

# Webinar - Recent developments in the DYNAmore Nordic Python toolbox to visualize and build tools for LS-DYNA


Rasmus Schützer - Project engineer





## ■ Today's topic


- Background
- The DYNAmore Nordic Python toolbox
- The binout-format
- Hands on experience, I will walk you through how I use the library to access data and how I tend to work when I develop postprocessing scripts
- Briefly introduce some other helpful and commonly used libraries and data structures
- Show the DYNAmore Nordic developed python tools and scrips to get you started with developing your own tools
- Explain how you can get access to said tools


- 
- Why develop tools for LS-DYNA using Python
    - Automate repetitive tasks
    - Get consistency so that all evaluation and figures are done and look the same
    - Reduce user error when dealing with manual tasks
    - Open the possibility to do more advanced postprocessing which might for example require a high data sampling rate
    - No licensing cost related to the Python programming language
    - Access to other Python tools and libraries that might be useful



- DYNAmore Nordic Python toolbox

- Toolbox have grown from previous work and projects
- Provide a good starting point
- Intuitive data structure to work with
- Read and plot data without the need to write a lot of code

- 
- When you want to export data for multiple nodes or elements in LS-DYNA you define this using `*SET_XXX` and `*DATABASE_HISTORY_XXX`
  - The data is then stored in the BINOUT-files
    - But almost all data regarding the model is lost, so the nodes and elements do not know to which part they belong or to which `*SET_NODE`
    - This makes automation problematic, typically resolved by allocating certain ranges of numbers to certain parts

- 
- New functions within the toolbox to read certain model data from keyword file
  - Use this data to filter, categorize and to do more complex postprocessing
  - The possibility to filter NODOUT data by the Set ID (SID) of the \*SET\_NODE\_LIST card
  - Possibility to filter ELOUT data by SID of the \*SET\_SOLID card
  - Opens the possibility to do multiple different postprocessing based on node or element data

## ■ Chaining keyword cards

### \*ELEMENT

Card 1	1	2	3	4	5	6	7	8	9	10
Variable	EID	PID								
Type	I	I								
Default	none	none								
Remarks	2									

### \*ELEMENT\_SOLID

Card 2	1	2	3	4	5	6	7	8	9	10
Variable	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10
Type	I	I	I	I	I	I	I	I	I	I
Default	none	none	none	none	none	none	none	none	none	none

### \*PART

### \*PART

**Card 10.** This card is included if and only if the ATTACHMENT\_NODES option is used.

ANSID							

### Data Cards:

Card 1	1	2	3	4	5	6	7	8
Variable	HEADING							
Type				C				
Default				none				

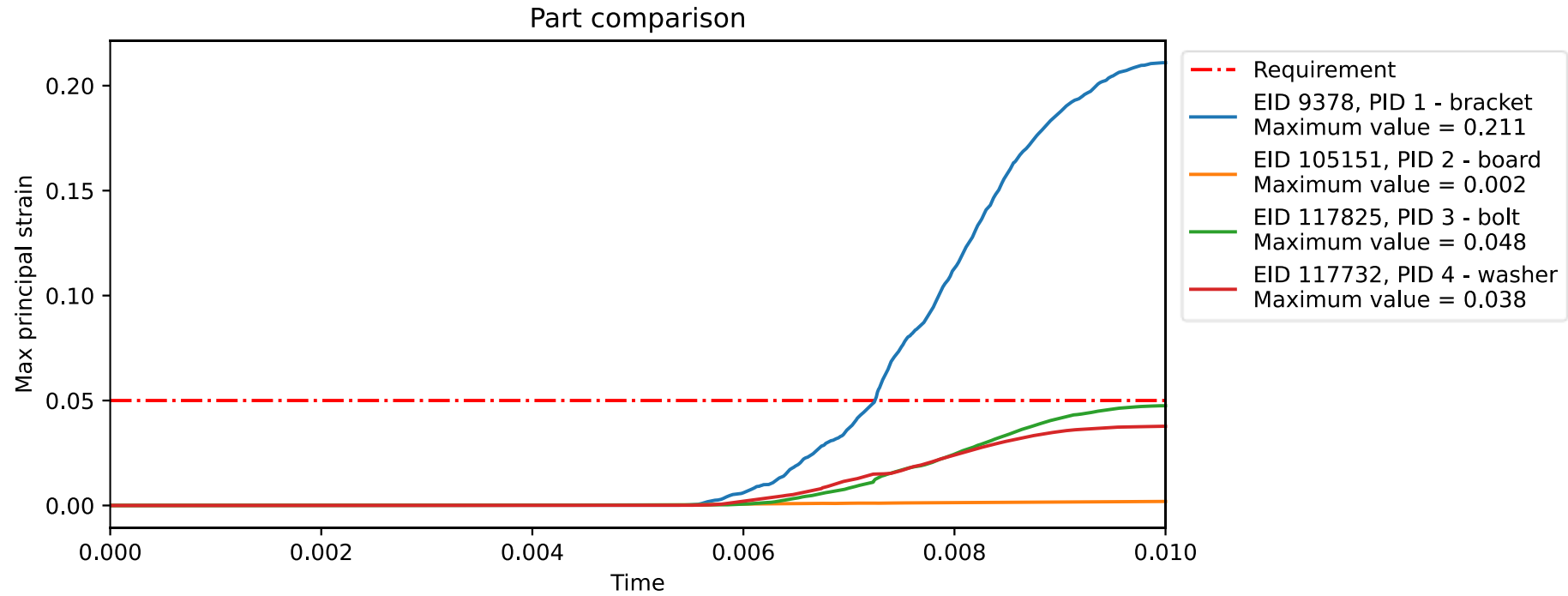
### VARIABLE

### DESCRIPTION

HEADING      Heading for the part

Card 2	1	2	3	4	5	6	7	8
Variable	PID	SECID	MID	EOSID	HGID	GRAV	ADPOPT	TMID
Type	I/A	I/A	I/A	I/A	I/A	I	I	I/A
Default	none	none	none	0	0	0	0	0

## ■ Example







Live demo



- Getting access to the tools:

- The tools will only be distributed to DYNAmore costumers
- You will have to sign a license agreement, this is done digitally
- After we have received a signed license agreement you will obtain instructions on how to download the tools
- **If you already have signed the license, you can contact us to get a new link to download the latest version**

- So, to start the process of getting access the tools send an email to [support@dynamore.se](mailto:support@dynamore.se)

Thank you!

**DYNA**  
MORE

Your LS-DYNA distributor and  
more

