

HYDRODYNAMIC

One of the major targets for the propeller design is to get a high efficiency of the propeller. The propeller design is optimised for efficiency, but it is also important that the operation of the vessel is optimised..

Optimal propeller design

Each Kamewa propeller is supplied with blades designed specifically for the particular vessel. Consideration is given to factors such as:

- Power
- Shaft speed
- The hull wake field
- Draught
- Clearance between propeller and hull
- Rules of the classification societies
- Etc.

If any of these factors are changed, the performance (efficiency, noise and vibration) could be influenced. Thanks to the flexibility of the CP propeller re-optimisation is simple. The modifications are normally limited to revision of the relationship between shaft speed and pitch, or modification of the existing propeller blades.

Please contact us for advice.

Correct relationship between shaft speed and pitch

As far as possible the pre-programmed combinator curve constitutes the optimal combination between shaft speed and pitch. The efficiency is maximized and the risk of harmful cavitation is minimized. Consequently the combinator should be used whenever possible.

In case of a shaft generator, constant speed must be used, when the generator is in service. As soon as the generator is disconnected (e.g. at low electrical load), the combinator should be utilized.

Load limit potentiometer

The load limit potentiometer on the electronic load control should normally be set on 100%. Otherwise the propeller is prevented from operating in accordance with the combinator curve, which will result in increased fuel consumption.

Idling speed

Due to skin friction and water circulation, the propeller will absorb power at zero pitch. At full shaft speed this could amount to 20% of full power. If the speed is reduced, the power will decrease rapidly. At normal idling speed (60% of full speed) the idling power is only 5% of full power. If the shaft cannot be stopped when the vessel is at standstill, the shaft rpm must be as low as possible.

The condition of the propeller blades

After some time in operation the propeller efficiency decreases as the blade surface finish deteriorates or due to mechanical damage of blades. When the vessel is drydocked the surface should be polished and any damage to be corrected.

Operation in ice

At operation in severe ice it is advisable to use high shaft speed. The mass-dynamic force in the system will contribute to effective milling of the ice.

Pressure side cavitation

In case a propeller is running at part load and a high shaft speed - i.e. low pitch ratio pressure side cavitation may occur. If this kind of operation is included in the normal profile of operation, the propeller will be designed to perform without problems. In other cases, prolonged running at high speed and low pitch may lead to cavitation erosion on the pressure side. If this occurs, a fairly simple modification of the blade will remedy the trouble. Please contact us for advice.