SIEMENS

Shipbuilding

Revolution Design

High-speed analysis tools yield some of the world's finest lightweight marine vessels

Products

Femap, NX

Business challenges

Accelerate product development turnaround

Increase production efficiency

Improve regulatory compliance and design approval process

Keys to success

Change design analysis and optimization from outsourced culture to in-house process

Leverage Femap with NX Nastran to analyze vessel design options and improve the "buildability" of a new vessel design to reduce build hours

Deliver design drawings faster to marine yards

Results

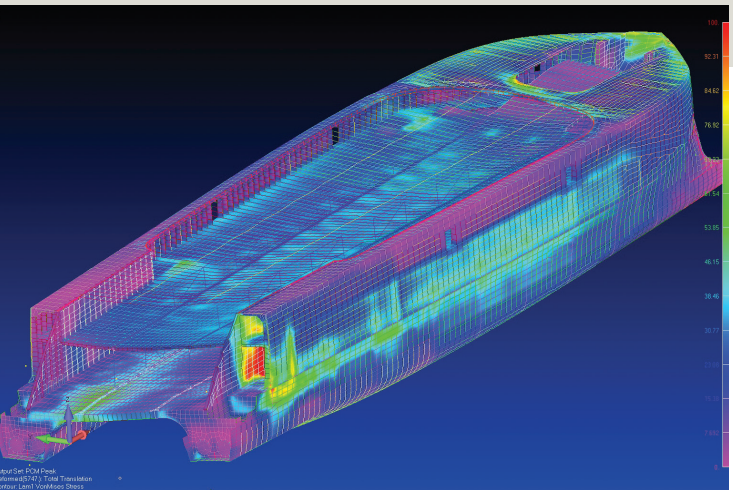
Significantly reduced product development costs by cutting the use of outside contractors

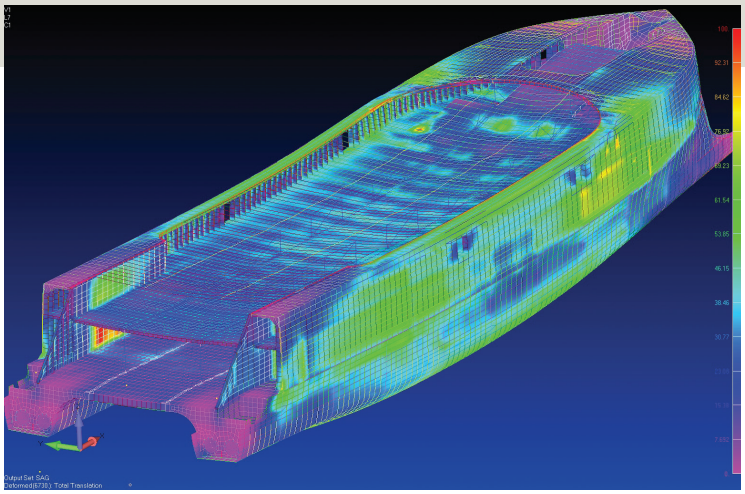
Femap with NX Nastran enables Revolution Design to accelerate product development turnaround, streamline compliance with industry standards and capture new business

The challenges of designing high-speed marine vessels

Located in Tasmania, Australia, Revolution Design provides its clients with innovative design services for all types of lightweight marine vehicles, as well as small to larger vessels, that use aluminum and steel in their construction. The company is especially well known for designing high-speed, lightweight catamarans.

Image courtesy of LD Lines.





Results *(continued)*

Speeded up design turnaround, while delivering higher quality designs

Improved process for meeting stringent industry standards

Utilizing upgrade path to more advanced analysis capabilities

Winning new contracts

Revolution Design's team of naval architects, engineers and designers frequently work together with its clients (who include shipbuilders, shipyards and other marine companies) from concept through to research and development. Revolution Design provides a variety of services for developing and refining marine vessels, including structural design and analysis, driveline technical specification and layout, naval architecture services and a complete set of drafting and design services.

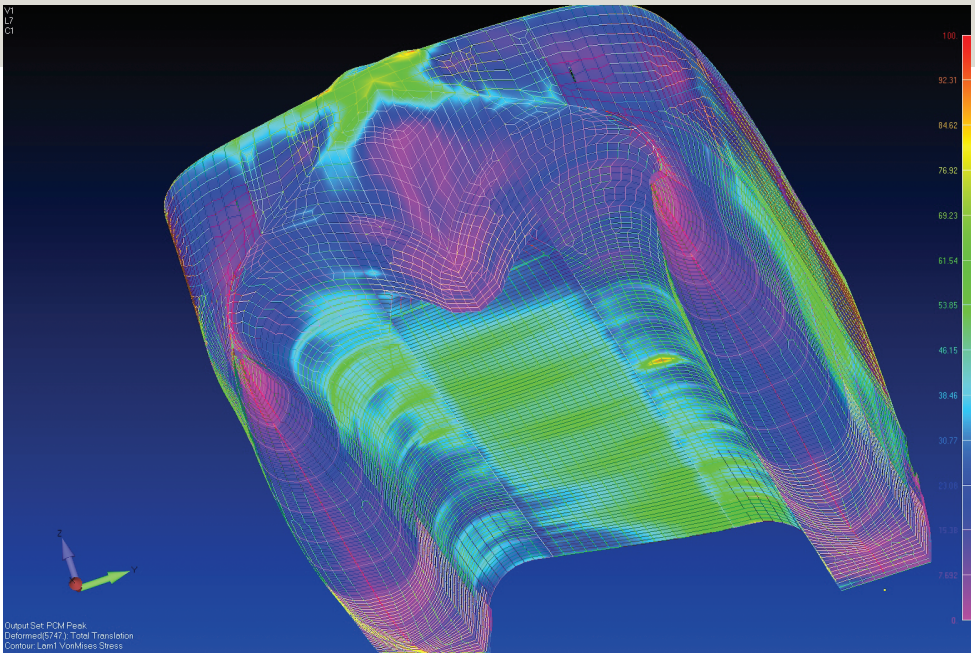
Revolution Design is particularly well known for designing wave-piercing catamarans built by Incat, one of the world's premier builders of high-speed vessels used by commercial businesses and military services around the globe. Revolution Design is famous for creating the 96-meter wave-piercer design, which became the first fast ferry in the world able to carry its own weight in payload. To achieve this milestone, the company had to understand and carefully assess the vessel's technical requirements, review and fully evaluate data from earlier vessels, design and optimize the new vessel, and rigorously test and analyze the proposed design's structural elements.

