

Distributed concept means maximum availability

Operator control and visualization concept developed jointly with Siemens is now a standard feature of EWD saw lines

There is probably not a tree trunk anywhere that grows absolutely straight. Conventional sawing techniques can often result in reduced logging recovery in the production process. The quantity recovered can be increased, however, if the machines on the saw line follow the ideal curve radius of the log, especially if they are always operated continuously. One of the most modern saw lines in Europe is installed at Axel Bergkvist AB in Insjön, one of Sweden's leading sawmills, where it is used exclusively for curve sawing. The plant is equipped with a distributed, flexible control and visualization system. All important plant states are shown on this system, permitting extremely short response times directly in the field. The saw line operator thus keeps a clear view of the curve sawing process at all times ...

In 2005 and 2006, sawmill manufacturer Axel Bergkvist (established over eighty years ago in 1926) embarked on the largest investment in the history of the company – a crucial milestone in its long-term strategy for the future. The innovative “Arcoline” technology developed by EWD in Altötting/Bavaria is now in place in the new sawmill (Issue 37 of Holz-Zentralblatt, dated September 15, 2006, included a detailed report on the project). The equipment is designed to handle an awesome 500,000 m³ of logs. The investor's principal aim was to increase the recovery and quality of its products. Today, around 290,000 logs are processed on the new sawline every month, equivalent to approximately 33,000 m³ of sawn lumber.

Large quantity framework

From the outset, EWD and Siemens collaborated intensively regarding the automation concept for this plant, which comprises a series of highly complex

process steps. Right up until commissioning, it was regularly optimized in close consultation with the operator. According to Edgar Bausinger, Head of Electrical Engineering at EWD, this long-standing technology partnership has paid off many a time because it enables the best possible solution for a particular task to be identified and realized without any wasted time.

Bergkvist's “Arcoline” is supervised by four “Simatic S7-400” controllers, each of which is equipped with a “CPU 416” motherboard that communicates directly via MPis (Multi-Point Interfaces) with nine distributed “Simatic Multi Panel MP370s” (with a 12-inch display) installed on the main machines. A tenth “MP370” and a master computer, both located in the saw line's control cab, are also integrated in the network.

“Simatic WinCC flexible” was chosen as the visualization system. Each of the nine Multi Panels in the saw line has to process some 1,500 variables, 100 graphics lists, 20 scripts, and 1,200 messages. The

installation is accordingly one of the biggest projects ever realized with “WinCC flexible”. The suggestion was raised at the time that a classic “Scada” system in client-server architecture might be a more suitable option. It should be mentioned in this connection that, in view of the multitude of tasks, each panel represented a separate project.

Flexible visualization at machine level

Bausinger explains that the customer was asked to choose between the two alternatives. A preference for the more flexible concept with the greater proximity to the “scene of the action” quickly emerged. In addition to lower costs, two central requirements were perceived to be better satisfied: on the one hand, short response times and signal propagation delays (less than 1 s) and on the other, the integration of operator control and visualization in a single system that provides all essential information promptly and realistically in the field in graphical form.

Each “Simatic Multi Panel MP370” additionally visualizes the upstream and downstream conveyor systems of the respective machines. The distances that must be covered in order to rectify a fault are much shorter than in the past

“Arcoline” at Bergkvist Insjön

The nine main machines on the “Arcoline” saw line at the Insjön plant and the conveyor system that links them together are fitted with 400 electric motors and 245 servo valves controlled by four PLCs. Around sixty screens for controlling and visualizing the production process are installed in the control desk and along the saw line. Six 3-D scanners that monitor each other guarantee full optimization for the log as it is processed. In combination with the optimization software, the recorded information allows the quality and quantity of recovery to be kept under continuous observation. The line operates in a feed range from 70 to 200 m/min with 6.5 MW power input.

The U-shaped, 2 x 90 m long EWD “Arcoline” profiling line at Bergkvist Insjön in Sweden (Photos: EWD)





The master computer accesses the saw line data via the “Simatic WinCC flexible/Smart Access” system (back). An additional “MP370” Multi Panel (front) is used to switch the plant on or off centrally and show synopses of the drive and bus data

