CASE HISTORY

Rev:00, Date : 01.02.2026

GROUND IMPROVEMENT FOR A WAREHOUSE FLOOR SUBGRADE USING TECHCELL GEOCELL AT HALOL, VADODARA, GUJARAT

VADODARA, GUJARAT, INDIA

TECHFAB INDIA

Ground Improvement

Client:	Products used:
SISE CAM FLAT GLASS INDIA PVT LTD	• TECHCELL GEOCELL - 445X150 mm TYPE • TECHGEO NONWOVEN GEOTEXTILE - PR 20
Consultant:	
HRS BUILDCON PRIVATE LIMITED	
Manufacturer & Supplier:	Year of Construction:
TECHFAB INDIA INDUSTRIES LTD.	2025

Project brief & Problem Description :

SISE Cam Flat Glass India Pvt. Ltd., located in Halol, Vadodara, Gujarat, is a leading manufacturer of high-quality flat glass products for industrial and architectural applications. The company is well known for its advanced manufacturing processes, stringent quality standards, and strong commitment to sustainable operations. To support its growing operations and increasing production demands, SISE Cam Flat Glass India decided to construct a new warehouse within its existing premises. The proposed warehouse is intended to handle large volumes of raw materials, machinery, and finished glass products, thereby improving storage efficiency and supporting smooth logistics and material handling.

The warehouse was subjected to heavy industrial loading conditions, including frequent movement of trucks and storage racks carrying large glass panels. To ensure long-term durability and performance of the warehouse flooring, a stronger and more reliable surface was required. The existing soil at the site exhibited variable subgrade properties, which were inadequate to support heavy traffic loads and load concentrations. Without appropriate treatment, this could have resulted in excessive settlement, reduced load-bearing capacity, and long-term serviceability issues. Therefore, suitable ground improvement techniques were adopted to enhance subgrade strength, control settlement, and provide a stable foundation for the warehouse flooring. These measures ensured safe and reliable operations under industrial loading conditions while extending the service life of the warehouse floor.

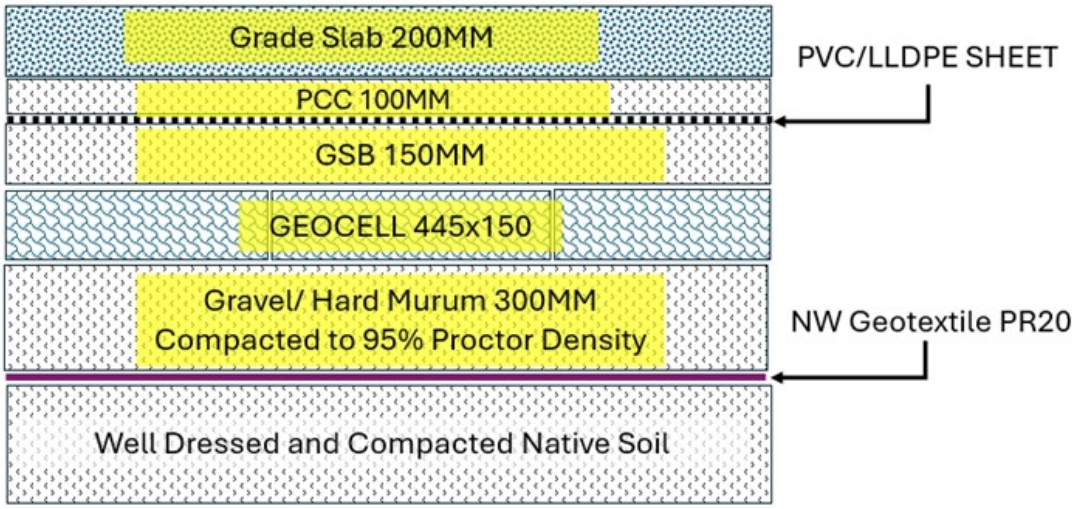

Figure 1: Proposed Solution

Proposed Solution:

Considering the identified site challenges, a comprehensive ground improvement strategy was provided to create a high-stiffness, reinforced foundation suitable for heavy industrial loading. The proposed solution (Fig. 1) commenced with subgrade preparation compacted to 95% of Proctor density. A non-woven geotextile (PR-20) was then laid to act as a separation and filtration layer.

