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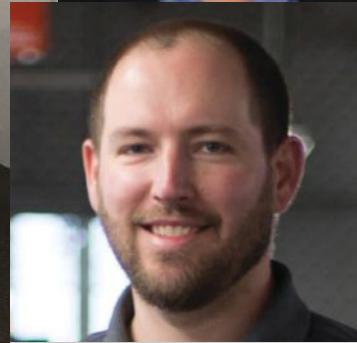
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Efficient Application

DATA MONITORING – pg 28
Optimize Machining
Processes

MULTITASKING – pg 38
Turn-Mill Doesn't Turn



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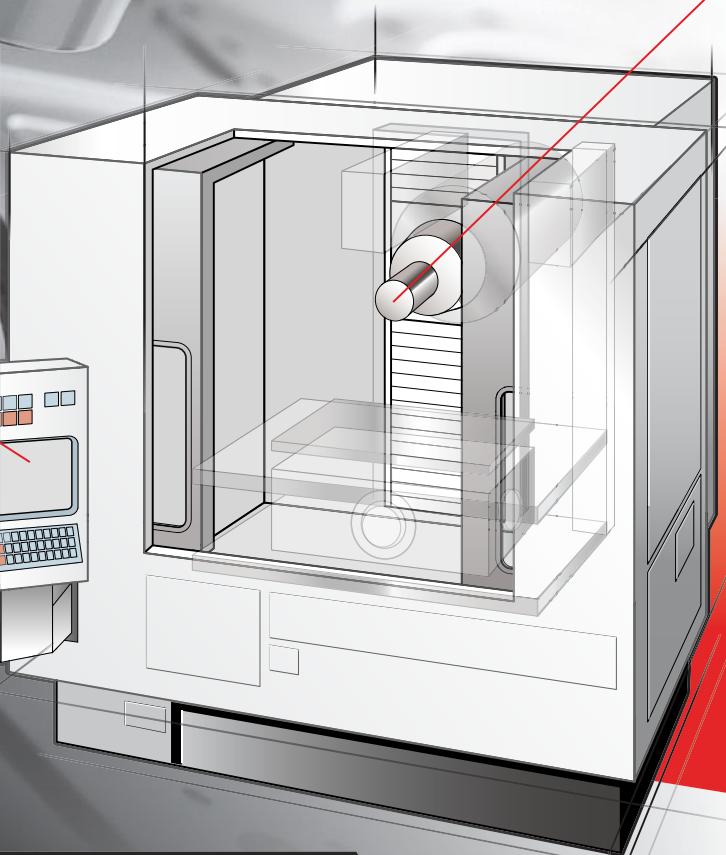
of Main Spindles:

Max. HP:

Top RPM:

Machine Type: 

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- Drill/Tap
- Boring Mill
- Milling Machine



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Features

ON THE COVER:

30 Emerging Leaders Transform Their Organizations

This year's 10 Emerging Leaders have many character traits in common that shine well beyond the buildings in which they are employed. Their leadership skills and willingness to help others grow within their skill sets has proven that the precision machining industry's future is bright in the hands of these talented individuals.

By Lori Beckman, Senior Editor

38 When a Turn-Mill Doesn't Turn

A shop in Big Sky Country uses a B-axis multitasking machine to produce complex, prismatic medical parts that require no turning complete from barstock.

By Derek Korn, Editor-in-Chief

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ABOUT THE COVER:

Our 2020 Emerging Leaders share inspiring stories of enthusiasm and innovation. Read about how each of these young and talented professionals have transformed the organizations they are working for and are influencing the precision machining industry.

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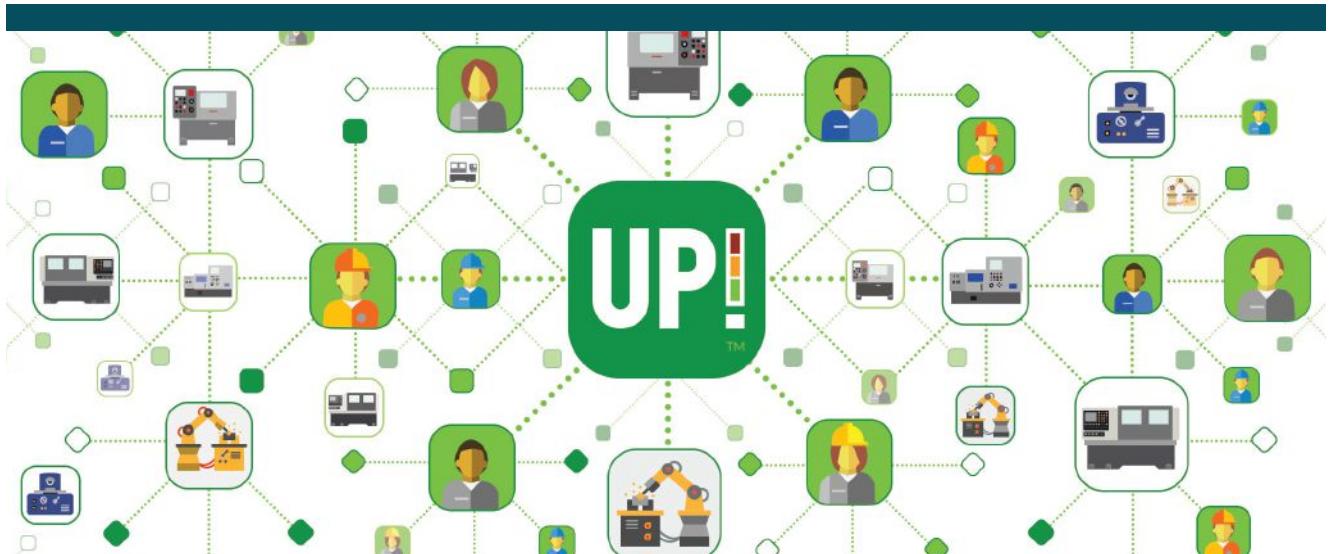
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How Social Are You?

I have a “like/hate” relationship with social media. I say “like” because there’s nothing I really “love” about it. And I dislike it because some people take advantage of the open channels to unfairly paint with a very broad brush, instigate and bully (my daughter has been on the receiving end of that last point). That’s why I don’t really engage with social media on a personal level outside of the random non-work-related tweet from my [@pm_derek](#) magazine Twitter handle.

Social media can, however, prove valuable in a business sense. Machine shops, for example, can leverage it to their advantage in a few ways, and data from sister publication *Modern Machine Shop’s* Top Shops benchmarking survey shows that the most successful U.S. shops are more apt to use and benefit from social media engagement.

I’ve watched all this play out since embarking on my career as an editor nearly 17 years ago. Back then, many shops had a website. In some cases, those websites were very basic, essentially consisting of a home page, contact page and equipment list. Over time, shops’

Let me know how you are using social media to help your shop.

websites became more informative and sophisticated, and some have added blogs to enable them to provide updated company information to site visitors. This might include newly purchased equipment, certifications attained, customer accolades, industry awards and so on.

In some cases, shops also have used their blogs to offer advice to their customers, such as design for manufacturability tips that demonstrate how a simpler part design can make for simpler machining to shrink overall production costs and turnaround time. Case studies describing ways a shop has helped a customer with a tough job or tight time frame also make for good blog fodder.

Social media, then, is the next logical step, and an increasing number of shops are now engaging with various channels. For example, Twitter enables frequent pushes to new information you have added to your website or blog, or articles from other websites that you think would be helpful to your followers. Clever use of hashtags is helpful, but less can be more in this respect. Twitter is also a good channel to let your shop’s personality shine through.

LinkedIn is the leading social media channel for business. It’s a good platform to post articles showing your



DEREK KORN

Editor-in-Chief

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[@pm_derek](#)

machining knowledge or offering industry opinions. It’s also better than Twitter in terms of spurring healthy interaction with and comments from your followers. In fact, our magazine is leveraging LinkedIn more to increase such interaction. A good example of this is a recent post on our [@productionmachining](#) page that lists questions a reader who manages a screw machine shop had about implementing lean manufacturing. Between the post from our magazine’s LinkedIn account and a push to it from my own account, we’ve received more than 12,000 views and more than 30 comments. (See this post at gbm.media/leanlink.)

What about video? Successful shops frequently open their doors to existing customers, prospective customers and the local community (for example, prospective new hires) to show off their capabilities and processes. Some also record video taken on their shop floor and post to YouTube for similar reasons. I’ve even heard of a shop that partnered with Google Street View to let people take a digital tour of its facility. Virtual visits such as these are even more valuable today as COVID-19 concerns have caused shops to limit or even restrict visitors.

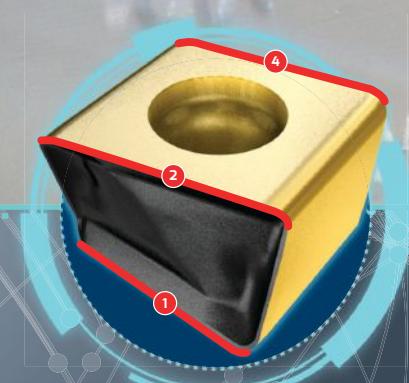
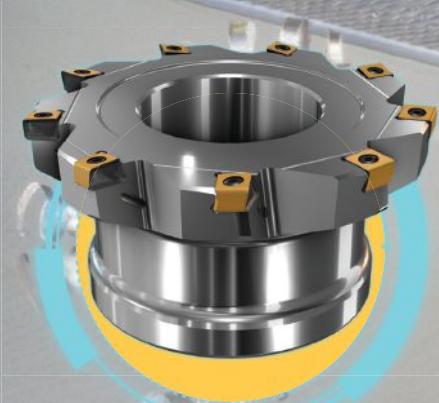
For some shops, the popular Facebook serves as their “website” while offering the ability to tag others. I’ve heard from some shops that have found this platform beneficial in reaching young people and recruiting new talent, too.

Instagram is another option, although it is not as commonly used by shops. It does enable them to show off photos and video of neat parts they’ve machined, new equipment and more, using hashtags to draw people in. The most popular shop hashtag is [#instamachinist](#).

The challenge is finding time to consistently engage with social media. That said, there are social media management platforms such as Hootsuite and Sendible to help with scheduling and monitoring posts.

So, if you’re a shop that hasn’t engaged with social media, why not? And if you are using social media, what platforms work best for you and how are you benefiting? Email me at dkorn@productionmachining.com to let me know. **PM**

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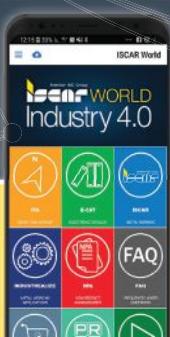


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Hanwha Machinery Opens West Tech Center

Hanwha Machinery America Inc. opened a technology collaboration and training facility in Cypress, California, just south of Los Angeles.

The company says the new tech center enables Hanwha Machinery to bring area customers to see the latest Swiss machines and also serve as a venue to support training and demonstration events both in person and online.

The facility will function as a showroom with business partners. The facility was originally a Hanwha Techwin location, a

sister Hanwha company, that specializes in semiconductor chip mounters. The two groups will share the machine tool showroom for collaborative and demonstration space.

“We are excited to introduce this new showroom technology space which will help us better serve West Coast customers,” says Nick Korfiyas, West sales manager for Hanwha Machinery. “It will allow us to work closer with complementary companies to develop and expand new equipment.”

:: **Hanwha Machinery America, Inc.**
414-421-2300 | hanwhamachinery.com

Department of Energy Selects the University of Texas–San Antonio to Lead Cybersecurity Manufacturing Innovation Institute

The U.S. Department of Energy (DOE) selected the University of Texas–San Antonio to lead the Cybersecurity Manufacturing Innovation Institute (CyManII), a public-private consortium to bolster U.S. manufacturing competitiveness, energy efficiency and innovation. CyManII will focus on early-stage research and development to advance cybersecurity in energy-efficient manufacturing. >

IMTS 2020 Has Been Cancelled

This year’s biennial International Manufacturing Technology Show (IMTS) has been canceled amid COVID-19 concerns.

Last month, AMT – The Association For Manufacturing Technology announced that it was cancelling the 2020 edition of the biennial International Manufacturing Technology Show (IMTS) that was scheduled for September 14-19 at Chicago’s McCormick Place. According to AMT, which owns and produces IMTS, its board of directors and staff had been closely monitoring the impact COVID-19 has had on its members, show exhibitors and visitors, and the industry. It says IMTS is being cancelled because of health and safety requirements imposed by the state of Illinois for holding conventions, which include the availability of a vaccine for the COVID-19 virus or a highly effective treatment protocol. This is the first time the show has been cancelled since World War II.

“The show has been held uninterrupted for more than 80 years, but now the global coronavirus health crisis requires the cancellation of what would have been the 34th edition of IMTS for the health and safety of our exhibitors, audiences and local business community,” says Peter R. Eelman, AMT vice president and chief exhibitions officer. “Our organization and its members take immense pride in presenting one of the world’s largest manufacturing technology events, one that dates back to 1927. The cancellation is especially poignant because the show was poised to offer an unmatched breadth and depth of resources to help industry rethink, reestablish and reengage with supply chains disrupted by COVID-19.”

As a result, IMTS will offer two comprehensive digital programs — IMTS Network and IMTS Spark — to assist exhibitors and visitors with connections, networking opportunities and technical knowledge. The IMTS Network will livestream a wide variety of feature and human interest stories from the manufacturing com-

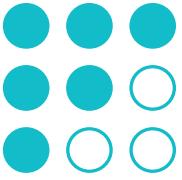


munity. IMTS Spark will be a comprehensive digital platform that connects IMTS exhibitors and visitors, providing educational and networking opportunities.

In addition, the ReBuilding the Supply Chain microsite at imts.com/supplychain explains how OEMs can rethink their current operations, reengage with suppliers, secure trading partners and reestablish connections for a more localized industrial base.

Visitors who have registered for IMTS 2020 have the choice to receive a refund on registration or transfer their registration to a tax-deductible donation to Miles For Manufacturing, where every dollar is given to programs that prepare students for careers in manufacturing technology. Exhibitors will receive direct communications from IMTS. The show is scheduled to return to its normal rotation at McCormick Place September 13-18, 2022.

