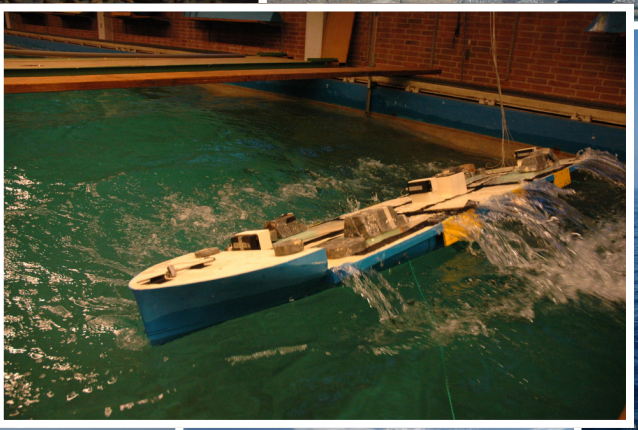
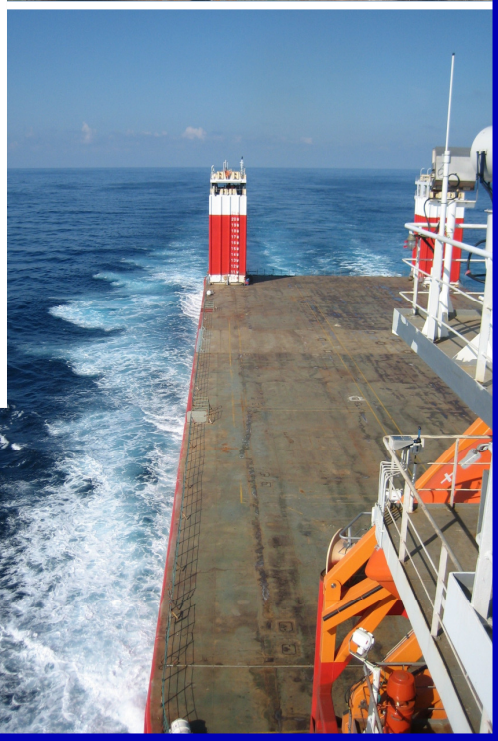
HMC

Picture book





PREFACE

Dear reader,

This document gives examples of projects of which HMC performed the engineering and conducted the operations.

HMC has been incorporated in 1986.

The direction is in hands of Mr. (Ton) Bos who graduated from the Technical University Delft in the degree of Naval Architecture and Marine Engineering. As of 1978 Ton Bos was involved in towing, salvage and heavy transport when he joined the Wijsmuller Group of companies.

With kind regards,
A.J. Bos M.Sc. MBA Eur. Ing.

Mr. Ton Bos
Director HMC BV

Mr. C.B. van der Zwan is business partner and advisor to the HM-group. Mr. van der Zwan is former CEO of Dockwise and renown in the industry of salvage and heavy transport.

HMC BV head office in Almere-City:

Hydrographic and Marine Consultants BV (HMC BV)

HMC is an independent engineering and consultancy organisation and offers transport and offshore installation engineering, fatigue analyses and is renowned supplier of ship loading instruments, safety systems, and hull monitoring systems.

Our services and products are geared towards improving the safety, quality and efficiency of maritime operations, improving economics of operations and supporting policy decisions.

The work of HMC is divided into three strategic business units:

Marine Services (MS)

Marine Services/ hydrography are geared towards the operational side of maritime—, offshore and shipboard projects. The marine services comprise:

» Engineering and supervision of heavy lift transportation's, special transport including tow outs of platforms and pipelines
» Condition surveys
» Supervision during construction works
» Company representations
» Implementation of Quality Assurance programs
» Hydrographic surveys and research programs

Maritime Business Applications (MBA)

Maritime Business Applications comprises the technologies: management science (among others operations research) and information technology, both directed to the maritime industry. The Maritime Business Applications comprise:

» Development of systems for: Fleet scheduling, Crew planning and Inventory control and planned maintenance.
» Class approved CPC Systems Cargo Planning & loading Computers
» Fleet automation
» Voyage calculation software
» Cost benefit analysis and deal evaluations
» Decision support and optimization systems
» Systems for transport engineering
» Transport and ship's hull-monitoring systems related to motions, loads strength and fatigue

Maritime Education (ME)

For the past 25 years, the previously mentioned MBA & MS activities of HMC have accumulated knowledge and skills over numerous projects by offering transport engineering solutions to their customers. To support industry wide innovation and safeguard the continuity and quality of education Maritime Education aims to share its knowledge-base with the industry and educational institutions via the following activities:

» On-site company courses on transport engineering for your organisation
» Maritime and engineering (guest) lectures on schools and universities
» Open-admission courses on a variety of topics regarding transport engineering
» Re-training courses for nautical employees towards maritime engineering careers
» Course materials developed through 25 years of real-world experience

Please visit www.hmc.nl for more information.

