

THE RECORD

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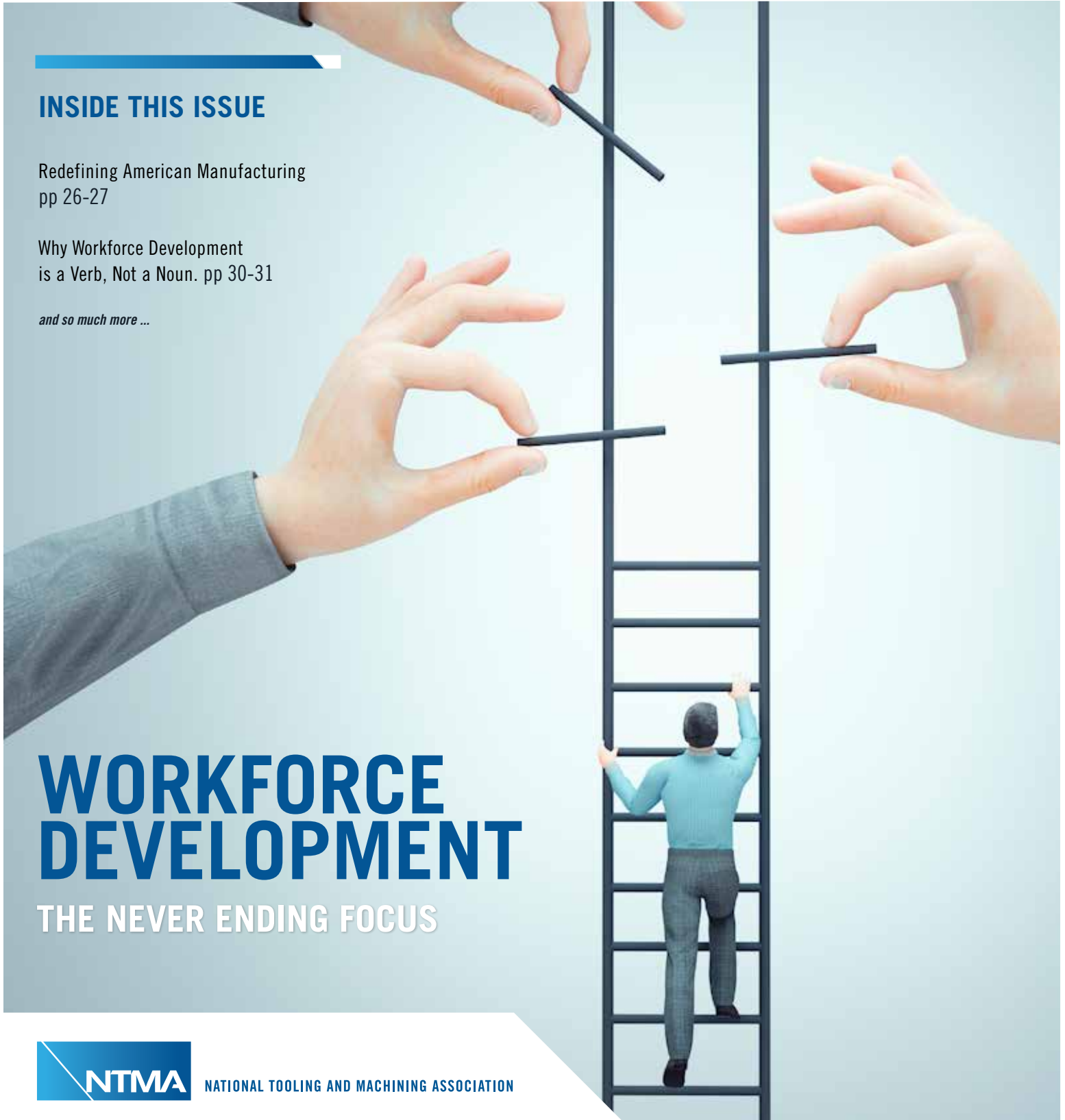
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and so much more ...

WORKFORCE DEVELOPMENT

THE NEVER ENDING FOCUS



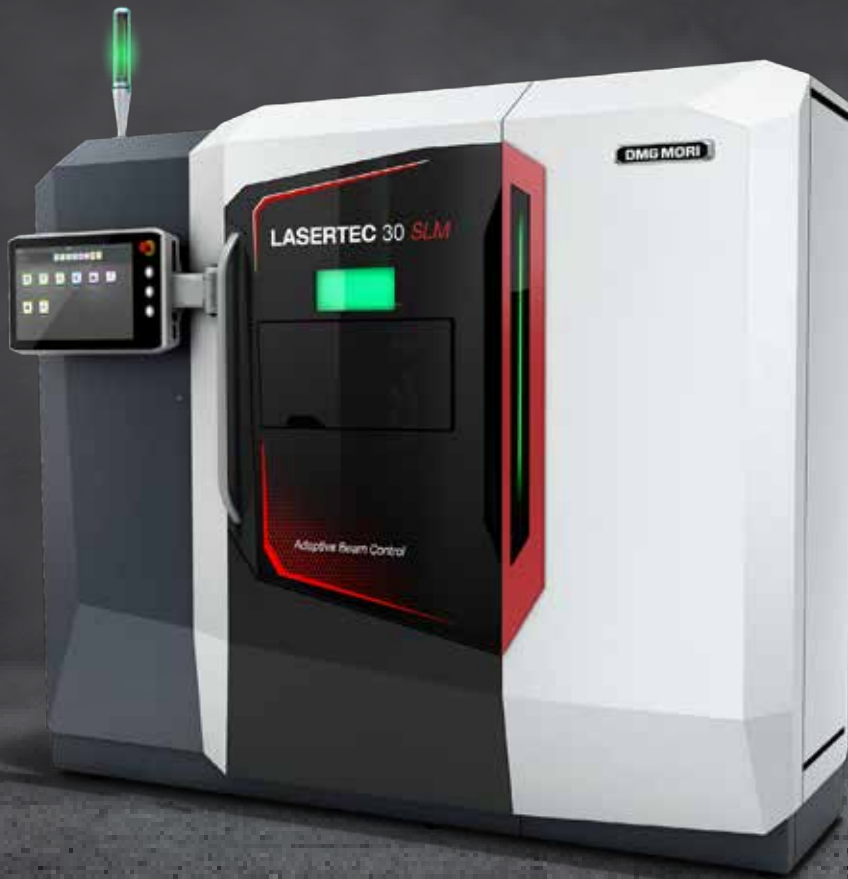
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SEND US YOUR STORY

Each issue of The Record will feature stories from members – and we want to hear from you. Send us stories of success, or those that fit the theme of the month's issue. The submission deadline is the first of the month prior to publication. Contact editor@ntma.org or call 800.248.6862.

