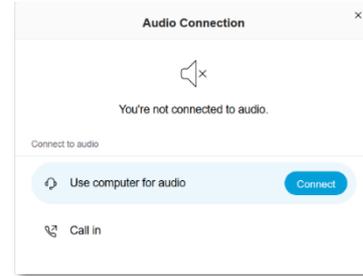


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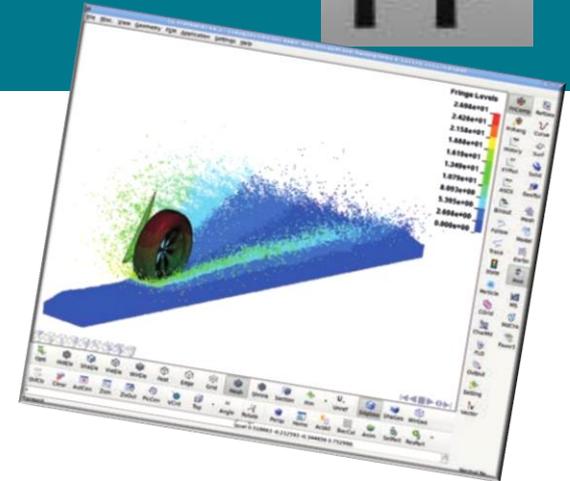
# LS-PrePost: News, Tips & Tricks



Dipl.-Ing. Silvia Mandel, DYNAmore

[silvia.mandel@dynamore.de](mailto:silvia.mandel@dynamore.de)

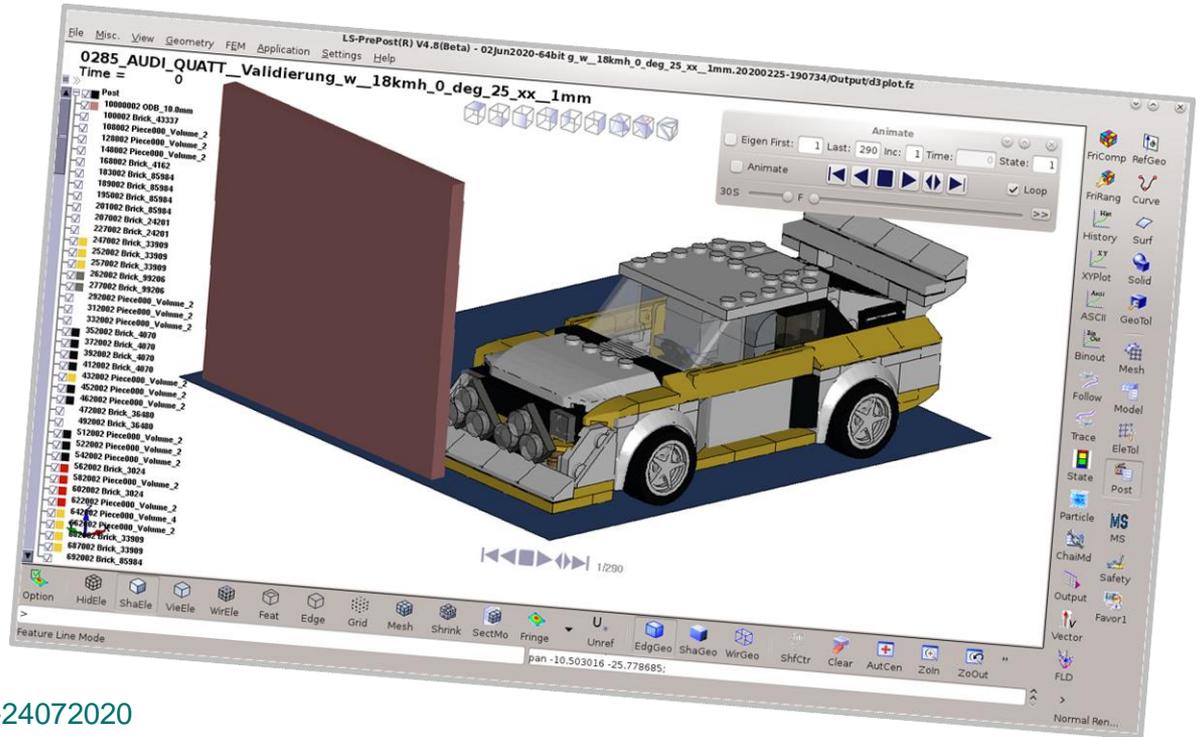
July 2020



# Agenda

Presentation of news, tips and tricks for the following topics ...

- Installation
- Display & Configuration
- Pre- & Post-Processing
- LS-Run
- Model Checking Tools
- Automatization
- Recent developments



Example files and presentation:

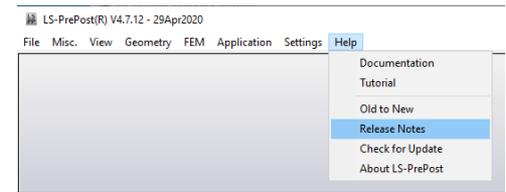
<https://files.dynamore.de/public/webinar-lspp-24072020>



# 1. INSTALLATION

# Installation Remarks

- LS-PrePost download area for the DYNAmore clients: <https://fileshare.dynamore.de>
- LS-PrePost is FREE! (For LS-DYNA users)
- Current release version: 4.7
  - The OLD GUI is NOT supported anymore! → After more than 10 years the toggle option between old interface and new interface by F11 function has been discontinued.
- Development version: 4.8 (Dev)
- Linux OS:
  - What is the “Common version”?
    - Since July 2019 one LS-PrePost installation is running on all Linux systems and this version is called “Common version”
  - This common version has 2 scripts in it:
    - “lspp47” - run the regular OpenGL version
    - “lspp47\_mesa” - run the mesa version (e.g. systems without no powerful graphic card like NVIDIA, helpful for SSH –X connection)



## 2. DISPLAY & CONFIGURATION

# Toolbar Modifications – General Options

- The Toolbar Manager of LS-PrePost permits a range of options for individual adaptation:

■ Option: “Allow directly editing on toolbar” (only Windows OS)

- Switch the toolbar icons positions by drag and drop.

■ Option to dock the popup dialog windows on the right toolbar.

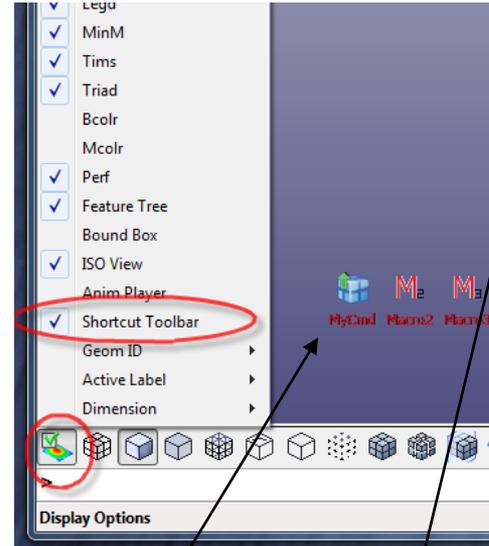
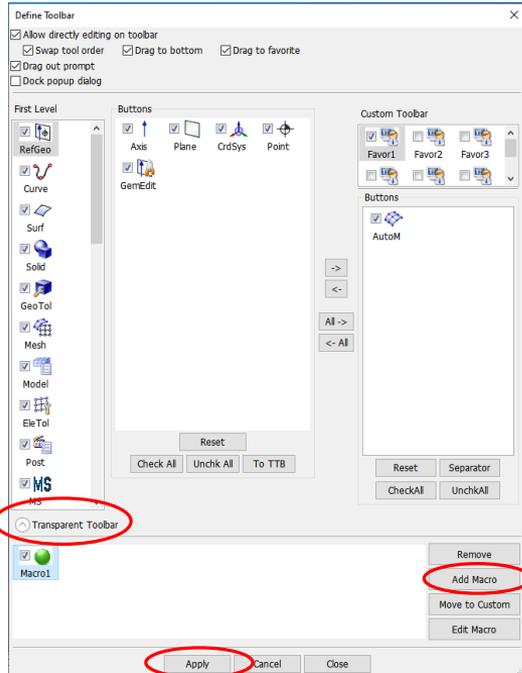
■ Reduce or reorder icons in the bottom and right toolbars.

■ “Collect” option for bottom toolbar icons:

- Collect multiple tools by dropdown button

# Toolbar Modifications – Macro Icons

- The toolbar manager permits a range of options for positioning of macro icons
  - Add a user macro (cfile command script):



Macro in transparent toolbar or right toolbar.

Transparent Toolbar (TTB) = All available tools in the main window like ISO views , animation player , macros with right mouse click options like “Move, Size, Transparency,...”

# Settings Menu: Configuration Setting

- Pulldown menu *Settings->Configuration Settings* provides user interface to set user's general preference.
  - New **Reset Config** option for setting reset to installation default values

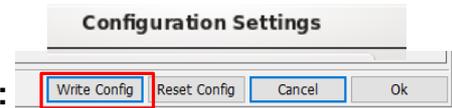
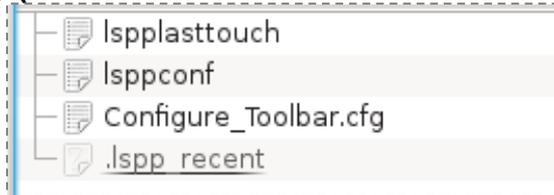


- These are all the configuration files which contains all the settings which are set in the whole GUI:
  - Isppconf – stores general configuration parameters.  
Use the pull down menu “Setting” → ”Configuration Settings” to set parameters.
  - Ispplasttouch – stores last session windows size, dialog location, file path, etc.
  - Configure\_Toolbar.cfg – stores toolbar configurations
  - .Ispp\_recent – stores recently used files and their locations

**Configuration file directory (each version of LS-PrePost has its own directory):**

## Windows

C:\Users\uname\AppData\Roaming\  
LSTC\LS-PrePost4.6



## Linux

\$HOME/LSTC/LS-Prepost4.6

The path for the configuration file can be changed with the environment variable “LSTC\_FILE”.

# 3. PRE- & POST-PROCESSING

# Identify Part/Element/Node with keyword form



- New option “Kwd Card” in  →  which also pop up the keyword input form when identify part/element/node

The screenshot shows the LS-PrePost V4.8 (Beta) interface. The main window displays a 3D model of a curved bar with different colored segments. A 'Keyword Input Form' dialog is open in the foreground, and an 'Identify' dialog is open on the right side. The 'Identify' dialog has 'Part' selected, and the 'Kwd Card' checkbox is checked. A red arrow points from the 'Kwd Card' checkbox to the 'Keyword Input Form' dialog.

**Keyword Input Form**

Use \*Parameter  Comment

(Subsys: 1 impact.k) Setting

\*PART\_TITLE (5)

TITLE	PID	SECID	MID	EOSID	HGID	GRAV	ADPOPT	TIMID
Bar	1	1	1	0	0	0	0	0

COMMENT:

\$ pid sid mid eosid hgid adpopt

**Identify**

Node  Element

**Part**  Particle

CNRB  Composite

Shell  SPH  Iner.

Solid  Mass  Nurbs

Beam  Disc.  Tshell

Seat.  DiscSph.  AnyE

xyz coord Node

Show Results  No ID

Elem Dir  Mat Dir

Fiber Dir  Write MatAxes

AirbagRG  Show Popup

Echo  Part Name

Kwd Card

inp1 1

inp1 2

Total identified nodes: 0

Total identified elems: 0

Total identified parts: 1

Total identified particles: 0

Total identified CNRBs: 0

Clear Node Clear Part

Clear Elem Clear CNRB

Clear All Locate Elem

Done

Pick a part will also pop up this keyword form

# Saving keyword file in i10 Format



File Misc. View Geometry FEM Application Settings Help

**Keyword deck by LS-PrePost**

- New
- Open >
- Import >
- Recent >
- Save >
- Save As >
  - Save Keyword As... Ctrl+Shift+S
  - Save Active Keyword As... Ctrl+Shift+K
  - Save Project As... Ctrl+Shift+R
  - Save Post.db As...
  - Save Reduced D3plot Files As... Ctrl+Shift+D
  - Save Geom As... Ctrl+Shift+G
  - Save Keyword and Project As...
  - Save Solution As...
- Update Ctrl+U
- Run LS-DYNA
- Print... Ctrl+P
- Movie... Ctrl+M
- Exit... Ctrl+X
- Save and Exit

Save Keyword

Save Keyword File

File Name: Z:\Aufbau\_mod.k Browse

Output Version: V971\_R8  LongFmt  **I10Fmt** Advanced ...

Save Renumber Offset Cancel

```

*ELEMENT_BEAM
$      1      2      3      4      5      6      7      8
$234567890123456789012345678901234567890123456789012345678901234567890
$#  eid  pid  n1  n2  n3  rt1  rr1  rt2  rr2  local
    1    1    1    2    0    0    0    0    0    2
    2    1    2    3    0    0    0    0    0    2

*NODE
    8      2767.36      339.21      1218.7      0      0
    9      2778.68      335.87      1250.0      0      0
    
```

Regular Format

```

*ELEMENT_BEAM
$      1      2      3      4      5      6      7      8
$234567890123456789012345678901234567890123456789012345678901234567890
$#  eid  pid  n1  n2  n3  rt1  rr1  rt2  rr2  local
    1    1    1    2    0    0    0    0    0    2
    2    1    2    3    0    0    0    0    0    2

*NODE
$#  nid  x      y      z      tc  rc
    1    2846.26  379.26  1084.44  0    0
    2    2827.73  370.6   1111.83  0    0
    
```

I10 Format

# Contact SortBy Table



Entity Display

Entity Display Entity Preview

All None

- Boundary
- Constrained
- Contact
- Damping
- Database
- Define
- Element
- Load
- Set

Entity Selection

All None Rev AList

SortBy ALL  Selected

Label None  RefParts

24 Contact\_General

- 1 AUTOMATIC\_SINGLE\_SURFACE SSET 3 A ^
- 2 AUTOMATIC\_NODES\_TO\_SURFACE NSET
- 3 AUTOMATIC\_NODES\_TO\_SURFACE NSET
- 4 AUTOMATIC\_NODES\_TO\_SURFACE NSET
- 5 AUTOMATIC\_NODES\_TO\_SURFACE PSET
- 6 AUTOMATIC\_NODES\_TO\_SURFACE PSET
- 7 AUTOMATIC\_NODES\_TO\_SURFACE PSET
- 8 AUTOMATIC\_NODES\_TO\_SURFACE PSET
- 9 AUTOMATIC\_NODES\_TO\_SURFACE PSET
- 10 AUTOMATIC\_NODES\_TO\_SURFACE PSE
- 11 AUTOMATIC\_NODES\_TO\_SURFACE PSE
- 12 AUTOMATIC\_SURFACE\_TO\_SURFACE P

