

Welding of safety-related parts

Starting point / Task definition

SBH supplies modern shoring technology for all civil engineering applications. The manufacture of these components involves important safety considerations, since the parts may have to withstand the pressure of heavy road traffic or adjacent buildings, for example. Previously SBH welded all of the parts manually. In order to achieve consistently high quality and more flexible production, the user planned to automate the processes.

Implementation / Solution



The company opted for a KR 6 six-axis jointed-arm robot from KUKA Roboter, which met SBH's requirements thanks to its integrated touch and through-the-arc sensors, among other features.

Moreover, the robot ensures greater throughput, since it switches between two work stations, thus avoiding idle time during set-up. While the KR 6 is carrying out welding at one of the stations, an operator removes the finished part from the other station using a crane and loads the station again. As a result, wait times for the robot are eliminated. Besides the six axes of the KR 6, the robot controller also coordinates the motions of the linear unit and the turnover fixtures, the latter functioning as axes 8

and 9. The parts, which include roller slides which are about 2 m long and weigh about 500 kg, and connecting pieces which measure from 0.5 to 2.5 m, are first tacked manually with weld spots. They are then lowered by crane onto a work station in the robot cell and positioned at a defined zero point. The KR 6 then identifies the seam with the aid of a touch sensor and determines any geometric differences in the component compared to a reference model. Then comes the pulsed MAG welding process. If the welding torch deviates from the center of the joint, this is registered by the controller by means of the through-the-arc sensor, which responds to variations in the current strength from one side of the groove to the other. In this case the controller causes the robot to compensate for the difference by adjusting the positions of its axes accordingly.

System components / Scope of supply

- ∴ KUKA KR 6 with touch and through-the-arc sensors, which traverses in an inverted position on a C pedestal on a linear unit
- ∴ PC-based KUKA robot controller, including control panel with Windows interface
- ∴ Linear unit
- ∴ Robot programming
- ∴ Safety installations
- ∴ Commissioning

The complete robotic cell was supplied by KUKA system partner and welding process specialist Paul von der Bank GmbH from Hilden near Düsseldorf, Germany.

Results / Success

- ∴ Competitive advantages through new technologies

With this capital investment, SBH has made a conscious commitment to new technologies. This results in competitive advantages for the company. Otherwise, in the medium term it might even have been at a disadvantage compared to other suppliers. In addition to greater cost-effectiveness, SBH also expects to enhance its corporate image by increasing confidence in its products.



Number of report:
R 157

Industry:
Metal products

Application:
Welding

Product:
Robots
Low payloads (3-16 kg)
Controller
KR C (Robot Controller)

Implementation:
04.01.1999

Customer:
SBH Tiefbautechnik
GmbH, Heinsberg,
Germany

∴ Consistent quality

The high repeatability of the robot means that SBH also achieves consistent quality in the safety-related parts.

∴ High flexibility

Since the number of different parts to be welded is constantly increasing, high flexibility was required. At present the KR 6 primarily welds roller slides for the SBH double sliding rail system, together with the associated intermediate pieces. The cycle time for the slide is 60 minutes, and for the intermediate pieces 30 minutes. All of the dimensions for the parts to be welded are stored in the subprograms of the robot controller, and can thus be called up quickly.

∴ Availability of at least 95%

Due to the high utilization of the robotic cell, an availability of at least 95% was agreed upon. Malfunctions which cannot be eliminated by the company's own KUKA College trained employees are rectified by KUKA system partner von der Bank within 24 hours.

∴ Processing time cut in half

The processing time for the parts could be cut in half, even though personnel requirements have been significantly reduced. In order to further increase the efficiency of the robotic cell (despite the fact that program selection is so simple), the cell is operated in large batches, and thus independently of the company's other production processes.



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