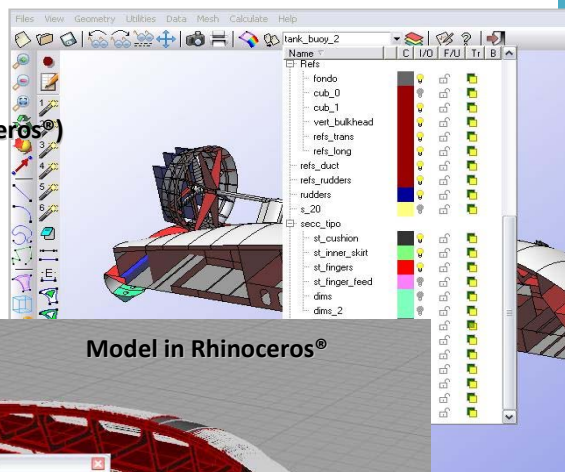


About RamSeries YACHT

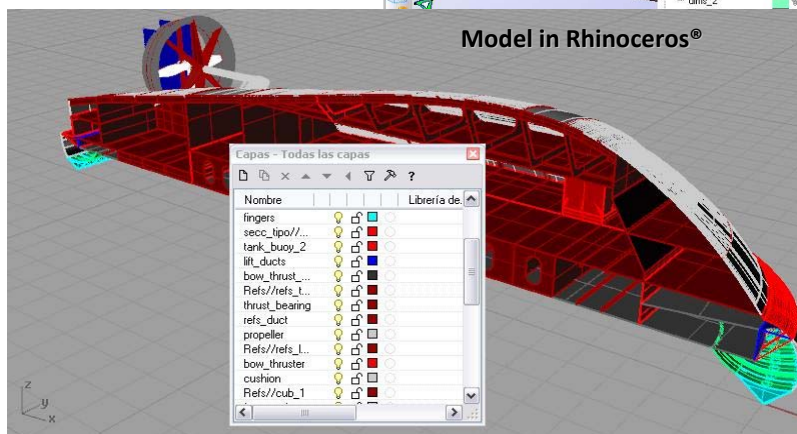
RamSeries is an advanced environment for structural analysis, based on the Finite Element Method. It is fully integrated in a Graphic User Interface (GUI) for pre and post processing of the analysis data. This allows a user friendly data insertion, as well as easy visualization/post-processing of results.

The graphic interface can import standard CAD geometry models, in order to easily adapt them for the analyses if necessary. RamSeries has direct CAD connection with some popular CAD packages like Rhinoceros®. Using this tool, it is not only possible to import the geometrical model but also the parts definition and the tree-like layers structure. It is also possible to adapt the GUI, allowing the user to automate and simplify the analysis processes.

**RamSeries Model
(imported from Rhinoceros®)**



Model in Rhinoceros®



RamSeries includes different element typologies, as well as constitutive material laws, which allow the user to undertake analyses of most complex structures with total reliability and precision.

RamSeries YACHT features some specific tools for naval structures analysis, which apply to both metallic and composite materials.

Arquinautic experience

"Nowadays in Arquinautic, RamSeries YACHT is the irreplaceable tool for verification and detail analysis of the behavior of our designs' structures, both aluminium or composite.

Its agility and sturdiness for importing and managing really complex surfaces, has impressed us, leaving other software far behind.

With RamSeries we have enhanced the design quality of our structures, thanks to its capacity for determining the possible critical zones, as well as the over-dimensioned parts, allowing taking decisions safely and efficiently. Both our customers and ourselves are happy with the reports of the behavior of the marine structures analyzed by the Finite Element Method, thanks to RamSeries".

Juan Moreno Fernández. Director.

Arquinautic is a Marine Technical Office basically devoted to yacht design, specialized in structural and hydrodynamic analyses. Among other clients, they work together with relevant yacht shipyards, like Astilleros Astondoa, Barcos Deportivos, Astilleros Belliure and Vulkan Shipyard.