Done

Contact Sort

	Type	CID	TITLE	SSID	MSID	SSTYP	MSTYP	SBOXID	MBOXIC	SPR	MPR	FS	FD
1	AUTOMATIC_0			10	11	2	2	0	0	1	1	0.80000	0.80000
2	AUTOMATIC_0			12	13	2	2	0	0	1	1	0.70000	0.70000
3	AUTOMATIC_0			14	15	2	2	0	0	1	1	0.40000	0.40000
4	AUTOMATIC_0			16	17	2	2	0	0	1	1	0.40000	0.40000
5	AUTOMATIC_0			18	19	2	2	0	0	1	1	0.40000	0.40000
6	AUTOMATIC_0			20	21	2	2	0	0	1	1	0.40000	0.40000
7	AUTOMATIC_0			22	23	2	2	0	0	1	1	0.40000	0.40000
8	AUTOMATIC_0			24	25	2	2	0	0	1	1	0.40000	0.40000
9	AUTOMATIC_0			26	27	2	2	0	0	1	1	0.40000	0.40000
10	RIGID_BODY_0			28	29	2	2	0	0	1	1	0.75000	0.75000
11	AUTOMATIC_0			3	0	0	0	0	0	0	0	0.70000	0.70000
12	RIGID_BODY_0			30	31	2	2	0	0	1	1	0.75000	0.75000
13	RIGID_BODY_0			32	33	2	2	0	0	1	1	0.75000	0.75000
14	RIGID_BODY_0			34	35	2	2	0	0	1	1	0.75000	0.75000
15	RIGID_BODY_0			36	37	2	2	0	0	1	1	0.75000	0.75000
16	RIGID_BODY_0			38	39	2	2	0	0	1	1	0.20000	0.20000
17	AUTOMATIC_0			4	5	4	0	0	0	0	0	0.30000	0.30000
18	RIGID_BODY_0			40	41	2	2	0	0	1	1	0.20000	0.20000
19	RIGID_BODY_0			42	43	2	2	0	0	1	1	0.20000	0.20000
20	RIGID_BODY_0			44	45	2	2	0	0	1	1	0.20000	0.20000
21	RIGID_BODY_0			46	47	2	2	0	0	1	1	0.20000	0.20000

Setting Column:

- CID
- TITLE
- SSID
- MSID
- SSTYP
- MSTYP
- SBOXID
- MBOXID
- SPR
- MPR
- FS
- FD
- DC
- VC
- VDC
- PENCHK
- BT
- DT
- SFS
- SFM
- SST
- MST
- SFST
- SFMT
- FSF
- VSF
- LCID
- FCM

AutoSizeAll All None Rev Write Done

- SelPart RefGeo
- Keyword Curve
- CreEnt Surf
- PartD Solid
- Display** GeoTol
- RefChk Mesh
- Renum **Model**
- Renum
- Section EleTol
- MSelect Post
- Subsys MS
- MS
- Groups MS
- Favor 1
- Views

# Support \*SET\_PART\_TREE data

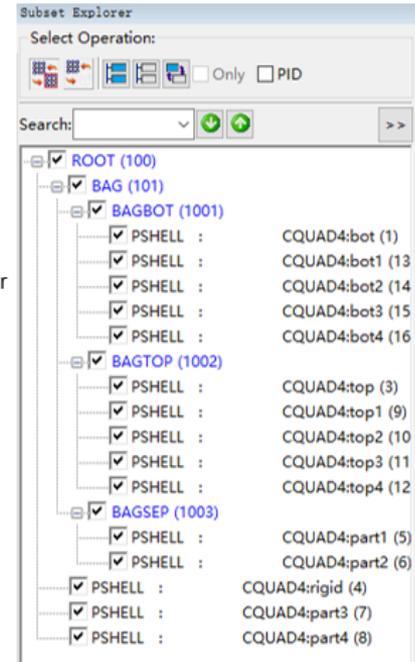


- \*SET\_PART\_TREE is a new definition in LS-DYNA which allows user to organize the model with part data in a hierarchical manner for easy manipulation and visualization
- This data is also stored in d3plot files for post-processing
- Show SET\_PART\_TREE in LS-PrePost:
  - Main menu “View” → “Subset Explorer”
    - Options in LS-PrePost:

1. Highlight
2. On/Off
3. Blank
4. Create
5. Remove
6. Delete
7. Move

```
*SET_PART_TREE
100
ROOT
101,-4
*SET_PART_TREE
101
BAGBOT
1001,1002,1003
*SET_PART_TREE
1001
BAGTOP
-1,-13,-14,-15,-16
*SET_PART_TREE
1002
BAGSEP
-3,-9,-10,-11,-12
*SET_PART_TREE
1003
BAGSEP
-5,-6,-7,-8
-5,-6
```

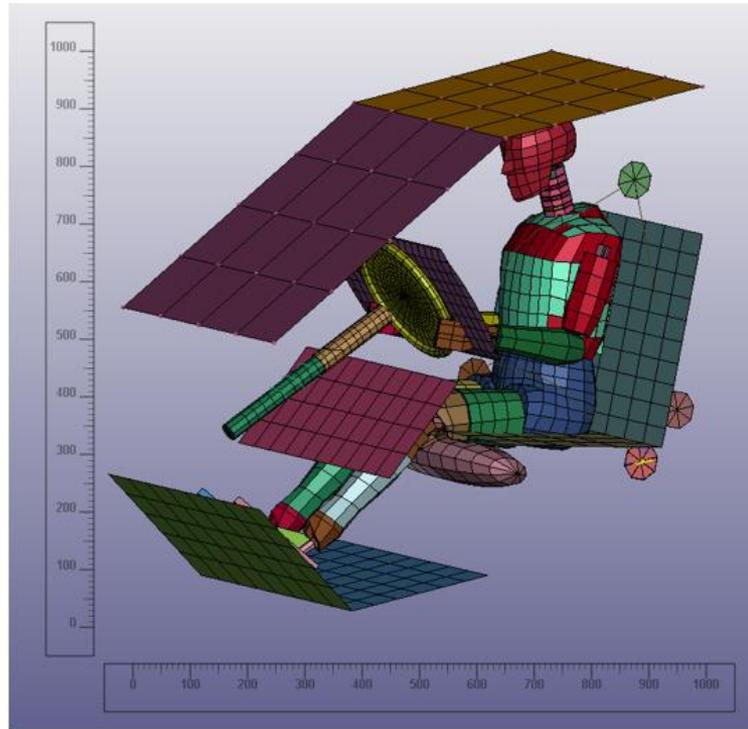
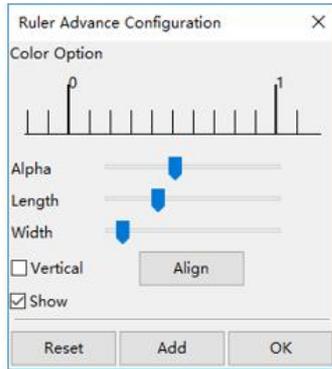
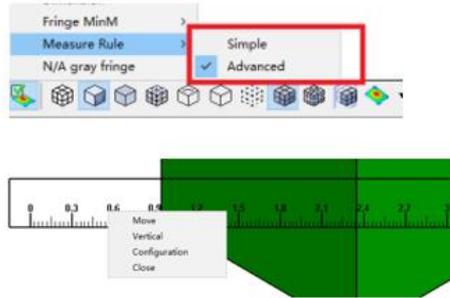
View->Subset Explorer



# Advance On Screen Measuring Ruler



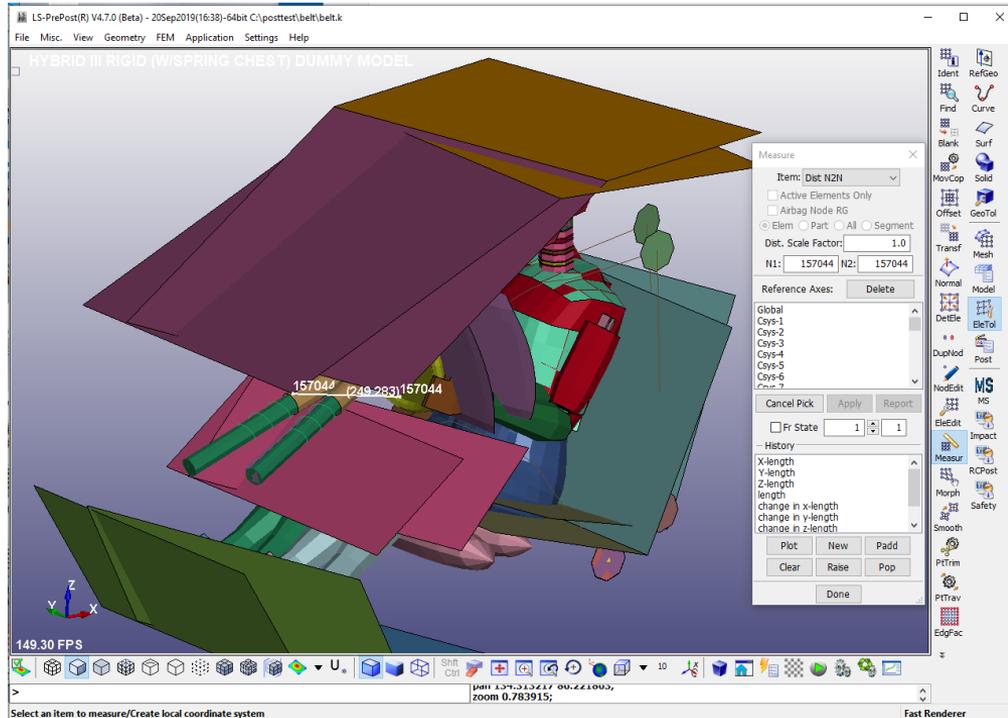
- Allows user to see approximate size of the model



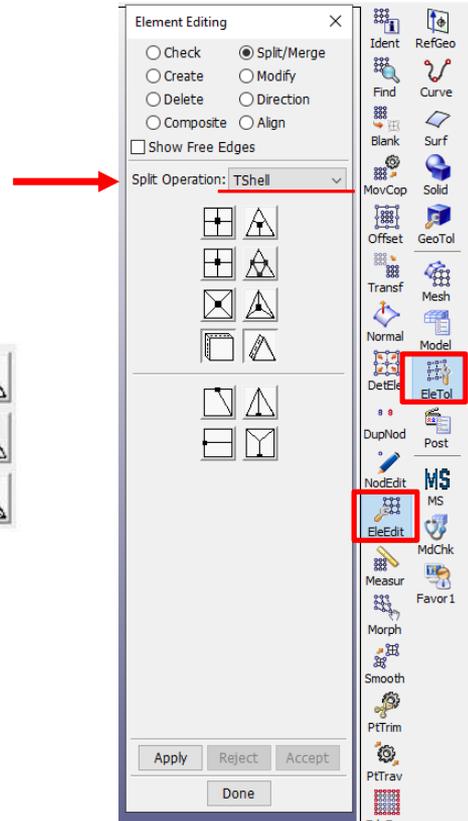
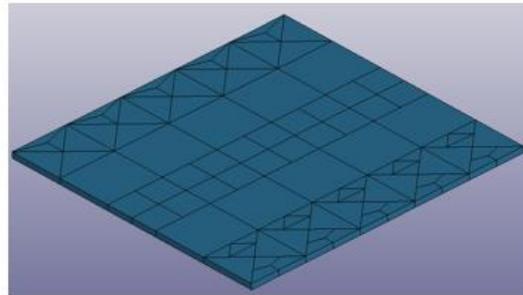
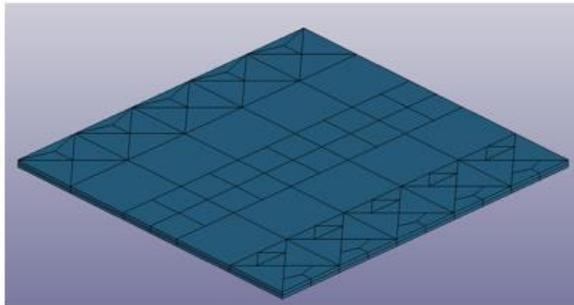
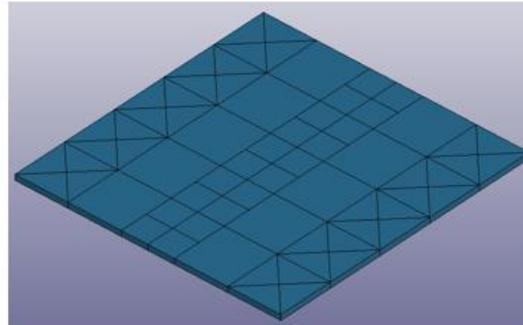
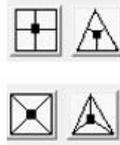
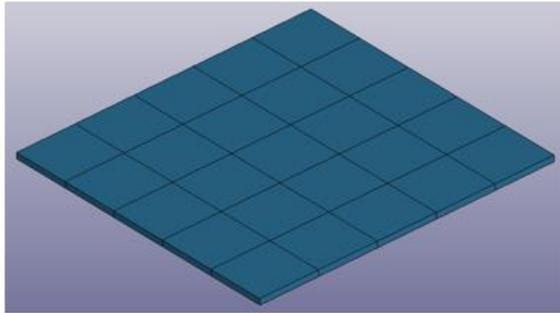
# Measure Distance between 2 different models



- Load 2 similar models into LS-PrePost, one can measure distance between the 2 models



# TSHELL splitting



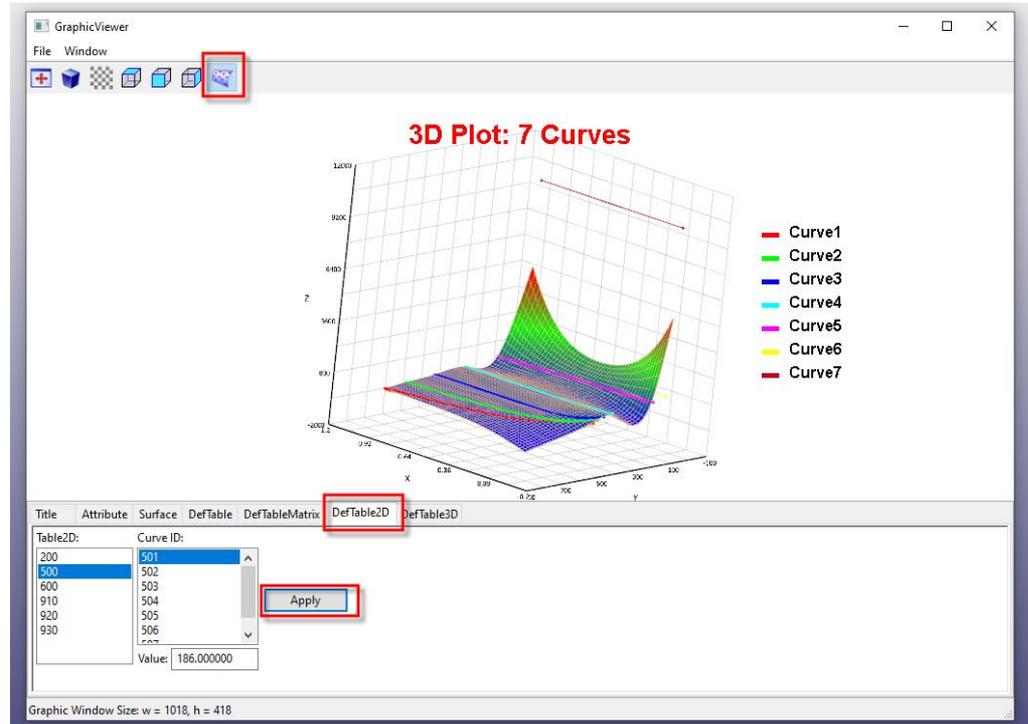
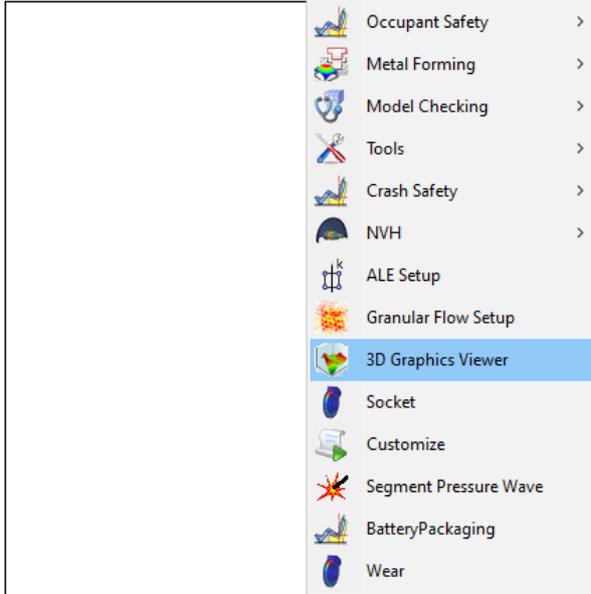
# Support DefTable2D and DefTable3D Visualization



