

## TEST DRIVE EDUCATIONAL SERVICES

Learn more about NTMA-U and explore new training opportunities for your business. — p. 3

## THE FUTURE OF OUR INDUSTRY

The NTMA's new Emerging Leader initiative brings together some of the sharpest young professionals in the industry. Samuel B. Griffith Jr. is in the spotlight this month. — p. 6

## IMTS THROUGH THEIR EYES

Two robotics students share their experience at IMTS. The future looks bright. — p. 16

## PHILADELPHIA DELAWARE VALLEY CHAPTER'S NEW EVENT IS A GREAT SUCCESS. COULD THEIR PLAN WORK AT YOUR CHAPTER?

The Manufacturing Advocacy Series has received such great reviews, it will become a regular chapter event in the region. Get the details. — p. 17

# MFG DAY



## MFG DAY 2016

NTMA MEMBERS FROM ACROSS THE COUNTRY OPENED THEIR DOORS TO OPEN MINDS TO MANUFACTURING. TAKE A LOOK AT WHAT SOME OF OUR MEMBERS DID TO CELEBRATE THE DAY. — PP14-15

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Interested in taking it for a test drive? If you'd like to review NTMA-U, email [aoverton@ntma.org](mailto:aoverton@ntma.org) for a sample registration and directions.







## PRESIDENT'S UPDATE

DAVE TILSTONE / NTMA PRESIDENT

*As we look toward the future of manufacturing, workforce development immediately comes to mind. The lack of available skilled labor is a challenge we all face. As part of the NTMA strategy, it was agreed upon that the success of our industry is highly dependent on attracting the best talent to precision manufacturing. In order to accomplish this strategy, we must hire the best talent. Traditionally, manufacturing has been a male-dominated industry. If this trend continues, we limit ourselves by dramatically reducing the talent pool. Fortunately, things are changing. We see more and more women competing in the NRL, entering trade schools and graduating with engineering degrees. In support of women entering manufacturing, NTMA became involved with Women in Manufacturing™ (WiM).*



*WiM is a national association dedicated to supporting, promoting and inspiring women. NTMA's Tiffany Bryson has championed WiM since its inception and recently attended their national conference in Nashville. Below is a brief summary of the conference.*

### **MFG REDEFINED: ANOTHER SUCCESS FOR WiM'S ANNUAL WOMEN IN MANUFACTURING SUMMIT!**

The 6th annual Women in Manufacturing Summit was held September 19-21 in Nashville, TN. The annual summit is geared toward women who have chosen careers in manufacturing and want to share perspectives, network, and be inspired. The event brought over 300 professional women and men from across the US with titles ranging from production to CEO.

Attendees could tour places like the Nissan Smyrna Vehicle Assembly Plant, attend topic specific roundtables and participate in Minute Mentoring. The sum-

mit included an impressive line-up of keynote speakers including Tina Magazine, Marketing Strategist and Innovator

for The Goodyear Tire Rubber Company and Wamwari Waichungo, PhD, and VP of Global Scientific & Regulatory Affairs for The Coca-Cola Company.

Waichungo shared her perspective on Women in STEM and the staying power for tomorrow's future leaders. The open and honest dialog allowed attendees to share their stories and provided a plethora of takeaways from Waichungo.

Amy Elliott, PhD, Research Scientist, and millennial at the Department of Energy's Oak Ridge National Laboratory also presented. She currently focuses on binder jetting of metals and ceramics and creating new material systems for use in the binder jetting. She's a TED Talk speaker, reality television series star on Discovery, and co-host of a web series for the Science Channel. Elliott impressed the crowd with her relaxed stage presence and immense technical knowledge of 3-D printing.

Other highlights included the Minute Mentoring Workshop which was a welcomed addition to this year's summit. Minute Mentoring featured fast-paced mentoring sessions-- akin to speed dating-- for accomplished female leaders and rising stars. Attendees could also participate in panel discussions with industry leaders which were very informative. The summit brought together a broad range of genera-



tions sharing their perspectives, challenges and advice. Mark your calendars now for the 2017 summit, September 13-15, 2017 in Hartford, CT!

### **HOW IS THE NTMA SUPPORTING WOMEN IN MANUFACTURING?**

NTMA's National Account Manager, Tiffany Bryson has been a passionate champion of future and current women in the manufacturing industry. Tiffany sits on the Cleveland WiM Chapter board, joined the WiM SUMMIT Host Committee this year and facilitated 'The Art of Negotiation' roundtable at the event. The National Robotics League (NRL) stirred excitement with their interactive exhibit table at the summit and illustrated the importance of the program in growing our manufacturing workforce.

*Are you a NTMA women of manufacturing? I invite you to share your story and perspectives. Please contact Tiffany Bryson at [tbryson@ntma.org](mailto:tbryson@ntma.org).*

CONTINUED ON PAGE 5



# THE RECORD

## OPERATIONS & EDITORIAL

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Molly West, Editor

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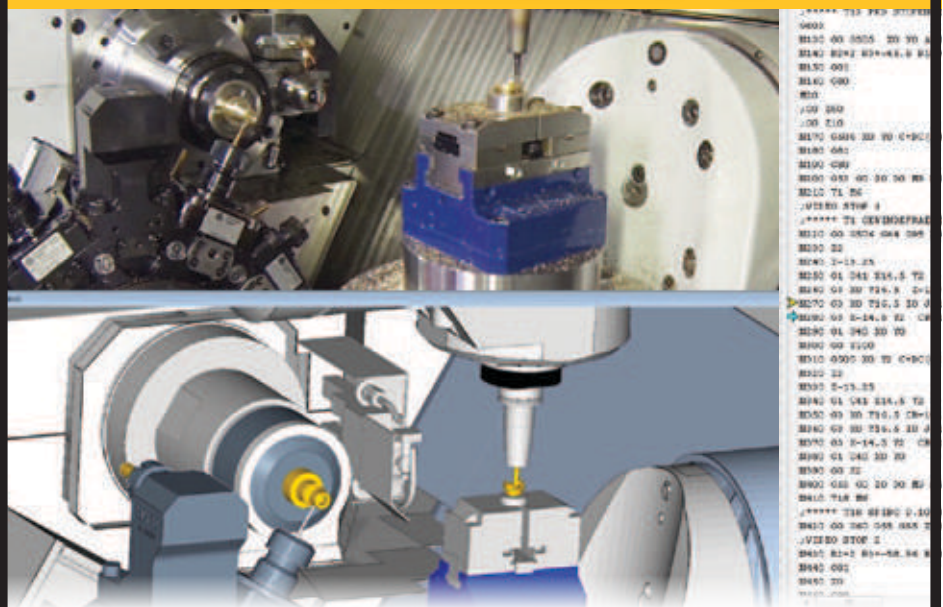
*If there are women in your organization, congratulations! You are leading the way in efforts to attract the best talent for your workforce, our industry and the future.*

DAVE TILSTONE / NTMA PRESIDENT

*Dave Tilstone*



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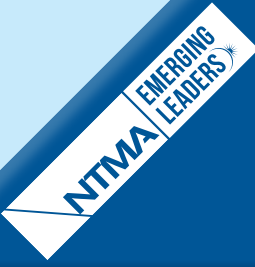
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## EMERGING LEADER SPOTLIGHT: SAMUEL B. GRIFFITH JR. - NATIONAL JET CO., INC.

FIRST AND SECOND GENERATION LEADERS: SAME COMPANY. SAME FAMILY. DIFFERENT PATHS TO LEADERSHIP.

BY KELLY KASNER, NTMA EMERGING LEADERS STAFF LIAISON

National Jet Company of Cumberland, Maryland is the embodiment of the family owned business. The company was purchased in 1992 by Sam and Pam Griffith with no prior experience of owning a manufacturing company. Over the years, Mr. Griffith leaned on his family, team, passion and integrity to grow the business. He comes to work at the office every day handling most of the scheduling, equipment purchasing, personnel and accounting issues.

