Part I:
MAAT Hydro's Quick Interface Tour
Rev. 6.3m

An Introduction to
MAAT Hydro's User Interface
and Data Management

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1. MAAT Hydro’s Display Pages:

MAAT Hydro provides 4 pages allowing to manage parallel aspects of the project. These pages are selectable by the lower-left tabs:

- [3D] Page (default)
- [Data] Page
- [2D] Page
- [Ship] Page

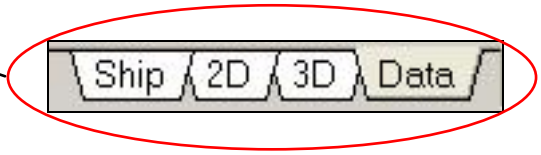
Any of these MAAT Hydro pages can be displayed by clicking on its tab, the current one being greyed.

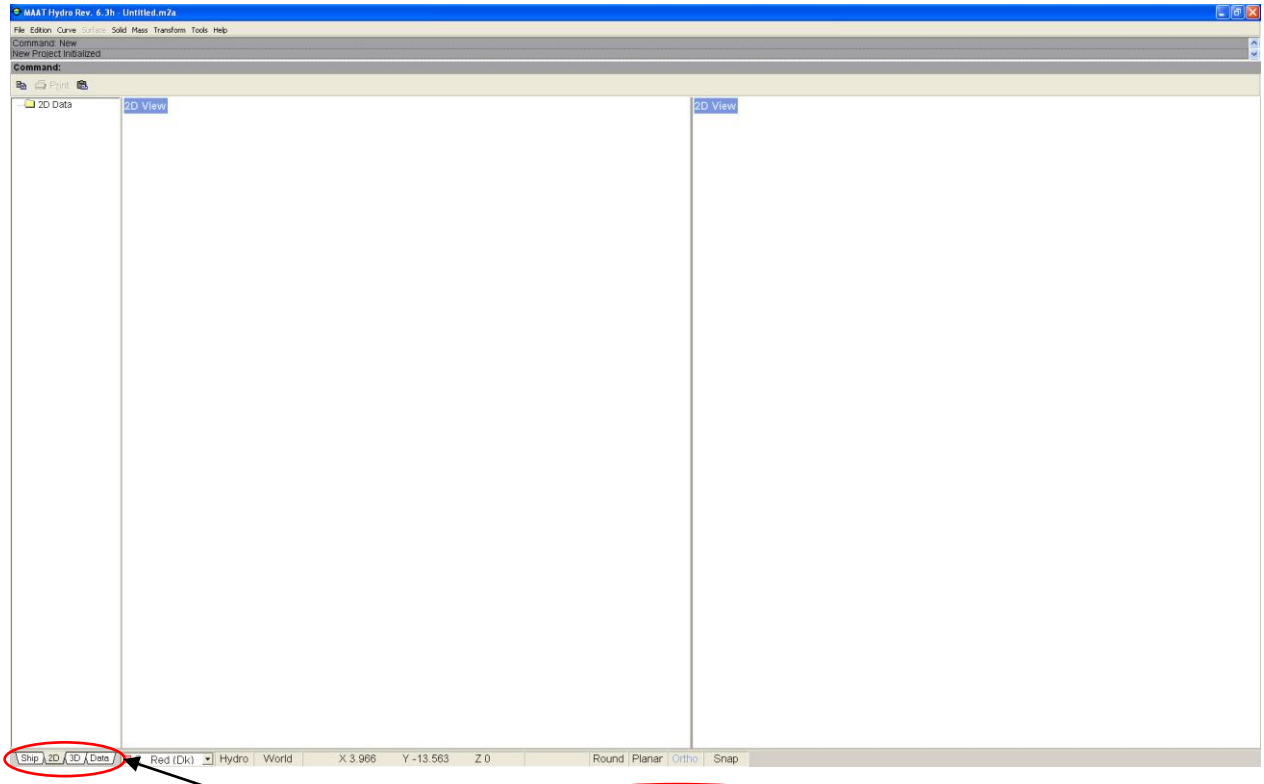
This short manual will explain how to use them efficiently.

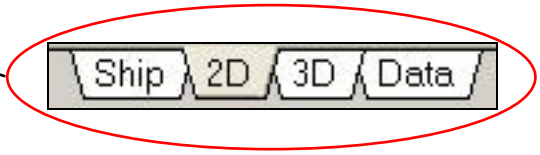

MAAT Hydro Rev. 6.3h - Untitled.m2a
Command:
New Project
Bottom
Perspective
Front
Right
Ship
2D
3D
Data
Red (Dk)
Hydro
World
Round
Planar
Ortho
Snap

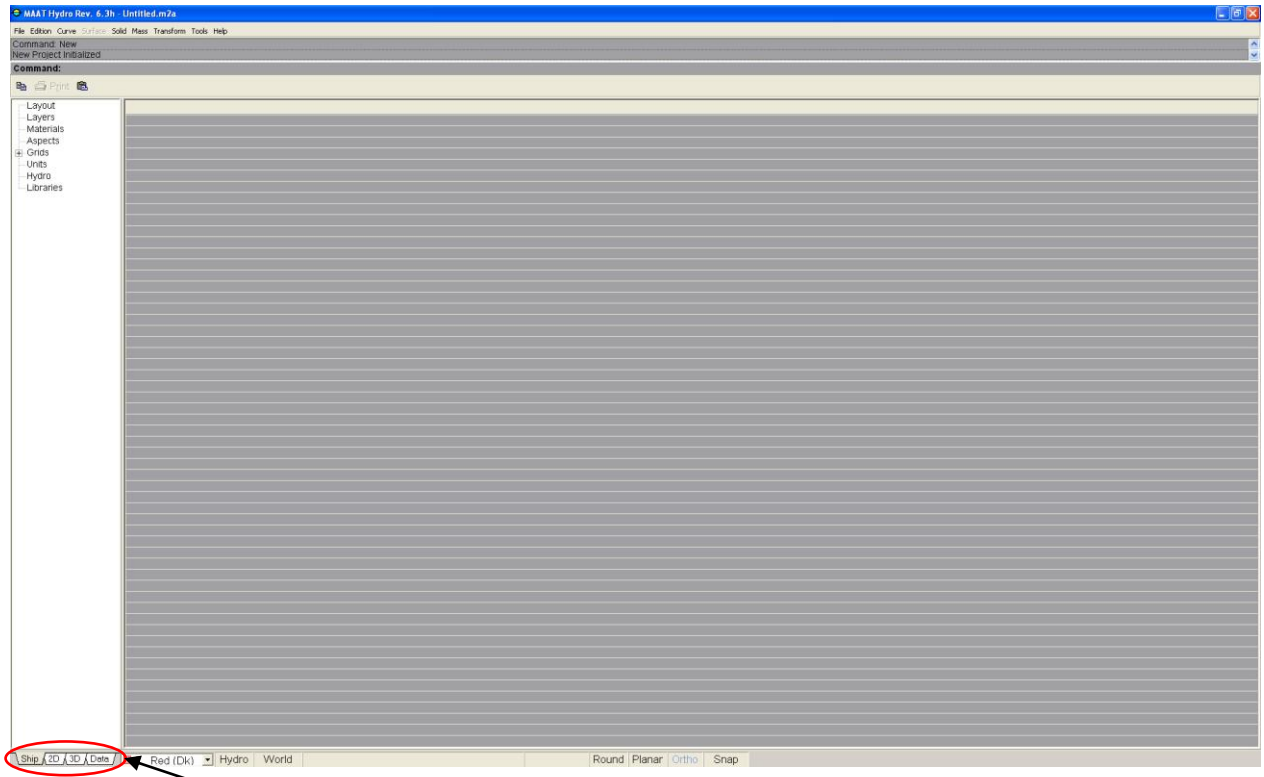
Ship
2D
3D
Data

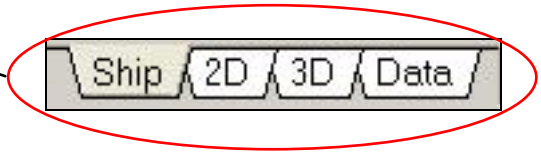

MAAT Hydro Rev. 6.3h - Untitled.m2a
Command:
New Project
Ship
2D
3D
Data
Red (Dk)
Hydro
World
Round
Planar
Ortho
Snap


Ship
2D
3D
Data


MAAT Hydro Rev. 6.3h - Untitled.m2a
File Edition Curve Surface Solid Mass Transform Tools Help
Command: New
New Project Initialized
Command:
Print
2D Data
2D View
2D View
Ship 2D 3D Data
Red (Dk)
Hydro
World
X 3.966
Y -13.563
Z 0
Round Planar Ortho Snap

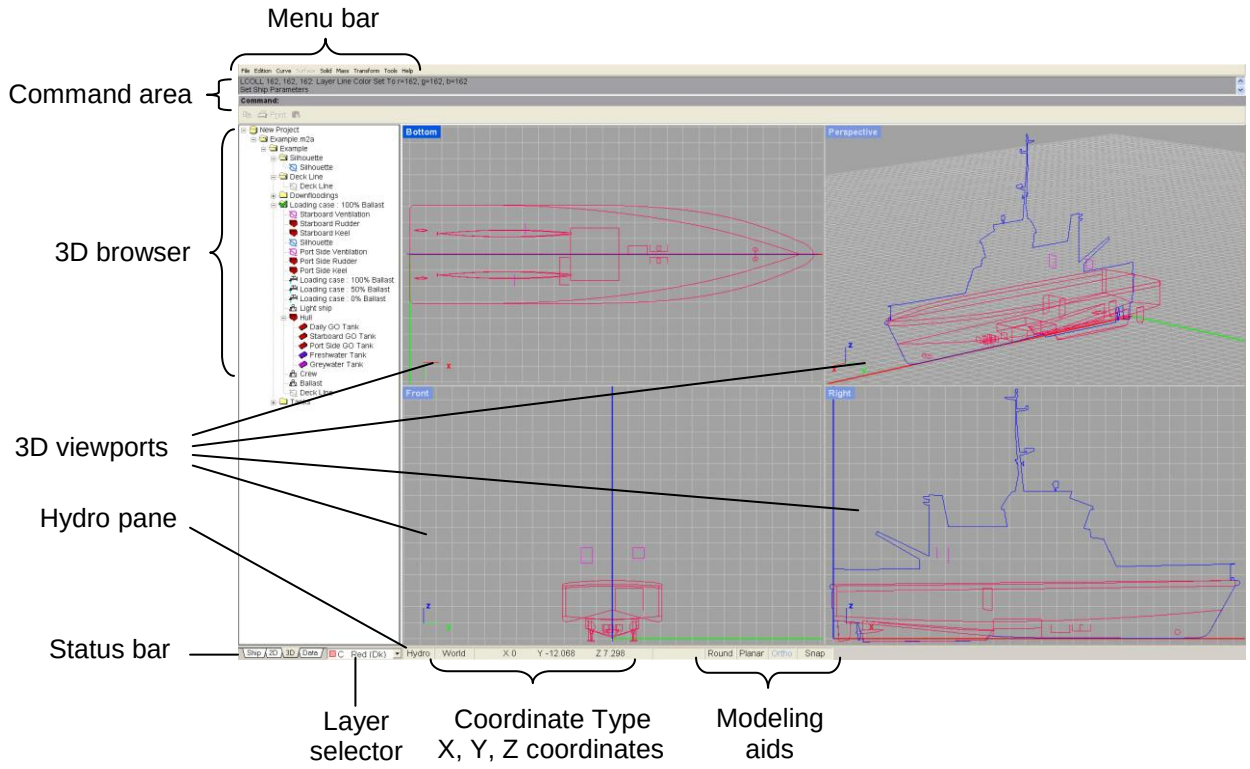

Ship
2D
3D
Data


MAAT Hydro Rev. 6.3h - Untitled.m2a
File Edition Curve Surface Solid Mass Transform Tools Help
Command: New
New Project Initialized
Command:
Print
Layout
Layers
Materials
Aspects
Grids
Units
Hydro
Libraries
Ship 2D 3D Data
Red (Dk)
Hydro
World
Round Planar Ortho Snap


Ship
2D
3D
Data

2. [3D] Page:

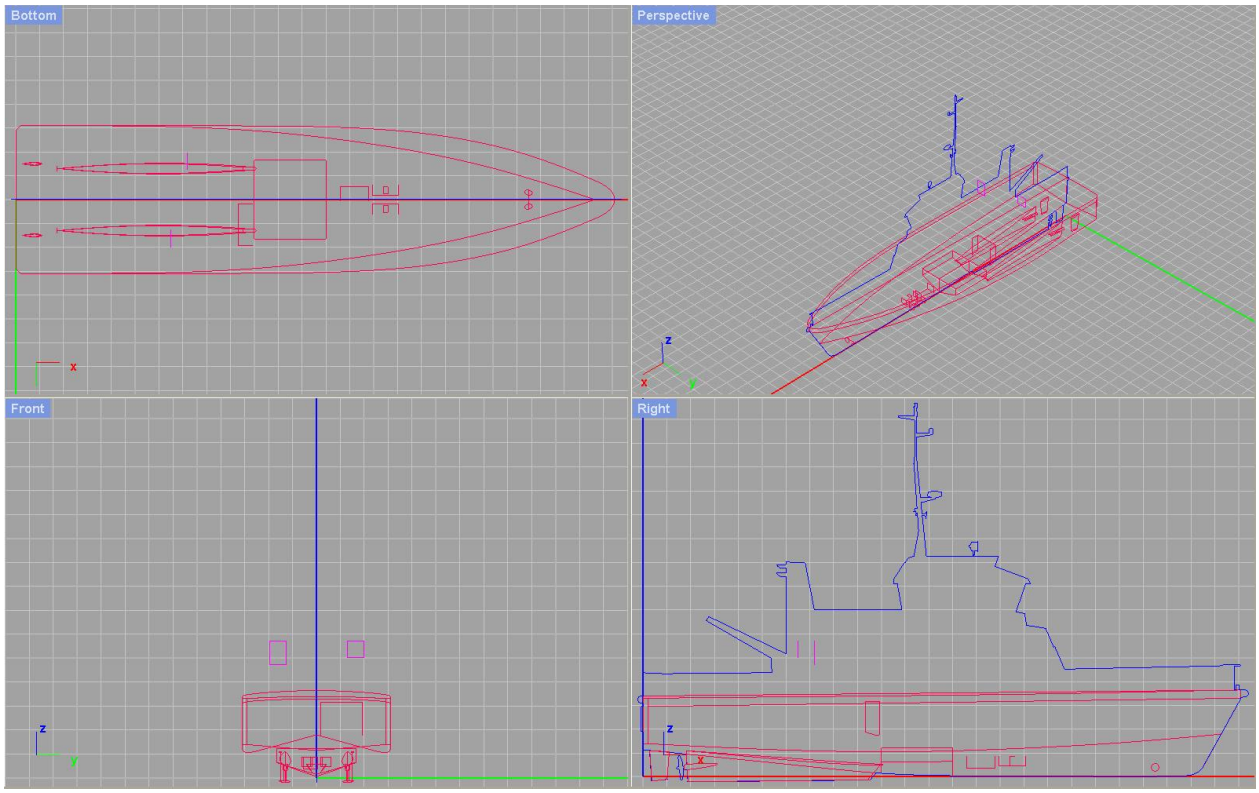
The (default) [3D] page shows current model's geometry in the 3D viewports and its data structure in the 3D Browser:



2.1. 3D Viewports:

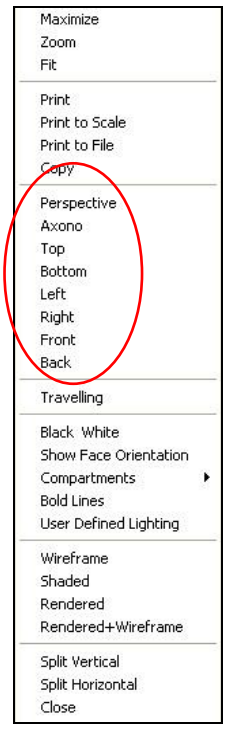
2.1.1. Viewports:

Viewports are MAAT Hydro's child windows in which the current model is displayed.

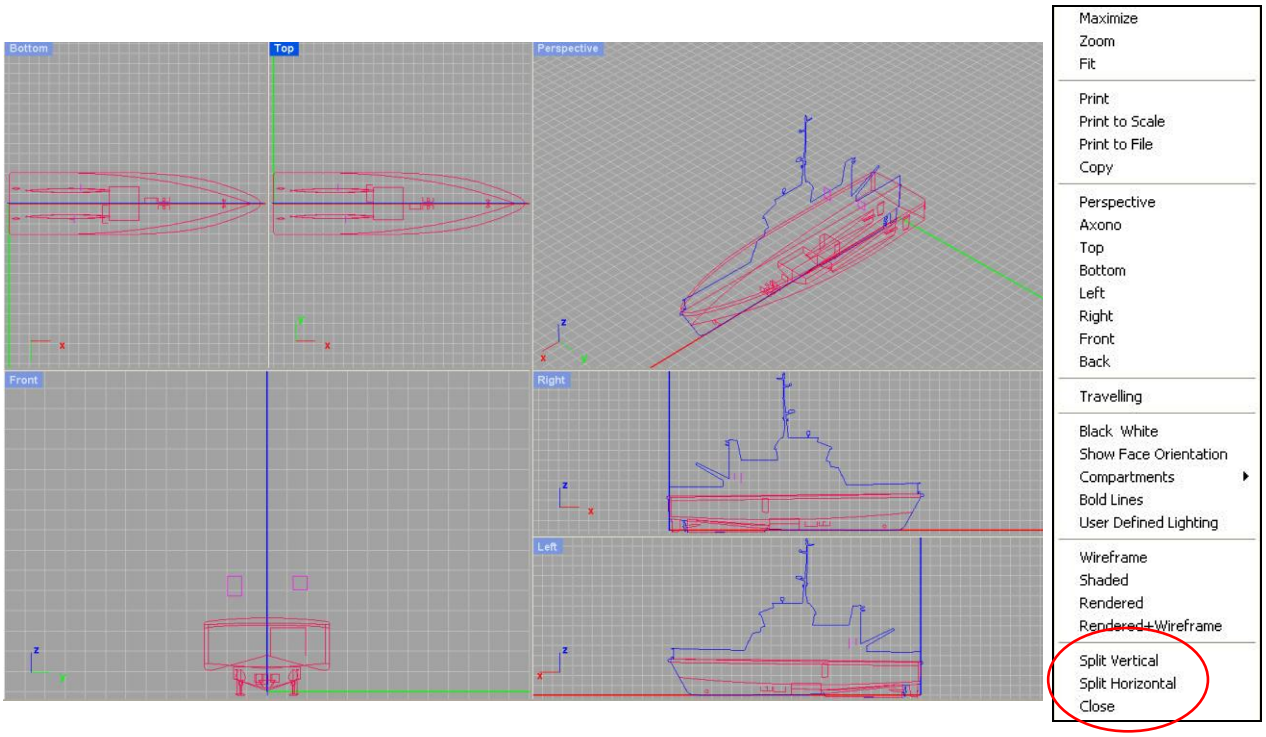


The four "**Bottom**", "**Front**", "**Right**" and "**Perspective**" views are the default ones, although other views are, of course, also available ("**Top**", "**Left**", "**Back**", "**Axono**", etc…).

Any other view or display option can be selected in viewport's menu, which pops up by a right-click on its title.



To add an extra viewport, just split an existing one by selecting “**Split Vertical**” / “**Split Horizontal**” in the viewport menu and, conversely, select “**Close**” to close it.



You can therefore easily customize MAAT Hydro’s 3D display, depending on your preferences, habits and project constraints.

All the views except the “Perspective” one are parallel views (no foreshortening).

2.1.2. Resizing a Viewport:

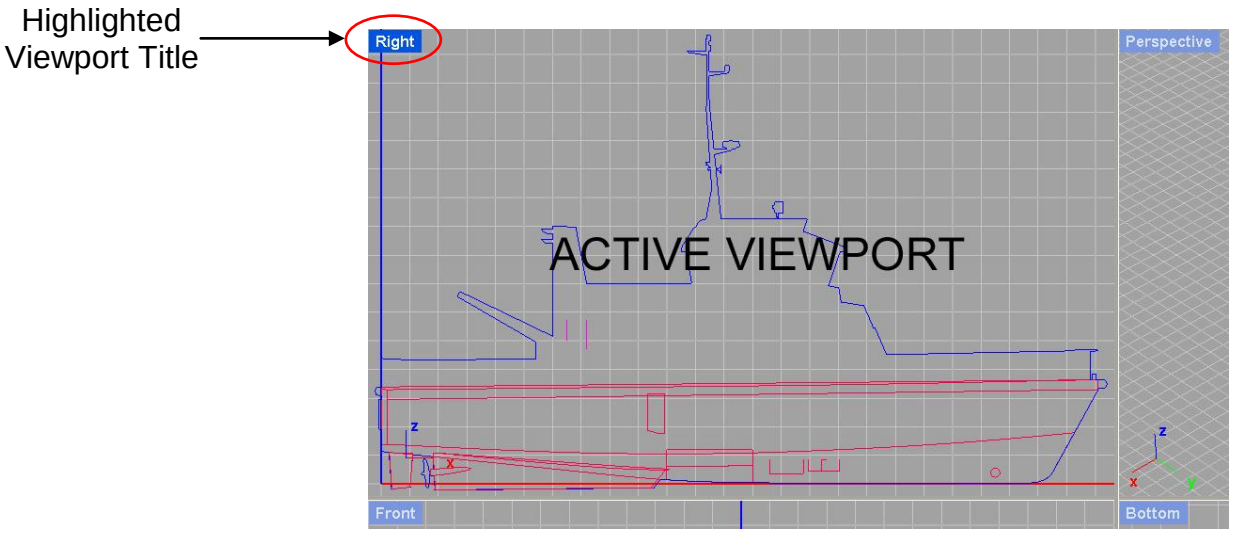
Any viewport can be immediately resized by sliding the splitters (↔) associated to its edges with left mouse button pressed.

2.1.3. Maximizing / Restoring a Viewport:

Any viewport can be easily maximized or restored to its initial size by a double click on its title or by selecting “**Maximize**” / “**Restore**” in its viewport menu.

2.1.4. Activating a Viewport:

A viewport is active when its window “has the focus”, which means that it receives and reacts to your actions (mouse clicks, shortcuts, keyboard inputs…). For obvious reasons, only one viewport can be active at a time. Left clicking in a viewport allows making it active without disturbing the view: Its title then become highlighted, showing its active status.



2.1.5. Zooming a Viewport:

Zooming in or out is possible by three different ways:

- Rotating the mouse wheel in the viewport, cursor location being considered as the magnification center.

- Pressing [Ctrl] key and right mouse button simultaneously while dragging up or down the cursor in the selected viewport, the initial cursor location being considered as the magnification center.

- Pressing [Page Up] / [Page Down] keys.

2.1.6. Panning a Viewport:

Dragging the cursor with right mouse button pressed allows shifting MAAT Hydro’s “camera” in its “projection screen” and, therefore, causes current display to be panned in orthogonal views or the viewpoint to be rotated in Perspective / Axono views.

For panning perspective and axono views, you must therefore also press the [Shift] key while dragging the cursor with right mouse button pressed, in order to shift camera’s target point together with it.

2.1.7. Scaling a Viewport:

Scaling the display can be helpful for magnifying smoothing problems and then, pressing the [Alt] key with the right mouse button while dragging the cursor in a viewport (orthogonal views only) will allow setting anisotropic views whenever necessary.

Select “**Fit**” in the viewport menu to return to an isotropic view.

2.1.8. Tilting a Viewport:

Press [Shift] [Ctrl] keys simultaneously while incrementing / decrementing viewport’s rotation angle with [Page Up] / [Page Down] keys.

2.1.9. Resetting a Viewport:

Each view can return to its default framing by selecting “**Fit**” in the viewport menu.

2.1.10. Setting a Viewpoint:

Moving the cursor with right mouse button pressed allows rotating a perspective or axono viewpoint, as seen previously for panning.

