

# Experimental Methods in Naval Architecture

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**Abstract:** Importance of the experimental validation of numerical results is increasing with the high added value projects and the risk to not fulfill contractual requirements justify investigations. In this course you will learn and perform resistance and self propulsion tests in calm water and seakeeping tests in regular and irregular waves. The course will give you overview of the experimental facilities in the world and experimental set ups developed for testing of highly nonlinear phenomena in harsh environment, of wave energy converters, of mooring loads and hydroelasticity.



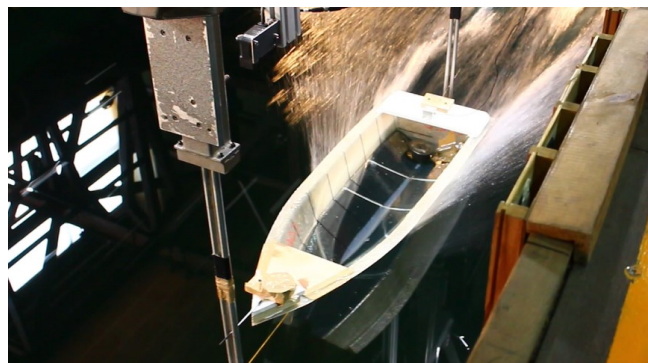
## Contents of the Course

**L1 –Introduction and objectives of the course.** In this lecture an overview of the course objectives and of the world experimental facilities and will be given.



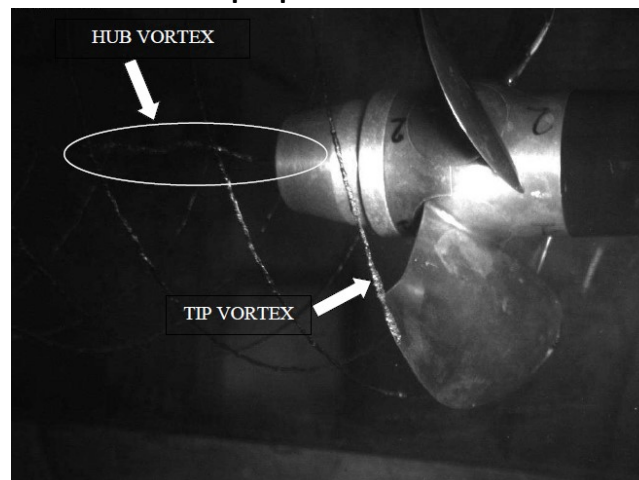
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**L2 – L3 Resistance tests in calm water.** In these lessons we will repeat the ITTC methodology for the resistance tests. We will perform the resistance tests and apply uncertainty analysis.



**L4 – L6 Open water propeller and self propulsion tests.** In these lessons we will repeat the theoretical part and then measure and analyse experimental data.

**L7 – L8 Cavitation tests.** In these lessons we will analyse experimental data from the scientific papers.

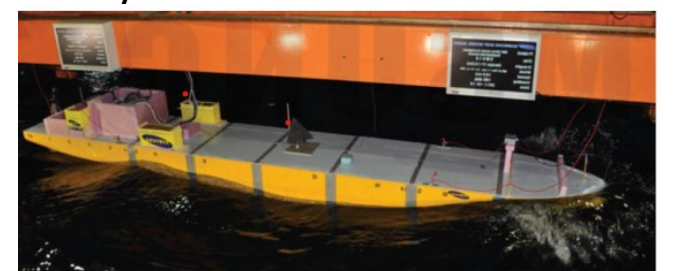


**L9 – L12 Ship Responses in Regular Waves.** In these lectures you will calibrate the wave maker and prepare the model and for seakeeping testing. You will perform the testing at one speed and different wave frequencies.

**L13 – L14 Ship Responses in Irregular Seas.** You will measure the response of the ship in ideal sea spectra and calculate RAO from the measured data. You will learn and apply filtering techniques and spectral analysis during the data analysis. You will calculate performance criteria and ship operability.

**L15 – L16 Roll Decay assessment in calm water and irregular sea.** In these lessons we will learn how to analyse roll decay test and perform the stochastic linearization.

**L17 – L20 Testing in Harsh Environment, Mooring, WEC performances.** Selected scientific papers will be analyzed and discussed.



Comparison of slamming and whipping loads by fully coupled hydroelastic analysis and experimental measurement, Kim et al, JFS, 2014