

Clyde Tunnel – New Secondary Lining

Contract Value	£12.1M	Commenced	Jan 2004
Contract Period	3 Years	Completed	Jun 2007

Features

- Stainless steel lining support structure incorporating over 14km of unistrut
- 24,000m² of fire resistant panel linings
- 3km of drainage collection system
- Lighting support system incorporating 9km of unistrut
- Concrete repairs
- Target cost contract

Brief Description

The twin bore road tunnels beneath the river Clyde, 760 metres long and 9.2m diameter, have cast iron segment primary linings and were constructed under compressed air. The tunnels were opened in 1964 and today carry 65,000 cars daily.

The contract provided new secondary linings for ensuring the continuing stability of the tunnel fabric and adequate escape time for road users in the event of a fire.

The Design and Construct Contract was originally let under ICE conditions. The initial works included fire tests on materials and assessing and testing the merits of spray applied vermiculite/cement and panel systems supported on a framework fixed to the cast iron segments. During this phase, a new insitu concrete channel drainage system was constructed to collect and convey tunnel infiltration water away from the new lining. The support framework for the fire proof lining was manufactured from high quality grade 316 stainless steel. This ensures the framework will resist the highly corrosive environment within the tunnel.



Work was carried out separately on the northbound / southbound tunnels during a night time possessions 7 day week basis, with traffic management being co-ordinated by the Tunnel Master.



Following discussions with the Client the panel system was adopted as the preferred solution and Phase 2 was commenced under a target cost contract (NEC Option C) for installation of the secondary lining throughout both tunnels.

The system comprises double layer calcium silicate panels fixed to the stainless steel framework with a stainless steel joint retaining strip. An additional ceramic coated panel is provided at traffic height level to facilitate cleaning and maintenance. Orange colour coded panels are provided at fire alarm points. The coloured finishes had to meet stringent road safety standards for light reflectance, durability and maintenance (washing down). As before, work was undertaken during night time possessions on a 7 day a week basis.

The rectangular tunnel portals and transition lengths to the circular tunnel section are constructed of reinforced concrete. These areas had suffered damage from exposure to exhaust fumes etc over the tunnels life time and extensive concrete repairs (value around £200,000) were undertaken. Damaged concrete was broken out by means of Hydro-demolition and repaired using spray applied proprietary repair mortar which was then trowel finished. Other works associated with the project are provision of a support system for existing and future tunnel lighting, removal and reinstatement of the exhaust extraction system, removal and re-locating all tunnel safety alarm and controlling systems.

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