

Fault exclusions - an underestimated risk

Technical contribution: Requirements for safety switch and trapped key interlock systems.

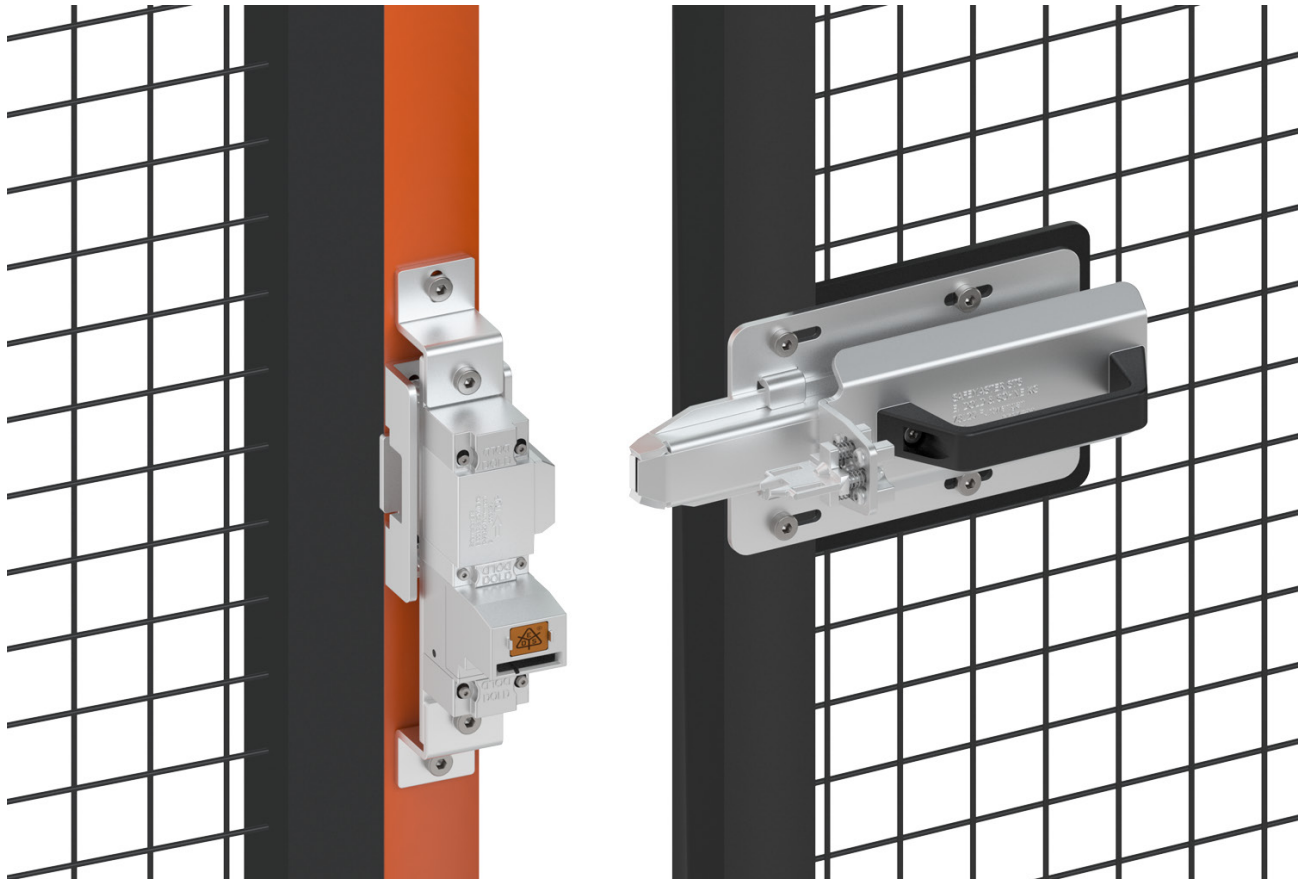


In addition to general functionality and functional safety, cost plays a decisive role in the commercial competitiveness of machinery and plant. However, despite of all the cost constraints placed upon machinery designers, the view of critical risk and the associated incalculable follow-up cost of a failure causing an injury must be taken into consideration.

