

FEMAP v11.4 Tips and Tricks (10 Best Things)

A Seminar for FEMAP and NX Nastran Users

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Upcoming Training

FEMAP training: October 9 - 13, 2017

FEMAP API course available as an on-demand online course

LS-DYNA training: May 14-18, 2018

Support Review:

"Adrian and Applied CAX consistently get back to me within a few hours with helpful tips or insights. Engineers know that you can't extend a deadline because your FEA support was late in getting back to you. This is why I truly appreciate the level of support Applied CAX provides... They are an excellent resource and I'm glad to have their support."

[Allen Foulstone](#)
Senior Systems Engineer
[Stratolaunch Systems](#)

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1. WHY WE ARE HERE

Congratulations – Taking time out from your schedule to sharpen up your skill sets is always a good thing.



2. OBJECTIVE

What we consider our most important and useful FEMAP capabilities and share with our colleagues our knowledge in building accurate FEA models. We aim to provide a high-level overview but also a path forward for deeper learning.

3. WHAT ABOUT FEMAP V11.4 AND NX NASTRAN V11.0.1?

The FEMAP v11.4.0 release reminds us about this saying: What is the difference between a scientist and an engineer? A scientist quests for the new and novel while an engineer looks for the tried and true. Why? An engineer must have something that will work and not break.

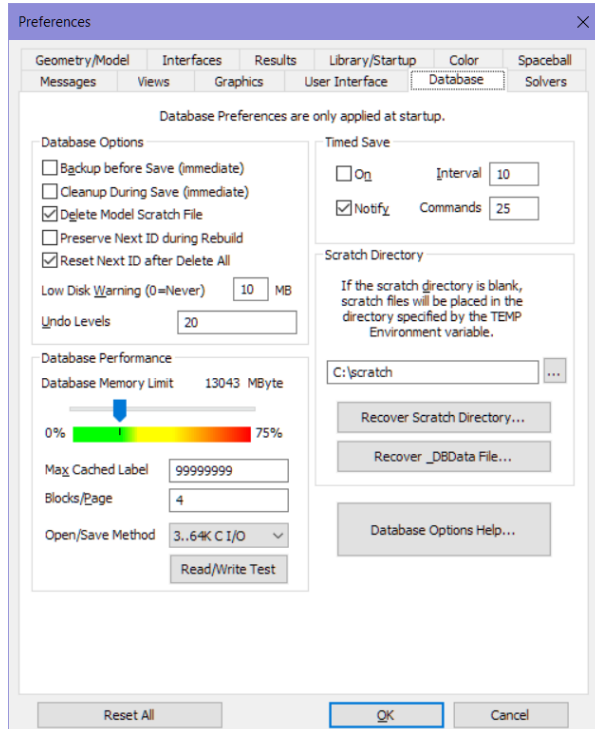
The current release represents about six months of work by the development team. It is not flashy and represents subtle quality improvements in robustness and speed. We truly feel that this is the Engineers' release.

4. TOP TEN THINGS WE LOVE ABOUT FEMAP

1. Undo: Let's talk FEMAP Preferences
2. Geometry Manipulation: From manifold to non-manifold surfaces
3. Meshing Toolbox: The quest toward the perfect quad
4. Visualization: Ctrl-Q and Draw and Erase (Toolbar)
5. Selector Entity: On the fly control of your model and stress visualization
6. Free Body Diagram (FBD): What every simulation engineer truly loves
7. Panes, Toolbars and Views: The joys of creating a custom work environment in hues
8. FEMAP's Help: So much goodness – so little time
9. Application Programming Interface (API): Just amazingly practical innovation (API)
10. Undo: We have to give it double-billing

