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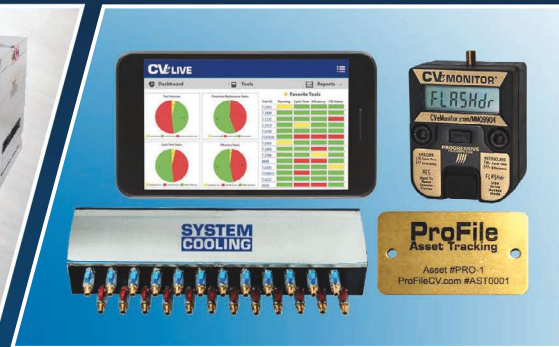
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**20**  
YEARS  
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**2018**  
**AWARD**

**WINNER!** PG 10. **Maximum Mold Group**

**MMT**

[moldmakingtechnology.com](http://moldmakingtechnology.com)

**Informed Mold  
Manufacturing** PG 28.

**The Hidden Complexities of  
Optimized Roughing** PG 32.

**How to Advance  
Molding Undercuts** PG 88.



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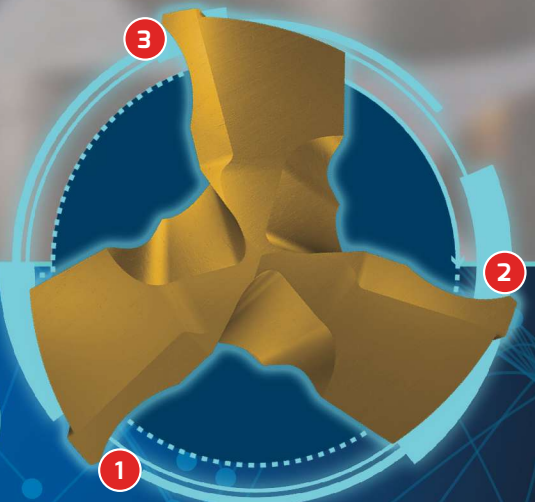
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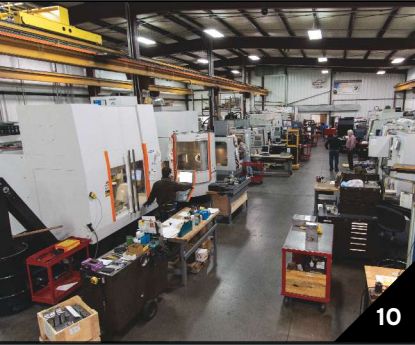


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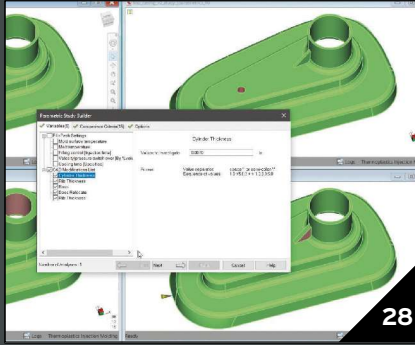


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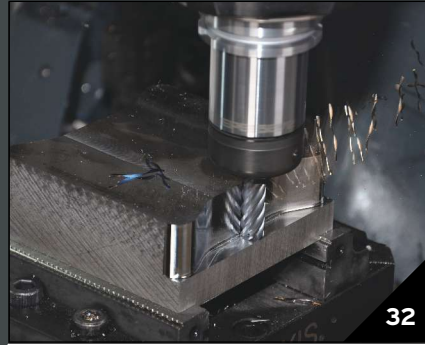
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**PG. 22.**

**2. There's More**  
With geometry optimization, the mold builder can go one step further than DOE and analyze the impact of wall thickness and processing conditions simultaneously.  
**PG. 28.**

**3. Roughing It**  
Optimized roughing requires high-speed spindles, secure fixturing and a machine architecture designed for rigidity.  
**PG. 32.**

**4. ISO This**  
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**5. Lean Management**  
Management by exception is the practice of examining the financial and operational results of a business and only bringing issues to the attention of management if results represent substantial differences from the budgeted or expected amount.  
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### ON THE COVER

Image courtesy of Creative Technology Corp. This month's cover shows the 2018 Leadtime Leader Award winner: Maximum Mold Group of Benton Harbor, Michigan. This group of three companies works together seamlessly to manufacture high-quality injection molds, blow molds and die-cast dies. Owner David LaGrow credits the company's notable lead times to the inclusive family culture, continuous improvement, integrity and a can-do attitude. Find out how LaGrow has taken his company from one successful, small mold and die operation to three interconnected operations with diverse capabilities in just three years on **page 10**.

Images courtesy of (left to right) Creative Technology Corp., Autodesk Inc. and Niagara Cutter LLC.





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## Our 2018 Winner Is...

Maximum Mold Group of Benton Harbor, Michigan.



This year marks the 15th anniversary of our Leadtime Leader Awards competition, and it marks the closest race we've ever had among the scores of the top three contenders. In the end, Maximum Mold Group took the 2018 title.

There is nothing quite like an unscripted reaction. When I told her the news, Cindy LaGrow, CFO of Maximum Mold Group, said "OMG, we are so excited! OMG. I freaked out and screamed that we won!" That type of reaction is *priceless!*

The judging panel did not decide lightly. The panel took a few rounds to review each finalist on performance in lead time and deliveries, investment in technology, innovation in business strategy, manufacturing efficiency, commitment to workforce development, industry involvement, customer satisfaction and presentation material.

Maximum Mold Group comprises Maximum Mold (Max 1), Max 2 and Max 3. Overall, the group specializes in project management and injection mold and die-cast die manufacturing while achieving average on-time deliveries of 95 to 98 percent and lead times from six to eight weeks for small molds and 25 to 30 weeks for multiple, complex molds. Maximum Mold Group accomplishes this by capitalizing on the skills and experience of 83 employees across the three facilities.

The standout items that stole the win for the shop include its:

- Growth from a small mold builder into a business group,
- Team and family environment,
- Shorter lead times from the increased capacity of the business group, increased in-house design and engineering capacity and investment in high-speed machining centers,
- Presentation material that showcased its mold and machining work,
- Commitment to international travel to work with customers,
- Diversification,
- Service,
- Workforce development and training efforts, and
- Sales team comprising journeyman moldmakers.

However, according to Maximum Mold Owner and President Dave LaGrow, it's *the people* who push this company forward and helped the company earn this year's title. "Every good shop has a good team, and Maximum Mold Group has a good team. We are a family, and we treat each other accordingly. Team members say that I run a family-owned business. I take pride in that. I believe it takes more than the owner to run a business that is family-oriented. It's all about the people who work for the company and how they treat each other."

Read more about Maximum Mold Group on page 10, take a virtual tour of the companies via our video feature that Creative Technology produced, and register for Amerimold to be part of our celebration as we honor this year's winner! [MMT](#)

*Christina Fuges*

Christina M. Fuges  
Editorial Director

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



### VIDEO: 2018 Leadtime Leader Award Winner

Take a look inside this year's winning shop, Maximum Mold Group, comprising Maximum Mold (Max 1), Max 2 and Max 3. Strategic acquisitions and diversified capabilities combined with a can-do, inclusive culture take this mold manufacturer to new heights.

[short.moldmakingtechnology.com/lla2018](http://short.moldmakingtechnology.com/lla2018)

### PODCAST: Mixing It Up with Maximum Mold Group

MoldMaking Technology and The Manufacturing Alliance caught up with Dave and Cindy LaGrow of Maximum Mold Group for some casual conversation about the family and company culture that has helped them earn this year's Leadtime Leader Award title.

[short.moldmakingtechnology.com/mfgallmmt](http://short.moldmakingtechnology.com/mfgallmmt)

### ZONE: Leadtime Leader

Here you can read about past winners, get a virtual look inside winning shops, check out the benefits and rewards, learn about the criteria, comb through some FAQs, review the questionnaire and nominate your shop today for the 2019 Awards competition! [moldmakingtechnology.com/zones/leadtime-leader](http://moldmakingtechnology.com/zones/leadtime-leader)

### EVENTS: Amerimold 2018

Check out MoldMaking Technology's Amerimold Zone for articles, news and products that focus on the technology, processes and equipment on display.

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# Five Reasons to Invest in Five-Axis Machining Technology



**Rich Stueber**  
*Engineering Manager*  
 NyproMold  
 Instructor, Lake County  
 Community College  
 Clinton, Massachusetts

*Rich Stueber, MMT EAB member and operations manager at NyproMold Inc., says that anyone who has worked 35-plus years in moldmaking has seen many innovations, from CNC, wire EDM, additive manufacturing and, most recently, five-axis machining. A lot has changed when it comes to how molds are manufactured.*

I know that not everyone sees the benefits of investing in five-axis machining technology. Objections include the costs of the machine and software and training and finding the right person to oversee the technology and make it cost-effective. But, here are five reasons why making five-axis machining part of the moldmaking process is a smart investment for the future.

**Improve cycle times.** With five-axis capabilities, you can machine on five sides of inserts, plus square it on all five sides while adding required side work and angled work without removing the insert from the vice. Eliminating multiple setups will increase production and accuracy and reduce the time parts sit between operations.

**Eliminate surface blends when cutting from multiple sides on the same insert.** While machining multiple sides of a workpiece, the program works off of one pickup location just like a three-axis mill. The blends between rotations are controlled by the true center of rotation of the machine and its relationship to the pickup location.

**Get new options for cooling lines within components.** Five-axis capabilities open the door for drilling holes on compound angles to get into tight areas. This improves cooling and gets air into areas that previously may have taken several setups to achieve. Imagine having the ability also to cut helical cooling lines on the outside of round inserts to improve cooling.

**Get more cut and accuracy from cutting tools.** Five-axis machining makes it possible to use the same tool at many different angles, thus increasing the number of cutting edges used on each tool. Tool life and accuracy will increase by tilting the axis to cut deeper without having to hang workpieces further out of the holder than designed to be able to machine the part.

**Open the door to simultaneous machining.** Growing into simultaneous machining makes it possible to machine parts that before were not even considered possible. Because it is possible to simultaneously move cutting tools 360 degrees around the part, five-axis technology empowers machinists to easily machine tight, previously unreachable surfaces.

With five-axis capabilities, you are limited only by your creativity! [MMT](#)

## EDITORIAL ADVISORY BOARD (EAB)

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, OEMs and academia, and various moldmaking segments and job functions. A member is selected based on his or her experience and knowledge of the mold-making industry to serve a three-year term.

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## Maximum Mold Group – Taking It to the Max

Strategic acquisitions and diversified capabilities combined with a can-do, inclusive culture take this mold manufacturer to new heights.

**M**aximum Mold Group's culture is all about getting it done—whatever a customer needs, team members from this assemblage of three companies put things into high gear and make it happen. At the risk of sounding “punny,” parent company Maximum Mold states on its website that it “molds” its processes to meet customers’ needs, and it demonstrates this by taking its capabilities “to the max” and tackling

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Access the related video under the Videos tab at MMT online.



Images courtesy of Creative Technology Corp.

challenging jobs that others will not touch. This confident, inclusive company culture is why Maximum Mold (also called Max 1) has expanded twice since its founding by owner and President David LaGrow in 1996. These qualities certainly helped Maximum Mold Group win the 2018 Leadtime Leader Award.

LaGrow says that he had one single purpose in mind when he established Maximum Mold in Benton Harbor, Michigan: “to

provide customers with a better alternative for tooling development.” He believes that customers “deserve a better partner who understands their businesses, their needs, their challenges and their realities.” This singular objective remains today and is reflected in the caliber of experience offered by the teams working under the Maximum Mold Group umbrella as well as by the continual investment in state-of-the-art machinery and

Maximum Mold Group in Benton Harbor, Michigan, is *MoldMaking Technology's* 2018 Leadtime Leader Award winner. Because of strategic acquisitions made over the last three years, Maximum Mold (also called Max 1) has grown from one small company to a group of three separate companies, each offering its own list of services but definitely complementary to the other two. Shown here is Max 1's CNC department.

# 2018 Leadtime Leader Award: Winner

## COMPANY:

### Maximum Mold (Max 1)

1440 Territorial Road  
Benton Harbor, Michigan 49022  
Phone: 269-468-6291  
Email: davel@maximummold.com  
Website: maximummold.com

## Leadership

David LaGrow, *President*  
Cynthia LaGrow, *CFO, LaGrow Consulting*  
Skip Thibeault, *General Manager*

## Metrics

- No. of employees: 28
- Facility: 15,000 square feet
- Average on-time delivery: 98 percent
- Lead time: six to eight weeks on small molds, 25-30 weeks on multiple, complex molds
- No. of molds/year: 40 tools, depending on size and complexity
- Website: maximummold.com

## End Markets

- Automotive/Transportation
- Consumer products
- Electronics/Computer
- Medical
- Packaging
- Telecommunications

## Capabilities, Products and Services

Maximum Mold specializes in manufacturing die cast dies and injection molds including complete project management.

## Equipment (highlights):

### CNC Mills:

- GF Machining Solutions - Mikron five-axis UCP 800 HSM and Mikron three-axis 500 Moldmaster HSM
- Haas-VF-2, VF-2 30, VF3 40, VM6
- Hurco-VMX-50 VMC, VMX-24 VMC, BMC-4020 VMC and (2) Hurco 42

### EDMs:

- AgieCharmilles-Roboform 550 Sinker, Roboform 51 Sinker, Robofil 310 Wire and Cut 30 P Wire

### Surface Grinding:

- Chevalier 20x40 Grinder
- Okamoto 6x18 Grinder

### Related Equipment: Need models

- 17-inch Turnado Lathe
- 20-ton Spotting Press
- Caser Drill Press
- (3) 10-ton overhead cranes
- (2) Hi-Lo lift trucks
- (1) Big Joe lift

### Special Equipment:

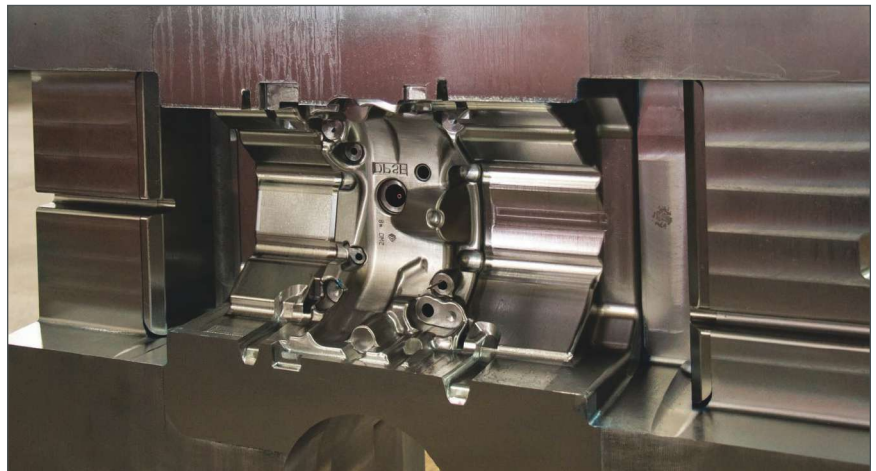
- Nikon Metris LK V 10.7.6.
- Nikon Metris XC65D Digital Cross Scanner
- Nikon CMM-Manager software
- Nikon Focus point cloud software

equipment. Even the company's location is by design, as it is advantageously located within a two- to three-hour drive of Chicago, Indianapolis and Detroit and within a couple hours of strategic vendors of heat treating, tool steel and surface coating services. "We believe that the best results are achieved through teamwork, which means working together in person, not just over the phone or e-mail," LaGrow says.

Maximum Mold Group serves the die casting, injection-molding and blow-molding markets, offering complete project management from concept and design to sampling and production. Types of tooling that it builds include prototype molds and dies, molds with undercuts, two-shot molds, injection molds with rotating cores, trim dies, high-pressure die cast dies, rack-and-pinion dies, low-pressure die cast dies with hard plumbing, high-pressure dies with vacuum assist, valve body dies and more. Primary markets that it serves include the automotive, aerospace and appliances industries, though the company also builds tooling for the medical, packaging, agricultural, telecom and wind-turbine industries.

## Maximum Times Three

Maximum Mold Group is made up of three independent companies, each with its own list of service offerings. The original plant is Maximum Mold (again, now called Max 1), which has 28 employees and manufactures trim dies, die cast dies and plastic injection molds using full engineering, three- and five-axis CNC machining, sinker and wire EDM and coordinate measuring machine (CMM) and mold polishing capabilities (see sidebar for equipment list). The company, led by LaGrow with vital support from a trusted team including his wife, Cindy, was launched in 1996. Then, in 2009, when many moldmakers were shutting their doors, LaGrow bought a larger building to expand. "I had a lot of people telling me that I was crazy to buy a building, not to mention purchase three new pieces of equipment," he says. Despite the concerns, LaGrow persevered, bolstered by a passion for moldmaking. The company went along well for several years, building molds and dies for customers who valued its commitment to quality and partnership. Then in October 2015, the opportunity



Maximum Mold Group serves the die casting, injection-molding and blow-molding markets, offering complete project management from design to sampling and production. Primary markets that it serves include the automotive, aerospace and appliances industries. Owner David LaGrow says that his group of companies provides a comprehensive array of services, all under one roof.



Gary Gagliardo operates this new AgiesCharmilles Mikron UCP 800 Duro five-axis machining center, which is one of several pieces of equipment purchased recently for the Maximum Mold Group. Every year, to ensure that each company has what it needs to complete projects accurately and efficiently, Maximum Mold Group works with a local machine tool supplier to assess capacity needs and invest in new machinery.

Mandatory Monday morning meetings with Maximum Mold Group's management team, along with daily check-ins, are integral to keeping the three companies on track job-wise and informed about each division's quoting opportunities, customer concerns or questions, quoting, scheduling and so on. Here, Owner and President David LaGrow (bottom right) reviews a job with (from bottom left) Gavin Dewey, plant manager at Max 3, Skip Thibeault, plant manager at Max 1 and Charlie Kreitner, plant manager at Max 2.



arose to purchase the assets of Michigan Mold in Coloma, Michigan. LaGrow felt that it was a good time to expand his company by adding precision expertise in CNC lathe and turning. He renamed the new division Max 2 LLC.

"To be honest, I wasn't exactly looking to acquire another company, but I knew the owner of Michigan Mold, and he was looking to sell the company and asked me if I was interested," LaGrow says. He saw the opportunity to diversify and grow but says it was a leap of faith because there would be no work in progress when he took over. There were 13 employees who had valuable expertise that he did not want to lose, but that also came with regular paychecks and rent that had to be paid. "We met with the employees, and they wanted to stay in their jobs, and they wanted to excel and do some things differently. It took about six months for our sales team to land the work we needed to get it back up and running," he says, adding that business has been going well ever since. While Max 2 primarily serves the capital equipment industry, it also produces precision components for molds and dies and the aerospace industry. Naturally, Max 1 and Max 3 are customers. "Previously, we were subbing out a lot of this work, but now we have this capability in-house, which has been an advantage," he says.

With regard to Max 3 LLC, LaGrow came upon another opportunity to acquire a mold shop nearly twice the size of Max 1 in 2017. That company was Mach Mold Inc., located just around the corner from Max 1 in Benton Harbor. Owner Bill Mach was looking to retire and pursue other interests, so LaGrow bought the whole operation including the equipment, the customer list and the work in progress. He also kept all of



# 2018 Leadtime Leader Award: Winner

## COMPANY:

### Max 2 LLC

320 Park Street, PO Box 152

Coloma, Michigan 49038

Phone: 269-468-3452

Email: davel@maximummold.com

Website: max2.us

## Leadership

David LaGrow, *President*

Charlie Kreitner, *General Manager*

## Metrics

- No. of employees: 13
- Facility: 10,000 square feet
- Average on-time delivery: 95-98 percent
- Website: max2.us

## Capabilities, Products and Services

Max 2 manufactures complex components for customers, including Max 1 and Max 3, in the following industries:

- Molds and dies
- Aerospace
- Wind/Turbine
- Automation equipment

## Equipment (highlights):

### CNC Mills:

- 5 CNC Mills with travels up to 64/32/32 and fourth axis rotary table up to 22 inches

### CNC Lathes:

- HAAS-TL-3, (2) SL-40 and (3) SL-30 CNC lathes

### Related Capabilities:

- ID/OD grinding from 0.125-inch-20 inches

At Max 3, formerly Mach Mold Inc., which was acquired in July 2017, Dave Pudell keeps multiple AgieCharmilles EDM machines running, including a Roboform 400 Sinker, two Roboform 800 sinkers and a Roboform 85 sinker EDM. Further EDM capacity can be found at Max 1, where a new AgieCharmilles CUT P 30 Wire EDM adds capacity and increases efficiency to the company's busy EDM department. Other models include an AgieCharmilles Robofil 310 Wire, Roboform 550 Sinker and Roboform 51 Sinker.

Mach Mold's 42 employees. He implemented the same benefits program to maintain consistency between the three companies. "Bill agreed to stay on during the transition, too, which has been helpful," LaGrow says. "Adding Mach Mold's capabilities to that of Max 1's has been very advantageous. We can take on larger projects, build physically larger molds and continue building on the valuable relationships Mach Mold had with its established customer base, which is primarily automotive."

## Maintaining Maximum Performance

Maximum Mold Group builds molds ranging from those that are micro-sized up to 1600-ton press-size and die cast dies can be as large as six feet by six feet, according to LaGrow who adds that 1,000-ton molds are the company's "sweet spot." The company reports lead times of six to eight weeks on small molds, 16 weeks on large tools and 25 to 30 weeks on multiple, complex molds. The company delivers those molds on time at a rate of 95 percent. "Some of our customers have asked us to accelerate the timeline to expedite their delivery to their final customers, and we try to accommodate them," LaGrow says. "We are able to maintain faster lead times because we run our operations in cells, so certain machines are matched with certain other machines to handle specific types of jobs. We design our tooling one-to-one based on tolerances that our customers require and program the cutter paths before work begins so that workpieces move seamlessly between the machines in the cell. This reduces the need for physically handling workpieces and reduces the risk for error."

It is clear that LaGrow cannot contain his excitement and passion for what he does when he says that Maximum Mold Group "is capable of turning around the largest and most complex tool projects, including dies for transmission housings and, most recently, a 1+1 two-shot injection mold with two different cavity shapes, hard shots on top and soft on the bottom, with slides moving inside of slides and an 18-drop manifold." LaGrow says that despite the company's small size, the team believes it can compete with the largest shops because it has standardized and refined its processes and invested in current technology. An example is the new Shoptech-E2 web-based enterprise resource planning (ERP) system that the company invested in and installed at Max 3. "Max 3 was a company that did everything





Max 2 LLC was acquired by LaGrow in October 2015 and specializes in precision machined components for the capital equipment, mold and die and aerospace industries. Located in Coloma, Michigan, Max 2 will soon be moved into a new building to provide space for expansion.

by hand or paper. Max 1 and Max 2 already use E2 and are paperless companies. E2 enables our employees to electronically clock in and out of work each day, sign in to and off jobs, track hours and materials purchased for tooling projects and know with certainty our true capacity and availability of machine time, which helps us ensure that every job is completed on schedule,” LaGrow says. In addition, the E2 system is also integrated with each of the company’s tool crib vending machines, which enables Maximum Mold Group to more



Maximum Mold Group Owner and President David LaGrow is passionate about moldmaking and proud of his employees and their skills and contributions to the organization’s success. At Max 1 and Max 3, journeyman moldmaker certificates are displayed for all to see. All six of the organization’s salesmen are journeyman moldmakers, and the company currently has eight apprentices with three more expected to join the team yet this year, bolstered by active relationships with local high schools as well as with Lake Michigan College.

accurately quote jobs and facilitate precise job costing and time tracking to ensure that the company is profitable on jobs.

Max 1’s first-pass quality rate remains steady at 98 percent. This is due, in part, to the company’s quality system, which includes CMM inspections on all outgoing dies and molds. Throughout the mold building phase, the company provides customers with progress reports that include Gantt charts and photographs when they are requested. “We use our Nikon Metris LK V 10.7.6. CMM machine to measure and document all electrodes prior to production and all critical workpieces after production,” LaGrow says. “If we find something that is out of tolerance, we immediately call our customer contact to let him or her know what we found and how we can correct it. Sometimes it is something that was missed at the project kick-off meeting, and we will go back to what was discussed and work with the customer to resolve the issue. It is a partnership, and we are always open and honest about the work that is being done here.” Often, Maximum Mold Group is on the receiving end of transfer tools without any data. “That’s where having the CMM scanning capability is particularly beneficial,” he says.

In addition, the Maximum Mold Group is ISO 9001:2015 certified for quality management systems as they pertain to the manufacturing of die cast dies, plastic injection molds, contract machining and fixtures. It is a distinction that the company embraces at all levels of its culture. “We live and breathe ISO, standardization, risk reductions and continuous improvement strategies. We have processes for everything, and we don’t cut corners,” LaGrow says. For example, at Maximum 1, every steel-cutting machine has the exact same tooling setup so that any CAM program can be run in any of the machines. All programming is done using the same tool library, too, which is part of the company’s ISO standards. In addition, every electrode made goes under the CMM before it is placed into an EDM machine, and everything is documented to ensure quality and accuracy. Every team member is trained to use manual devices that are used for inspection as well, and every device is calibrated according to ISO requirements. Traceability is particularly important, according to LaGrow. “Using the E2 System at all three facilities helps us track who is using what machine for what job, what is quoted, what is required by the customer, what material is being used and much more,” he says. “The E2 system makes it so much easier for us to earn and maintain our ISO certification. It makes us a better company because when we say what we are going to do, and then we do what we say, it makes everyone’s life that much easier across all three companies.”

