



A sawmill made to measure

The combination of XV300, modern motor starters and motor-protective circuit breakers with the intelligent wiring solution SmartWire-DT significantly improves the operation and reliability of the log handling facility.

Location:

Fürnitz, Austria

Challenge:

Upgrading the automation system of a more than 20-year-old log handling facility to prevent motor drive overload, simplify maintenance and increase the ease of operation.

Solution:

System control via an XV300 HMI/PLC, replacing the complex hardware wiring with SmartWire-DT and monitoring the motor current with PKE motor-protective circuit breakers.

Results:

The visualization of system functions via the XV300 increase the ease of use while the intuitive indication of errors simplifies maintenance. Using SmartWire-DT to network the RMQ pilot devices in the operating console as well as the automation components inside the control cabinet requires considerably less wiring and offers a high degree of flexibility when it comes to system modifications. Soft starters protect the mechanics and drives. Now that the motor current can be measured, not a single drive motor has failed due to overheating.

“Thanks to the automation technology from Eaton, Wertholz now faces lower costs and has been able to reduce technical failures virtually to zero.”

*Christian Gallob,
Elektrotechnik Gallob*

Background

For companies in the pulp, paper and wood panel industry, it is essential that their plants have a continuous and uninterrupted supply of timber. This is exactly what Wertholz, based in Fürnitz, Austria, specializes in: Since 1989, it has focused on providing the log processing industry with sufficient quantities of timber in the required dimensions and quality for further processing. The company processes around 80,000 cubic meters of timber annually. The heart of its wood processing plant is a log handling system dating to 1997 where the logs are debarked, measured, cut to the required length and discharged into appropriate sorting boxes. “After more than 20 years in operation, however, the system was becoming outdated, as the control and drive technology no longer corresponded to the state of the art,” says Christian Gallob of Elektrotechnik Gallob, a full-

service provider for commercial and industrial electrical engineering applications. He started servicing the Wertholz log handling system right after it was commissioned and has made constant minor updates to the technology since. However, it was not possible to carry out any major upgrades during normal operation. This changed in 2018, when Wertholz moved its operations from rented premises to a newly purchased 2.5 hectare plot of land in the vicinity. The company also moved its log handling facility, which Christian Gallob then upgraded with state-of-the-art technology both inside and out.



Powering Business Worldwide



Wertholz based in Fürtitz Austria is specialized to provide timber for the pulp, paper and wood panel industry.

Challenge

Expensive to adapt and prone to too much downtime

“With the old system, all operating elements were still conventionally wired, making it difficult to implement changes or new functions that the customer or the system operator wanted,” says Gallob. The wiring of the approximately 20 drives in the system was also very complex, and necessary functions such as counterclockwise and clockwise rotation or emergency stop also had to be implemented using conventional wiring. The sheer size of the facility – the shop floor occupies an area of 25 by 12 meters, while the sorting line has a length of around 90 meters – illustrates just how many cables had to be laid to control the system.

In addition, the drive technology was controlled solely via contactors. “Contactors are subject to constant wear and are therefore no longer appropriate in a modern system,” says Gallob, not least because they also made troubleshooting difficult: If one of the automation system components failed, the system operator only received this information via a warning light – the location and cause of the fault then had to be painstakingly investigated.

The conveyor drives on the crosscut saws were the leading cause of downtime: In the old system, they were controlled by a star-delta starter, meaning they ran at constant speed – no matter how easy or difficult it was to cut the wood. “In hot weather and if the wood was difficult to cut, the motors overheated very quickly – in which case I often had to replace two or three motors per week,” recalls Christian Gallob. This was also due to the fact that while the motor-protective circuit breaker did respond in the event of overload or overheating, it was often manually switched on again too soon – before the motor could cool down sufficiently. As a result, the motors were prone to failure and thus to downtime: “Replacing one of the motors could easily take a day or even two.”

Solution

Making all parts of the system more intelligent

Christian Gallob therefore took advantage of the relocation of the log handling facility to redesign its automation system from scratch. The core of the new system is an XV300 HMI/PLC with integrated touch display, which is built into the control chair in the control room and allows the operator to control all system drives and functions. Only the station that measures the logs has its own controller, which transmits the data to the XV300 via an I/O interface. “The system was previously controlled by an Eaton PS4 compact PLC without visualization options and with pure hardware operation only,” explains Gallob. “But a control system without touch display is simply no longer in keeping with the times.”

However, the multi-touch technology of the control system not only offers an attractive design and intuitive operation, much like a smartphone or tablet, but is also practical, as Gallob emphasizes: “This allows additional functions to be implemented quickly. For example, it was very easy for us to program a virtual ‘button’ after the system was already put into operation that allows the plant operator to sound a warning when the system is about to start up.” Gallob programmed the control and automation technology in CODESYS, which was completely new territory for him. “But with the Galileo visualization software from Eaton, it was easy for me to get started: The user interface is relatively simple, and the program is basically self-explanatory.”

