

**LS-dyna and Prepost 4.3.13+
StepbyStep Training
manual**

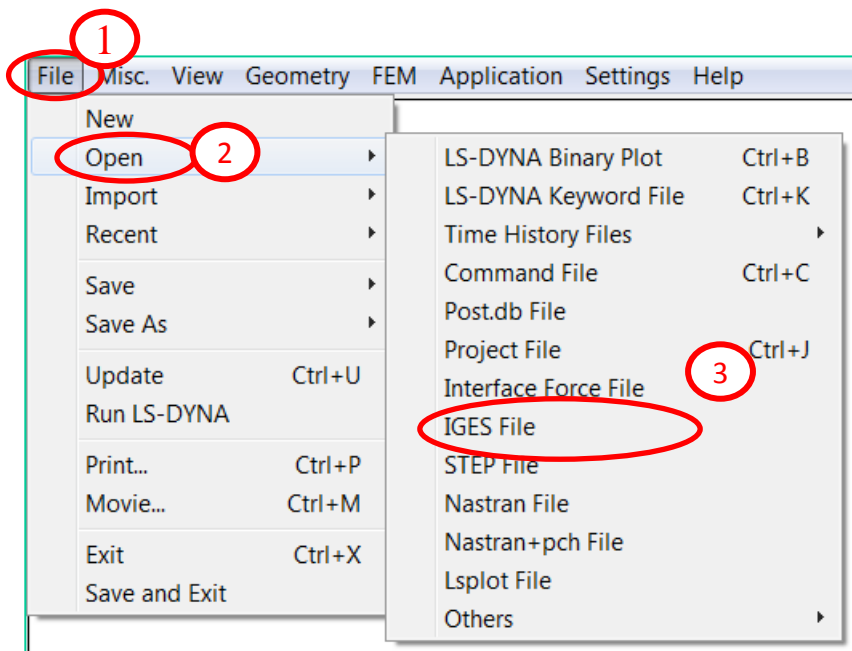
By Jeanne He

support@formingsimulation.com

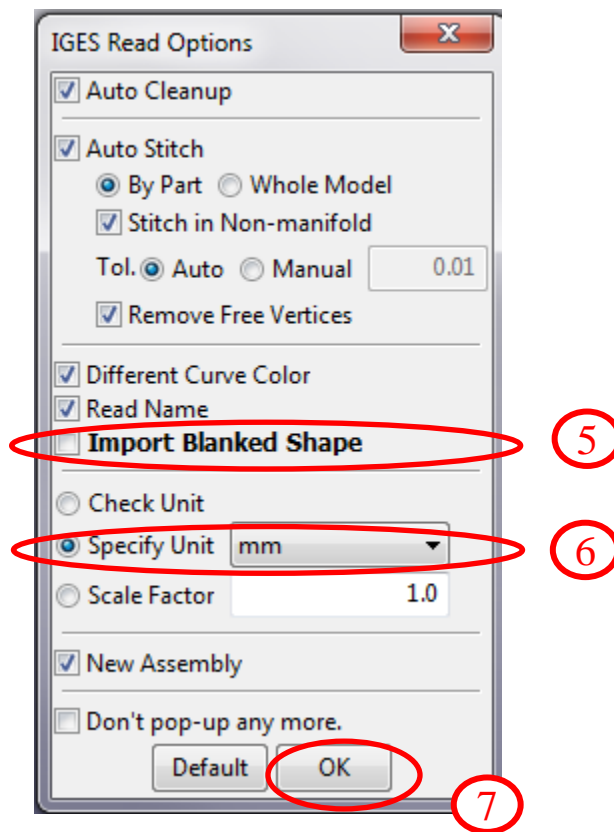
October , 2017

Input Designed Surfaces Iges file

Open an IGES file:

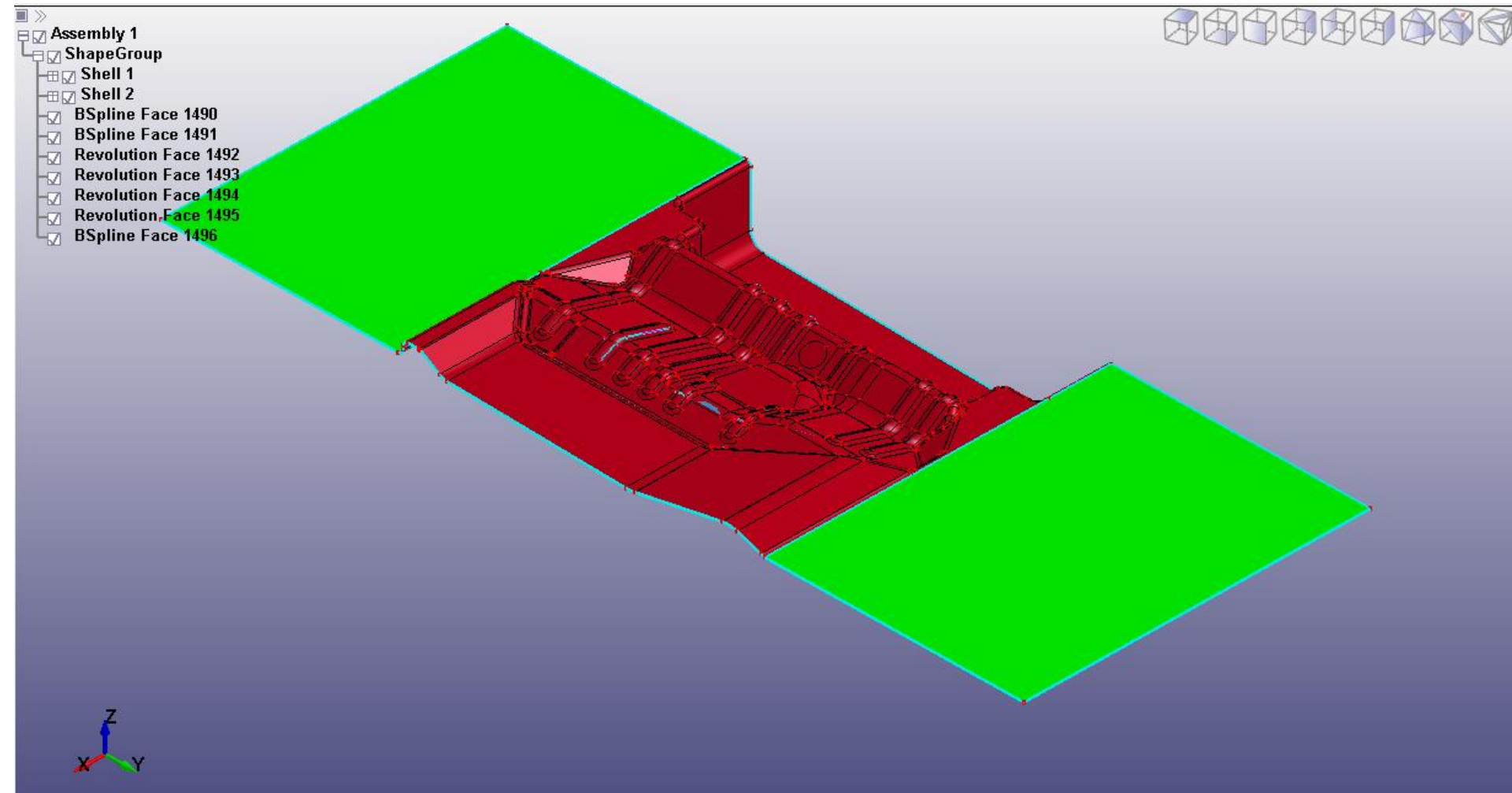


Directory: Workshop 1



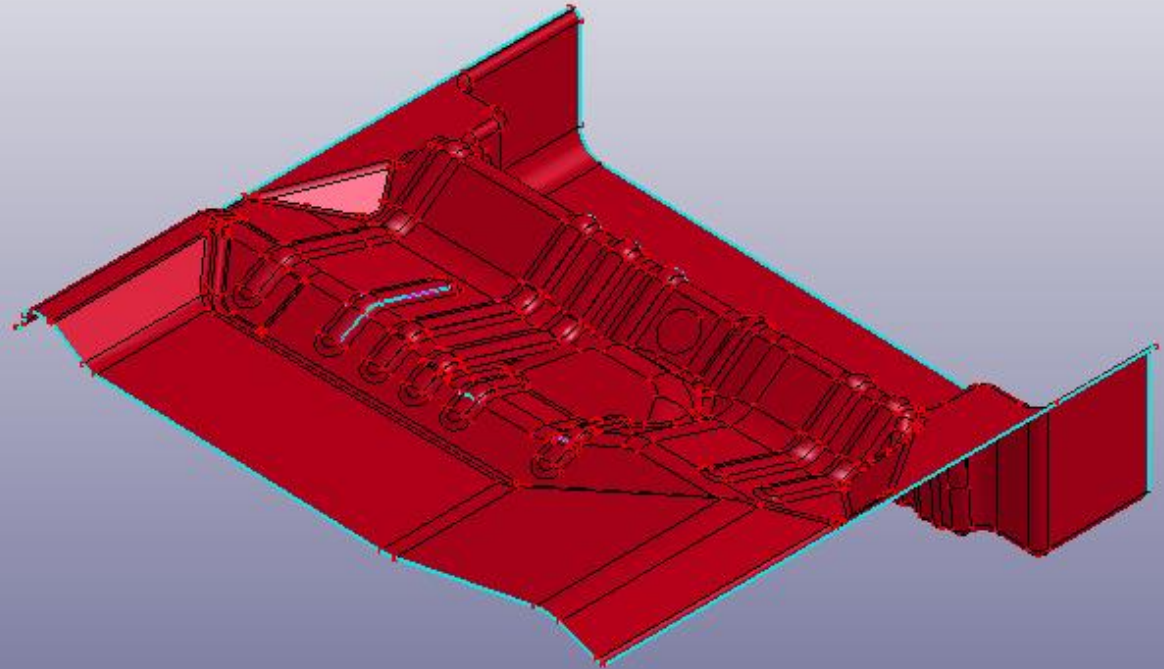
Name	Date	Tags	Size
53694txma_001_f0297_f1.igs	21/08/2017 15:45		16,451 KB
1403_blank_optimized_cf.igs	21/08/2017 15:45		93 KB

Input Surfaces



Turn Layers Off/On

Check off other layers, leave only Shell 1 (the punch) displayed



Mesh the Punch

The screenshot displays a CAD software interface with a 3D model of a part meshed in red. The software window includes a menu bar (File, Misc, View, Geometry, FEM, Application, Settings, Help), a tree view on the left, a central 3D view, and a right-hand property panel. The property panel is titled 'Mesh Mode' and contains several sections:

- Mesh Mode:** Radio buttons for 'Size', 'Deviation' (selected), 'Remesh', and 'Variable Size Mesh'. A red circle '3' is around the 'Deviation' button.
- Mesh Type:** A dropdown menu set to 'Mixed'.
- Mesh Parameters:** Input fields for 'Max Elem Size' (15), 'Min Elem Size' (1), 'Max Deviation' (0.27), and 'Max Angle' (20).
- Buttons:** 'Compute' and 'Reset' buttons.
- Mesh by GPart:** A checked checkbox.
- Ignored Hole Size:** Input field set to 0.
- Merge Tolerance:** Input field set to 0.0001.
- Part ID:** Input field set to 1.
- Action Buttons:** 'Mesh', 'Reject', 'Accept', and 'Done' buttons. Red circles '5', '6', and '7' are around these buttons.

