

Manual DSYHS.tudelft.nl

A User Manual for the Delft Systematic Yacht Hull Series Database website

Michiel Katgert, Jasper den Ouden

The screenshot displays the DSYHS website interface. At the top left is the TU Delft logo. A navigation bar contains links for Help, Library, Discuss, Edit profile, Admin, and Logout. The user is logged in as 'mkatgert'. The main content area features a 'Sysser choice' section with an 'Overview of performed tests' and three search options: 'Sysser choice number based' (with an input field and 'Enter sysser number' button), 'Sysser choice series based' (with an input field and 'Enter series number' button), and 'Sysser choice hydrostatics based' (with a checked checkbox and an input field containing 'cb>0.3' and an 'Enter query' button). There is also an unchecked checkbox for 'Including overhang variations'. Below this are three download panels. The 'Download hydrostatics' panel has radio buttons for 'Full scale (Lwl=10m)' and 'Model scale', and checkboxes for 'Upright', '10° heel', '20° heel', '30° heel', and 'With Appendages'. The 'Download measurement data' panel has radio buttons for 'Full scale (Lwl=10m)' and 'Model scale', and checkboxes for 'Bare hull', 'Upright', 'With appendages', 'With trimming moment correction', '10° heel', '20° heel', '30° heel', and 'Yawed & heeled'. The 'Download geometries' panel has a text description, radio buttons for 'IGES', 'Maxsurf MSD', and 'Points file (.txt)', and a 'Download geometries' button. Each panel has a 'File type choice' section with radio buttons for 'Text (.csv)', 'Excel 2007< (.xlsx)', 'Excel 2003> (.xls)', and 'HTML', and a corresponding download button. The footer contains the copyright notice: '© Ship Hydromechanics Laboratory TU Delft 2012'.

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Introduction

The website DSYHS.tudelft.nl has been created to present all the measurement data of the Delft Systematic Yacht Hull Series (DSYHS). This series has been started in 1973 by professor J. Gerritsma, in cooperation with N. Newman and J. Kerwin of the Massachusetts Institute of Technology (MIT).

The aim was to perform measurements on a series of systematically varied yacht hulls, in order to assess the influence of the varied parameter on the hydrodynamic performance (resistance, seakeeping etc.) of a sailing yacht hull.

In 2010 it was decided that all data within the framework of the DSYHS had to be collected, verified, organized and presented in a clear and futureproof way.

The models

The first model tested in the series (Sysser 1) was the Standfast 43, designed by Frans Maas in 1973. This was also the base model for series 1 (Sysser 1-22); this means that Sysser 2 till 22 were geometric variations on Sysser 1. The linesplan of Sysser 1 is shown in figure 1.

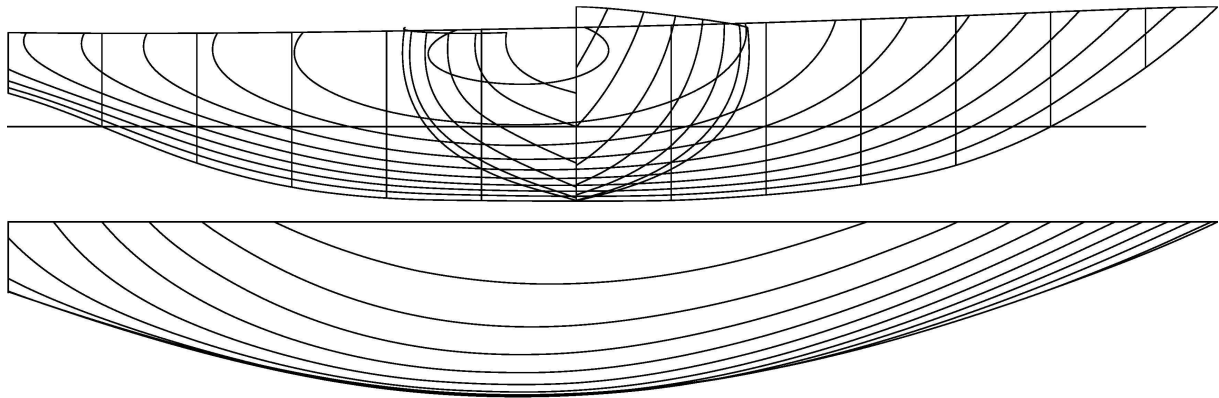


Figure 1 - Linesplan Sysser 1, basemodel series 1

After 22 models, a new base model was chosen to reflect the changing trends in sailing yacht design. This was Sysser 25, the base model for series 2 (Sysser 23-28), series 3 (Sysser 29-39) and series 7 (Sysser 71-73).

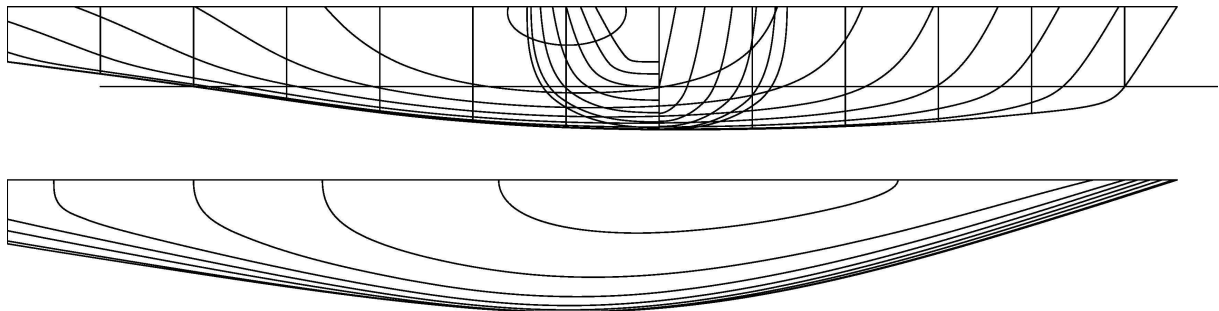


Figure 2 - Linesplan Sysser 25, basemodel series 2,3 and 7

Series 4 had been primarily created for measurement on the seakeeping of sailing yachts, and in particular the added resistance in waves. Since all models had also been tested according to the standard measurement procedure, they were included in the database. Base model of series 4 is Sysser 44, and the Sysser 42 to 49 are part of this series.

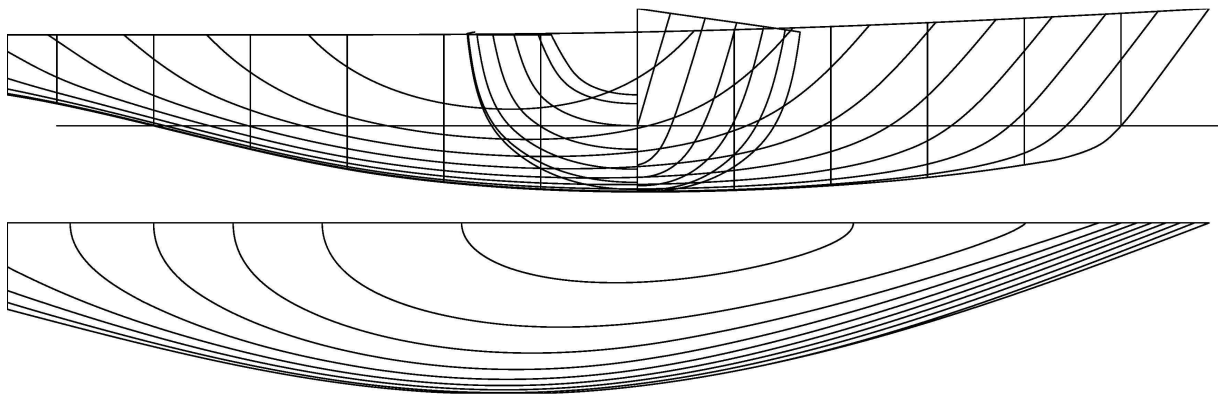


Figure 3 - Linesplan Sysser 44, basemodel series 4

The measurements - Setup

All models have been tested with the same measurement setup. In this case, 'measurement setup' signifies the way the models have been connected to the towing carriage. All models have been connected in such a way that they were free to heave (displacement in z), pitch (rotation around y) and roll (rotation around x) and restrained in all other modes of motion.

