Oasys
REPORTER

REPORTER 21.1

REPORTER 21.1 – Contents

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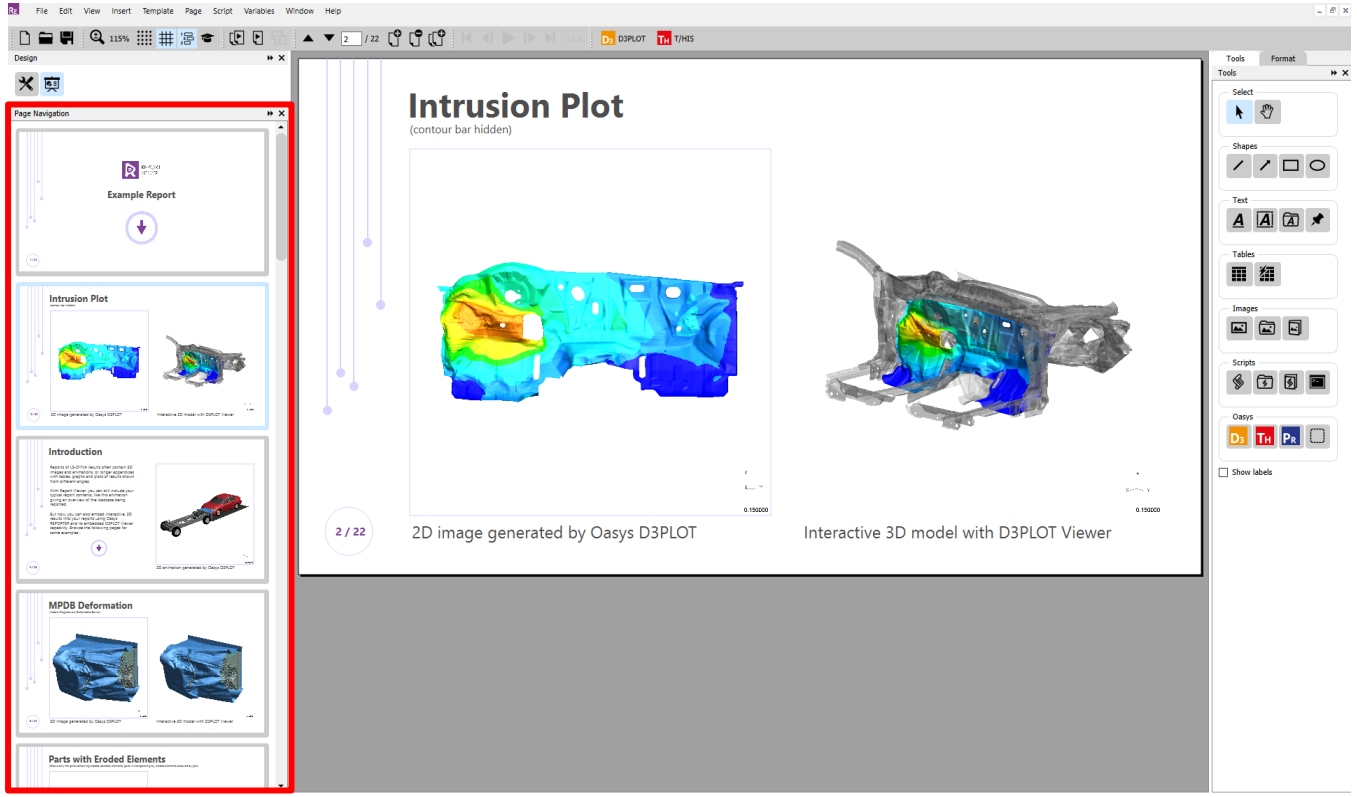
Page Navigation

Page Navigation

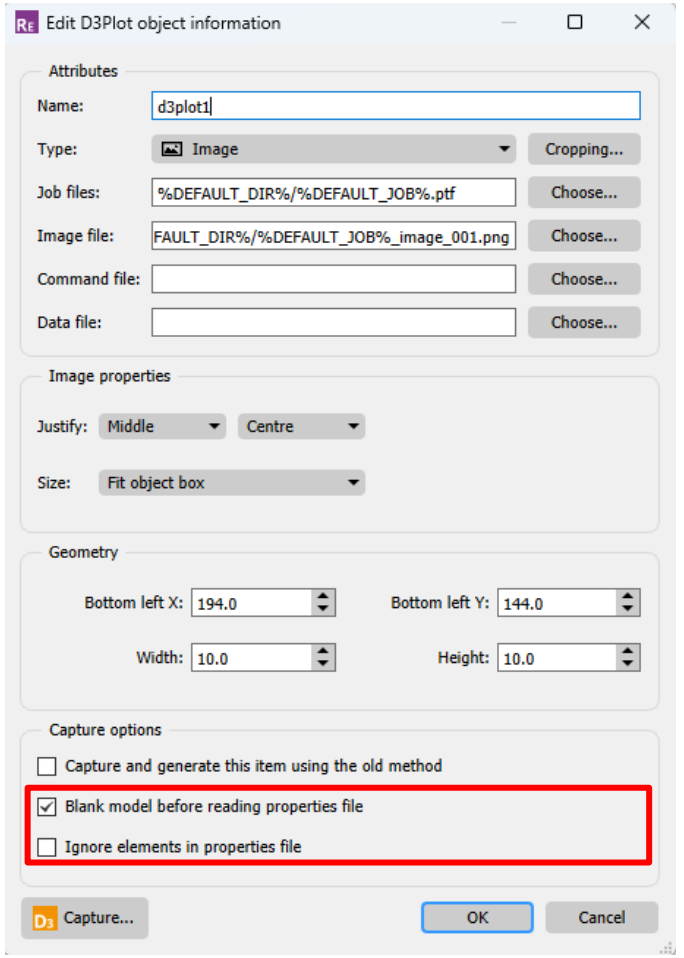
- REPORTER now has a Page Navigation bar to help you easily navigate your report.
- This bar also allows you to carry out the following actions by interacting with the page thumbnails:
  - Drag-and-drop to re-order pages.
  - Right click to insert page after/before, delete a page, and duplicate a page.