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Marine Services (MS)

1. DRY DOCKING

1.1 Mata Redonda

HMC ref: 04519

The semi submersible Mata Redonda was dry docked on a semi submersible heavy lift barge (Zhong Ren 3) at Tampico so that the rig could be modified.

The rig was placed athwart ships on the deck of the semi submersible heavy lift barge (Zhong Ren 3), with her bow facing to starboard. For accurate positioning of the rig 2 guideposts were used whereby the anchor racks are used as point of reference.

1.2 Paul Wolff

HMC ref: 04554

The semi submersible Noble Paul Wolff (NPW) was dry docked on a semi submersible heavy lift barge (Gavea Lifter) at Rio de Janeiro area where the rig could be modified.

1.3 Noble Leo Segerius

HMC ref: 05536

The semi submersible Noble Leo Segerius needed to be dry docked on a semi submersible heavy lift barge (Zhong Ren 3) at Rio de Janeiro area where the rig was modified. HMC made ballast steps, ballast and de-ballast sequences. Taken in account wind load, wave height and heel angle.

1.4 Sedco 709

HMC ref: 05557

This rig (Sedco 709) was docked on top of a semi submersible heavy lift barge (Gavea Lifter). The barge needed to be shipped from Cape Town to Saldanha Bay and unloaded there.

1.5 Pride of South America

HMC ref: 07573

The Pride South America was discharged from a semi submersible heavy lift barge (Gavea Lifter) in the sheltered waters near to Arraial do Cabo, Brazil. The rig was stowed longitudinally, with its bow facing aft.



2. LAUNCHING

2.1 Chemical tanker

HMC ref: 07638

The mooring, loading and discharge on sea of the chemical tanker (Marettimo M) at Trapani, Italy was carried out as per operations manual by the self propelled semi submersible heavy lift ship the Fjell.


3. SHIP RECYCLING

3.1 Sandrien

HMC ref: 03507 and 06265

The Sandrien, a Chemical Tanker, had to be dismantled when afloat in the port of Amsterdam. The conditions were:

1. Dismantling when afloat.
2. No debris in the harbor.
3. No pollution.
4. Chemicals and oil to be removed and transported to a recycling installation on another location.
5. Last cargo was sulphur, tanks had to be washed and cleaned.

HMC was commissioned to:

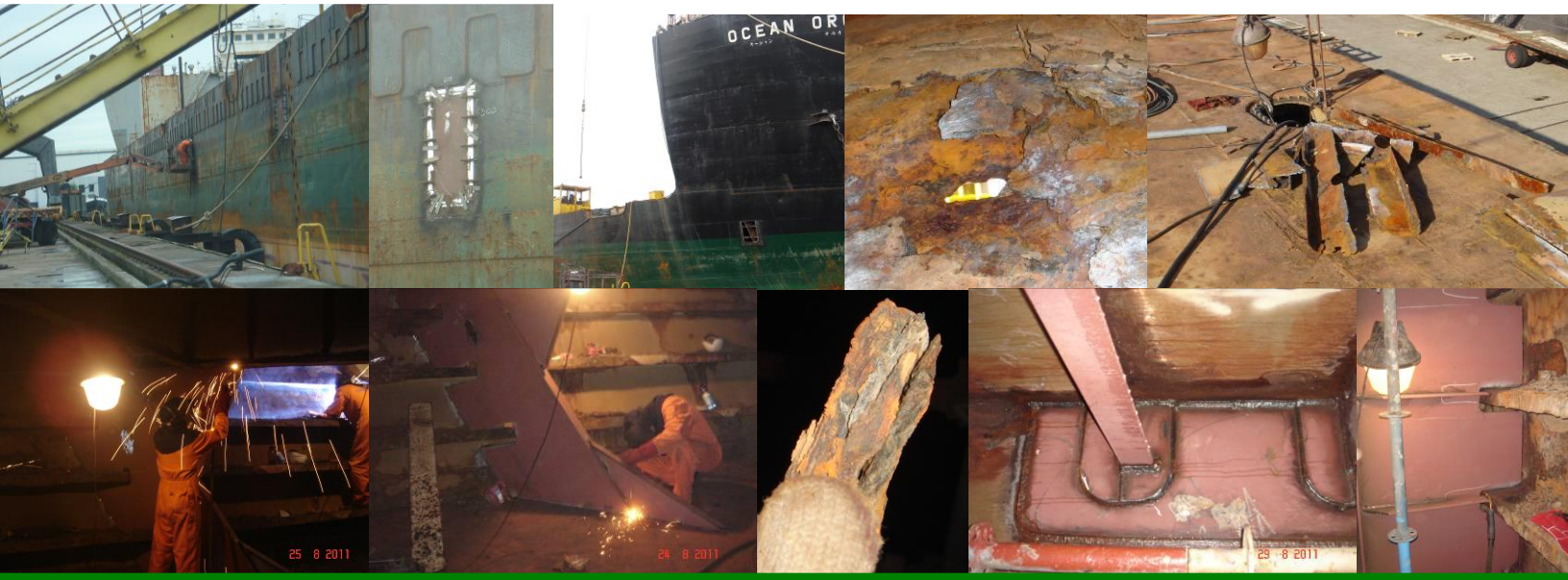
1. Calculated the weight during various critical steps in the dismantling process.
2. Determine the draughts and centre of gravity.
3. Control and assess the stability during the entire process.
4. Control the removing of the water containing sulphur remnants after the tank cleaning.
5. In the final stage when the double bottom of the engine room had to be lifted and lifting plan had to be made.

