Photo by Flying Focus, Bussum, The Netherlands

M² RUNNER - NORDIC

A LOOK BELOW THE SURFACE OF A METRE SQUARE

Builder
Shipkits B.V., Groningen, the Netherlands

Owner
Hartman Marine Group BV, Urk, the Netherlands

Principal particulars	
Length oa mld	92.90 m
Length pp	84.99 m
Breadth oa	15.00 m
Breadth mld	14.00 m
Depth to upper deck	10.00 m
Depth to main deck	5.50 m
Draught design	5.00 m
Speed design	11.5 kn
Cargo capacities	
Hold volume, appr.	6,200 m³
Deadweight	3,500 dwt
Gross tonnage	2,979 GT
Nett tonnage	893 NT
Tank capacities	
Marine gas oil	230 m³
Fresh water	73 m³
Ballast water	1,770 m³

The launch of a new vessel always provokes comment, but with the launch of the first of three vessels the m² Runner class has attracted some especially diverse comments from the 'experts'. With its high freeboard, and narrow bridge and accommodation block located at the aft end of the vessel on the port side, it is very distinctive. On the prominent internet forums the first of the series, *Oceanic*, was the second most viewed item in 2012.

Recently the second vessel in line, *Nordic*, was launched and the 'judges' were much gentler. With its unique design concepts, Hartman Global Seatrade has often been the subject matter of internet forums and professional literature. Although the m² Runner type vessels are subjected to more criticism than their predecessor the Deo Volente series, the spiritual fathers behind both designs still consider the *Deo Volente* more pioneering than the latter. With their latest design Hartman has simply responded to changes in the market for transportation of offshore equipment and wind turbines. And once one becomes accustomed to its striking appearance and looks beyond the surface, in general one has to admit the shear brilliance and down to earth smart thinking. Closer investigations will show that Hartman is simply able to offer more productivity at lower cost with these vessels. After one year experience and the second vessel just launched, often heard phrases now are "stretching the margins" and "unbearably functional".

The general concept

The initial idea for developing a new type of vessel was first conceived in 2010 by the Hartman Marine Group in collaboration with Conoship. The contract between Shipkits and Hartman Global Seatrade for the delivery of three vessels was signed a short while later. *Oceanic* was the first of the three vessels of the m² Runner type and was delivered in July 2012. The second vessel, *Nordic*, was delivered late 2012 to Hartman for outfitting at their quayside in Urk and was finished early 2013. The hull of the third, *Arctic*, is currently being built at the Shipkits facilities in Poland.

To deal with m² Runner's outward appearance first, the vessel has a relatively high freeboard, a narrow superstructure on starboard side aft, no funnel for exhaust pipes, significantly protruding fendering/sheerstrakes, an aircraft carrier deck and what appears sponson like structures over half of the hull side. This may sound a bit strange, but as the text below will explain, it is the result of a well-balanced and sophisticated design.

The vessels are designed to support the offshore market and for other special project cargoes. As a result a great deal of thought has gone into the cargo hold arrangements. Every effort has been made to exploit the space available to provide extremely large holds and deck space in relation to the overall size of the vessel. At the same time a great deal of attention has been paid to maintaining and optimising the hull form, so that a modest size engine could be used to reduce running costs. In this respect, the concept of the m² Runner differs significantly from the four previously built Deo Volente type fast special cargo vessels from Hartman. Unlike the Deo Volente, the m² Runner series is designed for a relatively low service speed.

The ultimate challenge of this design was to keep the vessel below the 3,000 GT, despite the large freeboard and the 8.30 metres high hold. This was important, from financial perspective, as staying below 3,000 GT would mean lesser crew requirements. Keeping the load line length below 85 metres, means that a (freefall) lifeboat is not required, gaining even more precious deck space.

And finally: the vessel also had to be recognisable as a typical Hartman vessel… hence, for example, the negative transom and the silhouette of the superstructure.

Flip side of the coin

As a famous Dutch soccer player used to say: "Every disadvantage has an advantage". Though in this case it is just the other way round, the revolutionary design provided the builders, the classification society and the flag state with some new challenges. It must be said that Bureau Veritas and all other parties involved

"Stretching the margins of project cargo vessels"

provided their undivided attention and full support in the development of this concept.

Just to mention a few of the challenges encountered. The location of the navigation lights had to be specially considered. Mooring on portside has to be done by means of camera assistance. Launching of life saving equipment on portside has to be executed remote controlled. Ballast also has become a 'necessary evil', due to the asymmetrical nature of the superstructure and considering that wind farm cargoes have considerable volume with relatively low weight.

The market demands

As stated above, with the m² Runner series, Hartman has responded to changes in the market for transportation of offshore equipment and wind turbines. For the transport of windmill parts many square metres (cargo area) and cubic metres (volume) are needed, instead of deadweight. These vessels can carry 80% to 100% more windmill parts than other similar coasters of 3,500 dwt. Ships like *Nordic* can transport almost as much wind farm material per trip as a 6,000 ton vessel, but in this instance the costs are only those of a 3,500 ton vessel.

