Oasys
D3PLOT

D3PLOT 21.1

D3PLOT 21.1 – Contents

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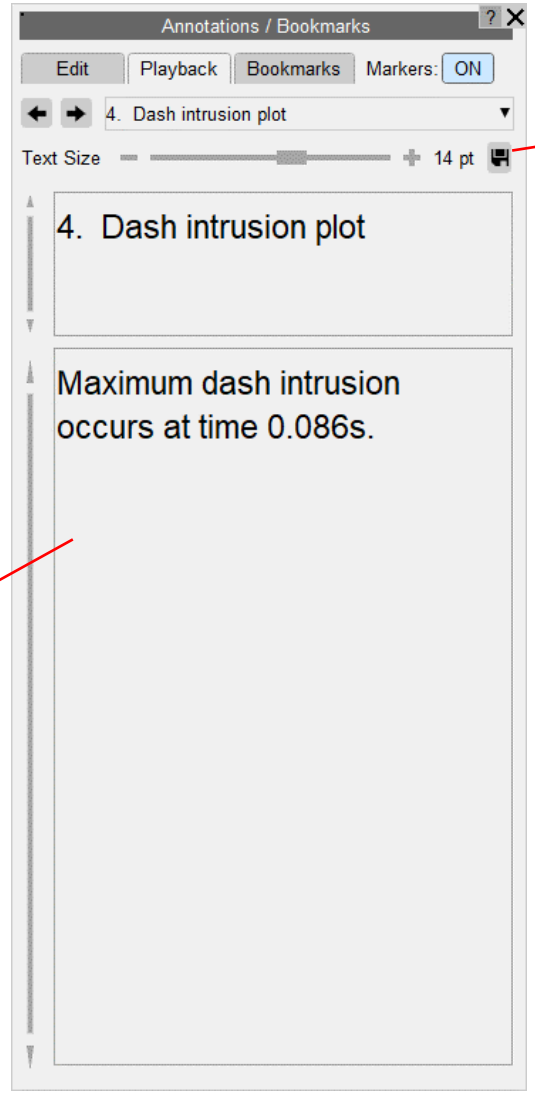
Annotations

Annotations

In the **Playback** tab, text size can now be modified using the new slider at the top of the panel. This improves readability of your annotations when you are presenting to your team.

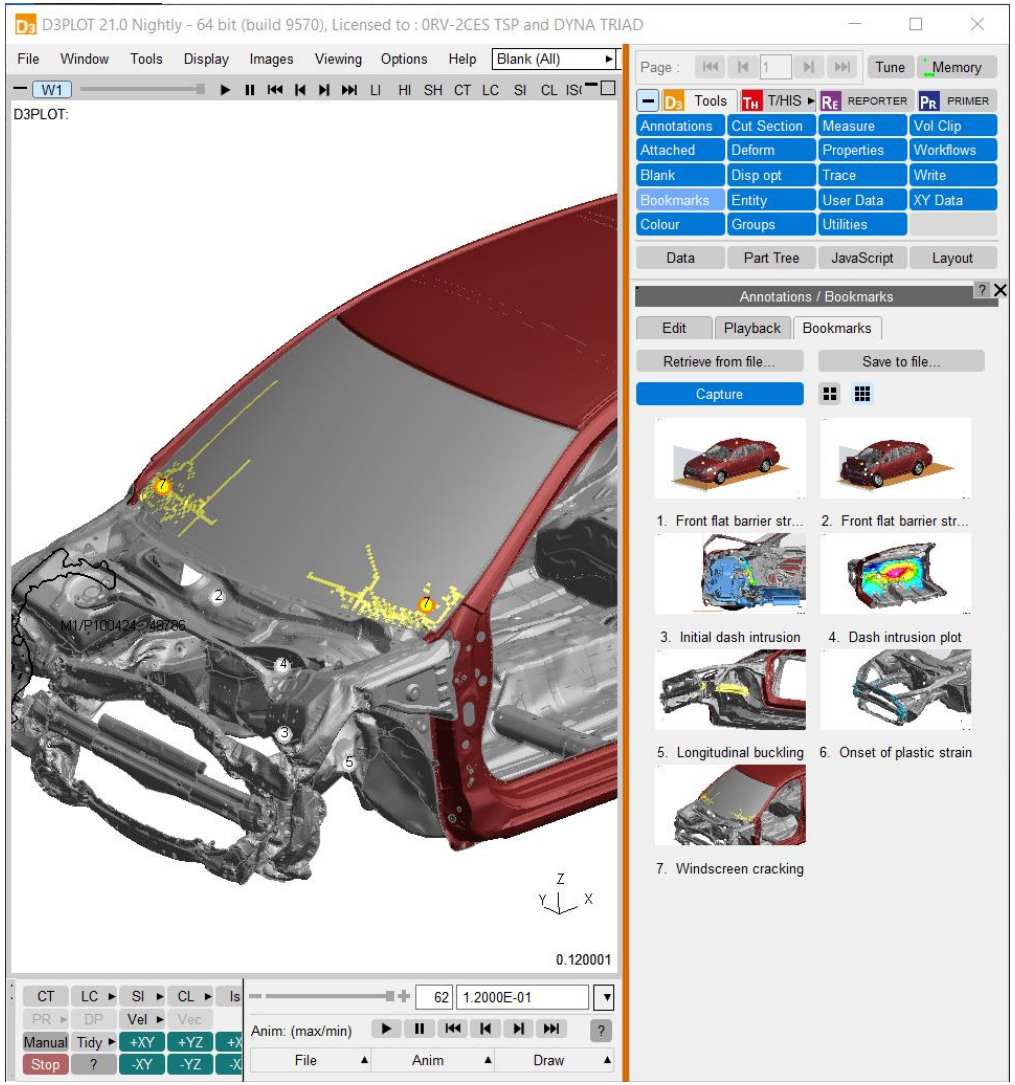


The text size can be saved quickly to your preference file using this button

We have made improvements to the speed and selection behaviour of the description textbox

Bookmarks

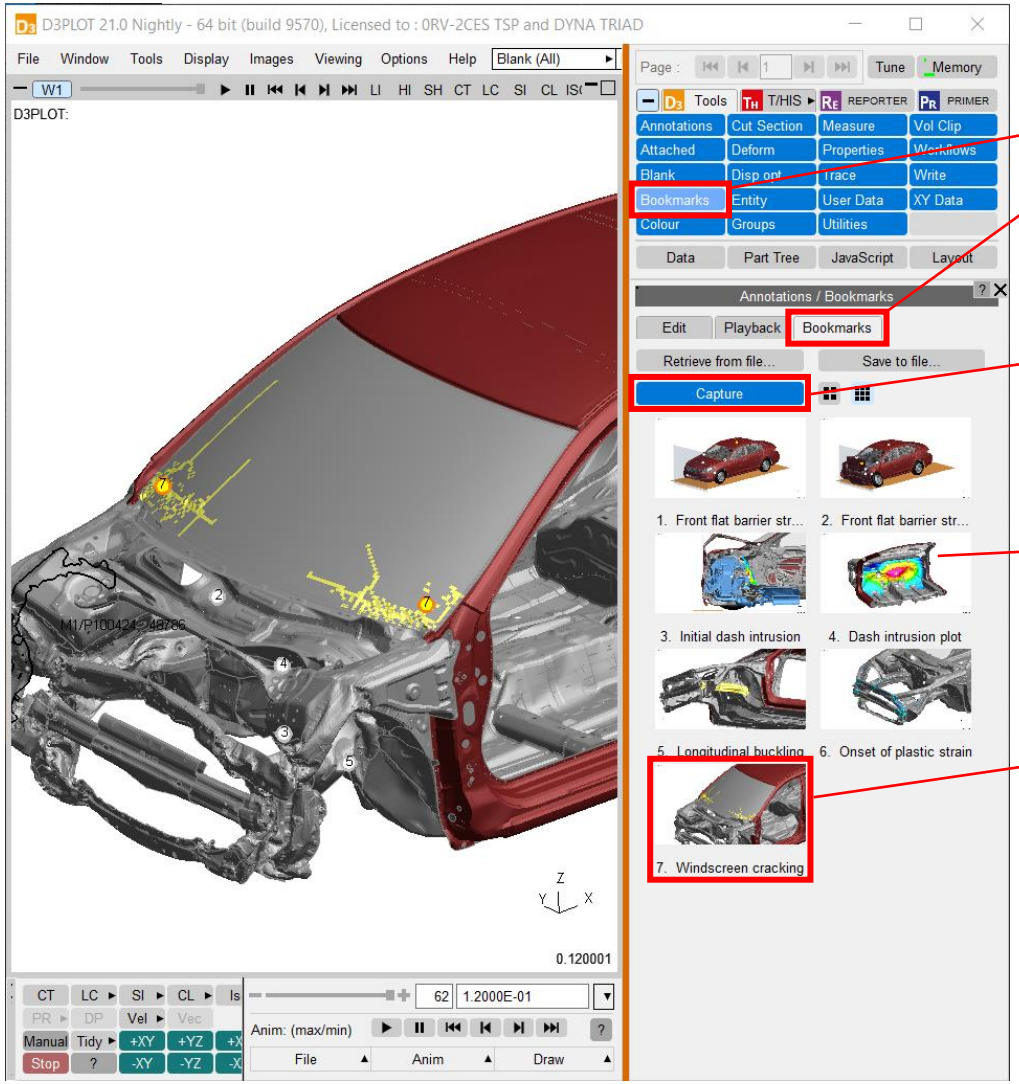
Bookmarks



Bookmarks is a quick, easy way of using the Annotations feature to save and reload page views as you review your analyses:

- **Quick**
  - Single click to capture
  - Single click to reload
- **Easy**
  - Thumbnails make navigation of your bookmarks simple and intuitive
  - Save and retrieve from file with thumbnails preserved

Bookmarks



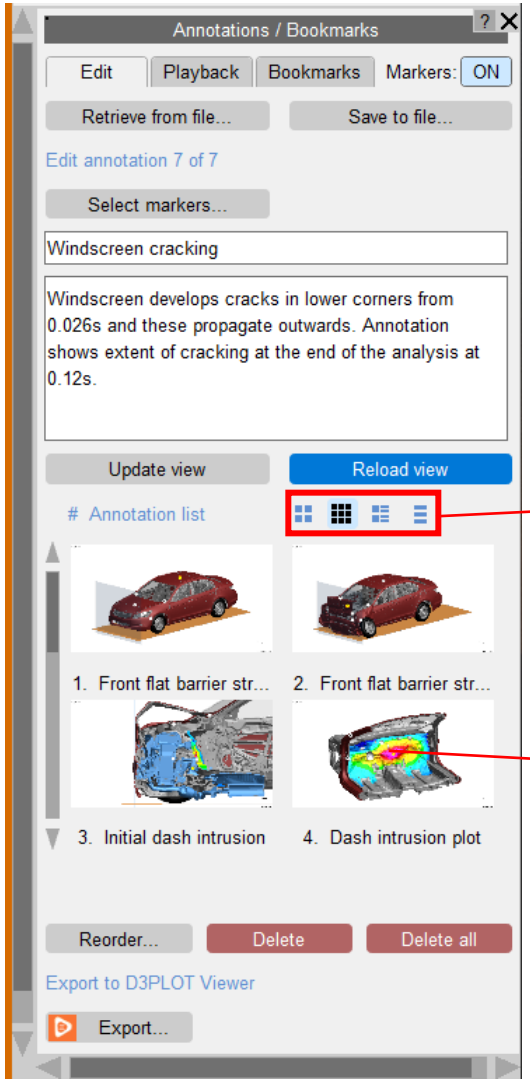
A **Bookmarks** tool has been added to the Annotations panel and the Tools menu

The page view can be captured with a single click of **Capture**

Bookmarks are displayed as thumbnails for easy navigation

A bookmark can be reloaded with a single click on the thumbnail

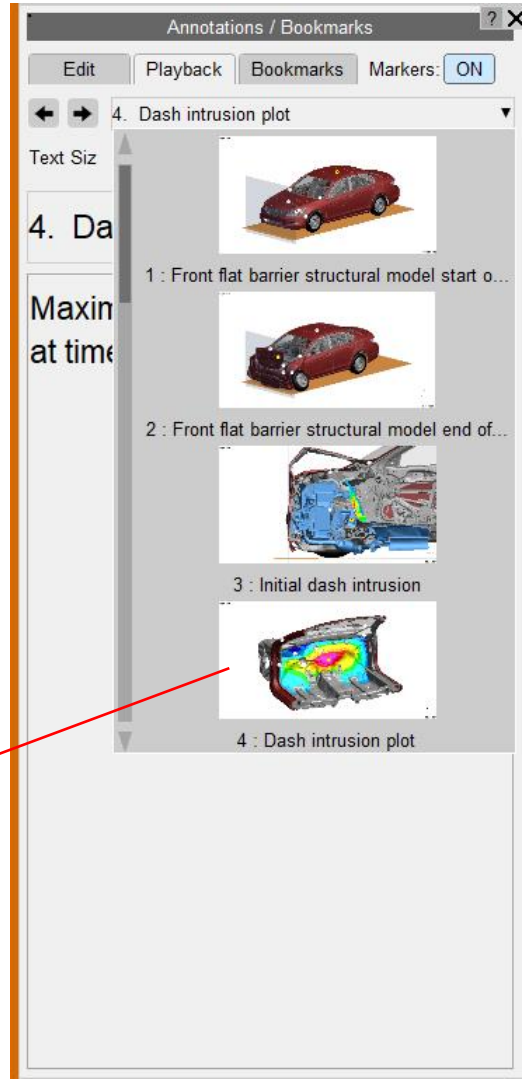
Bookmarks



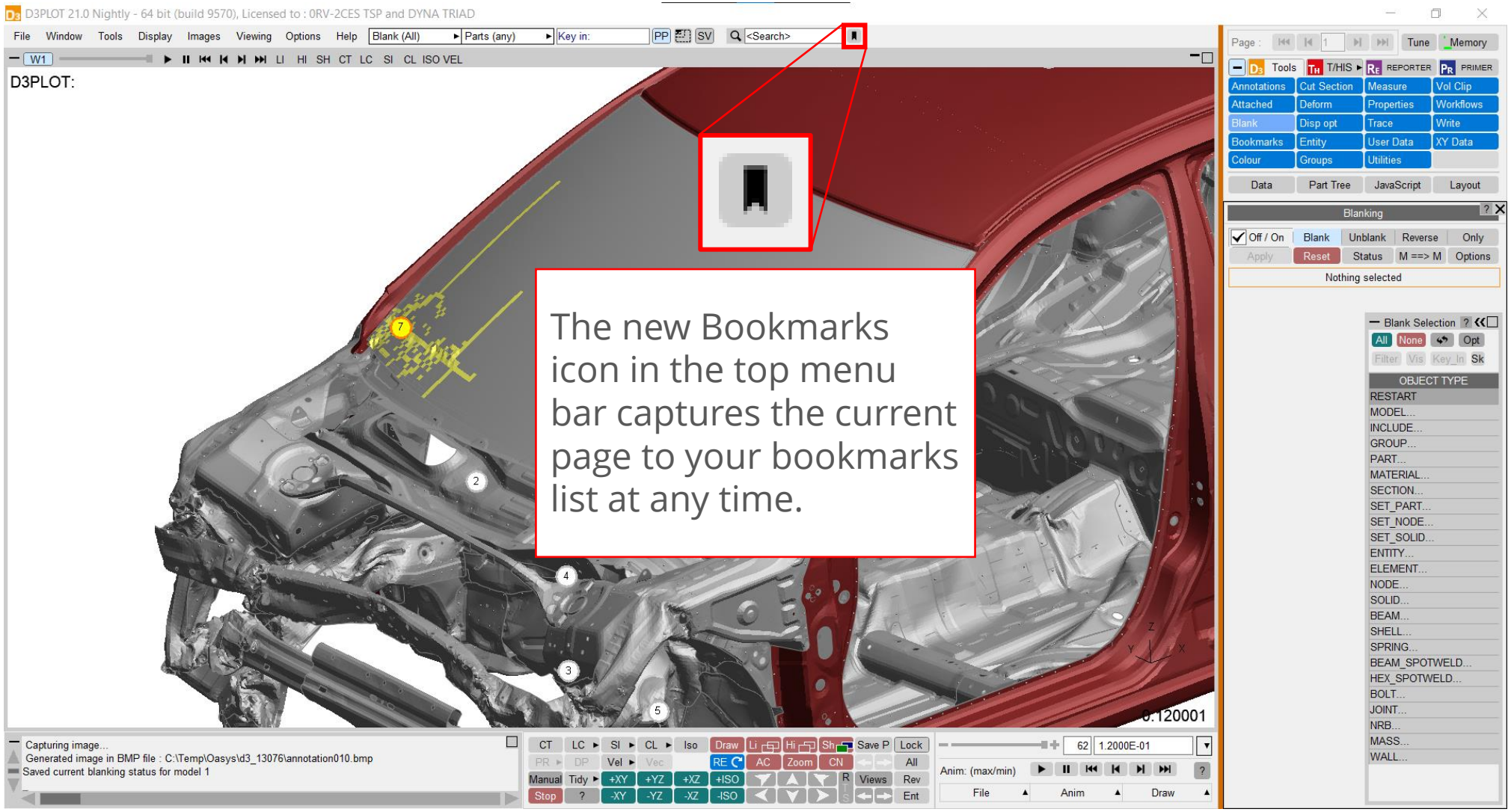
Bookmarks use the same list as Annotations, so when you capture a bookmark, it can also be viewed in the **Edit** tab where annotation information (markers, title, description) can be added.

Different views of the Annotations list, including the simple list view introduced in D3PLOT 20, can be selected using icons.

Thumbnails have also been added throughout the Annotations panel in the Edit tab, Playback tab and Reorder menu.



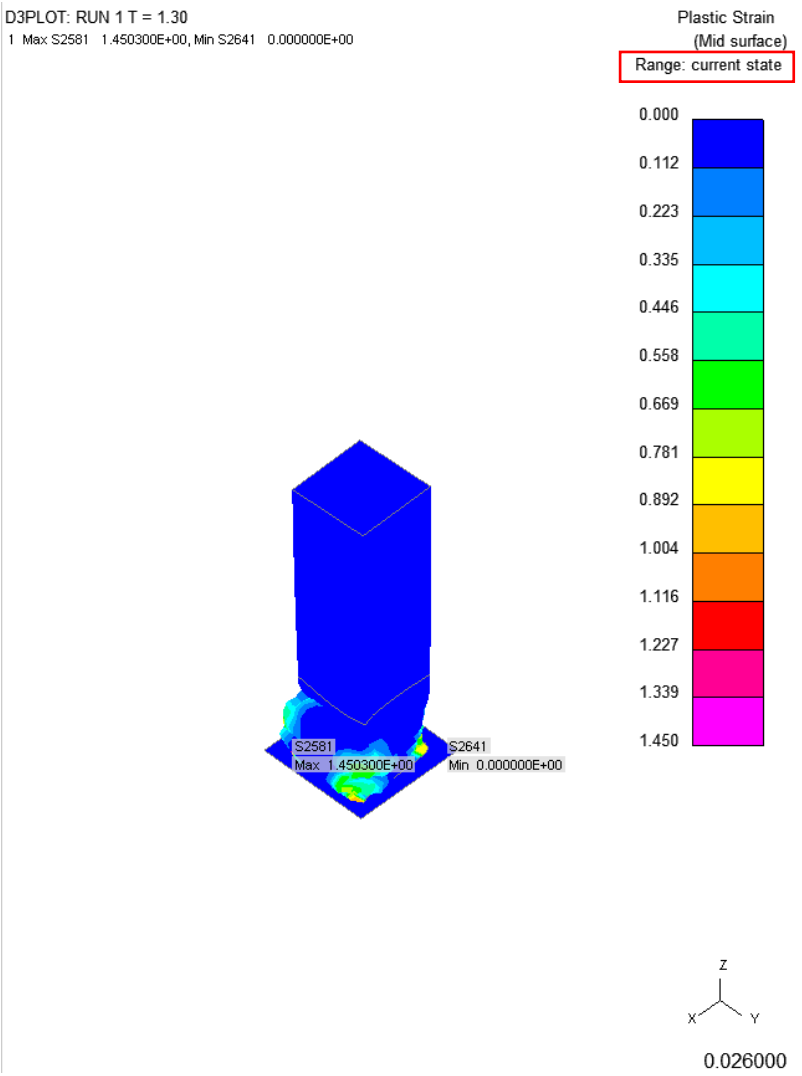
Bookmarks


D3PLOT 21.0 Nightly - 64 bit (build 9570), Licensed to : 0RV-2CES TSP and DYNA TRIAD
File Window Tools Display Images Viewing Options Help
Blank (All) Parts (any) Key in: <Search>
D3PLOT:
The new Bookmarks icon in the top menu bar captures the current page to your bookmarks list at any time.
Capturing image...
Generated image in BMP file : C:\Temp\Oasys\d3_13076\annotation010.bmp
Saved current blanking status for model 1
Blanking
Nothing selected
Blank Selection

Contour Plots

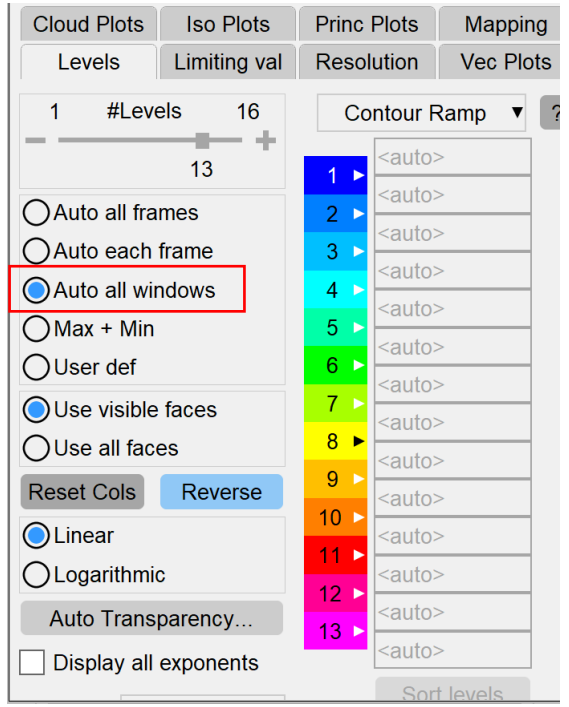
Contour range label

- The new contour range label describes the contour data range for plots in D3PLOT.
- The contour range label will be one of the following:
  - ‘Range: automatic’ for envelope plots with automatic contour modes active.
  - ‘Range: user defined’ for envelope plots with max-min or user defined contour modes.
  - ‘Range: current state’ when the contour plot displays current state data.
  - ‘Range: all frames’ when the active contour mode is ‘auto all frames’.
  - ‘Range: current frame’ when the contour plot displays current frame data.
  - ‘Range: all windows’ when the active contour mode is ‘auto all windows’.



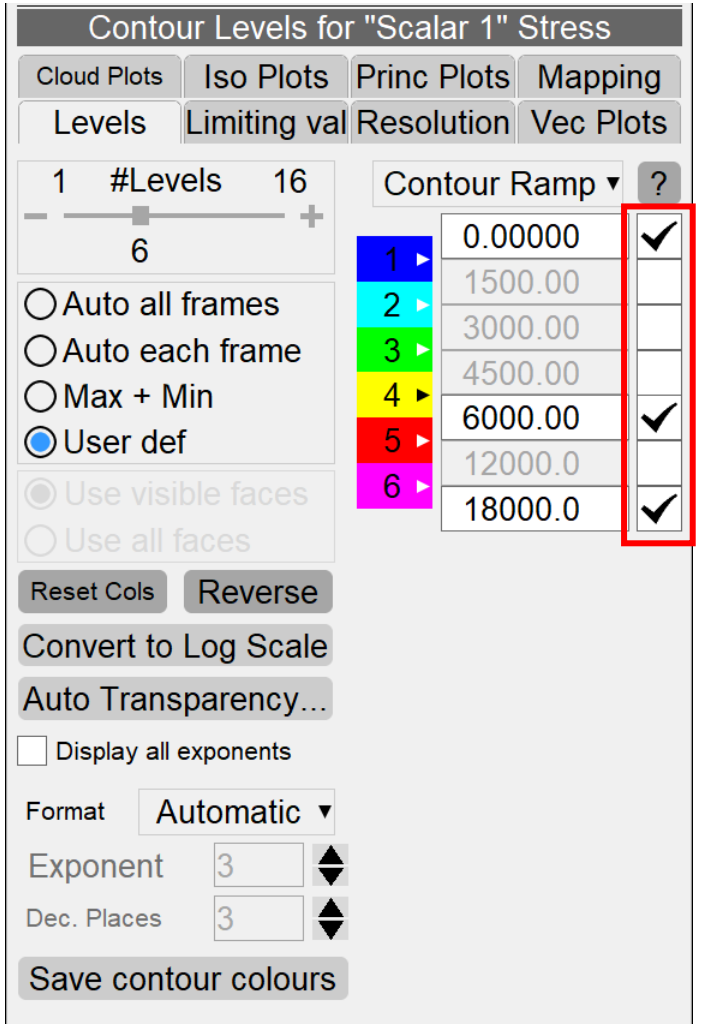
Auto all windows

- A new **Auto all windows** contour mode makes it easier to compare results between multiple models.
- The Auto all windows mode scans through all the frames across all the windows in selection in the current page and sets the contour bar maximum and minimum values to the maximum and minimum found across all windows.
- Auto all windows mode works with multiple components (Scalar 1, Scalar 2, Vector and Vel).



