



SoilTain® Bags

Bags for Erosion Control and Scour Protection





Overview of a typical SoilTain Bag construction site



The SoilTain Bag system

Bags provide an efficient and economic solution for erosion and scour problems. The bag system comprises a geotextile shell which is normally filled with dry sand. Depending on the geosynthetic material and construction boundaries ordinary soil can also be used as fill. By using the SoilTain Bag system expensive rock fill can be substituted by locally available materials which are contained in a flexible geosynthetic bag.

After installation the geotextile sand bags form a durable and robust anti-erosion system which is characterized by a high degree of flexibility and self adaption. Erosion prone areas can be stabilized with an efficient soft solution, avoiding rock, concrete or steel.

Installation and typical dimensions

A typical installation process is as follows:

1. The pre-fabricated bags are filled with locally available material on-site;
2. Closure of the bags by means of a hand-sewing machine;
3. Final installation with the aid of an excavator grab, or similar mechanism.



According to the site-specific requirements and type of application of the SoilTain Bags, the installation of the sand containers may be also done by placing them from a barge by use of a crane.

SoilTain Bag sizes vary in between 0.02 m³ up to 5.00 m³. There is a smooth transition between the definition of geotextile sand bags and geotextile sand containers regarding the corresponding containment volume. Therefore the 5.00 m³ sand bags may sometimes already be designated as „containers“. However, the common SoilTain Bag has a 1 m³ containment volume at an 80% filling.

Advanced geosynthetics

The used geosynthetic material can vary according to the specific project requirements. HUESKER offers an appropriate SoilTain Bag solution with a range of different materials: bags made of non-wovens, wovens or geocomposites. The corresponding material properties vary from low tensile strength accompanied by high elongation to high tensile strength in combination with low elongation.

Durability and long-term performance

History has proven that geosynthetics are a soft but at the same time durable solution. One fundamental criteria for materials used in the marine environment is the abrasion resistance. The wave and current induced movement of sand particles or even of heavy armour stones can lead to the disintegration also of hard materials such as steel and concrete. HUESKER can supply bags made out of geosynthetic materials with enhanced abrasion resistance.

Filtration stability

The use of geosynthetic bags offers stable filter construction without additional measures. A double layer of SoilTain Bags can be a substitute for one or more granular filter layers. This is beneficial especially for underwater constructions as the installation of submerged granular filters is always a challenge.

Versatile application possibilities

SoilTain Bags offer a wide range of possible applications: They can be used for permanent structures or temporary measures such as emergency repair of dike breaches. Apart from short-term applications SoilTain Bags are a durable solution for permanent works such as slope protection elements, beach repair or scour protection for structures like wind turbines, bridge foundations or piers. Additionally, geotextile encapsulated sand elements have previously been successfully used for artificial reefs, supporting sea life.

Ecological sustainability

Past practice has shown that geosynthetics are well accepted by the marine flora and fauna. This has been confirmed and supported by executed research projects. This tells us that the rough outer surface of the geosynthetics provides opportunities for the colonization and growth of marine organisms on the sand container structures without any damage to the container itself. Furthermore this ecological blanket enhances the UV- and abrasion resistance of the geosynthetic sand container.



Placement of the SoilTain Bag



SoilTain Bags as scour protection for a bridge pier



SoilTan Sand Bags for coastal protection works



Colonization of geotextile sand element by the marine flora and fauna

Design

HUESKER engineers can help to design the right SoilTain Bag size with the corresponding appropriate geosynthetic material and they can also assist finding the best customized solution.

Brief history of HUESKER SoilTain Sand Bag milestones

One of the first large applications of 25.000 1m³ bags worldwide was executed in 1963 near Wilhelmshaven at the Rüstersieler Watt (Germany). A dike was constructed with woven polyamide ("nylon") bags forming the dike core, retaining the soil and offering a stable slope for further construction.

In 1985 the Endicott development was constructed as the first oil exploration facility in the Beaufort Sea, Alaska. A part of the revetment was built with 35.000 3m³ woven polyester fabric bags, filled with gravel. In 2010 the Endicott project reached the end of its intended 25-year design life. The performance of the slope armour has been excellent and the service live of the platform has now been extended indefinitely.

In 2011 approximately 60.000 1m³ bags made out of a BAW certified non-woven have been installed for slope and bridge pier protection of the river banks located at the North-South Express Highway in Sungai Melaka, Malaysia. A system was required which provides erosion resistance including a "green concept". The SoilTain Sand Bag system offered the possibility of a stepped slope construction in combination with an environmental friendly solution. This construction method is widely accepted by the Malaysian local authorities and well known as a "green revetment" post construction due to the growth of algae and grass on the geotextile bags.



Construction of the dike core at the Rüstersieler Watt 1963



Endicott Island after completion of work in 1985



Endicott Island after 25 years of service-life in 2010
(source www.wikipedia.com)



Sungai Melaka project, Malaysia in 2011

Construction cycle

The following pictures illustrate the installation of SoilTain Bags. According to site-specific conditions and requirements the procedure and the utilized equipment may vary from site to site.



Fig. 1: Delivered SoilTain Bags



Fig. 2: Filling process of the SoilTain Bags with a funnel



Fig. 3: Closing of the SoilTain Bags with a hand-held sewing machine



Fig. 4: Prepared SoilTain Bags, waiting for installation



Fig. 5: Transportation by an excavator with a grab



Fig. 6: Placement of the SoilTain Bags

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HUESKER Synthetic is certified to ISO 9001, ISO 14001 and ISO 50001.



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