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AUGUST 21ST | HARTFORD, CT

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WHAT MAKES A TOP SHOP

Presented by Modern Machine Shop

INTERACTIVE DISCUSSION ABOUT TOP SHOPS' BEST PRACTICES

Presented by Modern Machine Shop

MODERATED ROUNDTABLE WITH OPEN DIALOGUE

Facilitated by Modern Machine Shop

SUCCESSION PLANNING IN TOP SHOPS

Presented by Legacy Business Advisors

EMPLOYMENT BACKGROUND CHECKS: ANATOMY, BEST PRACTICES AND COMPLIANCE

Presented by SafestHires

PULLING AND ANALYZING DATA IN TOP SHOPS

Presented by machinometrics

INDUSTRY 4.0 AND AUTOMATION IN TOP SHOPS

Presented by Protected Flow Management

Plant Tour & Reception at the host site following the sessions!



IN MEMORIAM

MICHAEL C. MITTLER



Mike Mittler, president of Mittler Brothers Machine & Tool, Division of Mittler Corporation, Foristell, MO, passed away on May 10, 2019.

In 1980 Mike and his brother Paul turned a few notes scribbled on the back of a tool catalog into Mittler Brothers Machine & Tool. Mike's long-term relationship with NTMA began in July 1986 when he attended his first St. Louis Chapter meeting. He often attributed the company's success to what he learned through his involvement with NTMA.

Those who had the privilege of knowing and working with Mike will recall his frequent admonition to "sell early and sell often" that earned him the nickname of "Mike the Marketing Guy," his passion for NASCAR racing and building race cars, and the fact that he didn't need a microphone to get people's attention. These and many other special traits made up the Mike Mittler that NTMA was grateful to have among its leadership.

Mike served as president of the St. Louis Chapter and was active in a number of NTMA committees and teams including Marketing, Education (Team Leader), Insurance and the National Tooling & Machining Foundation (Chairman).

Mike was sworn in as NTMA Chairman of the Board in 2006. His theme "Building a Winning Team" emphasized how we all could achieve more by working together than we could ever achieve alone. This is the very foundation of Association membership.

In 2011 he was given the L.A. Sommer Memorial Award in recognition of his exemplary service and dedication to the Association and industry.

We will miss the great enthusiasm that Mike brought to every aspect of his involvement with NTMA. Our deepest sympathies go to his wife, Beverly, family, friends and employees.



DAN YAHRAUS

Dan Yahraus, founder of Modern Industries, Phoenix, AZ, passed away at home on May 30, 2019.

Dan was well-known and well-loved among his fellow NTMA members. He nurtured and grew Modern Industries for over 50 years. He joined NTMA in March 1972 and by July 1972 had been instrumental in establishing the Arizona Chapter. He went on to serve as Chapter President in 1974 and attended his first NTMA Conference that year. Along with his wife Nancy, they became "regulars" at NTMA national events throughout the years. Dan and Nancy were able to attend the 2018 Fall Conference in Denver, CO



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LOOK FOR THIS SYMBOL THROUGHOUT THE ISSUE FOR STORIES RELATED TO THIS MONTH'S FEATURED TOPIC.

and join the distinguished group of Past Chairmen celebrating the Association's 75th Anniversary.

During his lengthy involvement with the Association, Dan served on numerous committees including Apprenticeship & Training, Industrial Relations, Sales Planning & Support, Manufacturing Technology, and Insurance (Team Leader 1998-1994). In 1995, NTMA took a look back at Dan's accomplishments and presented him with the NTMA Honor Award.

Dan's interest and enthusiasm for NTMA only seemed to increase. In 1999, he was elected to the Board of Directors of the National Tooling and Machining Foundation. In the Fall of 2006, on behalf of Modern Industries, Dan made a generous donation of \$100,000 to the Foundation. Continuing his support of the Foundation, Dan served as Chairman in 2012.

Dan was elected to the Executive Committee in 2001 and moved through the positions of Secretary, Treasurer and Vice Chair to become Chairman of the Board in 2004. His year as Chairman was devoted to the theme of "Core Values and Ethical Business Standards." That theme was a true reflection of Dan's strong personal beliefs and value system. That vision kept the Association steadfastly focused through-out his Chairmanship. It was inevitable that Dan was again honored in 2007 with the L.A. Sommer Award.

NTMA has lost a true leader. Dan's contributions to the Association and his love of the industry will long be remembered. Our heartfelt condolences go out to his family, friends and employees.





PRESIDENT'S UPDATE

DOUG DEROSE / INTERIM PRESIDENT-NTMA

Welcome to summer! Believe it or not, 2019 is already half over and as we make the turn into the 3rd quarter, NTMA has some great things waiting for you!

The 30 under 30 program is wrapping up its inaugural year. NTMA has identified 30 outstanding, future leaders from members, NAMs and Affinity Partners who are making an impact in our industry. The program will culminate with the individuals being honored for their efforts in this issue of the Record and at the Fall Conference in Austin, Texas in October.

Upcoming national events include the third and final Top Shop Seminar August 21st in Hartford, CT. If you haven't attended one this year, don't miss presentation topics like succession planning, compliance and what it takes to be a top shop, just to name a few. As mentioned, The Fall Conference is in Austin October 15-18th. As always this annual event packs networking, learning and advocacy into three days at a fantastic hotel in downtown Austin. NTMA will be at the Westec Manufacturing for Technology event September 24-

26th in Long Beach, CA and at the Top Shop Conference in Cincinnati, OH in September. We would love to see you at one of these events!

Can't make a national event? No problem, be sure to get in contact with your local chapter executive and find out what's going on locally for the second half of 2019. Why not consider hosting an MFG Day event at your facility? Or perhaps you could participate in one a fellow manufacturers shop, or at a local community college or tech school. MFG Day is October 4th and if you need more information contact Bill Padnos (bpadnos@ntma.org).

If you haven't had time, check out the new NTMA website: www.ntma.org. Over the last 8 months the staff has worked with Datacheive to rebrand and freshen up the site. Please take it for a test drive and let James Mayer (Jmayer@ntma.org) know what you think! We will continue to update the site with additional pages and content as we move through 2019, so be sure to check back in on the site frequently.

And finally, need something to do and

want to pay back the industry that has served you so well in your career? NTMA is always looking for candidates for our board teams. It's another great way to be involved and meet people just like you! If interested, contact Kelly LaMarca (klamarca@ntma.org). Our board teams are: Budget & Finance, Audit, Governance & Compliance, Education, Government Affairs, Technology, Emerging Leaders, Nominating Team and the National Tooling & Machining Foundation.

There's plenty to do with NTMA the rest of 2019, and it's never too late to get started improving your business. Remember, NTMA is here to help!

