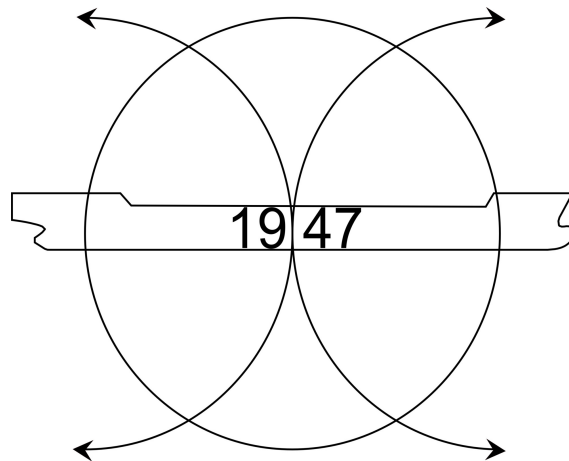


NUL-KRYDS

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# NTHS 2015

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## Foreword

This year's annual NTHS congress (Nordic Technical Universities' Shipbuilders Congress) was hosted by Aalto University in Finland.

Of the Nordic countries, Finland stands out because of its relatively large amount of heavy industry. It is therefore one of the more popular venues for NTHS, which was made apparent by the amount of applications we received. The host delegation did not disappoint; they delivered a spectacular program which included visits to state-of-the-art companies manufacturing machinery, icebreakers and some of the world's largest cruise vessels, among others.

For the Danish delegation it was a great experience to visit shipyards and vessels, both finished and under construction. It is always a focal point in Nul-Kryds to present a practical dimension to the engineering students and NTHS is one of the most efficient ways of obtaining this. This years NTHS also offered interesting knowledge on sailing in ice, something very relevant with the increased focus on sailing in arctic waters.

Additionally, we expanded our professional networks and created contacts throughout Scandinavia. This enables future cooperation and exchange of know-how. We also believe that the relations between the Nordic Five Tech universities support the Nordic Master program which several of DTU's students are enrolled at.

The report at hand presents the NTHS congress day by day and offers an insight in the exciting experiences we have gained throughout the week.

On behalf of Nul-Kryds I would like to express my gratitude towards everybody who have supported the congress and the work of Nul-Kryds in general. We look forward to continuing the fruitful cooperation.

Christian S. Nielsen  
President of Nul-Kryds

# Contents

<b>1</b>	<b>Schedule of the week</b>	<b>4</b>
<b>2</b>	<b>Monday</b>	<b>5</b>
2.1	Meyer Turku Shipyard . . . . .	5
2.2	Steerprop . . . . .	5
<b>3</b>	<b>Tuesday</b>	<b>6</b>
3.1	Rolls Royce . . . . .	6
3.2	Wärtsilä . . . . .	7
<b>4</b>	<b>Wednesday</b>	<b>8</b>
4.1	Maritime Seminar . . . . .	8
4.2	NAPA . . . . .	8
<b>5</b>	<b>Thursday</b>	<b>9</b>
5.1	Aalto University . . . . .	9
5.2	Finish sauna . . . . .	9
5.3	Arctech – Helsinki Shipyard . . . . .	9
5.4	Anecdote evening and Chairman’s dinner . . . . .	10
<b>6</b>	<b>Friday</b>	<b>11</b>
6.1	Aker Arctic . . . . .	11
6.2	ABB . . . . .	11
6.3	The Banquet . . . . .	12
<b>7</b>	<b>Accounts</b>	<b>13</b>

# 1 Schedule of the week

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
Morning		Meyer Turku Shipyard	Rolls Royce		Aalto University	ABB Marine/ Aker Arctic
Afternoon		Steerprop		Seminar at Forum Marinum with Deltamarin, Evac, Almaco and Turku Repairyard	Sauna at Otaniemi campus	
Evening	Meeting in Stockholm Welcoming dinner at MS Galaxy	Evening hosted by Steerprop	Evening hosted by Wärtsilä	Evening hosted by NAPA	Evening hosted by Arctech Föredrag afton Chairman's dinner	Banquet
Night	Party on a boat!	Everyone goes to jail!	Party at Vaasa!	Sauna at NAPAs office	Meet up with the old-timers!	Banquet after party!

Figure 1: Program for the congress.

## 2 Monday

### 2.1 Meyer Turku Shipyard

In the morning we arrived at Turku Harbor with the overnight ferry from Stockholm. The ferry arrived at 07:00 and we immediately took off to go to Meyer Turku Oy where we got a nice breakfast and an introduction to the company and their construction processes and innovation. After the presentations we went off with busses to see the yard and their dry-dock. They were in the progress of outfitting a new cruise vessel and we got a guided tour on board the vessel. We had some good talks with our guides gaining insight into the decision process and getting to know more about the different methods used for outfitting a cruise vessel.