Blanking in D3PLOT Items

Blanking in D3PLOT Items

- D3PLOT items in REPORTER now have two extra options to help provide consistency in captures:
    1. Blank the D3PLOT model before reading the properties file.
    2. Ignore elements when reading the properties file.
- These options are particularly useful when you want consistent captures even if parts/elements are added or re-numbered in the model when you reload the capture or generate the item.
- These options will be saved to the report or template which will ensure consistent captures when it is shared with users that have different preferences set.



Blanking in D3PLOT Items

- The D3PLOT pre-blanking option will blank the whole model before the properties file is read, preventing any additional parts from showing up in the capture.

Original capture.

Capture **without** the pre-blanking option when the item is reloaded/generated with the model with additional car door parts.

Capture **with** the pre-blanking option when the item is reloaded/generated with the model with additional car door parts.

Python API

Python API

- The new Python API will allow you to do most things you can do from the JS API.
- Advantage: the Python scripts run outside the programs: from the same script it is possible to speak to PRIMER, D3PLOT, T/HIS and REPORTER, and to any other software that has a Python API. It also allows importing any Python module into the script.
- Install the Python modules:
  - https://pypi.org/project/Oasys.PRIMER/
  - https://pypi.org/project/Oasys.D3PLOT/
  - https://pypi.org/project/Oasys.THIS/
  - https://pypi.org/project/Oasys.REPORTER/
  - https://pypi.org/project/Oasys.gRPC/
- There is a comprehensive Python API documentation to help you start scripting.

Workflows

Workflows User Data

Automotive Assessments

Energy Check

Entities of Interest

Seismic Workflows

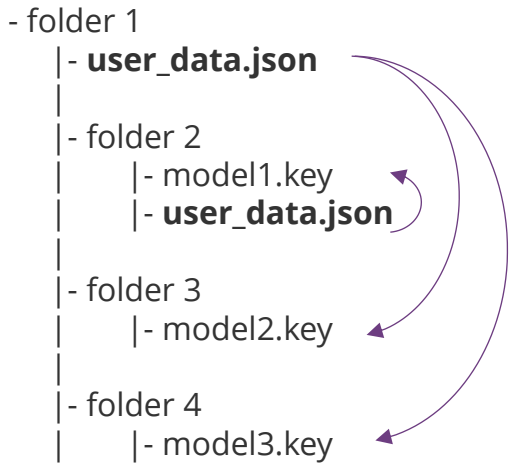
Defined and Undefined Workflows

Virtual Testing

Workflows User Data

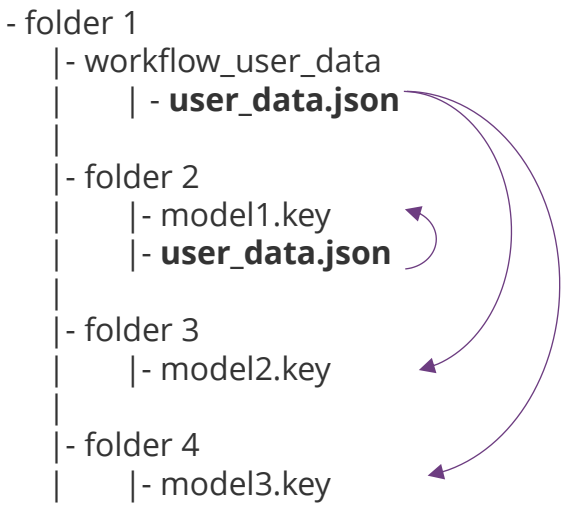
- We have made it easier for you to save Workflows user data to be re-used by multiple models and LS-DYNA runs.
- In Oasys 20, the JSON user data file written by a workflow tool had to be saved in the same folder as the model/results. This meant that if you had multiple variations of a model, you had 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

