SoilTain® Coastal Protection

Geotextile container systems for coastal and shore protection

HUESKER
Ideen. Ingenieure. Innovationen.

Discover Geotextile Coastal Protection Solutions

Your application possibilities with SoilTain Tubes and Bags

Land Reclamation | Bank protection
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Breakwaters | Groynes
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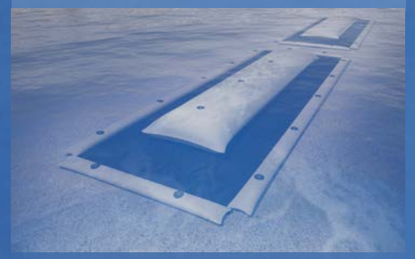

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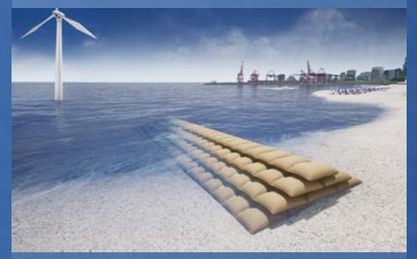


Container Systems for Coastal and Shore Protection

Sustainable hydraulic structures made of robust geotextiles

Due to global climate change, intelligent coastal and bank protection systems play an important role in modern hydraulic engineering. With the geotextile SoilTain Tubes and Bags you can quickly and easily erect permanently safe erosion control structures on land and in water. They are the economical and natural-looking alternative to solutions made of stone and concrete. The individually prefabricated elements can be filled with locally available materials such as sand and thus save on armourstone/armorstone stone. Because of this and the demonstrably rapid colonisation with marine flora and fauna, geotextile containers are a very ecological construction method. Our solutions are solid and at the same time adaptable and can be easily installed in combination with other materials. Depending on the element size and type, filling can be done by means of a funnel or hydraulically by flushing with a sand-water mixture. The possible applications of geotextile construction elements are very diverse and range from dikes on land to breakwaters in the water.

Advantages

- Economic alternatives to conventional construction methods
- Safe structures thanks to high adaptability
- Fast and flexible installation on land and in water
- Ecological construction
- Numerous certifications and tests (BAW etc.)

Production of project-related special solutions

In addition to standard dimensions, we also offer project-specific production with individually selected dimensions and properties (e.g. filling aids such as loops, inlets, closures, etc.). Our experts and engineers will be happy to assist you in the correct product selection and technical design of your hydraulic engineering projects.

SoilTain Tubes

Geotextile tubes made of fabrics or composites up to 1,000 g/m² for large-format heavyweight structures. Installed with a scour apron.

SoilTain Bags Xtreme

Extremely robust Sand Bags made of a two layer needle punched non-woven of 1,200 g/m² for permanently exposed revetments and structures.

New!

SoilTain Bags

Sand Bags made of non-wovens or composites with mass per unit weight from 600 g/m² to 1,000 g/m². For temporarily exposed or permanently covered structures made of small-format, flexible elements.