The models have been attached to the towing carriage, by means of two so called 'balance arms' at even positions fore and aft of the LCG of the model. These arms have been designed so as to exert no extra forces or moments on the models caused by their weight, while restraining them in sway (displacement in y) and therefore also in yaw (rotation around z) motions. The balance arms consists of three parts, mutually connected with pivot points which are free to rotate around the y -axis (nr. 7 and 8). At the lower end of these arms force transducers have been mounted to measure forces F_f at the fore arm and F_a at the aft arm. Based on these forces and the distance to LCG also the yaw moment is known.

Under the force transducers, a pivot point is mounted which is connected to the model. This pivot points keep the model free to roll, pitch and yaw with regard to the balance arm. The model is towed with a towing line, which is connected to the front pivot point on the model at one side, and a force transducer mounted on the carriage on the other side. This force transducer measures the resistance exerted on the model.

The **yaw angle** is adjusted by moving one of the two balance arms in y -direction.

The **roll angle** is adjusted by laterally shifting a movable weight, nr 3, mounted on the model.

The **pitch angle** is adjusted by longitudinally shifting this same weight.

For the roll angle, only the copper colored part of the weight is shifted laterally, by rotating a spindle on which it is mounted. For the pitch angle, the complete weight, including frame, is shifted longitudinally.

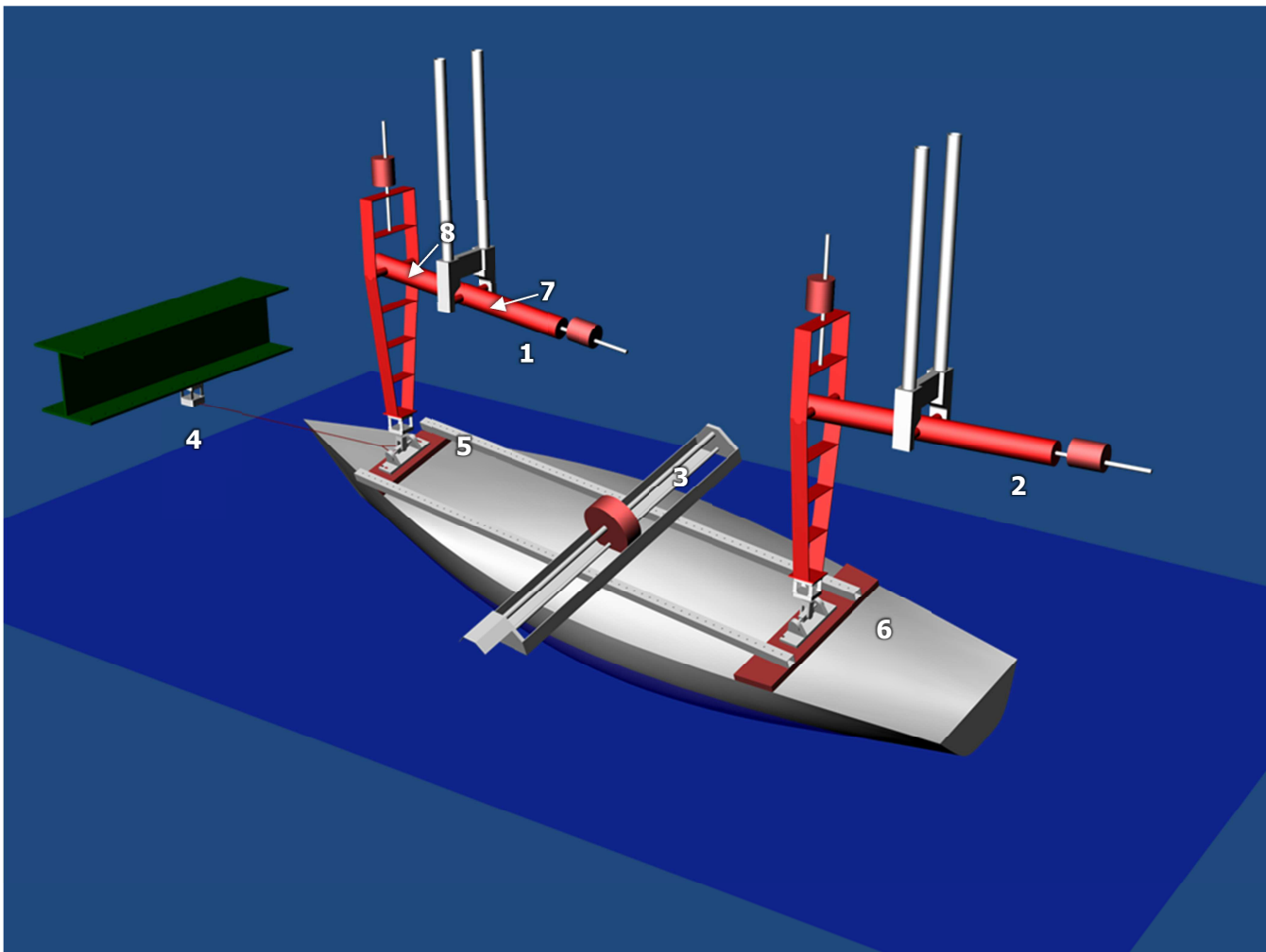


Figure 4 - Schematic render of the measurement setup

In Figure 4 a 3D schematic render of the measurement setup is shown. The numbers in the figure correspond with the following parts:

| | |
|---------|---|
| 1 and 2 | Balance arms fore and aft |
| 3 | Shifting weight on deck to adjust pitch and roll angles |
| 4 | Force transducer mounted to the carriage to measure resistance |
| 5 and 6 | Force transducers to measure F_f and F_a , with pivot points mounted underneath |
| 7 and 8 | Pivot points balance arm fore |

The measurements - Procedure

The testing procedure which has been used has been kept the same throughout the years. This procedure is as follows:

1. First the **upright resistance** tests are carried out. See note ¹. In this condition the LCG is equal to the LCB (no trimming moment), the model has no heel angle and no leeway angle. The model is towed through the tank at a specified speed, a time signal of all the relevant quantities is recorded and the measured data is presented as the time-average of the signal during the run. This is done for a series of specified speeds, mostly starting at Fn 0.15, and in steps of Fn 0.05 (for some models Fn 0.025) up to the highest attainable speed or Fn 0.75, whichever is reached first. The highest attainable speed is mostly dictated by the speed where the model floods by its own waves, or generates excessive waves which overflow the towing tank. On older models, upright resistance tests are carried out both with and without appendages. More recent models only have upright resistance tests without appendages.
2. Next, **upright resistance tests with sailing trimming moment correction** are carried out. Due to the fact that on model scale the propulsive force is acting just above the deck, at the pivot point, where the towing line is attached, but on full scale the propulsive force is acting from the Center of Effort of the sails, a correction has to be done for the extra trimming moment which was neglected in the upright resistance tests. A vertical position of the CoE of the sails is assumed and converted to model scale (ZCE) with which this extra trimming moment can be calculated, in the form of $(ZCE - Zsm) \cdot R_{tm}$, in which Zsm is the height of the towing point above the waterline and R_{tm} is the total model resistance. This trimming moment is also included in the measurement results, as $M\theta$. The trimming moment is exerted on the model by a shift of LCG: the weight on deck is shifted longitudinally. The same speed range is used for this test series, but in most cases the highest attainable speed is significantly lower than for the upright resistance tests. See figure Figure 5 and note ². On older models, upright resistance tests with sailing trimming moment correction are carried out both with and without appendages. More recent models only have upright resistance tests with sailing trimming moment correction without appendages.

