Webinar:
Organizing Your Models with Femap Groups

Laura Hoffman, ATA Engineering

March 18, 2022

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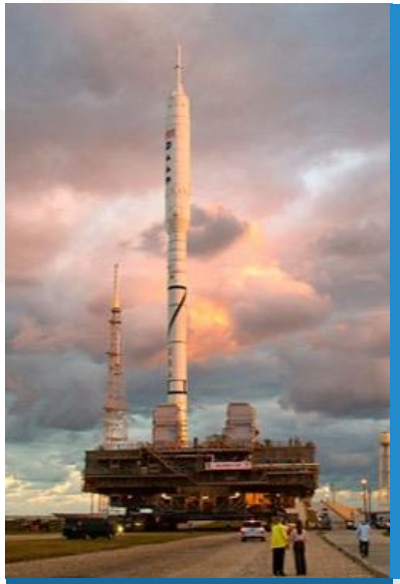

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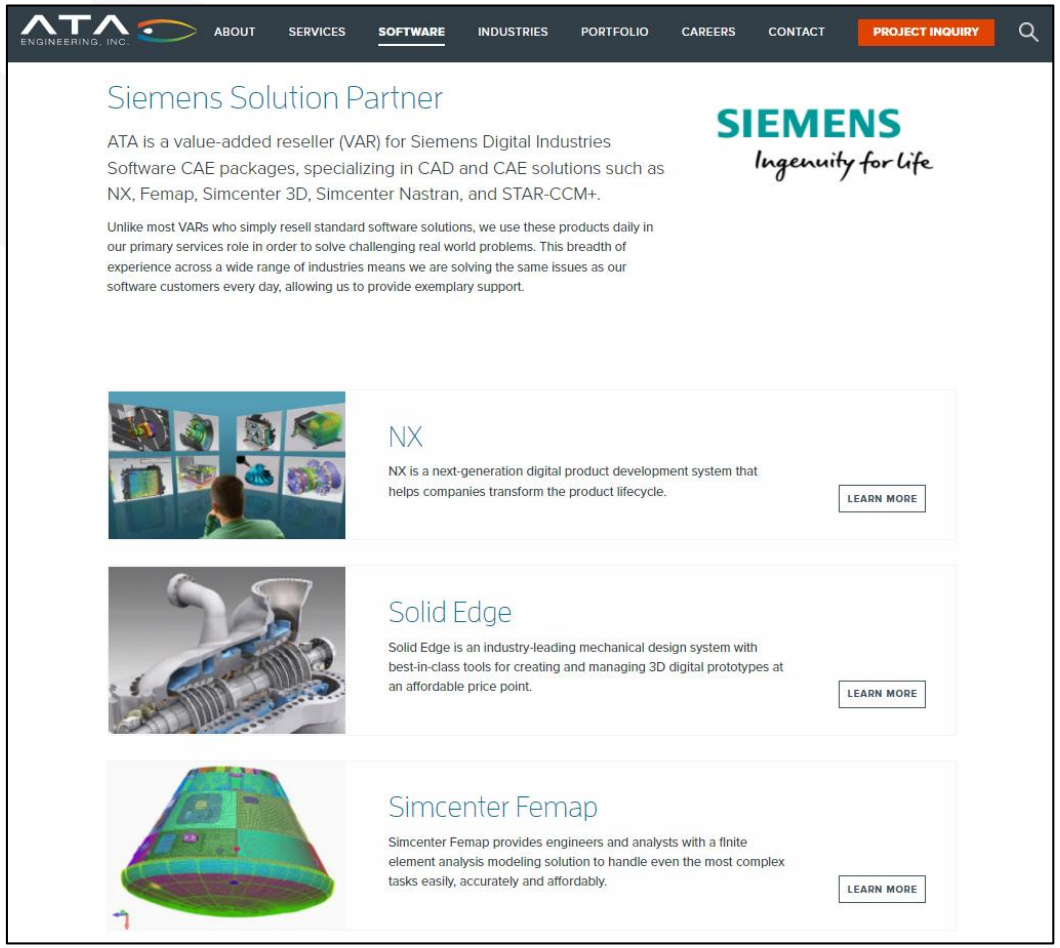

