

MONDAY
NOVEMBER 6, 2017

DAY 1

McCORMICK PLACE



THE OFFICIAL SHOW NEWS

SHOW DAILY

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

TODAY'S EVENTS

KEYNOTE: FABX TECH TALKS

8:45–10:00 AM, S100 Ballroom

OPENING CEREMONY

10:00 AM, Grand Concourse

ADAM GENEI MEET/GREET AND AUTOGRAPH SIGNING

10:15–11:30 AM, S100 Ballroom

ADDITIVE AND CONVENTIONAL MANUFACTURING, A SMART COMBINATION

11:00–11:30 AM, 3D/Additive Manufacturing
Theater, Grand Concourse

DEFINING THE NEXT CHAPTER IN 3D PRINTING: Mass Customization, Agile Manufacturing

11:30 AM–12:00 PM, 3D/Additive Manufacturing
Theater, Grand Concourse

ADVANCED MANUFACTURING FOR THE NEXT INDUSTRIAL EVOLUTION

12:30–1:30 PM, 3D/Additive Manufacturing Theater,
Grand Concourse

HYBRID ADDITIVE MANUFACTURING: THE FUTURE OF METAL PARTS PRODUCTION?

2:00–3:00 PM, 3D/Additive Manufacturing Theater,
Grand Concourse

PROFESSIONAL WELDING COMPETITION

Show Hours, North Hall, Booths B32110 & B33109

SPIN TO WIN

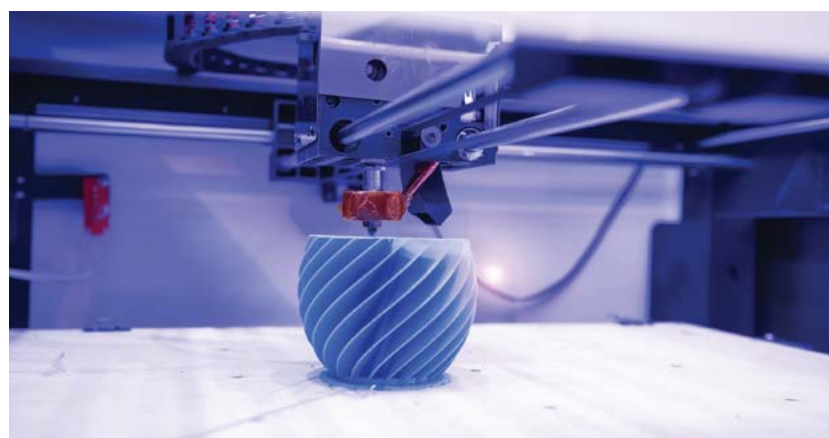
12:00 PM–5:00 PM, Hall C, Booth C41344
Chance to Win Prizes!

3D/Additive Pavilion Opens in Response to Rapidly Growing Interest

More than a third of those attending this year's FABTECH have expressed a strong interest in additive manufacturing—a number that has increased year over year. This shouldn't be too surprising. According to global consultant Deloitte, "3D printing will potentially have a greater impact on the world over the next 20 years than all the innovations from the industrial revolution combined."

That's the kind of assessment that gets your attention; and it's getting serious investment. Markets predict the value of additive manufacturing will be \$32.78 billion by 2023, representing a compound annual growth rate of 25.76 percent between now and then. Why the explosive growth? Consider some of the benefits additive manufacturing provides compared to traditional manufacturing processes:

- **Rapid prototyping.** Single items can be produced at low cost without incurring the mold and tooling expenses of traditional manufacturing.
- **Shorter lead times.** By producing goods comparatively faster than with



traditional methods, additive manufacturing can drive down lead times.

- **Rapid innovation.** Because additive manufacturing is an iterative process, new innovations can be designed, produced, and revised rapidly.
- **Lower inventory costs.** Capital costs of investing in and warehousing inventory are reduced because components can be printed on demand. Some manufacturing sectors (e.g., aviation) have been quick to take advantage of this benefit.
- **Mass customization.** Additive manufacturing enables customization of

goods and components in small (but increasingly larger) production runs in response to increasing demands for customized goods and services.

- **Use of new materials.** An increasing array of printable materials developed by material science has vastly expanded the types of applications to which additive manufacturing can be applied. For example, this year researchers at MIT have created 3D-printable graphene that ultimately may have a dramatic effect on the weight of automobiles and aircraft, driving down fuel costs and carbon emissions.

continued on page 14

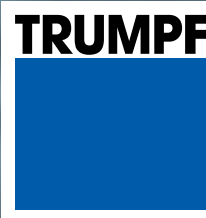
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Visit booth B17013 for a chance to win one.

Meet the new plasma - XPR300™. Live demos at booth A3525.



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FABTECH is the perfect opportunity to get connected with TRUMPF. With best in class equipment, automation components, vertical software solutions and experts that guide you every step of the way, TRUMPF is in the best position to support your smart factory. The demands of producing a high volume production of parts with smaller lot sizes require solutions that stay connected, adapt quickly and operate efficiently. TRUMPF provides solutions from stand alone machines to full systems across a wide range of processes. If efficient manufacturing is in your future, we invite you to stop by our booths at FABTECH and start your smart connection today.

FABTECH Booths A2601, B11013, B103 / www.trumpf.com

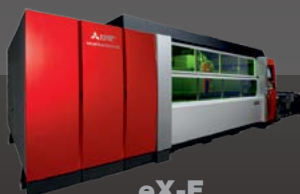


MITSUBISHI LASER

FABTECH BOOTH **A2619**



SR-F



eX-F



RX-F



XL-F

MEET MITSUBISHI'S COMPLETE LINE OF FIBER LASERS

FABTECH is just around the corner – Visit **Mitsubishi's** booth A2619 and see how ZOOM Fiber technology is changing the game. Are you moving towards industry 4.0? Learn about **Mitsubishi's** Remote 360 application and how it's revolutionizing business. That's not all – Press Brake, Automation, CO² laser, 5-axis laser, milling and turning equipment will all be on display!!! Visit our web site at www.mcmachinery.com

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Connected Manufacturing Featured in the TRUMPF Booth

A live demonstration of connected manufacturing across multiple technologies is taking place in TRUMPF booth A2601. Attendees are able to order their own personalized part which may be produced either in the TRUMPF booth or at the nearby TRUMPF Smart Factory in Hoffman Estates, IL. Each custom part is ordered through a cloud application and then laser cut, bent and marked with custom text. Progress notifications are sent via text message at each operation, as well as when the part is ready for pickup.

In addition to connected manufacturing, laser cutting is demonstrated on a TruLaser 5030 fiber with the new HighSpeed Eco nozzle that nearly doubles the cutting speed while reducing the assist gas consumption considerably. Also, the TruLaser 5030 fiber and TruLaser 2030 fiber are both demonstrating BrightLine fiber, which produces excellent cut quality even in thicker materials. Both models are

available with various automated material handling options.

Combination punching and laser technology is on display with the TruMatic 1000 fiber, which features a revolutionary "Delta-Drive" flying punching head. Another major advantage this machine offers is that it can be installed as a TruPunch 1000 and be field-upgraded later to become a TruMatic 1000 fiber by adding the TruDisk laser and associated components.

Bending technology is shown with both automated and manual press brakes. The TruBend Cell 7000 is the world's fastest system for automated bending of small parts. The TruBend 5130, TRUMPF's flagship press brake is shown with the new ToolMaster, an automatic tool changer, as well as with ACB laser- a fast and accurate non-contact angle measuring system. The stand-alone TruBend 7036 stands out for its ergonomics, high speed and energy efficiency.



A new addition to TRUMPF's portfolio is the TruLaser Weld 5000, a laser welding cell that puts laser welding within the reach of more fabricators. The TruLaser Weld 5000 features FusionLine, which enables welding across gaps that typically are too large for laser welding by perfectly coordinating the laser, beam guidance, and optics. FusionLine allows many components to be laser welded without redesign, broadening the range of applicable parts.

The main booth also features laser marking with the TruMark 5050. This machine produces permanent marks with its high average power fiber laser source. The TruServices team is also on hand to discuss how TRUMPF supports the entire life cycle of their equipment with the best financing options, training, consumables, tooling, service and other solutions.

TRUMPF's main display at FABTECH would not be complete without its line of portable power tools for cutting, fastening, beveling and deburring sheet metal.

This year TRUMPF is featured in two additional booths, B11013 in the Tube and Pipe Pavilion and B103 in the Additive Pavilion. In booth B11013, the TruLaser Tube 5000 fiber is shown for the first time at FABTECH, and features RapidCut, a feature that improves processing speed by up to 15 percent. In B103, the TruPrint 1000 and TruLaser Cell 3000 are demonstrating two different solutions for additive manufacturing. ■

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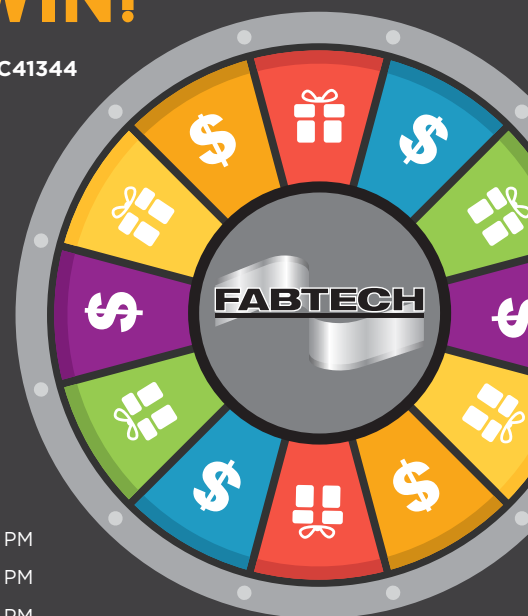
SPIN TO WIN!

