CNC MACHINING

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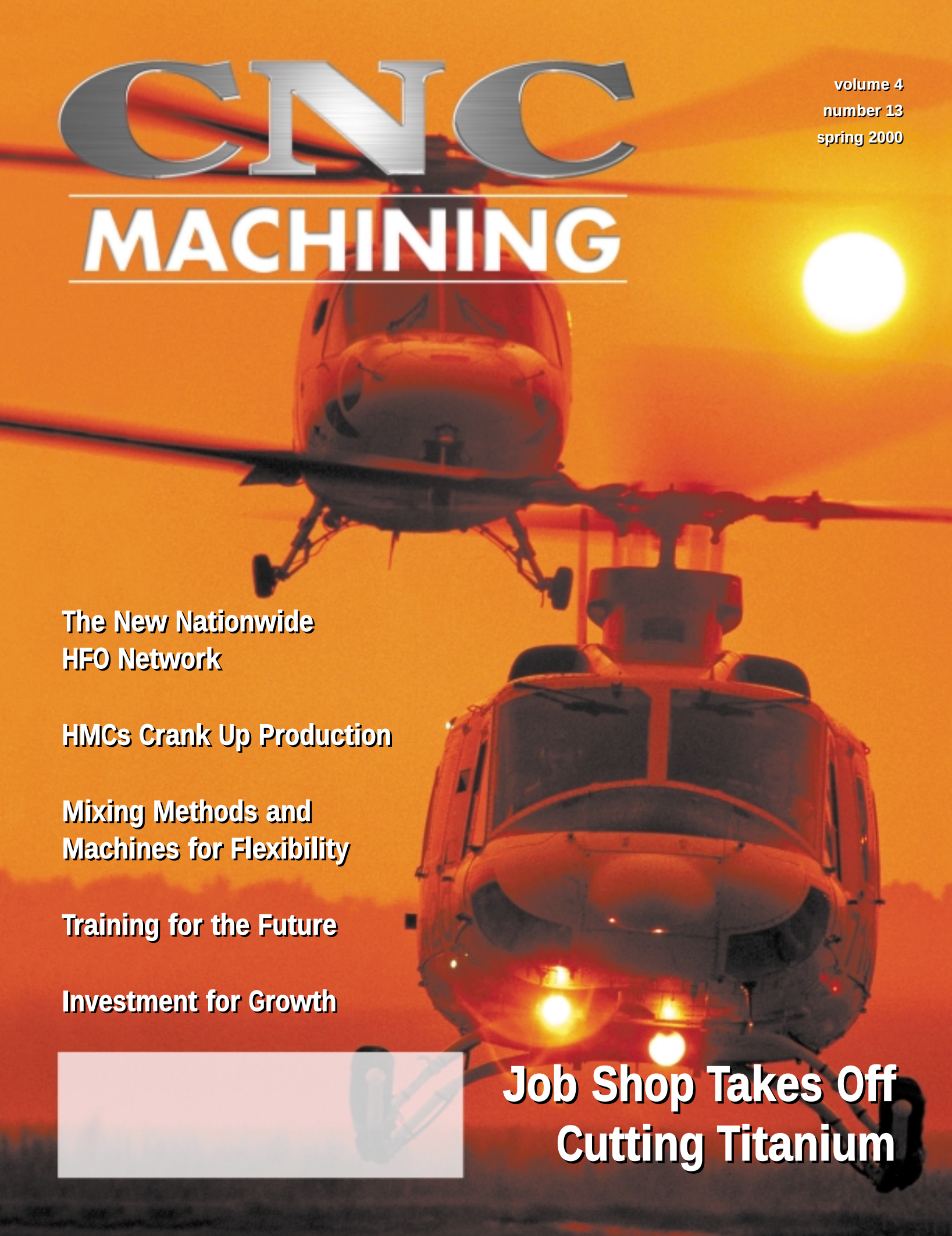

The New Nationwide HFO Network

HMCs Crank Up Production

Mixing Methods and Machines for Flexibility

Training for the Future

Investment for Growth

Job Shop Takes Off Cutting Titanium

CNC MACHINING

> volume 4 > number 13 > spring 2000

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THE MASTHEAD

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photo by Mike Reyno
© Skytech Images

What goes around, comes around. No, wait, that's not it. What comes around, goes around? Nope, that's not it either. How about: What goes around and around? Yeah, that's it.

Now that you're totally confused, I'll explain. The above is just a roundabout way to convey that this issue of *CNC Machining* is filled with things that go around. From helicopters, to crankshafts, to mixers, the stories revolve around things that rotate.

Our cover story this time around features MB Manufacturing and Tooling Corporation, a relatively young job shop that cut its teeth hogging out titanium blocks for helicopter rotor components. After reaching a turning point in his life, owner Mike Bramlage decided to quit the rat race and set off on his own. With little more than two years under its belt, his shop has turned the corner and become a very profitable venture.

Then we head out east to Kellogg Crankshaft, a company that specializes in short-run and specialty crankshafts for the automotive industry. Their crankshafts have been around since the early days of Indy. Currently, they put Haas five-axis horizontals to very good use drilling oil passages in their cranks.

Taking things in a slightly different direction, we visit Hobart Corporation, a company that manufactures industrial mixers that put even the most steroid-pumped Cuisinart® to shame. These puppies are designed to handle even the toughest mixing job, and Haas horizontals play a key role in their production.

Bringing things around a bit to the current situation in the work force, we visit a community college that uses Haas mills and lathes to make inroads into the serious shortage of qualified machinists entering the market. By using modern CNC equipment from Haas to train the students, the school better prepares them for the real world.

We also strolled around the recent WESTEC show to see what's new, so be sure to look around back for the "Spied at WESTEC" section, where you'll find the latest machines, options and features available from Haas.

And, as usual, be sure to check out the trade show roundup and the race report, where you'll find the latest info about shows around the country and race sponsorships.

So, sit back, relax and enjoy!

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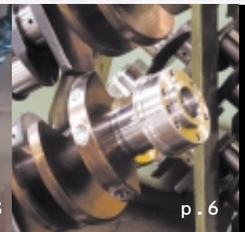

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p 14. INSIDE:

The MD500 helicopter, above, is widely used by law enforcement agencies, fire departments, television stations and the corporate world. Like any aircraft, it has certain components that must be replaced at FAA mandated intervals in order to maintain airworthiness. Such components are one of the specialties at MB Manufacturing and Tooling Corporation.

by Denis Dupuis

I've been doing a lot of travelling lately, jetting around the country to attend the openings of various Haas Factory Outlets. As a result, I've had plenty of time to catch up on my reading. I recently came across an article in IndustryWeek *that caught my attention because it talked about the future of marketing and product distribution. In light of the changes we are making in the distribution of our own products, I found the article especially appropriate. After reading the article again, I realized that the ideas it discussed would be of interest to many of our customers and suppliers. Rather than trying to paraphrase the article here (I didn't feel I could say it any better), I contacted Mr. John Sheridan, the author, and* IndustryWeek *for permission to reprint it. I would like to thank Mr. Sheridan and Joanne Honohan for allowing me to reprint this article, and for their quick response (as usual, I was close to deadline).*

Mixing It Up

Multiple-channel approach nabs customer wherever he buys.

In the past, manufacturers tended to rely on a single channel to sell their products – either a direct sales force or distributors, or through dealers or retail chains. In recent years, however, a growing number of companies have adopted a hybrid marketing approach – using multiple channels – to reach various customer segments. And they are increasingly integrating new channels like telemarketing, direct mail and the Internet into the mix.

The basic rationale is fairly simple, explains Timothy R. Furey: "You want to intercept the customer wherever he decides to buy."

But deciding on the right mix of channels is often complicated – especially when the Internet is one of the options, says Furey, who is CEO at Oxford Associates Inc., a Bethesda, Md.-based marketing and sales strategy consulting firm. To people who make their living through more traditional sales activities – like dealers – the appearance of Web sites as an alternative vehicle for reaching customers can seem threatening.

"A lot of traditional industry executives and sales reps are scared to death of the Internet," Furey says. "They think the Internet is going to put them out of business. . . . I would argue that for certain segments of their customers, they need to start selling direct over the Internet and use sales reps less. But on the other hand, there are still major segments of the market that require the traditional distribution channels."

Some customers who need special advice or hand-holding, for example, are willing to pay a premium in order to deal face-to-face with a field sales representative.

Each marketing channel offers a different level of value-added, notes Furey, who coauthored – with Laurence Friedman – *The Channel Advantage* (1999, Butterworth–Heinemann).

In *The Channel Advantage* Furey and Friedman note that the hybrid approach is the key to growth in many markets, since "no single channel captures more than half of the available transaction." Moreover, a hybrid mix of channels that work well together "can reduce selling costs by 20% to 30%, and in some cases, can cut them in half."

Just as significant, says Furey, is the downside risk for companies that don't take advantage of a particular channel like the Internet. Competitors who do may lure existing customers away.

– John Sheridan

HFO Network Nationwide by IMTS 2000

Over the past year, there have been major changes in the way Haas Automation does business. The most innovative, and possibly revolutionary, of these changes has been the ongoing development of the new network of Haas Factory Outlets (HFOs). These locally owned and operated HFOs are simply the conversion of Haas' long-established existing distributors into facilities dedicated exlusively to the sales, service and support of Haas products. Each HFO is staffed with experienced and fully trained Haas personnel who are dedicated to supporting every sale.

"Haas' overall market share increased by some 30% in 1999," said Peter Hall, Director of Haas Factory Outlets, commenting on the success of Haas in what many call a sizable, worldwide machine tool sales slump. "In addition, Haas also doubled its market share in turning centers, and increased its HMC market share significantly. Haas was probably the best performing machine tool company worldwide in 1999.

"This is a result of much hard work by our distributors," Hall explained, "but also in no small measure due to Haas' strong marketing, and the growing success of the HFO program."

Hall, who spoke recently at the Annual Haas Distributor Meeting, said it is Haas' ability to quickly respond to the dramatically changing global business environment that is key to survival on today's sales battlefield. "Haas' total commitment to rapid continuous improvement – to radically changing the way we do business – should be absolutely clear to everyone at this point," he said.

A number of the nearly 50 planned HFOs are already certified and operational, with more than 30 scheduled to open by IMTS in September. The majority of these HFOs will also be supported by Haas Technology Centers, where prospective clients can see Haas machine tools performing in real-world working surroundings.

