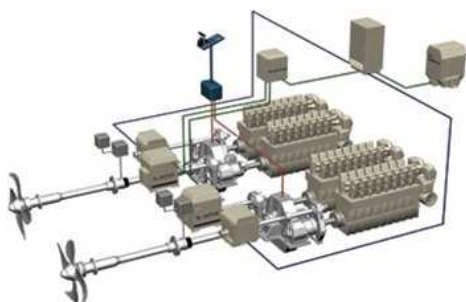


Packaging power prevents problems

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Single-source supply of integrated propulsion systems yields significant benefits for ship designers, builders and operators in planning, installing and commissioning projects

A propulsion system typically comprises four main elements – an engine, gearbox, propeller and control system – whose individual envelopes can represent a compromise in installation when sourced separately. Unknown or contradictory component and package main dimensions, for example, might result in inadequate space reservation for the shaft alternator; a 'collision' between gearbox and engine charge air receiver; and an unsuitable compromise between the total machinery installation and engineroom lengths.

In service, the performance of the different elements may not be precisely matched to each other, potentially undermining the operational efficiency and reliability of the system.

An integrated package designed and supplied from a single source, however, enables a shipyard to concentrate on its core competence (steel fabrication and project co-ordination) and allow a specialist supplier to take responsibility for designing, delivering and commissioning an optimised propulsion plant.

Among the few marine engineering groups offering complete solutions, Wärtsilä taps its own core products – two-stroke and four-stroke engines, gearboxes, propellers, waterjets, thrusters, rudders, shafting and sterntube seals – to create and supply fully optimised packages tailored to the project. Its programme also includes electric drive, automation and low voltage and medium voltage switchboard systems.

A range of pre-engineered propulsion packages based on Wärtsilä L20 and L26 medium speed engines in four-to-nine-cylinder configurations has been

developed for two types of installation:

? Propac CP, embracing the engine, CP propeller, reduction gearset with built-in clutch, flexible coupling, shaft, seals, bearings and integrated propulsion control and monitoring system

? Propac ST, embracing the engine, steerable thrusters (with either a fixed pitch or CP propeller), propeller nozzle, slipping clutch and/or flexible coupling, shafting, bearings and integrated control and monitoring system.

These systems cover an output band from 1,080kW to 3,060kW but higher powered packages - up to 19.4MW - can be offered using Wärtsilä and Mitsubishi Heavy Industries low speed engines: MHI UEC37LSII, 43LSII and 45LSE models and Wärtsilä RTA48T-D, RTA52U, RT-flex50-D, RTA58T-D, RT-flex58T-D and RT-flex60C-B models.

Standard propulsion package solutions with ratings up to 21.6MW from MAN Diesel can feature appropriate members of the German group's four-stroke and two-stroke engine programme. The medium speed engine options embrace L21/31, L27/38, L/V32/40, L/V32/44CR, L/V48/60CR and L58/64 series models with ratings up to 21.6MW; the low speed engines available for packages range from 260mm to 600mm-bore designs, including the new S50ME-B models, and cover output requirements up to around 19MW.

System integration is facilitated by Renk gearboxes, Alpha type VB and VBS CP propellers and Alpatronic remote control systems, all supplied from within the group.

Rolls-Royce also taps group specialities to design and supply packages based on its Bergen medium speed diesel and gas engines, Kamewa CP propellers and bow thrusters, and Ulstein Aquamaster azimuth thrusters. The portfolio further extends to Frydenbo and Tenford rotary vane steering gear, various rudder designs and automation and control systems.

Packages are commonly supplied by Rolls-Royce to yards worldwide building the group's popular and diverse UT700-series of offshore supply and support vessels, but references also include mainstream cargo tonnage. In-house expertise in ship design and hydrodynamics R&D is cited as beneficial.

Hyundai Heavy Industries' Engine & Machinery Division pursues propulsion package projects based on its own-design HIMSEN medium speed engines. The key members of the programme for such applications are the H21/32P, H25/33P and H32/40P series, which currently cover a power range up to 4,320kW (although V-cylinder versions of the latter 320mm-bore design will eventually double the upper limit).

Nine vessels for the Korean Ministry of Food, Agriculture, Forestry and Fisheries are being supplied with HIMSEN-based twin-engine/twin-screw propulsion packages.

Norway-based Scana Volda has developed a range of CP propellers, reduction gearboxes and remote control systems for integrated propulsion packages, with propellers optimised for various plant configurations: diesel-mechanical, diesel-electric or hybrid. Its gearboxes can be designed for one or several input shafts and supplied in vertical, horizontal or coaxial versions, and take-off or power take-in or combined PTO/PTI facilities. **MP**