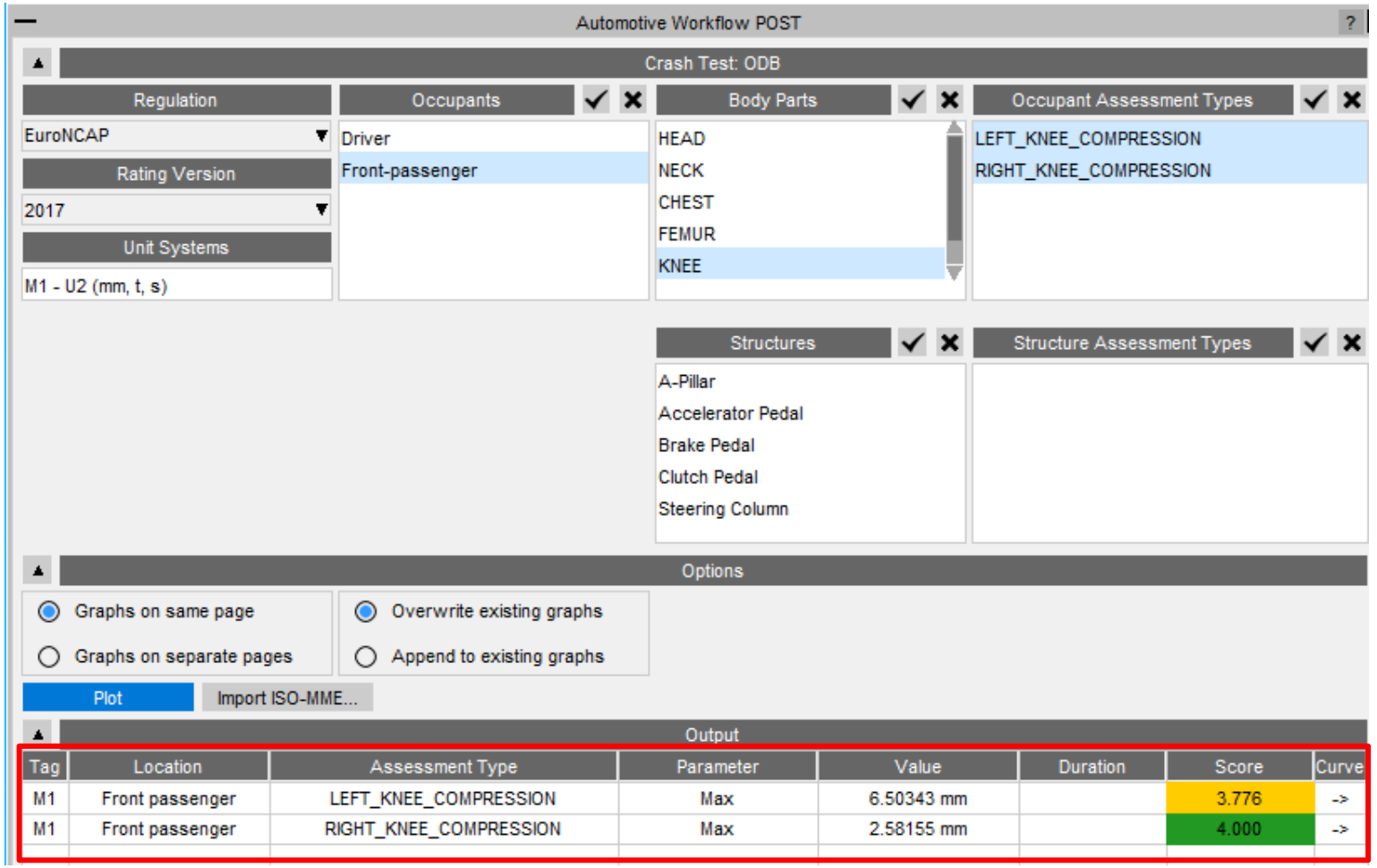
- The scan will also look for user data in a folder named '**workflow_user_data**' in the model folder and its parent folders.
- For example, in the folder structure below, the user_data.json file in **folder 1/workflow_user_data** will be used for the models in folder 3 and folder 4, and the user_data.json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