4. CONSTRUCTION SUPERVISION

4.1 Ocean Orc

HMC ref: 11610

HMC received instructions for work to be performed encompasses hull thickness measurements on the Ocean Orc to determine the most critical spots. These were measured and compared with previous hull thickness report. The most critical areas were at the outside at the height of the waterline and inside the ballast tanks at various levels. Within three days all steal surfaces were measured. After HMC concluded its report they were asked for supervision during the constructions.



4.2 Conversion of the shallow water drilling rig Richmond

HMC ref: 12549

The RICHMOND submersible mobile offshore unit (MODU) was undergoing major modifications for conversion to a Mobile Offshore Production Unit (MOPU) for service in the Songka oilfield offshore Thailand. HMC was asked to analyze the strength of the structure supporting Phase Shift Transformer (PST) and Step Up Transformers (SUT). HMC concluded that the new structure was strong enough to support the listed equipment. Despite of the fact that the model was loaded with 4 (PST 260) on this area and 2 (PST 260) half-loaded, it was recommended to load it as less as possible and no more than 4 small phase shift transformers (PST260); due to this structure has some stiffeners significantly smaller than the rest of the shale shaker area and because of the difficulty to asses the support showed in figures B) and C);

The equipment on this area should be installed as far to the forward edge as reasonable possible and as close to the bulkhead as reasonable possible.

4.3 Mobile Offshore Application Barge (MOAB) for wind turbines

HMC ref: 12517

Organizing an engineering staff of 4 with a continue presentation at the yard for T&I (Transport and Installation) support for the transport and offshore installation of the MOAB presently under construction at Keppel Verolme. After the construction the MOAB was towed over a distance of 100 [nMile] where she was installed.

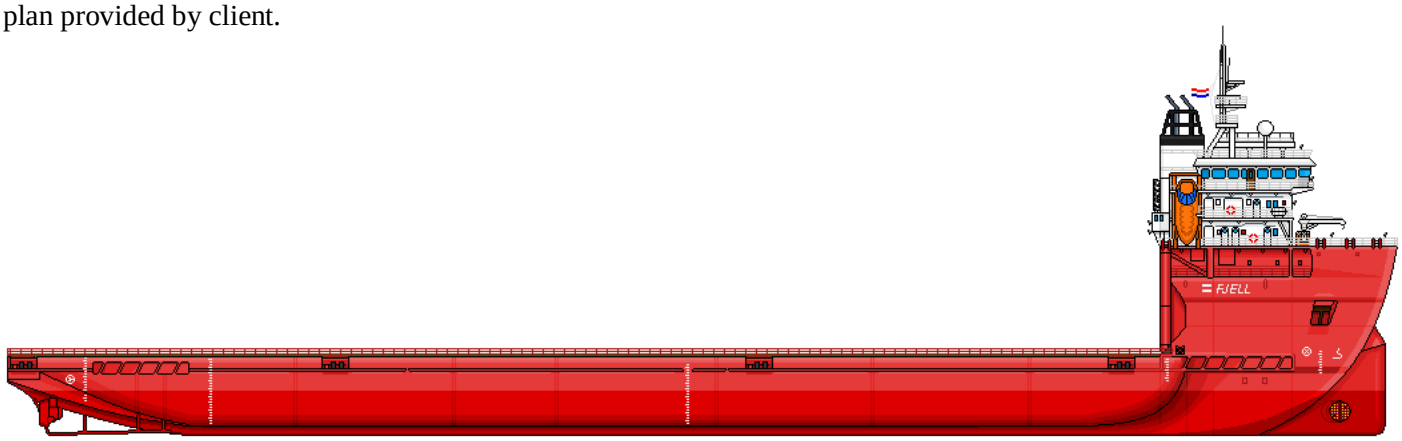
5. MODULES

5.1 PAZFLOR Fjell

HMC ref: 08532

The modules were loaded by means of the lift-on method. The Fjell was ballasted and de-ballasted during the load out operation in according with the ballast-sequence as per agreed steps in order to follow the ballast manual that HMC calculated and put together.

The modules were rested on grillage, which were situated under the strong-points of the modules, according the bottom plan provided by client.



