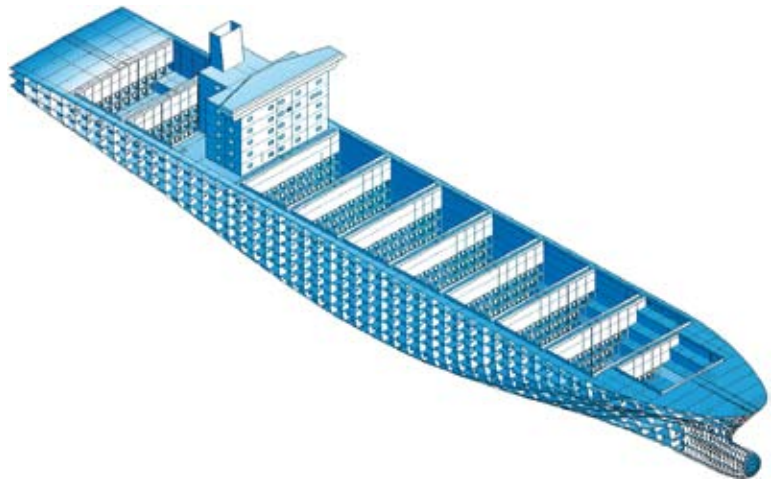




# Naval Architectural Software for Professionals



# Napa Ltd

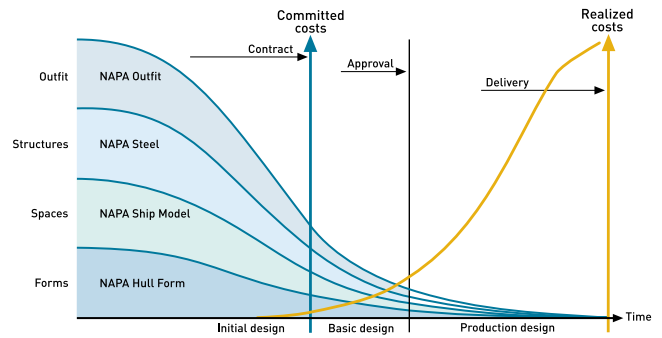
Napa Ltd is an independent software house that develops and markets systems and services for the design and operation of ships and offshore structures. We have been in the forefront of software development for decades, setting new standards for marine industry software.

The company is privately owned and has a staff of more than 90 people, including the original key persons who laid the foundation of NAPA more than 20 years ago.

## NAPA's Role in the Design Process

NAPA can be used to design any type of floating structure, and it accommodates every designer's needs in the early design phases. From the first sketches through hull design and fairing, basic structural design and performance predictions to statutory calculations and delivery documents, only one tool is needed: NAPA.

Role of NAPA in ship design



## Where is NAPA in Use

NAPA is used successfully by over 270 professional organizations, including the leading shipyards, classification societies, maritime authorities, consultancies, model basins, research institutes, ship owners and ship operators worldwide. From the beginning, NAPA has been developed and tested in a true shipbuilding environment, ensuring that it meets the practical needs of naval architects. This makes NAPA an ideal choice for professional designers and shipbuilders.

## Technical Gains and Advantages

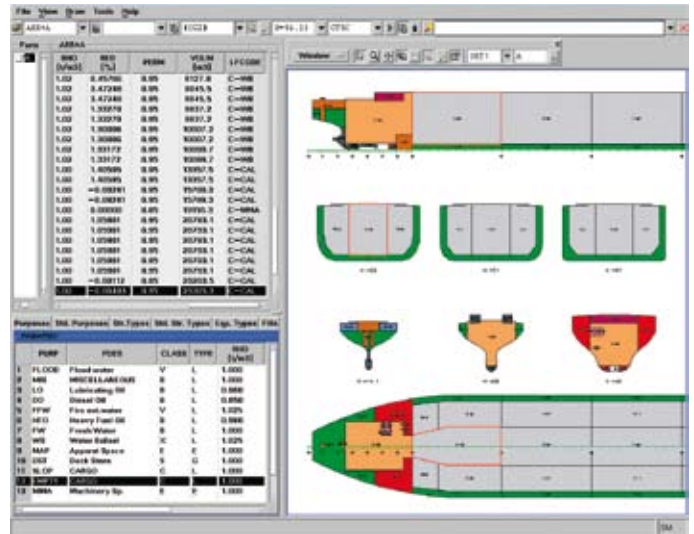
NAPA is designed to cover the most demanding needs of naval architects and marine industry professionals.

- A 3D topological product model supporting rapid changes in design
- Any kind of floating structure can be modelled
- A wide range of analysis for design, stability, hydrodynamics and structures
- Completely customizable automatic document generation
- An application generator, scripting language and tools for managing working processes support efficient customizations
- Interfaces to numerous standard and proprietary formats for data transfer

## 3D Product Model

The core of the NAPA system is the topological NAPA 3D product model. Since all calculations and definitions are based on the same model, design consistency is assured.

One 3D Ship product model serves each user's every need, allowing the concurrent sharing of design information within the marine industry.