Regarding continuous improvement, it is evident that the Maximum Mold Group strives to advance. For example, lead times for 2017 have improved over 2016. “Lead times were shorter last year compared to 2016 because we increased the

# 2018 Leadtime Leader Award: Winner

## COMPANY:

### Max 3 LLC

360 Urbandale Avenue  
Benton Harbor, Michigan 49022  
Phone: 269-925-2044  
Email: davel@maximummold.com  
Website: max3.us

## Leadership

David LaGrow, *President*  
Gavin Dewy, *General Manager*

## Metrics

- No. of employees: 34
- Facility: 25,382 square feet
- Average on-time delivery: 95-98 percent
- Lead time: six to eight weeks on small molds; 25-30 weeks on multiple, complex molds
- No. of molds/year: 45 molds, depending on size and complexity
- Website: max3.us

## End Markets

- Automotive/Transportation

## Capabilities, Products and Services

Max 3 specializes in manufacturing injection, blow, compression and encapsulation molds. Capabilities include prototypes, multi-shot/multi-material, extrusion and suction blow molds and molds for insert- or over-molding. Equipment (highlights):

### CNC Mills:

- Eumach-(2) Horizontal Mills and (1) Vertical Mill
- Sharnoa-(9) Vertical Milling Machines including a HPM44 with fourth-axis table and a HPM-60 VMC
- Roeders-RFM 600 VMC and RFM 800 VMC
- Milltronics-(3) VM-17 and (1) VM-30 VMC
- Nomura Horizontal Boring Mill

### EDMs:

- AgieCharmilles-Roboform 400 Sinker, (2) Roboform 810 Sinker, Roboform 85 Sinker EDM

### Surface Grinding:

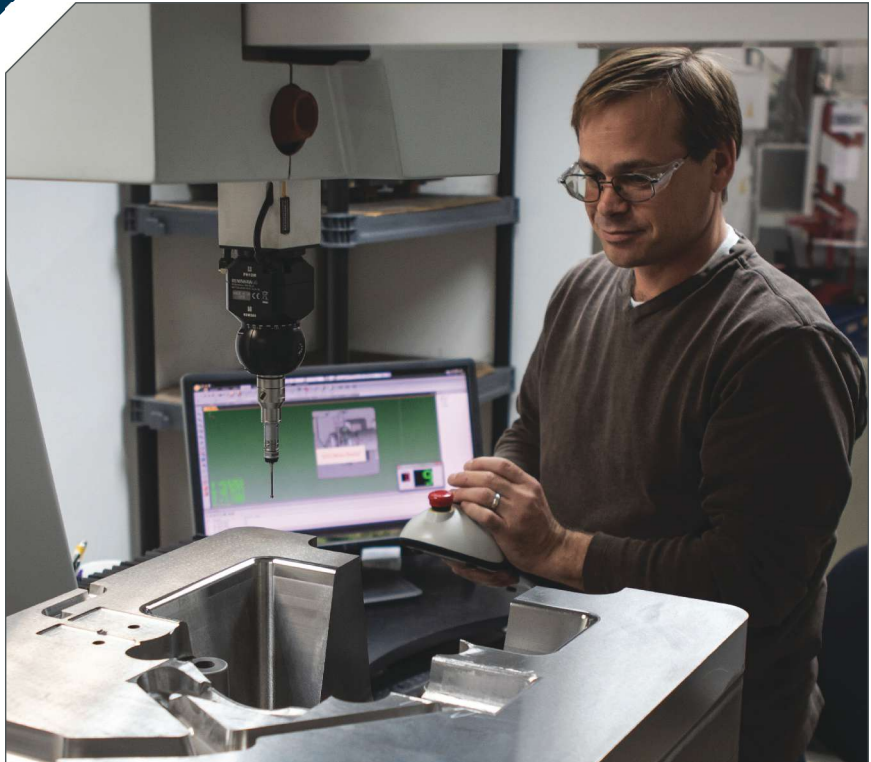
- Proth Surface Grinder
- Nicco Surface Grinder
- Chevalier Surface Grinder

### Related Equipment: Need models

- Milltronics-ML-17 CNC Lathe with 17-inch swing
- Tarus Gun Drill
- Wells Horizontal Saw
- Cranes-(2) 10-ton beams each with (2) 10-ton hoists, (3) five-ton beams each with (2) five-ton hoists and a five-ton beam with five-ton hoist and three-ton hoist

### Special Equipment:

- Freightliner Flat-Bed Truck, Max Load 30,000 pounds



This Nikon Metris LK V 10.7.6 High Accuracy Bridge coordinate measuring machine (CMM) is in constant use by Nate Mukavet at Max 1 to ensure that all critical-to-function parts, mold and die cores, cavities and more meet customer specifications. The system includes a Nikon METRIS XC65D Digital Cross Scanner for inspection and reverse engineering and uses Nikon CMM-Manager and Focus point-cloud software programs.

capacity of our in-house design and engineering services,” LaGrow says. “We took two employees off the shop floor at Max 1 to train them. One of them moved over to Max 3 to be a designer, and we invested in two new seats of Vero Software’s VISI software there. The second employee wants to become an engineer and will start training soon at Max 1. We will then have six designers and all of them journeymen toolmakers.”

As stated earlier, the continuous improvement mindset is company-wide. LaGrow relies on the input of his design and engineering staff who research new and better ways to run the business. “We have meetings that involve team members from all three companies whenever we kick off a new job. The designers and engineers give input on the job timeline, design, components and materials to ensure that we are as efficient as possible,” he says. “We have gone to great lengths to ensure that we know and understand our customers’ needs and expectations and their methods of doing business. I have even traveled with my sales team to Germany, China and Mexico to work with our customers on specific design changes.” While in China, LaGrow made arrangements so that Max 1 is a service center for two Chinese mold shops that build tooling for a mutual customer. LaGrow wants to build tools in the United States to export to Chinese original equipment manufacturers for production. He even exhibited at a die casting exposition in China in 2016 to try to open a door, but it has not been easy. “We were the only U.S. company at the show,” LaGrow says. “I know there



Every individual matters, from apprentice to mold polisher to journeyman moldmaker, says David LaGrow, who is shown here checking in with machinist Jorge Gallegos at Max 2's Haas VF-6 CNC vertical machining center. A consistent and cohesive family-like culture is paramount to Maximum Mold Group's success because it is the people that matter most, he says. He makes an effort to spend time at each facility every day to touch base and assist where needed, and he purposefully seeks out employees' input on the direction of the company to keep it on a pathway for growth.

Mold Group increase its sales in 2017 by 20 percent over 2016. Additionally, the company reports that 28 percent of the customers served in 2017 were new customers, with 100 percent of them fully referred by other customers.

Maximum Mold Group is careful not to "max out" its capabilities, however. LaGrow says customer service is about more than just producing a product, and his team works hard to ensure that promises are kept and not oversold. This is possible, in part, because, like their sales team counterparts, the five engineers who work on behalf of all three companies have backgrounds as machinists and toolmakers. And, LaGrow says that

are some obstacles, but I still want to be one of the first companies to land a U.S.-made tool in China."

### **Selling Maximum Experience**

Maximum Mold Group sells experience. In fact, its entire sales team is made up of six journeyman moldmakers who use their shop-floor experiences to fully understand customers' needs. They can typically secure a purchase order within 10 days of quotation, on average. "Our salesmen have been known to work on tools in the press during sales visits at our respective customer locations," LaGrow notes. Going the extra mile is routine, and it is made possible because of the "can-do" culture that is built into every level of service. "Our customers depend on our responsiveness and quality craftsmanship. Recently, a customer brought us three tools built by another shop so that we could repair and fit the molds to run right," he says. "On another occasion, Ford Motor Company wanted our customer to expedite a four-cavity mold build in four weeks. We pushed this tool build and made the accelerated delivery with first-shot approval." It is service like this that has helped Maximum

customers appreciate that his team can see projects from their perspectives, taking into consideration things like manufacturability, cooling, shrinkage and draft characteristics and even mold maintenance requirements that keep the tools running as expected with as little hassle as possible. Maximum Mold Group offers service contracts upon project completion and provides customers with on-site troubleshooting to ensure that desired results are met during sampling, and service hours are 24 hours a day, 365 days a year. The group of companies also conducts annual customer surveys and holds review meetings with customers at the end of a tooling project. "Customer feedback is included in our company's ISO policy to help with continuous improvement objectives throughout the year," LaGrow says. "We try to maintain an open line of communication with our customers and keep an open-door policy when they have questions on upcoming projects. Doing this can only make our company stronger."

Each year, Maximum Mold Group works with KM Industrial Machinery Co., a machine tool supplier out of Kalamazoo, Michigan, to address Maximum Mold Group's capacity needs

# 2018 Leadtime Leader Award: Winner



As a full-service mold manufacturer, Maximum Mold Group offers in-house mold sampling services. The recent acquisition of Mach Mold (now called Max 3) helped to increase molding capabilities by enabling sampling of larger molds and also the ability to offer short-run production. Plans are in motion to create a separate molding department at Max 3, giving customers a more convenient and discreet sampling experience while qualifying molds. Here, Brian Tabor runs production on the company's 1100-ton molding machine.

and invest more than \$500,000 in new machinery. "For example, Max 1 recently purchased a new AgieCharmilles Cut 30 P Wire EDM machine, a new AgieCharmilles Mikron UCP 800 Duro five-axis machining center, and, for Max 2, a new Haas three-axis CNC mill to ensure that we have the fastest, most efficient and accurate machines with which to complete customers' projects." Max 3 is also slated to take delivery of a used Krauss-Maffei 1,000-ton molding machine with a robot this month to provide a customer with Production Part Approval Process (PPAP), enabling delivery of a production-ready mold without the time and expense of shipping it back and forth.

## A Maximum Team

LaGrow has worked hard to maintain a consistent, cohesive culture between Max 1, Max 2 and Max 3. "Each of our shops has the needed equipment, the same five-axis machining technology, the same design software, but it's the people that set us apart from other tool manufacturers," he says. "We pull from our team's vast knowledge and skills to ensure that we are building a complete tool that meets or exceeds our customers' expectations. But even more than that, we really are like a family in the way we sit down at Maximum Mold Group and discuss projects and the group's strategic direction. It is during these meetings that team members express their ideas and their concerns." Some examples of the inclusive nature

of the Maximum Mold Group include the two-hour mandatory Monday meetings with the group's management team to discuss current and upcoming projects at each plant, any customer concerns or questions, quoting, scheduling and so on. LaGrow also makes it a point to spend time at each facility every day to touch base with his employees and to ensure that things are running smoothly. When he is considering expanding the company or making a major equipment purchase, he turns to his employees for input. "We share our plans and ask our team to offer ideas on it. We ask them where they think we should go next, or what we need to do next and how to keep us on a pathway for growth," LaGrow says. "We meet one-on-one and as a group with every employee to hear from his or her perspective on what's working and what isn't. We believe this sets us apart from other tool shops."

## Maximum Recruitment and Training

With three companies offering a variety of different capabilities, maintaining a viable workforce now and for the future can be a challenge. Max 1 has eight apprentices and 13 of its 75 employees are under the age of 25. The company plans to hire three more apprentices this year. "Part of our recruiting strategy is to have our current employees discuss our company environment with potential candidates," LaGrow says. "We can say all we want about the company and how good we think we are, but we believe it is best if it comes from team members." Recently, students from Coloma High School were invited to tour the shops in March and two of the boys told LaGrow that they were genuinely interested and asked how they could get involved. "Coloma High School has a very good machinist program," he says. "Through a grant program with Lake Michigan College, we can bring in three full-time apprentices at no cost to us. They will be paid \$10 an hour and will work here part of every day and then go to school, and they will be paid for the time in school. All their classes and books are paid for 100 percent. It's a great program." He says that Max 1 is currently searching for a third apprentice to take advantage of the grant. They want and need apprentices. "Our guys are not getting any younger, and while no one is looking to retire very soon, we still have to be focused on training the next generation."

Critical to the company's recruitment process is maintaining solid relationships with local schools like Lake Michigan College. LaGrow says that the company offers the employees training at the college each year so that they can keep their skills sharp. Five of the company's eight apprentices are currently attending classes at the college. "Lake Michigan College is part of our annual budget preparation to ensure that its programs have the tools necessary to train apprentices," he says. Each year, Maximum Mold Group donates supplies to the college ranging from cutting tools and other perishable

items to used machines. Additionally, the group supports the Coloma Community School District's tooling and robotics programs. "We have an open-door policy with the community schools mainly because we believe in the trade and want to ensure that the younger generation learns about it and understands the opportunities that are available," he says. "No longer are tool shops dark and dirty. We employ state-of-the-art machines with high-tech machining centers that are computer controlled. When the students enter our shop, they are usually surprised by just how clean the shop is and impressed with the software that we use to design and engineer a tool. Some students have equated our techniques to running a video game, and it looks fun to them. Sometimes they ask us to provide input on projects they are working on.

"We also are a member of the Berrien Tooling Coalition," he continues. "The coalition is a group of 21 tool and die shops who share information on ways of doing business, hiring practices, technology, recruiting, sales, marketing and development. The coalition makes it possible for members to band their collective capabilities together to win large tooling packages." The group meets monthly and networks and exchanges information. Annually, the group purchases and donates materials or supplies for local school districts and colleges that have either an apprentice program, tool shop courses or robotics courses. Part of this organization's responsibilities include working with local high school shops and verifying curriculum for their shop classes and judging shop class contests, he says.

#### ACKNOWLEDGMENTS

The Leadtime Leader project has been a collaborative venture. We'd like to thank Creative Technology Corp. for its video and photography services, and *MoldMaking Technology's* judging panel for their time, hard work and commitment.

#### VIDEO:

##### 2018 Leadtime Leader Award Winner: Maximum Mold Group

Winner Maximum Mold Group in Benton Harbor, Michigan, has grown from one small company to a group of three separate companies in just three years. A can-do, inclusive culture fosters teamwork and provides customers with an array of services built on integrity and experience. [short.moldmakingtechnology.com/max](http://short.moldmakingtechnology.com/max)

Reinforcing the family-like atmosphere, LaGrow offers his employees the flexibility they need to fulfill non-work obligations. "For example, our employees set their own hours. They know what they need to do to meet the company's needs and we work with them so they can also spend quality time with their families, like attending school functions and sporting events, or taking a child to the doctor." The company actively supports programs outside of the tooling spectrum, too, he says, like sponsoring football, baseball and softball teams, participating in an annual Toys for the Needy program in Benton Harbor and partaking in a program called "Shop with a Cop." LaGrow asserts his belief that when employees are happy in their personal life, they are happy and more productive at work.

Honored to be named *MoldMaking Technology's* 2018 Leadtime Leader, LaGrow says the Maximum Mold Group looks to further expand its capabilities. "Maximum Mold has reduced lead times through diversification of services offered and horsepower via the acquisition of Max 2 and Max 3," he says. "In the future, the Maximum Mold Group plans to invest in five-axis bridge machines, the latest technology in EDM and workholding systems to continue to be a Leadtime Leader." **MMT**



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# LEADTIME LEADER AWARD TURNS 15!

MoldMaking Technology has been honoring excellence in mold manufacturing for 15 years with its annual Leadtime Leader Award. To celebrate this milestone, we want to acknowledge all of our past winners and honorable mentions.



## PAST WINNERS:

2003 Advance Tool  
2003 M & M Tool and Mold  
2004 Wentworth Mold Group  
2004 M & M Tool and Mold  
2005 Minco Tool and Mold  
2005 M & M Tool and Mold Inc.  
2006 Extreme Tool and Engineering  
2006 A.J. Tool Co. Inc.  
2007 Chicago Mold Engineering  
2007 Tech Tool and Mold  
2008 Commercial Tool and Die  
2008 Extreme Tool and Engineering  
2009 Commercial Tool and Die  
2009 Byrne Tool and Die  
2010 Triangle Tool  
2010 Mold Craft Inc.  
2011 United Tool and Mold Inc.  
2011 Mold-Tech Inc.  
2012 Industrial Molds Group  
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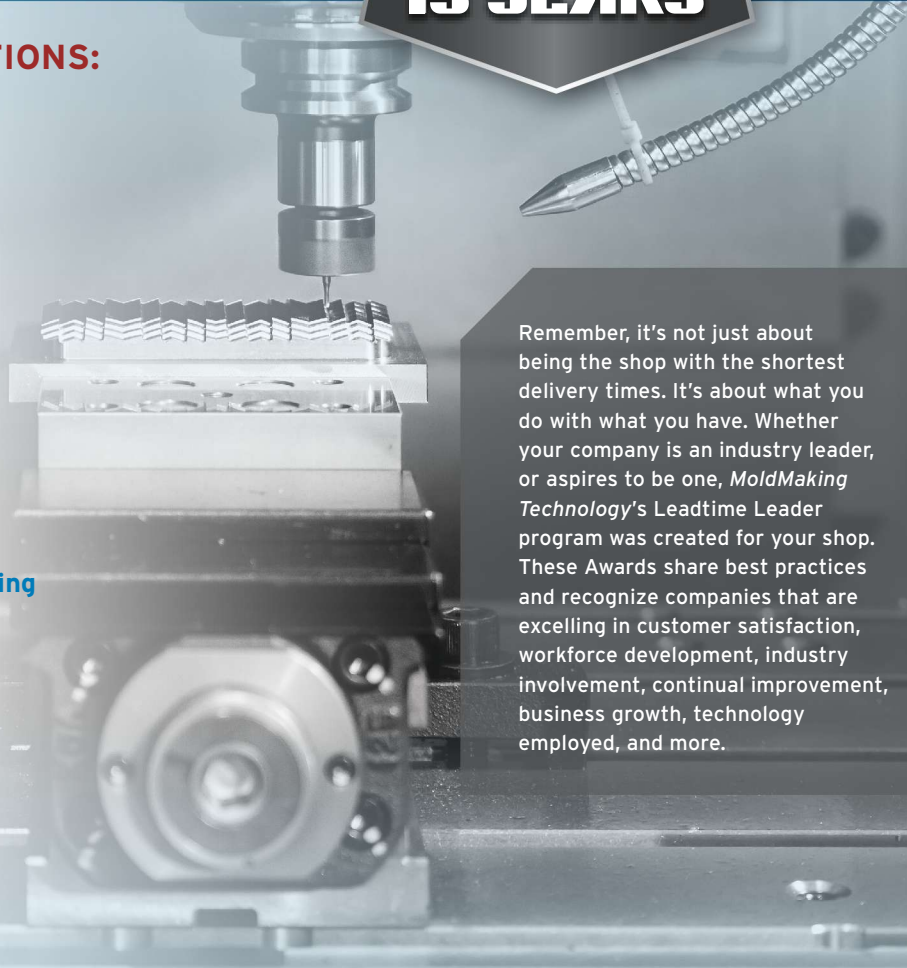
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 2003 Eimo Americas  
 2003 Graphic Tool Corp.  
 2003 Peterboro Tool  
 2004 Century Die  
 2004 Summit Mold  
 2005 StackTeck  
 2005 IDEAS Inc.  
 2006 MSI Mold Builders  
 2006 IDEAS Inc.  
 2007 Synergetic M2M Group  
 2007 M & M Tool and Mold Inc.  
 2008 StackTeck Systems Ltd.  
 2009 Armin Tool and Manufacturing  
 2009 Elite Mold and Engineering  
 2010 H.S. Die and Engineering  
 2010 CS Tool Engineering  
 2011 MSI Mold Builders  
 2011 JM Mold South, Inc.  
 2012 M&M Tool and Mold  
 2013 Micro Mold Company Inc.  
 2014 Aalbers Tool and Mold Inc.  
 2015 Dynamic Tool and Design  
 2016 MSI Mold Builders  
 2017 Concours Mold Inc.



Remember, it's not just about being the shop with the shortest delivery times. It's about what you do with what you have. Whether your company is an industry leader, or aspires to be one, *MoldMaking Technology's* Leadtime Leader program was created for your shop. These Awards share best practices and recognize companies that are excelling in customer satisfaction, workforce development, industry involvement, continual improvement, business growth, technology employed, and more.

Winners are chosen by staff editors and a judging panel of select processors and OEMs based on the shop's innovation, efficiency, quality and commitment.

Judging considerations include the mold shop's commitment to world class quality, performance in leadtime and deliveries via efficient manufacturing processes; current and projected sales growth; innovation in technology and business strategy implementation; industry involvement; and customer satisfaction.

### CONTACT:

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After winning its title in 2009, Commercial Tool & Die is still focused on growth and consistent reinvention through continuous improvement, new technology investment and talented employees.

## Celebrating 15 Years of Moldmaking Excellence

Winning *MoldMaking Technology's* Leadtime Leader Award helped these shops realize their strengths and recognize their weaknesses.

**M**oldMaking Technology has recognized excellence in mold manufacturing through its annual Leadtime Leader Awards Competition since 2003. The time seemed right for the magazine to revisit a few past winners to find out where they are today and to determine the role that winning the Award played in getting them to where they are.

### How would you describe the company's growth since winning the Leadtime Leader Award title?

**Andy Baker, strategic account manager, Byrne Tool + Design (Byrne):** In 2009, we were blessed to be recognized for the Leadtime Leader Award (LLA), which validated our lean and continuous improvement strategies and created great energy for our culture. We planned and achieved consistent, sustainable growth, doubling our revenue since that time. We continue to invest in people and technology. Last year alone, we invested 20 percent of our revenue in new equipment and disruptive technology, specifically in 3D-printing equipment and the printing of mold cavities for real parts with the actual resin. We continue to invest in training our talent on new technology skills, leadership development and team cohesion.

**Brian Bendig, president, Cavalier Tool & Manufacturing (Cavalier):** We obtained the Leadtime Leader title in 2015, and since then our workforce has grown from 96 to 145 people, which led to the start of a human resources department. In that same period, our sales increased from \$24 million to \$30 million (projected), which prompted a

\$12-million investment in infrastructure expanding our building's footprint by 30 percent. We filled that space with an array of new technology, including a Hermle Flex C42, Apex, Huron KX50 and Huron KXG machines, a Millutensil spotting press, five cranes and a Peterbilt truck. We also increased our trade show presence, opened Cavalier Tool Design & Engineering Services PVT Ltd. in India and hired a dedicated Midwest account manager.

**James Bouwman, president, Commercial Tool & Die (Commercial Tool):** We won the Award two years in a row. The feature for our second win in 2009 mentioned that we were poised for growth and consistent reinvention through continuous improvement, new technology investment and talented employees. This mission sustained us through difficult times and propelled us on a steady path of growth. Today,

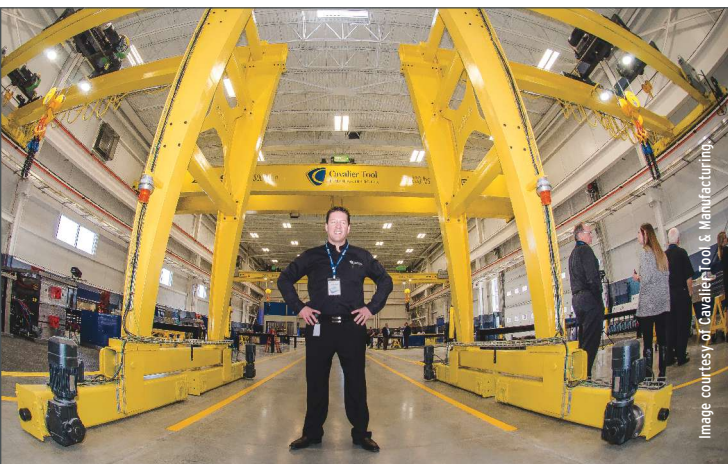


Image courtesy of Cavalier Tool &amp; Manufacturing.

Since its win in 2015, Cavalier Tool & Manufacturing increased sales, prompting a heavy investment in infrastructure expanding its building's footprint and filling that space with an array of new technology, including this immense crane that towers over President Brian Bendig.

we envision more growth through process, leadership, relationship management, engagement of people, improvement, evidence-based decision making and customer focus.

**Ray Coombs, president, Westminster Tool:** Our growth since 2014 can be best described as evolution. We were in the beginning stages of becoming strategically focused on human capital when we won the Award. Today, we are a much younger organization (with an average employee age of 33), which is laser-focused on getting the right people on our team to advance the organization faster. During this transition, we still have managed to improve throughput and advance our internal training program.

**Jeff Lucas, project management manager, Minco Tool & Mold Inc. (Minco):** After our win in 2005, we remained competitive through bi-weekly, continuous improvement meetings and streamlined processes. For example, we invested in a gun drill, two large vertical mills, 2 five-axis mills, a boring mill, a large wire EDM machine and fixturing and palleting. We also continued our apprenticeship program and employee cross-training. Also, we hired a full-time sales representative, updated our website, increased our trade show presence, improved our global capabilities, refined our repair and engineering change capabilities and boosted our customer service via the use of customer scorecards.

**Justin McPhee, vice president, engineering, Mold Craft:** Since 2010, many things have changed, but ultimately things still feel the same. We maintained a great company culture, fantastic employees who help produce an outstanding product



Image courtesy of Extreme Tool &amp; Engineering.

Extreme Tool & Engineering's employee pipeline remains stable and strong since the company's Leadtime Leader win. President Mike Zacharias attributes this to the publicity benefits of the win, which helped to get the word out about Extreme's location, employee development and culture.

with the customer as our top priority, and we are still pushing the limits of innovation. For example, we established a tech center for sampling micro-molds with our customers' material in our Wittmann Battenfeld Micro Power 15-ton press. We also launched our Production Quality Prototypes (PQP) process, which involves molding micro parts at the initial design approval phase. This is a specific program using Mold Craft molds with custom components installed in our quick-change frame to mold a handful of small molded parts made from any customer-provided material.