5.2 P-08 BATAM Mega Caravan 2

HMC ref: 12526

Motions responses were can be calculated using the Marine Services Tool with the tuned version of Shipmo. Next to the motions the slamming was predicted using SafeTrans 5.1 which incorporates slamming calculations. The results can were compared and validated with the tests of the 2 extreme loading conditions. No extremes were deducted from the tests. The model tests results in 2 [m] wave without the sponsoons in the water at the bench mark RAO's, the influence of filtering the model tests results give discernment in the non linear effects of sponsoons and push pads.

6. FLOAT OVER

6.1 Skidding top side

HMC ref: 05511

HMC was involved in loading and transportation of the AMP 2 Deck by the self propelled semi submersible heavy lift barge (Fjell) from Pasir Gudang, Malaysia to the Amenam Field, offshore Nigeria.

The route went from Malacca Strait trough the Mozambique Channel and around Cape of Good Hope. HMC calculated to see when there were the best weather condition for to tow of the AMP 2.

6.2 VOSCF seafastening calculations

HMC ref: 12509

HMC performed seafastening calculation for the VOSCF. HMC also created: stowage plan, Determine and assess the stability condition, Create a hydrodynamic model of the OSV, Motion calculations, Cribbing/grillage plan, Sea fastening plan, Efficient placing of the grillage and sea fastening including determination of the support forces on deck and the sea fastenings, Check the allowable strength of the materials used, Generate a transport manual for the Marine Warranty Surveyor (MWS), Processing comments of VOSCF and Processing comments of MWS.

7. TOPSIDES JACKETS

7.1 Modules Heerema

HMC ref: 06547

For the calculation the SHIPMO's 3D module tuned for heavy lift vessels and barge was used. Analyses performed and discussed with the Technical University Delft, department hydrodynamics resulted in the conclusion that the 3D version of SHIPMO is a system to calculate the motions adequately with good agreement with the actual responses. The Fjord had to transport 2 modules from Korea to offshore Angola for the Tombua Landana field. HMC equipped the Fjord with HULLMOS and Wave Radar for the measurements.

7.2 PRH, PRF, PRG, PRE

HMC ref: 08564

The voyage on the Mussafah channel and mooring at the GPC 1 yard were carried-out as per operations manual and passage plan for the self propelled semi submersible heavy lift ship (Fjord). Load out of modules was at Abu Dhabi, United Arab Emirates to the cargo's destination Escravos, Nigeria via Cape of Good Hope.



7.3 20D, 20C, 30E, 50B

HMC ref: 08566

HMC was involved by the discharge of modules 50B, 20C, 20D and 30E onboard a self propelled semi submersible heavy transport vessel (Fjord). The discharge location was Escravos, Nigeria.


7.4 Heerema Mearsk Halfdan

HMC ref: 08583

The HBD jacket, piles, HBA pipe crossing bridge and HBA-HBB pipe bridge were loaded on board the self propelled semi submersible heavy transport vessel (Fjell). The modules HBD jacket and piles were loaded at Shenzhen, China, the HBA pipe crossing bridge and HBA-HBB pipe bridge were loaded at Sembawang, Singapore. The cargo's destination was Halfdan, HBD B Field (via Suez).



8. JACK-UP RIGS

8.1 Trident IV

HMC ref: 04511

For the transportation of the jack-up rig (Trident IV) from Luanda to Malta, HMC made strength and stability calculations. HMC calculated with the Marine Services tool how the jack-up rig could best be placed on top of the semi-submersible heavy lift barge the Zhong Ren 3.

Upon request of the warranty surveyor motions response calculations have been verified by MOSES.

8.2 Trident IV Malta Nigeria

HMC ref: 05547

The jack-up rig (Trident IV) was transported from Malta to Malabo, Nigeria. The transport was carried out by the semi-submersible barge (Fjell) and towed by tug (Salvanguard).

8.3 Seadrill 6

HMC ref: 05558

In Singapore the rig (Seadrill 6) was loaded on deck (of the Ocean Seal) on a 0.988 meters high grillage and transported to Hakodate, Japan. For accurate positioning of the rig two guideposts in combination with two catchers where used. HMC made a stowage plan, Grillage plan and Guidepost and Catcher plan for the positions.

8.4 LD 3 units 116 C

HMC ref: 06528

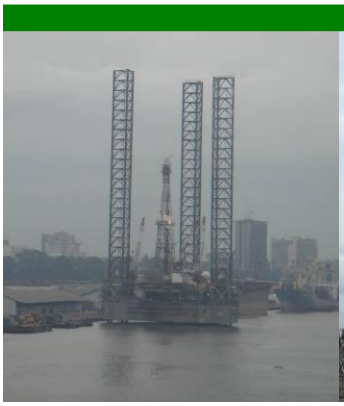
Two jack-up rigs (Rowan Paris and Gilbert Row) were loaded by float-on method on the semi submersible barge (Gavea Lifter) in the Gulf of Mexico and transported to the Arabian Gulf, via the Cape of Good Hope.



