

CEE 595F – Geotechnical Seminar – ONLINE

Friday, September 24, 2021 | 11:00am Central Time on Zoom

Vibratory-Installed Bucket Foundation for Fixed Foundation Offshore Wind Towers**Charles Aubeny, PhD**
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Van Dorp et al (2019), OktaKong Project

Abstract: Bucket foundations for offshore wind turbines provide an attractive alternative to piles, since they introduce potential for fabrication, transport and installation efficiency. Bucket foundations are typically installed using suction installation. However, this method requires relatively favorable seabed soil conditions in terms of soil types and homogeneity in the soil profile, and it can be limited by potential cavitation in shallow water. Additionally, suction installation requires relatively thick foundation wall thickness to avoid buckling failure during installation. Vibratory installation provides a promising alternative to suction installation in that it is feasible under a much wider range of soil conditions than suction installation.

Additionally, vibratory driving stresses are relatively modest, so thinner walls are needed. Recent innovations in vibratory pile installation methods permit installation of large diameter buckets, on the order of 20m, using multiple synchronized hammers.

An ongoing study sponsored by the National Offshore Wind Research and Development Consortium will address a number of issues in regard to vibratory installation of bucket foundations including uncertainties in the prediction of driveability during installation, the effects of vibratory installation on load capacity of the foundation, comparative studies to suction installation, and potential benefits to be derived from installation of buckets in terms of transport and installation costs. This study will also investigate the potential for onshore fabrication of a combined foundation-tower unit that can be towed to an offshore site, where it will be installed by vibratory or suction methods. Vibratory installation will be evaluated as either a possible alternative to suction installation or as a complement to suction installation when premature refusal occurs.

Speaker Bio: Charles Aubeny is a professor of civil engineering at Texas A&M University in College Station, Texas. He specializes in geotechnical engineering and has over 20 years of experience in foundations and anchors for offshore energy structures, both traditional oil-gas facilities and, since 2011 with fixed and floating structures for renewable energy. His research and publication record has a large focus on the performance of suction caissons and piles. His Federal research sponsors have included the National Science Foundation, Office of Naval Research, Minerals Management Service and industry sponsors have include BP America, Shell Global Solutions, Delmar, and ABS Consulting. Dr. Aubeny has also served as a consultant to offshore industry clients worldwide including Advanced Geomechanics, Norwegian Geotechnical Institute, Fugro, Shell, Delmar, and Franklin Offshore International.