

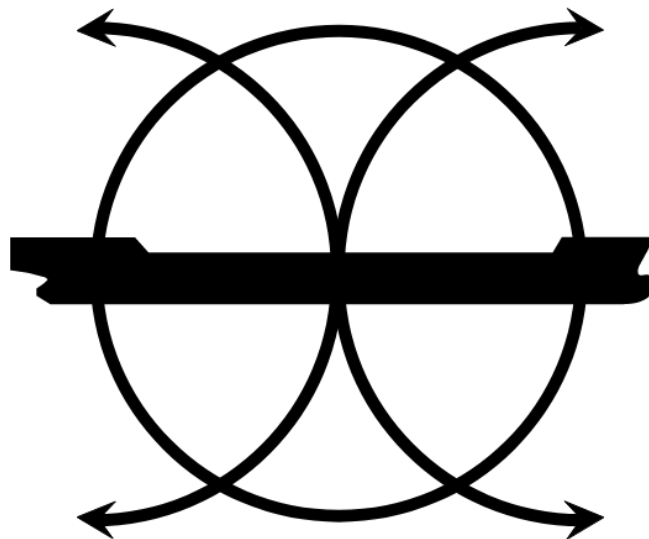
NUL-KRYDS

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NTHS 72, Sweden 2019

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Nul-Kryds



since 1947

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# 1 Words from the President

The NTHS congress (Nordic Technical Universities' Shipbuilders Congress) has been an annual tradition for Nul-Kryds to participate in since its outset in 1947. This year the congress was a trial co-organised and hosted jointly by the student associations at KTH in Stockholm, Kongliga Skeppssällskapet, and Chalmers Skeppsbyggare at Chalmers in Gothenburg.

The decision for the Swedish associations to host NTHS together was taken at the 70th NTHS in Norway in 2017 in order to strengthen NTHS in Sweden. This was done in order to ensure a full-week schedule with interesting visits and to allow the hosting organisations to utilise the full country when planning the congress. Based on these criteria NTHS 72 in Sweden was an absolute success and it was decided for Sweden also to co-organise the next NTHS on Swedish soil.

Even though Swedish shipbuilding industry is not as big as it used to be during the 20th century, the strong focus of the industry on high-end, high-speed crafts, naval vessels, small crafts and environmental technology formed the basis for a fruitful congress.

After having successfully organised NTHS 71 in Denmark in 2018, many members of the Danish delegation looked forward to have the time to fully participate in the interesting company visits and socialising without having to mind a time schedule. A delightful relief, and many bonds between the Danish delegation and the other organisations were formed. Bonds that I believe will be beneficial for our future professional careers – and for our future employers.

The report at hand presents the NTHS congress day by day. While I have the opportunity, I would on behalf of Nul-Kryds especially thank all of our sponsors for making our participation in this year's congress possible. The contributions and interests from the sponsoring companies are priceless and I would like to emphasise how important the support is for Nul-Kryds' activities. Activities that attract and motivate engineering students to aim for a career in the maritime industry.

Best regards,  
Philip Holt,  
President of Nul-Kryds  
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# Contents

<b>1</b>	<b>Words from the President</b>	<b>1</b>
<b>2</b>	<b>Participants</b>	<b>3</b>
<b>3</b>	<b>Schedule of the week</b>	<b>4</b>
<b>4</b>	<b>Sunday</b>	<b>5</b>
<b>5</b>	<b>Monday</b>	<b>6</b>
5.1	Alfa Laval . . . . .	6
<b>6</b>	<b>Tuesday</b>	<b>7</b>
6.1	Stockholm Repairyard . . . . .	7
6.2	Company fair at KTH . . . . .	8
6.2.1	DNV-GL . . . . .	8
6.2.2	Trans Auto AB . . . . .	8
6.2.3	Wallenius Marine . . . . .	8
<b>7</b>	<b>Wednesday</b>	<b>10</b>
7.1	Rolls-Royce . . . . .	10
<b>8</b>	<b>Thursday</b>	<b>12</b>
8.1	Volvo Penta . . . . .	12
8.2	SSPA . . . . .	13
<b>9</b>	<b>Friday</b>	<b>14</b>
9.1	Company fair at SSRS . . . . .	14
9.1.1	Scanjet . . . . .	14
9.1.2	ScandiNAOS . . . . .	14
9.2	Stena AB . . . . .	15
9.3	Banquet . . . . .	16
<b>10</b>	<b>Financial</b>	<b>18</b>
<b>11</b>	<b>Sponsors</b>	<b>19</b>

