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Master Thesis Abstract

of **Ahmad Sallar**

Numerical investigation of the influence of vibratory driven monopile installation on changes of stress and state parameters in the adjacent soil

Tubular monopiles are by far the most commonly used foundation for off-shore wind turbines. Several installation techniques are employed for monopiles but vibratory driving installation stands out for its effectiveness particularly in granular and non-cohesive soils. The soil around the vibrating pile undergoes significant changes as the pile is displaced deeper into the soil. These drastic changes give result in uncertainties about the final state of the soil surrounding the pile. This raises questions on the reliability and longevity of vibro-driven monopiles.

The present study aims to numerically investigate the influence of vibratory driven monopiles on the development of important state parameters and stress which can be quite difficult to evaluate by experimental methods. A finite element model is constructed using the Coupled Eulerian-Lagrangian (CEL) approach capable of recreating the essential conditions and therefore, simulating the installation process comprehensively. Validation is carried out by utilizing existing experimental research pertinent to this study.

The results encompassing all the important events of the installation process are compared, analysed and their respective interpretations are presented herein.