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FROM THE EDITORS

Dear Swell readers,

Sometimes it feels like time passes by slowly in this period of social constrictions, but realising that we’re already on the half of our period as Waterbouwdispuut evokes a feeling that time flew by! The Swell magazine is at the moment one of the few ways to connect with you so we have tried to make it a blast to read!

This Swell exists of diverse company stories, interviews, fun facts, puzzles and many more great articles. We hope that you enjoy reading it, that you can learn from it and that the Swell motivates you to keep going to become a hydraulic engineer!

We hope to see you very soon on the campus or otherwise at one of our many hybrid and online events! Thank you Ines Roebroeck for helping us with the visuals.

The editors,
Mathieu Roebroeck
Anne Douwes
Stijn Lamers

The editors: Mathieu, Anne and Stijn
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FROM THE PRESIDENT

Dear Hydraulic Friends,

I am happy to know that the first swell of 2021 has reached you and that you are discovering the cool things Hydraulic Engineering has to offer you, even during these hard times.

Already, half a year of the academic year 2020/2021 has passed and even though we had hoped for more, still great things have happened, like master community I, guest lectures and the kick-off and online drinks. But I am certain that the second half year will give you even more exciting things to engage in.

In 1981, The Hydraulic Engineering Student Association was founded, which means that this year, we celebrate our 40th anniversary. In March we kick-off our anniversary with a company day, with a few of our partners, which will be followed by a start-up day to also arouse your interest around smaller companies. Also a rally is planned later this year to blow off some steam from your hard working days at the home-office.

We know that since you started your master studies this year, it may not have been as rewarding as you would have hoped, but we try to encourage you to stay enthusiastic about the greatest field to study. In this swell we hope to give this to you, by some encouraging words from Marinus Aalberts, Head of the office Rotterdam at Witteveen+Bos, by letting you in on some exciting hydraulic projects and also on hydraulic distastars, which we will be able to prevent in the future with our skills. Lastly we will also give you some inspiration for your relaxing time, with an enriching cycle tour along some of the finest dutch water structures.

It is a great time to become an Hydraulic Engineer. The future is booming and the whole world is in need of sustainable and structural solutions in the hydraulic sector. So don’t give up and embrace our wonderful field!
CREATING A SUSTAINABLE FUTURE TOGETHER!

Who we are
Arcadis is the leading global Design & Consultancy firm. Our mission is to improve the quality of life by applying our knowledge and insights in partnership with our clients. With our design, consultancy, engineering and project management services we help our clients to deliver exceptional and sustainable outcomes throughout the lifecycle of their natural and built assets. With our integrated approach, Arcadis is able to meet the client needs of the world’s largest, most complex and iconic programs in the natural and built environment.

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Facts and figure
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- More than 27,000 employees
- Active in over 70 countries
- Over 350 offices
- Founded in 1888
- Headquarters in Amsterdam

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- MSc
- PhD
- Researches

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W www.hkv.nl

You can find our opportunities for students on our website www.hkv.nl
## PAST EVENTS

### SEPTEMBER

<table>
<thead>
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<th>Date</th>
<th>Event</th>
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<tr>
<td>1 Sep</td>
<td>Master kickoff</td>
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### OKTOBER

<table>
<thead>
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<th>Date</th>
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<tbody>
<tr>
<td>15 Okt</td>
<td>Waterbouwdag</td>
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### NOVEMBER

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tr>
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<td>Online pubquiz instead of MEX</td>
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### DECEMBER

<table>
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<tr>
<th>Date</th>
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<tr>
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<td>Business course W+B</td>
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### JANUARY

<table>
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<tr>
<th>Date</th>
<th>Event</th>
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<tr>
<td>6 &amp; 7 Jan</td>
<td>Business course W+B</td>
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UPCOMING EVENTS

FEBRUARY

20 Feb
Lunch lecture Van Oord

MARCH

11 Mar
Lunch lecture SBE Nederland
26 Mar
Master Community 2

APRIL

22 - 24 Apr
MEX
29 Apr
Lunch lecture MTBS

MAY

7 May
Symposium

TBA

Lustrum activities
Hydraulic dinner
Study tour
Just a short recap to our first big master event, to look back at a successful evening or to get excited for our upcoming events!