Large-Format Coastal Protection Solution

SoilTain Tubes – Sustainable erosion control system

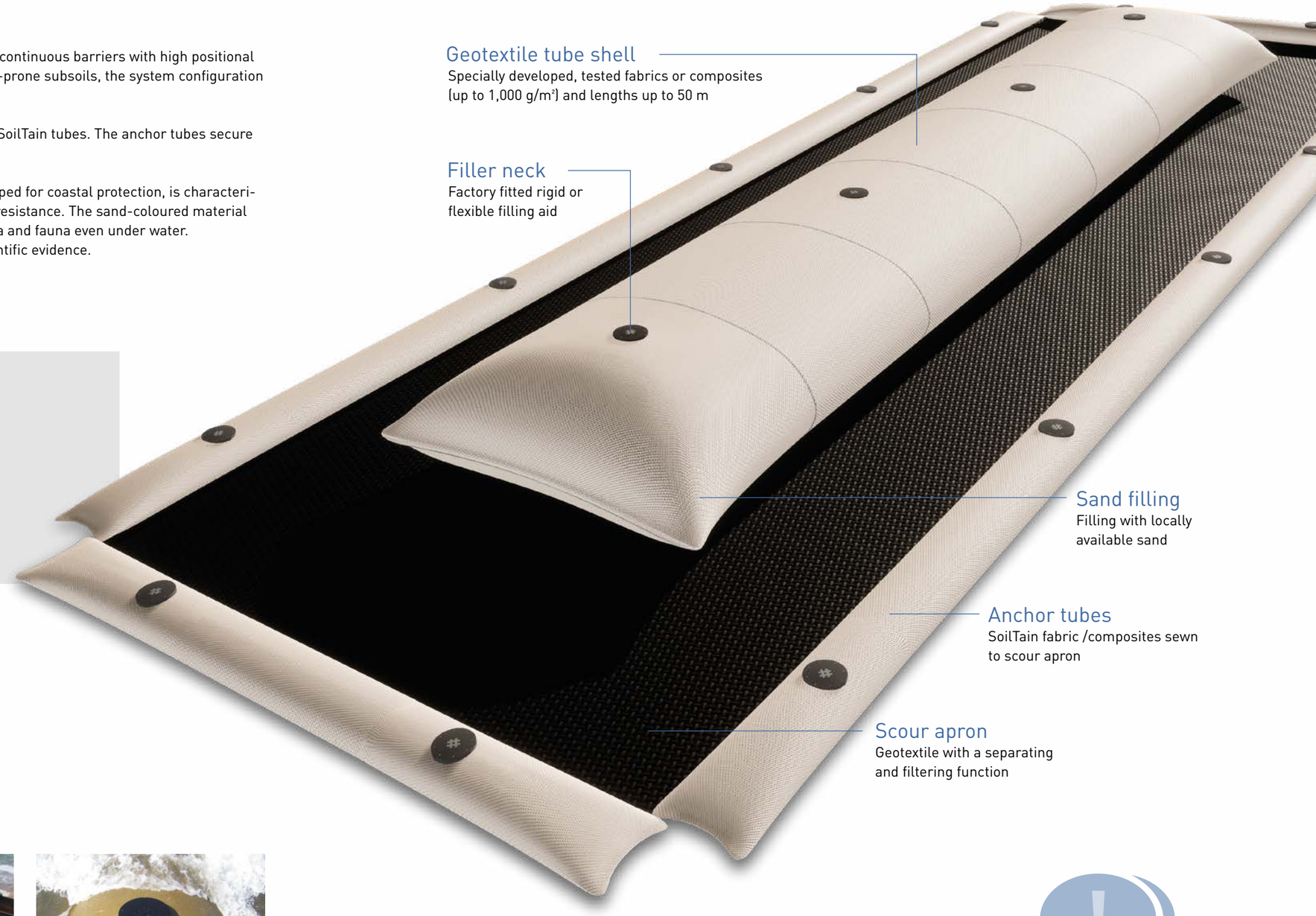
With the large-format SoilTain heavyweight elements, you can construct continuous barriers with high positional stability on coastal and shoreline sections. Even on very soft and erosion-prone subsoils, the system configuration provides stable and scour-free protection.

A scour apron, with anchor tubes, prevents erosion and scour below the SoilTain tubes. The anchor tubes secure the scour apron against undermining and ensure its positional stability.

The geosynthetic fabric of the SoilTain Tubes, which was specially developed for coastal protection, is characterised by both high robustness during installation and long-term abrasion resistance. The sand-coloured material blends in well with the landscape and is quickly colonised by marine flora and fauna even under water.
The ecological compatibility is demonstrated both in practice and in scientific evidence.

