

Keeping Manufacturing On-Shore with Machine Automation

Edited by Lori Beckman

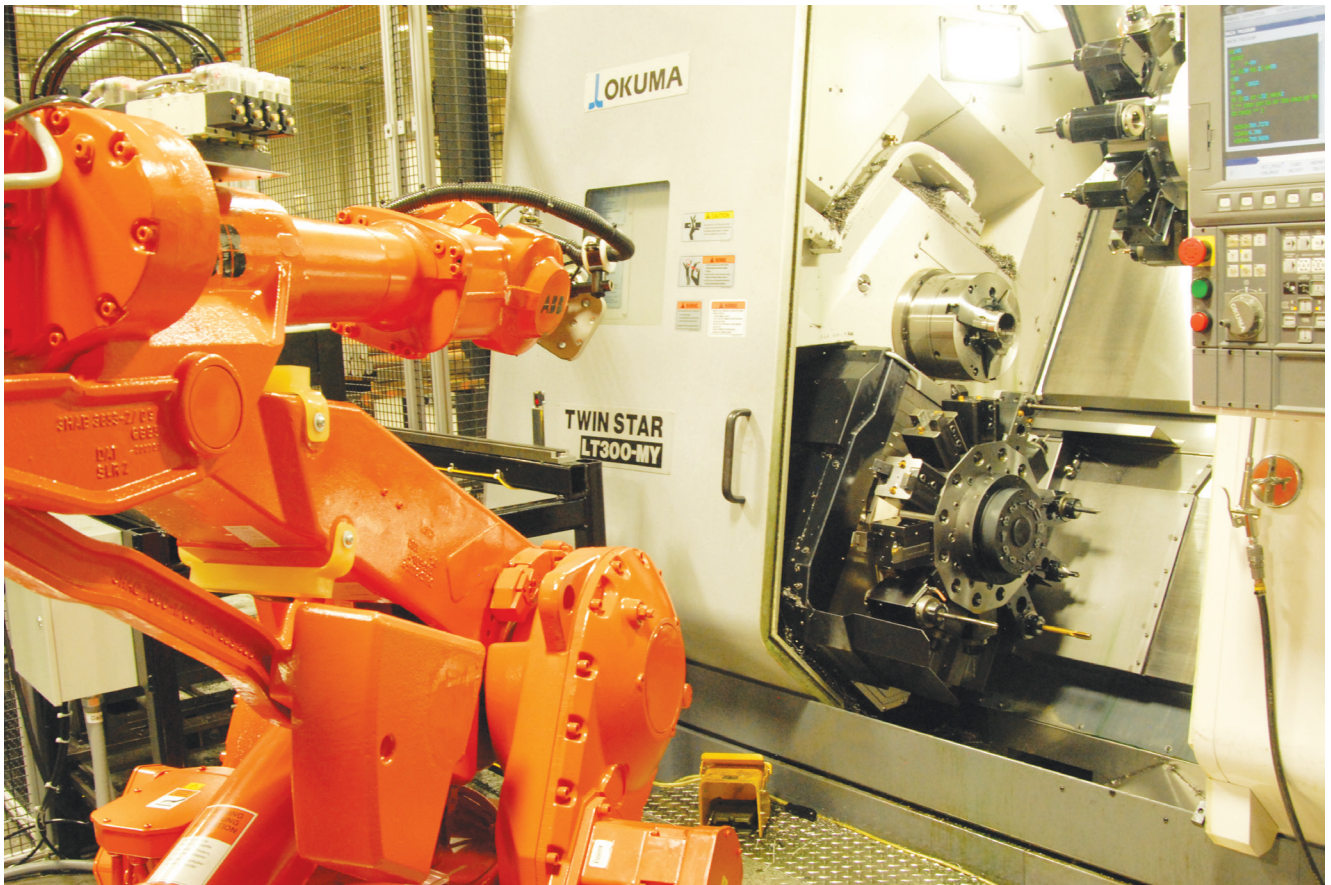
Many American metalworking companies are making important decisions that are helping to keep manufacturing in the U.S., whether this means they are purchasing equipment that makes them more efficient or adapting their entire processes accordingly. Toolholder manufacturer Command Tooling Systems LLC is one of these companies—it has created an automated system to reduce setup and run times.

Up until recently, Command Tooling's product manufacturing process included operations using several machines. Each turning and milling operation required lengthy setups and also contributed to extended lead-times. Something had to be done to quicken the process to support the company's large customer base, which includes automotive, aerospace, computer, defense, electronic, and medical industries, as well as the subcontractors that support these markets.