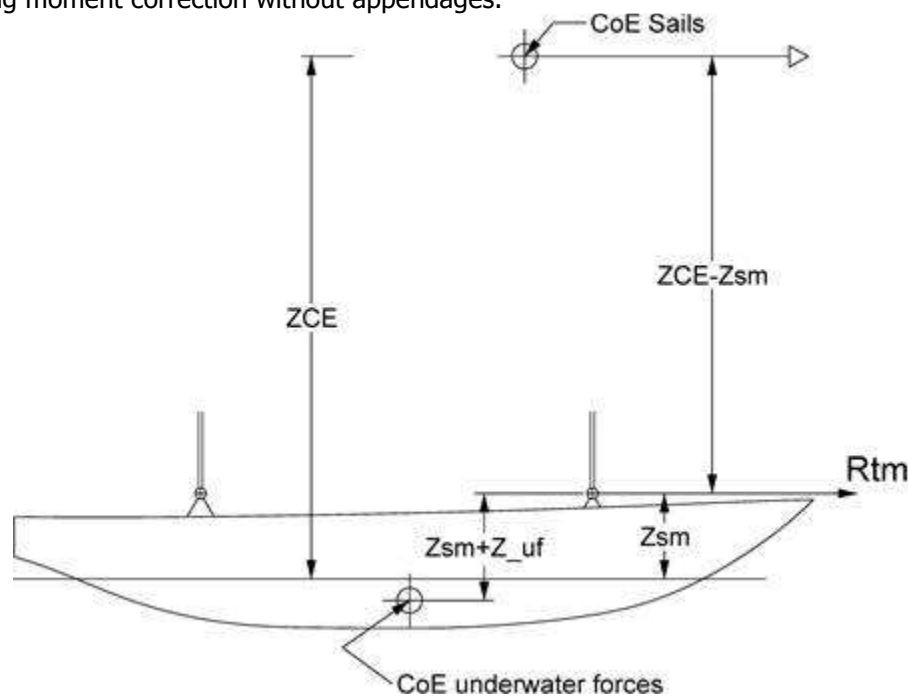


Figure 5 - Definition of trimming moment correction

¹ The upright resistance tests are in fact carried out twice: once with a single width turbulence stimulation strip and once with a double width turbulence stimulation strip. Due to the relatively small waterline length of the models it has to be made sure that the boundary layer of the models is turbulent. The resistance increase due to these turbulence stimulation strips is calculated from the difference between single- and double-width strip resistance. All results presented in the database are already corrected for this strip resistance, so this is only mentioned for the sake of completeness.

² In order to calculate the required trimming moment, the model resistance is used. Since this resistance increases due to the trimming moment, the trimming moment will consequently increase. For correctness this procedure should be carried out more than once to find a convergence point. In the DSYHS this is not done: for the trimming moment simply the upright resistance is used.

3. Next, resistance tests without leeway angle without appendages but with a set heel angle are performed. The heel angle is achieved by means of shifting a weight laterally. The sideforce fore and aft are also measured to measure the yaw moment due to asymmetry of the hull.
4. Next, a matrix of various heeling angles, leeway angles and speeds is performed. These tests are always performed with appendages. Sailing trim moment correction is added, and a correction for the vertical component of the sail forces (equal to $FH \sin \phi$) is applied on the model by means of adding a weight to the model which does not exert a heeling moment on it. The longitudinal position of the weight is taken as the longitudinal center of effort of the 'virtual' sail plan.

The measurements - Acquisition methods

Tests on the DSYHS have been performed since 1974. Data acquisition methods have changed since then.

Forces

Forces are measured by means of in-house manufactured strain gauge force transducers.

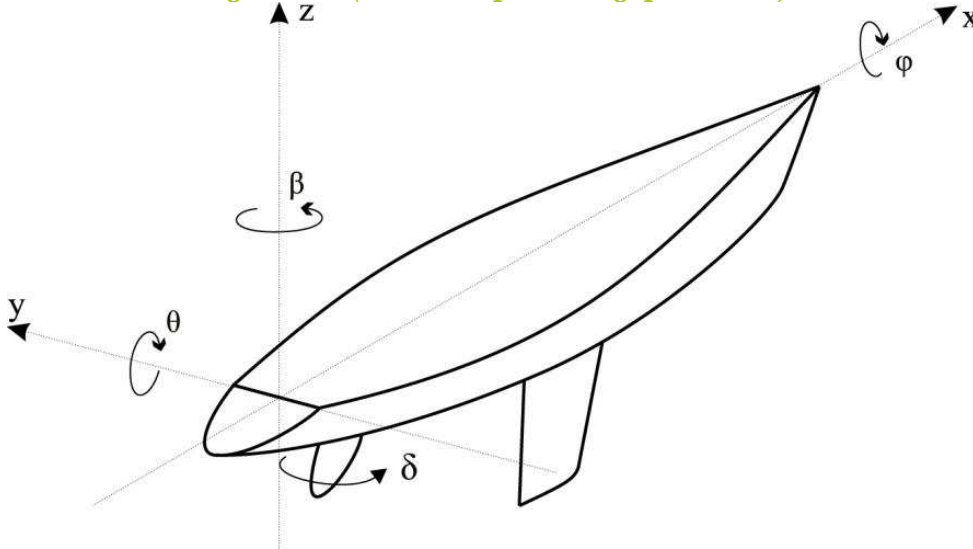
Motions

In the beginning, motions were measured with potentiometers and springloaded strings measuring the relative displacement at various points of the model, from which also the rotations could be derived.

Later, an optical tracking device has been used, which monitors the 6 degrees of freedom of the model with a camera aimed at an array of leds on the model.

The measurements - Measured quantities

Coordinate system: (arrows pointing positive)



