Research Summary

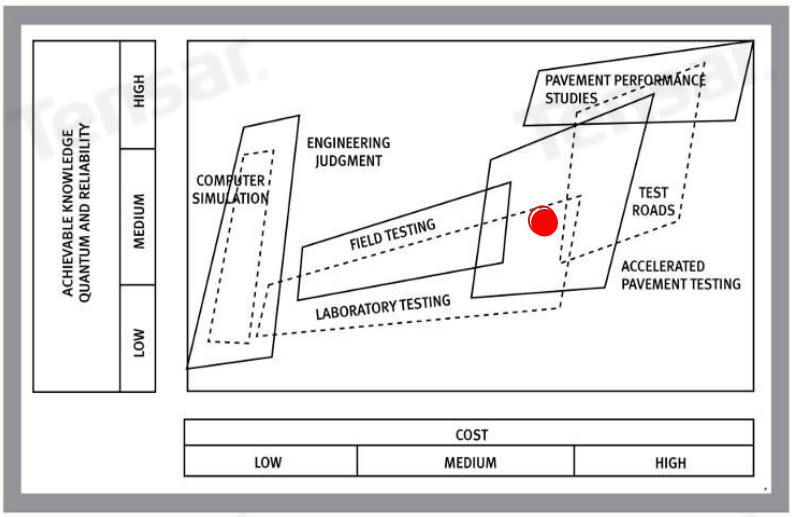
Evaluation of Geosynthetic Reinforced/Stabilized for Pavement Built over Soft Subgrade Soil Using Cyclic Plate Loading Testing – Louisiana Transportation Research Center (LTRC)

***Application:* Pavement Optimization**

Type:
- Cyclic Plate Load Testing
- Terminal Rut Depth ≤ 1”

Geogrid Products Tested:
- 1 Layer TX5
- 2 Layers TX5
- RS580i
- Geotextile wrapped sand layer

Section Profiles:
- 3” Asphalt Surface (all sections),
- 18” Thick Aggregate Base (Sections 2,3,4, and 5)
- 10” Thick Aggregate Base (Section 6)
- 10” Base, 12” Geotextile Wrapped Sand (Section 1)
- Subgrade CBR 1.5% (All sections)



Where this study fits within the matrix of pavement research (after Hugo et al 1991)

Background:
The Louisiana Transportation Research Center (LTRC) completed cyclic plate load testing to evaluate benefits of geosynthetics for flexible pavement construction. The results of this study were presented at the Geosynthetics 2015 conference. Pavement sections tested included; TriAx TX5 geogrid stabilized sections, a geotextile wrapped sand layer subbase, and high strength Mirafi® RS580i geotextile reinforced sections.

Purpose/Objective:
- To evaluate benefits for using geosynthetics to stabilize base layers and weak subgrades in flexible pavement applications.

Test Procedure:
The study included six different sections, two sections incorporating TriAx TX5 geogrid (Sections 2 and 3), two sections with a high strength RS580i geotextile (Sections 5 and 6), one section consisting of a geotextile wrapped sand and a control section. Section 2 included an additional layer of TX5 geogrid at the upper one-third of the base layer. Sections are depicted below in Figure 2. The subgrade soil in this study was a heavy clay (CH) with ~ 96.6% passing the #200 and a CBR of ~1.5%. Base course was a crushed limestone (GW) with a coefficient of uniformity of 3 and a uniformity coefficient of 37. The hot mix asphalt was a superpave mixture. All sections were instrumented to investigate loading responses of the pavement structure. Loading consisted of cyclic plate load testing with load pulses of 9,000 lb and 12,000 lbs.

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Results / Key Findings:

Results found that the test section with two layers of TriAx TX5 geogrid (Section 2) significantly outperformed the other sections tested in this study, providing exceptional life increase. Sections 3 and 5, where the TriAx TX5 and RS580i products were placed at the subgrade/base interface, performed similarly. Section 6 with a high strength geotextile and 10 inches of base course exhibited the worst performance among all six sections including the control sections.

