KINGSWAY PIPED SUBWAY FIRE SUPPRESSION SYSTEM TRIAL

Camden Lane Rental Industry Publication

TRANSPORT FOR LONDON

INTRODUCTION

In April 2015, a substantial fire in the Kingsway Pipe Subway service tunnel caused widespread disruption to the traffic network around Holborn as well as to businesses and residents of the surrounding area. The tunnel suffered significant structural damage together with the destruction of key services within the tunnel.

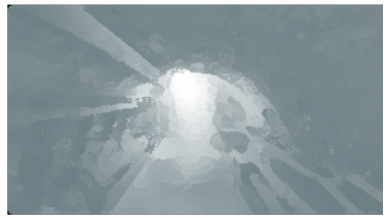
The resources required to rebuild the tunnel, relay services and to get the network back up and running were substantial. Subsequent to this, stakeholders undertook investigations for mitigation measures to eliminate, or at least reduce, any future fire impact.

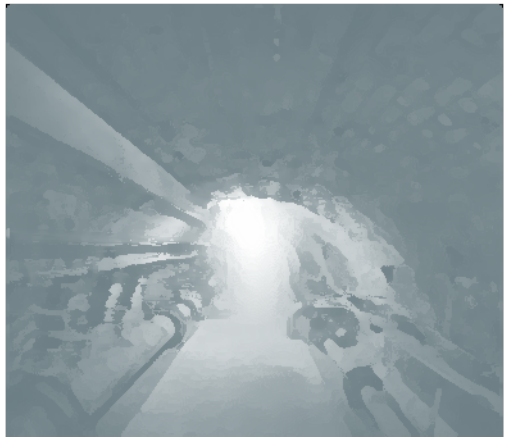
An investigation, and subsequent installation would serve as a trial for all 6 London Boroughs who have pipe subways under their road networks.

SYSTEM REQUIREMENTS

From early discussions, it was established that any fire suppression system installed would have to meet the following requirements:

- Easily implemented within a congested pipe subway
- Not hinder the safety of any operatives working in the tunnel at the time of activation.
- Should not cause substantial damage to the tunnel structure or the utility services within the tunnel.
- Ability to automatically extinguish a fire and be controlled from a location outside the fire zone.
- Capable of alerting operatives in the tunnel and surrounding area of a fire





THE TRIAL

Subsequent to a feasibility study and consultation with fire suppression specialists, it was decided to trial an automated water mist fire suppression system within the Kingsway Pipe Subway as it would allow for the safety of occupants in the tunnel, as well as being sympathetic to the services and the masonry structure.

A low-pressure water mist suppression system is a very effective system in fighting fires as, once a fire is detected, the system is automatically activated to release water mist via a series of nozzles at tunnel soffit level, which cools and suffocates in unison. This type of system has the added benefit of greatly reduced water demand due to the combination of micron sized water droplets interspersed with larger droplets.

There is also a local sounder strobe, which provides both visual and audible alarm, alerting those in the area of a system activation. If personnel are in the tunnel at the time of a fire incident, each activation zone will be equipped with both electrical and mechanical activation points.

OUTCOMES

The system was successfully installed and tested within the Kingsway Pipe Subway, which now has a system in place that will automatically detect and start tackling any future fire immediately and effectively. The system will also activate an alarm system which will enhance the safety of operatives in the tunnel.

The zoning system will allow the fire to be targeted at source without the need to enter the tunnel. This will prevent the spread of the fire which will ultimately avoid any major disruption to the road network above.

The system was however difficult to install due to the tunnel geometry and confined nature of the pipe subway. The scheme duration was 3 months longer than originally estimated due to a re-working of the installation method and materials. Stainless steel flexible braided water supply piping was required to replace the originally specified rigid piping and the existing electricals had to be upgraded due to the requirements of the system.

LESSONS LEARNT

The time allowed for the completion of this project was not realistic and should be reasonably assessed for any future works of this nature.

The system was difficult to install simply due to the nature of the tunnels and the confined space working. It is recommended that the installer spend a significant amount of time in the tunnel prior to presenting the final design to ensure the tunnel restrictions are understood and are satisfied with the plant to be used, its installation and functionality within the tunnel. The difficulties in installing this system in the Kingsway tunnel are now known and can be overcome for similar installations in other borough service tunnels.

CONCLUSION/ RECOMMENDATIONS

The operation is fairly complex and time should be taken to fully understand the workings of the system, in particular the control mechanisms and maintenance requirements. The respective Council should maintain the services of the installer for a year after installation to provide back-up service capabilities as well as maintenance of the system. An annual maintenance budget should be put in place to ensure that the system is always in good working order.

The system would be difficult to implement in a tunnel without the space for the large 16m^3 water tank (8m long x 2m high x 1m wide) and associated pump equipment that is required to provide sufficient water flow to the nozzles within the tunnel. The control panels and associated section control valves also take up a fair amount of space within the pipe subway. Fortunately, in Kingsway, the space was available, however it is understood that some of the other Boroughs might not have the space to install a similar system.

The system has been installed to a high specification and the end product is a good result.

This proven technology is now a model that can be deployed in other piped subways across London (and the rest of the country), with the social cost of delay saved for preventing a future fire in this subway estimated to be £1.6million.

The water mist fire suppression system is recommended as a measure to tackle fires in service tunnels, however each tunnel will require a bespoke design.

TfL Lane Rental Scheme

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Date Created: March 2020

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