

Nauticus™ Hull

The complete solution for strength assessment of ship-structures

DNV Software

Ship Design

Reducing time to market is a key challenge for ship designers as regulations and strength requirements become more complex



Key challenges in ship design

The technology innovation throughout the maritime world has resulted in new possibilities to bridge different design domains. Utilizing the power of existing design knowledge together with new Information Technology in a more integrated and structured manner will be an essential issue for improving design team productivity.

Addressing quality and productivity in ship design organisations is far from straightforward. The two terms are closely related. The number of “design errors” in ship design is directly proportional to the amount of rework and waste necessary for the designer to meet clients’ requirements.

The more rework, the less likely it is that a project will be finished on time and within budget. Ship design is an iterative process - you need to guess the ship’s scantlings

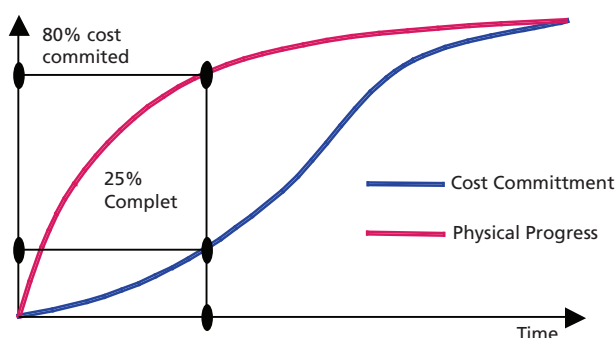
in order to settle the scantlings. Any changes in main dimensions made during the design cycle will require create new loads and analysis.

The design period is when the cost can be influenced to the greatest extent. Typically 70 to 80 percent of the total cost of a ship newbuilding project is determined at the end of the early design process. Efficient tools are essential for ship designers to optimise the design and reduce the risk of costly design changes later in the process.

Our innovation

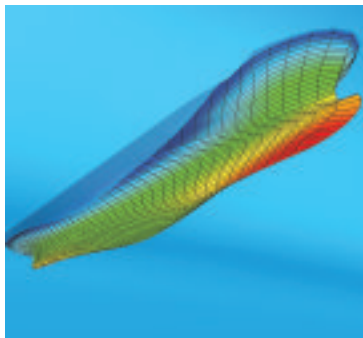
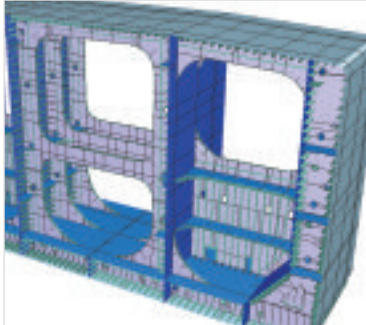
With the latest release of Nauticus Hull, DNV Software has responded to market needs by combining the best of Brix Foundation, Nauticus Hull and GeniE. Brix’s multi-user architecture facilitates an integrated Rule Engine and a separate Work Flow Engine.

The main purpose of building next generation Nauticus Hull on top of Brix Foundation has been to provide proper revision control and greater design automation capacity. Brix Explorer’s well defined API ensures easy integration with legacy systems. Common compartment definition has always been a prerequisite for efficient initial design. Nauticus Hull’s newly developed compartment tool glues together stability packages, rule calculations, hydro dynamics and strength assessment.



Nauticus Hull

Nauticus Hull is the preferred solution for ship design, verification and strength analysis



The lack of proper integration of Class rule loading, rule checking and computer aided engineering has for many years been one of the major obstacles in the design process. By introducing GeniE into the ship design domain, the fully integrated application environment will reduce modelling time, allow fast model changes and facilitate automatic code checking.

Rules and Regulations

The recent move by Class societies towards Common Structural Rules (CSR) will affect the current overall design process. The new rule requirements introduce a radical shift towards more computerisation of the rule formulations and structural assessment. Hence, good software support is critical for any Class society to provide timely and rational support to shipowners, designers and shipbuilders. In response to this, DNV's well established Nauticus Hull program has undergone a major upgrade to provide efficient support for the new rules.

Nauticus Hull

Nauticus Hull is DNV's software solution for strength assessment of ship-structures. Based on DNV's strong industry knowledge and expertise, the system provides a highly efficient environment for design and verification. It is a complete structural analysis package, developed by naval architects for naval architects.

The system is an important part of the design and verification work for more than 200 users worldwide. High quality technical support and a development strategy based on the latest technology make Nauticus Hull a safe long-term solution.

Brix Explorer

Brix Explorer is the main entry point to all the Nauticus Hull programs. It organises the work and gives easy access to various templates for typical jobs to be carried out.

The user is guided through the relevant tasks and data are gathered in a single database for each job. General information about the ship, such as dimensions, applicable rules, compartment data, loads, etc, is stored in the database and shared by all the programs.

