

SoilTain® Coastal Protection Tubes

Geosynthetic Container System for Coastal and Bank Protection

GEOSYNTIA

 **HUESKER**
Ideen. Ingenieure. Innovationen.

Geosynthetic Tube System

The All-Rounder for Coastal and Bank Protection

The effects of global climate change are steadily raising the importance of innovative, intelligent coastal and bank protection systems. The SoilTain tubes developed by HUESKER for such applications take the form of large-size geosynthetic containers installed for the purpose of preventing erosion.

The tubes are hydraulically filled in situ with a sand/water slurry. While the water drains out through the permeable geotextile encasement, the sand is retained within the tube.

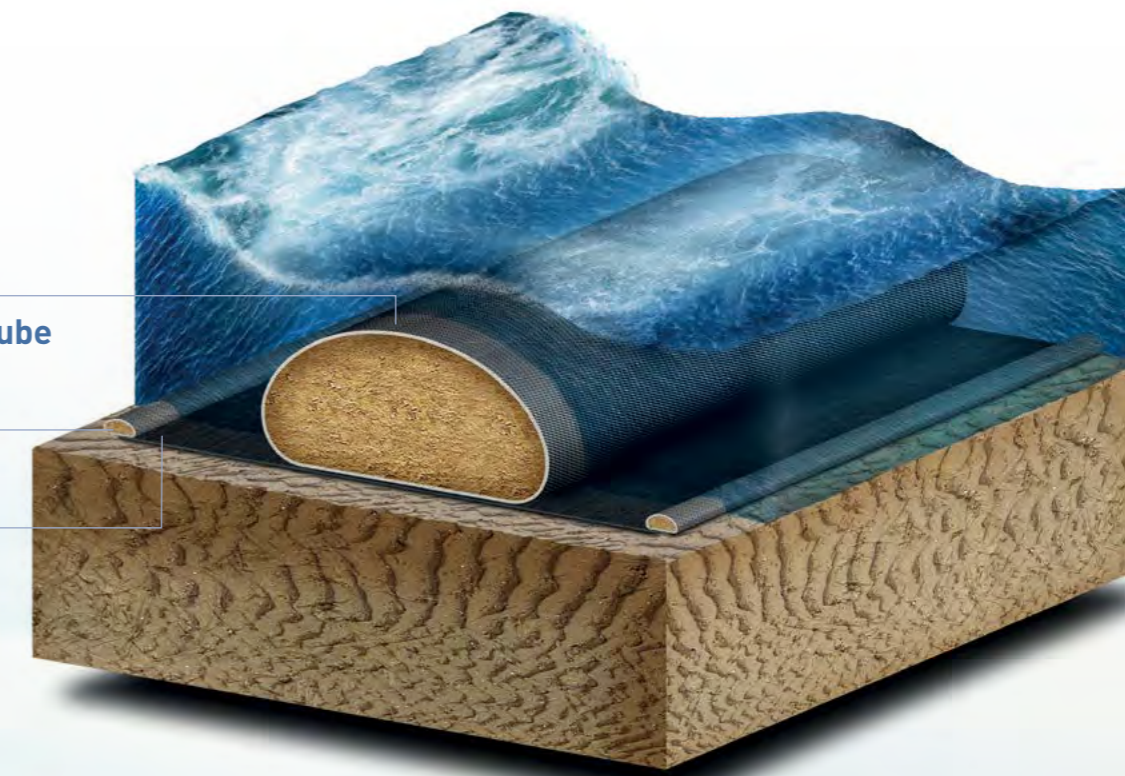
Multi-purpose application

The SoilTain tube system offers a versatile means of installing protective structures parallel to the coast, e.g. as artificial dunes/dikes or breakwaters. The tubes can also be placed perpendicular to the shoreline to form groynes or for the purpose of land reclamation.

SoilTain
Coastal Protection Tube

Anchor tubes

Scour protection
mat



Displacement-resistant and scour-free, even on erosion-prone bases

A scour protection mat with anchor tubes guards against scour and erosion below the SoilTain tube. The anchor tubes protect the scour protection mat against undermining and prevent its displacement.