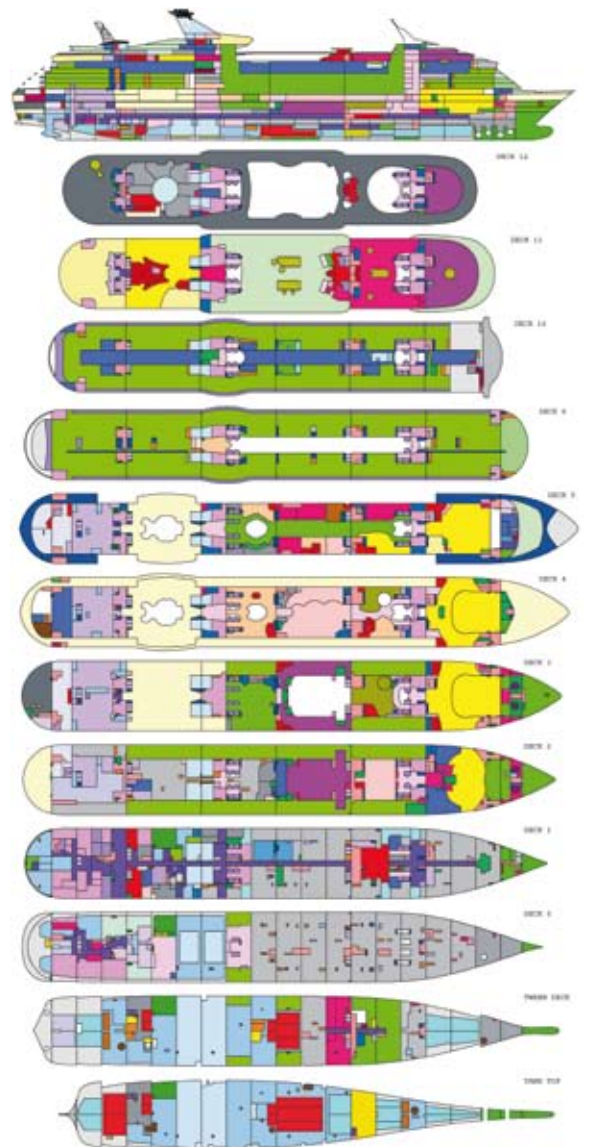


## Solutions for the Marine Industry

The NAPA system is a single integrated software system covering numerous aspects of ship and offshore platform design and analysis. The modular nature of the system makes it possible to select the functionality required to realise the desired design. The primary design disciplines NAPA covers are:

- **Contract Design** for finding the optimum design solution before signing the contract
- **Hull Form and Performance** for hull design, hydrodynamics and performance optimization
- **Statutory Compliance** for assuring that the design meets all rules and regulations
- **NAPA Steel** for structural design in the early design stages
- **Offshore Structures** for efficient design and comprehensive analysis of offshore structures

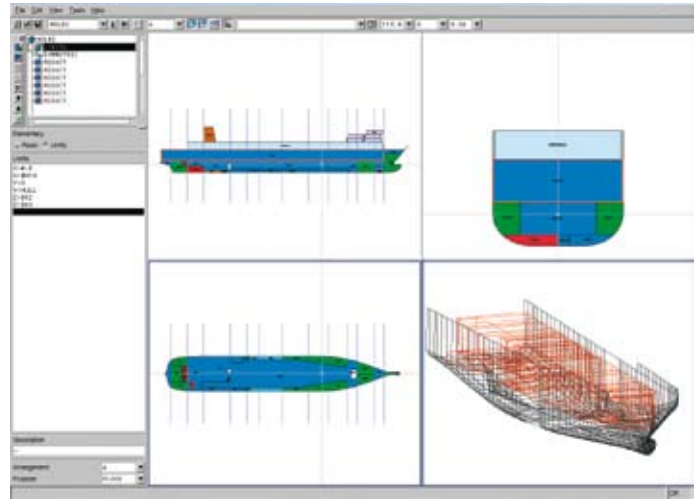
In addition, there are special applications for emergency response, outfitting and tools for developing and customizing the NAPA system to suit user needs.



# NAPA for Contract Design

The NAPA system contains all of the functions necessary for the contract design of ships and offshore structures.

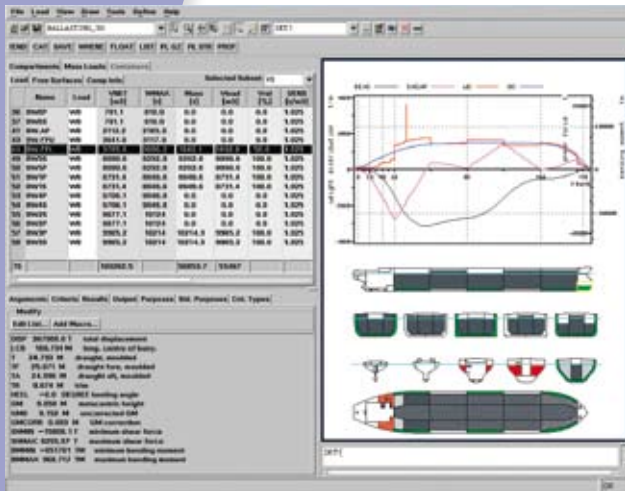
In the early design stages, it is vital to obtain reliable and accurate information quickly. It is also essential that rapid and extensive changes can easily be made to the design. The NAPA 3D product model is the primary source of design information at the stages leading up to the contract. With NAPA, compartments and structures can be modelled quickly and easily, the relevant detailed analysis can be done, changes can be made and the design can be optimized.



