

# MoldMaking

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YEARS  
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**Rethinking EDM for Additive Applications** PG 14.

**Steps to Better Mold Prices** PG 26.

**Advanced Manufacturing Cell Speeds Tire-Mold Production** PG 30.

**How to Implement CAM Software** PG 48.



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Ernie Young, Delta Mold Inc.

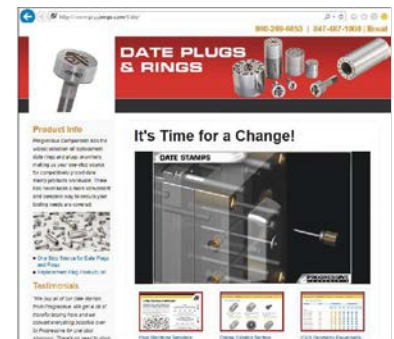
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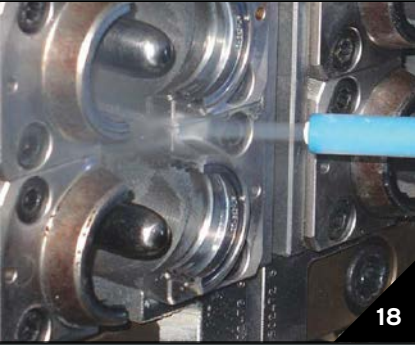
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Cost Effective  
Insert



**Multiple Cutting Edges**  
Face Milling Heads



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### ON THE COVER

Image courtesy of Sodick Inc. This month's cover demonstrates that for additive parts made in a hybrid machine (including both printing and milling), the simplest solution to use is often a dedicated angle plate as there will be very few secondary operations. For print-only parts at the "near-net-shape" phase, more sophisticated tooling is advisable. This makes vendor selection critical not only for choosing a printer, but for choosing wire EDM machines and tooling as well. See the related story on **page 14**.

Images courtesy of (left to right) Cold Jet LLC, Cooper Tires and Knarr Group.

## 5 TRICKS OF THE TRADE

### Great Tips from This Issue

- 1. Wire on Fire**  
While additive jobs will often not require numerous fine-start holes (unlike some typical EDM jobs), they will still require a highly capable threader. **PG. 14.**
- 2. Best Price**  
The final step in mold pricing is to evaluate the relationship of forecasted costs to actual costs through and after the mold-building process. **PG. 26.**
- 3. That's What Friends Are For**  
Peers do not always refer to the people who share the same job title or who work in the same industry. Peers are those who share common struggles and who use different approaches to overcome them. **PG. 28.**
- 4. Robot Rewards**  
A FANUC seven-axis robot gives a moldmaker freedom to move anywhere within the cell and the versatility to add different types of machines while minimizing the cell footprint. **PG. 30.**
- 5. Tally It Up**  
New software implementation requires management support, out-of-pocket costs and labor planning. The shop should manage and track this implementation as another project. **PG. 48.**

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## Expert Machining Software

RAMLAB and Autodesk have manufactured a ship propeller thanks to a new hybrid process combining wire and arc additive manufacturing using industrial robotic arms and subtractive machining and grinding techniques.

As a main software partner, Autodesk has played a key role in developing this innovative hybrid manufacturing approach.

Both teams have mainly relied on Autodesk PowerMill's extensive CAM know-how to develop this new technology.

See what's new in PowerMill 2019.1

<https://www.autodesk.com/products/powermill/new-features>

# It's About What You Do with What You Have



What makes your company special to your customers? That is at the heart of *MoldMaking Technology's* annual Leadtime Leader Awards program.

This competition was created to share best practices and recognize companies that are leading by example. A Leadtime Leader is a North American mold manufacturer that demonstrates overall innovation, efficiency, quality and commitment within its moldmaking operations.

The Leadtime Leader competition is open to every North American mold manufacturer regardless of its size, capabilities or equipment. It's all about what you do with what you have. It's about optimizing your assets to quickly deliver the best molds at fair prices.

A quality mold that is delivered on time is the result of a team of professionals working together. The team relies on a vision that defines company culture and strategy, driving success with a clear purpose.

Your company can benefit just by participating in the competition. After you complete the initial entry form, the application process will lead you through a self-examination of your organization, its workflow and ultimately your results. The efficient, in-depth review will help you see your company through your customers' eyes, revealing opportunities for improvement.

Winners enjoy a cover photo and feature story in the June issue, and online,

winners enjoy a feature video filmed at their shop to accompany the article. Winners also get a complimentary 10-foot by 10-foot booth at Amerimold 2019. But most importantly, the industry recognition helps winners build their credibility as an exemplary mold manufacturer.

Candidates are evaluated by a panel of molders and original equipment manufacturers on delivery, sales growth, technology, business strategy, efficiency, training, industry involvement and customer satisfaction.

What makes your company special to your customers? Show the world all you have to offer and build the recognition you and your team deserve. Visit the Leadtime Leader Zone at *MoldMaking Technology* online for everything Leadtime Leader, including how to enter your shop and what you can "win." Feel free to contact me with any questions at [cfuges@gardnerweb.com](mailto:cfuges@gardnerweb.com).

Remember, you have to enter to win! Good luck. [MMT](#)

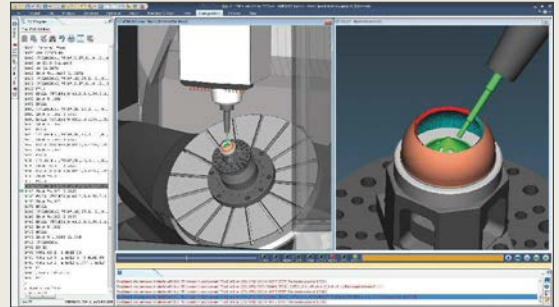
*Christina Fuges*

Christina M. Fuges  
Editorial Director

Follow MMT on: Follow @MMT\_ChristinaF



## THIS MONTH ON [moldmakingtechnology.com](http://moldmakingtechnology.com)



### VIDEO: Accurate Additive Manufacturing Requires Machine Simulation

Machine simulation can help to provide a clear picture of the additive manufacturing process from the first to the last step. [short.moldmakingtechnology.com/accurateam](http://short.moldmakingtechnology.com/accurateam)

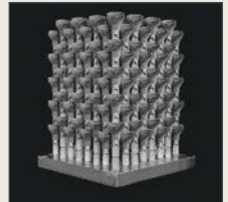
### BLOG/VIDEO: IMTS 2018: Process, Technology and Service Advancements

Advancements in automation and digital manufacturing took center stage during IMTS last week, but developments in additive manufacturing, cutter technology, machining solutions, simulation software, EDM, laser technology and customer service were other hot items. [short.moldmakingtechnology.com/imts18](http://short.moldmakingtechnology.com/imts18)



### WEBINAR: Innovations in Metal 3D Printing: Machines, Processes and Applications

This archived webinar focuses on metal additive manufacturing (AM). With the advances in the machine, software and lasers, the applications have grown exponentially, especially in the aerospace and medical industries. EOS takes a closer look at the past, current and future status of direct metal laser sintering (DMLS). Since powder is a common feedstock, understanding which powder properties matter is important. The unique nature of AM has opened a plethora of options in materials never seen before. [gbm.media/eosmetals](http://gbm.media/eosmetals)



### ZONE: Leadtime Leader

Enter *MoldMaking Technology's* 2019 Leadtime Leader Awards competition by visiting the Leadtime Leader Zone at *MoldMaking Technology* online for FAQs, an entry form and what you can "win." [moldmakingtechnology.com/zones/leadtime-leader](http://moldmakingtechnology.com/zones/leadtime-leader)





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## Effective DFM Analysis



**Andrew Garstkiewicz**  
*Senior Advanced  
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MMT EAB member Andrew Garstkiewicz of GE Appliances, a Haier Co., offers sage advice on design-for-manufacturing (DFM) analysis.

One key aspect of plastic part manufacturing is that of a proper DFM analysis, starting as early in the design process as possible. A good DFM analysis should be made by someone who has some knowledge of the part function and of the material that has been selected. The following steps are the responsibility of the designer. With the following information in hand, the DFM analyst should be able to dissect the CAD model and the part-design intent to provide good feedback to the designer about the feasibility of the design and subsequent mold that will produce the parts for the intended tool life:

- Maintain a uniform wall thickness for the main form of the part, except for supporting structures such as ribs, bosses, etc.
- Be aware that thickness variances that are greater than 10 percent of the nominal thickness of the main form can cause issues with cosmetics as well as the final shape.
- Spread thickness transitions from across the form of the part over three times the thickness difference in the variation.
- Utilize ribs and gussets versus adding thickness to add structure to the form.
- Ensure that the maximum thickness of the rib is no more than 60 percent of the thickness for non-cosmetic thermoplastics to strengthen part form (with ribs, gussets, etc.) or to integrate other features into the form. This must include radii and true intersection thickness against the main-form wall stock.
- Ensure that the thickness of the rib is less than 40 percent of the nominal thickness for cosmetic surfaces that comprise the form. This must include radii, too. (This, of course, can vary somewhat because of proximity to the gate and because amorphous resins shrink relatively less than semi-crystalline resins.)
- Add radii to intersections of form to structure as well as structure to structure. A small radius goes a long way to reduce stress concentrations.
- Prepare for and apply adequate draft on the form and structure of the part. Ejection forces on the part from the mold should be low to prevent deformation, and proper draft will directly affect these forces.
- Understand and prepare for gate location or locations with respect to manufacturability, strength of form and structure, cosmetics and the final part cost.
- Consult with colleagues and industry professionals that have depth of knowledge in all the above considerations every time. Speak with them early in the design phase to maximize benefits and realize lower costs.

All the above will go a long way to obtaining a valuable DFM analysis that leads to smoother tool builds and trials and optimized production life. **MMT**

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The EAB enhances the standing of the publication and strengthens its professional integrity through the active involvement of its members.

The Board represents all aspects of the mold manufacturing industry with a balance of moldmakers, molders, original equipment manufacturers and academia, and various moldmaking segments and job functions. A member is selected based on his or her experience and knowledge of the moldmaking industry to serve a three-year term.

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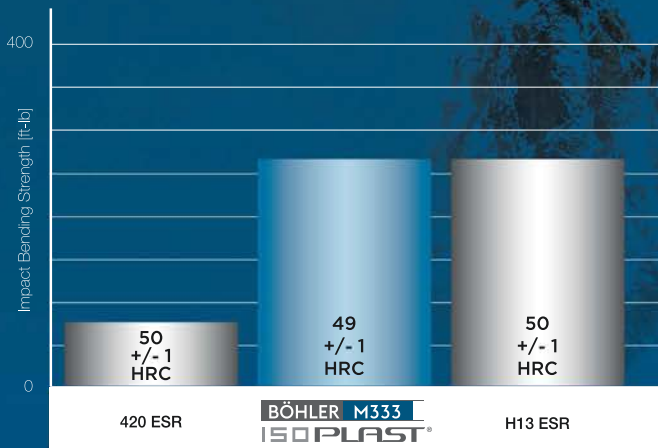
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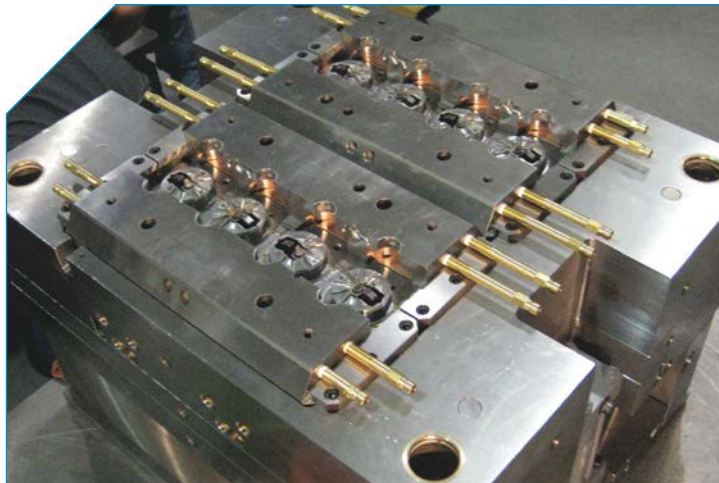


### A Conversation with ... **B A Die Mold Inc.**

**B A Die Mold Inc. (B A Die Mold) has built molds with its patented Programmable Electric Rotating Core (PERC) System for many original equipment manufacturers, custom molders and other moldmakers. What makes the PERC System so successful for molding threaded parts?**

**Jason Baker, design engineer:** B A Die Mold developed a system that offers precision positioning of virtually unlimited threads on any given part. It is a servo-motor-driven mold system that B A Die Mold developed for molders who use electric molding machines to manufacture threaded parts. Molds with a PERC System can be installed on traditional, hydraulic molding machines as well. One of the patented features of the PERC System is that the servo motor is part of the mold, which makes it possible to set it up in any type of molding machine. The PERC System works well with robotics, too.

