MARCO POLO SERIES PROPULSION ARRANGEMENT

A lot of attention has been given to the efficiency of the propeller. Marco Polo, to begin the series, has a single propeller concept, following the evolution of the world's most efficient commercial ships. This has been fine-tuned and verified by scale model tank test studies.
We have taken full advantage of the reliability of modern marine engines and drive systems, but as a further safety backup, Marco Polo has a Schottel bow thruster powered by its own remote engine, and this allows a 'get home' capability at seven knots. It is unique in the yachting world that a separate engine and powerful steerable bow thruster in a separate engine room are used to give an outstanding safety feature. Fire or flooding of the engine room will render most motor yachts inoperable, navy safety standards were used on Marco Polo to overcome this problem.
Marco Polo's propeller is also well-protected by twin rudders that avoid propeller damage even when grounding. She is fitted with one Caterpillar 1400 kW engine and controllable pitch propeller to constantly being able to adjust the engine load to optimum conditions.

Single screw arrangement is normal for most ships and fishing vessels. There the reason is of course efficiency; a single screw arrangement is much more hydro dynamically efficient than two and the capital and maintenance costs are of course much lower. A second engine often offers less than a few knots more and, anyway, many twin-screw motor yachts make placing voyages on one engine only.

That leaves the issue of redundancy and safety. Twin-screw thinking goes: "Well we have a complete spare propulsion system if one breaks down". That is valid for cases of external damage to props and shaft or machinery failure. However, when it comes to – for example – an engine room fire or flooding it is highly likely such would disable all propulsion and power generation in the room. Twin-screw military vessels and indeed some new cargo vessels are

designed as Redundant Propulsion vessels. They get round this risk by splitting engine room spaces into watertight sections; twin-screw motor yachts don't.

Regarding manoeuvrability, Marco Polo though is fitted with a stern thrust and is designed to be docked on thrusters alone.

The key to easing single-screw redundancy fears lies forward: a Schottel pump jet. Pump jets are not new on yachts; Oceanco's Constellation used them aft for manoeuvring. Like on the commercial application, the pump is driven directly by a diesel engine mounted in a forward engine room completely isolated from the aft one. This means that even total destruction of the aft engine room would not disable Marco Polo, as, for making way, the pump jet offers 7 knots of speed, with full directional control.

The water jet propulsion system, flush–mounted in the ship's bottom, is totally protected even against grounding.

Pump jets operate on the principle of a centrifugal pump. An impeller sucks water in through an intake funnel and forces it into a diffuser. A pressure casing collects water and expels it through the outlet nozzles which are steerable through 360 degrees and can generate thrust in any direction. They are used since many years for tug-boats and ferries and they are very solid and a reliable equipment.

Thanks to their compact design, low loss of buoyancy and low suction effect, they generate extremely high thrust over wide speed range. As thrusters they provide yachts with excellent manoeuvrability.

Pump jets provide the conventional benefits of precision manoeuvring in port and independent secondary propulsion units and steering systems.