Monday November 16th, we organized the online event ‘Master Community I’. The theme of this evening was to become acquainted with your future prospects in the sector Hydraulic Engineering. During the event we focused on the question: ‘what to do after you graduate?’ We all enjoy studying Hydraulic Engineering, but what kind of opportunities do you have after your graduation?

Four guest speakers, all former Hydraulic Engineering students that had graduated recently, told us their answer to the question: ‘what’s next?’ From tips and tricks for finding a company that suits you best, to experiences from their first projects and traineeships.

Iris Heemskerk, working at the Port of Rotterdam, kicked off. She told us all about the choices she made between the different specialisations and how she transferred from graduate intern to Project Engineer at the Port of Rotterdam.

Next up Stef Boersen from Royal Haskoning gave an elaboration about the different types within Hydraulic Engineering. He sorted Hydraulic Engineering in four types: science, consultancy, clients, contractors. The sorting in types and subjects was very helpful! Additionally he told us about different projects he worked in and how he chose for Royal Haskoning.

The third speaker was Paul van Wiechen. He is starting his PhD at the TU Delft this year. He told us why he decided to do a PhD and what a PhD looks like. His research topic is Dune erosion during mega storms, this summer he will construct a scale dune at the Sand Engine!
Last but not least Auke Tempel tuned in from Denmark. Auke started a traineeship at Boskalis. He told us about the opportunities he had been offered and his interest in working abroad. Finally he talked about his experience at the different projects he has been working on so far.

It was all very interesting and exploratory for the students. We would like to thank Iris, Stef, Pau and Auke again for their time and effort and wish them all the best in their future careers!

If you missed Master Community 1 and are interested in the stories of our four guest speakers, you can send an email to onderwijs@waterbouwdispuut.nl and we can send you the recording.

And to all of you stay tuned, because more events are coming up!
HYDRAULIC PUBQUIZ

Last November Het Waterbouwdispuut organised the Hydraulic Pubquiz! With over 40 questions and the 30 people that attended the online quiz made it a success. The questions were divided into four topics: Around the world, The Netherlands, Delft and Hydraulic Engineering. In this way the scope went from large to very specific.

Three prizes could be won. The winner of the quiz received a SodaStream, whereas the second and third places received a JBL speaker. Congratulations to Soesja, Waterbouwdispuut 2019 and Ruben! You will definitely make it in life if you already have all this knowledge.

Here you can find five quiz questions to test your own knowledge!

Which place does The Netherlands hold in the top 10 agricultural export countries worldwide?

A. 2  B. 5  C. 8  D. None

Which percentage of the population of Delft represents students?

A. 15%  B. 25%  C. 30%  D. 40%

What is the total length of the Dutch coast?

A. 350 km  B. 400 km  C. 450 km  D. 500 km

The four wave height statistics are the mean, root mean square, modus and significant wave height. What should be known to derive these four statistics?

A. Variance  B. Phase velocity  C. Maximum wave height  D. Water depth

Which of the following researchers created a stability formula as a function of a squared velocity, developed for large water depth (high h/d)?

A. Darcy-Weisbach  B. Izbash  C. Shields  D. Chézy
Bijdragen aan spraakmakende civieltechnische projecten in Nederland?

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- Ben jij ondernemend en ambitieus?
- Ben jij gefascineerd door de aanleg van grootschalige infraprojecten?
- En geïnteresseerd in zaken als project- en contractbeheersing?
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INTERVIEW WITH MARINUS AALBERTS

Marinus Aalberts works as head of the Witteveen+Bos office in Rotterdam and is a familiar face in the world of hydraulic engineering. You may know him from the ‘Waterbouwdag’, as the secretary of the ‘Agemaprijs’ jury, as a member of the Expertise Network for Flood Protection (ENW) or from one of the many dyke reinforcement projects that he has worked on. Like many of us, Marinus started his career at Delft University of Technology at the faculty of Civil Engineering. I had the opportunity to talk to Marinus and to ask him questions about his career, hydraulic engineering and his connection with hydraulic engineering students.

Marinus, thank you for joining me today. Can you tell me something about your time as a student in Delft and your career at Witteveen+Bos?

