FEMAP Version 12 What's New

FEMAP Release Schedule

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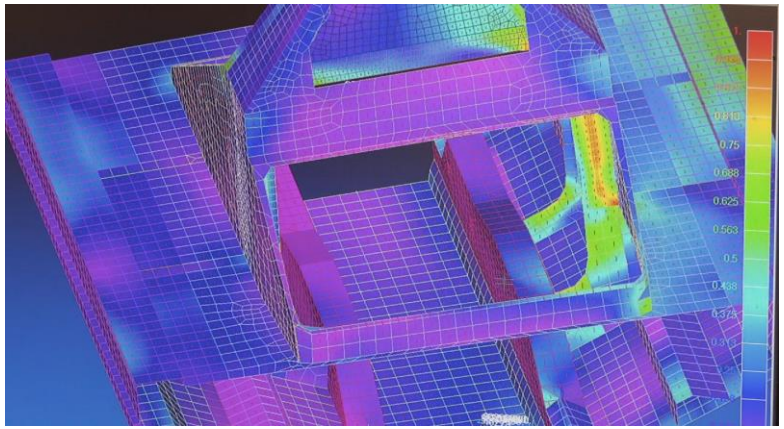
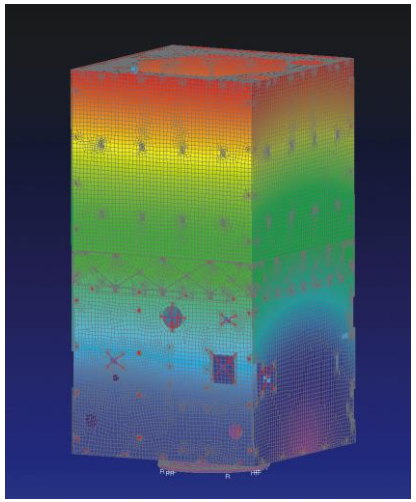
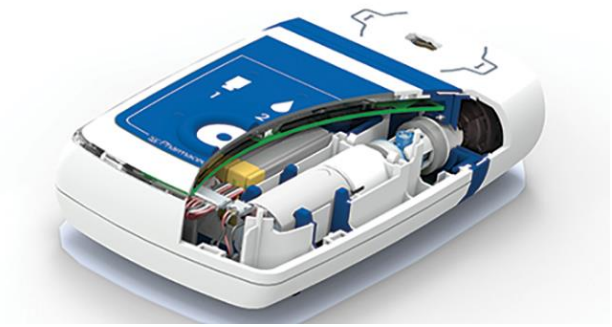
Regular release schedule

- *v12.0 August 2018*
- *v11.4.2 December 2017*
- *v11.4.1 September 2017*
- *v11.4 May 2017*
- *v11.3 May 2016*
- *v11.2 March 2015*
- *v11.1 November 2013*
- *v11.0: January 2013*







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FEMAP Direction

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Maximize efficiency of FEA tasks

- Efficient creation of high fidelity FE models that accurately represent real-world engineering problems
- Intuitive interpretation of analysis results to improve the design and performance of engineered products

Build upon strong FEMAP capabilities

- Geometry idealization and processing for FE models
- Powerful meshing, model creation and interactive editing
- In-depth support for industry standard solvers
- Flexible customization tools to streamline analysis processes

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FEMAP 12.0
Overview

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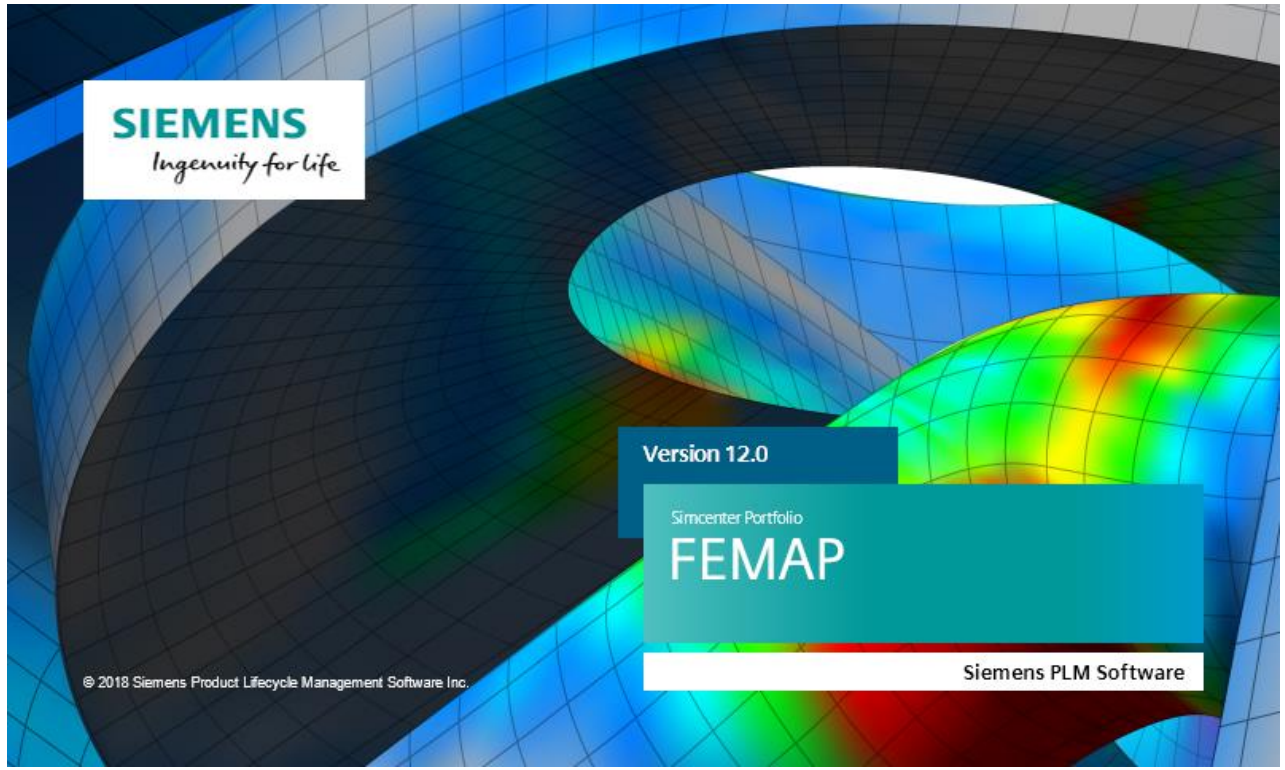
New functionality and updates

- UI and visualization
- Geometry enhancements
- Preprocessing
- Postprocessing
- Solver support



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UI and Visualization
New Functionality and Updates

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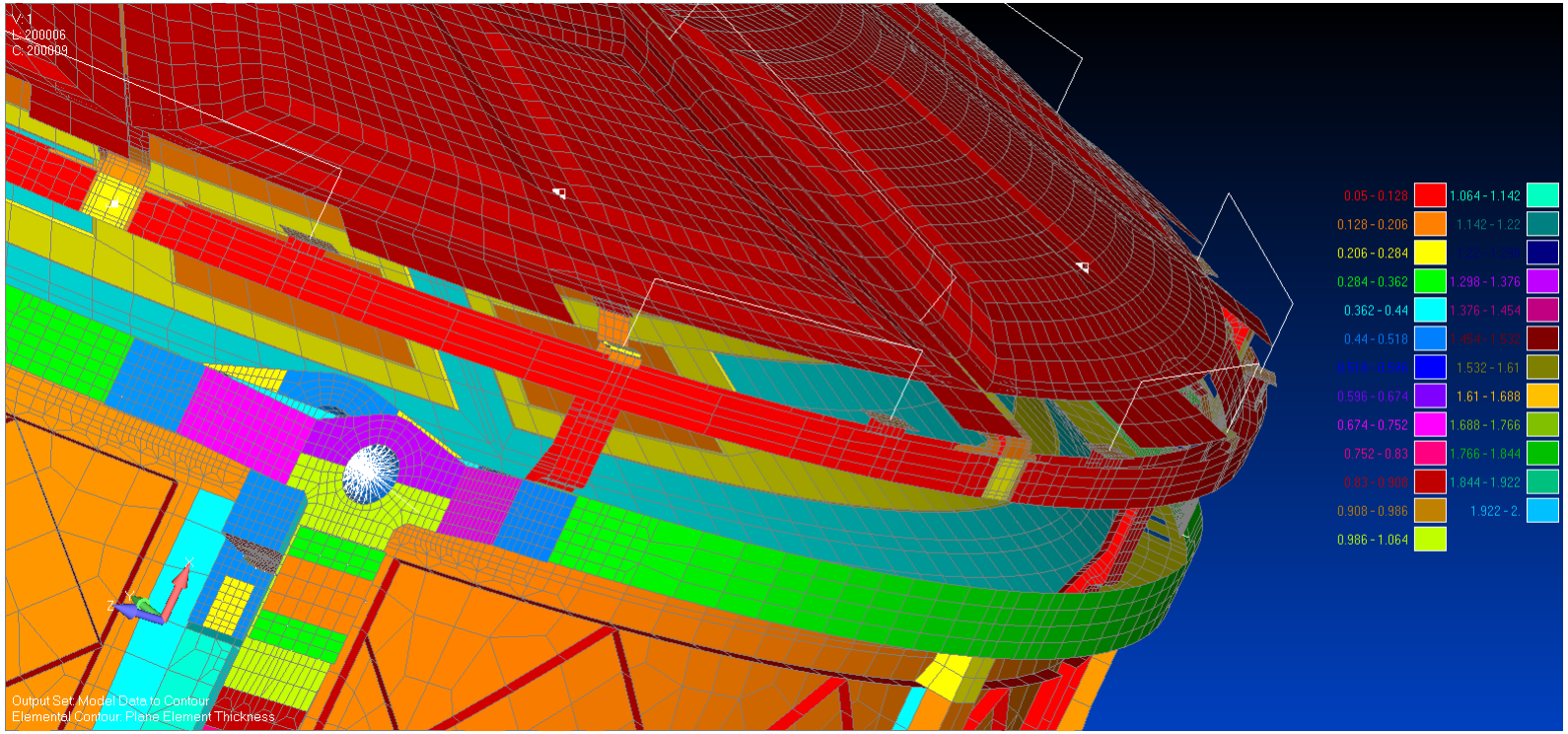
New functionality and updates

- Live Screen Entities
  - View Axes
  - Contour Legend
  - Post Titles
  - View Titles
- Silhouette and Feature Lines
- Postprocessing
- Performance



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UI and Visualization
Interactive Screen Entities

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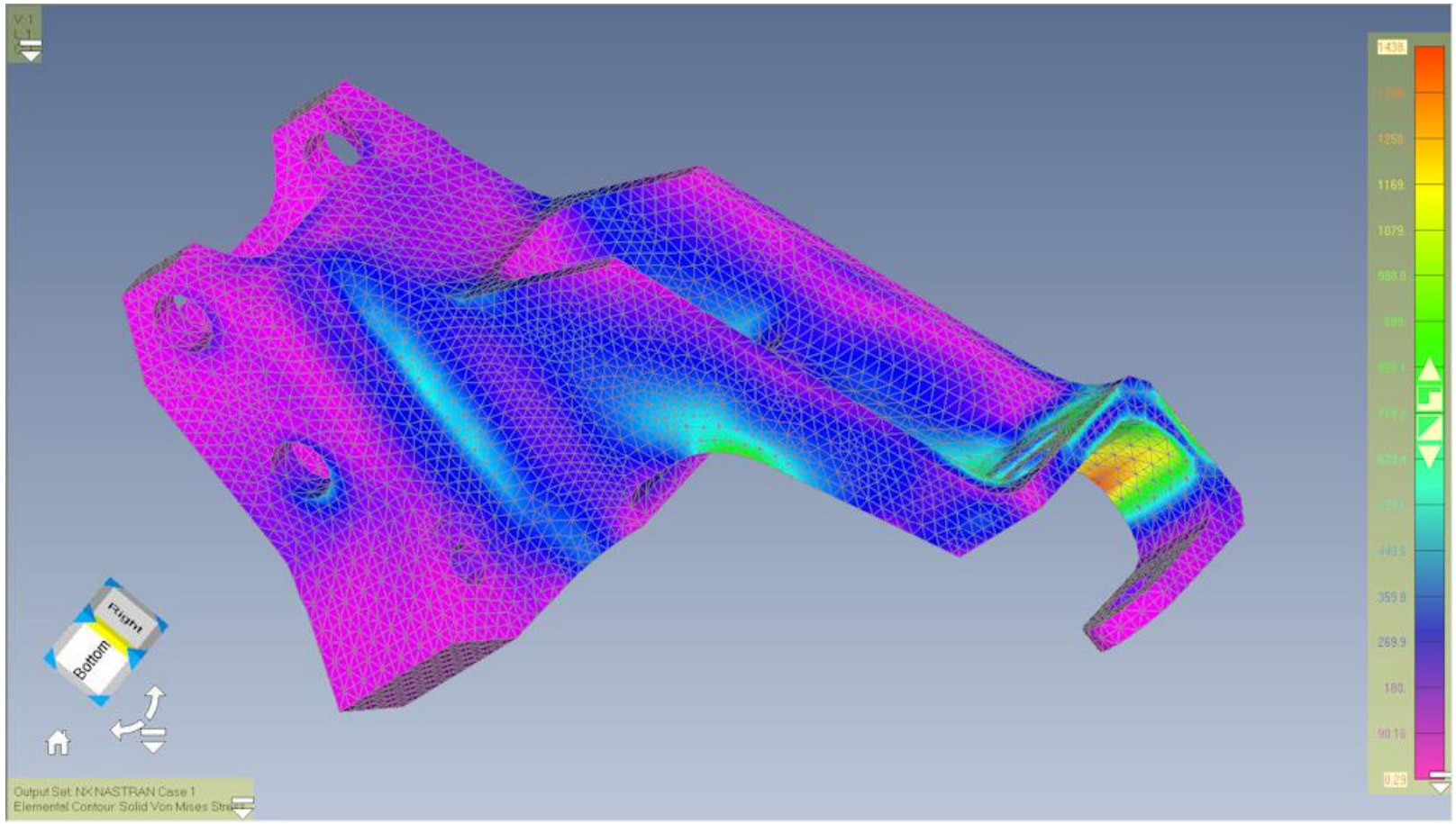
Interactive screen entities
- View Legend
- View Axes
- Post Titles
- Contour Legend

Mouse over the areas indicated and each item becomes “live”
- Drag to reposition
- Other specific functionality on each item



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UI and Visualization
Interactive Screen Entities

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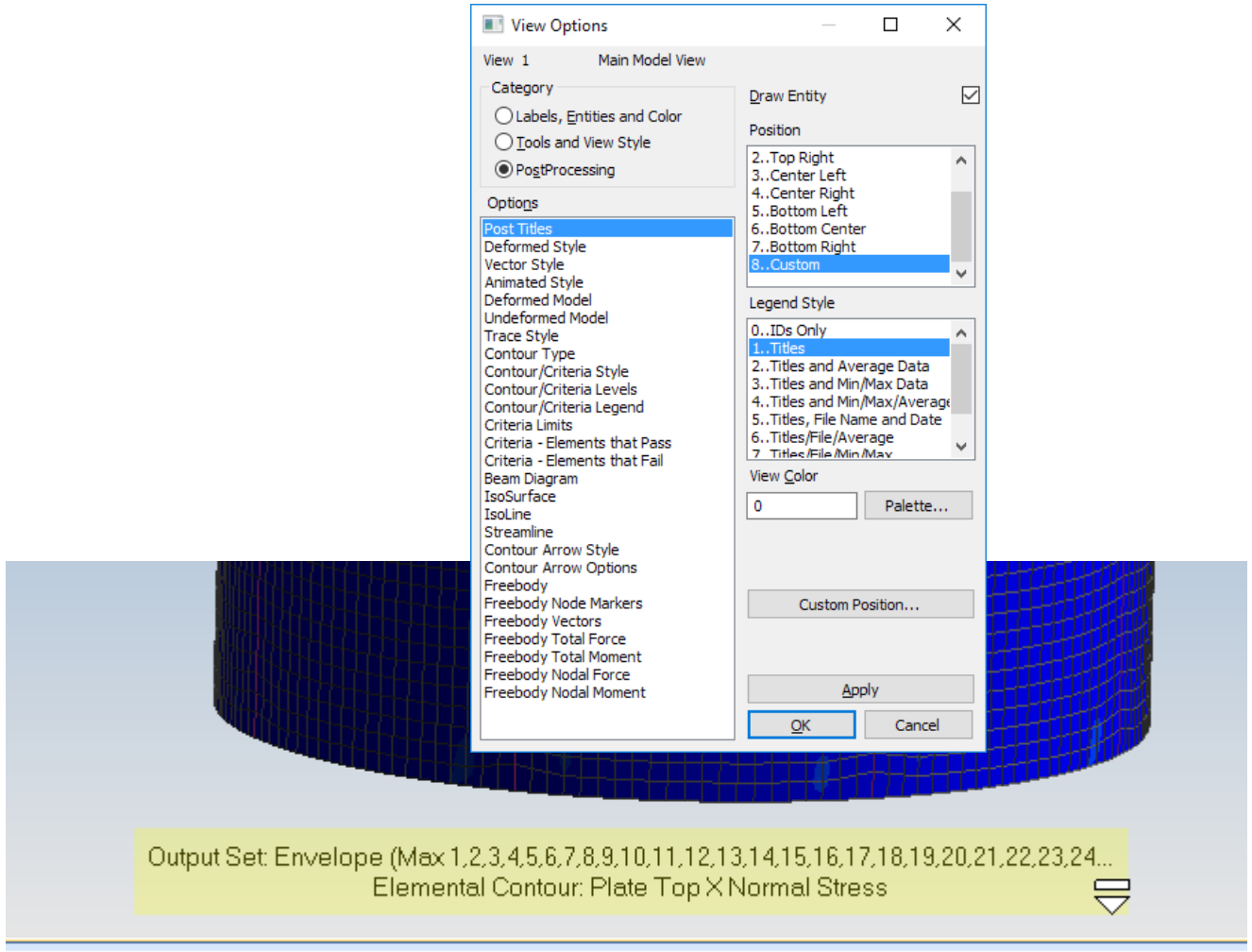
View Legend and Post Titles

- Pick to select
- Move
- Text auto justification
  - Left
  - Center
  - Right
- Quick access to applicable View Option for further control



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UI and Visualization
Interactive Screen Entities

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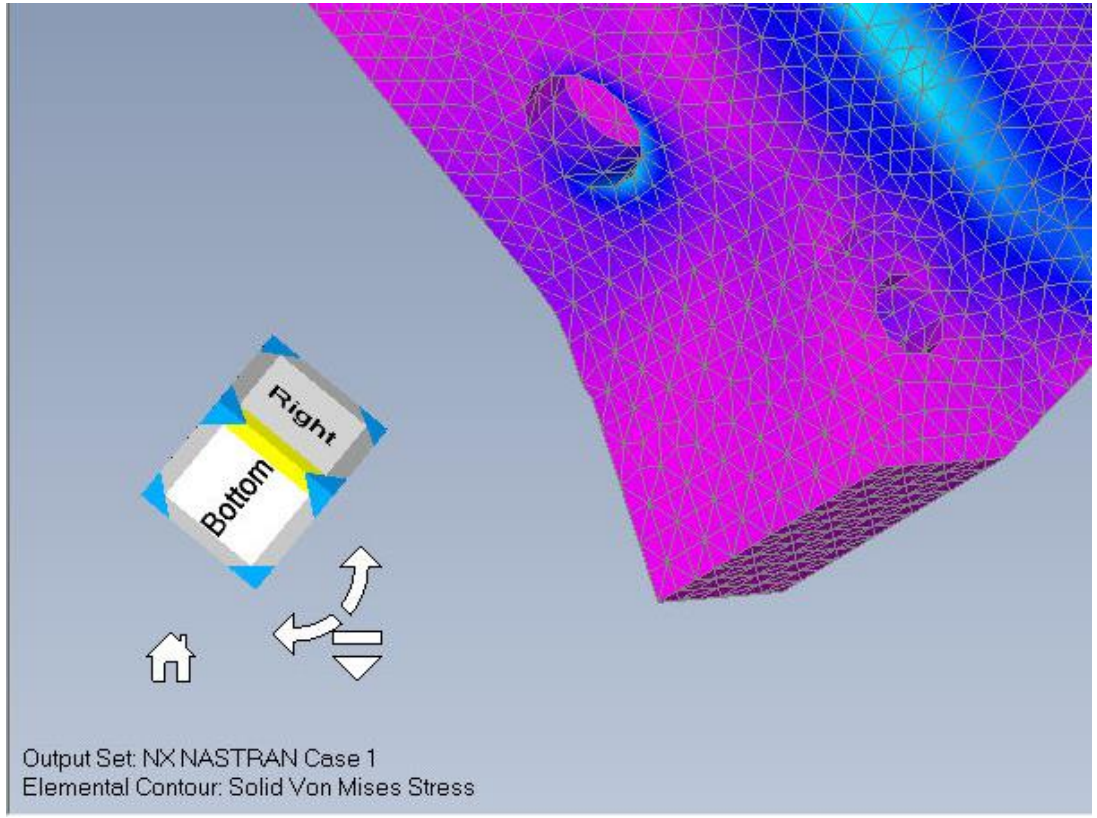
View Axes

- Pick to activate
- Cube for accessing standard orientations
- Face Pick for Top, Bottom, Left…
- Edge pick for 45 Degree Left/Top – Top/Back…
- Corner pick for isometric views
- Arrows rotate about Screen Z
- Home to autoscale
- Quick access to applicable View Option for further control



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UI and Visualization
Interactive Screen Entities

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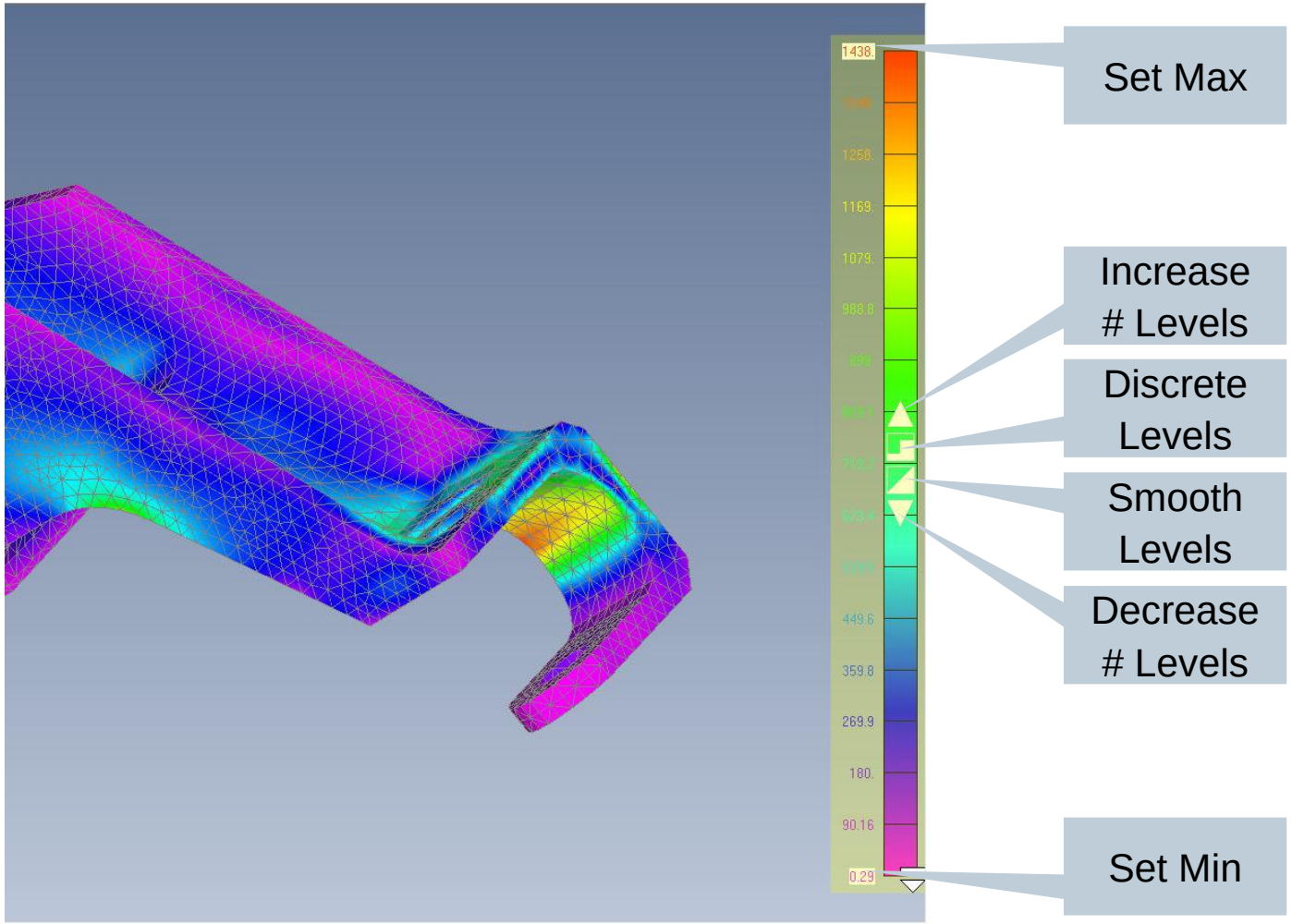
Contour Legend

- Pick to activate
- Drag to move
- Pick the down arrow to bring up the standard View Option dialog
- Control options
  - Max/Min
  - Smooth/Level
  - Number of Levels



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UI and Visualization
Best Possible Graphics

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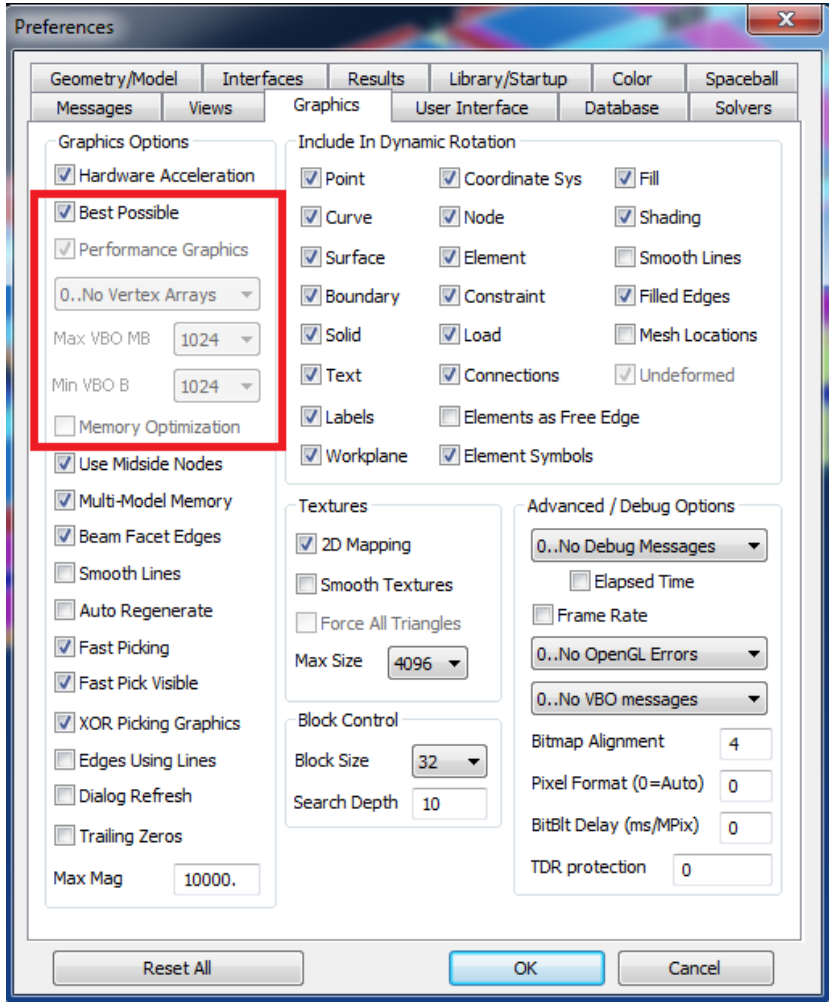
- Queries the available graphics hardware to determine best options to get best performance
- AMD and NVIDIA work well but Intel is not fully supported by Performance Graphics option



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UI and Visualization
Feature and Silhouette Lines

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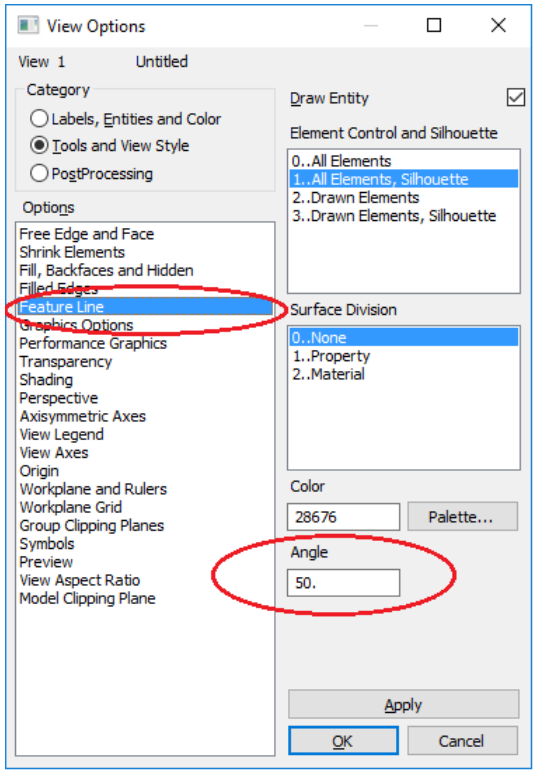
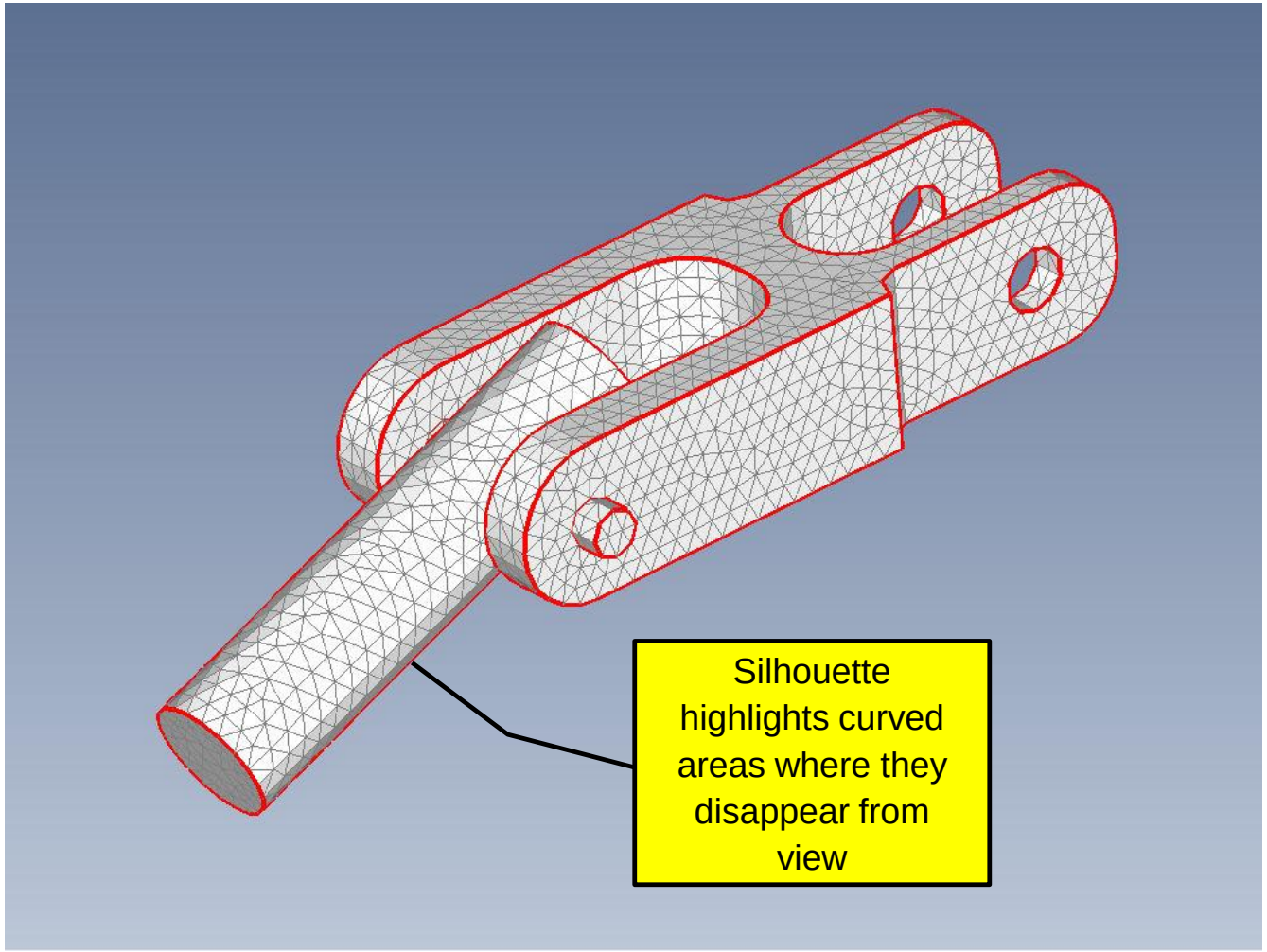
Feature Lines and Silhouette Lines

- Mesh based – displays hard edges
- Controlled with break angle





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UI and Visualization
Feature and Silhouette Lines

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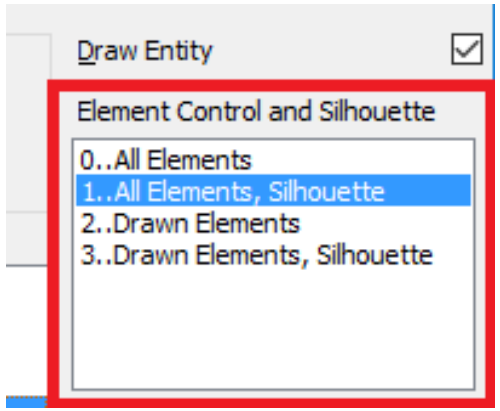
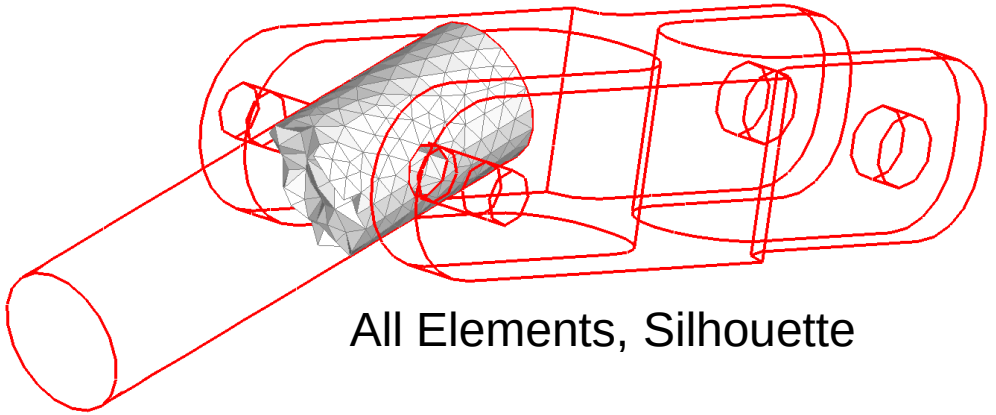
Feature Lines and Silhouette Lines

Control options

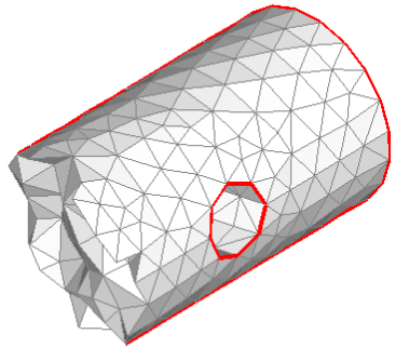
Silhouette Lines On/Off

Feature Lines for All Elements, or the current Drawn Elements





All Elements, Silhouette



Drawn Elements, Silhouette

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UI and Visualization
UI Themes

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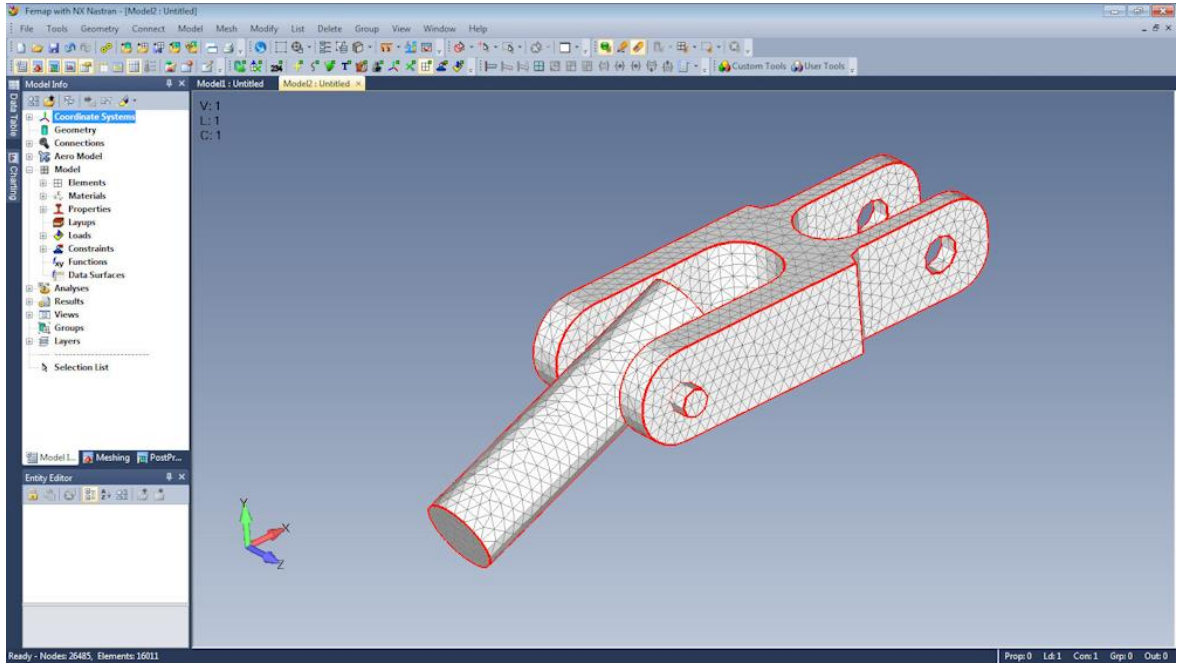
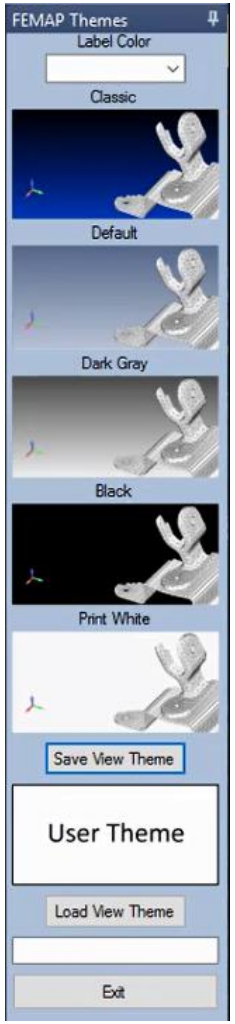
Updated UI theme
- Fresh and modern look and feel
- Clean UI appearance
- Clear model viewing