But, orthogonal views being remarkable parallel views (axono), it is also possible to transform any orthogonal view into a parallel one by dragging the cursor with [Shift],and [Ctrl] keys simultaneously pressed with the right mouse button.

For Perspective views, the foreshortening can also be set with the [Shift]/[Page Up] or [Shift]/[Page Down] shortcuts.

2.1.11. Animating a Viewpoint:

Animating a viewport may be useful for controlling or presenting a model with various viewpoints.

A short way to do this is to press [Alt] and [Ctrl] keys while rotating a perspective viewport with right mouse button pressed: When the keys and button are released, the last rotation increment continues to be repeated, so that the rotation continues. The following shortcuts become then available:

- [Alt] key toggles the viewport animation.
- [Alt][Ctrl] [f] speeds up the viewport animation.
- [Alt][Ctrl] [s] slows down the viewport animation.
- A left click in the viewport ends animation mode.

A more sophisticated animation mode is also available, needing a camera path descriptor (any line along which the camera will travel).

Once such a camera path is created and selected, "**Travelling**" must be selected in the viewport menu to start animation (for obvious reasons, the camera path is hidden during travelling).

Selecting "**Stop Travelling**" in the viewport menu stops the animation, while [Alt][Ctrl] [f] / [Alt][Ctrl] [s] shortcuts allow speeding it up / slowing it down.

2.1.12. Viewport Display Options:

Different options allow controlling project's 3D display from the viewport menu, the default display mode being "Wireframe":

	Grids	**Lines**	**Faces**
Wireframe	Shown	Shown	Not shaded
Shaded	Shown	Shown	Shaded
Rendered	Hidden	Hidden	Shaded
Rendered+Wireframe	Hidden	Shown	Shaded

Moreover, the viewport menu also provides additional display options:

- Black White / Color: Toggles line's color display from one mode to the other.
- Show / Hide Face Orientation: Toggles current face shading mode to / from the "red / green" orientation mode.
- Compartments: Normal / Dimmed / Clear: Selects the compartment shading mode among 3 possible, in order to display included tanks according to your preferrence.
- Bold Lines/ Sharp Lines: Toggles line's display mode from Bold to Sharp.
- User Defined / Flash Lighting: Toggles current light position from its user defined location (User Defined) to the camera location (Flash Lighting, the default one). This option only concerns the shaded display modes.

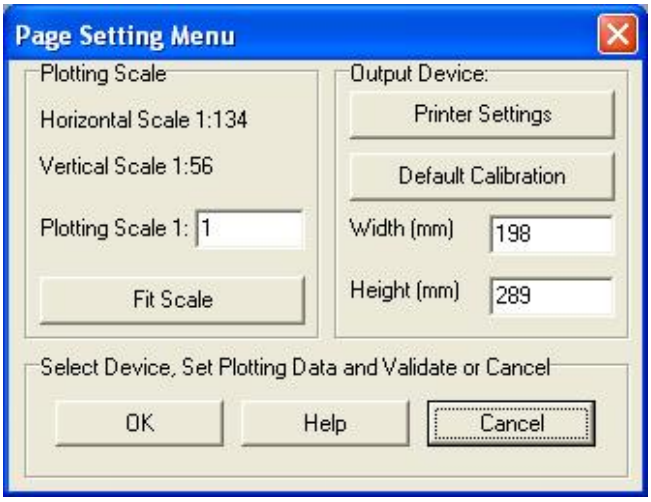
2.1.13. Printing and Copying a Viewport:

- Print:

Selecting "**Print**" in the viewport menu allows printing it directly on a single sheet, without any scale constraint.

- Print to Scale:

Selecting "**Print to scale**" in the viewport menu allows printing at a given scale. The following dialog box pops up:



Minimum horizontal and vertical scales are suggested, depending on viewport dimensions and current printer's width / height, in order to remind you the plotting scale limit for a single sheet printout of the viewport.

If the physical printing width / height don't match with the logical ones, the physical drawing won't match also with the logical one, so that the physical plotting scale will differ from the logical one you have input. You will then have to calibrate this printing area yourself by entering its measured physical dimensions in the corresponding fields (a [Default Calibration] button allows returning to the logical size).

When you have no scale constraint, the [Fit Scale] button automatically sets the plotting scale for a single sheet printout, depending on current printer settings.

If the plotting scale you have entered is greater than the displayed minimum values, the selected printer will directly print the viewport.

If not, you will have to define the printing layout by 3 clicks in the viewport (at any step, a right click allows cancelling the operation):

- Click plotted area's anchor point.

- Click plotted area's opposite corner (plotted area is automatically divided into printing sheets, depending on the scale you entered and printer's features).

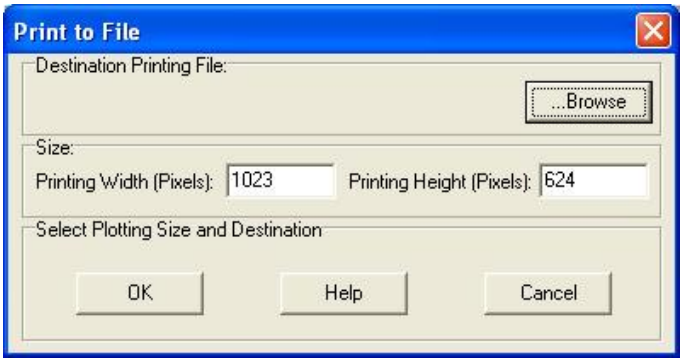
- Pan the plotted area accurately.

The displayed pages will then be printed (they will have to be fixed together for getting the final plot). Take care to check the amount of necessary pages with small scales!

- Print to File:

Selecting "**Print to File**" in the viewport menu allows saving the viewport display in a "JPG" file.

The following dialog box pops up:



- The [Browse] button allows selecting printing file's name and path.

- Bitmap's width and height can be specified in the corresponding input fields, viewport's aspect ratio being automatically conserved.

- Copy:

Selecting "**Copy**" in the viewport menu allows copying a viewport in Windows clipboard (in wmf / emf vectorial format) in order to paste it in another application (typically an MS Word document).

The associated shorcut is [Ctrl C].

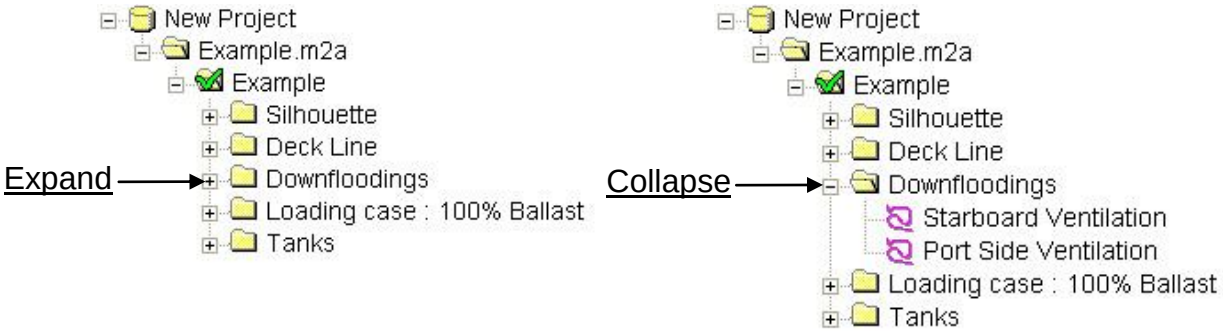
2.2. 3D Browser:

In order to face the increasing complexity of hydrostatic models, MAAT Hydro simulates Windows Explorer's ergonomic in order to provide an intuitive, powerful and totally recursive data management.

2.2.1. Using MAAT Hydro's 3D Browser:

2.2.1.1. Expanding and Collapsing Browser Objects:

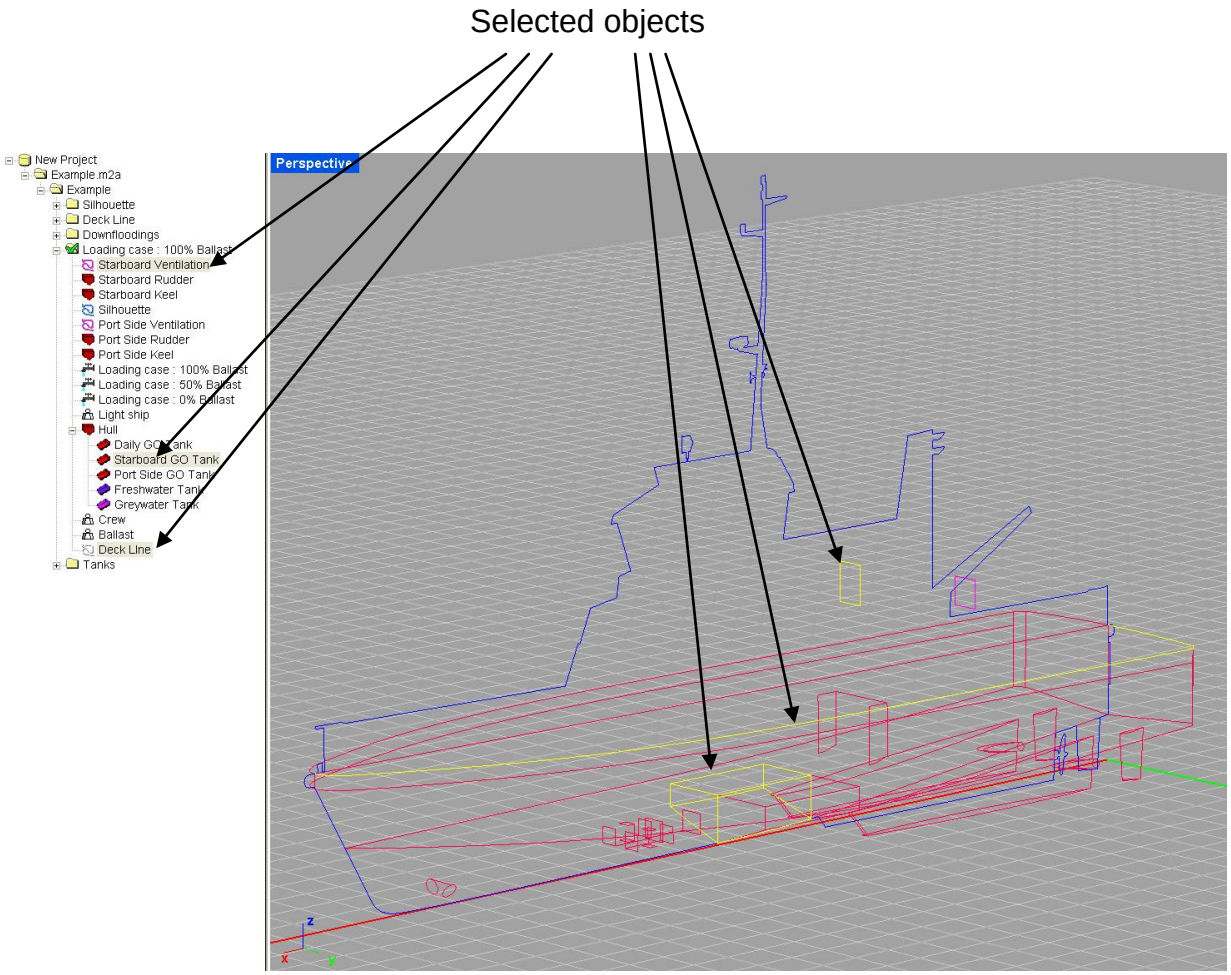
Like in Windows Explorer, clicking on the [+] / [-] symbol beside a parent element expands / collapses it:



2.2.1.2. Selecting Objects:

Left clicking on an object (line, compartment, tank, ...) in the 3D browser as well as in a 3D viewport allows selecting it. Like in AutoCad / Rhino, object groups can be selected exclusively (left to right selection) or inclusively (right to left selection) in the [3D] page viewports. Moreover, pressing [Ctrl]/[Shift] keys allows simulating a Windows Explorer selection and [Ctrl] [a] allows selecting all the objects.

In response, selected objects are highlighted in the browser as well as in the viewports:



2.2.1.3. MAAT Hydro 3D Objects:

MAAT Hydro's 3D Browser manages the following objects:

Symbol	Object	Description
	Project Root	This root folder, associated to each project created in MAAT Hydro, is parent of all others and contains all the [Ship] data.
	Workspace	Like a Windows Explorer folder, a workspace allows grouping a set of MAAT objects separately. According to your needs, workspaces can be created and organized hierarchically. Typically, your different project versions have to be grouped in different workspaces allowing to work on them separately. For obvious reasons, only one folder can be activated at a time. A double click on it allows activating it (a green tick will identify the active workspace in the 3D browser).
	Compartment	Ship's buoyancy results from the compartments and tanks describing its geometry. Compartment's buoyancy loss is the product of its geometric submerged volume by its permeability and its flooding factor (see [Data] page). Permeability represents the amount of compartment's buoyancy lost when flooded and therefore depends on its occupation (usually in the 70% - 100% range, 95% being most common). The flooding factor controls compartment's status, being defined in the 0 (intact) / 1 (flooded) range.
	Tank	Basically, a «tank» is a special compartment whose permeability is forced to 0 (it must be watertight), in order to allow it containing a certain amount of liquid. As a physical tank usually includes an internal structure, tank's geometric volume is not totally available in practice and a «tank permeability» is therefore necessary to specify the percentage of tank's space really available. Therefore, a value of 0.95 (the most common) means that 95% of tank's geometric volume can be filled.
	Mass	Ship's weight estimate contains all the items necessary for C.G. calculation, except fluids, which need a separate process. MAAT Hydro's masses are used to represent all these solid loads, the resulting C.G. being calculated in real time. Moreover, in order to allow a more synthetic work, such

		masses can include submasses, and so on... At last, each mass can also be instantly weighed in the 0% - 150% range (see [Data] page), in order to allow easy weight configuration. Additionally, in order to allow Longitudinal Strength calculations, the longitudinal (X) extension of masses can also be specified. This recursive mass management therefore allows encapsulating the complete weight estimate in a single parent mass whenever necessary.
	Line	Lines are necessary for many complementary calculations (freeboard, downflooding, windage area calculation…). Lines, which are virtual “wires”, are not necessarily “closed” and must not be mistaken with outlines, which trim “areas” and must therefore always be closed. Line’s use is layer dependent.
	Outline	An outline is a closed line trimming an area of its parent surface, to which it confers its properties (layer, material, color, rendering aspect,…). An outline is therefore a trimming curve. Faces are trimmed surfaces (surfaces containing outlines) and are used for defining solid’s faces, a solid being considered as a closed (watertight) set of such faces.
	Surface	Surfaces are the basic 3D objects created by your favourite modeller (NURBS, B-Splines…). Untrimmed surfaces (boundaryless) having no “physical” existence, the “existing” faces needed by BREP solids can only be trimmed surfaces (including outline(s) defining their boundaries).
	Loading Condition	Creating a “Loading Condition”, allows encapsulating all the weight settings of the active folder (masses, tanks content and filling, compartment permeabilities, silhouette lines...). Any double click on such a Loading Condition then allows restoring the encapsulated settings instantly, provided that compartments and tanks have not been renamed, moved, deleted or transformed (compartment in tank or tank in compartment).
	Damage Condition	Like for Loading Conditions, Damage Conditions allow encapsulating all the damage settings (mainly compartment flooding factors…). Any double click on such a Damage Condition then allows restoring the encapsulated settings instantly, provided that compartments and tanks have not been renamed, moved, deleted or transformed (compartment in tank or tank in compartment).

2.2.2. Browser Objects Management:

2.2.2.1. Creating a Folder:

Creating folders is helpful for organizing data efficiently, especially when they are copious.

This can be done easily by selecting folder's parent object in the 3D Browser and selecting "**New Workspace**" in the popup menu. Any existing object can then be dragged and dropped in the created folder.

2.2.2.2. Organizing Browser Objects:

Whenever necessary, 3D browser objects can also be organized with the following functions, available in browser's contextual menu:

- "**Push**": Encapsulates the selected element(s) in a parent folder;
- "**Pop**": Extracts the content of selected folder(s) in parent folder.
- "**Sort**": Sorts selected folder's child objects alphabetically.

2.2.2.3. Editing Browser Objects:

Windows Explorer's editing functions are available in the 3D browser menu, associated to their classical shortcuts:

- "**Cut**" (Ctrl X);
- "**Copy**" (Ctrl C);
- "**Paste**" (Ctrl V);
- "**Delete**" (Del).

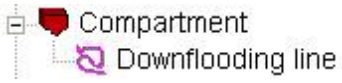
2.2.2.4. Renaming an Object:

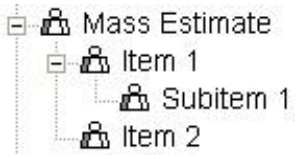
Like in Windows Explorer, left clicking on a selected object's name allows renaming it.

2.2.2.5. Dragging and Dropping:

Like in Windows Explorer, dragging and dropping 3D browser's selected objects with left mouse button pressed allows moving them quickly from a location to another.

The following rules must be known in order to use MAAT Hydro object's hierarchy efficiently (see "Advanced buoyancy management" for more details):

	When a compartment is child of a parent one, its buoyancy is subtracted from parent's buoyancy. This allows modeling solid holes easily with optimal accuracy.
	When a "Downflooding" layer line is affiliated to a child compartment, it will be processed as a hole as soon as its downflooding line is submerged (resp. ignored as long as its downflooding line is not submerged). Intermediary buoyancies are interpolated linearly according to the line submersion / "downflooding range" ratio (see [Ship] tab / "Hydro" page).
	When a tank is affiliated to a parent compartment, its buoyancy depends on its parent's flooding: No tank buoyancy when affiliated to an intact compartment, full tank buoyancy when affiliated to a totally flooded compartment.
	Compartment's buoyancy becomes conditional when it contains a downflooding line (a child "Downflooding" layer line): It remains intact as long as its child downflooding line is not submerged (resp. totally flooded as soon as its child downflooding line is submerged). Intermediary buoyancies are interpolated linearly according to the line submersion / "downflooding range" ratio (see [Ship] tab / "Hydro" page).
	Tank's content becomes conditional when it contains a downflooding line (a child "Downflooding" layer line): Tank's filling is automatically reduced as soon as its free surface exceeds the downflooding line. This overflowing mechanism may be usefull for modelling the effect of water on deck, of cargo loss at heel (dredgers…), of swimming pools (super yachts),...
	An outline affiliated to a parent outline is automatically subtracted, therefore defining a hole.

	Any mass can include “submasses”, allowing them to be structured in order to reflect weight estimate’s structure, each mass remaining weighable from 0% to 150% on the [Data] page in order to allow quick and easy weight settings. Ship’s weight estimate, weight curve and longitudinal strength can then be calculated in real time when corresponding hydrostatic display options are activated.

Nevertheless, for technical reasons, surface’s child lines and outlines cannot be dragged and dropped.

2.2.2.6. Activating a Folder:

Double clicking on a folder / workspace allows activating it. It will then be displayed in current 3D viewports and interact with all your actions. For obvious reasons, only one folder can be activated at a time.

A green tick identifies the active folder: 

2.2.3. Miscellaneous:

2.2.3.1. Importing / Exporting:

MAAT Hydro is designed to be combined with any 3D surface / solid modeller exporting lines, faces and solids in IGS format.

Its outputs, being mostly 2D diagrams and data arrays, are exported in DXF and CSV formats, in order to be readable by most of the 2D programs and spreadsheets.

IGES or MAAT (2000 / Hydro) files can be imported in MAAT Hydro by selecting “Import” in 3D browser’s contextual menu. Notice that imported file’s parent must be selected before selecting “Import”.

Conversely, MAAT Hydro’s 3D browser objects can be exported in *.igs files and 2D browser objects in DXF files. Moreover, *.csv exports are also possible when 2D documents contain them.

At last, copying viewport’s content in the Windows clipboard ([Ctrl][c]) is also a way of exporting MAAT Hydro’s data, as well as printing their content in a bitmap file.

2.2.3.2. Optimizing:

Depending on their origin and history, the imported data can be extremely copious for nothing, slowing down all the MAAT Hydro calculations. In order to allow improving calculation performance and data size in such cases, you can optimize the selected data automatically by selecting "**Optimize**" in the 3D browser menu.

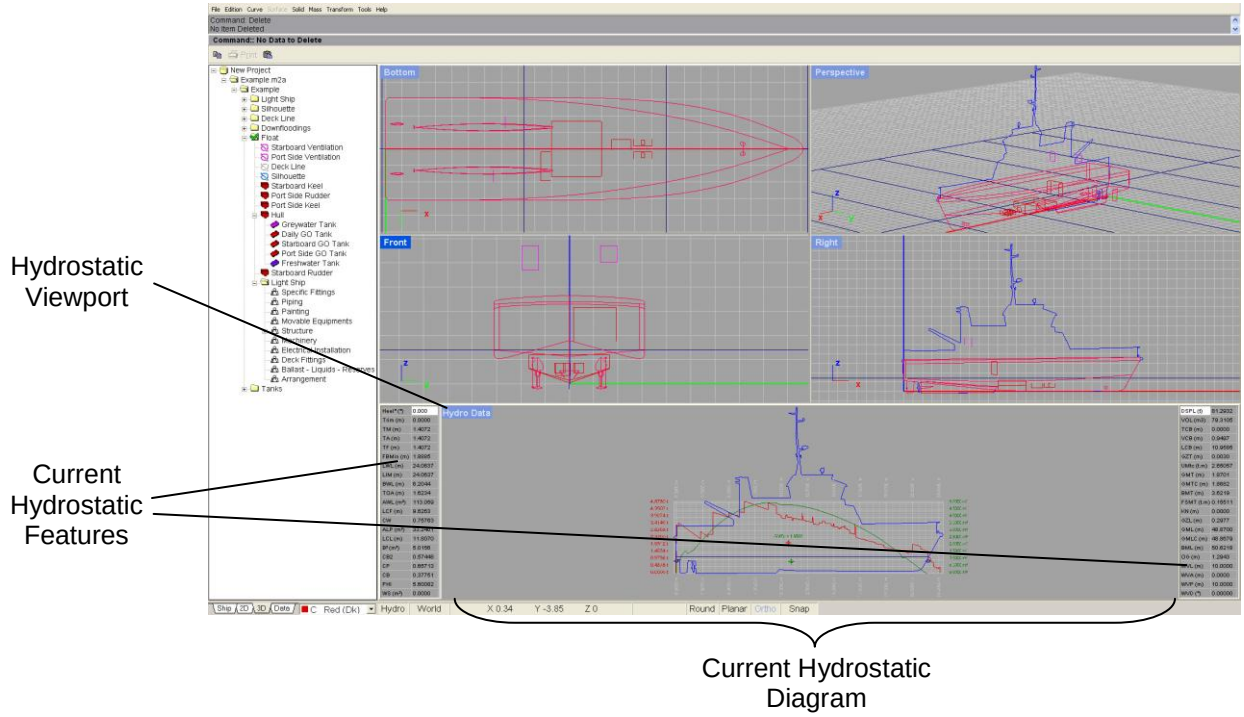
2.2.3.3. Other 3D Browser Functions:

All the previous functions are dedicated to MAAT Hydro's 3D data management.

Additionally, depending on 3D browser's currently selected data, more oriented functions are also available, being detailed in MAAT Hydro's modelling and reference manuals.

2.3. Hydrostatic Viewport:

The hydrostatic viewport can be instantly opened / closed whenever necessary, to show the current hydrostatic features of the active model according to the current floatation in a real time / simulation mode.



2.3.1. Displaying / Hiding the Hydrostatic Viewport:

The hydrostatic viewport can be displayed / hidden by left clicking in the [Hydro] pane at the bottom / left of the main window.



2.3.2. Activating the Hydrostatic Viewport:

The hydrostatic viewport must be activated (highlighted title) by a left click in it in order to respond to your inputs / shortcuts, otherwise the other active viewport will have the focus.

2.3.3. Zooming:

Like for zooming 3D viewports, zooming the hydrostatic viewport in and out is possible in two ways:

- Set cursor's position to hydrostatic viewport's zooming center and rotate the mouse wheel.

