

## CASE HISTORY

Rev:01, Date : 11.07.2020

**IMPROVEMENT OF ASHAGAD UDHAVA KODAD ROAD OF SH-75, PALGHAR,  
MAHARASHTRA**  
PALGHAR, MAHARASHTRA, INDIA



### Soil Stabilization

Client:	Products used & Quantity supplied:
PUBLIC WORKS DEPARTMENT, DAHANU	<ul style="list-style-type: none"><li>• TECHCELL GEOCELL - 350 X 150</li><li>• TECHGEO NONWOVEN GEOTEXTILE 200 GSM</li></ul>
Main contractor:	
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	FEBRUARY 2018

### Abstract:

This case study discusses the possible causes of flexible pavement failures, and recommends Geocell for sub grade stabilization instead of conventional stabilization method. Sub grade stabilization using Geocell resulted in minimization the causes of failures in flexible pavements.

### Common causes of failure in flexible Pavement :

Flexible pavement deflects under moving vehicular load. In general the service life period of flexible pavement is 10-15 yrs. However, increase in no of vehicles time to time has been undoubtedly deteriorating the serviceability of pavement structure. The effect of heavy vehicle moving loads is the critical causes of fatigue and rutting failure.

In addition to vehicle loading, Sub grade properties such as low bearing capacity result in depressions and settlement. It is found that water has got easy access into the pavement. It saturates the sub grade soil and thus lowers its bearing capacity, ultimately resulting in heavy depressions and settlement.

In the base course layers comprising of Water Bound Macadam (WBM), water lubricates the binding material and makes the mechanical interlock unstable. In the top bituminous surfacing, raveling, stripping and cracking develop due to water stagnation and its seepage into these layers. Also, Inadequate and poorly maintained cross fall of shoulder and drainage systems are causing failure. The main cause is blockage in drainage structure due to deposition of silt/waste, presence of excess grass.

Pavement need to carry large no of heavy moving loads over many years. Therefore, it is reasonable to adopt geo synthetics reinforced soil rather conventional solution which is chemically stabilizing soil. The utilization of cost effective material such as geo synthetics is important to achieve desired life of the pavement as well as to facilitate their faster construction. This type of pavement may save the engineers from day to day maintenance problems also.

### Project Brief :

This case study describes the improvement of damaged pavement by subgrade stabilization using Geocell and geotextile. Geocell is used for lateral confinement of aggregates, stabilization and reinforcement in wide variety of load support applications. Geotextile will act as separator layer and filter media.

## Project Challenges :

The improvement of : Ashagad Udhava Kodad Road was done in 2016, after the monsoon in Aug 2017, it was observed that the road surface started damaging, the depressions and signs of distress can be seen in major area, which resulted in very bad riding quality and ultimately resulted in slow traffic movement on a busy state highway. Looking to the scenario PWD Dahanu has decided to go with some long term sustainable solution with some advance applications apart from the conventional one.

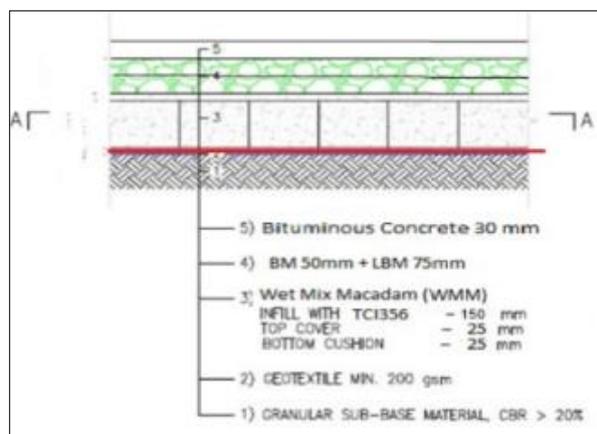
For providing the best sustainable solution, it was decided to visit the site with geotechnical experts and observe the road condition, after visual observation it is decided to check the conditions of the internal layer of pavement to know the severity of damage and cause of damage. The two locations were selected where the severe depressions were observed and trial pit was excavated, it was observed that the base, sub-base and sub grade settled and the reason of settlement was seems to be the weak foundation of the pavement.



After site visit and detailed observation it is concluded that the softening of sub base layer can be the main reason of failure under heavy axle loading which was not anticipated. Conventional methods of pavement/soil improvement were already tried and which proved ineffective, so it is very important to offer solution considering the life of pavement; anticipated growth in traffic and cost.

## Solution :

After a careful evaluation of the project requirements and site conditions, it was decided to remove the existing WMM layer and redone the WMM layer, given solution is that the WMM is to be removed and redone using Tech-cell and Geotextile. The proposed section is as follows.



The geotextile gives a tensioned member effect and will act as a separator to separate the mixing of the large base particles with the sub-base. This will also give effective load distribution.

Geotextile is act as best filter media and reduce the pumping of fines from sub grade to sub-base.

The upper base layer is subjected to hundreds of millions of repeated dynamic and cyclic loadings as well as elevated temperature and thermal cycling. Techcell have high dimensional stability to maintain long term confinement and compaction under asphalt.

The use of Techcell Geocell not only increase the strength and bearing capacity but also enables a reduction in the layer thickness of base and sub grade layers resulting in cost saving which results saving in project and life cycle costs. The perforation (holes) in Techcell walls enhances the drainage and releases pore water pressure from pavement section.



After laying geotextile, laying of 25mm bottom cushion of WMM



Laying of Techcell Geocell in Progress

### Execution :

In this project, the road width was 7.5m which include 5.5m paved surface and 1.0m unpaved shoulder on both sides. All the damaged layer of pavement till GSB top were removed and after profile correction it was well compacted, the geotextile is laid on full width of 7.5m.

After laying geotextile, Techcell Geocell of 150mm thick with a weld spacing of 350mm were laid in full width of 7.5m over the 25mm cushion layer above GSB (covered with geotextile). Since the thickness of WMM was 200 mm a cushioning of 25 mm both on top and bottom was provided.

The shoulders did not have asphaltic course and remained unpaved, it is necessary to be confined. This improved shoulder will not sink due to any occasional vehicle movement or due to parking of heavy vehicles over it.

## About Techcell :

Techcell is the 3D-Honeycomb like cellular confinement system created, manufactured and distributed by TECH-FAB INDIA Industries Ltd 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.

## Applications

- Roadways
- Railways
- Steep soil reinforcement
- Reservoir
- Landfill areas
- Channel protection

## Advantages

- It is easy to install in any weather.
- It does not require skilled labor for installation.
- It is an effective ground improvement solution for weak soils.
- It allows reduction in granular sub base layer



WMM compaction in progress



**Best riding quality Finished road**

**Present Status:**

The road was completed by contractor before monsoon (Feb 2018) and presently the road is in excellent condition with good riding quality and Department officials are happy and satisfied with the performance of TechCell.

**For further details kindly contact :**

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