

NTMA 2015 Events

- Discounted rate available for those who register for both the Sales & Marketing Workshop and the Distribution Fair.

Time Is Money.

Start Here and SAVE!



1

Raw Stock

Requires sawing, milling, grinding, deburring, or wasteful machining in cycle.



2

Machine-Ready Blanks

Go directly from receiving to CNC machine.



3

Finished Part

The high value result—Up to 25% faster cycle time, chip-to-chip.

Make parts faster with TCI Machine-Ready Blanks.

- Custom made to order from one to thousands
- As close as +/- .0005" dimensionally and .0002" flatness, squareness and parallelism while minimizing material movement during CNC machining
- Deburred and clean; ready to load directly into your CNC machining center

Call today to discuss your next job. 800-234-5613.

Save On:



Material Prep Time



Set Up Time



CNC Cycle Time



tciprecision **PRECISION METALS**

Good Parts. On Time. Period.

www.tciprecision.com



ISO 9001 & AS 9100



MEMBER

TABLE OF CONTENTS

PRESIDENT'S UPDATE	4
ADVOCACY	
"AMBUSH ELECTION" RULES TO EASE EFFORTS FOR UNION ORGANIZING	
NEW NLRB RULES WENT INTO EFFECT IN APRIL	11
THE NEW NLRB "AMBUSH ELECTION" RULES BECAME EFFECTIVE ON	
APRIL 14, 2015	21
AWARDS	
2015 STEP AWARD HONOREE	6
2014 NTMA SAFETY AWARD WINNERS	27
CALENDAR OF EVENTS	1
COMPANY NEWS	
NEW WHITE PAPER FROM OKUMA DETAILS THE PRODUCTIVITY AND	
PROFITABILITY OF USING MACHINE TOOL APPS	25
ECONOMY	
MILITARY HIRING: NEW GUIDE ON TIPS BY EMPLOYERS, FOR EMPLOYERS	6
ENERGY OUTLOOK: A LOOK BACK, AND A LOOK AHEAD	19
SAVE AT LEAST 70% ON LTL FREIGHT SHIPMENTS ARRANGED THROUGH	
PARTNERSHIP®!	28
OCEC FINANCIAL BENCHMARKING STUDY	29
EDUCATION	
NTMA OFFERS A MECHANICAL APTITUDE TEST	3
NTMA MEMBER ADDED VALUE: NTMA-U DIMENSIONAL METROLOGY:	
APPLICATIONS AND TECHNIQUES	29
NATIONAL EVENTS	
THE 2015 SWISS TECHNOLOGY TOUR: EYE-OPENING AND INSPIRING	8-10
NATIONAL ROBOTICS LEAGUE	
SCARY NUMBERS THAT ONLY YOU CAN CHANGE	13
KANSAS CITY LAUNCHES NEW NRL COMPETITION	14
AMAZED BY THE ROBOTS IN NW PENNSYLVANIA	14
WEBER HIGH'S BATTLE ROBOT 'BRUCE' CRUSHES OPPONENTS IN UTAH	15
CHAPTER LEADERSHIP SUMMIT	16
EMERGING LEADERS CONFERENCE	17
NTMA PLANT MANAGERS ROUNDTABLE	17
NTMA CFO ROUNDTABLE	17
HR ROUNDTABLE PROVIDED VALUABLE INSIGHT	28
NTMA CHAPTER NEWS	
NTMA WELCOMES NEW MEMBERS	3
NTMA'S 2015 MEMBERSHIP DIRECTORY – ONLINE	21
MITTLER BROTHERS AND ST. LOUIS CHAPTER	
DONATE MEETING FUNDS TO NTMF	22
NTMA TEAM SPOTLIGHT	
EDUCATION TEAM	22



WELCOMES NEW MEMBERS

A & L MACHINING, INC.
Rocky Mountain Chapter
Mr. Allen Dvoracek
11295 East 51st Avenue
Denver, CO 80239

DATA MACHINE, LLC
Pittsburgh Chapter
Mr. Chuck Tissue
140 Brush Creek Road
Irwin, PA 15642

DO-IT TOOL & DIE, INC.
Rock River Valley Chapter
Mr. Ray Vince
P.O. Box 997
Beloit, WI 53512-0997

LG METALWORKS, LLC
Indiana Chapter
Mr. Gary Fleener
4200 N. Mount Gilead Road
Bloomington, IN 47408

MICRO PLASTICS, INC.
General Membership
Mr. Tom Hill
P.O. Box 149
Floppin, AR 72634

R.L. INDUSTRIES
St. Louis Chapter
Mr. James Leary
13795 Ferguson Lane
St. Louis, MO 63044

S & B JIG GRINDING, INC.
Rock River Valley Chapter
Mr. Rick Spades
6820 Forest Hills Road
Loves Park, IL 61111-4367

SAWS INTERNATIONAL
Rock River Valley Chapter
Mr. Mike Rans
4931 26th Avenue
Rockford, IL 61109

TECM
Rock River Valley Chapter
Mr. Joel Zehrung
2932 Eastrock Drive
Rockford, IL 61109-1739

NTMA OFFERS A MECHANICAL APTITUDE TEST



The NTMA Mechanical Aptitude test is part of the selection process used by NTMA members for a large array of jobs within their shops. Last year over 700 tests were used to test employees' or future employees' skill knowledge.

Mechanical Aptitude Tests have a mix of questions identified by members of the NTMA Education Team, focused on industry skill sets required to be successful with their companies.

Each of the tests' four parts and must be completed within the testing period of one hour and 20 minutes for

a total overall score. The testing sections are: Mechanical Comprehension, Mechanical and Spatial Relationships, Applied Math and Mechanical Reasoning. These 90 question tests are especially effective in evaluating and hiring new employees, but will help anyone wanting to assess mechanical aptitude within the shop environment. The cost for the test is only \$35.00. For more information or to get the test contact Ken McCreight, NTMA Vice President at (216) 264-2834 or email Ken (kmccreight@ntma.org).



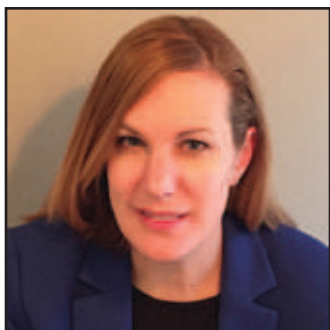


PRESIDENT'S UPDATE

DAVE TILSTONE / NTMA PRESIDENT

I am writing this as I travel to join the NTMA group for the Swiss Tour being hosted by Big Kaiser, Blaser Swisslube and +GF+ for a week of tours of their companies and customers. The objective is to see first hand the best practices employed by some of the leading technology leaders in Switzerland. There's a dedicated section in this edition of The Record about our visit, so I'll focus on some other topics that are affecting our association and our industry.

I'd like to first of all introduce our new Director of Membership and Business Development, Sarah Shoaff.



Sarah joined us on April 15 and brings a wealth of experience and knowledge from her work at the COSE (Council of Smaller Enterprises) of the Cleveland Partnership. When you meet Sarah you'll find her very energetic, motivated and passionate about membership and business development. She has over 10 years of not-for-profit experience coupled with extensive expertise in

developing corporate partnerships. She is skilled in nurturing and maintaining member and business partner relationships. Her reputation for outstanding membership relationships was a key factor with us offering her the position. She's an energetic leader with a strong team building acumen that will fit well with the NTMA Team.

In her new role, Sarah will be responsible for and manage all of our Affinity Programs and our Chapter management agreements. Tiffany Bryson, who is responsible for our National Associates will report to Sarah and continue to support our industry partners and remain as the primary contact for them. Sarah will be building her team over the coming months, adding a staff person to manage and expand our Chapter management efforts. In addition to these responsibilities she'll be developing new programs for membership and partners. Sarah is extremely excited to be joining us and, likewise, we are anxious to have her talent and experience grow our organization. Sarah will report to me.

I am also very pleased to announce that Drew Swindler is joined us on April 15 as the Membership and Chapter Services Executive for the Eastern Region. Drew's background includes a decorated tour of duty in the Army. Prior to becoming an Executive Officer,



he began his career in the Army after graduating from Officer Candidate School (OCS) as a Platoon Leader before becoming a Squadron Maintenance Officer. He leads by example with a very positive and "can do" attitude. His combined civilian and military background provides the NTMA extensive project management expertise and over 10 years of professional management experience. Drew will initially focus on supporting our established members and chapters in New England, New York, the mid-Atlantic and the southeast. He will also work toward establishing additional chapters in the southeast. In this role, Drew will report directly to me. Drew resides in Davidson, North Carolina with his family.

As we look at the economy the first quarter was a mix of good and bad news. The good news is that aerospace, medical, and automotive as well as die and mold are going strong. Current lower oil prices have really impacted our members in the energy sector. Some are

experiencing 30 to 60% reductions in orders, with backlogs diminishing. This sudden and dramatic response to the drop in the price of a barrel of oil is typical and in the opinion of some industry experts too dramatic. These corrections aren't representative of the worldwide forecast for consumption, although the press is convincing many of us otherwise. When I speak to our members in the oil and gas sector, they tell me that quotation activity is very high and in general they are doing what they can to adjust their operation for a weak 2015. As the year progresses, I'll continue to monitor the situation and offer support to members that need our help. One important event that can help with diversifying the businesses for those closely connected to the oil and gas industry is the upcoming Purchasing Fair in September.

The Purchasing Fair as we know has been rebranded the "Supply Chain Network" and will be revised for the September 16th event, hosted this year by Hurco at their Indianapolis facility. The intent is to make it even more attractive to buyers and, likewise, more valuable to our members. The focus on managing and streamlining the supply chain of OEM's and Tier 1 suppliers has never been higher. The more value added services you can provide, the more valuable you are to them.

CONTINUED ON — P5

THE RECORD

OPERATIONS & EDITORIAL

Dave Tilstone, President

Sally Safranski, Executive Editor

NTMA EXECUTIVE TEAM

Herb Homeyer, Chairman

Homeyer Precision Manufacturing – St. Louis, MO

Matt Wardle, Vice Chairman

J D Machine – Ogden, UT

Ken Seilkop

Seilkop Industries – Cincinnati, OH

Mark Vaughn

Vaughn Manufacturing Co., Inc. – Nashville, TN

Theodore O. Toth, Jr.

Rosenberger-Toth – Pennsauken, NJ

ADVERTISING INQUIRIES

To advertise in *The Record*, or for information on publishing your corporate newsletter or sales literature, contact NTMA at (216) 264-2847 or tbryson@ntma.org for advertising, ssafranski@ntma.org for editorial content. Design & layout by Z Graphics david.zablo@gmail.com



NATIONAL TOOLING & MACHINING ASSOCIATION

1357 Rockside Road

Cleveland, OH 44134

1-800-248-6862

www.ntma.org

© Copyright 2015 NTMA



Over the past few years, attendance has waned, so the NTMA staff, with Dan Bagley's help, are developing creative ways to attract more attendees and provide a more productive experience. In the meantime, a new logo is being prepared and a Save the Date postcard will be mailed to perspective buyers. To help members prepare for the Supply Chain Network event, a Sales and Marketing Workshop will be held the previous day, with a discounted rate offered to members who attend both events. The Sales and Marketing Workshop will focus on differentiating your company from others. In other words, why should the buyer prefer to do business with you rather than other suppliers? Your marketing materials will also be reviewed and input provided for

improvements.


