ShipX

Integrated Ship Design Tool – Hydrodynamic Workbench ShipX

During the last 15 years SINTEF Ocean has developed a hydrodynamic workbench called ShipX. This workbench gathers the numerical tools and prediction software developed by SINTEF Ocean into a single workbench, enabling the user to apply all these tools in a common user interface.

ShipX is built upon a STEP-compatible product model implemented in an easily extendable database. The database stores ship and propeller geometries with related results, which can be generated by calculations or by model testing. The storage of results is very flexible, since results can be stored either directly in the internal format or in separate files in a corresponding file structure. ShipX reads a large number of different geometry file formats (DXF, LIN, MGF, AutoShip, AutoHydro, NAPA). Since ShipX is STEP-compatible, it is prepared for exchange of ship data based on the ISO/STEP protocol, which might be the universally adopted standard for exchange of ship data.

DESIGN IDEA

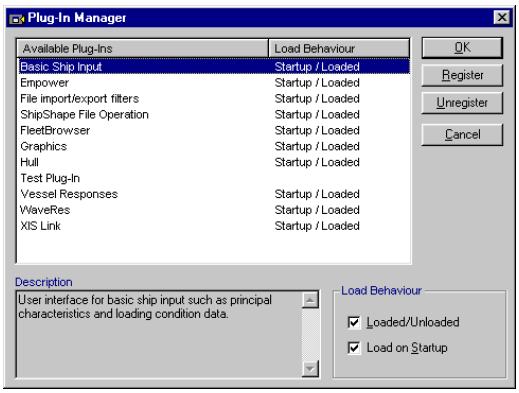
The basic idea behind ShipX is to make a platform that integrates all kinds of hydrodynamic analysis into an integrated design tool. By removing the need for file format conversions and re-entering of input for each new program, systematic design studies using highly advanced hydrodynamic analysis tools is fully possible. By integrating all the analysis programs in the same package, systematic design studies can to some extent be automated. When a sufficient number of analysis programs have been added to ShipX, SINTEF Ocean will pursue the extension of ShipX into an integrated design tool.

FUNCTIONALITY

In addition to the basic functions built into ShipX, like hull geometry manipulation and database operations, advanced functions are added as “Plug-Ins”. The basic functions built into ShipX makes it fast and easy to create new “Plug-Ins”.

PLUG-INS

Currently, plug-ins for seakeeping calculations (Veres program package), animation of ship motions, numerical wave resistance calculations (Waveres), simulation of manoeuvring and station keeping capabilities as well as calm water performance prediction and calculation of speed loss in waves are all available as “Plug-Ins”. In addition, the new report generator at SINTEF Ocean for analysis of performance tests is developed as a ShipX Plug-In.



At the moment, the following Plug-Ins are available:

Plug-In	Function
XIS Link	Connecting the workbench to the ShipX database. Works as a link between the Plug -Ins and the database.
Hull	Hull manipulation module (add/change/ delete sections contour lines and 3-D lines). Various re-shaping tools, length, beam and draught scaling.
Graphics	Graphical presentation of the hull lines.
File import/ export filters	Import of hull geometry from various formats: VERES file format (*.MGF) AutoShip (*.DRA) AutoHydro (*.GF) AutoCAD (*.DXF) ShipShape (*.LIN) + project files NAPA files exported with a special NAPA macro freely available from SINTEF Ocean Export to VERES and GLView.
Basic ship input	Input of ship main data and loading condition.
Hydrostatics	Hydrostatic calculations.
Waveres	Calculation of wave resistance.
Vessel Responses	Calculation of motions and global loads using VERES.
Report Generator	Report generator for performance tests in SINTEF Ocean laboratories (internal use only)
Manoeuvring	Simulation of manoeuvrability of a ship (SIMAN).
Ship Speed and Powering	Tool to perform speed prognosis based on empirical and model test data as well as predict speed loss in waves due to added resistance and loss of propulsive efficiency.
Station Keeping	Calculation of ship station keeping capabilities.
Animation Lab	3D visualisation of ship motions in waves based on calculations or model tests.
Slamming	Slamming pressure and forces on 2D (ship) sections (Slam2D).

ShipX provides an excellent platform for development of hydrodynamic calculation programs, due to the availability of high-quality basic functionality in ShipX. SINTEF Ocean uses ShipX as the platform for future development of hydrodynamic calculation tools and updates of hydrodynamic calculation programs.

An automatic update function makes it easy to ensure that all users are using the same, latest version of all applications of the workbench.

Currently there are more than 50 national and international companies using ShipX in their daily work. In addition, hundreds of students use ShipX in their education and thesis work.

SINTEF

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