## 2 Participants

<b>Nul-Kryds</b>	
<b>- Copenhagen -</b>	
Philip Holt	Frederik H. Berthelsen
Anna K. Joensen	Ondine Chegaray
Hans Frederik W. Schwarz	Rasmus Ruff
Chandan Kumar	Jesper M. Antonisen
Bjørn W. Daugbjerg Welling	Mathias V. Hemmingsen

<b>Mannhullet</b>	<b>Laivanrakentajain Kerho</b>
<b>- Trondheim -</b>	<b>- Helsinki -</b>
Harald Haugli	Lassi Mastomäki
Henrik Heien	Eetu Kivelä
Live Forfang Bjørnstad	Joakim Heinolainen
Vilde Eirin Bruun	Nikita Dementyev
Mari Taranrød Storsul	Werner Hämäläinen
Aksel Knudsen Nordstoga	Essi Ekman
Anders Falsen Habostad	Alexander Jerne
Sohrab Sekandar	Juho Särkkä
Ola Drange Veglo	Veikko Ahola
Erlend Lundby	Iiro Vanne

<b>Chalmers Skeppsbyggare</b>	<b>Kongl. Skeppssällskapet</b>
<b>- Gothenburg -</b>	<b>- Stockholm -</b>
Gabriel Taquet	Nitish Shetye
Ho-Ann Chen	Victor Ekström
Linda Sieber	Alfred Rapaport
Janne Heiskari	Arvid Larsson
Gustav Svensson	Valérie Bouysses
Foivos Lemonakis	Gökhan Çakır
Javier Llop	Yucong Ma
Vikram Raju Ilangovan	Sonja Wadelius
Nimal Prabahar	Erik Blackert
	Jonathan Viinikka

### 3 Schedule of the week

The schedule for this years NTHS consisted of twelve companies where the three companies were the main contributors: Alfa Laval, Rolls-Royce and Volvo Penta - as these were the main sponsors. All aspects of the maritime industry was covered with this programme: fuel, yard, classification, propellers, engines, towing tank, CFD, ship owners, operation and shipping in the future. This made it a fruitful week where the participants gained a lot of knowledge.

It can furthermore be seen from the schedule that the congress took place in Stockholm Monday and Tuesday, and then in Gothenburg Thursday and Friday. Wednesday was therefore a long day with bus drives as well as long and interesting visit at Rolls-Royce in the middle of the day.

