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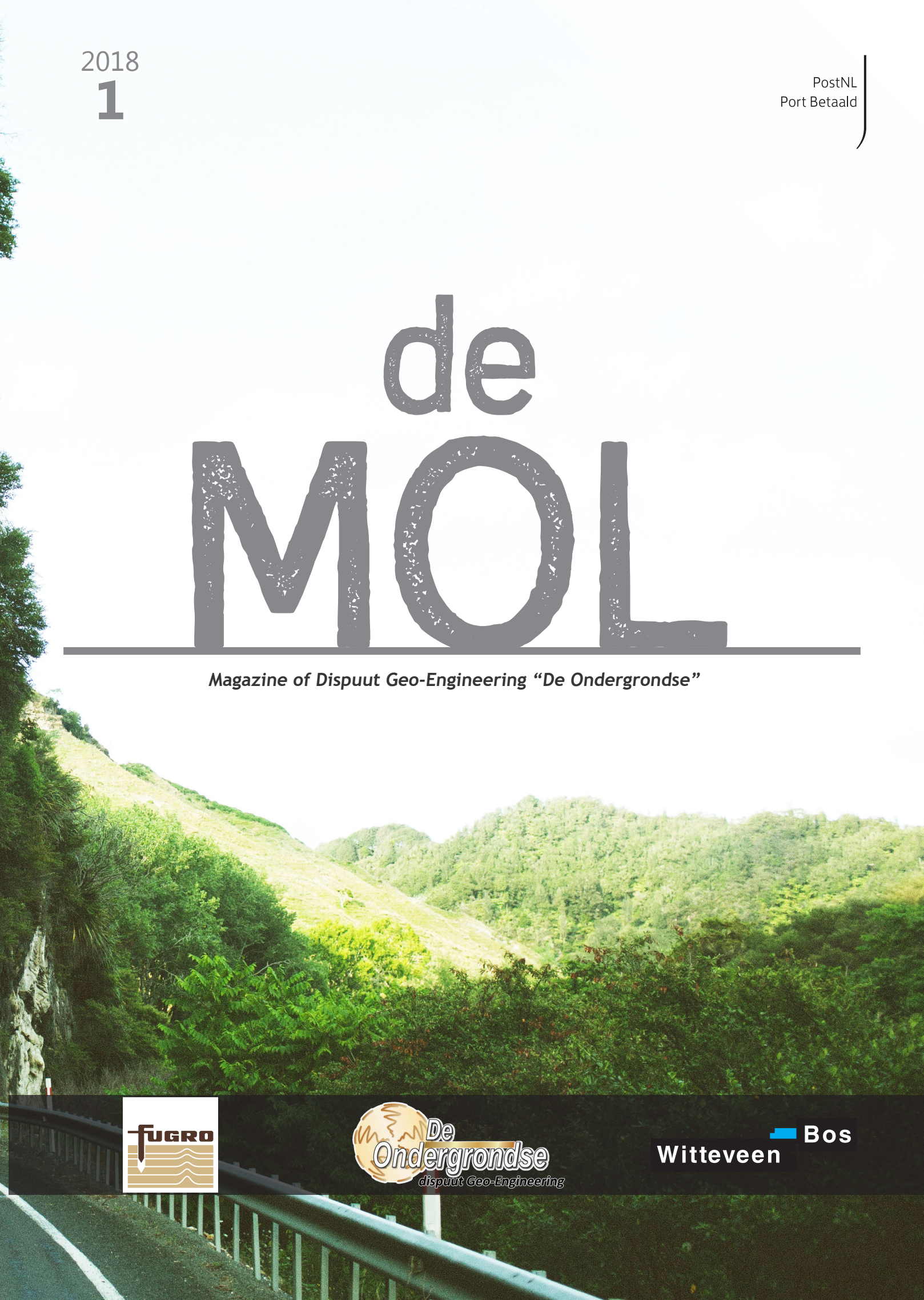
de MOL

Magazine of Dispuut Geo-Engineering "De Ondergrondse"



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From the Board

Dear Geo-engineers and other readers,

Several events have already taken place this year and with the fantastic New Year's dinner in de Wijnhaven we are looking forward to a New Year with plenty of opportunities and events. Not only the board is excited about making this possible, but also our new committee members for the GETA (Geo-Engineering Trip Abroad) will aim to organize an amazing trip.
Of course the editorial staff of De Mol will be there to inform you about the most recent topics related to Geo-Engineering as you can read in this Mol.

We can be proud of our Geo-engineering section where everyone is actively involved and open to work with each other.
The ease of working together with fellow students and staff is clearly present all the time!
What better environment can you get to combine study and free time?
It is essential to keep up this spirit and cooperate where possible.

Besides our good connection within the University we also have our sponsors that collaborate with us by organizing trainings, lectures and company days. For example, the company day of Fugro that took place and the lecture of GEO2 engineering. With their help we also learn how to broaden our perspective of our study and to think in multiple solutions for different real life technical problems.