FUTURE THEMES

December 2023: The Value of Membership

January 2024: NTMA Member Value and Vision for 2024

UPCOMING NTMA EVENTS



Chapter Leadership Summit 2024
January 17-19, San Antonio, TX



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March 20-22 Greenville, SC



Engage 2024
October 16-19, Nashville, TN



PRESIDENT'S UPDATE

Workforce Development...A Never Ending Focus

As I write this month's Record article, I have just returned from attending AMT's MTForecast Conference where industry leaders, economists, and futurists presented information, insight, and forecast. So when I think about this month's focus "**Workforce Development...A Never Ending Focus**," it seems to indirectly tie into much of what I heard at the MTF Meeting. Whereas many referenced or spoke directly on the "workforce" issue, their focus was more on "us the employers" rather than "those to be employed." Sound backwards? Maybe, but I hope to make sense on what I heard.

The underlying thoughts of the presentations at the MTF Meeting were that we spend too much time trying to change the thinking of potential employee's instead of taking the time to create a place of employment that people are "**drawn too**" and not "**convinced of**." Let's look no further than the 2023 MFG Day this past October 6th. In a recent meeting with multiple shops across the country, the woes of the "workforce" were again an issue, but when asked how many opened their shops during MFG Day, on a couple shops said yes.

One shop even described their shop as a dirty old shop and no way would open their shop for MFG Day. Yet in both cases, neither addressed their workforce problems. For anyone not opening their shops on such a nationally recognized day, was a lost opportunity.

Other challenges discussed at the MTF Meeting were the lack of "change", the lack of "engagement", and the lack of "technology", which also hinders attracting a new generation workforce. I think small-to medium-sized businesses across the country lack the focus and the importance of telling their personal and company's stories. We miss the fact that our stories are meaningful, attracting, and inspiring potential workers to want to be a part of our companies. The fact is, millennials want to be paid well, if not better than well. They have the attitude of wanting to save the world/society and to contribute to that through their work.

Bottom line: if they cannot connect those dots in our shops, they most likely will not enter the manufacturing industry

The fact is, millennials want paid well, if not better than well. They have the attitude of wanting to save the world/society. Their mission in life is to save the world/society. So bottom line is if they cannot connect those "DOTS" in our shops they most likely will not enter the manufacturing industry.

Other discussions include opening our company opportunities to different people groups/communities that we have not given much attention to in our past recruiting efforts. Such as women, previously incarcerated, high-functioning persons with learning

disabilities, and people of different color/race, and gender. Let's remember, our goal is "building a workforce" not "building a workforce that looks and thinks like us." We live in a world of **CHANGE**, and therefore **CHANGE** is no longer a must, but rather a necessity. In our recent NTMA survey the number one challenge identified by you the member was "recruitment and retention". If that is indeed the number one challenge, should we not give it our number one attention? In all other aspects of our companies, if we have a problem, we "together" find a solution. Unfortunately, in the case of recruitment and retention, to date, we have not given it the same attention we have given to challenges related to manufacturing-related issues. If we do not see recruitment and retention as a manufacturing problem, the problem will never be solved. Don't let the industry pass you by because of your unwillingness to change.

We must have, or get our own houses in order, our company stories told, and our company messages changed. Our shops must be inviting, we must be inclusive, must be clean, must be organized, and must have a united purpose. Change in most companies must start at the top. If those at the top do not change, the people below them only work themselves to frustration and eventual burnout, none of which helps our companies or industry.

YOU CAN HELP TODAY, SIMPLY REFER A MEMBER TO NTMA.

New people want to see opportunity, want to see opportunities for advancement, want to see management's commitment to success. A company's commitment, or lack of commitment to technology speaks volumes to potential employees. Let us not forget that AUTOMATION is too a part of our workforce solutions. Doing more work with the same number of people. You don't have to have all the answers when thinking about automation, we have industry partners committed to help you.

Only 15 companies took advantage of our recent HR Cohort with Chris Czarnik. In one case, the company person attending said that they incorporated what

Chris had taught in the cohort to their recruiting efforts and received the most inquiries ever for two open positions. Thinking the old way of recruiting or advertising or word of mouth is going to carry us into the future is futile. Reality is, **if we don't change will we not survive.** In a time where technology and challenges are changing so quickly, it will force you to change or it will crush you.

Obviously, for every negative example that I mentioned in this article, they are offset by the majority of proactive companies throughout NTMA that are incorporating these strategy changes and are prospering as a result. Our industry needs all

companies to prosper and I believe working together will result in success for us all. As the old saying goes **"A Rising Tide Lifts all Boats."** Let's raise the tide for all US Manufacturers.

Like all challenges in life or business, it takes leadership to get us through. NTMA continues to focus on solutions by **"ADVANCING MANUFACTURING'S FUTURE"** for, and with our members.



Roger Atkins, President – NTMA

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Since its founding in 1949, SPINNER has become known by its customers around the planet for the high-efficiency, precision, and reliability of its CNC machine tools. Today, although it remains a family owned business, SPINNER produces and sells more than 1,000 CNC lathes and machining centers per year from its facilities in Sauerlach, Germany, and its other facilities across Europe. That number is increasing every year. In addition, SPINNER's automation division produces turn-key automation solutions from its facility in Markgröningen, Germany.

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MACH 3 MACHINING Akron Chapter



MACH3, an Alloy Engineering Company, is a newly developed employee-owned company stemming from a collaboration of Hall Machine, Alloy Engineering's Wellington located Machine Shop, and J&J Precision Machining. The MACH3 name symbolizes machining, speed, and the consolidation of these three locations into one facility located off the Howe Rd exit in Cuyahoga Falls. Our specialty is large machining, notable examples such as turning diameters up to 192" OD and lengths up to 37.5' long. We also pride ourselves as a leader in welding of exotic and abnormal alloys with many certifications developed by our own AWS-SCWI certified Vice President, Dan Logan.

We are excited to announce the start of our apprenticeship program which will cultivate the skilled trade market in this area. A few markets that we excel in are fan building, shaft manufacturing, and cable drums. Check out our website to see if there may be a fit for your projects as well. Our work library section shows examples of the size of parts we shine in.

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FASTEMS ANNOUNCED THE DELIVERY OF THE 1,000TH UNIT OF ITS FLEXIBLE PALLET CONTAINER

Fastems announced the delivery of the 1,000th unit of its Flexible Pallet Container (FPC). Designed 23 years ago to meet the need for fast-to-deploy and easy-to-purchase automation for virtually any horizontal milling machine tool, FPC has already been integrated into hundreds of machine tool models. Many OEM and contract manufacturers worldwide have taken their first steps toward automation with FPC and have made their high-mix production more efficient and profitable.