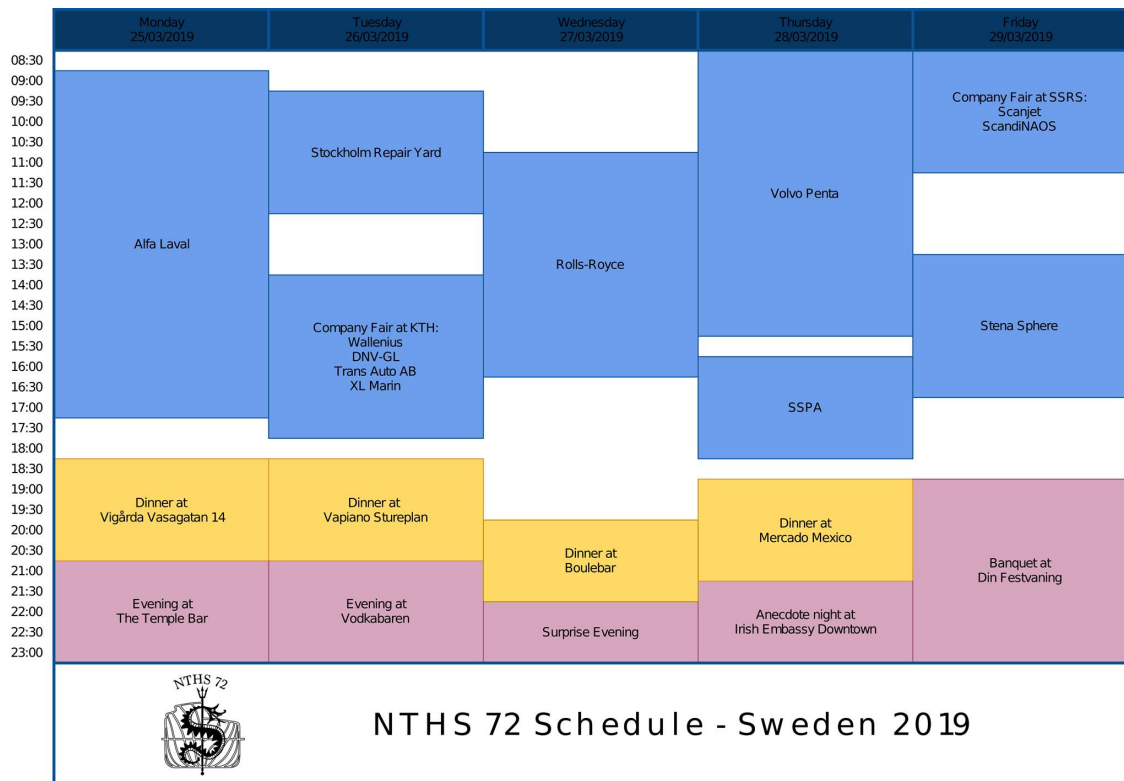


Figure 1: *The schedule for the NTHS 72 congress.*

## 4 Sunday

The Danish delegation met at the Copenhagen Central Station at 10 o'clock Sunday morning and short after took the fast train to Stockholm. The delegation had high expectations for the week to come and as five of the Danish participants had never been to NTHS before, they were eager to get to Stockholm.

After a smooth ride that lasted for four and half hours, we arrived to Stockholm and went to the hostel AF Chapman, which was a full-rigged ship in the centre of Stockholm. This was a very nice way to start the congress and there was a magnificent view of Stockholm from the hostel.

When everybody had arrived we met at a Chinese restaurant where people met and greeted each other. Some were recognisable faces from previous congresses but for the most part people were new at NTHS and excited to get to know each other and experience the atmosphere of NTHS.



Figure 2: *The Nul-Kryds delegation in Stockholm on board AF Chapman.*

## 5 Monday

Monday started early with a good breakfast at the Af Chapman Hostel. Afterwards we went with the bus to Alfa Laval Tumba.

### 5.1 Alfa Laval

Arriving at Alfa Laval we were greeted by a welcoming team. The company was presented with focus on separators which are produced there. The NTHS participants were divided into two teams, each having three presentations. The presentations were "Separators on board" by Remco de Witte, "Trainee at Alfa Laval" by Emil Anderson, "Innovation in Marine" by Franciska Kjellström, "Introduction of high speed separators" by Shinya Tanohashi, "Oily water separation" by Nicolas Meslot and "Puredry" by Ali Kamil.

After the three presentations lunch was served. During lunch there was plenty of opportunity to mingle with the employees and trainees. After lunch there was a tour of the test centre where cells, different types of tests and requirements were explained.

The teams went back to the conference rooms to see the other three presentations. A tour of the training centre was part of the last three presentations mentioned. Here two separators in different sizes were turned on to allow the participants to see how it worked. Afterwards, coffee and cake was served, in Swedish "Fika", and there was again great opportunity to mingle with the employees.