At the bottom of the property panel, there is a 'Sel. geom(0)' dialog box with the following options:

- Pick:** Radio buttons for 'Pick' (selected) and 'Area'.
- In/Out:** Radio buttons for 'In' and 'Out'.
- Add/Rm:** Radio buttons for 'Add' (selected) and 'Rm'.
- Buttons:** 'Clear', 'Save', 'Load', 'Deselect', 'Whole', 'Active' (circled with a red circle '4'), and 'Reverse'.

The software interface also features a toolbar at the bottom with various icons for meshing and editing. On the far right, a vertical toolbar contains icons for 'AutoM' (circled with a red circle '2'), 'RefGeo', 'BlankM', 'Curve', 'NodEdit', 'Surf', 'EleEdit', 'Solid', 'CreEnt', 'GeoTol', 'Transf', 'Mesh', 'Offset', 'Model', 'MovCop', 'EleTol', 'Normal', 'Post', 'Dup', 'MS', 'Ident', 'MFPre', 'Measur', 'MFPost', 'Blank', 'Favor1', 'MForm', and '3DDrawB'.

Rename Mesh Layer to Punch

The screenshot displays the LS-PrePost(R) V4.3.15 software interface. The title bar shows the file path: "LS-PrePost(R) V4.3.15 - 09Sep2017-64bit st\prepost-training-midland\demo1\53694txma_001_f0297_f1.igs". The menu bar includes "File", "Misc.", "View", "Geometry", "FEM", "Application", "Settings", and "Help".

In the left-hand tree view, the following items are visible:

- Assembly 1
 - ShapeGroup
 - Shell 1 (highlighted)
 - Shell 2
 - BSpline Face 149
 - BSpline Face 19
 - BSpline Face 149
 - FEM Parts
 - 1 LSHELL1 (circled in red)

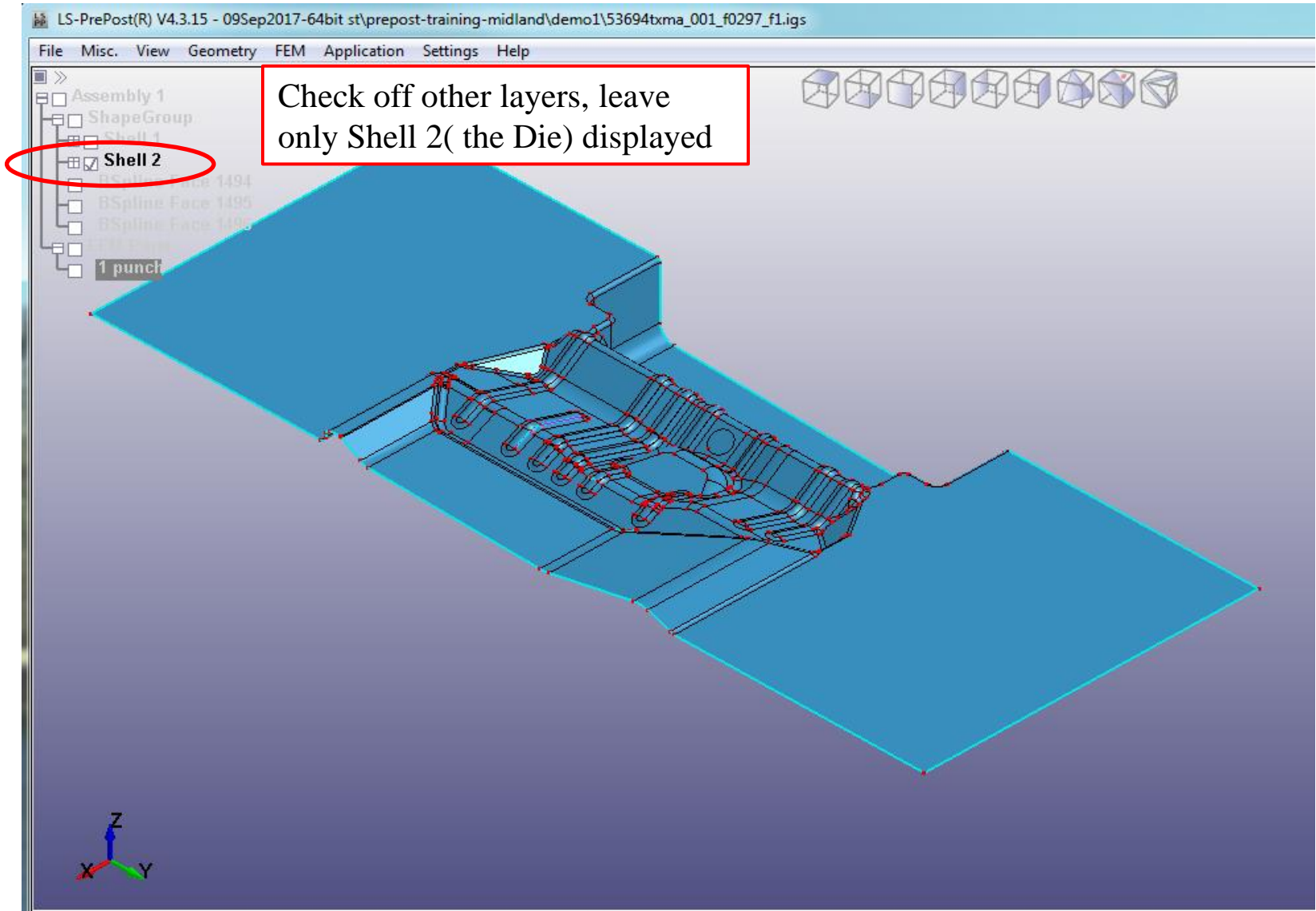
A red box with a white background and black text contains the instruction: "Left click on the name and right click, select rename". An arrow points from this box to the "Shell 1" entry in the tree view.

Another arrow points from the "Shell 1" entry to a small dialog box titled "Name" with a close button (X) in the top right corner. The dialog box contains a text field with the word "punch" entered.

A final arrow points from the dialog box to a red box with a white background and black text that says "Enter to complete".

The main 3D view shows a red mesh of a mechanical part, with the selected mesh layer highlighted in a darker red.

Turn Layers Off/On



Mesh the Die

The screenshot displays the LS-PrePost(R) V4.3.15 interface. The main window shows a 3D model of a die with a blue mesh. The left sidebar contains a tree view with the following items: Assembly 1, ShapeGroup, Shell 1, Shell 2 (selected), BSpline Face 1494, BSpline Face 1495, BSpline Face 1496, EM Parts, 1 punch, and 2 LSHELL2. The top menu bar includes File, Misc., View, Geometry, FEM, Application, Settings, and Help. The right sidebar contains a Mesh Mode panel with the following settings: Mesh Mode (AutoM selected), Mesh Type (Mixed), Max Elem Size (15), Min Elem Size (1), Max Deviation (0.27), Max Angle (20), Mesh by GPart (checked), Ignored Hole Size (0), Merge Distance (0.0001), and Part ID (1). The Mesh Mode panel also has buttons for Mesh, Reject, Accept, and Done. The bottom toolbar contains various icons for meshing and visualization. A status bar at the bottom shows 'Input Ignored Hole Size' and 'Normal Renderer'. A small dialog box titled 'Sel. geom(0)' is open in the bottom right, showing options for Pick, Area, In, Out, Add, Rm, and Active. The interface is annotated with red circles and numbers 1 through 5, highlighting the AutoM button, the Mesh button, the Active button, the Done button, and the Merge Distance input field.

