

Pump makers primed for future

The established cargo pump manufacturers continue to consolidate their positions in a market somewhat depressed compared to the heady days of early 2001. But the longer term outlook is good and a number of suppliers are adding new pump models and ranges

Besides price, the two key criteria tanker owners focus on when ordering cargo pumps are discharge time and reliability. Over the years the leading cargo pump manufacturers have consolidated their positions in the marketplace and all are confident that their credentials with respect to these key criteria meet the requirements of their customers.

Tanker cargo pumps are arranged either in aft pumprooms or at the bottom of individual cargo tanks in a one-pump-per-tank configuration. Aft pumprooms, with three or four high-capacity centrifugal pumps installed, are usually the chosen option for crude oil carriers of 50,000 dwt and above.

The one-pump-per-tank segment includes hydraulically driven submerged pumps and electrically driven deepwell pumps with the motors placed on deck. Both types are favoured on the smaller tankers, including product and chemical tankers, where product purity and the provision of a high degree of cargo segregation are important considerations.

Historically, electrically driven deepwell pumps enjoyed greatest market penetration in the smaller tanker sector, whereas the hydraulically driven submerged pumps continue to find favour across the spectrum, including on an increasing number of larger tankers.

Although pumprooms are chosen for the majority of floating production storage and offtake (FPSO) vessels, some FPSO operators are specifying a one-pump-per-tank approach. Hydraulically driven pumps tend to be specified when this type of arrangement is required but electrically driven deepwells were specified on one recently completed FPSO project. As FPSOs are either converted VLCCs or a similar size newbuilding, cargo tanks are large and thus require long lengths of vertical shaft attached to the pumps, possibly as much as 30 metres.

Electric Marflex pumps

Marflex BV of the Netherlands is a leading supplier of electrically driven deepwell pumping systems and is finding that the demand for its equipment is increasing. The company reported a 50 per cent increase in sales in 2001 compared to the previous year.

"Over the past decade we have slowly but surely built up a reputation as a reliable manufacturer of a quality deepwell pump that performs well," comments Paul van Beveren, managing director of Marflex BV. "This recognition has finally led to wide-ranging acceptance of our electric-drive system."

The feature of the Marflex deepwell pump which sets it apart from the competition is its oil-lubricated shaft arrangement. "This configuration, in conjunction with the electrical drive, ensures low noise levels and minimises the need for pump maintenance work," continues Paul van Beveren.

The company reference list shows that this year 57 tankers with full shipsets of Marflex pumps will have been delivered in 2002, including the 255,000 dwt Belanak FPSO for Conoco, up from 40 such ships last year. In addition, the orderbook for 2003 and beyond currently stands at 35 ships. Chemical tankers account for at least 75 per cent of the ships on the Marflex reference list.

Bigger electrics

In line with this increasing demand for its products, Marflex BV has introduced three new types of cargo pumps - the MDPC-300, the MDPC-350 and the MDPC-400 in the recent past. The new units provide increased pumping capacity compared to that provided by the existing pumps, to the extent that the company is able to offer customers deepwell pumps with a maximum capacity of up to 1,200 cu m per hour. The Dutch company has an ongoing R&D programme, and the current emphasis is on maintaining the increase in momentum achieved over the past two years. Priority will continue to be given to augmenting the existing range with new versions of the oil-lubricated, electrically driven Marflex pump to suit customer needs.

The oil-lubricated shaft arrangement remains the foundation stone of the Marflex pump. According to the manufacturer, the working life for such a pump is more than 10,000 running hours, based upon the service life of the bearings in the electric motor. Such a number of running hours is normally sufficient to last the anticipated operating life of 20-25 years for a seagoing tanker.

Framo to the fore

Frank Mohn AS of Bergen, Norway pioneered the development of well-known 'Framo' hydraulically driven submerged cargo pumps in a one-pump-per-tank arrangement. Following initial success with cargo pumps, the pump supplier took the concept one stage further and introduced submerged pumps for ballast water handling on larger product tankers and crude carriers in the 1980s.

The single-suction, single-stage design enables the handling of a full range of chemicals and oil products, irrespective of the specific gravity and viscosity. The hydraulic drive secures stepless capacity regulation and oil-lubricated bearings allow dry running during stripping and tank cleaning operations.

Shipsets of Framo pumps are prepared as modularised systems in Norway to facilitate installation and reduce commissioning time at the shipyard. Tankers fitted with Framo pumps span the size range 2,000-300,000 dwt.