Accommodation and wheelhouse

As stated above the vessel's superstructure has been located to permit the largest possible deck space. The choice of an aft accommodation instead of forward also provides a higher level of comfort, thus reducing seasickness to an absolute minimum. The reasoning for the relatively large height of the narrow superstructure is born from the requirements of the visibility from the bridge over odd sized deck cargos. The shape and location of this accommodation and the absence of a central

The upper deck shape allows for the 'Coops & Nieborg' hatch crane to be positioned at the forward end 'over the bow'

funnel for the exhaust lines provide a barrier-free cargo deck that extends over the full length of the ship. Below the upper deck at the stern is an open tween deck, which is home to the mooring equipment, allowing the upper deck to be clear. The exhausts pipes of the main and auxiliary engines are also located on this tween deck on portside.

The forward bulkhead of the superstructure has a recess between the upper and officers deck for stowing the hatch covers in such a way as to keep a clear deck opening over almost the full length of the hold. The wheelhouse forward area contains the L-shaped navigation console with all the required navigation and ship control facilities. The aft part of the bridge is an office and seating area with storage space and a U-shaped settee. Below the wheelhouse is the captains deck with the captain's dayroom, bedroom and bathroom, and a cabin for the pilot. One level lower, the officer's deck contains similar, though smaller, facilities for the ship's officers.

The saloon deck accommodates an office, relax/day room facilities and a spare cabin. The superstructure layer on upper deck solely contains a changing room and lockers. The crew accommodation is to be found on the raised quarterdeck along with the open deck aft for mooring equipment life rafts and m.o.b. boat. Besides the obvious crew accommodation, this deck contains the galley, laundry, mess room, and emergency generator, and includes provision and other storage spaces.

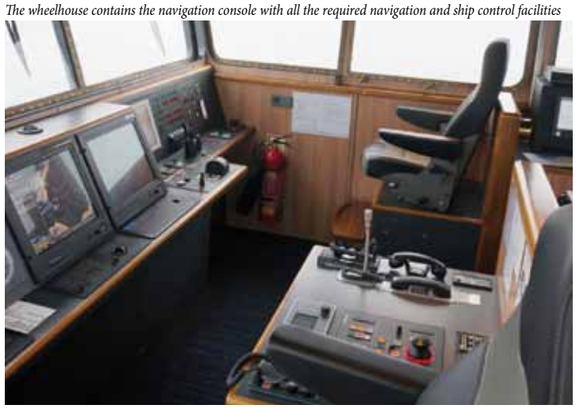
The vessel has a crew accommodation for six people, two spare bunks and the cabin for a pilot. Thus offering accommodation to nine people in total. Air-conditioning and sanitary systems are delivered and installed by Breman.

Deck arrangement and hull shape

The vessel has two significantly protruding fenders/sheerstrakes on each side, a remarkably 'aircraft carrier' shaped deck and a locally widened hull. The upper fender has been designed in order to create a facility to walk on deck when sailing with open top. The lower fender acts as a bumper to avoid damage occurring to the upper fender while, for example, moored along a quayside.

The ship has one controllable pitch propeller in a HD nozzle, which is powered by a Wärtsilä main diesel engine

The wheelhouse contains the navigation console with all the required navigation and ship control facilities



The almost square upper deck is simply to obtain as much square meterage as possible. Where the average 3,500 dwt vessels can store only three (maybe four) rows of windmill blades on deck, *Nordic* can have five spread over the full width of the vessel and three rows next to the superstructure. An average 3,000 GT vessel has a cargo deck of approximately 60 times 11 metres, whereas *Nordic* features twice that area with dimensions of 90 times 15 metres, when hatch covers are fitted. The hatch covers are flush and are placed on a custom made support therefore, by omitting the normal coamings, optimal use has been made of the width. The hatch covers and adjoining upper deck have a loading capacity of three tons per square metre. Tween deck hatch covers allow for a maximum load of 2.5 tons per square metre.

The upper deck shape allows for the hatch crane to be positioned either aft, against the superstructure, or at the forward end 'over the bow'. In the event that the hatch crane is in the way of odd sized cargo, it can be rotated horizontally to one side of the deck and 'parked' longitudinally. The hatch crane and hatch covers were delivered by Coops & Nieborg. Like the crane, the hatch covers can be stored both aft and forward.

The partially widened hull is to make optimal use of the volume available within 3,000 GT limitations. The volume thus gained, is used for side tanks and additional reinforcements in the hull side, requested by the owner to strengthen the 'open shoebox' against potential impacts. The ship's construction was drawn and calculated by Vuyk Engineering Groningen. The upper and lower fender have been locally recessed amidships to accommodate the pilot ladder and the landing of pilot tenders.

Photo by Flying Focus

Nordic has an 'Open Top' notation and is suitable for cable laying, wherein the coils/reels are placed in the hold

Cargo hold

The *Nordic* has one hold with a width of 12.50 metres, which is, compared to an overall width of 15 metres and a moulded width of 14 metres, impressive. This is achieved by building without the normal (hatch) coaming. The hold length is 54 metres at the bottom and 69.30 metres at the top and is thus almost a regular box shape. However it is stepped in way of the engine room aft and the deep tanks forward.

