cover story

➤ BY BILL KENNEDY, CONTRIBUTING EDITOR

Breaking the Mold

U.S. moldmakers must adopt new business strategies to remain competitive.

Michelangelo believed that when he carved a statue he was simply freeing the shape that resided in the stone. Arguably, toolmakers, the manufacturing artists who create molds, have a tougher job: Producing an exact enclosure for the shape of something that isn't there at all.

And, unlike Michelangelo, toolmakers must struggle with ramped-up competition from overseas and other recent changes to the manufacturing landscape.

Jeff Mengel, partner and plastics industry team leader for the business-advisory firm of Plante & Moran PLLC, Chicago, said that changes in manufacturing and markets over the last 5 to 10 years have made the moldmaking business increasingly challenging. Productivity improvements in the plastics industry, and in moldmaking itself, have reduced demand for molds. Today's molds last longer and make parts quicker, meaning that end users

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need fewer of them.

Mengel said moldmakers' lead-time performance has been improving by as much as 15 to 20 percent every 2 years. As a result, makers of plastic parts see less need to stock backup molds.

As for overseas competition, Mengel said that 4,000 to 5,000 injection-molding machines were sold in North America last year. Worldwide for the same period, 67,000 were sold.

Sean Shafer, business unit manager of die/mold technologies for machine tool builder Makino Inc., Mason, Ohio, said there's been a big change in the marketplace. North America has gone from "owning" the market 10 years ago to being one of an assortment of players today.

"Mold builders have been slow to realize that they've got to change," said Shafer. "A lot of tool and die makers have all the right technical skills, but after 30 or 50 years of profitable business, it is difficult for them to change their business model.

"You can't be a general mold supplier anymore," he continued. "Once you get into high volumes, everybody is looking for the lowest price and [they look] globally. You've got to figure out what your niche is and go after that." Typical niches include very large molds or very small, highly detailed molds.

Certain product areas, such as medical parts, are less susceptible to the vagaries of overseas competition. For those types of products, the competition is "the guy down the street," Shafer said.

Shops can work that situation to their advantage, however, by forming partnerships and alliances with local competitors. "This keeps them from adding labor or facility overhead or expanding floor space," Shafer said. "If a shop can get along with the guy down the street, they can get the order out together and do more with less."

Mengel cautioned that establishing such partnerships isn't easy. "The problem with partnerships is governance," he said, adding that agreement must be reached on matters relating to warranties, priorities, pricing and engineering changes.

Establishing partnerships with customers is another possibility. Increased competitiveness can result from working with the customer on "launch dynamics." In these cases, the customer launches a program with design considerations still in flux. Unlike the traditional contract-machining relationship where the customer simply submits a print and the shop machines the mold to match it, the partnership involves dealing with ongoing changes as the mold design evolves. The mold shop addresses changing manufacturing issues and makes "engineering changes on the fly," Mengel said. The strategy enables the customer to get a product to market more quickly.

Retain Business

Dwindling demand for molds from existing customers prompts shops to seek new customers. However, said Rod Jones, president of the industrial sales and marketing consulting firm Decision Technology Inc., Ada, Mich., shops should never lose sight of the importance of retaining the customers they have.

"It costs five to six times more to get new customers than to keep existing customers. You really have to work at customer satisfaction and loyalty," he said.

Rarely does a shop take time to sit down with its customers and ask them what it's doing right and wrong. When a customer ends a relationship with a shop, Jones noted, 65 percent of the time it is due to unhappiness with the way it's being treated—not because there was something wrong with a product or service. The positive aspect of that particular problem is that it's relatively simple and cheap to fix. It usually involves making some kind of "attitude adjustment within your own plant, maybe with some training," said Jones.

B. Kennedy

Untended machining can help a mold shop maximize machine utilization and, thereby, cut lead times.

Everyone who interacts with a customer has to appreciate the lifetime value of that customer. Don't think in terms of the next job, Jones said, but in terms of "what is that customer really worth to you over the next 5 to 10 years. When you start adding those numbers up, it's pretty compelling."

Land New Business

Jones said it is not unusual for a shop to have well over 50 percent of its business come from just one customer. Cash flow and other small-business concerns make that a precarious position.

"If you lose more than 30 percent of your revenue stream at any given time, you probably are not going to make it. This makes these shops very vulnerable to market changes."

