

CASE HISTORY

Rev:00, Date : 19.02.2021

**STRENGTHENING AND IMPROVEMENT OF MAJOR DISTRICT ROADS TO SH120 MDR 121
KM 33/00 TO 40/00 NEAR INDAPUR, DIST. - PUNE
MAHARASHTRA, INDIA**



Subgrade Stabilization / Sub-Surface Drainage

Client:	Products used & Quantity supplied:
PUBLIC WORKS DEPARTMENT, PUNE, MAHARASHTRA	<ul style="list-style-type: none">• TECHCELL GEOCELL 356 X 150• TECHDRAIN DRAINAGE COMPOSITE TDC - 55130W
Main Contractor:	
M/S T G TORADMAL AND CO	
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	JANUARY 2021

Introduction:

PWD Maharashtra is implementing a road network development plan, with the objectives to improve state roads connecting industrial, tourist, religious, and district headquarters to two-lane roads; connecting villages with at least single lane roads; and expanding the overall length of Maharashtra's road network.

The major district roads (MDR) connecting Nimgaon Ketaki, Pitkeshwar, Sarafwadi, Niowangi, Khorochi, Lumewadi, Pimpri, Girvi, Taanu to SH120 MDR 121 near Indapur Taluk of Pune district were planned to be improved and made to single lane flexible pavements of 3.75m lane width with 1.875m earthen shoulders on both sides. PWD Pune circle has awarded the work for construction of conventional road pavements earlier. However, considering the site conditions, the PWD department has decided to strengthen these roads and make them all-weather roads.

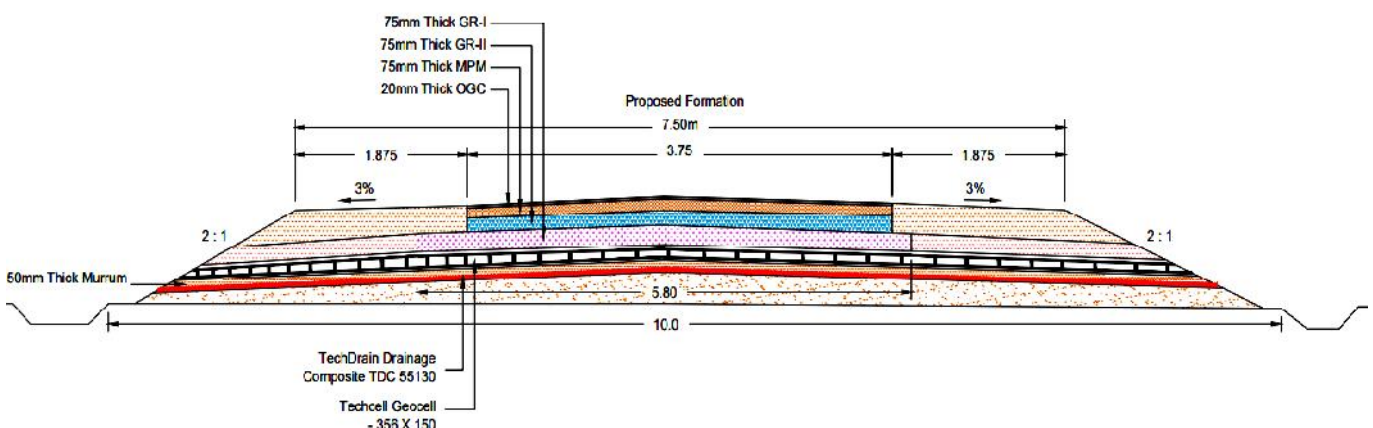
Problem:

The major problem associated with the construction of these roads is that most of the road stretch passes through the agricultural fields and adjoining water bodies. The subgrade soils on which the road pavements are planned to be constructed consists of clayey soils which are very weak in nature.

The subgrade soil CBR was ranging around 3% in majority stretch and the sub-surface drainage was of utmost importance for the long-term performance of road pavement. Under these conditions, construction of conventional pavement as planned earlier was not suitable and department has decided to strengthen the pavement along with providing suitable sub-surface drainage measures.