Advantages

- Economic and ecological coastal protection
- Multifunctional use thanks to flexible system configuration
- High position stability
- Simple filling through the use of local sands
- Rapid colonisation by marine flora and fauna
- High UV resistance and abrasion resistance



Easy installation on land and in water

Laying out the tubes
(e.g. with our laying aid)

Filling the tubes
(suction dredger, slurry pump)

Closure / securing of the filler neck

Production of project-related special solutions

In addition to standard dimensions, we also offer project-specific production of tubes and individual system configurations. All designs are created by our engineers taking into account the latest findings and relevant standards and guidelines.

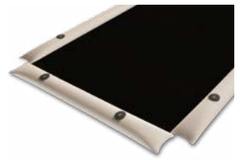
SoilTain Tube Application Possibilities

The multifunctional ‘all-rounder’ with outstanding advantages

SoilTain Tubes can be used as a central construction element for the structure core with subsequent superstructure. In addition, conventional structures, e.g. those made of armourstone or concrete, can be replaced by the geotextile tubes.

The applications are many and varied: breakwaters, groynes, dams, dykes, dunes, land reclamation, and bank protection.

System component kit



Scour apron

SoilTain Tubes

Protective non-wovens

Cover layer

Simple and fast in-situ filling
Filling of a 450 m³ tubes possible in approx. 8 hours.

Safe use even with erosive subsoil
In the system with **scour apron**, undermining of the tubes is prevented.

Ability to stack enables greater construction heights
Structures, several meters high for maximum protection, achievable.

Tubes assembly for every project
Material adaptation, different filler necks and tubes heads possible.

Ecologically compatible
Provides habitat for marine flora and fauna and is characterized by the sustainable and gentle installation method.

The Sand Containers for all Situations

SoilTain Bags – Easy handling and durable protection

SoilTain Bags are small and large-sized sand containers that can be used quickly and flexibly for temporary or permanent protection of coastal, shore and harbour areas at risk of erosion. They are characterized by their high adaptability due to their flexible shell and the deformable filling material. This means that both subsoil and structural deformations can be compensated for and increased structural safety is, therefore, ensured.

With the 'filter-stable' construction of SoilTain Bags, mineral filter layers can be completely replaced and material saved. In addition to this economic aspect, structural safety is also increased thanks to the filter stability. In addition to the normal SoilTain Bags, SoilTain Bags Xtreme are also available. With a unique two-layer composite and a high mass per unit area of up to 1,800 g/m², these provide the best possible protection against extreme mechanical external impacts such as vandalism. They are particularly suitable for permanently exposed revetments, scour protection and structures with required adaptability.

Advantages

- For temporary and permanent applications
- Safe structures thanks to high adaptability
- Application-optimized raw material and product selection
- Use of locally available filling materials such as sand etc.
- Stable filter design enables material savings
- Good integration into the natural environment
- Vandal resistant design

SoilTain Bags Xtreme

New!

The extremely robust solution especially for exposed structures

- Increased UV stability
- High sand storage capacity
- Abrasion and vandalism resistant
- Unique two-layer composite
- Non-woven mass per unit area 1,200 g/m² - 1,800 g/m²
- Standard product sizes up to 2.5 m³

SoilTain Bags

The solution for temporarily exposed or permanently covered structures

- Specially tested materials (BAW)
- Weight per unit area 600 g/m² - 1,000 g/m²
- Non-wovens, wovens, composites possible
- Standard product sizes up to 1.0 m³
- Easy handling on site

Easy filling and installation

Mechanical filling by means of hopper, excavator

Closing of the bags by means of a hand held sewing machine

Installation with the aid of an excavator or similar

Production of project-related special solutions

In addition to standard dimensions, we also offer project-specific production of tubes and individual system configurations. All designs are created by our engineers taking into account the latest findings and relevant standards and guidelines.

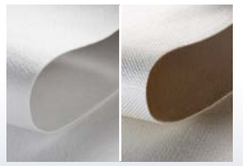
SoilTain Bags Application Possibilities

Large selection available for more ‘extreme’ challenges

For permanently exposed revetments and structures, you have the option to use the more abrasive and UV-resistant SoilTain Bags Xtreme. For temporarily exposed or permanently covered structures made of small-format, flexible elements, you can use standard SoilTain Bags. Our bags are used for dune reinforcement and revetment construction as well as for scour protection of all kinds and as a construction element for breakwaters and groynes.