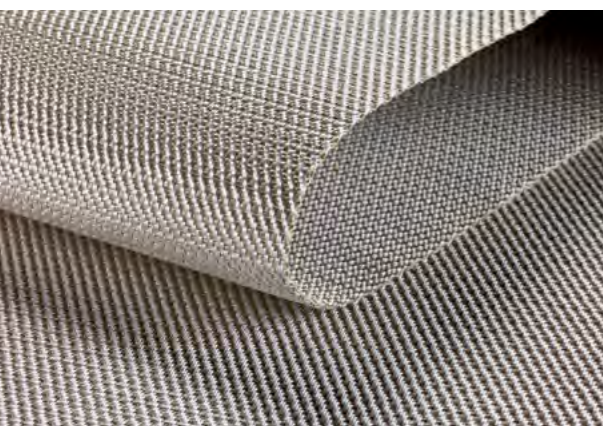




BENEFITS

- Long-term erosion control function
- Large-volume tubes guarantee continuous barrier, even over long distances
- Rapid colonisation by marine flora and fauna
- Cost-effective due to savings on armour stone
- Variety of materials for project-specific selection
- High UV resistance

Economical and Eco-friendly Coastal Protection



Cost-effective solution

SoilTain tubes for coastal and bank protection offer a cost-effective and natural-looking alternative to concrete and stone. They can be filled with locally sourced materials such as sand, thereby eliminating the need for conventional armour stone products. Cost-intensive material shipments that negatively impact the carbon footprint of projects are no longer required.

Across-the-board sustainability

Purpose-developed as a coastal protection solution, the geosynthetic woven excels both by its high robustness during installation and by its long-term abrasion resistance. Visually, the sand-coloured material blends harmoniously with the landscape setting and is rapidly colonised by marine flora and fauna, even under water. The product's eco-compatibility has been demonstrated by both practical applications and scientific investigations.

Wide variety of applications

- Breakwaters and groynes
- Dams, dikes and dunes
- Land reclamation and bank protection



Project-specific manufacture

In addition to standard product sizes, we also offer custom-fabrication with varying tube diameters and lengths to meet project requirements. All design solutions developed by our engineers are based on state-of-the-art practice and comply with the relevant standards and guidelines.

Tubular geotextile encasement

Prefabricated unit made from custom-developed and tested wovens or composites

Filler neck

Rigid or flexible factory-fitted filling aid

Sand filling

Trouble-free filling with sand/water slurry via filler necks; use of locally sourced sands



Fast, Straightforward Installation

1. Extraction

Hydraulic extraction of filling sand by means of suction dredger or dredge pump. Alternatively: liquefaction of sand through addition of water in mixing tank and filling by means of slurry pump.

2. Delivery

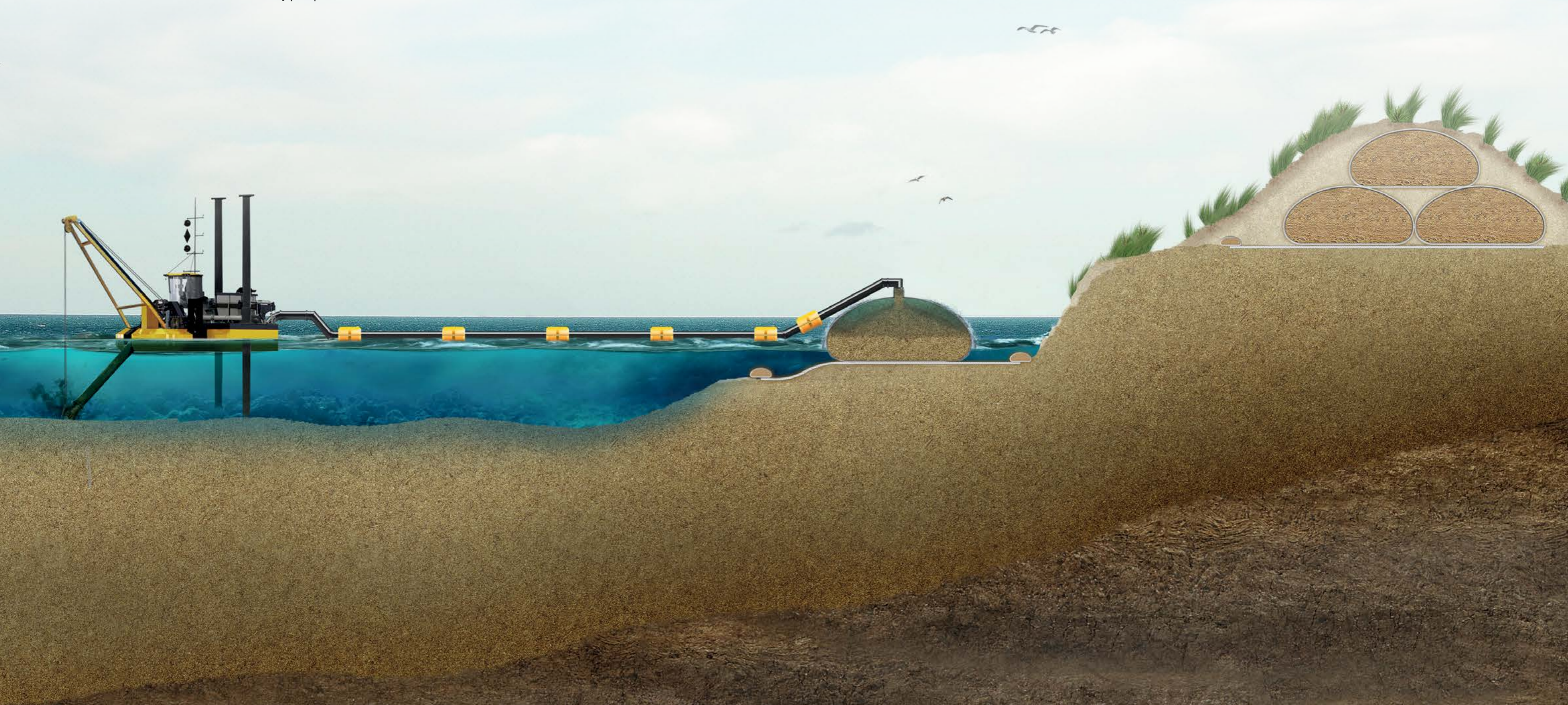
Hydraulic delivery of sand/water mix to place of installation.

