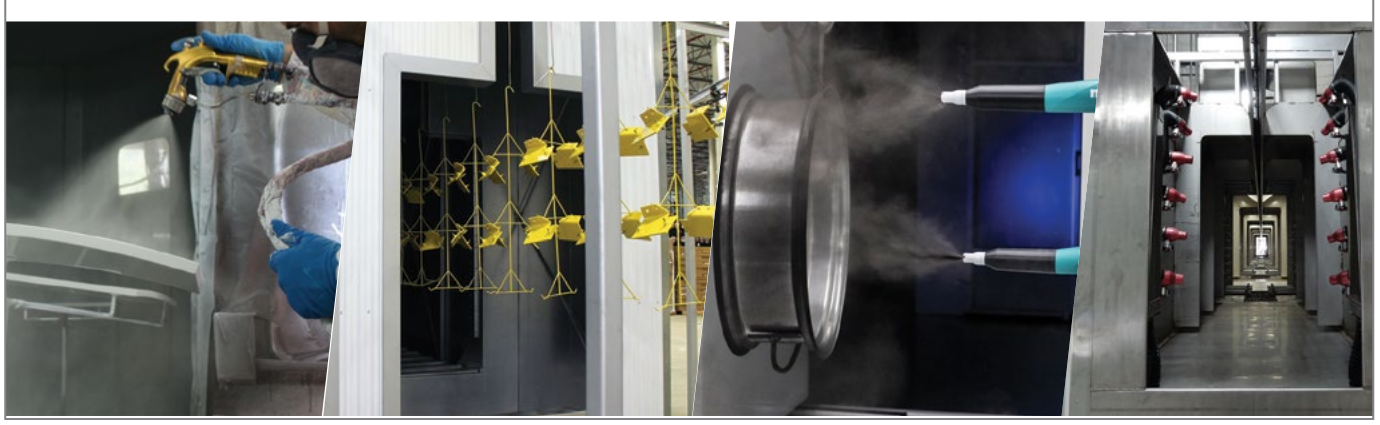
A widening skills gap threatens U.S. manufacturing competitiveness and consequently our economy. A talent pipeline with a sufficient supply of properly aligned skills is imperative to meet U.S. manufacturers' needs for capacity, productivity and innovation.

We expect 3.5 million manufacturing jobs will likely need to be filled over the next decade with a skills gap that is expected to leave in excess of 2 million of those jobs unfilled. The gap is a result of an overall shortfall of recruits, a mismatch between the skills needed by manufacturers and the skill sets of available workers, and a high rate of retirement. A surge in reshoring will increase that gap by millions more. The long-term skills gap has contributed to a loss of U.S. manufacturing over the last 40 years. Failure to overcome the gap now will limit the U.S.' ability to ride the reshoring wave.

Our Competitiveness Goal

Global manufacturing executives rank skilled talent as the number one driver of manufacturing competitiveness. As manufacturers increase competitiveness with automation and other new technologies, the workforce will need comprehensive training and corresponding skills to interact and grow. New-collar workers must develop technical and soft skills through non-traditional educational paths, including community colleges, vocational schools, software boot camps, technical certification programs, high school technical education and on-the-job apprenticeships and internships as opposed to a four-year university degree. Manufacturers must incorporate lifelong learning into their business plans to develop the future workforce needed for "smart factories."

Digitization and reshoring are tightly and positively linked. Reshoring increases capacity utilization, which drives capital investment in the newest technologies. The new systems increase competitiveness, enable recruitment of a smarter, tech-oriented workforce, and thus enable more reshoring (see Figure 1). continued on p. 21



AMADA BOOTH A2104

JOIN THE CELEBRATION AT

AMADA®

No company
is better equipped
to support
North American
Fabricators
than AMADA.

50 AMADA 1971-2021

HRB 1003 ATC
Press Brake with Automatic Tool Changer

Celebrating 50 Years of Innovation in the U.S.

Founded in 1971 as a research and development company, AMADA AMERICA, INC. has grown to become the industry leader. Each year, AMADA continues to develop and perfect innovative sheet metal manufacturing and automation solutions to maximize the productivity of North American Fabricators. At FABTECH 2021, AMADA will showcase the latest advances in blanking, bending, and fiber laser welding technology. Each innovative solution is engineered to achieve the highest level of performance while reducing setup, lead times, and operating costs.

Proud sponsor of the FABTECH mobile app.

All Systems Go

AMADA Automation Provides Process Flexibility And Maximum Production.

ENSIS 3015 AJ
12kW Fiber Laser with AMS CL + ROS Automation

Blank-To-Bend-To-Weld Solutions Featured at FABTECH

MADE IN USA

ENSIS 3015 AJ 12kW w/AMS CL + ROS — U.S. manufactured high-power and high-speed fiber laser provides print-to-product, unmanned processing of a wide range of thin-to-thick parts. Modular automation ensures maximum flexibility.

MADE IN USA

VENTIS 3015 AJ — U.S. manufactured fiber laser with Locus Beam Control technology and a high-brightness oscillator — easily rivals machines utilizing much higher wattage at a lower operating cost.

NEW

BREVIS 1212 AJ — Compact, 3kW fiber laser provides the ideal solution for smaller parts up to 4' x 4'. A rotary chuck expands capabilities by enabling tube cutting.

LIVE FEED

EML 2515 AJ + PDC — Combination of fiber laser cutting and turret forming capabilities offers maximum part processing flexibility with automated tool change.

MADE IN USA

HRB 1003 ATC — U.S. manufactured press brake with Automatic Tool Changer (ATC) is the ideal solution for variable lot sizes and the seamless introduction of rush jobs. The ATC performs even the most complex tool setups in 4 minutes or less.

