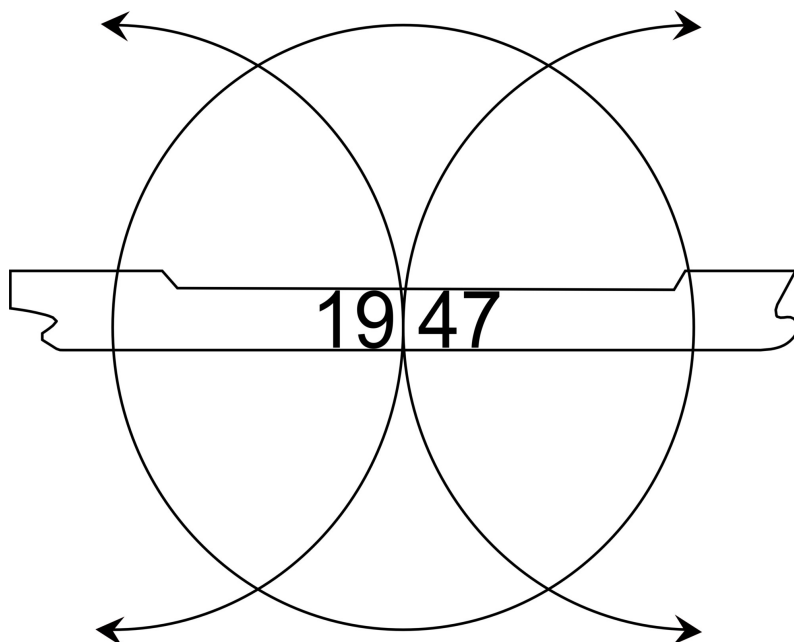


NUL-KRYDS

Field trip to Shanghai 2018



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1 Words from the President

First of all, we wish to express our gratitude towards our sponsors, the Danish Maritime Fund and the Danish Society for Naval Architecture and Marine Engineering Foundation. Without these sponsors the many experiences you will read about in this report had not been possible for us at all.

This field trip have been arranged in close cooperation between the section for Fluid Mechanics, Coastal and Maritime Engineering, FVM, at the department for mechanical engineering at DTU. We, the students, want to express our thanks towards FVM for the many hours spent to arrange this. Especially towards Ulrik D. Nielsen and Yanlin Shao whom have put much effort into this trip both before and during the actual week.

I can speak for the full delegation when I write that the trip have been a real success. The contribution of the trip towards our education as naval architects and maritime engineers have been wast. Seeing the vast dimensions of the vessels and experiencing the sort of "assembly-line" style ship production that is conducted in China is remarkable. Just as remarkable are the differences experienced within the standards of the different yards, with regard to capabilities and working culture, something that will be reflected upon throughout this report.

Perhaps even more remarkable are the cultural differences experienced, both with respect to the Chinese society in general, but in specific on the view upon the challenges to the modern shipping industry with respect to sustainability and how to work with this. This experience on the different views on the future gave rise to many interesting discussions and considerations within the group and can also be seen as a major gain from the trip.

I hope that the many positive experiences the group have had in Shanghai transmits through the written reports on the days of the trip described in the following report. The report on each day have been written in teams of three students and have allowed every member of the delegation to express their views on the experiences, why the different focuses of the individual participants also comes into light.

Sincerely yours
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2 Participants

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3 Sunday

3.1 Arrival in Shanghai

After landing in Shanghai Pudong International Airport everybody went through immigration smoothly albeit rather slowly. A driver was waiting for us in the arrival hall and drove us by bus to the hotel. Upon arriving to the hotel a traditional Chinese meal, consisting of a lot of small dishes that everybody shared, was served. After finishing lunch we left our bags and went to the city centre with our bus.



Figure 1: Arrival at the Shanghai Pudong International Airport.

