



Liquefaction Susceptibility of Bottom Ash Under Cyclic Loading

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Abstract

The present study mainly focuses on defining the consolidated-undrained behaviour of bottom ash under cyclic loading conditions. An appropriate evaluation of liquefaction potential is the key to accurate dynamic response analysis. A series of strain-controlled consolidated undrained cyclic triaxial tests were conducted on bottom ash samples at a loose state until the occurrence of initial liquefaction. Undrained cyclic loading behaviour is studied for an effective confining pressure of 100kPa at different cyclic axial strains (0.30%, 0.50%, 0.75%, 1%, and 1.25%). The loading frequency is kept constant at 1Hz. Exponential decay of deviator stress is observed with an increasing number of cycles for initial liquefaction, which can be attributed to the deformation of the sample. After initiation of liquefaction, the deviator stress tends to decline toward zero. The pore pressure response and effective stress path of bottom ash indicate the high liquefaction susceptibility of bottom ash at high cyclic axial strain, i.e. liquefaction susceptibility increases with the cyclic axial strain of bottom ash samples. The stress-strain response pointed out the degradation of shear stiffness with an increasing number of loading cycles. In all cases, the bottom ash can hold some deviator stress during the beginning of the cyclic loading. However, for the time being, its holding capacity decreases to zero due to the sudden accumulation of excess pore water pressure, which creates initial liquefaction in ash samples.

Keywords: BA, Liquefaction, Pore pressure response, Shear stiffness