

# *Introduction to LS-PrePost (workshops)*

*Quanqing Yan, Philip Ho, LSTC*

*2018*

# Table of Contents

SECTION	WORKSHOPS
Overview	-
General Operations	Workshop 1
Mesh Generation	Workshop 2
Pre-Processing	Workshop 3-4-5
Post-Processing	Workshop 6

# *Overview*

# About LS-PrePost

- LS-PrePost is an advanced pre and post-processor designed specifically for LS-DYNA
- LS-PrePost is developed for Windows and Linux
- LS-PrePost is ***Free***
- Core Functionality
  - Full support of LS-DYNA keyword files
  - Full support of LS-DYNA results files
  - Robust handling of geometry data (including CAD engine)
  - Pre-processing (meshing, model clean-up, entity creation)
  - Post-processing (animation, fringe plotting, curve plotting)

# Online Resources

- Official Website
  - <http://www.lstc.com/lspg>
- User Group
  - <http://groups.google.com/group/lspg>
- Latest Release Version:
  - <http://ftp.lstc.com/anonymous/outgoing/lspg/4.5/>
  - <ftp://ftp.lstc.com/outgoing/lspg/4.5/>
- Beta Version:
  - <http://ftp.lstc.com/anonymous/outgoing/lspg/dev>
- Training notes:
  - <ftp://ftp.lstc.com/outgoing/qyan/Class>

# ***Workshop 1***

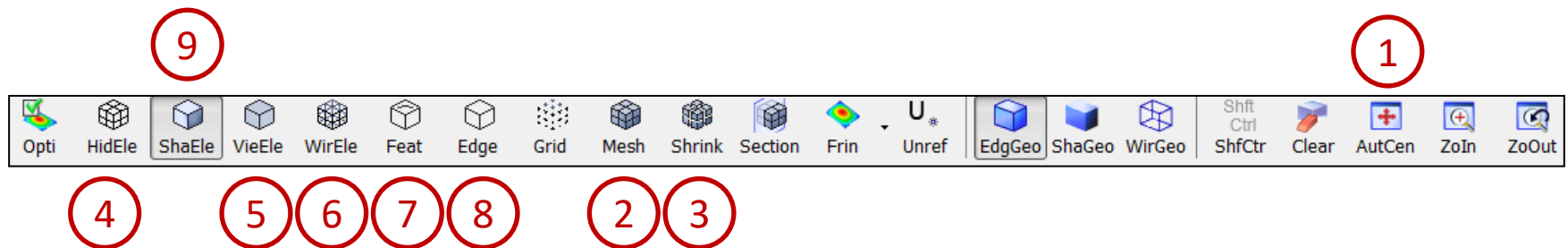
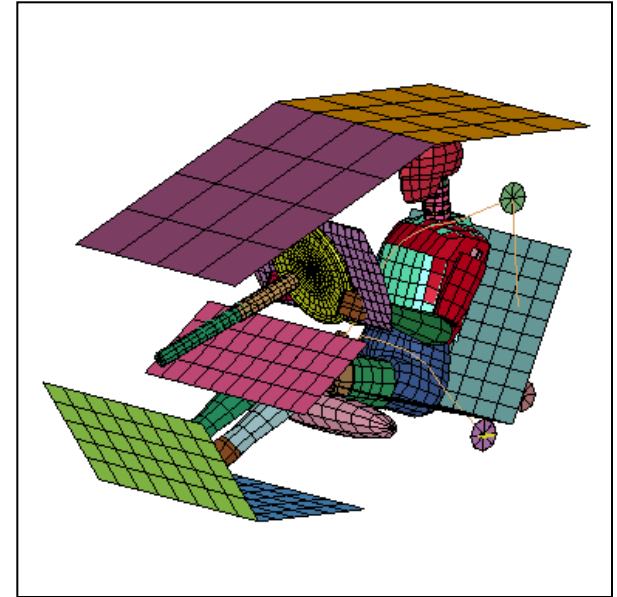
## ***General Operations***

- ❖ Parts on/off
- ❖ Render buttons (bottom toolbar)
- ❖ Group, appearance and view
- ❖ Identify and find
- ❖ Element blank(mask)
- ❖ Part color

# Workshop 1

Load and view an LS-DYNA Keyword file...

- Launch a new session of LS-PrePost
- File > Open > LS-DYNA Keyword File  
(select /workshop1/belted.k)
- Use Shift + Left Click to rotate the model
- Click render buttons **1** ---- **9**



# Workshop 1 (continued...)

Use the part on/off interface...

- Go to **Model** → **SelfPart** (“Assembly and Select Part”) and select individual parts from the list
- Use Ctrl + Left Click to select multiple parts
- Click **All** to display all parts
- Toggle **Beam** / **Shell** / **Solid** / **Disc** / **Sbelt**
- Click **SortBy** button and turn on/off some check boxes in the setting columns in the Part Sort dialog
- Click the **MatTypeName** header to see the sorting effect
- Click **Done** in sort part

Part Sort

Sort Part

	MatId	MatName	MatTypeName	EosId	Hrglass	Elfor
1	1		006 VISCOELASTIC	0	0	
2	36		006 VISCOELASTIC	0	0	
3	86		009 NULL	0	0	
4	88		009 NULL	0	0	
5	2		020 RIGID	0	0	
6	3		020 RIGID	0	0	
7	4		020 RIGID	0	0	
8	5		020 RIGID	0	0	
9	6		020 RIGID	0	0	
10	7		020 RIGID	0	0	

Setting Column:

- ☒ Type
- ☒ PartId
- ☒ PartName
- ☒ SectionId
- ☒ SectionName
- ☒ MatId
- ☒ MatName
- ☒ MatTypeName

Assembly and Select Part

Assembly GPart Part

Md1

- ☒ Beam
- ☒ Shell
- ☒ Solid
- ☐ Tshell
- ☐ CNRB
- ☐ Mass
- ☒ Disc
- ☒ Sbelt
- ☐ Inerta
- ☐ Rsurf
- ☐ Sphnd
- ☐ Fluid(Ale)
- ☐ Nurbs
- ☐ DiscShpere
- ☐ MSMesh

InputOrder

- ☐ Selected
- ☐ List CNRBs

Select Type >>

All None Rev

Auto Apply Restore

Info SortBy

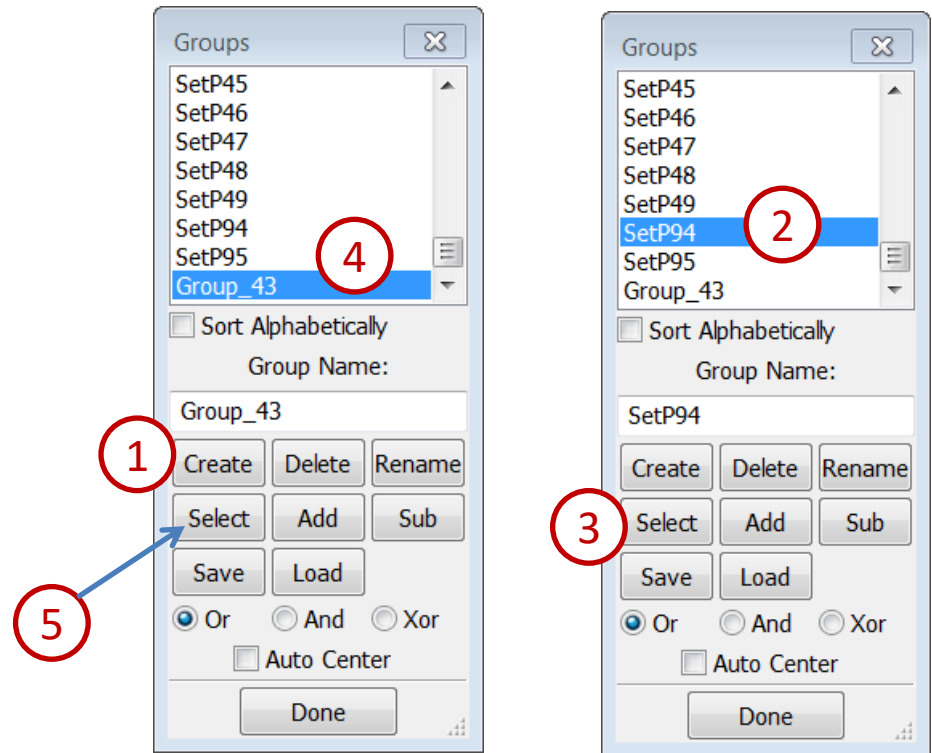
Done



# Workshop 1 (continued...)

Create a part group...

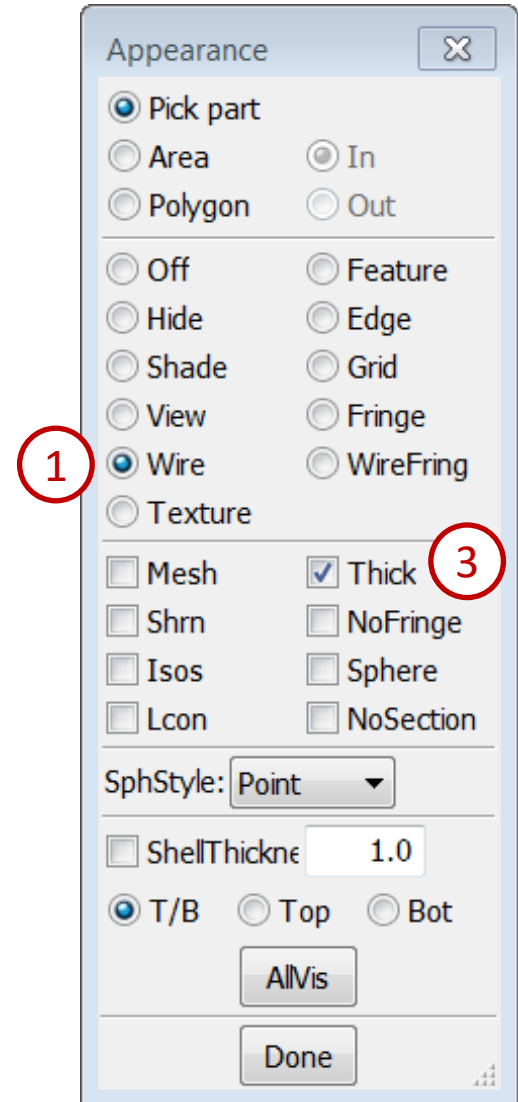
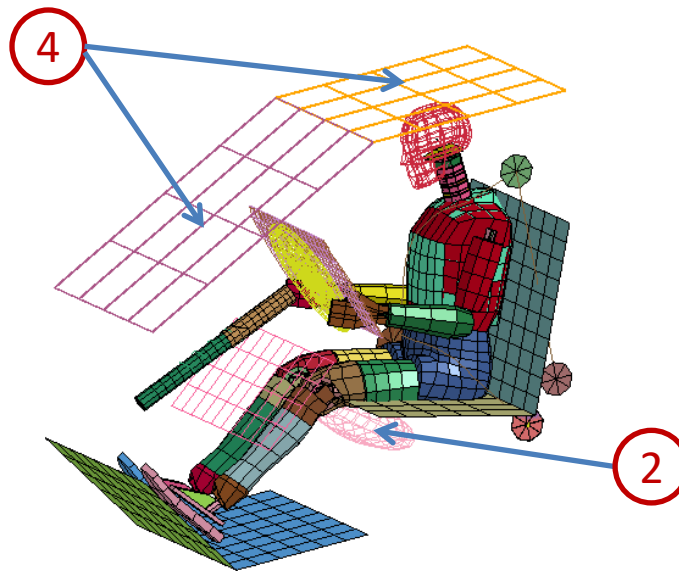
- Go to **Model** → **Groups**
- Click **Create** (all visible parts will be saved to “Group\_43”)
- Select “SetP94” from the list
- Click **Select**
- Select “Group\_43” from the list
- Click **Select**



# Workshop 1 (continued...)

Modify part appearance...

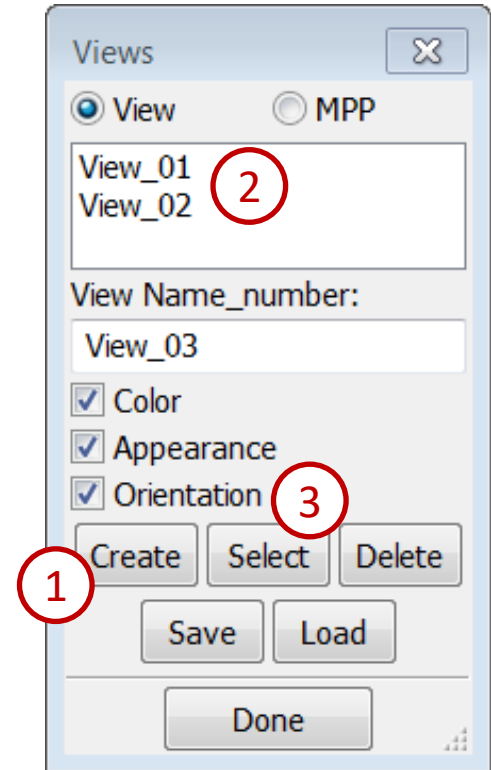
- Go to **Model** → **Appearance**
- Select any one of the drawing modes **Hide** / **Edge** / **View** / **Wire** in the Appearance interface
- Pick some parts in the model
- Toggle **Thick** in the Appearance interface and pick the roof parts
- Click the **Zoom In** render button (or hit Ctrl+Z) and zoom in on a shell part to verify that thickness is displayed



# Workshop 1 *(continued...)*


Create a view...

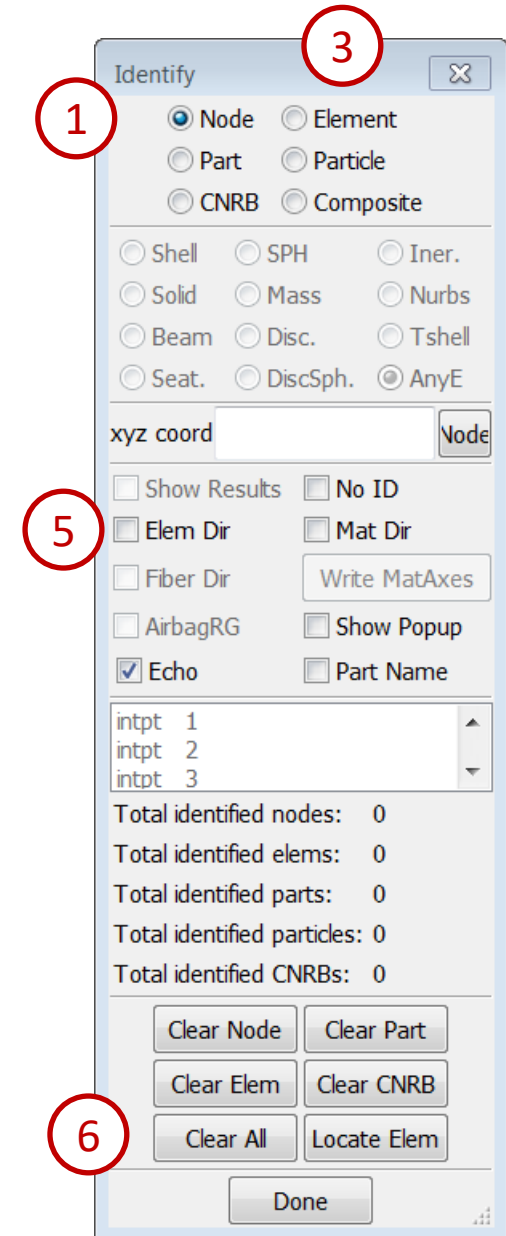
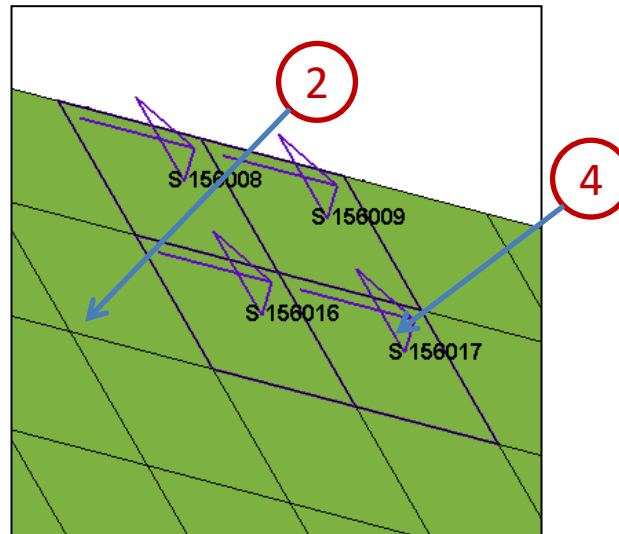
- Go to **Model** → **Views**
- Click **Create** (the current view will be saved as “View\_01”)
- Rotate the model and click **Create** again (saved as “View\_02”)
- Select “View\_01” from the list
- Click **Select**
- Select “View\_02” from the list
- Click **Select**



# Workshop 1 (continued...)

Identify nodes and elements...

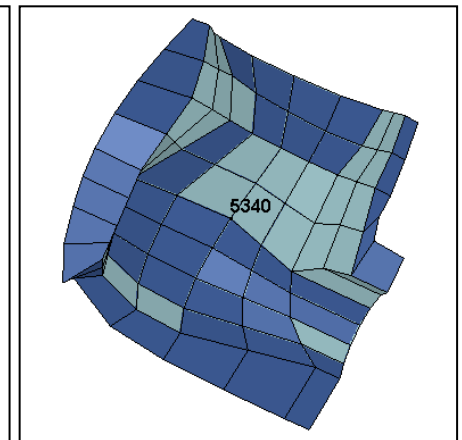
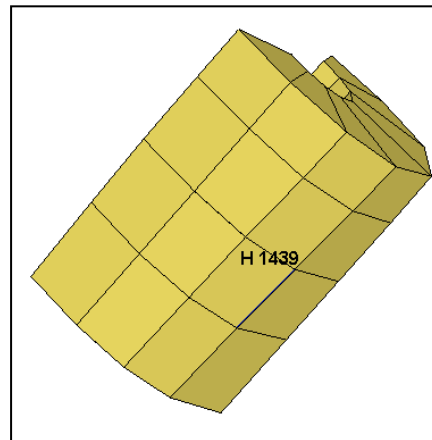
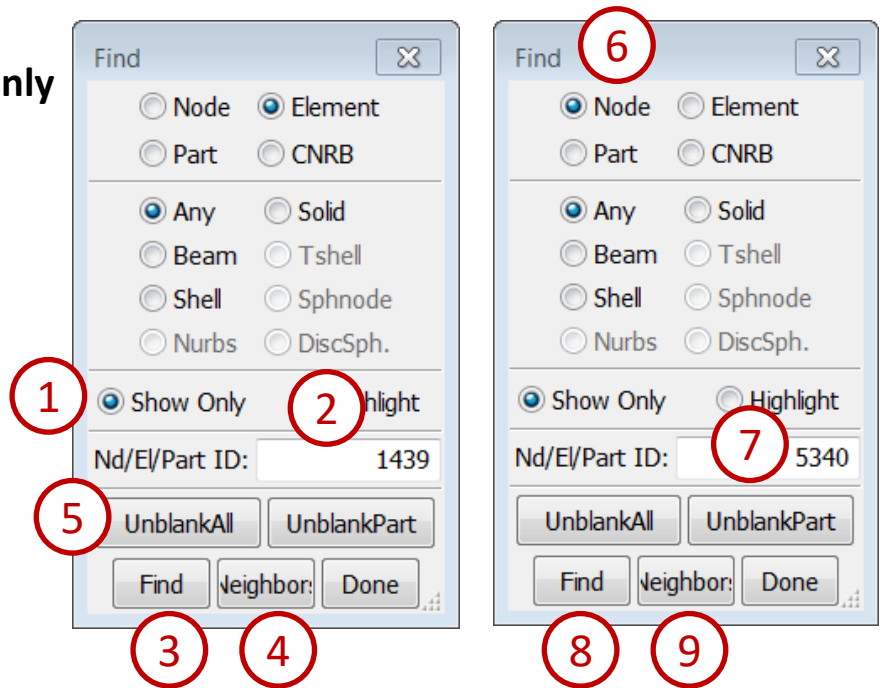
- Turn on the mesh (using the **Mesh** render button) 
- Go to **Element Tools** → **Identify**
- Select **Node** in the Identify interface and pick some nodes in the model to display their IDs
- Select **Element** in the Identify interface and pick some elements
- Toggle **Elem Dir** to display the N1 to N2 direction
- Click the **Clear All** button to clear all highlighted entities



# Workshop 1 (continued...)

Find a node and element...

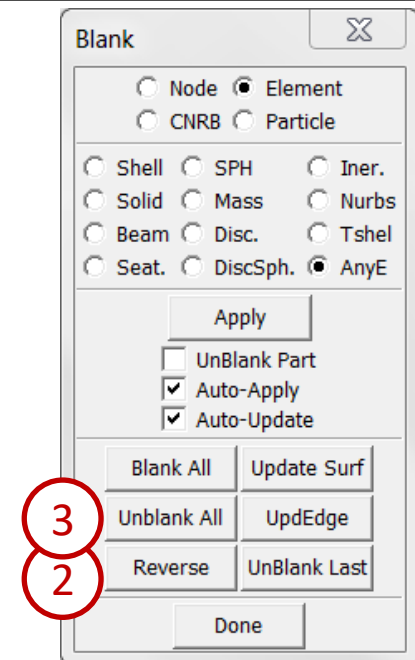
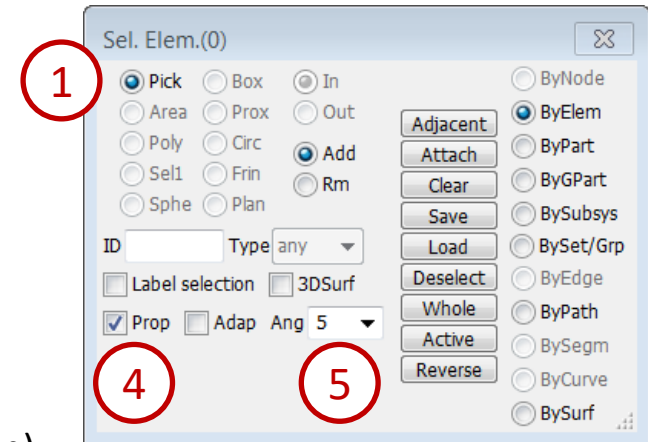
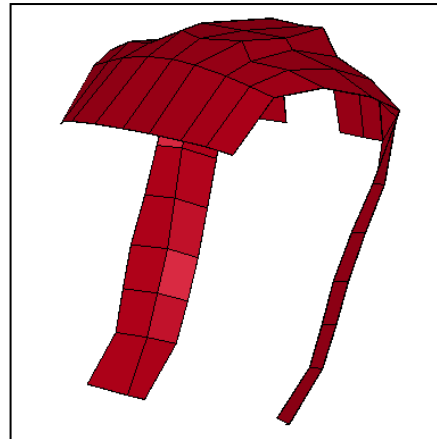
- Go to **Element Tools** → **Find** and select **Show Only**
- Enter 1439 in the text field and click **Find**
- Click **Neighbors** several times
- Click **UnblankAll** button
- Select **Node** in the Find interface
- Enter 5340 in the text field and click **Find**
- Click **Neighbors** several times



# Workshop 1 (continued...)


Blank some elements...