DOUG DEROSE / NTMA INTERIM PRESIDENT



THE RECORD

OPERATIONS & EDITORIAL

Doug DeRose, Interim President
James Mayer, Editor

NTMA EXECUTIVE COMMITTEE

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Alan Ortner, Vice Chairman
Sirois Tool Co., Inc. – Berlin, CT

Samuel Griffith, Board Member
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Mark Vaughn, Board Member
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Tom Sothard, Board Member

Gillen Young, Board Member
Custom Tool, Cookeville, TN

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NATIONAL TOOLING & MACHINING ASSOCIATION

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NTMA NEWS



WELCOMES NEW MEMBERS

KINGS PEAK MANUFACTURING
Northern Utah Chapter
Mrs. Shelley Chase
2581 Rulon White Blvd.
Ogden, UT 84401

MIDDLETOWN TUBE WORKS
General
Mr. Clay Dolesh
2201 Trine St
Middletown, OH 45044

SHELBY WELDED TUBE
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NTMA Pre-Apprenticeship Program

NTMA's Pre-Apprenticeship program is designed to develop entry-level skills for employment at a manufacturing company and enhance the skills set for existing employees. Program participants will benefit by learning skills and behaviors that will lead to success as an apprentice at your shop. YOU will benefit by providing your company with the opportunity to attract and engage new talent in a cost-effective and flexible manner.

The NTMA Pre-Apprenticeship program combines four of our in-depth online training courses via NTMA-U with relevant reading material, hands-on exercises, and either the physical parts or the blueprints to make the physical parts for the hands-on exercises.

Topics covered:

Basic blueprint reading and shop math

Quality processes and procedures

Manufacturing processes

Manual and electronic measuring instruments

Basic shop equipment operation

Visit <http://tinyurl.com/NTMA-PreApp> for more information.

For questions or to get started, contact Bill Padnos at bpadnos@ntma.org.



TOP SHOPS SEMINAR IN PHOENIX A SUCCESS

The second NTMA Top Shops Seminar of 2019, held at Modern Industries in Phoenix, AZ on Wednesday, May 22nd, can be called a success. The event, in partnership with Modern Machine Shop, drew 30 attendees for a full day of discussions on benchmarking best practices, metrics and more. Along with educational presentations presented by the following companies, the day featured a roundtable discussion, networking lunch and reception.

Educational presentations included the following:

WHAT MAKES A TOP SHOP?

Steve Kline – Chief Data Officer, Gardner Intelligence

INTERACTIVE DISCUSSION ABOUT TOP SHOPS' BEST PRACTICES

Derek Korn - Executive Editor, Modern Machine Shop

PULLING AND ANALYZING DATA IN TOP SHOPS

Eric Fogg – machinemetrics

SUCCESSION PLANNING IN TOP SHOPS

Joe Scheid and Diane Thomas– Legacy Advisors Network

EMPLOYMENT BACKGROUND CHECKS: ANATOMY, BEST PRACTICES AND COMPLIANCE

James Mayer – NTMA (on behalf of SafestHires)

INDUSTRY 4.0 AND AUTOMATION IN TOP SHOPS

Mark Lilly – Protected Flow Manufacturing

The event also featured a plant tour at R&D Manco, a precision aerospace machining company of over 50 years and a 22 year member of NTMA.

This event could not have been possible without our sponsors – Modern Machine Shop, machinemetrics, Legacy Advisors Network, SafestHires and Protected Flow Manufacturing.



The third and final NTMA Top Shops Seminar of 2019 will be held on Wednesday, August 21st in Hartford, CT. Registration is only \$200 per person and is now available on the NTMA website.



NTMA 30 UNDER 30



It is with great pleasure that we announce the inaugural NTMA 30 Under 30 awardees! There were many great nominees, and it was a difficult task to select the 30 that have had the greatest impact in the companies they work for. These wonderful young people are the future of manufacturing, please join us in congratulating them. Each of the awardees are invited to the NTMA Fall Conference, where they will be recognized during the awards luncheon.



ADAM HEPBURN

AGE: 26

COMPANY: Gaum, Inc

HOMETOWN: Ringoes, NJ

CURRENT CITY: Lambertville, NJ

WHAT DREW YOU TO MANUFACTURING? I was drawn to metal working because I have been an artist since the minute I was able to pick up a pencil. I have a deep love for creating and my whole life I have helped my father work with wood, stone and various other materials, but never metal. I was very interested to add another material type under my belt so I persued a welding career. Quickly the owner of Gaum Inc wanted me to try machining, which I had not the slightest clue about. I gave it a shot and ended up loving it! To this day I am still a welder, a CNC machinist, and I also make custom hand fabricated silver jewelry. My love for creation of all types will never end!



ALEX CLARK

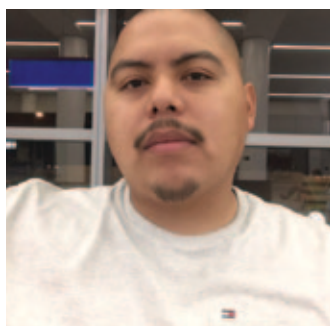
AGE: 25

COMPANY: Leese & Co

HOMETOWN: Jeannette, PA

CURRENT CITY: Greensburg, PA

WHAT DREW YOU TO MANUFACTURING? There are a few things that drew me into machining. One of them was that I am always looking for new opportunities to learn and grow, while I am getting my education. The other factor that drew me into the industry was the operations. I think it is fascinating to watch parts made from scratch, and go from raw metal into different things such as heatsinks or parts for the railroad. The last thing that helped me want to make the move was that my current employer Leese & Co is a small business and I know that they play huge parts in our economy, and community, and wanted to be a part of that.



ALFREDO GARCIA

AGE: 29

COMPANY: Allied Tool and Die

HOMETOWN: Guanajuato, Mexico

CURRENT CITY: Phoenix, AZ

WHAT DREW YOU TO MANUFACTURING? What drew me into manufacturing was the opportunity to learn how to use the amazing machinery for many aerospace products.

ANDREW PISORN



AGE: 28

COMPANY: Allied Machine and Engineering

HOMETOWN: Kirtland, OH

CURRENT CITY: Jackson Township, OH

WHAT DREW YOU TO MANUFACTURING? My mom is a Senior Reliability Engineer at Eaton Aerospace. Ever since I saw the first wax replica of a jet fuel-pump on our kitchen table I knew that I wanted to get into manufacturing. After a few sales and manufacturing internships I began my relationship with Allied Machine & Engineering Corp. and could not have been happier. I am truly blessed to work for an innovative company that continues to challenge me with opportunities and equip me to succeed. It is a great team to be a part of.