Under Griffith's leadership, National Jet Company is not just a family business; it is a family-friendly business. They celebrate employees' personal milestones. There is a quarterly pancake breakfast where bonus checks are passed out. There is always a company Christmas party and frequently a company sponsored trip to amusement parks with entire families. It is a typical family-run business, and it's a great place to work.

While Mr. Griffith is in no hurry to retire, it is time to start preparing for the next generation to run this business. In June 2014, National Jet Company welcomed Griffith's son, Sam Jr. to the organization.

The younger Griffith is a 2011 graduate of the University of Maryland with a degree in mechanical engineering. He spent several years working for a firm in the Washington D.C. area, but now, the National Jet Company team is pleased to have him on board. His current capacity is Special Projects Engineer, and over time, he hopes to work with each of the departments in the shop as well as learning front office administrative functions.

For National Jet Company, it's a win-win. The company gains from the



younger Griffith's state-of-the-art skill-set, while continuing to benefit from the elder Griffith's experience. The father-son team works daily to improve processes and capabilities. Preparing for the next generation of leaders in micro hole manufacturing, the future looks very bright for National Jet Company.

Many people and companies still know National Jet Company as a U.S. company that specializes in making spinnerettes for the man-made fiber industry, still a big market for National Jet. They make spinnerettes for carpet fiber manufacturers, spinnerettes for artificial grass, outdoor furniture, and fishing line. In addition, National Jet makes spinnerettes for spunbond fiber, meltblown, filtration, slit film and specialty markets.

Interestingly, over the last 2 decades National Jet has also become a world leader in the manufacturing of parts for other industries. They now make nozzles

for 3-D printers, ink jet printers and industrial glue dispensers. They also make parts for the solar panel industry, the medical industry, aerospace and telecommunications industries as well as parts for defense contractors.

The Griffith men recognize the value of developing authentic leadership and team building by engaging in a network of like-minded people and learning from one another. Both are active in NTMA and the NTMA Emerging Leaders network. The NTMA values National Jet's membership and appreciates the contribution both of these men make to the association and industry.

Source: [najet.com/stories](http://najet.com/stories)



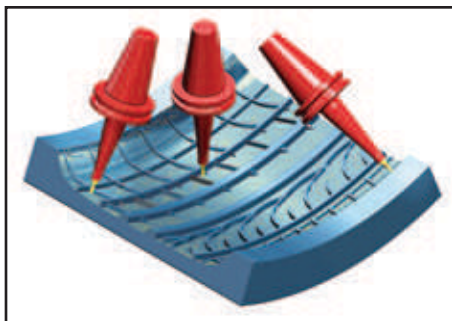


# GAINING TRACTION

A MAJOR TIRE MANUFACTURER IMPROVES ITS TOOLPATH VERIFICATION PROCESSES WITH VERICUT

BY KIP HANSON

Over one billion of them are produced each year-- complex structures of rubber, chemicals, carbon black, fabric, and wire. Each contains several steel belts, dozens of plies and a thousand or more high strength fiber cords. They keep us and our families safe, yet most of us don't give them a second thought until we are sliding on ice, hydroplaning during a rainstorm or sitting on the side of the road with a flat. For the folks at a major tire manufacturer, however, designing and manufacturing good tires is a way of life.

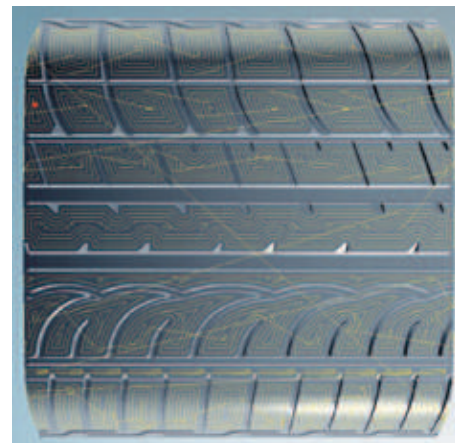


## IN THE GROOVE

Look closely at the tires on your car. What appears at first to be a regular pattern of grooves and crosshatching is actually an intricate series of segments that vary in design and circumferential width. Depending on the tire size, manufacturer and anticipated use, there may be just a handful of these segments or dozens or more. Each segment repeats itself at known locations around the tire circumference, like the hands on a clock.

The creation and layout of these patterns is difficult, time consuming work. Each segment corresponds to a mold section that must be precisely machined to assure alignment to its adjacent mold components. The resulting toolpaths may consume gigabytes of data and take tens of hours to generate. Until a few years ago, tire companies had no easy way to verify that each toolpath was correct.

This has long been the challenge faced by the CNC programmers who have re-



lied for years on a combination of CAD and CAM systems.

## A BIG HELP

The situation became far less worrisome when the one major tire manufacturer implemented California-based CGTech's VERICUT toolpath simulation software. The programming team mem-

CONTINUED ON PAGE 9



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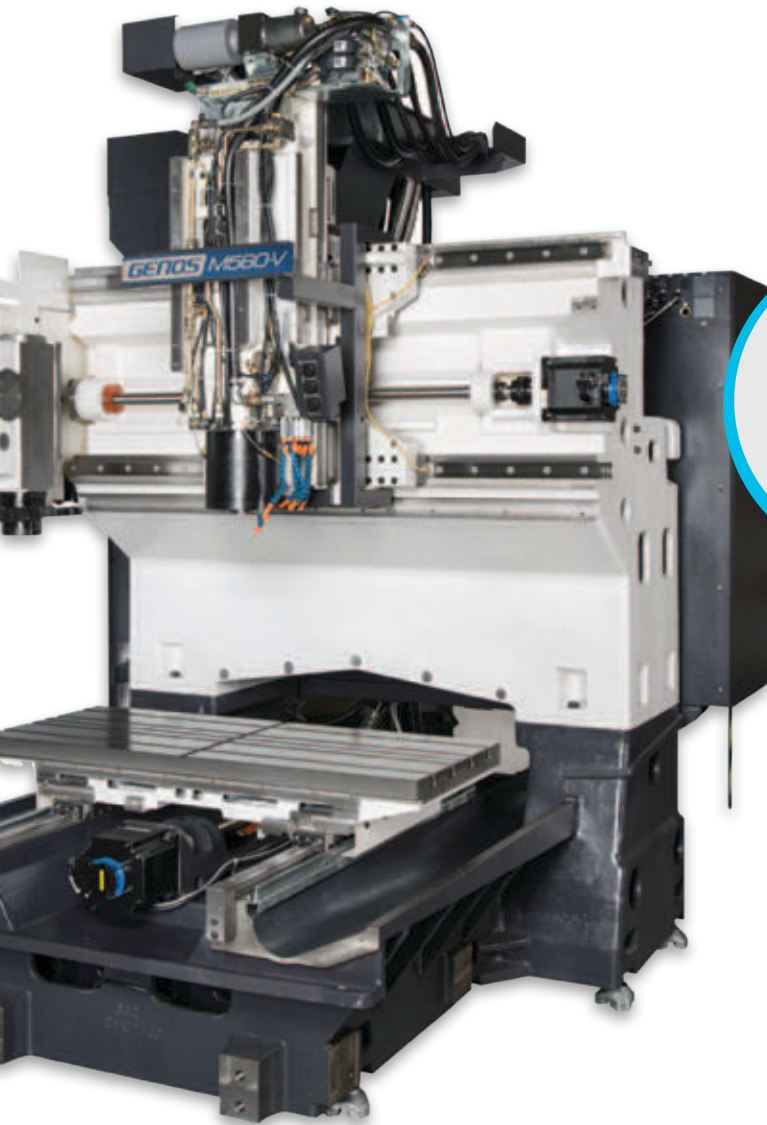
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bers were now able to visually check for gouging and misalignment between sections, and were confident there would be no collisions once the program was sent to the shop floor. Still, it was a lengthy process.