:: **AMT - The Association For Manufacturing Technology**
800-524-0475 | amtonline.org



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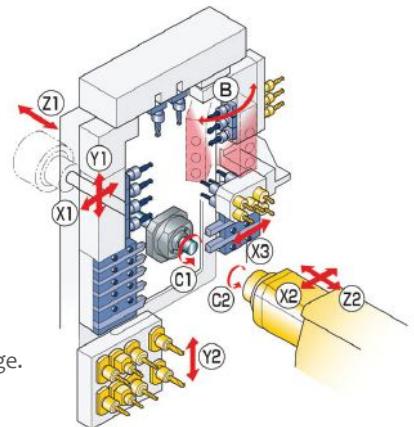
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“As the sector-specific agency for cybersecurity in the energy sector, the DOE is committed to working with our public and private partners to mitigate cyber risks across the energy sector, including in advanced manufacturing,” says Under Secretary of Energy Mark W. Menezes. “Through the CyManII, DOE will leverage the capabilities of the Idaho, Oak Ridge and Sandia National Laboratories across

the applied energy, science and national security mission space to develop innovative cybersecurity technologies and strategies to minimize risk and accelerate energy efficiency across manufacturing supply chains. This institute will help ensure America’s manufacturing base remains secure, resilient and globally competitive.”
U.S. Department of Energy
202-586-5000 | energy.gov

Rollomatic Appoints Joe Kane COO

The Rollomatic Group appointed Joe Kane COO for both Rollomatic Inc. and Strausak Inc., companies focused on providing precision tool grinding solutions. Kane will continue to hold his position as president of Strausak Inc. and will also continue to be based in the company’s North American office located in Mundelein, Illinois. As COO, Kane will oversee all areas related to the operation of the two companies, including managing the combined team of applications engineers and providing leadership and training to the field service manager, parts and logistics manager as well as the customer solutions manager and their respective teams. He will also focus on the day-to-day running of the company.

:: Rollomatic Inc.

866-713-6398 | rollomaticusa.com



Parts and Online Metals Partner for On-Demand Materials Pricing

Paperless Parts is partnering with Online Metals to streamline the materials pricing quoting process for engineers and custom part manufacturers. Through this partnership, Paperless Parts will combine its understanding of how part geometry drives materials selection with Online Metals’ instant materials pricing. As part of the partnership, Online Metals will provide free access to this tool for one year for its customers who sign up for Paperless Parts.

By integrating Online Metals’ materials expertise with Paperless Parts’ technology, Paperless Viewer, estimators will have access to an engineering tool that analyzes part manufacturability, which is said to enable estimators to deliver more accurate, comprehensive quotes with the right pricing in minutes. This solution is designed to address key challenges related to selecting and pricing raw metals.

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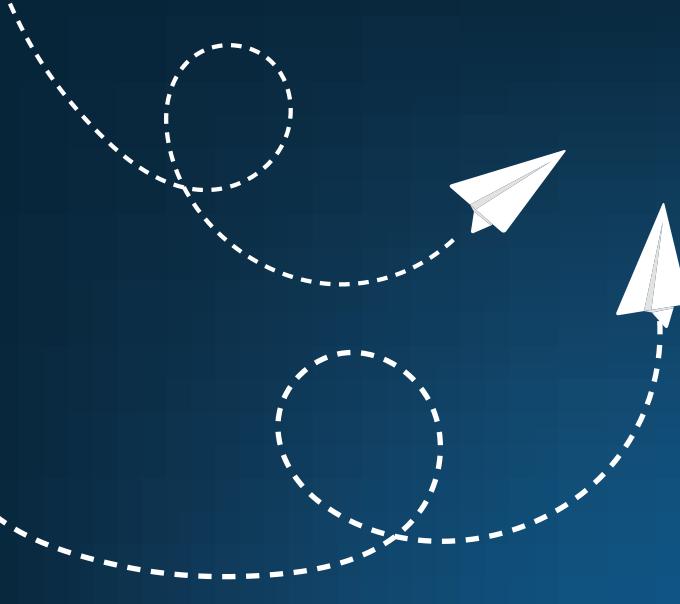
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This year may have
thrown us all for a loop.

But we have a plan.



We understand that it is our responsibility to provide the IMTS exhibitors and visitors with connections, networking opportunities and technical knowledge. We do not take this responsibility lightly and, to that end, we will launch two NEW programs that will accomplish these goals.



We will host **IMTS Network**, a live-stream event bringing you a wide variety of features and human stories from the Manufacturing Technology sector.

► [IMTS.com/Network](https://www.imts.com/Network)



NEW - IMTS spark, a comprehensive digital platform that connects you with the latest manufacturing advancements, industry experts, educational deep dives, networking opportunities, and top notch experiences to ensure your business prospers.

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Follow *Production Machining* staff members on Twitter:

Derek Korn @PM_Derek
Lori Beckman @PM_Lori



"I'm looking forward to highlighting each of our 10 Emerging Leaders weekly on our blog starting the first week of July. I think you'll be inspired by their stories of how they are shaping the #precisionmachining industry for the better."

— Lori Beckman



Burr-Free Electrochemical Grinding System Makes a Point

Tridex Technology, a Glebar company, has developed a programmable pointing and material handling system for more effective electrochemical grinding (ECG) of medical needle points. ECG flows electrical current from a negatively charged abrasive wheel to a positively charged conductive workpiece through an electrolyte. gbm.media/ecgmedical



Ceramic Microtool Being Tested in Italy

The MicroDyn dynamometer from Kistler ensures that cutting forces during CNC machining are measured precisely so that performance parameters of ceramic cutting tools can be determined. These ceramic microtools are currently being tested at an Italian university for a Swiss watch part maker. gbm.media/ceramicmic



Ultraviolet Light Causes Workpieces to Stick

Some turning applications, chuck jaws or other conventional workholding devices for CNC lathes can cause a part to distort as clamping force is applied. Those workholding elements can also prevent full access to a part, which might necessitate reclamping for an additional operation. Blue Photon offers an alternate workholding method that uses adhesive cured by ultraviolet light to secure a part for turning. gbm.media/uvturning



How Do We Fix American Manufacturing?

In America, many have lost sight of the fact that the object of the act of manufacturing is not merely the generation of maximum profit, but instead the creation of value.



Miles Free III
Director of Industry Affairs

In America, many have lost sight of the fact that the object of the act of manufacturing is not merely the generation of maximum profit, but instead the creation of value. Many have lost sight of the idea of self-sufficiency in our race to the bottom for the lowest global price. Many have lost a sense of economic patriotism by ignoring the production of our natural neighbors so that we can get the lowest possible price from strangers overseas.

As MBA finance culture takes control of corporate board rooms, (full disclosure, I am an MBA), the emphasis is on optimizing for financial instead of noneconomic “indicators of success.” The focus is on supply chains rather than loyalty to constituents, communities and manufacturing ecosystems. But the blame is not solely on the MBAs and capitalists. It is on everyone.

- It is on us as parents, who say that manufacturing is a great career for someone else’s kid, but “ours need to go to college.”
- It is on the politicians who paint the middle-America-Buy-American crowd as “Bitter clingers” not up to speed with the sexy new global reality that funds their campaigns.
- It is on the folks who race to buy the latest technology from overseas, and the lowest priced goods from “big box” and discount “dollar” stores. I don’t recall the labor share of profits ever being lower in this country.

How do we fix?

The question isn’t “Why?” The question today is, “How do we fix?”

- 1. Create value, not just profits.** Value includes meaningful work for our neighbors and quality products that are useful to buyers and society. Profits are the result of creating value, not the cause.
- 2. Economic patriotism.** As consumers, we need to acknowledge that loyalty to our friends and neighbors might be as important as saving a few bucks on

products made overseas where the costs and worker protections are far, far lower.

- 3. We need to once again recognize the dignity of work, and value a job well done.** We need to acknowledge the fact that our economic support of our community is an essential means to creating a just and productive society.
- 4. Invite critical thinking back into our lives.** We want to buy local food so we can see where it was grown, so we can have a relationship with the people who grow it. We need to abandon our blind trust that manufactured goods from “over there” are magically just as good as what our friends and neighbors could make here in our zip code. *We need to hold foreign goods to same levels of regulatory and labor standards as we hold our local manufacturers.*
- 5. Refocus on production and creation, not profits.** What is the object of the act? Western culture seems insanely focused on profit and wealth accumulation. Nowhere do we read that the object of the act just might be the “existential joy of manufacturing” — where our talents, capital and creativity turn raw materials into items of utility, quality of life and creation of joy. Instead of expecting instant career success through college (and debt), we can consider a longer game



where we grow and develop as humans creating and accumulating value for our communities, societies, our families and ourselves.

6. We need to re-value the talent and knowledge and capabilities of our human performers. Our performers and their talents are currently greatly discounted compared to money in the bank. What do we value? What do we treasure? As individuals? As employers? As a society?

Have we traded our morals and values for profits? False profits and false savings are gained at the expense of our neighbors' jobs. At the expense of having a robust and resilient economy. At the expense of huge gaps in our collective capabilities, due to having given away manufacturing expertise. Jobs and pollution weren't the only exports to Asian manufacturing. Agency and knowledge to make things that matter went with them.

Rediscovering True North

Rediscovering True North is the understanding that the basis of our individual success is also the foundation of our community's success. And that as our communities succeed, so do we. If decision-making is reframed from

profit maximization at any cost, the lens of economic patriotism can be moved to recognize dignity of work, value in (and pride of!) creation and shared community values.

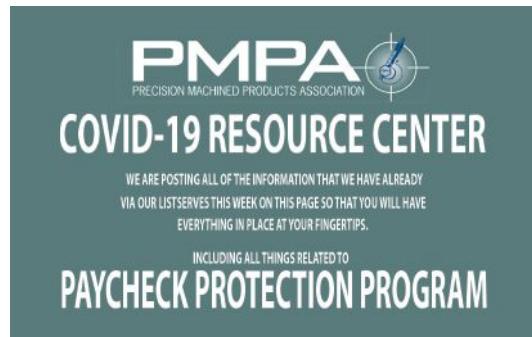
Recognizing that profits are a result of manufacturing — and not the goal of manufacturing — is essential to restore dignity to American manufacturing and economic patriotism. In target shooting, aiming at the right target is crucial. The results can change when American business (and consumers) stops aiming at the cheapest price and maximum profits target. Profits are the result of manufacturing, not the cause. We need to change our aim for values, community and America.

Mastery of our craft, of our materials, creation of production capability, these can lead us to mastery of our world, mastery of our fate. Manufacturing engineering, not financial engineering, is the sustainable way back to lives worth living. How do we change our economic incentives to reflect this? [PMPA](#)

Miles Free III is the PMPA Director of Industry Affairs with over 40 years of experience in the areas of manufacturing, quality, and steelmaking. He helps answer "How?," "With what?" and "Really?" Miles' blog is at pmpaspeakingofprecision.com; email: mfree@pmpa.org; website: pmpa.org.

**Like Feeds and Speeds,
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Precision Machined Products Association (PMPA) kept all members up-to-date on Covid-19 and SBA loan announcements. Members also helped members. This is just a small sample of how we work Better Together.



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bit.ly/PMPA-Benefits

COVID-19 Effects on the Manufacturing Workforce

How has COVID-19 actually affected the manufacturing workforce?
Have employer needs changed? Are the changes here to stay?



Workforce is an evergreen issue for the manufacturing industry. With the changes in our COVID-19 world, some companies need more employees and some had to layoff employees. I talked to Taylor Evans from Rust Belt Recruiting to get his perspective.

I have to share how Taylor started his company. On the day Taylor and his wife found out they were pregnant with their second child, his wife told him to quit his job and start the recruiting company. Wow! Thereafter, Rust Belt Recruiting began serving the manufacturing industry by recruiting and placing temporary-to-hire and direct-hire employees.

As I am not familiar with the recruiting process, I asked Taylor how it worked. A temp-to-hire employee works for a company for 90 days, is on Rust Belt's payroll, and is eligible for hire after the 90 days. This way the company can determine if the employee is a good fit before directly hiring them. Direct hire is what it sounds like — Rust Belt finds candidates and the company can hire them.

So how has COVID-19 actually affected the manufacturing workforce? Have employer needs changed? Are the changes here to stay? Taylor sees COVID-19 affecting the manufacturing workforce in several ways.

Short Term

From March to the writing of this article, the workforce has seen a dramatic change. Some shops are dependent on the automobile industry or other industries that slowed and had to lay off employees. There are several shops that supply the medical field, were awarded ventilator part jobs or make other virus essential parts and they are actively hiring.



PMPA member Linas Biliunas, from Martindale Electric Co., discusses workforce needs with Taylor Evans.

Long Term

Eventually, the economy will get back to some semblance of "normal" and the people in other industries (such as retail, restaurants, or hospitality) who were furloughed or laid off may see manufacturing in a different light. Manufacturing kept going while other industries came to a standstill. Manufacturing is essential and it is everywhere. The world needs manufacturing to survive. According to Taylor, "There may be a renaissance of sorts where people view manufacturing jobs as stable and desirable." Additionally, in about six to 18

months, we could see a change in the supply chain and more reshoring. These changes would bring a lot of work back and the manufacturers are going to need additional employees.

Silver Lining

Many of us look for the silver lining when things look bad. When I asked Taylor what he thought the COVID-19 silver lining is with regard to the manufacturing workforce he boiled it down to three outcomes:

- A greater appreciation for the importance of manufacturing
- A resurgence in the manufacturing work in our country
- An awareness that spans all age groups about the viability and the security that can come with a manufacturing job — unlike in other industries.

As Taylor summed it up, "Those three outcomes could be really exciting and I hope that high school guidance counselors and school leaders begin to encourage their students to consider a manufacturing career path." PMPA

Carli Kistler-Miller, MBA, has over 20 years of experience with communications, event/meeting planning, marketing, writing and operations. Email cmiller@pmpa.org.

A Commitment to Reducing Machining Times

Steven Baier, Haimer USA's vice president of Sales, shares the company's four core competencies, its commitment to reducing machining times and why thinking like a manufacturer has proven beneficial.



PMPA: What is a brief history of Haimer?

Steven Baier: Franz Haimer founded Haimer in 1977 in his father's garage. For our first 11 years, we were a job shop doing work for the aerospace, die mold and defense industries in Germany. Mr. Haimer's first employee was a local woman named Claudia. Later she became Claudia Haimer. Today, Franz and Claudia Haimer are co-CEOs and Haimer is still a family owned company.

PMPA: What does Haimer do and who do you serve?

SB: Haimer has four core competencies, Shrink

Holders consistently provide the best gripping torque and runout accuracy of any other tool holding system. Haimer Shrink Fit Holders consistently maintain 0.0001" runout at three times diameter of the cutting tool. Haimer is also the only tool holder manufacturer in the world that also produces a balancing machine specifically for balancing tool holder assemblies. Unbalanced tool holder assemblies create centrifugal forces during rotation that generates vibration. This vibration can only go two places, up into your spindle or down into your part through the cutting tool. Unbalance reduces the life of the machine spindle and cutting tool. Unbalance also affects surface finish negatively. The result is the machinist must slow the machine tool down to make a good part. By running balanced tool holder assemblies, the machinist can increase metal removal rates and reduce machining time. The result is more profit made per part.

We also produce presetters so that tools can be preset outside of the machines — while the machines are running — which reduces downtime and eliminates scrapped parts due to tools with excessive runout or other geometrical problems.