MADE IN USA

HRB 1003 — U.S. manufactured high-speed, high-precision press brake provides an excellent price/performance ratio and ensures repeatable accuracy for new and experienced operators.

EG 4010 — High-speed, high-precision electric press brake provides the ideal solution for small, complex parts that require exceptional precision.

FLW 3000 ENSIS M3 — High-speed, high-quality, automated fiber laser welder eliminates secondary processes and associated costs.

FLW 3000 ENSIS M3
Fiber Laser Welder

FABTECH

BOOTH A2104

Stay In Touch With What's Next.

AMADA AMERICA, INC.

180 Amada Court • Schaumburg, IL 60173 • **877-262-3287**
www.amada.com/america

BEVs: Some Parts Disappear, But New Opportunities Await

By Brad F Kuvin, Editorial Director

MetalForming magazine

The experts are out in full force analyzing the impact of electrification on the automotive supply chain, which we know will be significant as some components common to tradition internal-combustion-engine (ICE) vehicles go away, while battery-electric vehicles (BEVs) offer new opportunities to supply metal parts.

What disappears with the move from ICE to BEV is dozens if not hundreds of engine and transmission parts. For example, the average four-cylinder ICE has 113 moving parts, compared to three in a Chevy Bolt EV, say PwC researchers. "And most EVs have single-speed transmissions," adds the PwC report, "with no need for turbo- or superchargers… or exhaust systems."

Bottom line, say PwC consultants: While currently automotive-parts suppliers contribute 50 to 55 percent of the value of an ICE-powered vehicle, that might shrink to 35 to 40 percent for a BEV.

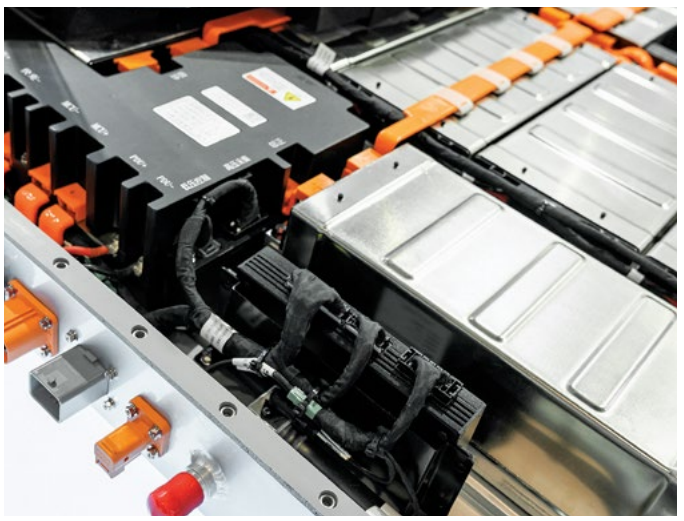
Batteries Making Headlines

The most obvious new opportunities for BEV suppliers revolve around the battery pack and power electronics, as well as motor laminations for rotors and stators. Battery packs are complex systems combining battery cells assembled into fabricated modules; a thermal-management system to keep the battery modules cool; and a host of electronics to, among other tasks, monitor battery performance. And EVs require numerous power converters and electronics controllers not found in ICE vehicles. Simply, a lot of big metal parts—stamped, cast or machined—are replaced with a lot of smaller electrical components. Meanwhile, at the top of the supply chain, OEMs will continue to look to replace steel body panels and perhaps even some structural elements with aluminum.

The big unknown with BEVs is what work OEMs will keep inhouse vs. outsourcing to suppliers. As noted in a late-2020 industry survey by Boston Consulting Group (BCG), General Motors is outsourcing most of the Chevy Bolt powertrain and power electronic components, and has earmarked its Lordstown, OH, joint venture with LG to produce its Ultium battery packs, while Tesla plans to produce battery cells inhouse.

The Ingredients of a Battery Pack

A BEV's power comes from a battery pack, comprising a cluster of several modules with each module assembled from individual battery cells. For example, as noted in a white paper from battery-cell, module and pack manufacturer Samsung, the battery pack in the BMW i3 comprises 96 cells separated into eight 12-cell modules. Included with each module is a structural frame designed and built to protect the modules and its cells from heat and vibration, and the complex electronic battery-management system.



Among the stamped-metal components common to the battery pack and its associated elements: the module frame, the enclosure housing the battery pack and the charger box. In addition, the uptick in the number of electrical components — battery contacts, heat sinks, etc. — promises to create opportunities for suppliers in those niche areas.

Battery cases and cell covers may require blanking, forming, bending, embossing and drawing operations, to increasingly tight dimensional tolerances. Some suppliers have chosen (for now) to manufacture cases from aluminum extrusions (Constellium) or deep-drawn stampings (Novelis); others from fabricated sheet metal (Benteler); or a combination of stampings and castings (Audi). Still others have developed one-piece aluminum castings, and the Chevy Bolt's battery enclosure is made from a thermoset vinyl hybrid resin with a woven-glass reinforcement.

