

An explosive situation?

With security at unprecedented levels people movement and security experts SIMON BABES and FATHI TARADA review the lessons learned from the February firebomb attack on the Hong Kong MTR, and how we can build a safer Crossrail



Above
The platform
at Charing Cross

It is a time of rapid change and massive opportunity for the UK's transport industry. Under pressure to increase the capacity of the capital's burgeoning transport network, address the salient and changing terror threat and deliver on looming project deadlines, staying abreast with advances in fire safety and rail management must remain a priority. While security breaches are thankfully rare, decision makers must study these occurrences closely, most recently, February's firebomb attack on the Hong Kong Mass Transit Railway (MTR), to ensure that their trains, stations and employees are best equipped to manage these risks.

Why is the MTR incident of note?

The arson attack, which occurred on 10 February at Hong Kong's Tsim Sha Tsui (TST) station, injured 19, leaving three people critically hurt, has prompted an internal investigation by MTR. This was not the first such incident, with a similar attack occurring on the network in 2004. The UK Government has currently set the nation's terror threat level as severe, meaning that an attack on the public is highly likely. As such, there is a distinct possibility that an incident of this nature could happen in London – any incremental improvements that can be made to the safety features of the UK's transport network

through the examination of events in Hong Kong could save lives.

Security threats aside, though, this incident warrants particular attention due to the high level of similarity between TST station and the UK's Crossrail stations, due to open in 2018. The trains themselves are larger than existing tube stock (roughly double the capacity), while the platforms are comparably configured with full height platform edge doors, lengthened and widened island platforms and active tunnel ventilation – Bombardier is set to supply Crossrail's rolling stock as part of a £1bn contract with TIL. Coincidentally, the line itself will be run

by the European arm of MTR, the Hong Kong-based transport operator that runs the Hong Kong MTR.

Areas for improvement

The TST incident highlighted a number of areas for improvement, in particular the need for better communication between drivers and the control room to enhance passenger safety. Immediately following the attack, a non-incident train was stopped on the opposite platform with open train doors and platform screen doors – this is contrary to good practice and causes evacuation difficulties, as double the number of passengers are required to escape from the platform to street. If the fire or explosion had been widespread, this may have contributed to significant injury, panic, or loss of life.

While it may have genuinely been too late for the incident to be reported to control in time, CCTV coverage was not available on the incident train, which meant that both the driver of the incident train and central control room, were unaware of the incident, and unable to stop the other train pulling in to the station. Safety experts must push for universal CCTV coverage for this communication gap to be filled.

Furthermore, the smoke extract facilities at the MTR station, which is similar to the smoke extraction to be provided in Crossrail, was of limited use in clearing smoke from inside the incident train. This is because the design of the smoke extraction is undertaken assuming a large fire on the outside of the train, rather than a small fire inside the carriage. Increasing the effectiveness of this system in dealing with this type of incident is another area that must be examined.

It is also likely that passenger injury could have been reduced through the installation of a fire suppression system, or a high pressure water spray, which is not present in MTR trains. Although retrofitting these devices on existing London Underground trains may be impossible due to space constraints, there may still be a chance to introduce them on the Crossrail fleet, although this would have a detrimental effect on capacity – a decision that Transport for London must make in due course.

Finally, the operation of an on-board fire suppression system combined with rapid fire detection system in Hong Kong may have significantly reduced the spread of flames through passengers' clothes and possessions, and also limited the production of toxic smoke. Lessons have been learned in the analogous field of road tunnels – although traditionally fire suppression systems were not a recommended safety feature in European tunnels, improvements in available technology prompted a change in guidance by the World Road Association in 2008, meaning that asset owners and operators are now encouraged to consider the benefit-cost ratio of installation. The New Tynes Crossing tunnels were the first



Above
Fathi Tarada, managing
director of fire safety
specialist Mosen



Above
Simon Babes, managing
director of people
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tunnels to install fire suppression systems in the UK in 2011, followed by the Dartford River Crossing in 2013. On board fire suppression has been fitted to ships to address maritime risks for many years.

What worked well

Similar to the London Underground, the interior of MTR carriages are specified to exacting reaction to fire properties and a low fire load density. This means that seats and flooring do not support flaming combustion

unless the temperature of the carriage 'flashes over' ie exceeds 600 degrees Celsius. Video footage from the attack shows that the only items burning in the carriage were passengers' belongings and the Molotov Cocktail, not the internal carriage seats or lining, demonstrating that these fire retardant measures were effective.

The event also provides assurance that the TST's station and train configuration performs well in terms of smoke handling and the inability of the fire to spread and take hold – information that will be well received by Crossrail bosses.

New challenges

It is imperative that metro operators, design engineers and station planners draw parallels from the arson attack on the Hong Kong MTR, identifying both the successes of in-built safety features and areas where contingent systems can be improved – in this case communication between drivers and central command and the potential installation of fire suppression systems.

Each incident highlights new facets of people movement patterns and passenger behaviour which themselves offer opportunities for the further evolution and adaptation of evacuation protocol. For example, this incident drew attention to a new phenomenon; commuters, seemingly assured of their safety, stood on the platform and took photos and videos of the fire, rather than evacuating – tackling this behaviour will be the next challenge. ■



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