Regardless of how strong or weak your backlog, the Supply Chain Network and preceding Sales and Marketing Workshop will be a great tool to add to your sales strategy – with the goal that on September 16 you can meet up to 15 potential buyers and begin to build new relationships with companies that have work to subcontract.

DAVE TILSTONE /
NTMA PRESIDENT

A handwritten signature in black ink that reads "Dave Tilstone".



VERICUT User



*Right the first time.
Every time.*

VERICUT can help you avoid:

- Machine repairs
- Replacement material
- Re-machining time
- Lost production time
- Late delivery penalties
- Replacement cutting tools

VERICUT can give you the confidence to run a part for the first time with no one at the machine. VERICUT works with all CAD/CAM/PLM systems to simulate CNC code, whether programmed manually or post-processed from your CAM system. Every day, our software is trusted by thousands of companies from all industries to simulate and optimize their machining process within a virtual machining environment.

Contact us to learn how an investment in VERICUT pays for itself.

VERICUT

The CGTECH.com logo, with "CGTECH" in a stylized font and ".com" in a smaller font.



2015 STEP Award Honoree

Carol is an “unconventional” CEO at the helm of Craig Technologies, a business closing in on \$45M a year in revenues. In 1999, Carol incorporated her small engineering and technical services business to meet the needs of her Department of Defense customers. During the economic downturn in 2011, she diversified the business into manufacturing following the end of NASA’s Shuttle program.

Center in June 2012 to operate, maintain and store an inventory of over 1,600 pieces of specialty manufacturing and test equipment once used to process NASA’s Space Shuttle fleet and space-bound payload components at the former NASA Space Shuttle Logistics Depot (NSLD).

Carol has a talent for turning adversity into an asset and has pioneered her own methods to achieve success, rely-

“MANUFACTURING IS A VERY DIVERSE CAREER FIELD. THERE ARE MANY OPPORTUNITIES TO BECOME INVOLVED BOTH ON THE PRODUCTION FLOOR AND OFF. STRENGTH IN THE STEM SUBJECTS ARE CRITICAL, BUT IT’S ALSO IMPORTANT TO HAVE INTERPERSONAL SKILLS AND FIND A ROLE THAT WILL BRING OUT YOUR NATURAL TALENTS AND PASSION.”

CAROL CRAIG, FOUNDER AND CEO OF CRAIG TECHNOLOGIES

Because of Craig Technologies’ exceptional performance on contract with NASA and government partners, Carol was able to negotiate a five-year unfunded Space Act Agreement (SAA) with NASA’s Kennedy Space

Center on reputation and unique ‘people-first’ culture to attract new business. She is personally involved in civic and economic development activities that guide business and manufacturing policy development, and Craig Technologies is a



Carol Craig, Founder and CEO of Craig Technologies. Cape Canaveral, FL

supporting member of a wide range of trade groups. The company’s ambitious foray into manufacturing has led to a host of recent accolades to include the 50 Fastest Growing Woman-Owned Businesses (ranked sixth) by Women Presidents Organization/American Express Open in 2013.

Additionally, Carol reaches out to other women and young girls through active involvement in organizations that

encourage growth and development of woman-owned businesses and entrepreneurship.

Carol was named the 2015 Florida Small Business Person of the Year by the U.S. Small Business Administration. Earlier this year she was appointed to the U.S. Commerce Department’s Manufacturing Council. For more information on Craig Industries: <http://www.craigtechinc.com>



MILITARY HIRING: NEW GUIDE ON TIPS BY EMPLOYERS, FOR EMPLOYERS

BY TODD YOUNG, CENTER FOR AMERICA

A growing number of U.S. employers are eager to hire military men and women to fill critical gaps in

the workforce, particularly with available jobs at a 14-year high, according to the U.S. Labor Department. A

new guide coming in May will provide a catalogue of real-life best practices that have helped employers find

and retain military hires.

Military hiring efforts like the American Jobs for

CONTINUED ON — P7



America's Heroes (AJAH) campaign supported by NTMA are successfully connecting veterans, National Guard members, Reservists and military spouses with employers. But not all employers use the same tactics and strategies for recruiting, hiring and retaining military – and that has created some costly challenges for both employers and veterans.

“We’ve heard from employers and job applicants alike that many recruiting practices and interview techniques are slow, inefficient and often result in great candidates with the right credentials getting lost in the job process,” said Steve Nowlan, AJAH campaign director and president of the non-profit Center for America, which coordinates the campaign.

“What we’ve found in

working directly with employers is that there are a range of good practices that result in efficient hiring and retention, and likewise, there are some unproductive practices that make it more difficult for employers to hire veterans,” Nowlan added.

AJAH plans to roll out the comprehensive guide to provide employers of all sizes the tools to develop military hiring programs, and to offer HR professionals proven practices to enhance or improve their existing recruiting efforts.

AJAH provides a host of information and resources to help employers navigate the military hiring effort, including guides written by industry experts for AJAH on taking advantage of available tax credits for hiring veterans and understanding

new OFCCP guidelines for federal contractors requiring veteran hiring. The guides have been downloaded more than 85,000 times. AJAH has also produced a number of webinars designed to help HR professionals and small to mid-size employers take advantage of the available veteran workforce.

Employers can register with the AJAH campaign to post jobs and get free help on job descriptions and connect with experienced nonprofit employment counselors – free of charge – by visiting www.CenterforAmerica.org. AJAH provides a host of information and resources to help employers navigate the military hiring effort, including guides written by industry experts for AJAH on taking advan-

tage of available tax credits for hiring veterans and understanding new OFCCP guidelines for federal contractors requiring veteran hiring.

There are no fees to participating companies or job candidates. Employers who want to post open positions can sign up through the Center for America website at: www.centerforamerica.org/register.html



Royal Quick Grip™ CNC Collet Chucks set a new standard featuring superior design, incredible accuracy, and easy, 10-second collet changes.



Check out the
Royal Quick-Grip™ Video
at: colletchucks.com

ROYAL
PRODUCTS
Optimize everything.

1-800-645-4174
www.royalprod.com

10-SECOND COLLET CHANGES PLUS....



Ultra-Precision Accuracy

- Chuck and collets guaranteed to 0.0002" TIR or better
- Total system accuracy guaranteed to 0.0004" TIR or better



Exclusive Bolt & Go™ Mounting Advantage

- Out-of-the-box near perfect face/taper fit with machine spindle-nose
- No jack screws to hassle with
- Significantly reduces chuck changeover time



Widest Gripping Range

- Full 0.062" grip range – 50% greater than the competition
- Parallel clamping collet segments remain in contact with the workpiece over their entire length for maximum holding power and accuracy
- Compensates for oversized or undersized bar stock



Most Compact Chucks in the Industry

- Ultra-compact lengths maximize z-axis capacity
- Super slim nose diameters provide outstanding tool clearance

THE 2015 SWISS TECHNOLOGY TOUR: EYE-OPENING AND INSPIRING

In April, 25 participants traveled to Switzerland, part of NTMA's Swiss Technology Tour. With the backdrop of the historic Swiss Alps, NTMA members found their hosts to be welcoming and dedicated to using the time very pro-

ductively. The hospitality extended to us by our hosts Big Kaiser, Blaser Swisslube and GF Machining Solutions was exemplary. The management and the employees at their facilities and during the plant

CONTINUED ON — P10



Dave Tilstone, Jack Burley, Gisbert Ledvon, Chris Kaiser, Mal Sudakar and Drew Borders

"THE NTMA SWISS TOUR WAS AN AMAZING EVENT. THE EXPOSURE AND INSIGHT TO THE COMPANIES WE VISITED WILL BE VALUABLE BOTH SHORT TERM OPERATIONALLY AND LONGER TERM STRATEGICALLY. ADDITIONALLY, THE RELATIONSHIPS AND INPUT FROM THE NTMA MEMBERS ATTENDING IS INVALUABLE AS WE EVALUATE NEW BUSINESS OPPORTUNITIES."

Gillen Young, Custom Tool Inc

Group photo at Mikron Agie Charmilles AG, GF Machining Solutions in Nidau, Switzerland



Group photo at Blaser Swisslube in Rüegsau, Switzerland

"OUR VISITS TO BIG KAISER, BLAZER SWISSLUBE AND GF MACHINING SOLUTIONS WERE EXTRAORDINARY. WE WERE EXPOSED TO DIFFERENT MANUFACTURING METHODS AND OBSERVED REAL LIFE APPLICATIONS DURING ACTUAL PLANT TOURS. VIEWING AND SHARING THIS EXPERIENCE WITH FELLOW NTMA MEMBERS AND OWNERS WAS PRICELESS."

Mark Vaughn, Vaughn Manufacturing



"I THOUGHT THE TRIP WAS GREAT. THE NATIONAL ASSOCIATE SPONSORS WENT ABOVE AND BEYOND TO GIVE US A FIRST CLASS EXPERIENCE. I LEARNED A LOT AT EACH VISIT AND THE NETWORKING WAS FANTASTIC. AS WITH EACH NTMA EXPERIENCE I CONTINUE TO EXPAND MY NETWORK. AN EXPERIENCE LIKE THIS ONE REINFORCES THE NEED TO SUPPORT OUR NATIONAL ASSOCIATE SPONSORS. THEY HAVE MUCH TO ADD TO OUR BUSINESSES."

Dave Sattler, Sattler Companies



Group photo at KAISER Precision Tooling in Rümlang, Switzerland



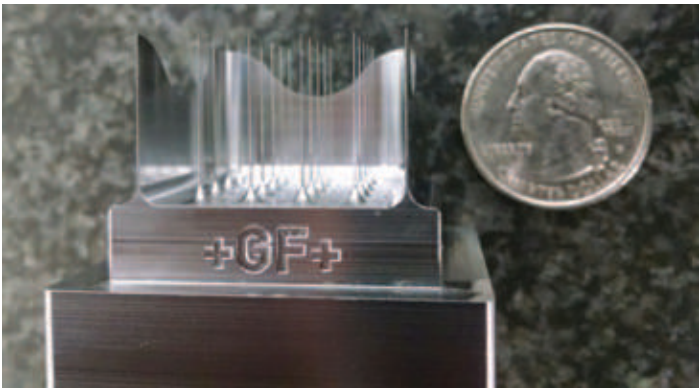
Marc Blaser, CEO of Blaser Swisslube impressed the attendees with his presentation on the possibilities to fully exploit the potential of machines and tools by using the right metalworking fluid, which becomes a “Liquid Tool.”



GF Machining Solutions' Milling Technology Center is a showcase of applications expertise with live demonstrations.



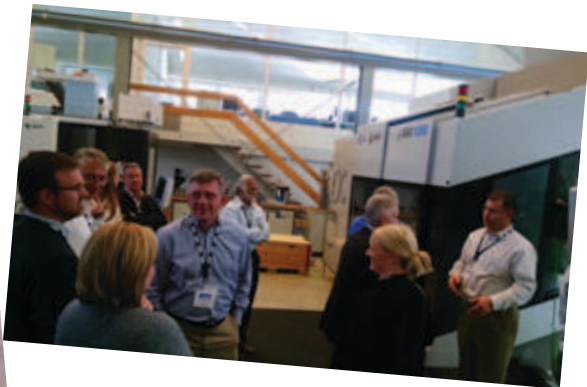
Pete Elmer, CEO of KAISER Precision Tooling welcomed attendees with a presentation on the history of the company.



An example of Swiss precision at Mikron Agie Charmilles AG, GF Machining Solutions in Nidau, Switzerland.

