

CASE HISTORY

Rev:00, Date : 14.09.2020

EMBANKMENT PROTECTION OF NATIONAL HIGHWAY WITH GEOCELL FOR THARAD - DHANERA - PANTHWADA SECTION OF NH-168, GUJARAT GUJARAT, INDIA



Slope Protection works

Client:	Products used:
ROADS & BUILDING DEPARTMENT, NATIONAL HIGHWAY DIVISION, GOVT. OF GUJARAT	TFI TECH CELL GEOCELL TCI - 660 X 75mm
Main contractor:	Quantity Supplied:
MKC INFRASTRUCTURE LTD., ANJAR - KUTCH, GUJARAT	36,000 SQM
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	ON GOING

Project Brief:

The National highway NH 168 was planned for better connectivity between Gujarat and Rajsthan through Dhanera Panthwad section. This project site is located in the north part of Gujarat where weather is generally dry most of the year, but from couple of years heavy rains are also observed. The major part of National highway is coming under filling section considering low existing ground levels which was water logged during heavy rain. The height of embankment are varies from 3m to 8m. Due to limited Right of way the slope of embankment planned for 1: 1.5 and for higher embankment to maintain the same slope RCC Toe walls were constructed. As the slope is steeper and growth of vegetation in this area seems difficult, department has decided to go for some advance solution to protect the slope from erosion due to heavy wind and rains.

It was required to provide efficient erosion control system for embankment slope for this project. Project scope included embankment slopes at multiple locations.

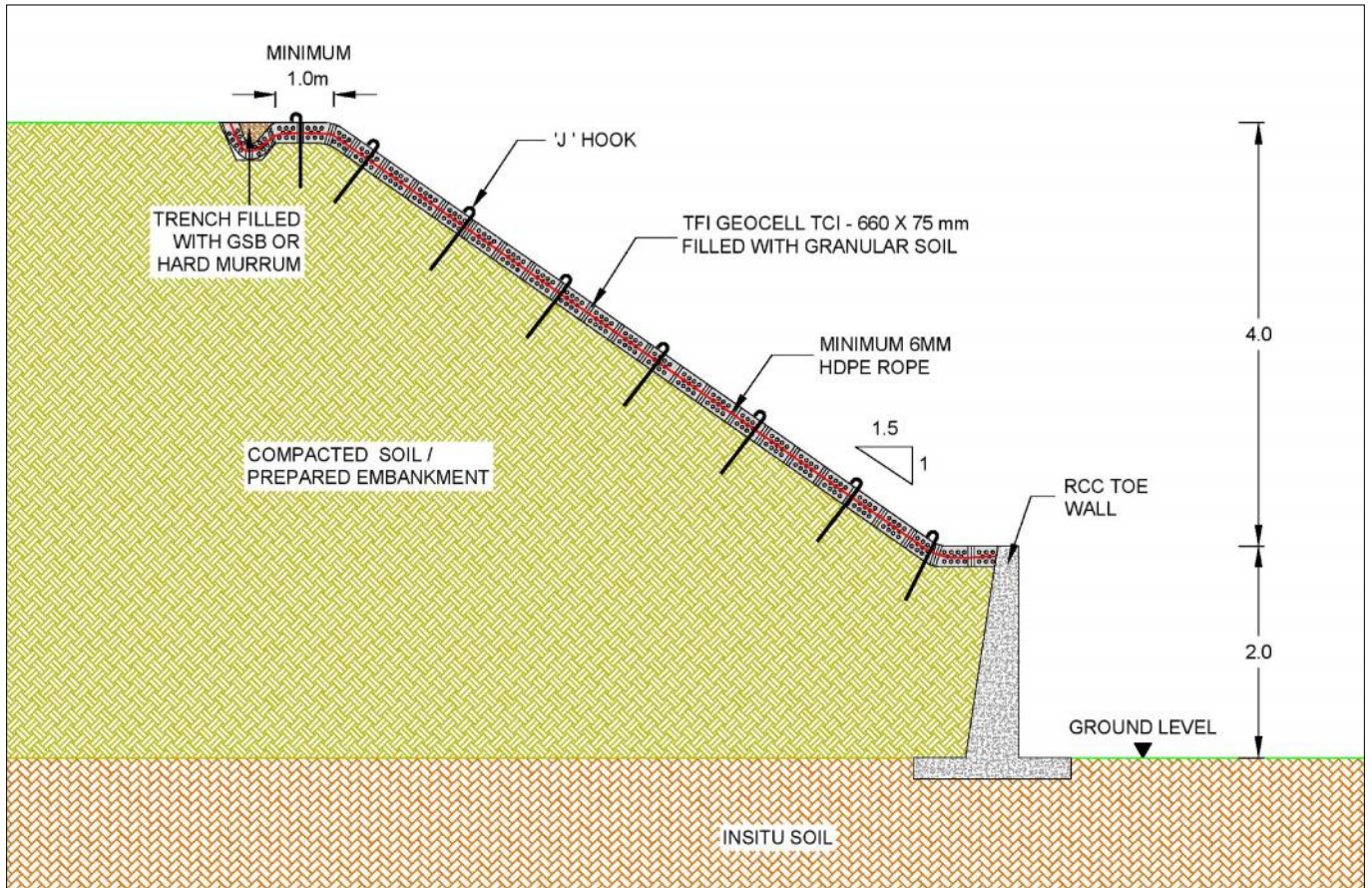
Contractor and department officials has did some trial patches vetiver grass, protection with coir mat, Plain cement concrete lining and Geocell with GSB & Geocell with soil.