Christian Gallob used SmartWire-DT to connect the XV300 to the various automation components. This means that the individual switching devices, sensors and drives are not connected to the controller via direct point-to-point wiring, but via a green eight-pole cable with quick and simple plug-in connectors. The SmartWire-DT cable supplies the connected devices with power and simultaneously handles the communication of data. “This solution is highly flexible and completely eliminates the need for cumbersome hardware wiring. Gallob can now quickly and easily integrate any components that may need to be added in the future. “When we were commissioning the system, for example, the plant operator wanted an additional pushbutton – which we were able to quickly retrofit thanks to SmartWire-DT.” This is also helped by the fact that all the pilot devices in the control panel – 20 components in total – come from Eaton’s RMQ family.

Christian Gallob also used Eaton's intelligent wiring solution to wire the various automation components inside the facility's control cabinets. A total of 43 devices are thus connected via two interlinked cables. However, Gallob opted not to use SmartWire-DT to transfer data between the XV300 and the control cabinets, which are located some 15 meters away, or between the control cabinets and the system: "The ambient conditions inside the plant are very harsh, which is why I decided to network the various areas using a robust Ethercat ground cable instead. The XV300 comes with an integrated Ethercat interface, and the SmartWire-DT cables can be connected via an Ethercat gateway.

Christian Gallob also updated the entire drive technology: The wood feed drives are now controlled by means of DS7 soft starters from Eaton, which also protect the mechanical components. And the drives of the mechanism that sorts the logs into various boxes are now equipped with EMS electronic motor starters. This electronic motor starter can handle DOL and reversing starts, while offering wide-range overload protection and an emergency-stop function. What's more, the drives of the conveyors between the stations are now frequency-controlled. With the help of Eaton DA1 variable frequency drives, their speed can be adjusted via sliders on the display of the XV300, so that the system's performance can be adapted to the type of timber being processed. However, the most important new function was implemented on the drives at the crosscut saw stations, which had previously been prone to failure: Their speed can now also be adjusted, and thanks to the use of a PKE electronic motor-protective circuit breaker their motor current can be monitored. "Tachometers on the display of the XV300 indicate the motor current of the two drives in real time," explains Gallob. "This enables the plant operator to recognize very quickly if an overload is imminent, so that the conveyor speed can be reduced or the log can even be retracted."

Result

More than a year without a single motor fault

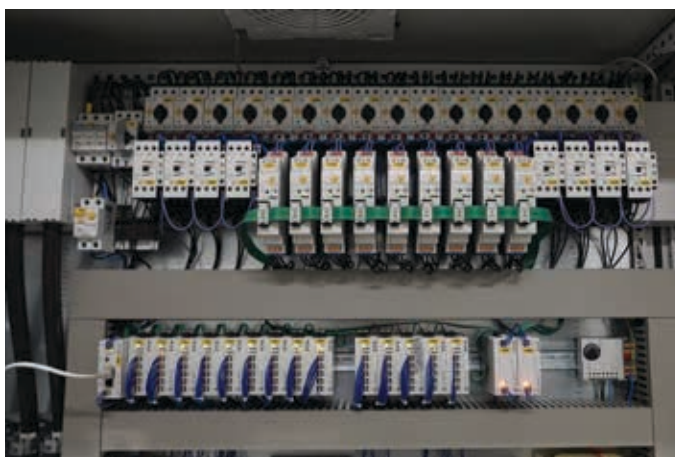
As a result of this upgrade, the log handling system at Wertholz's new site has now been running for over a year – and so far, Christian Gallob has not had to replace a single motor due to overload. Any faults that occur are now indicated in plain text on the display of the XV300 so that the causes can be quickly rectified. To do this, Christian Gallob no longer needs to travel to the plant – he can solve many problems over the phone thanks to the information provided by the system. Overall, this has significantly increased system availability while also boosting throughput and productivity. "The fact that I was able to obtain the entire automation technology – from the power supply and the RMQ pilot devices to the PLC and the drive technology – from Eaton as a one-stop shop made the entire project much easier to realize," says Gallob, adding, "With a project like this, you can nevertheless quickly get bogged down in the details. But whatever issues I faced, I could call Eaton at any time – and together we were always able to find a quick solution."



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For the control and protection of the motor electronic motorstarters EMS and PKE are used. The drives of the conveyors between the stations are now frequency-controlled with the help of Eaton DA1 variable frequency drives.



SmartWire-DT was used to connect the XV300 to the various automation components like switching devices, sensors and drives. The SmartWire-DT cable supplies the connected devices with power and simultaneously handles the communication of data.

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