To reduce the number of manufacturing operations and decrease machine cycle time, the company purchased an Okuma LT 300 twin-spindle machine with driven tools to eliminate the need for multiple operations. This new seven-axis lathe allows full part creation on a single machine and reduces labor costs, according to the company, as this is the only machine required to produce blanks that are ready for heat treatment.

After some research, the company determined that an automated robotic machine tending cell would be a cost effective option and began to review a variety of robot products. "While researching a robotic solution, we wanted to maintain flexibility. In the future, the robot will tend two machines, each handling raw materials of varying sizes and weights," says Nick Martin, president of Command Tooling. "The ABB robot fit the bill, not only with the needed payload and reach capabilities, but with its compact design, high-speed accuracy and flexibility benefits. Due

▼ **The ABB IRB 4400 robot has the reach and payload to tend to the Okuma lathe for both current and future machining needs. The lathe tended by the robot allows for full part creation on a single machine.**



to the exchange rate (euro/dollar), we may want to move some manufacturing from Germany to the U.S., which requires us to increase flexibility. With this type of manufacturing cell, we will be ready for it.”

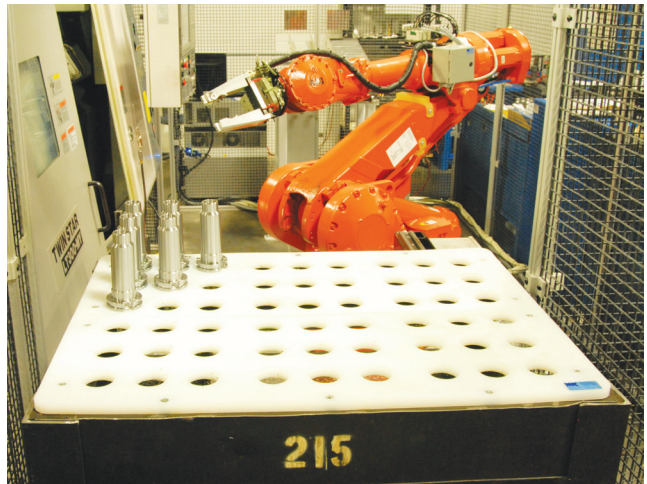
The company determined that an ABB IRB 4400 robot had the payload and reach capacity that was needed to tend the Okuma lathe. With a payload capacity of 60 kg and a reach of 1.96 m, the robot was not only ideal for the company’s current requirements, but would be able to meet future needs.

For implementation, the company relied on Hegman Machine Tool Inc. (HMT) (Maple Grove, Minn.), to set up and program the automated cell. HMT and Command set about programming the IRB 4400 robot to tend the company’s Okuma lathe. The floor-mounted robot sits in front of the Okuma lathe, with a Toellner gravity-fed part loader on one side and two crates for finished product on the other. Raw material—slugs or blanks for the toolholders—is loaded into the part loader, which can hold as many as 40 blanks at one time. The blanks currently being used are approximately 3 inches in diameter and 8 to 12 inches long.

When the process begins, the part loader isolates one blank and presents it to the robot for pick-up. The robot is programmed to pick up the isolated blank and place it into the chuck in the lathe using a pneumatic end effector. With material in place, the lathe performs the necessary cutting operations to produce a finished piece. When complete, the semi-finished part is extracted by the robot and placed in one of the two crates. When one crate is full, the parts are removed from the manufacturing cell and transported to an outside service where they are heat treated.

When the cell is loaded with blanks, it can run untended for several hours. An operator then removes the parts and reloads the part loader. Additional runs can be set up in the evening so that even more parts can be completed after business hours, thereby further extending production. In addition to manufacturing, the cell is set up for quality inspection. The material loader has a conveyor belt along its right-hand side. The robot is programmed to place a completed part onto the conveyor after a set number of parts have been made. The conveyor promptly moves the finished piece outside of the protective cage, allowing Command employees to inspect the part for quality without interrupting the production process.

This new automated system has lowered the cost of Command’s final product allowing them to be comparable in price with both domestic and overseas competitors. As manufacturers are continuously reducing their product prices, this new manufactur-



▲ The Okuma lathe and ABB robot can run untended for several hours. Robotic automation increases the throughput and efficiency of the machining process.

ing process gives Command a leg up on the competition.

Chuck Berg, director of production and engineering at Command, commented, “Implementation of this cell allowed a machine setup reduction of 75 percent and a run time reduction of approximately 40 percent. We expect this type of process to be our manufacturing standard in the near future.”

The impetus for the newly automated process was started when Command was purchased by its parent company, EWS. Becoming a part of the EWS group expanded the company’s global reach and spearheaded the need for reduced cycle times, improved production and efficiency. Now, Command Tooling, with its American-made products, can more easily compete with China. ■



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