



Noran Engineering, Inc.

Newsletter

January 2006



Dave Weinberg
President

2005 has been an exciting year for Noran Engineering and 2006 promises to be even better. NEi Nastran V9 will be released in Q1 with many new enhancements and productivity features that will make your job easier and significantly faster. Other products such as the NEiModeler, NEiEditor, and NEiWorks have also been significantly upgraded.

I would also like to take this opportunity to let all our users know how important customer support is to me personally and Noran Engineering. I spent the first 15 years of my career in the aerospace sector doing finite element analysis. I know how important it is to get good support and how frustrating it can be if that support is not there when you need it the most. For that reason, Noran Engineering is extremely customer focused. If the support is not absolutely fantastic then I want to hear about it. I always have time for any of our customers so feel free to email me personally at dweinberg@noraneng.com and tell me what you like and if there is anything we could be doing better.

Dave Weinberg

Noran Engineering Provides Preview of Upcoming Release of NEiNastran V9.0

NEi Nastran V9.0 is a major upgrade with over 50 customer driven enhancements. Major features include support for automated internal superelement generation, enhanced nonlinear and dynamic solutions, improved solver and overall performance, a faster Lanczos eigensolver, support for XDB results neutral files, and new aerospace, maritime, and automotive productivity tools. Several NEiEditor enhancements have been included such as a fully automated HTML report generator, shear flow plots, assignment plots, an enhanced X-Y plotting interface, and a secure DDAM data input form.

Performance Enhancements

- Faster nonlinear solver performance
- Faster Lanczos eigensolver
- Faster Direct Frequency Response
- Support for large laminate models
- Improved performance for models with CQUADi and CHEXA elements
- Support for very large input files
- Better VSS solver

Nonlinear Analysis Enhancements

- Enhanced surface contact
- New surface contact forms:
- Displacement based stiffness:
- Enhanced nonlinear static solution restart:
- Added better support for contact between a surface and a line or point

Dynamic Analysis Enhancements

- Support for vibration fatigue analysis in random analysis
- Added invariant stress/strain results for random analysis
- Added bush elements results in random analysis
- Multipoint constraint force output for random analysis

Heat Transfer Analysis Enhancements

- Enhanced surface contact
- Initial condition temperature correction

Composite Analysis Enhancements

- Added Von Mises stress and strain output
- Added new failure theory
- Added automatic selection of core material type
- Added failure theory for individual ply results
- Enhanced composites strength ratio support
- Enhanced failure theory

Additional Enhancements

- Modified local coordinate systems for rigid elements and MPC equations
- EIGR Bulk Data entry added
- Added automated numerical damping

Element Enhancements

- Additional parabolic shell element support
- Automated generation of CWELD elements from existing bar elements
- Added switch from linear to parabolic shell elements
- Additional bush element output results

Superelement Enhancements

- Added automated internal superelement capability
- SESET and SEELT Bulk Data entries added
- Added superelement generation via SET

Welcome
New
Noran
Engineering
Customers

*BD Systems
Sanswire Networks
US Army, AL
AeroAstro
ISR
Kazak Composites
Ingersoll Rand Co.
Arctic Cat
Entegee Eng. Tech. Group
Scaled Composites
Toyota Motor Corp.
IMP Aerospace
Naval Surface Warfare
RFA/Minnesota
ACMT Engineering
GKN Aerospace
Andrews Space & Tech
Aurora Flight Sciences
BAE Rockville MD
Soo Tractor Sweeprake
BAE Systems NY-CSC
Ametek
Cobasys
Eglin AFB
Sechan Electronics
Advatech Pacific
Indus
G. Edward Engineering
Digital Engines
National Research Council
Sanmina-SCI
Essilor of America
Norfolk Naval NMLC
Northrop Grumman Elec Sys
Redstone Aerospace
AAR Composites
Lockheed Martin MD
WhiteWater Composites
Eagle Aviation
Technologies
ProbaSci LLC
Bluestone Fabrication
Millenium Concept, Inc.
Integrated Composites
DeepSoft
Shelhigh, Inc.
Micardia Corp.
Structures, Inc.
International Rectifier
Crown Equipment*

NEi Nastran V9.0 continued...