Once the toolpaths were simulated and verified, a run sheet was automatically populated for use on the shop floor. This solution provided what was needed for several years, but any changes to the tool, toolholder or machine component, or even hardware and software version upgrades, were very time consuming to implement.

The tire company looked to further refine the process and turned to VERICUT partner, OPEN MIND Technologies USA Inc., Needham, Mass. OPEN MIND is the developer of the hyperMILL CAM solution. Managing director Alan Levine and his applications team demonstrated the programming and cutting of a tire mold segment in hyperMILL using a special application package appropriately named “the tyre module,” designed specifically for tire manufacturers.

“Many people don’t realize it, but tire manufacturing is one of the most challenging from a programming perspec-

tive,” notes Levine. “There are car tires and truck tires and racing tires and everyone does things a little differently, but they all have this variable pattern running around the circumference of the tire. So you have these huge molds with multiple unique segments. You don’t want to program all of that as a single CAM file because it would take endless amounts of computer memory, processing time, and so on. Instead, we program them as ‘pitches,’ and have created logic to manage the timing and spacing of the pitches as they travel around the mold.”

#### ROUND THE CLOCK

Levine explains that the transition between each mold section is automatically checked for interference and linked according to a “tire clock” that determines the harmonics—i.e. road noise—and other operational dynamics such as traction, load bearing capacity, braking distance and so on of each tire model.

How did all this work with VERICUT? Levine says the answer is simple. “We make good tool paths and our customers want to check them. Sometimes that can be done in hyperMILL, but if you need to check interference against accurately modeled machine tool components,

oddly-sized fixtures, that sort of thing, VERICUT makes a lot of sense.”

#### ROLLING IT UP

OPEN MIND applications engineer Alan Zielinski, who worked with company employees during the hyperMILL implementation, adds another point. “Our software does a great job of tying it all together and posting the correct toolpaths, but VERICUT simulates the actual G-code that the machine reads. This is an important feature to this tire manufacturer.”

The tire company is now able to launch a VERICUT project file—which contains tool, stock, fixture and design geometry directly from the hyperMILL CAM system. Additionally, they firmly believe it is always best to verify a post-processed toolpath, and the partnership between OPEN MIND and CGTech has given them an integrated toolpath verification solution. This capability has provided a substantial benefit to this tire manufacturer.





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# TOYOTA RACING DEVELOPMENT PUTS THE 'AUTO' IN AUTOMATION

BY KIP HANSON, CONTENT PROVIDED BY GF MACHINING SOLUTIONS

Obsolescence in auto racing is wasteful and costly, so the faster Toyota Racing Development (TRD) USA Inc. can manufacture, the less chance its highly engineered race engine components will become obsolete. GF Machining Solutions helps boost TRD's production speed and puts the shop in a prime position for future increases in demand.

Speed in part production provides the race engine builder's engineering group more time to develop and test new and improved components and ultimately achieve higher performance on the track. This need for speed drove TRD to completely rebuild its Costa Mesa, California, manufacturing

Sprint Cup Series Championship with driver Kyle Busch and the 2016 Daytona 500 with driver Denny Hamlin. TRD's headquarters in Costa Mesa, California, encompasses two buildings and employs over 200 people.

For the 2016 NASCAR Sprint Cup Series, TRD supplies engines to five Toyota Racing Camrys, manufacturing all the core components of its engines. And, with the recent addition of high-speed, high-precision GF Machining Solutions Mikron Mill machining centers and System 3R Automation, TRD's manufacturing is positioned to meet future increases in demand.

"We have the ability to produce over 400 racing engines per year," said Ozmai. "That production includes engines for race and team test events, as well as those for internal TRD research and development. The dynamic development environment paired with a 40-hour-plus week schedule create an ever-changing demand for precision manufactured components in the shortest possible lead time. The added flexibility and precision of the Mikron Mill machining centers within a new automated manufacturing cell allows us to keep pace in such a dynamic manufacturing environment."

Within TRD's automated manufacturing cell, one rail-guided robot works from 100 open pallet positions to serve seven full five-axis Mikron Mill Milling machines: six HPM 800U HDs and the HPM 1350U.

## STAYING AHEAD OF COMPETITORS

The high-performance Mikron HPM 450U processes TRD's smaller engine components. With a rotary/ tilt table, providing unencumbered, interference-free machining, it is well suited for universal, automated



One rail-guided robot works from 100 open pallet positions to serve seven full five-axis Mikron Mill

production. On the Mikron HPM 800U HD (High Dynamics) high performance machining centers which deliver 1g acceleration rates, TRD mills mostly engine cylinder heads. For heavy-duty machining of its cylinder blocks, TRD is in the final stages of qualifying the Mikron HPM 1350U with 1,100 mm (43.30 in.) diameter rotary table and a load capacity of up to 1,500 kg (3,306.9 lbs).

Part machining cycle times at TRD can range from a few minutes to as long as 15 hours. Average part sizes run between 25.4 mm (1.00 in.) and up around 508 mm (20 in.) in any one dimension, with tolerances as tight as 5 microns or less. Many parts require full simultaneous five-axis machining of contoured surfaces; for others, five-axis motion simply provides better part accessibility and fixturing for faster and more accurate production.

Today, with GF Machining Solutions' machining centers and Automation, TRD is much more productive with the same amount of capital equipment.

"With the Automation and five-axis machining, we have gained the flexibility and confidence—due to the accuracy and performance consistency of the Mikron Mills—to now produce any one of our parts on any one of our machines without skipping a beat," Ozmai said. "With the advanced machine tool technology and exceptional support from GF Machining Solutions, we are well on our way in achieving a level of production to stay ahead of the competition."

*Kip Hanson is a freelance writer and manufacturing consultant based in Tuscon, Ariz. with more than 35 years experience in manufacturing, management and IT.*



TRD has the ability to build more than 400 racing engines per year

facility and incorporate a highly advanced, fully automated machining cell. The cell also gives TRD part processing flexibility, consistency and precision as well as increasing overall output.

For flexibility, TRD's Automation allows it to pull a machine "offline" from the cell as needed and use it independently for regular production tasks such as part development or simply to run occasional parts requiring manual loading.

## HIGHER PRECISION, GREATER OUTPUT.

According to TRD Group Vice President of Operations Greg Ozmai, the main manufacturing benefit of the cell is that it has increased the level of component precision and output capacity—including greater lights-out production—to provide maximum time for component engineering.

TRD's primary focus is on race engines for Toyota's NASCAR Sprint Cup Series program. Toyota, TRD and team partner Joe Gibbs Racing won the 2015 NASCAR







WORKFORCE  
DEVELOPMENT

## PA TEACHER CHAMPIONS THE MAKERS MOVEMENT TOUCHING MORE THAN 100 SCHOOLS

BY BILL PADNOS, DIRECTOR OF NTMA YOUTH ENGAGEMENT

When BattleBots first aired on television, it was simply about entertainment. The show featured homemade remote controlled robots squaring off in a competitive arena. As the show developed a strong fan base, high school students wanted to get in on this robotic action. The owners of BattleBots established the Bots IQ program hoping to re-engineer education by bringing STEM (science, technology, engineering and mathematics) to life. Since then, the National Robotics League (NRL) has stepped in to take over this innovative program by creating curricular resources and helping to establish new programs in regions across the country.

For the past 15 years, students in Kirk Marshall's Robotic Design class have been

building some of the country's most innovative and best engineered robots in the NRL. Marshall discovered when students get excited about building combative robots, they actually take their education into their own hands. Students learn advanced hands-on design skills in SolidWorks, Mastercam programming and innovative CNC machining techniques that they can use to manufacture their robots while hoping to gain an advantage over their opponents.

Marshall said, "I like to think of this robotic engineering program as athletics for the mind."

