

## LABORATORY AND CENTRIFUGE MODELING OF BLAST-INDUCED LIQUEFACTION

FRAGASZY,R.J.;VOSS,M.E.;SCHMIDT,R.M.;HOLSAPPLE,K.A.

To verify the hypothesis that blast-induced liquefaction can be caused by inelastic behaviour of granular soil under compressive loading, undrained isotropic compression tests were performed on Eniwetok beach sand and Ottawa sand. In these tests, a cylindrical sample of sand is saturated under a total stress of 1.72 MPa and a pore water pressure of 0.6 MPa. After saturation, the total stress is increased to 34.5 MPa, and then returned to 1.72 MPa. The total stress and the pore water pressure are continuously recorded during the test. It was found that during unloading of the Eniwetok sand liquefaction occurred; i.e., the pore pressure equaled the confining pressure during the final stages of unloading. For Ottawa sand, a residual pore water pressure was observed, but liquefaction did not occur.

Additional tests were conducted on Eniwetok sand to measure drained volume compressibility over the range of effective stress achieved in the un drained tests. The effects of membrane penetration and system compliance on the generation and dissipation of pore pressure were determined. Using these data, calculations were made which showed that the deviations in the test from perfect undrained conditions inhibited the development of liquefaction; therefore, Eniwetok sand is more susceptible to liquefaction than indicated by the laboratory tests.

Two centrifuge model tests are being performed, one using Eniwetok sand and the other Ottawa sand. The objectives of these tests are to determine the feasibility of conducting centrifuge model tests of blast-induced liquefaction and, if possible, verify the significant difference in behaviour between these two sands observed in the laboratory tests. In each test a single spherical charge is placed in the center of the saturated deposit of sand. Two pressure gauges are used to record pore water pressure at different distances from the charge. After the test is completed, the surface profile is measured and the amount of compaction determined.