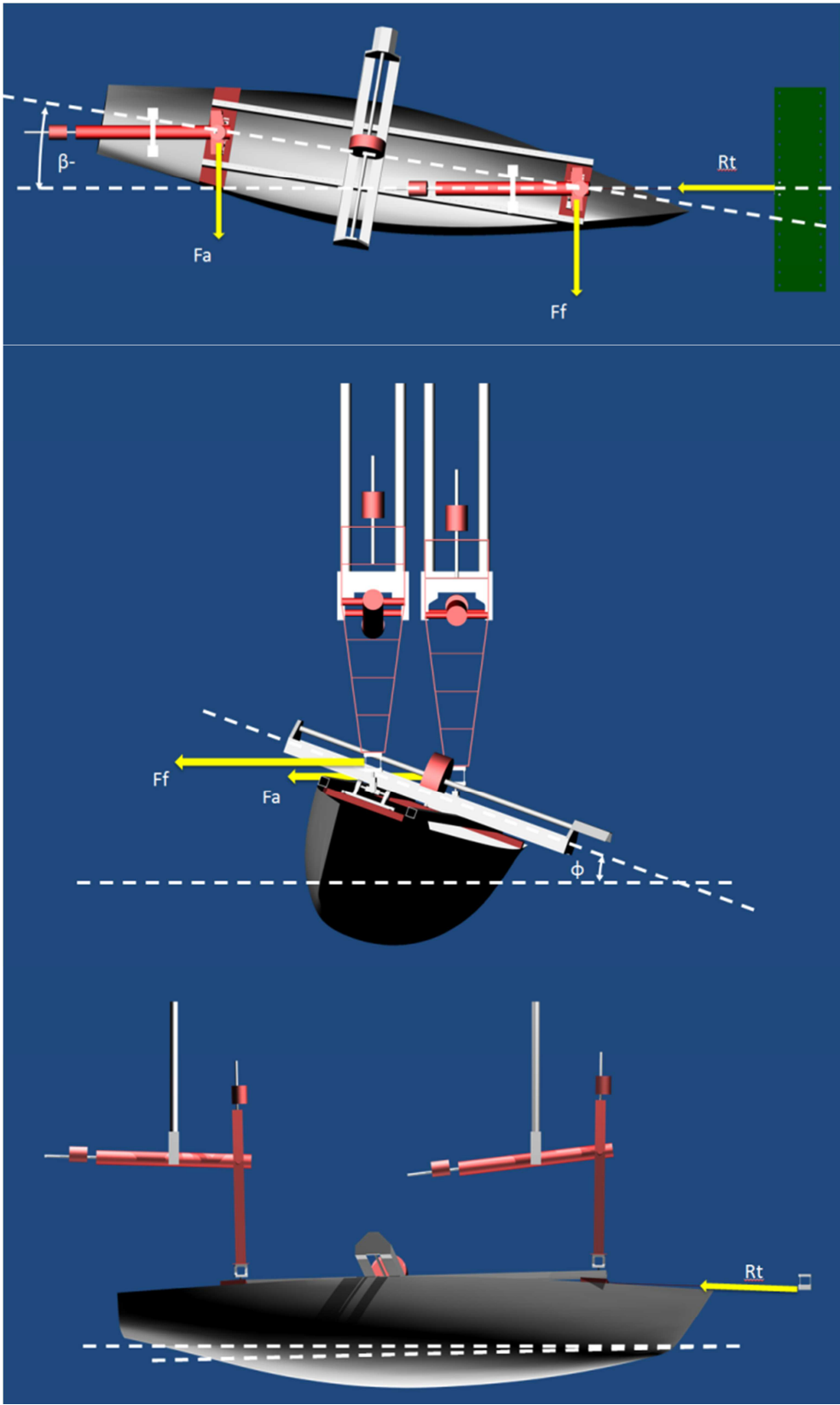
Measured quantities

| Quantity | | Unit | Direction | Positive | Note |
|---|----------------------------|-----------------------------|---|-----------------|-------------------------------------|
| Velocity | V | Meters/second | | Forward | |
| Resistance | R _t | Newton | Parallel to towing tank x-axis, see note ³ | Backwards | |
| Sideforce fore | F _f | Newton | Parallel to towing tank y-axis | Portside | |
| Sideforce aft | F _a | Newton | Parallel to towing tank y-axis | Portside | |
| Heave | z | Millimeter | Parallel to towing tank z-axis (See note ⁴) | Up | Only measured from Sysser 34 onward |
| Roll | φ | Degrees | | Starboard down | |
| Pitch | θ | Degrees | | Bow down | Only measured from Sysser 34 onward |
| Yaw | β (See note ⁵) | Degrees | | Bow to portside | |
| Trimming moment | M _θ | Newton.Meter | Around ship y-axis | Bow down | |
| Vertical sail force correction | FH.sin(φ) | Newton | Parallel to towing tank z-axis | Down | |
| Temperature | T | Degrees Celsius | | | |
| Kinematic viscosity | ν | Meter ² /second | | | |
| Specific density | ρ | Kilogram/Meter ³ | | | |
| Distance F _f to CoG | df | Meters | Parallel to ship x-axis | Forward | |
| Distance F _a to CoG | da | Meters | Parallel to ship x-axis | Forward | |
| Vertical center of towing point above waterline | Z _{sm} | Millimeters | Parallel to towing tank z-axis | | |

³ The height at which the resistance force transducer is mounted on the carriage is constant during tests. The towing point on the model (front hinge point) is varying in heave and pitch of the model during tests. Therefore they need not be on the same height. This possibly influences the measured resistance with the cosine of the angle between force transducer and hinge point. Since the longitudinal difference between the both is large, this angle is generally very small and the influence is therefore neglected.

⁴ For heeled tests, the heave is the difference between upright without speed and heeled under speed. For the first few tests, where the heave motion was measured with the displacement of the balance arms, the vertical shift of the CoG due to heel was not taken into account.

⁵ Normally, yaw angle is denoted by ψ, but since the yaw angle equals the leeway angle β, this symbol is used throughout the series



Definition sinkage bare hull measurements

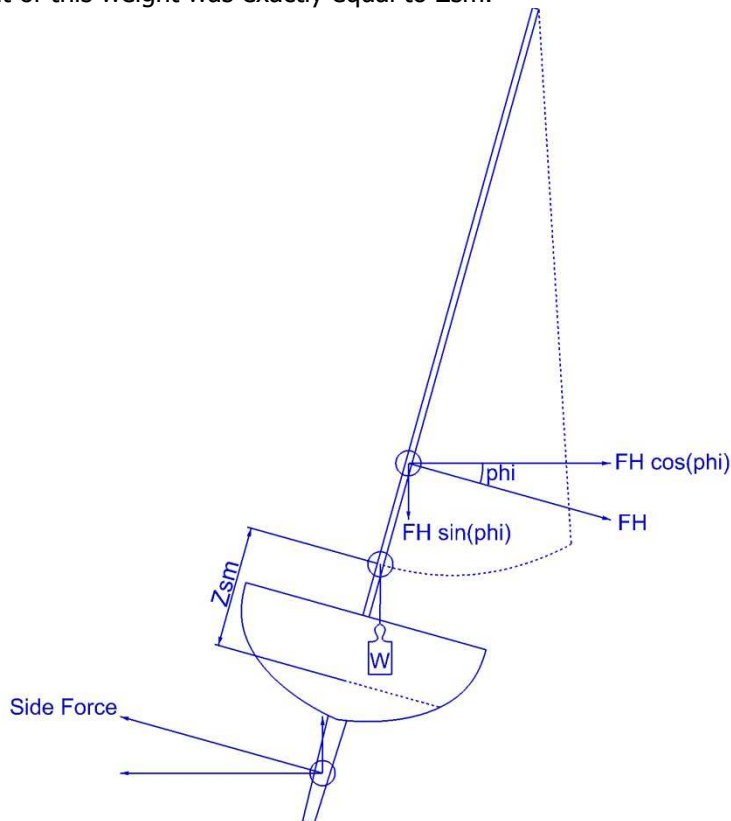
The sinkage of the hull as given in the database is defined as the vertical translation of the hull's centre of gravity in an earth fixed coordinate system. During the bare hull tests the vertical center of gravity of the model was not measured. For the bare hulls the center of gravity is assumed to be exactly at the waterline. This is especially important for the results of the test with heel angle.

Sailing point definition

During the tests with keel and rudder, with heel and leeway angle, the vertical sailing force component was represented by a weight in the longitudinal position of the Centre of Effort of the sails plan. This weight is indicated by an 'W' in the picture below.