Also available in Custom Tools:
- Selection of predefined themes
- Create your own theme and save it





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Geometry Enhancements
Geometry Processing

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Sewing uses new Multi-Body processing

- Old algorithm made copies of all sheet bodies, and sewed them together

New algorithm keeps original surfaces, including

- Surface based loads and BCs
- Surface based contact
- Composite curves
- Composite surfaces

Also uses tolerance algorithm, specify a larger tolerance, and surfaces will be sewn at full tolerance first, working its way up to the larger tolerance

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Geometry Enhancements
Geometry Processing

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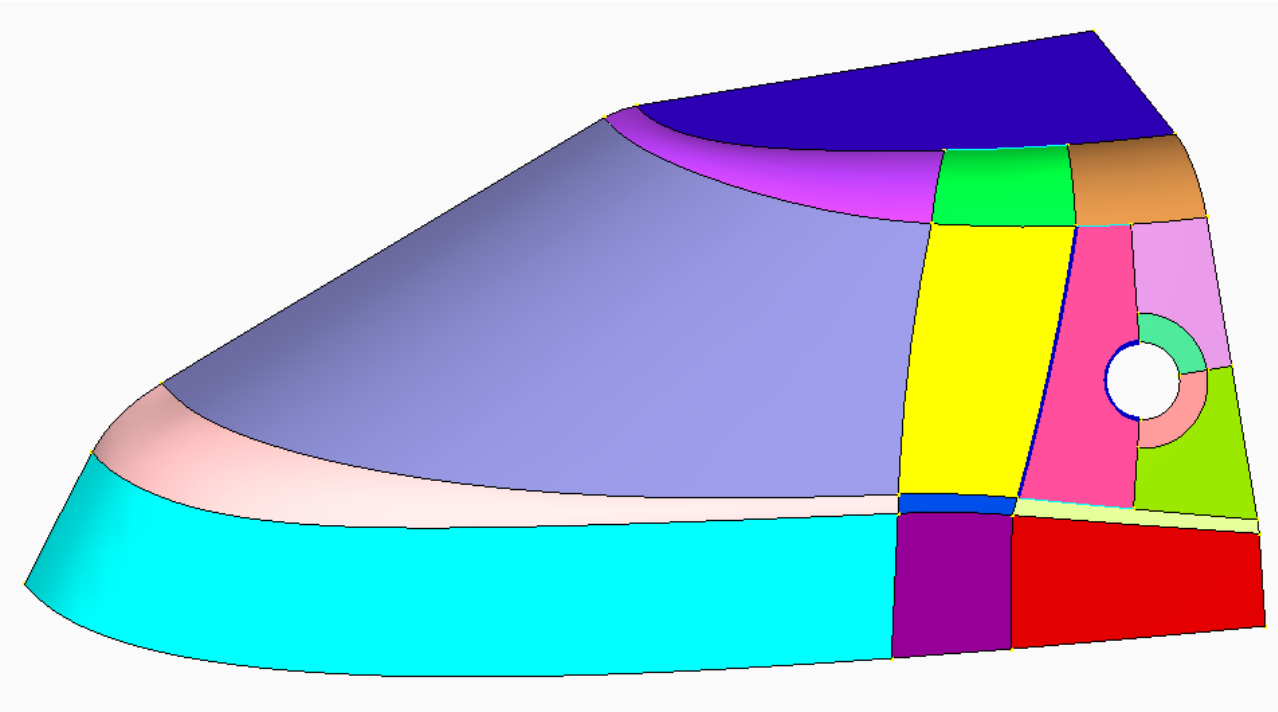
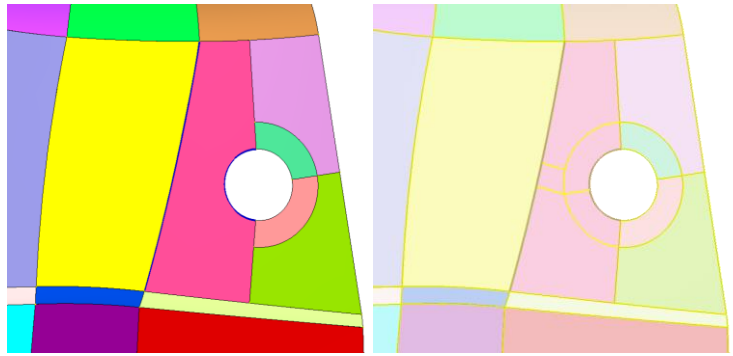
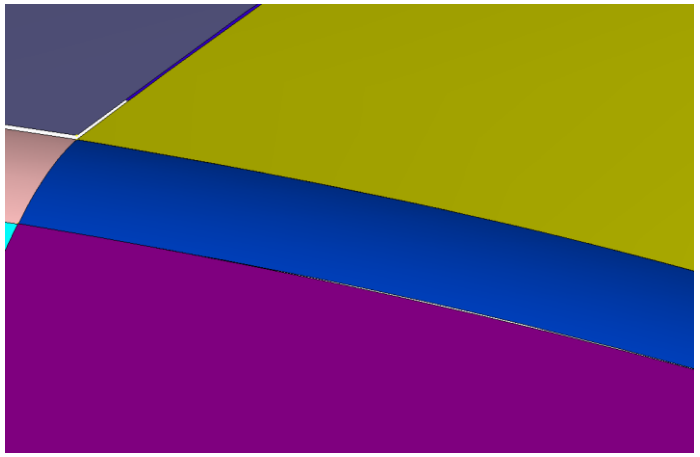
Single call to stitch – 0.1 tolerance – fully connected and ready to mesh





Some surfaces are composite
overlapping edges with composite curves



Various gap distances – some quite large

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Geometry Enhancements
Boolean Operations

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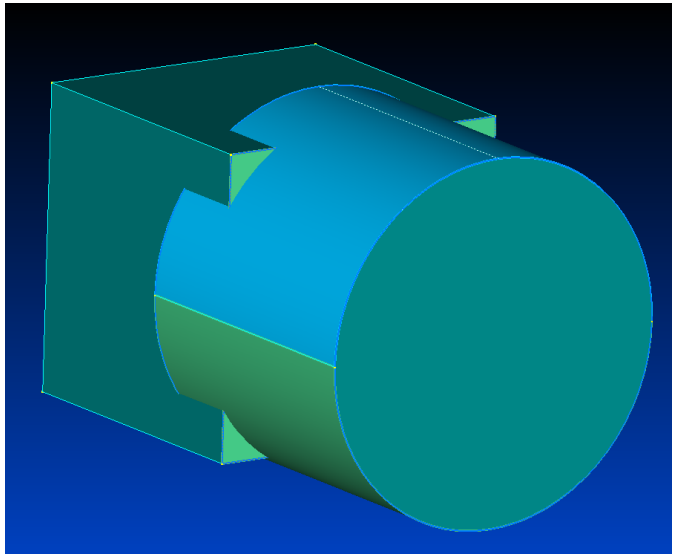
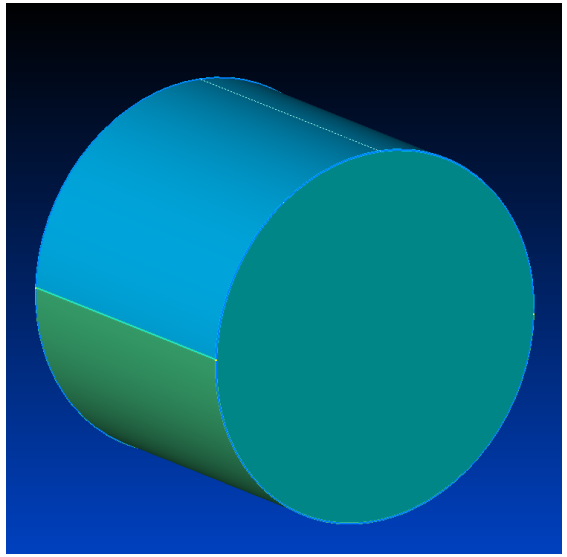
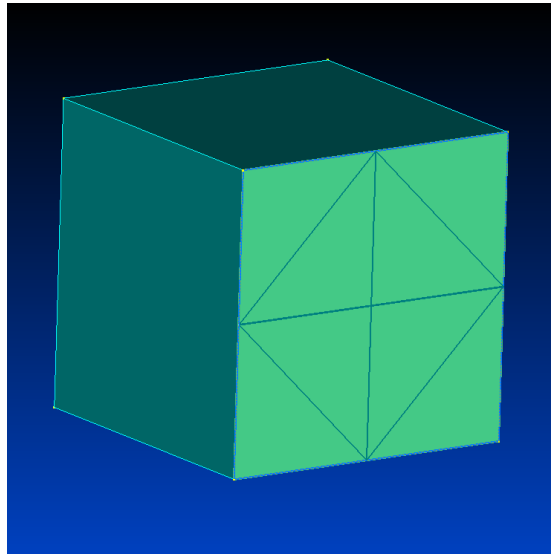


Two overlapping solids



Cylinder is split at 0, 90, 180, and 270. Two combined surfaces and four combined curves



Face of block is split into 8 faces, recombined with a single composite surface and four composite curves – internal curves highlighted

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Geometry Enhancements
Boolean Operations

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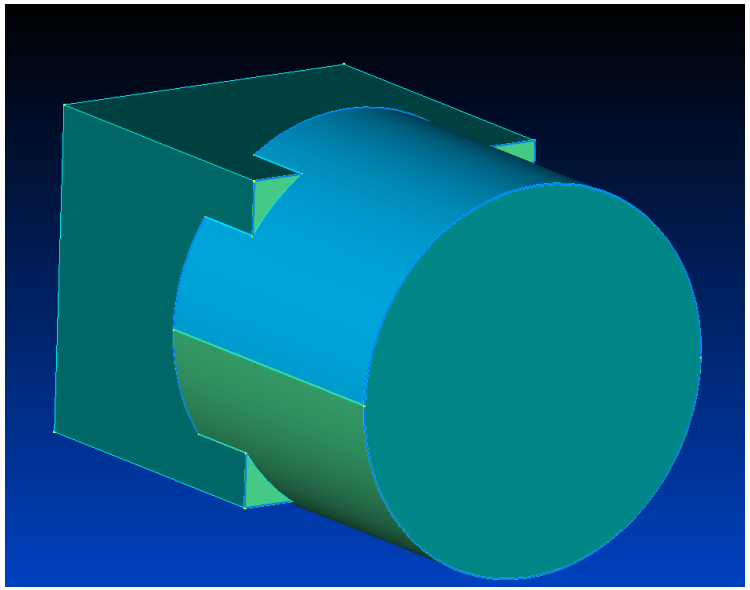
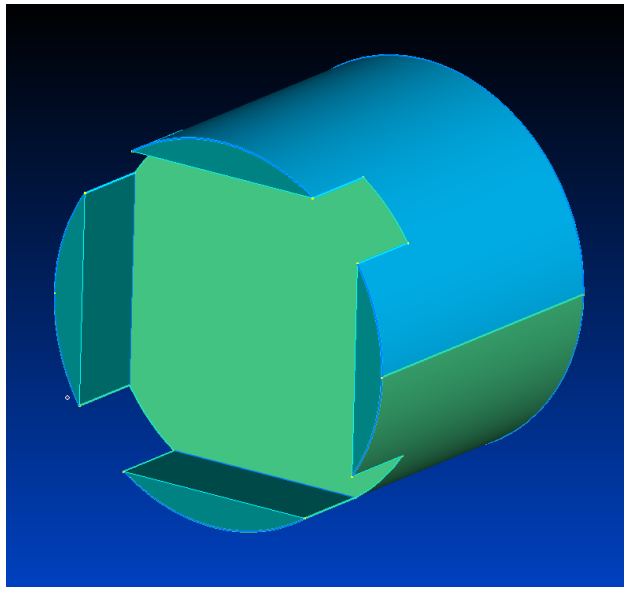
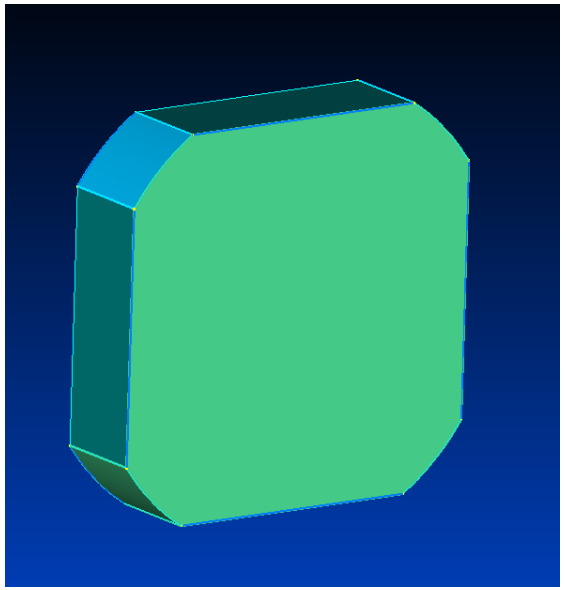


Boolean Add, block composite face split into four, cylinder composite faces updated



Boolean Subtract block from cylinder, split faces of block are recombined on resulting cylinder



Boolean Common

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Geometry Enhancements
Boolean Operations

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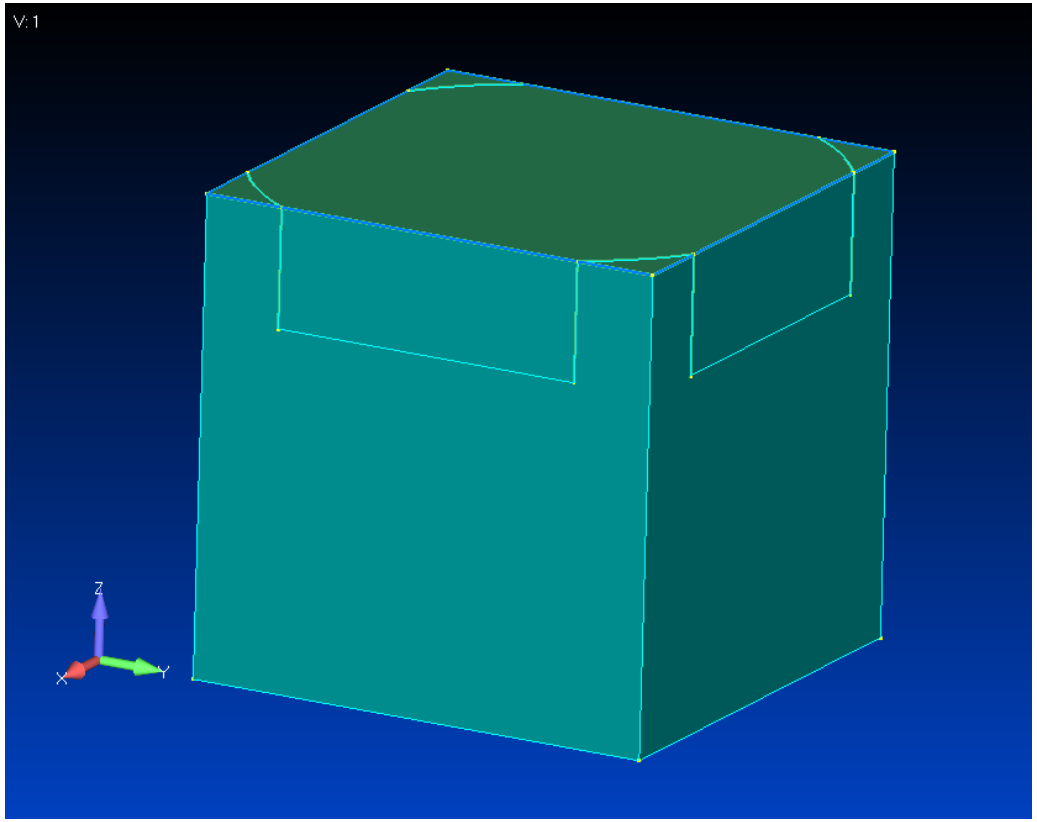
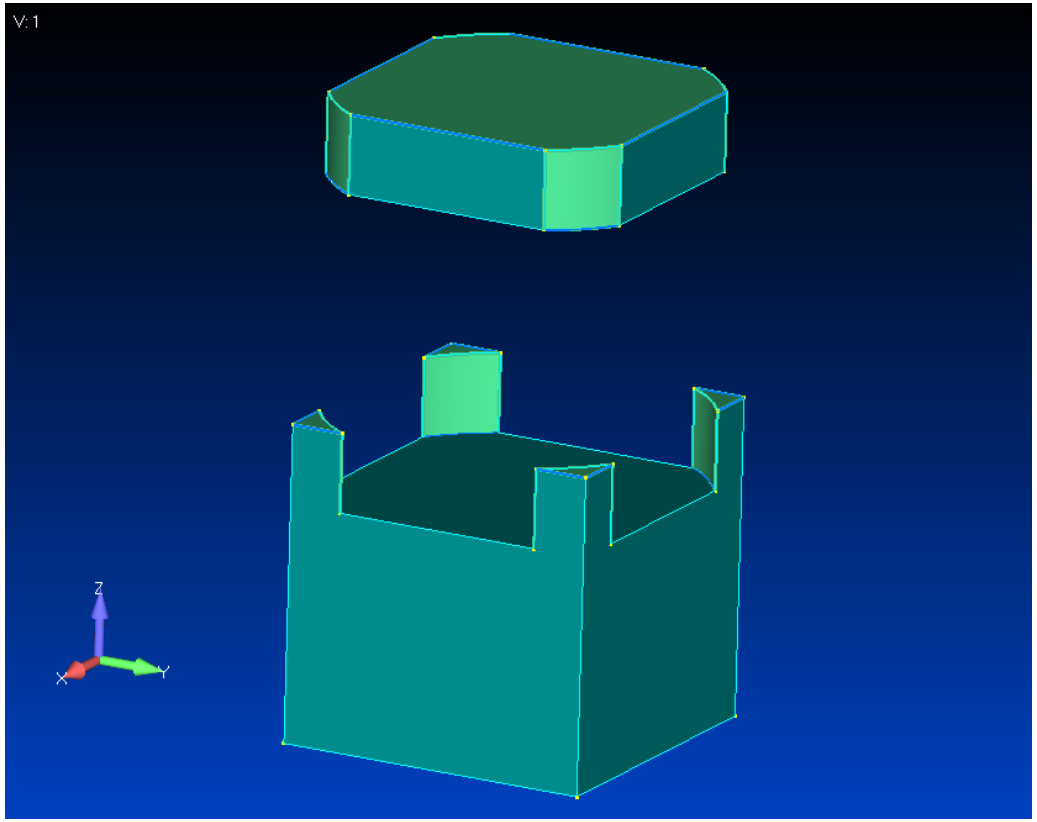


Solid – Embed
cylinder embedded Into block



Solid – Embed
cylinder embedded Into block
exploded view

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Geometry Enhancements
Combined Curve and Combined Surface Preservation

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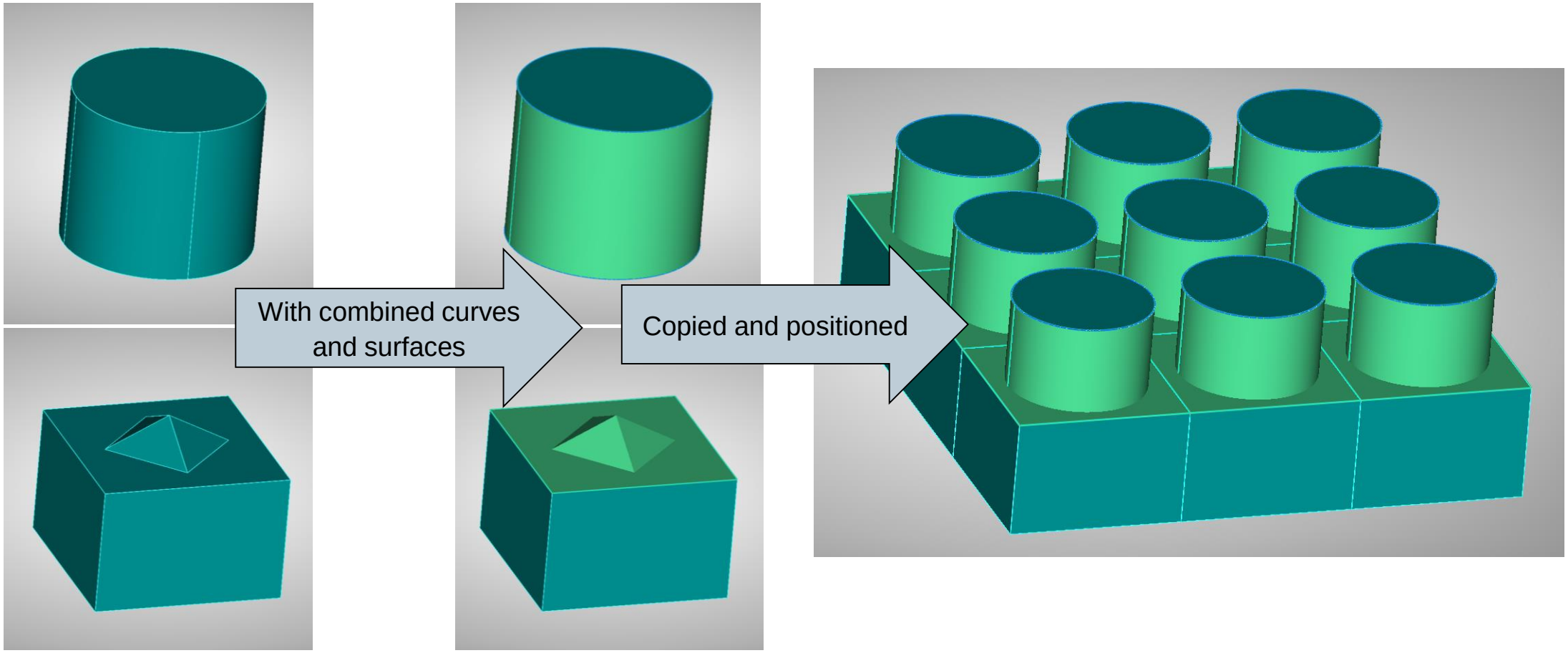
Preservation of combined/boundary curves and surfaces in solid operations



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Geometry Enhancements
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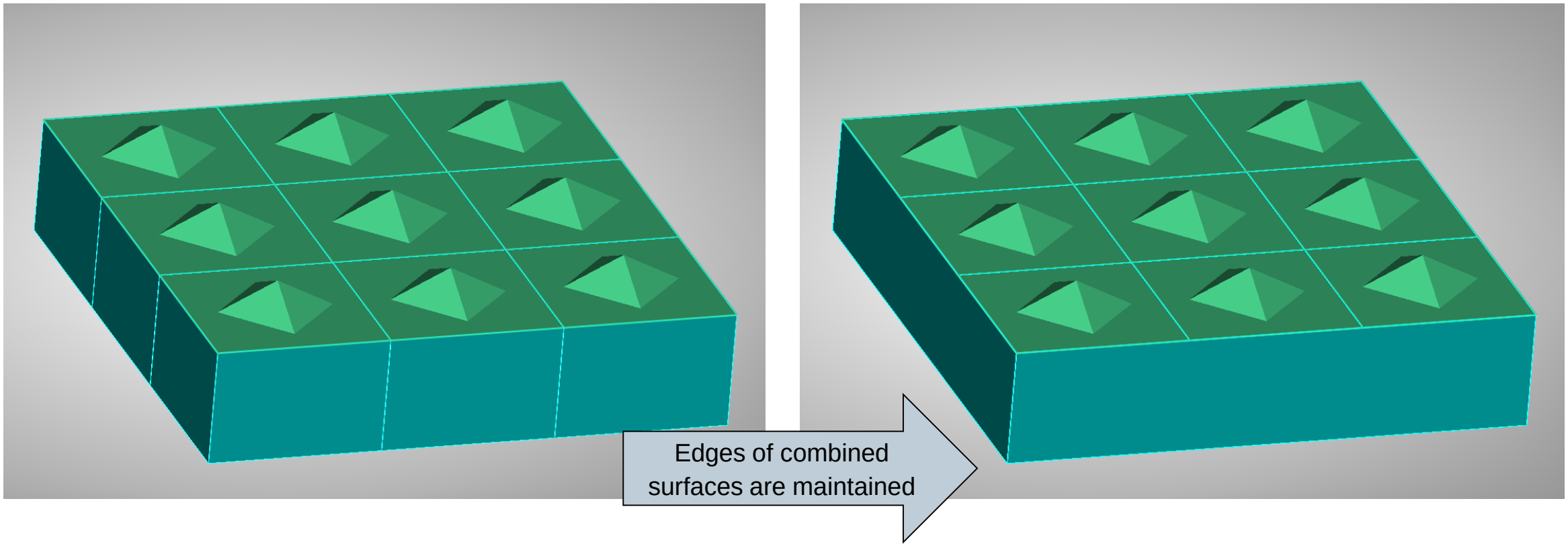

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Geometry Enhancements
Combined Curve and Combined Surface Preservation

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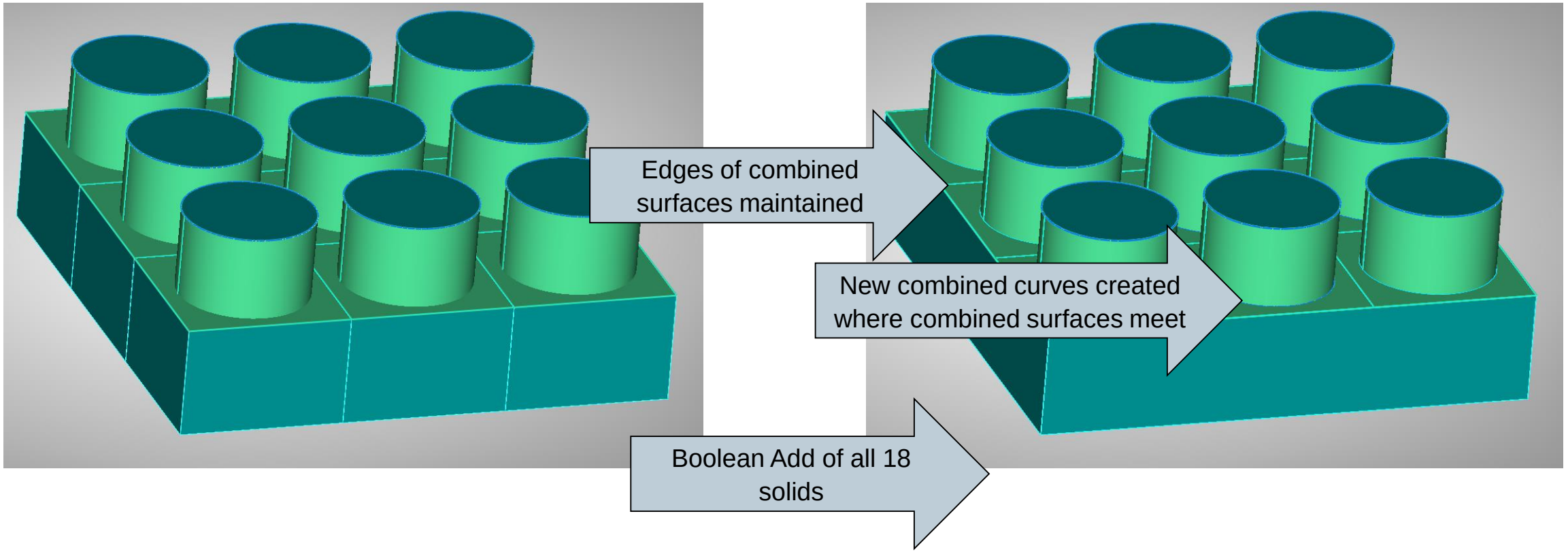
Preservation of combined/boundary curves and surfaces in solid operations



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Geometry Enhancements
Combined Curves and Combined Surfaces

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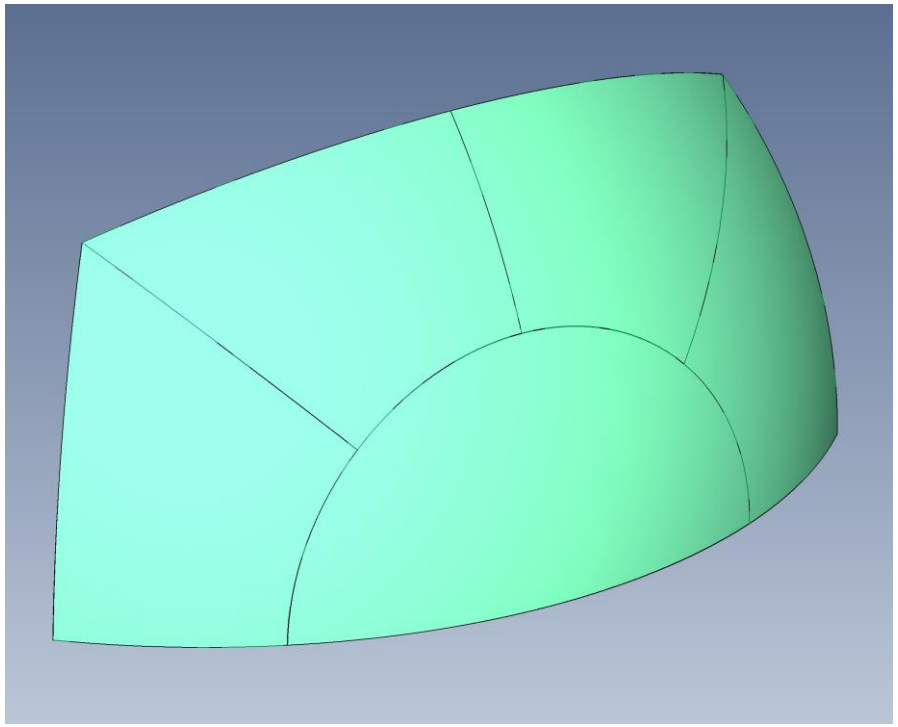
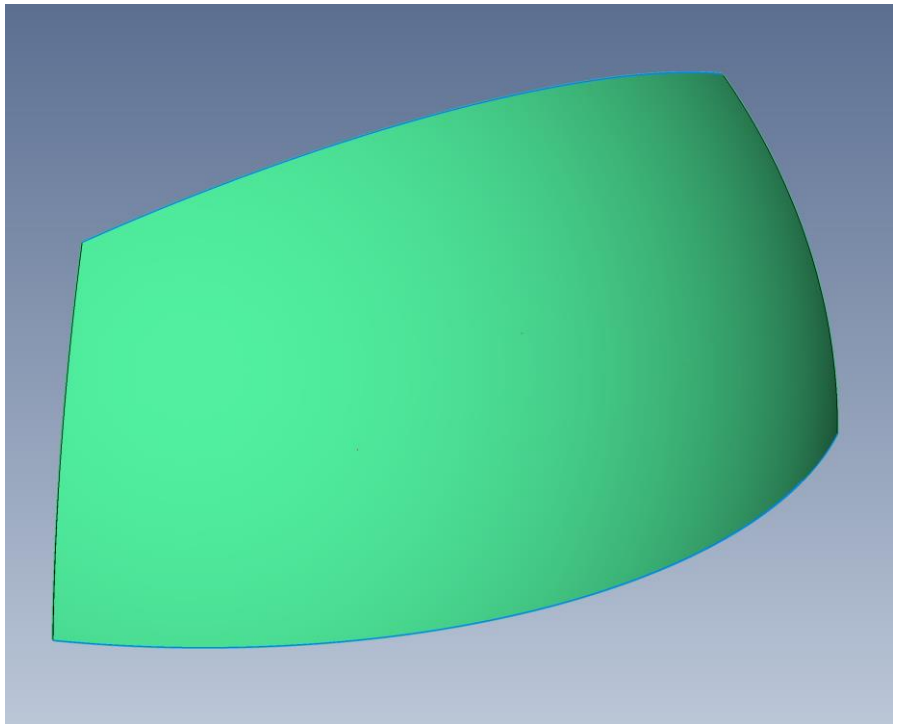
Starting with this divided surface, the Combined/Composite Curve Tool and Combined/Boundary Surfaces Tool in the Meshing Toolbox is used to create a single surface, with 4 edges and four corners





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Geometry Enhancements
Combined Curves and Combined Surfaces

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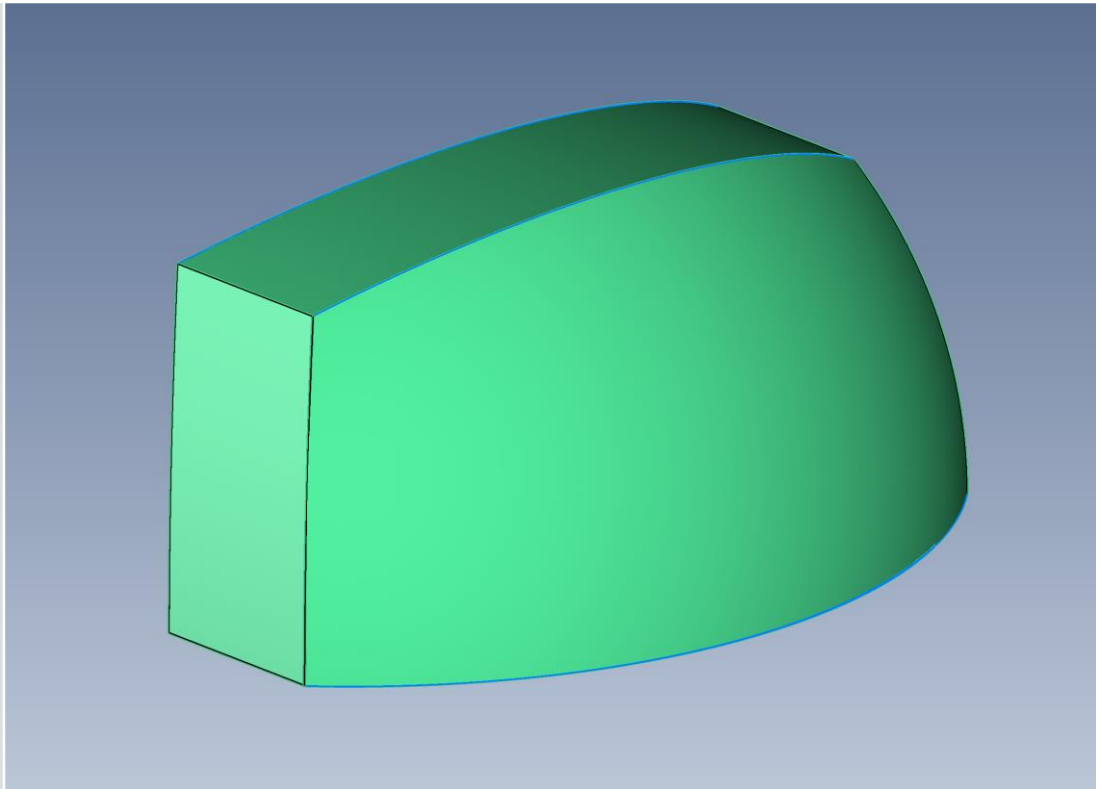
Extrude/Revolve

- Matching Combined Curves and Combined Surfaces at new end
- Combined Surfaces where required along side



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Geometry Enhancements
Combined Curves and Combined Surfaces

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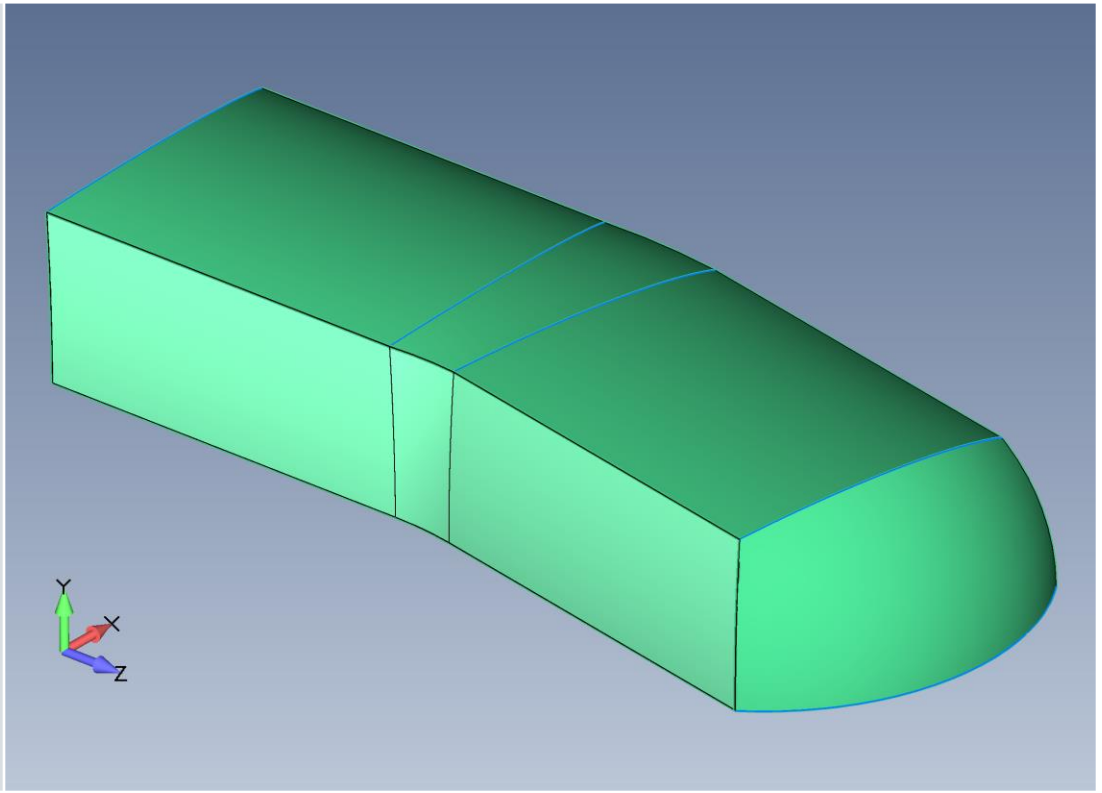
Sweep

- Matching Combined Curves and Combined Surfaces at new end
- Combined Surfaces where required along all newly created sides



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Geometry Enhancements
Combined Curves and Combined Surfaces