■ \*Define\_Table\_2D and \_3D can be visualized in the 3D Graph interface

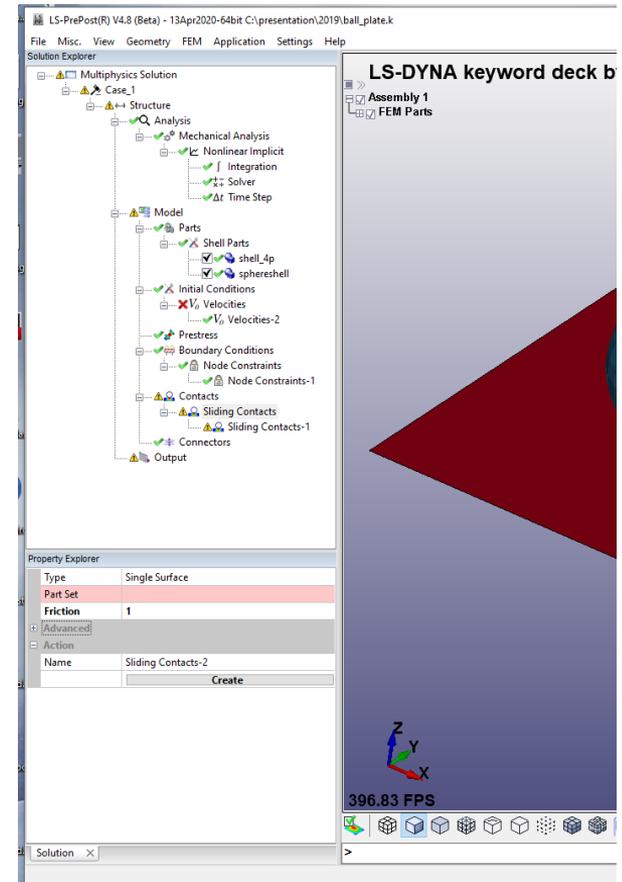
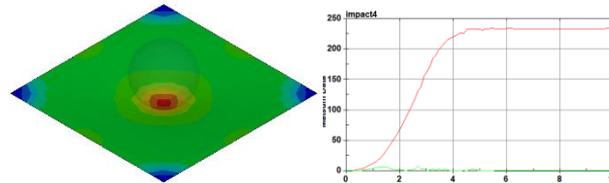
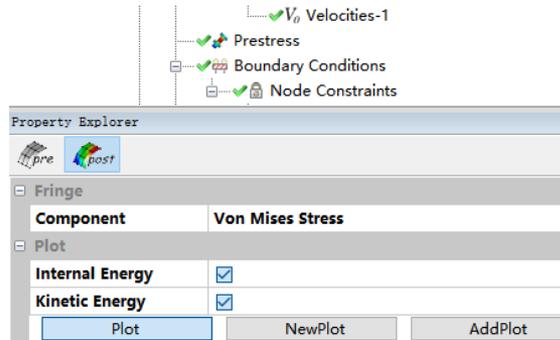
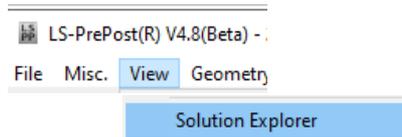
LS-PrePost(R) V4.8(Beta) - 01Jul2020-64bit uelles\Examples\_Features\_LSPP\testdata\_t

File Misc. View Geometry FEM Application Settings Help



# Solution Explorer

- A new way to build LS-DYNA model
  - Currently simulation setup of...
    - Incompressible CFD,
    - Implicit
    - Structured ALE included 
- Tree Structure
- Visualization
- Expert setting
- Error checking
- Material database system
- Unit system consistency
- \*CASE support
- New/Load/Save solution
- Exporting Keyword
- LS-DYNA Job submission
- Post Processing integration



# Result mapping by scalar values (e.g test result)



- Result file: x-, y-, z- coordinate followed by scale value(s) for this location. One point per line.

```

cx      cy      cz      val1      val2      val3
20.000000  0.000000  0.000000  1.000000
16.800000  -121.350000  0.000000  0.750000
15.400000  -121.940000  0.000000  0.750000
14.000000  -122.470000  0.000000  0.750000
56.000000  -132.560000  0.000000  0.500000
54.000000  -134.670000  0.000000  0.500000
52.000000  -136.670000  0.000000  0.500000
50.000000  -138.560000  0.000000  0.500000
    
```

Example file: "pressure.spf"

- Specify "From" in table: Which scalar value should be map. In this example only scalar value (val1) is defined.
- Specify "To" in table: Define to which element history variable number map this scalar value.

Example: 01-ResultMapping

The screenshot shows the ANSYS software interface. A central mesh is displayed with a color gradient from blue (low values) to red (high values). On the right, a 'History1' legend shows a color scale from 2.500e-01 to 1.000e+00. The 'Result Mapping' dialog box is open, showing options for mapping scalar values to history variables. The 'From' table has '1' in the first column, and the 'To' table has '1' in the first column. The 'Mesh' button in the software's toolbar is highlighted with a red box.

# Right mouse click options for keyword modifications



## Keyword Transfer “Transfer to”:

The screenshot shows the Keyword Manager dialog box with the 'Keyword Edit' tab selected. The 'Edit' field contains 'ELEMENT\_SHELL'. A right-click context menu is open over the 'SHELL' keyword in the list, with 'Transfer to' highlighted. The 'Keyword Transfer' dialog box is also visible, showing 'From: ELEMENT\_SHELL' and 'To: SHELL\_BETA'. A list of keywords is shown in the background, including SHELL\_SHL4\_TO\_SHL8, SHELL\_BETA, SHELL\_BETA\_OFFSET, SHELL\_COMPOSITE, SHELL\_COMPOSITE\_LONG, SHELL\_BETA\_COMPOSITE, SHELL\_BETA\_COMPOSITE\_LONG, SHELL\_DOF, SHELL\_MCID, SHELL\_MCID\_OFFSET, SHELL\_OFFSET, SHELL\_OFFSET\_COMPOSITE, SHELL\_OFFSET\_COMPOSITE\_LONG, SHELL\_BETA\_OFFSET\_COMPOSITE, SHELL\_BETA\_OFFSET\_COMPOSITE\_LONG, SHELL\_THICKNESS, SHELL\_THICKNESS\_BETA, SHELL\_THICKNESS\_BETA\_OFFSET, SHELL\_THICKNESS\_MCID, SHELL\_THICKNESS\_MCID\_OFFSET, and SHELL\_THICKNESS\_OFFSET.

## Replace Field in the Keyword Input Form:

The screenshot shows the Keyword Input Form dialog box with the 'Keyword Input Form' tab selected. The 'Field Name' is '\*CONTACT\_FORMING\_ONE\_WAY\_SURFACE\_TO\_SURFACE\_ID/TITLE/MPP\_(THERMAL) (3)'. A right-click context menu is open over the 'FS' keyword in the list, with 'Replace field value' highlighted. The 'Replace Keyword Field Value' dialog box is also visible, showing 'Field Name: FS', 'Data Type: REAL data', 'Old Value: 0.1000000', 'Replace Setting: IDs Info: Min ID: 1; Max ID: 3', 'Kwd IDs: All 1', 'New Value:', and 'Match Value: [checked]'. An arrow points to the '1' in the 'Kwd IDs' field, with a callout box stating 'Option to define id number range: 200:500'.

Option to define id number range: 200:500



# Convert CSV curves to Define\_Curve and Define\_Table

- Option to **convert CSV curves** or LS-PrePost curves into the keywords **\*Define\_Curve** and **\*Define\_Table**
- Right toolbar: Model → Keyword Manager → Right mouse click on “Define”->”Curve” in the tree.  
→ Pulldown Menu “Load Curve” and “Load curve to table”
- CSV title line are convert to the **table values** of the the keyword **\*DEFINE\_TABLE**

**Input:**  
CSV-Curves  
or LS-DYNA curve file

```

testdata table-values.csv
time 1.00E-07,5.00E-03,1.00E-02,5.00E-02,0.1
0.00E+00,6.58E-02,2.93E-01,3.38E-01,3.74E-01,3.94E-01
5.00E-03,7.26E-02,3.00E-01,3.61E-01,3.86E-01,4.10E-01
1.00E-02,7.60E-02,3.03E-01,3.73E-01,3.97E-01,4.15E-01
1.50E-02,7.77E-02,3.05E-01,3.83E-01,4.06E-01,4.20E-01
2.00E-02,7.82E-02,3.07E-01,3.91E-01,4.15E-01,4.26E-01
2.50E-02,7.88E-02,3.09E-01,4.00E-01,4.24E-01,4.34E-01
  
```

**Output:**  
Keyword **\*DEFINE\_TABLE**  
and related **\*DEFINE\_CURVE**

```

$# LS-DYNA Keyword file created by LS-PrePost(R) V4.8
$# Created on Apr-2-2020 (07:00:41)
*KEYWORD
*DEFINE_TABLE
6
1.0E-7 1
5.0E-3 2
1.0E-2 3
5.0E-2 4
0.1 5
*DEFINE_CURVE
1 0 1.0 1.0 0.0
0.0 0.0658
0.005 0.0775
  
```

**CFILE Commands:**

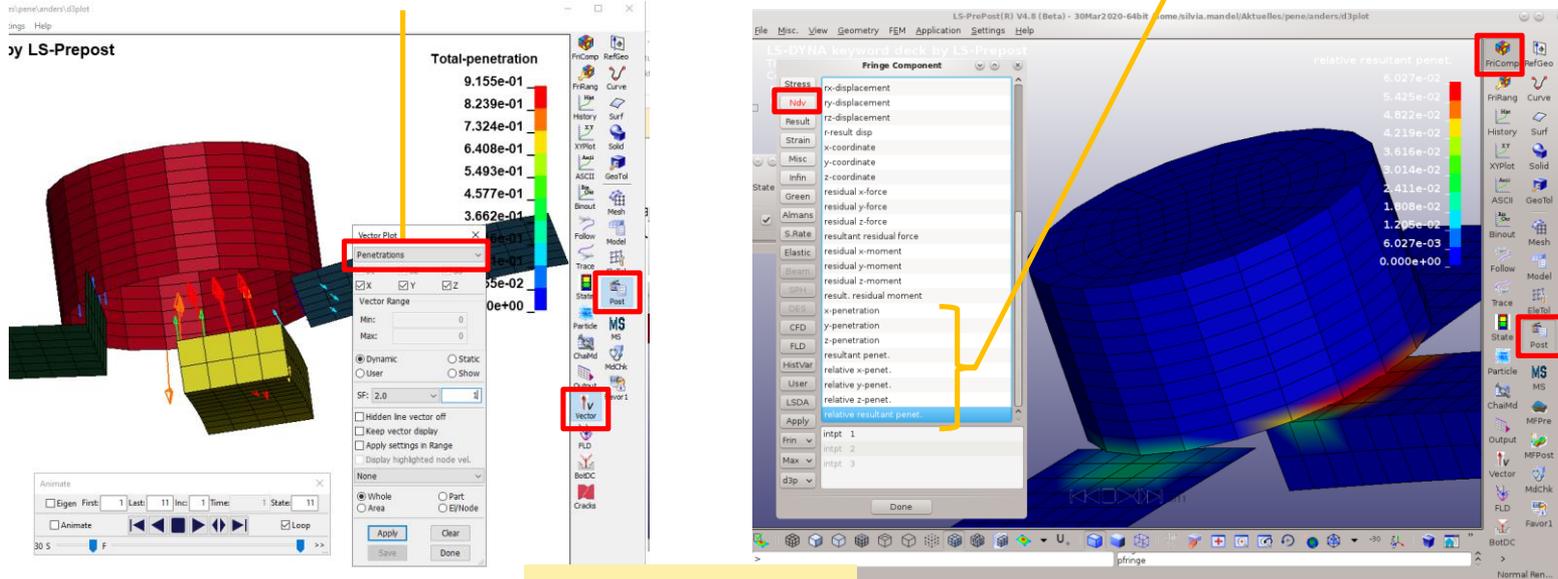
- Create \*Define\_Curve from file including xydata : *loadcurve "testdata.csv"*
- Create \*Define\_Curve and \*Define\_Table from file including xydata: *loadcurve "testcurve.dat" 2table*

Example: 02-CurveTable

# Penetration Display (PENOUT=1)



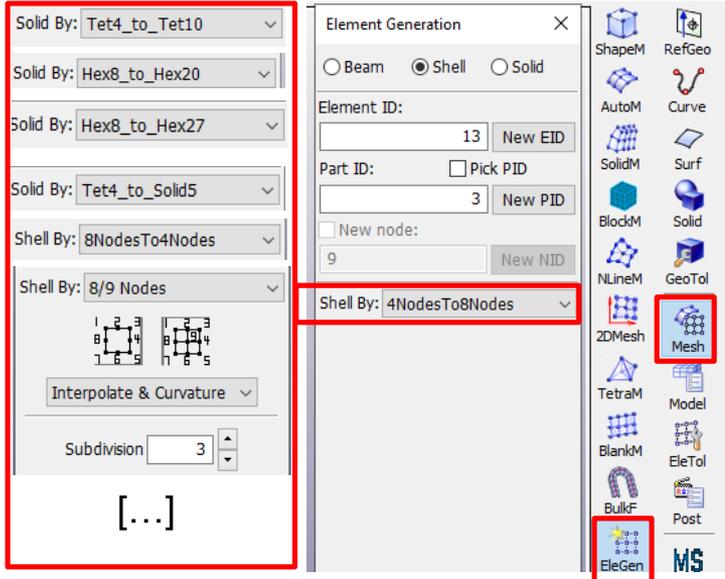
- New LS-DYNA options 'PENOUT =1/2' on \*CONTROL\_OUTPUT for d3plot and NPEN=1 on \*DATABASE\_EXTENT\_INTFOR which writes penetration information to d3plot and intfor file is now supported from LS-PrePost: LS-PrePost displays these penetration information in the interfaces (d3plot/intfor).  
POST → Vector → Penetration  
FringeComp > Ndv > (resultant/rel.) x/y/z-pen



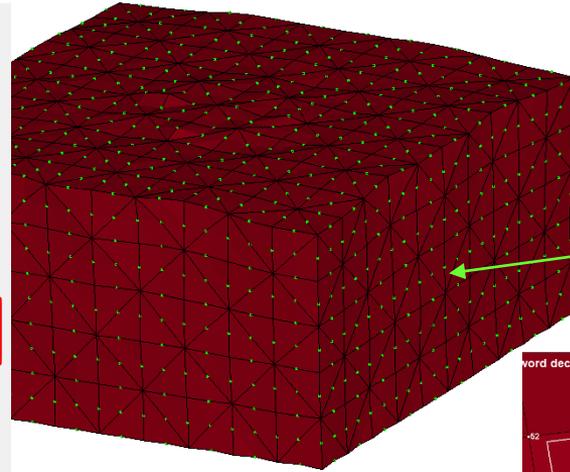
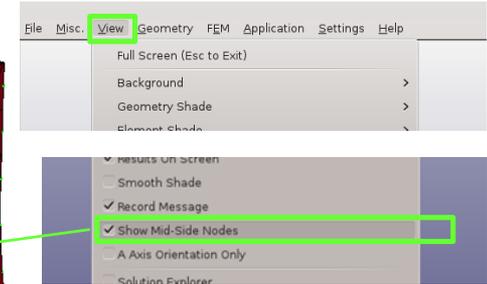
Example: 03-Penout