Other BEV opportunities include aluminum rear underbody components, motor housings, gear boxes and main transmission parts, engine cradles and cross members, dashboard components, flooring, fender aprons, and the rear axle housing.

continued on p. 28

WEDNESDAY, SEPTEMBER 15

SCHEDULE-AT-A-GLANCE

TECHNOLOGY	8:00 AM – 9:30 AM	10:30 AM – 12:00 PM	1:00 PM – 2:30 PM	3:30 PM – 5:00 PM
3D/ADDITIVE MANUFACTURING	**NEW!** ■ **WS2:** Pre and Post Processing of Additive Parts Workshop (8:00 AM - 12:00 PM) **Room S405B**		■ **F101:** Continuous Improvement for Additive Manufacturing Initiatives **Room S405B**	**NEW!** ■ **F102:** Materials and Joining for Plastic & Metal AM Technology **Room S405B**
AUTOMATION/ ROBOTICS	**NEW!** ■ **F28:** Understanding & Automating Your Data to Stay Competitive **Room S405A**	**NEW!** ■ **F29:** Automating Press Brake & Bending Systems **Room S405A**	■ **F201:** What You Need to Understand Before Thinking About Running Your Shop Lights-Out **Room S405A**	**NEW!** ■ **F202:** Automation for Metal & Finishing Processes **Room S405A**
CUTTING	**NEW!** ■ **F38:** Advancements in 3D Plasma and Waterjet Cutting **Room S401D**	■ **F39:** Getting the Most Out of Your Waterjet **Room S401D**		
FINISHING	**NEW!** ■ **C18:** Robotic Finishing for General Industry **Room E353A**	**NEW!** ■ **C19:** Finishing's Future Through Automation **Room E353A**	**NEW!** ■ **C101:** Can I Justify a Batch Powder Coating System? **Room E353A**	
	NEW! ■ **C28:** Finishing Systems - Design and Project Management **Room E353B**	■ **C29:** Automating Your Powder Coating Line **Room E353B**	**NEW!** ■ **C201:** Mastering Surface Preparation **Room E353B**	
	NEW! ■ **C38:** Advancements in Powder Coating Materials **Room E353C**	**NEW!** ■ **C39:** Technology Update - Heat Sensitive Substrates **Room E353C**	■ **C301:** Preventative Maintenance and Troubleshooting Your Powder Coating Operations **Room E353C**	
	NEW! ■ **C200:** Powder Coating 101 Workshop in Spanish - Básicos del Recubrimiento en Polvo 101 Taller en Español - Day 1 (9:00 AM - 4:00 PM) **Room E271B**			
FORMING & FABRICATING	■ **F48:** Tube Bending and Hydroforming **Room S403B**	■ **F49:** Roll Forming: Advanced Techniques and Design **Room S403B**	■ **F401:** Coil Processing: Slitting Thin Materials, Leveling, & Deburring **Room S403B**	■ **F402:** Advanced Solutions for Tube and Pipe **Room S403B**
JOB SHOP	■ **F78:** Your Family Business: Everything You Need to Know **Room S403A**	**NEW!** ■ **F79:** Revolutionizing the Manufacturing Industry with XR Technology **Room S403A**	■ **F701:** Innovative Manufacturers: To Patent or Not to Patent? **Room S403A**	**NEW!** ■ **F702:** Building Business Resilience Next Steps Now **Room S403A**
LASER			**NEW!** ■ **WS5:** Laser Fabrication: Welding, Cutting & Additive Workshop (1:00 PM - 5:00 PM) **Room S401D**	
LEAN	■ **F58:** Lean Tools: Go to Gemba **Room S402A**	**NEW!** ■ **F59:** Lean Tools: Hoshin Kanri **Room S402A**	**NEW!** ■ **F501:** Lean Tools: Mastering Mixed Model Flow for a High-Performance Operation **Room S402A**	**NEW!** ■ **F502:** Lean Principle: Long-Term & Four System View of Lean for Manufacturing Success **Room S402A**
MANAGEMENT	**NEW!** ■ **F68:** How to Build a Better Supply Chain for your Business **Room S404BC**	**NEW!** ■ **F69:** Thriving Under Pressure: Revenue Growth In a New Business Paradigm **Room S404BC**	**NEW!** ■ **F601:** Markets & Energy Incentives for Manufacturing **Room S404BC**	■ **F602:** Brainstorming & Problem Solving Tools for Leaders **Room S404BC**
MARKETING & SALES	**NEW!** ■ **F88:** Creating an Inbound Marketing Action Plan for Manufacturers Who Are Prioritizing Online Lead Generation **Room S402B**	**NEW!** ■ **F89:** How Industrial and Manufacturing Companies Create Predictable Revenue Growth **Room S402B**	**NEW!** ■ **WS9:** Essential Sales Strategies for Manufacturers in 2021 and Beyond – Workshop (1:00 PM - 5:00 PM) **Room S402B**	
SMART MANUFACTURING	**NEW!** ■ **WS11:** Smart Manufacturing Bootcamp (8:00 AM - 5:00 PM) **Room S404D**			
STAMPING	■ **S18:** Deep Drawing Cylindrical Shells: Tooling Principles and Design Guidelines **Room S404A**	■ **S19:** Deep Drawing Rectangular Box Shells: Tooling Principles and Design Guidelines **Room S404A**	**NEW!** ■ **S101:** Reducing Cost and Risk to Timing Associated with Tool Buy-Off **Room S404A**	■ **S102:** Evaluating Your Lubricants for Performance and Safety **Room S404A**
WORKFORCE DEVELOPMENT	**NEW!** ■ **WS12:** Leadership Skills & Development Workshop (8:00 AM - 12:30 PM) **Room S401BC**		**NEW!** ■ **F210:** Diversity, Equity, and Inclusion: Future-Proofing Your Workforce **Room S401BC**	■ **F211:** Why You Can't Get Your People Motivated & What To Do About It **Room S401BC**

WELDING	**W7:** Additive/ASME - **Room N230AB**	8:00 AM - 11:00 AM
	W8: Metallurgy (Advance) - **Room N230AB**	1:00 PM - 5:00 PM

Schedule subject to change. Detailed Conference Program session descriptions, speakers, pricing, room locations and more can be found at **fabtechexpo.com/conference**.

