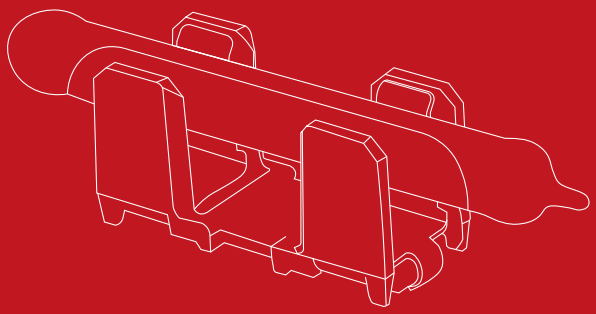
FIRE PROTECTION IN AUTOMATED GUIDED VEHICLES

WHITEPAPER



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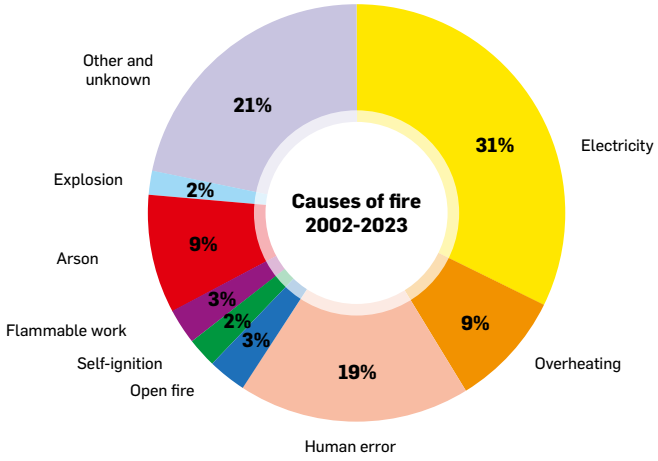
INITIAL SITUATION

Modern production and logistics processes are becoming increasingly digitalized and automated, with automated guided vehicles (AGVs) playing a central role. These systems increase efficiency, but bring with them new safety challenges, particularly in terms of fire protection. The question is whether traditional fire safety measures such as sprinkler systems and smoke detectors are sufficient in highly automated environments and how to effectively protect AGVs from fires before they spread.


DTS catches fire in a warehouse

RISKS FOR AUTOMATED GUIDED VEHICLES (AGVs)

AGVs are used in production halls and warehouses, where different hazards exist. In production environments, they are active in the vicinity of machines and hot surfaces, while in warehouses they transport goods between shelves with flammable materials. Both areas of use involve risks from electrical components that can lead to fires.



Source: Institute for Loss Prevention and Loss Research of the Public Insurers (IFS)

THE STATISTICS

The Institute for Loss Prevention and Loss Research of the Public Insurers (IFS) has been publishing fire cause statistics for years. Every third fire is caused by electricity and many fires occur within electrical appliances and systems. Business continuity is often at risk. There is a fire in Germany every 2 minutes. Every 6 minutes due to electricity.

Consequences for businesses after major fire incidents:
- 1/3 goes bankrupt immediately after the fire
- 1/3 goes bankrupt within 2-3 years after the fire
- 1/3 remains bankrupt in the long term after a fire.

In the best-case scenario, an insurance company will pay out the sum insured in the event of damage. However, the damage cannot usually be compensated in monetary terms. This is why there are statistically so many insolvencies after a fire. Preventive fire protection makes sense to protect the business.

A fire in an AGV can quickly endanger surrounding facilities, especially if there is no employee on site. Insurers warn that fires and business interruption are among the biggest business risks. Traditional fire protection measures are often inadequate, as many fires start inside equipment. Complementary fire protection approaches are therefore necessary for AGVs.