2000 TradeShow Calendar

Show Name and Location	Dates and General Information
Cleveland Machine Tool Show, (Ohio)	May 9 - 11, 2000 This show is held at the Cuyahoga Fairgrounds in Berea, Ohio, and is expected to draw attendees from all over Northern Ohio's metalworking industry.
Tulsa Machine Tool Show, (Tulsa, OK)	May 10 - 11, 2000 For the fourth consecutive year, the Tulsa Industrial & Machine Tool Show will be held at Expo Square, where it is expected that more than 3,000 attendees will preview products, and discuss new technologies for the manufacturing and machine tool industries.
Montreal Machine Tool Show, (Canada)	May 23 – 25, 2000 Quebec's largest machine tool show and factory automation event will be held at the Place Bonaventure in Montreal. This show is expected to draw more than 12,000 attendees. Haas Automation will be displaying machines and running demos in booth #302.
EASTEC 2000, (West Springfield, MA)	June 14-19, 2000 EASTEC is New England's leading metalworking machine tool event, attracting more than 20,000 buyers from the aerospace, computer and electronics industry. Held at the Eastern States Exposition Grounds, Haas Automation will be in Booth #2448 in Building 1 (NAC).

For additional show listings please visit www.HaasCNC.com

Motorsports competition is one of only a few ultimate proving grounds where the latest technology is tested in life-threatening situations with participants battling side by side – and people pay to watch.

Absolute perfection is the most efficient path to success, and teamwork is the binding force that delivers this perfection to the "Winner's Circle." Haas Automation's technical partnerships with the racing fraternity actively support this relationship by reinforcing the close bond between precision driving and precision machining.

With the 2000 racing season now underway, here is a listing of the various racing teams and suppliers partnered with Haas Automation in the quest for ultimate perfection.

Hendrick Motorsports

WINSTON CUP SERIES:

There are new cars on the NASCAR circuit this year, and Hendrick Motorsports is fielding three of the new Chevrolet Monte Carlos. Piloted by veteran NASCAR champions Jeff Gordon (#24) and Terry Labonte (#5), along with a new Hendrick team driver, Jerry Nadeau (running the #25 car under the new Michael Holigan Homes sponsorship), these three Chevys are ready to rack up some wins.

Gordon won the most races last year and earned more pole positions than any other driver, yet he missed the championship title on points. So look for some hard charging on behalf of this trio.

CRAFTSMAN TRUCK SERIES:

Jack Sprague (#24), driver of the Chevrolet Silverado pickup entry from Hendrick Motorsports, captured his second Craftsman Series championship last year. He is the odds-on favorite again for 2000.

PacWest Racing Group

CART CHAMP CARS:

Both Mark Blundell (#18) and Mauricio Gugelmin (#17) have re-signed with PacWest Racing Group for the 2000 series, with Gugelmin running fresh livery for Nextel, his new primary sponsor. Blundell continues his ongoing relationship with Motorola.

CART INDY LIGHTS:

Tony Renna (#17) signed with PacWest as the new full-time driver for the Indy Lights Championship, and as the new Champ Car testing and development driver. Joining Renna in the Lights camp is Scott Dixon (#18).

Ilmor Engineering

CART TEAMS

The Mercedes-Benz powerplant has been completely redesigned for 2000, and while slightly larger in size, it is developing more power now with more reliability.

There is also a new team running the Ilmor engine in the 2000 series. Mo Nunn, former crew chief of the Target/Ganassi team (CART Champions for the last four years) is the primary

owner of the new team, with Tony Kanaan behind the wheel. PacWest president Bruce McCaw is a minority owner, along with Mercedes-Benz. Look for some interesting developments here!

All American Racers (AAR)

CART CHAMP CARS:

Team owner Dan Gurney says AAR has elected to take a season off from CART to regroup and formulate plans while keeping "a close eye on how things are being sorted out." However, the team is actively supporting the All American Racers' entry (#48) in the Toyota/Atlantic series driven by Alex Gurney, Dan's son. These cars feature a tub and chassis (basically the whole car) built by Swift Engineering using Haas machining centers.

PPI Motorsports

CART CHAMP CARS:

Cristiano da Matta (#97) takes over as lead driver in the Pioneer car for the PPIM CART efforts following Scott Pruett's switch to NASCAR. New for the PPIM CART team is Oriol Servia in the new #96 Toyota/Reynard sponsored by Telefonica.

TOYOTA/ATLANTIC SERIES:

PPI Motorsports is fielding two cars in the Toyota/Atlantic series. Andrew Bordin, who placed third in the 1999 series championship (his second consecutive top-three championship finish) will be driving the #1 Swift. Joining Bordin will be Daniel Wheldon, reigning U.S. Formula Ford champion, driving the #3 Swift.

SCORE OFF-ROAD:

Ivan "Ironman" Stewart continues to dust his competition with the latest version of his Baja-dominating, V-8 powered Toyota Tundra off-road pickup.

C&C Motorsports

Dividing their driving chores among various race vehicles – SCRA Sprint Car circuit, NASCAR Winston West sedan racing, and the SCORE off-road racing championships – Troy Cline and partner Joe Custer are running hard, keeping the Haas name out in front of the racing privateers and parts manufacturers of the Southwestern states. Cline closed out the hotly contested 1999 SCRA season in second place.

Haas Offshore Racing

Bill Bowen, General Manager of Haas Factory Outlet, Torrance, captained his Unlimited Warlock 32-foot E-Class power boat to yet another victory at the Ventura Offshore Grand Prix. This win pushed the rookie pilot over the top in the Pacific Offshore Power Boat Racing Series points race and earned the Haas Offshore Racing team its first championship. Notable is the fact that he did so during his first year of competition. Bowen will try for a repeat performance in 2000.

Cranking Out Performance

Gasses explode violently, sending a machined mass of metal rocketing down a cylindrical bore. Converting this bang into a contorted mass of burning rubber on a high-performance car requires the oscillatory motion of a precision-machined, well-oiled rotating crankshaft.

Story & Photos

Preston Gratiot

When you hear that something "really cranks," you can rest assured the comment almost always refers directly to attention-grabbing performance. And performance is what Kellogg Crankshaft is all about. As a manufacturer of prototype and low-production-volume crankshafts, you could say that Kellogg literally turns the bang of the combustion chamber into ground-grinding torque, ergo: Kellogg Really Cranks!

With a client list covering everything from two wheels to 18 (customers include Harley-Davidson, Detroit Diesel and Cummins Engine), Kellogg has a reputation for keeping the big wheels turning. Ford, Chrysler and General Motors regularly call on the company, as do the likes of Mercury Marine and John Deere.

FROM MODS TO COMP

Located in Jackson, Michigan, Kellogg Crankshaft has been in business, now, for 44 years. "This is a third-generation family business here," says Charles C. Baker, Director of Marketing and Administrative Services. "In the very early years here at Kellogg, we were a remanufacturer and retooler of specialized crankshaft-machining equipment. That's how the company was founded. One of our earliest crankshaft programs was when Ford first got involved in Indianapolis with Jimmy Clark – all of those Ford racing cranks came from Kellogg.

"Another early crankshaft we had was for the famous Chrysler Hemi (a 331-cubic-inch V-8 introduced in 1951 that featured hemispherical combustion chambers in the heads) in the drag racers," explains Baker. "As a matter of fact, we occasionally get a call from somebody still running one of those old Hemis."

CUSTOMER BASE

Today Kellogg builds prototype and special-use cranks for the major automotive manufacturers, and their customer base is growing faster than ever before. "We do cranks for Europe, Asia, Taiwan, England and Germany," Baker says. "We build them for companies all over the world, but our primary customers are in America.

"Right now we are putting out about 35,000 crankshafts per year," continues Baker. "We have three production lines plus the prototype department." Kellogg currently runs two shifts per day with about 100 people on the payroll. The facilities have grown to more than 100,000 square feet in order to properly service the increase in clientele and production.

Kellogg is currently updating their production capabilities with a growing number of Haas HS-1R five-axis horizontal machining centers. Initially acquired for fabricating prototype designs, the new horizontal machining centers – equipped with Haas HRT-210 rotary tables for full five-axis drilling and machining – are now entering mainstream production, primarily for drilling the various oil channels needed to keep the crankshaft webs and pins properly lubricated.

COMP TO CORP

"We produced those racing cranks back in the early days for private engine builders," says Baker. "It was because of our involvement in early racing that we got involved with the major automotive manufacturers and their production prototyping, and that's pretty much where we are today."

Primarily a prototype/low-volume-production house when compared to the "Big Three" automakers, Kellogg offers a product line that is typically composed of niche crankshafts devoted to performance. Kellogg's extensive experience and problem-solving capabilities allow the company to resolve design concerns related to high-performance/heavy-duty use prior to production.

"When it comes to specialty cranks, like high-performance or specialized steel cranks and designs that are low volume, then that's where we step in," says Baker.

SHORT-RUN RADICALS

A typical job may start out at 5,000 cranks a year, and at the end of a ten-year program it may be down to 1,500. "Two of my production lines here are running about 10,000 to 12,000 cranks per year, but those are current products," says Baker. "They just happen to be specialty products.

"We're a known supplier of crankshafts for the Cobra, the high-performance version of the Ford Mustang, but we also build specialized cranks for a major aftermarket high-performance company. As a matter of fact, that contract is growing into our fourth largest business. That's one of the reasons that we can justify the purchase of these Haas machines (HS-1Rs)," says Baker. "The high-performance crankshafts that we make are available with a number of different strokes, and because of design variances, we have to have a number of different, and unique, oil-hole programs. At last count, I think we had 37 different oil-hole programs for one customer's high-performance crank line. That's why the Haas multi-axis HMCs are so valuable, we can make rapid changes by either loading a new program, or modifying an existing code to meet production demands."

As far as *CNC Machining* divulging any of the actual methods that Kellogg uses, or describing the special tooling they have selected or modified, that is proprietary. "The only thing I will speak of is that when we bought the machines, we specifically wanted to make sure that we had through-the-spindle coolant capabilities," says Baker. "That is necessary for the way we are running, as are the Haas rotary tables. They are standard items on all of our Haas machining centers. We're not using the simultaneous movement of the axes, but

The HS-1R horizontals at Kellogg have been modified with a slot above the door to allow easy loading of weighty crankshafts using an overhead hoist.

we're using all five axes positionally to achieve what we're after."

