A STANDARD INVESTIGATED

In June last year, the reworked DIN EN ISO 13849-1 standard was published. The editorial team chatted to machine safety expert Siegfried Wolf from K.A. Schmersal GmbH & CO. KG about how the changes and additions will impact machine constructors.

Mr Wolf, what is it that you do at Schmersal?

I have been in charge of the training centre at Schmersal Group for a few years. Our tec.nicum academy offers a comprehensive range of courses and seminars on machine and plant safety. This is both for the continuous professional development of our own employees and as an open range of training options for external participants at a total of nine centres across Germany.
Since 2017, I have also been responsible for the tec.nicum consulting service division. In 2016, we realigned the Schmersal Group service division under the name tec.nicum, which was already known in the market. Based on our motto "Excellence in Safety", we offer our customers expert product and manufacturer-neutral advice and support on the design of machines and plants in compliance with relevant norms and regulations.

Has the reworking of the DIN EN ISO 13849-1 standard made work easier for you?

As, in line with our training and consultancy services, we are constantly confronted with new situations and problems, this reworked standard has a massive impact on our daily work in as much as we are faced with large numbers of new questions. At tec.nicum, we do not have the luxury of being able to define our own operational standards which we can apply over and over again. At the end of the day, the customer comes to use with their requirements and the individual problems associated with them and wants us to provide them with a solution. In this respect, I can only say that our work has become more varied because of the revised version, but not necessarily easier.

One new thing is that the probability of occurrence of a risk event can be taken into consideration when defining the necessary performance levels. What does this mean in individual cases?

If the probability of occurrence of a risk event is considered low, then the necessary Performance Level (PLr) may, under some circumstances, be able to be put down a level in future. While this sounds like a relief for users of the norm, they must still take into consideration that the application of this new option must always be based on robust and, above all, documented justification.
For example, reliability indices can be used to justify the decision, or perhaps the accident history of comparable machines and systems could be used. Where an argumentation is based on accident figures, it must also be taken into consideration that these accidents relate to machines which are already in service (including the safety measures implemented). Low accident numbers on comparable machines or systems must therefore be considered a confirmation of the effectiveness of the measures taken and not as an argument for reducing the PLr for the user's own machine. At the same time, this is only an option and must be applied with due consideration. If the user decides not to apply this option, there are no implications.

What does the change to the definition of the terms "hazard situation" and "operating mode with increased conveyor rate or operating mode with continuous conveying" mean for machine constructors when it comes to implementation?

The amendment to or inclusion of the two definitions makes the application of this standard much clearer. It means the standard applies only for SRP/CS (safety-related parts of control systems) with high and continuous conveyor rates. This means that the relevant mode is required more than once per year.

ESSENTIALLY, I AM ALREADY WORKING ON THE ASSUMPTION THAT THE REWORKING OF THE NORM WILL MEAN SYSTEMS CAN BE BETTER DESIGNED TO MEET THE ACTUAL SAFETY REQUIREMENTS

How will the newly added definition of "proven in practice" impact plant design?

Firstly, we need clarification that there is no confusion between the newly introduced term "proven in practice" and the term "proven component", as the meanings are different. Evidence of this new "proven in practice" characteristic is based on operational experience with the use of a specific configuration of a component in a specific application. The evidence must prove that the probability of hazardous systematic errors is so low that every safety function also meets the requirements of the respective Performance Level (PLr) required.

Has anything changed with respect to the aspects of higher-level risk and separate hazards, and what does this mean?

Appendix A - A3 of the current version of EN ISO 138491-1:2015 or DIN EN ISO 138491-1:2016-06 clearly states that every risk determined in line with the risk assessment can be considered and evaluated alone.
But as a result of this approach, a separate performance control element must be considered at the end of the I-L-O chain for every single safety function. But if multiple risks are associated with one another within a machine, then it essentially makes sense to consider them in line with a joint risk assessment and to secure the higher-level risks by means of a shared safety function tailored to the hazard situation. One example is a continuous test cell for rectifiers where the testing personnel are exposed to both risks from mechanical energy (blows, crushing, being pulled in) and risks from the test current (electric shock). Both hazards could be secured by means of a single safety function which triggers a safety-related stop when the protective cover is opened. The user is thus given the option of bundling measures from a control engineering perspective.

Does the reworking of the norm allows systems to be better designed to the actual needs with respect to safety requirements?

I would assume so. We are currently still in a phase in which many users are sceptical about the new opportunities and regulations because they are lacking experience and example applications. But once the first machine constructors braved the move to the new regulations, it became apparent that more would follow and thus gain their own experiences. The aim now is to make this experience accessible to as many people as possible in order to allow dynamic exchange of experience. I am working on the assumption that, over the coming months, the market will continue to reveal best practice examples which will serve to clarify any questions which are still open.

Interview by Dr Michael Döppert, Editor in Chief

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The norm DIN EN ISO 13849-1

Die Norm DIN EN ISO 13849-1 (Safety of Machinery – Safety-related parts of controllers - Part 1: General design principles) sets out safety requirements and guidelines for the principles of design and integration of safety-related parts of controllers. For these parts, specific characteristics and Performance Levels are defined which are required to carry out the relevant safety function. It is applicable to safety-related parts of controllers, irrespective of the technology and energy used (electrical, hydraulic, pneumatic, mechanical). The standard does not define which safety functions or performance levels are used for a specific case.

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