

## SINOCHEM WAREHOUSE PROTECTION USING FIBER OPTIC LINEAR HEAT DETECTION (LHD) SYSTEM & MAXVIEW SOFTWARE



### The Scenario

Founded in September 2006, Sinochem Quanzhou Petrochemical Co is located in Quanhui Petrochemical Industrial Park at the Mezhouwan petrochemical base in Fujian. It covers an area of about 270 hectares and operates a 12-million-ton-capacity-per-year refinery project.

The refinery consists of two areas - the internal plant area and the external storage and transport area. As the facility stores and transports large amounts of combustible material, the design and implementation of the fire detection system was critical.

For the fire detection system, the focus was on continuous, comprehensive and early detection to protect the facility and stock from the threat of fire. The customer carried out an extensive review of a wide array of fire detection technologies including some of the more traditional technologies (e.g. conventional linear heat detection, beam detectors, aspiration detectors) as well as more advanced systems such as fiber optic linear heat detection systems based on Distributed Temperature Sensing (DTS).

Fiber optic based linear heat detection (LHD) systems are well known and established in transportation industries (road and rail tunnels, escalators etc.). However, they are still relatively new in other industrial applications. Recently though, LHD systems are becoming increasingly popular due to some of the key advantages they offer over conventional technology.

## Client Requirements

Sinochem employed a strategy of adopting advanced technologies with a proven international track record as well as a focus on high standards of environmental protection, safety and occupational health and clean production.

When evaluating the different fire detection technologies, Sinochem considered a combination of technologies including aspiration detectors and beam detectors as part of the fire detection and suppression strategy. However, given the extensive area and potentially highly flammable product, the owner wanted a system which had a higher density of coverage. The facility had 46 rows of shelving that needed to be monitored at multiple levels (eight levels) as well as a highly advanced automated loading and unloading system.

The owner was looking for a more robust technology that could still offer comprehensive coverage throughout the large area but with a higher reliability, lower maintenance costs and fewer false alarms. They also wanted the ability to visualise each specific alarm event to a higher level of accuracy than is available with conventional alarm panels.

Figure 1: Example of shelving



## What Did We Do?

Bandweaver worked with the customer to design and install a fiber optic Linear Heat Detection (LHD) system based on Bandweaver's FireLaser system and MaxView Software.

Given the large area of coverage required for this installation, 11 of the FireLaser DTS systems were utilised. The cable was installed below the shelving struts.

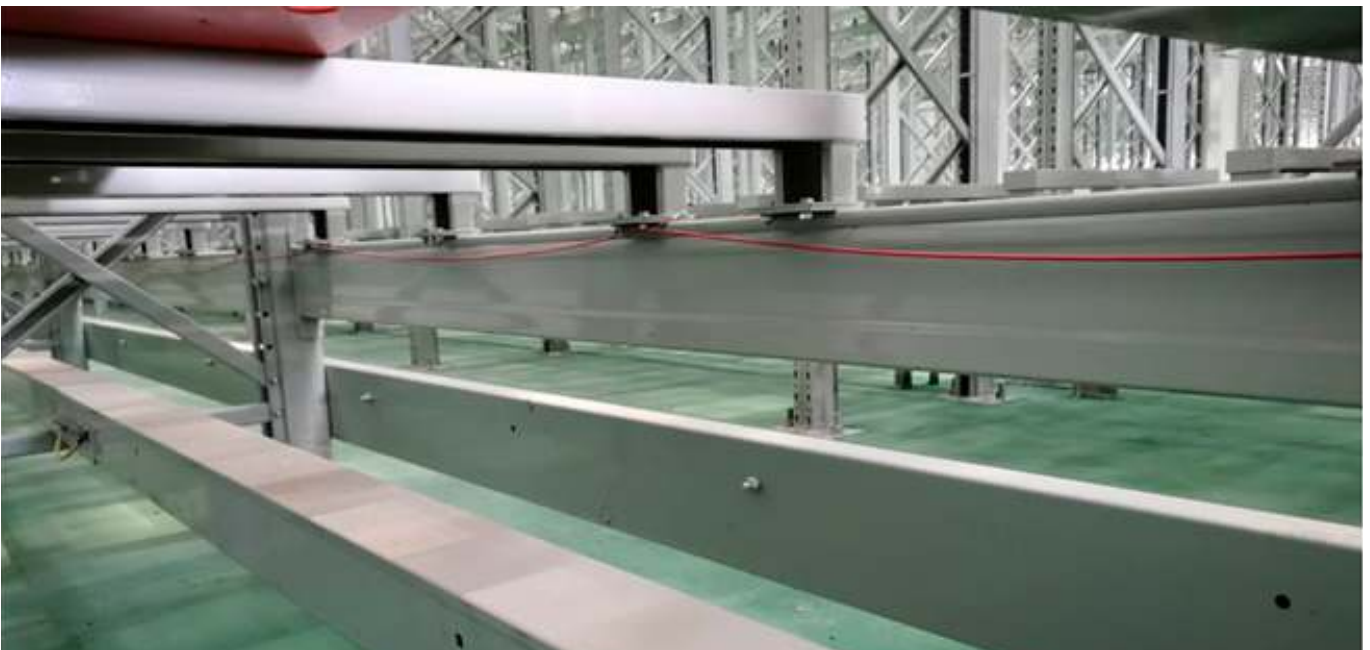


Figure 2: Positioning of sensor cable

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 2 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.