Once they see the PERC System in action, our customers really appreciate the precision and speed,



Images courtesy of B A Die Mold Inc.

For more than 10 years, this integrated cap mold built by B A Die Mold is still in production and has run nonstop other than when it stops for routine preventive maintenance. The complex design combined two molds into one, eliminating a secondary, spin-welding operation and paying for itself in under a year.

not to mention how perfectly it forms threaded details, especially on complex parts. Because PERC is a compact system, PERC molds typically can be run in a molding press that is smaller than what a traditional unscrewing system requires.

One example that highlights how the PERC system benefits customers involved a project in which a medical part required a side action to pass through a threaded core. The resin was very flashy, and the position of the threaded core had to be dead-on for the side action to pass through and shutoff properly without galling. With the PERC System, we were able to accomplish this with relative ease. The customer was very happy with the multi-cavity tool we built as it functioned flawlessly with no flash—right from the first shot. We were confident from the start that the PERC System would be the answer, while others hesitated and shied away from the job.

Another example is a PERC mold for a water-filtration cap. The customer had a two-piece assembly for a cap that required spin-welding to join the two parts. We helped the customer by redesigning the parts so that they were molded together, eliminating that secondary operation. The design was very complex as it required A- and B-side unscrewing. We designed the mold so that the PERC System very precisely shut off the threaded core from the B side on the threaded core from the A side of the mold, forming a waterway every cycle. Our customer told us that the mold paid for itself in under a year, and 10 years later, it is still producing perfect parts nonstop, except of course when the customer performs preventive maintenance.



**B A Die Mold Inc.**  
**3685 Prairie Lake Court**  
**Aurora, Illinois 60504**  
**badiemold.com**

- Celebrates 50 years in business this year.
- Was founded in 1968 by Alan Petrucci, who leads a very tight, lean team building molds in its 16,000-square-foot, modern facility.
- Has an owner, Alan Petrucci, who is a founding member of the American Mold Builders Association and was named AMBA's Mold Builder of the Year in 2011. Petrucci is still actively involved with day-to-day operations as CEO, and his daughter Francine Petrucci is B A Die Mold's president and majority shareholder.
- Specializes in the engineering and manufacturing of highly complex injection molds for water filtration, medical devices, appliance controls, housewares, automotive electrical components, caps and closures and threaded devices.
- Is well known for its patented PERC System for unscrewing molds.

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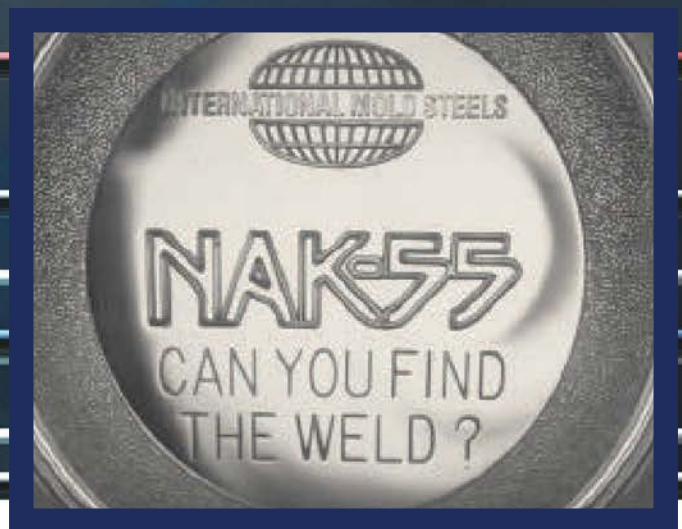
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Capable of the perfect weld – polished and textured surfaces

Easy to Machine – 30-50% easier than P20

Very Stable – does not need stress relieving

Capable of the perfect weld – polished and textured surfaces



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### What other advantages does B A Die Mold offer customers?

**Baker:** Besides the PERC System, we offer our customers the creativity that we have for solving problems. We are a small shop with huge capabilities. We specialize in doing what was formerly considered impossible. We love the “hero jobs,” and I guess you could say that we are suckers for them because we welcome a challenge, large or small. For example, a customer

had a part for a medical device in an eight-cavity mold that another moldmaker provided where two pins shut off end-to-end to produce a 0.025-inch-diameter hole in the part. The pins were very small, and alignment was critical. The B-side pin's diameter was 0.025 inch and the A-side pin's diameter was 0.037 inch. The part was molded between side actions and the A- and B-side core pins together formed a 0.025-inch hole through the part. Because of misalignment and injection pressure, the pins were shifting slightly—enough where the small B-side pin was not fully shutting off on the large pin, and the through-hole was not fully round. The customer could not get the pins to align in the existing mold, and the parts were flashing as a result. We had to find a way to solve the problem without interfering with the intended function of the part, which was the flow of IV fluids or blood to patients. We redesigned the mold so that the B-side pin telescoped inside or through the A-side pin to produce the hole without flash and without any inconsistencies. We were successful and saved the customer thousands of dollars in repair and maintenance costs.



The graphic features the Sodick logo in green at the top left. Below it, the text "MoldMaker's Choice" is written in large, bold, black letters. Underneath, three key features are listed in white text: "Simple Programming", "Flushing-Free EDM", and "Zero-Wear Linear Drives". At the bottom, contact information is provided: "Sales@sodick.com", "www.sodick.com", and "(847) 310 9000". The background is a dark, stylized image of industrial machinery.



B A Die Mold's patented PERC System eliminates the need for a rack and cylinder by integrating a servo-driven motor to rotate the core and enable the molding of an unlimited number of threads. The system does not use hydraulics, which makes the PERC System an option for cleanroom and FDA situations. B A Die Mold builds and programs the PERC System's control cabinet (shown here), so it is ready to run at the user's facility. Customers can use one cabinet to control multiple molds. B A Die Mold says that the system itself requires little to no maintenance.



B A Die Mold is known for its innovative part and mold designs. Pictured here are telescoping pins that are used to form a micro-sized, medical needle-hub part. The company redesigned the eight-cavity mold that another moldmaker built so that the B-side pin (on the right) telescoped inside the A-side pin to produce a fully round hole, eliminating imperfections and flash issues.

### How does your team work with customers, especially when a job could pose serious challenges?

**Baker:** Every team member that we have is aware of the issues that our customers can have during the molding process, so we strive to eliminate those issues up front in the design phase. After collecting the part, material and press information, we invite customers to sit down and review the job before it is even quoted, which is not unusual but is critical when addressing complex parts. We then develop sketches with approaches to show the customer design options. In the process of doing that, the customer may make part changes to facilitate simplifying the mold or to facilitate better steel conditions, based on what we recommend. We gather as much intel as we can so that we know what the molded part must do, we understand its critical-to-function features and then we work as a team to make it happen. We also offer customers 3D models of the new designs that reflect the agreed-upon modifications. Upon customer approval, we manufacture the mold and sample it at our facility. Our customers are always invited to attend the sampling.

If we are not running production for customers, we offer in-house preventive maintenance services and training for our customers' toolmakers, on complex, multi-action molds and particularly on PERC System molds, which can require extra care because of the unique drive train. Our customers spend tens of thousands of dollars on our molds. We want to ensure that their in-house mold technicians have the confidence to properly assemble and disassemble the molds and that they know what to investigate. We also include a customized mold-maintenance guidebook to assist them in that task as well. It is just another way that we add value to our customer's bottom line.

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# Rethinking EDM for Additive Applications

3D printing impacts wire EDM workholding, cutting conditions and machine-tool specifications.

As manufacturers accept and implement new technologies into their operations, downstream processes often need to be adjusted to accommodate the type of work that then comes down the pipeline.

One example is additive manufacturing or 3D printing. While many of the first commercial 3D parts were for specialty aerospace and medical applications, the technology slowly but surely has crept into much broader manufacturing settings, including the mold and die industries.

Because of the unprecedented nature of 3D printing, these adjustments touch all areas of machining processes. This article examines the impact of 3D printing on EDM and specifically the impact on wire EDM workholding, cutting conditions and machine-tool specifications.

## Workholding

One of the most basic considerations before a technician prints a 3D part is how subsequent processes are affected by early workholding decisions. One factor that complicates these decisions is the great variance in 3D printers. Some additive machine manufacturers come from the machine-tool world and have quickly leveraged that experience to provide easy solutions just as they would with a traditional CNC machine. Conversely, those that have led innovation specifically in 3D printing often have less experience with questions pertaining to workholding and so may require more ingenuity to strategize secondary operations.

Naturally, one trend that is taking root quickly is for traditional tooling suppliers to partner with original equipment manufacturers (OEMs) for machines to provide integrated solutions. With validated systems at the OEM level, it is possible for tooling manufacturers to make the secondary operations just a little less laborious. Alternatively, for machinery without an established tooling solution, it may be possible to produce tombstones or other custom fixtures to expedite the setup process, though these would be less transferable from



Images courtesy of Sodick Inc.

Some additive machines can print directly onto traditional fixtures for multiple operations.

one operation to the next. For example, a part that requires both wire EDM removal and sinker EDM finishing likely would not be able to use a tombstone for both.

Moreover, operators should be aware that because 3D printing is not a perfectly accurate process, virtually all applications would still benefit from the inclusion of reference or datum surfaces for more accurate pickups.

## Cutting Conditions

As anyone who has wire-cut into a 3D-printed part would attest, special care is necessary to avoid wire breaks, which typically result from a combination of hollow spaces designed into 3D parts and loose powder that has not been sintered, which often coats and fills these parts. While flushing is important in all EDM applications, it is especially important for additive parts. Inside a typical kerf, flushing jets are confined, which makes it possible for fluid to laminate the EDM wire and to clear swarf efficiently and neatly. As the distance from the flushing nozzle increases, this stream becomes more turbulent and less effective. Also, upon hitting an open or hollow cavity within a part, the flushing stream experiences a drop in pressure, expanding the flushing path and creating even more turbulence to disrupt flushing.



These poor flushing conditions result in an increased concentration of conductive particles that linger within the spark gap rather than being flushed away. These conductive particles continue to spark with each pulse, wearing the EDM wire more quickly than it would under better circumstances. Add to this the loose metal powder that uniquely coats and fills 3D-printed parts, and the operator has even more conductive materials that are not flushed away within these hollow spaces. All of this causes increased wire breaks when cutting additive parts.

Operators can avoid wire breaks by strategizing their choice of wire. Most shops rely heavily on standard, 0.010-inch brass wire, so the goal in troubleshooting is to improve wire breaks over this benchmark. For this type of application, operators can switch to 0.012-inch wire. The larger diameter provides additional strength that keeps the temperature of the wire core low. Others users may switch to steel-core wire, which is much less likely to break under these conditions. However, it is not compatible with most wire-choppers on the market and is more difficult to recycle.

Before buying new wire, however, it may be more cost-effective to explore solutions on the machine control itself. On Japanese controls, the key settings for this case are MAO settings, which more broadly have to do with ON time, OFF time and the sensitivity of adaptive circuits. Increasing the sensitivity of adaptive circuits enables operators to adjust to more conservative settings on most of the newer EDM models when the cutting environment is not ideal. One example is when the wire opens a pocket of trapped powder.

