

Crossrail Moorgate Shaft

Case study

Focus products: Intercrete® 4800, Intercrete 4870

Location: Liverpool Street Station, London, UK

Client: Crossrail Ltd

Contractors: BAM Nuttall Kier Joint Venture
& Prestec UK Ltd

Summary: Enhancing durability of new concrete



Background

Crossrail is Europe's largest infrastructure project, with a total of 21km of new twin bore tunnels under construction in the central section to provide a railway line running across London. Crossrail's aim is to provide a high frequency rail service that will link parts of Berkshire and Buckinghamshire, via central London, to Essex and South East London, in turn relieving pressure on several London Underground lines. Scheduled to open in 2018, around 200 million passengers will travel on Crossrail each year and the route will provide a 10% increase to rail capacity in the capital.

New Crossrail stations are being built across London, one of which is Liverpool Street Station. It is located below London Underground's existing Liverpool Street and Moorgate stations with both stations providing access to the Crossrail station. At the western end, a new ticket hall is being constructed and the development in which it is housed contains a 42 metre deep shaft with piles 60 metres deep and steel reinforced rings to secure the permanent structure for the next 120 years. The final concrete pour of 1,800m³ was one of the largest on Crossrail and took 17 hours to complete. The shaft will provide ventilation and emergency access to the new ticket hall.

The solution

Intercrete 4800, a low density, high strength, shrinkage compensated waterproof mortar, was specified to reinstate an area of 50m² to the new concrete shaft walls at a thickness of 20-70mm. Applied by wet process spraying at thicknesses up to 80mm even in vertical and overhead situations, the contractor was able to achieve the reinstatement in a single application because of its low sag properties. It is rapid curing and its high bond exceeds the tensile strength of concrete, ensuring monolithic performance of the repair whilst its dense matrix offers low permeability to water, even at 10 bar positive and negative pressure. Intercrete 4800 is CE marked in accordance with the demands of BS EN 1504 and it is exceptionally well proven in both new build and refurbishment projects.

In order to prevent rapid drying out of the mortar, Intercrete 4870 was applied to the surface immediately after finishing. With a waterborne formulation and backed by British Board of Agrément (BBA) approval, it can be safely applied in enclosed locations as it releases no hazardous solvents or strong odour. This Intercrete system provided an ideal solution, ensuring full conformance with specification. Intercrete guaranteed that the system will provide a 120 year design life to match the overall requirements and the strength of the parent concrete.