► LOCATION: HALL C BOOTH# C41344

Stop by and
spin the wheel
for a chance
to win prizes!

HOURS OF OPERATION

Monday, Nov. 6 . . . 12:00 PM - 5:00 PM
Tuesday, Nov. 7 . . . 11:00 AM - 4:00 PM
Wednesday, Nov. 8 11:00 AM - 4:00 PM
Thursday, Nov. 9 . . 10:00 AM - 2:00 PM



The Bystronic logo is displayed in white text on a red background. The 'y' in 'Bystronic' is stylized with a diamond-shaped pattern of dots.

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NEW – Xpert 40 Mobile Bending Cell
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NEW – Xpert 80
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NEW – Xact Smart 160
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NEW – ByCockpit
Real-time Information for Sheet Metal Processing

NEW – Bystronic MES Software
The Ultimate Navigation System for Production Management

Additional Demonstrations and Services:

- BySmart Fiber 3kW – Bridging Performance with Lower Investment Costs
- Xpert Tool Changer – The Set-up Accelerator
- BySoft 7 – Make It Easy
- ByFinances – Turning Dreams into Reality

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BLM GROUP USA: A Leader in Tube Processing Equipment

BLM GROUP USA, (www.blmgroupp.com), a global leader in the manufacture of tube processing solutions offers a range of products including laser tube cutting, cold sawing, bending, end-forming, end-machining and wire bending machines.

Visit Booth #B11010 where BLM will feature its new LT8.10 fiber laser tube cutting system, along with its series of high-

ly efficient and productive tube bending machines: SMART, ELECT 102 and E-TURN 52 integrated with robotic load/unload demonstrating a fully automated production process.

With its 3kW fiber laser, the LT8.10 provides excellent flexibility for precise laser cutting on a variety of materials for tube diameters up to 9.5 in. (241 mm).

The system is ideal for cutting highly reflective materials such as brass, copper and aluminum and can process round, square, rectangle, special shaped tube or bar and open profiles with ease.

SMART, the all-electric tube bending machine provides speed, precision, and reliability when processing tube with diameters up to 1 in. (28 mm). Its compact

layout and integrated loading/unloading enable automated non-stop operation. The SMART is particularly well suited for bending complicated shapes and multiple radii tubes. It can be used in a wide range of configurations; from manual to robotic loading or with a range of automated loaders designed to handle straight tubes or pre-assembled tubes with formed ends, flanges or fittings. The entire system is managed from a single point via the VG-P3D software, making programming and operating simple.

The ELECT 102, an all-electric tube bender brings advanced levels of accuracy and productivity to the bending of tubes up to 4 in. (102 mm) diameter. The machine can bend multiple radii using stack tooling for right-hand or left-hand bending. Up to eight tools can be fitted at the same time. Variable radius tools can be used in any position. The unit can handle difficult applications with little or no straight between bends or where tight radius bends are required.

E-TURN 52, the all-electric tube bender, can bend a variety of tube configurations including round, square, rectangular, flat-sided, oval and elliptical. Tube can be automatically loaded, bent and unloaded all in one machine. The E-TURN 52 can bend tube up to 2 in. (50.8 mm) diameter and can automatically predict and calculate the behavior of the tube during the bending operation. This is particularly useful for processing high-strength materials or stainless steel with high spring-back to prevent the formation of unsightly marks caused by slippage at the end of the bend or early wear on the tools.

Applications specialists are also on hand to demonstrate BLM GROUP's proprietary software suite called, "BLMelements" which is a single management point for designing, programming and planning tube and sheet fabrication production. The software also allows for remote machine monitoring and collecting operating statistics and receives real-time notifications of events that may require attention all to optimize the data networking, computerization and digitization of the "Smart Factory" of the future and Industry 4.0.

BLM GROUP is a global leader in tube and sheet metal processing solutions. The company has more than 60 years of experience and thousands of applications in the development of tube and sheet metal fabrication equipment. ■

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Technology. Dedication. Service. That's us in three words. For over 60 years, BLM GROUP has developed state-of-the-art systems for processing tube, bar and special sections to make production more simple, more innovative and more efficient. Whether it's laser cutting, bending, sawing, end-forming or machining centers, our tube technology makes the difference. *See how at FABTECH 2017 in Booth B11010.*



LT8.10
3D Fiber Laser Cutting



E-TURN 52
Right & Left Hand Tube Bender



ELECT 102
102mm Tube Bender



SMART
28mm Tube Bender with Auto Loader

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Taking Learning and Development Beyond Onboarding

Today, companies leading business innovation are increasing investment in training and development programs to keep up-to-date with new technologies and equipment, recognizing that increased productivity, reduced waste and the abilities of skilled, knowledgeable employees directly affect the bottom line.

All too often, employers start off strong with onboarding, immersing new staff in company culture, and level-setting them on the skills and knowledge they need before sending them out on their own. But once new hires have completed their initial training and move to full productivity, they are left to navigate through informal learning and development, by way of job shadowing and knowledge sharing by senior employees.

Unfortunately, many manufacturers don't have plans in place to provide employees with ongoing training throughout their tenure on the job. Case in point, Tooling U-SME's Mission Critical: Workforce 2021 report found that three out of four manufacturers (75 percent) say their company doesn't offer a structured training program on manufacturing skills.

When this happens, chances increase for high turnover, low morale, safety concerns, reduced productivity and sluggish growth.

On the flip side, high-impact learning organizations (HILOs) understand that

successful learning programs are continual, and they realize that after the initial onboarding is complete, they must continue to offer new hires relevant training and development opportunities that will result in high productivity, customer satisfaction, quality and other metrics.

Continuous education and performance support need to be part of every learning and development strategy to build company productivity and profitability. To help the case for constant training, here are five reasons learning and development must go beyond onboarding:

1. Happy Employees Are Productive Employees.

The University of Warwick conducted research to test the idea that happy employees work harder, and they learned that happiness led to a nearly 12 percent increase in productivity.

With this insight, manufacturers can create a culture of happy employees by implementing a strong training program, which assures employees that their company is investing time and money in their development. This step boosts morale and productivity, as well as helps improve retention.

2. Employees Stagnate Over Time.

The lack of ongoing training often contributes to a decline in employee skills, which over time can lead to diminishing

worker competence and performance.

To counter this loss, a continuous education or performance support initiative must be built into a learning and development strategy. For instance, to validate a worker's continued ability to meet organizational performance requirements, a requalification strategy may be necessary.

When his company lost a long-time customer because there were not enough skilled workers available to fill a large order, Michael Munday, CEO of Arwood Machine Corp., in Newburyport, Massachusetts, worked with Tooling U-SME to create a training program that would develop new employees and sharpen the skills of incumbent workers. Not too long after developing the company's program, Arwood saw a 10 percent upward trend in productivity, scrap cost as a percentage of sales

was at a lower level, defects were down and morale was up.

3. Technology Is Quickly Changing.

Manufacturers need to anticipate and plan for constant changes and advancements in technology and tools. They also need to train their employees to embrace this fast-paced growth as an opportunity.

Smart manufacturing – including automation, robotics and the industrial internet of things (IIoT) – is transforming the competitive landscape, allowing for increased flexibility in our factories and plants, improved productivity and opening new possibilities for workers across the U.S.

Change is inevitable, and it is the obligation of manufacturers to invest in their employees through continuing education that will prepare companies — and their employees — for success into the next decade and beyond.

4. Knowledge Spurs Innovation.

Customers expect their business partners to stay ahead of new technology trends and innovations, which means teams at manufacturing companies need to be well-trained and have a continuous improvement mindset – the forward-thinking that customers need and demand.

When team members fully understand how to operate the latest equipment and technology, they can incorporate more efficient approaches, come up with new



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ESAB Welding & Cutting Products will offer hands-on demonstrations of its innovative products for arc welding, filler metals, plasma cutting, oxy-acetylene cutting, carbon-arc gouging, exothermic cutting and personal protective equipment at FABTECH 2017, booth B17074. Select products will be available for purchase at FABTECH show special pricing, with details only available in person at the booth.

ESAB's "Filler Metal Hub" will help visitors find exactly the right electrode to improve productivity, lower cost and operator appeal. ESAB will demonstrate its new PURUS™ 42 ER70S-6 solid wire (which reduces silica islands and spatter for faster clean-up), as well as offer visitors the opportunity to run products such as Dual Shield® X series FCAW-GS wires and Atom Arc® 7018 Acclaim. Both experienced and novice welders will appreciate their excellent weld performance, wide operating range and easy clean up.

