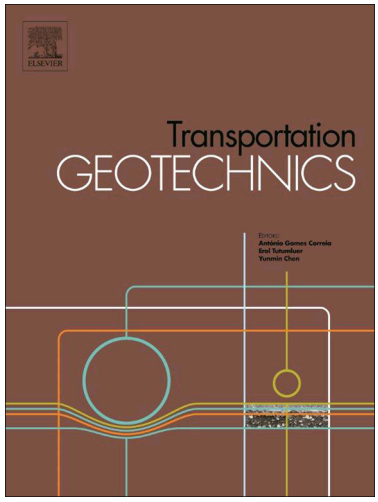

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PII: S2214-3912(16)30098-8
DOI: http://dx.doi.org/10.1016/j.trgeo.2016.10.002
Reference: TRGEO 103

To appear in: *Transportation Geotechnics*

Received Date: 5 June 2016
Revised Date: 25 July 2016
Accepted Date: 24 October 2016

Please cite this article as: E.V. Cuelho, S.W. Perkins, Geosynthetic Subgrade Stabilization – Field Testing and Design Method Calibration, *Transportation Geotechnics* (2016), doi: http://dx.doi.org/10.1016/j.trgeo.2016.10.002

Geosynthetic Subgrade Stabilization – Field Testing and Design Method Calibration

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Abstract

Geogrids and geotextiles are used routinely to stabilize weak subgrade soils during road construction. Typical subgrade stabilization applications are temporary haul roads or unpaved low-volume roads, but can also include paved roads built on poorer foundation materials. Full-scale test sections were constructed, trafficked and monitored to compare the relative operational performance of geosynthetics used as subgrade stabilization, as well as determine which material properties were most related to performance. Unpaved test sections were constructed using twelve geosynthetics consisting of a variety of geogrids and geotextiles. Multiple control test sections were also built to evaluate the effect that subgrade strength, base course thickness, and/or presence of the geosynthetic had on performance. Even though the geotextile materials used during this study showed good performance as subgrade stabilization, material properties associated with their performance was difficult to establish due to the limited number of test sections and lack of relevant tests to properly characterize these types of materials for this application. Using longitudinal rut as the primary indicator of performance, it was determined through a linear regression analysis that the stiffness of the geogrid junctions in the cross-machine direction correlated best with performance in this application and under these conditions. Using this knowledge, the design equation associated with the Giroud-Han method was calibrated to make geogrid junction stiffness in the cross-machine direction the primary property of the geosynthetic, thereby replacing geogrid aperture stability modulus. The calibration and verification of this method is described herein.

Keywords

geosynthetics, subgrade stabilization, design calibration, junction stiffness, performance

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