EcoMarine Innovations

PROPELLING A GREENER FUTURE

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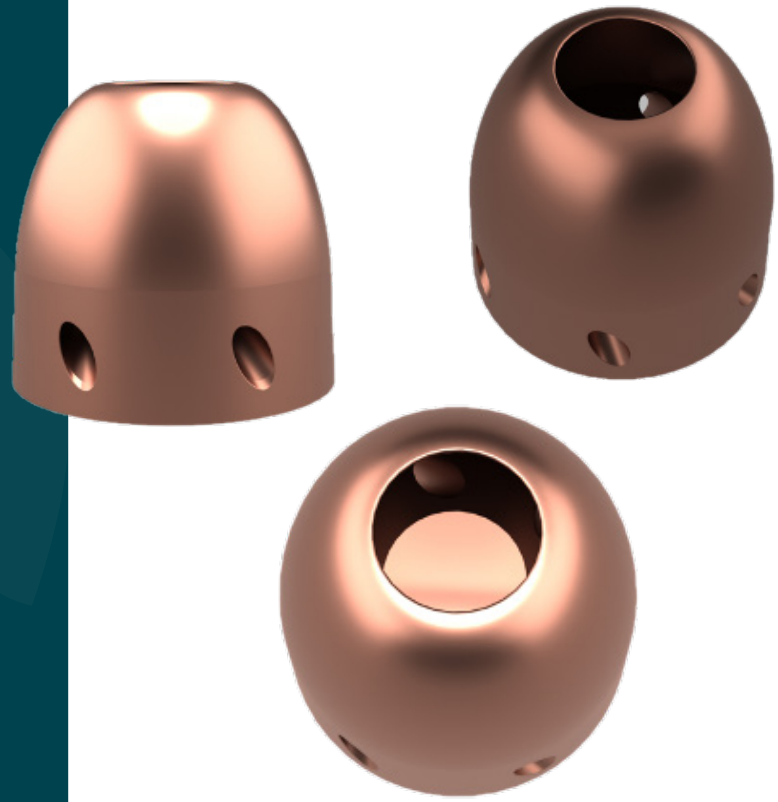
Holy Boss Cap (HBC)

What is hub vortex?

The formation of the hub vortex can be associated with various mechanisms. With a conical shape of Holy Boss Cap, the rotation of water set around the outside of the propeller hub, may form a vortex cavity due to inversely magnified values of the tangential velocities with contracting radius of rotation towards to tip of the cap. Other mechanism is the coalescing of the several root vortices coming off the blades just outside the hub surface.

What effect can a hub vortex cause?

- This excessive swirl will result in a pressure reduction across the downstream face of the slipstream relative to the ambient pressure and thus will create an undesirable drag force on the propeller.
- Furthermore, the swirl may become so large that the energy imparted to the fluid near the hub will produce no axial thrust but will be dissipated by turbulent mixing.
- It is a large cavity and not “solid” water so that a rudder or control surface placed in line with the propeller-shaft axis loses part of the lift force that it is intended to produce.
- It is a source of undesirable vibration, noise and erosion on any object that may lie its path.



The rudder of a ship behind its heavily loaded propeller can be subjected to severe hub vortex cavitation that may cause undesirable vibration and noise and, in extreme cases, erosion on the rudder.

The **Holy Boss Cap** is based on the idea of increasing the flow pressure in the core of the hub vortex by using slots. These slots would effectively direct high pressure downstream of the propeller and the natural flow movement behind the blades to the vortex core where the pressure would be very low.

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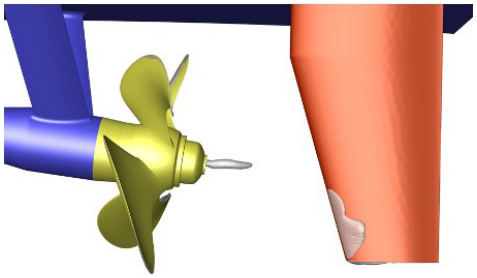
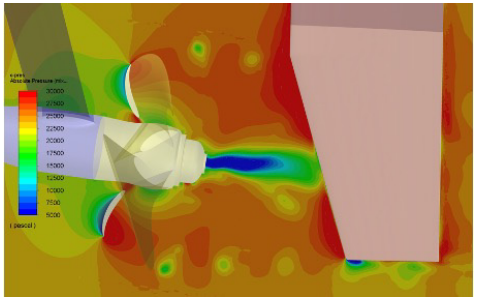
Optimised Holy Boss Cap

HBC Optimisation

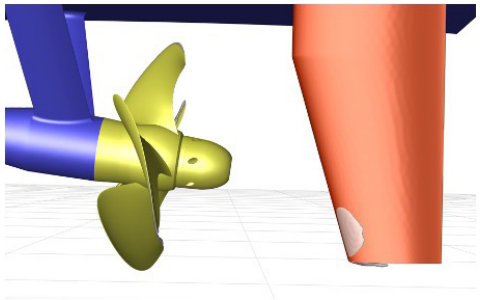
CFD based optimisation shows that there is a performance improvement of the propeller with the Holy Boss Cap appended.

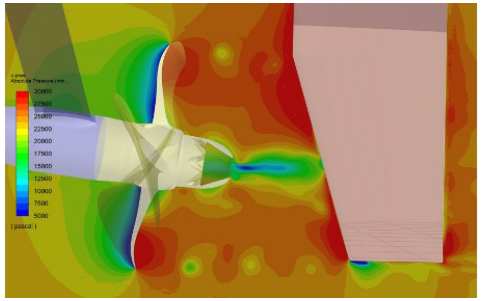
Conventional Standard Boss Cap





Optimised Holy Boss Cap





3.1% ↑
Propeller Efficiency

1.1% ↑
Thrust

-2.0% ↓
Torque

-10% ↓
Cavitation at Rudder

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Get in touch with our team to learn more about the Holy Boss Cap

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