ANDY REINWALD



AGE: 26

COMPANY: Ripley Machine & Tool Company, Inc.

HOMETOWN: Ripley, NY

CURRENT CITY: Ripley, NY

WHAT DREW YOU TO MANUFACTURING? I began working at Ripley Machine as a high schooler. After our foreman retired in 2012, I took over for him and did a lot of learning through “baptism by fire”. In 2014, my grandfather (RMT’s owner and President at the time) recognized that he would like to retire and I was running day to day operations already so he asked me if I would like to purchase the company from him.

On January 1, 2015, I became the owner and President of Ripley Machine and Tool Company, Inc.

BRANDON SEITZ



AGE: 26

COMPANY: Acutec Precision

HOMETOWN: Mt. Lebanon, PA

CURRENT CITY: Meadville, PA

WHAT DREW YOU TO MANUFACTURING? My dad has always had a love for planes and flying, which is something he passed on to me. However, I was not aware of a means of being involved with the aerospace industry beyond working for the airlines themselves. While in college, I was primarily interested in biochemical research, but I was offered an internship opportunity at Acutec Precision Aerospace. Once I became aware of the products and their applications, I really learned to enjoy manufacturing and the industry. To summarize, I had the interest but was not aware of the means to follow that interest. Once I became aware, I really learned to enjoy manufacturing and have pushed to make a career of it.

KENDAL GLOTZBACH



AGE: 27

COMPANY: LMC Workholding.

HOMETOWN: Monticello, IN

CURRENT CITY: Monticello, IN

WHAT DREW YOU TO MANUFACTURING? Manufacturing is a very interesting industry happening all around us and it is such a value for our local communities and country. Until I was in college I never really thought about manufacturing, but with advancements in new technologies and capabilities it is truly amazing what can happen in our own backyards. Now that I am in the industry and see the demand for people I have become even more passionate about it and want to do all I can to help bring awareness to the issues that many businesses, both large and small, are facing today.



CHRIS BEALL

AGE: 30

COMPANY: Nelson Engineering

HOMETOWN: Salem, OR

CURRENT CITY: Scottsdale, AZ

WHAT DREW YOU TO MANUFACTURING? I enjoy the challenges of manufacturing and hope to become a leader in the manufacturing world helping to find new ways of thinking and providing new solutions to complex problems to the manufacturing world.



CLAIRE GABRIELLE KLANICA

AGE: 20

COMPANY: Leese & Co

HOMETOWN: Greensburg, PA

CURRENT CITY: Greensburg, PA

WHAT DREW YOU TO MANUFACTURING? I have always been fascinated by how things are made. I got a peek of machining when I was younger and visited my dad at work. I thought the whole machining process was captivating. I thought it was amazing how something so small (the inserts) had the power to cut large metal pieces. The drawings and programs were so detailed and precise. I was thrilled when I learned that I was able to work in the industry and learn more about the process. Machining continues to capture my attention with all of the new technology and upgrades that have developed over the years.



CLAY DAWSON

AGE: 27

COMPANY: Acutec Precision

HOMETOWN: Saegertown, Pennsylvania

CURRENT CITY: Meadville, Pennsylvania

WHAT DREW YOU TO MANUFACTURING? I have always been very mechanically oriented in process driven, both in my work and personal life, so manufacturing was a good way to put those traits to use. But tool & die has also been a very big part of my life, as my father owned his own machine shop during my childhood and high school years, and is where I got my first job and learned a lot of the basics that go along with the tool & die / manufacturing industries. It's also where I learned that while tool & die/ manufacturing is not the most glamorous job you can find, it is certainly one of the most rewarding, and going home every night feeling fulfilled is something you can't find everywhere.



LAUREN MORLACCI

AGE: 25

COMPANY: L&S Machine Co.

HOMETOWN: Latrobe, PA

CURRENT CITY: Pittsburgh, PA

WHAT DREW YOU TO MANUFACTURING? My high school calculus teacher was a great influence on my education, and she was a former engineer. Because of my success in and love for that class, I decided to major in Industrial Engineering at the University of Pittsburgh. After my junior year, I completed a summer internship at L&S Machine Company. I started full time after graduating one year later. L&S is clean, and we are constantly implementing new technologies. It's really rewarding for me to see the results and improvements around the shop from my projects.



ANTHONY FLOHR

AGE: 20

COMPANY: Flohr Machine

HOMETOWN: Norton, OH

CURRENT CITY: Norton, OH

WHAT DREW YOU TO MANUFACTURING? I was drawn to manufacturing through the family machine shop and my natural love for building and tinkering.



AUTUMN BOWLES

AGE: 28

COMPANY: NTMA

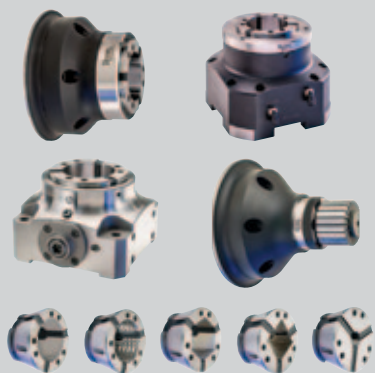
HOMETOWN: Cleveland, OH

CURRENT CITY: Cleveland, OH

WHAT DREW YOU TO MANUFACTURING? Originally, I needed the credits for my associate's degree. After being there for 2 years, I was drawn to manufacturing because I like what we do, helping those in the (manufacturing) trade rather than their employers or employees.

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CORY CETKOVIK



AGE: 29

COMPANY: Big Kaiser

HOMETOWN: Mt. Des Plaines, IL

CURRENT CITY: Chicago, IL

WHAT DREW YOU TO MANUFACTURING? I have always been fascinated with machinery, tooling and the processes involved to produce objects used in our daily lives. Manufacturing has allowed me to turn those interests into a rewarding career. I enjoy working in an industry that is hungry for innovation and demands cross-functional collaboration to achieve long-term success. A successful manufacturer encourages creativity and innovation while maintaining the value associated with long-term industry experience.

DAVID DRYDEN



AGE: 30

COMPANY: Nelson Engineering

HOMETOWN: Phoenix, AZ

CURRENT CITY: Phoenix, AZ

WHAT DREW YOU TO MANUFACTURING? Started driving for Nelson and the fascination with the precision drew me to learn more.

DAVID HOLMES



AGE: 29

COMPANY: Cadence Aerospace

HOMETOWN: Phoenix, AZ

CURRENT CITY: Gilbert, AZ

WHAT DREW YOU TO MANUFACTURING? From an early age I've been fortunate enough to have exposure to the manufacturing industry. My father has been in the aerospace industry his entire career, and having the opportunity to spend time in various shops around the world was what initially sparked my interest in the manufacturing industry. The eleven years of experience at Cadence Aerospace has only furthered my passion for manufacturing. Being appointed to a leadership position has allowed to me to view manufacturing through a new lens. I am now afforded the opportunity to develop and lead our team into the next era of manufacturing.