■ Basic ■ Intermediate ■ Advanced

Click. Tap. Fabricate. Ship.

continued from p. 12

every passing month and year, the amount of information grew. It was all just so unfathomable.

Still, the 1990s internet didn't change my life in a dramatic way. Early internet searches weren't like Googling. The answer didn't just appear. I and everyone else hadn't clicked enough, and the algorithms behind internet search hadn't learned enough. I had access to a seemingly infinite amount of information, but I had to do something with information before reaching my goal. For instance, I had to use the information the internet search gave me to refine my search terms. I'd search again, refine again, and sometimes come up short. Some information—be it a government document or the address of the bookshop down the street—hadn't made it online to a place where search engines could see it.

Compare that to the state of Industry 4.0 today. Sure, some plants are far into the Google age, but most are in the age of Lycos and Yahoo. Metal fabricators have plenty of data, and most of it is turned into actionable information, but they still have to act. They still have to do something with the information. The solution doesn't just happen by itself. And some information just isn't there. Old iron dies hard, and most old machines don't have myriad sensors.

Industry 4.0 remains a vast puzzle, and significant pieces are starting to appear. Web-based automated quoting and scheduling engines are evolving. OSH Cut is a prime example. The Utah-based job shop has a quoting engine that pinpoints manufacturability issues in cutting and bending. The online quoting engine even gives customers a simulation of how a part will bend in a press brake. From there the system produces a quote and then schedules a job based on real-time equipment utilization.

At this writing, OSH Cut is a relatively small operation that offers cutting and bending. But what about larger operations with various processes, including welding and finishing? Some machines can be changed over in an instant and can easily achieve single-piece flow — think panel benders, automatic-tool-change press brakes, or FMSs incorporating various cutting and bending methods. And parts can be routed through various work centers. If one brake doesn't have capacity, you can send a job to an adjacent brake with a similar bed length, tools, and tonnage rating. Other processes, like powder coating or automated blasting lines, occur in one machine or location and that's it. For large operations, the routing variables seem infinite.

Even so, what if not just every job but every workpiece and component, even down to the individual weld nut, could be visible, tracked, and learned from, analogous to those billions of clicks that feed information to Big Tech? At FABTECH 2019 I spoke at length with Richard Boyd, the founder of Tanjo (rhymes with "bongo), a Carrboro, N.C., company that specializes in AI and machine learning. Boyd spoke of what he called the "enterprise brain," effectively a businesswide problem-solving system that would draw on an immense amount of data to come up with solutions, many nonintuitive.

For instance, the brain theoretically (though this isn't a reality yet) could schedule for optimal flow and minimal WIP between steps. It could release orders in new ways that would be extremely complex and cost-prohibitive to do manually, like running part X of one job with part Z of another job, splitting a job at one workstation multiple ways so that everything reaches assembly at just the right time, and the slowest component—the constraint element that needs to go through the most time-consuming processes—never stops moving. That is, the component moves from laser cutting to the press brake to welding to assembly, with no time spent waiting in a WIP queue.

The brain then feeds that information to engineering and quoting, refining manufacturability even further, based not just on the machines on the floor, but when the order is placed and what part mix is on the floor. It could, for instance, automatically uncover new opportunities for shared tool setups. One small change sends a ripple effect throughout the entire part mix at a given moment, everything adjusts, and the best solution just happens.

At that point the shop floor will have moved past Lycos and Yahoo. It's Googling. And all those clicks — those points of data gathered from the receiving dock to the shipping dock — helped make it happen.

Article originally appeared in The FABRICATOR, August 2021 issue.

Workforce Development for Global Competitiveness

continued from p. 15

Manufacturing executives expect the demand for the following five skills to increase significantly within the next three years:

- technology/computer skills,
- digital skills,
- programming skills for robots/automation,
- working with tools and technology, and
- critical thinking skills.

Some organizations are already making investments in training. Earlier this year, BMW broke ground on a 67,000-ft2 (6225-m2) training center in South Carolina with a $20 million investment, as part of the company's $200 million, five-year workforce training investment.

Virtuous Cycle: Reshoring/Productivity

Rockford, Illinois-based PBC Linear found that the COVID-19 pandemic accelerated the skilled labor shortage. Beau Wileman, a design engineer at PBC Linear, discovered that new technology was the most efficient way to train new workers. Wileman turned to augmented reality (AR) to reduce training time and the need for manager supervision during training. "We have since refined the process where 70 percent of training occurs through the headset," said Wileman.

FANUC America Corp., Rochester Hills, Mich., provider of CNC systems, robotics and factory automation, formed a coalition with Rockwell Automation Inc., Milwaukee, provider of industrial automation and digital transformation, to address the manufacturing skills gap with robotics and automation apprenticeship programs that offer opportunities to gain credentials.

Workforce Development

The Fourth Industrial Revolution (Industry 4.0) is transforming work due to rapidly changing technologies like AI, advanced robotics and cognitive automation, advanced analytics, and the Internet of Things (IoT). New technologies help developed countries like the U.S. reduce the labor hours required to produce goods and shift jobs toward higher skilled workers.

A new study by Mendix, a Siemens business, showed manufacturing workers are interested in learning new digital skills (83 percent), and they see learning new digital skills as important to success in their current role (62 percent).

The availability of a skilled workforce is critical for industry retention and expansion. The workforce must have the skillsets required to operate, maintain and repair the automated equipment that will power new production processes.

continued on p. 26

Creating Prestige Around Skilled Trades with YouTube Competition Series

continued from p. 10

competition, and from there narrow it down to four teams that qualified for the national finals. Those four were Danville Community College, Danville, Va.; Calhoun Community College, Decatur, Ala.; Tennessee College of Applied Technology, Clarksville, Tenn.; and Southwestern Illinois College, Granite City, Ill.

