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NOVEMBER 18, 2016

DAY 3

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TODAY

RUN4MFG 5K

Reg. Opens 6:30 AM
5K Start Time: 7:00 AM
Town Square Las Vegas

SHOP TALK WITH COUNTING CARS

9:00 - 10:00 AM
FABTECH Theater
Central Hall Lobby

BLUES, BREWS AND BBQ

11:00 AM - 4:00 PM
Outside of Central Hall



FABTECH Panel Details Development Trends in Additive Manufacturing

Additive manufacturing, more commonly known in the popular vernacular as 3-D printing, continues to be a hot topic in manufacturing, and certainly was one of the areas of interest generating buzz during this year's FABTECH.

It shouldn't come as a stunner. 3-D printing materials were identified as one of Gartner's top 10 strategic technology trends for 2016, and was one of the principal areas discussed during the panel discussion, "Development Trends in Additive Manufacturing and 3-D Printing," held Thursday morning at the FABTECH Theater.

Here's what Gartner had to say on the subject as we headed into this year:

Advances in 3-D printing have already enabled 3-D printing to use a wide range of materials, including advanced nickel alloys, carbon fiber, glass, conductive ink, electronics, pharmaceuticals, and biological materials. These innovations are driving user demand, as the practical applications for 3-D printers expand to more sectors, including aerospace, medical, automotive, energy, and the military. The growing range of 3-D-printable materials will drive a compound annual growth rate

of 64.1 percent for enterprise 3-D-printer shipments through 2019. These advances will necessitate a rethinking of assembly line and supply chain processes to exploit 3-D printing.

According to David Cearley, vice president and Gartner Fellow, "3-D printing will see a steady expansion over the next 20 years of the materials that can be printed, improvement in the speed with which items can be printed, and emergence of new models to print and assemble composite parts."

Nothing was discussed at the panel session to dampen this assessment of where additive technology is moving—in a direction determined to have a significant impact on manufacturing practices.

The panel of experts at the session included:

- **Jennifer Cipolla**, Center for Additive Technology Advancement Leader, GE
- **Robert Henderson**, Director of Additive Manufacturing, Linear Mold & Engineering, Inc.
- **Steve Immel**, Americas Business Development, Materialise USA
- **David Lakatos**, Chief Product Officer, Formlabs

• **Carl Dekker**, President, Met-L-Flo, Inc. (moderator)

The group discussed the technology and materials driving practical solutions and innovations using 3-D printing, noting that a manufacturing environment demanding more customization and faster solutions continues to drive the rapid development of additive manufacturing techniques. Using available and affordable additive manufacturing technologies can increase manufacturing efficiencies of complex products, improve performance, decrease cost and reduce waste; this was the general consensus that emerged during the session.

Prototyping and Beyond

The first industrial applications for additive manufacturing were in rapid prototyping, based on the capabilities of 3-D printing to accelerate product development by cutting the time to design and machine the multiple experimental iterations required for optimizing designs for a complex engineered part or product. While the advantages of rapid prototyping are being felt in all industries, as new 3-D processes and higher performance materials are coming to market, there are

continued on page 30

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Vox Populi: Interviews with Attendees Reveal Ongoing Value of FABTECH

With thousands of people attending this year's FABTECH, we took to the show floor to find out why they are here. A quartet of interviews with show registrants gives a taste of what "the voice of the people" says about FABTECH.

**Chuck Mazoch, President,
Coastal Welding Supply
Beaumont, Texas**

Q: Why are you here at FABTECH this year?

A: We try to attend FABTECH every year. The main reason is to stay on top of technology, and to see the progress in automation and welding and fabrication. We always use that information to help our customers stay on top of what's going on, and to make sure that their productivity and quality is top notch. If they are successful, we're successful.

Q: Are you looking for anything particular at the show? Any technology or equipment?

A: Our focus is in automated pipe welding, general metal fabrication, and plasma and laser cutting technology. Those are the big ones for us.

Q: What benefits does attending FABTECH bring to your company?

A: I bring a team of about four people, and it allows us to see all the manufacturers and technologies under one roof. In fact, we can actually do comparative analyses of what this company is doing versus what that one is doing, and why one item might be better to promote than another item. That's a real benefit.

We also catch up with a lot of people we haven't seen since last year, or we don't

get to see that often, people we've known over the long term in this industry. We get to share stories and experiences and learn from each other.

Finally, we do some benchmarking on what others are doing that is successful in their marketplaces that might work for us in our marketplace.

**Denise Johnson, President/
Owner, RiteWay Conveyors
Lester Prairie, Minnesota**

Q: What brings you to the show?

A: I'm at FABTECH this year because it's such a cool thing to look at all the wonderful, new opportunities to buy equipment.

Q: Any equipment in particular?


A: I am looking at a tube laser, possibly an additional laser, and a press brake.

Q: What are the benefits of attending FABTECH for you and your company?


A: I've brought five of my employees so they can see and assess the opportunities of the new products that are coming our way, and think about what we can do to make things better in our business.

I also like networking, especially meeting new vendors that could possibly do new and improved things for us. If I'm always buying the same thing and at the show I see someone who might provide me with the exact same benefit, but maybe with shorter lead times or even a better piece of equipment, that's always beneficial.