3.2 Sightseeing in the Old City

The bus dropped us off right outside Yu Garden in the Old City of Shanghai. We then went in to the garden which has a small pond with a tea house in the middle accessible by a zigzag bridge. The bridge like the rest of the garden was bustling with people. After having walked as a group for a while we split up so everybody had a chance to look at the old shops and perhaps buy some souvenirs by themselves or in smaller groups.



Figure 2: Yu Garden in the Old City of Shanghai.

After a while the group was gathered again and we then walked to a nice Chinese restaurant close to the garden to get dinner. The dinner was served in the same way as lunch but with even more different dishes. Everybody tried foods not easily available in Denmark, e.g. jellyfish, and got to practice their chopstick skills.



Figure 3: Traditional Chinese dinner.

3.3 Visit to the Shanghai Tower Observation Deck

After having finished dinner, our bus driver should have dropped us off at the Shanghai Tower, the world's second-tallest building. There was however a slight misunderstanding and he drove us to the Oriental Pearl Radio & Television Tower, another one of the famous buildings in Shanghai. The two buildings are fairly close to each other so we decided to walk to the Shanghai tower. This also gave us the opportunity to see the Oriental Pearl Tower from up close.



Figure 4: The Oriental Pearl Radio & Television Tower.

Once we got to the Shanghai Tower we all got tickets and went with a single elevator to the observatory at 562 m. The view was amazing and it was mind-boggling to look down at the otherwise super tall skyscrapers. People walked around in small groups and tried to get the best pictures possible, though not fully capturing the experience. The view also showcased the love of extravagant lighting on buildings in Shanghai.



Figure 5: LTR: Jin Mao Tower (421 m) - Shanghai World Financial Center (492 m) - Shanghai Tower (632 m).

4 Monday

4.1 SWS Shipyard

After a well-deserved long first night in the hotel room Monday morning started of in the buffet of the hotel. Everybody was trying as many new Chinese morning meals as possible. It seems like the differentiation between breakfast, lunch and dinner is not as pronounced as in Denmark. Spicy noodles are just as good in the morning as in the evening. However the coffee was good.

First visit of the day was the large SWS Yard in the Pudong new area of Shanghai. SWS Yard is one of the larger yards in the Shanghai area. With around 10.000 employees, the yard have made hand-over of more than 8 million dwt yearly possible. The yards history is only 19 years long, which makes the above number even more impressive. SWS Yard is owned by the CSSC Group, which is owned by the Chinese government. This might also be a reason for the rapid growth of the yard.

In the yard a young site manager who was to be the guide of the day met us. We started with a walk-around in their conference centre. The manager put great effort into as well showing the important governmental personalities visiting as the types of vessels the yard were capable to construct. The latter obviously being of highest interest of the group. SWS yard do mostly bulk carriers and tankers, however also have a sub-division focusing on offshore vessels like FPSOs, FPOs, semi-submersibles and drill-ships. The picture hereunder is of the group in-front of the hall of fame containing all deliveries divided into years.



Figure 6: The full Nul-Kryds delegation in front of SWS Yard Portfolio.

Next up was a promotion video in their company cinema. Followed by a short Q&A session and finally a safety video before we could drive around the facilities. The yard

is build up around two main dry-docks. The one dock has the capacity to facilitate the construction of two full-length and two half-length tankers of the largest type. The second even longer though not as wide but with plans of increasing the length to a whole 700 meters. They where also proud to tell, that besides huge amounts of bulk carriers, tankers and offshore vessels the first Chinese produced cruise ship was on the way, expected to be finished in 2020. After the bus-tour around the yard it was time to leave for the next company visit. We all left with an impression that this was the closest one could get to assembly line production of bulk carriers and tankers. Indeed very efficient, but smoother lines of ship designs have been seen other places.



Figure 7: SWS - a megablock being lifted into place.

