

## Research Summary

### In-Situ Performance Verification of Hwy 63, Alberta, Canada

**Application:**

**Verification of Geogrid-Stabilized aggregate layers using TX geogrid**

**Type:**

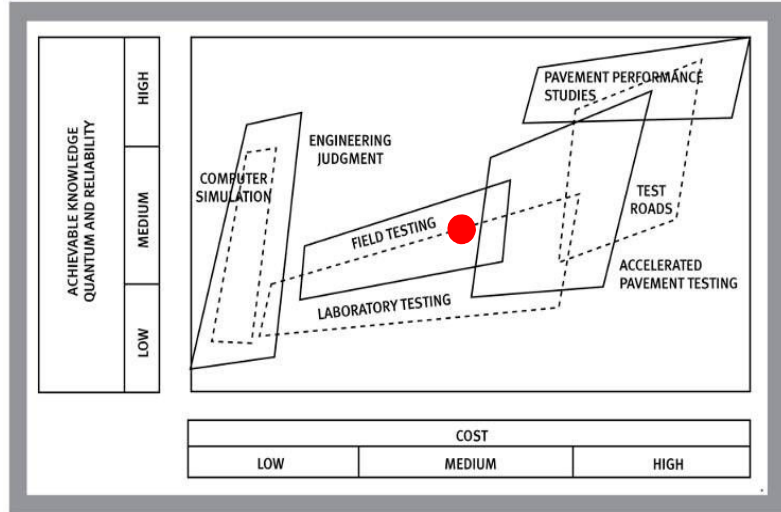
Field Structural Performance Study

**Products Tested:**

- Tensar TX5

**Section Profiles:**

- 7.9 inches (200 mm) Thick Aggregate Base over medium plasticity clay. (control)
- 7.9 inches (200 mm) Thick Aggregate Base over layer of TX5 over medium plasticity clay.
- 15.8 inches (400 mm) Thick Aggregate Base over layer of TX5 over medium plasticity clay.



**Background:**

Highway 63 is located near Crow Lake Provincial Park in Alberta Canada. It connects the communities of Fort McMurray and Fort MacKay to Edmonton. Highway 63 sustains a significant amount of economic commerce, supporting substantial traffic. Traffic includes vessel carriers and heavy trucks.

**Purpose/Objective:**

Performance assessment of TX5 stabilized section. Determination of in-situ resilient modulus values and deformation values in comparison to a traditional (control) section.

**Test Procedure:**

This study included a total of 17 automated plate load tests (APLTs) to determine the resilient modulus ( $M_r$ ) of the stabilized aggregate layer and the underlying subgrade. Loading cycles varied from 1,000-10,000 cycles at each location. For two locations, one TX5 test location and one control section location, APLT tests were performed directly on the subgrade layer. DCP tests were also conducted at each location. Nominal thickness of the base course layer was 7.9 in (200 mm) for 12 of the locations, and 15.8 in. (400 mm) for 3 locations. Base course consisted of round to sub-rounded, partially fractured, poorly-graded sand with silt and gravel.

## Results / Key Findings:

Results from the testing found the TX5 stabilized sections demonstrated significantly less permanent deformation than the control, even when the control section subgrade had a resilient modulus 2.3 times that of the TX5 stabilized section. Recoverable deformation (ability of a soil to maintain the modulus characteristics under repeated loading conditions) was approximately 3x greater in the TX5 stabilized section, when compared to the control section, when sections were tested to 10,000 cycles.

Based on the average base resilient modulus values from the 10 locations tested, with base thicknesses of 7.9 and 15.8 inches, the TX5 stabilized base (a2) produced a layer coefficients of 0.44 and 0.30, respectively.

## References:

1. "In Situ Performance Verification of Geogrid-Stabilized Aggregate Layers: Hwy 63, Alberta, Canada," prepared by David J. White, Ph.D., P. E.



Figure 1: Down-hole confined subgrade test in TX5 section with geogrid pulled back.



Figure 2: Placement along Highway 63



Figure 3: Full-gradation sample of aggregate base.

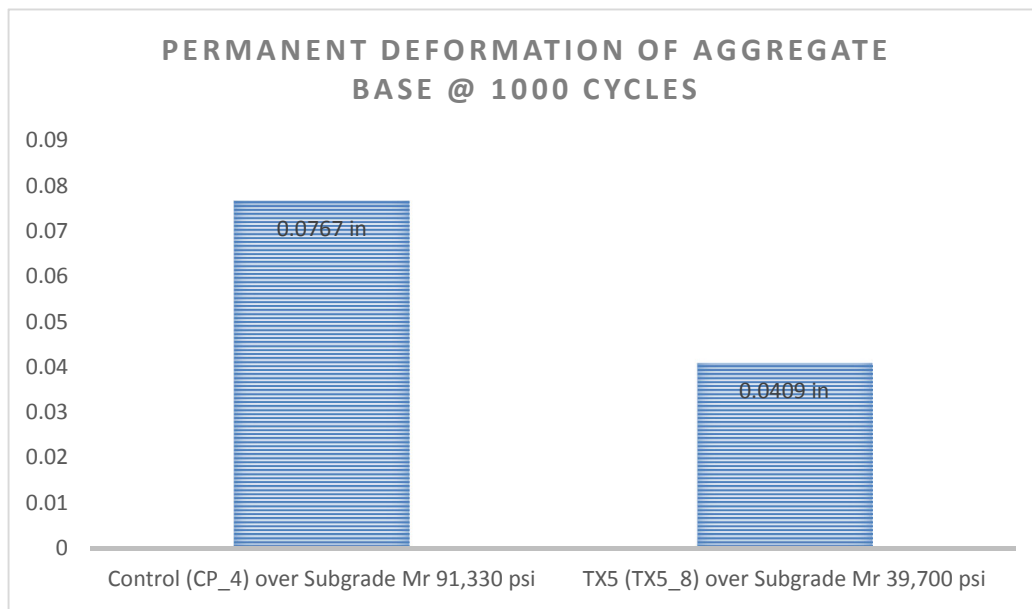


Figure 4: Permanent deformation responses