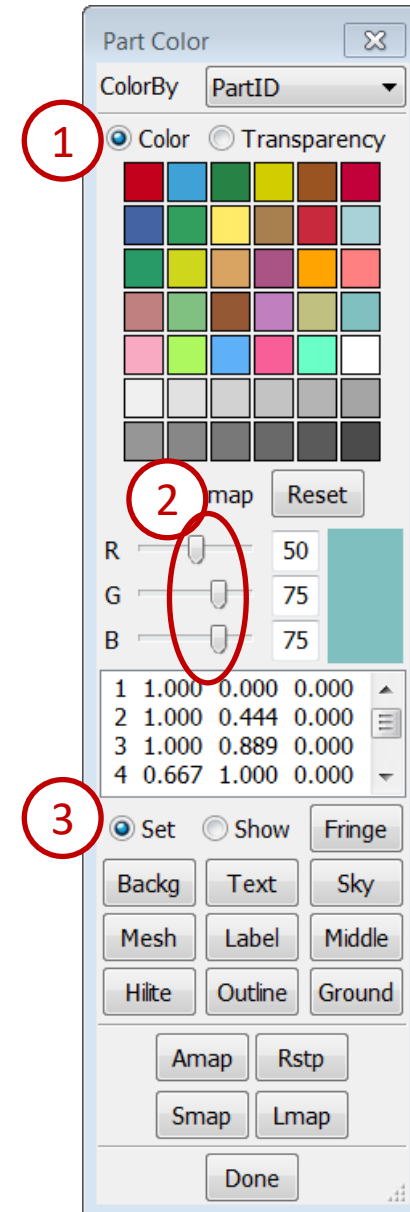
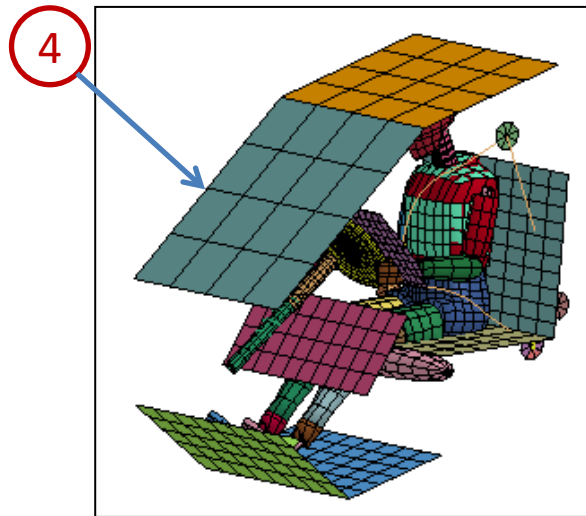
- Go to **Element Tools** → **Blank**
- Select **Area** in the General Selection interface and draw a box to blank some elements
- Click **Reverse** in the Blank interface
- Click **Unblank All** in the Blank interface
- Click the **Assembly and Part** (SelPart) render button
- Select “88 PSHELL” from the list, click the **Auto Center** (AutCen) render button, and click **Done** in the Assembly and Part interface
- Toggle **Prop** (propagate) in the General Selection interface, select **Ang: 15**, and pick an element on the front of the torso



# Workshop 1 (continued...)

Modify part color...

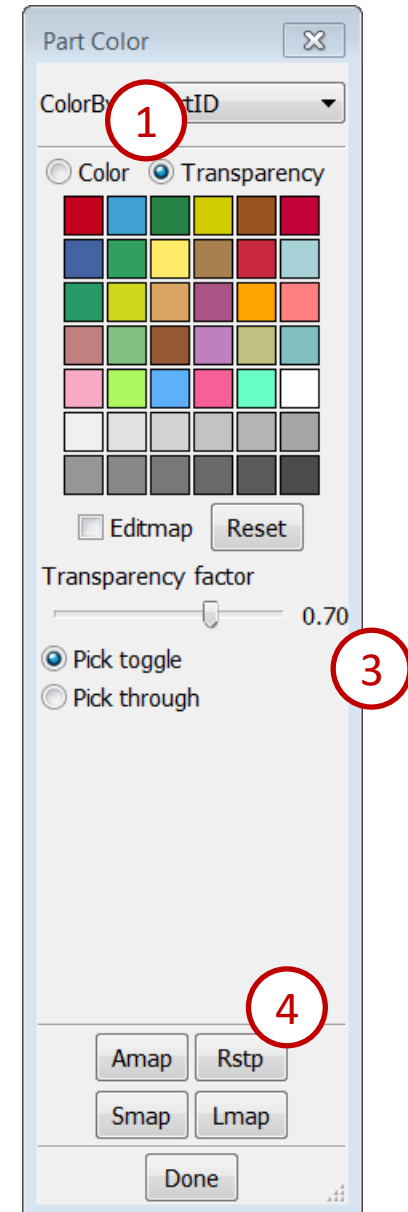
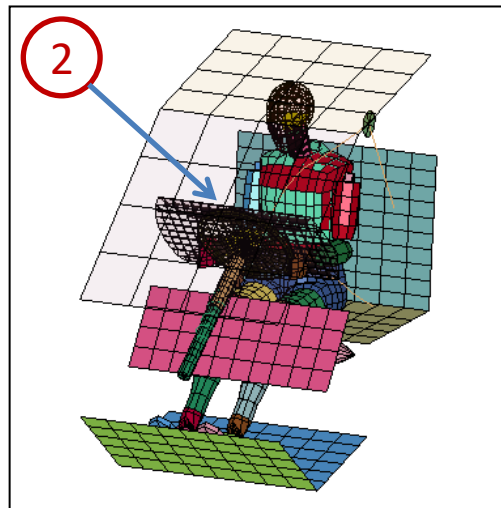
- Click the **Activate All** render button 
- Go to **Model** → **PtColor**
- Select **Color**
- Adjust color using the RGB sliders
- Select **Set** and pick some parts
- Select any color from color map
- Click **Backg** (only works when View > Background > Plain is selected)



# Workshop 1 (continued...)

Modify part transparency...

- Select **Transparency**
- Pick the roof of the structure and adjust the slider
- Select **Pick Through** and pick through the roof to make some additional components transparent
- Click **Active** and drag the slider to the far left
- Click **Rstp** button (reset all parts to opaque)
- Click **Amap** button (reset parts color by color map)





# ***Workshop 2***

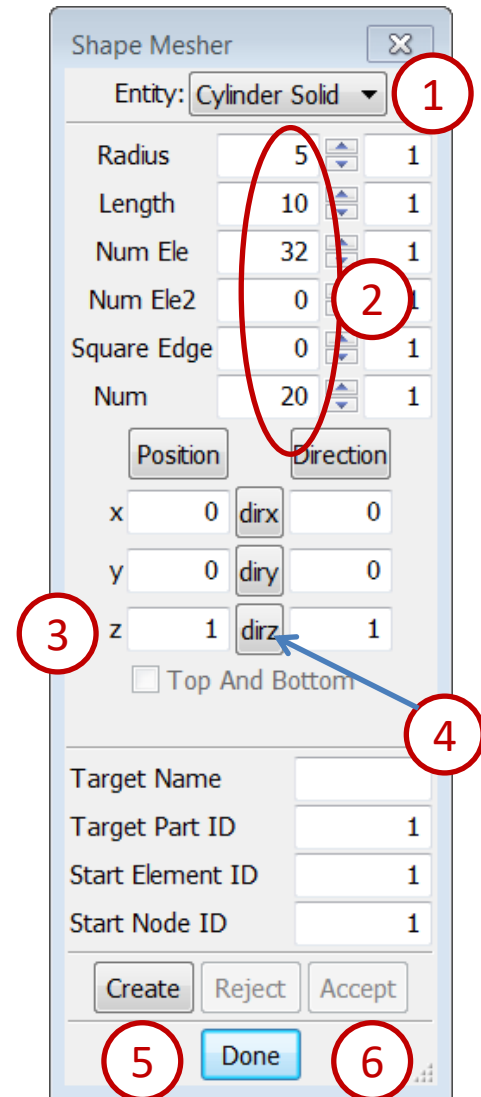
## ***Mesh Generation***

- ❖ Shape mesh
- ❖ N-line mesh
- ❖ Auto mesh
- ❖ Solid mesh

# Workshop 2

Create a solid cylinder...

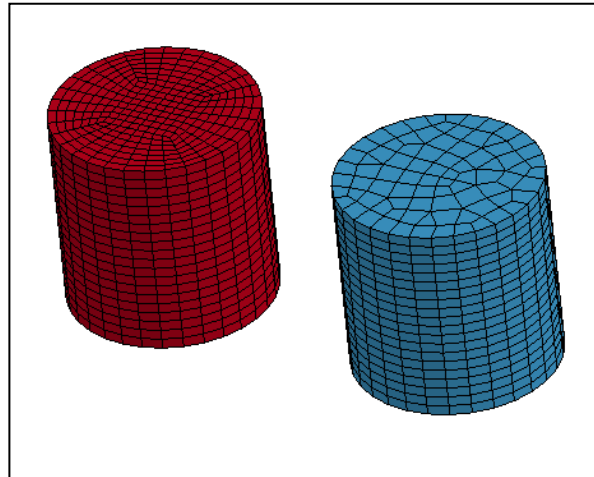
- Launch a new session of LS-PrePost
- Go to **Mesh** → **Shape Mesher**
- Select **Entity: Cylinder\_Solid**
- Enter **Radius: 5, Length: 10, Num Ele (Circumferential): 32, Num (Length): 20**
- Enter **XYZ: 0,0,1** for position
- Click **dirz** (set direction to 0,0,1)
- Click **Create** and **Accept**



# Workshop 2 (continued...)

Create a shell cylinder...

- Select **Entity: Cylinder\_Shell**
- Enter **Num Ele: 30** (leave other parameters unchanged)
- Enter **XYZ: 15,0,1** for position
- Activate **Top And Bottom** (meshes ends of cylinder)
- Click **Create** and **Accept**
- Turn on the mesh (using the **Mesh** render button)
- Rotate the model such that you can see the cross-section of both cylinders  
(note the different cross-sectional mesh of the two parts)



Shape Mesher

Entity: **Cylinder Shell** 1

Radius: 5 1

Length: 10 1

Num Ele: **30** 2 1

Num Ele2: 0 1

Square Edge: 0 1

Num: 20 1

Position: x: 15 dirx: 0

y: 0 diry: 0

z: 1 dirz: 1

☒ Top And Bottom

Target Name: 4

Target Part ID: 3

Start Element ID: 6543

Start Node ID: 7216

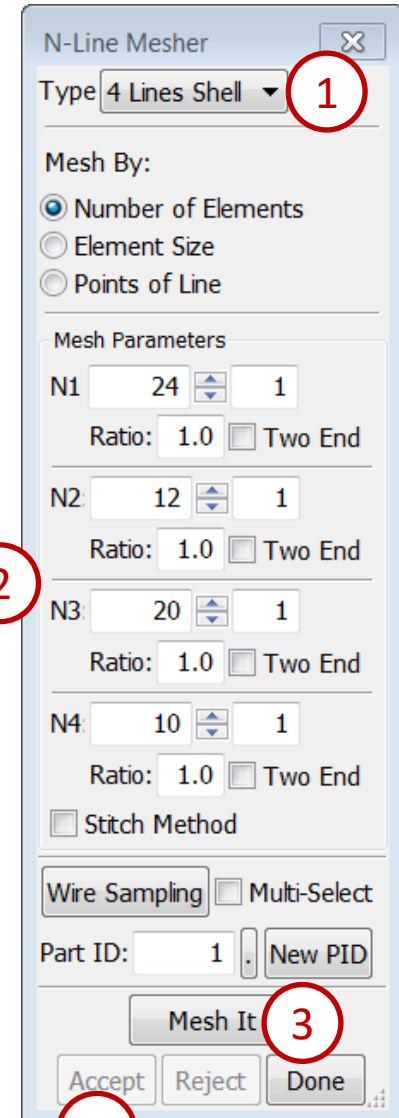
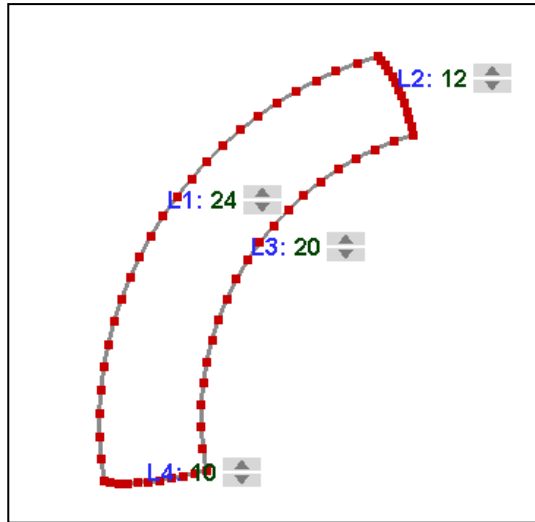
Create Reject Accept

5 Done 6

# Workshop 2 (continued...)

Create a mesh from 4 lines...

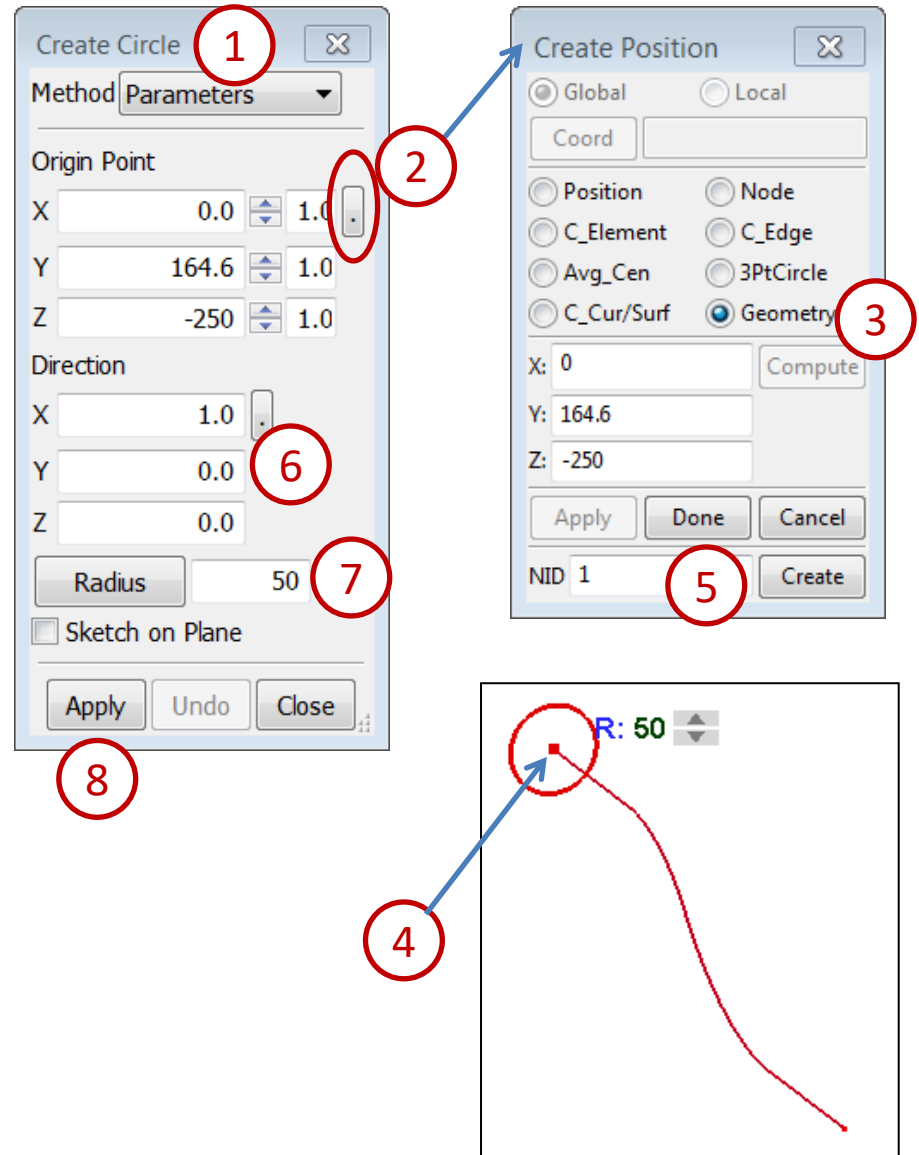
- Launch a new session of LS-PrePost
- File > Open > IGES File  
(select /workshop2/test\_4lmesh\_curves.igs)
- Click **Open** in the IGES Read Options popup
- Go to **Mesh** → **N-Line Mesher**
- Select **Type: 4 Line Shell**
- Pick the longest curve
- Pick the remaining curves in clockwise order
- Enter **N1: 24** and **hit Enter**
- Enter **N2: 12** and **hit Enter**
- Enter **N3: 20** and **hit Enter**
- Enter **N4: 10** and **hit Enter**
- Click **Mesh It** and **Accept**



# Workshop 2 (continued...)

Sweep one line along another...

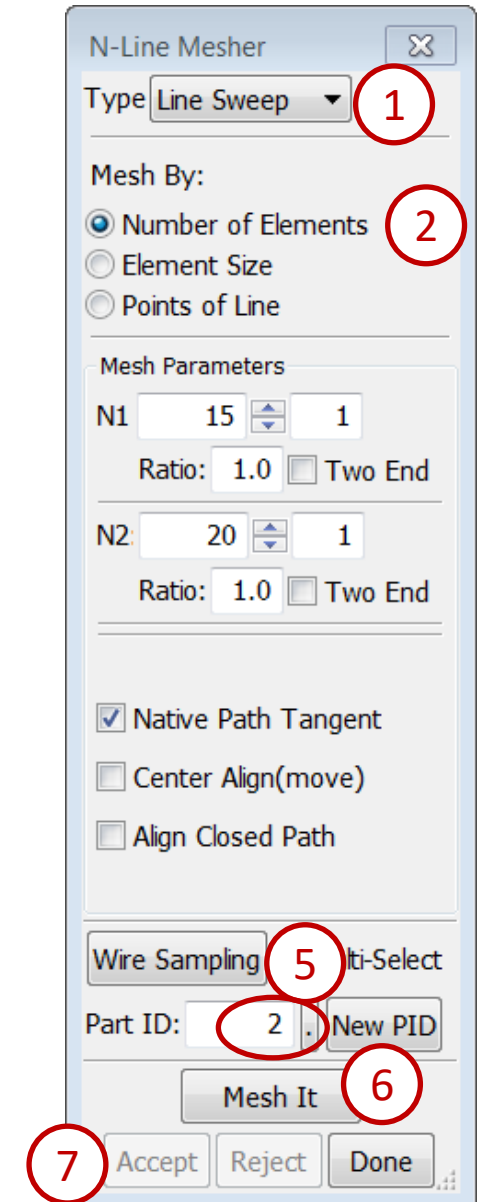
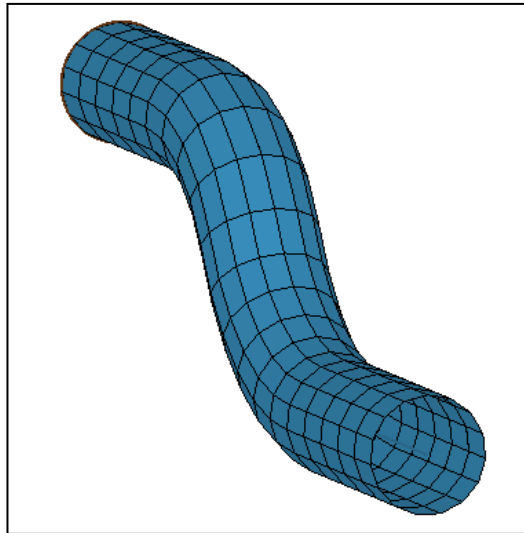
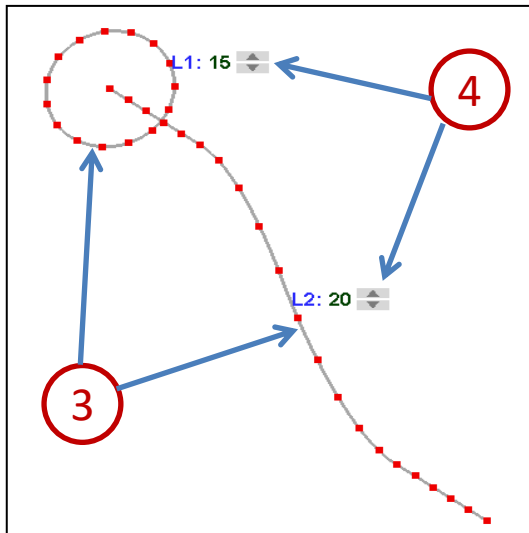
- Launch a new session of LS-PrePost
- File > Open > IGES File  
(select /workshop2/sweep\_lines.igs)
- Click **Open** in the IGES Read Options popup
- Go to **Curve** → **Circle**
- Select **Method: Parameters**
- Click the "." button next to **Origin Point X**
- Select **Geometry** in the Create Position interface
- Pick the endpoint of the remaining curve
- Click **Done** in the Create Position interface
- Enter **Direction X Y Z: 1 0 0**
- Enter **Radius: 50** and click **Apply**



# Workshop 2 (continued...)

Sweep one line along another...