Student teams collaborate, practice and

work together to design and manufacture robots with both offensive and defensive capabilities necessary to beat their opponents in the arena. For a robotic team to reign as champions, they need to work together managing their time, materials resources and money. Marshall's students leave his class with valuable life skills that have served them well after graduation.

However, this exciting educational course is not isolated to Marshall's classroom, he has been instrumental in bringing this "Smart Sport" to life. As Pennsylvania's

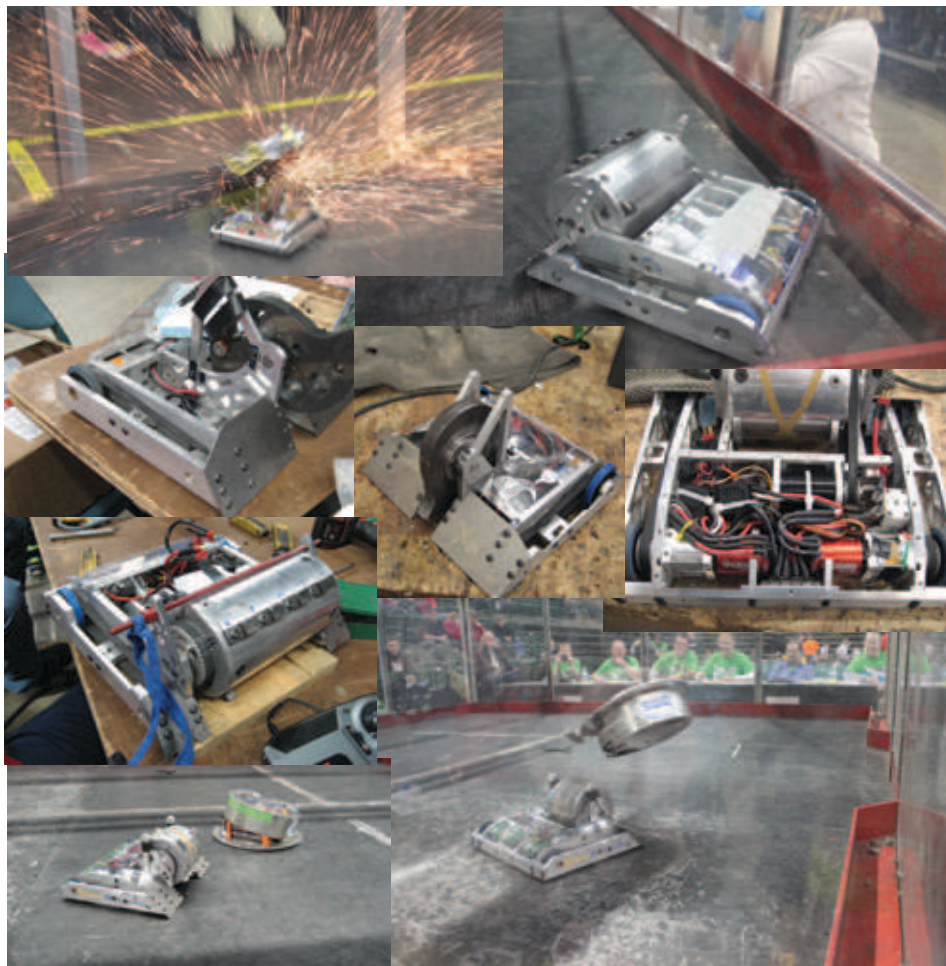
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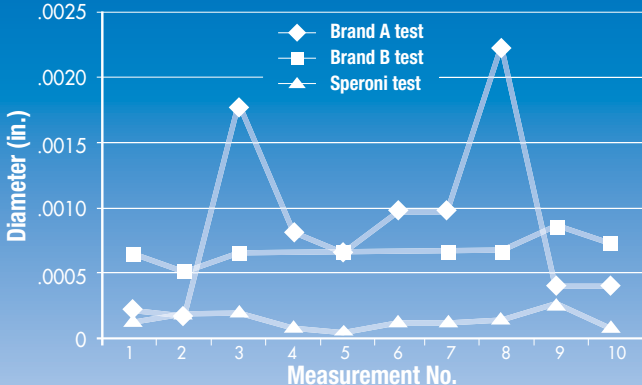
first school to implement this robotic curriculum, he has helped the NTMA bring this program to over 100 schools in the western part of the state. Marshall is now focusing his attention to bring the National Robotics League opportunities to Central and Eastern PA.

In 2013, with financial assistance from the Alcoa Foundation and a material donation from Beyer Material Science, Kirk Marshall and his students were able to design and manufacture their own robotic arena. They hosted their first Rage-in-the-Cage Tournament that included over 50 students. This spring, they are expecting to bring at least five new schools into their regional program now numbering close to 150 student participants. This grass roots effort is bringing new excitement to central PA and changing the way engineering education is being taught. With support from local NTMA members, Marshall hopes he can capture the interest of schools in the eastern part of the state. He is on a mission to help students make educated career decisions which will directly affect the skill set of future manufacturing employees.





### Gauge Repeatability and Reproducibility



Measurement No.	Brand A test (in.)	Brand B test (in.)	Speroni test (in.)
1	0.0002	0.0007	0.0001
2	0.0001	0.0005	0.0002
3	0.0018	0.0007	0.0001
4	0.0008	0.0007	0.0001
5	0.0007	0.0007	0.0001
6	0.0010	0.0007	0.0001
7	0.0010	0.0007	0.0001
8	0.0022	0.0007	0.0001
9	0.0004	0.0008	0.0002
10	0.0004	0.0007	0.0001

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# A DAY TO OPEN DOORS AND OPEN MINDS

MANUFACTURING DAY 2016

*From Brownsville, Texas to Anchorage Alaska and from San Francisco, Calif. to Maple, N.C., American manufacturers hosted 2,585 Manufacturing Day events this year. They opened their doors to open minds about the importance of manufacturing in this country now, and in the future. Many guests were young people and students on the brink of making career choices that could place them decidedly in our*

*industry workforce. Don't be fooled. While students saw the newest and most exciting technology that manufacturers had to offer, this wasn't a dog-and-pony show. This was a massive workforce development event, and as reported by our participating NTMA companies, it was-- by all accounts-- a success. Here's a sampling of member events from across the nation.*



## AXXIS CORP

PERRIS, CA

CONTRIBUTED BY BRIAN GRIGSON



We utilized the information that was provided at [www.nist.gov](http://www.nist.gov) and passed that along to the youth. I focused primarily on the "Facts About Manufacturing," "What Manufacturing Really Looks Like" and "Manufacturing in America" (three really great slides). I had EXCELLENT response, questions and feedback from the students as well as the teachers. After that we took a detailed shop tour and I had arranged for our Makino A61NX machine to be ready so each student could run their own part from start to finish (loading, unloading pushing the button). I got the best and strongest reaction from this. All the kids had their phones out taking videos, posing for pictures with their part that they made and then spreading the word about MFG Day all over their social media!!

Great Event and a Great Day. We couldn't be more proud to participate.



Students from Val Verde HS tour Axxis Corp.

## M&S CENTERLESS GRINDING

HATBORO, PA

CONTRIBUTED BY SUE COLRAN



M&S Centerless Grinding celebrated Manufacturing Day 2016 by hosting 61 students from Hatboro Horsham and Norristown Area School Districts located in Montgomery County, PA. The students received a tour through our facility and had the opportunity to speak with John Shegda; president, and Michelle Martin; operations director about how M&S runs as a company based on our values and the role each of our employees play in our success. Family members, customers and government officials also visited throughout the day. We feel so fortunate to have a day set aside annually to celebrate our industry.

A member of the M&S team offers insight to visiting students



## JD MACHINE

OGDEN, UT

CONTRIBUTED BY MADDIE DAHL



Kicking off Manufacturing Week, JD Machine hosted a well-received open house on Monday, October 3. The company invited area junior high students to visit their operation.