PROOF OF CONCEPT

"We've been running the two existing Haas HMCs for a little over a year now. They were sort of a proof of concept," explains Baker. "These Haas horizontals are dedicated to making prototype short-run parts right now. I've got two more on order that are going into a dedicated production run, and a third one that will be used for a different process."

The production lines at Kellogg are currently setup for flexible manufacturing. "We integrate a lot of different part numbers in the same line. That means that with our new HMCs, we can easily change over to a different oil-hole pattern with a much shorter setup time when compared to our old machines.

"That old machine next to the Haas is a good example of a technology that stretches almost all the way back to World War II," says Baker. "It's basically a one-spindle, one-man machine. That means one crank at a time, and that can really cut into production efficiency.

"We've kept these old machines in the plant for backup, but things are so reliable now with these new HS-1Rs that we don't need them anymore. So now we're going to gain that space back and fill it with more Haas HMCs."

DEALER MODS FOR MAX USE

Because the cranks weigh anywhere from 20-90 pounds, Kellogg uses overhead hoist mechanisms to facilitate safer and more efficient loading. "We have to be able to get in to the center of that fixture, so Gerotech (the local Haas distributor, recently certified as a Haas Factory Outlet) modified the sheet metal enclosures over the door opening so we could get our cranks in and out with the hoist." explains Baker. "This required the removal of a portion of the sheet metal over the door."

MARKET COMPETITION

"We've got a limited competitor who also has a Haas HMC," says Baker. "As a matter of fact, his is a year older than ours. But what we've done here – especially with our lead HMC operator, Mike Boley – has given us maximum productivity, and it's all in the programming and tooling that we've developed.

"Mike is excellent. He's taken on the operation and development of these machines as his personal mission, and he has come up with some fantastic things," says Baker. "In addition to his programming, he has designed some cooling methods that even my engineers hadn't dreamed about. That personal touch and the major savings he has come up with have helped to enhance the efficiency of these machines. It's a rare operator who can, and will, do all of that."

It is because of this success that Kellogg has been able to actually take production parts off-line and test run them on the new HMCs. "Mike has already setup these production cranks and successfully run them. That's how we've been able to justify buying the Haas HMCs for our production line."

In addition to the Haas CNC horizontal machining centers, other specialized equipment at Kellogg includes: CNC turning equipment; CNC crankshaft milling machines; infinite-angle CNC drills; induction hardening equipment; CNC grinders; balancing equipment and micro-finishing equipment.

Because of the prototype nature of many of the jobs run at Kellogg, setup time on short-run parts would frequently exceed the actual run time. Operators could spend eight hours setting up, and then spend just two hours running what few parts were needed.

"Then," Baker explains, "if there was a repeat job six months later, you would have to go through the same eight-hour setup again. Whereas Mike changes over jobs on the Haas faster than the inspector can check them out. The thing about it is the precision; he has two axes to enter in, then he downloads the floppy and starts cutting."

PRECISION PAYOFFS

"We used to fight to hold location of plus or minus a half or three-quarters of a millimeter on our old drills," says Baker. "Now we can work within a tenth of a millimeter. There's just that much of a difference. You can do a lot of things with these new multiple-axis CNCs. My boss has been very happy."

When Baker orders a piece of capital equipment, he tries to justify a two-year, maximum three-year, payback. "With Mike's efforts and what he's been able to do here, our payback on this program has been less than a year," says Baker. "Very seldom do you ever have this kind of result."

BONUS BACKUP

"Another thing these machines are giving me is a versatile backup capability for my production runs, and that's what I am doing here on the horizontal right now," says Baker. "This is a production crank, but the normal machines are going to be down for two or three days while we move them to a new location. However, I'm not going to miss a lick, the Haas will keep me going in cranks."

OPERATOR OPINIONS

"You can really tell that these machines are designed to be easy to operate," says Mike Boley, HS-1R operator. "When I got here 10 years ago, we only had a couple of older CNCs, then the guy who ran them went on vacation for a month.

"They ended up needing somebody to run some parts, so I went over and tried to figure things out. I had never been trained to run a CNC," explains Boley. "Actually, I think that's

Please see PERFORMANCE page 34

Mixing it Up to Maximize Production

Process flexibility and a multi-talented work force are two important elements when it comes to success in today's manufacturing world. One of the easiest ways to capture this elusive upper hand of productivity is through effective employment of user-friendly, automated machinery.

Story & Photos

Preston Gratiot

Hobart Corporation works to constantly refine and augment its success to this end by maintaining a stringent set of standards when it comes to the machine tools it selects.

The 247,000-square-foot Hobart facility in Hillsboro, Ohio, employs approximately 350 people, working 3 shifts daily, 5 days a week. At present, there are about 70 CNC machines operating in the facility, 24-hours a day.

We visited the Hobart Corporation's manufacturing plant to see what methods and machines it uses to reflect today's job shop manufacturing realities. Known as Plant 31, the Hillsboro Hobart facility is basically a large-scale captive job shop that makes food wrapping machines, package labelers and the world-famous Hobart line of mixers.

HOBART AND HISTORY

Ever since the introduction of the company's first product, the coffee mill (introduced in 1897), Hobart has been the world's leader in innovative food processing equipment, systems and service. Although Hobart manufactures a wide variety of industrial food machines – mixers and slicers, warewashing equipment, cooking equipment, bakery equipment, refrigeration equipment, and weighing and wrapping equipment – today, the company is probably best known for its line of "industrial-strength" mixers.

Hobart's Plant 31 has been successful in implementing numerous techniques to increase throughput and reduce cost while maintaining quality; but the relocation of the mixer line to the Hillsboro plant brought about new challenges, along with new chances to improve with new technologies.

Dick Valentine, Hobart's manufacturing manager, explains the tools and techniques used to continuously upgrade the company's manufacturing process.

"Our latest major expansion was in 1994," remembers Valentine. "It was done to accommodate the addition of the Hobart mixer line, which was to be transferred from the company's headquarters in Troy, Ohio. For a hundred years, the company manufactured mixers at the Troy plant. We saw the move of the product line to our plant as a chance to re-evaluate how these mixers were manufactured, and to improve the process."

A mixer body is ready for the installation of the heavy-duty innards that have made Hobart the standard for the industry.

MOVE TO MODERN METHODS

Hobart's professional mixer line has nine standard models ranging from counter-top to freestanding industrial units. These can be used for all manners of food preparation duties, from mixing enough pizza dough to feed a high school football team, to chopping up the Caesar salad fixings for the latest awards convention.

"When the mixer line moved to our plant," recalls Valentine, "we inherited the machines and processes that had been used to make them. This included a lot of older machines; they were good machines, but they were technologically out of date."

Prior to receiving the mixer product line, Hobart's Hillsboro facility manufactured wrapping and labeling machines for the food industry. The plant's existing manufacturing capabilities were already well on the way to implementing CNC operations across the milling and turning departments, so the decision to update manufacturing process for the incoming mixer line was approved.

In evaluating the new CNC machines to support the new mixer production capabilities, one of the major concerns was making sure that the new machining centers would be compatible with the existing software and controls. With most of the CNC machining centers already Fanuc-compatible, the search was narrowed to controls that would fit within these existing parameters and limitations.

Also of major importance were providing the means to service Plant 31's current product mix, and the shop's need for maximum flexibility. Typical lot sizes for Plant 31 are 50 to 150 pieces. These are scheduled on a "just-in-time" basis so inventories can be kept reasonably low, or in some cases eliminated.

Manufacturing without an inventory safety net means downtime is not an option. To ensure that manufacturing stays online and on time, Hobart made sure that backup systems were created for most of its critical operations. This included the purchase of a number of Haas CNC machining centers.

Not only are Haas controls Fanuc-compatible, meeting one of the most important requirements of the Hobart system of built-in backups, but they are significantly more affordable than comparable

machines.

"Because Haas machines are virtually identical in control operation, and the control is Fanuc-compatible, proprietary programming and fixtures can be easily changed from one machine to the next." Valentine also noted that this also makes operator training easier. "We can have a novice up and programming in a week," says Valentine. "Our operators do the programming on the shop floor, so there is little off-line programming done by our manufacturing engineers. This frees them to work on process improvements and developing more efficient methods, rather than being tied to a programming task."

Valentine continues, "One can argue about which CNC is the best, but for our shop, compatibility of controls is important, because we move people around from department to department. We can take a program from a Mori Seiki machining center, change one element of code and our Haas machines will run the Mori code.

"Most of our fixturing is designed to run on more than one machine," says Valentine. "If, for example, one of our Makino machining centers is loaded or goes down, we can quickly and easily shift work to one of our Haas machining centers because of program and workholding compatibility."

TRAVELS AND PODS

In addition, many of the machines on the floor are arranged in small pods or groups. "We've combined lathes and mills in one group because there's less interference time," says Valentine. "When the lathe is equipped with a bar feed, that typically leads to long runs where the machine doesn't need a lot of attention. The verticals need more hands-on operation, so two mills together would have a lot of interface. But you put a vertical machine together with a lathe and you'll have a more productive station."

So in that respect, it's important to have controls that are virtually identical. "I won't argue with anybody about who's best," says Valentine, "but for us, from both a maintenance standpoint, and from an operator training standpoint, we were deep enough into Fanuc that that is where we wanted to stay."

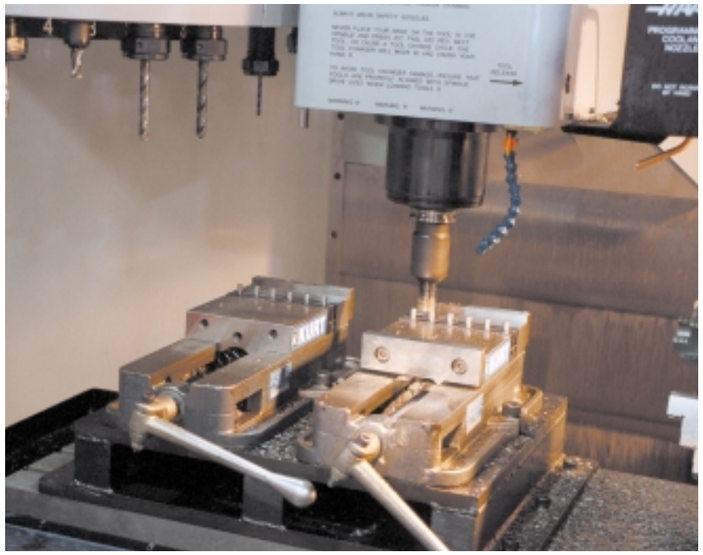
When they started looking at new CNCs to bring the mixer line up to date, a lot of the manufacturers said that, while they didn't have the Fanuc control, they were 100% compatible. "So we took some of the programs we run on our larger machines and put them on a disk, took it to their showroom and put it on their machine," says Valentine. "When we put it on the Haas, we only had to change one code and we were running. Every other machine we tried couldn't cut it. So when they say 100% Fanuc-compatible, that's a pretty broad statement."