The MaxView software allowed the user to visualize precisely on which shelf there was a potential temperature event. The user requested two views, firstly the plan view of the warehouse with a schematic detailing the plan view of each of the shelves. The user can then click on any of the shelves and then will get a detailed view with a full temperature profile of each shelf.

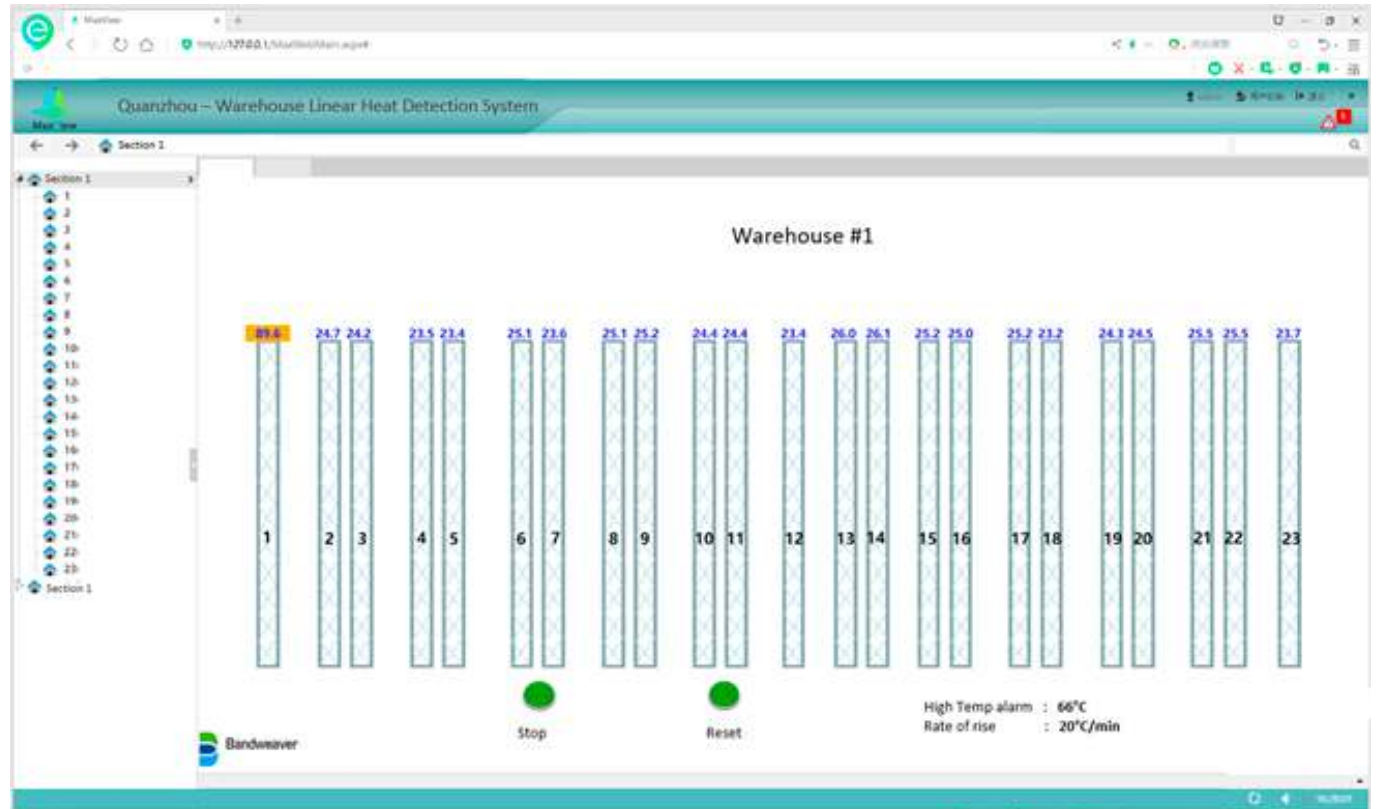


Figure 3: MaxView interface screenshot – plan view of warehouse

Figure 4: MaxView interface screenshot – plan view of shelves





Figure 5: FireLaser LHD controllers in control room



## 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 that helped persuade the client that fiber optic LHD systems were a superior choice to other technologies.

**Advanced Visualisation:** With the MaxView software, the user was able to customise the view according to their specifications as well as have the ability to view the precise location of any event to within 0.5m on any shelf.

**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 greater 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 typically installed at height, 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.