“THE TECHNOLOGY THAT WE WERE EXPOSED TO WAS VERY INSPIRING. HAVING THE OPPORTUNITY TO SEE WHAT OTHER COUNTRIES ARE DOING WITH THEIR RESOURCES MAKES YOU COME HOME AND THINK ABOUT HOW WE CAN INCORPORATE THAT INTO OUR METHODS FOR IMPROVEMENT. THEIR APPRENTICESHIP PROGRAMS AND GREAT VALUE OF WORKFORCE DEVELOPMENT DEFINITELY GAVE ME SOME IDEAS FOR IMPROVEMENTS THAT CAN BE MADE TO BENEFIT THE FUTURE WORKFORCE IN THE U.S. THE NTMA MEMBERS ARE VERY LUCKY TO HAVE THE SUPPORT OF NATIONAL ASSOCIATES LIKE BIG KAISER, GF MACHINING SOLUTIONS AND BLASER SWISSLUBE, WHO MADE THIS TRIP POSSIBLE.”

Herb Homeyer, Homeyer Precision Manufacturing



tours reinforced why these companies are among the world's leaders in their respective technologies.

Dave Tilstone noted that "We were amazed that our hosts can manufacture products with the infamous Swiss precision in one of the highest cost countries in the world and still be globally competitive. The cultures they nurture with their employees and their dedication to being 'green' were also common themes wherever we visited."

The agenda with a mix of National Associate Members and their customers was really a good way to see their products in action. The Technology Tour began with a tour of one of Switzerland's leading aircraft maintenance facilities, SR Technics.

At GF's Mikron facility, the precision and care they took to build every machine to the specific customer's order was impressive. The design elements of their machines, spindles and even their water-cooled machine bases make them one of the world's leading companies in precision milling. Their spindle anti-collision technology was very impressive, as were the people who spoke to us at GF's Technology Center.

At Blaser Swisslube, Marc Blaser did an excellent job presenting an economic model to illustrate the importance of coolant. The investments Blaser has made to help solve customers' problems and find solutions for metalworking customers was very impactful to all of the attendees.

GF's Liechti company that specializes in turbine blade machining was an example of how focus and continually working toward best practices results in excellence and market differentiation. As a result, they have been awarded machine orders by one customer alone equivalent to one year's backlog to produce turbine blades. This is really well thought out process technology.

The visit to BIG Kaiser and meeting the people who design and manufacture their precision tooling makes it apparent where Chris Kaiser gets his motivation and passion for the BIG Kaiser products. Their products are designed and manufactured with Swiss precision, yet are very competitive in world markets through innovation and lean implementation.

The visit to Burckhardt Compressor was nothing short of amazing because of the size of the equipment they produce as well as the culture they have fostered to become the premier provider of compressors throughout the world. Having the CEO of this \$1.4 billion company personally



"SOME OF THE MOST VALUABLE LESSONS LEARNED OR TAKE-AWAYS: 1. TRAINING IS (OR SHOULD BE) A CORE FUNCTION OF ORGANIZATIONS IN OUR INDUSTRY 2. A COMMITMENT TO ORGANIZATION/CLEANLINESS/PROCESS "FLOW" WAS EVIDENT AT EACH AND EVERY COMPANY WE VISITED 3. EVERY COMPANY WE VISITED MADE GREAT USE OF POINT-OF-USE WORK INSTRUCTIONS 4. TECHNOLOGY SHOULD BE UTILIZED WHEN IT MAKES SENSE, NOT JUST FOR THE SAKE OF TECHNOLOGY. WHILE THESE POINTS ARE CERTAINLY NOT UNUSUAL IN OUR INDUSTRY (IN THE UNITED STATES), THE LEVEL OF IMPLEMENTATION OF THE FOUR ABOVE PRACTICES WAS MUCH HIGHER IN THE COMPANIES WE VISITED, AND SEEMED TO BE VERY CONSISTENT ACROSS EACH ORGANIZATION. IT WAS A PLEASURE TO HEAR MARC BLASER SPEAK - ONE OF THE BEST TALKS AND EXPLANATIONS THAT I HAVE EVER HEARD OF HOW THE SMALL THINGS CAN HAVE A BIG IMPACT."

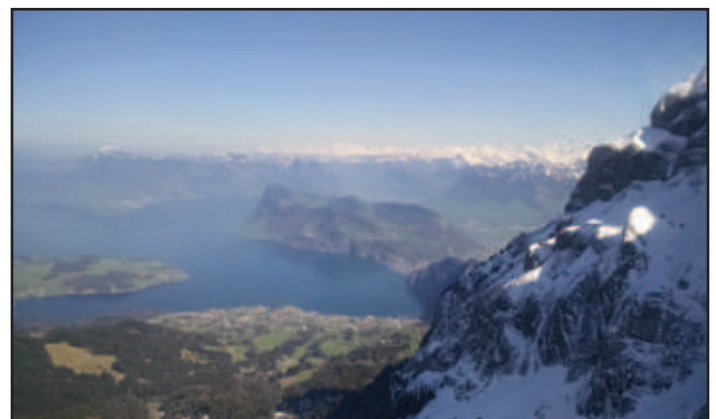
Jonathan Veteto, Cogitic Corporation



"TO SEE HOW THE OTHER SIDE OF THE WORLD LOOKS AT THE SAME BUSINESS THAT WE ARE IN WAS A VERY EYE-OPENING EXPERIENCE. I WENT ON THIS TOUR WITH THE EXPECTATIONS OF COMING AWAY WITH ONE TECHNOLOGY IDEA THAT I COULD BRING BACK TO MY COMPANY AND THE TRIP WOULD WORTH MY TIME. I CAME BACK EXCITED TO GET INTO WORK SO I COULD EXPLAIN WHAT I LEARNED THAT COULD HELP MY BUSINESS."

Paul Bonin, Bertrand Products, Inc.

present and then do the tour of the shop was very impressive. Their dedication to the apprenticeship program and the support of the local school is very admirable yet required due the lack of skilled labor in Switzerland. His expansion strategy into global markets has provided life blood for the company and all of their employees.



"WE HAD ACCESS TO TOP EXECUTIVES WHO PASSIONATELY TAUGHT US ABOUT THEIR COMPANY AND THEIR NICHE WITHIN THE INDUSTRY. WE ALSO LEARNED ABOUT THE SWISS APPRENTICESHIP MODEL, WHICH WAS REFLECTED BY THEIR YOUNGER WORKFORCE."

Shannon Sweatman, Southern Machine Works

"AMBUSH ELECTION" RULES TO EASE EFFORTS FOR UNION ORGANIZING NEW NLRB RULES WENT INTO EFFECT IN APRIL

New federal rules went into effect in the middle of last month which some U.S. employers say will assist labor organizers.

The new rules, called "ambush election rules" by Speaker John Boehner and others, significantly reduce the amount of time employers have to dissuade workers from voting to join or form unions.

By way of background, the National Labor Relations Board - the organization which oversees such votes - had typically given employers approximately 40 days to communicate with workers before an election was held. The new rules reduce that time to approximately 11 days.

In addition, the new rules expand the information that employers are required to provide to union organizers in advance of an election. Whereas employers were previously required to provide only employee names and addresses, employers must now provide employee names, addresses, phone numbers - including cell phone numbers - and email addresses. The time now allotted for providing that expanded information is two days.

Employers are not alone in opposing these measures. Members of Congress signaled their opposition last month when the House and the Senate passed a joint resolution disapproving of the new rules. But, at the end of the March, President Obama vetoed that resolution.


While the fight is likely far from over as industry groups are expected to challenge the new rules in court, NTMA members should still be prepared to cope with the new rules in their workplaces. In order to help members learn more about the new rules and be ready to face any challenges, NTMA hosted a webinar during the second week of April with Bracewell & Giuliani LLP Partner, Bob Nichols. With more than 25 years of experience in labor and employment law, Nichols offered an expert analysis of the rules and suggested responsible strategies for heading off union organizing attempts. This webinar is an example of ways NTMA's advocacy team is available to assist members both inside Washington, DC and back home in manufacturing facilities across the country. NTMA members can access a

recorded version of Nichols's presentation and download the slides on the NTMA website - www.ntma.org.

It is clear that there is a lot at stake for manufacturers. To make a difference in Washington, you have to participate in the process. Funds contributed to advocacy efforts help to ensure that the voices of small and medium-sized manufacturers are heard. Remember that NTMA members can give unlimited corporate or individual contributions to the NTMA Government Affairs Administrative Fund which supports the work done by The Franklin Partnership and Policy Resolution Group at Bracewell & Giuliani LLP. Additionally, NTMA members can make limited personal donations to the Committee for a Strong Economy (CFASE) PAC, which supports pro-manufacturing Congressional candidates.

And don't forget to stay tuned for the latest on NTMA's advocacy efforts by following NTMA and One Voice on Twitter - @NTMATalk and @OneVoiceforMfg.





Cutting Time Comparison

Material: 4140 Steel
Starting Hole: 3"
Final Hole: 4"

Bore Depth	Milling (Minutes per Hole)	Boring (Minutes per Hole)
3"	~5	~2
6"	~10	~5
9"	~15	~8
12"	~40	~10
15"	~130	~12

Milling: 2" Face Mill, 5 Flute Feed/Tooth: .005"

Rough Boring: 4" SW 319, Stepped Cutting Feed/Tooth: .014"


HIGHER PERFORMANCE GUARANTEED

THE FASTEST WAY TO PREP A HOLE FOR FINISH BORING AND

WE'LL PROVE IT.


As hole depth increases, circular interpolating with a milling cutter is a drain on cycle time. The rugged design of the KAISER Series 319 SW twin cutter boring head set for stepped cutting permits extreme stock removal that simply can't be challenged. Don't believe us? Test the KAISER 319 SW head in your shop to see the proof.

Visit BIGKaiser.com/TestUs to request your KAISER 319 SW free trial today.



Attend our complimentary "Breakfast & Learn" each morning before DMG MORI Chicago Innovation Days. Learn more and sign up at BIGKaiser.com/RSVP.

BIG KAISER
PRECISION TOOLING INC.
A PROUD NATIONAL SPONSOR OF NTMA



PALLET CHANGE SYSTEMS

AUTOMATIC • MANUAL • Y-AXIS SHIFT • FLEXIBLE



Go

BIG

or

small



Increase productivity...

on any model, NEW or EXISTING machining center. Pallet Changers available in sizes from 12.75" x 10.5" up to 150" x 50". Improve efficiency in all aspects of manufacturing including VMC, Bridge, HMC, Drill/Tap and EDM machines.

- ☒ Automatic Pallet Changer
- ☒ Manual Pallet Changer
- ☒ Micro Pallet Changer
- ☒ Manual Rotary System
- ☒ Automatic Door Opener



Automatic 120" x 60"



1969 **46** 2015
celebrating years

Midaco Corporation

toll free: 888.593.8420

email: midaco@midaco-corp.com

www.midaco-corp.com

SCARY NUMBERS THAT ONLY YOU CAN CHANGE

BY BILL PADNOS, NTMA DIRECTOR OF YOUTH ENGAGEMENT



Last September, I had the opportunity to participate in a roundtable discussion in Pittsburgh sponsored by the U.S. Chamber of Commerce Foundation on “Managing the Talent Pipeline: A New Approach to Closing the Skills Gap.” The roundtable discussion centered around the fact that our educational system is failing to keep pace with our economy and that employers throughout the U.S. are struggling to find skilled workers who can contribute to their companies’ growth.

