

# Wärtsilä propulsion upgrade with new propeller design



Improving fuel efficiency is considered to be the most effective way to reduce a vessel's operating costs. Redesigning the propeller can lead to significant efficiency gains for vessels that employ slow steaming to save fuel, but also for fast ferries, which can achieve higher speeds and efficiency gains with modifications to controllable-pitch propeller (CPP) blades. Wärtsilä combines decades of experience with state-of-the-art tools to redesign your existing propellers. A new propeller design, along with reduced vessel speeds and engine power, can lead to propulsive efficiency improvements of up to 15%.

## TECHNICAL CONCEPT

To create an optimal replacement propeller design, our highly experienced engineers use computational fluid design (CFD) to analyse the performance of your current propeller as well as the interaction between the propeller and hull. This provides extremely accurate information to achieve an optimised parametric design.

Each individual Wärtsilä replacement propeller is customised to improve your vessel's Energy Efficiency Design Index (EEDI) and Energy Efficiency Operational Indicator (EEOI), which also reduces exhaust emissions.

## KEY BENEFITS

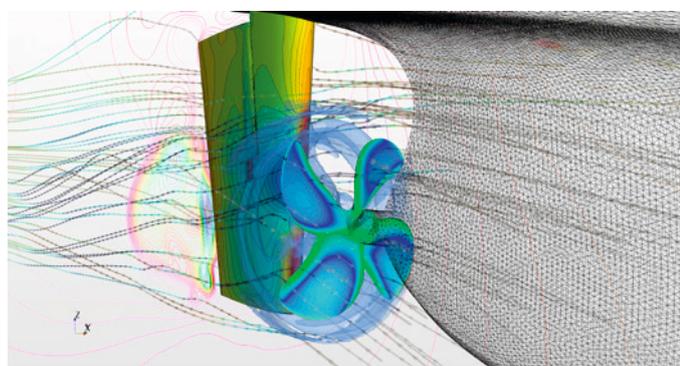
- Improve propulsive efficiency by as much as 15%
- Reduce emission levels, pressure pulses and underwater noise
- Short payback period – typically 2 to 3 years



A Wärtsilä propeller design ensures acceptable pressure pulses on the hull to avoid high propeller-induced underwater noise and vibration levels. To further add value to a propeller redesign and replacement, Wärtsilä can typically buy back your old propeller, lowering your payback period.

Efficiency gains typically vary from 5 to 15% depending on the type of propeller and vessel, as well as the redesign approach:

- A redesign of the existing propeller using CFD tools – without optimising boundary conditions like propeller speed and diameter – can lead to fuel efficiency improvements of up to 5%.
- Increasing the propeller diameter in combination with low rotational speeds increases efficiency by up to 10%. This solution can typically be applied to all ship types; in cases where the diameter cannot be increased, a larger number of blades (5 or 6) can be used for fixed-pitch propellers.
- Designing a fixed-pitch propeller to accommodate slow steaming at reduced speed and power levels typically leads to efficiency improvements of up to 15%.



Volume rendering of water around a propeller and the pressure distribution on the propeller and rudder, including streamlines and velocity behind the rudder.

## SCOPE OF SUPPLY

We can create an optimised propeller design for any type of vessel and propulsion unit, including fixed-pitch propellers, controllable-pitch propellers, transverse thrusters and steerable thrusters.

Propellers can be supplied with the required number of blades in diameters up to 12 metres. All propellers are designed to meet every possible class notation.

We have decades of in-house hydrodynamics experience supported by deep knowledge of ship systems and the latest numerical techniques like CFD. We also have specialised blue fitting experts available globally to reduce dry dock times and ensure a vessel returns to service as quickly as possible.

Wärtsilä continues to lead the way in developing solutions that save energy and improve the efficiency of propellers, meaning a new propeller design can be combined with our other available efficiency solutions:

- Wärtsilä High performance nozzles offer an increase of up to a 25% in bollard pull and/or up to a 15% free-running efficiency increase for vessels operating at lower speeds.
- Wärtsilä EnergoProFin weakens the hub vortex to decrease resistance and increase thrust, resulting in average fuel savings of 2%.
- Wärtsilä EnergoPac is an integrated propeller and rudder design that effectively increases propulsion efficiency, leading to savings of 2–6%.
- Wärtsilä EnergoFlow is an innovative and cost-effective pre-swirl stator that increases propulsive efficiency by up to 10%.