4.2 Visit to the design company SDARI

The afternoon brought us to SDARI – a ship design office of around 600 employees of which 500 are engineers of some kind. We started the visit with a lunch on round tables. Then we had a thorough presentation of all the different types of ships the company was experienced in designing. We asked if they did a lot of model testing, and the answer was, that if the customer or the boss required it then yes, else no. It seemed that often they relied on numerical methods and the fact that they already had built similar ships in most cases. But since the company is from 1964 they had a bit longer span of experience than the only 20 year old yard.

Questions where also raised about what they thought about the IMO 2050 emission reduction and there was no information revealed on this topic, if it was because it was a secret or if simply no plans existed is not easy to tell. Another interesting way of thinking environmental friendly shipping was, that bigger cargo ships equals more energy efficient transport of goods which then lead to the labelling of green shipping. This is not wrong, however it is also not the answer we expected since the concept of sustainability is not really present.



Figure 8: The Nul-Kryds delegation in front of SDARI premises.

A lady working in the marketing department showed us around their exhibition center – another hall of fame some would maybe call it, with ship models and praise to the company’s achievements and their excellent employees. They also had a map of the world showing how many ship designs they had sold to which countries and where these ships were sailing. The map clearly gave an impression of SDARI being mostly present in the Asian markets, but also some in Europe – where mostly Greece, Italy and Denmark were presented. We asked about how the working together with European business was coming around, and was replied a nice and honest answer: ”It is hard to gain the trust of the European companies, this is why we do not do so much business with them as we could. We have the technical competence but not the trust.”

They told us that when SDARI worked together with European companies on more specialised vessels they were mostly sub-contractors of European design companies, which then held the responsibility towards the customer. Therefore SDARI mostly did detailed designs –receiving the main design layout from the European design companies.



Figure 9: The Nul-Kryds delegation in the VIP-Bus.

4.3 An asian evening

Taking the bus back to the hotel, we stopped on the way for an Asian supermarket experience - it was an enormous shop, with things we could not even have imagined being sold in a supermarket – everything from furry manga decorated toilet seat covers to alive crabs, fish and snails, to fruits no one had seen before. After getting lost in this shop – and found again, we had a short stop at the hotel. Then we continued into town to have dinner at the downtown foodcourt. This however turned out difficult to find, and we all experienced the Chinese lack of easy googling and googlemaps - an experience to be repeated in the coming days - how used we are to rely on that smartphone...

Even though the foodcourt was hard to find, a place to eat was not. When dinner was done we had the magnificent opportunity to have a 100% Asian sensation and trying the Shanghai karaoke. This is not like we do it in Denmark, where one drunken person spoils the good mood in a pub for all the rest except his three friends on first row. No, to do karaoke in Shanghai you rent a room, for just you and your friends. Then you all can sing and laugh at each other without having to ruin the mood of the rest of the pub or having to listen to anybody else singing really badly. This was the last part of the programme for that day, and we all went to bed tired and with a pop-tune spinning around in the head.

5 Tuesday

After a good breakfast at the hotel, we embarked on an hour long bus drive to reach *Shanghai Jiao Tong University* (SJTU), a major research university in Shanghai. It was established in 1896 as Nanyang Public School and later developed to a public university, which is today considered as one of the premier education and research centre in China. The University has many departments relating from arts, law, science, engineering to medical sciences. The campus is vast (we walked around for hours), scenic with many parks, lakes and canals.



Figure 10: The Picturesque Park at SJTU.



Figure 11: The super busy canteen had a wide variety of delicious dishes. This was one of six main canteens.

