Franklin Bronze foundry expands capacity. With the help of an ABB IRB 6600, U.S.-based Franklin Bronze and Alloy improves the production and quality of molds by using an automated dipping system from Canadian partner Shell-O-Matic.

A longtime partner
Franklin Bronze and Alloy, Inc. is located in northwestern Pennsylvania in the United States. Founded in 1878, it is among the oldest continually operating facilities of its kind in Pennsylvania. But there is nothing oldfashioned about its state-of-the-art shelling system that was installed in 2005 by Shell-O-Matic Inc. of Montreal, Canada, a longtime partner that supplies the investment casting industry with both stand-alone equipment and totally integrated systems. The centerpiece of the system is abb’s irb 6600 robot, which has exponentially increased the foundry’s capacity while simultaneously improving the uniformity of the shells it creates.

The investment casting facility produces ceramic shells to create parts for a multitude of industries ranging from automobiles to door hardware and industrial valves. Among its biggest product lines is a part that is used in conjunction with molds for creating glass bottles. In this area, Franklin Bronze is an industry leader, supplying most United States manufacturers as well as clients in 15 to 20 other countries.

Better shells with automated dipping
Shells begin with wax patterns, which are injected to a high tolerance, measured down to 1/500th of an inch. Up to seven coatings, including colloidal slurry and a thin layer of sand, are applied to the shells before they are hung on industrial-sized racks to dry for pre-specified amounts of time.
Franklin Bronze

When done by hand, the dipping process can be both fatiguing and cumbersome. Six employees produce about 100 molds each day, standing for long hours over a vat of slurry or sand, allowing the coatings to drip off before hanging them on a rack.

“To remain competitive in the industry, we needed more capacity, more volume,” says Franklin Bronze President Robert Barber.

In July 2005, Shell-O-Matic installed a complete shelling system, including the robot, slurry tanks, fluidized beds, and a rainfall sander with automatic sand feeding. Four compact conveyors are used to dry the molds from the first to last coats.

A supervisory computer with a barcode reader tracks parts as workers load them onto the conveyor. The computer determines which dipping program the robot will follow for a certain part. Once dipped, the mold is then routed through the drying process by the computer. The robot lifts the hanger to which the molds are attached and steers it through the room’s controlled climate according to the parts’ drying schedule. As a finished mold exits the system, a report is automatically printed out with the manufacturing details for that shell. Workers manually unload the finished pieces from the conveyor.

Faster system, more molds

Under the new system, three workers make approximately 200 molds every day, compared to the six workers who produce half that amount in a section of the foundry that still dips by hand. Prior to the installation of the new robotic system, Franklin Bronze’s maximum capacity was 140 molds daily using nine workers. Today, their maximum capacity is up to 400 molds per day with six people, though they have yet to reach that point. Man hours have been reduced from 56 hours a day to 32.

“We’re increasing our molds per day by 30 to 40 percent with the same amount of people, and there is still a lot of capacity left,” says Barber.

In addition to the increased production, the quality of the shells is better, because the machine dips them the same way every time. The Shell-O-Matic system can also hang more shells up to dry – up to 250 pounds – a factor contributing to the increased capacity.

“It has great ease of programming, and the reliability of the abb robot is excellent,” Barber says. Workers also appreciate the impact the shelling system has had on improving their quality of life in the workplace. Not only is the environment cleaner, the job is also less physically fatiguing.

Shell-O-Matic provided startup and training, spending time at Franklin Bronze to fine-tune the system, and glitches were minimal, says Barber. The system, which cost approximately 250,000 U.S. dollars, is expected to pay for itself within 2½ years from November 2005, when it started production.

FACTS

Benefits for Franklin Bronze of Shell-O-Matic’s automated shelling system with IRB 6600 robot from ABB include:
- Man hours reduced from 56 per day to 32 per day
- Increase in production of molds from 140 to 200 per day
- Improved quality of shells due to uniform dipping
- ROI of 2.5 years
- Cleaner environment for workers, plus less physical stress

ABB Robotics
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