continued on p. 8




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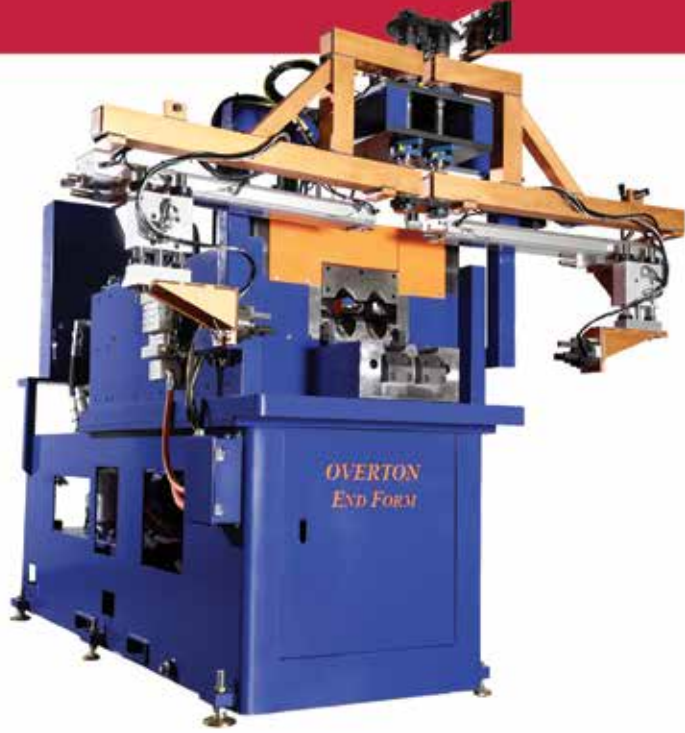
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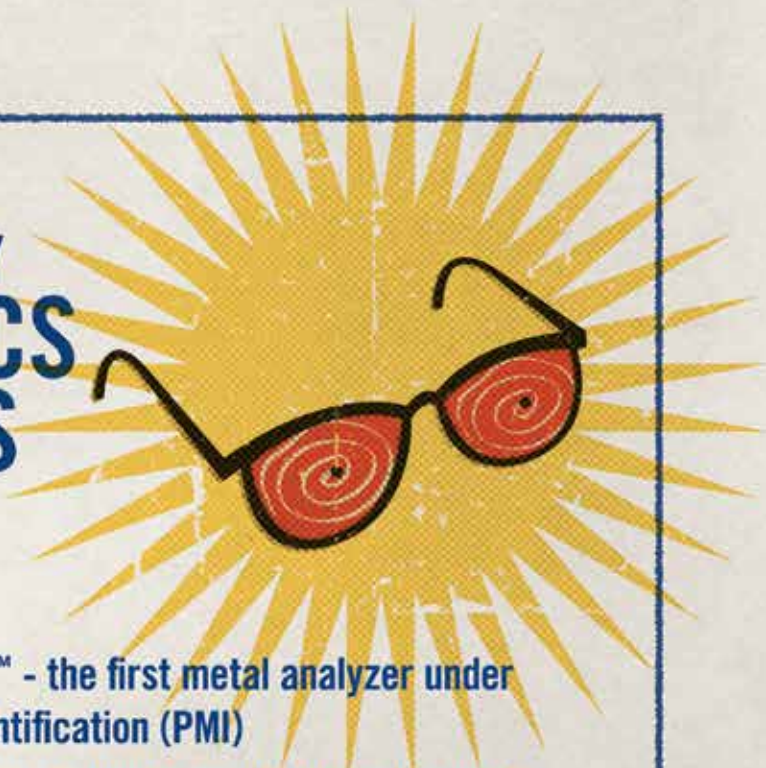
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Vox Populi: Interviews with Attendees Reveal Ongoing Value of FABTECH

continued from p. 4

**Rick Gehman, President,
Keystone Coating LLC
Lititz, Pennsylvania**

Q: What's your reason for coming to FABTECH?

A: It's the largest and most efficient place to get in touch with so many vendors and

suppliers in one shot. We do manufacturing and finishing, we are also an OEM, we provide job shop services, and we have three production power gridding lines. So there's a little bit of everything for us at this show. It's also a place to see what new technology is out there, what we need to be considering to help our operations, and to connect with other people about how the market is

doing and learn some new best practices.

Q: Is there anything in particular you're looking for this year?

A: One specific thing we're considering is a jig template or a jig builder. But in general, we're looking for other tools and resources we can use to improve our business and save time.

Q: What are the benefits of attending the show?

A: The quick answer is to keep in touch with the market and new technology.

Another thing is connecting with some of our major suppliers and seeing how things are going—all in one location. Another benefit is getting together with our current network, to talk shop, and find out what's being said about the market, the industry, and so forth.

Q: What about the value you get personally or as a company?

A: I am bringing two younger gentlemen who are newer, less experienced in manufacturing. It is an opportunity for them to see other resources in the industry and what's actually going on out there. So it's a valuable learning experience. For me personally, it's a maintenance experience. The value is in staying current with the market and not falling behind.

Another value: it's free to attend with registration; we just pay for our flight and hotel. So it provides a great exposure to the manufacturing industry for a very competitive cost.

**Steve Zienka, Special Projects
Manager, Welded Tubes, Inc.
Orwell, Ohio**

Q: Why are you coming to FABTECH?

A: We are always looking to improve, so a big reason is to see the new technology that we could apply to our process, along with benchmarking.

Q: Are you looking for any particular technology?

A: We're looking at technology that could detect surface defects in line. We're always looking for things to improve the process, to take out uncertainty and use technology that will tell us if there's an issue or not.

Q: What do you think are the benefits that FABTECH brings to your company?

A: Besides exposure to the technology, it is networking. I came from a roll manufacturer in the industry, and I now work for a tube manufacturer because of networking. Across the industry, a lot of people know each other and can certainly help each other in many ways.

The show is priceless at times in regards to bringing forward new technology; but it also facilitates the exchange of ideas that we can bring back to our employees and help make us a better company. ■

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Differentiation through High Performance Innovation: Bystronic Introduces ByStar Fiber 10kW

Innovation is the driver of high performance manufacturing and the key to competitive differentiation. It can be found at the core of every company that desires to compete, survive and flourish. The new high performance ByStar Fiber with 10kW Fiber Laser achieves the competitive differentiation sought by leading edge manufacturers. ByStar Fiber has been designed from the ground up to meet the speed and acceleration demands from high power Fiber lasers.

As Fiber lasers continue to expand to higher power thresholds, one of the key performance factors is the ability to harness the speed benefits from the higher laser power through improved machine performance capabilities. At the core of the improved machine performance is the ability of the motion system to respond without compromises, to the speed requirements from

the higher laser power, and the ability of the motion system to maintain its accuracy and rigidity even with changes in direction while cutting at high speeds. To facilitate speed, the ByStar fiber employs a linear drive motion system for both X and Y axes that removes any mechanical limitations from the drive system.

