

CASE HISTORY

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GROUND PREPARATION FOR CONSTRUCTION OF DEDICATED FREIGHT CORRIDOR FROM JNPT TO VAITARNA, MAHARASHTRA MUMBAI, MAHARASHTRA, INDIA



Ground Improvement application

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|--|---|
| Client: | Products used: |
| DEDICATED FREIGHT CORRIDOR CORPORATION | TECHDRAIN DRAINAGE COMPOSITE - TD - 3520U |
| Main contractor: | Quantity supplied: |
| | 8,50,000 LM |
| Manufacturer & Supplier: | Year of construction: |
| TECHFAB (INDIA) INDUSTRIES LTD. | NOVEMBER 2019 - MARCH 2020 |

Project description:

DFCC - Multimodal & International Rail Cargo Transportation Project which includes connecting high density Corridor (that is Connecting Golden Quadrilateral – Mumbai, Delhi, Kolkata, Chennai + Diagonals connection). This project is divided into 2 parts –Western corridor and Eastern corridor. JNPT to Vaitarna project comes under project comes under Western Corridor – From Dadri, Uttar Pradesh to Mumbai, Maharashtra.

Constructing railway track near by the ports is always been challenging since the foundation soil is mostly of soft marine clay and heavy dynamic loading are expected from High Speed railway which require effective time tested ground improvement solution.

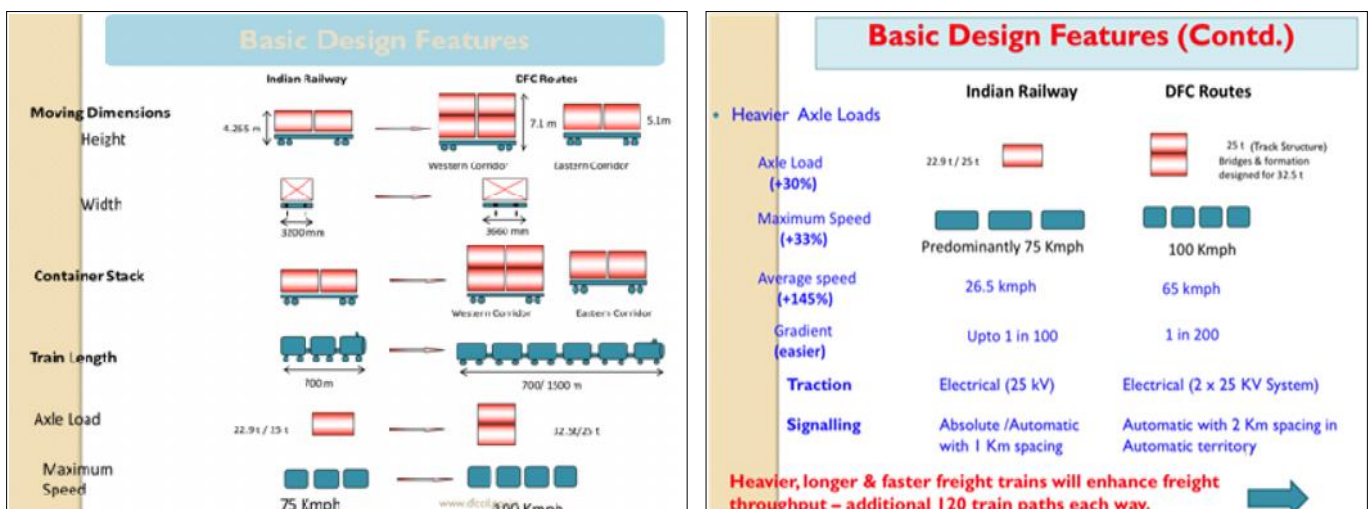
Project Challenges:

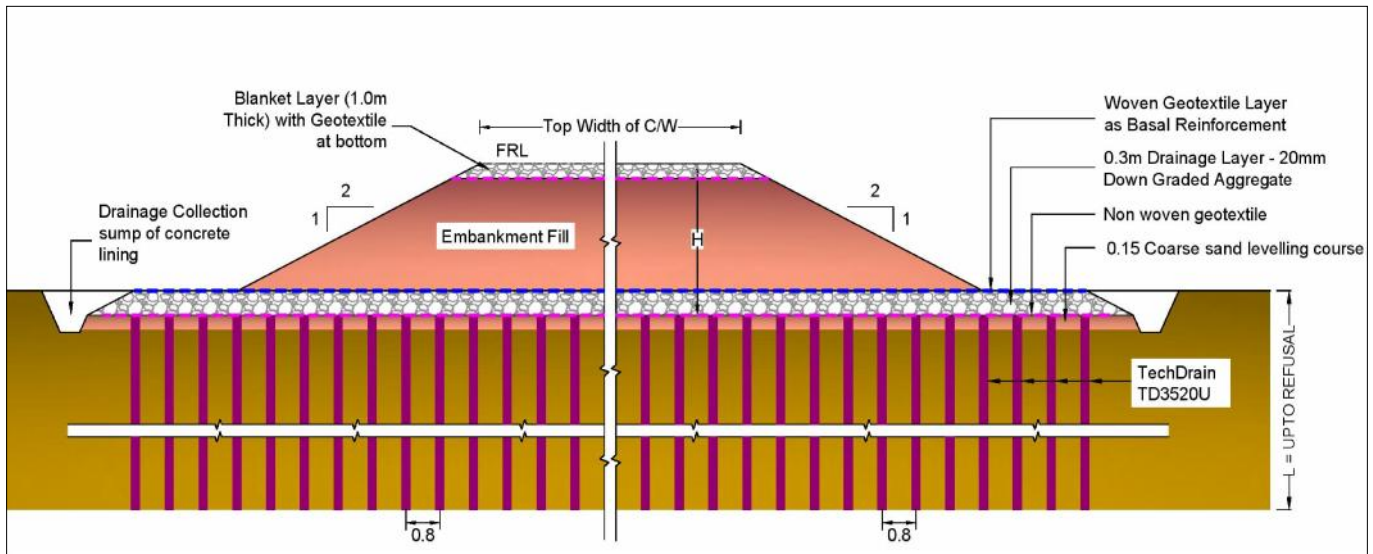
This project stretch is from JNPT to Vaitarna is 109 km, out of which few km stretches nearby JNPT Port area and nearby Vasai creek area is covered by marine clay of depth 10m to 24m. In addition to weak soil strata, bogie load and speed of railway is increased.

Project requirements was speedy and effective soil consolidation measure so that further track construction can be taken place within given timeline.

Solution Proposed:

As per soil investigation, the depth of soft soil layer varies from 10m to 24m and as discussed heavy loadings are expected. The normal railway bogies & DFCC bogies requirements are shown as follows :





Typical Cross Section Drawing

Various Ground improvement techniques are soil replacement, Soil Stabilization with Geosynthetics, preloading, sand drain, stone columns, prefabricated vertical drains or combinations of any of the above as per the site conditions.

Ground Improvement with Stone column can be the one of the solution for this site, but considering large depth the effective function shall be question as well as the high consumption of stone make the solution costly. Considering all this aspects the solution with PVDs are the most suitable and cost-efficient Solution.

The ground improvement with PVD accelerates the consolidation of the soil beneath the embankment, They are more effective when used in conjunction with preloading. In this project, PVDs installation and preloading is adopted for faster mitigation liquefaction of soil. Techdrain PVD 3520U was recommended in triangular pattern with spacing of 0.8m and later followed by 3m preloading.



Techdrain PVD Installation in progress Overview

Why PVD perform better than conventional solution

- Easy and Faster installation
- Cause less soil disturbance during Installation.
- Can withstand lateral displacement or bucking under horizontal or vertical soil movement
- Decrease primary consolidation time from years to months



Marking done as per design for Techdrain PVD Installation

Execution on Site:

TechDrain PVD was installed by using static methods.

- PVD is enclosed in a tubular steel mandrel of small cross sectional area usually 50X125mm. A small steel anchor plate is attached to the drain at the bottom of the mandrel.
- The mandrel is then driven in to the soil either with a static or vibratory rig. When the design depth is reached, the mandrel is extracted.
- The anchor plate retains the drain in the soil.
- When the mandrel is fully extracted, the drain is cut off. A New anchor plate is installed and the process begins again.
- Typically between 5000 to 20,000m of PVD can be installed in a day depending upon equipment, ground and working conditions.
- We can arrange the installation of PVD's at the clients site through our associates.



TechDrain PVD installed with preloading in progress

Conclusion:

For this Project requirement was 8,50,000 LM of TD-3520U. Client was really happy with quality of materials and timely delivery of the product and support extended by TechFab India industries Ltd.

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