

CASE HISTORY

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CONSTRUCTION OF REINFORCED SOIL EMBANKMENT USING TECHGRID UNIAXIAL GEOGRID FOR BRIDGE APPROACH NEAR THE INTERSECTION BETWEEN HIGHWAY NO.117, HIGHWAY NO.122, AND HIGHWAY NO.225 (NAKHON SAWAN BYPASS) – SECTION 1, NAKHON SAWAN PROVINCE, THAILAND



REINFORCED SOIL WALL

Client:

MINISTRY OF TRANSPORT, KINGDOM OF THAILAND

Contractors:

ASIAN ENGINEERING CONSULTANTS CORP.LTD

Products used:

TECHGRID UNIAXIAL GEOGRID - TGU 150 / 30

Manufacturer & Supplier:

TECHFAB (INDIA) INDUSTRIES LTD.

Year of Construction:

2025

Project brief & Problem description:

The Nakhon Sawan Bypass, a crucial highway intersection connecting Highway No.117, Highway No.122, and Highway No.225 in Nakhon Sawan Province, Thailand, was undergoing major construction and improvement works to enhance traffic flow and regional connectivity. The project included the construction of approach embankments for a bridge near the intersection. However, the site presented multiple geotechnical challenges due to weak subsoil conditions and the need to construct steep embankment slopes within a limited right-of-way.

Conventional retaining systems such as reinforced concrete walls or gravity structures were evaluated but found to be costly, time-consuming, and unsuitable for the varying ground conditions. In addition, the area experienced seasonal rainfall and potential surface runoff issues, which could lead to erosion, settlement, or instability in unreinforced embankments.

The primary engineering challenge was to ensure the stability, strength, and long-term performance of the approach embankments under heavy traffic loads and dynamic stresses while maintaining cost-effectiveness and construction efficiency. Therefore, a reliable and flexible soil reinforcement solution was required - one that could accommodate differential settlements, reduce lateral pressures, and provide durable support to the bridge approaches under challenging site and environmental conditions.



Photo 1 : Site Condition Before Reinforced Soil Embankment Construction

Solution Proposed:

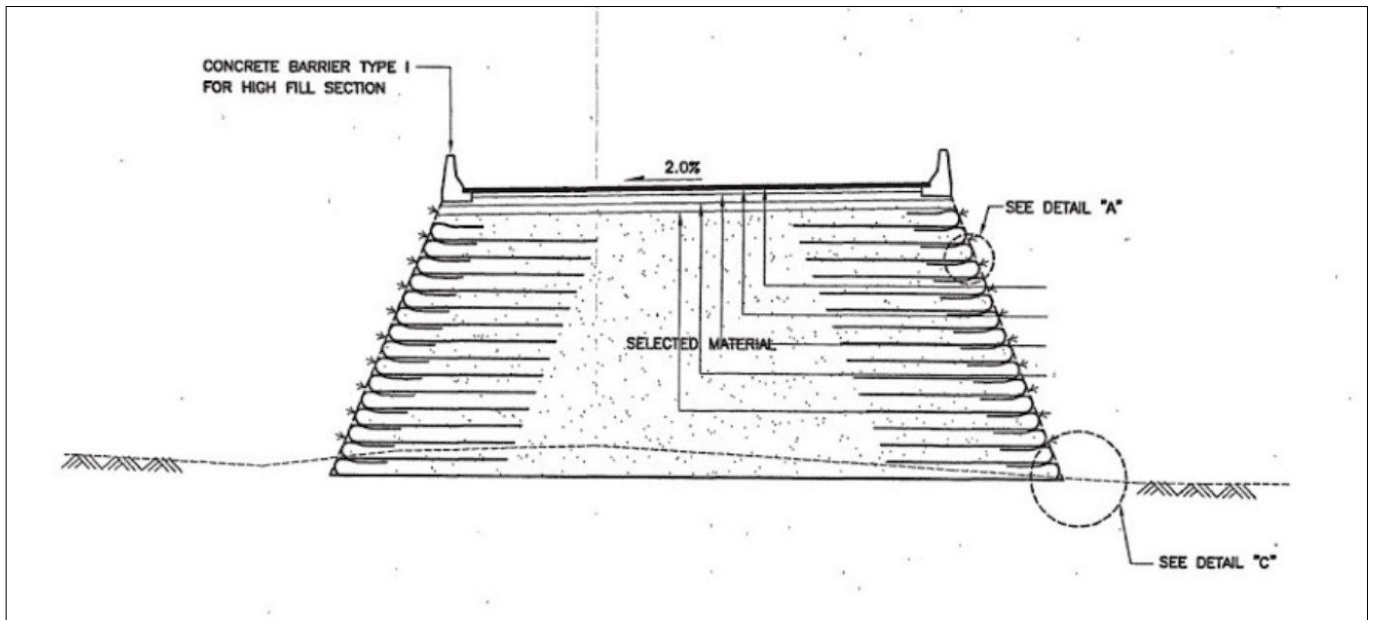
To address these challenges, a Reinforced Soil Embankment system was implemented using TechGrid Polyester Uniaxial Geogrids from TechFab India. The system offered a cost-effective, durable, and technically advanced alternative to conventional retaining structures. The high-strength polyester geogrids provided excellent tensile capacity, low creep characteristics, and superior soil interaction, ensuring overall stability and improved performance of the embankment.