User-defined contours

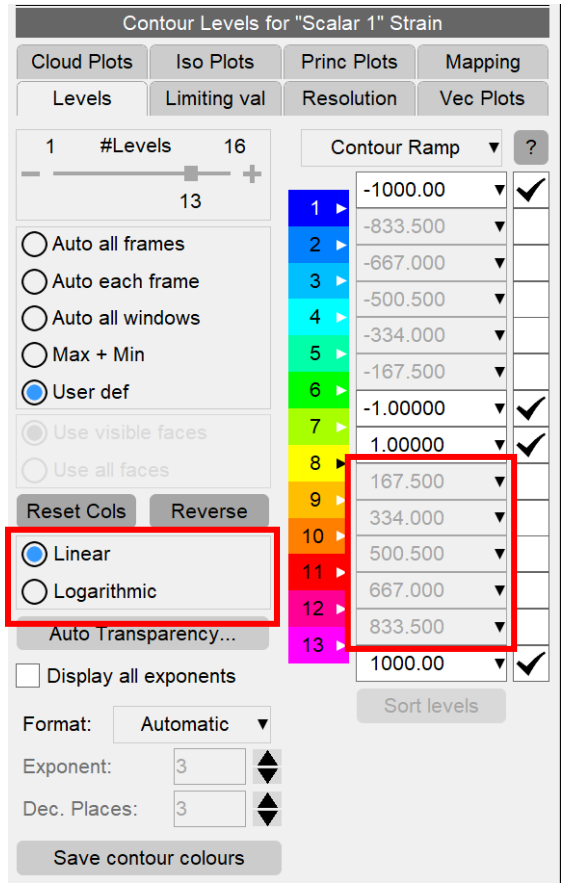
- In D3PLOT 21, we have made it easier to set specific user-defined contour bands.
- Any subset of contour level thresholds selected by tick boxes can be specified explicitly.
- When the first and/or last level is not specified, the minimum and/or maximum across the whole model is taken.
- All other deselected levels are automatically calculated linearly between the previous and next selected level. This saves calculation by hand when setting user-defined contours.



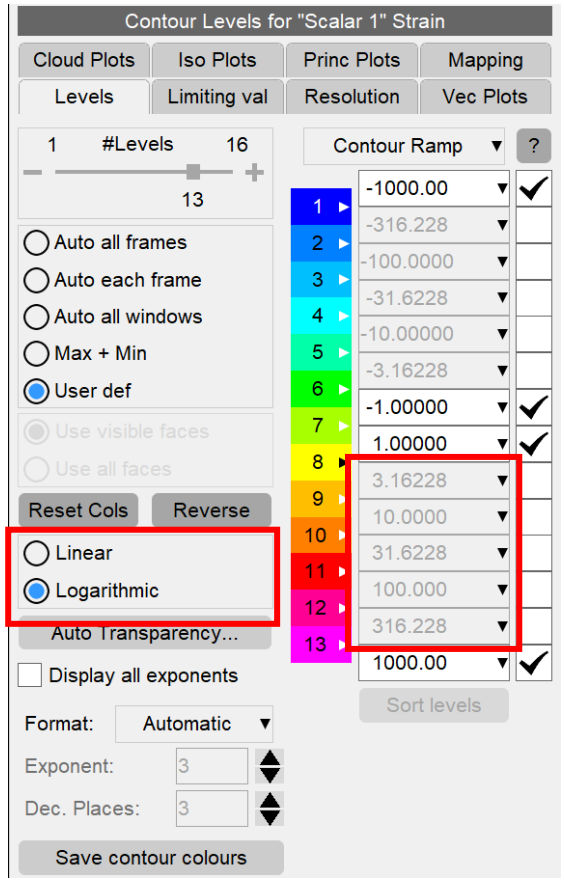
Linear and logarithmic interpolation

- The interpolation between explicitly defined levels and/or automatic minima or maxima can now be switched between linear and logarithmic. This makes it easier to convert back to linear levels while intermediate ticked levels are preserved.

Linear

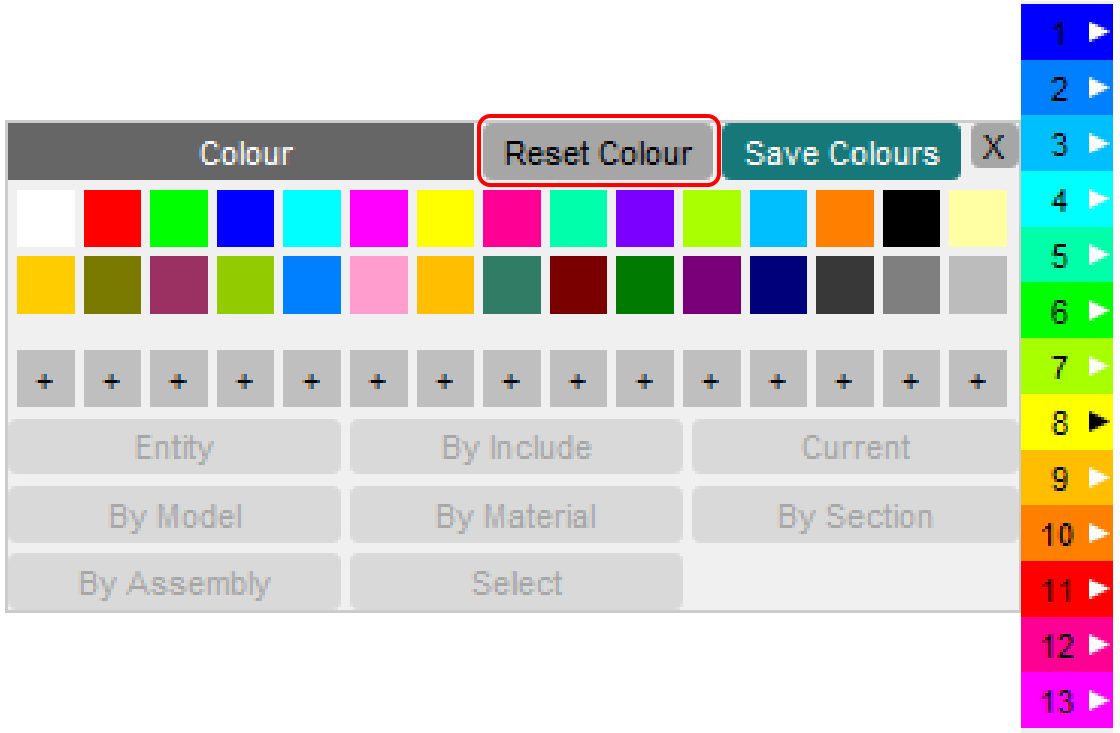


Logarithmic



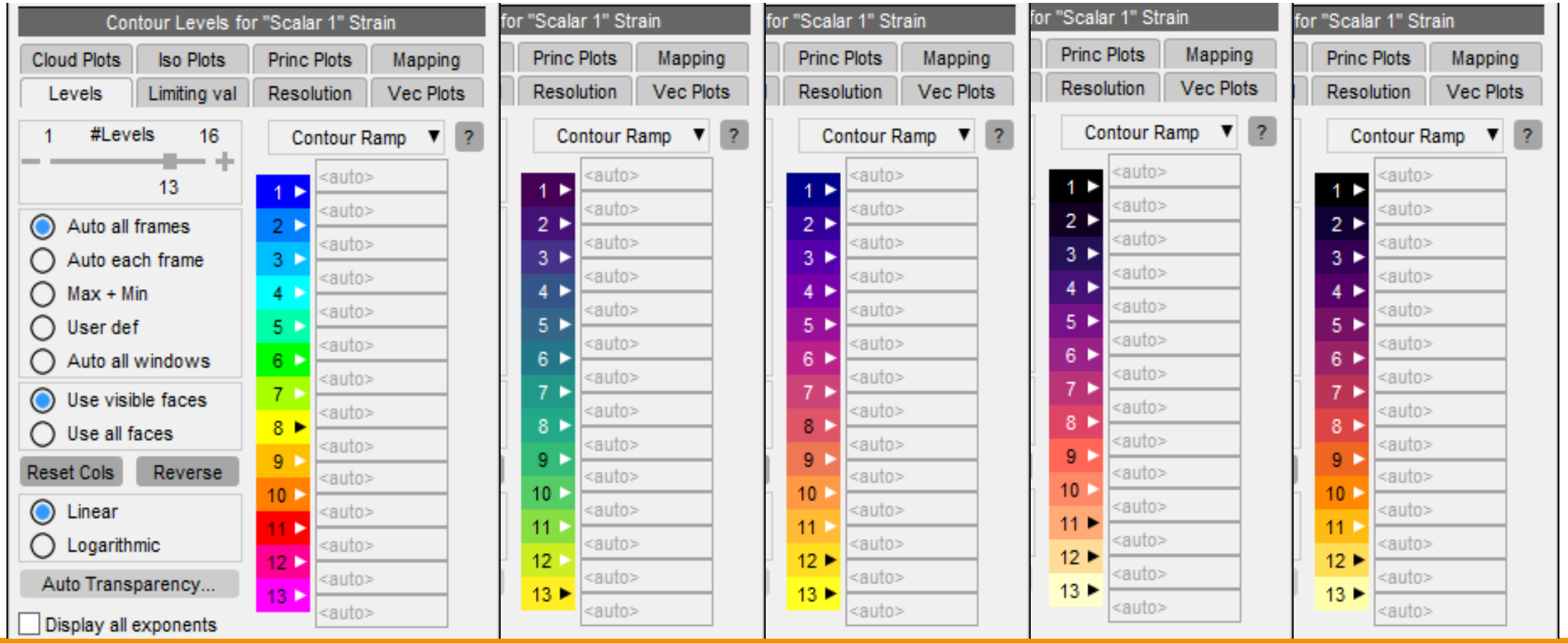
Reset contour level colour

- A new **Reset Colour** button has been added to the colour popup menu so that the contour level colour can now be reset to the default colour specified by the current contour ramp option.



Contour level text colour

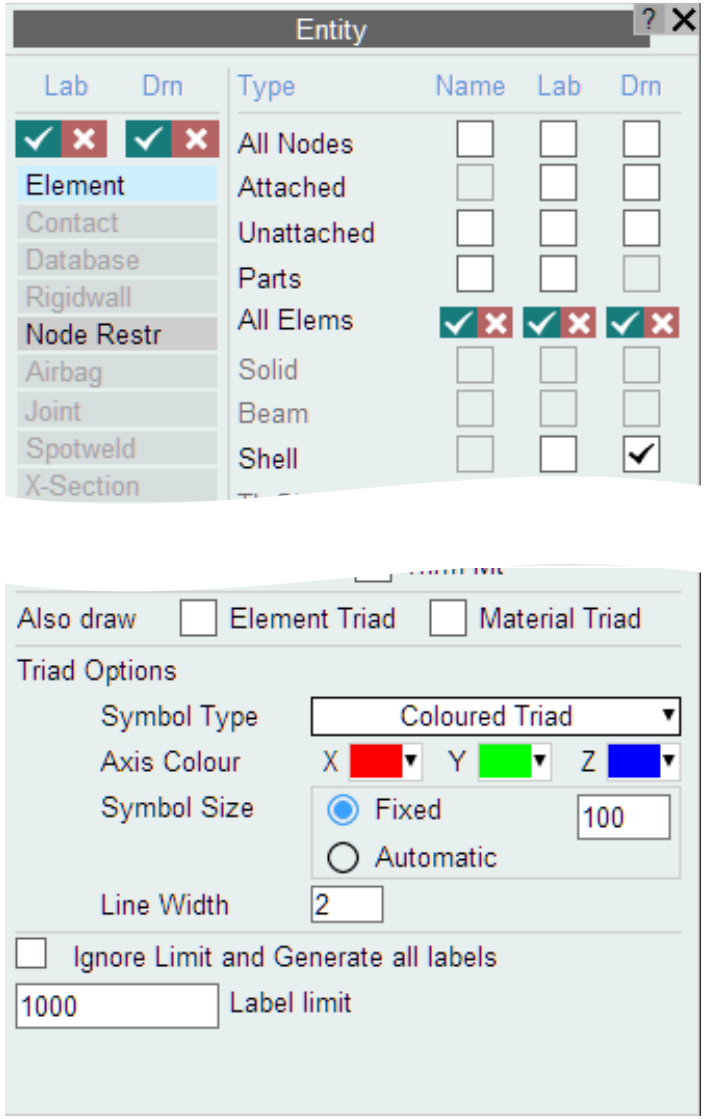
New logic has been added to make the contour level text colour more visible. The text colour will be either white or black according to the contour level colour.



Element / Material Triads

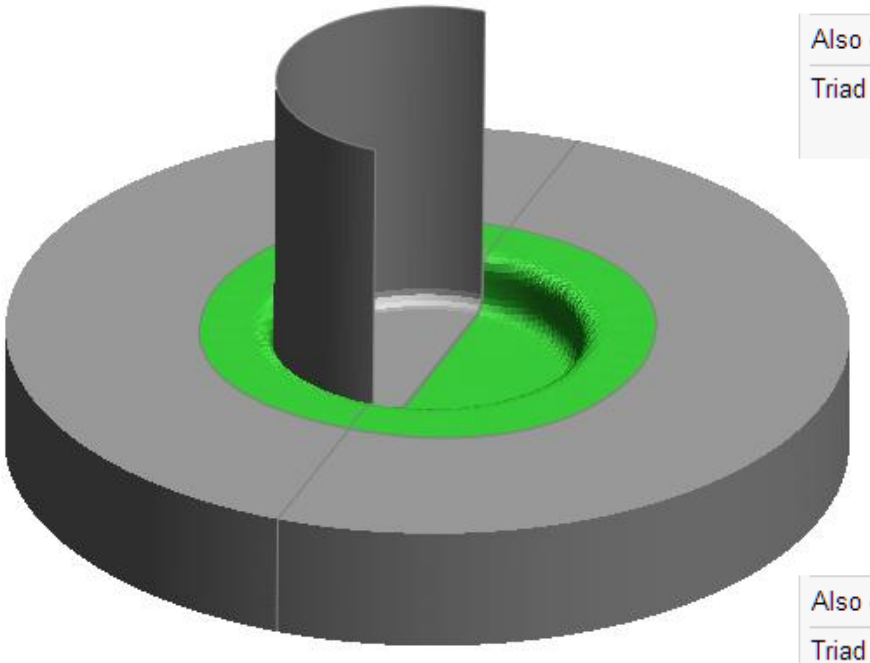
Element / Material Triads

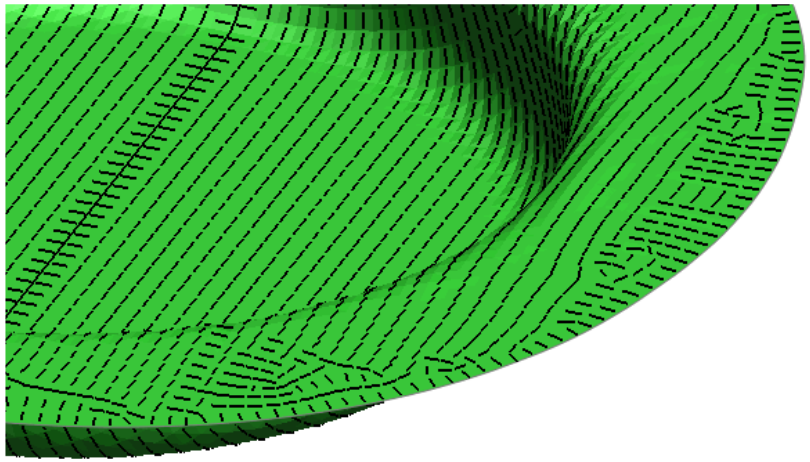
- In D3PLOT 21, the display of element and material triads (via the Entity menu) is faster, and several new options have been added to control the display of triads.
- These options include:
  - Triad + X, Y, Z labels
  - Coloured Triad (x axis Red, y axis Green, z axis Blue)
  - X Axis Only
  - Y Axis Only
  - Z Axis Only
- New options have also been added to control the line width and the size of the triad symbols.

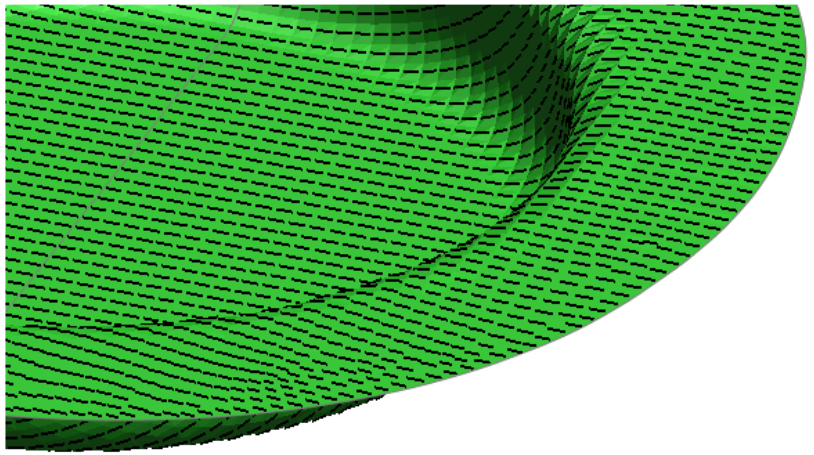


Element / Material Triads

- If a ZTF file created by Oasys PRIMER is available, DPLOT can use the material card information written to the ZTF file to calculate and plot the material orientation in orthotropic materials.





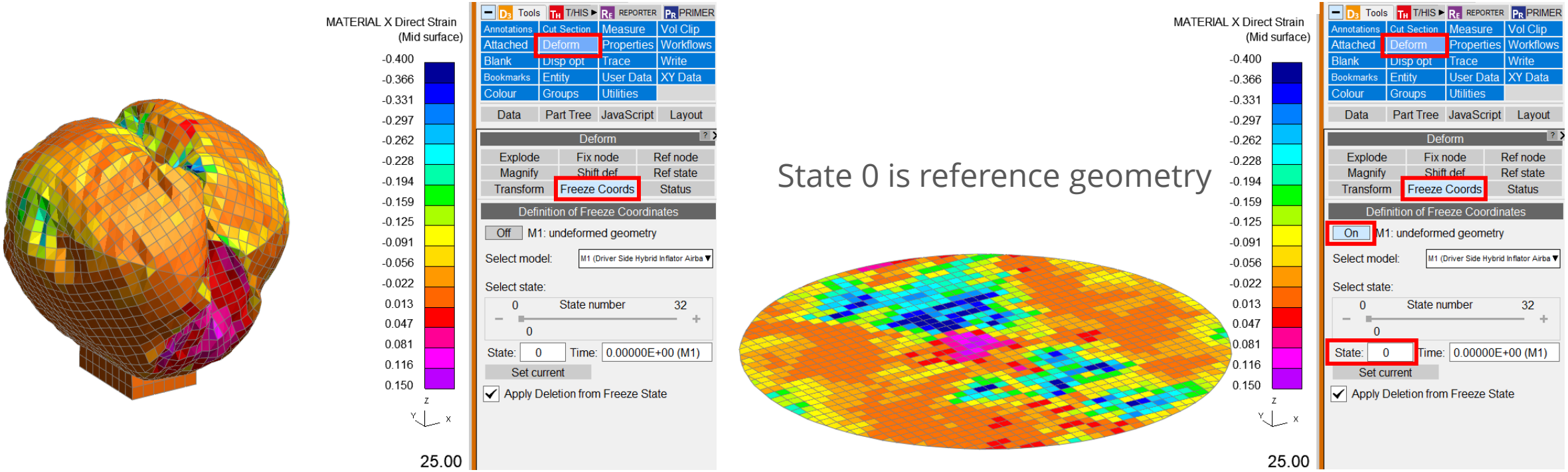


Freeze Coordinates

Displaying Results on a Fixed “Frozen” Geometry

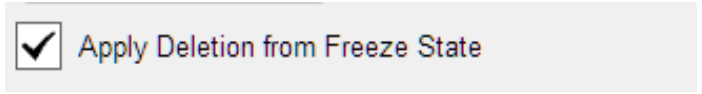
Freeze Coordinates

- In D3PLOT 21, a new option **Freeze Coordinates** has been added to the **Deform** menu. This option can be used to display the results from any state on top of the deformed geometry from another state.
- Freeze Coordinates is similar to using **Magnify** with the magnification set to 0.0, but unlike Magnify, this option can be used to fix the geometry at any state within the analysis.

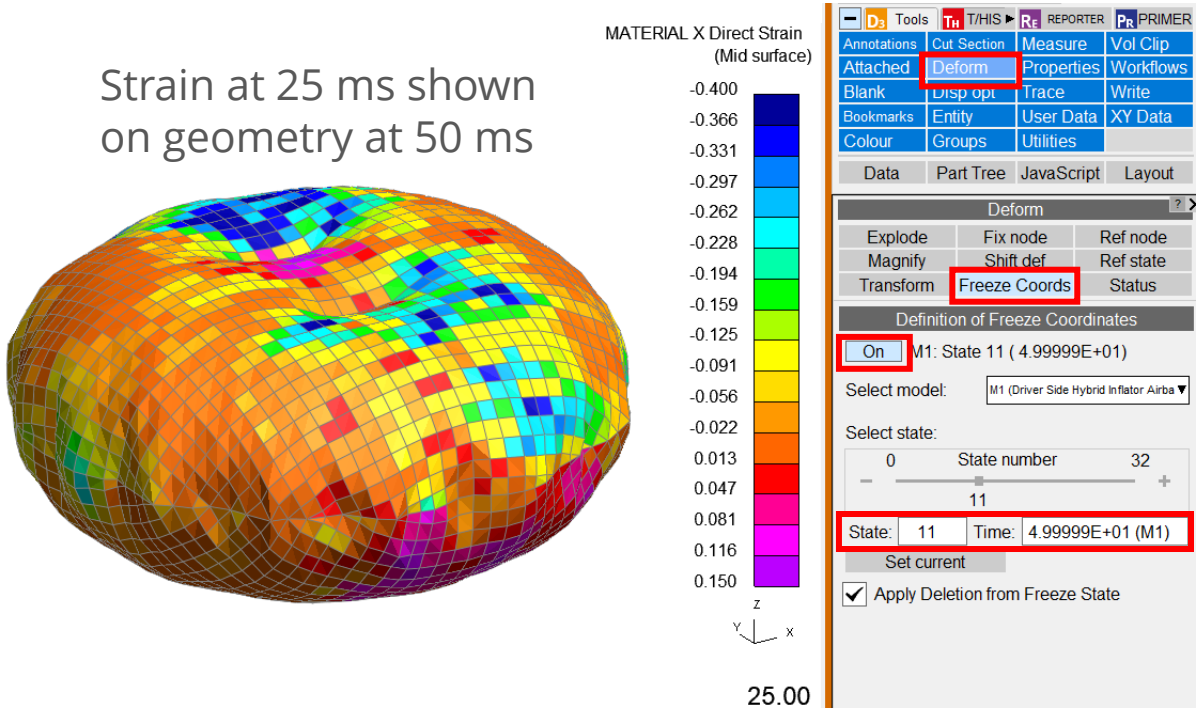


Freeze Coordinates

- The state used by Freeze Coordinates can be set using the state slider, by entering a state number, or by entering a time value. When a time is entered the state nearest to the specified time is selected.
- **Set current** can be used to set the Freeze State for each model/window combination to the state that is currently being displayed in the window.
- By default, element deletion from the Freeze State is used when displaying the results from other states on the Freeze State geometry.