LEVI PIEPLOW



AGE: 22

COMPANY: Flohr Machine

HOMETOWN: Rootstown, OH

CURRENT CITY: Barberton, OH

WHAT DREW YOU TO MANUFACTURING? I have always been hands on, so the love of working with my hands paired with an artistic mind that wants to create led me to manufacturing. The money is also a big motivator. It is something that is never going to die, manufacturing will always be around so it's a good field to get into. I have never worked any other type job. Creating and giving 100% effort to put out a product that people are proud to buy in the USA!

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GAGE TRUELOVE



AGE: 28

COMPANY: Allied Tool and Die

HOMETOWN: Gilbert, AZ

CURRENT CITY: Mesa, AZ

WHAT DREW YOU TO MANUFACTURING? What drew me to manufacturing was a number of things. I am drawn to the idea of people using something that I had a hand in creating, as it gives me a sense of fulfillment and purpose. In addition to that, working in the aerospace industry with Allied Tool and Die means that the parts I help create go on to companies like Honeywell and SpaceX, which allow me to feel like I am a part of something much greater than myself. The thought that I'm working to better not only myself, but also the company I work for, as well as helping all of mankind get to space, the Moon, and Mars is both simultaneously humbling and satisfying. Though I have only been in this career for a little over a year now and am constantly learning new things, I try to keep that bigger picture in mind, especially when I am struggling when it comes to learning a new concept or technique, or fighting to produce parts with very tight tolerances. This career is radically different from any I've had before, and while it can be hard work at times, I find the creation process to also be immensely rewarding.

GARRETT ROSS



AGE: 25

COMPANY: FocusedOn Machining

HOMETOWN: Mesa, AZ

CURRENT CITY: Sedalia, CO

WHAT DREW YOU TO MANUFACTURING? Growing up always was building things with my grandpa in his garage, took some welding, wood working, shop and auto-cad classes in high school. When I graduated, my uncle who lived in Colorado, owned a machine shop and offered me to come live with him for a week and work for him to try it out. I fell in love with it and he offered me a job so I packed everything up the next week and moved to Colorado and have been machining ever since.

JEREMY LASHINSKE



AGE: 30

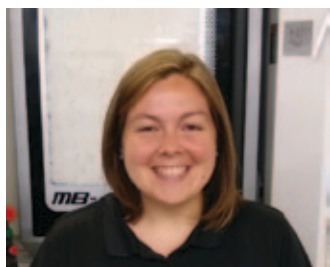
COMPANY: Modern Industries

HOMETOWN: Phoenix, AZ

CURRENT CITY: Phoenix, AZ

WHAT DREW YOU TO MANUFACTURING? I grew up following my dad around the shop and talking with my grandpa about Modern and manufacturing. I've always been drawn to what manufacturing means for a free America and love the value add nature of our industry both in terms of GDP and money multiplication. It's an industry I feel conviction for and makes going to work every day satisfying.

KATHRYN WOLLENHAUPT



AGE: 28

COMPANY: R&D Manco

HOMETOWN: Russell, KY

CURRENT CITY: Phoenix, AZ

WHAT DREW YOU TO MANUFACTURING? The innovative environment



JOHN HERNANDEZ

AGE: 30

COMPANY: Allied Tool and Die

HOMETOWN: : Bangor, MI

CURRENT CITY: Buckeye, AZ

WHAT DREW YOU TO MANUFACTURING? I've always been interested in making things and working with my hands. Envisioning a plan and seeing it manufactured from a 3D model. Luckily my school in Michigan was involved with the Van Buren Tech Center in Lawrence, MI and that allowed me to get hands on experience at an early age.



KAITLYN FRICKE

AGE: 22

COMPANY: Peerless Precision

HOMETOWN: Ware, MA

CURRENT CITY: Ware, MA

WHAT DREW YOU TO MANUFACTURING? I knew I wanted to be an Engineer someday and have always enjoyed working with my hands. When I went through the exploratory program at Pathfinder Regional Vocational Technical High School, I found that I really enjoyed the manufacturing program and knew that was the place for me!



MARKUS GONZALES

AGE: 30

COMPANY: Modern Industries

HOMETOWN: Phoenix, AZ

CURRENT CITY: Phoenix, AZ

WHAT DREW YOU TO MANUFACTURING? I kind of actually fell into manufacturing in the beginning. I didn't really know anything about it but was going back to school for some pre requisite towards engineering, when I was told about the AZPMAP apprenticeship. I applied for it hoping to get some experience and I got assigned to Modern Industries. I had absolutely no experience in machining before but I really enjoyed working and learning hands on. I felt like I picked it up pretty quickly because it was fun to learn something new every day. Even though I finished the apprenticeship a few years ago, I still learn something new all the time. That's what continues to draw me towards manufacturing.



SETH HOLLINGSWORTH

AGE: 29

COMPANY: Allied Machine and Engineering

HOMETOWN: Indianapolis, IN

CURRENT CITY: Hudson, IA

WHAT DREW YOU TO MANUFACTURING? What originally drew me to manufacturing was the dynamic nature of the work. I enjoyed/enjoy the need for constant innovation and problem solving.



NICHOLAS GULLEY

AGE: 23

COMPANY: AccuRounds

HOMETOWN: East Bridgewater, MA

CURRENT CITY: East Bridgewater, MA

WHAT DREW YOU TO MANUFACTURING? Reason why I got into manufacturing- I attended a vocational school and as freshmen we would cycle through and sample all of the shops at the school. When I went through the Machine Tech program it was something completely new to me and I was drawn to the field. Seeing how vital manufacturing is to our society, I was excited to learn more about it.



NIKOLAI BIBIK

AGE: 24

COMPANY: FocusedOn Machining

HOMETOWN: Boulder, CO

CURRENT CITY: Littleton, CO

WHAT DREW YOU TO MANUFACTURING? The primary force that inspired me to go into manufacturing was my grandfather, Jim Coons. He has been a machinist for over fifty years. He invented and manufactured aftermarket trigger systems for Perazzi and Kohler competition trap shotguns. I had my foot in the door of manufacturing as a floor supervisor at a water bottling plant in northern Denver but sought to follow in my grandfather's footsteps and enter high precision manufacturing.



