Success Story

Quality and ergonomics in focus

New CLOOS robot system welds brackets at BPW

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HAIGER/WIEHL – BPW Bergische Achsen KG is a world-leading manufacturer of axle, brake and suspension systems as well as bearings for lorry trailers. At its production site in Brüchermühle, the family-run, traditional company commissioned a new CLOOS robot system for welding connection pieces in early 2017. The new system has enabled BPW to significantly improve both the quality of its production processes and the work environment for its employees.

Based in Wiehl, BPW has been manufacturing complete chassis systems for lorry trailers since 1898. Together with its global subsidiaries, the company also offers locking, attachment and lighting systems as well as plastic technologies and user-friendly telematics applications for lorries and trailers. Globally, the owner-managed BPW group of companies includes more than 60 companies in 30 countries and employs around 6,400 people.
BPW aims to achieve a high level of efficiency in all production areas. By automating and optimising its primary and secondary processes, it hopes to shorten throughput times and increase productivity. In addition, the company wants to further improve the work environment for its employees.

For this reason, at the beginning of this year BPW replaced an older CLOOS system for welding brackets from 2002 with a new high-tech robot system. The new welding system consists of several sub-areas that optimally complement each other.

Photo 1: In the new robot system, the handling system and welding technology work hand in hand.

Automated component handling
Initially, the employees manually tack the parts at a total of four workstations. They then place the pre-tacked brackets on special workpiece carriers which automatically transport the parts for further processing via two parallel conveyor belts. Each workpiece carrier is equipped with an RFID memory module which stores all relevant information about the respective component. The next area of the system consists of two handling robots and six welding cells which are arranged on both sides. First, the handling robots take the brackets, read the RFID code on the workpiece carrier and place the components in a vacant welding cell before forwarding the component information to the welding cell. The workpiece carriers are then automatically guided back to the loading area via the conveyor system. After the welding process, the handling robot unloads the brackets and places them on another conveyor belt which transports them to the next area of the system.

The handling robots are each equipped with a double gripper that allows virtually simultaneous pick-up and delivery of the components. The robots can unload on both sides of the conveyor system.

Photo 2: The handling robots load and unload the welding cells fully automatically.

Modular, compact welding cells
All welding cells have a uniform design and include a two-station workpiece manipulator with a horizontal transition as well as rotating and pivoting movement. Each cell is equipped with a compact QIROX QRH-280 welding robot, which is particularly fast, highly dynamic and achieves high speeds and improved positioning accuracy thanks to its low mass and small lever arms.

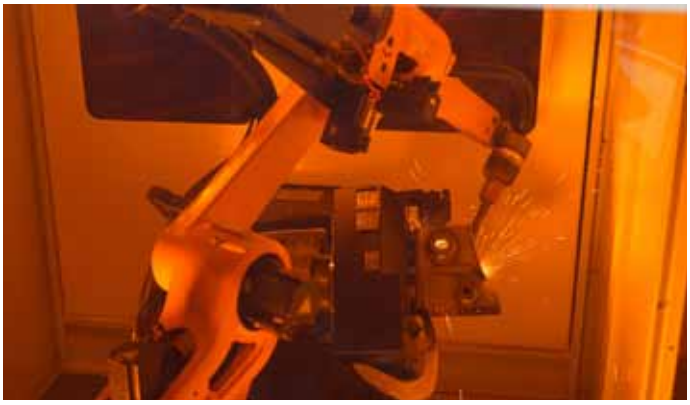

Photo 3: Each welding cell is equipped with a QIROX QRH-280 welding robot as well as a two-station workpiece positioner.

BPW placed great emphasis on transparency during planning of the welding system. Each welding cell is equipped with windows, vastly simplifying the maintenance process. In addition, the modular design also allows quick and easy expansion of the system in the future. For example, two additional welding cells can be integrated and tacking can be automated without a problem.

Sensors compensate for component tolerances
Each welding robot has two sensor systems to compen-

sate for any component tolerances as well as tolerances between the welding cells. The tactile wire sensor uses electromechanical sensing technology to determine the start and end of the weld seam so that deviations caused by workpiece tolerances can be corrected. During the welding, the arc sensor measures whether the burner position actually agrees with the programmed track. Loss of time is minimised because measuring and welding take place simultaneously. At the same time, any workpiece deformations are directly balanced out.