One of the keys to achieving exceptional acceleration dynamics is reducing weight while increasing rigidity. Bystronic's innovative triangle cutting bridge on the new ByStar Fiber provides both. The triangle shape of the cutting bridge enables a 40% increase in acceleration over square profile designs, a 60% increase in torsional rigidity and a 25% reduction in overall profile weight. The triangle cutting bridge design enables the ByStar Fiber to take full advantage of the increased speeds generated by the high fiber laser powers and the



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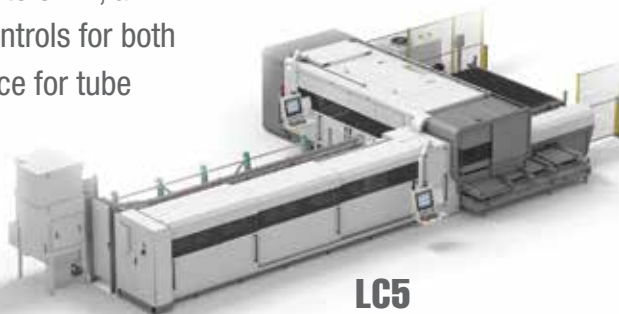
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“Women of FABTECH” Celebrates the Importance of Women in the Manufacturing Sector

On Thursday morning, FABTECH hosted a networking breakfast celebrating the importance of women in the manufacturing sector. Designed to foster relationships and dialogue between supporters and practitioners in the field, the well-attended

event included a continental breakfast and tech tour on the show floor.

While far from a new concept, the idea of recruiting women for manufacturing may not be top of mind when looking to fill the

current skills gap manufacturers face. In fact, women represent manufacturing's largest pool of untapped talent and are a critical component to helping fill this gap.

Numerous studies have shown that com-



panies that achieve diversity in management and on their corporate boards attain better financial results, on average, than other companies. According to a Women in Manufacturing (WiM) survey, more than 80 percent of women who do work in the manufacturing industry find their jobs interesting and challenging. Talent development efforts such as increasing STEM education for women, combined with organizations such as WiM and industry events such as FABTECH that support, promote, and inspire women who have chosen a career in manufacturing are important. At the same time, increasing the presence of women in manufacturing helps to create the “push-pull” effort needed to build supply and demand. Bottom line: it's a win-win situation for the industry.

Keynote speaker for the event was Jennifer Cipolla, Center for Additive Technology Advancement Leader at GE. “This breakfast and tech tour was a wonderful opportunity for women who are in manufacturing to network, discuss what they're doing, what their companies are working on—basically help each other grow and advance our careers,” said Cipolla.

She spoke at length of her own career and the experience of women at GE.

“At GE especially, we stress the importance of having a diverse team,” said Cipolla. “Through diversity, the organization benefits from different perspectives, and a lot of dynamic and engaged conversations occur. At the facility I run, we have a lot of women working in manufacturing. GE in general has always been very strong in furthering the careers of women in manufacturing operations, and we're always looking to participate in events like this that promote women in the sector.” ■

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At the most basic level, "value" really means "cost"; customers typically look at cost-per-unit and compare it to like products. But true value lies beyond merely the cost of the product, there are numerous other factors, including:

- **Longevity:** How long a product lasts is as important as its price. If you pay less but have to replace it more often, you're losing money in the long run.
- **Performance:** No matter the industry or product, it's important to offer proof of performance and quality objectively. At PFERD, we perform comparative testing which scientifically measures material removal and product loss over a fixed amount of time. When these figures are combined with hourly labor costs and the cost of the product itself, we can calculate an empirical measurement of a product's impact on overall productivity, and therefore its value.
- **Health and Safety:** As part of the PFERDVALUE® program, our products are designed to focus on the improved health and safety of the operator, an approach we call "PFERDERGONOMICS®." an important component of value means a happier, healthier workforce. Cost savings are also achieved by reducing worker fatigue, downtime, and workplace injuries that can be caused by excessive noise, vibration, and dust.
- **Time:** Longevity of a product can impact time; As we all know, time is money. Products with longer tool life reduce change-up times, and PFERD's focus on applications solutions increase the efficiency of processes.
- **Service:** Good service leads to repeat customers and high satisfaction rates, which directly leads to increased value. This is an absolute priority for us at PFERD, and we place great importance on the feedback and happiness of our clients.

Our applications specialists are trained to help end-users choose the right tool for the job. These experts observe real-world processes and operations every day, optimizing them using the ideal product. We aim to dispel the myth that "bigger is always better". Using a 9" cut-off wheel doesn't necessarily mean the job will be done faster,

better, or more easily than if you were to use a 4-1/2" cut-off wheel. A larger diameter wheel can increase fatigue and danger to the operator, reducing value significantly.

To that point, many of our innovative products, including POLIFAN®-CURVE flap discs and POLISTAR-TUBE grinding stars, are designed to perform a task with little-to-

no secondary finishing time required. Other innovations, such as our quick-change COMBICLICK® system or quick-change adapter for hole saws mean faster tool changes, saving the user time and money. We take a multi-faceted, unique approach to everything we do—and what it all means, in the end, is value at every turn. ■

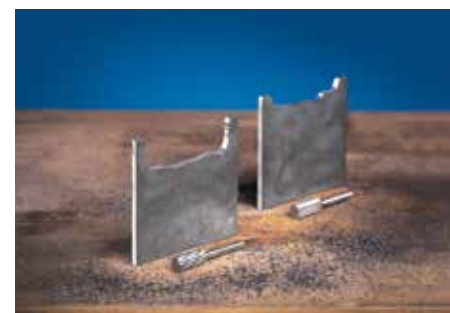


Figure 1 An example of improved value using PFERD's CAST cut burs on cast iron plate

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Five Things Manufacturers Need to Know About 3DMP

3D metal printing (3DMP) is the hottest subject throughout manufacturing. This technology is revolutionizing how companies design, test, manufacture and distribute products. With all the hype surrounding 3DMP technology, what are the effects on manufacturers serving key markets for machined metal parts, including aerospace, medical and automotive, and what are the key takeaways?

We have identified five things manufacturers should understand before entering the 3DMP workspace.

1) 3DMP provides the ability to create components that most directly embody and enable true design intent.

The freedom possible in the manufacturing process allows designers to create optimal designs without restrictions from conventional manufacturing processes. Shown is a metal bracket printed on a 3D Systems laser-sintering direct metal printer.

The freedom possible in the 3DMP process allows designers to create optimal designs without restrictions from conventional manufacturing processes. Design for manufacturability (DFM) has long been the method by which components were designed, and it subsequently drove design standards and practices by which compromises to performance, weight, cost, materials and other factors were necessary to result in a produc-

ible part. With additive manufacturing, the restrictions from DFM are greatly eliminated, allowing designers the freedom to create, optimize and push the limits of component development. As a result, designs become lighter, structural capabilities and product durability increase, products perform at higher efficiencies and temperatures, and assemblies are eliminated. All of these results combine to equal lower total cost.