A survey by Accenture stated that 75% of manufacturers reported a moderate to severe shortage of workers. This problem is only going to grow if not addressed. The Georgetown Center on Education and Workforce is predicting that the skills gap will cause more than five million positions to go unfilled by 2020. This problem will be further compounded by Baby Boomer retirements.

According to CareerBuilder, manufacturing companies forgo \$23,000 in revenue per unfilled position. In a survey by the American Institute of CPAs, the workforce shortage means that 43% of companies are failing to achieve key financial targets, 40% had a reduced ability to innovate and 37% were unable to start a major project or strategic initiative.

HERE ARE SCARIER NUMBERS:

In a FastCompany article, the author noted that a recent Gallup survey found that only 11% of business leaders say that they are confident that college graduates are prepared for the workforce; meanwhile 96% of chief academic officers of colleges and universities are somewhat or very confident that they are preparing student for success in the workplace.

WHAT DOES THIS MEAN TO YOU?

You all have known for some time – there is a skills and interest gap caused by the disconnect between what is taught in the classroom and what is needed for a career in

manufacturing. The academic community is not going to solve this problem without your involvement in the process. *It is time for you to become an active participant in the development of tomorrow’s manufacturing workforce.*

EMPLOYERS CAN CLOSE THE SKILLS GAP BY ENGAGING WITH THEIR LOCAL SCHOOLS.

Lucky for you, NTMA sponsors a ready-made job-driven program – The National Robotics League (NRL). This program provides you the opportunity to contact your local high schools about working together on a fun, hands-on STEM project that immerses students in the manufacturing process. In addition, you have the ability to communicate with the school’s administration about your workforce talent needs. This creates a strategic partnership that is beneficial to all parties. The school gains a better understanding of your operations, you create a talent pipeline and, most importantly, students learn from you the technical and necessary skills needed for a career in manufacturing.

Again, the numbers tell the truth. The average cost to fill an employee vacancy is \$3500 and there is no guarantee that the individual will work out. However, the average cost of being an Industry Advisor to an NRL team is \$3000 (based on an estimated 60 hours x \$50 per hour). Besides saving \$500, you have the ability to train and pick the best student team members to be a part of your company.

We all understand that you are very busy and have limited time to spare. However, in the end, you (the NTMA member) are the only one that can turn things

around. We are asking you to start considering this: *participation in NTMA’s NRL program is an investment in time that you cannot afford to miss.*

Over the next couple of months we will talk more about what it means to be an NRL Industry Mentor. About how you can turn NRL participation into a strategic advantage in recruiting talented, skilled and enthusiastic workers. About how being an NRL Industry Mentor is a great way to engage your current workforce and to create new opportunities for on-the-job-training.

Make the investment right now to come to Baldwin-Wallace University in Berea, OH (Cleveland area) on May 15 and 16 for this year’s NRL National Competition. Take this opportunity to interact with the students, teachers and industry mentors already involved in the program to find out why this program is making a difference. Even better, sign-up to be a volunteer while you’re there. Visit www.gonrl.org for more information.





Integrating Robotics & STEM Initiatives in the Classroom

BUILDING AMERICA'S TECHNOLOGY LEADERS, ONE ROBOT AT A TIME



OUR NEXT GENERATION NEEDS YOU

WHEN & WHERE

MAY 14-16
8 AM - 7 PM

Baldwin Wallace University
Lou Higgins Center
136 E. Bagley Rd., Berea, OH 44017

You are invited to be part of the team that makes the 2015 NRL National Competition possible.

Starting with set-up on Thursday, May 14, all the way through tear-down on Saturday, May 16th this competition is a volunteer run event—so if you have some time—even as little as 2-4 hours to join us, please sign up!

Scan the QR code or visit <http://tinyurl.com/2015-NRL-Volunteer> for more information and to register.



The National Robotics League is powered by:



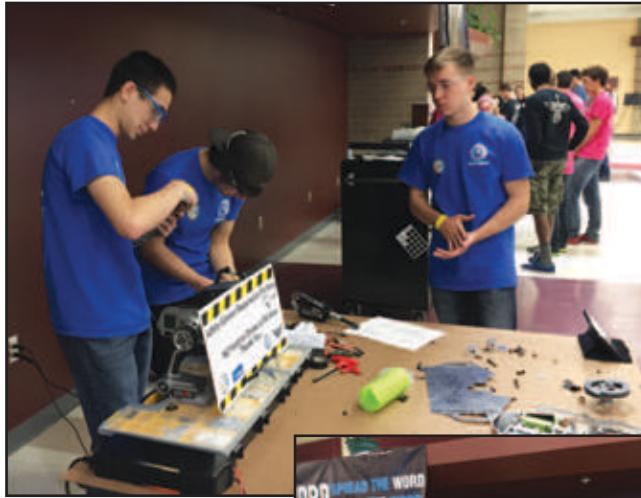
PLUG IN AT GONRL.ORG
OR JOIN US ON FACEBOOK
[FACEBOOK.COM/GONRL](https://www.facebook.com/gonrl)

KANSAS CITY LAUNCHES NEW NRL COMPETITION

There were big NRL successes in Kansas City on March 11, as the Olathe Northwest NRL Regional Competition was the first annual NRL event in the region. Over 250 attended the event, which was full of excitement and energy of teams, sponsors, family and onlookers. The completion got lots of buzz from the local press, which brought out the crowd. The Kansas City Chapter has been working hard to prepare for just this time, including creating a brand new arena.

A big "Thank you!" goes out to Olathe NW High School junior Sam Fruth for taking and editing videos, then posting a collection of competition videos on YouTube - check it out! <https://www.youtube.com/playlist?list=PLZDGrExnnNYrZDebLSXhZm6jX9gw26-D>

Kansas City Chapter NRL supporters know they are investing in talent, said Michael Bohning, president of Creative Blow Mold Tooling in Lee's Summit. "We want to educate them and their parents about the opportunities that exist," he said. "Our biggest challenge is attracting good, solid employees. We need to grow our own talent." (as quoted to The Kansas City Star reporter Joe Robertson, 3/27/15)



Above: The winning Olathe NW High School team in the pit before the competition working to prepare their winning robot, Dry Bones.



Left: The second place team from Kansas City NRL Competition



Above L-R: NRL judges Michael Bohning, Herb Homeyer and Mike Hudson with KC Chapter Executive Torree Pederson



Kansas City's first NRL competition in action!

AMAZED BY THE ROBOBOTS IN NW PENNSYLVANIA



RoboBOTS is a hands-on robot-building initiative to stimulate student interest in technical education careers. Teams of students build 15-pound robots that battle each other in an arena-competition in a double elimination tournament.

The free, open-to-the-public competition is sponsored by the Northwestern Pennsylvania Chapter. The event is made possible with funding from regional busi-

ness sponsors and from contributions through the NWPA NTMA Education Foundation Educational Improvement Tax Credit Program (EITC) as an Educational Improvement Organization.

This year, 17 schools with a total of 38 teams competed in the RoboBOTS competition at Meadville Area Senior High School. Congratulations to the competition's winning team and robot, "Regicide," Cochranton

High School (Cochrannton, PA).

The Northwestern Pennsylvania Chapter provides 1st and 2nd place RoboBOTS teams with funds to participate in the national NRL Competition at Baldwin-Wallace University (Cleveland, OH) May 15-16, 2015.



WEBER HIGH'S BATTLE ROBOT 'BRUCE' CRUSHES OPPONENTS IN UTAH

The Utah Chapter joined forces with local school districts to form the Rocky Mountain Robotics League in 2014. As a result of their hard work and dedication, the first RMRL bout was held at the Ogden-Weber Applied Technology Center on April 13, 2015.

Five teams competed for the title, representing Ogden, St. Joseph, Roy, Weber and Bonneville high schools. Bots scored points by pinning their opponents, flipping their opponents or knocking their opponents behind yellow barriers within the cage in three minute matches. At stake was the chance to be the first school to house the Rocky Mountain Robotics League trophy and yearlong bragging rights for having designed, built and fought the best bot in the county.

"THE COMPETITION WAS A GREAT SUCCESS-ESPECIALLY FOR OUR FIRST YEAR. WATCHING THE PARTICIPANTS ENGAGE IN BUILDING THEIR ROBOT AND GET EXCITED ABOUT MANUFACTURING PRACTICES WAS PRICELESS. WE'RE ALREADY LOOKING FORWARD TO NEXT YEAR!"

Matt Wardle, Utah Chapter President

For months, the students worked to build their 15-pound machines, along the way developing skills in mechanical and electrical engineering, machining, project management, communication, problem solving and teamwork. "It's about the fun the students are having when they get to build something from the ground up, design it and compete with it," said Charles Nielson, career technical education coordinator for Weber School District. "To see if it does what is it intended to do."

In the end, Weber High School, Bruce: The Hash Slinging Slasher stood victorious. A lifting mechanism designed to flip an opponent served as the robot's special weapon, helping it be undefeated through its many battles. "It's doing awesome," said Weber High student Jantz Perigo



in the middle of the competition. "The one thing I wish we had done is a higher gear ratio so we could actually lift these things."

Nielson said the spirit of competition provides a vision of what their future may hold. Through the program, organizers hope to meet the need in northern Utah for highly qualified young people to work

in manufacturing.

"There are so many jobs in Weber County that are dealing in manufacturing today and all of these kids have been exposed to it," Nielson said. "I don't know if they will go into it, but at least now they have seen what it is. My job at the high school is to get students on a pathway for a greater career and I believe this program has helped that happen."

In Monday's competition, the goal was total destruction. "It's like toys for teenagers," said Ogden High student Eli Beus, "but kind of deadly." But along with the mayhem, came a learning experience,

Beus said. He learned about physics and torque. "It's fun learning and it's fun competing," Beus said. "It's exciting."

Content provided by Jesus Lopez Jr., Standard Examiner staff, Ogden, UT, reprinted with permission.



REGISTER NOW

**PLANT MANAGERS ROUNDTABLE**

NTMA PLANT MANAGERS ROUNDTABLE

WEDNESDAY MAY 27, 2015

CYPRESS/LOS ANGELES, CA

8:00AM - 4:30PM

Registration Rates:

Early Bird Member	\$425
Deadline 5/6/15	
Regular Member	\$500
Non-Member	\$550

Topics

- Metrics: Machine up time, production throughput, gross margin, etc.
- Inspection Management
- Tooling Management
- Equipment Purchase Justification
- Laser Technology

Hosted by:

SANDVIK
Coromant

* Plant Tour followed by Welcome Reception & Dinner on Tuesday May 26th

For more information, contact:
Kristen Hrusch 216-264-2845 or khrusch@ntma.org

Network with
some of our
TOP Affinity
Partners

GRAINGER
1117 FROM THE ONES WHO GET IT DONE

STAPLES Advantage

CITRIX

**Partner
Ship**

Heartland

APPI
ENERGY

02

Hear The Buzz on Chapter Leadership

Reasons to attend the Chapter Leadership Summit:

- 1) **Build** relationships with "new" and "seasoned" Chapter Leaders.
- 2) **Learn** how other chapters are advertising the benefits of NTMA membership.
- 3) **Meet** NTMA Staff, and hear what they think is worthwhile about NTMA.
- 4) **Hear** a different view about Board and chapter dynamics from chapters around the country.
- 5) **Find** out about different chapter models, which might or might not fit your chapter.
- 6) **Ensure** your voice heard on subjects that affect your chapter.