LS-PrePost(R) V4.3.15 - 09Sep2017-64bit st\prepost-training-midland\demo1\53694bxma_001_f0297_f1.igs

File Misc. View Geometry FEM Application Settings Help

Assembly 1
ShapeGroup
Shell 1
Shell 2
BSpline Face 1494
BSpline Face 1495
BSpline Face 1496
EM Parts
1 punch
2 LSHELL2

Mesh Mode
AutoM
RefGeo
BlankM
Curve
NodEdit
Surf
EleEdit
Solid
CreEnt
GeoTol
Transf
Mesh
Offset
Model
MovCop
EleTol
Normal
Post
DupNod
MS
MS
MFPre
Measur
MFPost
Blank
Favor 1
MForm
3DDrawB

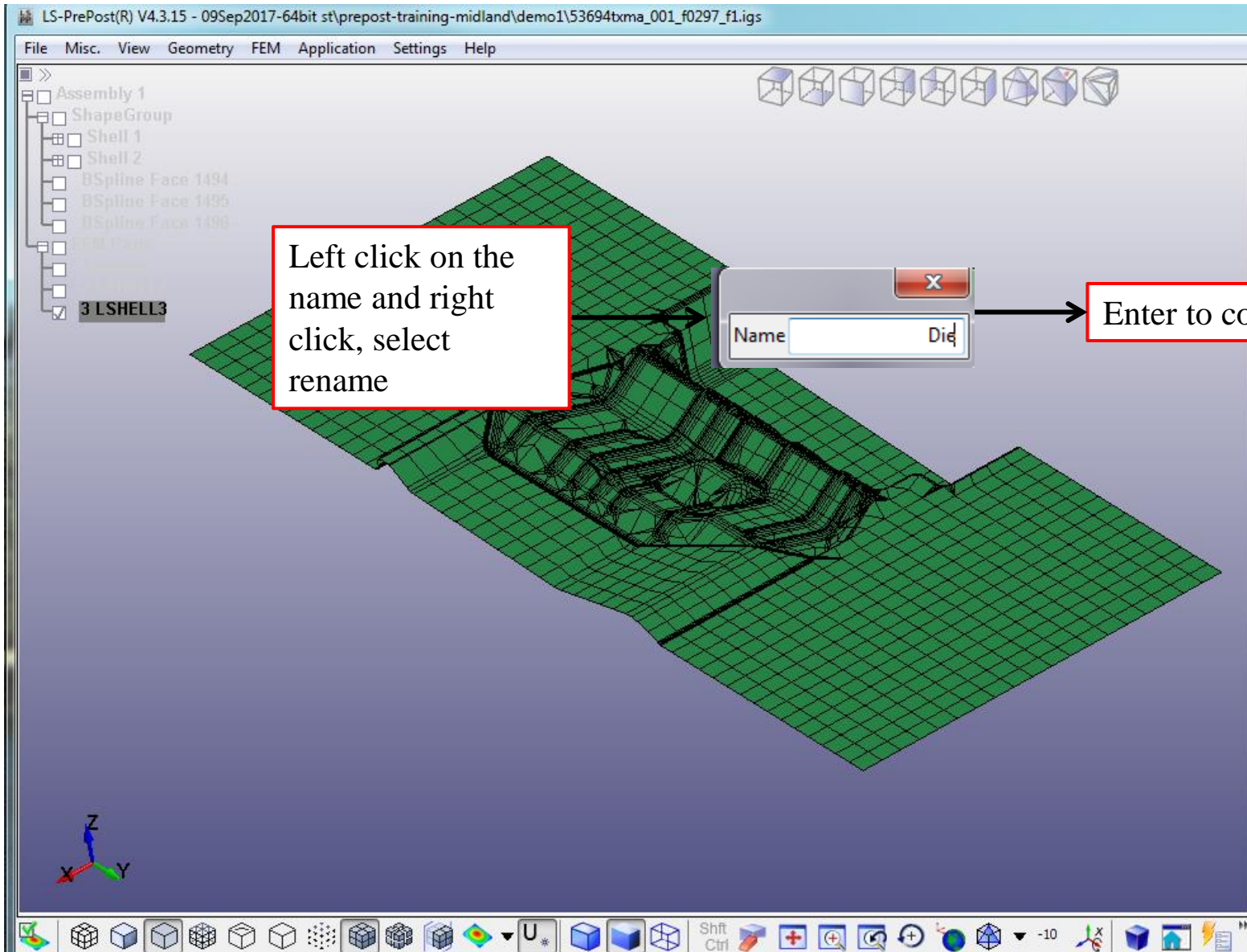
Mesh Mode
 Size
 Deviation
 Remesh
 Variable Size Mesh

Mesh Type: Mixed
Max Elem Size: 15
Min Elem Size: 1
Max Deviation: 0.27
Max Angle: 20
Compute Reset
 Mesh by GPart
Ignored Hole Size: 0
Merge Distance: 0.0001
Part ID: 1
Mesh Reject Accept
Done

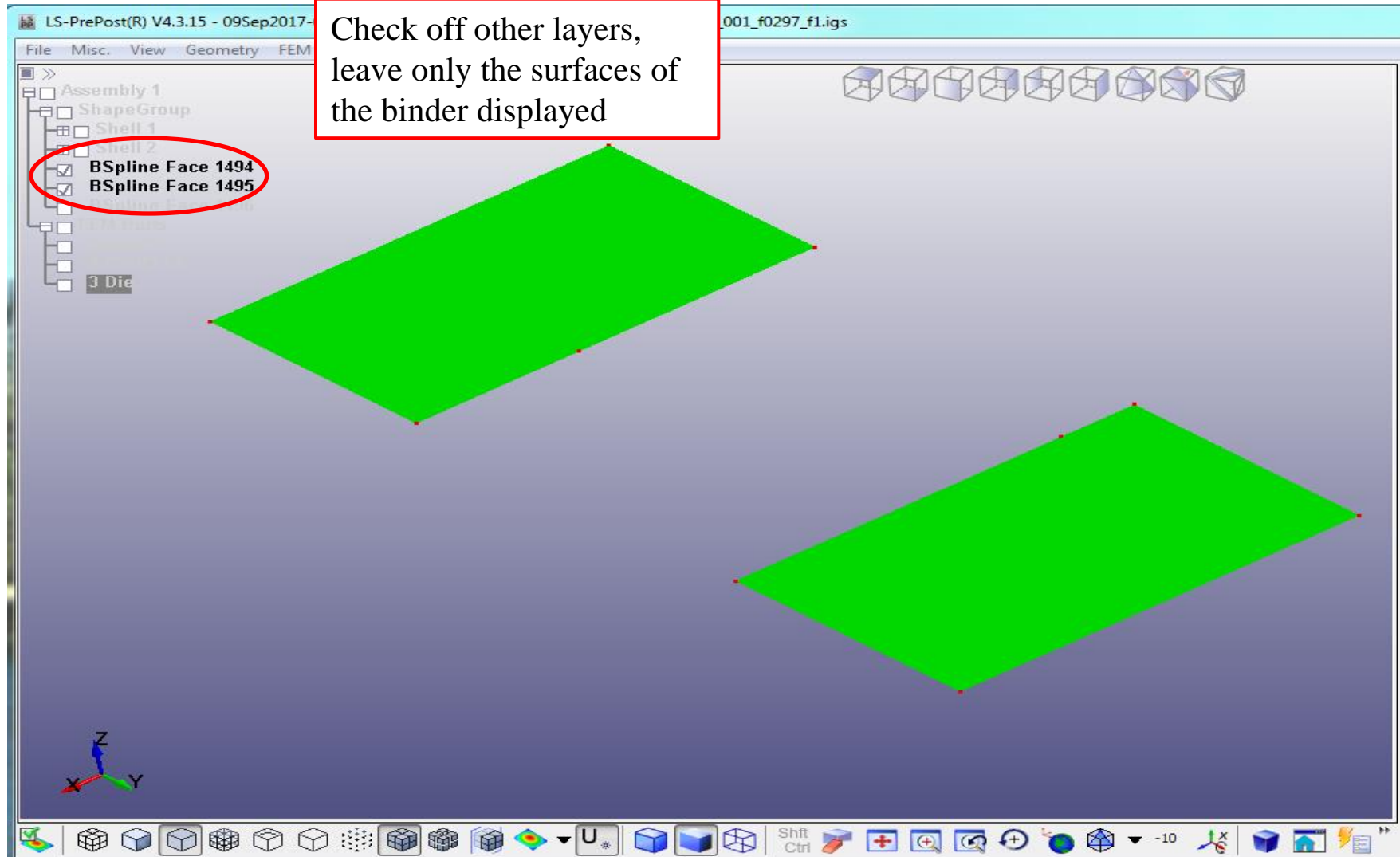
Sel. geom(0)
 Pick
 Area
 In
 Out
 Add
 Rm
 Ind Sel. ID
Active
Reverse