# Higher order elements

- Convert to higher order elements with right toolbar “Mesh”

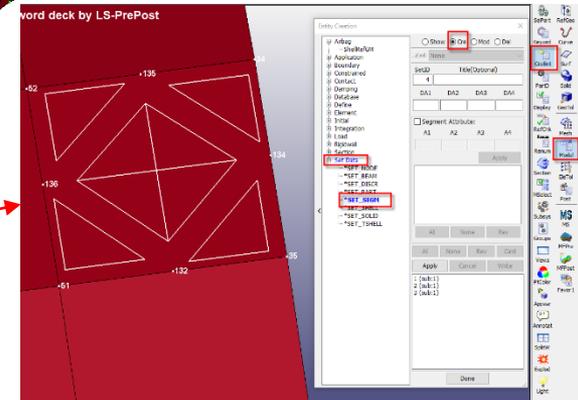


- Display of mid-side nodes

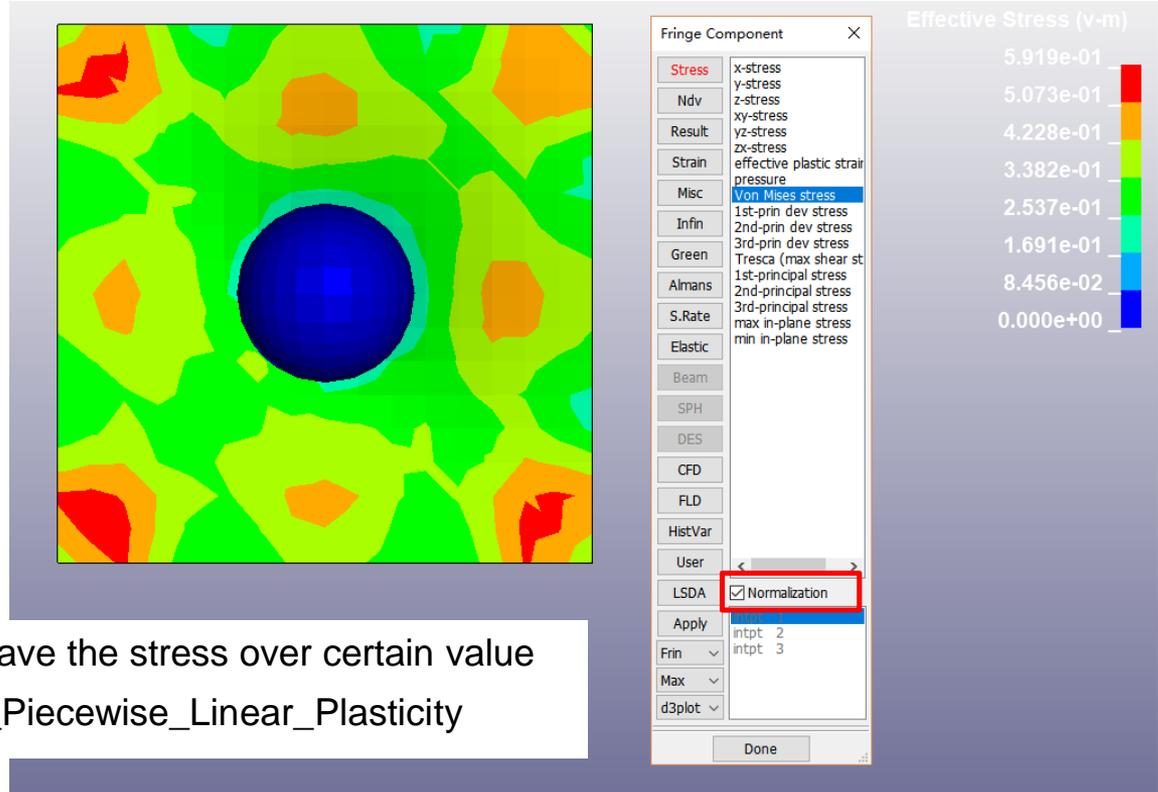


- Support \*SET\_SEGMENT creation for high order element:

- Multiple triangular segments will be created for high order element
- Can be 8-node shell element or 20/27-node solid element face

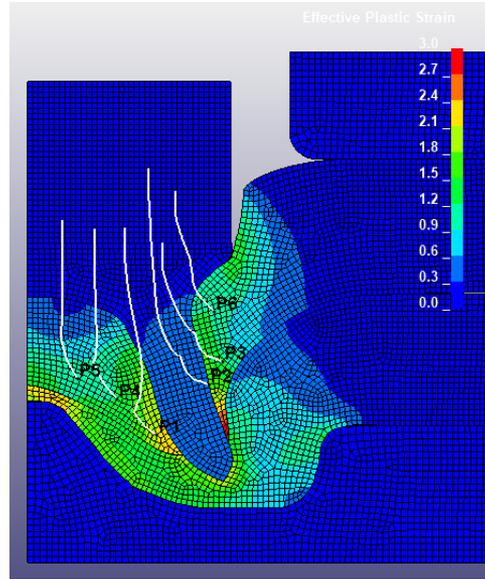
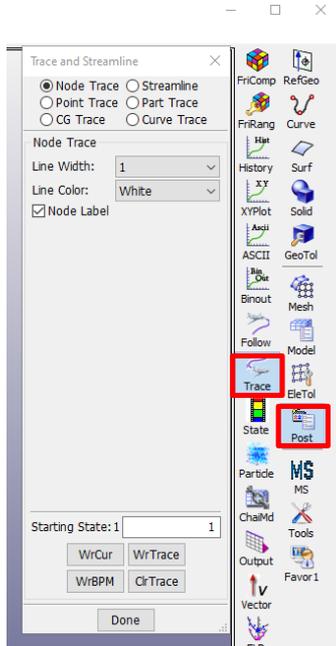


# Von-Mises Stress Normalization



- To easily visualize the parts that have the stress over certain value
- This only work with Mat24 – \*Mat\_Piecewise\_Linear\_Plasticity

# Postprocessing with Trace feature



## \*CONTROL\_ADAPTIVE

This card is optional. It is read if ADPOPT = 1 or 2.

Card 4a	1	2	3	4	5	6	7	8
Variable						D3TRACE		IFSAND
Type						I		I
Default						0		0

### VARIABLE

D3TRACE

### DESCRIPTION

Output flag:

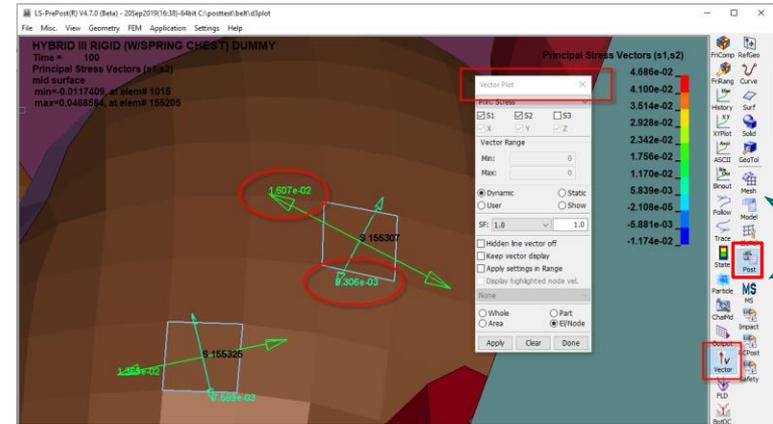
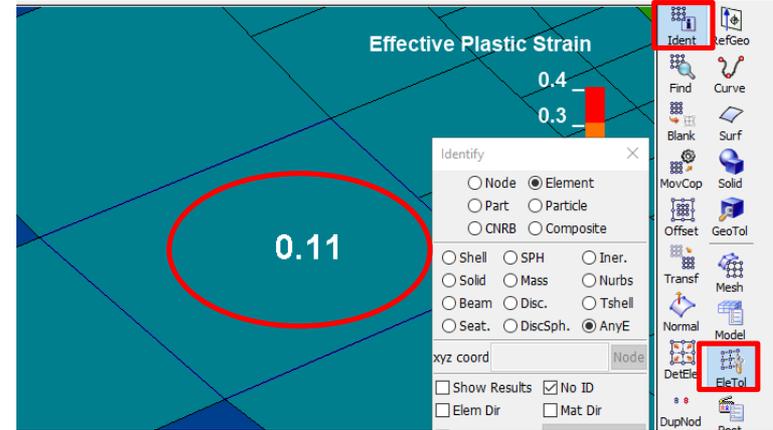
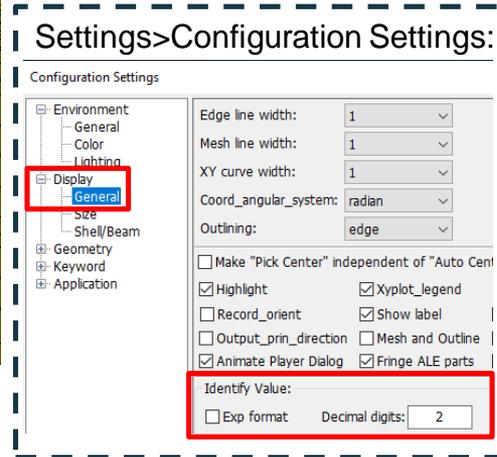
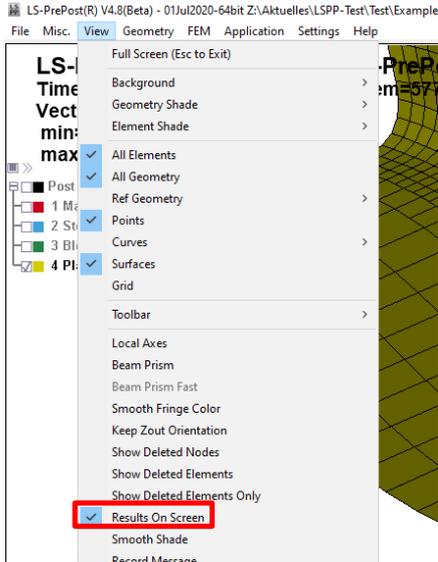
EQ.0: no additional output states

EQ.1: a d3plot state will be output just before and after an adaptive step even though it may not be requested. You may want this output so that the LS-PrePost particle trace algorithm will work in the case of adaptivity.

■ Simulation with mesh adaptivity: Set “D3TRACE”

# Show “Result On Screen”

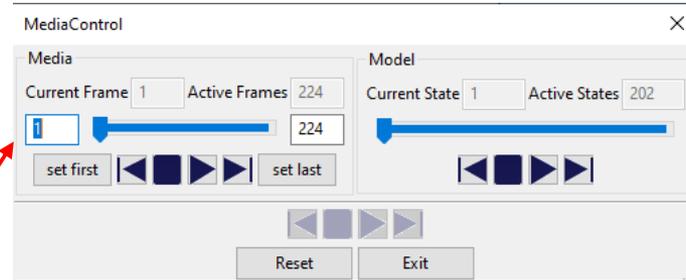
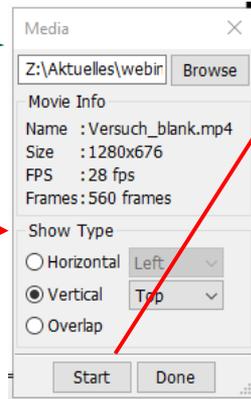
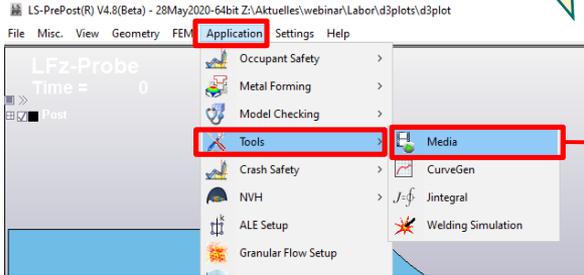
Result values are visible directly on the model in the “Ident” interface and also it is possible to show values at the tip of the vectors in the vector plot, if “Result On Screen” is turned on in the “View” menu.



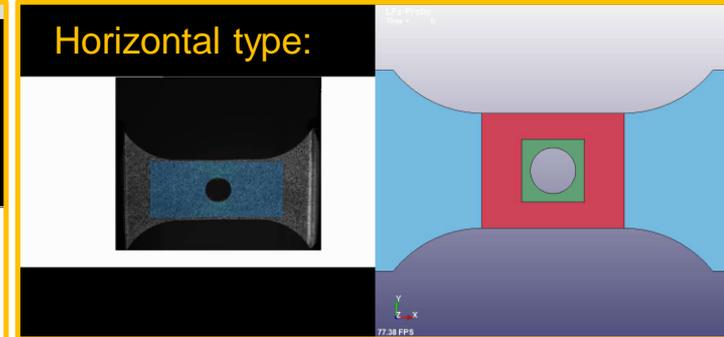
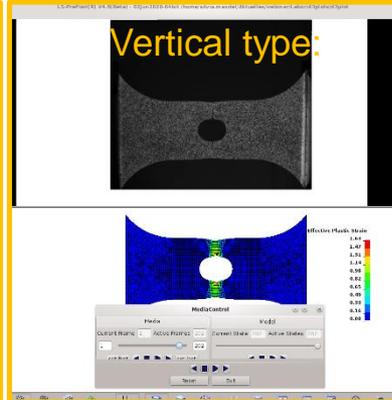
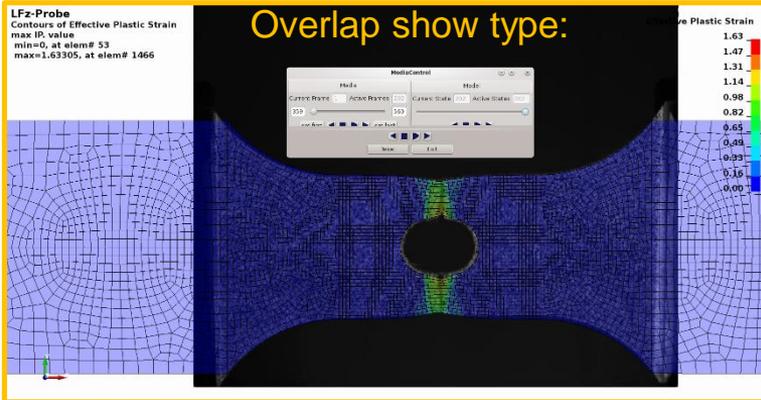
Since 4.7

