

Machine Job Shop Uses Flexible Manufacturing System to Shorten Lead Times

L&R Precision Tooling has bolstered its capabilities for aerospace work with AS9100 certification and open capacity for horizontal machining

By Mark Shortt

Operating at the foothills of the Blue Ridge Mountains is a 20-year-old machine job shop that specializes in machining complex parts in titanium, Inconel, and other exotic materials to tolerances of plus or minus 0.0002 inch. L&R Precision Tooling Inc., of Lynchburg, Virginia, has made its mark turning out parts like titanium base plates for submarine antenna systems, Inconel housings used in deep oil well drilling, and specialized fasteners for the exterior of the International Space Station. The company has also produced parts for use in surgical, night vision, fiber optic, nuclear plant inspection, and filtration products.

Along with conventional CNC milling and turning equipment, L&R Precision deploys a pair of 7-axis Okuma Multus milling and turning machines, multiple 4- and 5- axis milling centers, and a 4-axis wire EDM machine at its 57,800-square-foot facility. But perhaps the crown jewel of its operations, and a key to L&R's adaptability and future growth, is its Okuma Palletace / Fastems Flexible Manufacturing System (FMS), currently configured with three Okuma MB 4000H horizontal machining centers.

L&R has been using the flexible manufacturing system since January 2014, a year or two after the company's founder, Allen Leath, had seen a Fastems Flexible Manufacturing System operating in an aerospace facility in the Midwest. Leath, whose company was already gearing up to become an AS9100 certified aerospace supplier, took an immediate interest in what a flexible manufacturing system could do for L&R and its customers.

"It just made logical sense," said Clay Leath, Allen's brother



L&R Precision Tooling's Okuma Palletace/Fastems Flexible Manufacturing System enables the company to accommodate changes in scheduling and quantities of horizontally machined parts. As a result, L&R can achieve quicker lead times and offer consistent pricing on varying quantities of horizontally machined parts for ongoing repeat jobs. Photo courtesy of L&R Precision, Lynchburg, Va.

and currently the president of L&R Precision Tooling, in a phone interview. "As a job shop, we get a lot of repeat jobs, but the quantities can be very small. So the more he thought about it, the more logical sense it made to have the machine with 52-pallet capacity. It allows you to set up repeat jobs and leave the tombstones fixtured up and ready to run. When a customer calls up for an order, they want it just as soon as they can get their hands on it."

Sadly, Allen Leath passed away in 2013, but not before leaving his brother and others at L&R with the idea that a flexible manufacturing system could help the company adapt to the changing needs of its customers in a big way.

"You have to be flexible with customers' demands, whether they need five parts, 500, or 5,000 parts," said Clay Leath. "The system is easily adaptable to run small quantities, and then you turn around and you can go to the other extreme and run high production."

One reason why L&R liked the flexible manufacturing system is that it meets the needs of customers who don't want to carry inventory, but want to be able to achieve volume pricing on smaller batches of repeat parts, said Chris Coffey, vice president of business development at L&R, in an emailed response. "The FMS works well for the aerospace and aviation markets, as they typically don't need large runs of parts—they

need smaller batches for just in time delivery, and that's the sweet spot for this system."

Best suited for horizontal machining jobs, the FMS has two loading stations integrated with three Okuma MB 4000H, 4-axis horizontal machining centers. It can hold up to 52 pallets via two levels of pallet storage, and its footprint, including the machining centers, is approximately 30 feet by 80 feet by 12 feet high. The system's 52-pallet capacity and its ability to store programs enable L&R to readily call up repeat jobs and to quickly and efficiently get them into production scheduling.

"That, coupled with its ability to run multiple jobs, adjust scheduling, and run lights out, makes for a winning scenario," Coffey said. "It's highly unusual for a job shop to make an investment of this magnitude, but the flexibility that it offers made it a good decision for us and our customers."

L&R (lrprecisiontooling.com) added a Haimer heat shrink tooling system and a Parlec tool pre-setter to maximize tool life and minimize run out for quick change adaptability in the machining centers. The company also added a Tool Monitoring Adaptive Control (TMAC) system to measure tool wear and increase efficiency.

"For so many years, we didn't have any capacity—we were maxed out," Coffey told *D2P* in a phone interview. "What this flexible manufacturing system has accomplished for us is that, specifically for horizontal machining, we've got open capacity."

The biggest benefits of using the FMS are quicker lead times and consistent pricing on varying quantities of horizontally machined parts for ongoing repeat jobs, particularly "long running blanket orders with minimum quantities kept on hand for immediate delivery when it's appropriate," Coffey said.

"As a job shop, we don't know what will be coming our way from the type of material through the complexity of the parts, but the advantages of the FMS, coupled with the rigidity and tolerance capabilities of the Okuma machining centers, make it a great fit for L&R and our customers," he explained.

Coffey said the system offers an innovative path to solving

customers' needs because of its adaptability, which allows L&R to accommodate changes in scheduling and quantities of horizontally machined parts. The flexible manufacturing system can run many different jobs or operations simultaneously, in addition to running certain jobs lights out.

"You don't have that downtime like you do on a vertical [machining center] when you've got to change the parts in and out," said Scott Mullins, vice president of manufacturing at L&R Precision Tooling. "It saves time, speeds up the process, shortens your lead time, and just makes everything so much more flexible that you can get the jobs out a little faster."

It can also accommodate future growth, allowing L&R to add up to six additional machining centers, two more load stations, and automation and robotics.

"It's a system that L&R can grow with," said Clay Leath. "It's not a system that you buy, and [you're told] 'this is what you've got—that's it.' We can expand and take advantage of adding more capability and more 5-axis machines. It's something for a business to grow for the future."

L&R Precision Tooling has been an approved supplier to a large company in the oil industry, a designation that required L&R to satisfy extensive traceability and inspection requirements. Its success in meeting those requirements, along with the new capabilities enabled by its implementation of the flexible manufacturing system, encouraged L&R to boost its quality management system up a notch from ISO 9001 certification. In April 2015, the company achieved AS9100 registration after meeting the stringent quality standards for aerospace work.

"We're always looking for new customers, so we'll be happy to fill the machine up to capacity and then, hopefully, even expand it and add more machines to the system," said Leath. "We'd like to get more into the aerospace work. We're doing some work now for NASA and different companies, but we want to utilize the full capacity of the machine. One thing we do like about it is that it gives us flexibility for high production, or to use robotics to load parts."

This is a reprint of an article that ran in the August 2017 edition of *D2P* magazine.

L&R's quality system is AS9100 Rev.C & ISO 9001:2008 certified and is ITAR & GIDEP registered. We provide precision machining in quantities from single prototypes through production quantities.

We are adept in exotic materials, Inconel's and titanium in particular, to tolerances of +/- .0002" and would welcome the opportunity to speak with you concerning any machining challenges you may be facing.



L&R Precision Tooling, Inc.
3720 Cohen Pl. Lynchburg, VA 24501
800 263 4445 or 434 525 4120
Chris Coffey VP Business Development
[*ccoffey@lrprecisiontooling.com*](mailto:ccoffey@lrprecisiontooling.com)
[*www.lrprecisiontooling.com*](http://www.lrprecisiontooling.com)