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GENERAL CARBIDE CELEBRATES THE LAUNCH OF ITS CAREER ACADEMY TO HELP TEAM MEMBERS GROW PROFESSIONALLY & PERSONALLY

In an effort to empower excellence among team members, General Carbide, a vertically integrated manufacturer of finished tooling, wear parts, and components for customers in more than two dozen market segments, recently marked the start of the General Carbide Career Academy (GCCA) with a breakfast attended by employees and members of the community. The GCCA consists of a series of in-depth eight-week training courses that General Carbide's plant managers have developed for new employees, and weekly classes for established employees, to hone their skills and develop new ones.

Courses offered during the new employee training sessions include Best Quality Practices for 5S Lean Manufacturing; Use of Calipers & Micrometers; Math for Manufacturing; CNC Programming, Milling & Lathe; and Print Reading. In addition, the GCCA will offer professional development classes on a variety of subjects, including Advanced Machining, Training with Live Tooling, G-Code, Leadership, Communication, and Safety.

"We created the GCCA to empower excellence among our employees," says Mona Pappafava-Ray, General Carbide's President and CEO. "We want to give them the resources to be successful and grow in their careers at General Carbide all the way to retirement, and I am delighted that members of our community showed up to support this innovative effort."

The GCCA drives home General Carbide's commitment to enhance workforce development by creating an intentional space where all new employees can attend the in-depth sessions and also provides courses for the established workforce to hone in on specific areas in between the in-depth sessions. Additionally, the GCCA will further enhance the company's efforts to shorten the learning curve of high school students that General Carbide recruits out of school to begin their careers with the company upon graduation. Those individuals will also participate in the GCCA.



About General Carbide

General Carbide has four facilities and sells its products throughout the United States, Canada, Mexico, Europe, and Asia. The company was established in 1968 by Premo Pappafava (1926-2002) and is headquartered in Greensburg, PA, near Pittsburgh. Since 2002, Premo's daughter, Mona Pappafava-Ray, has been at the helm of General Carbide. After joining the company in 1986, upon completion of her Industrial Management degree at Carnegie Mellon University, Mona held numerous staff and management positions before she was named General Carbide's President in 1997.

As President and CEO, she has grown the company by transitioning from a manufacturer of semi-finished tooling to a leading producer of finished tooling. Mona has also led the company's efforts to acquire several

strategically significant businesses. Despite those changes, she has retained the family atmosphere that has been one of General Carbide's distinguishing features from the beginning. Throughout her career, Mona has been the recipient of numerous awards for leadership and philanthropy.

As a woman-owned business, General Carbide has achieved certification from the Women's Business Enterprise National Council (WBENC) and has received widespread recognition for business excellence. For more information, contact Denis Pasay at denis@generalcarbide.com or 724.672.4041.





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The TNC Club at HEIDENHAIN CORPORATION offers a unique community for users of CNC machining and controls. Primarily designed as a learning and loyalty program for end-users of TNC controls, this platform bridges the gap between TNC and CNC experts worldwide! It provides personalized training and interactive learning, extends application support, and garners valuable insights from its users for the development of future products.

Two membership levels are available in the TNC Club: Basic and Premium

The Basic membership is free and includes access to the TNC Club community, application help, and up to three free software licenses such as the DXF Converter /CAD Import or Remote Desktop Manager. Basic members also receive exclusive TNC Club news and event invitations, as well as access to more efficient technical and application assistance.

The Premium membership includes all of the benefits of the Basic membership, plus much more! For a yearly fee, Premium members can select from an additional free software option (OCM), numerous product and training discounts, and a free additional day with an application engineer for on-site training!

The Premium membership includes all of the benefits of the Basic membership, plus much more! For a yearly fee, Premium members can select from an additional free software option for organizational change management (OCM), numerous product and training discounts, and a free additional day with an application engineer for on-site training. Premium membership also offers custom virtual training with engineers, HIT licenses (interactive training) for every registered employee, a programming station (TNC or DATAPILOT), and three coordinate models. HEIDENHAIN Interactive Training, or HIT, is an online platform focusing on 3-axis and 5-axis machining. It offers comprehensive learning modules, guidebook PDFs, introductions to new products, control manuals, and webinars.



Joining the TNC Club is easy! Visit the TNC Club website and submit your registration. Our TNC Club Ambassador will personally reach out to you to complete the registration process and send your benefits.

In addition, the TNC Club offers a rewarding referral program for existing members and distributors of HEIDENHAIN products. Every TNC Club member is automatically entered in the Club Referral Program. By referring others who join the TNC Club you can accumulate points that can be redeemed at any time. Prizes include everything from small HEIDENHAIN branded merchandise to free training courses in-person or online. Distributors (who are ineligible to join the TNC Club) can also participate in the TNC community and receive benefits through the TNC Club referral program.

The TNC Club serves as a community and support network for TNC or CNC control users of HEIDENHAIN products, offering an array of learning resources, networking opportunities, and a rewarding referral program! Join our community and become a member of the TNC Club today!

About HEIDENHAIN

Dr. Johannes Heidenhain GmbH, headquartered in Traunreut, Germany, develops and supports motion control feedback solutions for machine tool, semiconductor, electronics assembly and testing, metrology, automation, medical, energy and other global industries. HEIDENHAIN employs approximately 8,700 people worldwide in its core business activities. The North American subsidiary is HEIDENHAIN CORPORATION, headquartered in Schaumburg, IL, and San Jose, CA.

More: www.heidenhain.us/about-us

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ARIZONA CHAPTER CAR SHOW AND GATEWAY COMMUNITY COLLEGE TRAINING FACILITY OPEN HOUSE

The NTMA Arizona Chapter, in partnership with Gateway Community College, held a Car Show Social and Precision Training Facility open house on Oct. 12 to celebrate Manufacturing Month. The event featured live machining demos, campus tours, free prizes, and some magnificent cars that were enjoyed by members, students, and teachers from across the Phoenix metro area.



1932 Ford Coupe / Dynamic Machine



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Arizona @ Work Table



Gateway training facility

A large, colorful promotional banner for the 'EMERGING LEADERS '24' event. The background features a scenic view of a city with a river and a bridge. The text 'Save The Date' is in large, stylized letters on the left, and 'MARCH 20-22, 2024 GREENVILLE, SC' is on the right. The main title 'EMERGING LEADERS '24' is in the center in large, bold, multi-colored letters. At the bottom, it says 'IN PARTNERSHIP WITH:' followed by logos for AMT, sme, tma, and NFFS.

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ONE VOICE: FEDERAL GOVERNMENT ADVOCACY PROGRAM

As US manufacturing continues to navigate the unique challenges and changes brought on by the last year – and a change in administrations – it remains important to have a partner in advocacy. NTMA helps provide this support by working closely with the team at One Voice: the

combined federal government advocacy program representing small- and medium-sized business manufacturing in the US.