8.5 Trident 14

HMC ref: 06548

The rig (Trident XIV) was loaded at the commercial quay on a 1.65 [m] high cribbing in Douala, Cameroon. The transport went from Angola Middle East around Cape of Good Hope.




8.6 Seadrill 6

HMC ref: 06551

The rig (Seadrill 6) was loaded and placed abeam on the deck of the Ocean Orc, on a 0.988 [m] high grillage in Hakodate, Japan and then transported to Singapore. HMC made Stowage plan, Grillage plan and Guidepost and Catcher plan for the positions.

8.7 AL KHOR

HMC ref: 06566

In offshore sheltered water in Singapore the rig (AL-KHOR) was loaded and then transported to Quatar.

8.8 Seadrill 7

HMC ref: 07513

The Seadrill 7 was loaded on the Gavea Lifter in the sheltered waters near to Port Gentile. The rig was stowed longitudinally, with the bow facing to forward.



8.9 Energy Exerter

HMC ref: 08538

The jack-up rig (Energy Exerter) was loaded in extreme weather conditions with temperature up to -37°C in the sheltered waters of Kirkenes, this implied special measures for the workers and for welding operations in order to assure good welding quality. The rig was transported to Kavalla. Therefore the Energy Exerter was placed longitudinal on a 0.30 [m] high cribbing on the aft deck of the Fjord, facing with the stern to the bow.

8.10 Two rigs on the ORC SEAHAWK

HMC ref: 11642

HMC made the transport manual for 2 rigs on high cribbing on the Ocean Orc. As the unit will pass Cape of Good Hope special attention will be given to the overhang of the rigs and the probability of slamming and the effect on the tow. For the preparation of loading, discharge and transport manuals in general the following works were executed by HMC: Digitalization and entering into the MS Tool of the cargo particulars and in case of floating cargo the lines of the floating cargo for multi hull hydro- mechanical analyses, Cribbing and guidepost plan, Finite Element Analysis for the cribbing, Guide post design or modifications, Seafastening plan, Seafastening design or modifications, Manuals for the loading and discharging, Welding details, Motion response calculations, Probability of slamming especially taking into account the passage of Cape of Good Hope, Extreme forces, Ballastplan loading, Ballastplan discharging, Bollard pull calculation for the towage and Processing of comments.

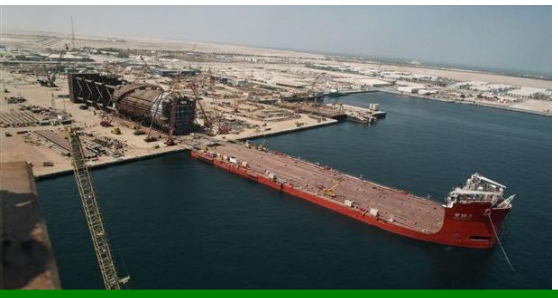
9. SEMI

9.1 LD Transport Atlantic Venture

HMC ref: 06583

The Atlantic Venture was loaded on a 0.30 [m] high cribbing in the sheltered waters of Dubai on a semi submersible heavy lift barge (Gavea Lifter). For accurate positioning of the rig, two guideposts in combination with one catcher were used. HMC made calculations for stowage plan, cribbing plan and Guidepost- and Catcher plan for the positions.