Welcome Mixer

June 10th at 6:00 pm



MAY AND JUNE NTMA EVENTS

Summit Highlights:

OCEC / Wage & Fringe

Understand the value of benchmarking and how to improve your companies' bottom line.

Chapter By-laws

Acquire answers to all your chapter by-law questions and meet one-on-one with NTMA's corporate counsel.

ASAE

Learn how you can be selected to receive your ASAE certification through the NTMA ASAE Scholarship Fund.

What it Takes to be a Star

Hear the latest updates and changes to the Chapter Organization Questionnaire to ensure you're on the next "Star Chapter" list.

Networking Lunch

Connect with our top Affinity Partners and get the scoop on how your members can increase their cost savings.

Let's Knock 'em Down

Bring out your competitive side, all while team building.

Testimonials

"Leadership Summit was one of the several national NTMA events that have helped me as Chapter Executive and benefited our Chapter. Why? Networking with other CEs and industry leaders. Learning best practices. Gaining inspiration from other chapters' success stories and sharing our own. Acquiring tools so that we don't have to reinvent the wheel. Getting up to speed on new technologies. As a newer CE a few years ago, this was vital to my/the Chapter's success! Now - I still learn and grow each time I go! Time well spent? Yes - without a doubt."

Sally Safranski
Chapter Executive - St. Louis Chapter

"The Chapter Leadership Summit is a great opportunity for chapter leaders to develop ways to strengthen and grow our local chapters. For new chapter leaders it is a way to learn more about the national benefits of being an NTMA member and to learn how national can help your chapter. Also, it is a great chance to network with other chapter leaders from around the country."

Mike Pasch
Chapter President - Western Lake Erie Chapter



03



CHAPTER LEADERSHIP SUMMIT

*The Snow Will Be Gone, The Sun Will Be Out,
TIME FOR YOU TO JOIN US AT THE SUMMIT!*

June 11th-12th • 2015

**Cleveland Marriott Downtown
at Key Center**

**127 Public Square
Cleveland, Ohio 44114
216.696.9200**

**FREE
REGISTRATION
For The First
60 People!**

Register by May 11th, 2015
(Up to 3 free registrations per chapter)

CHAPTER PRESIDENTS | CHAPTER TRUSTEES | CHAPTER EXECUTIVES

FOR MORE INFORMATION ON THESE AND OTHER NTMA EVENTS, INCLUDING SCHEDULES, HOTEL DETAILS AND LINKS TO REGISTRATION FORMS GO TO WWW.NTMA.ORG/EVENTS/UPCOMING-EVENTS/

THE NATIONAL TOOLING & MACHINING ASSOCIATION — WWW.NTMA.ORG



EMERGING LEADERS CONFERENCE: MAY 15 (CLEVELAND OH)

Thomas R. Dillon will give the opening address at NTMA's inaugural Emerging Leaders Conference "We Are Manufacturing!" Dillon, now Vice Chairman of DMG MORI, has over 20 years of machine tool industry experience, ranging from sales and distribution to executive management. He will bring his years of leadership experience to empower, motivate and inspire future leaders as the future of American manufacturing. This two-day event will be a fast-paced, high-impact conference of professional development sessions, workshops networking opportunities and moderated roundtable discussions.



PLANT MANAGERS ROUNDTABLE: MAY 27 (CYPRESS/LOS ANGELES, CA)

Following a hugely successful Plant Managers Roundtable earlier this year, the upcoming Plant Managers Roundtable will be hosted by Sandvik Coromant. The day will be chock-full, with a focus on metrics (machine up time, production through put, gross margin, etc.), inspection management, tooling management and equipment purchase justification. Gisbert Ledvon (GF Machining Solutions) will speak on Laser Technology: EDM vs. Laser Texturing and Other Nontraditional Machining.

See more details on page 15.



FOR MORE INFORMATION ON THESE AND OTHER NTMA EVENTS, INCLUDING SCHEDULES, HOTEL DETAILS AND LINKS TO REGISTRATION FORMS GO TO WWW.NTMA.ORG/EVENTS/UPCOMING-EVENTS/



The Future of Manufacturing Begins May 15
Emerging Leaders Conference

...We
ARE
Manufacturing!

Event Details

May 15-16, 2015
Aloft Cleveland Downtown
1111 West 10th Street
Cleveland, OH 44113
Hotel Room Rate - \$129 plus tax per night

Questions or for more Information contact:
Brittany Belko
bbelko@ntma.org
216-264-2848

To Register:
www.ntma.org/events/upcoming-events/

Event Highlights

Personal & Professional Development Workshops

- Financial Management for Non-Financial Managers
Specialized Industry Consultant, CliftonLarsonAllen
- Building a Stronger, Cohesive Team
Ron Kaminski, President, CultureShoc
- Preparing for the Next Level of Leadership
Erik Skie, Managing Partner, CliftonLarsonAllen
- Sales & Marketing - Finding Your Strengths
Dan Bagley, Strategist, NTMA

Only \$325

Members:	
Early Bird	\$325
Early Bird 2nd Attendee	\$250
Must register by 4/15/15 to receive the early bird rates	
Regular	\$375
Regular 2nd Attendee	\$300
Non NTMA Members	\$450

#NTMAEL2015

DMG MORI

+GF+

CliftonLarsonAllen



CFO ROUNDTABLE: JUNE 24: (CLEVELAND, OH)

The CFO Roundtable now offers CPE credits: 2 hours of tax and 3 others of other. Financial managers and those individuals responsible for their companies' financial operations are encouraged to attend this central, Midwest location.

See more details on page 25



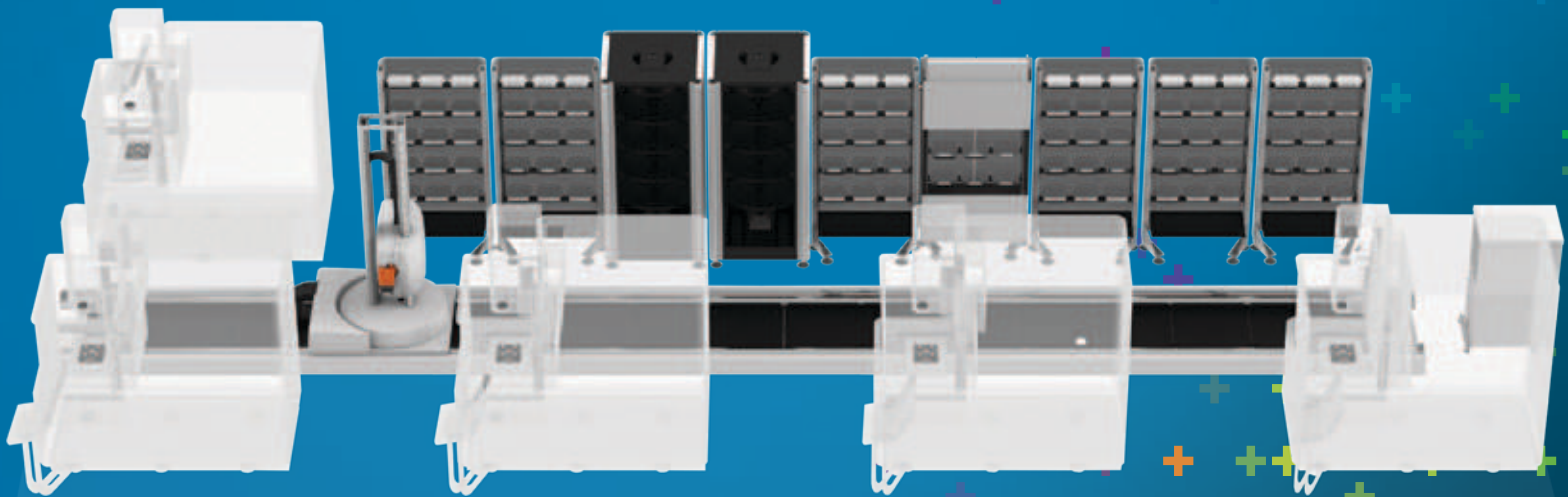
System 3R



Work is challenging. Redefine job satisfaction on your shop floor.

Your employees want to focus on work that challenges their minds, not their backs. The System 3R TRANSFORMER enables them to do just that. Scalable from one to twelve machines, this modular automation system **fits your operations**, regardless of your size. An open architecture **ensures compatibility** with all your equipment, from machining centers to EDMs to CMMs to cleaning stations. Let your team focus their attention where it's needed and **leave the heavy lifting to the TRANSFORMER**.

GF Machining Solutions
560 Bond Street
Lincolnshire, IL 60069
847-913-5300
www.gfms.com/us



Do more with the people you've got. Hire automation.

Tooling | Automation | Software

ENERGY OUTLOOK

A LOOK BACK, AND A LOOK AHEAD

APPI

ENERGY

WILL ENERGY PRICES RISE? HOW SHOULD YOU PREPARE AND BUDGET?

Volatile energy markets are dependent on many factors, including legislation, weather events, consumer demand, and environmental concerns. Extreme weather, Environmental Protection Agency regulations, and domestic natural gas resources are three of many important considerations that impact today's energy price trends.

WEATHER

Extremely hot temperatures in the summer, and record-setting cold temperatures in the winter, directly increase demand and prices for electricity and natural gas. Fossil fuel consumption and emissions increase substantially during extreme temperatures. In deregulated energy markets, fixed-price supply contracts can mitigate exposure to volatile prices.

NATURAL GAS

An abundance of natural gas resources in the U.S., coupled with enhanced drilling techniques, has led to historic increases in natural gas production and delivery of natural gas. This has reduced dependence on foreign natural gas imports.

Production. Natural gas production in the U.S. continues to break records. In December 2014, domestic natural gas production reached a record-setting 74.3 billion cubic feet (Bcf) per day, according to the U.S. Energy Information Administration (EIA). Horizontal drilling and hydraulic fracturing, also known as "fracking," are innovative techniques for capturing natural gas in shale formations, including the Marcellus Shale, the largest source of natural gas in the U.S. Natural gas production in the Marcellus Shale region is expected to increase year-over-year.

Supply/Demand. Natural gas storage levels are a primary driver of price trends for both gas and electricity. Natural gas storage levels in the U.S. were historically high in October 2012, but extreme winter weather in late 2013 and early 2014 substantially increased natural gas demand for heating, which depleted storage inventories. As the power sector increased demand for natural gas to generate electricity, the amount of natural gas in storage steadily plummeted to 822 Bcf, which was

an 11-year low, by the end of the storage withdrawal season in April 2014.

Summer 2014 produced the largest natural gas storage injections ever recorded by the EIA. Weekly storage injections, which typically occur in May through October each year, were greater than 100 Bcf for eight consecutive weeks during the 2014 summer months. Below-normal temperatures across the U.S. during summer 2014 contributed to large storage injections, as the power sector's demand for natural gas-fired generation weakened. Record-breaking storage injections during the summer of 2014 replenished historically low natural gas storage levels in time for heating demand during the winter of 2014-2015.

Imports/Exports. U.S. natural gas imports in 2013 declined for the sixth consecutive year. Total natural gas imports for 2013 were 2,883,355 million cubic feet, which is the lowest level since 1995, according to the EIA. The U.S. is expected to become a major exporter of liquefied natural gas (LNG) in the near future. Jordan Cove in Oregon, the nation's seventh LNG export terminal, was recently approved. LNG exports are expected to begin in late 2015.

