

West Rhyl Coastal Defence Phase 3

North Wales, United Kingdom

The United Kingdom has seen increased coastal erosion, flooding & high wave activity, resulting in devastation to existing coastal defences using traditional reinforcement methods such as steel mesh. Where the steel has corroded causing the concrete it is encased in to spall and fail.



Project owner
Denbighshire County
Council

Product
Durus S400

Function
**Used as non corrosive
reinforcement in the
concrete in fills around
linked concrete matting**

Contractor
Dawnus

Volume
**600m³ C40/50 Concrete
2400Kg Durus S400**

Challenge

Concrete sea defences are subjected to a very aggressive environment where continuous wave action which often contains Sand, Stone, Sea debris can lead to the concrete suffering from severe degradation.

When you combine this with an environment which has high chloride content then not only does the concrete degrade but so does any embedded steel which has been used to reinforce the concrete. When this occurs the traditional steel reinforcement begins to rust and it expands causing the concrete to spall and fail.

Solution

4Kg Durus S400 Macro Fibre

The inclusion of this fibre in the concrete is primarily to replace the reinforcing steel. In addition to this it also improves the impact resistance of the concrete. With Polypropylene not being susceptible to chloride attack there will be no spalling of the concrete caused by the failure of the steel reinforcement. This means that the structure will have a longer maintenance free life span and keep its aesthetic look for much longer.



Showing where the Fibre concrete was also used in the steps



Linked Concrete blocking surrounded by C40 Concrete containing 4Kg Durus S400. Protecting the Land from coastal attack & Erosion

Benefits of the solution

By using the Durus Macro fibres in the concrete used on this project, the sea defence will have extended life cycle and will need less maintenance than if traditional steel mesh had been used. The replacement of the steel mesh with the Durus also saves time in constructing the project. Durus S400 Macro fibre is a recognised & accepted fibre for the Environment Agency's Minimum Technical Requirements for Marine Concrete.

Installation benefits (optional paragraph heading)

By using Fibre Concrete the Contractor Dawnus were able to save time not having to fix steel in place. This was vital as they only had small daily windows of opportunity to pour concrete continually fighting against the tidal flow. They were also thankful of not having to store steel in their compound and having to transport it to the beach areas. Health and safety factors were taken away by not having to use steel.

Result

The council will now have the peace of mind that the sea defences will stay in a good condition and capability of use for many years. The aesthetic look of the sea defence won't become un-naturally unpleasant by spalling and rusting concrete. The beach was opened to the public far quicker than if they had used steel mesh. This helping the local services, people & economy getting back to normal quicker. With Fibre concrete being able to save around 50% in CO2 emissions in comparison to steel reinforced concrete the project worked in practical, environmental & safe harmony with the nature of the coastline.

Products used



Durus S400 BS EN 14889 Class 2 Embossed Macro Fibre at a 4Kg per Cubic meter of concrete