**Tim Peterson, vice president, Industrial Molds:** A strategy we use since winning the Award in 2012 is assessing how a new

# Leadtime Leader Award

## Graphic Tool: The Rest of the Story

Graphic Tool won the Leadtime Leader Award in 2017. The company's goal upon entering was only to document its journey in building a metric, data-driven business to help grow the business. According to then General Manager Don Smith, it was an amazing, humbling and unexpected experience for the team. "To be recognized by your peers as an industry leader is remarkable and justifies all of the hard work the team accomplished. The Leadtime Leader process helped us map our business goals and ultimately provide the proper direction in which to move the business."

So, what happened to Graphic Tool after the Award? Let's go back a bit to tell the whole story.

A private equity group purchased Graphic Tool in 2013, and Smith was hired to head up the business with a "scalability" strategy that involved a new quoting system, scheduling system, sales tracker and quote and sales log. The company also established new pillars for growth focused on core competencies, business agility, customer and supplier relationships, efficiency and collaboration. Graphic Tool continued on its path of scalability for the next two years.

New metrics were in place and working (at the end of 2016, Graphic Tool was moving forward with a better-than-average EBITDA return). Smith warned private equity leadership about the need for strategic partnerships to ride the industry's "peaks and valleys," explaining that Graphic sells a service, not a product. He emphasized that it is next to impossible to forecast sales and discussed achievable margins in this industry. Nevertheless, the private equity group charged ahead on its own course without a commitment to much-needed and recommended investment to scale the growth.

From this point forward, Graphic Tool was at the beginning of its end. The private equity group finally understood that moldmaking is not a high-margin business with forecastable sales, and that it requires capital investment during the economic valleys. Graphic Tool then won the 2017 Leadtime Leader Award, which the private equity group viewed as a "sale point" for a "strategic partner." However, pressure from the bank that financed the sale of the business took its toll, and Graphic Tool was closed for business.

Smith notes that he learned several important realities during this challenging time. He realized that it is important to:

- Recognize that mold manufacturing is not the type of business that can be scaled and then sold. It is a long-term business operated by people who stay in this business their whole careers.
- Understand that the business is very capital-intensive and has low margins.
- Be aware that moldmaking experiences a continuous blend of busy and slow times.
- Note that a shop cannot forecast sales, as there is no pattern, and sales do not rise incrementally.
- Factor a mix of new work, new components and repair into the mold building equation for cash flow.
- View mold manufacturing as a business by using key performance indicators to measure success.

Despite the challenges that Graphic experienced, Smith is still positive about the industry. "A modern-day mold manufacturing business can succeed. It just takes time. It actually takes a lifetime. Our business would have worked and grown into a world-class mold manufacturer if the private equity group re-invested or took more time to secure a strategic partner."

piece of equipment will work with our existing automation. Technology automation, such as our Erowa workholding for unattended machining, has eased employee on-boarding as the thought process is already established. For example, proven methods for holding a workpiece in the work cell and ways to prevent orientation challenges by identifying the front of a workpiece. Today we also periodically send out customer surveys to monitor our service, and we hold quarterly department meetings to establish future goals and review performance.

### Mike Zacharias, president, Extreme Tool & Engineering

**(Extreme):** When we won the award in 2008, we had increased our sales to \$7.2 million, and employed a 37-person workforce.

In the calendar year 2017, we had 80 total employees and \$16.5

million in sales, indicating that our growth curve remains positive.

Winning the Award (twice) is part of our heritage; part of our legacy as an organization.

In 2007, we purchased a second building and installed our first molding machine. Today, that same facility houses

eight 50- to 500-ton state-of-the-art molding machines that are fully equipped with modern robotics. Our growth strategy is more conservative than in the past, but we continue to be blessed with good opportunities and more importantly, with great people. Our employee pipeline is stable and strong, which I attribute to our location, commitment to employee development and culture.

### What are the Award's short- and long-term impacts on the company?

**Baker (Byrne):** The Award motivated us to continue improving while helping to spread the continuous-improvement mindset throughout all levels of the organization. In the early 2000s, nobody knew who Byrne Tool was, but in 2009, with the help of the Leadtime Leader title and other industry involvement, we gained respect and recognition. This Award was a gateway for us to start making a difference in our industry. The Award also helped us recognize the talent gap, so we started a formal apprenticeship program through which many apprentices have come, the majority of whom still work here. The Award created great energy for our team and a little pride in who we are today. We would all love to win this award again!

**Bendig (Cavalier):** The team felt a sense of accomplishment after the win because there is nothing better than peer recognition. It boosted employee morale and helped validate the opinion we hold of ourselves. Let's face it—the win gave us bragging rights, and the exposure raised our credibility, both locally and



Image courtesy of Mold Craft Inc.

Years after being named a Leadtime Leader, Mold Craft took what it learned from the experience and made company improvements, including this Tech Center focused on R&D and injection molding. Here Derrick Jahr, a graduate of The University of Wisconsin Stout plastics engineering program works in the Tech Center after designing molds for the company for five years.

industry-wide. The Award also helped generate our website traffic, which led to more trade shows and a bigger presence at each. All of this has been instrumental to our growth.

**Bouwman (Commercial Tool):** Winning the Award twice is part of our heritage and part of our legacy as an organization. Being recognized provided validation that our shop could take positive action to improve delivery times. We took current resources, technologies, tools and techniques and made changes that positively impacted our lead times. The Award created a renewed sense of pride in our workmanship. All employees received a copy of the issue, and we still find them around the shop. We also received accolades from customers, suppliers, former employees, the township and our insurance provider.

In the long-term, winning the Award gave our team confidence in our systems, processes and approaches to improvement. And, leadership also knows that winning such an Award has a larger meaning. We entered the contest as part of a long-term plan to improve as an organization. As with most Award programs, it's the journey that matters. Along with this journey, we learned new, more efficient ways of doing things and many of these methods are still in use today.

**Coombs (Westminster Tool):** Brand recognition was the immediate benefit of our Award. The long-term benefit

was helping us establish lasting relationships with friendly competitors with whom we share best practices. These relationships have helped us to improve our organization. The win also introduced us to the American Mold Builders Association (AMBA) shop tours and ultimately helped us establish the Plastics Technology Alliance, a joint venture with Leadtime Leaders Extreme Tool & Engineering and Mold Craft.

**Lucas (Minco):** The Award immediately puts our name in front of all *MoldMaking Technology* subscribers—mold builders, molders, and original equipment manufacturers (OEMs)—opening the door to additional opportunities. Long term, this Award made us realize what it takes to be a leader among such an outstanding group of mold shops who have taken the title in the past.

**McPhee (Mold Craft):** Notoriety was the initial impact. From the initial announcement at Amerimold, we were perceived by our customers as a premier mold shop. The level of inquiries from the medical device market segment increased substantially and not just from our existing customer base, but from new customers as well.

**Peterson (Industrial Molds):** The Award gave us industry recognition of our timing abilities, and the magazine article gave us a marketing tool to use with our customers. It was a good conversation starter.

**Zacharias (Extreme):** The publicity we received from the Award was very important, considering our facility's remote location. The win helped put us on the map. Plus, in 2008, we were a "young" 10-year old company, so the Award process helped us build and support our brand. Our company gained the Leadtime Leader title twice, so in the long term, the Award established Extreme as an industry leader that was here for the long haul. The credibility we received from this Award solidified our brand and mission.

### What has been the biggest change within the company since winning?

**Baker (Byrne):** The biggest change is how we view the company. We used to think of Byrne as a tool shop. Now, we think of the company as a brand. Our services have evolved strategically to add more value and innovation to the go-to market of our customers. We view the company as a collaborator of innovation with our client. We bring the simplest idea into a real hand-in-part solution. We bring integrating product development, industrial design and 3D printing on the front end into validation, fixture design and development, molding and end-of-arm tooling on the lifecycle and launch

## Leadtime Leader Award FAQs

Each year, the moldmaking industry recognizes outstanding performance and innovation with *MoldMaking Technology's* Leadtime Leader Award. Leadtime is the culmination of the entire mold manufacturing process. A quality mold delivered on-time is the result of a team of professionals working together from sales, design and manufacturing to validation, delivery and support. Whether a company is an industry leader or aspires to be one, this competition was created to share best practices and recognize companies that are excelling in customer satisfaction, workforce development, industry involvement, continual improvement and business growth.

**What are the criteria for entering?** Any shop performing moldmaking operations is eligible. Every shop does a lot of the same things, but it is what a shop does differently—or perhaps better—that sets it apart. It is not just about being the shop with the shortest delivery times. It's about what shops do with what they have.

**How does a shop apply?** Visit the Leadtime Leader Zone to fill out the initial entry form. Once it is reviewed, shops will be notified via email if they move on to the next phase of the competition, which requires additional company data via a questionnaire.

**How does a shop win?** Completing the questionnaire with detail is required, and additional presentation, photographs, employee input and video information is recommended.

**How are shops assessed?** Judges are representatives from mid- to large-size OEMs and molding companies across all end markets and industry consultants. All judging is conducted with anonymity. Metrics include performance in lead time and deliveries, current and projected sales growth, investment in technology, innovation in business strategy, manufacturing efficiency, commitment to workforce training and development, industry involvement, customer satisfaction and presentation material.

**What is the deadline to enter?** *MoldMaking Technology* encourages shops to enter online before the end of the year. The deadline for final questionnaire submission is February 1.

**What does the winning shop win?** The winning shop is featured on the cover of *MoldMaking Technology's* June issue and is showcased in a full feature story. A video that is filmed at the winning shop accompanies the article. The winning shop receives a complimentary 10 x 10 booth at Amerimold, a targeted advertising program in *Plastics Technology* magazine and a free expanded showroom at *Plastics Technology* online and *MoldMaking Technology* online.

[moldmakingtechnology.com/zones/leadtime-leader](http://moldmakingtechnology.com/zones/leadtime-leader)

side of product deployment. Mold manufacturing is now only one of our many services.

**Bendig (Cavalier):** The internal and external recognition as a player in this industry has been the biggest change for us as a company. We experienced increased shop capacity that required a process change, and that is a close second. The Award also helped us change from a small company to a big one, which boosted our drive to be successful as a team.

**Bouwman (Commercial Tool):** There have been so many big changes in the organization since 2009. Take, for example, the threat of losing organizational knowledge and our organizational knowledge management methods to combat this



Image courtesy of Minco Tool & Mold.

After its Leadtime Leader win in 2005, Minco Tool & Mold invested in a gun drill, two large vertical mills, 2 five-axis mills, a boring mill, a large wire EDM machine and fixturing and palleting.

challenge. Or take, for instance, changes we have had with apprenticeships, job fairs, mentor-protégé relationships, succession planning, best-practice documentation, on-the-job training, grant-funded training and more. Today, we have a very solid human resources team in place.

**Coombs (Westminster Tool):** We have become laser-focused on who we are, what our differentiator is and how we can best serve our customer, which is summed up in our current value proposition: Your Challenge Is Unique, So Is Our Solution. Today, we are also a more data-driven organization focused on advancement, not perfection. We recognize that we are only able to improve if we admit that there is a better way to do something. This mindset allows us to make the necessary changes and learn from our shortcomings.

**Lucas (Minco):** Our biggest change has been our global presence with the flexibility to build domestic, hybrid or complete tool builds in a competitive marketplace.

**McPhee (Mold Craft):** Some of the biggest changes involve improvements to the customer experience. For example, we use a Design for Manufacture (DFM) questionnaire and a mold specification sheet to determine the successful path to mold design and molded part inspection qualification. We also use our enterprise resource planning (ERP) system more today than we did in 2010 to improve process efficiency, gain visibility into the organization

and enhance the customer experience. We use it to track customers and quotes, improve workflow and track shipments. We use the data to create weekly project status updates for our customers. We also provide shipping status upon request.

**Peterson (Industrial Molds):** Finding our “sweet spot” in automation has been the change that has allowed the company to excel. We now purchase machinery with unattended machining in mind, using our work cells and a team of people who always push themselves.

**Zacharias (Extreme):** Maintaining the culture and agility of a small organization as we continue to grow is a big change and a daily challenge that requires constant monitoring. Growth as a larger company is more complicated than that of a smaller organization. The easiest way that I can put it is that as an owner and president of a 37-person organization, I had my hands on everything we did. I am blessed to be surrounded by great managers and employees. However, today the wins and losses are both much more significant as a larger organization.

### What advice do you have for shops considering the 2019 competition?

**Baker (Byrne):** Absolutely do it. Put yourself out there. Challenge your culture! Steel sharpens steel. This Award has become a benchmark for best practices.

**Bendig (Cavalier):** Do it! Winning produces a great feeling of pride, but don't discount the value of the entry process. It forces you to do some introspection and self-evaluation. Not

Industrial Molds credits its determined team for the company's success in addition to the company's focus on automation.



Image courtesy of Industrial Molds.

only do you realize the areas that make the company great, but you also recognize the areas needing attention.

**Bouwman (Commercial Tool):** Treat lead time as you would any other organizational, quality or business objective. Develop lead time as a Key Performance Indicator (KPI). Define lead time. Does it start when you accept the job and end when you ship to the customer? Determine methods for monitoring, measurement, analysis and evaluation for the KPI. Integrate this and other KPIs into your management system.

**Coombs (Westminster Tool):** For anyone who is on the fence about entering the competition, I say, jump! This is a great opportunity for reflection on your business because the criteria and entry questions require you to truly evaluate your organization. Additionally, the *MoldMaking Technology* team does a phenomenal job of creating brand awareness for your organization. The exposure and marketing material we received was invaluable.

**Lucas (Minco):** We recommend that all shops sit down and create a company profile to see where they may be as a leader in the market or target an area to improve their processes to be competitive in the global market place.

**McPhee (Mold Craft):** This Award is serious business. Make sure you have a great marketing person on board and collect a lot of data, including where you are with quality and commitment.

**Peterson (Industrial Molds):** Don't be afraid to push yourself. You can only win!

**Zacharias (Extreme):** One of my favorite statements is, “There is no such thing as bad press,” and I believe it. You have to be willing to “toot your own horn” once in a while if you want people to listen. Even if you don't win, there is great value in moving through and learning from the process. I place our Leadtime Leader Awards at the top of my list of those our company has ever received. [MMT](#)

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# Informed Mold Manufacturing

Flow simulation analysis helps optimize mold design and drive better tooling decisions.

**M**anufacturing is changing. Manufacturers are seeing greater pressures from the consumer for improved product quality and faster time to market. This pressure is felt across the entire product development cycle from design and engineering to tooling and production. And, each step of the process has its own challenges.

As the pressure for improved product performance rises, mold builders are experiencing increases in part complexity that require more complex tooling, new material and molding technologies, “first-time-right” requirements and competitive pressures from other mold shops. All of this means a shop must adapt or be left behind.

Simply buckling down and working harder has been the common approach to address these increased demands. Mold builders have invested in bigger, faster and more high-tech machinery to meet the new production needs, which has required a large investment. This, in turn, has limited growth in other areas of the business that could support innovation and further business growth.

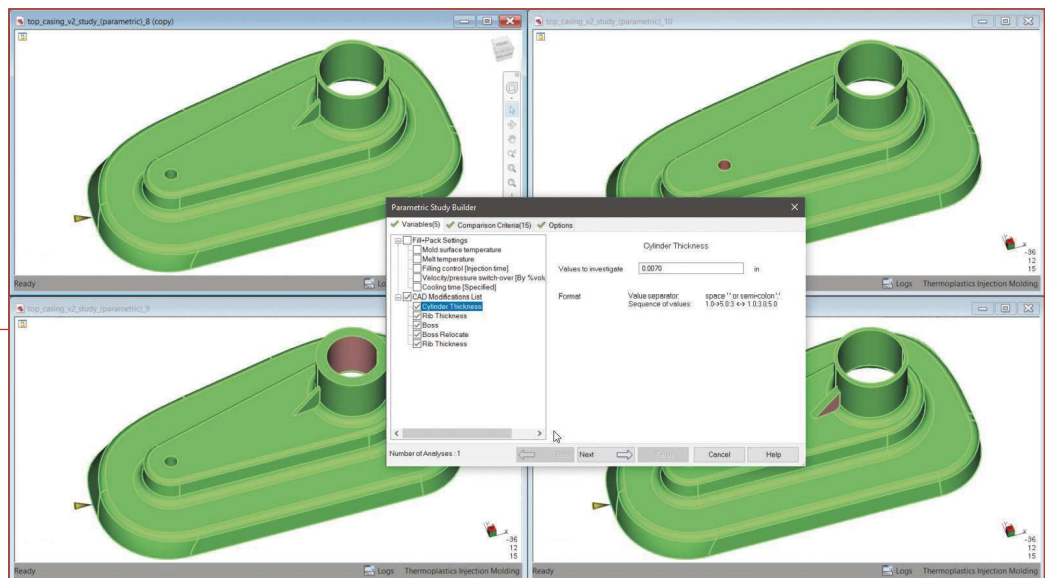
Today, a shift is taking place in the approach to work: working smarter rather than harder to meet the increased demand. Mold builders are now searching for ways to increase the use of existing in-house tools while improving the quality of the final product.

A popular working-smarter approach is using software to aid the programming of machinery and to gain tooling design insights. CAM and CAE software play a key role in these efforts, as they both help to increase the availability of information earlier in the manufacturing process before cutting any steel. More data means mold builders can make better decisions, which gives them the ability to provide a better product to their customers and increase quoting accuracy.

## CAM and CAE Advances

CAM and CAE work together to improve the mold manufacturing process. Mold builders can use CAM to program planned tool paths, to decrease tool collision and to identify effective paths to use machine time optimally. Mold builders

Geometry optimization combined with injection molding simulation illustrates the positive impact of the design change on the final part, which provides justification for the changes and increases the mold builder's credibility with the customer.



Images courtesy of Autodesk, Inc.

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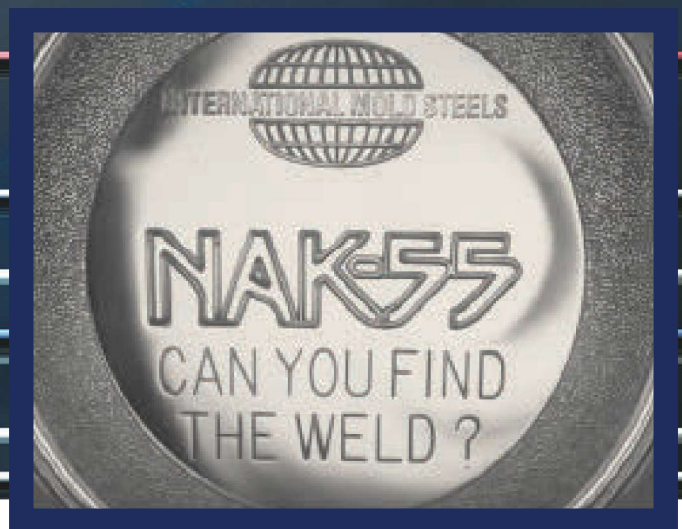
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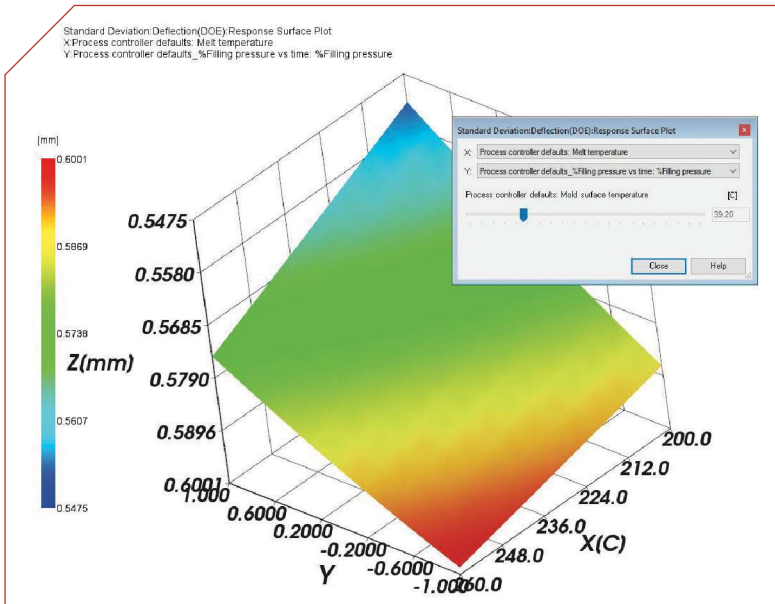
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Design of Experiments (DOE) enables a mold builder to explore molding process conditions automatically by specifying a processing window for a given design.

can use injection molding CAE simulation to assess mold design options and their impact on the final plastic product before programming tool paths to ensure that the machine cuts the right shape.

Overall, the value of simulation is rooted in the ability to make a better decision sooner. Simulation enables the mold builder to explore different tooling configurations, including gate locations and runner sizes, to measure the impact on the quality of the plastic product and the speed of production. Mold builders can also use this information to justify investment in new technologies or different design approaches, which could change the way machines cut steel, making a part easier to manufacture.

Traditionally, mold builders or molders apply injection molding simulation to a project using a trial and error approach when they discover a problem. The molder sets up a configuration, runs the analysis, evaluates the results by comparing them to a specification and then repeats the process until he or she produces a satisfactory result that meets the required guidelines.

Although this approach provides the molder with a result that meets specification and solves the issue, the molder never really knows if the results are optimal. A trial-and-error approach limits a user's configuration, iteration, and variation options, as the end user will only be able to try a few different approaches based on his or her experience with what the best options are in a set amount of time. The user can determine a better configuration within this time

frame, but he or she may not discover the best configuration.

Mold builders also use injection molding simulation early in the design phase to gain advanced insights, such as proper gating placement, cooling line placement, cooling complexity (conformal cooling versus drill and plug), material shrinkage and so on. They employ simulation in the cloud to expand the number of scenarios for parallel analysis rather than serial analysis. The cloud also provides on-demand resources at the click of a button without the need for local infrastructure support or local hardware investment that may sit idle most of the time.

Here is how it works: The end customer supplies a mold builder with a part model for a mold build. If the mold builder requires additional designs options or a reduction in wall thicknesses, he or she must work with the part designer to incorporate the changes. At best, this approach yields an updated model to review. In some cases, an updated design is not possible because of a tight specification. In

other cases, design variations are possible, but the wait time for an updated part model cuts into overall mold design and build time, which leaves less room to address any issues that arise during the build process.

### Adding Optimized Geometry to Simulation

Today, mold builders can adjust part geometry on the fly (for example, remove ribs and bosses or adjust wall thickness) with geometry optimization tools that help them explore different configurations for improved moldability without multiple iterations with the designer. These design updates can also reduce extra features, such as slides and undercuts, reducing tool complexity. Combining geometry optimization with injection molding simulation goes one step further and illustrates the positive impact of the design change on the final part, which provides justification for the changes and increases the mold builder's credibility with the customer.

Injection molding simulation analysis, such as Design of Experiments (DOE), enables a mold builder to explore all

Today, mold builders can adjust part geometry on the fly with geometry optimization tools that help them explore different configurations for improved moldability without multiple iterations with the designer.

molding process conditions automatically by specifying a processing window for a given design (high- and low-end melt temperature, filling time and so on). The analysis will then determine and analyze all possible combinations and

Manufacturers are seeing greater pressures from the consumer for improved product quality and faster time to market.

identify the optimal quality based on the end user's design criteria. With geometry optimization, the mold builder can go one step further and analyze the impact of wall thickness and processing conditions simultaneously where the mold builder specifies the part areas requiring adjust-

ment. The analysis will then determine and analyze all possible processing combinations along with wall thicknesses to identify the optimal combination based on the end user's criteria. This design approach greatly reduces all manual, individual analysis set up.

Once the analysis is complete, the mold builder uses investigation tools to examine every scenario simultaneously rather than one at a time. For example, to determine the

weld line location, a DOE analysis will produce 20 different scenarios to evaluate the impact of wall thickness in a specific area. Reviewing 20 combinations one at a time through a side by side comparison is a challenge. However, DOE investigation tools provide the use of a slider bar to vary processing conditions (mold temp) as it moves. This will show the impact on the part warpage as the temperature is varied. Reviewing this impact in a single view cuts the time it takes to interpret the results in half.

Mold builders who take advantage of the added insights from flow simulation, geometry optimization and investigation tools will reduce mold rework, increase shop throughput and deliver better, higher quality tools to their customers with confidence that the final product will be right from the first shot. [MMT](#)

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Access the related video under the Videos tab at *MMT* online.

# The Hidden Complexities of Optimized Roughing

Consider these factors for developing an optimal process using optimized roughing strategies.

Optimized roughing shortens tool paths and cycle times dramatically. These benefits have piqued the interest of many moldmakers, but shops must understand that this machining strategy does not apply universally across all workpieces. So, shops must evaluate every application before applying optimized roughing.

When roughing out a mold, moldmakers aim to produce a near-net shape in the shortest amount of time. Optimized roughing helps achieve that goal by using multi-flute tools with a cutting program that involves large depths of cut and shallow radial stepovers while maintaining a constant arc of contact (or angle of engagement).

Optimized roughing is the latest milling technique used in moldmaking, and at its core is traditional trochoidal milling. Optimized roughing is ideal for straight-walled cavities and other simple prismatic features. It is similar to slot-milling applications that first employed trochoidal tool paths.

A trochoid is a type of curve that is created by tracing a point on a circle's radius as it rolls along a straight line. This movement is perfect for ensuring the constant arc of contact that enables the quick material removal approach used in trochoidal milling and optimized roughing. This movement



This solid carbide cutter side mills 4140 with an optimized roughing strategy.

also creates the perfect balance between speed, throughput and tool life consumption for many parts that were otherwise difficult or time-consuming to machine. However, this type of complex spindle movement along the X and Y axes is not possible without the aid of advanced CAM software.

