

CASE HISTORY

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PAVEMENT STABILIZATION USING TECHGRID PP BIAXIAL GEOGRID FOR SIX-LANE ACCESS CONTROLLED HIGHWAY FROM KM 0+000 TO KM 40+080 (PANIYALA TO MATOR SECTION) AND KM 40+080 TO KM 86+513 (MATOR TO BARODAMEO SECTION) OF PANIYALA – BARODAMEO UNDER BHARATMALA PARIYOJANA, RAJASTHAN

RAJASTHAN, INDIA



Pavement Stabilization

Client:

NATIONAL HIGHWAYS AUTHORITY OF INDIA

Contractor:

JOINT STOCK COMPANY INDUSTRIAL ASSOCIATION

Products used:

- TECHGRID PP BIAXIAL GEOGRID

Manufacturer & Supplier:

TECHFAB (INDIA) INDUSTRIES LTD.

Year of Construction:

2025

Project Brief & Problem Description:

The six-lane access-controlled greenfield highway by National Highways Authority of India (NHAI) in Rajasthan will connect Paniyala in Jaipur District with Barodameo in Alwar district at an approximate cost of Rs. 2876.42 crore including land acquisition. The project's feasibility study and Detailed Project Report (DPR) was prepared by Chaitanya Projects Consultancy Pvt. Ltd. under the Bharatmala Pariyojana program. Its main purpose is to connect the recently opened 313 km Ambala – Kotputli Economic Corridor and the under construction 1350 km Delhi Mumbai Expressway. The expressway's alignment will pass north of Alwar and construction will be carried out through 2 civil packages – 40.080 km Package 1 (Paniyala to Mator) and 46.433 km Package 2 (Mator to Barodameo).

The Paniyala–Barodameo Six-Lane Access-Controlled Greenfield Highway is a strategic infrastructure project undertaken by the National Highways Authority of India (NHAI) under the Bharatmala Pariyojana. The highway is envisaged as a high-capacity, high-speed corridor designed to improve regional and inter-regional connectivity. It will serve as a critical link between the Ambala–Kotputli Economic Corridor. The proposed alignment passes north of Alwar city, minimizing urban interference and ensuring smooth traffic flow with controlled access provisions. For effective execution and project management, the construction has been divided into two civil packages: Package 1 covering 40.080 km from Paniyala to Mator, and Package 2 covering 46.433 km from Mator to Barodameo. Upon completion, the project is expected to significantly boost economic activity, improve logistics efficiency, and support balanced regional development in Rajasthan.

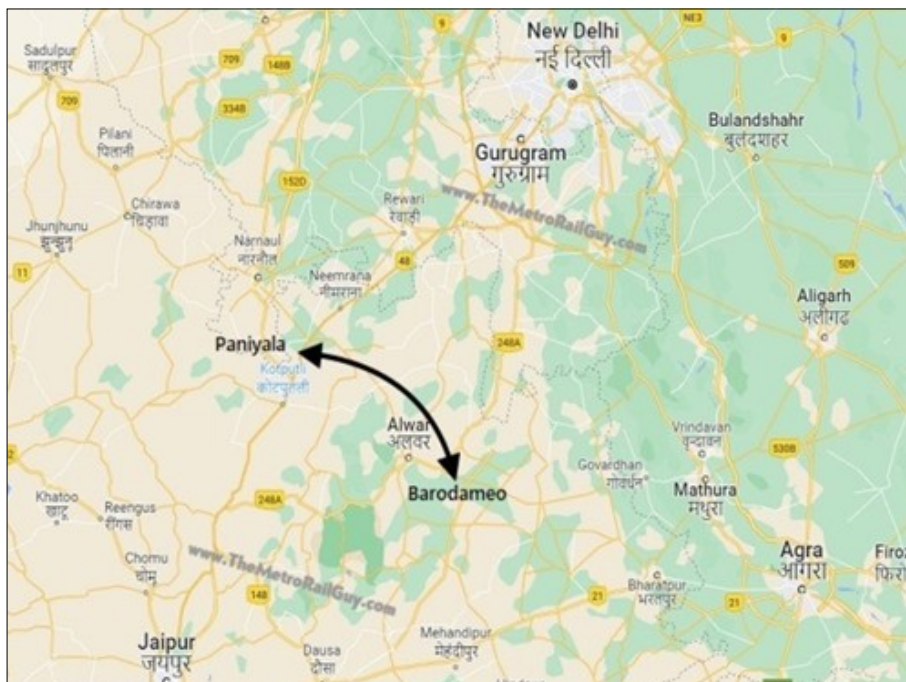


Photo 1 : Locations of Paniyala and Barodameo with its route map passing north of Alwar

Solution:

The conventional pavement design methodology predominantly depends on thick layers of granular aggregates to achieve the required load-carrying capacity and durability. This approach results in large-scale extraction of natural materials, increased transportation demand, and higher greenhouse gas emissions, thereby contributing significantly to environmental degradation and increased project costs.

Geogrid-reinforced pavement offers a sustainable and performance-oriented alternative. Geogrids are polymeric grid-like materials placed within or between pavement layers to provide reinforcement through interlocking with aggregates. This reinforcement mechanism improves load distribution, increases bearing capacity, and restricts lateral movement of aggregates under traffic loading. As a result, pavement layers experience reduced deformation, rutting, and fatigue cracking. By enhancing the mechanical performance of pavement layers, geogrids allow for a reduction in granular layer thickness without compromising structural integrity. This leads to conservation of natural aggregates, lower construction costs, and reduced carbon emissions associated with material production and transportation. Additionally, geogrid-reinforced pavements exhibit improved service life and reduced maintenance requirements.

