Editorial Note – Issue 2 2019

We are excited to present the work of five excellent author groups who prepared the research papers and case studies featured in this Issue. Three of the five papers deal with piles and the remaining two papers involve foundation construction on soft ground conditions.

Our issue starts out with B. Fellenius, F. Edvardsson, J. Pettersson, M. Sabattini, and J. Wallgren, who describe the prediction, testing, and data analysis for an instrumented precast concrete pile that was driven in soft marine clay. Predictions of the top load-displacement were made by 22 individuals from all around the world and significant scatter was observed among all submitted predictions. This emphasizes the importance of high quality, full-scale testing lest we become overconfident in our ability to predict. It is also of special interest that a residual force was evident when the static top loading was carried out 210 days after driving.

M. Bristow proposes an analytical method for determining the effects of cyclic loading on laterally loaded piles that explicitly considers cyclic degradation of the soil material. The effects of cyclic loading are quantified using a numerical procedure and then incorporated into the well-established p-y curve methodology using modifiers. The proposed analytical method is validated using the results of testing performed on instrumented piles. The method shows that when the severity of cyclic loading is very low, the cyclic p-y curves tend towards the static p-y curves. The method can be used for either short/rigid or long/flexible piles, and shows that the effects of cyclic degradation increase rapidly as the pile length decreases below a critical value.

O.F. El Hadi Drbe and M.H. El Naggar evaluate the uplift and lateral performance of hollow bar micropiles (HBMP) by executing full-scale testing. Their testing included consideration of grout reinforced with micro steel fibers. The results showed that the performance of these piles is sensitive to the construction technique and the drill bit specification. Two failure mechanisms were observed during lateral load testing, namely a global mechanism starting with crack formations at the interface between the micropile shaft and the soil, and a local mechanism that created a radial cracks starting from the hollow core bar and extended toward the outer surface of the grout. The study indicated that in the absence of plunging failure, Fuller and Hoy’s method provides a good estimation of the ultimate uplift capacity. The values proposed by FHWA (2005) for type B micropiles were found to underestimate bond strength for calculating the ultimate uplift capacity.

T. T. Miyake and M. R. Saberi present a fascinating case history involving soft ground (site class F), potentially large seismic demands, and construction of a state-of-the-art biosolids and energy recovery plant. The seismic analysis was quite extensive as it began with cone penetration testing and included consideration of liquefaction triggering and the development of site-specific horizontal acceleration response spectra for the maximum credible earthquake. The significant benefits of a well-designed and executed indicator pile program contributed substantially to the critical refinements of the preliminary pile designs. In this case, considerable cost and time savings were realized by being able to reduce the pile lengths using the indicator pile data. The project serves as exemplary case of the importance of project owner sophistication, professionalism and the collaboration between all members of a project team through the entire project design and construction process.

W. Perkins and A. Malinak describe the application of jet grouting to serve as ground improvement for the design and replacement/retrofit of 1,130 meters (3,700 feet) of new seawall in the Seattle downtown. The design considered...
three earthquake ground motion levels and the potential for liquification triggering. The unique case study describes the construction challenges that were overcome with the application of jet grouting in soft ground conditions, the underground obstructions faced during the installation process, and construction challenges associated with working under low headroom/limited space restrictions. With approximately 6,000 soil-cement columns up to 28.3 meters (93 feet) deep with a total volume of approximately 133,800 cubic meters (175,000 cubic yards), the Elliott Bay Seawall Project is one of the largest jet-grout projects ever constructed.

This issue concludes the DFI Journal publications for 2019. As always, we as Editors-in-Chief look to forward to receiving your manuscripts and helping you navigate the editorial process.

Best regards,

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