



Project builds on experience

A new EU-funded project is to look at the knowledge that has been gained in the use of podded systems such as the Azipods shown here on *Oasis of the Seas*

Due to be completed in October this year, the EU-funded Azipilot research project has drawn together partners from technical and operational disciplines concerned with azimuthing control devices (ACDs) to foster greater knowledge exchange in the interests of vessel safety. By influencing both design and policy, the primary aim is to improve the operational safety and security of ACD-equipped ships by focusing on the man-machine interface, pilot training and the harmonisation of practices.

Azimuthing units for main propulsion have found increasing application across the industry, from the

steerable thrusters on tugs and other small vessels to the podded drive installations favoured by the largest cruise ships, as well as ice-going and special-purpose vessels.

It is felt in some quarters that the rapid evolution of the technology has prevented sufficient time being devoted to the propagation of knowledge throughout the various disciplines involved. For some time, concerns have been expressed about what is regarded as the counter-intuitive nature of manoeuvring with pods and the perceived operational restrictions or shortcomings imposed by the engineering facets of such propulsors.

The three-year Azipilot study was launched in response to these concerns. The 14 participant organisations reflect the breadth of interest and include specialists in design, testing, simulation and training, pilots who handle ships fitted with azimuthing devices and regulatory authorities.

The project is also a forum for cross-disciplinary discussion between key sectors represented by specialists in hydrodynamic modelling, marine simulation, marine training and operational practice.

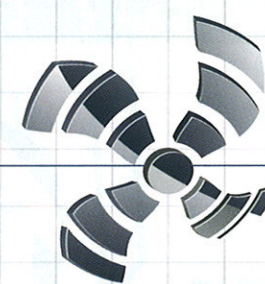
Ships equipped with azimuthing control devices tend not to use tugs when manoeuvring within the close confines of a port or berth. Such exacting operational demands call for the ship and its outfit to be designed to give the requisite performance, for adequate and appropriate training of pilots and for a reliable environment in which the pilot can exercise this training. Closer alignment of the man-machine interfaces aboard ship with the actual training of pilots and bridge personnel in its use has been identified as a vital requirement. Harmonisation of practices and the provision of recommendations for policy making are important aims.

The project is co-ordinated by the School of Marine

Azipilot project partners

Denmark	FORCE Technology
France	METTLER
	Sogreah Consultants-Port Revel
Germany	Development Centre for Ship Technology and Transport Systems (DST)
Ireland	Transas Group
Italy	Cons.A.R. (Italian Shipowners Research Association)
Netherlands	STC Group
Poland	Centrum Techniki Okretowej (CTO)
	Foundation for Safety of Navigation and Environment Protection (SHRTC)
Sweden	Broström Ship Management
	SSPA Sweden
UK	Newcastle University, School of Marine Science & Technology*
	South Tyneside College
	UK Maritime Pilots' Association

*Project co-ordinator



Optimum efficiency from MAN propeller

IF THE STAR of the MAN Diesel exhibit at last year's SMM was the 20V32/44CR common-rail large-bore diesel engine with SCR catalytic converter, the supporting role was most definitely taken by the new high-efficiency VBS propeller generation.

The new VBS Mk5 generation of MAN's Alpha CPPs consists of a complete range of 20 hub sizes, capable of handling outputs from 1,000kW up to 40,000kW. The new range spans hub diameters from 600mm to 2,150mm.

The greatest benefit of the VBS Mk5 propeller claimed by its German maker is an increase in efficiency of up to 2%. The operational advantages can be lower fuel consumption and reduced exhaust gas emissions or higher thrust for increased speed or higher bollard pull for a given engine power.

