

THURSDAY
NOVEMBER 17, 2016

DAY 2

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TODAY

WELDERS WITHOUT BORDERS: WELDING THUNDER TEAM FABRICATION COMPETITION

7:00 AM - 1:00 PM
Silver Parking Lot

WOMEN OF FABTECH BREAKFAST WITH TECH TOUR

7:30 - 10:30 AM
Room N101
Must be registered to attend.

DEVELOPMENT TRENDS IN ADDITIVE MANUFACTURING AND 3D PRINTING

8:30 - 9:30 AM
FABTECH Theater
Central Hall Lobby

BLUES, BREWS AND BBQ

11:00 AM - 5:00 PM
Outside of Central Hall

ADVANCED MANUFACTURING: CREATING COMPETITIVE ADVANTAGES FOR FABRICATORS

12:30 - 1:30 PM
FABTECH Theater
Central Hall Lobby

HAPPY HOUR

3:00 - 5:00 PM
Throughout Exhibit Halls

The Power to Win!

Leonard Scores Another Knockout with Keynote Speech at FABTECH 2016

When the crowd rose to its feet at the end of his keynote presentation yesterday morning, Sugar Ray Leonard must have had a sense of déjà vu. For Leonard, getting people up and out of their seats in Las Vegas is something he's done for decades, first as a world-championship boxer, later as an author, entrepreneur, and motivational speaker, and always with the confidence and charisma that marked him early on as an American hero.

When Leonard was introduced to the gathering at the FABTECH Theater, he bounded to the stage flashing a contagious smile, much as he used to do when stepping between the ropes to defend a title. "I know what you guys are thinking," Leonard said as the audience returned to their seats, "Hey, Sugar Ray is not that big. I think I could take him."

Think again. Leonard, who burst into national consciousness at the 1976 Montreal Olympics, is the first and only fighter in history to win world championships in five different weight classes. Inducted into the International Boxing Hall of Fame in 1997, Leonard was named Fighter of the Decade for the 1980s by *Ring Magazine*. He retired with a record of 36 wins, three



losses, and one draw; many of his victories (e.g., over Tommy "The Hit Man" Hearns, "Marvelous" Marvin Hagler, and Roberto "Manos de Piedra" Duran) are considered classics of the ring. Today he still looks like he could go 15 rounds.

While Leonard was always known as a supremely gifted boxer, with blazing speed and power often belied by his slight frame, his path to glory was paved by the same qualities that help drive business and personal success. He detailed these qualities, adding emphasis with stories from his career, to a packed and rapt audience at the keynote address.

The Principles of Success

"Boxing has given me an incredible ride," said Leonard. "It's afforded me the opportunity to escape poverty, to travel the world and meet important people like Nelson Mandela; but it's also taught me that the same principles that I applied to become world champion are applicable in the success of life and business."

Among the principles Leonard touched on in his speech:

- Preparation (i.e., roadwork)
- Overcoming failure
- Determination
- Focus
- Self-esteem
- Confidence
- Risk-taking
- Success
- Communications
- Composure

"Let's talk about the roadwork, the extra rounds, the early morning runs," Leonard said, speaking to preparation. "The important thing about the roadwork:

continued on page 28

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Mazak Optonics Corporation Features New Laser-Cutting Systems, Booth #C31068

Mazak Optonics Versatile Compact Laser- Tube 100

The Mazak Optonics VCL-T100 is an affordable tube production laser that utilizes Direct Diode Laser technology which delivers higher efficiency and reliability than traditional fiber or other solid state laser generation systems. This is the first in a series of machines to be engineered and produced in North America to meet the specific demands of our local market.

VCL-T100 has been designed as a cost effective solution for low to mid volume tube components up to 4" round, 3" square and standard lengths up to 12' (24' optional). This versatile machine also cuts flat sheets up to 20" x 24" and 1/4" thick. The VCL-T100 utilizes Direct Diode Laser technology which is the next generation of solid state laser technology. VCL-T100

includes a fiber delivery system and the generator that offers unique advantages including more efficient operation. Direct Diode lasers deliver better performance when cutting aluminum as compared to other technologies. They also offer enhanced modular flexibility over fiber laser generators.

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OPTIPLEX 3015 DDL is revolutionary technology that changes the game - OPTIPLEX DDL delivers faster cutting speeds than fiber generators of like power - Wall-plus efficiencies of 45% as compared to 35% for fiber - New Preview G control and drive package.

About Mazak Optonics Corporation


Mazak Optonics Corporation is a major supplier of laser-cutting systems, offering 50 laser models and leading the industry in the implementation of emerging laser technologies. The company's 50,000 sq. ft. North American Headquarters are located in Elgin, Illinois, and feature a 30,000 sq. ft. laser technology center housing up to 18 machines for demonstrations and training.

Mazak Optonics is part of Yamazaki Mazak Corporation (Oguchi, Japan), the global leader for the manufacture of machine tools and systems for the precision machining of metal parts, including CNC

turning centers, horizontal and vertical machining centers, Multi-Tasking machining centers, turnkey cells and software solutions. The North American Headquarters for Yamazaki Mazak are located in Florence, Kentucky. ■




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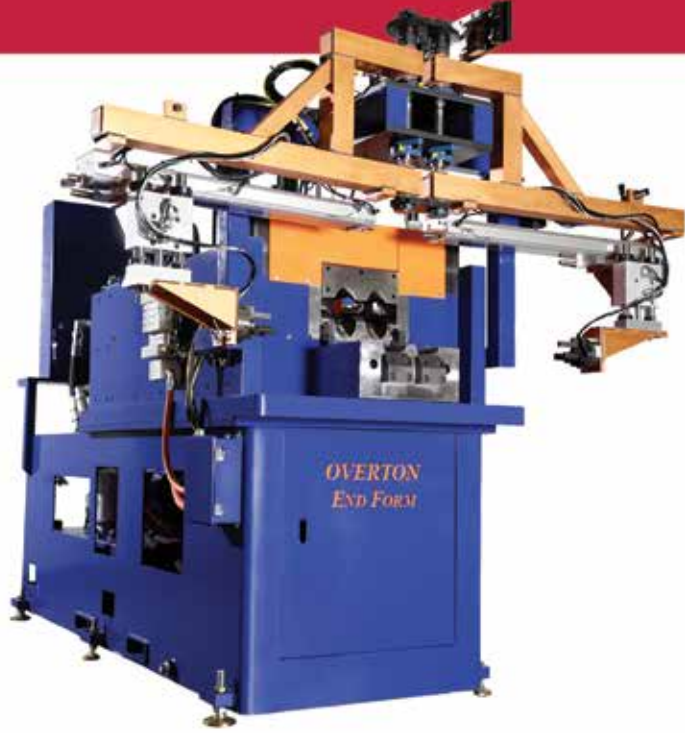
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Your Chance to Talk Shop with the Guys from “Counting Cars”

Usually when you see Kevin Mack, he's cruising around Vegas with Danny “The Count” Koker looking for cars to buy, renovate, and customize. Michael Henry—a.k.a. “Horny Mike”—is typically airbrushing 3-D horns on everything from

vehicles to helmets to clothing. On November 18th, Friday morning, from 9 a.m. to 10 a.m., these two well-known cast members of the popular History Channel show “Counting Cars” will be in the FABTECH Theater in the Central Hall Lobby ready

to talk shop with attendees who know the feeling you get from working on that special car sitting in your garage.

