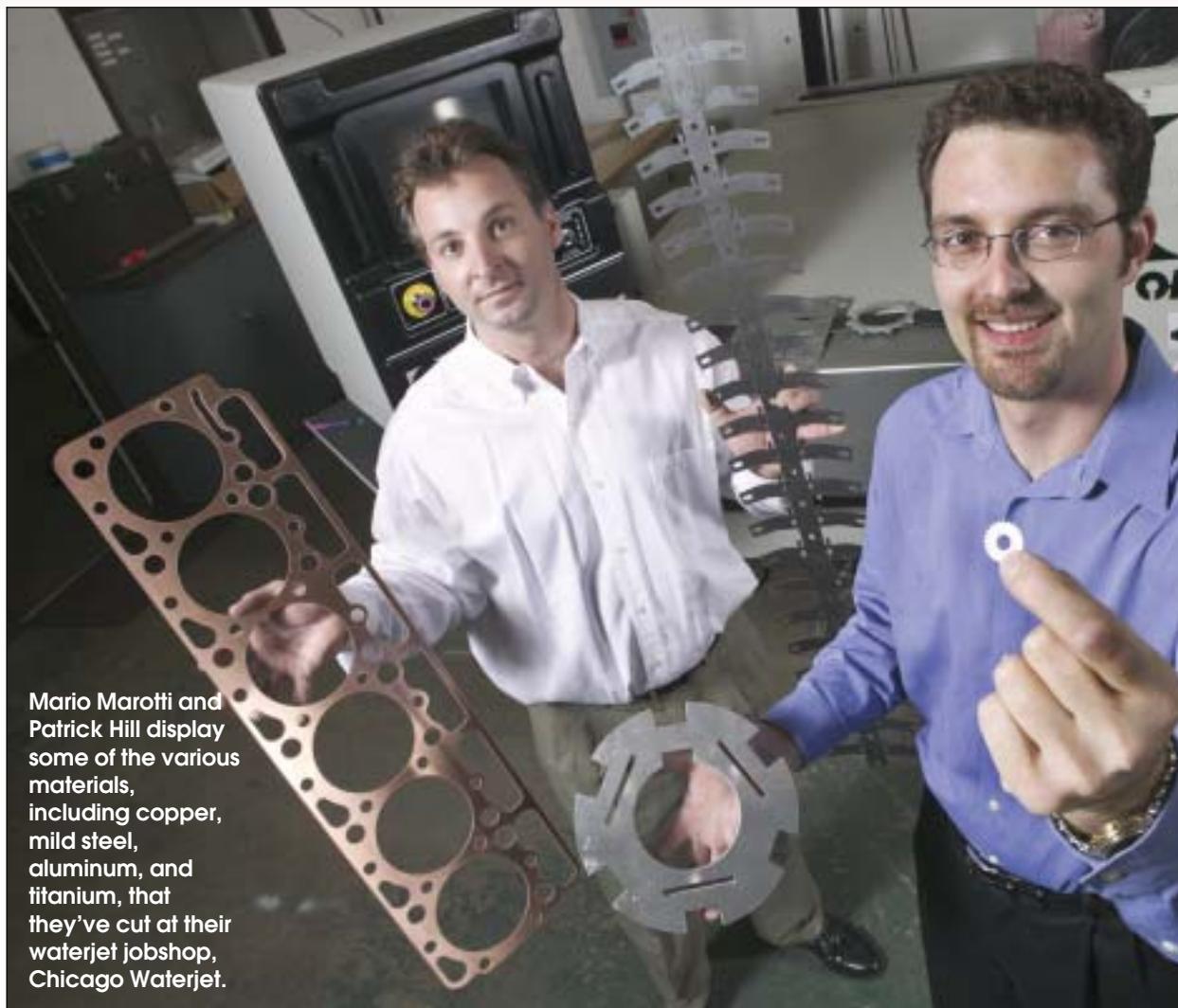


BUILDING A BUSINESS



Mario Marotti and Patrick Hill display some of the various materials, including copper, mild steel, aluminum, and titanium, that they've cut at their waterjet jobshop, Chicago Waterjet.

ON WATERJET CUTTING

Today's waterjet systems attract more work than most shops realize.

BY CHARLES BATES
SENIOR EDITOR

When Patrick Hill and Mario Marotti started their jobshop, they banked their business on one machine: an abrasive-waterjet system. They did so because they believed the technology offered more opportunities for jobs from many diverse markets as compared to conventional machining equipment. The risk paid off for Chicago Waterjet, which now has enough work to keep two Omax abrasive-waterjet systems busy.

“We saw the potential for profit without much competition in the Chicago area,” explains company vice president Marotti. “The bulk of companies owning waterjet systems use them to create their own product. And not many do a lot of marketing for abrasive-waterjet jobshop services.”

The Chicago-based shop has an Omax model 2652 (2×4-ft table) and a model 80160 (6×12-ft table). The 2652’s accuracy of motion over its entire travel is ±0.003 in. and ±0.002 in. for 1 ft of travel. Repeatability is ±0.0013 in., squareness 0.0013 in./ft, and straightness is 0.0017 in./ft.

On its first system, the smaller 2652, the shop cut parts from sheet material measuring between 5 and 12-ft long. However, running long sheet lengths on this smaller machine meant first cutting them to a manageable size for the machine. Because of this extra step, jobs that should have taken 6 hr to complete took 10 hr. Also, the shop’s workload was no longer just “onesy-twosy” prototype parts, but included production parts cut out of whole 8 or 12-ft-long sheets.