Junior high school students visit JD Machine in Ogden, UT

## FLOHR MACHINE

BARBERTON, OH



Flohr Machine in Barberton welcomed students to visit on October 7, 2016. More than 100 students from multiple school districts visited the company to learn about manufacturing.



Wadsworth students visit Flohr Machine

## NEW CENTURY CAREERS

PITTSBURGH, PA

CONTRIBUTED BY KATIE DELVERNE



On October 5, New Century Careers, a southwestern Pennsylvania training and workforce development non-profit, invited the public to visit their Training Innovation Center. Approximately

60 people attended the event which included interactive tours with demonstrations showing visitors pathways to successful manufacturing careers and the educational programs and training that New Century Careers provides. During the open house, the organization was awarded two separate \$10,000 grant checks from Kennametal Foundation and the Gene Haas Foundation.



Paul Anselmo of New Century Careers accepts a grant from Chris Merlin of the Kennametal Foundation



Visitors toured NCC's Training Innovation Center. (above and below)



# IN THEIR OWN WORDS: TWO HIGH SCHOOL ROBOTICS STUDENTS TAKE ON IMTS 2016

## WHAT AN EXPERIENCE AT IMTS 2016!

BY MARGARET SCHIFFER AND ROSIE SIRK,  
BEAUMONT SCHOOL ROBOTICS

In early September, two members of Beaumont School's Robotics team traveled to Chicago to participate in the International Manufacturing Technology Show (IMTS). The IMTS is a bi-annual trade show – one of the largest in the world – where the latest technological advances are showcased alongside new manufacturing breakthroughs. Bill Padnos, the NTMA Director of Youth Engagement, invited us to represent the National Robotics League (NRL) and to present our robot, "Stobor," at the NTMA/NRL booth. We were extremely excited to demo our bot for other attendees as well as discuss the program's impact on our views of manufacturing.

We arrived from Cleveland on Sunday evening and enthusiastically explored the city. It was quite apparent that many guests at our hotel would also be attending IMTS. Our excitement heightened on Monday morning as we headed for the Hyatt McCormick Place. Upon arrival, we noted that IMTS was much larger than what we had expected. It hosted both big name companies and less recognizable ones. The atmosphere was one of high-energy and high-tech expertise.

Most of Monday was spent at the NRL and NTMA booth discussing our robotics experiences and showing off our bot to those in attendance. When the weapon fired up, its noise attracted many people

to the booth. They were excited to watch – and some were lucky enough to drive – our bot as it destroyed several key-boards. In addition to demonstrating Stobor's power, we also spent a few hours on Monday afternoon assembling an Armadillo kit bot. It took some major problem solving skills to assemble it without the necessary tools and in the absence of detailed directions, but we were able to completely build the wedge bot and successfully drive it.

Tuesday proved to be another exciting and highly-educational day. We eagerly explored many other showrooms at IMTS. Our teacher and mentor, Mrs. Santo, accompanied us to check out the Student Summit where Margaret had the opportunity to design, 3-D print, and then test a mini rocket. With great interest and concentration, Rosie learned how to operate heavy machinery with a remote control. Afterwards, we visited the



3-D printed car room to check out *Strati*, the 3-D printed all-electric car which was created at the 2014 IMTS. Our next planned adventure was to ride on *Olli*, the new driverless electric bus that is powered by an IBM Watson computer. Unfortunately for us, *Olli* was recharg-

ing its batteries or we would most definitely have taken a ride. In spite of that disappointment, we still successfully earned autonomous drivers' licenses.

In the afternoon, we had the privilege of meeting and thanking the NTMA Executive Committee, discussing with them our RoboBots experiences and our plans for the future. We really enjoyed explain-

ing how much we value our experiences with the NRL and pointing out our pride in the documentation skills we have learned. We now know how important documentation is in the manufacturing world. Our current motto is, "If it isn't documented, it didn't happen." Additionally, we loved describing how we decided on a name for our past year's bot, Stobor. Rosie explained how we reverse engineered the process through analyzing past competitions and previous bots' successes and failures. Because of that experience of looking back, we named our robot Stobor, which is robots backwards.

The NRL and involved students depend on sponsors to continue these yearly competitions. Beaumont's robotics team has been extremely fortunate to have been sponsored by Christopher Tool and Manufacturing for six years. Without their help, we would not have realized so much success. In addition to guiding us in the design, engineering, and manufacturing processes, our mentors have inspired us to consider careers in engineering and manufacturing. We would like to thank Mr. Patrick Christopher and our mentors, Joe Gerdes, Jim Colantuono, and Adam Lommler, for their guidance, encouragement, and generosity as we compete again this upcoming year.

At IMTS, our nametags said that we were *Future Customers*. Rosie and I look forward to that identity: attending as customers in future years. We are so thankful for the opportunity to be part of such an impressive international gathering of manufacturers. Now we are back in Cleveland, preparing to begin another year of designing and building a 15-pound combat robot for the National Robotics League Competition in the spring. With all the encouragement and support we have, we know our bot is bound for victory!





## PHILADELPHIA DELAWARE VALLEY NTMA BRINGS MANUFACTURING ADVOCACY SERIES TO THE REGION

BY SUE COLRAN, M&S CENTERLESS GRINDING, INC.



On Wednesday September 28, the second Manufacturing Advocacy Series was held at the Valley Forge Casino. This event presented by the Delaware Valley NTMA, in conjunction with the regional Manufacturing Alliances, is designed to exchange valuable information within our manufacturing community. A poll of attendees from Philadelphia and surrounding counties, Delaware and New Jersey, revealed that this event was both timely and effective.



The audience was first told of upcoming manufacturing events, and initiatives that were pertinent to them. There were also two featured speakers. The first speaker was Scott Schmidt, principal of the Black Line Group. Schmidt discussed how the recent enhancements made to the R&D Tax Credit will significantly allow more manufacturing companies to claim the credit starting in 2016. The second keynote speaker was

Omar S. Nashashibi, who is a Founding Partner with The Franklin Partnership, a bipartisan lobbying firm based in Washington, D.C.. The NTMA retained Nashashibi's firm to be the voice of the industry in Washington. Nashashibi gave a compelling (while entertaining) view of

how the House of Representatives and the Senate are affecting change. He reviewed the stricter stance OSHA will be taking in the upcoming months, along with top House and Senate races. He shared his insights on the presidential election, while summing everything up with what it means to manufacturing.

**"I WANT TO THANK YOU VERY MUCH FOR INVITING ME TO THE MEETING YESTERDAY. IT WAS VERY BENEFICIAL WITH LOADS OF INFORMATION TO HELP OUR BUSINESS. ...THIS WAS VERY HELPFUL AND I MADE MANY CONTACTS FOR THE FUTURE."**

Richard Hurst, XL Precision Technologies, Inc

The response was so positive from the first two events of the Manufacturing Advocacy Series, that this event is now slated to be held twice annually. The next Manufacturing Advocacy Series will be held in the spring of 2017.



## RESHORING: THE TREND FROM GLOBALIZATION TO LOCALIZATION

BY HARRY MOSER, PRESIDENT AT RESHORING INITIATIVE

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### OVERVIEW

From the manufacturing employment low of February 2010 through the second quarter of 2016, more than 265,000 manufacturing jobs have been brought from offshore, about 30 percent of the growth in manufacturing jobs in that period. The annual count was off 6 percent from 2014 due to recently stronger headwinds such as: a very strong dollar; low oil prices and shipping rates; and most competitor countries having weaker economies than the U.S.