Likewise, increasing the OFF time opens more opportunity for the swarf and other debris to clear between electrical pulses. Additional speed can be regained by increasing the ON

time, which means that the EDM model will have both longer pulses and longer gaps between pulses. Because adaptive circuits treat ON and OFF time differently, a more sensitive circuit will continue to be conservative even when ON and OFF time are both increased. In broader strokes, the goal is to make the spark environment more conservative while recovering the speed where that is possible.

### Machine-Tool Specifications

Additionally, many shops would benefit from reviewing machine specifications in regard to the type of work that they do. Shops that plan to take on more additive work may want to consider machinery that is suited more specifically for this application, as the requirements of an additive part can be quite different than other processes. Often, wire-EDM work on an additive part is limited to the removal of supports or of a baseplate, meaning that the goal is no longer fine finishing or extreme precision but capacity, cutting speed and reliability under unfavorable conditions.

This change has put equipment manufacturers in a somewhat difficult predicament, as they design around very different specifications than those that the additive market demands. As additive applications continue to grow in size at a fairly rapid pace, the Z height required to machine these parts with EDM also continues to increase.

And yet, while this application does not necessarily require an extreme surface finish and micron accuracy, the only machines

Operators can avoid wire breaks by strategizing their choice of wire.



Simple and easy-to-use workholding can be equipped in most machine tools.



This connector mold is ready for wire cutoff.

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As the capacity of 3D printers grows, it is critical to select an EDM machine with a tall Z height to accommodate.

capable of accommodating these large workpieces are often the premium, large-capacity models in the EDM lineup. These premium models tend to offer many capabilities that, while impressive, are not strictly necessary for the application at hand, and thus add unnecessary cost. Moving forward, expect EDM manufacturers to introduce models that target the additive marketplace more adequately, with fast cutting speeds and large capacity but without advanced technology for six-, seven- or eight-pass finishes. These machines will be a much better fit for the type of additive work that looms on the horizon without breaking the bank.

The automatic wire threading (AWT) on these machines will be important as well. While additive jobs will often not require numerous fine-start holes (unlike some typical EDM jobs), they will still require a highly capable threader. This is because 3D parts frequently use exotic geometries, hollow cavities and more. These factors, alongside the increased wire breaks on 3D applications, mean that a reliable threader will be a key factor for success.

Look for threaders that are annealing, which keeps the wire straight even through a tall, hollow workpiece. Also verify that AWT performance is reliable even at the full Z height, as operators can expect to see taller work with some frequency.

The growth of additive manufacturing seems poised to benefit mold builders here in the United States, where access to high-end technology may contribute to reshoring. However, the shops that will capture much of this new business will be the shops that recognize new demands and new ways of doing things. **MMT**

## CONTRIBUTORS

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This article is part of a series of roundtable discussions with industry suppliers addressing recent trends in moldmaking, the challenges moldmakers are experiencing and the latest solutions that are or will be available to resolve them.

## Complex Molds Require Advanced Maintenance Strategies

As molds become more complex in design and function, the demand for advanced training and equipment for mold maintenance increases.



Image courtesy of Cold Jet LLC.

Ohio), says that molds continue to advance in their design and build. The industry is seeing molds with higher cavitation, faster cycle times and more complexity in the use of hot runner systems, in-mold functions, over-molding, process sensors, engineered resins, mold-monitoring devices, rotating, spinning plates and so on. Because of this, molds today require a higher level of shop maintenance skills and management strategies to safely and effectively run and maintain the molds. “Original equipment manufacturers (OEMs) continue to raise the bar as well, requiring their molds to run longer, more cheaply, faster and more reliably while molding quality parts,” he says. “They want mold builders to go beyond the million-cycle warranties, which means that the molder must take better care of the mold to maximize tooling and mold life.”

Louis Bowler, executive vice president of sales at Die Sep (Lake Geneva,

Wisconsin), shares Johnson’s views, saying that the attitude of management toward mold maintenance is changing. “Up until about 10 years ago, mold maintenance was regarded as a necessary pursuit that often was too expensive. Everyone knew that the molds needed to be maintained, but getting

In recently published roundtable discussions about mold-making trends and challenges, participants indicated that increasingly complex mold designs and functions have been central in driving industry advancements in services, products and technologies. *MoldMaking Technology* uncovered that the same forces drive mold-maintenance strategies. Professionals from a few supplier companies share their take on the topic.

### Maintenance Matters More Today

Mold maintenance expert and *MoldMaking Technology* columnist Steve Johnson, president of MoldTrax (Ashland,

Cleaning molds, especially complex molds, can be labor-intensive and difficult, but using newer technologies like dry-ice blasting (shown here) can help a technician reach into tight places and alleviate a lot of frustration. Methods like dry-ice blasting also accelerate cleaning processes and preserve a mold’s details and surface finish.



Image courtesy of Slide Products Inc.

Mold-cleaning products come in many forms, including wipes like these that are easy to use anywhere in the shop. While molders are becoming more and more proactive about preventive maintenance for their molds and tooling, products like this can be beneficial during and in between preventive maintenance programs.

ahead of the game and providing the tool room with the equipment it needed to sustain a preventive maintenance (PM) program was not a priority.”

Brian Finkel, manager of Repairs-Service of North America for Mold-Masters/Milacron (Georgetown, Ontario, Canada), says, “We see more customers requesting pre-scheduled PM runs on their molds and systems.”

Michael Muth, president of Slide Products Inc. (Wheeling, Illinois) concurs, saying that companies have become more proactive about using advanced mold-maintenance schedules and products. “They realize that an ounce of prevention can be worth a pound of cure. Molders are using predictive patterns to help schedule their mold maintenance before the processing issues pop up and delay or slow down production,” he says.

“People recognize how the mold maintenance facet of their molding operations greatly impacts their overall equipment effectiveness (OEE) scores,” Steve Wilson, Global Business Unit Director—Plastics, Rubber & Composites for Cold Jet

LLC (Loveland, Ohio) says. “Traditional, manual, in-machine cleaning methods often are ineffective and have a negative effect on several OEE scores, including Quality Loss, Availability Loss and Performance Loss.” He says that molders are looking to improve methodologies for cleaning the molds in-situ and at operating temperatures to improve overall plant-OEE scores.

### More Effective Cleaning Strategies Are Emerging

Mold-cleaning strategies, like the molds themselves, take many forms and the array of options is wide. Suppliers understand that customers want efficient and effective methods that will not affect surface treatments adversely or damage the critical-to-function areas of molds. Steve Wilson says that Cold Jet has developed dry-ice cleaning solutions that incorporate the use of 0.3-millimeter dry-ice MicroParticles instead of traditional 3.0-millimeter pellets. “MicroParticles are less aggressive and increase the area of coverage,” he says. “In the dry-ice cleaning process, the kinetic energy of the particles delivers most of the cleaning effect. Enabling molders to adjust their cleaning levels is a big advantage for those who use surface treatments.” He says that it takes less air to fully accelerate the MicroParticle to proper cleaning velocity, so systems connect using ½-inch or even 3/8-inch air lines and consume around 30 cubic

feet per minute of air and 0.6 pounds per minute of dry ice, whereas 3.0-millimeter systems typically require ¾-inch or 1-inch air lines, which often are not available near the molding press. “Additionally, using dry-ice cleaning is environmentally responsible and eliminates the use of chemicals that often contain volatile organic compounds (VOCs).”

Expanding on that, Michael Muth of Slide Products says, “In the United States, emissions of VOCs to the outdoors are regulated by the EPA and some states mostly to prevent the formation of ozone, a constituent of photochemical smog. Many VOCs form ground-level ozone by ‘reacting’ with sources of oxygen molecules such as nitrogen oxides (NOx) and carbon monoxide (CO) in the atmosphere in the presence of sunlight.” California is the state that most heavily regulates VOCs at this point, Muth says, but it is expected that other states and regions in the United States will follow California’s lead and start limiting the VOC content of certain product categories, like spray mold cleaners and releases. Canada has already announced that it plans to

# Mold Maintenance & Repair



Image courtesy of Die Sep.

Every shop must take care to provide the proper tools to ensure that employees can perform mold-maintenance and repair actions safely and efficiently. Mold and die separators like the one shown here are multi-tasking machines that can open the mold halves and tip them so that the cleaning and repair of molds can be performed without ever leaving the machine. Some can also collect and store mold-maintenance data for later use.

adopt the VOC standards that California has implemented, he says. “Slide Products has been focusing on developing and introducing new VOC-compliant chemical processing aids to help molders and moldmakers meet these new VOC limits without losing the needed functionality.”

Mold-Masters’s Brian Finkel says that the company’s repair facility has adopted new processes for cleaning and maintaining molds for customers, including a laser cleaner. “It removes rust, discoloration and burning from the part surface of the tool. It does this by removing one micron at a

time. It will not remove the steel’s surface. It only burns away the surface contaminants.”

### Training, Data Collection and Safety Are Key

MoldTrax’s Steve Johnson says that many repair shops are not equipped for success through the application of today’s cleaning technologies, like ultrasonics, dry ice, plastic media and laser blasting. “Shop designs and layouts need to be more conducive to mold size, mold pull pace and work flow through the shop,” he says. “Benches and tools need to be

A large advertisement for Mitsubishi EDM. The background is red. On the left, the text "PINCH ME" is written in large, white, bold letters. In the center, a hand is shown touching a large, 19-inch touch screen monitor. The monitor displays a 3D wireframe model of a part. To the right of the monitor is a handheld device, likely the HFS circuit mentioned in the text. Above the monitor, the text "PINCH IT, TAP IT, SWIPE IT." is written in white, bold letters. In the top left corner of the red area, there is a small circular inset image showing a Mitsubishi EDM machine.

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arranged in a more work-cell-like layout to afford the technician every chance to work more safely and efficiently. MoldTrax stays in touch with new products and designs new, hands-on training methods to equip its customers with the most current information and bench skills.”

Regarding safety, Die Sep’s Louis Bowler emphasizes that by eliminating as much manual labor as possible from the mold-maintenance process, companies reduce the risk for worker injuries. He says that, historically, repair technicians have had no choice but to open molds with pry bars and cranes. When a mold is jammed because the parting line is not opening parallel, technicians resort to using house jacks or hydraulic jacks to force open the mold. “Nowadays, mold

“Maintenance is no longer an afterthought for companies but a necessity.”

separators are available that use hydraulics to do the heavy work of opening, tipping and closing the mold, and they use magnets to mount the mold,” he says. “Toolroom techni-

cians do not have to contend with the labor or dangers of handling molds. Furthermore, the job is completed in a fraction of the time without the risk of damage to parting-line surfaces. Reducing or eliminating these battles when molds get jammed not only saves the technicians’ wrists, elbows, shoulders and backs, it saves their attitude and improves morale in the tool room as well.”

Josh Kauzlarich, North America sales representative for Millutensil SRL (Milan, Italy), says that the company’s line of machinery for molds and dies is multi-functional and can be used for mold cleaning and repair, spotting and validation. “The Millutensil system provides a safer way to handle, disassemble and maintain dies and molds because it eliminates mold damage and potential safety risks that come from using traditional overhead cranes. Users can equip it with swivel and tilting plates, which provide more ergonomic access to each half of the mold without requiring the technician to remove it from the Millutensil press.”

MoldTrax’s Steve Johnson sums it up when he says, “Maintenance is no longer an afterthought for companies but a necessity, along with more complete and accurate documentation for OEMs who demand better care for their molds.” **MMT**

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# Machine-Tool Investment Considerations

Several European moldmakers offer rational for their purchasing decisions when they invest in new machine-tool technology.

It is not possible to establish fixed rules when it comes to choosing the right machine tool. However, attuning to the needs of shops and delivering on the promise to ensure machine availability as much as possible are often said to be the most important factors that drive moldmakers to opt for a certain machining center or machine-tool brand, no matter the initial price tag. Several European moldmakers offer rational for their purchasing decisions.