Results Enhancements

- Added parameter to support analysis result output
- Support for mass properties output
- Support for individual element mass properties output
- Added Von Mises stress and strain output
- Added support for real element results data
- Support added for strain curvature output
- Case Control command modification
- PUNCH output format addition
- Strain output for bush element

NEi Nastran V9.0 Editor Enhancements

The NEi Nastran Editor has been significantly enhanced in its post-processing capabilities including a new graphics engine, results querying, and animation capabilities. Other enhancements include new print and graphics file exports and improved real-time controls and plotting capabilities. Specific enhancements include:

Custom X-Y plotting of results:

- Users can click on the Create Plot icon after loading the results in the Model View and a dialog is displayed. Users can select output sets for the X-axis and results to plot for the Y-axis.
- Users can enter a node or element ID to plot, or can select the node or element with the mouse
- Users can then click a button for a Plot Preview. This is helpful because there may not be any data the user wants to save.
- When users close the Plot Preview, they are prompted whether to save the plot or not. If yes, the plot is saved and displayed in the Plots tree in the Model/Results pane.
- Alternately the user can click button for View/Save. The plot is displayed and automatically saved and displayed in the Plots tree.
- The plots are permanently saved in the .xyp file.

Custom settings defined for each individual plot.

- When the user double clicks on a displayed plot, a Custom Settings dialog bar is displayed. The user can select the desired settings for this plot.
- The user can also reset the Defaults if they want. The changed settings can be immediately previewed by clicking the Apply Settings button.
- When OK is clicked, the custom settings for this individual plot are saved (to the "xyp" file).
- When this plot is loaded again it reflects its custom settings.
- The user can click the Data button to save the XY data to the clipboard.

Improved highlighting feature

- When the user clicks to highlight nodes or elements, a dialog is displayed on the side of the view.
- Elements or nodes can be specified by adding them to the list, or by selection with the mouse. When the user clicks OK, all the entities in the list are highlighted.

Improved options menus in tree-like format

- The setup dialog box has been re-implemented using a tree-control on the left side and property pages on the right side.
- When the user clicks a tree item the property page for the options for this item are displayed.

Added report writer

- HTML format report can be generated after the users load the .fno file while some PARAMs are set to ON.
- The HTML report contains summary of the analysis. Other data includes group definition, contact definition, element initial distortion summary, applied load vector resultant, reaction load vector resultant, displacement data, peak displacement component, and stress result summary of the model.
- Users can add their own conclusion and modify the default summary and glossary list.
- Default images are generated for the HTML report, or users can go to "Default Setting" to setup their own image preference.
- Users just have to click the "Generate Report" button and a wizard will come up to guide them to generate their reports.

Noran Engineering
Upcoming Trade Shows & Events



Anaheim Convention Center
800 W. Katella Ave
Anaheim, California 92802
Show Hours:
Tuesday - Thursday
January 31st – February 2nd
10:00 am to 5:00 pm

Booth #3809



SolidWorks World 2006
International User Conference and Exposition
Caesars Palace Hotel, Las Vegas, Nevada
January 22-25 2006



Design & Engineering Show
Chicago, Ill.
Show Hours:
Monday - Thursday
March 20th thru 23rd
Noran will be in the
SolidWorks Pavilion
Booth #19040



Noran Engineering attends SNAME

NEi attended the SNAME conference in October in Houston sharing a booth with its partner Anteon/Proteus Engineering, developer of Underwater Shock Analysis (USA) software. USA and NEi astran are well integrated to simplify the use of data in each program.

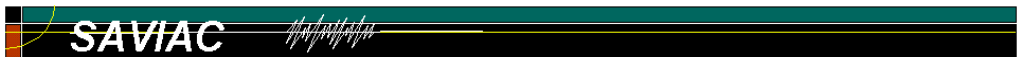
While NEi astran has been widely used in U.S. NAVY circles and by its related contractors it was interesting to find that many of the commercial boat builders and shipyards have very limited exposure to FEA. So, SNAME was a great opportunity to generate interest with a number of Naval Architects/Engineers, some select shipyards, as well as some up and coming CAD developers who are leading the effort in this space.

DDX and LCS are two hot projects that are coming to the functional design phase and everyone would like to have a piece of the action. NEi is well positioned to handle a lot of the FEA required in the areas of shock and vibration analysis, composites and elastic raft mounts. What was surprising to a many visitors was that NEi Nastran has such capability off the shelf.

We also learned from show attendees that they spend an inordinate number of hours and funds to calculate stress, shock, and related design information because no single company provides an affordable comprehensive solution in one software package. Plus they liked the fact that NEi Nastran did not need any add-on products providing the

And the price was in the range that made it justifiable with an attractive payback.

