Application: Coating

P-145 robots consistently apply chop and gel coat.

Industry: Glass
Products Used: 2 Paint Cells with FANUC P-145

Challenges:

A manufacturer of fiberglass products recently converted their chop and gel coating area from manual operations to robotics. The conversion to robotics took place after the company was awarded a large contract by an egg producer to manufacture the fiberglass housings of ventilation fans used to control the climate in hen houses.

The contract's aggressive production plans meant that the company would need to hire additional skilled chop and gel coat operators, but none were readily available in the local work force. The lack of skilled labor and high production rate requirements prompted management to evaluate robotic automation.

Solution:

FANUC Robotics America, Inc. was selected as the robotics supplier. The company selected FANUC Robotics based on their reputation for reliable products and superior customer support.

The system uses two robotic paint work cells supplied by FANUC Robotics' paint operations in Toledo, Ohio. Each cell includes a P-145/RJ-3 paint finishing robot with PaintTool application software and safety equipment including safety fences with interlocked gates and curtains, and servo disconnect switches. FANUC Robotics also supplied an explosion-proof manual input station which is used by technicians to set program requirements and to start the robots, and solenoid valves that turn the spray guns on and off. The company supplied the chop and gel coat application equipment, including the spray guns, chop motors and material supply pumping systems.

While this customer chose to do their own system integration, FANUC Robotics was on-site for installation supervision, system start-up and de-bug activities. In addition, a process engineer from FANUC Robotics did the initial robot programming and a trainer provided on-site programming and operations training to personnel.

Solution *(cont.)*

Improved accuracy has been the major factor in part quality improvements and reduced costs. In the past, even the most highly skilled chop and gel operators became fatigued by the repetitive motions required by the application. With fatigue comes the likelihood of overspray and the extra costs associated with material wastes.

For chop and gel applications, quality is assessed by the uniformity of material weight. The P-145 robots, capable of achieving +/- 0.5mm repeatability, spray materials within a one percent variation of weight. In addition, the customer has realized a 30-35% savings on gel coat materials. “They also never tire and rarely make a mistake,” added the company president.

Here’s How The System Works

The production of one fan housing requires two gel coat applications and one chop spray application. The following describes how the system works step-by-step.

A technician prepares a mold for the initial gel coat application and positions the mold in front of the gel coat robot. The technician sets the safety interlocks, checks to insure that no personnel are in the robot work area, closes any gates or curtains and energizes a servo lock-out switch. After the robot cycle is complete, the technician moves the mold to an area where the first gel coat application can cure.

After the first gel coat application is cured, the technician positions the mold in front of the chop robot for the chop application. The safety procedures are adhered to before the robot begins the fiber chop spray. Upon completion of the chop spray cycle, the technician positions the mold in the chop roll out area.

When the roll out is complete, the part is moved to an area for drying and then to a grinding booth. After the surface of the part is ground and smooth, it is moved back to the gel coat area.

The technician positions the mold in front of the gel coat robot for the second gel coat application. Safety precautions are again adhered to and the robot applies the final layer of gel coat. Upon completion of this cycle, the technician moves the mold to the curing area.

After curing, the part is removed from the mold and transferred to an area where other operations are performed to complete production. Finished fan housings are loaded onto a truck for shipment to the customer.

Production speed has been favorably rated. The robots are able to accomplish a day’s worth of work in about half the time it takes a fully manual operation. In fact, the robots have not yet been required to run at their full capacity.

Overall, the robotic system has allowed this company to have a competitive advantage in the composites industry where robots are just now beginning to be used. With the increase in production, material savings and reduction in labor costs, payback is expected to be just two years.