

Beach erosion rehabilitation

using Fibertex Geosynthetic Sand Container (GSC) bags

Location: Umdloti Beach, South Africa

Project: Umdloti / Ethikwini Municipality (Durban) Coastal protection



Traditionally, hard wave energy deflecting structures were common in the form of reinforced concrete seawalls.

Even though these structures are very effective during storm events, the damage is often just diverted to adjacent structures, aggravating an already sensitive coastline environment. Over time, hard concrete structures are also susceptible to wave damage if not designed properly, and regular maintenance can be a problem after construction.

A general challenge at exposed coastlines

Coastal erosion is becoming more prevalent across the globe due to rising sea levels and change in global weather patterns. Spring tide storm events often affect, if not destroy, infrastructure and property in close proximity to beaches.

The human factor has also been one of the main contributors to the erosion of beaches. With beachfront properties being cleared of natural erosion protective vegetation, the remaining dunes are left vulnerable to wave attack and storm events.



Absorbing the wave energy

Often, such hard solutions are not viable options when addressing the needs of infrastructure protection. A soft solution is required, over which dunes can be reestablished and that can assimilate with nature over time. Such a soft structure needs to absorb wave energy instead of deflecting it, thus a porous structure is required.

Protection efficiency

- The highly porous nonwoven fabric allows for a high degree of bidirectional water flow, which translates to a high degree of wave energy absorption.
- Unlike hard concrete revetment structures that deflect wave energy and might thus be susceptible to wave impact damage.
- The GSC bags are more aesthetically appealing.
- The GSC bags allow for free access to beach.
- Should beach sand be scoured during a storm event, the GSC core structure will remain stable, and can be recovered with beach sand after the storm.

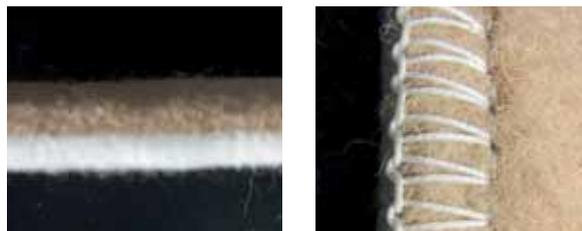


Fibertex Australian distributor: Global geosynthetics
Project name: Dolphin Bay / Madurah / Australia

The Fibertex Geosynthetic Sand Container concept – more stable structure

The concept of sandbag revetments is not new, and many revetment structures have been built using sandbags. However, this is one case where bigger is definitely better. As the anticipated wave energy will have a significant impact on the stability of a well-engineered structure, the resistance of a bigger GSC bag to wave induced movement will lead to a more stable structure.

The engineered fabrics from which these bags are manufactured have seen significant advances in development over the past decades. Fibertex Geosynthetic Sand Containers (GSC-bags) offers the perfect soft solution to beach rehabilitation and protection. Made from highly UV-stabilised virgin polypropylene fibres, mechanically needlepunched together to allow for a high degree of robustness and optimal water permeability.



The robust fabric combination consists of a strong base fabric, needlepunched together with a coarse anti-abrasion and vandal-resistant cover layer. This combination offers a fabric that can retain a local fill medium (sand) yet withstand a harsh coastal environment and survive repeating attack after wave attack.

With a range of GSC bags, with sizes varying from 200 kg to more than 4000 kg, the GSC bags can be used in riverine, lagoon and coastal protection works depending on the environmental and engineering requirements of the designed stormflooding protection structure.



Filling and placement

- The convenient volume of GSC bags, (approx. 3 m³) allows for building a stable structure, resistant to failure during extreme storm events.
- Filling ports: allows for GSC bags to be filled manually or by using mechanical plant.
- The GSC bag size also allows for convenient placement of the GSC bags in the revetment or artificial reef structure.

Durability

- Highly abrasion resistant against wave and sand interaction.
- Highly UV-stabilised for long-term outdoor exposure.
- Double overlock stitching allows for a highly stable seam.
- Vandal-resistant against malicious human interaction.
- Should excessive damage occur, the bag size allows for convenient replacement within the structure.

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