Products and configuration options

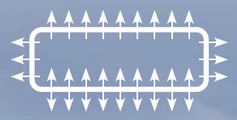
SoilTain Bags Xtreme



SoilTain Bags

Transport/filling loops

Different closures



Filter stable scour protection
The flexible, quick solution for scour filling or for preventing scour formation. Quick installation directly on the existing subsoil.

Safe structures thanks to high adaptability
Structural deformations are compensated for by the small-format and flexible elements.

Ecologically compatible
Provides habitat for marine flora and fauna and is characterized by the sustainable and gentle installation method.

Robust, permanently exposed structures
Abrasion and UV resistant, vandalism proof with SoilTain Bags Xtreme.

Material savings due to filter stability
Saving of filter layers, armourstone/armorstone, transport and CO2.

Land Reclamation and Bank Protection

Innovative system solutions for containment bunds

To sustainably protect an area of land reclamation from water impacts during development, an erosion resistant barrier is essential. Conventional practices, such as the placement of sand as a perimeter dam, are subject to the natural process of erosion. The “containment” of the sand material in geotextile tubes prevents its erosion by wind and waves and enables rapid construction progress.

The same basic principle can be applied to bank protection measures. In the case of a cliff to be secured, the large-format tubes can be the only economical and safe option due to the construction height and this can be achieved in a single operation.

Advantages

- Durable and erosion resistant protection
- Large construction heights achievable in one operation
- Fast and economical filling
- Use of locally available sand materials
- Cost-effective due to savings on armourstones

Cliff protection

Germany | 2016 | Below the small village of Lieske, a cliff with a height of up to 5 m had formed over a length of about 1,500 m due to wind-induced waves and associated erosion processes. This was sustainably secured with SoilTain coastal protection tubes and other HUESKER hydraulic engineering products, thus ensuring safe final flooding of the artificial lake.

Artificial islands

Netherlands | 2012 | As a refuge for an endangered species, the two artificial islands “Ecologische Eilanden de Morra” were built using SoilTain coastal protection tubes as containment bund.

System components

- Scour apron
- SoilTain Tubes
- Protective non-woven
- Armourstones

Breakwaters and Groynes

Erosion resistant hydraulic structures with tubes

The construction materials for classic hydraulic structures such as breakwaters and groynes have changed over the years. From timber constructions to sheet pile walls to riprap constructions in combination with asphalt or concrete, almost the full range of construction materials available on the market is used today. However, only the use of geotextile tubes makes it possible to use sand, which occurs naturally on the beach and in the sea, as a construction or filling material.

Whether as a structure core with subsequent cover or as a replacement for the classic structure in its entirety: SoilTain tubes for coastal protection expand the range of construction materials available with an economical and ecological solution.

Advantages

- Applicationas a structure core with subsequent covering
- Large format for heavy weight structures
- Durable and erosion resistant protection
- Fast and economical filling
- Material savings through use of locally available sands

Beach Protection

Greece | 2015 | To protect the beach of a hotel resort on Kos from erosion, several breakwaters made of SoilTain tubes with scour apron were installed. This measure led to a sustainable widening of the beach.

Nature Conservation

Italy | 2012 | Off the bay of Punta Ala, a reef breakwater consisting of several SoilTain tubes with different diameters and lengths was constructed to protect the seagrass. Thanks to the gentle installation process, SoilTain coastal protection tubes were the most ecologically compatible solution compared to other construction methods.

System components

- Scour apron
- SoilTain Tubes

System components

- Scour apron
- Protective non-woven
- Armourstones
- SoilTain Tubes

Dikes, Dams and Dune Reinforcement

Sustainable flood protection with tubes and bags

Both man-made flood protection structures, for example dikes and natural barriers - such as a dune system - can be substantially strengthened and improved with SoilTain tubes. In addition to the installation of the tubes as a structure core in new construction, they can also be installed at a later stage during dike widening or as a surcharge filter structure.