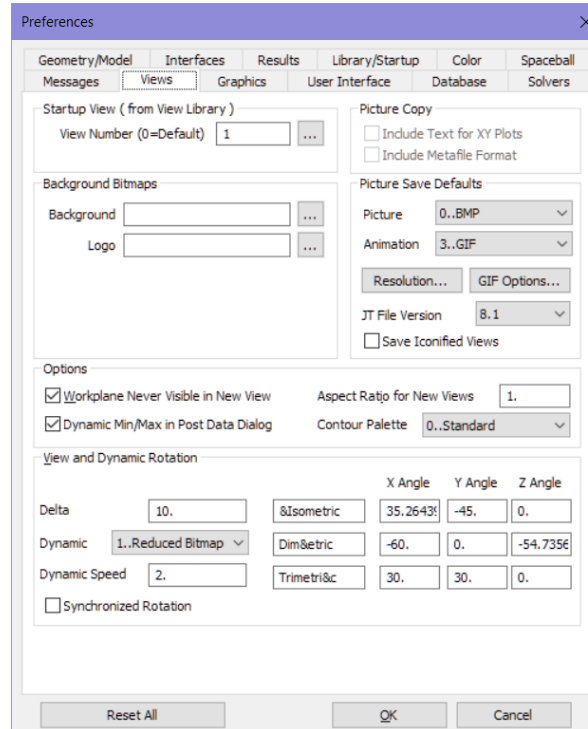
4.1 UNDO: LET'S TALK FEMAP PREFERENCES

Undo at 20



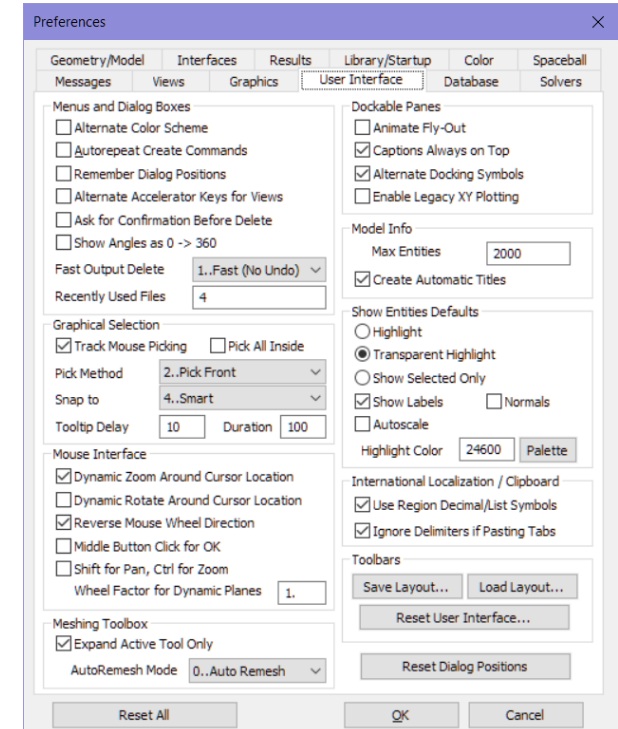
Scratch to C:\scratch

Resolution at 4x



View Number to predefined view

Pick Front



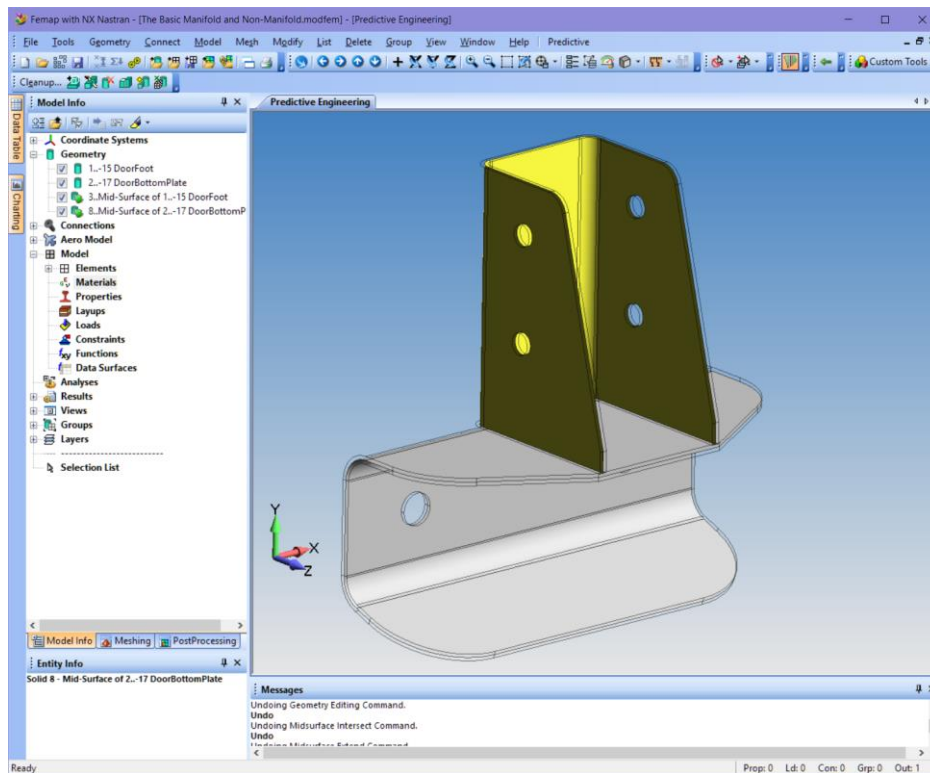
Turn off Ask for Confirmation
Turn off Autorepeat
Dynamic Zoom Around Cursor Location

