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Abrasivejet technology boosts business for EDM shops

Operator checks CNC screen for program details on OMAX JetMachining operation for machine parts

For years, job shops used only wire EDM or laser equipment for cutting precision parts. Abrasivejet machining was new to the industry, and not yet considered practical. Today, state-of-the-art technology has successfully reconciled full-scale abrasivejet production with consistent precision results. And job shops that procure this technology stand to boost their profit margins in return.

Steve R. Miller, president of Milco Wire EDM, in Huntington Beach, CA, and owner of Milco Waterjet, would be the first to agree.

Miller started out in 1972 as a tool and die apprentice. He worked in more than a dozen deep draw, progressive, and compound die shops until taking on wire EDM as his primary vocation.

"It really got started when I was asked to run a wire EDM room for two weeks while the regular foreman was on vacation. Then, when he left to start his own company, I took over running the room full time."

Miller moved on to helping a steel rule die company start an EDM room, then became a partner in a downtown Los Angeles wire EDM company. When the commute between Huntington Beach and L.A. began to wear him down, in 1990 Miller started Milco Wire EDM, Inc.

"Business at Milco was always steady" says Miller. "But even with stack ups (stacking materials in order to cut multiple parts) there were times when it was too expensive to cut precision parts in the quantities the client wanted.

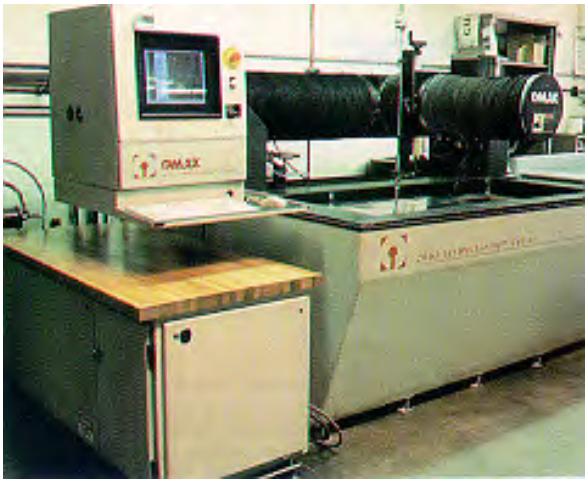
"And we had to pass on cutting other parts because of materials being nonconductive. So when a local distributor told me that I could do all of these jobs quickly and economically on the OMAX JetMachining Center, naturally I was interested." Soon after, Miller purchased the JetMachining Center and started full-scale production in Jan, 1996.

Miller immediately identified a basic, yet overlooked similarity between wire EDM and JetMachining: both cut around complex contours with a kerf. One simply uses a wire to penetrate, while the other uses water. "The water is three times as thick as the wire," adds Miller, "But it fits right into jobs that don't require the same tolerances as wire. What's more, it typically does those jobs more economically."

In other words, JetMachining is not so much a replacement for wire EDM as it is a natural addition to existing wire capabilities.

Of course, JetMachining can be a lot more forgiving than the wire EDM. "This is more important than you might think," suggests Miller. "For instance, hot rolled steel is particularly difficult to cut on a wire EDM because of surface impurities that reduce cutting speeds and may cause the wire to break. It can be an operator's nightmare.

"In the past, we'd have to remove surface impurities with a disk sander, then make sure no tape or other nonconducting materials got in between the stack up. Fortunately, the JetMachining Center is able to 'ignore' many material aberrations that would cause wire EDM to lose flushing. That cuts way down on prep time [and makes the job more profitable]."



Overall view of OMAX JetMachining system with CNC control, left, shown in plant at Huntington Beach, CA, where part production is enhanced through use of this relatively new machining technology.

JetMachining has allowed Milco to expand into cutting non-conductive materials as well. "We recently finished a job cutting quartz wafer carriers for the semiconductor industry. The quartz was delivered to us in 1/4" thick sheets of varying size, at a cost of approximately $8 per square inch. That kind of cost has no room for error," muses Miller. "Quartz can be especially difficult to cut because of a tendency to fracture. But the JetMachining Center was able to cut various part configurations--many of them with holes--without any problems. In addition, JetMachining helped minimize material waste by allowing us to cut the maximum number of parts per sheet."

Milco often uses the JetMachining Center as a CNC mill, speeding component prep time by creating holes for wire insertion later on. "A mill could certainly do the job, but only after spotting the hole, changing tools to drill a pilot, then changing tools again to drill out the hole.

"Just last month we created some backup plates using the JetMachining Center to cut the clearance holes for Allen Cap Screws, all the start holes for the wire, and all the internal shapes that the slugs would fall through.

"We even used it to cut holes that were counter-bored or tapped afterwards. Then, after heat treating the plates, we used wire EDM to cut holes requiring a tighter tolerance."

JetMachining is often more economical than wire EDM for creating prototypes. A good example is the quick-release binders Milco cut for a nationally-renowned snowboard manufacturer. This particular binder is unique in that it replaces the need for conventional snowboard straps.