# Media Tool

## Media tool improved

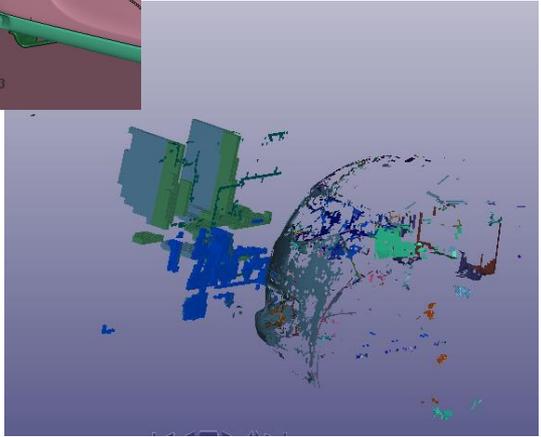
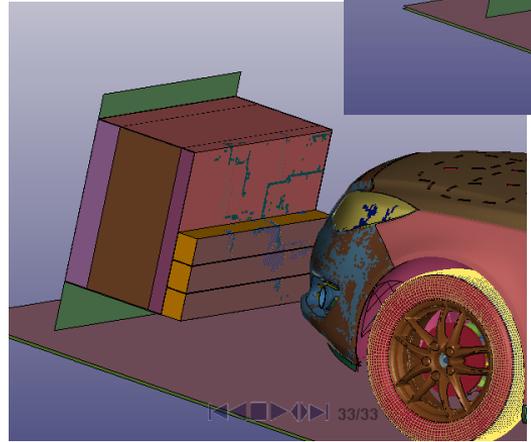
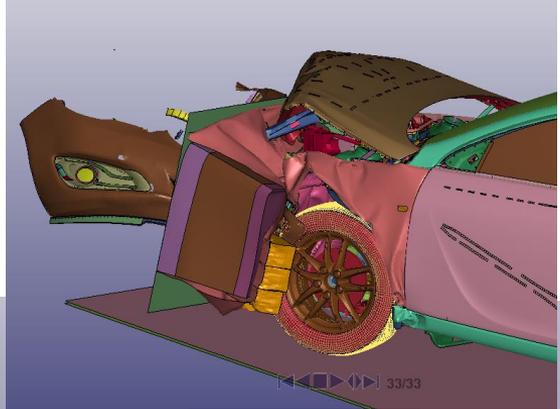
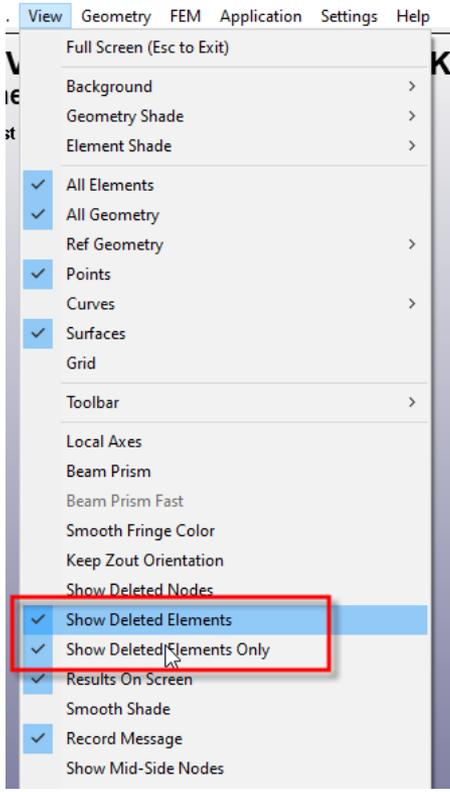


- Left part is used to control media, right part is used to control model
- Then you can move media or model state with each control.
- Media frames always different with model states, but active frames == active states, then 'model and media control area' will be enable. (The use of buttons "set first" and "set last" are one possibility to set active frame = active states)



Since 4.8

# “Show Deleted Elements Only”

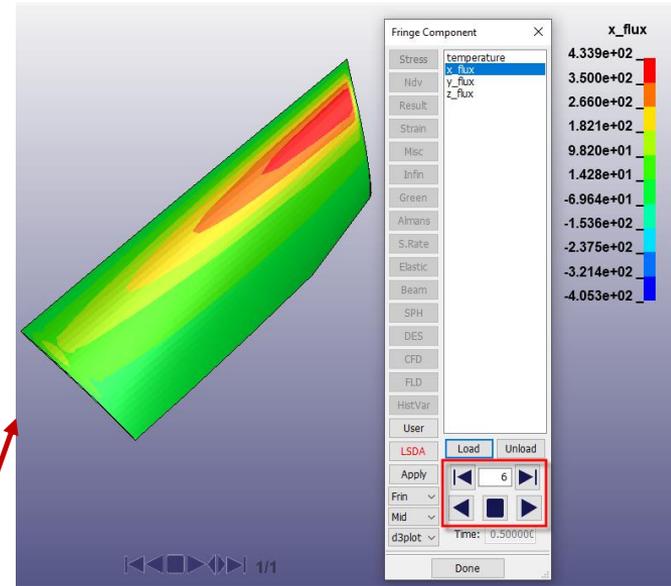
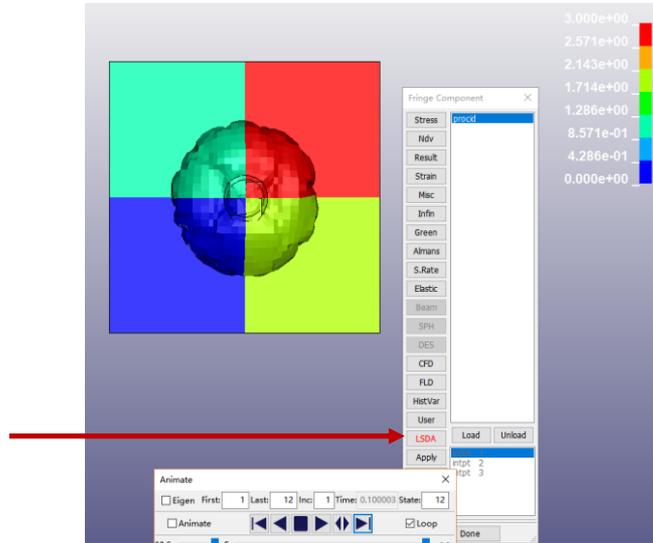


Show Deleted Elements

Show Deleted Elements Only

# Fringe LSDA Formatted Post Data

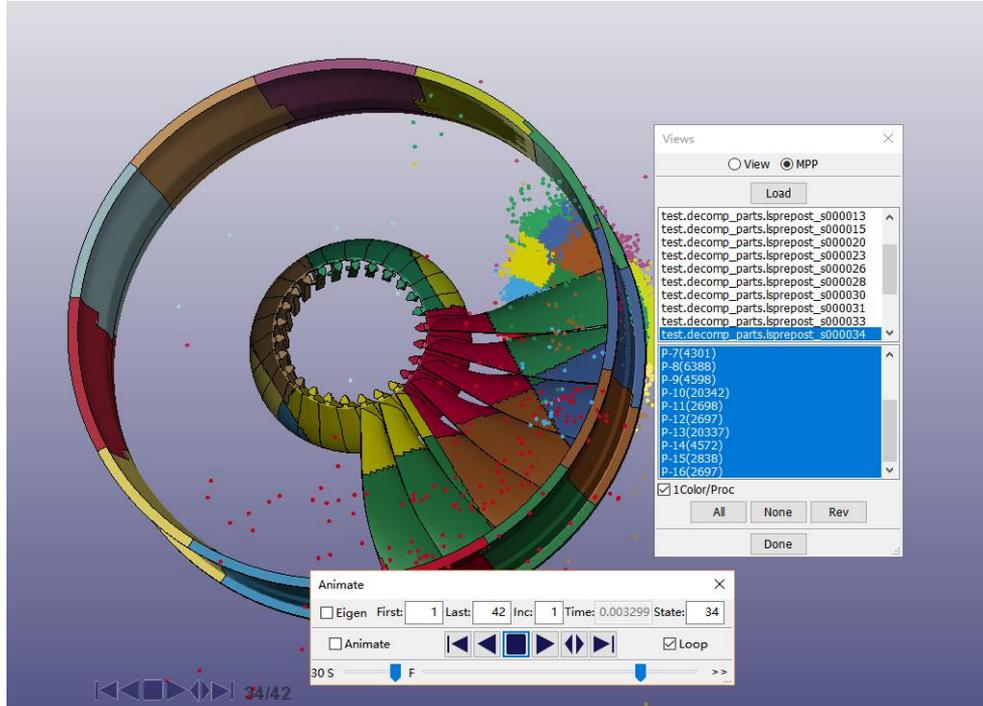
- In order to avoid writing data to d3plot file, more new result data in LS-DYNA are being output as LSDA format. Support fringing the LSDA format.



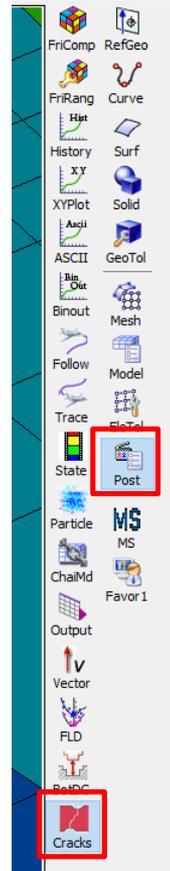
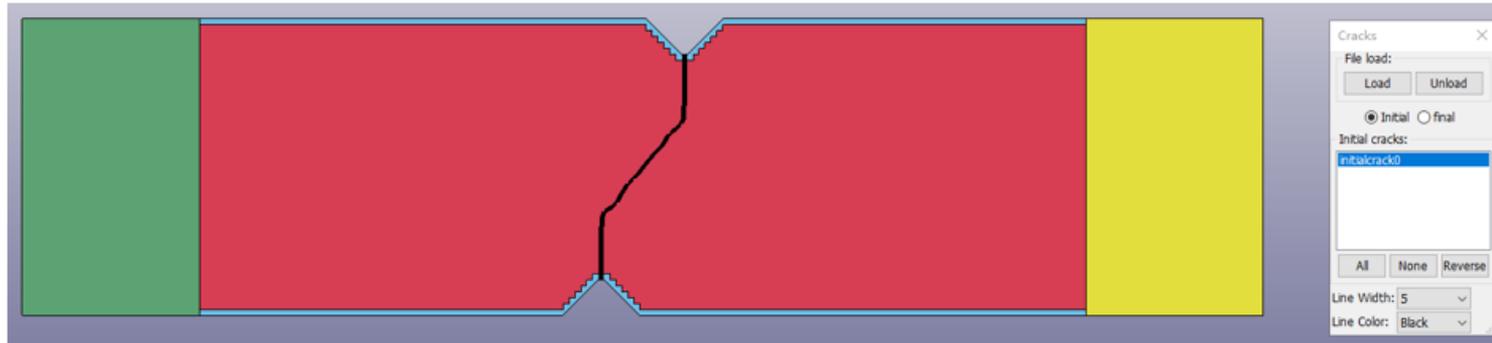
- The LSDA file can also have multiple time steps, like this BINOUT file. One can also animate the change of the fringe data. The model itself came from a Keyword file. The fringe data came from LSDA file

# View MPP Domain Decomposition

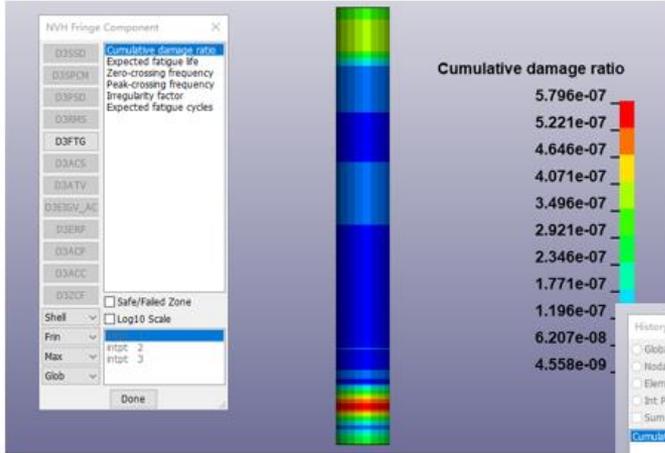
- LS-DYNA now output multiple files showing different domain decomposition at different states. LS-Prepost reads and animates such setup



# Support XFEM Crack file and Crack Visualization

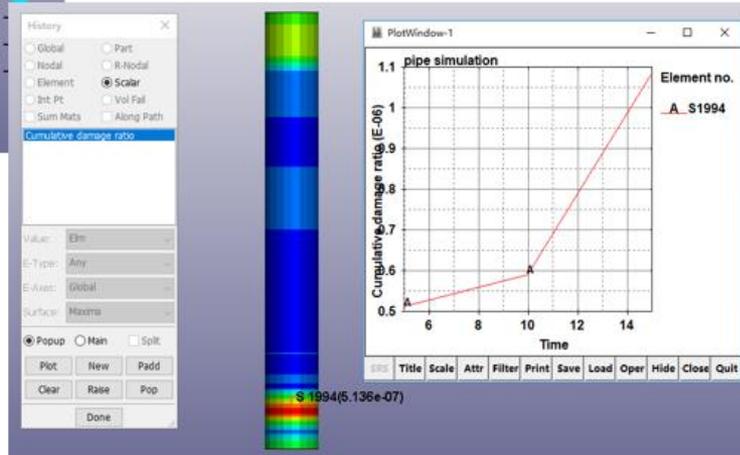


# Support NVH Fatigue File d3ftg New Format

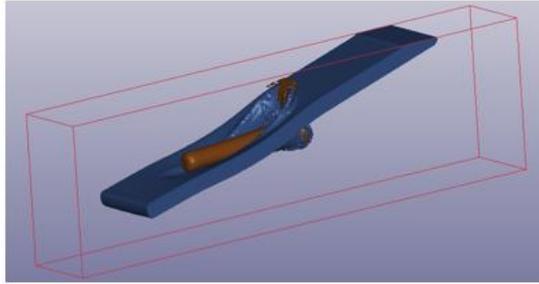


D3ftg with multi-states

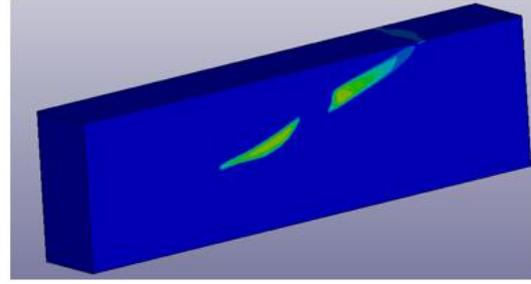
## History plots



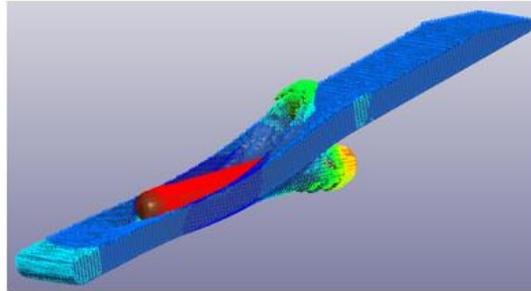
# Structural ALE Visualization



Interface



Domain pressure

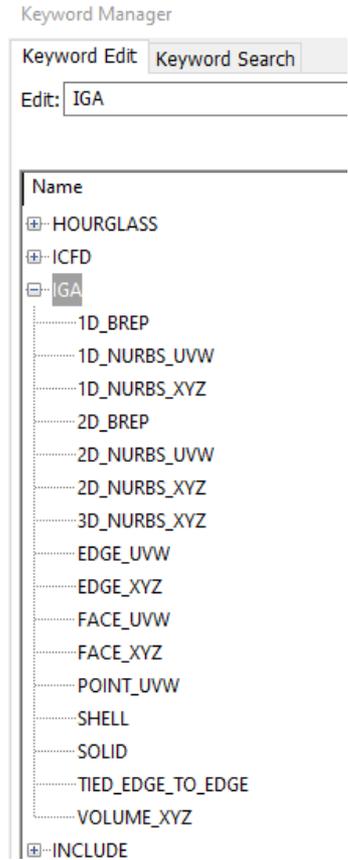
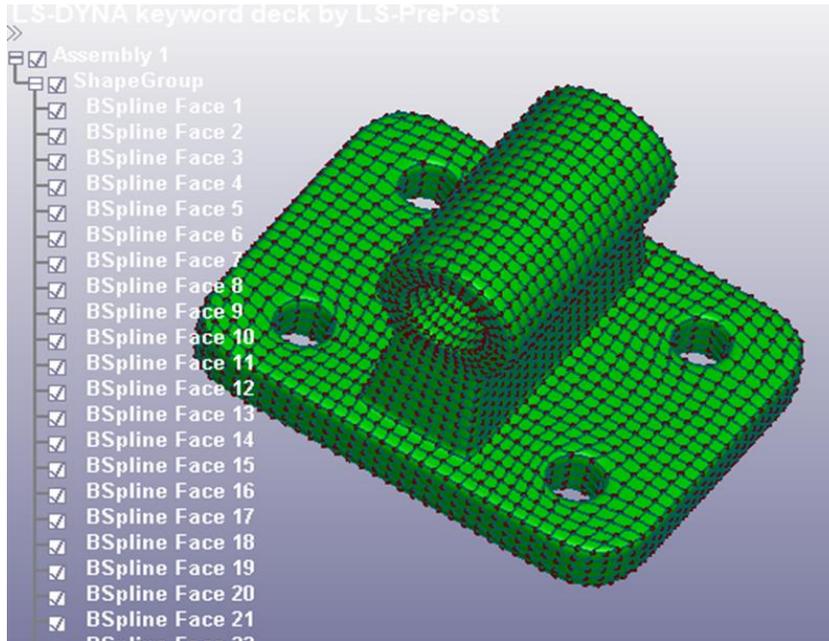


