Machinery Directive puts value on safety

The new EU Machinery Directive will enable end users and specifiers to introduce quantitative assessment of safety factors, over and above the qualitative approach embodied in EN 954-1. **Paul Considine**, of **Wieland Electric** explains

When the new Machinery Directive comes into force across Europe, compliance will be achieved through two standards: EN ISO 13849-1 and EN 62061, together replacing the current EN 954-1

On 29th December, European Directive 2006/42/EC, otherwise known as the Machinery Directive, is scheduled to come into force across Europe, amending Directive 95/16/EC. Compliance will be achieved through two standards: EN ISO 13849-1 and EN 62061, together replacing the current EN 954-1.

As of this time there is no extension period for EN 954-1 and as of the 29th December the new Machine Directive will come into effect. As such EN 954-1 will not be harmonised any more and EN ISO 13849-1 and EN 62061 will become the harmonised standards. There is planned a final review meeting of the Machinery Working Group early in December and this will be the only chance for any changes to this.

The EU Machinery Directive is based on the premise that, while it is not feasible to achieve zero risk in the real world it is possible to achieve an acceptable residual risk. Consequently, where safety is dependent on control systems, those systems must be designed to ensure the probability of functional errors is acceptably low. Or, if that isn't possible, any errors should not bring about a loss of the safety function. The harmonised standards will ensure all installations meet these requirements.

EN ISO 13849-1 takes its core from the familiar categories in EN 954-1: 1996 by examining complete safety functions, including all the components involved in their design. However, it goes beyond this qualitative approach to include a quantitative assessment of the safety functions, based on a performance level (PL) that builds on the category approach. The standard also describes how to calculate the PL that can be achieved when several safety-related parts are combined into one overall system. Any deviations from EN ISO 13849-1 are referred to IEC 61508.

As noted above, EN ISO 13849-1 will be operated in conjunction with EN 62061, which is a sector-specific standard under IEC 61508. Based on quantitative and qualitative examinations of the safety-related control functions, EN 62061 describes the implementation of safety-related electrical and electronic control systems on machinery. It also examines the overall lifecycle from the concept phase through to decommissioning.

In EN 62061 the performance level is described through the safety integrity level (SIL), and the safety functions identified from the risk analysis are divided into safety subfunctions. As a safety-related control system is made up of several subsystems, these safety subfunctions are assigned to the actual devices (hardware or software) that are the subsystems or subsystem elements. The safety-related characteristics of the subsystems are described through the SIL and probability of dangerous failure per hour (PFH_D) parameters.

Clearly, the Machinery Directive introduces increased complexity to the process of ensuring safety, but in addressing the changes that have been wrought by new technologies it also lends itself to the deployment of technology to facilitate compliance.

The one thing that hasn't changed, of course, is the principal raison d'être of such systems, namely to ensure that safety systems are operating properly. The key is to achieve this in the most efficient and cost-effective fashion.

With newer technologies, for example, it is possible to address all of the subfunctions referred to above through the same control system, and to incorporate effective fault diagnosis into that system. As a result, while there will still be some downtime when a system shuts down due to a fault, this can be kept to a minimum.

Of course, electronic monitoring systems to reduce manual inspection following a safety alert have been available for some time. The trouble is they have tended to be very expensive, so the return on investment wasn't always sufficiently attractive to make them worth installing.

Now, however, there are relatively low-priced, computer-based systems that will continually monitor every aspect of safety systems, from post-top emergency buttons to light beams on conveyors, and quickly locate and diagnose faults.

For instance, Wieland Electric has been working with a company where any fault with a lathe would result in an engineer call-out and downtime costs of £10,000 per hour per lathe. Having installed Wieland's samos PRO system, the company can find the cause of the fault and often rectify it immediately. Even when a specialist engineer is required, less time is wasted on locating the fault.

Recent experience shows that companies adopting a smart approach to business are less vulnerable to the vagaries of the economy. So it makes perfect sense to apply a smart approach to safety control systems.

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