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Measuring pile side-shear using full scale tests

Darren Campbell & Erik Loehr

This research focuses on testing side shear resistance of piles to determine how much load bearing capacity they can support. The work includes the testing of full scale piles in a chamber of sand. The chamber allows for different piles to be tested. The test plan is as follows: A large chamber with a hole in the bottom will have a pile placed in it and then be filled with sand. The hole in the bottom of the chamber will not allow the pile to absorb any load from end bearing. The density of the sand placed around the pile can be correlated to the height from which it is dropped into the chamber. A bladder is then placed on top on the sand, followed by the lid to the chamber and the loading frame. The bladder is filled with a certain air pressure that will increase the stresses of the sand, which simulates deeper soils. Loads will then be applied by a hydraulic cylinder and the deflections measured until the pile fails. The amount of load applied to the cylinder will be measured by two methods, using a load cell and by multiplying the pressure applied to the cylinder by its area. Then, by knowing the area of the pile in contact with the soil and the load, the friction resistance of the piles can be calculated. So far, only preliminary test has been conducted. More results are to be available at the Undergraduate Research and Creative Achievements Forum.