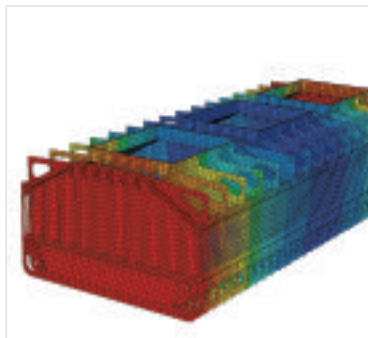
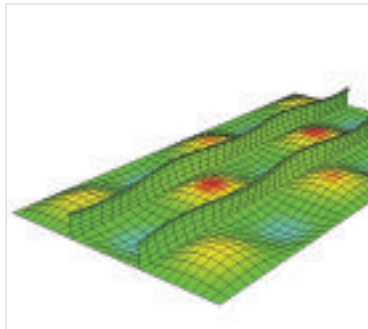
The Brix technology will also enable you to build on Nauticus Hull's pre-defined templates to create your own customised workflows, integrating your best engineering practices.

Nauticus Hull - a complete solution

Nauticus Hull is available in different configurations, from basic Rule Check package to advanced systems for wave load and finite element analyses. For all packages, a common user interface, with intuitive toolbars combined

Supporting CSR

Nauticus Hull has undergone a major upgrade to provide sufficient support for the Common Structural Rules



with specialised modelling wizards, minimises the learning period and user threshold. With less time spent on generating models, more time can be spent on essential design-process decisions.

Nauticus Hull Rule Check

User-friendliness and powerful modelling capabilities make the Rule Check package a generic design tool and a preferred system among ship designers for initial hull girder design and optimisation. The package provides support for the DNV Rules, including the new Common Structural Rules.

The Rule Check package includes:

- Section Scantlings, the market leader for hull scantlings design
- Rule Check XL, several calculation programs needed for structural analysis according to the Rules for Ships
- Automatic buckling check of stiffened thin plate elements based on PULS (Panel Ultimate Limit State) and the DIN standard
- H-ULS (Hull Girder Ultimate Limit State) check to ensure hull girder capacity
- Nauticus Fatigue for calculating the fatigue life of longitudinal girders and stiffeners

Nauticus HSLC

Nauticus High Speed Light Craft is a customised package with programs for rule checks and structural analysis according to the DNV Rules for High Speed and Light Craft.

Nauticus 3D Beam

Nauticus 3D Beam is a general beam element analysis program featuring an intuitive and user-friendly interface, tailor made for modelling complex 3D frame structures such as web frames, foundations, deck grillages, etc. The program features a very powerful solver allowing fast and accurate linear static analysis of complex models with multiple load cases. 3D Beam is an important supplement to the Rule Check packages and a valuable strength calculation tool when advanced finite element analysis is not required.

The Rule Check and HSLC packages are offered in extended versions, including Nauticus 3D Beam.

Nauticus Hull Finite Element Analysis

With Nauticus Hull, FEA may be performed as an integrated part of ship design. This is achieved through the exceptionally fast modelling and result evaluation including the way the user may utilise the information stored in the concept model to automatically generate compartments, loads, boundary conditions, etc.

A complete solution

Nauticus Hull is available in several different packages tailor-made for specific user needs



The FEA Package now includes GeniE for 3D modelling and analysis. GeniE represents the latest generation design and analysis software for maritime and offshore structures. This has been motivated and driven by end-user needs for solutions offering faster modelling speeds, closely integrated with advanced strength assessment tools. By offering design, modelling, analysis and result-evaluation features within the same user interface, GeniE supports the engineers' need for fast design iterations.

By introducing concept modelling techniques, GeniE allows engineers to focus on real structural parts, loads and environmental conditions instead of nodes and elements. Combined with strong features for 3D visualisation, this significantly reduces the time spent on modelling and documentation and provides efficient verification.

For CSR tank and bulk, as much as 30-40 load cases are automatically generated by Nauticus Hull depending on the design configuration. With automated post processing, including a scanning check of all load cases for buckling, yield and deflections, the time spent on evaluation has been dramatically reduced.

Nauticus Hull Wave Load Analysis

Nauticus Hull Wave Load Analysis provides the shipbuilding and shipping communities with state-of-the-art hydro-

dynamic analysis tools. All ship types, all speeds, all sea directions and all six degrees of freedom are accounted for by the new generation of hydrodynamic software programs.

Pressure loads on the wet surface of the hull and inertia loads throughout the vessel can be automatically transferred to Nauticus Hull's finite element programs for subsequent structural, fatigue or buckling analysis. This automatic transfer saves valuable time and improves quality.

Nauticus Hull Wave Load Analysis is based on Wasim, a non-linear time domain hydrodynamic analysis tool solving the full 3D radiation/diffraction problem by using a Rankine panel method.

Nauticus Container Securing

Nauticus Container Securing is a software tool for assessing forces on containers and securing devices during sea transport. A user-friendly environment lets the user easily model container arrangements and perform analyses. The program utilises a seamless combination of MicrosoftTM Excel for input specification and result presentation and Nauticus 3D Beam for the analytical solution.

Nauticus 3D Beam is optionally included as a stand-alone product in the Nauticus Container Securing Extended version.

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