ELECTRICITY GENERATION

New federal regulations on power plant emissions have prompted electric utilities and generators to schedule two dozen coal-burning generators in the U.S. for decommissioning, beginning in 2015. On April 29, 2014, the U.S. Supreme Court upheld the U.S. Environmental Protection Agency's Cross-State Air Pollution Rule (CSAPR), which is expected to cost power plant operators \$800 million per year, starting in 2015. The EIA forecasts 16% of coal-fired capacity available at the end of 2012 will be retired by 2020. The increasing use of natural gas for power generation will put upward pressure on prices for both natural gas and electricity.

Fuel mix. In PJM, the regional transmission organization responsible for reliable delivery of electricity in 13 Midwest and Mid-Atlantic states, the fuel mix used to generate electricity in 2014 was 40% coal, 30% natural gas, 19% nuclear, and 11% renewable and other. At the current

rate, natural gas will surpass coal as PJM's primary source for generation by May 2015. Natural gas is attractively priced compared to coal, and natural gas-fired generators are easier to install and operate. The U.S. Nuclear Regulatory Commission has granted license renewals providing a 20-year extension to 74 of 100 total operating reactors in the U.S., according to the EIA.

Renewable energy. Thirty states have renewable energy mandates in place for wind and solar generation sources. Implementation of renewable generation in the U.S. has been slow. Solar power provided 42% of installed generating capacity in the U.S. during the first half of 2014, while wind accounted for 14 percent. Biomass provided less than 3%, and geothermal and hydropower each comprised less than 1% of installed generation capacity in the U.S. during this timeframe. The cost of electricity from a green system remains high relative to the cost of electricity created by gas or coal generators.

ELECTRICITY DELIVERY

Power outages cost the U.S. economy \$18 billion to \$33 billion per year. The average U.S. power plant is 30 years old, while 70% of the grid's transmission lines and transformers are at least 25 years old. Modernizing the U.S. grid system will cost \$673 billion by 2020, according to the American Society of Civil Engineers.

STABILIZE ENERGY COSTS

Unforeseen and uncontrollable circumstances can greatly affect gas and electricity prices that impact generators, suppliers, and customers. NTMA members are encouraged to mitigate risk exposure to volatile energy prices by using a fixed-price supply contract. Since 2001, NTMA has endorsed APPI Energy to provide data-driven procurement and consulting solutions. For more information, contact APPI at (800) 520-6685.



OkumaAppStore

PRODUCTIVITY CENTRAL



www.myokuma.com

Productivity improvements have never been faster, or easier. Just visit Okuma's App Store, the industry's only centralized online marketplace for machine tool apps, at www.myokuma.com. Download any of the 25+ apps and start seeing results. Even better, you can write your own apps to meet your unique requirements.

A few ways our apps streamline, simplify, and enhance operations:

- Reduce Scrapped Parts
- Reduce Downtime
- Diminish Labor Learning Curve
- Maximize Consumables Use
- Increase Part Quality
- Increase Productivity
- Enhance Ease-of-Use
- Improve Communication



Always Be Connected

MACHINE ALERT

The Machine Alert System will allow user to assign machine alarms to be sent to user by email, and text message to a mobile phone.

www.myokuma.com/machine-alert



Paper Is Obsolete

SCREEN BLOCKER

Paper is obsolete. Stop using it to cover the control screen when you don't want anyone messing with your machine.

www.myokuma.com/screen-blocker

**FOR AN IN-DEPTH DESCRIPTION OF POWERFUL PRODUCTIVITY ENHANCEMENTS, READ OUR NEW WHITEPAPER:
"MACHINE TOOL APPS: A MANUFACTURING DEFINITION," AVAILABLE AT WWW.OKUMA.COM/WHITE-PAPERS**

Arizona CNC Equipment
www.arizonacnc.com

EMEC Machine Tools, Inc.
www.emecmt.com

Gosiger
www.gosiger.com

Hartwig, Inc
www.hartwiginc.com

HEMAQ
www.hemaq.com

Morris Group, Inc.
www.morrisgroupinc.com

Thomas Skinner & Son, Ltd.
www.thomasskinner.com

THE NEW NLRB “AMBUSH ELECTION” RULES BECAME EFFECTIVE ON APRIL 14, 2015

WHAT IMPACT WILL THESE RULES HAVE ON UNION ELECTIONS AND WHAT STEPS SHOULD YOUR BUSINESS TAKE TO DEFEND ITSELF?



Effective April 14, new NLRB rules will, among other things, require that elections be held within 10-21 days of the filing of a petition, limit the scope of pre-election hearings and expand employee contact information employers must provide to a union. As a result, the ability of an employer to effectively campaign after a petition is filed will be greatly diminished.

Consider the impact this change may have on the likelihood of a union successfully organizing your employees:

Based on data over the last ten years, under the new NLRB rules unions will have between an 86% and an 89% chance of winning an election! So, what can your business do to defend itself against these new rules?

Because businesses will no longer have the opportunity to run a meaningful campaign after a union files a petition, businesses must be proactive and remember that the best defense is a good offense. This strategy should include:

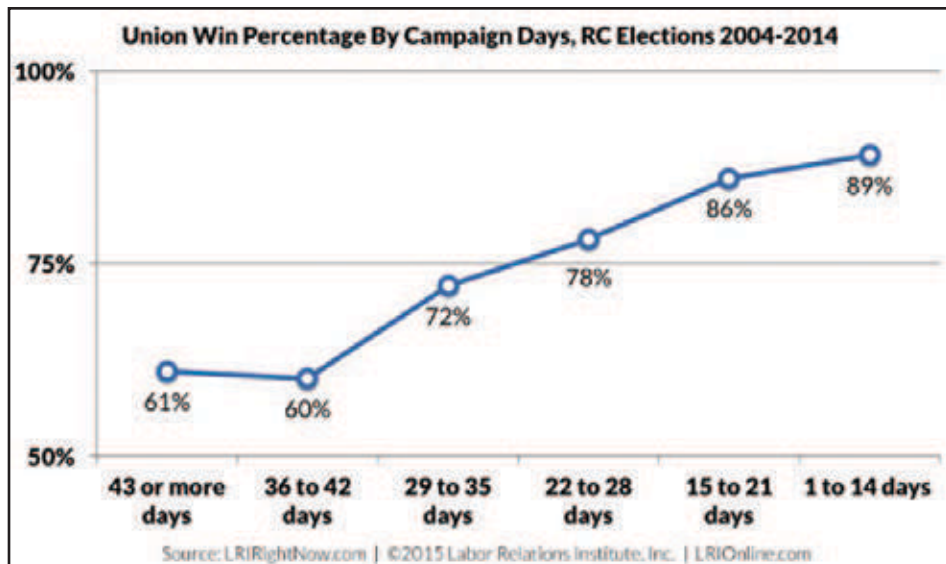
- Training supervisors about the warning signs of unionization, union finances, decreasing union membership, collective bargaining and strikes, AND what they can lawfully say and do, so they can properly respond to employee issues and questions;

- Reviewing and updating your employee handbook to ensure it comports with current NLRB law and contains critical policies such as a process for resolving grievances, open door policy, solicitation/distribution, etc.; and

- Improving communications and relationships with employees. This can include regular plant, department, shift and one-on-one meetings, round table discussions, quality circles, newsletters, etc.

In other words, treat your employees as one of your company's greatest assets, which they are!

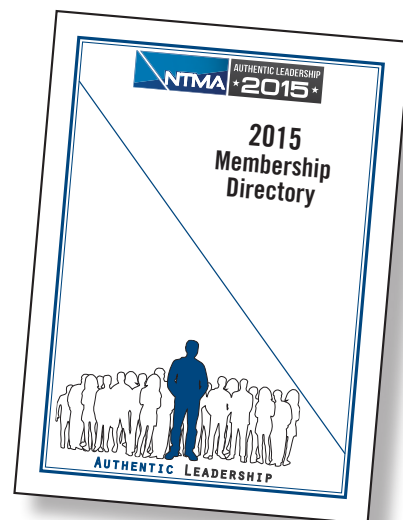
To learn more about how to proactively protect your business against the new NLRB ambush election rules, please contact McMahon Berger at (314) 567-7350.



NTMA'S 2015 MEMBERSHIP DIRECTORY – ONLINE

ACCESS THE DIRECTORY ANY TIME,
ANY PLACE - WWW.NTMA.ORG

Did you know this important tool is available online? Just log into the Members Only section of the website and look under “Resources.” NTMA members: you can even sign up now to receive your membership directory online or to request information on advertising in the 2016 directory. Contact Sandy Bailey (sbailey@ntma.org) for more information.



THE NTMA EDUCATION TEAM

Some NTMA leadership happens at the Team level, as member volunteers drive many of the projects and events that happen each year. Throughout 2015 The Record will feature overviews of the various NTMA Teams.

Michael Kerwin (President of the NTMA Training Centers of Southern California) is the team leader for the Education Team. The Education Team is a sub-team under the Workforce Development Team.

VISION:

To be the center of knowledge for education/training for our industry.

PURPOSE:

To increase the availability and skill level of human resources for U.S. Precision Custom Manufacturers.

The Education Team believes that there is a lack of defined paths that lead to great careers in Manufacturing.

Recruiting and training the next generation is the biggest problem our members face. We constantly hear how difficult it is to fill open positions. Not only are the proper skills in short supply, young people who would do well in our industry have been misled into believing brighter futures lie elsewhere.

At the same time, training our existing workforce – growing their skills and keeping them current on new technology – remains a pressing need.

NTMA is combating these issues through education and awareness, combined with a healthy dose of innovation.

NTMA-U:

NTMA-U offers a path to Journeyman's certification, recognized by the Department of Labor; it also offers modular courses that enhance skill-sets. These courses include but are not limited to: Blueprint Reading, Math, Precision Machining Technology, etc.

THE NATIONAL ROBOTICS LEAGUE:

Our flagship program provides a key link between students (middle school, high school and college), educators and NTMA members. Through robotic competition, students forge partnerships with manufacturers and, as a result, many find bright futures in manufacturing careers. This program falls under federal and state Science, Technology, Engineering and Math (STEM) development efforts

and many chapters are eligible for public funding. Not only is it deeply valuable to NTMA's future but it's "so much fun, it's inhuman." This year's National Championship will be held in Cleveland, Ohio, May 15-16.

NTMA PUBLICATIONS AND MATERIALS:

The Team is reviewing NTMA's publications to update/edit where necessary. The Team will also look at the possibility of formatting them into an easily deliverable electronic package.

SCHOLARSHIPS:

The Team also solicits and reviews scholarship applications, and then recommends recipients to the NTMA-Foundation.

These include The Brock Babb Memorial Scholarship and the Edwin Vobeda Memorial Scholarship.

Remember this: "It takes a vil-

lage" as we forge partnerships between Education/training and Manufacturers.

EDUCATION TEAM MEMBERS:

Michael Kerwin:

Education Team Leader

Kevin Ahaus:

Workforce Development Team Leader

Phyllis Miller

Joe O'Dell

Rich Ditto

Tim McCord

John Dalrymple

Pat Walsh

Eric White

Hank Epstein

Christine Jensen

Ken McCreight (NTMA Vice President – Team Staff Rep)



MITTLER BROTHERS AND ST. LOUIS CHAPTER DONATE MEETING FUNDS TO NTMF



The St. Louis Chapter's April 7 meeting was a combination plant tour/chapter meeting, hosted by Mike Mittler at Mittler Brothers Machine & Tool Company. The word was out around the region that this was an event not-to-be missed - over 125 people registered to attend the meeting. It was a wonderful evening – well received by all.