Cutting tool technology includes Safe-Lock, Duo-Lock, Haimer Mill and Power Haimer Mill. In addition to sales, we are a manufacturer and, because Mr. Haimer has the mentality of a manufacturer, it is very important that our customers are not locked into just one supplier. Because of this, many of Haimer's innovations are available from several sources. For example, Haimer's patented Safe-Lock system is available from over 15 of the world's leading cutting tool manufacturers.

PMPA: You mentioned Duo-Lock. What is that?

SB: Duo-Lock is the strongest solid carbide indexable end mill system in the world. For example, Duo-Lock end mills are capable of doing a 1.5 times diameter full slot in 4140 steel. Haimer controls the overall length of Duo-Lock end mills to $\pm 0.00039''$, which makes very quick tool changes possible. Because Duo-Lock is a threaded on connection it also provides excellent tool security.

PMPA: How do your ER Collets help with machining times?

SB: Duo-Lock ER collets and Shrink Fit ER collets are not the typical collet. Today's lathe OEMs talk about the horsepower and torque their turrets and spindles have, but operators cannot always take advantage of it. With Duo-Lock ER collets and end mills, an operator can change an end mill in 30 seconds versus three to 15 minutes — less downtime.

The Shrink Fit collets are shaped like a traditional ER collet except they have a precision ground ID that expands like a Shrink Holder to precisely grip a cutting tool. Shrink Collets are heated on a Haimer Shrink Machine like a shrink fit tool holder. When the collet is heated, the gripping ID expands and a cutting tool is inserted. Haimer ER Shrink Collets provide exceptional gripping torque. We have an online video that shows the tool change times — bit.ly/PMPA-PM0720

PMPA: Why do you value your PMPA membership?

SB: The PMPA is a special, tight-knit group of manufacturers and tech suppliers that works together with each other's best interests in mind. This collaboration results in the old saying that a rising tide lifts all boats. Haimer is proud to be a part of such a great organization. **PMPA**

We invest 8-10% of all revenue into research and development.

Fit Technology, Balancing Technology, Presetting Technology and Cutting Tool/Tool Holder Technology. All of Haimer's core competencies are designed to pay for themselves through increasing metal removal rates and reducing machining times. We are so committed to reducing machining times, that we invest 8-10% of all revenue into research and development.

Haimer is strong in the Aerospace, Defense, Semi-Conductor, Medical, Die Mold and automotive industries. This is because Haimer's solutions provide our customers with consistent setups that can be measured and improved upon.

PMPA: How are Haimer's core competencies reflected in the products?

SB: Haimer Shrink Fit Machines and Shrink Fit

PMPA

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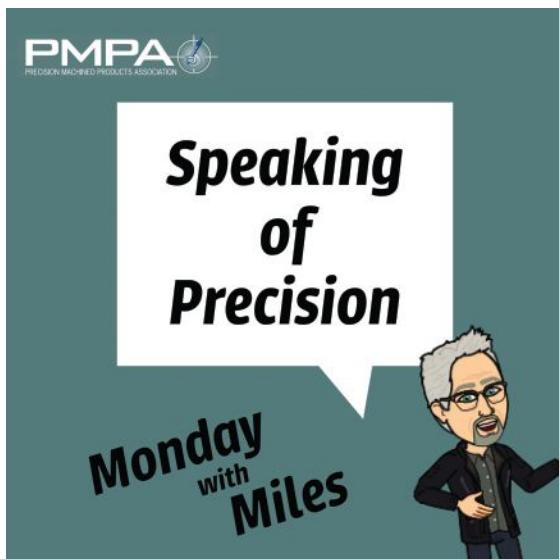
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CRAFTSMAN'S CRIBSHEET



Contract Review — Thought Starters

Precision machining manufactures critical components for advanced technologies where human safety is in the balance. How can risk be intelligently managed for all parties — ourselves, our customers, their customers and the public? The answer is an effective contract review process — one that covers both explicit (clearly stated) requirements and implicit (implied by application or process) requirements.

Explicit Requirements

Purchase Order Issues

- Is QS 9000, AS9100 or other Quality System required to quote?
- Are there other agency requirements — DFARS, ITARS, QS-9000, AS9100, Conflict Minerals, RoHS or REACH — that could limit materials used or acceptable suppliers?
- If the materials used to produce the parts are not compliant, the parts will not be acceptable.
- Is there a contract? Terms and conditions? Did you acknowledge the acceptance of their terms and conditions? In writing? Can you show it?
- Fine print? Did you take any exceptions? In writing? Were these acknowledged?
- Are releases firm? Payment terms acceptable? Evergreen/automatically renewing?
- Provision for cost escalations?

Print Issues

- Is the Part ITARS? If so, can you show it to all employees in your shop? Your vendors? What if the vendor is foreign?
- Can you read the print? If the print has non-disclosure statements and you need to send to an outside vendor, is it in English?



- Are the tolerances being asked typical for your shop?
- Any callouts that will require new methods of gaging?
- Does your method of measurement match that of customer for those tolerances (especially surface finish and GDT)?
- Is material readily available? Is the grade designation a standard U.S. grade? Or a foreign designation? Or a company specific designation? Who has the Analysis? If customer supplied material, will it be optimized for machining or is that unknown- low sulfur, not annealed, peeled hot roll not cold drawn?

Implicit Requirements

- What is implied? Many fastener specifications imply cold heading or forging to fabricate the product.
- Are cut threads anticipated by the spec? Are they supposed to be rolled or cold formed? Does the grade suggest that cold heading is the expected process?
- Are the mechanical properties that are required controlling? Or do they need to be achieved as a result of a process, such as quenching and tempering — as opposed to heavy draft cold drawing?
- Will the parts that you produce undergo subsequent cold work or transformation? By your customer or their customer?
- What happens to the part once it leaves your shop? Different steel making processes can impact subsequent cold work after machining due to higher amounts of nitrogen, increased cold work and higher or lower ductility. How will the material that you provide impact subsequent operations downstream?
- What other unstated expectations might be waiting, unconsidered in that item for you to quote? PMPA

PC

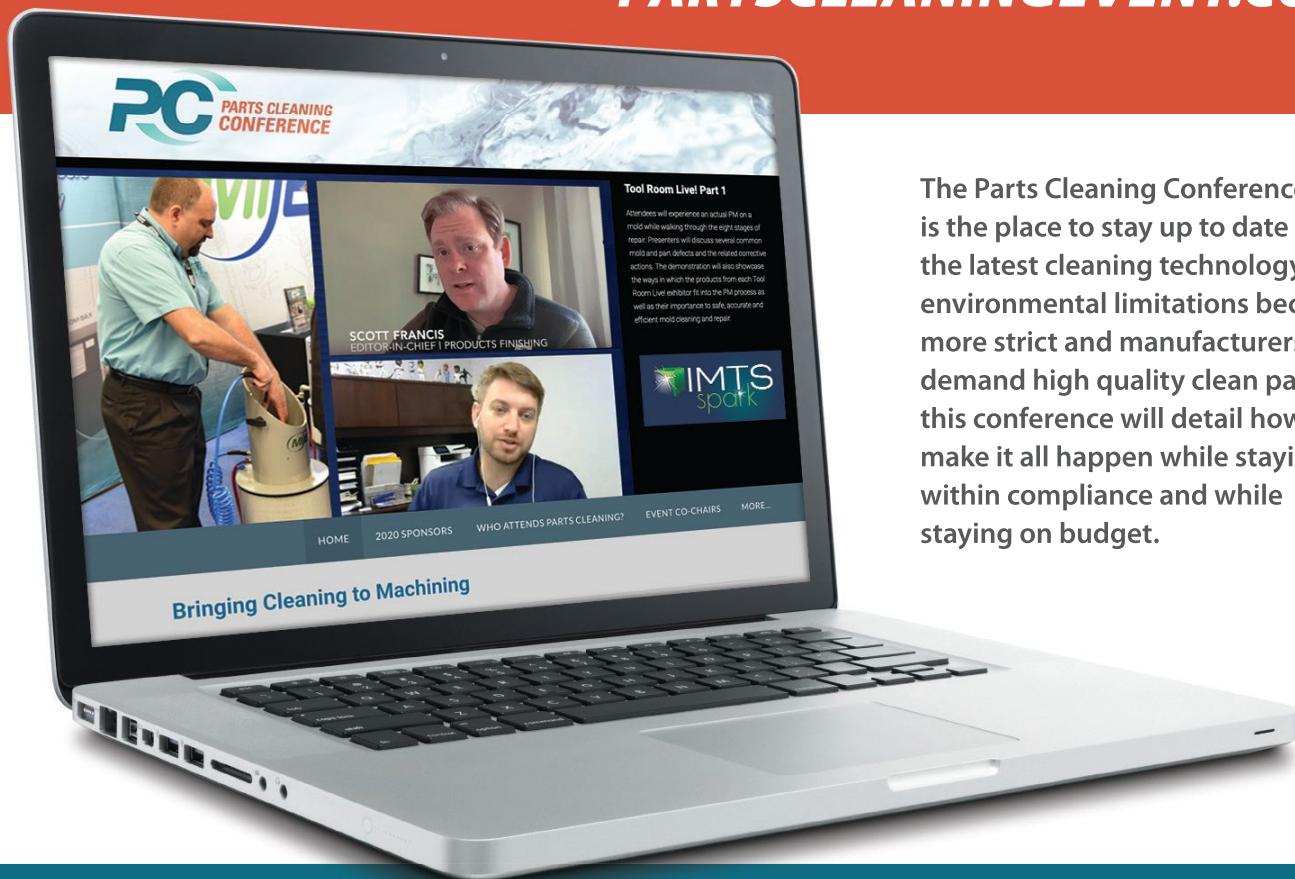
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Production Machinists Report Slowing Decline

The Gardner Business Index (GBI): Production Machining moved higher in May, registering 38.4 after setting an all-time low in April. For the first time since the government curtailed normal business operations to prevent the spread of COVID-19, all components of the Index moved toward more 'normal' levels. Excluding supplier deliveries, all components moved higher from their prior month readings — although each remained below a reading of 50. This situation signals that the industry is experiencing a slowing contraction, meaning that while conditions deteriorated further in the most recent month, they did so at a slowing rate compared to the prior month.

The supplier delivery reading fell slightly in May, which may indicate a turning point in the unprecedented disruption that affected upstream production and slowed deliveries earlier in the year. By the nature of how this question is asked, quickening supplier deliveries lower the Index's reading. However, the resumption of upstream production and deliveries appears to be coming with an additional cost as May's results showed a growing proportion of survey participants reporting higher material prices while also reporting weakening pricing power for their own products. The result of this widening spread across the '50' or 'no-change' line suggests that profit margins are being compressed. **PM**



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Michael has performed economic analysis, modeling and forecasting work for almost 20 years. Gardner Intelligence is a division of Gardner Business Media, publisher of this magazine.

PRECISION MACHINING INDEX



The Precision Machining Index moved modestly higher in May. Higher readings for new orders, production, exports, backlogs and exports (along with a decline in the supplier deliveries reading) were welcomed news as they indicate the first signs of a turn toward more typical business conditions.

SUPPLIER DELIVERIES LENGTHEN WHILE NEW ORDERS FALL TO ALL-TIME LOW



Machinists reported an increase in the cost of input goods from upstream suppliers, while also reporting weakening pricing power for their own products. The combination of these events is almost assured to reduce profitability for the machining industry.



Stay ahead of the curve with Gardner Intelligence. More information about the Precision Machining Index can be found at gardnerintelligence.com.

The Insight That Matters Most to Your Business

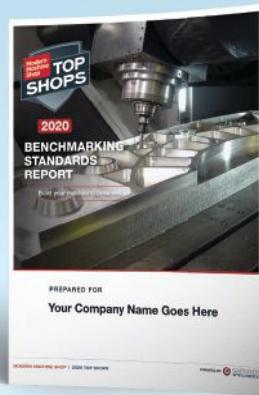
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GARDNER BUSINESS INDEX

GARDNER BUSINESS INDEX

A business trends index measuring monthly changes in new orders, production, backlog, employment and other critical measures.



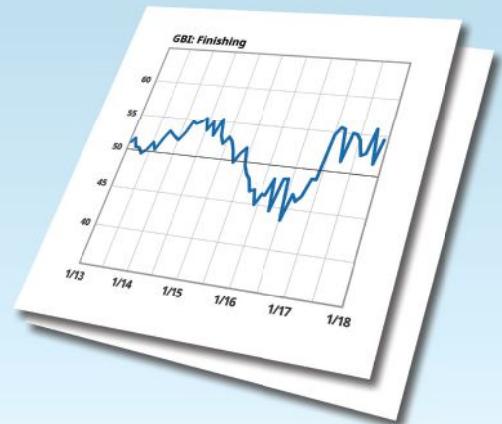
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Opportunity Within a Tragedy

By Todd Palmer

This has officially become the year of unexpected change for businesses. The changes imposed upon today's world, from the COVID-19 pandemic, have been thrust upon all businesses, regardless of industry or geography. For many, this may be the first time they are faced with an uncertain future. For Ruthie Johnston, CEO of Croix Gears in Hudson, Wisconsin, dealing with an uncertain business future is old hat.

In 2010, at the age of 57 years young, her husband Mark unexpectedly passed away. Ruthie had never worked a day in the family business and was thrust into running a company "in a man's world," as she calls it, without any notice or experience. Less than two weeks after her husband was gone, she was at the plant, ill-prepared to handle the day-to-day operations as the new CEO of Marine Associates.

What Johnston had to deal with in 2010 closely mirrors today's business climate, and there is a lot we can all learn from how Ruthie dealt with unexpected change and how she came out on top.

Ruthie Johnson exemplifies the type of leadership needed in times of unexpected change.

Due to her husband's close-to-the-vest management style, Johnston didn't have any idea what she needed to do to grow the business, let alone keep it afloat. He left her without a business plan or succession

plan. She needed to start from a place of humble honesty. She was in over her head. On her first day as the boss, she had to ask for help. "I walked in and said to the team, 'I am new at this and I need your help,'" Johnston says. "I had to approach the business with massive curiosity and ask a bunch of questions. I was getting a late start in the business and I needed all of them to teach me."

And so began her journey as a CEO/entrepreneur. One of the first things she did was change the name of the business from Marine Associates to Croix Gear, to more accurately reflect the products they make.

She soon realized there was a lot of business knowledge and best practices available to her from outside her organization. She knew that neither she nor her team was equipped with all the tools and skills needed to grow the business. She found a business coach who had decades of experience to bring to her and her leadership team. Her coach helped Johnston implement the Entrepreneurial Operating System (EOS), to help the entire company work from the same metrics, use one

operating system, analyze staff with the same wording and understanding, and lay out quarterly and annual goals for the entire company.

