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Abrasivejet Carves A Niche For Competitive Job Shop

"As a shop owner, the thing you hate most is sending a customer down the street with a part you can't cut. He may take all his work elsewhere. That's why we want to be a full-service job shop."

That is the principle that motivates Dan Mottl, president of Atlas Tool & Die Works Inc., a job shop in Lyons, IL. The company was founded in 1918 by his grandfather, a European-trained tool and die maker and machinist. Today, the company employs 65 people in its 50,000 sq.-ft. facility. Originally a general machine shop specializing in tools, die, and die repair, Atlas Tool has succeeded in fulfilling customer needs by utilizing the most current technology.

"Our company has reinvented itself several times over the years," Mottl explains, "each time providing a broader range of services than before. In the mid 1970s, we became one of the first shops in the Chicago area to have a wire EDM (electrical discharge machining) in-house with a full-service die shop and stamping facility. We saw wire EDM as a way to make high-quality tools at the lowest possible price. It really was a big turning point, because we did get a whole new array of customers; not only for wire EDM, but for stamping and assembly as well."

As Atlas Tool & Die Works continued to grow, so did customer demand for short-run and prototype production work. "Although we were doing some of that on the wire EDM," Mottl says, "it was tedious and slow work. Everybody else had conventional methods of production, so we looked for something new.

"By 1985, we had seen lasers progress to a point where they weren't too different from wire EDM, in that both are two-axis close-tolerance machines," he re-ports. "We also saw that customers weren't willing to pay the high price of tooling anymore. So we purchased a laser. Again, it was a foot in the door to get jobs that demanded fast

turnaround and competitive pricing. Parts that conventionally would take two or three setups now took only one setup with the laser. Again, we tried to stay ahead of the market by adopting new technology, and it's obviously proved itself. In fact, we now run seven lasers."



The JetMachining® Center is able to cut a variety of materials, with no toxic fumes or heat-affected zones.

The laser is faster than wire EDM. While slightly less accurate, it is more than adequate as a substitute for producing most stampings. However, lasers are limited. Even under ideal conditions, most lasers cannot penetrate materials with thickness of more than 3/8". Many plastics melt and give off toxic fumes when cut by a laser; and lasers are unable to cut thicker reflective materials such as aluminum, copper, crystal, and glass.

Abrasive Waterjet Rounds Out Machining Lineup

"We'd been watching the market for abrasive waterjets," Mottl says. "We definitely saw a need for it, because we were getting a lot of requests to cut thicker materials, more exotic materials, and plastics. From the start, I was impressed with the overall quality and general appearance of the OMAX JetMachining® Center. It's faster and more economical than wire EDM, and it can cut thicker materials than our most powerful laser."



JetMachining® cuts complex geometry part with no secondary processing needed.

Glen Mottl, Dan Mottl's cousin and vice president of Atlas Tool & Die Works adds, "Before seeing the OMAX JetMachining® Center, we didn't feel there was an abrasive waterjet capable of producing parts with tolerances where we wanted them to be. After all, we are basically a precision shop. But, JetMachining offers close tolerances and good control over the quality of the part. It increases our capabilities above and beyond what the other equipment can do. And, the more versatile we are as a company, the better we look to potential customers.

The OMAX controller includes an *Expert System* with an interface, so that even novice operators can start machining parts within minutes. Submerged cutting on the machine is cleaner and quieter than other systems, and the OMAX P2040 mechanical pump is a big plus, according to Glen Mottl. "It has no cooling water requirements, and we felt its overall simplicity would translate to easier maintenance." Dan Mottl adds, "Lasers need a lot of maintenance; we saw the JetMachining center as less maintenance-prone, and so far that has proven to be the case."

For the first week or so after installation, the operators at Atlas Tool were encouraged to try out JetMachining, making different shapes and materials, including glass, stainless steel, and plastics. "The JetMachining center does a fantastic job on aluminum," says Dan Mottl, "and it cuts through ceramic and marble like butter. That may open up a whole new market for us."

One of the major advantages to JetMachining is the elimination of heat-affected zones. When a laser cuts stainless steel or high-carbon materials, it produces a hardened edge that interferes with secondary operations such as machining, welding, or tapping holes. Laser-cutting also can result in cracking during later forming operations because of the hardened edge from the cutting," says Glen Mottl.

"I just recently had a job where I had to make some stainless steel rings," he continues, "and they had tight dimensions on roundness on both the outside and inside diameters. The thermal cutting process of the laser creates shrinkage on the cut edge sufficient to distort the parts. I ended up machining them with the JetMachining center because it has no thermal impact on materials being cut. So, the rings came out truly normal.

In certain materials, laser cutting creates a burr that has to be removed mechanically. In addition, it is difficult to deburr a foil-type material mechanically without destroying the part. "I've switched to a couple of jobs over to JetMachining where I knew burrs would be difficult to remove, especially with lighter gauge materials," says Glen Mottl, "Rather than laser-cut parts and have to remove the dross, I'll stack and machine them on the JetMachining center. That completely eliminates the need for any secondary finishing.

"It's a definite asset to our shop to have the OMAX JetMachining® Center," he concludes. "It complements our existing equipment by cutting materials our other machines can't handle."

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