

Transparency creates efficiency

In collaboration with Siemens, mlp GmbH is developing a high-performance SCADA solution to vertically integrate tire curing presses.

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Network, gather data, analyze it, improve efficiency. As it moves toward digitalization, mlp GmbH from Hamburg, Germany, is relying on forward-looking methods to improve productivity and quality while curbing power consumption and costs in its tire vulcanization process. The process data processing and automation systems specialist has contributed its many years of expertise in tire manufacture and worked with Siemens to develop the tailored “mlp SCADA system for curing presses.” This makes it possible to structure the operation of entire curing press lines with much greater transparency and efficiency, while keeping investment and set-up costs to a minimum.

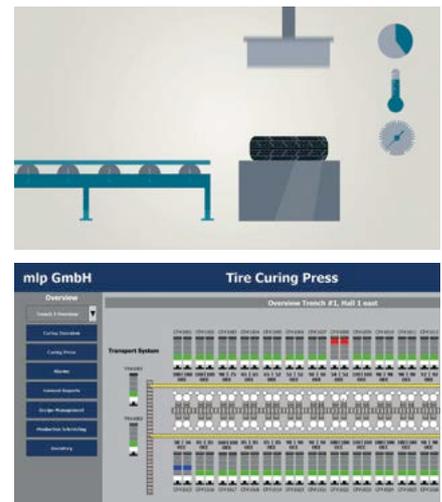
Latest automation technology from Siemens

The system was brought to the series production stage using end-to-end automation technology from Siemens. Its core components are scalable SIMATIC S7-1500 Advanced Controllers with graduated performance levels to control the curing presses, SIMATIC Comfort Panels for on-site

display, and a sturdy SIMATIC industrial PC for the higher-level mlp SCADA system. The press controls are networked with the central display system using industry-quality SCALANCE industrial Ethernet switches. The software platform is the TIA Portal V14 engineering framework with integrated SCADA engineering under SIMATIC WinCC Professional.

All that’s needed to connect existing curing press control systems is to implement the defined data interface to the SCADA system, and establish a network connection. There is no impact on the actual process and no additional sensor technology is needed. This makes upgrading while the system is running a practical option.

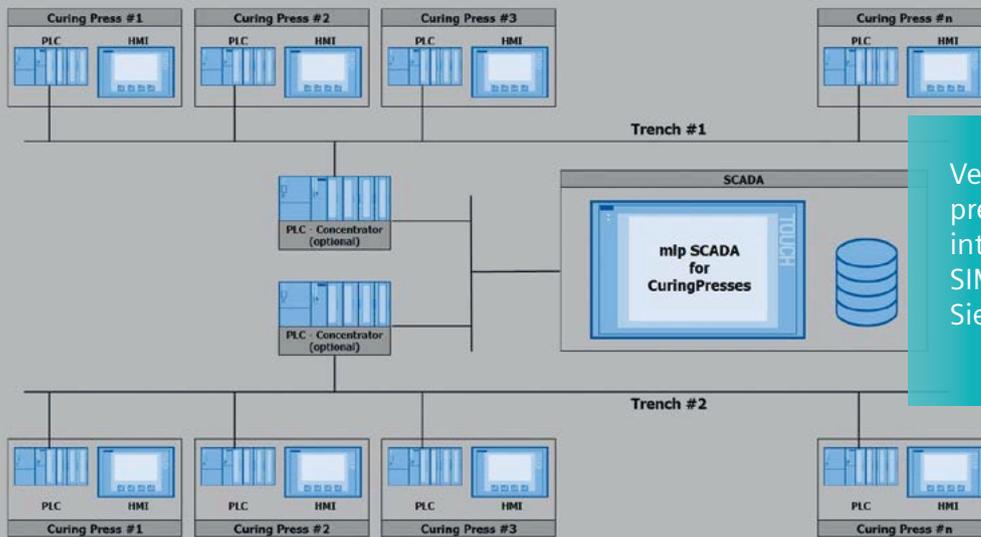
With today’s solution, up to 64 curing press controls can be connected to the SCADA system directly via Ethernet. The quantity structure is easy to expand using an additional concentrator PLC, preferably a SIMATIC S7-1500. This can pre-process the data, which takes the load off the target system and ensures higher performance.



The mlp SCADA system for curing presses developed by mlp GmbH in collaboration with Siemens results in much higher process and product quality in the vulcanization process.

The system displays a clear overview of the status of individual presses as well as the whole area, and helps users leverage optimization potentials by providing analyses and reports.

Topology



Vertical integration of curing presses with standardized interfaces – preferably with SIMATIC S7-1500 from Siemens

Functions tailored to suit the application...

The mlp SCADA system records the process data supplied by the curing press controls, like temperatures, pressures, cycle times, downtimes and setup times, unit quantity and reject counters, unique tire labeling, and status, alarm, and error messages.

Algorithms developed by mlp use this data to calculate meaningful key performance indicators (KPI) for each individual press and the line as a whole. The system uses live dashboards to display aspects like availability, throughput, quality, and the overall equipment effectiveness (OEE) of the curing presses. At the push of a button, it provides overviews of the molds and bladders used, as well as order and product data. An optional element is production and formula management especially for the vulcanization area.

The information thus gained can be used to analyze the performance of individual presses and compare them against others. This gives operators the chance to identify weak points in the entire production process quickly, eliminate them, and improve efficiency as a result. Comprehensive alarm analyses that can be individually filtered make it possible to draw conclusions about both systemic and sporadic influences.

An additional function module is used to optimize the way all the presses close, to ensure the best possible capacity utilization of the central media supply unit without overloading it.

It is also possible to monitor the service life of the bladders and notify the service team if any limit value is exceeded.

Users can also generate various reports, for example on process capability (Cp) for selected temperatures and pressures for each press, or trend and data analyses for each individual tire.

mlp shares data with the final checking unit via the local network communications system. The grading codes are transmitted to the SCADA system for analysis, which makes it possible for maintenance tasks to be carried out faster. Networking in this way also creates the preconditions for end-to-end tracking and tracing of production data.

A further module lets inventory lists and documentation like electric circuit diagrams and maintenance instructions be saved and called up when needed at the press of a button, which also helps ensure a high level of availability.

...for a much more efficient vulcanization process

All these options lead to much better process and product quality, and improved productivity and efficiency. Analysis and evaluation also result in improvements in heating times. Operators can be more flexible and make the best possible use of their production lines as a result.

The modular path to a customized SCADA solution

The mlp SCADA system for curing presses has a modular structure, which enables its functions to be adapted to the user's individual circumstances and expanded whenever needed. The following elements are currently available:

- Status overview
- Alarm and process analysis
- Synchronized closing
- Bladder life cycle monitoring
- Reports
- Tracking & tracing
- Quality
- Remote access and messaging
- Production and formula management
- Inventory management
- Documentation