NEIL CHAPMAN

AGE: 29

COMPANY: Homeyer

HOMETOWN: Washington, MO

CURRENT CITY: Marthasville, MO

WHAT DREW YOU TO MANUFACTURING? I was drawn to manufacturing by my appreciation for the ability of the industry to coordinate on such a large scale and find solutions to problems. Through working at Homeyer Precision Manufacturing, my appreciation has done nothing but grow as I continually realize just how impressive this feat is. A thriving manufacturing industry is the foundation of a successful economy, and a driving force in human progress. Manufacturing provides the means to achieve, to create and to improve. I can honestly say I'm excited to see what the future brings to the manufacturing industry and what manufacturing brings to the world.



ZACH HALE

AGE: 22

COMPANY: LeanWerks

HOMETOWN: Layton, UT

CURRENT CITY: Layton, UT

WHAT DREW YOU TO MANUFACTURING? I started looking into machining when I was at a car show and I started talking to a guy whose car was in the show. We started talking about his work, CNC machining, and how much he loved it. Right when I got home from the car show I applied for some local shops.



MARSHALL SEELEY

AGE: 25

COMPANY: Kennametal

HOMETOWN: Spokane, WA

CURRENT CITY: Phoenix, AZ

WHAT DREW YOU TO MANUFACTURING? I've always been interested in making things. However, I acquired my taste for manufacturing through another passion: motorsports. At ASU, I was on the Formula SAE team. If you're unfamiliar, FSAE is a collegiate engineering competition where students from all over the world design and build Formula-style racecars and compete against each other in a series of different events. While on the team, I learned how to make parts on manual machines, then CNC machines. My final year on the team, I programmed, setup, and ran most of the machined parts on the car. Through this experience, I realized I wanted to pursue a career in manufacturing.



FEATURE

NATIONAL TOOLING AND MACHINING ASSOCIATION

HITTING A FIVE-RUN HOME-RUN

At this very second, there are over 500,000 manufacturing jobs open. That number has the potential to grow to 2.4 million by 2028. According to the US Census Bureau and MAPI, there are 295,643 manufacturing companies in our country. So right now, each manufacturing company has almost 2 job openings. The loss of US productivity due to this labor shortage is already in the trillions. In other words, no one is immune from this.

Unfortunately, when the White Sox are down by 5 runs in the 9th inning, there is no way for the next batter to make up the difference. One swing is not able to tie the game. However, that batter is able to start that ball rolling by not swinging at the outside pitch on a 3 & 2 count. The next batter hits a single over the head of the shortstop followed by a hit by pitch to load the bases. Abreu is up next and plants the first pitch into the left field bleachers. The crowd goes wild and the fireworks explode in the air, but in reality, the White Sox are still down one run and need to manufacture one more run.

When it comes to workforce develop-

ment, we all want to hit a five-run homerun but it is not possible. We need to move step by step to close the gap in order to win the game, or even to just stay in contention. Abreu would have never had the chance to hit that grand slam if Tim Anderson tried to be the hero and reach for that full count pitch. In the end, that grand slam generated a lot of excitement and made for a great fan experience but it did not mean that the game was won.

Over the next 12 months, we are asking for our NTMA members to not swing for the fences. We want for you to move base by base when it comes to workforce development and youth engagement.

- If you have never engaged with your local school, then reach out to the administration about serving on their advisory committee.

- If you serve on an advisory committee and have never invited the students to tour your facility on MFG Day, then we ask for you to open your doors this year.

- If you have had students take a tour of

your facility in the past, then reconnect with the teacher to see if any student is interested in job shadowing or see if you can support them to participate in the NRL program or another STEM competition.

- If you are engaging students at your facility, then take advantage of the opportunity to create a Co-Op program or engage students by utilizing NTMA's Pre-Apprenticeship Program.

- If you have create educational opportunities for students, then take advantage of this relationship by offering them a job upon high school graduation.

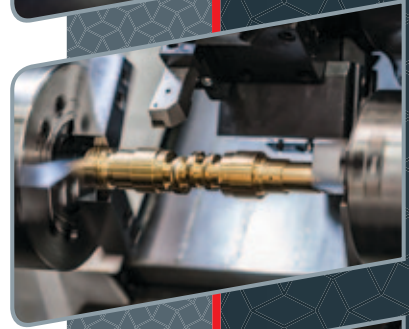
No matter how hard we try, workforce development is a step by step process. It takes an investment in time and resources to build the foundation of creating a talent pipeline which is hard because you need skilled people today to fill those open slots. However, in order for you to have long-term success, it is important to have your foundation set.



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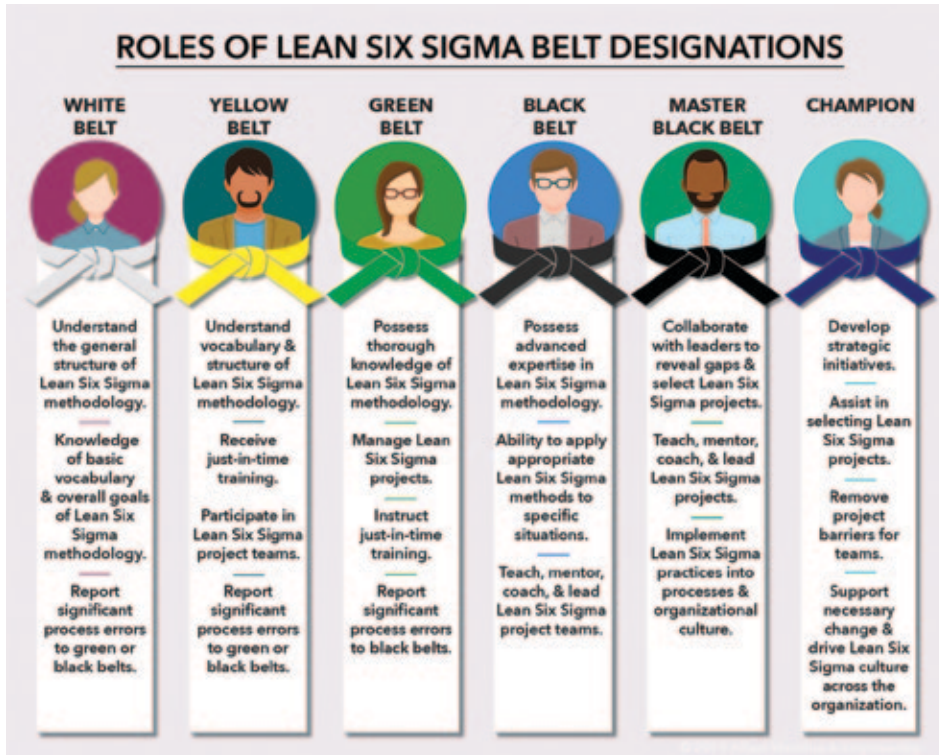


BLACK BELT TRAINING BENEFITS COMPANIES AND THEIR CUSTOMERS

ALLIED MACHINE INVESTS IN LARGE-SCALE LEAN SIX SIGMA EDUCATION FOR CONTINUOUS IMPROVEMENT.