Additional show highlights include a growing line-up of the powerful and portable Rebel, Renegade and Cutmaster 60i products, the new DMX Automated Plasma Beveller and Smart Bevel Technology, demonstrations of ESAB® Cloud Services featuring ESAB WeldCloud and ESAB CutCloud online data management systems, expanded

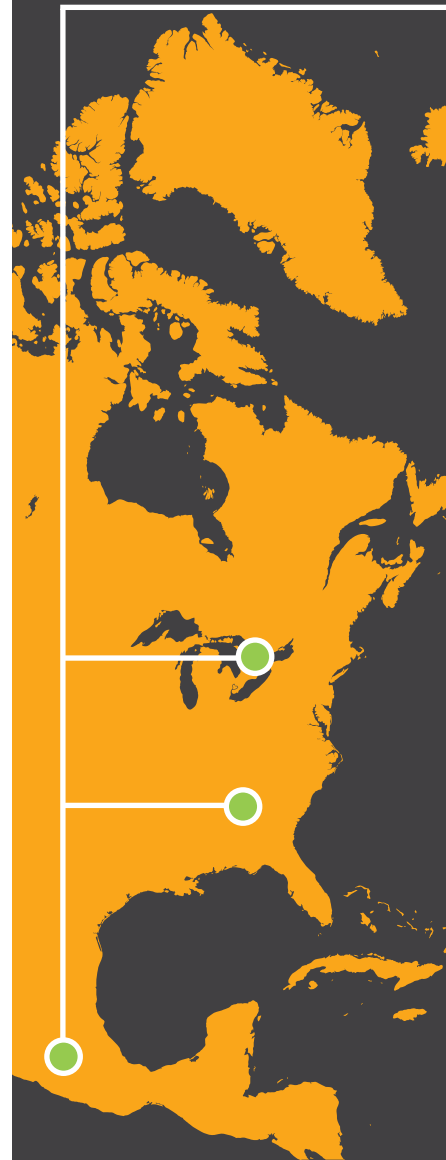
options for Sentinel helmets, new and expanded Aristo® advanced synergic multiprocess equipment and a growing line of Victor EDGE™ 2.0 regulators and Arcair® exothermic cutting systems.

Everyone who visits the booth and participates in a demonstration will be eligible to win ESAB's daily grand prize drawings, held one hour before the close of the show. Entrants must be present to win; prizes may include Rebel® welders, Thermal Dynamics® Cutmaster® plasma cutters, ESAB Sentinel™ helmets and Victor® cutting outfits. ESAB will also hold its traditional oxy-fuel and manual plasma cutting contest that judges entrants based on a combination of speed and quality. ■



FABTECH demonstrations include PURUS 42, a solid wire formulated to reduce post-weld cleaning of spatter and silica islands, minimizing rework and reducing the total cost of welding.

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

► 2018 SCHEDULE

May 2-4, 2018

Centro Banamex
Mexico City

NEW SHOW DATE

June 12-14, 2018

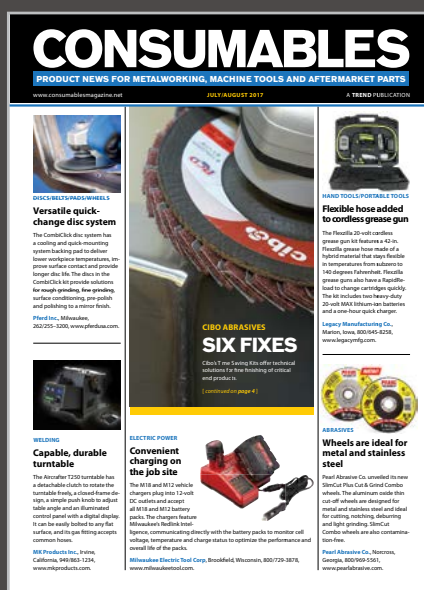
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Then experience the expanded Renegade™ family, Cutmaster® 60i, EDGE™ Series 2.0, and Purus™ 42 wire; see the DMX automated plasma beveller in action; and try the industry's hottest helmet on for size – Sentinel™ A50. And when you demo anything, you'll be entered in our daily equipment drawing.

FILLER METAL HUB.

Stop by our interactive filler metal hub where you can chat with our technical experts, sign up to receive a free copy of our latest Filler Metal Data Book, and enter for a chance to win a Sentinel A50 welding helmet.

THE PALEY-JAMES PROJECT.

ESAB is a proud sponsor of the Paley-James Project, a collaboration between sculpture artist Albert Paley and motorcycle builder Jesse James. The final product of their collaboration will be on display at the entrance of the North Hall, so make sure to check it out.

Don't miss your chance to do all this and more. Get in on the action at booth B17074.

Visit Booth B25069 to Learn About McDantim Trumix® Gas Blending Systems

McDantim Trumix® gas blending systems are all based on a unique approach to creating accurate gas blends. Taking advantage of laminar gas flow properties, its blenders maintain industry standard blend accuracies over a wide range of flow rates

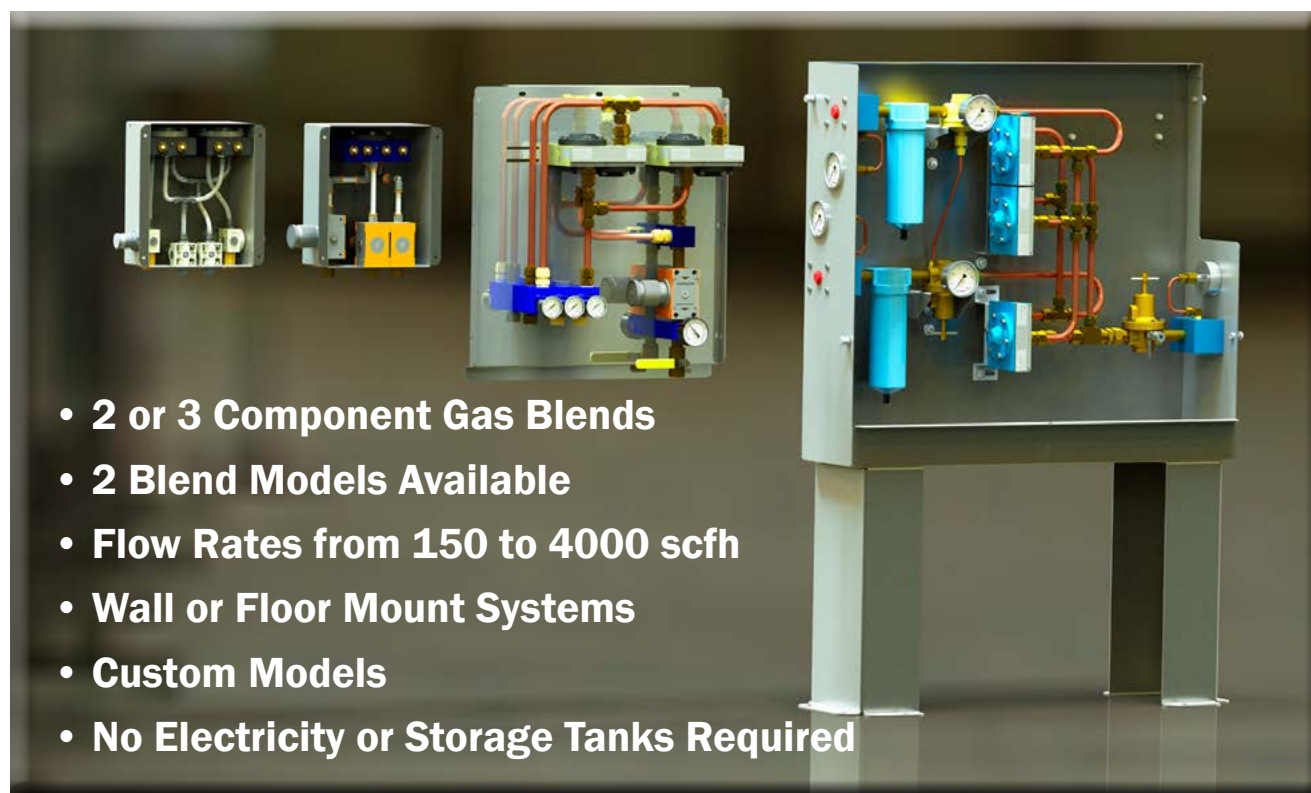
without the need for buffer tanks, electrical connections, or user calibration. Two-component or three-component blends at flow rates ranging from 1 scfh to over 4000 scfh are available from McDantim Inc.'s range of products.

The new TM2B450 will provide two different blend ratios of a two-component mixture. If a shop uses 2% CO₂/Ar on some days and then 25% CO₂/Ar on other days the TM2B450 helps make the switch between the two as simple as flipping a le-

ver on a 3-way valve. Need to use both blends at different stations at the same time? No problem. The TM2B450 can deliver 450 scfh of both blends at the same time and still maintain +/- 10% (of the minor component) accuracy.

