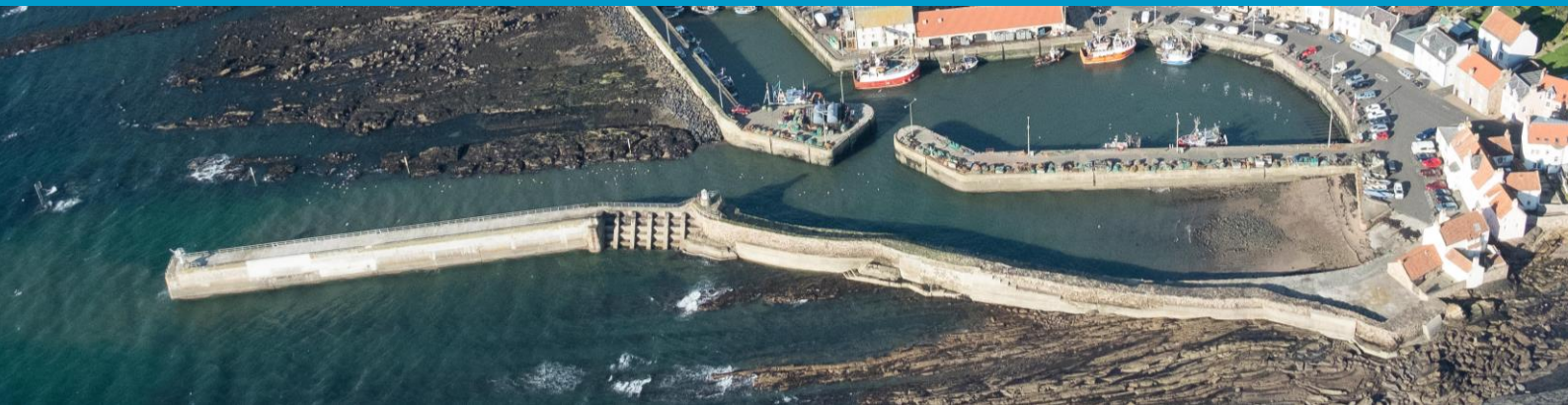


Engineer: AECOM Mattress Engineering: Proserve Contractor: Farrans / Aberdeen Marine Services



The concrete caisson breakwater extension at Pittenweem had suffered base underscour and failure of the foundation bedding stone, causing settlement of caisson 3 of some 0.2m.

The foundation was reinstated by underbase grouting of the caissons, assisted by Proserve's grout bag perimeter seals, along with subsequent pattern grouting of the caisson fill.

CT1000 mattress, 1.0 m thick was installed to the outer breakwater, for wave action of 4.5 m. Mattress edges were toed into the variable mudstone/sandstone bedrock to protect edges from future scour. The mattress was tied into the breakwater wall using heavy steel pins to resist breaking wave loads.

CT480 mattress, 0.5 m thick was installed to the inner face of the breakwater, for lesser wave action and local fishing vessel traffic.

A total of 1,100 m² of concrete mattress was installed by Diver in suitable weather windows for 2 summer working periods. Repairs and maintenance to the breakwater deck were also undertaken.

Concrete mattresses were fabricated in compartments of 10 m³ filling volume for constructability, with robust ball and socket shear joints between panels.

The concrete mattress panels were filled in situ with highly fluid sand:cement micro concrete delivered by ready-mix. The mix was pumped using a Putzmeister 1000D piston pump up to 270 m along the breakwater in 100 mm steel pipes, into a secondary worm pump at the worksite with 50 mm rubber grouting hose for diver handling.



Caisson Breakwater



Concrete Mattress