For these reasons, Chicago Waterjet purchased the larger Omax 80160.

Its X-axis travel measures 168 in., while the Y is 80 in. Accuracy of motion over the 80160’s entire travel is ±0.005 in. and ±0.002 in./ft of travel. The machine repeats at ±0.002 in. with a squareness of 0.002 in./ft and straightness of 0.003 in./ft.

“Our attitude was to look for and accept jobs cutting anything and everything,” says Hill. “Abrasive-waterjet systems let us do that, not only in different materials, but also for different types of runs.”

With the two waterjet systems, the shop gets business from tool-and-die shops, sign shops, countertop houses, automotive shops, fiberoptics companies, and numerous other businesses. The bulk of its jobs involve both rough and finish cutting of materials from granite to stainless steel. Two parts the shop often cuts are shims and strippers for die shops.

To save hundreds of hours of production time, the shop cuts multiple shims simultaneously from welded or bolted-together stacks of shim material. For stripper plates, the shop beats the competition with quick job turnarounds.

“Today’s waterjet machines are 15% faster than they were a few years ago, and getting faster,” says Hill. This speed is what makes them the perfect machine for cutting stripper plates.

If a die shop has wire-EDM machines, it most likely sets them up to run stripper plates overnight. This is fine, says Hill, as long as the shop is slow. When things get busy, though, most die shops realize that it’s not cost effective to run strippers on wire EDMs. In such situations, waterjet cutting actually complements wire EDMing.

Wire EDMs are precision machines, and cutting stripper plates with 0.15 to 0.30 in. of clearance per side isn’t necessarily the most productive use of these systems. Waterjet machines, on the other hand, says Hill, are 10× faster than wire EDMs, just not as accurate. This is why Chicago Waterjet is considering the addition of a wire-EDM machine to partner with its waterjet-cutting capabilities.

According to Hill, the problem with waterjet cutting was never accuracy or repeatability, per se. The technology’s biggest drawback has always been taper. However, today’s waterjet OEMs now offer options that virtually eliminate taper from the process, and most do so by skewing or tilting the machine’s waterjet head.

Omax’s Tilt-A-Jet option, for instance, achieves virtually zero taper by adjusting/tilting the waterjet head according to the material type and thickness being cut, the cut path, and the overall distance of the waterjet nozzle from the part. The Tilt-A-Jet delivers 9° of maximum tilt angle and works on new and existing Omax machines.

Software performs all the necessary calculations for the head and also squares the Z axis, making sure it’s exactly perpendicular if it gets jarred. It does so in 15 sec and with the touch of a button.

To keep up with the changing jobs at shops like Chicago Waterjet, Omax provides free software upgrades that improve precision and reduce machining times. The OEM also employs a “bolt-on” policy for hardware upgrades, so early models like Chicago Waterjet’s 2652 remain current and just as capable in precision and speed as today’s newer models.



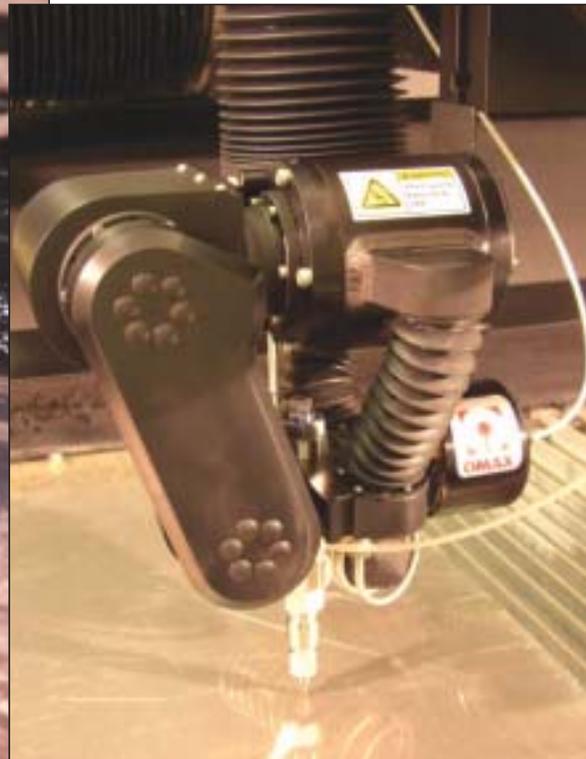
Chicago Waterjet relies on Omax abrasive-waterjet systems for producing such parts as head gaskets from sheets of copper.

Some of the Omax options the shop has taken advantage of, according to Marotti, include the Precision Optical Locator for feature location to enable secondary machining, a 55,000-psi direct-drive pump, and a programmable motorized Z axis on the big machine.

A motorized Z axis provides precise nozzle positioning. It, along with the Precision Optical Locator, delivers precise machining of pre-machined parts, such as die-stripper plates.

The Z axis jogs up and down at operator-set speeds and distances and does heads-up traversing to miss obstacles. It is programmable using Omax 3D Path Editor and lets shops create toolpaths for materials with non-flat surfaces or features that the nozzle must avoid. **CT**

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Innovations such as Omax's Tilt-A-Jet system eliminate taper, which was once one of waterjet cutting's most critical drawbacks.