- Set cursor's position to hydrostatic viewport's zooming center, press [Ctrl] key while dragging mouse cursor up or down with right mouse button pressed.

2.3.4. Panning:

Like for panning 3D viewports, just drag hydrostatic viewport's display with right mouse button pressed.

2.3.5. Scaling:

Like for scaling 3D viewports, press [Alt] key, move cursor to hydrostatic viewport's scaling center, and drag it with right mouse button pressed.

2.3.6. Controlling Ship's Current Floatation:

You can control ship's current floatation by directly entering its heel (**Heel**), AP / MP / FP immersions (**TA**, **TM**, **TF**) or trim (**Trim**) in the corresponding input fields:



Moreover, ship's immersion, trim and heel can be set incrementally with the following shortcuts:

- Use [Page Up] / [Page Down] keys to increase / decrease current heel.

- Use [←] / [→] keys to increase / decrease current trim.

- Use [↑] / [↓] keys to increase / decrease current immersion.

Keeping the [Shift] key pressed while setting the floatation incrementally allows magnifying the increments. Conversely, the [Ctrl] key reduces them.

The default floatation is planar but any sinusoidal swell can be added to the mean floatation plane. The “wave length” (**WVL**), “wave amplitude” (**WVA**) and “wave phase” (**WVP**) fields allow entering directly the swell features used for current and longitudinal strength calculations.

WVL (m)	10.0000
WVA (m)	0.0000
WVP (m)	10.0000

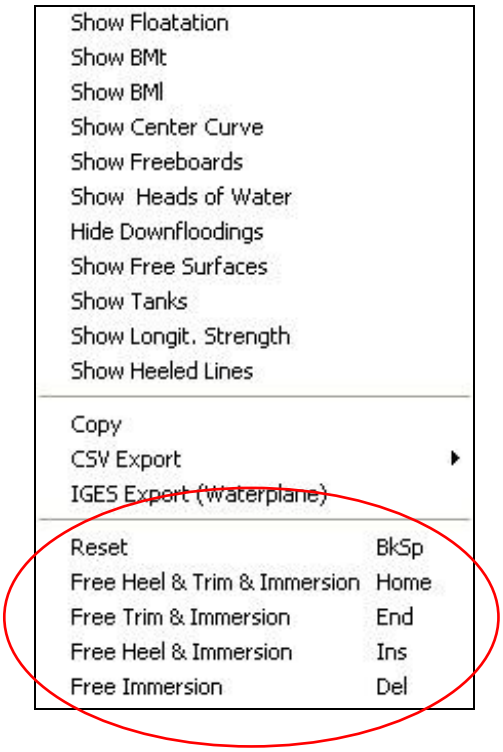
WVL (m)	10.0000
WVA (m)	0.0000
WVP (m)	10.0000

WVL (m)	10.0000
WVA (m)	0.0000
WVP (m)	10.0000

2.3.7. Calculating Ship’s Balance / Resetting Ship’s Floatation:

In addition to the previous incremental floatation settings, ship balance can be automatically calculated whenever possible (at least a buoyant solid and a realistic mass must be present among the calculated data).

Different kinds of ship balances can be calculated, depending on your selection in the hydrostatic viewport’s menu:



- **“Reset” (Shortcut: [Backspace] key):** Resets the floatation to its design status.

- **“Free Heel, Trim and Immersion” (Shortcut: [Home] key):** Calculates ship’s heel, trim and immersion corresponding to current load when a balance can be reached from the current floatation.

- **“Free Trim and Immersion” (Shortcut: [End] key):** Calculates ship’s trim and immersion corresponding to current load, without altering heel.

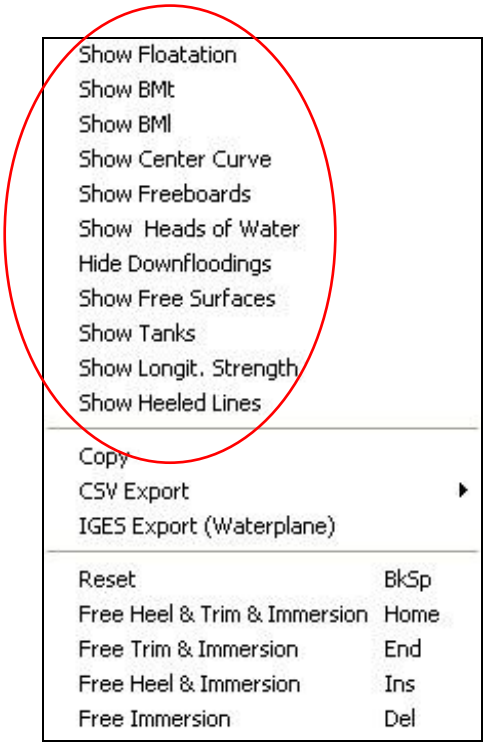
- **“Free Heel and Immersion” (Shortcut: [Ins] key):** Calculates ship’s heel and immersion corresponding to current load, without altering trim.

- **“Free Immersion” (Shortcut: [Del] key):** Calculates ship’s immersion corresponding to current load, without altering trim nor heel.

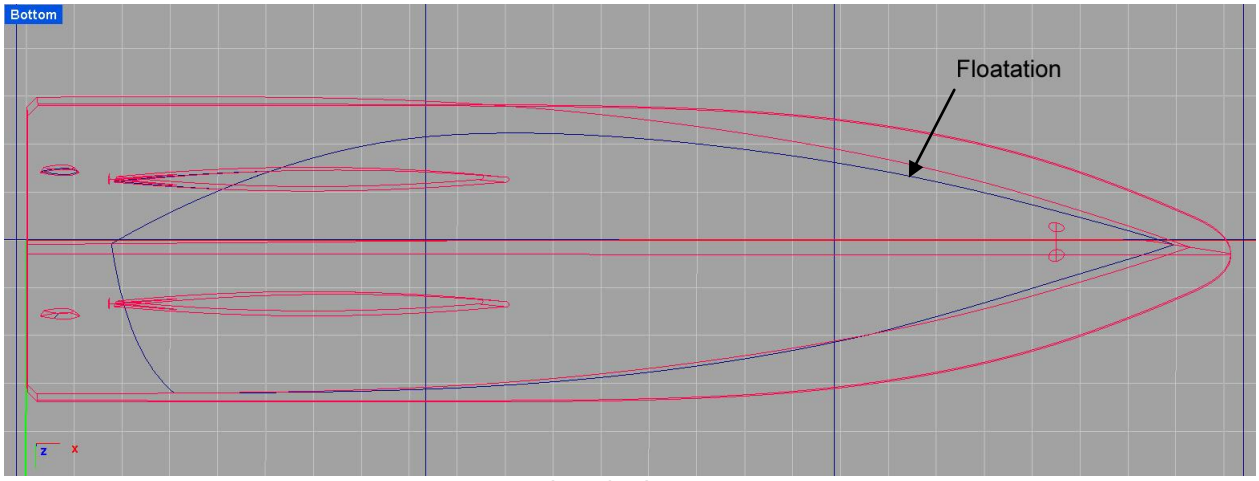
2.3.8. Hydrostatic Display Options:

The hydrostatic viewport enables showing additional hydrostatic data in the hydrostatic and 3D viewports.

Right click on viewport's title to select the data you want to show in the hydrostatic menu:

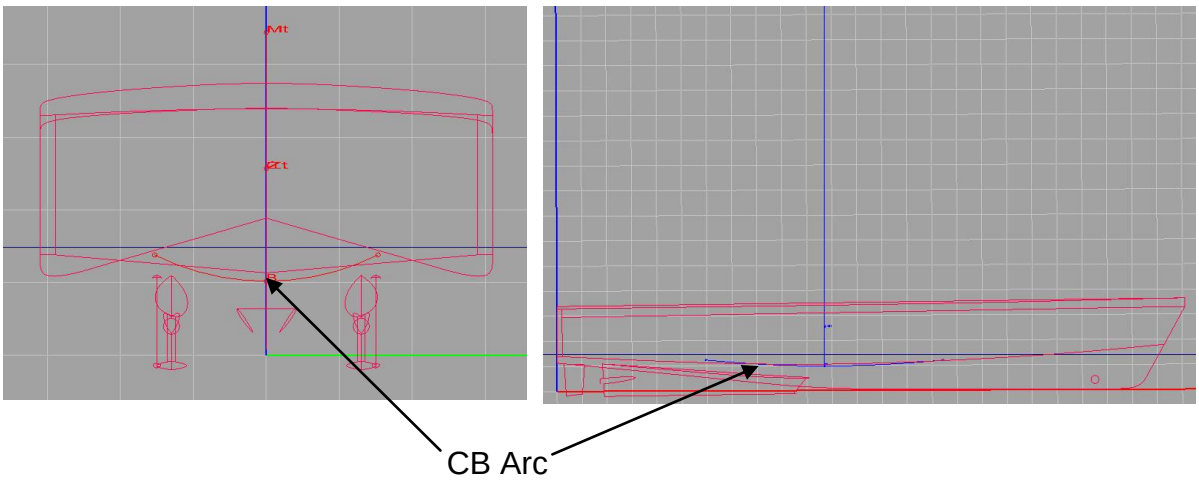


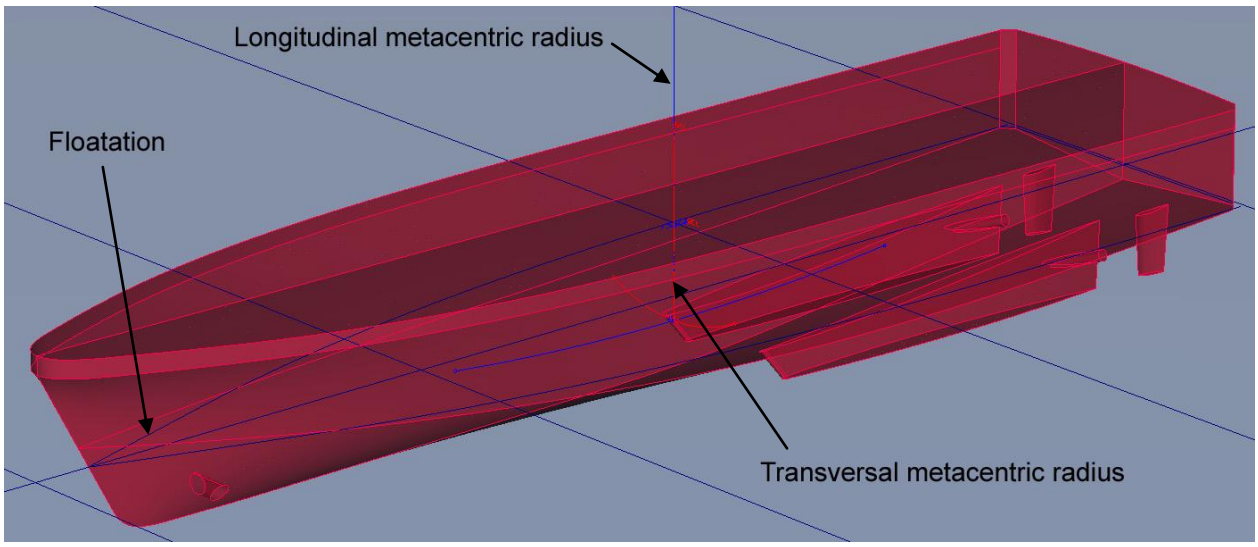
- **“Show/Hide Floatation”**: Allows displaying current floatation line(s) in the 3D viewports. Yacht designers will appreciate combining this option with the “Show/Hide Center Curve” option in order to display submerged station’s CGs simultaneously.



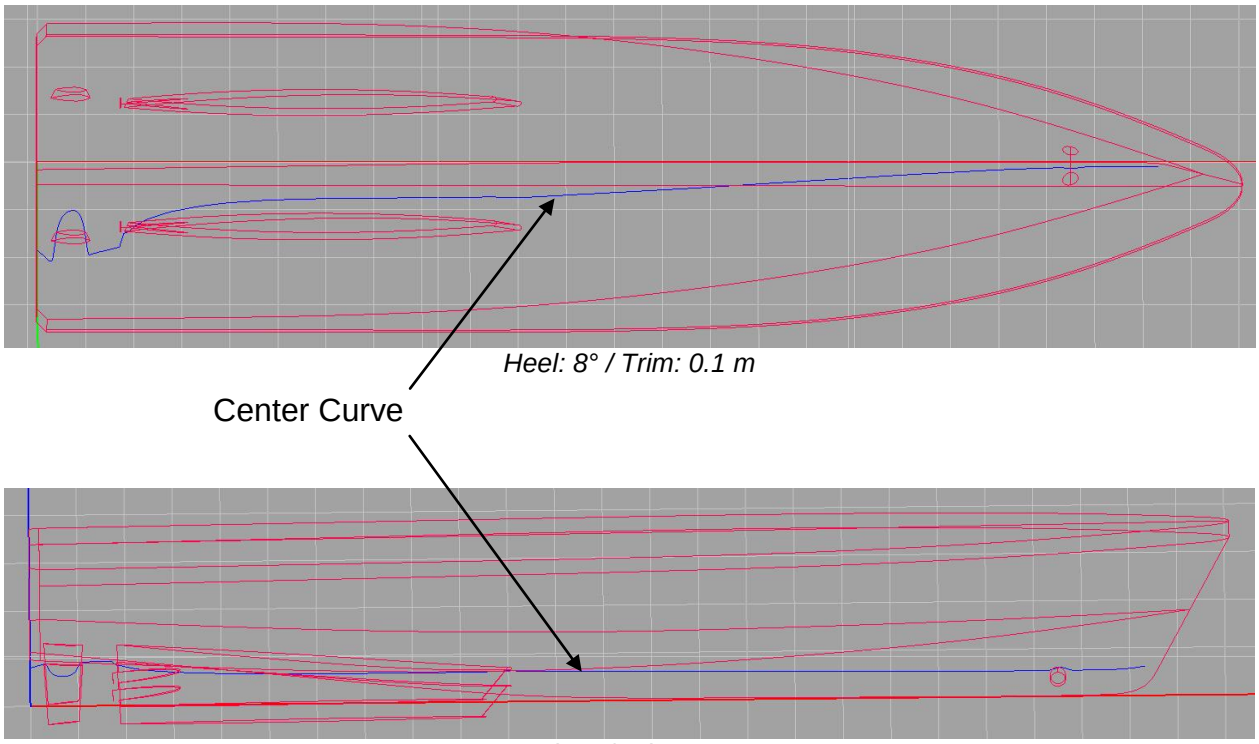
Heel: 5° / Trim: - 0.1m

- **“BMt” / “BMl”**: Allows displaying the metacentric radii with their CB arc in the 3D viewports.





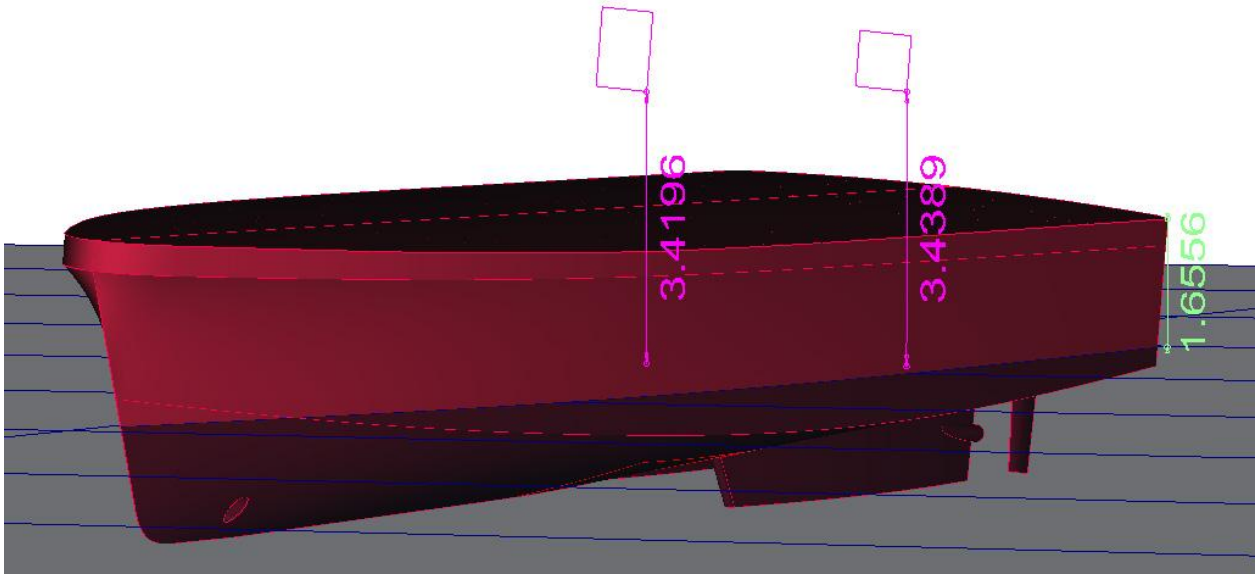
- **“Show/Hide Center Curve”**: Allows displaying the centers of immersed areas curve in the 3D viewports.



Heel: 8° / Trim: 0.1 m

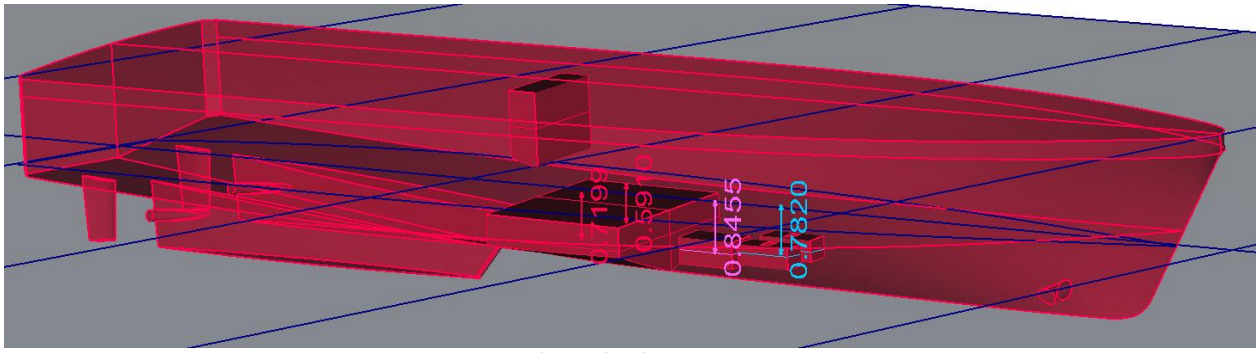
Heel: 8° / Trim: 0.1 m

- **“Show/Hide Freeboards”**: Allows displaying / hiding the current minimum freeboards of model’s freeboard and opening lines in the 3D viewports.



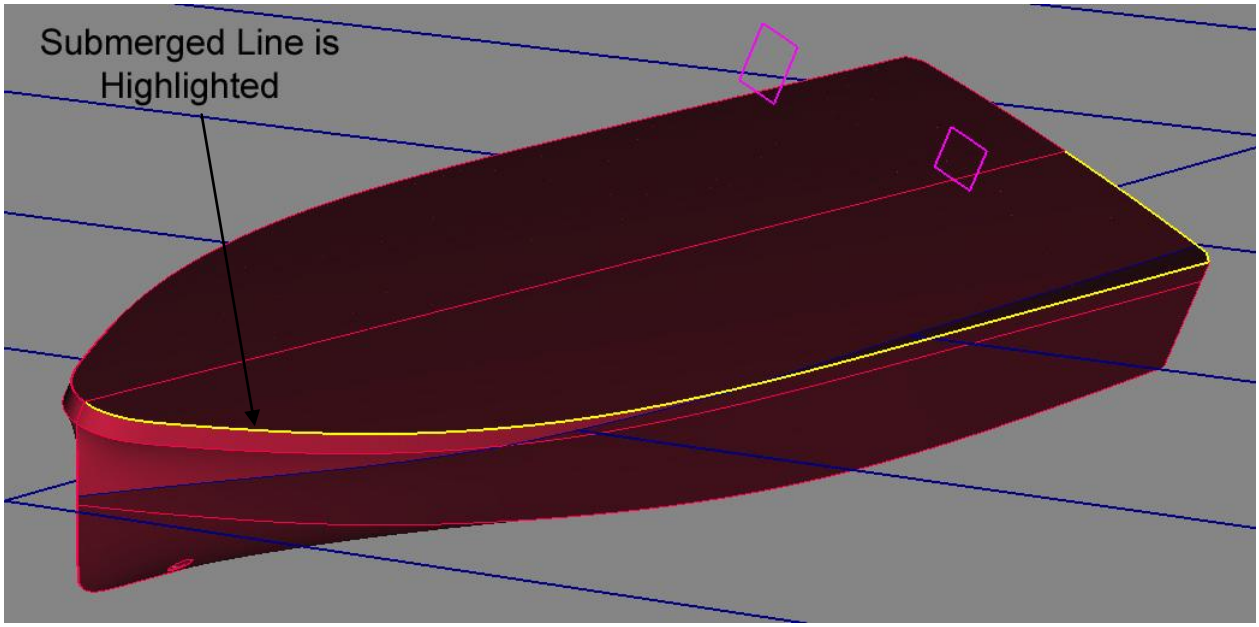
Heel: 5° / Trim: - 0.1m

- **“Show/Hide Heads of Water”**: Tank’s Head of Water allows displaying / hiding the current head of water (tank’s free surface / floatation distance) in the 3D viewports according to the current heel, trim and immersion.



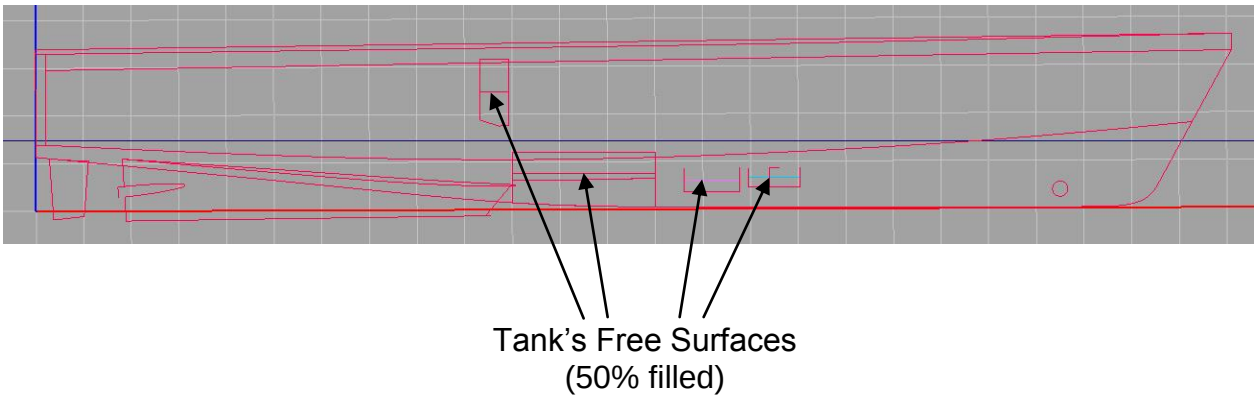
Heel: -5° / Trim: -0.15 m

- **“Show/Hide Downfloodings”**: Allows highlighting the submerged opening lines (when present) in the 3D viewports.



