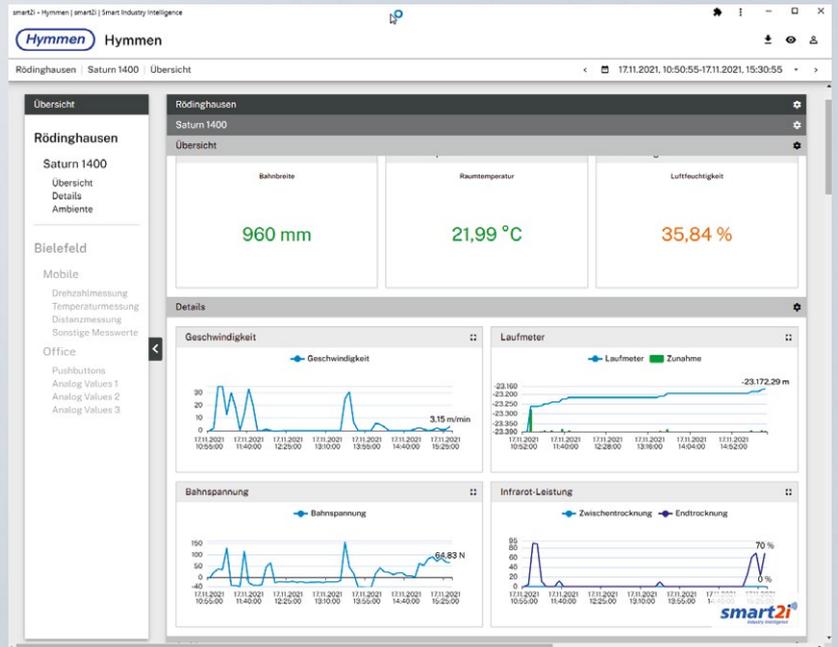


Cloud-based software with TwinCAT IoT functions for efficient plant control

Smart industry app and standardized IoT communication promote greater transparency

It is no secret that there is often a lack of transparency in the sophisticated systems that make up manufacturing facilities, especially where these may comprise multiple plants. In practice, this means it is not uncommon for production figures to fall short of expectations without an obvious cause. A solution to this issue can be found in continuous data acquisition, which is afforded by a ready-to-use software solution from Hymmen in the form of the smart2i Industry Intelligence app. The IoT functions of the Beckhoff TwinCAT software facilitate a standardized data exchange that can include data from any source.

Example of a customized smart2i dashboard



Bielefeld-based plant and machinery builder, Hymmen, has been working with Beckhoff, Verl, for a solid 30 years. Barely 30 km (20 miles) separate the two East Westphalian companies, which Hymmen Managing Director Dr. René Pankoke believes is the ideal situation to support their technological cooperation. The Hymmen plants for finishing rigid wood-based panels or technical laminates, for example, which are often several hundred meters long, are automated by a network of several Beckhoff Industrial PCs and other components from the PC-based control portfolio.

Production optimization increasingly important to customers

As the optimization of production processes, including long-term assurances on the desired surface quality, becomes increasingly important to machine end users, Hymmen's smart2i software solution makes it possible to integrate a system that offers continuous monitoring, permanent recording and intelligent analysis of machine, production and quality data. What's more, the cloud-based solution allows production data such as speed, pressure and consumption quantities to be stored securely and permanently in real time. This information can then be displayed and analyzed "intelligently" by any authorized user as required, either on a permanently installed computer or via a mobile device.

The smart2i industry app is suitable for the entire manufacturing sector, regardless of the size of the company. And since the open system is compatible across machines and manufacturers, its use is not limited to Hymmen systems. Dr. René Pankoke explains: "From machine operators and plant managers to managing directors and anyone else involved in the production process, everyone can

access the exact information they need in such a way that it can be used as a sound basis for making decisions."

Fields of application for the software solution

In addition to the classic display of key data such as equipment availability, a unit counter and overall equipment effectiveness (OEE), the digitized production parameters can also be correlated with specific performance data. The smart2i system is designed to be very flexible in terms of the type and amount of data processed, too: it can focus on the performance of an entire production line (e.g., the number of units produced per minute or individual parameters such as temperature), as well as on signals from individual machines (e.g., a grinding machine).