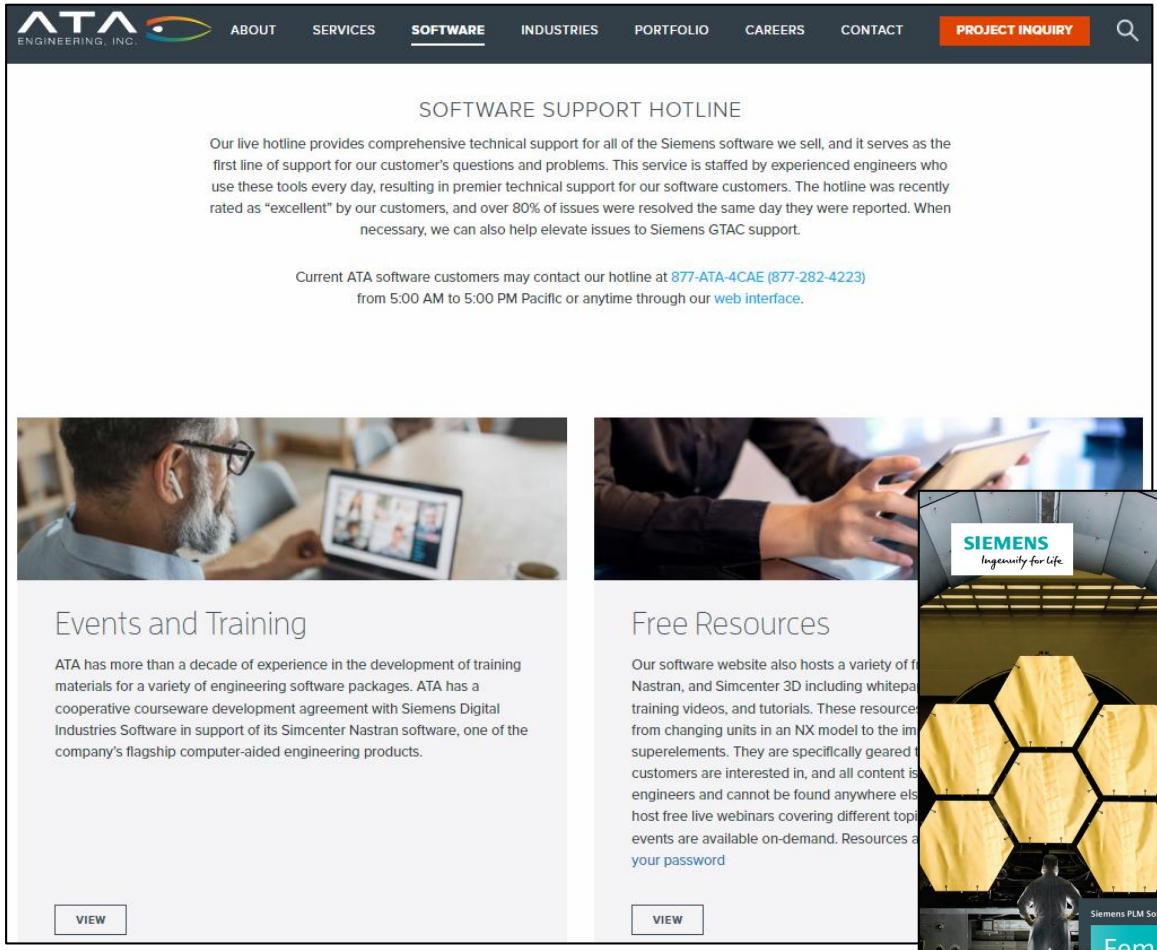

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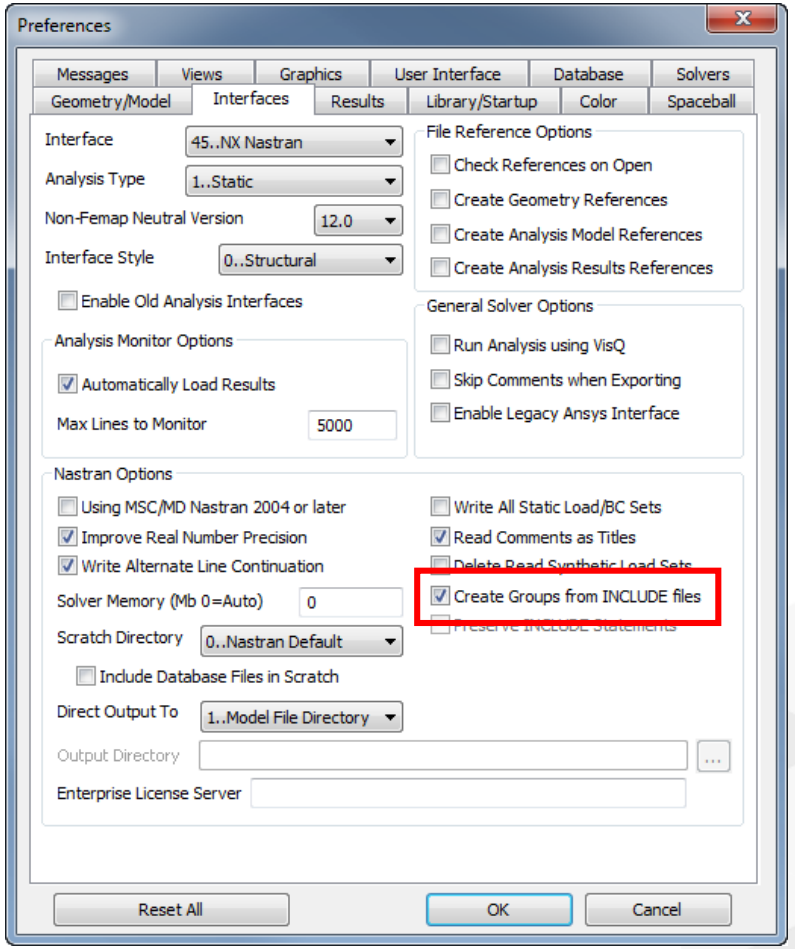
Tips to Create Groups in Femap

- Femap is a great tool for making groups
  - View finite element models in pieces
  - Look for specific results
  - Documentation
- This presentation is a demo to highlight:
  - Grouping basics
  - Boolean operations
  - APIs for creating/editing/using groups
- This presentation will not cover: layers
- This demo assumes you have some basic knowledge of how to use Femap

Femap Group Basics

- What can be in a group?
  - FEM entities (node, element, csys)
  - Glue/contact regions, properties
  - Loads, Constraints
  - Geometry
- When Importing a Model, Create Groups Based on INCLUDE files
  - Under File -> Preferences -> Interfaces
- Group by ID or rules
  - Nodes with ID 201-396
  - "All elements with property 100"
- An entity can be in more than one group
- Viewing
  - Active
  - Multiple (show/hide)



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Femap Groups Pair well with Nastran Debug

- Helps with debugging Nastran errors
  - Elements with geometry issues
  - Meshing errors: e.g. node attached to multiple RBE legs
- Add these elements/nodes to a group by ID to view

```
    TOLERANCE LIMITS ARE:  TET_AR =   100.00, TET_EPLR =   0.50, TET_EPIA =  30.00, TET_DETJ =   0.00, TET_DETG =   0.00
                           (xxxx = LIMIT VIOLATED)
                        LONGEST    SHORTEST          ASPECT      EDGE POINT      EDGE POINT   MIN. JACOBIAN   MIN. DET(JAC)
