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Theoretical and experimental investigations of appendages and heeling angle influences on the hydrodynamic resistance of a sailing yacht

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The hydrodynamic resistance of the sailing yacht is strongly influenced by both the large appendages and significant heeling angles, respectively.

In order to evaluate the components of the hydrodynamic resistance the theoretical approach was based on the method proposed by Larson and Eliasson. The residuary resistance was calculated by using the regression formula proposed by Gerritsma which was obtained based on systematic experimental tests on models, known as Delft series.

The experimental approach is based on model tests results which have been carried out using the existing facilities provided by the Towing Tank of the Naval Architecture Faculty of "Dunarea de Jos" University of Galati. An important number of tests, for different combinations with/without appendages and a range of heeling angles were performed.

The comparative results are presented in synthetic diagrams revealing some important differences between the theoretical and experimental approaches. Thus, the influences of the appendages dimensions and heeling angle were clearly pointed out.

Consequently, it can be now concluded that the level of accuracy of the theoretical methods, to be used during the preliminary design stages, has to be significantly increased

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