## Optimal Uses

For moldmakers, the mold base itself is often the most promising application for optimized roughing, especially for

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applications involving a steel base holding heat-dissipating copper or brass features. The short stepovers and high depth of cut make it ideal for these and other similarly prismatic part features. For example, an end mill performing optimized roughing will cut these parts three to four times faster than a comparable high-feed mill while causing significantly less tool wear.

Those same stepovers, however, prevent the use of optimized roughing for complex 3D contours and surface features. Although in theory these types of parts may still be faster to rough out with optimized roughing, the moldmaker must consider the downstream effects. Optimized roughing will produce 3D surfaces with big stair steps as a result of the large depths of cut. So, even if optimized roughing is significantly faster than using another milling strategy, it will require additional semi-finishing passes to achieve a near-net shape.

Despite this, optimized roughing remains useful even for relatively complex features when it comes to material removal. For example, moldmakers often use high-speed

Optimized roughing is ideal for straight-walled cavities and other simple prismatic features. It is similar to slot-milling applications that first employed trochoidal tool paths.

machines that prevent the use of large high-feed milling cutters. Moldmakers would ideally rough out 3D surfaces using a large high-feed mill, but without the torque to achieve the necessary large stepover for this strategy, the tool would stall against the workpiece.

In other words, while optimized roughing may require more semi-finishing, it will still be appropriate when a moldmaker is starting from a solid block of metal or otherwise needs to remove a lot of material. It may not be the optimal approach for a given part, but it is still going to get shops closer to that near-net shape faster than conventional milling, especially when heavy roughing is not an available option.

### Optimal Processes

For optimized roughing, shops should consult their cutting tool suppliers for optimized cutting data for any cutters that are designed specifically for optimized roughing. After a mold shop has determined if the part features are ideal for optimized roughing, it is time to consider the ability of the shop's current equipment to perform the cutting program. As a relatively new approach to pocket milling, optimized roughing requires modern machine tools with the processing power and software support that is necessary to handle complex cutting programs.

The most important requirement is robust CAM software that has the ability to produce an optimized trochoidal tool path. Manually coding this motion is virtually impossible without the specialized algorithms included in newer CAM

# Cutting Tools

software. Some of today's CAM software can generate an optimized roughing program simply by selecting that operation and assigning the tool definition, maximum stepover and pocket dimensions.

Optimized roughing also requires high-speed spindles, secure fixturing and a machine architecture designed for rigidity (or that is capable of holding 0.0004 of an inch or less tool runout necessary for optimal performance).

Optimized roughing is also hard on CNC controls.

Trochoidal motions require many more lines of code than moving the spindle in a straight line. Only newer machines have the necessary processing power, given the speeds and feeds that are required to create that motion.

Even with the correct CAM software and machine, optimized roughing needs the right cutting tools. Typically, those tools are end mills with eccentric outer diameter reliefs and

variable indexing to improve performance. The recommended feed rates and radial stepover for a given material dictate the number of flutes. Typically, end mills used for optimized roughing have between five and nine flutes. As a rule of thumb, fewer flutes allow for higher stepover, and more flutes enable aggressive feed rates.

Another rule to live by is ensuring the optimized roughing tool's diameter is half its cutting length or depth of cut. Beyond that, axial cutting pressures on the tool will cause deflection and poor chip formation. Particularly deep axial cuts require chip splitters, which are notches in a cutter's cutting edge that cause chips to break off before they cause problems.

For many moldmakers, optimized roughing represents the latest innovation in an industry that has seen rapid technological advancement. However, in a way that is similar to high-feed and high-speed cutting strategies, what may seem simple about optimized roughing has hidden complexities that can catch the unprepared moldmaker off guard. To fully understand optimized roughing, start with the part and the application, and then optimize from that point. [MMT](#)

#### CONTRIBUTOR

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# Visual Tools Improve Lead Times and Enable ISO 9001 Certification Upgrades

Capturing and visually documenting the processes of your shop with your employees maintains focus on business improvement, not just compliance.

Successful mold builders are constantly honing their competitive advantage while managing the challenges of receiving accurate, timely customer data for making quality parts with ever-shortening lead times. Leading shops recognize that better integration of technology, processes, worker skill-sets, workpiece processing capabilities, shop floor, program and schedule management and the effective integration of the Internet of Things and Industry 4.0 can make a significant contribution to meeting and overcoming these challenges. Upgrading your existing ISO 9001:2008 system to ISO 9001:2015 is one way that your shop can achieve this improved integration to increase employee engagement, accelerate performance improvement and increase profits.

*MoldMaking Technology* kicked off an ISO 9000 series with its premier issue back in 1998, and this certification is still of great importance today. Moldmaking requires a high degree of integration among multiple functional areas. A closer look at the standard itself and how it has evolved is important to understand how an enlightened approach to upgrading to ISO 9001:2015 will improve the effectiveness of integration and process performance for your shop.

## Challenges of a Changing Standard

As part of its ongoing improvement process, the International Standards Organization (ISO) has issued ISO 9001:2015 to replace ISO 9001:2008. Companies intending to maintain their ISO 9001 certification must transition to the new ISO 9001:2015 standard by September 15, 2018. According to the International Accreditation Forum (IAF), all certification bodies have been required to conduct all ISO 9001 and ISO 14001 initial surveillance and

recertification audits to the new versions (ISO 9001:2015 and ISO 14001:2015) starting March 15, 2018.

The upgrade involves new requirements and sections, moving specific elements to different sections and splitting and relocating elements to other sections. However, four significant changes include integrating actions to address risk, engaging interested parties, increasing emphasis on a process-based approach and a new, 10-section structure instead of an eight-section structure.

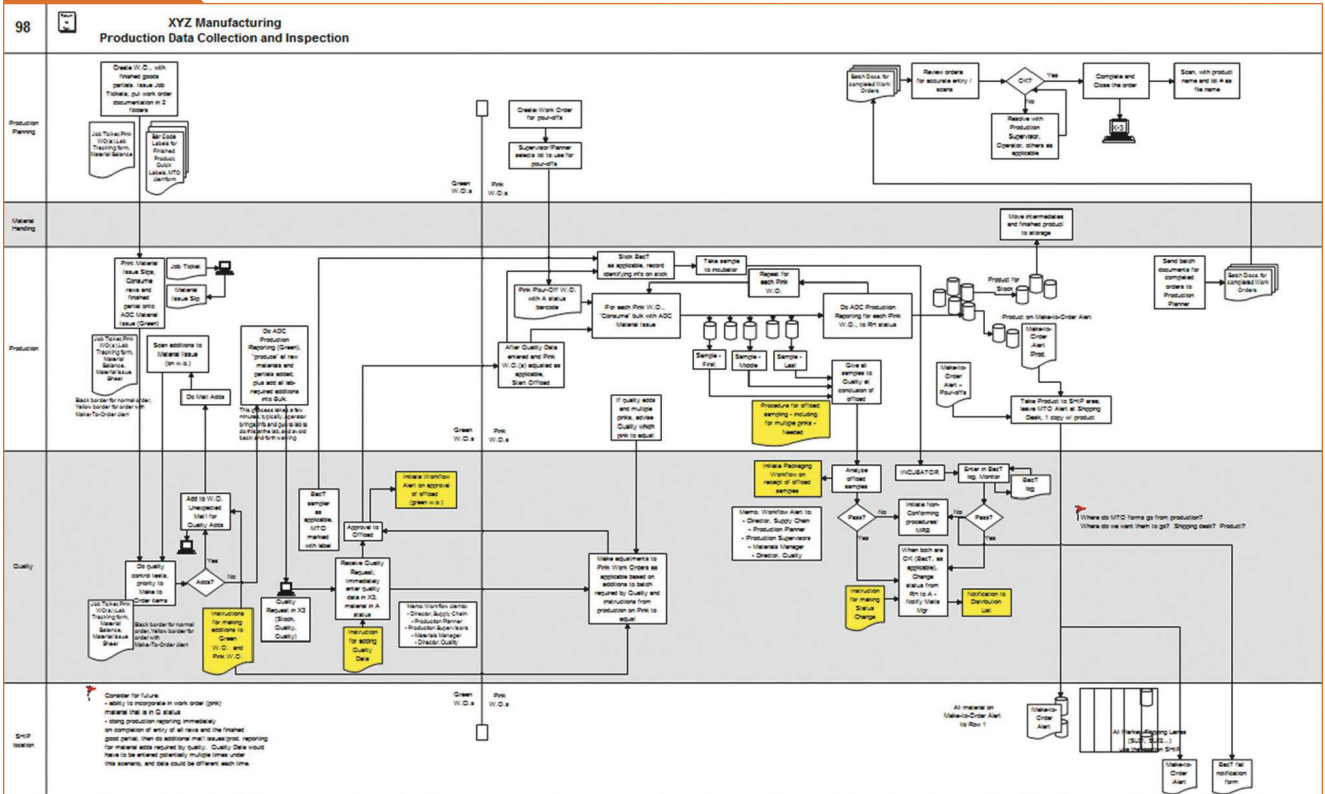
*MoldMaking Technology* kicked off an ISO 9000 series with its premier issue back in 1998, and this certification is still of great importance today.

The initial 1988 structure of ISO 9000 had 18 or 20 sections, depending on whether a company's operations included a Design section. The 1994 version eliminated ISO 9002 and standardized ISO 9001 with 20 sections. The 2000 version of the standard changed the structure to eight sections with sub-sections. The 2008

version of ISO 9001 retained this structure. The 2015 version of ISO 9001 now has 10 sections, and it includes the shifts of existing sub-sections to new areas of the standard.

If your system was based on procedures written to match the structure of the standard, then any one of these changes caused a major disruption in your system documentation. You needed (or still need, if you are retaining a procedure-based system) to find the new location of each element in the new system and re-number your sections or create another way for everyone in the organization to be on the same page.

**FIGURE 1**



Images courtesy of 4aBetterBusiness Inc.

This deployment process map is an example of a “natural process” that involves multiple functions that you might find in a mold-building operation. Each function involved in the process is identified in the left-hand column. Within the horizontal lines for each function are the activities that the function carries out as a part of the process, and the responsibilities and authorities for those actions. All of the activities are expressed in the language of the shop, not in the language of the standard. The map clearly shows inputs, activities and outputs that are part of the process. This view of all the interactions in the process facilitates identifying risk and process changes that can eliminate or minimize risk.

Even if you manage to keep track of all these changes, you still end up with thick notebooks of procedures. These text-based documents may describe your business in terms of the standard (literally, “document what you do and do what you document”). However, these documents represent a bureaucratic layer of documentation that is on top of your business, not a part of it. These documents do little to help you address and overcome the challenges that are described in the opening paragraphs of this article.

A procedure-based documentation system also complicates your ability to achieve a significant objective to address risk, which is introduced in ISO 9001:2015. A procedure-based system breaks the natural connections in a company’s operations down and re-distributes them according to the sections of the standard. Without a clear picture of the connections among all the processes of the business, it is difficult to get a meaningful grasp of risk, especially in the complex operating environment of a mold builder. A separate risk analysis process on top of procedure-based documentation further complicates the system without effectively identifying and eliminating or mitigating risk.

### Using Process to Solve the Problem

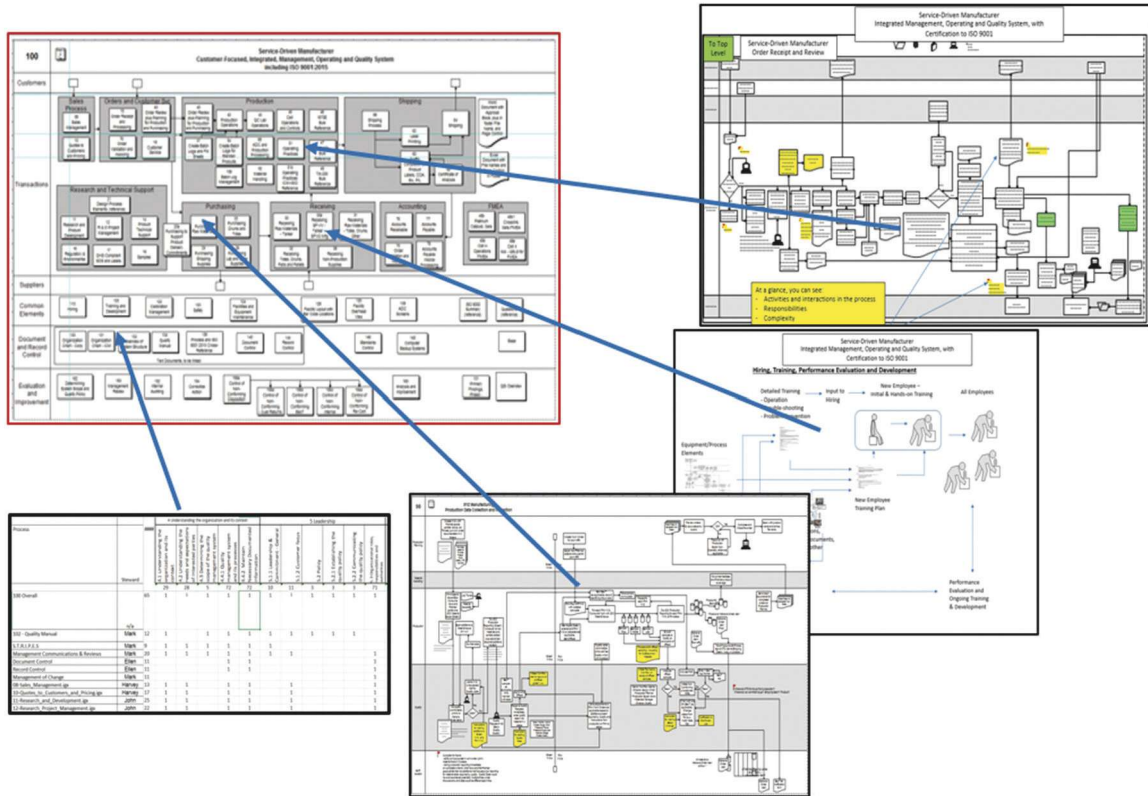
While procedure-based systems start with the standard and work backward, process-based systems start with the actual activities and processes of your business and support your management and employees in moving your shop forward.

For the first time, the ISO 9001:2015 standard explicitly recognizes principles involved in the use of visual, process-based systems and a compliance matrix to achieve improved performance and certification. The standard states, “It is not the intent of this International Standard to imply the need for alignment of documentation to the clause structure of this International Standard and use of the specific terminology of this International Standard within the organization.” In other words, you do not have to incorporate the specific words in any element of the standard in your documentation.

The foundation for developing visual, process-based systems is identifying the actual activities that take place in your shop, within and across functions and levels. These activities are then gathered into the “natural processes” of your business, which are defined as ones that have logical start points (a clear



FIGURE 2



A company-wide, visual, process-based system captures all of the processes of the business, producing an integrated management, operating and quality system. Each box on the top-level map is linked to a detailed deployment process map.

## Visual Process Capture in Action

A company facing operating challenges used a visual, process-based system and attained big dividends. The company was operating at 50-percent on-time delivery. Finding the means to improve delivery performance through the text-based system it had in place was not improving the situation. After performing a company-wide, visual process capture in 30 days, the company immediately identified and implemented a set of actions that raised performance to over 86-percent on-time delivery. This included design, development and implementation of a production-data capture system using bar codes in three weeks from concept to full operation.

To achieve the next level of performance, the company performed a major computer system upgrade to integrate the production data into the company's material requirements planning (MRP) system. The common understanding of processes that were identified eliminated multiple issues, preventing the types of delays and implementation failures that are common with large system upgrades. On the day of the cutover to the new system, each production area completed processing of a full order through its area within four hours. The company was able to achieve and sustain 96-percent on-time delivery while reducing inventory by 22 percent.

input or set of inputs), processing and activities that occur from that point, and a clear output or outputs.

The activities that actually take place often differ from what the existing documentation of the system describes. For example, documentation may be out of date because of the typically cumbersome actions that are required to update a procedure-based system. Text-based procedures make it easy to leave "loose ends" in describing how operations work, and the documentation may not address real issues in an integrated business like mold building. Alternatively, where parts of the system are not documented, differing perceptions of how a process actually works may exist. For example, there may be differing perceptions among the employees at your shop over the work your shop performs, the problems that exist and the opportunities that are available.

Figure 1 is an example of a deployment process map, which clearly establishes the functions involved in a process, the activities in each function (with responsibilities and authorities) and inter-relationships among activities in different functions, all in one place. This natural process shows what functions are involved, the inputs, the sequence and the interaction among the activities in the various functions, transfers of information or

material to different functions and the outputs of the process. This visual view also provides a visceral indication of the complexity and potential risks involved in the process. **Figure 2** shows all of the individual natural process maps linked to a top-level map, creating a company-wide, integrated management, operating and quality system, which is completely focused on the company's processes and operations.

### Identifying Activities and Information

The best sources for the information on the actual activities within a business are the existing documentation, people overseeing the work and people doing the work. The accuracy of existing documents can be suspect for several reasons, including the difficulty with updating procedure-based systems that can cause existing procedures to be out-of-date or no longer applicable as written. Also, text-based procedures lack the essential "a picture is worth a thousand words" characteristic of a deployment-process map, and they have loose ends that are not apparent.

Managers, supervisors or others not doing the specific work in a process every day may have expertise in the area, but they often lack the detailed, hands-on knowledge that is essential in capturing the actual actions and interactions from which issues and solutions can be developed. The people who actually do the work can share what actually happens. For example, they can describe the variety of situations and interactions among people inside and outside of their functional areas and any developed workarounds. The people who do this every day are the world's experts at knowing what they actually do (which is their local system) and are the best source of the information about how current activities and processes actually work.

Effectively capturing existing activities and processes should be conducted on a no-fault basis, which means that



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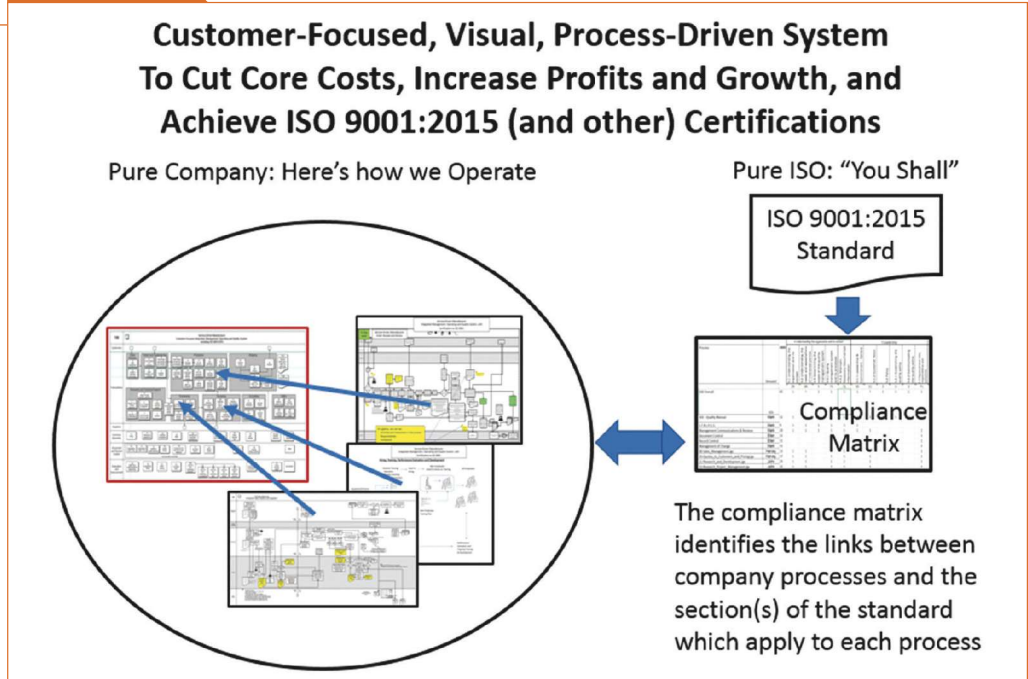
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FIGURE 3

In an Excel spreadsheet, this compliance matrix lists, across the top, all the sections and paragraphs of the ISO 9001:2015 standard. The left-hand side of the matrix lists all the processes of the shop. Each process is reviewed and the sections and paragraphs of the standard, which are addressed by that process are indicated by a "1" at the intersection.



any issues identified should not be fodder for blame but should be pursued as opportunities to further develop and grow the business. Pursuing the required actions quickly with the management and employees involved as part of the solution will develop buy-in, participation and contribute to change.

Another essential feature of the capture and documentation process is an objective approach to identify what actually happens without incorporating assumptions or bias to solutions. Outside resources can provide this objectivity while avoiding internal conflicts, and outside sources can shorten the time

required for a full capture of the system.

#### Complying With Standards and Achieving Certification

Any given process area of your shop can address multiple elements in ISO 9001:2015, and one element

This approach enables you to keep your processes in the language of your shop while easily demonstrating compliance to ISO 9001:2015.

of ISO 9001:2015 can be addressed in multiple areas of your shop. A compliance matrix (see Figure 3) will make identifying connections and demonstrating compliance easier. This matrix consists of a list of the company's processes on the left-hand side and a list of the standard's elements across the top. For a given process, the body of the matrix identifies which elements of the standard are addressed. For a given element of the standard, the body of the matrix simultaneously indicates

which processes in the company have content that addresses that element of the standard.

This approach enables you to keep your processes in the language of your shop while easily demonstrating compliance to ISO 9001:2015. In fact, you can use the same approach to demonstrate how your processes comply with other standards (ISO 14001, IATF 16949, AS 9100 and so on) without creating separate systems.

It is widely recognized that many of the issues facing companies today are embedded in the system, which includes people, processes, information, technology, machinery, equipment and culture. To identify and address these issues, engage your employees, capture the actual activities and interactions in your shop, document the language of your business visually, focus on developing a common understanding of activities, risks and opportunities and take action immediately to develop buy-in, participation and contribution to change. Using the visual, process-based approach to upgrade your certification to ISO 9001:2015 will yield outcomes that improve lead times and increase business growth and profitability. [MMT](#)

#### CONTRIBUTOR

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# Making Sense of Financial Statements

Asking the right questions when reviewing a profit and loss statement will facilitate better decision making.

The mid-way point to 2018 is here, and it brings with it the running, printing and emailing of various reports like financial-based statements. Take, for example, the balance sheet and human resource reports detailing attendance or operational data, like Overall Equipment Effectiveness (OEE). Whether these reports are sought out or thrust upon mold builders, the information the reports contain can help mold shop owners, managers and operators to understand their business better and improve decision making.

One prominent example of these reports is the profit and loss report, which is also known as an income statement. Many mold builders look to this report to answer the question, How did we do? This question takes many forms, depending on who is asking. Many mold builders ask, Was there a profit or a loss? What was the material expenditure? What was the revenue in each department? How much was spent on overtime?

While these are all valid questions, none of them help mold builders make decisions. Mold builders need to ask different questions to facilitate decision making. Managers should ask questions like, What was our profit percentage compared to industry averages? What was my material expenditure this quarter compared to a year ago? How did departmental revenue compare to budget? What percentage of total payroll was overtime?

The primary difference with the latter questions is that mold builders are not viewing the report in a vacuum. Instead, they are comparing the data to the budget, actual performance in other periods or years, industry averages or other benchmarks. They also analyze the relationship of items. For example, a mold builder looks at each expenditure as a percentage of its parent expense group.

## The Percentage Key

To ensure that the information is easily comparable, it is paramount that mold builders use percentages rather than actual dollar amounts. The most used income statement

base component for profit and loss analysis is revenue, but mold builders should also examine subcategories of major expenses. This would simply make the revenue number 100 percent and each line item below it somewhere between 0-99 percent, depending on the amount.

Using percentages enables a comparison between departments, divisions and companies of different sizes. The performance of a department that spends \$1,000 per month on steel versus one that spends \$100,000 at first glance may seem impossible or even impractical. However, when a mold builder looks at that number as the percentage of raw material purchased or percentage of revenue that went toward steel, he or she can perform valuable analysis.

Dollar amounts can also be misleading. Being \$10,000 over budget in payroll could be alarming upon first look. If revenue is \$50,000 over budget during the same period though, it may not be a concern. In fact, if target payroll is 25 percent of revenue, the overages this period would be viewed favorably at only 20 percent.

At a minimum, mold builders should always compare actual percentages to the period before the one that is being measured, the same period in the previous year and to the budget for the current period. If a mold builder obtains additional information from the state, industry or sector, it is advisable that he or she use this data as well. Mold builders can do deeper dives into the data by looking at several periods or years in a row.

Mold builders should also concentrate on the differences in the same item between periods or budgeted and actual totals. The goal is to uncover trends. This type of analysis allows for management by exception, which is a practice that focuses only on items that have a sizable variance. Management by exception is the practice of examining the financial and operational results of a business and only bringing issues to the attention of management if results represent substantial differences from the budgeted or expected amount. It is lean management at its finest!

## Investigating Trends

It is important for mold builders to investigate the cause thoroughly when significant trends, positive or negative, are discovered. Mold builders can do this by reviewing additional data, performing a visual inspection and asking questions. For example, during an OEE analysis, a vertical machining center's performance is shown to be substantially lagging historical output. In this case, it may be necessary to review attendance reports, training records and preventive maintenance logs and interview employees before a solution is determined.

Once the mold builder determines a solution, he or she should devise and implement an action plan that contains a measurable and timely target outcome. In future periods, the success of the strategy will be evident by what happens to the data. If the shop does not achieve the desired result, the action plan may not be sufficient, or it may not have uncovered the actual problem. When the mold builder applies the right solution to the right problem, the data will reflect it.

While these reports can be extremely valuable management tools, they can have limitations as well. Information must be accurate and credible for it to be useful. Systems must be in place to make certain the mold builders are not using data that has been corrupted or misrepresented.

