

PROPELLER-WAKE STUDY

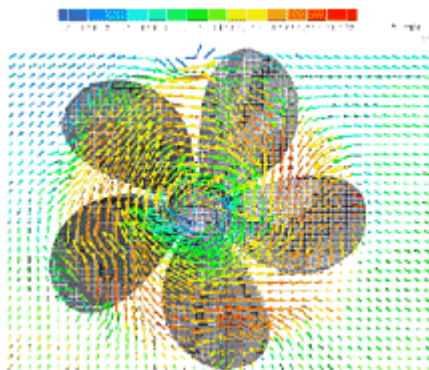
APPLICATION NOTE STEREOPIV-006

An experimental investigation of a five-blade propeller wake behind a ship model was performed using Stereo Particle Image Velocimetry (StereoPIV) in a large free surface cavitation tunnel. Investigation of the wake at different longitudinal stations and its evolution in phase with the propeller pointed out the capability of stereo-PIV in resolving the complexity of the flow field. Phase-averaged results provide a detailed picture of the nature of the flow field.

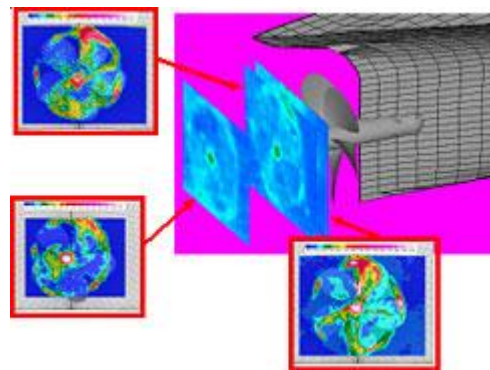
The blade viscous wake, which develops from the blade surface boundary layers, the trailing vortex sheets that are due to the radial gradient of the bound circulation, and the velocity fluctuation distributions were identified. The complex interaction between the hull wake and propeller was described through the evolution of the mean velocity components and the velocity fields.

A TSI StereoPIV system was setup to make measurements in the cavitation tunnel. One of the cameras was inside the water tank and the other was outside the tank.

Measurements were carried out at different planes downstream of the plane of the propeller. At each downstream location, phase averaged measurements were carried out.



Courtesy: INSEAN



Reference

Felli, M., Pereira, F., Calcagno, G., Di Felice, F., "Application of Stereo-PIV: Propeller Wake Analysis in a Large Circulating Water Channel," *10th International Symposium on Applications of Laser techniques to Fluid Mechanics*, Lisbon, Portugal, 2000.



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