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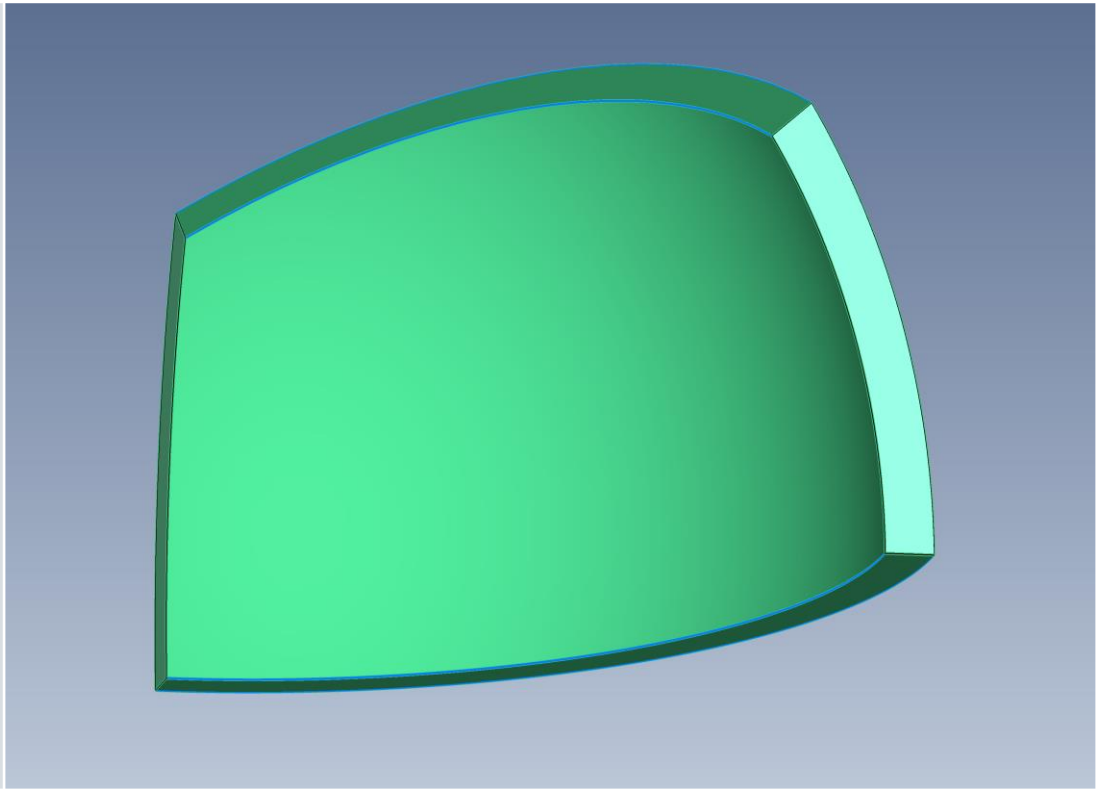
Thicken

- Matching Combined Curves and Combined Surfaces at new end
- Combined Surfaces where required sides
- Similar to Extrude, however normal to surface



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Geometry Enhancements
Combined Curves and Combined Surfaces

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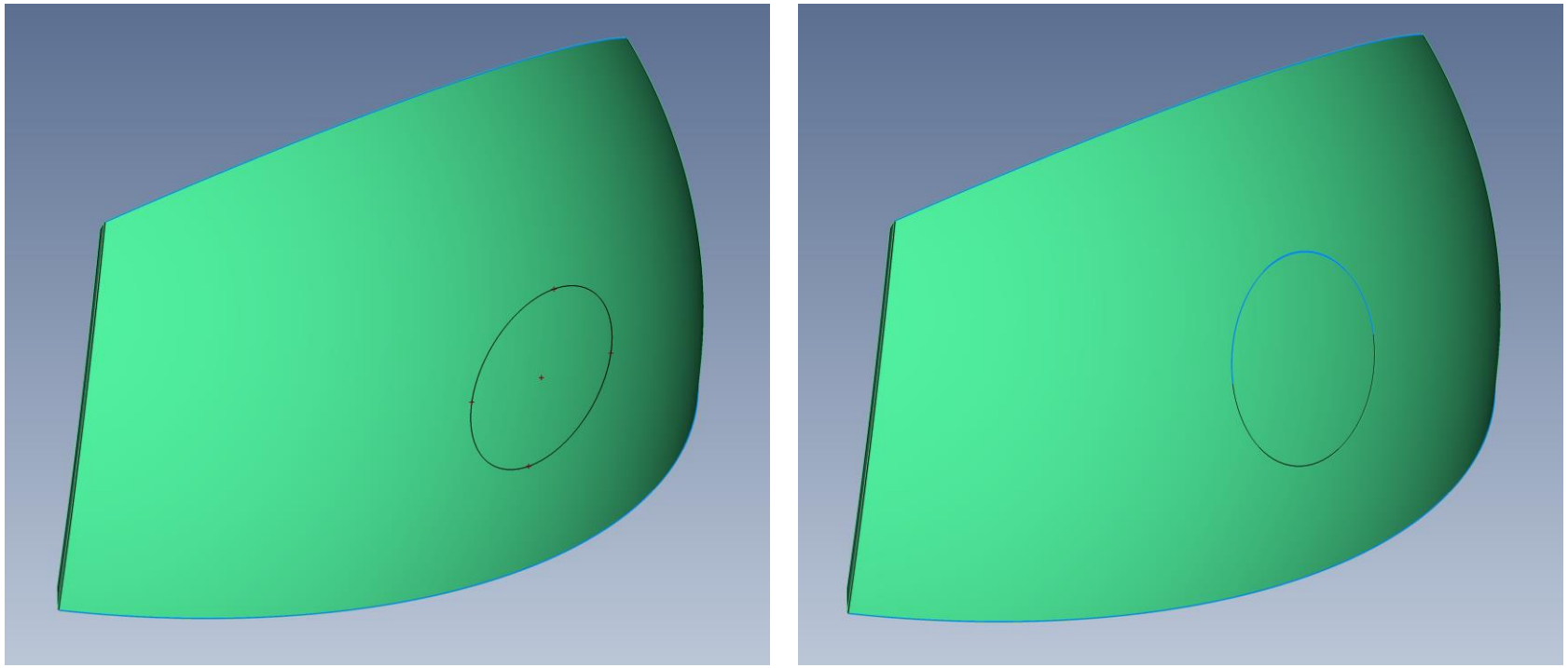
Menu based “Curves from Surfaces” and Meshing Toolbox splitters now work with Combined Curves and Combined Surfaces

Project Along Vector



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Geometry Enhancements
Combined Curves and Combined Surfaces

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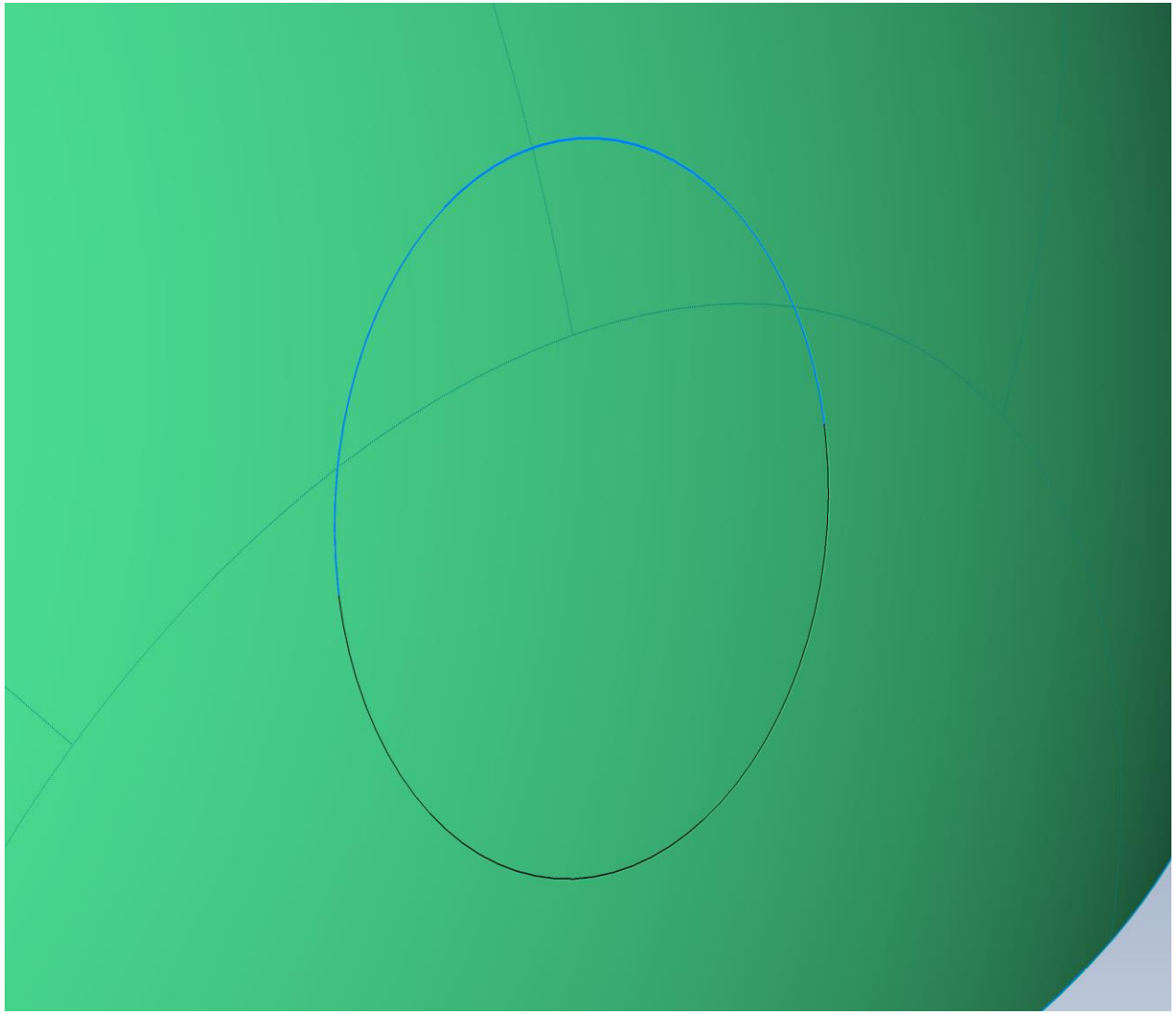
Edges of the underlying surfaces are being displayed – note that where required by the underlying splits, a Combined Curve has been created



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Geometry Enhancements
Combined Curves and Combined Surfaces: Slicing

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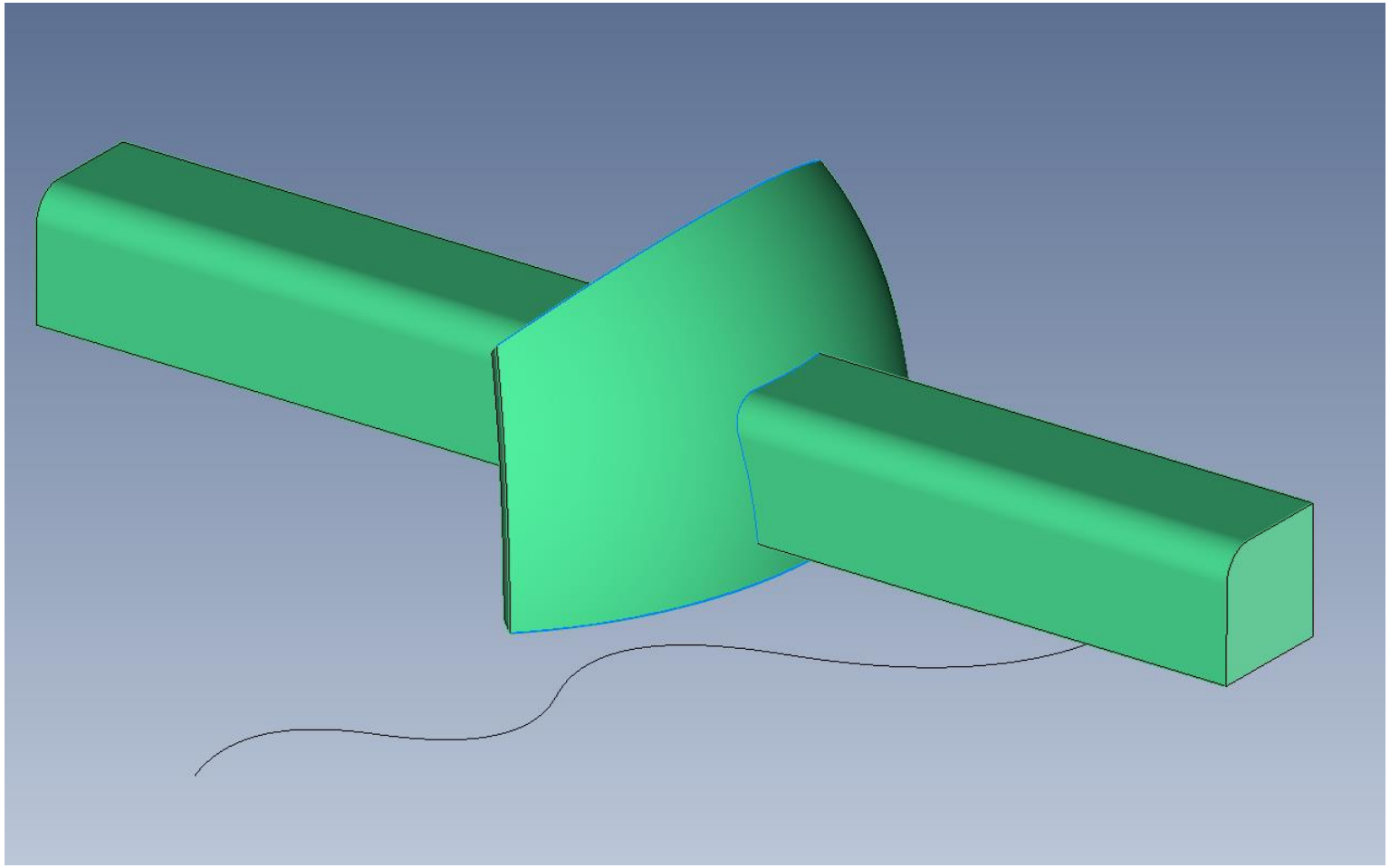
Surface and solids model with Combined Curve and Combined Surface now support all slicing operations – consider this single solid, that was created by a Boolean Add of two solids both with Combined Geometry



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Geometry Enhancements
Combined Curves and Combined Surfaces: Slicing

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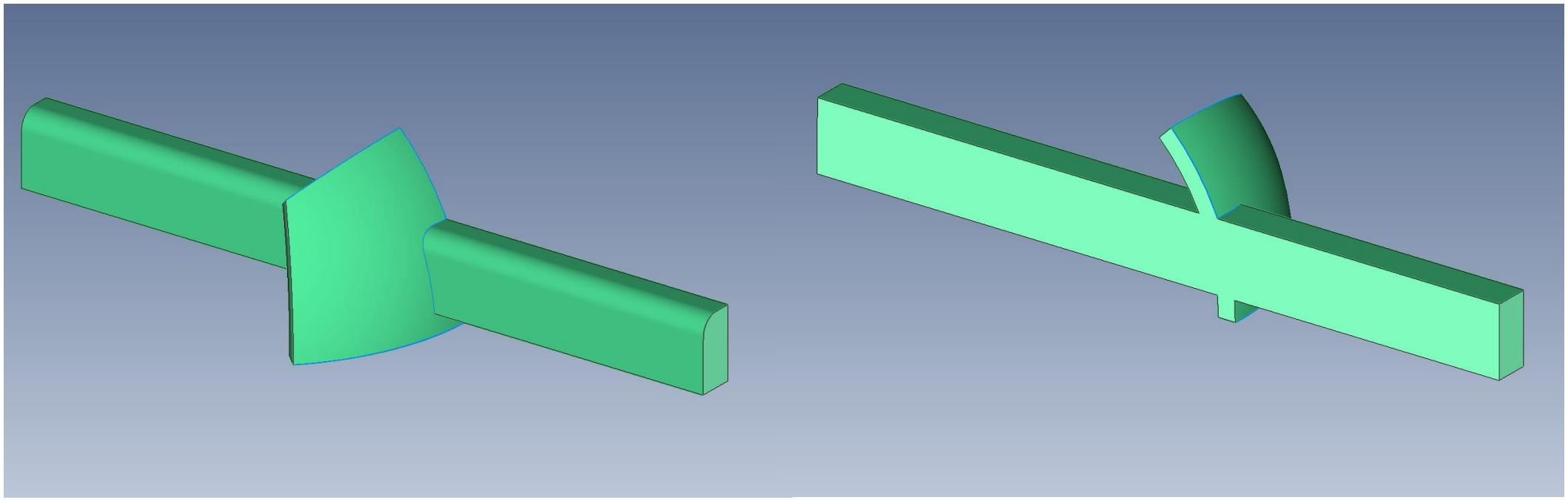
Planar Slice



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Geometry Enhancements
Combined Curves and Combined Surfaces: Slicing

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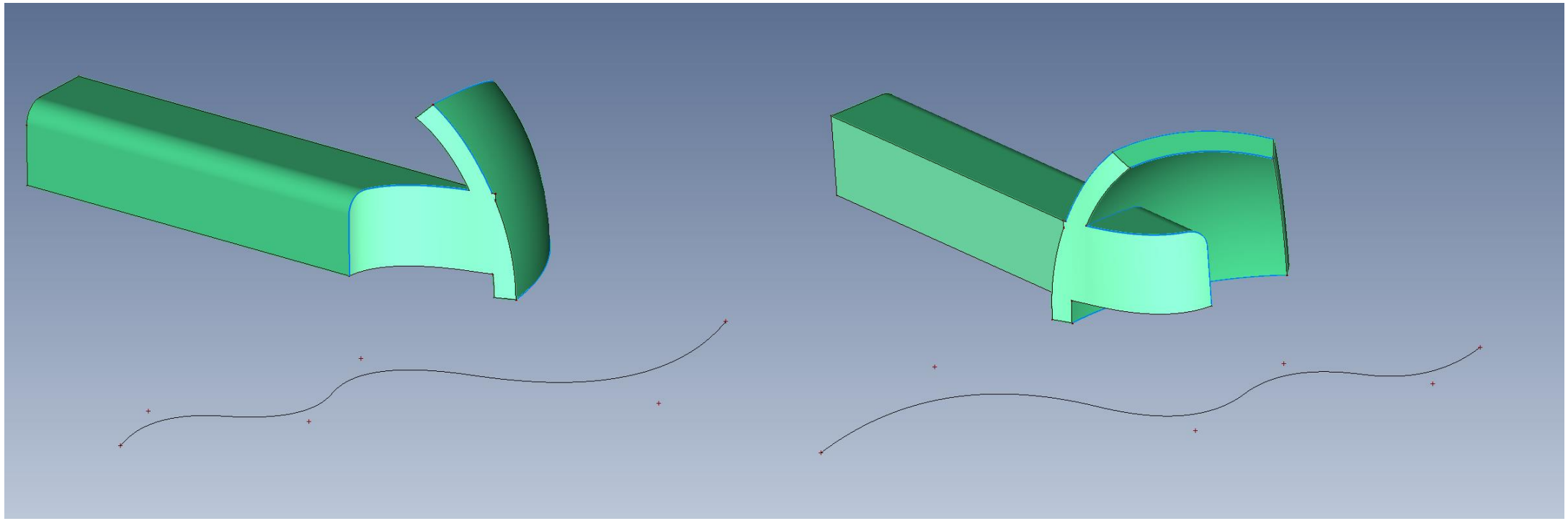
Spline Slice



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Geometry Enhancements
Combined Curves and Combined Surfaces: Slicing

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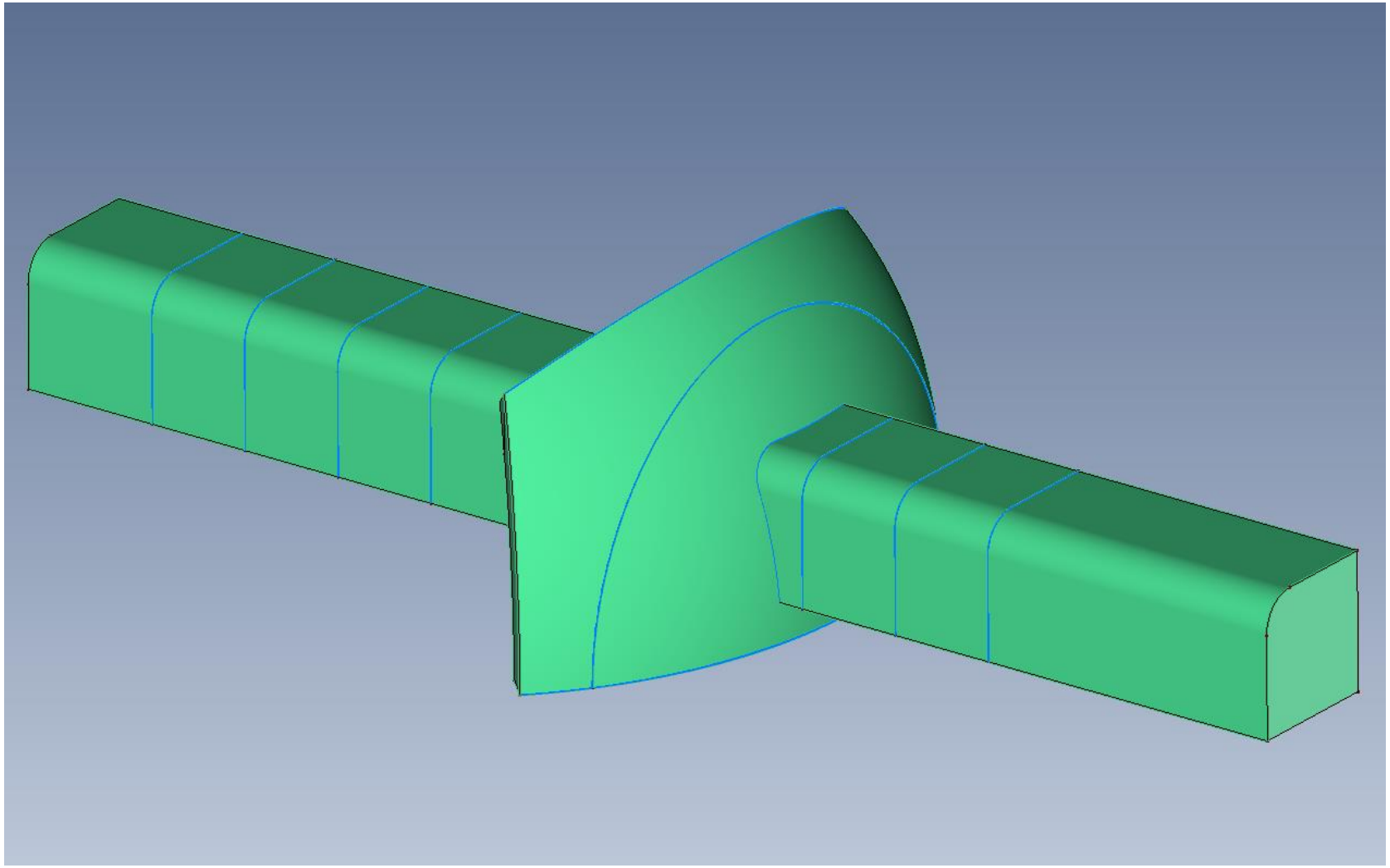
Parallel Planar Slices



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Geometry Enhancements
Surface Ruled/Between Curves

SIEMENS
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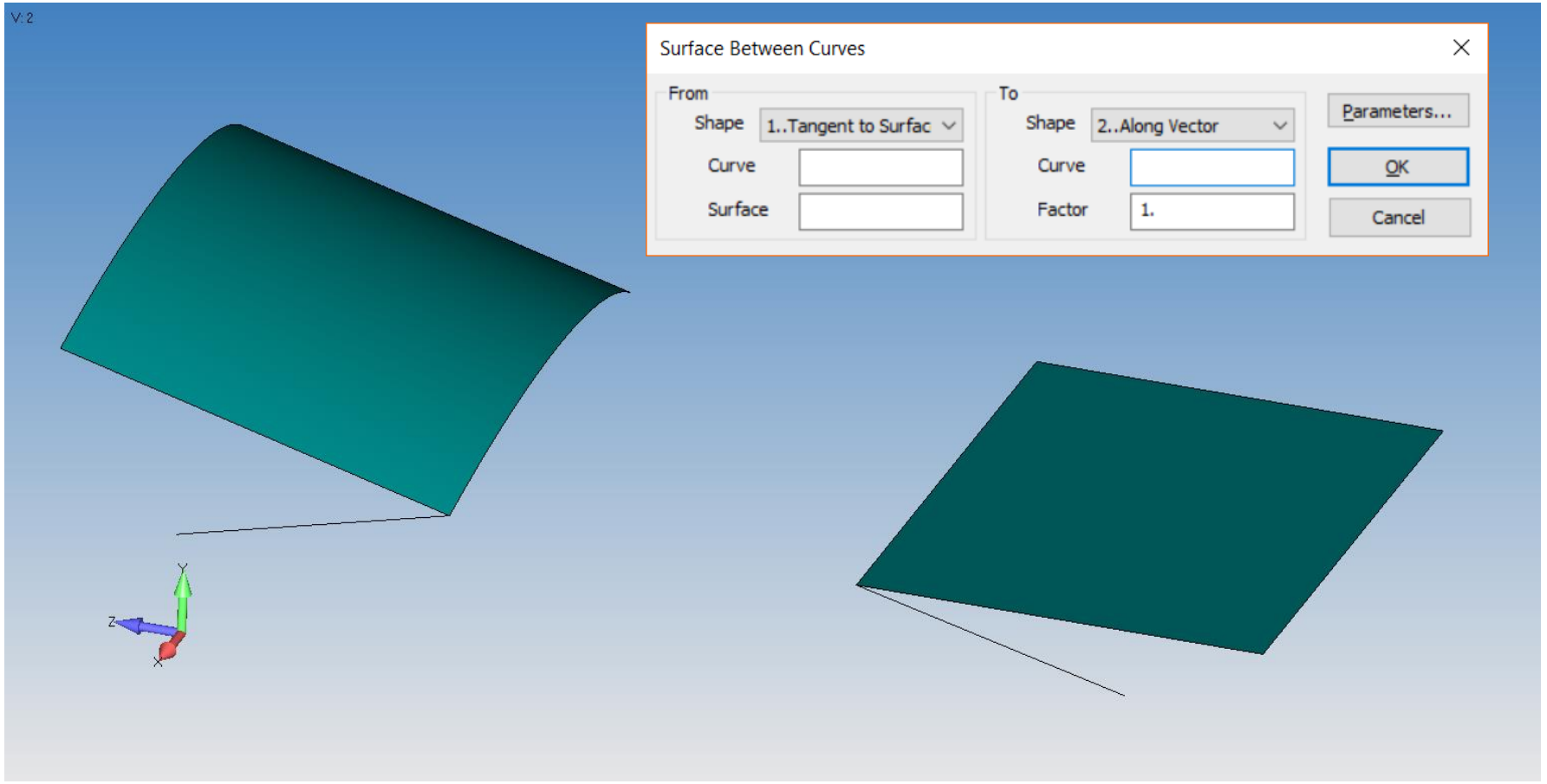
Geometry – Surface – Ruled/Between Curves replaces Geometry – Surface – Ruled command

Curve to Curve Surface Option has been enhanced

At Each curve
- Ruled (as before)
- Tangent To Surface
- Along Vector

- Starting geometry as shown



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Geometry Enhancements
Surface Ruled/Between Curves

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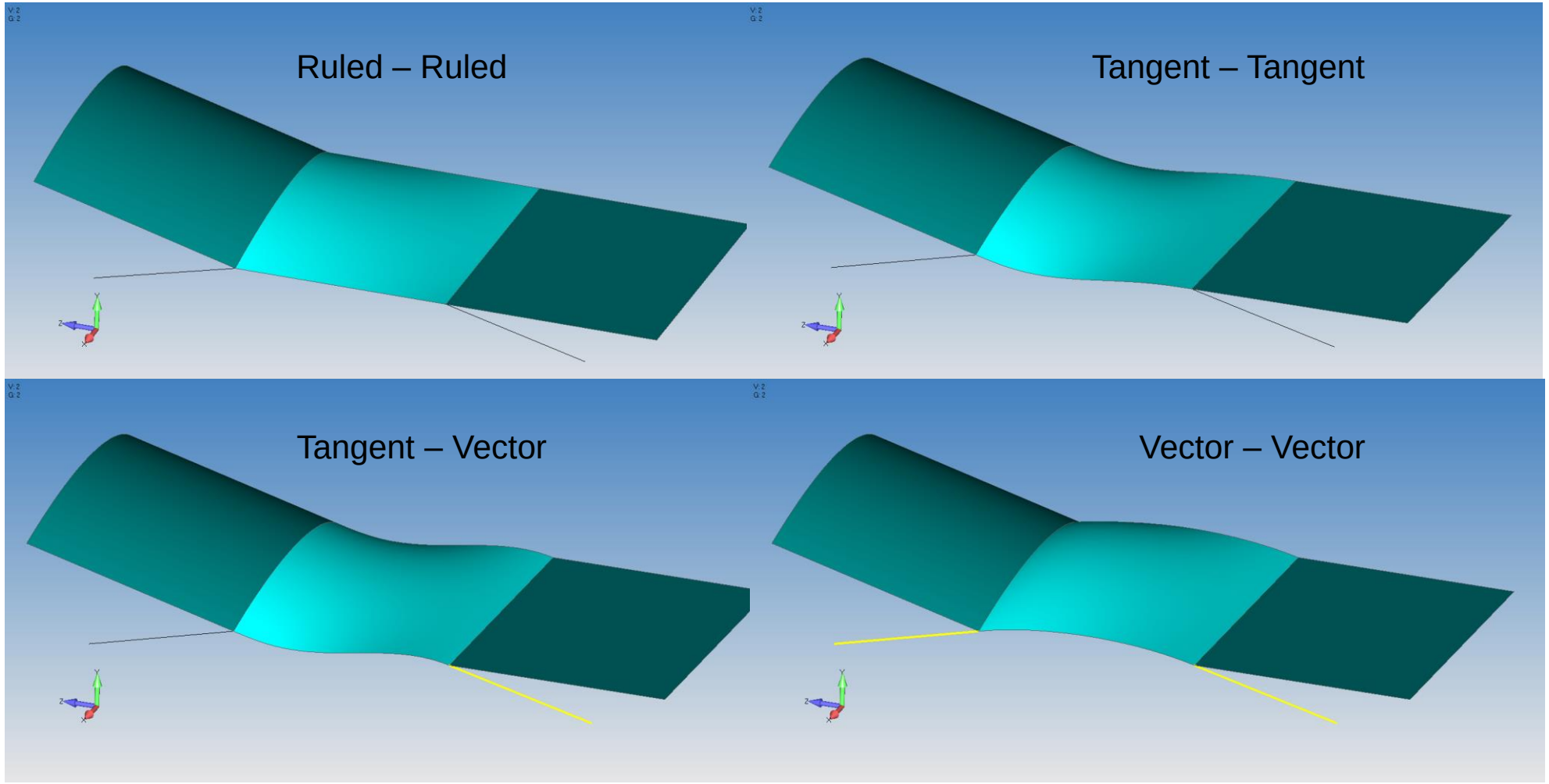

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Geometry Enhancements
Surface Alignment for Meshing

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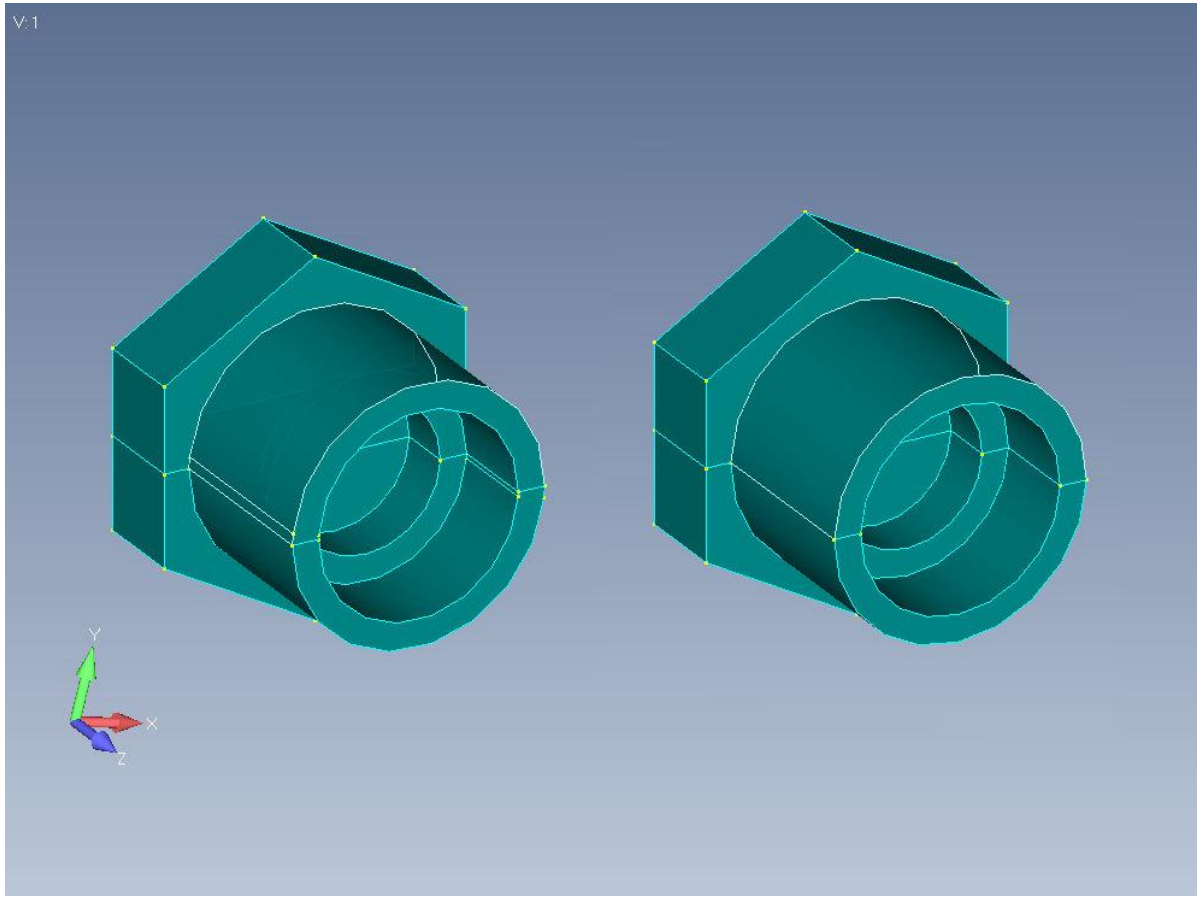
Modify – Update Other – Align Surface Parameters implemented as a GUI command (available via API in v11.4.x)

FEMAP splits all periodic surfaces at 0° and 180°

In some cases, with data coming in from various CAD systems, the surface representation may not be exactly aligned in connected faces, this results in short edges in the geometry near adjacent splits

Meshing tools in FEMAP can overcome this, but this command provides a more exact solution



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Geometry Enhancements
Surface Alignment for Meshing

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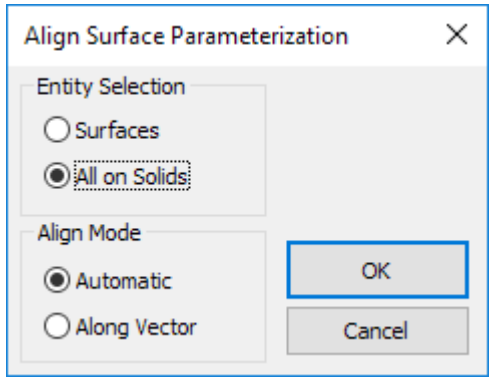
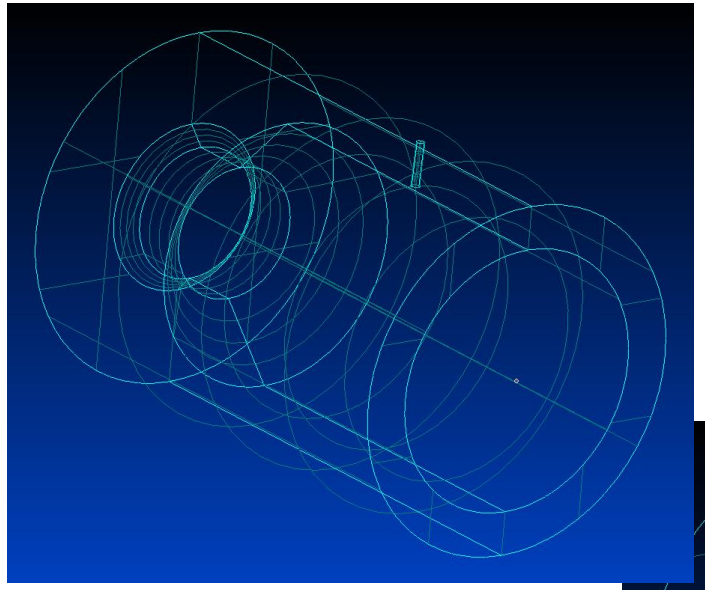
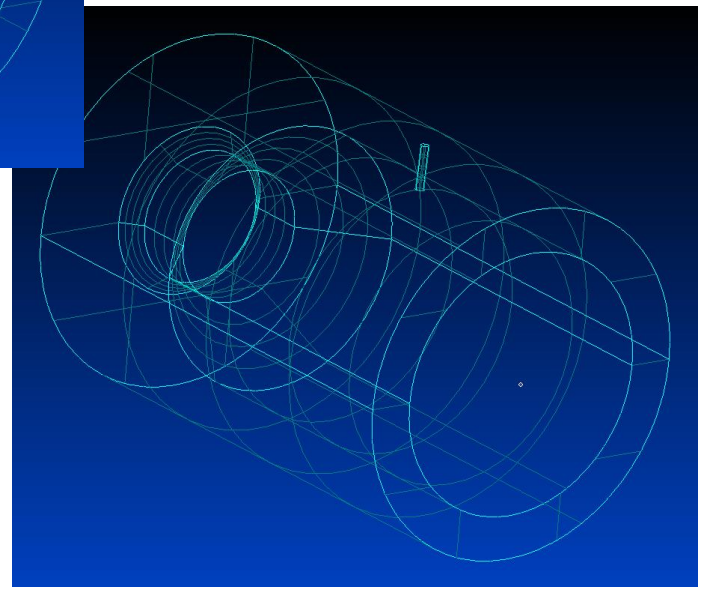
Entity Selection:

- Auto-Mode pick All on Solids, and the Automatic Align(ment) Mode – FEMAP will rotate connected periodic surfaces to match







Splits aligned, no more short edges – however the small hole is now very close to one of the splits lines, better option, select the Along Vector option for full control

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Geometry Enhancements
Performance Improvement

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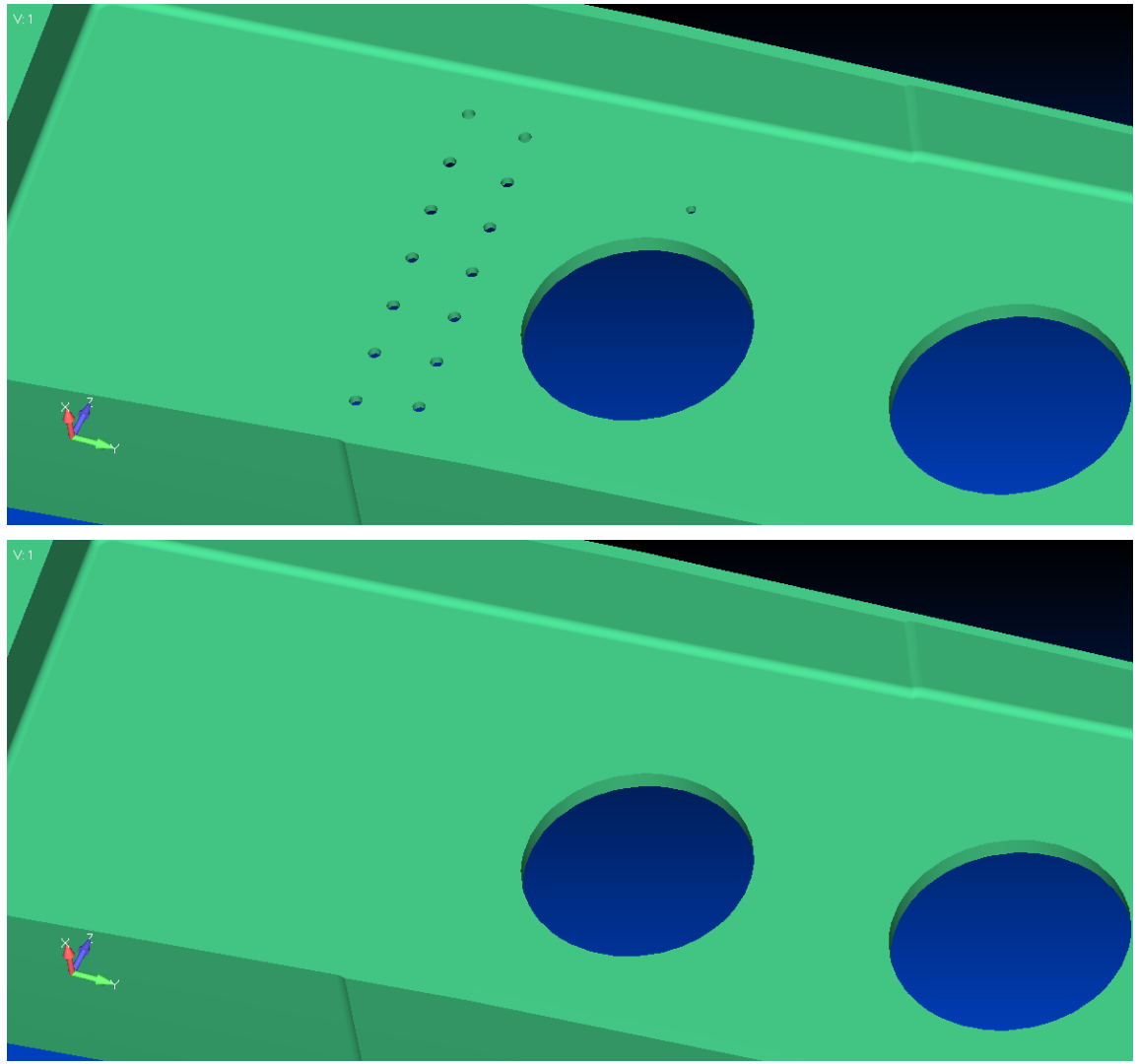
Ingenuity for life

Feature Removal – recoded to maximize performance

Removing 50+ small holes from wing spar

30+ seconds in v11.4.x

Less than 1 second in v12!