With regulations, policy, and shop safety all constantly evolving, One Voice has a wealth of fantastic resources, developed to help keep your shop informed and prepared for whatever comes next. In addition to ongoing COVID-19 response information – in line with any and all changes that our industry may need to know – the team at One Voice also provides informative policy webinars, news releases, educational materials, video recaps, and much more.

Don’t forget about the Talking With One Voice podcast – every episode, the One Voice advocacy

team breaks down how the latest news from Washington impacts manufacturing businesses across the country.

It’s yet another way your shop can get quick, concise information on everything from tax development to loans and even workforce development issues. You can send in your key questions to be answered by emailing onevoice@policyres.com. We hope you continue to utilize this key partner in One Voice – one that ensures that millions of manufacturers across the country have their voices heard.

Please visit www.metalworkingadvocate.org for more information.



Enhancing Operator Training with Real-Time Monitoring

By: Barbara Shea, Director of Content Marketing, Datanomix

Real-time production monitoring goes way beyond operational benefits. It can play a critical role in improving the skills of machine operators.

1. Identifying Skill Gaps: By continuously monitoring machine performance, operators and supervisors can easily identify skill gaps and areas in which operators might require additional training. This proactive approach ensures that training is targeted where it is needed.

2. On-the-Job Training: Real-time monitoring data provides operators with on-the-job training by providing immediate feedback, showing them how to optimize their performance.

3. Customized Training Programs: With real-time data, training programs can be customized to address specific machine or process-related challenges. This

tailoring ensures that training is both relevant and effective.

4. Performance Incentives: Real-time monitoring data can be used to establish performance incentives for operators. This can motivate operators to continuously improve their skills and achieve higher productivity.

While real-time machine monitoring is a powerful tool for enhancing operator training, it is not without challenges:

1. Avoid Data Overload: It is important that your production monitoring system quickly and easily shows employees where they need to focus to get jobs back on track. Best practice would be to have large-screen TVs hung in the facility so operators could simply look up to see relevant data such as uptime, Takt parts, down machines, etc.

2. Address Operator Concerns: Some operators may initially resist the idea of monitoring, fearing “Big brother is watching.” Communication and education are essential to address these concerns and show how the system is a tool for operators and the organization to optimize their performance to stay competitive.

Real-time production monitoring is more than a tool for boosting operational efficiency; it’s a key to enhancing the skills and training of machine operators. By leveraging the data generated by these systems, companies can create a culture of continuous improvement and increased productivity. In today’s highly competitive manufacturing landscape, those who embrace real-time production monitoring and use it to enhance operator training will certainly gain a competitive edge.



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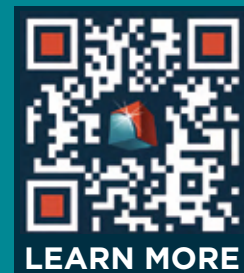


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Join me at McCormick Place in Chicago from September 9-14, 2024.



Reshoring Fuels U.S. Factory Construction Boom

By: Harry Moser, Founder/President, Reshoring Initiative®

A factory construction boom fueled by reshoring is surging in the US. The momentum is prompted by a US industrial policy push to boost domestic clean-energy manufacturing, by global supply chain risk, and by the Total Cost of Ownership (TCO) equation. Almost 60% of the spending is attributed to the construction of chips, EV batteries, and other manufactured electronics.

In April 2023 manufacturing's share of construction spending hit a 30-year high with another record high in May. US construction spending by manufacturers has more than doubled in the past year, reaching an annual rate of almost \$190 billion in April compared with \$90 billion in June 2022.

UNPACKING THE BOOM

A recent briefing from the U.S. Department of the Treasury, reviews the reasons behind the “doubling of real manufacturing construction spending since the end of 2021 and, [...] the near quadrupling of real construction spending on computer, electronics and electrical manufacturing.” Figure 1.

The Treasury Department notes that “the surge appears to be uniquely American,” i.e. other advanced economies have not experienced similar manufacturing construction surges. Although the prevailing component of the U.S. manufacturing boom is in the computer/electronics segment, it has not been offset by reduced spending in other manufacturing construction segments. Figure 2.

The Reshoring Initiative's data concurs on the magnitude and focus of the investment, with EV battery and semiconductor investments accounting for the largest portions of job announcements in 2022, a 53% increase from 2021. Manufacturing job announcements continued to outpace recent records, adding 101,500 jobs in 2023 Q1.

CLEAN ENERGY INVESTMENT

The investment and manufacturing construction phenomenon in the U.S. is unlike anything seen in decades. In the last year, companies have announced nearly 200 new projects totaling over \$110 billion of investment in clean energy projects. Maxeon Solar Technologies Ltd. plans to spend \$1.2 billion to build the biggest U.S. factory for polysilicon solar panels. Ford Motor Co. plans a \$3.5 billion electric vehicle lithium-ion battery plant in Michigan, creating 2,500 jobs. Automaker Hyundai and South Korean battery maker SK plan to set up a joint venture to build a \$5 billion battery plant in Bartow County, Georgia.

SEMICONDUCTOR ECOSYSTEM PROJECTS

To date, over fifty new semiconductor ecosystem projects and \$210 billion in private investment have been announced, which will reduce dependence on critical products and technologies from China. For example, Wolfspeed, Inc., a leading manufacturer of semiconductors, will create 1,800 new jobs with an investment of approximately \$5 billion over the next eight years in North Carolina. The semiconductor supply chain includes new semiconductor manufacturing facilities (fabs), expansions, and suppliers of the materials and equipment used in chip manufacturing. Chronic supply shortages threaten infrastructure, military defense systems, medical equipment, automobiles, and various electronic devices. Figure 3.

FUELING THE FACTORY CONSTRUCTION SURGE

U.S. policy has created favorable conditions for reshoring and FDI facility construction via the Infrastructure Investment and Jobs Act (IIJA), Inflation Reduction Act (IRA), and CHIPS and Science Act. Each one provides funding and tax incentives to spur on U.S. manufacturing where the U.S. has an excess dependency on imports.

Some of the states that have won manufacturing investment have provided state-level tax incentives, ensured the availability of shovel-ready sites and worker training, and invested in infrastructure. Shifts in the global supply chain via sustained disruption and geopolitical risk are driving more companies to use Total Cost of Ownership (TCO) estimating for location decision-making. Markedly rising wages in China, increasing U.S. use of automation, and new trade policies have “reduced the total cost gap between Asian production and nearshoring to almost zero.” Figure 4. It is clear from the report that the authors are using “nearshoring” to mean localization, including both reshoring, to the US and nearshoring to Mexico and Canada.

