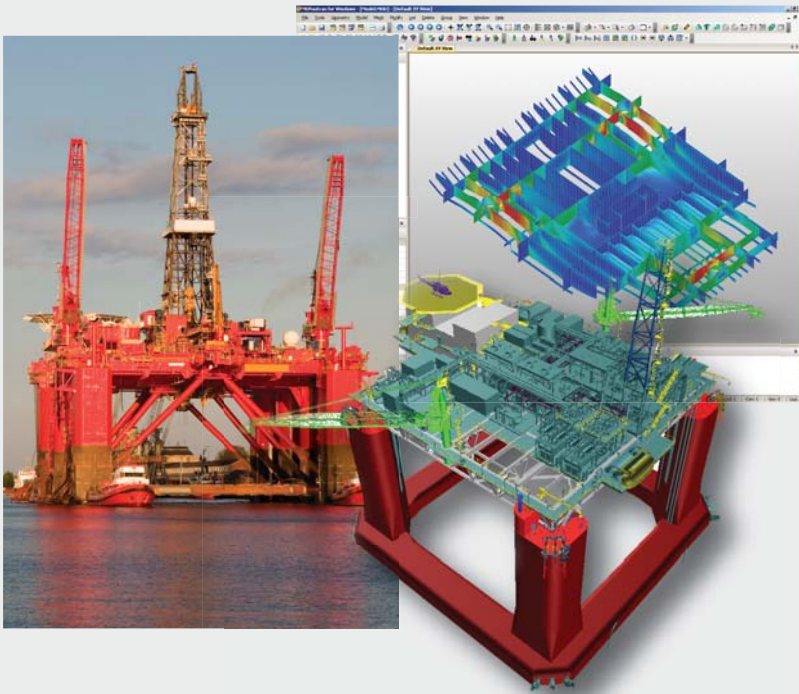


NEi Nastran Engineering Analysis and Simulation Software



Offshore Petroleum Industry

NEi Software develops Nastran solutions for the engineering analysis of structures, equipment, facilities, and ships used in the offshore industry. A full complement of professional analysis tools, proven accuracy, responsive technical support, and the ability to provide customer requested enhancements define NEi Software.

www.NEiSoftware.com

NEi Nastran Engineering Analysis and Simulation Software For the Offshore Petroleum Industry

Benefits and ROI with NEi Software

NEi Software provides a range of industry proven analysis and simulation solutions for offshore applications that enable our customers to confidently evaluate designs, explore options, optimize performance, increase reliability, and manage project risk. The software earns a return on investment (ROI) with business justification coming from areas like improved safety, shorter project development cycles, fewer prototypes, identification of problem areas, improved quality, higher productivity, and lower operating costs.

Technical Strengths

Offshore projects present unique challenges and demands. To be successful in this environment, finite element analysis (FEA) software must be capable of modeling the full range of materials and structures found in the industry with a high degree of accuracy. Technical strengths of NEi Nastran of particular interest in offshore engineering include comprehensive nonlinear analysis, robust 3D surface contact, support for special materials like concrete, composites, elastomers and hyperelastic, a suite of modal analysis tools, and 64-bit large model capability. Moreover, many labor saving tools like Automated Edge Contact Generation (AECG™) and Automated Surface Contact Generation (ASCG™) remove the tedium and significantly reduce the man-hours required for modeling large shell-like structures typically found in offshore and marine applications.

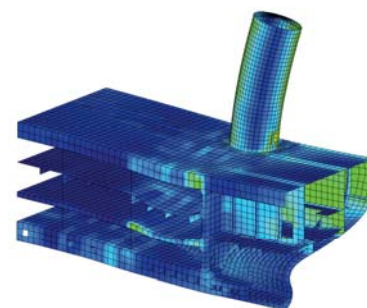
Of particular note to engineers and managers involved with analysis software is the record of new features, enhancements, and tools incorporated in each release of NEi Nastran that are provided specifically in response to customer's requests.

Support

We understand your working environment. Our technical support is staffed with seasoned application engineers who provide quick turn around when you have questions. The value our customers get from our support is best reflected in the testimonials they submit. We invite you to view them on our website.

Business Advantages

In addition to software performance and reliable support, there are many instances of cost saving advantages of NEi Nastran in deployment and use. Examples include productivity features like Automated Surface Contact Generation (ASCG™), the NEi Token Licensing which gives the least cost for a full portfolio of simulation software in large organizations, no charges for multiple CPU use in NEi Nastran's 64-bit version, and the ability to batch jobs for overnight and weekend runs using the NEi Editor feature.



Shell elements in NEi Nastran are used to model the crane pedestal, foundation, and surrounding hull to check stresses and buckling. (Image Courtesy of STX Canada Marine Inc.)

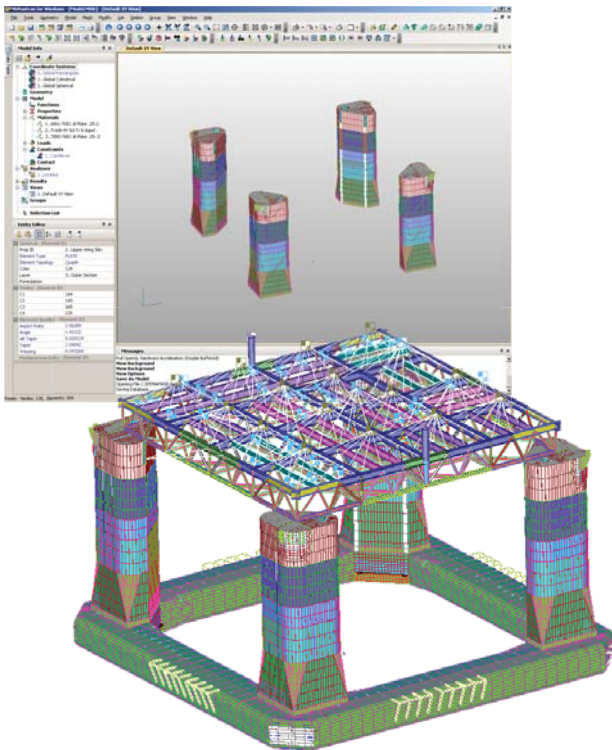
Examples of the types of applications NEi Nastran can provide in offshore analysis and simulation:

