Bandweaver

CASE STUDY

PROTECTION OF PAPER MILL USING FIBER OPTIC LINEAR HEAT DETECTION (LHD) SYSTEM

The Scenario

The client based in Thailand owns a number of paper manufacturing plants with capacity of greater than 300,000 tonnes per year across the various sites. The plants use some of the most advanced technology in Asia including advanced automation and advanced quality control.

Based on the size of these plants and the desire for the client to proactively manage the critical infrastructure the client implemented a coal fire power generation plant on site with a conveyor belt system to distribute the coal.

One of the key operational and safety issues with conveyor belts in general are the fire safety concerns. Fires on conveyor belt systems are a real risk and one of the most common causes is the friction from seized rollers or from bearings overheating. The product on the belt in this case is highly flammable and so any ignition caused by bearing heating has the ability to spread rapidly and over long distances.

Client Requirements

The client had previously used more traditional fire detection technologies but had experienced particular issues including fire events which had gone undetected. The client worked with a consultant to adapt the strategy and 2 of the key considerations required for the detection technology included:

Pre-alarm detection: The ability to be able to detect any heating early on, prior to ignition.

Continuous coverage and clear zoning: Complete coverage at all points and the ability to pinpoint any event so that early action can be taken before the fire potentially spreads.

What Did We Do?

Innovative Energy (IE) together with Bandweaver designed and installed a fiber optic Linear Heat Detection (LHD) system based on Bandweaver's FireLaser system. IE has extensive experience in installing fiber optic monitoring systems including fire safety, condition monitoring and asset security systems.

Figure 1: Photo of plant showing conveyor belt runs

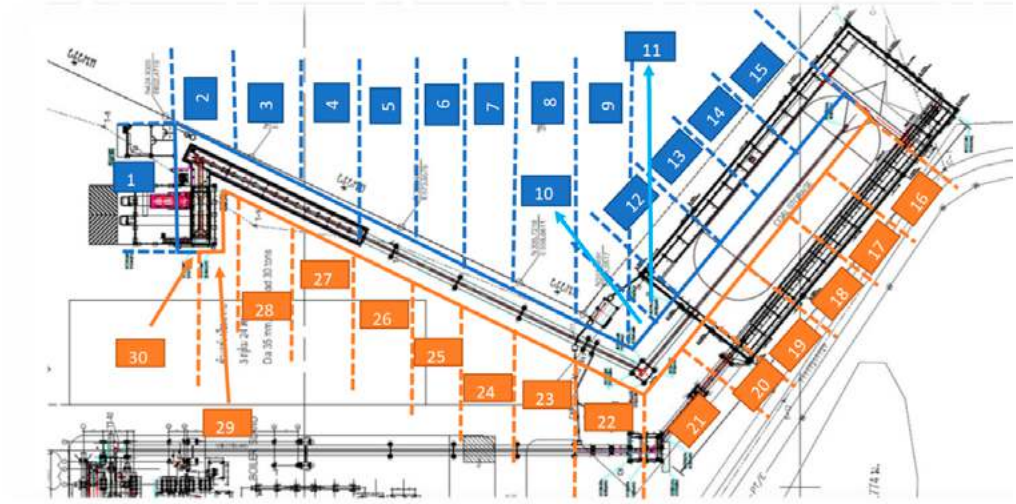

Figure 2: Example of zone configurations

SENSING CABLE INSTALLATION

The sensing cable was installed on the struts that support the bearings. This is close enough so that it can detect heat conduction or radiation from an bearings which have issues and are starting to generate frictional heat. They are positioned out of the way of the operations and so the cable does not get damaged during operations.

ALARM CONFIGURATION

The system used a dual strategy for heat detection with the following alarming levels set:

Maximum temperature 60°C: This is well above the atmospheric conditions within the plant but at a low enough level that any heating event can potentially be detected before full scale ignition

Rate of rise 11°C/minute: With intelligent rate of rise alarms, each zone can be specifically configured so that any heating event can be captured before the temperature reaches the maximum temperature and so gives an extra level of protection

Figure 3: Cable route shown on conveyor belt

Figure 4: Wall Mounted FireLaser Installation

One of the key factors to success was to ensure that the LHD sensing cable provided extensive coverage to the facility. One of the unique features of Bandweaver's FireLaser LHD system is that it provides measurement points every 50cm along the length of the cable and so any heat event can typically be located to within a few metres.

Benefits to the Client

The customer was extremely satisfied with the solution and has installed this technology across four facilities and plans to extend to other facilities in the future.

When evaluating the system, the client used a number of factors to make the choice across the lifetime of the project. Below are the following benefits which helped persuade the client the fiber optic LHD systems were a superior choice to other technologies.

Low Cost of Ownership: Fiber optic sensors are completely passive and are immune to EMC interference, not affected by dust or other environmental factors and are completely non-corrosive. Therefore, the lifetime of a fiber optic cable can be greater than 30 years, without any maintenance required.

High Reliability: Another benefit of the passive, inert nature of fiber optics is that they are very reliable and so there is no downtime. In addition to the lower maintenance costs, they also provide a higher level of coverage which lowers the overall risk and improves protection levels. The Bandweaver FireLaser has an MTBF of >29 years (Telcordia standard) and is SIL2 certified which makes it appropriate for some of the most stringent applications.

Fully Certified to Internationally recognised standards: The Bandweaver FireLaser DTS together with the sensing cable has been certified to both Ex explosion proof standards (Ex IIC) and also international fire standards (EN54 part 22). This gives the customer the knowledge and security that the system has been designed and tested to the highest standards in the fire detection industry.

Early Detection: With the rate of rise detection algorithms and complete coverage along the conveyor belts, the system can detect events prior to other fire detection sensors. With the fiber optic LHD you are able to take measurements every 50cm and so there is always a sensing point close to the fire, meaning it is detected earlier and any fire or water related damage is minimised.