

Behavior of Reinforced Soil by Polypropylene Fibers

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Abstract : The beneficial effects of reinforcing the subgrade soil in pavement system with randomly distributed polypropylene fibers were investigated. For this issue, two types of soils and one type of fiber were selected. Proctor, CBR and unconfined compression tests were conducted on unreinforced samples as well as reinforced ones at different concentrations and aspect ratio of fibers. OMC, CBR and modulus of elasticity were investigated and thereby, the optimum value of aspect ratio and fiber content were determined. The static and repeated triaxial tests were also conducted to study the behaviour of fiber reinforced soils under both static and repeated loading. The results indicated that CBR values of reinforced sand and clay were 3.1 and 4.2 times of their unreinforced values respectively. The modulus of elasticity of fiber reinforced soils has increased by 100% for silty sandy soil and 60.20% for silty clay soil due to fiber reinforcement. The reinforced soils exhibited higher failure stresses in the static triaxial tests than the unreinforced ones due to the apparent bond developed between soil particle and the fiber. Fiber reinforcement of subgrade soils can play an important role in control the rut formation in the pavement system.

Keywords : polypropylene fibers, CBR, static triaxial, cyclic triaxial, resilient strain, permanent strain

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