## Unrivalled Functionality

From the beginning, Napa Ltd has focused on providing the best solutions to meet the needs of the people involved in contract design. The NAPA system provides the tools needed at the early stages of design, including:

- Hull form design
- Compartmentation
- Hydrostatics and stability
- General arrangement
- Tank calibration and capacity tables
- Freeboard and tonnage calculation
- Loading conditions and intact stability studies
- Longitudinal strength
- Damage stability
- Speed and power prediction
- Seakeeping and maneuvering
- Weight and cost estimation
- Drawings and documentation

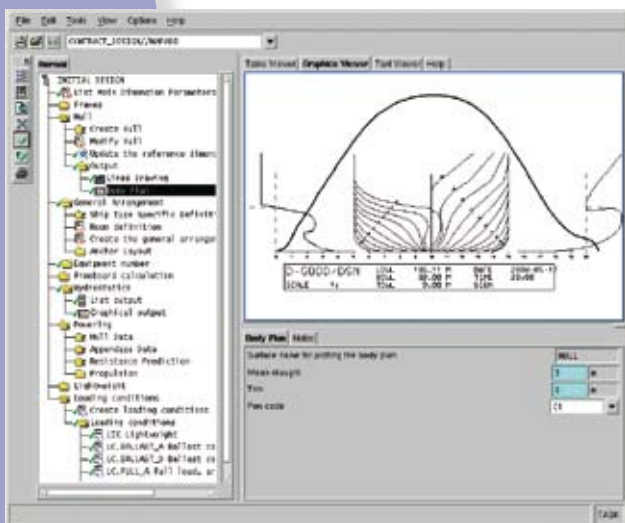


## Contract Design Made Easy

The Contract Design **NAPA Manager** application is intended for quick and easy creation of the whole 3D model with NAPA. It provides the logical workflow for contract design. The NAPA Manager works as a user-oriented intuitive, visual interface for NAPA and manages extensive design processes. Changes, adjustments and updates are done easily with the NAPA Manager. All tasks, their relative order, up-to-date status and dependencies can be seen at a glance.

## Advantages

The key benefit of the NAPA system is the unequalled speed at which design variations can be investigated and the design accomplished. NAPA offers an integrated package with the wide variety of applications needed in ship design. The outcome of the early design with NAPA can be further developed in the latter stages of design, including meeting the final challenges of delivery and operation.

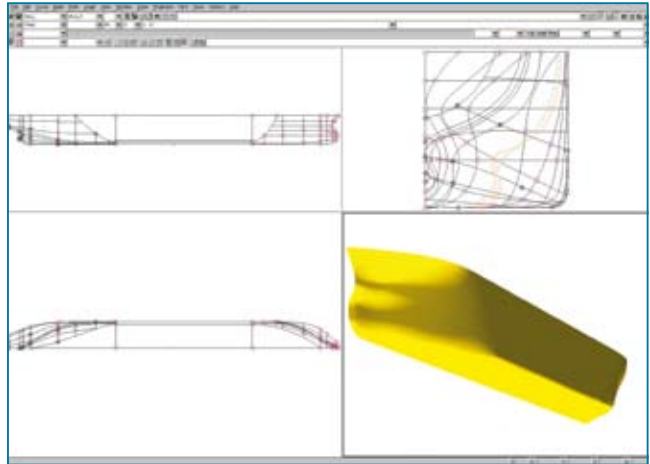


# NAPA Hull Form and Performance

NAPA brings the conceptual hull form all the way to the production stage, including final fairing. NAPA's hydrodynamics suite includes a variety of performance analysis systems covering the early stage design up to more advanced CFD techniques for optimizing the hull form as the project progresses.

## Efficiency in Design – The Hull Surface Editor

NAPA supports several methodologies for hull design, including real 3D surface modelling, transformations, parametric definitions and more. The tools for hull surface design are integrated into a single window in NAPA – the Hull Surface Editor.



## Hydrodynamic Design and Analysis

Integrated performance prediction routines facilitate the evaluation of the hull design quickly in the early design stage.

- Power prediction, including use of model test data
- Propeller selection with standard series propellers or user defined performance curves
- Seakeeping analysis with strip or linear diffraction theory in irregular waves
- Downtime calculations
- Maneuvering simulations according to IMO resolution MSC.137(76)
- Stationkeeping and other special studies



## Hull Form Optimization and CFD Analysis

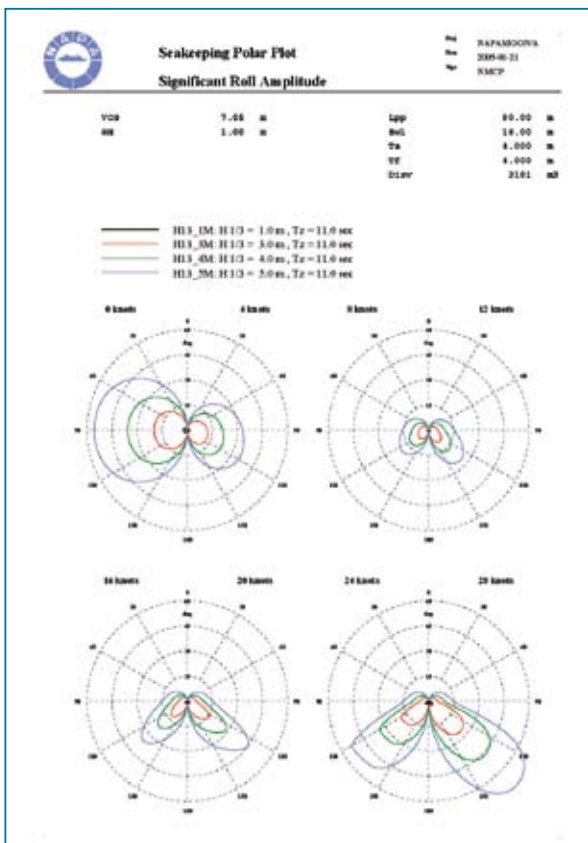
Detailed hull form evaluation and optimization based on CFD are available entirely within the NAPA system.

