Bypassing of protective devices – a need for action by standardization bodies?

During plant visits, occupational health and safety experts frequently observe position switches on safety doors which have been bypassed, resulting in machinery being operated in an improper condition. Bypassing of this kind has repeatedly led to serious accidents, some of which sadly have been fatal. Generally, the party which bypassed the function is considered responsible. In the view of many OH&S experts, however, this definition of responsibility does not go far enough.

Normally, a machine deactivates hazardous areas when a safety door the position of which is monitored is opened. Should the position monitoring facility be bypassed, the door can be opened without the fact being registered by the control system. It is of course prohibited for protective devices to be rendered inoperative. The responsible parties in the plants and the manufacturers should nevertheless give greater consideration to the underlying reasons why protective devices are bypassed in the first place.

The reasons for bypassing may lie in the design of the machine itself. Possible reasons include a poor view of the process, malfunctions leading to repeated interruption of production, and excessive delays before operation can be resumed. In some cases, operating modes are not provided which are necessary for the completion of certain work required on the machine. Other factors may also be at work: switches may be freely accessible and easily removed, even at critical points. In addition, employees may not have been adequately informed of possible risks, and bypassing may be tolerated in the plant. Reckless use of substitute actuators for bypassing, whether fabricated by those concerned or obtained commercially, has also become widespread – but incorrect – practice.

In the light of this situation, KAN was asked by the institution for statutory accident insurance and prevention in the mechanical engineering and metalworking industry to gather and summarize opinion on the issue and to propose solutions within standards projects. A working group convened by KAN has drawn up recommendations for standardization activity and OH&S research. KAN considers the most important step towards the avoidance of bypassing to be the application of user-oriented and ergonomic concepts for equipment operation and protection, beginning at the design stage; such concepts should leave no incentive for bypassing in later operation. OH&S institutions have a valuable role to play in the drawing up of balanced concepts in conjunction with manufacturers and operators.

Following this stage, technical solutions must be found by which bypassing can be made more difficult. The working group has therefore recommended that standard ISO 14119/EN 1088, "interlocking devices associated with guards", be adapted. This generic, type B standard is intended to offer a range of solutions, including for location of the switches, which can be selected for the machinery-specific standards. This would enable an appropriate level of protection to be laid down in consideration of the machine and situation concerned. The technical solutions are largely contained in Section 5.7 of the existing version of the standard, concerning arrangements for the reduction of scope for bypassing (such as shrouded installation of the switches); the structure should however be improved to facilitate referencing, as the reference to ISO 14119/EN 1088 contained in many type C standards in the past is too general.

In its plenary session held at the beginning of October 2003, the responsible ISO/TC 199, "Safety of machinery", accepted the German petition for an amendment to Section 5.7 of the standard, to be drafted on the basis of the proposals drawn up by KAN.

Although the responsibility shared by operators should not be diminished, it is crucial that the guidelines contained in the generic standards describing the means by which bypassing is to be avoided and made more difficult are also observed by designers. One aspect of this is that the latter must include "reasonably foreseeable misuse" in their risk assessment in addition to "intended use". All work to be performed on the machine by an operator must also be possible with the observance of an appropriate safety level. With regard to standardization, this means that the existing type C standards must be reviewed and if necessary improved in consideration of practical application with regard to their concepts for protection and operation and the technical measures contained within them for the prevention of bypassing.

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See KANBRIEF 2/01, p.12