Case Study

EMESH

Rozelle Interchange
WestConnex

JOHN HOLLAND | CPB CONTRACTORS

Innovation

Emesh is an Australian innovation by Fibercon that completely replaces steel reinforcement in concrete pavements. This is done by adding recycled macro polypropylene fibres to the concrete mix.

Emesh controls the risk of shrinkage and cracking over short and long durations, while diverting industrial plastic from landfill and eliminating the use of steel mesh.

This material provides a pathway for the replacement of conventional reinforcement steel, specifically SL82 as per TfNSW Specification R53 (concrete for general works) in NSW and has successfully been used at the Rozelle Interchange as a trial within a section of a permanent Shared User Path (SUP).

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Benefits

Design:

- Superior long-term performance
- Flexibility in the shape of pavements
- Greater flexibility of joint locations
- Corrosion free reinforcement
- Longer life span
- Reduction in earthing & bonding issues

Construction:

- Faster application (applied in the concrete mix at the batch plant)
- Safer, with no requirement to lay steel reinforcement

Economic:

- 20% cost reduction (arrives on site ready to use and does not require engineering inspection for reinforcement)
- Eliminates the requirement to procure steel reinforcement and the labour to install it
- Simple, fast and easier to use as it dispenses with the need to cut steel mesh or manoeuvre mesh and bar chairs.

Environmental:

- Reduces reliance on natural resources and can be recycled and reused the same as traditional recycled concrete aggregate
- Reduces CO2 emissions by 91%
- 100% recycled product, diverting waste from landfill
- Covered by an Environmental Product Declaration

Social:

- Reduces injury risks for workers as there is no cutting and tying of steel mesh or chairing up required
- Fibrecon supports the National Disability Industry Scheme (NDIS)
- 100% Australian innovated and produced product

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Project Implementation

The Project has successfully trialled Emesh within temporary works and continues to investigate permanent works implementation in various Project footpaths, islands and medians. The Project trials include:

TEMPORARY CONSTRUCTION GATE (BRENAN STRET BRIDGE - DRIVEWAY)

The first trial was conducted together with the implementation of a low carbon concrete mix trial, containing glass sand (virgin sand replacement) and Emesh (steel reinforcement replacement) within a temporary works driveway.

Construction of the temporary gate was under tight time pressures as it provided the only access (over a channel) to a work site. The construction of this gate was critical to the Projects construction program.

Implementation involved:

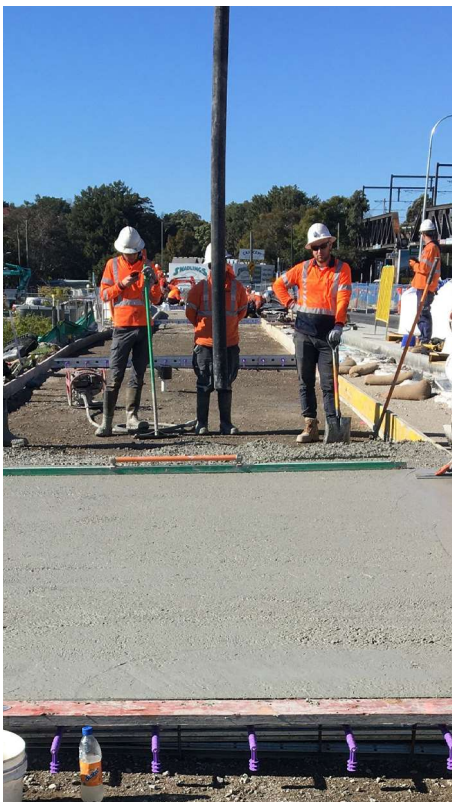
- 15.2m³ of a low carbon concrete mix developed by Boral (80% cement replacement) (40MPa, 120mm slump, 20mm aggregate)
- 40% recycled crushed glass sand
- 90 kg of Emesh (6kg/m³)

PERMANENT SHARED USER PATH (SUP)

The Project team trialled Emesh within a section of a SUP connecting Annandale to the CBD. The SUP represented a key opportunity for the Project to test the material's workability and performance within non-structural concrete pavement and to showcase the material's benefits to the general public.

Implementation involved:

- ~15m³ of a low carbon concrete mix developed by Boral (70% cement replacement) (32MPa, 120mm slump, 20mm aggregate)
- 8% recycled crushed glass sand
- 60 kg of Emesh (4kg/m³)



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Challenges

Implementing Emesh on the project came with challenges, including:

- Working with regulatory authorities to obtain approval for implementation
- Working with subcontractors to ensure finish quality of the product
- Overcoming prescriptive nature of specifications
- Introducing an innovative technology that had not been used in an RMS road project

To overcome these challenges, the sustainability, construction, and design teams worked closely with each other and the material suppliers.

Lessons Learned

Provide training to ensure the design and construction teams are provided with sufficient training and understanding of the triple bottom benefits of the new material. This will ultimately drive implementation.

Engage with suppliers to build a strong and transparent relationship with the supplier to influence market transformation.

Familiarise teams with the product to ensure the crews familiarise themselves with the product. Improper experience can result in a poor concrete finish (fibres extruding through surface). This was the case with the Project's initial implementation at the temporary construction gate. Familiarisation resulted in a smooth finish in the subsequent implementation.

Contact Details

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