Input Ignored Hole Size
Normal Renderer

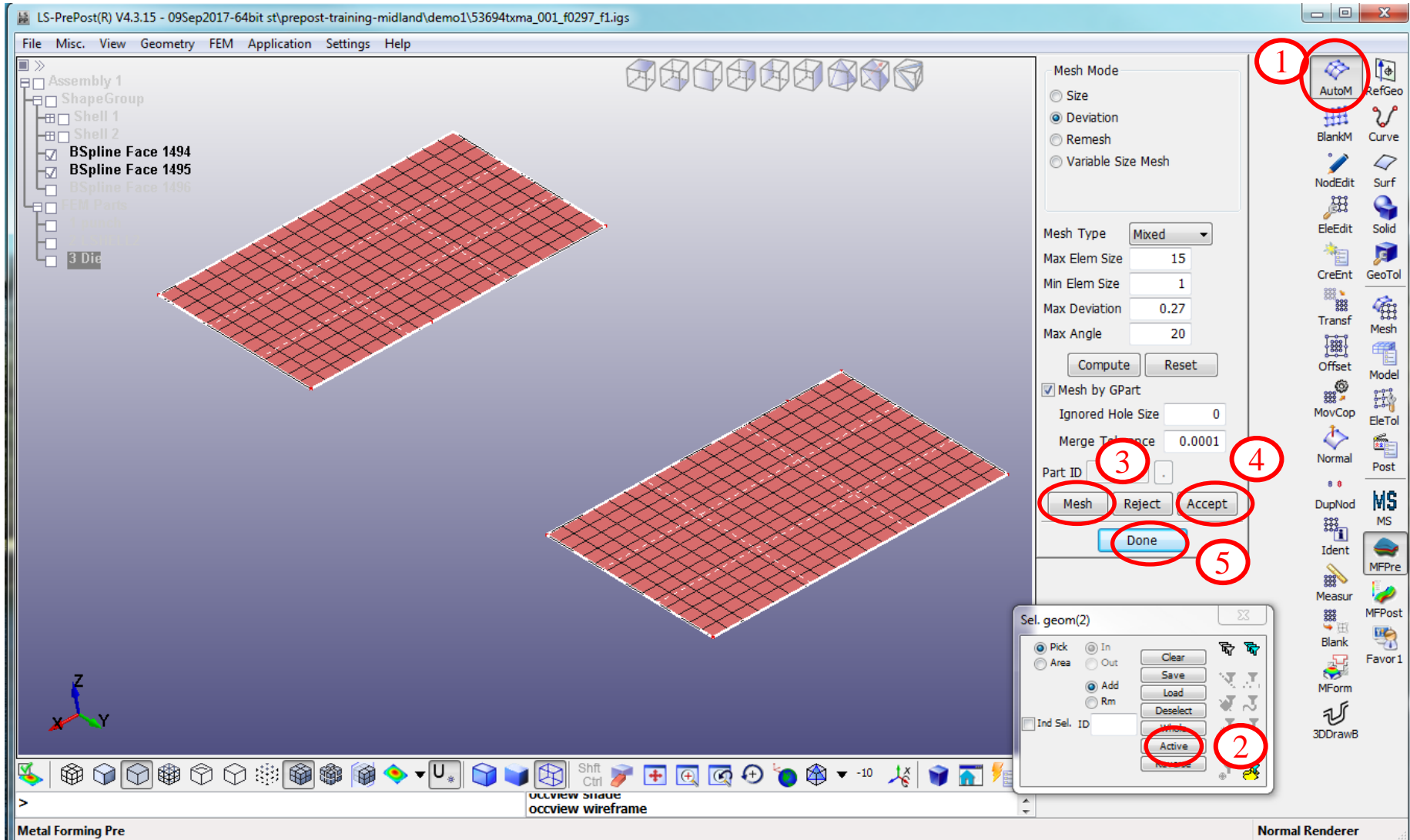
Rename Mesh Layer to Die



Turn Layers Off/On



Mesh the Die

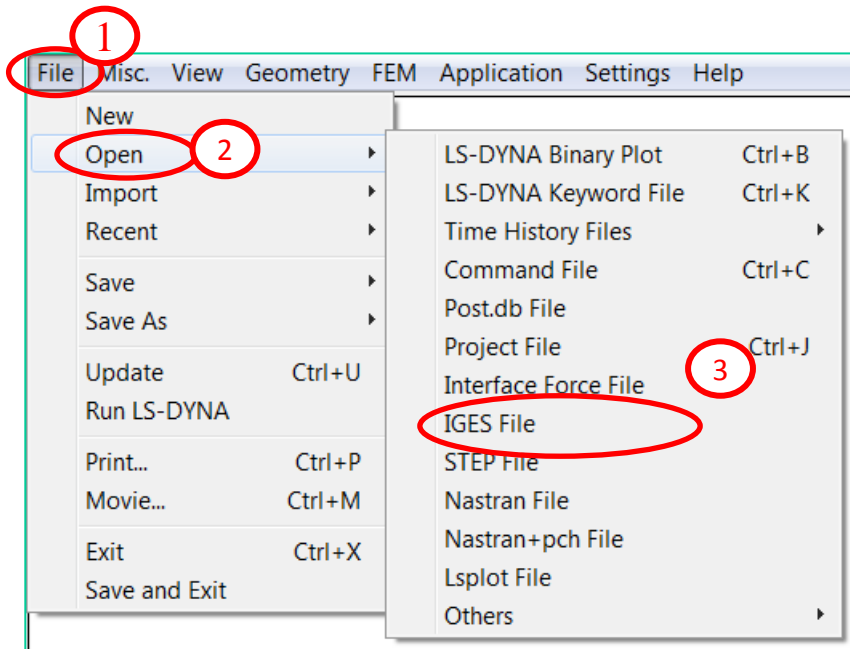


Rename Mesh Layer to Binder

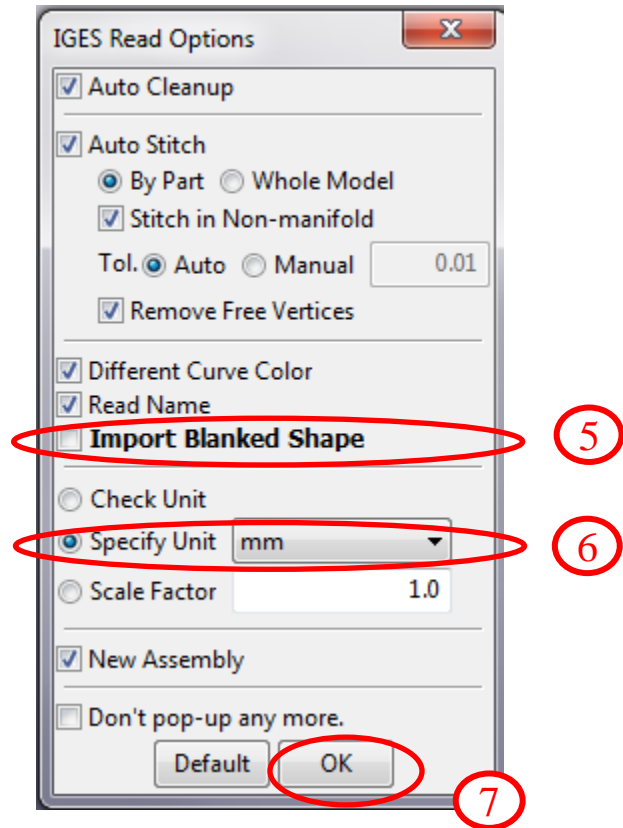
The screenshot shows the LS-PrePost (R) V4.3.15 interface. The left-hand tree view displays a hierarchy under 'Assembly 1', including 'ShapeGroup', 'Shell 1', 'Shell 2', and several 'BSpline Face' elements. The element '4 LSHELL4' is highlighted with a red box. A red-bordered text box with an arrow points to this element, containing the text: 'Left click on the name and right click, select rename'. An arrow points from the 'LSHELL4' element to a context menu that is open, showing a 'Name' field with the text 'binder' entered. A second red-bordered text box with an arrow points to this field, containing the text: 'Enter to complete'. The main 3D view shows a yellow mesh layer. The bottom status bar displays 'UCRiter add Face showexclu fem 4'. The top menu bar includes 'File', 'Misc.', 'View', 'Geometry', 'FEM', 'Application', 'Settings', and 'Help'. The bottom toolbar contains various icons for file operations and viewing options.

Input Blank Surfaces Iges file

Open an IGES file:

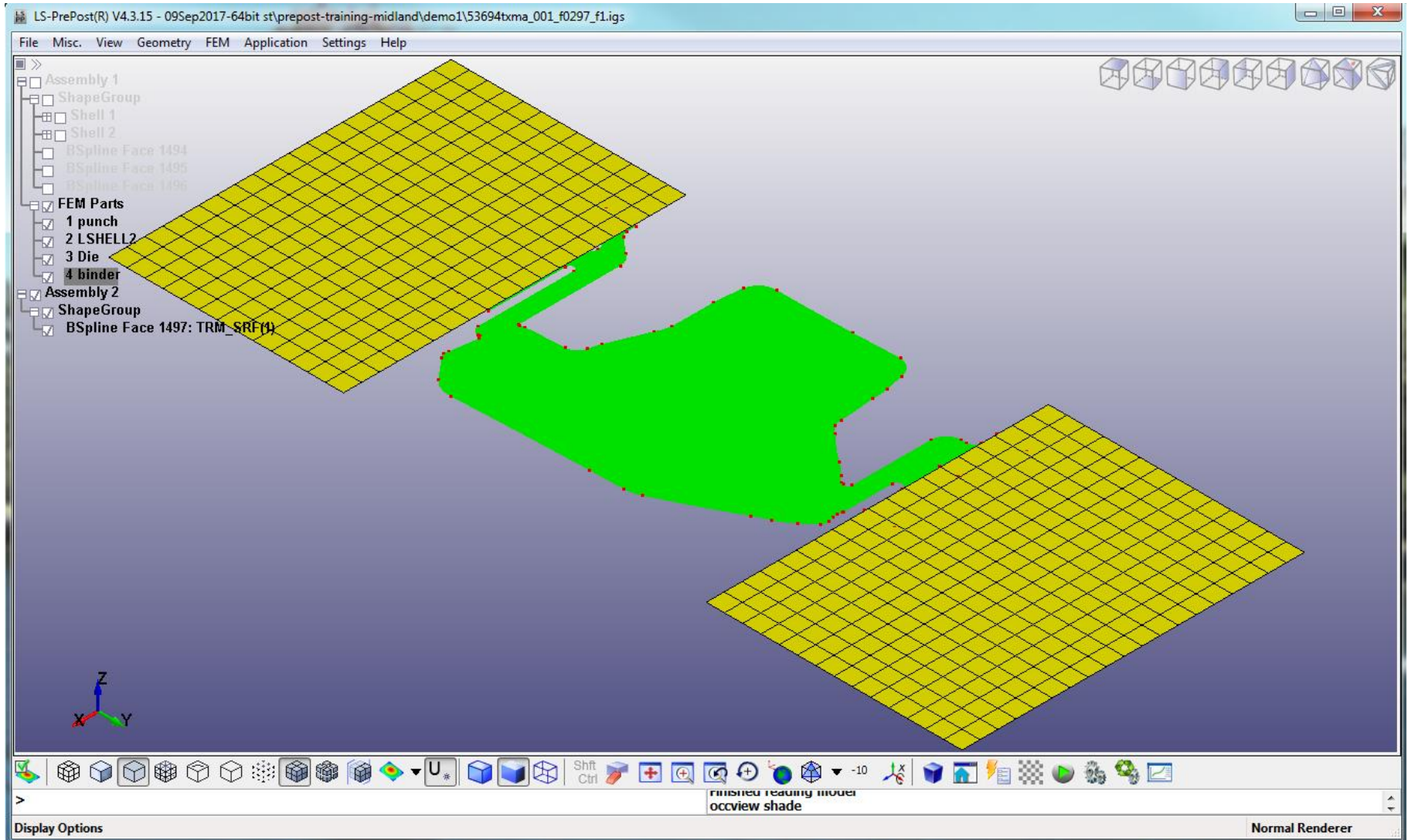


Directory: Workshop 1

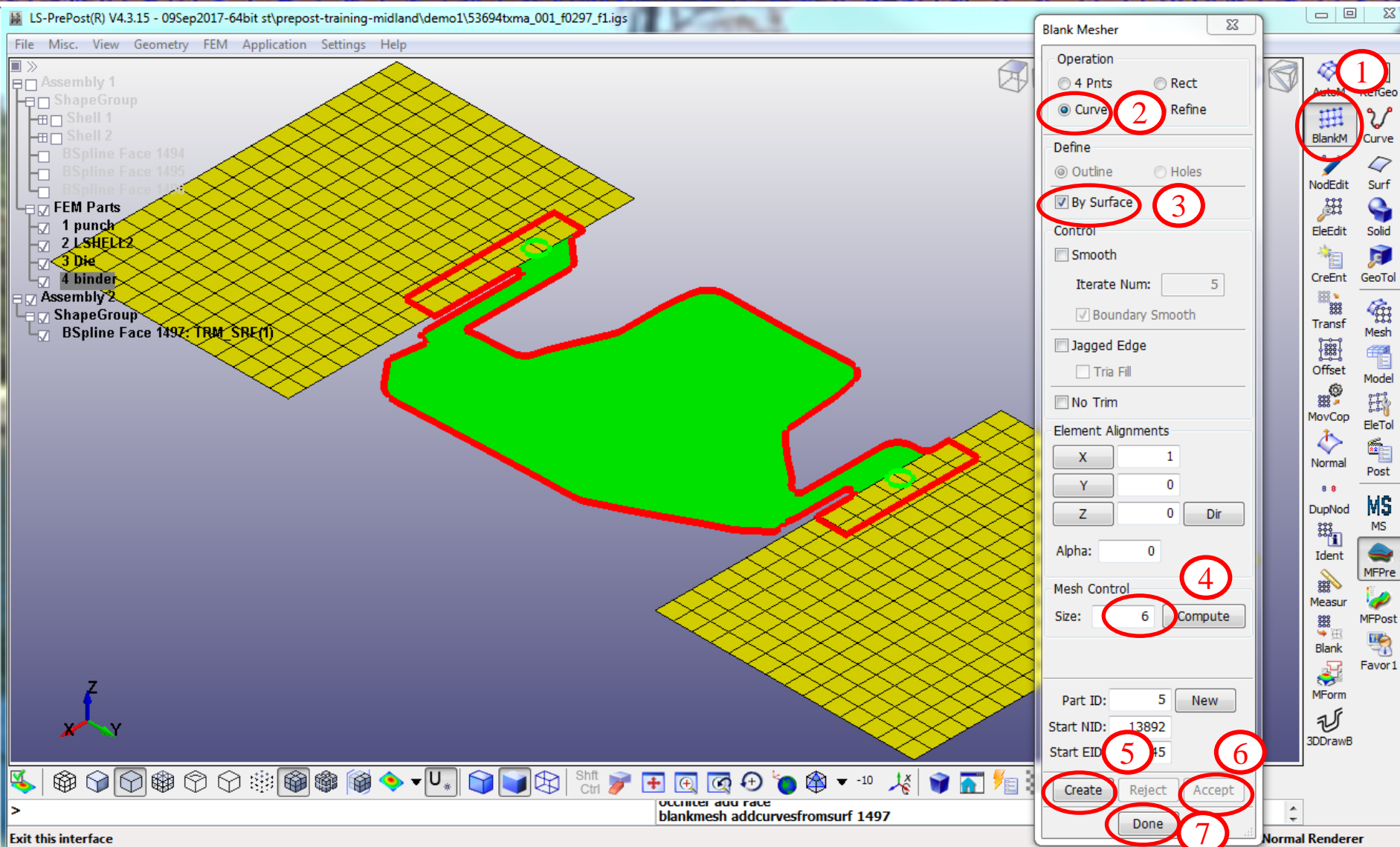


Name	Date	Tags	Size
53694txma_001_f0297_f1.igs	21/08/2017 15:45		16,451 KB
1403_blank_optimized_cf.igs	21/08/2017 15:45		93 KB

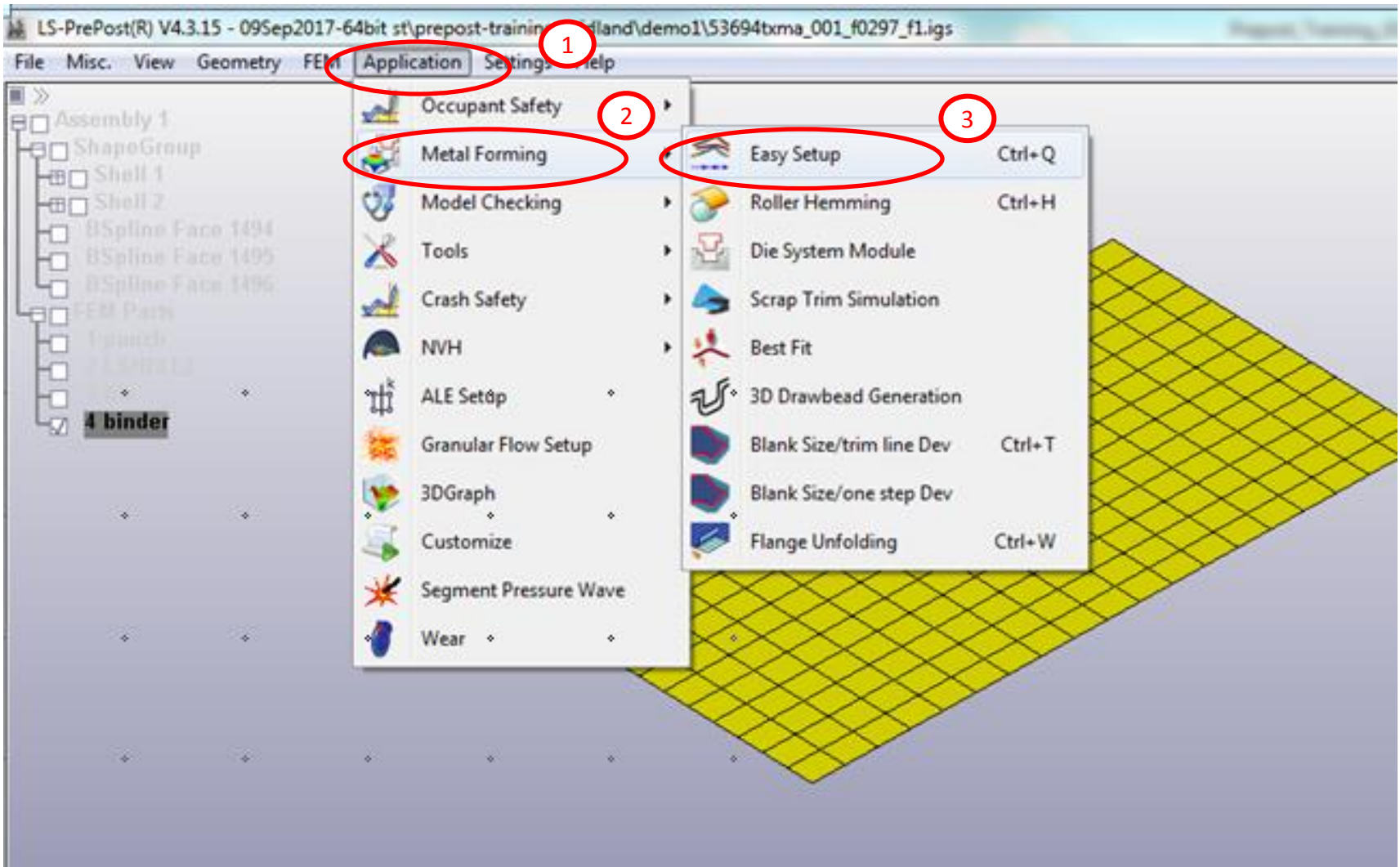
Import Bank Surfaces into the Model



Mesh the Blank



Easy Setup



Select the Draw Type

3 Piece Toggle Draw

Setup Blank Die Binder Punch Draw

DrawType

Air Draw Toggle Draw 1

Virtual(contact) Offset:

Offset Die

Offset Punch/Binder

Offset amount: (blank thickness) X 1.1

Process Selection:

Selected Processes

Forming

Available Process

Gravity

Trimming

SpringBack

Flanging

Closing

Tipping

Hemming

Compensation

Stage Definition:

stage1

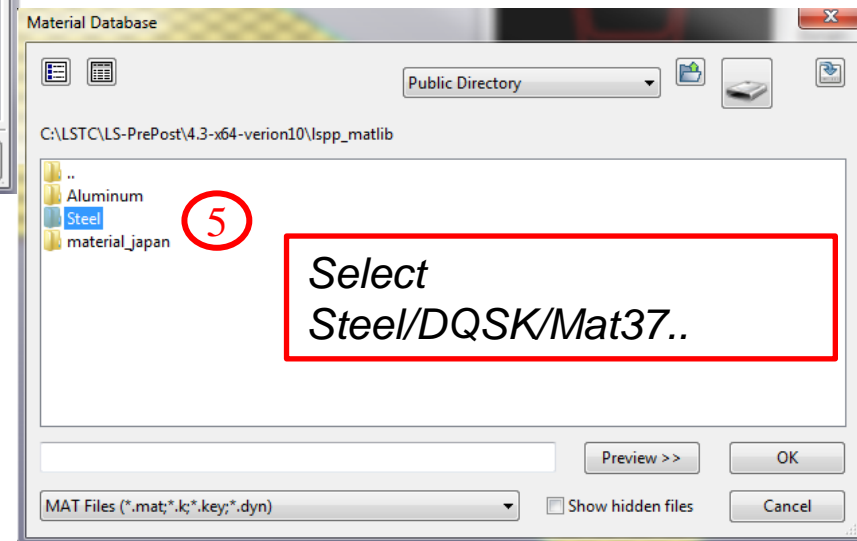
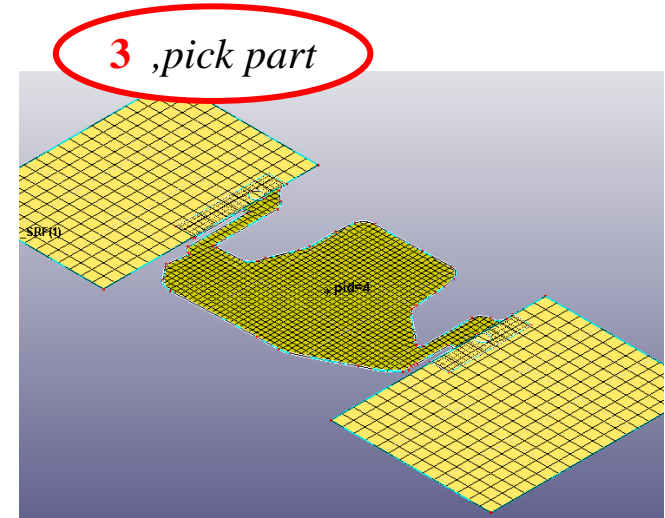
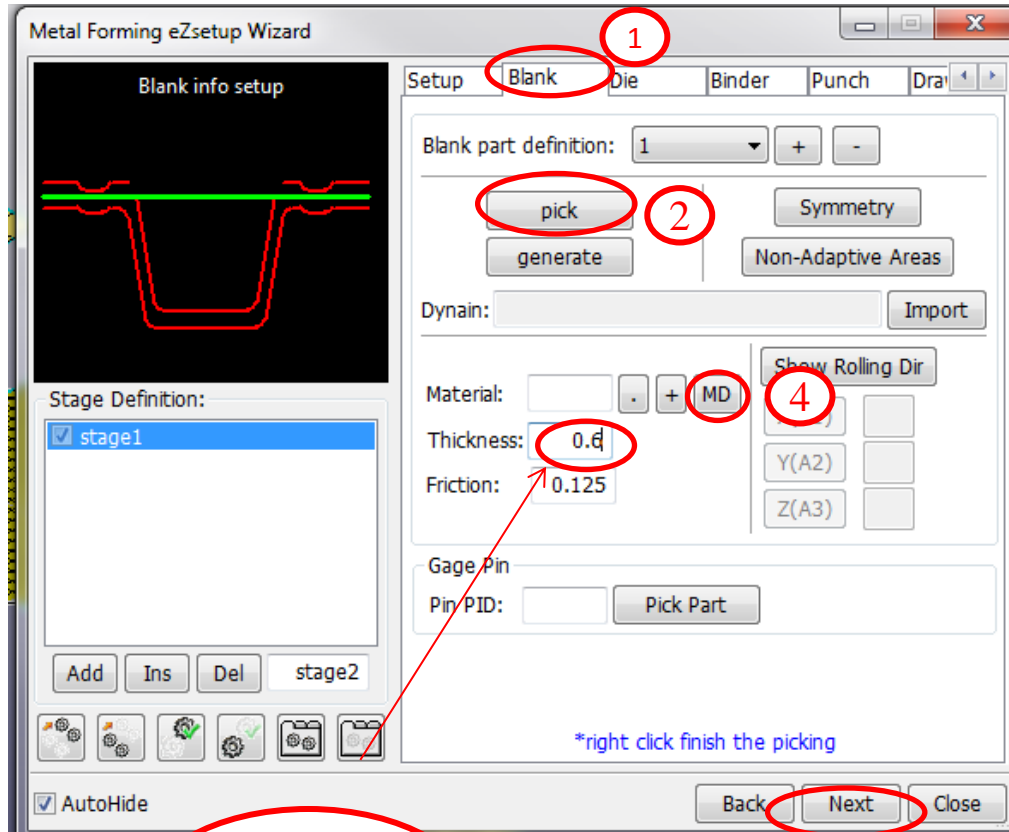
Add Ins Del stage2

Unit System: mm-second-tonne-Newton

Note: All tools must be in home position, eZsetup works best with LS-DYNA R6.1.0 and later.

AutoHide Back Next Close

Define Blank/Blank Material/Blank Thickness

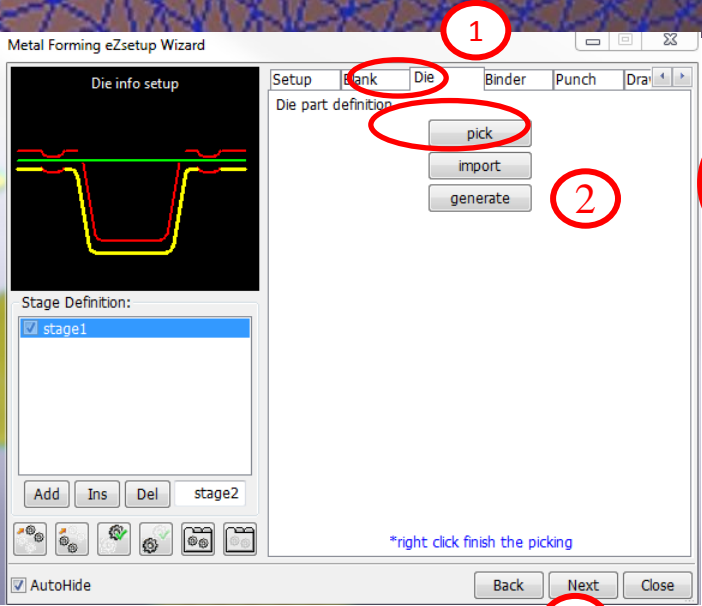


6 ,type in
thickness and
friction

7

Select
Steel/DQSK/Mat37..

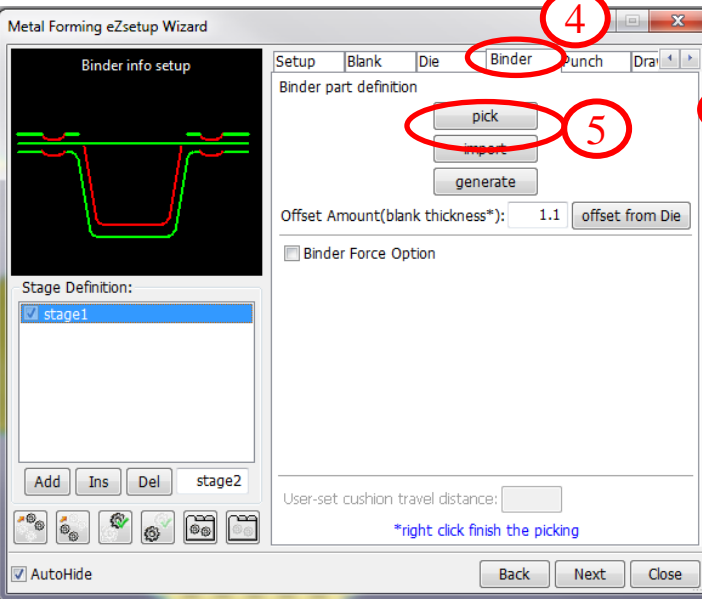
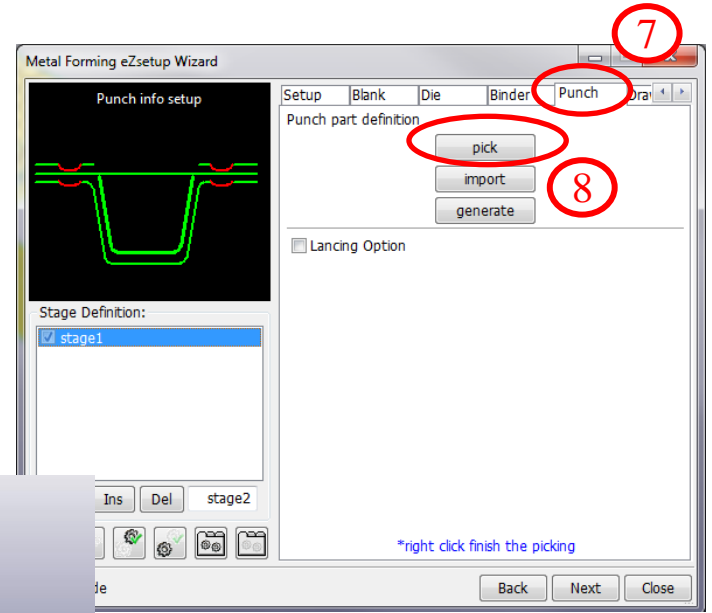
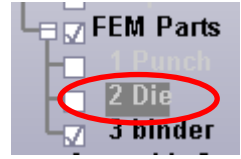
Define Tools/Die/Binder/Punch



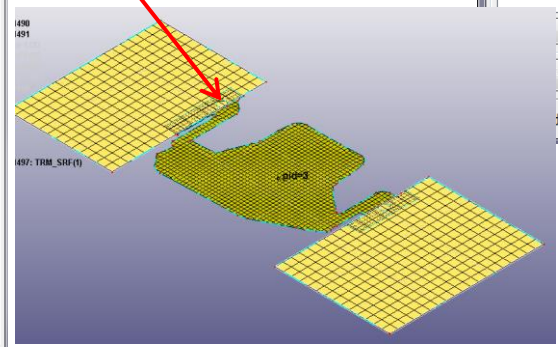
5, left mouse pick Die from the name list, click right mouse button when finish