BY DEBORAH A. FROELICH

Why do companies like 3M, GE, Ford, and even a 78-year old, family-owned cutting tool manufacturer like Allied Machine & Engineering continue to invest in black belt training? After all, it's time consuming, expensive, and pulls valuable employees from their daily commitments. Not to mention, it's particularly rigorous and certification is not guaranteed. Investing in Lean Six Sigma's black belt training is intimidating, but businesses committed to educating employees in key roles throughout their organization see long-term benefits in customer satisfaction, work culture, and their efficiency.



Lean Six Sigma methods are rooted in process improvement systems like Total Quality Management (TQM) and evolved over time. Motorola's Bill Smith coined the term in the early 1980's. The name originates from a statistical measure, and the goal is to consistently produce no more than 3.4 defects per million opportunities (DPMO).

Initially Lean Six Sigma was used exclusively in parts manufacturing, but over time companies like 3M and GE started using it in other areas too. In the 2000's, companies began combining the quality improvement systems of Six Sigma with the waste reduction methods of Lean Manufacturing, creating the term Lean Six Sigma. As defects are reduced, waste is reduced, so the two practices complement each other well. The methods worked so well, that by 2009, 82% of Fortune 100 businesses had implemented Lean Six Sigma practices into their business strategies.

"Belt Roles": The hierarchy of Lean Six Sigma certification is represented by various belt colors. Each color encompasses various skill sets, roles, and duties.

importance of educating key players to shape the continuous improvement culture and sustain process excellence. Black belt training was the perfect solution.

Executive Vice President Steve Stokay, participated in black belt training alongside employees. He said, "I chose to go through the training to be able to lead the cultural shift at Allied. It is vital that I hold the organization accountable to effectively use the tools to continuously improve our business. By learning the nomenclature, understanding the software, and working on a black belt project with my team, I am living the change process with them."

Throughout black belt training, the facilitators instructed candidates in advanced Lean Six Sigma, covering the DMAIC (define, measure, analyze, im-

SEE "SIX SIGMA" NEXT PAGE

With such successful businesses using Lean Six Sigma tactics, executive leadership at Allied Machine understood the



There are many tools that exist within each segment of the DMAIC method. Here are several applied to Six Sigma projects by Allied's candidates as they pursued their certification

"SIX SIGMA" CONTINUED

prove, control) methodology, the unique nomenclature, analysis software, data-driven techniques for process improvement and more. Higher level procedures are covered and practiced in the final week of classroom instruction.

Once classroom sessions conclude, trainees lead a black belt project that must make a significant financial impact and support strategic initiatives. The project is the proving ground for all the skills covered during classroom sessions and generally takes at least three to six months to complete.

Trainees submit their project to the certification trainer for review and if approved, they are certified as a black belt. Not all participants achieve this status. Ross Randazzo, the director of operational excellence at Allied Machine, notes that "Black belt training not only identifies potential leaders in our workforce, but it also identifies areas for improvement, even in existing leaders too." Along with processes and products, this training also provides continuous improvement opportunities for an organization's workforce.

SO HOW DOES THE TRAINING HELP AN ORGANIZATION'S CUSTOMERS?

Organizing black belt training for leadership roles across various departments is no small feat, but in the end, it benefits the most vital component to an organization's success and longevity--its customer. It systematically defines a roadmap to match the voice of the process with the voice of the people. In other words, it teaches how to listen to customers and align internal quality standards to meet the end-user's needs.

In the 1990s, Ford Motor was struggling with low productivity, environmental issues, and very low customer satisfaction rates. In response, they began a consumer-driven Six Sigma focus. Ford poured through surveys and feedback to target the top 25 critical customer concerns for each vehicle line and developed a process improvement strategy to address each. Their hard work drastically improved customer satisfaction ratings, according to Quality Digest. By setting standards that mirrored their customer's expectations and monitoring processes to consistently meet them, Ford demonstrated the value of their customer's feedback and restored credibility.

Lean Six Sigma certification conveys that an organization is fiercely devoted to producing and delivering the best products and services on time, every time. According to classroom facilitator S. Skillman, "Customers receive higher quality goods in a faster time frame with better reaction to problems."

SIX SIGMA OFFERS SIX WAYS TO BENEFIT CUSTOMERS.*#1 Communication*

Customers deserve to be heard and communication is a critical component of Lean Six Sigma. Understanding a customer's requirements and making them your own is a mantra repeated throughout training. The terminology used in Lean Six Sigma is well-known and provides a common language for businesses and their customers. It puts an emphasis on gathering the right information from clients in order to shape internal quality standards.

#2: Trust

End-users also want to trust their suppliers. Lack of transparency, inconsistent compliance, and varying lead times chip away at vendor relationships. By training employees in the data-driven processes, organizations like Allied Machine have documentation that can provide compliance visibility to their customers. Tracking and archiving data through control systems and analysis software allows employees to react quicker to significant variances and reinforces customer trust.

CONTINUED NEXT PAGE

The 8 Deadly Wastes of Lean (Muda)**D**efects:

Producing work that doesn't meet customer requirements, such as product with missing parts requiring rework or scrap.

Overproduction:

More products/services produced than customer requires. Creating components in advance of current demand.

Waiting:

Idle time created from improper material/equipment, waiting on approvals, ineffective meetings/communication.

Not Utilizing Talent:

Under utilizing existing talent, insufficient training, high absenteeism or turnover, inadequate job performance.

Transportation:

Material/product movement that doesn't add value like moving between workstations or shifting inventory before shipping.

Inventory Excess:

Purchasing materials in excess of current workload, storing obsolete files, holding on to broken/antiquated equipment.

Motion:

Human movement that doesn't add value such as repetitive motion or physically searching for files, supplies, & information.

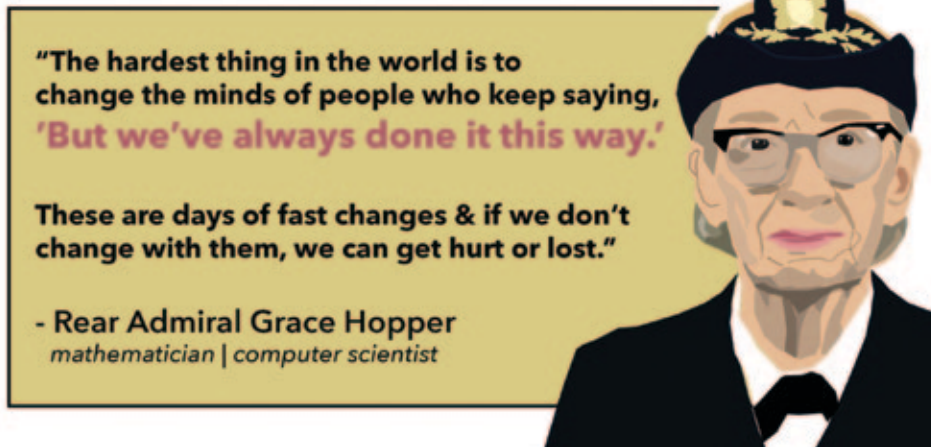
Extra Processing:

Excessive document approvals, using higher tech equipment than required, adding unrequired value to products, & extra steps taken to correct avoidable errors.

