Identifying and analysing optimisation potential

Re-engineering project at Werner & Mertz

For years, the renowned manufacturer of cleaning and care products Werner & Mertz has relied on state-of-the-art technology for plant automation in order to be able to consistently keep its production plants, including control components, at the cutting edge of technology. The German company receives support from the system specialist ProLeiT to enhance quality assurance, improve plant safety and environmental protection and, ultimately, to strengthen its competitiveness.

Re-engineering project double-batch plant at Werner & Mertz

The potential for improving the economic viability of individual manufacturing processes is often offered by plants that are still fully functional but can only be operated with high cost and time implications due to outdated and thus maintenance-intensive control system and control components. Furthermore, hardware defects may lead to production downtime. To minimise the risk of failure, the decision-makers at Werner & Mertz in Mainz decided to implement a new, cutting-edge automation solution for an existing double-batch plant that featured outdated and only partially automated technology. In addition to increasing efficiency, the new system also required an open architecture that is largely hardware independent and easy to expand. For this project, ProLeiT, a system builder for automation software and engineering, was chosen as the contact partner.

Modular and future proof

The hardware-independent and modular Plant iT system provides extremely flexible and powerful software that also fully meets the demands of complete automation solutions. In addition to the basic process control functions such as operation and monitoring (Plant Direct iT) or operating data acquisition (Plant Acquis iT), ProLeiT also offers an innovative batch system with Plant Batch iT that satisfies the ISA S88 standard.

Modules

Plant Direct iT is an open, component-based process control system. A variety of technological objects and standard modules provide the solution to control and process engineering tasks. It boasts:

- Visualisation via Microsoft Visual Basic
- Messaging system with system, operational and fault message processing
- Display of measured value curves
- Powerful and easily configurable communication infrastructure for data exchange
- Pre-assembled library with technological objects and standard components ‘componentware for automation’.

The parameters are configured centrally using a tree structure with a topological view of the data landscape. MS Excel is additionally available as a configuration tool. The class concept also proves to be advantageous during project implementation. From an application software perspective, it uses predefined technological classes that allow recurring, similar automation tasks to be standardised and routinely processed. For a re-engineering project – like the one at Werner & Mertz – this means, in particular: Already existing software functionalities can be taken over to a large extent by recreating them only once as an up-to-date ProLeiT class. This allows well-established processes to be adopted 1:1 without too much effort. In practice, this saves a lot of time thanks to trouble-free engineering, one-time testing and parameterisation of the instances.

Plant Acquis iT collects, processes and archives process, production, operating and machine data. Archive data can be recorded in a time-related as well as in a batch, shift or order-related fashion. The evaluation modules allow you to take a closer look at the collected data. It is real-time capable and combines historical data also with current measurement series and messages. Convenient standard tools offer a wide range of evaluation options, including via the Intranet. As with Plant Direct iT, Plant Acquis iT is parameterised using a tree structure with a topological view of the data landscape.

INFO

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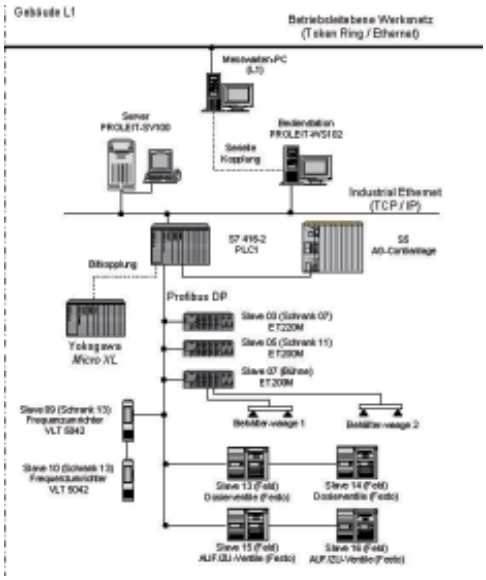
Plant Batch iT is a system designed for the specific requirements of batch-controlled processes, taking into account materials management aspects. A configuration tool – Batch iT Configuration – is used to parameterise the technological system structure. This is where specific parameters of the plant components as well as the required phases, operations, partial recipes and recipes are defined. This results in a plant model for creating production regulations and control recipes. The Batch iT server executes central coordination functions and the Plant Batch iT Manager is used to create and manage production instructions (basic recipes). Plant Batch iT incorporates materials management with integrated batch traceability, thereby ensuing seamless documentation and traceability of all the relevant data.