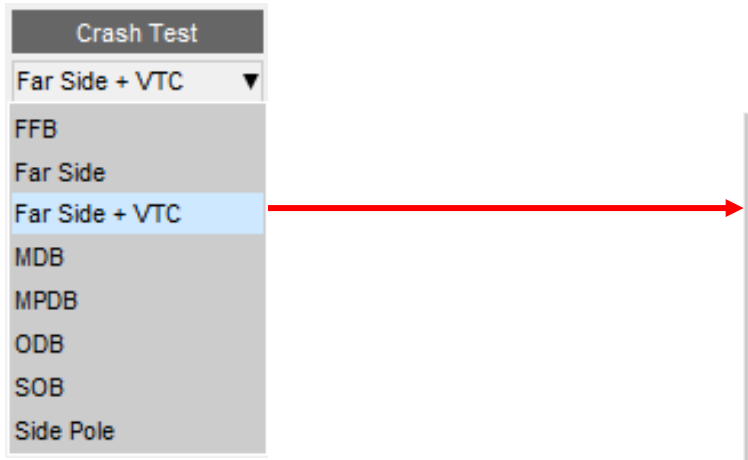
Automotive Assessments

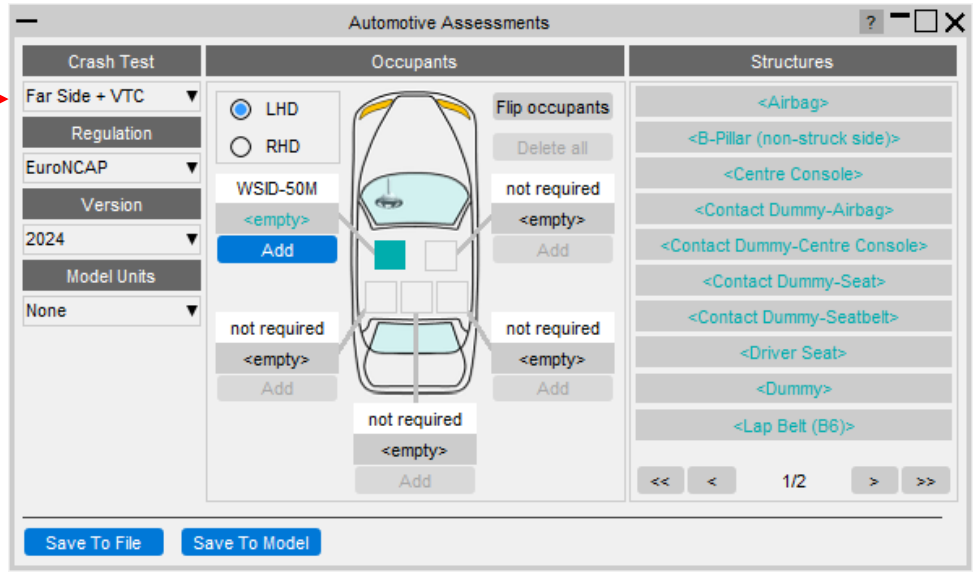
In Oasys 21 the assessment values and scores are now presented in a table making it easier to view the results



Far Side + VTC crash test

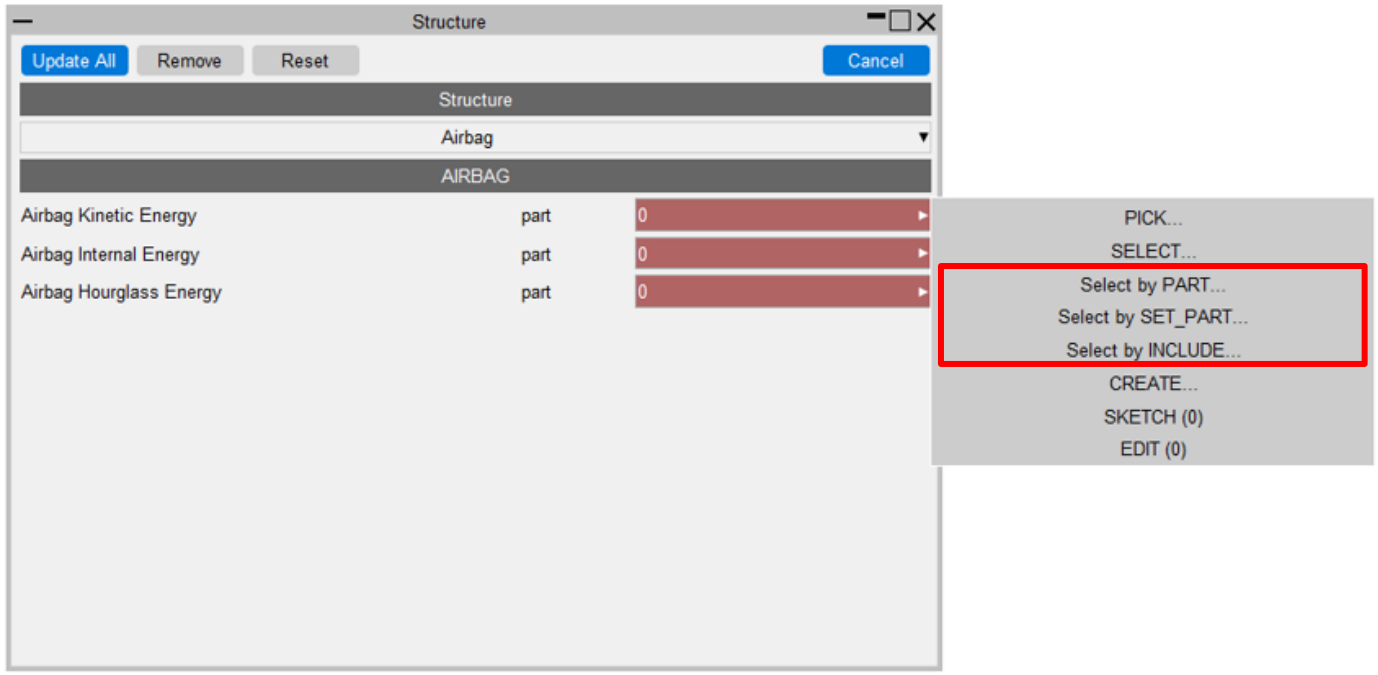
- New **Far Side + VTC** crash test has been added in the Automotive Assessments workflow to support Virtual Testing.
- Includes support for all 115 channels (Occupants + Structures) required for the Euro NCAP Virtual Far Side Simulation & Assessment Protocol





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.