Recently, FDI has been stronger than reshoring. Both trends are based on the logic of producing in the local market, generally known as localization. One reason FDI has a higher number of jobs is definitional. If a U.S. company, e.g. GM, expands production in the U.S., we consider it expansion due to market growth, and we do not count it as reshoring unless the jobs were specifi-

Manufacturing Jobs/Year: The Bleeding Has Stopped			
	2000 - 2003 Annual average	2015	% Change
New Offshoring	~ 240,000*	60,000*	-75%
New Reshoring & FDI	12,000*	67,000**	+400%
Net Jobs Gained	~ -220,000	~ +0	N/A

\* Estimated \*\* Calculated - Reshoring Library through Dec 31, 2015

cally brought from offshore. However, we count all job increases by foreign companies (Toyota, for example). Also, foreign companies, especially the Japanese, appear

CONTINUED ON PAGE 19



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to have a better understanding of the lean benefits of local sourcing.

For the second year in a row the number of jobs returning to the U.S. equaled or slightly exceeded the number of jobs leaving. By comparison, in 2000-2007 the United States lost, net, about 220,000 manufacturing jobs per year to offshoring. The steady decrease in the net number of jobs lost per year, from 220,000 to zero, is consistent with the Labor Department's job statistics. Manufacturing employment as of December 31, 2015 is about 2.3 million higher than a regression curve from 1997, the beginning of the greatest offshoring surge, to 2009, the beginning of the reshoring surge, would forecast. Clearly we are offshoring less and reshoring more.

#### MAJOR DRIVERS OF RESHORING SUCCESS

Of particular interest are the reasons companies give for reshoring and FDI. Government incentives, proximity to customers, and skilled workforce topped the list in 2015 for positive reasons to bring work here. At the same time, companies cited lower quality, supply interruption (this category had the largest increase from 2014, perhaps due to the west coast dock labor dispute), high freight costs and delivery as leading problems offshore. Cumulatively since 2010, rising offshore wages and total cost have been the major drivers of reshoring decisions.

Structural tailwinds for reshoring include: ongoing wage increases in China and Vietnam; automation; and increasing consumer preference for Made in USA. Skilled workforce in the U.S. is improving, with credentials awarded by NIMS and MSSC rising 10 to 15 percent per year for the last decade.

The top three regions from which jobs are coming to the U.S. are Asia (primarily reshoring), Western Europe (primarily FDI), and North America (Canada and Mexico). Work moving from Asia to Mexico (near shoring) is another sourcing shift that is gaining strength, and is also a positive for U.S. manufacturers. Exports from Mexico have about 40 percent U.S. content vs. 5 percent for Chinese exports. The trend to shift jobs from offshore remained strongest in the Southeast and Texas, but in 2015 the West displaced the Midwest to hold second place. Cumulatively and in 2015, the strongest reshoring industry is Transportation Equipment, followed by Electrical Equipment and Appliances. Apparel is seeing the largest growth by percentage of company cases. About 60 per-

Country From	# of Jobs	# of Companies	Average # of Jobs/Facility
China	27694	285	97
Germany	26995	87	310
Japan	15885	77	206
Canada	8001	53	151
Mexico	7498	39	192
Korea	6442	16	403
Switzerland	4109	21	196
Spain	2710	11	246
Denmark	2620	9	291
United Kingdom	2212	19	116
United Arab Emirates	2172	2	1086
India	2015	24	84
Singapore	1700	1	1700
Sweden	1590	5	318
France	1513	14	108
Italy	1486	26	57
Austria	1230	6	205
Taiwan	1148	12	96

cent of all reshoring cases are from China. Walmart is having the biggest corporate impact on reshoring, via their \$250 billion commitment to supply more Made in USA products.

The logic of reshoring and local sourcing

applies to all countries, but countries that offshored more will have greater opportunities in reshoring. Other countries that are effectively focusing on reshoring include the UK, Canada, Netherlands, Australia, France, Italy, South Africa, Japan and Korea. Most of the reshoring in Europe is from Eastern Europe, which fills much of the role that Mexico and China do for the U.S. China has actually begun offshoring more work, but it is also focused on protecting and supplying its home market.

#### IMPLICATIONS FOR FUTURE U.S. RESHORING

Having brought back hundreds of thousands of manufacturing jobs despite the existing headwinds demonstrates that it is feasible for the U.S. to bring back mil-

CONTINUED ON PAGE 21

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# GROW YOUR VETERANS NETWORK TO CAPITALIZE ON AN UNDER UTILIZED TALENT POOL

BY BOB DORIGO JONES

Are your job advertisements attracting veterans? If they aren't, you're not alone. In a national survey by the nonprofit Center For America, 57 percent of employer respondents indicated that their job advertisements are not attracting veterans.

There are many effective nonprofits, state agencies and military employment transition organizations in your area which may be able to assist in your search for the right candidate. Be sure to share information about your open positions with these groups. You can also market directly to veterans. Many vets conduct internet research. Perhaps you can add a link to your job posting or description that outlines what makes this particular position and your company attractive to veterans. Some military-friendly attributes may include: future career growth supported by training or in-house mentoring, an emphasis on teamwork, and your commitment to diversity. Since veterans are accustomed to the transparency and clarity on these topics in the military, the more specific you can be, the better.

However, when it comes to connecting with vets, other veterans may be your best solution. Veterans want to help other veterans find good full-time jobs. Most veterans maintain close contact with other veterans through a wide range of organizations and events. They know friends and acquaintances who are looking for good jobs. They also have good instincts about who in their network would have an interest in a particu-

lar job as well as the skills and experience necessary.

Use your veteran contacts to connect with vets on a personal level--never underestimate your own networking potential with the veteran community. You have an advantage over all other sources—a strong understanding of your requirements and company culture.

Tapping into your local veteran network isn't hard. Start by identifying veterans



among your employees, your retirees and your suppliers. Share a written description of the job and the qualifications you'd like to fill. Then, simply ask for their assistance. They can pass this along to their vet contacts and get the word out.

Developing a word-of-mouth network works most effectively when your veteran contacts understand why your jobs and your company are a good fit for people with a military background. Equip your contacts to confidently advocate for your company with other veterans. Veterans making a transition to a civilian job may know little about your industries and less about

specific companies.

The time you spend developing a word-of-mouth network among veterans will have cumulative benefits over the coming months and years. The more your veteran contacts learn about you and your company, the more they will want to recommend candidates to you. The more you learn about veterans, the more effectively you can gain their interest. Your veteran network can also pro-

vide feedback about your job postings and provide valuable input as you reach out to the vet community.

Developing your veteran network is also budget friendly. Veterans who informally help you with open jobs are not looking for fees. They simply want to be confident that your intentions are honorable and that your company is offering good jobs. Some veterans may invite you to attend a meeting or event their veterans' organization is planning. This is a great opportunity to make many friends and learn a lot about how veterans view your company and the jobs it offers.

Tapping into the veteran

network can also be very efficient. We know one owner of a small firm who needed to hire several employees. She wanted to find people who could do the work, but also put a high premium on people who work well on teams. The owner did not have a lot of time or patience to devote to recruiting new people. She went to one of her most reliable managers who she knew served in an Army Reserve unit and asked him to reach out to others in his Reserve unit. The manager asked her to give him a description of the position to take to the next meeting of his Reserve unit. He passed out copies of the description at the meeting and spoke to a few people. By the end of the weekend, the manager had identified several people who were interested in talking to his firm.

A veteran network is a win-win strategy. You communicate to your organization stakeholders that you value their qualities associated with military service and you create a new pipeline of potential military candidates.

*Bob Dorigo Jones is a Senior Fellow at Center for America. Visit [www.CenterForAmerica.org](http://www.CenterForAmerica.org) to access free employer guides, webinars and presentations with practical tips for hiring veterans, National Guard members and reservists, and learn how you can benefit from the American Jobs for America's Heroes campaign. [Bob@CenterForAmerica.org](mailto:Bob@CenterForAmerica.org)*





lions more if the playing field were leveled. Leveling the playing field would require reducing some or all of these barriers: dollar consistently about 30 percent to 40 percent too high; currency manipulation by some countries; insufficient skilled workforce recruitment and training; highest corporate tax rate; no VAT (Value Added Tax); too many corporations buying on the basis of wage rates and ex-works price instead of total cost; and imbalances in the terms and enforcement of our trade agreements.