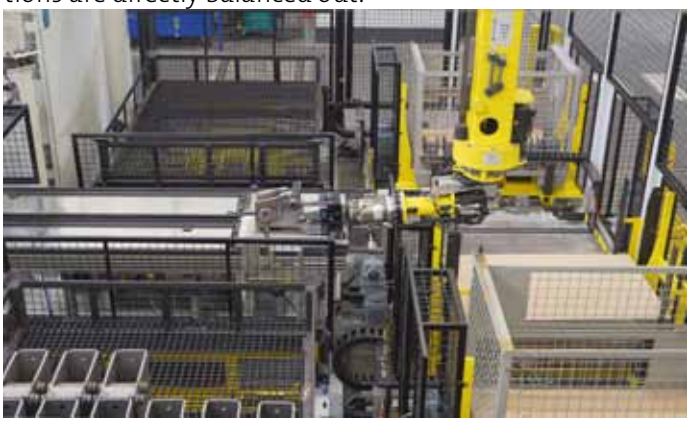

Photo 4: After the welding process, a robot automatically unloads the finished components.

Test station with robot gantry

After the welding process, each component is provided with a data matrix code which contains information about the product and support type as well as classification data. This is followed by a quality inspection by an employee. If the bracket meets the quality requirements, it is forwarded to the unloading station where a robot automatically stacks the parts in mesh boxes. During this process the RFID code on the workpiece carrier tells the portal in which box each component should be placed. This allows a variety of different component variants to be packaged for further processing or shipping.

Centralised data management via software solutions

Documentation of the welds, optimisation of the welding parameters and creation and management of the robot programs are all carried out using the CLOOS software solutions (PDM, QINEO Data Manager (QDM) and Carola Edi. This enables BPW to extensively document the production of each component and therefore also its quality. This central data management system allows seamless traceability of all components.

Maximum system availability and minimised downtimes

The product diversity at BPW is also reflected in the new robot system. The intelligent interplay of handling, welding technology and software ensures that the system can process more than 70 different component types — even with different cycle times — without retooling.

"High system availability is indispensable for us because the system plays a key role in our production line," says Ralf Kamphus, head of production at the BPW site in Brüchermühle. In total, the robots weld about 2,000 to 2,500 parts per day.

Thanks to optimised loading and automated unloading, BPW has been able to greatly reduce both set-up and downtimes. In addition, the throughput times in the system have been shortened considerably. "In the old system, we had twelve arcs," explains Andreas Schatner, foreman in the area of brake shoe and bracket production. "Today we can achieve the same output with six arcs."

Photo 5: The system's welding fumes are extracted by means of a completely closed system.

Improved working conditions for employees

A total of five workers are employed per shift on the new system. Training sessions held both on-site and at CLOOS have enabled the employees to familiarise themselves with the new technology. Indeed, BPW personnel intensively accompanied the entire planning and commissioning process and were able to contribute their own ideas and design wishes. "Our employees were delighted to receive the new robot system, since it has improved the ergonomics in the workplace," explains Ralf Kamphus. Working on the system is now physically less stressful than before. Since the test station is height-adjustable, the workers can inspect the parts without taking them off the belt. Furthermore, the parts do not need to be stacked by hand after completion because the robot portal now performs this task. When designing the new system, BPW ensured that it already complies with new workplace limits for welding fumes that will come into force in 2018. The extraction equipment forms a completely closed system and keeps the air clean in the production hall. An additional, significant benefit is that the new system is much quieter than the old one, which has further improved the working environment.

Professional know-how and many years of experience

BPW also uses another robot system from CLOOS in Brüchermühle for welding brake shoes. In addition, the company has more than 35 CLOOS current sources for manual welding. Beyond this, BPW relies on welding technology from CLOOS at its production sites all over the world. Seven large welding systems from CLOOS are in operation at the firm's headquarters in Wiehl alone. On-site support in Brüchermühle and Wiehl is provided by long-standing CLOOS sales and service partner Lixfeld Schweißtechnik from Kreuztal.

On the basis of its positive experience with the existing systems, BPW again chose CLOOS for its new welding system. "The professional expertise offered by CLOOS won us over once again," explains Ralf Kamphus. "We designed that system together over the last eighteen months, right down to the last screw." As a result, commissioning went smoothly and the new system welded flawlessly from day one. "Everything worked perfectly at the first attempt," says Ralf Kamphus. "We look forward to continuing our trust-based partnership with CLOOS in the future."

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