



Simulation and laboratory study of liquefaction at interface of soil - structure under cyclic loading

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This paper presents results of cyclic loading on loose and dense silica and carbonate sands using a modified direct shear box. The laboratory shear box was modified so that the lower part of the box was composed of a metal plate with sand grains glued at its surface. Various test parameters such as sand type, sand density, interface conditions, number and form of cyclic loading were studied to explore behavior of soil-soil and soil-structure under naturally occurring loading conditions. Results showed that the two sand types tested demonstrate contraction behavior at the beginning but dilation performance later on. Shear and normal forces decreased during the tests; the decline was larger for carbonate sand than for the silica one. The reduction of shear and normal force increased with decreasing density of sand. This reduction behavior of forces in tests with zero displacement under cyclic loading is similar to the liquefaction phenomena and these results might be applied to evaluate liquefaction problem.