RamSeries YACHT

Isonaval experience

"RamSeries YACHT is an efficient tool for local and global analysis of naval models. With its aid, we perform the necessary direct calculations in order to study naval structures and have them certified by any Classification society"

Raúl Salinas. Technical Director.

IsoNaval is a Marine Technical Office of naval architecture, established on 2003 in Barcelona, initially dedicated to recreational yacht design. Market circumstances, together with the high qualification and enthusiasm of the staff, has propitiated that nowadays, ISONAVAL has the necessary tools and experience for engaging successfully with any task involving engineering or design among shipbuilding.

Cognit Design experience

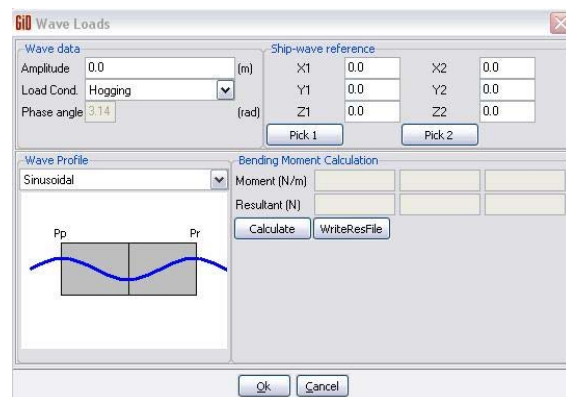
"Using RamSeries YACHT for structures verification has allowed us to consider with a higher level of detail the behavior of complex materials, like composites. These materials can be easily defined thanks to the specific graphic user interface, and what is more important, stresses, strains, and security coefficients for each layer can be easily visualized. The quick visualization of the several security factors available is really helpful: it allows to easily spot critical zones of the model. It is undoubtedly a versatile and powerful tool."

Alberto Fernández. Technical Director.

Cognit Design is the development and design branch of Totalmar Group. It is an integral design office, which groups support services from the initial conception of the idea to the prototyping. These services are thought from a multidisciplinary point of view, avoiding barriers between disciplines. So, Cognit Design offers design, engineering, development, management and control of construction services.

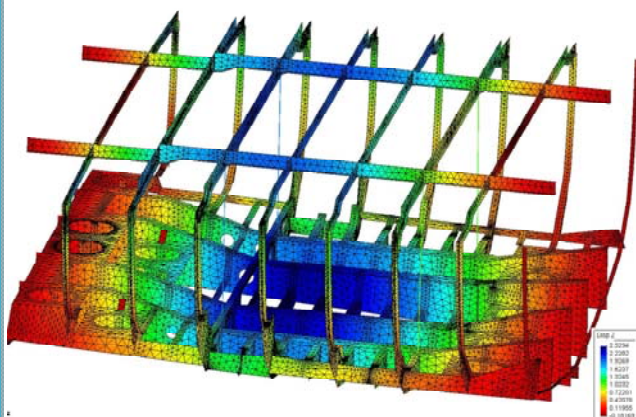


These tools allow, in a very simple way, to define wave loads in hogging or sagging condition, and the automatic adjust of sink and trim of the hull for static analysis. Dynamic analysis can be carried out by applying loads coming from standard wave spectrum (Pearson-Moskowitz) or coupling RamSeries calculation with the fully integrated seakeeping analysis tool (SeaKeepingFEM).



Wave loads definition window

As for laminated composite materials, RamSeries allows to define laminated shells, and naval stiffeners. One important improvement is the capability of setting predefined standard laminate sequences giving each ply direction.



**Structural analysis of a 40 m motor yacht module
(courtesy of Arquinautic)**

COMPASS Ingeniería y Sistemas S.A.