THE TCO EQUATION

Total Cost of Ownership is the best metric to use for comparative analysis. The Reshoring Initiative's TCO Estimator is a free online tool that helps companies account for all relevant factors to compare the true total cost of domestic and offshore sourcing and siting. These factors include overhead, balance sheet, risks, corporate strategy, and other external and internal business considerations. The Impact of Using TCO shows that shifting decisions from a price basis to TCO can be expected to drive reshoring of 20 to 30% of what is now imported.

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Real Manufacturing Construction Spending by Type

Figure 1. Source: Graphic courtesy of U.S. Department of the Treasury

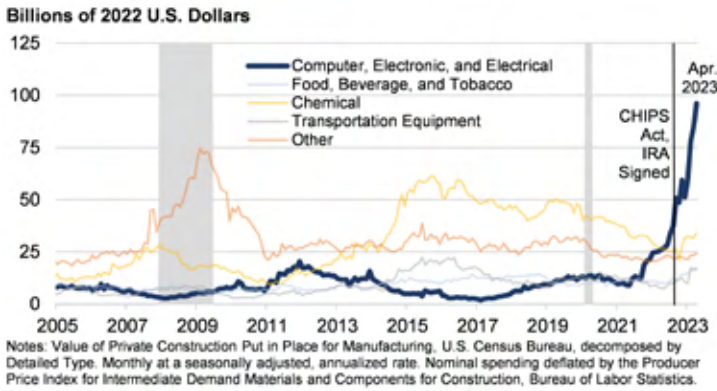


Figure 2. Source: Graphic courtesy of U.S. Department of the Treasury

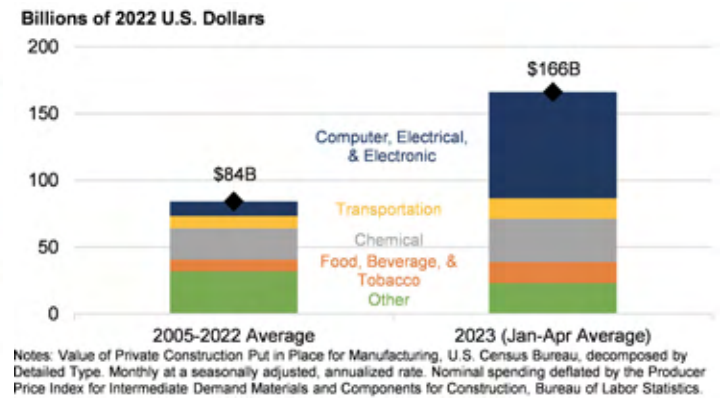


Figure 3. Source: Semiconductor Industry Association analysis



U.S. construction spending by manufacturers has more than doubled in the past year, reaching an annual rate of almost \$190 billion in April compared with \$90 billion in June 2022.

TCO Curve Overtime (US Nearshoring Versus LCC/China)

Figure 4. Source: Alix Partners, June 2023, "Shifts in the Global Supply Chain and the Impact on Nearshoring"



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By: John Davis, CTO - Global Shop Solutions

10 Areas Manufacturers Might See an Impact from AI

Few technologies have changed the manufacturing industry as much as ERP software. From automated scheduling to precision inventory management, automated purchasing, real-time job costing and more, ERP simplifies production processes so manufacturers can work faster and more efficiently while delivering a quality product on time every time. The next transformative technology – artificial intelligence (AI) and machine learning (ML) – is already having a significant impact on our industry by changing the way manufacturers collect, process, and analyze data.

Inventory Management

AI-integrated ERP software helps manufacturers optimize inventory management by predicting demand, identifying slow-moving products, and automating order fulfillment. According to a study by McKinsey, companies that utilize AI to optimize inventory can reduce inventory levels by up to 50%. Managing inventory is mostly a reactive process, measuring stock levels and ordering materials based on historical usage and seasonal trends combined with estimates of expected customer orders. AI-based inventory planning makes it more proactive with:

- Increased visibility of inventory KPIs
- Improved product, channel and location forecasting that includes seasonality and trend data
- Automatic classifying of SKUs to identify what's needed to meet
- demand
- Replenishing SKUs faster with predictive ordering based on anticipated changes in supply and demand

Quality Control

AI-based inspection systems can identify defects and anomalies in manufacturing processes in real-time, thereby reducing the risk of product recalls and improving overall quality. For example, image recognition algorithms are capable of analyzing images of products on the assembly line to identify defects that may not be visible to the human eye. AI is also changing the way quality gets inspected. Machine vision is an integral part of many quality applications. With its deep learning capabilities, AI-powered quality control software can self-learn which aspects are vital and create rules that determine the features needed to define quality products.

Pricing Optimization

AI-powered ERP software can optimize pricing by analyzing market trends, competitor pricing, and customer behavior. With this data, manufacturers can make better-informed decisions to optimize prices for their products, resulting in higher profits and better customer satisfaction. AI's deep data dives allow you to model how customers will respond

to price changes based on historical sales data. It also lets you factor customer behavior into pricing strategies, predict how different prices will impact sales, and combine experience and data to increase prices without damaging sales. AI predictions aren't 100% accurate, but they inform gut feelings about effective pricing strategies.

Demand Forecasting

AI can be used to predict demand for products based on historical data, market trends, and customer behavior, helping to optimize production schedules, reduce lead times, and avoid stockouts. With AI you can predict consumer demand for every SKU by taking into account seasonality, pricing, promotions, and product lifecycles. AI offers the unique ability to engage in demand forecasting across different time horizons. This includes near-term demand sensing, a forecasting method that combines AI and real-time data to create a forecast based on current supply chain conditions. Other AI-enabled forecasting includes direct-to-consumer and e-commerce. AI can also combine supply, sales, finance, and marketing projections into a holistic view of demand across your entire enterprise.



Supply Chain Management

As we all experienced during and after COVID, disruptions to supply chains can create serious problems. AI-powered ERP software helps optimize supply chain management by predicting supplier lead times, identifying bottlenecks, and optimizing logistics routes to reduce lead times, lower costs, and increase customer satisfaction.

AI algorithms analyze data to predict which products will be in demand and in what quantities, reducing strains on specific links of your supply chain. AI can also provide upgrades to important supply chain elements, including:

- Improving warehouse supply and demand management
- Improving the health and longevity of your transportation vehicles
- Making your loading processes more efficient
- Helping supply chain managers reduce costs and increase revenues

Predictive Maintenance Scheduling

Proper maintenance is essential to minimizing downtime, reducing repair costs and extending the life of your machines and equipment. AI helps achieve these goals by predicting equipment failure and scheduling preventative maintenance before a breakdown occurs. AI collects and processes data from sensors, cameras, logs, and other sources. Engineers then analyze the data to make predictions and recommend maintenance actions. In addition to protecting your machines and equipment, AI can:

- Improve safety by minimizing human errors and accidents
- Reduce quality defects
- Increase efficiency and productivity
- Support innovation, sustainability and environmental compliance with data-driven decision making

Labor Management

Labor costs are often the biggest line item in the manufacturing budget. AI powered ERP software can help reduce labor costs and increase productivity by predicting employee productivity, identifying training needs, and optimizing scheduling. AI can also alleviate another costly labor problem – workplace injuries – by limiting shop floor personnel's exposure to powerful, unwieldy machinery and dangerous tasks. AI does this by streamlining or automating risky processes that can lead to serious injuries.