- RANS viscous flow solver integrated into NAPA
- Automatic grid generation for RANS analysis
- Wave resistance according to a linear potential flow solver
- Multi-objective genetic algorithms to handle any kind of optimization problem
- Panel model generation and transfer to external CFD systems

## Interfacing and Data Exchange

A very wide variety of links and interfaces allow the user to transfer the hull surface to production systems, CAD programs, CFD software and other systems capable of handling 3D surfaces, including:

- AVEVA Marine/TRIBON
- NUPAS-CADMATIC
- FORAN
- IGES
- DXF/AutoCAD
- CFD links to Shipflow, Rapid and Shallow and many more.

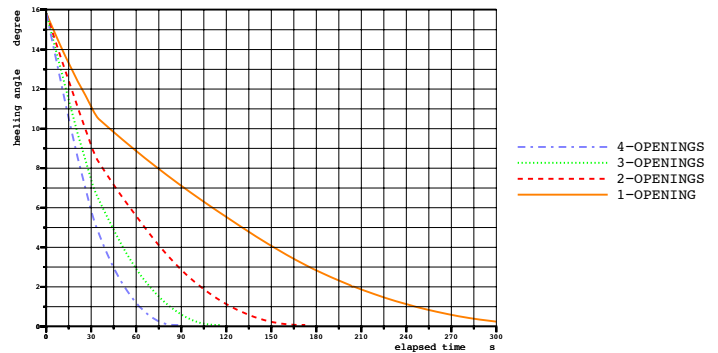


# NAPA for Statutory Compliance

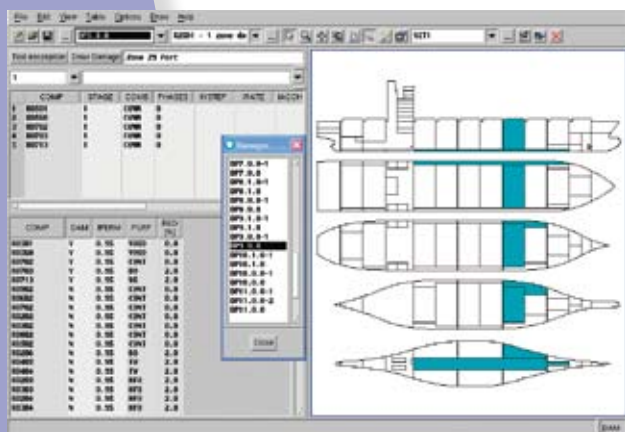
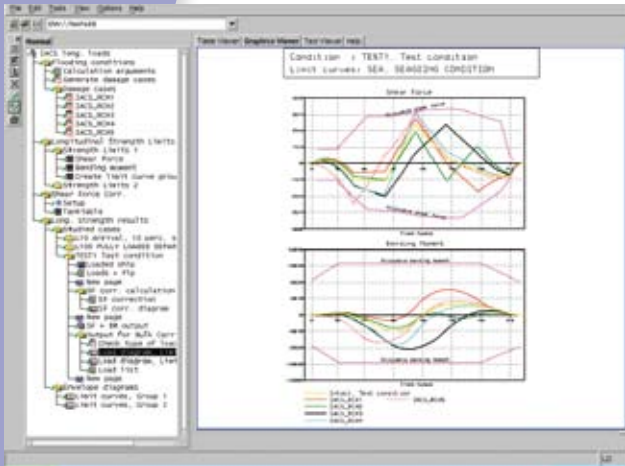
Through its extensive set of tools for designing and calculating stability and strength, NAPA offers comprehensive functionality beyond the initial design phase.

The NAPA Manager automates routine tasks, such as calculation of probabilistic damage stability and generation of statutory documents during the design process.

The NAPA system has been approved, and is continuously used, by the world's leading classification societies and maritime administrations, a factor which means a smooth approval process. NAPA is also one of the main tools used by experts in the development of new stability regulations.



Example of Flooding Simulation Results



## Main Characteristics

- Intact and damage stability evaluation for all existing regulations also including:
  - Revised Chapter II-1 of SOLAS 74
  - Revised Annex 1 of MARPOL 73/78 (including Regulation 12A)
- Flooding Simulation in time-domain
- IACS longitudinal strength
- Shear force corrections
- Inclining test
- Grain stability
- Freeboard and tonnage
- Automatic document generation
  - Trim and Stability Booklet
  - Damage Stability Booklet

## The Leader in Stability Analysis Software

NAPA has proved its power and efficiency in the field of stability analysis. Thanks to the strong product model and the extremely fast and accurate calculation engine, NAPA is the de facto standard for the shipbuilding industry.

NAPA includes a comprehensive stability criteria library covering a substantial portion of the existing statutory requirements. In addition, macro based criteria can be defined for any existing regulation.

The Flooding Simulation feature for calculating progressive flooding and the floating position of the damaged ship offers a powerful tool especially for future stability regulations.

