

Cycloidal Propulsion - The Silent Manoeuvring Propulsion for Research Vessels

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Abstract: The vertical axis cycloidal or VOITH SCHNEIDER Propeller (VSP) is a silent propulsor giving unique manoeuvrability to any vessel. Based on this special low noise characteristics it is today's standard for MCMV. The VSP has by no means reached the limits of its development. A new generation of VSP with enhanced hydrodynamics and improved construction is ready for introduction into the market.

With the latest computational fluid dynamic methods (CFD) continuously the hydrodynamic and noise radiation is improved. New blade profiles with higher efficiency have been developed. Additionally to the propeller the hull design of ships with VSP is subject of continuous research and improvement. Model scale test haven proven better efficiency than contra-rotating poded propulsors.

A new cycloidal propeller generation with higher maximum input powers is under development. For the redesign of each component an industry-leading structural analysis FEM program is used. This provides the power of linear and non-linear structural capabilities to deliver

reliable structural simulation results. New construction principles for key-components have been developed. The first shipset VSPs with 6 blades (instead of 5) and improved hydrodynamic efficiency is already installed and has been tested during trial runs 2002 successfully.

The new generation of VSP is the optimum propulsion and manoeuvring system for research vessels regarding maximum manoeuvrability over the entire speed range, extremely low acoustic and magnetic signatures, precise thrust control and auxiliary propulsion capability.

A further good example of enhanced cycloidal propulsion is the VOITH CYCLOIDAL Rudder (VCR). This modified VSP, with only 2 blades, is the latest propulsion and manoeuvring device to be adopted for research vessels at higher speeds. It has two operating modes: a passive one, in which the VCR acts as a conventional rudder for cruising speed and an active one, in which it works in the same way as a VSP to ensure a high degree of manoeuvrability at slow speeds. CFD calculations, model- and full-scale tests will be presented.