

Alexandra Parade Peterhead Sea Wall

CASE STUDY

Aberdeenshire, United Kingdom



Following storms in 2014, and the devastation caused to Alexandra Parade from the ferocious power of the North Sea, Peterhead Port Authority decided that they urgently needed to enlarge and repair their sea defences.



Project Owner

Peterhead Port Authority

Product

Durus Macro & Fibrin XT

Function

Used in the concrete for its impact, abrasion & corrosion resistant properties.

Contractor

Durus Macro & Fibrin XT

Volume

1000m³

Background

The original design was for steel bar and B785 welded mesh fabric reinforcement. The jack-hammering effect of flying rocks led to shattered concrete defences. The heavy abrasion of debris from the volatile sea led to traditional steel mesh reinforcement being exposed and susceptible to eventual corrosion. The client was unwilling to invest in problematic reinforcement of this type. With such a large structure and its location next to the sea, a time saving and more resilient material was required.

Solution

5Kg Durus Macro Fibre & 0.910Kg Fibrin XT. The inclusion of Polypropylene-fibre-reinforced concrete shows impact resistance values well in excess of double the amount of plain concrete.

Furthermore, the punch loads that specialists calculated could be accommodated by the Durus concrete satisfied the client that there would be no spalling of the first 100mm depth. With the 1.9m-thick section depths, the micro fibres would have at least the same preventative effect on shrinkage as on the steel mesh.



Shutter during construction. The road to the left the sea to the right



Sea Wall Enlargement

Benefits of the solution

Polypropylene fibres are not susceptible to sea water corrosion. In large sections of concrete such as this fibres will prevent thermal cracking. Durus Macro & Micro fibres in the concrete on this project gave the concrete the benefit of double the impact resistance & 60% better abrasion. The amount of steel mesh reinforcement needed on this project would have increased construction time, by using fibre reinforcement already within the concrete, this time was saved. Cost savings would have also been made.

Installation benefits

With the removal of steel mesh, basic shuttering was able to be used. Meaning the placement of the concrete was quicker and easier.

Timing the tides and weather were better planned due to replacing the need for steel mesh, this also led to improved safety on this already dangerous location.

Result

- The concrete slab will now have a 3D reinforced throughout the concrete structure.
- Construction time was saved not having to fix steel.
- The concrete will have additional impact and abrasion properties, protecting the structure from the sea.
- The reinforcement is not susceptible to corrosion.
- The structure will last longer.
- The environmental credentials of the project will have been improved.
- The health and safety of the site will have been improved.

Products used



Durus Macro fibre BS EN 14889 Class 2 Embossed at 5Kg per Cubic metre of concrete



Fibrin XT BS EN 14889 Class 1a Micro Monofilament Fibre at 0.910 Kg per Cubic metre of concrete