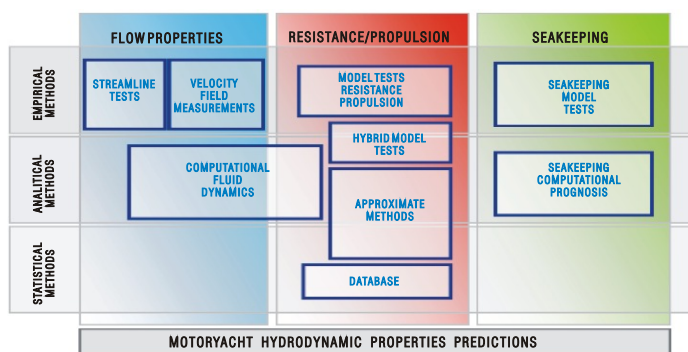


Motoryacht Design Support Program



Program's purpose

The program is aimed at providing **reliable predictions** of the **hydrodynamic performance** of yachts equipped with a mechanic propulsion system. The scope of work can be individually adjusted with regard to the design criteria and Client's requirements. According to the individual preferences and allocated budget the scope of work includes analyses based on the database of similar vessels, calculations using own-developed software, CFD analyses or model tests.

The program is addressed to motoryacht designers, design offices, yachtbuilders and owners, especially operating charter vessels, interested in the development of their fleet.

General description

Yacht designers rarely take the advantage of the experimental hydromechanics, reserving the model testing programmes mainly for the purpose of vessels having special requirements e.g. megayachts. It is connected with the costs of traditionally prepared and performed model tests. As a consequence the risk of the failure in the design process, which usually leads to increase of the **building or operating costs**, rises considerably.

The idea of the hydrodynamic expertises (including model tests) accessible through moderate, adjusted to the yachtbuilding realities and prices has been the background for the development of the design support program. **Cost-effective model testing** methodology has been supplemented by the system of statistical and numerical tools in order to provide the comprehensive program, which assures high quality of predictions at an attractive price level.

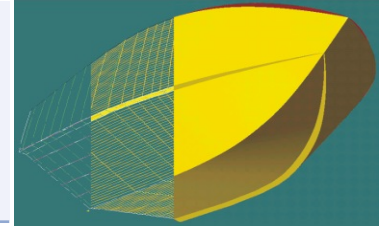
The support program includes **statistical, analytical** and **experimental** methods of motoryacht hydrodynamics, enabling the selection of appropriate method with regard to the current design stage and Client preferences. The program has been supplemented with **geometry design** and hull **visualisation** packages.

Implementation of the program to the yacht design and building process radically **decreases the risk** connected with faulty determination of the vessel hydrodynamic properties.

Motoryacht design support program – building blocks

Geometry

Covers wide range of works connected with hull shape definition, starting from design, through modifications and fairing, ending on the generation of building frames. Hull geometry can be modelled in NAPA or MAXSURF systems based on the Client's preferences. The digital hull form description can be also prepared from the paper drawings. Initial geometry version is the base for a further numerical calculations and hull model manufacture.

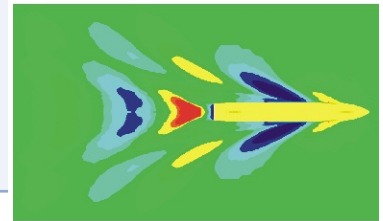
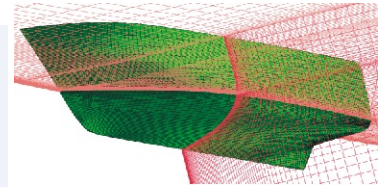


Flow properties

Analyses of the flow around the hull reveal the quality of the underwater part of the designed vessel by showing the generated wave system, streamlines and pressure distribution as well as velocity distribution in defined regions (e.g. inflow to the propeller). Flow visualisation can be obtained from:

- Computational Fluid Dynamic (CFD);
- streamline model tests;
- velocity measurements around the hull model.

Accurate determination of the flow around the designed hull for the defined draft and speed gives the possibility to select the hull regions needing modification in order to optimise the resistance-propulsion characteristics and for proper localisation of appendages.

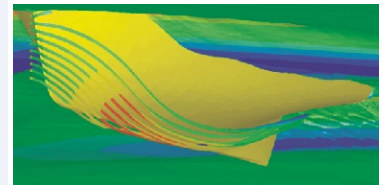


Resistance/propulsion

Covers the elaboration of resistance or resistance-propulsion predictions for the selected draft/trim condition and speed range in order to select the propulsor and determine the power requirement. The program provides wide range of methods offering different level of complexity in order to best fit the Client's requirements:

- resistance predictions based on statistical and analytical methods;
- resistance-propulsion predictions based on the extrapolation of the model test results of the similar vessels included in the own database (dozens of hulls tested);
- resistance-propulsion predictions prepared using the hybrid method, which combines the resistance test and statistical data regarding the propeller performance in order to determine the engine power requirement;
- resistance-propulsion predictions determined on the basis of the complete set of resistance test and propulsion test with stock propeller.

The resistance-propulsion prediction can be supplemented by CFD analyses of different hull modifications in order to establish relative resistance difference of each variant.



Seakeeping

Covering prediction's elaboration of yacht performance in the given sea conditions. Depending on the selected variant seakeeping qualities can be determined based on:

- computational methods (own-developed and commercial software validated on the basis of the model tests results);
- seakeeping model tests.

The prediction provides the information regarding the yacht response (such as 3D motions, relative motions, accelerations in defined positions on the hull and deck wetness) for the wave conditions appropriately defined (through the height and spectrum) for the sea region of operation.



Visualisation

The final hull version developed with respect to the best hydrodynamic performance can be supplemented and enhanced with details according to the Client's requirements e.g. as 3D hull visualisation for advertising and marketing purposes or as a simplified 3D model including the internal arrangement for further analyses.