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McDantim Inc.'s TMA950-3 gas blending system can provide up to 950 scfh of a three-component gas blend. Accurate mixtures of any three of the following gases; Ar, N₂, CO₂, O₂, He, or H₂ can be produced on-site in the exact ratios required. McDantim Inc. guarantees +/- 10% (of the minor component) accuracy at any flow rate from 1-950 scfh. Like all its gas blending systems, the TMA950-3 requires no electrical connections, buffer tanks, or ongoing maintenance and the tamper-proof design ensures that well-intentioned welders can't change the blend ratios. Systems that can provide up to 4000 scfh are readily available.

The most complete and versatile package is the Trumix® TM4000-2 (standard or laser model) gas blending system can provide up to 4000 scfh of a two-component gas blend. Accurate mixtures of any two of the following gases; Ar, N₂, CO₂, O₂, He, or H₂ can be produced on-site in the exact ratios required. System includes; inlet and outlet pressure gauges, inlet filters, and mixed gas sampling port. Appropriate for high-pressure laser gas systems as well as welding applications. Visit the McDantim booth # B25069 to find out more. ■



Booth # B25069



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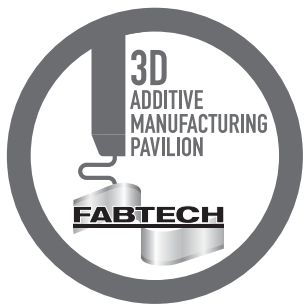
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3D/Additive Pavilion Opens in Response to Rapidly Growing Interest

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Another driver of growth: decreased costs have lowered barriers to entry. Hardware costs have dropped dramatically year over year, facilitated by the continuing development of technology and influx of new machine providers increasing competition. Further, lower costs of raw materials used in additive manufacturing have added to the downward pressure on pricing. The combination of these factors has consistently cut additive manufacturing costs.



Featured at the 3D/Additive Pavilion

The implications of these developments will be discussed in the Additive Manufacturing Theater at the 3D/Additive Pavilion. It will feature leading companies in the industry and provide presentations, education, and networking opportunities for FABTECH attendees. Located in the Grand Concourse Lobby, the Pavilion is an all-encompassing area for everyone with an interest in additive manufacturing. All events are free and open to all attendees.



Monday, November 6

11:00 – 11:30 AM

Additive and Conventional Manufacturing, a Smart Combination

Frank Geyer, Product Manager, Additive Manufacturing, TRUMPF

Additive manufacturing (AM) is a hot trend that is discussed amongst many industries. In the field of AM with metal powders the methods Laser Metal Deposition (LMD) and Laser Metal Fusion (LMF) are widely used. Each process offers a variety of advantages as well as limitations.

However while technically possible it is often not economical or even required to generate an entire structure with AM. Solid and simple geometries can be produced much faster and at lower cost using conventional processes, such as machining, punching, forging, and when combined with AM processes for the more complex features the overall production cost and time can be significantly reduced.

In this presentation several examples of cases where a combination of processes is the smart choice are discussed.

11:30 AM – 12:00 PM

Defining the Next Chapter in 3D Printing: Mass Customization, Agile Manufacturing

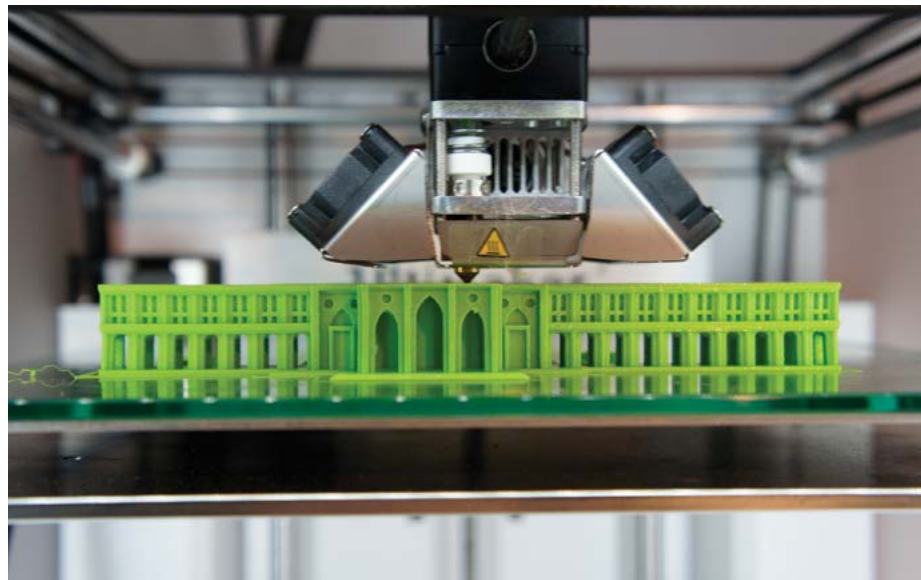
Jennifer Milne, Applications Engineering Lead, Formlabs

3D printing has crossed a threshold. Machines are reliable, materials are advanced, and the technology is widely adopted by CAD users across industries. Formlabs carved a space for powerful, affordable 3D printing in prototyping, but, as we enter a new chapter in 3D printing history, moving rapidly towards a digital, highly-customized manufacturing landscape, what's next?

2:00-3:00 PM

Hybrid Additive Manufacturing: The Future of Metal Parts Production?

Since its inception, there has been a gap between additive manufacturing and traditional subtractive manufacturing. In recent years, many machining companies have opened their minds to the idea of integrating the two processes, enabling designers to create product enhancements, increase production time, and make cost-efficient machines that do both. Join our panelists as they discuss the development of hybrid additive machines and how it will impact manufacturing in the future.



Panelists include David Fischer, lathe product specialist at Okuma America Corporation; Frank Geyer, product manager, additive manufacturing at TRUMPF GmbH; and Jason Jones, Ph.D., co-founder and CEO at Hybrid Manufacturing Technologies. Debbie Holton, vice president of events and industry strategy at SME, will moderate the panel.

Tuesday, November 7

10:30-11:30 AM

Evaluation of Additive Manufacturing and What It Means for the Fabrication Industry.

What does this technology mean for the manufacturing industry? How should we be preparing for the future? Industry expert Todd Grimm, president of T.A. Grimm & Associates, explains the impact that additive manufacturing is having and will continue to have on manufacturing, as well as how companies can embrace what it has to offer.

11:30 AM – 12:00 PM

3D Printing at a Crossroads: How Metal Printing at Scale Will Change the Manufacturing Landscape Over the Next Five Years.

3D printing has helped speed innovation across multiple industries with prototyping and modeling. Its ability to remove inefficiencies in production line turnover, decrease costs, and reduce time to market for new products is well known and understood. Still, solid investment returns from widespread adoption come when printing disrupts traditional manufacturing. Taking metal 3D printing in particular from a niche that only the largest enterprises can afford to something scaled, accessible, and low-cost has the power to literally

change the world. By creating customized products and parts in a range of industries, from medical to aerospace, 3D printing can solve a range of very diverse and particular industry challenges in a way never before possible. Greg Mark, CEO and founder of Markforged, will share both his current perspective on the industry and examples of 3D printing's undeniable power to improve the world we live in.

12:00 – 1:00 PM

Designing for 3D Printing & the Complexity Paradox

Greg Paulsen, Director of Applications Engineering, Xometry

How do you design parts with 3D Printing in mind? In order to best design for additive manufacturing, you have to know a little bit about how parts have been designed and made in the past! Greg Paulsen, Director of Applications Engineering at Xometry, will present an overview of the most common additive (3D printing) and subtractive custom manufacturing technologies, how they are used, and some best practices on designing for manufacturability.

Learn:

- The strengths and trade-offs of modern 3D printing
- How to take advantage of The Complexity Paradox
- When a project is right for 3D printing versus machining
- Key design considerations between technologies
- How to streamline the entire process in minutes

2:00-3:00 PM**Effectively Incorporating Additive Manufacturing into Your Business.**

How do you incorporate additive into your manufacturing process? Should you purchase equipment or is a partnership with another facility a viable option? What about training? Join our expert panelists as they discuss the resources that are available as you implement your additive manufacturing process. From funding to workforce development, get guidance on the best route for your business. A panel of industry experts discusses the resources available, from financing to workforce development. This discussion is a must for those planning an additive manufacturing initiative in their business.

Panelists include Carl Dekker, president of Met-L-Flo; Jon Riley, Sr. Vice President, Technology at the National Center for Manufacturing Sciences (NCMS); and Federico M. Sciammarella, Ph.D., interim chair mechanical engineering and associate professor, Northern Illinois University. Todd Grimm, president of T.A. Grimm & Associates, will moderate the panel.

Wednesday, November 8**10:00-11:00 AM****Accelerating Innovation in 3D Printing: Practical Tools You Can Apply Today.**

Learn how several organizations used collaboration to accelerate additive manufacturing development to levels never seen before. The principles learned can

be applied to all kinds of advances and provide a competitive advantage for your organization. Rick Neff, additive manufacturing product and sales manager, Cincinnati Inc., helps point you to practical tools to jump start your innovation during your time at FABTECH.

Previews, Predictions, and Philosophies

In providing a preview of his presentation, Greg Mark offered a clearly defined view of 3D printing as it is emerging: "The critical point as we scale up is producing the exact same part with the exact same process, but with a \$1,000 printhead," he explained. "As we go from single-part production to thousands of parts, we use the same technology to do so. If you switch technologies, you have to re-quality the part. The key is using the same process the entire way, and parallelization is how you can do this."

