



CONFERENCE

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FEAUTRED SPEAKER

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**INVESTIGATING REINFORCING EFFECTS OF SOIL-CEMENT
COLUMNS IN LIQUEFIABLE SAND USING DYNAMIC
CENTRIFUGE TESTS**

Dynamic centrifuge tests were performed on unimproved and improved soil with soil-cement column models. The reinforcing effect of isolated soil-cement columns for reducing liquefaction potential and ground deformation in improved soil were investigated. This paper presents the observed acceleration, pore pressure, and settlement responses under an earthquake base motion for both unimproved and improved soil models. In addition, lateral reinforcing effects of soil-cement columns were also investigated in terms of site stiffening effects and the increasing natural frequency of improved soil. The test results show that the soil-cement columns were rather ineffective in preventing liquefaction triggering in improved soil and in significantly reducing the magnitude of the resulting soil settlement compared to the model with unimproved soil profile. Furthermore, the predicted natural frequency of the improved soil profile estimated using existing design equations is shown to be significantly higher than the observed natural frequency inferred from centrifuge tests results. These design equations assume shear strain compatibility between the columns and the surrounding soil. On the other hand, revised design equations that account for shear strain incompatibility between column and surrounding soil are shown to give reasonable estimates compared to the observed natural frequency of the improved soil model.

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