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## Cavity Formation and Bearing Force Caused by Air Ventilation on Marine Screw Propeller

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**Summary:** Large diameter and low rotational speed propellers have been applied for a number of merchant vessels to improve the propeller efficiency, while the propeller immersion has become small relatively. Air cavity ventilated from free surface can be easily formed on propeller blades due to small immersion and the bearing forces increase under a certain operational condition. There were several reports which investigated the bearing forces induced by air ventilation. In those research works, the observation of air ventilation was carried out by still pictures with stroboscope, and the air ventilation phenomena were classified into full ventilation and partial ventilation. There are many points at issue which must be made clear on the dynamical phenomena. In the present research work, the observation of dynamic cavity formation by using a high speed video camera and the measurement of bearing forces caused by air ventilated propellers are carried out synchronously. It is discussed in this paper that the partial ventilation can be classified into three modes of unstable ventilation, non-uniform ventilation and uniform ventilation, and the amplitude and the frequency characteristics of the bearing forces are closely related to the cavity formation on propeller blades.

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