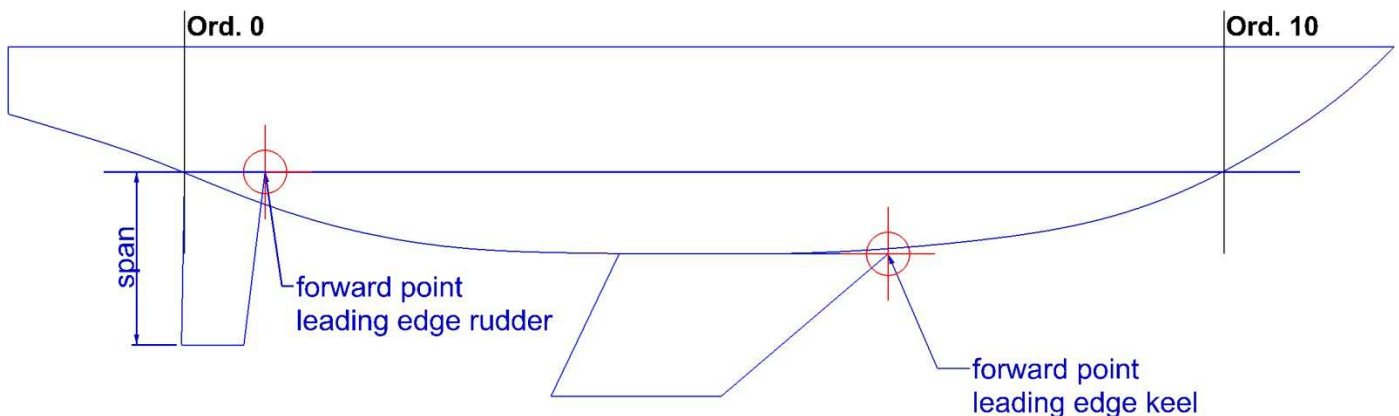
This sailing force component acted vertically downward independent of heel and trim angle.

The vertical height of this weight was exactly equal to Z_{sm} .



Definition keel and rudder position

The position of keel and rudder in the database is defined with respect to Ordinate 0. In the database the most forward point of keel and rudder is given. The void space between hull and keel was filled up with filler. This filler was shaped as an extension of the keel. The span of the rudder below waterline was always the same. When the rudder was fixed behind Ord. 0, the space between rudder and hull was also filled up.



The website – The procedure

The procedure for acquiring data is as follows:

- First, select the Sysser(s) you want information from
- Next, select which information you want
- Finally, select the output format.

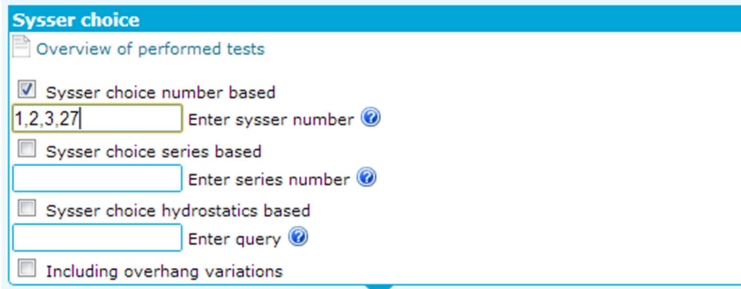
All three steps are explained in the following chapters.

Tip: if you are looking for hydrostatics or measurement data, and you are not sure you have selected the correct Sysser or data, select HTML as output format. This gives a quick overview of the final output, and will give you an idea which data is available, without having to startup programs to view the data. If you are satisfied with the output, go back one page (with the back button of your browser) and select your final desired output format.

The website – Sysser selection

The first step in downloading data, is selecting the Syssters for which you want the information. There are four possibilities for selection:

- *Selection by Sysser number:*



The screenshot shows the 'Sysser choice' selection interface. The 'Sysser choice number based' checkbox is checked, and the input field contains '1,2,3,27'. Other options are unchecked.

To select specific Sysser model numbers, tick the checkbox next to 'Sysser choice number based'. Enter the Sysser numbers, separated by commas.

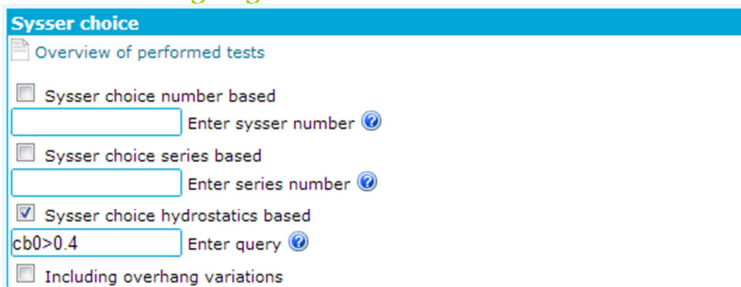
- *Selection by series number:*



The screenshot shows the 'Sysser choice' selection interface. The 'Sysser choice series based' checkbox is checked, and the input field contains '1,2,4'. Other options are unchecked.

To select all the Syssters belonging to a certain series (that is, the base model and its variations), tick the checkbox next to 'Sysser choice series based'. It is possible to select multiple series, separated by commas.

- *Selection by hydrostatic criteria:*



The screenshot shows the 'Sysser choice' selection interface. The 'Sysser choice hydrostatics based' checkbox is checked, and the input field contains 'cb0>0.4'. Other options are unchecked.

To select Syssters which meet certain criteria regarding hydrostatics, tick the checkbox next to 'Sysser choice hydrostatics based'. Enter a query to which the hydrostatics should satisfy; if for instance you want to have information about all the Syssters with a upright block coefficient higher than 0.4, the query would be `cb0>0.4`. Click on the question mark next to 'Enter query' to fold down a panel with all possible options:

Sysser choice

Overview of performed tests

Sysser choice number based
 Enter sysser number

Sysser choice series based
 Enter series number

Sysser choice hydrostatics based
 Enter query

Use the buttons or type into the textbox to enter a hydrostatics based search criterion.
 For example: $cb0 > 0.4$ AND $bw10 / tc0 > 10$
 The search is done on model scale values.
 Hover over the buttons to get a description.

| | | | | | | | | | |
|---|---|---|----|----|-----|--------|-------|-------|-----|
| 1 | 2 | 3 | (|) | AND | lwl30 | bwl30 | tc30 | 0° |
| 4 | 5 | 6 | < | > | OR | volc30 | lcb30 | lcf30 | 10° |
| 7 | 8 | 9 | <> | <= | | sc30 | aw30 | ax30 | 20° |
| . | 0 | + | >= | = | | cb30 | cm30 | cp30 | 30° |
| - | * | / | | | | cw30 | | | |
| ^ | | | | | | | | | |

Including overhang variations

Please note: the query is performed on model scale values! Therefore, if a query contains a dimension, make sure this is a model dimension.

- *Selection by a combination of the above*

Sysser choice

Overview of performed tests

Sysser choice number based
 Enter sysser number

Sysser choice series based
 Enter series number

Sysser choice hydrostatics based
 Enter query

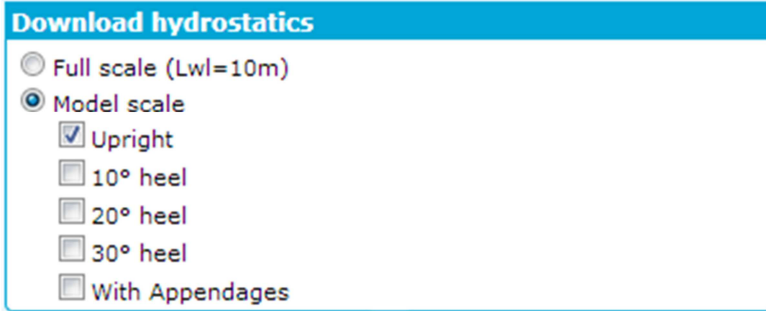
Including overhang variations

It is possible to tick multiple checkboxes next to the selection criteria to make a combination of the above options. The selection in this figure will result in information about Sysser 47, all Syssters from series 1 and all the Sysster which have a upright block coefficient higher than 0.4. If there's overlap in the selection criteria (for instance, Sysser 47 has a block coefficient higher than 0.4) the data is shown only once.

- *Inclusion of overhang variations*

Some Syssters have been tested with overhang variation. These Syssters are 23,27,29,42 and 47. To include the overhang variations in the results, tick the checkbox next to 'Including overhang variations'. If one or multiple of these four Syssters are not in the result set of the Sysster selection, no overhang results will be shown.

