

CASE HISTORY

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GROUND IMPROVEMENT WORKS FOR CONTAINER YARD USING TECHDRAIN PVD & NONWOVEN GEOTEXTILES AT DP WORLD TERMINAL, TUNA TEKRA, KANDLA, GUJARAT

TUNA TEKRA, KANDLA, GUJARAT



Ground Improvement

Client:	Products used & Quantity :	
DP WORLD	• TECHDRAIN PVD 3520U	- 12 Lakhs LM
Contractor:	• TECHDRAIN PVD 3540T	- 79 Lakhs LM
OCEAN LIFESPACES PRIVATE LIMITED	• TECHGEO NONWOVEN GTX	- PN 60 - 30,000 Sqm.
	• TECHGEO NONWOVEN GTX	- PR 20 - 6.5 Lakhs Sqm.
Manufacturer & Supplier:	Year of Construction:	
TECHFAB INDIA INDUSTRIES LTD.	2025	

Project Brief & Problem Description :

The Development of Container Terminal for DP World at Tuna Tekra near Kandla, associated with Deendayal Port Authority, is a landmark infrastructure project aimed at strengthening India's maritime logistics network. Strategically located in the Gulf of Kutch, the project is expected to significantly enhance cargo handling capacity and drive economic growth in the Kutch region through the development of ancillary facilities such as warehousing and logistics hubs.

However, the site presented challenging ground conditions dominated by soft marine clay deposits with low bearing capacity and high compressibility. These weak strata posed serious risks of excessive and differential settlement, particularly under heavy static and cyclic loads from container stacking operations and internal railway embankments. The performance requirements of the container yard demanded a stable and uniformly performing subgrade to support high load repetitions and long-term operational efficiency.

Additionally, the project required adherence to green port guidelines, necessitating sustainable ground improvement solutions with minimal environmental impact.

Thus, a robust and efficient ground improvement system was essential to accelerate consolidation, improve shear strength, and ensure uniform settlement behavior across the container yard and associated infrastructure.



Photo 1: Site Prepared Prior to Protection Works

Proposed Solution:

To overcome the challenging ground conditions, an efficient ground improvement solution using TechDrain Prefabricated Vertical Drains (PVDs) was adopted. Prefabricated Vertical Drains (PVDs) are composite products consisting of a plastic core wrapped in a nonwoven geotextile filter. They are installed in soft clayey soils to accelerate consolidation by shortening the drainage path for pore water and are typically used in conjunction with surcharge or preloading.

Compared to conventional sand drains, PVDs offer several advantages such as faster and easier installation, minimal soil disturbance, and the ability to withstand lateral displacement or buckling under soil movement. This leads to enhanced performance in weak ground conditions. The use of PVDs significantly reduces primary consolidation time from years to months, enabling faster project execution and early site readiness.

For this project, PVD 3520U was utilized beneath internal railway embankments, while PVD 3540T was deployed across the container stacking areas to improve subgrade strength and ensure uniform settlement under heavy static and cyclic loading conditions. Additionally, geotextiles such as PN 60 and PR 25 were incorporated to provide separation, filtration, and reinforcement functions.

This integrated geosynthetic solution ensured improved load distribution, minimized differential settlement, and delivered a cost-effective, sustainable, and technically efficient approach for long-term ground stability and performance of the container yard.