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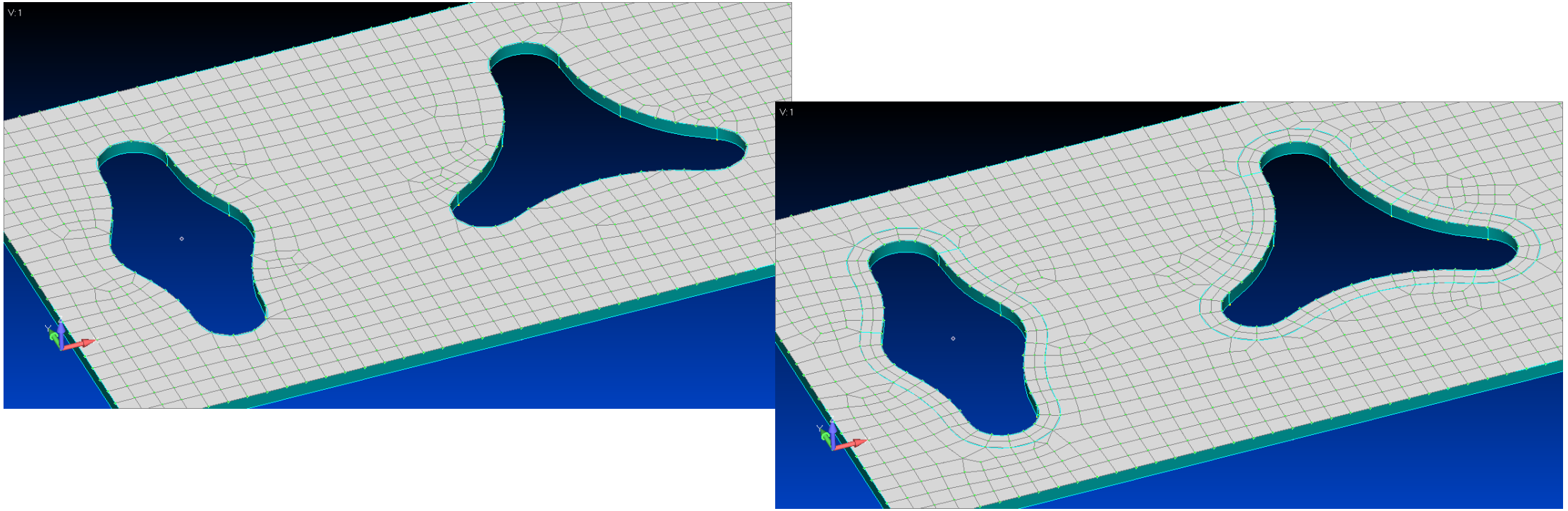
Preprocessing
Meshing Toolbox – Washer and Pad

SIEMENS
Ingenuity for life

Washer has been expanded to include non-circular holes

Burns a perfect offset and with pre-established mapped meshing constraints creates a perfect mesh around any cutout



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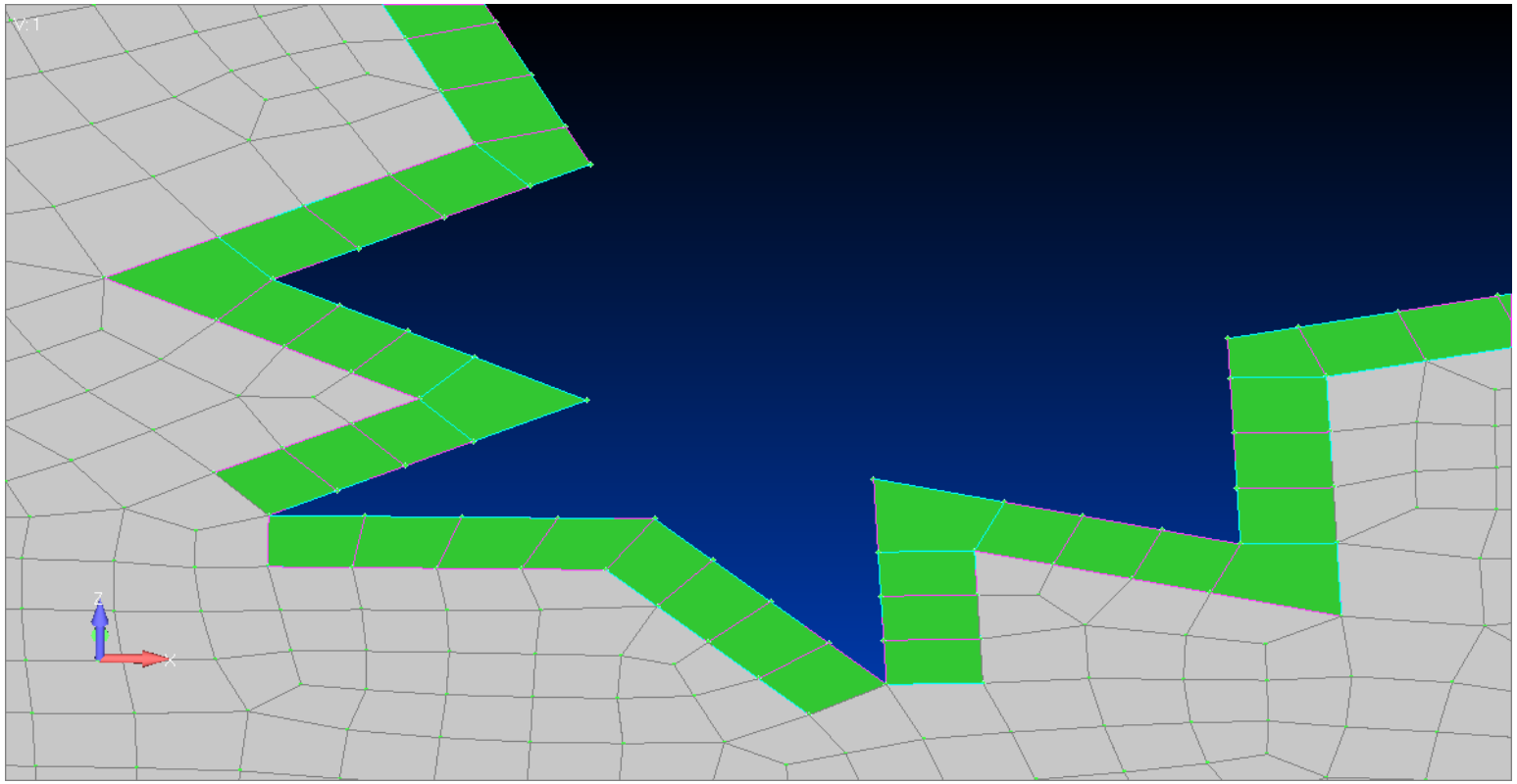
Preprocessing
Meshing Toolbox – Washer and Pad

SIEMENS
Ingenuity for life

On non-tangent corners performs different splits on inside, outside and sharp corners to create the best possible mesh



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Preprocessing
Meshing Toolbox – Washer and Pad

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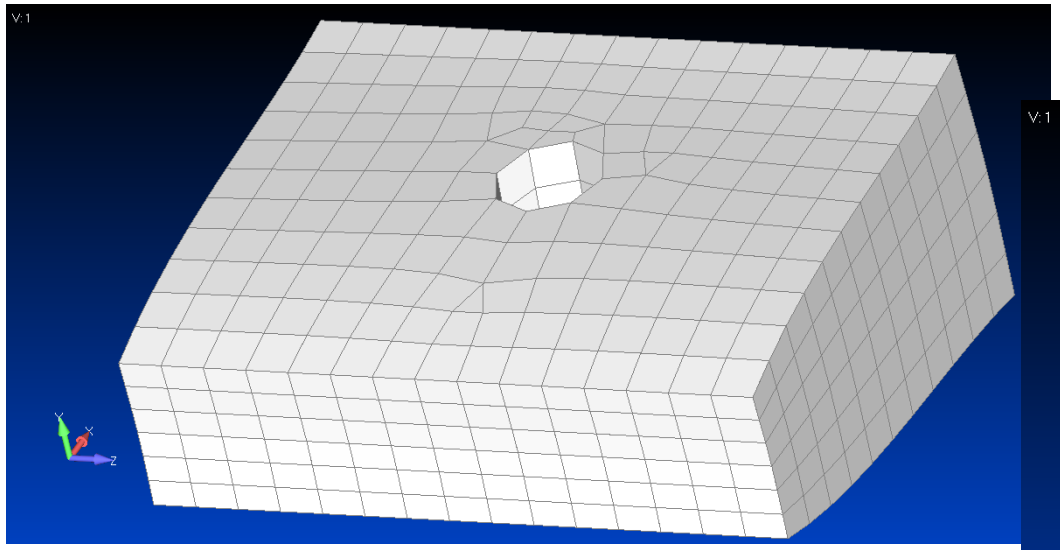
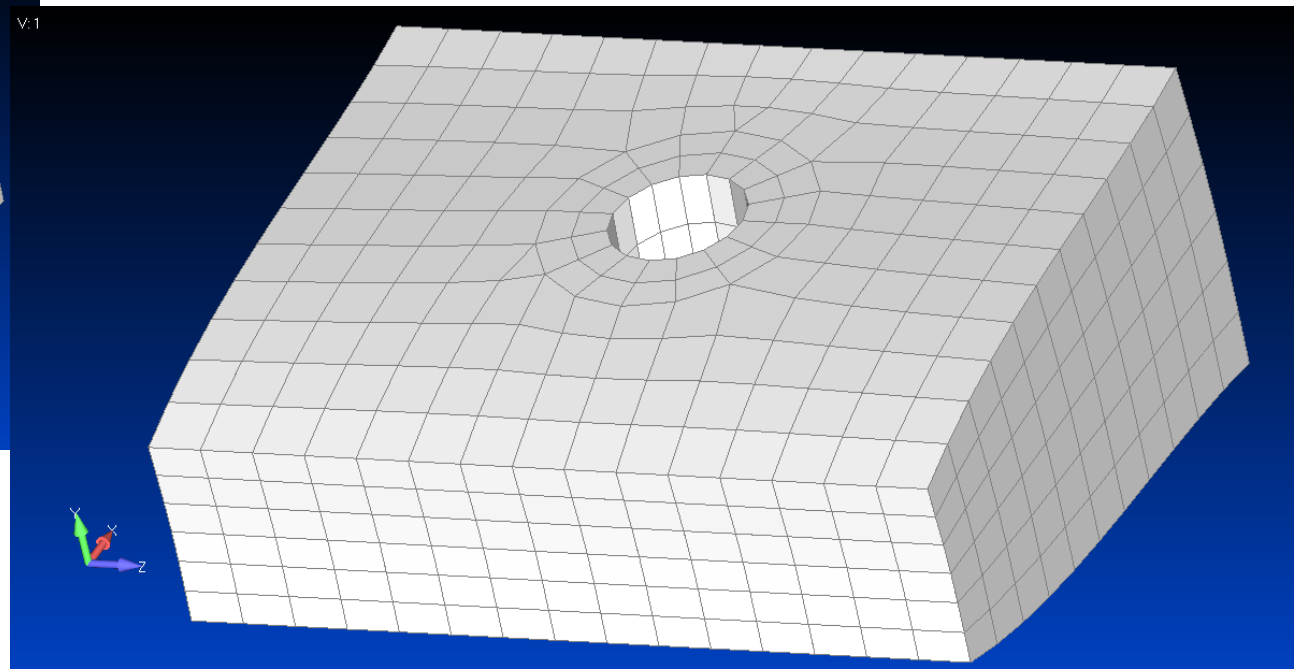
Ingenuity for life

Solid Washer

Auto connects and remeshes with tetras or bricks





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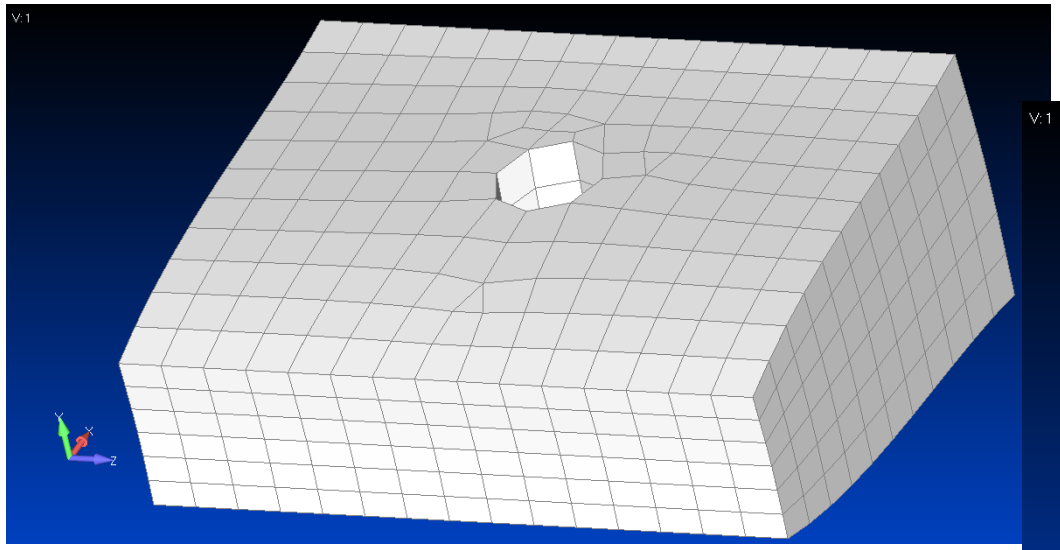
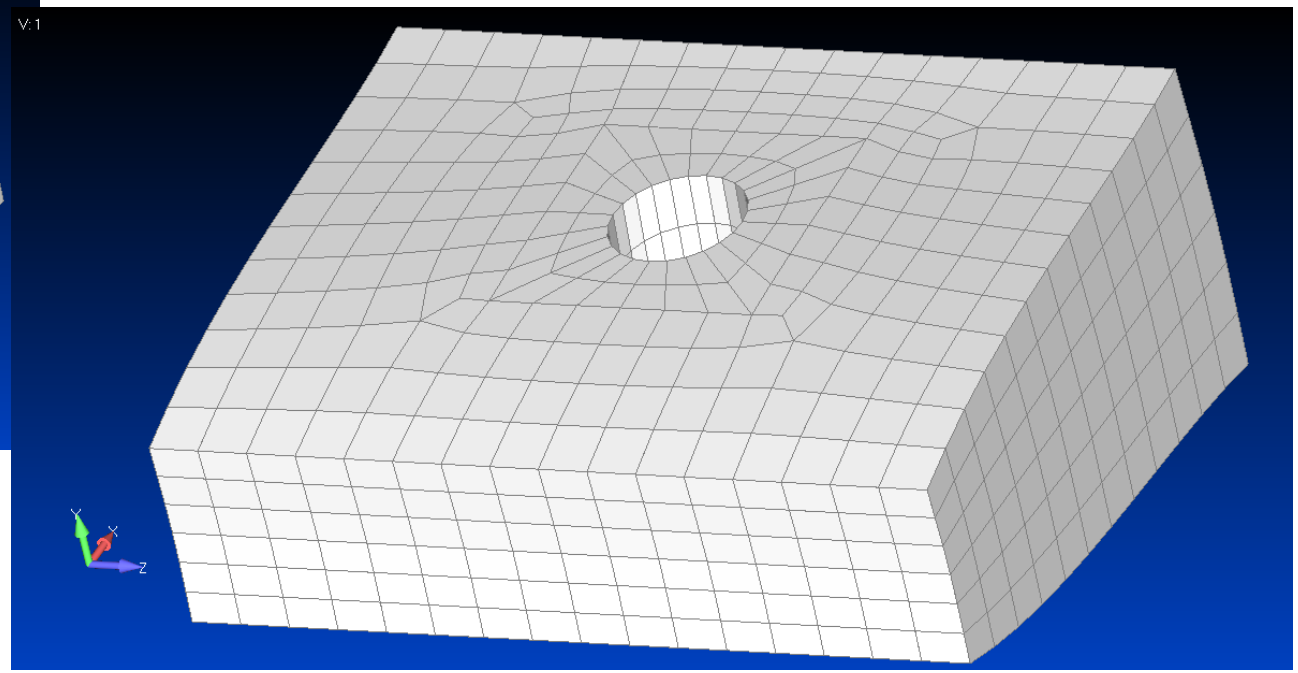
SIEMENS
Ingenuity for life

Solid Pad

Auto connects and remeshes with tetras or bricks





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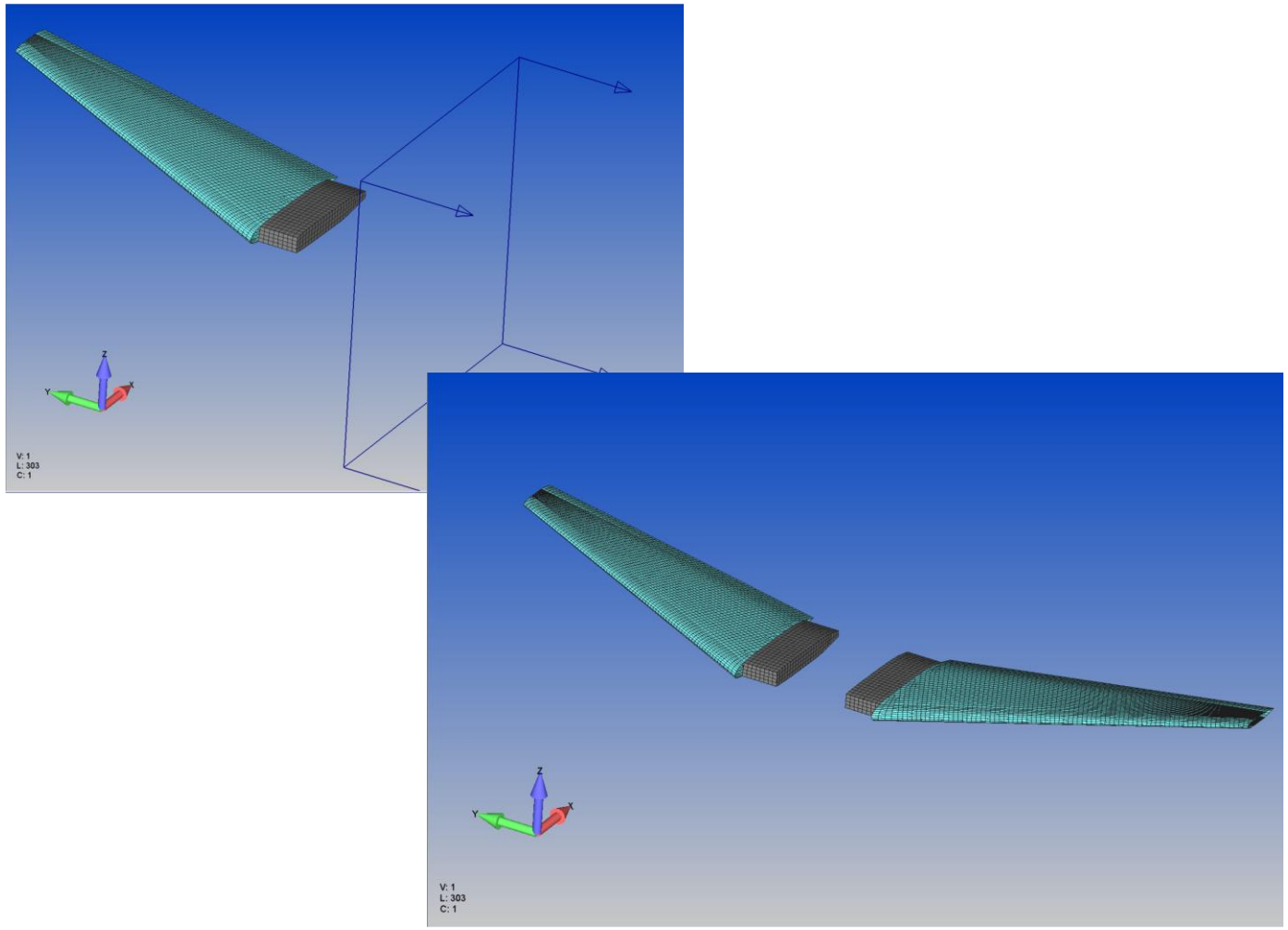
Preprocessing
Updated Copy Commands

SIEMENS
Ingenuity for life

Updated Copy/Rotate/Reflect commands

- Copy/Rotate/Reflect Geometry with associated mesh or vice versa
- Options to also Copy/Rotate/Reflect:
  - Loads
  - Constraints
  - Connections/Regions
- Block and Offset Numbering options
- Copy using a Pattern or in the Same Location, create Multiple Repetitions, and/or AutoRepeat using currently selected entities and specified options



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Preprocessing
Updated Copy Commands

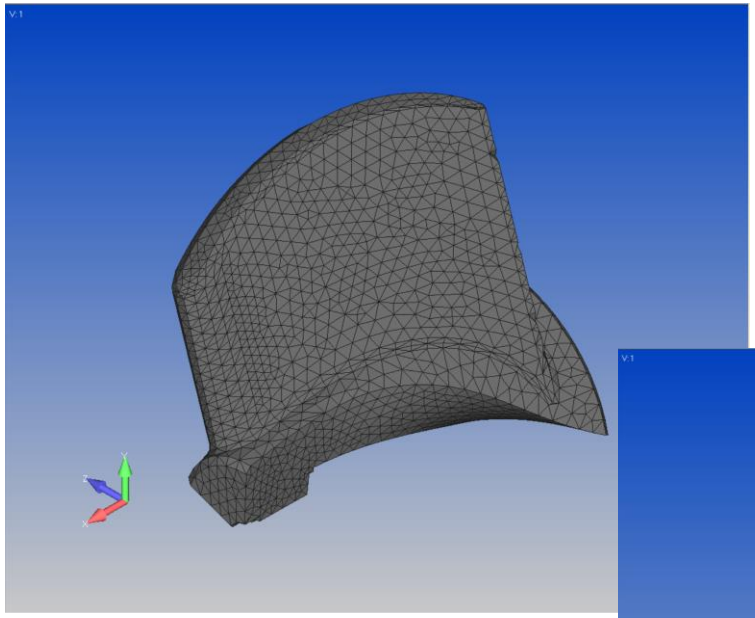
SIEMENS
Ingenuity for life

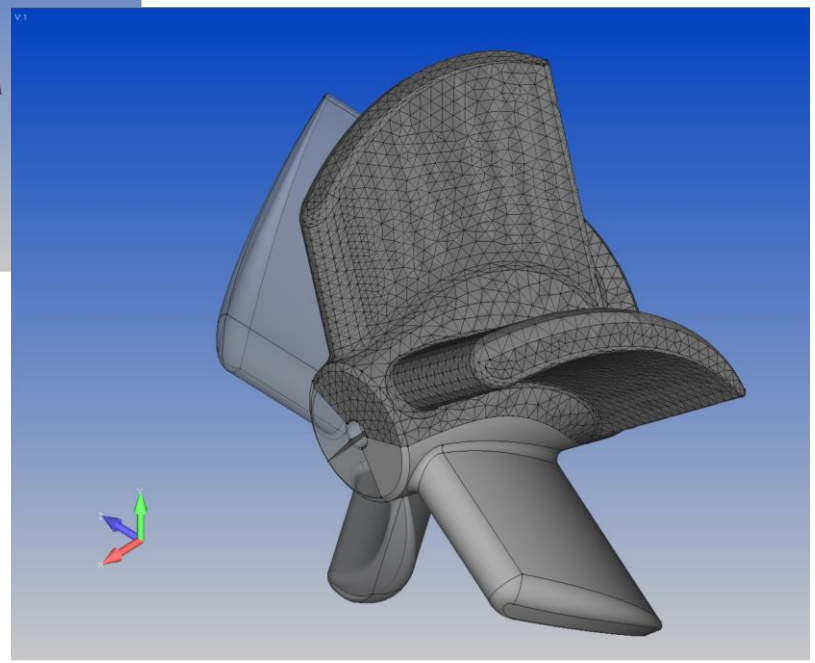
Updated Copy/Rotate/Reflect Commands

- Copy Orient/Transform methods:
  - Move Along Vector
  - Move to Location
  - Between Coordinate Systems
  - Between Vectors
  - Between Planes

- Rotate Orient/Transform methods :
  - Rotate Around Vector
  - Rotate to Location

- Reflection Option to specify Trap Width





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Preprocessing
Updated Copy Commands

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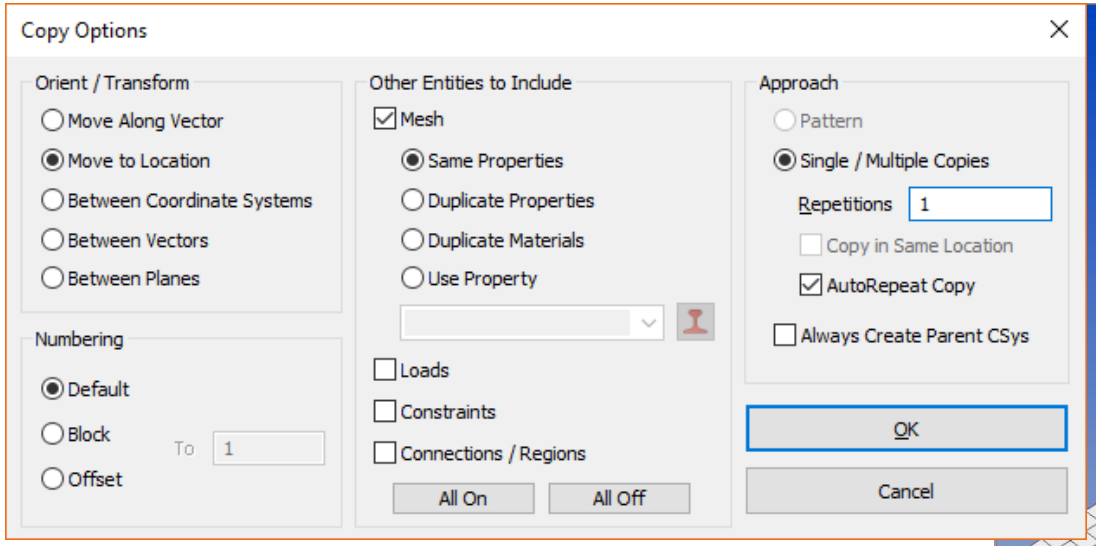
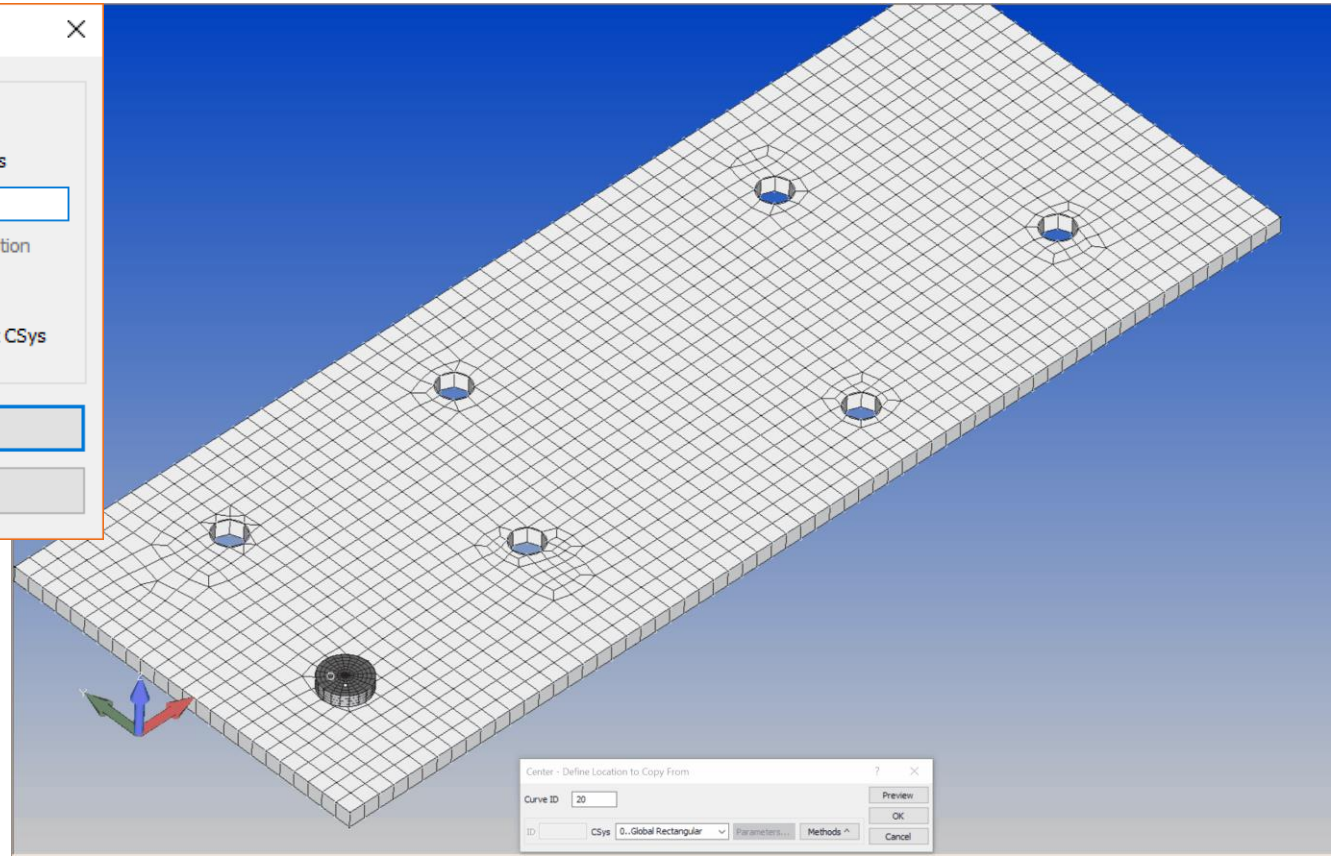
Ingenuity for life

Copy Geometry and Mesh

- Copy Solid geometry with associated mesh using Move to Location method and AutoRepeat Copy





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Preprocessing
Updated Copy Commands

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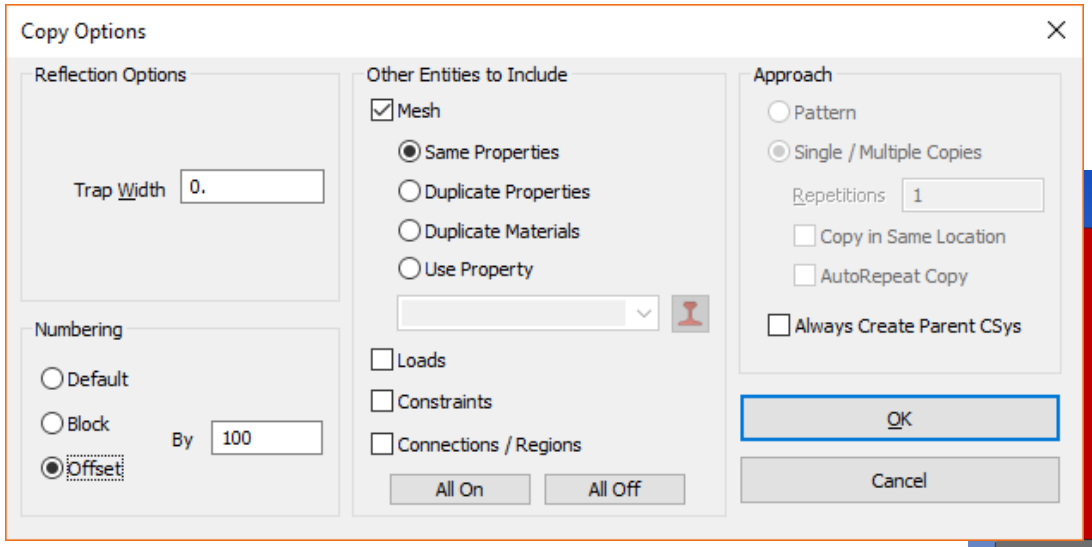
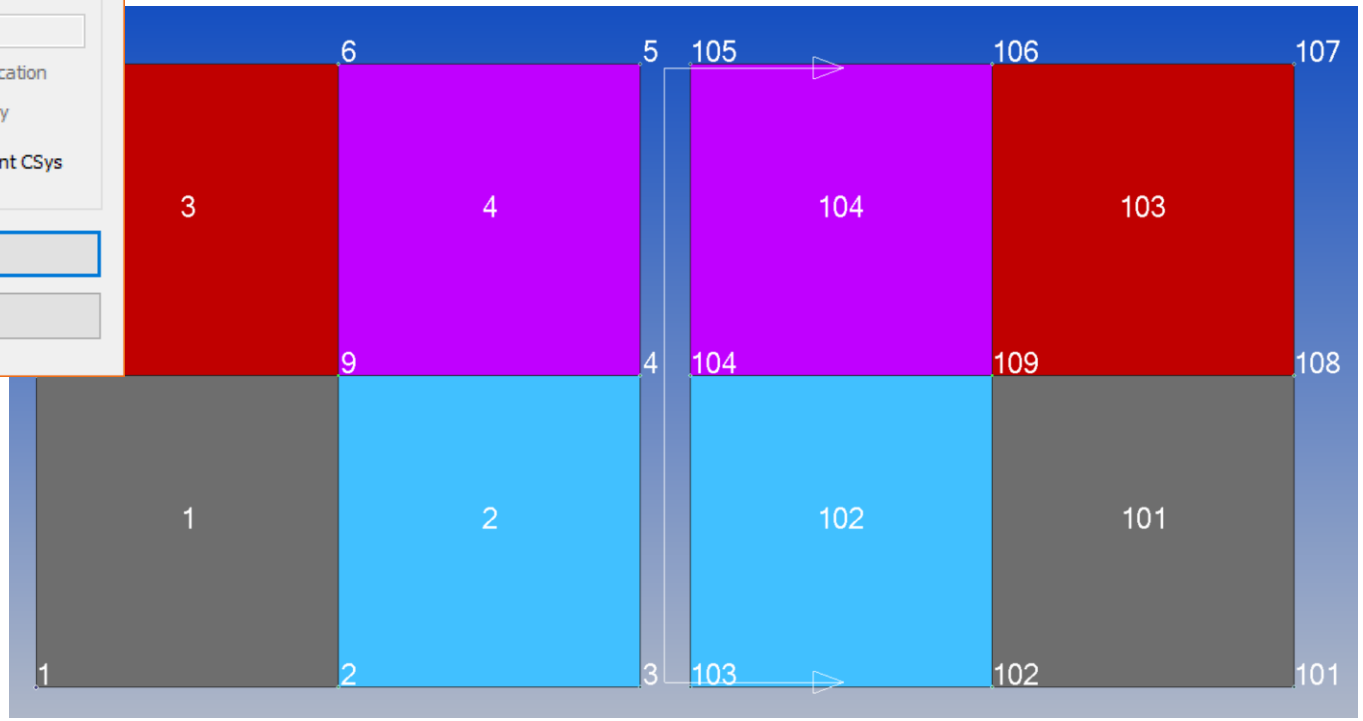
Reflect Geometry and Mesh

- Using Surface geometry with associated mesh, Offset existing Entity IDs by 100





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Preprocessing
Updated Copy Commands