Real-time Analytics

AI-powered ERP software provides real-time analytics on key performance indicators such as production rates, inventory levels, and quality metrics to help you make data-driven decisions and identify areas for improvement. While conventional data analysis methods do a good job of organizing and distributing IoT data, AI does it faster and with greater precision by identifying patterns and inconsistencies in real-time. AI algorithms process data from different sources and present it in a consistent manner, making it easier to structure the data for analysis. AI speeds up real-time analytics by preparing, analyzing and assessing data as soon as it is available.

Labor Shortages

AI can even help with labor shortages through robotic automation, additive manufacturing, and machine vision. AI applications enable robot arms to safely handle objects on the production line regardless of their orientation, speed, or placement. With these abilities, robots can be trained to perform various types of assembly line work done by humans. Assembly line work is repetitive, labor intensive, and prone to error. Even with years of experience, highly skilled designers and engineers often use a “best guess” approach when creating design solutions. AI empowers the development of complex, highly optimized designs that can be accurately produced with 3D printing. AI-driven autonomous machine vision can count and track items, identify defects, and properly sort products using cameras and specific lighting conditions.

Autonomous Manufacturing

AI can be used to automate manufacturing processes, reducing the need for human intervention and increasing efficiency. AI robots tap into machine learning algorithms to automate repetitive tasks and decision making. Robotic process automation can perform repetitive tasks like data entry and order processing, but it can also handle more complex tasks, such as spotting anomalies on the production line. AI-powered robots can work side-by-side with humans. Autonomous mobile robots can transport packages within the warehouse, while collaborative robots (cobots) assemble products alongside humans on the production line. These factory robots combine the precision and efficiency of machines with the skills and intelligence of human operators, taking product quality to new levels.



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Innovation Revs Up: 'Manufacturing Explorers' Season 3

By: Bonnie Gurney, Vice President – Content and Partnerships at AMT

Numbers matter in Season Three of the IMTS+ Original Series “Manufacturing Explorers,” brought to you by Mazak, which premiered September 28 on IMTS.com. Critical numbers encountered by show stars (and father-son duo) Max and Travis Egan in their exploration of the automotive industry include the part count reduction in Tesla’s Model Y (which has a single-piece rear casting), the 185,000 printed circuit boards produced each week by Tier 1 automotive supplier, and the temperature of the plasma column (6,000°F) that synthesizes EV battery materials.

Season Three starts with a visit to Munro & Associates in Auburn Hills, Michigan. Sandy Munro, known as the “Teardown Titan,” deconstructs and analyzes vehicles, particularly focusing on EVs. The tour starts with Munro explaining the genius behind the Model Y design and, really, any design that consolidates parts for optimization. Munro calls items such as bolts “unfasteners.” Any design that eliminates a connection is one less thing to go wrong, and it’s something he happily points out as part of Munro’s redesign services.

Munro also answers Max’s questions about EV battery

design (you’ll be surprised), explores the design of electric motors (they are only about the size of a basketball), and provides insights into design and manufacturing efficiency. In a twist of fate, a fender bender at home provides the opportunity to rent a Model Y, and it’s a contest between Max and Travis to see who becomes the bigger fan and why.

In the second episode, Max and Travis travel to Magna to meet up with another father-son duo, General Manager John Cunningham and Manufacturing Engineer Alex Cunningham. If you drive a modern vehicle, chances are you’ve experienced one of the millions of sensors manufactured by Magna, including those used for cruise control, parking assist, object detection, and tailgate cameras. Watch as Max experiences one of Magna’s newer innovations, the Toyota Tundra trailer backup assist, then gets a firsthand look at how printed circuit boards are made.

In the final episode of the third season, Max and Travis explore what might be the key to EV growth: the synthesis of Lithium-ion cathode battery materials. Based in North Andover, Massachusetts, 6K Inc. created the UniMelt® system, a production-scale microwave plasma process that produces critical materials. Using ultra-high temperature 6,000°F plasma, battery elements feedstock gets processed

into high-value materials in just two seconds. Where conventional production processes of battery materials pose geopolitical risks and where mining damages the environment and practices are often fraught with fair labor issues, UniMelt is a green process that enables a diverse and reliable supply chain for EV battery components leveraging both domestic and recycled feedstock.

Season Three is also bittersweet, as it’s the final season with Travis and Max. The show started with Max as a young mechanical engineering undergraduate and Travis introducing him to his world of manufacturing. After one pandemic, five years, two degrees, and 10 road trips with dad and a camera crew, Max is now pursuing his dream career as a lead analyst in the renewable energy industry.

Buckle up and join Max and Travis as they tour other innovative automotive companies that provide high-tech parts and ideas to car-market giants in the premiere of the third season of “Manufacturing Explorers,” an IMTS+ Original Series, at [IMTS.com/ManufacturingExplorers](https://www.imts.com/ManufacturingExplorers).



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Redefining American Manufacturing: Ultra-Tech Aerospace and the Future of Workforce Development



In an era defined by rapid technological advancements, the landscape of American manufacturing is evolving at an unprecedented pace. A pivotal component of this evolution is workforce development.

By investing in the workforce, companies play a key role in shaping the future of the manufacturing industry. Ultra-Tech Aerospace, a pioneering company in the industry, stands at the forefront of this transformation. With its unwavering commitment to employee welfare, growth, and success, Ultra-Tech Aerospace is redefining the industry norms of American manufacturing. Ultra-Tech Aerospace continues to set new positive standards in workforce development by demonstrating that investing in employees can lead to unparalleled success.

The Changing Face of American Manufacturing

American manufacturing has long been the backbone of the nation's economy, providing millions of jobs and shaping communities throughout the nation. However, globalization and automation have presented both challenges and opportunities. As advancements in technology continue to reshape the manufacturing landscape, companies must adapt to stay competitive in the industry. Workforce development has emerged as a strategic solution, ensuring that the American workforce remains skilled, adaptable, and motivated.

Ultra-Tech Aerospace: A Beacon of Innovation

Ultra-Tech Aerospace, at the heart of this transformative movement, is a company that embodies the spirit of innovation and progress. With a commitment to excellence, Ultra-Tech Aerospace is not merely a manufacturer; Ultra-Tech Aerospace is a breeding ground for talent and an advocate of employee empowerment. What sets Ultra-Tech Aerospace apart is its dedication to providing some of the best benefits on the market, setting a new standard for the industry.