The website – Hydrostatics selection



Download hydrostatics

Full scale (Lwl=10m)

Model scale

Upright

10° heel

20° heel

30° heel

With Appendages

The selection of the hydrostatics is pretty straightforward. It is possible to get the bare hull (unappended) hydrostatics on full scale (scaled to Lwl=10 meter) or on model scale, as tested in the towing tank. Furthermore it is possible to select various heel angles up to 30°. The hydrostatics for heel angles are calculated with a free to trim model (LCG=constant).

If 'With Appendages' is selected, an extra sheet with appendage hydrostatics is presented, separate from the bare hull hydrostatics.

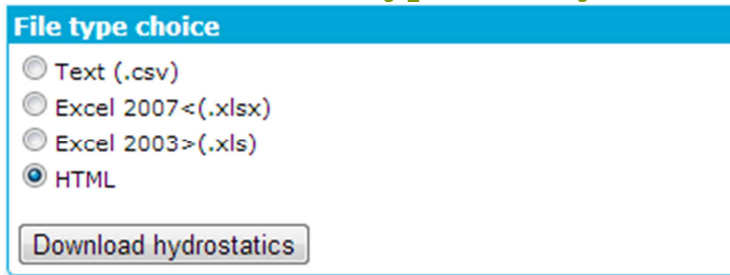
Please note: the appendages used in the DSYHS have physically remained the same for all series. This means that, while the scale, and therefore the waterline length of the models, varies per series, the appendages are the same, and therefore the appendage scale relative to the model varies! Due to this, the appendages hydrostatics are always given on model scale, regardless of whether Full scale or Model scale has been selected!

The website – Measurements selection

Download measurement data

- Full scale (Lwl=10m)
- Model scale
 - Bare hull
 - Upright
 - With trimming moment correction
 - 10° heel
 - 20° heel
 - 30° heel
 - With appendages
 - Upright
 - With trimming moment correction
 - Yawed & heeled

The website – File types for hydrostatics and measurement data



File type choice

- Text (.csv)
- Excel 2007< (.xlsx)
- Excel 2003> (.xls)
- HTML

Download hydrostatics

The hydrostatics and measurement data can be exported in multiple formats. At the moment 4 types are supported:

- *Text (.csv)*

A text document with 'comma separated value' text arrangement. This is the simplest and most robust way of representing table data. A CSV-document is a simple ASCII text-file, which can be opened in Notepad, for instance. Every line represents a row in the table, every column is separated by a comma. CSV-files can be opened by for instance Excel⁶, Lotus 1-2-3, Numbers, Gnumeric, or almost any other spreadsheet-program you prefer. Next to this, you can read it in in for instance Matlab.

Hydrostatics are presented in two or three sheets (depending on whether you select 'appendage data'), and every sheet is saved as a single CSV-file. All CSV-files are then bundled in a ZIP-archive and then presented in the browser. You can simply open the ZIP-archive and use the CSV-files to your liking.

Measurement data is presented in at least 2 sheets (one per Sysser and one for general measurement information) and is therefore also bundled in a Zip-archive.

For more information about the CSV-file format, see Wikipedia: http://en.wikipedia.org/wiki/Comma-separated_values.

Please note that CSV-files do not support layout options, so only the pure data is available.

- *Excel 2007≤ (.xlsx)*

An Excel-sheet, compatible with Excel version 2007 and up. Hydrostatics are presented in two or three sheets (depending on whether you select 'appendage data'), measurement data is presented in at least 2 sheets (one per Sysser and one for general measurement information).

- *Excel 2003≥ (.xls)*

An Excel-sheet, compatible with Excel version 2003 and before, included for compatibility reasons. Hydrostatics are presented in two or three sheets (depending on whether you select 'appendage data'), measurement data is presented in at least 2 sheets (one per Sysser and one for general measurement information).

- *HTML*

HTML-output is a simple on-screen display of the selected data. This is mostly included to have a quick look of the results of your query, without having to download files and start up programs to view the data. Hydrostatics are presented in two or three sheets (depending on whether you select 'appendage data'), measurement data is presented in at least 2 sheets (one per Sysser and one for general measurement information). All sheets are presented below each other.

HTML-output has a small bug: the display of the kinematic viscosity and the density of the water per measurement block is not correct. This is due to a bug in the software package used for file export.

Once you are happy with your selection, press the Download-button and your data will be downloaded or, in case you selected HTML-output, will be presented in your browser.

⁶ Excel does not correctly interpret all special symbols in the csv-files. This is a bug in Excel, not in the csv-files!

The website – Layout of the downloaded measurement data

In this example an Excel 2007 output of the data is used to show the layout of the measurement data. The principle holds for all output formats. See Figure 6. This is a screenshot of selected measurement data of Sysser 44. The numbers in the figure are as follows:

1. The Sysser number.
2. Measurement information specific for this Sysser. This is for instance the distance of the balance-arms to the center of gravity, and the height of the towing point above the deck. This is Sysser dependent. The longitudinal distance of the balance-arms to the center of gravity can be used to calculate the measured yaw moment.
3. This is measurement block: the results for a certain test condition on the Sysser. These are the upright unappended results for Sysser 44. In the upright measurements the resistance, trim, sinkage and temperature (on which the density and kinematic viscosity are dependent) are presented.
4. If the temperature (and therefore density and kinematic viscosity) remained the same during a measuring block, these are presented in a separate information block. If the measurement block is for an appended condition, the Keel identification number is also presented in this block. The keel ID number corresponds with the keel ID number in the appendage hydrostatics.
5. Every Sysser has its own sheet. The Sysser-number is presented in the sheet name.
6. The Excel sheet has an extra sheet with information. In this sheet, the column names are explained.
7. In the measurement block for the heeled condition, also the side force fore and aft (F_f and F_a) are presented. In this case they have not been measured, so the values have been set to zero.

The vertical spacing of the measurement blocks has been maintained throughout the whole excel-file. For a file with multiple sheets with multiple Syssters, this spacing is constant on all sheets. The amount of spacing is taken from number of rows of the biggest measurement block, so this may change according to the Syssters you selected.