Especially for the sensitive dune system, SoilTain tubes represent an ecologically justifiable and economical safety measure. Due to the sand-coloured appearance and the possible covering as an artificial dune, the tubes can be successfully integrated into the dune landscape.

Advantages

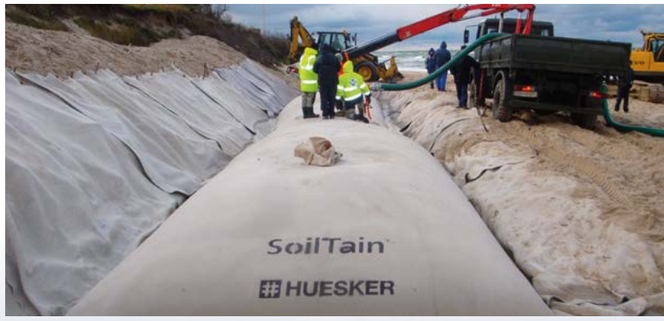
- Durable and erosion resistant protection
- Application for new construction, dike widening, surcharge filter construction
- Good integration into the landscape thanks to sand-coloured appearance
- Fast and economical filling
- Material savings through use of locally available sands

Bathing Beach Protection

Spain | 2018 | In order to secure the base of the dunes at Playa San Bruno in Isla Canela near the village of Ayamonte against erosion, several SoilTain tubes were installed. The system integrates perfectly into the dune landscape and protects the tourist infrastructure located in the vicinity.

Dune Reinforcement

Poland | 2012 | As a result of winter storms, a dune shift of up to 10 m occurred on the Baltic Sea coast near Rowy. SoilTain tubes were installed in one section to reinforce the dune system. In order to secure the cliff with a height of over 4 m, the tubes were installed and stacked in two layers. The system has already proven itself in several winter storms.



System components

- SoilTain Tubes
- Non-woven
- Armourstones

System components

- Non-woven
- SoilTain Tubes
- Cover

System components

- Non-woven
- SoilTain Bags
- Cover

Sea Walls and Revetments

SoilTain Sand Bags - the alternative to stone revetments

As an economical alternative to conventional stone revetments, SoilTain Bags can be used to construct safe protective structures on coasts and beaches. Due to their high adaptability, both subsoil and structural deformations can be compensated. In combination with the excellent filtration properties, the Sand Bags are the ideal solution for scour filling and are more suitable for securing sandy coastal sections than conventional stone revetments. Thanks to their colouring and rapid colonisation by maritime flora and fauna, they integrate sustainably into their surroundings. Compared to stones, the robust and sand-filled elements are also easy to walk on and have a lower risk of injury.

In order to meet the high demands of the external stresses of the maritime environment, we have developed extremely robust non-wovenss for the SoilTain Bags Xtreme. This way, safe, permanently exposed and sustainable structures made of geotextile elements can be erected for the long term.

Advantages

- Small-format, flexible container elements
- Safe building structures thanks to high adaptability
- Uncomplicated scour prevention and subsequent scour protection
- Filter stable design enables material savings
- Good integration into the natural environment
- Vandal resistant solutions

System components

- SoilTain Bags

Revetment construction

North America | 1985 | To secure the shores of the man-made Endicott Island in the Beaufort Sea, Alaska from erosion, 35,000 bags filled with gravel were installed. In 2010, the revetment reached its expected 25-year service life. This was extended indefinitely due to the continued excellent performance of the bags.

Shore wall

Germany | 2014 | The flooding of the former open pit, Spreetal-Nord, endangered the steep slope of the rim at the "Restloch Nordschlauch". To secure the toe of the embankment, a bank protection structure consisting of 1 m³ SoilTain Sand Bags was constructed, thus enabling safe flooding.