One of the things that Johnston learned from using a coach was that her business had some physical constraints. To address this problem, she expanded the headquarters by adding 23,000 square feet of space in 2016.

By 2019, things were humming along at Croix Gear, but Johnson knew they were vulnerable in one key area — new sales opportunities. There weren't any outside sales efforts and the company was existing on new orders from loyal clients and word-of-mouth. This vulnerability made Johnston anxious, so she took swift action. She added an outside sales department for the first time in the company's 50-plus years. No longer would her team simply just take orders, now they would have sales activity metrics and sales goals. Her team, with the help of their coach, created a customer journey map.

When COVID-19 hit, her sales team put that customer journey map to good use and adopted her "connector mindset." They called customers to offer help and service — not to sell them a new gear. "We asked the simple question, 'how do we help you accomplish your goals, in these difficult times?'" Johnston says. "And we listened. By listening, we created deeper connections and discovered new opportunities."

Johnston's leadership was originally in direct response to outside circumstances. First, the changes required self-acceptance of what she did not know and acceptance of an uncertain future. Then they required asking a lot of questions, seeking answers, getting internal and external help from others, creating strategies and executing them, and ultimately pivoting multiple times to create a sustainable, growing company in the face of outside tragedy.

Ruthie exemplifies what all of us can do. Ask for help within our companies, go outside our companies for additional help, think outside the box and be of invaluable service to our clients. **PM**



CONTRIBUTOR

Todd Palmer is the president of Diversified Industrial Staffing, a national skilled labor recruiting firm, based in Troy, Michigan.

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tpalmer@diversifiedindustrialstaffing.com

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Putting Pressure on Coolant Delivery

Edited by Lori Beckman, Senior Editor

Unpredictable cutting tool wear or failure has an adverse effect on machining speeds, feeds and throughput. Coolant that is not efficiently applied to the cutting zone is a leading contributor to these problems. However, this can be corrected through proper application of high-pressure coolant delivery, according to Ron Parker, national product manager, LNS Chipblaster High Pressure Coolant Systems.

For milling, drilling and turning, the friction generated by conventional metal machining creates substantial heat where the cutting tool meets the workpiece. By some estimates, 97% of energy consumed in metal machining converts to heat. That's why machinists have always attempted to cool the cutting zone by applying liquid or gas coolants that may be petroleum- or plant-oil-based, water-soluble or derived from animal fats.

The objectives are to:

- Moderate the temperature in the cutting zone to maintain consistency;
- Lubricate the work surface and cutting tool to enable faster and more precise cuts;
- Prevent oxidation of the workpieces and tools; and
- Prolong tool life.

Low-Pressure Problem, High-Pressure Positives

In many cases, though, coolant is delivered at relatively low pressures to the cutting area where it simply floods the workpiece and cutting tool. Unfortunately, because of the heat generated during a cut, this method might produce super-heated steam before the coolant is able to reach the tip of the cutting tool. As a result, little or no lubrication is provided, the temperature is not consistent, and chips are not efficiently evacuated and are recut, thus accelerating tool wear and possibly damaging the workpiece.

But when coolant is delivered to the cutting zone

via pressures of 1,000 psi or higher, the additional force increases localized pressure that eliminates the formation of super-heated steam. Thus, the coolant successfully reaches the tool tip and prevents premature failure because of heat damage.

Further, because the chips produced are kept at a cooler temperature, they break much more easily and are quickly evacuated from the point of cut. The force of the high-pressure coolant is not what breaks the chips; instead, it's the effect of the coolant that shortens the primary shear zone. Therefore, instead of producing long, stringy chips (as is typical with low-pressure coolant), high-pressure coolant produces shorter, broken chips.

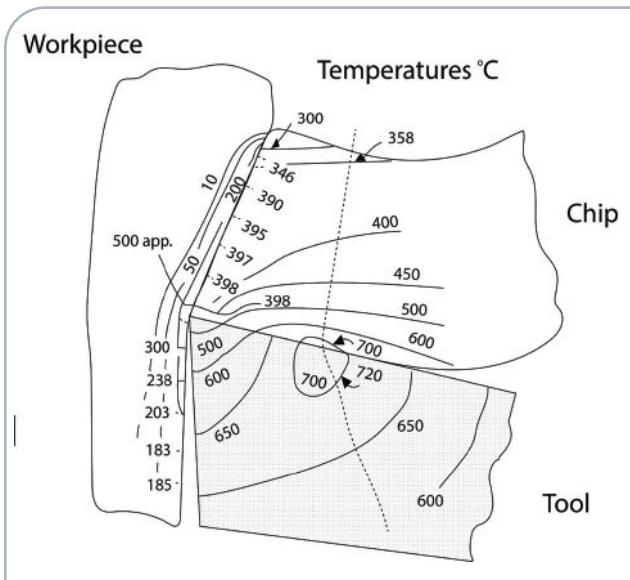
Additionally, the cutting tools can wear at a more predictable rate, making tool replacement far more efficient.

Examples of Improved Cut Data

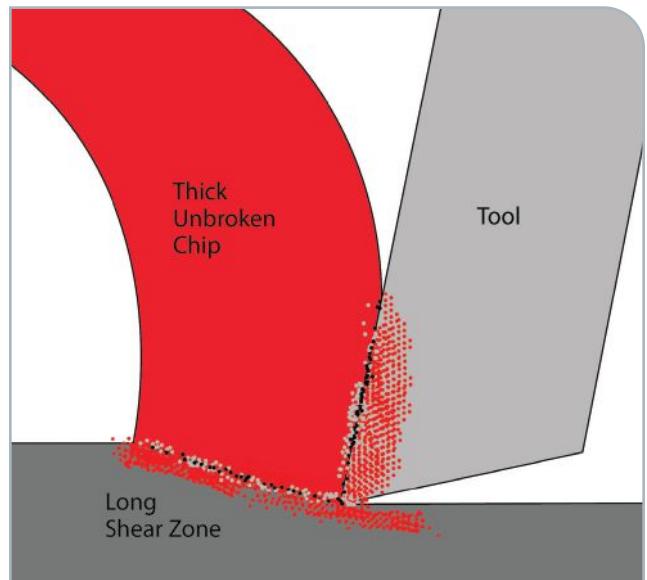
High-pressure coolant delivery enables machines to cut material more efficiently. One way to measure this is by comparing surface feet per minute (sfpm), which is the number of linear feet that a given point on the cutting tool

⚙️ In this turning application, 1,000-psi coolant is directed precisely at the point of cut for optimum efficiency. (All photos courtesy of LNS Chipblaster High Pressure Coolant Systems.)





∴ This illustration shows heat generated in a workpiece and cutting tool during machining. Low-pressure coolant delivery can form super-heated steam that prevents the coolant from reaching the tool.



∴ The high-pressure coolant force does not break chips, rather the cooling of the cutting tool causes the chips to break. Then, the high-pressure stream blasts the chips away from the tool, thus preventing damage.

travels in one minute. For example, 300 series stainless steel has a median sfpm of 325 to 350. With high-pressure coolant properly applied, the same material can be milled at 800 sfpm. Here are other examples.

Milling sfpm with High-Pressure Coolant:

Aluminum	10,000 sfpm
Low Carbon Steel	2,000 sfpm
Medium Carbon Steel	1,200 sfpm
Stainless 300 Series	800 sfpm
Cast Iron	1,600 sfpm
Titanium	400 sfpm
Inconel	350 sfpm
Copper	1,200 sfpm

In drilling applications, high-pressure coolant helps evacuate chips from the hole and eliminates the vapor barrier that inhibits cooling.

Drilling sfpm with High-Pressure Coolant:

Aluminum	2,000 sfpm
Low Carbon Steel	1,100 sfpm
Medium Carbon Steel	1,000 sfpm
Stainless 300 Series	800 sfpm
Cast Iron	1,200 sfpm
Titanium	220 sfpm
Inconel	180 sfpm
Copper	1,200 sfpm

Pressure Isn't Everything

Efficient machining using high-pressure coolant requires more than the ability to deliver 1,000 psi or more. Flow rate and the size of the opening through which the coolant passes are other critical factors.

The relationship between these three factors is best explained by a fluid dynamics principle named for Swiss mathematician Daniel Bernoulli, which states that an increase in the speed of a fluid produces a decrease in the fluid's energy. In the case of machine tool coolant, this means that the larger the coolant delivery nozzle, the higher the flow rate must be to achieve the desired pressure at the cutting area. Conversely, the smaller the orifice, the lower the pressure needs to be to achieve the same pressure.

Therefore, for effective high-pressure coolant delivery, the delivery system must be capable of providing enough fluid volume as well as pressure. For milling and turning, the volume requirement is 0.5 gallon per minute (gpm) per machine tool horsepower. Therefore, a 20-hp machine requires 10 gpm (20 hp x 0.5 gpm = 10 gpm), a 30-hp machine requires 15 gpm and a 40-hp machine needs 20-gpm coolant volume.

In drilling applications, the diameter of the tool determines volume. Each inch of tool diameter requires 10 gpm. Thus, a 1-inch drill requires 10 gpm, a 1/2-inch drill needs 5 gpm and a 1/4-inch drill needs 2.5 gpm.

The cutting fluid itself also plays a role in the effectiveness of high-pressure machining. The coolant must have high lubricity to adequately reduce friction; must not be prone

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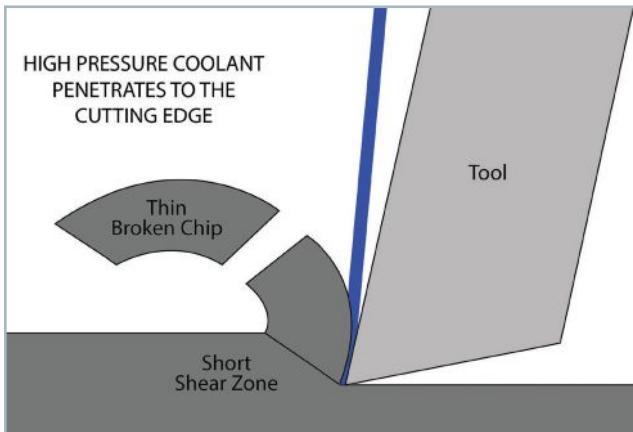
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17-4PH Stainless Steel		
	OEM Coolant System	High-Pressure Coolant System
Operation	Drilling 6x diameter depth	Drilling 6x diameter depth
psi	300	1,000
Tool	0.098 diameter HSS drill	0.098 Mitsubishi Micro MZS drill
Holes	600	600+
Tool Life	Inconsistent tool life (20 drills used)	1 drill used
rpm	2,400	10,000
ipm	5	20
fpr	0.002	0.002
Peck Cycles	5	0
End Result	600 holes (0.600" deep)	600 holes (0.600" deep)
Drills Used	20	1
Cycle Time	8 hours, 24 minutes	28 minutes



∴ Cooling of the cutting tool by high-pressure coolant causes chips to curl more aggressively and break, preventing recutting of chips.

to foaming; and have a coolant concentration of at least 8% and no more than 12%.

High Pressure Versus Standard Coolant

The example in the table above illustrates the dramatic difference high-pressure coolant delivery makes when performing the same operation, using the same material and machines. The savings in both production time and tool costs enable a fast return on investment for high-pressure coolant systems.

High-pressure coolant systems provide an opportunity for manufacturers to improve productivity and measurably reduce cost per part. However, it is critical that a high-pressure system is properly matched to applications so it can deliver the precise flow, pressure and temperature control required. **PM**

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Data Enables Machines to Tell Their Own Stories

By Lori Beckman, Senior Editor

If the machines on your shop floor could talk, what would they say? Would they tell stories of being cared for and maintained to the utmost degree, or would they disclose being abused or neglected? Would the turning center that broke last week explain precisely why an alarm went off causing the machine to be out of commission since then? Would it know how many parts it produced in a day or how many hours/minutes it ran last month? Would the CNC Swiss lathe sitting in the corner alert an operator of a potential tool failure before it happens?

Imagine having all this information at your fingertips. The data collected would be a gold mine to management; it could be used to make more informed decisions on the shop floor as well as optimize processes. Money and time would be saved and return on investment (ROI) would be easy to calculate.

Eric Fogg, co-founder and COO at MachineMetrics, says his company's monitoring and communication system can make these ideals attainable for a shop by helping discover paths to efficiency.

This product is also said to bring transparency to machine tools through machine data collection.

"MachineMetrics can collect any data that is useful to a customer," he says. "That data can be whether the machine is running, how many parts it has made, and its alarm history, for example. We take all the data, encrypt it and forward it to our cloud service where we perform analytics and create dashboards for our customers to use."

The company uses an edge device that lives in each of its customers' machines that can remotely update, making the system hands-off and low-maintenance for machine shops.

Although this machine monitoring concept is cloud-based, it sheds light on practical, actionable measures that can be taken to alleviate real-world issues at the ground level. For example, it can help:

1. Make Old Problems Go Away

One shop's operators found an effective way to communicate with its management through MachineMetrics. These



MachineMetrics' monitoring and communication system can make a shop's ideals attainable by helping discover paths to efficiency. This product is said to bring transparency to machine tools through machine data collection. (All photo courtesy of MachineMetrics.)

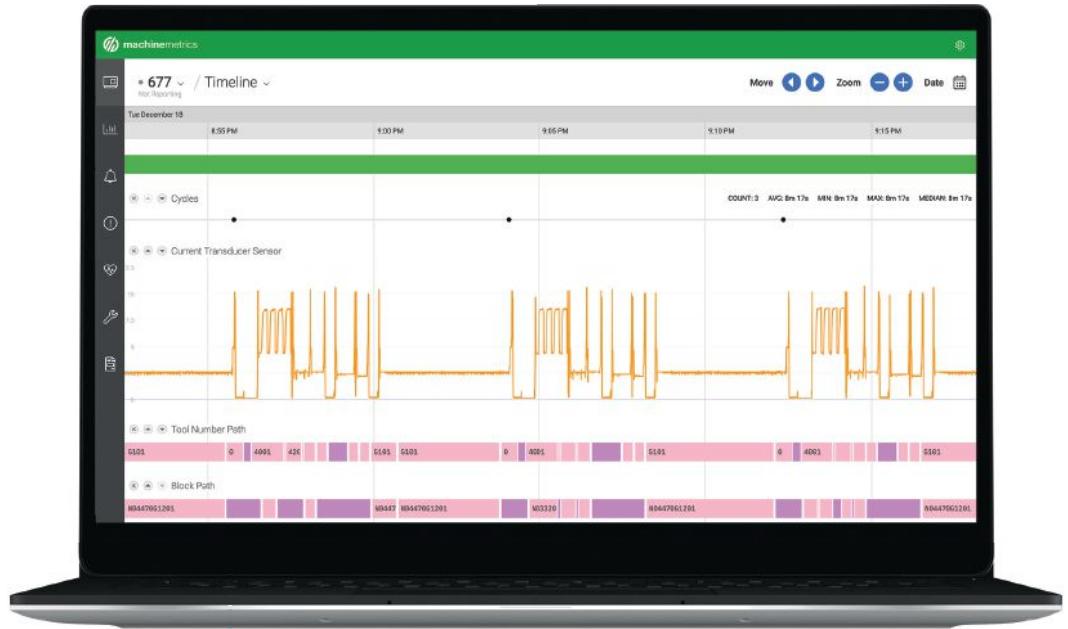
operators "hated" two old machines in their shop that continued to break down, causing a lot of downtime and headaches with fixing them. However, management hoped to hang on to the machines because they had already paid for them. But when MachineMetrics connected its system to the outdated equipment, the problems revealed themselves to management, which showed how much time was being lost in repairs. Two weeks after that, the shop bought two new machines to replace the old ones.

