QSHIP Hydrodynamic Suite

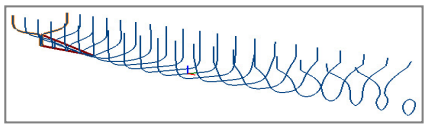
Seakeeping and Workability Analysis software

QSHIP offers a hydrodynamic suite for seakeeping calculations and workability analysis of ships in waves. The hydrodynamic suite contains (depending on the selected version) two potential flow methods: the strip theory code SHIPMO and/or the panel code SEACAL. QSHIP calculates motions like ship motions, velocity accelerations and relative wave elevation of the ship in waves. Based on this, QSHIP can calculate the uptime based on exceedance of defined criteria like illness rating or local accelerations.

Process steps within the QSHIP workflow:

- Import hull description;
- Add appendages;
- Define loading conditions;
- Define environmental conditions;
- Run strip theory and/or 3D potential flow calculation;
- Post processing; make figures of transfer functions;
- Define workability criteria;
- Run downtime/uptime analysis.

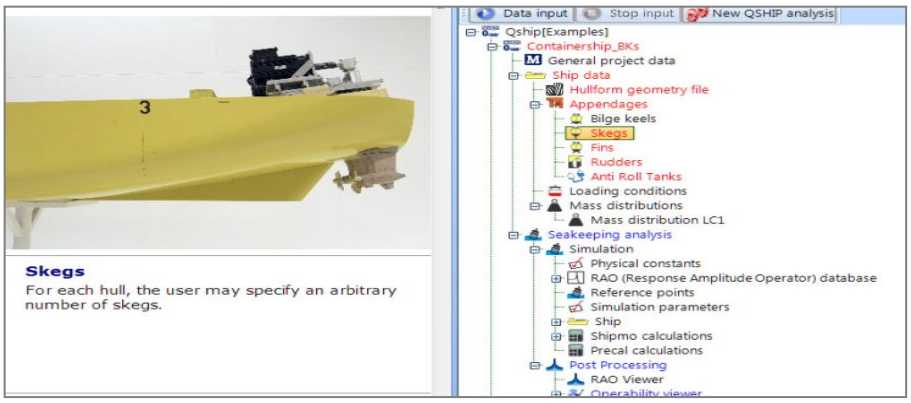
QSHIP automates data exchange between all analysis programs and process steps. It enables an easy comparison of the hydro-dynamic performance between different ship configurations, loading and environmental conditions.



ConvertHullForm tool

Integrated approach

The workflow of QSHIP provides guidance for and easy use of complete chains of pre-processing, calculations and post-processing.

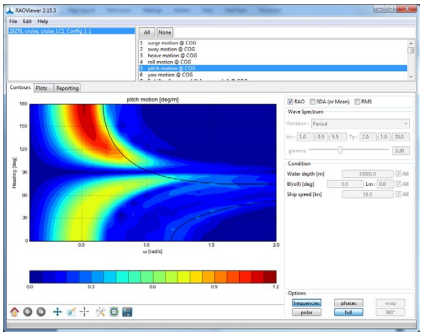


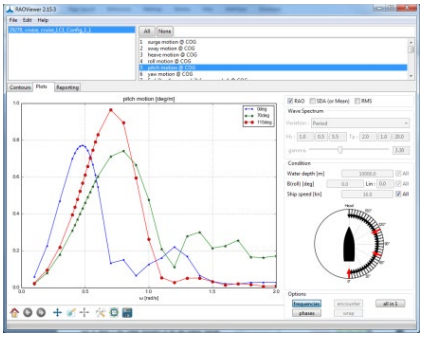
ConvertHullForm

Calculations start with a description of the ship's hull, either by panels or strips. The included ConvertHullForm tool converts a wide range of file formats into the appropriate QSHIP format.

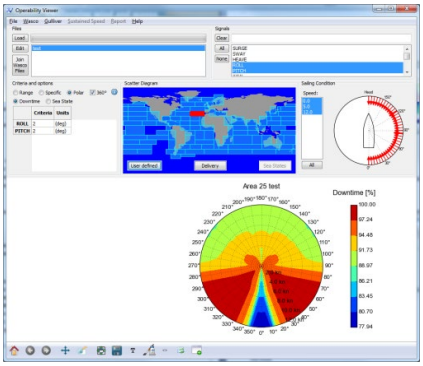
SHIPMO

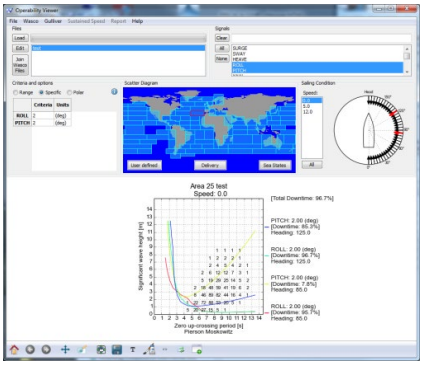
SHIPMO is the MARIN implementation of strip theory. It is the fastest way to obtain a first reliable impression of the ship motions. SHIPMO gives an answer in a few minutes, depending on the number of headings, speeds, frequencies and hull lines. SHIPMO provides the transfer function in all 6 degrees of motions and has different methods to include the viscous roll damping (e.g. IKEDA, FDS, Nobel Denton).





For leaflets on SHIPMO, SEACAL and OPCAL see
www.marin.nl/software





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It can include damping contributions like fins, rudders, skegs and anti-roll tanks. Because of the strip theory assumptions, SHIPMO is limited to slender ship types.

SEACAL

The SEACAL code is developed within the MARIN Cooperative Research Ships (CRS) framework and consists of a 3-dimensional potential code. Since panel codes use a more detailed description of the hull, the diffracted and radiated waves can be accounted for in all directions. Therefore, SEACAL is not limited to the slender ships only, but can also be used for fuller ships. Detailed calculations provide improved results of the relative wave height and added resistance in waves. All options on roll damping and appendages are taken care of by the user interface and are equal to those from SHIMPO. The SEACAL version in QSHIP uses the well-known zero speed Green functions, with forward speed corrections, to solve the hydrodynamic problem. Calculations take longer than strip-theory calculations but since all computer cores are being used, they remain relatively short. More detailed methods of panel codes can take several hours depending on the number of panels, headings, speeds and wave frequencies.

Uptime/downtime analysis

In the OPCAL code of QSHIP the significant values for a range of signals can be calculated for any sea state. In the Operability Viewer, these can be combined with actual wave statistics (scatter diagrams) to evaluate the time that a criterion is exceeded in that specific location (downtime). This includes the calculation of comfort indicators such as MII, MSI and local accelerations but also relative wave elevation and related risk of green water or slamming. When SHIPMO is used, the relative wave elevations are based on the undisturbed waves and the ship motions only while with SEACAL they also include the radiated and diffracted wave components.

RAO-viewer

The RAO-viewer tool provides easy access to the calculated RAOs by SHIPMO and SEACAL. It provides figures for reporting and enables an easy comparison between different calculations.

Operability viewer

Operability viewer gives easy access to the significant values computed in OPCAL, showing downtime/uptime in polar plots or wave scatter diagrams, as well as limiting wave heights for a given criteria set.

QSHIP user group meetings

QSHIP has an active user group which meets once a year. In this meeting the QSHIP users receive first-hand information on new features and code improvements by our QSHIP developers and domain experts. At the same time QSHIP users can share experiences, give their feedback and express future wishes for QSHIP.