

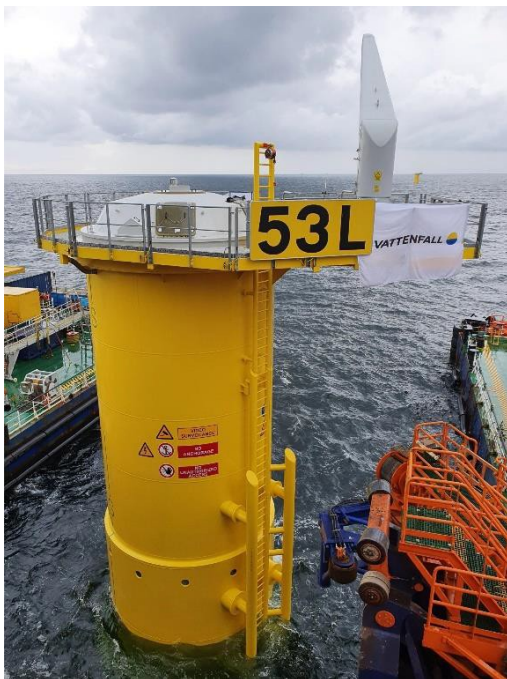
CFD investigation of monopile replenishment holes

Master thesis for Spring 2021

Location : Älvkarleby (Sweden) or online

Description

A stable pH-value regime inside of monopiles is vital for an adequate functioning of corrosion protection concepts. Therefore replenishment holes are introduced into the primary steel. Number, diameter and orientation of such openings are subject to design optimisation. The exchange rate on the monopile is difficult to predict analytically, so that is why numerical simulation is used to determine the rate of water refreshment.



The thesis could be divided in several stages:

- a) On a CFD software, set up a calculation. The student could compare parameters with a previous similar analysis.
- b) Systematically study design options with respect to water exchange rate . Various combinations of monopile geometry and water depth to be assessed.
- c) Modify different parameters to investigate influence of:
 - Wave parameters (height, frequency)
 - Marine growth

Identify driving parameters of water exchange rate.

- d) Study internal water level fluctuation for extreme wave cases and determine pressure on airtight deck.

Skills

Required :

- Good knowledge of fluid mechanics , for example, you are a student in applied Physics, or in Fluid Mechanics with some CFD knowledge, e.g ANSYS Fluent, StarCCM, OpenFOAM or similar.

Beneficial :

- Experience in coding
- Basic knowledge of the offshore environment/wave modelling

Contact person : Eric Lillberg, eric.lillberg@vattenfall.com