

CASE HISTORY

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SLOPE EROSION CONTROL USING GEOCELL FOR ROAD EMBANKMENT OF AHMEDABAD - VADODARA EXPRESSWAY, GUJARAT GUJARAT, INDIA



Erosion Control & Slope Protection

Client:	Products used:
NATIONAL HIGHWAYS AUTHORITY OF INDIA (NHAI)	• TFI TECHCELL GEOCELL (712 X 75 TYPE) • TECHGEO PR20 GEOTEXTILE
Main contractor:	
L & T	
Manufacturer & Supplier:	Year of Construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2022

Problem:

The National Highways Authority of India (NHAI) is upgrading the highway system in various stretches along Ahmedabad – Vadodara Expressway in the state of Gujarat.

Highway embankments are an integral part of the motorway to maintain the finished road levels. In this project, the embankments are provided with 1:1.5 (V:H) side slopes for the stability of embankment. Erosion of slopes of road embankment due to rainfall and surface runoff of precipitated water is one of the major problems that need to be addressed during the construction of highways / road embankments. If neglected, the progressive erosion of slopes may lead to overall instability of the slope of road embankment affecting the service life and performance of the road pavement too. National road construction guidelines recommend surface protection in any case where there is a chance of surface erosion.

Solution:

Conventionally, concrete lining / 300mm stone pitching are used for the slope erosion protection. TechFab India suggested use of Techcell Geocell of 712 x 100mm type, which is infilled with vegetative soil as an appropriate solution for effectively protecting the embankment slope as Geocell is cost-effective, long lasting and eco-friendly. This solution is in accordance with the provisions of Section 705 specifications of MoRTH 5th revision. By using geocell confinement system, the slope protection measures can be optimized in terms of thickness and further improve the performance of protection measures due to its confinement effect. The infilled geocells provide a stable layer of confined material over the slope surface. They promote vegetation growth to provide a green surface which also protects against erosion. At the toe of the slope geocell was embedded in the subgrade. A collecting drainage system was also constructed which comprised of Geocells infilled with concrete over Non-woven Geotextile to improve down-slope stability against high water flow.



Photo 1 : Installation of Techcell Geocell over the embankment slope



Photo 2 : Filling of vegetative soil in Techcell Geocell



Photo 3 : Slope after filling of vegetative soil in Techcell Geocell



Photo 4 : Construction of Drains lined with concrete filled Geocells

Execution on site :

- Prepare slope surface. Remove debris, rocks, unacceptable soil from area where Geocell is to be laid.
- Replace removed soil with acceptable soil and compact earthwork.
- Excavate anchoring trench and toe trench according to drawings provided.
- Install J shaped anchors along anchor trench with proper alignment to hold Geocell section in place on the slope.
- Expand down the Geocell section on the slope and allow settling then fix end of Techcells by using J shaped anchors.
- Adjacent Geocell must be levelled with each other and tie with each other using cable string.
- Install J hooks at specified distance.
- When Geocell has been laid in place properly, it should be filled with specified material.
- Infill should be delivered either to top of slope or bottom of slope using a loader.
- For vegetative slope, locally available vegetative soil should be utilized as infill. Vegetation grows naturally or can be implanted as required



Photo 5 : Grass was planted on finished surface of road embankment

Conclusion:

The Project is completed successfully and serving its purpose. The slopes are now green and aesthetically pleasing.

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