

# **Stress Analysis and Corrosion Fatigue Test of the Propeller Blade in Cycloidal Drive**

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The Cycloidal Drive or Voith Schneider Propellers (VSP) are widely used in the ship with safety and extreme maneuverability requirements. On the Cycloidal Drive, the rotor is mounted below the ship's hull and rotate about a vertical axis. The resultant force of all blades can be generated freely in any direction. One of Thailand's ship is prone to propeller blade break down at the root of the blade. The failure analysis shows that the blade is subjected to corrosion fatigue. The objective of this research is to investigate type of corrosion and the stress on the propeller blade at the different the rotor speed. Microstructures of blade have been investigated for corrosion study. For stress analysis, the investigation has been carried out as 3-D nonstationary flow around the propeller using ANSYS Fluent 15.0 with the Shear-stress transport (SST)  $k-\omega$  turbulence model. The calculation stress will be used to predict fatigue life cycle of blade. The results show that blade material is manganese aluminum bronze and is subjected to dealloying corrosion at beta phase. The maximum stress occurred at the junction between the shaft, which mounted in a rotor casing and protruded blade as a cyclic load between tension and compression. Blade will subject to stress more than 400 MPa when rotate at 350 degree, this high stress is greater than yield point of manganese aluminum bronze which is used for blade material. Fatigue life cycle of blade is about 7 years.