I started as a student of civil engineering at Delft University of Technology in 1998. During this period, I enjoyed a lot of extra-curricular activities like starting a company in ornamental paving, which turned out to be really good business! Also, I was involved in several other undertakings and social activities which resulted in a somewhat delayed graduation. Nevertheless I finished my study which is most important. This is also my first piece of advice to all the hydraulic engineering students reading this article: finish your study! Setbacks like falling behind shouldn’t be a reason to give up on working in our great field.

After graduation I applied for a job at the Witteveen+Bos office in Deventer. The working life took some getting used to. The fact that I started at the end of the autumn, meant I was going to work in the dark and at the end of the day I would go home without having seen the sun. During this period, I was involved in several dyke reinforcement projects and I realised that engineering is about learning through practice, in other words, building up experience. Along the way, you will become more effective and self-assured which will increase job satisfaction. In 2014 I moved to the Rotterdam office and a year later I became head of the office. Here, I started with the project ‘Markermeerdijken’ as technical manager for the dyke design. Currently, I’m also involved in other activities like co-organizing the ‘Waterbouwdag’ and recently I became a member of the ENW as a technical expert.
In which role would you like to see yourself in 10 years?

I’m a technical manager now and in 10 years I still see myself in this position. Something that appeals to me and which I hope to do more in the following years is taking on the role of an expert. Giving advice on big projects, as well as being part of organizations like ENW, is something that I’d like to do more in the future.

What is the greatest challenge in the field of hydraulic engineering in the next decades?

Climate change, by far. I think that every engineer agrees with me on this point. The problem here is twofold: On the one hand, climate change results in rising sea levels and more extreme weather patterns. On the other hand the population is expected to increase and these people are increasingly moving towards coastal areas. This sounds very contradictory, which it is, but engineers have to deal with this problem.

In The Netherlands however, this is not so much of a challenge. The Netherlands is one of the few countries that has an active policy instead of a responsive policy when it comes to flood protection, which means that climate change is already accounted for in the Dutch dyke design. The biggest challenge facing The Netherlands regards circularity. This is something that we still can’t get a hold on while it becomes increasingly important to work with renewable and reusable materials. Building with nature is certainly a part of the answer, but it’s not the complete solution. I don’t know the answer myself, but I think that the new generation of engineers will play a big role in creating innovative and circular solutions.

As Annemieke Nijhof (CEO Deltares) explained at the ‘Waterbouwdag’, our field needs projects that introduce innovation and work like a booster for hydraulic engineering development. A project in this category which has already been carried out is the sand engine near The Hague. An offshore storage basin for wind-generated energy might be the next innovative project that brings us further in engaging the challenges of the future.
Currently, students in TU Delft’s hydraulic engineering master’s can choose from 7 specializations. Do you think that engineers are educated too specific or should engineers be specialists in their field of work?

A bit of a lame answer, but yes and no. A team of specialist won’t succeed in a project, just as a team of only broadly educated engineers will not succeed. All kinds of people are needed, both specialists and broadly educated engineers. The crux lies in finding the right combination within a project team.

Digitalisation is developing fast which results in increased complexity of calculation methods which in turn stimulates digitalisation. This interaction is crucial. We need specialists to work with and understand these complex systems, but we also need people that have an overview to see how this complex approach fits into the integrated design. Nowadays engineers have an explanatory role rather than doing the exact calculations themselves. 100 years ago, the engineer decided how it was done and that was the end of it. In the 21st century we work in a broader integrated way where social interaction is very important. So again, the right proportion of specialists and managers is key to successful projects.

Do you think that education at the university is too science-based without enough emphasis on practical application?

No, students should have a strong technical basis when they graduate. A student must also be tested to prove that he/she is smart enough to pass difficult scientific courses while also demonstrating perseverance. He/she has to show that he/she is able to buckle down to work through hard topics. The master’s degree needs to keep its value and is a ticket that shows that you have these abilities. During your working life, the practical experience will come. In your first position, you will get space to develop yourself and to become a professionally orientated engineer.

Via LinkedIn, I became aware of a series of videos that you make for hydraulic engineering students. Can you tell me what this series is about and why you make them?

