

HEAVY-LIFT SHIPS – WEATHERING THE STORM

by Frank van Hoorn

July, 2017

Introduction

Out in the open oceans, heavy-lift ships occasionally have to deal with severe weather if onboard routing cannot avoid stormy conditions. But the ship owners have a different storm to weather, an economic storm caused by the downturn in heavy-lift shipping resulting from the sudden and severe drop in oil prices in mid-2014. This latest oil crisis put the break on many offshore construction projects, some of which were delayed, others were canceled altogether. While some of the ship owners plan to reduce their fleets by scrapping older ships and converting newer ships, other owners are expanding their fleets by ordering new ships so they are ready when the storm settles and the boom times return... This article focuses on semi-submersible heavy-lift ships. Certain trends are indicated, such as the increase in ship size, and the shift of ship owners towards the Far East.

Recent changes to the heavy-lift fleets

Since 2010, a number of changes were seen in the marine heavy-lift industry, ranging from consolidation, take-overs, and introduction of new ships.

In 2011, Korean shipping company TPI Mega Line introduced the large 53,000 dwt semi-submersible heavy-lift ship MEGA PASSION. This 60 m wide ship, under a long term contract with shareholder Daewoo, is used to transport big ship hull blocks from construction yards in China to the large Daewoo yard in Okpo, South Korea. Occasionally it is used in non-shipyard related transports, such as the dry transport of the Chevron Wheatstone 36,000 t Steel Gravity Substructure from Korea to NW Australia.

The author of this article has over 35 years of experience in the marine heavy-lift business. After graduating from Delft University of Technology on the subject of barge motions, he joined Wijsmuller Engineering where he became involved in ship design, salvage, and heavy-lift transportation. He transferred to Wijsmuller Transport in 1985 to focus exclusively on heavy-lift transportation and worked his way up from Project Manager to General Manager R&D. In 1991, he moved to the United States and founded Argonautics Marine Engineering, Inc. (www.argonautics.com), which provides marine heavy-lift transportation related consulting services to ship owners, cargo manufacturers, marine warranty surveyors, shipyards, lawyers, etc. (Photograph author courtesy of Andy Moore)





MEGA PASSION arrived in NW Australia with the Wheatstone SGS (courtesy of TPI Mega Line)

The Chinese dredging company CCCC introduced the new build 21,200 dwt WISH WAY semi-submersible ship in 2011. This open deck ship with two movable casings on the stern looks very similar to the COSCO owned TAI AN KOU. It is mainly used for transporting the company's dredging equipment, but also ventures out into the open market.

