Cast in Place secondary tunnel lining improves performance for Thames Tideway

Project overview ›

A Cast in Place secondary tunnel lining for London's 'Super Sewer' mitigates the risk of seepage and improves performance flow. The Thames Tideway Tunnels are the new sewage and storm water tunnels that intercept the existing London sewage system. The tunnels feature a secondary steel fibre reinforced Cast in Place lining that sits on the inside of the primary tunnel lining.

Project title: Thames Tideway

Client: Tideway (Bazalgette Tunnel Limited)

Contractor: Ferrovial Agroman UK and Laing O'Rourke Construction Joint Venture (FLO JV)

Concrete Producer: Hanson Concrete

Location: London, United Kingdom

Working environment: Up to 60m below ground and under the river Thames

Internal diameter of the tunnels:
Central Tunnels - Secondary lining of 7.2m internal diameter
East Tunnels - Secondary lining of 7.2m internal diameter

Duration: 2016 - 2024

ArcelorMittal Fibres used: HE++ 90/60
Central Tunnels 1800 tonnes
East Tunnels 1500 tonnes

Dosage: 30kg/m^3

> "ArcelorMittal provided another brilliant service. The HE++ 90/60 fibre was an integral part of the high strength, high performance concrete required by the client. Not only that, ArcelorMittal were always on hand to provide technical support where required."
>
> James Lloyd,
> Hanson Concrete

The challenge ›

The Thames Tideway tunnels have been excavated through highly variable strata and there is significant geological faulting in the area. The traditional configuration of variable shaped precast tunnel lining segments means that the entire interior surface of the tunnel lining is divided with longitudinal and circumferential joint seams. In the case of the Thames Tideway there was a risk that the water would seep through the primary lining. Furthermore, the combination of many joint seams and the multitude of joint connector cavities located around the perimeter of each tunnel lining segment, results in a surface that is not smooth and continuous. Overtime, this irregular surface will act as a catalyst for the build up of effluents on the walls of the tunnel, impeding the flow of sewage to the treatment works, and causing back up.

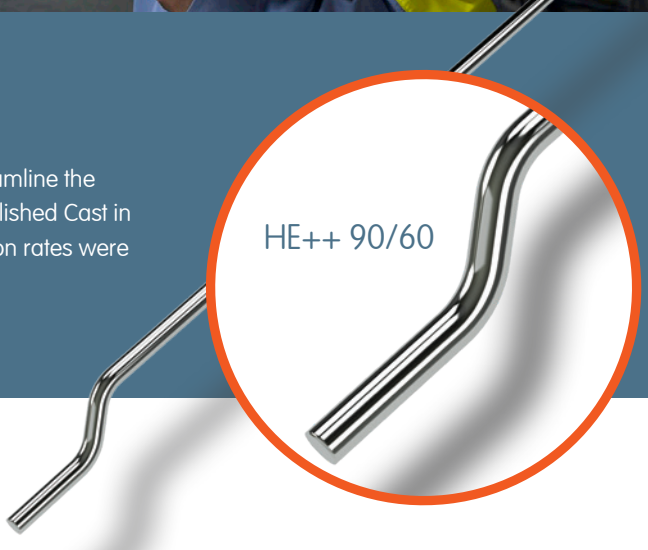
The solution ›

To address the dual issues of water seepage and the discontinuous interior surface texture of the pre cast TLS lining, a Cast in Place secondary lining was used.

Following the completion of a significant proportion of the primary pre cast TLS lining, preparatory works for the secondary Cast in Place lining began. The secondary Cast in Place lining was cast using a bespoke travelling shutter system serviced by a pump supplied with C50/60 concrete by remixer wagons. The concrete, mixed with ArcelorMittal Fibres was pumped directly into the formwork via ports. HE++ 90/60 steel fibres dosed at 30kg/m³ were used.

The result ›

The Cast in Place lining required careful planning in order to streamline the construction process throughout the project. The use of this established Cast in Place method presented few challenges and consistent production rates were maintained throughout the construction.



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