4.2 GEOMETRY MANIPULATION: FROM MANIFOLD TO NON-MANIFOLD SURFACES

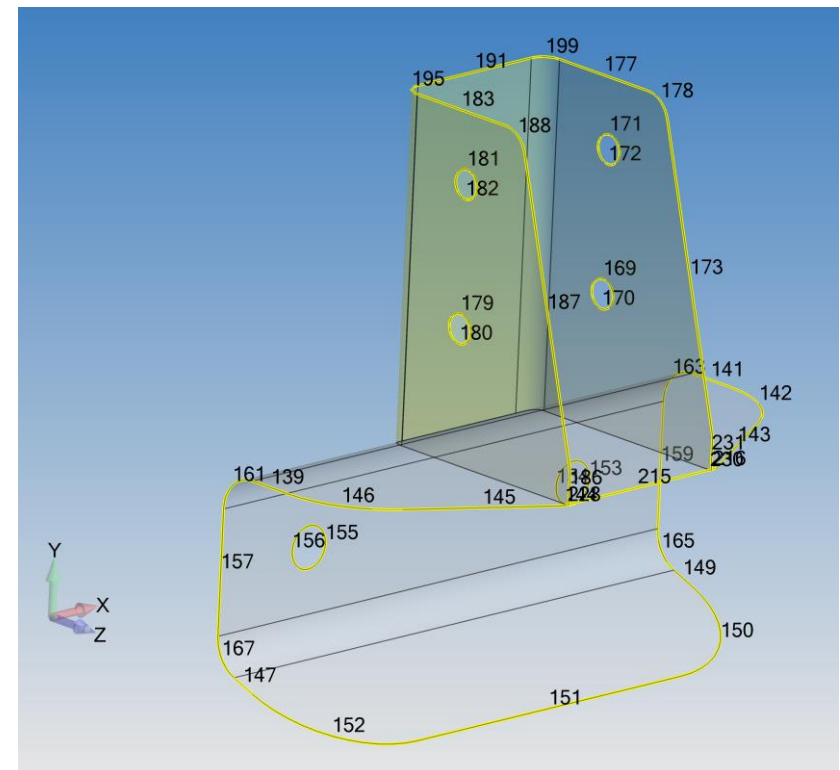
4.2.1 THE BASICS

These were the breakout geometry operations in FEMAP that brought forth the ability to create clean quad meshes from tangled collections of surfaces.

Manifold



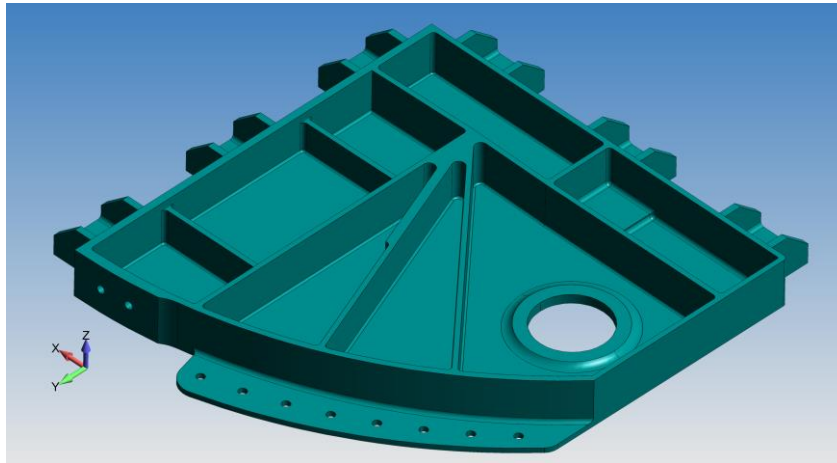
Non-Manifold



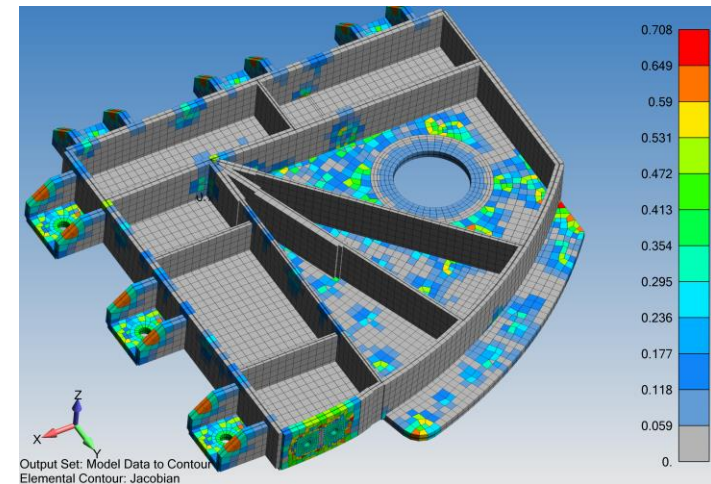
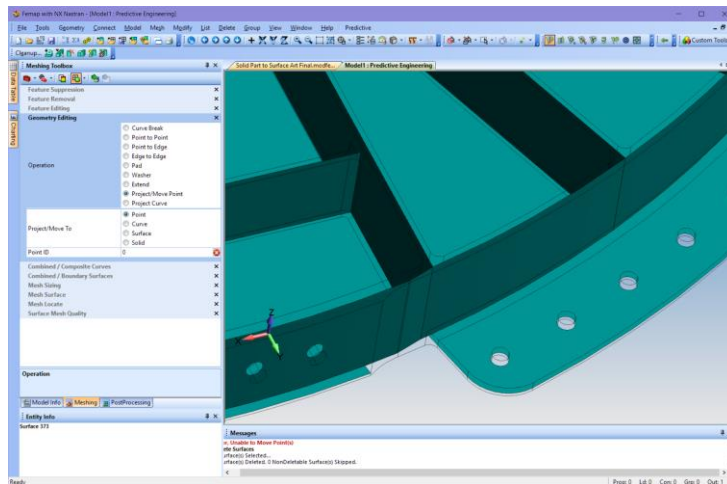
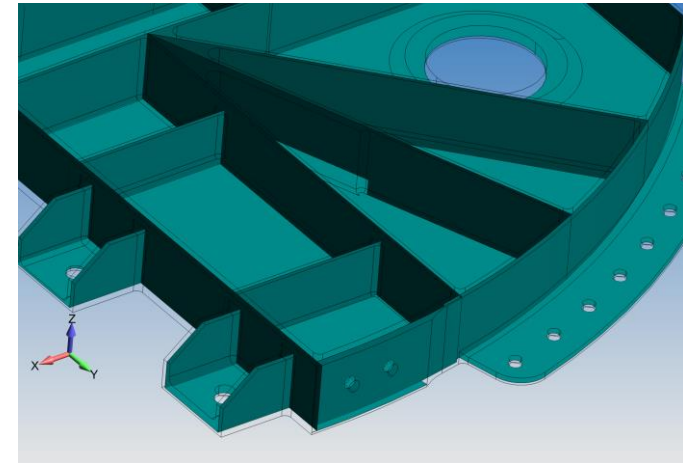
4.2.2 THE ADVANCED

One can do some flashy things and FEMAP should not be underestimated.