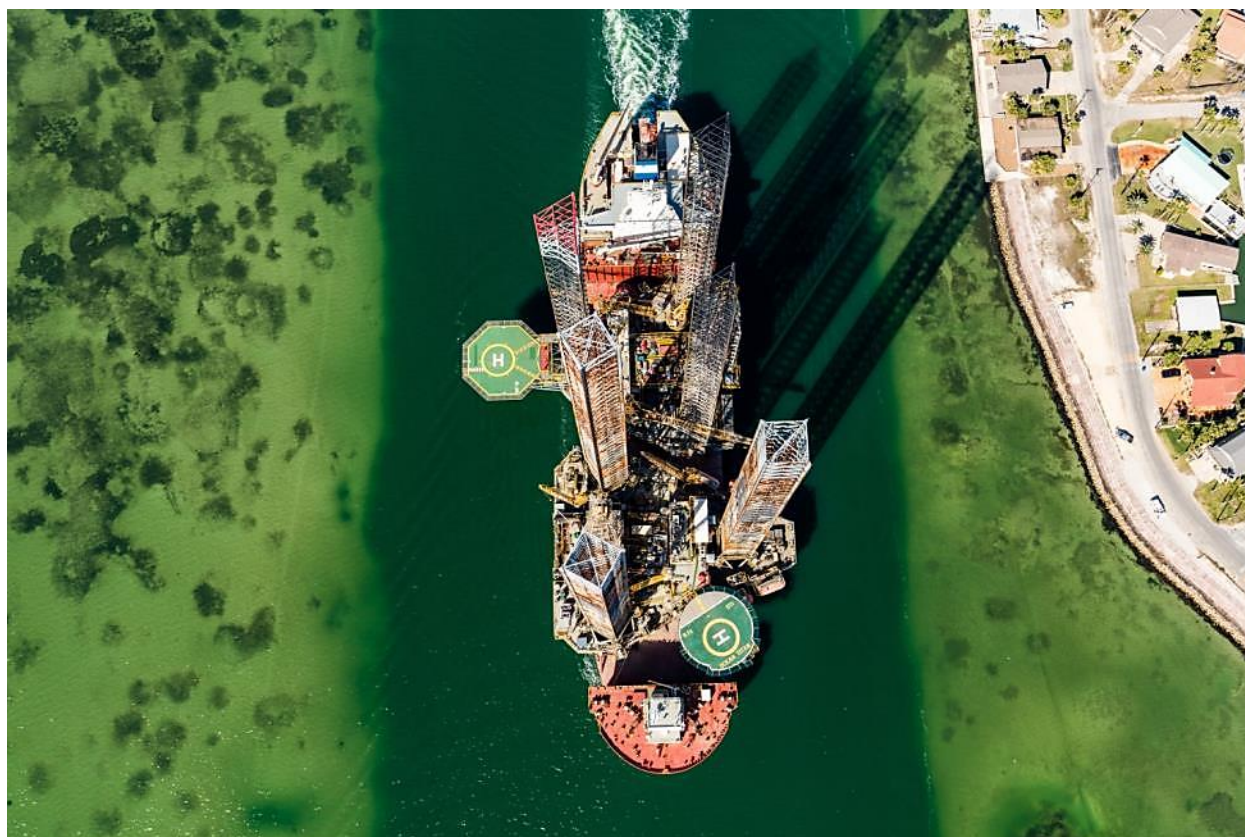
In 2012, the shipping company Fairstar Heavy Transport NV, which operated the four heavy-lift ships FJORD, FJELL, FORTE, and FINESSE, and one more ship on order in China, was taken over by Dockwise which added the existing ships to its large fleet of heavy-lift ships. The newbuilding project was renegotiated to make it a bigger ship, which became the 72,000 dwt WHITE MARLIN, delivered in 2013. Dockwise also started managing the 2012 build and Offshore Oil Engineering Co Ltd (COOEC) owned 52,500 dwt DP-2 semi-submersible HAI YANG SHI YOU 278. Management of this vessel later transferred to COSCO Heavy Transport.

In 2013, the largest heavy-lift ship, the 117,000 dwt DOCKWISE VANGUARD was delivered to its owners, Dockwise. To allow for extreme long cargoes, the traditional forecastle was replaced by three buoyancy casings, two movable casings on the port side and a large fixed casing structure on the starboard side that houses the engines, crew accommodation, and the navigation bridge. Its design is reminiscent of the semi-submersible OCEAN SERVANT class barges that were equipped with four casings, one on each corner. The aft starboard casing housed the accommodation and navigation bridge. Not long after the delivery of the DOCKWISE VANGUARD, Dutch dredging company Royal Boskalis Westminster NV acquired Dockwise (Dockwise continued to operate under its own name). This same year, the 1987

build 34,000 dwt semi-submersible heavy-lift ship TRANSSELF was converted by moving its main engine exhaust stacks from the aft starboard side casing all the way forward to aft of the existing forecastle. This way, the fixed aft casing (often an obstacle for module load-outs or deck mating operations) was made movable.

Also in 2013, the STX Pan Ocean operated 16,700 dwt semi-submersible heavy-lift ship STX ROSE 1 was renamed SUN SHINE, and the newer 24,100 dwt STX ROSE 2 was renamed SUN RISE. The latter was used to transport the new Panama Canal lock doors from Italy to Panama. In 2014, Pan Ocean cancelled the contract for the building of a 31,000 dwt heavy-lift ship that they ordered at the STX Dalian yard in 2012.

The Norwegian company Offshore Heavy Transport (OHT) owned HAWK was widened with large full depth sponsons in 2014. Its width increased from 44.5 m to 55.5 m, resulting in a new deadweight of 64,900 t, and an improved capability to transport large semi-submersible drilling rigs. In 2015, OHT added the newly converted 34,800 dwt ALBATROSS to its fleet, bringing the total ships in their fleet to five.



