

CASE HISTORY

Rev:01, Date : 29.04.2020

IMPROVEMENT OF PAWALE - KOLTHAN BHADANE ROAD FROM CH: 0/000 TO 8/640 ON SH-79 AT MURBAD, MAHARASHTRA MURBAD, MAHARASHTRA, INDIA



Pavement Stabilization

Client:	Products used:
PRADHAN MANTRI GRAM SADAK YOGANA (PMGSY)	TECHCELL - 356X150
Main contractor:	Quantity supplied:
SAURABH CONSTRUCTIONS	2020 SQM.
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	

Project brief:

Pradhan Mantri Gram Sadak Yojana (PMGSY) is Centrally sponsored scheme and is being implemented in Maharashtra since 2000. The scheme is implemented by Rural Development Department through Maharashtra Rural Roads Development Association.

The Primary objective of the PMGSY is to provide connectivity, by way of an All-weather Road (with necessary culverts and cross-drainage structures, which is operable throughout the year), to the eligible unconnected Habitations in the rural areas with a census 2001 population of 1000 persons and more in non-tribal areas and population of 500 persons and more in Tribal areas.

Some of the stretches of PMGSY roads in the state of Maharashtra are under weak soils which affects the long term performance of these roads, in order to provide all weather roads for areas with soft and weak soils, it is necessary to adopt suitable technologies which enhance the pavement life and functioning.

This case study describes Improvement of Pawale Kolthan Bhadane Road on SH 79 Using Techcell Geocell to enhance the performance and life of flexible pavements over weak and soft soils.

Project Challenges:

Following are some of the major challenges faced for this PMGSY road in Murad Taluka of Thane District:

- The road pavement was needs to be constructed on weak subgrade. Hence the pavement structure needed to be strong enough to absorb the traffic loads.
- The availability of good quality of granular fill material for structural layers of pavement was a challenging task during the construction. Hence the locally available marginal soils had to be used for the construction.
- Diversion of traffic was very difficult. This resulted in very less working period in a day.

Solution proposed:

Considering the aforesaid challenges, there was a need for a system which accepts the use of marginal fill for base layers, resist the road pavement against degradation and complete the construction within a short period of time without creating much disturbance to traffic. Rutting, potholes, and pavement degradation can be dramatically reduced using the TechCell Geocell system in the granular layers under bituminous layers. Performing as a semi-rigid beam, the Geocell system spreads loads over soft subbase soils, significantly reducing deflection and settlement that cause pavement deterioration — and with reduced cross-section. The Geocell also enhances the quality of infill as the project site does not get good quality of granular fill material for structural layers of

pavement. The positive effect on the pavement base layer results in usage of marginal infill material for base layers and an extended pavement life with lower maintenance requirements and costs.

The design solution included construction of Flexible pavement over weak ground by using Techcell Geocell (356 X 150) filled with marginal granular material. TechCell will improve the modulus of marginal fill material and transfer the load pressure to wider area and hence reduces the strains to permissible limits.



Compaction and preparation of subgrade for laying Techcell Geocell



Spreading of TechCell Geocell above the subgrade

The advantages of Techcell Geocell for pavement stabilization works are as follows:

- Lower capital costs – lower aggregate costs, reduced pavement structure, Enables use of lower quality / local granular infill in base layer
- Lower maintenance costs – decreases pavement degradation, repairs, rehabilitation cycles
- Easy and fast all-weather installation by work crews (trained onsite)
- Reduce infill requirements decrease quarrying, hauling, fuel and carbon pollution



Filling and Compaction of granular material into the TechCell Geocell

Why Techcell Geocell is recommended?

Techcell is the cellular confinement system created, indigenously manufactured and distributed by TECHFAB INDIA made from High Density Polyethylene stabilized with carbon black which has higher tensile strength and stiffness.

Techcell is expanded on-site to form a honeycomb like structure, which is in filled with granular infill which creates unique cellular confinement system. Techcell will increase the shear strength of the confined soil, and increase load carrying capacity. With granular infill material and holes in Techcell wall, it enhances drainage and release pore water pressure.

Techcell is used for soil confinement, stabilization and reinforcement in wide variety of load support applications.

Designed for challenging roads, Geocells are a new standard in road base reinforcement and ground improvement. Geocells provide a stiffer layer which distributes the loads over a wider area and reduce the stress on the subgrade layer. The increased soil modulus allows you to save greatly reduce the overall pavement thickness.

Known as the “beam effect”, the result is a strengthened base layer, which prevents rut development and degradation of the sub-base layers. Thanks to the stiffness and strength of Techcell Geocell, the soil confinement is retained for entire road design life.

Aggregate resources are becoming scarce and costly. With Techcell Geocells you can use locally available infill materials. Thanks to our innovative technology, the same increased modulus effect can be achieved with marginal fill materials.



Execution on Site:

- The work site shall be well prepared before the installation. The ground shall be compacted in accordance with the project specification. All surfaces to be deployed shall be free of all foreign and organic material or sharp objects.
- Stretch Techcell Geocell to maximum area and allow it to relax and install J-pins (permanent or temporary) to anchor the edge cells. Align and fasten the Geocell by using hooks.
- Fill the system with the infill material suggested and level to approximately 30mm above the cells. Compact the infill material with Roller or compacter as suggested by Engineer in charge or as per the project specification.
- Proper side-to-side cell alignment is maintained to prevent loss of cell infill material. Compact every surface of the panels well as per the specification.
- Road pavement was ready to be laid with bituminous layers.



Road Pavement after completion of base layers

Conclusion:

The road is completed by contractor before monsoon and presently the road is in excellent condition with good riding quality and Department officials are satisfied with the performance of TechCell. Further, other stretches of PMGSY roads under conditions are being pursued for adopting TechCell Geocell for improvement works.

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