Import Parasolid File



Midsurface at 0.1



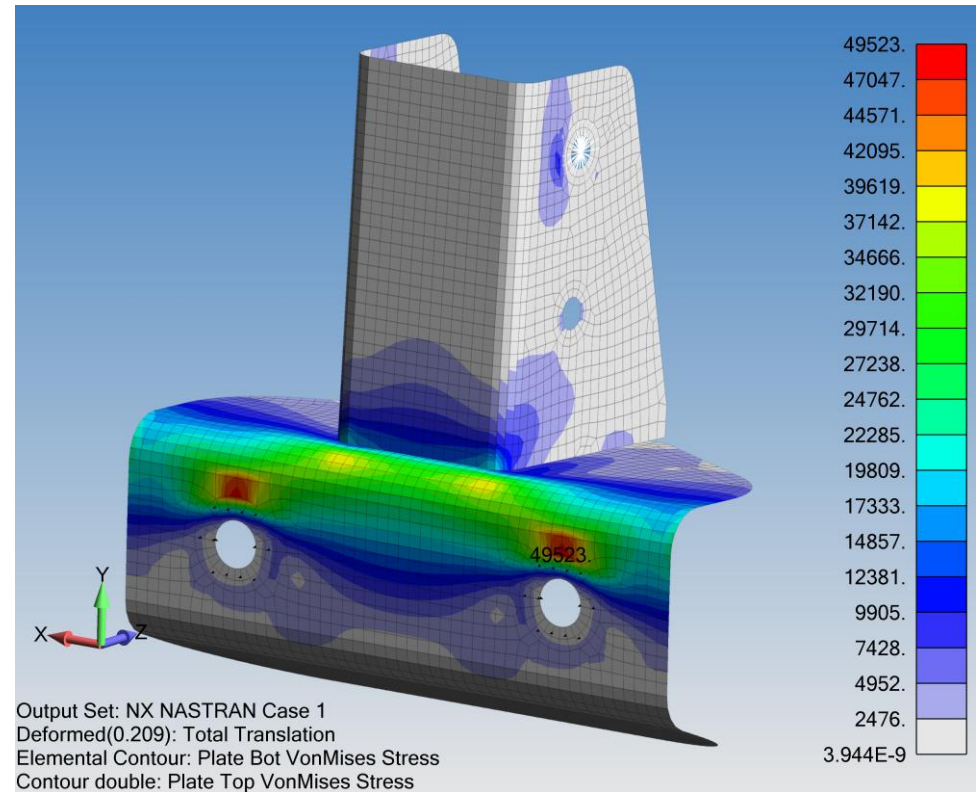
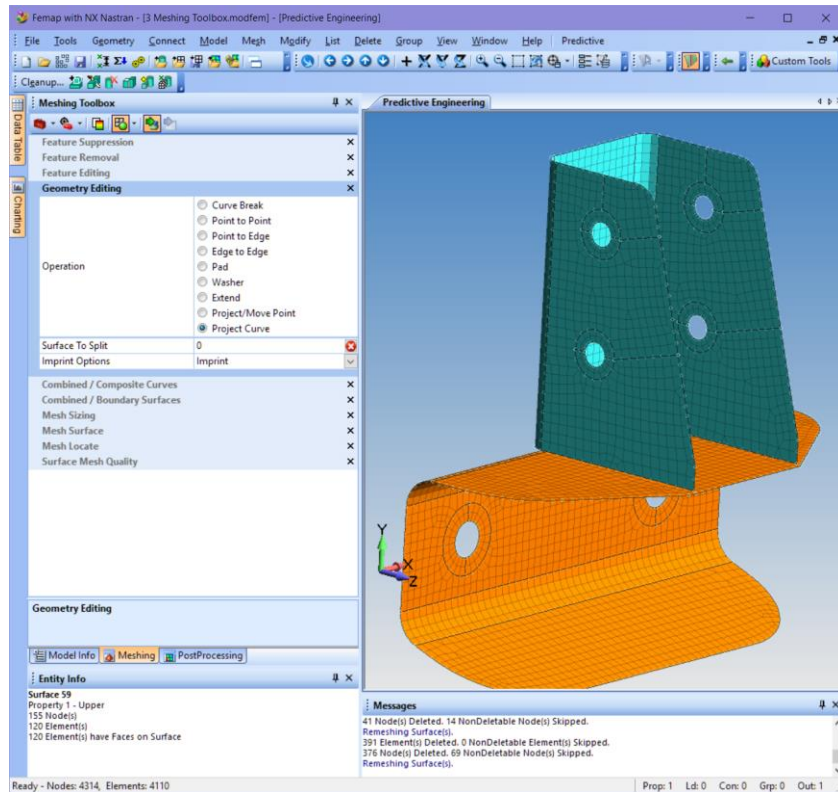
The complete process: Predictive Engineering Technical Seminar - Surface Modeling and Plate Meshing - FEMAP v11.2.1.pdf

4.3 MESHING TOOLBOX: THE QUEST TOWARD THE PERFECT QUAD

The meshing toolbox is fundamental in our pursuit of the perfect quad mesh.

