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Thesis

Post Liquefaction Deformation of Initially Strain Softening Sand

Abstract

An experimental study aimed at investigating the post liquefaction deformation characteristics of an initially strain softening sand is presented. The shear modulus of the liquefied sand is initially equal to zero, and it continuously increases with strain. Regardless of whether the sand is contractive or dilative in the pre-liquefaction response, its post liquefaction response is dilative if a state of zero effective stress was realized at the end of cyclic loading. Influence of relative density, consolidation stress, maximum strain prior to the post liquefaction shearing, and stress path on the characteristics of the post liquefaction response are studied using simple shear and triaxial devices. It is shown that relative density and strain level profoundly influence the post liquefaction response, and the post liquefaction response is stress path dependent. The residual strength calculated in current practice based on $N_{1,60}$ values appear conservative compared to laboratory post liquefaction data.

Degree

M.A.Sc.

Completion

2004

Supervisor

Sivathayalan