The idea arose during the summer. The students who were going to start university in September had a somewhat false start due to COVID. Starting in an online study environment is very different from experiencing your first year in Delft the ‘normal way’. When you go to lectures, meet study friends and study together you get a connection
with the university, but also with the wonderful field of civil engineering. These first-year students lack the connection and integration with the faculty. I have the privilege of working in this amazing field and I couldn’t just allow students who might end up sharing this passion to become demotivated and lose enthusiasm because of this false start. In my videos I talk about several aspects of hydraulic engineering and the main goal of these videos is to offer future perspective for the students who need it.

Do you have any final advice for students in this time of online education?

The message that I try to send is: don’t give up because of this hard time and don’t let falling behind because of social restrictions demotivate you from finishing your study. Don’t worry too much about not finishing your studies within the suggested time and don’t worry about the extra study loan that you might need. You have a very bright future ahead of you and I can assure you that if you keep going, everything will work out.

I had the privilege of having a great conversation with Marinus and would like to thank him very much for his time.

Are you interested in the videos (Dutch language) about hydraulic engineering? Check out Marinus’s YouTube account: Marinus Aalberts. The videos are inspiring and fun to watch!
'Door de vergrijzing is het van belang meer jonge starters te werven. Het is belangrijk om jonge mensen in je organisatie te hebben. Jongeren die net van school komen, hebben nieuwe werkwijzen en technieken tijdens hun studie meegekregen. Daarnaast hopen wij de bestaande samenwerking tussen de waterschappen te versterken. Welk beter moment is er dan om nu direct deze jonge starters voor te werven?'

**Wat zijn de doelstellingen?**
'We willen de waterschappen neerzetten als aantrekkelijke werkgever. Maar ook willen we de samenwerking binnen de waterschappen bevorderen.' We gaan 2-jaarlijks minimaal 20 jonge starters werven en hen een traineeship aanbieden binnen Waterschapstalent. Uiteraard willen we een aanzienlijk aantal trainees behouden voor de Landelijke Waterschappen.'

**Waaruit bestaat het opleidings-/ontwikkelprogramma?**
'Gedurende twee jaar doorlopen de trainees een gevarieerd werk- en leertraject. Het programma start met een "verwonderingsperiode" waarbij de trainees kennis maken met de waterschappen. De trainees volgen onder meer diverse vaardigheidstrainingen, bij voorbeeld op het gebied van projectmanagement, adviseren of persoonlijke effectiviteit. De praktijkopdrachten met een duur van 3 tot 6 maanden worden in groepsverband uitgevoerd, gaan over een actueel thema van belang voor alle deelnemende waterschappen.'

**Welke toekomstverwachtingen hebben jullie over de traineepool?**
'De traineepool is enerzijds een succes wanneer een groot deel van de trainees aangeeft te willen blijven werken bij het waterschap. Anderzijds kunnen we spreken van een succes wanneer de waterschappen het jammer zouden vinden wanneer de trainees na het traineeprogramma weg zouden gaan. Voor de trainees is het de uitdaging om ervoor te zorgen dat ze onmisbaar voor ons worden, hun meerwaarde te tonen en ervoor te zorgen dat ze de ruimte krijgen om hun plekje te vinden.'
Deel jij onze passie voor complexe vraagstukken op het gebied van geotechniek in waterbouw, tunnelbouw en ondergronds bouwen? Werk je graag mee aan uitdagende infrastructurele projecten in binnen- en buitenland? Voel je je thuis in een informele werkomgeving, waarin je de ruimte krijgt om jezelf te ontwikkelen en initiatief zeer wordt gewaardeerd?

**DAN ZIJN WIJ OP ZOEK NAAR JOU!**

Voor academische starters hebben wij een trainee traject. Direct solliciteren kan door je CV en motivatiebrief te mailen naar info@arthecs.nl. Voor vragen neem contact op met dhr. M. Brugman of mevr. A. Bäcker op tel. 030-638 45 54 of neem een kijkje op onze website www.arthecs.nl
AFSLUITDIJK RENOVATION

Our worldwide well known 32 kilometre long closure dam, which is one of our most famous water works for flood protection and land reclamation is turning 89 this year. 89 is a long lifetime which is why Rijkswaterstaat and ‘De Nieuwe Afsluitdijk’ together with several other parties are preparing the closure dam for the future in the coming four years.

