

DFI Europe

Once this issue of *Deep Foundations* is printed, we should all know more about the situation regarding Brexit and the consequences for the European construction market. At the moment, the industry is unsure about the next steps. We assume that the politicians will be sensible enough not to harm any of the industry partners, neither in the U.K. nor in the EU. We, as DFI Europe, will do our best to continue our excellent relationship with and among all European countries.

Infrastructure projects like Grand Paris, Stammstrecke Munich, Metro Brussels or Central Station in Gothenburg, to name only a few, are well underway. But new large-scale projects still need the go-ahead from their respective governments, which can slow down economic growth in the construction sector.

Building Information Modeling (BIM) and digitalisation are being pushed in all fields but need more coordination on the European level. DFI Europe is heavily engaged in these topics and supports the initiatives in close coordination with the DFI Project Information Management Systems (PIMS) Committee.

New Board Member



DFI Europe welcomes Bjoern Boehle as a new board member. Boehle is head of the technical office of Keller Grundbau, Business Unit Central Europe. He has been involved in several major projects in Europe, including the city ring around Copenhagen (compensation grouting, jet grouting, geotechnical monitoring) and tank terminals in Amsterdam and Rotterdam. He has an excellent network in Europe and is experienced in operation and design. Boehle is a member of the EFFC/DFI Concrete Task Group and the EFFC/DFI Support Fluids Group.

As the board attaches great importance to the contact and interaction with owners and major clients, we are looking for owners/major clients with a technical background to become a corresponding member of the board. The intention is to keep these people informed about the activities of DFI Europe and invite them to the meetings of the board when specific topics that concern them are discussed. If you are interested, please contact Monika De Vos, secretary of DFI Europe, at office@dfi-europe.org.

BIM/Digitalisation Committee

The BIM/Digitalisation Committee was established at the end of 2017 to promote digitalisation and BIM processes within DFI's European membership and the wider geotechnical industry in Europe and DFI worldwide. In 2018, a membership survey was undertaken of DFI's European members to understand the current uptake of BIM across the different European nations. The survey identified that very few clients are specifying BIM processes on their projects and, as a result, BIM application on projects is low. Digital geotechnical data is rarely shared between project participants on geotechnical projects.

A session at the DFI-EFFC International Conference in Rome last June promoted digitalisation and best practice. The interest in the committee increased, with five new members including increased contractor presence and broader geographic spread. A dialogue started with EFFC, AGS (Association of Geotechnical & Geoenvironmental Specialists) and FPS (Federation of Piling Specialists) regarding data formats and specifications.



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Future initiatives are likely to include guidance for clients to promote the benefits of digital data and BIM to help increase industry uptake. And guidance for members to clarify the roles and responsibilities within BIM to help members prepare and upskill to develop specification guidance on digital data capture for use by members to make client adoption easier and improve consistency in approach.

Support Fluids Guide

The EFFC and DFI have set up a task group to compile a *Guide to Support Fluids for Deep Foundations*. DFI Europe board member Jorge Capitaio-Mor is a member of this group. A 1st edition of the guide will be published on the DFI and EFFC websites soon. The guide presents good practice in the use of support fluids for the construction of deep foundations and sets out the latest understanding of support fluids. A field research study is currently ongoing to develop recommendations on acceptance values for bentonite, polymer and blended fluids that will be incorporated into the 2nd edition of the guide.

Student Chapter

In December 2018, the proposal of Prof. Massimo Grisolia, DFI Europe board member, to open a DFI Europe Student Chapter at the Sapienza University of Rome was approved. The student chapter is organized and run by the students with Prof. Paolo Marzano as faculty advisor and liaison with DFI. DFI Europe is supporting this initiative and will find cooperative universities throughout Europe and the world.



Chair: Jason Boddy,
Arup

DFI Europe Member Report: “Sluishuis” Amsterdam, an Extraordinary Landmark

In Amsterdam, Netherlands, about 20 min. from the city center, Van 't Hek is constructing the foundation for the iconic Amsterdam Sluishuis, an extraordinary landmark, which will house 442 luxurious apartments (73 for sale and 369 for rent). Its construction, when finished, will allow pleasure crafts to navigate into a patio-like courtyard and moor to the building's jetties.

The project is being developed and constructed by Besix and Vorm and will be completed by spring 2022. Because the building has to rise from the “Buiten IJ” Lake, its shape induces a complicated play of actions on its foundation, which is a challenging assignment for the piling company and geotechnical engineers.

The building cantilevers over one side, which forms the entrance from the water. This means that in an ultimate limit state (ULS) situation, the foundation rafts on the other side of the building will be subject to tension forces, while the concentrated load on the cantilever construction requires a pile tip level of about 63 m (207 ft) below reference level.



Architectural rendering of the Amsterdam Sluishuis, the jetty view

This loading condition causes a very interesting piling layout, consisting of 714 precast concrete piles varying in length between 15.5 and 17.5 m (51 and 57.5 ft), which will



be driven with the pile top to about 5.50 m (18 ft) below the water and silt levels. The precast piles will be installed using silenced hydraulic impact hammers to reduce noise emission and nuisance for the neighbouring residential area, IJburg, as much as possible.

There will be 102 precast piles within the two tension rafts and will have a maximum load of about 900 tonne (992 ton). Due to the concentration of load on a small area, the design engineers and geotechnical engineers decided that these piles could not have their tip level within the second Pleistocene sand layer, in which most piling works in that area are installed. These piles had to pass the second Pleistocene sand layer and the so called “eem clay” to have the pile tips at a depth of about 63 m (207 ft) below reference level, well in the third sand layer.

Driving these piles with an impact hammer would cause a lot of nuisance and even impose a high risk for damaging neighbouring structures. This is why the piles will be installed as steel screw piles using a 50 tonne-m (361,774 ft-lb) rotary head. The lost steel casings have a diameter of 864 mm (34 in) and a thickness of 11 mm (0.43 in), with a lost conical drill head of 990 mm (39 in) in diameter. The piles are installed in two segments, which are welded together after installing the first segment of 30 m (98 ft).

After the installation of the 800 precast concrete piles is complete, Van 't Hek's job is not done. Around the perimeter of the building's footprint, a double cofferdam of steel sheet piles will be installed. Between the two sheet pile walls, a sand fill will be placed to create a surrounding construction site and roads, while the inner area will be dredged and drained to create the building's foundation and two-story parking basement.

Later in the construction phase, Van 't Hek will return to extract the sheet piles, since these piles are not part of the permanent structure.

Installation of the piling from barges

