Development of a new class of pile drivability models for the offshore industry

PhD candidate: Athanasios Tsetas
Section: Offshore Engineering
Supervisor: Dr. ir. A. Tsouvalas
Promotor: Prof. dr. A. V. Metrikine

Description:

Prediction of pile drivability comprises one of the significant challenges that hampers the activities of the Offshore Wind industry. More specifically, the installation of monopiles, the most widely used foundation type for the Offshore Wind Turbines, is a process in which strong interaction takes place between the vibrator or the impact hammer (depending on the driving method employed), the pile and the surrounding soil.

Current drivability models in their majority deploy the one-dimensional wave equation analysis to study the process of the penetration of piles in the soil and address the aforementioned interacting components in simplistic ways, that do not capture accurately the phenomena occurring during pile driving. On the other hand direct methods, with extensive representation of the soil, are by far the most computationally demanding methods available and their applicability is restricted to a limited extent. Therefore a new research effort to address the physical phenomena taking place in pile driving is a necessity indicated by the inapplicability of present models, especially for large-diameter monopiles and for multiple modes of vibration (axial, torsional, bending) which are present in the “Gentle Driving of Piles” (GDP) method.

Goal:

Optative research goal is the proposal of a new formulation, that can capture the global behaviour of the soil in the vicinity of the pile in an effective manner. Development basis is the idea to combine efficiently the ability to predict accurately the pile drivability and the applicability that engineering practice requires.

Sponsors:

TU Delft grow

Contact Details:

E-mail: A.Tsetas@tudelft.nl
Room: 3.45