Mark called out three points he hopes his presentation will make clear:

- Additive manufacturing is moving to wards a new process: tens to hundreds of times cheaper than what the process was when it first appeared in manufacturing. Today we have \$100K machines instead of \$1 million machines, just as reliable and easier to use.
- Technology is maturing so that it can scale through massive parallelization. The switchover point to 3D will rise from 200 parts to 20,000 parts.

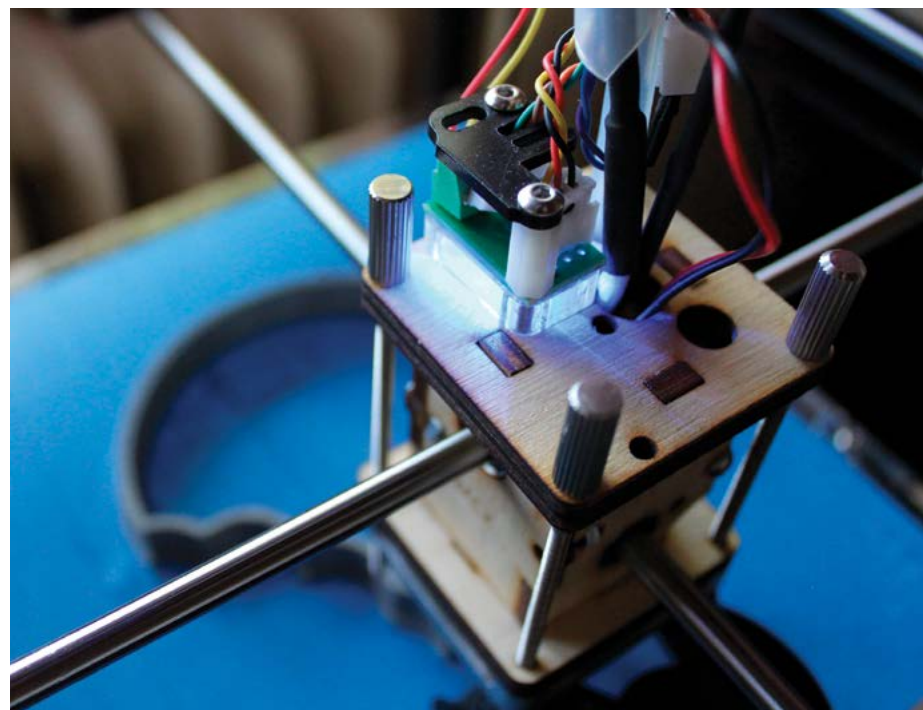
- The infrastructure to do this exists now; the software and hardware are already at hand and easily accessible.

"Think of it like Tesla," says Mark. "The first cars they came out with were cost prohibitive; but what they're doing now is changing the industry."

Carl Dekker's comments underscore Mark's observations. "Additive manufacturing is headed towards enabling the manufacture of quantities that weren't viable before," he notes. "For fabricators, this is opening a door to a new world of specialty applications and products. The question is: How do you manage the engagement to

support integration within a business model that supports these new products?"

Those that come to the 3D/Additive Pavilion this week will be better prepared to answer that question when they return to their businesses. It's one good reason to check it out, and one of many why we're looking forward to seeing you there. ■

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- **LC 2515 CI AJ + ASR 3015 NTK:** Punch/Fiber Laser Combination Machine with Automated Material Handling
- **HG 1003 ARs:** Integrated Robotic Bending System
- **FLW 4000 M5:** 4kW Fiber Laser Robotic Welding System
Via live video feed.



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AMADA to Showcase "Automation For The New Era" at FABTECH 2017

Today, there is a major focus on revitalizing U.S. manufacturing — with American goods built by American workers. This defines The New Era of American Manufacturing. FABTECH provides the ideal opportunity for fabricators to learn how they can leverage AMADA's highly innovative automated solutions to thrive in this new era. Built locally at AMADA's Manufacturing Facility in Brea, California, these automated systems set new standards for world-class performance and reliability.

The LCG 3015 AJ + AMS 3015 CLT is a high-capacity fiber laser paired with an extremely flexible modular automation system that's designed and manufactured in the U.S. The 9kW LCG 3015 AJ combines optimal power and cutting speed to process a full range of thin-to-thick materials. Paired with AMADA's newest AMS CLT Automated Tower, the LCG AJ achieves unprecedented levels of productivity and manufacturing versatility. The AMS CLT is a fully automated material handling/storage system that enables fabricators to achieve 24/7 production. In addition, the tower features a multiple shelf design that provides the flexibility to store a variety of material types — ensuring quick response for short runs and rush jobs. The AMS CLT's modular design can be customized and expanded to meet American fabrica-

tors' specific production requirements, including the ability to support multiple laser systems.

The ENSIS 3015 RI is a 3kW fiber laser that's equipped with an integrated Rotary Index. AMADA's ENSIS technology utilizes a variable beam control unit that automatically adjusts the laser beam's properties to process a wide range of thin-to-thick material without a lens change. In addition, the Rotary Index enables operators to switch between flat sheet cutting to tube or pipe cutting in less than 2 minutes. The innovative design of the Rotary Index allows the cutting head to be positioned near the chuck, thereby minimizing the dead zone. As a result, bowed pipe or tubing can be cut without vibration while maintaining accuracy from end to end. The ENSIS 3015 RI can efficiently process round, square, rectangle, C-channel, and angle iron, making it the most versatile Rotary Index laser cutting system available.

The LC 2515 C1 AJ Punch/Fiber Laser Combination Machine provides the combined forces of a 22-ton turret punch press with the speed and versatility of a 2kW fiber laser. A 44-station MPT (Multi-Purpose Turret) includes four tapping tool stations to reduce secondary operations by enabling



fabricators to cut, punch, form and tap on a single machine. To optimize productivity and machine utilization, an ASR 3015 NTK system provides automated material handling and storage. In addition, the TK (Take Out) system eliminates manual material handling by providing single-part separation and sorting with automated efficiency and precision. The flexibility to produce smaller lot sizes in a variety of material types and thicknesses, or achieve 24/7 productivity is made possible by the multi-shelf tower configuration of the automated material handling/storage system.

The HG 1003 ATC is a high-speed and high-precision press brake that's equipped with AMADA's patented Automatic Tool Changer (ATC). The ATC achieves the world's fastest tool changes with optimal precision — loading even the most complex tool layouts within three minutes. Additional production-enhancing features include an AMNC 3i control that's equipped with a large touch-screen, and integrated bend sensor technology to maintain con-

sistent bend angle accuracy. The HG ATC's automated features ensure repeatable accuracy and ease-of-use from operator to operator — regardless of varying experience levels.

The HG 1003 ARs Integrated Robotic Bending System utilizes the combined forces of an ultra-precise press brake and a multi-axis robot to achieve unmanned bending operations. This automated bending system seamlessly integrates a 6-axis robot, Automatic Gripper Changer (AGC), and Automatic Tool Changer (ATC) with patented AMADA tooling. The ATC, designed exclusively for AMADA press brakes, eliminates costly delays associated with manual tool changes. Each step of the bending process, including tool loading, gripper exchange, and robotic bending, are all performed at fast speeds to achieve high levels of unmanned machine productivity. The HG 1003 ARs is also equipped with a camera system that enables the robot to accurately pick up parts during loading. Any small positioning discrepancies are automatically detected and compensated for to ensure precise bending results.

In addition to the machines featured at booth A1802, the FLW 4000 M5 will be demonstrated via live video feed from AMADA's Solution Center in Schaumburg, IL. The FLW 4000 M5 is a 4kW fiber laser robotic welding system that achieves unprecedented high-speed and high-precision welding that's not possible on a conventional welder.

