

CASE HISTORY

Rev:00, Date : 12.04.2024

EROSION CONTROL FOR RAILWAY EMBANKMENT USING TECHCELL GEOCELL - EASTERN DEDICATED FREIGHT CORRIDOR PROJECT BY- DFCCIL, MEERUT, UTTAR PRADESH

MEERUT, UTTAR PRADESH, INDIA



Erosion Control

Client:	Products used:
DFCCIL (DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA)	• TECHCELL GEOCELL (TYPE 712 X 75mm)
	Main contractors:
	L & T CONSTRUCTION
Manufacturer & Supplier:	Year of Construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2024

Project Description:

The project is a small part of the Eastern Dedicated Freight Corridor (EDFC), a broad gauge freight corridor in India stretching from Ludhiana in Punjab to Dankuni (near Kolkata) in West Bengal, passing through Meerut and Khurja in Uttar Pradesh. This railway line is one of several freight corridors being constructed by the Dedicated Freight Corridor Corporation of India (DFCCIL), a public-sector unit under the Ministry of Railways. A large logistics hub is proposed in Meerut, which will be well connected to EDFC and several expressways.

DFCCIL aims to protect rail embankments from erosion through strategic measures such as reinforcing embankments with gabion mattresses, planting vegetation to stabilize soil, and implementing drainage systems to divert water flow. Such initiatives ensure the longevity and safety of railway infrastructure, bolstering operational efficiency.