## Uptime, Location and Reputation

Moldmaker Schweiger Formenbau in Uffing, Germany, specializes in automotive work, creating highly sophisticated molds that are used in premium vehicles. For example, the company builds two-component injection molds that make headlight end plates. These customers place high demands on the end products and do not accept the slightest blemish. Accordingly, the injection molds have to meet similar requirements. As a rule, surfaces must be as smooth as glass and the company must maintain tolerances of less than 0.02 millimeter.

For Managing Director Anton Schweiger and his team of approximately 75 employees, this means meeting the highest standards of precision and quality with every injection mold



Image courtesy of Kegelmann Technik.

Kegelmann Technik near Frankfurt, Germany, operates six Hermle five-axis machining centers. All of them are automated and arranged in machining cells, where a robot handles blanks and pallets for unmanned operation. A machine-tool builder who builds reliable machines that rarely need unscheduled service and who can react quickly is essential.

that Schweiger Formenbau produces. Additionally, the company is competing in a global market, which—among other things—is subject to enormous pressure regarding costs.

However, facing the strain of global competition, the qualified toolmaker and his team have adjusted and positioned themselves. The team relies on an automated process chain that ensures absolute security and ends with injection molds that meet all requirements. In 2016, the company built a new production hall and invested in two DMC 210U and 270U five-axis machining centers from DMG MORI.





Deckerform manufactures molds that weigh up to 25 tons. Before investing in new equipment, the company first listens to other shops describe their experiences and suggestions before it starts its own research. Good service is always on top of the list when it comes to a decision.

“We knew that the machines had to run at least 6,500 hours per year. This machine uptime was essential for us since it is a large investment and our customers count on us,” Schweiger says. “When making a selection of machine tools, production capacity, cutting accuracy, cost of the

equipment and its reliability and performance are major considerations. However, the availability of replacement parts and factory service and support are very important criteria when considering the appropriate machine type and manufacturer.”

Schweiger machines many large injection molds automatically in one setup, machining 40 to 50 hours and sometimes as long as 100 hours non-stop. One of Schweiger’s main focus areas is milling large, complex molds that weigh up to 9 tons. The cavities are often very deep. They typically are between 300 and 400 millimeters deep and are sometimes as much as 500 or 600 millimeters deep.

Equipped with appropriate pallet automation, the machines run around the clock, seven days a week with

one-person shifts. On the weekends, the machines run completely unmanned. This requires the highest process reliability across all relevant components and functions.

DMG MORI and Schweiger Formenbau are both based in Bavaria, Southern Germany. For Schweiger, his company’s proximity to the machine-tool builder and the completeness and availability of the builder’s stock of repair parts were important factors when buying the two large machining centers, which was a significant investment for the medium-sized, family-owned business. “The DMG MORI machines were certainly not the least expensive ones,” Schweiger says. “But, in relative terms, the initial machine price is not what counts. What counts is machine availability, reliability, productivity and support in application engineering.”

Sometimes, a “subjective” evaluation is more important than the objective process. A subjective evaluation takes into account requirements such as tool capacity, work envelope, horsepower, control type, compatibility with existing equipment and the number of available machining axes.

On top of that, certain machine tools just have a feel, a reputation and a company structure with which people are comfortable. “We have to feel comfortable with the company and the people with whom we are working,” Schweiger says. “Our company and our machine-tool provider need to be on a level playing field.”

### Shared Experience, Service and Life Cycle

This subjective evaluation was a starting point for Hans-Jürgen Koppolt, production manager at Deckerform Production Systems (Deckerform) in Aichach, Germany, as well when he was looking to increase production capacity by investing in larger machining centers capable of five-sided complete machining. “We often talk to other mold shops and toolmakers, and many of them are friends rather than competitors,” he says. “So, when it comes to investing in new equipment, we listen to other shops describe their experiences and then start our own research.”

For instance, the company has invested in a BFR23 five-axis machining center made by Swiss machine-tool maker Reiden—not one of the most known brands. “The machine is ideal for



Image courtesy of Schweiger Formenbau.

Schweiger Formenbau invested 5.5 million euros in a DMC 270 U from DMG MORI to machine workpieces weighing up to 9 tons, fully automated, 24/7. A DMC 210 U portal machining center can handle up to 8 tons. Machine uptime was essential for this shop since the technology is a large investment.

extreme cutting forces and roughing operations with its box-type guideways.” The machine can rotate and machine workpieces with a diameter of 2,100 millimeters while the machine housing is completely closed. The compensation of the physical deflection of the beam is electric- and hydraulic-controlled for precise movement of the Y axis.

Deckerform’s decision to invest further in two large machines, the C40 and C50 U five-axis machining centers from Hermle Machine Co. (Hermle), resulted from Deckerform’s positive experience with its first Hermle machine, a C30 U. “Our operators are used to the Hermle machine and the CNC machine,” Koppolt says. “Investing in the same brand makes it easier to have new machines up and running. But, the most compelling reason to decide for another two Hermles was axis travels, spindle speeds and flexibility since we have high-mix, low-volume production.”

Stephan Kegelmann, managing director at Kegelmann Technik near Frankfurt, Germany, cites similar reasons when asked which are the most important criteria in selecting a machine tool. “It’s important to be taken seriously as a customer,” Kegelmann says. Since 1992, the tool and moldmaker, who specializes in 3D printing, prototyping, modelmaking and the manufacturing of end products, has counted on Hermle milling machines to machine its molds, tools and parts. Kegelmann

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Technik has always been a partner for Hermle, rather than just a customer.

"We have always pushed Hermle when we have had a new idea and wanted to try something new," Kegelmann says. "In 1998, for example, we suggested that Hermle get rid of the traditional t-slot tables and introduce zero-point clamping systems, which was something new at the time. Hermle always has been open to new ideas, and we often help them develop additional features and machine improvements. The working relationship between our companies is excellent."

Recently, Kegelmann Technik rebuilt a whole automated cell with Evomecs, a modular-built, browser-based, integrated automation system for single-part and small-series production. "This cell integration was a first for Hermle, but we never had any problems. Hermle is a family business just like many of its small to medium-sized customers. There is a lot of trust and confidence," Kegelmann says. As a result, Kegelmann Technik operates six Hermle five-axis machining centers, and all of them are automated and arranged in machining cells where a robot handles blanks and pallets for unmanned operation.

Kegelmann believes that Hermle is the only option when it comes to milling, even if Hermle's machines come at a higher price tag than others. He says, "Our approach here is

to stay on the leading edge of machining and manufacturing technologies." He says that Kegelmann Technik examines what the equipment costs over the span of its entire life and not just its initial cost. That includes expenses for maintenance, service and spare parts. "The more reliable a machine tool is, the less you spend on maintenance and service. However, if you need help, a machine-tool builder who builds reliable machines that rarely need unscheduled service can react quickly. That's important. No company can afford long machine downtimes." [M M T](#)

#### CONTRIBUTOR

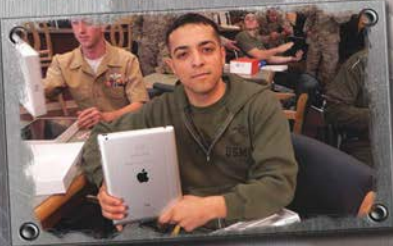
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# Steps to Better Mold Prices

Improving your mold pricing requires a deeper understanding of your business.

**P**ricing is a critical step in the mold-building process that does not get the attention that it deserves. Shops use several methods, and some are more effective than others. A solid understanding of the proper way to price molds can increase revenue and profits and improve customer relations and forecasting. While no magical solution fits all companies in every market, you need to be aware of the following key considerations:

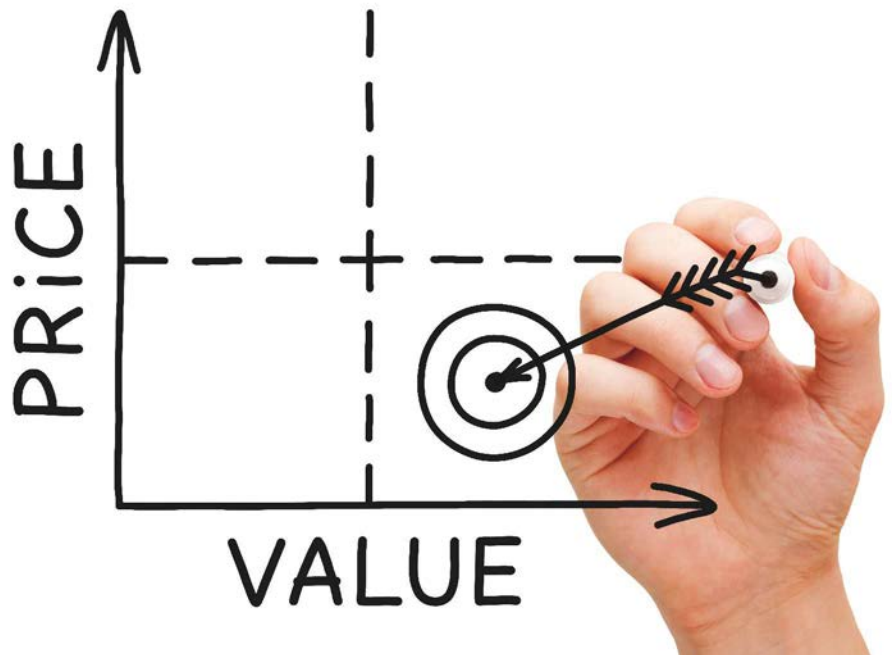
## Pricing Plan

The first step in establishing the proper price for a mold is understanding your business by identifying all of the costs associated with operating the business. This includes costs associated with making the mold or molds that you are pricing and any additional costs associated with the project, such as shipping or sampling. A thorough comprehension of internal processes, capacity and the value statement that you offer also is essential.

Once you establish an accurate picture of the costs incurred and the value that you offer, it is then necessary to look outward. You should use benchmarking and competitive analysis to establish the value that other companies offer and the price that they are charging for that value. Awareness of the needs of your customers, the abilities of your vendors and the overall economic climate are important elements of which to be aware as well.

The most significant point to remember is that all of these things can change. If your current pricing model is from the 1980s, there is a good chance that it is irrelevant and potentially causing harm to your operation. Constant monitoring and re-evaluation are the only ways to ensure that the data that you are using to arrive at the price is accurate.

There are several ways to use this information to price a mold project. Regardless of which pricing approach you use, the proper price should cover the costs necessary to complete the project, reflect the value that you are offering to your



customer and allow for a profit. Opportunity cost must also be a part of the equation. If you win the project that you are pricing, evaluate how that affects your shop's capacity and its ability to win other projects or complete other molds.

## Common Pricing Pitfalls

Other errors that companies make when pricing include chasing sunk or irrelevant costs, setting prices solely based on experience, setting prices solely based on competition and improperly using discounts. It is important to ensure that the revenue that you generate from building molds is sufficient to cover all of the costs associated with running the business. However, rigid pricing models that force the inclusion of factors like unused capacity run the risk of creating profitable job loss. This model could lead to more unused capacity, which forces higher prices and eventually causes a death spiral in the demand for your molds.

Pricing based solely on gut feelings, hunches or "because this is the way we have always done it" is another recipe for

errors. Experience is a plus when it comes to formulating how much to charge. However, you should not base prices on statements like “this should take two months.” Instead, you should use data to review historical times for similar projects and processes. This provides support for, or potentially tests, the theory of the hunch and facilitates greater confidence in the price.

The prices that other mold builders are charging is a very important consideration. Only using industry standards or market pricing without understanding internal costs and value could lead to poor pricing. The comparison must be apples to apples. For example, consider lead time and quality. If these two factors are not the same, then the price must reflect the difference.

Discounting can be a very valuable tool when you use it properly. Offering discounts is a part of marketing, similar to social media or print advertising. It is an expense, which on its own, reduces profit. You must measure the return on investment on the discounts that you offer to win new business. Discounts can also be an important part of negotiations. However, you must match price decreases to service decreases or differences. If a customer needs a specific dollar amount, you must work with the customer to see what changes to design, volume purchasing, lead time, material or tolerances can be made to save money. Strictly reducing price is rarely

the right thing to do, especially if you determined the original price using these other steps.