## NAPA for Design Approval

NAPA effectively integrates the design approval with the overall design process. Most classification societies and maritime authorities use NAPA for their plan approval, including:

- American Bureau of Shipping
- Bureau Veritas
- China Classification Society
- Det Norske Veritas
- Finnish Maritime Administration
- German Federal Maritime and Hydrographic Agency
- Germanischer Lloyd
- Hellenic Register of Shipping
- Indian Register of Shipping
- Inter maritime Certification Services Panama
- Lloyd's Register
- Nippon Kaiji Kyokai (ClassNK)
- Registro Italiano Navale
- Swedish Maritime Administration
- United States Coast Guard
- Vietnam Register

Specific tools have been developed together with leading classification societies to further improve the integration and design process. The provided tools help the designer to meet the classification and statutory requirements with minimal effort.

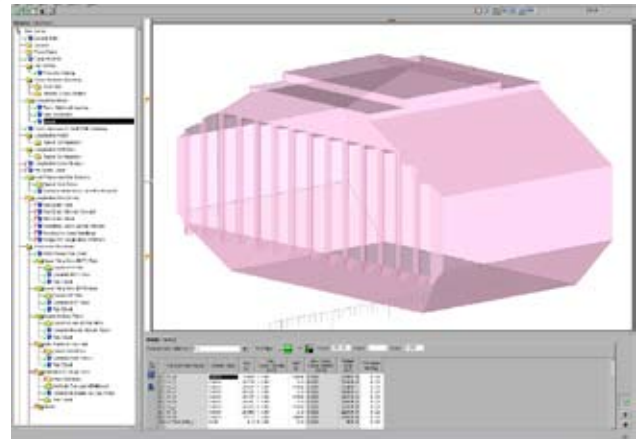
## Statutory Approval

The LR Statutory Compliance Manager Application, developed for Lloyd's Register, contains the up-to-date know-how required to check statutory requirements. Even before the plan approval begins, and by using an approved tool, the designer can verify the design against an ever-expanding constellation of statutory requirements. At present, the statutory rules covered include:

- IMO 749 – Intact Stability for all vessels
- MARPOL Annex I Reg. 26 – Intact Stability for Oil Tankers
- MARPOL Annex I damage stability for Oil Tankers
- IBC Code damage stability for Chemical carriers
- IGC Code damage Stability for Gas carriers
- ILLC plus related protocols damage stability for all ships
- SOLAS Chapter XII for Bulk Carriers with reduced freeboard

## Common Structural Rules

Napa Ltd and ABS have jointly developed software to assess the scantlings against the requirements of IACS Common Structural Rules for Tankers and Bulk Carriers. The user interface of ABS CSR software has a workflow guiding the user through all necessary tasks. Each item in the workflow has an easy-to-use template which asks the user to provide the information about the geometry in a 2D view. The 3D structure model is then created on the basis of the user input. The same 3D structure model can



be used for both rule check and in NAPA for various other design purposes and disciplines.

A variety of links and tools exist to help to reuse the design information from the classification process and vice versa. For example, the NAPA Steel model can be exported to LR ShipRight and SDA software and GL POSEIDON systems for rule check, and the FEM mesh to all class programs.

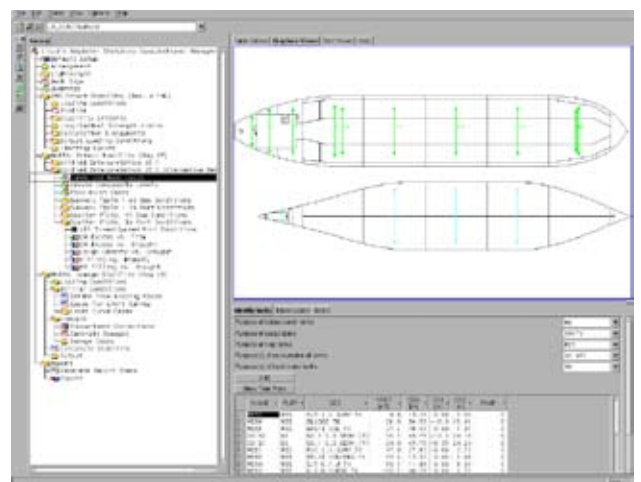
### Benefits of NAPA's Design Approval tools:

- Integrate the latest regulations and knowledge
- Save time during the design approval process
- Are fully integrated into the design process

## NAPA Emergency Response

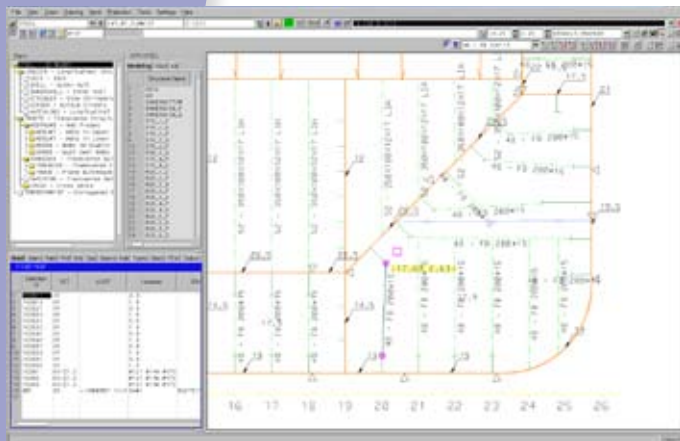
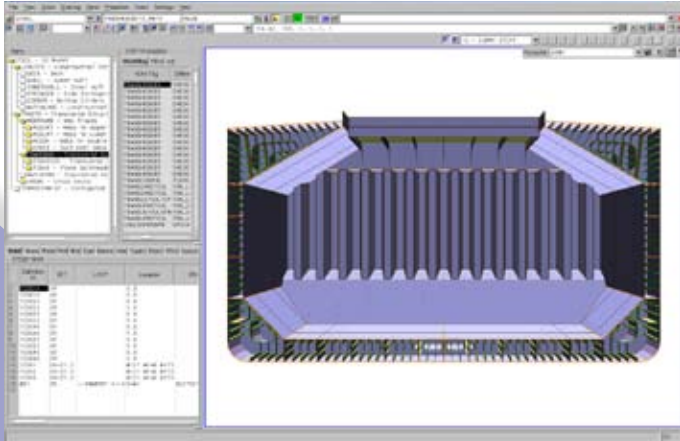
NAPA Emergency Response (NAPA ER) is a powerful tool to help ship operators, national and coastal administrations, classification societies and salvage companies quickly decide on the best recovery actions.