2. Understand Why Crashes Happened

Machine tool crashes often revolve around uncertainty because sometimes an operator will not admit fault. Shop management understands production time is being lost, but might not know the real reason why the machine crashed. "The machine OEM is in a hard place because if it has to repair a spindle under warranty, that's a big hit to take if it thinks the machine crashed because of someone's

error,” Fogg explains. “With tools like MachineMetrics, you can look back in time and get a very good understanding of why it crashed, reading all the alarms and alerts from the machine and looking at the load of the spindle over time. This gives management power to make more informed decisions”

In addition, managers can receive an alert on his or her phone or tablet the moment a crash happens, greatly reducing the reaction time for fixing the problem.



MachineMetrics is able to collect machine data that tells operators and/or machine OEMs when a machine is running (cycle time), how many parts it has made, alarm history and more.

3. Manage Planned Maintenance

With the machine tool OEMs that MachineMetrics has partnered with, the product can manage planned maintenance (PM) within a machine, eliminating the need for a shop to manually track machines’ production hours. The edge device can track hours in production and alert the operator when it’s time for PM.

“OEMs like this capability because operators are doing more PMs, and they are doing them by the book,” Fogg says.

4. Enable Remote Communication

MachineMetrics’ connection to its cloud service enables machine monitoring and remote communication with shops anywhere in the world. These communication features are especially critical now during the COVID-19 crisis when technician travel is unsafe or not permitted.

An example of how these features worked to the advantage of both the shop and the machine OEM is in a story of a broken lube line. One of MachineMetrics’ OEM partners

was receiving repetitive alerts from a customer’s machine that it needed its way oil refilled. The system detected that every other similar machine rarely received this alert. Therefore, the OEM knew there was a leak somewhere. After communicating this to the shop, it saw that the lubrication line running to the subspindle bearing was damaged, and that bearing was running without oil.

“They repaired the lube line and, to my knowledge, there was no failure to the bearing,” Fogg says. “If MachineMetrics was not connected to this machine, the subspindle bearing would have failed and the machine would have been taken out of production for a period of time, maybe a couple weeks. A technician from the OEM would have had to go on site as well.”

Predicting the Future

Catching issues in machines before they become catastrophic failures is the goal at MachineMetrics. “Our overall theme is moving from a reactive to a proactive paradigm,” Fogg explains. “We are rolling out the ability to predict tool failures, which represents a huge area of growth for us.”

The company’s system is understanding tool failure and stopping a machine before it wastes time and money creating scrap parts. **PM**

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This year's 10 Emerging Leaders have many character traits in common that shine well beyond the buildings in which they are employed. Their leadership skills and willingness to help others grow within their skill sets has proven that the precision machining industry's future is bright in the hands of these talented individuals.

By Lori Beckman, Senior Editor

EMERGING LEADERS

Transform Their Organizations

In the uncertain times we are living in, it is refreshing to hear uplifting stories about young talent in the precision machined parts industry who are striving to make a difference within their organizations and the industry. We call them our Emerging Leaders. Their eagerness and fast-learning, think-outside-the-box mentalities have shined through to their managers, co-workers and industry partners. They are selfless individuals, under the age of 40, who face — and even welcome — challenges head-on. Many have transformed the companies at which they are employed, making these businesses more competitive, efficient, organized and overall better places to work.

After learning about each of these *Production Machining 2020* Emerging Leaders, it's easy to see why their nominators (their peers) chose them for this award. Our hope is that these stories inspire other individuals within the industry to do more than what is asked of them, and to be innovative, creative and enthusiastic team members who organizations do not want to function without, just as these Emerging Leaders have become.

Clay Adcock
Manufacturing Manager
Custom Tool



In August 2011, Clay Adcock walked into an interview at Custom Tool (Cookeville, Tennessee) with no experience in manufacturing, much less the machining trade, as his background was in auto mechanics. He made a promise to be the best worker the company would ever hire, if given a chance.

Within two years, he had excelled at learning the company's two-axis turning centers and began learning its turn-mill machines, which he excelled at a year later. He began leading the company's goal of achieving lights-out production as part of the standard operating procedures. Adcock's transition into management-related tasks began in 2015 and led to his current manufacturing manager position, which includes production floor management along with new technology implementation.

"While completing my assigned tasks, I gained thorough knowledge of machining and CNC controls through self-directed study and conversations with journeyman machinists," Adcock says.

He knew he made the right choice working in manufacturing early on in his career at Custom Tool. "I realized that in manufacturing, especially a machine shop, you can never stop learning no matter how long you've been in the industry," he says. "I enjoy being knowledgeable and being able to answer questions or have solutions when needed."

Although Adcock says his advancement within the company has come from leading efforts in lights-out production, robotic machine tending, robotic welding and many continuous improvement efforts within the company, his nominator believes his success stems from other sources.

"Clay's rapid progression to this point is due to his lead-by-example attitude, his commitment to achieving company goals and objectives, a tremendous work ethic, genuine respect for his co-workers and a tremendous attitude of humility," says his nominator, Bob Young, company vice president.

When asked about a time when he thought outside the box to complete a task, Adcock says his idea was successful. "One time, we had a job for a part that was rectangular and I thought it would be best to run on a CNC mill," he explains. "But after thinking about a better way to machine the part, I realized that we could turn certain features faster than we could mill them. So, I presented the idea, we made a special fixture and finished running the job using that approach."

"Clay is respected by his co-workers because he desires success and growth for them as well as himself."

Bob Young

In 10 years, Adcock would like to advance to a position of overseeing the company operations. However, leading up to that goal, he would teach the next generation of Custom Tool employees to do his current job. He enjoys helping others advance in their skill sets.

"He is respected by his co-workers because he desires success and growth for them as well as himself," Young says.

As an Emerging Leader, Adcock hopes to have a greater impact on the manufacturing industry by being an ambassador for the trade. "When we have shop tours for students and instructors, sharing the company's journey and sharing my experiences over time is important," he says. "Most everything in our lives is touched by manufacturing, so manufacturing is going to continue. Manufacturing is diverse. It offers a range of career paths where you have the opportunity to find a niche doing something you enjoy."

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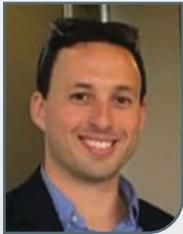
2020

Jerry Eighmy

Business Team Leader
American Turned Products

For the past 5 years, Jerry Eighmy has been an integral leader in developing people, processes and plant-level lean initiatives at American Turned Products (ATP). As business team leader, Eighmy holds a supervisory role where he oversees all shifts for manufacturing operations, managing about 40 employees at the company's Erie, Pennsylvania, facility. Eighmy began his career at ATP as its buyer, which gave him ground-level experience to help him understand the business and how to positively impact the organization.

Eighmy is the son of co-owner Scott Eighmy, making him a third-generation family member working at ATP. "Being the son of an owner can be a struggle on many levels, but Jerry has been able to really shake the stigma and become a well-respected and relied-upon member of our team," says his nominator, Drew Hoffman, company vice president.



Eighmy has had the opportunity to receive training in Kaizen events, 2-Second Lean, as well as Kata, and learn how to effectively implement each. He has also been an active member of Precision Machined Products Association (PMPA), having served previously on a marketing committee and attending various national technical conferences.

"I have been lucky to have had great mentorship and experience working in various roles in the manufacturing industry," he says. "My long-term aspirations are to continue to grow American Turned Products and lead the company to success in future generations."

Cassandra Haupers

Vice President of Operations
Swiss Precision Machining Inc.

Cassandra Haupers' daily refrain is, "We hold ourselves to the absolute highest of standards." This vice president of operations at Swiss Precision Machining Inc. (Wheeling, Illinois) consistently reminds employees of the purpose of their work: "We are machining the parts this world needs to be at its best for tomorrow," she says.

Haupers knows the ins and outs of the business, especially because she began her career on the shop floor and learned how to operate, set up and program lathes and milling centers. After mastering the machines, she moved into engineering, quality control and sales areas of the business.

Although she isn't stationed in front of a machine anymore, Haupers loves to be on the shop floor to stay in regular communication with the machinists so she can learn about their successes, challenges and ideas for the future. Her connectedness with the shop floor makes her good at investing in the latest technology needed.

"With her exemplary leadership and determination to succeed, Cassie is a positive role model for everyone at SPM, but especially for women in manufacturing," says her nominator, Georgia Joseph, digital director at Concept Co. "She believes in her people and is quick to let them know that they can achieve anything."

"Looking to my future in manufacturing, I not only want to meet family expectations, I want to surpass them," Haupers says. "My father has owned this company since 1979. As the future owner, it's my responsibility to garner the respect of my peers and to lead a prosperous company. To do so, I must learn from the past and innovate for the future."

"We are machining the parts this world needs to be at its best for tomorrow."

Cassandra Haupers



Travis Donaldson

Project Manager
Donmac Precision Machining Inc.

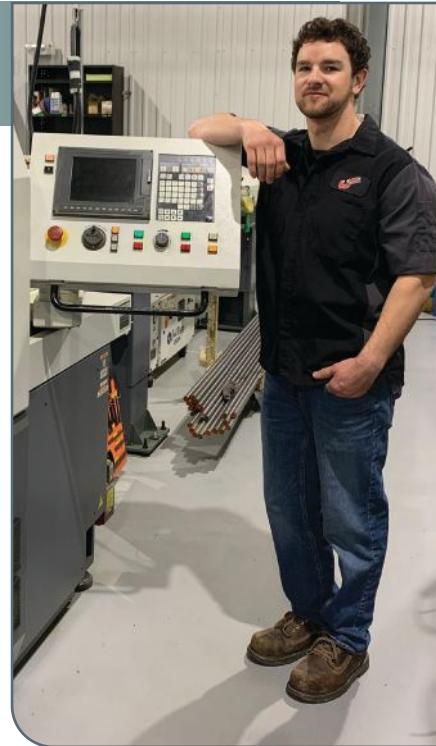
Although Travis Donaldson joined the team at Donmac Precision Machining Inc. (Foxboro, Ontario, Canada) — his parents' company — only last year as a full-time employee, he knows the business well. He grew up learning the basics of production machining, but decided to go to college to become an electrician instead of working at the family business. But, after using his education to work with emergency power systems, he chose to go back to Donmac.

“The family business was always in the back of my mind and when it outgrew the original property, I found my calling,” Donaldson says. “I came on to design and build the new plant. Two years and many projects later, I can't imagine working anywhere else.”

Since returning to the family business, Donaldson has initiated the 5S program, spearheaded major changes to inspection (including coordinating measuring machine programming) and has played a significant role in automating three new programs in a short amount of time. He works with the employees to find best solutions for production advancements, including anything from a simple improvement to a major overhaul of the production cell.

“Travis has taken on working with the customers, engineering departments and quality control to streamline production,” says his nominator, Jamie Smith, production manager. “He makes time to ensure employees have the knowledge and tools to proceed with the job at hand.

“I am very excited about the future and culture of Donmac with Travis becoming a stronger team leader every day. As the business moves forward in expanding with new employees and technology, he will be a huge asset with his ability to listen, learn and teach.”



Morgan Miller

Continuous Improvement Coordinator
C&A Tool

As continuous improvement coordinator, Morgan Miller excels at identifying and organizing necessary projects within C&A Tool (Churubusco, Indiana) and encouraging team

members to see things from a different perspective.

These projects cover all facets of the company's operations, span across three facilities and impact almost 700 employees. She has garnered support from employees to identify and implement new ways of doing things at a company that has been in business for over 50 years.

“In the short time that she has been with the company, she has made the single largest positive impact that I have seen in 12 years here,” says her nominator, Ryan Miller, an engineer at the company. “I have never seen her falter

under the stress of all she has to keep track of, and she is the most organized person I have ever had the pleasure to work with.”

Before Miller came to the company last year, departments were functioning in silos, resulting in multiple groups working unknowingly on similar projects. With the help from her teams and support from leadership, she has developed a communication structure to ensure improvement projects are launched and implemented successfully.

“I get to work with amazing people to understand processes, identify problems and develop solutions,” Miller says. “I aspire to be a leader who empowers individuals and teams to perform at their highest level, so we can continue to be the best at what we do.”

Her nominator adds that her accomplishments so far at the company have been inspiring.

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“Joshua consistently goes above and beyond what is needed.”

Karl Tinney



Joshua Tinney

Operations Manager
Tinney Tool and Machine Co. Inc.

Growing up in his family’s machine shop, Tinney Tool and Machine Co. Inc. (Belleville, Illinois), Joshua Tinney didn’t always feel called to a manufacturing career. In fact, Tinney received a bachelor’s degree in religious education and served as a youth pastor in

California before he began a full-time position with the family company in 2013. This is when he and his wife moved back home and he stepped up to help the business.

Tinney’s readiness to adapt and develop innovative solutions and goals has increased companywide sales, effectiveness and efficiency. He aspires to take long-term relationships with customers seriously, while striving to help Tinney Tool stay at the forefront of manufacturing.

“Joshua consistently goes above and beyond what is needed, always looking for ways to better our company, even when most of us are complacent and resistant to change,” says Karl Tinney, company president/owner and Joshua Tinney’s father and nominator. “He is effective in guiding others and wears many hats, and does it with integrity and a positive attitude. Joshua is always there to get it done. He is not afraid to experiment, take risks, fail forward and try again.”

When Tinney is not within the walls of Tinney Tool, he can often be found advocating for manufacturing. He works to get the next generation excited about manufacturing at local high schools. He also serves on the board for National Tooling and Machining Association’s St. Louis chapter.

Renee Schroeder

Vice President of Operations
Smith and Richardson Inc.

Often referred to as the heart and soul of Smith and Richardson Inc. (Geneva, Illinois), Renee Schroeder, vice president of operations, has worked to help the company grow its business since she began her career there after graduating from Northern Illinois University.

“I started in an accounting role, which allowed me to learn about the whole company and all aspects of manufacturing,” she says. “I have come to love manufacturing and what it stands for. Manufacturing has become more than just a career, it’s a passion.”