Mike generously chose to host the entire event, recommending that the Chapter donate all meeting proceeds (\$3200) to the NTMA Foundation (NTMF). Mike said "It is important that we invest now to support the Foundation's and our industry's future."

As former NTMA Chairman (2006) and a member of the NTMF Board of Directors, Mike knows first-hand about the work of the Foundation. NTMF Foundation's mission is to secure flexible and reliable sources of funding to support high quality education, technical training and leadership development for the next generation of career professionals in manufacturing technology.

For more information on how you can support NTMF, contact NTMF Chairman of the Board, Jeff Kelly or go to www.ntma.org/initiatives/foundation/



ERP that **works where you do**

"When you have a robust system that you can access anywhere, the constraints start to fall off. The creativity that was infused into our company and, more importantly, our culture by moving to Epicor Solutions in the cloud was absolutely incredible."

Michael Chirchirillo, Operations Manager, Chirch Global Manufacturing

Software should inspire your business, not complicate it.

ERP | SCM | CRM | MES | BI | HCM | Financials | InventoryControl | Mobile | Social | Cloud

epicor.com/manufacturing

EPICOR
Business Inspired®

Copyright © 2015 Epicor Software Corporation. Epicor and Business Inspired are trademarks of Epicor Software Corporation, registered in the United States and certain other countries.

NTMA FALL CONFERENCE

St. Louis , MO

October 21-24, 2015



Sponsoring Opportunities Now Open

Contact Tiffany Bryson • tbryson@ntma.org

Already on Stage:

EPICOR

+GF+

DMG MORI

SNK

EDGE
TECHNOLOGIES

tai PRECISION
METALS

BIG KAISER
PRECISION TOOLING INC.

fives
ultimate machines
ultimate factory

CGTECH.com

HARTWIG
Manufacture with Passion

AEROTEK
People. Fit. Perfectly.

OKUMA

NTMA
ST. LOUIS
CHAPTER

GRAINGER
FOR THE ONES WHO GET IT DONE

INDEX TRAUB

PAULO

WALTER

DOOSAN

NEW WHITE PAPER FROM OKUMA DETAILS THE PRODUCTIVITY AND PROFITABILITY OF USING MACHINE TOOL APPS



MACHINE TOOL APPS SIMPLIFY OPERATIONS ON A CNC MACHINE AND ITS CONTROL.

Apps make life easier and more productive and the same can be said for machining. Using apps on a CNC control is one of the simplest, fastest ways to make significant productivity gains quickly resulting in increased profitability. Machine tool apps

are easily accessible and can be customized to suit particular machining needs to improve communication, speed up operations, improve quality and optimize productivity. They can be developed by the user or any third-party developer (e.g. machine tool accessory providers, operators, programmers, or IT specialists).

A new white paper published by Okuma America Corporation, titled Machine Tool Apps: A Manufacturing Definition, explores how apps have become commonplace in

people's personal lives and are now available to manufacturers to assist in improving their business lives. The whitepaper is available for free download at <http://www.okuma.com/wp-machine-tool-apps>.

The ability to use apps is made possible by Okuma's revolutionary

THINC®-OSP CNC controls.

Okuma's OSP CNC controls use a Windows®-based open architecture platform, and therefore are fully integrated, allowing for true customization to suit particular machining needs. Existing machine tool apps have been developed by Okuma members, distributor engineers, members of Partners in THINC and even customers.

Practical Benefits of Machine Tool Apps

A few significant productivity-enhancing benefits are:

- Reduced Scrapped Parts
- Reduced Downtime
- Diminished Labor Pains
- Maximum Use of Consumables
- Increased Part Quality
- Increased Productivity
- Ease of Use

Okuma's App Store is the industry's only centralized online marketplace for machine tool apps and related content. It currently offers more than 29 apps available for various functionalities ranging from CAD/CAM software, measurement and gaging to security and tooling. All of Okuma's machine tool apps are designed to enhance productivity and efficiency.

You can also view our how to install an Okuma machine tool app video demonstration at <https://www.youtube.com/watch?v=fVYwBXm3y4>. For more information on Okuma machine tool apps visit <http://www.myokuma.com>.



Save the Date!



Date | Wednesday, June 24

Where | CBIZ Corporate Headquarters
6050 Oak Tree Blvd. Suite 500
Cleveland, OH 44131

Cost | NTMA MEMBERS

\$400 - Early Bird Member Rate *Deadline 6/3/15*

\$475 - Regular Member Rate

NON-MEMBERS

\$525 - Non-Member Rate

Continental Breakfast & Lunch Included

Welcome Reception:

Tuesday, June 23 - 6:00pm

CFO Roundtables
Sponsored by:



®

For more information or to register contact Brittany Belko (bbelko@ntma.org) or phone 216-264-2848

"SINCE INVESTING IN MAKINO EQUIPMENT, OUR REVENUE HAS GROWN MORE THAN 14 TIMES."

"TO SUM IT UP, WE'RE RUNNING MORE PARTS WITH BETTER QUALITY, FASTER THAN AT ANY OTHER POINT IN THE COMPANY'S HISTORY."

"[MAKINO] HAS GIVEN THE COMPANY A 200 PERCENT INCREASE IN SALES PER EMPLOYEE."



Profit. After all is said, all is done and everything has shipped, it's why today's leading manufacturers choose Makino.

Because when you make what matters, making it with Makino is the surest path to profitability. Just ask the companies that are already there. Read their stories. Watch their videos and cutting demos at [Makino.com/profitability](https://www.makino.com/profitability).





2014 NTMA Safety Award Winners

AccuRounds.....	Boston Chapter	Major Tool & Machine.....	Indiana Chapter
Advanced Tooling Specialists, Inc.	Milwaukee Chapter	MIC Group LLC	Houston Chapter
Allied Specialty Precision Inc.	Michiana Chapter	Micor Industries LLC.....	General
Apex Tool & Mfg., Inc.....	Indiana Chapter	Milco Wire EDM, Inc. dba Milco Waterjet Los Angeles Chapter	
Applegate EDM	North Texas Chapter	Mitchell Machine, Inc.....	Western Massachusetts Chapter
Applied Engineering, Inc.	General	Mittler Bros. Machine & Tool.....	St. Louis Chapter
Armin Tool & Manufacturing, Inc.	General	Moseys Production Machinists, Inc.	Los Angeles Chapter
Beaver Tool & Machine Company	Philadelphia Delaware Valley Chapter	Nolte Precise Manufacturing.....	Tri-State Tooling & Machining Association
Bendon Gear and Machine, Inc.....	Boston Chapter	North Easton Machine Co., Inc.....	Boston Chapter
Betar Incorporated	Philadelphia Delaware Valley Chapter	NuTec Tooling Systems, Inc.	Northwestern Pennsylvania Chapter
Bogue Machine Company.	New Mexico Chapter	O-D Tool & Cutter, Inc.....	Boston Chapter
C&R Manufacturing Inc.	Kansas City Chapter	Overton & Sons Tool & Die.....	Indiana Chapter
Cardinal Machine Company	Cleveland Chapter	Patterson Mold and Tool.....	St. Louis Chapter
Colonial Machine Company	Akron Chapter	Ponderosa Industries	Rocky Mountain
Criterion Tool.....	Cleveland Chapter	QME Inc - Quality Mold & Engineering.....	Michiana Chapter
Dekalb Tool & Die	General	R&M Manufacturing Company	Michiana Chapter
Designs For Tomorrow, Inc.	St. Louis Chapter	RM Machining, Inc.	San Francisco Bay Area Chapter
Disposable Instrument Company	Kansas City Chapter	RS Precision Industries, Inc.	General
DPI Inc.....	Philadelphia Delaware Valley Chapter	Sattler Companies	Akron Chapter
DRT Holdings, Inc.	Dayton Region Manufacturers Assn.	Southeastern Technology	Tennessee Chapter
Exact Tool & Die, Inc.....	Cleveland Chapter	Southern Manufacturing Tech., Inc. Florida West Coast Chapter	
F.H. Peterson Machine Corp.....	Boston Chapter	Stuart Tool & Die, Inc.....	General
Fitz Machine Inc.	Boston Chapter	Systems 3, Inc.	Arizona Chapter
FM Machine Company.....	Akron Chapter	The Lloyd Company.....	Houston Chapter
Fox Valley Tool & Die, Inc.....	Milwaukee Chapter	ThermoFusion, Inc.....	San Francisco Bay Area Chapter
Great Western Grinding, Inc.....	Los Angeles Chapter	Trec Industries, Inc.....	Cleveland Chapter
Grind All Inc.	Cleveland Chapter	Tri-Craft, Inc.....	Cleveland Chapter
Hans Rudolph, Inc.....	Kansas City Chapter	United Centerless Grinding & Thread Rolling.....	Connecticut Chapter
Hellebusch Tool and Die	St. Louis Chapter	United Tool & Machine Corporation	Boston Chapter
Horst Engineering	Connecticut Chapter	United Tool and Engineering, Inc.	Michiana Chapter
Howard Tool Company	Boston Chapter	Upland Fab, Inc.	Los Angeles Chapter
JD Machine Corp.	Northern Utah Chapter	Warmelin Precision Products	Los Angeles Chapter
Jig Grinding Service Company, Inc.....	Cleveland Chapter	WESCO Laser Machining	Rocky Mountain Chapter
Kentucky Machine and Tool.....	Louisville Chapter	West Hartford Tool & Die Company, Inc. Connecticut Chapter	
Kuhn Tool & Die Company.....	Northwestern Pennsylvania Chapter	Western Gage Corporation.....	San Fernando Valley Chapter
Laser Tool, Inc.....	Northwestern Pennsylvania Chapter	Win-Tech, Inc.....	General
Layke Inc.	Arizona Chapter	Wire Tech EDM, Inc.....	Los Angeles Chapter
M&H Engineering Company, Inc.	Boston Chapter		
Mahuta Tool Corp.	Milwaukee Chapter		

The annual Safety Award identifies top-performing NTMA companies in the area of safety, based on survey responses submitted earlier this year. The survey incorporates data from OSHA Form 300A, Summary of Work-Related Injuries and Illnesses.

Congratulations, Safety Award winners!

HR ROUNDTABLE PROVIDED VALUABLE INSIGHT



HUMAN RESOURCES
ROUNDTABLE

Modern Industries (Phoenix, AZ) hosted the March inaugural HR Roundtable, with attendees from Illinois, California, Utah, Arizona and Colorado. These HR professionals took a lot away from the presentations and networking opportunities; some very much appreciated the opportunity to gather with their peers in an intimate setting. The Roundtable was sponsored by Aerotek.

Jeanne Gladden (The Quality Coach) opened the day with a 2-hour workshop titled "Job Match... A Key Element of the Topgrading Process." Participants learned how to use DISC behavioral style assessment information to determine the match between a candidate and a job's requirements. Sharon Moyer (Attorney, Sacks Tierny P.A.) and Steve Rees (Benefits Consultant, CBIZ) also made impactful presentations.

Daniel McKee (Rockford Toolcraft, Rockford, IL) noted that "The NTMA HR Roundtable was a great opportunity for me to learn as well as to network. The presenters were knowledgeable. The event was well organized. I can't wait for the next one!" Daniel's enthusiasm was echoed by Maddie Wardle (JD Machine, Ogden, UT), who



Left: Mark Lashinske
(Modern Industries)
and Austin Mills
(Aerotek)

Below: Jeanne Gladden
(The Quality Coach)

said "I thoroughly enjoyed the HR Roundtable. I found each of the presentations made extremely valuable and relevant to the industry. It was so nice to network with other HR professionals within the industry, as we are all facing similar situations. I will definitely make the HR Roundtable a priority in the future."