Figure 2: Meyer Turku Shipyard

### 2.2 Steerprop

After the tour we were offered lunch before we headed off for our hotel in Rauma. We quickly checked in, dropped our luggage and went on to Steerprop Ltd. We were introduced to the company and afterwards an engineer gave an insightful and technical presentation of how they develop and innovate their Azimuth propulsors. Afterwards we were allowed into the welding/assembly shop. We arrived after the workers went home which meant we could peacefully go around and look at the machinery and at the propellers ready for testing before shipping them out to the customer. Our guide told us a lot about differences between normal and ice-class propellers and the difficulties they overcome in their production of these.

After a very nice and informative day Steerprop Ltd. treated us with dinner at a restaurant situated on a small peninsula in a lake. We were told that it was a tradition to dine there and they made us aware of the very old stickers in the ceiling placed up there by another NTHS delegation years before us. We had a very nice evening with the staff from Steerprop Ltd. and got to know them and their company a lot better.

## 3 Tuesday

### 3.1 Rolls Royce

We woke up in Rauma and went to visit one of the Finnish branches of Rolls-Royce - a factory where they are manufacturing azimuth thrusters. First we were given a company presentation which of course described the company's product range but also gave a short introduction to their vision - which included unmanned ships in the future.

After the company presentation we were first given a tour of the production facilities to see where they are assembling the large azimuth thrusters - including their large counter-rotating-propeller type. Then we went on board an ice-breaking vessel. The time was short but we managed to see the bridge which differed from our previous experience with bridges on container vessels since it was asymmetrical. Of course the accommodation featured a sauna but they also had a rather large gym with bouldering facilities. Lastly we went to the engine room to see how little space there is on such a vessel. The icebreaker had 4 main engines with a total output of 15MW and two azimuth thrusters.



Figure 3: Visiting the icebreaker

The visit ended with a nice lunch on compliments of Rolls-Royce together with the company representatives.

### 3.2 Wärtsilä

From Rolls Royce, the bus drove us the long way to Vaasa, where we checked in at the Omena hotel, and hurried back on the bus to get to Wärtsilä. At Wärtsilä we were given presentations about Wärtsiläs product ranges, current projects and future plans.



Figure 4: Technical presentation at Wärtsilä

Afterwards we were given tours through the testing facilities, where experiments are conducted on the medium speed engines in order to determine the performance under varying circumstances such as different fuels and different overload conditions, as well as testing on new engines. This was followed by a tour through the assembly plant, where some of the medium speed engines are assembled in production lines. Dinner was hosted by Wärtsilä at a very nice restaurant in Vaasa, close to the hotel.



## 4 Wednesday

### 4.1 Maritime Seminar

Wednesday morning we got up early at 6:00 for a 4-hour drive to Turku. Breakfast was on the bus, and when we arrived at the Forum Marinum a nice lunch was served in the restaurant. Representatives from the companies; Deltamarin, Almaco, Evac and Turku Repair Yard, joined the lunch for a more informal session. Afterwards we went to an old full-rigger, Suomen Juotsen, which created the right atmosphere for the upcoming company presentations with its smell of tar and new paint.

Turku Repair Yard gave insight in their services and presented a couple of ongoing tasks. Evac presented some of their environmental friendly wastewater collection solutions for the marine industry varying all from offshore platforms to river-cruise vessels. Deltamarin showed off some of their ship designs including an open hatch ice-classed bulk carrier and spoke about their role as a consulting company during a new-building process. Last but not least Almaco ended the very informative company presentations by presenting some of their accommodation solutions for the maritime industry. An example was the cabins and luxury suites for the Finnish build cruise-vessel Mein Schiff series.



Figure 5: The Danish delegation on the old full-rigger, Suomen Juotsen.

### 4.2 NAPA

Afterwards we got back on the bus and drove back to Helsinki. Check in at the hotel and then off to NAPA's head office. We got a warm welcome and dinner at NAPA's. They proudly showed off their new improved software interface - designed to be user-friendly, efficient and easy-to-use. In 10 minutes the demonstrator drew a hull, but upon request he was not able to construct a moon pool in the software. Since we made them look bad we were not allowed to leave, and we were put into the hot-box. Beers and soft drinks were served so the sauna-session was a really nice way to end a long day.

## 5 Thursday

### 5.1 Aalto University

The day started by taking breakfast onboard the bus. We left Helsinki city center to go to Otaniemi where Aalto University is located. At the university we had a presentation regarding the department of Naval Architecture at Aalto. The speaker provided us with some information regarding the Master's programs at Aalto, the available professors, the collaboration Aalto has with other universities and the industry as well as the expertise the Finns have on ice-classed vessels. At the end of this presentation, we went to the canteen where we had a delicious lunch.