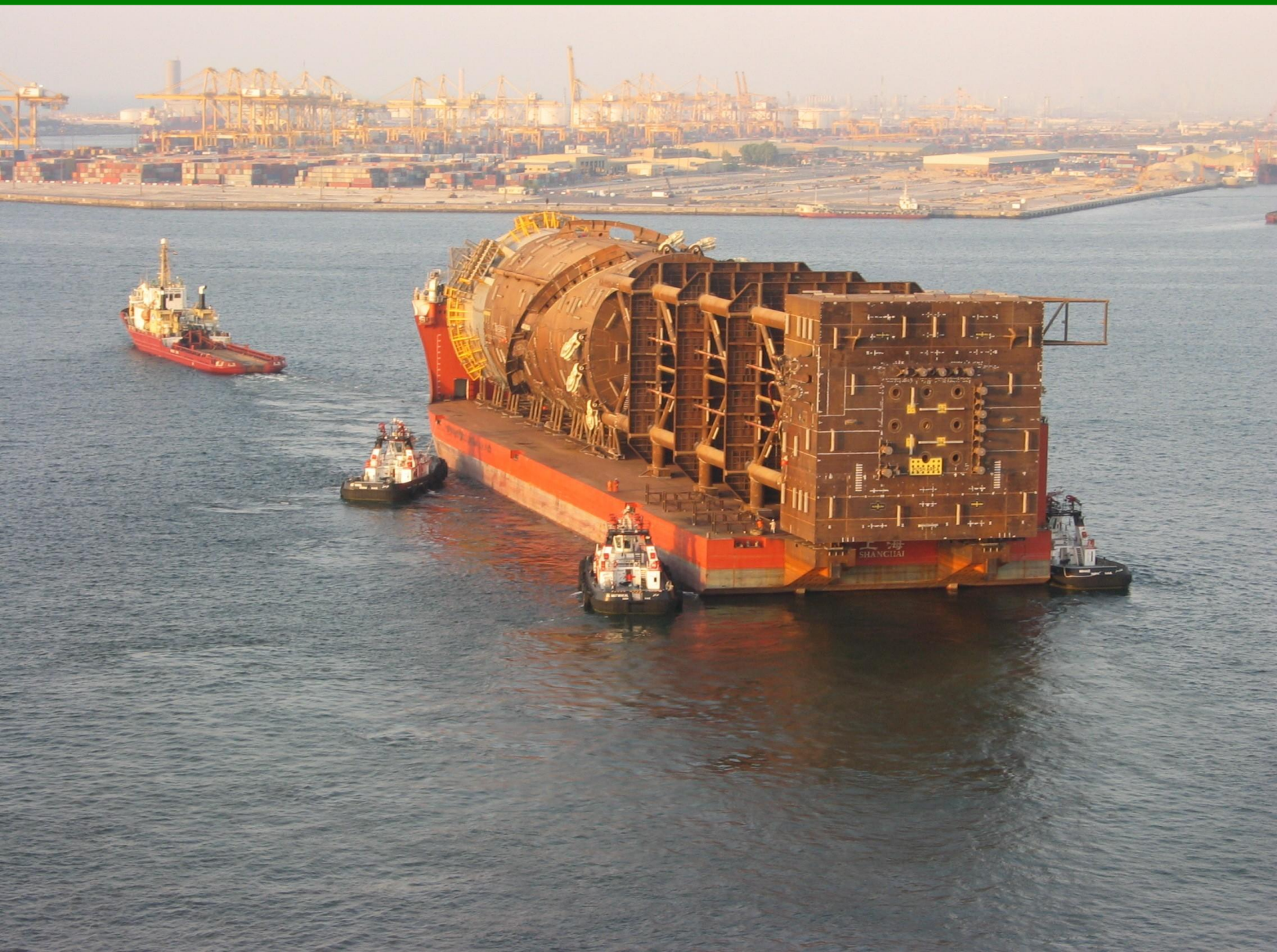
10. SPAR



10.1 Zhong Ren 3 with Spar

HMC ref: 03501

HMC used SafeTrans transport engineering for the voyage of a semi submersible heavy lift barges (Zhong Ren 3) loaded with the (Murphy Frontunner) Spar towed by tug (De Hong) from Dubia to the US Gulf. Various runs were made, two routes were analyzed i.e. the shortest and a southerly route where lower extremes were foreseen.



11. BARGES/ CRANES/ VARIOUS

11.1 Transport of 39 barges

HMC ref: 03533

The semi submersible heavy lift barge (Zhong Ren 3) was loaded with 39 Mississippi barges and shipped from New Orleans to Buenos Aires. HMC used SafeTrans to make risk analyses for the voyage. SafeTrans is a system conceived in a joint industry project involving 31 companies in the heavy lift and towage industry. Other calculations as loading condition and welding calculations are performed with the Marine Services tool.

11.2 Transport of 33 barges

HMC ref: 04507

HMC was asked to perform transport engineering for the transportation of 33 Mississippi barges from New Orleans to Buenos Aires, by the semi submersible barge Ocean Seal. The total distance of this tow was 6374 nautical miles. For safely transportation of this voyage HMC used SafeTrans. And with the Marine Services tool HMC calculated loading condition and welding calculations.

11.3 Delivery stability booklet for the heavy lift crane barge Conquest MB1

HMC ref: 12583

The state of the art crane barge was designed for off-shore transportation, removal, refurbishment, construction activities and especially for year round operation in harsh environments in full compliance with UK, Dutch and Danish operating regulations. HMC delivered the stability booklet comprising dynamic lifting tables. Conquest Offshore provided a barge, capitalizing on the demand for large offshore barges with heavy lift crane capabilities.

12. TOWAGE/ SALVAGE

12.1 Salvage of container vessel K Wave

HMC ref: 11532

HMC was involved in salvage work for the K-wave off the coast of Malaga, Spain. Just only 2 days after it had run aground it was refloated again and returned to its British owners.

HMC was contacted by Harms-ALP Maritime to perform engineering and survey works on the K-wave, which ran aground on the 15th of February. A naval architect was dispatched to work together with the insurance company, port authorities, the owner and Harms-ALP to survey and successfully refloat the container vessel only 2 days after it had run aground. HMC is proud of its flexibility to help out in last minute operations for its customers.

