



Machine Specialties Inc. follows two of the founder's guiding commandments by always having the best equipment and keeping everything spotlessly clean. That's owner Rob Simmons (left) and machinist Tripp Cook on the platform of MSI's Mitsui Seiki twin-pallet, five-axis HMC acquired to machine large titanium parts.

Precision Parts Shop Aims High to Win Big

*Invests in best equipment
and runs a clean shopfloor*

Jim Lorincz
Senior Editor

When Rob Simmons, owner of Machine Specialties Inc. (MSI; Whitsett, NC), listened to a seminar speaker in 2005 discussing the looming economic downturn, he raised his hand to comment. "I'm not going to participate in that," he stated. And he didn't.

His precision parts-making business, which employs 165, increased sales from \$18 million at the time of that seminar to \$27 million by 2010. "I think as a country we talked ourselves right into a recession," he says, "so I simply stopped listening to people whine about it, stopped watching TV news scare everybody, and, instead, set ambitious growth goals and went about achieving them with the help of everyone here."



Machinist Tripp Cook (left) and MSI owner Rob Simmons discuss a precision workpiece.

MSI was founded in 1969 by Carlos Black to provide precision-machined components to a host of industries. In 1980, Black hired 20 year-old machinist Rob Simmons, who had

earned a reputation as a screw-machine expert in the area. Over the next two and a half decades, Simmons was paid with modest salaries and shares in the company. By 2005, Rob owned 100% of MSI.

Smart Strategy to Go Big

From Black, who Simmons calls CB, he learned two guiding principles, which are still shop commandments today: Always have the best equipment and keep everything clean. Today, the company resides in a modern, immaculate 150,000-ft² (13,935-m²) facility, serving large OEMs in aerospace, medical, and power generation. "I think CB would approve," says Simmons. "Our dedication to cleanliness and our equipment is an impressive selling point to our customers. The whole package makes a positive impression on visitors, and helps with employee retention."

In 2009, Simmons received a call from the US government inquiring about MSI's capabilities to make large landing gear

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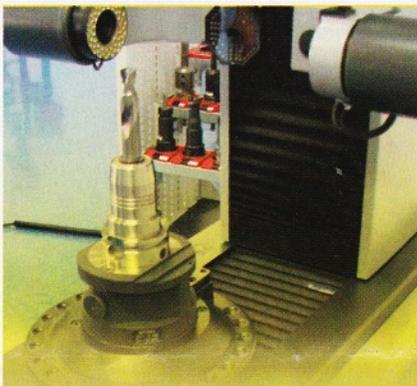
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parts. The government was looking for flexible and responsive small shops to replace the more "cumbersome" larger firms they had been buying from. The revenue potential was significant, and Simmons realized that focusing on larger precision parts for other customers would be profitable. Simmons categorizes large parts as being those up to 94" (2.4 m) in diameter, 20" (508-mm) long, and weighing as much as 7000 lb (3175 kg).

"Of course to produce big parts, we needed big machines and big space," says Simmons. "As far as machines were concerned, we first narrowed our focus on equipment that could cut titanium. It was a priority to get that capability in house. We kept hearing that engine and structural parts were growing in demand from the aerospace OEMs. I attended a seminar presented by Boeing and learned that the machine tool builder leading the way in that category was Mitsui Seiki. Shortly after that, our team went to IMTS 2010 [International Manufacturing Technology Show] in Chicago where we met with Mitsui's engineers."



Tammy Simmons recognized the twin needs for technical training and team building during MSI's current fast growth stage and has organized programs and events to shape the company's culture and workforce.

As a result, MSI took delivery of an HS6A-5X five-axis CNC HMC with a working envelope of 1300 × 1200 × 1200 mm (X, Y, Z) and two 1000-mm square pallet tables. Working with the builder and Boeing, MSI was advised on selection of titanium-friendly mills, drills, cutting tool inserts, and coolant.

