Cruise vessel with podded propulsion.

Podded MARIN

Increasingly, modern ships are, equipped with podded propulsors, especially cruise vessels and fast ferries. In this sector efficiency, manoeuvrability, installation flexibility and low vibrations, are all extremely advantageous.

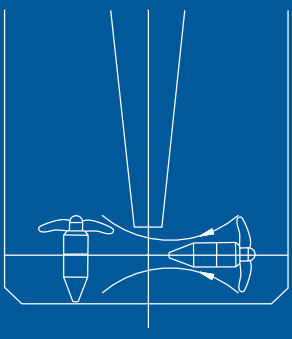
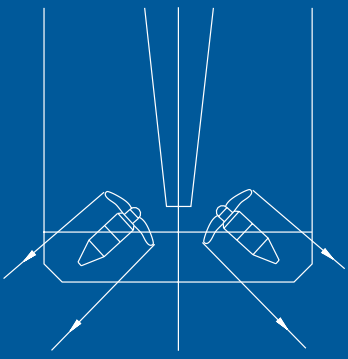


Figure 1.
Conventional way of
slow speed manoeuvring.

Figure 2.
Pod steering with
minimized interaction.



popularity sees building bridges

Freek Verkerk
F.Verkerk@marin.nl

Research and training on MARIN/MSCN Real Time simulators can build a bridge between the technical properties of the podded system and its safe and efficient use in practice.

Podded propulsion facilitates an efficient system, with low vibrations due to the undisturbed inflow into the propeller. The installation is flexible and ensures high manoeuvrability because of the azimuthing units. Steering forces of these units are much higher than those of conventional propeller-rudder arrangements using the same steering angles. However, the benefits must be considered more carefully.

Harbour and confined water manoeuvring requires more attention. Sailing at slow speeds in deep water means that pod units produce a steering force in the direction of the steering angle. It is only when the propeller wash hits the skeg that the force reduces. In shallow water however, the propeller wash cannot pass underneath the ship's bottom, therefore it will hit the other pod, skeg, or it may initiate a suction flow between the hull and the channel bank. These combined effects result in unpredictable manoeuvring behaviour.

Extensive model tests

Normally pods are use in a conventional way (see Figure 1). This method has two disadvantages. Firstly, the time delay for changing thrust from ahead to astern and from port to starboard and vice versa and secondly, the strong interaction between the 'transverse' pod and the strut of the 'longitudinal' pod.

Following extensive model tests in confined waters and simulator research, MARIN/MSCN has developed a special method to ensure safe, efficient and predictable harbour manoeuvring in shallow water and near banks.

Both pods are producing a low outward thrust (see Figure 2). The longitudinal motion is controlled by changing the steering angle of both pods together; increasing the thrust of one pod and simultaneously decreasing the thrust of the other pod controls the transverse motion. This method minimises interaction as the propeller wash is pointing outward and ensures a quick and yet smooth, reaction due to the low and almost constant power- setting.

This optimised manoeuvring strategy shows the comprehensive possibilities of pod manoeuvring in confined waters. This has been proven many times but most recently when training took place for four, 300m, cruise vessels at the MARIN/MSCN full mission bridge I and during the corresponding real passages of these vessels on the Ems river.