Digitization in the Biopharmaceutical Industry

Central Engineering Data as the Basis for Transparent and Sustainable Plant Design

The biopharma industry depends on innovative, flexible solutions. In order to meet the high demands of its customers, Zeta, as one of the leading suppliers of process technology for biopharmaceutical production plants, relies on comprehensive digitization. Cadison is a connecting element of the overall digital strategy.

Numerous planning steps are necessary on the way from the development to the industrial production of active ingredients. The need for transparency, sustainable planning and its seamless traceability requires the processing of large amounts of data. "This prompted us to develop an end-to-end digitization strategy to reduce complexity through the meaningful use of digital process data," explains Martin Mayer, Business Development Manager for Digitalization at Zeta. Mayer is responsible for developing and implementing digitization initiatives at the plant manufacturer.

Engineering is the Starting Point for Digitization

The central source of information and knowledge for digitization is the engineering part. Depending on the customer project, various tool chains are in use at the company. The data-centric engineering suite Cadison is one element of the holistically oriented digitization strategy. It makes an important contribution to coordinating the existing „islands of software support" in such a way that complexity remains manageable. In this way, trans-

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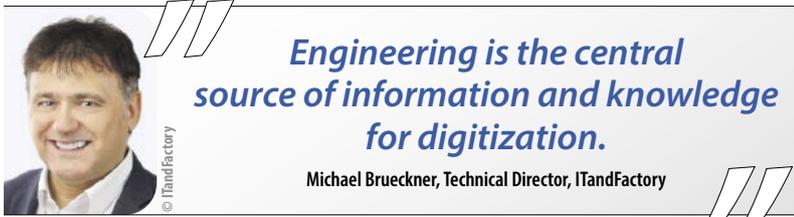
parency to ensure comprehensive project controlling is achieved.

The project management runs via an individually developed software project management office (PMO), with which Cadison actively exchanges data. In the CAE solution, the entire plant structure is defined, and each plant object is described in detail by metadata. In addition, data exchange with the ERP system is essential. This enables identical part numbers to be maintained and supports procurement as well as quality control. The same also applies to the so-called skids and, one hierarchy level lower, the different types of piping. „Thus, in our digital tool chain, the digital twin of the plant to be built is available according to the individual project requirements," says Mayer.

In the skids, the company has bundled the know-how it has built up over decades with regard to planning and technology. These are modules, such as bioreactors, which are commissioned in advance. The skid design and expertise in integrated engineering support the parallelization of project phases. As a result, the customer gains up to 30% time in project implementation, which is particularly valuable in the pharmaceutical industry. With the complete plant, the customer also has the corresponding digital twin at his disposal.

Digital Engineering Platform Serves as Information Hub

With the implemented engineering IT platform, customizable standards can be generated very quickly. These significantly accelerate project work. The aim is always to comprehensively represent the entire value chain, which cannot be mapped with the ERP system, with tool chains. To this end, the company has implemented a platform („Integrated Digital Engineering Platform") that enables end-to-end digital work – from process and mechanical engineering through automation and project

management to executive quality (qualification/certification). Each data record is entered only once. „In the process, we think very carefully about which data we make available to our customers in order to provide the maximum benefit. Depending on which aspects of the plant cycle the project covers, we have to work with different tools," explains Mayer. In some cases, up to 100 experts are involved in project execution. The Cadison suite is part of this integrated digital engineering platform, which is constantly being further developed.

Planning on the Base of Consistent Data

„We gain an enormous amount of time in P&ID creation by using cross-project specifications. Pipe classes (catalogs) can be stored, for example, to assign all type codes and other characteristics to the nominal width range under consideration. This means that the current data record is updated immediately if the nominal diameter of a pipeline changes in the P&ID," explains Mario Gerlza, CAD system administrator at Zeta. This takes advantage of the fact that the same P&ID is used several times as part of the step chain representation, so that the various process steps can be planned.

Massive Investment in New Services

Mayer is giving a great deal of thought to how customers can be supported in the long term with precisely tailored data

provision and engineering services. So-called smart engineering services have been designed to integrate all project participants and derive added value from them. The Smart Maintenance Navigator was developed based on the needs of leading pharmaceutical companies and ensures sustainable optimization of the maintenance process on mobile devices. As a virtual assistant and as a supplement to the customer's validated maintenance management, it links relevant information for maintenance intervals with plant data. In this way, the Smart Maintenance Navigator guides maintenance personnel through the plant in a targeted manner in order to carry out maintenance activities efficiently.

The maintenance support runs on smart devices (tablet, smartphone) and provides 3D plant models, building plans, P&IDs and related meta information. When a task is performed, comments can be stored and final reports can be generated.

„Our understanding is that the effort required to implement such a solution can be significantly reduced if all relevant data from development is available. Our assessment confirms this," says Mayer. Therefore, the strategic data reuse is of paramount importance.

Conclusion: Digital Journey Is Progressing

Around 450 employees work at the engineering department at the plant manufacturer, with more than 50 of them dealing with digitization issues: data scientists, key users and other specialists. In the past three years, the company has invested a double-digit million amount in digitization – with the aim of increasing its own competitiveness while generating added-value for its customers.
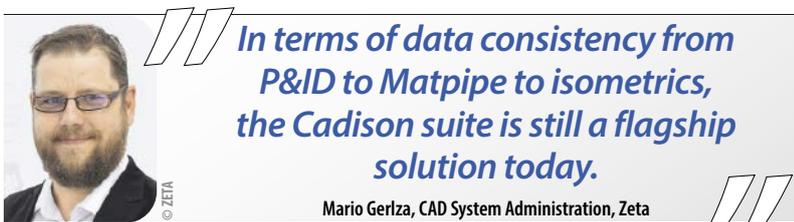
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