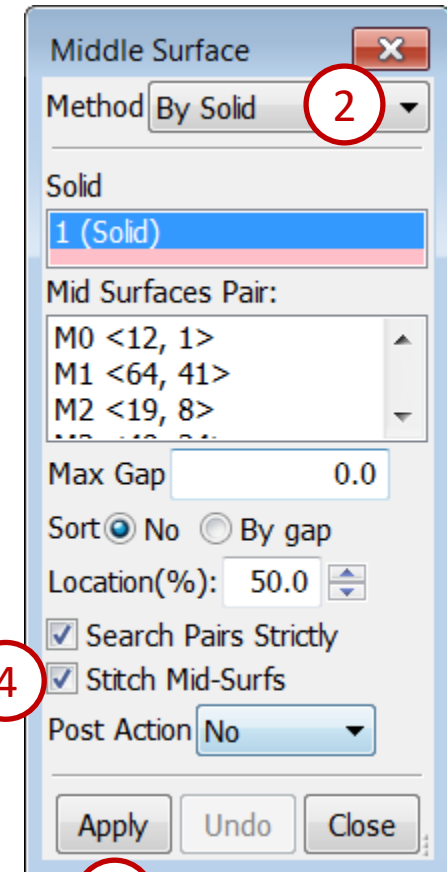
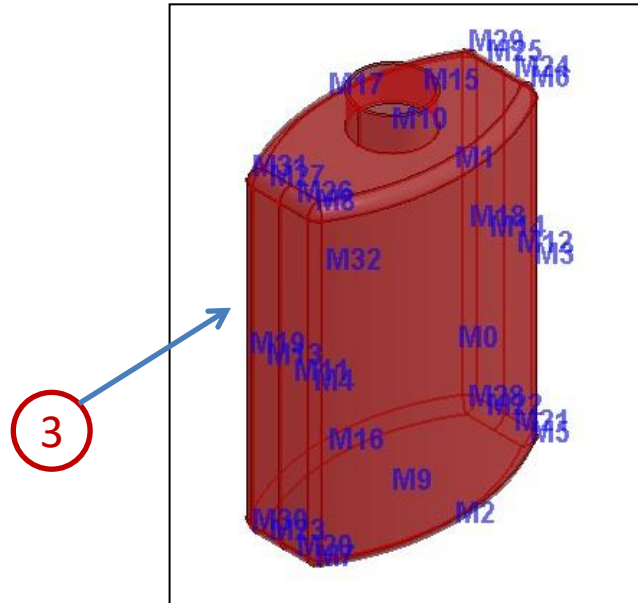
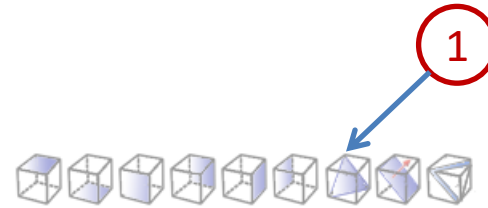
- Go to **Mesh** → **N-Line Mesher**
- Select **Type: Line sweep**
- Select **Mesh By: Number of elements**
- Pick the circle as L1
- Pick the red line as L2
- Click the up arrow near L1 several times to increase N1 to 15
- Click the up arrow near L2 several times to increase N2 to 20
- Enter **Part ID: 2**
- Click **Mesh It** and **Accept**



# Workshop 2 *(continued...)*

## Auto mesh an STEP file using Auto mesh...

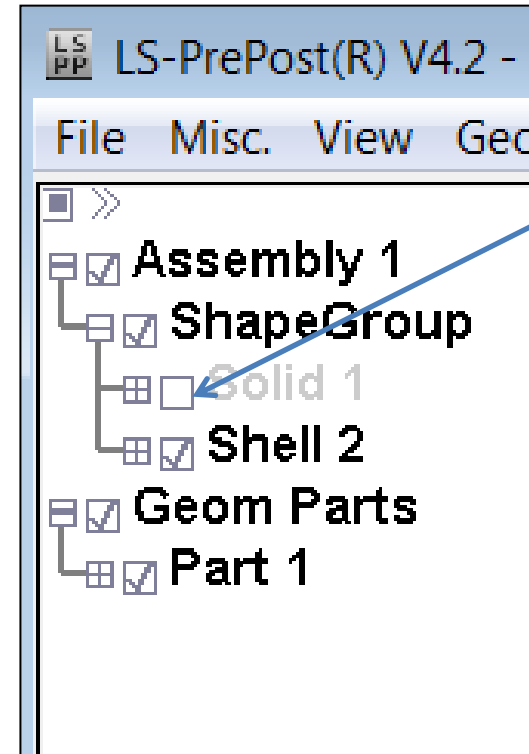
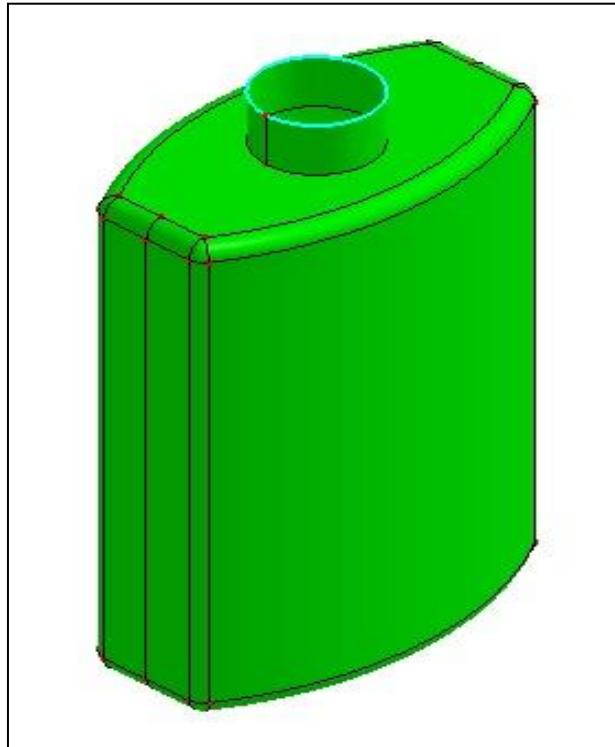
- Launch a new session of LS-PrePost
- File > Open > STEP File  
(select /workshop2/bottle.stp)
- Click **Open** in the Open File Options popup
- Click the **IsoMetric** render button
- Go to **Surf** → **MidSurf**
- Select Method **By Solid**
- Pick **Solid 1**
- Activate **Stitch Mid-Surfs**
- Click **Apply**
- Click **Close**



# Workshop 2 *(continued...)*

Auto mesh an STEP file using Auto mesh...

- Inactivate **Solid 1** in feature tree

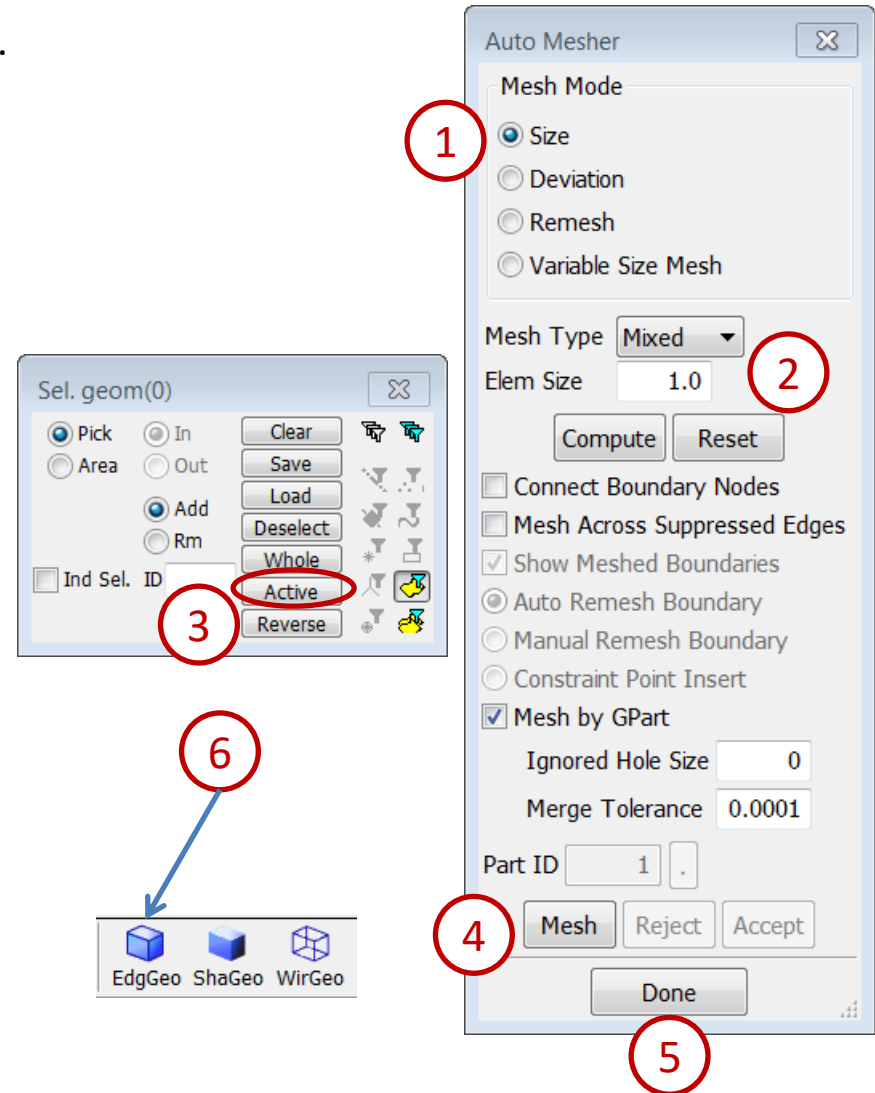
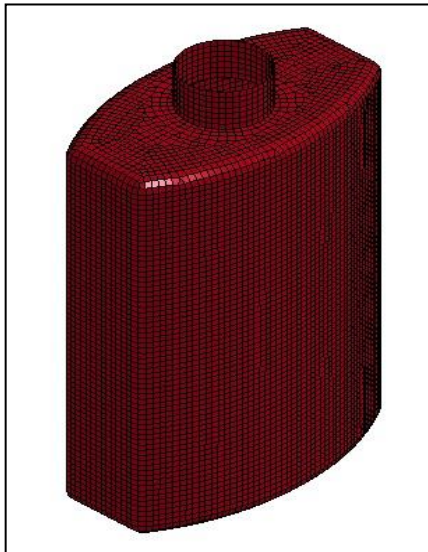




# Workshop 2 (continued...)

Purpose : Auto mesh an STEP file using Auto mesh...

- Go to **Mesh** → **AutoM**
- Select mesh mode by **Size**
- Enter **Elem Size** : **1.0**
- Click **Active** on Sel. geom interface
- Click **Mesh**
- Click **Accept**
- Click **Done**
- Click **EdgGeo** render buttons turn geometry off



# ***Workshop 3***

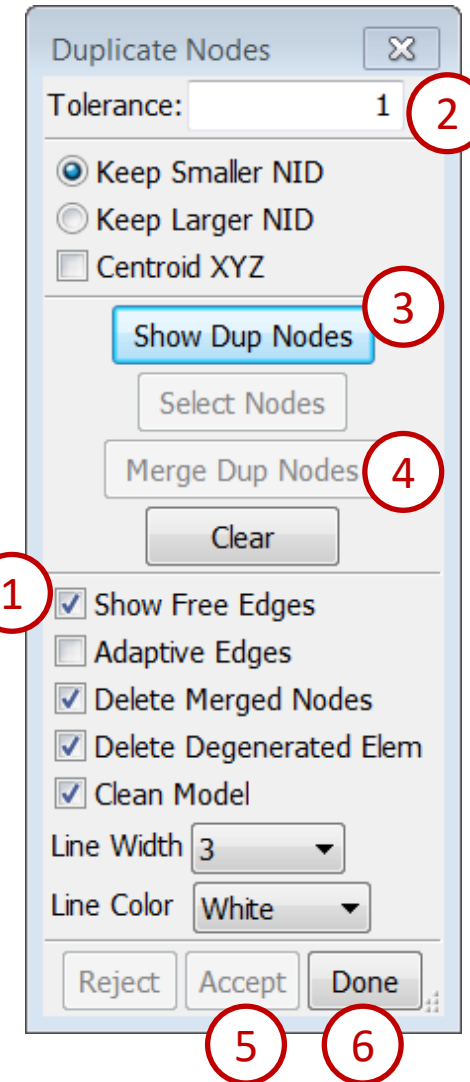
## ***Model Editing***

- ❖ Model free edge
- ❖ Duplicate nodes merge
- ❖ Node and element Editing
- ❖ Fill holes
- ❖ Element normal align
- ❖ Save a keyword file

# Workshop 3

Merge duplicate nodes...

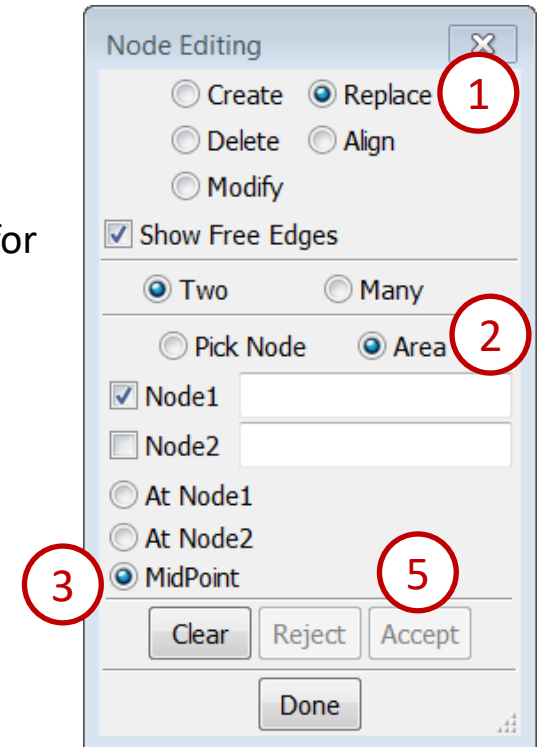
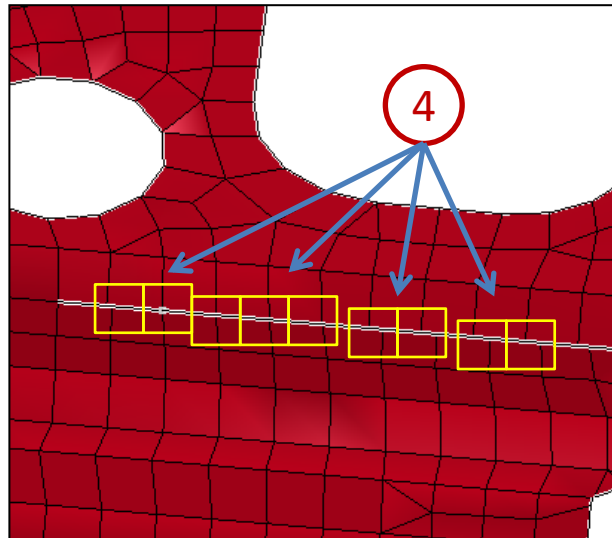
- Launch a new session of LS-PrePost
- File > Open > LS-DYNA Keyword File (select /workshop3/badmesh.k)
- Go to **Element Tools** → **Duplicate Nodes** and turn on the mesh (using the **Mesh** render button)
- Activate **Show Free Edges**
- Enter **Tolerance: 1.0**
- Click **Show Dup Nodes** (see figure)
- Click **Merge Dup Nodes**
- Click **Accept**
- Click **Done**



# Workshop 3 (continued...)

Replace nodes...

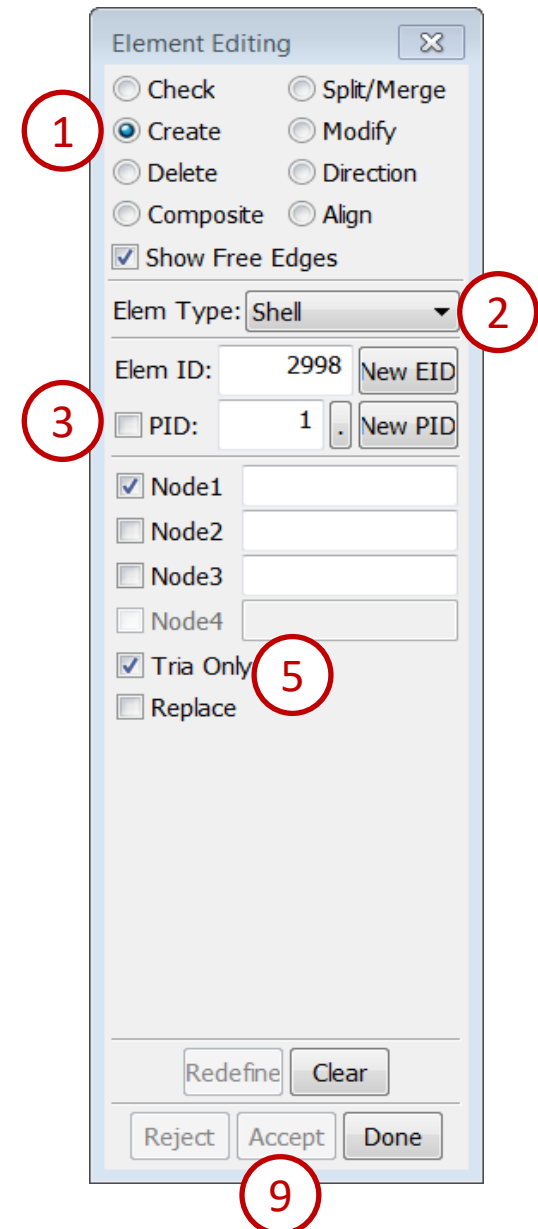
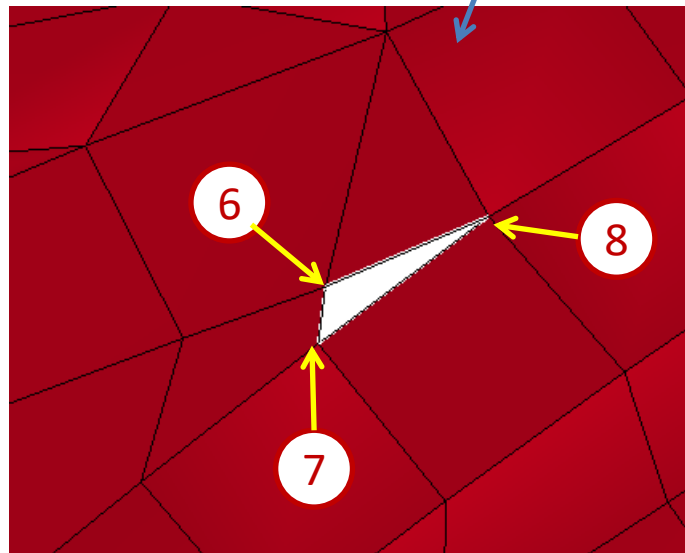
- Go to **Element Tool** → **Node Editing**
- Select **Replace**
- Select **Area** and **MidPoint**
- Zoom in the internal free edges area, select two nodes at a time for merging (by drawing a window)
- Click **Accept**
- Repeat (4) and (5) until all internal free edges have been eliminated



# Workshop 3 (continued...)

Create a tria element...

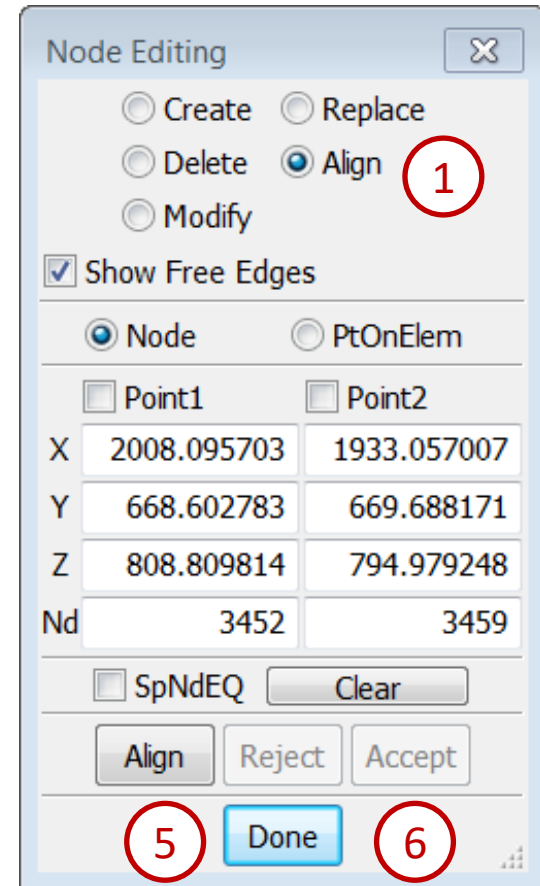
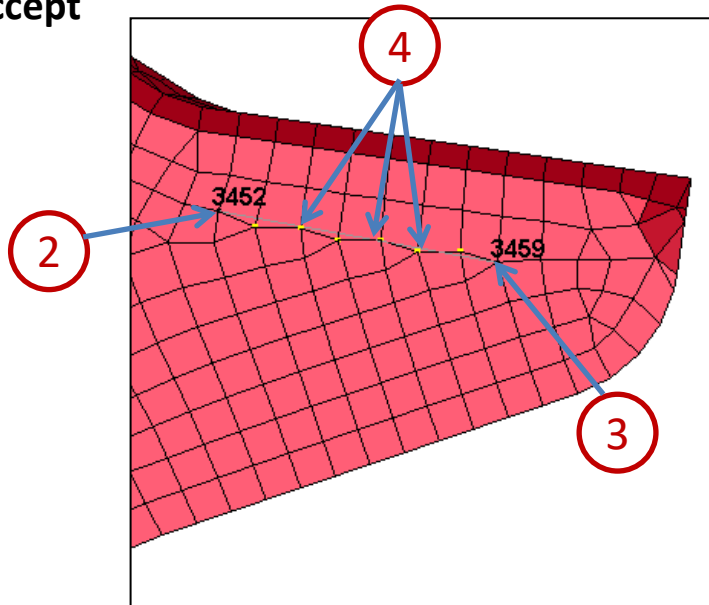
- Go to **Element Tool** → **Element Editing**
- Select **Create**
- Select **Elem Type: Shell**
- Activate **PID** and pick the part
- Activate **Tria Only**
- Pick the 3 nodes to fill the final gap in the part
- Click **Accept**



# Workshop 3 (continued...)

Align nodes along a line...