System components

- SoilTain Bags Xtreme
- Non-woven

Groynes and Breakwaters

Erosion-resistant hydraulic structures with SoilTain Bags

In addition to the SoilTain Tubes, groynes and breakwaters can also be constructed using the smaller SoilTain Bags. Depending on the project-specific conditions, they can offer construction advantages. With proof of the positional stability of the smaller elements for the given hydraulic conditions, the installation of the pre-filled sand bags can be easier in terms of construction practice than the in-situ filling of the tubes. This must always be evaluated on a project-specific basis.

SoilTain Xtreme material was developed to increase the durability of permanently exposed structures. Due to the high mass per unit area and the associated sand entrapment capacity, the material properties, with regard to abrasion and UV resistance, are improved.

Advantages

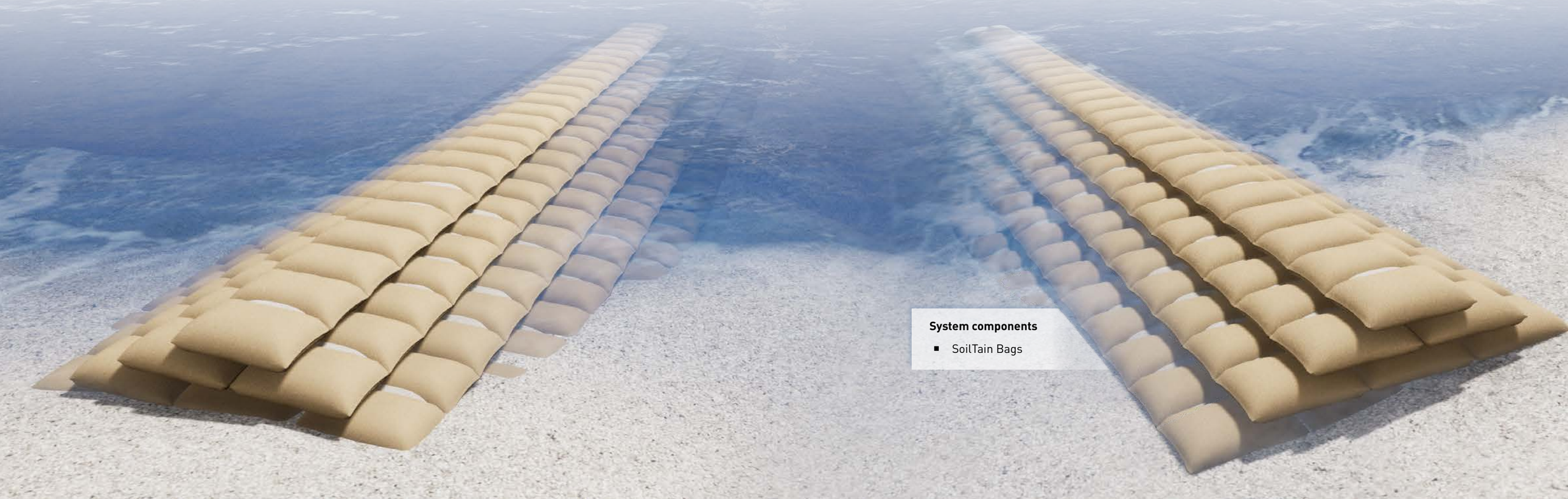
- Small-format, flexible container elements
- Safe structures thanks to high adaptability
- Filter stable design enables material savings
- Good integration into the natural environment
- Project-specific solutions and standard elements possible
- Vandal resistant solutions

Groynes

UK | 2018 | As part of a coastal management plan between Oldstairs Bay and Sandown Bay Estate, groynes made from 1m³ containers were constructed in the Wellington Parade area. This project stands out due to the special closing technique of the containers and the filling with gravel.

Breakwater

USA | 2000 | In order to protect a section of the coastline in North Carolina against hurricane impacts, a breakwater made of sand bags, approximately 1.2 m high, was constructed. For this purpose, sand bags with a filling volume of approximately 2.5 m³ were stacked in two layers.



System components

- SoilTain Bags

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HUESKER Synthetic is certified according to ISO 9001 and ISO 50001.

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