TechGrid Uniaxial Geogrid was utilized both for reinforced soil slope fascia and soil reinforcement. Multi-layered reinforcement was placed at specific vertical intervals to effectively distribute loads, minimize deformation, and prevent potential slope failure or slippage. The use of geogrids also enabled the construction of steep embankment slopes while reducing the footprint area, which was a key requirement at the constrained intersection site.

Each reinforced unit comprised soil bags placed up to 0.5 m from the fascia. The bags near the fascia were half-filled with topsoil mixed with fertilizer to promote vegetation growth, while the remaining portion was filled with suitable fill material available at the site. This arrangement not only contributed to structural stability but also enhanced the aesthetics and sustainability of the reinforced soil slope.



Photo 2 : TechGrid Geogrid Installation in Progress



Typical Cross Section Drawing



Photo 3 : During Construction photograph

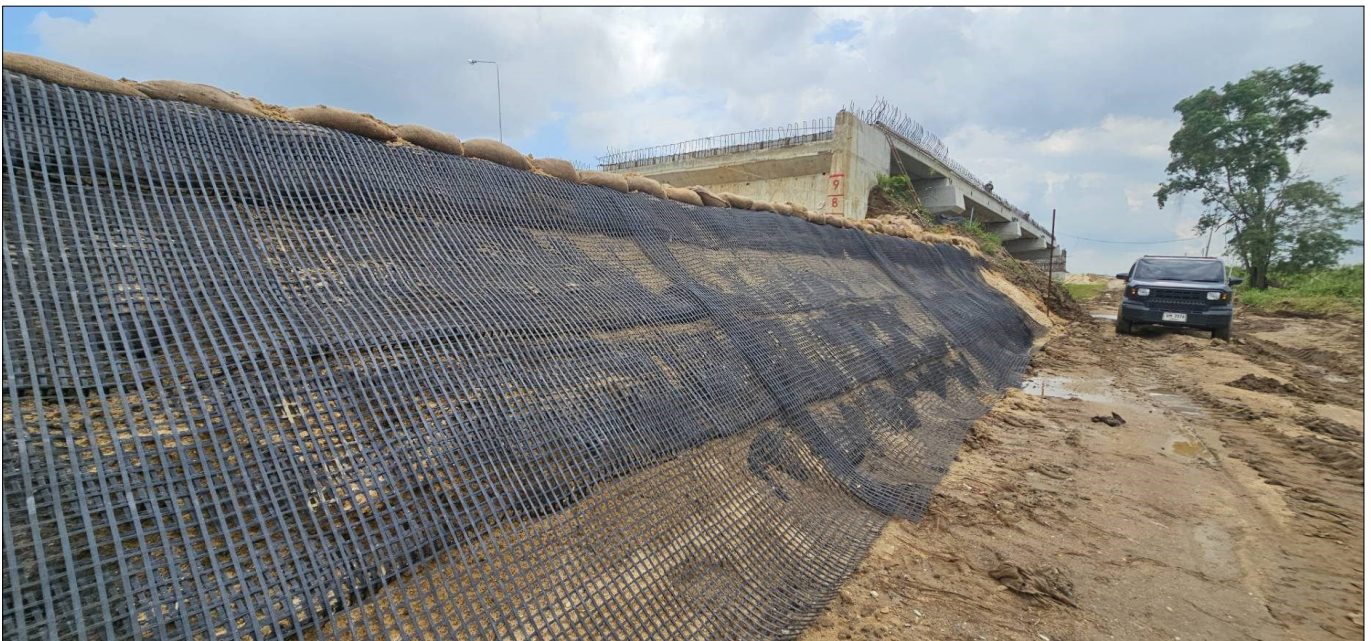


Photo 4 & 5 : During Construction – Reinforced Soil Embankment Execution in Progress

Conclusion:

The Reinforced Soil Embankment using TechGrid Polyester Uniaxial Geogrid provided a reliable, economical, and sustainable solution for the Nakhon Sawan Bypass project. The system ensured long-term stability, efficient load distribution, and enhanced aesthetics through vegetated fascia, demonstrating the effectiveness of geosynthetics in modern highway and bridge approach construction.

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