When developing a safety system for machinery or plant, the products suitability for the specific application must be taken into consideration when selecting and assembling the components of the safety system. This is determined not only by the mechanical features, such as stability, strength and the choice of the right materials but also by the normative requirements and safety aspects, such as the safety structure (category), reliability (MTTFd) and the inbuilt fault detection mechanisms (DC). Designers and planners often come up against limitations in this regard which they can only eliminate by claiming a fault exclusion.

Why fault exclusions?

According to section 7.3 of EN ISO 13849-1, fault exclusions are a compromise between the technical safety requirements and the theoretical possibility of a fault occurring. When considering fault exclusions in a safety system, the reasons for the exclusions must be seriously considered. It should be noted that in accordance with the general principles of the Machinery Directive 2006/42/EC, "the current state of the art must be observed".



Purely mechanical safety door protection

Under certain conditions it may be necessary to exclude faults, the preconditions for this include for example: the technical improbability of the fault occurrence, generally recognized technical experience and the technical requirements with regard to the application and the hazards. The risk of the claimed fault exclusions failure is then carried by the designer. However, the situation is different if fault exclusions are made for financial reasons, e.g. by using lower cost components, even though technical solutions exist that do not require any fault exclusions i.e. "the current state of the art".

The consequences of excepting fault exclusions.

One should always be aware of the consequences of accepting fault exclusions: The person who claims a fault exclusion can be held liable in the event of a failure occurring, in addition the reasons for the fault exclusion must be listed in the technical documentation and enclosed with the machinery or plant.

This would be considered a clear disadvantage compared to the use of products that do not require fault exclusions to meet the safety standards. The consequences of an excluded fault occurring cannot be neglected, not only with regard to the direct consequences of a local failure but also with regard to machinery and plant already delivered and in use.

This is best demonstrated by the well-publicised reports on recall and retrofit campaigns by the automotive industry. Machine manufacturers who use procured safety components with fault exclusions should be aware that they are also liable in the event of a failure occurring!

Safety systems are improved without fault exclusions.

For these reasons, Dold have developed a safety switch and trapped key interlock system without compromise –

SAFEMASTER STS. A TÜV-certified system which is available in stainless steel and fibre reinforced polymer, is suitable for use in standalone safety applications up to category 4 / PLe according to EN/ISO 13849-1 - without requiring any fault exclusions

This does not relieve the designer or system planner of his responsibility, but at least makes the decision easier, because with SAFEMASTER STS he is on the safe side - without fault exclusion!

Choosing Safemaster STS system does not relieve the designer or system planner of their responsibility, but it at least makes the decision easier because with SAFEMASTER STS they are erring on the safe side, as no justification is required for including a fault exclusion!

In addition, SAFEMASTER STS offers further important advantages such as its flexible modular design, its retro fit expandability and its flexible adaptation to the user's application



Electromechanical safety door protection with release of 6 keys for the opening of wirelessly safeguarded side doors

SAFEMASTER STS combines the advantages of safety switches, guard locks, trapped key interlocks and command functions all in one system. The modular, expandable system also has the possibility of safeguarding gates wirelessly, therefore reducing installation, retrofit and maintenance costs for the user. The high BI0d/MTTFd of the products also ensures STS systems have a long working life (T10d). The stainless-steel versions offer a solution that can withstand even the toughest environmental and temperature conditions.

Conclusion

If machine designers want to minimize the risk liability for their machinery and plant, the use of components that meet the highest safety requirements are recommended. The components should achieve the required performance level without requiring any fault exclusions. Regardless of a potentially higher initial acquisition cost, this strategy proves to be a more cost-effective option in the long term as it protects against the incalculable liability risk and potential recourse claims if a fault exclusion failure leads to an injury.

Further information can be found at www.dold.com



Safety switch and key transfer system SAFEMASTER STS for applications up to category 4 / PL e