Strain at 25 ms shown on geometry at 50 ms



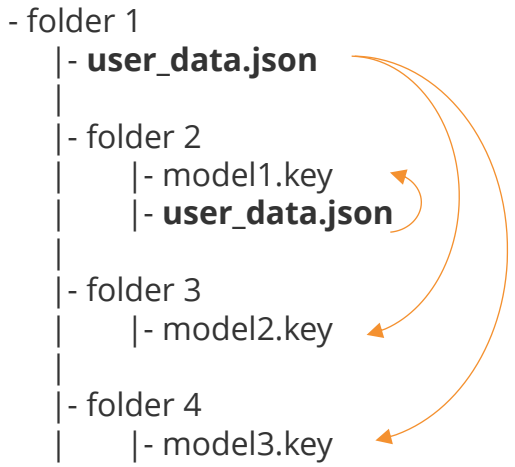
Workflows

Workflows User Data
Automotive Assessments
Energy Check
Entities of Interest
Seismic Workflows
Defined and Undefined Workflows
Virtual Testing

Workflows User Data

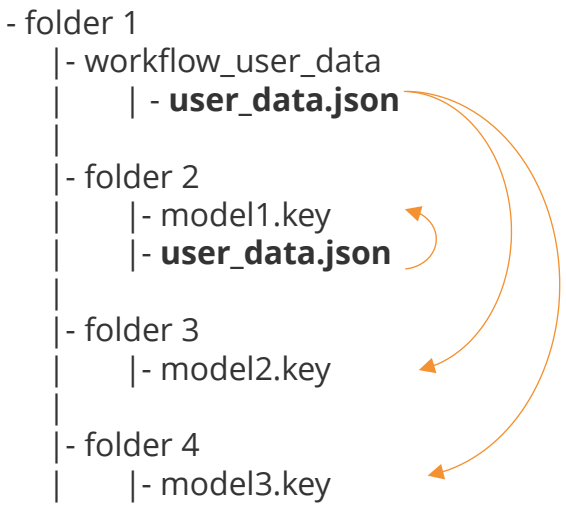
- We have made it easier for you to save Workflows user data to be re-used by multiple models and LS-DYNA runs.
- In Oasys 20, the JSON user data file written by a workflow tool had to be saved in the same folder as the model/results. This meant that if you had multiple variations of a model, you had to have copies of the same JSON file in each model/results folder, which was time consuming if edits needed to be made to the data.
- In Oasys 21, JSON user data can now also be saved in the parent folders of models, meaning the same data can be used for multiple models. The model folder is searched first, and then parent and grandparent folders are searched for valid JSON files. Preference **oasys*workflow_max_upward_folder_search_depth** can be set to control the number of parent folders that are searched. The default is 4.

In this folder structure [right], the user_data.json file in **folder 1** will be used for the models in folder 3 and folder 4, and the user_data.json file in **folder 2** will be used for the model in folder 2:



Workflows User Data

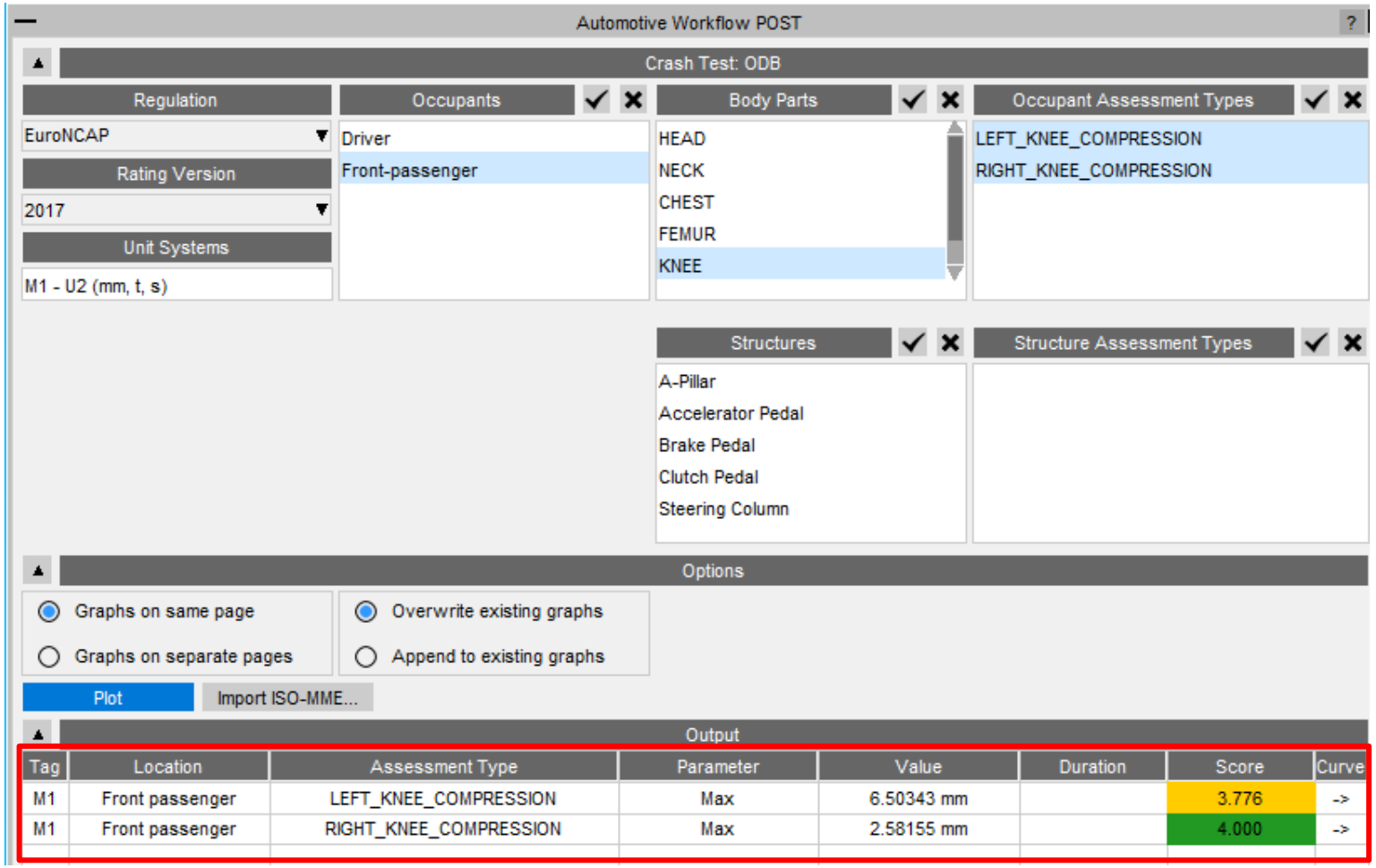
- The scan will also look for user data in a folder named '**workflow_user_data**' in the model folder and its parent folders.
- For example, in the folder structure below, the user_data.json file in **folder 1/workflow_user_data** will be used for the models in folder 3 and folder 4, and the user_data.json file in **folder 2** will be used for the model in folder 2:



- The name of the folder to search can be changed by setting the preference **oasys*workflow_user_data_directory_name**

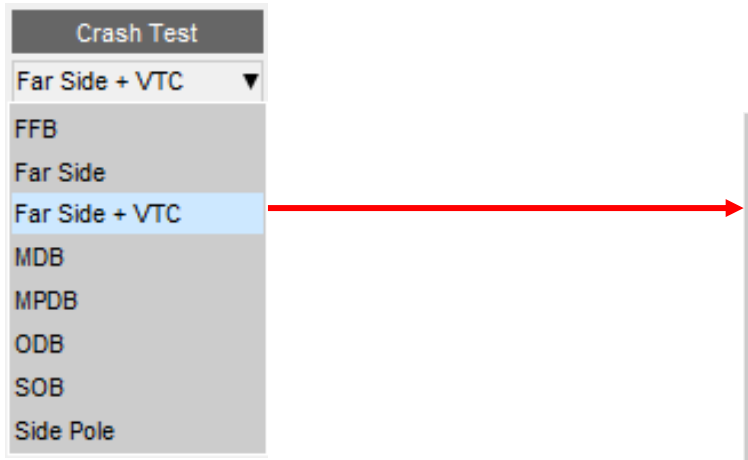
Automotive Assessments

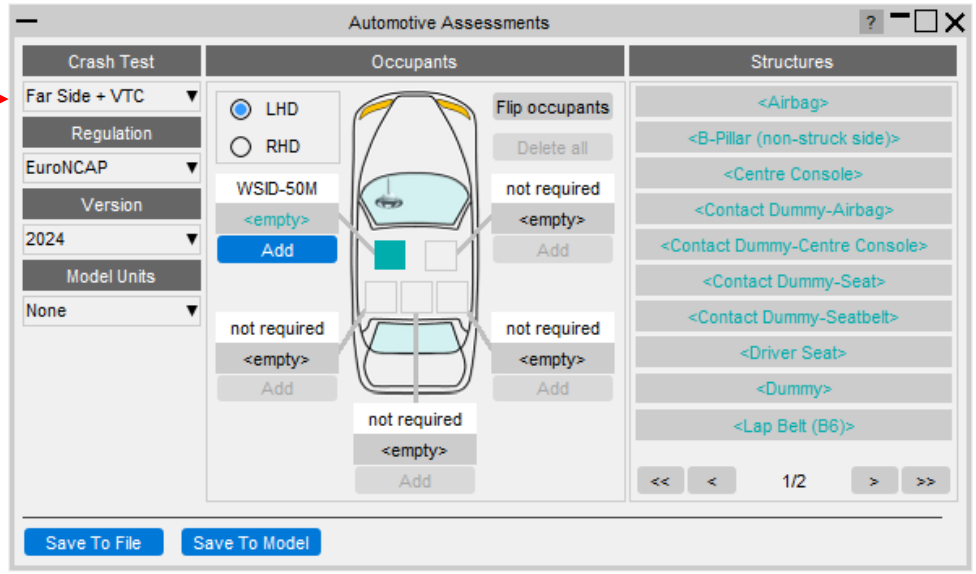
In Oasys 21 the assessment values and scores are now presented in a table making it easier to view the results



Far Side + VTC crash test

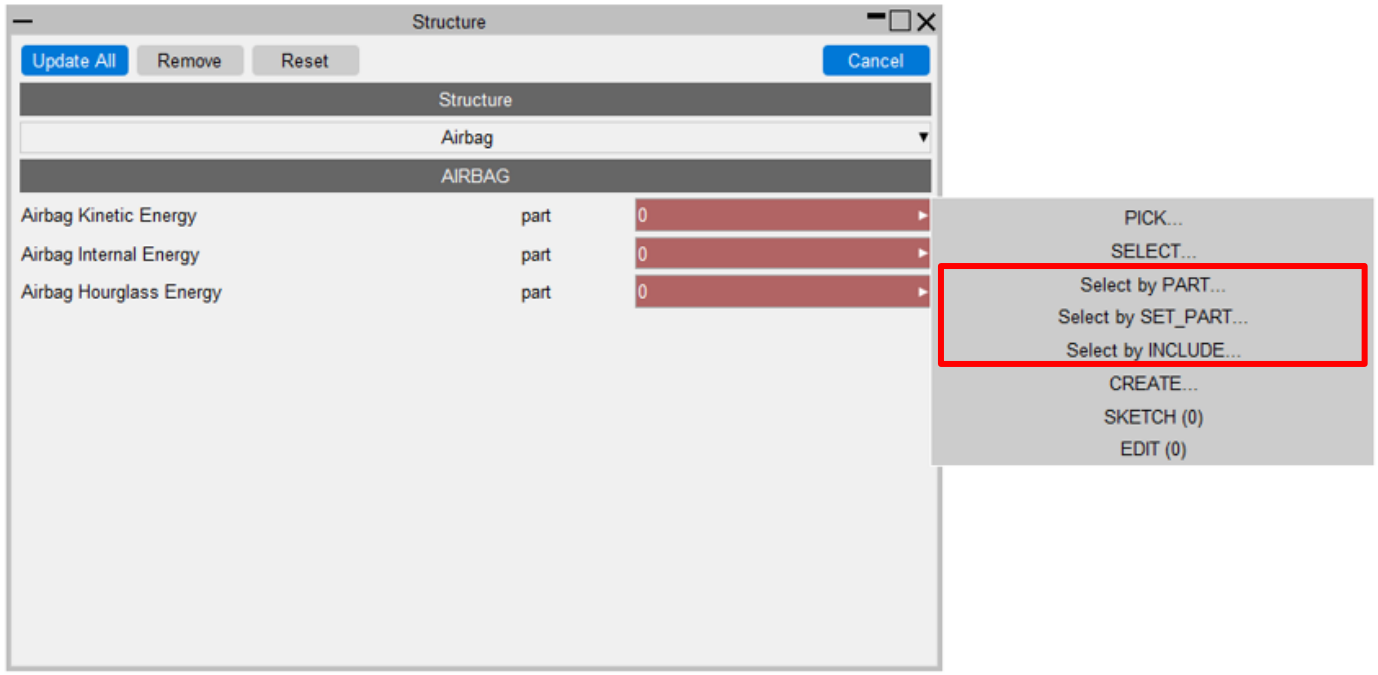
- New **Far Side + VTC** crash test has been added in the Automotive Assessments workflow to support Virtual Testing.
- Includes support for all 115 channels (Occupants + Structures) required for the Euro NCAP Virtual Far Side Simulation & Assessment Protocol





Improved entity selection for multiple parts

- To facilitate multiple PARTs selection, new options have been added in the Automotive Assessments entity selection popup:
  1. Select by PART
  2. Select by SET_PART
  3. Select by INCLUDE
- In the Far Side + VTC crash test, these options are useful for selecting multiple PARTs for structural channels like Kinetic Energy, Internal Energy, and Hourglass Energy, for Airbag, Centre Console, Driver Seat and Dummy.



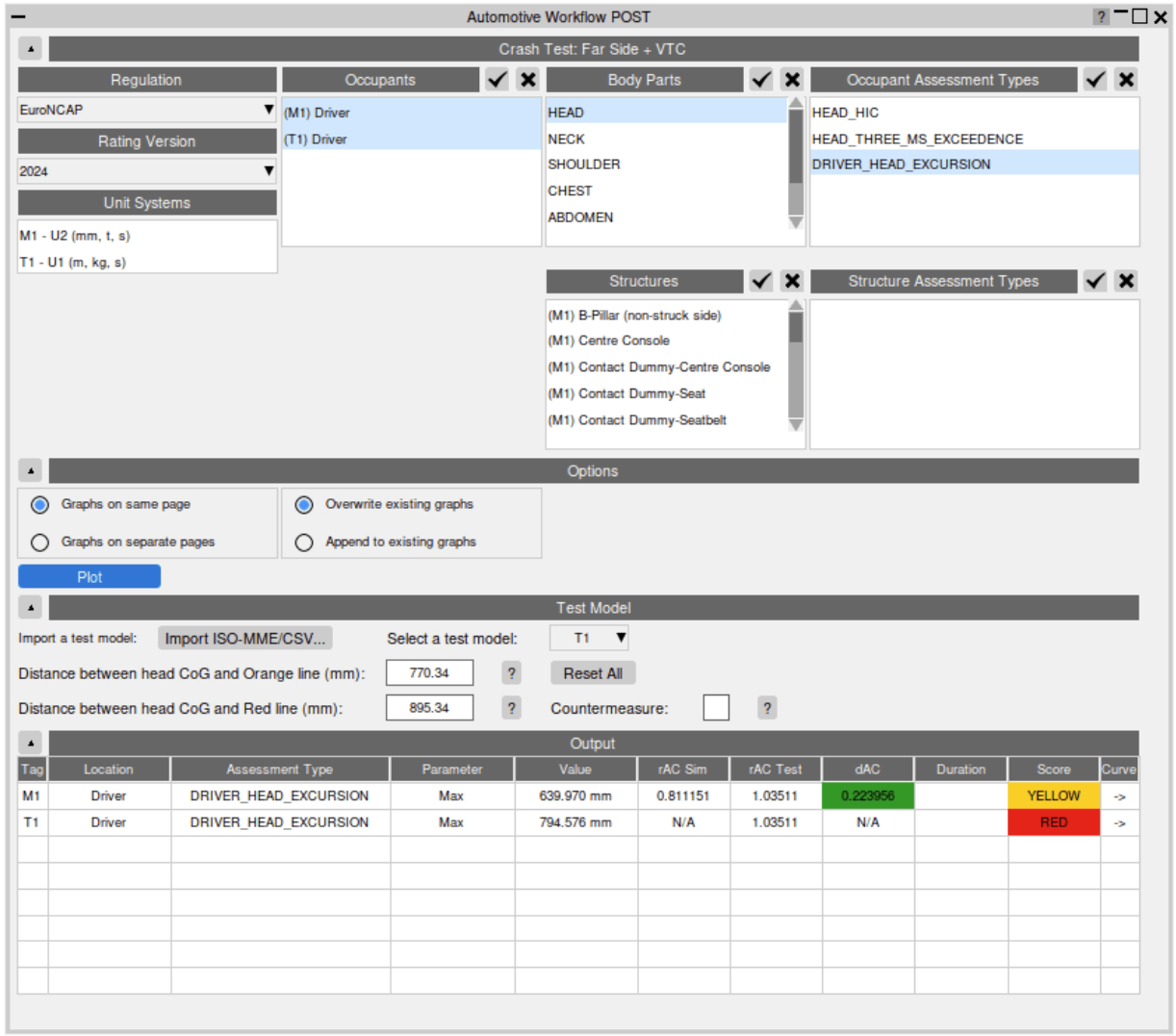
Updated support for different occupant versions

- We now support the DYNAmore/PDB WorldSID 50M occupant in versions 4.0, 6.0, 7.6 and 8.0 for left-hand and right-hand drive.
- We have reviewed and corrected various entity IDs and history titles in occupant JSON files that are supported in Automotive Assessments workflow. The list of occupant JSON files and corresponding manual referenced for checking are listed in this table.

Euro NCAP Virtual Far Side Validation Criterion 2

- Automotive Assessments can be used to check Validation Criterion 2 manually, according to Section 6.3 of the Euro NCAP Virtual Far Side Simulation & Assessment Protocol.

- Validation Criterion 2 check can also be automated using Euro NCAP Virtual Far Side 2024 VC2 (Assessment Criteria) REPORTER template .



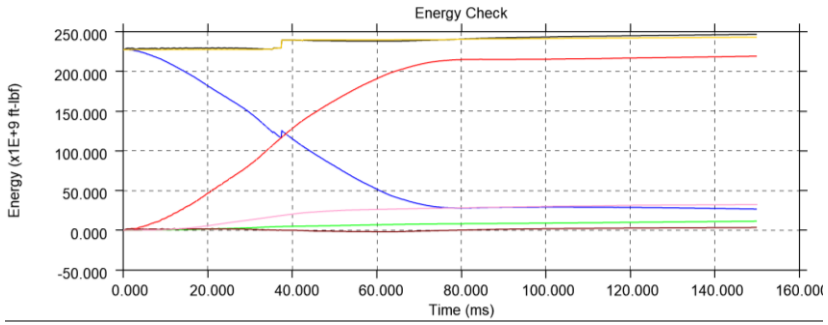
New Protocols

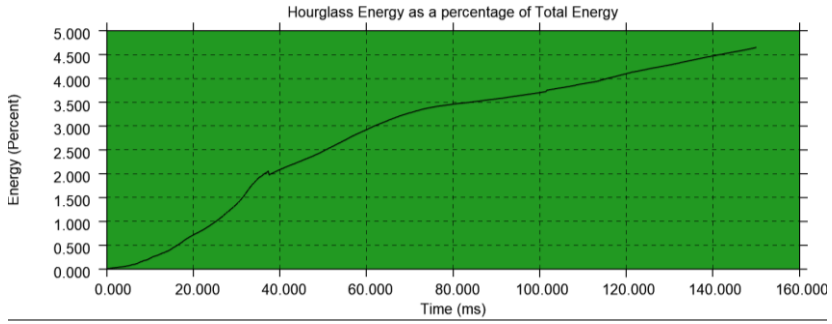
- In Oasys 21.1, the following new protocols have been added to the Automotive Assessments workflow. Each of these represents a different loadcase required as part of the C-NCAP Management Regulation (2024 Edition).

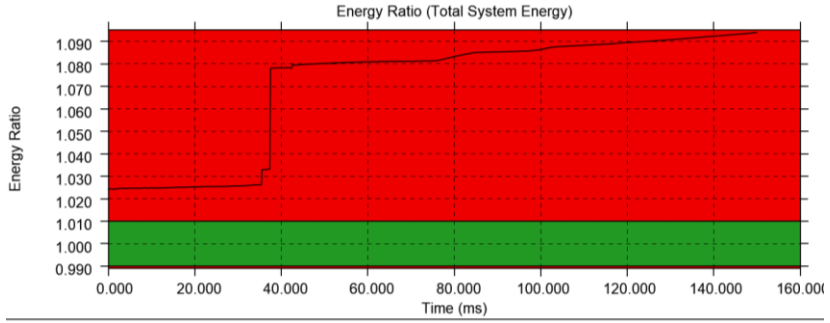
Crash Test	Regulation	Version	Description
Far Side + VTC	C-NCAP	2024 (SID2-SBLD)	• Front passenger side impact, assessing driver (Far Side Occupant) injury. • Injury scoring according to Chapter III section 1.2.1.5.3 of C-NCAP Management Regulation (2024 Edition) and Virtual Testing according to Appendix H.1.2.1.3.
Far Side + VTC	C-NCAP	2024 (WSID)	
Far Side Pole	C-NCAP	2024 (ES-2re+WSID)	• Front passenger side impact, assessing driver (Far Side Occupant) injury according to Appendix H.1.2.2.2. • Injury scoring based on Chapter III section 1.2.1.5.4 of C-NCAP Management Regulation (2024 Edition).
Far Side Pole	C-NCAP	2024 (WSID+WSID)	
Side Pole	C-NCAP	2024 (WSID+ES-2re)	• Driver side impact assessing driver injury according to Appendix D. • Injury scoring based on Chapter III section 1.2.1.4 of C-NCAP Management Regulation (2024 Edition).
Side Pole	C-NCAP	2024 (WSID+WSID)	

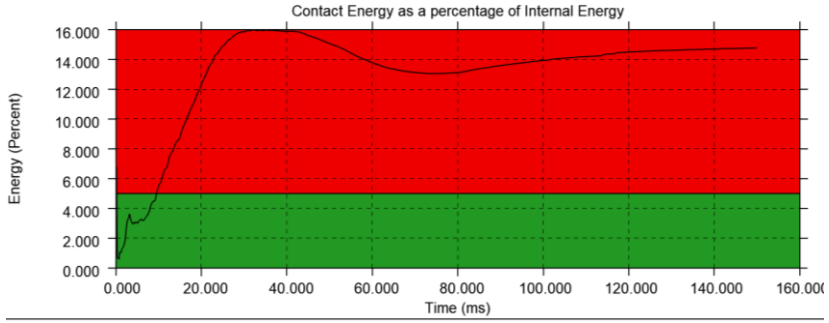
Energy Check

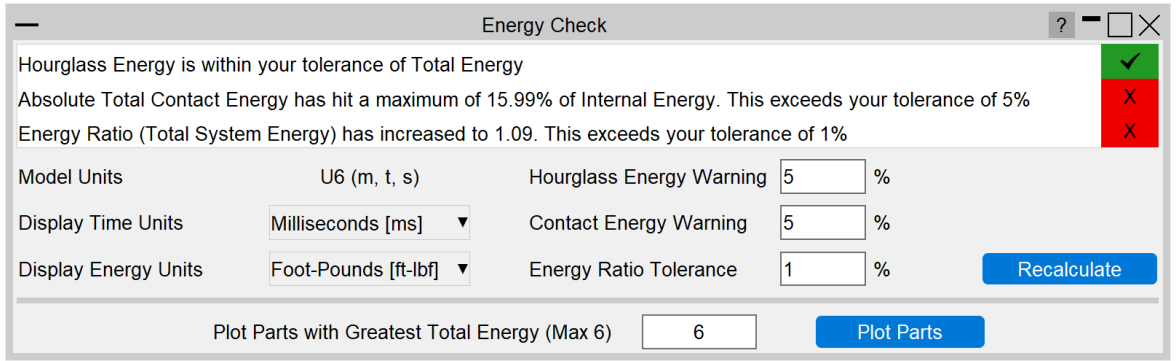
- Previously, the Energy Check tool simply plotted total, kinetic, internal and hourglass energy for your model. In Oasys 21, the tool now plots more energies, produces visual checks, and more.





