

ABROAD EXCURSION 2022



THE GUILD OF CIVIL ENGINEERING
HOLLAND & DENMARK



ABROAD EXCURSION

Traveling Dates
5.-11.9.2022

Destinations
Amsterdam
Rotterdam
Copenhagen
Lund

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COPENHAGEN



AMSTERDAM



ROTTERDAM



LUND

HELLO THERE!

Even though it feels like yesterday, it has been almost a year since I got elected as the new Master of Excursion of our Guild Rakennusinsinööri kilta. I vividly remember that almost immediately, I started to plan the upcoming abroad excursion. After all it was the thing, I was most excited for. I gathered a committee and we got to work.



The year 2022 has been a strange one. When we started to plan our trip, the covid-19 pandemic was still going around in the world. Our guild's yearly abroad excursion tradition had been put on hold for a good few years, so we were desperate to make the abroad excursion happen.

Then again, booking accommodation almost six months in advance didn't seem like a smart thing to do. We put our plans on hold for a few months and sat tight. After it started to look like travelling to another country would be possible again, we put our heads together and got to work. We landed on staying in Europe and mostly in the Nordic countries, since it felt like the safest bet that would still offer us with lot of different possibilities.

Sustainability was a big theme that we wanted to focus on this trip. On the excursion we gained a deeper understanding on renewable energy, sustainable cities and geoen지니어ing and how all different aspects of sustainability tie down into one large and complex entity.

On the trip, we tried to use

low-carbon transport, whenever possible. We used public transport in the cities, and a train between Denmark and Sweden. Unfortunately, due to a tight schedule we had to fly the longer transitions. For the future abroad excursion, we are working on a plan to cut down these emissions. Stay tuned for a possible zero carbon abroad excursion!

I don't want the reader to lose their appetite for reading this publication, so I won't go into details of the trip or continue rambling on about it. You can find more about the details and events of the trip already on the next page! But for those who are in a hurry, the trip was a big success!

This was a group effort and I want to thank all of the participants for the trip. Also, I had a wonderful team behind me, without whom the trip would have never happened. Lastly, but most importantly I want to take every single one of our sponsors, who made this trip possible!

Yours truly,

*Otto Jalas
Master of Excursion*

DAY 1 - BRIDGES AND KEYWALLS OF AMSTERDAM

On Monday morning our journey started rather early. We arrived at the airport around 6 am, and that was good as there was quite a line in the security check. After we got through it we had some breakfast, enjoyed the recently renovated Helsinki-Vantaa airport and waited for the plane to leave.

After arriving in Amsterdam and getting our luggage in the crowded Schiphol Airport, we took a train to the city centre. Our whole group had the excursion shirts and teekkari caps on as we walked around Amsterdam. This turned some heads and people took pictures of our group as we would have been a tourist attraction. It was funny, and we love to cause little confusion in people with our caps especially.



so we had some lunch in the city and then took a tram to the first excursion of the trip.

The first excursion was organized by the city of Amsterdam. The excursion took place in an of-

fice of “Bezoekerscentrum Bruggen en Kademuren” which translates to “Bridges and Keywalls Visitor Center” where the guide told us about the reconstruction projects of the city’s bridges and keywalls. Amsterdam is built on very soft ground so there are a



lot of problems with sinking.

After the first part of the excursion, we went outside and walked around the city as the guide showed us the repair construction projects of the bridges and the canals. We went to see new and old bridges and a previously collapsed keywall next to the University of Amsterdam.

After the excursion we got our luggage from the train station and took a tram to Flevopark. From there we walked to cozy Camping Zeeburg Amsterdam in which we stayed for the next two nights. In the evening our whole group went to have dinner together at Cannibale Royale which was recommended to us. After a delicious meal we explored the beautiful city of Amsterdam. Great start for the trip!

Fanni Mattsson
Lotta Aalto



DAY 2 - CULTURE AND ARCHITECTURE

After a good night sleep and morning routines we met at the gates of the camping site. We had quite a chill morning since we weren't leaving our camp until 10. The main mode of transportation for the day was rented bicycles.

We divided into smaller groups and began our trip to the city center. Our first excursion was a museum visit. Some of us thought cycling in a populous and unfamiliar city would not succeed without any major difficulties. Despite the doubts

everything went smooth. Amsterdam was easy to navigate and everyone arrived on time regardless of one group taking a slight detour.

The exhibition of Hermitage Museum took us back in time into the history of Amsterdam. We all could progress the exhibition at our own paces since we listened to the museum tour through these phone-like speakers. As we finished the tour one by one we moved to the cafe in the inner yard of the museum building.



The exhibition left us hungry for more but we decided to feed ourselves with food this time. We returned to our bicycles and scattered around the city in smaller groups. Many restau-

rants were closed at this time of the day but everyone managed to find aid for their feeling of hunger. Thank you Rejlers for sponsoring this lunch.

“ Hermitage Museum took us back in time into the history of Amsterdam

The starting point of our second excursion was on the southern part of northern Amsterdam. After lunch we all made our ways there and we saw a local host waiting for us. She took

us on a bicycle tour around the northern parts of the city and let us know about the architecture and solutions used in the buildings in the area. The bicycle tour ended in this lovely cafe by the water.

The official program for the day was over and we had a free evening ahead of us. While a lot of us headed shopping for vintage clothes, others wanted to see Banksy's iconic pieces in Moco museum.

Soon after these activities we were running out of time and we had to make our way back to our accommodation to re-



turn the bicycles. For some this was just a quick stop followed by a trip back to the city center for dinner when others decided to spend the evening and prepare their own food at the camping site's kitchen.