Critical juncture for change

Given the demands of the high-speed marine market and the desire to significantly improve its current process, Revolution Design was highly motivated to adopt product development technology that enables the company's design team to minimize turnaround, from concept to delivery.

At the same time, Revolution Design needed to facilitate regulatory compliance and meet its clients' requirements for high-quality vessel designs that are able to deliver exceptional performance and

The company's design team is now able to work with embedded class rules, which enable the systematic building of higher standards into the product development process.



"With trusted and strong CAE solution partners, we can concentrate on high-speed design/ analysis, streamlined compliance with industry standards and deliver on expectations. Business is good and growing."

Gary Davidson
Director and Principal
Structural Design Engineer
Revolution Design

structural integrity. This meant the company's product designs must comply with the complete design survey and classification society requirements for high-speed, lightweight aluminum craft.

To facilitate Revolution Designs' time-to-market and compliance goals and to continuously improve its product line, the company needed finite element analysis (FEA) to be performed on local and global structural models, as well as to facilitate structural detailing, strain gauging and fatigue assessment of the design structure. The goal was to deliver the aluminum structural design, optimized for minimum weight, as quickly as possible, while meeting industry design standards.

"We wanted to make a substantial improvement in our design analysis and optimization process and, considering our current process and market factors, we felt the time was right for making a change," says Gary Davidson, director and principal structural design engineer at Revolution Design.

Significantly improved design analysis and optimization process

Previously, Revolution Design subcontracted its FEA and the structural engineering aspects of its product development process to an outside vendor. However, over time, this outsourcing process proved to be both excessively costly and unacceptably time-consuming as Revolution Design's senior engineers found themselves having to constantly check, recheck and monitor the outside vendor's work and request repeated rework.

To solve this problem, the company brought these FEA and structural engineering activities in-house. Revolution Design initially used MSC Nastran® software for

Femap with NX Nastran has significantly improved the company's overall ability to turn around new vessel designs for its clients.

Solutions/Services

Femap
www.siemens.com/plm/femap

NX Nastran
www.siemens.com/plm/nxnastran

Customer's primary business

Revolution Design works with shipbuilders, shipyards and other companies to design and develop lightweight, high-speed aluminum marine vessels.
www.revolutiondesign.com.au
www.incat.com.au

Customer location

Tasmania
Australia

this initiative. However, the company did not realize the dramatic improvements it had originally sought. After assessing a number of options, the company replaced its MSC product with Siemens PLM Software's Femap™ software with NX™ Nastran software. Femap with NX Nastran provides core solver functionally fully supported within a finite element modeling environment that includes a robust suite of statics, normal modes, buckling, basic nonlinear and heat transfer capabilities.

In addition, Revolution Design selected EnDuraSim, a Siemens PLM Software Solution Partner, because of EnDuraSim's analysis knowledge, expertise, professional engineering support and training capabilities.

To ease Revolution Design's transition to these enhanced capabilities, existing MSC Nastran files were directly read by Femap with NX Nastran. Femap arranged these files according to the names used in Patran (the MSC software that the company had previously been using for finite element analysis pre- and postprocessing). Since the transition, Revolution Design has been performing all new analysis modeling in Femap with final analysis in NX Nastran.

Built-in standards, outstanding results

Femap with NX Nastran has significantly improved the company's overall ability to turn around new vessel designs for its clients. The company's design team is now able to work with embedded class rules, which enable the systematic building of higher standards into the product development process. "Our design team is taking advantage of and realizing great value with advanced modeling and analysis functionality," says Davidson.

In 2010, Revolution Design expanded the capabilities within its Femap with NX Nastran environment by adding the software's Dynamics option, which enables designers to calculate a product's forced dynamic response to inputs, such as loads or motion that vary with time and frequency.

Davidson concludes, "With trusted and strong CAE solution partners, we can concentrate on high-speed design/analysis, streamlined compliance with industry standards and deliver on expectations. Business is good and growing."

"Our design team is taking advantage of and realizing great value with advanced modeling and analysis functionality."

Gary Davidson
Director and Principal
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