

Short Guide
**Marine & Coastal
Applications**

Synthetic Fibre Reinforced Concrete
DURUS[®] Macro Fibre | CRACKSTOP[®] M Ultra Micro Fibre

Adfil macro & micro synthetic fibres can be used in a wide range of marine and coastal reinforced concrete applications to replace conventional steel mesh reinforcement.

Challenges

In marine and coastal environments, constant exposure to water, especially sea water, can cause devastating damage to concrete structures as a result of steel corrosion.

This is a high energy environment created by wave action and abrasion from shingle and sand particle impacts. The concrete used in these applications must have a high durability to ensure design service life is maintained.

Time constraints resulting from tidal movements are also a major factor. Ease of construction and reduced construction time present a huge benefit to the installer.

Where a coffer dam is required for installation, the importation of welded steel mesh reinforcement to the construction site can be difficult and dangerous due to a restricted working area.

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, which will be dispersed consistently throughout 100% of the volume of the concrete on delivery to site.

The use of Durus will also eliminate significant health and safety hazards associated with steel fixing.

The use of Crackstop M Ultra 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 M Ultra 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.

Compliance

Adfil fibres are compliant with the Environment Agency's Minimum Technical Requirements (MTR) WEM Table for Fibres in Marine Concrete and CIRIA C674 Use of Concrete in Maritime Engineering.

* Proven by accredited Test Data from Aston University

** Proven by accredited BBA Certificate



Peterhead Sea Defence



Southwick Groynes



River Parrett



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 makes the use of mesh difficult and dangerous. A challenge that can be overcome with Durus synthetic fibre reinforcement.

River Flood Defences

Adfil fibres have been used in concrete for river flood defence projects to increase their structural performance and durability. These benefits will be a high priority where design life is paramount to ensure lower long term maintenance costs.

Disclaimer

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Lagoons/ Reservoirs

These are generally mass reinforced concrete structures which are engineered to contain high volumes of water.

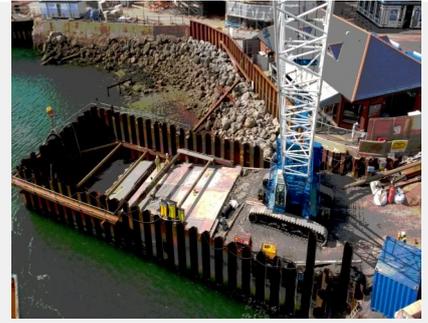
Penetration of water into the concrete will result in corrosion of any steel reinforcement used in construction, causing spalling.

Over time, spalling of the concrete will lead to weaknesses in the mass structure, potentially resulting in a containment breach and failure. The use of Durus synthetic fibre reinforcement will eliminate the problems associated with steel corrosion and maintain design life.

Sea Defences

Sea defences are subjected to high energy from wave action and constant abrasion and impacts from projected beach shingle particles.

To ensure the concrete is sufficiently durable to cope with these environments, the addition of Crackstop XT synthetic micro fibre will enhance the impact resistance and abrasion value of the concrete, as well as reducing permeability.



Harbour/ Slipway



River flood defence



Lagoon



Sea defence