*Ilmari Oinonen
Janne Suominen*



DAY 3 - SAMSKIP ROTTERDAM EXCURSION & OFF TO COPENHAGEN



On Wednesday we woke up at the crack of dawn. The weather had calmed down after a stormy night. Another day of interesting visits and travelling was ahead of us. It was time for us to leave our Amsterdam camping site behind us and head to our next pitstop. Our first task, or more like an exercise session, was to make our way to Amsterdam central railway station along with our belongings. Our path finder, Otto, showed us the way to the right platform, and so we were full speed ahead on our way towards Holland's second biggest city, Rotterdam.

Our journey had operated as well as a train's toilet and before we knew it, we had arrived at 'Rotterdam Centraal'. So what was it that had brought us there? – You might already know this, but Rotterdam is known for its port, which is the largest port in

Europe. Our excursion for day 3 was a visit to a logistics company Samskip, whose headquarters is located next to the Rotterdam Shortsea Terminal (RST). Samskip is a Dutch company, which offers multimodal transport solutions and related services to customers worldwide.

We received a warm welcome at the office accompanied with coffee, tea, cake, and other treats. While enjoying our sec-



ond breakfast, our excursion host began with presenting their business and strategy to us. While logistics and the shipping industry isn't exactly included in our study programme, nevertheless, it was interesting to learn about the industry, its challenges and targets for the future. Our host presented us the company's brand new strategy, in which sustainability is the main focus going forward. Our other host later gave us a more

detailed and concrete insight to what the company has done and will do in order to reach their ambitious sustainability goals. To keep us listeners on the edge of our seats, our hosts made us work on a case on how to make an old vessel more sustainable, and we came up with some fun innovations.

The presentation was cut a bit short and we had to move on to the next part of our excursion as we were running a bit late. We got to visit the Rotterdam Shortsea Terminal by bus. We had to make sure not to get in the way of anything or anyone as the terminal is a very busy and hectic environment. We were baffled by the enormous size of this terminal that is just one of many other terminals in the port area. There were stacks of containers as far as the eye could see, massive cranes lifting containers on and off vessels, and cars transporting trailers and containers from one place to another. It was really an insightful visit to see a little snippet of how the ports work. The tour had us asking many questions and I'm sure our hosts and guides were also pleased that we were such an active bunch.

After another fruitful excursion we had to start heading to Schiphol airport and unfortunately we didn't get to see much of Rotterdam outside of the port area. Our trip in Holland was coming to an end, but a lot was still yet to come as we still had a few days ahead of us.

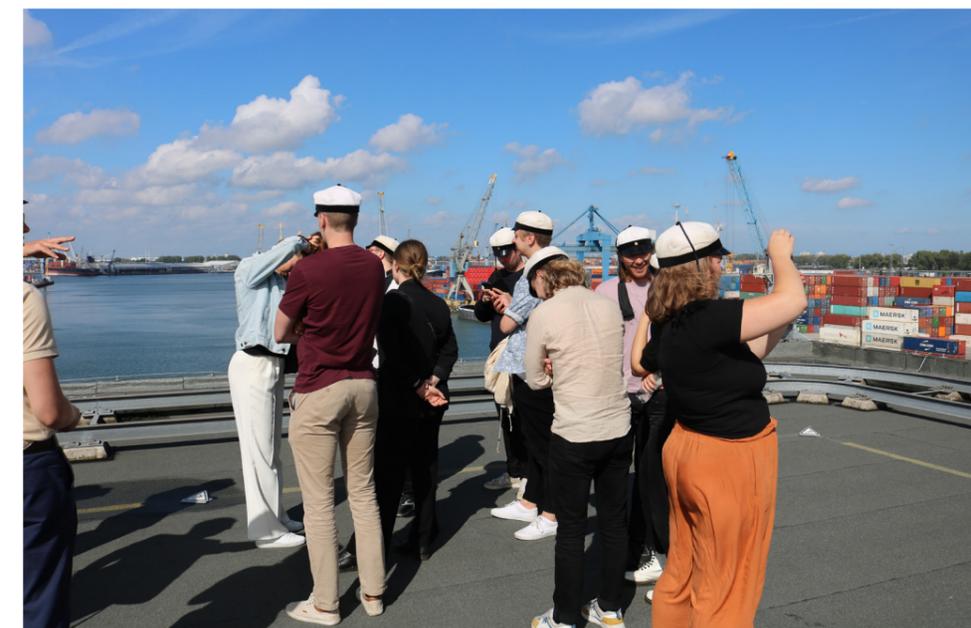
We arrived at the airport well in advance, as we had heard that there might be massive security check queues. We kept ourselves entertained in the queue by cracking each other up with

funny jokes. People were staring at our teekkari caps and quite frequently someone even asked us what the caps mean. Once we made it through the security check, we had plenty of time to kill before our flight was supposed to leave. And as the flight was a bit delayed, we had a good laugh following the airport staff working outside unloading and loading our plane, and cheering and applauding once we spotted our luggage on the belt taking our bags inside the plane.

Luckily, all our luggage made it inside the plane safely and soundly and then it was our turn to board the plane. The flight was about to leave and all the Moomins were aboard! So long Holland and helou Copenhagen!

*Anna Laaksonen
Matti Viitanen*

“**Our hosts made us work on a case on how to make an old vessel more sustainable, and we came up with some fun innovations.**”



DAY 4 - ENERGETIC DENMARK

Our first day in Denmark started after a well slept night in the Cabinn Hotel near the central railway station of Copenhagen and with a tasty hotel breakfast. There was a day full of excursions waiting for us and we were ready for them. After breakfast, we met up in the lobby of the hotel and headed on foot to the Energy Agency of Denmark which was conveniently close to our hotel.