- ▶ Offshore platforms, topside structures, floating units, subsea structures and underwater vessel modeling
- ▶ Seabed pipelines and manifolds, stability, upheaval buckling
- ▶ Gas processing equipment
- ▶ Hydraulic Workover units (HWO), guy line wind tower, helideck, well deck, caisson structures, offloading platforms
- ▶ Thermo-mechanical simulation of structures under different operating conditions
- ▶ Self elevating workover platform vessel, jackup boats
- ▶ Mooring chain and systems operating with fairleads, bending shoes, stoppers, trumpets and connectors
- ▶ Flexible Joints (FJs) and steel catenary risers (SCRs), high pressure high temperature (HP/HT) environments, cycling, fatigue life
- ▶ Long term management and structural integrity of floating platforms, hull fatigue, topside structures, anchoring
- ▶ Fatigue analysis survey and life prediction

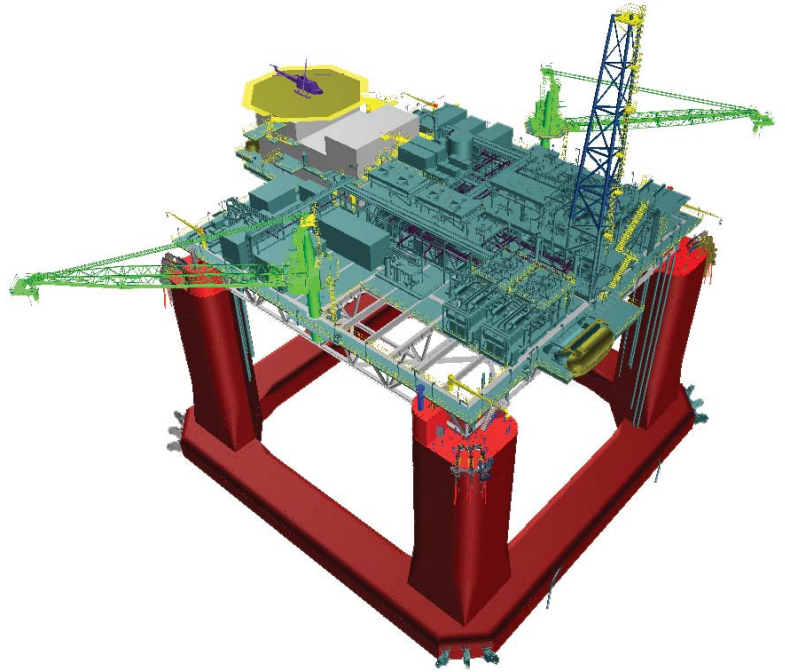
Key Technical Capabilities for Offshore

Analysis and simulation software can dramatically improve the engineering and design process in offshore projects. However, a number of specific tools and features are needed for achieving real world fidelity, productive and efficient model creation, and easy communication and sharing of results. Following are features of note in NEi Nastran that are particularly relevant in offshore.

- ▶ Comprehensive interactive tools for model creation, analysis monitoring, and results evaluation including NEi's industry unique Editor which provides real time information on solution progress, alteration of parameters and control.
- ▶ Specialized industry-proven element technologies including hybrid quad and hex elements and dissimilar mesh interpolation elements.
- ▶ Specialized solution sequences including Dynamic Design Analysis Method (DDAM), integration with Alion Science and Technology's Underwater Shock Analysis program (USA), and compatibility with MAESTRO from Proteus Engineering.
- ▶ High performance processing including advanced parallel PCGLSS iterative, sparse direct, and block Lanczos solvers with operation on 32-bit and 64-bit Windows and 64-bit Linux platforms providing solutions to large-scale models with over 10 million degrees of freedom.



Columns and Global FEM (Image Courtesy of Exmar Offshore Co.)



Basic Design Hull (Image Courtesy of Exmar Offshore Co.)

- ▶ Special modal filtering and database restart tools for performing DDAM and dynamic response solutions increase productivity by allowing a modal database to be altered and reused without rerunning an eigenvalue extraction analysis.
- ▶ Robust contact capability using a 3D surface contact method which easily handles dissimilar meshes between components including frictional effects.
- ▶ Basic through advanced material models including temperature dependent materials, nonlinear elasticity and plasticity effects, creep, and thermo-elasticity, hyperelastic and composites.
- ▶ Substructuring and Model Reduction allows the creation and reuse of substructures to improve the efficiency of large analyses and provides a convenient method to transfer model data to subcontractors.
- ▶ Submodeling allows in-depth evaluation of particular regions.
- ▶ Load and Boundary Condition Interpolation allows mapping of thermal and CFD output from specialized heat transfer and fluid dynamic models to the structural model for load and boundary condition definition.
- ▶ Inertia relief capability allows the quasi-static simulation of forces acting on an unconstrained structure such as aircraft in flight or submerged vessels.

USA HEADQUARTERS

NEi Software
5555 Garden Grove Blvd., Ste 300
Westminster, CA 92683-1886, USA
Phone: 1.714.899.1220
Fax: 1.714.899.1369
E-mail: info@neisoftware.com
Website: www.NEiSoftware.com



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