Rich Hoster, president of the company and her nominator, says he relies on Schroeder’s dedication to her job and her ability to make decisions that assist with cultivating the business. “She has become a leader and has the respect of the entire organization as well as the respect of many of our large customers with whom she has significant contact,” he says.

Schroeder, a mother of three young girls, says, “I have been very fortunate to have Rich Hoster as my mentor who has taught me what it means to be a leader. My goal is to continue to share manufacturing with the younger generation so they too can find passion from it.”

Hoster adds that Schroeder is an awesome role model for all working mothers and does an amazing job with her work/life balance. He says she is humble, as she hardly takes credit for all the positive contributions she has made to the organization. “She is impressive,” he adds.



Gary Sweeney
Operations Manager
Everett Industries

As operations manager of Everett Industries (Warren, Ohio), Gary Sweeney is leading the 58-year-old company, modernizing and streamlining processes while developing new products for the next-generation workforce.

Sweeney began his manufacturing career as a non-college-educated machine tool builder. He worked as a mechanical developer at a robotics company, prototyping and field testing autonomous vehicles designed for infrastructure inspection. He then worked for Drake Manufacturing, a manufacturer of thread grinders, where he held quality and methods manager roles and eventually became the production manager. He also earned his executive master's degree from Case Western Reserve University while employed at Drake.

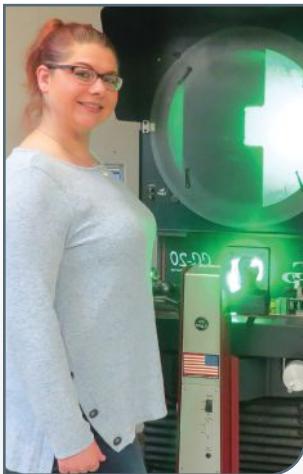
At Everett, a manufacturer of abrasive cut-off machines and wheels where Sweeney has been employed for 2 ½ years, he has organically developed engineering and product development systems and transformed them into scalable, reliable and efficient methods.

“He has learned aluminum casting, molds, tooling and heat treating to secure the company’s supply chain,”



says his nominator, President James Vosmik. “He has inventoried, qualified and then improved our fixtures for machining the castings. He has taught himself the Mazatrol CNC control (circa 1992), and is verifying and qualifying all the programs and tooling for machining shafts and wheel flanges. This is in addition to developing economic order quantity models for all our wheel and part inventory after building detailed bill of materials for all our catalog saws.”

Prior to his manufacturing career, Sweeney served as a trooper with the Ohio State Highway Patrol.



Erica Bonen
Quality Engineer
Galion LLC

Being able to help others develop and learn by sharing her knowledge is what Erica Bonen loves best about her job as quality engineer at Galion LLC (Galion, Ohio). She says the company — a cold forming, screw machining and small CNC machining business —

has always encouraged her in her quest to grow and develop professionally, so she would like to do the same for others.

She admits that she makes mistakes, but learns from them. “Adaptability is vital for healthy change,” she says. Bonen displays this quality every day with the other members of the Galion team. That ability to adapt is one

of her greatest strengths, next to being organized and her uncanny ability to prioritize her tasks.

In her position, she develops controlled inspection documents based on internal processes and customer requirements, ensuring clear and accurate inspection criteria that offers the highest quality product to customers.

In her 12 years at the company, she started as a general laborer, moved on to final quality inspector and then became a quality technician, where she received Galion’s Employee of the Year Award in 2017. In 2018, Bonen was promoted to quality engineer and is a strong candidate to directly replace Galion’s current senior quality engineer upon his retirement.

Bonen, mother of two children, says her aspirations include mentoring individuals who have an interest in the automotive, commercial and defense industries, and aiding those individuals in reaching their goals.



Today's manufacturing recovery period is unique. Unlike other comebacks where innovation primarily galvanized the growth and revitalization, this crisis requires that we also **RESET THE SUPPLY CHAIN.**



UNPRECEDENTED CHALLENGE



A NEW APPROACH

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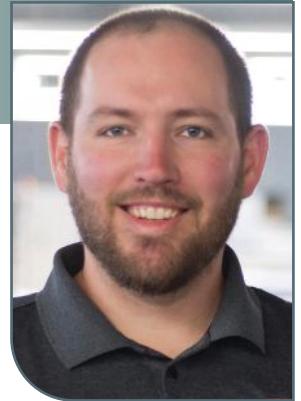


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Joshua Hardwick
Operations Leader
W.H. Bagshaw Co. Inc.



In three years, Joshua “Josh” Hardwick has gone from having only a tech support background to working as a CNC machinist and then a team leader before becoming operations leader at W.H. Bagshaw Co. Inc. (Nashua, New Hampshire). In his current position as operations leader, he supervises the safety and tech teams, and continues to grow within his role. He has completed a Loss Control Academy program and is highly involved with the internal ISO audits.

Hardwick is dedicated and lives up to his position as a leader within the company. Not only does he open the shop at 4 a.m. each day and regularly works overtime as needed but he also helps his co-workers enhance their skills. “He’s first to do a ‘dirty job’ himself, but is savvy to delegate for the purpose of elevating and advancing someone else,” says his nominator, Adria Bagshaw, vice president. “He’s supremely patient and has been a great resource for the other team leaders, not only answering their questions but taking the time to explain and improve their skills.”

“I look forward to continuing to grow my career at W.H. Bagshaw by using my leadership and troubleshooting skills to help my team accomplish anything that comes their way,” Hardwick says. **PM**

“Josh is patient and has been a great resource for other leaders.”

Adria Bagshaw

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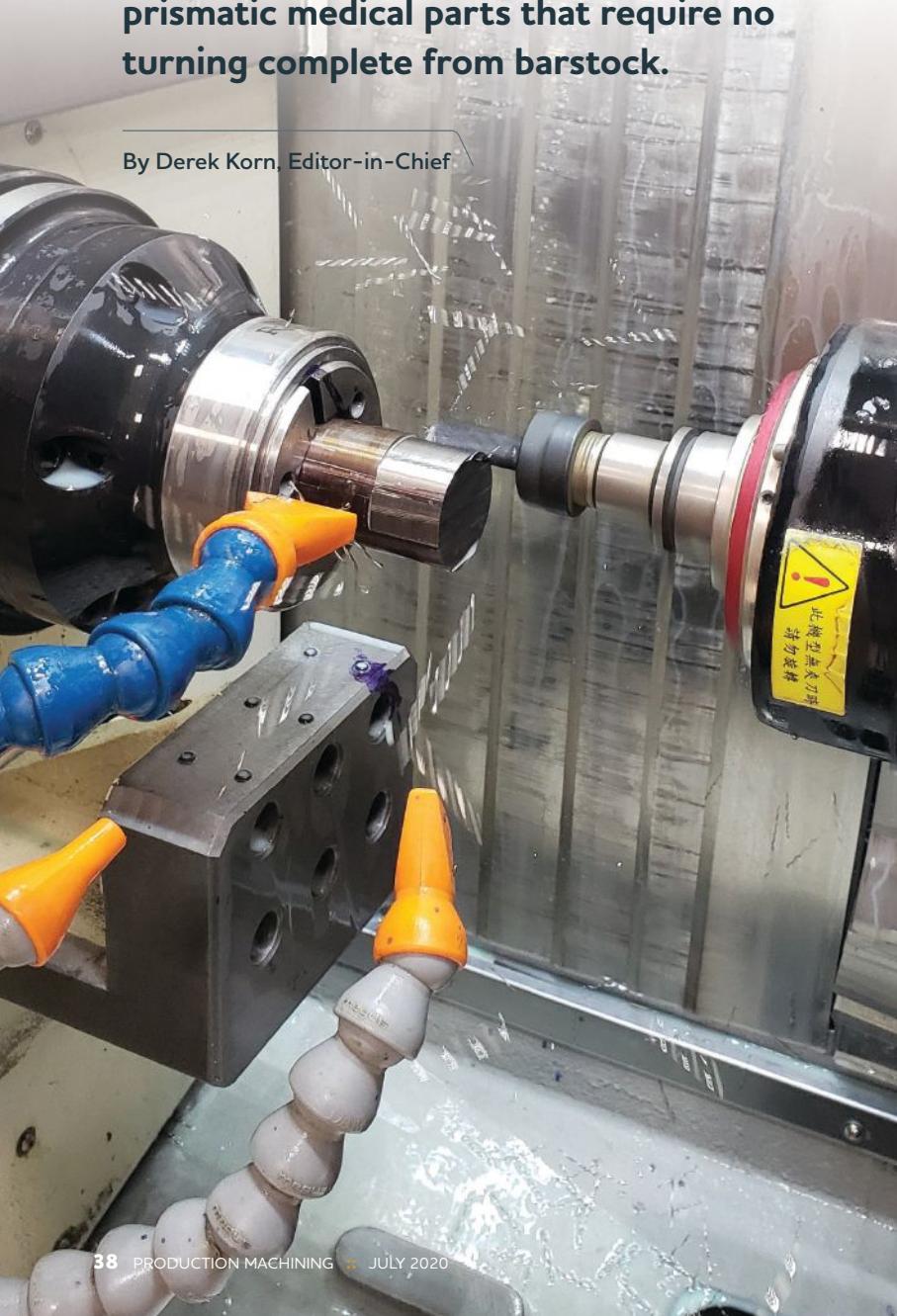


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When a **TURN-MILL** Doesn't Turn

A shop in Big Sky Country uses a B-axis multitasking machine to produce complex, prismatic medical parts that require no turning complete from barstock.

By Derek Korn, Editor-in-Chief



I've visited a number of very advanced machining businesses that are located in the middle of nowhere. Due to coronavirus travel restrictions, I didn't get to visit MoManTech — the precision machine shop profiled in this story — located in Sheridan, Montana. But, “middle of nowhere” is precisely how owner Kirt Johnston describes his business' locale.

It took a leap of faith for him and his family to get there. Originally from Indiana, he had progressed up the management ranks at a medical device manufacturer in Warsaw. In 2003, at age 31, he was planning to purchase the company. His plans changed after landing in the hospital as a result of work-related stress.

By chance, he learned about a small machine shop, in a 700-person Montana town, that was up for sale by an owner who had his own health issues and was eyeing retirement. That 1,800-square-foot shop had just a couple knee mills and three engine lathes. But it sat on three acres of land with killer views. Long story short, he bought that shop and moved his family there, leaving behind the security of existing employment for the unknowns this new experience would present.

When I say he moved his family *there*, he did indeed. For two years, his wife/business partner, Michelle, and boys, ages 2 and 5 at the time, lived in an 800-square-foot apartment attached to the shop.

The situation is much different now. After moving there in July 2004, Johnston expanded the shop by 4,000 square feet and began adding employees and more advanced CNC equipment, such as mills, a turning center, Swiss-type lathes, a wire EDM unit and B-axis turn-mills.

MoManTech's first B-axis turn-mill, purchased in 2012, enabled the shop to

⚡ The second B-axis turn-mill MoManTech purchased currently performs no turning work whatsoever, producing a range of complex, prismatic medical components from barstock. (All photos are courtesy of MoManTech.)



⚡ Kirt Johnston pulled up stakes in Indiana to move his family to Montana, where he purchased a small machine shop. He promptly added 4,000 square feet of floor space to the building as well as a diverse array of more advanced CNC equipment.

go after more complex medical work. Its second one did as well. The latter is a QuickTech 9-axis S42ATM turn-mill machine with subspindle from Absolute Machine Tools, which was installed last July. Perhaps what is most interesting about this machine, which can perform both turning and milling work, is that it is used solely for milling. “I’ve never installed a turning tool in it,” Johnston says. Using this machine in this way has enabled the shop to perform faster changeovers for the 100 different part numbers in two part families that run across the machine, while leaving the option open for additional prismatic work machined from barstock, should that work present itself.

No Turning Back

ISO 13485-certified, MoManTech specializes in surgical devices for spine, trauma, large joint and dental applications

as well as implants. Its range of capabilities enable it to be a virtual one-stop shop for its medical customers’ needs. In addition to its diverse machining capabilities, the shop has in-house secondary processes such as laser etching and marking, ultrasonic cleaning and citric passivation. MoManTech also has plastic and metal 3D printers it uses primarily to create fixtures used in the shop (see sidebar on following page).

The QuickTech S42ATM was its most recent capital equipment purchase. Johnston cites price and compact size as big reasons for choosing this model. But, he also appreciates that it has a full C-axis subspindle rather than a workpiece clamping device for backworking. The three-axis subspindle movement also contributes to the machine’s small size, as it can move in the X-axis above and below the part center line to provide the B-axis milling spindle with

better access to the part. The B-axis has a 10,000-rpm, 3-hp motor and working range of 190° (±95° from vertical).

The machine has a 30-mm bar capacity. Rather than using a

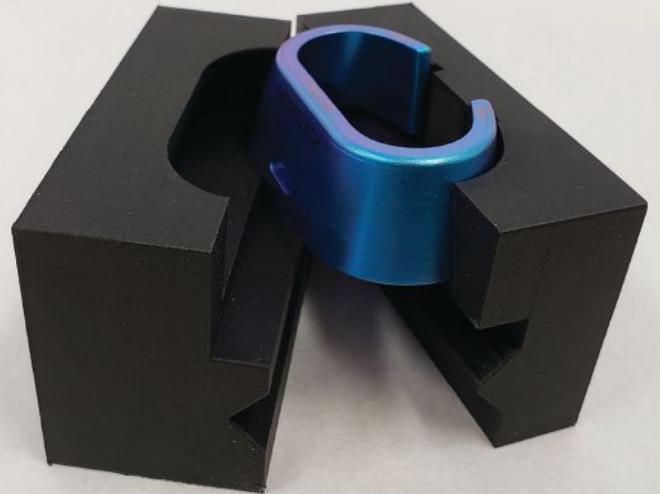


⚡ MoManTech machines a range of components for medical devices and implants.

3D Printing in a Machine Shop

MoManTech has two 3D printers from Markforged, one unit that prints plastic and another that prints metal. These printers use the fused-filament fabrication (FFF) process. For plastic printing, the printer heats the thermoplastic material to near its melting point and extrudes it out of a nozzle. The nozzle is moved in X and Y directions on a build plate to create a part layer by layer. The Onyx base material from Markforged — nylon mixed with chopped carbon fiber — is said to be 1.4x stronger than ABS. Plus, the shop can add layers of fiberglass, Kevlar or carbon fiber to achieve stronger properties, depending on the application. It is also possible to add metal-threaded inserts. To do this, the print job is stopped at the appropriate time, the insert is added and the print continues, encapsulating the insert into the object. The shop commonly uses this printer to create plastic fixturing devices. Nearly all fixtures used on MoManTech's laser marking machine are 3D printed from Onyx plastic.

