Coastal Erosion Protection at Benbecula Airport, Outer Hebrides

Isle of Benbecula, Scotland



TYPE OF PROJECT	YEAR OF CONSTRUCTION	CLIENT	CONTRACTOR	DESIGNER
Channelling Works	**2003**	**Highlands & Islands Airports Ltd**	**Aggregate Industries UK Ltd**	**Pick Everard Glasgow**

PROD. RELATED
Reno Mattress Plus (Null)

Challenge

Located in the Outer Hebrides, the Isle of Benbecula is one of the most westerly and exposed locations in the British Isles. The island faces relentless Atlantic Ocean conditions, including storm-force winds, high-energy wave action, and ongoing coastal erosion. Over time, this erosion began to threaten the south-western boundary of Benbecula Airport, an essential transport hub providing a vital connection between the island and mainland Scotland.

As the shoreline receded, the integrity of the airport's infrastructure and operations came under increasing risk. Highlands and Islands Airports Ltd required a long-term coastal defence solution capable of mitigating erosion, protecting critical assets, and ensuring the continued safe operation of the airport in a highly aggressive marine environment.

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Original construction if revetment at firing range



The revetment after construction - note accretion of sand

Solution

To combat coastal erosion at Benbecula Airport, consulting engineers Pick Everard developed a durable and adaptive revetment design tailored to withstand extreme coastal conditions. The solution consisted of a 500-metre-long rock-filled revetment system designed to stabilise the shoreline and reinforce the existing sand dune defences.

The revetment incorporated 0.5-metre-thick Reno Mattresses along the sloped face to provide robust erosion protection against wave impact and hydraulic forces. At the crest, a low-height gabion wall was constructed to retain the runway structure and minimise wave overtopping during storm events. This proven coastal engineering approach had previously been implemented successfully at a Ministry of Defence site elsewhere on Benbecula.

Recognising the challenges posed by variable ground conditions and dynamic coastal loading, the design prioritised flexibility and resilience. Double-twist woven steel wire mesh gabions were selected due to their ability to accommodate differential settlement without structural failure, ensuring long-term performance even as foundation conditions evolve.

Sustainability and environmental integration were also key considerations. Over 8,000 tonnes of locally quarried stone were used to fill the gabions and Reno Mattresses, creating a natural-looking coastal defence structure. This approach promotes sediment accretion and encourages vegetation growth, helping to restore and maintain the natural shoreline while enhancing ecological value.

The construction works were delivered by Aggregate Industries UK Ltd, based in Stornoway. Maccaferri provided specialist technical support throughout the project, leveraging over 130 years of expertise in coastal and hydraulic engineering. Their input ensured the incorporation of advanced design details that improved durability, performance, and long-term coastal resilience.



Construction on the airport slope



Vegetation establishing in revetment

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