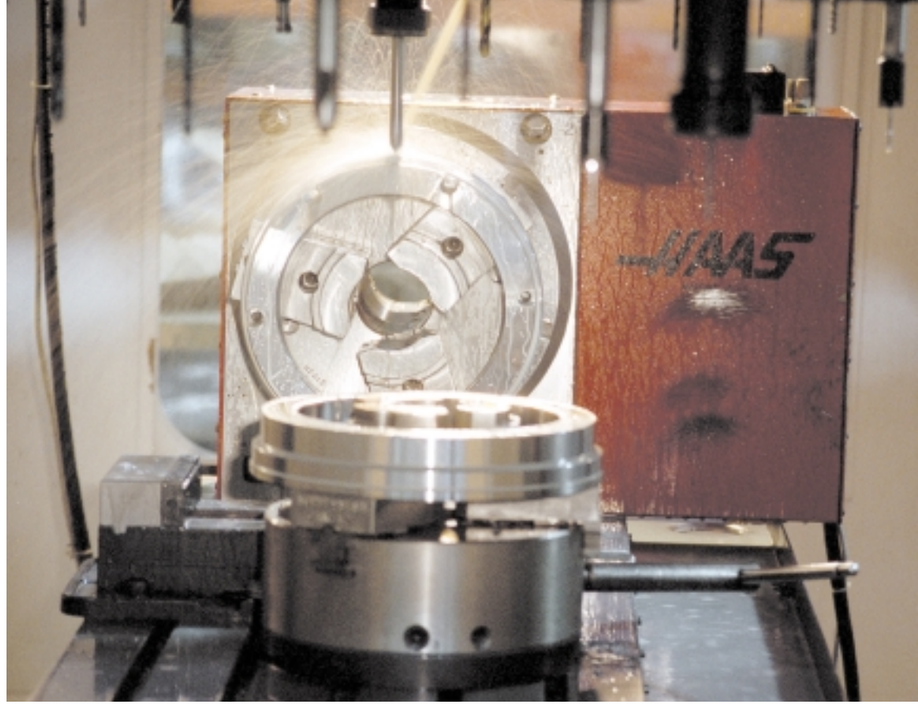
But before Hobart buys any big equipment, even if it's a brand already on the shop floor, they go out and look at other users. Valentine reasons that a lot of machine manufacturers have proven to be strong in one area, but not in another.

"We visited this one Haas user about 100 miles down the road that had 6-7 verticals," says Valentine. "We talked to the operators and everything, and got no negatives. However, we were skeptical, because traditionally, our facility has been a Mori shop. Then the maintenance guys paid them a visit and asked the manufacturer how the maintenance was on the Haas machines, and he said, 'I don't know, I've never had them out!' And one of these machines was six or seven years old! That really sold us."

VF VERSATILITY

"So we started out with the two VF-0s and ran the daylights out of them," he continues. "After we had them for about 2-3 years we started looking at 40"x20" machines. We bought three VF-3s with the 15-hp system on them and they did great – no problems. So as we needed more verticals, we kept buying VF-3s. You know, when you really look at the table size and the difference in price, why buy a VF-0?"





Hobart makes extensive use of mini pods or "cells" consisting of a mill and a turning center to maximize production. One operator is able to keep both machines cutting, increasing the output of the "cell" while minimizing the use of floorspace.

Valentine says he considers non-cutting time spent working on a machine as wasted time. "So if I've got a VF-0 with three or four jobs on relatively small fixtures, why constantly remove and refixture the jobs when I can buy a VF-3 and leave the fixtures on the table all of the time? That's why now, the smallest machine we are going to buy is a 40"x20", and we'll just fill the table up with fixtures. We've been doing that more and more, and it is really helping in setup savings and in reducing related problems like setup-related crashes."

SALES & SERVICE

"As far as service goes, Haas has kind of spoiled us," laughs Valentine. "It used to be that when we bought a new machine, it would be a week or two before we actually had it up and running. Virtually all of our Haas' have been up and running full production within three days at the most. For instance, we had one machine that came into the shop on a Monday at about 8 a.m. We had to take another old vertical out, put the Haas in place, and Wednesday at noon, the Haas rep turned the machine over to us. We ran that machine 24-hours a day, 7-days a week for 7 months before we shut it off. Never had to make a service call. How could you beat that? Like I said, we've been spoiled!"

By using the multiple-machine pods run by a single person, Hobart is able to beat the costs of parts manufactured overseas. "We just had a transmission part quoted in Taiwan, and they couldn't even touch our price. If it's a manufactured part and we have the technology, there's nobody going to beat us!"

The results of this technology are apparent in better throughput, lower production costs, better quality and reduced scrap and rework.

However, the plant isn't stopping to rest. "What's key for Hobart, or any job shop," says Valentine, "is to continuously look for processes, equipment and peripherals that maintain flexibility and agility on the shop floor while maximizing the in-cut time and production consistency."

Hobart Corporation
937-393-4271

High on the Hogging

Story and photos by
Scott Rathburn

It was probably inevitable that Mike Bramlage would become a machinist. After all, he grew up in Dayton, Ohio, an area rife with machine shops serving the needs of the automotive industry . . . and his father was a veteran toolmaker.

Like many fathers, the elder Bramlage harbored hopes that his son might follow in his own footsteps. He didn't force the issue, but when the time was right – and Mike couldn't decide what he wanted to do – he gently steered his son toward an apprenticeship as a tool & die maker. The young Bramlage dutifully set off down the chosen path.

Mike learned the basics of machining under the watchful eye of journeyman machinists during the day, and under the fluorescent lights of the classroom at night. It was a thorough curriculum: how to select materials, choosing speeds and feeds, the dynamics of cutting tools, and the operation of manual mills, lathes and grinders. Mike hated it.

About halfway through his apprenticeship, the budding machinist packed his belongings and moved to Los Angeles in search of warmer climes. Upon reaching the City of Angels, Mike plied his trade at various machine shops throughout the area, honing his skills and further learning the trade. Machining was all he knew.

A mold shop in Costa Mesa kept the young Bramlage busy for about a year and a half, until a brief detour at the behest of a friend led him to Houston, Texas. Unfortunately, Mike landed in the Lonestar State just as the oil industry went bust, so jobs for machinists were few and far between. He did whatever work he could to make ends meet.

In 1984, Mike returned to the West Coast, this time a little further south to San Diego. Again, he relied on his skills as a manual machinist to survive. Again, he hated it.

It wasn't until Mike discovered CNCs that he began to like his chosen career. "I hopped around a bit, working manual machines for a few years," he says, "and then I went to work for a guy who trained me on the CNCs. It was a whole different world; everything was more interesting.

"Because I would work weird hours – weekend nights, weekend days – he put me on a new machine every week," remembers Mike, "I got to learn all of the controls. I was on Mazaks, and Burgmasters, and Okamotos and Milacrons," he says. "The Burgmaster was the first machine I learned."

That shop was located in Santee, California, just east of San Diego, and it specialized in difficult work for the aerospace industry. "That's all we did, the hard 4-axis and 5-axis stuff," notes Mike. "We did anything and everything, and every machine in there was geared toward the harder work." In fact, he says, the owner would actually turn down easier work in order to concentrate on the difficult jobs that no one else would do.

That philosophy stuck with Mike, and later would serve him well.

For the next 12 years, or so, Mike worked at the aerospace shop, expanding his knowledge and skills, and mastering just about every CNC in existence. At last he enjoyed what he was doing. He no longer hated machining.

But enjoying his work wasn't enough. Mike wanted to learn more, so he took a job working nights at a shop that specialized in machining for the communications and electronics industries. They promised to teach Mike programming. "My whole goal was to learn," he explains. "I had been a manual machinist, and I had been lucky enough to learn the CNC machines, but I wanted to learn another dimension."

Mike admits, however, that he had another reason for taking the second job: "All along I wanted my own shop," he says. "The goal was to buy my own machine."

Having operated nearly every CNC available, Mike knew what to look for in a machine. He also knew the kind of work he wanted to do. Like his boss at the aerospace shop, he wanted to take on difficult work that was challenging. To do so, he needed a machine that would handle anything thrown its way. "You don't know what parts are going to arrive week by week," Mike explains. "I was looking for a machine that could do anything."

Because he was just starting out, price was a major factor. "I worked at two jobs for about three years, holding on to money because I wanted to buy a machine," he says. "Once I reached the point where I was ready to buy, I looked at the Haas machines and the Fadals, because they were what I could afford back then."

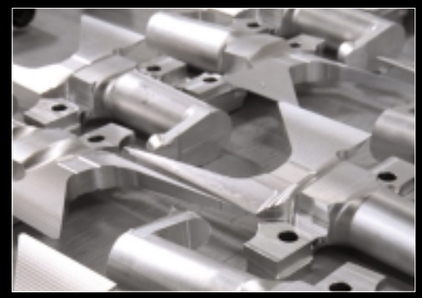
As luck would have it, the shop where Mike worked nights ended up purchasing both brands of machine during his tenure, so he was able to compare them head to head. "In my mind," Mike notes, "the Fadals were for aluminum only. We pretty much had a rule in-house to only use endmills $^1/_2$" or smaller. Then they brought the Haas machines in, and it was like night and day. After an hour on them I said, This is the one I'm going to get."

Mike made the leap to independence in January of 1998, buying a Haas VF-3 vertical machining center. He quit his day job, but continued working nights to supplement his income while he built his own customer base. The VF-3 was installed in a small 1,100-square-foot shop, and Mike began doing overflow work for a former employer. Thus was born MB Manufacturing and Tooling Corporation of Santee, California.

