BETA
SIMULATION SOLUTIONS

Maritime and Offshore design

Exceed the standards in engineering for the sea

Perform your Maritime simulation
in a single environment which offers all the tools you need

BETA CAE Systems software suite offers simulation solutions that cover the advanced needs of the Maritime industry. The advanced pre- and post- processing capabilities of our suite, will greatly contribute to costs reduction during your research and design processes, while the abundance of tools and practices will help you take your simulation analyses to new levels and grasp the behavior of your models in trials for the sea.

Model set up

- Integrated CAD tools for geometry creation, modification, cleanup and defeaturing.
- Middle skin extraction for complex parts with fully automatic functionality that produces high-quality mesh and assigns nodal thickness.
- Batch Meshing that respects user-specified quality criteria and mesh parameters for each part of the assembly. ANSA offers automatic feature recognition, defeaturing and special treatment for fillets, flanges, tubes, and holes, tailored meshing rules, local refinement and coarsening.
- Automatic curvature-dependent surface meshing with user-controlled growth rate, min & max element size and mesh feature angle.
- Fast and robust volume meshing for tetra, prism, pyramid, hexa and polyhedral elements.
- Generation of smooth boundary layers, advanced control for squeezing, collapsing or excluding to overcome quality and proximity issues.
- Easy setup and high accuracy results of Smoothed-Particle Hydrodynamics (SPH) simulations.
- Calculation of liquid level inside a tank of any shape with a dedicated tool.
- Interoperable pre-processing decks for numerous solvers for FEA and CFD analyses.
- Creation, manipulation and calculation of cross-sections.
- Automatic creation of beam elements with cross-section selected from a user-generated database.
- Replacement of meshed parts with beams of equivalent Cross-Section.
- Distribution of non-structural mass for proper total weight equivalence.
- Automatic replacement of a model part by rigid bodies that contain the mass and inertia of the substituted areas.
- Model sub-structuring while preserving the original load-case setup.
- Map pressure or temperature results from a CFD simulation to a FEA model.
- Calculation of ships & offshore platforms displacement and of corresponding waterline.
- Sinusoidal, Trochoidal and Navier Stokes waves creation with user-specified parameters.
- Calculation of ships & offshore platforms static position, considered momentarily balanced upon a design wave.
- Organization of stepwise sequence procedures including all steps and actions necessary for the model-build up.
- Fatigue life prediction in both frequency and time domain with the FATIQ platform.
- Parametric shaping of both FE model & geometry and model validation through preview of model shaping.

Optimization tool for:
- Enhanced Design Of Experiments allowing the exploration of the design space. Automatic generation of designs via numerous algorithms.
- Optimization studies via various available algorithms. Run direct optimization studies or exploit the state-of-the- art Machine Learning functionality to run Response Surface Model (RSM) based optimization studies.
- Direct coupling of ANSA and META with all industry-standard parametric optimizers.

EPILYSIS: The Finite Element Solver

- Linear Statics, including AMLS & block–Lanczos Eigen-Value analysis.
- Dynamics: Direct, Modal & Transient.
- Small-strain Non-Linear / Contact.Substructuring/Static Condensation/Component Mode Synthesis.

Features

- Process automation
- Geometry clean up
- Shell and Volume meshing
- Boundary layer meshing
- Interoperable decks
- Solver-like entity cards
- Model assembly
- Model checks & fixes
- Welds modeling
- Mass trimming
- Substructuring
- Results mapping
- FE and geometry parametric morphing
- Coupling with optimizers
- Automated 3D & 2D post- processing
- Results calculation
- Automated reporting

Benefits

- Multidisciplinary processing in a single environment
- Cost and time-to-market minimization
- Decrease of human error factor
- Fast design modifications for re-analysis
- Easy handling of large and complex models
- Coupling with any optimizer
- Fast generation of comprehensive and ready-to-show reports
- Effortless realization and repetition of frequent tasks

- Shared Memory Parallel Architecture, in & out-of-core, for large problems.

Post-processing

- Hot spots identification through filtering capabilities incorporated in many tools of META.
- Overview of results achieved through statistics tables with spreadsheet functionality.
- Integrated calculator for linear combination of results deriving from other loadcases. New datasets can be created by applying any mathematical operation on existing data.
- Calculation of forces and moments on any user-defined section and output in solver format to be used for sub-modeling.
- Integrated powerful graph tool for direct plotting of data deriving from the 3D model or from imported solver time history files and measurement data.
- NVH post-processing with a whole variety of 2D plots (Polar, Magnitude-Phase, DNA and more) and integrated tools like modal model building, modal response calculator and FRF assembly.
- Direct coupling of META with external optimizers.
- Support of CFD results format such as ANSYS FLUENT and OpenFOAM. Multiple visualization styles of Stream-lines, Streaklines.
- Particles and more, colored by any variable available.
- Image matching and video synchronization for results validation.
- Reports creation in pptx, pdf, html or Postscript format using the Report Composer.
- Dragging and dropping images and copying to clipboard functionality for transferring data.
- Automation capabilities via session commands, python scripting and fully customized user toolbars.

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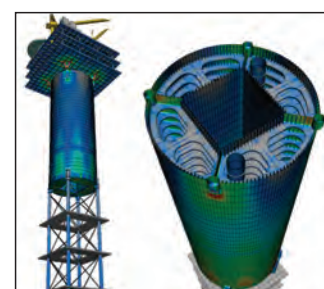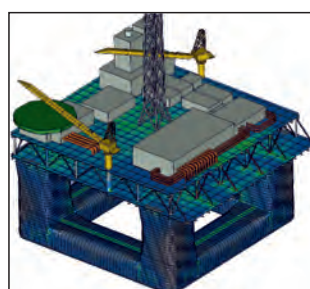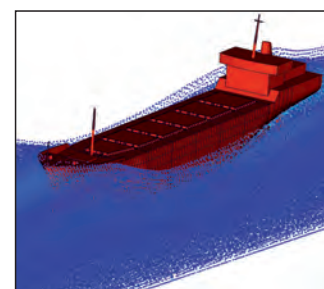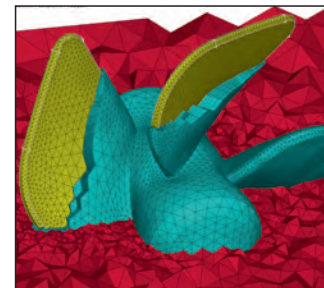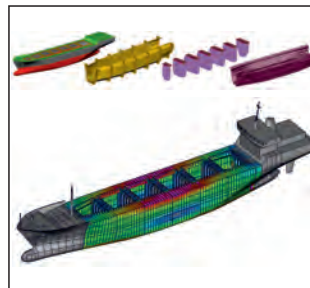
physics on screen

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