

Paramaguru Logeswaran

Thesis

Behaviour of Sands under Simultaneous Changes in Volume and Pore Pressure

Abstract

A comprehensive experimental study was conducted to investigate the response of sands subjected to simultaneous changes in pore pressure and volume under triaxial loading. In this study, three different types of strain increment paths, namely: (1) scaled volumetric strain (partially drained paths), (2) constant strain increment ratio paths, and (3) non-linear strain increment ratio paths were investigated using a strain path controlled triaxial device.

The nature of instability and relationship between stress and strain increment directions are investigated for the above-mentioned loading paths. The test results indicate that undrained state does not represent the most damaging scenario under field loading conditions. Much lower shear strength than undrained strength was measured when the boundary conditions caused expansive volume changes. The directions of stress increment and strain increment vector were not coincident and the nature of stress increment vector was dependent not only on the strain increment vector, but also on the current effective stress state. These results suggest that a non-associated flow rule must be used when attempting to model the response of sands.

Degree

M.A.Sc.

Completion

2005

Supervisor

Sivathayalan