The Metal X unit is used to print custom hard fixturing from 17-4 stainless steel for holding complex parts on milling machines. Johnston says printing hard fixturing is helpful in that he doesn't need to take a person off of a production machining center to machine fixtures. The fixture can be designed and then printed (overnight, if necessary) so it can be used the next day. And, given



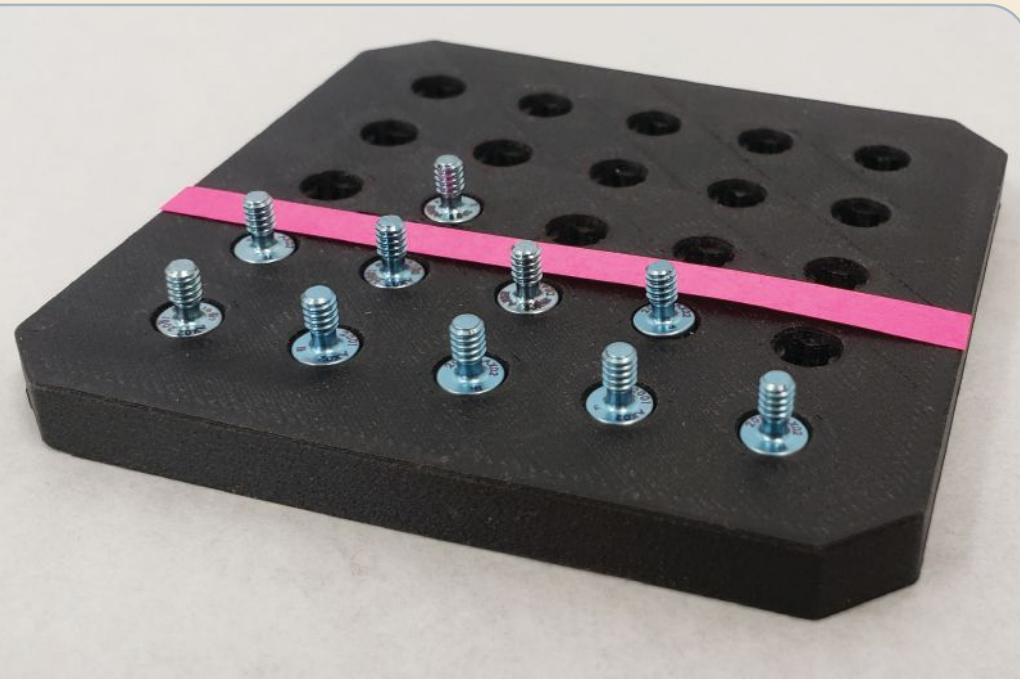
∴ This fiberglass-reinforced plastic fixture MoManTech printed is used to hold a five-axis, swarf-machined part.

the complex geometry of some parts those fixtures need to hold, machining a fixture can be challenging, if not impossible anyway, Johnston notes.

This printer uses two spools of material: one has metal powder and a binding agent inside a plastic encasement. The second is ceramic powder enclosed within plastic. Spools are fed through a heater block, heating the plastic to its melting point and feeding it through an extrusion

nozzle. The unit first lays down layers of the ceramic material, which is used for part release from disposable print sheets held in place on the units bed by vacuum. The ceramic material is also used to create support structures for the metal, where needed. After printing using the stainless spool is complete, parts are then sintered, fusing the metal powder into solid metal.

∴ This plastic, printed fixture for the shop's laser marker includes keys to ensure proper part orientation.



bar feeder, a bar puller is used to bring stock sawn in three-foot lengths into the work zone. This further reduces the amount of floor space the machine requires.

Both the main spindle and subspindle have 6,000-rpm, 5-hp direct-drive motors. They are synchronized to enable accurate part transfer for backworking operations. The automatic tool changer (ATC) has 24 stations to accept HSK-40T toolholders.

MoManTech currently runs two part families across this machine. One is a family of titanium implants and the other is for stainless steel medical devices. All parts require five-axis machining (positioning, not full contouring) as well as backworking. Typical batch sizes range from 5 to 25. Producing prismatic parts from cylindrical barstock makes setups easier, compared to a conventional mill that might require special fixturing.

Johnston takes advantage of the ATC's capacity to keep many standard tools used for most jobs installed. That way, no touch-off is needed for those commonly used tools,

thereby reducing change-over time to a new job. Changeovers typically require only a touch-off at the end of the barstock to set the work location and any new tools added for the new job. Absolute Machine Tools also created custom macros to carry over work offsets from the main spindle to

“I've never installed a turning tool in it.”

— Kirt Johnston

the subspindle. That way, a tool touch-off is only needed on the main spindle.

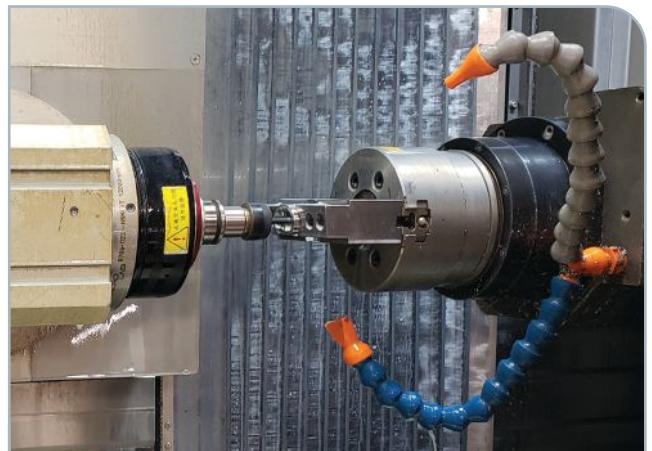
Effective machining of prismatic parts from barstock does require thought as to how a blocky part will be “oriented” within the volume of cylindrical barstock. Johnston tries to perform the bulk of the machining on the spindle side, leaving behind a feature that is easy for the subspindle to grip for backworking. This might only require machining of pockets in the subspindle jaws, instead of custom grippers. Most parts are machined complete and parts are ejected from the subspindle into a collection device.

More Work on the (Big Sky) Horizon?

When I spoke to Johnston in early May, he said his business had not been negatively impacted by the COVID-19 pandemic. Oddly enough, it actually offered an opportunity to add staff. He hired three people — one full-time and two part-time college students — who lost their summer jobs. Plus, as elective surgeries resume, it is possible the shop can



∴ To minimize floor space, this B-axis turn-mill does not have a bar feeder. Instead, barstock is sawn in 3-foot lengths and pulled into the workzone.



∴ Custom macros enable work offsets from the main spindle to be applied to the subspindle. Therefore, tool touch-off is only needed on the main spindle.

see more work related to those procedures. This could lead to additional machine purchases down the road. And, who knows, maybe that new turn-mill will actually run jobs that require turning. **PM**

Absolute Machine Tools Inc.
440-960-6911 | absolutemachine.com

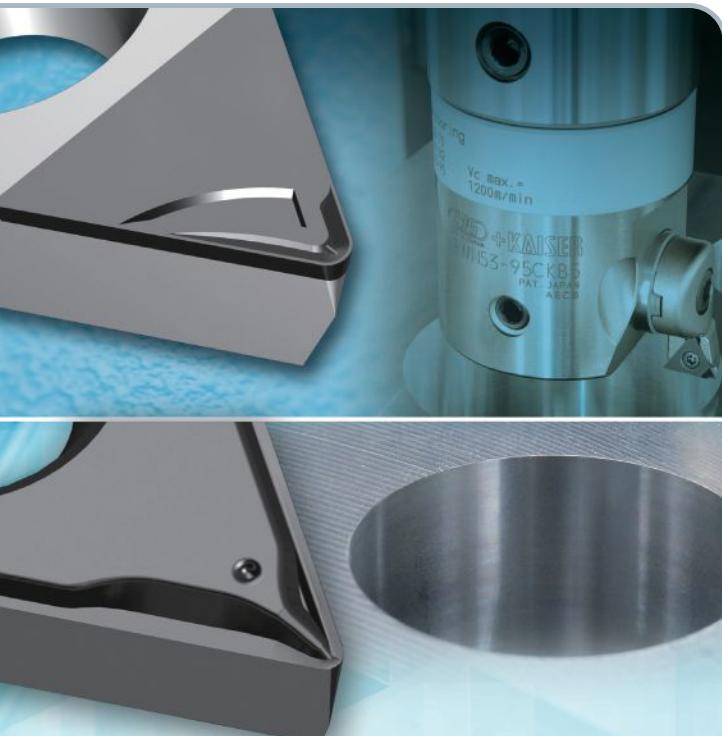
MarkForged | 866-496-1805 | markforged.com

Solid Carbide Gundrills for Medical, Deep Hole Drilling

Star SU's solid-carbide gundrills are used for machining challenging medical-grade materials. According to the company, the single-flute, solid-carbide gundrills are specially engineered and manufactured to meet part print requirements for medical devices and instruments with proven results in drilling a complete range of titanium and stainless steel materials. The small-diameter gundrills are said to provide cost savings due to long life and throughput improvements that can double production capability. Star SU's tool-design optimization process considered everything in the process, including selecting the appropriate grade of carbide, surface finish, edge prep and coating, all of which are essential for success in medical machining. The company says the gundrills feature high surface finish, special drill geometries and edge preparation on the cutting edge, selected advance tool coatings and a coolant hole diameter size range starting at 0.700 mm (0.028").



:: Star SU LLC | 847-649-1450 | star-su.com



Chip Breaker Inserts Improve Surface Finish

Big Kaiser's two insert chip-breaker types are designed to improve surface finish in long-chipping materials. Long chips that are difficult to evacuate can lead to poor surface finishes when they are dragged around by the tool. Insert life can be severely reduced if these chips are recut by and, in small-diameter applications, stringy chips can wrap around the tool to the point where a crash occurs.

The company's FLM 3D chip-breaker design is used on PCD-tipped inserts, which the company says is well-suited for finishing of aluminum components. This compares to traditional flat-top inserts that may produce a large continuous nest of chips that is difficult to remove from the bore and/or tool, even with high-pressure coolant. It comes in three radius options, including 0.008", 0.016" and 0.031" for the insert TCGT2 (1.5).

For finishing of mild or construction steels, cermet inserts with a chip-breaker form ELM should be used. Available in 0.008" radius and combined with a light depth of cut, this chip breaker creates a high-shear angle to shorten the cutting chips for better evacuation and is said to give superior surface finishes in these traditionally difficult materials.

:: Big Kaiser | 888-866-5776 | bigkaiser.com



Laser Cutter Offers Carbide Sharpening Capability

Rollomatic added capabilities to allow sharpening of thick-film,

diamond-coated carbide tools in its LaserSmart 510 laser cutting and ablation machine. The company says the Rollomatic CNC Laser Cutting Machine LaserSmart incorporates technologies that facilitate probing the surface of the coated cutting edge to detect the exact shape and position. According to the company, the laser cutting process removes just enough diamond coating to make the cutting edge sharp. Only a predetermined amount of the coating (just around the cutting edge) is removed by the laser cutting process. The company states that infield tests have demonstrated the tool life can increase significantly with a sharpened thickfilm coated tool compared to conventional diamond-coated cutting tools, and such cutting tools can be a cost-effective alternative to PCD tools. It is said the new capabilities also provide highly accurate, near-perfect total indicator runout, fast cycle time, simulation of the tool path after edge detection, and the same machine can laser cut PCD and other superhard materials.

Rollomatic Inc. | 866-713-6398 | rollomaticusa.com

Teachable Robot Offers Longer Reach

Productive Robotics' OB7-Stretch is the fourth model of its next-generation teachable collaborative robots (cobots). According to the company, this cobot is simple, affordable and has a longer reach to handle parts and machines with longer distances. OB7-Stretch is similar to the standard OB7 5-kg model, but has a longer reach of 1.25 m and a slightly lower payload of 4 kg.

The company says its 7-axis cobot is well-suited for applications that require a longer reach for picking up a part or reaching deeper into machines, such applications in plastics molding, packaging and palletizing. In CNC machine tending, OB7-Stretch can tend multiple machines at one time when the robot needs to reach more than one machine.

OB7 is said to offer flexibility thanks to its seventh axis. Like a human arm, seven joints give OB7 the flexibility and dexterity to reach around objects or obstacles where others can't. Unlike a human arm, each of OB7's joints can rotate 360 degrees in both directions, which allows the cobot to work in more confined workspaces and areas that a six-axis robot can't reach. The company designed OB7-Stretch to provide a cost-effective alternative to higher payload and longer reach robots.

Productive Robotics
805-244-9300 | productiverobotics.com



Real-Time Tool Monitoring for Tapping Cycles

Caron Engineering's Tool Monitoring Adaptive Control (TMAC) system offers a universal interface that provides a real-time connection with nearly any CNC on the market. According to the company, the system uses a high-precision, auto-scaling power sensor to measure the load on the tool and compares it to the user-defined limits to determine wear. TMAC's direct interface to the CNC is said to allow the system to make real-time adjustments to feeds and speeds, automatically expires worn tools, and stops and retracts tools instantaneously in the event of breakage or other extreme conditions. All of this is driven by an intuitive user interface to view all live cutting data as it happens, with all cuts recorded to view and analyze at any time.

The company says the system can also accurately monitor tapping cycles, which are otherwise difficult to monitor due to power spikes caused by the tool's forward and reverse actions. It is said monitoring tapping cycles is easy to set up through use of time increments in TMAC. The system learns the power of the tap as it winds into the materials. During monitoring, TMAC can isolate just the cutting portion of the tap (in its forward cutting motion). As the tap unwinds from the material, the monitoring goes into a "hold mode," while ignoring any spikes in data. TMAC measures the wear of the tool and alarms the machine when excessive wear or breakage occurs, using either tool wear linear or area-under-the-curve limits.

Use of a pre-load signal creates precise start and stop timing from the CNC, which synchronizes monitoring based on specific programmable logic controller (PLC) functions, according to the company. TMAC will ignore unwanted power spikes due to reversing the tap and unwinding out of material. By using precision power sensors, TMAC can monitor a wide range of taps. With smaller taps, the auto-scaling sensor capabilities make it possible to register even the slightest power signals and monitor all cutting operations. With the newest version of TMAC (version 3.0), users can even label the cuts as specific features on the part.

Caron Engineering Inc. | 207-646-6071 | caroneng.com



Cabinet-Style Washers for Powerful Cleaning

Jenfab Cleaning Solutions' two cabinet-style parts washing systems — the Orca and the Avenger — are built for heavy-duty, industrial cleaning.

The Orca roll-in door parts washer is available in turntable sizes of 25", 31" and 36". Depending on the model, it can handle between 1,000- and 1,500-lb loads, while the roll-in door design saves space. The Orca comes standard with a built-in oil skimmer, automatic water fill, containment ring, low water shutoff and a multifunctional timer for 24/7 control of the oil skimmer and heater.

