

COASTAL EROSION PROTECTION AT AIRPORT ISLE OF BENBECULA, SCOTLAND, UNITED KINGDOM

Slope Protection

Problem

Located in the Outer Hebrides, the Isle of Benbecula is among the most westerly places in the British Isles. It is exposed to the constant erosion and storm force winds of the Atlantic Ocean. This coastal erosion was encroaching on the South Western perimeter of Benbecula airport, a vital link with the mainland for those living on the Island. Client, Highlands and Islands Airports Ltd wanted to limit this erosion, thereby protecting their airport operations.

Solution

Project Consulting Engineers, Pick Everard designed a robust revetment that could withstand the exposure conditions. The 500m long revetment structure would stabilise and protect the sand dune system. 0.5m thick Reno Mattresses were selected to protect the sloped revetment and a low height crest wall constructed from gabions would retain the runway and control wave overtopping. A similar solution had been adopted successfully at a MOD Firing Range elsewhere on Benbecula. Due to the dynamic loading conditions and potential for the foundation conditions to change over the life of the structure, there was the possibility of differential settlement. Therefore, double twist woven steel wire mesh gabions were selected as their inherent flexibility would enable the structure to accommodate differential settlement without sustaining damage.

Preserving the natural shoreline, the box gabions and heavy Reno Mattresses were filled with more than 8,000 tonnes of locally quarried stone. These heavy revetment mattresses, provided a natural looking solution, which would soon accrete sands and silts in which vegetation can establish.

Construction of the revetment was carried out by contractor Aggregate Industries UK Ltd of Stornoway. Maccaferri assisted Pick Everard with technical advice on the project. Maccaferri's 130 years of experience in hydraulic and coastal works led to specific details being incorporated into the project to enhance performance of the solution.

Client: Highlands & Islands Airports Ltd

Designer / Consultant: Pick Everard Glasgow

Contractor: Aggregate Industries UK Ltd

Products used (Qty.)

Date of construction: 01/2003 - 02/2004

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Original construction of revetment at firing range



The revetment after construction - note accretion of sand



Construction on the airport slope



Vegetation establishing in revetment