Once arriving at the agency we were escorted to a meeting room by our hosts and they started presenting about the history, the current status and the future plans about Danish wind power and mainly off-shore wind power. We were looking forward to this excursion and were not disappointed about the new things we learned. What surprised us the most was Denmark's plans to build energy islands further off-shore. The idea was to build and connect several off-shore wind farms to an artificial island from where high capacity cables could transfer electricity back

to mainland Denmark and other countries such as Germany, Holland and even Great-Britain. This way, there is no need for every off-shore wind farm to have their own connecting transmission cable to the grid and it would make it possible to build off-shore wind parks even further away in the sea.

Another thing that we found to be an outstanding objective for the agency was how they try to export their knowledge on off-shore wind power to other countries that would benefit from it. They wisely claimed that even though Denmark would be carbon-free with their vast wind resources, it still would not have a big impact on the global environmental crisis. But, if they help other bigger countries to transition to greener energy products, that could have a great impact.

“ The Danish Energy Agency shares their knowledge on off-shore wind power to other countries

After the presentation of our hosts, it was our turn to take it to the stage. Our hosts had asked us out of curiosity if we could present the current standings of off-shore wind power in Finland. Lassi and Eetu were the lucky ones (or only volunteers) to prepare this presentation for the agency. We had worked hard on the presentation on the road during the past three days and we



were pleased with the result. Unlike Denmark, Finland does not really have much off-shore wind power at the moment, but the momentum is just picking up at the moment. We mainly focused on the upcoming projects, on the boom in on-shore wind power and the differences between our countries such as the geographical constraints for wind power in the Eastern Finland due to our neighboring country. The time was quickly running out due to our tight schedule, so we had to run through the last slides, but all in all the hosts seemed to have been impressed and learned a lot of new information from us as well.

After saying farewell to the Energy agency we went for a quick lunch before heading to the next excursion. The excursion was on the other side of Copenhagen in the showroom of Høfor, the state-owned company that supply Copenhagen its drinking water, district heating and cooling, gas, disposal of waste water and they do erect wind turbines to some extent and make sure that the metropolitan area can handle torrential downpours. First we thought that we were going to a kindergarten, due to children playing in the yard, but luckily that was not the case. They still do educate children on

sustainable societies and there was a kindergarten next to the place so there was understandably some confusion.

Our host was a passionate man and the house had multiple different showrooms to explore. He liked to challenge us and tease us with tricky questions, but after the initial shock to us timid Finnish people we started to test his knowledge and question everything we could and show our combined knowledge. We went through how the infrastructure of everything related to energy, fresh water and wastewater is handled in the metropolitan area. We learned about an innovative new smart district being built in Copenhagen where they test the usage of for example apartments and plugged electric vehicles as temporary energy storages. People living in the district even have to agree that the temperature of their homes can fluctuate since they are being used to balance out

the fluctuating production of energy. For example, a home might be warmed up due to excess electricity being produced even if you are not home. They test these kinds of optimizations with the district before gradually implementing it to the whole system.

Another main focus of Høfor is to mitigate the problems caused by heavy downpour that Denmark often experiences. They even had built a miniature city infrastructure in the yard where the host showed us how the downpour behaves in an built environment and what we can do to stop the damages of it. He controlled the setup with a remote control and even tried to get us all wet with the artificial heavy rains and sewage bursting water in the “streets”. They had great ideas on how to manage these masses of water and they tried to be smart on where to lead the excess water and if it is even necessary in some places.

At the end of the excursion we were shown how the rising sea levels will affect Denmark and how they will manage it with an interactive map. After last conversations and questions from our side, we thanked the host by our usual way of singing and with gifts. Before leaving we

were able to explore the rooms ourselves for a moment after the excursion and the giant toilet that led to the basement of the house was a fan favorite.

After the inspiring hands-on excursion at Høfor it was time for the third and last excursion of the day. At Vattenfall there was some tea waiting for us and we got to hear more about off-shore wind power. First we learned ourselves how off-shore turbines' substructures are chosen and built so that they endure the specific conditions like sea depth and wave conditions. At the moment there are multiple substructure options that are rooted to the seabed but Vattenfall is also innovating and developing floating substructure solutions that will allow wind power to be built in more and more shallow water.

Then we were given a presentation about measuring and forecasting the sea conditions that play a key role in selecting the right sub-structure. We learned of measuring buoys with which Vattenfall gathers information of how the sea behaves. Even though the day had been quite long to this point the excursion had an interesting subject and the students stayed focused and asked good questions.

For the remainder of the day our excursion master gave us free and so we had an opportunity to go and explore the beautiful Copenhagen. A part of the group for example went to an Indian restaurant for dinner and then for drinks at a riverboat. Some chose to rest at the hotel and gather strength for the next day!

Lassi Mäkelä
Leevi Koistinen



DAY 5 - RAMBOLL HEAD OFFICE IN COPENHAGEN

Day five was Ramboll-day and the excursion group got to know Ramboll and visit the cool main office in Copenhagen.

We started the day with a Danish tradition of having breakfast at the office. Ramboll offered us delicious sandwiches, fruit and the Finnish favourite, porridge. During the excursion, we heard from Ramboll representatives about different things Ramboll is doing in Denmark and around the world. The topics ranged from smart mobility to bridge building and ocean tunnelling. The day was certainly not lacking variety, and everyone got to hear something of interest.

“
The topics ranged from smart mobility to bridge building and ocean tunnelling.

