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 Reference

Transforming your own business

Digitalization strengthens the competitiveness of the Schaeffler Group's special machinery department

The Schaeffler Group-owned special machinery department, a globally operating automotive and industrial supplier, is one of the major manufacturers of customized production facilities, also in comparison to the external market. More than 1,800 employees at 16 locations develop, construct and maintain the special machinery used in Schaeffler plants worldwide, especially assembly systems, testing equipment and handling systems. Just like the Schaeffler products themselves, the special machinery also has to evolve from pure mechanics to mechatronic systems to IT-integrated solutions. A comprehensive digitalization strategy for the special machinery department is the basis for its own transformation.

On the way to digitalization, Schaeffler special machinery in Erlangen, Germany, has already made great strides. Applications? Identified. Objectives? Precisely formulated, at the same time ambitious yet realistic. Fundamental technical questions? Clarified. At the moment, the team around Holger Auernheimer and Stefan Soutschek, which is helping to shape the digital transformation, is concerned with the question of how digitalization is changing work. As always, the two do not just want to watch, but actively shape – to achieve value for the company and the internal customers. This applies to one's own surroundings and the organization of work in the sense of "New Work", because the separate handling of tasks by different specialist departments no

longer functions. It is, of course, also about the technical aspects, such as the human-machine communication. In the future, machines at Schaeffler are to no longer display errors, but, for example, intelligently point out ways to solve problems. "But it would be even better," says Stefan Soutschek, "if the machines could optimize themselves through an adaptive parameterization in such a way that problems do not even occur." User-centered development instead of "from engineers for engineers" – especially if in the end, no engineers work there at all – is a central guiding principle, as are the modularization and interconnectivity of components. Accordingly, the configuration of the machines has radically changed – the operator guidance and maintenance steps are communicated through their design.



Drivers of digitalization in Schaeffler's special machinery department: Holger Auernheimer (left), Stefan Soutschek (right)

Global standards as prerequisite for a comprehensive data model

An important advantage of Schaeffler's special machinery department is the possibility to standardize the global concepts for digitalization and connectivity. This can prevent an unmanageable number of implementations, especially with regard to the data models. Here, the semantic description of the data plays a crucial role – so that actual information arrives in the cloud. Whether this is realized with OPC UA or another technology is of secondary importance to Schaeffler – the modeling and description of the data is the decisive element for generating added value. When it comes to data access, Schaeffler special machinery enjoys a strategic advantage – it is both supplier and part of the customer and operator, which allows practically unlimited access to all data. Both integrated and complementary solutions are important – for example, a communications processor (CP 1545-1) for a new machine with SIMATIC S7-1500, or an industrial IoT gateway, such as the new SIMATIC CloudConnect 7, for existing machines. However, "production first" always applies – the cycle times of the machines must not be affected. Rules in the gateways regulating the access to the data are therefore needed.

The data model is but one aspect, another is the architecture of the systems. Schaeffler special machinery is pushing service-oriented approaches here, instead of large monolithic software blocks – simply to create an intrinsic openness for innovation. "Every day, there are three new ideas on how things can be linked," says Stefan Soutschek. And you have to establish the requisite conditions, as new

disruptive approaches emerge – a powerful infrastructure helps here to enable an end-to-end communication from the sensor to the cloud. This requires above all scalable solutions that adapt to the respective use case. In the case of a handheld measuring station, the processing in the cloud suggests itself; if processes have to be influenced in sync with the machines, edge computing is needed. But without having to reprogram the algorithm. It is similar with artificial intelligence: Due to the large amount of data, the training of the models has to be performed in the cloud, their application – for example, as a decision tree – will also take place one after another, if it has to be quick. And all of these technologies also have to be integrated into existing machines – so that the success of digitalization can also be achieved with the installed base.

Wide range of implementation projects

The implementation projects are diverse and relate to both the actual machines and the products produced with them. For example, one project concerns the optimization of machines, which can improve itself by evaluating the measurement technology in the plant. This goes far beyond preventive maintenance, because it aims at eliminating specific maintenance work. A second topic concerns predictive production quality. The idea behind it: If measurement data on the product is already continuously collected throughout the facility, why does every product still have to undergo a final inspection? Rather, could it be possible to predict the product quality with a certain probability on the basis of the information collected, and then focus only on those products where a possible malfunction was predicted? And then to precisely check the critical parameters detected by the algorithm? After all, it is about the machines themselves, or more specifically, the



Schaeffler's special machinery department supplies equipment to all Schaeffler plants worldwide



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commissioning. As a result of the special machinery department closely collaborating with its internal customers and thus receiving information about the future product range early on, it is now possible to develop the machine in parallel to the new product. Simulations help to greatly shorten the commissioning times of the plants. Holger Auernheimer speaks of 20 percent, which the virtual commissioning already helps save today – with further potential.

Security is indispensable – even if it renders an idea not feasible

However, despite the openness of the systems, the confidentiality, integrity and authenticity of the data must be ensured. For Stefan Soutschek, security and the Industrial Internet of Things (IIoT) are no contradiction: The special machinery department follows a “security-by-design” approach here, which is realized in close cooperation with the corporate security team. When new services are developed, this is carried out exclusively under this approach. In case of doubt, though, this could be the knockout criterion for a new system; so far, Soutschek has not had that happen. However, suppliers, too, must ensure that their components meet the high security require-

ments. At Siemens, for example, the product development process for network components is certified by the TÜV.

Challenging from a security perspective are the suppliers’ objective to run their own clouds for the machines supplied by them. Schaeffler certainly sees the advantages, if manufacturers can optimize their own components. For example, Siemens: Since SIMATIC and SINUMERIK controllers are in use worldwide, Siemens is in the best position to make optimization – but requires the data from the field to do so. “Here, we will find solutions, because the manufacturers can make these specific improvements much better,” states Soutschek. For example, a central messaging system is conceivable, which passes on the information via cloud-to-cloud connections in a controlled manner.

Strong partnerships help with the digital transformation

To implement its ambitious digitalization strategy, the special machinery department, of course, needs strong partners. Schaeffler has been working with Siemens as technology supplier for over 30 years – from standard SIMATIC and SINUMERIK systems all the way to collaborative problem solving at the management level. Here it shows: The cross-functional collaboration not only affects internal specialist departments, but likewise changes the customer-supplier relationship towards an in-depth partnership.



Color-coding is used to keep the overview between realtime automation (green cables) and IT-communication (pink cables)