

# APPLYING TECHNOLOGY

Automation • Machines • Spindles • Tooling • Software • Workholding

## Thorn Industries Parlays Experience into Efficient Medical Parts Manufacturing Business



John Hicks (right) and his son Steve made their medical manufacturing and CNC programming experience the foundation for Thorn Industries, a medical parts job shop.

In February of 2002, John Hicks was invited to set up his own captive CNC machining operation within the walls of Blackstone Medical Company. He was joined by his sons Steve and John. Both were highly experienced CNC equipment programmers, hand coders and operators.

They started out with a couple of modest 3-axis mills and a lathe. Initial work involved part prototyping and repairing instrumentation. The more work they did, the more they were given. Within six months, they bought a 4-axis milling machine and started planning for ISO certification.

Now eight years later, Thorn Industries is a lean, 10-person medical manufacturing shop with its own plant in Springfield, MA. The company boasts a range of capabilities that shops many times their size would find hard to equal. This includes ISO medical certification, MRP, 5-axis milling and Swiss-style turning.

General Manager Steven Hicks said that the not-so-secret secret of his company's success has been to specialize in one thing and do it really well, hire only experienced staff with multiple skills, acquire the best manufacturing technology they can afford and avoid extravagant "bells and whistles" to stretch the company's technology acquisition budget as far as it can possibly go.

### Through the Customers' Eyes

In addition to the steady stream of work, the biggest advantage the company got from its captive status was the daily interaction with Blackstone's engineers.

"We worked hand in hand with the engineers, with the designers, with quality control. When we had issues with quality, we wouldn't have to hop in a car and drive somewhere or hop on a plane to fly somewhere. We would just walk over into their quality room and inspect the parts right there with the quality department and work out issues with engineering and quality at the same time," he said.

Learning to look at manufacturing problems through the medical part customer's eyes would prove to be an invaluable experience when the opportunity for Thorn to expand its customer base presented itself. Blackstone wanted Thorn to take on production manufacturing work. That would require the acquisition of more advanced manufacturing systems, which, in turn, would require the company to take on additional customers to support their increased investment in manufacturing capacity.

Medical parts are small, so shipping is not a barrier to working with customers anywhere in the country. So in addition to customers in New England, Thorn works with OEMs in places as far away as Ohio and west to California. Now having worked on a broad range of projects from nearly a dozen OEMs, Hicks is frequently consulted on material, geometry and tolerance issues

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## Air-Way Manufacturing Improves Efficiency with PAWS Workholding Modular Hydraulic System

Air-Way Manufacturing Company is an OEM specializing in producing a full line of hydraulic fittings and accessories for off-road construction, agriculture, material handling and defense. One of Air-Way's strengths is its ability to design and build custom hydraulic fittings for its customers with quick turn around.

Over the last couple of years Air-Way has had to explore ways of increasing the efficiency of its manufacturing operations. Troy Newman, Manufacturing Technology Manager, along with Jeff Hanson, Plant Manager, and J.C. Buettgen were put in charge of a project to move all of the company's secondary operation machining

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(l-r) Jeff Hanson, Plant Manager, and Troy Newman, Manufacturing Technology Manager, Air-Way Manufacturing Company.

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## Omega Tubular Products Increases Production Capabilities with FEMCO Machines



Fernando David Alanis and Jorge Alanis Jr., owners of Omega Tubular Products, making changes to the program for a part on the FEMCO HL-35.

Omega Tubular Products, a creator of custom designed metal works and industrial projects in Houston, TX, recently encountered a challenge that may seem atypical in the recent economic environment. "At a time when the economy was slowing down, we were having diffi-

culty satisfying the demand of our customers," said Jorge Alanis, Jr., co-owner of Omega Tubular Supply. "We needed an efficient and economical machine that would be great for large production orders. We had the parts running smoothly

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Thorn Industries maintains a range of manufacturing capabilities in-house.

These include 5-axis milling, Swiss machining and wire EDM. All of these processes were used to manufacture the components (shown here) for a single medical device. Code for the CNC machining toolpaths used by each of these systems was generated using the most basic level of Mastercam CAD Software.

## Thorn Industries

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even before his customer releases the model for initial prototyping.

For example, recently a customer sent Hicks the SolidWorks model for a tap. It was a perfectly good design for a steel tap, but not for a bone-cutting tap. "So we began shooting ideas back and forth over the Internet until we had something that satisfied the designer and something I knew would work," Hicks said.

### Importance of Personnel

In 2006, another company acquired Blackstone, and Thorn moved into a separate facility. Thorn still does work for the parent company and many others in the medical products industry. "We have a great story to tell customers because we were groomed in the medical industry. We are not a company that was in aircraft one day and into medical the next. We stuck with medical right from the beginning. Today, we are probably about 95% medical."

Thorn's organization is lean and flat. At any given time, four of the five people are engaged in programming, setting up and operating CNC equipment. The company feels that a diversity of skills is essential so that as a team the staff is able to tackle any combination of projects that present themselves during a given day.

Since its inception, the company has experienced nothing but steady growth in its chosen industry. There is one thing holding it back however - the availability of experienced people. "If we could have found more people with the right combination of experience and skills, I think we would have grown even faster," Hicks said.