After another delicious meal at Ramboll's lunch restaurant, we set off towards the



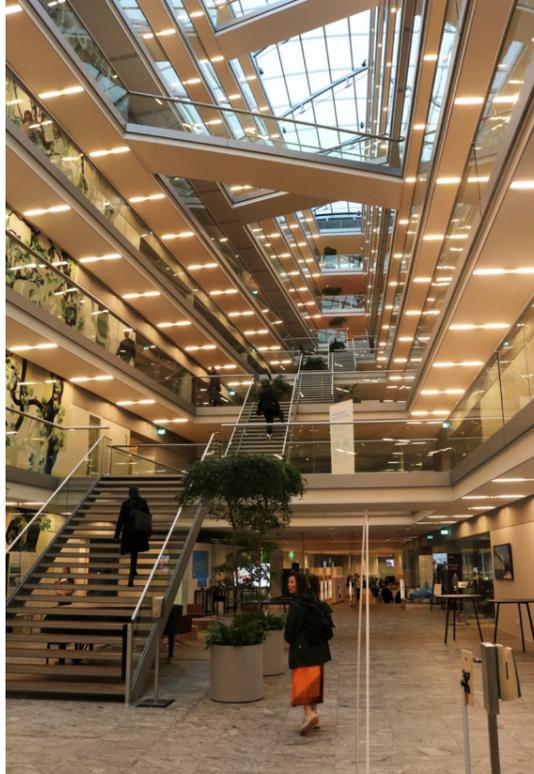
office of Henning Larsen, an architect company that recently merged with Ramboll. There we heard about sustainable design and new, ecological materials. Finally, we took the metro that Ramboll helped build, and went to see the developing urban area in Nordhavn.

In the evening, we had a lovely dinner at an Italian restaurant

with our hosts. The dinner marked the end of the official part of the excursion as a whole, and afterwards the group went on an unofficial excursion of the vibrant Copenhagen nightlife.

Thank you for the fun and diverse excursion day Ramboll!

*Aapo Salonen
Iiris Vuorialho*



Rakenna uraasi T2H:lla

Tarjoamme erinomaisia mahdollisuuksia urallaan ensimmäisiä askelia ottaville, tuleville rakennusalan ammattilaisille sekä jo rakennusalan kokemusta omaaville.

Persoonasi ja kykysi oppia uutta ovat meille aikaisempaa työkokemustasi tärkeämpää.

Lue lisää ja hae: ura.t2h.fi



T2H
Ihania koteja

DAY 6 - LUND UNIVERSITY



We started our 6th day in Copenhagen and traveled to Lund by train. The train journey was pleasant, and we got to see Øresund bridge and an offshore wind farm. When we arrived at Lund we were welcomed by the V-sektion, a guild representing students from the programmes of Civil Engineering, Survey Engineering and Fire Protection Engineering.

The local orientation week was coming to an end, and we were able to join their party. We got to show off our own dance moves to other students in Lund and they also showed their dances. The university guilds have a tradition of making their own class dance. They were excited to see new dance moves and we learned some new ones as well. After dancing our day continued to the campus area where we got to meet even more students and played some games. We got tickets to the afterparty, and the night went on from there.

Lund University was established 1666, making it one of the oldest universities in Sweden. The University consists of nine faculties, one of which is the Faculty of Engineering or LTH for short. The other faculties are Fine and Performing Arts, Humanities and Theology, Law, Medicine, Science, Social Sciences and Economics and Management.

The Faculty of Engineering was established 1961 and has nowadays about 10 000 students

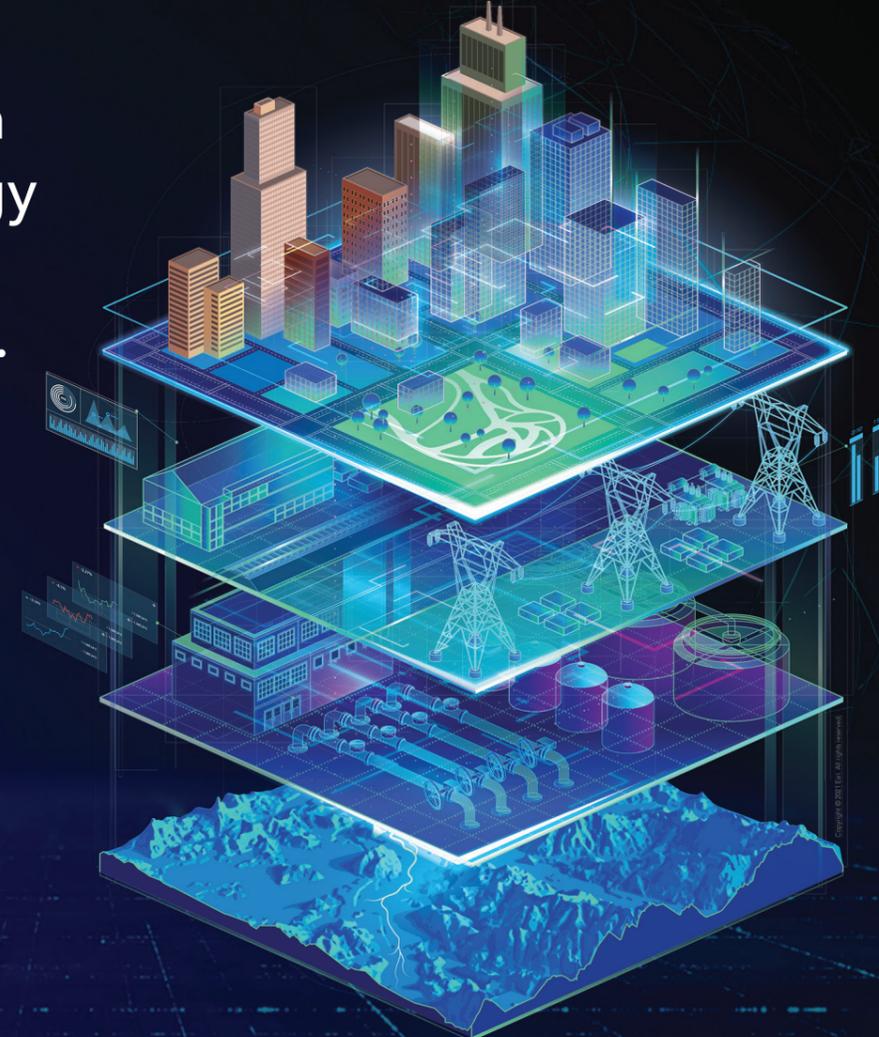


studying in 16 engineering programmes. The faculty also has 5 more programmes leading to a bachelor's degree and 19 international master's programmes.

