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Machine safety 4.0

Generating data from safety switchgear for condition monitoring

In modern condition monitoring concepts, machine components have become 'data collectors', offering up information about the anticipated availability of plants and systems. The benefits of these concepts are obvious, and machine safety can and must be integrated. Siegfried Rüttger, Project Manager for Industry 4.0 at the Schmersal Group, explains the background and opportunities.

The Schmersal Group offers a Safety to Cloud solution. What are the benefits of connecting safety switchgear to the cloud?

In a nutshell, the benefit is improved transparency. Machine and plant operators get a whole range of data that is collected during cyclical diagnostics of the safety systems, which they can then use to optimise machine as part of condition monitoring.

Can you give any practical examples?

Users of our Safety to Cloud solution, for instance, can retrieve the switching cycles of their safety switchgear at a central location. They can then identify which safety doors are opened most frequently, leading them to the obvious conclusion that there are frequent faults in that particular hazard area. In that case, they then need to go and find out why. So networking and digitisation in production, or more accurately the evaluation and intelligent analysis of data, contribute to enhanced machine productivity. That's classic condition monitoring and, incidentally, a very popular and practical application for digitisation of maintenance at the moment.

How does the data flow work in practice?

Our important safety interlock and safety sensor series are equipped with an SD interface, so serial diagnostics of sensors switched in series, and refers to a communication protocol for the transmission of non-safety-related data, or data relevant to diagnostics. The data can be transmitted to the cloud via OPC UA through our PSC1 safety control system and an edge gateway. That's the basic principle behind our Smart Safety Solution.

You mentioned the switching cycles of safety switchgear. What diagnostics and maintenance-related data can be transmitted in this way and how does the evaluation work?



Siegfried Rüttger, Project Manager for Industry 4.0 at the Schmersal Group

The SD bus captures a wide range of information such as switching cycles, limit warnings, distance warnings, safety statuses and more. When you're using optoelectronic safety equipment, you can monitor the lenses for dirt and proper alignment and if the signal weakens, generate a warning notification. The diagnostics information that is evaluated can be displayed on screens or mobile devices like tablets and smartphones. This makes our Safety to Cloud Solution a classic tool for use in predictive maintenance.

You just mentioned optoelectronic safety equipment and the fact that their data can also be integrated into the cloud. Are there any particular advantages of that?

Certainly. If there's dirt on the lens of light barriers for example, or if the alignment of the transmitter to the receiver changes and the signal weakens as a result, you can transmit

a warning notification. As part of predictive maintenance, the user can then take corrective action before the light barrier safely shuts down. It helps to prevent unscheduled machine downtime.

Which cloud is being used with the solutions that have already been installed?

As I've already mentioned, we're open in that respect. Many industrial users working in maintenance use Microsoft Azure or Siemens MindSphere as these platforms offer such a range of useful functionalities for displaying, evaluation and saving data - in tables, diagrams and graphs, for example.

Who are the users of cloud-based condition analysis and predictive maintenance in practice? Maintenance planners or service personnel in the field?

That largely depends on the way activities are allocated within the individual maintenance departments, and the size of those departments. Both are reasonable possibilities.

You're in charge of the Industry 4.0 projects at the Schmersal Group. What topics and solutions are on your agenda at the moment, aside from Safety to Cloud?

An overarching theme is the way in which digitisation and Industry 4.0 affect machine safety. If components are manufactured in highly-automated one-size production batches, machines need to offer much greater flexibility, as must the safety equipment. We're working on these kinds of solutions, not only as a manufacturer of safety switchgear and systems but also as a service provider.

What services do you offer in this area for safety-related digitisation?



Off into the cloud with the Smart Safety Solution.



The PSC1 safety control system is one option for transmitting data to the cloud

We operate under the brand tec.nicum to offer services such as support to machine manufacturers on machine safety, but also safety consultations and optimisation of existing machines and plants that are undergoing modernisation and retrofitting. This is often all about enhancing throughput capacity or flexibility, which require new machine safety concepts. We can offer professional advice to machine operators in this regard.

One final question. Why should machine users concern themselves with the integration of machine safety into Industry 4.0 concepts and digitisation projects?

It's simple, to benefit from reduced downtime and to have the ability to better schedule machine maintenance.

SPS IPC Drives: new safety field box

Schmersal will be presenting its new safety field box for Profinet/Profisafe systems at SPS IPC Drives 2018 (hall 9, stand 460), which is due to be launched in 2019 and

offers simple plug and play installation of up to eight safety switchgear units. The universal device interface with eight-pin M12 connector enables connection of a wide range of different safety switchgear units. For the user, it represents a straightforward and cost-effective installation solution which enables flexible and individually configurable safety solutions for complex machines and plants. The additional transmission of diagnostics signals from connected devices to, if required, the cloud, as discussed in the interview above, creates the conditions for optimal process transparency and fault-free machine operation.

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