And there is yet more to come! On the 5th of June we will visit Witteveen&Bos and during our excursion on the 17th of March we got a better insight in the Delta Works of the Netherlands, something that Dutch students maybe know well, but for others still a vague project.

Furthermore, we recommend all students to keep their energy up for the updates about our summer trip (7-17 July) that has just been announced.
On behalf of the board I want to thank the editorial staff of the Mol and want to wish everyone a fruitful year!

Jasper Snoeren

Contents

Recent Activities

Geodrinks ++

December 22nd

by Carlota

Last 21st of December, students, PhD researchers and professors reunited in a very Christmas-theme decorated Geocorner as usual to enjoy an unusual Geodrink. This time, as a part of the Christmas celebration, a pizza dinner was part of the plan.

Due to the wide range of personalities involved, the future Geo-Engineers were asked about their preferences: veggies and carnivores were all treated lovely.

Everyone had the chance to get together before parting ways for holidays. All of the plans for the vacation were shared over beers and food.

It was definitely a great time for bonding in an informal event. A new item, the Party-Pig (mini-speaker), was fundamental to cheer the people up for the whole reunion. Everybody had a great time at the Faculty, and those in higher spirits continued with the party at the Bierfabriek and De Kurk.

January 12th

New Year's Dinner

At the beginning of January, Thursday 11th, the New Year's Dinner was organized by De Ondergrondse to welcome all the students and staff of the Geo Engineering section from the holidays.

This year's dinner took place in De Wijnhaven where our board prepared a wonderful menu including three possible starters and main course with also dessert included and unlimited drinks! Even the vegetarians had a delicious alternative.

During the dinner, Jasper Snoeren, De Ondergrondse's Chair, and professor Michael Hicks shared some words of gratitude to all the assistants and invited us all to enjoy our time and to strengthen the bonds among the Geo people.

After the dinner was finished, some of the assistants decided that stopping the celebration at that point would be a total pity and decided to move to another location in the city center to share the joy of a New Year all together.

Geodrinks 15th February

February 16th

by Andres

The first week of the third period was almost over when the Geo-Engineering section got together once again to celebrate the first Geodrinks of the year.

At five o'clock some early birds were already enjoying beers at the Geocorner. Minutes later, more and more people showed up and the atmosphere cheered up soon.

Impressions about the new classes were exchanged, but quickly conversations turned towards more varied topics. Everybody got the change to exchange a laugh and some conversation over snacks and fresh beer.

Some dance steps were seen, while the geo-speaker sounded. All the students may agree that this evening was the best way to start a new period.

Geo2 Lecture

February 23rd, by Sebastián

On February 20th, Ir. Dennis Wondergem from GEO2 gave a very interesting lecture about the project: "De Entree: Amsterdam".

This revolutionary work will change the face of the Amsterdam Centraal Station by adding a completely renovated landscape.

It has a large zone dedicated to water, new underground/ underwater bike parking and a new transport strategy that includes less cars and buses and more trams, pedestrians and bikes around the area.

The project faces large challenges, regarding the complex layered soil profile and the maintenance and restoration of old structures such as the Westertoegang bridge.

After the lecture, Ir. Wondergem and his colleagues from GEO2 grabbed a drink with the enthusiastic students, who had time to ask them questions regarding the project and the work life as a Geo-Engineer.

Dr. Julia Gebert

After her charming classes during the courses Engineering Geology and Environmental Geotechnics, the editors were left with a few questions about this Associate Professor. Sebastián looked her up to find some answers.

Can you tell us something about yourself? Where are you from? What is your academic background?

I was born in Hamburg, Northern Germany. Very soon after, on account of my father's work as a geologist, my parents displaced me and my brothers to Togo, West Africa, and later to Thailand and Indonesia, where I spent childhood and teen years and graduated from high school. I returned to Germany to study Biology and later Soil Science. Combining the two, I completed my PhD on the microbial oxidation of methane in landfill cover soils. As a postdoc, that work was extended to cover the topic of gas transport through soils, one of the most important processes to consider when engineering systems for the biological treatment of landfill gas. During that time I also built the second focus of my work, the investigation of the suitability of treated dredged sediments as construction material for dikes and embankments. Hamburg operates one of the largest ports in Europe, so just as in the port of Rotterdam, dredging and handling of dredged sediments are a hot topic! At some point I joined Hamburg Port Authority, becoming head of the Environmental Services Unit. In this position, my task was to oversee all environmental monitoring activities associated with dredging, relocation of sediment in the river, treatment and disposal on land.

Which were your reasons to come to Delft?

While enjoying my work at the port of Hamburg, I terribly missed research. I was therefore happy to accept the position as associate professor in the geo-engineering section at TU Delft which I joined last May. The TU Delft fellowship seemed like the perfect option to follow my interests and experience in the applied aspects of fundamental processes, bringing together approaches from the natural sciences and engineering. Coming to Delft also enabled us as a family to finally live in one place, as my husband also works in The Netherlands.

