Multi-directional Simple Shear Response of Gulf of Mexico Clays

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Abstract

The response of submarine slopes to seismic or storm loading has become an important element in the risk assessment for offshore structures and local tsunami hazard. Evaluation of submarine slope stability requires characterization of soil behavior and relies on the selection of appropriate parameter values. Although the traditional simple shear device has been used to investigate cyclic loading effects on marine clay, it does not allow for complex loading conditions which often contribute to the failure on submarine slopes.

A new multi-directional simple shear device developed at Texas A&M University allows loading along three independent axes, two perpendicular horizontal directions to allow any stress or strain paths in the horizontal plane, and a third in the vertical direction. This device is used to investigate the response of Gulf of Mexico marine deposits to different loading conditions. One-dimensional monotonic and cyclic shearing of Ko consolidated specimens is used to simulate level ground conditions, whereas the effect of the slope was simulated using K? consolidation for both monotonic and cyclic tests.