Success Story

Efficient welding of small batch sizes - without programming effort

CLOOS innovation enables efficient welding in steel and metal construction

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Kalkar/Haiger – As a future-oriented partner for steel and structural engineering solutions, Schwevers attaches great importance to innovative solutions in industrial and commercial construction. With the intelligent robot system from CLOOS, the company not only convinced its customers with its usual professional handling of projects, but also the employees. Thanks to the minimal programming effort and the simple operation of QIROX RoboScan, even workpieces in batch size 1 can be welded automatically today.

"I was looking forward to the system," says Maximilian Vogt, who as a system operator had no previous experience with robotic systems. "The system was so easy to understand that I could already operate it after a basic robotics course. And it's really fun to work with." Until the end of January, he only knew manual welding and welcomed the decision of the company on the Lower Rhine to simplify everyday work with an automated solution in production.

The specialist for warehouses and production halls moved its location from Geldern to Kalkar in 2012 in order to meet the highest demands on the approximately 21,000 m² site with currently 63 employees. More than 60 % of the business partners of the long-established company are existing customers who appreciate Schwevers' experience and competence in cost- and quality-conscious hall construction - from consulting to assembly and execution. From conception to turnkey halls, the company offers functional, flexible and creative construction projects with steel.

In November 2020, the CLOOS robot system was installed in order to generate programs for automated welding with QIROX RoboScan in the shortest possible time. Since the end of January 2021, the system, which was individually developed for their requirements, has been in use in production.

Photo 1: The laser scanner scans the work surface of the component and saves the result.

New technology inspires employees

It is the first robot system for Schwevers Stahlhochbau GmbH & Co. KG. It was therefore important to the company that the fully automated system fulfilled the highest safety requirements. In addition, the decision-makers ensured that the system operators did not need to have detailed knowledge of robots in order to be able to work with QIROX RoboScan. With this investment, the hall builder is reacting to the changes in the course of digitisation and wants to take advantage of new technological possibilities at an early stage in order to gain experience in the field of automation.

The robot system expands the inventory of the existing 16 welding power sources from CLOOS, such as the QINEO Pulse. "We have been welding and trusting CLOOS for decades," explains Heinz Schwevers, Managing Director of the company, adding with a smile: "CLOOS welding machines existed in the company before me."

The decision for automation was already made at the beginning of 2020. Because the programming effort for automated welding of small batch sizes is often disproportionately high, especially in steel and metal construction, the decision was made in favour of QIROX RoboScan. One of the selection criteria was the easy handling of the system. Every welder should be able to work with it. And thanks to the employees who were involved in the project from the beginning, the introduction succeeded quickly. Even the employees who were sceptical at the beginning were quickly convinced of the new technology.

"We wanted to support our manual welders with the possibilities that automation offers. In this way, they can acquire new skills in everyday life, in a "learning by doing" manner, so to speak," Heinz Schwevers reports further.
Today, eight manual welders and QIROX RoboScan are in use in the company. "Programming is much easier with QIROX RoboScan," beams Marcel Bergkämper, a system operator for whom working with CLOOS robots is not new. He had already been able to gain many years of experience with them in another company and states: "What I previously had to program in a time-consuming way is now done automatically by the system. That makes my work a lot easier.

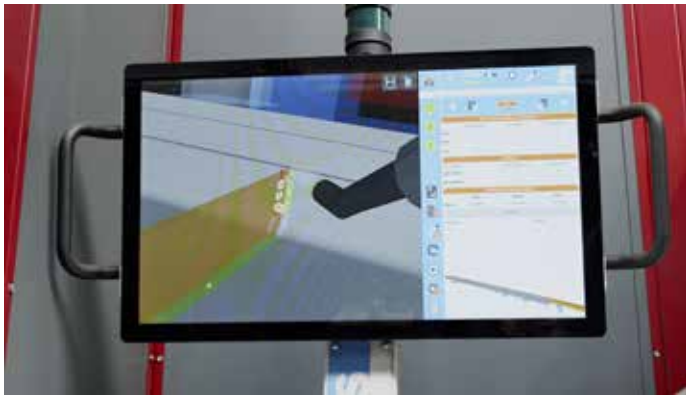

Photo 2: The system converts the stored data from the scanner into a 3D model.

QIROX robots in use

The hall builder offers its customers everything from a single source - from the steel construction to the turnkey hall. A car hall made for a private individual has different requirements than an order from a large construction company. Therefore, the robot system also had to offer a lot of flexibility.

Large steel beams with head and foot plates, for example, are processed in 1-station operation. To do this, the operator first positions the workpiece on the workstation of the

system and the scanner mounted on a linear track scans the work surface of the component and saves the result. The system detects weld seams such as fillet and corner seams as well as butt and lap seams and converts the data stored by the scanner into a 3D model which appears on a screen. The welding program is automatically generated from the comparison of the 3D model with the component geometry stored in QIROX RoboScan. The operator can check the result and, for example, make corrections to the weld seam length or change the welding direction. QIROX RoboScan then transfers the completely generated program including all welding data to the robot controller and welding can be started simply by pressing a button on the QIROX RoboScan screen.

In the next step, the six-axis QIROX QRC-350 articulated arm robot is used, the heart of the system. It is mounted on a C-frame, directly on a floor-mounted linear track, and is moved horizontally by a carriage.

Photo 3: The robot is mounted overhead on a floor-mounted linear track.

Since the welding program with all welding parameters, such as speed, wire feed and gas, is already predefined, the robot can start directly. The overhead positioning of the welding robot ensures optimum accessibility as better welding positions can be achieved. Additional movement devices and extensions are also easy to realise. The MAG pulsed arc makes it possible to achieve optimum weld seam quality at high welding speeds.

An arc sensor is used for all welds. A separate weaving pattern is defined for welding the web seams of the workpieces in which the measuring points of the sensor are programmed. A tactile sensor with welding wire is used as a "tracer pin". Since clean nozzles are a prerequisite for the exact adherence to the welding parameters and ensure a good quality of the weld seam, a fully automatic welding torch cleaning system is also part of the robot system.

One system - flexibly applicable

In addition to the large workpieces, various other sheet metal constructions up to ribs and connecting plates are also produced. Schwevers can use the system flexibly in 1- or 2-station operation. "In this way, we can not only weld steel beams automatically, but also process smaller parts. This is a real added value for us. And we are glad to have such a competent partner at our side who solves all tasks in an absolutely open and appreciative manner," Heinz Schwevers announces.

In 2-station operation, the system can be loaded by the operator on one side while welding takes place on the other side, which saves time in the production process for the specialist in hall construction and thus leads to shorter project times. This flexibility also requires adjustments in the area of safety. Therefore, technical measures such as fixed separating protective devices (for example, safety fences) or non-contact ones such as light barriers are flexibly adapted according to the requirements and the component in order to protect the operators from movements of the robot, for example.

Markus Rompf, a long-time CLOOS application engineer who was in charge of the project, is proud: "Everything fitted together well," he says and adds: "We have constantly optimised the software during the cooperation with Schwevers and improved the product recognition overall, so that we can now process a wider range of components with QIROX RoboScan. The partnership between CLOOS and Schwevers was simply great. I think we all benefited from the project."

Photo 4: The robot system also includes a fully automatic welding torch cleaning system.

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