Smart engineering at a global leader of compressed air technology

Whether a global corporation or skilled trade business is involved, or whether the industry focuses on food production or aerospace, compressed air is needed everywhere. In order to increase their reliability, one of the world's leading providers in this area has significantly accelerated the digitization of its products and processes. Kaeser Kompressoren SE has been supported in its efforts by data-driven software that was suited to this task.

Kaeser is a highly successful global supplier and manufacturer of compressors and compressed air systems. The company is located in Coburg, Germany and employees more than 54,000 people worldwide. Under the banner "Smart compressed air", the family business Kaeser, which dates back to 1919, now offers networked compressors with intelligent control in its online product range. Its digital twin allows the real-time transfer and monitoring of operating data, which not only enables compressed air experts to analyse when a plant may fail and where there may be issues. The data is also used to continuously improve the product range and engineering. "A lot of expertise and experience has been invested in it," said Falko Lameter, Head of IT at Kaeser. This solution also incorporates the concept of not only building and distributing compressors, but of always ensuring the availability of compressed air, thus reliable functionality at every site in the world for everything from mining to brewing.

The heart of the digital twin

For their new digitization strategy with such Industry 4.0 projects as the creation of a digital plant twin and predictive maintenance, Kaeser opted for a special software platform a good three years ago. With its architecture and flexible openness, Engineering Base (EB) from Aucotec has significantly advanced Kaeser's strategy.

"EB is now the heart of our smart engineering," explained Patrick Dietz, the project manager who was responsible for the introduction of the system at Kaeser. "This is where the 'digital twin' of the compressed air plant is created," he claimed. Its lifecycle begins with an assessment of the customer's situation and an analysis of its needs. EB's database can manage the results so that the original requirements can be traced over the entire lifecycle. It is on this basis that the new or revamping design starts, together with the configuration of its control and data transfer.

Integrative database

All master data and documents that accumulate during the lifecycle of plants are collected, processed and maintained via the central database. This also includes documents such as P&IDs or sketches in addition to the technical data of machines. Three-dimensional modelling is also possible due to the connection to the MCAD system.

"EB is perfect for the integration of all technical information and changes, even from connected systems," said the project manager. In order to simplify the sometimes highly specialized work steps, Aucotec has developed numerous EB apps that are tailored precisely to the needs of the compressed air experts.

Kaeser's own control system SAM is also closely connected with EB. It is configured automatically and directly from the engineering platform. "EB is like a spider at the centre of its network. The entire plant design, but also, for example, maintenance and sales systems, can be virtually 'woven' around it," said Patrick Dietz. He added that everything was now linked together and one could recognize how the systems were related. The compressed air plant is then implemented and put into operation based on the documentation created in smart engineering. Predictive maintenance and asset management then enable Kaeser to remotely monitor the plant and continue its further development.

Efficient predicting

Thus one of the most important innovations that Kaeser was able to introduce with its smart engineering was the linking of predictive maintenance (PdM) and engineering. "Without the EB database, we would not have been able to offer PdM as such a good service to our customers," explained Falko Lameter. For this purpose, the PdM system first receives a list of all possible tags from EB. This includes information about the type of measurement, as in whether it involves pressure, temperature or level sensors, and whether they record bar, Celsius/Fahrenheit or other units. Thus the platform is not only the "single source of truth" of all tech-

nical data of a plant, but also its transfer characteristic. This is only possible because EB, due to its database concept, can describe objects such as tags that are not represented on any P&ID or circuit diagram.

However, the decisive factor is the configuration of the data transfer from the control system to the PdM. On the one hand, EB informs the control system about which tags in the operation it should actually send data to the PdM – because not all of them are relevant for predictive maintenance. On the other hand, the Kaeser experts also use the engineering platform to configure how often and how precisely these reports should be made.

Central means consistent

Kaeser wanted to ensure that everyone was speaking the same language for its digitization strategy. The data had to be improved so that it could become the starting point and focal point not only of planning, but also of the subsequent operation. "With EB, we have achieved both: extensive standardization and higher quality," said Patrick Dietz.

He attributed the main reason for this achievement to the central database. He claimed that it ensures the quality of the information about a compressed air plant, particularly with regard to consistency and completeness. He also referred to the fact that it provides expert knowledge and enables a high degree of division of work – both for everyone involved internally, such as the sales force, plant experts, order processing or service teams, and when cooperating with external partners such as distributors or planning offices. "For the first time, everyone involved in the process has access at all times to up-to-date plant data that is relevant for them," explained Falko Lameter.

