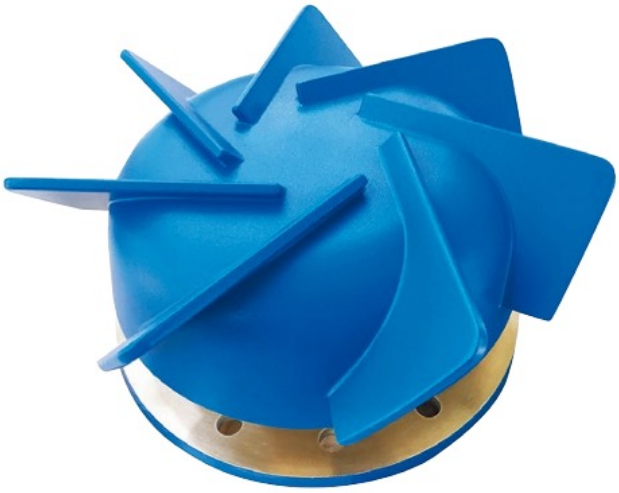
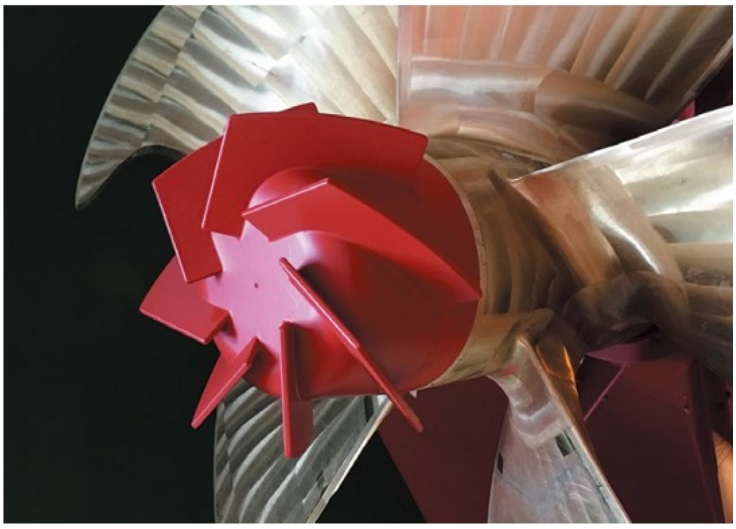
ECO-Cap

Energy saving device for Zone-2

ESD
ENERGY SAVING DEVICES

1~3% Improvement

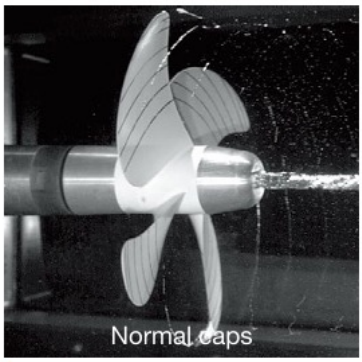


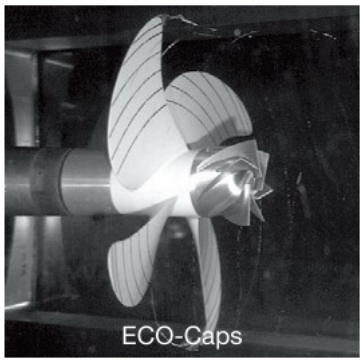


Visualization of hub vortices via model tests

Hub-vortex-diffusing propeller cap

The circumferential flow generated from the trailing edge of the propeller generates a hub vortex at the aft end of the cap, which dissipates energy. Therefore, over 500 different cap shapes were trial-designed to identify one that can diffuse the hub vortex and recover the energy losses. Numerous trial designs showed that a cap with multiple wings was the most effective, so this became the prototype for the ECO-Cap. The diffusion of hub vortices was confirmed in model tests in a circulation water tunnel



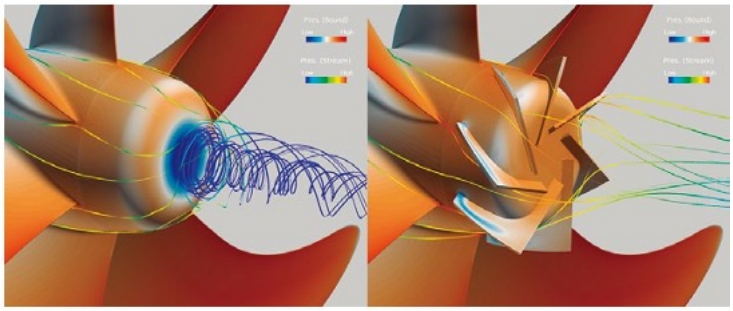


Increase of propeller cap thrust

The pressure distribution at the rear end of the cap shows that a normal cap has greater resistance due to negative pressure, whereas the ECO-Cap generates thrust due to positive pressure, resulting in increased propulsive force. In model tests, the efficiency of an ECO-Cap is higher by approximately 1.0%–1.3% than that of a normal cap.

Although model tests generate only weak hub vortices and smaller energy losses than actual vessels, the energy loss recovery (amount of efficiency improvement) induced by the ECO-Cap is expected to be greater in actual vessels.

Pressure distribution at aft end of cap
(blue: negative pressure; red: positive pressure)

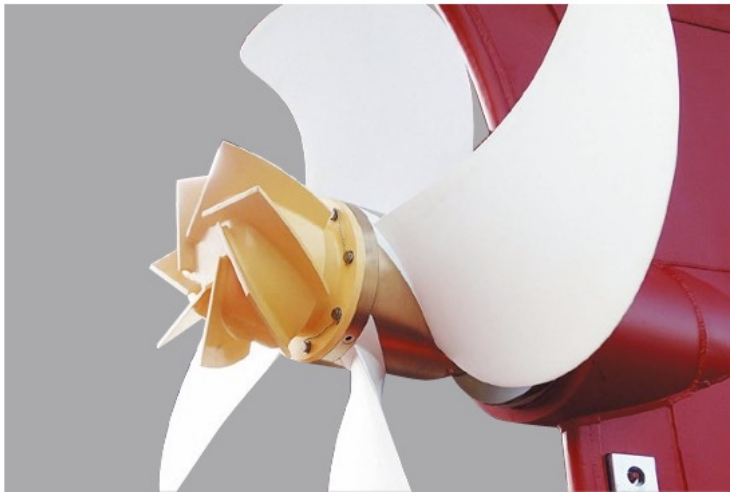


Normal caps ECO-Caps

Energy saving in actual vessels

The ECO-Cap for actual ships uses very thin blades made of FRP to reduce resistance; these are mounted on a cap body made of copper alloy. The use of FRP material also minimizes the mass difference with the standard cap.

Verification checks of the energy saving effects of installing ECO-Caps on existing vessels showed an improvement in fuel consumption of approximately 2.8% compared with that before the ECO-Caps were installed.



NAKASHIMA
We Go Beyond