Another potential issue is that reports may conflict. A safety report could show an increase in accidents during a period when employee attendance improved. This outcome is contrary to what the shop expects. Mold builders should always investigate these contradicting statistics down to the root cause of both the negative results (more accidents) and positive results (better attendance).

### CONTRIBUTOR

Charlie Daniels is chief financial officer for Wepco Plastics Inc.

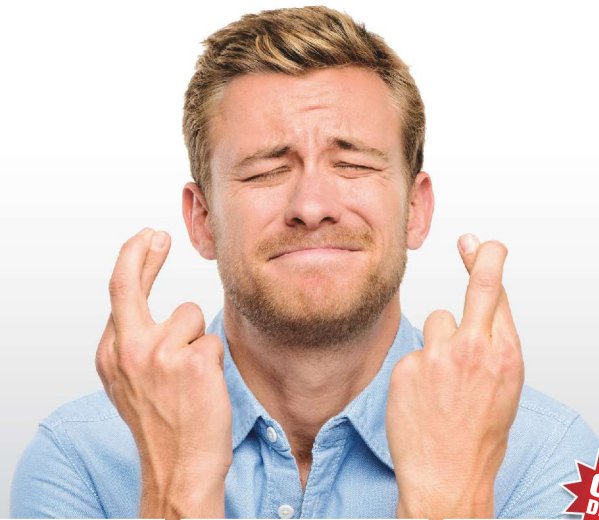
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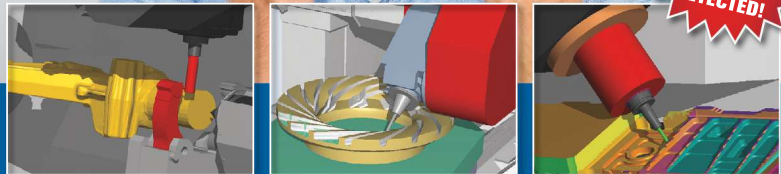
The mold building industry has access to more data now than at any point in history. If you look at your data differently, it can drastically improve your decision making and increase your shop's chances of success. Hopefully, this column has encouraged you to uncrumple your recently discarded profit and loss report and give it another look. In August, I will review pricing. Are you confident that you are charging the right amount for your molds? Until then, happy analyzing! **MMT**

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# What's Behind Germany's Apprenticeship Success?

Germany's apprenticeship approach has often been replicated by other countries, but the copy has rarely achieved the desired success. One of the secrets of its success lies in the country's legacy of vocational education and the fact that "vocational" is not a bad word.

**N**iklas, an 18-year old apprentice, is operating a deep-hole boring machine at Deckerform's mold shop in Aichach, Germany. Although he is only in his first year of training, Managing Director Anna Tschacha is convinced that the young apprentice has already acquired enough skills in mechanical machining to be working the machine on his own. "Since I've learned about the trade at our technical college via internships, I wanted to be an industrial machinist," Niklas says. "Many of my friends are learning a trade in the field of manufacturing, and it is a well-respected profession. Friends told me about Deckerform and recommended the company as a vocational training company, which is also only a 10-minute drive from home. I have never regretted my decision to start my career here because management supports and encourages every employee, including the apprentices.

Niklas is one of what are currently 15 apprentices in the 80-men-strong company, which trains apprentices in machining, toolmaking, product design and project management.

Founded in 1992 as Deckerform Production Systems with around 35 employees, the mold shop has developed into a leading player in the international tool and moldmaking world. Managing Directors Rosemarie Linzmeier-Tschacha, Anna Tschacha and Franz Tschacha have always stood behind their slogan that the development of plastic products is their passion and that motivated and highly-skilled employees always deliver the best performance.

## Apprentices Secure the Potential for Growth

It certainly pays off for Deckerform to invest in its employees because for many companies, it is not easy to find skilled staff. This is especially true in the states of Baden Württemberg and Bavaria, where the youth unemployment



Images courtesy of Barbara Schulz.

According to Deckerform Managing Director Anna Tschacha, it is important to put the word out there and educate young people about the various vocational training opportunities and trades that are available. Founded in 1992 as Deckerform Production Systems with around 35 employees, the mold shop has developed into a leading player in the international tool and moldmaking world and currently trains 15 apprentices in its 80-men-strong company.

rate (for persons 15–25 years of age) is the lowest in Germany. Here, only 2.5 percent of people in that age range were unemployed in Baden Württemberg in March 2018 (where companies like Daimler Chrysler, Bosch, Porsche and many other big players are located), and 2.7 percent were looking for jobs in Bavaria, where Deckerform is based. In March 2018, the youth unemployment rate for 15–24-year olds in

Germany was 4.8 percent, the lowest rate in the European Union, where the unemployment rate was 15.9 percent across all member states.

As a result, most companies like Deckerform do not have a choice but to take on apprentices to meet their long-term supply of adequately trained workers to secure the potential for growth and innovation. However, many small and medium-sized enterprises (SMEs) in other countries fear that apprentices will leave at the end of their apprenticeships, taking their skills with them. German companies do not share that fear, and the majority of apprentices stay.

So, what is different in Germany, and why does its apprenticeship approach seem so hard to copy? To answer this question, it is important to shed some light on why manufacturing is more appealing to (young) people in Germany than in many other countries, including the United States.

Part of the story involves history and culture. Germany's industrial power was built on a core of family-owned businesses, many of which date back to the 19th century and which often operate out of small towns, similar to the aforementioned example of Deckerform. These family-owned businesses plan for the long term, pride themselves on quality and see themselves as having social obligations to the local community. These companies thrived in the decades immediately after 1945 when the economy boomed as a result of the need to rebuild a war-ravaged country. Moreover, while many companies look for hitting short-term targets, the Germans have been able to concentrate on making small improvements to their products that help to keep them ahead of the field.

And then there is the support that is given by the state. One key pillar of support is provided by the Fraunhofer-Gesellschaft, a part publicly-funded research organization



"Since I've learned about the trade at our technical college via internships, I wanted to be an industrial machinist," Niklas, a young apprentice at mold shop Deckerform (Aichach, Germany) says. "Many of my friends are learning a trade in the field of manufacturing, and it is a well-respected profession."

that provides applied science for companies that would otherwise find the cost prohibitive.

### Place an Emphasis on Vocational Training

Another part of the story involves vocational training, which enjoys an excellent reputation in Germany. The emphasis on vocational education combined with academic studies and on-the-job training for apprentices is globally admired.

The fact that Germans are accustomed to the work-study model masks some of the challenges other countries might face in adopting it, such as doubts about the value of vocational training. The apprenticeship route is a genuinely respected and valued alternative to college or university, and it pays off.

"Learning and earning" on the job is an attractive alternative to studying, leaving many students with a crushing level of student debt. "We are paid to learn, how great is that?" Niklas says. "We gain an education while incurring little or no debt." On the other hand, employers like Deckerform gain a pipeline of skilled workers who have been shown to increase productivity and boost the bottom line. It's a win-win.

The same is true for Anna-Lena Amon, apprentice for Mechatronics at Hofmann Innovation Group (Lichtenfels, Germany). Like many SMEs in Germany, the tool and moldmaking company knows that to give back to the communities where its employees live and work is an important corporate social responsibility. For example, Hofmann participates in an educational program known as Girls Day. Each year, manufacturing and technology companies in Germany are invited to host a career day for young females, ages 12-16, in which they educate the girls on various technical and professional careers. Girls Day has evolved into an important recruitment philosophy, encouraging and motivating female participants to seize career opportunities in vocational training and technical areas that typically have had fewer females.

"Next to the mandatory internships at our Realschule [which is a secondary school preparing students for apprenticeships and vocational qualifications in Germany], I participated in Girls Day to find out what vocational training would be right for me," Anna-Lena says. "I tried different things in care facilities, manufacturing companies like Hofmann and offices. I found that a technical profession would be most suitable and applied for an internship at Hofmann, where I ended up staying and started an apprenticeship in Mechatronics."

"In the first year of apprenticeship, we are almost exclusively in our training workshop, practicing turning and milling. Then there is the basic training in pneumatics and,


The fact that Germans are accustomed to the work-study model masks some of the challenges other countries might face in adopting it.





Machine tool manufacturer Grob (Mindelheim, Germany) employs 100 new employees each year and is closely cooperating with local schools to find the right students interested in a technical career.

for example, learning how to work with cordless screwdrivers, cutting threads, or making a hammer with the help of files, milling and turning,” Anna-Lena says. “But apart from what Hofmann teaches us to learn the trade, it is the general atmosphere within the company that is appealing and makes you want to go to work every morning. It is a family business where people care about you and let you take over responsibility for certain jobs right from the start.”



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## Internships Give Initial Impetus

Jonas Kluge, a young apprentice in industrial machining at Mayer Feintechnik (Göttingen, Germany), has also found his way into the profession through an internship. Jonas decided to “test” the job he had chosen, called a “one-year internship,” before starting an apprenticeship after school. “This is common practice in Germany,” he says. “You get a one-year contract similar to the one for a regular apprenticeship, which defines your workload and subjects. You join the apprentices going to Berufsschule and get a small salary as well as social insurance.”

Apprentices earn a wage of 750–1000 euros per month, which is not a great earning, but enough to get along and make a living while learning a trade and going to school. More than 350 professions are officially recognized as training occupations in Germany, and more than 60 percent of high school graduates regularly participate in the apprenticeship system. That’s because Germany’s labor market values workers trained for specific occupations.

“The way this dual training program works is that students apply directly to employers for apprenticeships,” Niklas says. Companies like Deckerform usually try to recruit their apprentices via newspaper ads, participation in trade shows, job fairs and participation in various fairs of the Chamber of Industry and Commerce (IHK). According to Anna Tschacha, it is important to put the word out there and educate young people about the various vocational training opportunities and trades that are available. How many know what a tool maker or moldmaker at the age of 15 is doing? Not many, that is for sure.

## Encourage Kids Early

As a result, it is important to encourage young people to start thinking about their future early. Many students are allocated to high school (known as gymnasium at the age of 10) to prepare for the “Abitur” (the A-level-equivalent qualification needed to get a place at university), while others go to schools dedicated to vocational education before choosing apprenticeships or specialist vocational schools at the age of 14 or 15. From the age of 14 (depending on the respective state), all school children have mandatory internships in different companies. The mandatory internships last two to three weeks and are conducted at local companies. Students can also visit a career adviser in their local region for one-to-one advice and guidance.

One reason why many kids decide to start a career in engineering or manufacturing in Germany is that it is a valued occupation, and local companies are deeply involved in their local communities to further spread the word. Together with the education system, employers are there to help young adults succeed if they aspire to get into the industry.

The German system is not without its flaws, of course. Falling numbers of students, the threat of a shortage of skilled

workers and often problematic transitions into the job more than ever require close cooperation between schools and companies. Therefore, the IHK supports partnerships between schools and companies. The aim of the school partnerships is that secondary schools and companies cooperate, develop a better mutual understanding and benefit from each other.

Machine tool manufacturer Grob (Mindelheim, Germany) is one of many companies cooperating closely with local schools. Considering that the company employs 100 new apprentices per year in mainly technical professions, it is evident they need to go out there and recruit students to work for them.

One of the projects that the 4,500-men-strong company is engaging in is called “Come with me,” where Grob apprentices go to secondary schools to conduct a specific technical project with interested kids. “The project takes about six school lessons, and one apprentice builds something like a small saw or some other tool together with four or five school students in grade seven or eight,” Manager Mechanical Training Department in Mindelheim Werner Drexel, says. “Moreover, we go into ‘Realschulen’ where we cooperate with selected schools on long-term projects. Here, students simulate a job interview with us. They come to Grob for internships—also during their holidays—and learn about the complete manufacturing chain including design, manufacturing, quality control, assembly and hand-over to the customer.”

According to Drexel, Grob is not only interested in recruiting potential trainees or apprentices but is also


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committed to conveying an interest in technology, manufacturing and skills to students in secondary education.

Back at Deckerform, Anna Tschacha says, “Our apprentices usually stay at our company because we value their work, and they know that we encourage and support them. Most applications come in via word-of-mouth because people know Deckerform is a good place to work. It pays off to value vocational education and to invest and have a stake in it.” 

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# Determination and Skill Save Critical Micro-Mold Cavity

By Cynthia Kustush

Team 1 Plastics Inc. (Albion, Michigan) operates 24/7 molding plastic parts for the automotive industry in presses ranging from 25 tons to 300 tons. As the name Team 1 implies, the company's success is built on teamwork and a culture that revolves around continuous improvement, excellent customer service, flexibility and reliability. When a serious problem arose concerning a complex production mold that has been in service since 2011, Team 1 Plastics Inc. (Team 1) found a new supplier "soul mate" in Alliance Specialties and Laser Sales (Wauconda, Illinois), which displayed a commitment to and the skills for a successful solution.

Parts that Team 1 molds typically fall into three categories that include precision components, transparent plastics, enclosures and housings. The company specializes in molding small, intricate, precision components and also offers light assembly services. The complex production mold for which Alliance Specialties and Laser Sales (Alliance) found a solution produces small precision components.

### Tiny Damage Poses Big Problem

This precision mold is a two-cavity family mold, which means it produces two separate and distinct parts. While one cavity makes parts, Team 1 employs a hot-runner shut-off to the other cavity so that only one cavity is in production at a time. The company maintains inventories of each part to ship quantities as needed to its customer. Dave Seedorf, who is Team 1's engineering manager, says that not too long ago, the second cavity was in production for months before it became



Image courtesy of Alliance Specialties and Laser Sales.

A steady, skilled hand and an educated approach that comes from years of experience were the key differentiators for Team 1 when it turned to Alliance with an urgent micro-mold repair that other vendors would not touch. Alliance's Project Manager and polishing expert Kirby Jednachowski (pictured here) and Laser Welding Foreman Rick Hendry knew what to do and saved Team 1 thousands of dollars and the weeks it would have taken to build a new cavity block.

### TEAM 1 PLASTICS INC.

**PROBLEM:** The cavity block for a very small, complex part was damaged by broken ejector blades and proved nearly impossible to repair.

**SOLUTION:** Alliance Specialties and Laser Sales employed expert laser welding and a combination of ultrasonic and microscopic polishing.

**RESULTS:** The mold was properly repaired and is back in production as before, saving significant time and money.

necessary to switch to the other cavity to replenish the inventory of the other part. Team 1 was switching between cavities when it discovered the damage. "When we started production, we realized something didn't look right," Seedorf says. "The tool was producing a part that was in such bad shape that it was not even possible to trim excess material off the part to meet orders. We knew that whatever inventory we had on-hand was it, and that raised the situation to a whole new level of priority."

The part that the mold produces is a lens, or a light pipe, and it fits into a heater control unit in an automobile dashboard, he says. The part itself measures 27.24 millimeters wide by 26.71 millimeters high and has seven "legs," each with





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an undercut that helps secure it in place when assembled. An LED bulb goes up into the middle of it and then lights the small features at the tips where they are visible. “The way the tool is constructed, you have a block and the visual tips of the part are embedded into the block itself about 2.5 inches down. The width of each tip of the part is about 1.6 millimeters, and the distance between the ejector blade and the textured tip is about 0.5 millimeter. Each leg is spaced about three millimeters apart from its neighbor. It was near the parting line of these tips of the features to the body of the part where the breakage took place, in between the ejector blade and the visible textured tip of the insert.” The trouble, Seedorf says, was that no one—not even the mold manufacturer who originally built the tool—wanted to attempt to repair the cavity that molds the tiny part, and that posed a big problem. Every mold shop he turned to told him it was not feasible to reach down into the cavity to be able to weld it and, even if it could be welded, it was not possible to go back and try to properly blend the weld and recreate the textured finish. They said that a better solution would be to build a new cavity block.

Seedorf admits that he was getting a little panic-stricken, but then he recalled meeting brothers Tony and Chris Demakis of Alliance Specialties and Laser Sales when he attended Amerimold 2017 in Chicago. “I remember Tony and Chris showed me some of their areas of specialty includ-

ing laser welding, mold repair and mold polishing. What is unique is that they do this all in one location, but at the time, nothing told me that I should do business with them because, for one, we have an in-house tool room,” he says. “We also have several tooling vendors here in southwest Michigan, so I thought, ‘Why would I send work to Chicago?’” He would find out soon enough.

## Repair or Rebuild?

Faced with the very real possibility of having to hire someone to build a new cavity block and remembering his conversations with the Demakis brothers, Seedorf says he decided he would contact Chris at Alliance as a last resort. He figured that he would see if Chris could offer a workable solution. After describing the problem over the phone, Seedorf emailed Chris a model of the part and a couple of photographs. “When I looked at it, I knew that I was only looking at the model, but I called Dave and said it doesn’t look like it is in a bad spot. I told him that I thought we could fix it,” Chris Demakis says. Seedorf explained that he went to the original toolmaker, who said that the part is scrap and that a new cavity block and ejector blades were required. Demakis replied, “If that is the case, send it to me and I’ll take a closer look at it.”

“I sent Chris a lot of information and sample parts, good and bad,” Seedorf says. “To be honest, I fully expected that Alliance would reply in the same way as the others—that repairing the cavity was not feasible—and that is kind of what happened.”

“The parts came in along with the custom ejector blades and cavity block,” Demakis says. “It can be tricky quoting work just looking at a model because you don’t get the full perspective of how big a part is or, in this case, how small it is. I showed my dad (Owner John Demakis) and others at Alliance, who told me that there was no way to get in there and fix it. I explained that I could not call Team 1 and tell them I couldn’t fix it unless I had exhausted every option that I had.”

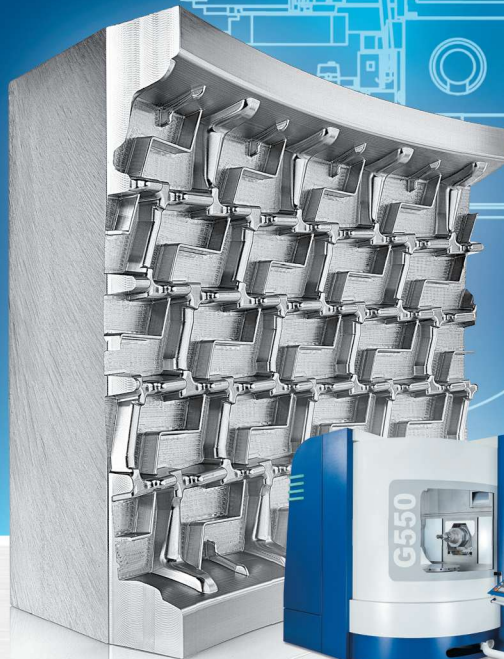
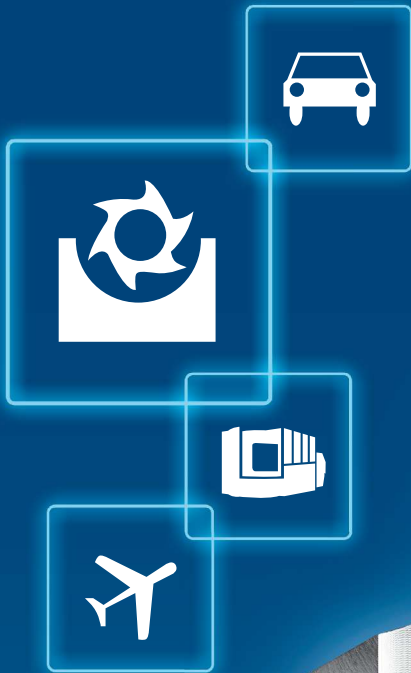
Despite continued objections, Chris Demakis and his brother Tony offered Seedorf a deal. They told him that if they fixed it and it worked that he should pay them. On the other hand, they told him that if they tried to fix it and it was catastrophic that they would not charge him. Demakis says, “It was a risky thing to do, so I was determined to find a way to do it.”

“Chris reassured me that there were no guarantees, and we understood that,” Seedorf says. “But I think at that point we were kind of stuck in desperation mode and willing to try something.” Seedorf says that the company’s alternative was to spend thousands of dollars on a new block. Getting a new block would take eight to ten weeks, not including necessary time for sampling, layout, dimensional tuning and PPAP time. “With no inventory, what were we going to do for the next eight weeks to help our customers meet their orders?” Seedorf says. “Chris confirmed that laser welding can get



Image courtesy of Team 1 Plastics Inc.

This micro-sized part was molded by Team 1 Plastics using the repaired cavity block and shows the repaired legs restored to the customer's specifications using precision laser welding and polishing.



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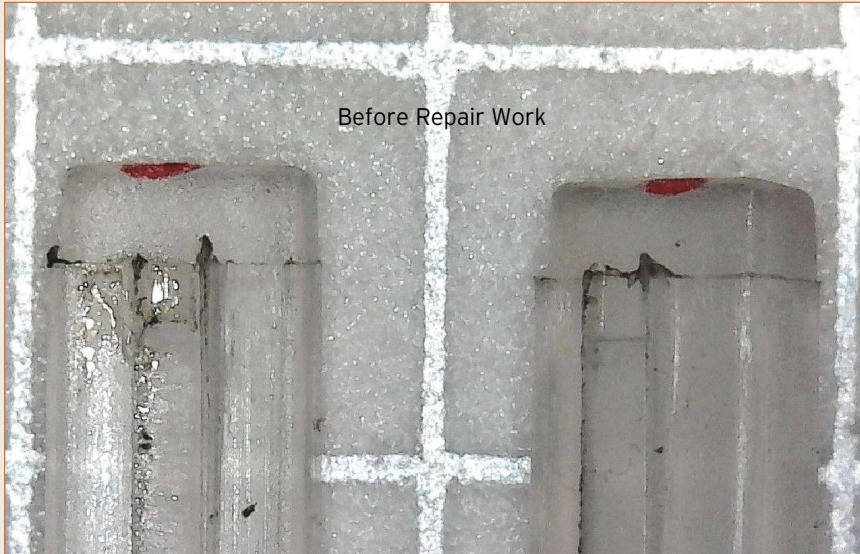


Image courtesy of Team 1 Plastics Inc.

This image shows Team 1's mold prior to repair. A closeup view of the two tips measuring only 1.6 millimeters wide and three millimeters apart shows serious imperfections from missing mold material and slightly worn ejector blades. The tips are visual and light up as part of a heater control unit in an automobile dashboard. To repair this, Alliance's team had to be able to laser weld and polish about 2.5 inches down into the micro mold's cavity block, a feat no one else thought was possible.

down in there, but what process can clean that out?" Team 1 did not have the original electrodes. "The alignment of that part had to be really dead-on, otherwise it could cause mismatch issues and other problems."

Looking more closely at the tooling, Chris Demakis noted that there was a small issue with one of the ejector blades. "The blade was worn out slightly, and there was an undercut, so it was creating a lot of flash in the detail at the bottom of the rib. I zoomed in with a 10x microscope and marked the spot. In the cavity, only two of the seven identical legs were bad." However, he says that on the mold, the damage was located about 0.125-inch *inside* the parting line, not on the actual edge as he expected, and that there was mold material missing with high spots on the outside, which further complicated the repair. "That is why the lifter couldn't form the detail correctly," he says.

Alliance's laser welding foreman Rick Hendry applied his expertise and went to work using the company's Vision Unixx 300W Fiber Laser Welding System to rebuild the missing metal deep inside the cavity. "Because the process of laser welding is so precise with minimal heat displacement, it was the only possible way to get down into those difficult areas to make the repair without risking damage to other areas of the cavity," Hendry says. He adds that typical welding processes require users to heat the surrounding area to accept the weld, whereas laser welding sends very quick pulses of focused heat to very specific areas with minimal heat distortion to surrounding areas. "The area in this cavity has details in and around the damaged section that needed to be maintained and therefore avoided," he says. "Using the laser, I was able to melt the high spots back to the middle and create as flat a surface as possible so that I had a better welding surface." Hendry says that this is a preferred method because it lets the welder use as much of the original

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base material as possible, which reduces the amount of added foreign material while also cutting down the post-polishing work that is necessary. "Once we reestablished some of the missing material by evening out the high spots, I went in with a 0.003-inch diameter wire and made multiple passes to build the damaged area back up so that it matched the customer's prints."

"Our biggest advantage in a case like this is that we have guys like Rick who have been laser welding for about 10 hours a day for 15 years," Tony Demakis says. "I believe this is unheard of as most welding houses have TIG and laser welders, so they split time between the two and may not use them daily like we do."

Following the laser welding process, Alliance Project Manager and polishing expert Kirby Jednachowski finished the repair job, blending and restoring texture to the micro-sized cavity. "For years, we have used Diprofil ultrasonic polishing equipment, which enables us to remove minimal stock in a very controlled process. It is ideal for the most intricate parts like this one where sizing and tolerances are critical and re-machining is impossible," he says. "The part was set up using a 10x microscope so that the area that needed to be polished could be clearly seen." He says he used an 800-grit ceramic stone to blend out the weld with the existing stock from the tool until it was even. "We did have a sample part that was used to fit in the block, so I needed to be vigilant with stock removal until the part was able to fit into the tool freely. If I did not blend the weld out correctly the part would not have fit. The process was a bit painstaking but worked out perfectly. The result was a satisfied customer with a functioning tool."

"Chris communicated that they were going to bench this in using a similarly-sized ejector blade and some lapping compound," Seedorf says. "They just worked it in, and I thought, 'Wow,' because so many toolmakers hate the lapping process these days. But, a project like this proves that there is a time and place for it."

### Skills and Confidence Defy the Odds

"Within a couple of weeks and before our required completion date, the repair work was completed and returned," Seedorf says. "It actually took Alliance just five days to complete the repair, which is pretty quick. The Alliance team also laser-welded the ejector blade corners and fit them by hand into the core block, which was not part of the original conversation. It was incredible." Team 1 sampled the cavity at its shop, and the repair work was a success. Currently, it runs production on the repaired mold and things are "back to normal," according to Seedorf.