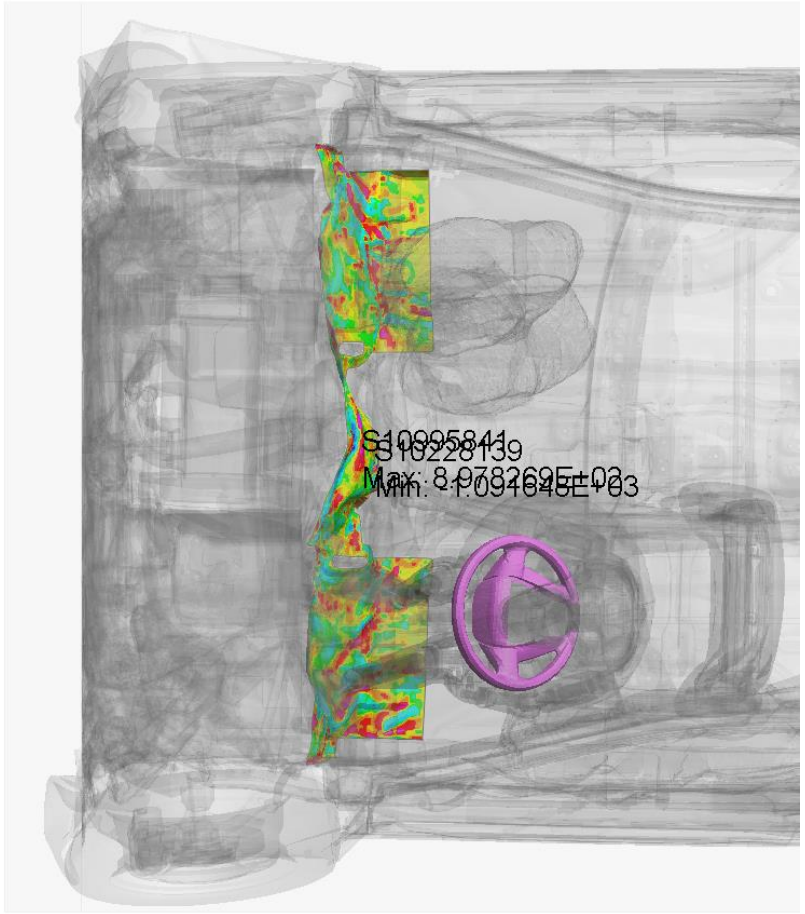


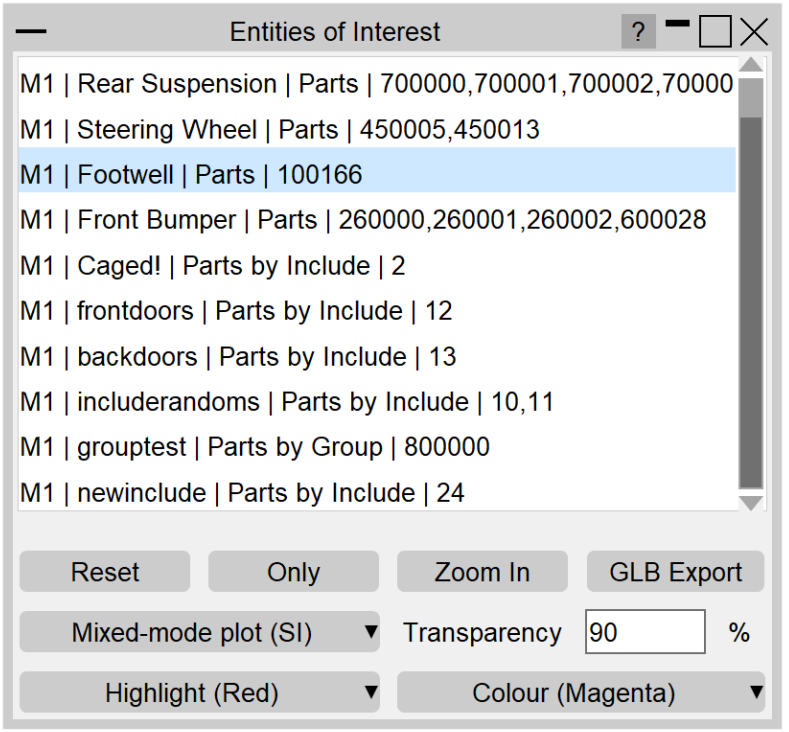




Entities of Interest

- Previously, the Entities of Interest tool was able to Only, Highlight and complete GLB Exports for selected entities grouped by Parts or Part Sets. In Oasys 21, you can now Zoom In, Colour By and produce Mixed-Mode Plots grouped by Parts, Parts by Set, Parts by Include and Parts by Group.





The image shown is an SI Mixed-Mode Plot on the Footwell and Coloured by Magenta on the Steering Wheel

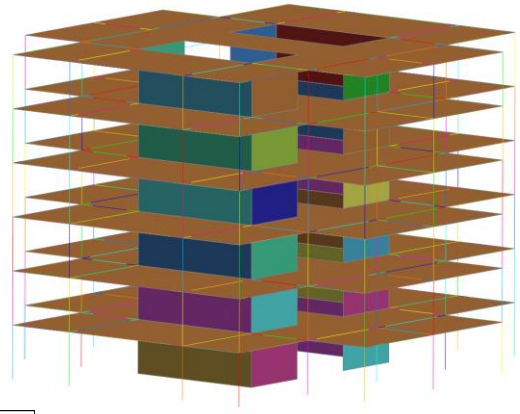
Seismic Workflows

Oasys 21 features new tools to power two of the most common seismic analysis workflows:

Storey Drift

In PRIMER, define drift nodes at different locations, for each storey.

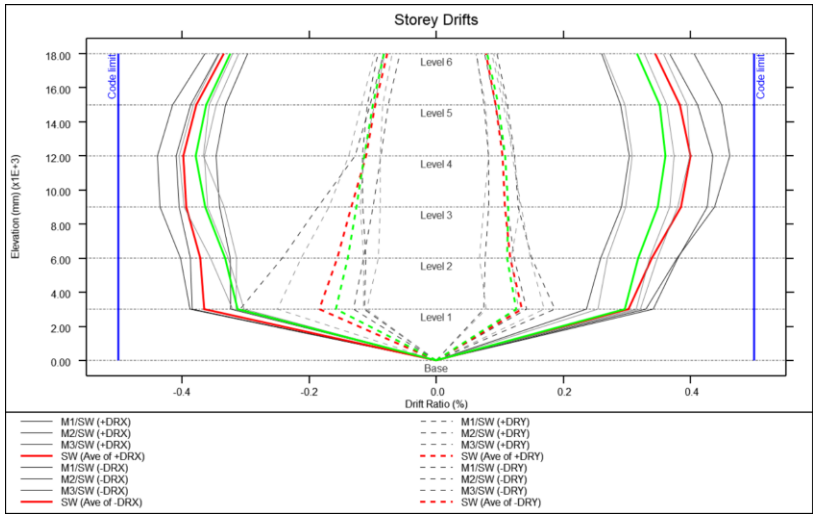
In T/HIS, storey drifts are plotted for each location defined.



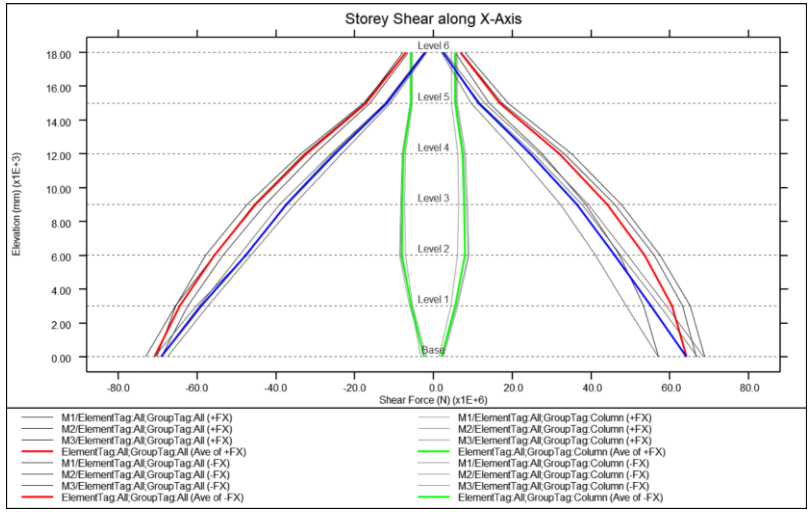
Storey Force

In PRIMER, define DATABASE_CROSS_SECTIONs for selected structural members grouped into SET_PARTs, for each storey.

In T/HIS, storey section forces are extracted for the cross-sections defined.

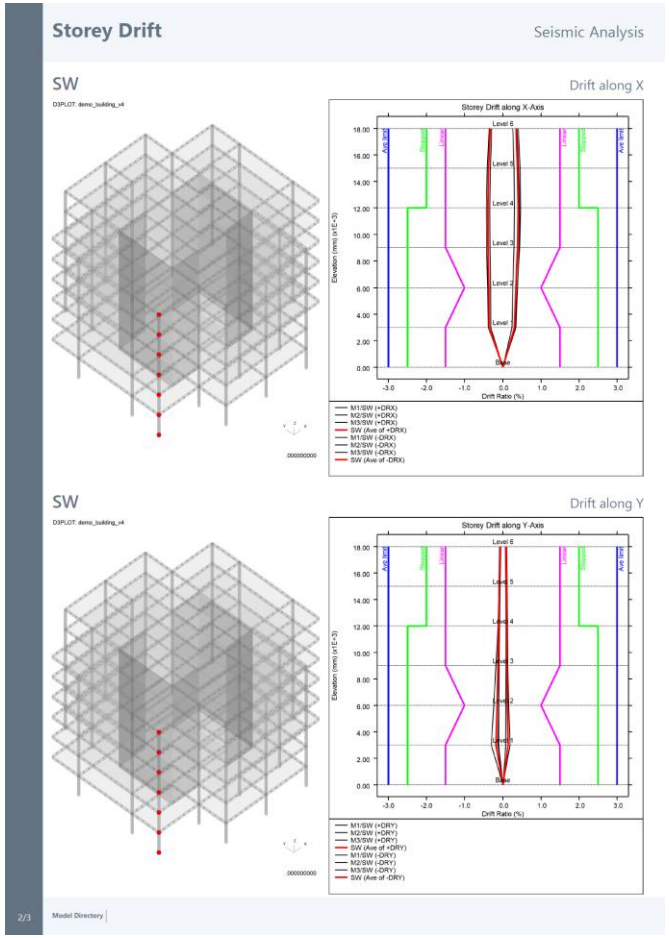


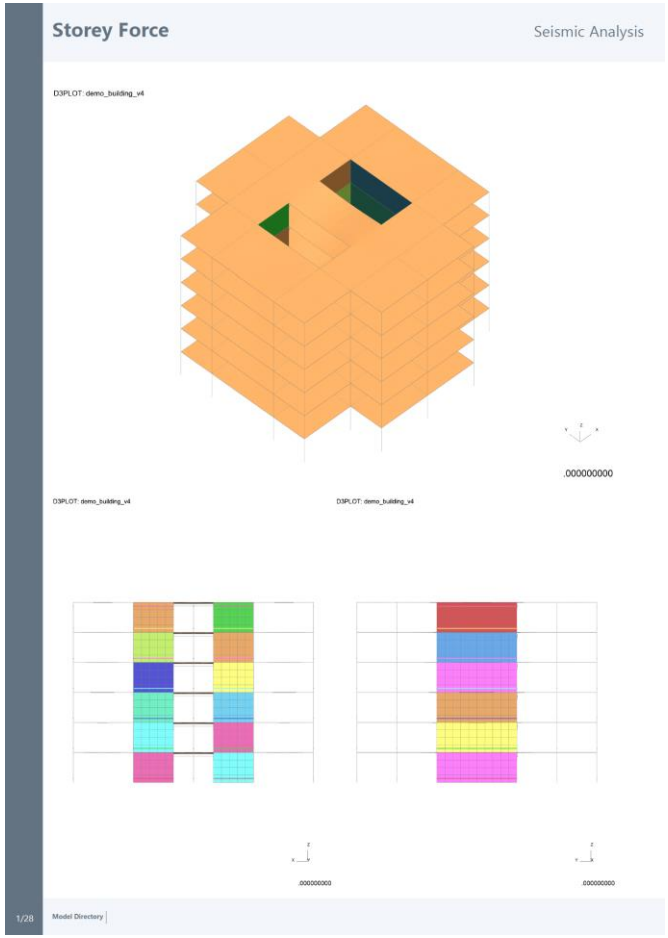
The Workflows can process a single model or a sweep of LS-DYNA runs for a set of ground motions.

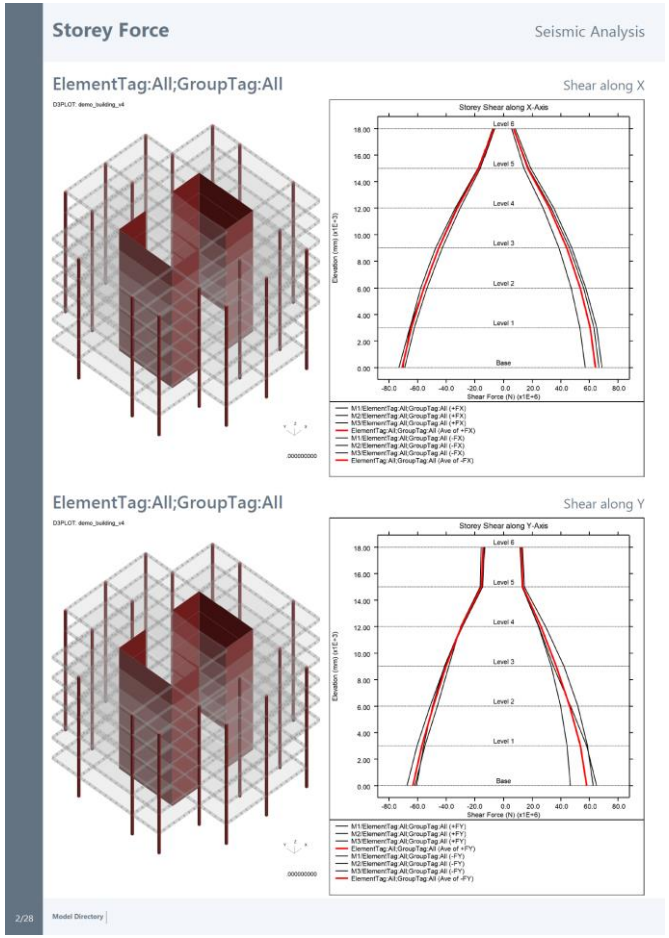


Seismic Workflows

You can also generate automated reports with the REPORTER templates provided:



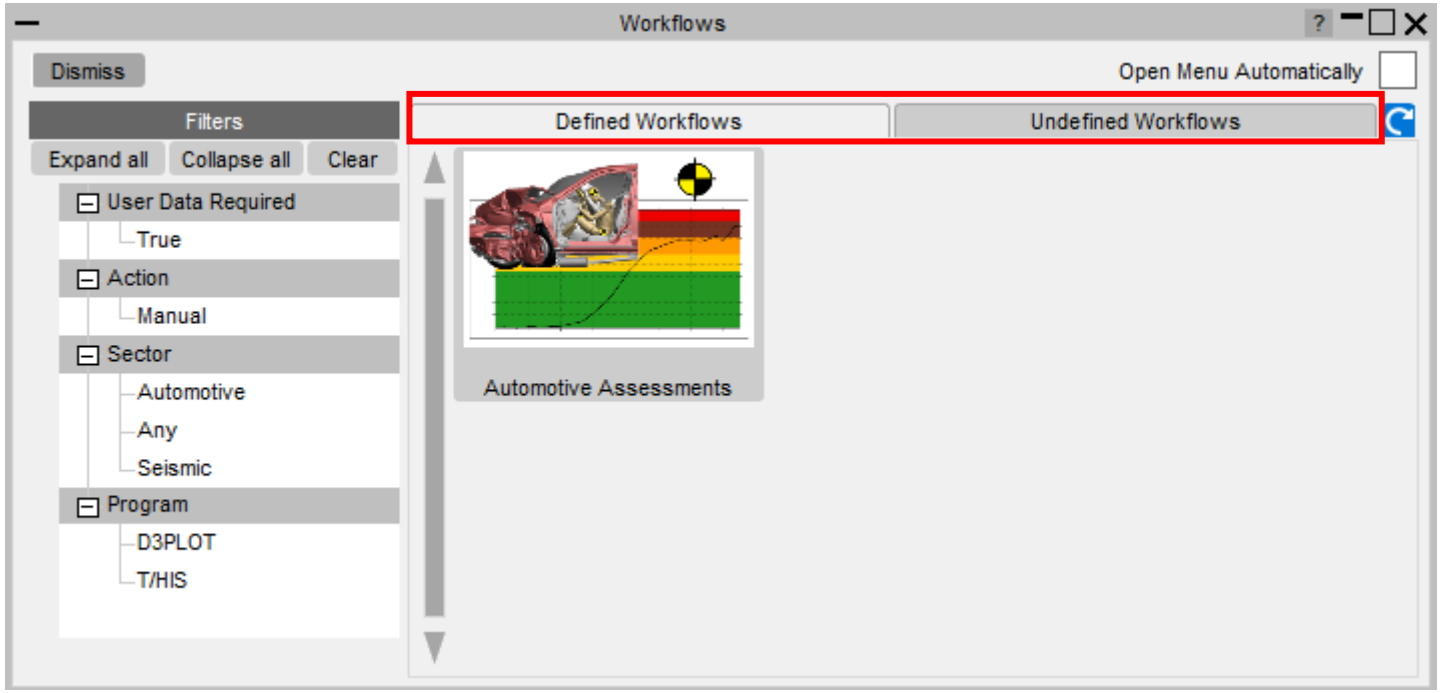




Defined and Undefined Workflows

The Workflows menu has been split into two tabs:

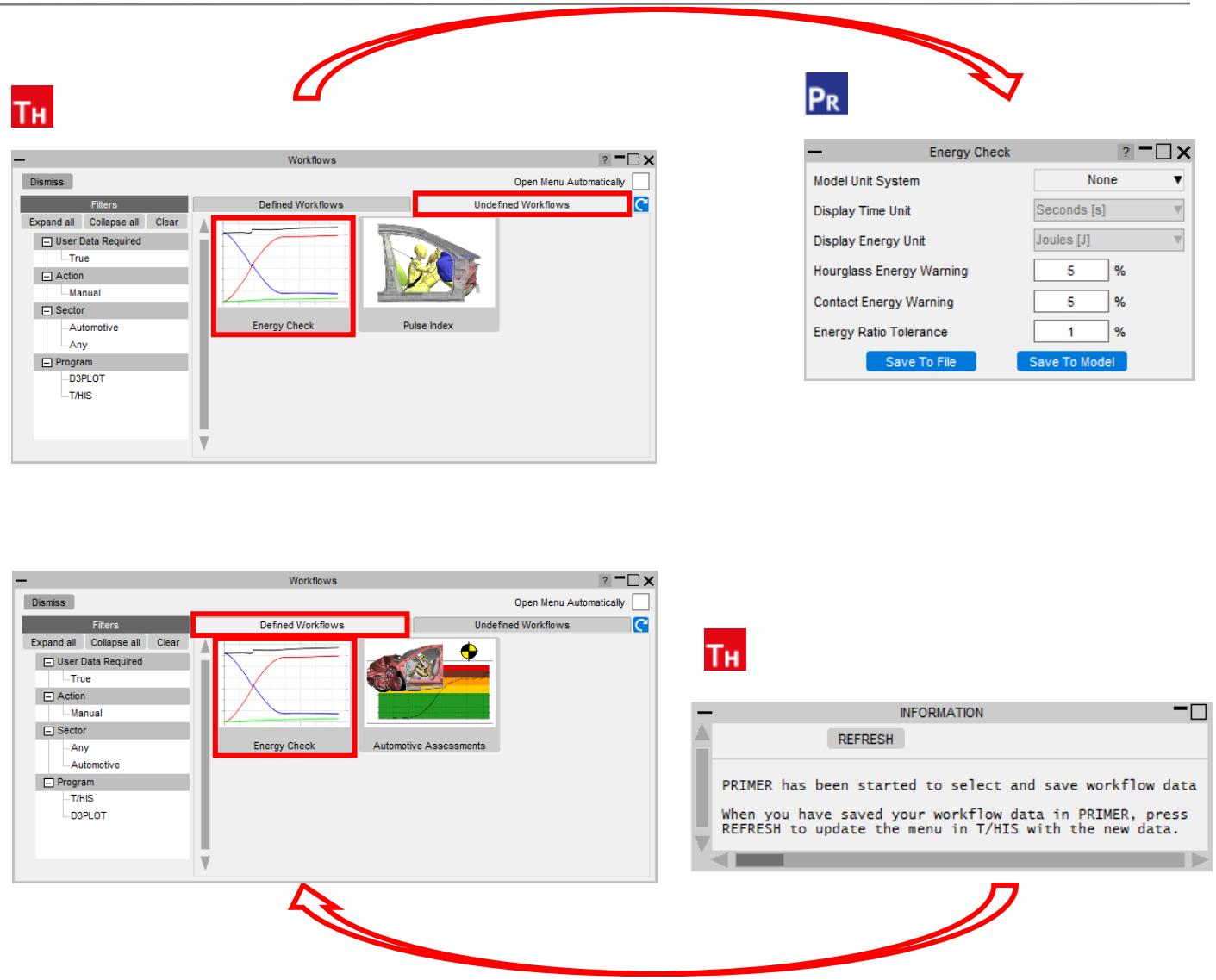
- **Defined Workflows** – shows workflows that can be run in T/HIS and have the required data
- **Undefined Workflows** – shows workflows that could be run in T/HIS, but don't have the require data



Defined and Undefined Workflows

Selecting a workflow in the **Undefined Workflows** tab will open the model in PRIMER and start the workflow to select the required data.

In T/HIS, a window will open telling you to press **Refresh** when the data has been saved. This will update the Workflows menu, moving the workflow to the **Defined Workflows** tab so it can be run in T/HIS.



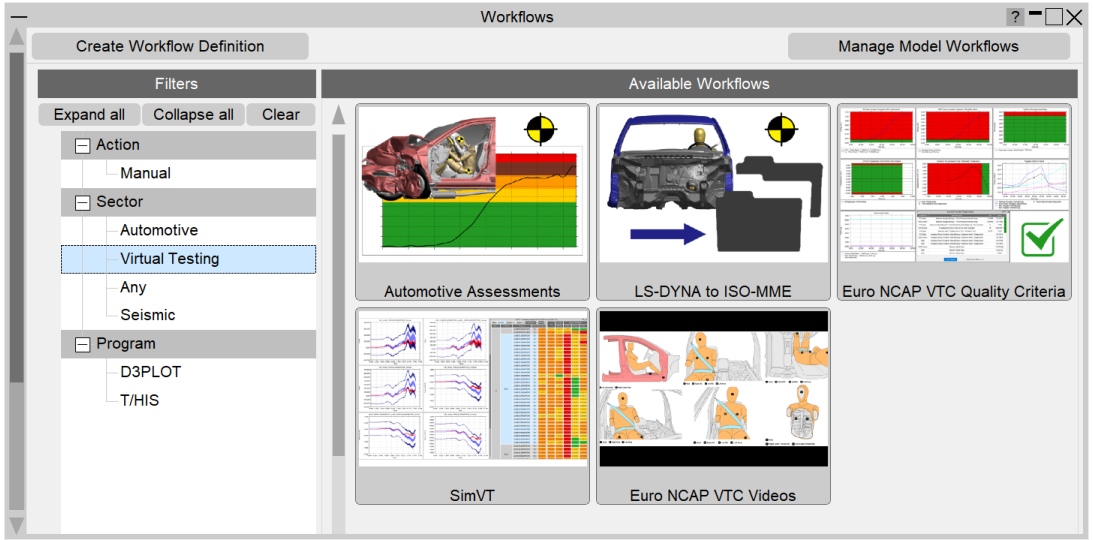
Virtual Testing

Virtual Testing

At Oasys Ltd., we are working on software features to support the upcoming Virtual Testing Crashworthiness protocols. The first protocols to be introduced are the Euro NCAP Virtual Far Side Simulation & Assessment Protocol, and C-NCAP Management Regulation (2024 Edition), with others to follow soon.

Oasys 21 contains a set of integrated and complementary Workflow tools to power your Virtual Testing CAE workflows:

- **Automotive Assessments** (now supports the Euro NCAP and C-NCAP virtual testing protocols)
- **LS-DYNA to ISO-MME**
- **SimVT**
- **VTC Quality Criteria**
- **VTC Videos**



Virtual Testing

Virtual Testing presents several challenges for CAE workflows:

Q1. Good correlation is moving from beneficial to mandatory. As CAE teams, we can no longer rely on conservative assumptions. How do we ensure that physical tests perform as predicted?