The biggest intervention is probably the increase of the dike’s height with 2(!) meters, to improve the dike’s main functions and keep the protection sufficient enough for the coming future, with climate change uncertainties taken into account. BAM and Van Oord are currently occupied placing 75,000 hexagonal blocks, each weighing a 6,5 thousand kilograms, on the dike to ensure water safety through implying a rougher dike revetment, protecting the dike from high waves. Computer models and 3D printing helped develop this innovative revetment, which is sustainable in materials and CO2-emissions. The openings in the blocks flourish the ecology surrounding the entire closure dam.

This picture on the left shows an integral design for de Breezanddijk called ‘sustainability island’ developed by both architects in the Master planning to preserve the Monumental value of the Afsluitdijk by combining the renovation of the dike with ecology, tourism, and sustainability.

A fishing migration river is a 6 kilometre long river crossing through the dike which connects the fresh and salt waters from the Waddenzee and the Ijsselmeer. It is expected that millions of migratory fish like salmon and seatrout will make use of this new connection that makes it easier for them to transfer between those fresh and salty waters which is essential for them for survival. Also, extra scour outlets, locks, and pumping stations are being built in Den Oever. Excess water in the IJsselmeer can be pumped to the Wadden Sea this way to control water levels in the Ijsselmeer and ensure flood safety.

This large integral innovative renovation project realized by many parties, amongst them many water builders, is another important step into maintaining our flood protecting future.
VENITIAN FLOOD RISK

‘Acqua alta’, a venetian term for exceptionally high tides of around a metre above mean sea level in the surroundings of Venice, occurring periodically in the Northern Adriatic Sea mainly between autumn and spring. A pair of galoshes is a common property of every Venetian inhabitant. This picture shows St. Mark’s Square in Venice, which is one of the lowest points in the city, someday in 2019 after an exceptionally high acqua alta.

A combination of extreme prevailing winds and astronomical tides cause this phenomenon. The long and narrow shape of the Adriatic Sea causes an oscillating water motion on top of the regular tidal cycle, which is a unique phenomenon for the Mediterranean sea. The water in Venice is brackish water as a result of water mixing from the rivers and sea, but it is also highly polluted since sewerage water is still dumped into the canals.

The Modulo Sperimentale Elettromeccanico (MOSE) project is implemented to protect the city of Venice and the Venetian Lagoon from flooding, next to additional coastal reinforcement and improving payments of the lagoon. It is a series of barriers consisting of mobile gates at the inlets shown on the left image. Construction of this flood protection system began in 2003 and missed it’s completion deadline in 2018 (originally 2011). On the 10th of July in 2020 the first test was successfully completed, and the construction is now expected to be finished at the end of 2021.

The high waters in Venice causes flooding everywhere which causes lots of discomfort for inhabitants but also raises questions for tourists if visiting is still safe. Future flood protection works and maintenance like MOSE are expected to be needed to keep Venice dry.
HYDRAULIC CROSSWORD PUZZLE

**Horizontal:**
1. Our most handsome board member
4. Former keeper of PSV
5. Costs 5 euro
6. Best read magazine under students
8. Definitely NOT water
10. Famous duck from magazine
12. Handles Covid with intense care
15. Laughing out loud
16. Rolling on floor laughing
20. Most famous mark of our country

**Vertical:**
2. Head of the HE department
3. The best Zodiac sign
5. Sending an email to multiple persons
7. Dutch word for still water
9. River in Asia
11. Dutch version of Sweet Lake City
13. Dutch palindrome
14. Sleepy Pokémon
HYDRAULIC QUIZ

1. There is a chance I will name one of my kids Eva
   a. Of course!
   b. Hmm depends whether it’s a boy or a girl
   c. Never, would rather name them Willem–Alexander

2. The first thing in the morning I think about is?
   a. A glass of water! Quick!
   b. My beloved board of the Waterbouwdispuut
   c. Can mosquitos get drunk?

3. Which of these do you like to do most?
   a. Drink water with my buddies
   b. Eat, sleep, study, repeat
   c. Play online 30 seconds, that sounds great!

4. If I had a million dollars I would?
   a. Buy a house with a pool and a shark in a tank and a cold water tap and a jacuzzi and and and...... I <3 water!
   b. Nothing, I am already happy. Money doesn’t make you happy!
   c. Make a long vacation to Atlantis... AHHHH that would be lovely...