### Technologies Compete for Dollars

For the longest time, Thorn resisted acquiring a CAM system because all of its operators were experienced hand coders, and because the dollars that would be used to invest in CAM would initially subtract from dollars available for other important investments. For a small and relatively new shop, its equipment acquisitions have been impressive. Thorn's manufacturing technologies include 7-axis screw machining, 5-axis milling, 5-axis wire EDM, CNC turning, 4-axis laser marking/engraving, weld-

ing, passivation, polishing and assembly. The company is certified to ISO-13485 and ISO-9001.

As for CAM, in 2008 the company rented and purchased a 2-1/2 seat of Mastercam (from CNC Software, Inc., Tolland, CT). The company considered several options. There were a number of products that offered more features than the basic level of Mastercam, but within these feature sets, the alternative products did not allow programmers to modify the toolpaths to do exactly what the programmer wanted in critical areas of the part. In addition, all of the operators had used Mastercam at other companies and were immediately comfortable with it.

So, Thorn began to use its single seat of Mastercam to program all of its sophisticated CNC equipment, including its three Tsugami Swiss machines. "You just have to know what you are doing," Hicks said. "My father used to work for a company that had every CAM system under the sun. He learned from the bottom up using a 2-axis and 3-axis type program because that was all there was. Over the years, I watched him and saw how he did it. When we started to evaluate Mastercam, we discovered that the base level product is capable of automating the vast majority of the things we did when we were hand coding.

"You just have to know how to orient Mastercam to the appropriate geometry and it will do the rest. You need to know where you are. We build a model in SolidWorks, rotate that thing around, bring it into Mastercam and we are exactly where we need to be to create the toolpaths. We do some really intricate 5-axis work using just our standard CAM package."

Hicks said the switch from hand coding to using the basic level of Mastercam has resulted in an astounding 50% improvement in both programming and manufacturing productivity. A large proportion of the machining cycle reductions has come about by using computer simulation and other features in Mastercam to eliminate "air cutting" time.

Today, Thorn has one programmer and most of the CAM work is flooded through him. So, only one seat of Mastercam is needed for the time being. If need be, there are four others (including Hicks and his father) who can jump on Mastercam and create a program. At present, the

company is "pounding out" about 20 CNC programs a week on this system. They are fairly evenly balanced between mill, lathe, wire EDM and Swiss machines.

In the future, Hicks anticipates moving into a full-blown 5-axis version of the CAM software. However, the year they purchased it, the company also bought four other software products, including MRP software and SolidWorks. For now, the basic package gives them a solid foundation for everything they need to do.

### Advice to Students

In spite of the deep recession, 2009 was Thorn Industries' best year. So Hicks is pushing forward in his quest to find potential employees with diverse skills.

He said, "I do tons of interviews, but it's hard to find individuals with an aptitude for the kind of work we do here. We are not like a company that might have the machines set up for a month or a week running the same job. Every day we are setting up new jobs two or three times while we are getting other jobs programmed and ready to bring in as soon

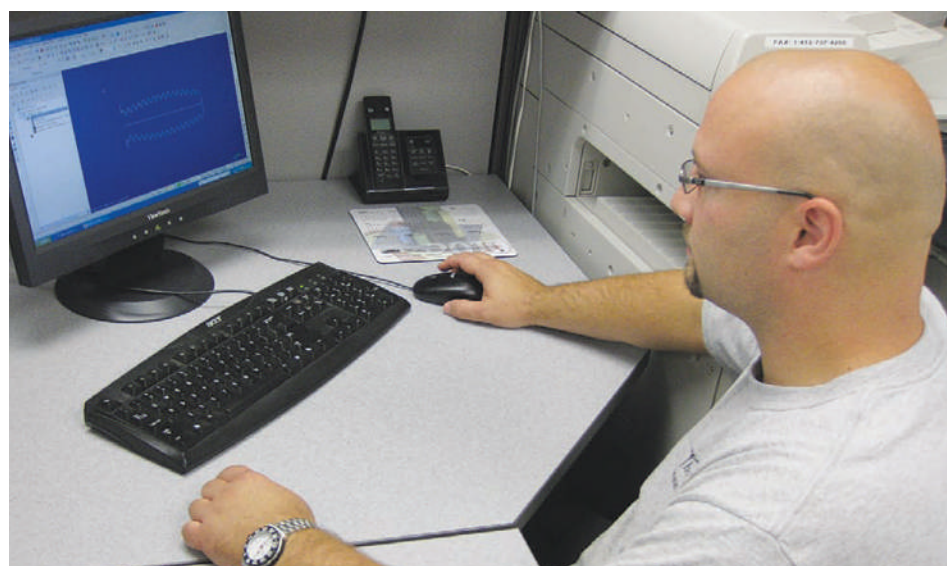
as one is finished. This work is high quality, fast paced and demanding."

He also is a frequent guest speaker at high schools and vocational schools in the Springfield area. He tells students that it is okay to have 10 or even 15 jobs starting out. Their first priority as students and workers is to find out what they love to do. After that, they need do what it takes to get really good at it.

For more information contact:

Michelle Nemeth  
CNC Software, Inc.  
671 Old Post Road  
Tolland, CT 06084  
860-875-5006  
info@mastercam.com  
www.mastercam.com

Steven Hicks  
General Manager  
Thorn Industries  
732 Cottage Street  
Springfield, MA 01104  
413-737-2464  
Steven@thornind.com  
www.thornind.com



Thorn Industries has several CNC programmers with medical manufacturing experience. They use the basic level of Mastercam CAM Software to evaluate part models and create code that they insert into their CNC manufacturing programs. Here Steve Hicks is working on part that will be manufactured on Swiss machine.



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