The ALBATROSS transporting 2 jack-up rigs (courtesy of OHT)

In 2014, ZPMC Shipping had a 15 year old Aframax tanker converted into a semi-submersible ship, the 46,670 dwt ZHEN HUA 15. This was followed by 47,100 dwt ZHEN HUA 28 and the 51,500 dwt ZHEN HUA 29, all three semi-submersible with up to 7.0 m of water over deck (the ZPMC Shipping's first semi-submersible ship, the in 2009 converted ZHEN HUA 22, can have only 3.0 m of water over deck). Adding these semi-submersible ships to its large fleet of crane carriers allowed for the shipping of floating cargo (floating cranes, barges, etc.) in addition to the frequent container crane deliveries.

In 2014, the Chinese shipbuilder Qingdao Wuchuan Heavy Industries won the order to build two 50,000 dwt semi-submersible heavy-lift ships for Hong Kong based United Faith Group. By the time these were ready for delivery in 2015, the ships, named RED ZED I and RED ZED II, were chartered to the new company ZPMC-Red Box Energy Services which focused on the energy services aspect of marine logistics for energy infrastructure projects like Yamal LNG, Ichthys LNG, and Gorgon LNG. The vessels were delivered with a single temporary stern casing, housing the engine exhaust stacks. This left the stern open for loading of large Yamal modules for which a multi-year contract was obtained. Additional shipping capacity for Yamal was provided by the 50,000 dwt semi-submersible ship HUA YANG LONG, delivered in 2016 to its owners Guangzhou Salvage and time chartered to Red Box Energy Services.



The RED ZED II with Yamal modules (courtesy of RedBox)

In December 2016, the newbuilding 98,000 dwt GUANG HUA KOU was delivered to its owners COSCO Shipping Specialized Carriers Co Ltd. This is presently the second largest heavy-lift ship in operation,

after the DOCKWISE VANGUARD. In addition to its own heavy-lift ships, COSCO also has the 38,000 dwt XIA ZHI YUAN 6, and the 30,000 dwt HUA HAI LONG (owned by Guangzhou Salvage) under management. Both of these ships were built in 2012. As mentioned above, the HAI YANG SHI YOU 278 is currently also in the COSCO pool. With most of the COSCO vessels having DP capability, COSCO has been active in the topside float-over installation market.



The GUNG HUA KOU with the DANA FPSO (courtesy of COSCO Heavy Transport)

Future changes to the semi-submersible heavy-lift fleet

At the start of 2017, some significant changes are on the radar. Older ships will be taken off the market by either scrapping or conversion, while more new ships will be introduced. The first of the older heavy-lift ships to be scrapped is the TERN, which late January 2017 departed to a scrap yard in Turkey, loaded with a Boskalis sheerleg and salvage tug, all destined for the same scrap yard. The SUPER SERVANT 3 will be scrapped next. Given their age, it is likely that the sister ships of the TERN (SWAN, SWIFT, and TEAL) will likely follow in the not so far future. This is in line with the late February announcement by Boskalis that it was writing off €365 million on its fleet, mostly on Dockwise because of the current structural imbalance between supply and demand in heavy ocean transport.

Boskalis also announced plans to convert its 2012 build semi-submersible heavy-lift ship FINESSE into a 3,000 t capacity crane vessel for the offshore wind farm installations and platform decommissioning market. This DP2 F3000 crane ship with accommodation for 150 persons is expected to enter the market in 2018 and start working on the DONG Energy's 1.2 GW Hornsea Project One wind farm, located 120 kilometers off the Yorkshire Coast in UK waters.



Artist impression of the new F3000 crane vessel, ex FINESSE (courtesy of Boskalis)

During the 2014 Offshore Technology Conference, Boskalis announced that they had started a study into a new ultra large heavy-lift ship, similar to the DOCKWISE VANGUARD, but much larger. To illustrate the size, an artist impression showed the new ship with the DOCKWISE VANGUARD loaded on deck. Given the current market conditions, it is assumed that this design has been shelved for the time being.