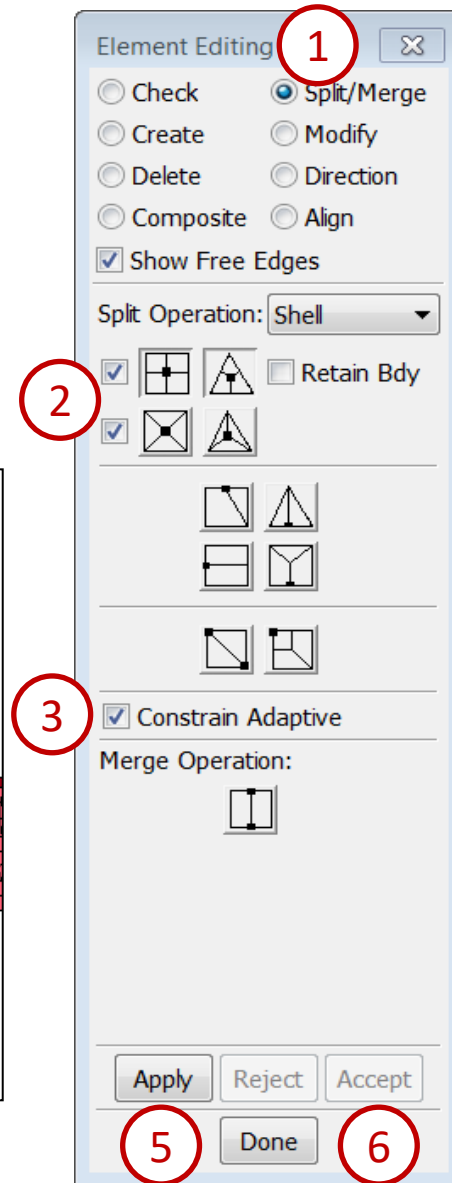
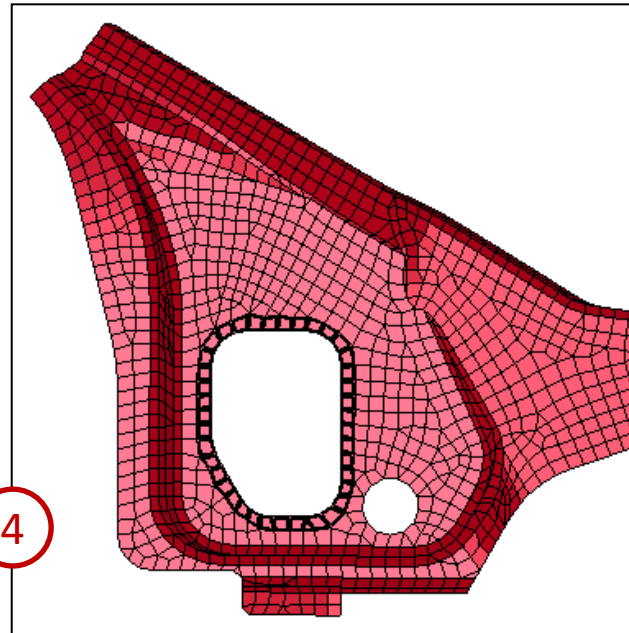
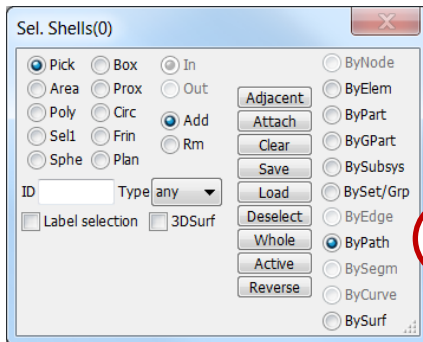
- Go to **Element Tool** → **Node Editing**
- Select **Align**
- Click the **Right** render button
- Click the **Zoom In** render button and zoom in as shown
- Pick 2 nodes to form a line
- The yellow dots shows the nodes will be align
- Click **Align**
- Click **Accept**



# Workshop 3 (continued...)

Split elements...

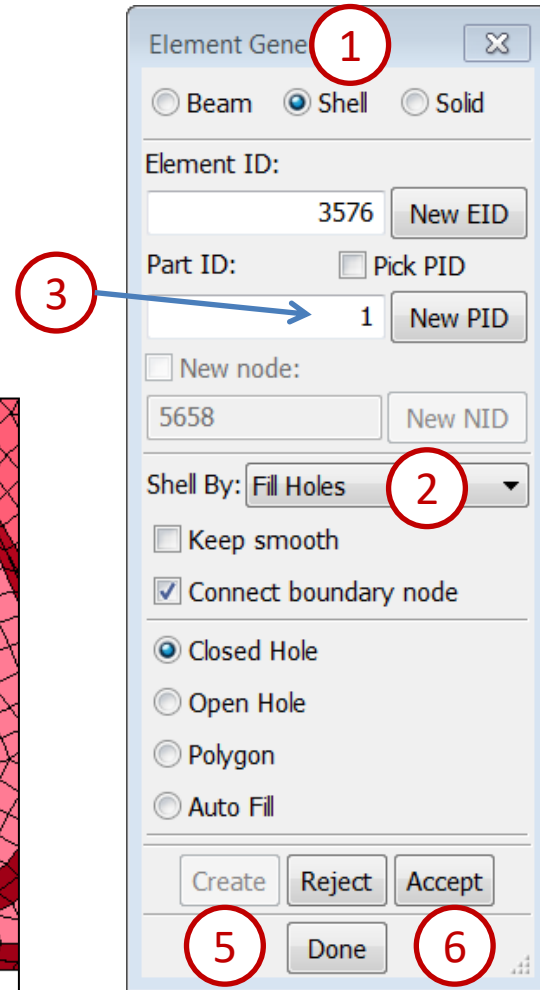
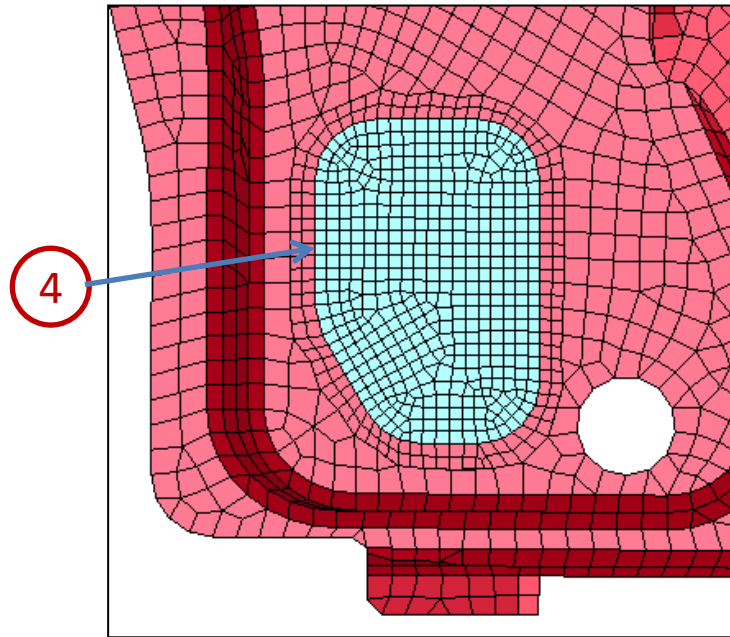
- Go to **Element Tool** → **Element Editing**
- Select **Split/Merge**
- Activate **Constrain Adaptive**
- Pick the elements around the hole as shown  
(use **ByPath** filter in the General Selection interface)
- Click **Apply**
- Click **Accept**



# Workshop 3 (continued...)

Fill a hole...


- Go to **Mesh** → **Element Generation**
- Select **Shell**
- Select **Shell By: Fill\_Holes**
- Type **1** in Part ID
- Pick any one node on the perimeter of the hole
- Click **Create**
- Click **Accept**

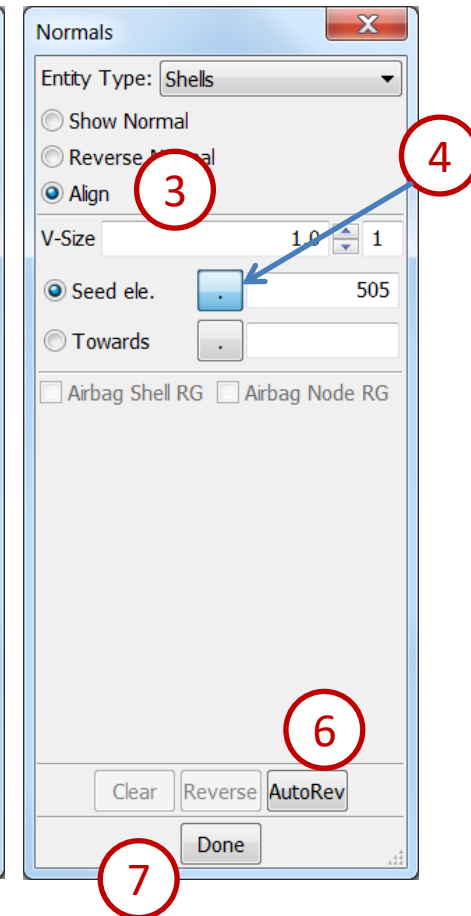
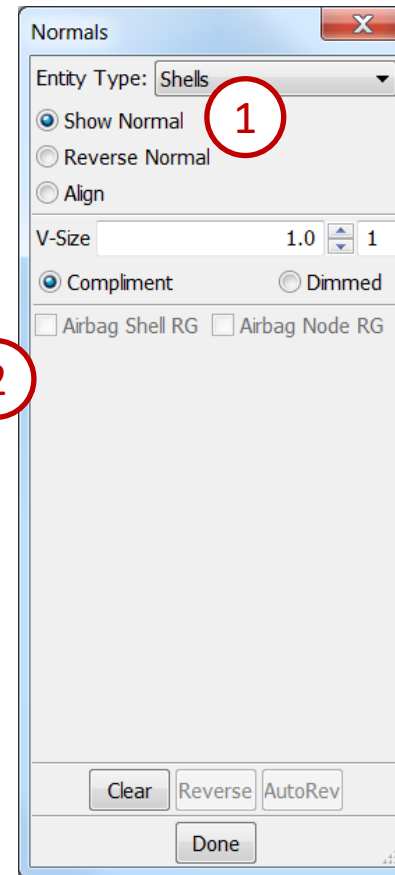
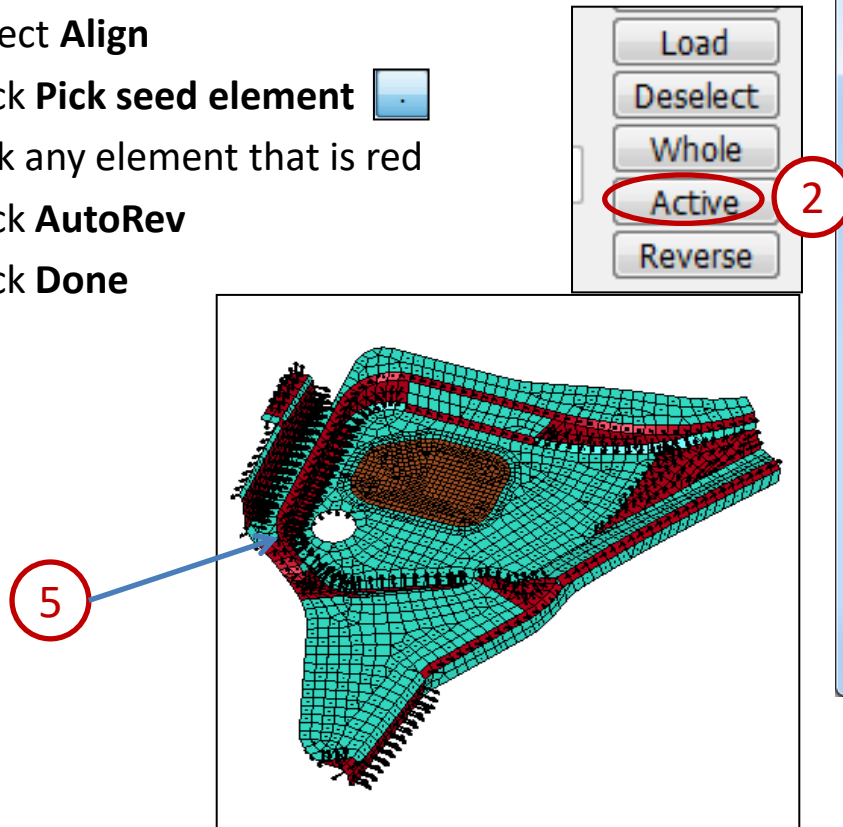




# Workshop 3 (continued...)

Align shell normals...

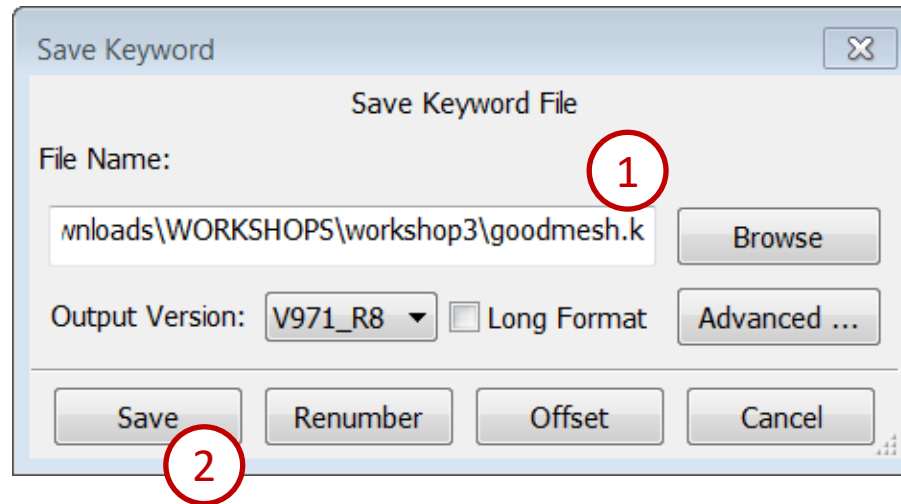
- Go to **Element Tools** → **Normals**
- Select **Show Normals** (should be already selected)
- Click **Active** in the General Selection interface
- Select **Align**
- Click **Pick seed element** 
- Pick any element that is red
- Click **AutoRev**
- Click **Done**



# Workshop 3 *(continued...)*

Save the modified input file...

- File > Save As > Save Keyword As...
- Click **Browse**
- Enter a file name (save as /workshop3/goodmesh.k)
- Click **Save**



# ***Workshop 4***

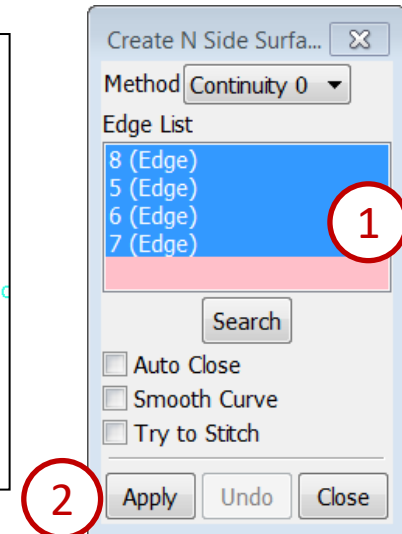
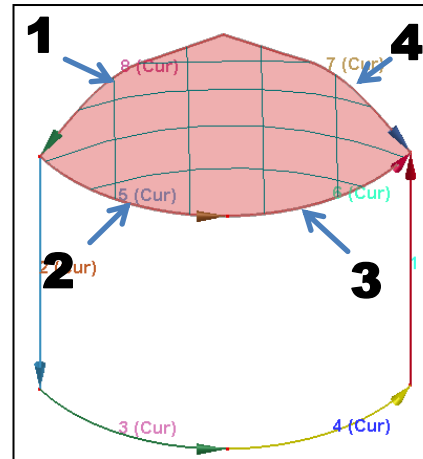
## ***Build a fan model***

- ❖ Create a surface
- ❖ Surface mesh
- ❖ 2Line mesh
- ❖ Part trim
- ❖ Model transform (rotate)
- ❖ Save a keyword file

# Workshop 4

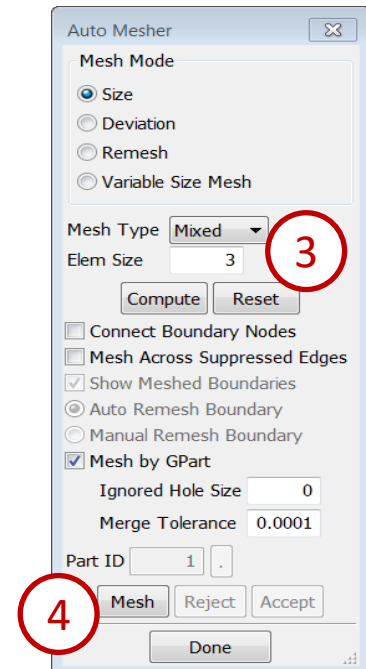
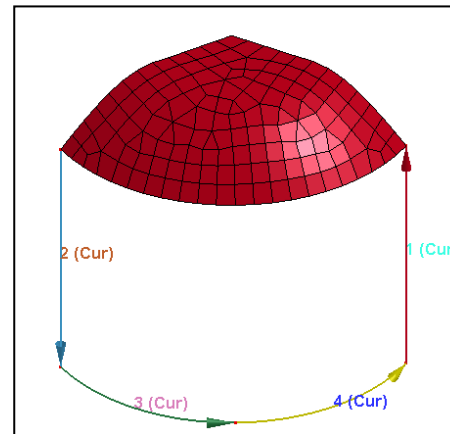
Create a surface...

- Launch a new session of LS-PrePost
- File > Open > IGES File  
(select /workshop4/hub.igs)
- Rotate model as shown in figure
- Go to **Surf** → **N-Side**
- Pick edge **8,5,6,7** then click **Apply**



Surface mesh...

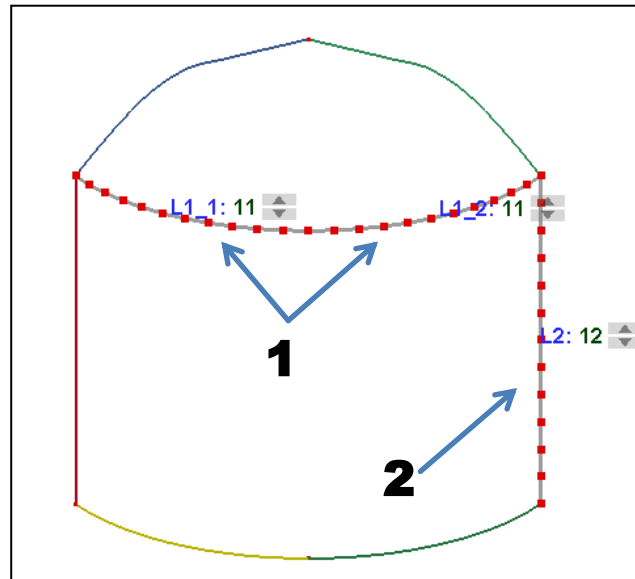
- Go to **Mesh** → **AutoM**
- Select mesh mode by **Size**
- Enter **Elem Size : 3.0**
- Pick **Face 1** then click **Mesh**
- Click **Accept**
- Click **Done**



# Workshop 4 (continued...)

Hub mesh(sweep)...

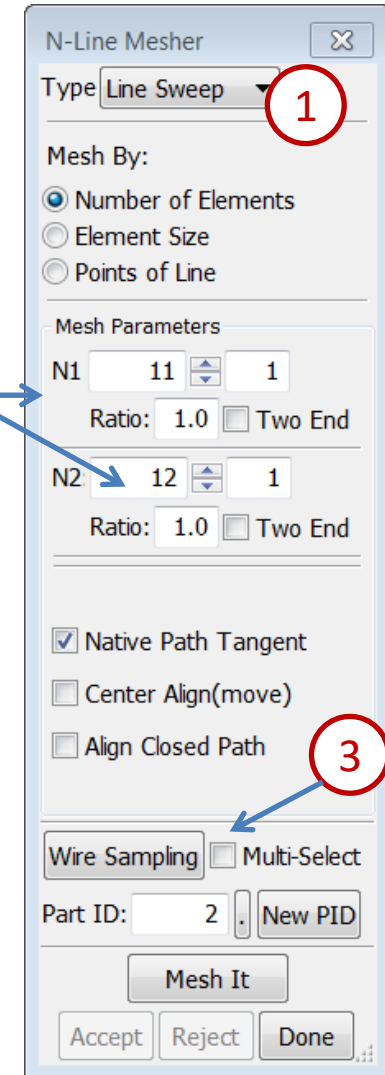
- Go to **Mesh** → **NlineM**
- Select mesh type by **Line Sweep**
- Enter **N1: 11** hit **Enter** and **N2: 12** hit **Enter**
- Activate **Multi\_Select** ☒ Multi-Select
- Pick curve **L1\_1** and **L1\_2**
- Inactivate **Multi\_Select** ☐ Multi-Select
- Pick curve **L2**
- then click **Mesh It**
- Click **Accept**
- Click **Done**



2

1

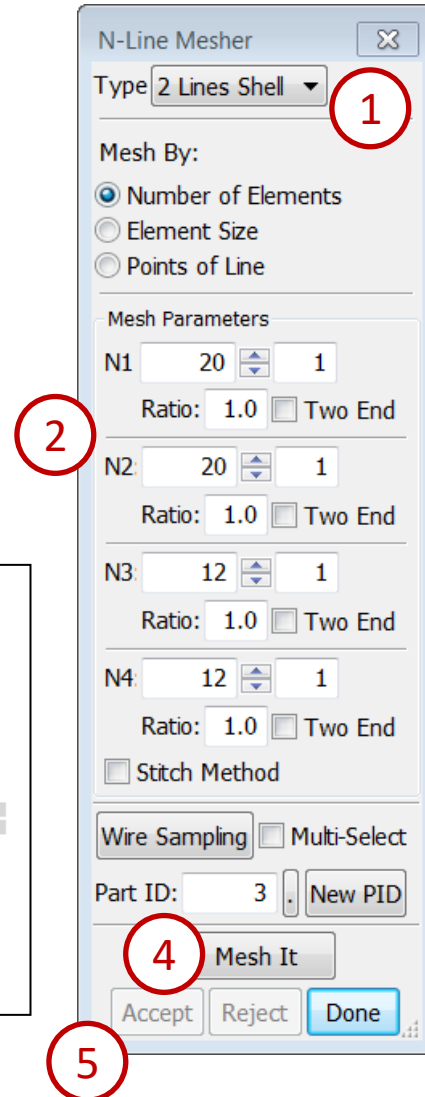
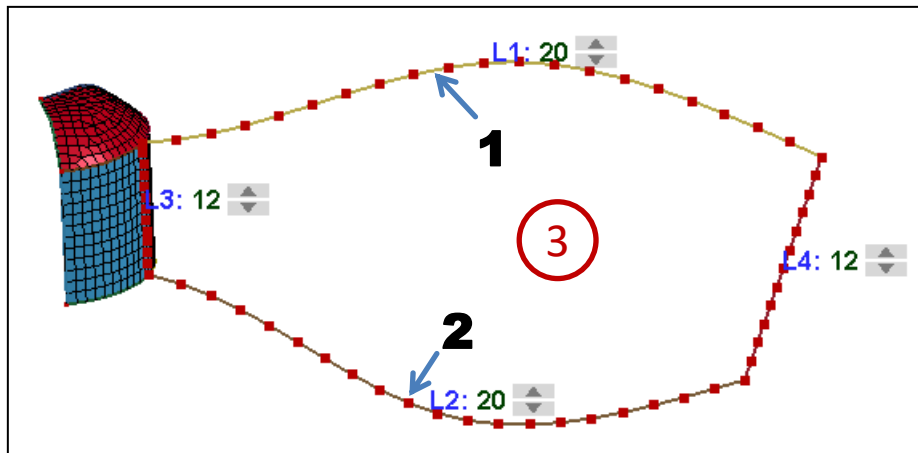
3



# Workshop 4 (continued...)

Blade mesh...

