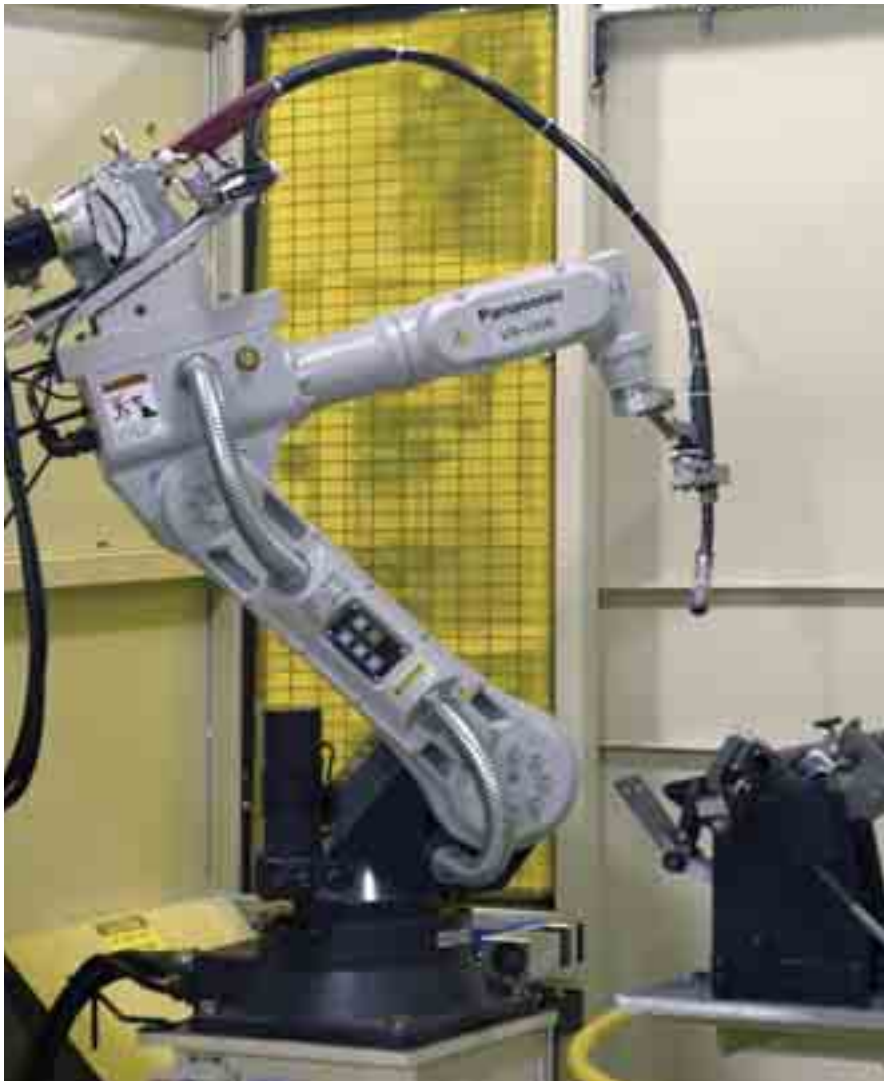
Robotic Welding Helps Stamper Grow in Automotive

In four years, Res Manufacturing has more than doubled its automotive business, supplying primarily to the new domestics. Among its keys to unlocking the door to this valuable supply chain: value-added services, including design optimization and implementation of two robotic arc-welding cells.

BY BRAD F. KUVIN, EDITOR



The Panasonic robot arm works within a PerformArc 102S work cell as the custom-designed fixture presents parts to the robot for welding at Res Manufacturing, Milwaukee, WI.

It's no surprise that twin objectives facing fabricators of any size are to achieve worldclass quality standards and to manufacture with sufficient productivity to be cost-competitive in today's marketplace. Profit motive adds to those pressures, according to Dave Johnson, project engineer at Res Manufacturing Co., Milwaukee, WI. The company's drive to value-added and its goal to bring in more automotive work helps to successfully unite these objectives.