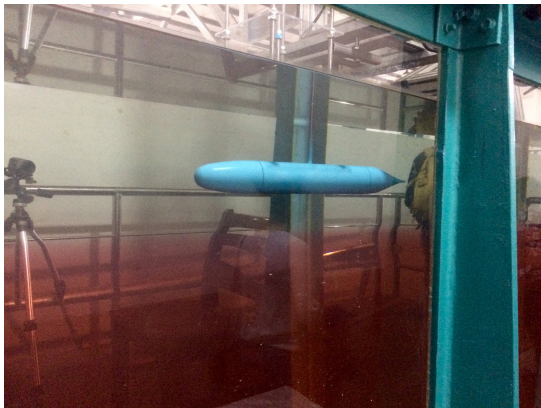
5.1 Laboratory of Fluid Mechanics

After having enjoyed a good lunch and walked around campus a bit, the delegation was taken to the Laboratory of Fluid Mechanics. Professor Benlong Wang presented the three different tanks seen in figure 12 and 13: A classic wave tank with wave generator, a tsunami wave tank and a tank with varying densities.

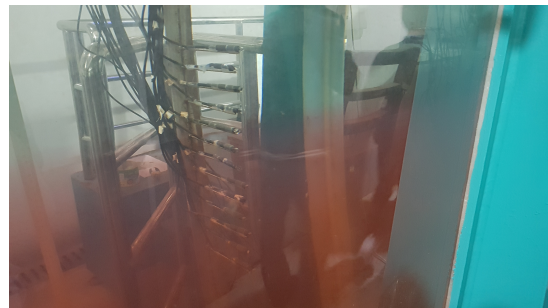


Figure 12: Overview of the tanks in the Laboratory of Fluid Dynamics. From right to left: Wave tank, tsunami tank and a varying density tank.

Tsunami waves are simulated using very big amplitude waves on fairly shallow water while also generating massive currents. The current generating pump provided a flow rate of 100 m^3 water pr. minute. The professor emphasised the importance of including currents when simulating tsunamis.



(a) Submarine model experiment



(b) Density sensors

Figure 13: Tank with varying densities. The red-coloured water is saltwater and the clear water is freshwater. Each experiment normally had 2 days preparation time, as the fresh water had to be slowly filled on top of the saltwater. (a) Experiment concerning the effects of varying densities on a submarine model. (b) The density of the water through the depth is carefully controlled by a row of sensors.

5.2 Towing tank

Next on the tour the group visited a towing tank named *State Key Laboratory of Ocean Engineering, SJTU Multi Function Tank*. This is a new Towing tank facility to carry out model testing. General details are as follows:

Length : 270 m
Width: 16 m

Depth: 7.5m

With 3D wave generators facilities. This facility can carryout model testing for models up to 12 m in length.

At the end of the Towing tank visit, Director Mr.Ye Li welcomed DTU group and invited students to come here on exchange for summer and winter courses to study/work and to engage and establish various collaborations. Naturally, no pictures were allowed.

5.3 Deep water lab



Figure 14: The sign in front of the deep water lab.

Last stop on the university campus was a deep water lab. Compared to the two other labs, this was something special. They have three ROVs, all of them for examination of the environment in deep water.

The first ROV they've build has a maximal operational depth of approximate 4500 m. The second ROV they've build has a maximal operational depth of approximate 6800 m. And the latest ROV they've build has a maximal operational depth of approximate 11000 m, capable to reach the bottom of the Mariana Trench (-10.994 m). To test the manoeuvrability of these ROVs they have a 10 m deep tank. But for pressure test this tank is far from deep enough. So for that purpose they apply a thick steel pipe, filled with water. When testing they drop whatever electronic, structural etc. component in the water, put a lid on, and lock it with two large pipe clamps on rails. Then by hydraulics they are able to make a pressure up to 120 MPa, similar to the pressure on a depth of 12000 m.