“We do a lot of a shows where we basically meet and greet folks, but we love



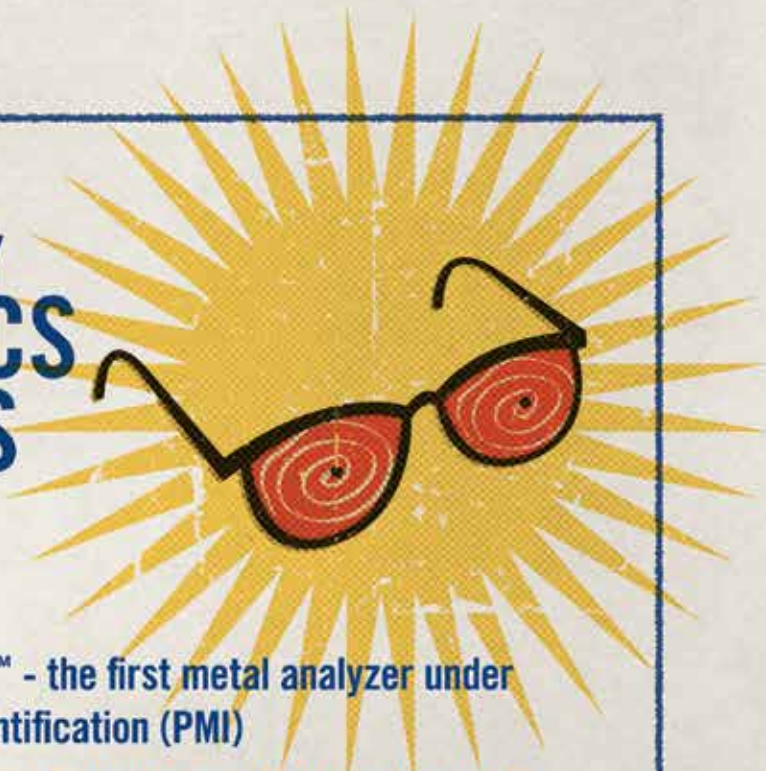
talking shop,” says Horny Mike. “Or it can be talking about and answering questions about the show; but we're always happy in either case, because it's just fun to meet and talk with the people who appreciate ‘Counting Cars.’

“I'm really looking forward to this one, though, because there's going to be a lot of guys at FABTECH who basically do what we do. They'll have a lot more technical questions, some of which I won't be able to answer because I don't do all the work. Unfortunately, we don't often show the guys behind the scenes, and they really deserve a ton of credit, especially our metal fab guys and our body shops. At least we show a bit of the interior guys, but I don't think our metal guys and mechanics get a lot of love.”

“Counting Cars,” the third spinoff of “Pawn Stars,” is filmed in Las Vegas where it chronicles the daily activities at Count's Kustoms, an automobile restoration and customization company owned and operated by Danny Koker, who previously appeared as a recurring expert on “Pawn Stars.” In a format similar to another spinoff, “American Restoration,” the series follows Koker and his staff as they restore and modify classic automobiles and motorcycles.

We hope you take this chance to swap some stories with Kevin and Horny Mike—it will be a great way to start your final day at this year's FABTECH! ■

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ESAB Expands REBEL Welding Family

ESAB Welding & Cutting Products showcases its Rebel EM 215ic MIG welder, Rebel™ EMS 215ic MIG/ Stick welder and Rebel EMP 215ic MIG/TIG/Stick multi-process welder in the North Hall, booth # N4529. Each Rebel offers primary power and location flexibility, as well as some of the most innovative welding technology available today.

"These machines were designed to meet specific needs voiced by our customers," says Doug Smith, Product Business Manager – Arc Equipment, ESAB. "By offering MIG-only, MIG/Stick and MIG/Stick/TIG models, customers get exactly the processes they want without sacrificing Rebel's premium arc performance and other unique features."

A Field Machine

The Rebel EMS 215ic is a compact, portable welding system that offers industrial quality arc performance for MIG/Flux-Cored and Stick welding. It features a 4.3-in. LCD/TFT color display, the ability to store and recall welding parameters, a built-in owner's manual, operating instructions and parts library and advanced functions such as voltage trim, inductance,



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The Rebel EMS 215ic is ideal for Stick welding and for running Flux-Cored wires in farming, construction, maintenance/repair and mechanical contracting applications.

"This machine has everything the Rebel EMP 215ic multi-process welder has but without the TIG-related functions," says Smith. "It is targeted at users who do not want to transport a shielding gas cylinder to their welding location or who never plan to TIG weld. It currently has an MSRP \$100 less than the EMP model, so users do not pay for functions that do not need."

All MIG, No Frills

For users who only plan to wire weld and who value a traditional operator interface, ESAB offers the Rebel EM 215ic for MIG and Flux-Cored welding.

"Veteran welding operators told us that they feel more comfortable basic controls, so we designed the Rebel EM 215ic with a standard LED display and conventional controls for voltage and wire feed speed/ amperage," says Smith.

Note that the Rebel EM and EMS 215ic models both contain ESAB's unique sMIG (smart MIG) function that monitors the operator's technique and continuously adapts to provide a stable arc and superior, repeatable welds. Other common family features include a weight of 40 lbs., a MIG welding duty cycle of 25% when at 205A/24.3V, the ability to use 120V - 230V primary power for location flexibility and excellent generator performance for field work. Use a generator with at least a 3.7 kW output using a 120V connection and a 7.5 kW generator for maximum output when connected to a 230V outlet. ■

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Who Won? Who Cares?

“State of the Industry” Panel Indicates Key Issues for Manufacturers Less Tied to Presidential Election Than Generally Believed

Jimmy Breslin, the Pulitzer Prize-winning journalist and author, once noted about the American presidency: “The office of president is a bastardized thing, half royalty and half democracy, that nobody knows whether to genuflect or spit.”

Well, there wasn't genuflecting going on during the recent campaign, and spitting sometimes seemed like it was being taken to new levels; but all that's over now. Manufacturers can look with a bit more equanimity to the months ahead.

Yesterday at the FABTECH Theater, three distinguished experts looked into the crystal ball now that the election is behind us, and what they had to say might be a bit surprising. Bottom line: the outcome is likely to have a lesser effect on manufacturing than what unfolds between the presi-

dent-elect and Congress and the federal government and the states.

State-Level Action

“In the great scheme of things, presidents have relatively little to do with the economy,” said Dr. Chris Kuehl, Ph.D., managing director at Lawrence, Kansas-based Armada Corporate Intelligence. “For manufacturers, what will matter much more is what is happening in their states.”

Kuehl contends the system is set up so that, regardless of who wins, the president-elect ends up fighting a big chunk of their own party as well as the opposition. “So it's going to be difficult to get a whole lot done at the federal level,” he noted. “The states have already started rebelling.” Their attitude? If the federal

government isn't going to get to the issues important to manufacturing, they will do it on their own.

“So you're starting to see states set up their own infrastructure funds, and they're also beginning to pass laws that are fairly radical in their difference from federal laws,” explained Kuehl. This is going to have significant implications for manufacturing. States that are more heavily oriented towards manufacturing are likely to start responding to requests from the sector faster than the federal government does.

Holding Court

While the future of the Supreme Court was a high-level concern for both Republicans and Democrats, the focus (on opposite sides) in both cases was largely on the social implications. Panel experts were quick to remind the audience that, from a manufacturing perspective, the Court issue was more pragmatic but just as important.

