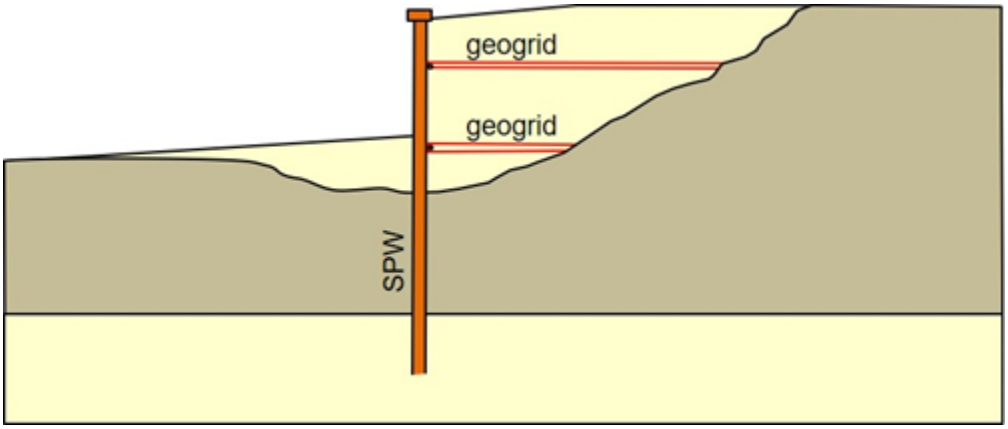
DEL076 - Geogrid-anchored Sheet Pile Walls subjected to strip footing surcharge loading

Introduction

The use of geogrids to anchor Sheet Pile Walls (SPW) is relatively new. In this approach, SPWs can be anchored with one or more geogrid layers. This type of SPW anchorage has benefits such as the possibility of pre-stressing the anchorage earlier during the backfilling stage, reducing horizontal deformation as a result. In addition, it is also possible to anchor the SPW continuously at several levels, making the design economic and allowing for the installation of piles through the geogrid anchors, providing greater project flexibility. The drawback of geogrid-anchored SPWs is that a relatively large amount of space is needed for the installation of the geogrids. Furthermore, the method is suitable for backfilling projects only and not for building pits with excavations.

This project looked at the behaviour of geogrid-anchored SPWs subjected to strip footing surcharge loading. For this purpose, the following was done:

- Full-scale field measurements in Krammer, Netherlands.
- Small-scale and medium-scale experiments at the Deltares Model Hall.
- FEM analyses by several partners: GeoTec Solutions, University of Bochum (Germany) and Deltares.



A geogrid-anchored sheet pile wall

Geogrid anchored Sheet Pile Walls in Krammer, Netherlands.

Surcharge load in the Krammer field monitoring project

Consortium

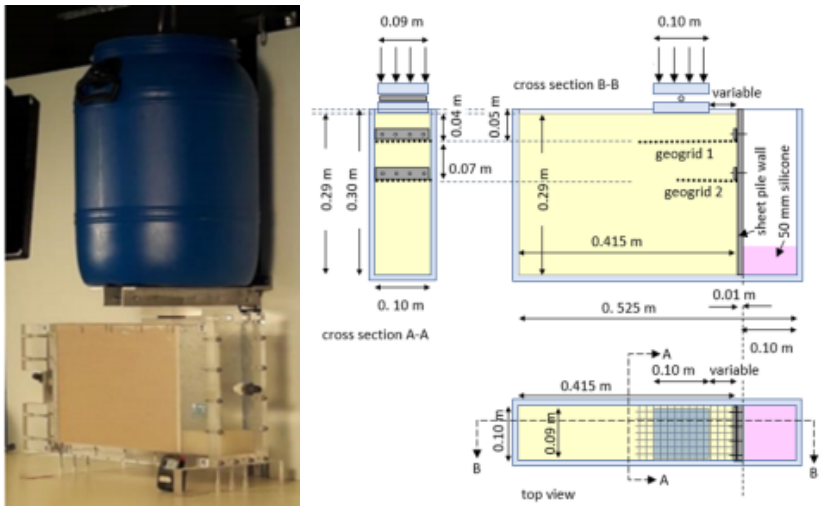
The consortium consisted of the following partners:

Private partners

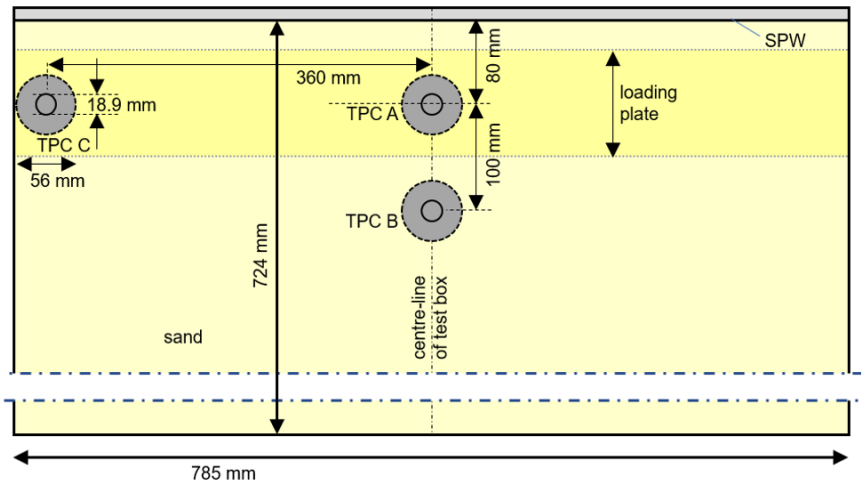
- GeoTec Solutions, Netherlands
- Huesker GmbH, Germany
- Huesker BV, Netherlands
- Voets Gewapende Grondconstructies BV, Netherlands
- GMB Haven & Industrie, Netherlands

Knowledge Institutes

- Ruhr-Universität Bochum, Germany
- Deltares, Delft, Netherlands



Test set-up for the small-scale experiments



Top view of the test set-up for the medium-scale experiments

Activities and products

Activity	**Product**
Initial study and trial projects.	Paper in the GeoKunst, GeoTechniek: Detert et al., 2019.
Field measurements in an example project (Krammer, Netherlands), analyses measurements and numerical analyses.	Paper published in the GeoKunst, GeoTechniek: van Duijnen et al., 2020. Proceedings paper: van Duijnen et al., 2022. MSc thesis University of Bochum; Springher, 2018, and the accompanying presentation (Springher, 2018, Powerpoint)
Small scale and medium experiments in the Deltares Hall, analyses measurements and numerical analyses.	MSc thesis of TU Delft; Wittekoek, 2020. Paper published in the GeoKunst, GeoTechniek: Wittekoek et al., 2021. Journal paper published in *Geosynthetics International*: Wittekoek, van Eekelen, Terwindt et al., 2022.
Numerical simulation small-scale tests Deltares	BSc thesis University of Bochum; Thielecke, 2020, and the accompanying presentation (Thielecke, 2020, Powerpoint)
Numerical analyses full scale geogrid anchored SPWs	MSc thesis University of Bochum; Wagner, P, 2021.

More information?

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