

Conveyor belts are a leading cause of underground fires yet they are avoidable

Wednesday, 17 October 2018, Johannesburg: This year has proven to be one of the deadliest for mine safety in South Africa since 2012. One of the leading causes of deaths and injury in mines is fire and a large proportion of fires are caused by conveyor belts. Conveyor belts are widely used in mining, both under and above ground.

Yet conveyor belt fires are largely avoidable, according to Herbert Schmitz, Technical Director at [Advanced Automated Systems](#), a leading fire engineering company. "Conveyor belts do not spontaneously burst into flames. They require significant heat energy and time to burn freely. Most conveyor belt fires are preventable if the correct technology is used to measure the environment around the conveyor installation for heat build-up. Informed action can be taken to stop the conveyor belt before it bursts into flames," he says.

Schmitz conducted detailed flammability testing on conveyor belts, which revealed that significant heat energy and time is required before the material on conveyor belts burns.

"To prevent conveyor belt fires and save the lives of miners, we need to replace the current focus on extinguishing a fire once it ignites. It makes more sense to detect the problem earlier and if there is a dangerous heat build-up, it is possible to cool surfaces with a wet chemical agent. This is much more effective than trying to extinguish a fire once it has started," he says.

Schmitz developed a system which provides preventative detection of heat-causing friction, effective cooling and therefore avoids conveyor belt fires.

Pyrolysis (when materials decompose at high temperatures) is the initial killer, as toxic gases are emitted from the conveyor belt. Heat-building friction is measurable, so it is crucial to measure the most common areas of heat build-up.

Current conveyor belt protection systems require the conveyor belt to be burning to be detected and cannot pinpoint the exact position and temperature of the fire, the direction in which the fire is spreading and the propagation of toxic fumes and smoke. While current systems deploy water deluge spray systems to suppress a fire after it has been detected, extinguishing it completely is neither guaranteed nor efficient when dealing with a flaming conveyor belt.

"For this reason, the system has temperature sensors at various hotspots. Unlike conventional sensors, our distributed temperature sensing system uses optical fibre cable to measure temperatures in a continuous profile. The system can detect thermal overloading during the build-up phase, before or during early pyrolysis. Should there be dangerously high temperature, our system raises the alarm immediately and provides the exact location of the problem area to ensure that a proper risk assessment and the correct technology can be applied. This means that the entire system can be cooled long before the flame ignites," Schmitz explains.

An independent assessment presented at the Mine Ventilation Society of South Africa's conference in June confirmed that the LIOS optical fibre sensor cable can continually measure the temperature with very high accuracy and resolution over vast distances, making it ideal for infrastructure. In addition, the cable responds to temperature changes faster than conventional thermal sensors, requires no maintenance and is immune to common factors such as humidity, dirt, smoke and radiation.

South Africa's Mine Health and Safety Act indicates the government's intent to prevent employees

from being exposed to any atmosphere that can be dangerous or which could negatively affect their wellbeing.

“If conveyor belts are left unmonitored, frictional heat can cause a significant mix of toxic combustion gases and smoke. Existing reactive conveyor fire protection systems can only act when it is already engulfed by fire whereas the LIOS optical fibre sensor cables can provide accurate, speedy warnings. Mines with underground conveyor belts should consider installing early and intelligent detection systems as the cost is minor compared with saving lives, not to mention business continuity interruptions and the cost of replacing conveyor belts,” he concludes.