Do you still have some links with other universities or staff out of Delft with whom you have some common projects to develop?

I have always maintained strong links to my home university, the University of Hamburg, and will now start an new project on sediment organic matter in close collaboration with the former colleagues. As a result of my research networks, such as the CLEAR group (Consortium for Landfill Emissions Abatement Research) or DGE (Dredging in Europe) or the sediment network SedNet, I benefit from strong links to colleagues in Canada, Austria and Denmark, amongst others. These also brought me a scholarship for a research visit to the University of Sherbrooke in Canada, for example.

Which are your main activities here at TUDelft?

Currently, I am starting up both teaching and the research. I gave some lectures in Engineering Geology (AES1630, first period) and in the second period I taught Environmental Geotechnics (AES1640). With the recently approved BIOMUD project, my research in the next years will focus on the cycling of organic matter in river sediments and its connection to the processes of settling and consolidation of suspended matter, a very interesting topic that requires a multi-disciplinary approach. I will also continue to look into optimizing engineered systems for the microbial oxidation of landfill gas and hope to start a project on soil structure development in land-treated sediments (STS – Sediment to Soil). So – plenty to do!

Can you tell us something about your areas of interest and research, your link with the students in terms of providing areas of investigation and thesis topics?

I hope to involve many students in the research areas outlined above. In all of them (sediment organic matter, soil gas transport, sediment to soil) there are ample opportunities to carry out research for Bachelor and Master theses. As an example, MSc candidate Charlotte van Verseveld currently investigates the effect of soil compaction and saturation on gas transport properties. All of my research fields have a strong connection to applied questions and therefore hopefully are of great interest to the students of geo-engineering.

How was this first experience teaching here at TUD?

My first teaching experience was great. I think that Environmental Geotechnics provides a great framework to connect fundamental knowledge to applied questions. Another positive aspect as that I was able to integrate much of my own research and work experience into the course and thus provide the students with up-to-date case studies, questions and examples. I was lucky to teach a fairly active student group and I enjoyed their involvement, their questions and their feedback. Next year, I want to introduce one or two field-trips to make the course even more interesting.

Which are your expectations here at TUD?. Would you like to keep being a lecturer in more different courses rather than focus more on the research or a mix of both?

I believe that the unity and the freedom of education and research is a unique university privilege.

> “Curiosity may have killed the cat, but not the researcher”

It means that I want research to be part of education and education to be part of research. In that sense, I enjoy pursuing both. The art is to balance both tasks in a way that the respective other task is still manageable on a satisfactory level. We all know this can be a challenge!

Can you give some tips for the future Geo-Engineers?

Oh yes: follow your curiosity and your interests and don't let anybody tell you that the topic of your interest is currently not “en vogue” and that therefore you should drop it. Curiosity may have killed the cat but not the researcher, right? And, as a soil person and with a twinkle, do not forget that almost everyone in their early days was a little soil scientist – remember that sandbox experience? What I mean to say: The truth is in the field! Go and check back from time to time in order to recalibrate your inner model.

New Committees

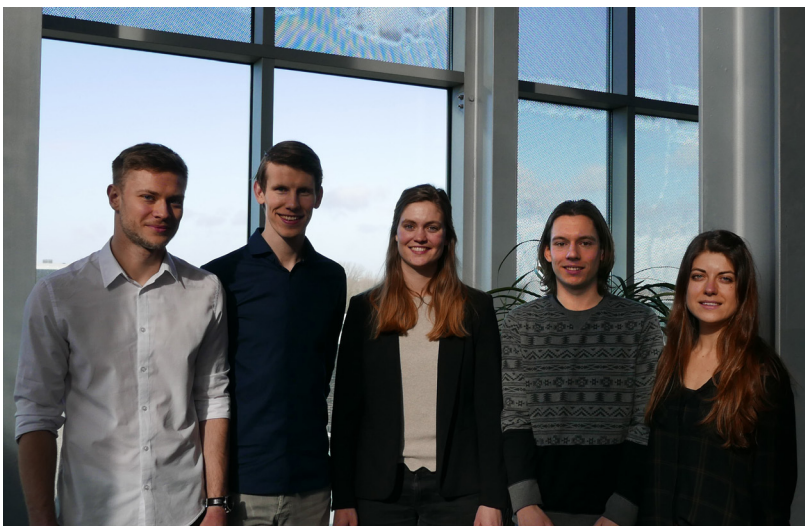
De Mol-Committee

Left to right: Sebastián Bascuñan Chaparro, Floor van Daatselaar and Maurits van der Wal

We are very much looking forward to publish four new exciting editions of De Mol Magazine this year!
Our goals are to further develop the beautiful layout that has been introduced recently, and also to try and involve students more in the writing about past events.
We are going to provide you with interesting and informative articles about Geo-Engineering, and we will give some insight in the awesome activities of the organisation.