Handysize and Panamax

Over the past two years Handysize, Handymax and Panamax ships have been the most buoyant segments of the newbuilding market. This has suited Frank Mohn as the Handysize/Handymax sectors, i.e. 35-48,000 dwt ships, have traditionally been strong ones for the company, while more and more operators of Panamax vessels are turning to submerged pumps.

"During 2002 some 130 tanker newbuildings equipped with Framo submerged pumps will be commissioned," points out Eivind Borgen of Frank Mohn AS, "and we expect that a similar number of tankers fitted with our equipment will be handed over in 2003. There are now approximately 1,700 tankers with Framo pumps in service, and over 10 per cent of these are in excess of 50,000 dwt in size. The 1,700 tankers are fitted with a total of 29,000 Framo cargo pumps."

In the FPSO sector Frank Mohn is supplying complete sets of submerged pumps for four large FPSO units under construction in Korea, two at Samsung for Shell Nigeria and two at Hyundai. The latter units have been commissioned by Elf for positioning off the Nigerian coast and by Esso for an offshore Angola location.

Offshore Svanehøj pumps

Amongst the range of equipment being supplied by Hamworthy KSE for the Sanha LPG floating production storage and offtake (FPSO) vessel building at IHI in Japan are 18 deepwell cargo pumps and four booster pumps supplied by group company Svanehøj. The 135,000 m³ capacity vessel, which is being constructed for a joint venture between Single Buoy Moorings Inc and Sonangol, the state oil company of Angola, will be stationed on the Sanha condensate complex north of the Congo River off Angola's Cabinda province when delivered in 2004.

Mixed LPG gas will be received from two production platforms and then fractionated onboard the FPSO to separate butane and propane products. Each product stream will then be chilled for storage in the vessel's atmospheric pressure storage tanks and periodically transferred to LPG export tankers for shipment and sale.

Sanha will be the world's largest LPG FPSO. Hamworthy KSE supplied a similar system to Escravos, the first-ever LPG floating storage and offtake (FSO) vessel, which has been operating successfully in Nigerian offshore waters on behalf of ChevronTexaco for the past five years.

Svanehøj on the ships

Svanehøj is most well known for the deepwell cargo pumps it supplies for use onboard LPG, ethylene and other gas carriers, and the company has established itself as one of the leading players in this sector.

The Danish manufacturer has put its 35-plus years of experience into the development of its equipment range. Recently, Svanehøj announced that its LPG pump technology is eminently suitable, with minor modifications, for use on the new generation of small, coastal LNG carriers that has been mooted. Two such ships have already been ordered, one for use in Norway and the other for Japan.

Svanehøj also supplies a range of electrically driven, deepwell cargo pumps for handling liquid cargoes, including chemicals. Until recently, the range has centred around multistage, slow-speed pumps. However, company's package of liquid cargo pumps has now been augmented by a high-speed version, which includes a single-stage option.

Pumproom workhorses

Despite the advances made with the use of deepwell pumps in larger ships, the most common pumping arrangement for crude oil carriers of Panamax size and above is still the aft pumproom equipped with cargo and ballast pumps.

A typical pumproom features three steam turbine-driven, vertical centrifugal cargo pumps, one reciprocating, steam-driven cargo stripping pump and one cargo stripping eductor. To handle ballast, pumprooms are usually provided with two vertical centrifugal pumps, one of which is steam turbine-driven and the other powered by an electric motor, as well as one water ballast stripping eductor.

For a standard million barrel tanker, each of the cargo pumps would be rated at 4,000 cu m/hour at a delivery head of 135 metres to allow a maximum unloading rate of 12,000 cu m/hour with the three main cargo pumps working. Such a tanker would normally be expected to handle up to three grades of oil simultaneously with two-valve segregation. Operation of the three pumps at full capacity over a 24-hour period would consume 80-90 tonnes of fuel oil. In contrast, the deballasting pumps in operation over a similar period during cargo loading operations would consume only one-tenth as much fuel.

Shinko adds LNG

The leading supplier of centrifugal pumps for tanker pumprooms is Shinko Industries Ltd, the Japanese company having built up its market share for such pumps to over 90 per cent

Although the steam turbine-driven centrifugal crude oil pump is the company mainstay, Shinko has developed a line of cryogenic pumps since manufacturing its first such unit in 1972. To date, more than 750 sets of cryogenic pumps for marine and terminal use have been supplied.

This experience has been put to use in the development of a new submerged cargo pump for handling dimethyl ether (DME), a unit which was on display at the Gastech 2002 meeting in Doha last month.