A1. SimVT is a powerful new tool for correlation analysis, providing flexibility, and the ability to interrogate correlation results in detail, to help you understand your models' accuracy, robustness, and sensitivity.

Q2. How do we ensure that the format and quality of information is sufficient when submitting results to Euro NCAP? How to avoid rework and resubmission?

A2. Use the VTC Quality Criteria tools to ensure your models meet the required standard. Use the VTC Videos tools to provide the video evidence required. Use the LS-DYNA to ISO-MME tool to export your results data in the required format.

Q3. CAE teams will need to work more with physical test data, and safety teams will need to work more with simulation. We will also be dealing with more metrics than ever before. How do we improve collaboration and processing?

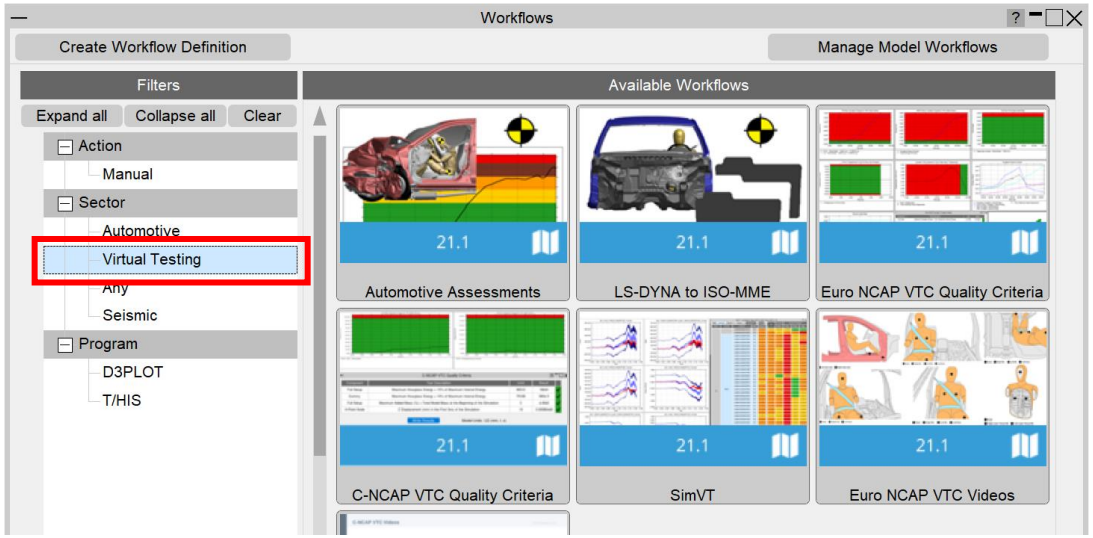
A3. The LS-DYNA to ISO-MME tool provides seamless transition between simulation and test formats. SimVT supports test data stored in ISO-MME format as well as a configurable CSV format.

Q4. How can we manage the large volume of data and processing required for Virtual Testing?

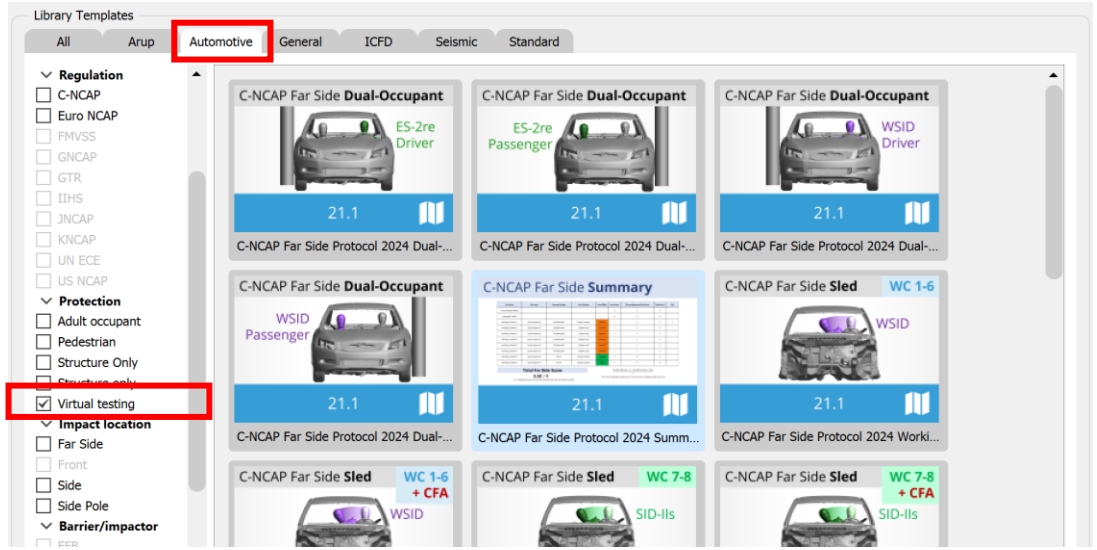
A.4 SimVT helps you summarise the correlation analysis results for all the occupant and structures data channels, as well as providing the ability to sift through the data in more detail. Other tools include REPORTER templates to automate the processing of data. Results tables, graphs and scores can be exported in various formats to link with your team's data management tools and processes.

Virtual Testing

- All the new Virtual Testing tools can be accessed from the **Tools** → **Workflows** menus in PRIMER, D3PLOT and T/HIS by filtering for **Virtual Testing**.

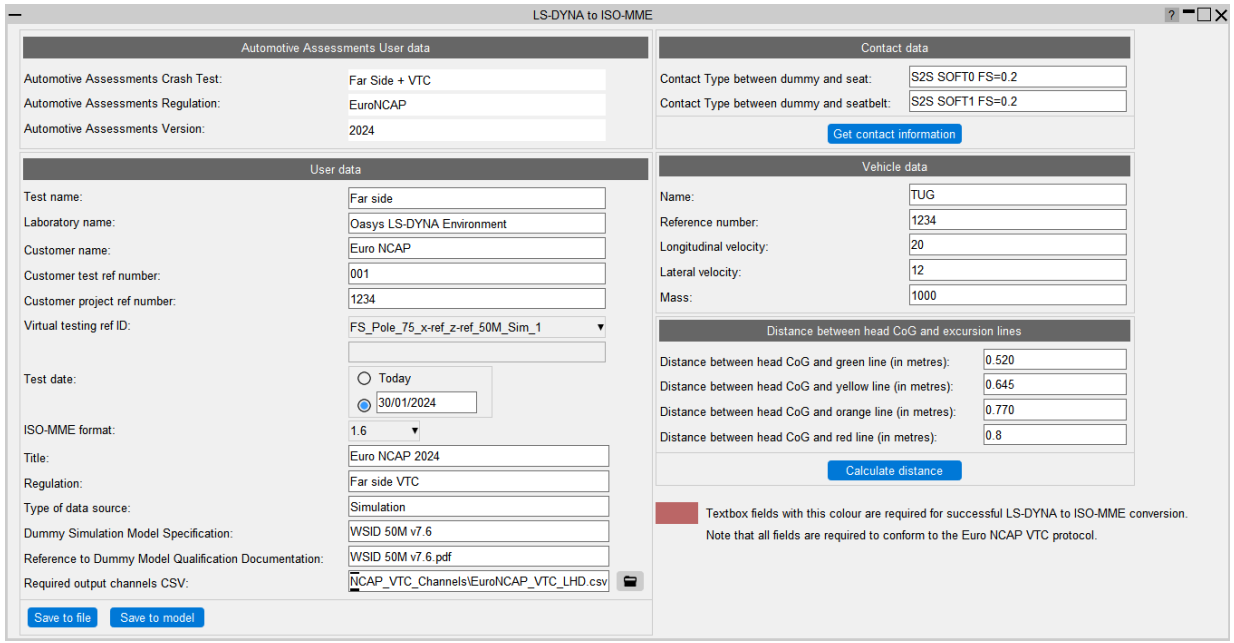


- REPORTER templates can be found at **File** → **Open Library Template...** by selecting the **Automotive** tab and filtering for **Virtual testing**.



LS-DYNA to ISO-MME

- “LS-DYNA to ISO-MME” is a new Workflow tool to convert LS-DYNA results into the ISO-MME format specified by the Euro NCAP Virtual Far Side protocol. It can also be used to export the channels required by the C-NCAP Far Side Occupant Protection Protocol.
- Automotive Assessments workflow user data removes the need to manually map LS-DYNA entities to ISO-MME channel codes.
  1. In **PRIMER**, populate all the fields required by the Euro NCAP or C-NCAP protocol. Contact data and Distance between head CoG and excursion lines can be populated automatically. When you save these, you can reuse the settings for subsequent LS-DYNA runs.
  2. In **T/HIS**, perform the export to ISO-MME format. Solver and simulation information can also be populated automatically.

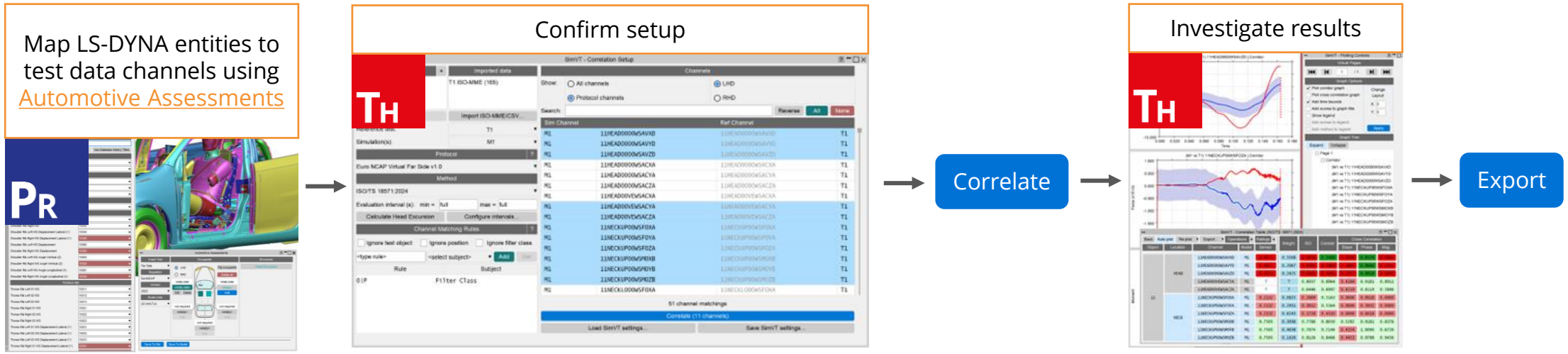


LS-DYNA to ISO-MME

- The LS-DYNA to ISO-MME Workflow can be automated using the REPORTER template provided. The report generated contains a summary of the ISO-MME file information and individual channel graphs, as well as highlighting any missing data for correction.

SimVT

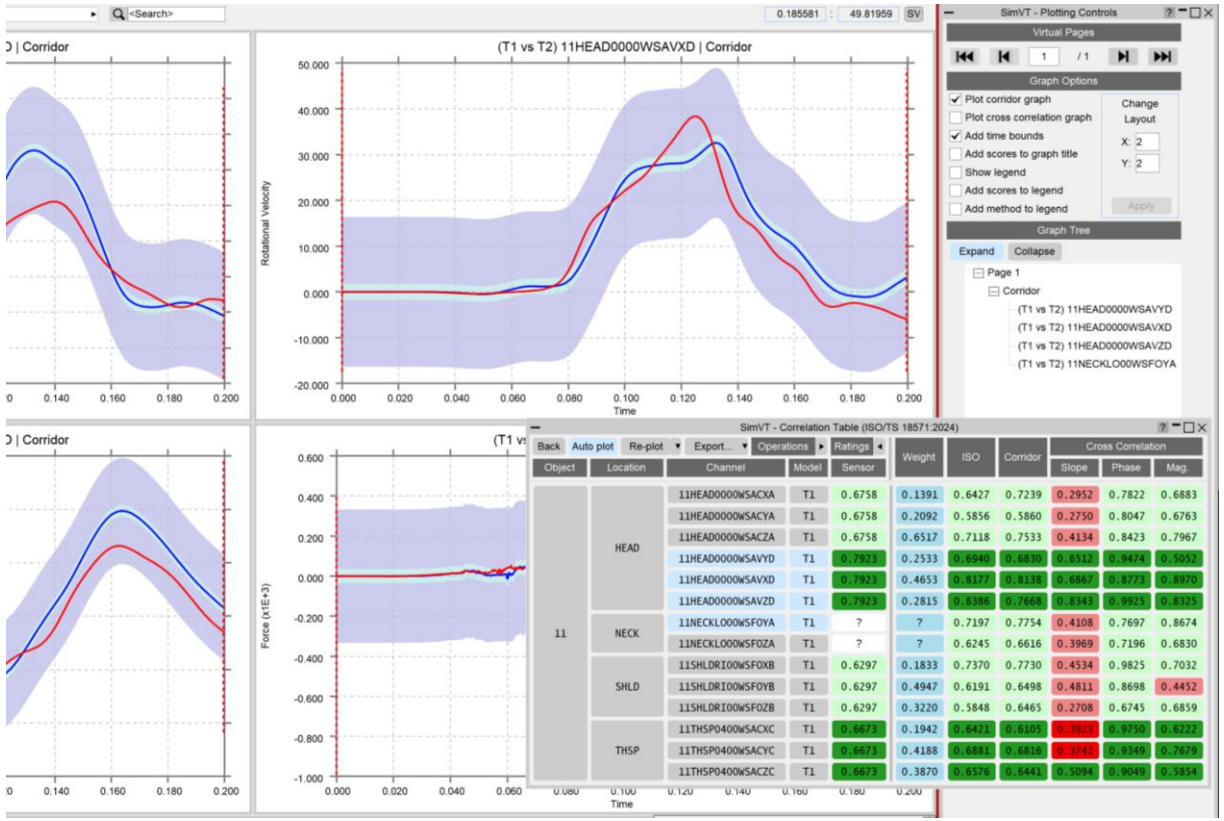
- SimVT is a powerful interactive tool for correlating simulation data vs test, or indeed any combination of: LS-DYNA models, ISO-MME data or CSV data.
- SimVT supports the Euro NCAP and C-NCAP Virtual Testing protocols and can be used to identify sensors that fail to pass Validation Criterion 1 or correlation fitting index requirements.



The SimVT Workflow

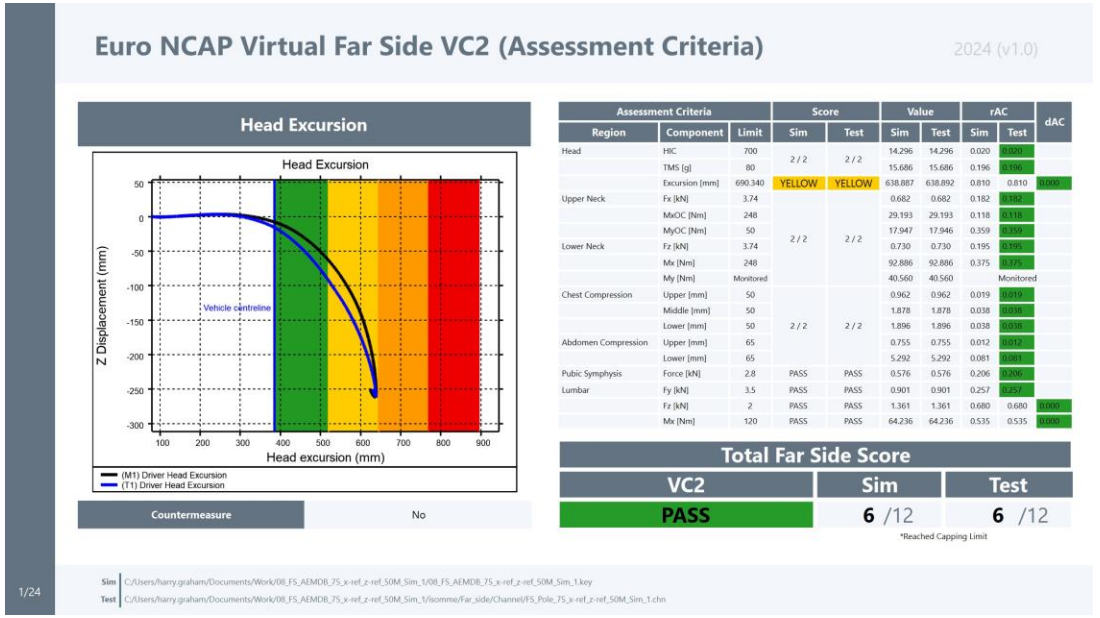
SimVT

- SimVT seamlessly aligns simulation curves to tests using ISO-MME Channel Codes.
- You can create custom rules for pairing approximate matches.
- Hundreds of correlations are achievable with a single click.
- Results are displayed in a table and can be exported to CSV.
- Graphs of all correlations can be easily plotted and navigated.
- Settings files can be saved to restore previous sessions.



Euro NCAP Virtual Far Side Validation Criterion 2

- The **Euro NCAP Virtual Far Side 2024 VC2 (Assessment Criteria)** REPORTER Template can be used to perform the Validation Criterion 2 (Assessment Criteria) check according to section 6.3.10 of the Euro NCAP VTC Simulation and Assessment Protocol v1.0.
- Before running the template, you need to set up user data in PRIMER's Automotive Assessments Workflow using the Euro NCAP 'Far Side + VTC' protocol.
- You can also perform VC2 manually in T/HIS.

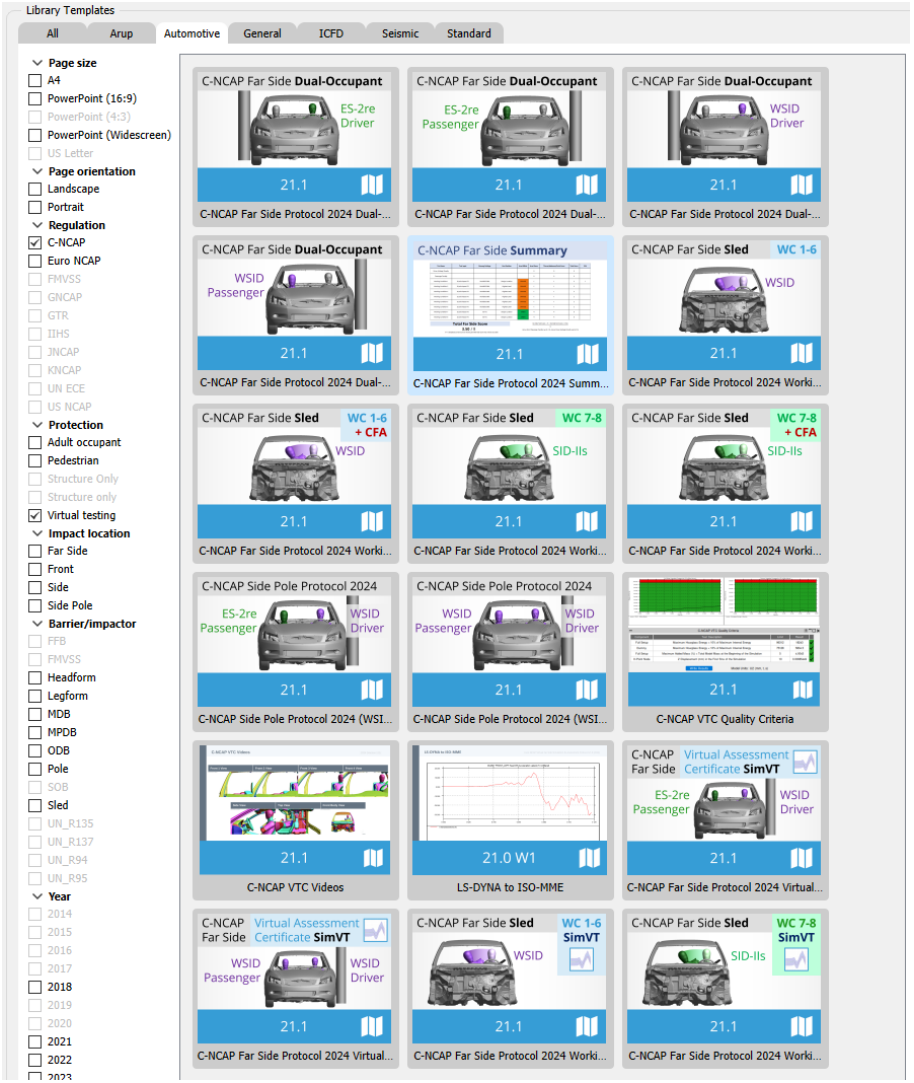


C-NCAP Management Regulation (2024 Edition)

Oasys 21.1 has new support for the various requirements of the C-NCAP Far Side Occupant Protection Protocol, including:

- For each of the eight Working Conditions:
  - Occupant injury assessment
  - ISO Correlation Fitting indices
  - Correction Factor A
- Dual-Occupant Penalty calculation
- ISO correlation fitting indices for the Virtual Assessment Certificate (prerequisite for the symmetry of far side occupant protection airbags)
- Overall score calculation

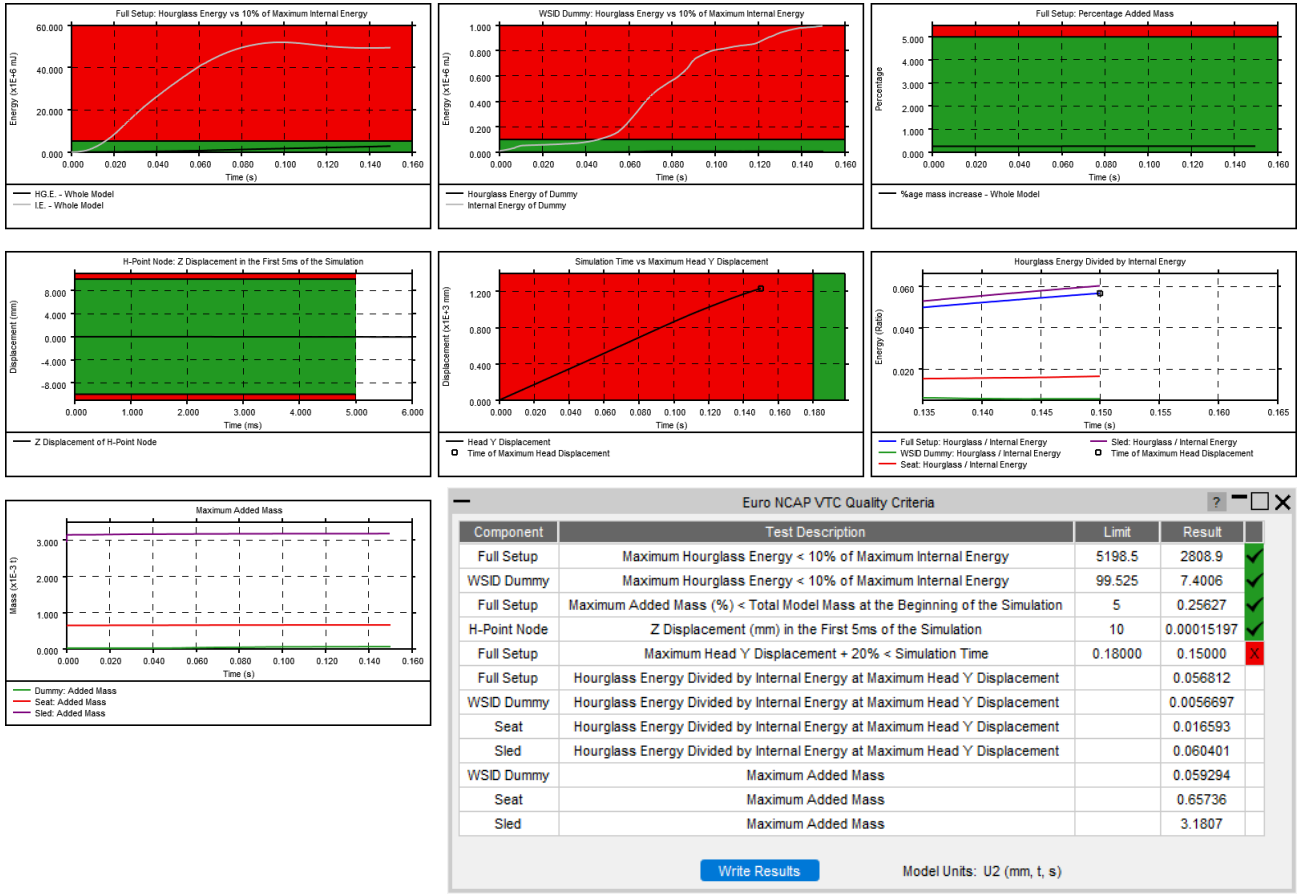
Read the documentation to learn more



Euro NCAP VTC Quality Criteria

- “Euro NCAP VTC Quality Criteria” is a new, convenient tool for assessing the quality criteria specified in section 6.1 of the Euro NCAP Virtual Far Side protocol.