Installation of Geocell

Solution:

Considering Site conditions and availability of local materials , Techfab India has suggested the solution with Geocell filled with GSB. As per the sketch attached below: And department as well as contractor found this solution viable for this situation., and major part of embankment protection done with this solution.



Typical Cross Section Drawing



During Construction Photographs

Facts about the different Erosion Control Systems:

- **Conventional Slope - Vegetative Soil + Vegetation** Site location where the soil type and weather conditions is such where vegetation can easily grow and regular watering is possible this system can be adopted.
- **Slope protection with Coir Mats / Bio mats Vettiver Grass**— Site location where scarcity of good vegetative soil , weather condition is not favouring all type of vegetation, in that condition top soil of around 30 cm is prepared with vegetative soil and seeds are mixed with the top soil and over that Coir mats are installed which will take care of slope erosion for up to 6 months with normal wind / rain conditions after 6 months it start degrade with the weather and water as it is biodegradable material. So disadvantage of this system are it will protect the slope till the vegetation established after that it will degrade. If the vegetation will not grow in time the product will vanished and again you have to think to provide another slope protection work.
- **Plain Cement Concrete lining** : As we all know that PCC lining is rigid lining require proper compacted slope which will not settled due to Heavy load of CC Lining., Need to be very careful for quality of work, proper expansion joints length wise as well as slope wise if it is not constructed properly lining shall be damage due to unequal settlement , temperature cracks etc.. and ultimately damaged the slope beneath. And overall it is very costly options compare to other erosion protection system.
- **Geocell** : Geocell is three dimensional confinement system, easy to install in very short time , factory made product so consistency in quality of product. Geocell can be used with various combinations, like Geocell filled with vegetative Soil, Geocell with filled with GSB Materials , and Geocell with Light weight concrete. The combination can be decided on site condition and availability of filled materials.
- Geocell with GSB was chosen as Geocell confines infill GSB material and protects slope erosion.
- Geocell has perforated soil wall and Geocell with GSB will reduces hydraulic energy and drain out the access water from the slope.
- A layer of nonwoven geotextile will avoid further penetration of water in to the embankment and help drain out water efficiently .



Installation of Geocell

Execution on site :

- Prepare the slope surface as per the slope angle suggested in the drawing. Remove debris, rocks, unacceptable soil from area where Techcell Geocell is to be installed.
- Compact the Slope with proper compacting arrangement ,loose pockets can be filled again and compacted.
- Excavate anchoring trench at the top of slope and toe trench according to the design.
- Installed the layer of nonwoven geotextile if specified in the design with recommended overlapped anchored the same in anchor trench.
- Line out the position of Techcell Geocell and Install J shaped anchors along anchor trench with proper alignment to hold Techcell section in place on the slope.
- Expand down the Techcell section on the slope and then fix end Techcells by using J shaped anchors.
- Adjacent Techcell must be levelled with each other and tie with each other using cable string.
- Install J hooks at specified distance as mentioned in design and drawing.
- When Techcell has been installed in place properly, Techcell should be filled with specified material.
- To prevent possible damage, limit drop height of infill to not more than 1m.
- 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, in case of vegetative soil as infill the layer of Geotextile can be avoided for roots



Installation of Nonwoven Geotextile & Geocell completed



Slope is ready and filled with GSB

Conclusion:

Project work is still going on and expected to get completed by March 2021. Roads and building authority were really happy with the technical support received from TechFab India and really appreciated the Installation training received from TechFab India. Partial Portion of the scope which is completed already faced this monsoon and performed very well.

For further details kindly contact :

TechFab India Industries Ltd.

711/712, Embassy Centre, Nariman Point, Mumbai – 400021
Tel: + 91- 22 - 2287 6224 / 6225 Fax: + 91- 22 - 2287 6218
E: info@techfabindia.com
W: www.techfabindia.com