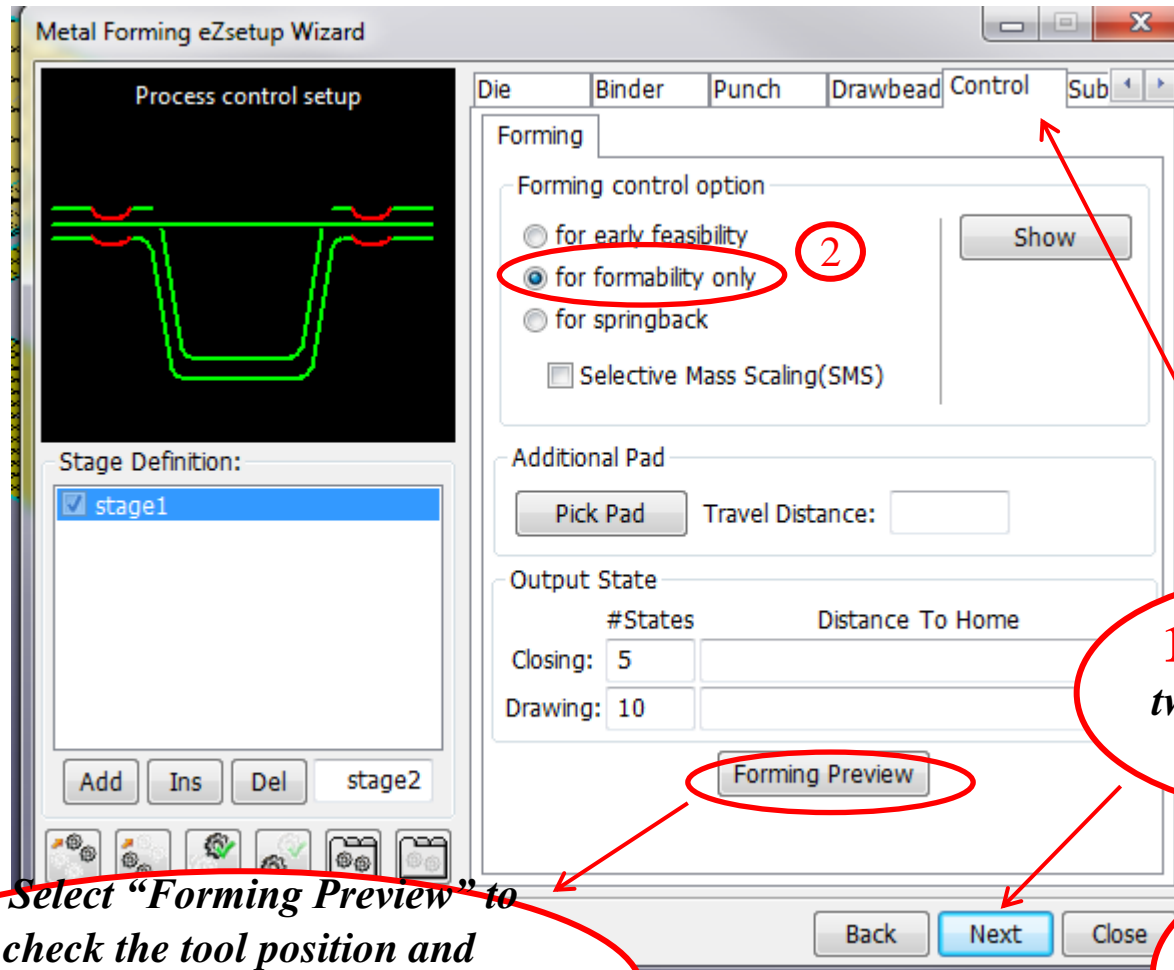
9, pick part name and right click



6, pick part



Select the Control Options and Preview Tool Motions

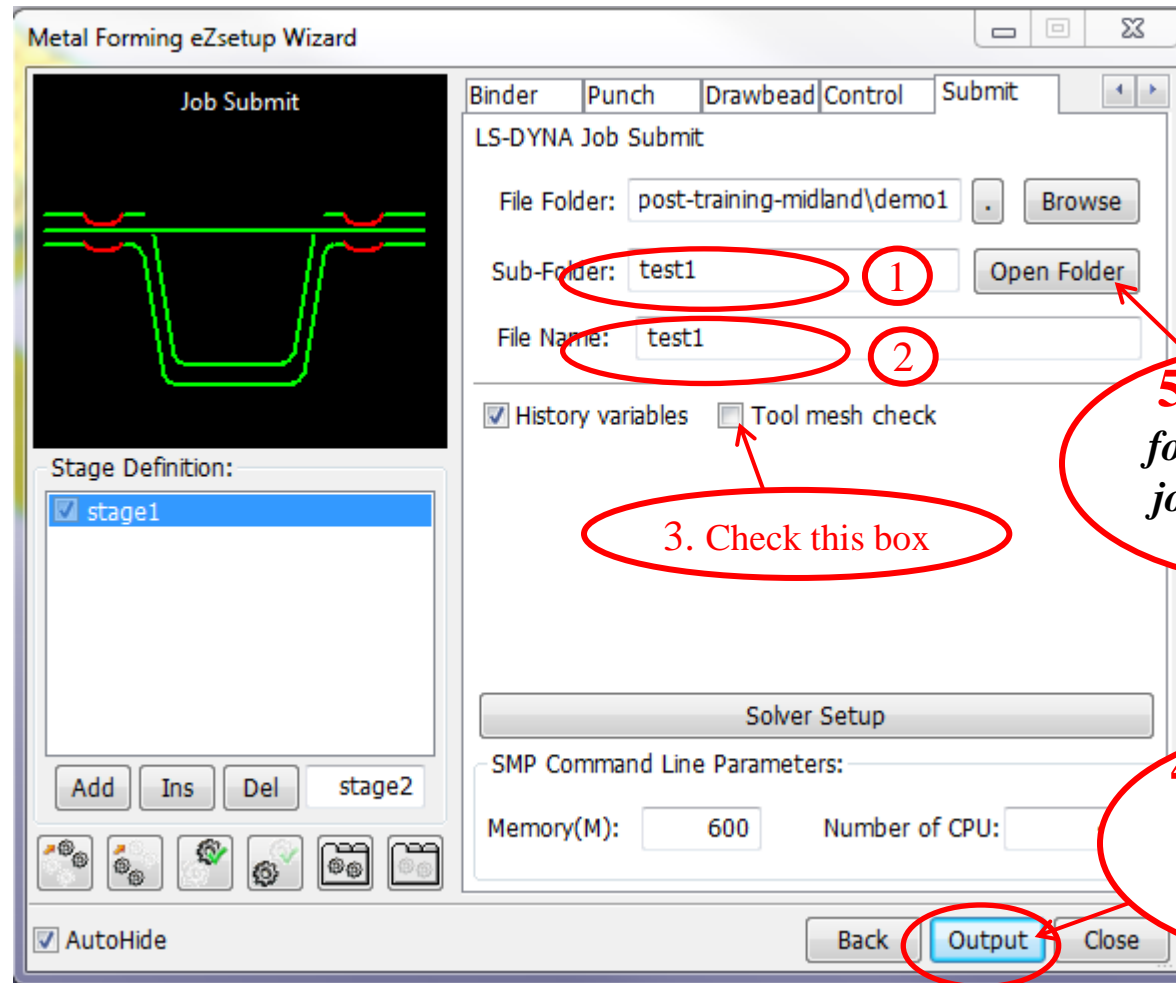


1. Select "Next" twice to reach the "control" tab

4. Select "Forming Preview" to check the tool position and motions. This function requires an additional exe files in your installation directory




3. Select "Next" to reach the "submit" tab

Output Files for the Calculation



Run batch file and Results Folder

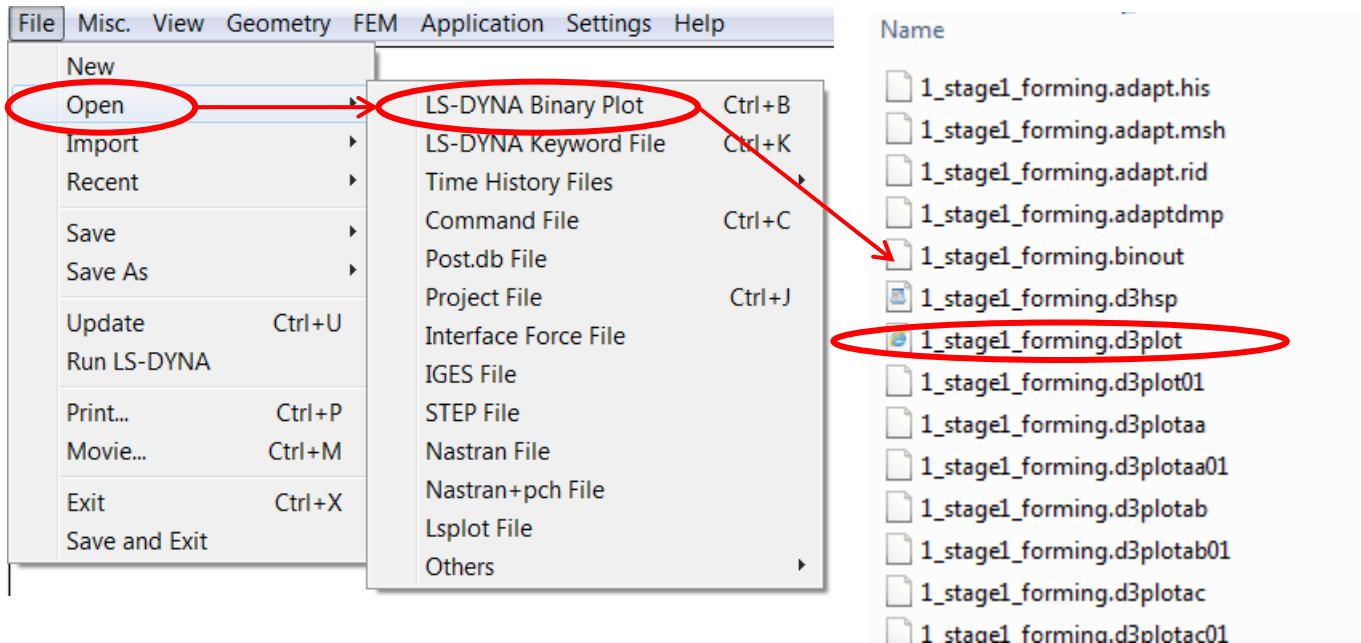
Forming Results will be in this folder

Name	Date modified	Type	Size
 1_stage1_forming	06/10/2017 14:33	File folder	
 blank	06/10/2017 14:33	File folder	
 test1.bat	06/10/2017 14:33	Windows Batch File	25 KB