Between the state, regional, and now the national rounds, we had a total purse of about $300,000. That is a combination of grants to the schools, scholarships for the students, upgrades to the facilities, and trade kit and swag.

We had over $1 million in grants, scholarships, and in-kind donations by our wonderful partners. Mastercam, Haas Automation, and HFO Phillips have been incredible partners. Lincoln Electric on the welding side has been a great help as well. They've provided welding machines for our competitions, and their training crew and subject matter experts have helped us design elements of the competition.

Project MFG's Ray Dick hopes his initiative helps to show the skilled trades in a different light.

Can you describe the competition?

We tasked the teams with building their own trophy, which had three components – a stand, midsection, and the feature element on top. The feature element was a surprise-- they didn't know what it was until they showed up at the competition.

It was up to each team to design and source materials, and in the first round it was 6061 aluminum. Each team had to show up to the competition with their design package and raw materials and then execute the fabrication of that stand during the two days of competition.

In the second round, which was our regional round, we elevated the complexity of the 5-axis machining process and the known commodity in the center section, and for the stand itself. We also added design features to make the welding tougher. This included directional welds and being more specific in what the weld process definition was, and then we judged them to the WPS. And then we also added a functional feature of the stand. It had to incorporate a 2- by 2- by 6-in. welded aluminum pressure vessel made out of 11-ga. 6061 aluminum.

For the national competition, we took things a step further. Again, the CNC machining got more complex. They actually had the machine around a globe and then engraved the continents on the globe, which had a bearing fit and had to spin. They had a twisted neck in the center section that held the globe. And then for the stand, we went back and were prescriptive, saying they had to make a part to print, but the part was an octagon-shaped pressure vessel made out of 11-ga. 304 stainless steel. They had to weld the eight pieces of the octagon together and then weld a base, the top, a pressure vessel, and a Schrader valve on it.

It went from a fairly open-ended creative exercise where they really got to play to their strengths to what we believe turned out to be a much more prescriptive product for which they had to meet some pretty tight, industry-oriented tolerances on the fabrication and welding.

What impressed or surprised you the most about the process of narrowing down to a final four?

I would be very remiss if I didn't say I was impressed by the pure doggedness of these teams and their ability to work with us collaboratively during the COVID-19 pandemic.

What continued to amaze and impress me was the competitors' willingness to tackle hard projects. The skill these young people demonstrated during the technical portions of the competition, including machining, welding, fabrication, and metrology, was just way beyond any reasonable expectation of what a person emerging out of school should be able to do.

Our fear initially was making the requirements too difficult and scaring young people away, but that didn't end up happening at all. Every time we threw a really dang

continued on p. 30

Welcome back to **FABTECH**

VISIT & EXPERIENCE:

Light**WELD**™ **1500**

Handheld Laser Welding System

LIVE HANDS-ON DEMONSTRATIONS

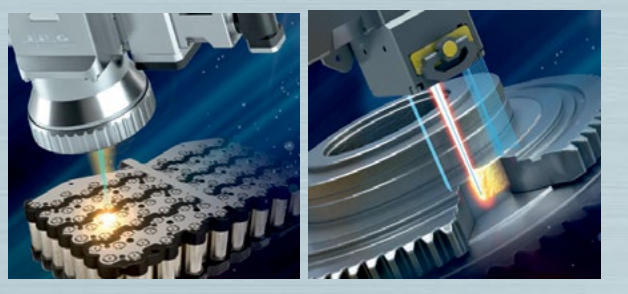
Prepare to be amazed and discover for yourself why seasoned professionals are calling Light**WELD** the most revolutionary welding system available.

THE POWER TO TRANSFORM

HIGH POWER
Laser CUTTING & WELDING

PRECISION
Laser WELDING & CLEANING

SPATTER-FREE
WELDING with REAL-TIME MONITORING



LASER AUTOMATION SYSTEMS

Robotic laser automation systems combine world leading fiber laser technology with advanced system design, simulation and analysis.
Increase quality and productivity with reliable and efficient production solutions for any application.

IPGPhotonics.com I 508-373-1100

Booth **B27038**

State of the Industry: Navigating into 2022

continued from p. 24

laser cutting systems and press brakes coupled with automation, software, and service solutions offer comprehensive digitalization for the sheet metal industry. This fall, Bystronic is unveiling BySoft Business, an end-to-end business and manufacturing suite of software tools, curated for the metal fabrication industry. BySoft Business will enable digitalization, increase visibility and enable smarter factory operations.

Just as Bystronic has embraced digitalization, Haines advised the audience to adopt it to achieve greater visibility of costs, rapidly spot and respond to trends, and highlight the best opportunities for optimization. With an Enterprise Resource Planning (ERP) system, and working in an integrated way with digital information, for example, shops can use historical costs data, predict work, and manage purchases.

"The more digital a shop is, the more successfully they can increase visualization in order to make flexible business decisions," said Haines.

For example, it may make sense to keep an inventory of certain material as prices rise, or to purchase different sizes. Good data can help managers determine the best course of action. Similarly, a detailed analysis of costs might make it clear that some projects may not be worth it due to narrow margins. Customer satisfaction, too, can be improved by digitalization.

"Rather than a price increase, it may be possible to contact the customer and offer a delay until spikes in cost level out," said Haines.

