



The effect of soil nonlinearity on the short-term and long-term dynamics of offshore monopiles

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Description:

The use of Offshore Wind turbine's (OWT) is in the process of becoming economical feasible. A part of initial costs goes into the design of the Support Structure (SStr) which is most often a MonoPile (MP) foundation. The design of this type of foundation rely heavily on past experience and methods used in the Offshore Oil and Gas industry.

The choice for an OWT as an alternative energy is becoming more popular this is why an investigation of the effect of non-linear soil behavior on the dynamic response of the OWT is paramount. The extent to which non-linear behavior contributes to; fatigue life, response to extreme loading and long term stability is unknown. Yet an important consideration in design. Modeling of Soil-Structure interaction phenomena (SSI) with common numerical methods are considered to be slow, difficult and computationally expensive. With FEA it is possible to simulate SSI problem but requires a large amount of degrees of freedom. In other cases where finite difference techniques are employed it might not even be possible to model certain physical phenomenon. E.g. how to incorporate the rearrangement of particles (remolding) into the theoretical framework of continuum models is unknown!

Goal:

The goal of this project is to analyze the (non)linear effects of the soil-structure interface and the influence on the dynamic behavior of the monopile supporting offshore wind turbines. The knowledge gained from this project should aid industry partners in optimizing design.

Sponsors:



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