5. What is your favorite song?
   a. Watermelon sugar – Harryyyy
   b. Waterfalls – TLC, you know the scene from we’re the Millers?
   c. Waves – Mr.Probz, wave after wave

6. Where do you like to live in 5 years?
   a. Wateringsevest
   b. Sahara
   c. Antartica, Ice is also water

7. Things I don’t like:
   a. A waterproof marker, I make a lot of mistakes so just not convenient
   b. Guys who eat their instant noodles without the water, the soup is the most delicious!
   c. Waterproof make-up, I also make a lot of mistakes but a lot more inconvenient than A

8. This test was:
   a. Really weird, as if I saw water burn...
   b. Funny, great test! (P.S. this answer gives the most points)
   c. Nice, I think I did (s)well.

Scores:
1: a = 3, b = 2, c = 1; 2: a = 2, b = 3, c = 1; 3: a = 2, b = 1, c = 3; 4: a = 2, b = 1, c = 3;
   5: a = 1, b = 2, c = 3; 6: a = 1, b = 3, c = 2; 7: a = 1, b = 1, c = 3; 8: a = 3, b = 1, c = 2;

Results:
8 points – 12 points: Wow! You really do not like water! What has water done wrong to you? Why? I just don’t understand...... I do not want to use more words on you.
13 points – 17 points: Okay, Okay, we are getting somewhere. You do like to sail on the Ijsselmeer and listen to Waterloo by ABBA while drinking an ice cold Chaudfontaine with extra ice (that is frozen water). Just the kind of guy that would never turn down a fresh glass of cold water. Everyone likes that, right?
18 points – 24 points: Hell Yeah! You are perfect! Do you live in swimming pants? Water is definitely your best friend! You love water, water loves you! Did you know that this Swell contains the word water 1382 times! I think that will make your day right? Enjoy Aquaman!
Hi, I (Jelmer Dijkstra) work as a junior consultant in the field of flood control and hydraulic engineering at TAUW, an international firm of consulting engineers. At TAUW we support clients in a responsible way considering all aspects in the field of the environment, safety, energy, water and the living environment.

After finishing the Master specialization Water Engineering and Management at the University of Twente, I started at TAUW. Here I get the opportunity to develop myself in a broad water engineering environment, within different projects. This was one of the reasons I wanted to work for TAUW, without immediately knowing what my field of expertise would be.

Projects
At TAUW I work on different projects concerning flood control and hydraulic engineering. Last year, I worked on a project called ‘Lowering of groynes and banks in the Pannerdensch Canal’. The hydraulic task of this project is a water level reduction of 5 cm at a discharge of 16,000 m³/s at Lobith on the Upper Rhine. It is important here that the policy-based water distribution between the Pannerdensch Canal and the Waal remains manageable.

The (completed) ‘Room for the River’ program was aimed at increasing the discharge capacity of the rivers and limiting the water levels during high discharges. With the ‘Bank channel Upper Rhine’ project being cancelled, ‘Lowering of groynes and banks in the Pannerdensch Canal’ is the final project to complete the goals set for the ‘Room for the River’ program in the Netherlands.

In this project the contractor is involved from the start. This is a relatively new method for civil engineering projects, which makes it possible to use each other’s knowledge and prevent unnecessary delay during the realisation process. The involvement with stakeholders and other engineering firms makes it an interesting project to work on, where different skills are needed and learned. Within this project I learned the process to determine the coating of the groynes and riverbanks and contributed to the process of system engineering.
TAUW provides the environment to further develop your skills, especially during the start of your career with professional guidance and a program for learning professional skills at the TAUW University.

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If you want to work in an inspiring and dynamic environment, with colleagues who work on engineering sustainable and future-proof solutions. We are hiring enthusiastic colleagues and students. For more information and application go to: tauw.com/careers or werkenbijtauw.nl.

Picture Johan de Putter
Ferdinand, great that you could join me today. I would like to start with a short introduction. Who are you, when did you start with your master’s hydraulic engineering and what is it that you are passioned about?

My name is Ferdinand Holzhaus, I am 26 years old and I live in the city of Amsterdam. In 2019, I started with my master’s hydraulic engineering with a specialization in dredging technology. I really like to solve hydraulic engineering related problems in a sustainable and business-wise manner. Courses like building with nature are among my favourites.