3. Filling

In-situ filling of SoilTain tube: water drains out while sand is retained in tube.

4. Integration

Possibilities for integration in landscape setting by covering with sand or overlaying with revetment system; optional stacking of tubes.



Breakwaters and Groynes

Hydraulic Engineering for Erosion Control

Over the years, the range of products used for traditional hydraulic engineering structures such as breakwaters and groynes has become much broader. Today, virtually all materials available on the market – from timberwork or sheet piling to rip-rap structures combined with asphalt or concrete – are specified.

However, geotextile tubes are the only solution allowing the use, as a construction or filling material, of the sand naturally available on beaches and on the seabed.

BENEFITS of SoilTain

- Multi-purpose application
- Long-term erosion control function
- Incorporated as structural core for subsequent covering
- Incorporated in structure or exposed as new alternative to traditional structures
- Fast and economical filling
- Use of locally sourced sands
- Cost-effective due to savings on armour stone

Whether incorporated as a covered-over structural core or remaining exposed as a new alternative to traditional structures, SoilTain Coastal Protection Tubes represent a cost-effective and eco-friendly addition to the existing range of construction materials.

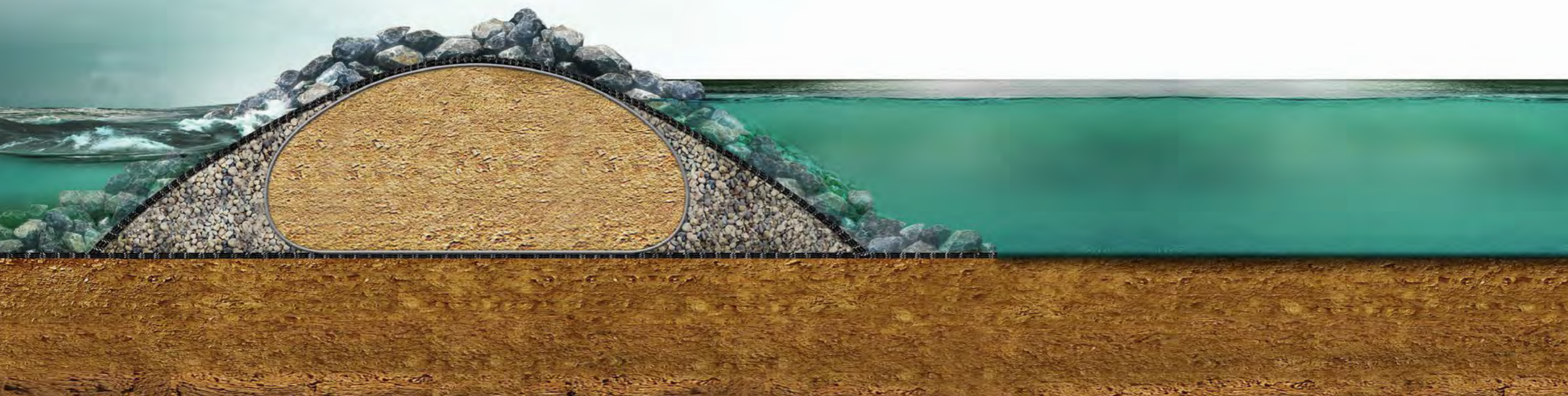
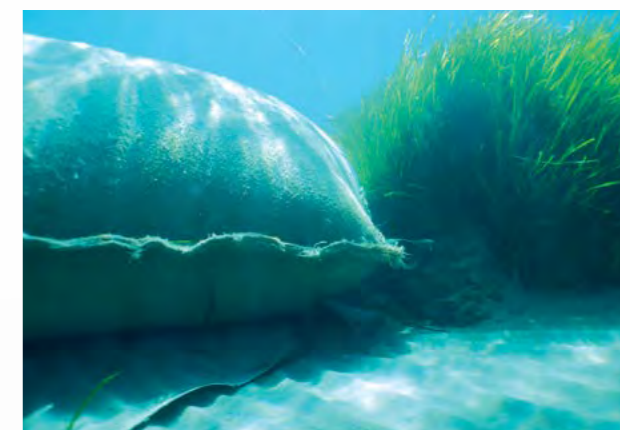
Beach protection