ELEMENT TYPE    ID         EDGE      HEIGHT           RATIO    LENGTH RATIO  INCLUDED ANGLE     DETERMINANT       AT VERTEX
   TETRA     1503764       0.04        0.02        2.12            0.72          42.33 xxxx       0.00            0.00
   TETRA     1503820       0.05        0.02        2.30            0.98          44.53 xxxx       0.00            0.00
   TETRA     1504005       0.03        0.02        1.60            0.62          48.28 xxxx       0.00            0.00
   TETRA     1504547       0.04        0.01        4.14            1.00          30.01 xxxx       0.00            0.00
   TETRA     1504687       0.04        0.01        4.78            1.00          30.01 xxxx       0.00            0.00
   TETRA     1505009       0.06        0.02        2.88            0.97          35.04 xxxx       0.00            0.00
   TETRA     1510992       0.04        0.02        2.19            0.48 xxxx      4.16            0.00            0.00
   TETRA     1511899       0.04        0.02        2.14            0.36 xxxx     31.21 xxxx       0.00            0.00
   TETRA     1511999       0.04        0.02        2.19            0.37 xxxx     24.77            0.00            0.00
   TETRA     1512094       0.04        0.02        1.97            0.48 xxxx      3.00            0.00            0.00
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*** USER FATAL MESSAGE 5289 (WRGMTS)
    DEPENDENT DEGREE-OF-FREEDOM GRID ID =     7000001 AND COMPONENT = 1 APPEARS ON MORE THAN ONE MPC OR RIGID ELEMENT ENTRY.
    User information:
    An MPC entry or rigid element entry lists the same dependent grid point more than once.
```
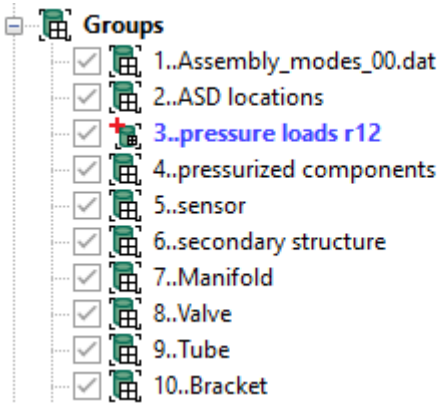