You have recently started your MSc thesis in dredging technology. Can you tell me something about your thesis?

I have started my thesis in December 2020 at Boskalis. I’m working on a partial computational and partial scale model research on the mobility of tracked subsea trenchers. With my graduation research, I hope to gain insight into different trenchers’ deployability. Besides, I hope that by adapting the type of tracks to the operational environment, it could be possible to improve the deployability.

Do you encounter COVID-related difficulties in your research? I’m also wondering what it is like to work on your thesis from home and if this resulted in delays or setbacks. Do you have any tips for students that have to start with their thesis?

For me, the most considerable difficulty due to the corona crisis was finding a graduation internship. I wanted to do my research at one of the larger hydraulic engineering contractors. At the time I was searching, there were not a lot of opportunities. In the end, I was able to start two months later than planned. Graduating in corona times is quite different from normal circumstances. Still, compared to studying from home at this time, it is not that different. The most annoying thing is that it is more difficult to discuss things with your fellow students. You’re more self-dependent, which makes it hard sometimes. The most important advice that I can give is to start on time with your search if you want to do a graduation internship for a company.
What are your plans when you graduate? Do you think you will end up at a company like Boskalis or have you already discovered that this is not your ambition anymore?

In the future, I would still like to work for a large hydraulic engineering contractor. Something that appeals to me is that I can contribute to major projects around the world. But don’t me pin me down on this! In a few months, the world might look different.

Where do you think lies the greatest challenge in the world of dredging technology in the coming decades?

That is a hard question. Of course, I am part of the new sustainability generation. Therefore, I hope that several essential steps within hydraulic engineering and dredging technologies will be taken in this direction. A first good step is already taken since designs increasingly follow the building with nature approach. It is a good sign that many of the leading hydraulic engineering companies are already involved in this way of thinking. Of course, I understand that the transition cannot be completed in one go. Still, I hope and I am confident that the sustainable solutions will predominate in some years.

Thank you for taking the time for this interview Ferdinand. I wish you the best of luck with your graduation internship.

Are you interested in Ferdinand’s research? Contact Ferdinand via his TU Delft e-mail address: f.c.holzhaus@student.tudelft.nl
Passion for smart solutions

Throughout history our engineers have solved pressing problems that societies are facing. Today is no different. At Royal HaskoningDHV we focus on delivering added value for our clients while at the same time addressing challenges like adaptation to climate change and the growing world population.

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For more information about Royal HaskoningDHV, please contact Gosse de Boer (Gosse.de.Boer@rhdhv.com).

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Arthe Civil & Structure working on the Markermeerdijken

Since the repairs following the tragic flooding of 1916, the Markermeerdijken have not been upgraded or reinforced. Now, due to background settlement and worsening hydraulic conditions they no longer comply with safety standards. 33 km of flood defences between the cities of Amsterdam and Hoorn have to be improved, both in terms of stability and wave overtopping. The project is part of the National Flood Protection Plan. The Alliantie Markermeerdijken (an alliance between Hoogheemraadschap Hollands Noorderkwartier and contractors Boskalis and VolkerWessels) is tasked with the design and construction of the improvements of the dike. The first million m³ sand is already in place.

*Arthe Civil & Structure assists the Alliantie with the design. Three Arthe Civil & Structure colleagues share their experience working on this project.*
Bart: “As in most large infrastructural projects people are living near the construction site. From start to the end of the project it has to be ensured no damage is done to their houses or other vulnerable objects. I am part of a project-wide Integral Monitoring Team. With my colleagues I ensure that we know all the possible negative effects on the objects surrounding the project. We calculate the expected effects, for example the soil displacements at the location of a house that is next to the dike that is being raised.

When the design is finished for a certain part of the project a monitoring plan is made based on the estimated risk to the objects nearby. This monitoring plan is a detailed assessment which focusses attention from all possible effects on all objects in a large perimeter to only the effects on objects that have certain damage risk level. Based on the type of effect and the risk level specific monitoring equipment is applied and/or mitigating measures are applied.”
Anne: “In this project I am not tied to a specific team, but act more as a ‘trouble shooter’ for issues that are not tied to the design directly. I designed the layout for the three full scale test sites, and kept an eye on things during testing. Currently I am finalizing the analysis of the test results. Because this is the first in the Netherlands to be redesigned using the ‘Dijken op Veen’ (dike on peat) method / critical state soil model, we are acquiring a lot of new data, and the interpretation of the results and the consequences are discussed not only with my colleagues and managers, but also with the Water Board and Deltares.

