

Laser Automation Sparks Productivity

Thanks to productivity and performance, what began as a captive fabrication operation for a case and cabinet manufacturer has evolved into a thriving contract manufacturer.

When Great Lakes Manufacturing, Inc. (Corry, PA) began operations in 1998 as a precision sheet metal fabrication shop, its original function was to be a supplier to sister company Great Lakes Case & Cabinet. However, this modest objective was met and dramatically exceeded thanks to performance by the company's management and employees. "Currently, we have 102 employees and about 60% of our business is for our sister company and 40% is for contract customers," explains Robert Lowther, owner.

According to Lowther, his company's philosophy of investment in people and in the latest technology helped to make Great Lakes Manufacturing a leader in precision sheet metal fabrication. "Our manufacturing plant occupies over 90,000 sq.-ft. in a prime location along the I-90 and I-79 corridors of northwestern Pennsylvania," says Lowther. "We've tried to position ourselves as one of a handful of fabricators that have our level of capabilities. The latest technology combined with a commitment to lean manufacturing are the ways that we have attempted to differentiate ourselves," Lowther continues.

"Automation, robotics, information technology and a high level of employee skill allow us to be competitive in a global economy. In the past two years, we have invested more than \$3-million into our facility."



Clean cuts delivered by laser cutting eliminate secondary sheet metal operations common to cutting with a turret punch press.

Laser Investment

Part of that investment was earmarked for the procurement of a new laser in 2004. Fred Cooke, director of engineering/MIS, was chosen to search the marketplace for the latest laser technology. Cooke began the search during the second quarter. "I began with some of the big traditional names in the laser industry," he explains. "I visited several companies and thoroughly investigated the best lasers on the market. I sent the same time study to each of these companies. I also came across the Finn-Power L6 Laser Work Center.

"I sent the same time study to Finn-Power. When the time studies of the same nesting run came back, Finn-Power's time was 60% faster than the next best time. It was a massive production improvement. We also received some parts back so we were able to check the edge quality and everything worked out very well. We selected the L6 with load/unload and a 10-shelf storing tower which was installed in December, 2004."

The Finn-Power L6 Laser Work Center utilizes a flying optics/moving beam system driven by a linear drive motor system to achieve maximum speeds, even while cutting small notches or narrow contours.

It also features a 4 kW fast axial flow CO₂ laser. Cutting speeds up to 60 m/min. are reached using nitrogen as cutting

assist gas. The L6 can process sheet sizes up to 60" x 120" and up to 0.78" in thickness. Performance values include a positioning speed of 11,811 ipm, acceleration over 2 G, and cutting speeds up to 2,363 ipm. Unlike conventional repositioning, where straight line movements of the cutting head waste time, the unit optimizes the cutting head movement with "Ping Pong" repositioning. This smooth and efficient transition translates to added production speeds – up to 1,000 holes/min are now possible. The patented rigid frame design withstands all the forces of high-speed positioning and provides a solid base for stable beam delivery optics.

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Automation Is Key

According to Cooke, automation was another key reason for choosing Finn-Power.

"With other lasers, automation involved taking down an entire shelf of material and working with that," reflects Cooke. "With the L6, we take down one sheet at a time, so we can nest and kit parts. I can run a 13 ga. sheet and then a sheet of 16 ga. and then a sheet of aluminum ... and build up kits that way. Over the last 1-1/2 years, we've had a heavy flow of "lean manufacturing" – we're not batch manufacturing anymore. We are producing a lean flow..."

"Prior to our purchase of the L6, we compiled a matrix of all lasers that were currently on the market," adds Lowther, "and the Finn-Power L6 was

the most proficient for our needs. When we started to take a look at the other offerings from Finn-Power, there was one common denominator that kept jumping forward: Finn-Power was the only machine builder that took a position on the front end in material management – for the other builders it looked like an afterthought."