One of the departments in the Faculty of Engineering is called the Department of Building and Environmental Technology. The department is responsible for the teaching in three different programmes: Civil Engineering, Environmental Engineering and Fire Protection Engineering and Risk Management.

Staying current with the latest technology will give you a competitive edge.

Grow and Apply ArcGIS Skills



The student culture in Lund is very similar to Otaniemi. Here are some of the similarities we found:

Teekkarilakki / Teknologmössa / the Cap of Technology Students

Both the Finnish and Swedish technology students wear a cap with a tassel. While in Finland the cap is always white with only small design variations between cities, the Swedish teknologmössan changes colour in each school.

“**The local orientation week was coming to an end, and we were able to join their party**

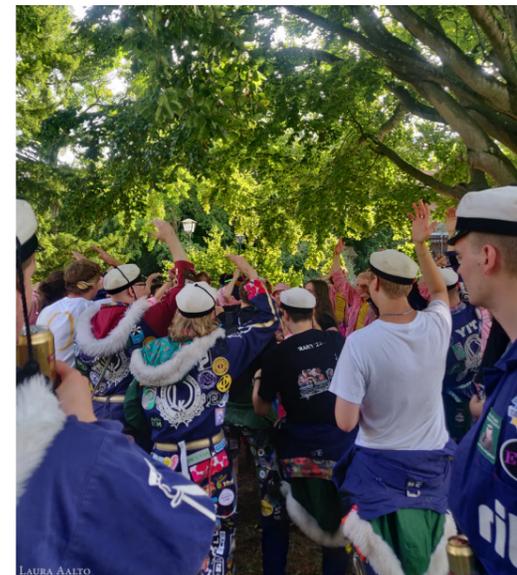
Haalarit / Overall / Overalls

Each guild has their own overalls with a signature colour. In Finland students wear the overalls all the way up or tied to the waist, but in Sweden the overalls are usually hanging freely behind the wearer. Our guild's overalls are blue with a green sleeve. Our Swedish friends from V-sektion also wear blue or green overalls as well as black ones.

Kiltahuone / V-huset / Guild room

Each guild has their own room where they can meet other students of their guild and buy some snacks.

Aino Tornivaara
Niilo Kantoniemi



DAY 7 - RETURN TO COPENHAGEN AND HOME

Sunday morning started with an energizing hotel breakfast, which successfully balanced our night's sleep that was left short due to all the fun we had with our Swedish technology student colleagues last night. Saturday night was indeed eventful, and it was pleasant to get to know Swedish

student culture and other students. Breakfast was followed by gathering in front of our accommodation, from where we headed back to Copenhagen by train.

After we arrived in Copenhagen, the group split up to discover the city's attractions. First, we visited freetown Christiania, intentional community and commune right in the middle of Christianshavn neighbourhood. It's a former military base that was squatted in 1971 and transformed to the community of freedom and art. Nowadays it's quite a tourist attraction, there are restaurants and shops, also often concerts etc. Cars are not allowed and the nature was beautiful, it felt strange to be in the forest in the middle of the city. Photographing is not allowed on the site.

On Friday's excursion, we saw the Amager Bakke, a waste power plant with a skiing hill, hiking trail and climbing wall from

afar. Inspired by this we went to check out the place and how Copenhagen looks seen above from the observation deck. This time though we choose stairs instead of the 80 m high climbing wall.

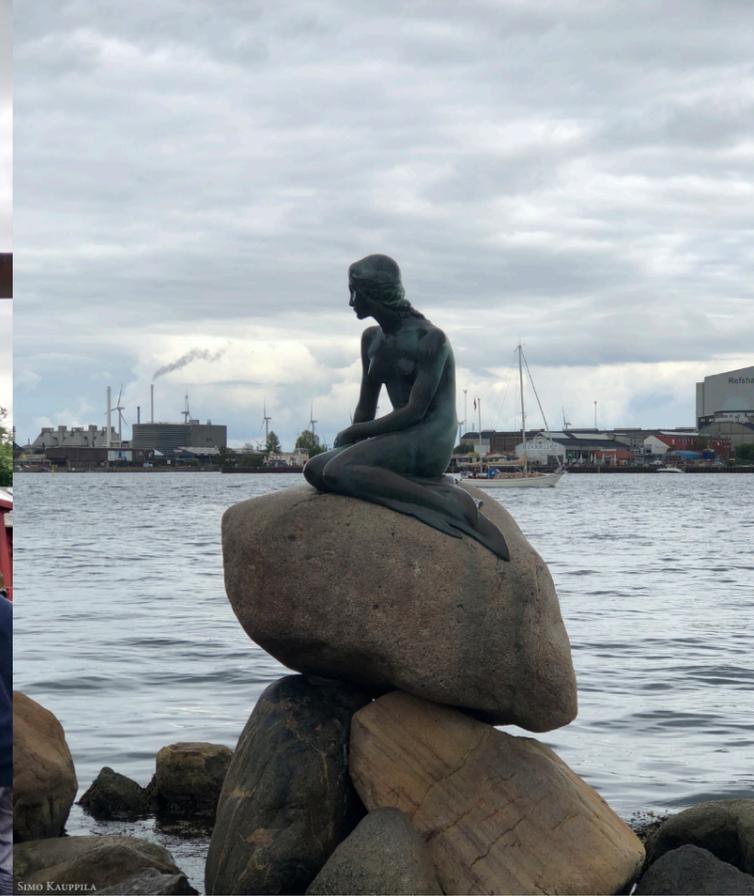
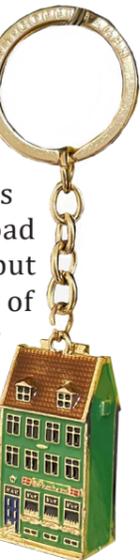
Is trip to Copenhagen nothing without seeing the Little Mermaid, nature of Kastellet and Ny havens colourful houses? Of course not, so we went to check that they are still in their places. Last stop was tip from the friend that lived in Copenhagen, Torpedohallen. It's an old submarine hall that has been reformed to the living buildings. Reforming old industrial areas for residential purposes was important theme in Amsterdam and Copenhagen, so this felt good place to check out. It was worth it, the former submarine hall looked really nice!