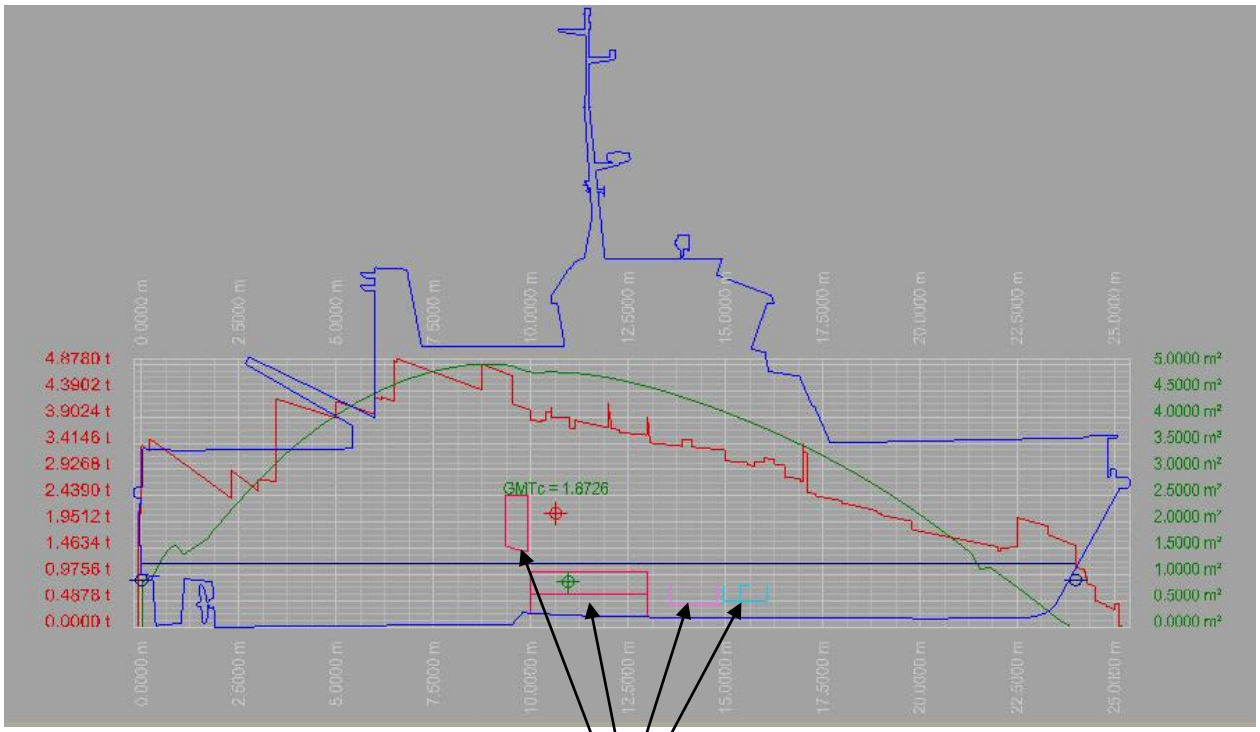
Heel: 25° / Trim: 0.1m

- **“Show/Hide Free Surfaces”**: Allows displaying / hiding tank’s free surfaces in the 3D viewports (when filled tanks are present).



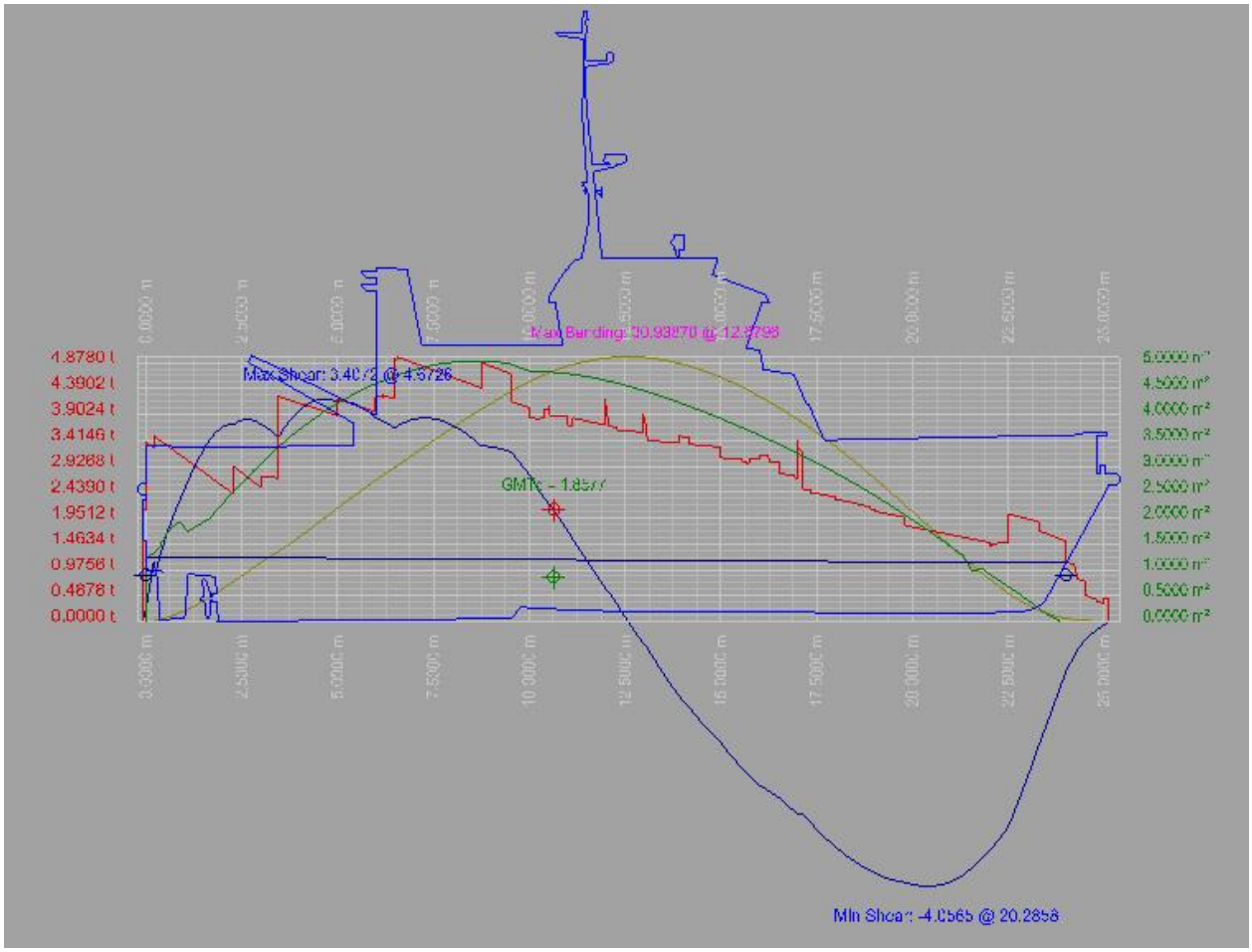
Tank’s Free Surfaces
(50% filled)

- **“Show/Hide Tanks”**: Allows displaying tanks in the hydroctatic viewport.

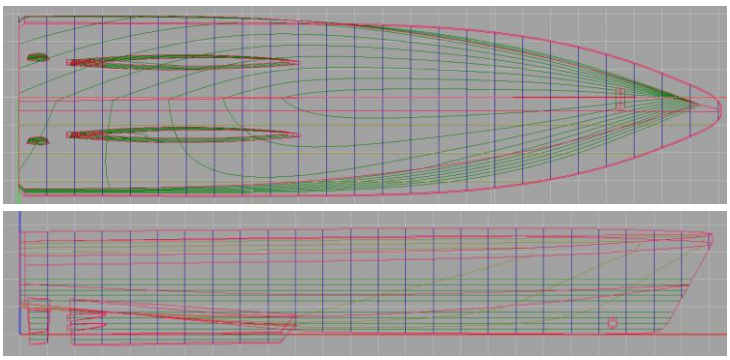


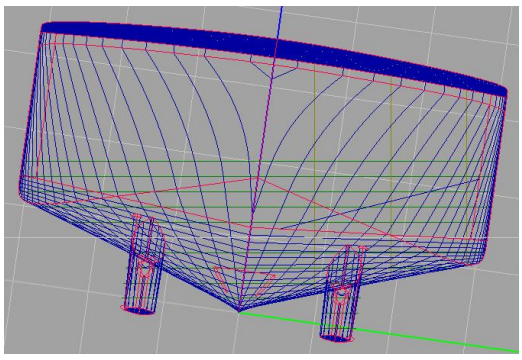
Tanks

- **“Show/Hide Longitudinal Strength”**: Allows displaying shear forces and bending moments in the hydrostatic viewport. These data are only realistic when ship’s longitudinal balance has been calculated with a realistic weight distribution. A dedicated function is also available in the “Tools” submenu for detailed results.



- **“Show/Hide Heeled Lines”**: Allows displaying all the current lines of heeled and trimmed ship. Yacht designers may appreciate combining this option with the “Show/Hide Center Curve” option in order to display immersed station’s CGs simultaneously.





Heel: 8°

Remark: To display the current freeboard(s), freeboard and / or opening line(s) must have been set in the appropriate layer on the [Data] page (see [Data] page" and [Ship]/[Hydro] page below).

2.3.9. Copying:

Like any viewport, Hydrostatic viewport's content can also be copied in Windows clipboard (in wmf / emf vectorial format) by selecting "**Copy**" in its menu, in order to paste the current diagram in an external software (typically MS Word, …). The [Ctrl][c] shortcut is also available when the hydrostatic viewport is active.

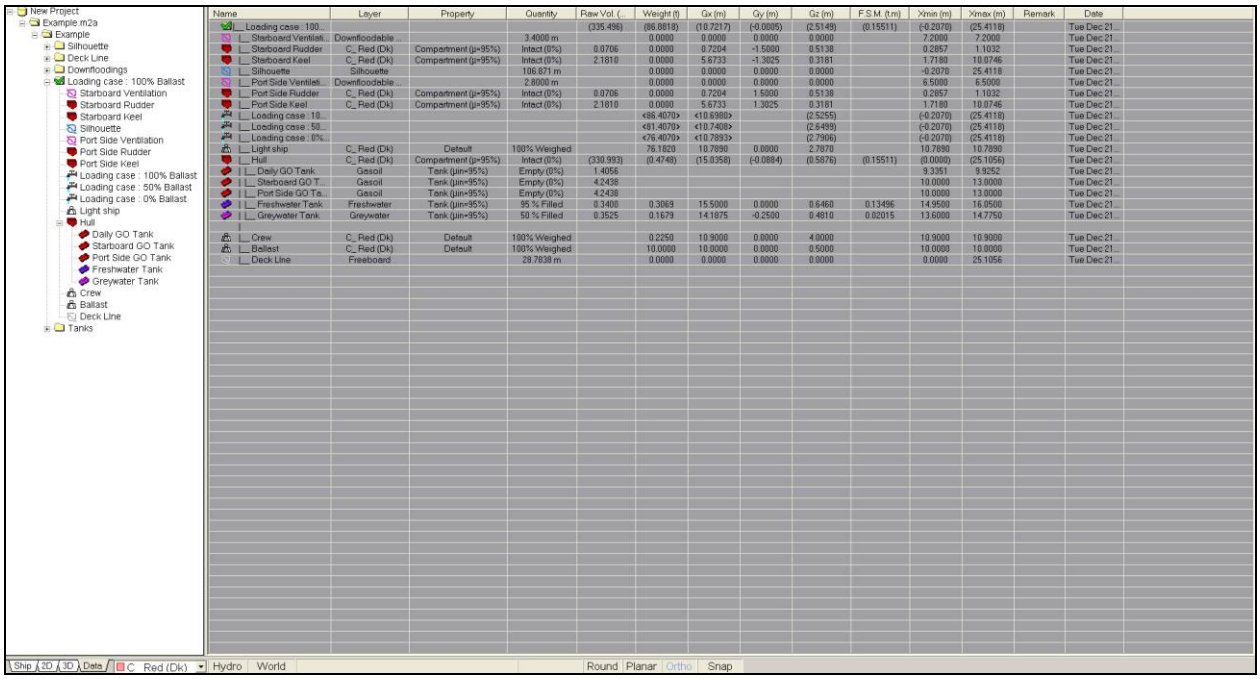
2.3.10. Exporting:

Selecting "**CSV Export**" in hydrostatic viewport's menu allows exporting current hydrostatic parameters to a spreadsheet like MS EXCEL through a 'CSV' file (three header options are available).

3. [Data] Page:

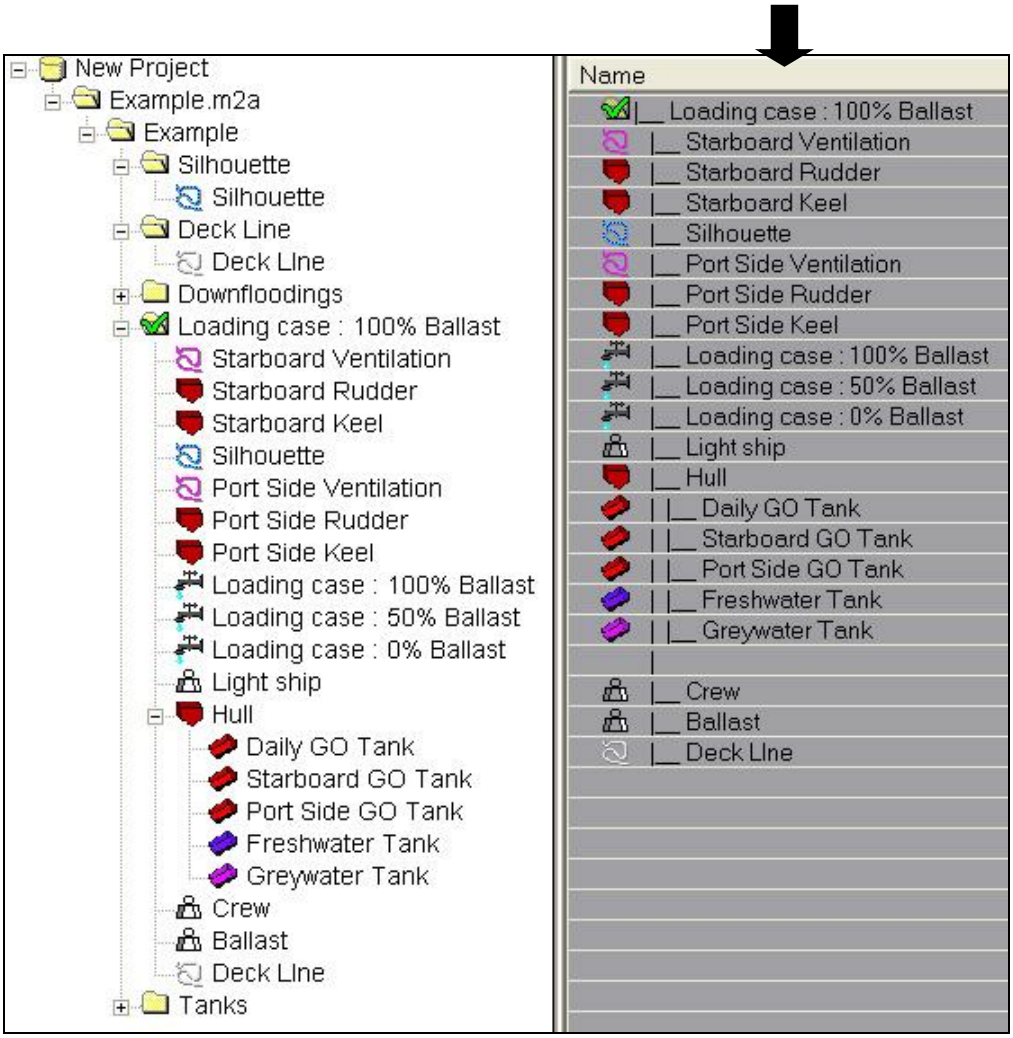
3.1. Data Table:

The [Data] page uses the same 3D data browser than the [3D] page, current model's 3D display being replaced by a spreadsheet-like control table allowing setting its components attributes. Each table's column corresponds to the properties described below.



3.1.1. Name:

The "**Name**" column displays the name of the objects contained in browser's active set:



Like in Windows Explorer, any object's name can be modified directly by selecting and clicking it:

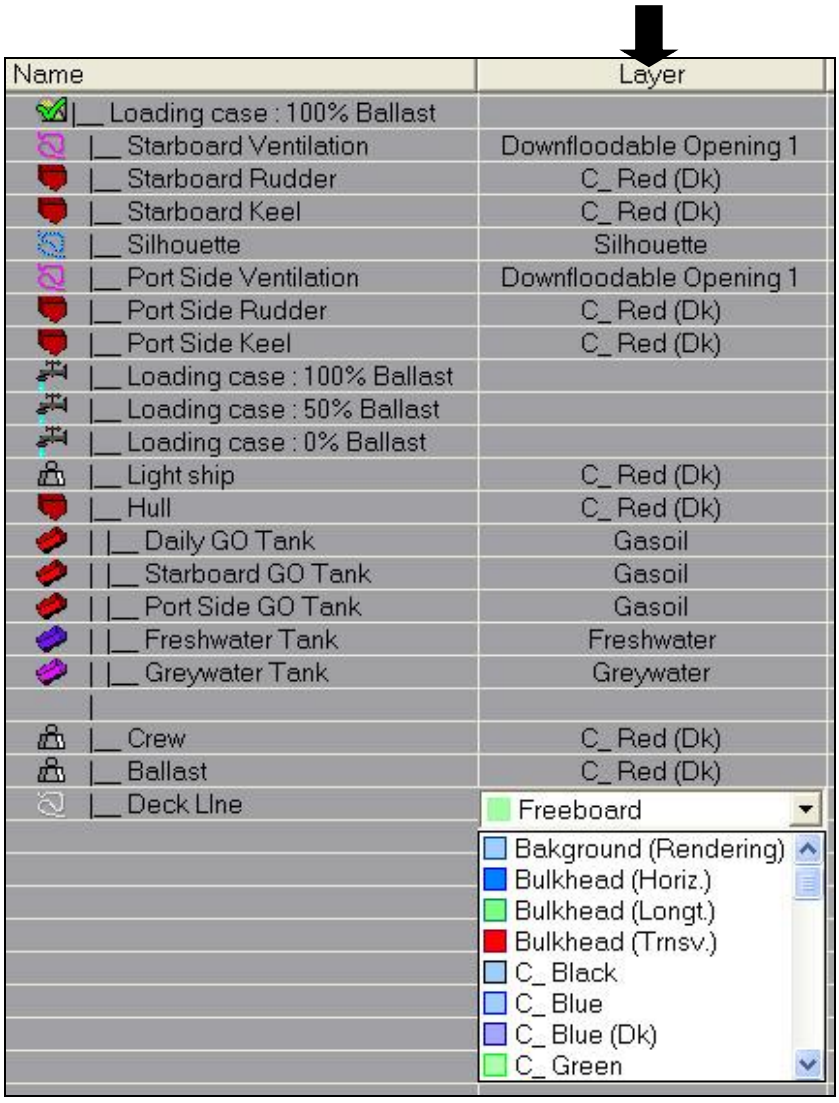


New objects (Folder / Workspace, Mass, Solid Box, Solid Sphere, Loading Condition, Damage Condition) can be created by right clicking in any blank line:



3.1.2. Layers:

The "**Layer**" column allows controlling object's layers, which can be directly selected in a dropdown list by left clicking in its field (the layers list depends on node's nature). Layers are described below, in 5.2.

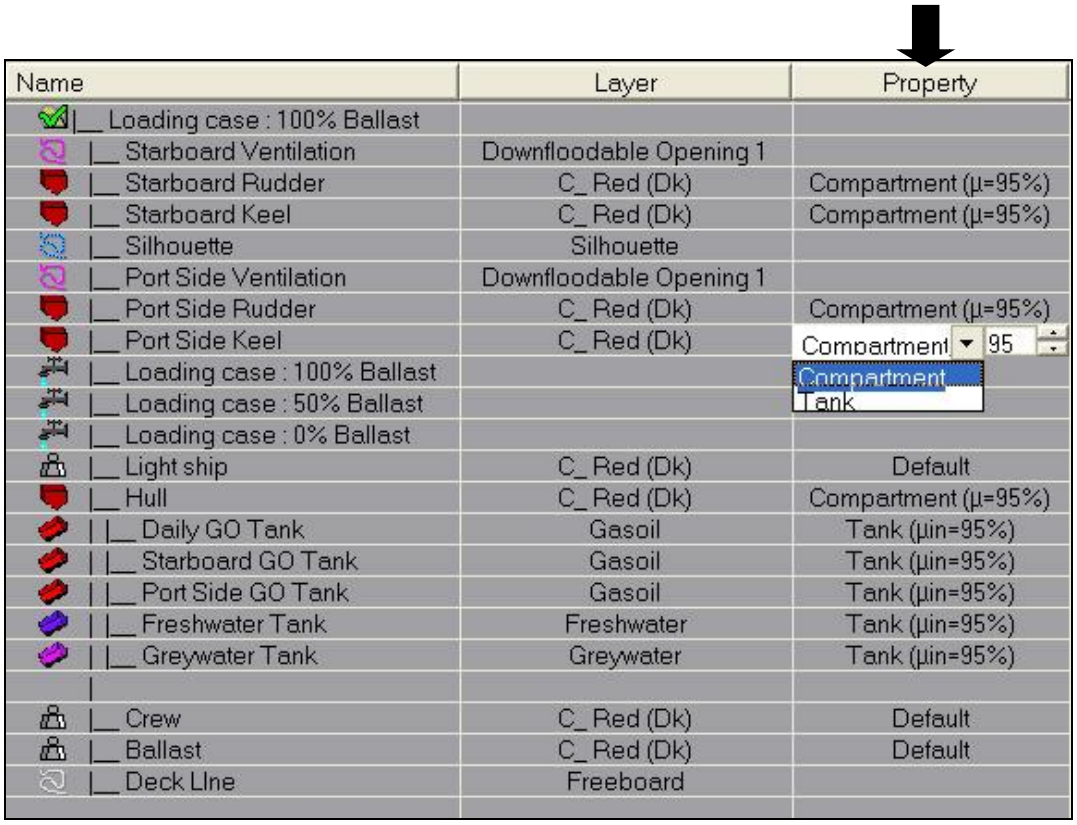


3.1.3. Property:

The "**Property**" column shows node properties. Solids have two distinct properties, which can be set by clicking in the corresponding field:

- Nature: Allows declaring the solid as a compartment (floodable buoyant space) or a tank (fillable buoyant space);

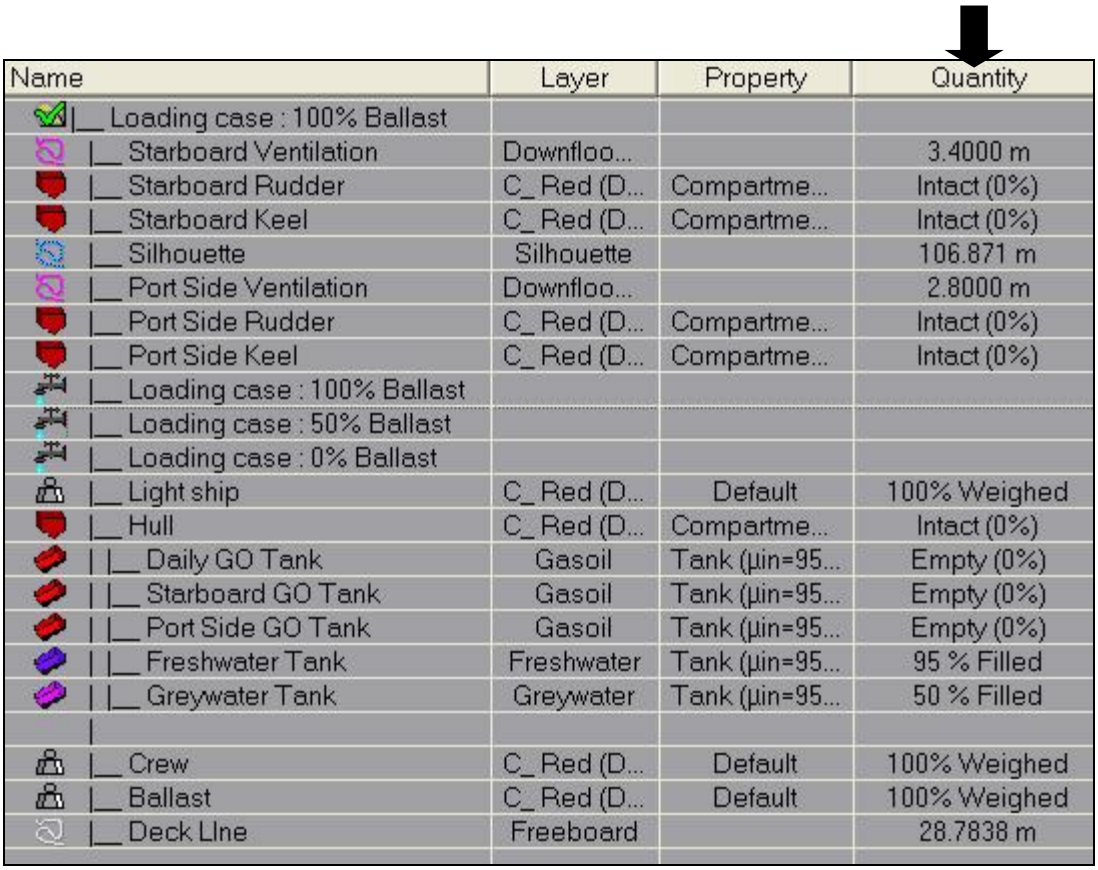
- Permeability (μ) / Inner permeability (μ_{in}): Allows setting compartment's permeability (floodable percentage of geometric volume) when solid is declared as compartment or tank's inner permeability (percentage of geometrical volume really available for filling) when solid is declared as tank.