GETA-Committee

GETA – Geo-Engineering Trip Abroad (in previous years known as KBR) – is a summer trip organised for students of Geo-Engineering masters of TU Delft that combines educational activities like visiting construction sites and engineering companies with social and cultural activities to give participants the opportunity to relax after exam period and enjoy summer break. This year the trip will take place in the first weeks after exam period in Q4 (approximate dates are the 7th - 17th of July 2018).



Left to right: Konrad Bartczak, Jeroen Beute, Rosanne Verloop, Goitze Simon and Nataly Filipouskaya

At the beginning of this year a new committee was created out of 5 motivated students - Rosanne, Jeroen, Goitze, Konrad and Nataly – and now step by step organisation of the trip is advancing with first decisions on the trip destination, projects and companies to visit and of course fun things to do. To keep everyone excited the committee will weekly post some new information about current steps of organisation via GETA group on Facebook.

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Photo above: all nominated students for the Schreudersstudieprijs 2016. Photo below: winners Giel Sengers (left) and Tomas Weeda. (Photos by Vincent Basler)

Figure 1 - Artist impression Verdiepte Ligging Groningen [https://www.aanpakringzuid.nl]

Verdiepte Ligging Groningen

The existing Southern Ring road A7/ N7 within the city of Groningen will be upgraded over a total length of approximately 12 km.
Part of the overall project, called "Aanpak Ring Zuid" is a 1,3 km long tunnel which comprises four open and three closed sections, referred to as the "Verdiepte Ligging Groningen".
At present, the elevation level of the Ring road is approximately NAP+10 m. After completion of the Verdiepte Ligging, the road will be 18 m below present ground level at NAP-8 m.

GEO2 Engineering BV, in coordination with Vienna Consulting Engineers ZT GmbH, is responsible for the geotechnical final design, based upon which the contractor Combinatie Herepoort (CHP) will commence construction works.

An artist impression of the Verdiepte Ligging is presented in Figure 1.

From a geotechnical design and construction standpoint this project brings many interesting challenges such as:

- Design and execution of sheet pile walls with a retaining height of 18 m whilst the present Ring Road will remain in function and will be located immediately next to the building pit by means of a temporary bypass (see Figure 2).
- Various adjacent buildings at distances varying from 9 to 20 m from the building pit. Most building foundations are shallow foundations (strip footings) where strict limits apply with regard to vibrations, (differential) deformations, rotations and strains.

Damage to buildings can be caused by multiple construction activities, including:

1. Installation of sheet pile walls by means of vibration;
2. Deformation of sheet pile walls during all excavation and construction stages;
3. Extraction of sheet pile walls;
4. Dewatering.

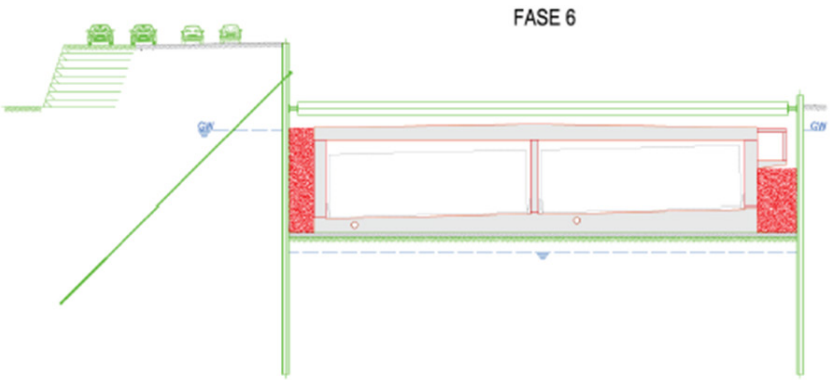


Figure 2 - Typical cross section for closed part of the Verdiepte ligging

For the vibration of sheet piles into the ground strict requirements apply with regard to both particle accelerations as well as ground deformations.
The first mentioned are analyzed and verified according to the SBR A guideline whereby the strip footing is for reasons of safety is placed in in Category 3.

In addition to the SBR, site specific information from intensive sheet pile wall testing on site is used in the design.
One outcome of the test was that the impact force applied whilst vibrating could be lowered which is favourable for the design and lowers risks of damage.
The second mechanism that is analyzed is the compaction of (loose) sand layers due to vibrations. This is done according to Hergarden, van Tol and Meijers, see Figure 3.

