

CASE HISTORY

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USE OF TECHGRID BIAXIAL GEOGRID AS PART OF GROUND IMPROVEMENT SYSTEM BENEATH DCU FEED STORAGE TANK AT NUMALIGARH REFINERY EXPANSION PROJECT, ASSAM

GOLAGHAT, ASSAM, INDIA



Ground Improvement

Client:	Products used:
NUMALIGARH REFINERY LTD.	• TECHGRID BIAXIAL GEOGRID TGB 200
Main contractors:	Manufacturer & Supplier:
• VIJAY TANKS & VESSELS PVT LTD. • MAHATHI INFRA SERVICES PVT LTD.	TECHFAB (INDIA) INDUSTRIES LTD.
	Year of Construction:
	2022

Project Brief & Problem Description:

Numaligarh Refinery Limited (NRL), a subsidiary of Bharat Petroleum Corporation Limited is a public sector undertaking under the Ministry of Petroleum and Natural Gas. The refinery located at Golaghat District in Assam was commissioned in the year 2000 with a crude processing capacity of 3 million tonnes per annum (MMTPA) to process indigenous crude of Assam.

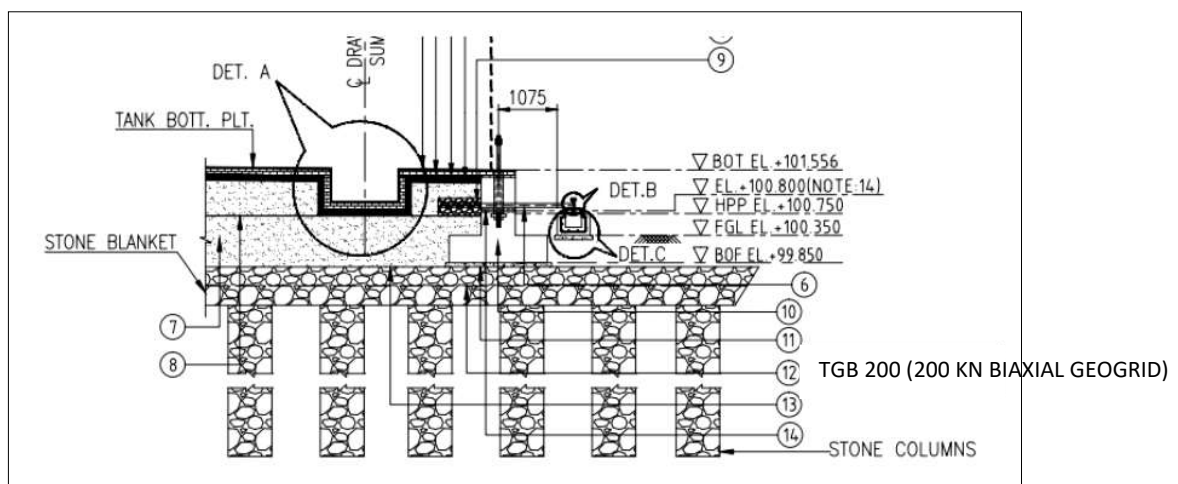
NRL intends to install a parallel new refinery of crude processing capacity of 6 MMTPA to expand its capacity from present 3 MMTPA to 9 MMTPA. The project is integrated with a new crude oil pipeline from Paradip (Odisha) to Numaligarh (Assam) and a product pipeline from Numaligarh to Siliguri where NRL has its own Marketing Terminal for distribution of product. The project has been named as Numaligarh Refinery Expansion Project (NREP).

The proposed Storage tank of this new refinery, which are used for the bulk containment of fluids at different stages of the refinery process, was suggested to locate in area where the soils are weak and compressible. Bearing capacity under heavy loads is always a challenge so it was necessary to do ground improvement to increase soil bearing capacity and control settlement before construction of storage tank. The client decided to go with conventional ground improvement technique using stone column.

But they have decided to provide a layer of geogrid in between the stone blanket layer above the stone columns.

Solution:

It was suggested by Consultant to use TechGrid Biaxial Geogrid (TGB 200) above stone columns to minimize settlement. The Techgrid Biaxial Geogrid (TGB 200) having 200 kN/m ultimate tensile strength on both the directions are manufactured from high tenacity polyester filament yarns with molecular weight ≥ 25000 g/mol when measured in accordance with GRI-GG8 / ASTM D4603 and carboxyl end groups ≤ 30 mmol/Kg when measured in accordance with GRI GG7 / ASTM D2455.



Typical Cross section drawing of proposed solution



Photo 1 : Prepared Surface for Laying Geogrid & Rolls of Geogrids are ready to be laid



Photo 2 : Laying of Techgrid Biaxial Geogrid (TGB 200)



Photo 3 : Geogrid overlaps at the side edges



Photo 4 : After laying of geogrid layer



Photo 5 : Spreading of Fill material over geogrid



Photo 6 : Spreading of Fill Material

Execution on site :

- Upon the completion of installing stone columns, the half thickness of stone blanket layer shall be installed as per project requirements.
- After the installation of first half thickness of compacted stone blanket layer, the surface shall be prepared by clearing, grubbing or levelling the area to the design grade. This includes removal of loose topsoil and vegetation if any.
- The Techgrid Biaxial Geogrid shall then be laid smoothly without wrinkles or folds on the prepared surface.
- Adjacent geogrid rolls shall be overlapped by 300mm width and the roll ends shall be overlapped by 1000mm.
- On curves, the geogrid may be folded or cut to conform to the curves. The fold or overlap shall be in the direction of construction and held in place by pins, staples, or piles of fill or rock.
- Prior to placing the fill material (Stone blanket) on the geogrid layer, the installed geogrid shall be inspected and approved by the Engineer. Any damages shall be repaired by covering the damaged location with a geogrid patch, which extends an amount equal to the required overlap beyond the damage area, as directed by the Engineer.
- The fill material shall then be placed by end dumping onto the geogrid from the edge of the geogrid or over previously placed stone blanket layer.
- Movement of construction equipment directly over the geogrid shall not be permitted.
- Sudden breaking and sharp turning of construction equipment shall be avoided on the first lift of fill material over the geogrid. Any ruts occurring during construction shall be filled with additional fill material, and compacted to the specified density.
- Upon completion of compaction of stone blanket to required density, further layers as per the project requirements shall be completed as shown in drawings or directed by engineer in charge.



Photo 7 : Surface after completion of filling over the geogrid

Conclusion:

The project completed successfully and performing to the intended purpose, to the satisfaction of client and contractor.

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