

LARGE SCALE TESTING FACILITIES – USE OF HIGH GRAVITY CENTRIFUGE TESTS TO INVESTIGATE SOIL LIQUEFACTION PHENOMENA

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ABSTRACT

Soil liquefaction following earthquake events causes severe damage to Civil Engineering Infrastructure as witnessed in many of the recent earthquake events. High gravity centrifuge tests are able to simulate earthquake induced liquefaction in saturated soils and allow us to study the physics behind liquefaction phenomena and the behaviour of structures that are located on such sites. In this paper, the use of large scale testing facilities in studying the problems in geotechnical earthquake engineering will be highlighted. Soil liquefaction problems are used as a vehicle to illustrate the use of these large scale testing facilities. Some of the recent investigations that were carried out at University of Cambridge will be presented. These include the novel testing that was carried out which involved creation of triaxial chambers within centrifuge models to delineate drainage effects on liquefiable soils. Direct comparisons are possible between free-field soil and the soil enclosed within the triaxial chamber. Similarly the reduction in settlement of foundations on liquefiable soils due to air injection *a priori* to earthquake loading will be discussed. In addition to liquefaction problems, the use of centrifuge testing in relation to pile-soil interaction and use of viscous dampers in soil-structure systems using the large scale testing facilities will be presented.