“The U.S. Supreme Court has been in conservative hands since 1972, so the potential change of this election was not just in the normal branches of government (i.e., executive, legislative) that manufacturers have regular interactions with; there was also the potential of a dramatic shift in what is normally considered a backstop against many policies that harm manufacturing in America,” said Omar S. Nashashibi, partner at Washington, D.C.-based The Franklin Partnership, LLP. “So what we have typically seen as a court system that we could rely upon now could be in a completely different position.”

Court appointments and their subsequent confirmation battles will have an impact on the manufacturing bottom line. There are cases coming through on labor policy, EPA environmental regulations, and federal versus state rights, to name just a few manufacturing-centric issues.

Laying Out China

Most manufacturers rely on international trade to a significant degree, so they want to know what's going on globally that will impact their market share. One of the most troubling developments for manufacturers is related to inventory in China, a thorny issue regardless of who won the election. “I'm concerned that China is building up a tremendous amount of inventory that they don't know what to do with,” said Kuehl. “It's

typical. They're basically trying to keep jobs intact. But they keep stockpiling, and maybe there will be a gigantic accidental fire or they're going to dump that inventory wherever they can. We heard very little from either side during the election about this issue, but it's one we're going to have to face—and maybe sooner than later.”

Tax Reform on the Horizon

According to Nashashibi, it's fairly safe to say that tax reform is a likely possibility in 2017. “Both parties believe that the system is not working,” he said. There seems to be an emphasis placed by all sides on capital equipment investment and investing in U.S. businesses and facilities, and that is going to have a tremendous impact on manufacturers. “We saw Congress at the end of 2015 make permanent Section 179 equipment expensing, while also expanding bonus depreciation in 2019,” explained Nashashibi. “Those two provisions, in and of themselves, save manufacturers hundreds of thousands a year, or at least the people I represent. Many of them are attending FABTECH. Building on that success is something that we are very hopeful can be achieved under the new administration.”

On taxes, in terms of U.S. global competitiveness, it appears that a critical mass has been reached where all sides believe something has to be done. As such, manufacturers can be hopeful that the foundation of future tax reform policy is going to be the recognition that business tax investment is really the right way to go, because it generates jobs, whether from those who are building the machines, or those that are hiring more employees to run the equipment that's being purchased.

Points of Convergence: Education and Infrastructure

While Republicans and Democrats come to the issue from different angles, all agree that the skills shortage faced by manufacturers is stunting growth and is a problem that must be solved. “There are additional efforts that we expect to be expanded on by the next Congress in the next year to improve accessibility to all Americans of any age who want access to training for skilled careers,” said Nashashibi. Again, the ultimate solution is not agreed upon; but the recognition that there is a critical

continued on p. 28



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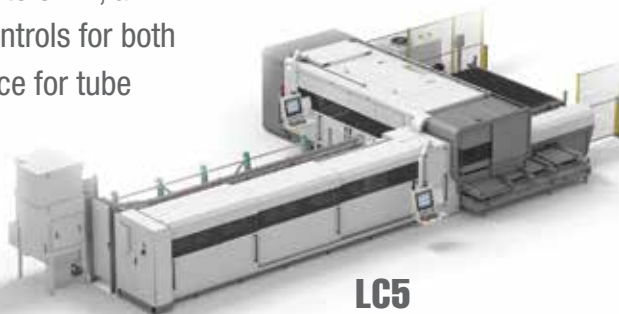
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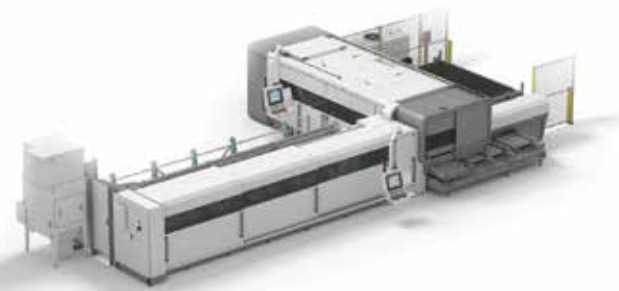
BLM GROUP USA Features Tube and Sheet Metal Solutions

BLM GROUP USA is a global leader in the manufacture of tube and flat sheet processing solutions, featuring its wide range of equipment in booth N6300.

The company is demonstrating the LC5

tube and sheet fabricating machine, the LT-FREE fiber laser tube cutting machine for cutting 3-dimensional parts, as well as the E-TURN and 4-RUNNER tube bending machines.

LC5 is a compact laser machine that can be equipped with either a CO2 laser source with a



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power up to 4.5 kW or a fiber laser source with a power up to 5 kW. It is the only high production machine with automatic loading and unloading that can process both tube and flat sheet in a single machine. The LC5 can handle tube up to 334" in length and 4.75" in diameter. The processing of sheet metal is fully automatic and allows for sheet up to 78" x 236". The fiber laser is ideal for cutting both mild steel and highly reflective materials such as stainless steel and aluminum.

The LT-FREE is a five-axis, fiber laser system designed for cutting three dimensional formed or shaped parts such as bent tubes, hydroformed tubes, welded assemblies and stamped or flat sheets. The LT-FREE, with powers up to 3 kW, table dimensions of 59" x 39" and axis stroke to x= 116", y= 37" and z= 29", is ideal for cutting mild steel, copper, aluminum, brass, stainless steel and galvanized steel.

The E-TURN 32 tube bender can handle tube up to 1.18" dia. and will be equipped with a Kawasaki robotic arm. This 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 4-RUNNER tube bender and end-forming machine can be configured as a dedicated tube bender for a specific production application or a complete process that includes straightening from coil, bending, end-forming and cut off. With a footprint of 13.08' x 7.17' x 6.17', the 4-RUNNER is ideal for machining small to medium sized tubes and can bend tube to 0.875" diameter with accuracy to ± 0.05 " on the linear axis and $\pm 0.05^\circ$ on the rotational axis. The unit comes standard with 2.76" maximum bending radius, and an "increase bend radius" option is available. ■

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Reporting for Duty as an Army Welder

By Charles C. Wheeler

A long-time Soldier describes the journey of his welding career in the U.S. Army, including training, responsibilities, and opportunities.

Welding may not be the first job considered when a person intends to join the military, but for some, like me, welding in the military can become both a career and a passion.

I have been in the welding field my entire military service, which spans 19 years. I have been stationed in Iraq, Korea, and Alaska, among other places. Currently, I am a Chief Warrant Officer Three (CW3), Active Duty Army 914A, Allied Trades Warrant Officer.

The purpose of this article is to share my experience. In doing so, welding educators can become more informed about a welding career in the U.S. Army and pass on that knowledge to students who might be interested in a military career. It is based on the "Welding in the Military" lecture I delivered as part of the Education Program at FABTECH 2015 in Chicago, Ill.

Basic Entry Requirements

In general, applicants to the Army are required to have strong moral character, be able to pass a thorough physical and mental examination, and pass the Armed Services Vocational Aptitude Battery.

The Army also has strict regulations on tattoos and piercings, as well as hair and beards, but this should not discourage an otherwise qualified applicant from visiting a recruiter. Only the local recruiter or other authorized personnel can determine whether or not a person is qualified.

Many recruiters may not want to talk about specific jobs the applicant is interested in. This is partly because there are always high-demand Military Occupational Specialties (MOSs) that need to be filled. For metalworking, MOS 91E Allied Trades Specialists are generally not in that category.

If applicants get through their local recruiter, Military Entrance Processing Station, and enlist as a 91E, they can expect to go to Basic Combat Training for 10 weeks. Once individuals complete that stage, they will be shipped to Fort Lee in Virginia for Advanced Individual Training as an Allied Trades Specialist.