The large freeboard allows for higher cargoes, such as cranes, drums/boilers and windmill foundations, to be transported upright with the hatches removed. Whilst clearly the vessels have an 'Open Top' notation, the m² Runners can also be made suitable for cable laying, wherein the coils/reels are placed in the hold. As a requirement of this, suitable bilge pumps with ample capacity had to be fitted. They can also be used for pumping out the hold in the event that the sprinkler system is used. This makes the vessel suitable for transport of dangerous cargos, including IMO Class 1 explosives.

"Unbearably functional"

The shape and location of the accommodation provide a barrier-free cargo deck over the full length of the ship

Propulsion

The hull shape and propulsion options have been optimised and tank-towing tests have demonstrated a low hull resistance. There is no apparent advantage in using a Heavy Fuel Oil (HFO) propulsion system for these vessels. The reasoning behind this is, that HFO is more suited to engines above 2,000 to 2,500 kW, hence the choice to use a considerably less powered diesel engine.

"High productivity at very low cost"

The ship is provided with one controllable pitch propeller (CPP) in a HD nozzle, which is powered by a Wärtsilä main diesel engine of 1,200 kW by means of a single shaft. The main engine is flexibly mounted on the engine seating and flexibly coupled to the Renk gearbox, delivered by AMW Marine. The main engine is data linked directly to the Wärtsilä factories in Finland; this remote telemetry facility has the effect of making the chief engineer superfluous. Wolfard & Wessels Werktuigbouw was responsible for the complete outfitting of the engine room, including piping and assembly. The flap rudder, delivered by Becker Marine Systems, is operated by Rolls-Royce steering gear. The ZF Marine stern and bow thrusters are the finishing touch to ensure good manoeuvrability. The auxiliary equipment consists of 2 Stamford/Scania diesel generator sets of 250 kW one of which is also the emergency set. Ajax Chubb Varel delivered the fire extinguishing systems for all engine spaces as well as for the holds and high fire risk spaces. The propulsions configuration complies with the EEDI-requirements.

Conclusion

The m² Runner is a demonstration of the ultimate optimisation of the class and authority boundaries of a 3,000 GT and 85 metres load line length vessel. With this class of vessel, Hartman has realised as much area, volume and flexibility as is presently available within those constraints. They have thus delivered a highly competitive concept, offering clients more cargo volume economically transported per voyage.

Tom Oomkens

Subcontractors and suppliers of equipment fitted on board the *Nordic* - YN H 007

Ajax Chubb Varel, Amsterdam	: firefighting systems
AMW-Marine, Hendrik-Ido-Ambacht	: *Renk* gearbox
Anker, Het, Schelluinen	: windows
Becker Marine Systems, Hamburg, Germany	: *HRC* rudders
BenDit Isolatietechniek, Groningen	: engineroom insulation
Breman Shipping Installation, Genemuiden	: airconditioning and sanitair
Caldic Technic, Rotterdam	: *Stamford* generators
Conoship International, Groningen	: design
Consilium, Schoonhoven	: nautical equipment
Coops & Nieborg, Hoogezand	: hatch coversystem and tweendecks
Damen Marine Components, Hardinxveld-Giessendam	: *Optima*-nozzle; rudderstock
Datema Nautical Safety, Delfzijl	: liferafts; life saving equipment; personal protection; medicins; nautical inventory
De Flux Jacht & Scheepsbetimmering, Urk	: wainscotting and panelling; insulation accomodation
DELFTship marine software, Hoofddorp	: loading computer
GEA Westfalia Separator Nederland, Cuijk	: fuel oil and lubricating oil separators
Hartman Marine Shipbuilding, Urk	: main contractor; design
Helder & May, Rotterdam	: levelfloors
International Paint, Rhoon	: coating system
Intersona, Heerde	: sound and vibrations
MACH6, Emmeloord	: V-Sat and airtime
Marble Automation, Urk	: alarm and monitoring system
MME Group, Ridderkerk	: gangway; aluminium turntable top platforms
Ned-Deck Marine, Barneveld	: combined life raft / rescue boat manual slewing davit; rigid rescue boat
Piet Brouwer Elektrotechniek, Urk	: electrical system
Reikon, Spijkenisse	: *Accue* pumps
Rolls-Royce Marine Benelux, Rotterdam	: steeringgear system
Sandfirden Technics, Den Oever	: *Stamford* generators; *Scania* generatorsets
Ship's Equipment Centre Groningen (SEC), Groningen	: mooringwinches
Shipkits (Partner Stettin), Groningen	: hull
TCD, Urk	: steelwork
Vuyk Engineering Groningen, Groningen	: engineering constructie
Wartsila Netherlands, Zwolle	: main engine; CPP; HP Nozzle
Winel, Assen	: weather and watertight musketeerdoors and tank vent check valves
Wolfard & Wessels Werktuigbouw, Hoogezand	: design and delivery of engine room piping; bilge/ballast system and auxiliary systems
ZF Marine Krimpen, Krimpen aan de Lek	: bow and stern tunnel thruster