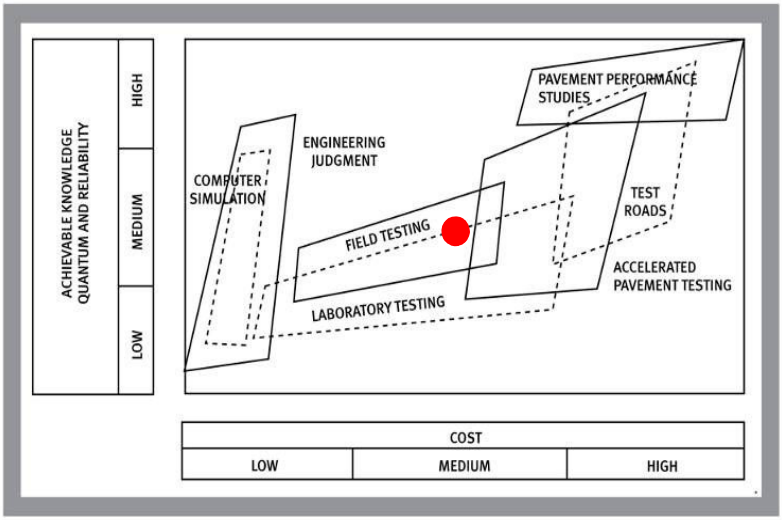
Research Summary

In-Situ Performance Verification of Cabeza Road, Nordheim, Texas

Application:

Verification of long term benefits using TriAx® geogrid



Type:

Field Structural Performance Study

Stabilization Methods Tested:

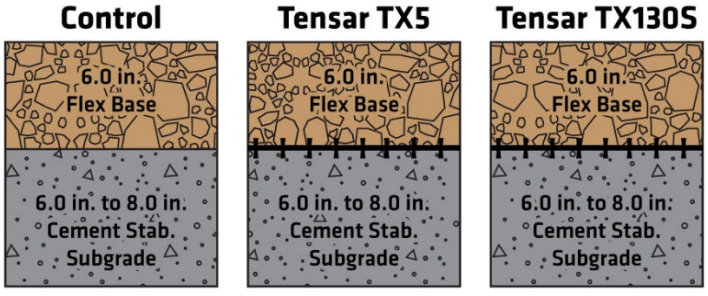
- Tensar TriAx TX5
- Tensar TriAx TX130S
- 6-8 in (152-203 mm) Cement Stabilized Subgrade

Section Profiles:

- 6 inches (152 mm) Thick Aggregate Base over 6-8 inches (152-203 mm) of Cement Stabilized Subgrade
- 6 inches (152 mm) Thick Aggregate Base over TX5 over 6-8 inches (152-203 mm) of Cement Stabilized Subgrade
- 6 inches (152 mm) Thick Aggregate Base over TX130s over 6-8 inches (152-203 mm) of Cement Stabilized Subgrade

Background:

Cabeza Road is located in Dewitt County, Texas. Three test sections were constructed in 2014 along Cabeza Road. Two TriAx (TX) geogrid-stabilized sections (both TX130s and TX5) and a control section were constructed. The subgrade for all sections consisted of 6-8 inches of a cement treated subgrade (6% nominal by dry weight). Control and TX stabilized pavement sections used TxDOT flex base material (Type 2, Grade A) and then were capped with a chip seal and subjected to heavy truck traffic.



Purpose/Objective:

Confirming performance over time, following a year of heavy trafficking and moisture.

Test Procedure:

In July 2014, Ingios Geotechnics conducted Automated Plate Load Tests (APLTs) on the control and TX stabilized sections to measure in-situ resilient modulus (modulus based on recoverable deformation), and to evaluate the permanent deformation response of the sections over time. At the time of the July 2014 testing, following construction of the pavement sections a few months earlier, little difference was observed between the newly constructed sections. Ingios Geotechnics recommended additional testing be performed, preferably during a wet period, to better understand performance.

In August 2015, a little more than one year after construction, Ingios Geotechnical returned and tested these sections for a second time. In the year leading up to this testing, the roadway had experienced heavy truck traffic from the adjacent oil and gas recovery facility. Precipitation, between the months of March and August 2015 was about 31 inches, and in the weeks leading up to the 2015 testing, the roadway sections had experienced a significant rain event.

Results / Key Findings:

Ingios Geotechnics performed Resilient Modulus (Mr). Modulus of Subgrade Reaction (k), and Ev1 and Ev2 testing on the sections. Visual observations were also made. After a year of trafficking and heavy rain, results from the study showed both TX5 and TX130S are significantly enhancing the performance of the roadway by preventing permanent deformation, and reducing longitudinal cracking. The TX130S sections yield about ¼ the permanent deformation of the control section for the same level of stress. The control section displayed longitudinal cracking in both the wheel path and along the edge of the road (Figure 1). There was minor longitudinal cracking noted near the edge of TX130S section, adjacent to the control section. The TX5 stabilized section had no cracking, even though the subgrade was weakest in this section.

The TX geogrids reduced the amount of permanent deformation accumulated under repeated loading, and as additional loading occurred, the rate of deformation in the TX stabilized sections decreased. Data and estimates from the testing show that at an estimated 0.25” of permanent deformation, the TX geogrids would provide approximately 2-5 times the life when compared to the control section.

It should also be noted that based on the in-situ testing, the TX5 sections had the poorest subgrade conditions, followed by TX130S. Even with these poorer subgrade conditions, the TX stabilized sections are providing better permanent deformation performance than that of the control.

References:

1. *“In Situ Performance Verification of Geogrid-Stabilized Aggregate Layers: Dewitt County, Nordheim, Texas – Cabeza Road*, prepared by David J. White, Ph.D., P. E.

Figure 1: Longitudinal cracking observed in the wheel path and along the shoulder of the control.

Figure 2: APLT testing of TriAx stabilized MSL

Figure 3: 2014 Testing locations

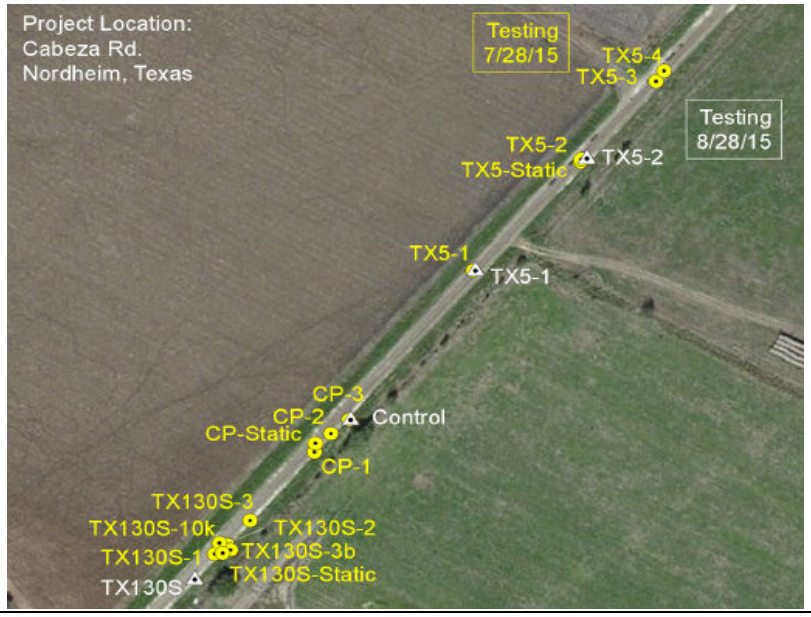


Figure 4: 2015 Testing Locations