Greece, 2015. At a hotel resort on the island of Kos, several breakwaters comprising SoilTain tubes with scour protection mats were installed to protect the beach against erosion. The works also helped to permanently widen the beach.



Nature conservation

Italy, 2012. Several SoilTain tubes of varying lengths and diameters were used to build a reef breakwater in the bay of Punta Ala with the aim of protecting the seagrass. The low-impact installation method offered by SoilTain Coastal Protection Tubes made these the most eco-friendly alternative among the possible solutions.



Dams, Dikes and Dunes

Durable Flood Control

Both artificial flood control structures such as dikes and natural barriers such as dune systems can be comprehensively reinforced and improved with SoilTain tubes. The tubes are not only suitable for incorporation as the structural core on new-build projects, they can also be subsequently installed for the widening of dikes or as a surcharge filter.

BENEFITS of SoilTain

- Multi-purpose application
- Long-term erosion control function
- For incorporation in new structures, for dike widening or as surcharge filter
- Harmonious integration in landscape setting due to sand-coloured finish
- Fast and economical filling
- Use of locally sourced sands

SoilTain tubes offer cost-effective and eco-compatible protection, particularly for sensitive dune systems.

The sand-coloured finish and optional creation of an artificial dune by covering-over ensure perfect integration in the existing dune system.

Dune reinforcement

Poland, 2012. Winter storms on the Baltic Sea coast near Rowy resulted in the displacement of sand dunes by up to 10 m. To reinforce the dune system, SoilTain tubes were installed along one section. The 4 m high cliff was stabilised by a stacked, two-high tube arrangement.

Once installed, the tubes were covered over with sand to achieve full integration in the dune landscape. Having already successfully resisted a series of winter storms, the system has now halted the process of dune erosion.



Land Reclamation and Bank Protection

Innovative System Solutions for Perimeter Dikes

Erosion-resistant barriers play a crucial role in protecting reclaimed land against water action during the reclamation works. Standard practices such as the dredging of sand to form perimeter dikes are susceptible to natural erosion processes. The encasement of sand material in geotextile tubes prevents its erosion by wind and waves, thereby speeding up the progress of the works.

BENEFITS of SoilTain

- Multi-purpose application
- Long-term erosion control function
- Erosion-resistant perimeter dike
- Large construction heights achievable in single operation
- Fast and economical filling
- Use of locally sourced sands
- Cost-effective due to savings on armour stone

The same principle can be applied to bank protection: given the significant construction heights achievable in a single operation with the large-format tubes, these sometimes offer the only reliable and cost-effective solution, particularly for cliff stabilisation works.