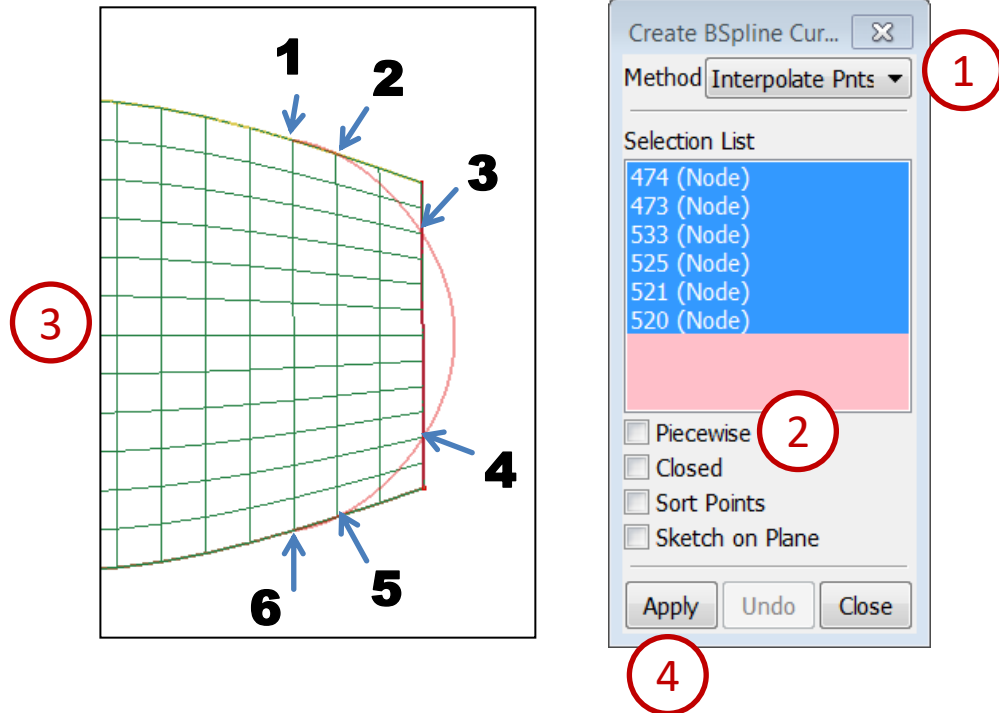
- File > Import> IGES File  
(select /workshop4/blade.igs)
- Go to **Mesh** → **NlineM**
- Select mesh type by **2 Lines Shell**
- Enter **N1: 20** hit **Enter** and **N2: 20** hit **Enter**
- Enter **N3: 12** hit **Enter** and **N4: 12** hit **Enter**
- Pick curve **L1** and **L2**
- then click **Mesh It**
- Click **Accept**
- Click **Done**



# Workshop 4 (continued...)

Trim curve create...

- Go to **Curve** → **Spline**
- Inactivate **Piecewise**
- Pick nodes **1, 2, 3, 4, 5** and **6**
- Click **Apply**
- Click **Close**



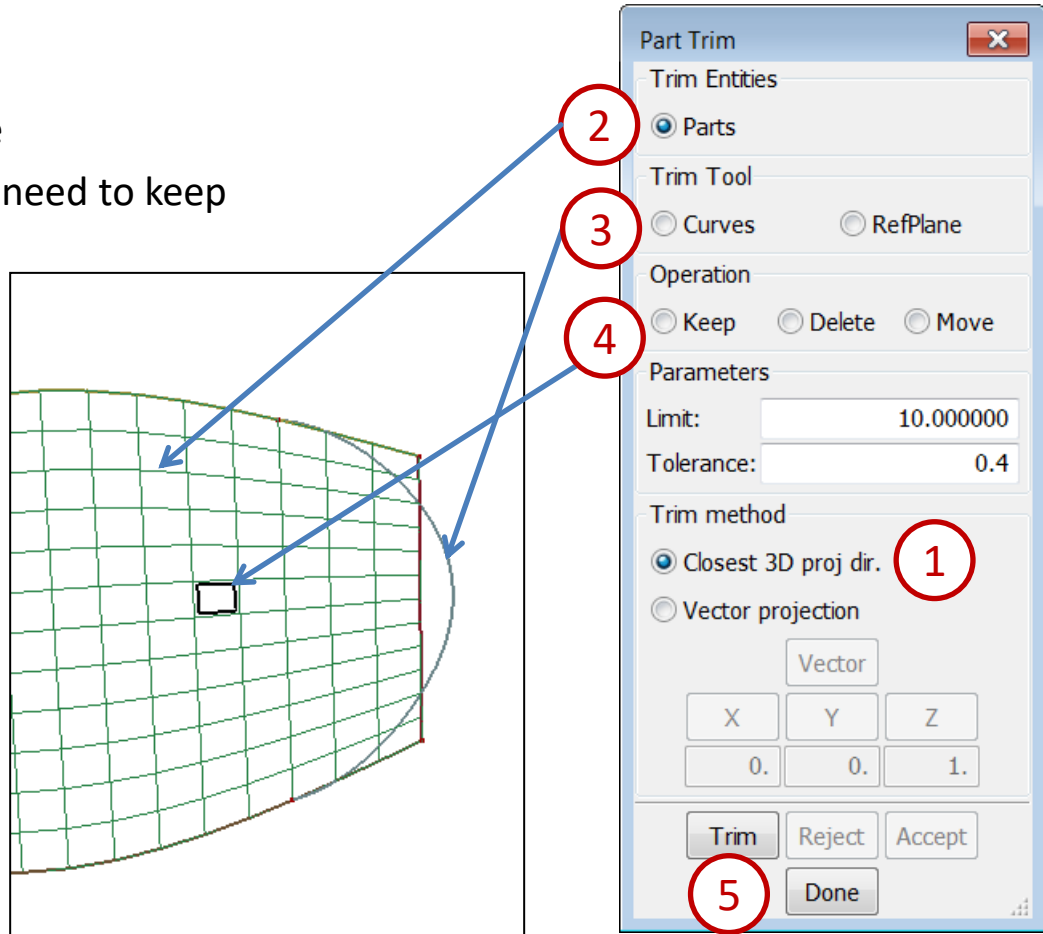
# Workshop 4 (continued...)

Trim blade...

- Go to **EleTol** → **PtTrim**
- Click **Closest 3D proj dir.**
- Select **Parts**, pick part **3** (blade)
- Select **Curves**, pick the trim curve
- Select **Keep**, pick a seed element need to keep
- Click **Trim**
- Click **Accept**
- Click **Done**

Save a project file...

- Go to **File > Save > Save Project**
- Enter a file name (save as /workshop4/fan.proj)
- Click **Save**

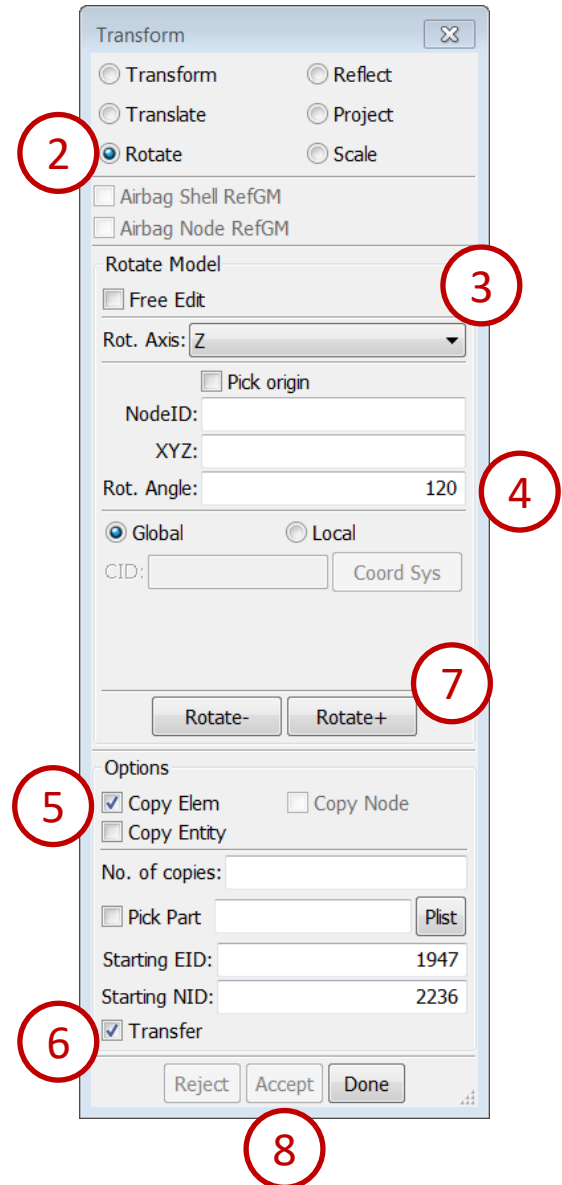
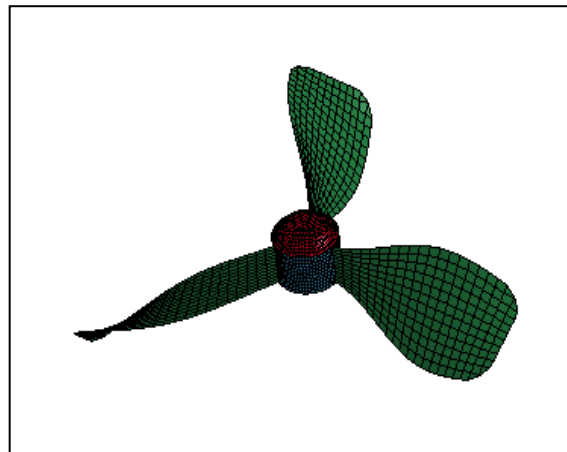
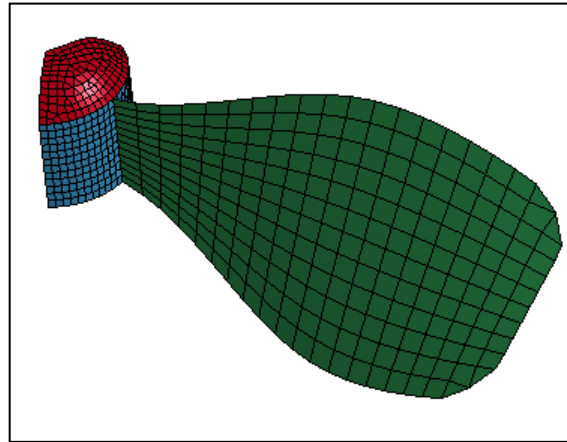
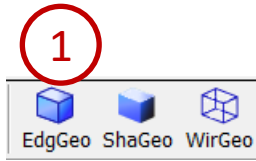




# Workshop 4 (continued...)

Model rotate...

- Click **EdgGeo** render buttons turn geometry off
- Go to **EleTol** → **Transf**
- Select **Rotate**
- Select Rot.Axis: **Z**
- Enter **120** at Rot. Angle
- Activate **Copy Elem**
- Activate **Transfer**
- Click **Active** in the General Selection interface
- Click **Rotate+**
- Click **Accept**
- Click **Rotate+** again
- Click **Accept**
- Click **Done**



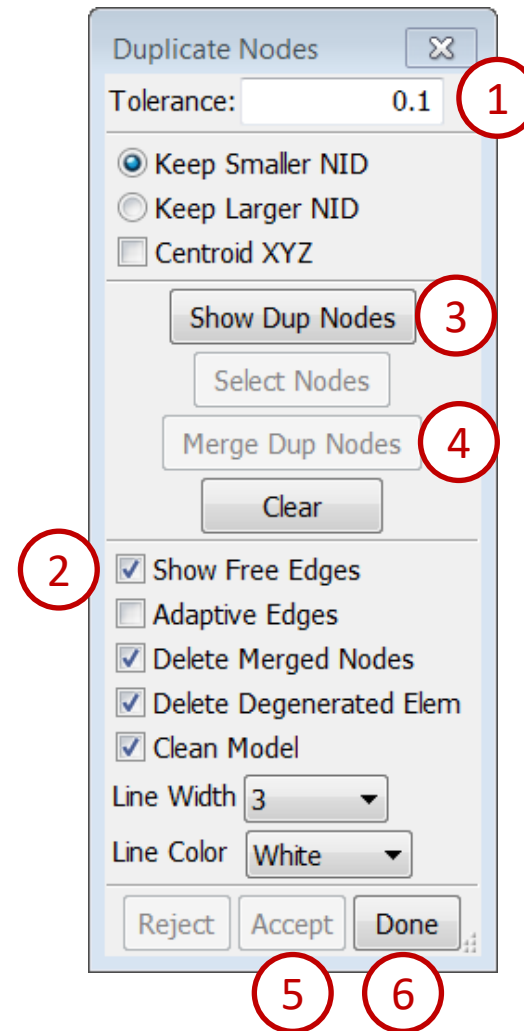
# Workshop 4 (continued...)

Duplicate nodes merge...

- Go to **Ele Tol** → **DupNod**
- Enter **Tolerance: 0.1**
- Activate **Show Free Edges**
- Click **Show Dup Nodes**
- Click **Merge Dup Nodes**
- Click **Accept**
- Click **Done**

Save a keyword file...

- Go to **File > Save > Save Keyword**
- Enter a file name (save as /workshop4/fan.k)
- Click **Save**



# ***Workshop 5***

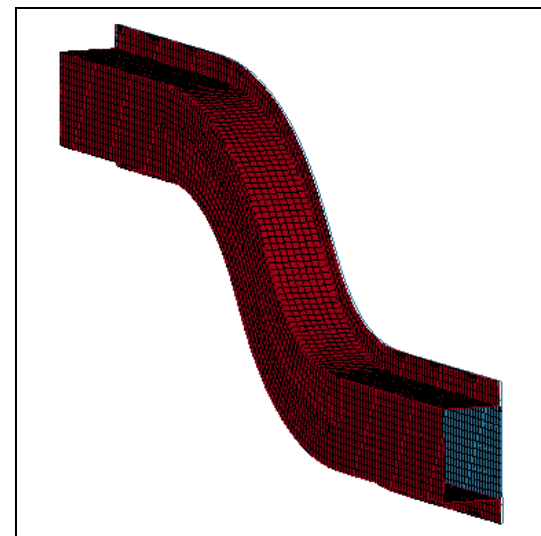
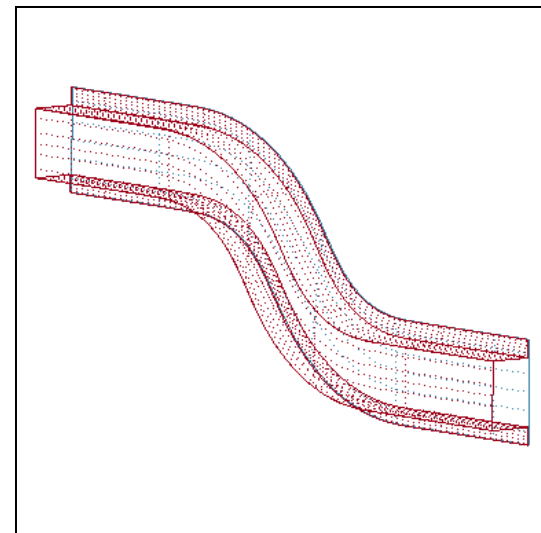
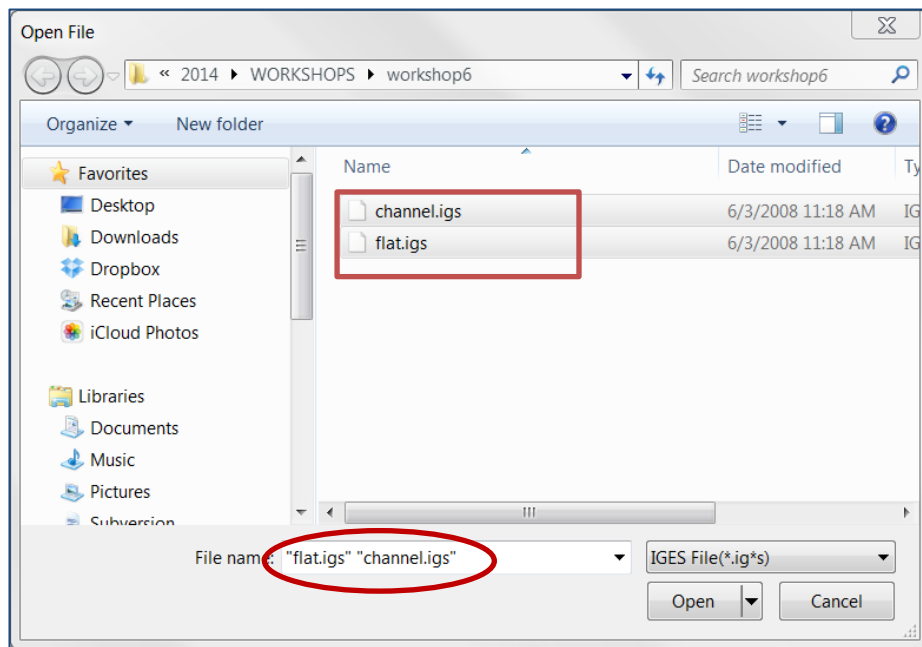
## ***Create a Keyword File (S-Rail to Rigidwall Impact)***

- ❖ Mesh model
- ❖ Assign material and property
- ❖ Apply mass, constraint and velocity
- ❖ Rigid wall creation
- ❖ Define spot welding
- ❖ Save a keyword file
- ❖ Model comparison

# Workshop 5 (continued...)

Import and mesh IGES surfaces...

- Launch a new session of LS-PrePost
- File > Open > IGES File (select /workshop5/channel.igs **and** flat.igs both)
- Click **Open** in the IGES Read Options popup
- Go to **Mesh** → **Auto Mesher**
- Enter **Elem Size: 6**
- Click **Active** in the General Selection interface
- Click **Mesh**
- Click **Accept**
- Click **Done**



# Workshop 5 (continued...)

Define section property...

- Click **EdgGeo** render buttons turn geometry off
- Go to **Model** → **Keyword Manager**
- Select **All**
- Expand **SECTION**
- Double-click “**SHELL**”
- Click **NewID** in the Keyword Input Form
- Enter **TITLE: 1.0mm**
- Enter **ELFORM: 16** , **T1: 1.0** (and hit the **Enter** key)
- Click **Accept** and **Done**



The screenshot shows the 'Keyword Input Form' dialog box. It has a title bar and a toolbar with buttons: NewID (circled 1), Draw, RefBy, Sort/T1, Add, Accept (circled 5), Delete, Default, and Done (circled 6). There is a checkbox 'Use \*Parameter' and a 'Setting' button. The main area shows the keyword '\*SECTION\_SHELL\_(TITLE) (0)'. Below this is a text input field for 'TITLE' containing '1.0mm' (circled 2). Below the text field is a table with two rows of input fields. The first row has fields for SECID (1), ELFORM (16, circled 3), SHRE (1.0), NIP (2), PROPT (1), QR/IRID (0), ICOMP (0), and SETYP (1). The second row has fields for T1 (1.0, circled 4), T2 (1.0), T3 (1.0), T4 (1.0), NLOC (0.0), MAREA (0.0), IDOF (0.0), and EDGSET (0). A blue arrow points from the T1 field to the T2 field.

	SECID	ELFORM	SHRE	NIP	PROPT	QR/IRID	ICOMP	SETYP
1	1	16	1.0	2	1	0	0	1
2	T1	T2	T3	T4	NLOC	MAREA	IDOF	EDGSET
	1.0	1.0	1.0	1.0	0.0	0.0	0.0	0

# Workshop 5 (continued...)

Define material property...

- Expand **MAT** in Keyword Manager
- Double-click “**024-PIECEWISE\_LINEAR\_PLASTICITY**”
- Click **NewID** in the Keyword Input Form
- Enter **TITLE: Mild Steel**
- Enter **RO= 7.83e-6, E= 207.0, PR= 0.3, SIGY= 0.2, ETAN= 2.0**
- Click **Accept**
- Click **Done**

Keyword Input Form

1 NewID Draw MatDB RefBy Pick Add Accept Delete Default Done 4 5

☐ Use \*Parameter (Subsys: 1 New\_Subsystem\_1) Setting

\*MAT\_PIECEWISE\_LINEAR\_PLASTICITY\_(TITLE) (024) (0)

TITLE 2 Mild Steel

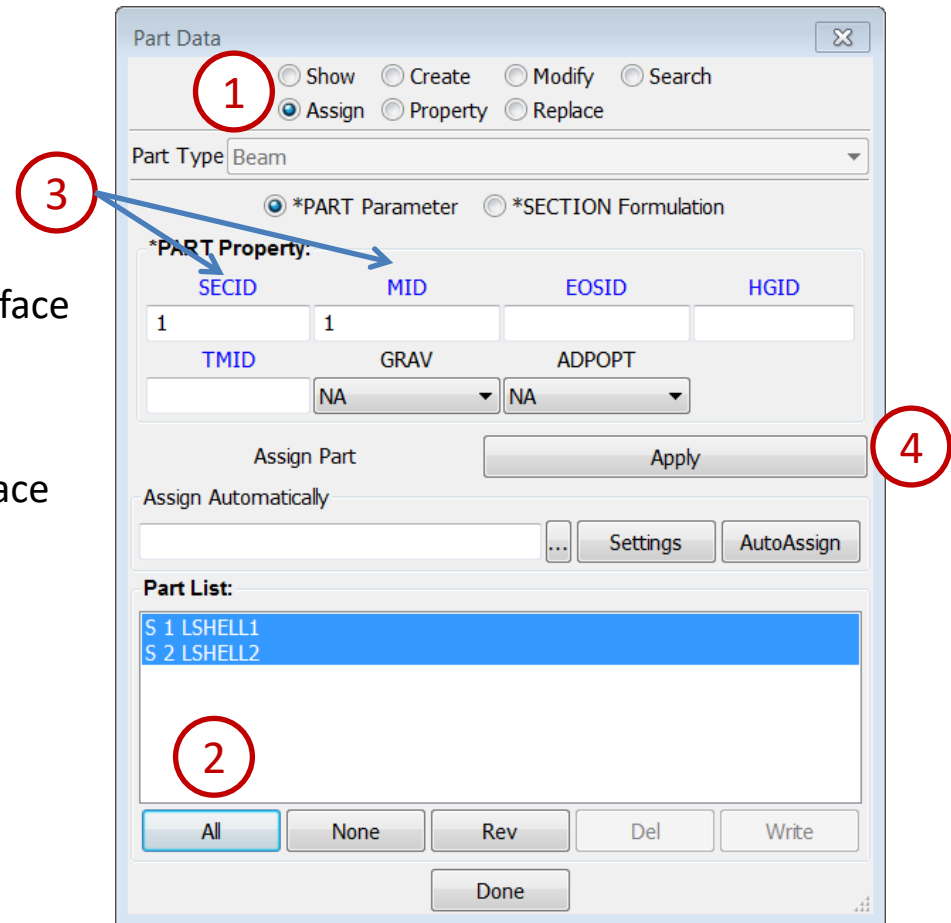
1	<u>MID</u>	<u>RO</u>	<u>E</u>	<u>PR</u>	<u>SIGY</u>	<u>ETAN</u>	<u>FAIL</u>	<u>TDEL</u>
1	1	7.83e-6	207.0	0.3	0.2	2.0	10.E+20	0.0

3

# Workshop 5 (continued...)

Assign section and material...