Early 2017, ZPMC introduced its first custom designed and build semi-submersible ship, the 50,000 DWT ZHEN HUA 33. This new vessel will be operated by ZOMC, a strategic joint venture between ZPMC Offshore Services Group and Offshore Tech LLC, founded in 2015 to provide the oil and gas market with access to vessels and engineering for the execution of a broad range of complex offshore projects. The alliance combines the ZPMC's fleet of 23 transportation vessels, five sheer leg cranes (ranging in lifting capacity from 1,600 to 5,000 t), 18 tugs, 22 barges, three jack-up barges and the 12,000 t capacity

floating crane ZHEN HUA 30, with OTL's expertise in offshore transportation and installation engineering design.

The ZHEN HUA 33 is an Ice Class B self-propelled semi-submersible transportation and float-over installation vessel. Without its aft buoyancy casings, it has a free deck area of 185 x 43 m, making the ZHEN HUA 33 the longest vessel in its class. It is constructed with a reinforced stern and equipped to submerge to 13.5 m of water over deck. A Kongsberg DP-II system is fully integrated with two tunnel thrusters at the bow and three fully-revolving main azimuth thrusters at the stern. With 19,000 kW of power, the vessel's transit speed is estimated to be 14 kn.



The ZOMC operated ZHEN HUA 33 (courtesy of ZPMC)

Taking advantage of the downturn in shipbuilding and associated reduction in construction costs, the Singapore based Greenland HeavyLift Holdings Limited Ltd (GPO) ordered four new purpose designed 64,000 dwt semi-submersible heavy lift ships for delivery in 2017 (first two) and 2020 (last two). These four identical ships, to be named GPO GRACE, GPO AMETHYST, GPO SAPPHIRE and GPO EMERALD, are each equipped with tall movable stern casings allowing for 15 meters of water over deck. The DP2 propulsion system is designed for a fast transit speed of up to 16 kn. With a beam of 48.0 m, these ships

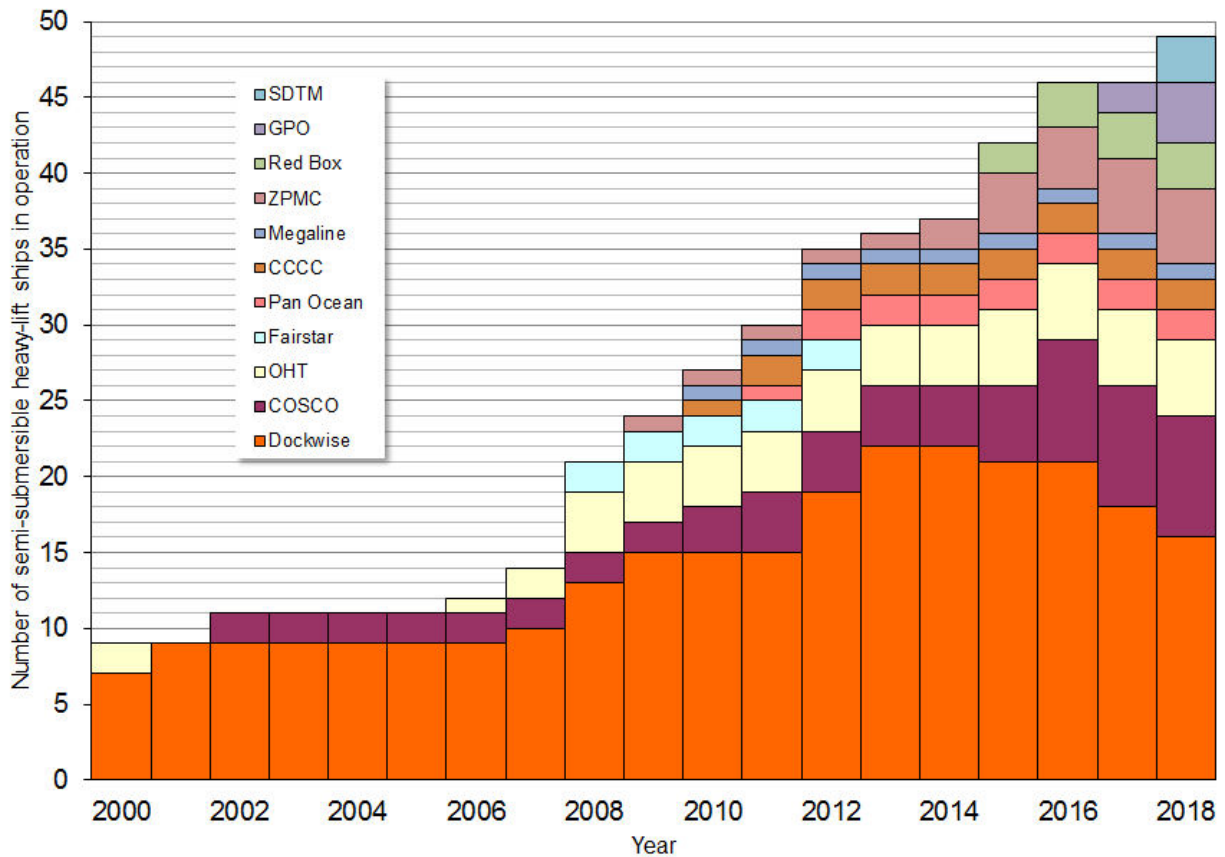
can still pass without any overhanging cargo through the expanded Panama Canal, with its 49.0 m maximum vessel width limit. Late June 2017, ZPMC announced that they planned to acquire 50% of PGO to further increase their semi-submersible shipping capabilities.