Interface velocity

# Iso-geometric Analysis (IGA) support extended



- Added \*IGA keywords in LS-PrePost keyword manager
- Support Solid IGA with the “Bezier-Extraction” (BEXT) format



# Additional interesting features

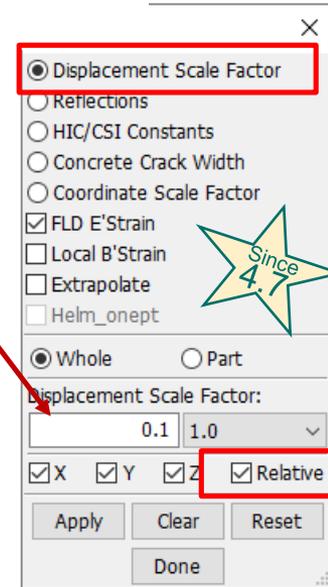
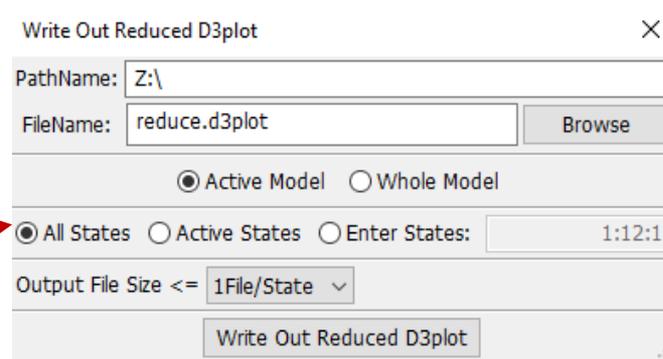
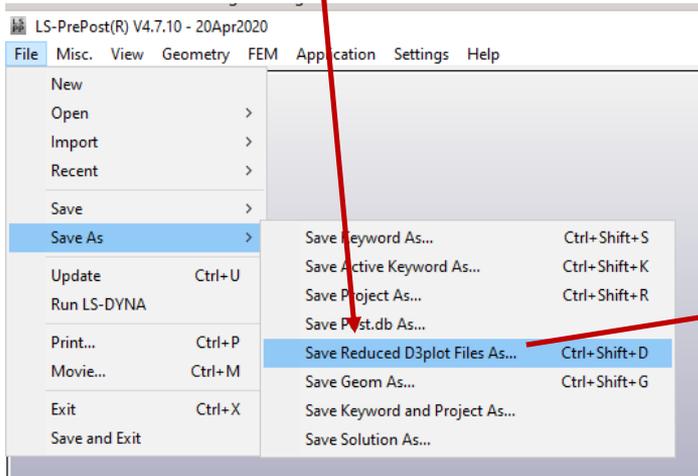
## ■ Settings → Post Settings → Displacement Scale Factor → New option “Relative”:

- Proportional ratio of the max. deformation to the largest model dimension

→ The greater the model, the greater the deformation scaling.

If the automatically calculated relative factor is too big, reduce e.g. to 10%

## ■ Save Reduced D3PLOT Files As ...



# XYPlot Manager (2D Graphics Viewer)

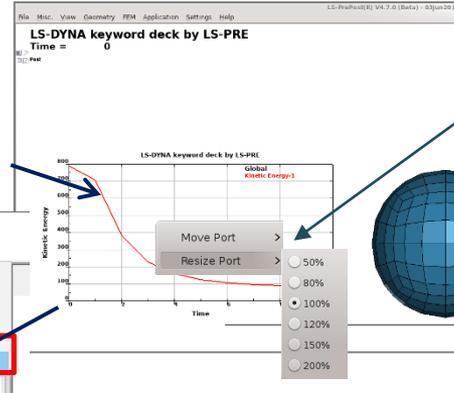
■ The (new) XYPlot frame is designed as 2d curves viewer, which can show multiple ports of the 2d curves page by page.

■ Two start options for new plot manager:

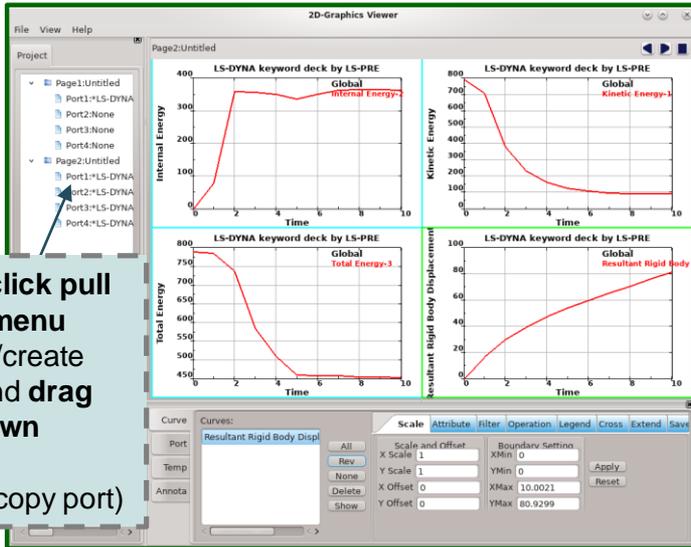
1. Bottom toolbar icon "Plot Manage" 

2. "Main" option in curve selection interfaces

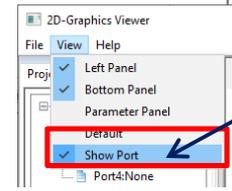
- open the XYPlotManager and plot the curve also in the GUI main window



Right click pull down menu with move and resize options. Best move option is "Shift" + "Ctrl" + mouse left button to drag the plotting port area on the main window.



Right click pull down menu (delete/create port) and drag pull down menu (move/copy port)



Some advantages compare to the "old", still available plot window:

- Multiple plots on a page / multiple pages.
- Modification of legend position.
- Cross panel for crossing plotting of curves (2D/3D).
- "Template" option to save curve plot settings ("LineColor", "LineStyle" and "Name").

Tip

# Blank Mesh with Boundary Adaptivity



Blank Mesher

Operation

4 Pnts     Rect

Curve     Refine

Define

Outline     Holes

By Surface

Control

Smooth

Iterate Num:

Boundary Smooth

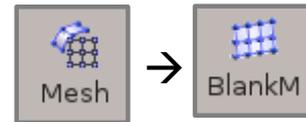
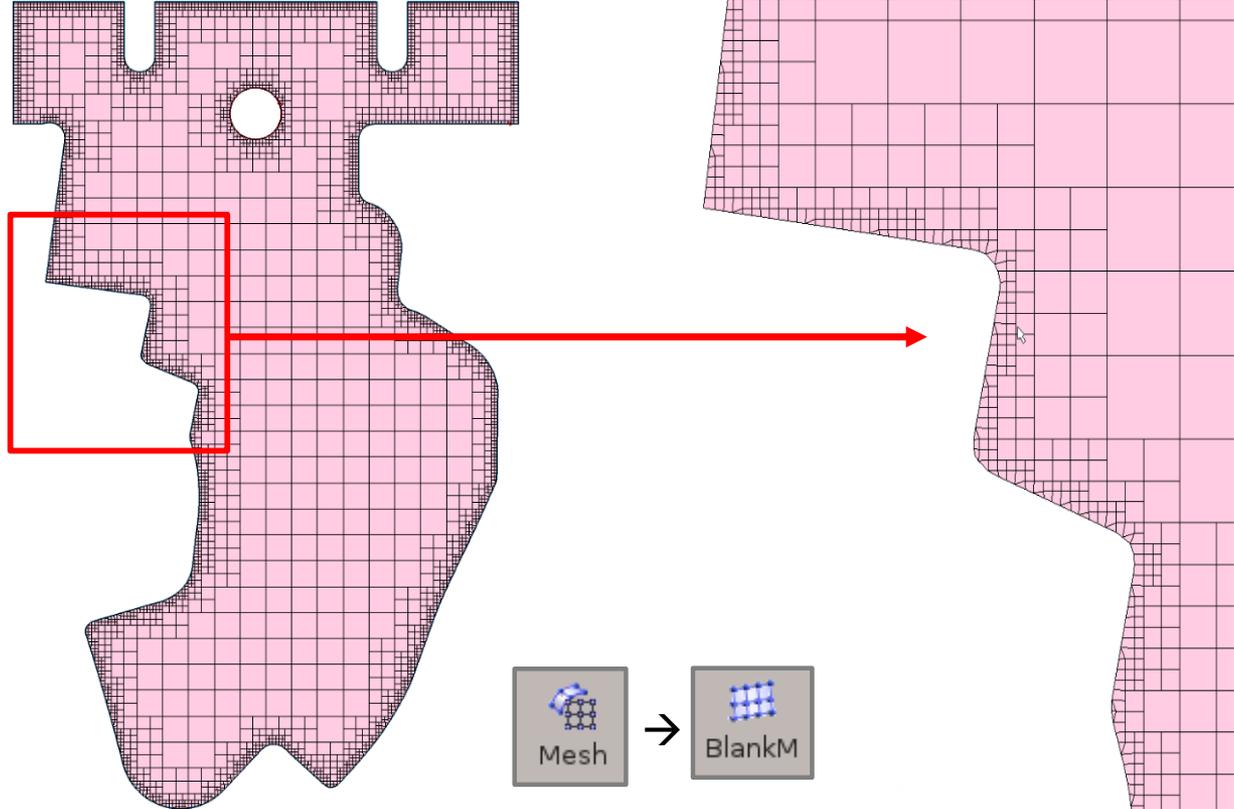
Jagged Edge

Tria Fill

No Trim

Adaptive Boundary

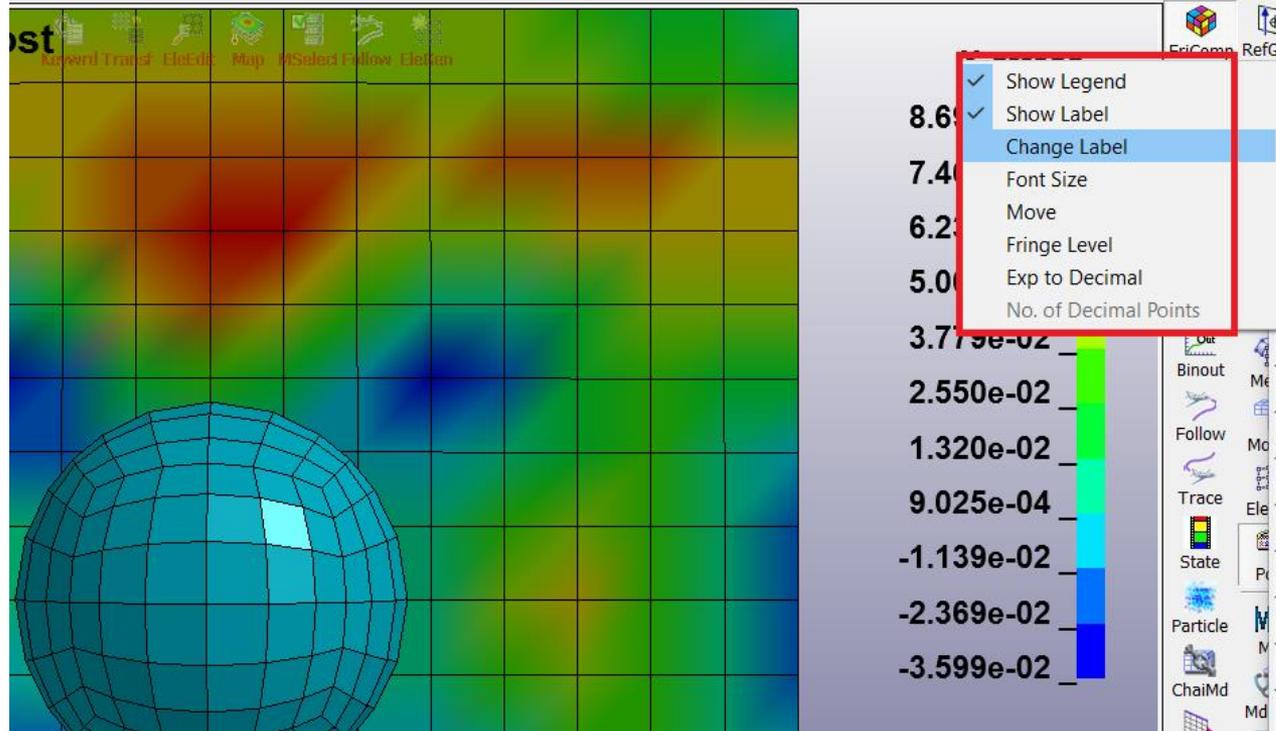
Iterate Num:



# FAQ: Fringe Legend Modification



- Right mouse click on fringe legend

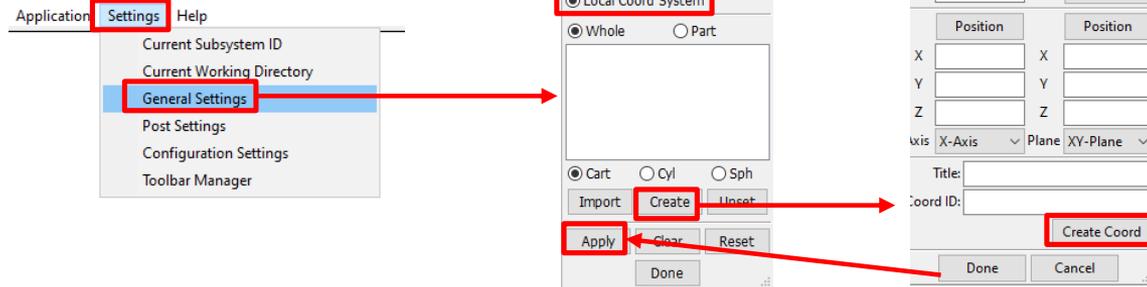


# FAQ: User Coordinate System



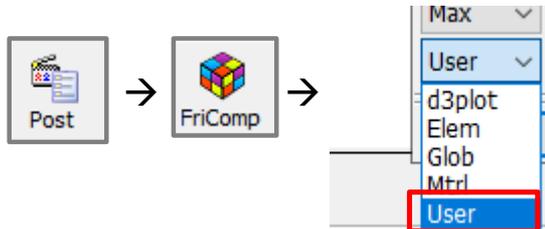
■ Change from global to **user coordinate system** and make a fringe plot:

1. Load the keyword file **and** the d3plot files of the model.
2. Select/Create User Coordinate System:

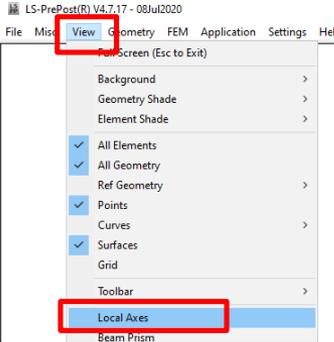


Select your predefined coordinate system (\*DEFINE\_COORDINATE\_NODES) in the list or create your kind of local system: "Cart" (Cartesian), "Cyl" (Cylindrical) or "Sph" (Sphere)

3. Fringe Plots:



# FAQ: Local Element System

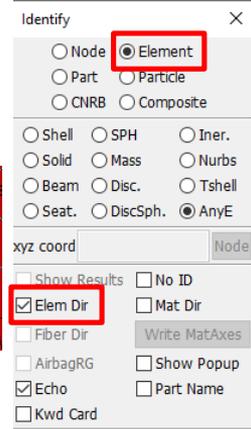
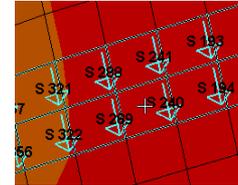


- Change from global coordinate system to **local element system** (based on element node numbering ( $n1 \rightarrow n2 = x$ -axis))

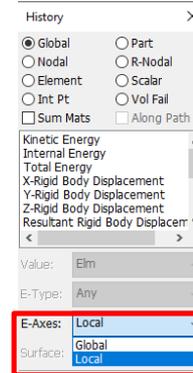
1. Load the keyword file **and** the d3plot files of the model.