The Avenger is designed specifically for small shops, automotive repair facilities and cellular working environments to provide the power and convenience of an automatic parts washer without the mess and labor cost associated with manual systems or spray washing. It comes equipped with a 21" sprocket-driven turntable and is designed to fit into tight areas in facilities where floor space is at a premium. The Avenger comes in either 120 V or 230 V variations. Other features include a stainless steel cabinet, built-in "Y" fluid strainer, soaking reservoir, low-water shutoff, chip basket strainer, 60-minute timer and a removable water tray in base.

:: Jenfab Cleaning Solutions | 417-866-8855 | jenfab.com



Automatic Die Match Optimizes Form/Thread Rolling

Marposs' Automatic Die Match (ADM) option for the Brankamp X5 in-process monitoring system automatically controls the die match in form or thread rolling if the dies are not aligned. The ADM feature helps the operator find an optimum setting during setup for dynamic operation at nominal machine speed. After setup, the Brankamp X5 system continuously monitors the rolling process, detecting rollbacks and automatically controlling the ADM if the dies are not aligned.

According to the company, in cold forming, the insertion of the blank into the forming tools plays a crucial role in process stability and reducing the potential of failures. This is particularly true in thread or form rolling with flat dies where the insertion of the blanks into the rolling tools significantly determines the quality of the forming.

With ADM, the system transmits positioning information to the machine control system in the event there are changes in the vertical force signals. If the vertical force falls below the specified limit value, Brankamp X5 generates a corresponding warning message and the adjustment is stopped and only activated again when it is exceeded again.

To ensure that the quality monitoring integrated into the process does not impair the productivity of the machine, the company says that the parts detected as faulty are separated from the good



parts by a sorting device without interrupting the production. The X5 systems enable manufacturers to optimize machine efficiency, improve part quality and limit unplanned downtime and tooling costs, helping lead to 100% workpiece quality control.

:: Marposs Corp. | 248-370-0404 | marposs.com



Anti-Vibration Boring Bar for Deep-Hole Machining

Walter's Accuret-ec anti-vibration A3000 boring bar is designed to excel at length/diameter ratios beyond 6 × Dc, which the company says is the point where some conventional steel or solid-carbide boring bars often prove less efficient.

The unit is available in lengths of 6, 8 and 10 × Dc, and boring bar diameters of 1.25", 1.50" and 2.00" (32, 40 and 50 mm), with additional sizes and lengths available on request. Capto C6 and C8 spindle connections along with HSK100T connections are also offered as standards. The company says the boring bars feature compact, robust QuadFit precision quick-change exchangeable heads, which boost versatility and decrease downtime. The unit also features internal coolant delivery for optimum chip removal to help achieve superior surface finishes.

The anti-vibration feature is preset at the factory, so the tool is ready for quick application. The tool is also available with both negative and positive inserts, including Tiger Tec silver grade materials for turning productivity. It is said to provide fast and productive counterboring and internal profiling of parts for industries such as aerospace, oil and gas, and general metalworking.

:: Walter USA LLC | 800-945-9554 | walter-tools.com/us

Automatic System Delivers Coolant to Multiple Machines

168 Manufacturing's FullShop automated coolant delivery system is designed to deliver properly mixed coolant to multiple CNC machines without human intervention. The company says the system monitors coolant usage at each machine tool's sump and automatically replenishes the coolant before it runs low. Well-suited for 24/7 machining environments, it is said FullShop is an easy-to-install turnkey system consisting of a centralized pumping station, controller, distribution manifolds and a small sensor that drops into any machine tool sump to report level and temperature.

According to the company, the system has a compact footprint of 50" × 60" and modular design. A single FullShop system can serve as many as 120 CNC machines and deliver up to 5,760 gallons of coolant per day. It also enables lights-out manufacturing, allowing machine shop owners to run high-volume jobs unattended overnight. The system's features include machine-specific concentrations with closed-loop flowmeter assurance.

:: 168 Manufacturing
800-450-8665 | 168mfg.com



Cabinet Coolers Offer Digital Control

Exair Corp.'s dual 316 stainless steel cabinet cooler systems have electronic temperature control (ETC) to keep electrical enclosures cool with 20°F (-7°C) air, while maintaining the NEMA 4X rating of the enclosure and preventing heat that could adversely affect the internal components. The company says the wear, corrosion and oxidation resistance of 316 stainless steel assures long life and maintenance-free operation within food, medical, pharmaceutical, chemical and other harsh environments. Cooling capacities up to 5,600 Btu/hr. are well-suited for larger enclosures and heat loads. The digital ETC is said to provide precise temperature control in the electrical enclosure, which is constantly being monitored by a quick-response thermocouple. Other models have cooling capacities up to 5,600 Btu/hr. for NEMA 12, 4 and 4X enclosures. Exair also offers hazardous location cabinet coolers which have a UL-classified listing. The line also includes nonhazardous purge models, high-temperature models, and continuous-operation and thermostat-controlled models. All cabinet cooler systems are UL listed and CE compliant.

:: Exair Corp. | 800-903-9247 | exair.com



Face and Centering Machine Offers Production Flexibility

CellCon Cellular Concept's face and centering machine is designed for flexible pre-turning production operations and features a FANUC 35iB CNC. The machine consists of a fully ribbed and welded base, with machined cast iron fixture saddles and spindle slide mounts, all traveling on linear guide rails. The company says that the slides contain servo-driven ballscrews for precise feed control, providing positioning accuracy of ±0.001" and ±0.0005" repeatability.

Each spindle is driven by a 15-hp servomotor to accommodate a range of materials with variable speed control up to 3,600 rpm. For productivity purposes, CellCon has also included thru-the-tool coolant capability and an HSK63 quick-change receiver for offline presetting capability. The tooling fixtures contain hydraulic, self-centering vises that can be individually positioned for high part rigidity and allow for larger part family sizes with diameters of up to 3" and lengths up to 40".

:: CellCon Cellular Concepts | 800-467-2464 | cellcon.com



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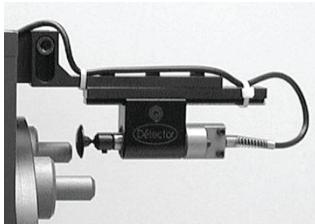
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Multitasking Machining Center with Large Machining Area

Methods Machine Tools' Nakamura-Tome JX-250 turn-mill offers a large machining area envelope for precision milling and turning of complex parts. It also has a twin lower turret configuration, which allows flexibility for complex component manufacturing. According to the company, the unit features an NT smart cube milling spindle, which is one of the shortest on the market. This 12,000-rpm spindle permits maximum part length on the left and right spindles, including when the horizontal tool spindle and lower turrets are in the cut. To optimize part transfer, independent right spindle guideways on lower turrets minimize the distance between the spindles at 11.8" (300 mm). For high processing flexibility, a single or twin lower turret design is offered with overlapping travels and Y-axis box guideways are standard. The machine provides up to 168 tool stations and can perform left and right simultaneous machining.

The company says the machine provides high accuracy and exceptional rigidity due to its horizontal bed design with a wide, low center of gravity and vertical column structure, weighing 55,000 lbs. The NT Thermo Navigator AI technology controls thermal growth during machining and compensates for temperature changes. The multitasking turning center has a maximum turning diameter of 12.6" (320 mm) and maximum turning length of 65" (1,650 mm). The left and right spindles have 3" (80 mm) and 2.5" (65 mm) bar capacity, respectively. Milling spindle X, Y, Z travel is 25.4" × ± 4.9" × ± 32.5" (645 mm × ±125 mm × ±825 mm) and its B-axis positioning range is 240°. The machine features a Fanuc 31i-B5 CNC and SmartX PC-based 19" high-resolution color touchscreen. A 5-axis precision milling software package is included.

The JX-250 also has an NT Work Navigator that can recognize the coordinates of machine parts with non-round shapes such as those in forgings and castings. This feature eliminates the need for costly positioning fixtures and clamping devices. An advanced NT nurse system all-in-one software package is also included to provide convenient, easy-to-use support for the operation, programming and production.

:: Methods Machine Tools Inc.

877-668-4262 | methodsmachine.com



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POSTMASTER: Send address changes to *Production Machining Magazine*, 6915 Valley Ave., Cincinnati, OH 45244-3029. If undeliverable, send Form 3579.

CANADA POST: Canada Returns to be sent to IMEX Global Solutions, P.O. Box 25542, London, ON N6C 6B2. Publications Mail Agreement #40612608.

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Defining Your Niche

By Ted Toth

Our company is fortunate that we have become a niche shop and been in business more than 70 years. We attribute our niche development to forming our capabilities around our customers' needs. This is what led to one of our customers purchasing us in 2012.

Because of our success, when I hear companies defining themselves as general machine shops, I want to ask "why?" Why be like everyone else? I guess you like a lot of competition! Niche shops tend to be very successful. They have less competition and higher profit margins. They are both assets and partners for their customers. They move up the supply chain by providing more value-added processes.

That said, it might take a few years to establish your company as a niche shop. You might need higher skilled workers. Some customers might require you to take on more risk or investments or require a higher quality level and/or certifications. Your shop will need to be a good, clean, 5S-organized facility.

You need to be an expert in your niche.

So how do you determine your niche(s)? First

of all, you need to use the 80/20 rule. Answer the following questions to help start determining some niches:

- Which industries are 80% of your customers in?
- Which customers are 20% of the most profitable?
- What are the most profitable products you make for them?
- What types of services do you provide for them?

Make lists and filter that information to help define your sweet spot. It is okay to have a few niches if they complement each other, have similar quality requirements and/or use similar equipment. It is also good to have a few niche industries to aid in riding out market swings. For example, the communication industry includes niches in satellites, defense and commercial radar, microwave testing and measurement, and wireless communication equipment. Different industries use similar parts, but the product technology is similar.

You need to utilize your current equipment and expand on your knowledge of the customer(s), products, parts and processes. You do not want to retool your facility, but any future purchase should support your niche. It is not rocket science. Rather, it is a process of elimination. It might also be a good time to fire a problematic customer or two.

Many successful niche shops are service niches, such as EDM shops or shops that produce large parts. You need to become an expert in your niche. You need to research your customer's

product so you can "talk the talk" when communicating with them. One of our successes occurred when a customer asked us to bring an outside process in-house to better control the process. It was a gamble to invest in a new process. To offset the risk, we developed a team to research the process and equipment and, in a few months, we became experts in the process.

Once you become the expert, you need to expand your marketing to let others know about your capabilities. Do a little research. What product is your customer manufacturing? Who are their competitors? Which trade shows do they exhibit or what publication do they advertise in? A little research goes a long way to reduce your limited marketing funds.

Going to a general job shop show, with other similar companies, might not be in your best interest. Your marketing needs to be more targeted. You will also need to develop an elevator speech so when someone asks what you do, you can tell them in only one sentence. An example is: we manufacture parts for satellites and connectors for radar systems.

Make sure your website is kept up-to-date. Customers like to see part samples. Make sure you get permission to show your customers' parts on your site. (Often, less is more.) You also need to revisit your list every few years. Can you expand your niche by adding value-added or other related processes? Partnering and networking is a great way to expand your niche. Is there another shop that can complement your niche or expand it until you can justify adding additional capacity? You also need to research your competitors, keep an eye on their websites and try to keep ahead of them. You should also educate your employees on the parts you are making, including who the customer is and how the parts are used. Make sure employees can also "talk the talk."

Even though we are now part of a large corporation, we are still reviewing and bringing in processes to expand some of our niches. We constantly review our products, processes, customers and competitors. So, why be a general machine shop? Instead, develop into a niche shop and survive. Build a needed niche and your customers will come. Become an expert in your niche and customers will keep coming back to you. **PM**



CONTRIBUTOR

Ted Toth is a senior technical advisor at Rosenberger North America. He was owner and president of Toth Technologies before it was purchased by Rosenberger in 2012. He also served as treasurer, vice chairman and chairman of the board for the National Tooling and Machining Association. Contact: ted.toth@rosenbergenerna.com or 856-662-8700.



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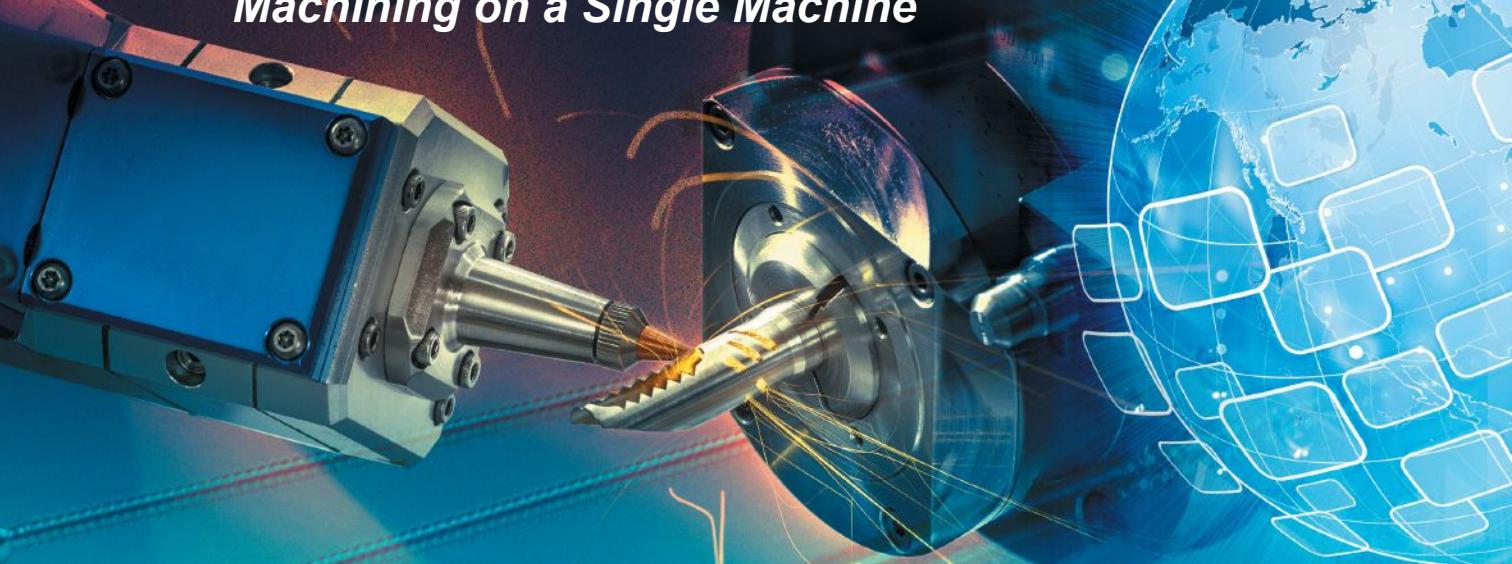
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