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In the 2015 Paris Agreement on climate change, 195 countries agreed to limit the global average temperature rise to maximum 2 °C above pre-industrial levels. This requires massive deployment of low-carbon energy technologies, among which offshore wind is one of the largest contributors to renewable electricity. Foundation response is integral to the behaviour of the overall wind turbine system. A rapidly evolving body of research is tackling the complex challenges of these soil-structure-interaction problems. The main objective of this special issue is to reflect the recent advances in geotechnical engineering of the foundations of offshore wind turbines which have been enabled through developments in theoretical, experimental and computational modelling of soil-structure interaction problems.

More than twenty papers were received following a special session on same theme at ICONHIC 2019 covering topics from monotonic/cyclic to seismic response of monopiles and suction caissons. Out of these, seven papers made it through Soils and Foundations review process and five have been selected to be contained herein. Two additional papers still need further review and may appear later if they are accepted for publication. Below is a summary of selected papers.

- Ueda, K., Uzuoka, R., Iai, S. and Okamura, T. 'Centrifuge model tests and effective stress analyses of offshore wind turbine systems with a suction bucket foundation subject to seismic load', https://doi.org/10.1016/j.sandf.2020.08.007.
- Miyamoto, J., Sassa, S., Tsurugasaki, K. and Sumida, H. 'Wave-induced liquefaction and instability of offshore monopile in a drum centrifuge', https://doi.org/10.1016/j.sandf.2020.10.005.
- Frick, D. and Achmus, M. 'An experimental study on the parameters affecting the cyclic lateral response of monopiles for offshore wind turbines in sand', https://doi.org/10.1016/j.sandf.2020.10.004.
- Grecu, S., Ibsen, L.B. and Barari, A. 'Winkler springs for axial response of suction bucket foundations in cohesionless soil', https://doi.org/10.1016/j.sandf.2020.10.010.
- Futai, M.M., Haigh, S.K. and Madabhushi, G.S.P. 'Comparison of the dynamic responses of monopiles and gravity base foundations for offshore wind turbines in sand using centrifuge modelling', https://doi.org/10.1016/j.sandf.2020.10.009.

In this issue, the first paper, by Ueda et al. (2020) presents the seismic behavior of a suction bucket foundation for offshore wind turbine systems using centrifuge facilities at Kyoto University as well as effective stress analyses. The results exhibit how the confining effect of a suction bucket will increase the excess pore-water pressure inside the bucket. The inertia effects of the wind turbine upper struc-

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ture generating the rocking and shear at mudline, which lead to the rotation are also evaluated.

In order to examine the instability of an offshore monopile due to wave-induced liquefaction of sand beds, centrifuge wave tests in a drum channel are performed such that time scaling laws for fluid wave propagation and soil consolidation are matched, as proposed in the second paper by Miyamoto et al. (2020). The findings indicate that significant structural rocking in a monopile is formed as a result of liquefaction as well as increased residual displacement of monopile with the downward progress of the liquefied zone which eventually lead to pile collapse.

Serviceability and fatigue limit state considerations are important in the design of monopile foundations for offshore wind turbine structures. In the third paper by Frick and Achmus (2020), results of model tests dealing with the response of monopiles to lateral cyclic loading in medium dense sand at different cyclic load ratios, load eccentricities and pile embedment lengths are presented and discussed. These are complemented by visualization experiments to shed light on the underlying mechanisms. This contribution adds to the growing database of experimental results of monopiles subject to cyclic lateral loading in sand and methods to predict the accumulation of pile head displacement.

Finite Element simulations are used by Grecu et al. (2020) through the fourth paper of the special issue to study the load transfer mechanism of suction bucket foundations installed in Frederikshavn sand under tension and compression. An extensive number of numerical models assessing various bucket dimensions, soil properties and drainage conditions is utilized to adopt modified mathematical formulations of the *t-z* curves that are applicable to large diameter foundations, in contrast to existing relationships that are exclusively appropriate for small-diameter piles.

Moving toward the theme of dynamics of wind turbines, the paper by Futai et al. (2020) tackles the challenges of dynamic responses of monopile and gravity base foundations under free vibration in order to gain understanding on how to avoid potential resonance and failure of wind turbines. The natural frequency (f_n) of the foundation-soil systems obtained by centrifuge experiments demonstrates that soil-structure interaction (SSI) needs to be accounted for determination of the system's natural frequency since the SSI is particularly responsible for departure of this frequency from fixed-base related values.

Special thanks to each of the contributing authors and reviewers for their contributions and time invested in the submission and review process and we hope that this special issue will inspire new research ideas in the area.