The participants were divided in two again, one with a presentation about the marked, treatment principles and ballast water in general. The other team got a tour of test centre with focus on UV-ballast treatment. The teams were competing in Kahoot with questions from the day's presentations. The winners got a PureBallast bottle and everybody got a goodie bag.

The night ended with burgers in Vigård, here all the participants had good time to meet each other and continue to socialise.



Figure 3: All five NTHS delegations in front of Alfa Laval.

## 6 Tuesday

Tuesday the congress went by bus to the small island Beckholmen dedicated mainly to Stockholm Repair Yard. The congress stayed there until lunch and afterwards drove to KTH in Stockholm for company presentations held during the afternoon.

### 6.1 Stockholm Repairyard

At Stockholm Repairyard, SRY, the visit took off with a presentation of the place and history behind the company. Since it was founded in 1850, it has grown and will continue to do so - in that connection we got to see future sketches of the island as the engineers imagined it would improve in the upcoming years.

This presentation was undertaken by sales manager, Torvald Hvistendahl, who also informed about his and his co-workers job at the Repairyard as project managers. The majority of the work done there is repairing and maintenance of vessels from the Stockholm archipelago and the Baltic sea. Furthermore, SRY had a lot of costumers to whom they sold interior and essential equipment for the different vessels.

After the presentation and introduction the congress went for a tour around the shipyard. One of the staff-members, Johanna Sunneland, guiding one of the groups around the yard was a familiar face to many of the participants as she had participated at NTHS in 2017 and 2018. Experiencing how nice a job one can end up with only half a year after graduation was highly motivating.

During the tour the congress saw their drydocks blasted right out of the bedrock - that measures  $180\text{m} \times 25\text{m}$ , in which a lot of the work was concentrated. The congress also saw the outfitting-quays, went on board a smaller harbour bus and saw the iconic giraffe-crane which stands as an indicator of SRY.



Figure 4: *One of the drydocks at Stockholm Repairyard.*





Figure 5: *Group photo outside Stockholm Repairyard.*

## 6.2 Company fair at KTH

After lunch the congress proceeded to the Swedish hosts university, KTH Royal Institute of Technology. At the student bar, T-centralen, three company presentations with adjoining discussion where held:.

### 6.2.1 DNV-GL

DNV-GL gave a short presentation very much focusing on the possible contributions of the maritime industry towards fulfilling the Global Goals of the United Nations and autonomous shipping. Digitalisation of the ship, certificates, and even surveys performed from shore were in focus as future areas of development.

After the presentation some questions to the specific work of the company representative were asked and the developments within digital certificates discussed, something at the moment not accepted by the Swedish Maritime Authority.

### 6.2.2 Trans Auto AB

Reflecting the focus on small crafts at KTH, Trans Auto AB, were an excellent representative, also for the present day Swedish maritime industry: Trans Auto AB manufactures driveline components for smaller high speed vessels and act as a system integrator whom can provide everything from high-speed engines to propellers or water-jets. The presentation provided an extensive overview of the solutions offered.

### 6.2.3 Wallenius Marine

Wallenius Lines was represented by three naval architects, Urban Lishajko, Carl Fagergren and Carl-Johan Söder, who presented the naval architecture activities within the Wallenius Marine department. The presentation focused on the developments within the PCTC segment of the Ro-Ro business in which they are pioneers and keep developing the concept. Also the company's occupation with ship management, design and performance was mentioned while questions regularly were asked and answered, further enhancing the academic outcome.

Finally, Wallenius Marine's involvement in sustainable projects was introduced, presenting the idea of a carbon-neutral PCTC design to be ready in 2021 - amongst others in cooperation with both KTH and Chalmers. Afterwards there was time to mingle and ask specific questions to the different representatives for each company.