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Largest Order to Date Received

A visitor to MSI recently would have seen the HS6A-5X producing proprietary commercial helicopter parts for a \$15 million-dollar 1800-piece order that was heralded as the company's largest ever. "Our customer gave us a preliminary order of 24 pieces and said, 'prove to me that you can do this part,'" says Simmons. "He came back, went up on the machine platform, scrutinized the two pieces on the machine, and liked the results—from both a quality perspective and a 33% faster cycle time. Before the customer came off the platform, I was handed the biggest order in the history of the company."

In operation, the roughing operation takes 6.5 hr. The titanium 10-2-3-grade block starts out weighing 140 lb (63.5 kg) and is machined into a finished part that weighs 7.5 lb (3.4 kg). The first pass with the 80-mm MB690 24-insert cutter takes a 1" (25.4-mm) wide pass by 2.5" (63.5-mm) deep. The tool rotates at 110 rpm

with a 3 ipm (76-mm/min) feed rate, driven by the 50-hp (37-kW) spindle. After 6.5 hr, the part is down to near net shape at 100 rms with a remaining 0.200" (5 mm) to be finished after off-site heat treating. Once back from heat treatment, the finishing operations take 12.5 hr.

The company is hopeful that soon it will be able to do this portion "lights out" with the aid of the machine's reliable tool management software and probing. The tightest tolerance is on the bores at 0.0005" (0.013 mm).

One of the significant ways the company has reduced the process cycle time is by simultaneously sawing the test tensile blanks during the rough machining operations. Each part requires an accompanying tensile rod so that the customer can test the material. Once the part is complete, 390 dimensions are checked on a CMM. Simmons says the reports show zero defects at every check.

Expanding Machine and Plant Capacity

Three months after the first machine arrived, MSI added a second Mitsui Seiki, an HU50A-5X, featuring a 720 x 850 x 850-mm (X, Y, Z) working envelope for what Simmons calls their "regular" work. Another recent technology purchase was a WFL Mill-Turn Center with a 62" (1.5-m) turning diameter with 40' (12 m) between centers.

As for the larger quarters, the company moved into its new location in Whitsett in early 2010, more than tripling its space, with plenty of additional property to expand further when necessary. The additional room has allowed MSI to add capabilities and further enhance its expertise in such areas as engineering, metal finishing, assemblies, and other special processes that many shops have to sub out.

Simmons is quick to point out that this recent growth spurt is not without

its rash of challenges. "Growth also means adding people, and it's old news in our industry that we are frightfully short of machinists and engineers. Another issue with regard to people and policy was how to grow and yet retain the small

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shop family atmosphere, along with the responsiveness and flexibility that our customers rely on.”

MSI adopted the approach that if it couldn't hire people with machining skills, the company would train them. To

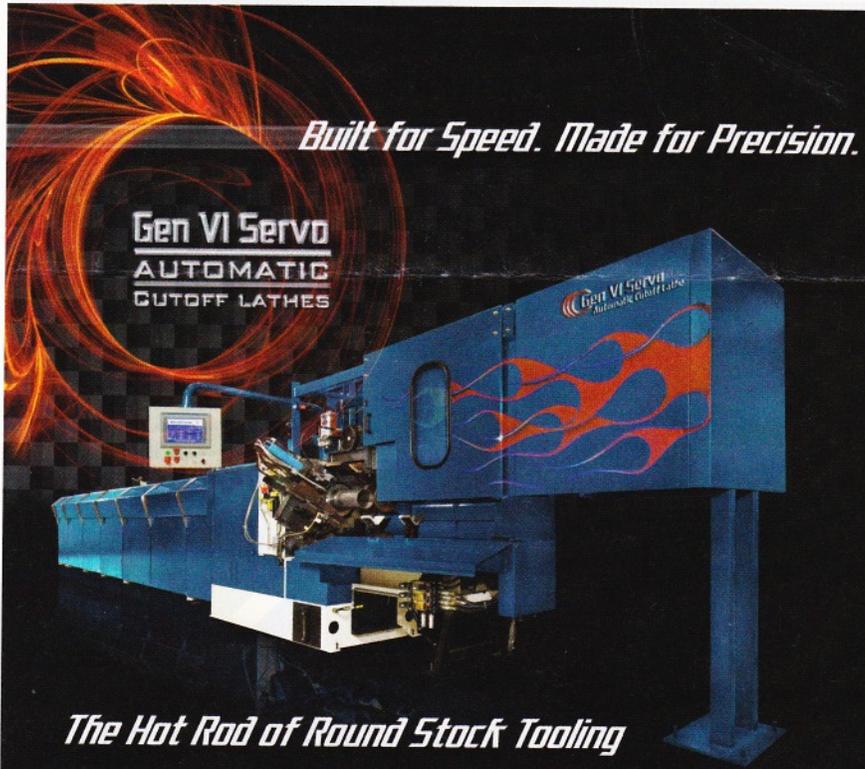
retain employees, it would celebrate them. And to keep customers 100% satisfied, it would assure 100% on-time delivery and perfect quality. The company didn't have far to reach on the delivery and quality aspects, as those two