12.2 Tow line catenary analysis PSVM

HMC ref: 11654

During the tow of the PSVM FPSO there exists the possibility that the tow wire clashes with the turret. For the PSVM a SafeTrans analyses has been performed for the sustained speed of the PSVM. SafeTrans can be used for the dynamic anchor wire catenary study.

12.3 Adriatic GBS/ LNG Terminal

HMC ref: 12502

The giant 180 meters by 88 meters (and nearly 50 meters high) Adriatic GBS/ LNG Terminal was winched out of its construction dock at the Dragados yard in Algeciras.

13. INCLINATION TESTS

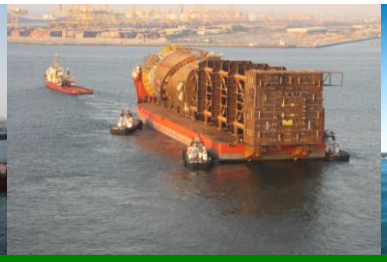
13.1 Murphy Frontrunner Spar

HMC ref: 03501

A semi submersible heavy lift barge (Zhong Ren 3) loaded with the Murphy Frontrunner Spar for the voyage from Jebel Ali to Ingalls. HMC made stability and strength calculations for load- out, ocean transportation and float off have been calculated using the Marine Services tool of HMC, incorporated HMC's own class approved loading and stability software CPC.

SafeTrans was used for transport engineering for the voyage with a semi submersible heavy lift barge (Zhong Ren 3) loaded with the Murphy Frontrunner Spar towed by tug (De Hong) from Dubai to the US Gulf.






13.2 Inclination test Fjell

HMC ref: 08540

A inclination test is performed to establish the stability of a vessel. This is done by putting weights on top of the vessel and measure the differences, such as draught and list. After shifting the weights and measuring everything multiple times a sufficient inclination test is performed. The objective was to determine the position of the centre of gravity of the Fjell in the situation that she is ready for transportation. This time it was not an experiment for the lightship conditions.




13.3 Inclination test Fjord

HMC ref: 08518

The objective of HMC was to determine the position of the centre of gravity of the self propelled semi submersible heavy lift barge the Fjord in the situation that she is ready for transportation. This was not an experiment for the lightship condition.




14. MODEL TESTS

14.1 Tank tests TUD

HMC ref: 08517

HMC commissioned the Ship Hydromechanics Laboratory of the Delft University of Technology to investigate the behaviour of a heavy lift ship in still water resistance, motions in beam seas and motions in head seas.

Therefore the following tests have been performed:

- Resistance tests in calm water.
- Motion tests in irregular beam waves.
- Resistance and motion-tests in regular head waves.

The resistance tests in calm water have been carried out to determine the resistance of the ship on full scale.

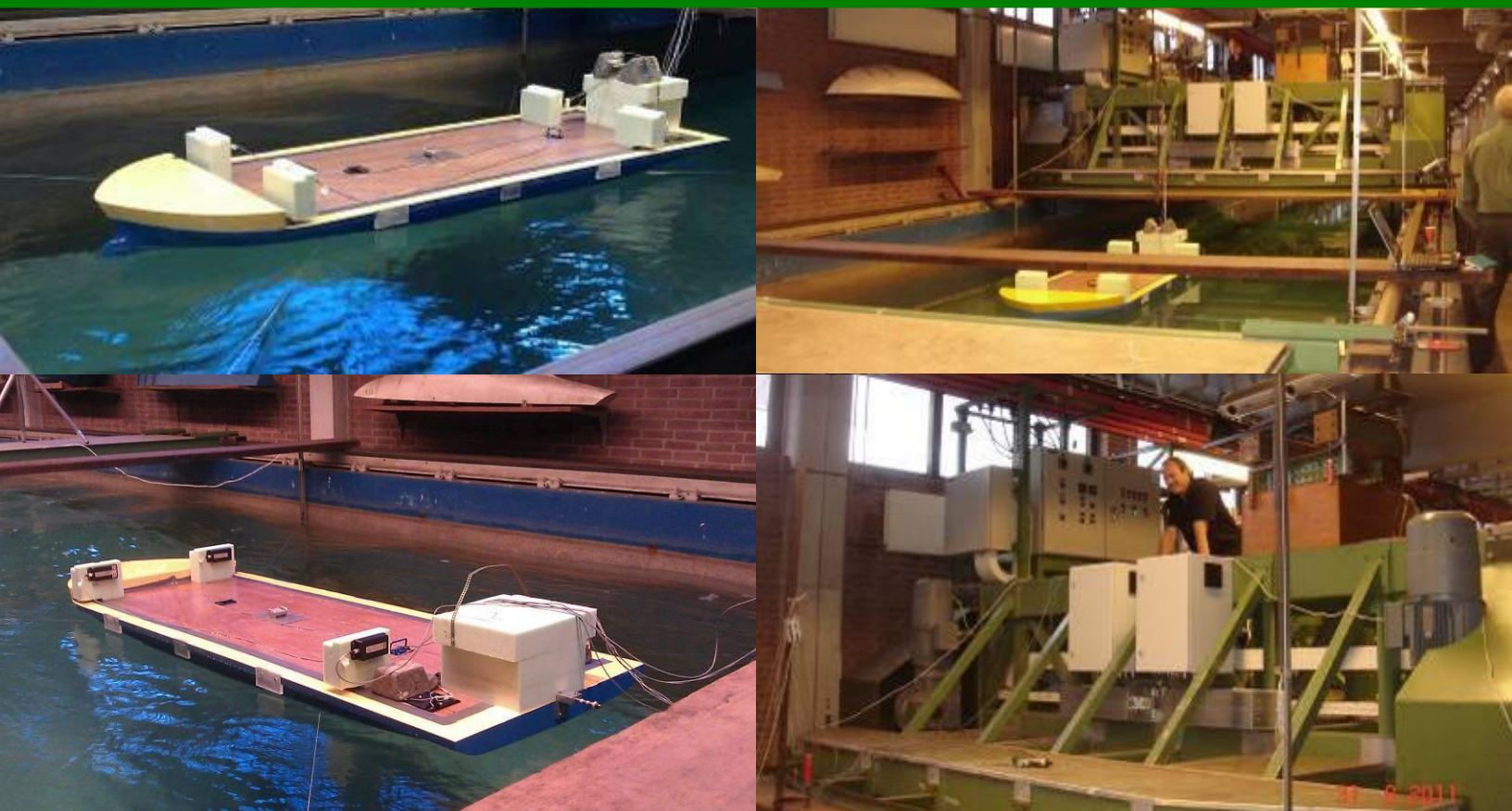
The motion tests in irregular beam waves have been carried out to investigate the response of the ship in roll motion to irregular beam seas.