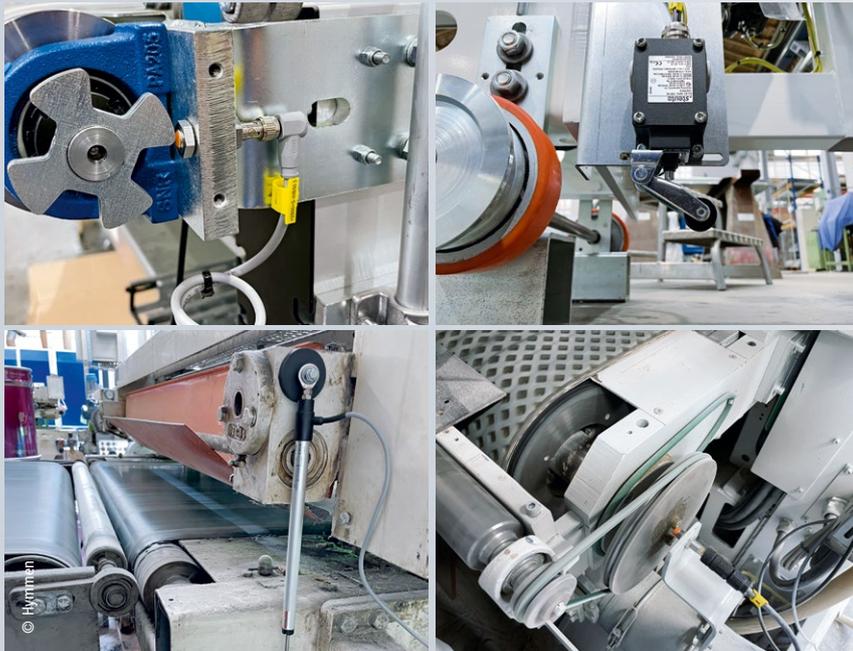
Production managers can check and analyze up-to-date information at any time from their office, their smartphone or in fact any other digital end device. The parameters of each respective plant can be traced back for reliable problem reporting during production. Even external signals, such as room temperature and humidity, as well as batch changes in raw materials, may also play a relevant role in the analysis and should therefore be recorded. This makes it possible to compare all parameters side by side so that the cause of any potential complaint can be narrowed down.

As before, routing slips and lists that have to be filled out by hand are often used to record daily production parameters. This time-consuming stage can be almost completely eliminated by digitization, as the values are either recorded

immediately or transmitted directly to the system at regular intervals or using a tablet, ready to be assigned to the daily production processes at the exact time. The measured values of a glossmeter, for example, can be entered directly into the system and saved. This includes every measurement – not just the good results. Together with the associated machine parameters, direct correlations can be identified either directly afterwards or at a later date, thereby allowing

be identified quickly so that measures can be taken to economize or compensate for them.

The basis for precise and meaningful evaluations is continuous data acquisition and structured storage: the more comprehensive the amount of data available, the more well-founded the findings from the tools developed individually for the



Ready-made solution or free programming – as required

- With smart2i, Hymmen offers a ready-to-use solution. Together with appropriate support during implementation, users benefit from minimized effort on the way to achieving greater transparency in their production processes.
- With TwinCAT Analytics and the TwinCAT IoT functions, Beckhoff offers numerous ready-made software functions that users can benefit from to implement their own individual data analyses. Further details on TwinCAT Analytics can be found in the PC Control technical article on page 14.

Examples of sensors on Hymmen machines

processes to be optimized on a continuous and sustainable basis. Another field of application for smart2i is preventive maintenance: by analyzing current profiles, machine wear can be detected and remedied at an early stage before system downtime occurs.

PC-based control provides the necessary database

Sufficient machine and production data are indispensable prerequisites for this kind of system monitoring, as Dr. René Pankoke clarifies: “For users who already have sufficient sensor technology on their machines, Hymmen supports them with the targeted, structured digitization and analysis of the data – across all machines and plants of the enterprise. Or for those who don’t, Hymmen integrates the appropriate sensor technology on their new plants or plants already in operation. Of course, existing data sources can be integrated via communication standards such as OPC UA.”

When implementing smart2i in the new and existing plants, Hymmen uses the CX9020 Embedded PC from Beckhoff as the communication node. Dr. René Pankoke cites the following reasons for this: “Together with the TwinCAT Runtime and the TwinCAT IoT Communication (TF6701) function, the CX9020 is ideally suited to the rapid transmission of information to the cloud. In addition, PC-based control proves to be extremely flexible when connecting machines from other manufacturers through the large variety of retrofittable EtherCAT Terminals for a wide range of interfaces and bus systems.” For example, the energy consumption of the machines is continuously measured and evaluated with the EL3443 power measurement terminal. This allows peaks in demand to

user’s needs. This is why IoT communication in TwinCAT is particularly important for smart2i, according to Dr René Pankoke: “The IoT function facilitates the transmission of an enormous amount of signals to the cloud application within a very short cycle time. In addition, future developments of smart2i incorporate artificial intelligence and big data analytics.”

Convenient display and high data security

The dashboards for displaying the information can be customized with features including technical parameters for the QA department, availability and performance data for production management and specific information for maintenance. All available data can then be displayed and analyzed over any period of time.

According to Dr. René Pankoke, the smart2i software solution works with certified and GDPR-compliant cloud solutions. This safeguards against data theft and loss, ensures a secure legal position and guarantees failure safety. What’s more, the cloud solution is also compatible with corporate IT. The telegrams from the machine to the cloud are encrypted in the TwinCAT control using Beckhoff certificates and protected against unauthorized access.

More information:

www.hymmen.com

www.smart2i.cloud

www.beckhoff.com/twincat-iot

www.beckhoff.com/twincat-analytics