

Container Handling Terminal External Reinforced Concrete Pavement

Port of Tyne - South Shields

The Container Handling Terminal at the Port of Tyne has a storage capacity of 5,000 TEU (20 Foot Equivalent Units). This is serviced by 3 Hyster Reach Stackers. The success and growth of the facility as a key logistical hub had resulted in wear of the concrete pavement, exposing conventional steel mesh reinforcement. Exposure to the marine environment lead to accelerated corrosion of the steel. As a consequence, areas of the pavement became unserviceable. It was necessary for urgent replacement of these areas, and eliminate the risk of damage to the Reach Stacker pneumatic tyres.



Client
Port of Tyne Authority

Product
DURUS S400 45mm
Macro Synthetic Fibre

Function
DURUS S400 Macro
Synthetic Fibres replace
conventional steel mesh
reinforcement which is at
high risk of corrosion in
the marine environment.

Contractor
Raintons Construction

Volume
800m³

Background

The Port of Tyne Deep Water Container Terminal is located 5km from the Open Sea. Regular Services operate from the terminal, connecting the Tyne to other major ports.

With 33 Tonne FEUs stacked 4 high and 25,000 laden Reach Stacker passes each year, the concrete pavement was prone to localised wear, resulting in the need for urgent repair.

The original concrete did not provide adequate cover for the mesh reinforcement, and in heavily trafficked areas, exposed mesh was causing tyre punctures to the container handling equipment. The marine environment also caused

accelerated corrosion to exposed mesh, exacerbating the problem.

Solution

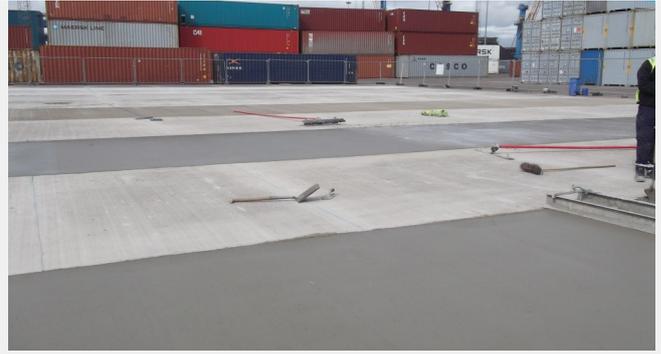
- The use of DURUS macro synthetic fibre reinforcement eliminates the risk of steel corrosion and associated loss of serviceability in the marine environment along with the problematic issue of accurate steel mesh placement.
- This convinced the Ports Engineers that an alternative reinforcement option should be considered.
- With decades of experience, ADFIL were able to offer a comprehensive Professionally Indemnified design which resulted in the original specification using A393 mesh being replaced with DURUS Synthetic macro fibre reinforcement.



With the replacement of conventional Steel Mesh with DURUS Macro fibres, steel mesh placement and fixing is eliminated, allowing large areas of concrete to be poured quickly, reducing disruption to Port Operations and costs.

Benefits of the Solution

- DURUS Macro synthetic fibres are not liable to corrosion. This eliminates the risk of a reduced service life of the reinforced concrete in a marine environment.
- There is no requirement for handling, cutting and fixing of steel mesh. As a consequence installation time and overall construction cost are reduced. Significant health & safety considerations are also eliminated.
- Disruption to site operations are also minimised, as there is no need to store steel mesh on site.
- The risk of steel mesh reinforcement being misplaced has been eliminated. DURUS macro synthetic fibres are uniformly distributed throughout the delivered concrete, ensuring consistent performance.
- Macro fibre reinforced concrete can be discharged directly into formwork, allowing larger areas to be poured, with saw cut joints being made the following day.



A high quality surface finish is achieved with the use of 4kg/m³ of Durus S400 45mm Macro synthetic fibre.

Result

- All parties involved in this project were extremely satisfied with its success.
- The Plant Supervisor commented that the 4kg bags of DURUS S400 Macro synthetic fibre were 'simple' to batch, and his Concrete Manager welcomed the 'technical support' during initial plant trials.
- The Installation Contractor commented on the 'ease' of placement and their Site Manager explained that the time and cost savings of getting the concrete installed without labour intensive steel mesh handling, cutting and fixing was a significant benefit during the project.
- The Client, Port of Tyne Authority, thought that the DURUS fibre reinforced concrete had an 'excellent surface finish' and that delivery of the finished slab, from the initial design process, to the reopening of the repaired area to traffic was prompt, straight-forward, safe and effective.

Products used: DURUS S400 45mm Macro Synthetic Fibre



Effective replacement for Steel Mesh reinforcement in ground bearing reinforced concrete pavements.