Coastal Protection  
Product: Maccaferri MacBags

Problem
The beach at Eustatia Island was eroding; erosion was progressing at an alarming rate by 2008, threatening upland infrastructures, including the loss of trees. The erosion line got as far as the beach dining pavilion, 20 yards from the original shoreline from a few years prior.

Solution
The preferred design alternative was a very low profile groin to allow regeneration of the beach through retention of sand migrating in from the reef. During the permitting phase, however, erosion progressed, prompting the need for a revetment to be added to the design. The final design of this project incorporated a groin field consisting of 9 low profile groins designed to reduce oblique wave energy and retain sand in the area of influence of the groins. During storms it is likely that sand will be lost from the beach, but the groins will act to rebuild the beach width to its pre-storm equilibrium.

The second design element was a low, sloping wall designed to protect the upland from direct wave attack during storms associated with high water levels. Both design elements relied on sand-filled Maccaferri MacBags as the primary construction material. The two elements acted together to retain upland sand, protect palm trees and beach pavilions, and provide a relatively stable sandy beach. Presently, OCC is executing a monitoring plan that includes beach surveys and aerial photography. The project was tested within months of completion as Hurricane Earl passed directly over the island. Neighboring beaches and properties suffered a great amount of damage, while the owner’s beach suffered nearly no detrimental effects. Perhaps the most interesting aspects of this project are that it functions in harmony with the carbonate beach and reef system, is visually non-obtrusive and did not require the carbon footprint typically associated with barging rock or sand to the site. The Eustatia Island Beach Restoration project was the first of its kind in the BVI and “is now the poster child for environmentally favorable beach restoration projects in the BVI” as Michael Hahn (property/project owner) has put it. This project has won the 2011 COPRI Project Excellence Award.
Technical Characteristics

MacBags® are small, highly UV resistant, sand-colored geotextile containers filled hydraulically or mechanically with sand and utilized in lieu of stone, concrete, or other hardened armor systems to protect our coastline. They are especially advantageous where there is minimal local stone or where stone or concrete structures would detract from the aesthetics of the area. MacBags® are easy to install, both above and below the water surface. The soft armored structure offers the customer minimal impact to the environment while providing a cost-effective alternative to hard structures. The bags are designed with a proprietary flat, self-sealing fill port that is unique to the industry. The port does not require the fill hose be secured during the filling process and has a clean, finished appearance once the bag is filled. Maccaferri MacBag® OS 150 is composed of high-tenacity polypropylene (PP) yarns, which are woven into a network in such a manner that the yarns retain their relative position to each other for the high demands required for MacBag® OS 150. MacBag® OS150 is inert to biological degradation and resistant to most naturally encountered chemicals, alkalis, and acids.