3.1.4. Quantity:

The "**Quantity**" column allows setting object's associated quantity as follows:

- Tank: Sets tank's filling from 0% (empty tank) to 100% (full tank);
- Compartment: Sets compartment's flooding factor from 0% (intact compartment) to 100% (flooded compartment);
- Mass: Weights the mass from 0% (ignored mass) to 150% (100% = fully weighed mass).



Name	Layer	Property	Quantity
|__ Loading case : 100% Ballast			
|__ Starboard Ventilation	Downfloo...		3.4000 m
|__ Starboard Rudder	C_Red (D...	Compartme...	Intact (0%)
|__ Starboard Keel	C_Red (D...	Compartme...	Intact (0%)
|__ Silhouette	Silhouette		106.871 m
|__ Port Side Ventilation	Downfloo...		2.8000 m
|__ Port Side Rudder	C_Red (D...	Compartme...	Intact (0%)
|__ Port Side Keel	C_Red (D...	Compartme...	Intact (0%)
|__ Loading case : 100% Ballast			
|__ Loading case : 50% Ballast			
|__ Loading case : 0% Ballast			
|__ Light ship	C_Red (D...	Default	100% Weighed
|__ Hull	C_Red (D...	Compartme...	Intact (0%)
| |__ Daily GO Tank	Gasoil	Tank (µin=95...	Empty (0%)
| |__ Starboard GO Tank	Gasoil	Tank (µin=95...	Empty (0%)
| |__ Port Side GO Tank	Gasoil	Tank (µin=95...	Empty (0%)
| |__ Freshwater Tank	Freshwater	Tank (µin=95...	95 % Filled
| |__ Greywater Tank	Greywater	Tank (µin=95...	50 % Filled
|			
|__ Crew	C_Red (D...	Default	100% Weighed
|__ Ballast	C_Red (D...	Default	100% Weighed
|__ Deck Line	Freeboard		28.7838 m

Any percentage can be modified directly by a left click in its field:



Remarks:

- Compartment's icon changes according to the flooding state:

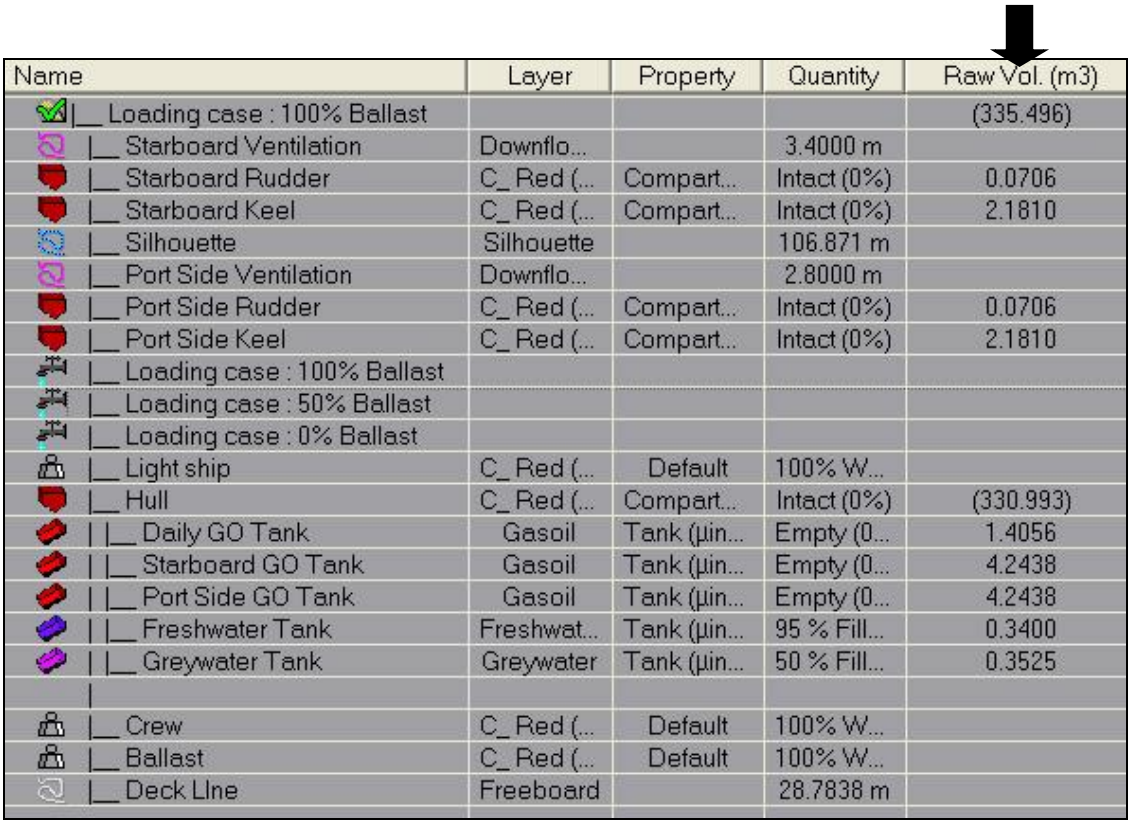
  Intact: 

  Flooded: 

- Line and outline quantities (line length / outline area) cannot be modified, only depending on object's geometry.

3.1.5. Volume:

The “**Raw Vol. (m3)**” column recalls solid’s raw volume and cannot therefore be modified. Parent’s volume sum is displayed between brackets.



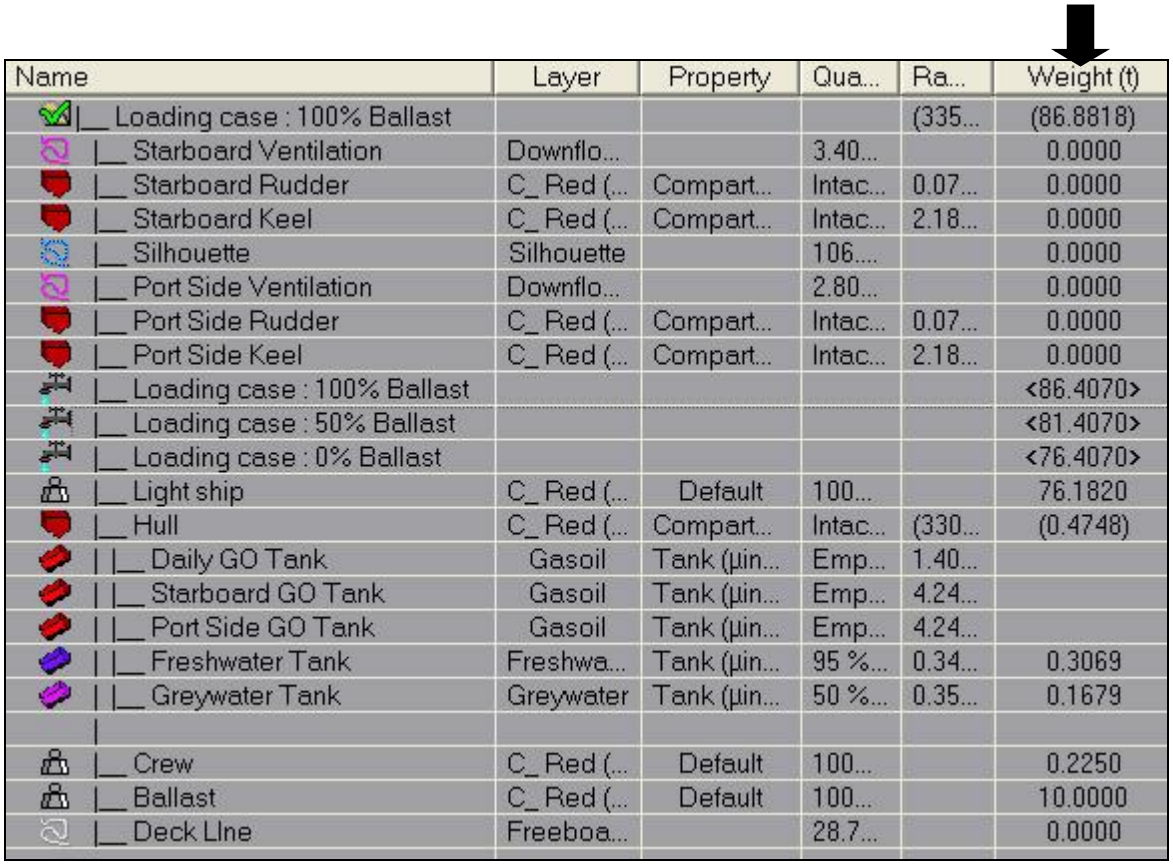
Name	Layer	Property	Quantity	Raw Vol. (m3)
|__ Loading case : 100% Ballast				(335.496)
|__ Starboard Ventilation	Downflo...		3.4000 m	
|__ Starboard Rudder	C_Red (...	Compart...	Intact (0%)	0.0706
|__ Starboard Keel	C_Red (...	Compart...	Intact (0%)	2.1810
|__ Silhouette	Silhouette		106.871 m	
|__ Port Side Ventilation	Downflo...		2.8000 m	
|__ Port Side Rudder	C_Red (...	Compart...	Intact (0%)	0.0706
|__ Port Side Keel	C_Red (...	Compart...	Intact (0%)	2.1810
|__ Loading case : 100% Ballast				
|__ Loading case : 50% Ballast				
|__ Loading case : 0% Ballast				
|__ Light ship	C_Red (...	Default	100% W...	
|__ Hull	C_Red (...	Compart...	Intact (0%)	(330.993)
| |__ Daily GO Tank	Gasoil	Tank (µin...	Empty (0...	1.4056
| |__ Starboard GO Tank	Gasoil	Tank (µin...	Empty (0...	4.2438
| |__ Port Side GO Tank	Gasoil	Tank (µin...	Empty (0...	4.2438
| |__ Freshwater Tank	Freshwat...	Tank (µin...	95 % Fill...	0.3400
| |__ Greywater Tank	Greywater	Tank (µin...	50 % Fill...	0.3525
|				
|__ Crew	C_Red (...	Default	100% W...	
|__ Ballast	C_Red (...	Default	100% W...	
|__ Deck Line	Freeboard		28.7838 m	

3.1.6. Weight:

The “**Weight**” column shows object’s weight. Object’s weight cannot be modified, except masses and tanks, by a left click in the corresponding field. Parent’s weight sum is displayed between brackets.

It is important to remember that mass’s final weight is weighed by mass’s quantity (i.e. a 0% mass quantity will produce a final 0 weight, even if its proper weight is non zero), like tank’s final weight depends on its filling quantity. This incidence of mass quantities and weights on the final C.G. can be easily experimented by setting child masses quantities and weights while controlling parent’s weight changes.

Setting tank’s weight automatically updates its filling, depending on its content’s density.



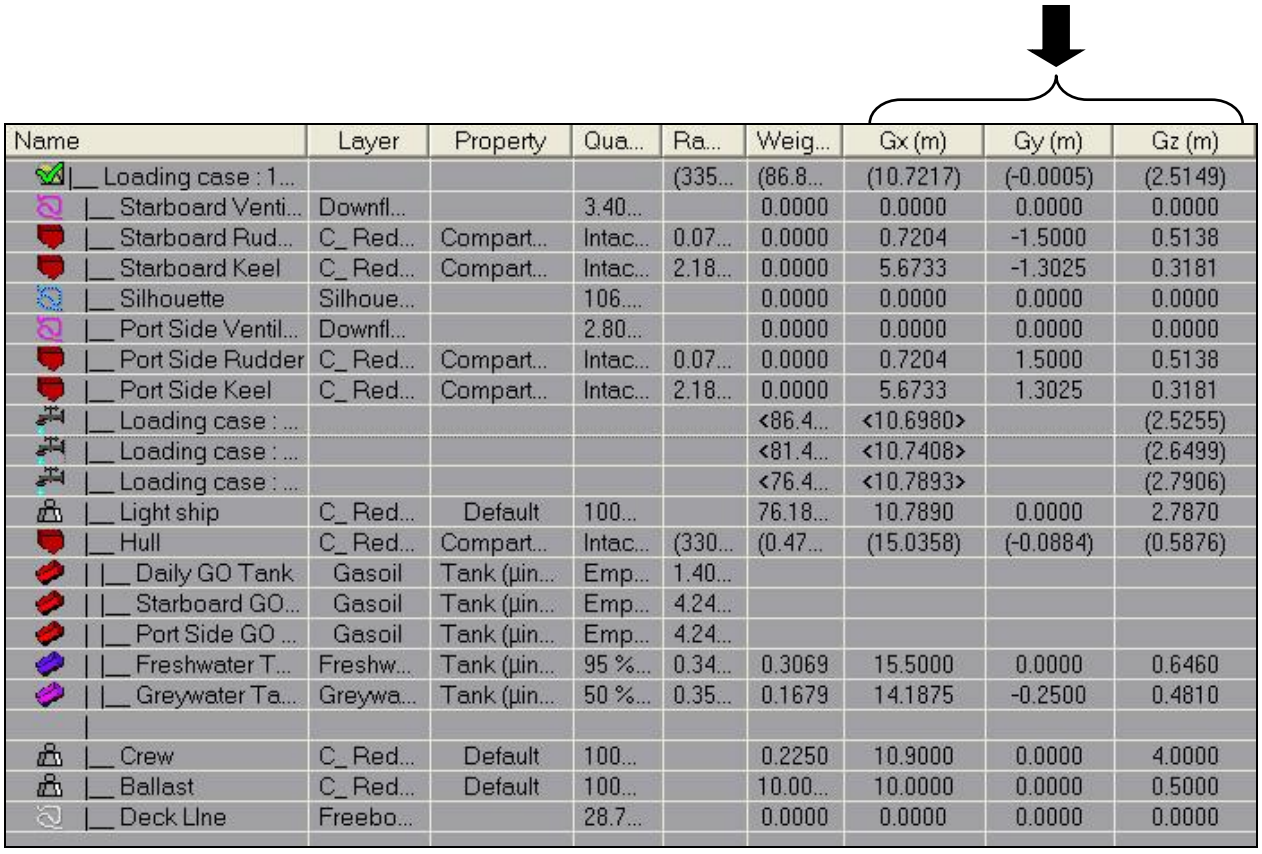
Name	Layer	Property	Qua...	Ra...	Weight (t)
|__ Loading case : 100% Ballast				(335...	(86.8818)
|__ Starboard Ventilation	Downflo...		3.40...		0.0000
|__ Starboard Rudder	C_Red (...	Compart...	Intac...	0.07...	0.0000
|__ Starboard Keel	C_Red (...	Compart...	Intac...	2.18...	0.0000
|__ Silhouette	Silhouette		106....		0.0000
|__ Port Side Ventilation	Downflo...		2.80...		0.0000
|__ Port Side Rudder	C_Red (...	Compart...	Intac...	0.07...	0.0000
|__ Port Side Keel	C_Red (...	Compart...	Intac...	2.18...	0.0000
|__ Loading case : 100% Ballast					<86.4070>
|__ Loading case : 50% Ballast					<81.4070>
|__ Loading case : 0% Ballast					<76.4070>
|__ Light ship	C_Red (...	Default	100...		76.1820
|__ Hull	C_Red (...	Compart...	Intac...	(330...	(0.4748)
| |__ Daily GO Tank	Gasoil	Tank (µin...	Emp...	1.40...	
| |__ Starboard GO Tank	Gasoil	Tank (µin...	Emp...	4.24...	
| |__ Port Side GO Tank	Gasoil	Tank (µin...	Emp...	4.24...	
| |__ Freshwater Tank	Freshwa...	Tank (µin...	95 %...	0.34...	0.3069
| |__ Greywater Tank	Greywater	Tank (µin...	50 %...	0.35...	0.1679
|					
|__ Crew	C_Red (...	Default	100...		0.2250
|__ Ballast	C_Red (...	Default	100...		10.0000
|__ Deck Line	Freeboa...		28.7...		0.0000

3.1.7. Object Location:

The “**Gx**”, “**Gy**” and “**Gz**” columns show object’s C.G. coordinates:

- Gx: **longitudinal** coordinate;
- Gy: **transversal** coordinate;
- Gz: **vertical** coordinate.

Object’s C.G. coordinates and weight cannot be modified directly, except for masses, by clicking in their corresponding fields (see 2.1.6 for setting mass’s weight and 2.1.9 for setting mass’s longitudinal extent, needed by longitudinal strength calculations).

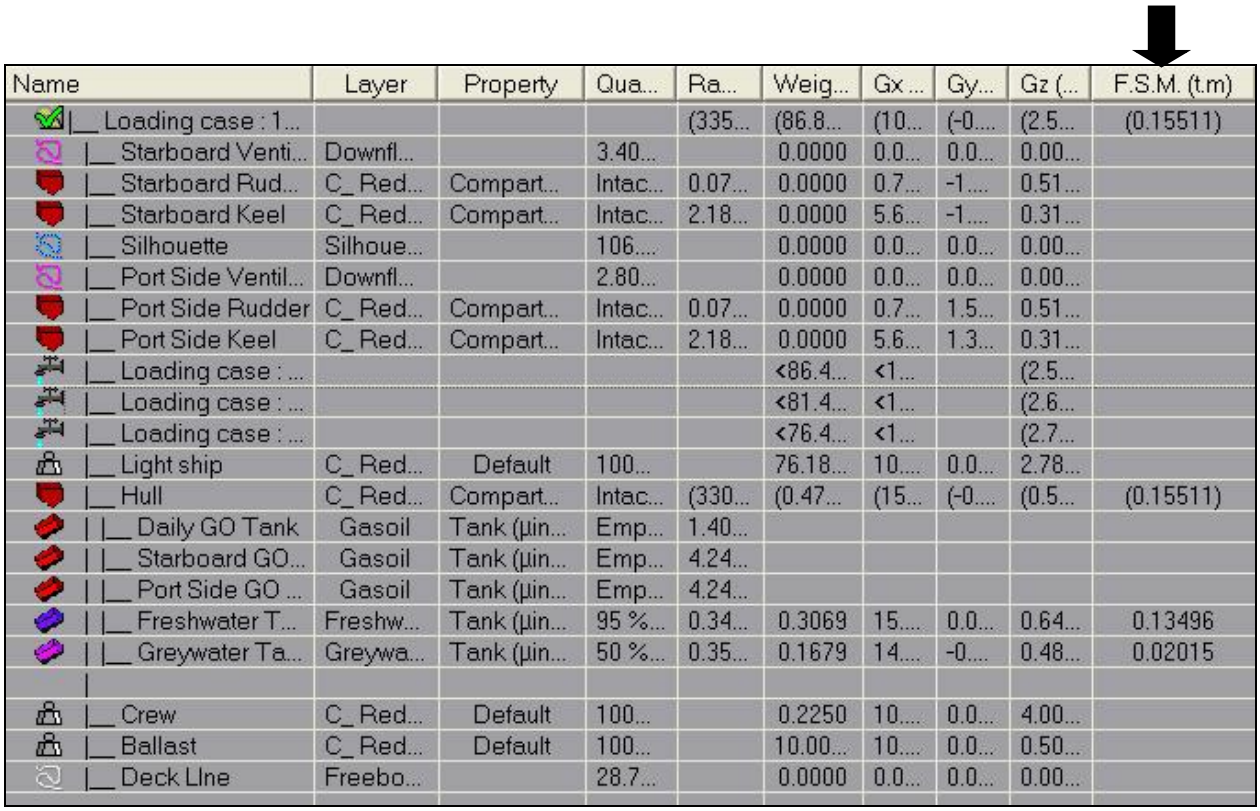


Name	Layer	Property	Qua...	Ra...	Weig...	Gx (m)	Gy (m)	Gz (m)
|__ Loading case : 1...				(335...	(86.8...	(10.7217)	(-0.0005)	(2.5149)
|__ Starboard Venti...	Downfl...		3.40...		0.0000	0.0000	0.0000	0.0000
|__ Starboard Rud...	C_Red...	Compart...	Intac...	0.07...	0.0000	0.7204	-1.5000	0.5138
|__ Starboard Keel	C_Red...	Compart...	Intac...	2.18...	0.0000	5.6733	-1.3025	0.3181
|__ Silhouette	Silhoue...		106....		0.0000	0.0000	0.0000	0.0000
|__ Port Side Ventil...	Downfl...		2.80...		0.0000	0.0000	0.0000	0.0000
|__ Port Side Rudder	C_Red...	Compart...	Intac...	0.07...	0.0000	0.7204	1.5000	0.5138
|__ Port Side Keel	C_Red...	Compart...	Intac...	2.18...	0.0000	5.6733	1.3025	0.3181
|__ Loading case : ...					<86.4...	<10.6980>		(2.5255)
|__ Loading case : ...					<81.4...	<10.7408>		(2.6499)
|__ Loading case : ...					<76.4...	<10.7893>		(2.7906)
|__ Light ship	C_Red...	Default	100...		76.18...	10.7890	0.0000	2.7870
|__ Hull	C_Red...	Compart...	Intac...	(330...	(0.47...	(15.0358)	(-0.0884)	(0.5876)
| |__ Daily GO Tank	Gasoil	Tank (µin...	Emp...	1.40...				
| |__ Starboard GO...	Gasoil	Tank (µin...	Emp...	4.24...				
| |__ Port Side GO ...	Gasoil	Tank (µin...	Emp...	4.24...				
| |__ Freshwater T...	Freshw...	Tank (µin...	95 %...	0.34...	0.3069	15.5000	0.0000	0.6460
| |__ Greywater Ta...	Greywa...	Tank (µin...	50 %...	0.35...	0.1679	14.1875	-0.2500	0.4810
|								
|__ Crew	C_Red...	Default	100...		0.2250	10.9000	0.0000	4.0000
|__ Ballast	C_Red...	Default	100...		10.00...	10.0000	0.0000	0.5000
|__ Deck Line	Freebo...		28.7...		0.0000	0.0000	0.0000	0.0000

3.1.8. Free Surface Moment:

The "**F.S.M.**" column shows tank's **free surface moments**, depending on their filling and geometry as well as floatation's heel and trim. Parent's FSM sum is displayed between brackets.

Object's F.S.M. cannot be modified.



