

RamSeries

RamSeries is an advanced environment for structural analysis, based on the Finite Element Method.

If you are looking for a structural simulation software package, capable of delivering the highest-quality, most-reliable structural simulation results available, **RamSeries** is surely your best choice.

Thanks to its full complement of nonlinear elements, nonlinear and linear material laws, and inelastic material models, **RamSeries** easily simulates even the largest and most intricate of structures.

It includes 3D beams, shells and solids models, and a fully integrated pre/postprocessing environment for easy insertion of the necessary data for the analysis and subsequent results visualization.

RamSeries offers an intuitive GUI for easy definition of even the most intricate material models and a choice of iterative and direct solvers for optimal results.

RamSeries may also be adapted for specific necessities, allowing the user to perform most automated and simplified analysis process.

Product development is a constantly evolving process and down the road, if you realize the need for additional simulation capacity, **RamSeries** is easy to be upgraded.

Reports

RamSeries can export many types of results, images, animations and reports. Among others, the following are possible:

- Images in formats like **GIF**, **JPEG** or **PNG** of contour fill, countour lines, graphs, beam diagrams, deformed, etc.
- Animations based on dynamic analysis or on deformed for static analysis or in change of visualization path
- List of beam or elements with selected result values
- Concrete dimesioning of the steel
- Predefined ranges of values

Modules Information

DYNSOL

This module features the latest technology for solving structural dynamic analysis of beams and shells, using the finite element method.

Different types of dynamic analysis may be performed, including : step-by-step, modal and seismic analysis.

It also includes the capability of performing non-linear analysis of

beams and shells (plasticity, J2 model).

NAVAL

RamSeries is improved in its capabilities with some specific naval utilities.

For example, it is possible to study the behaviour of a hull structure with stiffened shells (with standard naval stiffeners, like HP), not being necessary to model the whole set of stiffeners.

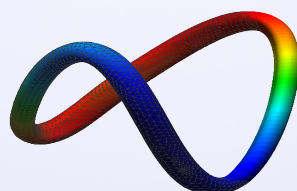
It is also possible to define wave loads, using the wave significant parameters relative to the hull. An automatic equilibration of the ship in that conditions is performed, adjusting sinkage and trim.

This allows a complete structural analysis of the hull, with the self weight loads, specific weights loads and the loads due to the pressure of sea water.

PLASTICITY

RamSeries includes several material constitutive laws in order to model complex model behaviour. Among others, it is possible to simulate the structure assuming shell elements with **J2 plasticity** for the material with the following characteristics:

- Isotropic hardening (linear, exponential, linear+exponential)
- Kinematic hardening (linear)

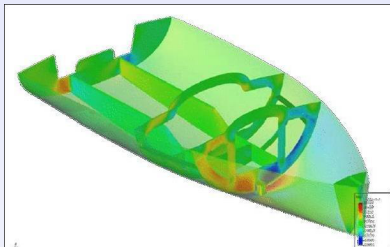


IMPACT

One of the most significant developments of **RamSeries** is the implementation of contact-impact algorithms which permit the analysis of many problems in engineering. The contact-impact algorithm implemented in **RamSeries** is the so called "Node to Node approach". In this approach the potential contact nodes are predefined by the user. In each time step the potential contact nodes are monitored, if contact is verified the contact element are set active, otherwise inactive.

COMPOSITE

As for composite materials, **RamSeries** allows to study laminated shells, and also composite material naval stiffeners. One important improvement is the capability of setting predefined standard laminate sequences giving each ply direction. A key feature here 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).



PREPOST

RamSeries includes a fully integrated pre and post processor environment specifically designed for the creation and adaptation of analysis geometry, as well as the later visualization of results.

The pre-processing part allows the generation of complex geometries defined by typical CAD entities, such as NURBS or COONS surfaces, through the variety of tools available. In the same way, it is able to import standard CAD files in IGES, PARASOLID and DXF formats among others.

PREPOST offers a consistent and intuitive interface for definition of boundary conditions, material properties and other data. Data definition is performed at geometry level, being independent of the mesh/es used in the analyses.

RamSeries meshing technology includes a suite of tools to create high-quality unstructured or structured meshes in an automatic way and verify the quality of the results.

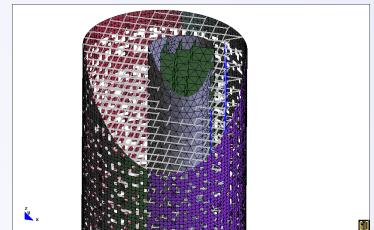
CFD coupling

RamSeries can be fully coupled with a Computer fluid-dynamics program (CFD), **Tdyn**, offering the possibility to transfer temperature increments and or pressures between both programs. In this way, a new range of problems can be solved:

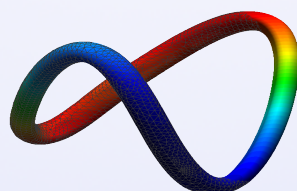
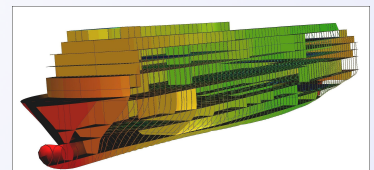
- Thermo-mechanical problems
- Aero-elasticity problems