2. Main menu “View” → Activate “Local Axes”

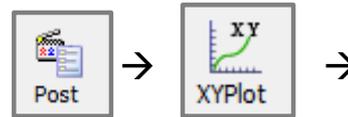
3. Check element direction with



4. Fringe Plots:



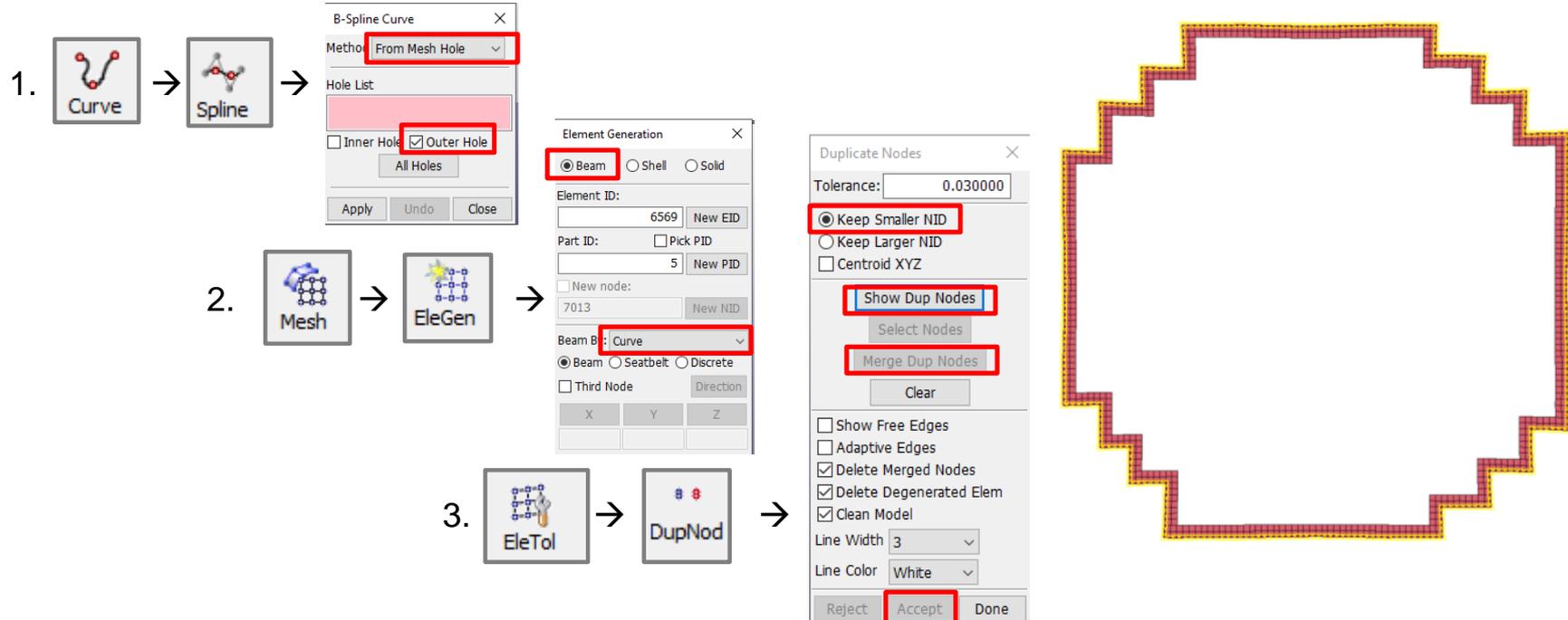
5. History curve plots:



# FAQ: Selection of shell outline nodes



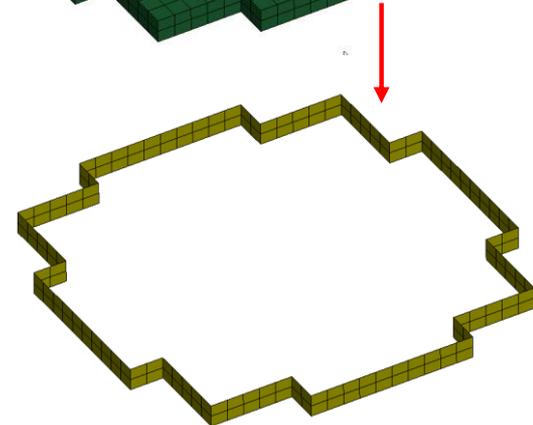
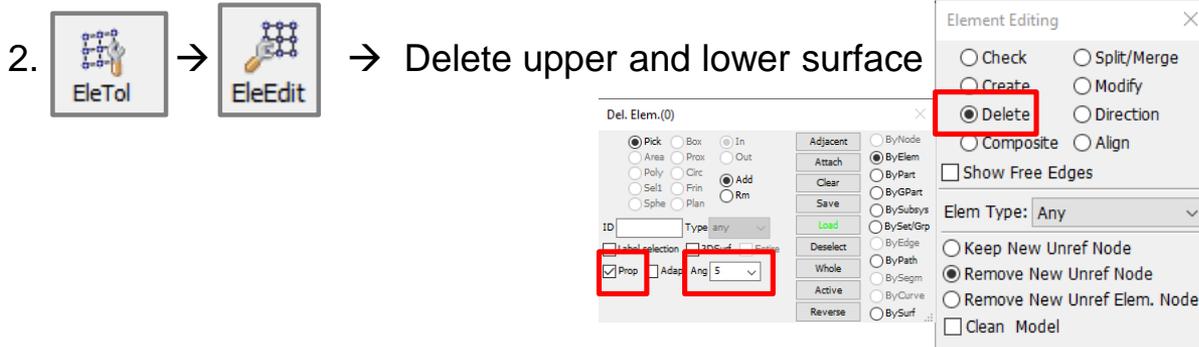
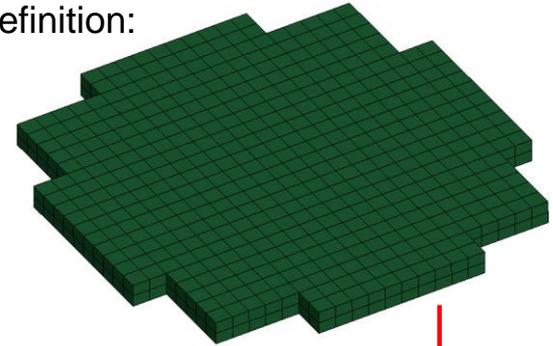
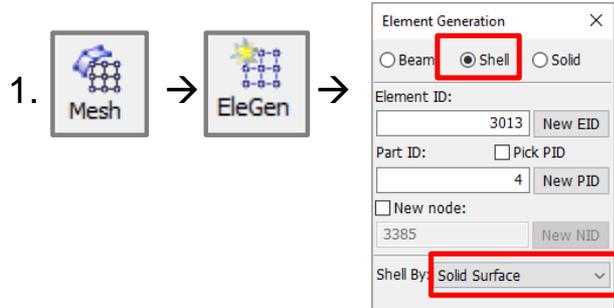
- For complex outlines no simple option is in the selection dialog available.
- Workaround e.g. for node selection to create a \*SET\_NODE for SPC definition:



# FAQ: Selection of solid surface nodes



- For complex part surfaces no simple option is in the selection dialog available.
- Workaround e.g. for node selection to create a \*SET\_NODE for SPC definition:



# FAQ: Create fringe plots with user values

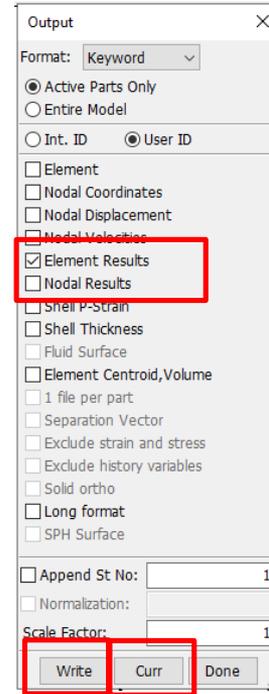
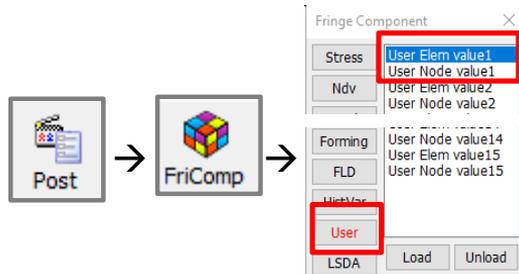


- Is it a nodal or an element result?
- Get an input example format:

1. Fringe any nodal/element result



- Import the user values:



Remark: If you like to average the element values over the nodes, select in Post>FringeRange> Option “Avg”: Nodal instead of “None”:



# 4. LS-RUN

# About LS-Run

- On Microsoft Windows, the LS-Run software is the preferred method to start your LS-DYNA simulation. LS-Run also provides:
  - Queueing system, to manage your LS-DYNA simulations.
  - Managing of running and finished simulations, including starting LS-PrePost etc.
  - Access to all LS-DYNA manuals.
  - Install and check the LS-DYNA license and license server.
  - Examples, Tutorials, Benchmark and Guidelines for LS-DYNA

# LS-Run Interface

The screenshot shows the LS-Run application window with the following fields and controls:

- Path to LS-DYNA Executable:** SOLVER field, set to C:\Program Files\LSTC\LS-DYNA\R11.0\ls-dyna\_mpp\_s\_R11.0\_winx64\_ifort131\_msn
- Path to input:** INPUT field, set to C:\Users\David Schröder\Desktop\WinSuite\_models\Examples\Stamping\srail.dyn
- Number of CPU used for execution:** NCPU field, set to 4
- Memory:** MEMORY field, set to 20m
- LS-DYNA command:** Expression field, set to `mpixec -np $NCPU "$SOLVER" i=$INPUT memory=$MEMORY`
- Start Simulation:** Play button icon
- Start LS-DYNA in command prompt window:** Terminal icon
- Apply Sense switches:** stop button
- Remove Job from Queue:** Trash icon
- Rerun job:** Refresh icon
- Open File in Texteditor:** keyword field
- Open File in LS-PrePost:** messag field

ID	Input File	Run Command	Status	ETA
1	C:\Users\David Schröder\Desktop\WinSuite_	mpixec -np 4 "C:\Program File	Finished (Normal Termination)	0s

## LS-Run Interface → Settings

The screenshot shows the 'Settings' dialog box for LS-Run. On the left, three callout boxes with dashed borders and red arrows point to specific fields in the dialog:

- Path to LS-PrePost** points to the 'LS-PrePost' field.
- Path to Texteditor** points to the 'Text editor' field.
- Path to LS-DYNA Manuals** points to the 'Manuals directory' field.

The 'Settings' dialog box contains the following fields and sections:

- Max running proc. [ ]
- Max running jobs [ ]
- LS-PrePost: C:\Program Files\LSTC\LS-PrePost 4.6\lsprepost4.6\_x64.exe
- Text editor: C:\Program Files\Notepad++\notepad++.exe
- Manuals directory: C:\Program Files\LSTC\Documentation\Manual
- Remote host execution section:
  - Host name [ ]  Linux
  - User name [ ]
  - ssh key file [ ]
  - Map local directory [ ] to [ ]
- Windows HPC section:
  - Head Node [ ]
  - Working Dir [ ]
  - Job File: C:\Program Files\LSTC\LS-Run 1.0\jobfile\_template.xml
- Done button

# LS-Run Interface → LS-DYNA License

License-Server

LS-DYNA License Settings

License type: Network  Set env. Remove env.

Server hostname: localhost

Node Locked lic. File

Request License | Adm. License | License Info | Jobs

License server: localhost

LICENSE INFORMATION

PROGRAM	EXPIRATION	CPUS	USED	FREE	MAX	QUEUE	JOBS	USED	FREE
LS-DYNA_960	07/31/2019		0	6	6	0	0	0	2
MPPDYNA_960	07/31/2019		0	6	6	0	0	0	2
LS-DYNA_970	07/31/2019		0	6	6	0	0	0	2
MPPDYNA_970	07/31/2019		0	6	6	0	0	0	2
PC-DYNA_970	07/31/2019		0	6	6	0	0	0	2
LS-DYNA_971	07/31/2019		0	6	6	0	0	0	2
MPPDYNA_971	07/31/2019		0	6	6	0	0	0	2
LS-DYNA	07/31/2019		0	6	6	0	0	0	2
MPPDYNA	07/31/2019		0	6	6	0	0	0	2
LICENSE GROUP			0	6	6	0	0	0	2

Close



# 5. MODEL CHECKING TOOLS

# Application → Model Checking → General Checking → Element Quality

The screenshot shows the LS-PrePost(R) V4.3 software interface. The 'Application' menu is open, and 'General Checking' is highlighted. The 'Model Checking' dialog box is open, showing the 'Element Quality' tab. The dialog box contains a table of mesh quality checks and a 'Check' button.

Purpose: "Element Quality" tab checks overall mesh quality

- Available for beams, solids, shells, and thick shells

Shell check item	Allowable	Min. val	Max. val	#violated(%)
<input type="checkbox"/> Min side len	32.0	***	***	***
<input type="checkbox"/> Max side len	320.2	***	***	***
<input type="checkbox"/> Aspect ratio	10	***	***	***
<input type="checkbox"/> Warpage	10	***	***	***
<input type="checkbox"/> Max edge ang	45	***	***	***
<input type="checkbox"/> Min edge ang	135	***	***	***
<input type="checkbox"/> Max face ang	30	***	***	***
<input type="checkbox"/> Min face ang	120	***	***	***
<input type="checkbox"/> Max skew	0.7	***	***	***
<input type="checkbox"/> Min skew	45	***	***	***

# Application → Model Checking → General Checking → Keyword Check

The screenshot displays the LS-PrePost 4.1 (Beta) software interface. The 'Application' menu is open, showing options like 'Airbag Folding', 'Dummy Positioning', 'Seatbelt Fitting', 'Metal Forming', 'ALE Setup', 'Model Checking', 'Intrusion Measurements', 'Head Impact Positioning', 'Granular Flow Setup', 'Airbag Impact Setup', 'Media', 'Sled Creation', 'DynFold', 'CurveGen', and 'THUMS Positioning'. The 'Model Checking' option is selected, and a sub-menu is open showing 'General Checking' and 'ALE Checking'. The 'Model Checking' dialog box is open, showing a table of errors and warnings. The 'Keyword Check' tab is selected, displaying a list of keywords. The 'Keyword Check Extended Information' dialog box is open, showing details for a specific keyword error.

