

# FAST TRACK TO EUROPE

The departure of new Eurostar rail services from St Pancras station in London this month will mark Britain's entry into Europe's high speed rail club. **Ron Alalouff** previews the fire safety aspects of the stunning refurbished terminus.

COMBINING CAREFULLY REFURBISHED AND IMPOSING VICTORIAN architecture with a modern extension and sophisticated facilities, St Pancras station in London may do something to bring the glamour back into rail travel.

On the evening of 13 November, the last Eurostar train will arrive at Waterloo station. On the following morning, the first fully high speed passenger service will depart from St Pancras International. The new station will also feature retail and catering facilities previously unseen at UK rail stations, including designer boutiques and – at 90m long – one of the longest champagne bars in the world.

With such a large and complex site (the distance from the front of the station's facade to the end of the platforms is around 1km), the fire safety system needs to be robust and flexible. The Infrastructure and Rail Services division of engineering company EMCOR has been responsible for designing, specifying and installing a comprehensive system. In charge of the team is Peter Patrick, a veteran of assignments such as the Jubilee Line and Russian pipe lines who has overseen a team of six project managers and over 50 electricians. With responsibility for designing, installing and commissioning the system – as well as choosing suppliers – Peter's skills has been critical in ensuring the integrity and functionality of the fire system.

In total, 5000 Hochiki ESP analogue addressable devices

have been fitted and linked to 14 Syncro control panels and repeaters from Kentec Electronics. The panels are fully compatible with all of Hochiki's ESP devices and are configured to share system information and log details, on what is described as a fault tolerant secure network. To ensure that any disruption to passengers and the public from false alarms is minimised, the system has network-wide cause and effect logic and the ability to configure delays to outputs. In the event of a confirmed fire event, the Syncro system directly controls and monitors the station's voice evacuation system, which is fitted in all public areas. Places where it may be difficult to hear voice alarms, such as toilets and areas with high levels of noise, are also fitted with beacons.

"The key elements in a fire system that I look for," says Peter Patrick, "are reliability, flexibility, high performance and false alarm management. The last thing we need on a site such as St Pancras are unnecessary false alarms! With both companies working in synergy, they have delivered superior product performance and hands-on technical support."

#### Under the clock

The sheer size of the station and the variety of activities going on, means that a range of detection technologies have



Left: Detectors have to distinguish between real fires, and false alarms caused by particles such as dust from train engine brakes

LOR / HUGO DIXON

## LIFE IN THE FAST LANE

The launch of Eurostar services from St Pancras International this month is the culmination of an estimated £5.2 billion construction project – Britain's largest single one to date. Trains will travel along a new high speed line – known as HS1 – from the station to the Channel Tunnel entrance, near Folkestone, via the new £100m Ebbsfleet International station near Dartford.

Reaching speeds of 186 mph, the new services mark Britain's full entry into the European high-speed rail club. Previously Eurostar trains have had to chug along through the Kent countryside where they have shared regular commuter rail lines. London to Brussels will now have a journey time of just 1 hour 51min, and London to Paris 2hours 15min

Apart from building the new stations, the project involved laying track over the River Medway and under the River Thames, and through 11 miles of tunnels beneath London. In early 2009 domestic high speed services from destinations in Kent to London will commence. Stratford International Station will come into its own for the 2012 Olympics.

Here are a few quirkier facts about the station:

- The original St Pancras station designed by William Barlow took 6000 men, 1000 horses and 100 steam cranes four years to complete, and opened in 1868
- The underneath of the new station which has become the new international concourse area was originally built to house barrels of Burtons Beer brought to London by rail
- St Pancras International will have six international platforms for Eurostar services, each one 455 metres long
- The Victorian Gothic St Pancras Chambers fronting the station is being transformed into a 245 bedroom hotel with 68 apartments and will open in 2009
- A 67 acre area to the north of the station will be regenerated into a new business and leisure district
- St Pancras was a 14 year old Christian martyr in Rome whose relics were sent to England by Pope St Vitalian in the 7th Century

**“The Syncro system directly controls and monitors the station’s voice evacuation system, which is fitted in all public areas”**

had to be deployed in areas as diverse as control rooms and offices, the station concourse and shops and restaurants. These include optical sensors for back office and concourse areas, multi-sensors for more challenging environments such as plant rooms and workshops, and heat detectors in kitchens and toilets. In a station such as St Pancras, any alarms caused by dust from train brakes need to be filtered out.