Investing in Employee Well-being

Ultra-Tech Aerospace understands that the key to a successful manufacturing operation lies in the hands of the highly skilled people it employs. Recognizing this, the company has implemented a comprehensive employee benefits program that goes above and beyond the industry norm. From healthcare and retirement plans to professional development opportunities, Ultra-Tech Aerospace ensures that its employees are not just workers but valued stakeholders in the company's journey to a successful future. Flexible schedules, tuition reimbursement, unparalleled vacation and sick time, remote work opportunities for those positions eligible, Ultra-Tech offerings are centered around employee work-life balance.

The company's healthcare benefits are designed to cover a wide range of services, including preventive care, mental health support, and specialized treatments. This comprehensive approach to

healthcare ensures that employees can focus on their work without the burden of healthcare-related concerns.

Additionally, Ultra-Tech Aerospace prioritizes financial well-being by offering competitive retirement plans and financial counseling services. Employees are not just encouraged to save for their future; they are equipped with the knowledge and resources to make informed financial decisions, fostering a sense of security and stability.

Professional Development and Growth Opportunities

Ultra-Tech Aerospace recognizes that investing in its employees' skills and knowledge is an investment in not only the employees' future but also in the company's future. The company provides access to extensive professional development programs, ranging from technical training to tuition reimbursement. These initiatives empower employees to enhance their expertise and skillset, keeping them abreast of the latest industry trends and technological advancements.

Furthermore, Ultra-Tech Aerospace fosters a culture of continuous learning and innovation. The company encourages employees to propose and implement their ideas, driving a sense of ownership and creativity throughout the workforce. This culture of innovation and employee empowerment not only benefits individual employees but also contributes to the company's overall growth and competitiveness in the market.

The Impact of Ultra-Tech Aerospace's Initiatives

The initiatives undertaken by Ultra-Tech Aerospace have far-reaching implications, both for the company and the manufacturing industry. By investing in employee well-being, professional development, and diversity, the company has created a workplace where employees are motivated, engaged, and committed to their roles.

This high level of employee satisfaction translates into increased productivity, higher-quality output, and ultimately, enhanced customer satisfaction. Ultra-

Tech Aerospace's reputation for excellence not only attracts top talent but also establishes the company as a preferred partner for clients and stakeholders. Moreover, the company's approach to workforce development serves as a model for the manufacturing industry. Ultra-Tech Aerospace demonstrates that prioritizing employees' welfare and growth leads to a positive cycle of success. By doing so, Ultra-Tech Aerospace continues to maintain a positive and productive work environment where our employees continuously go above and beyond helping to lead the company in growth, which, in turn, benefits the workforce even more.

In the ever-changing landscape of American manufacturing, Ultra-Tech Aerospace stands as a beacon of innovation and progress. By redefining the norms of workforce development and employee benefits, the company has not only elevated its own standing in the industry but has also set a new standard for manufacturing companies across the nation.

As Ultra-Tech Aerospace continues to invest in its employees, providing them with exceptional benefits, opportunities for growth, and an inclusive work environment, it paves the way for a brighter future for American manufacturing. Through its unwavering commitment to its workforce, Ultra-Tech Aerospace showcases the transformative power of investing in people, proving that a company's success is intrinsically tied to the well-being and prosperity of its employees. In doing so, Ultra-Tech Aerospace has not only redefined American manufacturing but has also reimagined the very essence of workforce development, setting a powerful example that the entire industry can follow.

Ultra-Tech Aerospace's redefined mission statement stands as a lasting commitment to its employees. "We are a diverse team proud to provide precision solutions beyond the ordinary. Driving excellence through cultural change in American Manufacturing."



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From K to Gray - The Pittsburgh Chapter is Focused on Workforce Development

By: Michel Conklin, Chapter Executive, Pittsburgh Chapter National Tooling & Machining Association

In the dynamic world of manufacturing, a skilled, adaptable, and motivated workforce is necessary to drive operational efficiency, quality, innovation, and competitiveness. The NTMA Pittsburgh Chapter is a leader in workforce development, owing to its comprehensive training and education programs that build the current and future workforce needed by its members. Boasting three levels of education (youth, apprentice, and professional), there is a program for anyone interested in joining the field.

The Pittsburgh Chapter introduced its first workforce development initiative in 1976 with the launch of a regional apprentice training program. Hosted at three convenient locations, the four-year apprenticeship offers 144 hours of in-person related instruction for individuals to supplement the 2,000 hours of on-the-job training they receive at their company. This year, nearly 160 apprentices are enrolled in the program from more than 50 regional companies.

In July, the NTMA Pittsburgh Chapter received approval from the Pennsylvania Apprenticeship and Training Council, Department of Labor and Industry, for their group non-joint sponsored machinist apprenticeship program. This milestone is the next step in supporting the expansion of apprenticeship for companies without their own registered program.

"We often have companies who want to provide their employees with apprenticeship opportunities, but

don't have a formal registered program and aren't in a position to develop their own," said Liz Blashock, Apprentice Program Coordinator. "Now, we can support them and their apprentices through this new program."

Career conversations happen throughout life, beginning in kindergarten. With the Pittsburgh Chapter's youth workforce development program, BotsIQ, students from kindergarten through postsecondary grades are provided opportunities to explore and experience manufacturing through hands-on activities and career-related experiences. The program works to help children answer the often-asked question, "What do you want to be when you grow up?" with manufacturing.

This year, BotsIQ is premiering a new set of curricula called MFGexplore. Each lesson focuses on an in-demand manufacturing career such as CNC Machinist, Quality Inspector, or Industrial Designer, and includes a hands-on activity connected to the skills and knowledge associated with, and required by, the profession.

"MFGexplore can be easily incorporated into any classroom – from elementary to high school and math to English," said Michel Conklin, BotsIQ's Executive Director. "The goal that we have is to reach as many students as possible in as many classrooms as possible."

Sparking an interest in the youth and introducing these careers is the first step, but BotsIQ's high school and postsecondary programs give students the opportunity to build their technical skills, knowledge, and professional network. This year, BotsIQ's Robotics Technician Pre-Apprenticeship program is running its first cohort of students through our brand new Training & Education Center, while its summer internship program graduated its third class of young adults, many of whom accepted job offers to continue working at their host company.

"We want our students, and their parents, to understand that these skills can open doors to numerous opportunities in manufacturing," said Conklin. "It is our job to ensure they have access to great opportunities to develop their skills and create a network of companies who will hire them and continue providing training and education."

The Pittsburgh Chapter is currently working on its professional development offerings for 2024. Through partnerships with regional leaders, the chapter will host a variety of lunch and learn workshops for its members.



