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Evaluation of Critical State Behavior of Granular Soil in Confined Compression Tests

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Abstract : Identification of steady/critical state of coarse granular soil is challenging at conventional pressures. This study examines the drained and undrained triaxial tests for large strains on loose to dense, uniformly graded, Leighton Buzzard Fraction A sand. The triaxial tests are conducted under controlled test conditions. The comparison of soil behavior on shear strength characteristics at different effective stresses has been studied at the medium to large strains levels and the uniqueness of the critical state was discussed. The test results showed that there were two steady/critical state lines for drained and undrained conditions at confining pressures less than 1000 kPa. A critical state friction angle is not constant and the overall scatter in the steady/critical state line for the tested sand is ±0.01 in terms of void ratio at stress levels less than 1000 kPa.

Keywords : critical state, stress strain behavior, fabric/structure, triaxial tests
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