Allied Trades Training

Welding and machining together are Allied Trades. At one point, welders and machinists were separate jobs in the Army. A few years ago, as part of a larger restructuring effort, the two jobs were combined to form one MOS. So, if a school-trained welder

joins the Army as a 91E, he or she will also be a trained machinist once training is complete.

For most people, this is a huge benefit,

especially those who already have a background in the trades. Personally, I have found it easier for skilled welders to learn how to be machinists than the other way around. Having the skills, experience, and

knowledge of both trades can be a valuable asset to the Army as well as individual service members when they prepare

continued on p. 14

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Reporting for Duty as an Army Welder continued from p.13

to leave the service and begin searching for work.

Training for Allied Trades Specialists is currently 19 weeks, 2 days and is conducted at Fort Lee in Virginia. The Ordnance Corps, which is the Army corps that oversees most maintenance-related fields, was moved around 2010 from Aberdeen Proving Ground in Maryland to Fort Lee. The Allied Trades hall, located on the Ordnance Center and School campus, houses modern equipment for Soldiers to train on. The course is laid out as follows:

- Introduction to Machining (23 h)
- Bench Layout Operations (52 h)
- Lathe Operations (192 h)
- Milling Operations (82 h)
- Introduction to Welding (35 h)
- Oxyfuel Operations (38 h)
- Gas Tungsten Arc Welding (GTAW) (54 h)
- Gas Metal Arc Welding (GMAW) (62 h)
- Shielded Metal Arc Welding (SMAW) (88 h)
- Army Unique (69 h).

Currently, in the initial entry phase, Soldiers learn machining on manual lathes and mills. The Army does use computer numerical control technology, but the initial entry course is not long enough to accommodate

that type of training. It is taught later in a Soldier's career.

The Army welding school at Fort Lee is an American Welding Society (AWS) SENSE accredited facility. During the course's welding phases, Soldiers weld in all positions, normally on steel, standard weldable grades of aluminum, and stainless steel. The course is designed for those who have never welded.

The students start on a Lincoln Electric VR-TEX® 360 virtual reality arc welding training simulator before performing actual welds in the booth. The Marine Corps uses the same school; therefore, the course's portion called Army Unique is training unique to the Army. This is where the Soldiers learn how to set up and use our welding trailer, plus other Army-specific equipment.

Ability to Earn Credentials

For those who come to the school as trained welders, there are opportunities to advance through the course faster than their peers. In addition to moving ahead and getting out of training quicker, another advantage is the Army has recently begun credentialing welders and machinists at the school. This is an area I am especially proud of as it brings even more validity to our training.

From the AWS, this consists of achieving credentials in SMAW, GMAW, flux cored arc welding, GTAW, and oxyfuel cutting/plasma cutting. Also, from the National

Institute for Metalworking Skills (NIMS), this includes the following: Measurement, Materials and Safety; Job Planning, Benchwork, and Layout; Drill Press Skills I; Manual Milling Skills I; and Lathe Turning Skills I.

Credentials are becoming more and more important as technology and the need for greater skill increases. These are free of charge to the individual. With further experience and maintenance of earned credentials, the opportunities are further increased when the person leaves the service.

Not everyone can leave the school with a folder full of certificates. Each person is evaluated throughout the duration of the course and only individuals with demonstrated ability are allowed to take credentialing tests, but the opportunity for a person who already has demonstrated welding skills to earn credentials can be far greater than for someone learning each process for the first time.

Equipment Used

The equipment Soldiers train with are mostly commercially available welding machines, generally modern inverter-based models, and cutting equipment. Most students start on a virtual reality arc welding training simulator.

Once the students get to the Army Unique portion of the course, they learn how to set up and use our welding trailer, otherwise

known as Shop Equipment, Welding (SEW).

The SEW is a small trailer that can be pulled behind a 2.5-ton vehicle. It has a diesel-driven welding power source, suitcase-style GMAW machine, 300-A GTAW machine, along with associated tools, cutting apparatuses, and all the basics needed for a field welding job. Nothing else being guaranteed, anywhere in the Army that a 91E will go, there will be at least one SEW.

Service Details

A common question among new recruits is, "Where am I going to be stationed?" The Army has duty stations throughout the continental United States, Alaska, Hawaii, and around the world. There is virtually no way to be able to say a certain person will be stationed at a particular location.

I recommend Soldiers embrace a different environment and take advantage of the opportunities presented there. You'll never know if you love Korean food without being stationed in South Korea or know what the northern lights truly look like from Alaska without actually being there.

Solving Problems with Welding

It is difficult for me to state specifically what Army welders do, because we do a little bit of everything. I say, "We solve problems." I have repaired radiators, weldments on tracked vehicle hulls, and a plethora of other random items.

continued on p. 30



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Ability to grow and adapt, be motivated and responsive to customers' needs and wants has propelled us to great levels of success...continuing to do better will make us unstoppable. Our organization is facing a time of many changes and we're progressively meeting these changes to adapt to the nation-wide and global shifts occurring. The technology evolution in the welding industry is an exciting area in which we will continue our endeavor to meet and bring innovative people together to ensure MK Products remains on the cutting edge.

Our employees and partners have continued to meet the challenges of the welding industry's growing needs. We all share in the pride of accomplishment and it is with great enthusiasm we look ahead to our future for our industry and for MK Products.

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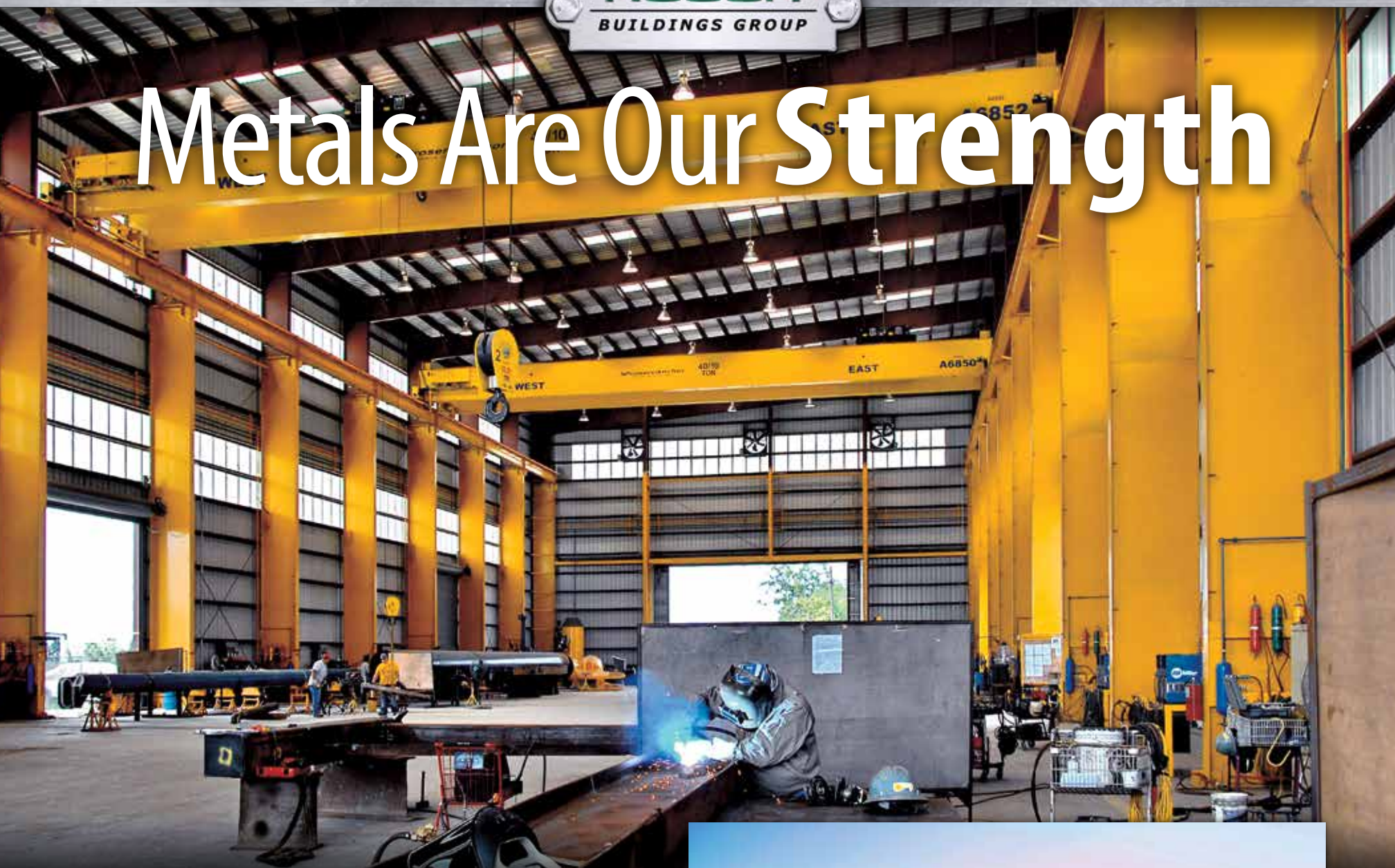


