

Manoeuvrability and power from Schottel

Although tankers account for a comparatively modest 5-10 per cent of ship propulsion system sales for Schottel GmbH & Co KG, safety-conscious owners of smaller tankers are increasingly waking up to the advantages offered by the German manufacturer's innovative designs

So far this year Spay/Rhein-based Schottel has delivered or has on order propulsion systems for 14 tankers. Amongst these is the order for a system for the fourth in a series of 3,000 m3 LPG/petrochemical gas carriers for Italian owners Stargas/De Poli and construction at the De Poli shipyard in Venice.

Stargas has specified for each ship a pair of Schottel STP 1010 L-drive twin propellers, each powered in a compact installation by an electric motor with direct vertical coupling and a power rating of 1050 kW/ 720 rpm. An STT 170 LK bow thruster rated at 300 kW completes the complement of Schottel equipment.

"The arrangement offers the most space-saving propulsion solution, making more ship hull space available for cargo, as well as exceptional efficiency," says Dipl-Ing Uwe Gragen, naval architect and Schottel sales and project manager.

"As a steerable propulsion unit, the STP 1010 provides optimum manoeuvrability and at the same time the Schottel twin propeller solution requires two relatively small propellers, of 2,150 mm diameter each, to provide a contract speed of 13.5 knots at 80 per cent engine power. Tank tests with the vessel have shown that performance is equal to that of a similar propulsion unit with a single 2,538 mm propeller."

Main propulsion options

Besides Schottel twin propellers (STPs), other main propulsion system options available from the German company are:

- a) podded drives up to 20 MW, i.e. Schottel electric propulsors (SEP) and Siemens-Schottel propulsors (SSP);
- b) Schottel rudder-propellers (SRP); and
- c) Schottel controllable-pitch propeller systems, including shafting and rudder arrangements (SCP).

Schottel also supplies auxiliary propulsion systems, most notably its Schottel Pump Jets, which serve as both thrusters and "get-you-home" secondary propulsion devices, and Schottel transverse thrusters (STTs).

For tankers, the SRP, STP and SSP arrangements have proved to be effective main propulsion systems, particularly for smaller tankers of up to 9,000 dwt. Not only are the units an efficient means of propulsion while the ship is at sea, they provide the ship with a high degree of manoeuvrability and enable harbour operations without tug assistance.

More from pods

Outside the small tanker sector, the most important development at Schottel over the past 12 months has been the development of a diesel-electric pod drive system, the Schottel electric propulsor (SEP), for the power range from 1 to 5 MW. Following its introduction in 2002, this system has proven successful with customers.

"Our engineers are now developing a new concept that combines the main technical and economic capabilities of both mechanical rudder-propellers and pod drives," explains Uwe Gragen. "In contrast to pod drives with an electric motor inside the underwater pod, the motor in the new propulsion system will be integrated vertically into the support tube of the rudder-propeller.

"This arrangement for the electric motor means that the new concept is similar to that of a rudder-propeller with a vertical power input, i.e. the L-system. This new, very compact electric drive will cover the power range from 1,500 to 3,400 kW."

Controlling the pitch

Another segment where Schottel is increasing its market share is controllable-pitch propellers, which are manufactured by the subsidiary company Schottel-Schiffsmaschinen GmbH in Wismar.

"One key to this success is the know-how and quality inherent in the hydrodynamic design of Schottel controllable-pitch propellers (SCP)," adds Uwe Gragen. "In addition to the expertise of our own design team, we have secured the support of experienced propeller designers. With the recent development and manufacture of 25 MW units for fast container vessels, Schottel has demonstrated that it is fully equipped to meet the increasing demands of the world market for such propellers."

Get-you-home capability

The intensifying focus on tanker safety, especially after the sinkings of Erika and Prestige in recent years, has prompted shipowners and charterers to review, amongst other things, main engine reliability and the level of propulsion system redundancy in new tankers being commissioned. For some tanker newbuildings earmarked for service in particularly sensitive environmental areas, shipowners have opted for full redundancy by specifying vessels with twin engines, twin engine rooms, twin propellers and twin rudders. Others have opted for more modest arrangements which nevertheless provide the ship with a "get-you-home" capability in case of an emergency.

Schottel has been closely involved with the issue of emergency power capabilities for vessels transporting hazardous cargoes for some time. Several years ago the company carried out a feasibility and cost-effectiveness study on emergency propulsion devices (EPD) using the formal safety assessment (FSA) approach. It marked the first time such an approach was used in the context of ESD.

The study was supported by the German government and presented to IMO's Maritime Safety Committee (MSC) but on that occasion delegates decided that the measures inherent in the proposal were unwarranted and the submission was rejected. Nevertheless, Schottel remains committed. It is continuing to refine the FSA approach and has the ESD study available should the maritime community decide it needs to be reassessed at the IMO forum at some stage in the future.

Two birds and one stone

Meanwhile, Schottel continues to market both the get-you-home and ship manoeuvrability capabilities of its Pump Jets. One of the advantages of this equipment is that it can be retrofitted on existing ships relatively easily, as typified by the case of the IMO Type 3 chemical/product tanker Amber.

Built in Korea in 1997 and operated by the Danish company Transmarine Management ApS, Amber and her sistership Ametist have recently each had a Schottel Pump Jet type SPJ 82, rated at 400 kW, fitted in the bow.

The Pump Jet utilises a water jet drive technology developed by the company some 25 years ago. On the two tankers the drive unit is fitted flush with the outer shell in the ship's bow and seawater is drawn in through a protective grid by an impeller and expelled laterally through three nozzles located on the periphery. Because the drive unit can be rotated through 360°, thrust can be delivered in all directions.

Amber and Ametist did not previously have bow thrusters so the Pump Jets have provided the tankers with a high degree of manoeuvrability, an important factor considering the narrow waterways in many of the European ports visited by the ships. The bonus is that the Pump Jets effectively provide each of the ships with a second propulsion system capable of powering the vessel home should the main engine fail for any reason.