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Geotechnical Characterisation of Natural Sub-base and Subgrade Material for Pavements

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Abstract

This study shows experimental results of evaluating shear strength parameters for natural debris material for use in pavements, including coarse aggregate. A proper geotechnical characterization is required to assess the strength and durability of this material for utilization in engineering projects. Most of the past studies have mainly focused on evaluating strength parameters for fine aggregate (sand size). The present work addresses the geotechnical characterization of pavement material, including the coarse aggregate (gravel size). For this purpose, a large-scale direct shear (LSDS) apparatus with a 300×300×150 mm size shear box was used to determine the shear strength on a pre-defined failure plane for material characterization. The direct shear tests were performed following the grain size analysis for gradation of the material and compaction tests for relative density. This study can be further extended to other areas such as geotechnical characterization of mine tailings for the stability of mines, uses of debris material as structural and geotechnical fill, and modeling and simulation of natural debris material to gain a more thorough understanding of the mechanism of landslides, etc.

Keywords: Strength parameters, Gravel fraction, Large scale direct shear test, Shear strength, subgrade, Sub-base