The final step in pricing is to evaluate the relationship of forecasted costs to actual costs through and after the mold-building process. If actual costs diverged from estimated costs, then research is required to identify the reason and to take corrective action. You can then use the information that you have acquired for future pricing.

Increasing revenue and reducing costs are two ways to improve profit. A robust pricing strategy can help with increasing revenue by growing incremental income per mold or by stimulating the sale of more molds. It is vital not to lose focus on reducing costs wherever possible. Often, raising the price is not the right answer. Eliminating waste and improving the process is. **MMT**

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# The Power of Collaboration

Work with peers in your own backyard to solve common manufacturing challenges.



When you think of learning new techniques for improving your business, what are some of the first thoughts that come to mind? Perhaps you are thinking about being out of the office for two to three days at a costly seminar or the expense associated with working on the business instead of in the business. Perhaps you are thinking of returning to an inbox full of emails from people needing you yesterday or simply that you do not have the time to spare.

These thoughts are common, but they fail to recognize the resources that may be in everyone's backyards. For example, companies within Eastern Connecticut and Rhode Island have

experienced firsthand the benefits of collaborating with peers through the Eastern Advanced Manufacturing Alliance (EAMA), specifically in learning new ways to improve each organization.

An important factor here is that *peers* do not always refer to the people who share the same job title or who work in the same industry. Although all EAMA members are

Peers do not always refer to the people who share the same job title or who work in the same industry. The key to the success of a peer group is acknowledging that while many businesses share common struggles, each one uses a different approach to overcome them.

manufacturers, they each operate their businesses very differently from one another and supply a diverse range of products to varying industries. The key to the success of this peer group is acknowledging that while many businesses share common struggles, each one uses a different approach to overcome them. This group provides an opportunity for a business to see a common challenge from a different perspective, which can help that business implement a successful solution.

### Putting Peer Networking to Work

As the event coordinator for EAMA, it is my job to provide valuable learning opportunities to the members on a consistent basis. For example, EAMA hosts an event every other month that highlights a strength or challenge of a member company. The group holds shop tours, roundtables and even hires consultants to provide learning opportunities for members. These events offer convenient, insightful learning opportunities within a 45-minute drive and in fewer than three hours. The conversations sparked at these events continue well beyond the tour. Members are constantly engaging outside of sponsored events to continue a conversation or to support each other in implementing a shared idea.

One instance is a tour that EAMA member Unicorr Packaging Group hosted that focused on employee safety. Members learned how to develop a safety committee, set safety objectives and see the results in action. Unicorr also allowed time for attendees to chat with the safety committee about successes, failures and best practices. Westminster Tool implemented its safety committee using the structure that Unicorr shared.

Another recent event was a workforce-development, best-practices roundtable discussion on replacing an aging workforce, recruiting new talent and retaining existing talent. This event brought together a group of human resources professionals who represented employee structures ranging from a 20-person operation with one shift to companies with more than 200 employees operating three shifts.

Westminster Tool walked away from this discussion with some actionable insight for reducing the time the interview process takes with each potential new hire. Westminster Tool learned that implementing a phone interview strategy as a first step in the interview process can help the company screen out candidates who may look good on paper but are not a fit for the organization. Westminster also learned how to access funds from the State of Connecticut's incentive programs, which help manufacturers offset the cost of hiring new employees. One program offers as much as a \$12,500 reimbursement to help offset the cost of training.

Now you may be thinking, *How does my company get involved locally with an organization like EAMA?* If you do not have the time or resources to start your own grassroots effort, join forces with other companies in your area. This does not have to be expensive. Ideas for getting started

include joining a local chamber of commerce or business network or connecting with a business in your industrial park to take a tour.

When you establish these relationships and begin to collaborate, it's important to think less about *what other companies make* and instead focus on the *processes that they use to run their organizations*. As Edward Demming once said, "Eighty-five percent of the reasons for failure are deficiencies in the systems and process rather than the employee. The role of management is to change the process rather than badgering individuals to do better." Collaborate with your peers to improve the processes of your business. [MMT](#)

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## Advanced Manufacturing Cell Speeds Tire-Mold Production

By Cynthia Kustush

Anyone who owns a vehicle and who purchased tires for it is probably familiar with Cooper Tires, the flagship brand of parent company Cooper Tire and Rubber Co. (Findlay, Ohio). The Cooper Tires moldmaking plant is based in Findlay and currently designs and builds about 300 molds per year to produce tires for cars, minivans, SUVs/CUVs and pickup trucks.

Dan Duling is Cooper Tires's project engineer, overseeing the company's 24/7 moldmaking operations and its 85 employees. About two-and-a-half years ago, his plant took delivery of four new Makino D500 five-axis VMCs, a 40-position MMC2 pallet stocker and a FANUC seven-axis robot that operates on a rail system—an update to an aging CNC machining cell comprising 8 five-axis machine tools. Replacing just half of the less-efficient CNC machines with the Makino D500 machines has produced several notable benefits to the moldmaking process, Duling says, and will most likely lead to further investment in machine tools and automation sooner rather than later.

### More Capability, Less Equipment and Material

Cooper Tires's previous processes involved using a lot more CNC equipment, including a vertical turning lathe, a saw and a wire EDM machine, Duling says. Because tires are round and because the 20-year-old milling centers were not as versatile as the new Makinos, the company's moldmaking process began with a ring of aluminum material that was turned, cut into eight segments and then machined with wire EDM to burn through the remainder of the mold details. All those steps were necessary in addition to the vertical milling that was performed on more than one of the eight machines in the cell, he says.

### COOPER TIRES

**PROBLEM:** Aging, inefficient machine tools, excessive manual processes and, at times, added mold-material costs.

**SOLUTION:** Updated manufacturing cell with four new Makino D500 five-axis vertical machining centers and a FANUC seven-axis robot.

**RESULTS:** Significantly improved efficiencies leading to cost savings in both time and materials.



A seven-axis FANUC robot feeds a workpiece into one of four new Makino D500 five-axis vertical machining centers in Cooper Tires's eight-station CNC machining cell. The company says that investing in advanced automation has reduced costs and downtime, provided more flexibility and made the Findlay, Ohio, operations more competitive globally.

Images courtesy of Cooper Tires.



Today, Cooper Tires no longer uses the lathe, the saw or the wire EDM machine for upfront processing. “The advanced capability of the Makino D500 and the new robot have made it possible for us to machine the complex treads in three set-ups (the operator must flip the parts) and run unattended,” Duling says. “We took about 30 hours out of the processing time.” Now, the lathe is used for only one mold component—a turned part that has the brand name, inflation pressure, size of the tire and related warnings machined into it. “The EDM machine and saw are idled,” he says. “We’re looking to sell off that equipment and purchase a smaller EDM machine for other work that we are trying to bring in-house.”

Besides the reduction in equipment that the team needed to machine tire molds, Cooper Tires has reduced the aluminum it needed for the molds as well. Again, the company started with aluminum “rings” or cylinders that were cut into eight machinable segments. “That posed some problems,” Duling says. “If we had to scrap a piece out of that mold, we would have to acquire a whole new ring and cut it up just to get one extra segment, which added a lot more expense in the cost of the mold. With the Makino D500 five-axis machines and the FANUC seven-axis robot, we no longer have to purchase the material in rings. Instead, we order individual blocks of aluminum for each segment. Now, if we scrap a part, we only replace what we scrap. We don’t need a complete ring, so we eliminated some processes and saved, on average, about \$300 to \$400 in material per mold.”



A wider view of Cooper Tires’s CNC machining cell shows the company’s ability to enclose its eight CNC machining centers, a robot, a 40-position pallet stocker and a rail system into a compact space, which was a key factor in deciding to automate with a versatile, seven-axis robot. Space is currently at a premium in the moldmaking facility, the company says.

### More Automation, Less Downtime

With the investment in new, advanced CNC and automation technology came the elimination or significant reduction of manual processes, Duling says. He has 16 employees who work on the shop floor. One operator tends the new Makino cell with the four new D500 VMCs and the four Fidia five-axis verticals remaining in the old cell. The company also has four FPT Stinger five-axis VMCs that are fed by parts that the Makino cell prepares. Only one operator oversees production on the company’s only milling cell, unless workloads are heavy. In that case, a second operator is put on the cell. Unavailable operators and a lack of reliable automation from the existing cell to keep jobs moving from machine to machine using its Automated Rail-Guided Vehicle (ARGV) caused much of the downtime that Cooper Tires experienced, Duling says. “The ARGV was capable of automation but was unreliable,” Duling says. “With very geometrically complex tire tread designs and CNC machines that were bordering on 20 years that were inefficient and incapable of holding the tight tolerances we demand today, an operator had to be available to load the parts into the machines, set up everything and start the programs. The operator, however, might be tending other machines, be on break or even be on vacation.”

Makino worked with Cooper Tires to write the necessary macros for probing the parts, setting up the parts and running programs for the new machines and robot. Now, when a job order is created for the CNC cell, the new FANUC robot brings fixtures to a work-set station and from there tells the operator which part needs to go on which fixtures. Once the mold segments are in place, the operator pushes a button, and the Makino Advanced System (MAS) automation takes over. MAS is the brains of the system, and it keeps the machines loaded and running whether an operator is present or not.

“The NC program is uploaded and stored in the PRO6 control, from which the MAS directs the robot to perform the tasks of loading the machines and starting the programs,” he says. “The robot doesn’t take a break, and it doesn’t need time off. It looks at the cutting tools in the machine and ensures that everything is ready and available. Based on due dates and runtime estimates that we feed into the system, the MAS prioritizes and schedules parts for machining to deliver them on time. We have reduced our downtime by about 30 percent just by adopting automation and eliminating most of the manual processes.”

Additionally, Duling says that the machining technology is so advanced that Cooper Tires has been able to eliminate secondary manual processes. “Previously, our technicians were spending a lot of time—around six hours on average—blending out the tool marks and small gouges left by the older equipment,” he says. “Now, the surface finishes from the Makino D500 CNC machines are so fine that there is virtually no bench work or hand finishing required.”

He says that the PRO6 control, together with Makino’s SGI-5 (Super Geometric Intelligence) software and machine kinematics,



Only one operator oversees production on Cooper Tires's only milling cell. Previously, unreliable automation and older CNC machines with limited capabilities made manual processes necessary to keep jobs moving from machine to machine. Today, Makino's D500 five-axis VMC and its PRO6 control (shown here) with SGI.5 software integrated with the seven-axis robot has virtually eliminated manual processes and cut downtime by 30 percent.

enables Cooper Tires to switch between fast removal rates for roughing and more accuracy for finishing machining strategies. "Macros used to machine many of the part-specific features utilize information that is automatically pulled from our 3D modeling database," Duling says. "These part dimensions and tolerances are then compiled and registered in the MAS.

My goal with utilizing macros was to not put any additional programming burden on our CAM department, and it was a success!"

### More Flexibility, Less Footprint

Flexibility and limited floor space were also major factors in going with a robotic system, according to Duling. "I knew that I wanted a robotic cell because if we wanted to add, say, a wash station or a coordinate measuring machine to this cell, we would have the flexibility to load them with a robot, whereas an automated pallet-handling system like the ARGV would limit what we could load." He says that this is because of the difference in the number of axes that each system offers. An ARGV basically has an arm that shuttles palletized parts in and out of the machine, so there is no real articulation. Additionally, the team would need to install a transfer station between the machines and the ARGV, for which Duling says there is no room. "However, the FANUC seven-axis robot gives us the freedom to move anywhere within the cell plus the versatility to add many different types of machines while minimizing the cell footprint," he says. "It further justified the advantage of adopting the robot." **MMT**

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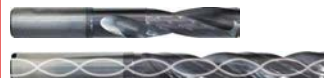


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## Reducing a Mold Shop's Top Effective Tax Rate

By Michael J. Devereux II, CPA, CMP

The U.S. Treasury and the IRS proposed new rules this past summer under §199A (also known as the deduction for qualified business income), which the Tax Cuts and Jobs Act (the Act) introduced. These rules provide a deduction equal to 20 percent of qualifying business income for the owner of a flow-through entity (which includes S corporations, partnerships and sole proprietorships) with the potential to reduce a mold shop's top effective tax rate to 29.6 percent.