Less than a month later, Mike's friend, Chris Miller – a programmer he had worked with during his stint at the aerospace shop – hooked Mike up with a company in Los Angeles that manufactured aftermarket service parts for helicopters. One of the parts – a rotor blade component – was machined out of solid titanium. They needed help roughing out the raw blocks, and they needed it right away.

This posed somewhat of a dilemma for Mike. From the start, his goal for MB Manufacturing and Tooling was to take on jobs that were challenging and interesting, and deliver the parts on time and without rejects. The titanium helicopter part definitely fit the criteria, but his one machine was already busy doing other work. If Mike wanted to maintain his on-time delivery, there was only one solution: buy another machine.

That Saturday, Mike contacted Mike Flower of Machining Time Savers (the local Haas distributor, now the San Diego Haas Factory Outlet), and explained his situation. Flower told him that if he wanted a machine in a hurry, there was a VF-2 in stock that could be delivered the following week. Mike said, "Yeah, do it," and by Wednesday he had a new machine.



The helicopter part
that started it all
is called a titanium
root fitting.
In essence,
it is a pair of
contoured titanium
“hands” that grip
the main rotor blade
and attach it
to the rotor.



The rest of the weekend, Mike says, he worried about whether or not the machine could handle the job. “I had heard rumors about the older Haas machines, and I didn’t know whether it would last with the titanium.” He soon realized he needn’t have worried.

That titanium job set MB on the road to success, helping Mike build the business much faster than he had anticipated. In fact, he ended up with so much work so fast that he had to quit his night job. “It just exploded,” Mike explains. “I was working from early in the morning until midnight, or later. I couldn’t miss even one night at the shop.”

The helicopter part that started it all is called a titanium root fitting. In essence, it is a pair of contoured titanium “hands” that grip the main rotor blade and attach it to the rotor. There are a top and a bottom “hand,” and both are machined out of a single 8.5x9x1.5-inch block of titanium.

Initially, Mike was contracted only to perform the roughing operations on the titanium blocks. This entailed hogging out about 50% of the material with a 1.25" roughing endmill, by far the most aggressive machining operation of the entire part.

Luckily for Mike, his customer had had problems in the past with other machine shops not delivering parts on time; so when Mike was able to deliver roughed blocks faster than the customer could finish them, the customer was quite pleased. It wasn’t long before Mike was given the contract to machine the entire part, as well as several other helicopter parts for the same customer.

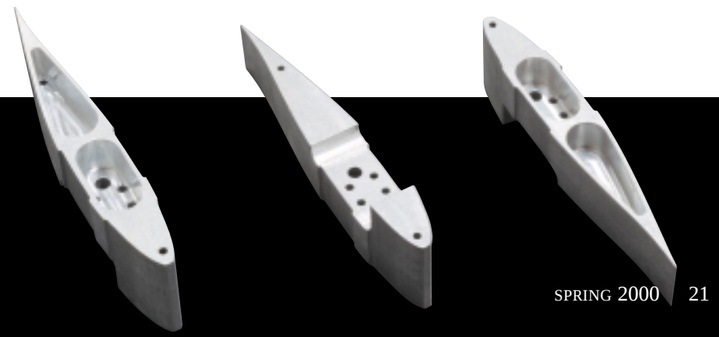
Those parts kept Mike’s two Haas machines busy all year, generating gross sales of about $200,000 – not bad for a startup company.

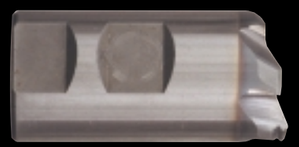
With those kinds of numbers, Mike felt he could justify another machine if he continued getting new work. “And it just so worked out that my main customer just kept loading me with more and more work,” he says.

So another Haas VF-2 was added, and during the following year, gross sales more than doubled to $500,000.

Hoping to continue the trend, Mike is already scanning the Haas product line for a new machine. “I figure adding another one is not going to hurt,” he says. His next planned acquisition is a Haas HS-1RP four-axis horizontal with pallet changer. “I think that will put me into a whole new line of work; I want to branch out a little.”

With success has come growth. MB Manufacturing and Tooling Corporation recently moved into a new 4,300-square-foot facility. The equipment list now includes three Haas VMCs (one VF-3 and two VF-2s), a Haas 4th-axis rotary table, a small Brown & Sharp CMM, a manual mill and a manual lathe. According to Mike, there’s still plenty of room for additional machines, and he made sure the new shop had enough power to accommodate any future additions.





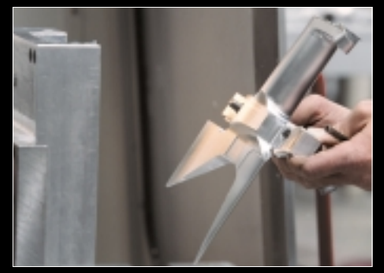
At the beginning of this year, Mike brought his brother, Matt Bramlage, on board to help run the machines (after about a year of constant persuasion). Like Mike, Matt has been a machinist since high school. The brothers also worked together at the aerospace shop before Mike set off on his own. Having shared many of the same experiences, they also share the same work ethic and desire to challenge themselves.

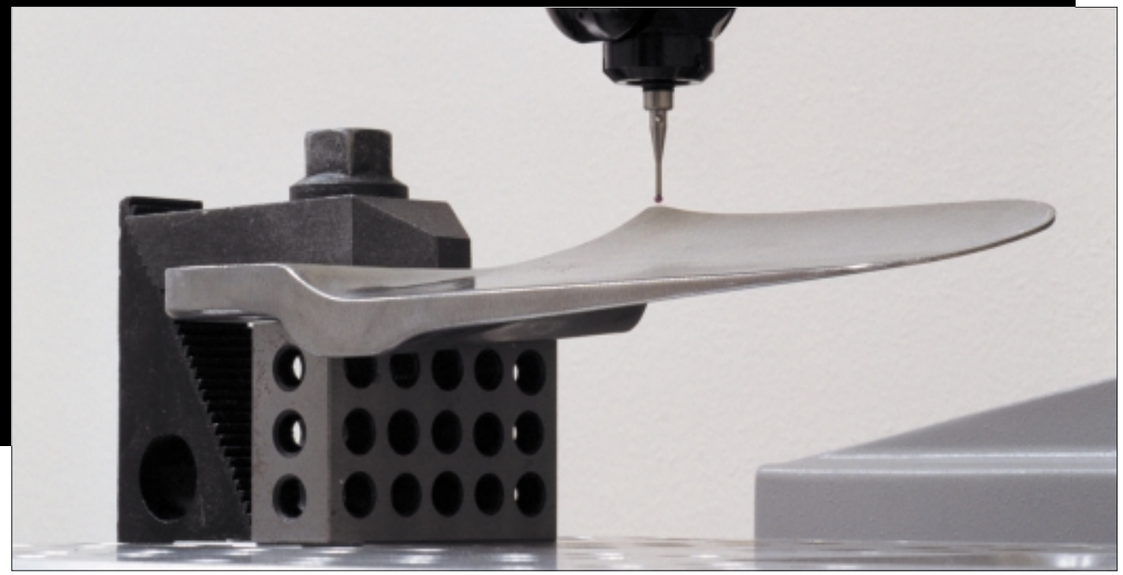
The programming tasks for MB have been handed over to Chris Miller, Mike's friend who helped land the original helicopter job. Chris supplements his day job by doing programming from home after hours. Mike explains the arrangement this way: "I realized it was more cost effective to hire Chris to program on his off-hours. I make money when the machines are running. I don't make money when I'm in here programming. He can write the programs and e-mail them over to me, and I can load them into the machines and start running parts."

It's a system that works well, allowing Mike to maintain his record of on-time delivery. At present, about three-quarters of his workload is comprised of helicopter parts, with the remaining 25 percent made up of jobs that walk in the door. "I've been lucky enough," Mike reflects, "that I haven't even had to look for work."

The titanium root fitting is still one of MB's primary jobs. Mike machines the part in four setups. First, a fixture holds the titanium block flat (at zero degrees), and a 1.25" roughing endmill hogs it out to begin forming the contoured shape of the two hands. A pair of holes is then drilled through one of the hands, and a flat is milled on that same hand with a 1" finishing endmill. The block is then moved to another fixture.

"I've been lucky enough that I haven't even had to look for work."





The second fixture holds the block at a five-degree angle (the job was programmed before Mike acquired his rotary table) so that the other hand can be machined. Again, holes are drilled and a flat is milled. The contours of both hands are then finished with a 1" ballnose endmill, and the perimeter is cut in two passes, a roughing and finishing.

For the third operation, the block is flipped and mounted (again at zero degrees) in a fixture cut with the reverse of the parts. It is locked down through the boltholes, and a $^1/_2$" endmill is used to separate the two hands. At that point, one of the hands is finished. The other hand is then moved to a fourth fixture where a 1" finishing endmill cuts the final flat on that part. Both hands are then deburred before being sent to the customer.

Mike wouldn't reveal his actual cycle times for the parts, but did say that he could produce about a dozen root fittings a day. Of course, a day is a relative term. Mike doesn't work your typical nine-to-five; rather, he usually works a full day, then goes home to share dinner and a little quality time with his family. Once the kids are in bed, he returns to the shop to run more parts.

Just because he takes a break, though, doesn't mean his Haas machines do. Before going home, Mike makes sure the machines are loaded with parts, then sets them to run unattended. The Haas VMCs have a programmable coolant nozzle that automatically adjusts the coolant for each tool via the part program, so there's no need for an operator to be present. This gains Mike several hours of additional machining that he otherwise might have lost. "Every night when I go home," he says, "I load three machines and hit them on. I don't have to worry about an endmill breaking, a drill breaking or a reamer running without any coolant on it. It's amazing."

MB has realized additional gains by optimizing his tooling and processes. For the titanium root fitting, for example, Mike researched several brands of endmill, talking to the manufacturers' engineers about speeds and feeds, until he found the combination that worked best.

"The one brand I had the best luck with is OSG," says Mike. "It's just a regular one-and-a-quarter hogger, but it's outperformed everything; it does about double what anything else does. I go half- to three-quarters width, and about $^3/_4$" deep, and it can hog no problem. And the Haas machines have been able to hold the recommended feeds on all the endmills."