Application Examples

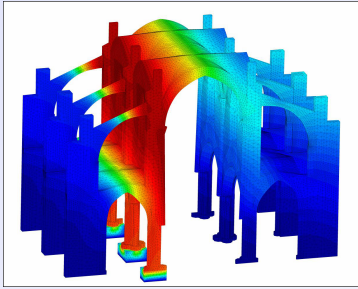
Structural analysis of the Agbar Tower at Barcelona (courtesy BOMA for Aigües de Barcelona)



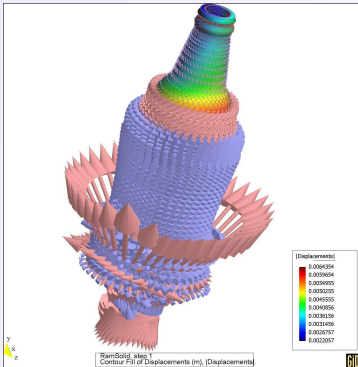
Structural analysis of the ropax ferry "Fortuny" (courtesy of ACCIONA/Transmediterranea)



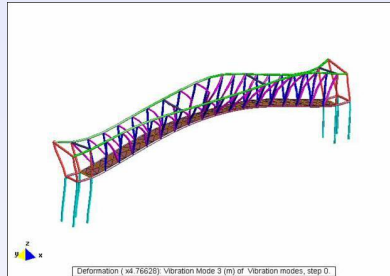
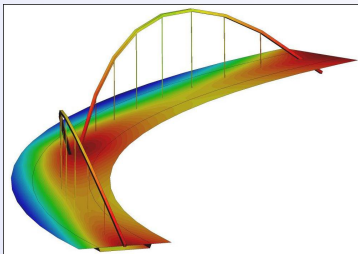
Structural analysis of the Tarazona Cathedral (courtesy of CIMNE)



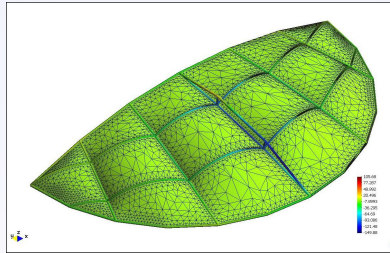
Analysis of glass bottles (courtesy of Heineken)



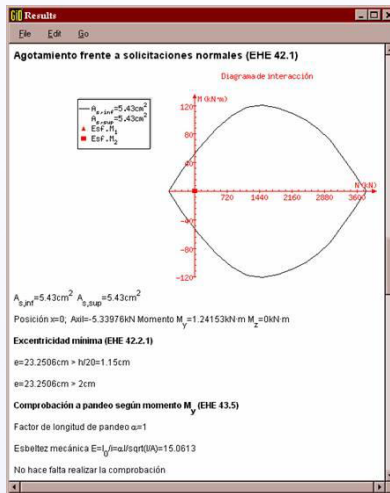
Bridge analysis



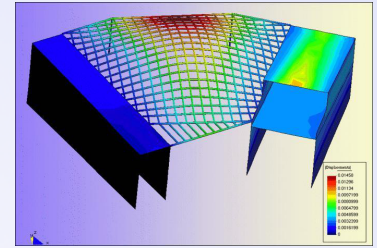
Composite structural analysis (Courtesy of Nautatec)



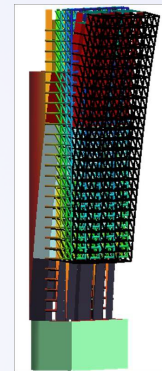
Concrete reports based on standard regulations



Structural analysis of the Agbar Tower auditorium at Barcelona (courtesy BOMA for Aigües de Barcelona)



Structural analysis of a high building at Barcelona (courtesy of BOMA)

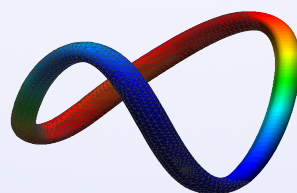


Technical Specifications

RamSeries solvers are based on the latest Finite Element Method technology, offering the highest stability and accuracy.

Summary of features:

- 1 Performance Simulation
 - Structural



- Linear
 - Nonlinear
 - Static
 - Dynamic
 - Transient, Natural frequency
 - Harmonic response
 - Response spectrum
 - Random vibration
 - Buckling PDELTA method
- 2 Structural Nonlinear
- Capabilities:
- Material
 - J2 Plasticity
 - Stiffness matrix defined
 - Element
 - P-delta
 - Contact elements
 - Automatic beam-shell contacts
 - Solution Methods (Solvers)
 - Iterative: Sparse storage, preconditioned conjugate gradients
 - Direct: Skyline storage with Cholesky solver
 - Eigensolvers
- 3 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
 - Simple and combined load

cases, with majoring coefficients

- Shell with stiffeners can be calculated in two ways:

- An equivalent shell with same flexion and membrane stiffness
- The stiffeners can be simulated with beams where the section has a excentricity
- Concrete steel dimensioning
- **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 XP 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.

Computer requirements

Windows

Windows 95/98/NT/2000/ME, XP, Vista or 2007

Pentium with 512 MB RAM and 100MB of hard disk space

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 platform

