Bandweaver

CASE STUDY

FORT CANNING ROAD TUNNEL
Fiber Optic Linear Heat Detection (LHD)

THE SCENARIO

Fort Canning road tunnel cuts under Fort Canning Park in Singapore which is a site of significant historical interest. The tunnel is an access road and brings traffic to Penang Road, providing direct access to the Orchard Road area, which is one of the key tourist shopping areas in Singapore.

The bedrock of the area was the so-called Fort Canning Boulder Bed, a stiff clay with huge embedded boulders, located on the boundary of Museum and Singapore River planning areas, Singapore. Construction of this station and associated tunnels started in 2011 and was completed on schedule in 2017.

Monitored | Secured | Safe

CLIENT REQUIREMENTS

The tunnel is part of a 500 meter, uni-directional three-lane new road and the customer required redundant design for protection of such a key area.

The client required the latest technologies in Linear Heat Detection for fast and accurate alarming. Particularly they required a system with smart zones and smart alarms, with the capability for rapid detection using rate of rise and deviation alarms. The system was also required to have EN54 part 22 certifications.

WHAT DID WE DO?

Innovative Energy worked with the customer to design, supply and install a fiber optic Linear Heat Detection (LHD) system based on Bandweaver's FireLaser DTS system. Based on the requirements they decided on a dual LHD system and implemented 2 x FireLaser DTS systems

Figure 1 The dual system installed in the control room

The FireLaser DTS used is a 2-channel system with each channel having a measurement capability of 2km in length. The FireLaser DTS Linear Heat Detection can utilise both smart zones and 3 different types of smart alarms (max, rate of rise and deviation). Each zone can be individually configured with both alarms and pre-alarms also possible.

In this case the total length of the tunnel was 1.5km and 9 zones were segregated into 150m sections.

The system architecture is such that when the FireLaser LHD system detects the fire, it triggers the respective programmable dry contact outputs for the specific zone in which the fire occurs. For this scenario in addition to the power connection from the fire panel, Innovative Energy also designed in an Uninterruptable Power Supply (UPS) into the system cabinet for added redundancy.

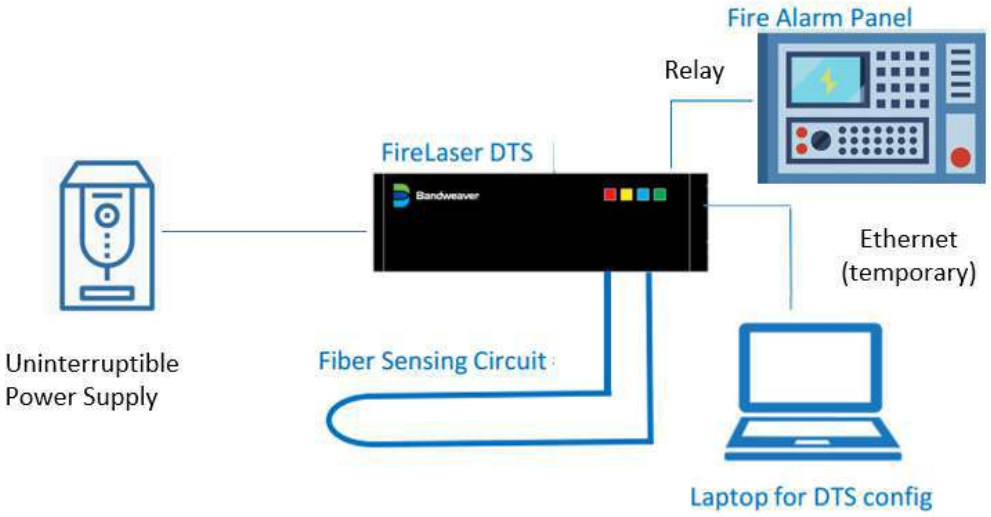

Figure 2 Example of system architecture

The diagram below shows the optical path and how the 2 FireLaser systems can offer cable cut redundancy with a single cable that contains 2 fiber optic sensing cores

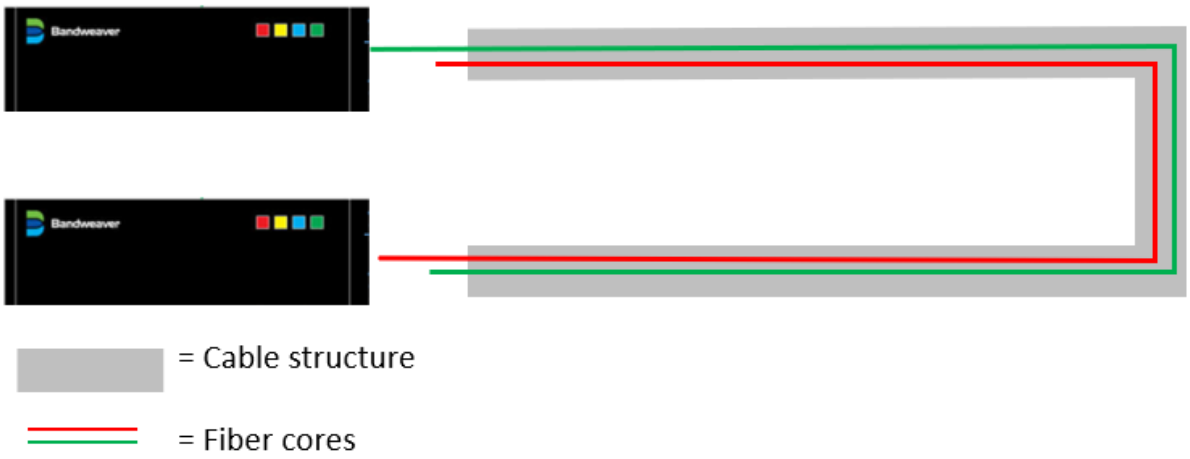

Figure 3 - Example of loop redundancy design

BENEFITS TO THE CLIENT

When evaluating the system, the client reviewed several factors in making the choice to optimise cost and performance throughout 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.
- **Fully Certified to Internationally recognised standards**: The Bandweaver FireLaser DTS together with the 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.
- **Complete Coverage:** Because the sensing cable was installed along the entire length of the tunnel, it means you have complete coverage. With the fiber optic LHD you can take measurements every 50cm, meaning there are no gaps between sensing points.
- **Early detection with Smart Alarms:** The smart alarms be configured to enable the system to detect much earlier than with conventional LHD systems thus minimising any damage to the assets.

ABOUT BANDWEAVER TECHNOLOGIES

Bandweaver has been providing advanced fiber optic monitoring sensors and integrated technologies since 2002. With an installed base of over 60,000km and 8,000 systems installed, our knowledge regarding the application of distributed temperature sensing technology and linear heat detection within the fire industry is second to none. We focus on the safe integration of FireLaser DTS technologies into clients' proprietary systems and Bandweaver and our partners provide exceptional systems design support, product support during installation and provide long term maintenance packages.

For further information please contact our global team at info@bandweaver.com