Use of NAPA ER will allow the user to prepare proactively for damage scenarios, quickly test recovery strategies and to provide innovative solutions based on sound technical information. It will help the ship operator minimize economic and environmental impacts in the event of an accident.



# NAPA Steel

NAPA Steel is a unique system for structural design of ships and offshore structures. The system facilitates a smooth transition from an early rough model to the level of details required for rule check, plan approval and shipyard production planning. NAPA Steel is an integrated part of the common NAPA 3D product model. NAPA Steel takes full advantage of the topological definition of structures.



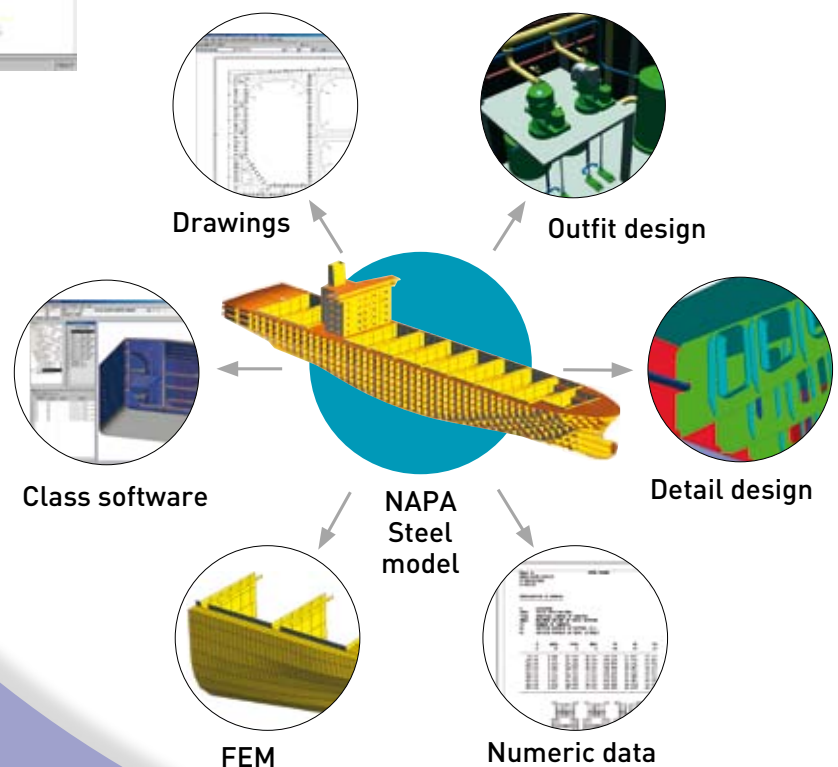
## Product Model

The product model approach permits fast modelling during the early design stages. The flexibility of the NAPA product model allows rapid changes to the structural design and provides the numerical figures for the optimization of the structures.

Detailed information on the steel production cost and production methods used can be extracted from the model. When the design progresses further, NAPA Steel allows a top-down approach for refining early structural concepts up to the detailed unique solutions for each individual structural member.

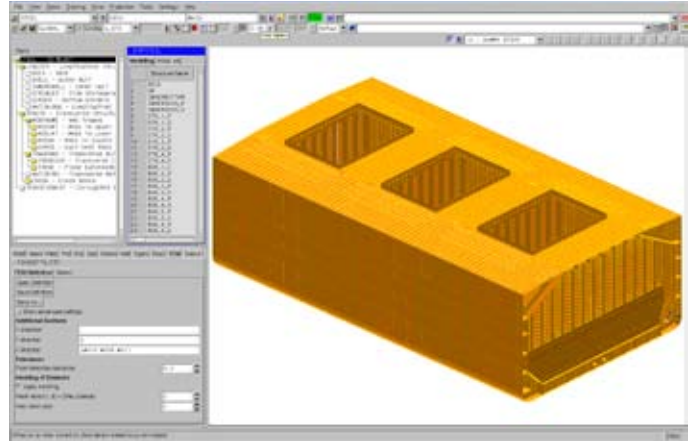
### Use of the 3D product model:

- Structural design for classification
- Cost-related information, e.g. weight, bill of materials, welding lengths and painting areas
- Production planning
- Generation of drawings and visualizations
- Export of the 3D structural model to outfit, classification and detail design systems, such as AVEVA Marine and NUPAS-CADMATIC
- Automatic FEM mesh generation for common software, e.g. NASTRAN and ANSYS
- IGES and DXF interfaces for linking to a wide variety of general CAD systems, e.g. AutoCAD



