Bandweaver

CASE STUDY

PROTECTION OF WAREHOUSE FACILITIES USING FIBER OPTIC LINEAR HEAT DETECTION (LHD) SYSTEM

The Scenario

Warehouses and distribution centres are environments that contain a wide variety of inventory that can be very valuable but also can be potentially flammable. The potential damage from a warehouse fire is not just limited to damage to inventory or buildings. Other considerations include environmental damage, cost of business interruption and damage to reputation.

There are a number of suppression and detection systems in place today but some of them have significant issues. For example if we take the case of sprinkler systems, for a sprinkler system to activate the fire already has to be of a considerable size before the sprinkler activates and the resultant water damage may be just as severe as the fire and smoke damage itself. It is therefore essential that the latest technologies are considered to provide continuous, comprehensive and early detection to protect the facility and stock from the threat of fire.

Fiber optic based linear heat detection systems are well known and established in transportation industries (road and rail tunnels, escalators..) but they are also becoming increasingly popular in industrial applications and are exhibiting a number of advantages over the conventional technology.

Client Requirements

The client owned a steel manufacturing plant with an extensive warehousing and storage area (240,000sqm). The warehouse had a high ceiling (9m) with multiple levels of racking. The stock was very valuable and so the customer wanted to ensure that the racking was protected at all levels and that a fire would be detected early on.

Traditionally, the owner had used a combination of aspiration detectors and beam detectors as part of the fire detection and suppression strategy. However, given that this is a manufacturing environment, there was a significant quantity of particles in the atmosphere. These particles were causing both the beam detectors and aspiration detectors to fail (due to blockages of pipes or a light blocking layer of dust and particles) and also caused false alarms as they were incorrectly being detected as smoke.

The owner was therefore looking for a more robust technology, which could still offer comprehensive coverage throughout the large area but with a higher reliability, lower maintenance costs and fewer false alarms.

What Did We Do?

BTS Yangin together with Bandweaver designed and installed a fiber optic Linear Heat Detection (LHD) system based on Bandweaver's FireLaser system. BTS Yangin has installed over 150 fiber optic LHD systems with over 430,000m of fiber optic sensing cable installed and so has extensive experience in designing and installing systems. BTS worked with the owner to design a multi-level detection system with over 1,800m of sensing cable within the facility.