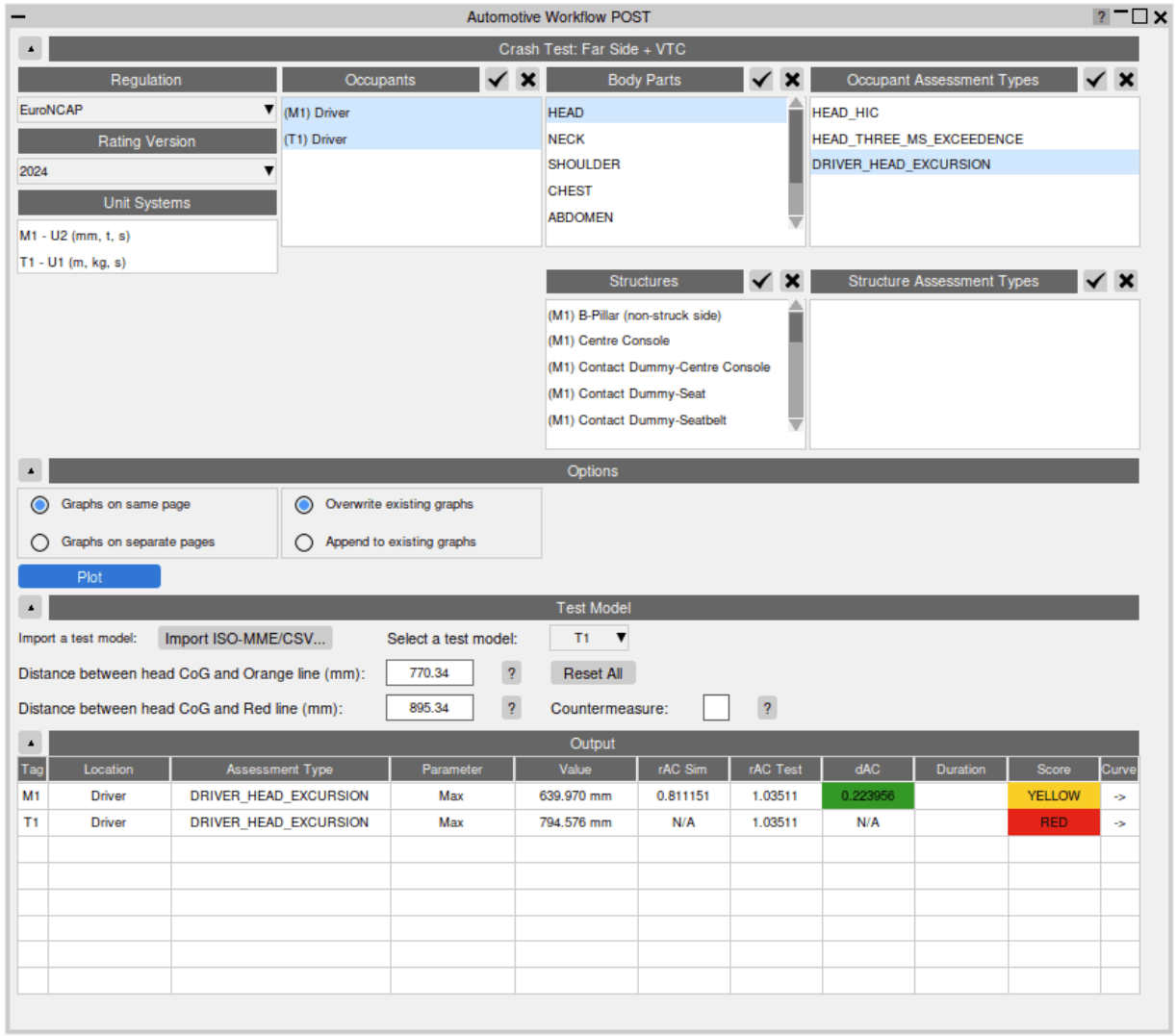
Updated support for different occupant versions

- 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 .