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2) Additive-manufacturing processes need to be fully integrated with EDM, multiaxis CNC, surface finishing and other high-precision machining operations within the confines of traditional manufacturing operations.

A common misconception is that additive manufacturing will replace or eliminate conventional machining. Although 3DMP allows for the creation of highly advanced,

complex designs, it does not necessarily produce end-use features required in many applications.

For example, due to the additive process, the resulting surface finish and tolerances often result in the need to selectively machine certain features. It is critical during the DFM process that the design and manufacturing teams communicate and coordinate activities to produce an additively produced design that is optimized not only for the AM process, but also for the conventional machining required to produce a true end-use component.

The ability of 3D metal printing to build parts directly from feedstock (metal powder, wire, etc.) eliminates the large investment in tooling lead time and cost found with other processes. Early in the development cycle of a product, the manufacturer can produce prototypes and end-use parts with minimal post-processing tooling, which accelerates times to market. Shown is a stainless-steel oil-pump pulley, created on a direct-metal printer.

Although additive manufacturing can produce highly complex end-use parts, it also provides excellent opportunities to enhance current processes. 3DMP processes also provide the ability to optimize and develop advanced techniques for current processes such as investment casting, injection molding and precision machining. Injection-molding dies, for example, can be designed and 3D-printed with conformal cooling passages

near the surface of the die. This design enhancement creates more efficient cooling and as a result reduces injection time-in-die. Ultimately, production rates increase and product costs decrease, while simultaneously improving die life.



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3) Additive Manufacturing reduces barriers to effective low-volume production.

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Hypertherm Introduces New SilverPlus Technology for HyPerformance Plasma Cutting at 80 amps

Hypertherm located in booths C27069 and N3724, introduces its lower-amp SilverPlus® electrode. This new electrode, for its HyPerformance® family of plasma cutting systems, is designed for cutting at 80 amps.

Like all SilverPlus electrodes, the new 80 amp electrode is proven in Hypertherm

laboratory testing to last more than twice as long as a standard copper electrode. Instead of replacing the electrode at a pit depth of 0.040 of an inch as recommended with standard electrodes, SilverPlus electrodes are designed to last to a pit depth of 0.080 of an inch. In addition, the electrode delivers a very consistent range 4 and 5 cut quality throughout its life, allowing

owners to lower their operating cost, with no impact on cut quality or speed.

The electrodes, protected by patent, are created by fusing a completely solid silver tip on to a copper electrode base. A hafnium pin is then inserted into the tip. This serves to dramatically slow the wear rate for both the electrode and nozzle as

silver disperses heat better than copper. Hypertherm’s electrodes are further differentiated from competitive and after-market consumables by a superior bond between the copper and silver. This results in more consistent wear rates, deeper pit depths, and more robustness to ramp down errors and hard failures.

“The proven performance of SilverPlus makes these electrodes a popular and cost-effective choice since it allows HyPerformance Plasma owners to cut their electrode and nozzle costs in half,” says Martin Geheran, a consumables product manager at Hypertherm. “These electrodes are a perfect example of Hypertherm’s commitment to lowering the cost of cutting for people who own our products.”

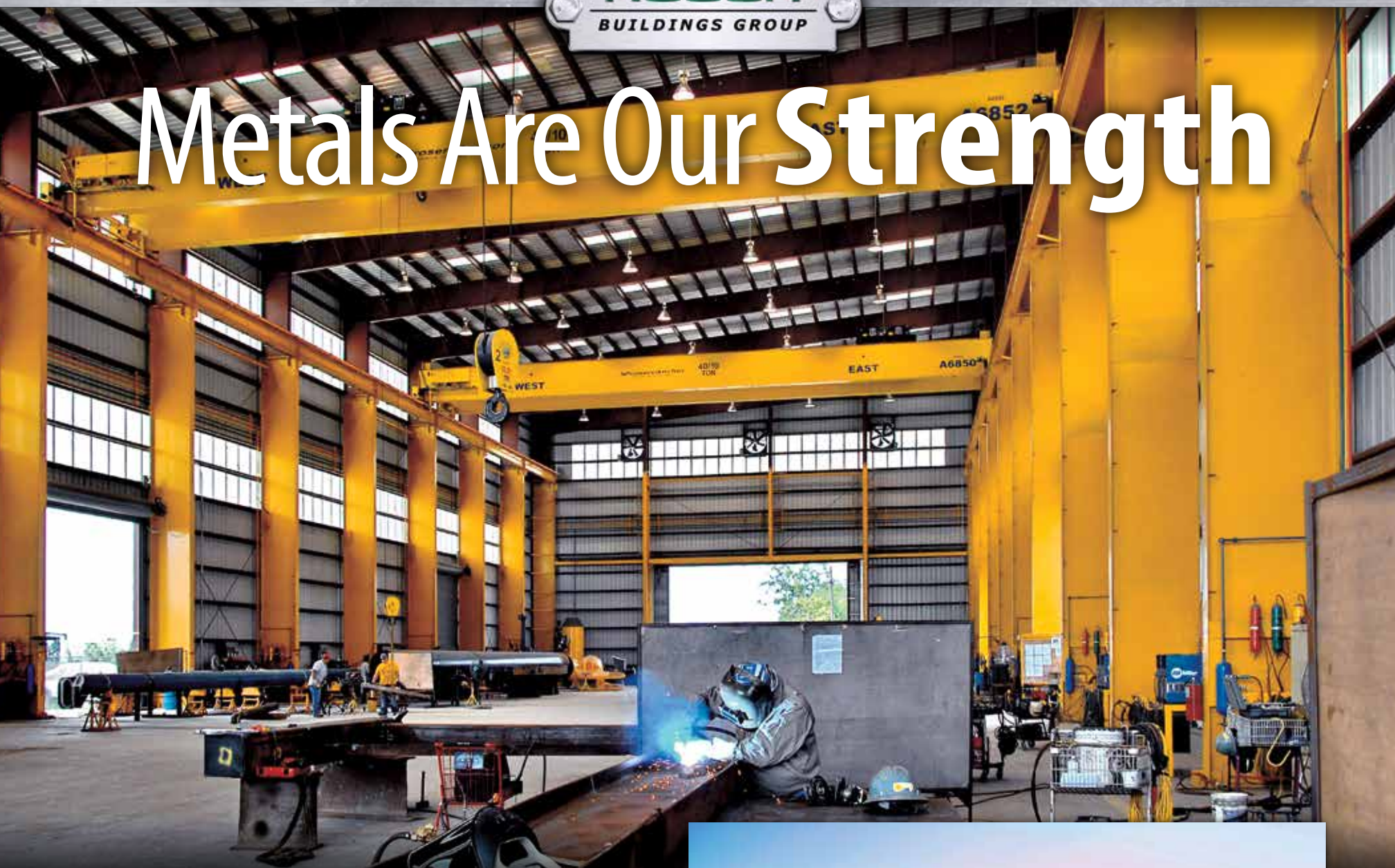
In addition to the new 80 amp electrode introduced today, Hypertherm also offers 130, 200, 260, and 400 amp versions with similar performance. Please contact Hypertherm or an authorized partner to request samples of SilverPlus electrodes.