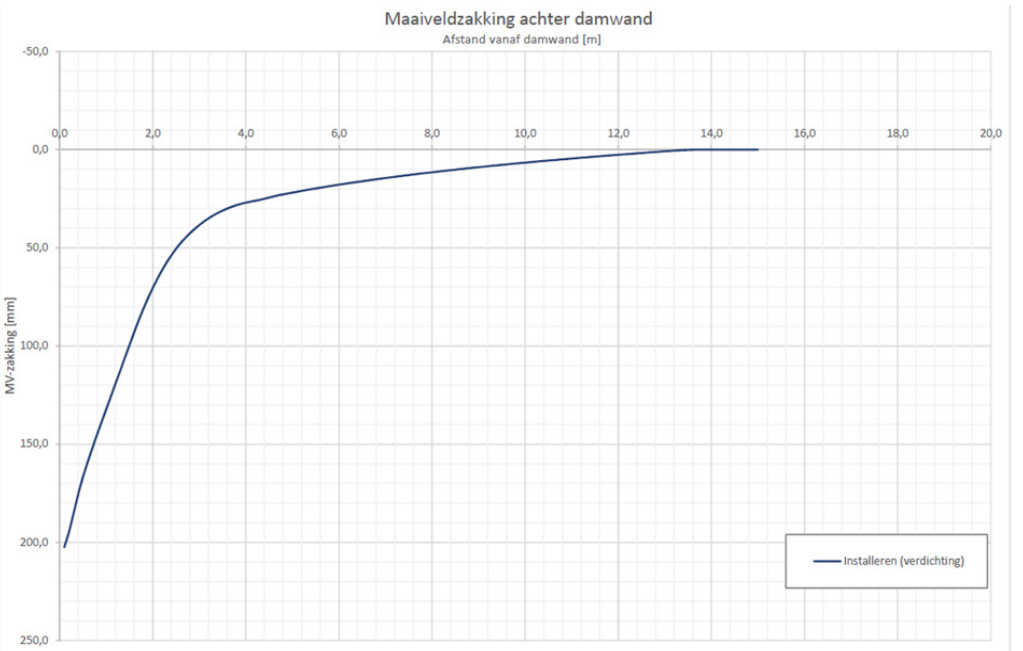


Figure 3 - Example of compaction analysis of loose sand due to vibrations

Excavation works in the building pit bring about sheet pile wall deformations which in turn can lead to surface settlements and thus potential damage to buildings.
Deformations are calculated with a Finite Element Model (Plaxis 2D), see Figure 4 and 5.