To maintain any inventory effectively, she added, it must be digitally managed. Digitally managed inventory can predict shortages, as well as alternatives. It should be clear when material will run out, what lead times are, and when is the best time to purchase. While large quantities of inventory are often risky, it may be riskier to run out of a certain material for a critical customer.

"Digitally managing inventory will offer better cost control and allow what-if analysis of decision-making choices," said Haines.

That means having some kind of central management system such as ERP integrated with a production planning system or a Manufacturing Execution (MES) system that includes a robust, real-time, bi-directional connection to the shop floor. This allows all data to be digital, reusable, integrated, visible, and predictable. When these end-to-end processes are connected, streamlining is possible, re-work is eliminated, and visibility in real-time can be realized.

"Automation is top of mind for most manufacturers, but it can be difficult to achieve without visualization of work in process and repeatable processes," said Haines. "Once manufacturers have greater visibility and control over their processes, automation becomes a means of increasing capacity."

But it isn't all about software and digitalization. After all, workforce shortages and skills gap challenges are at an all-time high. While manufacturers should continue to work on recruitment and on-the-job training initiatives, it is also important that they have their processes streamlined, not only to get by but to allow for faster training and onboarding, explained Haines.

Investing in Technology

Ludlow Manufacturing was formed to service OEM manufacturers with their metal fabrication needs. Since its founding, it has been devoted to providing customers with the best products, the highest quality, and the fastest service. It maintains this standard of excellence by continually updating its methods and seeking out the newest technologies and processes. The goal is to service clients better, said Todd Ludlow, President and CEO of Ludlow Manufacturing.

Like everyone else, the company is dealing with the problem of rising steel prices. They are working with steel suppliers on long-term monthly programs.

"Communication with customers is the key, and unfortunately if you don't have steel you are in trouble," said Ludlow.

His company offers laser cutting up to 6' x 12', has eight multi-axis CNC press brakes, and provides 6-axis robotic welding, CNC machining, and CNC tube bending. Ludlow noted that they spent more money this year than the previous five years on process automation and related equipment. For example, Ludlow Manufacturing recently added a Bystronic ByStar Fiber 3015 15kw laser to its arsenal.

"It's a game changer," said President Todd Ludlow. "We can laser cut parts really fast, and we can sort them - and we don't have to have people standing in front of a machine pulling parts."

While the machine investment is certainly a cost, it allows the company to utilize the nitrogen the company makes in house, process parts faster, and reduce labor costs.

Ludlow opted for the 15kw option, versus a 10kw or 12kw machine, realizing that as technology rapidly evolves and equipment can become outdated, the 15kw was a better investment for longevity. The cutting speed increases by up to 50 percent using Ludlow's in-house nitrogen, compared to a 10kW laser source. Ludlow says he sees this investment as a pathway to autonomous part movement.

The 2021 Bystronic ByStar Fiber 3015 15k employs extremely accurate and fast fiber laser technology. Ludlow's machine can support nominal sheet size 3000 (x-axis) by 1500 (y-axis) with a cutting area of 3100 (x-axis) by 1580 (y-axis) by 100 z-axis and maximum workpiece weight of 1100.

The high-performance Bystronic cutting head excels with maximum precision in both thin and thick sheets and profiles. The bottom line is this machine allows Ludlow Manufacturing to produce parts with speed, serving customers in a timely manner, said Ludlow.

Making the Right Decisions

With so many options to choose from in terms of vendors, technologies, and process adjustments, fabricators and manufacturers can sometimes struggle to know the right path for their own business.

Bryan Tice, Senior Partner, Metal Edge Partners, detailed how his firm offers risk management and advisory services that provide systematic analysis and evaluation of the risks associated with the metals industry and metals prices. The goal is to unlock supply chain value and evolve tailored commercial strategies. With in-depth experience concerning the volatile metals market, it helps clients identify, monitor, and manage price risk, capital and credit risks, operational risks, regulatory, and compliance risks.

Tice gave the example of a metal distributor. A major customer wanted market-based pricing in order to process a deal. This posed a problem on the reliability of stock inventory data and how the deal might impact revenue and profitability. They were given a full analysis of the market for accurate pricing including the futures and swaps market to help structure a solution. This worked out to be a win-win as the metal distributor could confidently grow market share, satisfy the needs of its largest customer, and no longer be at the whim of the market when trying to forecast revenue and margins.

The big takeaway from this panel: accurate data, digital process, and the right technology can propel manufacturing and fabrication to new levels of profitability and efficiency.

Attracting & Preparing the Next Generation of Manufacturing Talent

continued from p. 4

welcoming environment and target minorities and females for employment opportunities, the better.

However, Luce cautioned that greater resources and better funding is needed.

"Manufacturers need to support organizations that inspire and prepare the next generation, ultimately supporting their own operation through talent pipeline enhancement," said Luce. "Engaging and preparing the next generation ought to be an annual budget line item, like any other important undertaking."

Next Generation Welders

Monica Pfarr, Executive Director of the AWS Foundation, is deeply involved in creating a new generation of welders. She believes it is vital for companies to be active in helping to generate pipelines of future employees by promoting the skilled trades and manufacturing career opportunities available - especially to younger audiences. That could mean a number of things: Active participation on school boards; creation of youth apprenticeship programs; plant tours; speaking to students at local schools; working through industry associations to develop scholarships and grants; and continuing both traditional and digital efforts of career promotion.

"We need to do a better job of sharing and promoting the broad opportunities that a career in manufacturing has to offer, highlighting great pay, a pleasant work environment, the chance to learn emerging technologies, and the many career advancement opportunities," said Pfarr.

She encouraged the industry to continue its efforts to educate career counselors and education administrators about the well-paying and exciting career paths available in manufacturing. As part of this, it is important to spread the message that four-year education attainment is not the only option for success.