DEVICE-INTEGRATED FIRE PROTECTION

Device-integrated fire protection is an important solution component. Device-integrated systems, which are integrated directly into control cabinets, systems and machines, for example, enable an immediate response to fire incidents - even before they can spread further. Early detection, localization and extinguishing of fires directly at their point of origin can protect critical systems, minimize down-times and ensure the safety of personnel and systems. Device-integrated fire protection is therefore tantamount to a paradigm shift. By integrating fire protection technologies directly into critical components and machines, this solution enables fires to be detected and extinguished immediately.

Maintaining operational continuity

Minimization of damage

Improved response time

The advantage of this solution over traditional fire protection measures lies in its speed and accuracy. External fire detectors or sprinklers often only react when an appliance is already fully alight and flames are shooting out of the housing - by which time, however, considerable damage has usually already occurred. The AMFE, on the other hand, takes preventative action directly in the appliance and thus prevents major damage. Another advantage: unlike water or foam-based extinguishing systems, the special extinguishing agent of the AMFE does not cause any residue or consequential damage to the electronics, as it is non-corrosive and non-conductive. After automatic extinguishing, the environment of the AGV remains undamaged; often only the triggered component in the device needs to be replaced.
AMFE technology can be integrated into new AGVs as well as retrofitted to existing vehicles. Manufacturers can plan the extinguishing modules directly into the control cabinets or other electrical modules of the vehicles. Operators of existing AGV fleets have the option of retrofitting their vehicles with AMFE to significantly reduce the risk of fire. This device-integrated approach has already been tested by independent bodies (AMFE is recognized by VdS Schadenverhütung and TÜV Nord, for example) and has proven itself in practice. This provides an immediate-response, residue-free extinguishing solution that is specially tailored to electrical systems - ideal for protecting modern, autonomous transportation systems.

AMFE

Automatic miniature fire extinguishing unit

Effective fire protection for retrofitting
Our AMFE system is able to identify smouldering fires at an early stage. At the same time, it is so small that it can be retrofitted directly into electrical switch cabinets, operating devices or technology boxes. The way it works is as simple as it is reliable: At the appropriate, pre-defined trigger temperature, the glass ampoule bursts automatically and releases the extinguishing agent it contains independently of the current. As it escapes, the extinguishing agent vaporizes immediately and can be distributed highly effectively in gaseous form throughout the entire extinguishing area.

Another advantage:
Unlike aerosol extinguishers, foam or water-based extinguishing systems, there is no consequential extinguishing damage as the extinguishing agent is non-corrosive, non-conductive and residue-free.

ADVANTAGES FOR OPERATORS AND MANUFACTURERS

The use of device-integrated extinguishing technology such as the AMFE offers numerous advantages for system operators and AGV manufacturers:

Shortened business interruptions: An early extinguished fire prevents major damage and long production downtimes, which reduces the risk of expensive downtime. Statistics show that over 40% of companies become insolvent in the first year after a serious fire.

Minimized property damage: By fighting the fire at the source, machines and equipment remain largely undamaged, which drastically reduces follow-up costs for repairs and cleaning and ensures operational continuity.

Improved insurability: Proactive fire protection is viewed positively by insurers. Innovative systems such as AMFE can lead to lower premiums and better contract conditions as the risk of fire is reduced.

Competitive advantage and compliance: Integrated fire protection offers manufacturers a unique selling point in terms of safety. Operators can meet strict fire protection requirements more easily, which increases competitiveness and strengthens the market position in the long term.

CONCLUSION

Advancing automation will require device-integrated fire protection in the future, as classic measures are often not sufficient for driverless transport systems. A combination of proven concepts with innovative solutions, such as an AMFE unit in the vehicle, can extinguish fires quickly and prevent major damage. Manufacturers of AGV are recommended to integrate such extinguishing systems right from the design stage in order to increase safety and market attractiveness. Operators of existing systems are advised to consider retrofitting with device-integrated fire protection solutions. Overall, device-integrated fire protection optimally complements traditional concepts and protects investments in automated systems while safeguarding operational processes in the event of an emergency. Early investment in safety solutions increases the resilience of systems and shows that innovation and safety belong together.

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