

Project Profile

Hindhead Tunnel Spray-Applied Waterproofing

Project:

Hindhead Tunnel

Contract:

A3 Hindhead Improvement Scheme

Contractors:

Balfour Beatty

Consultants:

Mott MacDonald

Area Treated:

80,000 m²

BASF Products Used:

MASTERSEAL® 345

BASF Equipment Used:

MEYCO Piccola Dry Spray Pump

 **BASF**
The Chemical Company

Adding Value to concrete

Project Description:

The A3 Hindhead Tunnel is one of the projects in the Government's programme of major schemes and will complete the dual carriageway link between London and Portsmouth, removing a major source of congestion, particularly around the A3/A287 traffic signal controlled crossroads. The new road will be 6.5 kilometres (4 miles) long and includes 1.8 kilometres (1.1 miles) of twin bored tunnels under the Devil's Punch Bowl, a site of special scientific interest. Work started in January 2007, and the main tunnelling works started in February 2008. Both tunnel bores broke through on 26th February 2009. The tunnel is planned to be open for traffic in mid 2011.

The Challenge:

The Hindhead tunnel is 1.83 kilometres long comprising about 1.77 kilometres of bored tunnels and 30 metres of cut and cover at either end. The tunnel has two separate bores, each including a 7.3 metre wide 2 lane carriageway with 1.2 metre wide verges on each side. The tunnelling method proposed by Balfour Beatty was the Sprayed Concrete Lining method (SCL). The tunnel alignment is in the middle of the Upper Hythe beds at the southern portal. These beds consist of silt sand with rock bands. Further north, it passes through the Upper Hythe beds where the percentage of rock starts to increase and then in the Lower Hythe beds there is rock with minor sand bands.

Despite predictions of low ground water ingress and good self-supporting sandstone, the reference design for the tunnel included a drained PVC-membrane waterproofing system behind an insitu concrete final lining. However, consultants Mott MacDonald felt that an alternative solution could offer significant time savings and progress flexibility advantages for the contractor and major time and money savings for the client.



The Solution:

Taking a value engineering approach, consultants Mott MacDonald proposed a spray-on waterproofing system with shotcrete as the final permanent lining in the crown, with cast concrete sidewalls to allow a painted reflector surface and easier wash-down maintenance. The spray-applied system specified was MASTERSEAL® 345 from BASF Construction Chemicals, which is applied in a simple sandwich construction.

The waterproofing system's performance lies in the excellent bonding properties between the membrane and concrete lining on both sides, which mitigates the risk of water ingress by eliminating groundwater paths. MASTERSEAL® 345 closes and isolates any cracks so that stresses resulting from water pressure can be transferred to the outer lining, leaving the inner lining virtually unaffected

Advantages At A Glance:

The same workers who carried out the shotcreting were able to apply a 5mm layer of MASTERSEAL® 345 against the primary shotcreted surfaces using a MEYCO Piccola dry spray pump.

As the largest application of MASTERSEAL® 345 in the world, at the time of application, the Hindhead Tunnel required 80,000m² of spray-applied waterproofing.



Customer Satisfaction:

The Highways Agency stated: "Given the right conditions it's a very good system. It speeded construction of the tunnel by about three months over the traditional option and worked well."

References:

<http://tunneltalk.com/Spray-on-waterproofing-Mar10-Hindhead-application-UK.php>



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