Naturally, we were not allowed to take any photographs in the lab, so here is one we've found on the internet: ¹

¹<http://oe.sjtu.edu.cn/EN/list.php?id=50&t=3>

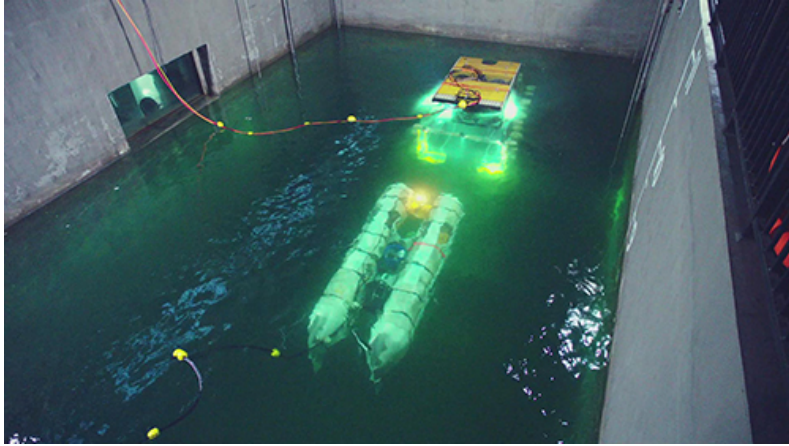


Figure 15: The 10 m deep tank. The fully submerged ROV is the latest (11000 m.) and the partly submerged ROV is the second one (6800 m.).

5.4 River cruise along the Bund

The afternoon left some time in the city to try out some local food. After that, the maritime trip naturally had to include boarding a ship. We went for a small cruise along the street and promenade *The Bund* also called the Huangpu river - a tributary of the Yangtze river.



(a) Cruise boat



(b) Group photo by the bund

Figure 16: In the evening the delegation experienced the shining skyline while cruising along *The Bund*.

6 Wednesday

6.1 Jiangsu Jinling Shipyard

Wednesday started early with the bus leaving from the hotel at 6.30 am. We went on a four hour trip to the Jiangsu Jinling shipyard. The shipyard is placed Northwest of Shanghai close to Nanjing around 350km up the river Yangtze. In this shipyard, DFDS is currently constructing five RO-RO vessels designed to carry 6700 lane meters.

When we arrived at the shipyard, we were greeted by Michael N. Klysner, Jeppe Halkjær Pedersen, and Frane Pilic where after we went on to their site-office. Here we got some much needed refreshment and an introduction to the projects. We were among other things shown how they kept track of the construction with markings on the general arrangement. With this method they could keep track of all the blocks in their different stages. After the introduction, safety equipment was handed out before we went on a tour of the shipyard.



Figure 17: Plate storage (left).

Right outside of the building with the office we walked past a large area where they stored welded blocks. When walking next to the block we started to get a sense of the scale of the vessels. Then we went by the buildings where they stored the plates before they were shaped.

During the walk, we had plenty of opportunity to ask questions and get a more personal conversation with the guides. We were visiting during the workers two-hour lunch break, meaning we got the whole shipyard to ourselves and could observe all the construction stages without disturbing the employees.

Hereafter we walked to the building where they test fitted all the piping. We could see how they pressure tested the assembled pipelines with water. Furthermore, we could see the storage of the raw pipes, and how the flanges were welded on with welding robots. At the entrance of the pipe storage facility there was a big flow chart displaying where to put the specific pipes according to size and treatment.

Next stop were the sand blasting and painting facilities, before heading to the final stop

on the tour which was the dry dock where the second of the five vessels were in the final stages of the construction.

6.2 New DFDS vessels

We went down a lot of stairs and out through a hole in the wall, where a gigantic ship came to sight in front of us. We were in the dry dock.

The MAN propeller in the port side was being installed as we walked in. We had a chance to observe the installation, before walking along the ship to the bow. The DFDS-captain was marking defects in the paint job, he just noticed as we walked by side of the ship. In the bow we could see the two thrusters, and a very nice bulb. The vessel is using a new design of bow where the stem rises almost vertically from the front of the bulb. While leaving the dry dock we walked close by the anchor chains lying on the dry dock floor.



Figure 18: Inside RO-RO, walking to the upper deck.

For the last part of the tour, we went inside the RO-RO from the side and walked to the top deck, where we had a nice view over the shipyard. We could also see the unfinished deck house and while we were on the ship, they started to paint it and we had to leave.

