

**Resonant Column and Torsional Shear Testing to Evaluate Soil
Properties Deposited Using Dry Pluviation and Hydraulic Fill**

by

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ABSTRACT

The resonant column and torsional shear testing device and its deformation sensors were developed and calibrated at RPI. The resonant column and torsional shear testing device was used to perform tests on generic sand such as Nevada and Ottawa sands prepared using the dry pluviation method. Values of shear wave velocity measured at low strain agree well with the results from the literature, which indicates that the resonant column and torsional shear testing device at RPI has the ability to precisely measure dynamic properties of soil. In addition to testing on specimens prepared using the hydraulic fill method, the procedure for the hydraulic fill method of preparation has been developed in this study. Effects of the specimen preparation method were also investigated on Ottawa sand and Ottawa sand with fines content prepared using two different methods: dry pluviation and hydraulic fill. Results verify that the specimen preparation method has effects on soil dynamic properties. The results from this study were also used to support the centrifuge model test at RPI and the full scale test at the State University of New York at Buffalo as part of the NEES project research. The results from the resonant column, centrifuge model, and full scale tests indicate that the specimen prepared by the hydraulic fill method has a lower shear wave velocity than the dry pluviation method. A decrease in the shear wave velocity was observed in the Ottawa specimen with fines content in comparison with the Ottawa sand specimen. Lastly, preshaking was performed on specimens prepared using the hydraulic fill method. Results from this study show an increase in the shear wave velocity with a small increase in relative density due to preshaking.