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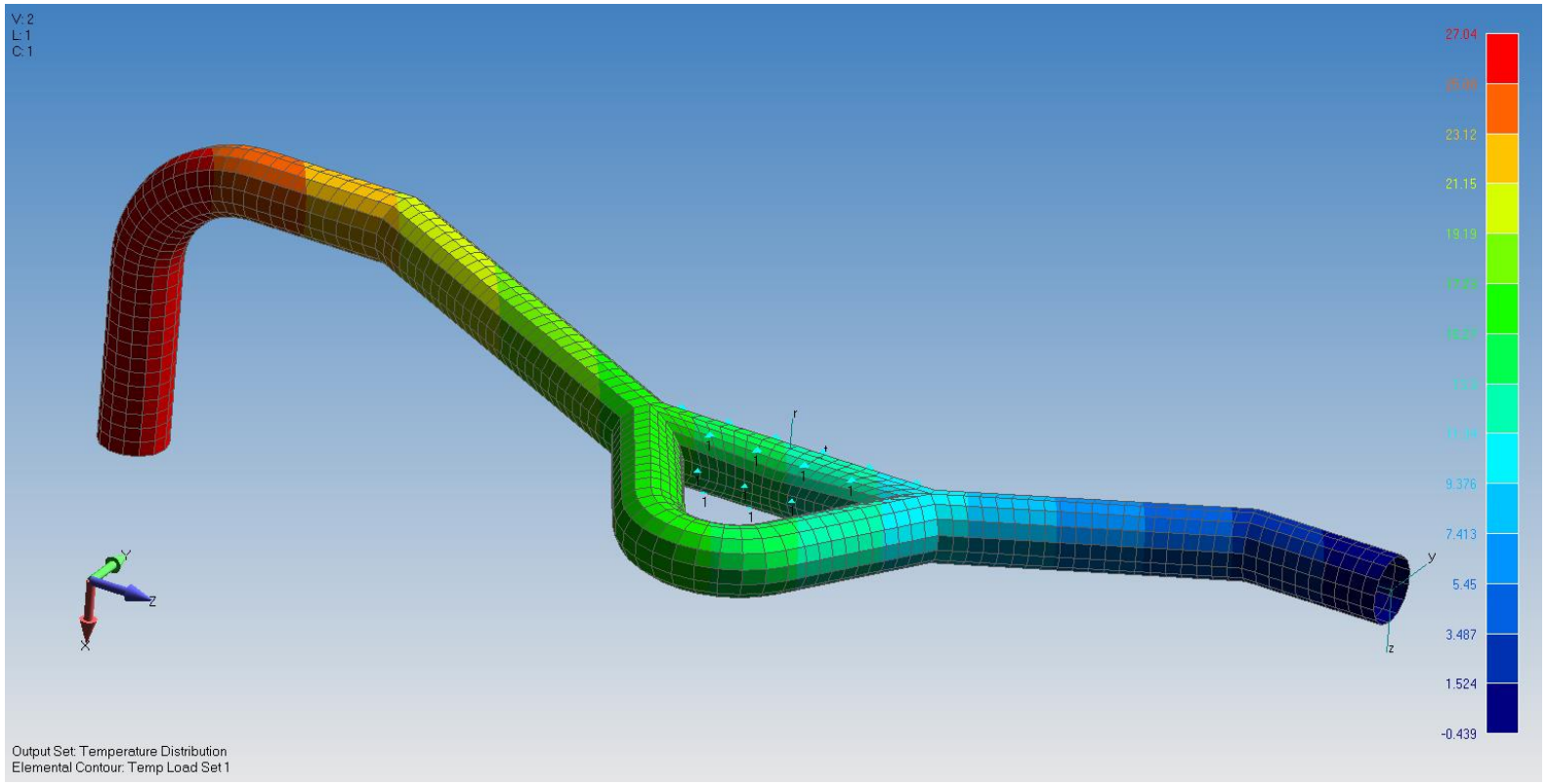
Example:

- geometry associated surface mesh
- complex nodal temperature distribution
- geometry based radial constraint in a non-global cylindrical coordinate system



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Preprocessing
Updated Copy Commands

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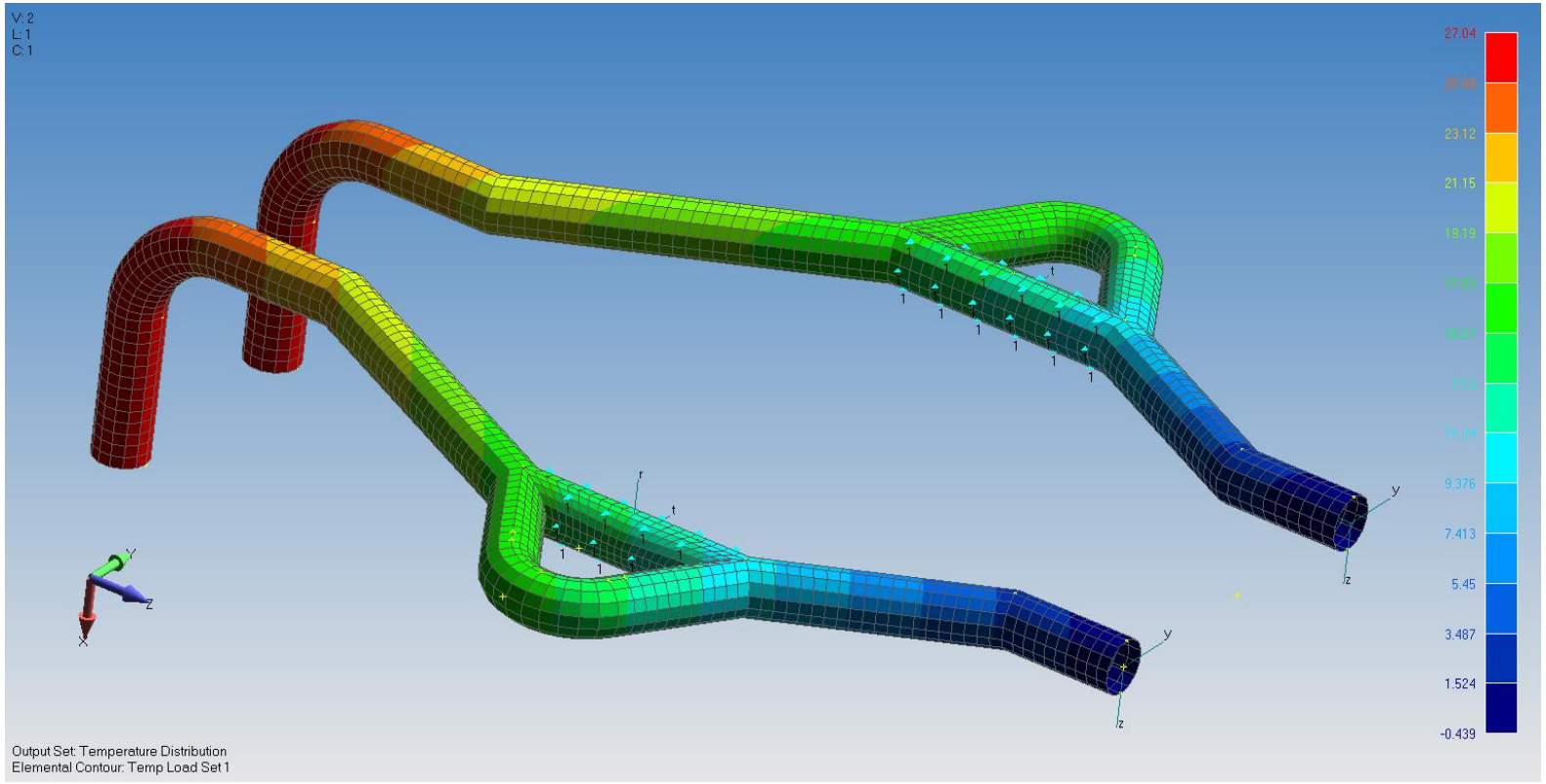
Reflect – select single solid

- Geometry reflected
- Mesh still associated
- Load reflected
- Dependent coordinate systems reflected
- Geometry based constraint reflected and attached



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Preprocessing
Updated Copy Commands

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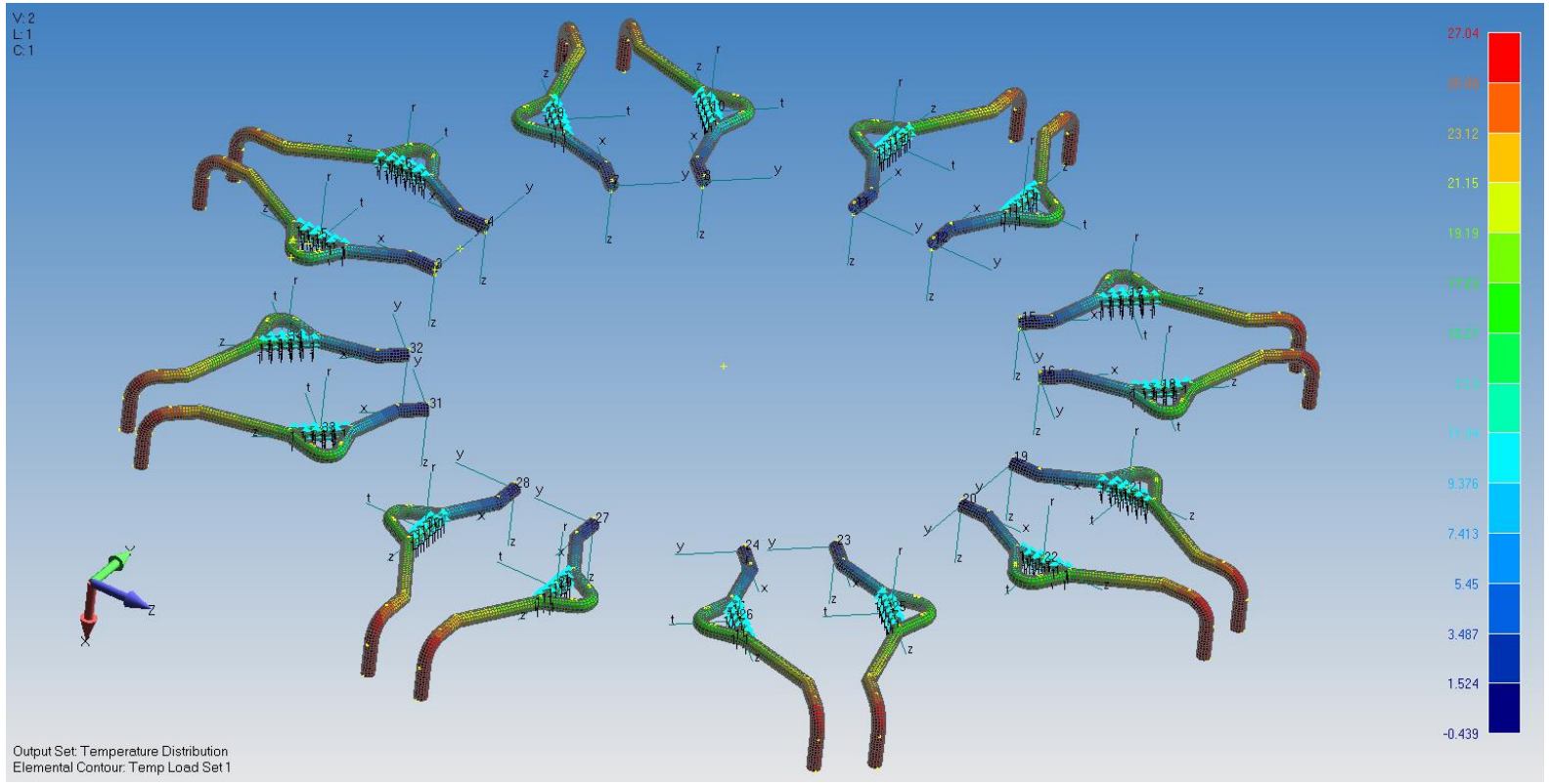
Rotate – 7 copies

Everything rotated, associated, and consistent



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Preprocessing
Updated Copy Commands

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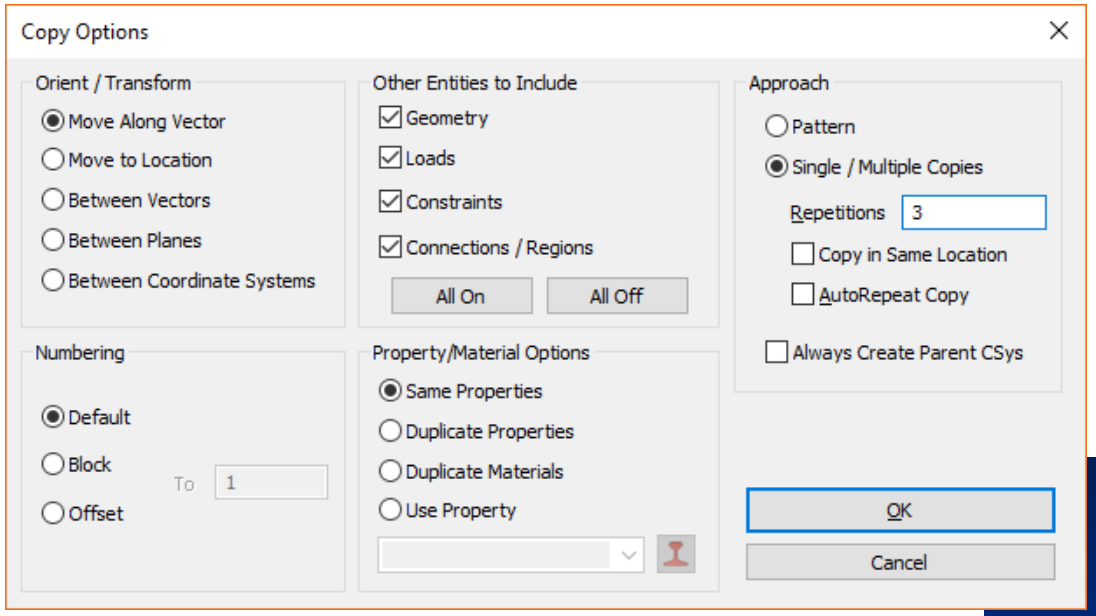
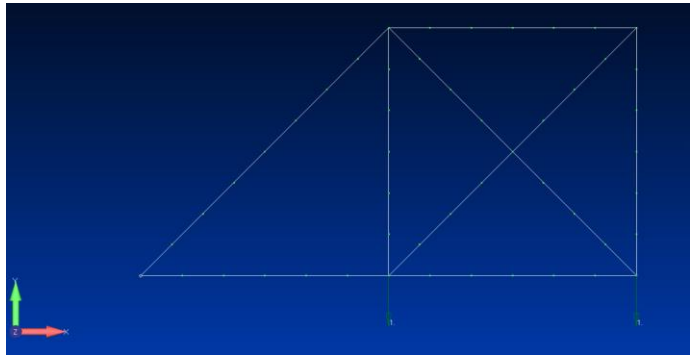
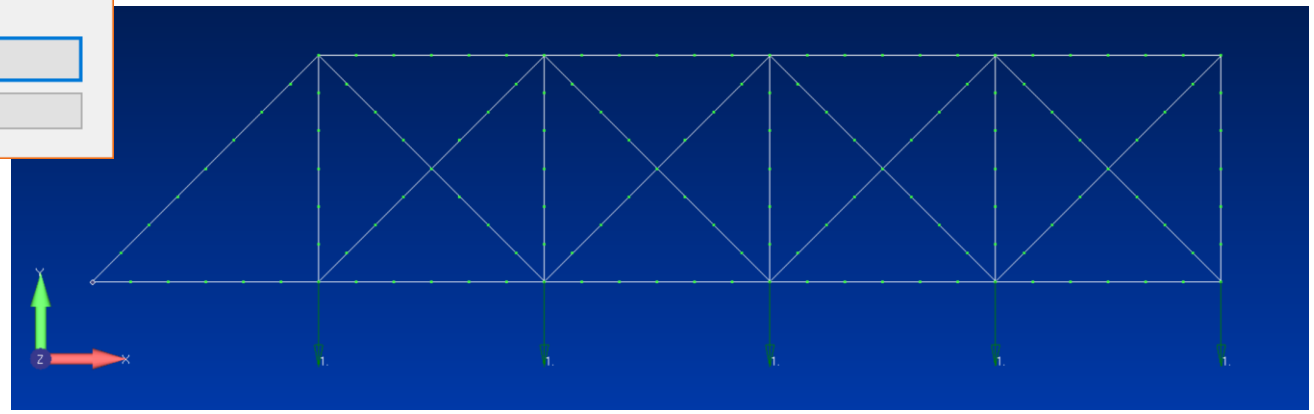
Copy Mesh

- Copy Mesh with associated Geometry, Loads, Constraints, and/or Connections/Regions







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Preprocessing
Updated Move Commands

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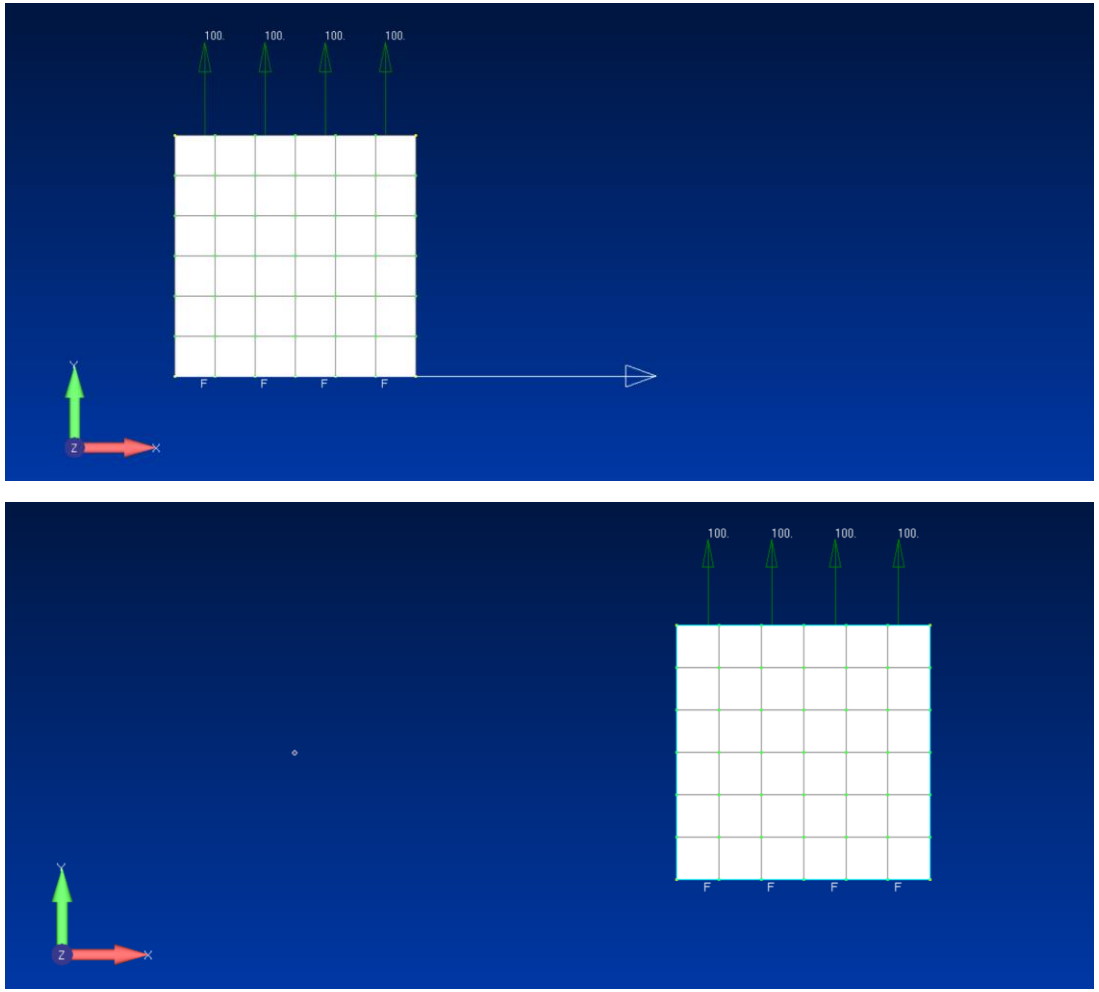
Ingenuity for life

Move Geometry and Mesh

- Option to include Mesh associated to Geometry and vice versa available for selected:
  - *Modify ->Move By* commands
  - *Modify ->Rotate By* commands
  - *Modify ->Reflect* commands (All New for 12.0!)
  - *Modify, Align* commands
    - Connections/Regions, Loads, and Constraints automatically moved with entities



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Preprocessing
Updated File – Merge Command

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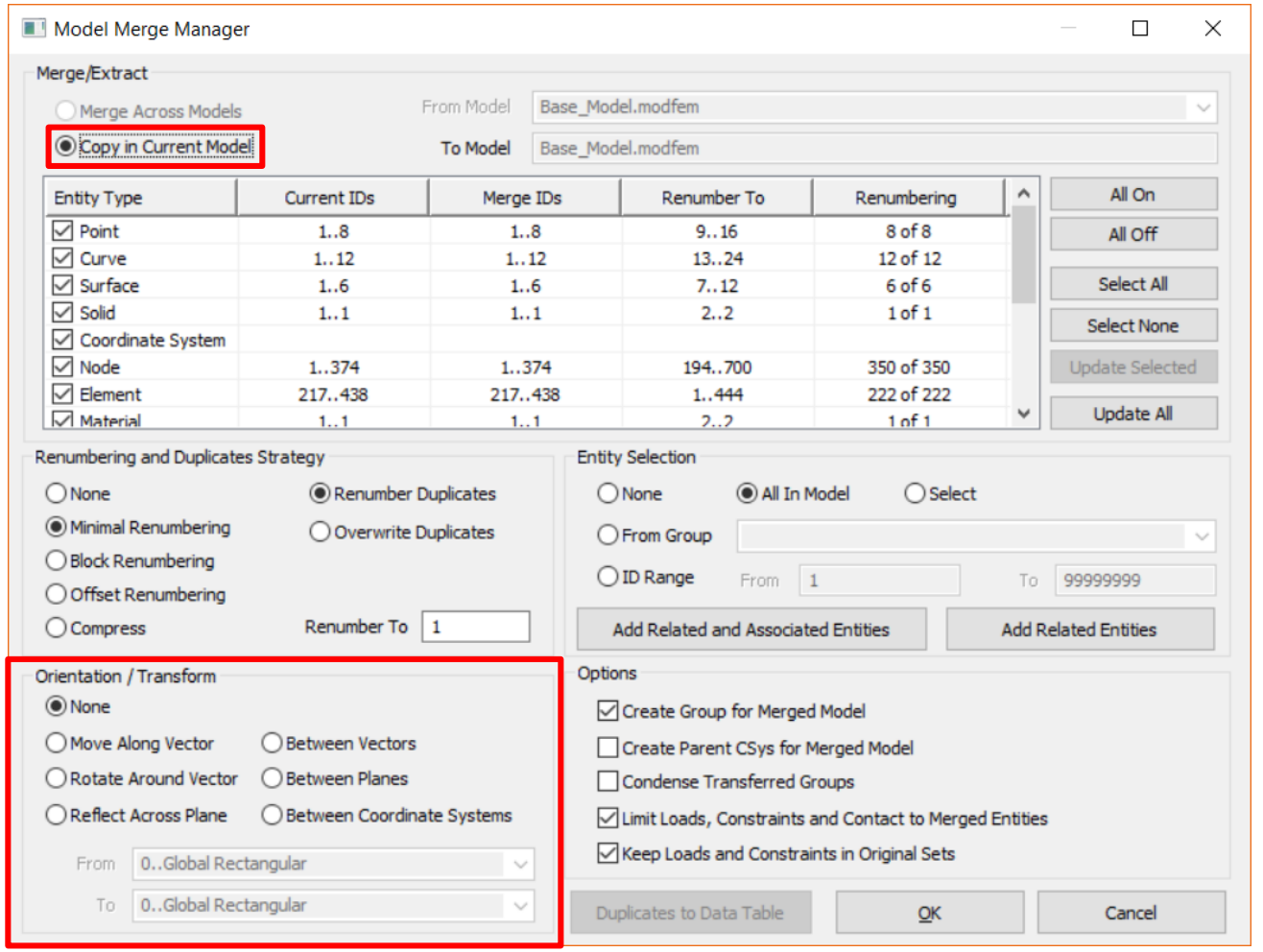
Added Copy in Current Model option to Merge/Extract section

Added options for transformation of merged entities in addition to Between Coordinate Systems in the new Orientation/Transform section:

- Move Along Vector
- Rotate Around Vector
- Reflect Across Plane
- Between Vectors
- Between Planes
- Align between Vectors and Planes



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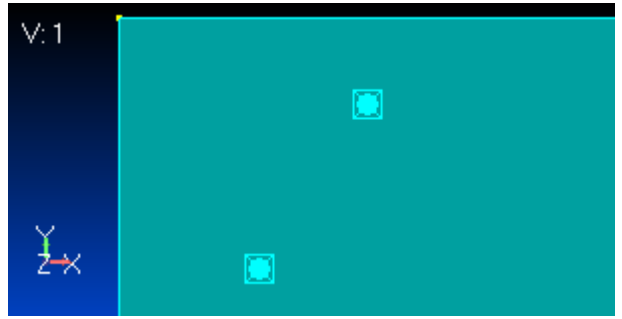
Accessed via the Tools – Mesh Point Editor command (and for version 12, also the Mesh – Mesh Control – Mesh Points on Surface command), the Mesh Point Editor dockable pane is an enhanced tool for creating Mesh Hard Points

Mesh Point Editor

0..Global Rectangula

ID	On/Off	Locked	Node O...	Definition	On Geometry	On ID	Distance To ...	Geometry X	Geometry Y	Geometry Z	Point X	Point Y	Point Z
1	☑	☐	☐	0..None	3..Surface	1	0.	3.879518	2.143998	0.	3.879518	2.143998	0.
2	☑	☐	☐	0..None	3..Surface	1	0.	7.92898	3.483364	0.	7.92898	3.483364	0.
3	☑	☐	☐	0..None	3..Surface	1	0.	2.228281	6.004525	0.	2.228281	6.004525	0.
4	☑	☐	☐	0..None	3..Surface	1	0.	8.046925	7.146926	0.	8.046925	7.146926	0.
5	☑	☐	☐	0..None	3..Surface	1	0.	3.958148	8.643865	0.	3.958148	8.643865	0.
6	☑	☐	☐	0..None	3..Surface	1	0.	5.530755	4.743945	0.	5.530755	4.743945	0.

- Used to create mesh hard points at a specified coordinate, using an existing point or node, loaded (imported) via a file, or copied from the clipboard
- Mesh Points can now be o” a surface, curve, or point
- Mesh Points now also have their own Symbol (shown on the right)
  - View – Options can be used to control display of mesh point symbols



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Preprocessing
Cohesive Elements and Properties

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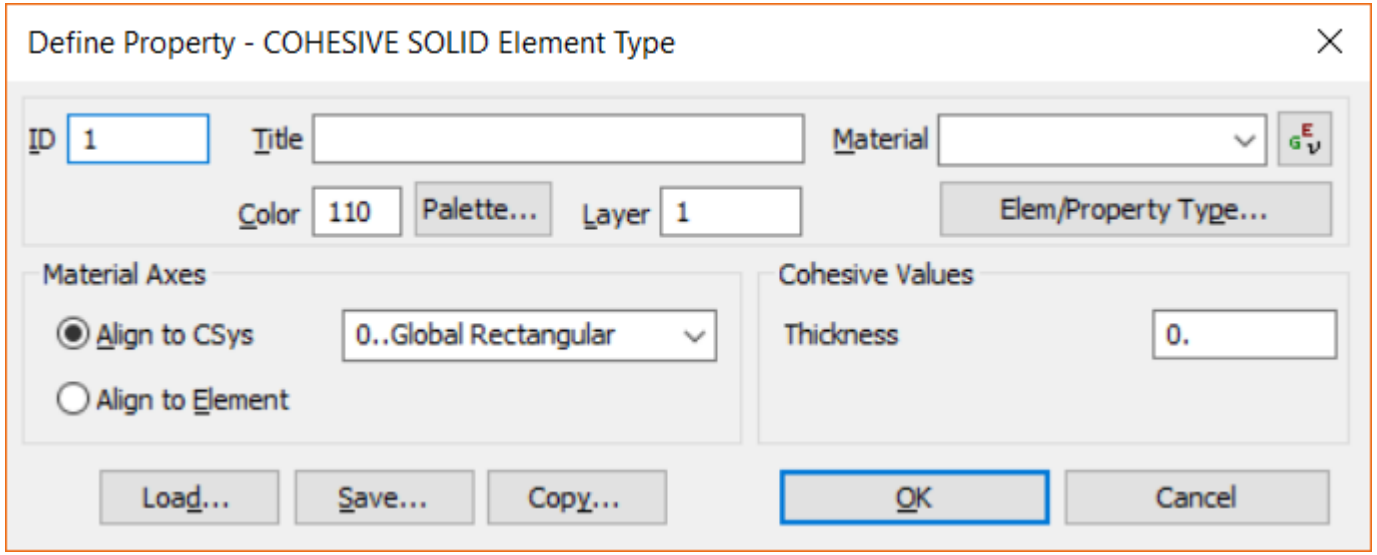
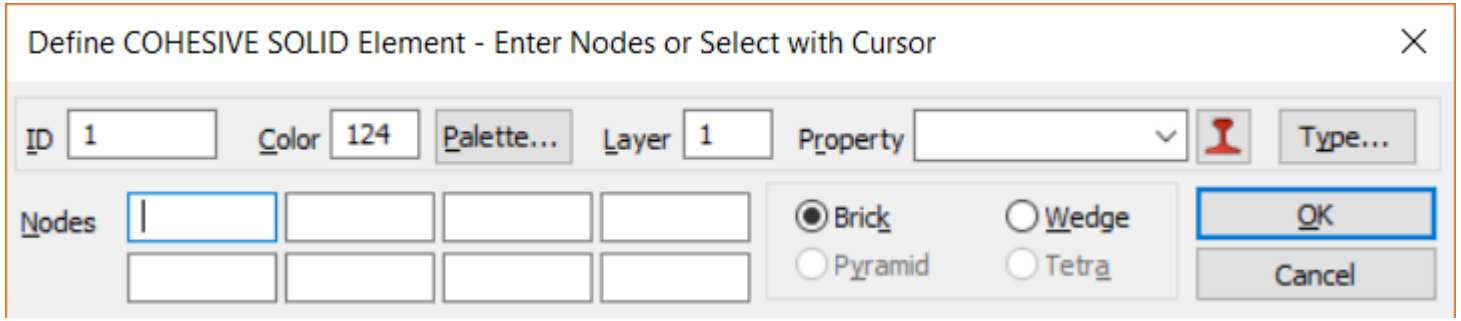
Ingenuity for life

New Property and Element Type

- Used in NX Nastran SOL 401 and SOL 402
- Property creates PSOLCZ entry
- Thickness on the Property is always used, which allows user to create a Solid Cohesive Elements with Zero Physical Thickness
- Similar to Solid Laminate elements, Brick (CHEXCZ) and Wedge (CPENTCZ) only





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Preprocessing
Cohesive Material

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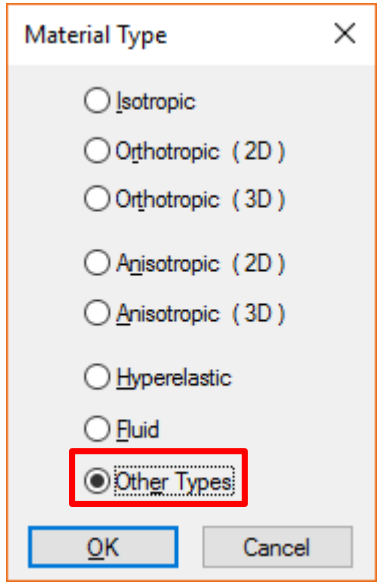
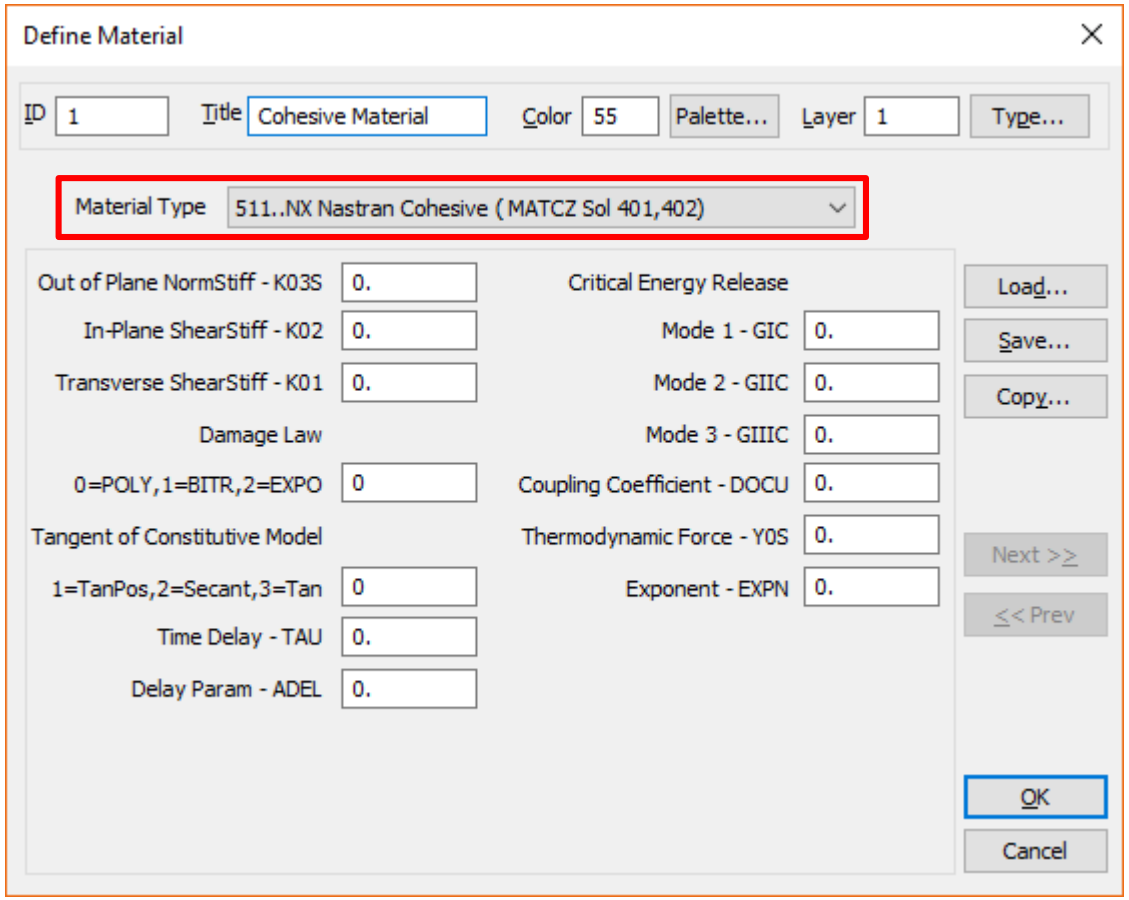
Cohesive Properties and may reference an *Isotropic* (MAT1), *Orthotropic (3D)* (MAT11), or “Cohesive” (MATCZ) material

Support for Cohesive material available via Other Types





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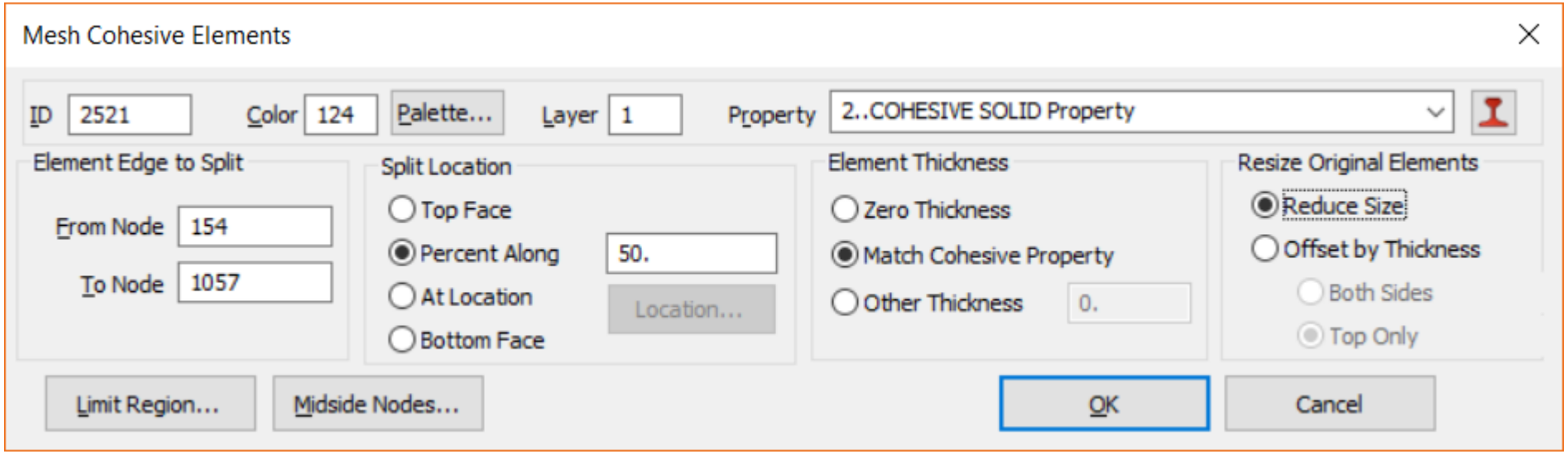
Ingenuity for life

New Mesh – Editing – Cohesive Meshing command



Works similar to Mesh – Editing – Edge Split command, but inserts a layer of Cohesive elements at the Split Location, using the specified Element Thickness and Resize Original Elements options

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Preprocessing
Beam Centerline Finder

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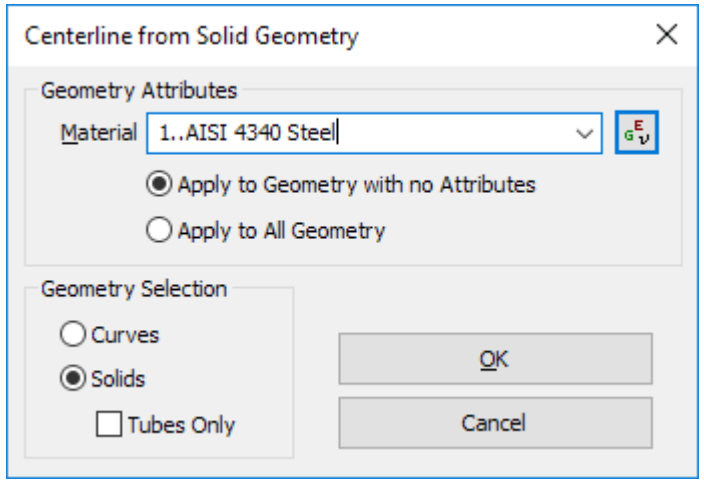
Ingenuity for life