"We have an endless demand for greater productivity, so tools to increase efficiency and quality are mandatory," Johnson says. "The core strength at Res is the manufacture of metal stampings, in addition to providing a vast array of secondary value-added operations that include heattreating, shot blasting, deburring and welding."

While Res supplies the automotive, cookware and lawn and garden industries, nearly 70 percent of its work is now automotive, up from just 30 percent four years ago. Prime automotive customers are Tier One and Two suppliers, which in turn supply the new domestics such as Toyota, Honda, Nis-

Shown examining an automotive seating bracket robotically welded at Res Manufacturing are, left to right: Gregg Sorenson, president of Sorenson Industrial Systems; Joe Bartolotta, sales engineer from the Brookfield, WI-based branch of Praxair, Inc.; Dave Johnson, Res project engineer; and Chris Vihnanek, a Praxair industrial automation specialist.

san and Mazda, as well as Ford, General Motors and DaimlerChrysler. Among the many products destined for automobiles: engine baffles, interior seating parts and bracketry.

New Child-Seat Restraints Provide Opportunity

Res operates from a single 90,000-sq.-ft. facility employing 80 people. A 14-year engineering and production veteran, Johnson is keenly aware of the pressures facing a small company in the automotive market.

"To illustrate these pressures, we received an order early in 2004 for welded automotive-seating components," he shares. "The specs, for Isofix attachment assemblies for a Toyota supplier, required arc welding. As a long-time stamper, we knew how to handle the forming operations. Now we had to deal with measurable welding requirements."

Isofix is the standard, governed by ISO 13216, that addresses car-seat installation. It creates a rigid link between the child seat and the vehicle, allowing the user to secure the seat to the car using a click-type connection without the use of a seat belt.

"After researching options for welding the assemblies and consulting with our local industrial-gas supplier at Praxair, we opted for an off-the-shelf robotic-welding solution—a PerformArc model 102S robotic arc-welding cell (from Panasonic Factory Solutions Co., Buffalo Grove, IL)."

Sorenson Industrial Systems, Inc., Waukesha, WI, provided the design and building of fixturing while Panasonic engineered the detailed programming and developed welding procedures for Res. Praxair helped with gas-supply planning and local welding support. In the end, Res received a turnkey cell capable of manufacturing 25 different parts. And, Johnson and Sorenson president Gregg Sorenson collaborated to develop a proprietary design and manufacturing procedure to eliminate post-weld shrinkage.

Sorenson recalls that the initial effort involved a feasibility review at Res, during which its personnel were made aware of the quality and productivity demands. Included in the cell design, therefore, was the ability to provide automatic verification that the correct tooling and/or parts are in place prior to welding-arc ignition.

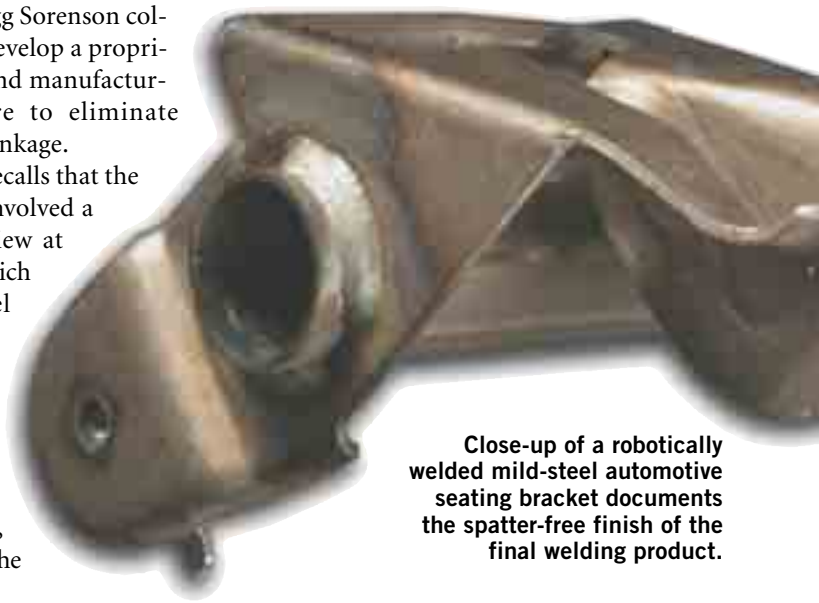
"Given the ability to preprogram more than 700 parts and/or fixtures," Sorenson notes, "we were certain of success right from the beginning. Without such sophistication, inaccurate and wasted production might occur. In addition, the robot and fixturing were protected from any errors.