Element Quality	Error(2)	Warning(89150)	UnRef(2)	UnDefined(48)
> BOUNDARY(102)	Error(0)	Warning(7488)	UnRef(0)	UnDefined(48)
> CONTACT(6)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> CONTROL(8)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> DAMPING(1)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> DATABASE(9)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> DEFINE(55)	Error(0)	Warning(0)	UnRef(2)	UnDefined(0)
> ELEMENT(95541)	Error(0)	Warning(81658)	UnRef(0)	UnDefined(0)
> HOURGLASS(1)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> INCLUDE(1)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> KEYWORD(2)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> MAT(3)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> NODE(90814)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> PART(9)	Error(0)	Warning(4)	UnRef(0)	UnDefined(0)
> SECTION(2)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> SET(11)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)
> TITLE(2)	Error(0)	Warning(0)	UnRef(0)	UnDefined(0)

The 'Keyword Check Extended Information' dialog box shows the following details:

Check/Fix Keyword Information

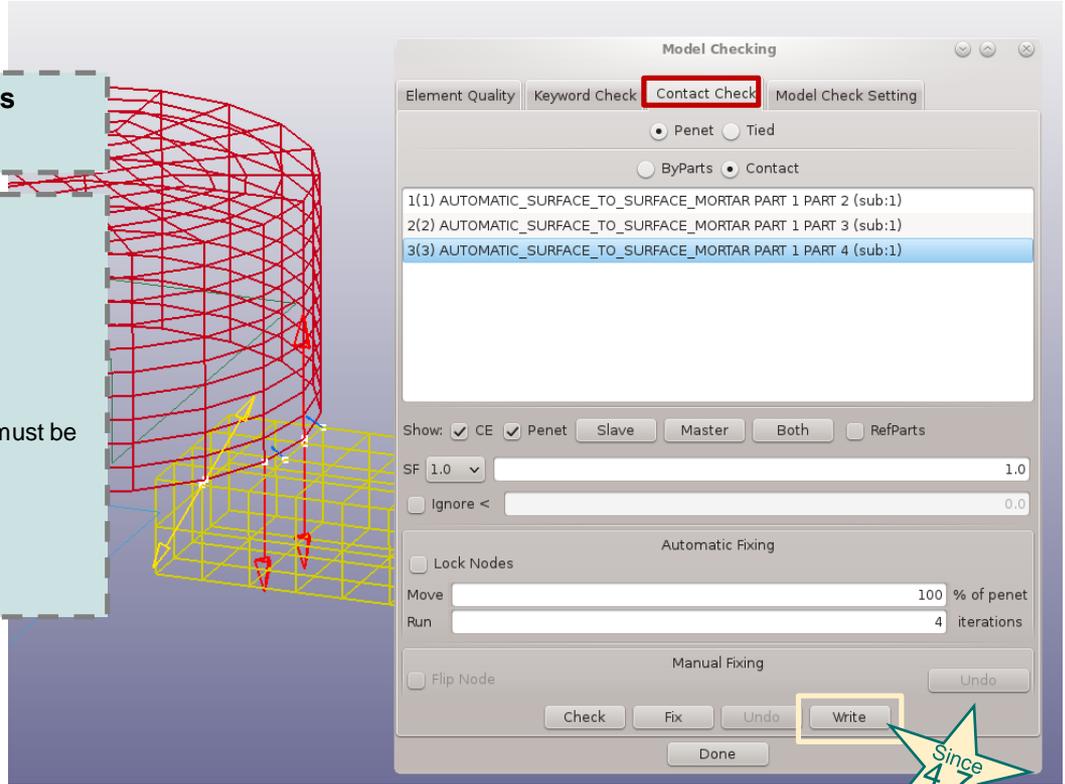
Check/Fix Keyword Information	1: BEAM_ELEM(ID: 34831):
34831_ELEMENT_BEAM	Beam distance is too small.

- “Keyword Check” tab checks model for input errors, e.g. identify and clean unreferenced or undefined entities
- Keywords are listed alphabetically
- Double-clicking an Error or Warning loads extended information
- From there, the Keyword Input Form can be opened (Read)

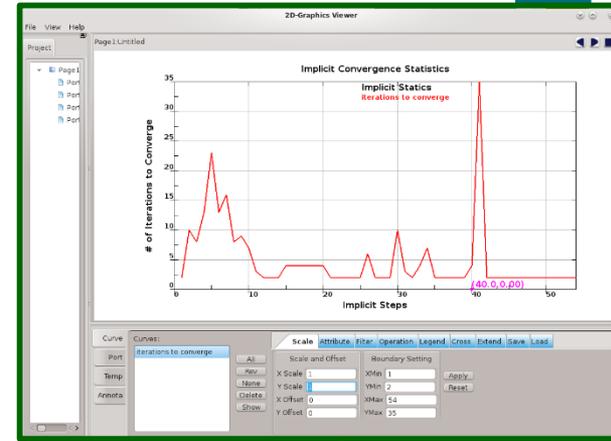
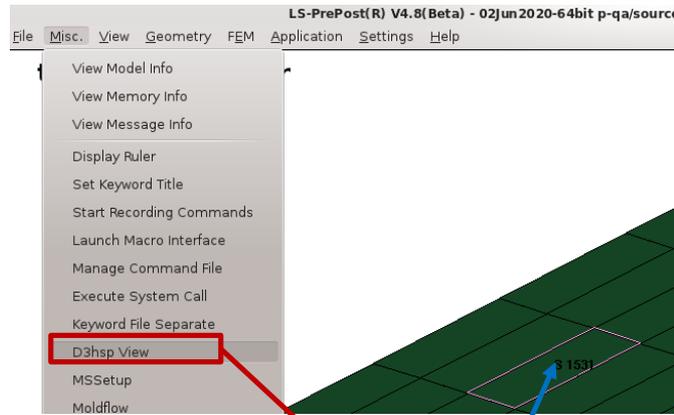
# Application → Model Checking → General Checking → Contact Check

## Purpose: “Contact Check” tab checks for contact issues

- Tying and initial penetrations can be examined
- Penet – check contacts (for initial penetration)
  - ByParts – check for penetrations based on part thicknesses
  - Contact – check for penetrations based on contact definitions
  - Show: CE – show crossed edges
  - Show: Penet – show initial penetrations
  - SF – apply scale factor to penetration vectors
  - Fix – penetrations can be fixed automatically, but this option must be used with caution
- Tied – check tied contacts (to see if nodes are tied)
  - Tied / Label – show labels for tied nodes
  - Not Tied / Label – show labels for nodes that are not tied



# Misc. → D3hsp View



**Purpose: To look at the content of the d3hsp file in an organized way**

- The d3hsp file contains a lot of information for the LS-DYNA run
- LS-PrePost reads the information from the d3hsp file and organizes it into a tree/list structure for easy reading
- Key phrase search is possible
- Entity model display is possible (entities are highlighted blue in list)
- Plot options for statistics of implicit simulation runs

Search:

- > mass properties of rigid body material # 2
- > mass properties of rigid body material # 4
- > mass properties of part # 1
- > mass properties of part # 3
- > mass properties of body
- > summary of mass
- > total mass = 0.30105200E+01
- √ 100 smallest timesteps
  - element number part timestep
  - shell 1531 3 2.3822E-06
  - shell 1479 3 2.3822E-06
  - shell 1475 3 2.3822E-06

Display Referred Entity:  
 Display Entity

File Path: /home/silvia.mandel/silvia/08-qa-software/lssp-qa/s

ExpandAll CollapseAll Save2XML Done

D3hsp View

**IMPLSTAT** Summary Warnings ITER-STAT

Implicit Statistics: Statistics

Plot as function of time  /home/silvia.mandel/silvia/08-qa-software/lssp-qa/s

Compare implicit info

Disp Norm  Energy Norm  RNORM-absolute

RNORM-relative  Cur Step Size  Converge Iterations

Stiffness Reformations  Calculate time per step  Num RHSE

Num LSCIter  Retries

# 6. AUTOMATIZATION

# Command File “CFILE”

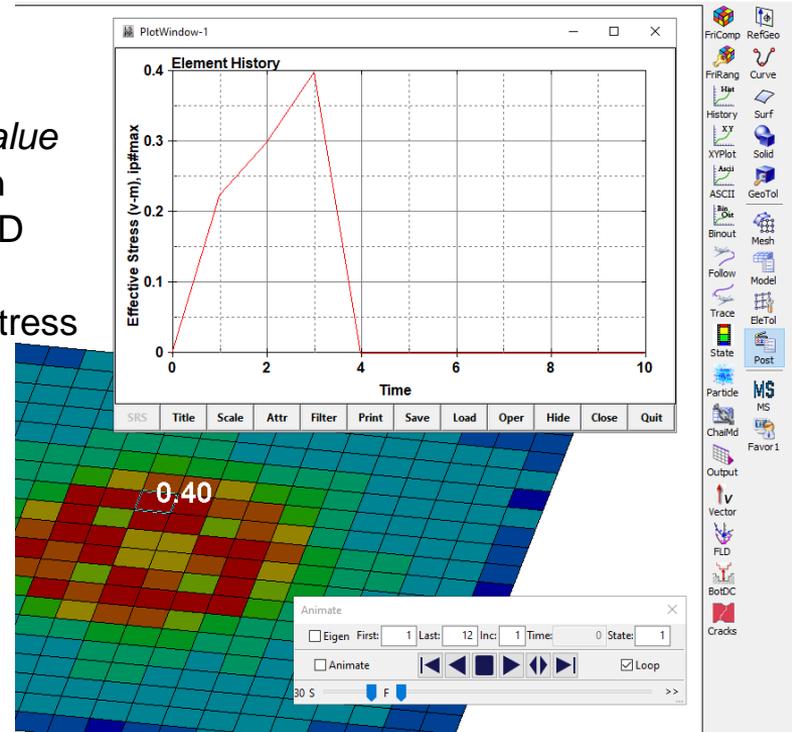
- **Almost all graphical user interface (GUI) interaction generates commands, and these commands are written to a file called `Ispost.cfile`.**
  - Created in same directory as input file
  - Can be modified to help automate repetitive tasks
  - Call other command files using “include” statements
  - Skip commands using “skip” and “endskip”
  - Enter interactive mode using “interactive” (use Esc key to continue)
- **This `Ispost.cfile` file can be renamed to replay the previous session using one of the following methods to execute command files:**
  - File > Open > Command File
  - `Isprepost c=cmd.cfile`
  - `Isprepost c=cmd.cfile –nographics` (batch mode, still requires graphics hardware and software)
  - `Isprepost runc=cmd.cfile` (truly no graphics operations)
- **Parameters can be used in command file**
  - Parameter definition can be numbers or strings
    - parameter directory “`c:\Home\Test\problem\`” parameter rotang “`45.0, 0.0, 30.0`” parameter filename “`test1.key`”
  - Use “&” to mark parameters
    - open `d3plot &filename`
  - Use “{“ and “}” when combining parameters
    - open `d3plot &{directory}&{filename}`
- **Important command file are listed in main menu “Help”>”Documentation”>”Command”**

# New: In Command File, retrieve IDs Using #var



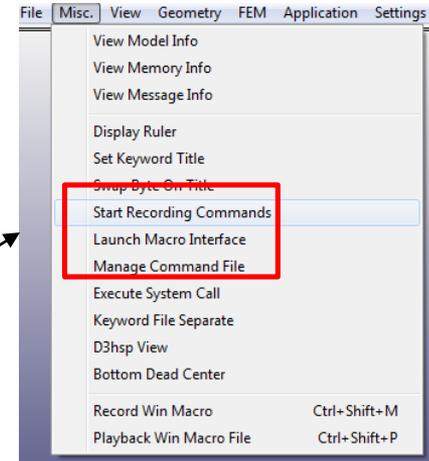
- open d3plot „04-ball\_plate\d3plot"
- m 1                                    <- Select part 1
- xfringe 9                            <- select von-mises stress
- Pfringe                                <- fringe the selected stress
- *range identmax 1*   <- find the element that has the max value
- genselect target element   <- Initialize the general selection
- genselect element add shell #var1/0   <- Add the element ID found in range identmax command
- etime 9   <- plot the time history of the element with Max stress

Example: 04-ball\_plate



# Macro definition

- A Macro is a group of commands
  - \*macro begin name <- Designate a new macro
  - Regular LSPP commands
  - \*macro end <- End of macro
  - A Macro file can contains multiple macros
- Use the Macro Interface to launch and operate macro
- A macro can be used repeatedly
- Purpose – To create user defined Macro with user defined icon and put it on the graphics screen as Transparent Toolbar (TTB) or in the right toolbar.



# Scripting Command Language

## ■ Scripting Command Language (SCL)

- Is a C-like programming language to be executed within LS-PrePost (with some exceptions)
- Executes LS-PrePost commands
- Allows “if then else”, for, and while loop operations
- Provides API (Application Programming Interface) to extract model and result data from the LS-PrePost data base

## ■ Operations can be done on extracted data to form new data

## ■ New data can be output to file or fringed on screen

## ■ Most suitable to perform same operations over different parts of the model

## ■ Documentation and tutorial for the Scripting Command Language are available at the DYNAmore client server

- Lsppscripting.doc – describes usage of the Scripting Command Language
- SCL\_Examples.zip –contains example scripts which demonstrate different operations

## ■ There are 2 ways to execute SCL file in LS-PrePost

1. LSPP Command line (cfile): Runscript “SCL\_filename” [optional parameters] (e.g. ‘runscript myscript.scl 10, 0.5’)
2. User interface: Application pull down menu, select “Customize” and in the pop up dialog, click “Load” to load the SCL file, then click “Run” to execute.

# Scripting Command Language (SCL) Improvement

- SCL: Add scl=filename on command line to activate SCL
- Add the following parameters:
  - SPH element stresses extraction by setting element type to “sphnode”
  - “num\_active\_element” – get no. of active elements currently on screen.
  - “active\_elements\_ids” – get the array contains the active element IDs
  - Extraction of principal strains
  - “id\_inset” – extract \*SET\_(Type) data array IDs
  - “x\_heatflux” – extract head flux (all 3 directions and magnitude)
  - “state\_node\_x”, “state\_node\_y”, state\_node\_z” – extract nodal coordinates at different states



# 7. RECENT DEVELOPEMENTS & SUMMARY

# Recent Developments

- The developers will try to improve more and more the UI to make it more user friendly.
- Dynamore is testing currently a new LS-PrePost version with Python scripting function and this feature will be available in the next weeks.
- Improvements/Extensions of the solution explorer.

## Summary

- LS-PrePost has been keeping up with the rapid development of LS-DYNA, both in the post-processing of results and pre-processing of input keyword setup.
- Many features and capabilities were implemented based on users' requests and suggestions.
- DYNAMore works directly together with the LS-PrePost developers and so customer requests can be discussed very fast with the LS-PrePost manager Philip Ho at Ansys and his developer team.
- DYNAMore and the LS-PrePost developers would like to support our customers by improving and speed up their pre- and post-processes for the LS-DYNA simulations.
- The DYNAMore LS-PrePost support team and the whole team of LS-PrePost developers are open to advice and happy to listen to our customers for their needs

# Thank you for your attention!

**We kindly ask you to evaluate this session.**

Link to the online evaluation form will be posted in the chat.  
It is anonymous and no registration is needed.

If you have questions, feel free to contact us at [support@dynamore.de](mailto:support@dynamore.de)  
or take a look at

- LS-DYNA examples ([www.dynaexamples.com](http://www.dynaexamples.com))
- Papers/Conference proceedings ([www.dynalook.com](http://www.dynalook.com))
- Hints, FAQ,... ([www.dynasupport.com](http://www.dynasupport.com))
- Manuals (<http://lsc.com/download/manuals>)

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