Geometry – Curve Centerline command implemented for v12 (was available via API in v11.4)

Choose or create material to be connected to new beam properties
- Material can optionally override any pre-defined solid attributes

Geometry Selection options:
- Curves – interactively pick curves, the mid-point of that curve is calculated, and a cross-section cut of that solid is used to calculate beam properties
- Solids – choose solids, two algorithms are run, one that looks for cylindrical and toroidal surfaces, and finds circular cross sections, if no circular cross section is found, the curve method above is used on the longest edge of the solid
- Tubes Only – turns off the secondary long edge check



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Preprocessing
Beam Centerline Finder

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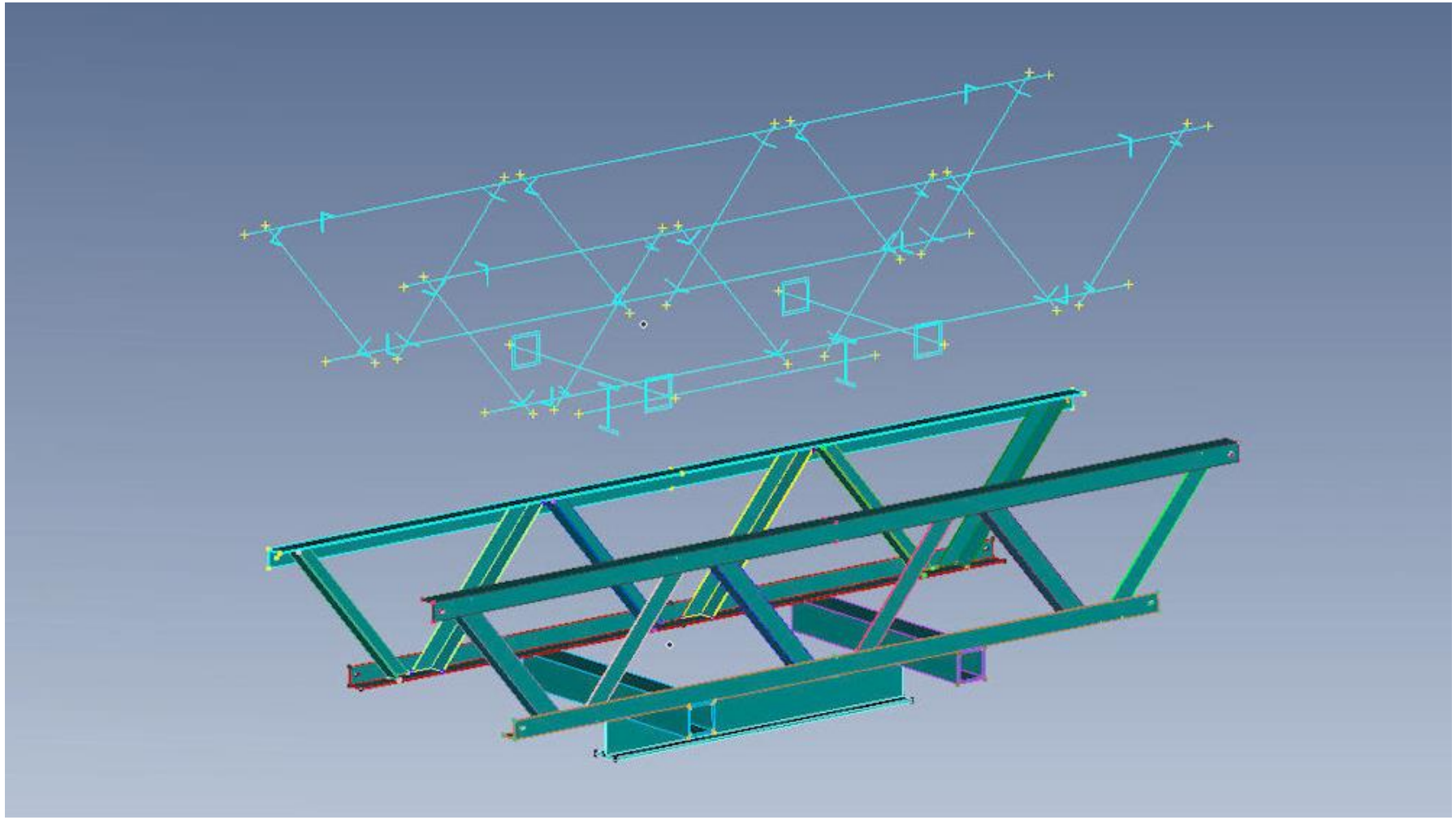
Ingenuity for life



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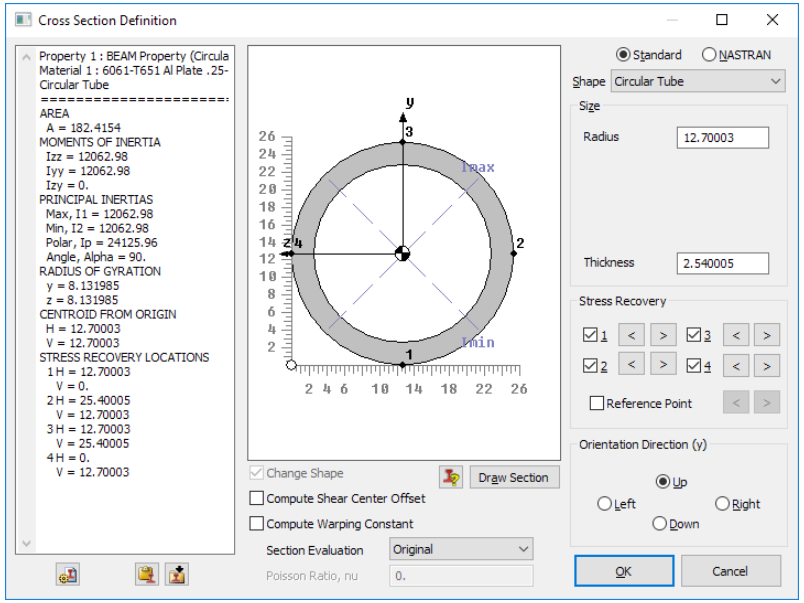
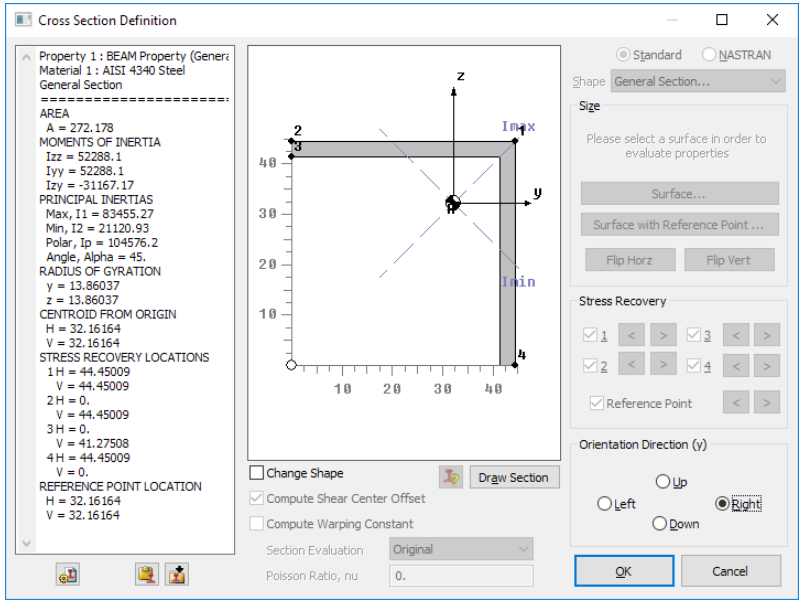
Preprocessing
Beam Centerline Finder

Circular cross-sections created as FEMAP circular tubes

All others treated as general sections





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Preprocessing
Data Mapping Enhancements

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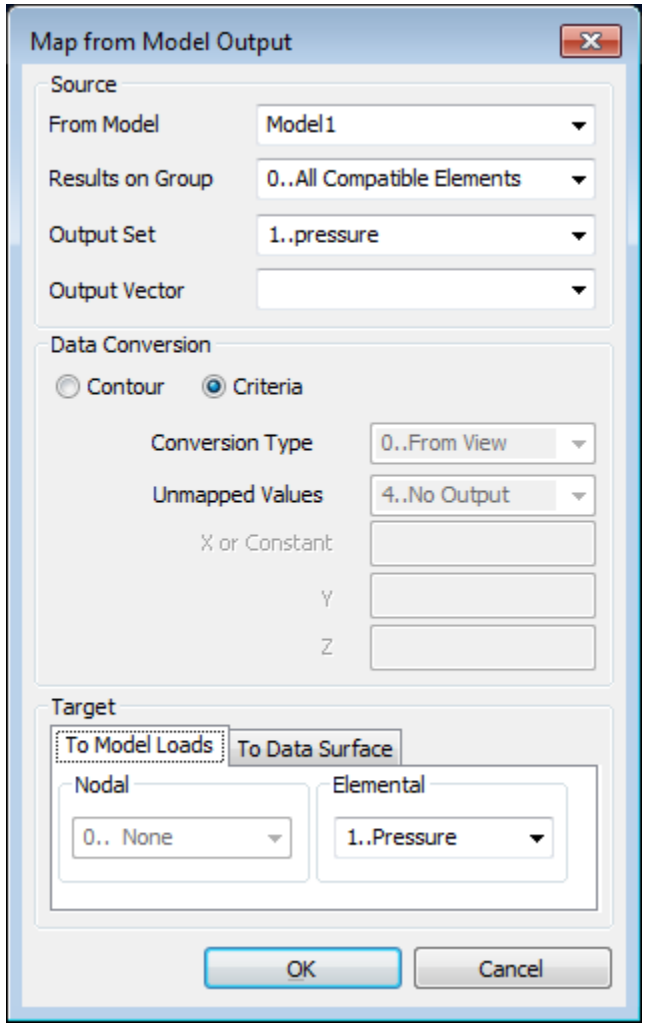
Model – Load – Map Output From Model implemented customer request for Criteria based mapping onto elements

- All Compatible Elements option available when mapping data from Source model to Target model (i.e., no Group needed in Source model)

Data Surface Editor

- Criteria option available when defining an Output Map Data Surface

- Arbitrary 3D Data Surface utilizes new high speed mapping algorithm



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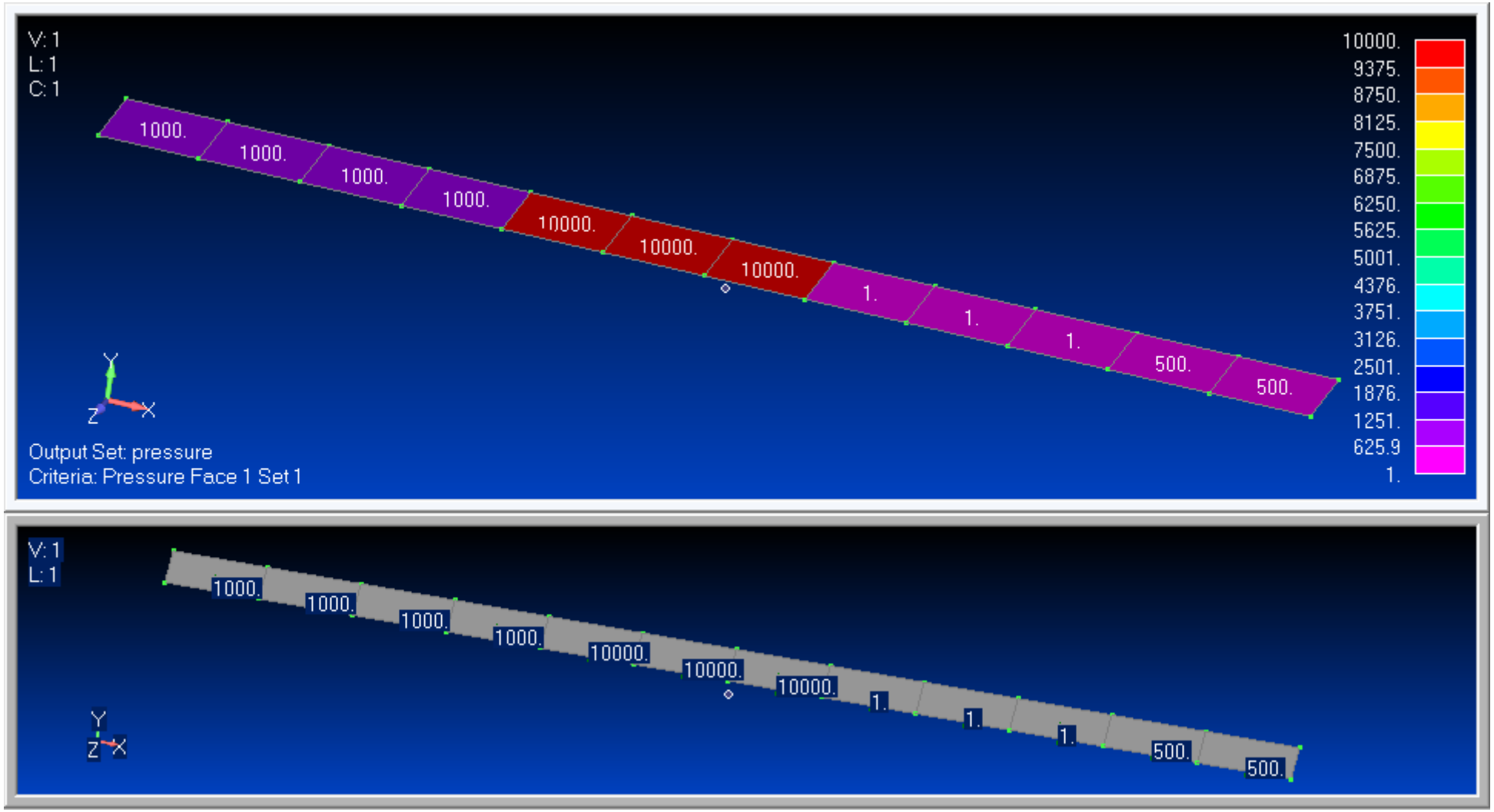
Preprocessing
Data Mapping Enhancements - Example



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Preprocessing
Discrete Value Plots

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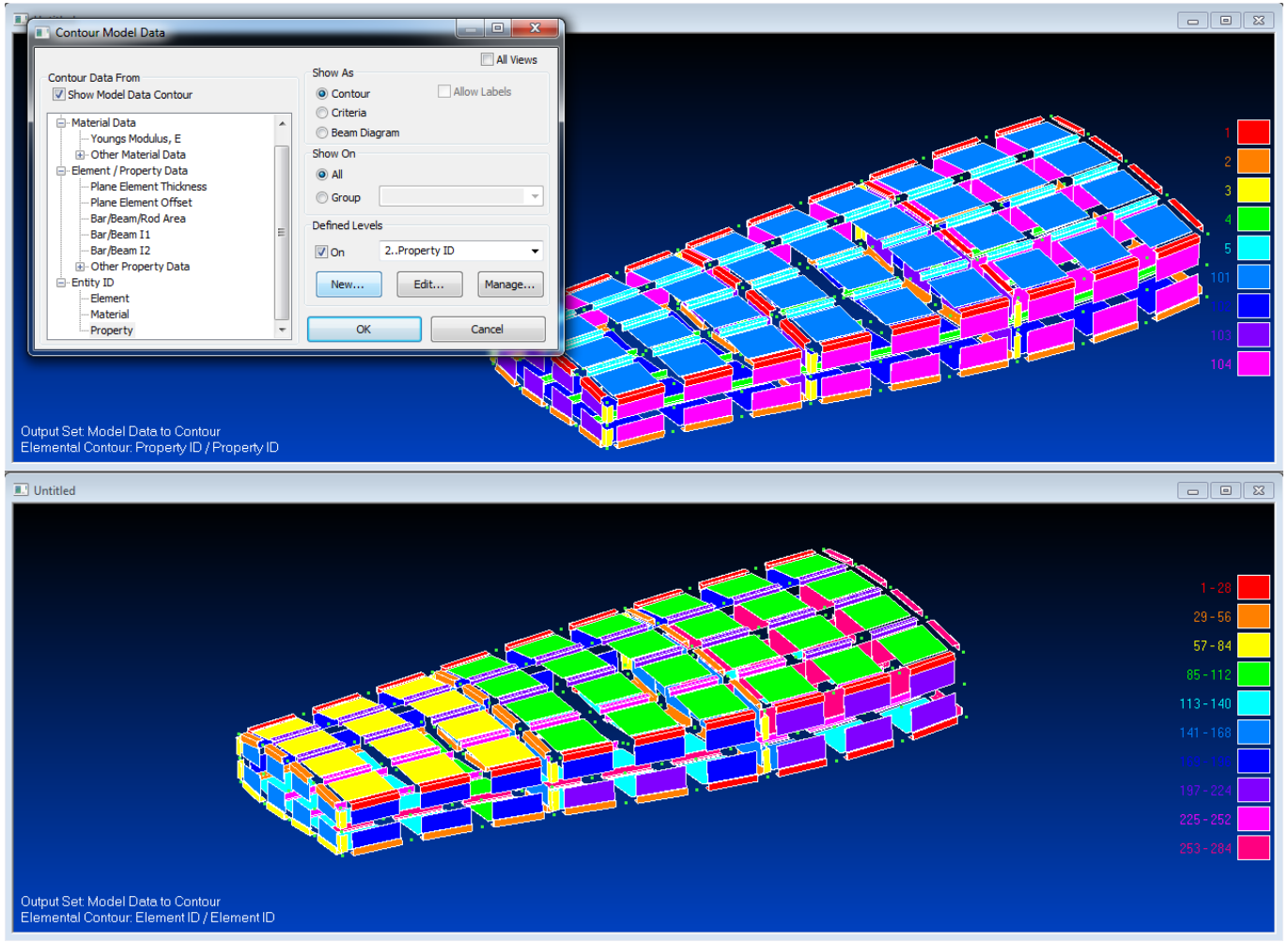
- Colored based on element value or range of values
- Covers all material, property and entity ID available in Model Data Contour
- Auto creation of list of values or list of ranges based on each model's data



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Postprocessing
Dynamic Criteria

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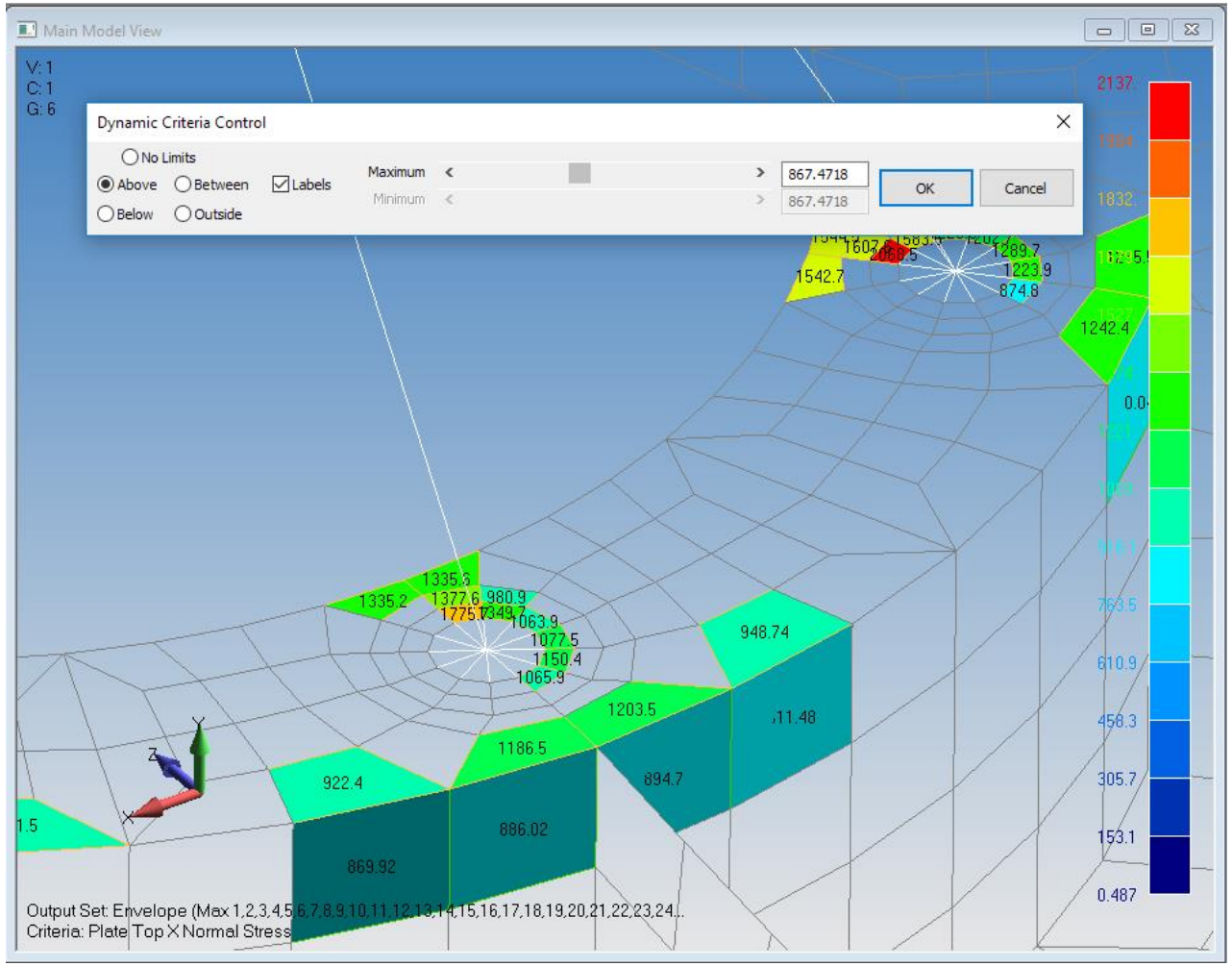
Accessed via the View – Advanced Post – Dynamic Criteria command or in the PostProcessing toolbox

- Interactively adjust Criteria Limits Mode and Limit Values
- Use slider bar(s) to update display
- Optionally display Criteria Labels and/or use the Absolute Value of current Output Vector



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Postprocessing
Report Generator

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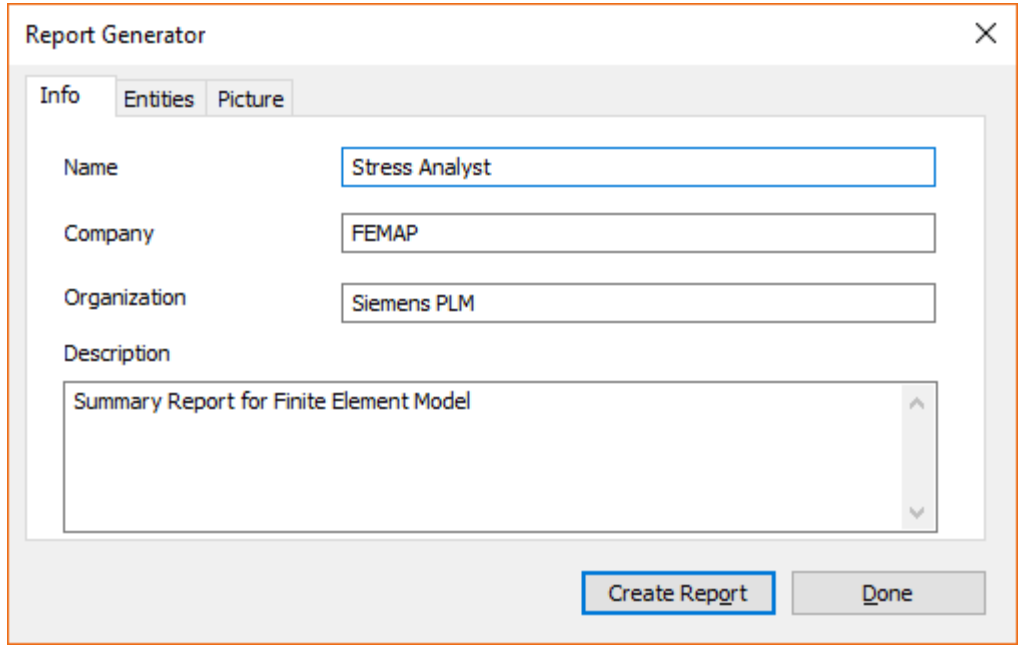
Tools – Report Generator command:

- Checks to see if Microsoft Word is available
- Dialog box with various tabs allows user to control settings
- FEMAP creates report directly within Microsoft Word
- Uses special functionality to create report seamlessly
- Organized for the technical analyst
- Summarize Model Data



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Postprocessing
Report Generator

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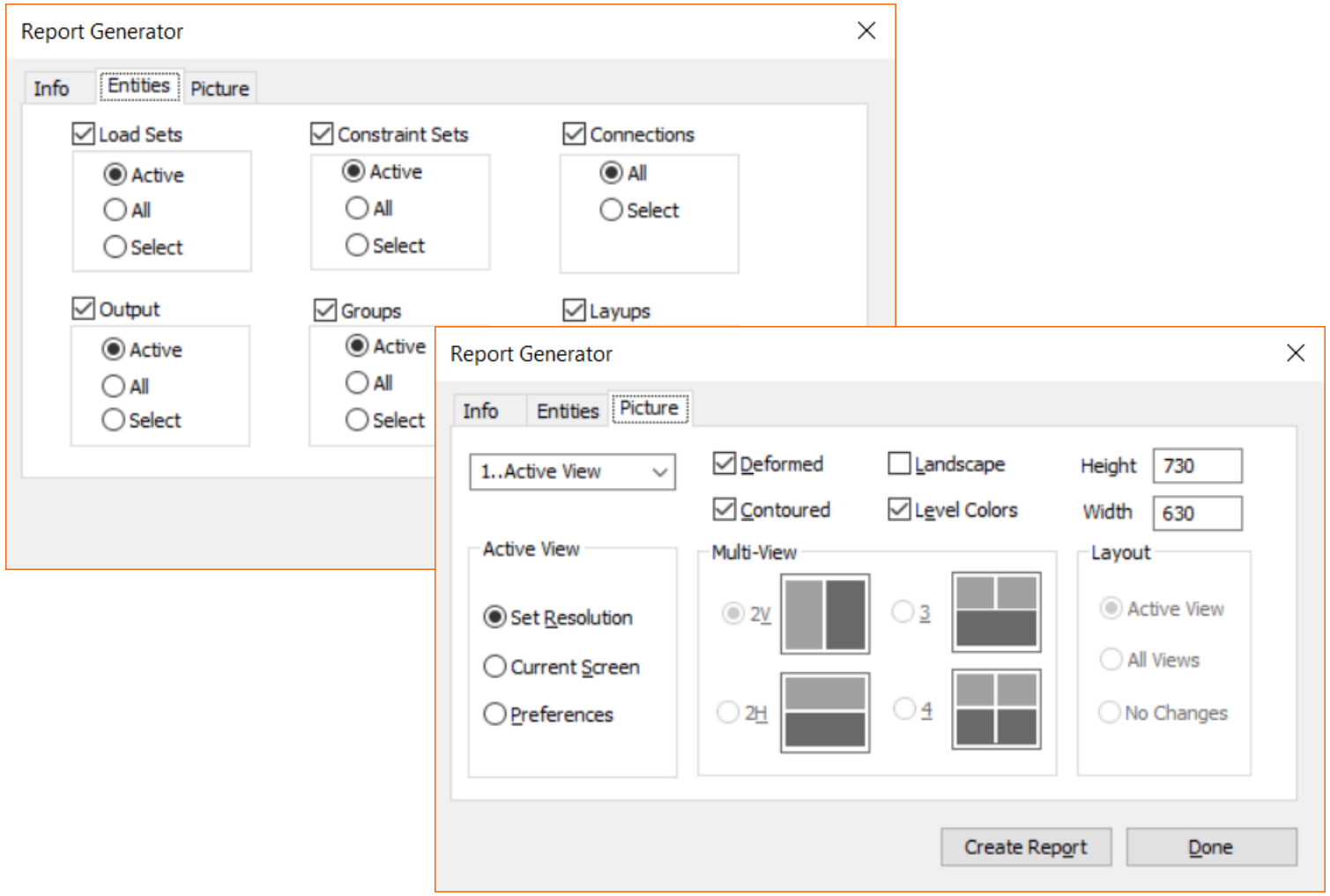
- Entities tab
  - Choose Entity Types to include in report (load sets, constraint sets, connections, output sets, groups, and/or layups)
  - Include the active entity of a certain type, all, or select a subset

- Picture tab (View Settings)
  - Choose Active View, Multi-View, or Current Layout (additional options available for each)
  - Choose to include deformation and/or contour in pictures of model
  - Specify orientation
  - Specify picture size (height/width)



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Postprocessing
Report Generator

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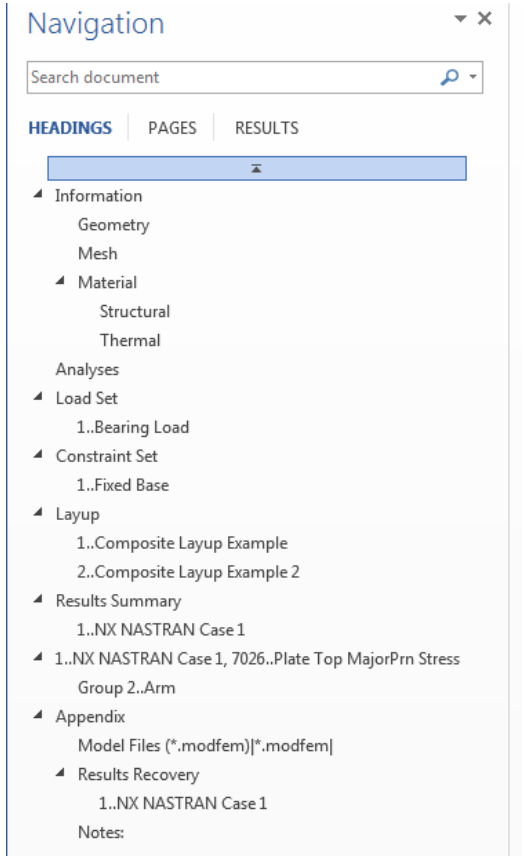


Material

Structural

ID	Title	Youngs Modulus, E	Shear Modulus, G	Poisson, Nu	Tension Limit	Compression Limit	Shear Limit
1	MAT_1	9900000	3800000	0.33	35000	35000	27000
2	MAT_2	16000000	6200000	0.31	145000	15000	93000
3	MAT_3	10300000	4000000	0.33	66000	65000	44000
Total	3						

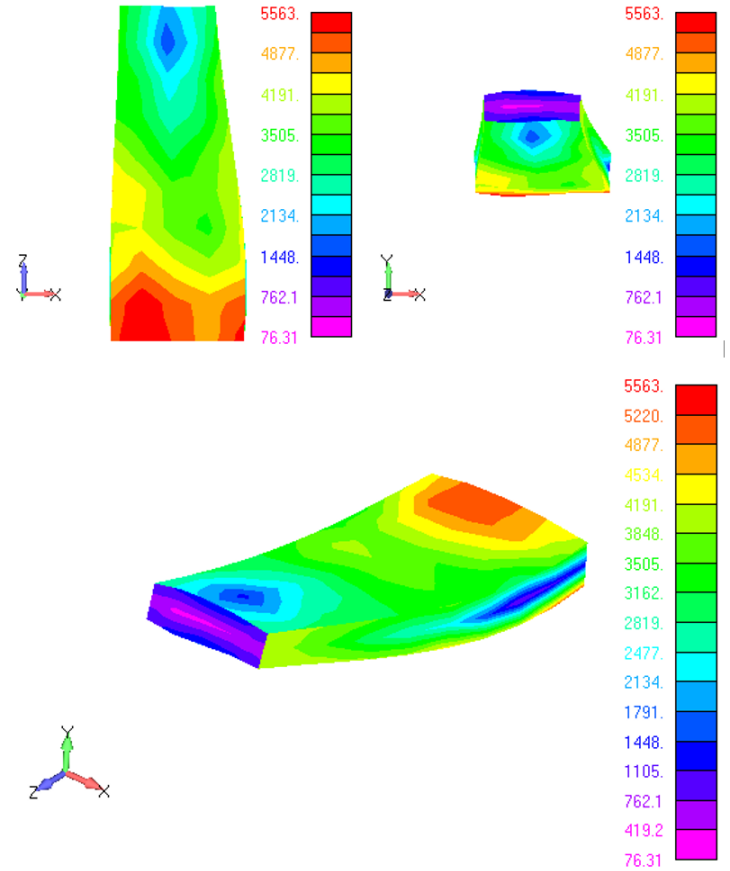
Results Summary

1..NX NASTRAN Case 1

Output Vector		Node	Element	Max	Node	Element	Min
1	Total Translation	126		0.330235	1		0.000000
2	T1 Translation	321		0.008644	383		-0.012213
3	T2 Translation	309		0.329352	1		0.000000
4	T3 Translation	220		0.018874	126		-0.025825
5	Total Rotation	131		0.008847	1		0.000479
6	R1 Rotation	256		0.003492	131		-0.008846
7	R2 Rotation	383		0.002254	382		-0.002274
8	R3 Rotation	386		0.005688	382		-0.003387

1..NX NASTRAN Case 1, 7033..Plate Top VonMises Stress

Output Vector	Element	Max	Element	Min
Plate Top VonMises Stress	136	5546.248535	159	290.303314



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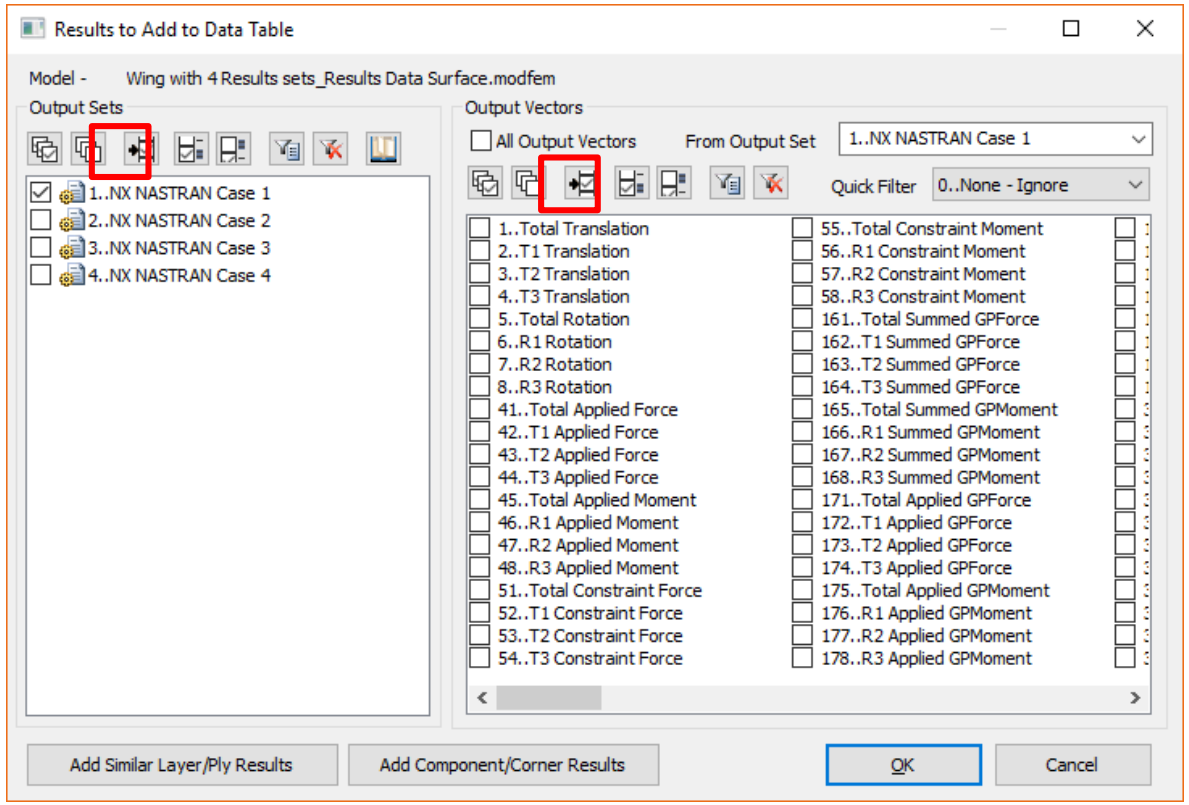
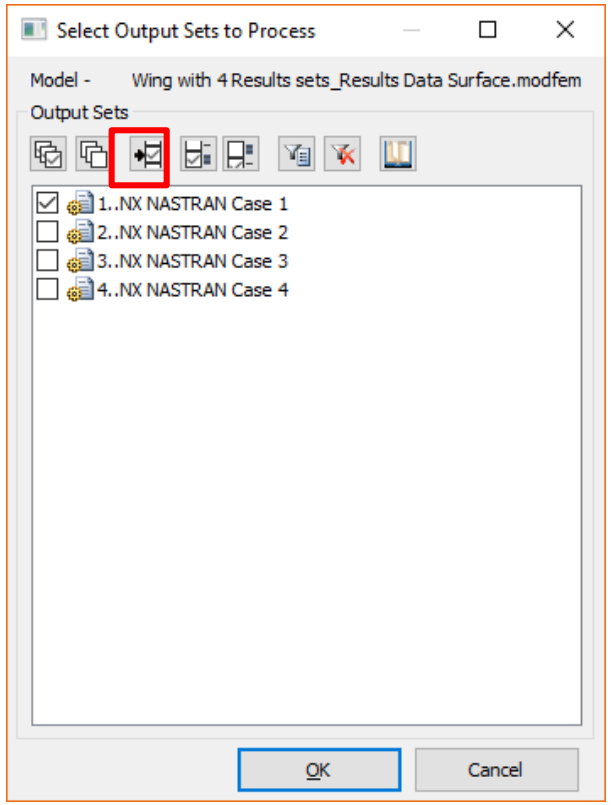
Added Previous On icon buttons to Select Output and Select Output Sets to Process dialog boxes used in a number of different commands (for example, List – Output – Results to Data Table and Model – Output – Process when processing Complete Output Sets)





