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Abstract

Driven piles can be severely damaged during driving into soil with high boulder content and can potentially lose their structural integrity, resulting in pile refusal. This can consequently aggravate project cost, delays and environmental impact. Pile drivability assessments during the design stage are frequently carried out by designers or contractors, to ensure that the selected foundation system is suitable for the given soil conditions. Such assessments rely heavily on their expertise regarding specific soil conditions, pile properties and installation methods. This procedure is often not properly documented, which can cause disagreements with the client when significant pile refusal occurs. At the tender stage, the type of contract should identify the risk owner for piling design and installation, however it is currently unclear for most projects. The urgency to optimize the design and minimize pile refusal in Sweden is evident, considering that more than 80% of all the piles in 2021 were installed by impact driving. A transparent methodology to support the decision-making in pile design is then necessary for a cost-effective driving strategy and optimal design solutions. Collected data of pile refusal from past projects in Sweden are illustrated and discussed in this presentation. Results from geotechnical investigation and pile testing are also discussed, in order to understand their impacts and their potential contributions in a pile drivability assessment. The aim of the presentation is to show the limitations and the consequent risk in using the current assessment methods, and how the research is currently aiming to develop new probabilistic methods.

Figur 1. Example of pile refusal for a driven reinforced concrete pile.