This is also due to the fact that changes basically have only to be maintained in one place. The data model ensures that they are visible immediately in each further representation of the changed object in Explorer, graphics and lists.

Vision

Kaeser is continuously expanding its use of EB together with Aucotec. The electrical design and a smartphone app are also planned in addition to the expansion of the circle of users. The partnership between the companies began more than 20 years ago with the introduction of the then state-of-the-art E-CAD system ELCAD. As an independent software developer, Aucotec itself has been at home in the engineering market for over 30 years.

"The decisive factor for our migration was the unique architecture for such a design and documentation system, with the central database as its core; without this basis, we could not have realized our vision," concluded Falko Lameter.

Photographs: *Kaeser Kompressoren SE*

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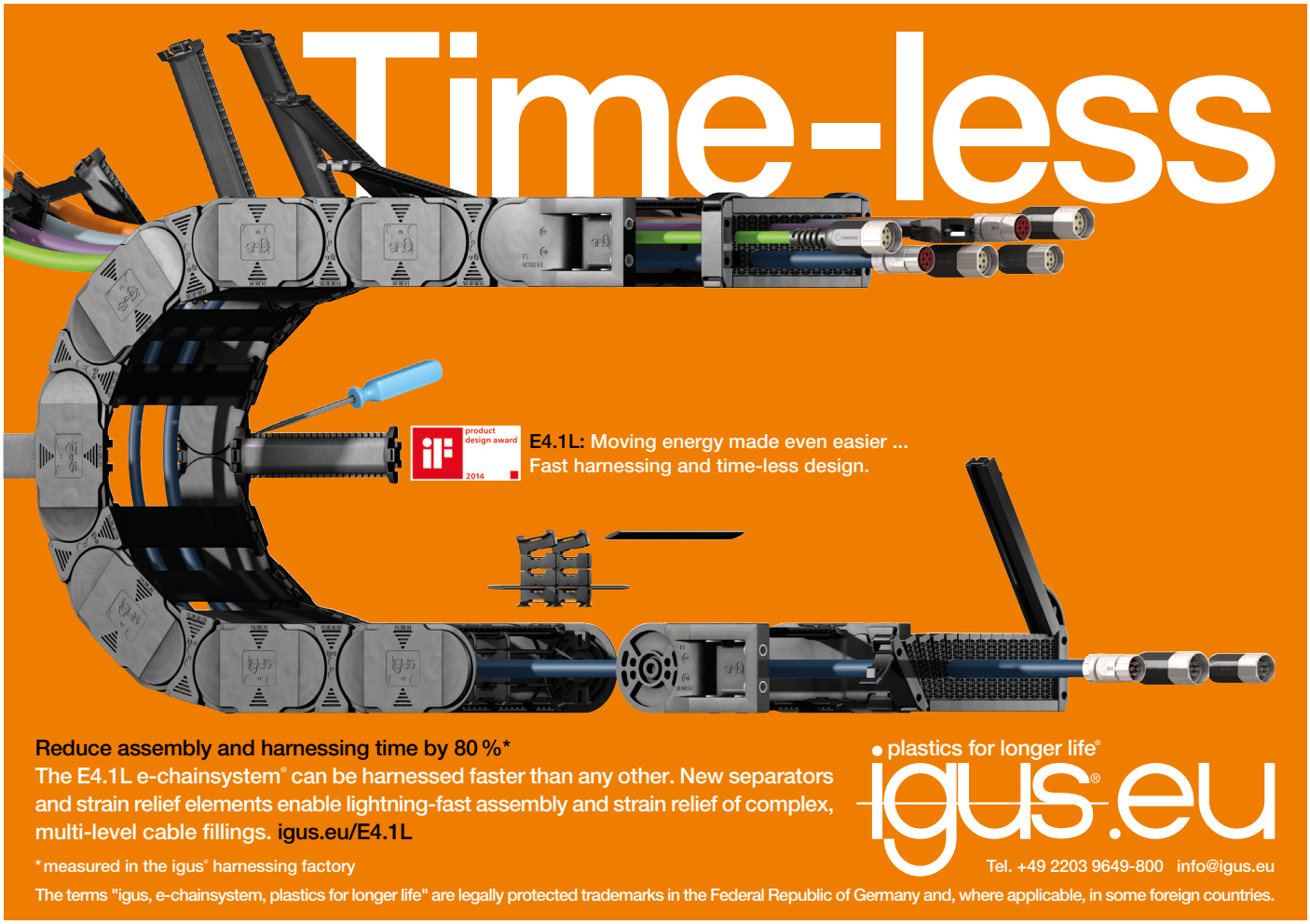

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