This new provision applies to tax years beginning after December 31, 2017 and before January 1, 2026. Generally, most non-corporate U.S. mold shops will qualify for the new flow-through deduction. Mold shops should review the new rules to ensure that they do not limit their potential §199A deduction.

In the case of an S corporation or a partnership, the deduction is determined at the individual or trust level, and the deduction cannot exceed 20 percent of the shop's taxable income. Losses for qualifying businesses are carried forward to offset future qualifying business income. Each shareholder or partner must consider his or her allocable share of qualified items of income, gain, deduction and loss to determine his or her qualified business income.

The deduction is "below the line." That is, the §199A deduction is not a part of computing the adjusted gross income (AGI). Instead, it is a deduction in the calculation of federal, taxable income. As noted, the §199A deduction can have the effect of lowering the tax rate to 29.6 percent for taxable income related to a qualified business like a U.S. mold shop.

### Wage and Property Limitation

For mold shop owners with higher income, §199A imposes a wage and property limitation. The §199A deduction is equal to the lesser of either 20 percent of the qualified business income or the wage and property limitation. The wage and property limitation is equal to the greater of 50 percent of the shop's W-2 wages and the sum of 25 percent of the shop's W-2 wages plus 2.5 percent of the unadjusted basis immediately after acquiring (UBIA) qualified property. As with items of income, gain, deduction and loss, shareholders of S corporations and partners of partnerships must consider their allocable share of the W-2 wages and UBIA of qualified property to determine their wage and property limitation.

The wage and property limitation does not apply to shops with taxable income below a threshold amount (which is \$315,000 if filing a joint return). The wage and property limitation is phased in for a joint return with the full wage and property limitation applicable once taxable income reaches \$415,000.



### Specified Service Trades or Businesses

For high-income taxpayers, §199A provides that no deduction is allowed for Specified Service Trades or Businesses (SSTB). These include a litany of different service businesses, such as law, accounting, health, consulting businesses and those for which the principal asset is the reputation or skill of one or more of its employees or owners. The exclusion for SSTBs does not apply to shops with taxable income less than the threshold amount (\$315,000 if filing a joint return) and is phased in over a range (between \$315,000 and \$415,000 for a joint return).

The new rules provide guidance in two important areas for tool shops. First, the proposed regulations narrowly define "reputation or skill of one or more employee" as income that is earned from endorsements, licensing of an individual's image, likeness, name, signature, voice, trademark or other symbol that is associated with an individual's identity or receiving appearance fees. Before the proposed regulations, some commentators would construe this provision in an overly broad way to include common activities for mold shops. However, this favorable definition is welcome news for mold shops.

Second, a de minimis rule (or a rule for something that is too small or insignificant to be considered) has been proposed for mold shops that have both qualifying business income and SSTB income. For mold shops with annual gross receipts of \$25 million or less in a taxable year, the shop will not be an SSTB as long as less than 10 percent of its gross receipts are attributable to the performance of services in an SSTB.

For mold shops with annual gross receipt greater than \$25 million, the shop will not be an SSTB as long as less than 5

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percent of its gross receipts are attributable to the performance of services in an SSTB. That is, mold shops are unlikely to be penalized when providing de minimis consulting services.

## Multiple Businesses

For shop owners who own multiple trades or businesses, each trade or business will compute its qualified business income along with its wage and property limitation. While shops are

permitted to aggregate these amounts, they are not required to do so. In the event of a shop wanting to aggregate its trades or businesses, special rules and limitations apply. However, qualifying businesses may not aggregate with SSTBs.

Also, shop owners who own their facilities in a separate entity and then rent the plant to the operating business will be happy to learn that the rental income will qualify for the deduction, as long as the rent is coming from a trade or business that meets the requirements for qualifying business income, and there is common ownership. However, not all rental income may qualify. Eligibility is determined based on the facts and circumstances.

## Non-Calendar Year-End S Corporations and Partnerships

The proposed rules clarify that individuals or trusts receiving a K-1 from a non-calendar year-end S corporation or partnership for a tax-year straddling December 31, 2017 can claim the full §199A for the tax year, assuming that they meet all the other requirements. While §199A is effective for tax years beginning after December 31, 2017, the tax year is determined at the individual or trust level.

For example, if an individual owns 100 percent of an S corporation with a fiscal year beginning on August 1, 2017 and ending on July 31, 2018, he or she will be able to claim a §199A deduction for the 12 months of qualifying business income on his or her 2018 federal income tax return.

The §199A flow-through deduction greatly benefits U.S. mold shops, making it important for them to understand the new rules, the limitations and exclusions so that mold shops do not diminish the benefits. [MMT](#)

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NOVEMBER 2018 | MONTHLY UPDATE

## AMBA.ORG MAKES ITS MARK

### NEW WEBSITE PROVIDES KEY INDUSTRY RESOURCES

AMBA's new website, AMBA.org, is making its mark on the mold building scene with refreshed branding, improved usability, clearer navigation and mobile-friendly features. The new site significantly improves ease-of-use for visitors, allowing quick access to key industry resources such as Find a Mold Builder and AMBA Skills Certification.

The updated website aligns with AMBA's mission of serving membership needs and addressing key industry challenges, particularly workforce development. A new Careers in Mold Building area will be a key resource for students, parents and teachers looking for useful information on careers in this field.

In addition, AMBA.org includes new recruitment tools for AMBA members, such as grants, scholarships and videos. Other sections include key publications on industry standards, benchmarking reports and upcoming industry events, such as plant tour workshops, webinars, AMBA's bi-annual Leadership Summit (Feb. 2019), Annual Conference (May 2019) and more.

To explore the new site and valuable industry resources, visit [AMBA.org](http://AMBA.org).

**WITH ITS EASE OF NAVIGATION AND SPAN OF RESOURCES, THE NEW AMBA WEBSITE PROVIDES ACCESS TO ESSENTIAL ELEMENTS THAT OUR MEMBERS NEED TO ADDRESS INDUSTRY CHALLENGES AND IMPROVE THEIR BOTTOM LINE!**

**LARRY PATTEN**  
Vice President, Dramco Tool Co.  
AMBA member 10 years



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- DEGREE PROGRAMS



## UPCOMING...

NOVEMBER

7

**SURVEY LAUNCH: BEST PRACTICES IN FILLING THE SALES PIPELINE**

DECEMBER

5

**WEBINAR: PEER NETWORKING FOR SENIOR LEADERS**

**WEBINAR: PEER NETWORKING FOR HR PROFESSIONALS**

FEBRUARY

8

**PLANT TOUR WORKSHOP: PYRAMID MOLD & TOOL**  
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# Index Growth Continues to Seesaw

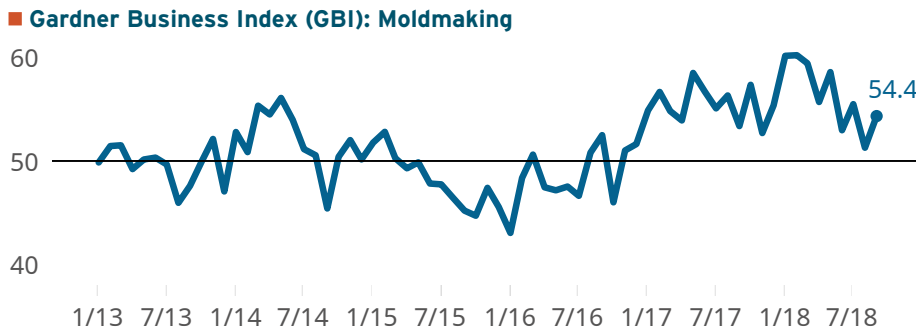
**Production, supplier deliveries and new orders lifted the Moldmaking Index, at 54.4 for September 2018.**

Registering 54.4 for September 2018, the averages-based Gardner Business Index (GBI): Moldmaking expanded sharply after setting a two-year low in August. Compared to the same month one year ago, the Moldmaking Index is up 1.9 percent but is well below the all-time high readings that it reached during the first quarter of 2018. Gardner Intelligence’s review of the underlying data for the month reveals that production and new orders recorded sharp expansions for the month along with smaller gains in backlogs and employment. Production, supplier deliveries and new orders lifted the Moldmaking Index, while employment, backlogs and exports lowered the Moldmaking Index. Exports were the only component of the Moldmaking Index to contract during the month, meaning that it registered a reading below 50.0. [MMT](#)

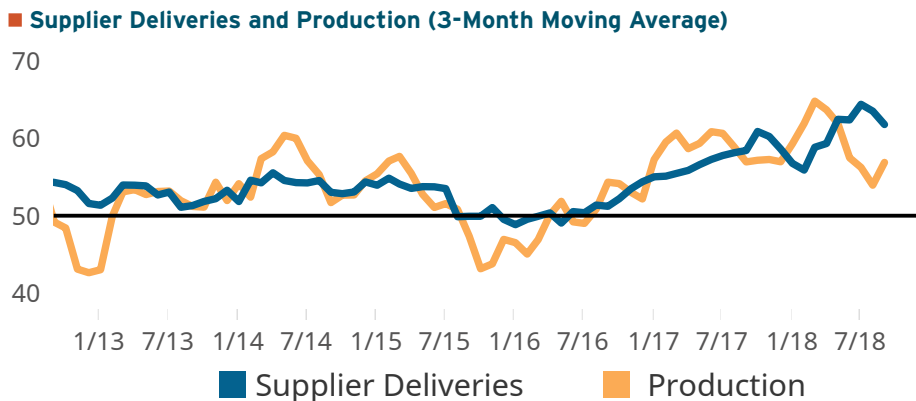


**ABOUT THE AUTHOR**

Michael Guckes is the chief economist for Gardner Intelligence, a division of Gardner Business Media (Cincinnati, Ohio, United States). He has performed economic analysis, modeling and forecasting work for nearly 20 years among a range of industries. He is available at [mguckes@gardnerweb.com](mailto:mguckes@gardnerweb.com).



Significantly greater expansion in production and new orders lifted the Moldmaking Index for September 2018. It is possible that several months of recent expansion in supplier deliveries is boosting production.



It is possible that an increase in supplier deliveries in the second and third quarters of the year is contributing to the production rebound evident in the underlying data of the Moldmaking Index.



# MOLDMAKING SOFTWARE



## Design Strategies Improve Workflow and Part Quality

Design and engineering is essential to building a better and more cost-effective mold with shorter leadtimes. *MMT* breaks down the variety of software available to help overcome the daily challenges faced from data, quoting, designing and programming—including computer-aided design (CAD), computer-aided manufacturing (CAM) and data management software.



Photo (left) courtesy of Kubotek;  
photo (above) courtesy of Siemens PLM

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# Medical Industry Strengthens Finances in Second Quarter

Data suggests growing capital spending by medical manufacturers through 2018.

Gardner Intelligence reviewed the medical industry using its proprietary data and the financial filing results of nearly 70 publicly traded medical firms for the second quarter of 2018. The review indicates an industry experiencing growth in revenues, earnings (EBITDA), free cash flow and capital expenditures. The latest quarterly results\* signaled a slight increase in the growth rate of capital expenditures. The most significant financial improvement in the industry was in earnings growth, which turned positive in the second quarter after contracting during the preceding two quarters.