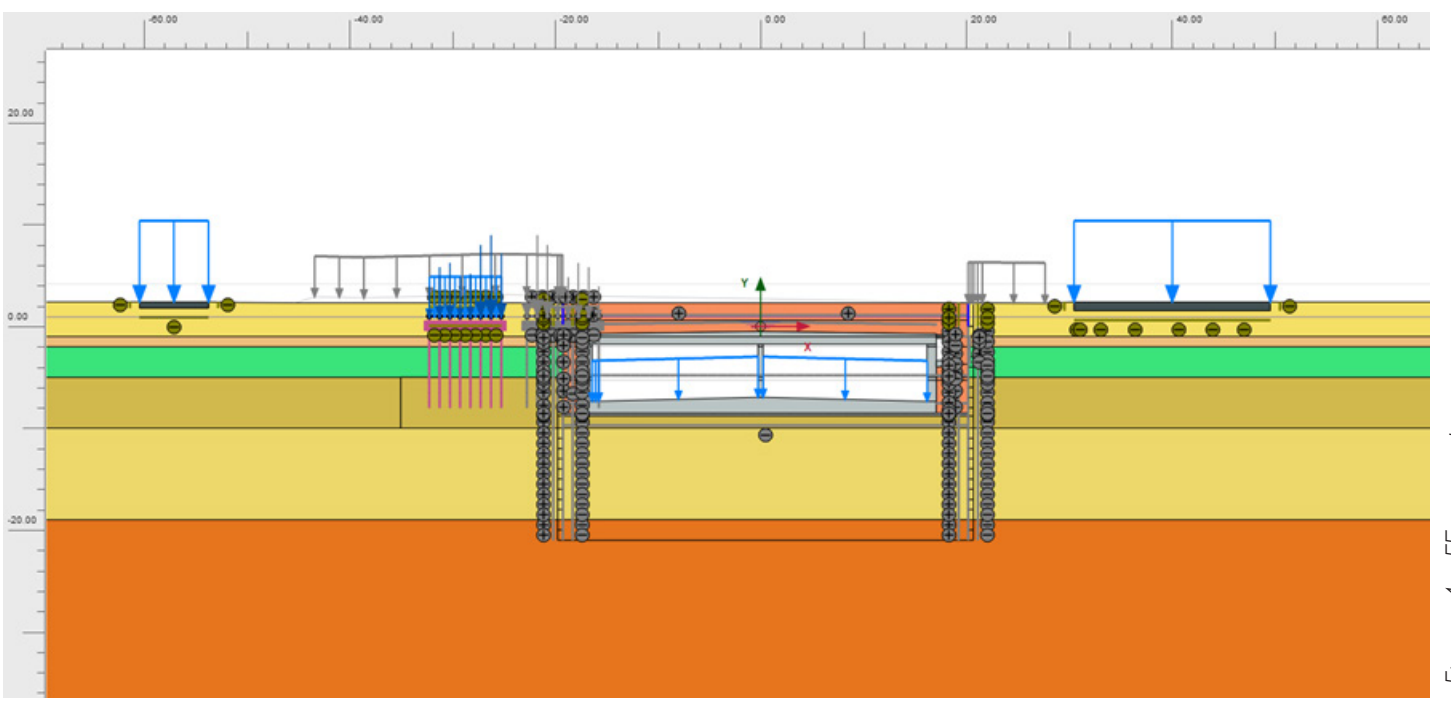


Figure 4 - FE geometry

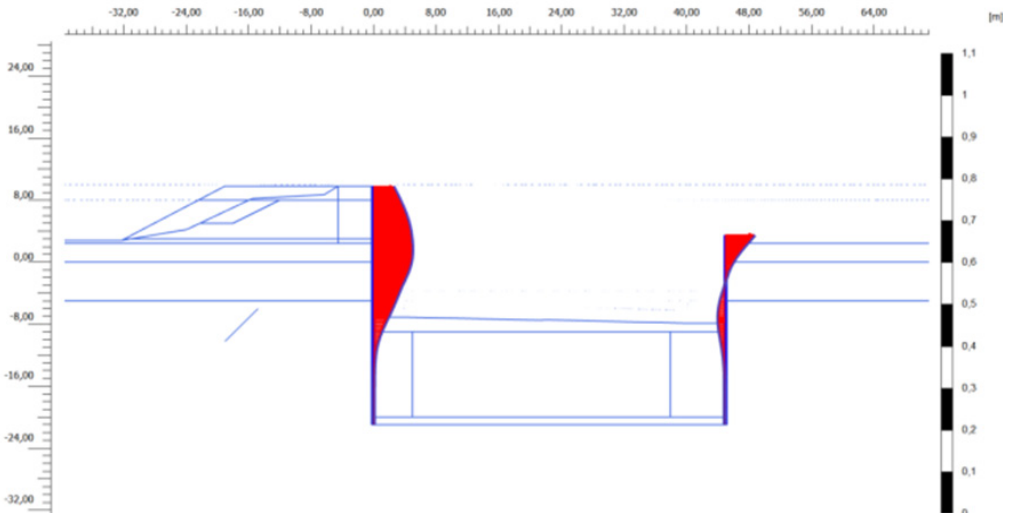


Figure 5 – Sheet pile wall deflections due to excavation works

As most of the sheet pile walls have a temporary function (temporary works), wherever possible sheet piles will be extracted after completion of the Verdiepte Ligging.
This activity will result in surface settlements within a limited area outside the sheet pile walls.

This is predominantly caused by a subsequent closure of the gap which the extracted sheet piles will leave behind.
The analyses are performed with Plaxis 2D.
A typical example is presented in Figure 6.

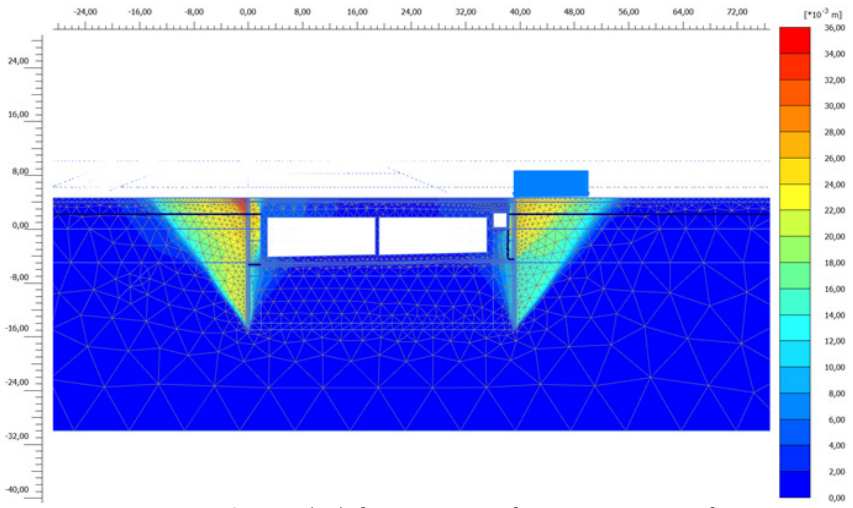


Figure 6 – Ground deformations after extraction of sheet pile walls

Temporary dewatering may result in a temporary and locally lower phreatic water level which can be potentially damaging for buildings on shallow foundations.
The effects are examined in a separate model.

The total damage assessment for the buildings is carried out by considering the sum of effects mentioned above.
These are analysed according to Boscardin & Cording, in which summed deformations, rotations (β) and horizontal strains (ε_h) are worked out at the location all investigated buildings, see Figure 7.