After sightseeing and other activities in Copenhagen, it was finally time to head to the airport. Our flight was naturally

a little bit late, but eventually the expedition of ours got to the plane and way home was able to start under general tiredness. Some of us still had some energy left to grind some fluid dynamics, but no beer clocking or other entertaining behaviours were performed during the flight anymore. At this point, access to own beds was very much welcome. However, altogether the trip had been very fruitful and memorable with all the places, events, and interesting com-

panies experienced during the week. We want to thank not only the other guild members for great company and sponsors that made this abroad excursion possible, but especially the Master of Excursion and other excursion organizers for their great work. Until next time!

Laura Aalto
Nina Tanskanen



Do you want to shape tomorrow?

At Alfa Laval, our driving force is to accelerate success for our customers, people and planet.

We design and supply waste heat recovery boiler systems and fired boilers for ships, power plants, process industry and offshore applications worldwide.

Alfa Laval Aalborg Oy summer positions are related to project handling, sales, R&D, procurement and engineering. The tasks may include mechanical and electrical engineering, sales support tasks, calculation and development work.

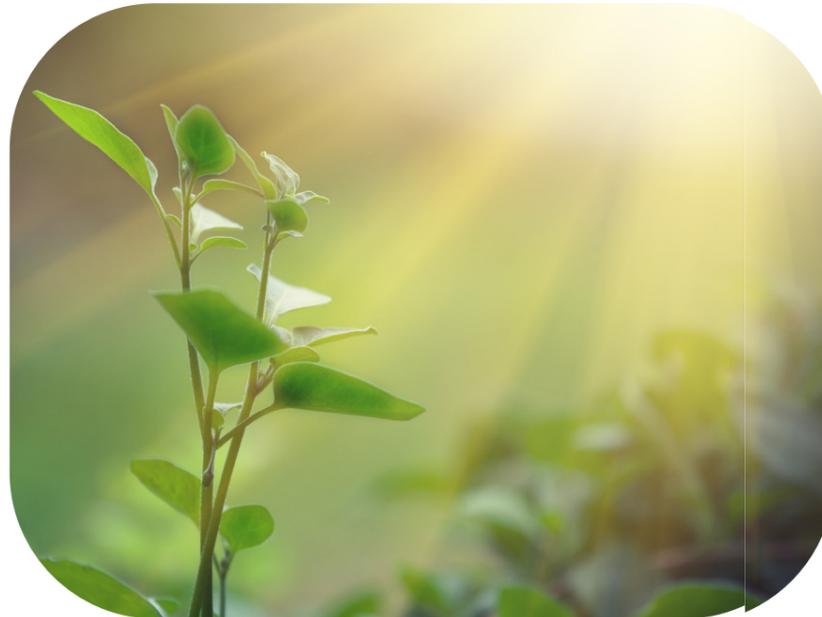
We have asked Simeon, our summer trainee 2022, who worked in Technology Department, to share his experience of working at Alfa Laval.

Where do you study and what is your major?

I am studying at Aalto University where my master's programme is Advanced Energy Solutions. I have selected Energy Systems and Markets as my major.

What kind of tasks were given to you as a summer trainee?

I developed Python packages which are utilized in sales support tasks. In addition, I was part of sales projects where I got to calculate, with the Python packages, the dimensions and performance values for flue gas heat recovery systems according to the values given by the customer. Furthermore, I was assigned to model with data analytics our currently operating boiler performance with utilizing IoT data from the plant.



What were the best aspects of your job?

The best thing about my job is that I got to do things, which I really want to do during my career. I am interested in energy technology and programming, and I got to apply both in my work tasks. I enjoyed working at Alfa Laval because I had the opportunity to take the initiative, which allowed me to reflect on different problems and find solutions to them.

Simeon Seppälä,
Aalto University student



Describe your onboarding process.

My onboarding process started with relatively complex programming project; I had to implement heat transfer calculation methods for heat exchangers to the Python package that has been developed in Alfa Laval Aalborg. The task taught me how to put theories like thermodynamics, heat transfer and fluid dynamics into practice and model heat exchangers. In addition, I was familiarized with programs utilized in Alfa Laval Aalborg. After this task I gradually got better in programming and modelling waste heat recovery systems which allowed me to be a part of more important tasks in sales support projects.