For anyone who doubts the ability of the Haas machines to cut titanium, Mike has this to say: "That machine has been doing those (titanium) blocks for two years. The whole part hinges on hogging out with that one-and-a-quarter endmill, and it's been hogging those things non-stop. I've got broken endmills out there.

"Looking back," Mike explains, "the big thing in my mind is that, for a guy like me who buys one machine starting off, if the Haas hadn't actually done what they claimed it would do, I'd have been dead. I'd have been under right then."

Well, MB Manufacturing and Tooling Corporation didn't go under, and it's a pretty sure bet that Mike now loves being a machinist. His father would be proud.

MB Manufacturing and Tooling Corporation
619-562-1162

Programming by mail . . . E-mail that is.

MB Manufacturing and Tooling Corporation is a small business with a big future. Owner Mike Bramlage (the MB in the corporate moniker) has parlayed his dream of owning a machine shop into a successful venture that is growing by leaps and bounds. In little more than two years, the company has more than doubled its gross sales, tripled its number of CNC machines and nearly quadrupled its square footage.

Until recently, Mike has been the sole employee at MB – a one-man band, so to speak – but it's a position for which he is eminently qualified. At the age of 38, he has been a machinist for more than 20 years. For nearly 15 of those years he has operated CNCs, primarily doing work for two of the most challenging industries today: aerospace and electronics.

For Mike, being the captain and crew of his own ship had definite advantages; but as the ship got bigger, and the work became more plentiful, he began to see the merits of having a few more hands on deck. So he changed his business strategy from keeping it all to himself . . . to keeping it all in the family.

This past January, Mike persuaded his brother, Matt, to come on board as a full-time machinist. Like Mike, Matt has plenty of experience under his belt, having started machining just out of high school. Mike also enlisted the help of his wife for the accounting side of things, further expanding upon the family theme.

There is one area, however, that Mike has always entrusted to an "outsider"– programming. It's not that Mike can't program – it's a skill he has mastered over the years – it's just that he found it more cost effective to have someone else write the programs while he ran the machines. That someone is Chris Miller.

Mike and Chris have been friends for nigh on 15 years, now, having met while working together at the same aerospace shop in Santee, California. Around the time Mike left to start his own shop, Chris left for other employment. For Mike, the move opened up a whole new world; for Chris, it opened up time to program jobs on the side.

Chris shares Mike's penchant for difficult work, "because it presents a challenge," he says. "I've run into a lot of shop owners, and some of them couldn't drill a hole without somebody telling them how to do it. It's nice to work with someone like Mike who can actually do the hard things. It's neat to see a finished product when you know you've labored hard and put a lot of sweat into it."

Mike Bramlage, left, relies on good friend Chris Miller for most of his programming. The arrangement has proven benificial to both parties.

Working from home after hours, Chris sometimes programs from the dimension prints, but more often than not, he creates the programs directly from solid models. MB Manufacturing and Tooling is his principal client.

On the surface, it might seem that doing the programming off-site – and usually late at night – is a recipe for delay. After all, it's not like Chris can run out to the shop if he has a question. But Mike and Chris have overcome this obstacle by staying in close contact via phone and e-mail during the process. If Chris has a question about tooling or a specific process, he simply gives Mike a call. Since they both work late into the night, delays rarely occur. Once Chris completes a program, he simply e-mails the file to Mike at the shop.

This process has proven quite efficient when programming for Mike's Haas machining centers. The Haas control allows Mike to edit programs at the machine, even while that same program is running, so he doesn't have to wait until Chris has programmed the entire part to start machining. Rather, Chris just e-mails each operation

Please see PROGRAMMING page 34

From Baseball to Billet!

Story & Photos

Gary Brient

The summer months of 1966 found Dave DeLong shuttling between the baseball diamond and his father's machine shop. In an era of manually operated machine tools, this young man of twelve years commenced learning the machining trade from an attentive father who was just scratching out a living.

There were two machines, a manual mill and a manual lathe. The actual shop area was about the size of a closet. "We were tucked into the back of an industrial wiring firm, leasing the space for dad's machines," remembers Dave.

In the ensuing nine years there would be one more location for DeLong Manufacturing, until the company settled in its present location in Santa Clara, California. Dave spent those nine years learning the ins and outs of manual machining. His father, Bill, was encouraged with his son's progress. Bill noticed that Dave would save all the parts whenever he took something apart, which in the machining trade is a sign of intelligent tinkering. Well, Dave still saves the parts. Enter his office and one notices cylinders, flanges and the like propped up against tables, door jams or whatever is handy.

A brother, Bill DeLong Jr., joined forces with the family business in 1983. Bringing with him 16 years of work-foreman's experience from IBM, Bill Jr. learned his scheduling and accounting on the job. But a greater influence was his mother, who would arrive once a week to do the company payroll. Bill still remembers "going to school" on the company books with his mother. Now everyone in the family was involved – mom, dad and two sons . . . no purer definition of a family business could be found.

Growth for DeLong Manufacturing was a constant. But as Dave DeLong admits, "As goes the Silicon Valley, so goes our business." Now, with real estate values as they are in San Jose and the surrounding communities, finding new space for growth is nigh on impossible; and if possible, the space is prohibitively expensive. DeLong's current building housed three independent machining companies at one time. But, the DeLongs always were in need of more space, so, when the front tenant vacated, the DeLong's negotiated a new lease, knocked out a wall and took over the space. And when the second machining company in the rear departed, the brothers expanded again, assuming control of the entire building. With all space problems resolved, DeLong Manufacturing was now focused on the long term.

The DeLongs made the jump to CNC machining in 1974. Though essentially a job shop, a wide variety of machining in aeronautics and computers comprised the company's primary workload. A collector plate for an F-15, a connector for AWACs, these are typical examples of the challenges confronting the shop. However, it wasn't until January of 1998 that the brothers purchased their first Haas vertical mill, a VF-4 with three rotary tables. Wayne Pate, one of the veteran machinists on staff, was chosen as the operator of the Haas.

Wayne had this to say about the VF-4: "Frankly we do a lot of parts with arcs and circles. These are complex parts, but I have learned with the Haas that you can machine a complex part with simple steps. The Haas is ideal for this! The interface between machine and operator is simple, the programming is easier – it's like having four machines in one . . . we can pull a part, run another program for a different part, come back, do the first part again with no loss of time." Wayne's next experiments are all going to be in the third dimension, using the Haas rotary tables for 4th- and 5th-axis work. These are the challenges for the future at DeLong Manufacturing.

Brothers Bill Jr. and Dave Delong (Dave's the one on the right) show off one of the aerospace parts they machine on their VF-4.

As for the total impact of Haas at DeLong, Dave DeLong, co-owner, said this, "As soon as our older mills die, I can assure you, we will replace them with Haas . . . they're such a value." And when asked as to the servicing of the Haas, he laughed and said, "We've had the Haas since January of '98. What is that, more than two years? Well, I don't know about the service, we haven't needed it! And remember, we run two shifts a day." Kim Gahafer, the shop quality control manager, volunteered, "We really are impressed with the Haas, to the extent that we will only look to Haas in the future."

DeLong Manufacturing
418-727-3348

Advanced Technology Center Prepares Students for the Future

Story & Photos

Chris Hemer

Just off the Ventura freeway, between Los Angeles and sunny Santa Barbara, route 126 cuts a narrow swath through the Santa Clara River Valley in the north-eastern corner of Ventura County.

It's a four lane highway that serves as a passageway from Ventura and Santa Barbara, east through the mountains and into the Santa Clarita Valley, where it dumps into California's main artery – Interstate 5. Simplistic in its beauty, the route takes you through rich farmland, past roadside fruit stands, ramshackle barns and towering, craggy mountains, often shrouded in coastline fog during the early hours. It's the kind of area you might go to for a weekend getaway, to buy farm-fresh produce, or to catch a fish or three at nearby Lake Piru. It's not the kind of place you'd expect to find a state-of-the-art manufacturing technology program. But if that's what you're looking for, you're definitely in the right place.

For as you start your journey on the 126 toward the mighty 5, you'll find yourself in the city of Santa Paula – home of the Ventura College Advanced Technology Center (VC-ATC). From the outside, it's not much to look at, but walk through its front door, and you'll find a facility that belies its stark exterior. Rows of brand new CNC machines lay gleaming beneath bright fluorescent lighting in the center of the shop; standard mills line one wall. Three Haas VF-E vertical machining centers and three SL-20 CNC lathes dominate the right and rear most walls, their gleaming exteriors and bold red lettering commanding respect from even the uninitiated.

Instructor Dr. Nick Vrajich (just call him "Dr. Nick") walks the floor amid the whir of spinning machinery and the incessant beeping of the six Haas control simulators like the captain of a mighty vessel, his silver hair and thick glasses providing mute testament to his many years (more than 45) spent scrutinizing the tiniest of tolerances. The VC-ATC is the kind of shop any professional would consider himself/herself lucky to be in, and with the largest assembly of Haas CNC technology of any college in the state (and beyond), it's an aspiring machinist's dream come true.

While the VC-ATC opened only in November of last year, Ventura College is hardly new to machining technology training; in fact, the main campus has offered courses on the subject for 75 years. However, industrial growth in Ventura County has been steady, and the decision was made to expand the existing manufacturing technology offerings into a more comprehensive precision machining program focused on high-tech manufacturing needs. "When Haas moved into the (Ventura County) area, we recognized this as an opportunity to train individuals for the various CNC-oriented positions, not only at Haas, but in the entire Ventura County area," said Scott Rabe, lead instructor for the machine tool technology program. "Haas was part of the impetus for the program, and made us realize that manufacturing was becoming a major industry in the county. We recognized that the way we were training students at the time would not prepare them for more specialized jobs."

Haas control simulators provide more stations for training purposes, and allow students to learn machine operation independent of the machine. The VC-ATC has six total.

Instructional assistant Octavio Garcia reviews programming procedures on an SL-20 CNC lathe with a group of students.

Moving the VC-ATC off the main campus held other advantages, too; college officials believed future growth would be in the Santa Paula and Fillmore areas, because of the connection of industry between Santa Barbara, Ventura and Los Angeles via route 126. The center would also help the college grow; Ventura is a city with historically slow growth, and slow growth means equally slow state funding. Finally, locating the center away from the main campus would attract new students and make the program more accessible to residents of Santa Paula and neighboring Fillmore, Rabe said.