SAVE AT LEAST 70% ON LTL FREIGHT SHIPMENTS ARRANGED THROUGH PARTNERSHIP®!

NTMA members save substantial money on every LTL freight shipment sent or received through PartnerShip. These savings are free as part of your membership in NTMA.

- PartnerShip works with the most reputable carriers, including UPS Freight, YRC Freight, Con-way Freight and many regional carriers.

- Using PartnerShip LTL freight services, you to save at least 70% on every shipment over 200 lbs. you send or receive.

- You'll also receive consolidated invoicing, a dedicated PartnerShip representative, inbound shipment management and

routing services, and access to our 24/7 online shipping tools at PartnerShip.com.

This tip is brought to you by PartnerShip®, the company that manages the NTMA Shipping Program. For more

information or to enroll, email sales@PartnerShip.com or call 800-599-2902.



SALES & MARKETING
WORKSHOP

CONNECTICUT

NTMA SALES & MARKETING WORKSHOP

WEDNESDAY JULY 29, 2015

Hosted by Mazak

MAZAK-NORTHEAST TECHNOLOGY CENTER
700 OLD COUNTY CIRCLE
WINDSOR LOCKS, CONNECTICUT 06096

8:00AM - 4:30PM

Sponsored by:

Mazak
Your Partner for Innovation

Registration Rates
Members- Early Bird: \$500
Members- Regular: \$575

Continental Breakfast and Lunch included

Welcome Reception & Dinner on Tuesday July 28th

To register or for more information contact Kristen Hrusch • 216-264-2845 • khrusch@ntma.org

OCEC FINANCIAL BENCHMARKING STUDY

The NTMA Operating Costs and Executive Compensation (OCEC) is a benchmarking process of comparing the costs of what one precision machining shop does against what another shop does. The result is a business case for making changes in order to make improvements.

The exhibit at the right shows NTMA median results for the past several years, the solid black line, and the “High Profit” NTMA member’s results, the dotted line.

It is worth noting that the High Profit group in the industry earned 3-4 times more profit in good times and in bad. The High Profit group is the top ¼ of all NTMA members that participated in the OCEC. If one in four companies in the industry can achieve those results, it is a reasonable, attainable goal for the other ¾ of the companies in the industry.

How it works—The OCEC survey was sent to each NTMA member company in late February. Because your company returns the survey directly to Mackay Research Group, no one from NTMA or its staff has access to specific company data. Participant data is aggregated in a manner that prevents identification of any individual company.

ONE SURVEY: TWO REPORTS

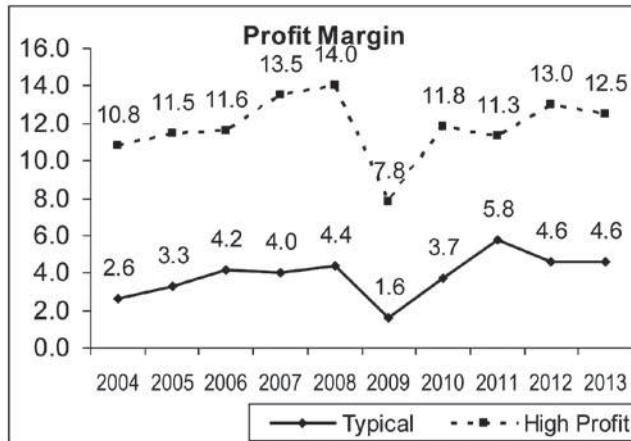
1. Operating Costs Report — This report is a profitability or cost of doing business study of NTMA members designed to obtain, understand and analyze “best practices” in the precision custom tooling

Report examines issues relating to reasonable compensation by analyzing the range of pay, including base salary, bonus, benefits and perks, that executives earn in the precision custom tooling and machining industry.

WHAT'S IN IT FOR YOU?

Individual Company Report — Each survey participant receives an individual Financial Performance Report analyzing your company. This report compares your financial performance to industry standards to others in the same line of business category (Tools & Dies, Molds, General Precision Machining, Aerospace Machining, Special Machines, Production Operations and Sheet Metal Fabrication) and to others in the same sales volume group. In order to protect your confidential data, Mackay Research Group sends this report directly to you. And it's free to you through NTMA!

To ensure a comprehensive report, NTMA needs your participation. Be sure to send in your OCEC response by May 31st.



& machining industry. It can help you improve your financial results by establishing “typical” financial performance targets and by analyzing how “high-profit” companies in the industry achieve their success.

2. Executive Compensation Report — Closely-held corporations are often the target of IRS “reasonable” compensation challenges. The Executive Compensation

NTMA MEMBER ADDED VALUE: NTMA-U DIMENSIONAL METROLOGY: APPLICATIONS AND TECHNIQUES

\$249 – now for a limited time only \$199

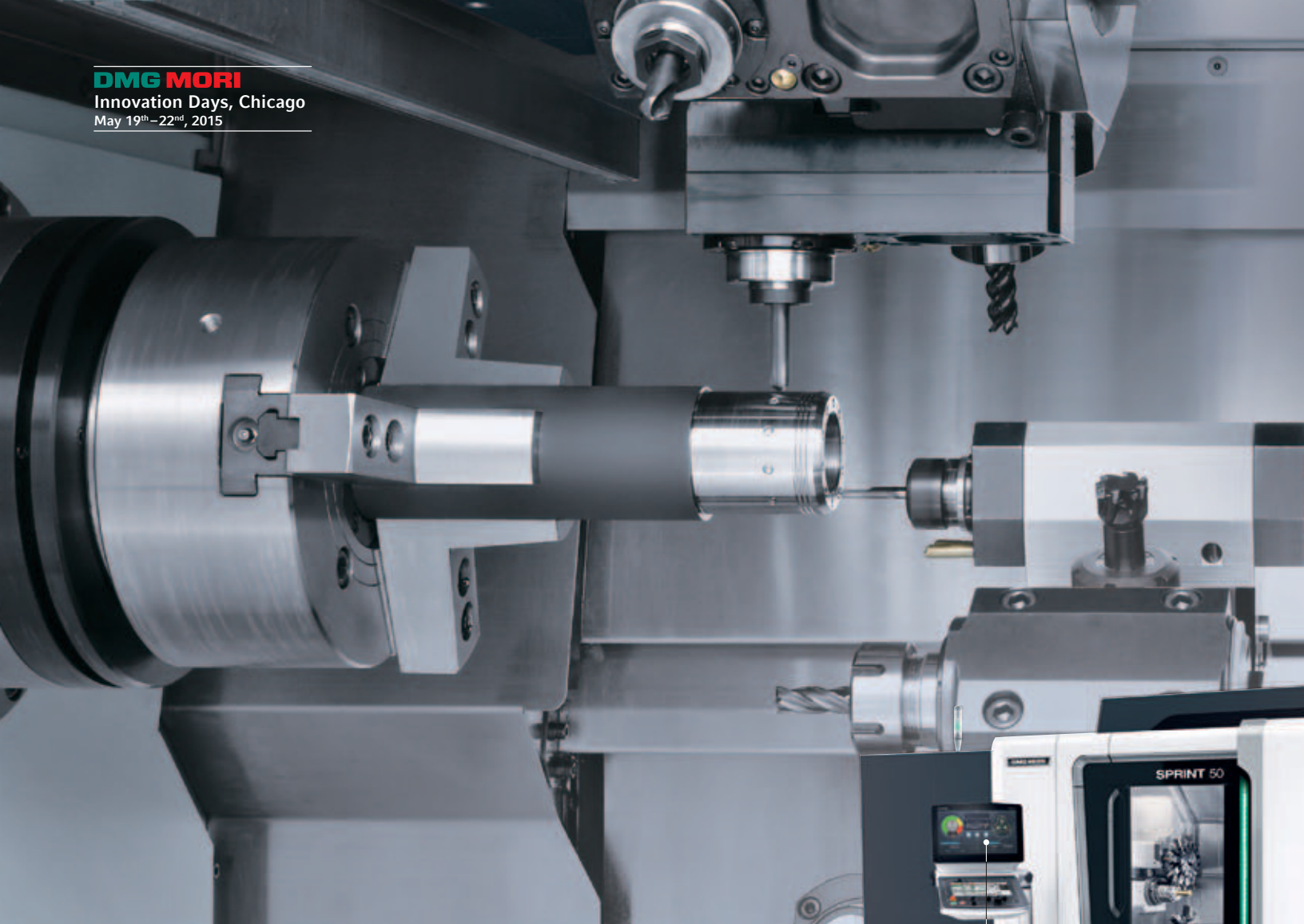


NTMA-U Dimensional Metrology is a 38-topic course in quality control and measurements. The course presents manufacturing measurement sciences for NTMA member employees who wish to learn or refresh their skills in the basics of tooling and techniques required for reliable quality control of measurement. The course covers a wide variety of related topics that apply to the measurement principles, with best practices and fundamentals of quality control manufacturing applications.

The course objective is to develop awareness and knowledge of basic skills necessary for quality control measurement applications. The course demonstrates safety, the proper use of common precision measuring tools, measurement applications for Geometric Dimensioning and Tolerancing (GDT) and measurement quality control.

Specific Topics include: Intro an overview of metrology / safety/ drill press/ units of measure- metric-SI / metric conversion / universal unknown errors, and random variables / metrology probability / blueprint basics / SPC / GD&T - terms and concepts - true position-straightness-feature control frames - profile of a line and surface - orientation tolerance – angularity – perpendicularity - MMC – position - runout - location / basics of CMM / Probes / dial calipers / micrometers / comparison measurement / gauges / surface finish, and basic parameters / portable measuring arm / metrology calibration - verification and validation / tricks and tips in Microsoft Word.

For more information or to take advantage of this limited-time offer, please contact Ken McCreight (kmccreight@ntma.org) or (216) 264-2834.



SPRINT 50 | **NZX 2000|800**

PRODUCTION TURNING

Production turning with up to 3 turrets and 3 Y-axes.

CELOS[®]
from DMG MORI



Technical information & brochures
available at: www.dmgmori.com
or through your local DMG MORI USA representative



1-855-364-6674
Support around the clock!

Production turning



CELOS®
from DMG MORI

SPRINT 50

- + 4-axis production turning of bar materials with max. 2.0 in. diameters
- + Machine options: 2 turrets, 2 turrets & TWIN, 3 turrets, or 3 turrets & B-axis

Nozzle // Hydraulics

Material: Stainless steel (AISI 303)
Dimensions: $\varnothing 1.9 \times 2.4$ in.
Production time: 3 min., 30 sec.



NZX 2000 | 800

- + Serial part measuring up to $\varnothing 12.6 \times 31.9$ in., 8-inch chuck, bar machining for max. 2.6 in. diameters
- + BMT® turret for max. 12,000 rpm. milling with up to 16 driven slots

Cam // Power tools

Material: ETG100
Dimensions: $\varnothing 2.4 \times 1.6$ in.
Production time: 5 min., 12 sec.



DMG MORI



THE RECORD

NATIONAL TOOLING & MACHINING ASSOCIATION

1357 Rockside Rd.
Cleveland, OH 44134



**Good luck to all NRL teams -
students, teachers and mentors!**