In summary, to enable fabricators to thrive in the New Era of American Manufacturing, AMADA continues to develop revenue-enhancing automated solutions. Built at AMADA's Manufacturing Facility in Brea, California, these advanced systems empower fabricators to achieve optimal efficiency, productivity, and repeatable accuracy. ■

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MONDAY, NOVEMBER 6				SCHEDULE-AT-A-GLANCE	
TECHNOLOGY	8:00 AM – 10:00 AM		10:30 AM – 12:30 PM	1:30 PM – 3:30 PM	
3D/ADDITIVE MANUFACTURING			F20: Fundamentals of 3D Additive Manufacturing for Fabricators B Room 402A	F30: NEW Fundamentals of 3D Additive Scanning and Imaging I Room 402A	
AUTOMATION/ SMART MFG			F27: NEW Introduction to IIoT & Strategies for Evaluating Industry 4.0 I Room 401A	F37: NEW Automation and Smart Machines: The Future of the Factory I Room 401A	
CUTTING			F21: NEW Automating in Cutting B Room 404A	F31: Comparative Cutting Systems with Tech Tour B Room 404A	
FINISHING			C20: Fundamentals of a Successful Powder Coating Operation B Room 404D	C30: NEW Fundamentals of a Successful Liquid Coating Operation B Room 404D	
			C21: Fundamentals of a Successful Electrocoat Operation B Room 405A	C31: NEW Fundamentals of Plating and Anodizing B Room 405A	
			C22: NEW Rack-up Profits with Productivity and Efficiency I Room 405B	C32: NEW Blasting Your Way to Successful Metal Preparation B Room 405B	
FORMING & FABRICATING	F18: Coil Processing: Leveling, Slitting and Best Practices I Room 502A		F28: NEW Tube & Pipe Cutting I Room 502A	F38: NEW Panel Bending Technology I Room 502A	
	F19: Press Brakes for Engineers I Room 502B		F29: Roll Forming Basics and Justification B Room 502B	F39: NEW Press Brake Cost Reduction I Room 502B	
JOB SHOP				F36: Activity-Based Costing and Estimating for Profitability in the Job Shop I Room 401D	
LASERS			F22: NEW Fiber Laser Cutting and Joining: Recent Advances in Technology, Tools and Applications B Room 403B	F32: NEW Laser Additive Testing and Application Solutions I Room 403B	
LEAN	F14: NEW Lean Principle: Strategic Planning and Organizational Alignment A Room 401BC		F24: NEW Lean Principle: Developing People and Processes B Room 401BC	F34: Lean Tools: A3 Thinking - Developing People & Solving Problems I Room 401BC	
MANAGEMENT	F15: NEW Today's Digital and Inbound Marketing Strategies for Fabricators I Room 403A		F25: NEW Current Economy, Labor and Employment Update for Manufacturing A Room 403A	F35: NEW Achieving Supplier Success in Today's Global Manufacturing Environment A Room 403A	
STAMPING	S10: NEW Deep Draw Process Technology I Room 503A		S20: NEW Deep Drawing Principles I Room 503A	S30: Lubrication Selection & Application I Room 503A	
			S21: Die Sensing Fundamentals I Room 503B	S31: In-Die Assembly, Monitoring & Adjustments I Room 503B	
STRUCTURAL STEEL/PLATE			F100: NEW AISC Market Outlook and Certification B Room 501D	F200: NEW Structural Steel Case Study B Room 501D	
WORKFORCE DEVELOPMENT	F13: NEW Managing Complex Change: The Challenge of Implementing a Significant Improvement Initiative B Room 404BC		F23: NEW Mission Critical: Tackling the Manufacturing Skills Gap I Room 404BC	F33: NEW Managing Conflict and Delegation Strategies for Effective Leadership B Room 404BC	
WELDING					
SEMINARS	W10: D1.1 - Structural Steel Code Clinic - 2015, Room N128			8:30 AM	4:30 PM
	W11: What's New in the 21st Edition of API 1104, Room N129			8:30 AM	4:30 PM
CONFERENCES	W25: Thermal Spray Coatings – FREE, Room N131			1:00 PM	5:00 PM
PROFESSIONAL PROGRAM	W27: Session 1: Additive Manufacturing, Room N138			2:00 PM	5:00 PM
	Session 2: Modeling 1, Room N139			2:00 PM	5:00 PM
	Session 3: Friction Stir and Solid State Welding, Room N140			2:00 PM	5:00 PM
EDUCATIONAL SESSIONS	W33: National Center for Welding Education and Training, Weld-Ed, Room N137			9:00 AM	4:30 PM
SPECIAL PROGRAMS	W35: AWS Prayer Breakfast, Room N227B			7:00 AM	8:30 AM

B = Basic **I** = Intermediate **A** = Advanced

Taking Learning and Development Beyond Onboarding

continued from page 8

product ideas and more. Cross-training employees for a variety of jobs through a blended learning program enhances productivity and efficiency. It also helps employees approach problem-solving from multiple angles, leading to fresh thinking.

Consider what KYOCERA SGS Precision Tools Inc. does to ramp up employee skills.

This lean manufacturing organization supports continuous training and development improvement by mandating an ambitious 50 hours of training per associate per year. This training philosophy might seem extreme to some, but it has led to continuous growth and employee retention for KSPT. In fact, the average tenure of employees at the company is 14 years.

5. Transfer Of Knowledge Must Take Place Now.

An escalating number of baby boomers eligible for retirement are opening jobs up faster than they can be filled. In fact, 14 percent of respondents in Tooling U-SME's Workforce 2021 Assessment said they will lose a full quarter (25 percent) or more of their workforce to retire-

ments in the next five years. This fact means there is no time to waste when it comes to transferring knowledge from seasoned workers to younger employees.

By establishing formalized plans that include an internal mentoring and training program, manufacturers will ensure that newer workforce members will be able to perform the work of experienced employees, maintain production and understand customers. This "changing of the guard" presents the perfect opportunity to reflect on existing learning and development programs and revamp them to attract, develop and retain the younger workforce.

Manufacturers must commit to establishing tried and true training programs that will curb turnover, boost morale, cut down on safety issues, and improve productivity and company growth.

Strong onboarding programs create a solid bond with employees from day one; but for the happiness of these workers to continue, manufacturers need to embrace a full lifecycle of training. As world-class manufacturers know, an ongoing standardized learning and development program that is methodical, visible and tied to the bottom line will provide manufacturers with a competitive advantage for years to come.

To learn more about developing your workforce, visit our Tooling U-SME team during the FABTECH show at booth #A3558 or visit toolingu.com. ■

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Hall A, Forming & Fabricating Pavilion

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30-70 dB



M-702-Cool

30-70 dB



M-802-Cool

30-70 dB



M-902-Cool

30-70 dB

External Frame	FRP	PE	PE	PE	PE	PE
Blade Size	42"	42"	30"	30"	24"	18"
No. of Blades	6 (Nylon 66+ Fiber Blades)	6 (Nylon Blades)	3 (Nylon Blades)	3 (Nylon Blades)	3 (Nylon Blades)	3 (Nylon Blades)
Motor Power	1 HP	1.5 HP	1.5 HP	1.5 HP	0.5 HP	0.3 HP
Inverter	2 HP	2 HP	1.5 HP	1.5 HP	1 HP	1.5 HP
Variable Speed	520 R.P.M	10-580 R.P.M.	10-1100 R.P.M.	10-990 R.P.M.	10-1200 R.P.M	10-1370 R.P.M.
Cools Up To	N/A	4,800 SQ FT	3,700 SQ FT	3,100 SQ FT	2,500 SQ FT	1,291 SQ FT
Capacity Gallons	N/A	47 Gallons	38 Gallons	33 Gallons	32 Gallons	14 Gallons
Volt	230 Volt 1-Phase	230 Volt 1-Phase	115 Volt 1-Phase	115 Volt 1-Phase	220 Volt 1-Phase	115 Volt 1-Phase
Size	61" H x 45.66" L x 35.43" W	73.22" H x 61" L x 31.89" W	67.71" H x 52" L x 27" W	62.20" H x 49.60" L x 28.34" W	54.33" H x 38.58" L x 26.77" W	51" H x 29" L x 19.68" W
Dry Weight	243 lbs	265 lbs	220 lbs	200 lbs	165 lbs	99 lbs

Albert Paley and Jesse James Collaborate for a Cause

Working together for a great cause, Jesse James of West Coast Choppers fame and world renowned sculpture artist Albert Paley used their talent to collaborate and create two metal sculptures. The artists approached the project from a unique perspective, each starting one sculpture but finishing the other. The sculptures have remained hidden from the public until the unveiling at today's FABTECH 2017 Opening Ceremony taking place at 10 AM in the Grand Concourse.

"Both Jesse and I have worked several decades with metal and metal technology. What I do and what he does is incredibly sophisticated. In the past, people have approached me to collaborate but I never thought it was a situation that was viable,"

says Albert Paley of the project. "What we have established about building these two sculptures is a very unique opportunity."

The sculptures will be on display in the Grand Concourse of McCormick Place throughout FABTECH 2017. On November 17, the sculptures will be auctioned by Wright Auction House in Chicago with the proceeds benefiting the five FABTECH cosponsors, AWS, FMA, SME, PMA and CCAI supporting grants and educational opportunities for the metal working trades.

When asked about the project, Jesse James states "when two craftsmen that truly love metal can come together in an organic way and create, expect something amazing to happen. My biggest hope for



this project is to inspire people and let them know that nothing is impossible. As long as you are willing to work hard and never quit."

The Paley-James Project is sponsored by ESAB and the five FABTECH cosponsors, AWS, FMA, SME, PMA and CCAI and is being documented by WXXI, Rochester, NY's PBS station. The 60-minute documentary will air first quarter of 2018 and will be available to PBS stations nationwide.

Visit fabtechexpo.com/paley-james-project to view photos, watch videos and get the rest of the story behind this exciting project.

See the sculptures unveiled today!

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Stop by booth B17074 today to experience them for yourself, and explore the whole Rebel family at esab.com/rebel.

Where is Global Manufacturing These Days?

– Dr. Chris Kuehl, FMA's economic analyst and founder of Armada Corporate Intelligence.

No country in the world makes everything it needs. This is the reason that trade takes place. The argument over what is and is not acceptable as far as trade is concerned has always been at the heart of economic decision-making.

