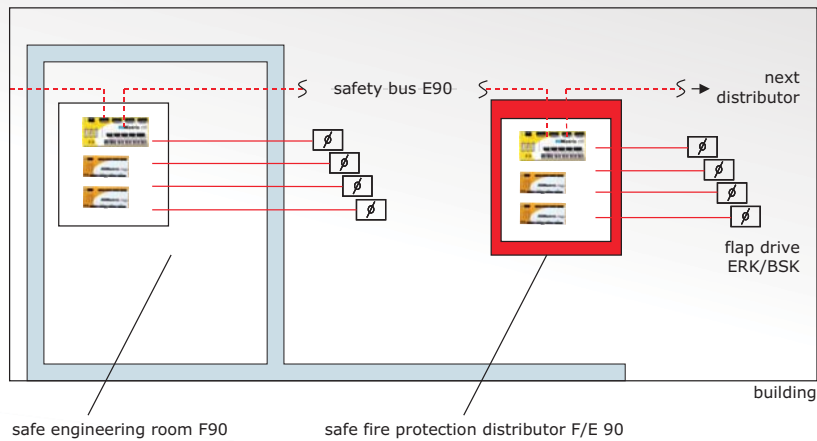


Special edition

“Preserving functionality”
meets
“functional safety”



The situation



Automated "fire protection and smoke extraction system" must function reliably and correctly at the time of the fire event. The demand for a safe "protection system capable of being certified" is emphasised in the technical inspection regulation (Technische Prüfverordnung (TechPrüfV)), which requires the demonstration of the operational safety of such a system. This demonstration includes a statement regarding the probability of failure of the electric and electronic components. The higher the hazard potential due to a non-functioning system, the lower their failure of probability must be. If there is an additional demand for the preservation of functionality, then the "electro-technical fittings" in the event of fire must maintain their functionality over 30 to 90 minutes (depending on requirement).

This attempt was first carried out in a fire trial by HIMA and Celsion, during which a system unit "safety-PLC in the fire protection cabinets" maintained full functionality over 90 minutes. An acceptable "automated fire protection and smoke extraction system" thus met the requirements of

- MLAR 11.2005 for "preservation of functionality" and
- DIN EN 61508 for "functional safety".



For the first time, the functionality of data communication in the case of fire with fire protection housings and safety-PLC under full load was demonstrated.

The fundamentals

MBO 2002, § 14 Fire protection

Building systems are to be arranged, constructed and maintained in such a way that the formation of a fire and the dispersal of fire and smoke (fire dispersal) is prevented and in case of a fire the rescuing of humans and animals as well as effective extinguishing tasks are possible.



MLAR 11.2005

Part 5: Preserving the functionality of electric wire systems in the event of fire

5.1.1 This functionality must be guaranteed in possible interaction with other facilities, devices or parts thereof.

5.2.2 Distributors for electric wire networks with preservation of functionality according to section 5.3 must...

b) be separated through housings for which the functionality of the electrotechnical fittings of the distributor in the case of fire for the necessary duration of the functionality is demonstrated by a building inspector's certificate of usability...



"Electrotechnical fittings"

here: Safety automation system

Highly reliable PLC in the network, communicating via safety bus.

Standards

- VDMA 24200-1: Automated fire protection and smoke extraction system
- MLAR 11.2005 Part 5: Preserving functionality
- TechPrüfV: Demonstration of operational safety
- DIN EN 61508: Functional safety, reliability

Assembly sections

- Detection
- Control of fire protection and smoke extraction flap
- Control + regulation of pressure ventilation systems
- Fire and smoke partition/door
- Safety-relevant ventilation systems

Areas of application

- Airports, high-rises, shopping centres, hospitals, train stations, tunnels,
- Clean rooms, laboratories, refineries, off-shore



Requirements of the fire protection housing

Verified along the lines of DIN 4102-2 "F90"
Verified along the lines of DIN 4102-12 "E90"

The solution

Before the fire trial



Type-tested system:

HIMatrix control modules in a Celsion fire protection housing of type CW 90 SO.

Requirement:

90 minutes preservation of functionality in case of fire with continuous data exchange of the systems.

91st Minute - end of the fire application



Length of trial: 90 minutes.

Carried out at a government Institute for Material Testing.

Functionality of the system during the entire length of trial confirmed.

Even after the after-glow time, the system is still fully functional.

After the cooling of the furnace



Fire protection



Safety - PLC



MLAR

Functional
safe
fire control

SIL



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