

EXPERIMENTAL INVESTIGATION ON LIQUEFACTION OF SATURATED SAND UNDER SHOCK LOADING

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Liquefaction - the loss of shear strength of a soil under earthquake type loading - is a well observed and well documented phenomenon. Experiments with underground explosions in saturated sand show a significant increase in pore water pressure and in certain cases also liquefaction. It is of great scientific and military interest to find criteria under which liquefaction under shock loading may occur.

Several experiments series have been carried out in cooperation with the shock-tube facility group at the NC-Defence Laboratory Wimmis, Switzerland. In a steel box three different kinds of sand were exposed to dynamic loading generated by a shock tube with peak overpressures between 0.3 and 1.3 bars.

The paper describes the measuring instruments for determining pore water pressure, residual pore water overpressure, effective and total stresses and displacements as well as the experiments themselves.

After the decrease of the air overpressure a residual pore water overpressure was early observed. At the same time the effective stresses shows a reduction. The following decrease of the pore water pressure as well as the increase of the effective stresses in connection with the displacements within the specimens were measured.

The paper shows results of the experiments and gives indication of the practical importance of the observed phenomena.