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EVALUATING THE PERFORMANCE OF GEOSYNTHETIC-REINFORCED AGGREGATE OVER WEAK SUBGRADE

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ABSTRACT

The objective of this study was to evaluate the performance of geosynthetic-reinforced unpaved road sections with aggregate bases over soft subgrade using laboratory plate load test. The model tests were conducted in a 1.5 m long, 0.91 m wide, and 0.91 m deep steel test box. The load was applied through a 190.5-mm diameter steel plate. The parameters evaluated in this study included the location and tensile modulus of geosynthetics, and the number of geosynthetic reinforcement layers. The stress distribution on top of the subgrade layer and the strain distribution along the geosynthetic reinforcements were also investigated in this study. Test results indicated that the geosynthetic reinforcement resulted in appreciable reduction of surface deformation and increase of bearing capacity for unpaved aggregate base over soft subgrade. The test results also showed obvious effects of the geogrid arrangement/location on the unpaved test section's performance, with the double reinforcement location consistently yielding the largest improvement. The definite trend of increasing BCR and reloading elastic modulus with increasing tensile modulus of geosynthetics was observed when geosynthetics are grouped according to the aperture shape and polymer type. Finally, the results of model tests were compared with the modified Meyerhof and Hanna's solution developed by the authors in a previous study; and the analytical solution gave a good predication of the experimental results of the model tests on geosynthetic reinforced unpaved sections.