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Lean's Eight Deadly Wastes" Originally Taiichi Ohno, a chief engineer at Toyota, created seven areas of potential waste (a.k.a. Muda) while developing Toyota's lean production system. The eighth waste was added in the 1990's when Toyota's method was adopted in the West.

"SIX SIGMA" CONTINUED



Hopper's Adaptability Quote" Rear Admiral Grace Murray Hopper, esteemed computer scientist known for her work on programming languages such as COBOL, spoke often on the dangers of fearing change and the power of adaptability. This quote is taken from an interview in Information Week, March 9, 1987.

movements, or eliminating creep from project meetings, Lean Six Sigma methodology helps businesses navigate process developments smoothly and delivers innovations to customers quicker.

#5 Improved Environmental Impact

Customers concerned about the environment can look to manufacturers practicing Lean Six Sigma too. Reducing energy consumption, minimizing material waste, and streamlining processes all make positive impacts on the environment. According to the EPA, 3M reduced volatile air emissions by 61% from 2000 to 2005 through Lean process improvements. The EPA has even developed a Lean guide specifically for environmental professionals. Emphasis on reducing specific waste groups helps provide a safer work environment, competitive pricing on products for customers and a healthier community for all.

#6 Shorter Lead Times

In order to improve reliability, organizations are always looking to improve delivery times. Black belts exercise critical thinking skills and mentor staff to proactively streamline processes so that customers receive orders faster. Employees are encouraged to think how they can make a significant difference, whether it's reduced movements in a particular work cell, improved inventory maintenance, or a simplified system for packaging.

HOW CAN COMPANIES AVOID STUMBLING BLOCKS ALONG THE LEAN SIX SIGMA PATH?

Integrating Lean Six Sigma into a company's culture is not an easy journey. Time and resources are obstacles for successful deployment, but other intangibles also stunt integration, including fear of change and lack of leadership buy-in.

Egos can cripple a continuous improvement culture. Jacob Miller is a master black belt and the director of product and process development. He's been working at Allied Machine for 13 years and understands people struggle with the fear of change. Miller advises, "We have to get over 'this is the way we've always done it' and realize it's going to make things easier for everyone involved in implementing processes."

As for buy-in from management in the organization, if they don't believe in the power of data-driven decisions and process improvements, they'll never reap the full benefits of Lean Six Sigma. Ownership and the executive board ultimately set the tone for the company's culture and are responsible for dedicating resources and removing road blocks along the way. It's imperative that leaders define the goals, understand the tools, and create a strategy for top-down deployment.

Investing in Lean Six Sigma black belt training is just good business, for its customers, its people, and the company. World-wide, businesses know what to expect from a company that adheres to this process. Executive Vice President Mike Stokey summarizes the importance of investing in black belt training: "There are plenty of cutting tool manufacturers out there competing to gain the market's attention. We know our people need to be trained at the Olympic level of waste reduction and quality control if we're to continue winning their business and their loyalty."

ABOUT ALLIED MACHINE & ENGINEERING:

Allied Machine & Engineering is a leading manufacturer of holmaking and finishing tooling systems. Allied devotes its advanced engineering and manufacturing capabilities to create the widest selection of value-added tooling available to metal-cutting industries around the world. Our tooling solutions deliver the lowest cost-per-hole in a wide range of drilling, reaming, threading, boring, and burnishing applications. Located in Dover, Ohio, Allied's precision holmaking technologies provide end users worldwide with the highest level of performance. Precision engineering and expert application support make Allied the first and best choice for solving complex metal-cutting challenges.

#3 Quality

John Frazier, a master black belt and manufacturing manager for Allied Machine, stated, "When customers realize a company invests in Lean Six Sigma training and is ISO certified, it gives them confidence. They understand this supplier is going to pursue excellence in everything they offer." Companies using Lean Six Sigma's structured, data-driven methods are truly dedicated to quality and, more importantly, define quality through the eyes of their customers.

#4 Innovative Products and Services

Streamlined processes also help new products get to market faster. Black belts are certified experts in identifying and reducing the eight deadly wastes often found in manufacturing. Whether identifying bottlenecks, removing unnecessary

CELEBRATING INNOVATION

This year, the NRL in partnership with the alliantgroup created the NRL Innovation Award to recognize the innovative solutions applied by students in the manufacturing process of designing, building or testing of their Bots. The NRL and the alliantgroup wanted to motivate student teams to explore new ways to implement new design features or methods, utilize new technologies like 3D printing, Bluetooth or sensors, and employ new communication strategies or project management tactics. This new award directly supports the NRL mission of providing an exciting, hands-on experience through business/education partnership to build the current and future workforce needed by the manufacturing industry

The alliantgroup was the perfect partner for this award due to their commitment to supporting NTMA members to receive the government-sponsored tax incentives that reward companies for conducting research & development in the United States. Dhaval Jadav, CEO of

alliantgroup, proudly stated “Being a partner with NTMA and the NRL has been such a tremendous honor for us. To see innovation within manufacturing being celebrated and supported in such a fun and creative way is truly inspiring and is directly in line with our mission of strengthening American businesses through empowering technical talent & driving STEM education.”