After the long tour around the shipyard, we came back to the office where a table full of McDonald's food was waiting for us. Afterwards plenty of questions were asked to the engineers that guided us through the shipyard. These questions included question on how it was to live in China, and how Chinese shipyards differentiate from European yards, both with respect to working methods but also work culture. The visit at DFDS gave a unique knowledge about how it is to have a vessel constructed in China, an insight we are very grateful for.



Figure 19: The group standing underneath the hull of the almost complete vessel in the dry dock. The propellers, with green covers, and the rudder can be seen in the sides of the picture.

In the evening the whole group enjoyed dinner together at a typical Chinese restaurant across the street from the hotel. We tried a lot of different Chinese seafood dishes, while improving our chopstick skills. The experiment into Chinese seafood would though sadly prove to haunt some of the participants for the rest of the trip...

7 Thursday

7.1 Jiangnan Shipyard

Thursday started with a visit to Jiangnan Shipyard. The shipyard is state-owned and hence a subsidiary to China State Shipbuilding Corporation (CSSC). The shipyard focuses particularly on gas-carriers and container ships, but also ships for the Chinese Navy. Because of this, it was not allowed to take any pictures on the shipyard.

The visit started with a bus-ride through the shipyard, where we could see all the blocks that will eventually form the ship. We also saw their largest crane, which is one of the biggest gantry cranes in the world (it was hard to miss!), capable of lifting 1600 tons (!). When we got to the docks we were allowed to step out of the bus and admire some of the worlds biggest container ships being readied for delivery to their owners. Currently, there were 7 container ships with a 22000 TEU capacity being build, 5 for Cosco Shipping and 2 for CMA CGM. The usual production time for those ships are 18 months, and the shipyard calimed to be able to produce approximately 10 such ships annually. They have two huge dry-docks, one is 365 meters long and the other is 580 meters long.

After the tour of the yard, we went back to the main building. Here a meeting with one of the Vice Presidents of the shipyard had been arranged, which was a great opportunity for Nul-Kryds to ask many questions! The VP started with a presentation of the shipyard, including the history and where they are today. Their current strategy is to move away from building bulk carriers and instead focus on more special ships, which represent a higher value and require more skilled workers and advanced production. They have many orders for gas carriers, container ships but also contracts for special vessels for the Navy such as destroyers, submarines and aircraft carriers. They are slowly moving towards doing more of the ship design themselves and they currently employ 1000 engineers in R&D. He also mentioned another interesting point, which was that all the CSSC owned shipyards are in fierce competition with each other for winning contracts, despite all being state owned.

The presentation and following Q&A with the VP was a very good experience, as he could (and would) answer many of the questions we had for him. For many of the other places we have visited, this has not been possible to the same extent, either because the people did not know the answers or did not want to tell us.

After the meeting with the VP, we had the opportunity to go to the top floor (22nd floor) of the main building to have a panoramic view of the shipyard. This was the same place Chinese President Xi Jinping stood when he visited the shipyard - so it was a great honor to be allowed to go up there. When looking out over the shipyard, we could see three Navy destroyers being build. We could also see the building in which they are currently building a new aircraft carrier. After having enjoyed the view, we had a nice lunch in the company canteen.



Figure 20: Group picture in front of Jingnam Shipyard.

7.2 FKAB Marine Design Office

In the afternoon the group visited FKAB Marine Design Office, which is part of the Sweden based Mattsson Group. FKAB Marine Design office works with all aspects of ship design and the Chinese branch, which was established in 2001, specializes in product tankers, bitumen carriers, gas carriers and dredgers. The design office was recommended to Nul-Kryds by the maritime student organization at Chalmers in Sweden, who had emphasised that this was a great opportunity to gain insight into the work related to bridging the gap between the wishes of western ship owners and ship yards in the far east. With the recommendations from our Swedish friends and after having visited a yard earlier this day the group was more than excited to hear what they had to say.

