



NAUTICUS HULL

RELEASE DOCUMENT

JULY 2009 RELEASE

DET NORSKE VERITAS

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1 Introduction

1.1 Purpose

The purpose of this document is to inform the users about system requirements, new programs and functionalities, enhancements and bug fixes that are implemented in Nauticus Hull since previous release.

Details about the implementations in all programs are not fully covered in this document, and for more information the user should consult the program documentations being a part of the local installations.

For details about rule implementations in the programs, the user should consult the approval engineers for information about how to use the program for specific ship structures.

For information on how to install the program, please consult the **Nauticus Hull Installation Guide.pdf**, which can be found on the root of the installation CD.

1.2 CSR-Tank and CSR-Bulk

CSR-Tank is in this document used as an abbreviation for “IACS Common Structural Rules for Double Hull Oil Tankers”. CSR-Tank is applicable for double hull oil tankers with length $L \geq 150$ m.

CSR-Bulk is in this document used as an abbreviation for “IACS Common Structural Rules for Bulk Carriers”. CSR-Bulk is applicable for bulk carriers with length $L \geq 90$ m.

2 Programs and versions

The following Nauticus Hull programs are available in the January 2009 release:

| <u>Program</u> | <u>Version</u> |
|-----------------------|-----------------------|
| Rule Check | 11.0 |
| 3D Beam | 11.0 |
| PULS | 2.0.9 |
| GeniE | 4.0-21 |
| Sesam Manager | 5.3-05 |
| Presel | 7.4-02 |
| Sestra | 8.4-01 |
| Cutres | 1.5-01 |
| Submod | 3.2-01 |
| Xtract | 2.1-00 |
| Waveship | 6.2-04 |
| Wasim | 4.2-01 |
| Wasim_setup | 2.2-04 |
| Wasim_solve | 3.5-01 |
| Wasim_fourier | 3.5-01 |
| Wasim_stru | 3.4-02 |
| Wasim_mass | 2.3-01 |
| Postresp | 6.2-04 |

New and old releases of the different programs are available for download on our web site

<http://www.dnv.com/software/support/index.asp>

3 System Information

3.1 Minimum software requirements

Microsoft Office 2000, Excel + Word, Internet Explorer 5.01, or later versions, Microsoft .NET Framework 2.0.

3.2 Minimum hardware requirements

| Package | Processor CPU/Mhz | Memory MB | Storage GB | Display and Graphics card |
|---------------|-------------------|-----------|------------|----------------------------------------------------------------|
| Nauticus Hull | 1500 | 2048 | 10 | 1024x768 resolution OpenGL hardware accelerator recommended |
| GeniE | 1500 | 1024 | | OpenGL |

3.3 Operating system requirement

Windows 2000 with Service Pack 4 or Windows XP. File system should be NTFS. Nauticus Hull must be installed and executed with administrative privileges under Windows Vista.

3.4 Decimal Separator

Decimal separator (symbol)

It is required to use . (dot) as decimal separator for some of the Nauticus Hull programs (e.g. Word and Excel report from Section Scantlings).

Open Control Panel → *Regional Settings* to inspect and modify the separator symbols.

If changing Decimals Symbol sign given in regional setting from what is default for selected country, change Decimal Symbol both for numeric and *currency* values. Otherwise, the RCXL spreadsheets may produce wrong result.

List separator

List separator sign must be different from the decimal separator used. Use comma , or semicolon ;

4 New Functionality

Compartments And Loads

The tank plan window is now a splitter-window and is resizable. Zoom and Pan is implemented for each splitter window.

Colour coding for compartment types and loads is implemented in the tank plan and the compartments and loads grid. The colours are explained in a colour legend box. Tooltip for compartments in the tank plan is implemented giving information about the compartment name and compartment type or load similar to the colour coding.

Default compartment type can be set for the cross section compartments (left side grid in the “Compartmentation” tab). These types are used to generate the default compartment types when the 3D compartments are generated.

DNV Rules – Prescriptive loads

Standard prescriptive compartment loads are now created based on *Relevant cargo* specified for the compartments in addition to *Compartment category*.

DNV Rules - FE Analyses using GeniE

- Loads for container carriers according to the DNV rules can now be generated in Nauticus Hull and transferred to GeniE for finite element analysis.
- Boundary conditions including vertical springs at transverse bulkhead positions can now be generated in Nauticus Hull and transferred to GeniE
- Calculation of net scantlings according to the DNV Rules is implemented in GeniE.

5 Error Corrections and Limitations

5.1 General

Error Corrections

- Problems related to 64-bit operating system have been corrected.