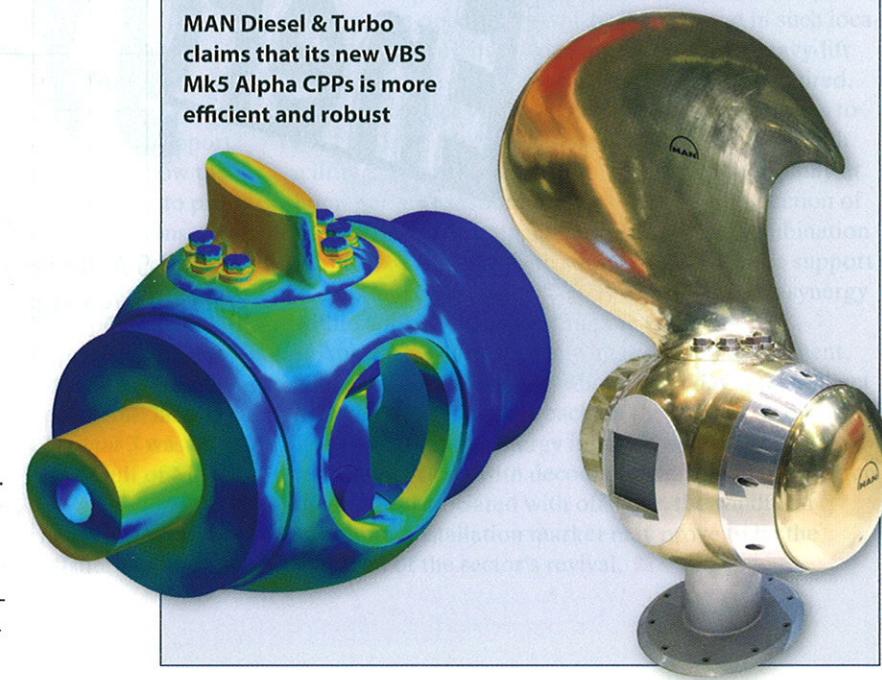
The shape of the new hub is flow-optimised at its afterpart and reduced in size, resulting in a lower hub:propeller diameter ratio and a reduced drag. The flow optimisation includes a new, more streamlined hub shape and blade foot integration that makes it completely flush with the hub contour.

The new hub design is simplified and has 40% fewer parts than previous versions. The material fatigue levels are calculated for a 30-year lifetime, considering all possible external loadings in service. Furthermore, the overall weight has been reduced for less impact on, for example, strut and stern tube bearing loads.

The new propellers have been developed with a number of inherent service, inspection and exchange features, including the unique possibility of inspecting and repairing all of the hub interior parts with the propellers placed *in situ*.

A new compact ODF oil distribution unit – for gearbox mounting – has been developed for the VBS Mk5 propellers. A short and very robust unit with 20% fewer parts compared with today's ordinary ODF designs. The installation length has been reduced by 15% to benefit very short and compact engine-gear-propeller installations. **S**

MAN Diesel & Turbo claims that its new VBS Mk5 Alpha CPPs is more efficient and robust



Science and Technology at Newcastle University in the UK and the consortium has representatives from nine countries. Grant aid covering the full project cost of €1.5M (\$2.1M) has been made available under the EU's Seventh Framework Programme

In the circular issued for the first Azipilot conference and workshop in November 2008, it was stated that "ACDs, although very flexible propulsion units as far as manoeuvring is concerned, can often be extremely confusing and counter-intuitive for the user (especially under stressful conditions such as ship handling). This has led to dangerous situations, expensive contact damages, and the ever-dreaded vessel downtime. In view of this, adequate training in the art of sailing with ACDs is not a luxury option for the maritime industry but a basic necessity. Indeed, in the near future, such dedicated training may well become a mandatory requirement for ACD operators."

One of the initial tasks of the project consortium has been to identify the interest group for the industrial sector, its manufacturers, technology specialists, shipowners, training, simulator and test facilities and associated suppliers. Azimuthing propulsion is employed by about 7% of the world fleet. The single largest field of application is among tugs, with some 2,700 vessels, or over 20% of the global tug fleet, using azimuthing devices.

Of course, the predominance of podded electric drives among the growing population of large cruise ships has become a major feature of passenger ship design and engineering, and its influence on operational matters has had a signal bearing on the instigation of the Azipilot project. Podded propulsion has been embraced over the past couple of decades by an increasingly wide range of vessels, including special-purpose ships, Arctic-going vessels and crude oil carriers up to Aframax size.

Phase 1 of the Azipilot programme entailed collating existing knowledge and ongoing research from the project's four main technical disciplines, resulting in a critical review of the subject areas, followed by a summary of the data in Phase 2, for presentation to the cross-disciplinary audience. Phase 3 involved the identification of critical shortcomings in the various fields. Phase 4 will provide a basis for future research, education, training and policy making.

The 'hands-on' nature of the project is such that the study consortium has visited the premises of various partners and has been able to observe and participate in manned and unmanned model testing, view and use simulators, view the manufacturing of the equipment and observe all manner of computational modelling techniques.

Project meetings are held four times a year and are used as an opportunity to share knowledge between the four disparate disciplines involved. The fact that three of the participating partners are operators and pilot associations ensure that there is a pragmatic end-user dimension to the undertaking. **S**