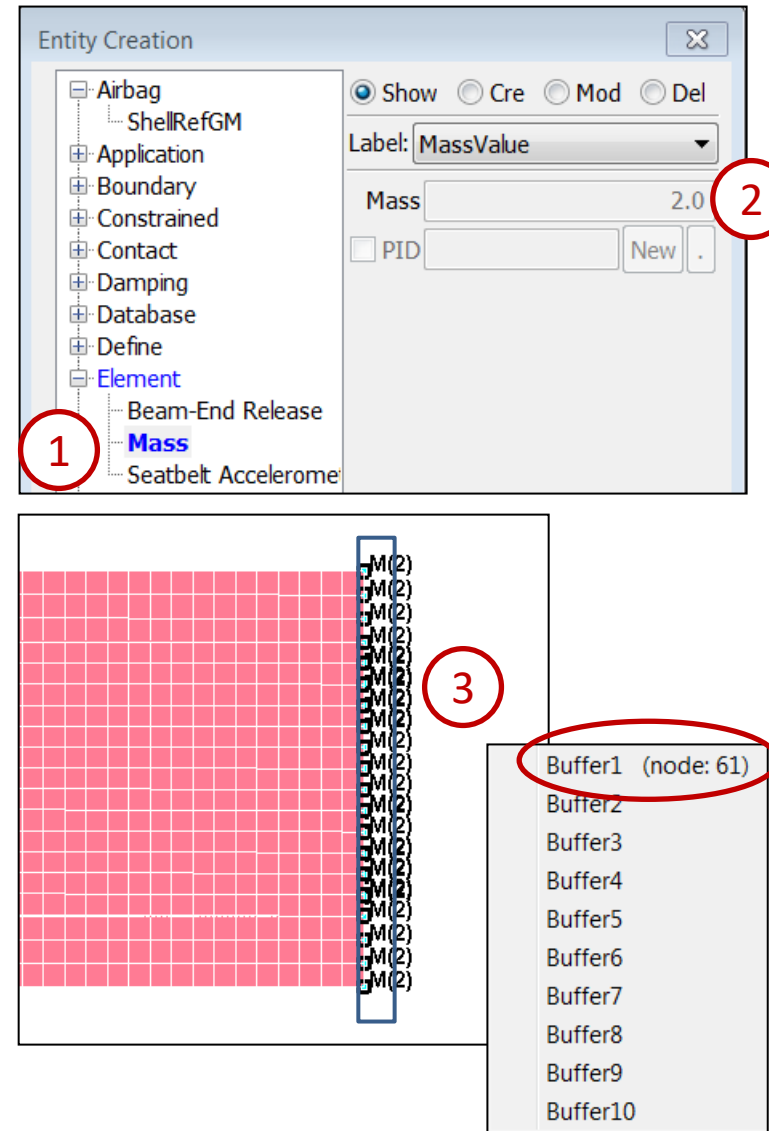
- Go to **Model** → **Part Data**
- Select **Assign**
- Click **All**
- Click **SECID**
- Select “1.0mm” in the Link SECTION interface
- Click **Done** in Link SECTION interface
- Click **MID**
- Select “Mild Steel” in the Link MAT interface
- Click **Done** in Link MAT interface
- Click **Apply**
- Click **Done**



# Workshop 5 (continued...)

Add mass to end of rail...

- Click the **Top** render button
- Click the **Zoom In** render button and zoom in on the right end of the rail
- Go to **Model** → **Create Entity**
- Expand **Element**
- Select **Mass**
- Select **Cre**
- Enter **Mass: 2.0**
- Select **Area** in the General Selection interface
- Click and drag to select 1 row of nodes along the end of the rail (see 3)
- Click **Save** → **To Buffer** → **Buffer1** in the General Selection interface
- Click **Apply**
- Select **Show**
- Select **Label: MassValue**
- Click **Active** in the General Selection interface

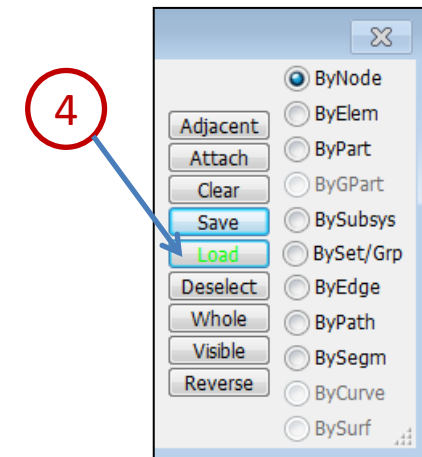
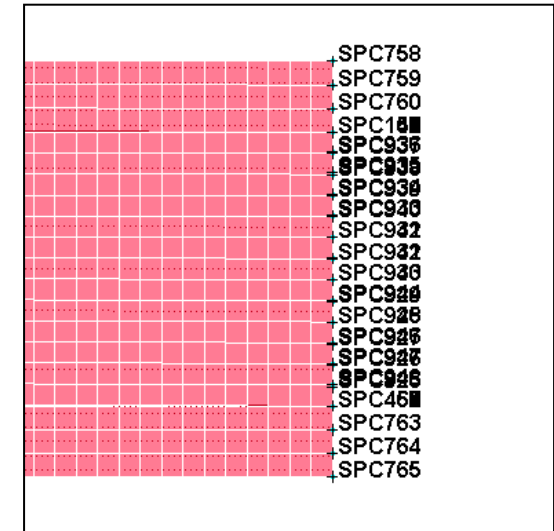
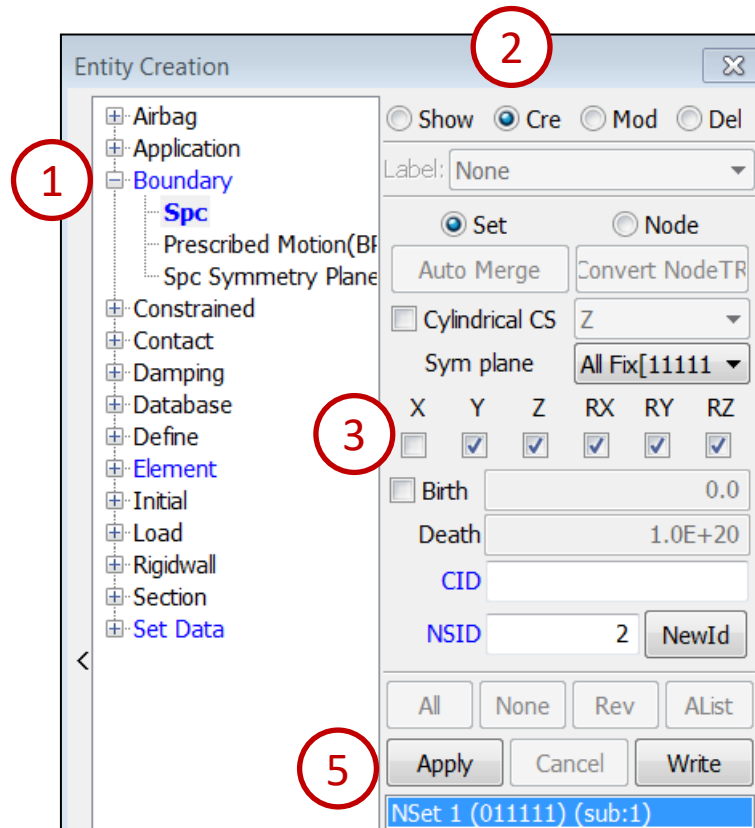




# Workshop 5 (continued...)

## Create constraints at end of rail...

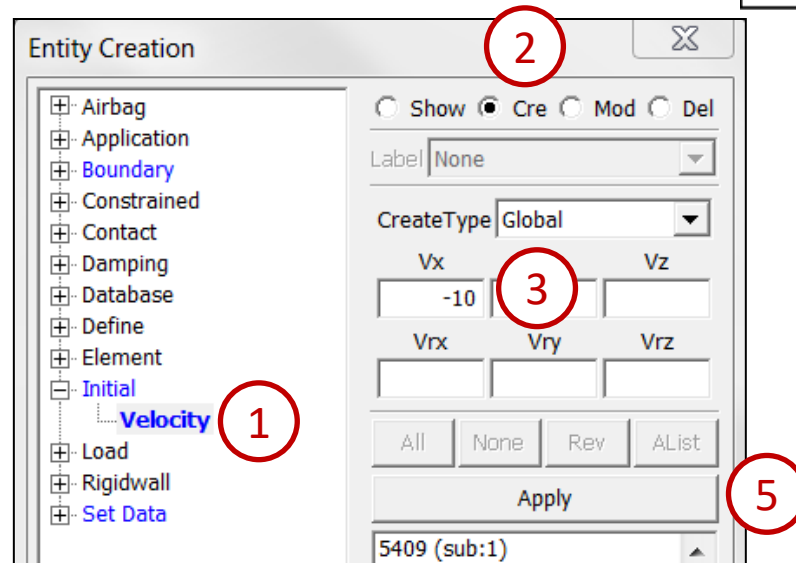
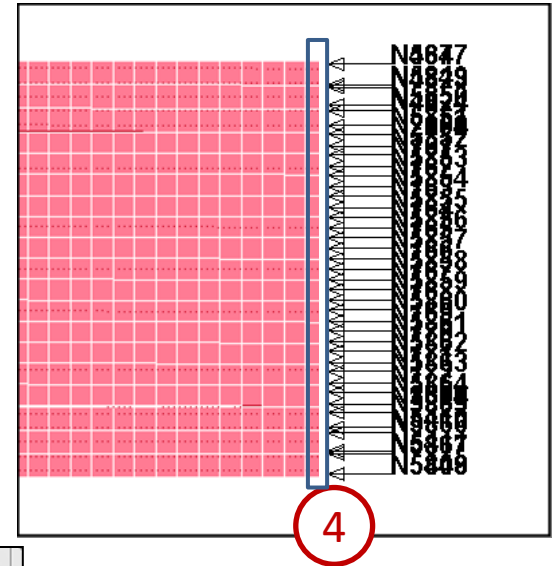
- Expand **Boundary** in entity creation
- Select **Spc**
- Select **Cre**
- Activate **Y, Z, RX, RY, and RZ** (everything except X)
- Click **Load** → **From Buffer** → **Buffer1** in the General Selection interface
- Click **Apply**



# Workshop 5 (continued...)

Create initial velocities at end of rail...

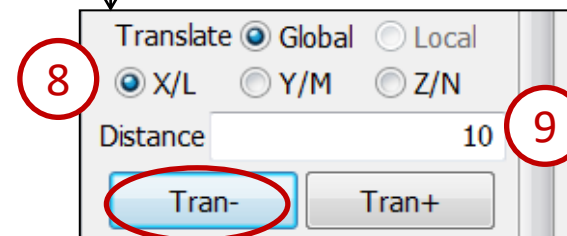
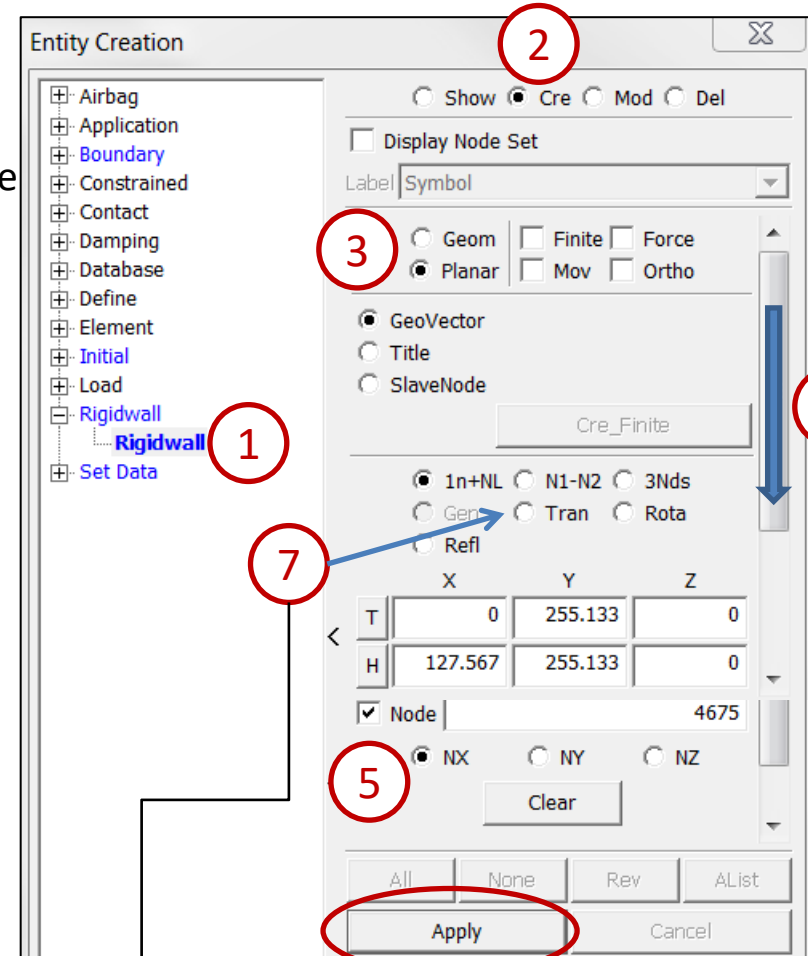
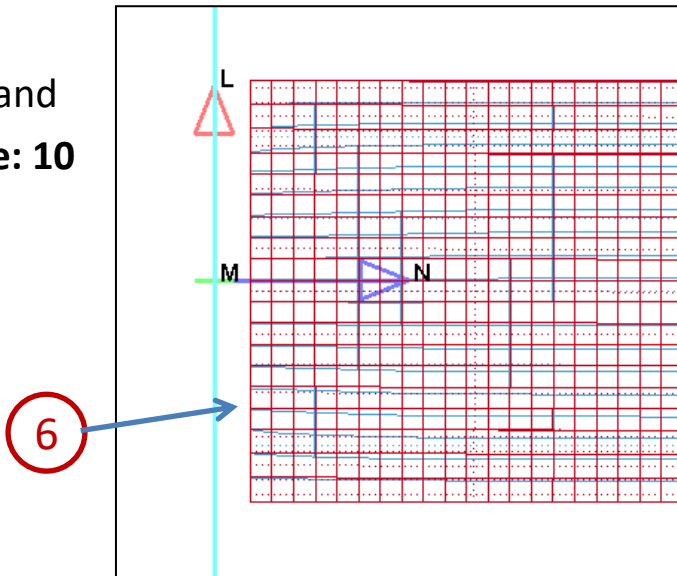
- Expand **Initial** in entity creation
- Select **Velocity**
- Select **Cre**
- Enter **Vx: -10.0**
- Click **Load** → **From Buffer** → **Buffer1** in the General Selection interface
- Click **Apply**



# Workshop 5 (continued...)

Create a rigid wall...

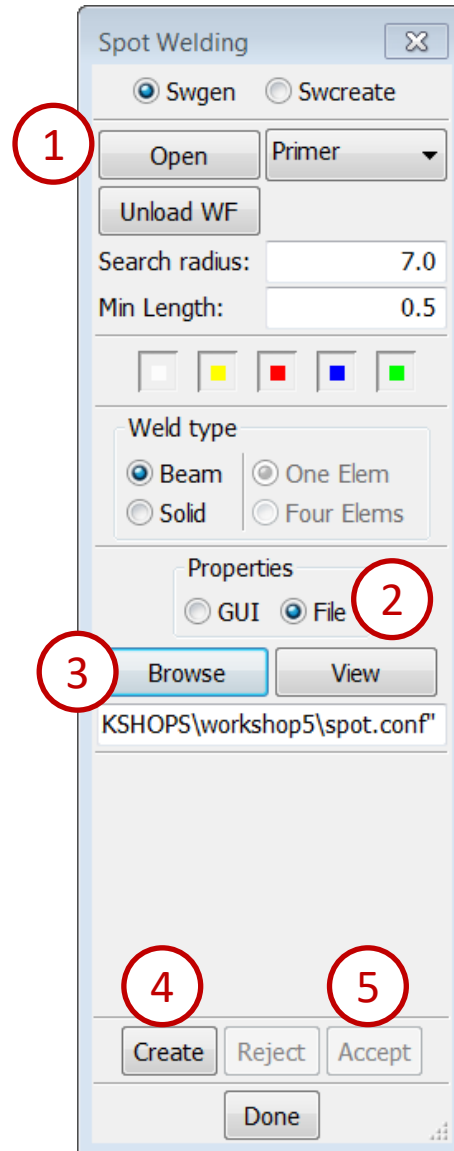
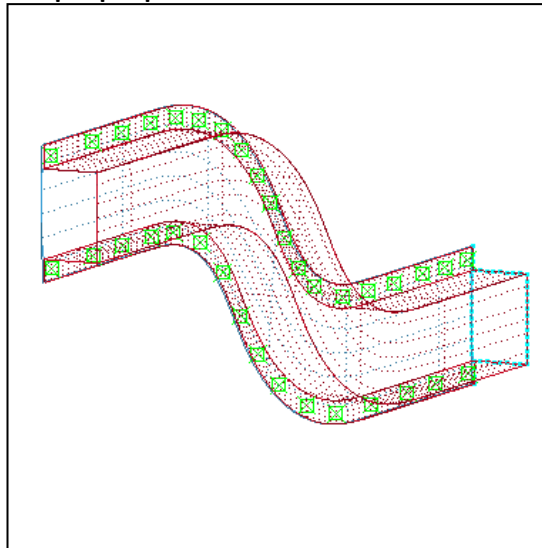
- Click the **Auto Center** (AutCen) render button
- Click the **Zoom In** render button and zoom in on the left end of the rail
- Expand **Rigidwall** in entity creation
- Select **Rigidwall**
- Select **Cre**
- Select **Planar**
- Select **NX** (you may have to scroll down)
- Pick any node at the left end of the rail
- Select **Tran**
- Select **X/L** and enter **Distance: 10**
- Click **Tran -**
- Click **Apply**
- Click **Done**



# Workshop 5 (continued...)

Create welds using a master weld file...

- Click the **Auto Center** (AutCen) render button
- Click the **Wire** render button
- Go to **Mesh → Spot Welding**
- Click **Open** in Spot Welding dialog box, load spotweld file (select /workshop5/welds.spot)
- Click **Open** in the Read Options popup
- Select **Properties: File**
- Click **Browse** (select /workshop5/spot.conf)
- Click **Open** in the Read Options popup
- Click **Create**
- Click **Accept**
- Click **Done**



# Workshop 5 (continued...)

Define contact...

- Go to **Model** → **Keyword Manager**
- Select **All** then expand **CONTACT**
- Double-click "**AUTOMATIC\_SINGLE\_SURFACE**"
- Click **NewID** in the Keyword Input Form
- Set **SSTYP: 2**
- Click the Link Button next to the **SSID** field
- Select "1 spotweld part set" in the Link SET interface
- Click **Done** in the Link SET interface
- Click **Accept**
- Click **Done**

Keyword Input Form

NewID Draw Pick Add Accept Delete Default Done

☐ Use \*Parameter (Subsys: 1 New\_Subsystem\_1) Setting

\*CONTACT\_AUTOMATIC\_SINGLE\_SURFACE\_(ID/TITLE/MPP) (1)

1 CID TITLE

2

☐ MPP1 ☐ MPP2

2 IGNORE BUCKET LCBUCKET NS2TRACK INITITER PARMAX UNUSED CPARAMS

0 200 3 2 1.0005 0

3 UNSEED CHKSEGS PENSE GRPABLE

0 0 1.0

4 SSID MSID SSTYP MSTYP SBOXID MBOXID SPR MPR

1 0 2 0 0 0 0 0

# Workshop 5 (continued...)

Set termination time...

- Go to **Model** → **Keyword Manager**
- Select **All**
- Expand **CONTROL**
- Double-click “**TERMINATION**”
- Enter **ENDTIM: 10** in Keyword Input Form
- Click **Accept**
- Click **Done**

Keyword Input Form

☐ Use \*Parameter

\*CONTROL\_TERMINATION ( 0 )

	1	ENDTIM	ENDCYC	DTMIN	ENDENG	ENDMAS
		10	0	0.0	0.0	0.0

Set d3plot frequency...

- Expand **DATABASE** in Keyword Manager
- Double-click “**BINARY\_D3PLOT**”
- Enter **DT: 1** in Keyword Input Form
- Click **Accept** and **Done**

Keyword Input Form

☐ Use \*Parameter

\*DATABASE\_BINARY\_D3PLOT ( 0 )

	1	DT	LCDT	BEAM	NPLTC	PSETID
		1		0		

2 IOOPT  
0

# Workshop 5 (continued...)

Set ASCII output frequency...

- Expand **DATABASE** in Keyword Manager
- Double-click “ **ASCII\_option**”
- Enter **Default DT: 0.1** (and hit the Enter key)
- Activate **GLSTAT**
- Activate **MATSUM**
- Activate **SWFORC** (spotweld forces)
- Click **Accept** and **Done**

Keyword Input Form

5 6

Accept Done

☐ Use \*Parameter

1 \*DATABASE\_OPTION ( 0 )

Default DT 0.1 Default BINARY 0

Default LCUR Default IOOPT 1

☐ ABSTAT

DT BINARY LCUR IOOPT

0.1 0 0 1

2 ☒ GLSTAT DT BINARY LCUR IOOPT

0.1 0 0 1

3 ☒ MATSUM DT BINARY LCUR IOOPT

0.1 0 0 1

4 ☒ SWFORC DT BINARY LCUR IOOPT

0.1 0 0 1

# Workshop 5 *(continued...)*

Save keyword file...

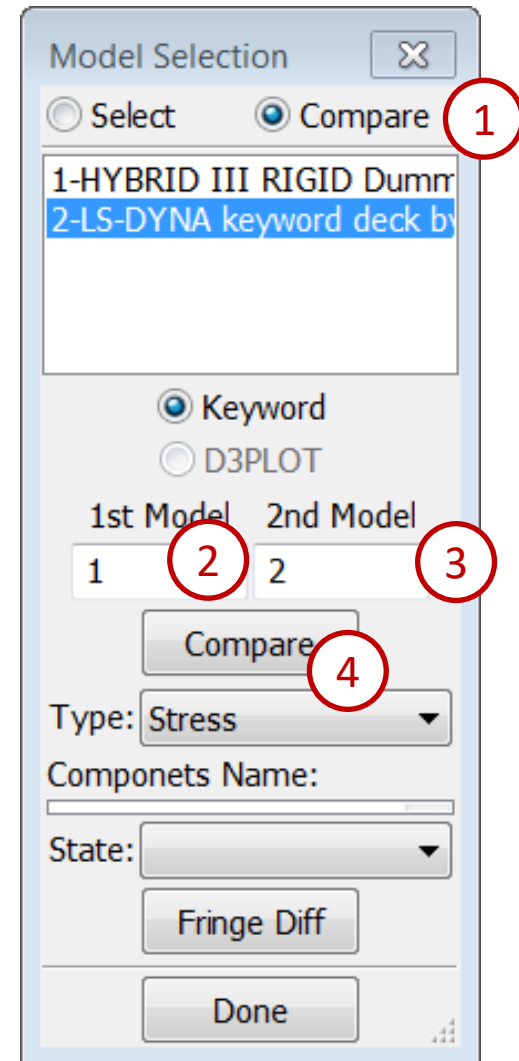
- File > Save As > Save Keyword As...
- Click **Browse** (save as /workshop5/srail.k) then **Save**
- Click **Advanced...**
- Click customize order: **Expert**
- Click **Ok** in the Advanced Setting interface
- Click **Save** in the Save Keyword interface



# Workshop 5 (continued...)

Compare a set of LS-DYNA Keyword files...