The primary structural component consisted of a 300 mm thick Lower Granular Fill (GSB) layer, compacted to 95% Proctor density, followed by the installation of TechCell Geocell reinforcement layers with 445 mm cell spacing and 150 mm depth. These geocells were infilled with GSB to enhance bearing capacity, provide lateral confinement, and improve resistance to cyclic and dynamic loads.

Above the reinforced zone, intermediate granular layers comprising 150 mm thick GSB compacted to 95% Proctor density were placed to achieve the required structural thickness and to form a stable working platform. Where required, a PVC/LLDPE sheet was installed as a moisture barrier prior to placing the final floor slab. The flooring system was completed with a 100 mm thick PCC slab with adequate reinforcement to effectively distribute applied loads.

To ensure uniform load transfer and minimize edge effects, the improved ground section was extended by B + 1 m beyond the foundation footprint.

Figure 2: Line Marking for TechCell Geocell Installation

Construction Sequence:

- The soil was excavated to the required depth for ground improvement, and the surface was prepared by clearing and leveling the area to the design grade. Loose topsoil, vegetation, and unsuitable material were removed as required.

- The prepared excavation surface (subgrade) and any fill layers were compacted in 200–250 mm thick layers to achieve a minimum of 95% Proctor density.

- The surface area of the prepared subgrade was measured and marked according to the width of the geotextile roll prior to laying the non-woven geotextile (PR-25). Line marking was carried out using lime to ensure straight and proper alignment during installation.

- The geotextile rolls were manually unrolled in the direction of placement. The exposed ends of the non-woven geotextile were secured using MS rods or wooden pegs to prevent movement. Pegs were installed at intervals of 3–4 m in both longitudinal and transverse directions. Adjacent geotextile rolls were overlapped by 150–200 mm to ensure continuity.

- The non-woven geotextile was not laced or mechanically joined to other system components, except by overlapping, as specified in the approved drawings.

- The GSB material, as specified in the approved drawings, was transported to the site and carefully end-dumped over the installed geotextile from one end. The material was spread uniformly along the alignment. A minimum compacted thickness of 150 mm was ensured over the geotextile before allowing any construction vehicle movement.

- Tracked vehicles were strictly not permitted to move directly over the exposed geotextile. Rolling and compaction of the granular fill were carried out in specified layer thicknesses using suitable earthwork equipment to achieve a minimum of 95% Proctor density.

- After achieving the required thickness of the GSB layer, the TechCell geocell panel layout was marked. The geocell panels were then unfolded and stretched to the specified dimensions, as shown in Fig. 2.

- The TechCell geocells were placed along the alignment and temporarily fixed to the ground using J-hooks at a minimum of four end points. J-hooks of 350–450 mm length and 8 mm diameter were used at a spacing of 3 m c/c to secure the geocell to the base layer over the full length. Adjacent geocell panels were aligned and interconnected using cable ties supplied by TFI. The J-hooks were either left in place or removed after infilling for reuse, as shown in Fig. 3.

- GSB infill material was placed by end-dumping from the edge of the geocell or over the previously filled section. The geocells were filled with GSB, slightly overfilled by 50–75 mm above the cell top, and compacted using a mechanized roller to the required thickness.

- A 150 mm thick GSB layer was then placed and compacted over the geocell-reinforced layer. A PVC/LLDPE sheet was laid as a moisture barrier, followed by another compacted 150 mm thick GSB layer. Finally, a 200 mm thick grade slab was constructed at the top to form the finished surface.

Figure 3 : Installation of TechCell Geocell

Conclusion:

The project was successfully completed with the implementation of an effective ground improvement solution, ensuring a durable and high-performance warehouse floor under heavy industrial loading. The adopted system delivered excellent structural stability and long-term performance. The client expressed complete satisfaction with TechFab India's services, product quality and performance.

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