Hypertherm designs and manufactures advanced cutting products for use in a variety of industries such as shipbuilding, manufacturing, and automotive repair. Its product line includes plasma, laser and waterjet cutting systems, in addition to CNC motion and height controls, CAM nesting software, robotic software, and consumables. Hypertherm systems are trusted for performance and reliability that result in increased productivity and profitability for hundreds of thousands of businesses. The New Hampshire based company’s reputation for cutting innovation dates back nearly 50 years to 1968, with Hypertherm’s invention of water injection plasma cutting. The 100 percent associate owned company, consistently named one of the best places to work in America, has more than 1,400 associates along with operations and partner representation worldwide. ■

FRIDAY, NOVEMBER 18		SCHEDULE-AT-A-GLANCE	
SPECIAL SHOW EVENTS	6:30 AM – 8:30 AM		9:00 AM - 10:00 AM
	RUN4MFG 5K Run/Walk Registration Open: 6:30 AM Event Start: 7:00AM Cost: \$50.00 Town Square, Las Vegas		Shop Talk With Counting Cars From the hit reality series <i>Counting Cars</i> , show stars Kevin Mack and “Horny” Mike Henry will be at FABTECH to talk shop with attendees. FABTECH Theater (Central Hall Lobby)
TECHNOLOGY	8:00 AM – 10:00 AM	10:30 AM – 12:30 PM	1:30 PM – 3:30 PM
FINISHING	C70: NEW! Pretreatment Performance & Analysis I Room N213-N214	C81: NEW! Trends in Liquid Industrial Finishing A Room N212	
	C71: NEW! Presentación en Español: En Polvo Automatización, Eficiencia y Control de Procesos — Ideas para Su Compañía (<i>Powder Coating Automation, Efficiency, and Process Control — Ideas for Your Company</i>) I Room N212	C82: NEW! Safety First & Maintenance Predictability A Room N211	
CUTTING	F70: NEW! Technical Advancements in Plasma Cutting I Room N221-N222	F80: NEW! Cutting Tools and Applications B Room N221-N222	
LEAN	F72: Lean Tools: 5S Workplace Organization and Standardization B Room N229-N230	F82: NEW! Lean Principle: Working Together with Six Sigma and Case Studies on Transformation and Continuous Improvement I Room N229-N230	F92: NEW! Lean Principle: Transformation and Productivity B Room N229-N230
WORKFORCE DEVELOPMENT	F74: NEW! Workforce: Funding and New Contract Labor Rules B Room N209-N210		
MANAGEMENT	F75: Succession Planning 101 B Room N207-N208	F85: NEW! Social Media and Branding 101 B Room N207-N208	F95: NEW! Operating in the Manufacturing Environment: Risk Assessment and New Rules for R&D Tax Credits B Room N207-N208
JOB SHOP SOLUTIONS	F76: NEW! Marketing and Sales for Fabricators B Room N201-N202	F86: Sustainable and Revenue Savings for The Job Shop B Room N201-N202	F96: Safety Strategies for Fabricators B Room N201-N202
AUTOMATION	F77: NEW! Benefits of Deburring and Leveling in Today’s Manufacturing Environment B Room N227-N228		
FORMING & FABRICATING	F78: Press Brake Tooling I Room: N203-N204	F88: Advanced Roll Forming Tooling and Line Troubleshooting A Room N203-N204	
	F79: NEW! Steel Metal 101: Mill to Fabricator B Room N205-N206	F89: Advanced Metals & Materials A Room N205-N206	
STAMPING	S70: Springback Analysis A Room: N225-N226	S80: NEW! AHSS Tooling Technology B Room N225-N226	
	S71: NEW! Modern Press Technology I Room N223-N224	S81: In-Die Sensing B Room N223-N224	
WELDING			
SEMINARS	W24: Fundamentals of Radiographic Inspection for CWI’s and Quality Assurance Personnel • Room N231. 8:30 AM – 4:30 PM		
RWMA SCHOOL	W29: RWMA Resistance Welding School – Day 2 • Room N253 8:00 AM – 4:30 PM		
PROFESSIONAL PROGRAM	W33: Session 10: Dissimilar Joining Applications • Room N238 8:00 AM – 12:00 PM		
	Session 11: Solid-State Processes • Room N240. 8:00 AM – 12:00 PM		
	Session 12: Overlay and Additive Manufacturing • Room N242. 8:00 AM – 12:00 PM		
	Session 13: Welding Metallurgy & Weldability Session B • Room N238. 1:00 PM – 4:30 PM		
	Session 14: Applied Technologies • Room N240 1:00 PM – 4:30 PM		
SPECIAL PROGRAMS	Session 15: Advanced Controls and Systems • Room 223 1:00 PM – 4:30 PM		
	AWS Certification Exam (advance application required) • Room: N223 7:00 AM – 6:00 PM		



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Five Things Manufacturers Need to Know About 3DMP

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with minimal post-processing tooling, which accelerates time to market. In addition, 3DMP reduces the potentially large investments in casting/forging tooling and numerous machining and transfer fixtures.

As the development cycle transitions from low-rate to high-rate production, the impacts are even more noticeable. Often times in the

process of ramping to high-rate production, multiple duplicate tools are required to produce castings, forgings and other raw material sourcing streams. These tools require additional investment and lead times associated with tooling inspection, validation, recurring maintenance and ultimate replacement.

Metal printing is just one manufacturing tool

available to the manufacturer, enhancing the entire manufacturing supply chain and allowing for selective utilization of the strong points of each process.

4) Additive manufacturing is not a plug-and-play process.

AM often is portrayed as a process in which a

user simply loads a 3D model into the machine, hits the print button, and hours later a finished part is waiting. This portrayal oversimplifies the process and fails to capture the true complexity of additive manufacturing.