Figure 6: *Presentation by Wallenius Marine at T-centralen at KTH.*

In the evening the congress visited the Italian restaurant Vapiano to get dinner. We had plenty of time to eat and talk to each other before continuing into a well organised karaoke night.

## 7 Wednesday

Wednesday was characterised by two long bus rides and the visit of the Rolls-Royce company. The delegations first drove for three hours from Stockholm to Kristinehamn, where Rolls-Royce is located. Then, after a visit of the facilities and presentations, the congress got on the bus again for another three hours ride to Gothenburg.

### 7.1 Rolls-Royce

Arriving to Rolls-Royce, we were first divided in two groups. Each of them was shown the wind tunnel facilities as well as the tunnel combining wind and water, and a power-point presentation of the company. In the wind-tunnel facilities we got an introduction to propeller design and the making process at Rolls-Royce. Especially cavitation is an important factor in the design of a propeller which is a trade-off between noise, efficiency and strength, depending on the purpose of the propeller. They explained how they both use CFD and testing and how both have their importance. Indeed, as CFD becomes more and more accurate, testing is still used a lot to check the obtained results. Furthermore, different parameters can be measured, as an example CFD does not show if cavitation will be erosive.

After a lunch served by the canteen of the company, we had a guided tour in the assembly hall where we saw shafts, propellers, bearings and more of all sizes. It was impressive to see a lying propeller almost as big as the tallest guy of the congress! Our guide explained about the CPP-propellers, the materials used etc. He showed us the place where they test the propellers in the hall (e.g. for the shaft). We went to the training room, where our guide showed us hydraulic systems for water-jets and the control simulator. Several participants even tried the chair with levers, and we could see how the vessel moved around on the simulation screen.

When the tour was over, we attended presentations by the company. The first presentation was about product management for propellers with focus on their Promas system, an integrated propulsion and manoeuvring system. This system combines a costa bulb (minimise pressure drop and vortex behind the propeller) and a twisted rudder (less stalling). The second presentation covered an other product: pods, which combine the properties of a rudder and thruster in one unit. The next presentation covered water-jets, as the ones we had seen in the training room.

Two presentations were then given by NTHS participants, Philip, president of the Danish delegation, and Nimal and Vikram, both from the Swedish delegation from Chalmers. They presented the topic of their master theses, such that the company could have an insight in the interests of their visitors.

Finally, the last two presentations by Rolls-Royce were respectively about commercial sales and recruitment.



Figure 7: *The congress in front of the Rolls-Royce entrance.*

## 8 Thursday

After a 6-hour bus ride Wednesday, everybody was ready for an exciting day by the ocean of Gothenburg at Volvo Penta and their outdoor facilities. Which was followed by a trip to Chalmers university to see the test facilities of SSPA. The day ended at a bar for Anecdote night.

### 8.1 Volvo Penta

The day started of by a quick introduction to the history of Volvo Penta which first engine goes back before the first world war. After the second world war this started going very well for Volvo Penta due to their innovative strategy and their stern driven boats, and in 1980's the Double propeller (Duo Prop) system was launched. After a lot of historic facts it was time for a leg stretcher at their amazing outdoor facilities.



Figure 8: *The harbour and test facility area at Volvo Penta*

This followed by a presentations of their double propeller system that was launched in the 80's and was a huge success. Volvo Penta then followed up on this system by launching the IPS (Inboard Positioning System). This is as far as known, the best positioning and manoeuvring system for yachts and smaller boats that drives on electric engines or diesel engines. With the IPS the propellers are placed in series in front of the rudder. At this time a boat can have up to 4 IPS system installed for more power and would still be able to manoeuvre perfectly. Volvo Penta's clients is mostly looking for luxury solutions, witch they complimented by introducing a joystick. This made the docking of the yacht amazingly easy, and as they said "its as easy as playing video games".

After presentations, we were show around their facilities. Showing the applied IPS system to some of the the customers boats and a tour at some of the boats and the yacht's they had brought in for testing, some of these can be seen in the following pictures:



(a) *Test boat.*

(b) *Yacht brought in for testing.*

After the guided tour around the facilities, we had an amazing outdoor lunch at the harbour shown in Figure 8. We believe everyone could agree that you could easily get used to that!