There are many rationales for protecting select industries from foreign competition, and just as many rationales for not restricting trade. A country may choose to protect certain manufacturing sectors to develop capability it currently lacks – the infant

industry argument. It may be important to preserve jobs and therefore preserve certain industry sectors. There is also a national security argument to be made. A nation does not want to be vulnerable in a time of war. For example, Japan has long

protected its rice farmers as it fears being without a domestic food source. There is also the desire on the part of nations to keep an eye on their potential enemies by having insight into their production. This was the motivation behind the creation of the European Coal and Steel Community after World War II. This organization eventually became the European Union, but it started as a way for Europeans to monitor potential buildup in each other's military capability.

The White House has now charged the Defense Department with examining the manufacturing capability of the U.S. with an eye toward how this affects national security. This is not a new development. The military has been concerned about the gaps that exist now in terms of the U.S. manufacturing capability, and there have been many areas that have provoked concern over the years. The U.S. does not exploit its rare earth materials as other countries have done – China is the world's leading producer of these materials, and the country is key to the high-tech devices the world is so dependent upon. The U.S. has this material in abundance, but exploitation is expensive and has significant environmental implications. The U.S. has capability as far as semiconductors are concerned, but so do other countries, and right now the U.S. imports a great deal of the semiconductor capacity it requires.

There have generally been two to three levels of concern regarding manufactured products and national security. The most reliable is being able to produce what is needed in the country, but there are distinctions made as far as who owns the resource or material. The U.S. is overwhelmingly privatized, and the Defense Department purchases what it needs from these companies. In some cases these are owned by U.S. operations; in other cases the owners are in other countries. The ownership is not generally an issue, but in the case of an actual war it could be.

One of the most important considerations is the relationship the U.S. has with the countries it relies upon. It is one thing to depend on oil shipments from Canada and another to depend on oil shipments from Saudi Arabia or Libya. It matters whether the U.S. is doing business with a friend or enemy. Much of the current concern is based on the amount that is purchased from China. This is not unexpected given the level of manufacturing that takes place in China. For the most part there are

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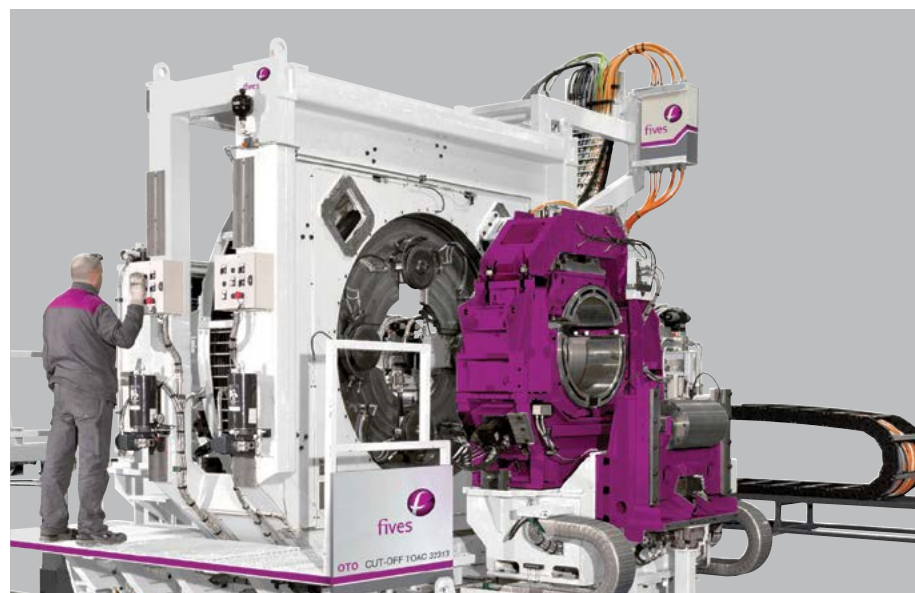
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OTO and Abbey electric resistance welding tube mills dedicated to the production of ERW tubes with a diameter range from 4mm to 914mm and wall thickness from 0.4mm to 25mm.

OTO & Abbey cut-offs



OTO and Abbey cut-off systems for small, medium and large size round tubes and profiles, including a new high-speed model with maximum cutting quality.

Bronx straighteners



Bronx heavy duty straightening machines with minimized set-up time, improved accuracy without surface blemishes, enhanced rigidity and consistent straightness / roundness.

Taylor-Wilson packaging system



The Taylor-Wilson packaging system to accommodate a multitude of variables, with three styles of machine to process tubes from 12 to 219mm with lengths of 3 to 12 meters.

Metal Fabrication in a Small Shop: How Being Small Helps a Shop Focus on the BIG Picture

Tim Heston, Senior Editor, *The FABRICATOR*

As shop metrics go, sales per square foot is elegantly simple. One New England fab shop has a sales-per-sq.-ft. metric that's twice the industry average. Its success shows how having so little space can be a blessing in disguise.

Some metrics in custom metal fabrication tend to cloud reality, even cause confusion. A chart on the side of a laser cutting machine may show high machine uptime or parts-per-hour rates, but overall output still may be suffering. What good is a laser head that cuts and rapid-traverses amazingly fast if more parts aren't shipping out the door?

More than overall equipment effectiveness (OEE) and other measurements with technical names, I like to look at another measurement that doesn't get much airplay: the dollars per square foot.

America has a lot of space, much of it empty, and that's often where you find manufacturing—in rural or far-out suburban areas where space is plentiful. More space is looked upon as a good thing, equating to the potential of greater throughput and more sales.

Of course, space also gives employees a place to put stuff that has no immediate

value, including rarely used machinery and supplies, as well as excessive work-in-process (WIP).

Several years ago I attended a lean manufacturing event in Columbus, Ohio, hosted by the Fabricators & Manufacturers Association International®. During a group tour at a local fab shop, our tour guide pointed proudly to ... empty space, roped off to prevent anyone from putting old machines, WIP, or just outright junk into it. Space, the tour guide said, should not be taken for granted; empty space represents potential productive space. Space cluttered with unneeded WIP is waste.

I first gained an appreciation for the sales-per-square-foot metric after reading Rajan Suri's *It's About Time*, which details quick-response manufacturing, an improvement method tailored for high-

product-mix operations. In these environments, thousands of different jobs may be routed every which way; cycle times vary, as do processing methods. Dang near everything varies. All the same, there remains one constant: space. If you can open up space for potential expansion—and not fill it with stuff—while maintaining



Without space, excessive work-in-process just isn't an option. Source: Getty Images.

or even increasing the output of profitable work, that's a very good thing.

That's what makes the sales-per-square-foot metric an elegantly simple way to measure the extraordinarily complex. In one sense, it treats the entire factory as a "machine." Certain pieces may be really shiny and new—a new laser cutting machine, a press brake with automatic tool change—but if it doesn't help "the machine" produce more sales in less time without using an excessive amount of resources, nothing really changes.

Consider one New England custom fab shop owner I spoke to (on background) earlier this year who touted the fact that his 25,000-sq.-ft. shop usually churns out more than \$10 million revenue each year. That's \$400 in sales per square foot. That's about double the industry average, according to FMA's "2016 Financial Ratios & Operational Benchmarking Survey."

From one perspective, the shop may be at a disadvantage. For instance, several years ago the shop purchased a press brake with automatic tool change, a machine bigger than a conventional brake and, for this fabricator, a very tight squeeze. It also purchased a fiber laser around that same time. In a conventional shop, the operation would have kept all of its old machines; but not at this 25,000-sq.-ft. shop.

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When a new machine comes in, an old one has to go out. The fabricator doesn't have a choice.

But as the shop owner explained to me, this situation also presents an advantage. The older machines are so much slower; the old CO2 because of its slow cutting speed, the old press brake because of its long setup time. Operating that equipment would be a bit like driving below the minimum speed limit on the interstate. Faster cars need to get around, everything gets more complicated, and before you know it, a backup or (at worst) a crash occurs.

The lack of space has forced the fabricator to throw out the old to make room for the new. It also forced the operation to limit batch sizes and produce only what downstream processes need immediately. There is simply no room for excess WIP.

And excess WIP would be tempting. Some of the shop's bending work involves very tight tolerances over many bends in a single part. A few thousandths off on the first bend can stack up to a significant error. With more space, the shop may be tempted to laser-cut a buffer stock to account for process variability in bending. But again, it just doesn't have room, so that forces them to work on making every process as predictable as possible, and that means standardizing and shortening setup time.

That said, according to the shop owner, having so little space also makes having multiprocess workcells impractical. Sure, if the shop had more space, it could organize operations into cells, if it had enough machines. But because of the nature of custom fabrication, employees would need to move to other machines to meet the varying demands of production. Certain stations wouldn't always be manned, which means some machines would be idle—usually doable, especially if a shop keeps its old machines and has the space. And having cells naturally increases throughput. Instead of flowing through cutting, then waiting for bending, waiting again for hardware, then on to paint, a job flows to "cell 1," then "paint," then "packaging" and out the door.

With only 25,000 sq. ft., the shop needs all the productive space it can get. It can't have, say, a dozen brakes distributed among four workcells, because it simply doesn't have room for a dozen brakes. So instead, the shop focuses on quick changeover, with brake operators who all can set up their own machines—no button-pushers here.

