TENCATE Mirafi®

PROJECT REFERENCE

Stabilization of soft swamp subgrades using woven geotextiles
US 90 Roadway, Louisiana, USA

Project Data

Project	:	Subgrade Stabilization at US 90 Roadway, Louisiana, USA
Products Used	:	Mirafi® HP570

The use of geotextiles to stabilize the base of roads constructed through extensive swamp areas with constant high water levels presents a unique challenge to highway engineers. This case reference describes the use of woven polypropylene geotextiles as a potential solution to typical problems experienced in such conditions.

Overview

Constructing roads through the extensive swamp areas of South Louisiana, USA is typical of this type of application, and a major challenge for the Louisiana Department of Transportation. Uneven long term differential settlement of road embankments, especially when embankments are constructed using sand fill results in an uneven road level and the typical "roller coaster" ride that is so familiar to drivers.

Surface pumping of the initial layers of fill installed over soft wet subgrades is a typical consequence when geotextiles are not used. The problem can be typically solved using either a combination of non-woven geotextiles with one or more layers of biaxal geogrid to reinforce the subbase layers, or a single layer of high strength and modulus woven geotextile.

Design Solution

A 10km section of the four lane US90 roadway between Morgan City and Houma, in Louisiana runs over very soft swampy land of South Louisiana. Subgrade soil strength ranged from 5 to 10kN/m². Typically, the majority of the relocated US90 roadway embankments are constructed from lightweight reef shell fill dredged from the Gulf of Mexico. The reef shell while having a higher friction angle than sand is also lighter and more permeable, thus making it a better fill material for such ground conditions.

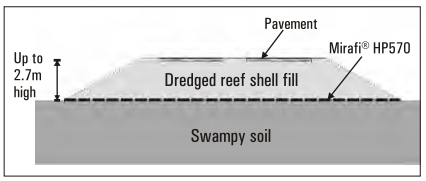
In this project, the consultants preferred the use of a single layer of Mirafi® HP570 woven geotextile to the alternative option comprising non woven geotextiles and biaxial geogrids, which were a more expensive option.

Construction

Construction with Mirafi® HP570 was straightforward. Trees and other obstructions were first cleared over the full 60m width of the embankment. Mirafi® HP570 was then unrolled over the leveled ground with the machine direction of the roll running across the road embankment.

Adjacent rolls were sewn together to provide continuity along the road embankment. Where the ground was waterlogged and extremely soft, large panels of Mirafi® HP570 were prefabricated and pulled over the waterlogged sections.

Once the site was fully covered with geotextile, fill was placed in sequential 500mm lifts and compacted. The use of Mirafi® HP570 not only achieved the engineering objectives but also allowed the contractor to carry out earthworks speedily despite working in swamp land.



Cross-section of road embankment

Installation of road base fill over the Mirafi® HP geotextiles

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