- Launch a new session of LS-PrePost
- File > Open > LS-DYNA Keyword File  
(select /workshop5/compare/belted1.k)
- File > Open > LS-DYNA Keyword File  
(select /workshop5/compare/belted2.k)
- Go to **Model** → **MSelect**
- Select **Compare**
- Click in the **1st Model** field and select model 1
- Click in the **2nd Model** field and select model 2
- Click **Compare**



# Workshop 5 (continued...)

Compare a set of LS-DYNA Keyword files...

- Select the **Common Keywords** tab
- Examine the **RED** items to identify differences

Model Compare

Summary Info **Common Keywords** Model1 only Model2 only

CONTROL\_OUTPUT(1, 1)

Keyword count: 1

Keyword ID range: 116 To 116

	Field #1	Field #2	Field #3	Field #4	Field #5	Field #6	Field #7	Field #8	Field #9	Field #10
<b>Card #0</b>	NPOPT	NEECHO	NREFUP	IACCOP	OPIFS	IPNINT	IKEDIT	IFLUSH		
<b>Value 1</b>	0	0	0	0	0	0	0	5000		
<b>Value 2</b>	0	0	0	0	0	0	100	5000		
<b>Card #1</b>	IPRTF	IERODE	TET10	MSGMAX	IPCURV	GMDT	IP1DBLT	EOCS		
<b>Value 1</b>	0	0	2	50	0	0	0	0		
<b>Value 2</b>	0	0	2	50	0	0	0	0		
<b>Card #2</b>	TOLEV	NEWLEG	FRFREQ	MINFO	SOLSIG	MSGFLG	CDETOL			
<b>Value 1</b>	2	0	1	0	0	0	10			
<b>Value 2</b>	2	0	1	0	0	0	10			

☐ ViewAll ☐ Draw

# ***Workshop 6***

## ***Post-Processing***

- ❖ Animation interface
- ❖ Fringe (contour) plotting
- ❖ Time history/ASCII data plotting
- ❖ Section cut
- ❖ Cross plotting
- ❖ Vector draw

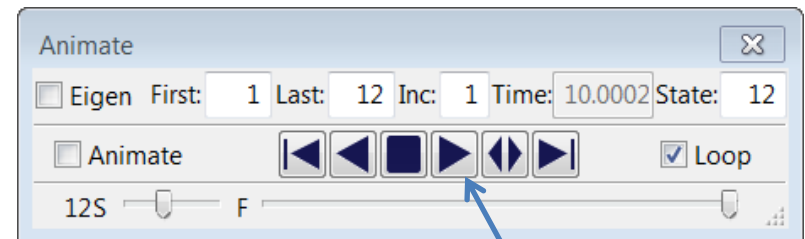
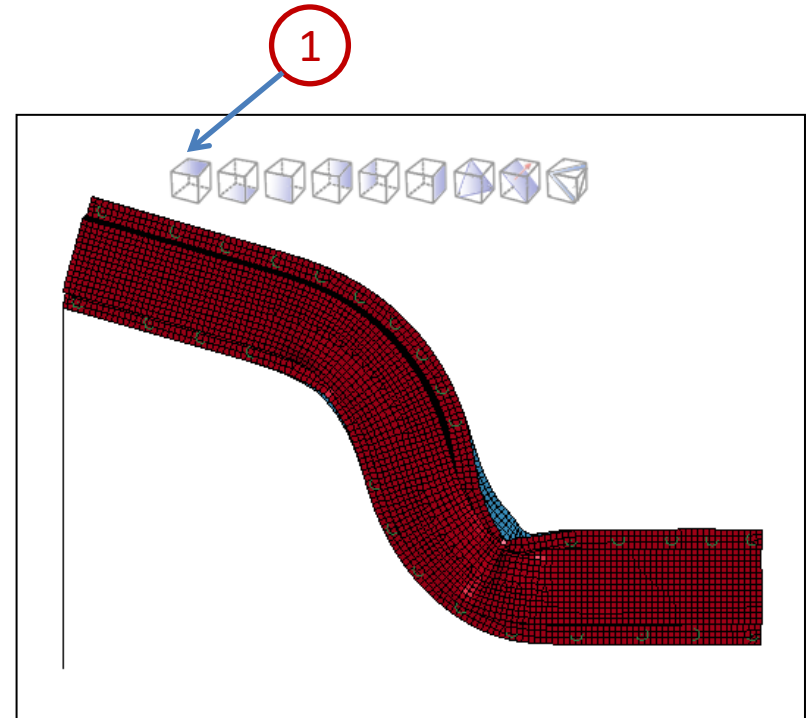
# Workshop 6

Load results d3plot file...

- Launch a new session of LS-PrePost
- File > Open > LS-DYNA Binary Plot (select /workshop6/d3plot), click **Open**
- Click the **Top** render button
- Click **Animate Forward** (click the **Anim** render button first if necessary)
- Decrease the animation speed using the slider

Generate a movie...

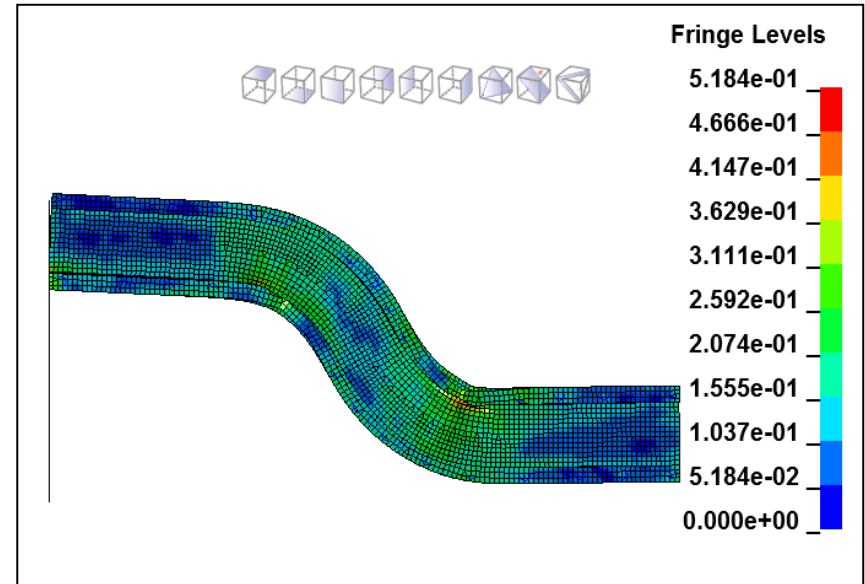
- File > Movie...
- Select Format : **JPEG**
- Enter **File Name: animation1**
- Click **Start**



# Workshop 6 (continued...)

Create a fringe contour plots...

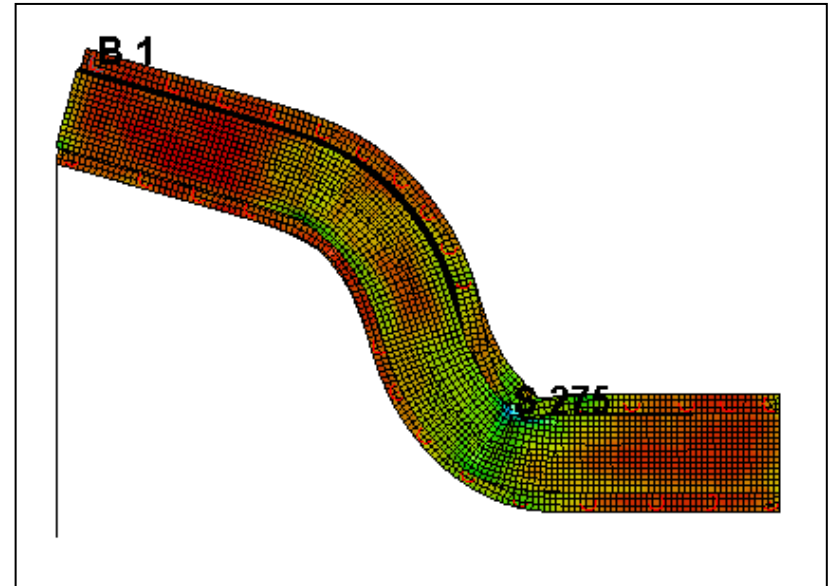
- Go to **Post** → **Fringe Component**
- Click **Ndv**
- Select “result displacement” from the list
- Click **Animate Forward**  
(if the animation is not already playing)
- Click **Stress**
- Select “Von Mises stress” from the list
- Click **Stop Animation**



# Workshop 6 *(continued...)*

Modify range settings...

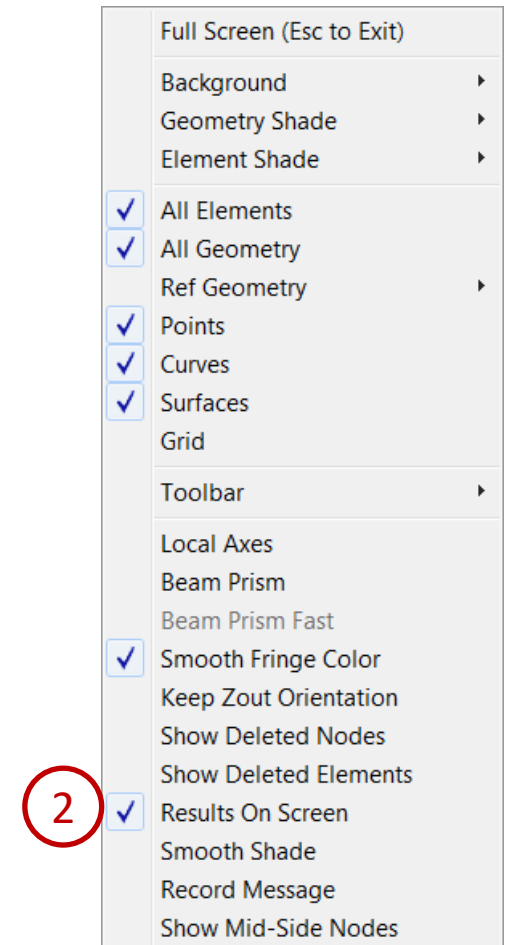
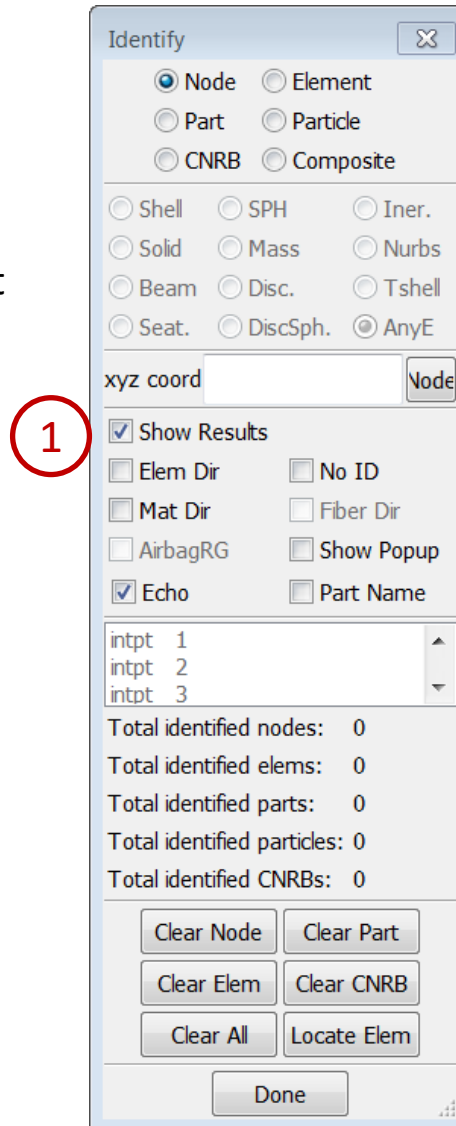
- Drag the slider to the last frame
- Go to **Post** → **Fringe Range** (FriRang)
- Select **Avg: None**
- Activate **Reverse Colors**
- Activate **Ident Min** and **Max**
- Enter **No. Min/Max Entities: 1** (and hit Enter)
- Select **Level: 20**
- Click **Animate Forward**  
(if the animation is not already playing)
- Click **Stop Animation**
- Click the **Shade Element** (ShaEle) render button



# Workshop 6 (continued...)

Identify nodes and elements by ID...

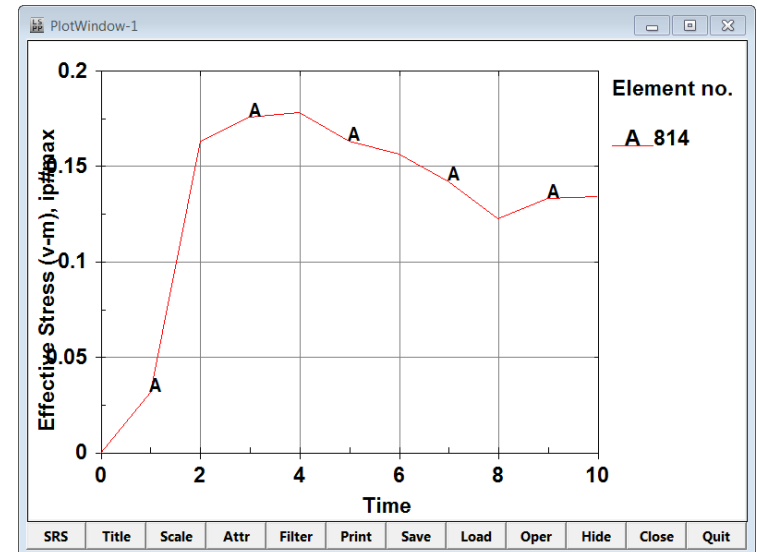
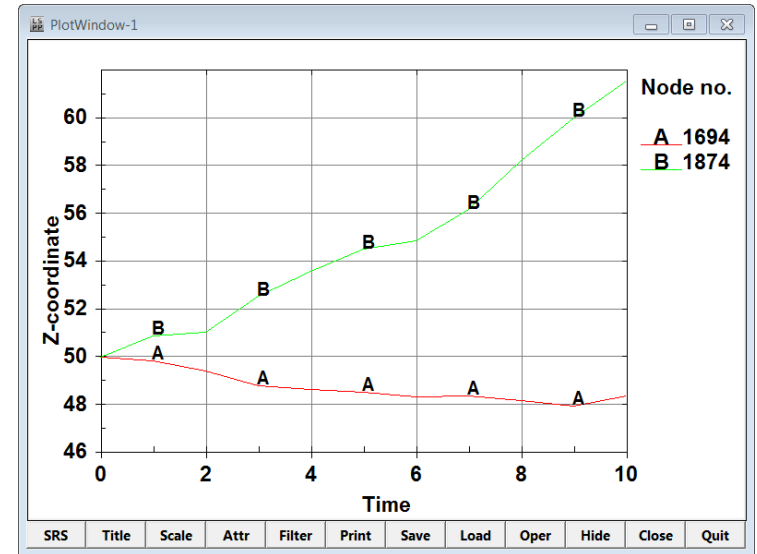
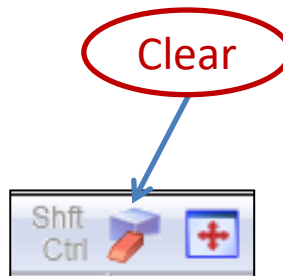
- Drag the slider to the last frame
- Go to **Post** → **Fringe Component**
- Click **Stress**
- Select “Von Mises stress” from the list
- Go to **Element Tools** → **Ident**
- Select **Node**
- Activate **Show Results** in Identify
- Go to **View** (drop down menu)
- Activate **Results On Screen** in view
- Pick some nodes in the model
- Select **Element**
- Pick some elements by clicking
- Click **Clear Node**
- Click **Clear Elem**
- Click **Done** in Identify



# Workshop 6 (continued...)

Plot time history data...

- Go to **Post** → **History**
- Select **Nodal**
- Select “Z-displacement” from the list
- Pick 2 nodes on the Model
- Click **Plot**
- Click **Quit** in the Plot Window
- Select **Element**
- Select “Effective Stress (v-m)” from the list
- Pick an element on the plate
- Click **Plot**
- Click **Quit** in the Plot Window
- Click the **Clear** render button

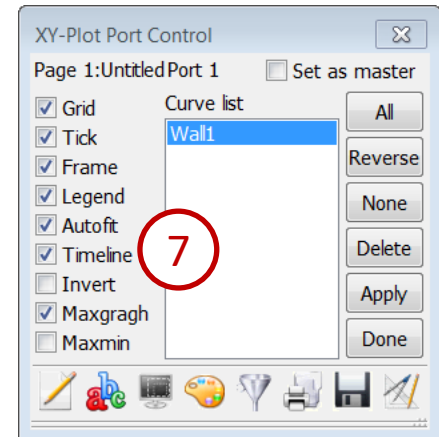
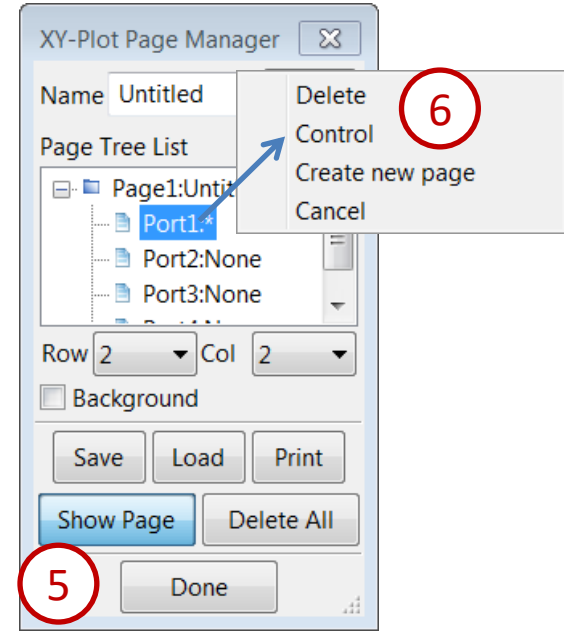
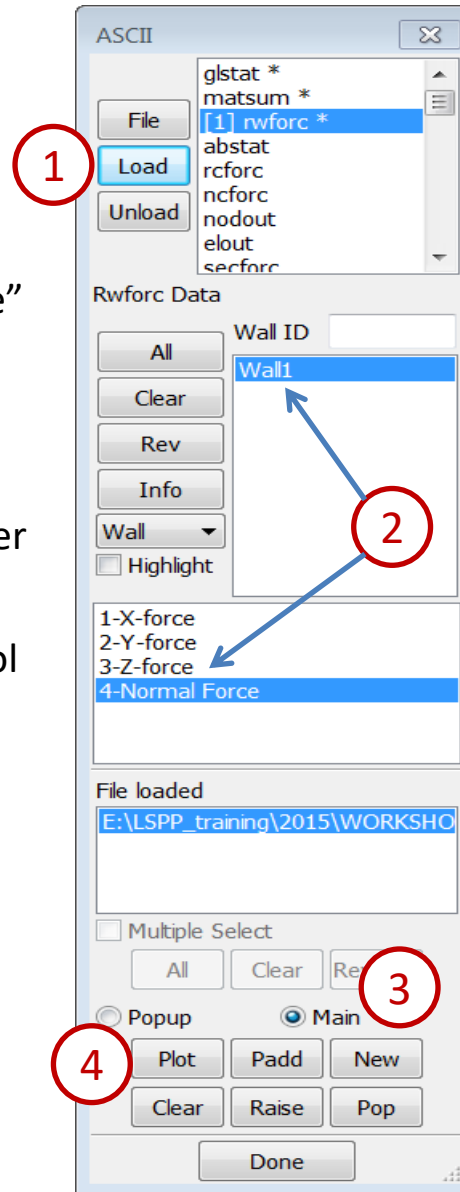




# Workshop 6 (continued...)

Plot ASCII data...

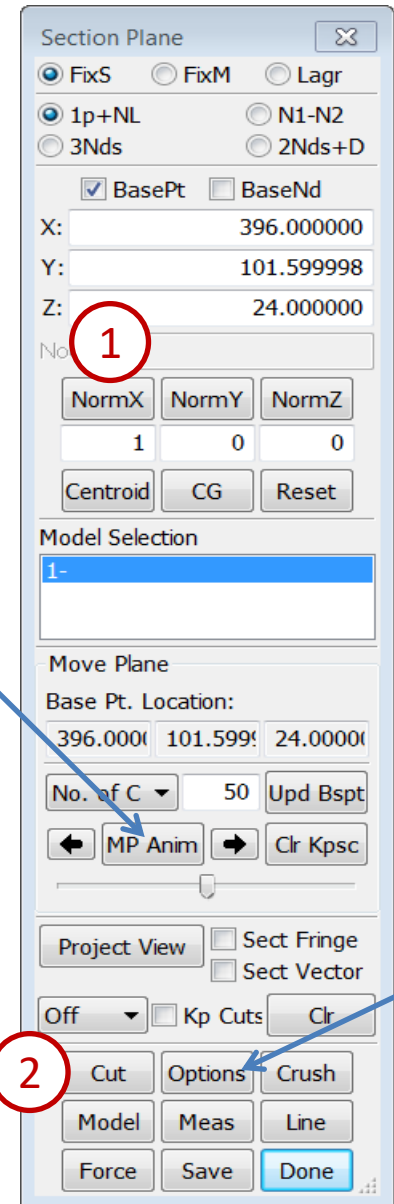
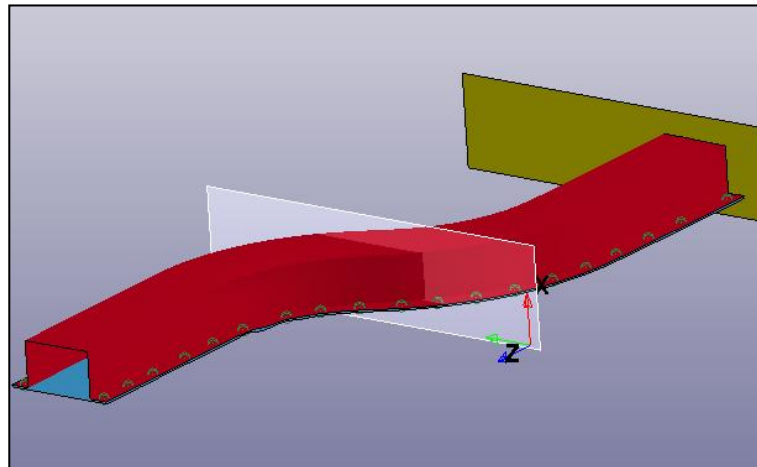
- Go to **Post** → **ASCII**
- Select “rwforc \*” from the top list
- Click **Load**
- Select the “Wall1” and “4-Normal Force” in the bottom list
- Activate **Main** in ASCII dialog
- Click **Plot** in ASCII dialog
- Click **Show Port** at XY-Plot Page Manager
- Right click **Port1:\***, select **Control**
- Activate **Timeline** in XY-Plot Port Control
- Click **Animate Forward**
- Click **Hide** at XY-Plot Page Manager
- Click **Stop Animation**



# Workshop 6 (continued...)

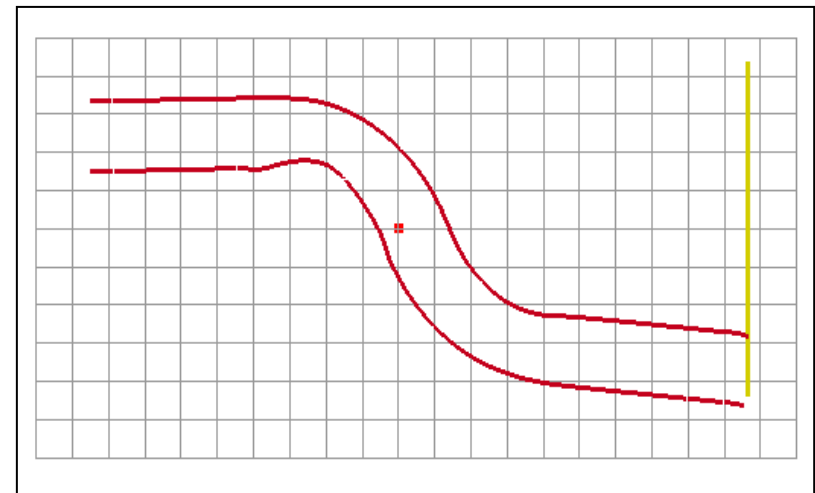
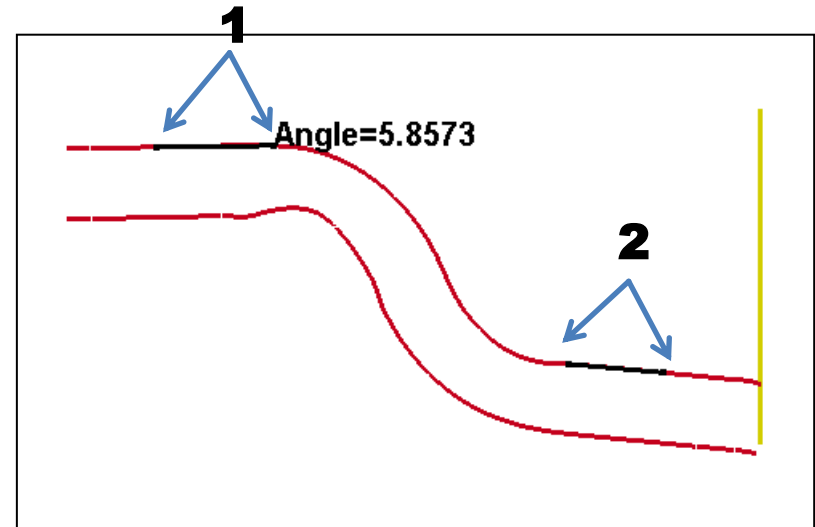
Cut a section plane...