Capital expenditures, which includes spending on manufacturing equipment, grew from 2.8 percent at the end of the first quarter of 2018 to 3.7 percent by the end of the second quarter. This reverses the slowing growth trend in capital expenditures that began after capital spending growth reached a peak of more

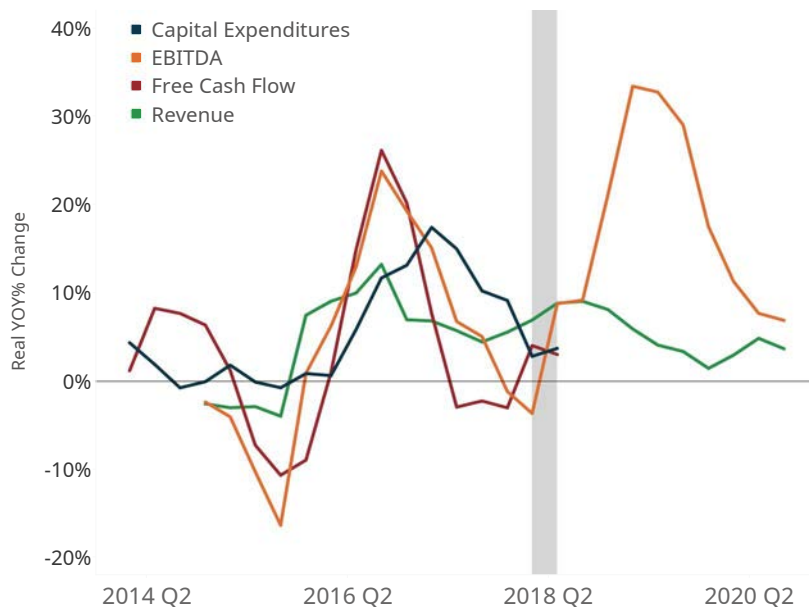
than 17 percent in the first half of 2017. An analysis of quarterly data between the fourth quarter of 2014 and the second quarter of 2018 indicates a statistically significant relationship between revenue change in a given quarter and a subsequent change in capital expenditure two quarters later. Assuming an accurate forecast of revenues based on the Wall Street consensus forecast, this simple linear regression analysis—which considers no other factors—predicts total capital spending growth of 11.3 percent during calendar year 2018 followed by slowing growth of 6.6 percent in 2019.

Gardner Business Index data from manufacturers supplying the medical industry is copacetic with Wall Street’s near-term optimism. According to Gardner Intelligence’s survey data in the year-to-date period ending in August 2018, manufacturers serving the medical industry have experienced strong growth in new orders, production and more recently, supplier deliveries.

Several of the business components that constitute the Gardner Business Index, including backlogs and exports, have experienced unusually long periods of continuous expansion. Backlogs have continued to expand every month since July 2017, representing the longest continuous stretch of medical manufacturing backlog expansion in recorded history. Similarly, one would have to go back to 2012 to find a stretch of time during which medical manufacturing exports expanded for more than eight consecutive months. On-going expansion in new orders and production, along with many months of growing backlogs, suggests that manufacturers are highly likely to close out 2018 in very good condition.

\*All quarterly results are calculated based on the trailing twelve months. Comparisons between two quarters one year apart represent a 12/12 rate of change. **MMT**

## Medical Industry Actual and Estimated Results



**FOR MORE INFORMATION:**

Michael Guckes, Chief Economist, Gardner Intelligence  
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## MOLD MATERIALS



### Modified Remelting Process Improves Material Purity

Bohler M333 Isoplast is a development from Bohler that is exclusively available from **Edro** in the United States. The material has been developed for mold inserts with high demands for toughness, polishability, corrosion resistance and thermal conductivity. It is supplied in the soft, annealed condition and used after heat treatment to 50HRC using Bohler heat-treatment specification recommendations. Edro says that M333 Isoplast is produced using an optimized chemistry, a modified production process and the latest steel re-melting technology known as Pressure Electroslag Remelting (PESR), which is a modified remelting process that results in improved purity and homogeneity. Nitrogen is added as an alloying constituent during the PESR process.

M333 Isoplast has toughness that has been increased to the same high level as H13ESR at 50HRC. It has approximately three times the toughness of 420ESR at similar hardness levels. According to Edro, the unique chemical composition coupled with the modified production process results in improved corrosion resistance and thermal conductivity.

**Edro Engineering and Specialty Steels Inc. / 800-368-3376 / edro.com**

### Steel Resists Wear from Abrasive Resins, Extends Tool Life

**International Mold Steel** says that DC53 is a fully hardenable mold steel with good machinability, a wide range of applications and hardnesses, good polishability and excellent wear. DC53 heat treats consistently and stably, reduces rework and eases grinding. According to the company, one moldmaker that used DC53 reported that the material significantly reduced its tooling costs, the time it took to make cores and cavities and the amount of necessary preventive maintenance. The same client said that DC53 withstood wear from glass-filled ABS carbon resin, and that the material is now its preferred mold steel for projects with highly abrasive resins.

**International Mold Steel Inc. / 800-625-6653 / imsteel.com**

### Technical Specialist Helps Customers Choose Ideal Alloy

**Ellwood Specialty Steel** has been actively stocking and marketing aluminum alloys to the molding industry for three years. Stocks of 5083, 6061 and 7075 aluminum tooling plate and Alumold 500 alloys are available from 0.25" to 42.00" thick, depending upon the alloy. Ellwood technical representatives are available to assist customers in choosing the most suitable aluminum for a given mold project. They can advise on matters pertaining to aluminum alloys and plastic compounds, projected process temperatures, part tolerances and estimated product volumes.

**Ellwood Specialty Steel / 800-932-2188 / ess.elwd.com**



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## HMC Built for Speed to Aid High-Volume Production

**Absolute Machine Tools Inc.** sells and services the Tongtai SH-4000P HMC, a high-speed machining center designed for high-volume production. The machine has an XY traveling column design in which the pallet moves in the Z direction. The automatic pallet changer (APC) is located in front of the machine to provide easy access and to reduce idle time. The APC is a rotary-type pallet changer that exchanges pallets in 5.9 seconds. For pallet rotation in the machining envelope, a full-contouring B axis precisely indexes the pallet every .001 degree, and a hydraulic clamping mechanism is used to clamp the pallet in place for repeatability. The B axis is high-speed, with a 90-degree index time of 0.5 second.

The LHL/LubeUSA grease lubrication system is standard for ways and ballscrews, so there is no coolant contamination or waste oil. The 40-mm (1.57"-diameter) ballscrews have a double-nut, pre-loaded and pre-tensioned design, enabling a traverse rate of 2362" per minute. High-speed acceleration reduces non-cut time. The Absolute Pulse Coder servo system does not require a zero return. A standard, rear-discharge, chip-removal system includes a center trough design with high-volume chip wash for efficient chip removal. A combination dual-level, caterpillar-type conveyor is standard.

The SH-4000P has a high-power integral spindle with 15,000 rpm and spindle acceleration from 0-7000 in 0.48 second and 0-15000 in 1.9 seconds. Deceleration from 12000 rpm to stop is 0.8 second. The spindle produces 50 HP peak, 35 HP in high and 25 HP in low while producing 184 ft./lbs of peak torque at only 980 rpm. To enhance milling capabilities, a Big Plus dual-contact spindle is standard. Air and oil mist are used for spindle-bearing lubrication to increase spindle life.

The Sankyo RollerDrive gearbox arm mechanism gives the standard 60-station automatic tool changer (ATC) a tool-change time of 1.4 seconds. Average chip-to-chip time is 2.6 seconds. A FANUC OiM-F conversational control is standard and available with a full range of high-speed machining options for mold detail and electrode machining.

**Absolute Machine Tools Inc. / 800-852-7825 / absolutemachine.com**



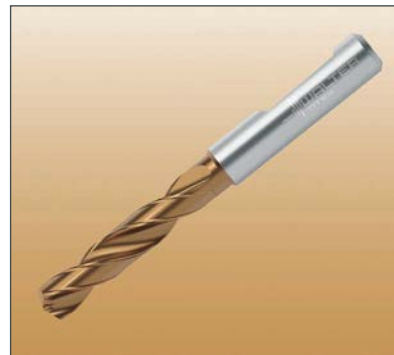
## Cleaning Unit's Dual Tank Offers Choices in Cleaning Methods

**Omegasonics** announces that Plural Additive Manufacturing, the exclusive North American distributor of industrial 3D printers manufactured by 3ntr, is offering Omegasonics 815BTX cleaning unit to those purchasing its 3D printers to assist with removing support material. The Omegasonics 815BTX is a dual-tank, bench-top ultrasonic cleaning machine. The model's left tank utilizes BioSolv, a biodegradable, non-hazmat cleaning detergent that Plural Additive Manufacturing developed. The unit's right tank uses hot water. Omegasonics says that the programmable, dual action cleans 3D parts safely and efficiently. The machine leverages ultrasonic technology to optimize the cleaning of precision areas and combines it with agitation to remove support material thoroughly. The 815BTX also features programmable alternating cycles to provide hands-off cleaning from start to finish.

**Omegasonics / 800-669-8227 / omegasonics.com**

## Gash Angle Facilitates Better Hole Quality

**Walter USA** says that its new DC160 Advance solid carbide drill delivers high productivity in a wide variety of materials and can be used in a broad range of applications. The margins are located in an advanced, forward position to ensure rapid guidance in the hole. Walter says that a steep gash angle provides ample space for secure chip flow, which results in improved hole quality and reduced feed force. According to the company, a new thinner web provides for better positioning accuracy and improved roundness. The DC160 Advance is available in 3xD, 5xD and 8xD and features grade WJ30ET, which includes a Walter coating to optimize tool life. It has a cylindrical shank ground to an h6 tolerance, which makes it suitable for shrink-fit and hydraulic holders. The point angle is 140 degrees, and Walter recommends a coolant pressure of 145-580 psi (10-40 bar). With internal coolant, the drill is suitable for ISO P-, M-, K-, N-, S-, H- and O-material types.



**Walter USA LLC / 800-945-5554 / walter-tools.com/us**

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## BLOG

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The *MoldMaking Technology Blog* is designed for you, allowing you to participate in a dialogue among professionals in the mold manufacturing industry.



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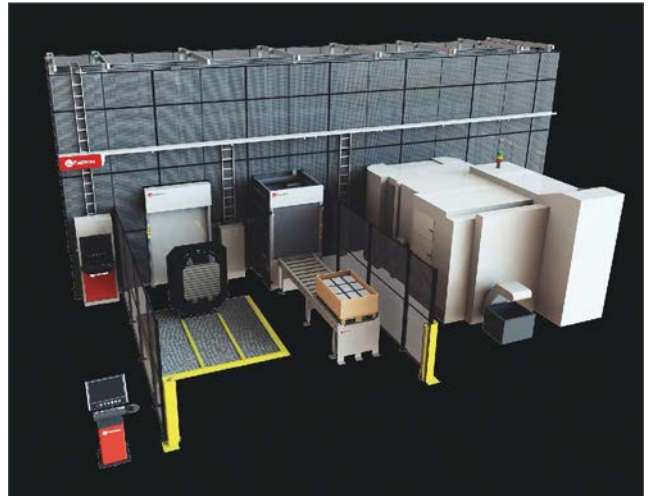
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### ROI Calculator Increases Savings and Reduces Tool Variety

**TDM Systems** says that the ROI Calculator helps users rethink tool management. The ROI Calculator is an online tool that helps users calculate potential savings and their return on investment for tools when using TDM tool-management solutions. TDM Systems says that by answering a few simple online questions, users can access information quickly as it relates to their investment in tooling and potential savings. According to the company, the software supports the reduction of tool variety and helps users target the best tools to use, and at the same time, the ROI Calculator helps users reduce tool-related machine downtimes and minimize hidden crib inventory. The ROI Calculator estimates potential savings and displays the results directly on-screen. The ROI Calculator is available on the TDM Systems website.

**TDM Systems / 847-605-1269 / [tdmsystems.com](http://tdmsystems.com)**



### Automation System Modularity Increases Adaptability

**Fastems** offers FMS One, a fully configurable machine-tool pallet automation system, and RoboFMS One, which combines the benefits of an industrial robot and a flexible manufacturing system. Fastems says that both systems are built from standard modules that offer fast delivery and easy operation. MLS Multi Level Systems and RoboFMS are systems that can be customized for special needs.

The FMS systems feature increased modularity for fast deployment and adaptability. Standard modules reduce equipment delivery and implementation lead times and enable custom fitting of automation solutions to specific end-user needs. Fastems says that the FMS systems integrate easily with a large number of four-axis and five-axis machine tools.