Demo

Group Basics

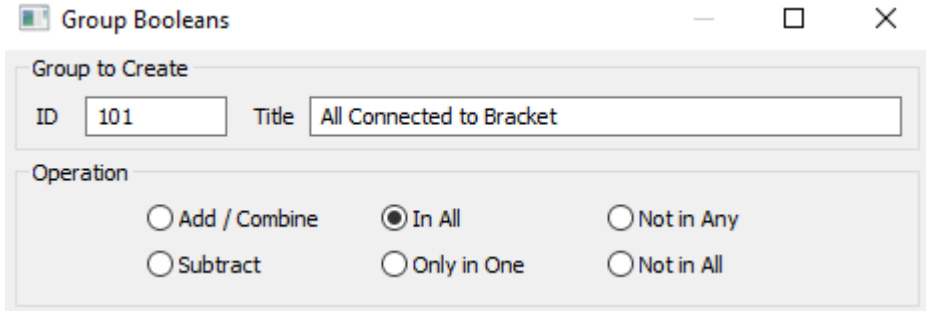
- Create a new group
- Rename a group
- Add items to the group
  - Several options to add things
  - Note that you can also pick by material, color, etc.
  - Use highlight tool to see what has been selected
- Copy or combine groups
- Displaying groups

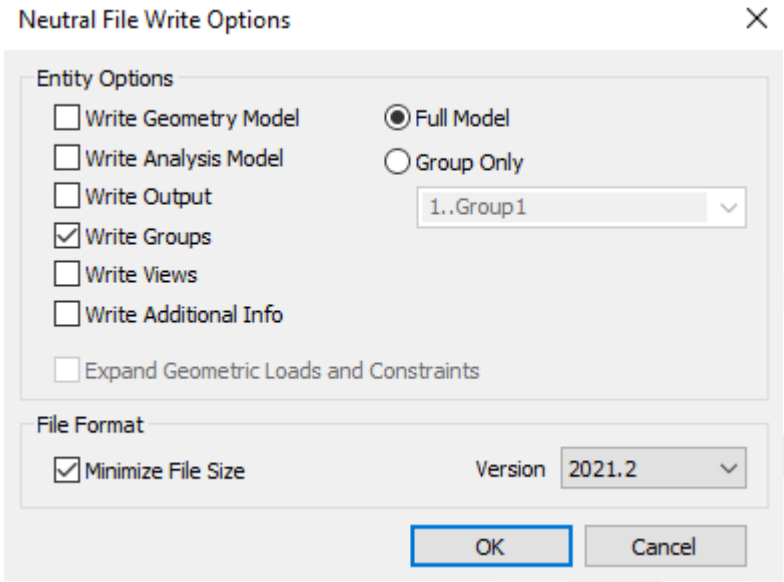


Demo

Group, Advanced Use

- Automatic Add
  - To chosen group
  - To active group
- Evaluate
  - Satisfy group rules
- Booleans
  - Add
  - In All
  - Subtract
- List of all the elements in a group
  - Back and forth from Excel
- Neutral files:
  - Use them to save groups and use them for other models
  - File -> Export -> Femap Neutral, deselect everything except Groups
  - File -> Import -> Femap Neutral





Demo

Femap APIs

- Element Group Expand
  - Create group of RBE2s and/or RBE3s and their adjacent elements
- Find Node/Element Groups
- Exports groups to Nastran files
  - Removes unnecessary data so they can be used as INCLUDE files
- Writes element group(s) out to Nastran Set(s)
- Documentation
  - Takes node/element information of user-selected group(s) and prints it/them to Excel (min/max, #, mass, CG{x,y,z}, length, area, volume

Contact Us

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