Improving shear strength of clay by using cement column reinforcement under consolidated undrained test

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Abstrak

Cement column reinforcement is a method of soil reinforcement used in the field to increase soil's shear strength and decrease soil's compressibility. A set of laboratory studies of the effect of cement column reinforcement on shear strength in an undrained condition was conducted on kaolinite clay by using a triaxial apparatus to simulate real conditions. For triaxial testing, the soil samples were made using an extruder. Afterward, to make the composite samples, the soil sample cores were bored to create holes 5 mm in diameter and 50 mm long, and the holes were filled with cement slurry. The soil samples' cement column reinforcements were cured for seven, 14, and 21 days. Then, the soil and composite samples were saturated, consolidated, and applied to the loading. In this test, applying shear force to the soil sample and composite samples was carried out until the maximum stress and a strain of 12% were reached. The results from this test indicated that the cohesion parameter and angle of the internal friction of composite samples are higher and lower, respectively, than the unreinforced soil samples in the consolidated, undrained triaxial test. It was found that a cement column reinforcement system can improve soil shear strength.