fundamentals have always been at the forefront of MSI's business model, but there was improvement to be made on the people side.

Training a High-Tech Workforce

Enter Tammy Simmons, Rob's Wife. Tammy's interests in training, workplace culture, and team building, along with her genuine warmth and creativity, have helped make MSI one of the *Triad Business Journal's* "Top Ten Places to Work" in the Triad area (Greensboro, Winston-Salem, High Point). "In early 2011, we projected that our workforce would double within two years," she says. "We assembled a training taskforce comprised of people from production and human resources to determine the best way to get people up to speed quickly. Our work is critical, the material is expensive, and so our new hires must have a comprehensive foundation."

The training taskforce established parameters, curricula, and evaluation procedures for a person's first week, first month, and second month. In addition to its in-house training program, MSI also has a custom curriculum taught by certain colleges in North Carolina and Virginia. It's a demanding eight-week crash course to assess capabilities and teach basic mechanical and math skills to make machining calculations. Also included are training in use of hand-held measuring devices, work with MSI's Vantage MRP system, and reading and interpreting technical drawings for both print and CAD/CAM systems. If the person passes the college course, he or she is granted an interview at MSI to



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potentially become a trainee in-house program. The company also accepts trainees right out of high school who have taken technology classes.

"Finding qualified people has been the biggest challenge in our growth," Tammy Simmons says. "You can buy equipment if you have cash flow, but you can't buy good employees. Happily, we instituted our training program about a year ago and are experiencing a 94% retention rate for new hires."

Transforming the Workplace

MSI fosters recognition for its employees through memorable team-building events such as poker nights, "pie-a-team leader" auction (cream pie in the face), bowling, employee of the month, sack races, "dress Rob in an NFL jersey of your choice auction," picnics, cultural-themed parties, and employee of the year. "There is always something rewarding and fun going on," Tammy Simmons says, "and the auction events fund most of the activities."



Machinist Cook monitors finishing operations on the titanium 10-2-3-grade workpiece, which can be performed lights out.

Another "people" aspect to improve was Rob Simmons himself. At Tammy's suggestion, Rob joined Vistage, a local group of CEOs that meets once a month to talk about business challenges, solutions, and goals. It was there where he

was steered to measure the two major areas that would put MSI over the top: quality and delivery. "I used to track at least five different dashboard metrics, now it's down to two, because if those two things are 100%, then all the other ones such as quotes and sales will take care of themselves."

The quality and delivery drivers have spurred change in other functions of the business, such as monitoring machine utilization continuously, knowing where to place and when to add personnel, and adjusting work-in-process procedures.

By all signs, AS9100-certified MSI is making a name for itself in a big way and being the "biggest small shop in the southeast." It's a niche the company is thriving in and it's sending MSI on its way to achieve its next financial goal: \$50 million by 2015. **ME**

For more information on Machine Specialties Inc., go to www.machspect.com, or telephone: 336-603-1919; for more information on Mitsui Seiki (USA) Inc., go to www.mitsuisseiki.com, or telephone: 201-337-1300.



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