5.2 Compartments and Loads

Error Corrections

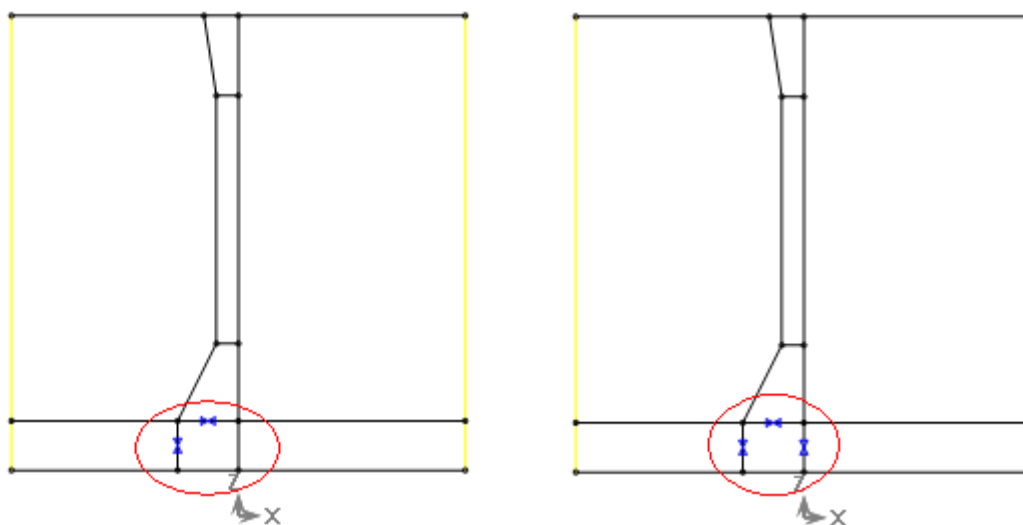
- **CompartmentAndLoads (IM1516, IM1518)**
For container ships, default compartment type for cargo hold is now “Dry Cargo Hold”. Inconsistent display of SB/Port compartments is fixed. Relevant cargo as function of compartment category is now working correctly.
- Several minor bugfixes in tank plan GUI
- Bugs creating inconsistent compartment model when changing input parameters are removed

Limitations

- Nauticus Hull generates compartments by linear extrusion of cross sections. Transverse stool tanks are generated similarly by linear extrusion of transverse bulkhead cross sections. Because of this, longitudinal structures which are present in the transverse bulkhead (e.g. inner bottom) cannot have varying z co-ordinate along y direction. It must match the constant z co-ordinate in the transverse bulkhead. If this is not the case, a warning will be generated during compartment generation.
- It is not possible to Join compartments across the centreline of a symmetric cross-section.
- Cut-outs used in transverse bulkheads can be used to automatically merge compartments made by longitudinal structures and compartments in transverse stool tanks. However, if cutouts are inserted in transverse bulkheads in such a way that the bulkheads become non watertight, this will not work. Compartments being part of more than one cargo tank/hold area have to be joined manually. See figure below:

This is supported:

This is not supported:



5.3 Cross Section Analyses - Section Scantlings

Rule updates

- **Fatigue calculations according to Class Note 30.7, October 2008 included.**
If the rule version is January 2009, the fatigue calculations are performed according to Class Note 30.7, October 2008. Otherwise, the previous version of Class Note 30.7 is used.
- **CSR-Bulk Rule Change Notice 1 to July 2008 included.**
If the rule version is July 2009, the calculations are performed including the updates in “Rule Change Notice 1 to July 2008”. It is the rule changes in No. 1-4 (Minimum Scantling, Side Frame and Grab) and N0. 1-6 (Fatigue check for longitudinals) that are included.

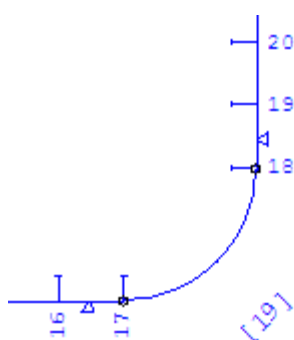
Error Corrections

- **CSR-Bulk, relative deflections (IM 1531)**
The sign of relative deflections calculated for use in the CSR-Bulk fatigue analysis were always positive in previous version. Now the program is updated so that the sign is according to Rule Change Notice 1 to July 2008.
- **CSA-Sync between stiffener in grid and graphics lost if grid not sorted by row (IM 1512)**
Synchronisation between grid and plot has been improved in the CSA tool. Plot has also been upgraded to be able to pan and objects will now only be selected if user clicks within a close area around the object.
- **CSA-Strange results in property dialogue-material factor (IM 1503)**
The 1A1-rules and CSR rules had been mixed. Results have now been updated according to section scantling.