Although it is true that the 3D equipment utilizes the 3D model as the primary input to build the desired geometry, several steps lie between creation of the designer's CAD model and achieving a successfully built component. Due to the layer-by-layer build of the component within the 3DMP machine, the designer and manufacturer must consider several factors when preparing a build.

The most notable item is orientation within the build chamber of the machine. This build orientation not only represents the XYZ location of the part, but also the rotation of the part relative to the build plate. Since the part builds layer-by-layer on a flat plane, the manufacturer must understand how those layers will interact and behave during the build process. Sacrificial supports often are added to the design, which play a key role in creating a high-quality, dimensionally accurate product. These supports provide structural stability to mitigate thermal stresses, and help maintain dimensional and metallurgical accuracy. After receiving the CAD model, the manufacturer must determine the optimum orientation to minimize the support structure while optimizing build time and the quantity of parts created within the build.

5) The material capabilities for additive manufacturing are nearly endless.

Every year more and more materials become available for 3DMP, as more products are developed. The process already is capable of producing many of the standard alloys used across industries, including stainless and tool steels, aluminum and titanium alloys, super-nickel alloys and transition metals (gold, copper, tantalum, etc.). These materials result in printed parts that exceed cast properties, and in many cases rival wrought properties.

In addition, the ability to modify the processing parameters with a single 3DMP build provides the manufacturer with the unique ability to tailor material properties throughout the component and further enhances the properties and performance of their product. The impact of 3D metal printing will continue to multiply as the technology continues to advance. ■


By: Ben Fisk

Ben Fisk is general manager, Methods3D, Sudbury, MA; methodsmachine.com

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So You Want to Buy a Metal Fabricator ...

By Tim Heston, Senior Editor, *The FABRICATOR* magazine

Closing a successful deal involves more than focusing on multiples

It's been a memorable few years for mergers and acquisitions. Doug Nix, vice chairman at Corporate Finance Associates, Oakville, Ont., Canada, attributes much of this activity to the sheer amount of invest-

ment money out there.

Of course, the M&A environment can change quickly. What was true a few months ago may not be true today. Regardless, Nix provided a few basic, timeless steps on how

a buyer should approach the acquisitions game, no matter what the broader M&A climate is.

As Nix explained, every company has a business model that usually can be bro-

ken down into four related components: (1) the customer value proposition, (2) processes, (3) the profit formula, and (4) the resources.

The customer value proposition defines customer value—that is, why customers buy from you. The exact value proposition depends on the company, but Nix categorizes value propositions into two broad categories: service- and price-driven. Fabricators with the service-driven proposition have customers who buy from them ultimately because they value the long-term business relationship; the interactions and knowledge gained from that relationship help drive company profits. Fabricators with the price-driven proposition compete on price and price alone.

He added that the value proposition affects another business model component, the profit formula, but not necessarily in ways many might expect. A company that competes on price alone may have extremely lean, well-polished processes—and, hence, enjoy a healthy profit margin.

The type of value proposition really isn't about price and quality, which are givens for any successful fabricator these days. Instead, the value proposition drives how people in companies interact with each other, their suppliers, and their customers—what Nix defines as the processes component of the business model.

A company with a price-driven value proposition may switch suppliers frequently and scrutinize internal processes always with the defined goal to keep costs as low as possible, so the company can offer a low price. It still treats customers well, but one underlying understanding pervades business relationships: The fabricator is trying to minimize its costs to keep prices low.

Companies with a service-driven value proposition prioritize long-term business relationships, which people hope will drive profits over the long term. They also scrutinize internal processes to keep costs low—a necessity for survival these days—but the core driver isn't to allow the company to offer a rock-bottom price; it's to improve those long-term customer relationships.

Next comes the fourth element of the business model: the resources. These include facilities, people, machines, and other technology the company uses to carry out the processes, which in turn fulfills the customer value proposition and profit formula.

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Millennials in Manufacturing

By: Andrew Bader

While manufacturing has evolved dramatically over the last several decades, many young people still do not consider manufacturing a practical career choice. I'm a millennial and, along with my brother, we are the third generation to work for my family's metalforming company. A newly formed partnership with a customer, cofounded by millennials, demonstrates how my generation can contribute to U.S. manufacturing.

From the modern world where everyone seemingly strives to develop apps, earn "likes" on social media and become the next Mark Zuckerberg, I'd like to introduce you to a young architect out of Chicago named Kyle Hoff. A recent graduate, Hoff quickly ran into a frustrating problem while adjusting to city life. He realized that moving desks and tables from apartment to apartment was not something easily accomplished. So, he designed a solution based on removable furniture legs featuring a unique clamping mechanism. After a successful Kickstarter campaign, he, along with business partner Alex O'Dell, developed, manufactured and shipped their first clamp-on table legs—The Floyd Leg.

A year after the initial release, the newly named company, Floyd, outgrew some of its suppliers and needed additional support to enable continued growth. That's when our company received an e-mail from Hoff, in search of a metalforming supplier. Hoff and I reviewed Floyd's designs and were able to make improvements to create a better-looking product, while also reducing costs. Over the next several months we shot videos, conducted conference calls and even texted one another. (Prior to this campaign, I had not once sent a text message to a customer.)

Floyd, Detroit, MI (www.floyddetroit.com), is comprised entirely of full-time millennials working in product design, supply-chain management, marketing and customer service, among other disciplines. I'm proud that my fellow millennials have gone beyond the typical modern-day route to success based on developing the next big app, and instead have committed to dreaming up tangible, innovative solutions to problems.

I have enjoyed working with the Floyd team because our partnership is a unique one. We (millennials) have a practical approach to doing business, with a strong focus on contributing to each other's success. There is something special about

helping to turn an idea into products you can touch and hold in your hand.

My message to other millennials reading this article: You, too, can get involved in transforming sketches, drawings and

ideas into tangible products, ideas that might improve the next airplane, electric car or piece of furniture.

Manufacturing provides unique opportunities to limitlessly leverage creativity.

I encourage more young people to get involved, and to realize that there is much more to manufacturing than meets the eye. With today's technology it can be

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furniture industry in 1980. Since that time, and upon the founding of Pneu-Mech Systems, we have directed our manufacturing/sales efforts strictly towards finishing systems equipment (both liquid and powder) for metal, wood and composite materials for all industries. With over 70 employees,

we are capable of completing "turn-key" projects of most any size. We are a custom manufacturer that builds systems to fit the needs of our customers, and our philosophy is "To deliver to our clients not only our equipment, but our knowl-



edge." This enables the end users of our equipment to produce both profits and a quality finish.