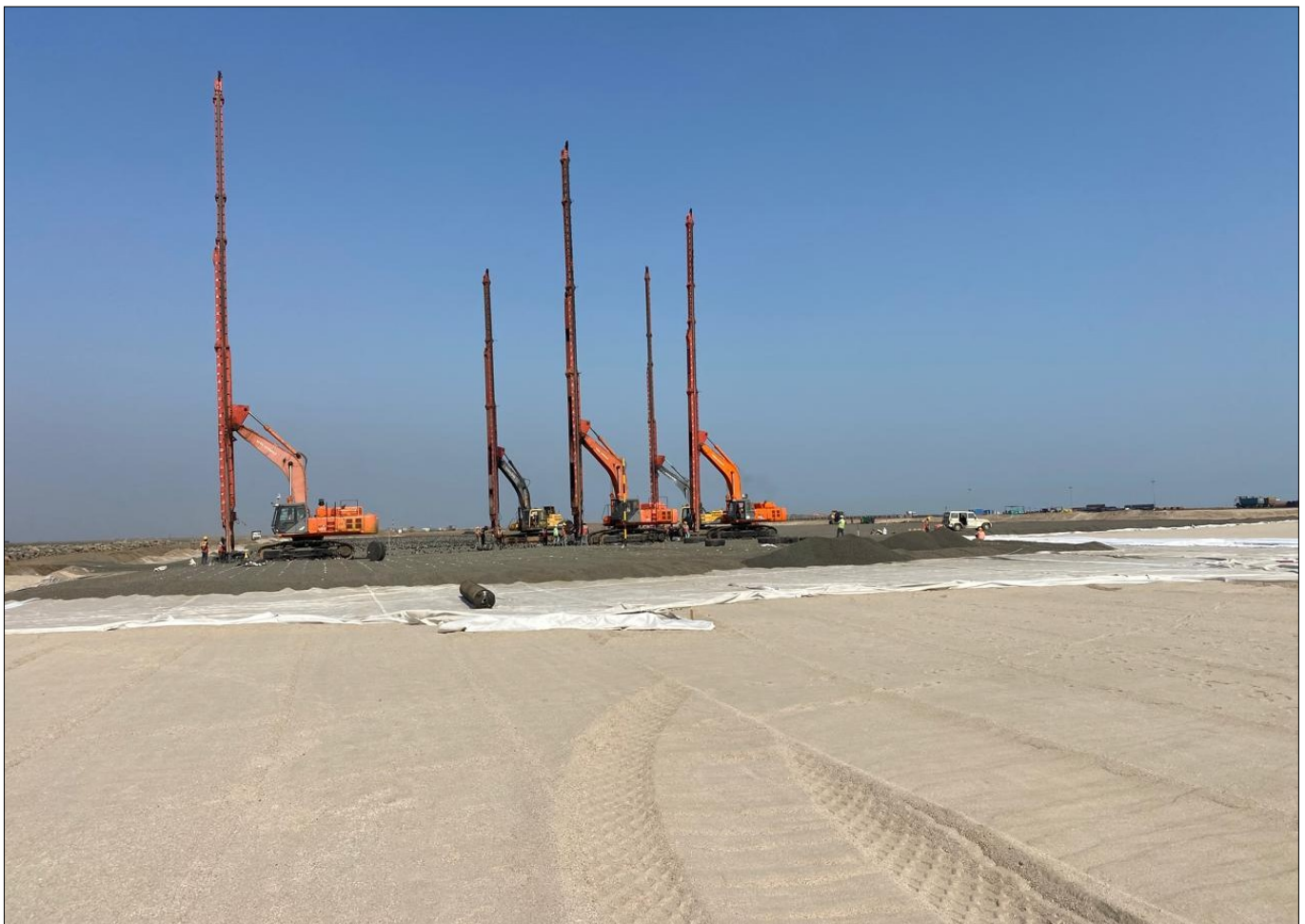


Photo 2 : Geotextile Layer Installed and Covered with soil - Site Ready for PVD Installation