Describe your colleagues, atmosphere, and supervisor work.

Colleagues in Rauma were nice and helpful. Every time I faced a problem which I could not answer, some colleague had always time to guide me towards the correct approach to the problem. Supervisor work repeated the same elements. Supervisors were easily approachable, and they gave me adequate resources and tools to accomplish all the task given to me.

The internship program in Alfa Laval Aalborg included a mentor for each of the interns. I really appreciated this system because I always had one person who was ready to dedicate his time for guiding me towards correct direction in my work projects. In addition, I learned a lot about energy engineering and programming by listening to my Mentor. Overall, I felt that the mentor program was useful to provide for each interns some responsible person who is not your supervisor.

What were the top three things about Alfa Laval Aalborg as an employer?

1. Work tasks were both demanding and interesting, which enabled me to improve skills required as an engineer.
2. Great working environment. Even though I was expected to accomplish results from my tasks, I got all the support needed.
3. There were always some tasks to do. I did not get bored.

Why should you apply for a summer trainee position in Alfa Laval Aalborg?

If you are interested in heat exchangers, power plant technology, physics related to energy technology, I recommend you to apply for a summer trainee position in Alfa Laval Aalborg. Here you really get to work on tasks which are demanding but at the same time, interesting and educational.

Every year we offer diverse and interesting summer internship positions for energetic and initiative technology students.



Note: The city of Rauma offers housing benefit for technical students coming to Rauma for a summer. Read more: www.rauma.fi

www.alfalaval.com/career

Read more about Alfa Laval as an employer and check out our open positions. Application period for summer internships 2023 is 1.12.2022 – 31.1.2023

INNOVATOR'S VOICE

Get inspired

YOU can make a CO₂ neutral choice

Climate change is forcing the world to find resource-efficient, clean and intelligent solutions to produce CO₂ neutral energy. Energy producers have the power to make a difference with their choices – but also an opportunity to benefit from the situation.

TEXT Marjaana Lehtinen

An excellent way to promote the circular economy is to reuse parts of an existing plant.

Europe is leading the way. It intends to become the world's first climate neutral continent by 2050. According to the Green Deal, the European Union has set a target of cutting its emissions by at least 55 percent by 2030 from the 1990 level.

"This is speeding up decarbonization in European energy production, as well as other energy-intensive industries like steel and cement production," says **Ari Kokko**, Director, Technology and R&D, Valmet. "At Valmet, we're witnessing this trend through our ongoing projects and deliveries of new resource-efficient boiler plants and rebuilds all over Europe."

One of the deliveries includes a Valmet CFB Boiler and a flue gas treatment plant to a German customer that is phasing out coal. By combusting waste wood instead of hard coal, the customer will reduce CO₂ emissions by 230,000 tonnes per year.

The upcoming EU directives may restrict the use of some biomass qualities such as roots and stumps, as well as co-firing waste with biomass. Resource efficiency as part of the circular economy prevents the use of good-quality wood-based biomass as a fuel, because in accordance with the cascading principle, it must be used as a raw material for something more valuable.

However, every cloud has a silver lining. What if you could make a profit with things that are usually an expense in the process? What if you could see residual waste as a resource and convert it into valuable products? And in a way that was respectful to the environment, while minimizing emissions?

"With Valmet's technology and expertise in energy, emission control and automation combined with services, energy producers can resource-efficiently decarbonize their processes and boost the circular economy," Kokko continues.

Resource efficiency plays a key role

Diminishing biomass availability is placing pressure on energy producers to move toward more demanding

residue-based fuels. Excellent low-cost residues or side-products from industrial processes can be utilized in energy production. However, they can be challenging if you don't know what they require from the boiler.

"Valmet was trying to find alternative fuels for energy production long before there was any requirement to do so. We've conducted extensive combustion testing with demanding fuels since 1990 at our own R&D center in Tampere, Finland. Currently, our fuel library consists of more than 9,000 samples," Kokko points out. He continues: "It's important to remember that resource efficiency isn't just about fuels. For example, flue gas scrubbers with heat recovery provide a huge amount of additional low-grade heat. Increasing resource efficiency means producing more energy with the same amount of fuel and lower CO₂ emissions. And biomass gasification can replace coal, natural gas or oil in heating on industrial sites."

To ensure optimal performance in energy production processes, Valmet is continually developing its Valmet DNA Automation System and Valmet Industrial Internet (VII) applications and services.

What if you could make a profit with things that are usually an expense in the process?

Conversions boost the circular economy

Switching to new and more sustainable fuels, achieving green energy targets and reducing reliance on fossil fuels does not always call for an investment in a completely new plant. A pulverized coal-fired boiler or grate-fired coal boiler can be converted into a biomass-fired bubbling fluidized bed (BFB) boiler. A coal-fired circulating fluidized bed (CFB) boiler can be rebuilt for biomass or multifuel firing.

"An excellent way to promote the circular economy is to reuse parts of an existing plant and convert it to run on biomass. It isn't always necessary to build a completely new plant, but existing parts can be utilized in a conversion," says **Jouni Koskinen**, Senior Manager, Sales and Technology, Energy Rebuilds and Conversions.

