

## CASE HISTORY

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### DEVELOPMENT OF INTEGRATED CENTRALIZED PARKING ZONE FOR PARKING OF TRACTOR - TRAILERS AT JNPT AREA, URAN, NAVI MUMBAI NAVI MUMBAI, MAHARASHTRA, INDIA



#### Ground Improvement Application

Client:	Products used & Quantity supplied:
JAWAHARLAL NEHRU PORT TRUST (JNPT)	TECHCELL GEOCELL - 356X150
Main contractor:	TECHGRID PP 2020
	TECHGEO PR 25
Manufacturer & Supplier:	Year of construction:
TECHFAB (INDIA) INDUSTRIES LTD.	OCTOBER 2019

#### Project brief:

Due to parking space constraint, trucks carrying containers were parked on the roadside which caused major snarls. These loaded trucks / trailers that need to wait for documentation or custom clearance before entering terminal. Sometimes, there were long queues of 10 km long which caused major traffic jam.

With increasing port facility, demand for parking of container increased for which Authority decided to build integrated centralized parking lot, located at JNPT near custom house.

JNPT Port authority decided to build parking lot. Parking lot was constructed for parking of 1553 no trailers. For convenience, parking lots are built near port for easy access and other operations.



**Project challenges:**

In most of such cases, typical failures are attributed either due to the formation of the mud wave. Mud waves are just like how the surface waves form in the ocean similar thing happens even in the soft clays get and that got reflected in the form of surface depressions.

This site was near shore line areas or near ports, foundation soil found was soft marine clay and parking lot are permanent loaded structures in this case with very high applied loads.



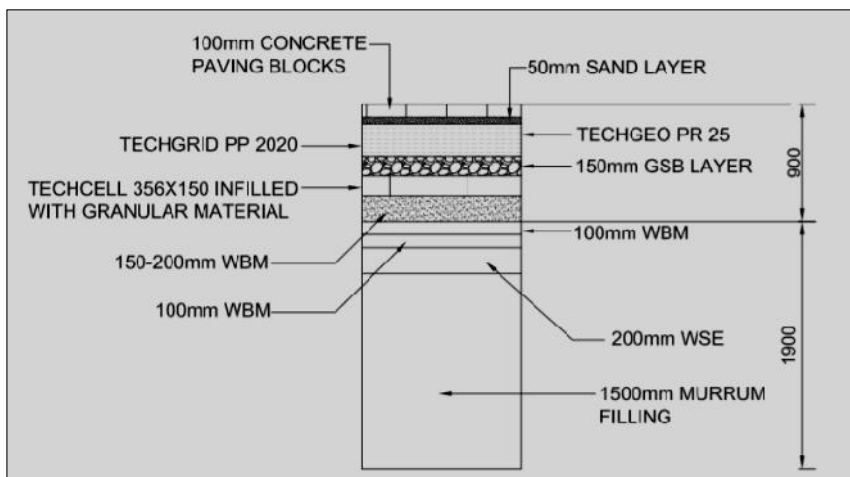
For reference, you can see how mud wave causes failure.

This parking lot, they will operate round the clock and all the 365 days in year. In spite of heavy rain or anything these operations do not stop. It is very important to give the best solution so that parking lot will stay strong for long time and absolutely level ground. So, that the parking lot operations are smooth.

**Solution proposed:**

After a careful evaluation of the project requirements and site conditions, has carried out detailed analysis and approved the usage of TechCell Geocell in GSB layer, Techgrid PP Biaxial Geogrid in GSB layer and TechGeo immediately below sand layer for constructing Parking Lot.

Proposed cross section is attached below.



**Typical Cross Section of Proposed solution**

General Paver block failure is caused by a number of variables including, water intrusion, stress from heavy vehicles, expansion and contraction from seasonal temperature changes.

The failure happens because water logging, which is biggest reason of failure of paver block.

For better water drainage in addition to sand layer a layer of TechGeo nonwoven geotextile is provided immediately after sand layer.

Since heavy permanent loading will be there as it is parking lot, it may cause deflections, undulations and to prevent basal reinforcement was provided. In lower layer, for ground improvement, Techcell Geocell was provided in bottom layer where the soil has low CBR.

#### **Advantages :**

1. Techcell Geocell –This is a cellular confinement system when compacted well increases bearing capacity of soil .Hence, Techcell is used for ground improvement application. In this scenario, heavy load is expected on parking lot on low bearing soil.
2. Techgrid PP - This layer of biaxial reinforcement enables effective load dispersion and avoids excessive deformation.
3. TechGeo - This layer of nonwoven geotextile used for separation, filtration, and better drainage.



**A layer of Techgrid PP Biaxial Geogrid was laid**

### Execution on Site:

- Land was reclaimed then filled and compacted with 1500mm thick layer of good quality murrum and compacted and a layer of WSE (wedge shear element layer) which consist of filler material from quarry size of aggregates from 50 mm to 10 mm was laid.
- Then WBM layer of 200 mm laid and compacted then remaining 100 mm thick WBM layer laid and compacted.
- A confining layer of Techcell Geocell 356 mm X 150 mm was laid which was filled with granular fill and compacted. In GSB layer, a layer of Techgrid PP biaxial is provided as a base reinforcement layer then remaining GSB laid and properly compacted.
- A layer of TechGeo is laid as a separation layer between GSB and Sand layer. After that 50 mm thick sand layer laid and compacted then 100 mm concrete paving blocks are laid.



Laying of Techcell Geocell in progress



After Completion of Parking Lot

### **Conclusion:**

JNPT Authority was very happy with timely supply of material and quality of material. The supply order completed on 22 Oct 2019. Project execution work is in progress and performance of product will be under observation till DLP of Project.

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