Experimental Study of Durability of Liquefied Stabilized Soil Blocks Containing Vinylon Fiber

by

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Abstract

Liquefied stabilized soil is made of cement, water and the remaining soil from an excavation site. At present, its application is limited to underground uses, and does not extend to atmospherically exposed conditions mainly due to its large drying shrinkage. One possible use for such a material under atmospherically exposed conditions is in constructing fences or retaining walls using blocks of the material. Concrete block construction, which is common for these structures, tends to collapse under strong earthquakes, whereas soil block construction is capable of avoiding such damages due to the larger toughness of soil blocks. Also, soil blocks are advantageous over concrete blocks in terms of appearance. In this paper, we describe the results of tests aimed at examining the effects of adding vinylon fiber to liquefied stabilized soil blocks in improving the durability of such soil under atmospheric exposure conditions. Tests were carried out on the mixing design, drying shrinkage properties, resistance to atmospheric exposure, and uniaxial compressive strength. It was found that vinylon fiber reduces the drying shrinkage and crack propagation, and increases the compressive strength of liquefied stabilized soil blocks. An appropriate mixing condition was that the clay content of the soil being processed is below 50%, minimum cement content is 200 kg/m^3, and fiber content is 1.0 % of the volume of the soil.

Keywords: Vinylon Fiber, Liquefied Stabilized Soil Block, Durability

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