Optimized production with HeiTPM

Designing products to meet individual customer requirements as cost-effectively as possible is a demand that today's companies must meet – and Industrie 4.0 allows them to do so. Production becomes more flexible and efficient, thanks to smart factories with networked machines that communicate both with one another and with all the company's IT systems.

What end customers want is customized products for the same price as mass-produced goods but at a higher quality. For manufacturers, this means producing ever-smaller batch sizes. However, the frequent product and machine changes this requires can be costly. This is where the advantages of smart factories appear, including self-organizing production plants and coordinated workflows and schedules. In these networked plants, production and machine-related data can be seamlessly linked to business processes and integrated directly into the ERP systems' business applications.

Vertical and horizontal IT integration

With HeiTPM, HEITEC builds the necessary bridges between machines on the shop floor and the company's IT environment. This solution for IT integration, data monitoring, and data analysis enables a fast integration into a variety of IT landscapes. Connections are manufacturer-independent via various platforms, including solutions from the software producers Acron and SAP and the MindSphere cloud solutions from Siemens. The specific platform used depends entirely on the customer's requirements. The most important factor initially is inventory: What controllers are present and what interfaces and functions are needed? Based on an as-is analysis, HEITEC finds the technologies on the market that best meet the customer's requirements and then recommends an appropriate solution.

HeiTPM serves as an optimal link between the object- and service-oriented IT world and the machines on the shop floor. SAP, with its new UI technology SAP Fiori, offers significant advantages for networking the business side with the technical. Based on the single source of truth (SSOT) principle, process data from operating machines and fault messages are seamlessly sent to the ERP level where they're analyzed and returned to production as planning data, including process information, component requirements, and production specifications.

If the demand is for the benefits of an open cloud solution, the process data can be transferred to Siemens' MindSphere via a nanobox. Machine utilization can be determined with no extra hardware, which increases machine availability.

If the customer can't use SAP and doesn't want a cloud solution, Acron software is available for accessing process data. "That's the strength of HEITEC, that we can find products on the market and know how to put them together in practical ways," explains Gerhard Stich, Sales Manager, Automation & Software at HEITEC.

Greater productivity through data monitoring

Data obtained from the shop floor can be forwarded to systems for online visualization, long-term storage, or further analysis, making production sufficiently transparent. To realize this, HeiTPM supplements the bits and bytes of the SPS that initially comprise just zeros and ones with self-describing

semantic information. The OPC UA protocol serves as a standard for data transmission. This interface is now common in modern controllers.

In medium-sized companies in particular, older plants often need to be made Industrie 4.0-capable; or else the companies have grown over time and acquired various controller types throughout their history. In this case, HEITEC defines appropriate gateways for data exchange.

With HeiTPM, measured data and messages that describe process quality can be traced at any time. For example, machine data can be collected and used to calculate key indicators that provide information on the plant's status and therefore help reveal optimization potentials. Detailed alarms can also be displayed so that preventive maintenance measures can be initiated, which prevents plant downtime. The 360-degree view of processes improves productivity and increases plant availability. Because production is shown in real time, processes can be reliably planned and production orders quickly prepared and processed.

Intuitive user interface

With HeiTPM, HEITEC offers a standardized, flexible user interface that improves the visualization of complex production workflows and provides users with a straightforward overview at all times. The SAP Fiori Launchpad is an easy-to-use, easy-to-understand user interface for different platforms that's also suitable for mobile applications. And Fiori apps also assist users: Individual, intuitive apps can be used to visualize various activities on the machine and, for example, process production orders or request a new order.

Analyze data – optimize processes

All the information collected from the real equipment – including order data, isochronous process data, and error messages – in conjunction with the digital twin of the plant allows plant operators to analyze production in the office. Causes of errors can be discovered, quality data can be evaluated, and optimization strategies for production workflows can be created. The targeted changes can then be tested on the virtual model using real information from operation before being applied to the plant. This greatly reduces setup time, especially when there are frequent product changes in which machines require frequent modification.

For example, a leading manufacturer of personal hygiene products stored its central formula management for the production of toothpaste in the cloud. Different batches – with green or red stripes – were to be produced in the plant. The various parameters had to be controlled centrally for the sake of efficiency and to eliminate errors. With HeiTPM, the formulas were first transferred from the cloud to the controller. Central feedback was then obtained on whether the data was loaded correctly. Based on the data collected, it was also possible to centrally monitor and document product quality and material consumption. This allowed raw materials to be reordered immediately via SAP when needed.

Summary

Thanks to the new ways of organizing and controlling the entire value chain associated with Industrie 4.0, experts are predicting that companies with smart equipment will experience an increase in production of up to 30 percent by 2025. By linking the production and IT levels, HEITEC creates tremendous optimization potential for its customers. When developing HeiTPM as a solution for

networking the two worlds, HEITEC worked closely with HEISAB, the SAP consulting firm in the HEITEC Group, taking advantage of its SAP expertise to implement an integrated SAP solution. The result is consistent, end-to-end digitalization that increases companies' productivity and efficiency.