Like Luce, Pfarr emphasized the need to allocate resources towards career exploration and growth. Grant programs need to be expanded to support manufacturing education at the secondary and post-secondary levels, for example.

"Scholarship programs can support and nurture the students who have made the decision to pursue a career in manufacturing," said Pfarr.

Accordingly, the AWS Foundation awards more than $2 million annually in scholarships, grants, and support for university research. These programs aim to inspire the next generation and include digital efforts such as CareersInWelding.com, a strong social media presence, a mobile exhibit that travels to large events (state fairs, agriculture and farm shows, maker fairs, etc.), and partnering with like-minded organizations and initiatives to amplify the message.

FMA-Sponsored Camps

The FMA is another industry body that is dedicated to the creation of a new wave of manufacturing talent. FMA offers training programs, industry-exclusive networking events, publications, and trade shows to secure the future of metal fabrication. Further, FMA awards more than 50 scholarships annually.

Ed Dernulc, Foundation Director at FMA, laid out how firms can go about engaging with key stakeholders in their areas. Partnering with local agencies such as the Chamber of Commerce, Business Development groups and service groups such as the Lions and Rotary can help to build more vibrant communities. Local schools, too, are an essential element in building a pipeline of human resources.

"Tour kids while they are young to encourage career paths in aerospace engineering, welding, fabrication, or manufacturing,' said Dernulc. "Develop internships, apprenticeships, and job fairs. Your job pipeline will come directly from the schools so be active with the locals by being actively involved with those schools at all levels."

Case in point: FMA's Nuts, Bolts & Thingamajigs (NBT) foundation supports individuals in discovering their interest in manufacturing as a career path. Its nationwide camp program impacts more than 2,000 kids annually to inform them about the opportunities within the industry. Kids not only become aware of the industry, they learn to build things, and are exposed to manufacturing companies with tours, Q&A with ownership, and understanding of manufacturing processes. 131 camps are being held this year in 24 states.

"This year, we will have 19 camps dedicated to young ladies in either welding (GLOW camps: Girls Learning to Weld) or engineering (GADGET CAMPS — Girls Adventuring into Design, Engineering or Technology)," said Dernulc. "We are looking to develop the next 'Rosie, the Riveter' by encouraging and supporting young ladies who want to pursue this path." ■

Hear more from the panelists tomorrow at 11:00 AM in the Lakeside Center Ballroom

Workforce Development for Global Competitiveness

continued from p. 21

This means skilled workforce recruitment and training is vital to grow manufacturing in the U.S.

The apprenticeship is an industry-driven, high-quality career pathway where employers can develop and prepare their future workforce, and individuals can obtain paid work experience, classroom instruction, and a portable, nationally recognized credential. Of the owners of contract manufacturing machine shops, 63 percent were apprentice graduates or had other skills training.

Creating a Talent Pipeline

Aerospace giant Lockheed Martin, Bethesda, Md., uses several pathways to fill its skilled talent pipeline. In early 2020 it launched a vocational scholarship program for high school seniors and college students pursuing vocational degrees. The scholarship funds degrees at accredited vocational-technical schools to prepare students for advanced manufacturing degrees that don't require a bachelor's or advanced degree. Lockheed Martin also offers a four-year STEM Scholarship program and apprenticeships that range from aircraft maintenance and assembly to software, cyber security and engineering.

Detroit-based LIFT, a national manufacturing innovation institute, recently received $1 million to expand its Operation Next program to reskill/upskill workers impacted by the COVID-19 pandemic. A skilled and ready workforce is among the most critical assets for manufacturing employers' recovery post-COVID-19, LIFT said in a statement.

Development of a skilled workforce begins with motivating a higher number of recruits that are more qualified. Words matter. Stop referring to "trades and vocations" for jobs requiring significant post-secondary training, such as apprenticeships. Adopt the wording that helped produce the exceptional German and Swiss manufacturing workforces: professions.

More informative categorizations of certain occupations can result in additional recruitment for skills training. For example, terminate the use of "middle-skills" and implement a term such as "skilled manufacturing technologists." Categorize skill level by the work that is accomplished, not by the number of degrees held by the workers. Is an apprentice graduate CNC machinist or toolmaker lower skilled than an English major working at a desk in an insurance company?

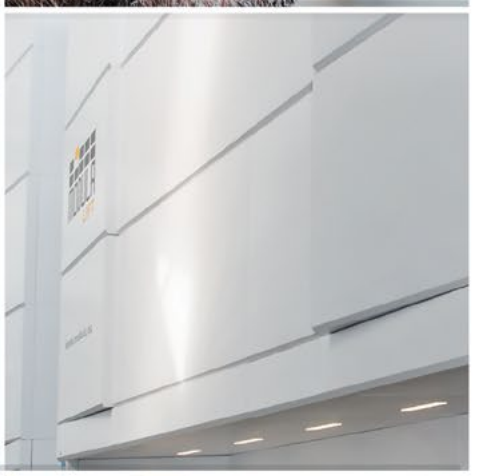
Creating a stronger skilled workforce is critical to reshoring and the country's manufacturing growth. Working together, the Reshoring Initiative and SME stand ready to help manufacturers make better sourcing decisions, bring offshored work to their region or industry, and develop a stronger skilled workforce.

Editor's Note: For more information, contact Harry Moser at 847-867-1144, or by email at harry.moser@reshorenow.org

OUR PRODUCTS ARE

★ MADE IN USA ★

From US & Imported Components



MODULA

Think Vertical, Think Modula

Lift your warehouse into the future with Modula

Lack of space, inaccurate inventory, and inefficient workflows limit future possibilities. Modula's automated storage solutions dramatically boost productivity and accuracy, reduce storage space requirements, and enhance worker safety.

