

Geogrid Stabilized Shallow Foundations



Building structures in areas underlain by soft soils is a common challenge that designers and developers face. The potential for differential settlement can threaten a project’s success while challenging soil conditions increase the project costs and construction time. Conventional solutions typically involve expensive deep foundation and ground improvement systems.

Supporting structures using shallow foundations underlain by a geogrid stabilized aggregate layer is an economical, less labor intensive, and environmentally friendly option compared to traditional deep foundation, deep over-excavation and other ground improvement techniques. The geometrical shape of Tensar InterAx geogrid allows the aggregate to mechanically interlock with the aperture and restrain the particles against translation and rotation.

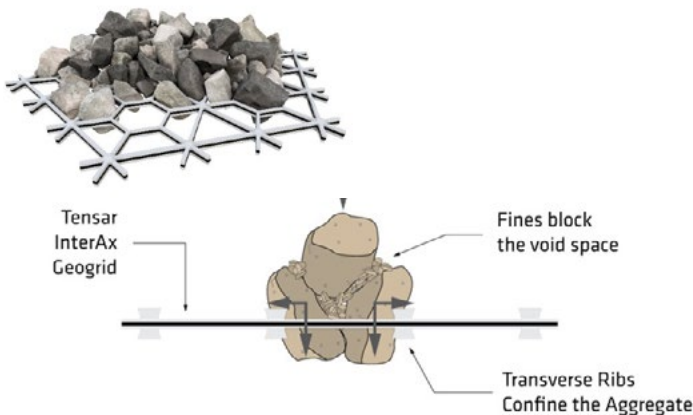


Figure 1 – Granular aggregate interlock within InterAx geogrid apertures to form the MSL

Placing multiple layers of InterAx geogrid within a granular material creates a mechanically stabilized layer (MSL) that increases the shear strength and stiffness of the layer, Figure 2.

The enhanced shear strength and stiffness of the system allow the building load to be distributed over a wider area below the geogrid stabilized aggregate layer. This allows an increase in bearing capacity and the potential for differential settlement of the building structure. In addition, the geogrid-stabilized

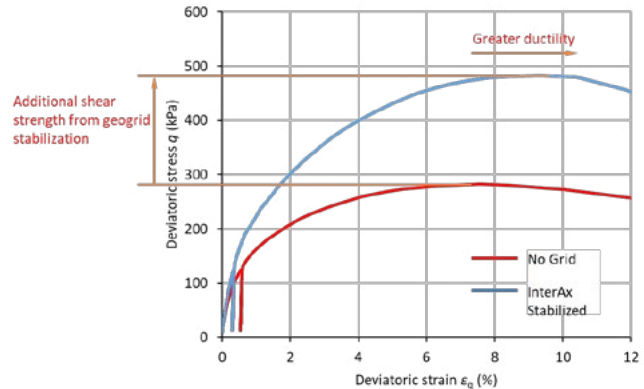


Figure 2 - Enhanced strength and ductility for mechanically stabilized layer

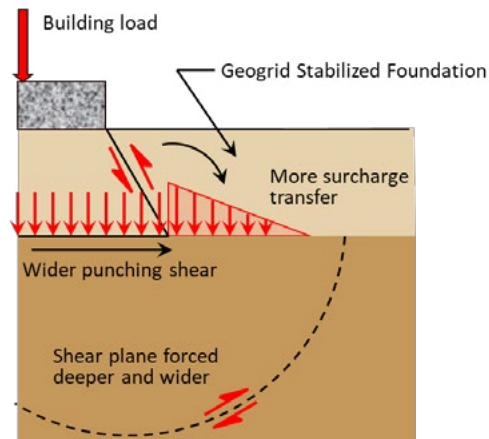


Figure 3 - Load transfer of Tensar's geogrid stabilized foundation system

foundation system mitigates the differential settlement by bridging across the inherent foundation soil variability.

The InterAx geogrid-stabilized foundation system for shallow footings can be designed using the free cloud-based software at www.Tensarplus.com. The design incorporates T-value bearing capacity design method using Tensar’s InterAx geogrid which enables the performance of the composite geogrid stabilized granular aggregate to be analyzed for a range of foundation soil and loadings. The software also incorporates three (3) settlement method of analysis options to estimate the settlement below the shallow footings supported by Tensar’s InterAx geogrid stabilized foundation system.

Proven Performance

PROJECT CASE HISTORIES



Improvement of Concrete Slab Foundation for Distribution Center

Bajos de Haina, San Cristobal, Dominican Republic

The client was required to build a concrete floor slab for this industrial warehouse on non-competent soil. The developer was concerned about cracks developing in the floor slab due to the variation of foundation soils. The original recommendation was to excavate and replace 2.50 meters with qualified material. Tensar developed a solution using InterAx® geogrid to stabilize the composite slab foundation of two 300mm thick layers, resulting in significant savings in granular fill.

Through Tensar's InterAx geogrid solution, the following was achieved:

- Reduced construction time by 75%.
- Eliminated 135 truck trips with additions.
- Reduced over-excavation and backfill by 76%.



Port Washington Townhomes

Orange Beach, Alabama

Two-story townhomes were being built on a site near the Gulf of Mexico that mostly consisted of fairly dense sand layers but also contained layers of soft clay and loose sands that could prove problematic. Two feet of structural fill was needed to bring the site to final grade. The project engineer was concerned about long-term differential settlements once the fill was added. The non-uniform nature of the soils posed a risk that needed to be addressed with a foundation improvement system.

Tensar designed mechanically stabilized layers consisting of two layers of Tensar® InterAx geogrid and two 12" lifts of clean, angular sand. This system provided a more uniform mat foundation beneath the concrete slabs and minimized the potential for differential settlements to within tolerable limits.

