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Numerical Studies of a Laminar Soil Box for Seismic SSI Effects of Nuclear Facilities

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Abstract

Model tests are required to study the soil structure interaction effect for nuclear facilities subjected to seismic load. One of the methodology adopted is to perform experiments on a shaking table in 1g gravity field using a soil laminar shear box to reduce the spurious boundary effects. In the present work, a detailed pretest numerical simulation of a soil laminar shear box of size 1.5m × 1.1m (in plan) × 1.2m (in height) which is fabricated in house is presented. The first part of the numerical work is focused on one dimensional pretest site response finite element analyses to predict the soil amplification and the expected base shear during the dynamic excitation. The pay load capacity of the actuators required for the tests will also be obtained from the analysis. The second part of the study includes more advanced 2D finite element nonlinear analyses to evaluate the effect of wall friction on rocking motion of the soil and boundary effects of the laminar box.

Keywords: Laminar box, DEEPSOIL, Nonlinear analysis