The visit ended by a presentation of a software that Volvo Penta had developed themselves. The MPS (Marine Propulsion Software) used empirical data to estimate how much power and how many IPS system that should be installed to reach the requirements of the law and the owners.

After the visit at Volvo Penta it was time to get to Chalmers University where SSPA had their headquarter.

## 8.2 SSPA

Arriving at Chalmers we definitely had to take a group picture before we went in to the secret test facilities, where no pictures were allowed.



Figure 10: *Chalmers University.*

We had a quick introduction of SSPA about who they are and what they do. After the presentation we were separated into 3 groups. The groups were chosen by the colour of our name tag handed out before the presentation, then we had a guided tour around the facility. They re-allocated us so that one group had a tour in the Maritime Dynamics Laboratory, to see how they simulated the different sea states with the wave makers in the tank. Another was shown the 260m long towing tank and afterwards got to see the enormous cavitation tunnel. Last group was shown how their newly developed navigation software called; Seaman Online, at this stop we also got to actually try the software, with simulated navigation in harbours for different sizes of ships. It was arranged so that everybody got to see the whole facility on a guide tour by the employees.

At the end, when there were no more questions to be asked or things to be shown. SSPA gave us refreshments in the form of cold beers, which was well received. We spent around an hour of small talking and networking with the employees before we headed towards our next stop - a Mexican dining place for some food and socialising. The evening ended with the annual Anecdote night at a bar, where we met recent and former participants of NTHS.

## 9 Friday

Friday was a shorter day with two smaller presentations that focused more on newer technologies and one larger visit at Stena, where we got to know the big picture of such a big company and went in depth with the maritime technical engineers who presented. The day ended early so the participants could get ready for the Banquet in the evening.

### 9.1 Company fair at SSRS

The day started after a short bus drive to SSRS (Swedish Rescue Society) in Langedrag, where the company presentations were held.

#### 9.1.1 Scanjet

The first presentation was from Scanjet who provides intelligent tank management in two fields: marine and industrial. Scanjet is on of the leaders when it comes to tank management and cleaning as they have 70% market share, mainly because of the old shipbuilding tradition in Gothenburg according to themselves.

#### 9.1.2 ScandiNAOS

The second presentation of the day was about ScandiNAOS and given by Development Engineer, Joakim Bomanson. He talked about methanol as an alternative fuel because it is globally available, easy to produce, easy to transport and store, no SO<sub>x</sub> emissions, lower NO<sub>x</sub> emissions and potentially renewable. But, as he said, the challenge is that it has a low flashpoint, the flame is invisible when it burns and methanol is toxic. ScandiNAOS primarily work with methanol but in general they work with energy efficiency and sustainable shipping. They are very involved in projects where the current projects are GreenPilot and LeanShips. And we actually saw the GreenPilot boat when we walked to Stena later that day.



Figure 11: *ScandiNAOS primarily focuses on methanol which they see as the next fuel.*

## 9.2 Stena AB

The last visit at NTHS 72 was at the Stena Denmark Terminal in Gothenburg where the headquarter of Stena AB is located. We could see the ferry to Frederikshavn from the meeting room and had a very good view of the quayside of Gothenburg. The visit started with a short introduction from Claes Tretow, Project Engineer at Stena Teknik. Here the whole Stena AB was presented and we got know that Stena is much more than vessels as they also own wind turbines and residential areas.

The first presentation was about operation in Stena Line and was given by Bjarne Koitrand, Manager Technical Operations. He presented about Stena Line and emphasized that they have 29,000 yearly sailing with the ferry fleet.

