

Image Processing on Geosynthetic Reinforced Layers to Evaluate Shear Strength and Variations of the Strain Profiles

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Abstract : This study investigates the reinforcement function of geosynthetics on the shear strength and strain profile of sand. Conducting a series of simple shear tests, the shearing behavior of the samples under static and cyclic loads was evaluated. Three different types of geosynthetics including geotextile and geonets were used as the reinforcement materials. An image processing analysis based on the optical flow method was performed to measure the lateral displacements and estimate the shear strains. It is shown that besides improving the shear strength, the geosynthetic reinforcement leads a remarkable reduction on the shear strains. The improved layer reduces the required thickness of the soil layer to resist against shear stresses. Consequently, the geosynthetic reinforcement can be considered as a proper approach for the sustainable designs, especially in the projects with huge amount of geotechnical applications like subgrade of the pavements, roadways, and railways.

Keywords : image processing, soil reinforcement, geosynthetics, simple shear test, shear strain profile

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