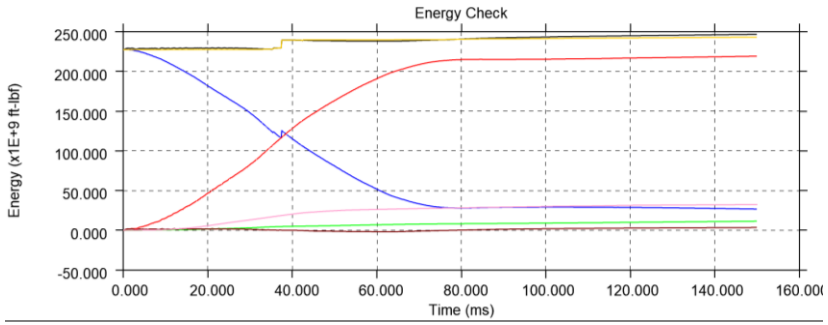
New Protocols

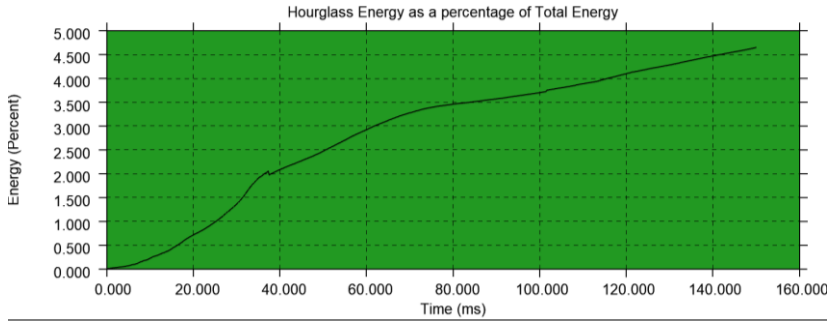
- In Oasys 21.1, the following new protocols have been added to the Automotive Assessments workflow. Each of these represents a different loadcase required as part of the C-NCAP Management Regulation (2024 Edition).

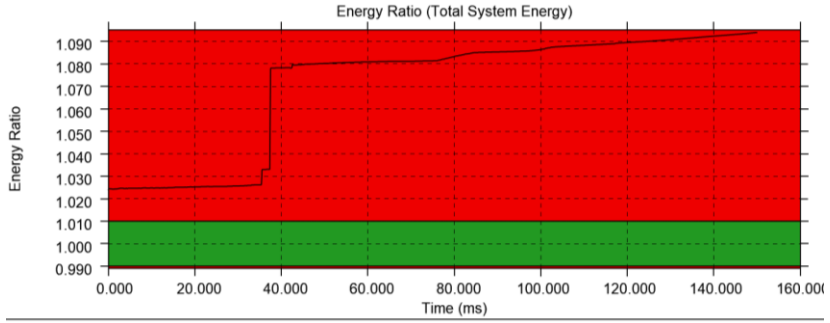
Crash Test	Regulation	Version	Description
Far Side + VTC	C-NCAP	2024 (SID2-SBLD)	• Front passenger side impact, assessing driver (Far Side Occupant) injury. • Injury scoring according to Chapter III section 1.2.1.5.3 of C-NCAP Management Regulation (2024 Edition) and Virtual Testing according to Appendix 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)	

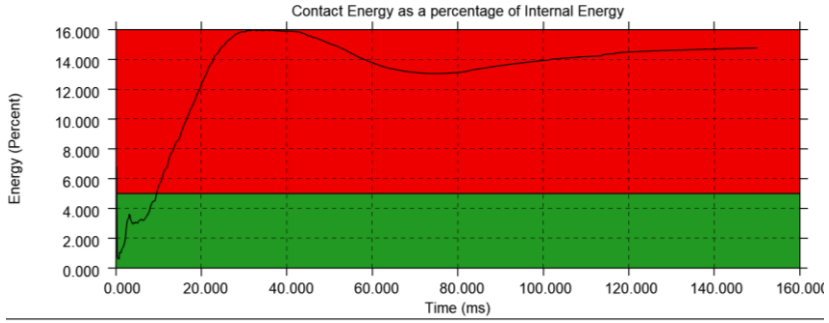
Energy Check

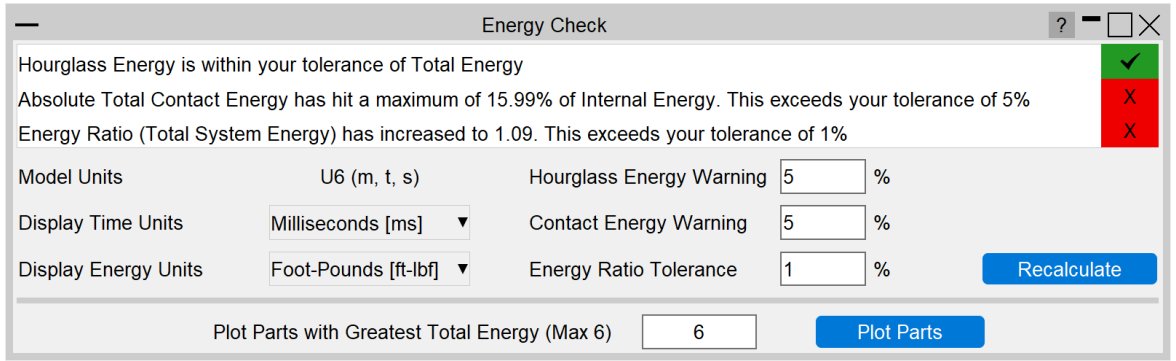
- Previously, the Energy Check tool simply plotted total, kinetic, internal and hourglass energy for your model. In Oasys 21, the tool now plots more energies, produces visual checks, and more.