Special Show Events & Education Program

THURSDAY, NOVEMBER 17			SCHEDULE-AT-A-GLANCE		
SHOW SPECIAL EVENTS	7:00 AM - 1:00 PM	7:30 AM - 10:30 AM	8:30 AM - 9:30 AM	12:30 PM – 1:30 PM	3:00 PM – 5:00 PM
	Welders Without Borders: Welding Thunder Team Fabrication Competition Silver Parking Lot	Women of FABTECH Breakfast with Tech Tour Cost: \$15 Room N101	PANEL DISCUSSION Development Trends in Additive Manufacturing and 3D Printing FABTECH Theater (Central Hall Lobby)	PANEL DISCUSSION Advanced Manufacturing: Creating Competitive Advantages for Product Development FABTECH Theater (Central Hall Lobby)	NETWORKING EVENT Happy Hour <i>Complimentary beverage ticket included with badge</i> Throughout Exhibit Halls
TECHNOLOGY	8:00 AM – 10:00 AM		10:30 AM – 12:30 PM		1:30 PM – 3:30 PM
FINISHING	C40: NEW! Adding Finishing to a FAB Shop – Design Criteria B Room N213-N214		C50: NEW! Adding Finishing to a FAB Shop – Part Cleaning & Spray Booths B Room N213-N214		C60: NEW! Adding Finishing to a FAB Shop – Coating Application & Curing B Room N213-N214
	C41: NEW! Efficient Paint & Powder Coating Batch Operations B Room N212		C51: NEW! Pretreatment Regulations I Room N212		C61: NEW! Hooks, Racks & Stripping Technologies B Room N212
	C42: NEW! Advanced Electrocoating Concepts A Room N211		C52: Efficient Curing with Infrared B Room N211		
CUTTING					F60: Comparative Cutting With a Tech Tour B Room N221-N222
LASER	AWF100: NEW! Laser Welding for Today’s Fabricator Workshop I Room N219-N220				F61: NEW! Laser Joining Applications I Room N219-N220
LEAN	F42: NEW! Lean: Lessons in Kata and Visual Workplace for Managing Fabrication I Room N229-N230		F52: Value Stream Mapping: Addressing the Differences Between the Office and Shop Floor I Room N229-N230		F62: Lean Tools: Quick Changeover and TPM B Room N229-N230
ADDITIVE MANUFACTURING	F43: NEW! Laser Metal Fusion and Laser Metal Deposition for Additive Manufacturing B Room N221-N222		F53: NEW! Design and 3D Merging Technologies for Additive Manufacturing I Room N221-N222		
WORKFORCE DEVELOPMENT	F44: NEW! Building Teams and a Quality Culture for Team Leaders B Room N209-N210		F54: NEW! Delegate, Influence and Motivate Employees for Effective Management B Room N209-N210		F64: NEW! Build A Manufacturing Workforce with Veterans & Skilled Labor for Dedicated Employees B Room N209-N210
MANAGEMENT	F45: Create Lasting Strategic Business Value I Room N207-N208		F55: NEW! Research Like a Pro to Grow Your Business B Room N207-N208		F65: NEW! Leveraging Disruptive Technologies to Become the Fabricator of the Future I Room N207-N208
JOB SHOP SOLUTIONS	F46: NEW! Software Solutions for Fabricators I Room N201-N202		F56: Structural Fabrication Technology B Room: N201-N202		F66: NEW! A Competitive Roadmap and Strategic Plan for the Fabrication Industry B Room: N201-N202
AUTOMATION	F47: NEW! Automating the Shop Floor and Reducing Lead Time B Room N227-N228		F57: NEW! Robotic Joining Technology I Room N227-N228		F67: NEW! Predictable and Virtual Concepts and Design A Room N227-N228
FORMING & FABRICATING	F48: Press Brakes for Engineers B Room N203-N204		F58: Tube Producing/Joining B Room N203-N204		F68: Roll Forming Basics and Justification B Room N203-N204
	F49: Tube Laser Processing 101 B Room N205-N206		F59: Press Brake Safeguarding: Changes to ANSI B11.3 I Room N205-N206		F69: Punching I Room N205-N206
STAMPING	S40: NEW! Formability Analysis B Room N225-N226		S50: NEW! Solving Progressive Die Problems A Room N225-N226		S60: Lubrication Technology I Room N225-N226
	S41: Sensor Basics B Room N223-N224		S51: Press Maintenance I Room N223-N224		S61: NEW! ANSI Z244.1 I Room N223-N224
WELDING					
SEMINARS	W16: ASME Section IX, B31.1 & B31.3 Code Clinic – Day 2 8 • Room N237.....				8:30 AM – 4:30 PM
	W17: D1.5 – Bridge Code Clinic – 2015 • Room N235.....				8:30 AM – 4:30 PM
	W18: Ethics Seminar for Certified Welding Inspectors – Part A • Room N233.....				8:00 AM – 12:00 PM
	W19: What to Expect as a New Certified Welding Inspector – Part B • Room N233.....				1:00 PM – 5:00 PM
	W20: Ethics Seminar for Certified Welding Inspectors & What to Expect as a New Certified Welding Inspector (Part A & B) • Room N233.....				8:00 AM – 5:00 PM
	W21: Better Understanding of Welding Symbols (A2.4 and A3.0) • Room N259.....				8:30 AM – 4:30 PM
	W22: The NEW Visual Inspection Workshop • Room N258.....				8:00 AM – 5:00 PM
	W23: Fundamentals of Liquid Penetrant Testing for CWI’s and Quality Assurance Personnel • Room N231.....				8:30 AM – 4:30 PM
CONFERENCES	W27: So You’re the New Welding Engineer – Day 2 • Room N261.....				8:00 AM – 5:00 PM
	W28: Distortion Control Conference • Room N260.....				8:00 AM – 5:00 PM
RWMA SCHOOL	W29: RWMA Resistance Welding School – Day 1 • Room N253.....				7:45 AM – 5:00 PM
PROFESSIONAL PROGRAM	W32: Session 4: Plenary Session • Room N238.....				8:00 AM – 10:00 AM
	Session 5: Battery Welding • Room N240.....				10:00 AM – 12:00 PM
	Session 6: Honorary Symposium for Prof. T. Eagar – Session A • Room N242.....				10:00 AM – 12:00 PM
	Session 7: Mechanical Properties • Room N238.....				2:00 PM – 4:30 PM
	Session 8: Honorary Symposium for Prof. T. Eagar – Session B • Room N240.....				2:00 PM – 5:00 PM
	Session 9: Sensing and Analysis • Room N242.....				2:00 PM – 5:00 PM
EDUCATIONAL SESSIONS	W37: AWS Education Sessions 8 • Room N264.....				8:30 AM – 5:00 PM
SPECIAL PROGRAMS	W40: AWS Awards Luncheon 8 • Room N255-N256.....				12:00 PM – 2:00 PM