Thinking Thin

On the L6, Great Lakes runs anything from 24 ga. cold rolled steel to 1/4" hot rolled steel; 0.060" – 3/16" aluminum; and 20 ga. – 13 ga. stainless.

"The high productivity...in thinner sheets is very important," explains Cooke. "That's where the machine comes into its own versus the competition. Other laser builders make 5 kW resonators and different laser beam shapes and styles that will do beautiful jobs on big thick sheets – but we're not a thick sheet producer. We don't do plate work. We fabricated thin sheets. So high speed and high quality in thin sheets is very important for us."

About 60% of the material Great Lakes puts on the laser is between 16 – 14 ga. cold rolled steel. Currently, it is running 20 hours/day, 5 days per week. "We are at a stage now where the operator is doing his own nesting," explains Cooke. "So when we have demand for parts, the paperwork for XYZ part comes to the operator and the operator will make his own nests, because he knows how the machine runs best. He knows where he wants to put his crop lines and his scrap cuts...what should be tapped, where, and how. We found that by letting the operator do the nesting brought a huge improvement on producing the parts – we're not relying on an engineer in an office to pump out nests."

The L6 replaced two older technology turret punch presses and has enabled Great Lakes to add 30% – 40% to its output.

"The biggest impact has not been the mass of parts that we've been making... but the flexibility," says Cooke. "Now we can make one part without a setup. We do a certain amount of business in what is called *design changes*. We sell a standard product – 19" rack mounts for

IT industry. If a customer wants a fan in a certain spot on the door or they want a different networking coil, and they only want one or two of these parts, a traditional punching sheet metal shop would have a hard time making these few parts at a competitive price. But the L6 has enabled us to reduce setup so I can make fewer parts for the same price as doing a large batch. This helps in customer satisfaction.

"We are able to turn the one and two units instead of doing the 50's and 100's with the same net effect...and still maintain profitability," advises Cooke.



Employing the Finn-Power laser spec'd by Fred Cook, Great Lakes owner Robert Lowther intends to continue growing the contract manufacturing side of his business.

"With the laser," he adds, "we are able to do slots and tabs that you wouldn't normally do with some of the other punched parts. You get a clean edge. We're cutting with nitrogen most of the time, and we only cut oxygen when we are going 10 ga. and thicker in cold rolled steel and some hot rolled steels. By cutting with nitrogen, we're not getting the oxide layer on the parts – we are getting a nice clean edge. The powder quality is excellent. So you'll



Great Lakes Manufacturing uses technology, like the new Finn-Power laser and automated materials handling equipment, to differentiate itself from competitors.

see that we don't have an up or a down on the part when the parts are burr free. With a punched part you'll always have an up or a down. There is a definite change in quality. We're not nibbling radius like we used to with a punch press. The customer is getting a much better part. We aren't getting any scratches. The sheet is brought down with vacuum on rollers. There's no movement of the sheet in the machine. Parts are taken out and put on the unload – so we aren't getting scratches on the parts. We don't have to deburr or sand out

says Lowther. "Our goal will be to further reduce scrap and eliminate the costly material handling throughout the facility." *Finn-Power*

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deep scratches that you get with high dies and a punch press. It eliminates some of those secondary operations."

Results

Great Lakes reports that the L6 has allowed them to fully embrace lean/flow manufacturing. "It has allowed us to reduce inventory of the sister company by \$1-million in the last 12 months," says Cooke. "One of our primary objectives was to allow Great Lakes Manufacturing to become a better vendor to the sister company. We accomplished that because our on-time delivery is running 98-99% and our rate of return is probably less than 2/10 of 1% in terms of reject rate."

Great Lakes also purchased additional Finn-Power equipment: a hydraulic robotic press brake; a C5 Express (load/unload turret punch press); and an automated panel bender, the EB (Express Bender). "The next step is to not only remain a good vendor for the sister company but to position the company for future growth as a contract manufacturer,"