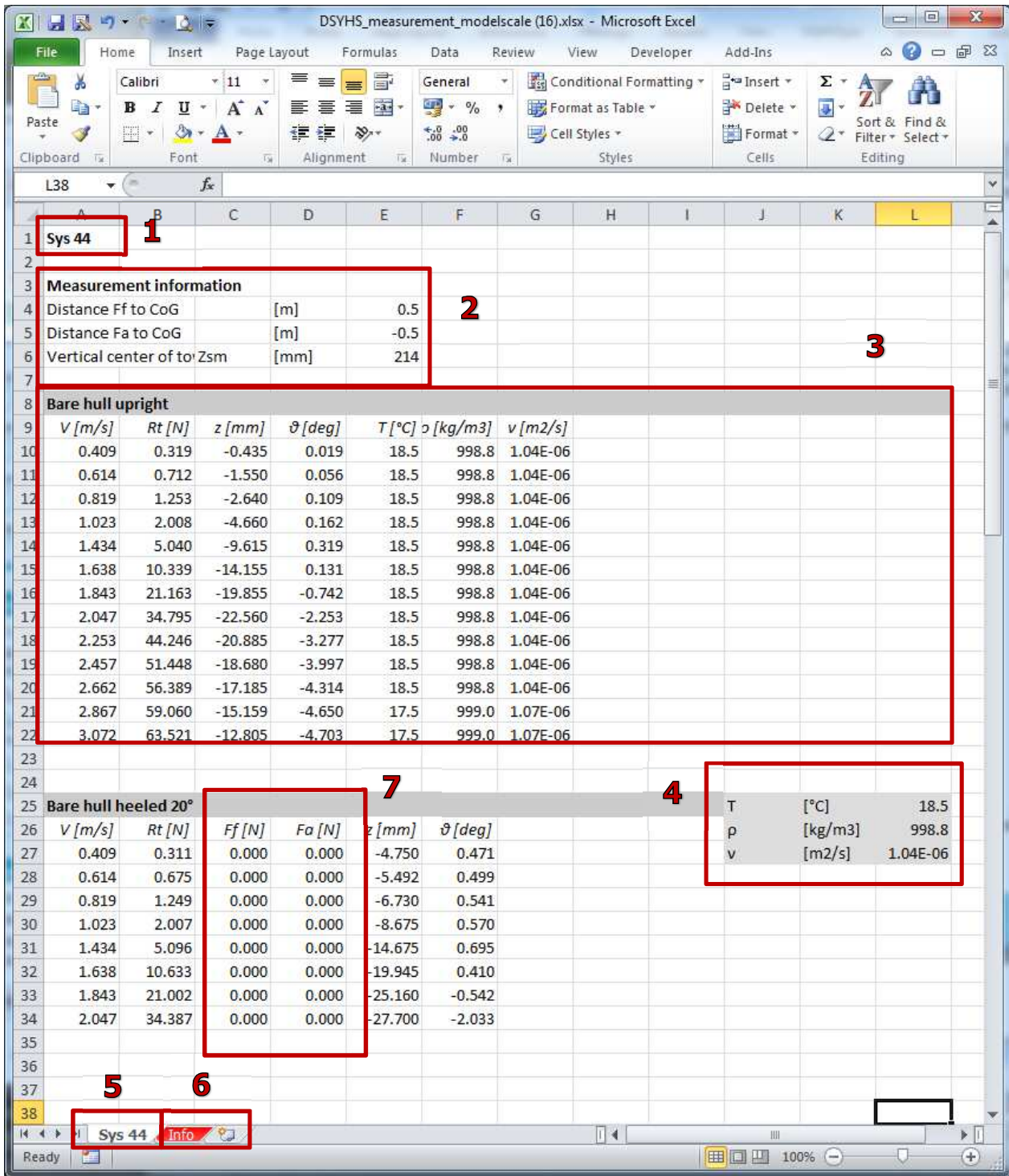
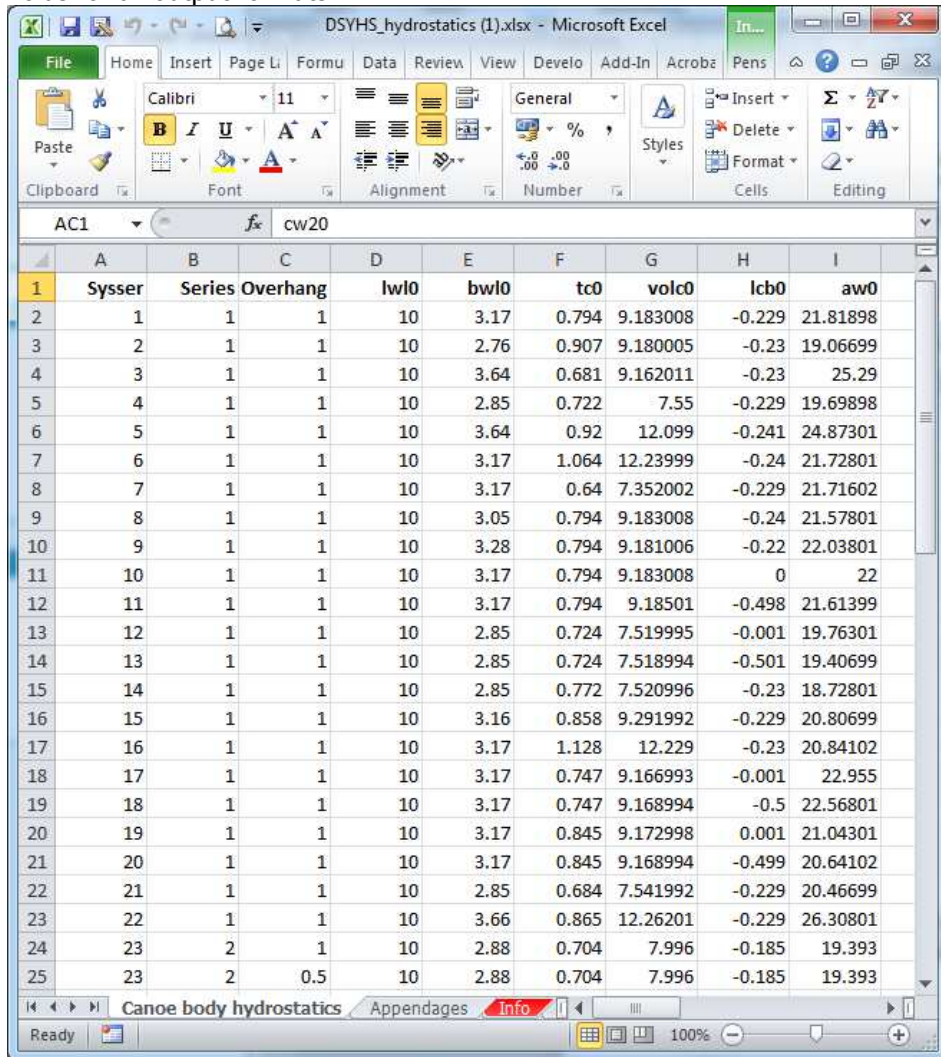


Figure 6 - Example of downloaded data

The website – Layout of the downloaded hydrostatics data

In this example an Excel 2007 output of the data is used to show the layout of the hydrostatics data. The principle holds for all output formats.



| | A | B | C | D | E | F | G | H | I |
|----|--------|--------|----------|------|------|-------|----------|--------|----------|
| 1 | Sysser | Series | Overhang | lwl0 | bwl0 | tc0 | volc0 | lcb0 | aw0 |
| 2 | 1 | 1 | 1 | 10 | 3.17 | 0.794 | 9.183008 | -0.229 | 21.81898 |
| 3 | 2 | 1 | 1 | 10 | 2.76 | 0.907 | 9.180005 | -0.23 | 19.06699 |
| 4 | 3 | 1 | 1 | 10 | 3.64 | 0.681 | 9.162011 | -0.23 | 25.29 |
| 5 | 4 | 1 | 1 | 10 | 2.85 | 0.722 | 7.55 | -0.229 | 19.69898 |
| 6 | 5 | 1 | 1 | 10 | 3.64 | 0.92 | 12.099 | -0.241 | 24.87301 |
| 7 | 6 | 1 | 1 | 10 | 3.17 | 1.064 | 12.23999 | -0.24 | 21.72801 |
| 8 | 7 | 1 | 1 | 10 | 3.17 | 0.64 | 7.352002 | -0.229 | 21.71602 |
| 9 | 8 | 1 | 1 | 10 | 3.05 | 0.794 | 9.183008 | -0.24 | 21.57801 |
| 10 | 9 | 1 | 1 | 10 | 3.28 | 0.794 | 9.181006 | -0.22 | 22.03801 |
| 11 | 10 | 1 | 1 | 10 | 3.17 | 0.794 | 9.183008 | 0 | 22 |
| 12 | 11 | 1 | 1 | 10 | 3.17 | 0.794 | 9.18501 | -0.498 | 21.61399 |
| 13 | 12 | 1 | 1 | 10 | 2.85 | 0.724 | 7.519995 | -0.001 | 19.76301 |
| 14 | 13 | 1 | 1 | 10 | 2.85 | 0.724 | 7.518994 | -0.501 | 19.40699 |
| 15 | 14 | 1 | 1 | 10 | 2.85 | 0.772 | 7.520996 | -0.23 | 18.72801 |
| 16 | 15 | 1 | 1 | 10 | 3.16 | 0.858 | 9.291992 | -0.229 | 20.80699 |
| 17 | 16 | 1 | 1 | 10 | 3.17 | 1.128 | 12.229 | -0.23 | 20.84102 |
| 18 | 17 | 1 | 1 | 10 | 3.17 | 0.747 | 9.166993 | -0.001 | 22.955 |
| 19 | 18 | 1 | 1 | 10 | 3.17 | 0.747 | 9.168994 | -0.5 | 22.56801 |
| 20 | 19 | 1 | 1 | 10 | 3.17 | 0.845 | 9.172998 | 0.001 | 21.04301 |
| 21 | 20 | 1 | 1 | 10 | 3.17 | 0.845 | 9.168994 | -0.499 | 20.64102 |
| 22 | 21 | 1 | 1 | 10 | 2.85 | 0.684 | 7.541992 | -0.229 | 20.46699 |
| 23 | 22 | 1 | 1 | 10 | 3.66 | 0.865 | 12.26201 | -0.229 | 26.30801 |
| 24 | 23 | 2 | 1 | 10 | 2.88 | 0.704 | 7.996 | -0.185 | 19.393 |
| 25 | 23 | 2 | 0.5 | 10 | 2.88 | 0.704 | 7.996 | -0.185 | 19.393 |