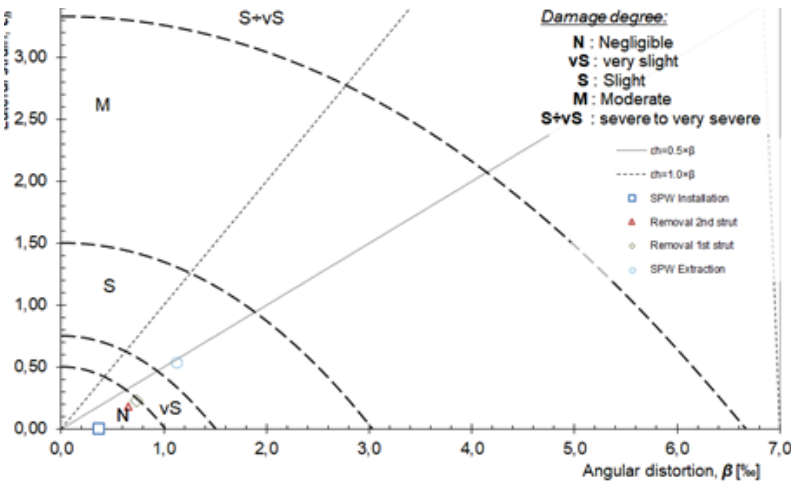


Figure 7 – Analysis of summed effects according to Boscardin & Cording

By adopting this procedure we were able to advise the contractor in an adequate manner and were able to identify risks and propose alternatives wherever required.
It is furthermore noted that in conjunction with the design carried out by GEO2, an intensive monitoring programme will be part of the execution phase.

For more information, reference is made to the project website: https://www.aanpakringzuid.nl/ .

The new year is really getting started at the beginning of the second quarter, and so have I, as ir. T.G.M. Laumen. Like expected from a just gratuated engineer, I am travelling to see the world first. I chose to do a five-week holiday to Vietnam. The differences in civil and construction industry between The Netherlands and here are abundant.

In contrast with the Netherlands, Vietnam is a country very much developing at the moment. Very interesting for a geotechnical engineer for two reasons: basically the whole country is under construction and all the rest is (at least for western standards).

The means to do so are however often limited, forcing them to be creative. I saw two 4.0 m long I-beams being transported on a scooter and 8.0 m long steel rebar on a 5.0 m long truck, not in the truck but hung over the cabin and sticking out of the back, just dangling above the asphalt. A sidewalk is made by pouring concrete on the asphalt, without any formwork. In total three tourists walked into it, thinking it was just the road instead of freshly poured concrete. Safety measures or protective gear are optional. Flipflops suffice for sure on a construction site.

TOM

New things are built everywhere, which is for the Vietnamese the goal.

And however, in our beautiful country, a lot more attention goes to the efficiency and/or quality of construction, all the building sites everwhere you are in Vietnam are for sure inspiring.

Kind regards,

Tom

30 meters deep excavation - Santiago, Chile

International Geo-Corner

Probably everyone noticed that, this academic year, the number of international students who started Geo-Engineering at TU Delft is almost as high as the Dutch future colleagues. Due to this, De Mol has kicked off a new section within the Magazine: The International Geo-Corner. In each edition of the Magazine, an international student will tell us about theirself, the Geotechnics in their country and how they see us here, in The Netherlands.

First guest: Sebastian Bascuñán from Chile.

I did my undergraduate in Universidad de Chile. There, you first do four years to get your bachelor, but you can't both sign projects and be responsible for them.
Then, after your bachelor, every student has to pass two more years to get the Civil Engineering. The majority of my elective courses were related to soils, from pavement design to soil dynamics.
I also was student assistant of three courses: Geotechnics, Advanced Soil Mechanics and Rock Mechanics in Civil Works.
I graduated in 2009 (yes guys!... I'm old) but I started working in 2008 when the company where I did my internship asked me to be fully part of their team.

That company had the "fame" of being the Geotechnical firm with more Geo-projects in Chile, so it was really challenging to be there and to realise that working and studying are, indeed, pretty different.
I worked on all kinds of projects: houses, buildings, pavements, railways, earth dams, etc.
In the meantime we had in Chile one of the

biggest earthquakes of the history: 8.8 richter scale. You can imagine that we had tons to do after it. Then I betrayed that company and I went to work with the archrival, where I did mostly supporting structures for excavation.

I had the honour of designing the second deepest excavation in Chile (about 30 meters).
Finally, I worked in a Geotechnical company focused on mining project, therefore, I mostly designed tailing dams and foundations under dynamic loads.
As you can imagine, in Chile and in the Netherlands we have different challenges. Due to our geology and our geography we are subjected constantly to earthquakes. Liquefaction is a phenomenon that is really common for us and we have to be prepared to deal with it. Now in The NL engineers are facing the earthquakes in the Groningen region due to the gas extraction and the investigation started to focus on that as well.