- Rotate the model for an isometric view
- Go to **Model** → **Section Plane**
- Click **NormX**
- Click **Cut**
- Click **Options**
- Select **Line Width: 3**
- Click **Animate Forward**
- Click **MP Anim**
- Click **MP Anim** again stop the animation
- Click **Stop Animation**



Take section plane measurements...

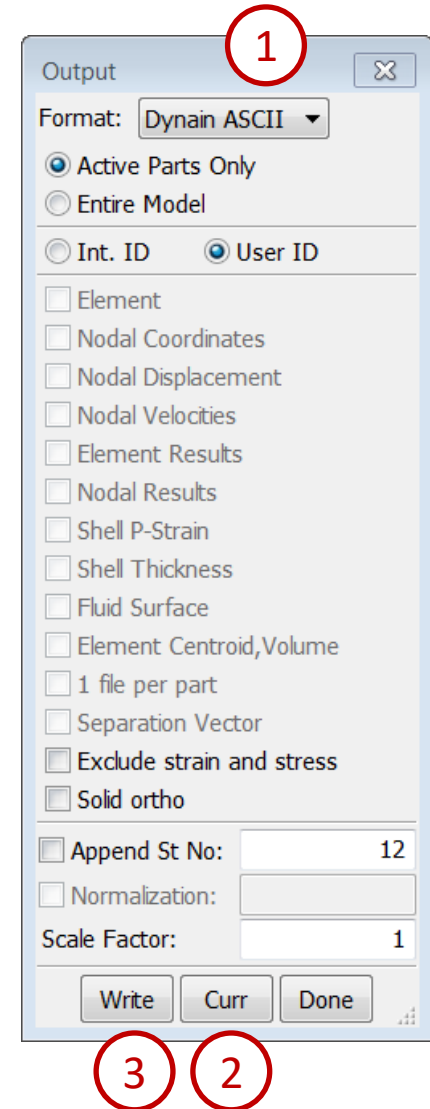
- Click **Model** in Section Plane
- Click **NormZ**
- Click **Cut**
- Click **Project View** in Section Plane
- Click **Meas** in section plane(NOT Measur)
- Select **2Ln-Angle**
- Click two points to form a line on the left top
- Click two points to form a line on the right top
- Click **Options**
- Activate **ShMesh** (section plane as a mesh)
- Click **Curr State**
- Click **Write** to save the section data  
(writes keyword file with beam elements only)
- Click **Done** in Section Plane interface



# Workshop 6 (continued...)

Output dynain file...

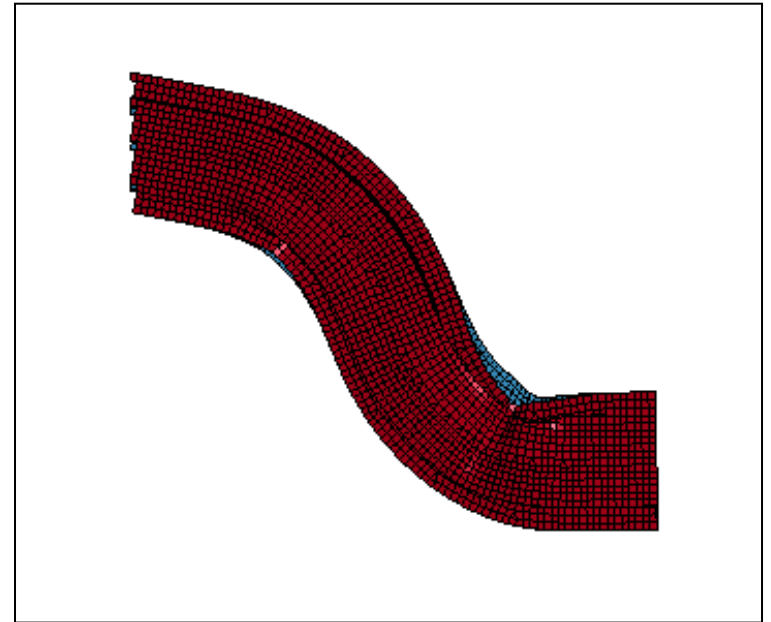
- Go to **Post** → **Output**
- Select **Format: Dynain ASCII**
- In the animation controls, advance to the last state
- Click **Curr** (current state)
- Click **Write**  
(writes a dynain ASCII file that contains stress, strain, and thickness information)



# Workshop 6 *(continued...)*

Save LS-PrePost database (post.db)...

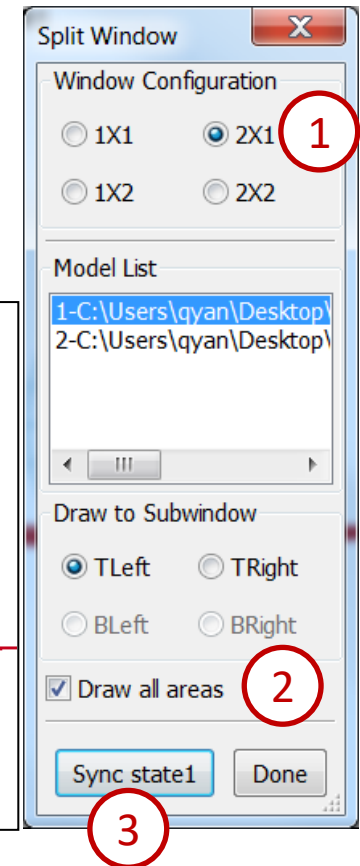
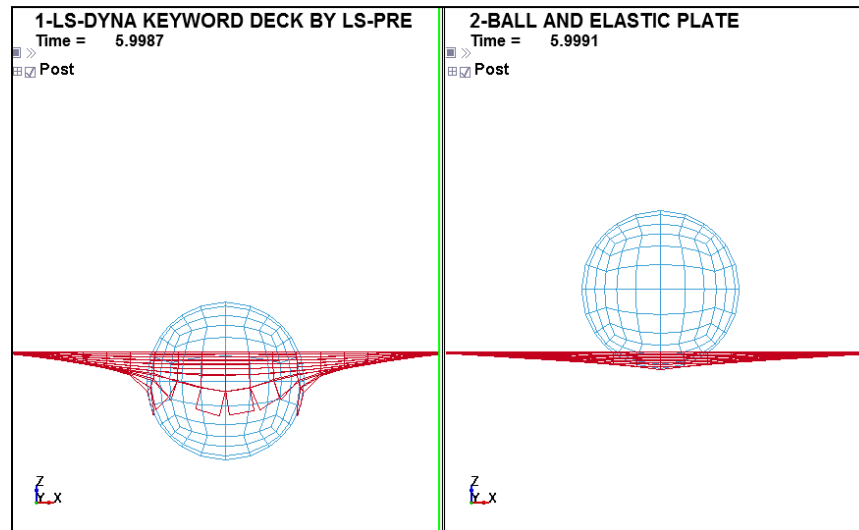
- In the animation controls, advance to the desired state
- Go to **Model → Assembly and Part** (SelPart)
- Select “1 LSHELL1” and “2 LSHELL2” only
- Go to **Element Tools → Blank**
- Select **Area** in the General Selection interface
- Select **Out**
- Draw a box around a portion of the model
- File > Save As > Save Post.db As...
- In the Save PostProcess DB interface, select the data you want
- Click >>
- Enter a file name  
(select /workshop6/post.db)
- Click **Write DB**



# Workshop 6 (continued...)

View multiple models by split window...

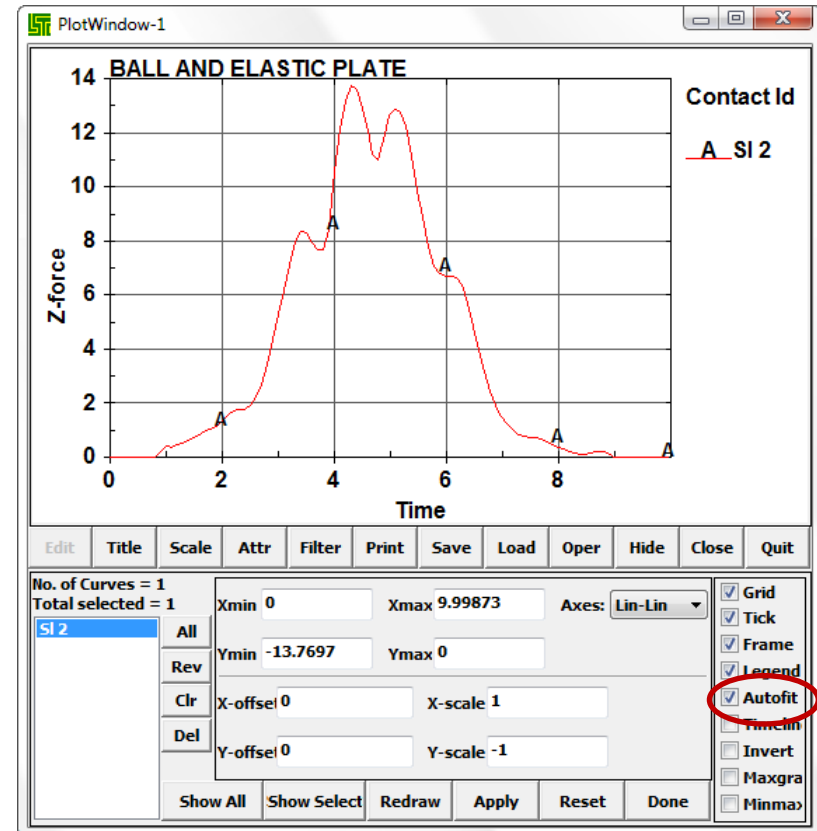
- Launch a new session of LS-PrePost
- File > Open > LS-DYNA Binary Plot  
(select /workshop6/example2/d3plot), click **Open**
- File > Open > LS-DYNA Binary Plot  
(select /workshop6/elastic\_plate/d3plot), click **Open**
- Go to **Model** → **SplitW**
- Select **2X1**
- Activate **Draw all areas**
- Click **Sync state1** button
- Click the **Left** render button
- Click **Animate Forward**



# Workshop 6 (continued...)

Create a cross plot...

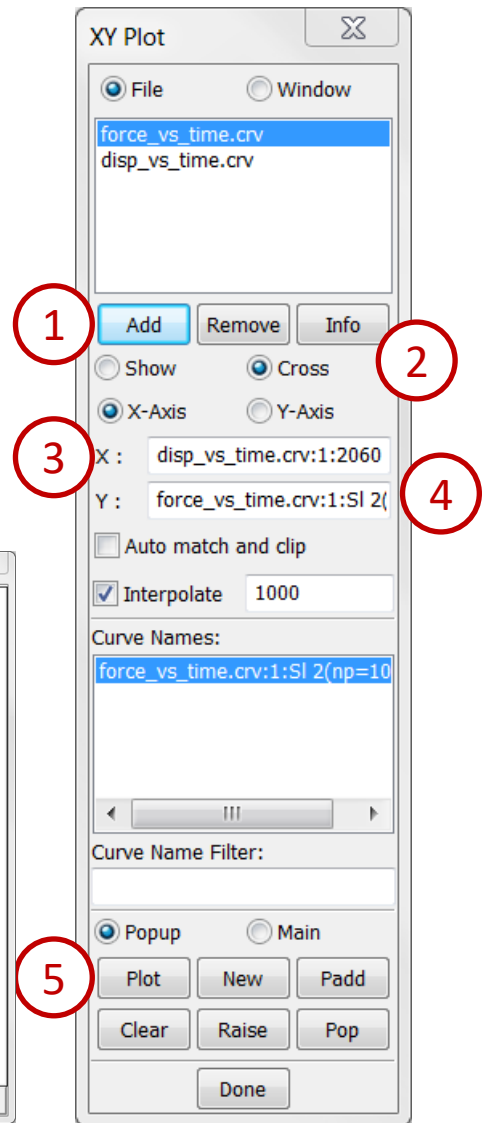
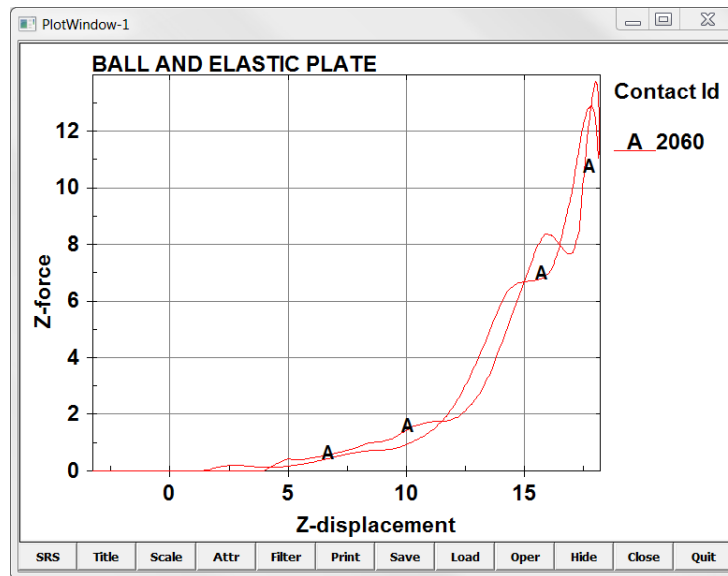
- Launch a new session of LS-PrePost
- File > Open > LS-DYNA Binary Plot (select /workshop6/elastic\_plate/d3plot), click **Open**
- Go to **Post** → **ASCII**
- Select “rcforc \*”
- Click **Load**
- Select “SI-2” from the middle list
- Select “Z-force” from the lower list
- Click **Plot**
- Click **Scale** in PlotWindow-1
- Enter **Y-scale: -1**
- Click **Apply**
- Activate **Autofit**
- Click **Save** enter **Filename:** force\_vs\_time.crv
- Click **Save** in the bottom row of buttons
- Click **Quit** in PlotWindow-1



# Workshop 6 (continued...)

Create a cross plot (continued)...

- Go to **Post** → **XYPlot**
- Click **Add**  
(select /workshop6/elastic\_plate/disp\_vs\_time.crv)
- Select **Cross**
- Select **X-Axis**
- Select “disp\_vs\_time.crv” in file
- Click “disp\_vs\_time.crv:2060” in Curve Names
- Select **Y-Axis**
- Select “force\_vs\_time.crv”  
in file
- Click “force\_vs\_time.crv:Sl 2”  
in Curve Names
- Click **Plot**

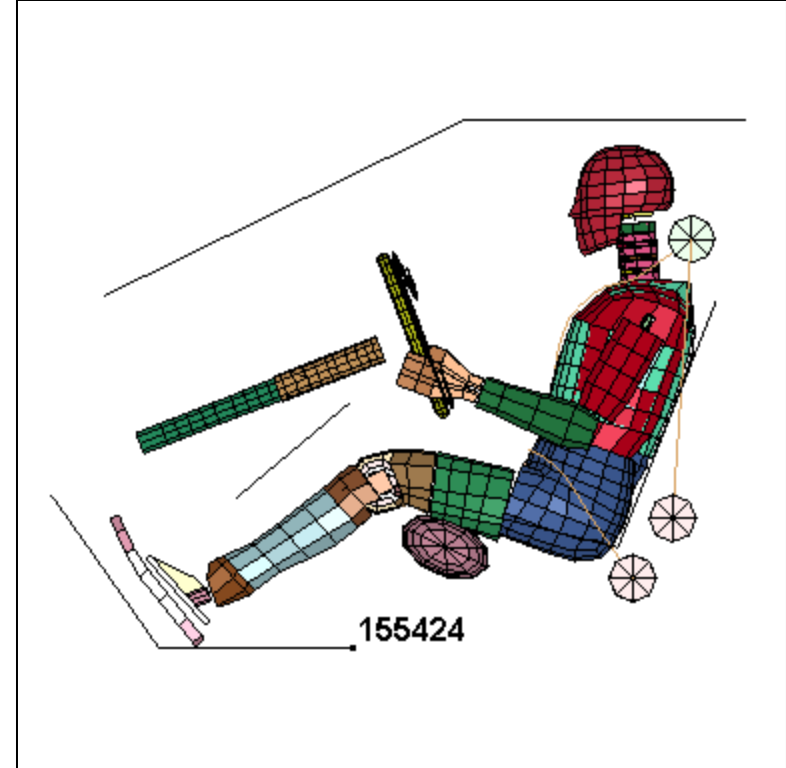




# Workshop 6 *(continued...)*

Set a reference point...

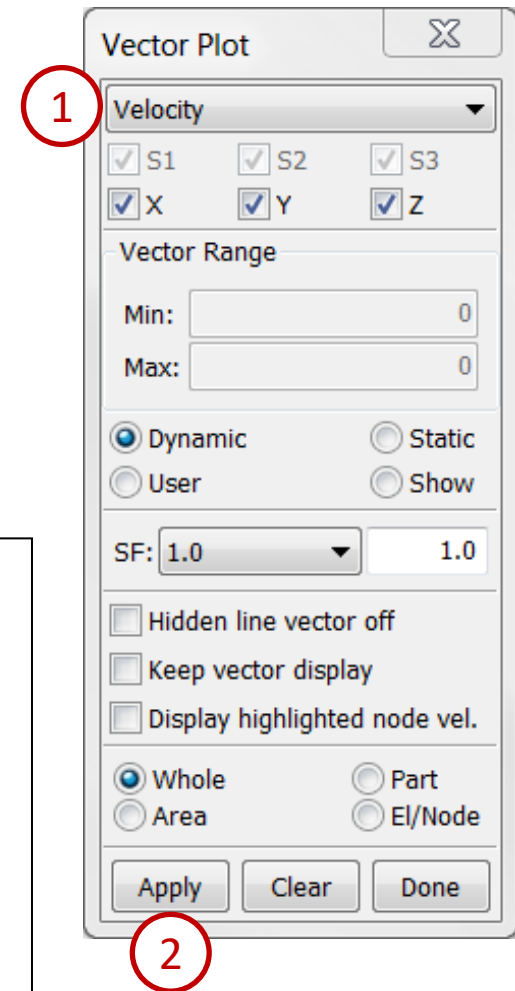
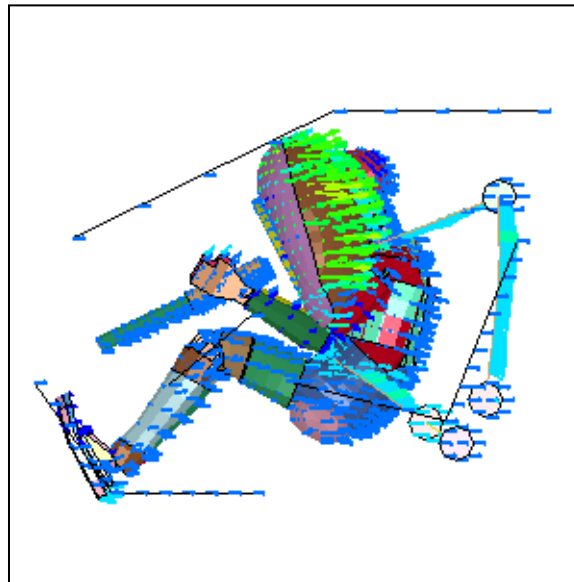
- Launch a new session of LS-PrePost
- File > Open > LS-DYNA Binary Plot (select /workshop6/belted/d3plot), click **Open**
- Click the **Left** render button
- Click **Animate Forward**
- Click **Stop Animation**
- Go to **Post** → **Follow**
- Pick any node on the structure
- Click **Apply**
- Click **Animate Forward**
- Click **Reset** (in the Follow interface)
- Click **Done** (in the Follow interface)



# Workshop 6 (continued...)

View velocity vectors...

- Go to **Post** → **Vector**
- Select **Velocity** from the drop down menu
- Click **Apply**
- Click **Next State** (in the animation interface) to step through the animation frame by frame
- Click **Done**



# Workshop 6 *(continued...)*

## Colors, Groups, and Views...

- Go to **Model → Part Color**
- Click **Lmap**  
(select /workshop6/colors\_groups\_views/colors)
- Go to **Model → Groups**
- Click **Load**  
(select /workshop6/colors\_groups\_views/groups)
- Select “dummy” from the list
- Click **Select**
- Go to **Model → Views**
- Click **Load**  
(select /workshop6/colors\_groups\_views/views)
- Select “View\_01” from the list
- Click **Select**
- Click **Done**

