

CASE HISTORY

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PAVEMENT REHABILITATION USING ASPHALT INTERLAYER BETWEEN DISTRESSED CONCRETE PAVEMENT AND NEW BITUMINOUS OVERLAY AT NAGARDHAN VILLAGE, RAMTEK, NAGPUR

RAMTEK, NAGPUR, MAHARASHTRA, INDIA



Pavement Stabilization

Client:	Products used & Quantity supplied:
PUBLIC WORKS DEPARTMENT, MAHARASHTRA	• PP BIAXIAL GEOGRID 20 x 20 - 5530 SQM • TECHPAVE C040 - 5500 SQM
Main contractor:	
OM SAI CONSTRUCTION, RAMTEK	
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2022

Project brief:

The Public Works Department Government of Maharashtra has taken up Maharashtra State Road Improvement project through different packages spread over 10 districts Ahmednagar, Pune, Satara, Kolhapur, Sangli, Nashik, Nagpur, Hingoli, Nanded and Aurangabad.

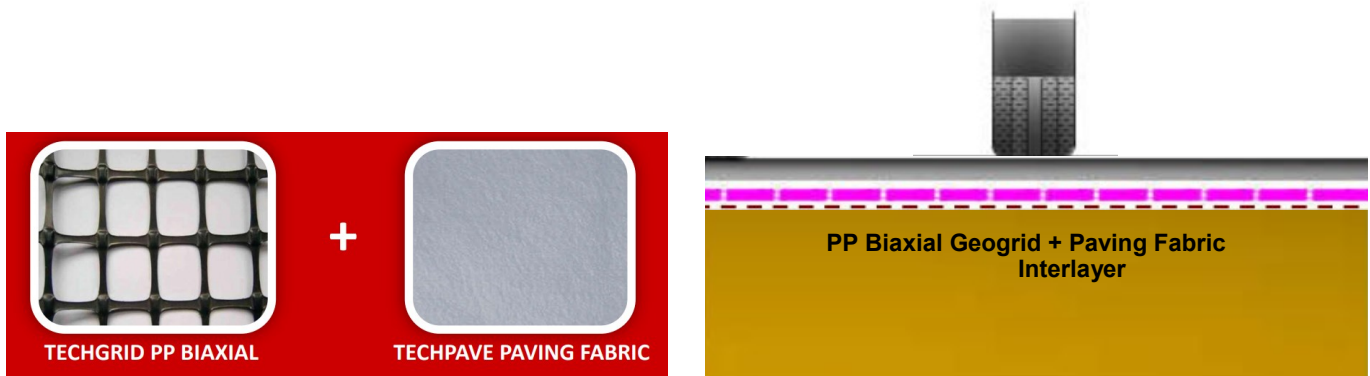
Nagardhan village is located in Ramtek Tehsil of Nagpur district in Maharashtra, 50km away from district headquarter Nagpur. Due to the increased traffic load, the internal roads at V.R.155 CH.0/00 TO 0/250, V.R.153 CH.0/00 TO 0/600, ODR - 133 CH.0/00 TO 0/900 and V.R.174 CH.0/00 TO 0/500 was subjected to severe problem of series of interconnected cracks. It was observed that the existing concrete pavement has been deteriorated and cracks were developed on the surface which had progressed further into large potholes at some places. During monsoon season, water use to penetrate inside and deteriorate the pavement further.

Considering the existing pavement condition and heavy traffic loading as the road was a busy one, it was decided by client to go for pavement rehabilitation, which is sustainable and minimize the further maintenance costs.

Solution:

Current pavement was needed to be repaired by placing an asphalt layer to increase the load carrying capacity of the pavement section. However the ability of asphalt to withstand tensile stress is limited. So there were chances of fatigue and reflective cracking in the surface course. To avoid this type of cracking, an interlayer is required between the existing old distressed pavement and new overlay so that the propagation of crack is intercepted in between. This interlayer must have properties with stiff tensile strength and minimum elongation and capacity to sustain laid temperatures of asphalt without melting.

As the client desired a cost effective and long term solution for pavement rehabilitation, TechFab India proposed an asphalt interlayer between the existing distressed pavement and the bituminous layers. Asphalt interlayer is a combination of TechGrid PP Biaxial Geogrid 20/20 and TechPave Paving Fabric. Combination of these two products makes this possible by forming a stiff interlayer and facilitating strong bond with the old and new pavement thereby depropagating the cracks horizontally by absorbing the tensile stresses.



TFI Proposed Solution



Photo 1 : Laying of TechPave C040



Photo 2 : Laying of PP Biaxial Geogrid over TechPave



Photo 3 : Placing of Asphalt mix over PP Biaxial Geogrid



Photo 4 : Compaction

Asphalt Reinforcement Technology :

TechGrid PP Biaxial Geogrid

TechGrid PP Biaxial is a family of integrally formed biaxial geogrids manufactured from superior grades of polypropylene using precisely controlled punching and drawing processes. Stringent controls on raw materials and manufacturing process ensures a high quality product with consistent geometry, integral junctions, superior mechanical properties and excellent durability.

In a reinforced asphalt layer, the geogrid in the interlayer will result in strong interaction, mainly through interlocking of granular particles of asphalt layer within the apertures which ultimately leads to significantly enhanced structural capacity of new overlay.

TechPave C040

TechPave C040 is a nonwoven paving fabric manufactured from high quality polypropylene staple fibres. The fibres are mechanically bonded through needle-punching with heat treatment (callandaring) on one side to form a strong, flexible and dimensionally stable fabric structure, with optimum bitumen retention capacity.

Impregnation of Bitumen with paving fabric prevents water movement from the old pavement layer to new overlay.



Photo 5 : During Construction

Benefits of Asphalt Interlayers :

Seizure of Reflective Cracks

Asphalt Interlayers with combination of PP Biaxial Geogrid and Paving Fabric helps in reducing the development of cracks in the surface layer caused by the movement, bending and shearing of a substrate. The Stress Absorbing Membrane effect also helps reducing the strain in overlay.

Reduces Water Infiltration

TechPave Geotextile (part of Interlayer) when saturated with bitumen (absorbed from the tack-coat) functions as an impervious membrane which prevents the entry of surface moisture into the pavement structure and the subgrade. The high elongation characteristics of TechPave allows it to deform without rupture, thereby enabling it to continue to function as an effective barrier even in a deformed state.

Reduces Surface Rutting

The apertures of TechGrid PP Biaxial Geogrid when filled with the asphalt mix, the granular material of asphalt mix confines and interlocks in the aperture forming a regular asphalt grid structure which restricts the lateral movement associated with surface rutting.

Reduces Thermal Cracking

Daily or seasonally peak tensile strains that occur on the existing thermal cracks in the underlying layers will result in the thermal reflective cracking of new overlay. The presence of TechGrid PP Biaxial Geogrid in the Asphalt Interlayer by virtue of its tensile strength and stiffness prevents the propagation of thermal cracks onto the new overlay surface.



Photo 6 : During Construction

Conclusion:

The project is completed successfully and the rehabilitated road is open to traffic.

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