While the VC-ATC took considerable time to get from concept to reality, it took only six months to make the transition from empty building to functional machine shop. Currently, the courses include CNC operator training, designed for students seeking gainful employment

opportunities without prior experience in machining; QA/QC Systems Technology, intended for experienced machinists and/or mechanical inspectors; and Geometric Dimensioning and Tolerancing (GDT), which covers basic to advanced principles of GDT as may apply to preparation for Certification of Geometric Dimensioning and Tolerancing Professionals (GDTP), Technologist and Senior levels.

"The Haas CNC technology is the backbone of our advanced machining principles," commented Dr. Vrajich. "This details not only proper setup and operation, but also preventive maintenance during operations. Within a very short period of time, we were able to bring our students up to speed in setting up and monitoring the equipment in a "short-run" production of products for local industry. We don't charge for this service, but the participating companies provide the materials and tooling. This gives the students 'on-the-job' training, using the same industry standards found in the work force. The difference is that this is an educational environment where students can ask whatever questions they feel are necessary."

Before students are introduced to the CNC equipment, however, Vrajich says they all have to go through basic machining principles, such as speeds and feeds, material/cutting tool selection, using measuring tools, principles of blueprint reading, etc. "This way, they are prepared to enter the work force in either a small job shop that may not have CNC equipment, or a larger facility that uses CNC technology. The emphasis of the program is to prepare our students to be proficient in a manufacturing/machining environment as CNC machinists and/or machine tool operators, CNC programmers, etc., in order to be competitive in a global market."

It may sound like a complex proposition, but the students are very motivated, and seem to catch on quickly. "The program is a lot more than I expected, and a lot better than I expected," commented 19-year-old Sean Lyons, who is training as a CNC operator. "The Haas machines are user-friendly, and very efficient. They can do in six minutes what it would take a manual machine 30 minutes to do."

But the VC-ATC is hardly limited to students just out of high-school; the richly diverse classroom is comprised of adults of all ages, both men and women. Dolores Soliz, for example, is a single mother who, until the VC-ATC opened in November, worked in retail. "I waited for my boys to go to high school, and during that period, I had plenty of time to think about what I wanted to do as a profession. This is it," she says. "My stepdad was a machinist, and I was always curious about his job. I am training as a CNC operator right now, but I want to be a programmer and machinist as well. I want to show other women that machine tool technology is not just a man's field."

Still others, like 36-year-old Brian Duke are already professionals in one field, but are attending the VC-ATC because a change of career appeals to them. "I was a pipe fitter before this," he says, "and when the weather was bad, there was no work. As a machinist, I feel like the sky is the limit. At first I was a little intimidated by the Haas machines, but now the fear is gone, because they are so easy to understand. All you have to do is learn the codes and understand them . . . and listen to Dr. Nick."

Ventura College East Campus
Advanced Technology Center (VC-ATC)
105 Dean Drive, Santa Paula, CA 93060
805-525-7136
For more information about the programs offered at the VC-ATC, contact Dr. Nick Vrajich at the above phone number, or at nvrajich@vcccd.net

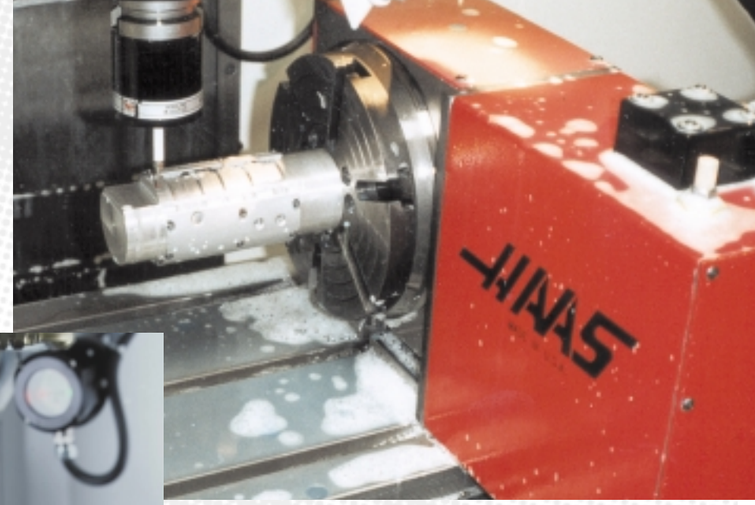
Though one of the school's missions is to provide students with "on-the-job" training, Dr. Nick is always nearby to answer questions. Above, he reviews the setup on one of the school's three Haas VF-Es with student Dan Buchanan.

At left, one of the three Haas VF-E vertical machining centers machines plates for a local business. This is only one example of how the VC-ATC provides students with an "on-the-job" training environment.

Delores Soliz is a single mother who, until the VC-ATC opened in November, worked in retail. Now she is training as a CNC operator, and plans to learn programming and machining as well.

Investment for Growth

Machining Centres & Probing – a Cost-Effective Quality Combination



Story & Photos

courtesy Renishaw

A Phoenix rising from the ashes, Coatbridge (Scotland) - based Fortec Ltd. has now seen its "investment for growth" policy pay dividends.

In 1983, Fortec was a small subcontract engineering company on the verge of disappearing. Now, the directors of this vibrant company see only the lack of skilled machine operators holding back future growth. The turn around in fortunes is a direct result of an "investment for growth" policy and the purchase of the latest technology from Haas Automation and Renishaw.

Director Jim Fraser explained the process of change. "We inherited a reasonable customer base and two Dah-Lih vertical machining centres and a Nakamura CNC lathe. To keep and build on the client base, principally from the aerospace, communications and computer industries, we needed to guarantee the accuracy of our parts. Unfortunately, the salvaged machines were not capable of holding accuracy, and we could not afford high scrap rates. As a result, we took the opportunity to investigate the market thoroughly for the purchase of a replacement machining centre. Although cost was a big factor, an enclosed tool changer was also important, because we are machining 90% of product in aluminium, and this is a messy operation."

Fortec eventually settled on a Haas VF-0 vertical machining centre, which features a unique 20-station tool changer with sliding doors to cover each pocket and prevent chips from entering the tool area. The Haas also had the added bonus of Fanuc-compatible controls – saving hours of retraining. And, according to Fraser, it came standard with all the options you would normally have to pay for.

"The other major factor," Fraser continues, "was to demonstrate and guarantee accuracy with reliability, and so we demanded that the Haas was fitted with Renishaw probing. In three years we have not experienced unnecessary downtime, and the

combination of probing and machine has continually achieved the accuracy required."

Since the first machining centre purchase and the guarantee to customers of reliable accuracy, the throughput of work at Fortec has steadily increased. This increase has necessitated the purchase of four further Haas vertical 4-axis machining centres: a second VF-0, a VF-0E, a VF-1 and a VF-3. All of the machining centres feature enclosed 20-station tool changers and are fitted with in-process Renishaw MP12 probing. The Haas VF-3, with gear-driven spindle and travels of 1,016x508x635 mm (40"x20"x25"), now gives Fortec the option of not only increased capacity, but also the ability to machine Inconels and designer steels. It is also fitted with a Renishaw tool setting probe which, allied to the Haas 4th axis, has saved Fortec time and money previously not realised.

Jim Fraser explains: "The aerospace and communications industries demand tight tolerances, typically four tenths (0.0004"). The contract for Marconi, for example, requires us to machine casings for radar equipment from solid. The finishing operation entails us to precisely machine a large number of locating holes. Having placed the part on the Haas and fed the data into the control, we only need to set an initial datum/starting point – the probe and machine simply carry out the operation. Manual setup would take on average 45 minutes, this has been reduced by up to 90%, saving us an immense wage bill. The combination of technologies allows us to operate two shifts, with the night shift manned by only a small semi-skilled work force.

"We also recently had the need to machine parts for a radio that is no longer in production, which means small replacement batch sizes. Previously, we would have spent hours setting up the component, an intricate sleeve which is machined in aluminium on the fourth axis of the Haas VF-3. After machining, we would have systematically checked the positioning accuracy of 16 x 5 mm holes on a homemade gauging tool, taking up to 30 minutes to confirm each one. Any error in setting up would have meant scrapping the part. Now, using tool set probing, in-process and post-process probing, all the necessary data is entered into the Haas control, so we are guaranteed 100% finished components within tolerance."

Fortec Ltd. is now able to look forward to a promising future as a CNC machining, precision engineering company. Jim Fraser in conclusion stated, "We have in Haas and Renishaw a cost-effective quality combination. Probing and accurate machining is critical in the work we do. I personally do not understand how anyone can machine accurately without probing."

For more information about probing, contact Renishaw at 847-843-3666.

> CONTINUED FROM . . .

PERFORMANCE continued from page 9

one of the best ways to learn something: take a little time and figure it out for yourself." (Of course, for the less adventurous, Haas and Haas distributors offer certified training classes.)

"When I first came on this machine (Haas HS-1R), it was just like I had run it before in the past. Everything was so familiar, especially the way the control was so friendly," says Boley. "One thing I really liked about the machine was the Quick Code feature. That idea alone is probably worth a bunch when compared to sitting down and repeatedly trying to figure out every code-for-code command. I can whip out a basic program in minutes, and then go back and just fill in a few of the lines. Quick Code is an excellent idea."

PRODUCTIVITY BOOST

"I'll tell you what," Boley continues, "I work on about three or four different CNC machines in here, and the Haas is the best of them. For the money and the value, you're getting the best tool with Haas. A lot of people say the Mori Seiki is better, but I don't see that. The HS-1R works perfectly for everything that I have to do. I think they are great machines.

"The problem we had with the old machine was that when we did a high-performance crank, we had eight different shafts with three guys running them to do one crank," explains Boley. "To get all of the oil holes in that crank would take us at least one hour."

Now he is able to run a number of cranks on the one Haas, plus run a totally different job on another machine at the same time. "So right there I've multiplied my hourly production of cranks, plus I'm running a completely different job on the second machine," says Boley. "That's a real increase in my productivity, plus it frees two people to take on another assignment!"

KEEP ON CRANKIN'

"That's one thing about the Haas machines," opines Baker, "they sell themselves! When you get them setup right and get the right combination of people together, you can really put out a lot of quality work on them."