The data is presented as a table with a row for every Sysser. In the sheet 'Appendages' the hydrostatic data of the appendages is shown. The ID-number in this table corresponds with the keel-ID in the measurement sheets.

Appendage hydrostatic data is always on model scale! This is due to the fact that the scale factor (and therefore the physical length) of the bare hull varies per series, but the appendages always remained physically the same. The scale factor of the appendages is therefore dependent of the Sysser it is mounted on!

The website – Hull shape selection

Download geometries

Download the geometries of the Syssters below. The hulls are available in MSD (Maxsurf)-format, TXT-format and in IGES-format. The files will be added in a single zip archive before downloading.

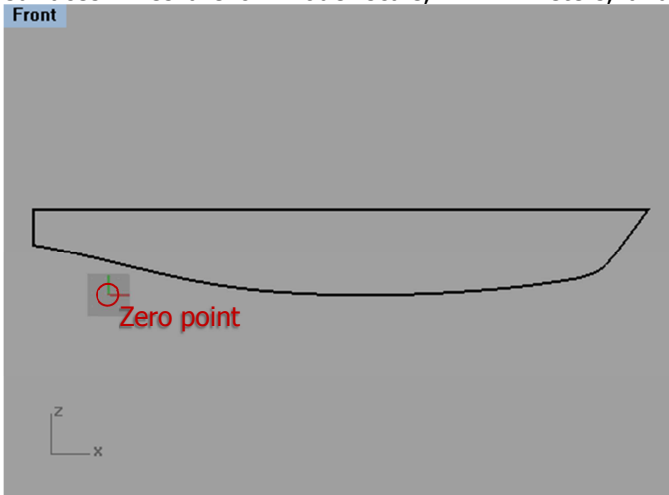
- IGES
- Maxsurf MSD
- Points file (.txt)

Download geometries

The hull shapes of the selected syssters can be downloaded in various formats, describing the 3D bare hull shape of the Sysster. The files are always compressed in a ZIP-file.

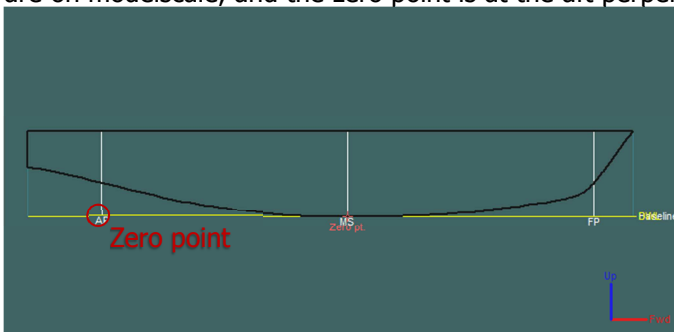
- **IGES**

IGES-files can be opened in most major 3D-programs. The hull and the transom are described as 3D-NURBS-surfaces. Files are on model scale, in millimeters, and the zero point is at the aft perpendicular at the baseline.



- **Maxsurf MSD**

MSD-files are Maxsurf-documents, and can therefore be opened in Maxsurf (www.formsys.com/maxsurf). The files are on modelscale, and the zero point is at the aft perpendicular at the baseline.



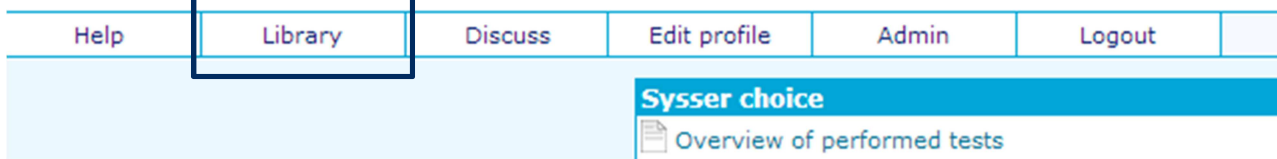
- **Points file (.txt)**

```

0 10 20
-150,-105.3,324
-150,-107.7,327.4
-150,-109.3,310.5
-150,-110.9,303.6
-150,-111.2,296.5
-150,-110.5,289.5
-150,-108.9,282.6
-150,-106.5,275.9
-150,-103.4,269.6
-150,-99.45,263.7
-150,-94.95,258.2
-150,-89.95,253.2
-150,-84.54,248.6
-150,-78.81,244.4
-150,-72.84,240.6
    
```

TXT-files are the most simple representation of the bare hull. Every line represents a point, described by its x, y and z-coordinates in millimeters. The coordinates are separated by a comma. The file is on model scale, the zero point is at the aft perpendicular at the baseline.

The website – The library



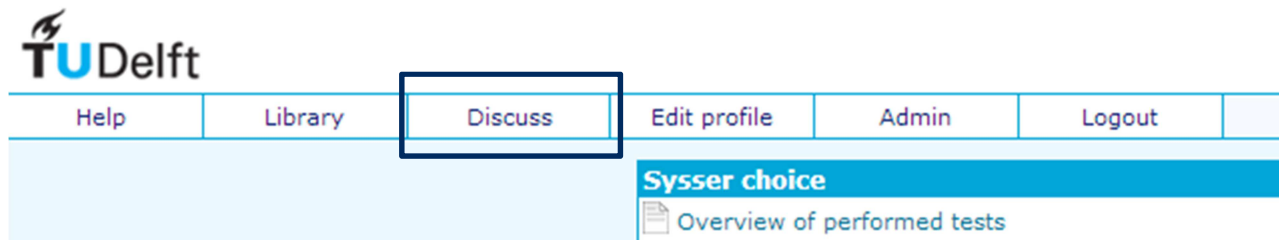
The library is accessed through the button 'Library'. A window will open with a list of all the publications. Just click on the link to download a publication in PDF-format.



Please note: the PDF-files are only downloadable when you're logged in! If you copy or bookmark the link for later use, make sure you're logged in!

The library can be closed by clicking on the 'Library' button again, or by clicking the white 'X' in the top left of the window.

The website - The discussion board



The discussion board can be opened by clicking on 'Discuss', and works pretty straightforward. It is a slightly modified version of MyLittleForum (www.mylittleforum.net). Posting, replying and editing should not require explanation; if you however have problems with your user account, please send an email to the administrator (M.Katgert@TUDelft.nl).

The discussion board can be closed by clicking on 'Discuss' again, or by clicking the white 'X' in the top left of the window.