25-01-20 Bengt H. Fellenius

Invitation to Participate in a Prediction Event on an 18-Inch Steel Pipe Pile

A test programme is underway in Mobile, Alabama, close to Mobile Bay. The test comprises a 457 mm diameter, 9.5 mm wall (18-inch, 0.375 inch), closed-toe, steel-pipe pile to be driven to 17.0 m (56 ft) depth (stick-up is about 3 ft) and grouted after driving. The pile has a 25 mm (1 inch) toe plate flush with the pile diameter. The piles will be VW-instrumented with pairs of VW-gages placed at five depths.

The site area is level. The soil profile at the site consists of sand. The below figure shows the results of a 17.8 m (58.3 ft) deep CPTU sounding overlaid with the distribution of SPT N-indices at the test site. But for an about 2-m (≈7 ft) thick zone of gravelly sand with 30 % fines content between 4.5 m (18 ft) and 6.5 m (21 ft), the soil consists to 90 % of sand size grains. The consistency of the sand is compact to about 4.5 m depth, loose to about 16 m, and, then, dense (sudden change at 16 m depth). In a zone between 4.6 m through 6.6 m depth, the density is 1,850 kg/m^3 (115 psf) and the density over and below this zone is 2,050 kg/m^3 (128 psf). The groundwater table lies at 3 m (10 ft) depth. The electronic file format of the CPT data (file called 24-11-05_CPT-B1.txt) can be downloaded from my web site (www.Fellenius.net\prediction).

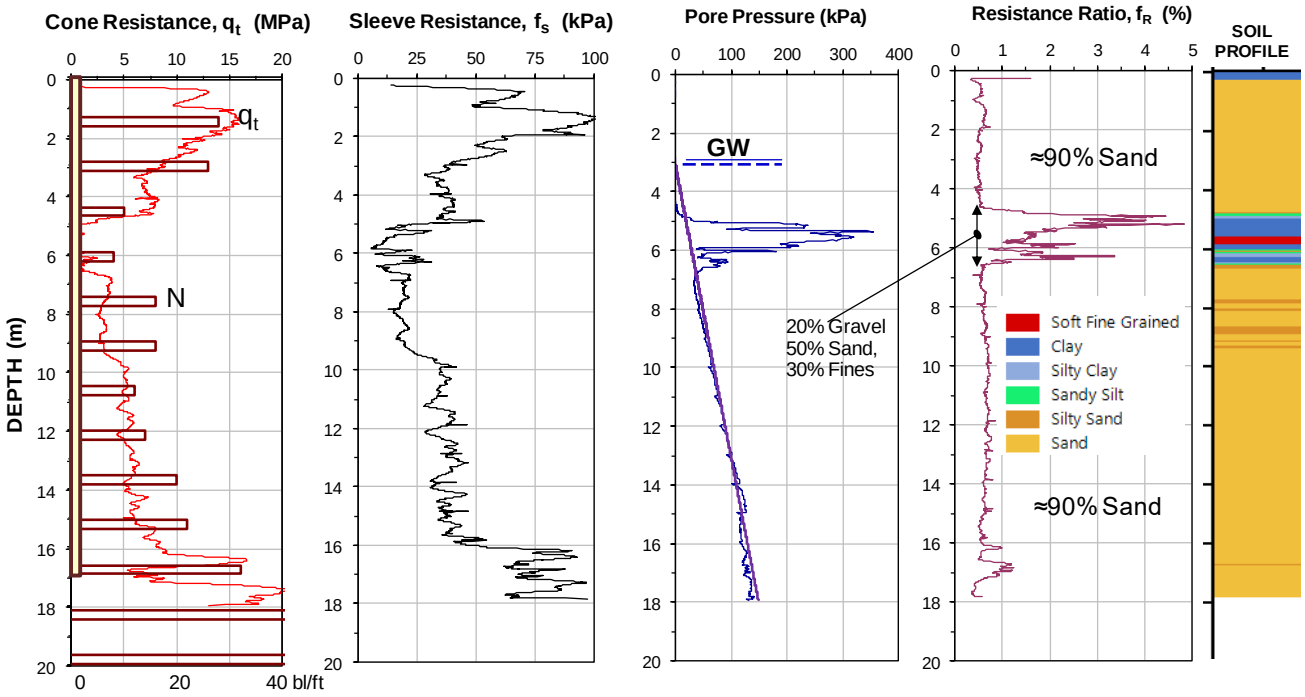

Fig. 1 Soil profiles with CPTU data, N-indices, and grain size distribution

About two weeks (at least) after the driving, a static loading test will be carried out on the pile (expected to occur toward the end of March). The test load will be applied by a hydraulic pump with automatic load-holding ability (no manual pumping) and the load will be monitored by a special load cell. All piles will have pairs of VW-gages attached to a central cage installed immediately after the piles are grouted. The VW-gages will be placed at 0.0, 6.0, 9.0, 14.0, and 16.5 m depths below ground (0.0, 18.7, 29.5, 45.9, and 54.1 ft). All piles will be supplied with a toe telltale. All load increments will be equal and the load-holding duration will be the same (15 minutes) for all loads. There will be no unloading-reloading events. The contemplated number of load increments is at least 15, but the test will continue until the pile "plunges" or the pile-head movement exceeds about 60 mm.

An Excel file prepared for the submission is available at www.fellenius.net\prediction. Compile your prediction submission (load-movement data, predicted "capacity", and force distribution at "capacity") in that file and send it to me attached to an e-mail message no later than February 24 (address is <Bengt@Fellenius.net>).

All submitted predictions will be kept confidential and only known to me. In reciprocal confidence, I will share my prediction with the participants in due course, i.e., before the static test (or it would not be a prediction).