1. In **PRIMER**, select the model entities required for the quality checks, and the relevant model and display units. Saved user data can be reused for subsequent LS-DYNA runs.
2. In **T/HIS**, the quality checks are calculated immediately. Graphs illustrate the results of each check. A summary table appears, with the option to write the results to a CSV file.



Euro NCAP VTC Quality Criteria

- The Euro NCAP VTC Quality Criteria Workflow tool can be automated using the REPORTER template provided.

Euro NCAP VTC Quality Criteria

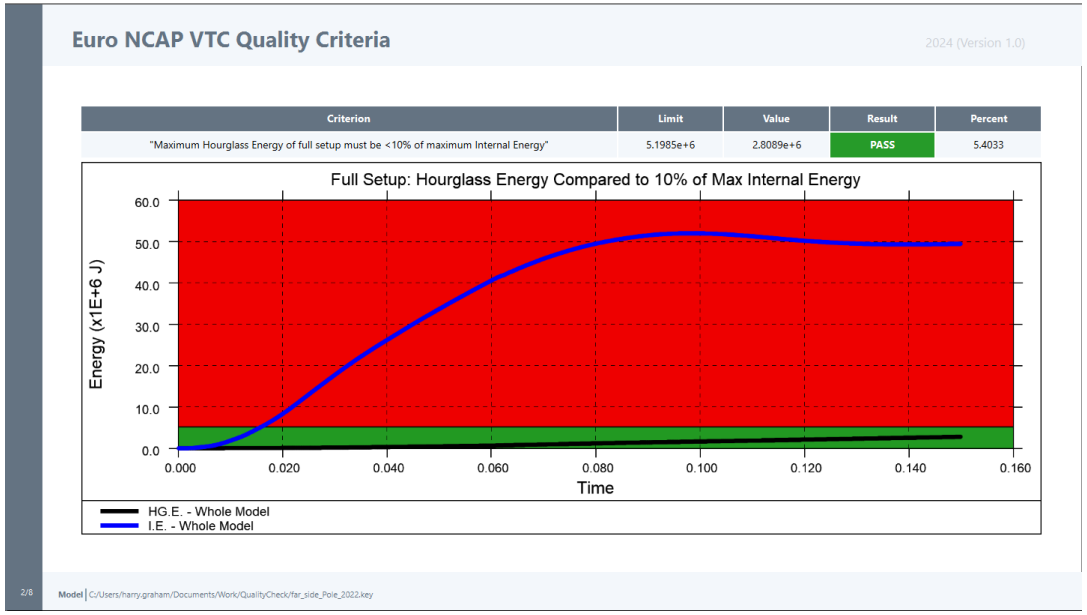
2024 (Version 1.0)

Summary

Component	Test Description	Value	Limit	Result
Full Setup	Maximum Hourglass Energy < 10% of Maximum Internal Energy	2.8089e+6	5.1985e+6	PASS
WSID Dummy	Maximum Hourglass Energy < 10% of Maximum Internal Energy	7400.6	99525	PASS
Full Setup	Maximum Added Mass (%) < Total Model Mass at the beginning of the simulation	0.25627	5	PASS
H-Point Node	Z Displacement (mm) in the first 5 ms of the simulation	70.006	10	FAIL
Full Setup	(Time of Maximum Head Y Displacement) + 20% < Simulation Time	0.15	0.18	FAIL
Full Setup	Hourglass Energy divided by Internal Energy at Time of Maximum Head Y Displacement	0.056812	[monitored]	[monitored]
WSID Dummy	Hourglass Energy divided by Internal Energy at Time of Maximum Head Y Displacement	0.0056697	[monitored]	[monitored]
Seat	Hourglass Energy divided by Internal Energy at Time of Maximum Head Y Displacement	0.016593	[monitored]	[monitored]
Sled	Hourglass Energy divided by Internal Energy at Time of Maximum Head Y Displacement	0.060401	[monitored]	[monitored]
Dummy	Maximum Added Mass	5.9294e-5	[monitored]	[monitored]
Seat	Maximum Added Mass	0.00065736	[monitored]	[monitored]
Sled	Maximum Added Mass	0.0031807	[monitored]	[monitored]

1/8

Model | C:/Users/harry.graham/Documents/Work/QualityCheck/far_side_Pole_2022.key



Euro NCAP VTC Quality Criteria

2024 (Version 1.0)

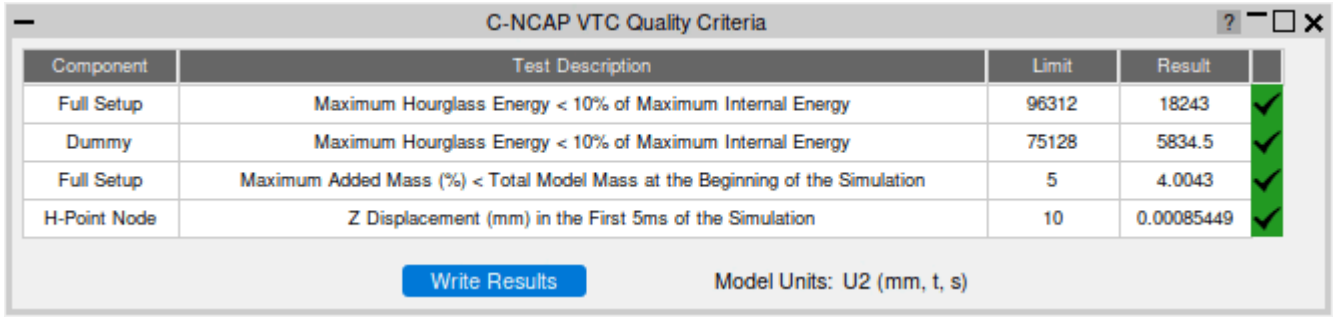
Criterion	Limit	Value	Result	Percent
"Maximum Hourglass Energy of full setup must be <10% of maximum Internal Energy"	5.1985e+6	2.8089e+6	PASS	5.4033

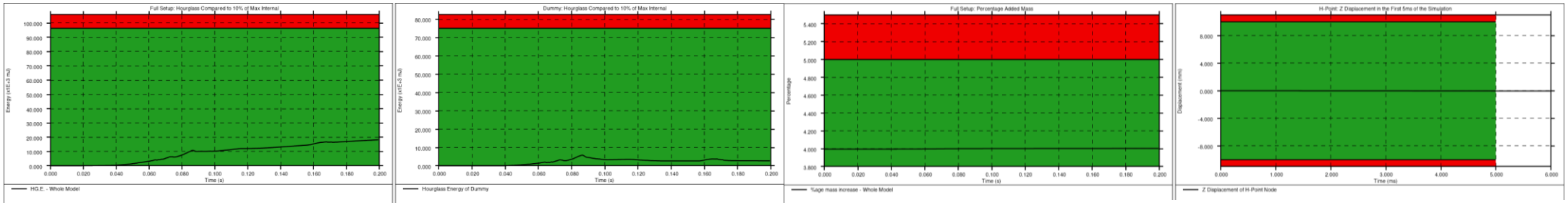
2/8

Model | C:/Users/harry.graham/Documents/Work/QualityCheck/far_side_Pole_2022.key

C-NCAP VTC Quality Criteria

- The C-NCAP VTC Quality Criteria Workflow tool follows the same principals as the Euro NCAP version but assesses the quality criteria specified in section H.1.1(f) of the C-NCAP Far Side Simulation & Assessment Protocol.
- The tool can be automated using the REPORTER template provided.





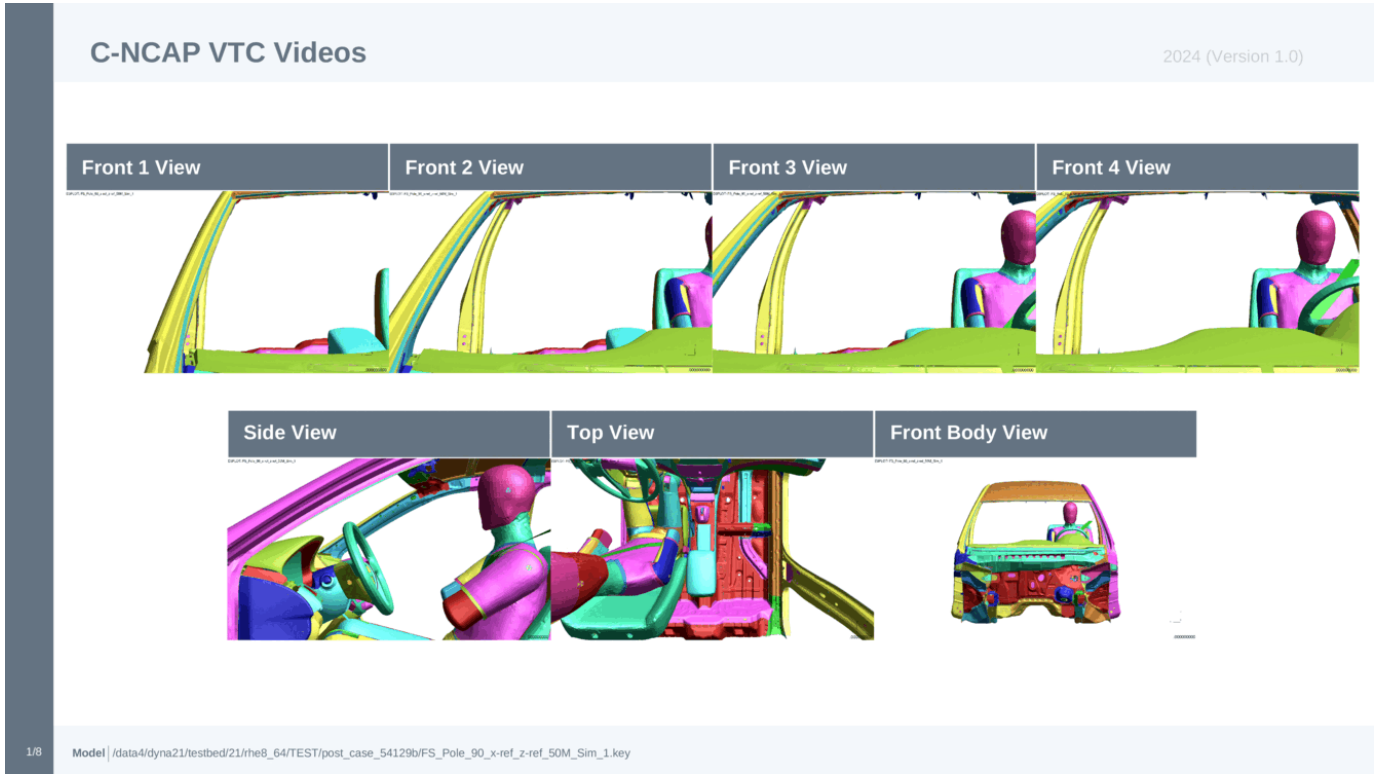
Euro NCAP VTC Videos

- The **Euro NCAP VTC Videos** Workflow tool helps you calculate the views and export the videos specified in section 5.2.1 of the Euro NCAP Virtual Far Side protocol.
- The tool attempts to calculate the camera positions automatically based on model entities you define in **PRIMER**. You can then adjust and save the views in **D3PLOT** to be reused to capture the videos for future LS-DYNA runs. The whole process can be automated using the **REPORTER** template provided.

C-NCAP VTC Videos

- The **C-NCAP VTC Videos** Workflow tool follows the same principles as the Euro NCAP version but helps you calculate the views and export the videos specified in section H.2.8 of the C-NCAP Far Side Occupant Protection Protocol (2024 Edition).

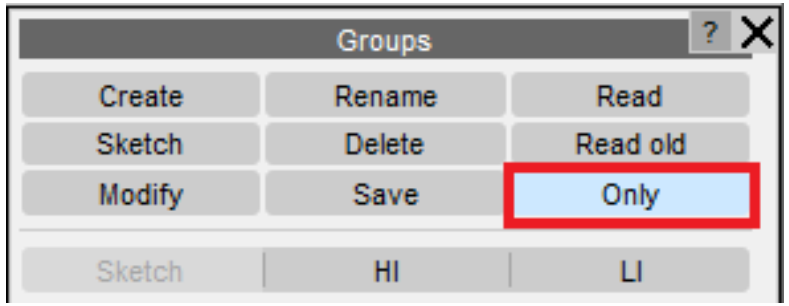
- Use the standard Workflow method in **PRIMER** and **D3PLOT** or the whole process can be automated using the **REPORTER** template provided.



Groups

Groups

- Reading a Groups file is now significantly faster.
- The binary groups file (.grp) format has been modified to store the visual attributes of Groups (e.g. colour, transparency), if defined in the Ascii file.
- A new “*.vis” extension of groups file has been introduced in PRIMER 21.0, to view the HBM visualisation entities.
- An **Only** button has been added in the Groups panel:

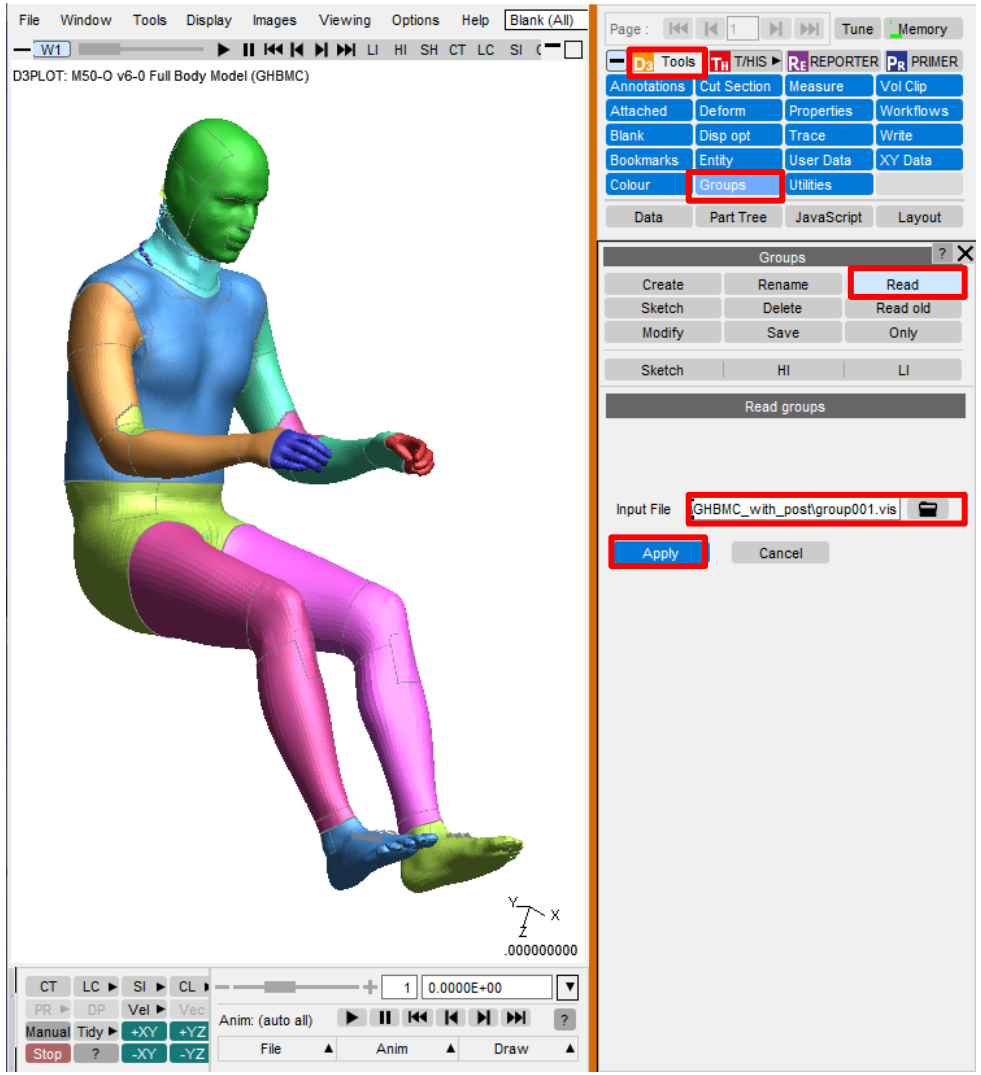


HBM Visualisation Entities

Image Acknowledgements

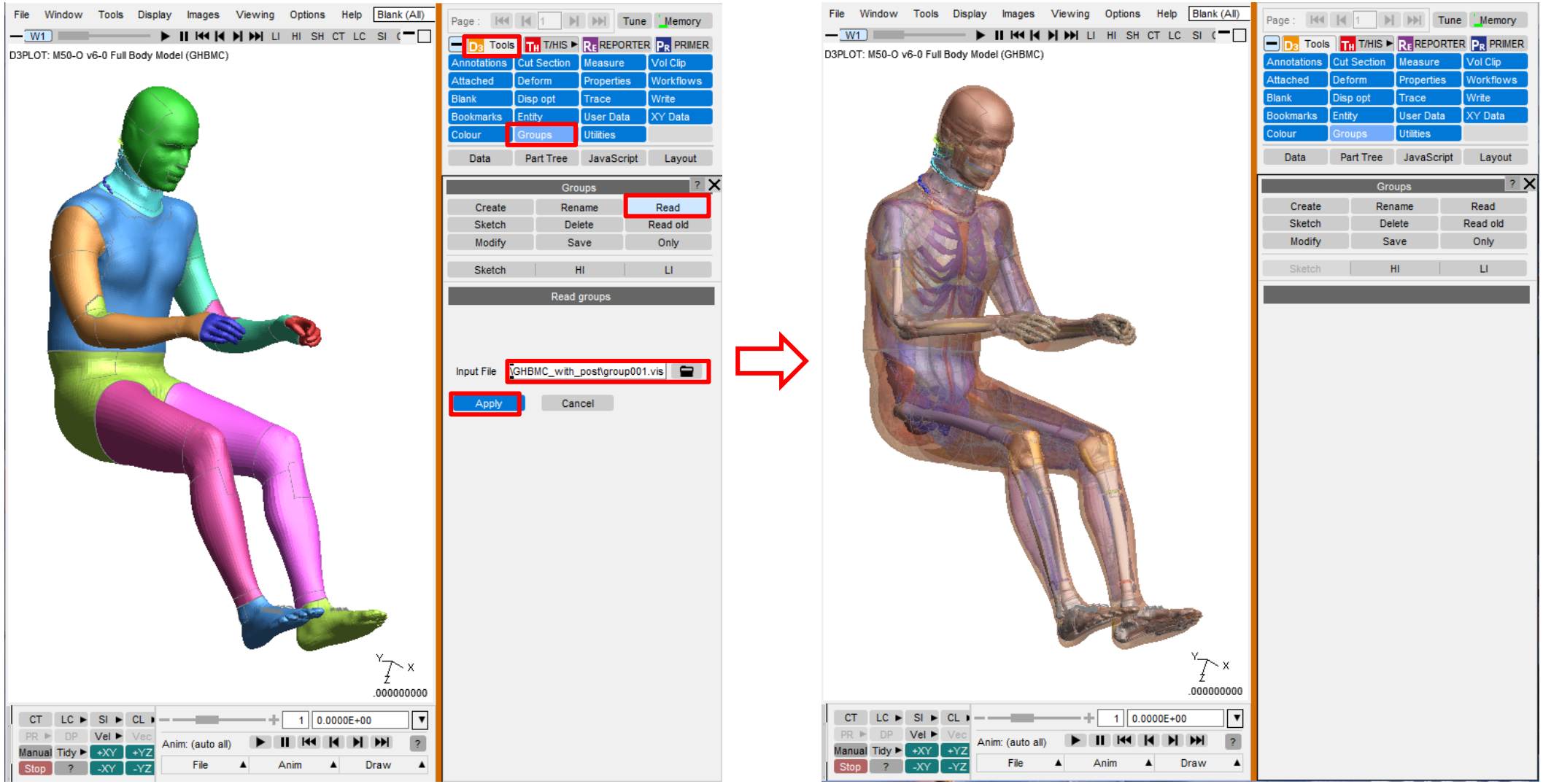
GHBMC - Elemance

HBM Visualisation Entities



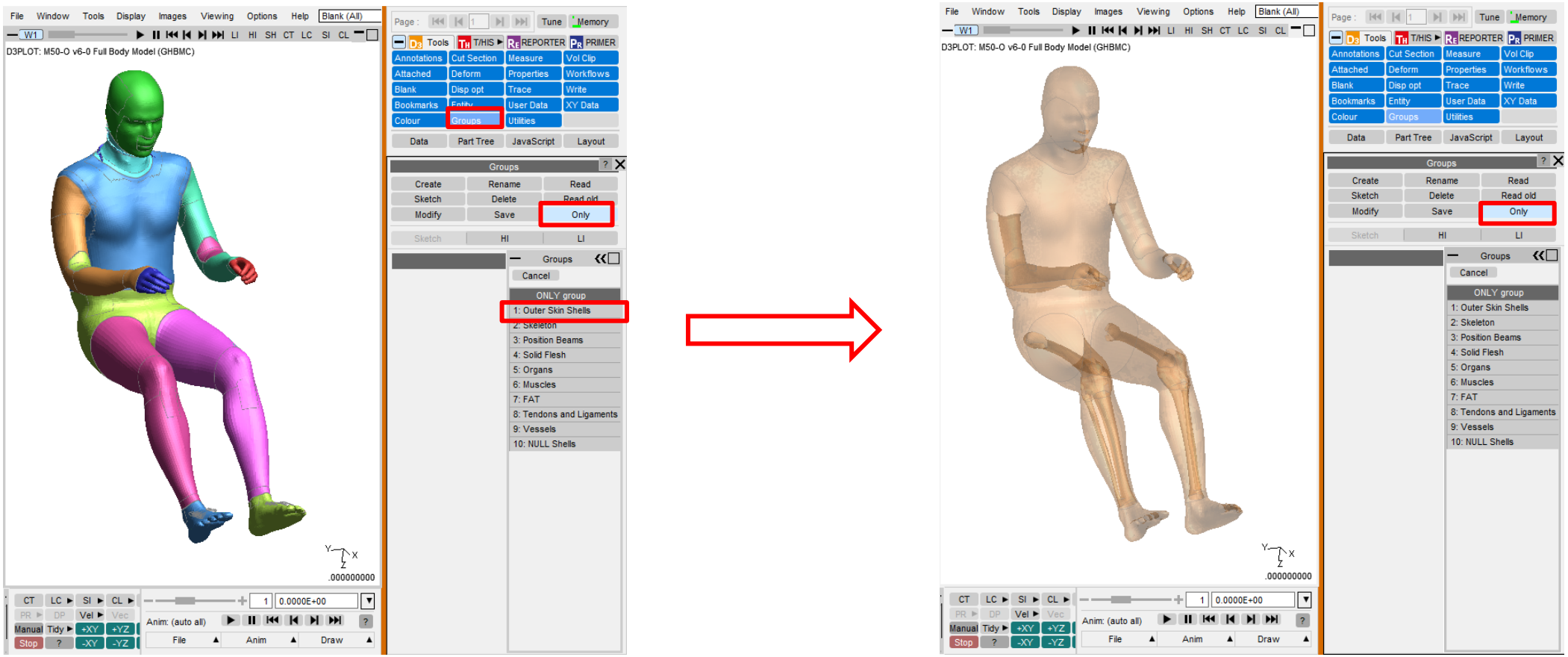
- It is now possible to view the HBM visualisation entities, created by the HBM visualisation table in a PRIMER session, in D3PLOT.
- To view the HBM visualisation entities in D3PLOT:
  1. Create a model-specific D3PLOT groups file (***.vis**) from the HBM visualisation table in PRIMER.
  2. Load the LS-DYNA results (*.ptf/d3plot file) into D3PLOT.
  3. Select **Tools** → **Groups** → **Read**, select the *.vis file, click **Apply**.

