Gentle Driving of Piles 1.2

Publieke samenvatting / Public summary

Aanleiding

This project is complementary to the ongoing GDP1.0 project (TEHE117100). The GDP1.2 project is an important step towards the final goal of the whole GDP projects chain which aims at creating a commercial GDP product. Even though GDP1.0 tests were concluded to be very successful, there are a number of questions that should be answered before starting the design, manufacturing and certification of the full-scale GDP shaker for offshore applications. The questions that will be answered in the framework of the GDP1.2 project are (i) is the GDP technique as effective in clay as it has been demonstrated to be in sand?; (ii) can the power consumption of the GDP shaker be significantly reduced by independent variation of the amplitude and frequency of the shaker?; (iii) can the choice of the optimal frequencies and amplitudes of the GDP shaker be automated so as to become self-tuning? The aim of the GDP 1.2 project is to answer these questions in order to get a step closer to the final product.

Doelstelling

The main goal of GDP1.2 is to have a complete proof of concept of this novel pile-driving technique before designing and building the full-scale GDP shaker. To this end, it is envisaged in this project to carry out a lab-scale (1:100) and mid-scale (1:10) experimental campaigns. The lab-scale tests are aimed at comparison of efficiency of the GDP technique under several controlled soil conditions. The other aim is to investigate the possibility of reduction of the power consumption of the GDP shaker by means of independent variation of the

Projectinformatie / Project information

Projectnummer / Project number
HER+-00789470
Subsidiebedrag / Grant amount
€ 875.177,00

Algemene informatie / General information

Penvoerder / Secretariat
Techn. Universiteit Delft

Volg Topsector Energie op X / Follow Topsector Energie on X

@TSEnergie

amplitudes and frequencies of the GDP shaker. Finally, in the framework of the lab tests, the automation will be attempted of the choice of the optimal driving frequencies and amplitudes. The mid-scale experimental campaign is aimed at demonstration of the efficiency of the GDP shaker in the mixed clay-sand conditions representative for the North Sea.

Korte omschrijving

The project, which is fully experimental, will be executed in two parallel phases: the lab-scale tests and the mid-scale tests. The two parts are complementary to each other and will provide a sound groundwork for the development of the full-scale GDP shaker. The following activities will be executed in the course of the lab-scale phase (scale 1:100): • Design and manufacturing of a small-scale GDP shaker with independent variation of the frequencies and amplitudes of vibration in both vertical and torsional directions. • Preparation of appropriate soil conditioning for the tests. • Instrumentation of the soil and pile. • Execution of the tests. • Experimental selection of the pile instrumentation that will allow to automate the choice of optimal pile driving parameters. • Data collection and reporting. The following activities will be executed in the course of the mid-scale phase (scale 1:10): • Localization and characterization of an area which contains sufficient concentration of clay layers. • Execution of pile driving tests using the existing GDP shaker, GDP test piles with the mounted during the original GDP campaign instrumentation.

Resultaat

The main result of this project is the verification of various aspects and further improvement of the recently developed pile installation technique (GDP) based on simultaneous application of vibrators acting in vertical and torsional directions. The major desired outcomes are envisaged as follows: • Provide a solid and extensive “proof of concept” of the proposed installation method with the aim to show that the pile penetration speed stays uncompromised for different soil conditions. •

Demonstrate the potential for significant reduction of the power consumption of the GDP shaker by means of independent control of the amplitudes and frequencies of both the vertical and torsional excitations. In addition, data collected in this project will be used to further calibrate and validate numerical models that are currently being developed in the GDP framework.

De data in deze applicatie is afkomstig van de Rijksdienst voor Ondernemend Nederland (RVO) en wordt in samenwerking met de Topsector Energie ontsloten.
Voor meer informatie over de Topsector Energie, ga naar **www.topsectorenergie.nl**.

Voor meer informatie over de TSE / Energie-Innovatie regelingen die RVO aanbiedt, ga naar **www.rvo.nl/tse**.