Delhi Metro Fire Detection
Delhi, India

AP Sensing was selected by Delhi Metro Rail Corporation (DMRC) to provide a Linear Heat Detection solution to monitor its phase III underground tunnel project. Specifically, our system is in use for monitoring hot spots, tunnel temperatures which vary during congestion and other ventilation system operation modes. In 2018 our local representative in India, TECHFAB Systems, had successfully installed, tested and commissioned the system.

Currently utilizing 13 Distributed Temperature Sensing (DTS) devices, AP Sensing provides coverage in three different sections of the metro system: from Azadpur to Subhash Chandra Place and Naraina Vihar underground metro station, from Kalkaji to Vasant Vihar covering 10 underground metro stations, and Janak Puri to Palam and Indira Gandhi domestic airport underground metro station.

Metro tunnel and sensor cable

The Fiber Optic Linear Heat Detection (FO LHD) system in each of these locations was set up with full redundancy. The system monitors and provides maximum temperature values in each zone (every 20 meters) and activates the alarm when temperatures in any zone exceeds the pre-determined value. Besides providing fire alarming capabilities, the system can activate the ventilation fans to extract smoke from tunnels and draw it away from any stations. All alarms and temperature values are exported to a central SCADA platform to monitor potential fires, their sizes, precise location, and the direction of spread due to wind factors in the tunnel.

The complete system (DTS devices, sensor cables, and various temperature zones along each cable) are VdS, UL/FM certified and configured in accordance with DMRC standards. For one section of the project, one additional set of alarm parameters was defined for test cases. All information from the FO LHD system is updated continuously, providing valuable information for additional firefighting measures.
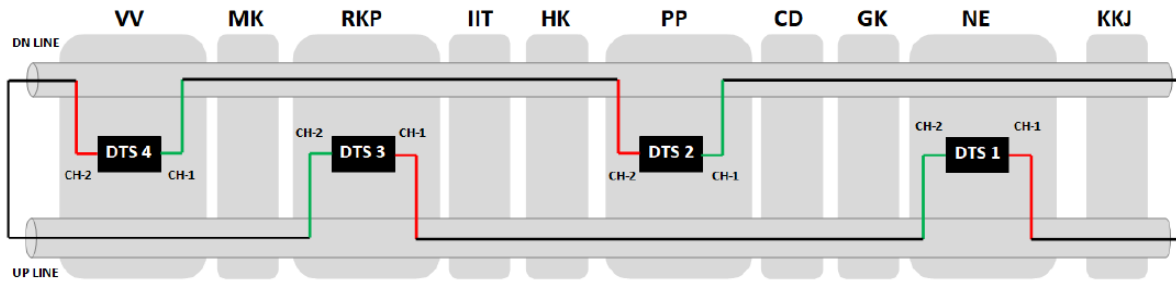
LHD System Schematic View (Kalkaji Metro Station to Vasant Vihar)

Key Project Requirements

- Fire monitoring capabilities – able to report temperatures up to 750°C to effectively deploy countermeasures in emergency situations
- Industry Standard interface (Modbus) for easy integration to SCADA
- Very high level of overall system availability
- Class 1M laser, which is inherently safe and enables continuous operation even in the presence of fiber cuts

Installation-Specific Highlights

- All FO LHD controllers are used in fully redundant ring arrangements and monitor the entire station/tunnel area
- Each complete tunnel length is continuously monitored by two fully independent controllers located in different station control rooms to achieve high availability and redundancy
- Each FO LHD unit has an integrated LAN/Modbus interface to communicate with SCADA and remote metro OCC, plus achieve centralized and regional control

The system has been in use since our partner, TECHFAB Systems, commissioned the systems in February, June and July 2018.