When I was working in Chile, I learnt a lot about fine soils and sands by reading Dutch research articles. Also, all the CPT innovation and the continuous upgrading of the equipment is well known in Chile and now the tendency is to use it more often.
Our standards are still correlated with SPT more than CPT, but some companies are already introducing the Cone as a site investigation element that should be included in our next geotechnical standards.
Moreover, since our cities are growing really fast and the "good" soils are scarce, foundations and tunneling in soft soils is the challenge that we are facing now and one of the reasons why we have to look at the Dutch experience.
Actually, the new Metro lines in Santiago are crossing fine deposits all the time. In Chile, it is really easy to find hard gravel, very dense sand and also soft silt and clay deposits: we are a natural laboratory.
Also, the Netherlands is well known due to its incredible compromise with the innovation and sustainability.

Both in situ and lab testing are elements that we certainly need to learn from the Dutch Geotechnics. Chile became the country with the biggest commitment in the region in relation to the clean energies.

Since we have almost 5000 km of coastline, our offshore techniques will be developed and improved by checking the expertise of countries as The Netherlands in terms of site investigation, analysis of the data and the use of softwares as PLAXIS in order to develop more complex Geotechnical problems.
By coming here, at TU Delft, I always expected to refine my Geo-skills.
I wanted to know a completely different point of view: from the rocky tunnels that I learnt at Universidad de Chile to the clayey, silty and sandy tunnels that I've learnt here; from the foundations and excavations in sandy and gravelly soils and even rocks to the sheet pile walls in clay and silts.
Besides, how to match the development with an environmental friendly professional career and to be inserted in an academic atmosphere that is always at the forefront and improving constantly.

"At TU Delft, I always expected to refine my Geo-skills"

Soccer Column

"The Geodudes are having a rough start of the season"

After a good start of the competition, the Geodudes were able to finish as third after the first half of the season. The league consist of 16 teams, after the first half of the season the first 8 teams will play twice against each other during a home and an away game.

During this second half of the season the Geodudes will defend their trophy of last year, which will be difficult after the last transfer window. Important players as former captain Jeroen Keuzenkamp, Centre-back Jeroen Vork and right-back Jorrit Molendijk decided to leave the Geodudes. They did it with pain in their hearts but couldn't neglect the great offers they were facing.
This is a tough situation for the Geodudes because the whole defensive block of last year left. Luckily, as every top team the Geodudes have a good youth academy where players are educated professionally.

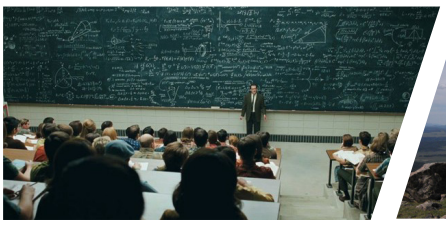
On Monday March the 5th, the first match of the second half of the season was scheduled. It was a tough one immediately. The unbeaten "Tamme eik" was on the program. They had only one draw during the first half of the season, against the great Geodudes! (2-2 red.).

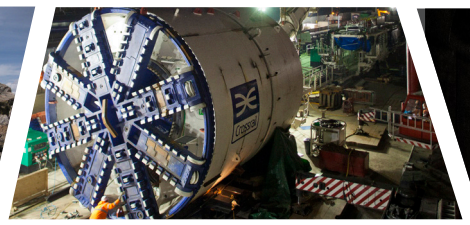
Bad news came in around one hour before the game, striker Max Veerkamp got a hamstring injury. The Geodudes had to improvise the line-up and switched to a new tactical plan. During the first 20 minutes the Geodudes created a few nice chances but couldn't convert them into goals.
Patricio Toloza(Pato) and the captain hit both the woodwork. There is an old saying in football if you don't finish your opportunities the opponent will score out of nothing. The Geodudes faced the old saying.
Two attacks of the "tamme eik" resulted in two goals. Something had to change. The Geodudes decided to attack a bit more, this plan worked and Mustaqim made his first goal for the Geodudes!

The Geodudes wanted more, they smelled blood! They were a bit too enthusiastic and conceded two goals within 3 minutes. The spirit was totally gone. In the last 10 minutes, 'tamme eik' enjoyed it a bit too much and scored three more times, 1-7.
Midfielder Richard Akporotu alias Flimzy stayed positive after the game.
"As a fan of Arsenal I got used to the feeling of losing the past years. Life goes on, however we need to keep the confidence of the first half of the season although it is difficult with a totally new squad. Every little thing gonna be all right!"

Some criticasters were saying that the Geodudes need to focus more on the defense. But to quote the best Dutch player in history, Johan Cruijff: "The attack is the best defense." Only then can we *Make Geo Great Again.*

Upcoming






MAR

29 Geo-drink ++ Easter

APR

MAY

3 Geo-drink
14 Evaluation Lunch
16-17 Civil company days (PS)
23 KIVI TTOW lectures

JUN

5 Witteveen&Bos Business course
6 Sentijn CV Check & Interview Training

JUL

7-17 Geo-trip Abroad (GETA)

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Circulation: 250
Editors: Floor van Daatselaar, Maurits van der Wal and Sebastián Bascuñán Chaparro
Layout: Maurits van der Wal

Cover by Taylor Leopold

Next edition expected:
June 2018

Colophon

Main Font:
GeoSansLight