

Short Guide  
**Port & Docks**  
Applications

**Synthetic Fibre Reinforced Concrete**  
DURUS<sup>®</sup> Macro Fibre | CRACKSTOP<sup>®</sup> Micro Fibre

**Adfil macro and micro synthetic fibre reinforced concrete can provide significant benefits in the construction of port and docks projects.**

**Challenges**

Ports and docks are key logistical hubs supporting the distribution of cargo worldwide. The cargo is stored in large steel containers which are loaded and unloaded via crane, reach stackers and specialist handling equipment from the docked cargo ships.

With some containers weighing in excess of 20T and being stacked in multiple layers, it is critical that the concrete slab contains appropriate reinforcement to accommodate such loads. Otherwise this could lead to serviceability problems and temporary closure of the affected area.

With most ports and docks located by the coast, the concrete pavement will be exposed to the sea water and spray, putting conventional steel reinforcement at high risk of corrosion. This will result in surface spalling, dramatically reducing the service life of the concrete pavement.

**Solution**

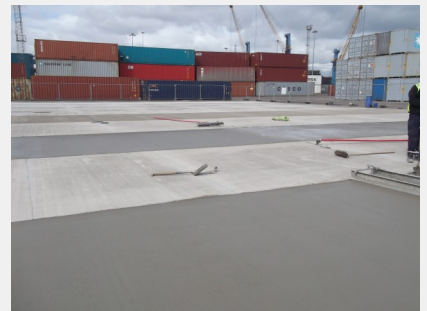
The replacement of conventional welded steel mesh with Durus synthetic macro fibre will eliminate the risk of corrosion and any associated problems. Synthetic macro fibre reinforcement will allow more efficient installation as there is no requirement for handling, placement and fixing of steel mesh. This will significantly reduce construction time.

The risk of steel mesh being placed incorrectly, with inadequate cover, will not be a factor if it is replaced with Durus macro synthetic fibres. Durus which will be dispersed consistently throughout 100% of the volume of the concrete on delivery to site. This will also eliminate significant health & safety hazards associated with steel fixing.

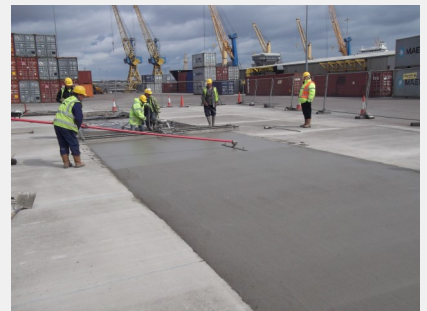
The use of Crackstop micro synthetic fibre will enhance the abrasion resistance\* of the concrete by around 60%, and more than double the impact resistance\*\*. This will extend the service life of the concrete structure in these aggressive environments.

Crackstop will also reduce permeability and the occurrence of plastic shrinkage cracking. This is a significant consideration with regards to the ingress of water into the concrete structure which can lead to accelerated damage and shortened service life.

\* Proven by accredited Test Data from Aston University  
 \*\* Proven by accredited BBA Certificate



Port of Tyne



Port of Blyth



Mamhead Slipway

## Application Areas

### Harbours / Slipways

With harbours and slipways being governed by tidal fluctuations, concrete structures in these situations can be above and below the water level. Any steel reinforcement is at high risk of corrosion resulting in a shortened service life.

Polypropylene fibres are not susceptible to corrosion so will maintain the integrity of the concrete in this environment. The use of Durus synthetic fibre reinforcement will also negate the need for steel fixing, resulting in easier and quicker installation where tidal factors are a consideration.

The restricted nature of a site inside a coffer dam would make the use of mesh difficult and dangerous.

The reinforced concrete pavements used in large container freight handling facilities, such as The Port of Tyne, are subject to excessive dynamic loads from heavy duty freight handling equipment, high impacts from container placement and abrasion from HGV traffic tyre scrub.

### Disclaimer

All information and product specifications provided in this document are accurate at the time of publication. As the Low & Bonar Group follows a policy of continuous development the provided information and product specifications may change at any time without notice and must not be relied upon unless expressly confirmed by a relevant member of the Low & Bonar Group upon request. No liability is undertaken for results obtained by usage of the products and information.

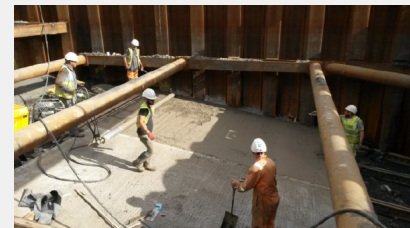
UG-ENG-Ports&Docks-09/2017

### Post Failure Serviceability

If conventional steel reinforcement becomes exposed due to corrosion or pavement damage it can pose a significant health & safety hazard to traffic and equipment. The use of Durus synthetic macro fibres to replace steel mesh eliminates any risk of puncture to HGV traffic.

### Armoured Joints

A combination of synthetic fibre reinforced concrete and a specialist armoured joint system will provide a solution which ensures prolonged service life, where construction joints are particularly at risk of damage from impact from heavy traffic, leading to time consuming and costly repairs.



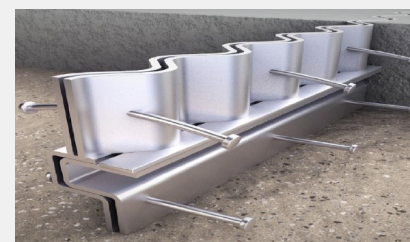
Slipways



Harbour



Post Failure Serviceability



Armoured joints