

CASE HISTORY

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CHANGE OF ALIGNMENT OF NH-15 (JAISALMER – BARMER – SECTION) FROM KM 123/410 TO KM 144/500 USING TECHGRID POLYESTER BIAXIAL GEOGRID IN VIEW OF MINES AREA BENEATH NH-15 FOR POWERPLANT INSTALLATION AT BARMER, RAJASTHAN

BARMER, RAJASTHAN, INDIA



Pavement Stabilization

Client:	Products used & Quantity:
NATIONAL HIGHWAY AUTHORITY OF INDIA (NHAI)	•TECHGRID POLYESTER BIAXIAL GEOGRID (TGB 40) - 3.5 Lakhs Sqm
Contractor:	
M/S RADHAKISHAN INFRA DEVELOPERS PVT. LTD.	
Manufacturer & Supplier:	Year of Construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2024

Project Brief & Problem Description:

Barmer, situated in the western part of Rajasthan, is known for its vibrant culture, historical heritage, and natural resources. Economically, Barmer has transformed into an important energy hub due to its substantial crude oil reserves. In light of the mining activities, the alignment of NH 15 has been changed from Km. 123/410 to Km. 144/500 along the Jaisalmer-Barmer section, where a power plant is planned to be installed in the Barmer district on EPC mode in the state of Rajasthan.

The present project involves the construction of a four-lane divided carriageway with paved shoulders from km 0.000 (km 144.200) of NH-15 (New NH-68) to km 21.042 (km 160.700) of NH-15 (New NH-68), including the Barmer bypass, in the State of Rajasthan. The project is being executed on EPC mode. The pavement has been designed for a design traffic of 60 MSA for the main carriageway and 10 MSA for the service road, considering an effective subgrade CBR of 15%.



Photo 1 : Initial Site Condition Prior to Pavement Stabilization Works

Solution:

Conventional pavement design relies severely on granular aggregates, leading to extensive consumption of natural resources and a high carbon footprint. An effective alternative to enhance pavement performance while conserving natural aggregates, without compromising structural integrity, is the use of geogrid-reinforced pavement systems.

In the present project, the proposed geogrid is TechGrid TGB40, a biaxial polyester geogrid manufactured from high-tenacity, high-molecular-weight, low-carboxyl end-group polyester yarn, ensuring high tensile strength, low creep behaviour, and excellent long-term durability. Such polyester geogrids, commonly referred to as flexible geogrids, redistribute applied loads to the surrounding material through interfacial friction, confinement, and membrane action. The membrane effect limits differential deformation and significantly reduces severe rutting damage to the pavement layer. Reinforcement of the WMM layer thereby reduces vertical deformation, preventing rutting at the pavement surface and enhancing overall pavement performance.

Typical cross section of the proposed improvement measures is as shown below.

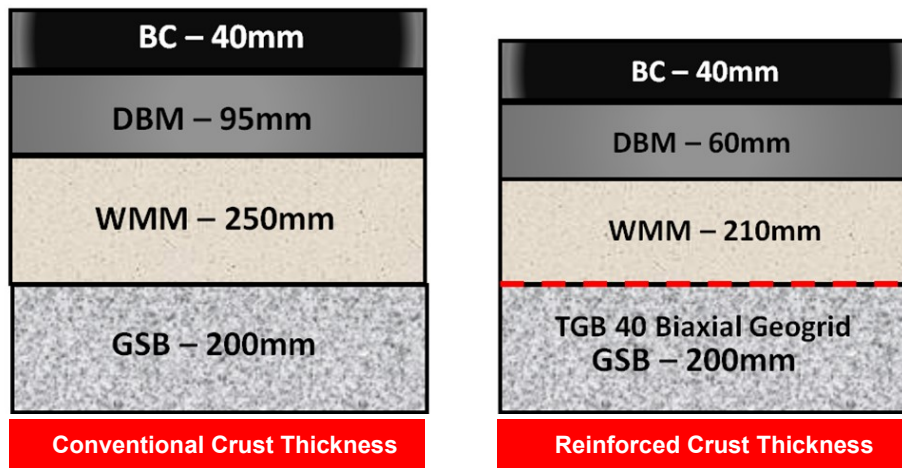


Photo 2 : Unrolling of geogrid over finished GSB layer with lateral overlap of 300 mm

Installation of TGB 40 Biaxial Geogrid

- Prior to laying the WMM layer, the GSB layer was well compacted to the specified density and was free from vegetation, loose material, and other extraneous matter, as shown in the figure.
- The geogrid was unrolled over the prepared surface and manual tension was applied to remove wrinkles and slack. The geogrid was secured along the edges using 10 mm diameter “U” bars at intervals of 2–4 m, as per site requirements.
- A minimum overlap of 300 mm along the width and 1000 mm along the length of the geogrid was maintained.
- The base material was dumped over the geogrid layer in a manner that minimized the movement of construction equipment over the laid geogrid.
- While placing the fill material over the geogrid, truck speed did not exceed 5 km/h. The WMM material was dumped carefully, and wheel turning, sudden braking, or sharp manoeuvres on the exposed geogrid were strictly avoided.
- The WMM layer was compacted to achieve 98% of Proctor density. Subsequent layers, such as DBM, were then laid as per project requirements and specifications.
- Any ruts or depressions formed during spreading or compaction were rectified immediately by adding base material to achieve the design thickness and surface tolerance.



Photo 3 : Securing the ends of the geogrid with “J” hooks



Photo 4 : Spreading of first layer of WMM material over Geogrid



Photo 5 : Laying of second layer of WMM material



Photo 6 : Finished pavement surface

Conclusion:

TechFab India has successfully supplied the entire quantity of Techgrid Geogrid within the agreed timeframe and in full compliance with all specified quality requirements. The contractor has completed the pavement base layers to the complete satisfaction of the National Highways Authority of India (NHAI) and the Project Management Consultant (PMC).

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