Photo 3 & 4 : TechDrain PVD Installation in Progress

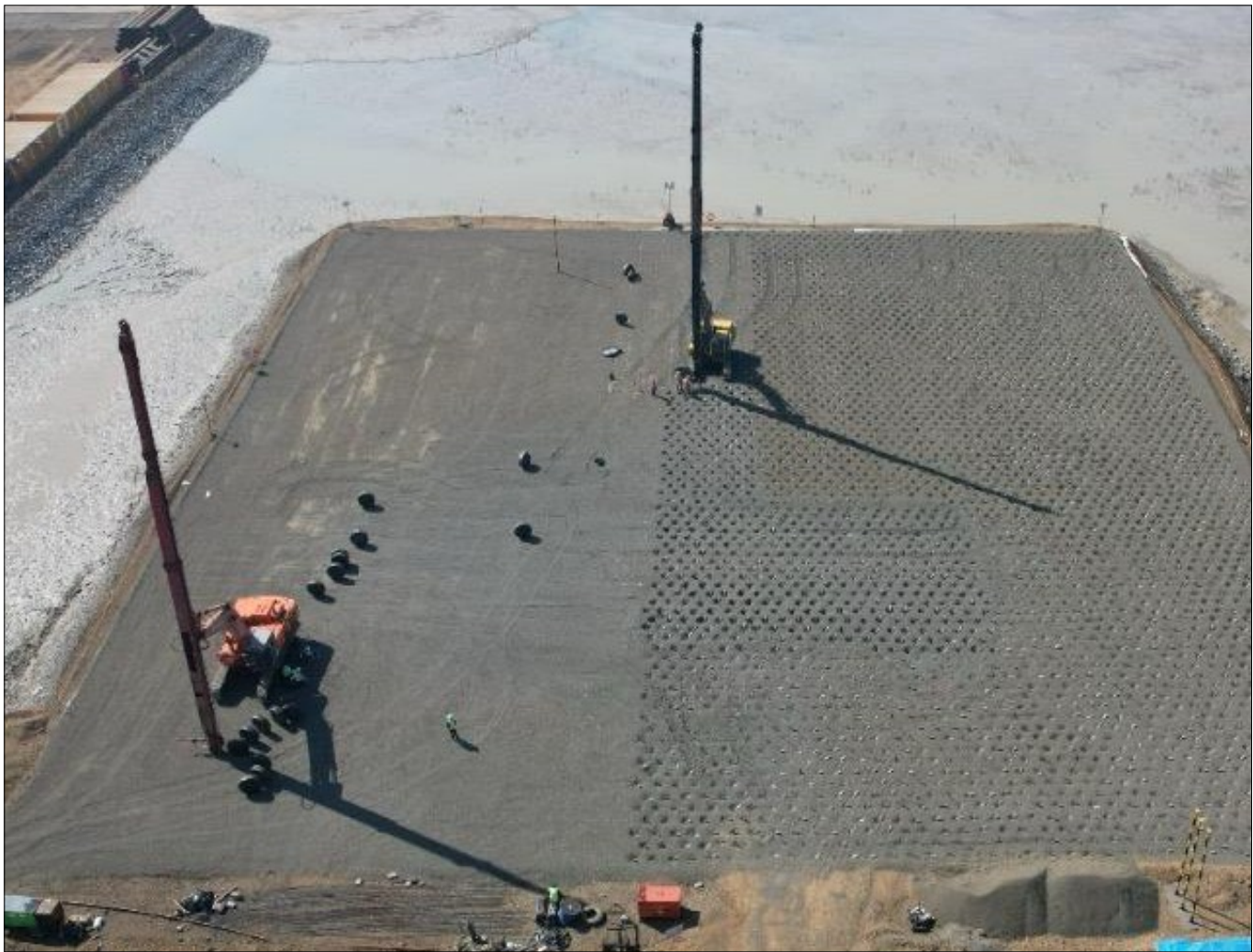


Photo 5 : Final Surface Preparation of Container Yard with Concrete after PVD Installation

Conclusion:

The adoption of advanced geosynthetic solutions ensured effective ground improvement for the Tuna Tekra container terminal. The integrated system enhanced soil performance, minimized settlement risks, and enabled faster project execution. By combining technical efficiency with sustainability, the solution supports the long-term operational reliability of the terminal while contributing to eco-friendly port infrastructure development in line with national green port initiatives. The client expressed satisfaction with the quality of the products, timely delivery, and the support provided throughout the project execution.

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