Solution:

Among all other alternative ground improvement methods like Chemical Stabilization, Soil replacement etc., PWD suggested using Geocell for stabilizing and improving the load carrying capacity of weak subgrade soils thereby minimizing the differential settlements that may occur due to the underneath soil and loads from superstructure. Drainage composite has been proposed to overcome Water logging problem wherein the horizontal drainage layer



Typical Cross Section drawing

Product Details:

1. Techcell Geocell – This is the cellular confinement system made from High Density Polyethylene stabilized with carbon black which has higher tensile strength and stiffness. Techcell is more durable over time and is available in different size, depending upon weld spacing of cell available in various depths. Techcell is used for soil confinement, stabilization and reinforcement in wide variety of load support application, slope erosion control application.
2. TechDrain Drainage Composite - It is a Geocomposite material formed by a combination of Polypropylene drainage core (Geonet comprising of two sets of parallel overlaid ribs integrally connected to have rhomboidal shape) sandwiched between two thermally bonded non-woven geotextiles. These non-woven geotextiles allows the water to pass through into the core by retains the soil particles. The water collected into the core shall

Advantages of using TechCell Geocell

- Techcell Provides effective ground improvement solution for weak foundations.
- The geocell confinement system provides a stiff layer which laterally disperses the partial loads coming from superstructure thereby minimizing the pressure intensity on the weak subgrade soils.
- Minimizes the usage of high thicknesses of aggregate layers.
- Ease of Installation in any kind of weather conditions. Also, they do not entail skilled masons.
- Economical ground improvement alternative compared to other conventional solutions.

Advantages of using TechDrain Drainage Composite

- Prevents intermixing of clayey subgrade soils with the aggregate layers of pavement laid above.
- Easy to Install, therefore allows fast construction.
- Cost effective and technically superior
- It's multidirectional flow allows a continuous path for water discharge, eliminating the potential for hydrostatic pressure build-up, which increases service life of road pavement.
- It can be used to engineer efficient and economic solutions by minimizing natural aggregate thereby reducing carbon footprint on the environment.

Installation Method

- The project site was well prepared before the installation. The ground was compacted in accordance with the project specification. All surfaces to be deployed was free of all foreign and organic material or sharp objects.
- Embankment fill of 100mm laid and compacted for road width of 7.5m (paved road 3.75m and 1.875m of shoulder on each side) as per drawings provided.
- The Drainage composite was unrolled as per the markings made in accordance with the cross section drawings provided.
- The Drainage Composite was folded, overlapped, or cut to conform to curves in the design. The direction of the fold or overlap was in the direction of the construction and was held in place using sandbags or any blocks.
- For the adjoining roll widths of drainage composite, minimum overlap of 150mm was maintained. Joints of the Drainage Composites was butted together and the geotextile of adjacent geonet core rolls overlapped along the roll, as per design.
- Fill material (Murrum) was back dumped onto previously placed fill from trucks or front-end loaders riding on top of the previously placed fill. At no time will equipment be allowed to drive directly across the drainage composite. The specified fill material was placed and spread utilising vehicles with a low ground pressure.
- Geocell was stretched to maximum area and allowed it to relax and install J-pins (permanent or temporary) to anchor the edge cells.
- Aggregate infill material was dumped and levelled to approximately 30mm above the cells. Infill material was



Pavement Subgrade Surface is Prepared for Laying of Drainage Composite



Laying of TechDrain Drainage Composite (With Necessary Overlaps) in progress



Murrum Cushion Layer Laid on Drainage Composite (To Prevent Puncture)



Techcell Geocell Stretched and Infill Material Dumped for Compaction



Compaction Process of Infill Material in the Geocell



Compaction Process of Infill Material in the Geocell

- Proper side-to-side cell alignment was maintained to prevent loss of cell infill material, compacted every surface of the panels well as per the specification.
- Remaining road pavement layers were installed and road pavement completed.

Conclusion:

TechFab India has associated with PWD Pune Circle in implementing strengthening and improvement of road pavement. Supplied the entire quantity of Techcell Geocell and TechDrain Drainage Composite within the stipulated time meeting all the quality requirements and ensured that the geosynthetic layers are installed as per the guidelines provided.

All remaining layers of road pavement have been constructed and road is now open to traffic. The project met the desired objectives and road is functioning well.

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