Flood Protection Solution in Boscastle – Combining Engineering Strength with Natural Aesthetics

BOSCASTLE - CORNWALL - United Kingdom



TYPE OF PROJECT	YEAR OF CONSTRUCTION	CLIENT	CONTRACTOR	DESIGNER
Longitudinal Protection	**2007**	**THE ENVIRONMENT AGENCY**	**Carillion**	**Harlcrow Group Ltd**

PROD. RELATED
GeoMats (7000m2), Reno Mattress Plus ()

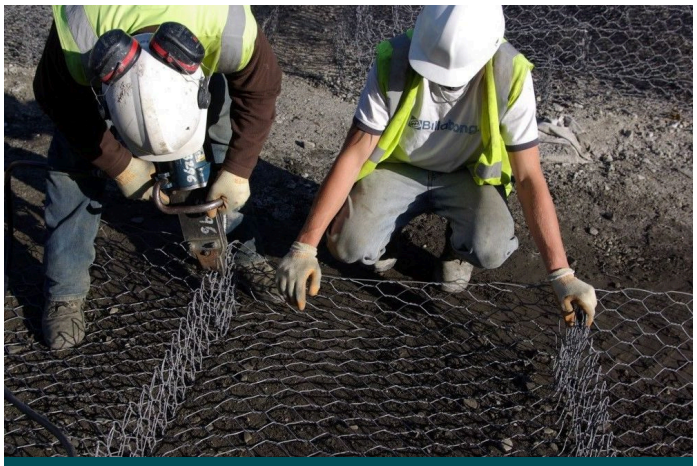
Challenge

Halcrow Group Ltd was commissioned by the Environment Agency to design and deliver an effective flood protection system in Boscastle, a historic village located within an Area of Outstanding Natural Beauty in Cornwall. The challenge was not only technical but also environmental, requiring a solution that could withstand extreme flood events while preserving the village's natural landscape and visual appeal.

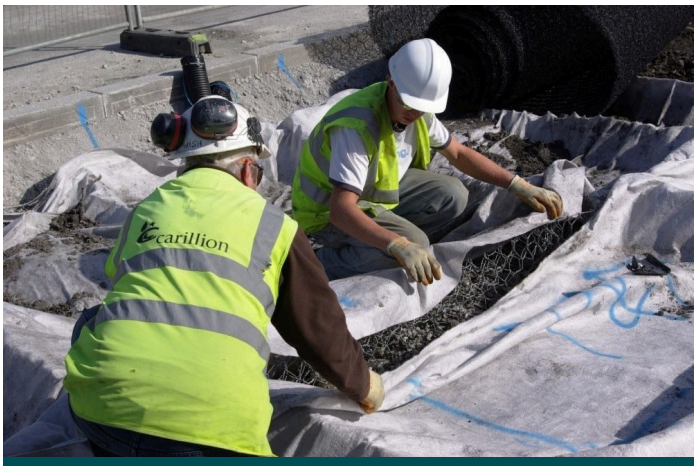
Following the devastating Boscastle flood of 2004, which caused widespread damage and gained national attention, there was an urgent need for a sustainable flood defence solution. However, traditional hard-engineered flood defences, such as concrete walls, were not suitable due to their visual impact on the rural setting.

The project required a riverbank stabilisation and erosion control system that could deliver long-term performance under extreme hydraulic conditions. Halcrow identified that systems relying solely on vegetation would be insufficient, as vegetation-based erosion control can fail during prolonged storm events, leaving embankments

exposed. Therefore, the solution needed to provide reliable protection both with and without vegetation cover, ensuring resilience throughout the full duration of a design storm.



Dramatic floods in Boscastle, August 2004



Construction of the Reno Mattresses

Solution

To achieve a balance between robust flood defence engineering and environmental integration, Halcrow collaborated with Maccaferri to implement a solution using Reno Mattresses and MacMat-R reinforced geomats.

Over 7,000 square metres of Maccaferri's advanced erosion control systems were installed to protect a vulnerable embankment between the River Valency and a newly constructed raised car park. This car park was designed to act as a sacrificial floodplain, providing additional flood storage capacity during extreme weather events.

The core of the system consisted of Reno Mattresses, which are double-twist wire mesh units widely used for riverbank protection and hydraulic engineering projects. Measuring 6m x 2m x 0.23m, these units were lined with Bidim filter fabric and filled with locally sourced material, ensuring both durability and environmental compatibility.

To enhance performance and provide a more natural finish, the Reno Mattresses were overlaid with MacMat-R, a high-performance reinforced geomat made from polypropylene monofilaments with integrated steel wire mesh. This combination created a composite erosion protection system capable of resisting high flow velocities while promoting vegetation growth over time.

The result is a sustainable flood protection solution that delivers long-term erosion control, maintains structural integrity during extreme storm events, and preserves the natural appearance of the Boscastle landscape. Even in scenarios where vegetation is lost, the engineered system continues to provide reliable protection, ensuring resilience and performance for years to come.



Adding the Bidim filter fabric lining to the Reno Mattresses



Filling the Reno Mattresses with site won material

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