FSIV IS DESIGNED TO MAINTAIN SPEED AND REMAIN MANOEUVRABLE

De Hoop in The Netherlands believes the FSIV it has developed can maintain speed whatever its cargo and avoids some of the limitations experienced by other similar designs

De Hoop's FSIV combines hybrid machinery with a very slender hull

De Hoop shipyard in The Netherlands recently delivered *Karina*, the first example of a new type of fast supply intervention vessel (FSIV) with interesting hybrid machinery.

The design goal for the new class of vessel was to develop a vessel that can maintain speed irrespective of how much cargo it is carrying or what draught it is operating at and to transport cargo and offshore personnel in the most fuel-efficient way.

Analysis undertaken by De Hoop of the existing vessels in this market segment highlighted a number of problems. Firstly, most designs are optimised for maximum speed at light load, but at full load, efficiency declines significantly and speed drops accordingly. Moreover, in the 13–15 knots speed range, the performance of many similar vessels is poor because the hullform is optimised purely for a high maximum speed.

To be able to manoeuvre vessels of this type at low speed and in dynamic positioning (DP) mode with very high power installed and light displacement, controllable-pitch propellers, two-speed gears, trolling gears and multiple engine installations are required (usually based on four or five engines). Controlling such a vessel in DP mode with multiple engines, rudders and clutching propellers can lead to problems, because light displacement vessels are very sensitive.

Other vessels were developed with maintaining speed in a seaway in mind, but, claims De Hoop, these vessels experience higher resistance in calm water, poor manoeuvrability and very wet deck with exposed cargo.

In contrast, claims De Hoop, the design adopted for its FSIV "solves all these problems in one go". The hull is a conventional displacement hull, with a very slender hull with very small entry angles, and a stern that is not only designed for maximum speed but for good seakeeping too (no slamming). The bow is fitted with a bulbous bow to reduce the effect of bow wave and improve seakeeping.

Further fuel savings are achieved by applying the Van Oossanen hull vane, realising an 11–15 per cent reduction in power consumption, proportional to speed. An additional characteristic of the hull vane is its stabilising effect, as the foil reduces pitching motions.

For the propulsion system, a hybrid concept was chosen. At low speed (up to 13 knots) and in DP mode, the vessel operates in diesel-electric mode, with electrical power generated by a shaft generator. In the higher speed range, propulsion is provided by two diesel engines (both Cat 3516s), which are directly coupled through a gearbox to the shaft. The gearbox has a power take-in (PTI) for a 350kW motor to propel the vessel at low speed. No reversing gear is fitted, and astern propulsion is only possible in diesel-electric mode.

"With this propulsion system, full rpm control of all propellers, including the bow thruster, is available, while at low speed, only one engine is running, which saves fuel and reduces maintenance," said De Hoop.

The propeller design is such that the vessel reaches 21.5 knots with 150-tonne deck load using 3.4MW (70 per cent mcr). Economical speed is 13 knots, on one engine, with 450kW. The two large highly efficient fixed-pitch propellers are responsible for rapid acceleration to full speed in only 60 seconds. Switching between diesel-electric and diesel-direct is automatic.

This propulsion configuration, in combination with the well thought-out hull, results in an impressive reduction in fuel consumption. Compared to many competing FSIVs, claims De Hoop, fuel consumption is reduced by 40 per cent.

The all-steel hull is built in accordance with DNV GL's High Speed Craft rules. To obtain a high strength lightweight hull and superstructure, high tensile steel is used in combination with what the yard describes only as "sophisticated construction techniques". This choice is primarily based on cost considerations – lower initial building and material costs with easier repair options once operational. In addition, the use of steel makes the vessel robust enough for a wide range of duties and ensures that it can be built at a wide range of shipyards.

The vessel has seating for 100 passengers, luggage storage, toilets and a messroom. It is located further aft than usual in order to reduce vertical accelerations as much as possible. During trials, noise levels were 55–57 dBA at full speed. Crew accommodation is below deck and consists of four cabins with two berths each. The spacious bridge gives a 360-degree view, and operation is from a single desk, suitable for navigation and DP operations.

The FSIV2000 was developed for combined transport of deck cargo and passengers to offshore oil fields. The vessel has a 200m² aft main deck with capacity for 200 tonnes of cargo and a 40m² foredeck with fittings and lashing points for two 20ft containers. Versions of the design based on the same hull are also being developed, including a patrol version with ballistic protection and more berths. A pure supply version of the design is also being developed with greater range and more below tankage and higher deadweight. OSJ

KARINA	
Designer	De Hoop
Builder	De Hoop
Length oa	55.17m
Length bp	49.81m
Beam moulded	9.00m
Depth moulded	4.50m
Draught design	3.10m
Deadweight design	210 tonnes
Deck space	200m²
Deck capacity	200 tonnes
Speed, trials	21.3 knots
Class	DNV GL+ 100A5, RSA (200), HSDE, Fast Crew Supply Vessel (+), MC, DP1

Karina has a slender, displacement hullform with very small entry angles, and a stern designed for maximum speed and good seakeeping