As a result of all the interest, NEi signed up for a booth for the 2006 conference. It's clear that working together with engineers in ship design and building, FEA has a great opportunity to contribute to innovation and productivity in the maritime industry. Maritime is a specific focus for NEi and we invite you to work with us to make FEA a tool that improves your designs and your company's bottom line.



Noran Attends and Presents at SAVIAC

Noran Engineering attended the 76th SAVIAC Shock and Vibration Symposium in Destin, Florida, October 30th through November 3rd.

It was a busy time for Tony Abbey, Technical Manager for NEi. Tony presented two papers in the technical sessions:

- “Application of Nonlinear Contact Surfaces in Modeling Whole Ship Shock Analysis”
And
- “Further Investigation into the Technique and Applicability of DDAM Analysis in Large Models.”

Copies of these papers can be obtained by requesting them via your own NEi sales representative, or info@noraneng.com.

Tony was also up early on Sunday (again!), presenting a tutorial on “Theoretical Background and Best Practice using DDAM”. This was well attended and prompted some good discussion. The audience enjoyed the live demonstration of several practical examples that were put forth, as well as, the

formal theory behind them. Tony's “hints and tips” were also a big favorite.

The second tutorial from Tony was on Monday afternoon. The unexpected overwhelming attendance was starting to give Tony superstar status, until he realized the reason for his new found popularity was that several other tutorials had been cancelled! The topic this time was “Nonlinear FE Analysis for Shock and Vibration”. This material is also available along with a workbook on the nonlinear example, please contact your NEi sales representative, or info@noraneng.com.





NEi Nastran Training

NEi Nastran training courses are taught at our training facility in Westminster, California or your location. Courses place emphasis on hands-on computer work to facilitate skills development. Professional Development Hours (PDH) is awarded based on course duration.

To get details and prices on Training Services, please contact us by telephone at **877-NENastran** or **1-714-899-1220 Ext. 2**, by email at training@noraneng.com, or by filling out the request on the [Info/Order](#) page on this website.

Training Classes offered at Noran Engineering, Inc. or on-site:

Advanced Dynamics Analysis

Advanced FEMAP

Advanced Heat Transfer Analysis

Advanced Nonlinear Analysis

Basic FEMAP

Composites Analysis

NEi Nastran Linear Analysis

Integrated NEi Nastran Linear Analysis with FEMAP

WinLIFE Fatigue

Noran Engineering to Introduce Token Based Pricing

NEi Nastran V9.0 will contain token based pricing which will allow for additional technology at a fraction of the cost. Noran Engineering, Inc. will be using the industry standard FLEXnet Manager from Macrovision. With FLEXnet Manager, organizations can optimize software spending, simplify license administration, and ensure end users have access to the licenses they need to do their jobs.

"We are very pleased to be able to respond to the demand of our customers as well as the requirements presented by our newer opportunities in the CAE community," says Mark Bruhns, General Manager.

"Not only will this functionality assist our end-users but this will allow Noran Engineering to apply token based solutions to our NEi Nastran and NEiWorks suites of products. Previously, our NEi Nastran solver would be priced by the seat only, based on the need for a linear solution or a nonlinear solution. These tokens represent a whole new way for users to obtain the tool they need for the job thus providing a higher value for their investment."

Noran Engineering's Director of Software Development, Sisira Jayasinghe commented,

"By adding the options available with the FLEXnet token approach, our growing number of SolidWorks users for example can have the capability of distinguishing their NEiWorks meshing and NEi Nastran solving routines, thereby maximizing the usage of the actual number of licenses being acquired. It is a much more efficient way to manage their software resources."

NEi Nastran Now Interfaces with USA

We are very pleased to announce that the Underwater Shock Analysis (USA) code from ANTEON has now been coupled with NEi Nastran.

