

## REINFORCED STEEP SLOPE, KAPIT, SARAWAK, MALAYSIA

# Strengthening steep slopes with geocomposite reinforcement



<b>Industry:</b>	Site development
<b>Application:</b>	Erosion control
<b>Location:</b>	Sarawak, Malaysia
<b>Product:</b>	<b>MIRAFI® Polyfelt® PEC</b>

## Overview

This project involved constructing an embankment with side slopes exceeding 63 degrees in a high rainfall tropical forest area in Sarawak, Malaysia. The main requirements were stability, ease of construction, and low maintenance for the facing system. The slope needed to reach a height of 12 m (39.37 ft) at its highest point. To make the project cost-effective and efficient in terms of logistics, a reinforced soil system utilizing the available on-site earth was chosen. The excavated residual soil, which has a high fines content (65% silt and clay), could be used as backfill material. The **MIRAFI Polyfelt PEC** reinforcement composite was selected due to its high tensile modulus and excellent in-plane drainage properties.

For the facing system, a stone and bent wire mesh approach was adopted. This system was easy to construct, requiring

minimal transportation of materials as only wire mesh and readily available stones were needed. The wire mesh was hot-dipped galvanized for long-term performance and could be bent on-site to the required facing angle.

## Challenge

The construction of the reinforced soil structure followed a straightforward process. Unsuitable soil was excavated from the foundation and compacted with 0.5 to 1.0 m (1.64 to 3.28 ft) thick granular fills on top of a geotextile separator to create a leveling pad. Steel mesh facing panels were then positioned and reinforced with steel ties. A layer of **MIRAFI Polyfelt PEC** composite reinforcement was installed

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## CASE STUDY

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and securely fastened to the facing panels using zip-ties. Stones were placed behind the facing panels, and the geosynthetic reinforcement was pulled taut and anchored at the end. A small trench was excavated beneath the middle of the composite reinforcement for pre-tensioning.

## Solution

Residual soil backfill was added in lifts of 150 mm (5.91 in) and compacted using plate compactors, extending up to approximately 1.0 m (3.28 ft) from the wall's facing. A lift of 300 mm (11.81 in) was then placed and compacted with a regular roller. This process was repeated for subsequent layers until completion.

To address water seepage, horizontal and vertical drainage layers consisting of 300 mm (11.81 in) thick aggregates were placed at the bottom and back of the reinforced fill at each berm.

The use of **MIRAFI Polyfelt PEC** composite reinforcement enabled the utilization of on-site residual soil with a high fines content as backfill material. The stone and bent wire mesh



facing system provided an aesthetically pleasing and low-maintenance solution for the reinforced slope, which was both economical and practical given the site's remote location and high rainfall conditions.



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