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Why Workforce Development is a Verb, Not a Noun.

By: Brad Robeson, CEO - Clean Machine

Brad Robeson, CEO - Clean Machine

It's certainly no secret that across America, industries are facing enormous supply chain delays and worker shortages due to several decades of offshoring, thanks to a trend of deemphasizing manufacturing research, education, and training in the US.

To solve these challenges and to affect change faster, we have to start treating Workforce Development (WFD) like a verb, not a noun — actively getting in the ring versus cheering from the sidelines. This starts with education.

Between 2000 and 2010, US manufacturing jobs declined by a third, falling from 17 million to below 12 million.

Today, roughly 12.8 million people make things in America and operate in an increasingly competitive global economy.

Unfortunately, going to school becomes the purpose of the system rather than personal growth that should be supported by the system.

Gallup research reveals that students start to disengage by 5th grade and, by high school, 66% of students are fully disengaged.

Post-Pandemic Reality

As a manufacturing business owner, I felt like after the pandemic started trailing off, getting employees was like waiting for a piece of space junk to fall out of the sky and land in your backyard. It just wasn't going to happen. And if it did, it certainly wasn't fast enough.

To address this issue, I've spent countless hours talking to the Utah Manufacturers Association, the Department of Workforce Services, Talent Ready Utah, the NTMA Northern Utah chapter, Apprenticeship Utah, and others focused on Workforce Development. They have the resources to do something about it.

I may not have been the most popular guy in the room, but the question I kept asking is, "We're talking about WFD and working on it, so why do we still have a workforce shortage and a skills gap — what are we actively DOING about it that's working?" I had a concept in my mind to create a two-year commitment for any student, whether it be college, or a vocational training program.

Adapting Education at the Speed of Culture

Working closely with state associations and local schools we've been able to arrive at a two-year program that's appropriate for the high school level. This didn't happen overnight. And it took some real curiosity and creativity.

To bring this to life, we started out with a round table discussion about who we are as an industry and as individual companies and machine shops. This resulted in a concise outline and proposal.

Ironically, the initial response from Department of Workforce Services was that this falls into one of the Six Hazardous Occupations and we can't have students participate.

I asked to review the description they were citing, and it basically described metal fabrication operations Circa 1940. (head scratch)

An important takeaway here is, BE CURIOUS AND ASK QUESTIONS! Don't just take no for an answer.

CNC Youth Apprenticeship Program

Another thing that I've learned is that folks, especially those in education, don't know what they don't know. If our industry isn't providing them with the right inputs, information, or the proper requests, then we're not going to get a relevant product or end result to solve this problem.

Through collaboration, the associations, along with JD Machine, Paramount Machine, Parker-Hannifin, and I focused on working with the local schools to arrive at a relevant curriculum for kids interested in manufacturing. This included materials for class lectures coupled with on-the-job learning situations.

I'm happy to report that in the last couple of months we finished our pilot program and announced the launch of this program statewide.

Yes, it felt triumphant, but we couldn't stop there.

I've been influenced by Dr. Tony Schmitz, a professor of Mechanical Aerospace and Biomedical Engineering at the University of Tennessee. He's also a researcher who works toward ways to solve key challenges in American manufacturing.

Our goal is to encourage students to commit to a two-year program, while in high school, and give them the beginner to intermediate training as a CNC machinist.

One challenge, specifically, is preparing workers to leverage today's technology and advance tomorrow's technology faster.

He published a paper in January 2023 that addresses this topic and aligns with my thoughts.

We need to ensure that education systems are set up in a way to advance students of any interest and then provide the means for them to learn about what they're interested in and train them with hands-on experience.

This is an all-hands-on-deck effort, so beyond local high schools, we also joined up with our local vocational schools. Their attendances have been way down.

Our goal is to encourage students to commit to a two-year program, while in high school, and give them beginner to intermediate training as a CNC machinist.

Upon graduating, we align them with the right vocational school. It's a win-win. The schools have a built-in supply of students and manufacturers have an experienced enthusiastic workforce.

This is also bigger than simply training CNC machinists. The goal is to affect the manufacturing industry, as a whole.

The Answer is in the Stats

Let's say in any given year, there are 50,000 seniors in Utah – 10% of those drop out in high school. Out of the 45,000 who graduate, 60% of those kids go on to college. This means that approximately 25,700 kids annually could be educated and added to the manufacturing industry. They can stay in their chosen trade or move on to other things, like engineering or industrial design.

On a national level, consider what can and can't be made with today's skilled workforce.

In his paper, Dr. Schmitz references this with the fact that the Department of Defense needs to build 12 new submarines and 50,000 skilled workers are required to produce them.

There's a lack of skilled workers to get this job done. This potentially contributes to a national security issue. By working together, in the manufacturing industry, we can change this.

How To Versus the Want To

If you're scratching your head thinking, "We're just a small shop and I don't know where I'll find the time to get involved," please know that you're not alone.

At Clean Machine, I have 32 employees. We're a very small shop.

For me and my team, it's been more about the WANT TO than the HOW TO. We all want to be part of the solution, not the problem. And, when you really WANT to do something, the HOW-to will appear all around you.

Through this process, we've discovered that we do have the time. By spreading the responsibilities across the entire team, it hasn't felt like a Herculean effort.

All of our employees are excited about the program and they want to know when the next class is coming through. They feel good about sharing their knowledge and experience with young people.

The enthusiasm and interest from our student apprentices has been phenomenal as well! They don't need to be pushed. They're willing and eager to learn.

Changing Generational Poverty

Programs like this have real potential of providing at risk or low-income students with an entirely different

future. Many of them have to start working in high school to help pay the family bills. They're also not encouraged to go to college or vocational school. Their future feels limited and like a replay of the family members who came before them.

We're talking about thousands upon thousands of kids (in every state) who can have a better life. Create a truly bright, fulfilling, and different future.

Desired Future State

To start treating Workforce Development like a verb, not a noun – actively getting in the ring versus cheering from the sidelines – it's important to have a vision of what that desired future state looks like.

Imagine a future where every student graduating from high school is trained and prepared for the next step, where effective and efficient partnerships exist between education institutions and employers, in every state. One where a diverse set of education and training models are recognized, supported, and in place.

Making manufacturing research, education, and training a top priority in the US is critical for reinvigorating the industry and securing a stronger foothold globally. As individuals and companies, we've got to actively engage in Workforce Development instead of waiting for someone else to be the change.

The fastest way to engage and enlist associations, employees, and students is to focus on unleashing the human potential. People want to feel valued and like they matter. (And that's a whole separate topic for a future article!)



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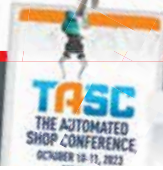
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