

MASTER'S DISSERTATION AT GEOTECHNICAL ENGINEERING

DEPARTMENT OF CONSTRUCTION SCIENCES | FACULTY OF ENGINEERING LTH | LUND UNIVERSITY



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PRESENTATION

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REPORT

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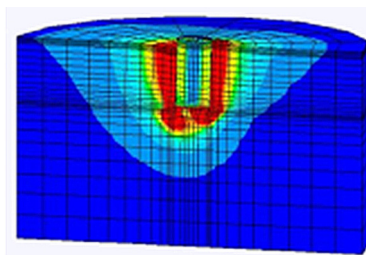
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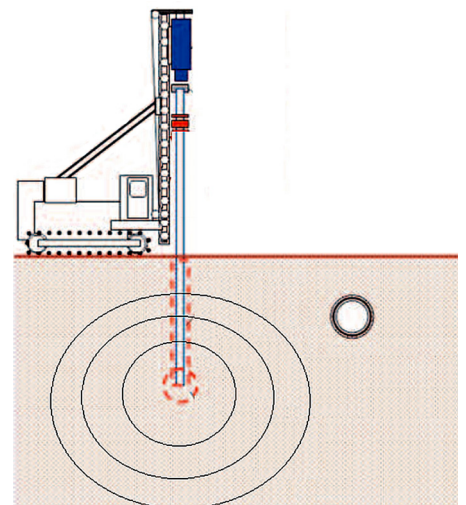
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NUMERICAL ANALYSIS OF PILE DRIVING EFFECTS IN SOIL



Source: fugro.be



Source: Massarch och Wersäll, 2014

BACKGROUND

Pile driving causes great dynamic loads in the surrounding soil. Vibrations can cause deformation to the soil and damage nearby constructions. At levels of great vibrations, the surrounding soil can deform due to either compaction or dilatation.

In the construction industry there are a lot of rule of thumbs to evaluate the effects of pile driving, some of them more accurate than others.

OBJECT

The object is to investigate the dynamic effects of pile driving using the finite element method. The effects investigated are the vibrations and the initial deformations in the surrounding soil. The questions at issue to be answered are:

- How can the initial deformations due to pile driving be simulated?
- How will the computed deformations in the surrounding soil appear compared to the rule-of-thumb methods for calculating deformations?

METHOD

Models with an ideal stratigraphy are built and simulated in a finite element program. Different material properties and groundwater situations are modeled. The program simulates the impulse loads due to pile driving. An analysis of the soil with respect of vibration and deformation is done.

Interesting parameters to investigate are:

- Different soil properties
- Force applied to the pile
- Frequency of the load
- Contact between soil and pile
- Pore water

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