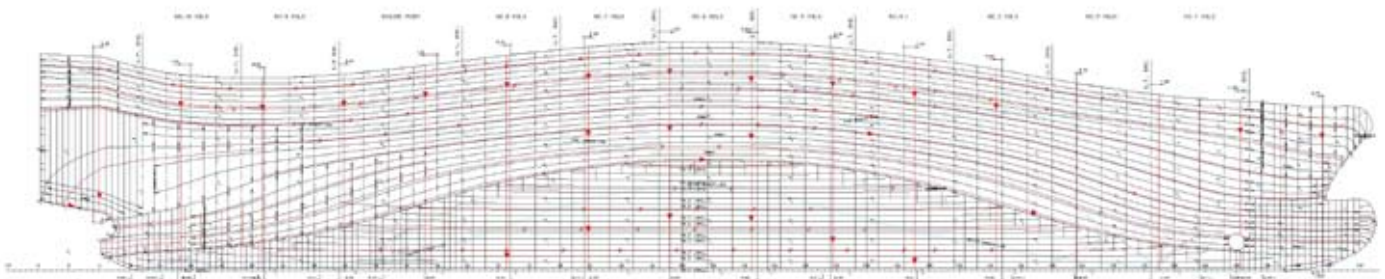
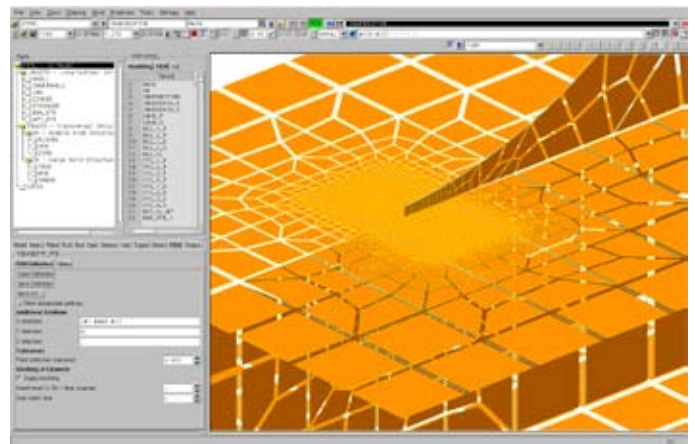
## Automatic FEM Mesh Generation

The 3D NAPA Steel model can be applied to produce a good quality FEM mesh for further analysis. The user can reproduce the mesh anytime the model is changed or updated. Predefined parameters control the mesh production automatically. A change of the parameter set controls the idealization of real structures to the geometry of the FEM mesh required for global, local or fine mesh models. The mesh can be exported in several formats for FEM software packages, such as Patran, Nastran and Ansys.



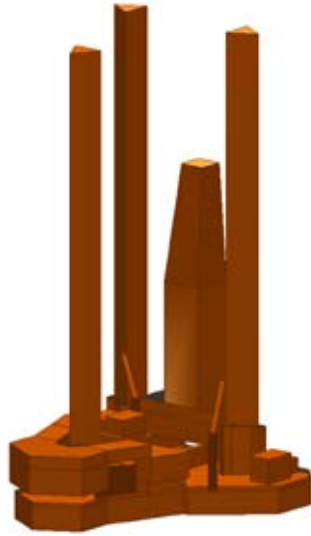
## Intelligent Classification Drawings

NAPA's drawing functions make it possible to create drawings for structural design approval quickly and easily from the 3D NAPA Steel model. The drawing is linked to the model, so that when the model is changed, the drawing is updated automatically, including all identifying markings and texts. This is an obvious advantage of the NAPA system; a feature preventing the inconsistencies between drawings that often result when relying on 2D CAD drawing systems.



# NAPA for Offshore Structures

Offshore structures are different enough from ships to warrant their own consideration in NAPA. For this reason, we have emphasized new tools and techniques specifically to make the handling of semisubmersibles, jackups and other offshore structures in NAPA as efficient as possible.



## Offshore Structures Stability Manager

The key NAPA applications for offshore structures is in the 3D modelling, stability analysis and reporting. The Offshore Structures Stability Manager (OSS) captures all the essential items required in the conceptual design of the platform.

- 3D product model allows for quick design variations
- Streamlined work process for stability analysis
- Reporting and watertight integrity plans

## Stability Analysis and Reporting

All functions necessary for the intact and damage stability calculations are included in the OSS manager.

- Wind moment analysis
- Loading conditions
- Intact and Damage Stability analysis
- Generation of intact and damage VCG curves
- Final operational limits plot
- Stability Analysis Report