Integration with the master station clock via the Syncro serial interface port allows all networked Syncro panels to be regularly synchronised, to ensure that all event log information is accurately timed and consistent between all panels.

### Nerve centre

The hub of fire detection activity is to be found at the main control room. Centre stage, there is a 46 inch LCD panel which shows the entire station and its fire system. Linked to the main Syncro control panel and using Kentec's GUIDE software it can be used as a 'virtual panel' that can display various levels of detail – from an overview of the whole system right down to pinpointing information on a specific device. For example, if a fire or fault occurs, the exact location can be viewed on screen, devices can be interrogated and isolated if required and, in the event of an emergency, it can even display the best evacuation routes. The graphical interface can also provide printouts of events for firefighters, and the event log can be interrogated and filtered to provide a detailed summary of any event type

between specific dates or times. In addition, the detectors are continuously polled to chart the variations of the sensing element, providing the facility to analyse and prevent false activations due to environmental changes.

Staff in the control room can also view images from the extensive range of CCTV cameras in the station, which helps them to identify any emergencies and take appropriate action. The control room itself is protected with 4-hour fire walls and other measures to preserve its integrity during a

**Peter Patrick, EMCOR's project manager for the fire safety installation, looks out onto the project**





fire. Other critical areas such as power plants have enhanced levels of fire protection.

#### Optimum detection

The optical smoke detectors have been designed for efficient detection while reducing false alarms. The chamber at the heart of the smoke sensor contains angled baffles which ensure that internal reflections are not misinterpreted as an alarm. It is also able to sense a wider range of fire types by the precise positioning of the optics, providing a more 'balanced' response to different types of smoke particles.

The sensitivity of the detectors has been configured using the Syncro panel's intuitive Loop Explorer configuration software to match relevant conditions. In addition, the multi-sensor mode may be configured between heat only, smoke only, or thermally enhanced smoke detection modes, to allow the optimum detection mode to be selected for the installed environment

To keep sensors working effectively, the control panels automatically re-calibrate the sensors every 24 hours, which is one way of minimising false alarms. In addition, two other key processes are used to minimise this problem; data integrity and error detection. ESP protocol uses a combination of algorithms which reduce data corruption. With parity and checksum error detection principles applied to every packet of data, unwanted activities from external noise such as EMC interference are eliminated. As Peter Patrick explains: "I've worked with many different fire detection products but I have found Hochiki detectors to be

**The Victorian frontage of the station is being transformed into a luxury hotel and apartment complex**

the best."

Kentec's multi input/output unit (MIOU) – with eight programmable, optically isolated inputs and eight programmable volt-free relay outputs – provides a convenient, compact and cost effective way of monitoring and controlling third party equipment. The system interfaces with others, such as those for smoke control and access controlled fire doors.

The main Syncro control panel was designed and engineered to meet CTRL's requirements, it incorporates 196 fire zone indicators plus additional sprinkler status indications. It also includes a number of firefighter's control switches to allow plant to be controlled, via Hochiki loop output relays, anywhere in the network. In addition, a special brushed stainless steel repeater panel with an emergency fire telephone was designed and fabricated for the east side of the station. This repeater panel will be used by the fire brigade if an emergency condition occurs within the main control suite.

When touring the St Pancras site, I didn't go as far as asking Peter Patrick whether or not he had any doubts about the project being completed on time, but I'm sure the image of a Eurostar train being unable to depart from an unfinished station on the morning of 14 November concentrated a few minds. "The project was one of the biggest challenges of my career so far," he concedes. The twin hurdles of working on a heritage building part of which had to remain a fully functioning station, together with the pressure to deliver to the timescales, seemed daunting! ■

**"Centre stage, there is a 46 inch LCD panel which shows the entire station and its fire system"**