"Once Res supplied us with its CAD drawings of the two initial parts involved," he continues, "we designed tooling within three weeks, having accurately verified the robot's motion, such as its ability to reach in multiple directions and access all of the weld areas. Everything was done off-site."

Seating Just One Automotive Success

The robotic-welding cell entered production at Res in mid-2004. For capacity issues, as well as to allow the firm to capture other robotic-welding jobs, Res installed a second identical cell early in 2005. The welding cells represent just one direction the firm has shifted toward as its growth strategies evolved. In mid-2005, it added to its pressroom an Aida 330-ton straight-side press with a Minster coil line, to complement its existing Aida and Komatsu 330-ton press lines.

"Four years ago, when we began to



Close-up of a robotically welded mild-steel automotive seating bracket documents the spatter-free finish of the final welding product.

see a lot of the commodity business head overseas," says Jim Stricker, Res market-development manager, "we turned our sights toward automotive stamping, where we felt we could leverage our capabilities and quality system. We strategically addressed the market by assigning specific people in purchasing and engineering to become experts in three specific market segments—engine and powertrain stampings, interior components and bracketry, and exterior bracketry and components for underneath and outside the vehicles."

The strategy evidently has paid off, as the firm has enjoyed a 50-percent increase in revenue since 2001. In fact, it received one of eight 2004 Wisconsin Manufacturer of the Year awards, earning a special award for "Reinventing to Meet Global Competition."

The company had to evolve into more than just being a stamper, working hard to develop a stronger core of value-added services, according to Rachael Poyneer, who works in inside sales and market development for Res.

"We work hard to learn more about how each automotive stamping fits into the overall vehicle platforms," she says, "and gather data on platform forecasts, program length, etc. so that we can better work with our customers and, in some cases, the OEMs themselves. All of this research allows us to better address forming concerns and offer cost-reduction ideas, which has become a critical value-added service for us."

In the last two years, Stricker and Poyneer agree that the focus has been on working closely with customers to find ways to offset increases in raw-material (steel) prices. One solution: Redesign parts to eliminate fastening by performing more work in the die and forming more complex stampings. As an example, Stricker describes an engine-component bracket where Res eliminated a weld nut and went with an in-die-tapped extrusion. "Per year," he says, "we saved the customer $90,000 on this part alone."

Early to the TS 16949 Table

Also playing a critical role in its successful growth into automotive stamping was an early commitment to changing over from QS certification to the global TS 16949 certification, which becomes required by Ford and GM by the end of 2006 and became required by many automakers as early as 2004. Res adopted the standard early in 2004, one of the first suppliers in Wisconsin to do so. Its early experience with the standard has helped not only internally by making teams accountable for quality improvement, but also has allowed Res personnel to share what they've learned with customers as they navigate the change to TS.

"With TS, the focus shifts on how our processes relate not only to internal customers but to external customers," says Stricker. "And, the bottom line is continuous improvement."

The company identified and analyzed numerous customer-oriented processes for procedure, workflow and documentation. These included marketing, order acceptance and billing to new-product launch, prototyping and manufacturing.

"Two years into the process," adds Poyneer, "we've used the TS 16949 program to launch several improvements. In one case, the quality system has helped us improve our new-product-launch process so that we now meet our launch schedules nearly 100 percent on-time. Of course, this has helped us grow our automotive business immensely."

The firm also has used TS to improve its customer-concern reporting process, according to Stricker. "We've refined our surveys to focus in on key areas so that we efficiently and quickly address critical issues," he says. "For example, our response to survey feedback has greatly improved—we communicate almost immediately with a customer when we receive their concern, to let them know that we are addressing that concern. Again, this is a key issue today if you're going to successfully operate within the automotive supply chain."

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