The benefit of Industry 4.0 for U.S. companies is the increased productivity that enables more flexible and efficient processes to produce higher-quality goods at reduced costs. Productivity reduces the disadvantage of high U.S. labor costs. Flexibility increases the advantage of producing in the market. Companies will see more benefit in proportion to the degree of corporate investment in the nine technologies that, per Boston Consulting Group, are transforming industrial production:

- Big data and analytics
- Robots/automation
- Simulation
- Horizontal and Vertical System Integration

- The Industrial Internet of Things (Iot)
- Cyber Security
- The Cloud
- Additive Manufacturing
- Augmented Reality

Alternative energy sources, virtual and augmented reality communications, and sophisticated local food-production systems all will also support the localization trend.

We need the government to overcome the barriers listed above. While we wait for our new president to resolve these issues, companies can focus on bringing back the 25 percent of offshore work that is reshoreable today. The most important tool to achieve this goal is total cost of ownership (TCO) analysis.

TCO is defined as the total of all relevant costs associated with making or sourcing a product domestically or offshore. TCO quantifies and forecasts current period costs and best estimates of relevant future costs, risks and strategic impacts of local vs. offshore production, making it possible to evaluate whether reshoring or offshoring is the best choice. Retailers and distributors as well as OEMs and contract manufacturers can benefit from better

understanding the cost factors of offshore products, and reevaluating their own domestic vs. offshore mix.

In summary, reshoring can position your company to best serve your home market, both now and as markets continue to evolve towards greater localization. The winning national strategy is to balance the trade deficit via a national program of competitive currency and lower corporate taxes. Additionally, we need to see corporate commitment to new technology, skills training and increased use of total cost for sourcing and plant siting decisions. By eliminating our trade deficit, we will increase U.S. manufacturing by 25 percent, curtail unemployment and the budget deficit, improve income equality, strengthen our defense industry and motivate skilled workforce recruitment. Such an approach offers shared benefits for companies, employees, customers and the country.

For full trend details, read: Reshoring Initiative Data Report: Reshoring and FDI Continue Strong in 2015. Find free tools and data at [www.reshorennow.org](http://www.reshorennow.org). To read the original article: <http://industrytoday.com/FlippingBook/19.4/#50>



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# FUN WITH A PURPOSE: TWO CHAPTERS RAISE MONEY FOR MANUFACTURING EDUCATION

## INDIANA CHAPTER

SUBMITTED BY ALICE OVERTON  
CHAPTER EXECUTIVE, INTMA



On Wednesday, September 21, 2016 the Indiana Chapter of NTMA held their Annual INTMA Golf Outing as a fund raiser for the INTMA Scholarship and Education Foundation. We are pleased to report over \$25,000 was raised to benefit INTMA 2017 Scholarships and Education Events to promote the Machining Industry.

There were 64 golfers enjoying a beautiful Indiana day and at the same time supporting the INTMA and their efforts to train the workforce.

We appreciate all of the sponsorships including Federated Insurance, Dinner Sponsor, \$2,500 contribution. Major Tool & Machine, Inc. and Overton Industries donated \$1,000 each and many \$250 hole sponsorships and donations. Thanks to Boyer Machine & Tool Co. for contributing 4 Pacer Tickets to the raffle. Jeff Haggard of Haggard & Stocking established a new contest, Jump Drive Blind Raffle game. The contest not only provided advertising for all of our associate sponsors, but also offered a Grand Prize Kennedy Tool Box to one lucky winner donated by Haggard & Stocking. Other contests included the marshmallow drive, closest to the bucket, and a Mr. Potato Head prizes for last place. Fun was had by all!

**MANY THANKS TO THE MAJOR EVENT SPONSORS HURCO AND HAAS**



Left: INTMA President David Weyreter and Cory Miller



Below: INTMA President David Weyreter and Tim Taylor



Jeff Haggard, Haggard & Stocking



## NORTHERN UTAH CHAPTER

SUBMITTED BY MADDIE DAHL  
CHAPTER EXECUTIVE, NUNTMA



The NUNTMA held a golf tournament to spread awareness about their chapter, and their Apprenticeship Program, Machine Utah. Green fees were waived for all shop owners and an employee from every CNC Machine Shop in Utah. In total, 105 golfers attended the tournament at Stonebridge Golf Club, in West Valley, Utah.



**THE NUNTMA WOULD LIKE TO EXTEND A SPECIAL THANKS TO THE PLATINUM SPONSORS, NEW WEST AND MSC INDUSTRIAL SUPPLY.**





# THE DIFFERENCE BETWEEN REALIZING AVERAGE PERFORMANCE AND ACHIEVING EXCELLENCE

BY MICHAEL CANTY, BUSINESS UNIT DIRECTOR FOR SYNERGY RESOURCES BUSINESS PERFORMANCE SOLUTIONS GROUP

Discrete manufacturers face constant pressure to deliver a quality product on time, every time. Economic fluctuations, compliance mandates, skilled labor shortages, and the ever increasing costs of operation are only a few of the complexities manufacturers face every day.

Commonly it is found that owners and senior executives of small to mid-size manufacturers achieving higher levels of process consistency and operational excellence share the following characteristics;

1. They have developed a business blueprint, or what most call a **strategic business plan**.

2. They have a clearly defined **organizational structure** that is shared with and known to all employees.

3. They have developed **operational support systems** combining the benefits of **Lean** and the power of **ERP**. The objective of these systems is to support and make efficient all the activities of the organization.

4. They have established **training and job enrichment** programs as well as incentive compensation plans that are designed to encourage each associate to improve and contribute.

5. They **reward performance** by rewarding those who consistently contribute to continuous improvement and positive results. Most importantly, it also disciplines those who deviate from acceptable behavior. Positions, tasks, duties and responsibilities are defined and communicated and performance is routinely measured.

## SETTING THE FOUNDATION IN PLACE

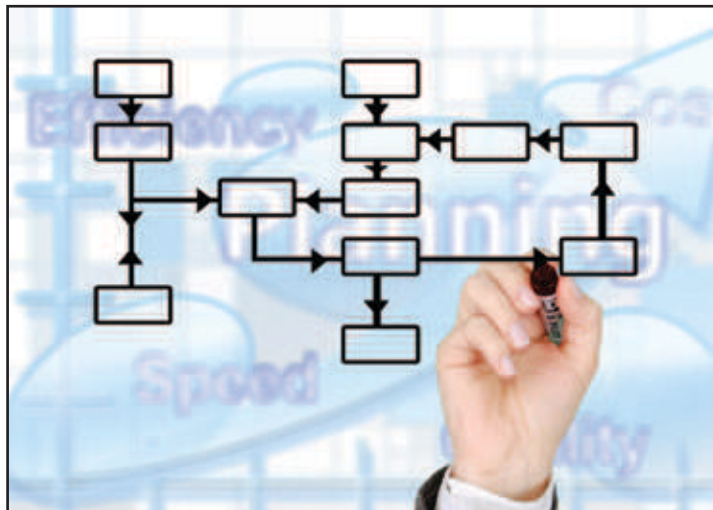
A strategic business plan clearly describes the business concept, the business mission and the owner's or company's philosophy of business. This document also sets forth personal and corporate goals with specific timelines and the recommended strategies to achieve them.

The organizational structure must include all the company's policies and

procedures as well as the positions, tasks, duties and responsibilities of the employees. This should be designed to encourage all employees to perform to their utmost capabilities and carefully communicated throughout the company at regular intervals.

## A SEAMLESS COLLABORATION

The operational support system has a significant impact on how training and job enrichment programs, as well as the performance reward programs are structured. Well structured, they also relieve management of many day-to-day routine activities, giving owners more time to be strategic thinkers.