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Tri-Tools New 6" to 16" Beveling Machine Offers Both Safety and Performance

Tri Tool has introduced their latest ID Mount beveler, the Model 216B Bevel-Master®. The new 216B is the ideal size for rapid, reliable weld prep for power and LNG pipe applications cutting all schedules of pipe from 6" to 16" and machining

up to 32" diameter when using an optional Single-Point Kit.

The Model 216B has been designed for maximum operator safety. There are no external drive housings or protrusions on the outer surface thereby eliminating any

"pinch points" during use, making it ideal for working in confined spaces or areas with limited clearance.

Its field-proven pinion gear design directs more power to the cut permitting rapid, full-width bevels on pipe and tube up to

1.5" wall thickness, while providing ample power to perform simultaneous beveling, facing, and counterbore operations.

The 216B can be configured with a right angle (pneumatic) or inline (hydraulic) drive motor, and the machine features two integral power inputs: high-speed for rapid cutting up to 55 RPM (hydraulic motor) / 30 RPM (air motor), and low-speed for optimal control of single point machining for complex bevel profiles.

The new machine's performance and versatility makes it a perfect choice for everything from working with exotic materials, to heavy-wall form tooling. Smooth bearings and rigid mandrel, housing, and faceplate make it one of the most stable machines ever designed. The machine's three lengthened mandrel blocks provide secure mounting support with maximum rigidity.

Other 216B accessories include an ID tracking module, miter mandrel, lathe stand, and rugged, lockable, powder-coated steel storage/shipping box. ■


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and Marketing. "We started with only the Mitsubishi EDM product line in 1978 and then added the Mitsubishi Laser product in 1987."

Today MC Machinery boasts a complete line of manufacturing products including, Wire and Sink EDM, Fiber and CO2 lasers, Press Brakes, Milling and Turning equipment, Gantry EDM, Gantry Laser, Graphite Machining, Automation

Solutions and more. Aside from all these great products, MC Machinery features an extensive service group. The service group has satellite locations across North America to ensure quicker response and more affordable on site visits. The future of customer service is front and center at MC Machinery with their recent release of Remote 360. This new mobile monitoring application is standard on all new Mitsub-

shi Laser and EDM equipment. Finally MC Machinery's Consumable Product Group is the best resource from OEM consumables for your Mitsubishi Laser.

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The Human Side of the Skilled Labor Crisis

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

Walk in to a custom plate rolling operation and you see the epitome of concentration and teamwork. In an initial-pinch, fixed-top-roll, three-roll machine, the punch roll provides the pressure while the bending roll's position determines the geometry. Every time the operator raises and lowers the bending roll, the position of the moment of bend changes, and setting it just right is a delicate dance.

A plate rolling operator and his helper aim to achieve a parallel line of pressure across the workpiece. It's easier said than done, especially when you consider the nature of the machine. Like a brake, plate rolls are rigid near their ends and deflect near the center—hence the need for crowning, with roll diameters thicker in the middle than near the machine frame.

Does the workpiece require shimming, to eliminate the barreling or hourglassing effects of improper crowning? By how much do you compensate, considering the amount the rolls are crowned in the center? Then there's the pinch pressure. How will changing the pinch pressure affect the material? A stainless workpiece might maintain its integrity with significantly increased pinch pressure, but under the same pressure a soft aluminum may succumb to "pie doughing," akin to thinning out a piece of pie crust. What kind of supports does the workpiece require? Gravity works, especially when rolling thin sheet into a large-diameter cylinder.

A skilled plate roll operator knows these questions need to be asked and—through finesse, tweaking rolling parameters a little here and a little there—discovers the answers.

This industry needs more of that.

Manufacturing seems to have the perennial problem of attracting the people it needs. According to the Bureau of Labor Statistics, despite news of layoffs, unemployment in manufacturing remains relatively low. Most significant, the BLS reported that the ratio of openings to hiring in manufacturing is at all-time highs. Companies still can't find the people they need.

Some shop managers have told me they're happy when they find people who stay off drugs and show up to work consistently. Then when they do become experts, they keep their knowledge to themselves and sometimes use their unique capabilities to their advantage; they know a good plate roller, press brake operator, or welder is tough to find. They know they have job security, so why put in the extra effort?

Of course, this is all from the manager's perspective; employees have another. Like in any industry, some employers are better to work for than others.

Fabricators try to attract the best, to be the employer of choice. The details are various, but the strategies usually involve giving a voice, career path guidance, and

some sense of security to permanent employees. They want employees to know that they aren't just a number in a headcount to be shrunk and expanded as demand dictates. This is real life, and a layoff can't be avoided entirely, but employees should at least know that managers consider it a method of last resort.

But there's another wrinkle to the skilled labor story. It goes back to the plate rolling operator, welder, press brake technician, or any person who does more than stand by a machine and push buttons. It's about the close relationship between operator, the machine (or cutting torch or welding gun), and the workpiece.

continued on p. 24



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DeVilbiss has developed the new AG-360 Series to provide the combination of finish quality, engineering robustness and superior transfer efficiency needed in low pressure finishing applications today. A key feature of this automatic spray gun is the QuickClean™ technology coating the

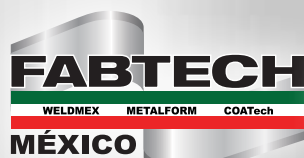
aluminum body, inside and out, for higher levels of durability, corrosion resistance and easier cleaning.

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explained Jesus Guerrero, Global Marketing Communications Manager. "There are multiple options and formats for both the general needs of many industrial applications and the individual needs of specific industries, such as metal, wood, glass, ceramics, and cosmetics."

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The Human Side of the Skilled Labor Crisis

continued from p. 23

Operators need to know math, of course. A press brake operator, particularly one working on an old machine, needs to know his way around trigonometry.

Still, so much in STEM education fosters an "if this, then that" way of thinking. If you write this code, then the software does this. If it doesn't do it, you then debug and perfect it until it works as it should. Ironically, machines are really good at "if this, then that" logic. If a person learns to think like code, his or her job could well be automated in the years to come.

But many in old-school metal fabrication don't go by that "if this, then that" way of thinking. Certain processes are far too complex. The mills still haven't found a way to produce sheet or plate that comes in a precise, homogenous thickness and strength. So when you cut, form, and weld it, there's variation. If you set a plate roll like this, that might happen or it might not. It depends. You can't debug it to make it work for all the jobs that follow, even if those jobs are identical (which, in custom fabrication, they usually aren't).

