Azimuth propulsion, what are the challenges?

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The words of the mediaeval philosopher were quoted by yacht designer Sergio Abrami during the seminar entitled “Innovative propulsion and transmission systems for yachting applications” organised as part of the Milan Polytechnic Master in Yacht Design. The event, held on June 3, 2013 at the Wind Tunnel of the Polytechnic, was supported by ATENA, the Associazione Italiana di Tecnica Navale.

Azimuth pod solutions
The problem of relations between yacht designers and producers of propulsion and transmission systems is destined to get worse with azimuth pod systems. These solutions are more complex than traditional straight through transmissions and demand development with close collaboration between designer and producer. This is one of the many themes that emerged in this seminar, which saw an encounter between leading pod system producers, top designers, engineering and naval and nautical design professors and students. One intervention was by engineer Alberto Amici of RTN; the company is the Italian representative of Reintjes, producer of Fortjes pod systems. The first Fortjes was created at the end of the 90s, when three concepts were analysed in the test tanks of Hamburg and Potsdam: push-push, push-pull, pull-pull. Various positions for the installation of the pods were evaluated, considering not only hydrodynamics but also comfort on board.

Better performance
The next speaker was Paolo di Muro of ZF AG. The company produces pods for pleasure boats in three different sizes. The range covers power from 242 930 kW and all engines can be coupled. The ZF PODs have in common a structure with two stern thrust counter rotating propellers; this solution ensures that the propellers are protected by the skeg. For ZF, the main competitive advantage is performance, with an average gain of 7 – 10%. Further advantages are the increase of top speed, safety and comfort, in addition to a smaller engine room. Andrea Cerutti, sales director of the Rolls-Royce Marine sector, explained briefly the main milestones in the history of his division, created in 1999.

The first Azipull was made in 2002; it is a pull propeller pod designed for displacement boats. The pod increases efficiency by 20% compared with earlier Rolls-Royce rotors, and was much in demand as a refit. In 2009 began development, still underway, of Azipull systems in different materials, as for example Carbon Azipull, which pays particular attention to weight reduction, hydrodynamic and fuel efficiency. At the moment, the Carbon Azipull system has been installed as a test on the carbon fibre ferry Rygertroll operating in Norway and on and Azimut Grande 125F yacht.

Andrea Piccione, account manager of Volvo Penta Italia, summed up his company’s interpretation of the pod concept with the word “integration”.

Efficiency and yield
The IPS system is quick to install and simplifies the work of the yard; a further advantage is having a single supplier for functions that are otherwise separate (propulsion, helm etc). Another positive aspect of the helm is that the propeller becomes a standard component, with consequent advantages if it needs to be replaced.

As underlined by engineer Carlo Belloni of Volvo Penta, all the speakers reported a common path of study and optimisation, assign that “straight through systems had their minutes numbered”. Pod systems represent one of the most radical innovations transferred to yachting, with significant technical content as regards efficiency, yield and safety; from the point of view of design, construction and maintenance, also interesting are the reduced volumes of the engine room, speed of installation and standardisation of components; finally, from the point of view of the user, the ease with which pods can be manoeuvred makes them very intuitive to use. In short, although there are still some doubts to overcome, the commitment and speed with which companies are developing azimuth systems makes it worth keeping a close eye on the sector.

”Frustra fit per plura quod fieri potest per pauciora”: there’s no point in doing with more what you can do with less, said Franciscan friar William of Ockham.