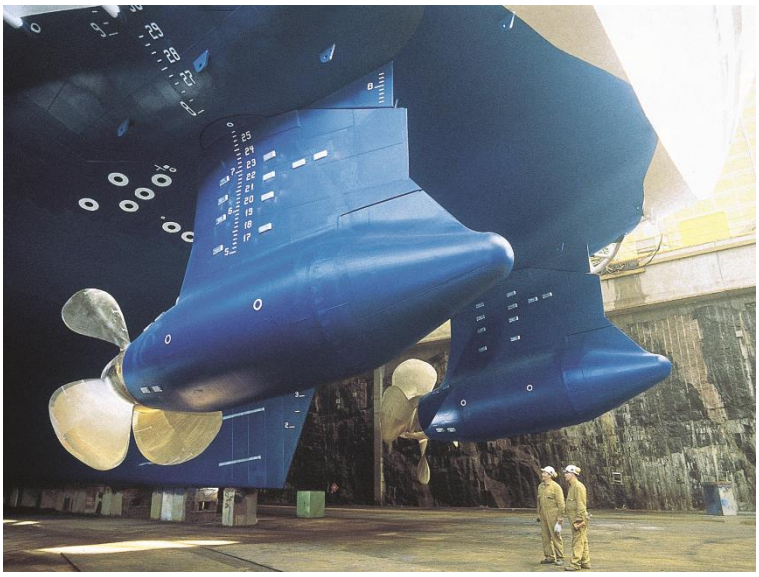
ABB White paper

Powerful, efficient, maneuverable ship propulsion

ABB's Azipod® propulsion systems feature an exterior electric motor that facilitates powerful, efficient, flexible and lower-maintenance energy use aboard ships.



A typical ship propulsion system involves a massive arrangement consisting of a prime mover or generator (a diesel engine, gas turbine, etc.), power transmission equipment (a long and heavy shaftline with gearbox), steering and control systems, and finally, the propeller to provide motion. Much of the world's fleet uses some form of this diesel-mechanical propulsion system.

By contrast, the Azipod® propulsion system, first introduced in 1990 for Finnish icebreaker operations, uses a streamlined electric system with the same generator that provides on-board electricity also powering the main propeller. Electric power is transmitted directly from the prime mover to the propeller, requiring neither gearboxes nor long shaftlines. This allows generators to run at optimum efficiency levels at all times, typically resulting in a 10-20% improvement in fuel efficiency while enhancing ship maneuverability. Noise and vibrations are reduced. And since there are no gearboxes or long shaftlines, maintenance is significantly reduced.

The Technology

Azipod® technology was originally patented in 1955, with the first commercial application of the system occurring in 1990. The technology has evolved over the years through refinements to the original design such as simplified maintenance and enhanced controls. Azipod systems have logged over 9 million hours of operation on vessels of various types.

Azipod systems feature their electric motor housed in a submerged pod completely outside the hull of the ship. Power is fed to the pod via cables from diesel generators inside the ship while a dedicated control system featuring circuit breakers, protective equipment, and electrical drives (i.e., motor controls) is managed from the ship's bridge. This streamlined propulsion system eliminates the need for rudders, stern transversal thrusters, or long shaftlines inside the hull. It also gives the ship greater maneuverability with pods able to rotate a full 360 degrees.

The Benefits

Azipod propulsion systems offer several benefits, including:

- Increased energy efficiency: Azipod-equipped ships are more fuel-efficient than conventional vessels of similar size and capability, typically realizing fuel consumption savings of 10-20%.

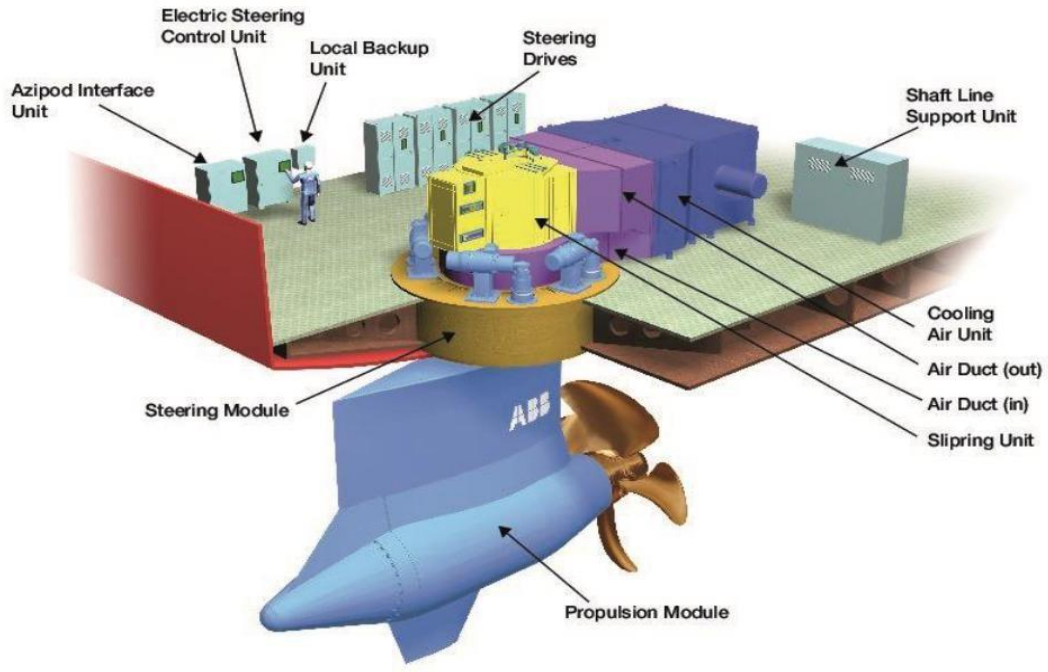
- Greater fuel flexibility: Since the Azipod relies on electric power, ships using the system can use a combination of any number of conventional generation technologies (e.g., diesel, natural gas) or new energy sources (e.g., batteries, fuel cells, and solar power).

- Improved maneuverability: With propulsion pods able to rotate a full 360 degrees, the Azipod provides ships exceptional maneuverability in tight spaces.

Future Trends

To date, the Azipod system has been used heavily by ice-going ships, offshore and research vessels, and cruise ships requiring superior maneuverability. In the future, use of the system is expected to expand to more conventional ships like cargo vessels. Meanwhile, the technology itself continues to evolve. For example, the hydrodynamic efficiency of the system is under further development, and more broadly, there is significant potential to improve overall energy efficiency by combining Azipod propulsion with intelligent vessel information systems.

Azipod Propulsion: How It Works



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