Name	Layer	Property	Qua...	Ra...	Weig...	Gx ...	Gy...	Gz (...	F.S.M. (t.m)
|__ Loading case : 1...				(335...	(86.8...	(10...	(-0....	(2.5...	(0.15511)
|__ Starboard Venti...	Downfl...		3.40...		0.0000	0.0...	0.0...	0.00...	
|__ Starboard Rud...	C_Red...	Compart...	Intac...	0.07...	0.0000	0.7...	-1....	0.51...	
|__ Starboard Keel	C_Red...	Compart...	Intac...	2.18...	0.0000	5.6...	-1....	0.31...	
|__ Silhouette	Silhoue...		106....		0.0000	0.0...	0.0...	0.00...	
|__ Port Side Ventil...	Downfl...		2.80...		0.0000	0.0...	0.0...	0.00...	
|__ Port Side Rudder	C_Red...	Compart...	Intac...	0.07...	0.0000	0.7...	1.5...	0.51...	
|__ Port Side Keel	C_Red...	Compart...	Intac...	2.18...	0.0000	5.6...	1.3...	0.31...	
|__ Loading case : ...					<86.4...	<1...		(2.5...	
|__ Loading case : ...					<81.4...	<1...		(2.6...	
|__ Loading case : ...					<76.4...	<1...		(2.7...	
|__ Light ship	C_Red...	Default	100...		76.18...	10....	0.0...	2.78...	
|__ Hull	C_Red...	Compart...	Intac...	(330...	(0.47...	(15...	(-0....	(0.5...	(0.15511)
| |__ Daily GO Tank	Gasoil	Tank (µin...	Emp...	1.40...					
| |__ Starboard GO...	Gasoil	Tank (µin...	Emp...	4.24...					
| |__ Port Side GO ...	Gasoil	Tank (µin...	Emp...	4.24...					
| |__ Freshwater T...	Freshw...	Tank (µin...	95 %...	0.34...	0.3069	15....	0.0...	0.64...	0.13496
| |__ Greywater Ta...	Greywa...	Tank (µin...	50 %...	0.35...	0.1679	14....	-0....	0.48...	0.02015
|									
|__ Crew	C_Red...	Default	100...		0.2250	10....	0.0...	4.00...	
|__ Ballast	C_Red...	Default	100...		10.00...	10....	0.0...	0.50...	
|__ Deck Line	Freebo...		28.7...		0.0000	0.0...	0.0...	0.00...	

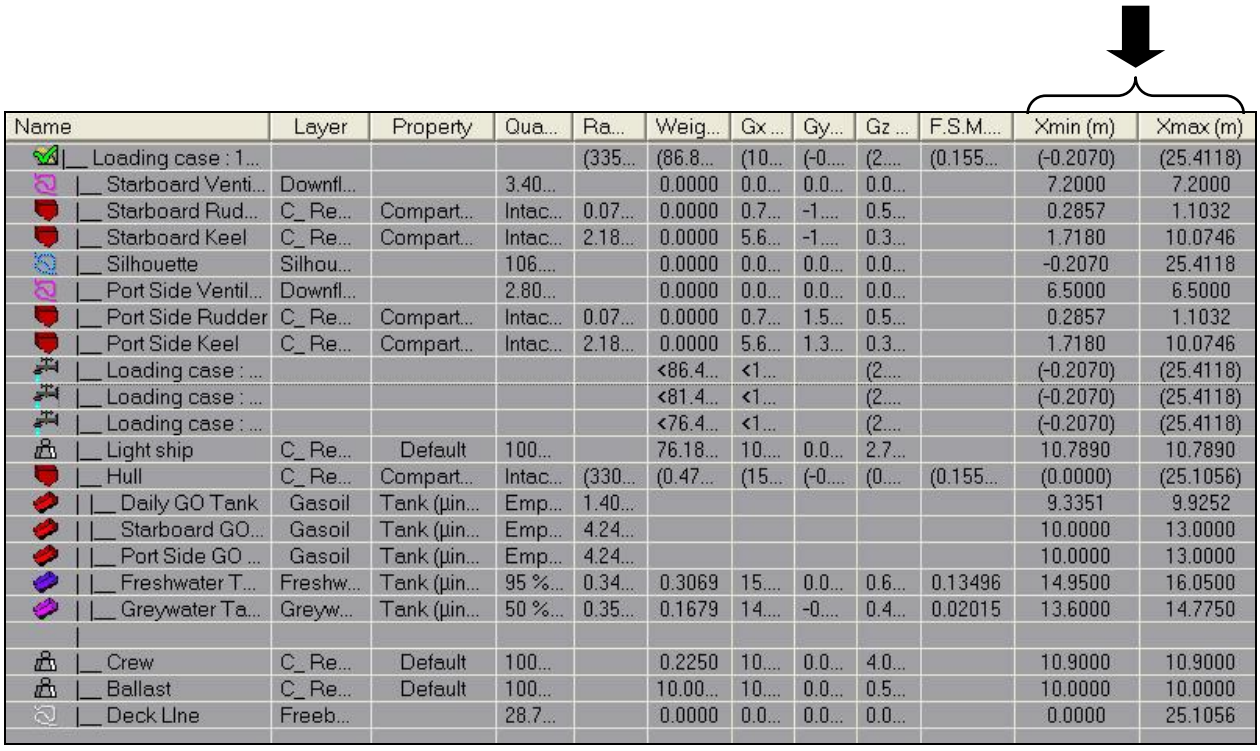
3.1.9. Longitudinal Extent:

The “**Xmin** (m)” and “**Xmax** (m)” columns show object’s longitudinal extent.

Object’s extent cannot be modified (depends on its geometry), except for masses, by left clicking in their Xmin / Xmax field.

Objects longitudinal extent are used in correspondence with their longitudinal C.G. and weight, in order to create the weight curve used for longitudinal strength calculations.

Mass’s longitudinal extent can therefore be ignored as long as no longitudinal strength calculation is needed.

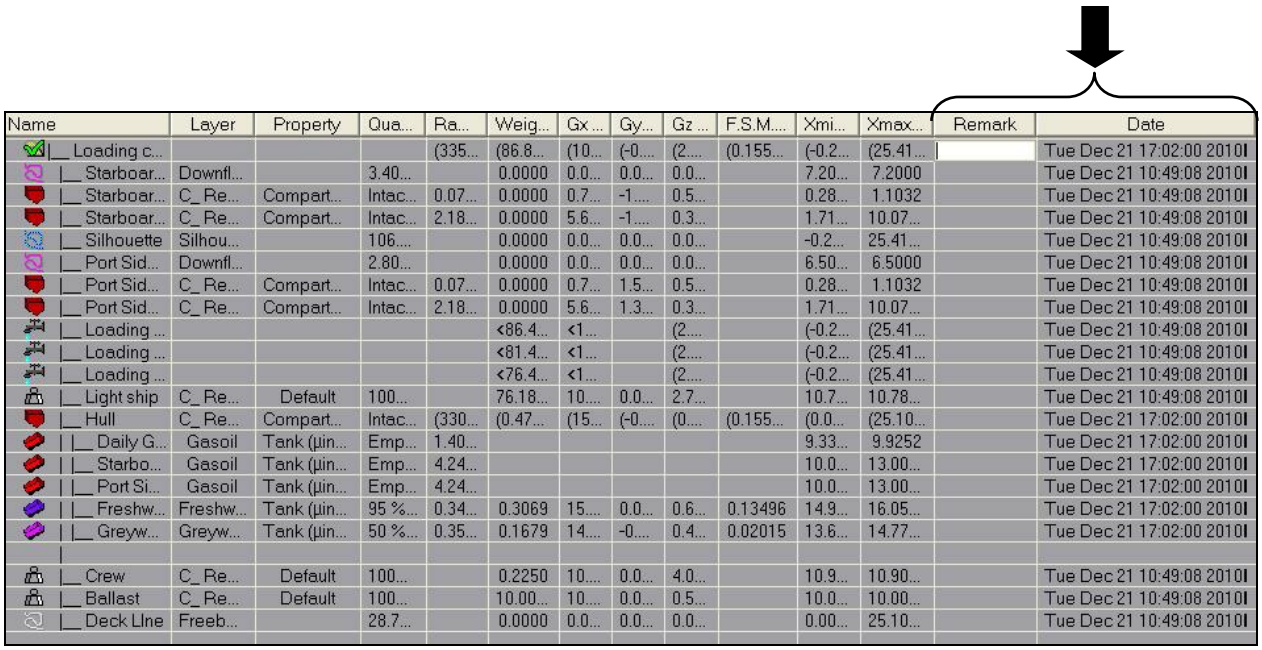


Name	Layer	Property	Qua...	Ra...	Weig...	Gx ...	Gy...	Gz ...	F.S.M....	Xmin (m)	Xmax (m)
|__ Loading case : 1...				(335...	(86.8...	(10...	(-0....	(2....	(0.155...	(-0.2070)	(25.4118)
|__ Starboard Venti...	Downfl...		3.40...		0.0000	0.0...	0.0...	0.0...		7.2000	7.2000
|__ Starboard Rud...	C_Re...	Compart...	Intac...	0.07...	0.0000	0.7...	-1....	0.5...		0.2857	1.1032
|__ Starboard Keel	C_Re...	Compart...	Intac...	2.18...	0.0000	5.6...	-1....	0.3...		1.7180	10.0746
|__ Silhouette	Silhou...		106....		0.0000	0.0...	0.0...	0.0...		-0.2070	25.4118
|__ Port Side Ventil...	Downfl...		2.80...		0.0000	0.0...	0.0...	0.0...		6.5000	6.5000
|__ Port Side Rudder	C_Re...	Compart...	Intac...	0.07...	0.0000	0.7...	1.5...	0.5...		0.2857	1.1032
|__ Port Side Keel	C_Re...	Compart...	Intac...	2.18...	0.0000	5.6...	1.3...	0.3...		1.7180	10.0746
|__ Loading case : ...					<86.4...	<1...		(2....		(-0.2070)	(25.4118)
|__ Loading case : ...					<81.4...	<1...		(2....		(-0.2070)	(25.4118)
|__ Loading case : ...					<76.4...	<1...		(2....		(-0.2070)	(25.4118)
|__ Light ship	C_Re...	Default	100...		76.18...	10....	0.0...	2.7...		10.7890	10.7890
|__ Hull	C_Re...	Compart...	Intac...	(330...	(0.47...	(15...	(-0....	(0....	(0.155...	(0.0000)	(25.1056)
| |__ Daily GO Tank	Gasoil	Tank (µin...	Emp...	1.40...						9.3351	9.9252
| |__ Starboard GO...	Gasoil	Tank (µin...	Emp...	4.24...						10.0000	13.0000
| |__ Port Side GO ...	Gasoil	Tank (µin...	Emp...	4.24...						10.0000	13.0000
| |__ Freshwater T...	Freshw...	Tank (µin...	95 %...	0.34...	0.3069	15....	0.0...	0.6...	0.13496	14.9500	16.0500
| |__ Greywater Ta...	Greyw...	Tank (µin...	50 %...	0.35...	0.1679	14....	-0....	0.4...	0.02015	13.6000	14.7750
|											
|__ Crew	C_Re...	Default	100...		0.2250	10....	0.0...	4.0...		10.9000	10.9000
|__ Ballast	C_Re...	Default	100...		10.00...	10....	0.0...	0.5...		10.0000	10.0000
|__ Deck LIne	Freeb...		28.7...		0.0000	0.0...	0.0...	0.0...		0.0000	25.1056

3.1.10. Remark / Date:

The “**Remark**” field allows associating a remark / comment string to any MAAT Hydro object by a left click in it.

The “**Date**” column displays object’s last modification date.



Name	Layer	Property	Qua...	Ra...	Weig...	Gx ...	Gy...	Gz ...	F.S.M....	Xmi...	Xmax...	Remark	Date
|__ Loading c...				(335...	(86.8...	(10...	(-0....	(2....	(0.155...	(-0.2...	(25.41...		Tue Dec 21 17:02:00 2010
|__ Starboar...	Downfl...		3.40...		0.0000	0.0...	0.0...	0.0...		7.20...	7.2000		Tue Dec 21 10:49:08 2010
|__ Starboar...	C_Re...	Compart...	Intac...	0.07...	0.0000	0.7...	-1....	0.5...		0.28...	1.1032		Tue Dec 21 10:49:08 2010
|__ Starboar...	C_Re...	Compart...	Intac...	2.18...	0.0000	5.6...	-1....	0.3...		1.71...	10.07...		Tue Dec 21 10:49:08 2010
|__ Silhouette	Silhou...		106....		0.0000	0.0...	0.0...	0.0...		-0.2...	25.41...		Tue Dec 21 10:49:08 2010
|__ Port Sid...	Downfl...		2.80...		0.0000	0.0...	0.0...	0.0...		6.50...	6.5000		Tue Dec 21 10:49:08 2010
|__ Port Sid...	C_Re...	Compart...	Intac...	0.07...	0.0000	0.7...	1.5...	0.5...		0.28...	1.1032		Tue Dec 21 10:49:08 2010
|__ Port Sid...	C_Re...	Compart...	Intac...	2.18...	0.0000	5.6...	1.3...	0.3...		1.71...	10.07...		Tue Dec 21 10:49:08 2010
|__ Loading ...					<86.4...	<1...		(2....		(-0.2...	(25.41...		Tue Dec 21 10:49:08 2010
|__ Loading ...					<81.4...	<1...		(2....		(-0.2...	(25.41...		Tue Dec 21 10:49:08 2010
|__ Loading ...					<76.4...	<1...		(2....		(-0.2...	(25.41...		Tue Dec 21 10:49:08 2010
|__ Light ship	C_Re...	Default	100...		76.18...	10....	0.0...	2.7...		10.7...	10.78...		Tue Dec 21 10:49:08 2010
|__ Hull	C_Re...	Compart...	Intac...	(330...	(0.47...	(15...	(-0....	(0....	(0.155...	(0.0...	(25.10...		Tue Dec 21 17:02:00 2010
| |__ Daily G...	Gasoil	Tank (µin...	Emp...	1.40...						9.33...	9.9252		Tue Dec 21 17:02:00 2010
| |__ Starbo...	Gasoil	Tank (µin...	Emp...	4.24...						10.0...	13.00...		Tue Dec 21 17:02:00 2010
| |__ Port Si...	Gasoil	Tank (µin...	Emp...	4.24...						10.0...	13.00...		Tue Dec 21 17:02:00 2010
| |__ Freshw...	Freshw...	Tank (µin...	95 %...	0.34...	0.3069	15....	0.0...	0.6...	0.13496	14.9...	16.05...		Tue Dec 21 17:02:00 2010
| |__ Greyw...	Greyw...	Tank (µin...	50 %...	0.35...	0.1679	14....	-0....	0.4...	0.02015	13.6...	14.77...		Tue Dec 21 17:02:00 2010
|													
|__ Crew	C_Re...	Default	100...		0.2250	10....	0.0...	4.0...		10.9...	10.90...		Tue Dec 21 10:49:08 2010
|__ Ballast	C_Re...	Default	100...		10.00...	10....	0.0...	0.5...		10.0...	10.00...		Tue Dec 21 10:49:08 2010
|__ Deck Line	Freeb...		28.7...		0.0000	0.0...	0.0...	0.0...		0.00...	25.10...		Tue Dec 21 10:49:08 2010

3.2. [Data] Page's 3D Browser:

See 2.2 (3D Data browser is identical to [3D] page's browser).

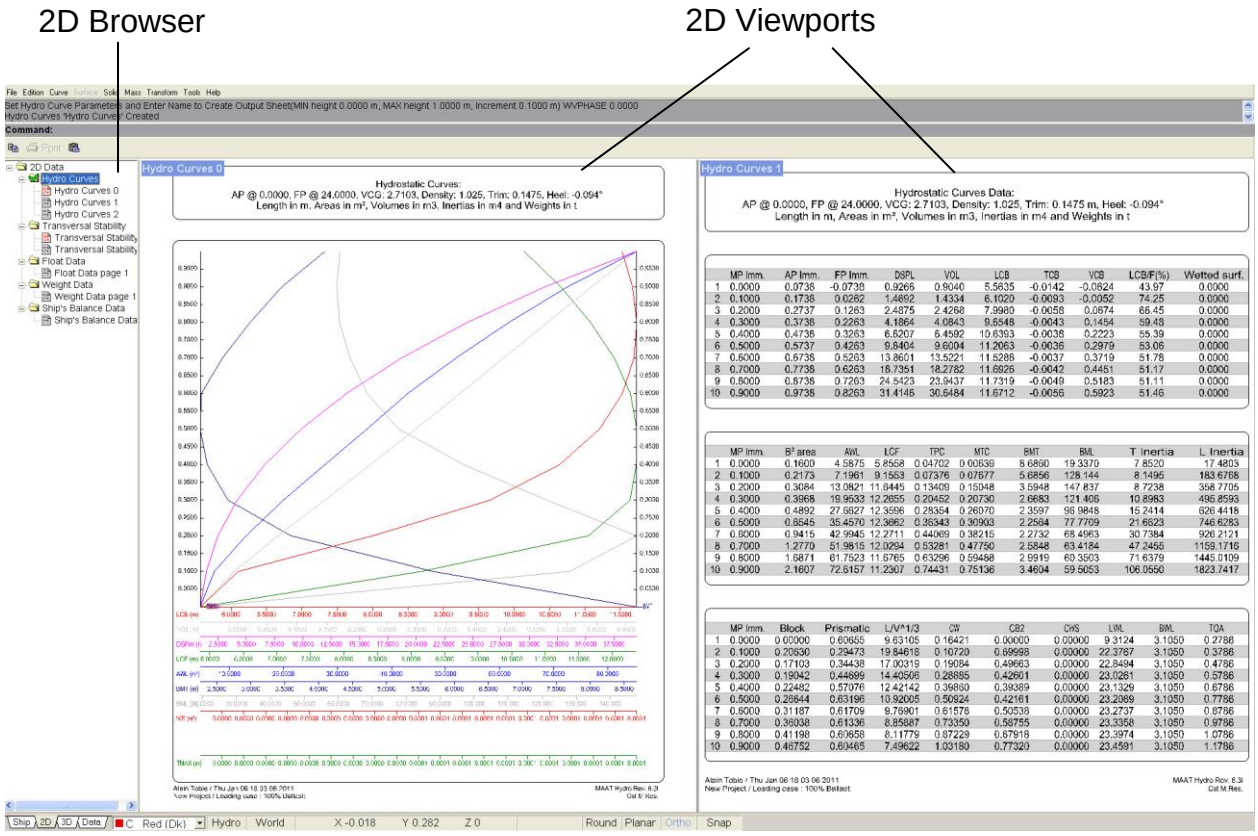
3.3. [Data] Page's Hydrostatic Viewport:

See 2.3 (3D Data's Hydrostatic viewport is identical to [3D] page's hydrostatic viewport).

4. [2D] Page:

The hydrostatic calculations available in the “Tools” submenu usually produce a set of 2D documents automatically included in the MAAT Hydro project as MAAT Hydro 2D objects.

Due to their 2D nature, these 2D documents must therefore be displayed separately on 2D viewports and handled by a distinct 2D browser. The purpose of the [2D] page is therefore to allow handling, reading, printing… MAAT Hydro’s 2D outputs:



At last, as such 2D documents can contain exportable CSV data, their browser icon color depend on their content:

- Black documents  don’t contain any exportable CSV data.
- Red documents  contain CSV data, which can be exported to EXCEL by selecting the corresponding function in document’s viewport menu (see below).

4.1. 2D Viewports:

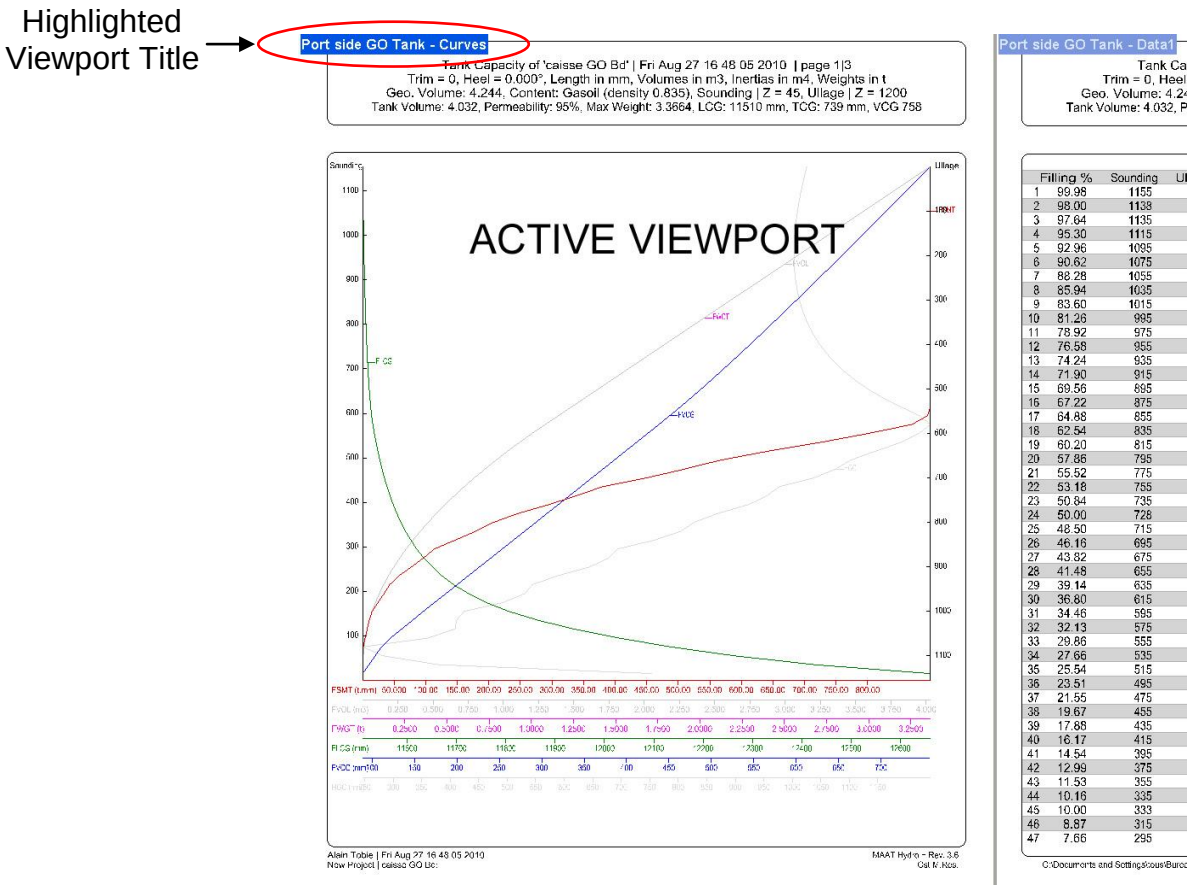
4.1.1. Resizing a 2D Viewport:

Each 2D viewport can be resized by sliding the splitters (◄┼►) associated to its edges with the left mouse button pressed.

4.1.2. Activating a 2D Viewport:

A viewport is active when its window “has the focus”, which means that it receives and reacts to your actions (mouse clicks, shortcuts, keyboard inputs…). For obvious reasons, only one viewport can be active at a time.

Left clicking in 2D viewport’s title allows activating it. Its title then becomes highlighted, showing its active status.



4.1.3. Zooming a 2D Viewport:

Zooming in or out is possible by two different ways:

- Rotating the mouse wheel in the viewport, cursor location being considered as the magnification center.

- Pressing [Ctrl] key and right mouse button simultaneously while dragging up or down the cursor in the selected viewport, the initial cursor location being considered as the magnification center.

4.1.4. Panning a 2D Viewport:

Like for 3D viewports, dragging the cursor with right mouse button pressed allows panning the 2D document in real time.

4.1.5. Scaling a 2D Viewport:

Like for 3D viewports, pressing [Alt] key and mouse's right button simultaneously while dragging allows scaling a 2D viewport in real time.

4.1.6. Resetting a 2D Viewport:

Like for 3D viewports, returning to the default framing is possible by double clicking in 2D viewport's title.

4.1.7. 2D Viewport Display Options:

The 2D viewport menu provides these display options:

- Black White / Color: Toggles line's layer color display from one mode to the other.
- Lines Only: Toggles outline's shading from "shaded" mode to "lines only" mode.
- Bold Lines/ Sharp Lines: Toggles line's display mode from Bold to Sharp.