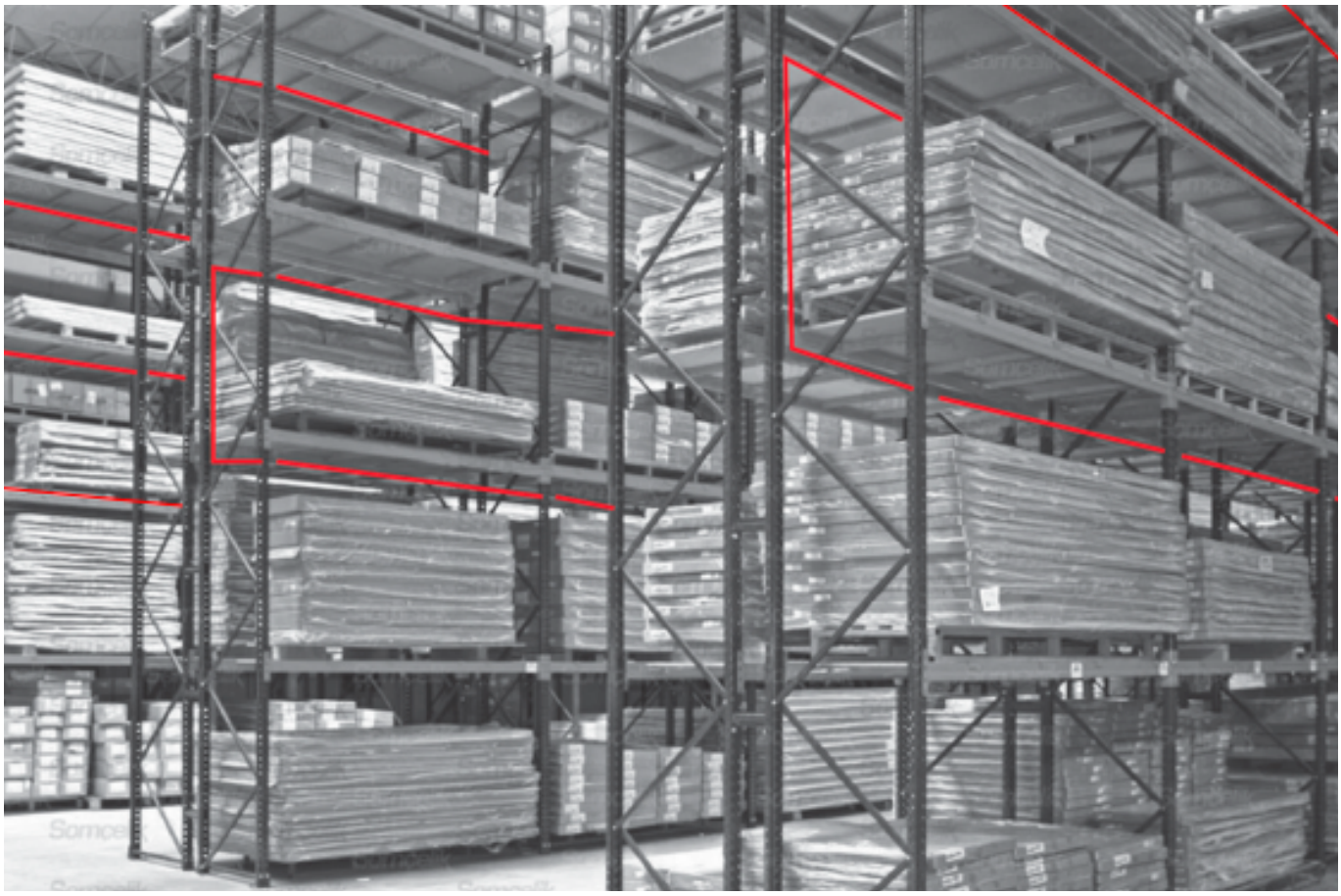

Figure 1 Installation of LHD cable on the racks

One of the key factors to success was to ensure that the LHD sensing cable provided extensive coverage to the rack at all levels. 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. In figure 1 above you can see the path of the fiber optic sensing cable on the racks and it is run backwards and forwards along each layer of the racks.

The FireFiber AT cable utilised is a lightweight, flexible yet rugged design which allows it to be easily installed and manipulated. It was installed in a 2-channel loop configuration which provides a level of redundancy. In the event the cable is severed at any point along it's length the system will continue to function

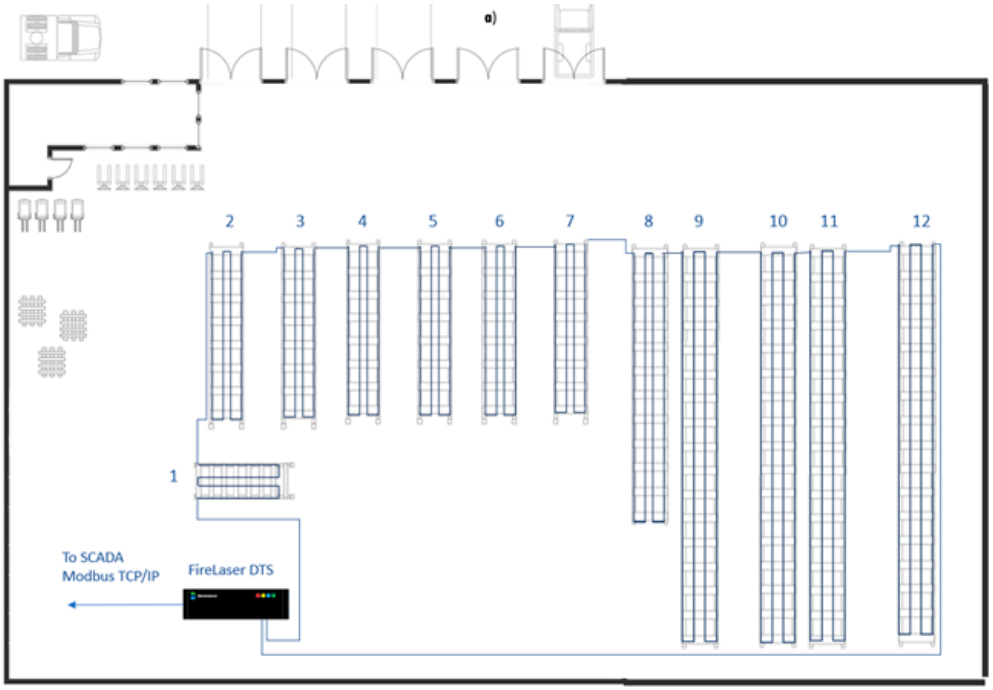

Figure 2 - Optical Path Schematic

The diagram above shows the optical path schematic of the looped configuration along 12 shelving units in one of the warehouse configuration. The cable path ran in a serpentine configuration backwards and forwards along each layer of the racks to provide complete coverage at every level.

Benefits to the Client

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. This was in contrast to the experience the owner had with aspiration and beam detectors both which required frequent maintenance.

For the evaluation of this project the customer took into account a 3 year investment period and over this period the LHD system was more cost effective than the other technologies.

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.

Fully Certified to Internationally recognised standards: The Bandweaver FireLaser DTS together with the FireFiber AT sensing cable has been certified to 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: Because the sensing cable was installed along all levels of the rack, it means that the precision and speed of detection can be much quicker. With aspiration and beam detectors these typically installed at height and it can take time before any smoke reaches that area. With the fiber optic LHD you are able to take measurements every 50cm, meaning it is detected earlier and any fire or water related damage is minimised.