The Anteon USA code is the industry standard for analysis of:

- Transient fluid-structure interaction
- Underwater shock

The USA Transient Response allows:

- Totally or partially submerged structures
- Acoustic shock waves of arbitrary pressure profile and source location
- Fluid-structure interaction via a variety of boundary element and volume element formulations

The NEi Nastran Interface is particularly powerful in that it employs sparse matrix data structures directly and all communication is via databases

Significant Advantages for USA users

- Access to a less costly Nastran solution for USA analyses
- Database communication permits use of USA time-integration code and User libraries of exotic nonlinear mounts

- Sparse matrix solver for efficient storage and fast, implicit solutions
- Access to the in-fluid eigenvalue capabilities of USA6

NEi Nastran Implementation

The User Interface in NEiNastran is very straightforward with just one case control command:

```
USAWETSURFACE = n
```

This references a PLOADi pressure set n which defines the wetted surface, and sets up the USA output file creation. It also tells NE/Nastran to stop automatically after the output file is produced and to read in the corresponding USA input file on restart

Conclusion

Simple Interface

Less costly Nastran solution for USA analyses
Use of USA time-integration code and Legacy User libraries

Sparse matrix solver for efficient storage and fast, implicit solutions
Access to the in-fluid eigenvalue capabilities of USA6



"Be sure to check out Noran's new Forums at www.NENastran.com/forum. We have added an industry specific forum just for the Maritime industry (scroll down to the bottom and look for the Maritime User Group). The forums are the perfect place to make observations, offer advice, ask questions, complain or complement."

Meet our Support Staff

Mitch Muncy has been in the industry of Finite Element Analysis for five years, with a degree in Mechanical Engineering. He has been with Noran Engineering for two years. In addition to technical support for customers, Mitch provides support to the sales department and conducts a few of the training classes. He is currently putting together software updates and doing web demonstrations for prospective customers.



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Technical Tips From Dr. Nastran

Using Advanced Modal Database Features in NEi Nastran V8.4

Introduction

The last installment of 'Technical Tips' discussed the usage and benefits of the MODALDATABASE feature in NEi Nastran. For those of you who missed the last article or are new to using the modal database, please refer to our white paper on this topic in the knowledge base section of our website (www.nenastran.com). This article continues the topic of modal database usage as well as discusses some new modal reduction features in V8.4.

Take Control of your Modal Database

By default NEi Nastran will check for an .mdb file with the same name as the analysis file being analyzed, then depending on the setting of MODALDATABASE (i.e., DELETE, FETCH, STORE, UPDATE) it will perform the requested action. This is often undesirable as it could lead to the .mdb file being overwritten or deleted if MODALDATABASE is inadvertently set to STORE or DELETE. Analysts generally run a modal analysis to save the modal database, and then run a frequency, transient or random response analysis using the modal database. This requires them to rename the .mdb file from the 'modal' run name to the current model name.

The preferred approach is to use the MODALDATFILE directive which allows an analyst to directly call a specific .mdb file on their hard drive. Any directive in NEi Nastran can be input into the executive control section of the bulk data file in the following format:
NASTRAN *directivename=value*. Where *directivename* is the name of the directive and *value* is the value you want to set it to. For MODALDATFILE this would be written as:
NASTRAN MODALDATFILE=C:\Analysis\Sample.mdb

See the figure below for a screen shot of a sample input deck using the directive:

```
NASTRAN MODALDATFILE=C:\Analysis\Sample.mdb
$
$ MODAL SOLUTION.
$
SOL 103
CEND
$
TITLE = INSTALLATION TEST CASE
SUBTITLE = VIBRATION OF A 2-D CANTILEVER BEAM
$
DISPLACEMENT = ALL
$
```

With this set, NEi Nastran will use that .mdb file/path to perform the 'DELETE', 'STORE', 'FETCH', or 'UPDATE' commands.

Using the UPDATE Feature

In NEi Nastran V8.4 the UPDATE option was added to the MODALDATABASE parameter which allows an analyst to quickly reduce a modal database using the MODESET command. The UPDATE option will 'fetch' the existing .mdb file and then reduce it based on the MODESET settings and finally 'store' the .mdb file with the updated database. Because no calculations are done (other than database modifications), an 'UPDATE' modal analysis only takes a few minutes (even for large models). This command is very useful when looking at the effects of changing MODESET parameters, or when you want to save a reduced modal database for future dynamic analysis. A cautionary note when using this parameter is to make a backup copy of your .mdb file since it will be overwritten with the updated file.

New MODESET Feature

A new MODESET option called CUTOFF has been added in V8.4 that allows the analyst to specify a modal effective mass cutoff percentage. When CUTOFF is selected, modes starting with the highest modal effective mass will be stored and will stop when the sum of percent modal effective mass is equal to the value specified. This is very useful for DDAM analysis where an 80% modal effective mass is required, as it will ensure the least number of modes are used while still meeting the 80% MEM requirement.