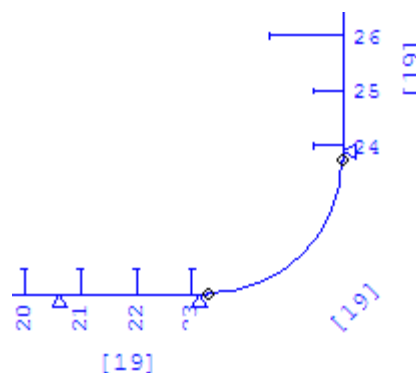
Limitations

CSR-Bulk Rules

- The specific requirements for ships with length less than 150 metres are not included.
- Bilge plate requirements, Ch 6, Sec 1, [2.3]:
For the transition zone between the flat bottom and the curved bilge, the bilge plate requirements are not specifically considered in the Rules. Thus the calculated requirements are limited to cases where the curved bilge area is modelled with a longitudinal stiffener at the transition point between the flat bottom and the curved bilge.
The same limitation applies to the transition zone between the curved bilge and the flat ship side.



Supported configuration:
Stiffener at transition point.



Not supported configuration:
Stiffener not at transition point

- Buckling strength of curved plates:
Plates with a varying curvature (or having both flat and curved parts) are not covered by the rules and should be specially considered.

DNV Rules 1A1 – fatigue strength requirements for bulk carriers

- Loads from bulk cargos are not included in the fatigue calculations.

5.4 Rule Check Analyses

Limitations

- CRS-Tank_ConnectionArea spreadsheet: When pressing the “Import data from Cross Section Analyses” button, the Design pressure P is not imported, and set to the value of 0.0.

Error Corrections

- Calculations in the Beam buckling spreadsheet according to Class Note 30.1 have been corrected (IM1046).

5.5 FE Analyses - GeniE

Limitations

DNV Rules

- Internal members and plate boundaries for ballast tanks and cargo oil tanks have to be split manually in GeniE at 1.5 m below weather deck tank top in order to get correct corrosion additions.
- Plates and stiffeners that span over compartments with different corrosion additions have to be split manually in GeniE at the compartment boundaries in order to get correct corrosion additions.
- Boundary conditions at the end planes and the CL symmetry plane of the model are only applied to intersection lines between plates and the planes.
- Loads for bulk carriers and ore carriers are not implemented.

5.6 FE Analyses - Modelling and Analysis

Error Corrections

- In some cases the commands in the Patran-Pre session file specifying boundary curves for paver mesh surfaces (trimmed surfaces) became too long, and Patran-Pre stopped reading the session file. This error is now corrected (Not registered in IM).

5.7 PULS

PulsComClasses is updated to version 2.0.9.

The update of the PulsComClasses in version 2.0.9 is almost similar to the update in version 2.0.8 in which some unexpected results occurred due to "numerical instabilities" in the numerical solver. These instability problems seem to be very rare, and in version 2.0.8 the problems were reduced by using a smaller incremental step size in the equilibrium equation solver. In the version 2.0.9, the incremental step size is also reduced in the procedure in which the most unfavourable imperfection is found.

More specifically, in the previous version 2.0.8 for biaxially loaded plates, two initial analyses with different imperfection were performed with a large incremental step size, and the most unfavourable imperfection were used in a new refined analysis with a small step size. In the new version 2.0.9, a small step size is also used to find the most unfavourable imperfection, and consequently there is no need for a new analysis since an analysis with a small step size already is performed. The results can simply be taken from the analysis obtained for the most unfavourable imperfection. The computational efficiency will be as before since the total number of increment steps will not be increased.

5.8 Other

Import and export – Settings and Tools

- "Export job" could fail if the job contained large files (>800MB). This is fixed and a progress bar is added.
- The vessel ID within old Brix packages (*BxPkg* files) will now be updated when importing a job to a new Vessel ID. (IM1306)

- *Import job* could fail when the original vessel folder included *Vessel ID* more than once, e.g. T:\3914\ships\3914\.

Finite element and wave load analysis programs

Please visit our website for latest status and updates

<http://www.dnv.com/services/software/support/downloadUpdates.asp>

6 *Known Issues*

The status of known issues, program errors and limitations are continuously updated on the online status list:

<http://exchange.dnv.com/NauticusHull/STATUS%20LIST.pdf>