4.1.8. Printing a 2D Viewport:

- Print this:

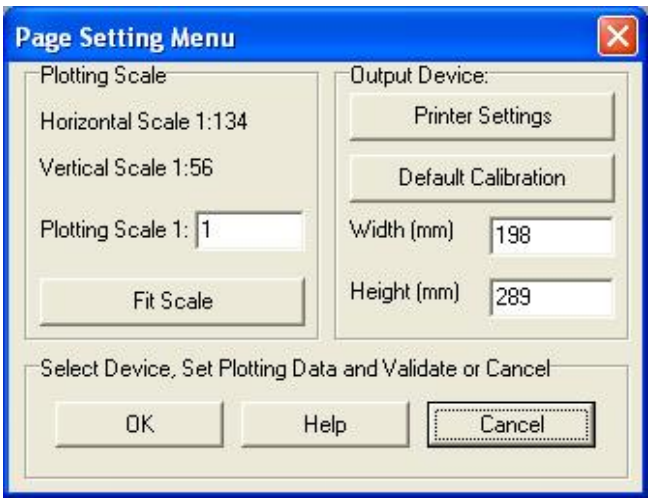
  Like for 3D viewports, selecting "**Print this"** in the 2D viewport menu allows printing the current viewport directly on a single sheet, without any scale constraint.

- Print All:

  Like for 3D viewports, selecting "**Print All**" in the 2D viewport menu allows printing all the documents contained in current folder, without any scale constraint.

- Print to Scale:

  Like for 3D viewports, selecting "**Print to scale**" in the 2D viewport menu allows printing at a given scale. The following dialog box pops up:



Minimum horizontal and vertical scales are suggested, depending on viewport dimensions and current printer's width / height, in order to remind you the plotting scale limit for a single sheet printout of the viewport.

If the physical printing width / height don't match with the logical ones, the physical drawing won't match also with the logical one, so that the physical plotting scale will differ from the logical one you have input. You will then have to calibrate this printing area yourself by entering its measured physical dimensions in the corresponding fields (a [Default Calibration] button allows returning to the logical size).

When you have no scale constraint, the [Fit Scale] button automatically sets the plotting scale for a single sheet printout, depending on current printer settings.

If the plotting scale you have entered is greater than the displayed minimum values, the selected printer will directly print the viewport.

If not, you will have to define the printing layout by 3 clicks in the viewport (at any step, a right click allows cancelling the operation):

- Click plotted area's anchor point.
- Click plotted area's opposite corner (plotted area is automatically divided into printing sheets, depending on the scale you entered and printer's features.

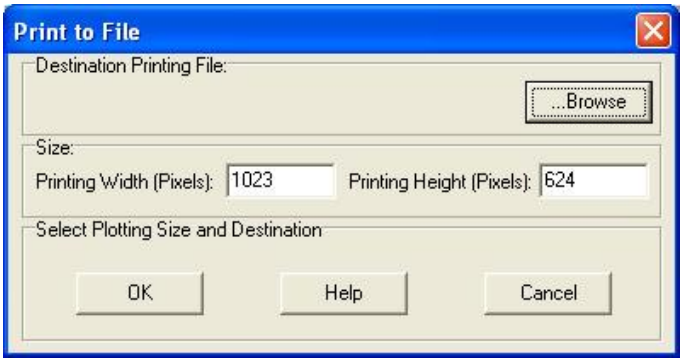
- Pan the plotted area accurately.

The displayed pages will then be printed (they will have to be fixed together for getting the final plot). Take care of the amount of necessary pages with small scales !

- Print to File:

Like for 3D viewports, selecting "**Print to File**" in the 2D viewport menu allows saving the viewport display in a "jpg" file.

The following dialog box pops up:



- The [Browse] button allows selecting printing file's name and path.

- Bitmap's width and height can be specified in the corresponding input fields, viewport's aspect ratio being automatically conserved.

4.1.9. Copying a Viewport:

Like for 3D viewports, selecting "**Copy**" in the 2D viewport menu allows copying it in Windows clipboard (wmf / emf vectorial format) in order to paste it in another application (typically an MS Word document).

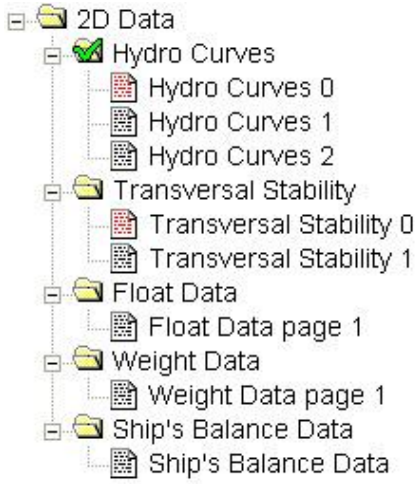
The associated shorcut is [Ctrl C].

4.1.10. Exporting Results:

The documents and associated data arrays can be exported in DXF and CSV formats, in order to be readable by most of the 2D programs and spreadsheets.

4.2. 2D Browser:

Most of MAAT Hydro's outputs are 2D documents, stored in folders and managed like files by Windows Explorer:



As seen above such 2D documents can contain exportable CSV data, their icon color depending on their content:

- Black documents don't contain any exportable CSV data.
- Red documents contain CSV data, which can be exported to EXCEL.

4.2.1. Creating a Folder:

Creating folders is helpful for organizing copious data efficiently. This can be done easily by selecting folder's parent in the 2D Browser and then "**New Workspace**" in the popup menu displayed by right clicking.

4.2.2. Organizing 2D Browser Results:

Like in the 3D browser, 2D items can also be organized with the following functions, available in browser's contextual menu:

- "**Push**": Encapsulates the selected element in a parent folder;
- "**Pop**": Extracts the content of selected folder;
- "**Sort**": Sorts selected folder's child objects alphabetically.

4.2.3. Editing 2D Browser Results

Classical editing functions are available in the 2D browser menu, associated to their Windows shortcuts:

- "**Cut**" (Ctrl X);
- "**Copy**" (Ctrl C);
- "**Paste**" (Ctrl V);
- "**Delete**" (Del).

4.2.4. Renaming an Object:

Like in Windows Explorer, left clicking on a selected object name allows renaming it.

4.2.5. Dragging and Dropping:

Like in Windows Explorer, dragging and dropping selected objects with left mouse button pressed allows moving them quickly from a location to another.

4.2.6. Displaying Folder's content:

Double clicking on a folder allows displaying its content in 2D viewports.

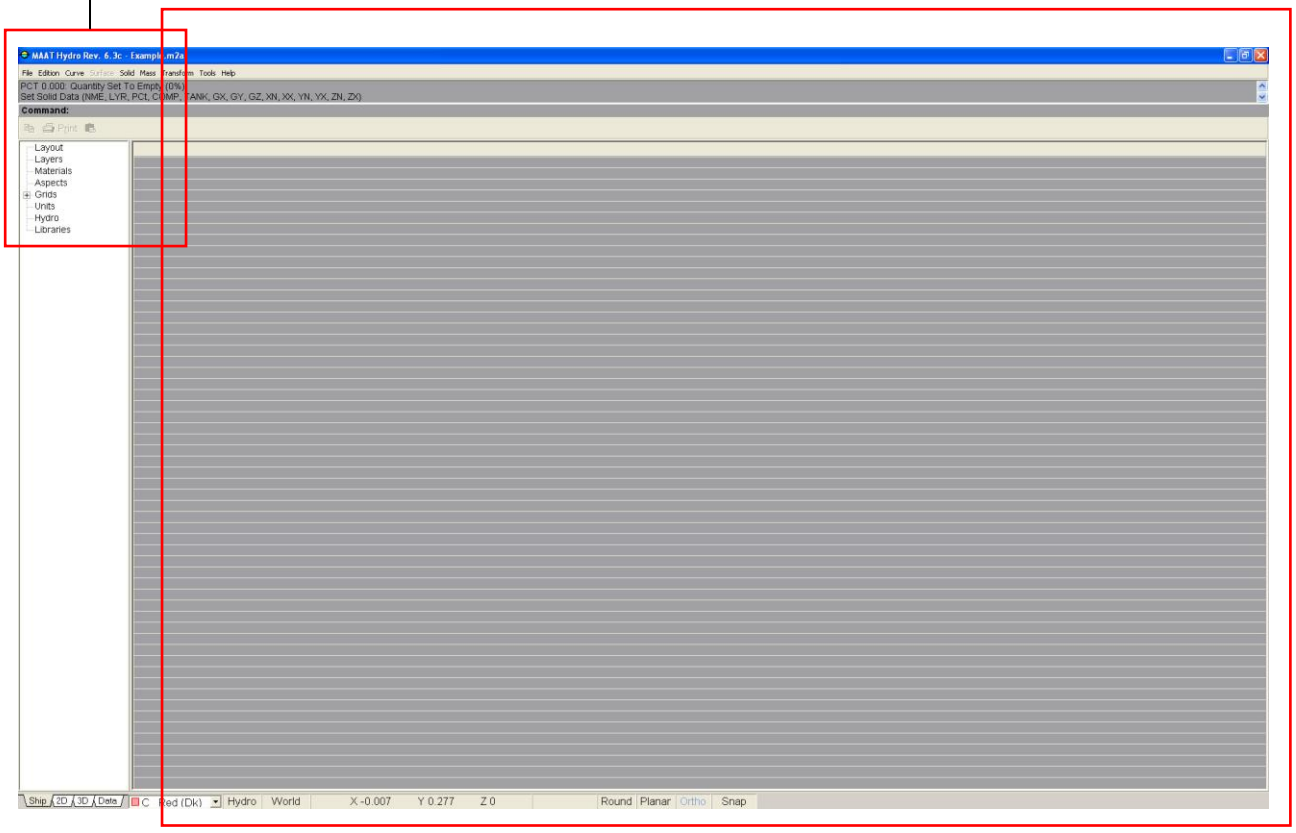
A green tick identifies the active folder: 

5. [Ship] Data Pages:

The ship data are numerous and therefore classified in different categories, whose pages can be selected and displayed with the ship data browser. Each of these data categories is described in the next pages.

Ship Data Browser

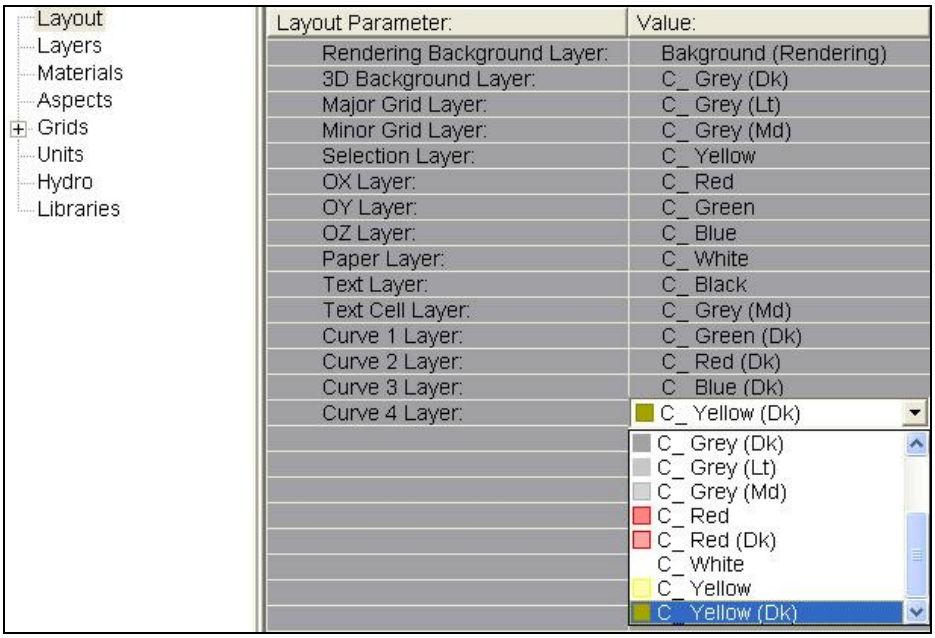
Current Ship Data Table



5.1. Layout Data:

The "**Layout**" category allows setting project's layout colors used in the 2D / 3D viewports. The layout colors used by MAAT Hydro are the colors of the layers selected in the "Value" dropdown list.

Special layers may have to be created (or their colors redefined) before customizing MAAT Hydro's layout colors.

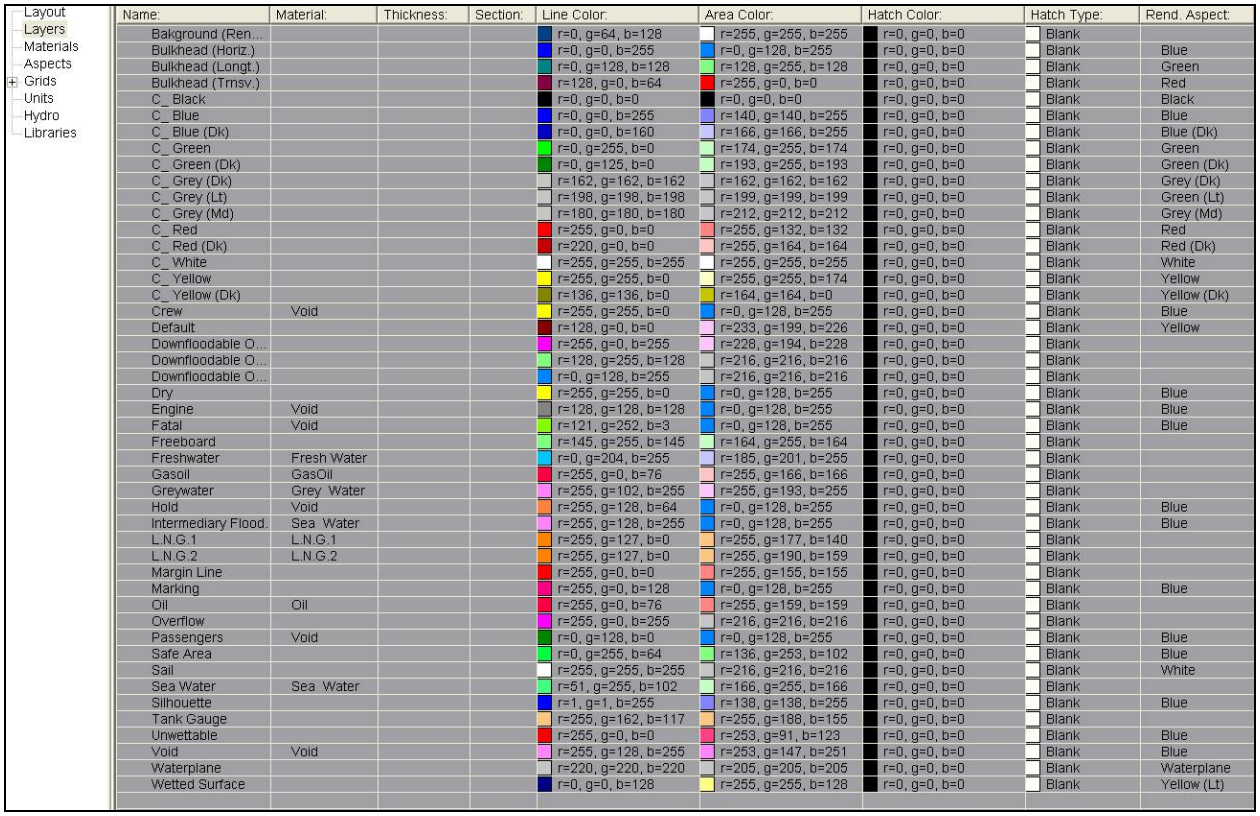


These layout colors are the followings:

- Rendering Background Layer: Selected layer's area color defines 3D viewport's background color used for rendered views.
- 3D Background Layer: Selected layer's area color defines 3D viewport's background color used for non rendered views.
- Major Grid Layer: Selected layer's line color defines 3D viewport's major grid line's color.
- Minor Grid Layer: Selected layer's line color defines 3D viewport's minor grid line's color.
- Selection Layer: Selected layer's line color defines 3D viewport's color used for highlighting selected items.
- OX Layer: Selected layer's line color defines 3D viewport's OX axis color.
- OY Layer: Selected layer's line color defines 3D viewport's OY axis color.
- OZ Layer: Selected layer's line color defines 3D viewport's OZ axis color.
- Paper Layer: Selected layer's area color defines 2D viewport's background color.
- Text Layer: Selected layer's line color defines 2D viewport's text color.
- Curve 1…4 Layer: Selected layer's line color defines 2D viewport's first,... fourth curve color when various colors must be used (i.e. hydro curves, lines plan, …).

5.2. Layers:

The “**Layers**” category allows setting the layer data (associated colors, hatching type, material, rendering aspects, etc...) directly in a single table:



Name:	Material:	Thickness:	Section:	Line Color:	Area Color:	Hatch Color:	Hatch Type:	Rend. Aspect:
Bakground (Ren...				r=0, g=64, b=128	r=255, g=255, b=255	r=0, g=0, b=0	Blank	
Bulkhead (Horiz.)				r=0, g=0, b=255	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
Bulkhead (Longt.)				r=0, g=128, b=128	r=128, g=255, b=128	r=0, g=0, b=0	Blank	Green
Bulkhead (Trnsv.)				r=128, g=0, b=64	r=255, g=0, b=0	r=0, g=0, b=0	Blank	Red
C_ Black				r=0, g=0, b=0	r=0, g=0, b=0	r=0, g=0, b=0	Blank	Black
C_ Blue				r=0, g=0, b=255	r=140, g=140, b=255	r=0, g=0, b=0	Blank	Blue
C_ Blue (Dk)				r=0, g=0, b=160	r=166, g=166, b=255	r=0, g=0, b=0	Blank	Blue (Dk)
C_ Green				r=0, g=255, b=0	r=174, g=255, b=174	r=0, g=0, b=0	Blank	Green
C_ Green (Dk)				r=0, g=125, b=0	r=193, g=255, b=193	r=0, g=0, b=0	Blank	Green (Dk)
C_ Grey (Dk)				r=162, g=162, b=162	r=162, g=162, b=162	r=0, g=0, b=0	Blank	Grey (Dk)
C_ Grey (Lt)				r=198, g=198, b=198	r=199, g=199, b=199	r=0, g=0, b=0	Blank	Green (Lt)
C_ Grey (Md)				r=180, g=180, b=180	r=212, g=212, b=212	r=0, g=0, b=0	Blank	Grey (Md)
C_ Red				r=255, g=0, b=0	r=255, g=132, b=132	r=0, g=0, b=0	Blank	Red
C_ Red (Dk)				r=220, g=0, b=0	r=255, g=164, b=164	r=0, g=0, b=0	Blank	Red (Dk)
C_ White				r=255, g=255, b=255	r=255, g=255, b=255	r=0, g=0, b=0	Blank	White
C_ Yellow				r=255, g=255, b=0	r=255, g=255, b=174	r=0, g=0, b=0	Blank	Yellow
C_ Yellow (Dk)				r=136, g=136, b=0	r=164, g=164, b=0	r=0, g=0, b=0	Blank	Yellow (Dk)
Crew	Void			r=255, g=255, b=0	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
Default				r=128, g=0, b=0	r=233, g=199, b=226	r=0, g=0, b=0	Blank	Yellow
Downfloodable O...				r=255, g=0, b=255	r=228, g=194, b=228	r=0, g=0, b=0	Blank	
Downfloodable O...				r=128, g=255, b=128	r=216, g=216, b=216	r=0, g=0, b=0	Blank	
Downfloodable O...				r=0, g=128, b=255	r=216, g=216, b=216	r=0, g=0, b=0	Blank	
Dry				r=255, g=255, b=0	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
Engine	Void			r=128, g=128, b=128	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
Fatal	Void			r=121, g=252, b=3	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
Freeboard				r=145, g=255, b=145	r=164, g=255, b=164	r=0, g=0, b=0	Blank	
Freshwater	Fresh Water			r=0, g=204, b=255	r=185, g=201, b=255	r=0, g=0, b=0	Blank	
Gasoil	GasOil			r=255, g=0, b=76	r=255, g=166, b=166	r=0, g=0, b=0	Blank	
Greywater	Grey Water			r=255, g=102, b=255	r=255, g=193, b=255	r=0, g=0, b=0	Blank	
Hold	Void			r=255, g=128, b=64	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
Intermediary Flood...	Sea Water			r=255, g=128, b=255	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
L.N.G.1	L.N.G.1			r=255, g=127, b=0	r=255, g=177, b=140	r=0, g=0, b=0	Blank	
L.N.G.2	L.N.G.2			r=255, g=127, b=0	r=255, g=190, b=159	r=0, g=0, b=0	Blank	
Margin Line				r=255, g=0, b=0	r=255, g=155, b=155	r=0, g=0, b=0	Blank	
Marking				r=255, g=0, b=128	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
Oil	Oil			r=255, g=0, b=76	r=255, g=159, b=159	r=0, g=0, b=0	Blank	
Overflow				r=255, g=0, b=255	r=216, g=216, b=216	r=0, g=0, b=0	Blank	
Passengers	Void			r=0, g=128, b=0	r=0, g=128, b=255	r=0, g=0, b=0	Blank	Blue
Safe Area				r=0, g=255, b=64	r=136, g=253, b=102	r=0, g=0, b=0	Blank	Blue
Sail				r=255, g=255, b=255	r=216, g=216, b=216	r=0, g=0, b=0	Blank	White
Sea Water	Sea Water			r=51, g=255, b=102	r=166, g=255, b=166	r=0, g=0, b=0	Blank	
Silhouette				r=1, g=1, b=255	r=138, g=138, b=255	r=0, g=0, b=0	Blank	Blue
Tank Gauge				r=255, g=162, b=117	r=255, g=188, b=155	r=0, g=0, b=0	Blank	
Unwettable				r=255, g=0, b=0	r=253, g=91, b=123	r=0, g=0, b=0	Blank	Blue
Void	Void			r=255, g=128, b=255	r=253, g=147, b=251	r=0, g=0, b=0	Blank	Blue
Waterplane				r=220, g=220, b=220	r=205, g=205, b=205	r=0, g=0, b=0	Blank	Waterplane
Wetted Surface				r=0, g=0, b=128	r=255, g=255, b=128	r=0, g=0, b=0	Blank	Yellow (Lt)

These layer data are the followings:

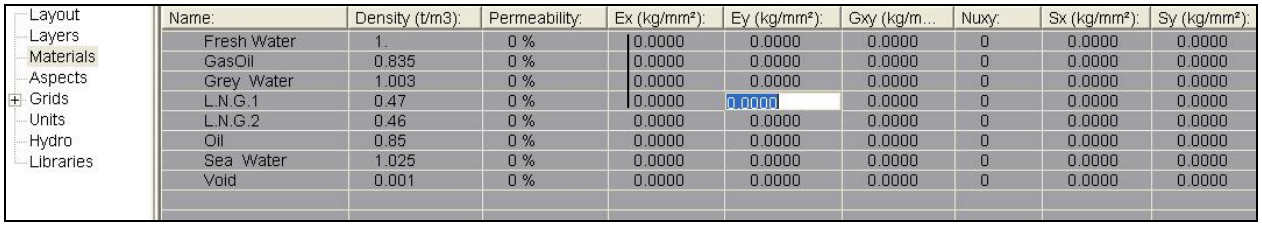
- Name: Defines layer’s name.
- Material: Defines layer’s associated material. Tank’s layers must be associated to a material defining content’s density.
- Thickness: Allows defining face’s volume according to outline’s area and, then, face’s weight when outline’s layer is associated to a material (backward compatibility).
- Section: Allows selecting line’s stiffener’s 2D section in a section library in order to calculate line’s weights (backward compatibility).
- Line Color: Defines the displayed color of lines located in this layer.
- Area Color: Defines the displayed color of areas trimmed by 2D outlines located in this layer.
- Hatch Color: Defines the displayed color of hatches trimmed by 2D outlines located in this layer.
- Hatch Type: Defines the displayed hatch type of outlines trimmed by 2D outlines located in this layer.
- Rendering aspect: Defines the aspect used for rendering 3D faces trimmed by outlines located in this layer.

You can also create additional layers by right clicking on any line and selecting “**New**” in the popup menu. The new layer will be automatically sorted alphabetically in the layer list.

At last, any unused layer can also be deleted by right clicking on its line and selecting “**Delete**” in the popup menu (this selection only appears when the selected layer is unused. If not, remove or modify the entities using this layer first).