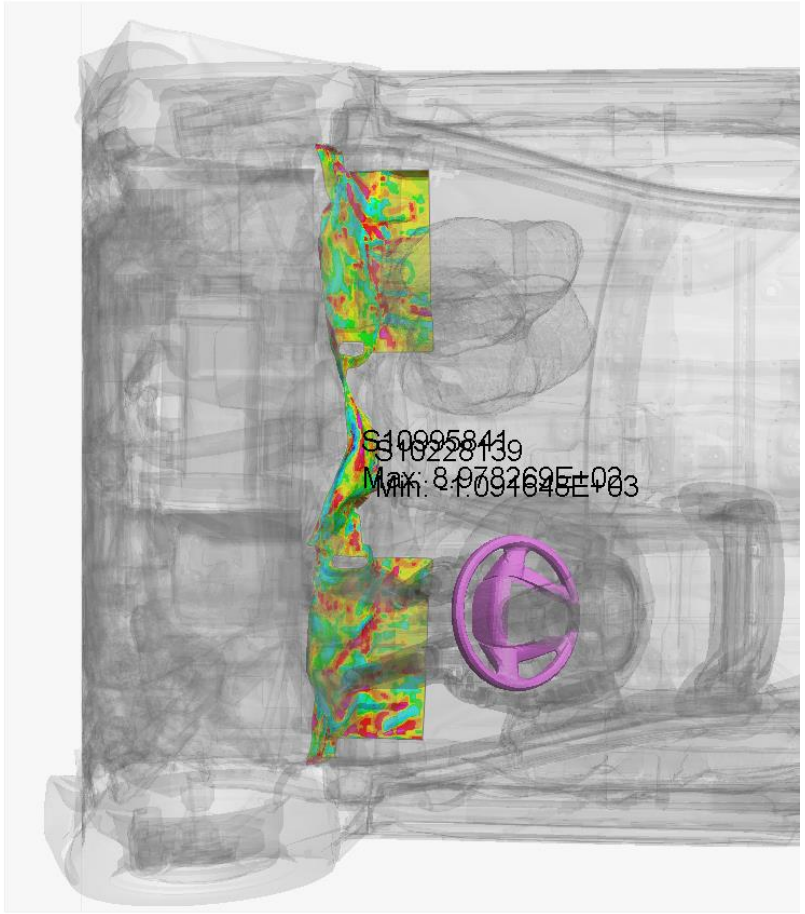


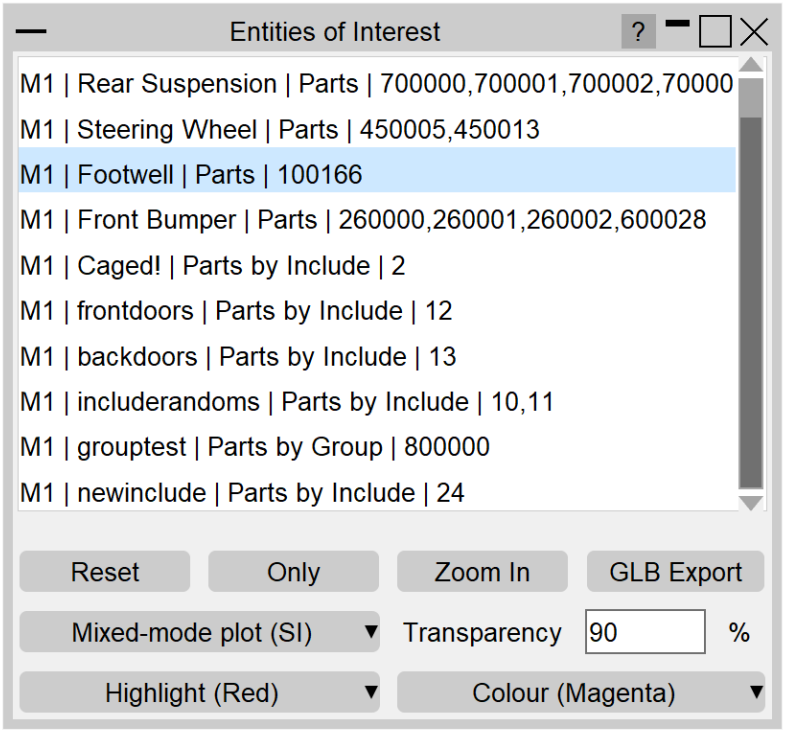




Entities of Interest

- 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

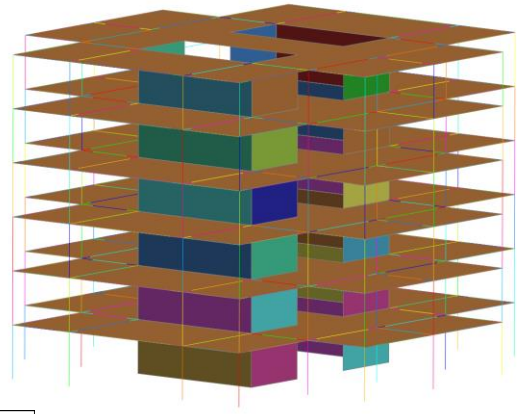
Seismic Workflows

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.