"Obviously, the laser welding process was key, but the other significant factor was the can-do attitude put forth by Chris Demakis," Seedorf says. "Many toolmakers have been forced to take full ownership of repair work over the years, and stepping out of the comfort zone of ordinary repair work is unusual these days," Seedorf says. "This is very short sighted, and it is why most toolmakers walk away from these types of challenges every day. Chris was aware of the criticality and took it very personally to help us out of this jam." **MMT**

### FOR MORE INFORMATION

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## Manifolds: To PM or Not to PM

By Steve Johnson

The frequency of hot runner mold preventive maintenance (PM) is commonly debated across the molding industry. Opinions concerning manifold PM frequencies range from too short to too long. As a matter of fact, the opinions are as varied as the manifolds themselves, even among manifold companies.

One manifold supplier once told me that since it cannot control the environment in which its manifold is run, it does not make recommendations. This line of thinking makes perfect sense on one hand, but at the same time begs the question, “Well, if you could control the environment, what PM frequency would you recommend for a valve gate or fixed gate system running a specific resin, and what would you do to the system?” A common answer is, “Send the system back to us when it stops performing and we’ll determine what it needs and how often.” Trying to perform PM on a hot runner system after it needs maintenance puts the customer back into fire-fighting mode.

### Frequency Facts

I reached out to several small and large manifold manufacturers to discuss recommended PM frequencies and related anxieties. Some suppliers offered general PM information online, which is helpful as a starting point. Others verbally recommended frequencies that range from 150,000 to 2 million cycles, running non-abrasive resins in valve gate systems. Still other suppliers had no information online, would only discuss maintenance for a specific system or refused to recommend any frequency, citing the aforementioned “environmental” factors.

Molding companies that perform their own in-house manifold PM also shared their frequency recommendations. Molders who track product frequencies discovered that a manifold cycle count, corresponding with historical cavitation loss, helps determine the best time to work on the manifold. This approach allows the molder to schedule the PM accordingly and greatly reduce the chance of a costly breakdown.

However, the majority of molding companies use a “when we start to have issues” decision-making process, which does not use a real cycle-number set. A few molders have an actual cycle count that dictates a desired PM frequency, but they are unsure how they derived that number other than noting that



Images courtesy of MoldTrak.

Many hot runner manifold issues are eliminated when molders better control the environment in which the molds are run and maintained.

using the number they mentioned is “the way we have always done it.”

This fact-finding mission proved that clearly setting accurate PM frequencies is a gray area rooted in a lack of reliable information on how hot runner systems perform over time (in cycles per issue), what should be done and when.

### Manifold Problems

Hot runner defects are the second most common manifold problem following flash as the top production stopper. The chart below is a snapshot of hot runner defects reported by 12

Hot Runner Defects	Count	Percent of Total Issues*
Self Blocked/Froze Off/Won't Shoot	2,868	50.84%
Gate Vestige Issues/Strings/Flash	1,593	28.24%
Bad Heater	639	11.33%
Bad T/C	325	5.76%
Manifold Leaks	84	1.49%
Hot Drop/Nozzle/Sprue Issues	66	1.17%
Degraded Material/Manifold	66	1.17%
Total Issues	5,641	100%

\*Percentages have been rounded.

companies over a three-year period. The list demonstrates types, counts and percentage of specific manifold-related problems.

The chart also shows that cavities mysteriously not making parts is the number one problem for molders. Although these 5,641 issues are interrelated in a few cases, the data (judging by frequency alone) points to more position-related problems, not overall leakage issues. This means that molders need to investigate manifolds for trends and patterns to determine the exact cause of a part problem. I am mildly surprised that manifold leaks are not higher on the list, as most molders have a total encapsulation horror story. All of these issues cause production losses and stoppages at a considerable expense, so molders need to prioritize them based on costs over cycles and then analyze the data to determine the best PM strategy for that particular manifold.

Bob Duffy of Polymer Cleaning Technology, a hot runner cleaning and repair specialist, believes that his shop deals with the same number of component issues as molders. However, more of his problems concern leakage or sand bath cleanings, which remove burned material in manifold channels, as most molders are not equipped to handle these problems. The top three issues his shop faces are:

- **Component Failure.** He sees heater and thermocouple failure that reduces cavitation to unacceptable standards.
- **Processing Issues.** He sees overheating or metal in the resin stream causing black specs and contamination.
- **Manifold Leakage.** He sees cold starts that cause encapsulation (or small leaks that can run for months through



Nozzles should be removed carefully instead of being thrown in a basket for cleaning.

multiple color changes before being detected), which requires all new heaters and thermocouples.

### Justifying Manifold PM

Most molders wait until the manifold needs work to run PM because there is no clear return on investment (ROI) on pulling a mold from production that is running satisfactorily just to perform PM that someone “thinks” is necessary. Plus, when it breaks down, technicians do not have to haggle with production about when to pull the mold or attempt to justify the cost of a proactive PM program with the boss. It’s a “just get it fixed” situation, and those are the most expensive mold stops.

Manifolds will only perform more consistently and efficiently if the molder understands and controls the environmental factors that dictate PM frequencies.

In most cases, supporting data to determine the number of cycles at which the mold really needs a validated and accurate PM performed is nonexistent. Instead, the cycle count is a subjective decision based on a company’s desire to continuously run to manifold failure or to employ a “best practice” culture. So, one group runs molds to failure and the other runs PM programs on systems religiously at frequencies considered “much too soon” by the other group.

Manifolds will only perform more consistently and efficiently if the molder understands and controls the environmental factors that dictate PM frequencies. Molders will more easily see patterns and trends of issues when they realize processing and maintenance consistency. Molders have little choice but to run to failure when there is no methodology and unreliable manifold performance.

Duffy’s says his school of thought for justifying the cost of hot runner PM before hot runners begin to suffer product issues or a total system encapsulation (or major internal plastic leak) is, “It’s always cheaper to do regular maintenance than to wait for more serious problems, such as leaking or a reduced cavity count.”

Regular maintenance more than pays for itself in the long run. This chart shows the relative difference in cost between performing a routine cleaning and rebuilding a tool after a full leak or total encapsulation.

Routine Cleaning	Flooded Cost With Parts
8 CAV-\$1400	8 CAV-\$2800
16 CAV-\$2400	16 CAV-\$4400
32 CAV-\$3100	32 CAV-\$6900
48 CAV-\$5200	48 CAV-\$9000

To understand the difference in cost is to realize that only five percent of all parts are replaced in a routine cleaning. The labor to disassemble the tool and clean manifolds, plates and components is a relatively small cost in a full leak. The major driver is the cost of spare replacement parts. According to Duffy, other costs associated with the decision to delay maintenance until tool failure include:

- **An out of service tool.** Turnaround time is measured in two to four days when maintenance is scheduled on a non-crisis basis. Turnaround time for a tool flood is measured in weeks, which is usually because of a lack of original equipment manufacturer spare parts.
- **The loss of production.** Scheduled maintenance allows for the building of a parts backlog prior to sending out the tool. Breakdowns can cause serious production delays.

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- **Cold side repairs.** Scheduled hot runner maintenance allows a molder to make minor repairs or change-outs on the cold side of the mold.
- **Freight costs.** A routine cleaning enables the client to ship the tool with a low-cost scheduled commercial truck, but an emergency situation requires the client to use expensive overnight services.

Hot runner manifold problems are widespread across the plastics molding industry. Molders can only reduce their impact on profitability by learning to better control the environment in which they are run and maintained.

In August, I will drill deeper into manifold performance by looking at mold defect history, heaters and thermocouples, processing, maintenance skills and manifold design. [MMT](#)

#### CONTRIBUTOR

Steve Johnson is president of MoldTrax Maintenance Solutions, which provides specialized course work, hands-on bench training, maintenance software, maintenance products, toolroom design and maintenance efficiency auditing.

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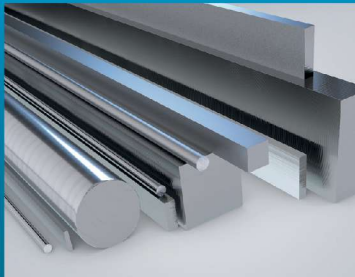
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# Tax Reform: Accounting Methods

By Michael J. Devereux II, CPA, CMP

The Tax Cuts and Jobs Act of 2017 (the “Act”) made numerous changes to the Internal Revenue Code that impacts mold builders. Guidance is available to help explain the new provisions of the expanded code, such as changes to the rules governing methods of accounting. Specifically, shops with average annual gross receipts for the prior three tax years that are less than \$25 million have more flexibility with respect to four different accounting methods. Each of these changes is effective for tax years beginning after December 31, 2017, and all four will be favorable to shops. In fact, many mold builders falling below the average gross receipts threshold will benefit from all four changes in accounting methods in 2018.

The following provides an overview of the different methods that may now be available to mold builders with average annual gross receipts of less than \$25 million for the prior three tax years.

## Cash Method of Accounting

Historically, mold builders whose average gross receipts exceed \$1 million must use the *accrual method of accounting*. Generally, this method recognizes revenue after all the events have occurred that indicate the right to receive income and then determines the amount with reasonable accuracy. That is, accrual-basis taxpayers pay tax on the income they collect *and* on the receivables. After all the events have occurred, shops also deduct expenditures, which determine the fact of a liability, the amount of such liability with reasonable accuracy and that the services or goods (or both) have been provided. That is, accrual-basis taxpayers may deduct their payables.

*Cash-basis shops*, on the other hand, pay tax when the income is actually or constructively received and deduct expenditures when the payable has been paid. The Act significantly broadened the number of shops eligible to use the cash method of accounting.

For tax years beginning after December 31, 2017, shops with average annual gross receipts of \$25 million or less for the prior three tax years may use the cash method of accounting. This change is available regardless of the entity structure.

Shops that previously have been on the accrual method of accounting that wish to begin using the cash method of accounting in a tax year beginning after December 31, 2017, may file a Form 3115: Change in Accounting Method from the IRS to request this change. The change is automatic, which means that shops are not required to wait for IRS approval.

Shops making this change effectively adopt the new method of accounting at the beginning of the year in which the change is made. That is, they get to true-up and reconcile the difference in taxable income from their old method (accrual method of accounting) and their new method (cash method of



accounting), and they may claim the difference in the year of the change (commonly known as a §481(a) adjustment).

For example, assume a \$15-million mold shop has \$2 million in receivables (for which tax has already been paid) and payables of \$800,000 (for which the expenditures have already been deducted) on January 1, 2018. If the mold shop changes its method of accounting from the accrual method to the cash method, it will recognize its 2018 income using the cash basis of accounting and claim a deduction of \$1.2 million. This is the difference between the receivables and the payables. For example, it is the amount of income for which income tax has already been paid.

The Tax Cuts and Jobs Act of 2017 code may broaden the accounting methods available to mold builders with average annual gross receipts of less than \$25 million for the prior three tax years.

## Inventories

Prior to the Act, mold shops with average annual gross receipts of \$1 million or greater were required to account for their inventories in the traditional sense by deducting their cost of goods sold once the mold had been sold to the customer.

The Act significantly raised this threshold, allowing companies with less than \$25 million of average annual gross receipts to avoid the general inventory rules and treat the inventory as materials and supplies that are not incidental to the shop. That is, they may deduct the cost of goods sold once the material is used in the work-in-process. In a fashion similar to an accrual to the cash-accounting method change conversion, shops are allowed to claim a §481(a) deduction that is equal to the difference in taxable income that is realized by the change.

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## Uniform Capitalization Rules

Prior to the Act, the uniform capitalization rules (UNICAP) required shops to include indirect and overhead costs in the cost of inventory at the end of the year. As a result, mold shops were required to review their indirect costs and capitalize some portion of these costs into ending inventory. This requirement resulted in greater inventory at year-end, less in the cost of the goods that were sold and ultimately, greater taxable income.

The Act removed this requirement for shops with average annual gross receipts of \$25 million or less for the prior three years. Taxpayers changing to this method of accounting may claim the difference as a deduction under section §481(a).

## Long-Term Contracts

Shops that begin a contract to manufacture a mold in one tax year and that complete the contract in a subsequent year have engaged in a long-term contract. Prior to the Act, a mold shop with average and gross receipts for the prior three years that exceeded \$10 million that engaged in a long-term contract had to recognize its income and expenses related to that contract under the percentage-of-completion method in its recognition of income. That is, if a contract is 40 percent complete on

December 31, 2017, the mold shop had to recognize 40 percent of the income related to the manufacturing of that mold.

The Act modifies the gross receipts threshold. Mold shops falling below the \$25-million gross receipts threshold will be exempt from the requirement to use the percentage-of-completion method and will be allowed to use the completed-contract method for contracts entered into after December 31, 2017. Taxpayers will recognize the income related to the production of the mold once the contract has been completed.

Mold shops with average annual gross receipts of \$25 million or less for the prior three tax years will want to review their methods of accounting to determine whether changing their method or methods would be beneficial. **MMT**

### CONTRIBUTOR

Michael J. Devereux II, CPA, CMP is a partner and director of manufacturing, distribution and plastics industry services at Mueller Prost.

### FOR MORE INFORMATION

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# Growth Slows from First-Quarter Pace

A mix of factors influence the Index, at 55.8 for April.

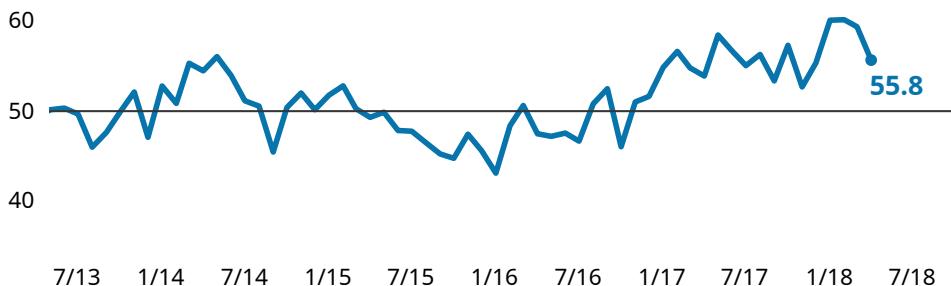
Registering 55.8 for April, the Gardner Business Index (GBI): Moldmaking fell nearly four points during the month after issuing a string of record-level readings earlier in the year. Compared to the same month one year ago, the Moldmaking Index increased by 3.2 percent. Gardner Intelligence’s review of the underlying data for the month reveals that growth in production, new orders and supplier deliveries drove the Moldmaking Index’s averages-based calculation higher while employment, backlog and a contraction in exports pulled the Moldmaking Index’s averages-based calculation lower. All components of the Moldmaking Index recorded lower values in April as compared to the prior month. The contraction in exports marks the first contraction of any Moldmaking Index component since November 2017. This four-month period also marked the end of the longest expansionary run of all of the Moldmaking Index’s components in recorded history. [MMT](#)



**ABOUT THE AUTHOR**

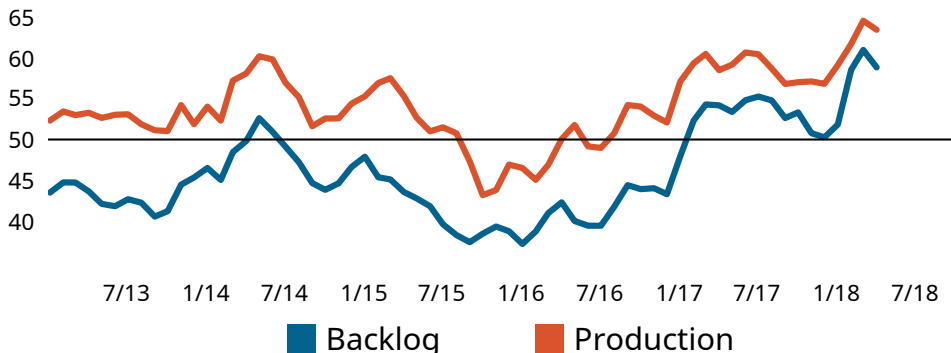
Michael Guckes is the chief economist for Gardner Intelligence, a division of Gardner Business Media (Cincinnati, Ohio, United States). He has performed economic analysis, modeling and forecasting work for nearly 20 years among a range of industries. He is available at [mguckes@gardnerweb.com](mailto:mguckes@gardnerweb.com)

■ Moldmaking Index



April’s Moldmaking Index reading of 55.8 was less impressive than the Moldmaking Index’s performance during the first quarter. Compared to the prior month, all components of the Moldmaking Index indicated slowing growth.

■ New Orders and Exports (3-Month Moving Average)



Data from the Moldmaking Index indicates that moldmakers are working through the rush of new orders placed at the beginning of the calendar year. The growth of both production and backlogs have recently slowed from their pace during the first quarter.



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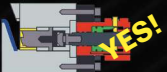


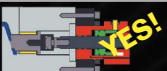


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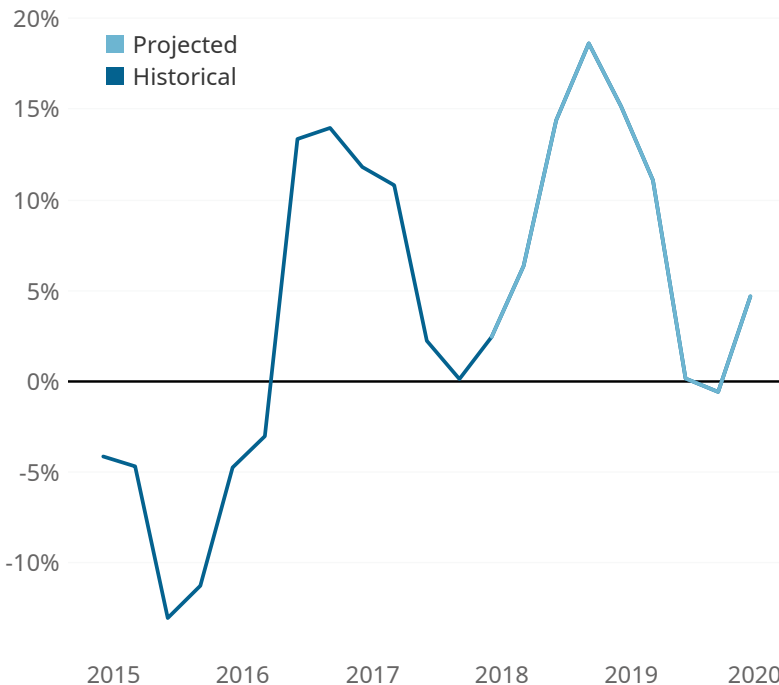
# Why a Decrease in Consumer Savings Means Good Things for Consumer Products

Consumer products goods companies should expect to do well in 2018.

According to the Bureau of Economic Analysis, consumer spending among Americans increased 2.8 percent for the year period ending February 2018. The latest available data on wages, overtime and employment indicate that in 2017 and in the initial months of 2018, workers experienced increasing incomes on average. Simultaneously, the U.S. Personal Savings Rate decreased from 3.6 percent during the fourth quarter of 2016 to 2.6 percent in the fourth quarter of 2017. This is important because income that is not deferred to savings is assumed to be spent in the present. For reference, the average savings rate since 2007 has been 5.3 percent, and the average savings rate since 1947 has been 8.5 percent.

Strong consumer confidence survey results may explain why consumers have been spending more and saving less. According to the Conference Board's survey results (which measures current business and employment conditions), respondents' outlook on their present situation is more positive now than at any time since 2000, including the period just prior to the Great Recession of 2008. Similarly, the Conference Board's survey of expectations (which measures expectations six months from now) also reflects highs that the Conference Board's survey has not experienced since the late 1990s and early 2000s. Gardner Intelligence notes that since the start of 2017, the present situation index has increased faster than the more forward-looking expectations index.

## ■ YOY Percent Change in Earnings (Seasonally Adjusted Annual Rate)



Wall Street's average 2018 revenue outlook among nearly 60 publicly traded consumer products companies is 4.8 percent growth. Increases in wages and hours worked combined with a reduced savings rate will likely drive increased purchases through the year. 2019 revenue projections for these same firms currently stand at 3.5 percent. Gardner Intelligence believes that the lower projections for revenue growth are likely to be a result of savings rates growing closer to their long-run averages. Conversely, should wages and work hours show advances that are even stronger than anticipated in 2018 and 2019, revenue projections could be upwardly revised.

Strong revenue and earnings projections for the industry coupled with solid 2017 growth may explain why capital expenditure levels among sector firms in calendar year 2017 were 6.6 percent higher than the same period one year ago. Comparable capital expenditure growth in 2016 and 2015 was 2.8 percent and negative 1.1 percent, respectively. **MMT**



### FOR MORE INFORMATION:

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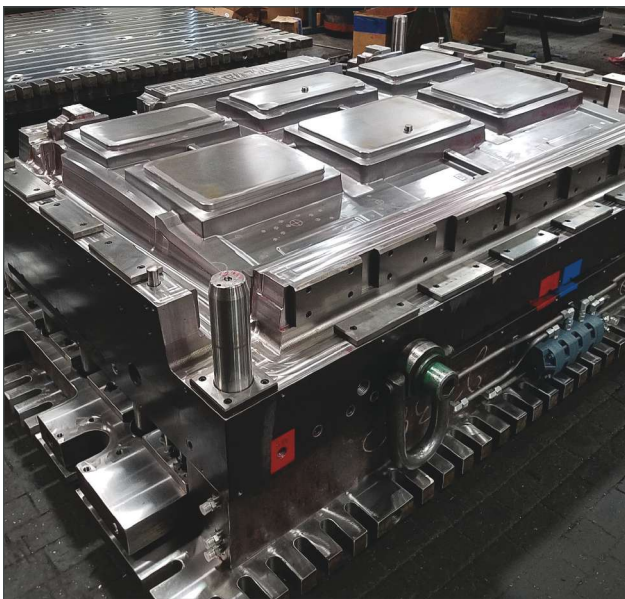
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### Compression Molds Enable Complex Designs for Many Applications

**Century Tool and Gage**, a composites tooling specialist recently acquired by the Tooling Tech Group, is highlighting its compression mold capabilities at Amerimold 2018 in Booth #725. The focus is medium- to large-sized molds required for producing Class-A exterior body exterior body panels, structural panels, headliners, closure panels, package trays, acoustical components, trunk and trim applications.

Within its 89,900 ft<sup>2</sup> facility, the company has 15 high performance machine tools for drilling, milling, 3D roughing, semi finishing and finishing of both steel and aluminum, enabling it to achieve complex geometries and exacting tolerances. The company can produce molds in excess of 100,000 lbs.

**Century Tool & Gage / 810-629-0784 / Booth 725**

### Components Catalog Reveals Extended Components Line

At Amerimold 2018, **Progressive Components** introduces its new v12 catalog. New product advantages include a variety of standard mold base components to complement its existing line, new cooling products that are readily machined and reach throughout cores previously not feasible, expanded through-hardened pins for large automotive and appliance tools, advancements in mold maintenance and monitoring technology and new alignment lock configurations.

The catalog provides new standardized options for plate sequencing and more economically feasible routing cooling. It also provides options for eliminating custom per-mold machining with new ejection and alignment standards. The company is also advancing its mold maintenance and monitoring technology. With the debut of the V12 catalog, Progressive Components has its most comprehensive product line offering in the company's history.

**Progressive Components / 847-487-1000 / Booth 203**



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## Trunnion Lifter Slides Cut Build Times and Cost

Mold and die component manufacturer **SelfLube** will showcase its trunnion lifter slides at Amerimold 2018. They come in inch and metric and are available with or without self-lubricating graphite. The company says these slides are ideal for mold builders because they reduce build time and cost since they are finished and ready for installation in the tool. The company also offers bushings, wear strips, parting line locks, and gib assemblies, among other products from its 10,000 standard part numbers.

SelfLube, which sells directly, offers a range of components, including bushings, wear strips, parting line locks, gib assemblies and more. The company can customize its standard offerings to accommodate any size or special feature a customer might require.

**SelfLube / 800-690-3600 / Booth 421**

## Vacuum Devices Introduce Speed and Prevent Clogging

**Cumsa's** two vacuum devices, the Double Action Vacuumjet (VB) and the Smart Vacuumjet (SV) have both been designed to create vacuum (-900 mbar) up to 60 L/min. and to eliminate molding problems caused by gas stuck in the mold. They also are designed to blow off the injection gases through the same channel, which cleans the vents to prevent clogging after every cycle. The VB model has a unique design that facilitates the addition of porous inserts and laminar vents that are conveniently located in the critical areas of the mold. It creates the vacuum during the injection process and, at the ejection of the molded part, blows off porous insert or laminar vents to clean through the same line.

The SV model is automatic and contains an internal solenoid to control the opening and closing of the vacuum valve, allowing it to reach the desired vacuum level faster than only removing air through the ejector pins and the vents. The selector placed in the backside of the device permits the user to choose between four vacuum levels which, when selected, repeat for every cycle without continuous manipulation.

**CUMSA USA LLC / 248-850-8385 / Booth 520**



## Milling Machine with Drilling Capacity Saves Time

**Cheto** is a CNC deep hole drilling-with-milling machine producer. It develops its product line with a focus to add value to the production process, mainly for the mold and die industry. The mold production is a complex and accurate process. Cheto says its machines reduce costs and offer improved production times for users. By comparison, the drilling process is slow. The company's goal is to increase feed rates and save time on the overall process, Cheto says that the process is the most important factor to get lower, effective cost production and the best delivery time.

**Cheto Corporation / cheto.eu/en / Booth 317**



## Electroformed Reflex Inserts Suitable for Automotive Lighting

J-Flex is an American producer of quality electroformed reflex inserts used in a variety of automotive and non-automotive lighting systems and retro-reflective products. J-Flex is an independently operated division of **Krieger Craftsmen Inc.** J-Flex says it has a highly trained team of seasoned professionals who are experts in the production of quality electroformed reflex products. Krieger has a variety of electroforms in various stages of completion on display and available for potential customers to inspect. The company also has representatives available to provide a detailed explanation of its electroformed reflex capabilities and process.

