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Using Distributed Sensing Technology to detect hot Spots on idlers of a conveyor belts: Application at a Chilean Mine.

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ABSTRACT

Over time, the idlers on a conveyor belt may develop friction, due to overload, a lack of maintenance, vibrations or normal wear. As a result, hot spots can form and pose a threat that could eventually lead to a fire.

Identifying hot spots and potential fires along the idlers of a conveyor belt in a Copper mineral transportation system has several unique challenges, such as the harsh environment (dust and vibrations) and the overall length of the conveyor belt. Detecting and precisely locating overheated idlers as early as possible can prevent not only down time, but potentially severe damage to facilities and personnel.

Nicolaides, an innovative industry supplier signed a partnership with AP Sensing (Germany) to introduce this technology in Chile, to meet the needs of their customers.

An important Copper Mine in Chile has relied on NYM/Nicolaides to address these challenges with a fiber-optic based DTS (Distributed Temperature Sensing). A DTS system provides quick and reliable overheating and fire detection along the length of the conveyor belt. The passive fiber optic cable acts as a temperature sensor. It is unaffected by dirt, dust, humidity, vibration and EMI (electromagnetic interference).

The important Copper Mine in Chile has initially installed 1.3km of sensor cable along a 200mt conveyor belt. The installation layout of the system is designed to detect which idler(s) of the conveyor belt are overheating, taking into consideration the need for easy removal for maintenance and the need for continuous operation. The sensor cable takes measurements every 8 minutes and forms a loop back to the DTS device for redundancy, and to attain the best temperature resolution and highest probability of detection. Four zones are defined along the length of the sensor cable, each with their respective alarm parameters and asset distances, to detect the precise location of any overheating idlers. Online software collects the data and displays it on site.

Finally this is just the first pilot project: Plans are in place to expand the coverage to 3.5km of the same conveyor belt and later to cover the complete transportation system (21km).

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