The FMS systems adapt to a wide range of load handlers as well. For example, the FMS systems work with cranes and robots that can handle workpieces from 0.1 kg to 2,500 kg in any shape or size. The systems offer more spacious pallet storage to maximize available space, and the systems have lower system reaches that free operators from working in difficult positions.

**Fastems LLC / 513-779-4614 / [fastems.com](http://fastems.com)**



## Mold Release Is FDA Compliant for Incidental Food Contact

IMS introduces its new Dry-21 paintable PTFE powder mold release, a low-residue release that is FDA-compliant for incidental food contact. Dry-21 brings the release ability of PTFE powder into an FDA-compliant formula under 21 CFR 177.1550 and 184.100. A general-purpose release, Dry-21 is applicable where the molded parts will be painted, plated or ink-stamped. Dry-21 is stocked in full-size, 16-fluid-ounce cans.

**IMS Co.: Industrial Molding Supplies / 800-537-5375 / [imscompany.com](http://imscompany.com)**

## Advances to CAD/CAM Software Designed to Boost Productivity

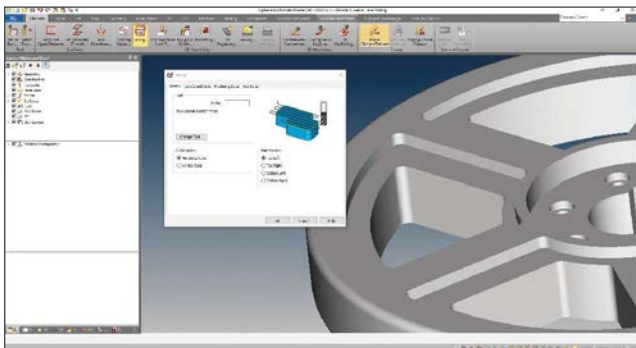
Alphacam 2018 R2 by **Vero Software** has a new nesting engine that the company says provides faster calculation times and improved feedback and graphics. Vero Software also migrated Parametric Rules to C#. Vero Software says that Parametric Rules have an enhanced GUI and functionality that facilitate greater control, improved UX and simpler logic statements. Vero Software also enhanced the Face Milling Cycle, which is now part of Alphacam's core functionality, creating intelligent tool paths and enabling users to face-mill irregular and multiple geometries.

Alphacam 2018 R2 also has a new order-by-intersecting geometry function, which the company says saves users time when they order the sequence of a complex job. It works by letting the user select a previously created geometry to define the order of geometries or tool paths based on those that intersect the selected geometry first.

Additionally, the Parametric Sketcher is now more powerful because of an updated UI, which means that the window can be resized. There are improvements to the Sketcher's geometry creation tools for creating fillets and chamfers as part of the geometry-creation tool set. Vero Software says that this eliminates the need to calculate those points.

Vero Software improved the importing of CAD models with Solidworks configurations. Alphacam has a new interface where users can choose which configuration of an assembly to import. With this interface, users are not obligated to check that the last version saved in Solidworks is what they want.

**Alphacam by Vero Software / 800-461-2015 / [alphacam.com](http://alphacam.com)**



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# INSIDER

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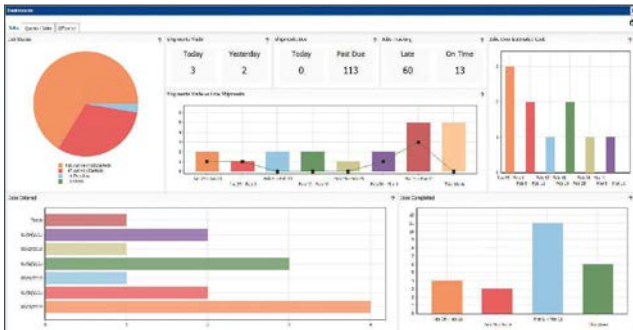
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## Dashboards Simplify Use of ERP Software

**Jobboss** says that with its 2018 release, businesses can access real-time visual information on quoting, company efficiency, job status and more. The company says that user-specific security and accessibility provides the right information to the right person and displays key information in visual dashboards. Over 20 pre-built widgets enable Jobboss users to access individual transactions and job data from the software's dashboards.

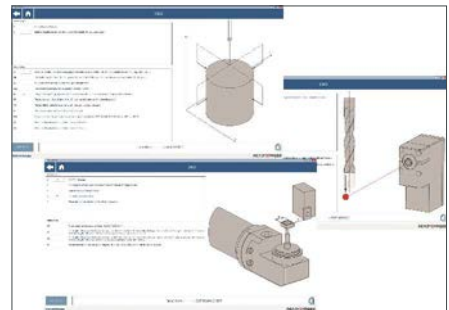
Jobboss native dashboards provide baseline metrics that pull directly from the core software. A strategic relationship with Lojic Dashboards for this release provides customizable dashboards as an optional upgrade. Lojic Dashboards are mobile and can display role-specific data via monitors on the shop floor.

**Jobboss / 800-777-4334 / [jobboss.exactamerica.com](http://jobboss.exactamerica.com)**

## Intuitive Software Aids CNC Code Programming

**Marposs's** Ready2Probe assists CNC users when programming cycles for measuring and checking components and tools using Mida spindle probes, lasers, tool-breakage detectors and visual tool setters. With intuitive icons and menus, Ready2Probe enables users to write machine commands for measurement cycles in seconds. Marposs says that this helps to reduce programming time and errors when generating G-code while improving quality assurance.

Ready2Probe is a Windows-based application that is compatible with a CNC control interface or computer. Upon initiation of Ready2Probe, users can interact with all of the Mida products. The software then prompts the user to input cycle-time information, and a macro string is generated from it, which the user can copy or transfer automatically into a part program. The user also can write the macro directly into the CNC by clicking a single button.



**Marposs Corp. / 888-627-7677 / [marposs.com](http://marposs.com)**

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**Guy Buttle**  
Technical Consultant

## Superior CNC Machining with the Latest Autodesk PowerMill Updates

The latest CAM release from Autodesk, PowerMill 2019.1 adds new interactive collision avoidance, enhanced machining and probing. Attendees to this webinar will learn how to:

1. Better identify where optimizing tool vector orientation or cutting tool definition will improve results.
2. Create surface probing routines to verify parts using spindle-mounted probes.
3. Automatically create smooth, stable machine motion when using new Automatic Tool Axis Collision Avoidance.

DATE & TIME:

**Tuesday, November 13, 2018, 2 pm ET**

**Register at: [short.moldmakingtechnology.com/Autodesk18](http://short.moldmakingtechnology.com/Autodesk18)**



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Richard G. Kline, Jr.  
President  
September 28, 2018

I certify that the statements made by me above are correct and complete.

## How to Implement CAM Software

By Alan Levine

Every new technology has a learning curve. For example, properly implementing CAM software poses challenges. When the implementation is done improperly, it can hinder a shop from moving forward technologically. If unable to navigate the implementation, the shop owner faces potential stagnation by staying with existing technology. These challenges are more prevalent in small and medium-sized shops that may not have the formal business processes and labor support to manage the transition to new technology easily. However, shops can overcome these challenges.

New software technology implementation requires management support, out-of-pocket costs and labor planning. The shop should manage and track this implementation as another project, requiring labor and machine allocation. In the short term, a loss of billable time from the machine tool is possible. The owner should only move forward with new software implementation if he or she can realize a return on investment over a defined period. Large capital investment may require a return that is measured in a few months or as long as a few years. Smaller items or more focused productivity improvements can sometimes generate ROI over one subsequent project.

Also, shops can attribute labor savings or machine savings to fundamental components of cost recapture. Other savings and return to the business may be from shorter delivery times or larger part volumes, the ability to win more orders and the ability to win more complex orders that come with higher shop rates.

### Reducing Risk

Ultimately, risk is the key factor to manage during a transition. Risk is associated with unknown variables or those that are hard to measure. Risk can lead to indecision. For a business plan with a projected return on investment, reducing risk can be identified by asking, "What is the probability that the shop will achieve the business plan?"

Here are some pointers for reducing risk:

- *Plan for sufficient training.* This can be standard classroom training or e-training, but often, hands-on custom training will have a more direct impact.

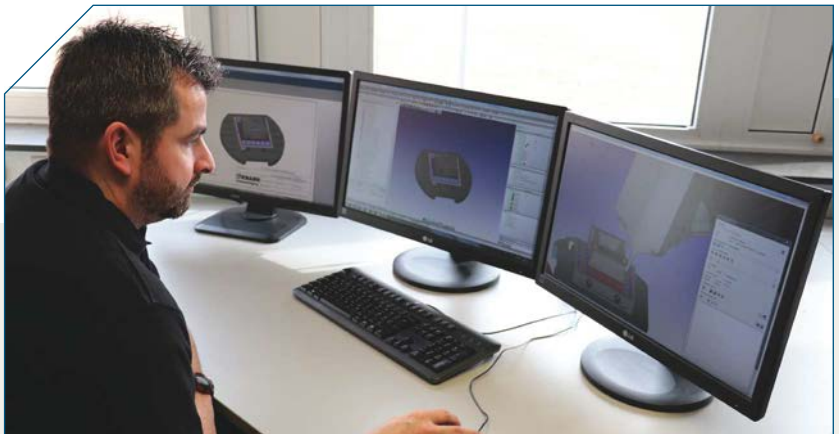


Image courtesy of Knairr Group.

New software implementation requires management support, out-of-pocket costs and labor planning.

- *Enable workers to use new software.* Consider uninstalling the previous software program—even if temporarily—to give the programmer a clear management statement to support the workflow change.
- *Focus the implementation on manageable tasks.* Start with one project on one machine, and with one or two employees. Later, expand on the best approaches for the entire shop.
- *Build long-term support structures.* This includes a tool database and a programming macro database. Look for other opportunities to automate regular tasks. This will save time on future work and instill a culture of adhering to work standards.
- *Acknowledge the risk of post-processor development and implementation.* Not all post-processor suppliers are the same. Find a software developer whose process is supported by a pool of similar successful implementations. Seek a test of the machine performance. Define change requests as functional or cosmetic. Test in all conditions, including 2D, 3D, indexing, five-axis, canned cycles, turning and so on.
- *Use machine simulation to ease implementation.* It can be a means to confirm new processes without tying up machining production.

While the short-term solution may favor maintaining the status quo or adding new, trained staff on the current software product, the best long-term answer is often to invoke change. Following a training and implementation period, new software technology can provide a strong return to the business and be key to long-term success. **MMT**

### CONTRIBUTOR

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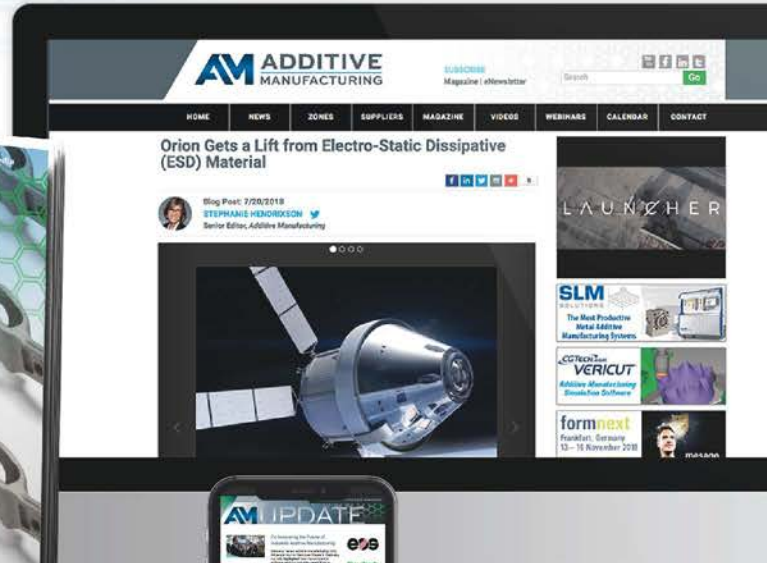
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