**Krieger Craftsmen / 616-735-9200 / Booth 531**

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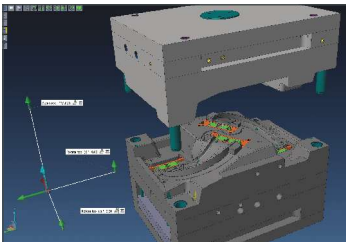
For **Intex Tooling Technologies**, the people on its team are the key. It says its group is made of experienced moldmakers who have excellent project management and engineering experience. Intex is committed to providing the best experience possible. A customer's experience is a blend of courteousness, professionalism, engagement throughout the project and finally, on-time delivery. Intex says it is committed to a customer experience that ensures the highest quality standards at a fair cost without compromise. Intex is engaged throughout the project lifecycle. It does not emphasize a "boutique" service without taking the appropriate steps. Once awarded a program, the Intex service begins. Everything revolves around understanding the needs of the project. The "why" of the project is just as important as the "how." According to Intex, success is not just measured by how fast steel is removed from a block.

**Intex Tooling Technologies / 289-840-1095 / Booth 235**

## Job Tracking Software Streamlines Shopfloor Processes

**TST Tooling** is demonstrating its TSTracker and Estimator software at Amerimold 2018, showcasing how the job tracking software streamlines shop floor processes and increases the client's bottom line. The company also distributes VISI CAD/ CAM/ CAE and VISI-PEPS laser and wire software. According to the company, these programs are known globally for the competitive advantage they provide to the tooling industry in the design and manufacturing of plastic injection molds, 2D through five-axis milling, electrode production and others, servicing a multitude of manufacturing industry sectors such as automotive, electronic, medical and aerospace. The company also sells and supports Factory Wiz Monitoring and DNC software and DYNAFORM Simulation software for the tool and die industry.

**TST Tooling Software Technology, LLC / 248-922-9293 / Booth 613**



## Group Highlights Increased Capacity, One-Stop-Shop Services

The **Maximum Mold Group** of companies highlights its increased capacity and ability to serve as a one-stop shop for companies that need trim dies, plastic injection molds and die cast dies. Its mold builders can bring a project from concept to mold sampling all from one source. It specializes in CNC EDM, wire EDM, five-axis milling and reverse engineering. Maximum Mold was established in 1996 with a single purpose-to provide customers a better alternative for Tooling Development. Maximum Mold says it knows that customers deserve a better partner who understands their business, their needs, their challenges and their realities. The company says that by using its state-of-the-art equipment and engineering and design software, its team is committed to providing die cast manufacturers and plastic manufacturers with the finest, most efficiently designed, high-quality, long lasting tooling possible.

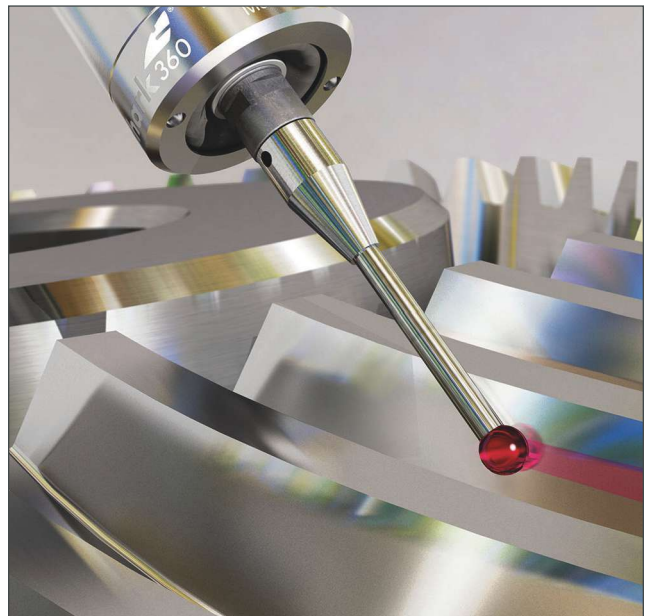


**Maximum Mold / 269-757-4433 / Booth 143**

## Touch Probes Enhance Digital and Analogue Measuring in Machine Tools

**Blum-Novotest** offers solutions for digital and analogue measuring tasks in machine tools with Digilog brand touch probes. When recording the workpiece position, state and dimensions, the probe's analogue measurement produces higher quality results in the evaluation of surfaces and contours, the company says. The touch probes are designed for the extreme requirements of highly productive machining centers.

**Prime Technical Services, Inc. / 216-210-7000 / Booth 707**





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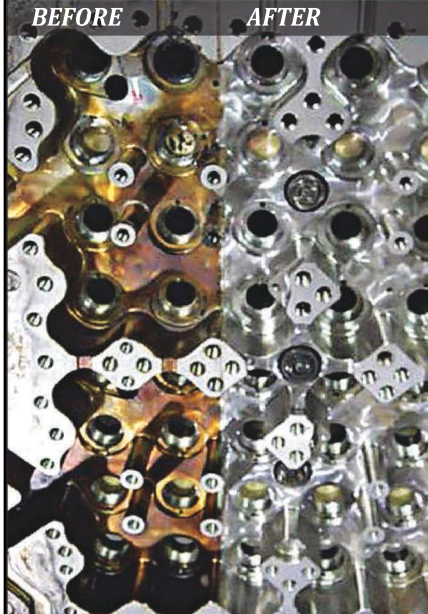
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### Servo Motor in Medical Mold Improves Accuracy and Cycle Times

**Westminster Tool Inc.** designed and built a progressive, single-cavity unscrewing medical mold that uses a servo-driven motor for a customer's medical device. The customer's project—a surgical device that would be molded in a cleanroom environment—required a threaded core feature. The hydraulic power pack that is typically required for threaded cores did not meet cleanroom requirements because of the risk of contamination. Westminster Tool's alternative solution uses a servo motor that integrates directly into the mold and provides tighter controls, greater accuracy and improved cycle time. Westminster Tool is a complex injection mold builder specializing in medical, aerospace and consumer packaging. Westminster Tool is in Booth 252 at Amerimold 2018.

**Westminster Tool, Inc. / 860-564-6966 / Booth 252**

### Rotary Table Accommodates Workpieces for Precise Machining

**Hermle Machine Company** has released a new machine to the North American market. The C 650 is an extension to the Hermle Performance Line Series, and Hermle now provides three machine models for economical five-axis machining. The Performance Line now consists of the C 250, C 400 and the new C 650. Like the C 250 and the C 400, the C 650 uses a modification of Hermle's gantry-type design. The swiveling rotary table can accommodate workpieces up to 1500 kg (Ø 900 x 600 mm), enabling highly precise machining.



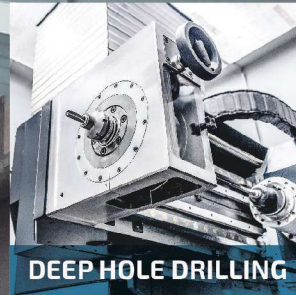
The traverse path in the stainless-steel-clad working area comprises 1050 x 900 x 600 mm with a vertical table clearance of 775 mm and a door aperture of 1050 mm. Hermle says these parameters are ideal for simple and safe crane charging. The C 650 has an integrated tool magazine for 42 tools, and additional magazines are available. The C 650 is equipped with the Heidenhain TNC 640 control system as standard, providing access to the full programming capacity of the system. Hermle representatives are on hand at the show to answer questions about the new C 650 and other Hermle machining centers.

**Hermle Machine Company LLC / 414-421-9770 / Booth 719**

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East Building-Level 2, booth 121229

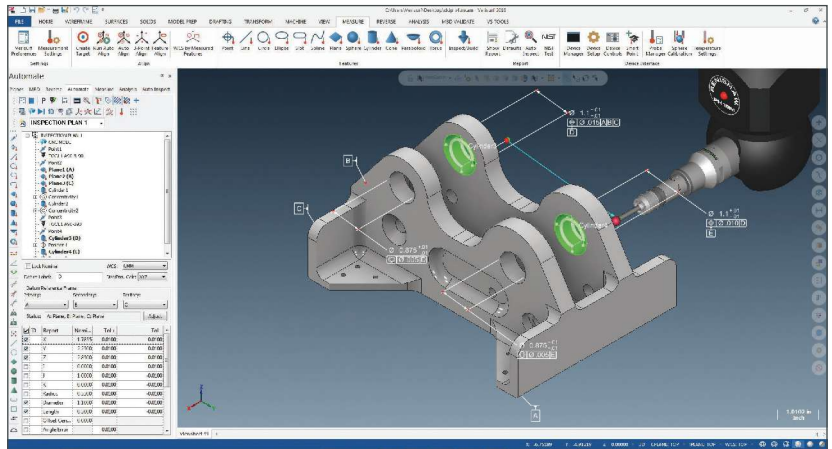
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### Software Release Has CMM Feature for Widespread Compatibility

Universal CMM is a key option to the new Verisurf 2018 software as it insures software compatibility with virtually all CNC coordinate measuring machines (CMMs). All CMMs, including previously closed legacy systems, are now open to Verisurf users. Universal CMM does not require controller upgrades or added software, the legacy CMM data is translated, enabling the operator to take full advantage of the Verisurf user interface, data management and reporting functionality. Verisurf says that this enables legacy CMMs to immediately become relevant as part of an overall measurement strategy.

Universal CMM communicates between Verisurf's standards-based I++ protocol and CMM controllers, enabling seamless interoperability between hardware and software. CMM operators avoid any risk associated with adopting new technology because with Universal CMM, they can continue to use legacy inspection programs if needed yet still enjoy the benefits of using Verisurf. Inspection programs created in Verisurf for a CMM can also be used on portable systems. Human and technology resource utilization improves substantially when all measuring devices can be operated with the same metrology software and skill sets; the result is a manufacturing 'enterprise-wide' measurement solution.

When shops run Verisurf 2018 Software with Universal CMM compatibility across all their measuring devices, newly added performance and productivity features of the software become available to everyone, including added programming shortcuts, Report Manager, an increase in I++ CMM probing speed and a Windows interface.

Added productivity features include feature recognition, which enables any CAD feature to be selected and immediately added to an inspection plan; quick measurement of torus shapes for parts such as O-rings; the ability to use the probe shaft for measuring thin edges, such as sheet metal; and improved mesh editing and added mesh Boolean controls for combining and dissecting meshes with intersecting geometry.

Verisurf says that management reporting is a key deliverable and says that added features in 2018 make producing and delivering reports quicker and easier. Dynamic Datum Reference Frame (DRF) enables the user to create datum alignments in the report manager using measured features; Auto DRF is accessed through the Report Manager Speed Menu and quickly sets up the most common reports utilizing single data reference frames; New drag and drop custom report builder is ideal for creating reports for measurement projects.

Feature and Analysis objects have been synchronized for smooth, fast execution, using Verisurf VDI 3.43.18 or newer. Verisurf says that this delivers an exponential increase in automatic probing speeds, reducing inspection time. The Verisurf User Interface (UI) continues to evolve in alignment with Windows standards. Easy-to-read icons and enhanced "tool tips" streamline workflows and make applications easy to navigate and learn.

**Verisurf Software / 888-713-7201 / Booth 340**

### Probe Filter Distinguishes False Triggering from Real Events

**Marposs** features its WRP60P and WRP45P high-accuracy touch probes with multichannel radio transmission at Amerimold 2018 in Booth 116. These probes are designed for high-accuracy, five-axis machining centers and milling machines. The WRP45P and WRP60P achieve part positioning, work-piece orientation and origin identification as well as accurate part measurement by automatically detecting the machine axis positions. Relying on piezo-electric technology, these probes provide measurement performance on 3D surfaces with repeatability within 0.25 µm. The incorporation of a special filter helps to distinguish false-triggering events from actual touch events.

The probes operate with the WRI receiver and have a range of 15 m, making them well-suited for large machines. And, since the line of sight between the touch probe transmitter and receiver is not required, complex surfaces and deep-cavity parts can be inspected. Measurements may be performed at depths as great as 1 m because of the modular structure and extensions of the probe.

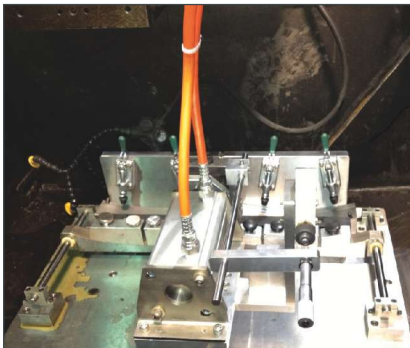
**Marposs Corp. / 888-627-7677 / Booth 116**



### EDM Tool Builder Adds Certifications to Its Design and Build Services

**Graphel Carbon Products** offers AS & ISO certified precision design and build capabilities for aerospace, medical and power generation EDM tooling. Capabilities include sinker/RAM EDM, Wire EDM and machining services. Graphel Carbon Products has been designing and building EDM tooling for over 30 years for internal operations and existing aerospace Tier I customers. Typical tooling types include electrode holders, part holding fixtures for EDM and inspection fixtures that are primarily designed to assist in checking EDM features. The company features examples of designed electrode holders and tooling fixtures at Amerimold 2018.

**Graphel Carbon Products / 513-779-6166 / Booth 430**



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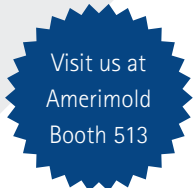
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## Spotting Press Designed for Ergonomics and Safety

Millutensil is showcasing the BV26E-R spotting press model at Amerimold 2018 in Booth 103. For validating and handling molds up to 980 mm x 750 mm in size, this spotting press occupies a small footprint. Designed for ergonomics and safety, the upper and lower platens can both rotate and descend, and the lower platen can tilt up to 75 degrees. For an aging workforce, comfort for moldmakers and maintenance employees has become an important consideration in the design, the company says.

The press is equipped with linear scales, so the company says that mold builders can relax knowing that their molds are being accurately validated. In addition, the Auxiliary Cylinder Control Unit and Ejector Pin features of this press enable the actuators or slides and ejection system to all be simulated during operation. This press is equipped with many other unique

features as well, such as the Siemens Touch-Panel, Energy Accumulators, Remote Assistance Device and Wax Injection Unit.

**Millutensil SRL / 39-02-29404390 / Booth 103**

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## Increase in Staff Designed to Accelerate Quote-Response Time

Stop by booth 223 at Amerimold 2018 to visit **Sturdell Industries Inc.** The company discusses its expanded inventories in H13 and P20 modified, increased floor space and added machinery. Whether visitors are looking for saw cut blanks or roughed-out, pre-machined parts, Sturdell says its the supplier that customers can trust. It says it has added to its inside sales department so that it can be one of the first to provide quotes back. Its shop is striving for 100-percent, on-time deliveries and accuracy. Sturdell says it has partnered with world-class steel mills to provide top-quality materials.

**Sturdell Industries, Inc. / 585-464-0800 / Booth 223**

## Range of Aluminum Alloys on Display

**Ellwood Specialty Steel** now supplies aluminum mold alloys with 5083, 6061, 7021 and Alumold 500 in stock at thicknesses ranging to 42 inches. Aluminum yields molds with higher thermal conductivity for shorter cycle times and faster machining, leading to lower costs.

**Ellwood Specialty Steel / 800-932-2188 / Booth 339**



## New Cleanser Variation Is Grit-Free for Polished Surfaces

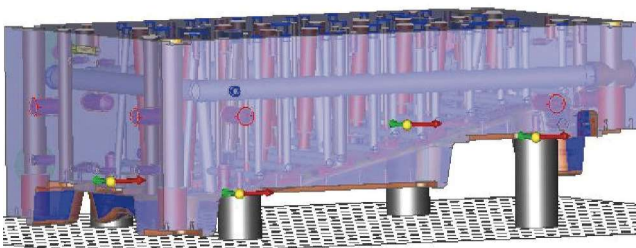
**Nanoplas Inc.** has an all new version of the Zap-Ox oxidation cleanser, Zap-Ox Non Grit. Zap-Ox is known for its exceptional cleaning properties of difficult to clean oxidation like gas stains, rust and weld marks. Just apply this cream cleanser to the affected surface, let it sit for a minute and then wipe away the oxidation. This product eliminates the need to scrub with scouring pads. The latest version of Zap-Ox is the Zap-Ox Non Grit. The same cleaning properties without the grit enables customers to clean oxidation on polished or textured surfaces where Zap-Ox has not been an option. For more information on the Zap-Ox products and our full line of innovative, mold maintenance products, please visit us at Booth #139.

**Nanoplas, Inc. / 616-452-3707 / Booth 139**

## Shop Prioritizes On-Time Deliveries as Part of Quality Strategy

**Aalbers Tool and Mold Inc.** is made up of precision mold and tool specialists. Its 100,000 square-foot facility features several machining divisions and a mold repair division. Headquartered in Windsor, Ontario, its state-of-the-art facility and robust capacity enable it to provide its customers with high-quality service. It also has a 18,000 square-foot plant in Querétaro, Mexico. Aalbers Tool and Mold says it believes quality is the most important feature of its injection tool. However, it says it also understands timing must be maintained to be successful. When it sets its timing goals, it meets those goals or improves those deliveries. Aalbers Tool and Mold has an on-time delivery rate of 99 percent.

**Aalbers Tool & Mold / 519-999-3352 / Booth 639**



## Automation Software Introduces Built-in Locating System

**XMD** presents the latest update to its mold design software, introducing automated clamping and built-in locating systems—a first for the industry, according to the company. The latest update is designed to automatically locate holes required for the FCS system based on the user's exact specifications of the machine, facility and clamping tool. The system is also built to automate placement of new holes to solids imported from any software for quick placement even at the shopfloor level. XMD says that the software is used widely by mold manufacturers, incorporating the system into CNC machine tables such as FCS, FPT's Fast Mill and more.

**XMD - EXPERT MOLD DESIGNER - Synergetic Eng & Manufacturing Services / 519-737-9638 / Booth 425**

## Guide Makes Optimal Surface Contact with Pin to Absorb Force

The E 3064 guide for inclined pin from **Meusburger** achieves optimal surface contact with the inclined pin and best material pairings, which results in a high-force absorption. The machining of the pocket in the slide is possible without inclining. Additionally, the slide stroke can be adjusted subsequently by customizing or adjusting the position of the guide for an inclined pin.

Meusburger developed the E 3064 guide for inclined pin to address the challenge of the inclined surface machining of the guiding hole in the slide. The product is inserted in the slide and forms the contact surface for the inclined pin. The special geometry in the hole creates full-surface contact between the inclined pin and the guiding. Meusburger says that to introduce the guide to the inclined pin, the machinist cuts a rectangular pocket with a threaded hole in the slide and then provides the required clearance for the inclined pin. The machining therefore can be carried out on a conventional three-axe machine and before the hardening. It is possible to execute the installation conveniently from the split line face. The E 3064 guide for inclined pin is available from stock for inclined pins with diameters of 12-30 mm.

**Meusburger US, Inc. / 704-526-0330 / Booth 614**



## Strength of Copper Mold Alloys Enable Shorter Cycle Times

**Materion Corp.** is a supplier of high-performance alloys, providing high-reliability copper, copper beryllium and spinodal alloy products that are backed by global service. Materion's high-strength mold alloys include MoldMAX, MoldMAX XL, PROtherm, and MoldMAX V for full core and cavity, core pins and hot runner components. Materion says that with the unique combination of thermal conductivity and strength available in the MoldMAX product line, these copper mold alloys provide shorter cycle times, improved plastic part dimensional control, better parting line maintenance, excellent corrosion resistance, machinability and wear resistance.

**Materion Brush Performance Alloys / 216-486-4200 / Booth 610**

## Pin Position Flow Control Technology Is Flexible and Functional

**Runipsys North America** is a global manifold manufacturing company focused on large and medium hot runner systems for the automotive industry, with a clear focus on sequential valve gate systems. Runipsys has developed proprietary color change technologies to manufacture superior performance hot runner systems. Runipsys announces the launch of a FlowDriver multi-speed hydraulic pin position flow control technology. Runipsys says that FlowDriver is flexible (not all drops may require it), cost-effective, functional and very user friendly.

**Runipsys North America / 519-737-0874 / Booth 441**

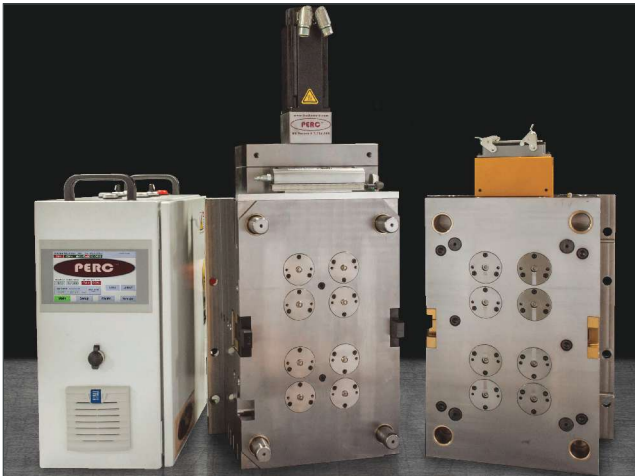


## Servo Motors Replace Hydraulics for Cleaner, Simpler Production

**B A Die Mold Inc.** (B A) offers its patented Programmable Electric Rotating Core (PERC) system. It is a compact, high-speed, high-torque and high-precision system using programmable servo motors in place of hydraulics for unscrewing applications. B A's PERC system is fully programmable and highly accurate. Users can program an unlimited number of profiles and repeatability is absolute. B A says it's perfect for electric molding machines and clean rooms. B A builds and programs the control cabinet so it's ready to run at the user's facility. And, if desired, one cabinet can be used with multiple molds. B A says that the system itself requires little to no maintenance.

PERC eliminates the need for a rack and cylinder. Instead, it uses a servo motor to rotate the core, which streamlines the processes of creating parts with an unlimited number of threads, intricate geometry or special requirements. Eliminating the hydraulic cylinder also eliminates the hydraulic cylinder maintenance and makes PERC sanitary for use in cleanroom and FDA situations. In fact, PERC servo motors can be purchased sealed specifically for cleanroom manufacturing environments.

**B A Die Mold Inc. / 630-978-4747 / Booth 442**



## Laser Engraving Solution Combines Technologies for Affordability

In most cases, laser engraving is the most efficient and accurate technology for achieving clean crisp logos, markings, part numbers or whatever the desired results. However, companies often use difficult-to-program CNC processes or experience limitations with other engraving technologies when parts that are too large or too heavy rule out the use of a traditional closed engraving system.

A new laser engraving solution marries the technology of the past with that of the future, while maintaining affordability. The NGRV2 laser engraving system from **Alliance Laser**, which the company says is coined "the moldmaker's laser engraver," retrofits a Bridgeport-style machine with an IPG laser, a U.S.-sourced scan head, coupled with Alliance Laser software for design and implementation. The system features a 36-square-inch field size, programmable X and Y travel for a larger engraving surface area, automated rotary function, 750-lb weight capacity and easy-to-operate software. Alliance can also take a shop's retired Bridgeport and add the IPG system.

**Alliance Laser Sales / 847-487-1945 / Booth 131**



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### Round Latch Locking Unit Offers Precision and Reliability

**Hasco** has extended its range of proven latch locking units with an innovative, compact version that can be mounted on the inside—the round latch locking unit Z1790. The internally mounted latch locking units have the advantage of not increasing the dimensions of the injection mold and of ensuring reliable stages in the plate opening movement from a protected position inside the mold, the company says.

The latch locking units require only a small space, permitting strokes of between 30 and 130 mm. The pulling bar Z1791 can be fitted in both the intermediate plate and the clamping plate. The stroke can be adjusted as required by shortening the pulling bar. Similarly, the housing can be cut to length in order to align it to the plate thickness. The central locking system ensures a high force transmission through its precise, interlocking connection, the company says. An additional feature is that the pulled plate is locked, ensuring greater safety during production.

**HASCO / 877-427-2662 / Booth 217**



### Reports Provide Easy Reference and Industry Insights

The **American Mold Builders Association (AMBA)** released its annual "2018 Wage and Benefits Report." Now in its eighth year, AMBA's report contains comprehensive analyses on 50 job classifications from mold manufacturing-related firms. The 2018 report enables mold building executives the ability to benchmark beginning and average wages for individual positions specific to the mold building industry by both company size and by U.S. region.

The AMBA collected data for its "AMBA Business Forecast Report" from over 100 U.S.-based mold builders during the AMBA's Business Forecast Study. The report showcases data on sales trends, profit levels, capital expenditures, shop and design employment levels and challenges faced in the industry. The overall objective is to provide company executives with a comprehensive overview of conditions in the industry for 2018.

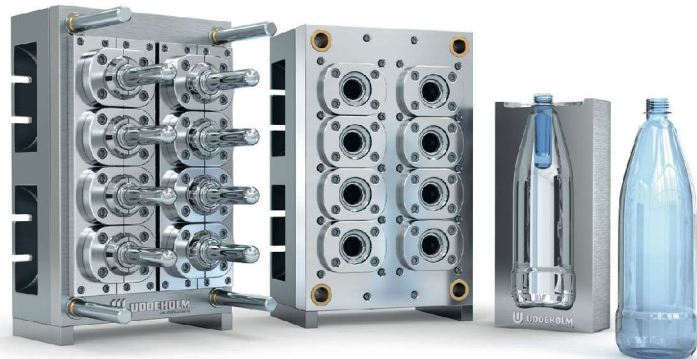
The AMBA says that its "2018 AMBA Sourcebook" is a key resource in the industry, providing valuable information for sourcing skills-certified mold builders in the United States. The reference guide enables users to sort by capabilities, geographic location, type and size of molds made, industries served and more. Users can find information to help them source the right AMBA mold builder for the job. AMBA partners are listed alphabetically with contact information and full descriptions of products and services for easy reference.