The NRL Innovation Award was open to all NRL teams for the 2018-19 season. To be eligible, the NRL team must compete at a local competition and the innovative solution must have been implemented to a newly manufactured Bot during the current school year. One (\$500) award will be given at each regional NRL competition with those winners



eligible to win national prize (\$1000). The national prize will be presented at the NRL 2019 National Championship. **WINNING INNOVATIONS SHOULD MEET ONE OR MORE OF THE FOLLOWING CRITERIA.**

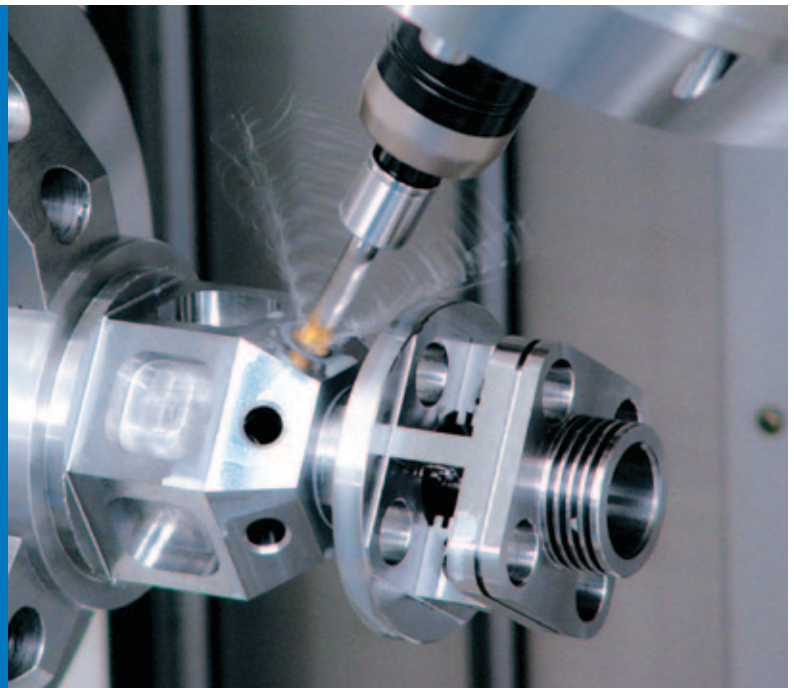
- **Quality:** The innovation increases engineering quality of the Bot.
 - **Efficiency:** The innovation contributes to more efficient Bot building processes.
 - **Cost Effectiveness:** The innovation
- SEE "INNOVATION" NEXT PAGE

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"INNOVATION" CONTINUED

adds value to the Bot building process while containing or reducing costs.

- **Replication:** The innovation is easy to replicate by other teams.
- **Creativity:** The innovation is original and creative.
- **Timeliness:** The innovation has not been used by the team in the past.

HERE IS THE LIST OF THE REGIONAL COMPETITION WINNERS:

BotsKC - Tonganoxie High School
 BotsSTL - FZW Robotics
 AWT RoboBots - Madison High School
 Xtreme Bots - Centerville High School
 Collegiate Clash - California University of PA
 RoboBots - Conneaut Valley Middle School
 Rage in the Cage - Bloomsburg Area High School
 SWPA BotsIQ - Pine-Richland High School
 Northern Utah - JD Machine Robotics Club
 BotsIQ of Wisconsin - Peshtigo High School
 NRL Colorado - Horizon High School
 Liberty Bots - Quakertown Community High School
 NRL Sacramento - Placer Advanced Robotics & Technology Club

Members of the NTMA Technology Team and the alliantgroup reviewed the submissions from the regional competition winners. In a runaway vote, Pine-Richland High School in Pittsburgh with their In Wheel Hub Motor Design was named the National Winner and the recipient of the \$1000 prize. Please visit <https://gonrl.org/resources/nrl-innovation-award/> to read the description of their submission.

We look forward to celebrating innovation in manufacturing during the next NRL season. If you would like to be a part of the action and ensuring that these talented students want to work for you, then please feel free to reach out to me at bpadnos@ntma.org. I will be glad to help you create your own workforce talent pipeline through the NRL program.



HORST ENGINEERING ANNOUNCES MAJOR EXPANSION

AEROSPACE COMPANY WILL BREATHE LIFE INTO EAST HARTFORD LEGACY SITE

The HORST Engineering Family of Companies, a leading manufacturer of precision machined aerospace components, today announced the acquisition of a property to be the future home of its consolidated Connecticut operations. The move marks another critical step in the company's ongoing objective: to benefit its employees, customers, and community.

With the acquisition of 141 Prestige Park Road in East Hartford, the 73-year-old, three-generation manufacturer will consolidate its three existing Connecticut locations into one world-class headquarters.

"We are thrilled to announce our acquisition of 141 Prestige Park, a new location that will allow us to continue our family tradition of manufacturing in Connecticut," said Scott Livingston, President and Chief Executive Officer of HORST Engineering. "The strategic decision to move will provide significant efficiencies for our team, allowing us to operate under one roof and enjoy a fantastic work environment."

HORST Engineering plans to reinvigorate the Prestige Park structure, located on just over seven acres. The purchase price was \$1.45 million.

The 100,566 square-foot masonry building, constructed in 1971, "has good characteristics but will need upgrades and repairs to many of its important systems, such as its roof, electrical, lighting, and HVAC," Livingston said, estimating that the project could take more than a year until completion and will cost substantially more than the purchase price. "We'll move in phases. With the additional space, we will gain flexibility to develop new processes and expand organically, while considering future acquisitions."

"Every week, we are invited to move out of state by locations hoping to lure high-value, advanced manufacturing aerospace jobs to their region," Livingston said. "We are choosing to stay here because our core skilled labor base is here, and the heart of our supply chain ecosystem is located in New England. With the right support from city and state, we can grow. Connecticut has a strong, educated, incumbent labor force that helps to counterbalance the high cost of doing business. The extent of our expansion will depend on the strength of our customers, the economy, and the business climate.

Our hope is that policy makers recognize that they need to do less harm to the small and mid-size businesses that drive the success of our state and this industry."

"In 2015, when we shifted operations from Mexico back to Connecticut, we obtained another site to house all the people and equipment which our two existing plant sites, on Cedar Street, could not accommodate," said Livingston. "As a solution, we set up the third location. Now, we have outgrown the arrangement of working from three separate buildings and need even more space to support our customers' needs.

"Our new location, which will house our entire Connecticut team when completed, will be a world-class manufacturing facility that will appeal to a skilled workforce, including the workers that will drive the next generation of success," Livingston said.

HORST Engineering now employs 110 people in Connecticut and has more than 10 job openings, with more employment opportunities expected as repairs to the property near completion. Sterling Machine, their Lynn, MA based operations is also growing and hiring.

The HORST Engineering Family of Companies was founded in 1946 by Harry Livingston (born Horst Liebenstein), the current CEO's grandfather. Today, in addition to primarily serving the aerospace industry, the company also manufactures precision products for high technology industries including power generation, motorsports, and the high end bicycle market.

"We are excited to be investing in our people and our community," Livingston added.

About: The HORST Engineering Family of Companies was founded in 1946, and is a privately held contract manufacturer of precision machined components and assemblies for aerospace and other high technology industries. Its core processes include Swiss screw machining, turning, milling, thread rolling, grinding, honing, and assembly. The company currently employs 32 people at Sterling Machine in Lynn, Massachusetts; and 110 people at HORST Engineering, in East Hartford, Connecticut.





SAVE THE DATE



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