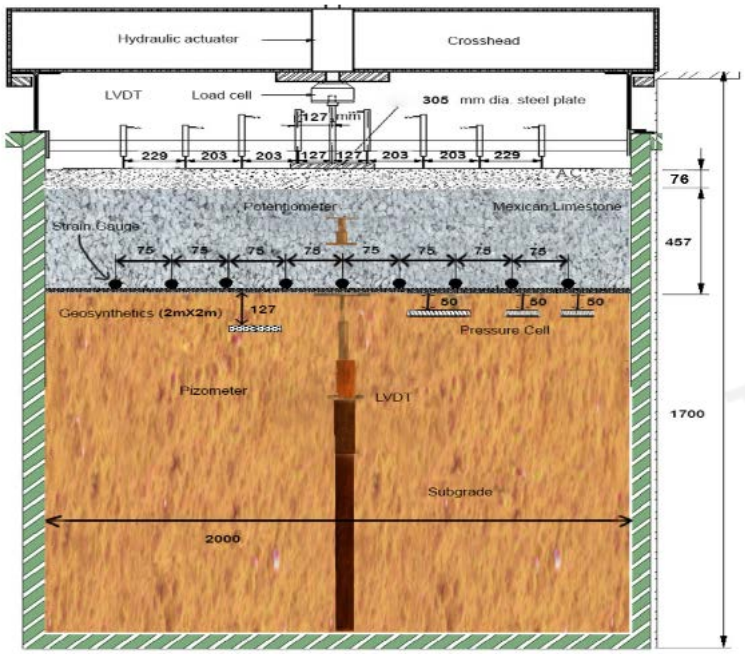

Figure 1: Test box constructed in a 6.5 ft. long by 6.5 ft. wide by 5.5 ft. high steel box.

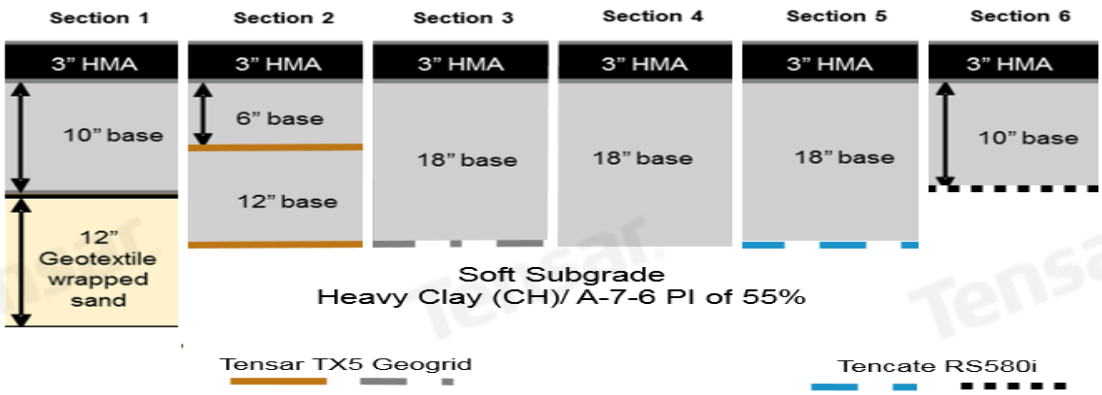

Figure 2: Cross-sections of test sections constructed.

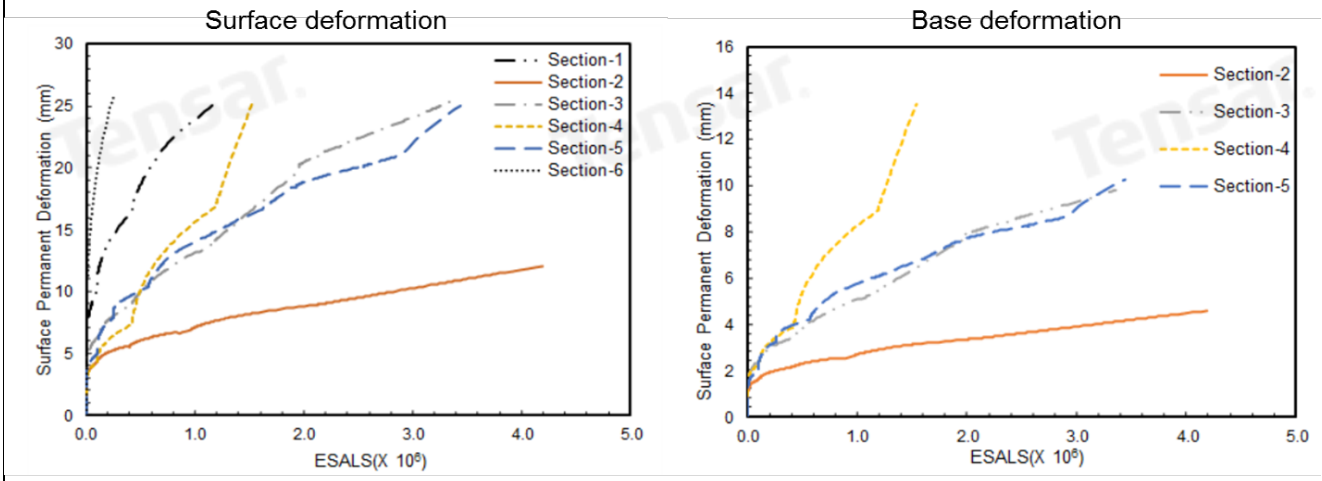

Figure 3: Surface Deformation and Base Deformation Results

References:

1. Abu-Farsakh, M., Hanandeh, S., Chen, Q., February 2015, "Evaluation of Geosynthetic Reinforced/Stabilized for Pavements Built over Soft Subgrade Soil Using Cyclic Plate Loading Testing", 2015 Geosynthetics Conference.