1. Click the batch file test1.bat, calculation will start.

```
Current[1_stage1_forming](C:\Users\paul\Documents\jeanne-file\ls-prepost\prepost-training-mid...
***** notice ***** notice ***** notice *****
*
* This is the LS-DYNA Finite Element code.
*
* Neither LSTC nor the authors assume any responsibility for
* the validity, accuracy, or applicability of any results
* obtained from this system. The user must verify his own
* results.
*
* LSTC endeavors to make the LS-DYNA code as complete,
* accurate and easy to use as possible.
* Suggestions and comments are welcomed. Please report any
* errors encountered in either the documentation or results
* immediately to LSTC through your site focus.
*
* Copyright (C) 1990-2016
* by Livermore Software Technology Corp. (LSTC)
* All rights reserved
*
***** notice ***** notice ***** notice *****
Beginning of keyword reader                                     10/06/17 14:35:20
```

Open the Result files



Or user can drag the *.d3plot file to



on the desktop

Open the Result files

LS-PrePost(R) V4.3.15 - 09Sep2017-64bit midland\demo1\test1\1_stage1_forming\1_stage1_forming.d3plot

File Misc. View Geometry FEM Application Settings Help

Time = 0, #nodes=13815, #elem=14409

Post

Reference Geometry

Normal Renderer

On/off Parts and Animations

Time = 0, #nodes=13815, #elem=14409

Post
4 Blank
1 upper punch
2 Lower punch
3 Upper blank

1. Check off tools, leave only blank on

2. Delete free nodes in the model

3. Select play for animation

Animate
Eigen First: 1 Last: 31 Inc: 1 Time: 0 State: 1
Animate [Play] [Stop] [Pause] [Reset] [Loop] [F] [S]
23 S

plotnode 0

Metal Forming Post

Normal Renderer

Plot the Thickness

LS-PrePost(R) V4.3.15 - 09Sep2017-64bit midland\demo1\test1\1_stage1_forming\1_stage1_forming.d3plot

File Misc. View Geometry FEM Application Settings Help

Time = 0.028234, #nodes=32040, #elem=32427
Contours of Shell Thickness
min=0.484169, at elem# 24314
max=0.694227, at elem# 20710

Post
4 Blank

Animate
Eigen First: 1 Last: 31 Inc: 1 Time: 0.0282339 State: [1] [Loop] [23 S] [F]

Fringe Component
Fringe: Thickness
Ndv: Thinning, Pressure
Result: Top Major Prin.strain, Top Minor Prin.strain, Bottom Major Prin.sti, Bottom Minor Prin.sti, Middle Major Prin.stra, Middle Minor Prin.stra
Misc: Max Inplane stress, Min Inplane stress, Displacement
Green
Almans
S.Rate
Elastic
FLD
Beam
SPH
DES
CFD
Forming
HistVer
User
Apply
Frin: intpt 1, intpt 2, intpt 3
Max
d3plot

MS
MFPPost
Favor 1

quat -0.591904 0.005479 0.207163 -0.770554;
quat -0.456801 -0.004415 0.196522 -0.867578;

Rotation angle range, right-click to edit

Normal Renderer

Plot FLD

The screenshot displays the LS-PrePost (V4.3.15) interface. The main window shows a Formability Diagram (FLD) plot titled "CRLCS (t=0.6 n=0.17), True strain) Traditi". The plot shows Major True Strain on the y-axis (ranging from -0.2 to 0.6) and Minor True Strain on the x-axis (ranging from -0.2 to 0.4). A color-coded region represents the formability limit, with a specific point labeled "pid=4" highlighted in red. A red arrow points to this point with the text "7 - pick the part".

The "Formability Diagram - CRLCS (t=0.6 n=0.17), True strain" dialog box is open, showing various parameters and a smaller version of the FLD plot. The parameters include:

- Limit % FLC: Cracks
- Marginal: %FLC Shift 10
- Allowable thinning: 0.2
- Essential thinning: 0.02
- Allowable thickening: 0.01
- R-value: 1
- Wrinkle_slope: 1
- Risk of cracks
- Severe thinning
- Inadequate stretch
- Wrinkling tendency
- Wrinkles
- Blank/Unblank elements of a Formability key
- Edge type: HEC Off
- Max. edge strain(%): 10
- Laser cut edge: 0.8
- New punch edge: 0.6
- Worn punch edge: 0.4

The "FLD" dialog box is also open, showing the "Calculated FLD" section with "t_n" selected and "n=0.17". The "Formability" dropdown is set to "Formability". The "Plot" button is highlighted with a red circle.

The software interface includes a menu bar (File, Misc, View, Geometry, FEM, Application, Settings, Help) and a toolbar with various icons. The status bar at the bottom shows coordinates: "quad -0.580207 0.044109 0.207078 -0.900513, pan -99.829506 -103.166832;".

Output Part Lines

LS-PrePost(R) V4.3.15 - 09Sep2017-64bit midland\demo1\test1\1_stage1_forming\1_stage1_forming.d3plot

File Misc. View Geometry FEM Application Settings Help

Time = 0.028234, #nodes=32040, #elem=32427
Contours of Shell Thickness
min=0.484169, at elem# 24314
max=0.694227, at elem# 20710

Post
4 Blank

5. Pick the part

Create BSpline Curve

Method From Mesh

Piecewise

Apply Undo Close

Thickness

42e-01
32e-01
22e-01
12e-01
02e-01
92e-01
82e-01
72e-01
62e-01
52e-01
42e-01

1

2

3

4

6

Sel. Curves(819)

Pick Area Poly Sel1 Sphe Box Prox Circ Frim Plan In Out Add Rm Adjacent Attach Clear Save Load Deselect Whole Active Reverse ByPart ByGPart BySubsys BySet/Grp ByEdge ByPath BySegm ByCurve BySurf

ID Type any

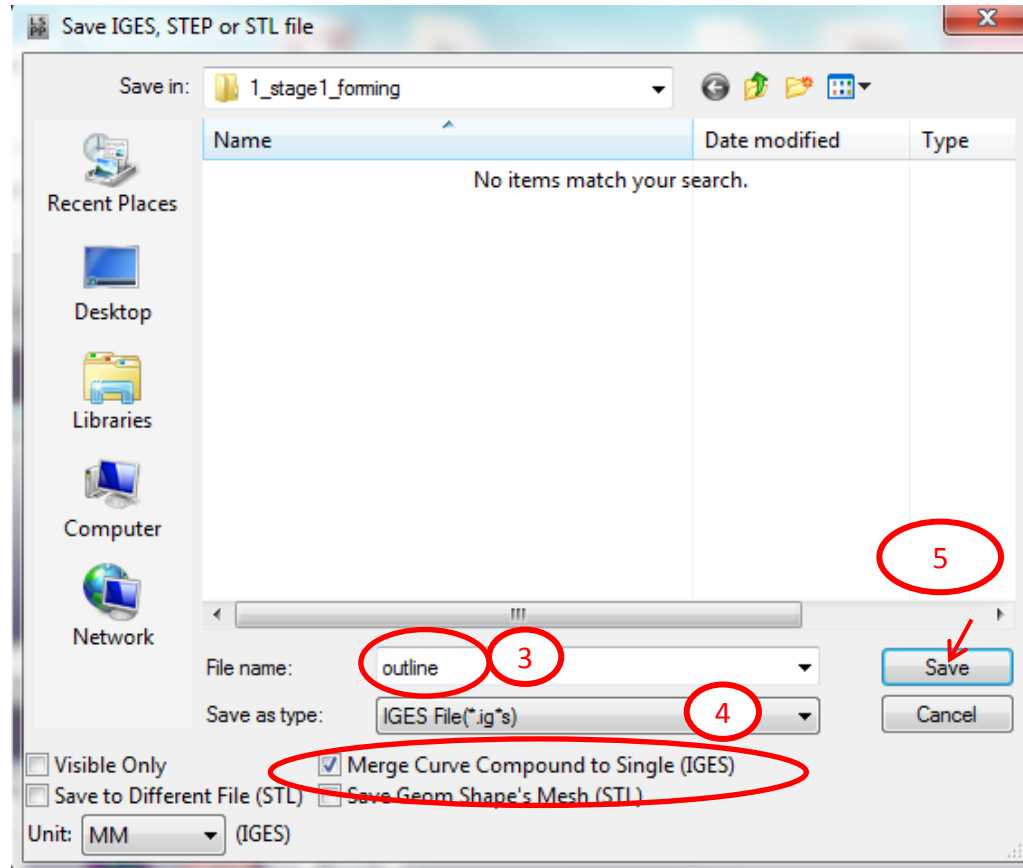
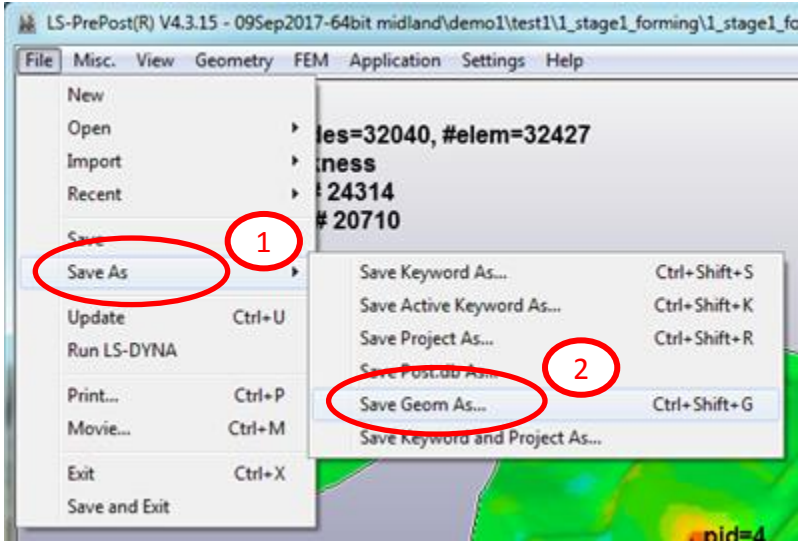
Label selection 3DSurf

MS MS Merge MFPPre MFPPost Favor 1 Smooth MidCur Morph

Normal Renderer

Pick new center of rotation

zoom: 0.011397 0.000630 0.077396, pan 60.289360 3.206915;



*Email qingjeanne@gmail.com or
qhe@formingsimulation.com for questions*