

CASE STUDY OF IT-CORRIDOR IN CHENNAI

Construction of Embankment using TFI 5200 Tape Woven Geotextile & TGU 40 TechGrid Geogrids at IT CORRIDOR in Chennai.

Client: Tamilnadu Road Development Corporation (TNRDC), Chennai, India

Consultant: M/S Wilber Smith Associates, India

Site Location: Information Technology (IT) Corridor Chennai-Chennai Old Mahabalipuram Road

Completion Date: Jan-2007

Product Used: TFI 5200 Tape Woven Geotextile and Uniaxial Knitted-PVC Coated-Polyester Geogrid TGU-40

As a part of improvement and widening of the IT corridor in Chennai, low embankments (Height varies from 0.75m to a maximum 1.50m) were to be constructed on ground underlain by weak soil deposits in the stretches of the Km 1/490 to 1/670 and 2/100 to 2/800. Consultant for the project Wilbur Smith Associates Pvt. Ltd., asked Techfab India Mumbai to evaluate the ground and loading conditions and suitable stabilization measures.

Problem:

In view of low shear strength and high compressibility of the poor soil strata there was concern regarding shear failure and excessive settlement.

The soil profile at the site was follows (Starting from ground level):

- Filled up ground consisting of the loose uncontrolled fill mixed with garbage with thickness of 1.50m to 1.70 m.
- Black clay+Clayey sand/ Silty sand with thickness of 1.30 to 1.50. The black clay is stiff clay with N values in the range 13 to 22. Silty fine sand is loose with N values of 3.
- Very soft clay with thickness of approx 5.0 m. N values for this layer is typically Nil. Only in one case N value 4 is obtained. Undrained cohesion values obtained from direct shear/ UCC tests are in the range of 4.0 to 5.0 kPa.

Contact:

TechFab India, 712 Embassy Centre, Nariman Point, Mumbai 400021, India

Fax : +91-22-2287 6218

Email : fti@vsnl.net / anant@techfabindia.com

Web : www.techfabindia.com



Solution:

Since the upper most layers consist of loose fill and soil mixed with garbage, it was decided to excavate and remove this layer completely and replaced with compacted quarry dust.

The major problems to be solved were:

- Stability of the embankment because of the very low shear strength of the very soft clay layer
- Placement and compaction of fill (to replace the layer of filled-up ground) was very difficult because of the soft clay and high water table conditions.

After analyzing the ground conditions, Techfab India proposed the following economical solution that saved time and money both by not having to import the fill or use heavy equipment for installation. The use of woven geotextile TFI5200 and TechGrid TGU 40 uniaxial geogrid allows the construction companies to work economically, quickly, safely:

- Where the embankment height was very low ($\leq 0.75\text{m}$) there was no problem with regard to stability. However placement and proper compaction of fill was difficult. Here it was proposed to lay a geotextile (TFI 5200 Tape Woven Geotextile) on top of the excavated surface to act as a separator cum reinforcement. Above this a 200mm thick layer of quarry dust was to be placed, spread and leveled. After this construction equipment could move on the fill and compact it. The geotextile would work as a tensioned membrane supporting the weight of construction equipment and facilitating satisfactory compaction.
- Where the embankment height was more than 0.75m, stability calculations showed that factor of safety against rotational failure was not adequate. Hence it was decided to go for basal reinforcement using Techgrid knitted and PVC coated polyester geogrids as shown in Figures In view of the urgency of clients to complete the work, TechGrid TGU 40, a uniaxial geogrids with a tensile strength of 40 kN/m in the machine direction, which was readily available in stock was selected. Stability calculations showed that for embankment heights of 0.75m to 1.50m, one layer of TechGrid TGU 40 was adequate. For embankment heights of 1.5 to 2.0 m, two layers of TechGrid TGU 40 were provided.



Laying of Techgrid U-40 as a basal reinforcement



Laying down fill over Techgrid U-40 for Embankment



Laying down fill over Techgrid U-40 for Embankment

Contact:

TechFab India, 712 Embassy Centre, Nariman Point, Mumbai 400021, India

Fax : +91-22-2287 6218

Email : ffi@vsnl.net / anant@techfabindia.com

Web : www.techfabindia.com