



Waterstopping and Control of Water Ingress Connaught Tunnel, Crossrail

Client
Crossrail
Principal Contractor
Bachy Soletanche (Phase 1)
Vinci Construction (Phase 2)
Works Commenced
January 2013 (Phase 1)
May 2014 (Phase 2)
Works Completed
February 2013 (Phase 1)
October 2014 (Phase 2)



Freysinet was appointed by Bachy Soletanche to carry out PU resin injection to 2no. one metre deep concrete invert approach ramps to Connaught Tunnel. The tunnel was built in 1878 and is situated on the former Woolwich branch of the North London Railway, running under the Royal Docks and City Airport in London.

Following the removal of sections of the concrete invert, reducing the depth from 2 metres to 800mm to accommodate the new Crossrail train dimensions, extensive water ingress occurred.

In the first instance, we were required to undertake an initial trial to 5 metres of the concrete invert, to calculate the depths, angle and quantity of injection holes and likely consumption of resin. This was carried out with great success.

This then enabled a full assessment of the scope of works to be undertaken which included drilling 16mm diameter injection holes at 400mm centres at an approximate angle of 60 degrees to intersect with the lowest point of the cracked concrete invert.

We installed 16mm packers complete with non-return valves and then injected TamPur 100 resin to stop the water flow. Following the successful sealing of the cracks a 'locked in' cementitious chase was installed.

Following the successful construction of the central tunnel section, Freysinet was re-engaged, this time direct to Vinci for Phase 2 of the works. These comprised:

- Leak sealing
- Hydrophobic grouting
- Hydro-demolition and mechanical breakout
- Sprayed, hand placed and flowable concrete reinstatement
- Recasting of brickwork arches and shafts
- Stainless steel pinning of brick work.

Innovations Freysinet brought to this contract included the introduction of hydro-demolition (safer and quicker than mechanical breakout) and recycling hydro-demolition water using water purification units.