

Construction of Breakwater using Mirafi® PP200 woven geotextiles Bengkulu, Indonesia

Project Data

Project	: Bengkulu Port, Sumatra, Indonesia
Application	: Breakwater reinforcement & filtration
Products Used	: Mirafi® PP200-40

Overview

Completed in March 1985, the new Port of Bengkulu, located at Pulau Baai along the West Coast of Sumatra, Indonesia is an important gateway for the economic development of the Bengkulu region.

Key to the design of the port were two rubble breakwaters with approximate crest length of 390m and 420m, and containing some 500,000m³ of rock in sizes up to 7tons. The head of the southwest breakwater was constructed with blocks weighing up to 10tons.

Design Solution

The engineering challenges on this project were numerous. The seabed comprised soft marine clay, complicating the dumping of rock. Scour of the toe of the breakwater caused by wave pressure differentials was also a concern. Whilst these problems can be solved using stone and rock and conventional engineering techniques, it was decided to solve the problems by installing a high tenacity reinforcement geotextile under the entire structure. The geotextile was also required to act as a filter, and prevent the effects of scour in the fine marine silt along the toe of the berm.

To perform these functions the geotextile used had to withstand the drop energy of bedding stones and armor rocks without puncturing, as well as be capable of filtering the fine silt particles.

Mirafi® PP200-40 geotextile, with special loops woven into the edges of the fabric to facilitate laying using bamboo was specified for the project.

Construction

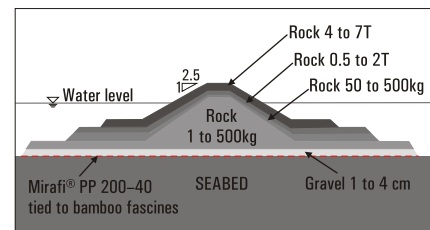
To facilitate the installation process the Mirafi® PP woven geotextile was sewn into large wide panels. The geotextile was fastened to a bamboo lattice using the loops woven into the fabric at regular intervals to form a geotextile fascine mattress that was then floated out into position using barges.

The geotextile fascine was lowered by ballasting with bedding stones. The advantage of this method of laying is that the fascine remains stable whilst ballasting and requires only a

relatively thin layer of bedding stones to be able to sink the mattress. The grid structure of the bamboo resists sliding of the bedding stones as the mattress slowly sinks into position.

This project was the first such application of geotextiles using this technique to be undertaken in Indonesia. Placement of the first rocks began in September 1983 and both breakwaters were completed by December 1984. A total of 110,000m² of Mirafi® PP200-40 were installed.

Today the breakwater remains, as constructed, and an integral part of the Bengkulu Port, and proving the durability of Mirafi® geotextiles in marine engineering works.



Cross section of the construction of breakwater



Construction of the breakwater

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Further details of this application and products can be obtained by contacting your nearest TenCate Technical Support office.

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