The decision-makers at Werner & Mertz decided to use all three modules in the automation of a double-batch plant (multi-path, multi-product plant). The actual plant and the associated network components, such as server, operating station, Profibus participants, etc., are operated and monitored via several process images. Visualisation via Microsoft Visual Basic and the message system of the Plant Direct iT module are employed. Agitator speeds, temperature and weight curves or machine operating periods are recorded with order or batch



Anlagenkonfiguration der Doppelbatch-Anlage

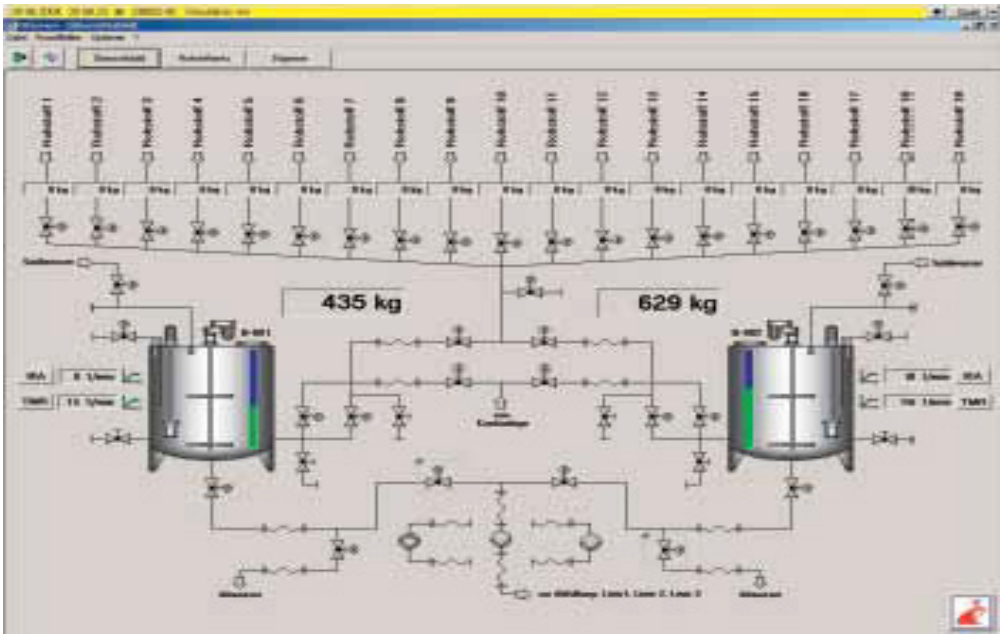
reference via the Plant Acquis iT module and stored in a real-time database to ensure they are available for later research. This data can then be linked to the batch records stored in the Plant Batch iT module, which assumes actual plant control, and visualised in curve representations. Using Plant Batch iT, the manufacturing sector uses a graphical interface to create the basic recipes for the individual products that are produced in the double-batch plant. The associated materials management simultaneously records additions and deletions to and from raw materials and products. The plant structure was implemented with Batch iT according to the ISA-S88 standard without any problems.

Open, expandable architecture

As a platform for the Plant iT software (Version 7), a server and an operating station based on Microsoft Windows 2000 with the corresponding national databases (Microsoft SQL) for seamless production data acquisition are used in the plant configuration. At control level, Simatic S7 components from Siemens are used, which in turn are connected via Profibus DP to distributed, type ET 200M peripheral devices. The ET-200M modules are redundancy-capable and offer a wide range of assemblies, which, e.g., deliver increased diagnostic capability and are specially designed for fail-safe applications.

This open system architecture, developed in cooperation with Werner & Mertz, allowed the integration of further operating stations into the client-server system. Since the ProLeiT modules are not hardware-technically bound to a platform, it was possible for Werner & Mertz to integrate PC hardware from their supplier of choice, which supports the Microsoft Windows 2000 operating system, into the project. At control level, too, the selected system architecture ensures other Simatic S7 components can be integrated at any time. A Simatic-S7-416-2DP is used as the central control unit to which three ET 200M peripheral devices, two Danfoss frequency inverters and four Festo valve islands are connected via Profibus, which are used to process all the signals. In a second step, ProLeiT's Conti system, which was automated back in the 1990s using a Simatic-S5, is integrated into the architecture via a connection to the Simatic-S7. This procedure allows the Simatic-S5 to continue to be used as a peripheral device without any rewiring work.

In addition to the integration of standard hardware for plant control, Plant iT is also able to incorporate higher levels of electronic data processing. At Werner & Mertz, the connection to an existing ERP system (Enterprise Resource Planning), e.g. SAP R/3, is an option that has already been considered. Furthermore, the Connect iT-module could also be used to integrate LIM-systems (Laboratory Information Management), an ideal alternative to standard paper management.



Prozessbild (Bedienung und Visualisierung) der Doppelbatch-Anlage