HBM Visualisation Entities

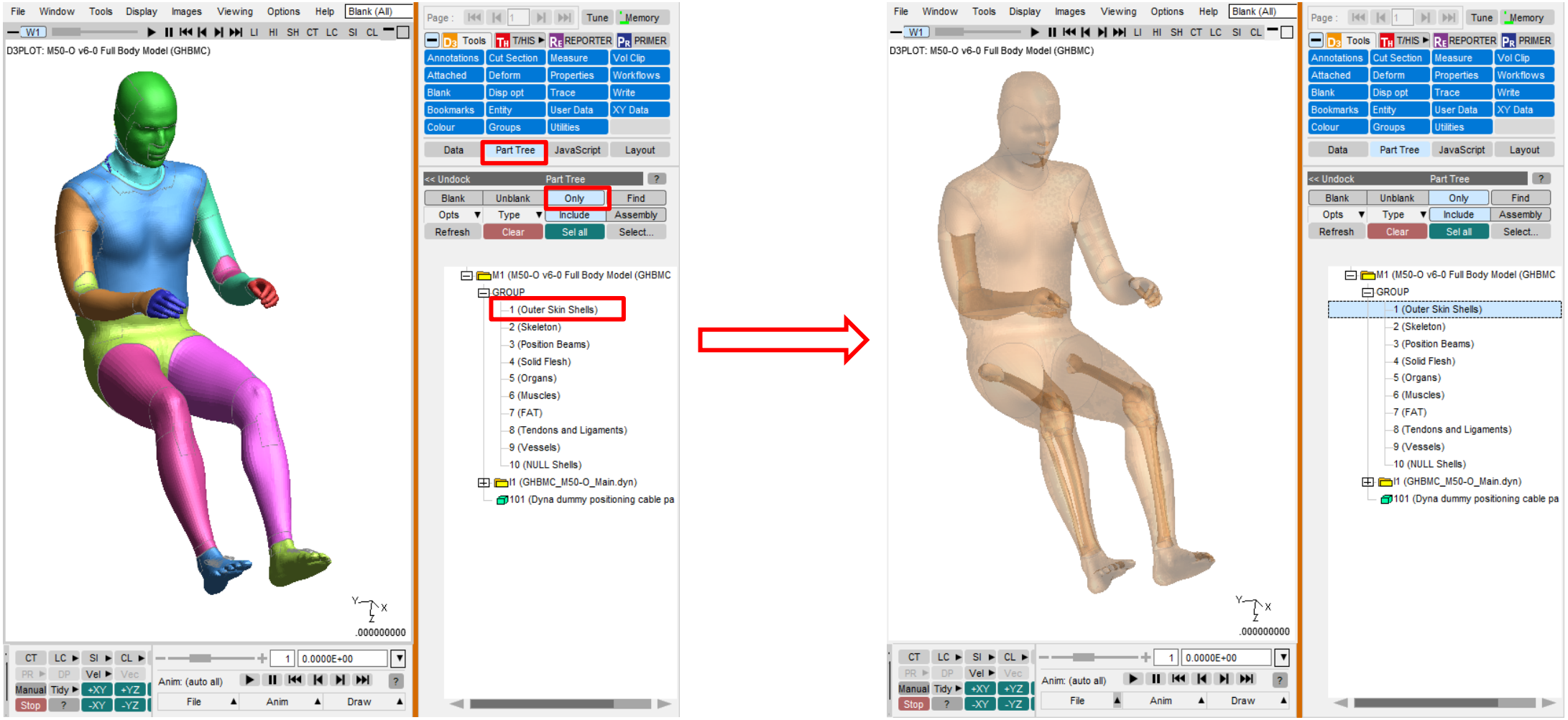


HBM Visualisation with Groups → Only

As .grp file stores the visual attributes of Groups, it is now possible to restore them, when performed an **Only** operation on Groups, either from the **Part Tree** or from the **Groups menu**.



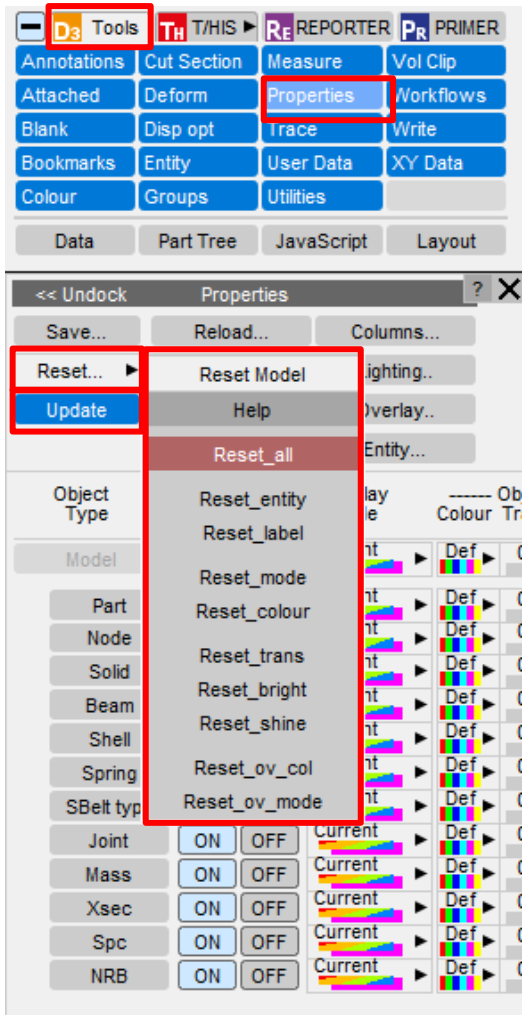
HBM Visualisation with Part Tree → Groups → Only



Reset the visual properties

To revert the visual attributes of the HBM model to the original state:

- Select **Tools** → **Properties** → **Reset**.
- In the Reset Model menu:
  - The **Reset_all** option resets the properties of the entire model.
  - You can also reset any particular property (colour, transparency etc.) from the list.
- The change in model visual properties takes effect only after you press the **Update** button.



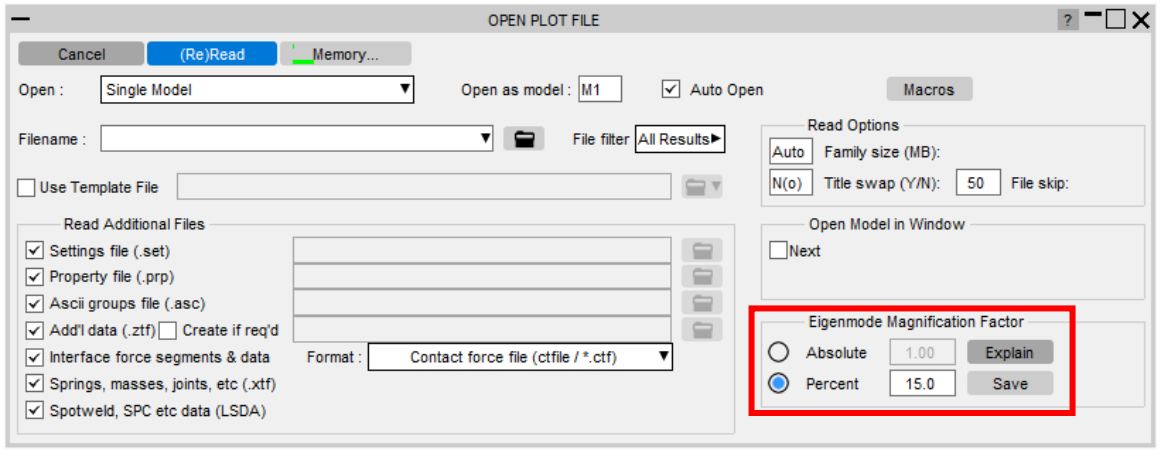
Eigenmode Magnification Factor

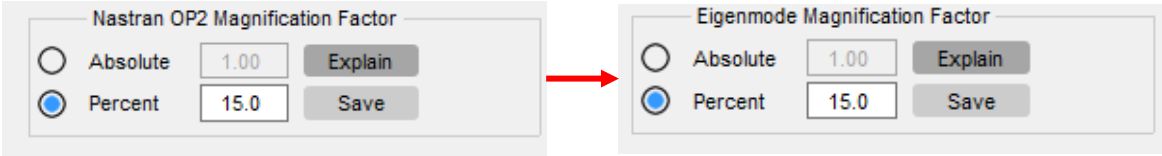
Initial Magnification for Frequency Response Functions

Previously, the NASTRAN OP2 Magnification Factor applied to frequency domain analysis results was only available for NASTRAN and OptiStruct .op2 files.

In D3PLOT 21, a common Eigenmode Magnification Factor can now be applied to LS-DYNA frequency domain analysis (d3eigv) as well as to .op2 files.

This standardisation makes it easier to compare mode shapes from different solvers. Some new preferences allow you to control the default behaviour.





Before

After

REPORTER Variables

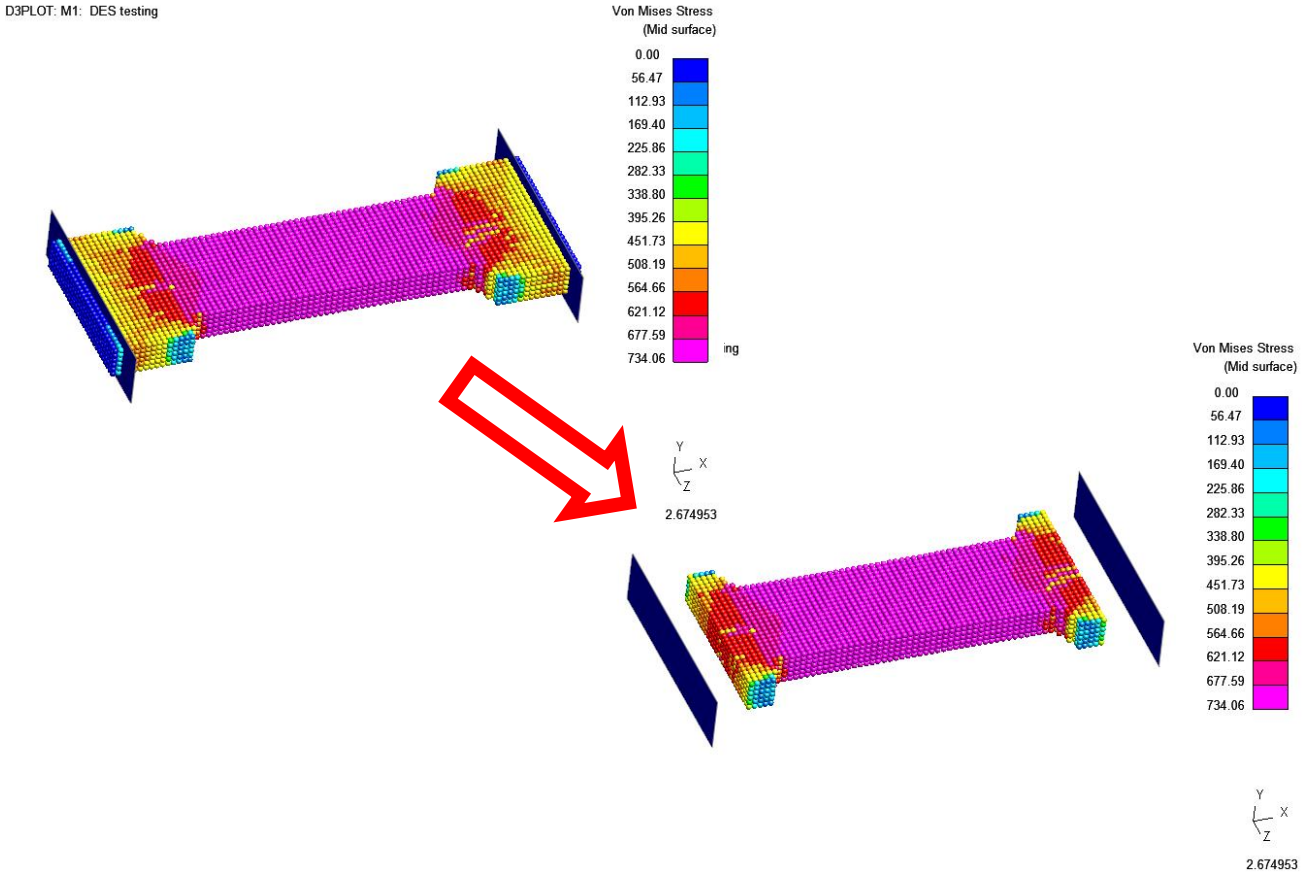
Default names for REPORTER variables

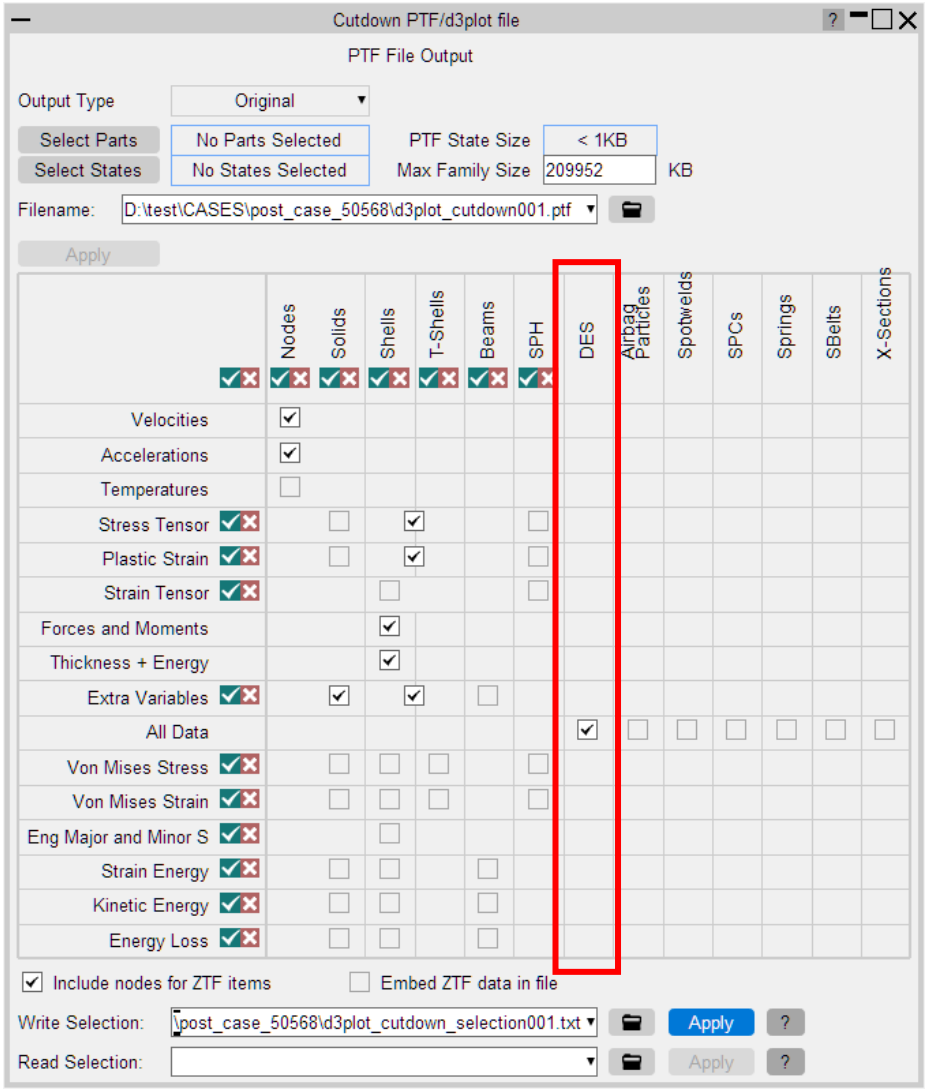
- Before Oasys 21, REPORTER default variable names were prefixed with ITEM_*n*, where *n* was the number of the item on the page in the D3PLOT item tree. Because items in the D3PLOT item tree are numbered from 1 on each page, it was common to have the same prefix for default variable names on multiple pages and therefore to have identical default variable names for items on multiple pages, resulting in variables being overwritten in REPORTER.
- In Oasys 21, default variable names are prefixed with the REPORTER item name, which defaults to a format like “d3plot6”, “d3plot6_1” for D3PLOT items. Since item names in REPORTER are unique, this ensures default variable names generated in D3PLOT are also unique.

PTF Compress

PTF Compress

- In D3PLOT 21, the PTF Compress utility has been updated to support DES elements

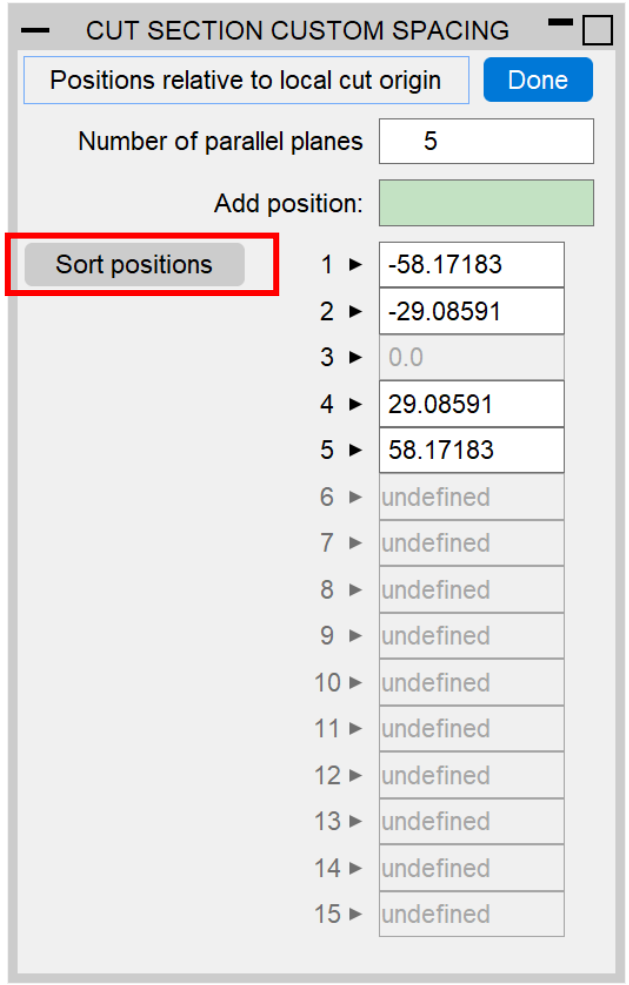




Cut Sections

Sorting custom spacing positions

- In D3PLOT 20, cut section custom spacing positions were sorted immediately after editing. Some users found this unintuitive when editing several positions in a row.
- In D3PLOT 21, positions will remain where they are after editing even if they are then no longer in ascending order.
- In D3PLOT 21 there is a new button to sort the positions into ascending order.

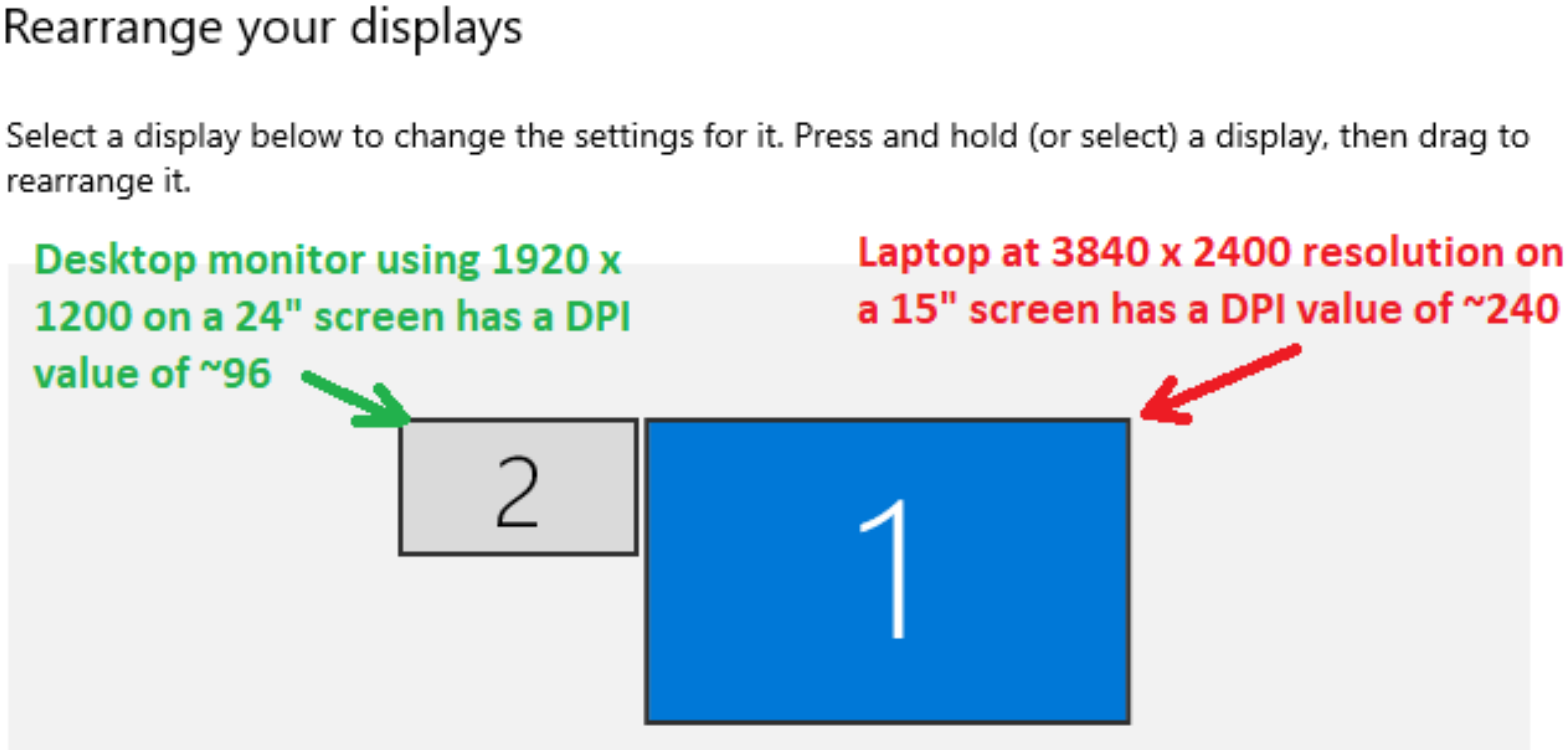


Per-Monitor DPI Awareness

(Windows platforms only)

Per-Monitor DPI Awareness

Windows 10 allows monitors of different resolutions to be used on a single desktop. For example, when a high-resolution laptop is attached to a lower-resolution monitor, you will see something like this in Windows “Display Settings”:



Per-Monitor DPI Awareness

When the monitors have very different Dots Per Inch (DPI) values, windows will look either “too big” or “too small” when moved to a different monitor unless the application adjusts its fonts and other scaling. This was a problem with Oasys Ltd software before Oasys Suite 21.0.

From Oasys Suite 21.0 onwards, Oasys Ltd applications will detect when they are moved to a different monitor and will resize themselves and their contents to fit correctly. Specifically:

- The master application window will resize
- Fonts will resize
- Line widths and spacing in the user interface will resize

The appearance may not be identical, since fonts scale in integer steps of point size, but it should be close. Bear in mind that images are captured at the resolution of the monitor so consider this when creating images.