The first of four GPO heavy-lift vessels nearing completion (courtesy of GPO)

Towards the end of 2016, a contract was signed between Shandong Twin Marine (SDTM) and CIMC Raffles for the design and construction of three DP3 semi-submersible ships, two of which are to be equipped with the 34,000 t Twin Marine Lifter (TML) system, while the third ship is to be used to transport new and decommissioned topsides (this concept was first introduced in 2008, but did not materialize at that time). These ships are to compete with the Allseas owned 415,000 dwt PIONEERING SPIRIT installation and decommissioning vessel. This huge vessel successfully removed its first platform, the 13,500 t Yme offshore production unit from the North Sea in late summer of 2016. Its next decommissioning project will be the removal of the larger Shell Brent Delta topsides before it relocates to the Black Sea to lay pipe for the TurkStream project.

For the past, current, and near future count of semi-submersible heavy-lift ships in operation, see the following graph:



Changes in the semi-submersible heavy-lift fleet over time

Trends

Based on the recent and upcoming changes in heavy-lift shipping fleets, the following trends are noted:

1. The newbuilding semi-submersible ships are getting larger, pushing the capability envelope. While the first heavy-lift ships in the late seventies were Panamax sized ships with a beam of 32 m and 14,000 dwt, the new ships now are all substantially larger, with beams of 48 – 70 m and deadweights in the range of 64,000 - 117,000 t. The largest ships cannot pass the expanded Panama Canal with its 49 m beam restriction. Smaller ships taken out of the market (converted or scrapped) are not being replaced with similar sized ships.
2. The semi-submersible heavy-lift ship owners originated in North-Western Europe, after the first jack-up rig was successfully dry towed on a submersible barge in 1974 by the Dutch towing

company ITC. With the maturing of the industry, more and more Far East companies are getting involved in the shipping of heavy cargoes, either directly as owners or indirectly as investors. This makes sense as many of the cargoes originate in the Far East construction yards. Some of these yards build and operate their own heavy-lift ship ships (such as STX Pan Ocean) or set up new joint ventures to operate heavy-lift ships (such as TPI Mega Line in which Daewoo is a shareholder).

3. With the completion of some of the larger LNG construction projects (Gorgon, Wheatstone) long term, multi-voyage contracts are getting rare. With many heavy-lift ships competing on the spot market, current dayrates are close to OPEX costs. This may lead to further consolidations.
4. Many of the pioneers of the heavy-lift industry have been or are about to retire, making room for the next generation. With this new generation may come new ideas and innovations.

Whatever the changes and trends are, it will be interesting to watch the development of the semi-submersible heavy-lift fleet over the next few years. Unless the oil price shoots back up, high and fast, it could be a matter of survival of the fittest. The author will continue to try to keep track of it all.

For more information, feel free to contact the author at: info@argonautics.com.