Get the lift you need today
Visit us at booth #A5761

www.modula.com info.usa@modula.com

BEVs: Some Parts Disappear, But New Opportunities Await

continued from p. 28

How Important is Lightweighting?

For perspective on the material mix for BEVs compared to ICE vehicles, in particular the body in white (BIW), we spoke with Michael Davenport, executive director of the Auto/Steel Partnership (A/SP). Davenport, formerly director of engineering—applications at United States Steel Corp., and BIW manager, upperbody systems at Chrysler and FCA, points first and foremost to what Tesla has done with the Model S and then the Model 3.

"Everybody's intuitive opinion would be that when you go to an electric vehicle, you need to drop the weight dramatically," Davenport says. "What we see, however, especially when you look at the more affordable price range for BEVs, not the $180,000 luxury vehicles, is that once you design-in and pay for all of the nice interior features and, of course, the new powertrains and battery systems, there's not a lot of money left over for the BIW.

"Take, for example, Tesla," he continues, "which at first came out with the all-aluminum Model S, but then for the higher-volume Model 3 went primarily with steel for the BIW, much of it hot stamped. It's using aluminum only for the closures—pretty much on par with what you see on a lot of standard ICE vehicles. So, as the industry transitions to more and more BEVs, the OEMs will shift more focus to minimizing the cost of the body structure so that they can invest more into the powertrain and interior features."

When it comes to lightweighting of BEVs, Davenport says that while still a critical material-selection consideration, "if you had a list of all technical solutions and ranked them in order by how much they improve either fuel economy or driving range and battery life, the lightweighting option drops a few pegs.

"Generally," he continues, "we expect about 100 kg of mass savings will get you somewhere between 5 and 8 km extended range. So, if you, for example, invest in more expensive materials and remove 200 lb. from the vehicle, you gain about 10 miles per battery charge, but there's a huge cost there. The OEMs will look closely at where it makes the most sense to add cost to the vehicles—in the powertrain and interior features, or for lightweighting. It's not that lightweighting is not important with BEVs, it's just not as big of a lever as with ICE vehicles." MF

NORTH AMERICA'S MOST INFLUENTIAL ADDITIVE MANUFACTURING EVENT.

rapid + tct

September 13-15, 2021
McCormick Place, Chicago, IL

EVALUATE. ADOPT. OPTIMIZE.

- 200+ AM Exhibits & New Products
- 65+ Conference Presentations
- Connect with Thousands of Experts & Peers
- Find Industry Leading Resources
- NEW! RAPID + TCT LIVE! Digital Content

SHOW YOUR FABTECH BADGE FOR COMPLIMENTARY ADMISSION!

sme RAPID NEWS PUBLICATIONS LTD

Creating Prestige Around Skilled Trades with YouTube Competition Series

continued from p. 22

hard problem at teams, they rose to the occasion and took it as a challenge. I would even argue that part of what we learned throughout the process is that schools can push students way harder than they ever thought they could.

Why is a competition like this important?

COVID-19 revealed our inability to produce domestically on demand or pivot our manufacturing base quickly and efficiently to produce what's needed. The pandemic reflected the general health of the industrial base as a whole. If we don't start yelling louder about the importance of attracting the next generation of manufacturers to the trades, we'll never solve this problem.

There are a lot of great competitions out there. SkillsUSA has a huge footprint, and I think all 50 states do a lot of great work at the younger ages, introducing people to and challenging them to get into the trades. But somewhere along the line, we need to elevate it to where young people are being recruited into manufacturing jobs just like the college football teams recruit players.

That's a future vision of ours as we continue to offer this national championship-type competition. We want industry leaders showing up, seeing in person what these young people can do, and talking to them about immediate job opportunities. If we can create that kind of prestige around the trades, then and only then can we take a breath and truly say that the future looks bright for manufacturing in the U.S.

How can people tune in to watch the final four compete?

The first episode aired April 20 on the Project MFG YouTube channel. All of the details about future shows are available on our website, projectmfg.com.

How can schools sign up to compete in the 2021 competition?

Anyone interested in participating can go to our website and access an application form under the Get Involved tab. We are always looking for schools and students that want to challenge themselves to the highest level. ■

Article originally appeared in The WELDER, May/June 2021 issue.

SAVE the DATES!

FABTECH's market-leading events take place at different times of the year and in different locations across North America, making it easy for everyone who wants to participate in a FABTECH event.

FABTECH

NORTH AMERICA'S LARGEST METAL FORMING, FABRICATING, WELDING AND FINISHING EVENT

MONTERREY MEXICO
May 3-5, 2022

TORONTO CANADA
June 14-16, 2022

ATLANTA USA
Nov. 8-10, 2022

AWS FMA sme PMA CI

FABTECHEXPO.COM

WALTER
Surface Technologies

ARCONE® DRILLCO CUTTING TOOLS TRIUMPH TWIST DRILL

METALWORKING SOLUTIONS HELPING YOU WORK BETTER

FABTECH CONTEST

you could

WIN $3,000

in WALTER products of your choice or one of

8 ZIPWHEEL™ and Grinder PRO-PACK*

VISIT BOOTH **B35060**

*Set an appointment with one of our WALTER product experts. Certain conditions apply. Must be eligible for contest entry.

PRE- AND POST-WELD TREATMENT | CUTTING
GRINDING | BLENDING | SANDING | FINISHING
BRUSHING | TOOLING | POWER TOOLS
LUBRICATING | DEGREASING | CLEANING | PPE