To strengthen its position, a shop needs to constantly cultivate new customers. They are two types of prospects: Those in the shop's existing markets, and those in markets in which the shop doesn't yet compete.

For the first category, Jones suggested "cloning" existing customers. A shop owner can determine five to 10 common characteristics among its present customers, such as what type of activity they are engaged in, number of employees, annual sales volume and so forth. Those characteristics can be used to mine available industry databases and develop a list of potential customers. A good database might cost $1,000. His firm accesses five or six databases, including Marketplace from Dun & Bradstreet.

Qualifying searches via the list of common customer characteristics enables a shop to shrink a list of thousands of companies down to a hundred or fewer. After the shop compiles a likely list of clones, the owner needs to "get on the phone, mail a postcard, send a letter, have his sales reps call on them—whatever his [preferred] methodology is," Jones said.

Finding customers in new markets intimidates many shops. Jones offered a few simple ideas for getting the process started.

Internet searches are a "great beginning," he said. He recommends that shop personnel type into search engines phrases such as "plastic product manufacturers" and "mold builders." The Web sites of companies fitting these descriptions often include pictures of their products and molds.

Shops should "just spend a lot of time looking and start building a catalog" of products that match their moldmaking capabilities, Jones said.

Another approach is what Jones called "machine matching." Many shops list the types of equipment they operate on their Web site, along with images of the parts they have machined. A shop seeking new markets can type the brand names and sizes of its own machines into a search engine. When it finds the sites of shops with similar equipment, it can check for photos of parts. This can give the searching shop ideas for using its equipment new ways.

The same approach can be applied to the brand and size of the injection-molding machines of a shop's current customers. Since the shop has already made tooling for the specified machines, noncustomers that operate the same equipment become viable prospects.

Qualifying a potential customer is important. Some companies make so few parts that their molds never wear out, Jones said. He recommended that shops "look at industries where there is a high volume of product and high turnover in designs."

As an example, he cited plastic stadium seating. The seats are produced in extremely large volumes. Not only do suppliers of such seating require a lot of molds, they also need

The reliability niche

A tool and die shop with six employees in North Royalton, Ohio, is staying competitive by being flexible, quality-conscious and reliable. CAM Tool & Engineering Inc. was founded in 2000 by Craig Mog and his father. It began with a couple of Bridgeports, a Makino EDM and an OKK machining center.

From the start, CAM Tool has focused on being flexible—not limiting itself to producing a single type of mold. "People think you have to specialize in one area, but we find that staying diversified is key to a successful business," said Craig Mog. "We've done everything from injection molds and hard milling for stamping to die-cast and foam molds. We've made tools out of aluminum, P-20 and exotics."

The shop even offers production-machining services. A typical job might be 100 to 800 aluminum parts for a relay manufacturer.

Mog feels that one of his shop's greatest strengths is reliable delivery. He would rather turn down a job than take it and let a customer down. "When we tell you we are going to do something, we are going to do it," Mog said.

Makino

The accuracy of the Makino S56 VMC helps CAM Tool cut lead times.

Reflecting that attitude, CAM Tool decided that it needed to add a second milling spindle. Customers' needs drove the decision. "If I was a molder, I would want my suppliers to have more than one spindle in case their primary spindle went down," said Mog.

CAM Tool bought a Makino S56 vertical machining center. To increase the shop's high-speed-machining capability, Mog ordered the optional 20,000-rpm spindle.

However, according to Mog, acquiring the machine was only the first step. "You can buy a high-performance machine, but if you don't tool it up correctly and buy the right software, you may as well buy a lower-end machine."

Mog gained an understanding of HSM by consulting software companies, tooling suppliers and other shops. With that information, he gradually upgraded his cutters, added balanced toolholders and improved his skills with the Cimatron and Virtual Gibbs software he uses to program jobs. As his understanding has grown, he has been able to continually extract more efficiency from the machine.

For example, he said, "on gates and runners, we are only doing minimal polishing, if any at all. On mating parts, we are only cutting once, and exactly to the numbers, instead of cutting twice like we've often had to do in the past." An optimized combination of toolholders, software and cutters has enabled the shop to take work from the EDM and machine it on the VMC instead, reducing cycle time and eliminating the time and cost of machining EDM electrodes. When the shop is busy, the machine runs unattended.

