

## **Moving, Machining, and Testing Parts 24 Hours a Day**

(FLORENCE, KY) – “The decision to automate came down to cost,” says Tim Roskey, business unit manager at Eagle Manufacturing Co. (Florence, KY). “The pressure from customers to cut costs and increase frequency of deliveries meant we had to figure out ways to be competitive. How were we going to increase productivity and quality for less money?”

The products Eagle Manufacturing manufactures are engine components: cylinder heads, connecting rods, intake manifolds, exhaust manifolds, lower crankcases, flywheel housings, and transmission shafts. And, as a subsidiary of Linamar Corp. (Guelph, Ontario), a global supplier of automotive components and assemblies with over 30 manufacturing operations worldwide, it makes a lot of them. The company’s newest production line for intake manifolds consists of nine FH-5800 horizontal machining centers from Mazak Corp. (Florence, KY) and two M-710IT Toploader overhead rail-mounted robots from Fanuc Robotics (Auburn Hills, MI) running 24 hours a day, 5 days a week. It also represents a complete turnkey installation by Mazak of an overall high-volume manufacturing system that integrates its advanced machine tools with high-tech material-handling equipment from other companies.

“The intake manifold is a changing part, driven by new model designs,” Roskey says. “Manufacturing them requires flexible fixtures and flexible equipment that can handle the dimensional changes.” It also requires rugged and reliable production equipment, as Eagle produces 1200 parts per day in intake manifolds alone.

The cell is currently configured with nine machining centers: one robot loads and unloads five from a conveyor belt, the second robot loads and unloads four machines from a separate conveyor belt. Ultimately, the cell can be expanded to a six-by-six machine configuration fed by the two robots.

### **Staying Competitive on Labor**

Without the new intake manifold cell, manufacturing these components would be extremely labor-intensive, according to Roskey. Additionally, large-volume customers were increasing the pressure to keep costs low and quality high. Making the decision to automate its intake manifold line promised two immediate benefits for Eagle: part quality and consistency would go up, and the reduction in employee headcount from 12 people to four per shift meant the company could remain competitive on wages and benefits.

The highly advanced FH-5800 horizontal machining centers feature 12,000-rpm maximum spindle speed powered by a heavy-duty 30-Hp spindle motor and 0.7G acceleration in X, Y, and Z axes. They mill, drill, tap, and bore the intake manifold castings automatically presented to them by the Fanuc robots. The cell machines two types of intake manifolds, a high-volume and a low-volume model, and a single end-effector for the robots can handle both versions.

Each FH-5800 also has a two-pallet changer, so loading and unloading takes place without interrupting machining. "They never sit idle," Roskey says. And the only labor in the cell is loading the buffer conveyor and offloading the parts for shipping or testing.

"You can't check quality in, but with the robots presenting one in every 50 manifolds to a CMM station, we can ensure all dimensions, diameters, and tolerances are right." All intake manifolds proceed to parts washing and pressure-decay testing from

the cell, then they are shipped to assembly operations. All quality and operating statistics for the intake manifold cell are stored in an electronic database.

### **Lean Achievements**

Along with its new production cell, Eagle Manufacturing adopted a lean manufacturing initiative in 2003 and provides all of its 200-plus employees training in lean concepts. "From documentation and work instructions through production and shipping, everybody here is on a mission to reduce waste from when the castings come in to when the finished product ships," Roskey says. Eagle's new intake manifold cell contributes to this initiative by providing production information and percentage of good parts vs. scrap by each machine. "It's tremendous," Roskey says of the new cell. "It's made us very competitive. We have a better handle on quality because we can always monitor each machine's production. I consider it the latest in technology and the future of manufacturing. This is what it takes to be competitive in a worldwide market."

**CAPTION:** Eagle Manufacturing's new intake manifold cell consists of nine Mazak FH-5800 horizontal machining centers fed by two Fanuc Robotics overhead robots.



**CAPTION:** The new intake manifold cell at Eagle Manufacturing runs 24 hours a day, 5 days a week. Daily production is 1200 intake manifolds.



**CAPTION:** The cell produces both low-volume and high-volume manifold models.



**CAPTION:** The highly advanced FH-5800 horizontal machining centers mill, drill, tap, and bore the intake manifold castings automatically presented to them by the robots.