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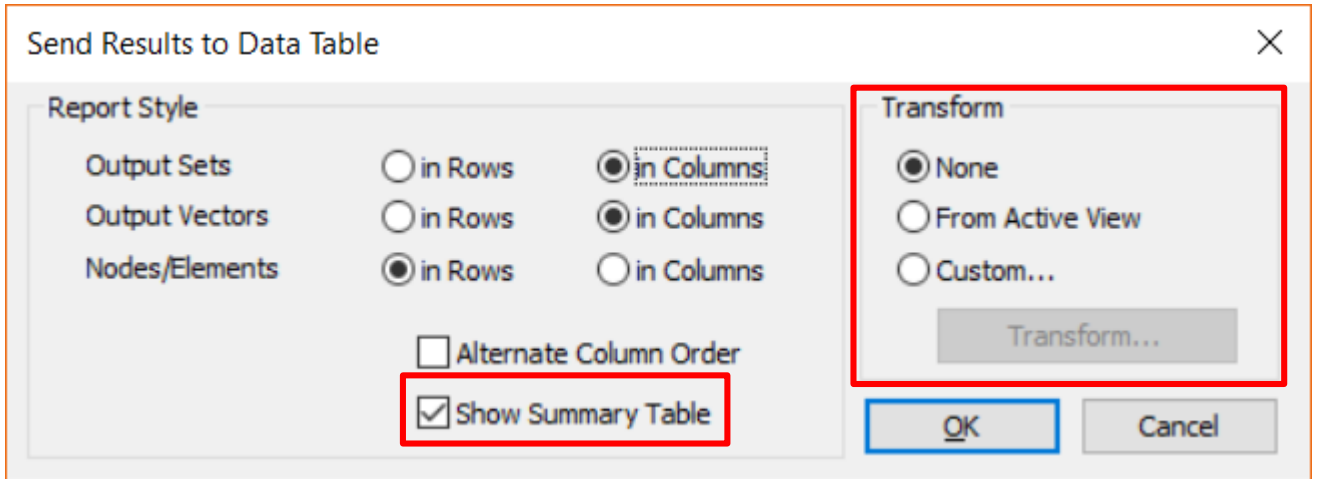
Added ability to send transformed results to the Data Table using the List – Output – Results to Data Table command and added option to Show Summary Table



Divided the Mesh – Edge Members command into two commands:

- Mesh – Edge/Skin Elements – Line Elements on Edges
- Mesh – Edge/Skin Elements – Planar Elements on Faces

Added Group – Operations – Generate From Criteria command – only adds elements which currently pass the Criteria (only available when a Criteria plot is being displayed in the graphics window)

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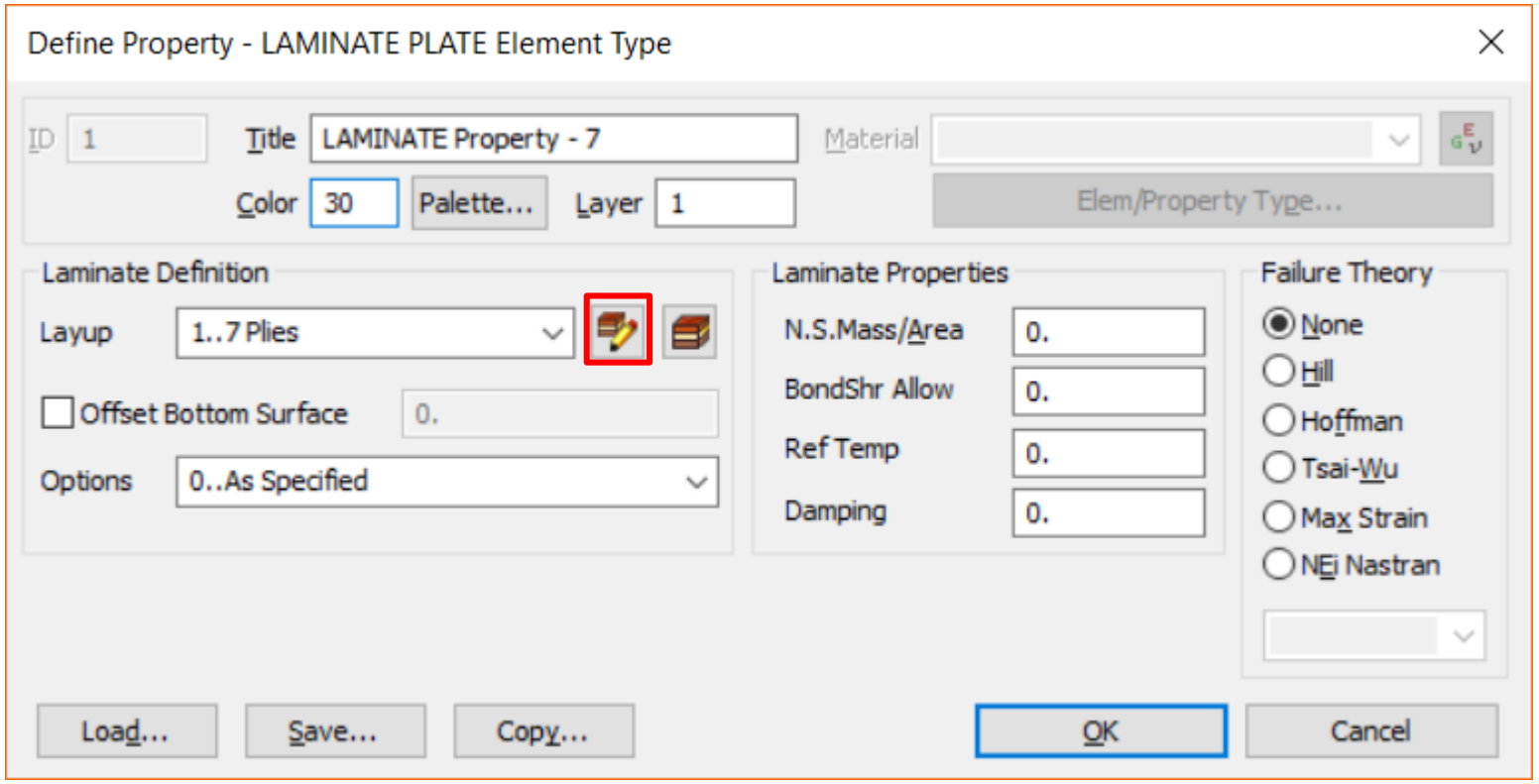
Added ability to edit the currently specified Layup when creating or editing a Laminate or Solid Laminate Property



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Miscellaneous
Updates and Enhancements

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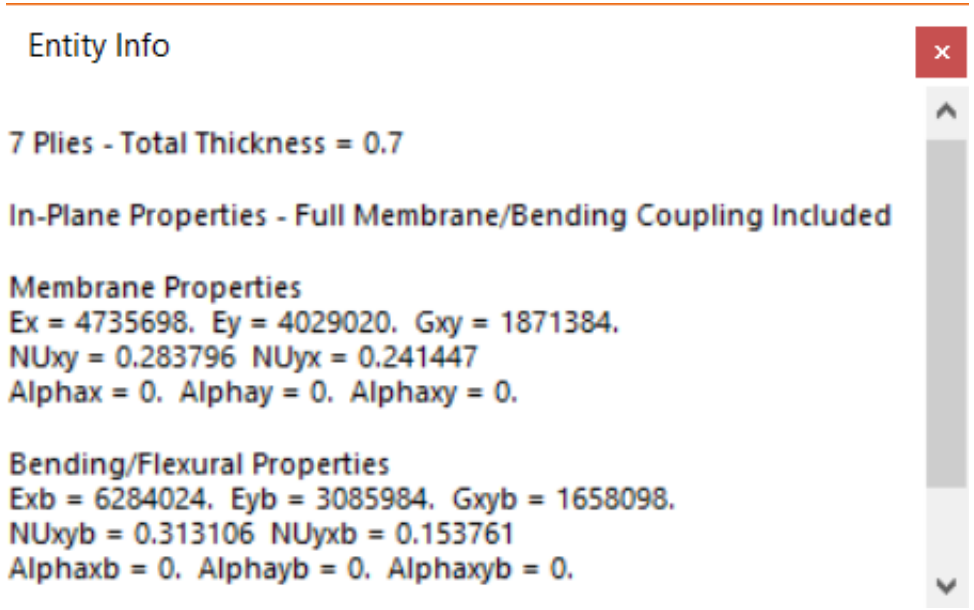
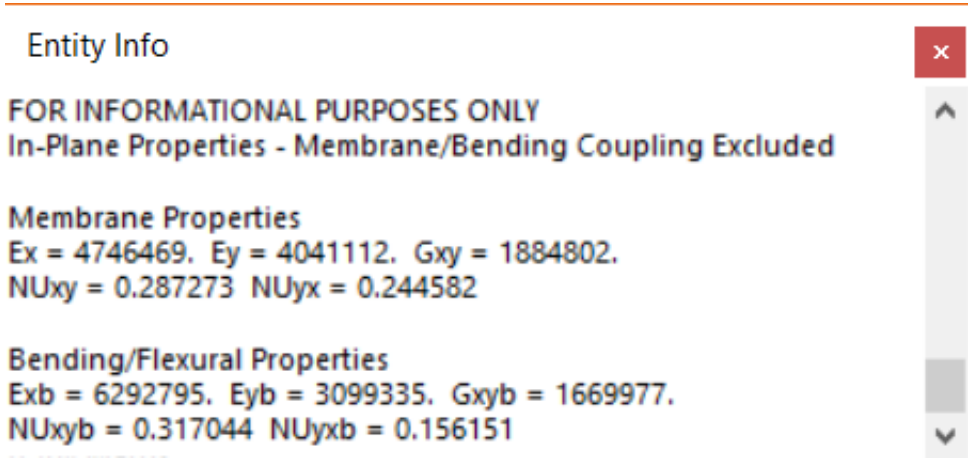
Ingenuity for life

Calculation of Laminate Equivalent Properties now done with both Full Membrane/Bending Coupling Included and Full Membrane/Bending Coupling Excluded (informational purposes only)





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Solver Support
Solver Updates

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Ingenuity for life

NX Nastran

- SOL 401 Multi-step Nonlinear Structural
- SOL 402 Multi-step Nonlinear Kinematic solver support
- SOL 200 Optimization
  - Enhanced design optimization support
  - Topology optimization support

ANSYS

- 100% completely new translator
- Modern ANSYS element types
- ANSYS organized input file creation

Abaqus

- Expanded support of rigid analytic surfaces
- Support export of CBUSH as CONN3D2 element

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Solver Support
Memory Management (NX Nastran 12)

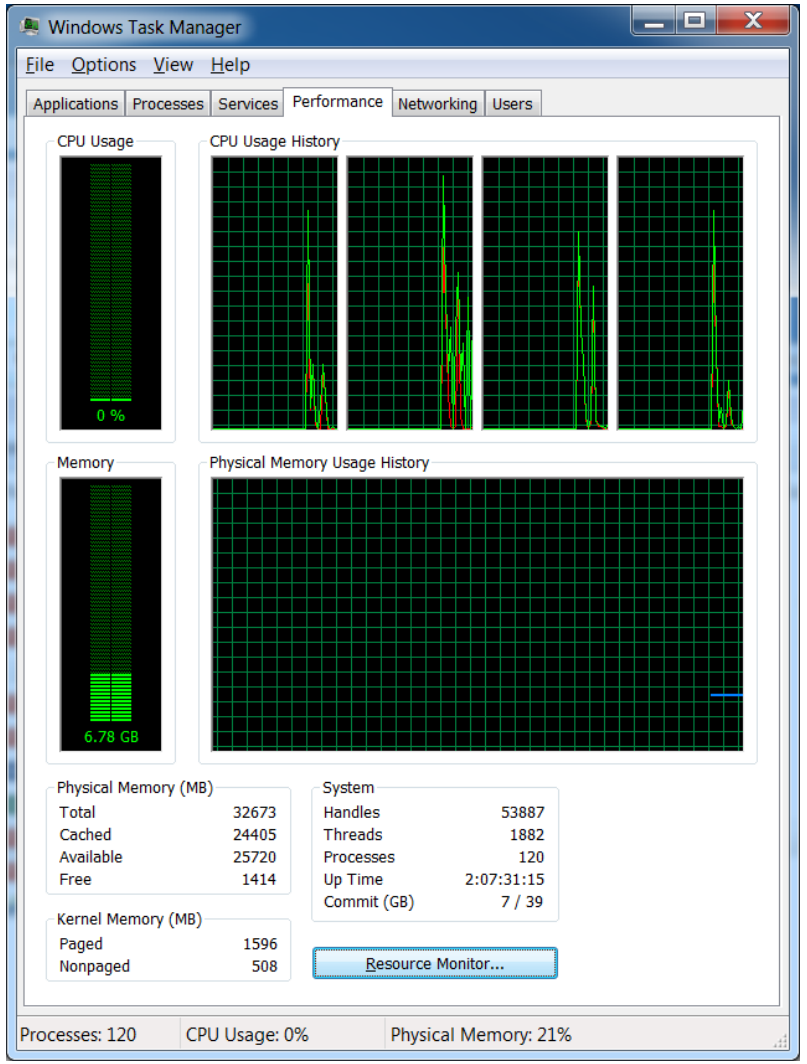
SIEMENS
Ingenuity for life

Nastran memory split into 2 parts:

- Fixed allocation
  - Database functions

- Dynamic allocation
  - Used for memory intensive modules, i.e. sparse solver, etc.
  - Can be released when not needed
    - ISHELL execution of external application
      - SOLs 402, 601 & 701
    - API call to external DLL.

- No UI controls. Implementation is transparent to the user.
- Value specified on MEMORY keyword is now a hi-water mark, not an allocation



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Solver Support
NX Nastran Multi-step Nonlinear

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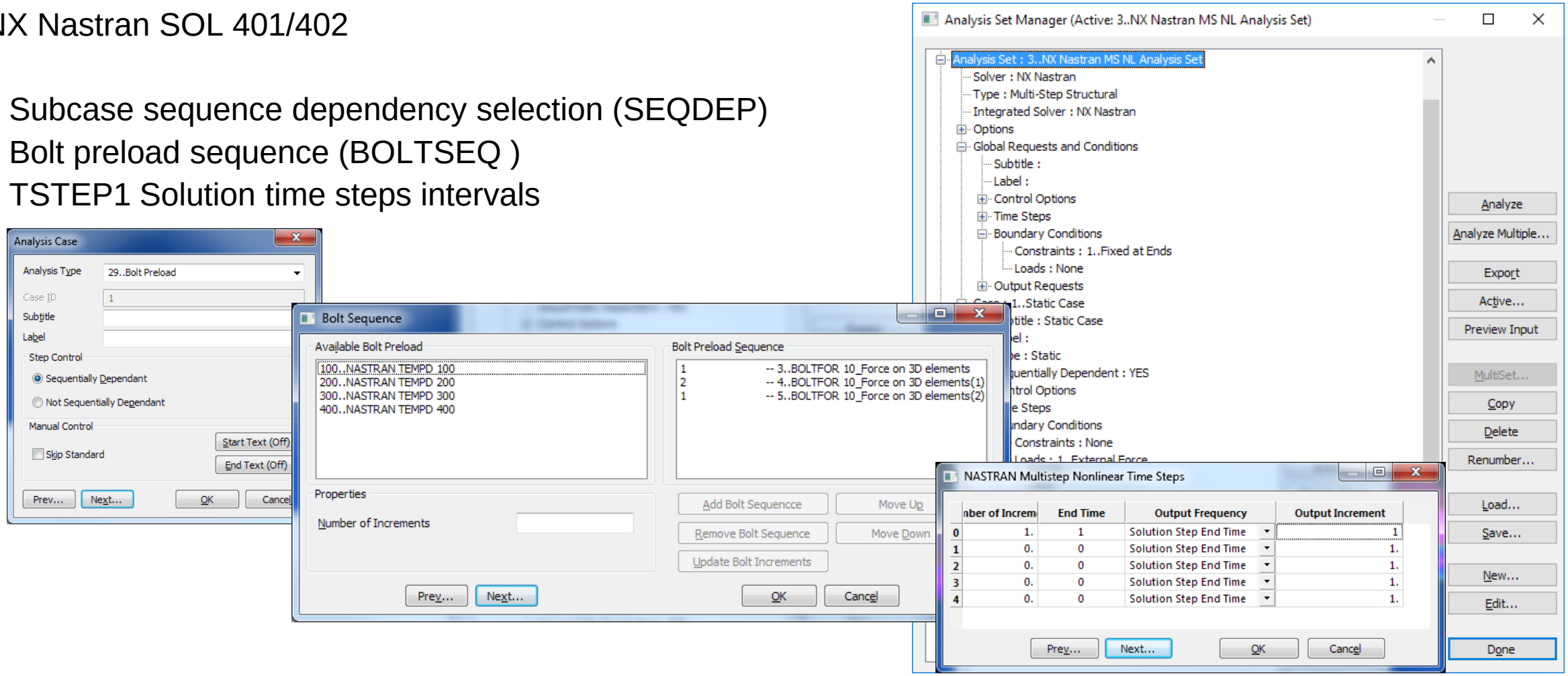
NX Nastran SOL 401/402

- Subcase sequence dependency selection (SEQDEP)
- Bolt preload sequence (BOLTSEQ)
- TSTEP1 Solution time steps intervals



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Solver Support
NX Nastran Multi-step Nonlinear

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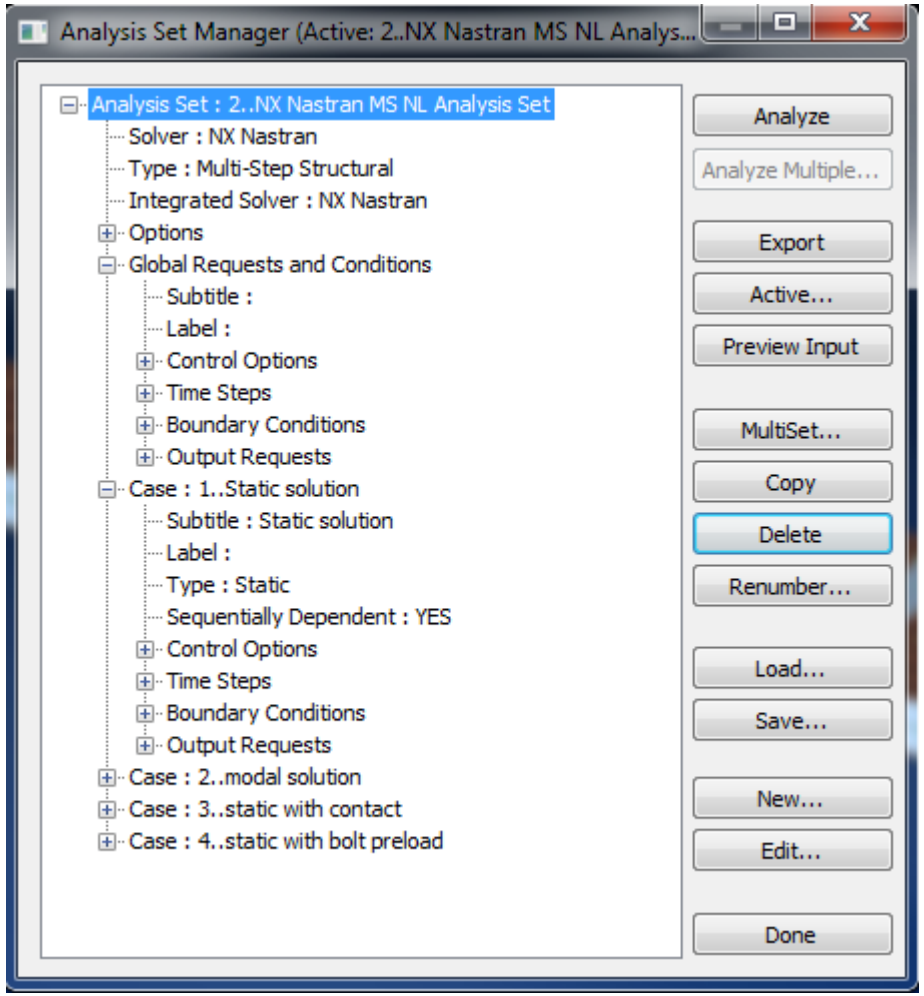
Support for new NX Nastran solution sequences:
- SOL 401 Multi-step Structural
- SOL 402 Multi-step Kinematics

Analysis Set Manager updated for new solution workflows
- Includes robust selection of element types With NX Nastran 12
- New multi-step workflow allows change of analysis type in subcase (statics, modes)
- Subcases can be dependent or independent of previous subcase
- Change contact/glue and boundary conditions in subcases
- Iteration/solution control changes allowed in subcases



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Solver Support
NX Nastran Multi-step Nonlinear

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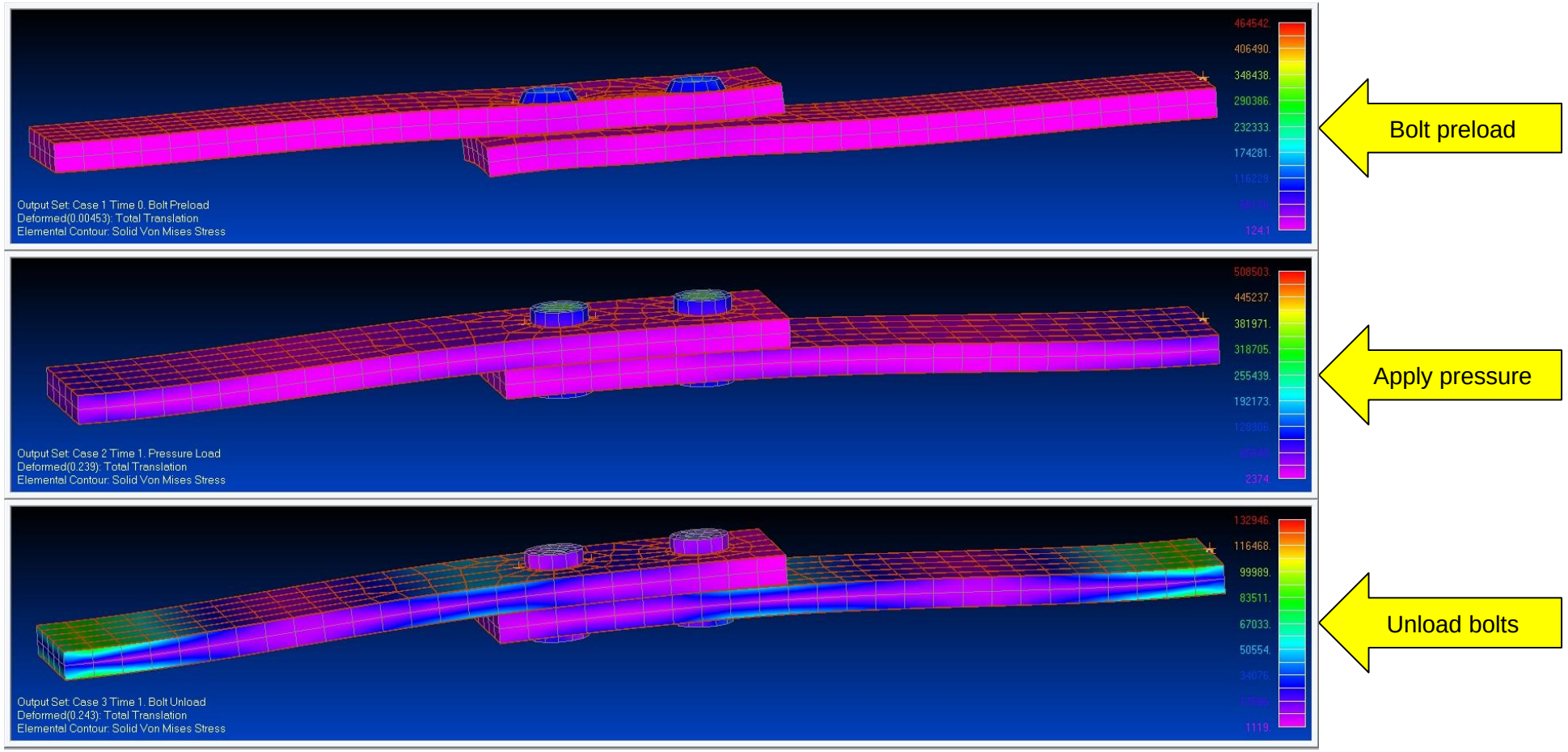
Ingenuity for life

NX Nastran SOL 401 – bolt preload example



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Solver Support
NX Nastran Multi-step Nonlinear

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SOL 401, NLSTEP, is a multi-step, structural solution which supports a combination of static (linear or nonlinear), modal (real eigenvalue), bolt preload, and buckling subcases

- Geometric nonlinearity – large displacement and rotation
- Geometric stiffening due to initial displacements and stresses
- Follower forces
- Large deformation effect resulting in large strains has not been implemented
- Material nonlinearity
- Plasticity
- Creep
- Primary solution operations are time increments, iterations with convergence tests for acceptable equilibrium error, and stiffness matrix updates

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Solver Support
NX Nastran Multi-step Nonlinear

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SOL401 FEMAP support - elements

- 3D solid elements
- Axisymmetric
- Plane strain
- RBE2 and RBE3
- CQUADR/CTRIAR (CQUAD4/TRIA3 can still be used, but internally converted to CQUADR/CTRIAR
- Shell elements support OFFSETs
- CBAR/CBEAM – PBAR/PBARL/PBEAM/PBEAML all supported
- Beam end offsets are supported
- Geometric nonlinear – large displacement/large rotation
- Material nonlinearity not supported in BEAMS
- Beam distributed loads are follower forces
- CELAS1/PELAS
- CBUSH/PBUSH (no damping)
- Cohesive

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Solver Support
NX Nastran Multi-step Nonlinear

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SOL401 FEMAP Support – Materials

- Isotropic (MAT1)
- Orthotropic (MAT8, MAT11)
- Anisotropic (MAT2, MAT9)
- Plasticity (MATS1)
- Creep (MATCRP)

SOL401 analysis setup

- SOL401 is multi-step
- Each case can optionally be dependent on the previous case or cases
- Nonlinear static
- Bolt preload
- Modal
- Buckling

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Solver Support
NX Nastran Multi-step Nonlinear

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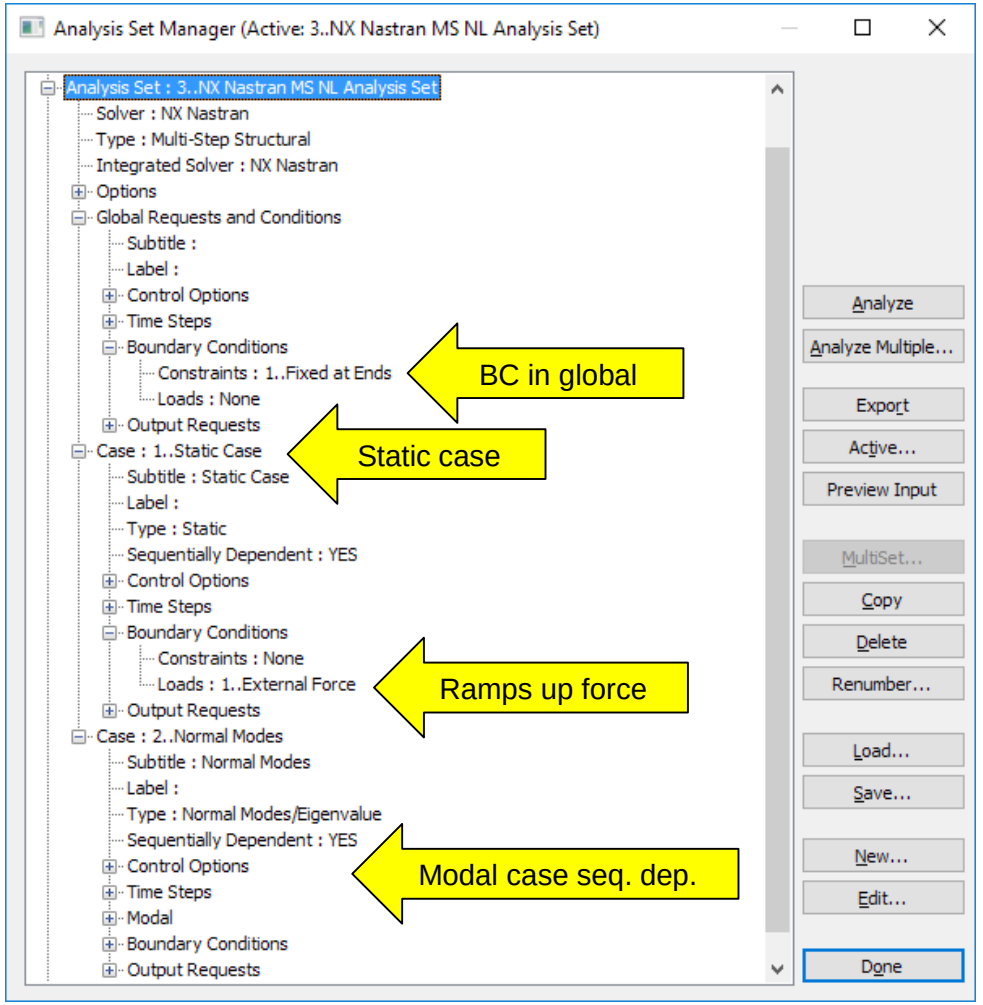
SOL401 FEMAP support – multi-step control

- Setup in the FEMAP Analysis Set Manager
- Time Step and Solution Control in each Subcase
- Example
  - Case 1 – ramps the structure up through a nonlinear static case
  - Case 2 – uses the stiffened results of case 1 and runs a modal solution



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Solver Support
NX Nastran Multi-step Nonlinear

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Ingenuity for life

SOL401 support – multi-step control

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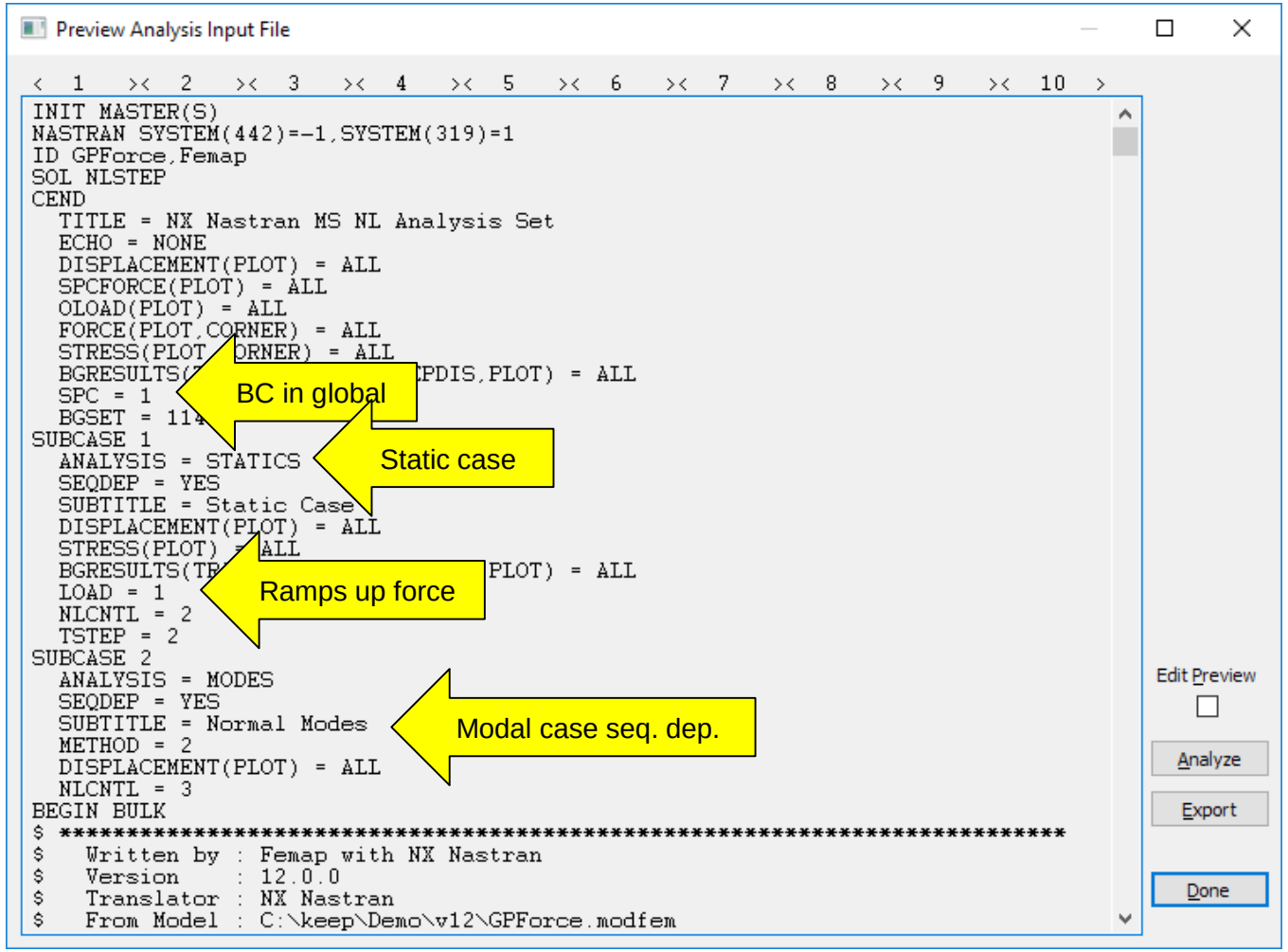

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Solver Support
NX Nastran Multi-step Nonlinear

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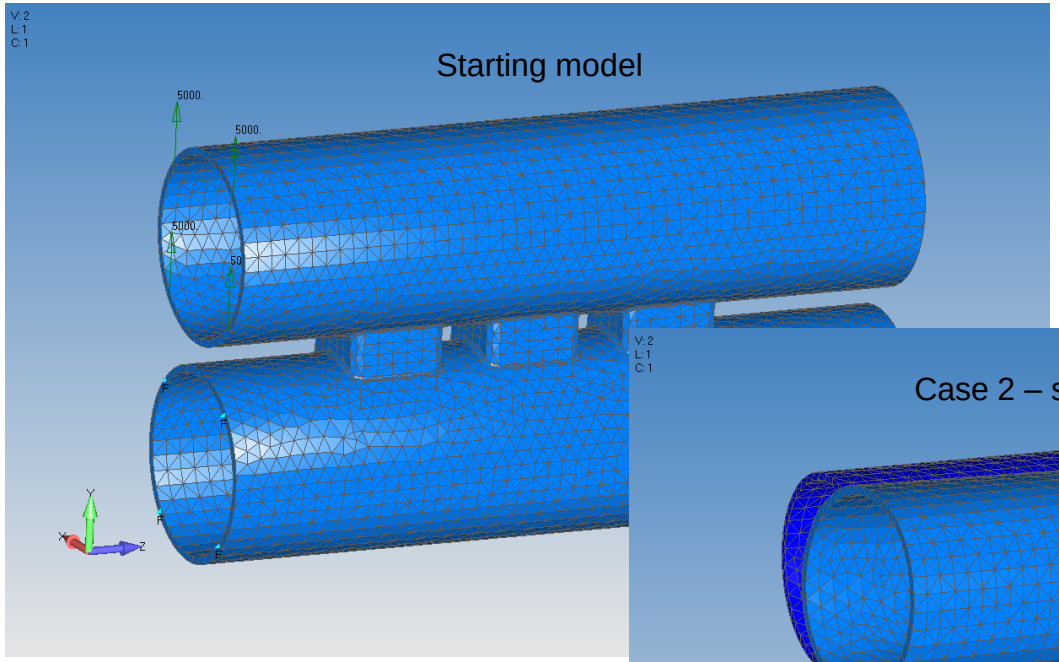

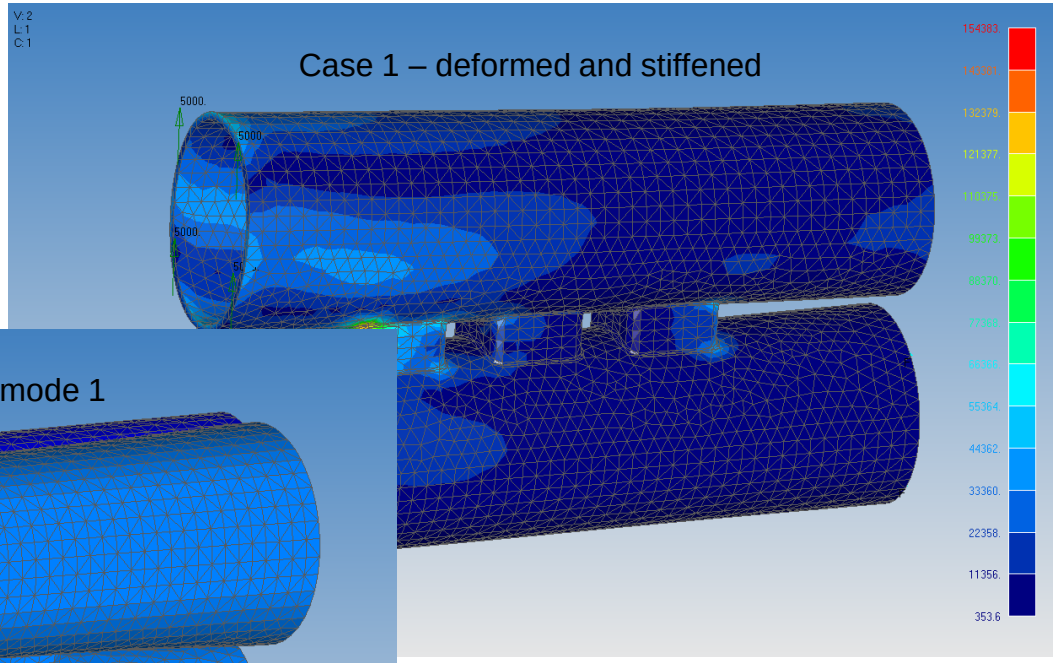

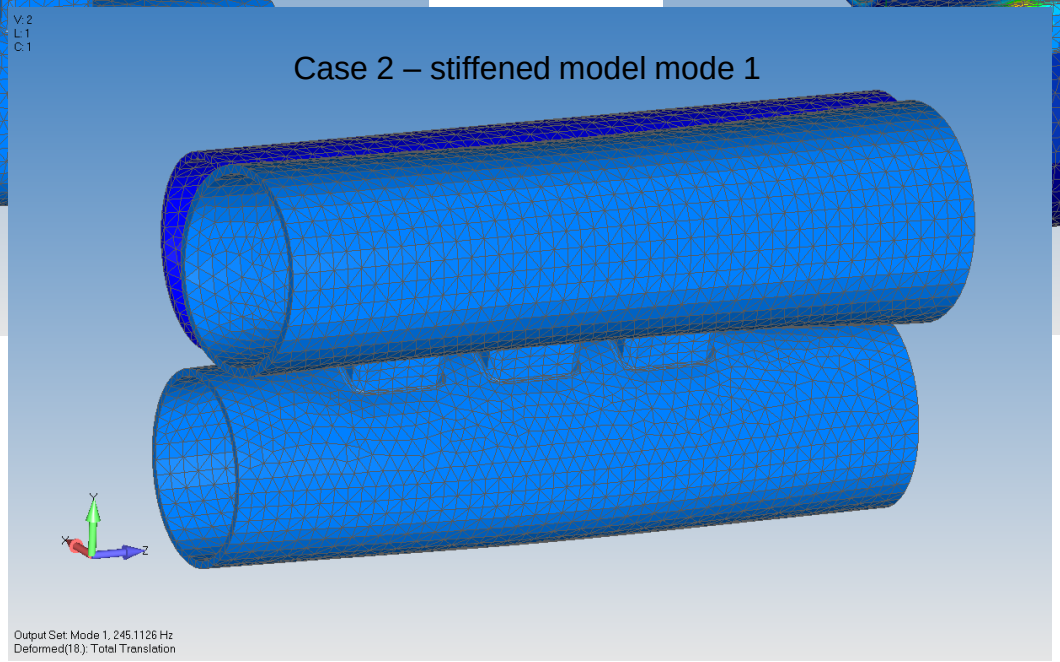

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Solver Support
NX Nastran Multi-step Nonlinear