Apart from that I help out my fellow geotechnical engineers, when their calculations give improbable results or crash. I help the stakeholder managers ‘translate’ technical issues into something they can relate to. I help site engineering set up procedures or help analyze unexpected monitoring results. A lot of my time is taken up by meetings, but I enjoy working with all the different people needed to make such a large project work.”
Frank: “The largest part of my work in this large flood defence project is taken up by stability- and settlement calculations for cross sections in one of my ‘modules’ (because of its length the design of the dike is divided into 15 ‘modules’). The design in the modules I’m working on consist mostly of a shift in the position of the dike, meaning the dike will be reconstructed, wider and higher, some distance from its current position. Other solutions include soil nailing, vacuumconsolidation, sheet pile walls and pre-loading.

I am responsible for making schedules for staged construction to ensure a sufficiently high safety level at all stages of construction of the dike. The first stage of construction is making a temporary road/embankment on the lake side for transport of materials. That is the basis for a gradual increase to the height needed for the dike, plus pre-loading and settlement compensation. My colleagues check my work, and I check theirs. This often sparks interesting discussions between geotechnical engineers. I also work closely with other specialists involved with the design: hydraulic engineers, structural engineers, BIM specialists and of course design managers. This leads to interesting weekly meetings (nowadays in Teams obviously). “
HYDRAULIC ENGINEERING CYCLE ROUTE (70 TO 80 KM)

It is important to stay healthy during this pandemic. So get up out of your seat and start planning this cycling trip with a friend! The route description focusses on landmarks to follow, so first have a look at the total route yourself before cycling. In this case the destination is more important than the journey!

Meet up at the place you wanted to be the most this year.

**Start: Faculty of Civil Engineering**
- From there find the Schie river and follow the Kandelaarweg. At housenumber 110 go right and pass over the highway A4 via the Woudweg.
- Go left at the Vlaardingervaart and follow this river until the bridge towards the right over it (Broekpolderpad)
- Pass over the highway A20 via the Broekpolderweg
- Cross the railway at the Recreatiepad
- Leave the fields at ‘De Polderij’ and go left towards your first goal

**You have reached goal 1: Viewpoint of the new Blankenburg tunnel**
- Go back from where you came and go left before the water pumping station towards the Burgemeester van der Lelykade, towards the ferry.
- From here, follow these three roads: Deltaweg, Industrieweg, Maasweg. After these you are back at the water.
- From here on always try to follow the Nieuwe Waterweg downstream. Do not forget to enjoy the view and vessels!

**You have reached goal 2: Maeslantbarrier**
- Do not forget to get up the hill to get those height meters and have a stunning view on the Maeslantkering!
- Keep following the Nieuwe Waterweg and follow the signs towards the Pier of Hook of Holland.
• At the restaurant La Porte Salut, go left, do not follow the Badweg.
• Follow the Koningin Emma Boulevard and get a snack at Snackbar the Pier.
• Follow the waterway towards the Pier to have a good view on the Port of Rotterdam (Tweede Maasvlakte)

You have reached goal 3: Pier of Hook of Holland
• Do not forget to watch the white-capping of the ocean waves!
• Return towards La Porte Salute and now follow the Badweg towards the beach
• At the beach make two turns right to enter one of the best dune cycling paths of the Netherlands.
• Go left at the T-junction of your road and the Schelpenpad and cycle towards the beach. From here you have a perfect view on the Sand Engine!

You have reached goal 4: The Sand Engine
• Continue towards Kijkduin.
• Cycle down the hill of Kijkduin and follow the N211 (Lozerlaan).
• At the crossing of the N464 make a right turn. Quickly after this go left at the Poeldijkseweg and left at the Holtewatering.
• After these roads, follow the Lange Weteringkade towards the Zwethzone.
• Follow the water towards the Lotseweg, from which you can cycle towards the South, aside the A4 highway.
• Go left at the Abtsrechtseweg and follow the N470 back to the faculty.

Do not forget to grab an ice cold beer when you get home!
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