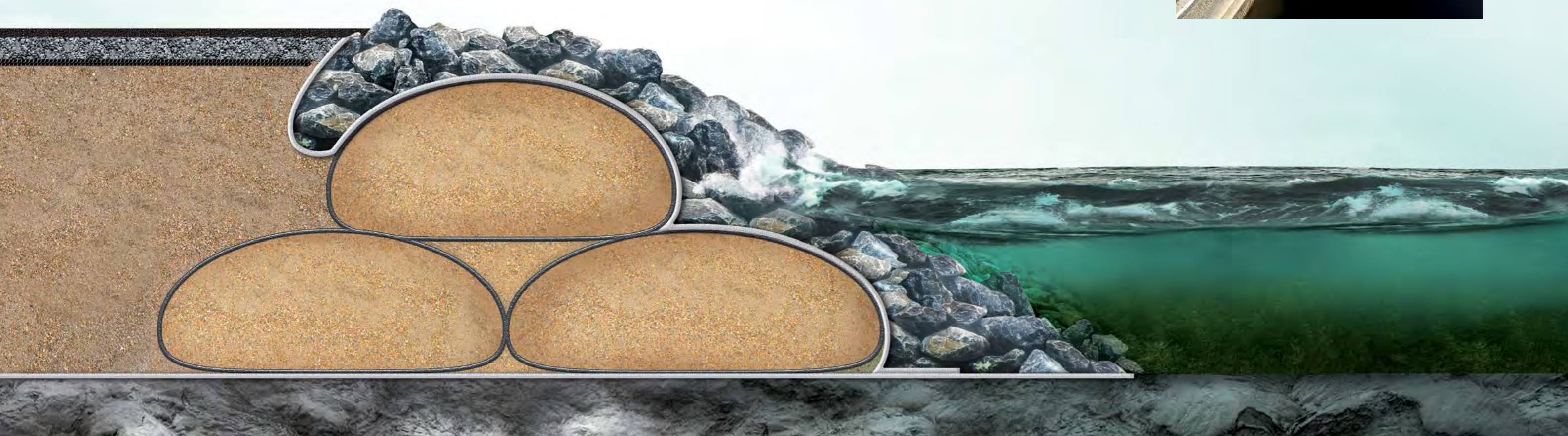
Artificial islands

Netherlands, 2012. Two artificial islands, the so-called „Ecologische Eilanden de Morra“, were built to provide a retreat for threatened animal species. SoilTain Coastal Protection Tubes were used to construct the perimeter dikes.



Cliff stabilisation

Germany, 2016. On the shore of the artificial lake below the village of Lieske, wind-driven waves and the resulting erosion processes had led to the formation of a cliff up to 5 m high over a length of approx. 1,500 m. This was permanently stabilised using SoilTain Coastal Protection Tubes in conjunction with other HUESKER hydraulic engineering products prior to final flooding of the lake.



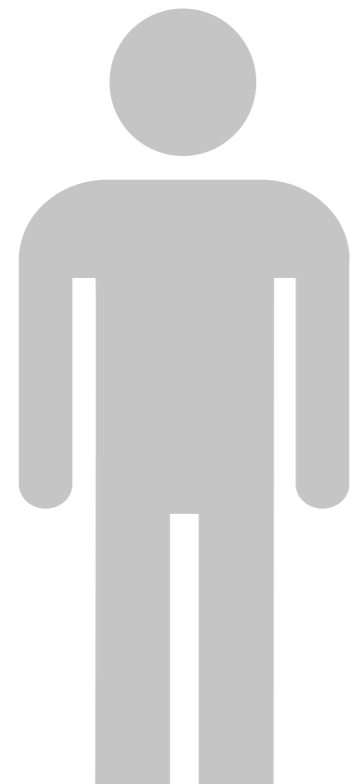


HUESKER Services

HUESKER Services begin with providing the customer with initial advice and end with supporting the realisation of the project on site. What we provide are safe, customised, ecologically sound and economically viable project solutions.

Services provided by our engineers

- **Hydraulic engineering design**
Our engineers assist design practices by performing verifiable design calculations in accordance with international codes of practice.
- **Technical consulting**
We will recommend the appropriate product types for your specific requirements.
- **Project-specific placement plans**
We will prepare installation and placing recommendations plus installation drafts.
- **International knowledge transfer**
Best practice solutions and techniques from our global network.



At HUESKER, every
**7th employee is
an engineer**

Product Services

- **Custom-designed product solutions**
We will assist you in developing custom-fabricated products to meet your particular requirements.
- **Alternative solutions**
We will propose alternative design solutions as well as recommendations for adjustments and optimisations.

Documents

- **Certificates**
Our products have numerous certifications that are issued, for example, by BAM, BAW, BBA, EBA, IVG and SVG, depending on the product type.
- **Installation guidelines**
Technical guidelines will help you to ensure the best-practice installation of your product on site.
- **Tender documents**
We would be happy to provide you with proposals for your specification texts.

On-The-Spot

- **On-site instruction**
Where required, our application technicians can offer installation assistance related to the specifics of product installation.
- **Installation aids**
We can offer you practical installation aids to facilitate the application of our products.
- **Training**



SoilTain® is registered trademark of HUESKER Synthetic GmbH.
HUESKER Synthetic is certified to ISO 9001, ISO 14001 and ISO 50001.



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