

IGT-Kolloquium

Wednesday, 8 December 2021

Offshore geotechnics - an Introduction

Hans Hanse, Geoquip Marine

13.45 - 15.30 Uhr, ETH Zurich, Hönggerberg, HCI J7

COVID certificates are compulsory for participation.

Geotechnical Site Investigations are a process of discovery, soil/rock conditions can present several surprises and/or challenges. To de-risk an infrastructural project, a proper site investigation is essential. This is even more so the fact offshore, where adaptations or mitigations during the construction process are extremely costly due to the challenging environment and remote nature of the operations, with a limited number of options (cranes, hammers, construction vessels) available. As such proper knowledge of the site conditions is key to ensure an offshore construction projects proceeds as planned, within the set budget. Similar challenges apply to the offshore geotechnical site investigation itself, which needs to be carefully planned at a time where the actual site conditions are relatively unknown. Consequently a responsible offshore geotechnical contractor mobilises a large suite of investigation tools to ensure it can deal with a large variety of soil and rock conditions. This, so it can appropriately deal with unexpected conditions in an efficient manner, meanwhile acquiring quality data for foundation engineering purposes.

This presentation aims to give an overview of the available offshore investigation techniques, discuss some of the more basic offshore geotechnical engineering disciplines such as pile capacity, pile drivability and spudcan penetration assessments and touch on some of the issues/problem areas in offshore data acquisition. Key to a sound foundation engineering concept is the definition of a sound geotechnical model, which is compiled using various sets of data (in-situ test data, soil lab test data), correlating these data sets and dismissing bad data in the process. Some projects are discussed where unexpected soil behaviour had an immense impact on the project schedule and budget, and the lessons learned from those project eventually changed the applicable design methodologies for foundations in such soils.

Finally we look at the present time, where the energy transition from fossil based energy to renewable energy has caused an unprecedented requirement for offshore geotechnical services. Literally thousands and thousands of offshore wind turbines require foundation design based on quality offshore geotechnical data. The development of different designs has also seen a significant shift in engineering, from ultimate limit state (max load capacity) to serviceability limit state (movement).

Hans Hanse has 25 years of experience in offshore geotechnical site investigations. Following completion of a Bachelor in Civil Engineering at the University of The Hague he started his career in offshore geotechnical engineering, and quickly progressed to become a Site Manager and Lead Geotechnical Engineer on various offshore projects, including platform site investigations, deepwater subsea completion projects and Jack-up installation surveys. In 2003 he moved to Australia to become the Business Line Manager for Offshore Geotechnics for a large geotechnical firm, being responsible for tendering, project management and growing the offshore geotechnical business in Australia-New Zealand. In 2015 he joined the Geoquip Group in Switzerland as Business Development Manager, responsible for tendering and project acquisition. In 2019, Hans was appointed to the role of Chief Operating Officer at Geoquip Marine.

