**SHIP RESISTANCE**

The main elements are:

* Evaluation of the different components of a ship resistance in flow
* Relationship between ship resistance and ship speed, hull forms, etc.
* Methods to optimize the resistance

Different aspects are analyzed:

* The values of the ship resistance can be obtained by model tests or full scale experiment or by calculation method (semi-theoretical semi-empirical method, computational fluid dynamics, i.e. CFD)
* Ship model test

Experiments in towing tank: ship resistance, open water test of propeller, self propulsion, seakeeping, data acquisition system (measurement and treatment: FFT, generation and measurement of waves…), etc.

* Conversion of the model resistance test results to the full scale in calm water
* Froude conversion method (two dimensional method)
* Three dimensional conversion method or (1+k) method
* Effect of the hull form on the ship resistance
* Example of the calculation of ship resistance by Ayre’s method.
* Ship resistance in shallow water

The ship resistance in shallow water can be estimated by experimental methods. For example, intermediate velocity method proposed by Schlichting.,

 Model resistance test of convoys carried out in University of Liege, Belgium and BSHC, Bulgaria. The model test data are represented in regression laws, where six non-dimensional parameters are considered.

* Resistance characteristics of various types of high-speed ships.