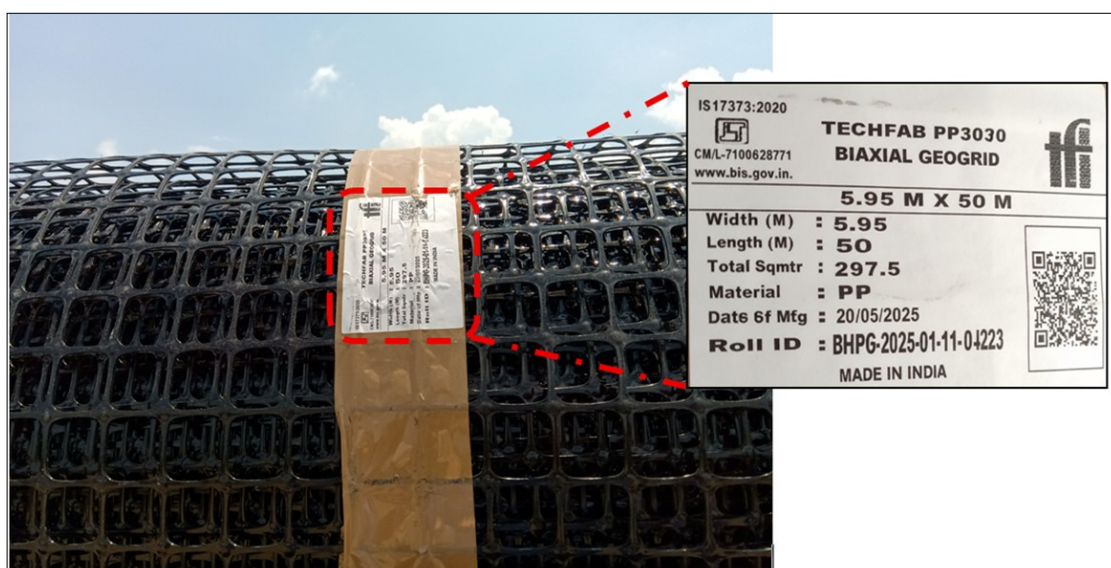
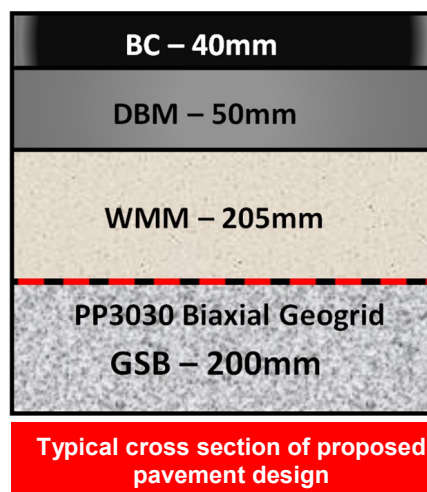


Photo 2 : Identification of Geogrid Roll



Photo 3 : Finished GSB layer



Photo 4 : Laying of the geogrid over prepared GSB layer with a minimum overlap of 300 mm

Execution on Site: :

GSB Surface Readiness: Prior to placing the geogrid and WMM layers, the Granular Sub-Base (GSB) shall be adequately compacted and cleared of vegetation, loose particles, and any foreign materials. Proper surface preparation is essential to provide a stable foundation and ensure effective performance of the reinforcement system.

Roll Identification: A roll identification register shall be maintained at site, recording details such as roll number, batch/lot number, manufacturer, roll dimensions, type of geogrid material.

Laying and Anchoring of Geogrid: The geogrid shall be rolled out over the prepared surface and manually tensioned to remove folds or undulations. It shall be securely fixed along the edges using 10 mm diameter U-shaped bars at spacing of 2 to 4 meters, or as required at site, to prevent displacement during construction activities. The minimum overlap of 300 mm and 1000 mm have been maintained in lateral and longitudinal direction respectively.

Placement of WMM Material: The base material shall be placed over the geogrid carefully so that direct wheel contact with the geogrid is avoided. This helps in preventing damage or misalignment of the reinforcement layer.

Vehicle Movement Control: While spreading the WMM material, construction vehicles shall operate at speeds not exceeding 10 km/h. Sharp turns, sudden braking, and wheel spinning over the geogrid shall be avoided to maintain the integrity of the reinforcement.

Compaction and Overlaying Layers: The WMM layer shall be compacted to the specified density as per project specifications. After achieving the required compaction, subsequent pavement layers such as DBM may be laid in accordance with the design and project requirements.

Rectification of Unevenness: Any depressions or ruts formed during spreading or compaction shall be corrected by adding suitable base material. The surface shall be brought to the designed thickness and level to ensure uniform pavement performance.



Photo 5 : Dumping and spreading of WMM material over Geogrid



Photo 6 : Compacted WMM Layer

Conclusion:

Techfab India has successfully delivered the complete Techgrid Geogrid quantity within the agreed timeframe and in compliance with all quality specifications. The contractor has finished the base layers of the pavement to the complete satisfaction of National Highway Authority of India and the Project Management Consultants.

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