Meshing Toolbox

RBE (MPC) / Weld / API

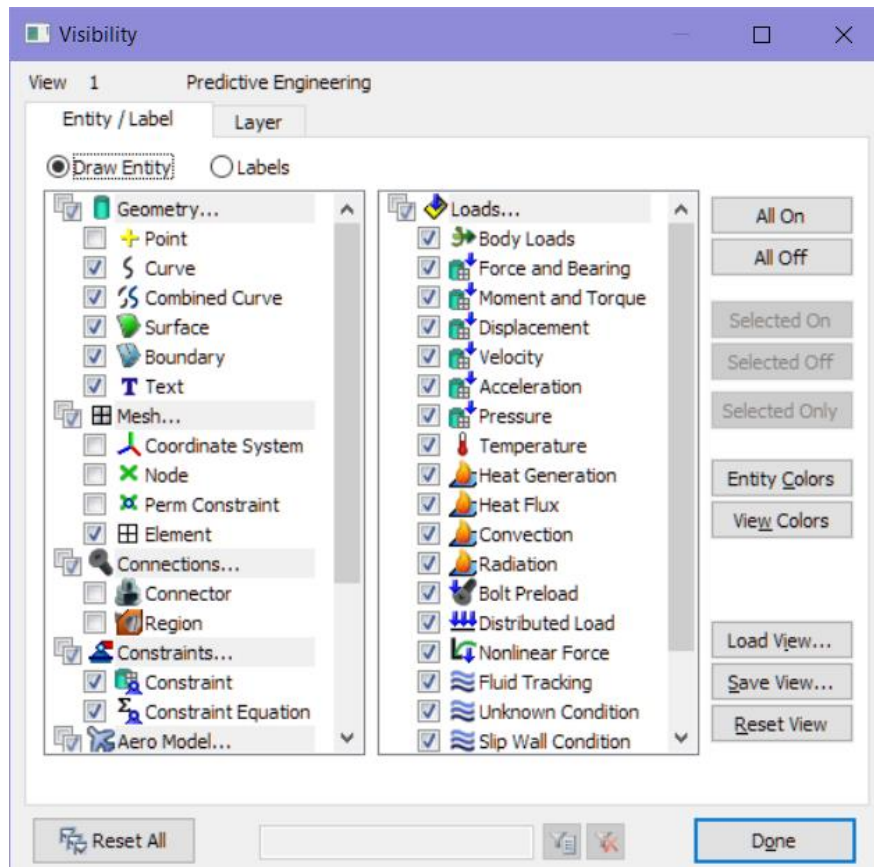


At AppliedCAx.com: Surface Modeling and Plate Meshing v11.2.1 and Surface Modeling,

4.4 VISUALIZATION: CTRL-Q AND DRAW AND ERASE (TOOLBAR)

CTRL-Q

Draw / Erase

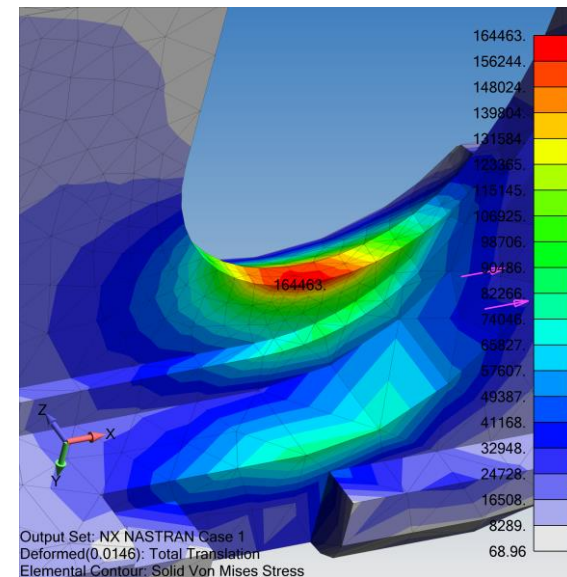
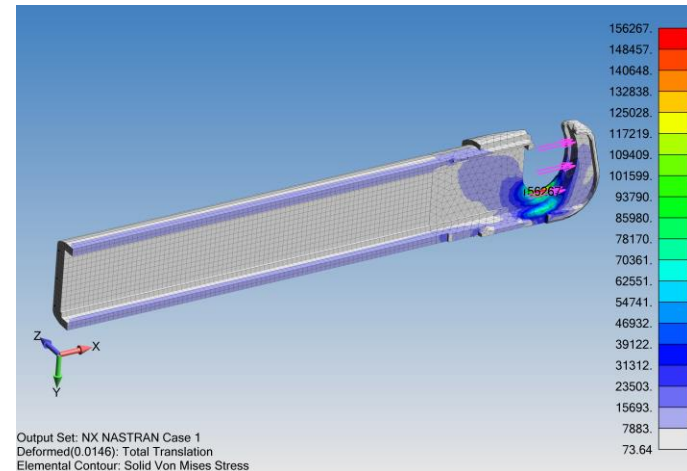