Lean, a western adaptation of the Toyota Production System (TPS), is often considered to be an efficiency and productivity improvement practice. But the true TPS philosophy is founded on the singular focus of value added. To become Lean, a company must take a hard look at processes and practices to identify those things that truly add value for the customer and eliminate those that do not. The continuous pursuit of waste elimination is the essence of Lean. Production processes and activities alike can be directly addressed in this value vs. non-value added campaign. And it does not stop there! Lean can and should extend beyond the shop floor. Indirect activities such as logistics, administration, engineering, and warehousing, as well as other non-manufacturing activities can benefit as much from Lean thinking.

As Lean thinking has evolved and the concepts broadened, Lean advocates have come to recognize that **Enterprise Resource Planning (ERP)** and **Lean** work together very well – each supporting and enabling the most important objectives of the other. Likewise, leaders in ERP technology development today advise enterprises to recognize the fact that the manufacturing world is getting...Leaner.

In essence, Lean becomes the culture or behavior of the company and the ERP system become the central nervous system by which the company responds. With the ERP system carrying the definitions, the data, a record of the activities of the organization,

and providing the measurement system for determining where opportunities for improvement lie – it also provides the measuring progress of efforts to know where to effectively apply Lean to further reduce and eliminate waste.

## CAUTION - "DON'T GO-IT ALONE"

Reaching out to a trusted business improvement partner to realize your full potential has become a natural response for many small to mid-size manufacturing companies. Lean and ERP deployments

alike require extensive system knowledge and strong change management skills to achieve success. Business improvement partners with expertise in both Lean and ERP will ensure conflict does not become a roadblock to achieving excellence.

*About the author: Michael Canty is the Business Unit Director for Synergy Resources Business Performance Solutions group. Throughout his thirty plus years of service he has used his vast business knowledge and by applying various strategies, technologies, tools and methodologies, helped a large number of manufacturing companies develop and implement effective business strategies and processes leading to improved operational performance.*



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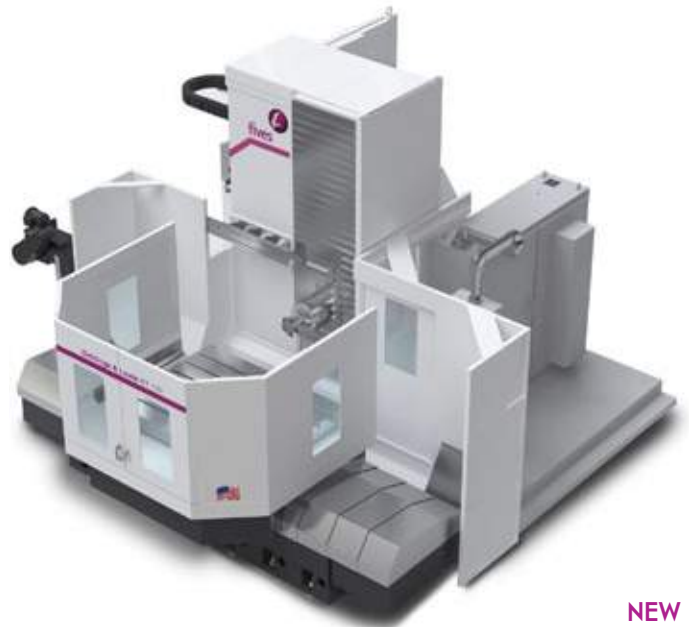
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# Think you can't afford a Giddings & Lewis VTC or HBM? Think again!



**Giddings & Lewis V Series**  
800 - 2500 mm tables



**NEW**  
**Giddings & Lewis T-Bed HBM**  
130 or 155 mm spindle

**Proudly designed and built in Fond du Lac, Wisconsin**

## **Very Affordable Prices** **Without Compromising Quality**

Fives Giddings & Lewis has a tradition of building rigid, accurate and reliable machine tools. The V Series and T-bed HBM carry on that tradition but at price levels that will appeal to every shop.

- Cast iron cross-braced construction
- Hydrostatics for added rigidity
- Flat floor installation

## **Financing Available** **NO PAYMENTS** for 5 months

Financing examples\*:

Giddings & Lewis V 800

**\$8,710** / month (60 months) turning only

**\$11,185** / month (60 months) live spindle

Giddings & Lewis RT 130

**\$16,200** / month (60 months)

\* Talk to a Fives representative for full financing details.

Fives Giddings & Lewis  
142 Doty Street, Fond du Lac, WI, 54935  
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ultimate factory



# 7 EXPECTATIONS FOR ENERGY CUSTOMER SERVICE

INFORMATION PROVIDED COURTESY OF NATIONAL ASSOCIATE MEMBER, APPI ENERGY

How would you rate your energy utility company's customer service? Have you ever called your utility company, or visited its website? A survey conducted by the Energy Research Council found that 30 percent of electricity consumers have experienced electricity billing problems. Billing errors, unauthorized changes to service, and opening or closing locations are just a few occurrences that cause customers to seek support.

Whether you procure energy from a utility company or from a retail supplier, or you trust an energy advisor to manage your supplier selection, what should you expect from customer service regarding your energy supply and consumption?

## **BILLING ACCURACY**

Customer service should verify bill accuracy and resolve billing errors and credit issues. A reliable customer service team can provide a courtesy evaluation of your most recent bill and help define each line item, including capacity charges and additional fees.

## **ENERGY EFFICIENCY PROJECTS**

Expect your customer service representative to evaluate utility programs and regulatory policies to identify opportunities for reimbursements and financial incentives that save you money. Many state governments offer financial incentives for planning and completing efficiency measures. A dependable customer service team can recommend efficiency experts to provide an energy audit of your facility.

## **DEMAND RESPONSE**

You can receive payment



for agreeing to voluntarily reduce energy consumption during periods of peak demand on the grid. Your customer service team can manage your enrollment and participation in a demand response program.

## **SLAMMING PROTECTION**

Slamming occurs when a misleading salesperson obtains your account information and terminates your supplier contract without your consent. If this happens to you, a dependable customer service representative would help you avoid early termination fees and reenroll dropped accounts without penalties or disruptions to your service. If you work with an energy advisor, longstanding relationships with suppliers should prompt many suppliers to notify your advisor when an account is dropped, often before you become aware.

## **ADD OR REMOVE METERS**

If your operation moves, expands, or needs to add or remove a meter, your customer service team should work with your supplier to adjust your existing account on your behalf.

## **BUY OR SELL PROPERTY**

If you buy or sell property

that is under contract with a retail energy supplier, a customer service team should work with your supplier and buyer or seller to ensure a smooth transition.

## **ENERGY SALES TAX EXEMPTION**

Most manufacturers qualify for energy sales tax

exemption. A customer service team should determine if you qualify, and secure refunds at no cost to you. Reimbursement for past paid taxes are possible.

## *Customer service excellence*

Since 2001, NTMA has endorsed consulting firm APPI Energy to interact on your behalf with utilities and suppliers to ensure smooth transactions. In 2015, APPI Energy resolved 747 customer service cases, including account changes, billing needs, and customer requests. The APPI Energy customer service team is available to provide courtesy evaluations and support. Contact Tracy McMenamy, Customer Service Manager, at 667-330-1157.



## **2016-17 NATIONAL EVENTS AND TECHNICAL SEMINARS**

**November 16th, 2016**

Plant Managers Roundtable, Denver, CO

**February 8th, 2017**

Plant Managers Roundtable, Boston, MA

**February 19th - 21st, 2017**

Chapter Leadership Summit, Austin, TX

**March 22nd - 25th, 2017**

The MFG Meeting, Amelia Island, FL

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**AN INVITATION  
FROM THE NTMA**



**What: NTMA Chapter Leadership Summit**

**When: February 19th-21st, 2017**

**Where: Austin, TX**

**Who: Chapter Presidents, Trustees & Chapter Executives**

***\*Free Registration and Hotel for First 50 Registrants\****