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Abeking & Rasmussen's SWATH – an ideal design for luxury and expedition cruising



The world of passenger ship building technology is today prodigiously peppered with an impressive array of cutting-edge concepts and designs, but few stand heads and shoulders above the rest. The SWATH (Small Waterplane Area Twin Hull) concept of Abeking & Rasmussen, based on the original 1938 idea of Frederick G. Creed, is one such frontrunner that is beginning to capture the cruise industry's attention and arrest its imagination.

The SWATH technology can be applied to a range of vessels, including minesweepers, offshore petrol boats, crew transfer vessels, and coastguard vessels where stability, operational safety, and comfort are paramount. In cruise shipping, the concept in its current form is ideal for luxury and expedition operations.

The pedigree

Founded in 1907 and headquartered in Lemwerder, Germany, a region of Europe with distinguished shipbuilding traditions, Abeking & Rasmussen, peerless in its specialised field, is one of the oldest shipyards in the world, a living embodiment of all that is emblematic of German engineering and ingenuity. Equipped with state-of-the-art shipbuilding facilities, its innovative designs and products are defined by a unique blend of quality, modernity, and pioneering spirit.

Small wonder that it should become the standard-bearer of SWATH – a technology known for its superior seakeeping capabilities. Abeking & Rasmussen's original intention was to introduce the concept to German pilot vessels in an effort to push the operational limit of boat transfers. Beyond this limit, these kinds



of operations were carried out by helicopters. They could be hazardous and had resulted in several fatalities.

"We managed to bring SWATH to the next level of safety and reliability," said Nils Olschner, sales director special vessels at Abeking & Rasmussen. "Since the introduction of our SWATH vessels, there have been no more fatal accidents." SWATH also fulfils all relevant IMO and class requirements.

The science

As with most brilliant ideas, the beauty of SWATH is in the exquisite simplicity of the science behind it. "The basic idea is not to absorb the energy from the moving water surface, by reducing the waterline area of the ship in the range of the surface to a minimum, as the motion of the ship is the reaction to the energy produced by the sea – the law of action–reaction," said Olschner. "The buoyancy of the ship is provided by two deeply submerged, submarine-shaped hulls. The actual superstructure is located on a platform well above the water surface. Hulls and platform are connected by one or two pairs of struts."

Stability, or seakeeping, is the underlying leitmotif of the concept. In terms of rolling and vertical acceleration, the motion of a SWATH vessel is only about 25 per cent of a conventional vessel's. The smaller the vessel, the more apparent this difference becomes. Although this benefit tends to diminish with increasing ship size, the difference can always be felt.

Abeking & Rasmussen is a consummate master of the SWATH technology and its applications. The company is constantly developing and improving the concept. Its 25-metre vessel designs, for example, have seven different versions with additional hull variations. "That enables us to constantly calibrate our software tools based on the full-scale measurements, as we can measure the influence of the slightest variations," said Olschner. "By doing so we have drastically reduced the power demand of our designs."

Inevitably, questions are asked about fuel efficiency, on account

of the wetted surface being larger than on a monohull vessel. According to Olschner, this really becomes relevant only at higher speeds. Abeking & Rasmussen has been aware of this from the very beginning. Through innovative designs, SWATH is now able to match the conventional vessels in speed and fuel efficiency.

The application

SWATH is therefore ideal for luxury and expedition cruise operations. "The good seakeeping capability of a SWATH ship offers a high degree of comfort for its guests," said Olschner. "We are convinced that a cruise line using SWATH vessels will lead to bookings from an additional target customer group. We see the great advantage of our SWATH@A&R technology that enables the privacy and intimacy of a boutique-size ship with the seakeeping capability of mid-size ship. In addition, the special architecture offers unique public spaces, like an underwater observation lounge in the submarines, a forward-facing observation lounge close to the water surface, and forward-facing cabins – which is very difficult to realise on smaller ships."

Above all, SWATH is still a unique concept.

