THE TECHNICAL ISSUE

Complex production line for high-tech tractor cabs

Fendt trusts in Cloos welding technology

Technical Issue of S. Nuechtern-Baumhoff, Carl Cloos Schweisstechnik GmbH, Haiger Photos: CLOOS

Asbach-Bäumenheim/Haiger – Fendt is the high-tech brand within the AGCO corporation which is one of the biggest manufacturers and suppliers of tractors and agricultural machinery in the world. At its Asbach-Bäumenheim site the company depends on the technologies of Carl CLOOS Schweisstechnik GmbH for welding the safety cabs for its tractors. Here, robots, workpiece positioners, handling systems and manual welding technology work hand-in-hand.

The AGCO-Corporation is one of the world's largest manufacturers and suppliers of tractors and agricultural machinery. The full AGCO range includes tractors, combines, forage harvesters and seed drills, manure spreaders and soil treatment machinery. As a high-tech brand and market leader Fendt serves the highest demands in this customer segment. The high quality tractors feature impressive performance with low fuel consumption. The average service life for Fendt tractors is around 30 years.

The 1,200 employees at the Asbach-Bäumenheim site produce around 18.000 safety cabs per year for the high-tech Fendt tractors in a three-shift operation. Manufacture starts with plate and profile production and continues through welding and spraying to cab assembly. The product range is huge. Customers can choose between more than 20,000 cab variants.

Each year approx. 18,000 tractor safety cabs are manufactured at the Asbach-Bäumenheim site.

Manual and automated welding technology work hand-in-hand

The complex production line for welding the cabs is equipped with state-of-the-art Cloos technology. It is more than 70 meters long and consists of twelve stations. Up to 23 cabs are MAG-welded per shift in seven systems with a total of 19 QRC 350 and QRC 410 robots (fitted with seven axes) and at six manual welding workstations. The partially automatic transport technology permits the smooth component transport between the different production stages, optimal logistics paths, short cycle times and minimum space requirements for provisioning areas.

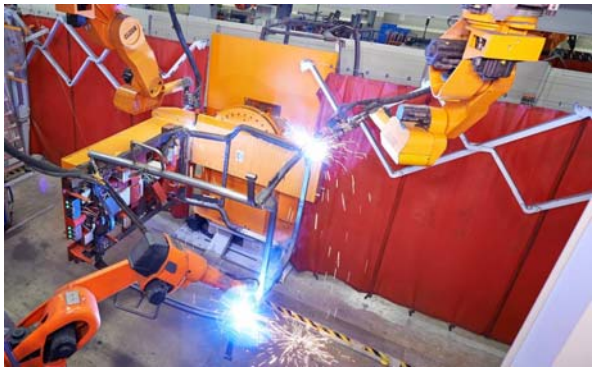
The complex cab-welding production line is more than 70 meters long and comprises a total of twelve stations.

Manual and automated welding technology work hand-in-hand in the production line. The cabs are tacked initially in the manual stations using Qineo Step 350 welding devices. These reliable, step-switched MIG/MAG welding machines feature a quiet, stable arc and minimal spatter.

Manual tacking is followed by the welding of the cabs in the automated robot systems. Here, the complex workpieces are optimally positioned for welding every time. Thus positions which are difficult to access can be reached and an optimum weld quality is achieved. The workpiece positioners each consist of two stations and are equipped with a standardised changing device which automatically adapts to the different cab variants. The different cab variants can therefore be welded without conversions or set-up changes. This reduces set-up times to a minimum.

After pre-tacking in the manual stations, the 7-axis robots weld the cabs in automated systems.

All systems are designed as multiple stations so that the robots can switch back and forth between the individual stations. High flexibility and system availability is thereby achieved. "The production line is absolutely reliable in operation. Thanks to the high system availability of more than 97 percent we can offer our customers the maximum possible product availability", says Peter Baumgarten, who is responsible at Fendt for processes and procedures in the welding technology division.



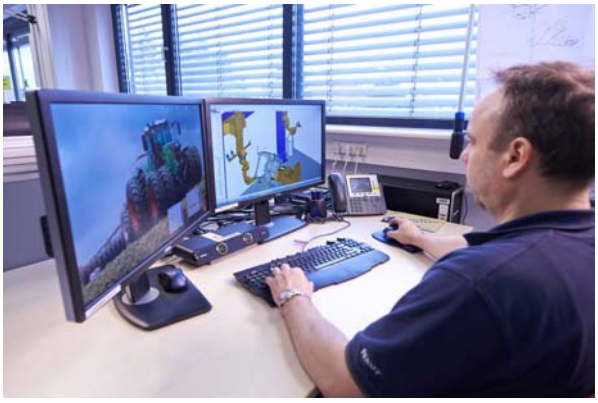
The workpiece positioners ─ equipped with a changing device¬─ position the cabs optimally for welding every time.

Sensors and software guarantee efficiency and quality

The robots at the three final welding stations are respectively fitted with a high-tech laser sensor which compensates for the tolerances between the programmed lines and the actual positioning of the workpieces. The position of the torch as well as various process parameters are continually adjusted to achieve an optimum welding result.

The offline programming of the robot systems is carried out using the Cloos RoboPlan software. While the system is in production, a new program can be simultaneously produced in RoboPlan. The software enables welding, search, travel paths and tools to be defined on 3-D models to which the welding parameters and further functions required for the running of the programme are then added. with the resulting program only then being transferred via a network connection to the robot controller and only optimised at the workplace. This process is less time-consuming than producing a whole new programme in the system.

As well as RoboPlan the Process Data Monitoring software (PDM) is used to monitor the program performance, generate error messages and to monitor welding parameters. In addition, Remote Diagnostics Software (RSM) enables remote maintenance of the robots.



Offline programming with the Cloos RoboPlan software can be carried out even during production: an enormous time saving!

Competent partner in automation

Investment in state-of-the-art robot welding systems has enabled the company to significantly accelerate its production processes and achieve precisely reproducible welding results. AGCO Fendt is now able to meet the demands of its customers for increased productivity and quality. Employees also benefit from better conditions as the robots undertake the physically heavy work and the general hazards of arc radiation and welding fumes are also reduced. Employees can therefore concentrate more on process monitoring.

The high level of redundancy of the robot and welding technology as well as the software in the production line also permit increases in capacity at short notice. Capaci-

ties of up to 20 percent are immediately implementable.

For both manual and automated welding, Fendt has relied for many years on the technologies of Cloos. "We benefit a great deal on the expertise and experience of our partner. Cloos supplies all the technologies we need, single-sourced", says Baumgarten. In the meantime more than 30 Cloos robot cells are in use in Asbach-Bäumenheim, for the welding of welding individual assemblies to entire safety cabs. The oldest Cloos robot system at Fendt has been operating successfully for over 20 years and for more than 100,000 operating hours.

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