

The latest design and monitoring practice for Offshore Wind Foundations

Yunsup Shin(Yunsup.Shin@ngi.no)

NGI.NO

Abstract

The main geotechnical challenge offshore is handling the large cyclical loads on structures and foundations from waves and wind. However, no standard and calculation procedure for designing offshore wind foundations under cyclic loadings generally accepted in practice. NGI makes significant contributions to the development of new concepts for offshore structures considering the cyclic loading with unfavourable ground conditions (Andersen et al. 1976). Through more than 40 years active involvement in offshore energy projects from all around the world, NGI became a unique knowledge hub for offshore geotechnics, foundation design.

Offshore SHM monitoring can be challenging both with respect to rough offshore conditions and costs (Sparrevik et al., 2015). Experience is important when selecting the appropriate monitoring solutions and hardware. State-of-the-art sensors and instruments are used for monitoring natural elements on exposed or large structures, onshore, offshore, under water and on the seabed. Instrumentation and monitoring technology are increasingly used to monitor structures, processes and infrastructure under construction and during the operational phase in order to verify design and planning and detect events in order to reduce risk.

In this presentation, the latest offshore wind foundation design methods are introduced and the recommendations of monitoring set up for the defined parameters of interest to monitor are described. Finally, practical advices for execution of an offshore wind foundation design and monitoring are given in terms of planning and design as well as practical installation work.

Keywords: *Offshore wind foundation, cyclic loading, design method, monitoring*

References

- [1] Andersen, K.H. (1976). Behaviour of clay subjected to undrained cyclic loading. Proc. 1st Int. Conf. on the Behaviour of Offshore Structures, BOSS'76, Trondheim 1, 392-403.
- [2] P. Sparrevik, J.M. Strout (2015). Novel monitoring solutions solving geotechnical problems and offshore installation challenges. Frontiers in Offshore Geotechnics III – Meyer (Ed.), ISBN: 978-1-138-02848-7

Biography

Senior engineer. M.Sc. in civil engineering, 1999 Yonsei Univ and PhD, 2011 Seoul National Univ. Seoul in South Korea. Dr. Shin has experience in geotechnical engineering, from detailed designs to construction. His main fields of work are related to general geotechnical engineering, research and interpretation of geotechnical design of liquefactions, composite piles, soft grounds, slope stabilities and offshore foundations related to offshore wind energy.