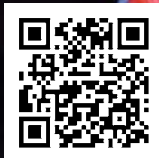


Customer Success Story: mts Perforator GmbH


Markets Served
Construction Vehicles



Eaton's smart devices enable us to implement detailed data access worldwide down to the field level.

*Norbert Simdon
working in electronic support at mts*

Tunneling Towards Industry 4.0

Location:

Valluhn, Germany

Segment:

Machine Building

Problem:

Precise and reliable operation of tunneling machines

Solution:

SmartWire-DT, HMI/PLCs, PKE motor-protective circuit-breakers

Results:

mts is now capable of safely operating its tunneling machines without the risk of manipulation; thanks to smart devices such as PKE the company can conveniently monitor its machines in operation worldwide, carry out remote diagnostics and quickly react in the event of a fault to ensure improved system availability for the end customers

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Background

The worldwide demand for innovative tunneling technologies is large, both for traffic systems and also in supply and drainage technology. The Valluhn-based company mts Perforator GmbH (mts) is part of the Schmidt-Kranz Group. The company develops and manufactures tailored solutions for trenchless tunneling, with a portfolio of technologies including auger systems, slurry systems and EPB systems.

Challenges

Several pushbutton actuators and indicator lights which have to be connected with the controller are used for the operation of the tunneling machines via the assigned control panels. In its search for an economical solution that also met the demanding requirements of the tunneling experts with regard to reliability and manipulation security, the company came upon the SmartWire-DT communication

system from Eaton. SmartWire-DT is an innovative connection and communication system which eliminates the need for any complex and error-prone point-to-point control wiring of components such as switching devices, sensors and actuators with the central controller.

With SmartWire-DT the data cable and the power supply are combined, thus enabling the standard communication of all modules with each other. Each function element in the system has its own address as well as the facility for self-diagnostics.

Solution

The control panels of the mts machines use RMQ control circuit devices which are all networked as SmartWire-DT slaves via the green eight-pole ribbon cable. For mts it is important that any manipulation or impermissible operation by the drill operator is prevented. This is made possible with SmartWire-DT as the system does not allow any contacts to

be bridged. Another key criteria for the machine builder was the fact that Eaton also provides worldwide service and support as well as a 24-hour delivery service for spare parts.

On account of its good initial experience, mts decided to work more intensively with SmartWire-DT and Eaton's Lean Solution philosophy. This is based on the consistent application of lean management methods to engineering and automation processes. The aim here is to reduce all forms of waste. This focuses the optimization of costs, materials and time. For this Eaton developed a solution consisting of products, technologies and processes with which savings can be implemented along the entire value chain. Lean Solution combines three areas for which SmartWire-DT is the connecting element: Lean Connectivity, Lean Automation and Lean Power.

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Powering Business Worldwide

Lean Automation means fewer components and less engineering. The I/O level is integrated in the switchgear such as motor protective switches, soft starters, variable frequency drives or circuit-breakers, which now communicate directly with Eaton's HMI/PLC devices. These can handle all control, visualization and data management tasks as a single unit, so that lean automation solutions can be implemented which at the same time can be designed faster and easier. These Lean Automation systems eliminate the need for entire device layers such as the I/O modules of a central PLC, and consequently also the required acquisition and maintenance costs.

The next step towards Lean Automation was taken recently by mts with the integration via SmartWire-DT of the PKE motor-protective circuit-breakers with electronic overload protection and also the NZM circuit-breakers in the switch cabinets of the tunneling machines. The combination of PKE and SmartWire-DT now brings the benefit of implementing enhanced drive monitoring: Process relevant data such as the actual motor current, thermal load and operating states can be monitored continuously and analyzed without any costly analog I/O technology.

In this way, Eaton has managed to convert switchgear into intelligent components. Smart devices such as PKE, which are able to communicate with any PLC in an open architecture, are an important step for the company in order to offer complete Industry 4.0-capable solutions.

"Eaton's smart devices enable us to implement detailed data access worldwide down to the field level," explains Norbert

Simdon, working in electronic support at mts. "We are thus able to monitor the current states of the 50 tunneling machines presently in operation worldwide, i.e. with condition monitoring. We can thus carry out remote diagnostics quickly in the event of a fault, provide a remedy and therefore ensure improved system availability for end customers. For example, we use the data of the PKE in order to indicate a repeated overload centrally and rectify the fault in good time. At the same time the smart devices enable us to protect our machines worldwide from manipulation."

In the past the local machine operator could manually change tripping characteristics and therefore run a motor continuously at too high a load. However, as the SmartWire-DT concept stores all setpoints centrally in the controller, the machine is automatically shut down if the tripping values of the motor-protective circuit-breaker are manipulated, thus preventing any risks to the user and the machine.

Results

As an innovative technology, SmartWire-DT is a trailblazer for Eaton in the development of the networked world of Industry 4.0. The company is thus pursuing the strategy of applying SmartWire-DT continually to all standard components and converting it to smart devices. These intelligent components will support machine and plant builders like mts to implement lean, smart and efficient methods and come one step closer to implementing complete Industry 4.0 solutions.



The Power of One: A complete system is being developed jointly by Eaton Hydraulics and Eaton Electrical, enabling both hydraulic and electrical components to be connected to SmartWire-DT and monitored centrally



mts had already experienced the benefits of Lean Connectivity with SmartWire-DT in several projects. Besides the inherent manipulation protection in the system, both the project engineering and the wiring effort for the control panels and the required costs could be considerably reduced.



Eaton Insight:
Success Story – mts Perforator GmbH tunneling machine
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April 2014

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