On the business side, Mog is exploring a partnership with a local producer of plastic parts. Working together would enable them to offer customers a one-stop source for trial parts as well as production capability.

Mog said CAM Tool intends to further exploit its ability to reliably produce a range of high-quality parts by entering new markets, including the medical field. —*B. Kennedy*

significant amounts of mold-repair work performed.

Parts and service manuals, surprisingly, are sources that can help a shop learn about products for which it might make molds. Jones gave the example of the molded parts on garden tractors. The shop owner can get a service manual and study the exploded views and part descriptions to learn part names and configurations. Then, he can contact potential customers and talk intelligently, because he has educated himself about those parts and knows where they fit in the overall assembly.

B. Kennedy

Five-axis machining permits manufacturing of some molds in one setup, streamlining the entire manufacturing process.

Learning Lean

According to Plante & Moran's Mengel, mold shops have to employ the tools of lean manufacturing. "The average mold sits on the floor 90 percent of the time, waiting for the next process step," he said. "The mold is queuing up for the next move because the shop doesn't have its act together and the process doesn't flow very well."

Applying lean manufacturing techniques, including eliminating waste, improving work flow and organizing documentation, will cut manufacturing time. The moldmaking process involves too many variables to eliminate waiting time entirely, Mengel said, but lean improvements can shave weeks from production.

Shops need to recognize which time savings are most valuable. Faster machining, in some cases, provides minimal benefits. A mold that takes 12 weeks to produce, Mengel said, may be clamped on a machine bed for only 4 days, or just 5 percent of the total manufacturing time. Cutting machining time in half with faster machining would yield only a 2.5 percent savings in total manufacturing time.

Manufacturing technologies that can provide significant benefits include multiaxis machines that permit more operations to be performed in one setup, and machines that run unattended.

"I talk to some of my customers about bringing in robots for machining centers for molds," Shafer said, "and they ask, 'What's the point of that? It machines for 10 hours at a time.' The point is if you can set it up right, in 10 hours when the machine is free, there's another part going right back on while you are sleeping."

Properly managing the supply chain and using standardized components and tools where possible also facilitate the manufacturing process. Mengel said the industry is "getting to be more of a 'mold manufacturing' business than a moldmaking business." Efficient processes can differentiate a shop from its competitors.

He said: "Buying a cutting tool, buying a machine tool—anyone can copy that. Developing a process that makes mold [production] faster—that's hard to copy. It's unique to the organization."

Survival Guides

Shafer said it is in the best interest of Makino, and other suppliers, to help mold shops adapt to current conditions. "Their survival is crucial to our survival," he said.

The traditional approach is that a shop machines a mold as near final shape as possible and then applies artistic skills, such as grinding and hand finishing, to complete it. There isn't time for such inefficient, labor-intensive practices today.

Instead of the post-machining investment of time and money, "you need to move it to the other end, to make the investment up front and make sure when the tool hits the metal that it's right," Shafer said.

Makino is working to help shops recognize what technology is available, and, just as importantly, how implementing that technology can boost throughput. "What's important is how a machine can shorten lead time, produce bench-free surfaces and run unattended," Shafer said.

Makino also presents educational programs that focus on the business aspects of competitiveness. Mengel and Jones have both participated in Makino-sponsored seminars that present ways to change a shop's business model to meet the changing state of moldmaking markets.

The company has also launched a series of Internet-based Webinars that address crucial manufacturing issues. The programs run live and are archived on Makino's Web site (www.makino.com). The programs, Shafer said, "hopefully will reach people and get some ideas into their heads. We are trying to create a dialog to help the industry."

The following companies contributed to this report:

CAM Tool & Engineering Inc.
(440) 877-9050
www.camte.com

Decision Technology Inc.
(616) 676-4650
www.decisiontec.com

GB Mold LLC
(951) 688-2132
www.gbmold.com

Makino Inc.
(800) 552-3288
www.makino.com

Omni Mold Systems
(888) OMNI-755
www.omnimold.com

Plante & Moran PLLC
(312) 899-4460
www.plantemoran.com

Outside Help

Although his company provides

Shaking the tree

GB Mold LLC, Riverside, Calif., makes high-quality plastic-injection molds ranging in size from 8"×8" to 48"×30" for irrigation equipment and medical products.

