



CASE STUDY

Nantucket Erosion Control Massachusetts, USA

Flint Industries TITANTube®
Dune Core/Revetment

Owner: Residents of City of
Nantucket Island, MA

Consultants: Cody Hanna

Contractor: Fishtec

Construction: 2013

Background

The Nantucket Erosion Control Project is a controversial US\$3 million project financed by local property owners in partnership with the town of Nantucket. Over the past 30 years Sconset Bluff (pictured above) has lost on average 3 to 4 feet a year as a result of erosion. The local property owners established the Sconset Beach Preservation Fund to fund a project to protect the bluff from the fierce storms and rising tides. The organisation funded the installation of a 900 foot (275 m) TITANTube® geotextile tube revetment to protect the toe of the bluff. The proposal for the geotube system, approved by the State Department of Environmental Protection, was subsequently appealed by the Island's Conservation Commission. The Conservation Commission believe that the system is not environmentally sustainable and argues against the installation of manmade devices within 100 feet of a coastal bank. They argue that the geotextiles tubes will harm a natural process that builds beaches elsewhere on the island.

Challenge

The challenge is to provide a geotextile solution to assist in the coastal protection of a logistically demanding site. A dune core

structure is needed to protect the toe of the bluff to prevent homes from falling into the sea. The revetment will prevent waves from crashing directly into the bluff. The structure is to be located on a narrow site at the base of a steep cliff which is difficult to access.

Solution

TITANTube® geotextile tubes are relatively simple to install and provide a synthetic barrier along shorelines to help control erosion. The shore-parallel geotextile tubes are ideal for the narrow toe of land along the Sconset Bluff. The specially engineered marine tube is composed of high-tenacity polypropylene yarns, which are woven into a stable network such that the yarns retain their relative position to each other. The textile is inert to biological degradation and resistant to naturally encountered chemicals, alkalis, and acids. As the waves crash against the tubes the water filters through leaving the geotextile embankment in place.

Installation

The site preparation includes the placement of an anti-scour apron onto which the geotextile tube is placed. The aprons protect the tube container from the effects of wave movement and water currents and protect the tube whilst it is being filled with sand.



Main picture: Aerial view of the Sconset Bluff, Nantucket Island

Above first picture: Close up of the TITANTube® geotextile tubes

Above second picture: Installation of the first tier of tubes



REINFORCED EARTH
SUSTAINABLE TECHNOLOGY



Left and above: Filling the TITANTube® geotextile tubes with the dredged sand

This apron is fabricated by sewing together mill widths of the woven engineered textile to form an apron with chambers to be filled with sand in the field.

The anti-scour apron is staked into place until anchor tubes are filled and provide adequate anchorage for the apron. The tube is delivered to the project site in a protective cover.

The fill material utilized is dredged from a designated site and the tube container shall be filled as evenly as possible until the design height has been achieved and excess water shall be allowed to drain adequately. Following the apron and tube container placement, filling with sand is accomplished by using a dredge which is fitted with a “Y” valve to allow control of the rate of filling. Upon filling the fill port sleeves are closed and attached to the main geotextile tube container in a manner sufficient to prevent movement of the sleeve by subsequent wave action or other disturbances. Once the geotextile tube has been properly installed, the area is ready to be backfilled to complete the process.

Conclusion

The TITANTube® geotextile tubes were laid out in a three tiered, nearly 900 foot long wall to prevent the toe of the bluff from storm waves. “It did its job” said Josh Posner (president of the Sconset Beach Preservation Fund) after hours of strong winds and pounding waves crashed onto the geotubes, “this is the first time the third tier has been exposed since the system was installed. We’ve had the second tier exposed and we’ve had places where the third tier has been exposed, but this is the first time it’s gone all the way up to the top of third tier.” TITANTube® geotextile tube technology has minimal environmental impact, is quick and easy to install, and has overall pleasing aesthetics which made it a perfect product choice for this project.

Project specifications

System	TITANTube® Geotextile tubes
Finish	Sand Coloured
Structure	High tenacity polypropylene yarns
Size	2,700 linear feet
Height	3 tiered revetment structure
Length	900 feet or 275 m
UV Resistance	95% (after 500 hours)
Strength	96 kN/m