4.5 SELECTOR ENTITY: ON THE FLY CONTROL OF YOUR MODEL AND STRESS VISUALIZATION

Quick Interrogation

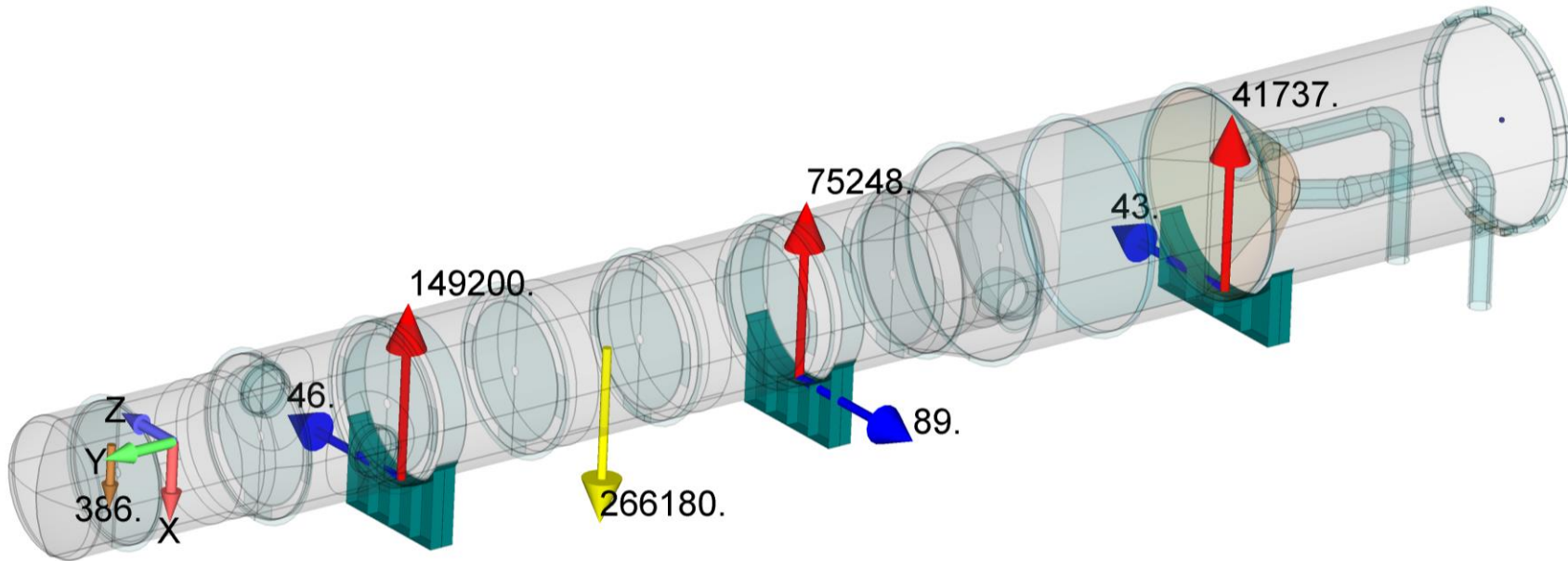


Stress Convergence Checking



4.6 FREE BODY DIAGRAM (FBD): WHAT EVERY SIMULATION ENGINEER TRULY LOVES

FBD – A Vital Step Toward Model Verification and Engineering Documentation



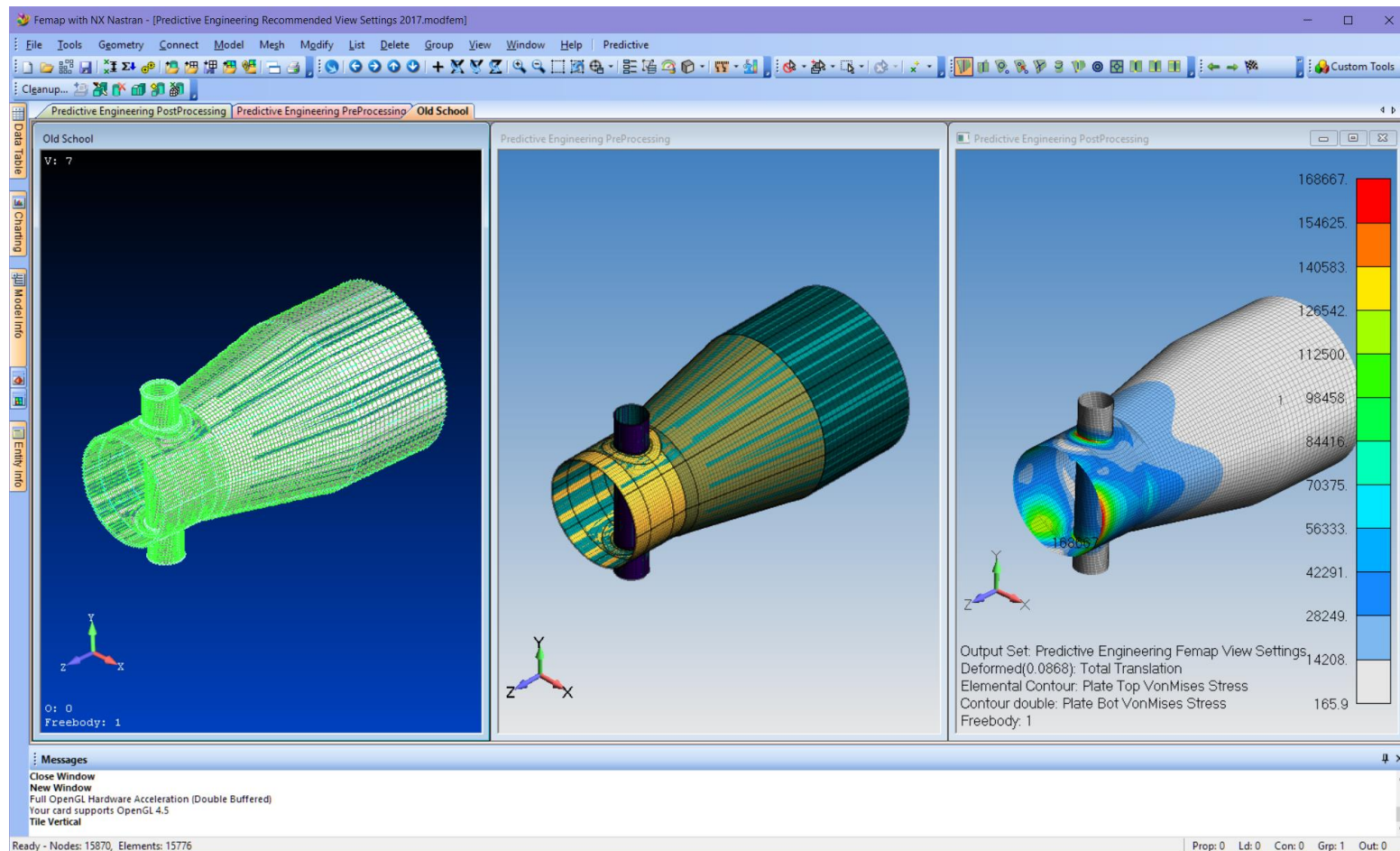
Output Set: Hydrostatic Test
