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Proactive solutions needed to protect conveyor belts from fire

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TRIAL BY FIRE Advanced Automated Systems undertook a series of tests on a mock-up conveyor to establish a test protocol to determine the effectiveness of a newly developed fire protection system

Currently a paradox exists between the legislative requirement and the code-based designs for the fire protection systems deployed for conveyor belt installations, says local fire detection and suppression solutions provider Advanced Automated Systems (AAS) technical director **Herbert Schmitz**.

He points out that the Mandatory Code of Practice (COP) for the safe use of conveyor belt installations under paragraph 8.4 requires the employer to prevent persons from being exposed to flames, fumes and smoke arising from a conveyor belt installation catching fire.

“The current code-based designs are reactive in their methodology demanding extreme temperatures or flames to detect and react to a fire. These systems therefore do not aid in the prevention of a person’s exposure to flames, fumes and smoke,” states Schmitz.

He notes that in addition to the Mandatory COP in Annexure B under the heading ‘Fire Detection’, there is a requirement for fire detection along the conveyor belt installation as the belt material can also burn and give off noxious gasses.

Schmitz highlights that currently the fire detection systems used underground and in conveyor tunnels lack real-time information on the exact position, temperature, scale and direction of the fire and are based on point type gas detection.

AAS recently researched the relevant fire standards and codes and compared them to the requirements of the Mines Health and Safety Act (MHSA) and concluded that the current available systems are not compliant with the Act.

“Therefore a new proactive approach needed to be developed to meet the challenges set by the MHSA and the Mandatory COP,” he states.

The company undertook a series of tests on a mock-up conveyor to establish a test protocol to determine the effectiveness of a newly developed fire protection system.

Tests were performed to assess the response of advanced fire protection systems provider Lehavot’s Delta pneumatic-electronic linear heat detector to rapid changes in temperature and fire tests were performed to assess the effectiveness of vehicle and plant fire suppression systems provider Ardent’s Dafo Forrex fire protection system.

For the detection along the conveyor belt installation, research led to fire detection systems used in the transport sector, specifically in Europe’s long underground tunnels.

Schmitz says the leading fire detection system used in Europe is the Lios De.Tect system. He explains that the system’s “state-of-the-art” frequency domain-based distributed temperature sensing system measures the temperature by means of optical fibres functioning as linear sensors, where temperatures are recorded as a continuous profile along the entire sensor cable.

Schmitz notes that the controller analyses the fibre-optic sensors for every 0.5 m up to 10 km in length with a resolution of 1 °C or better and with a response time of four seconds or less continuously. “As a result, the exact fire location, temperature and spread are accurately monitored along the complete conveyance installation,” he states.

Therefore, he believes that a proactive approach to conveyor belt safety, which enables compliance with the MHSA and the Mandatory COP and with real-time temperature information for the complete conveyance system, effectively increases employee safety and significantly lowers the probability of loss in production continuity occurring as a result of fire.

Schmitz states that by installing the Delta pneumatic-electronic linear heat detector within the conveyor framework at the designated areas, the rapid change in temperature can be detected before the ignition temperature of the conveyor is reached.

Additionally, he highlights that the automatic actuation of the Dafo Forrex wet chemical fire suppression system with its “unique” fire suppression abilities further inhibits the probability of ignition and the re-ignition thereof.

The Dafo Forrex system’s nozzles and pipework are installed within the framework of the conveyor at the designated areas.

The system is scalable and provides immediate protection to the area, where it is installed without the sizable investment required by complex water infrastructure and the damage caused by associated flooding of code based systems, Schmitz points out.

“The newly developed system, in its noncomplex design, facilitates ease of operation, and owing to

the limited maintenance required, compared to complex code-based reticulated systems, thereby provides higher levels of reliability and availability in the case of a fire.

“A proactive approach to fire safety saves lives and can be applied to various applications within the mining environment, particularly trackless mobile machinery, transformers and hydraulic power systems,” he concludes.

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