



KAYTECH CASE STUDY

SUSTAINABLE COASTAL PROTECTION AT SITU ISLAND RESORT

GEOSYNTHETICS USED

EnviroRock®: Composite geotextile used to form tube structures, geotextile sand containers, and wrap-around wall structures. EnviroRock® provides robust coastal protection with effective filtration. The manufacturing process incorporates an outer layer of sand-trapping fibres for long lasting protection against UV degradation.



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PROJECT DESCRIPTION

Situ Island Resort, located within Mozambique's Quirimbas National Park, faced severe coastal erosion due to strong tidal currents and 4-metre spring tides. This caused the collapse of a concrete walkway connecting the clubhouse and chalets. To address this, a coastal protection solution was implemented, tailored to the island's remote location and limited material availability. The design prioritised erosion control while minimising the need for imported materials, effectively stabilising the beach and preserving the resort's infrastructure.

A BETTER SOLUTION

To address erosion and prevent walkway collapse, EnviroRock® 3PL geocontainers were considered for use with locally sourced sand, eliminating the need for imported materials. Composite geotextiles like® EnviroRock are ideal for coastal protection due to their strength and ability to filter effectively, ensuring stability in high-energy environments. However, due to the lack of roads or vehicles on the island, traditional methods for filling and placing the 3-ton geocontainers were not feasible. Instead, EnviroRock® 3PL geocontainers were constructed on-site using manual labour. This process created tube-like structures that improved coastal stability. The final installation consisted of layered, coarse, beige, nonwoven tubes that blended into the coastal landscape, helping to dissipate wave energy and reduce erosion and wave reflection.

The construction involved the following steps:

- **Fabrication:** EnviroRock® geocomposite tube structures were assembled in 4.6m wide by 50m rolls, with each layer set back 750mm and measuring 1.8m in width. The composite geotextiles were hand-sewn along the edges and back, with holes thermally penetrated 25mm from the edge for sewing closures.

- **Installation:** A foundation, 1.8m wide by 50m, long was excavated during the receding tide. The composite geotextiles were placed and filled with sand using spades and wheelbarrows, then water-compacted. The cover layer was sewn into place before the high tide.
- **Formwork and Support:** The layers were contained within a frontal formwork, with support brackets featuring long flat sections placed between overlaying and underlying geocomposite tubes for stability. These brackets were removed once the tubes were filled and sewn.

The EnviroRock® geocomposite tube structures effectively protected Situ Island Resort's shoreline from erosion caused by spring tides and strong currents. These durable structures provided long-term stability, withstanding abrasion and hydraulic forces. Their quick installation preserved the natural aesthetics of the area while minimising ecological disruption. By reducing the need for imported materials, the solution proved both cost-effective and sustainable, highlighting the benefits of advanced geosynthetic technology.



Excavation of foundation.



Hand filling tubes.



Placing of EnviroRock® in position.



Sewing edges and filling corners.

Interesting facts



Durable Performance

Sand-Trapping Fibres for long lasting protection against UV degradation.



Eco-friendly

Used local materials, minimising environmental disruption.



Cost-efficient

Reduced reliance on imports and heavy equipment.