The resistance and motion-tests in regular head waves have been carried out to determine the Response Amplitude Operators (RAO) of the ship in heave, pitch and added resistance in waves at one particular speed.

14.2 Model tests for Mega Trust

HMC ref: 11586

HMC performed models test for the Mega Trust, these model tests were executed at and und the supervision of Delft University of Technology (TUD). HMC configured an MESH model and TUD tuned the model to meet the right Radii of the scale model reflecting the real loading condition in the correct scale and made a test model of the Mega Trust. Various loading conditions were tested and e.g. Lightest/Heaviest voyage with HMC calculated draft for METR.



Marine Education (ME)

15. COURSES

15.1 Course Marine Warranty Surveyor

HMC ref: 10804

HMC offers post educational training for fishermen and sailors to prepare them for a career in the technical world of surveying maritime operations. Their operational knowledge and practical insight is reinforced with a steady technical background to enable working in an environment where practical insight meets theoretical skills.

The course will enable attendees with a nautical background to become aware of the technical aspects of loading operations, and thus be able to find and solve problems as they advise their organisation or customer in special loading operations.

The course Marine Warranty Surveyor can be used more broadly when nautics pursue a nautical / maritime-technical career. In case you are interested in participation in this course, please contact our office via info@hmc.nl.

15.2 Course Transport Engineering on semi submersible heavy transport vessels

HMC ref: 11503

For some organisations, it might also be useful to teach those with no engineering background some essentials to understand problems that your engineering department runs into. Marketing employees, accountants and financial personnel and administrational staff might better understand your company's core business if it had a little more insight in technical difficulties you might encounter. HMC is able to deliver courses such as naval architecture for non-naval architects or specific topics within the domains of transport engineering and surveying.

If you wish to explore the possibilities of customized education in your company, on specific topics in the domain of maritime techniques and transport engineering, please contact our office via info@hmc.nl.

15.3 Course design for transport in Oil and Gas Industry

HMC ref: 11578

Oil and gas installations both onshore as well as offshore are often being built in modules and components on a different location than the location where those facilities are erected. The ocean transportation is often not adequately accounted for. The constructions are exposed to high motion when carried on a modules carrier or general purpose ship.
The motions should be based on motions response calculations and not on rules of the thumb especially now the carriers are becoming larger and larger the sea behaviour of the ships are more severe and consequently the loads on the constructions.

15.4 Course Anchor Handling and installation

HMC ref: 11537

Anchor Handling requires special equipment and skills not only in performance of the anchor handling operations but also in preparing the projects. The course gives an overview of the necessary skills, technology and requirements. Hydrostatics, hydrodynamics, hydrography, naval architecture, nautical engineering and safety engineering are the sciences that play an important role in Anchor Handling operations and design of the AHT's, the procedures and connections. All of those technologies will be used during the course. The course will give a practical knowledge of the technologies especially pertaining to Anchor Handling.

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