Freebodies: Weight, Saddle B4, Saddle B1, Saddle S2

At AppliedCAx.com: Femap v10.3 and NX Nastran v8.0 – Update Seminar

4.7 PANES, TOOLBARS AND VIEWS: THE JOYS OF CREATING A CUSTOM WORK ENVIRONMENT IN HUES

We do spend a bit of time with managing our work space.

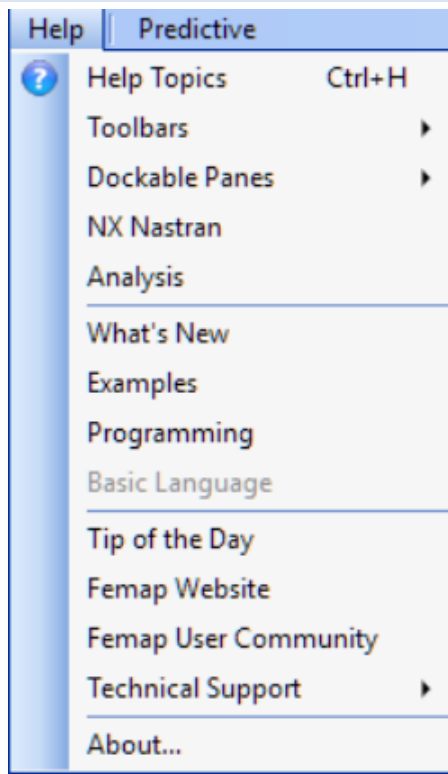
Graphic Presentation



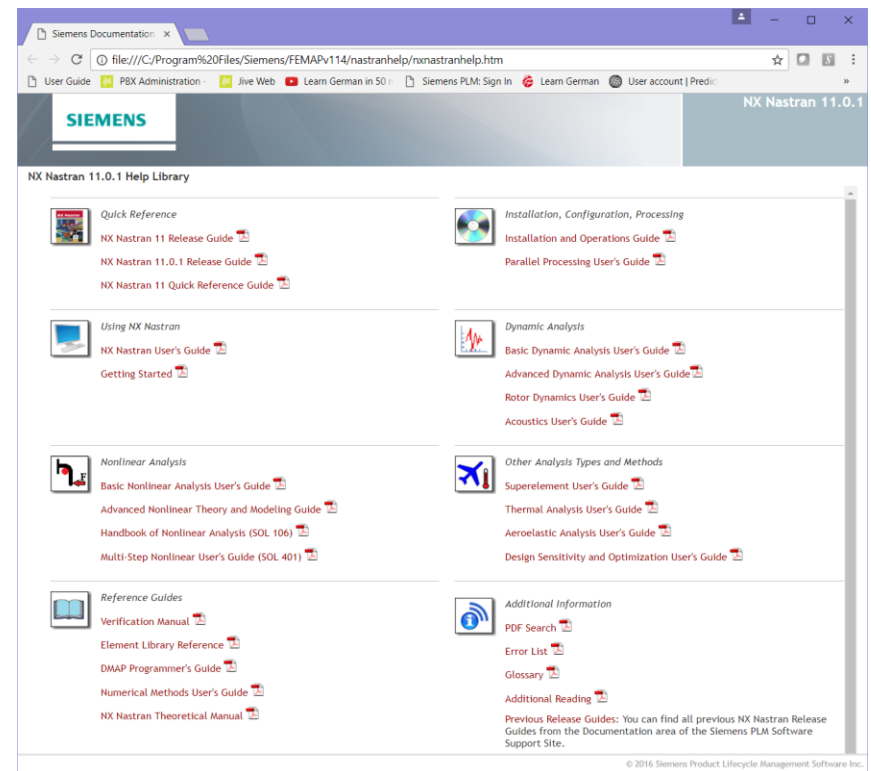
4.8 FEMAP'S HELP: SO MUCH GOODNESS – SO LITTLE TIME