Owner Anthony de la Fuente said the shop stays competitive by breaking tradition in two areas.

First, "we look at the business of toolmaking as a manufacturing process, not a custom job," he said. "Any other moldmaker will tell you that every mold is different and has to be handled differently. We think that is not the right way to do it. We look at every mold as the same, and some of the details are different. Yes, it's still custom work, but it is a very different process than the way traditional moldmakers work."

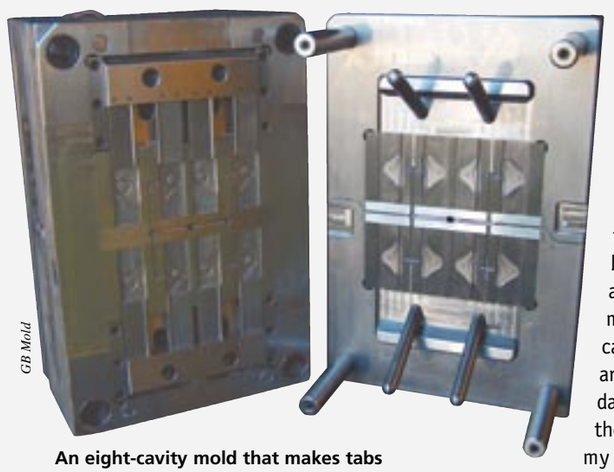
Part of this approach involves the use of off-the-shelf components for the parts common to every mold. For example, mold bases and related components are sourced from Omni Mold Systems, East Hartford, Conn.

Dave LaFleche, Omni Mold sales manager said, "Any product you can standardize enables you to increase your quality at a reduced cost, because of repetitiveness." To illustrate his point, he said that centuries ago machine shops turned their own screws for every application. The advent of standardized, inexpensive, high-quality screws saved shops the hassle of making their own.

It's similar for mold bases. Rather than designing and machining its own mold bases, GB gives part specifications to Omni, whose designers determine which of the company's 1,000 standard mold bases will accommodate the core and cavities. GB personnel can concentrate on designing the mold's unique features, "which is the cavity and core, which is what the customer is paying us for," de la Fuente said.

GB Mold

To make a mold used to produce components for an orthopedic knee brace, GB apprentice moldmaker John Price assembles hardened steel cores and cavities into a stainless steel standard mold base provided by Omni Mold Systems.



GB Mold

An eight-cavity mold that makes tabs used to attach a metal D ring to the knee brace.

After Omni delivers size and pricing information on a mold base, de la Fuente can incorporate it in his quoting process. GB's cash flow also benefits. "I don't need to order the mold base months in advance and tie up money," he said. "I can order a base to arrive almost on the day I am to deliver the mold, and have my biggest single material expense (the mold base material can consume up to 25 percent of the total project cost) at the end of the project and not at the front."

The second area where de la Fuente said his shop is "really shaking the apple tree," is the concept of "pay for performance" molding. Moldmakers traditionally are paid to simply build a mold to match a blueprint, without regard for the mold's actual output.

"What a customer is looking at is not the mold, but how much the mold can produce," de la Fuente said. "If we can make a mold run a little bit faster and produce good parts, that's just pure profit for the customer."

GB works with some of its higher-end customers to set bonuses or penalties based on the mold's performance. A plastic-parts manufacturer may base a production schedule on a 30-second cycle time between when the mold opens and closes. "Our proposal to the customer is, 'If we can do it in 30 seconds, here's a price, and if we can get it down to 15 seconds, that means money to you and we should get some kind of bonus.' "

—B. Kennedy

strategic consulting services, Mengel said staying competitive in the mold-making business requires shops to take a "holistic" approach, with strategy but one of the ingredients needed.

Advice from consultants and suppliers can be helpful because "too many times companies are in a cocoon, focusing on what they do" and not the bigger issues, Mengel said. However, such advice can be viewed negatively by shop owners, because often "outsiders come in with an agenda, and the agenda is to sell something. Whether it's a machine or a strategy project, the owner needs to find someone he can trust."

Jones said most mold shops that his company works with are reactive rather than proactive. "They have a network of customers and simply wait for the RFQs to roll in to bid on a mold. They are stuck in a market and with certain customers. Some are really getting worried.

"I tell them, 'There's still a lot of mold business around. Your job is to get more of it.' " △