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CASE STUDY

EXTRUDED CONCRETE Central Barrier Slot Drain M3 Motorway Infrastucture Works

Hampshire, United Kingdom

As part of ongoing national road infrastructure improvements, Highways England have commisioned Balfour Beatty to manage the upgrade of the M3 motorway to a 'Smart Motorway'. Specialists in slipform concrete, Extrudakerb have been contracted to install the extruded Concrete Step Barrier (CSB), substrate plinth and adjacent extruded concrete slot drain. As part of the approved Britpave specification for the CSB, a CE marked micro synthetic fibre must be added to the concrete barrier concrete mix to improve cohesion and surface finsih during the slipforming process. Extrudakerb also use the micro fibre to improve the reology, and reduce defects in the concrete used for the the extruded slot drain system that runs adjacent to the CSB.

Project owner
Balfour Beatty

Product
Fibrin XT Monofilament Micro Synthetic Fibre

Function
Improve surface finish and concrete mix stability during extrusion

Contractor
Balfour Beatty Extrudakerb

Fibre Dosage
0.91kg/m³ dosage

Challenge

The extruded concrete slot drain construction incorporates a defined void formed beneath a narrow aperture, into which surface water runs. This prevents excess water causing a driving hazard on the motorway carriageway.

The concrete needs to allow smooth movement of the drain profile during extrusion, preventing drag and subsequent damage, aswell as support the weight of the fresh concrete as the mould moves along.

Deformation and collapse of the slot drain results in lost time due to the need for manual cut out and repair, causing costly delays to the construction schedule

Solution

- The inclusion of a proven dosage of Fibrin XT monofilament micro synthetic fibre improves the reology of the concrete mix by enhancing mechnical interlock, cohesion thus increasing the tensile strain capacity of the fresh concrete forming the slot drain.
- The micro fibre is added during the batching process, so comes ready mixed in the delivered concrete.
- Fibrin XT is supplied in a 0.91kg bag, which is the standard dosage for 1m³ of concrete, allowing for ease of batching and consistent fibre distribution.

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The extruded slot drain can be susceptible to collapse as the profile moves along during installation. The addition of Fibrin XT increases the stability of the fresh concrete, resulting in less defects.

Consistent surface finish is an important factor in this concrete process. The additon of the micro synthetic fibres allows the form to slip more consistently by increasing cohesion and the green tensile strain capacity of the fresh concrete.

Benefits of the solution

- The micro synthetic fibre is added into the concrete during batching.
- The mixing action distributes the fibres throughout the whole volume of the concrete ensuring the required performance.
- The Fibrin XT increases mechanical interlock of the concrete mix forming the slot drain, improving green tensile strain capacity, which results in less instances of collapse and the need for associated costly and time consuming remedial repair works.
- The micro synthetic fibre also improves cohesion in the fresh concrete. This results in a higher quality surface finish as the slipform moves along the drain profile.

Products Used: Fibrin XT Monofilament Micro Synthetic Fibre

Fibrin XT - improves the plastic properties of the fresh concrete, resulting in better surface finsh and significantly less defects during installation of the extruded slot drain system.

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