An old-school brake operator can look at a blank and in his head see how it will fold. A plate rolling operator will know just how much to adjust the pinch and bending rolls to get the radius he needs. This sense takes time to develop.

The trick is to identify this sense early, particularly in those who are easy to work with and engaged in the process. Metal fabrication needs technical skill, but reading the machine and workpiece remains very much a human endeavor. That humanity is what makes this industry so great. ■



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CONSUMABLES

PRODUCT NEWS FOR METALWORKING, MACHINE TOOLS AND AFTERMARKET PARTS

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Milwaukee Electric Tool Corp., Brookfield, Wisconsin, 800/775-3878, www.milwaukee.com

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Brush Research Manufacturing now offers a new line of specialty Flex-Hones that bend and radii sharp edges and remove burrs on chamfered and finished parts. Standard Flex-Hones are effective in the interior corners of the chamfer or fillet. The new series of Flex-Hones are made of a special material that can be used on the exterior of the chamfer and fillet, as well as the inner corners and hole.
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(continued on page 41)

WELDING SUPPLIES
Select-Arc unveils new electrode
Select-Arc Inc. unveiled its all-purpose, flux-cored, gas-shielded electrode that is designed for welding high-strength, low-alloy steels such as 50 ksi and 60 ksi steels. The new Select-Arc electrode is ideal for large structural fabrication, including bridge construction, tank and shipbuilding and other offshore applications, requiring a good strength of weld and impact toughness at temperatures down to minus 50 degrees Fahrenheit.
Select-Arc Inc., Fort Loraine, Ohio, 937/295-5215, www.select-arc.com

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American Torch Tip Co., Bradenton, Fla., 941/753-7562, www.american TorchTip.com

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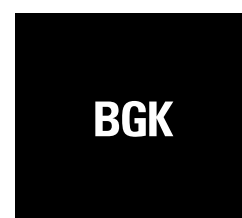
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Excerpts of “Replacing What’s Lost” as Featured in Risk & Insurance’s 2016 Insight Edition

Knowing the true costs of rebuilding its property after a loss allows a company to make a more informed decision when purchasing coverage.

In the middle of the night, an electrical fire destroys a corner store, resulting in a total loss. The store owner, sole proprietor of his business, calls upon his commercial property insurance to help rebuild and repair... but the funds come up short.

The ice-making and soft-drink machines are ten years old, and the cost to buy new equipment exceeds their insured value, which is currently set at their depreciated asset value. A beverage company that loaned some refrigerators to the store to

house its soft drinks comes knocking, looking to recover its own losses. As a result the owner is left with far too little resources to reopen his leveled shop and goes out of business.

The ending to this scenario could be different had the store owner insured his or her property to the value of its replacement cost.

“Replacement cost reflects the cost of buying something brand new to restore operations to pre-loss conditions,” said Peter Levesque, Property Valuation Technical Director at Travelers. “Old machinery may be insured at the current value on its fixed-asset list. In a total loss, the cost to replace that machinery with new equipment may exceed what’s covered under a replacement-cost policy.”

And this is not just an issue for small businesses, as large and mid-sized businesses do not always adequately value or insure their property either.

Have you considered the following elements?

- Locking Down the Wording
- Understanding Differences in Property Type
- Insured To-Do List

Knowing the true costs of rebuilding after a loss benefits both the insurer and the insured.

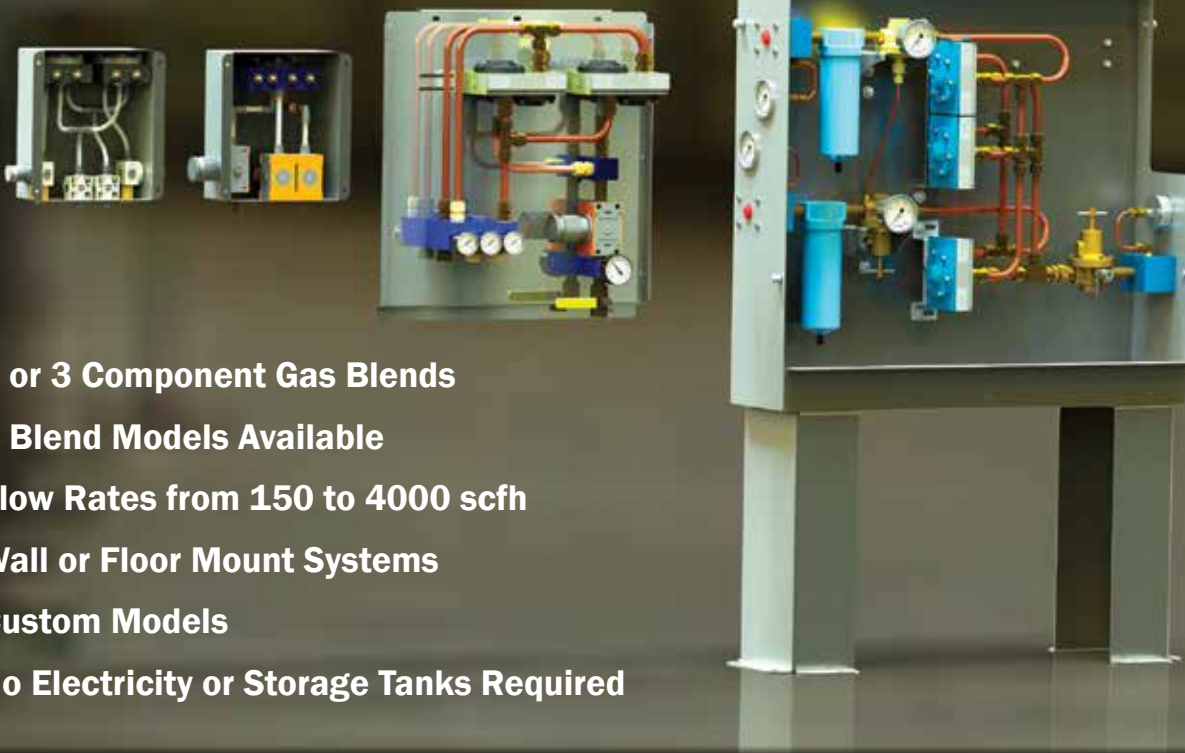
“An insurance company’s goal is to help customers realize the real value of their property, so they can protect themselves in the event of a loss” Levesque said. “Our goal as insurance professionals and trusted advisors is to help our customers be prepared for the unexpected and, if that unexpected event happens, they are ready to get back up and running with minimal disruption.”

To obtain a copy of the full Risk & Insurance Insights article titled “Replacing What’s Lost” or to learn more about building the right property coverage, stop by Travelers **Booth #C19071**.

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The Power to Win!

continued from p. 1

the more you do it, the easier it becomes, because sometimes the body has to catch up with the mind.”

Once it does, both accept it as routine. “The greatest thing about roadwork is how it positively affects your confidence and gives you the ability to dig deeper and perform in high-pressure situations,” he noted. Leonard credits his intense preparation as the reason he was able to come back late in the fight to defeat Tommy Hearn by technical knockout, while behind on the judges’ scorecards after 12 rounds.