Results Data

ICFD Surface and CESE Mechanical Solid Surface Part Names

- Part names can be specified for ICFD surface parts in the Heading field of *ICFD_PART_TITLE
- Part names can be specified for CESE mechanical solid surface parts in the SurfaceLabel field on *CESE_SURFACE_MECHSSID_D3PLOT
- The part names above are written to the results files and read by D3PLOT so these parts display the names in object menus, predictive pick and the part tree

Integrated and Resultant Beam Components

- Integrated and resultant beam elements use the same extra data slots for integrated and resultant beam components
- If a model contains a mix of integrated and resultant beam elements all elements would be contoured with a selected resultant or integrated beam component
- Now, D3PLOT will use section data from the ZTF file to identify whether a beam element is integrated or resultant type and will not plot invalid components on beam elements, i.e. a resultant beam component will not be plotted on an integrated beam element
- This can be switched in Display Options → Beam Symbols → Ignore Beam Type or using preference d3plot*ignore_beam_type: ON/OFF

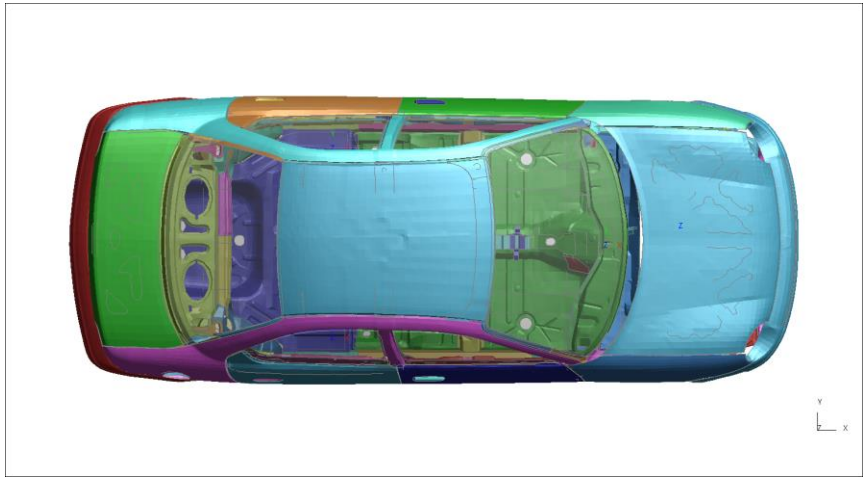
Changes to User Interface

Initial View

You can now control the initial view when D3PLOT opens. By default, D3PLOT opens with a plan view, +XY. If you wanted to change this to an elevation +XZ, for example, you can now change the default by setting the preference:

d3plot*initial_view_orientation: +XZ

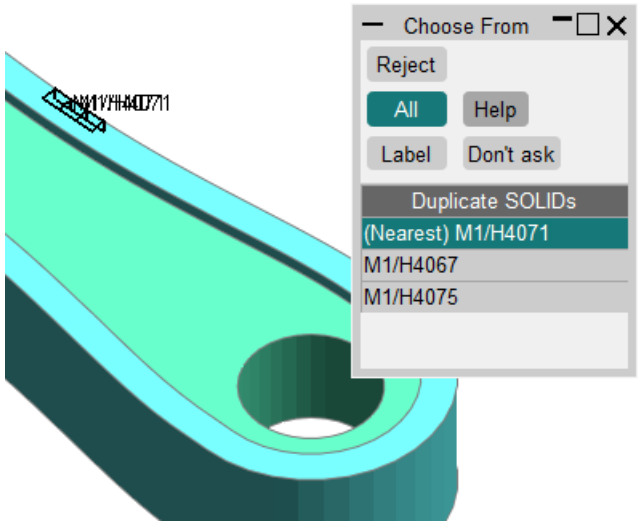
Default +XY view



+XZ view set via preference

Ambiguous Pick Behaviour

- When enabled, the ambiguous pick menu is displayed if multiple entities are close to the clicked location
- From D3PLOT 21, this is switched off by default, apart from for plies
- The menu can be switched on with preference d3plot*query_ambiguous or via Options → Pick & Select opts → Ambiguous pick menu

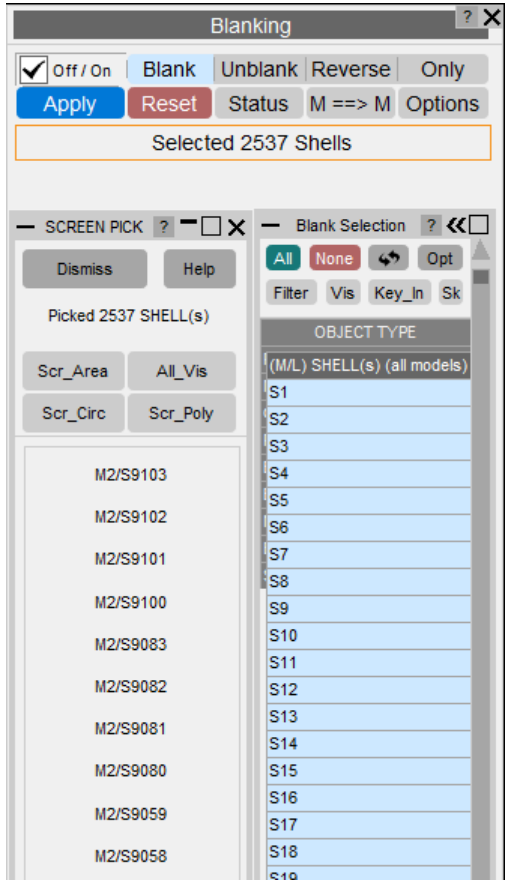


Object Menu Expansion Behaviour

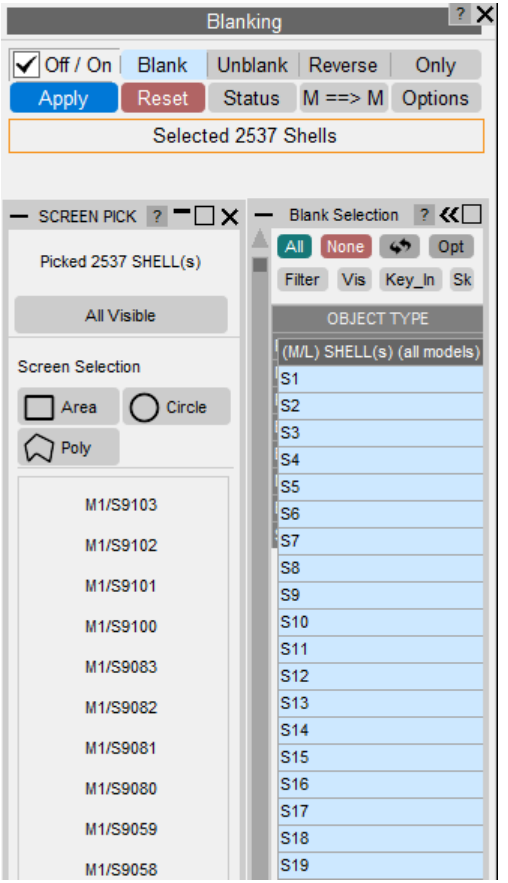
- In previous versions, object menus were set to auto-undock by default. This behaviour has been modified
- From D3PLOT 21, expansion and undocking are turned OFF by default
- This behaviour can be controlled using the preference d3plot*menu_expand or via Options → Expand menus

Screen Pick / Vis menu

- When entities are screen-picked, the Screen Pick menu is auto-populated and gives you further information on the entities picked. This menu also includes options to refine picking and can be explicitly invoked by clicking **Vis** in any object menu.
- The **Vis** (screen pick) menu has been redesigned to make various options more accessible and intuitive. Buttons have been reorganised, icons introduced, and hover text added.



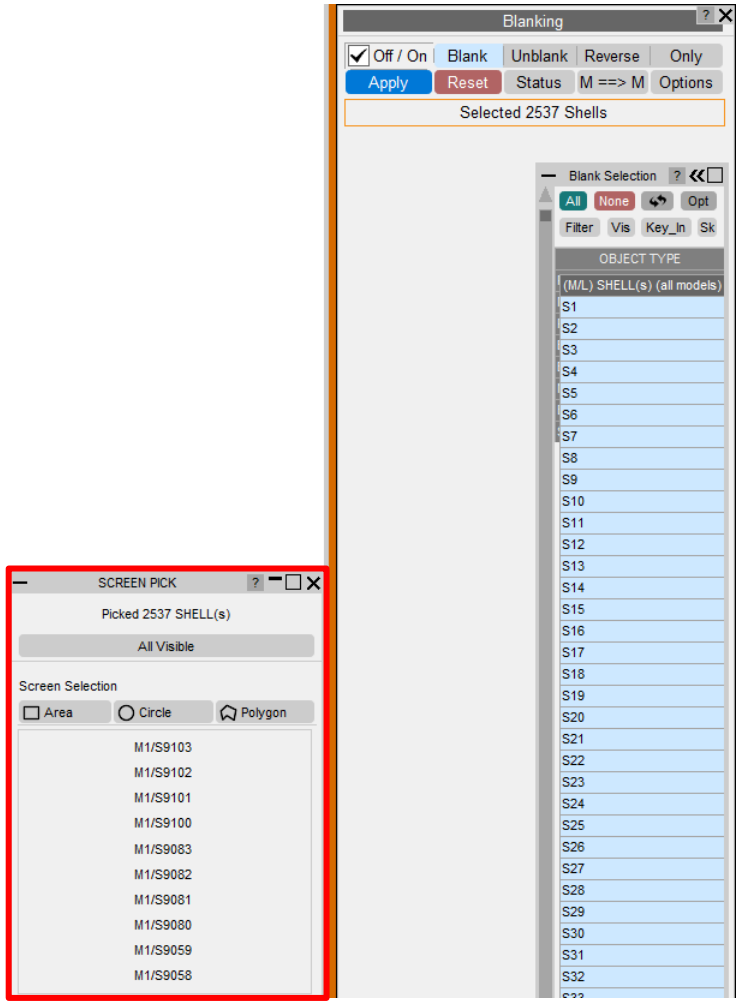
v20



v21

Screen Pick / Vis menu

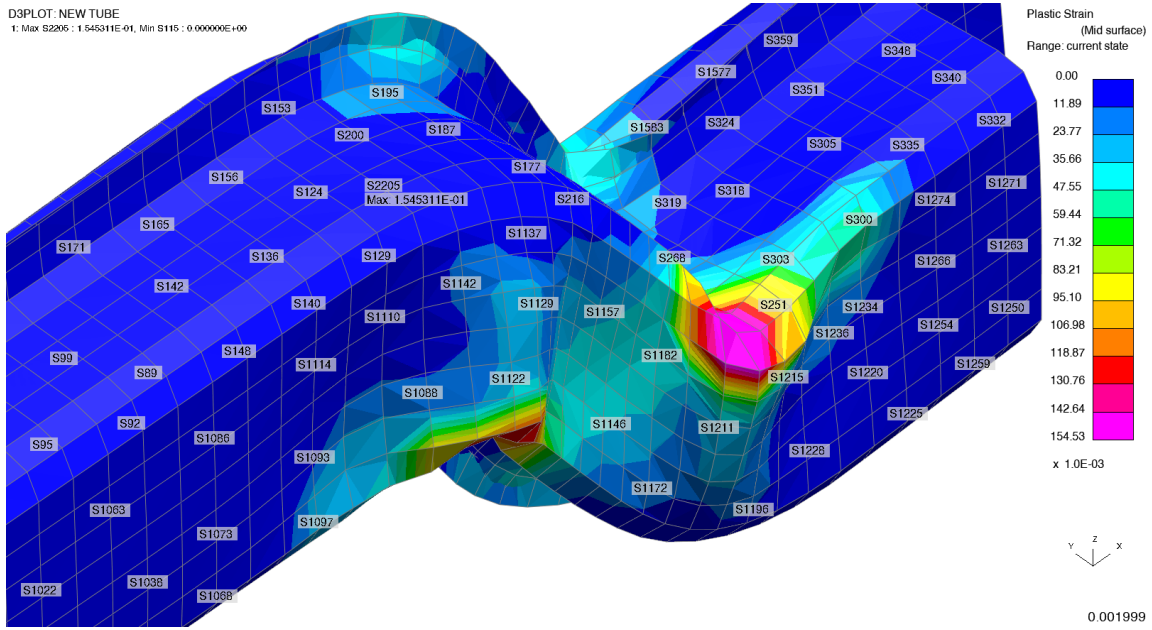
- By default, the updated Screen Pick menu is displayed as a docked menu as it was in previous versions but can optionally be made a floating menu by setting the preference d3plot*vis_menu_position and giving it the value "FLOATING“.

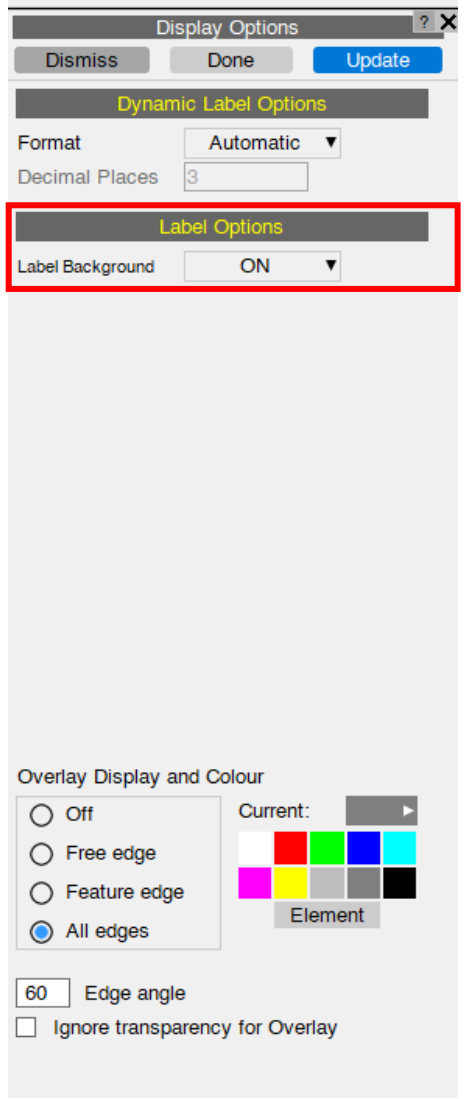


Floating Vis menu

Label Background

- Labels now have a background to increase the legibility of the text.
- The background can be turned off in Display Options → Label Options → Label Background or by setting the preference `d3plot*label_background`
- We will continue to improve legibility of text and labels in future versions; please contact us with your feedback.

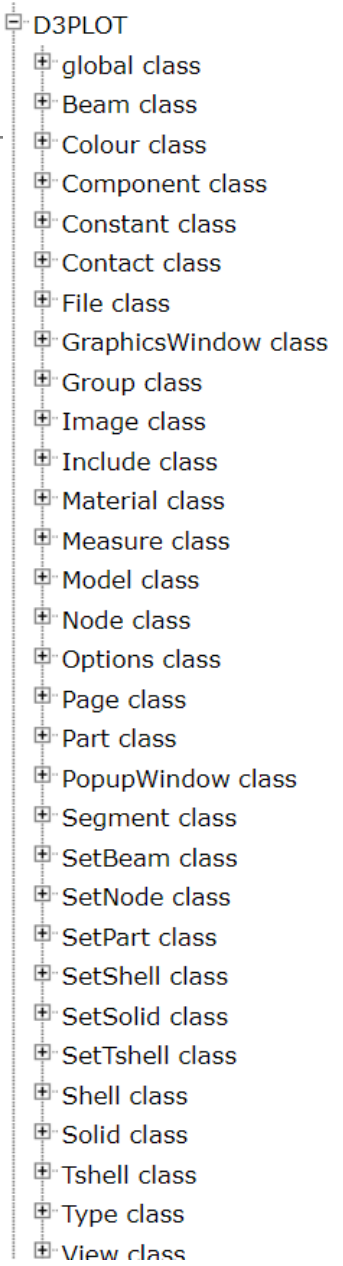




JavaScript API

JavaScript API: New Object Oriented API

- In version 21 there is a new Object Oriented API.
- Lots of classes have been added, with methods and properties, consistent with the other programs (PRIMER, T/HIS and REPORTER).
- It offers new capabilities and also replaces some of the old functions.
- The old functions are deprecated, but still working.



JavaScript API: New Object Oriented API

- In version 21.1 the following has been added to the Part class:
  - A .composite property which returns true if the Part is a *PART_COMPOSITE
  - A .nip property to get the number of integration points in a *PART_COMPOSITE
  - A .GetCompositeData() method to get the Material ID and Thickness at a specified integration point in a *PART_COMPOSITE

JavaScript API: Behaviour of scripts using windows

- The way that scripts that use windows/GUIs are run has changed in version 21.
- All programs that have a graphical user interface (GUI) use an “event loop” to process any mouse/keyboard events.
  D3PLOT has a main “event loop” to process all of the program’s events.
- In version 20 and before, if a script created and showed a window, D3PLOT would start a new “event loop” to manage and process that JavaScript window.
- The script would not return from the window Show() call until the window was hidden/closed.
  i.e. showing the window would “block” execution of the script until the window was closed.
- When the window is closed, the script continues.
- When execution reaches the end of the script, the script is terminated.

JavaScript API: Behaviour of scripts using windows

- For example, in version 20 and earlier, in the following script, “Hello, world!” will not be printed until the window is closed because the call to w.Show() will not return until the window is closed.

```
// Create a window with a widget
var w = new Window("Test", 0.5, 0.6, 0.5, 0.6);
var l = new Widget(w, Widget.LABEL, 0, 50, 0, 6, "Press X to close the window");

// Show the window and start event loop
w.Show();

// Print message
Message("Hello, world!");
```

- When the window is closed the message is printed and the script will then terminate as execution has reached the end of the script.

JavaScript API: Behaviour of scripts using windows

- In version 21 the behaviour has changed.
- If a script creates and shows a window, D3PLOT will ***not*** start a new “event loop” to manage and process that JavaScript window.
- The window will now be processed from the main “event loop” in D3PLOT.
- The script now returns from the window Show() as soon as the window is shown, and execution of the script continues.
  i.e. showing the window no longer “blocks” execution of the script until the window is closed.
- When execution reaches the end of the script, the script is ***not*** terminated.
- The script continues running “in the background” as the script has shown a window.

JavaScript API: Behaviour of scripts using windows

- For example, in version 21, in the following script “Hello, world!” will be printed immediately after the window is shown, because the call to w.Show() returns after the window is shown.

```
// Create a window with a widget
var w = new Window("Test", 0.5, 0.6, 0.5, 0.6);
var l = new Widget(w, Widget.LABEL, 0, 50, 0, 6, "Press X to close the window");

// Show the window
w.Show();

// Print message
Message("Hello, world!");
```

- When the message is printed, the script will ***not*** terminate when execution reaches the end of the script. The script will continue to run “in the background”

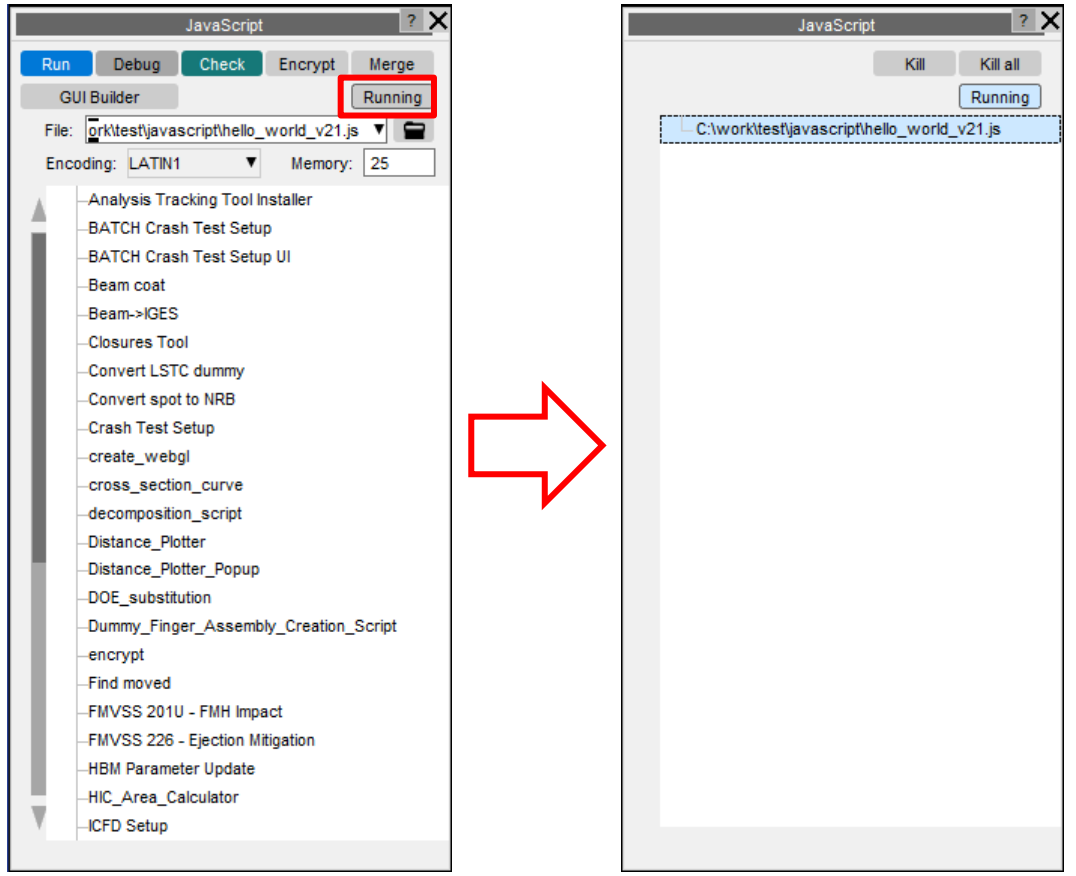
JavaScript API: Behaviour of scripts using windows

- If a script that shows windows continues running “in the background”, and does not terminate when execution reaches the end of the script, how/when does the script terminate?
- A script that uses windows ***must*** now call `Exit` to terminate the script.

```
// Create a window with a widget
var w = new Window("Test", 0.5, 0.6, 0.5, 0.6);
var l = new Widget(w, Widget.LABEL, 0, 50, 0, 6, "Press X to close the window");

// Exit when window closed
w.onClose = Exit;

// Show the window
w.Show();

// Print message
Message("Hello, world!");
```

JavaScript API: Behaviour of scripts using windows

- To find what scripts are currently running there is a new “Running” tool in the JavaScript window.
- Any scripts that are currently running will be shown and can be terminated if required.



JavaScript API

New methods added to the Workflow class:

- WriteToFile() – writes a workflow to a JSON file
- WorkflowDefinitionFilename() – returns the workflow definition filename
- Refresh() – scans for fresh workflow data
- ModelUserDataProgramFromIndex() – returns the name of the program that the user data was written from
- ModelUserDataVersionFromIndex() – returns the version of the program that the user data was written from
- ModelUserDataBuildFromIndex() – returns the build number of the program that the user data was written from

JavaScript API

An extra optional argument has been added to Workflow.WorkflowDefinitionFilename()

- If defined it returns the filename of the workflow definition filename for the specified window
- If not defined it returns the workflow definition filename for the workflow selected by the user in the workflows menu

An extra optional argument has been added to Workflow.NumberOfSelectedModels()

- If defined it returns the number of models that have data for the specified workflow (out of the models that were selected by the user in the workflows menu).
- If not defined it works as before where it returns the number of models that were selected by the user in the workflows menu.

JavaScript API

An extra optional argument has been added to Workflow.ModelIdFromIndex()

- If defined it looks through the list of models that have data for the named workflow out of the models selected by the user and returns the model id of the model at the specified index in the list
- If not defined it works as before where it returns the model id of the model at the specified index in the list of models that were selected by the user

An extra optional argument has been added to Workflow.ModelUnitSystemFromIndex()

- If defined it looks through the list of models that have data for the named workflow out of the models selected by the user and returns the unit system of the model at the specified index in the list
- If not defined it works as before where it returns the unit system of the model at the specified index in the list of models that were selected by the user

JavaScript API

- An onHide event has been added to the Window class
- New method Build() added in Utils class to return D3PLOT build number

Preferences

New Preferences

Preference	Description
d3plot*initial_view_orientation oasys*initial_view_orientation	Sets the initial view of the graphics window in which D3PLOT opens (Individual program preference takes precedence)
Oasys*workflow_user_data_directory	Name of a folder to search in for workflow user data
Oasys*workflow_max_upward_folder_search_depth	Maximum number of folders to search up to look for workflow user data
d3plot*annotation_desc_size	Sets the font size of the Annotation panel title and description
d3plot*thread_cut_section	Whether or not to use threading for cut section calculations
d3plot*triad_mode	Controls the display mode for Element and Material Triad Symbols. Can be set to : TRIAD+LABELS, COLOURED_TRIAD, X-AXS_ONLY, Y-AXS_ONLY, Z-AXS_ONLY
d3plot*triad_size	Display triads using either a FIXED size or an AUTOMATIC size
d3plot*triad_fixed_size	Size used for FIXED size triads
d3plot*triad_line_width	Line width in pixels used for drawing triads
d3plot*triad_x_axis_colour/triad_y_axis_colour/triad_z_axis_colour	Colour of X, Y, and Z axis when “triad_mode” is set to “COLOURED_TRIAD”

New Preferences

Preference	Description
d3plot*ignore_beam_type	The ignore_beam_type switch controls whether D3PLOT uses ZTF data (if available) to plot integrated/resultant beam components only on integrated/resultant beam elements. By default this is done (switch is OFF) but this can be changed by setting preference to ON.
d3plot*eigmode_disp_factor_type	Method for scaling Nastran and d3eigv displacements
d3plot*eigmode_abs_disp_factor	Absolute displacement scale factor
d3plot*eigmode_pct_disp_factor	Percentage displacement scale factor
oasys*workflow_only_use_specified_directory	Only scan location set by preference oasys*workflow_definitions_directory for Workflow definitions (if it is set)
d3plot*label_background	Label background display
d3plot*vis_menu_position	Mapping mode - FLOATING or DOCKED - for the Screen Pick menu
d3plot*contour_range_label	Contour range label switch
d3plot*show_qpick_stack_warning	Display Quick Pick memory stack size warning and option to clear stack if threshold is hit

New Preferences

Preference	Description
d3plot*thread_propagation	Whether or not to use threading for flag propagation

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