Considering all this, having no space is a blessing in disguise. If the shop is going to grow revenue, it must squeeze more out of the room it has, and that means focusing on shortening the overall manufacturing cycle, from order entry to final shipment. Everyone literally can see where parts come from and where they're shipping out the door, and that forces them to focus on the big picture—not just how fast they produce at their machine.

There's one big caveat. Like most readers, the shop owner said its skilled-labor situation is extremely challenging, which is why he takes training seriously. When fabricating so many different, challenging jobs at such a high velocity, you have a lot of value going through the hands of shop employees.

If all that value is passed through the hands of people who aren't very focused and engaged, troubles arise. But with the right skills and equipment, a few good people can produce an amazing amount of value in a tiny space. ■

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Centers and Microfactories—The New Paradigms

Lou Kren, Senior Editor, 3D Metal Printing Magazine

In basketball, the center used to be the most important position on the court. A center often was the largest player, patrolling the paint to block shots, clog the lane and gobble rebounds. On offense, the center was just as indispensable, a low-post presence used to occupy multiple defenders, score, rebound and put back shots, and occasionally form a barrier to give teammates a free path to the basket.

But that was then. Today, quickness and agility rules the court, not lumbering largesse. That's the evolution of basketball. The superstars today are the guards and forwards on the court, or 'tweeners' that don't fit under the typical position heading.

There is a similarity in manufacturing. Builders of stuff have become more agile and quick-thinking. And, no longer a common sight is a huge plant—the center, in basketball terms—with huge equipment and huge employment numbers spitting out huge part runs. In fact, we are in the throes of what futurists have termed the Microfactory Revolution.

Whether this trend has long-term industry staying power, only time will tell, but it makes a lot of sense. Microfactories, placed close to user locations, produce increasingly customized low-volume JIT parts. 3D printing

is a huge driver of this movement. Relatively inexpensive compared to traditional manufacturing processes from a capital-investment standpoint, additive manufacturing seemingly is in lockstep with the concept of microfactories.

With advantages related to cost, space, time, transportation and materials, the concept of microfactories migrated across the world from Japan more than two decades ago, and now has gained a foothold in the United States. With this development, entrepreneurs and other forward thinkers can serve customers in new ways and significantly impact supply chains. These are exciting times for the garage inventors and others in the maker community who historically have been at a disadvantage when seeking to penetrate mature and/or strong markets.

With its inherent agility and creativity related to ideas, products, processes and business paradigms, the maker community is well-suited to drive the microfactory revolution. This isn't lost on industry stalwarts, who look to partner in making microfactories work.

One venerable manufacturer recognizing the need to leverage this untapped talent is General Electric. You're proba-

bly familiar with FirstBuild, the partnership between General Electric and Local Motors, a startup that 3D-printed an automobile. FirstBuild, with its first microfactory built in Louisville, KY, in 2015, "is a co-creation community that is changing the way products come to market. By letting a community influence the product from the very beginning, we can quickly deliver better products that improve the lives of our consumers," the company's website reads.

In its effort to evolve into what it terms a "digital industrial company," GE is employing its vast engineering, design and manufacturing capabilities to back the maker community in an eclectic collection of projects. Consider that FirstBuild, in conjunction with RF Digital, has just launched the Wine Chiller, featuring a smart integrated bottle-management system, designed and prototyped through the use of FirstBuild's collaborative open-innovation process. The product incorporates RF Digital's Simblee technology and product-development methodology, which reportedly facilitates a simple path from rapid prototyping to mass production.

Read past the actual product—I'm guessing that GE isn't tying its fortunes to the

Wine Chiller—and focus on these phrases: "collaborative open innovation process," "technology and product-development methodology," and, "facilitates a simple path from rapid prototyping to mass production." The maker community is working with a major global manufacturer to reshape how we design, build and deliver.

The same holds true in another recent announcement, where Local Motors and GE debuted Fuse, a new approach to manufacturing that claims to accelerate product and technology development by combining open innovation with small-batch manufacturing. The digital community for the Fuse model resides at fuse.ge.com. Here, say company officials, "entrepreneurs, scientists, coders, engineers, makers from around the world meet to solve product development challenges." Fuse, too, has a microfactory component, including rapid prototyping, small-batch manufacturing and modular experimentation, that opened last year in Chicago.

Like a center on the basketball court, much of the manufacturing community has morphed into something completely new and scarcely recognizable. Though not certain where it all will lead, I'm excited to find out. ■

FMA Unveils New Headquarters

More than 200 people were on hand to celebrate FMA's newly constructed headquarters at 2135 Point Blvd. in Elgin, Ill. The open house, held May 18, offered FMA leadership, members, suppliers, and other industry stakeholders an opportunity to meet and network at the new facility. The ribbon-cutting ceremony was followed by a champagne toast and the unveiling of the chairman's and past presidents' wall.

The new Chicagoland location greatly enhances FMA's ability to serve the metal fabrication industry and sets the foundation for FMA's future growth. The facility's open floor plan, innovative lighting, and clean design are seamlessly merged with state-of-the-art technology. A highlight of the new building's exterior is custom metalwork framing the FMA logo, which can be seen from Interstate 90. "The new building includes added capabilities to conduct training and to host other industry events," said Ed Youdell, FMA president and CEO. "We now have the

most up-to-date technology and amenities, further enabling us to respond to the needs of FMA members, readers and advertisers of our publications, tradeshow exhibitors, and other industry partners." ■



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5 Sales and Marketing Adjustments Manufacturers Must Make to Reach Millennials

Josh Curcio, protocol 80, Inc.

By 2020, 50% of the workforce will be millennials. So what does this mean for you? Well...if you haven't seen a shift already, soon the people you deal with on a regular basis (prospects, engineers, leads, customers, employees, vendors, etc.) will be from the millennial generation.

OK, so what?

It's no secret that this generation communicates differently than you do. The difference is night and day. These people are the world's first digital natives. They're using texts, apps, social, and email significantly more than they're using the phone. I'm sure your sales teams are finding that their cold outreach via phone or in person is becoming less and less effective. If not, consider yourselves one of the lucky ones, but also understand that the time is coming.

If millennials are averse to "old school" marketing and sales approaches, what is your business doing to make sure you're marketing to this generation in such a way to stay relevant?

Here are 5 adjustments you need to make if you haven't already!

1 – Think Mobile

39% of millennials interact with their smartphones more than humans, according to a Bank of America study.

While it's a smartphone, it's not used as a phone. In fact, the actual phone functionality is used less than most of the other communication apps on a phone. Even if you do call, chances are you won't get an answer (or a call back) if your number isn't recognized.

The average millennial owns 7.7 connected devices and uses on average 3.3 of those EVERY DAY!

2 – Add Value

Your content, messaging, tone, and appearance should stand out. Spending all day in front of a screen means people are bombarded with websites, messages, ads, etc... You have to be memorable.

Be remembered by providing value. This means education. This means content (blog articles, ebooks, webinars, etc.)

Don't afraid to be less formal.

3 – Connect

Millennials are on social media and will continue to be for the foreseeable future. According to Pew, 90% of millennials use social to interact with others and process information.

If it's not facebook, it's something, and they'll continue to adapt over time.

Email is not dead. 69% of millennials prefer to engage with vendors during the sales process using email (IBM).

4 – Be Visual

A wall of text isn't appealing.

Use images.

Use infographics.

Use video. According to Animoto, 80% of millennials use some form of digital video when researching a product or service.

5 – Collaborate, Don't Push

In your marketing messages, don't force the issue, but offer guidance.

In sales, ask questions...a lot of them. Allow them to explain their actual problems and only after you have a true understanding, determine if you can help them or not.

When making a B2B buying decision, priorities are different (IBM)...

35% make ease of doing business their number 1 priority

33% make willingness to work collaboratively as their 2nd priority

31% state their 3rd priority is industry and marketplace expertise

It's hard to deny that this change isn't already happening. It's happening hard and it's happening fast. Manufacturers will likely struggle if they don't make the shift to market and sell to millennials in the way they prefer. Manufacturers that embrace the shift and are willing to change will come out on top.

Change isn't easy, we know that, but sometimes change is necessary.

Hear more from Josh during FABTECH Session F115: Marketing 101 for Fabricators at 10:30 AM on Thursday, November 9. ■



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Where is Global Manufacturing These Days?

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alternatives should the U.S. not want to buy from China, but this is not the case for everything the U.S. requires.

The big question is what the U.S. would intend to do about this. It is not a simple matter of refusing to import; there may not be alternatives, or those that exist could be extremely expensive. Consider the impact of the proposed punitive tariffs on steel. It has been proposed as a national security issue – the need to protect the U.S. steel sector. The problem is that this makes

steel extremely expensive in the U.S., and that adds thousands of dollars to the price of vehicles and construction and millions to the cost of making military equipment. The long-term answer is a healthier manufacturing sector, but that means paying attention to the lack of skilled labor, nonsense regulations, tax structure, environmental laws, and all the other inhibitions that manufacturers face. All of these changes are delicate as nobody wants unsafe products and working conditions, nor do people want environmental issues dismissed. ■



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