5.3. Materials Data:

The "**Materials**" category allows setting material's properties (density, permeability, mechanical properties...) by clicking in the corresponding field:

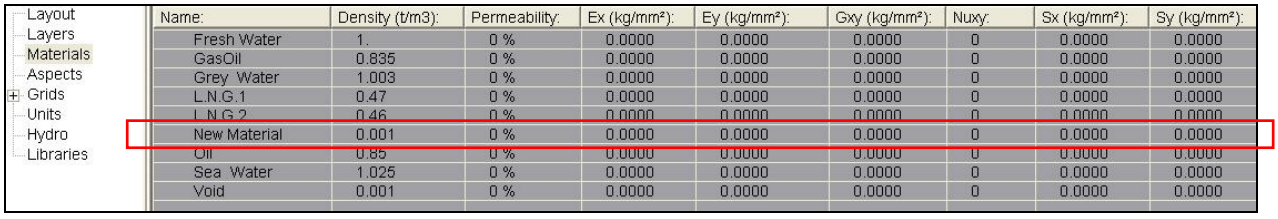


Name:	Density (t/m3):	Permeability:	Ex (kg/mm²):	Ey (kg/mm²):	Gxy (kg/m...	Nuxy:	Sx (kg/mm²):	Sy (kg/mm²):
Fresh Water	1.	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
GasOil	0.835	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
Grey Water	1.003	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
L.N.G.1	0.47	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
L.N.G.2	0.46	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
Oil	0.85	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
Sea Water	1.025	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
Void	0.001	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000

These properties are the followings:

- Name: Defines material's name.
- Density: Defines material's density in t / m3.
- Permeability: Defines material's permeability used for tank's flooding: 0% means that no water can infiltrate through the material, 100% means that the material can be totally infiltrated by the water (sometimes used for dredge stability).
- Ex: X Young's modulus (not used yet).
- Ey: Y Young's modulus (not used yet).
- Gxy: Gxy (not used yet).
- Sx: X stress limit (not used yet).
- Sy: Y stress limit (not used yet).

You can also create additional materials by right clicking on any line and selecting "**New**" in the popup menu. The new material will automatically be sorted alphabetically in the displayed list:



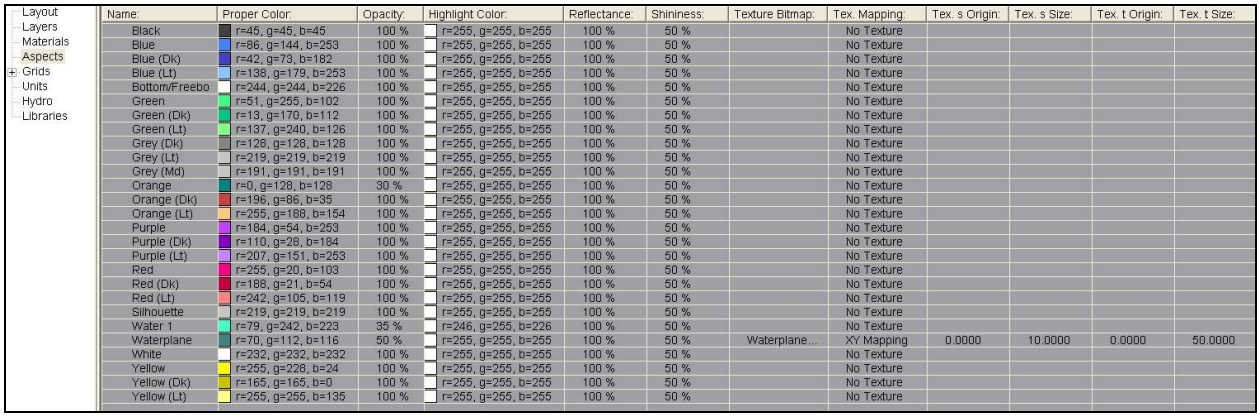
Name:	Density (t/m3):	Permeability:	Ex (kg/mm²):	Ey (kg/mm²):	Gxy (kg/mm²):	Nuxy:	Sx (kg/mm²):	Sy (kg/mm²):
Fresh Water	1.	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
GasOil	0.835	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
Grey Water	1.003	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
L.N.G.1	0.47	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
L.N.G.2	0.46	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
New Material	0.001	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
Oil	0.85	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
Sea Water	1.025	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000
Void	0.001	0 %	0.0000	0.0000	0.0000	0	0.0000	0.0000

At last, any unused material can also be deleted by right clicking on its line and selecting "**Delete**" in the popup menu (this selection only appears when the selected material is unused. If not, modify the layers using this material first).

5.4. Aspects Data:

An aspect is a MAAT object containing the optical properties (diffuse and specular colors, opacity, reflectance, texture, etc...) allowing to render a given material during the 3D rendering process. “Red plastic”, “Glass”, “Water”, “Marble”, “Steel”… having distinct optical properties, can therefore be represented by different MAAT aspects and then be directly associated to any layer as rendering property. The MAAT aspects must therefore be defined before being used by layers as, similarly, the layers must be defined before being used by face’s outlines to define their rendering aspect.

The “**Aspects**” category therefore allows setting these optical parameters directly in the current table:

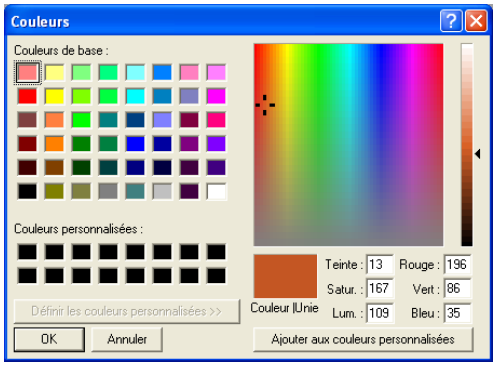


Name:	Proper Color:	Opacity:	Highlight Color:	Reflectance:	Shininess:	Texture Bitmap:	Tex. Mapping:	Tex. s Origin:	Tex. s Size:	Tex. t Origin:	Tex. t Size:
Black	r=45, g=45, b=45	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Blue	r=86, g=144, b=253	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Blue (Dk)	r=42, g=73, b=182	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Blue (Lt)	r=138, g=179, b=253	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Bottom/Freebo	r=244, g=244, b=226	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Green	r=51, g=255, b=102	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Green (Dk)	r=13, g=170, b=112	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Green (Lt)	r=137, g=240, b=126	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Grey (Dk)	r=128, g=128, b=128	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Grey (Lt)	r=219, g=219, b=219	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Grey (Md)	r=191, g=191, b=191	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Orange	r=0, g=128, b=128	30 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Orange (Dk)	r=196, g=86, b=35	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Orange (Lt)	r=255, g=188, b=154	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Purple	r=184, g=54, b=253	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Purple (Dk)	r=110, g=28, b=184	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Purple (Lt)	r=207, g=151, b=253	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Red	r=255, g=20, b=103	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Red (Dk)	r=188, g=21, b=54	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Red (Lt)	r=242, g=105, b=119	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Silhouette	r=219, g=219, b=219	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Water 1	r=79, g=242, b=223	35 %	r=246, g=255, b=226	100 %	50 %		No Texture				
Waterplane	r=70, g=112, b=116	50 %	r=255, g=255, b=255	100 %	50 %	Waterplane...	XY Mapping	0.0000	10.0000	0.0000	50.0000
White	r=232, g=232, b=232	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Yellow	r=255, g=228, b=24	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Yellow (Dk)	r=165, g=165, b=0	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				
Yellow (Lt)	r=255, g=255, b=135	100 %	r=255, g=255, b=255	100 %	50 %		No Texture				

These optical parameters are the followings:

- Name: Defines aspect’s name.
- Proper color: This is material’s (diffuse) color, which can be seen with a white diffuse light, without any specular reflexion.
- Opacity: This percentage represents aspect’s transparency: 0% = totally transparent, 100% = totally opaque.
- Highlight Color: This is the color of material’s highlights (specular color), which can be different of material’s proper color (i.e. plastic usually has a white highlight, independently of its proper color).
- Reflectance: This percentage represents highlight’s intensity: 0% = no highlight (dull), 100% = full highlight (shiny).
- Shininess: This percentage represents highlight’s “sharpnes”: 0% = wide highlights, 100% = sharp highlights.

Aspect’s color settings use the standard Windows dialog box:



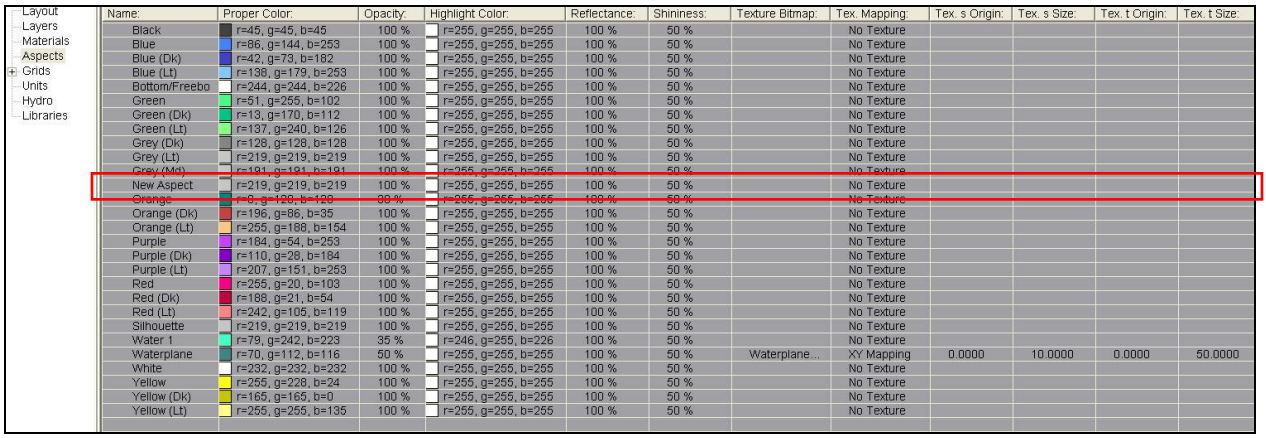
In addition to this direct control of aspect's optical properties, a texture bitmap file can also be associated for producing more realistic effects (due to OpenGL limitations, bitmap's X and Y dimensions must be powers of 2, like 2, 4, 8, 16, 32, 64, 128…pixels).

When such a texture file is selected (a default texture library is provided in the "/ProgData/Textures" folder), its horizontal and vertical mapping origins and periods must be specified, as well as its mapping mode (you can modify "Waterplane" aspect's settings and see how the hydrostatic viewport's floatation rendering changes in the 3D viewports):

- Texture Bitmap: Allows selecting the texture bitmap (JPG) file.
- Tex(ture) Mapping: Selects a (2D) texture mapping mode in the (3D) space. The texture bitmap being laid in the selected plane, its origin and periods being specified in both directions, pixel's colors will be "extruded" perpendicularly to the selected bitmap plane.
- Tex(ture) s Origin: Locates bitmap origin's abscissa in the mapping plane
- Tex(ture) s Size: Defines bitmap abscissa's period in the mapping plane
- Tex(ture) t Origin: Locates bitmap origin's ordinate in the mapping plane
- Tex(ture) t Size: Defines bitmap abscissa's ordinate in the mapping plane

You can also create additional aspects by right clicking on any line and selecting "**New**" in the popup menu. The new aspect will automatically be sorted alphabetically in the displayed list:

At last, any unused aspect can also be deleted by right clicking on its line and selecting "**Delete**" in the popup menu (this selection only appears when the selected aspect is unused. If not, modify the layers using this aspect first).



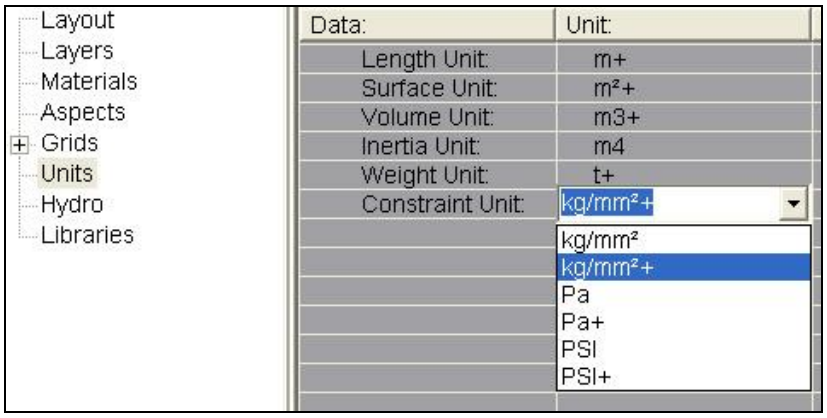
5.5. Grids and Libraries:

The “**Grids**” and “**Libraries**” categories are currently unused.

5.6. Units Data:

The “**Units**” category allows setting current project’s units used for entering data and displaying results.

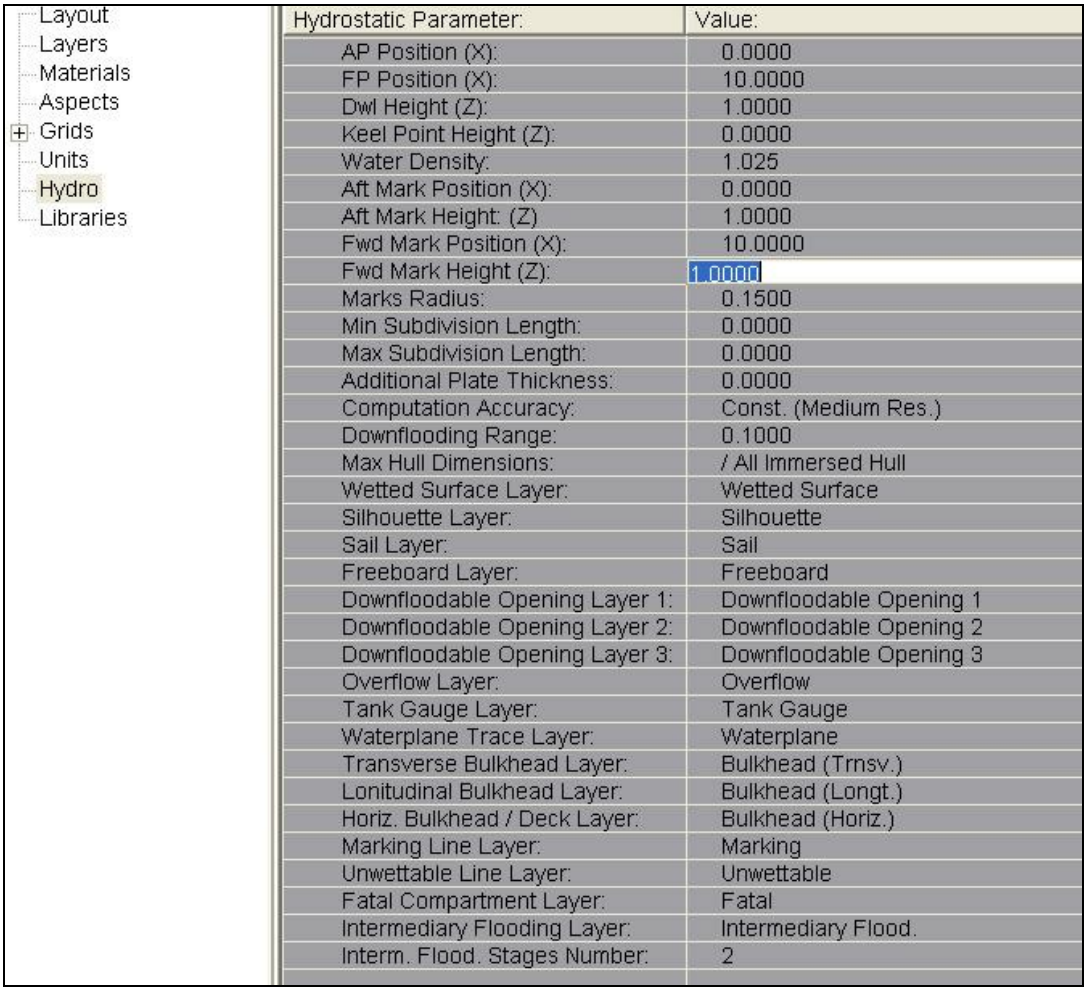
Units can be selected in a dropdown list by clicking in its corresponding field.



Remark: For all available units, the additional ‘+’ symbol allows displaying one extra digit.

5.7. Hydro Data:

The "**Hydro**" Data, which are probably the most commonly set, allow fixing the hydrostatic parameters. Each of them can be modified by a left click in its field.



Hydrostatic Parameter:	Value:
AP Position (X):	0.0000
FP Position (X):	10.0000
Dwl Height (Z):	1.0000
Keel Point Height (Z):	0.0000
Water Density:	1.025
Aft Mark Position (X):	0.0000
Aft Mark Height: (Z)	1.0000
Fwd Mark Position (X):	10.0000
Fwd Mark Height (Z):	1.0000
Marks Radius:	0.1500
Min Subdivision Length:	0.0000
Max Subdivision Length:	0.0000
Additional Plate Thickness:	0.0000
Computation Accuracy:	Const. (Medium Res.)
Downflooding Range:	0.1000
Max Hull Dimensions:	/ All Immersed Hull
Wetted Surface Layer:	Wetted Surface
Silhouette Layer:	Silhouette
Sail Layer:	Sail
Freeboard Layer:	Freeboard
Downfloodable Opening Layer 1:	Downfloodable Opening 1
Downfloodable Opening Layer 2:	Downfloodable Opening 2
Downfloodable Opening Layer 3:	Downfloodable Opening 3
Overflow Layer:	Overflow
Tank Gauge Layer:	Tank Gauge
Waterplane Trace Layer:	Waterplane
Transverse Bulkhead Layer:	Bulkhead (Trnsv.)
Lonitudinal Bulkhead Layer:	Bulkhead (Longt.)
Horiz. Bulkhead / Deck Layer:	Bulkhead (Horiz.)
Marking Line Layer:	Marking
Unwettable Line Layer:	Unwettable
Fatal Compartment Layer:	Fatal
Intermediary Flooding Layer:	Intermediary Flood.
Interm. Flood. Stages Number:	2

These hydrostatic data are the followings:

- AP Position (X): Locates Aft Perpendicular longitudinally.
- FP Position (X): Locates Fore Perpendicular longitudinally.
- Dwl Height (Z): Locates Design Water Line vertically (default floatation's height).
- Keel Point Height (Z): Locates Keel Point (K) vertically (vertical origin's height).
- Aft Mark Position (X): Locates Aft immersion mark longitudinally*.
- Aft Mark Height (Z): Locates Aft immersion mark vertically*.
- Fwd Mark Position (X): Locates Forward immersion mark longitudinally*.
- Fwd Mark Height (Z): Locates Forward immersion mark vertically*.
- Marks Radius: Defines immersion mark's radius*.
- Min Subdivision Length: Locates the first compartment subdivision (for probabilistic stability only).
- Max Subdivision Length: Locates the last compartment subdivision (for probabilistic stability only).

- Additional Plate thickness: Defines the mean plate thickness used for displacement correction (corrected volume = moulded volume + wetted surface x additional plate thickness).
- Computation accuracy: Defines current computation speed / accuracy compromise. Smart resolutions must be preferred when computation speed is prioritary, resp. constant resolutions when accuracy is prioritary. High resolutions must be preferred with light models, resp. low resolutions with heavy ones. Open the hydrostatic viewport to check resolution's incidence on speed and accuracy in order to determine your best compromise.
- Downflooding Range: Defines overflow line's immersion range used for managing the conditional buoyancy: Comparments containing such lines remain in the intact state as long as no overflow line is submerged and are totally flooded as soon as overflow line's immersion exceed this range (see "Advanced Buoyancy Management" for more details).
- Max Hull Dimensions: Specifies if the hull coefficients are calculated according to floatation's extremities or to immersed hull extremities (only useful with bulbous bows).
- Wetted Surface Layer: Allows sorting solid's "wetted" from the others (transom, bulkheads, etc…) for an accurate wetted surface (and therefore plate thickness correction) calculation.
- Silhouette Layer: Allows selecting the closed lines used for windage calculations.
- Sail Layer: Allows selecting the closed lines used for sail area calculations.
- Freeboard Layer: Allows selecting the lines used for freeboard calculations.
- Downflooding Layer 1…3: Allows selecting the lines used for downflooding calculations. Different numbers are available, depending on the opening type, whose use depends on the selected stability script.
- Overflow Layer: Allows selecting the overflow lines used for defining conditional buoyancies (see "Advanced Buoyancy Management" for more details).
- Tank Gauge Layer: Not used yet.
- Waterplane Trace Layer: Defines water plane's layer and, therefore, trace's color / rendering aspect.
- Transversal Bulkhead Layer: Allows identifying the transversal bulkhead faces in the probabilistic transversal subdivision scanning process (for damage stability only).
- Longitudinal Bulkhead Layer: Allows identifying the longitudinal bulkhead faces in the probabilistic longitudinal subdivision scanning process (for damage stability only).
- Horizontal Bulkhead Layer: Allows identifying the transversal bulkhead faces in the probabilistic horizontal subdivision scanning process (for damage stability only).
- Marking Line Layer: Allows identifying the marking lines whose freeboard must be calculated (script dependent, for distinct use of freeboard lines).
- Unwettable Line Layer: Allows identifying the "unwettable lines", whose immersion forces survivability to 0. Unwettable line's immersion is always tested when it belongs to the current model, but only when its parent is flooded when it belongs to a compartment (immersion calculated according to compartment's intermediary free surface in case of intermediary flooding, or to current floatation for standard damages).

- Fatal Compartment Layer: Allows identifying the compartments whose damage forces survivability to 0 (compartments containing vital equipments).
- Intermediary Flooding Layer: Allows identifying the compartments in which intermediary floodings must be calculated.
- Intermediary Flooding Number: Defines the number of intermediary floodings to calculate. Keep this number as small as possible for heavy probabilistic calculations, as it may increase significantly the amount of damage cases to process.

Floatation can be located:

- In the design referential with z coordinates at FP and AP.
- In the ship referential in which immersions refer to immersion marks “painted” on ship’s hull.

Depending on the available data, both referentials can be used for defining the floatation plane in “/Tools/Floatation Analysis/Fix Imm. + Trim + Heel” dialog box.

Moreover, these immersion marks are displayed as reference points in the hydrostatic viewport (erroneous mark coordinates / radius may therefore cause an erroneous display).

6. Appendix:

6.1. Shortcuts Keys Table:

ACTION	SHORTCUTS
GENERAL	
Save	[Ctrl] + [S]
Print	[Ctrl] + [P]
Undo	[Ctrl] + [Z]
Redo	[Ctrl] + [Y]
Select	All objects: [Ctrl] + [A]
	[Ctrl] / [Shift]
VIEWPORTS	
Zooming	Rotate the mouse wheel
	[Ctrl] + Right click
	[Page Up] / [Page Down]
Panning	Orthogonal views: Right click
	Perspective and Axono views: [Shift] + Right click
Scaling	To start: [Alt] + [Ctrl] + Right click → released
Tilting	[Shift] + [Ctrl] + [Page Up] / [Page Down] (3D only)
Rotating	Orthogonal views: [Shift] + [Ctrl] + Right click
	Perspective and Axono views: - Right click - Arrows of keyboard
Foreshortening	Perspective view: [Shift] + [Page Up] / [Page Down]
Animating	To stop: Left click
	To toggle: [Alt]
	To speed up: [Alt] + [Ctrl] +[F]
	To slow down: [Alt] + [Ctrl] + [S]
BROWSERS	
Copy	[Ctrl] + [C]
Cut	[Ctrl] + [X]
Paste	[Ctrl] + [V]
Delete	[Del]
HYDROSTATIC VIEWPORT	
Free heel, trim and immersion	[Home]
Free trim and immersion	[End]
Free heel and immersion	[Ins]
Free immersion	[Del]
Reset floatation plane	[Backspace]
Heel	[Page Up] / [Page Down] (standard increment)
Trim	[←] / [→] (standard increment)
Immersion	[↑] / [↓] (standard increment)
Smaller increments	[Ctrl] + [Heel, Trim or Immersion Shortcuts]
Larger increments	[Shift] + [Heel, Trim or Immersion Shortcuts]