### 5.2 Finish sauna

After lunch, we had a 10-minute walk to a beautiful and icy seaside just outside the campus where the last sauna would take place. The place was really magnificent. The sauna was quite spacious and it was easy for all of us to fit in. On the other hand, the really lovely Jacuzzi just outside the cabin was not that spacious but it was definitely lots of fun. The more adventurous students had a fast dive into the icy sea. After the nice shower we had, we made some hot-dogs and enjoyed the fascinating scenery. Then we went to the hotel.



Figure 6: Finnish spa and sauna

### 5.3 Arctech – Helsinki Shipyard

For many in the delegation, this visit was the first to a roofed dock. Inside the dock, they were building a Russian icebreaker. Over 50 percent of the world's icebreakers are built at this shipyard. The vessel was in the outfitting stage and we were split into small groups and got a detailed yard tour. The azimuth thrusters from Steer Prop were installed the day of our visit. It was very interesting since we visited Steep Prop the previous day. This gave a small sneak peek into to process of building a ship using many subcontractors.

Before the tour we got a presentation from the CEO and project managers of Arctech. They told that the owners are now Russian and how this was challenging compared to having Asian or western owners. Many others shipyards in Europe are challenged by Asia. Arctech said that they do not have the same problems yet since the ice-breaker industry is very knowledge-intensive and they lack that knowledge and experience in Asia for now.



Figure 7: Tour at Arctech Helsinki

#### 5.4 Anecdote evening and Chairman's dinner

After the yard tour, Arctech Helsinki invited us for dinner at the yard. The dinner started with the traditional anecdote presentation from each delegation. When the presentations were over, the president and vice president of each delegation went to the Chairman's Dinner to evaluate the congress and discuss the future of the congress. The rest stayed at the yard and enjoyed a fantastic dinner where there were good opportunity to talk to the employees and discuss maritime topics.

## 6 Friday

### 6.1 Aker Arctic

We began by taking the bus to the company Aker Arctic in the eastern part of Helsinki. At Aker Arctic, we were served breakfast and introduced to the company's main competences and history. The presenter told us that in 2004 it was decided to build a new test facility at the above-mentioned site. This was done in a joint venture between Aker Solutions, STX Finland and ABB. Arker Artic was founded in 2006 as an independent company and moved to the premises. Arker Arctic is now primarily owned by the state-owned Finnish Industry Investment, ABB and Aker Solutions.

Furthermore we were told that Aker Arctic has broadened its areas of interest, so that it is not only engaged in tests of icebreaker designs, but delivers designs and does consulting on various icebreaker projects too.

After the presentation we had a tour around the test facilities, where we saw the ice towing tank. The test rig had a ship mounted so we could see it perform icebreaking through the test basin. This was both possible from the side of the tank, but also from underneath the tank since the tank had a glass bottom. Here you could see how the ice was push down and crushed by the ship's bulbous bow.

All in all this was a very interesting place to visit.



Figure 8: Icebreaker model test

### 6.2 ABB

After visiting Aker Arctic we walked a couple of 100 meters to see ABB's Marine Propulsion R&D and production facilities.

First off we had a presentation about all the advantages of using podded propulsion instead of ordinary propeller systems on cruise vessels. Experience has shown that the overall efficiency of the entire propulsion system can be increased by more than 10 percent if the ABB system is fitted depending on operating conditions.

After concluding the presentation, we had a tour around the production and testing facilities at ABB. Here we saw how they assemble all the parts for the Azipod's, and test these at the site. Most of the parts which are used to build the Azipod's come from subcontractors, from various parts of Europe.

The trip around ABB was finalized in the canteen, where we were served lunch and had time to ask questions to the presenters.

### 6.3 The Banquet

As ABB was the last company visit, it was time for the Banquet. We had a couple of hours for ourselves in which we put on the best and most presentable clothes. We then took the bus to a ferry which took us to an old Finnish naval fort called Tenaille von Fersen. At this old fort we had a nice three course dinner and heard a lot of nice speeches from the attending people.

This concluded the 68th NTHS.



Figure 9: NTHS Banquet 2015

## 7 Accounts

Budget	Income	Expenses
Participants Fee	kr. 7,500.00	
Conference Fee		kr. 22,620.00
Transport		kr. 10,000.00
Meals during conference		kr. 500.00
Gift for host delegation		kr. 500.00
Miscellaneous		kr. -
Sponsorships	kr. 20,000.00	
Total	kr. 27,500.00	kr. 33,620.00
Result		kr. -6,120.00

Actual accounts	Income	Expenses
Participants Fee	kr. 7,500.00	
Conference Fee		kr. 22,621.30
Transport		kr. 11,667.03
Meals during conference		kr. 3,086.51
Gift for host delegation		kr. 149.00
Miscellaneous		kr. 736.95
Sponsorships	kr. 28,000.00	
Total	kr. 35,500.00	kr. 38,260.79
Result		kr. -2,760.79

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