Pneu-Mech System's two Statesville, North Carolina manufacturing facilities, with over 75,000 sq. ft., are equipped with all the essential equipment. Hi-definition plasma cutter, metal shears, press breaks, spiral duct fabrication and saws to fabricate our specialized and custom paint systems from flat metal to finished equipment. Our fabrication staff is highly experienced in the craft of building our systems in modular form to be freighted to our customer's facility and shorten the installation process.

Pneu-Mech's capabilities to supply finishing equipment, including pretreat washers, ovens, conveyors, paint booths and other ancillary finishing equipment make us the best choice as a supplier. Our installation staff is highly experienced in the mobilization, rigging and placement of specialized finishing systems. We are proud of our staff, highly trained and experienced in the installation and integration of our systems to meet our customer's needs. Focused on "being easy to do business with", we provide training, production assistance, troubleshooting and all service work required to install and maintain our systems.

We view ourselves as partners with the clients we serve, and highly value long term relationships. We welcome the opportunity to add you to our rapidly growing list of satisfied customers. ■

Millennials in Manufacturing

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very exciting to learn about subjects such as 3D modeling, robotics, lasers, CNC programming and additive manufacturing.

In this world, where there seems to be an emphasis on digital answers, know that the opportunities to create tangible solutions to real-world problems are almost endless, and will be here forever.

Andrew Bader works in marketing and sales for OGS Industries, Akron, OH; ogsindustries.com. ■

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Pearl Abrasive's new wheels are ideal for metal and stainless steel
Pearl Abrasive Co. unveiled its new line of Pearl Abrasive wheels. The wheels are designed for metal and stainless steel and ideal for cutting, grinding, deburring and light grinding. Pearl Abrasive wheels are also non-contaminating.
Pearl Abrasive Co., Norcross, Georgia, 800/955-5151, www.pearlabrasive.com

WELDING SUPPLIES
Select-Arc unveils new electrode
Select-Arc Inc. unveiled its all-position, flux cored, gas shielded electrode that is designed for welding high strength, low alloy steel such as HY 80 and other similar metals. The new Select-Arc electrode is ideal for large structural fabrication, including bridge construction, tank and shipbuilding and other offshore applications, requiring a wide range of bead and impact toughness at temperatures down to minus 70 degrees Fahrenheit.
Select-Arc Inc., Fort Loraine, Ohio, 937/295-5215, www.select-arc.com

SPOTLIGHT
A SPRAY ABOVE
Brush Research Manufacturing is proud to be the first to introduce its new Department and a look at chemistry experiments to perfect the product. The new product, called WD-40, is the product remains the most widely recognized product of oil and water-dispersing spray on the market.
(continued on page 41)

APPAREL
Durable work gloves provide protection
The new 1000 Series work gloves offer the perfect combination of durability and all-day comfort for users that require reliable protection when working with different plastic materials. All day working area of the gloves—fingers, palms and backs—are reinforced with Aramix. A knuckle pad provides protection from scrapes and impact without limiting movement, and a heavy duty strap on the back provides a place to attach a tool or other device. The gloves are made from 100% cotton.
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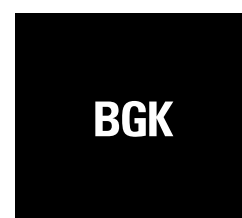
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Visit Booth N4514 to Learn About McDantim Trumix® Gas Blending Systems

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 our range of products.

The new TM2B450 will provide two differ-

ent 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 lever 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.

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 N4514 to find out more! ■

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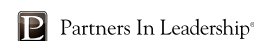
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Benefits Of Online Data Management Systems

ESAB WeldCloud™ and CutCloud™ automate functions once performed manually to save countless hours, provide real transparency into the drivers of productivity, quality and cost control

Because web-based reporting speeds information flow, companies obtain a clearer picture of plant operation. They can eliminate equipment downtime, unscheduled maintenance and process bottlenecks, as well as improve overall equipment effectiveness, speed up time to market and streamline schedules.

In metal fabrication, users of ESAB cutting systems equipped with Vision Series controls — such as the SGX and Combi-rex — can gain all the benefits associated with ESAB's Data Leap CutCloud and WeldCloud. With these systems, you can:

- Monitor manufacturing performance of machines automatically.
- Link data to scheduled order and part data for full traceability on material and parts.

- Automatically program or set up a part based on a scanned code.
- Transfer data automatically (instead of manually inputting information into production processes and record results) and automatically generate higher quality reports.
- Make real-time responses to production floor activities statistics.
- Fully integrate nesting, cutting and ERP systems with automatic data transfer of order data and production status.

Powerful Tools

With the ability to measure, store and analyze up to 7.5 million weld sessions per day, online data management systems such as ESAB's WeldCloud™ provides tools that enable managers to make quan-

tum leaps in productivity, quality and cost control.

To showcase the power of online data management tools, let's take a hypothetical case of a fabricator with 20 welding stations in Houston and another 20 in Seattle. To start, the welding engineer uses WeldCloud to push out the new weld procedure to

each system. Then, operators scan their badge to verify that they have the required certifications. After scanning a code on the blueprints for the part at hand, WeldCloud automatically pulls in the appropriate weld schedules and acceptable limits. Operator also scan codes for the raw materials, gas cylinder and wire spool for lot traceability.

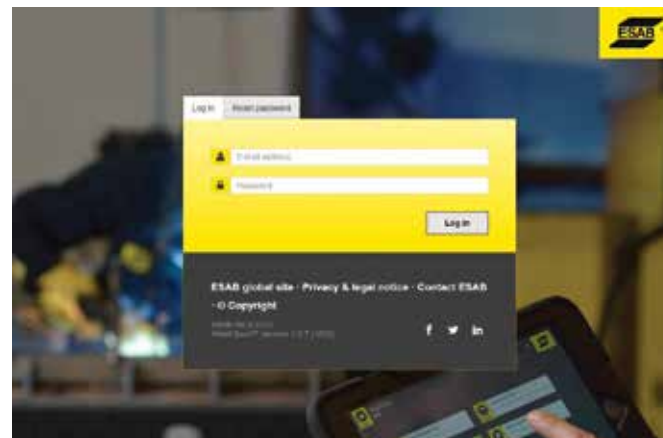
By identifying the exact source of the defect/reject, companies can rectify the situation faster. With WeldCloud, managers can generate reports in seconds and reduce paper use and associated storage space.