Don't forget that FEMAP's help includes the NX Nastran manuals and there are also FEMAP PDF's.

The Start



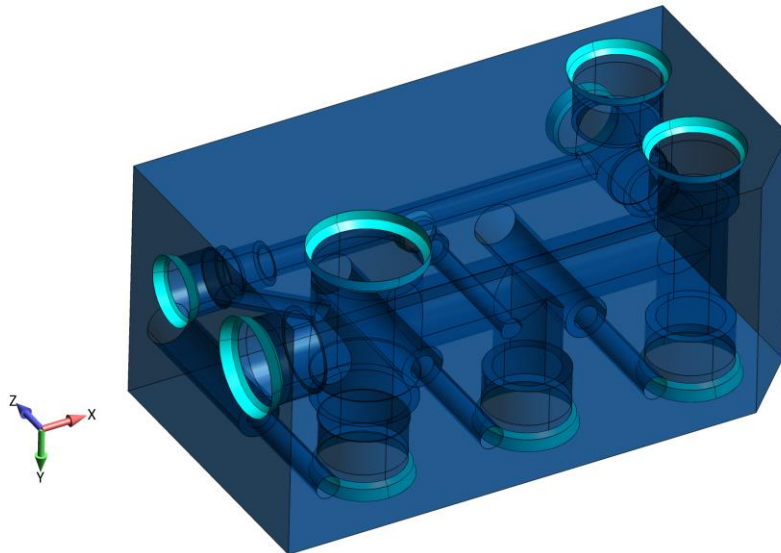
The Research



4.9 APPLICATION PROGRAMMING INTERFACE (API): JUST AMAZINGLY PRACTICAL INNOVATION (API)

Over the years, we have saved our clients hundreds of thousands of dollars using FEMAP's API to expedite project work.

Unique Load Applications



Driving FEMAP via Excel

HLP-VSL-00028 Fluid Mass Adjuster REV 2.xlsm - Microsoft Excel

HTTP 28247 Fluid Mass Balance Calculation			
Complete Operating Liquid Weight	1,350,000 lbs		
Specific Gravity of Fluid	1.5		
Upper Vessel Shell Property Number	102012	0	
Lower Vessel Shell Property Number	102512	0	
Bottom Head Under Jacket Property Number	101712	0	
Bottom Head Under Jacket Property Number	101513	0	
Center PJM Shell Property Number	202013	0	
Outer PJM Shell Property Number (in cluster)	302072	0	
Outer PJM Shell Property Number (in fluid)	302073	0	
	Density (lb/in ³)	Density (lbm/in ³)	
Water Density	0.0361	9.35233E-05	
Liquid Density	0.05415	0.000140285	
Concrete Density	0.0752	0.000194819	
Steel Density	0.283	0.000733161	
	Volume (in ³)	Weight (lb)	Mass (lbm)
Total Vessel Volume	30,445,914	1648429.64	4270.54
Total PJM Cluster w/ Supports	3,711,472	200976.21	520.66
Vessel Liquid	26,730,442	1447453.43	3749.88
PJM Cluster (Displaced Fluid Volume)	3,481,951		
PJM Liquid (Volume)	2,805,225	151902.93	393.53
PJM Liquid (Surface Area)	181,239		0.002171333
PJM Cluster Concrete (Volume)	676,686	50886.79	131.83
PJM Cluster Concrete (Surface Area)	17,873		0.007375828
PJM Cluster NSM (Liquid+Concrete)		202789.72	525.36
Horizontal PJM Cluster Supports (Displaced Fluid Volume)	136,669		
Vertical PJM Cluster Supports (Displaced Fluid Volume)	92,852		
Vertical PJM Cluster Supports Concrete (Volume)	92,852	6982.47	18.09
Vertical PJM Cluster Supports Concrete (Length)	180		0.10049612
Vertical PJM Cluster Supports NSM (Concrete)		6982.47	18.09

Buttons: Remove All Added Mass and Non Structural Mass, Adjust for Horizontal Seismic Analysis, Adjust for Vertical Seismic Analysis, PJM Full, PJM Empty, Set Stress Recovery Thickness to Surface, Set Stress Recovery Thickness to Midplane

4.10 UNDO: WE HAVE TO GIVE IT DOUBLE-BILLING

But what the heck – you most likely have already seen enough and you already know how useful undo is to your daily work.

5. AND NOW A WORD FROM OUR SPONSORS

Thank You

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