

# Miragrid GX road embankment slope failure repair Doi Suthep, Chiang Mai, Thailand

## Project Data

<b>Project</b>	: Doi Suthep, Chiang Mai, Thailand
<b>Owner</b>	: Department of Highway, Thailand
<b>Contractor</b>	: One Development Co., Ltd.
<b>Products Used</b>	: Miragrid GX40/40, GX60/30, GX80/30, and GX100/30 (17,000m <sup>2</sup> )
<b>Completion Data</b>	: July - September 2003

## Overview

The increased in traffic volume on a rural road leading to Doi Suthep Pagoda in Northern Thailand prompted the Department of Transportation to widen the carriageway of a sharp bend to make travelling safer.

A geogrid reinforced soil system, 300m long with a height ranging from 8 – 10m and slope of 1H:2V was constructed to facilitate the road widening. To blend with the surrounding greenery, it was specified that the facing facilitate grass system.

## Design Constraints

Given the steep slopes, space constrain was a major concern. Unstable adjacent slopes limited the capability to cut back into the existing slope and required that whatever structure was designed fit within the existing slope profile. This made design with a steep inclined facing necessary.

Various reinforced soil options were originally evaluated by the consultant. A geogrid reinforced soil structure option was chosen for cost and installation speed advantages.

The geogrid reinforced soil structure was analyzed for internal and external stability check. The internal stability was checked using the lateral earth pressure method while external stability was checked with Slope W computer program.

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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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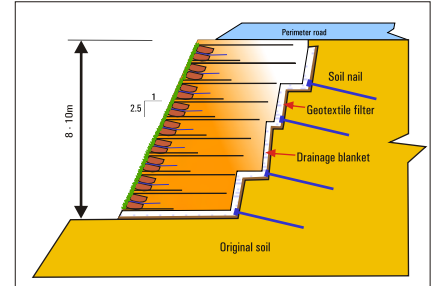
## Construction Methodology

Soil nails at 0.5m x 0.5m grid pattern was used to stabilize the existing slope prior to the erection of the geogrid reinforced soil slope. The geogrid slope was reinforced with primary reinforcement every 0.5m with a secondary reinforcement incorporated at intermediate 0.25m spacing to limit facing deformation. The backfill material consisted of sandy soil with an internal friction angle of 30 degrees.

To resolve the issue of vegetation growth, hessian bags filled with fertilizer and seeds were installed along the front face and the reinforced wrap round and back. The vegetation inclusion was that grass grow through the bag and grid apertures providing a green facing that blends with the surrounding vegetation. In total approximately 30,000m<sup>2</sup> of Miragrid GX geogrid was installed on the project.



The completed Miragrid GX reinforced slope with vegetation fully established



Typical cross section of the Miragrid GX reinforced slope



Soil nailing and slope base preparation



Slope repair works in progress