During welding, WeldCloud captures arc-on time and welding parameters. If at any point the system detects an error, incomplete data or parameters that are widely out of tolerance, it can create an alarm and even

prevent the operator from striking an arc.

Alerts can also include the system automatically sending an email to the welding supply distributor when consumables have run low, as well as text messages to alert the maintenance team that it's time to replace worn consumables.

For a large enterprise, managers can look at data for each weld system, groups of systems, by facility or enterprise wide. Because web-based reporting speeds information flow, companies obtain a clearer picture of plant operation. While results vary, companies who deploy cloud-based solutions often experience significant ROI in six to 12 months. ■



Online data management systems safely store data on your company's intranet, where it is password protected.



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So You Want to Buy a Metal Fabricator...

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Nix makes a clear distinction between resources and processes here. A laser cutting automation system with an advanced storage and retrieval system is a resource that can make a company more successful, but only if the company has the operational processes in place that allow this resource to fulfill the customer value proposition and profit formula.

Nix divides buying into four stages: strategize, search, structure the deal (including valuation), and integrate. The strategy defines why a company wants to acquire a business, which in turn drives which business it acquires (the search), how much it is willing to pay (valuation), and how the

new business integrates with the existing enterprise. Once a company establishes its strategy, it moves forward with a search. The better a seller can help a buyer achieve its strategy, the more the buyer may be willing to pay.

When looking at companies for sale, buyers analyze the business model components: customer value proposition, processes, profit formula, and resources. The first three determine how well a new business can integrate into the whole.

Nix added that misconceptions about integrating one company into another

continued on p. 30

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Back, left to right: Renegade ES 300i, Cutmaster 60i, Rebel EMP 235ic, Rebel EM 235ic, Rebel EM 215ic, Rebel EMS 215ic, Rebel EMP 215ic. Front: EDGE Series 2.0, Sentinel A50.

ESAB's breakthrough 2017 releases are here and redefining what's possible in welding and cutting. Consider yourself warned, and head to booth N4529 for a chance to win a machine a day.

FABTECH Panel Details Development Trends in Additive Manufacturing

continued from p. 1

more possibilities for them to replace existing commercial production processes.

"The benefits of additive manufacturing are the geometries that it allows you to build that, in a sense, can't be built any other way," said Henderson. "One of the major benefits of additive manufacturing for metal parts is that there is no tooling. You don't need a mold or a dye or any kind of core. You just need a computer program, and what I call a digital tread. You need the digital tread to make the part."

Another key advantage of additive manufacturing is the ability to integrate multiple parts into a single piece. "We have some components that we manufacture with 3-D printing that were four- or five-piece assemblies," noted Henderson. "In fact, I have one that was almost a 100-piece as-

sembly that we printed in a single piece. There is a maxim in engineering that says if you add a part, you add a problem, so we get rid of reliability problems down the road by making things in one piece."

Dekker detailed some use cases where additive manufacturing is being used for jigs, fixtures, and templates, as well as tooling setups and evaluation pieces.

The Importance of Education and Due Diligence

According to Dekker, one of the key takeaways of the panel presentation was the importance of education in the application of additive manufacturing technologies. "There are numerous processes involved, not to mention numerous manufacturers of additive technology. So making sure that

you understand where the strengths and weaknesses are for each different process as you apply it to your products and components is critical to achieving the desired results," he said. "Being aware of the technology specialization per application is key."

He also cautioned manufacturers who are incorporating additive technologies into their processes to be diligent in validating the claims of the technology they're acquiring. "I'm not trying to say that the salespeople are just selling stuff," explained Dekker. "Some of them have just not been trained. They're not hands on; their objective is to go out and find opportunities, not to apply the technology and make parts. They may not be aware of the specific things that will make your application successful."

According to Dekker, if a company hasn't researched and validated the technology being implemented, they could be looking at a series of additional expenses to get a usable end product. "When you start looking at that situation, you may be looking at literally a 2x factor or close to it on the cost of the equipment to be able to get it running for your specific needs," he noted.

Corporate Leadership and More

Cipolla spoke about what GE is doing specifically to advance additive manufacturing. Her center is part of GE corporate, and helps with advancing additive manufacturing technology across the enterprise.

"We work very closely with the other GE businesses and develop production-grade products using the additive technology," she explained. "How we help industrialize that process and help the product come to market sooner is at the core of what we do."

The session closed with an array of questions from audience members on issues such as expanding material sets, lightweighting designs, and finishing time associated with 3-D-printed parts.

"Everybody's exploring what would it really take to mass produce parts using additive manufacturing," concluded Henderson. "I think this session has tried to leave the audience with a basic idea of the steps and thought processes involved in applying the 3-D printing process, as well as underscoring the importance of guaranteeing quality. We hope we have accomplished that, as well as pointing towards the state of the art of 3-D printing in manufacturing at this time." ■

So You Want to Buy a Metal Fabricator...

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abound. People tend to think that if a large company buys a small company, then the small company naturally folds into the larger one.

In reality, it's not the size that dictates integration, Nix said, it's the buyer's strategy and business model. If a company's value proposition, processes, and profit formula align with the buyer's business model, the new company may integrate well. On the other hand, if the seller has a value proposition, processes, and profit formula that don't align with the seller's, then integrating the two businesses closely could spell disaster. For instance, a salesperson from one fabricator selling on a price-driven model may not merge well at all with a buyer's service-driven model.

Having different business models isn't necessarily a bad thing, Nix said, depending on what the buyer's integration plans are—

say, if the buyer goes into the deal knowing that the price-driven subsidiary will remain separate and not be folded into the larger company. Or if it is folded into the larger company, it may be part of a bolt-on acquisition; that is, the buyer really is purchasing a business only for its resources, such as machines, facilities, and talent.

If the buyer isn't willing to pay what the seller asks, the deal doesn't close. And the final price can vary dramatically depending on the buyer's strategy and all the circumstances surrounding the deal.

For this reason, Nix said, it's always difficult to base a price solely on the so-called "market rate" of a certain multiple of EBITDA (earnings before interest, taxes, depreciation, and amortization). Ultimately, the buyer determines the price, and if a seller fulfills the buyer's strategy well enough, the buyer may be willing to pay top dollar. ■



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