<http://www.compassis.com> email: info@compassis.com

Tel.: +34 932 181 989 - Fax.: +34 933 969 746 - C/ Tuset 8, 7º 2ª, Barcelona 08006 (Spain)

Sociedad inscrita en el R.M. de Barcelona, T.33954, fol.128, hoja B236843, inscrip. 1. CIF. A-62485180

RamSeries can export different results, images, animations and reports. Among others, the most remarkable are:

- GIF, JPEG or PNG image formats, including iso-contours, iso-lines, graphs, bar diagrams, deformations, etc.
- Animations based on dynamic analyses, on resulting deformation of static analysis, or generated by path definition.
- Element lists for a certain result.
- Standard format reports, containing text and graphical information of the results.

Summary of features

Available analysis types:

- Linear / Nonlinear
- Static / Dynamic
- Coupled waves-structure
- Transient, Natural frequency
- Harmonic response
- Response spectrum
- Random vibration

Structural Nonlinear Capabilities:

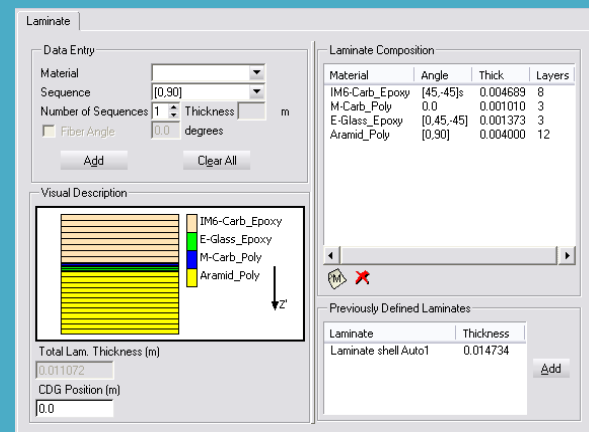
- Material
 - J2 Plasticity
 - Stiffness matrix defined
- Element
 - P-delta
 - Contact elements
 - Automatic solid-beam-shell contacts
- Solution Methods (Solvers)
 - Iterative: Sparse storage, preconditioned conjugate gradients
 - Direct: Sparse storage with LU, Skyline storage with Cholesky solver
 - Eigensolvers

Specific characteristics:

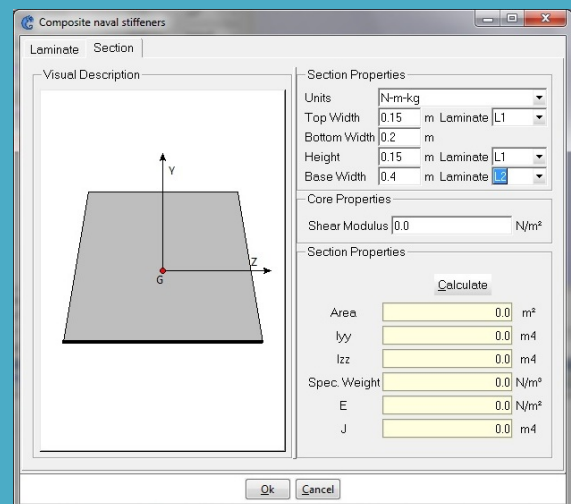
- Triangles DKT and 6 nodes, quadrilaterals 4-8 nodes, tetrahedral 4-10 nodes, hexahedra 8-20 nodes and bar elements.
- Disconnection of degrees of freedom, rotules, elastic constraints
- Various local axes definition techniques for anisotropic and laminate composite materials
- Metallic profiles data base and user-defined sections

RamSeries YACHT

A key feature for the analysis of laminate composite materials is the possibility of viewing the critical strains and stresses in each of the laminated material plies or tissues. The Tsai-Wu criteria is also applied for obtaining the security factor (global, and per ply).



Window for definition of composite laminates



Window for definition of naval stiffeners of composite laminates

- Simple and combined load cases, with majoring coefficients
- Stiffened shell model
- Utility for definition of naval composite stiffeners

RamSeries is fully integrated in a graphic pre/postprocessor environment based on GiD system.

