



Fire detection in tunnels should be considered as essential. A fire within the confined spaces of a tunnel can quickly produce intense levels of heat, smoke and toxic gases leading to structural damage and loss of life.

Road, rail and service tunnels in general terms are benign structures being constructed from non-flammable materials, however the vehicles and systems which use them have the potential to cause major fires. Vehicles can carry hundreds of litres of highly flammable fuels or containers full of combustible goods and material; electrical systems and power cables can malfunction and overheat or something as simple as the build-up of rubbish can be ignited by a discarded cigarette.

Fire detection in tunnels is essential to provide as much time as possible for the evacuation of people to safe areas and to allow suppression systems to contain the fire and smoke.

Tunnels require a reliable system that can detect even when there are high levels of dust and pollutants or when exposed to the effects of air movement produced by the flow of traffic or forced air ventilation. All of which may cause standard detectors to false alarm or fail to detect, but have little effect on the function of Linear Heat Detection (LHD) cable.

The simple design and long term reliability of Linesense digital LHD means it does not require additional measures that other detectors would need to prevent dust blocking sample points or obscuring optics. This reduces the need for increased maintenance or holding stock of costly consumable spares.

Linesense cable is formed from a pair of twisted steel conductors each with temperature sensitive insulation and then an overall outer sleeve. When the temperature sensitive insulation reaches its predetermined alarm temperature the two conductors short together providing the digital or switched signal.

The cable can be connected to any unit capable of monitoring a switched signal, i.e. conventional fire panel, addressable switch monitor unit or PLC.

The fire detection capability can be enhanced when the LHD is used in conjunction with the Digital Location Interface (DLI). Tunnels can be many kilometres long, so identifying where a fire is located helps speed up decisions.

The DLI has the ability to monitor up to 2,000m or 10,000m of LHD (depending on the unit selected) for both Fire and Fault conditions, when activated it identifies the location of the alarm. The distance in meters is displayed on the 3½ digit LCD and allows for appropriate action to be taken.

Application Note

Tunnels

The layout and makeup of the tunnel will determine how the LHD is installed and configured. System design should consider:

- LHD cable to be installed above the centre of each lane or rail track.
- LHD cable to be installed in service tunnels.
- LHD cable to be installed along cable trays.
- Local fire regulations.
- Size of each zone with respect to detection, suppression or water deluge. Each zone can be protected by an individual run of LHD connected to an interface module or switch monitor unit.

Linesense provide a selection of fixings and clips to retain the Linear Heat Detection (LHD) cable in place. Fixings should be placed at intervals of no more than 1.2m apart.

Where cable ties are used they should be used in conjunction with a neoprene sleeve and not over tightened to prevent damage to the outer sleeve of the LHD.

Cable should be mounted using “Tee” clips ensuring that at least a 25 mm spacing from surface to prevent the structure from acting as a heat sink and slowing detection.