Kellogg Crankshaft
517-788-9200

PROGRAMMING continued from page 25

(or even individual tool path) as it is completed. Mike simply loads each new piece of the program into the Haas control and pastes it into the existing file.

Chris explains: "If we're working on a job that requires a lot of time to program, but we only have a short period of time to do it, I'll program the roughing sequence, e-mail it to Mike, then call and tell him it's there. He'll load that into the machine while I'm doing the finish. So he's actually roughing the part while I'm programming the finishing sequence. When I'm done with the finishing, I e-mail that to him, and he just merges the programs into the machine. By the time he's done, he has a complete program, but he hasn't had to wait for me to get the whole thing done at one time."

"The Haas control makes it very nice," continues Mike. "I can just keep loading in new tools or new operations right there at the machine, then merge them all together at once. I've been on many machines where you would have to pull out the program, bring it back into the office and merge the pieces together that way."

"It works out really well that we have the e-mail," says Chris, "and that Mike doesn't have to wait until I'm completely done to get going. Otherwise, it may take two or three days before he'd see anything. This way, he can just get started making parts."

And making parts means making money.

New Machines, Features and Options Spied at WESTEC 2000

CNC MACHINES

- **Mini Mill** It takes up only 5'x6' of shop floor space, yet delivers a generous work envelope of 16"x12"x10" (xyz). This latest Haas machine features a 40-taper spindle, 0–6,000 rpm, 710-ipm rapids and a 10-pocket automatic tool changer.

- **Toolroom Mill (Prototype)** Combines the solid foundation and computer numerical control of the shop-proven VF-3 with the versatility of manual feed handles and a smaller, non-enclosed format. The TM-3 operates on either single- or three-phase power and is easy to setup and operate.

- **SL-10 Lathe** The new Haas Mini Lathe takes up only 6'x4' of shop floor space, yet provides a generous turning capacity of 10.5"x14" (max). This lathe features an 8" chuck, 2" bar capacity and an extremely affordable price.

- **VL-6 (Vertical Turning Center Prototype)**
Combines the rugged foundation of the VF-8 VMC and Haas-built 50-taper spindle with a 48"-diameter rotating platter. Platter speeds of 0–300 rpm are provided by a 30-hp motor through a 2-speed gearbox. The VL-6 is designed to handle large, heavy parts that require multiple operations in a single setup.

- **5-Axis Router Head (VR-6 Prototype)**
This machine's main focus is the 5-axis routing capability provided by its B-axis movement of ±120° and C-axis movement of ±300°. The BT 30-taper spindle provides speeds to 30,000 rpm.

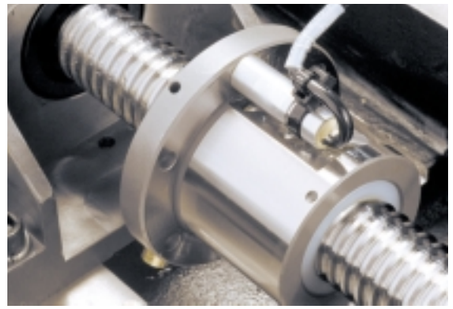
- **TL-15 Lathe** The new Haas TL-15 turning center is a dual-spindle CNC lathe built on the very popular Haas SL-20 foundation. The TL-15 comes standard with twin spindles, a hyper-disc tool turret and the ability to add options like live tooling and full C-axis capabilities.

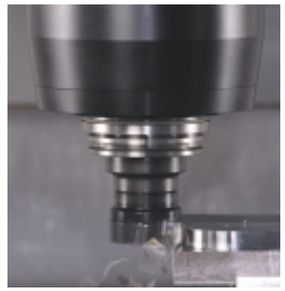
MORE >

New Machines, Features and Options Spied at WESTEC 2000 (cont.)

HIGH-PERFORMANCE OPTIONS

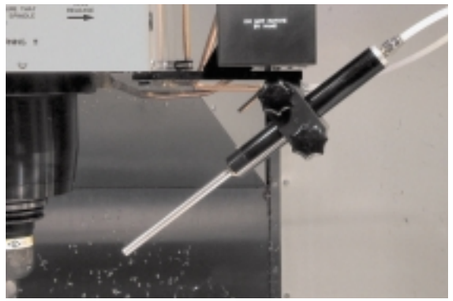
- **High-Speed Machining Option** Using a motion algorithm called "acceleration before interpolation," combined with full look-ahead of up to 80 blocks, the new High-Speed Machining option provides cutting feeds up to 500 ipm (833 ipm with High-Speed Rapid option) without risk of distortion to the programmed path.
- **Temp-Track** This temperature-tracking system uses probes attached to the ballscrew nuts to monitor temperature, then uses a sophisticated control algorithm to automatically adjust for thermal expansion, allowing the machine to maintain accuracy and repeatability throughout the day.
- **15,000-rpm Spindle** Maintaining the proper chip load during high-speed machining is crucial. The latest high-speed spindle from Haas provides 15,000 rpm of cutting speed to take full advantage of the time savings and increased accuracy possible with today's high-speed machining.



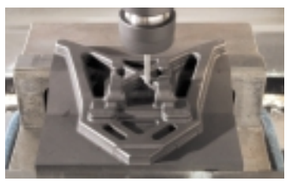


- **50-Taper, 8,000-rpm Spindle** This direct-speed, belt-drive, high-speed 50-taper spindle features 30 hp (peak) and a Haas vector drive. Motor and spindle are balanced to quality grade G-1, and wye-delta switching provides high torque and constant horsepower over a wide rpm range.
- **High-Speed Rapids (to 1,200 ipm)** High-lead ballscrews yield fast rapids and reduce the amount of non-cutting time during machining, especially on repetitive parts, resulting in faster cycle times and reduced cost per part.
- **Side-Mount Tool Changer** These Haas-built side-mount tool changers are located outside of the enclosure to free up valuable work space, and they accommodate more tools for additional machining operations and backup tooling. The all-new side-mount changer for HS-1 series HMCs provides rapid tool changes and a generous 60-tool capacity.

- **Automatic Air Gun** Provides a constant air blast to the cutting tool to clear chips safely and automatically during dry machining. Activated by M code, the air blast can be programmed to turn on while the spindle is turning, or at the end of a cycle.



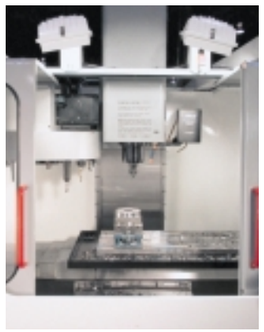
- **Magazine Parts Feeder** An economical option for loading pre-cut blanks or second-operation parts. Allows unattended operation of 15 to 25 parts. Adjustable for part size (2.12" max diameter, 2.0" max length).
- **APL-20 Parts Loader** Automatically picks up parts from an external tray and loads them into the lathe for unattended turning. The Auto Door opens to allow the double-gripper to load/unload parts or flip them for additional turning operations.
- **Robotic Parts Loader** Internal robot automatically loads large diameter pre-cut slugs, castings or second-op parts for turning. A 3-jaw gripper picks up the parts from a 12"x32" parts tray inside the lathe enclosure.



- **Auto Door** Reduces operator fatigue during repetitive machining operations, or allows for unattended operation when used with a robotic loader.
- **Live Tooling** Drives standard VDI axial or radial driven tools to perform secondary operations, such as milling, drilling, tapping and slotting, both on the face of the part and around the diameter.

- **Full C-Axis** Provides high-precision bi-directional spindle motion that is fully interpolated with X and/or Z motion. Speeds are 0.1–60 rpm with positioning accuracy of 0.01 degree. Cartesian to polar interpolation allows programming of face contouring operations in X and Y coordinates.
- **Index-On-The-Fly** Allows tool changes on-the-fly while the axes are in motion retracting from the part, resulting in faster tool changes and shorter cycle times.
- **Visual Quick Code** Allows the operator to choose simple representations of a final shape on screen, then simply fill in dimensions and variables to generate the complete G-code for the part.
- **100 PSI Coolant Blaster** High-pressure blast of coolant clears chips out of deep holes during drilling cycle, straighter and cleaner bores. Activated automatically via M codes in the part program.
- **Window Cleaner** Manually activated air blast clears coolant and chips from lathe window to allow visual inspection during turning operations.
- **High-Pressure Coolant** Provides 300 psi of coolant to the cutting edge for deep-hole drilling, heavy cuts, faster feedrates and better surface finishes.
- **Pallet Crane & Storage Cart** Enclosure-mounted crane provides a convenient and easy method for lifting and changing out pallets on Haas HS-1RP HMCs. The accompanying storage cart holds an extra pallet and has a built-in rack for holding toolholders.

MACHINE SPECIAL FEATURES



- **Door-Activated High-Intensity Lighting** Provides bright, even illumination of the work area for part inspection, job setup and changeover. Lights turn on and off automatically when doors open and close.

- **All-New CNC Control Pendant** The new Haas control pendant features a flush-mounted display screen, recessed floppy disk drive and expanded storage bin.

- **Convenient Note Pad & Disk Storage** Handy bracket on the side of the control pendant holds a pad of paper for jotting notes, and has slots for holding pencils and storing up to 6 floppy disks.

- **Tool Rack System** Provides convenient storage for tool holders, cutting tools and accessories right at the machine, eliminating the need for a separate tool cart.

NEW ROTARY TABLES

- **HRT-210SHS-HD** Greatly increases productivity with rapids to 360-degrees per second and feedrates to 270-degrees per second. High-precision harmonic drive system provides 200 ft-lb of spindle torque with a resolution of 0.001 degrees.
- **HSI-125** Ultra-high-speed indexer rotates at 3,000 rpm for rapids of 18,000 deg/sec. Designed for parts up to 2" diameter, it has a small footprint that is ideal for small mills, or where multiple heads are required. Multiple bolt patterns allow for both metric and standard 3-jaw chucks, as well as 5C collets.

INTRODUCING *the new*

HAAS MINI MILL.

What they *really* meant when they came up with the whole *"Good things come in small packages"* saying.

16" x 12" x 10" (travels)

36" x 12" (table)

5' x 6' (footprint)

. . . all the features you've come to expect from a full-size Haas VMC, now in a smaller package . . .

. . . at an even smaller price.

HAAS AUTOMATION, INC.
Call your local dealer for details.

(Machine not shown actual size.)