The second presentation was about Stena Bulk and given by Therese Jällbring, Manger Business Interaction. She talked about their fleet both consisting of owned and chartered vessels, where they own about 1/3 of the vessels. The newer vessel were presented as she talked about the new IMOII MAX vessels that is built to live up to the new IMO regulations. The vessels are designed by Stena Teknik. She also talked about vessel performance and how they benchmark their operation and route choices with their competitors. Stena Bulk watches their competitors routes by AIS and as she said it: "If the competitors go East, we go west".

Then after a coffee-and-cake break (in Swedish: Fika) the next presentation was given about Stena RORO by Niklas Andersson, Manager Technical Operations. He talked a lot about "Stenability" and how Stena make their business sustainable.



Figure 12: *Claes Tretow introduced the visit at Stena AB and talked about Stena Teknik.*

The fourth presentation was about Stena Teknik and presented by Claes Tretow, who was our host at Stena and did the introduction. He talked about Stena Teknik which works as technical consultants for the other departments in Stena AB. They design newbuilds for Stena Bulk, Stena Line and Stena RORO as well as doing project work, conversions, vessel concepts, innovation and R&D support. They are 20 engineers who work within four competence areas: structural, hydrodynamics, machinery & systems and contracts & procurement. He talked about quality check and energy efficiency as they are some of the keywords in shipping today. Claes, as a recent graduate, also told us about what we



should think about when we seek our first jobs and what to expect from working in the industry, when we are not studying anymore.

The last presentation was given by Per Wimby, Project Manager, about electromobility and green projects within Stena Teknik. He talked about the battery installations they have already done on some of the short-cruise ferries, which we could see through the window on the ferry to Frederikshavn.

### 9.3 Banquet

The NTHS-congress ended fabulously with the annual Banquet, where all the new friendships made during the week, collide in a mixture with good food and mingling with the old-timers. Among the old-timers were a lot of the participants from last year in Denmark, but there were also old-timers that had 10 years anniversary in participating in the NTHS Banquet, which meant that they had 10 medals. This was spectacular and they therefore also did one of the introductory speeches of the night.



Figure 13: *The complete picture; All 50 NTHS72-participants including the bus driver dressed up for the great Banquet-evening.*

As usual there are some traditions for the Banquet-evening that must be kept, one of them being the speech of the youngest male and female participant. This years youngest male participant was Mathias Hemmingsen from the Danish delegation. In the speech Mathias mentioned among other things how much he had learned throughout the congress and all the good friends that he had made.

The Banquet is the heart of the NTHS congress, because this is where you get to meet and chat with all the dedicated persons participating in the conference. It is a really good way to socialise and make new contacts, while scouting the industry for possible career paths. The Banquet rounds off the wonderful week with great, enthusiastic people. The next morning the delegates returned to their respective countries, although new bonds have already been made and will hopefully flourish in the future.



Figure 14: *Gifts for the hosting universities. The Danish gift included a self-inflating liferaft among other things.*



Figure 15: *Expectations are high for the evening at the presidential table.*



Figure 16: *Ho-Ann Chen from the Swedish delegation (Chalmers Skeppsbyggare).*

## 10 Financial

Thanks to the weak Swedish crown the total costs of the Danish participation in NTHS 72 were limited. Especially, money were saved on the train journey as Nul-Kryds by postponing the return journey from Gothenburg to the afternoon could have the ticket for 120 DKK/person.

For Nul-Kryds the congress therefore ended with a small surplus of 1,553 DKK. Upon request we will happily return the rated surplus to our contributors.

We are extremely grateful for the financial support we have received and very happy that both funds and the maritime industry see the value in NTHS. Without the generous help of our sponsors it would not have been possible to participate at NTHS with participation fees suitable for a student budget.

Participant fee NTHS	-22,457 kr
Transport (by train)	-5,321 kr
Miscellaneous, incl. gift for hosts	-2,719 kr
Printing of leaflet	-450 kr
Participant fee from students	8,500 kr
Support from DSNAME	12,000 kr
Sponsors	12,000 kr
Result	1,553 kr

11 Sponsors





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