Koskinen highlights a conversion project in Poland, where a pulverized coal-fired boiler is being converted into a 157 MW_{th} BFB boiler that will run on biomass. ■

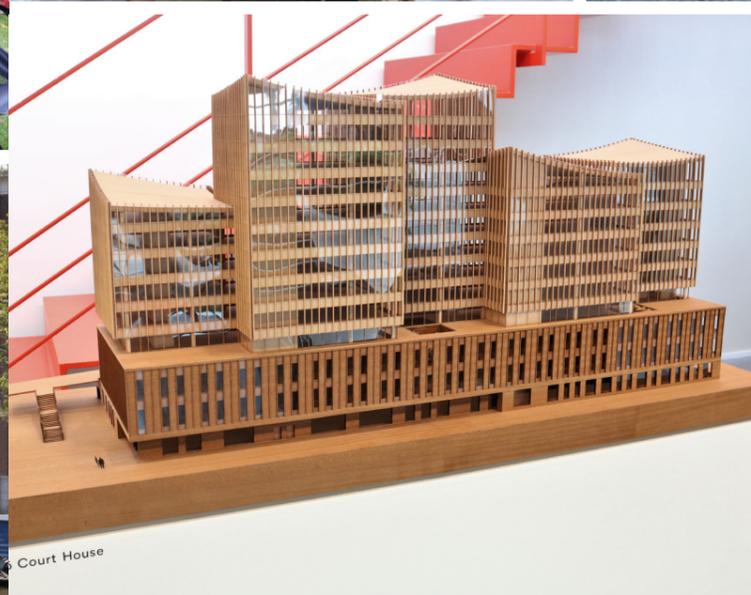
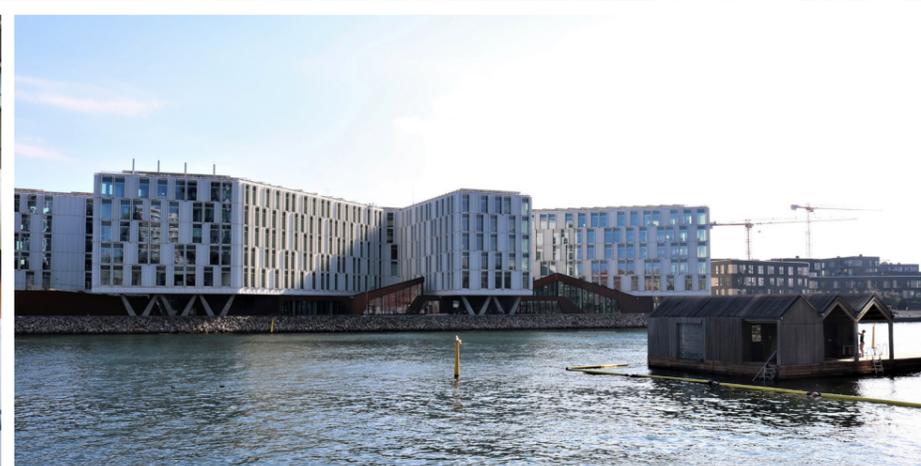
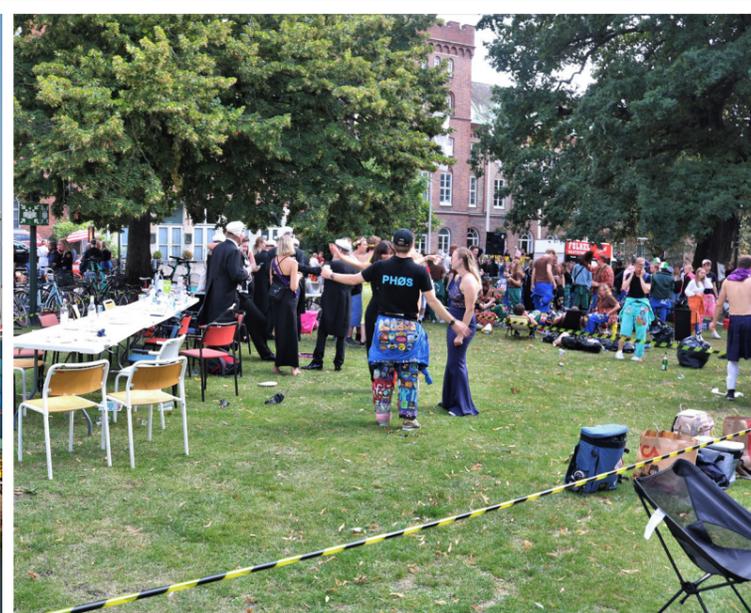
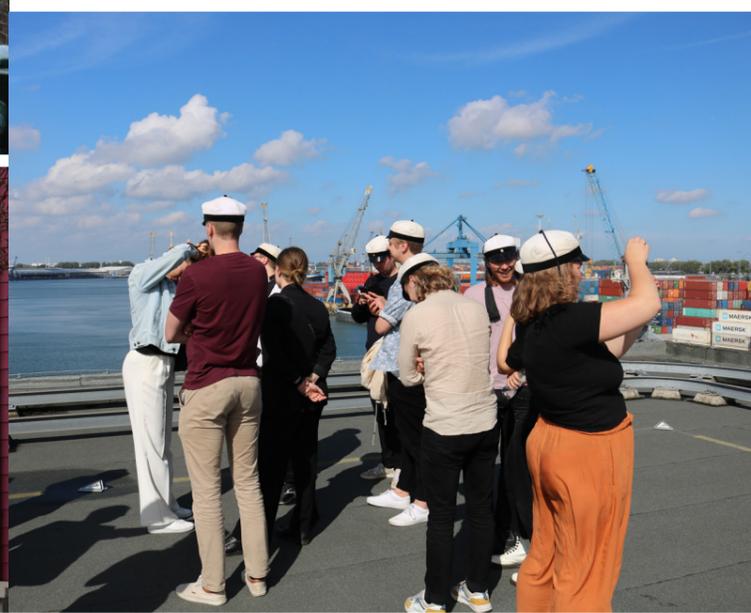
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A coal-fired circulating fluidized bed (CFB) boiler can be rebuilt for biomass or multifuel firing.



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