



Lyttelton Tunnel Fire System Upgrade

Since 1964 the Lyttelton Tunnel has been a critical road link. It runs through the Port Hills to connect the New Zealand city of Christchurch and its seaport, Lyttelton. It carries just over 10,500 vehicles per day as part of State Highway 74 and cuts the travel distance between the two by around 8 km. It is 1,970 metres long and was the longest road tunnel in New Zealand when it opened, being surpassed in July 2017 by the Waterview Tunnels.

Work on a new \$28.7 million fire protection system for the Lyttelton Tunnel was completed in 2019. Now operating, the system improves the safety for tunnel users on a route that's an economic lifeline for both Canterbury and the South Island.

The firefighting deluge system is designed to contain a fire until Fire and Emergency NZ can arrive.

A fire in the tunnel is likely to start in a relatively small location – a single vehicle accident, for example – rather than stretching the whole length of the tunnel

In a fire, tunnels can act like chimneys – quickly drawing smoke and toxic fumes away from the fire and sending it rushing down the tunnel.

This happened during the infamous 1999 Mont Blanc tunnel fire, in which 39 people died. That fire burned for 53 hours and reached temperatures of 1000 degrees Celsius, being fed initially by margarine and later by petrol and other combustibles. That tunnel is over 6 times longer than Lyttelton tunnel.

There have been fires in the Lyttelton tunnel in the past, including an incident where a tarp was ignited by an exhaust pipe.

The new deluge system is divided into 63 zones, three of which can be operated at any one time. Having three working zones means NZ Transportation Authority can deal with a multi-vehicle pile-up or more than one fire.

The system supplies 10 litres of water per minute per square metre from 2,274 nozzles. It's fed by a newly built storage reservoir and provides a heavy mist designed to suppress a fire.

The project consisted of 6 km of fire system piping, 2 km of water supply piping, 2,274 sprinkler heads, 40 new safety cameras, 70,000 metres of cable, 1.4 million litres of water storage and 62 – 100mm Cla-Val 134 Series Deluge Control Valves.

Cla-Val also supplied all of the control valves at both tunnel inlet and outlet works and were also chosen by the city to supply surge evaluation for the Scrubbs Road Pumping Station that supplies water to Lyttelton via the shared pipeline.



The contract for this involved surge evaluation, supply and installation of surge valves plus all piping, civils and electrical works along with commissioning and monitoring services.

The Cla-Val deluge valves were built and supplied from Cla-Val Pacific UL Certified Christchurch facility and featured Class 300 Ductile Iron valves with grooved ends complete with fully water supply certified coating, elastomers, ISST Test/drip checks/manual over-rides and unique speed control options.

Cla-Val Pacific also supplied critical pressure relief valves also with system block valves.