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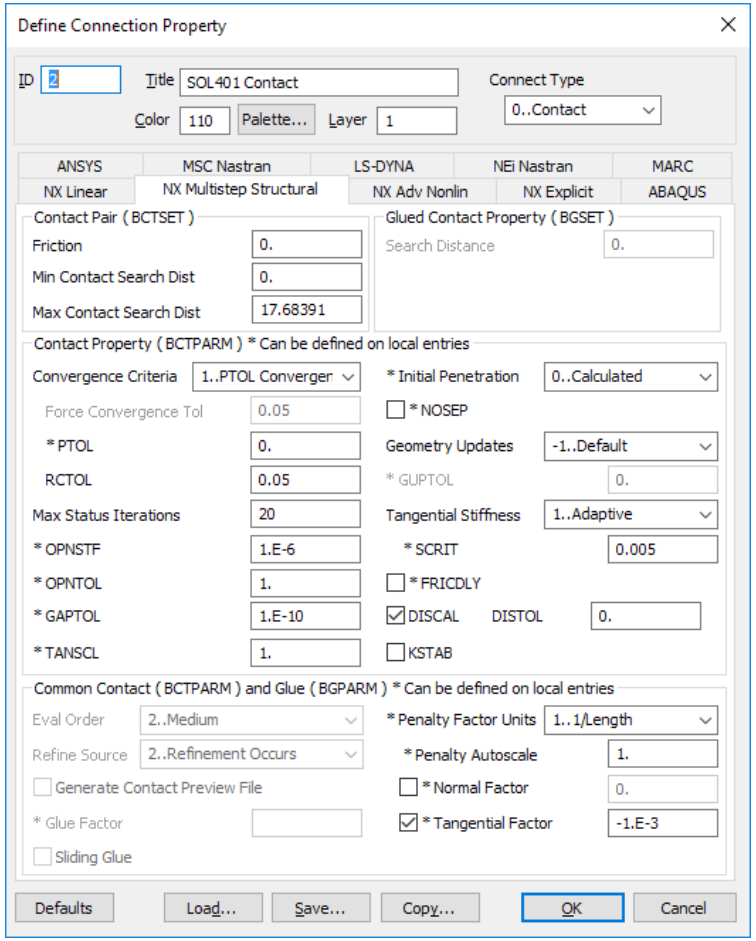
SOL401 support – contact

- Handled just like contact for SOL101, SOL601/701
- New tab for NX multi-step nonlinear



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Solver Support
NX Nastran Multi-step Nonlinear

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SOL 402, the multi-step nonlinear solution sequence combines the advantages of SOL 401 and SOL 601

- Large displacements, large rotation
- multi-step
- Similar element support as SOL401
  - Solid laminates
  - Shell laminates
- More nonlinear material laws
- Linear elastic
- Plasticity
- Hyperelasticity
- Creep
- Composite
- Damage interface (cohesive zones)
- Based on SAMCEF technology
- Advanced composite failure models

SOL 402 support in FEMAP will be exactly like SOL 401, including these additional features:

- SOL 402 is highly compatible with SOL 401 input files
- SOL 402 creates standard Nastran .OP2 files for results processing

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Solver Support
NX Nastran Design and Topology Optimization

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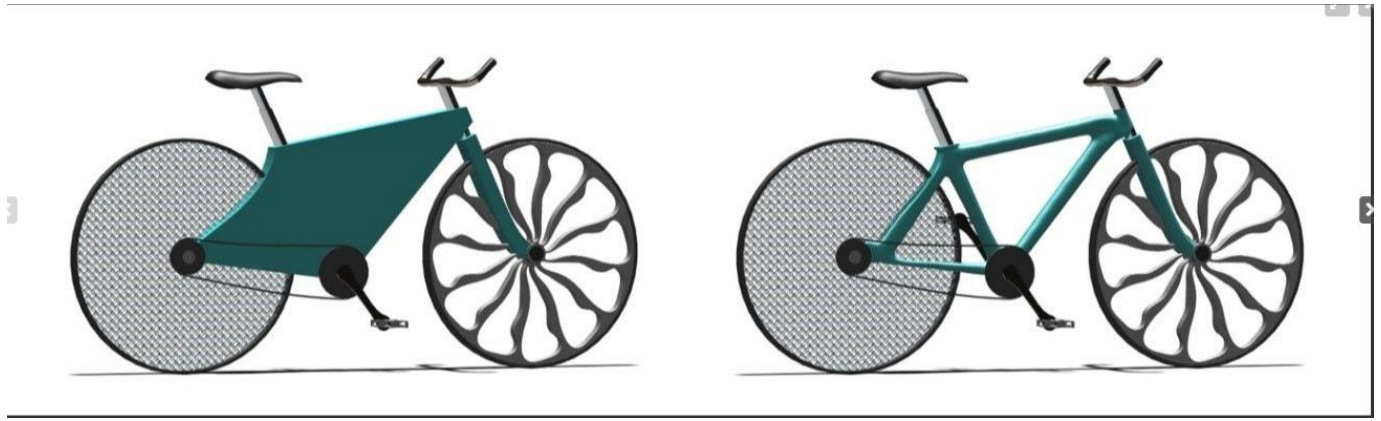
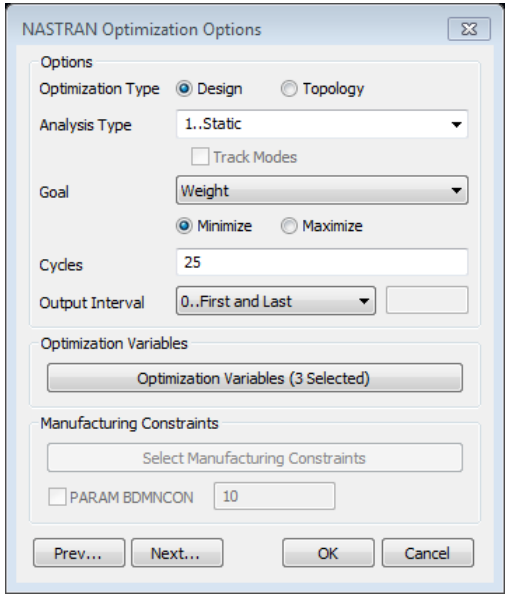
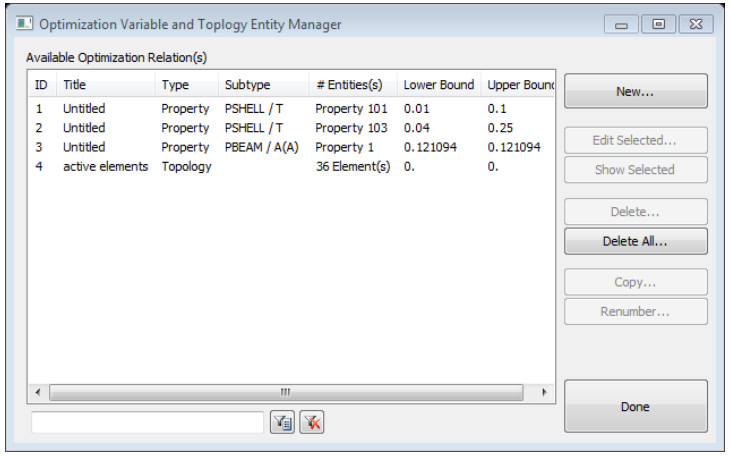
- Support for SOL 200 design and topology optimization
  - Updated work flow for traditional SOL 200 optimization
  - Added support for topology optimization







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Solver Support
NX Nastran Design Optimization

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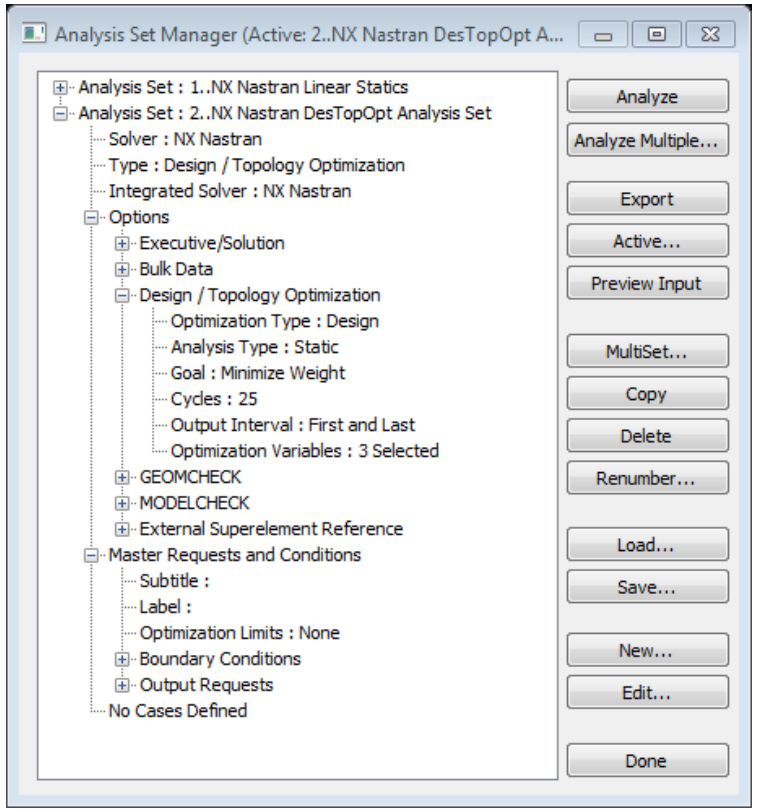
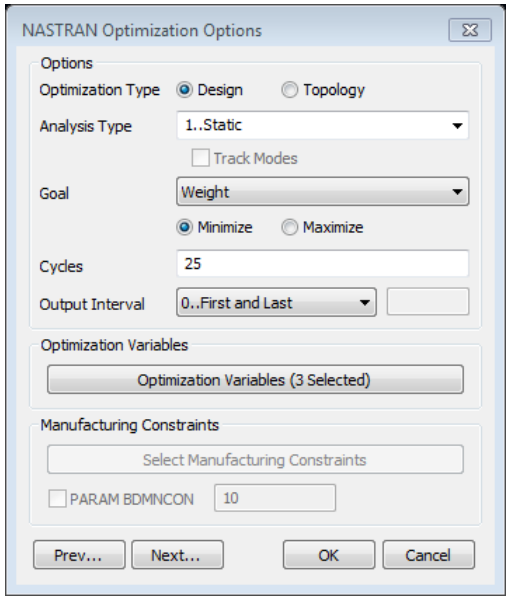
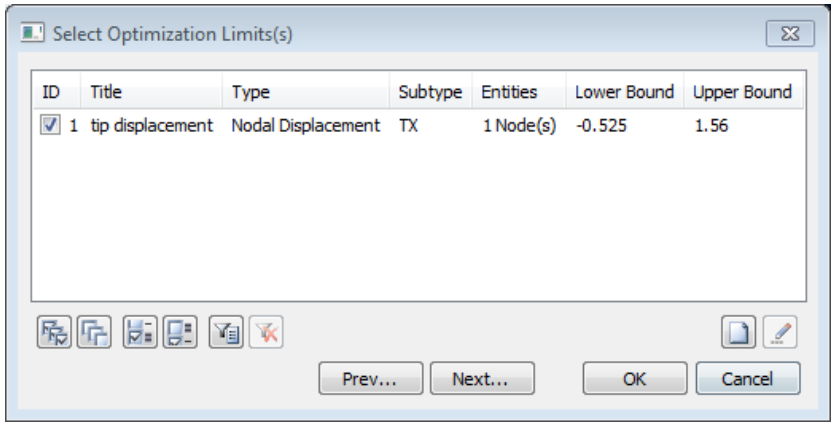
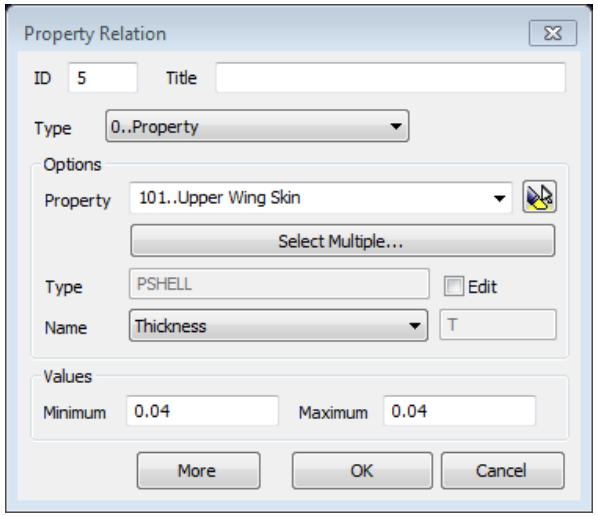
New optimization interface with expanded support for NX Nastran design optimization









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Solver Support
NX Nastran Design Optimization

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Ingenuity for life

New features
- Interface redesigned for ease of use and enhanced compatibility with NX Nastran capabilities
- Better integration with Analysis Manager allows for multiple design studies within a single model

Expanded support for NX Nastran solution sequences
- Existing: linear static, normal modes, linear buckling
- New: frequency response, modal transient, steady aeroelastic
- Now supports different solution sequences for each subcase

Greatly enhanced support for design variables and relationships
- New support for material relationships (E, nu, rho, etc)
- Expanded list of supported property relationships, including user-defined relationships
- Discrete design variable values can now be specified
- Multiple independent DESVAR cards for complex design relationships

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Solver Support
NX Nastran Design Optimization

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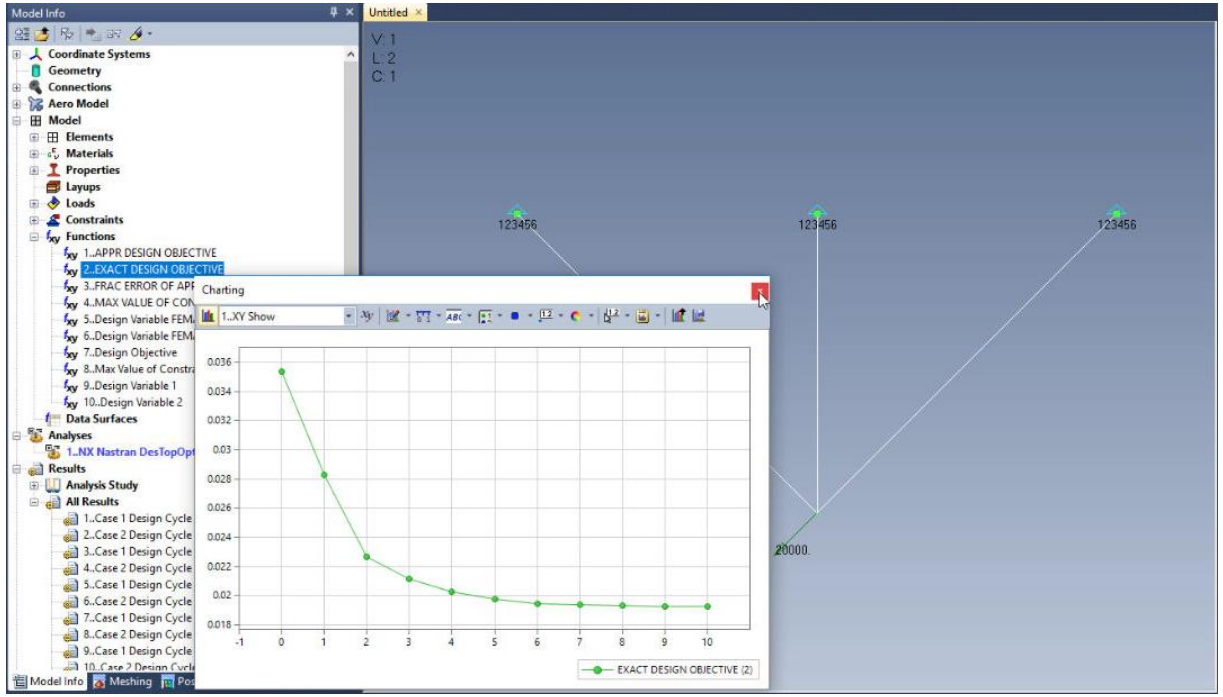
Expanded list of supported design responses
- Supported element types now includes beams and solid elements
- User defined responses

Constraints are now decoupled from responses
- Allows for trade studies where constraints vary between subcases
- Disable / enable constraints within the Analysis Manager



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Solver Support
NX Nastran Topology Optimization

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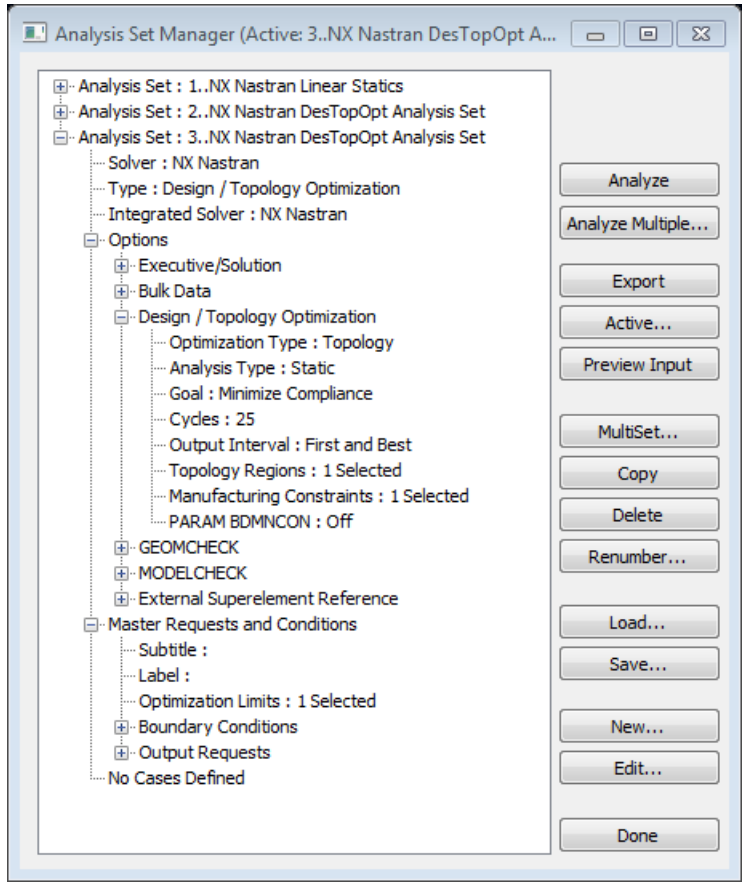
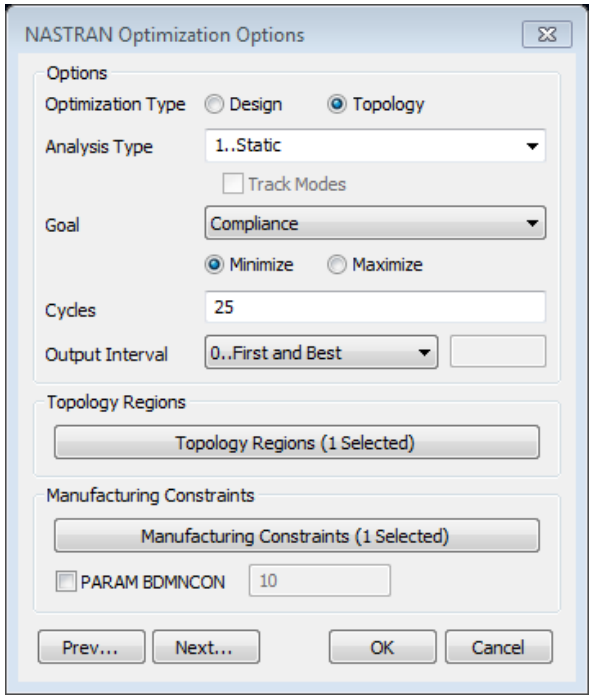
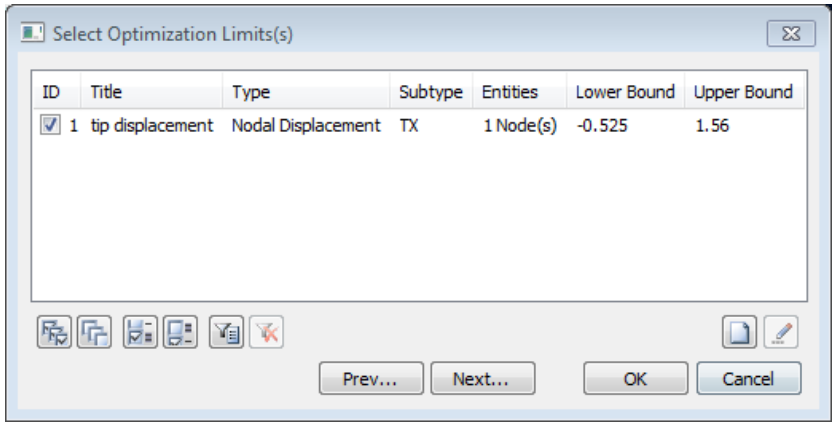
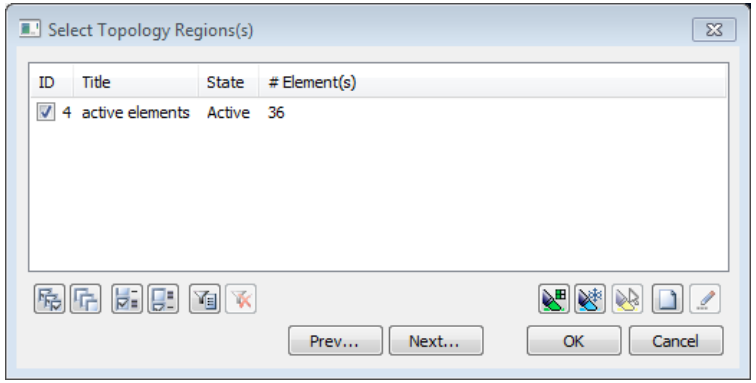
New optimization interface with support for NX Nastran Topology Optimization









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Solver Support
NX Nastran Topology Optimization

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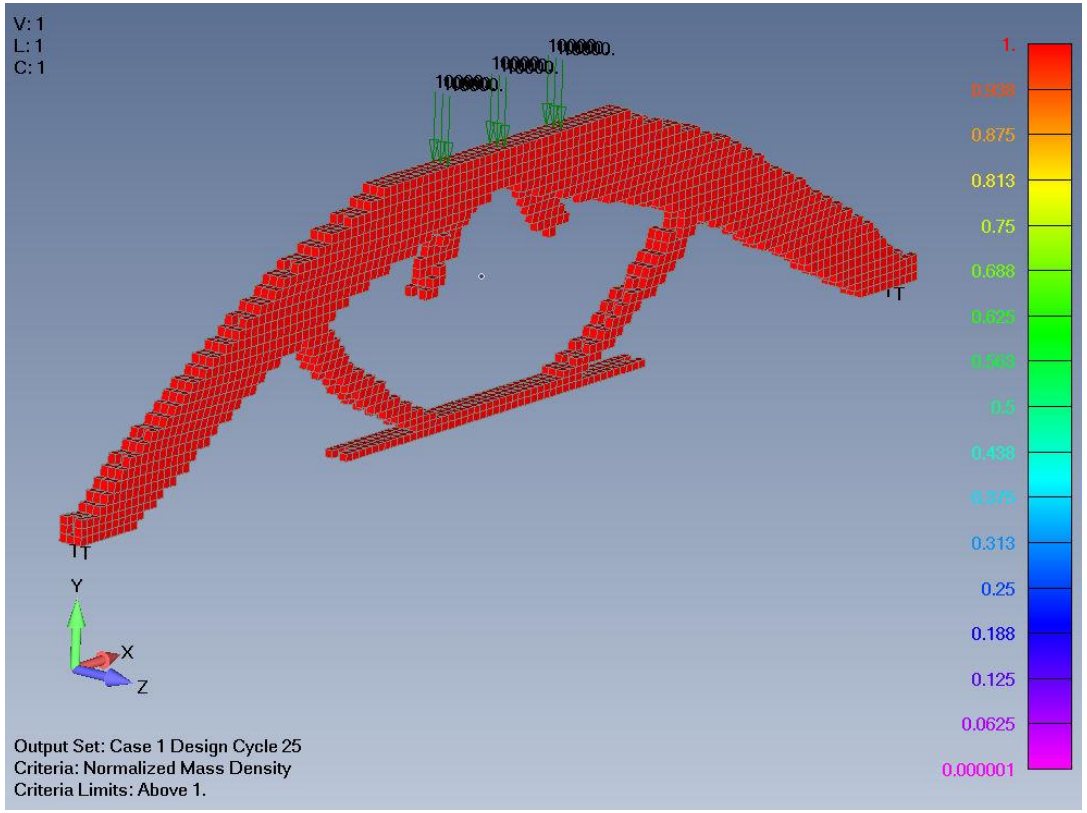
Shared interface with Design Optimization
- Adapt the same workflow
- Reuse optimization constraints and responses between both design and topology optimization

Compatible Solution Sequences
- Statics
- Normal modes
- Modal frequency
- Modal transient
- Linear buckling

Supported Element Types
- 2D: CTRIA3, CTRIA6, CQUAD4, CQUAD8, CQUADR
- 3D: CHEXA, CPENTA, CTETRA

Support for manufacturing constraints



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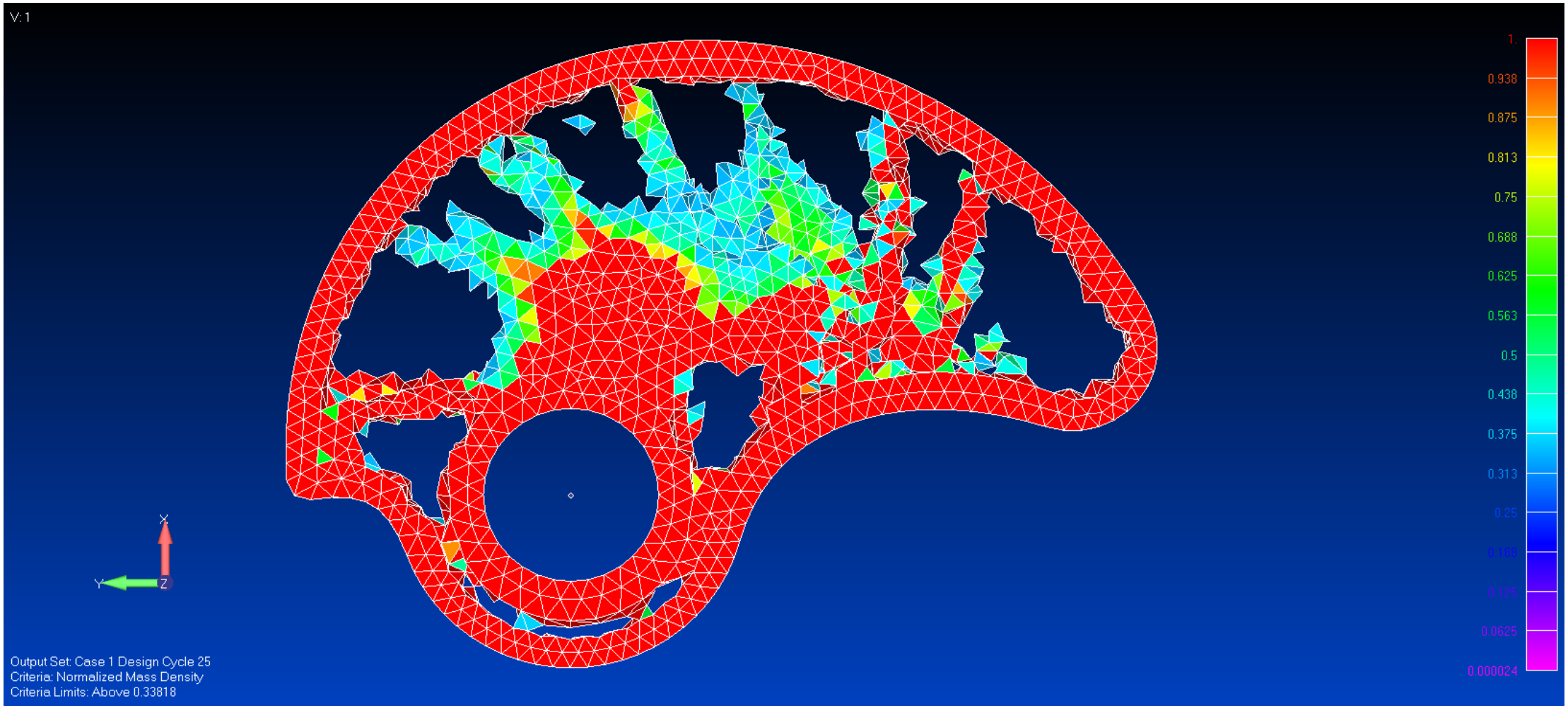
Original model 33,046 nodes, 20,595 elements



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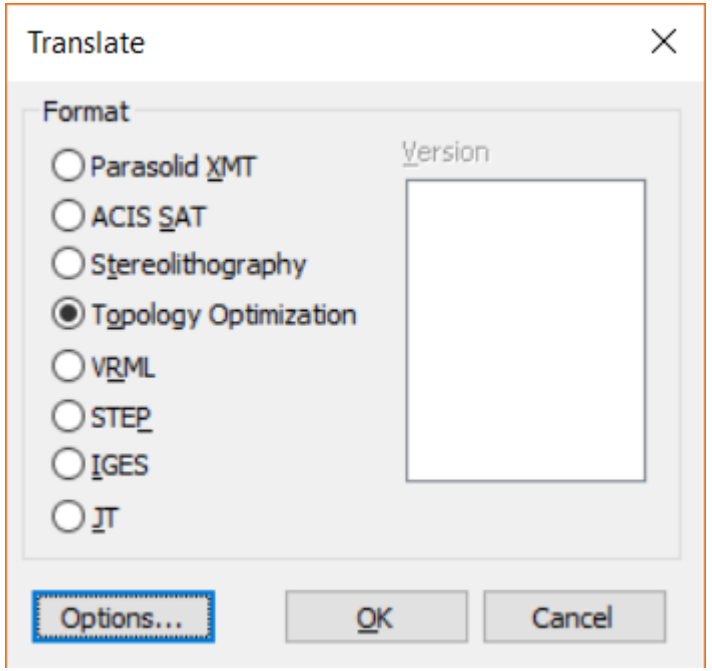
Added option to File – Export – Geometry command to export STL file based on Criteria Plot of Normalized Mass Density

- Clicking Options button opens dialog similar to the new View – Advanced Post – Dynamic Criteria command and slider bar can be used to export the optimized topology at the desired level



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Solver Support
ANSYS Enhancements

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Seamless model input data transfer between FEMAP and ANSYS structural/mechanical analysis

- 40 out of 42 FEMAP elements and their properties are mapped to modern ANSYS elements
- 30 FEMAP materials are mapped to modern ANSYS material models – constant or tabular
- Complete support of different boundary and loading definitions – nodal, elemental, surface or volume, constant or tabular
- FEMAP Connection entities are mapped to modern ANSYS contact definitions
- Data defaults are provided to allow minimal user intervention, while also allowing users to change the defaults, when required
- Error or warning messages are printed – the translator works like a compiler to let the user know where the input errors are in either FEMAP model or ANSYS input file

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Solver Support
ANSYS Enhancements

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Equivalence of physical models are maintained via bi-directional data transfer to make sure close computational results are obtained in NX Nastran and ANSYS

Enhanced code architecture allows easy future extensions, including additional ANSYS material models and element properties, some of which may not currently exist in FEMAP interface

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Solver Support
ANSYS Enhancements

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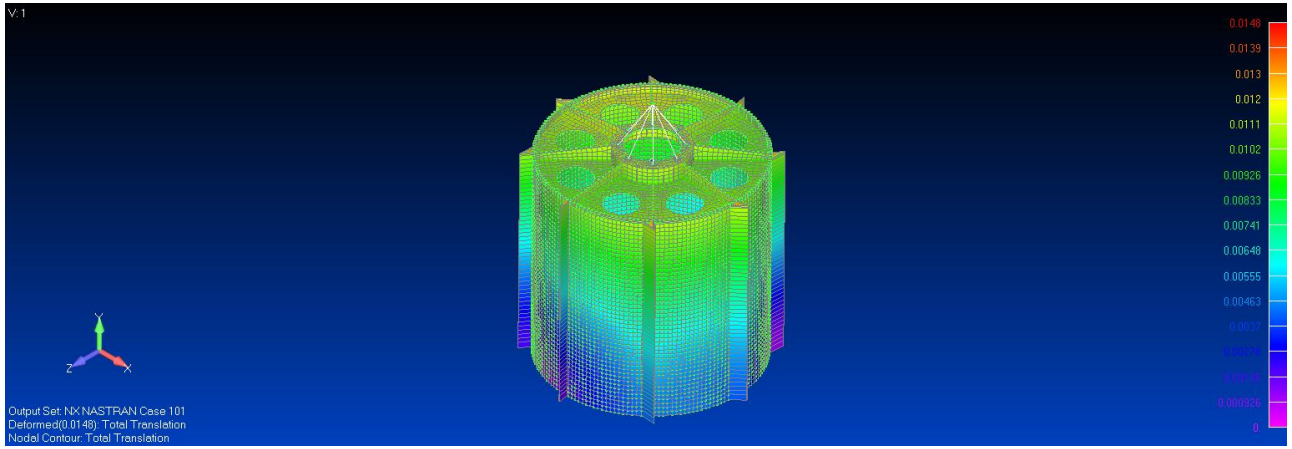
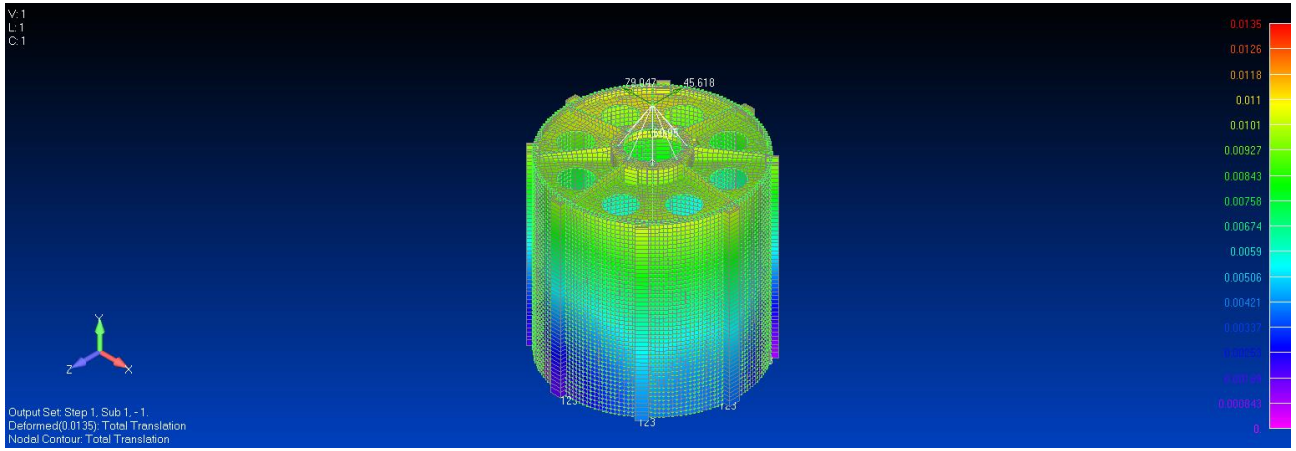
NX Nastran



ANSYS



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Miscellaneous
FEMAP Product Excellence Program

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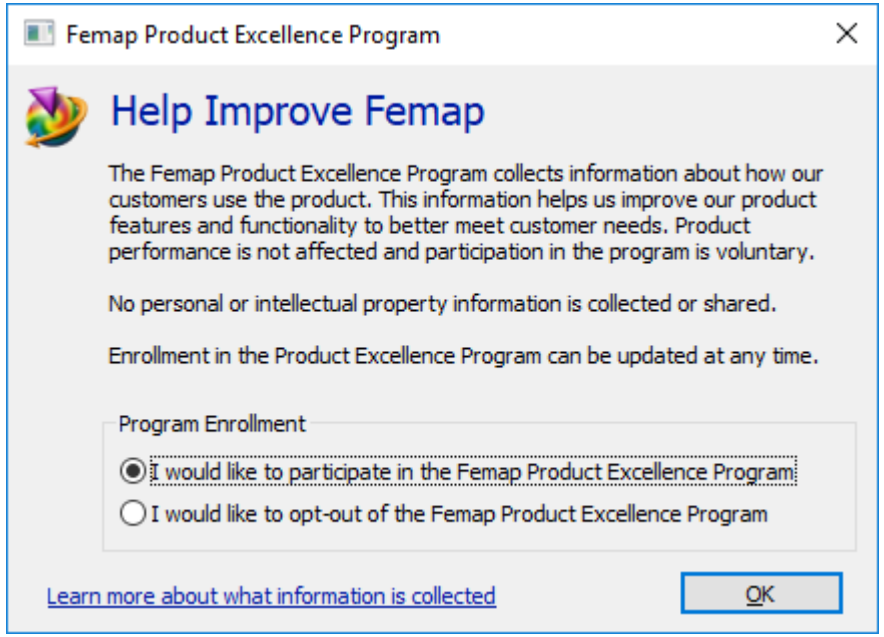
FEMAP has an optional program to collect telemetry data in order to improve the user experience

- This program is designed to give us additional insight into how FEMAP users use the product
  - Without telemetry data, we only have subjective and qualitative insights into how FEMAP is used
  - Telemetry data provides quantitative usage metrics
- Development actions will be directly influenced by usage data
- FEMAP performance is not affected
- Data is encrypted being to the Siemens cloud
- Participation in the program is optional
  - Your voice will not be heard if you choose not to participate



NO DATA IS COLLECTED THAT IS:

- Personally identifiable
- Intellectual property (e.g. NO model data)

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Miscellaneous
FEMAP Product Excellence Program

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What data is collected	How we plan to use that data
Machine information (CPU, GPU, RAM, OS version, etc)	By having a better understanding of the types of machines used in the field, we can better ensure FEMAP is optimized for the majority of hardware configurations
Program information (version / license type)	Version usage and license type (no serial numbers) gives us insight into how FEMAP is deployed, including adoption rate. This can impact release timing
User preferences	We aim to improve the FEMAP out-of-box experience by knowing which preferences are always set. Do we need to change defaults? ***Note: Preference data containing any directory or filename information is not collected***
Command history	This data gives us insights into which are our most-used and least-used commands, as well as which ones are undone most frequently. This can help us allocate development resources
Pane and Toolbox usage	How are panes and toolboxes used, and how are they used when duplicate menu functionality exists. Do we need better education programs?

In future releases of FEMAP we will disclose the direct impact usage metrics has on development and how it has been used to improve the user experience

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FEMAP 12.0
Q and A

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