From the beginning of our visit the mood was light and welcoming, we were offered tea by the receptionist and after few accepted a cup, she looked around the room and asked if anyone would prefer coffee. There was a forest of hands and a good reason to laugh in recognition of the small cultural differences.

Lu Bin, Managing Director at FKAB China, then started his presentation and invited the group to ask any questions that might arise. – This of course, is always a dangerous thing to tell Nul-Kryds, especially since the answer to one question easily gives rise to another one and another one and so on.

The presentation was about the design process and was followed eagerly by all present, most of whom had completed the course “Ship Design” and therefore were familiar with many of the terms and challenges related to fulfilling even simple requirements from the owner. Lu Bin outlined the process in the following way:

The concept design, is the initial design used by brokers to negotiate with shipyards. Following this a contract design is developed with the aim at getting the shipyard and

owner to sign a contract. Once this is achieved a detailed design for final approval is then developed, this is where most of the work is for FKAB's Chinese branch, before the production design finally is developed at the shipyards.

Before we could move on to the next part of the presentation there was a number of questions related to why a design office had an interest in being present at sea trials, what their role is once the detailed design has been delivered and for specific things as to who chooses the heating system to be installed.

Following the introduction about the work at a design office Lu Bin moved on to talk about "green ships" and possible implementations of environmentally friendly solutions. It soon developed into a discussion as Lu Bin did not get a chance to move past his first slide, which listed different technologies, before there was questions to the many solutions, to his own preferences, where he saw the market moving and what he thought we might see more or less of in the future. It is not often that students have a chance to interact with engineers working in ship design and the group had no intention of letting this chance slip away.

The group was then presented with different types of ships that had been designed ready for alternative fuel types and for some very slender designs with new wave breaking bows instead of the bulbs that are traditionally used. This gave rise to questions about whether ships should be optimised for still water or open sea conditions, to which Lu Bin gave the answer, that they often worked towards a compromise: That the ship should perform well in still water, since this was how the design would be evaluated on paper and also what the EEDI is defined by, while also performing well in waves. Lu Bin stressed how helpful it was to be part of a company which had offices both near the ship owner and near the yards. Especially when making innovative designs it is a huge advantage to have offices in both places and a deep understanding of the different cultures. The final part of the presentation introduced innovative LNG tanks which was developed by a Norwegian company and which had been implemented in some of FKAB's new designs. Although Lu Bin had answered numerous questions in great detail during his presentation he still asked if there was anything else we would like to know before we left.

Of course, there was more questions.

While the yards and many companies the group had visited this far had been owned by the government, FKAB is a private design office. Lu Bin explained that it is not as such a problem, but that you have to specialize in the less profitable areas with high quality specialized ships that are not "mass manufactured" but often see few new-buildings per design. The large yards are generally run by the state and they primarily build medium sized and big bulk carriers and tankers.

After a few more questions and some time to thank Lu Bin for his excellent presentation and great patience in answering all our questions the group left the design office. We had been so preoccupied following the presentation that we did not think of pictures until we had left the office, but the group photo in Figure 21 is taken outside the building just before the bus picked us up.



Figure 21: The Nul-Kryds delegation in front of the "Ship design building" where FKAB Shanghai is based.

8 Friday

After several visits to different shipyards, giving great insight into how steel plates are turned into vessels, Nul-Kryds spent Friday visiting the engine manufacturer CMD and China Maritime Museum, Shanghai. As on most other mornings, we started out by diving into the buffet at the hotel with the bus departing right thereafter.