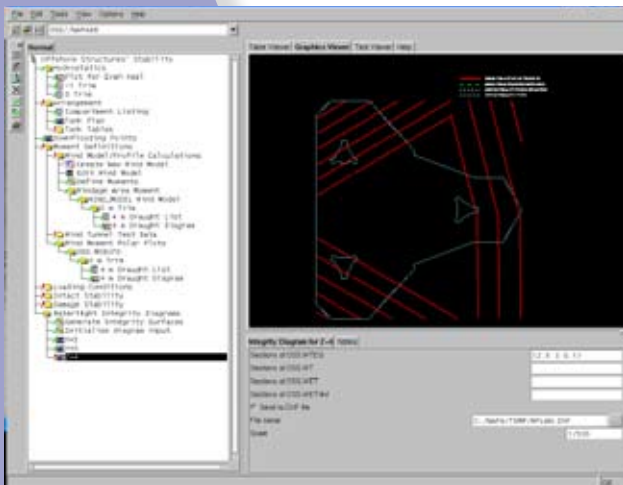
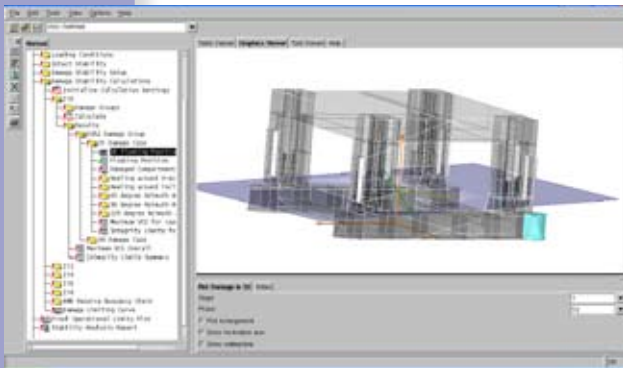
## Freeboard Plan

The OSS Manager also includes tools to calculate and gather the data required to generate watertight integrity plans and showing the limits for watertight and weathertight integrity on the structure. Scale drawings showing the compartment arrangement, openings and integrity limits can be generated and exported to DXF and AutoCAD for the incorporation of additional drawing details.

## Application of Other Solution Offerings

The use of NAPA for Offshore Structures is not limited to the stability analysis alone. The 3D product model of a platform can be used as with any 3D product model for ships. This means that relevant applications from other solution offerings are just as functional with offshore structures as with ship shaped hull forms. For instance:

- Motion and downtime analysis using the Seakeeping linear diffraction theory
- Export of pressures from motion analysis to FE programs
- Structural design using NAPA Steel
- FEM model generation and export to FEA software systems
- Structural drawing generation and export



## Maintenance and Support

- NAPA is developed continuously; two releases are issued every year
- Our Technical Support team of professional naval architects provide continuous technical advice and answers to your NAPA-related questions
- Training courses are held often and tailor-made training sessions are given on-site
- The annual NAPA User Meeting and Asian User Seminars bring together NAPA users to discuss the application and development of NAPA
- A web based support site, all users have access to a dedicated website and to a protected file transfer

## Cooperative Work

Napa Ltd plays an active role in international research projects. The company is regularly represented in a number of domestic and international projects. NAPA is also actively used in the development of new regulations and in research projects.

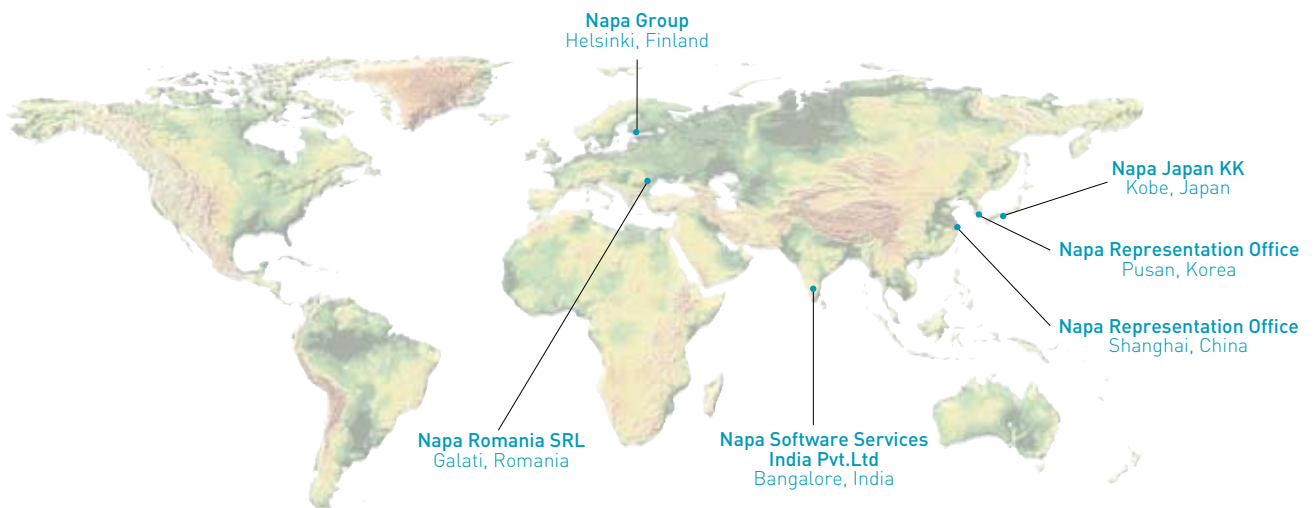
## Connection to Onboard-NAPA: NAPA and Ship Operations

After final delivery, the NAPA system supports ship operations and emergency response services through Onboard-NAPA and NAPA tools for emergency response (ER). Onboard-NAPA is a system used worldwide onboard some 800 ships for calculation of ship loading, damage stability analysis and ship performance prediction.

The Onboard-NAPA system is based on the same core technology as NAPA; it utilizes the same product model database as NAPA. This means great synergy for NAPA users, as the databases can be used in Onboard-NAPA without any extensive conversion work. Equipping a ship with Onboard-NAPA thus saves much time. NAPA ER combines functionality for loading and damage stability, grounding and tidal calculations into one easy-to-use tool for emergency response.



## NAPA Companies Worldwide





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