“As I sat in my corner, Angelo Dundee yelled at me, ‘You’re blowing it, kid! You’re blowing it!’ I was exhausted, completely spent. But I knew that through the roadwork, I had built up a reserve. We all have that reserve. The difference is what activates it, like a woman who finds the strength to lift a car off a trapped child or Michael Jordan scoring 56 points in a play-

off game when he was wiped out by the flu.

“Angelo Dundee activated my reserve. He wanted me to go out in the next round and take over, to take charge, to dominate, to throw more punches. It was either do that, or go home a loser. That reserve paid off, and I did not go home a loser.”

Using Resources to Overcome Failure

But sometimes we do go home losers. “We all get knocked down, in every aspect of life,” said Leonard. “The question is how do we respond to a setback.”

Leonard referenced his first fight with Roberto Duran, when he lost his welterweight title, as a point of departure for overcoming failure. “I really fought my heart out in that fight,” he said. “I just fought the wrong fight. So I studied the tape of that loss over and over again, trying to find a way to beat this guy. After a while, I be-

gan to see it: I had to be smarter, more economical; but first I had to take care of one other thing, and that was the ‘monster element’: Roberto Duran, the intimidator.

“He wasn’t going to change, so I had to change the way he affected me. So I called upon my resource, composure, to take away the monster element. Still, there were reporters and sportswriters trying to convince me of the monster. ‘Ray, don’t look into Duran’s eyes. He’s like a cobra. He’ll freeze you.’ I told them to stop it. Duran’s eyes couldn’t hurt me. It was his hands that I was worried about.”

The rematch of the first fight was made in less than six months at the New Orleans’ Superdome (with Leonard’s namesake, Ray Charles, singing an unforgettable version of “America the Beautiful” before the bout). “Now it was my turn to make him lose his composure,” said Leonard. “In fact, I did better than that—I made him say, ‘no mas’.”

The Natural Progression of Growth

One of Leonard’s most interesting points related to taking risks. “Risk is a part of success,” he explained. “It is a natural progression of growth; so when the time is right, do not be afraid to take risks.”

Leonard himself took a serious risk when he went up two weight classes to fight for the light heavyweight championship of

the world. Whoever thought of Sugar Ray Leonard as a light heavyweight? But in the end, that risk was worth taking, as Leonard defeated Canadian Donny Lalonde by technical knockout to claim the title (a world championship in his fifth weight class), something that no other boxer has accomplished.

“Our greatest entrepreneurs took risks on the way to the top,” said Leonard. “A common thread among them was no fear of failure—only the fear of doing nothing.”

Today Leonard’s concept of success, of what it takes to be a winner, is a little different from when he was a fighter on top of the world: “Yes, I’ve looked into the eyes of Roberto Duran at close range; I’ve been hit hard by Tommy Hearn. But I’ve also been asked by my son for help with his homework. Succeeding in that is as great as any ring success, and I think it’s longer lasting, provided that he gets a passing grade!”

Jokes aside, Leonard’s ultimate point to the gathering was that fights don’t go away; they just change over time. And whether one is a boxer or a welder, one has to continue fighting for what one believes in and what one hopes to achieve. With that attitude, the power to win is within the grasp of us all. ■



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Who Won? Who Cares?

continued from p. 10

problem—and that all leadership wants to work on it—is very real.

The same can be said about infrastructure. Throughout the campaign, both candidates were pushing for big infrastructure investment; while it was presented as a job creator, it is for manufacturers a revenue creator (i.e., more machines, more capital investment for manufactured goods). Regardless of the presidential outcome, manufacturers were confident of the desire to spend a lot more money on repairing and building infrastructure.

“Clearly the first 100 days’ agenda of the president-elect is going to be focused on infrastructure, and the question is will the Congress work together with the administration to advance the infrastructure by spending at levels commensurate with the plans laid out by the president-elect?”

asked Ned Monroe, senior vice president, external relations, National Association of Manufacturers. Anytime there’s a transition in government, until there’s a perception of stability, businesses tend to withhold major expansions and take fewer risks, particularly within the first 100 days. But, said Nashashibi, after that manufacturers tend to adept quickly. “Manufacturers recognize, regardless of who wins the election, once they know what the rules are, once they know the challenges and opportunities that they face, they’ll find a way to move forward,” he asserted.

That’s part of the innovative spirit inherent in manufacturing, and one reason we expect manufacturers to be looking forward hopefully, regardless of which horse they backed in the race. ■

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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.

Reporting for Duty as an Army Welder

continued from p. 14

Anyone with a little bit of skill can replace a transmission, yet only someone with great attention to detail can drill, tap, and insert 17 holes stripped in an aluminum transmission housing, all while it is attached to the vehicle and the person is lying in the sand in the deserts of California.

I have repaired and fabricated more parts and equipment than I can remember. Each time, I learned something new and gained invaluable experience. I'm still sometimes surprised by the metal components Soldiers manage to break or the special tools I am frequently asked to fabricate.

In-Service Opportunities

There are many reasons why people decide to enlist in the military, but one of the most popular is education benefits.

All Soldiers who serve honorably have access to the Post 9/11 GI Bill. The benefits in this bill can be transferred to spouses or

other family members.

One of the more popular education benefits while in service is Tuition Assistance. This allows a person who has at least one year of service to receive up to \$250 per credit hour to take college classes. The cap is \$4500 per year or 16 credit hours, whichever comes first. I have personally used Tuition Assistance to its maximum extent and earned associate and bachelor degrees.

There are multiple other benefits that really depend on how long a person stays in the service.

The Post 9/11 GI Bill can also pay for credentialing programs, like further AWS and NIMS certifications. As an example, I earned my AWS Certified Welding Inspector (CWI) distinction while on station at Training with Industry.

If a person stays in the Army long enough, he or she can submit an application to be-

come an Allied Trades Warrant Officer. Generally, candidates will be a promotable Sergeant E5, have at least 60 months of documented excellence in the form of evaluations, and have at least the Advanced Leader's Course completed.

The Warrant Officer program is highly competitive. Warrant Officers make up only about 1% of the total Army population, and there are only around 80 Allied Trades Warrant Officers on active duty at any given time.

A program called Training with Industry is also an option for those who choose to make a career out of the military. This is a collaboration between the U.S. Army and The Lincoln Electric Co. Soldiers competitively selected receive a one-year assignment at Lincoln's headquarters in Cleveland, Ohio. They have the opportunity to learn from welding experts, attend seminars, and go to the company's welding school, as well as other events. The program is designed so Soldiers gain knowledge that helps advance welding practices and procedures in the Army.

Currently, I'm on this assignment. As a career military member, the opportunity for me to get out and experience more of the greater metalworking industry has been invaluable.

Post Service Life

Whether a person enlists for four years and leaves the service, or chooses to make it a

career, there are many employment avenues available for separating service members.

Many businesses have veteran-preferred hiring procedures, unions offer a variety of training and job placement services, and the Army mandates that all service members who are separating complete the Soldier for Life transition program, which helps teach skills such as interviewing and résumé writing.

In addition, the Department of Defense Skillbridge program connects separating service members with employers and training opportunities.

Whatever the reasons for joining the Army, ultimately the experience is irreplaceable. The variety of fabrications, repairs, materials, and experiences in different locations are almost countless and ultimately invaluable.

I highly encourage educators with students who seem like a good fit for the Army to encourage them to consider the military as a career option. We are in a time of reduction of forces, but there are always people leaving the service who need to be replaced. Students who have at least some education in the trades and who are motivated, self-starters are ideal candidates to become an Allied Trades Specialist. ■

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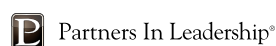
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