

CASE HISTORY

Rev:00, Date : 18.10.2023

IMPROVEMENT OF PRIVATE INDUSTRIAL ROAD USING TECHCELL GEOCELL IN VILLAGE ZHAROLI, GUJARAT ZHAROLI, GUJARAT, INDIA



Pavement Stabilization

Client:	Products used:
MISTRY ASSOCIATES	• TECHCELL GEOCELL - 356X150 - 183035 SQM • TECHGEO PR 20 - 424500 SQM
Main contractors:	
D R ENTERPRISE	
Manufacturer & Supplier:	Year of Construction:
TECHFAB (INDIA) INDUSTRIES LTD.	2023

Project brief :

Galva Decoparts Private Limited, Zharoli Village, Gujarat reached out to the client Mistry Associates for providing pavement stabilization solution for an unpaved road connecting to their production unit.

The overall stretch which was connecting their production unit from the main road was unpaved and has weak sub-soils which would heave under heavy loading from their trucks. Even after repeated overlaying of the earthen materials repeated heaving and subsidence of ground was observed which would worsen in rainy season.

In order to provide an all-weather road that could sustain the repeated heavy loading of the container trucks ferrying goods to the production unit, it was necessary to provide pavement stabilisation solution which will enhance the pavement life and functioning.

This case study describes Improvement of an unpaved road in Zharoli Village, 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 is unpaved and there will be no plan for a bitumen pavement in near future.
- In addition, the road is constructed on weak subgrade soil. Hence the subbase needs to be strong enough to absorb the traffic loads and allow drainage.
- This is the only road to the production unit hence diversion of traffic was very difficult. This resulted in very less working period in a day.



Photo 1 : Initial Condition of the Road

Solution Proposed :

Considering the challenging ground conditions and expected traffic loading, there was a need for a solution which performs well with the use of marginal fill, and resist the road subbase against degradation and also execute the work 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. Also, TechCell can itself sustain heavy loads under the absence of 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 design solution included rehabilitation and stabilization of unpaved road 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.

In addition to TechCell Geocell, Non-woven Geotextile PR20 was also used below the Geocell layers to act as a separation and filter layer. PR20 will provide a barrier between the soft ground and the infill material and prevent the intermixing. It will also help in preventing the erosion of fines from the either layers.



Photo 2 : Laying of GSB and Dressing the Road



Photo 3 : Laying of Non woven Geotextile as Base Material



Photo 4 : Placing Techcell Geocell over Nonwoven Geotextile

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

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.



Photo 5 : Expanding & Fixing of Geocell Layers



Photo 6 : Filling Geocell with GSB Material

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.
- Place the Nonwoven geotextile on the ground and make sure that there are no curls in the fabric.
- 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.
- If bituminous layers will not be laid, rock dust can be spread and compacted well after wetting for a uniform surface.



Photo 7 : Filling Geocell with GSB Material



Photo 8 : Road After Rolling & Compaction



Photo 9 : Finished View of the Road

Conclusion:

The road is completed by contractor before monsoon and presently the road is in excellent condition with good riding quality and the client is satisfied with the performance of TechCell.

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