8.1 Visit to CMD

The bus took us to the engine manufacturer CSSC-MES Diesel Co Ltd (CMD). CMD was established in 2006 as a joint venture between CSSC (China State shipbuild Corporation), MES (Mitsui Engineering & Shipbuilding) and HHM (Hudong Heavy Machinery). CMD specializes in the production of marine diesel engines, mainly within the low speed range. Due to the company's origin, CMD also produces engines for CSSC. CMD has license for manufacture engine designs by MAN-ES (MAN Energy Solutions) and Win-GD (Winterthur Gas & Diesel) which is also owned by and CSSC.



Figure 22: CMD-logo at building next to production hall.

Upon arrival at the factory, safety instruction and a brief introduction to the company itself were given. Afterwards we asked a few questions, but unfortunately, the person supposed to give us a tour around the production site and assembly line was not present. Therefore not all of our questions could be answered. From the brief introduction however, it was stated that it took 10 workers about 3-4 weeks to assemble an engine and at the current state, approximately 60 engines are produced per year. Depending on the size of the engine, it can be assembled to either one or two parts for ease of delivery.



Figure 23: Busy production hall at CMD production facilities

To substitute for our absent tour guide, four other CMD employees showed us the production site. It turned out to become a relatively brief tour due to high intensity in parts of the production hall - we were told that this was for safety reasons. Even so, the tour was quite interesting, showing main parts of the marine diesel engines as well as half and fully assembled engines. Additionally, at the time of the tour, we were so lucky that they were conducting a test on one of the engines, so we also managed to see a full-scale engine test. It was very nice that CMD had provided 4 employees for the tour as this gave us the opportunity of asking questions during the tour.



Figure 24: Crankshaft and piston for marine diesel engine.

As on the shipyards, the production at CMD also followed a strict production line structure - from incoming parts from production to the assembly of parts to assembly of the complete engine and finally to test of the engine. Each step taking place at a designated station in the production hall. Additionally, just the components themselves were also interesting to examine - the vast sizes of these are hard to comprehend and compare to anything we see in our daily work. Seeing the production of the engine has also contributed to the understanding of the skills and sizes necessary to build an entire vessel. In figure 25, a group photo in front of one of the completed engines is shown.



Figure 25: Group photo at the end of the production hall.

8.2 Visit to China Maritime Museum, Shanghai

After visiting CMD, we continued in the bus to China Maritime Museum, Shanghai located in the Pudong New Area - 70 km from downtown Shanghai. China Maritime Museum is the only maritime museum which is approved by the State Council of the People's Republic of China. The museum itself has a total floor space of 46434 m² and has a wide variety of exhibitions of marine industry, marine environment, China's numerous achievements in water sports and more.

Models of different vessels help you understand the development of the maritime industry all the way from the Ming Dynasty till today. One highlight of the museum was the chinese vessel wooden "Junk". Additionally, many other aspects such as navigation, military vessels, everyday life of sailors and security could also be seen among the many exhibitions at the museum. In continuation of the visit at CMD, the museum also had scaled and full-scale models of marine engines.



Figure 26: Group photo in front of China Maritime Museum, Shanghai.

Upon arrival, we decided to go to the canteen at the museum to have a Chinese lunch. After finishing lunch, everybody was given the opportunity to visit the exhibitions that they found most interesting. Some of us took a tour of the entire museum while others went straight for the sailing simulators which were also located at the museum. Overall, it was a good experience to visit a museum of this size, as it gave insight into the Chinese maritime history as well as an understanding of other aspects than just the commercial vessels of today.

8.3 Last evening in Shanghai

After the visit to China Maritime Museum, Shanghai, we headed back to the hotel where we had a short period of time to prepare ourselves before heading back into Shanghai to enjoy a fancy dinner together. Upon arrival in Shanghai, we had a bit of time to walk around the city ourselves before meeting up again. We then headed to a Western restaurant to have a long-awaited hamburger, steak and a Western beer - a welcome break from the Chinese food for many of us.

As a final destination, we went to visit the top of Jin Mao Tower where you needed to go with 4 different elevators in order to reach the top floor. The view from the top was spectacular and a fantastic ending to our time in Shanghai.

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