**American Mold Builders Association / 317-436-3102 / Booth 242**



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## Software Launches New CAD-for-CAM and Robot Programming

The newly-released version of WorkNC from **Vero Software** introduces two new tools to the portfolio—a direct modeling CAD system and a Robot Module, making offline programming of robots easy. Vero says that WorkNC Designer is built on the Parasolid technology, bringing hybrid modeling and direct modeling capabilities that revolutionize the way programmers prepare parts for manufacturing. It's not dependent on having a series of parameters that drive it or a feature tree. It provides a very quick, dynamic editing and modeling environment, where users simply sketch, drag, hold, push or twist to create and modify models.

The second major item of new functionality is the Robot Module. New simulation and singularity resolution

tools in WorkNC 2018 R1 mean users can take full advantage of the enormous benefits robots bring to the manufacturing process. For example, they free toolpaths from the limitations of milling, as the tool at the end of the robot's arm can also be a grinder, a laser head or a welding nozzle.

**WorkNC, by Vero Software / 248-351-9300 / Booth 414**

## Pre-Hardened Steels Eliminate the Need for Secondary Machining

**International Mold Steel** highlights mold base steels and cavity and core steels at Amerimold 2018. At the show, it has Toolox 33 and Superplast Stainless mold base steels. It also has cavity and core steels like Nak 55, Nak 80, PX5 Modified P20, S-Star 420 Modified, DH2F Modified H-13 and Toolox 44.

The company says its prehardened steels save time by eliminating the need for heat treat, which eliminates the need for secondary machining. With mold shop deliveries getting shorter and shorter, International Mold Steel's customers need to squeeze as much time out of their mold builds as possible. The company says these products are very free machining. In some cases, its customers are seeing double the cutter life of their tooling. These qualities increase savings for the moldmaker and the molder.


**International Mold Steel Inc. / 589-342-6000 / Booth 112**



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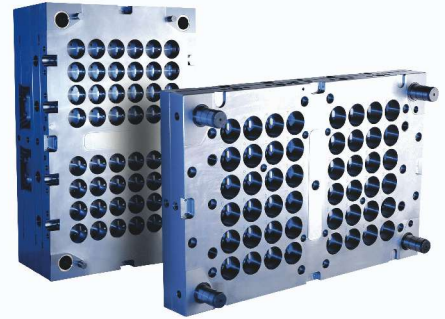


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### Strategic Shifts Enable Transition to Full Plastic Molding

This year, **Edro** showcases three recent developments that have grown the company into a full-fledged plastic molding entity. In the past year, Edro has become the exclusive distributor of Bohler tool steels and a distributor for all MoldMAX Alloys for plastic applications in Europe and North America. To help service the industry, Edro has added a new warehouse in Schaumburg, Illinois, which Edro says will enhance its presence throughout the Midwest. The company says that these additions look to enrich Edro's line of custom mold bases, steels that include Edro RoyAlloy and Edro PI-FM and Edro's growing aluminum products portfolio.

**Edro Engineering and Specialty Steels Inc. / 909-594-5751 / Booth 122**



### Machine Combines Processes for Finished Parts in Fewer Setups

The **Matsuura Lumex Avance-25** metal laser sintering hybrid milling machine is a powder bed metal additive manufacturing (AM) platform with subtractive machining capability. The Lumex Avance-25 combines selective laser sintering (SLS) with high speed milling (HSM), which is commonly called hybrid AM. The Matsuura Lumex Avance-25 predominantly serves the high-value, high-accuracy mold and die market. The hybrid technology creates a "finished" part with machined surface finish and accuracy without inducing the additional variation caused by multiple machine set-ups and part handling.

The machine enables production of complex parts through total manufacturing by digital engineering using 3D data. Matsuura says that moldmakers can incorporate 3D cooling channels into molds in the single setup, thereby increasing cooling efficiency and enabling high-cycle injection molding with improved quality and precision. Matsuura says that the Lumex Avance-25 can shorten lead times and reduce manufacturing costs to half or even to a third of the costs of conventional methods.

**Matsuura Machinery USA / 651-289-9650 / Booth 411**



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## Multi-Layer Technology Opens Opportunities for Packaging

**Husky** is in Booth 540 at Amerimold 2018. It features a range of solutions for the beverage, food, closure, medical, automotive and home, personal and beauty markets. Husky features the HyPET 225 system and has bottle designs with new colors, shapes and functionality. Husky also has a multi-layer technology that can enhance package design and unlock packaging opportunities, and it has tooling technologies that can deliver optimized equipment productivity and extended mold life. The company displays valve-gate innovations and original equipment manufacturer spare parts intended to reduce total part costs.

**Husky Injection Molding Systems / 905-951-5000 / Booth 540**



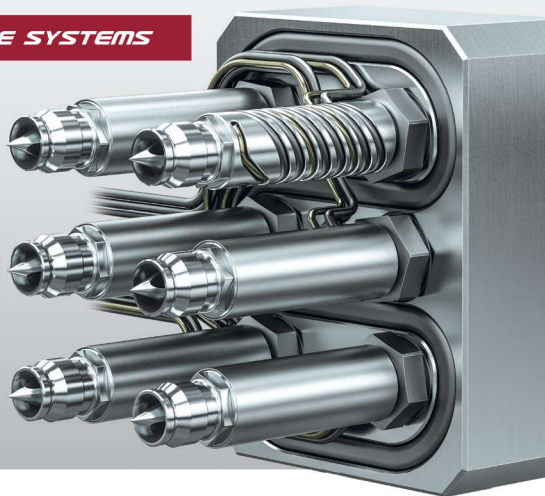
## Technology from Value-Added Services Featured

**Cavalier Tool & Manufacturing Ltd.** showcases its latest technology and capabilities at Amerimold in Booth 117. Cavalier focuses on value-added services in addition to its infrastructure, which includes multiple palletized five-axis machines; RFID-chipped EDM cells; double-cranned, fully serviced, advanced assembly bays and process monitoring. Its value-added services include presale feasibility studies, DFMs, product design assistance and simulations. Post-build support includes tool start-up, tool tuning and maintenance. The company says that anyone can cut steel, but that anyone wanting a cradle-to-grave tooling partner should contact Cavalier. Cavalier Tool manufactures medium to large plastic injection, compression and structural foam molds. Cavalier's reach extends into automotive, heavy truck, sport recreational and commercial industries. Cavalier Tool & Manufacturing Ltd. is the 2015 Leadtime Leader Award winner.

**Cavalier Tool & Manufacturing Ltd. / 519-944-2144 / Booth 117**

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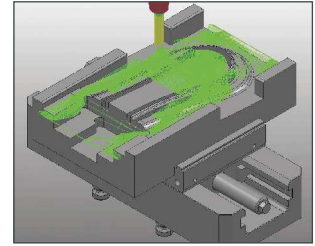
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### New Feature on CAM Software Simplifies Five-Axis Programming

PowerMill 2019 from **Autodesk** offers three- and five-axis programming tools to help manufacture complex parts with new additive and subtractive technology. Autodesk says that introducing enhanced three-axis high-efficiency roughing and new five-axis collision avoidance tools will generate more efficient tool paths with fewer tool retractions, shorter cycle times and increased tool life. Automatic Tool Tilting is a new option to simplify five-axis programming regardless of the model shape or the toolpath type. The user defines the required shank and holder clearance distance and PowerMill does the rest. Collisions and near misses are identified and automatically avoided with smooth machine motion, which helps prevent dwell marks and other imperfections.

PowerMill's new setup entity helps synchronize the connection between tool paths and NC programs. Autodesk says that this enables users to add tool paths to a setup and have confidence that the changes they make are automatically passed to the associated NC program. Users can use setups with fixture offsets to simplify the programming of parts using multiple operations or fixture locations. All manufacturing data can be sent to Fusion Production for cloud-based collaboration.

**Autodesk / 877-335-2261 / Booth 346**



### Coating Lowers Coefficient of Friction for Better Lubricity

**Bales Metal Surface Solutions** provides coatings and finishes to protect from wear, abrasion and corrosion. Its coatings can increase hardness for better durability and lower the coefficient of friction for better lubricity. Its diamond polishing can achieve finishes from D3 to A1. The company's newest coating, Diamond EN, has the uniform corrosion resistance of electroless nickel with the added toughness of diamond particles for 57RC. Samples of coatings are available in booth 307 at Amerimold 2018.

**Bales Metal Surface Solutions / 630-852-4665 / Booth 307**



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[www.rjginc.com/tzero](http://www.rjginc.com/tzero)

## Premium Graphite Enables Maximum Efficiency and Detail

**Poco Graphite** is showcasing several machined electrodes of various material classifications at Amerimold 2018 in Booth 513 to show the type of machining detail that can be achieved with the company's graphites, for which the company has more than 100 grades. The featured electrodes are provided by end users in the industry and represent actual applications from the aerospace, medical, consumer and automotive industries. The company's graphite line enables consistent performance, maximum efficiency and overall cost reduction for end users, the company says.

Representatives from the company's team of EDM Applications Specialists are on hand at the show to answer any EDM questions that visitors may have about EDM and machining processes. They are also available to answer questions about how material properties impact not only the EDM application but also the ability to efficiently manufacture the electrode. The company also offers no-cost technical training. The company's graphites have been used in EDM, semiconductor and other industrial applications for over 50 years.

**Poco Graphite / 940-627-2121 / Booth 513**

## Conformal Cooling Products Maximize Efficiency

TruCool Conformal Cooling from **DME** is designed to maximize cooling efficiency through 3D metal manufacturing. This line of conformal cooling products with complex cooling channels conforming to the part surface geometry provides greater overall cooling coverage with even distribution while maintaining a targeted, consistent temperature and reducing cycle times by as much as 60 percent. DME announces three new products and services to the TruCool product and services line. First, DME says that DME Design Services builds on decades of moldmaking, mold design, thermal analysis and conformal channel design to provide customers with the most reliable, robust and efficient mold design. Second, DME's new cooling DME says that Aftermarket Services and Equipment provides the ultimate cooling channel cleaning, diagnostics and maintenance. It comes with the ability to trouble shoot, clean and descale both conventional and conformal cooling water channels to maximize the lifespan and efficiency of intricate conformal and conventional cooling through a closed loop, computer-controlled, automated process. Third, DME announces its new line of TruCool "Standard" conformal-cooled components, including core pins, gates and sprue bushings.

**DME/Milacron / 800-626-6653 / Booth 337**



## SVG System Doubles as Locating Ring to Ensure Alignment

**Mastip** has Mastip VeriShot, a single valve-gate (SVG) system, and Mastip Nexus Systems, turnkey pre-assembled and pre-wired solutions, on display at Amerimold 2018. VeriShot SVG and Nexus Systems are both compatible with Mastip's FlowLoc Technology Nozzle Range for leak protection.

The VeriShot SVG system sports a compact design, reduces mold height requirements and doubles as a locating ring housing the mechanics, which the company says ensures alignment between mold and machine platens. Pre-assembled, VeriShot features Mastip's FlowLoc threaded leak proof nozzles with advanced heating technology for optimum control. FlowLoc threaded nozzles attach securely to the manifold and feature advanced heating technology with embedded heaters. VeriShot SVG is compatible with TX19 and TX27 FlowLoc nozzles, which screw directly into the lower manifold providing a secure, leak-proof solution. VeriShot is suitable for applications requiring a highly cosmetic gate finish, fast flow rates, large volume parts and dimensional accuracy. VeriShot is capable of processing a wide range of engineering and commodity polymers. Low-mold filling stress results in higher part quality and consistency. It has patent-pending technology that includes high-temperature seals and adjustable valve pins.

**Mastip Inc. / 262-644-9400 / Booth 220**

## Valve Gate Systems Designed for Simplicity, Safety and Precision

At Amerimold 2018, **HRSflow** is showcasing FLEXflow Family, a range of products that includes the electrically driven valve gate systems FLEXflow and FLEXflow One. Simple, safe and clean, the electrical technology is designed for the independent adjustment of each valve pin with precise control of stroke, velocity and force during opening and closing phases. According to the company, this solution ensures accurate, easy-to-operate, flexible control of pressures and flow rates at each individual gate.

In addition, the company features its Side Mounted Cylinder. Because the placement is far from the manifold area, cooling configuration for hydraulic or pneumatic cylinders is no longer required. This configuration ensures the high performance of the hot runner systems while maintaining the same reliability of the components. Placed laterally at the border of the mold, it makes maintenance easy, convenient and safe, the company says. These featured products join the company's lineup of hot runner technology for the injection molding industry.

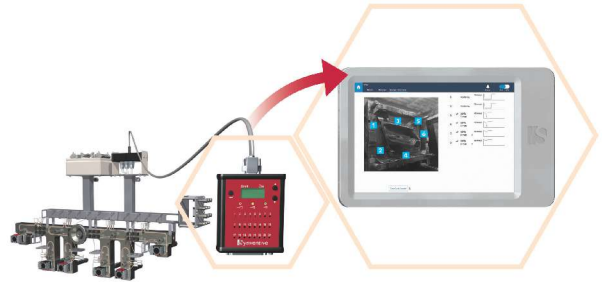
**HRSflow / 616-228-6900 / Booth 125**





**Moldmaker Adds Automated CNC and EDM Capacity**  
**Industrial Molds Group** specializes in engineering molds for medical, packaging, industrial, consumer and automotive markets. A multi-million-dollar investment in automated CNC and EDM work cells gives it the capability to improve lead times, accuracy and precision, the company says. Additionally, it provides mold tryouts, process validation and short- to long-run production at its sister company, Pyramid Plastics.

**Industrial Molds / 815-397-2971 / Booth 515**



**Hot Runner System Diagnostic Tools Save Time and Boost Quality**

**Synventive** showcases the SVG+ hot runner system with a simple design requiring no cooling lines or plates. The system saves time by providing monitoring and diagnostic tools from outside of the molding machine, resulting in less downtime, less scrap and increased reliability. The system upgrades easily to activeGate control technology for lower operating costs and improved quality. The system makes it possible to mold complex geometries and high-quality, Class A part surfaces in less time. The SVG+ hot runner systems are equipped with a new modular actuator design and patent pending SynCool3 technology. SynCool3 provides cooling of the actuators without the need for separate cooling lines. These systems are delivered with a Valve Monitoring Interface (VMI) for monitoring, diagnostics, and trouble shooting from outside the molding machine. VMI provides measured individual pin movement data and allows operators to check whether the valve pins are moving as intended.

**Synventive / 978-750-8065 / Booth 225**



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## Clamping System Has Internal Channel for Locking Control

FCS product lines include engineering (standardized clamping seats and virtual environment to design, configure and analyze the FCS clamping system), clamping (modular and standardized clamping systems (Manual Breyll & Automatic) for products and production fixtures), motion (automatic handling and storage systems for products and production fixtures) and control (flexible control software systems for managing the production processes work flow).

Automatic clamping devices for products and production equipment are based on a mechanical locking-unlocking system pneumatically activated. The company says that it is easy to fix the clamp onto a CNC machine table. The clamping system has a safety locking system that is normally closed with a dedicated internal channel for the swarf evacuation and the locking control, and it is capable of adapting to the workpiece or pallet deformation.



**FCS North America Inc. /**  
**519-737-0372 /**  
**Booth 336**



## Flexible Arrangement of Cylinder Cooling Lines Creates Space for Supply Lines

INCOE Corp. offers a powerful and highly compact valve gate cylinder. The HEM miniature hydraulics widens the choice of possible gating points and creates enough space for supply lines, as the outlets for the cooling lines can be arranged in four different directions. The new patented and improved thermal separation of distributors and cylinders prevents the hydraulic oil from reaching critically high temperatures. This helps protect moving parts and seals and means that cooling down is not required once production work is complete. If it is required, the cylinder can be removed without removing the cooling lines.

**Incoe Corp. / 248-616-0220 / Booth 511**



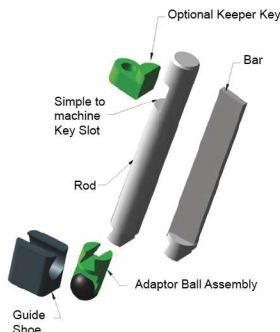
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## THIS MONTH ONLINE SOCIAL MEDIA



### YouTube™ Videos

MoldMaking Technology and Creative Technology Corp. take viewers on a virtual tour of the three shops that make up the business group that took this year's Leadtime Leader title: Maximum Mold Group.

[youtube.com/c/moldmakingtechnology](https://youtube.com/c/moldmakingtechnology)

### Facebook Popular Posts

MoldMaking Technology Senior Editor Cyndi Kustush uncovers how 2018 Leadtime Leader Maximum Mold Group improved its lead times with an increase in the capacity of in-house design and engineering services, investment in high-speed machining centers and the acquisition of two additional shops.

[facebook.com/moldmakingtechnology](https://facebook.com/moldmakingtechnology)



### Twitter @MMTMag Hot Tweets

Check out Editorial Director Christina Fuges interviewing Dave and Cindy LaGrow during the MoldMaking Technology/Manufacturing Alliance podcast with 2018 LLA Winner Maximum Mold Group.

[twitter.com/MMTMag](https://twitter.com/MMTMag)



### LinkedIn Conversations

Editorial Director Christina Fuges shares the secret to the success of this year's Leadtime Leader, which strives to provide customers with a better alternative for tooling development.

[linkedin.com/company/moldmakingtechnology](https://linkedin.com/company/moldmakingtechnology)



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# How to Advance Molding Undercuts

By Garry Zydron

Collapsible cores have long been touted as a viable alternative for molding undercut details like internal threads as opposed to using traditional unscrewing mechanisms like racks and gears. Several potential benefits result from using collapsible cores, not the least of which is eliminating the messy unscrewing cores, and yet it can be difficult convincing a moldmaker or a molder to use the technology. A new flush-style core design just might help to overcome objections and advance the molding of undercuts.

Here are seven good reasons to consider this new technology:

- **Durability.** The most common objection is that the cores do not have the durability to last three million cycles. In some cases, this might be true, but the patented flush-style core has succeeded in attaining eight to 10 million cycles. For example, flush-style cores were used for a 24-cavity tool molding a wine cap measuring 30 millimeters by 40 millimeters. The cap's wall thickness reduces to 0.25 millimeters for the tear-off strip. There are pin shut-offs on both sides of the core, and the slides shut off on the core, which shapes the bottom of the cap. The mold ran for eight years and averaged between one million and 5 million cycles per year.
- **Radius positioning.** This project was successful because unlike other styles of collapsible cores, the radius on a flush-style core (located on its pin) is positioned internally versus at the core's tip. This is so that the pin's top surface is flush with the core's top, enabling the part to be designed with a consistent wall thickness.
- **Ring design.** Also unique is that the inner and outer fingers of the flush-style cores are positioned on two separate rings versus one. Wire EDM improves the fit between the fingers, and all the fingers open independently so that the sides of the fingers do not wear.
- **Core assembly.** The core assembly uses straight, true diameters, further improving the fit and core durability and accuracy. These true diameters act like a pin and bushing with almost no wear.
- **Core fit.** Working without tapered-fit surfaces makes it

A new flush-style core design just might help to overcome objections and advance the molding of undercuts.

These wine caps were molded for eight years at a volume between one million and 5 million cycles per year using the original patented, flush-style collapsible cores.

easier to fit the core into the mold. A straight pin ensures that the core is open to the proper molding position, so the molded part shows only a witness line and no flash. This new fit also improves thermal transfer by fitting a true diameter.

- **Cost and cycle time.** A collapsible core design can help mold parts with undercut details at one-third the cost of an unscrewing mold and half the cycle time. It is no longer necessary to design in a rack mechanism because there is no need for it because of the cost reduction coupled with a simpler mold design. The notably faster cycle time is achieved because there is no unscrewing of the part.
- **Footprint.** A final point to consider is that collapsible cores have very small footprints, which means that the designer can position more parts in the same size mold or the same number of parts in a smaller mold using a smaller press. When compared to an unscrewing mold, the difference is dramatic, as cavitation can be increased by a third or even half again as much in the same size mold. [MMT](#)

### CONTRIBUTOR

Garry Zydron is the president of Collapsible Core Inc.

### FOR MORE INFORMATION

Collapsible Core, Inc. / 630-408-1693 / [collapsiblecore.com](http://collapsiblecore.com)

Image courtesy of Collapsible Core Inc.



30

UNDER 30

# NOMINATE A MOLDMAKER!

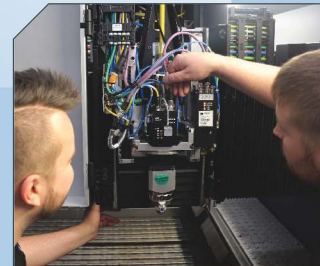
Young professionals are vital to the moldmaking industry, and it is important to acknowledge those making strides in shaping the industry's future. *MoldMaking Technology* is recognizing our industry's young talent by establishing a new **30-Under-30** honors program.

We are looking for 30 individuals under the age of 30 who are making a difference in moldmaking, both in their company and in the moldmaking community. The emphasis is on leadership and potential leadership—whether for a current employer or overall involvement in the industry, but they also may be hardworking industry volunteers and community members who know how to give back to the moldmaking industry.

Think of co-workers and colleagues—anyone who matches the criteria—and nominate someone you believe is deserving.

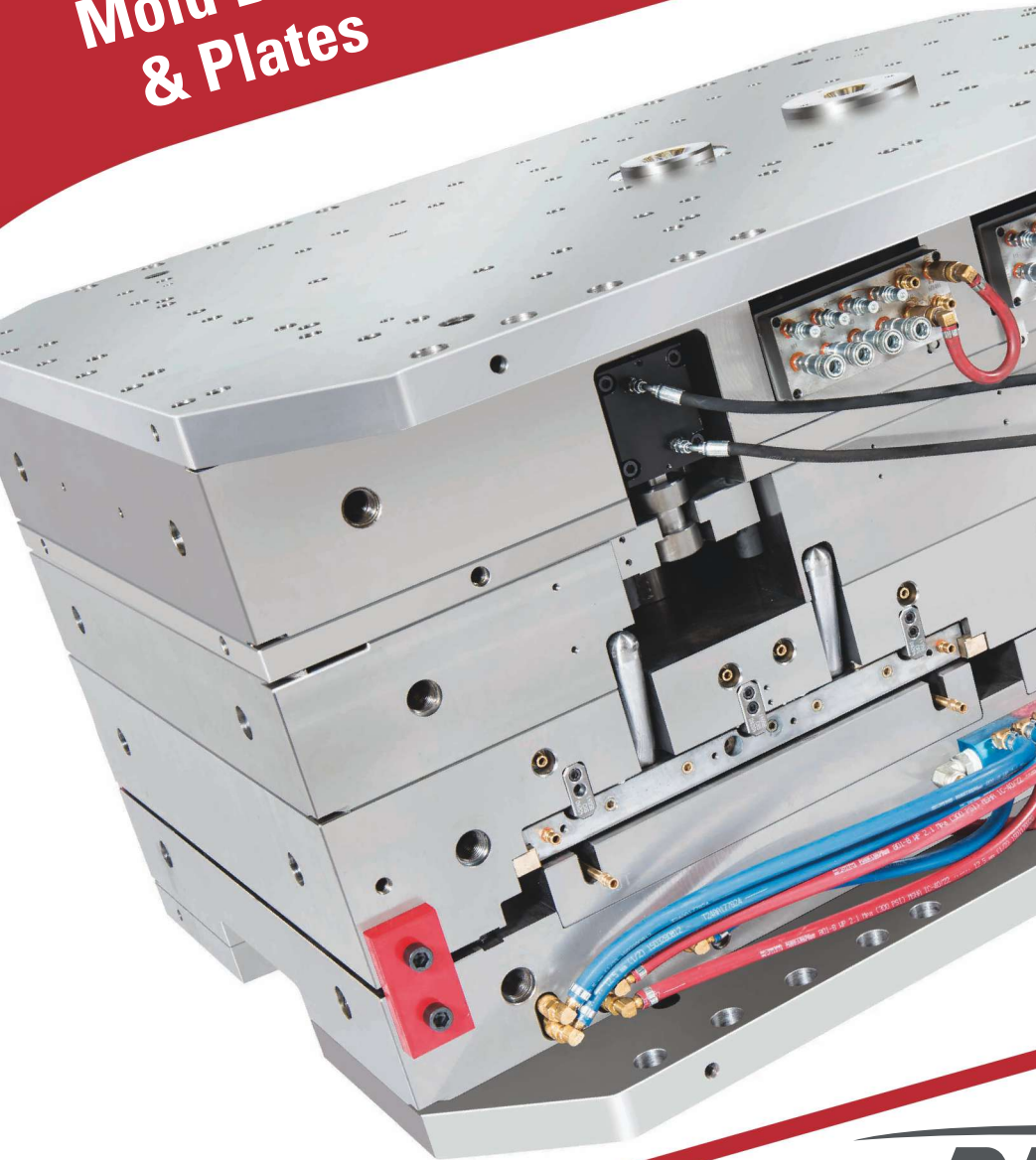
Honorees will be chosen based on the quality of the nomination submitted, not the quantity of nominations.  
*Nominees must be under the age of 30 as of October 1.*

*MoldMaking Technology* will select 30 young people in the moldmaking industry who are striving to be the next generation of leaders and innovators. We will recognize them throughout the year on the pages of *MoldMaking Technology*.



Nominate a young talent today at:  
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# Mold Bases & Plates



Plates



Components



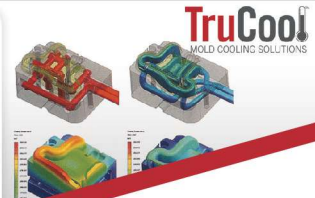
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