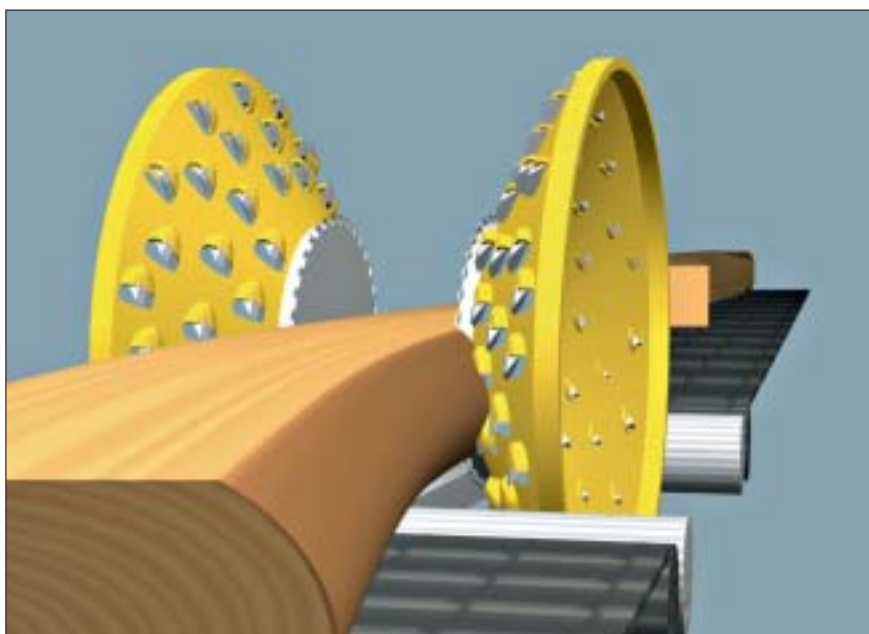
The distances that must be covered in order to rectify a fault are much shorter than in the past. “Troubleshooting is simpler and more reliable if the HMI devices are hooked up to the controllers directly rather than to a central server”, Bausinger continues.

The relatively time-consuming configuring phase was ultimately offset by the ease with which the basic framework could be copied. “The smaller WinCC flexible projects are elements of the overall S7 project, in other words they profit from the seamless Siemens technology when it comes to configuring, data management, and communication under Step 7 or the Simatic Manager.” Bausinger confirms that the job for EWD’s engineers is considerably more straightforward as a result.

Another advantage of the distributed control solution is revealed if ever a failure occurs at the control level. In this case, the saw line can be operated instead using the panels. Apart from a few central control steps, for instance at the start and end of a shift, the plant runs completely autonomously. In addition to the machines themselves, each panel also visualizes the upstream and downstream conveyor systems on anything between twenty and twenty-five control charts based on the design drawings. All data and recipes are stored on a CF card. The integrated user administration functionality of “WinCC flexible” is likewise highly valued by Bergkvist.



The complete “Arcoline” saw line at Bergkvist Insjön can also be controlled locally – in other words, independently of the control level – by means of the nine distributed “Simatic Multi Panels MP370” (right) installed at the main machines



Using modern 3-D measuring techniques and complex optimization programs the “Arcoline” method of head sawing achieves the highest yield of round timbers

Intuitive operation and troubleshooting

If a fault is detected, it can be instantly responded to because all messages are transferred to the master computer promptly and are therefore up-to-date. According to the plant operator, one of the system’s most important benefits is that there is no longer any strict separation between visualization and control, either in the plant control room or locally. On the contrary, the two functions are converged deep into the axes and light barriers. Henrik Pellas, the automation engineer at Bergkvist responsible for the new saw line, is altogether enthusiastic. The system can normally be operated by a single person. Thanks to the graphical visualization, error messages can be reacted to almost intuitively, so that downtimes are reduced to a minimum or avoided completely.

The “WinCC flexible/Smart Access” option, which provides simple client-server mechanisms, was installed on the master computer to enable the saw line to be controlled from the comfort of the control desk. Bergkvist also makes use of the “Archive” and “Recipe” visualization options. In the meantime, faults signaled by the saw infeed and the saw line disposal system are sent to the same computer. The tenth “MP370” Multi Panel located in the control desk serves to switch on the plant, record current consumption centrally for all main drives, and visualize the operating states of cabinets as well as bus and hydraulic systems.

A standard feature

The operator control and visualization concept realized by EWD on behalf of Bergkvist is meanwhile a standard feature of all the manufacturer’s saw lines of this type. It has been continuously optimized in the framework of ongoing enhancements to “Simatic WinCC flexible”. At Siemens itself, the know-how arising from the collaborative project with Bergkvist has enabled the visualization system to be further matured. The option of simulating and testing the system upfront in a runtime version without a PLC is deemed to be particularly advantageous for configuring and commissioning. EWD can access the Insjön plant from its Reutlingen site in South-West Germany via a VPN connection in order to carry out remote maintenance.

Finally, Pellas emphasizes that the control and visualization system assures a very high level of plant availability and that it comes up to Bergkvist’s expectations in every respect. The same applies to the reliability of the Multi Panels. In the meantime, an eleventh panel enables the saw line’s disposal system to be controlled from the control desk.