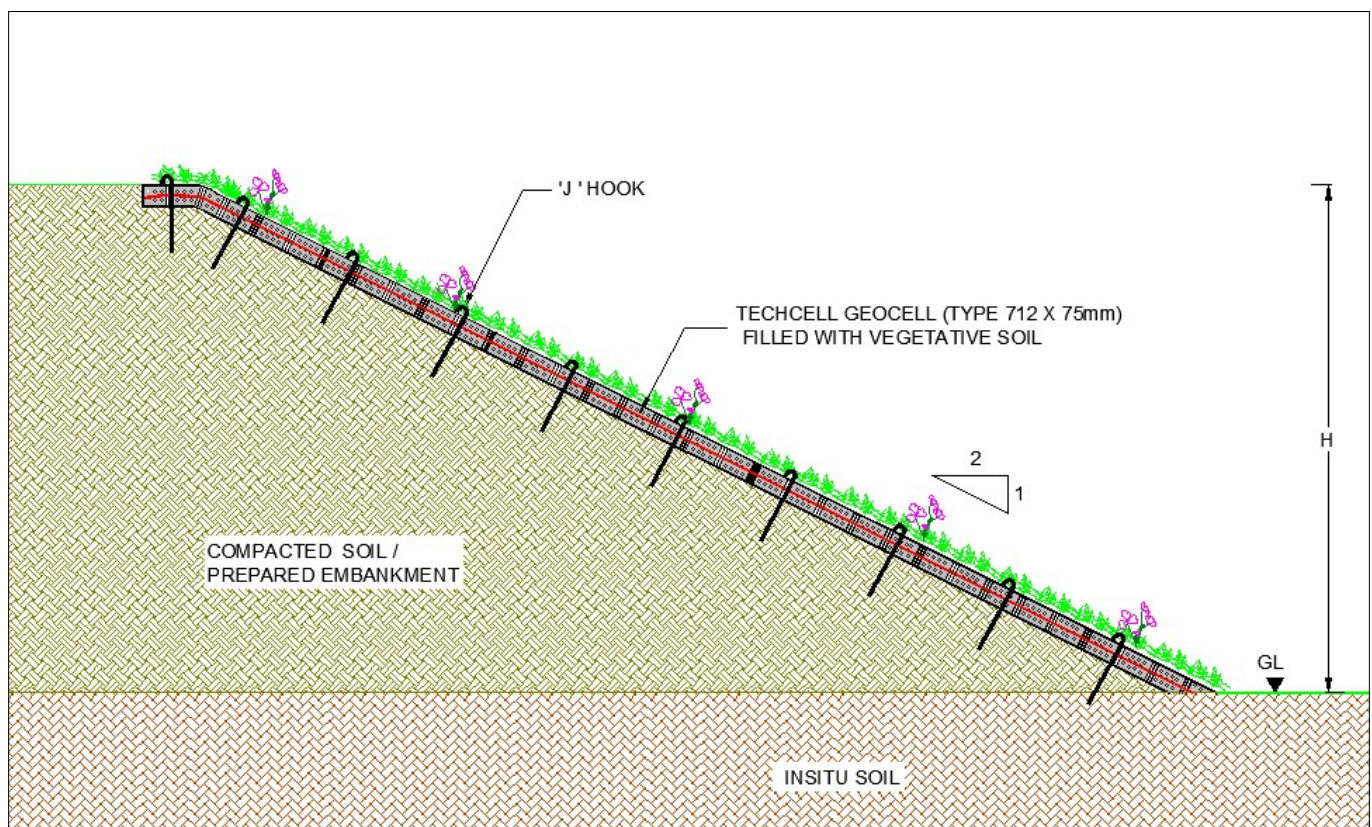


Photo 1 : Preparation of Slope (1V : 2 H)

Solution:

TechFab (India) Industries Ltd presented a proposal advocating the use of Tech Cell (Type 712 x 75mm) combined with vegetative soil for embankment erosion control (MoRTH 705.2.1), positioning it as a modern alternative to conventional methods such as stone pitching, concrete lining, and vegetation alone. This innovative approach promises enhanced effectiveness and environmental sustainability in erosion management practices. Stone pitching and concrete lining are the costliest and time-consuming options. Relying solely on vegetation is not feasible for higher heights and steep slopes, and it requires regular maintenance. Utilizing geosynthetics for preventing soil erosion has been proven to be a cost-effective option compared to these conventional solutions. Combining vegetation with Geocell presents a superior method for enhancing slope stability and erosion control.

Geocells stabilize the soil surface and secure seeds and vegetative soil in place, even on steep slopes where establishing vegetation may be challenging and mitigating potential erosive forces may exceed the strength of the root system. In such cases, geocells provide an effective solution by preventing soil slippage and facilitating vegetation growth. The use of polymer Geocell mesh honeycomb structure offers long-term protection as it is not biodegradable like jute or coir mats (as per IRC 59 2019, section 4.8.5.2). Due to its longer lifespan and high success rate in vegetation growth per year, it ensures reliable erosion control and slope stability.



Typical Cross Section Drawing of Proposed Solution

Installation Steps:

- The slope surface shall be prepared by clearing, grubbing or levelling the area to the design slope and levels. This includes removal of loose topsoil and vegetation if any Fig 1.
- The Geocell shall then be spread and laid smoothly by placing in intimate contact of soil ensuring slight tension, to avoid wrinkles or folds on the prepared surface as per Fig 2.
- Upon Spreading of Geocell Bundle on slope, the anchoring of Geocell to the prepared surface shall be carried out using J-Hooks as shown in the cross section show in Fig 3.
- The J-Hooks shall be made of minimum 10mm diameter MS bars and dimensions of J Hooks shall be as shown in fig 3 below.
- Adjacent Geocell Bundle shall be tie with tie bar.
- Prior to placing the vegetative soil fill material on the Geocell layer, the installed Geocell shall be inspected and approved by the Engineer in Charge.
- The fill material shall then be placed carefully using excavator from the top edge of the bund show in fig 5.
- Any ruts/undulations occurring during construction shall be filled with additional fill material to achieve required thickness.



Photo 2 : Spreading of Geocell on Slope Surface



J Hooks

Photo 3 : Anchoring of J Hooks



Photo 4 : Placing Vegetative Soil onto the Geocell



Photo 5 : Spreading the Vegetative Soil evenly over the Geocell



Photo 6 : Slope After Application of Vegetative Soil

Conclusion:

The project was completed in March 2024, with the client expressing satisfaction with the high quality of the delivered product and the exceptional service provided.

For further details kindly contact :

TechFab India Industries Ltd.

46 & 47, Maker Chambers VI, Nariman Point, Mumbai - 400021

Tel: + 91- 22 - 2287 6224 / 6225

E: info@techfabindia.com

W: www.techfabindia.com