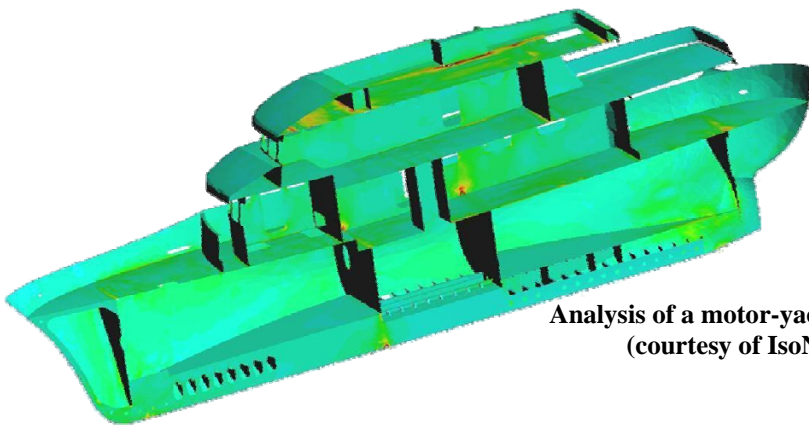
The Mesh generator is based in the advancing front technique, and includes tools for automatic generation of unstructured and structured meshes.

RamSeries post-processing tools include: contour fill, contour lines, display vectors, security factors, graphs, streamlines, result surface, deformed displays, animations and line diagram, among others.

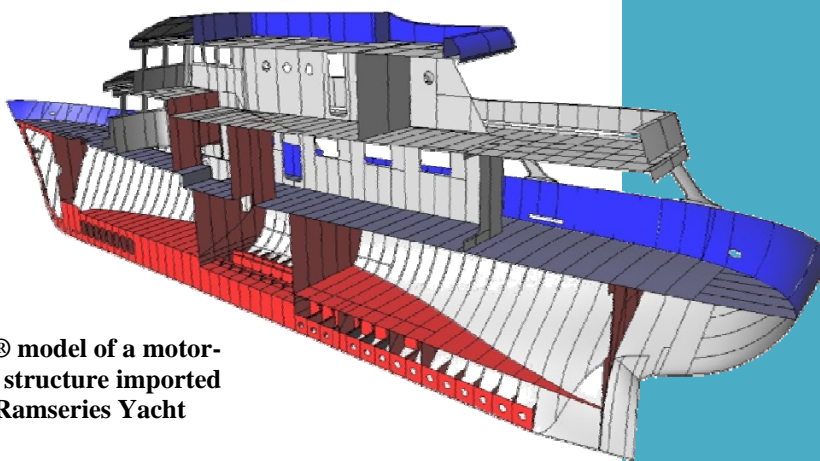
RamSeries is developed using C++, Tcl/Tk and OpenGL and is optimised for the best performance possible in UNIX workstations and PC computers under Windows or Linux, with seamless transfer of data between Windows and UNIX

RamSeries Graphic User Interface (GUI) is fully customizable and can be easily adapted to the user specific requirements.

English and Spanish versions available.



**Analysis of a motor-yacht structure
(courtesy of IsoNaval)**



Catia® model of a motor-yacht structure imported in Ramseries Yacht

RamSeries YACHT

Computer requirements

Windows

- Windows 95/98/NT/2000/ME, XP, Vista or 2007
- Pentium with 512 MB RAM and 100MB of hard disk space, or higher
- 3 button mouse recommended (SpaceBall supported)
- Support any graphics card with OpenGL acceleration

Linux

- Kernel version 2.0.30 or higher
- Pentium with 512 MB RAM, 100MB hard disk space
- SpaceBall supported

Silicon Graphics

- IRIX 6.2
- SpaceBall supported

Other operating systems

Please ask our representatives for Ramseries versions in other platforms