"JetMachining made it really easy for us to do this job," recounts Miller. "In fact, we found out that it took the contracting company all day to create a stack of prototypes on a wire EDM that we JetMachined in only two hours."

That kind of speed allows Milco to be extremely competitive, even against shops who own laser equipment (the average hourly rate for JetMachining is approximately half that of laser services; the equipment itself costs only a fraction of a full-blown laser system).

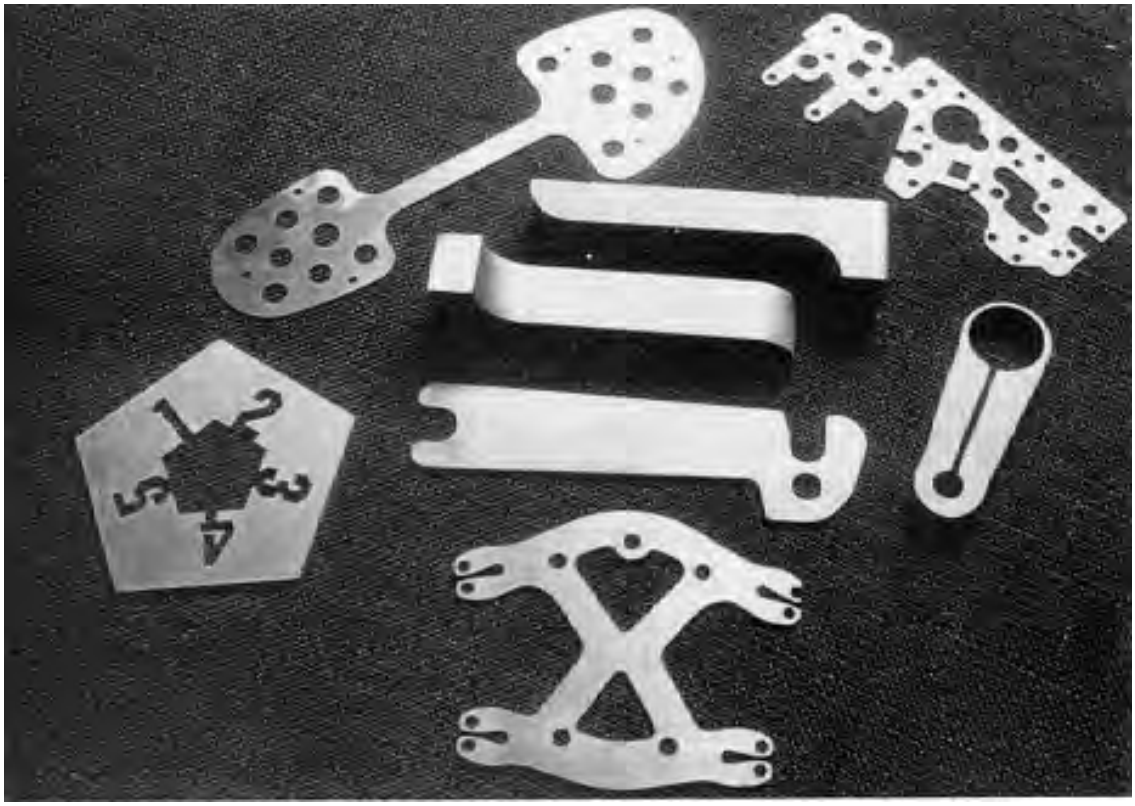
Mark is previewing the part on the "Make" screen of the OMAX software. The OMAX software calculates an optimized speed rate profile for parts being produced up to 2" thick, maintaining tolerances and surface finish with minimal time on programming or set-up.

"I actually get a lot of JetMachining work from laser companies," notes Miller. "Small quantity jobs they don't want, reflective materials they can't cut, materials that are too thick for them to handle, and general overflow."

Milco also capitalizes on the economy of JetMachining by using it to create compound dies.

"The average cost for making a shoebox-sized compound die (using traditional methods) is approximately $2,000 to $4,000. Even a 'pancake' tool and die house would charge $1,000 to $2,000. That makes it incredibly expensive to make limited runs of prototype parts, especially when the tooling will probably be modified or changed down the line.

"In many instances, the JetMachining Center can create the same part, in less time, for about $5 to $20."



Precision machining of 2-D parts on the OMAX requires minimal setup and fixturing.

Virtually all of the expertise needed to operate the JetMachining Center is built into the OMAX controller. The controller automates most programming and tool set-up work, practically eliminating the need for special skills or prior experience by the operator.

"I must say that the OMAX controller is probably one of the simplest programming systems I've ever seen. Every machine has its own idiosyncrasies, but if you know anything about programming or writing up a tool path, JetMachining is something you can pick up in about an hour. It's really that simple.

"There are four people here who uses the JetMachining Center--two of them apprentices from NTMA. All of them picked up the basics of JetMachining quickly and find it easier to use than methods they've used in the past.

"I've added two more employees to our administrative staff to keep up with the additional invoicing. And I'm hiring a new foreman and customer service representative to handle the extra business JetMachining continues to bring in. We currently run two shifts and there are plans to add a third shift in the near future."