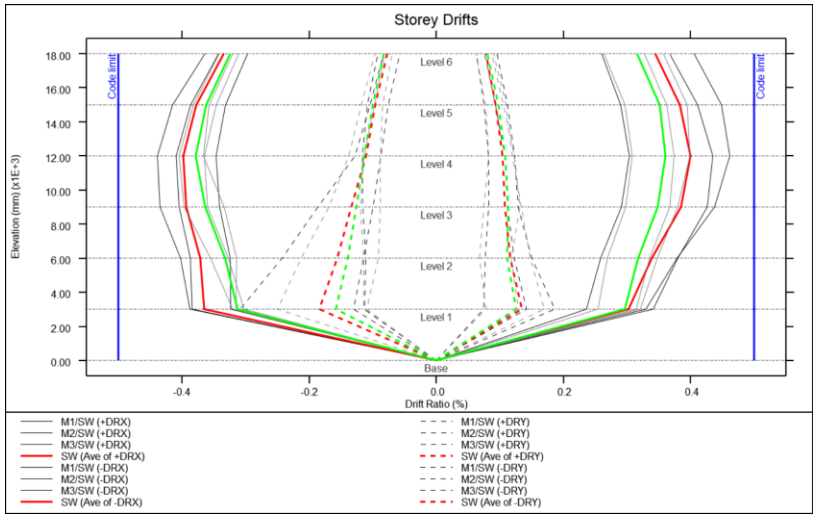
In T/HIS, storey drifts are plotted for each location defined.



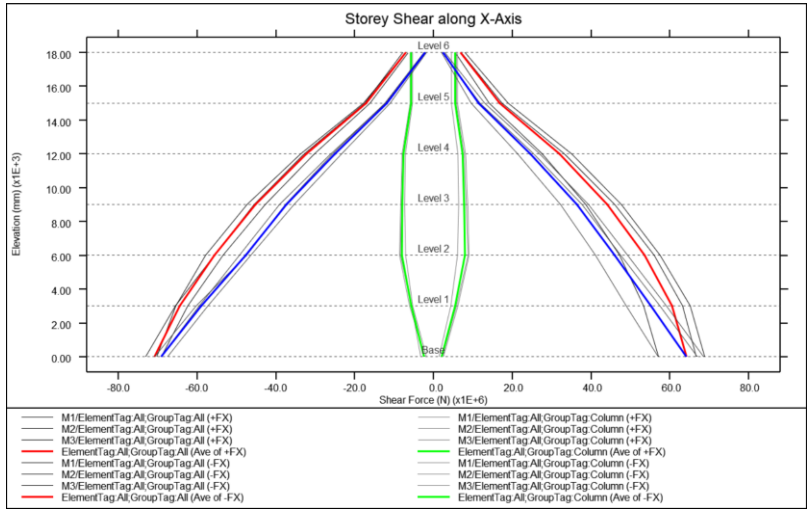
Storey Force

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.

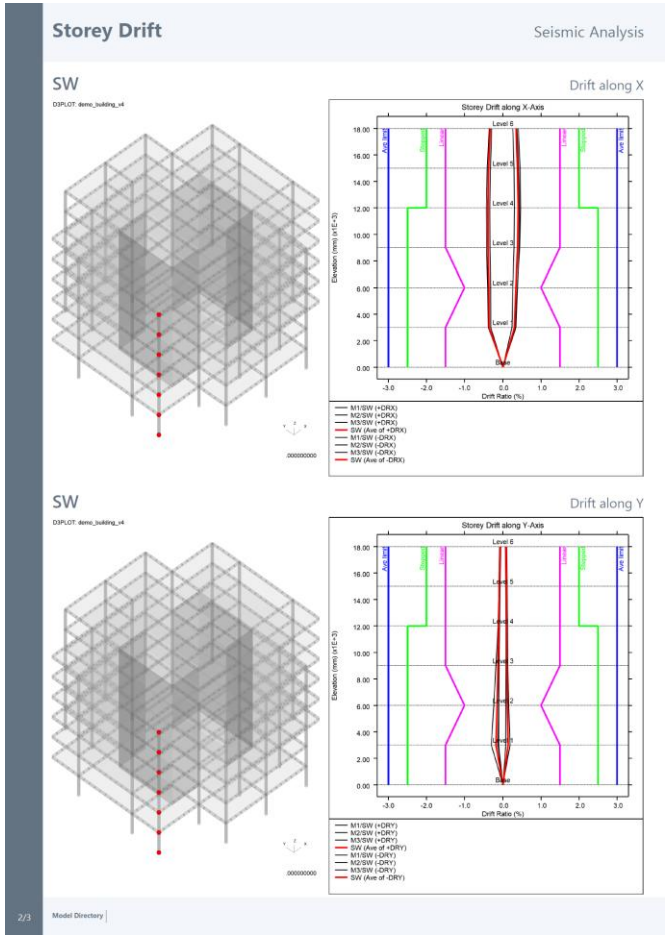


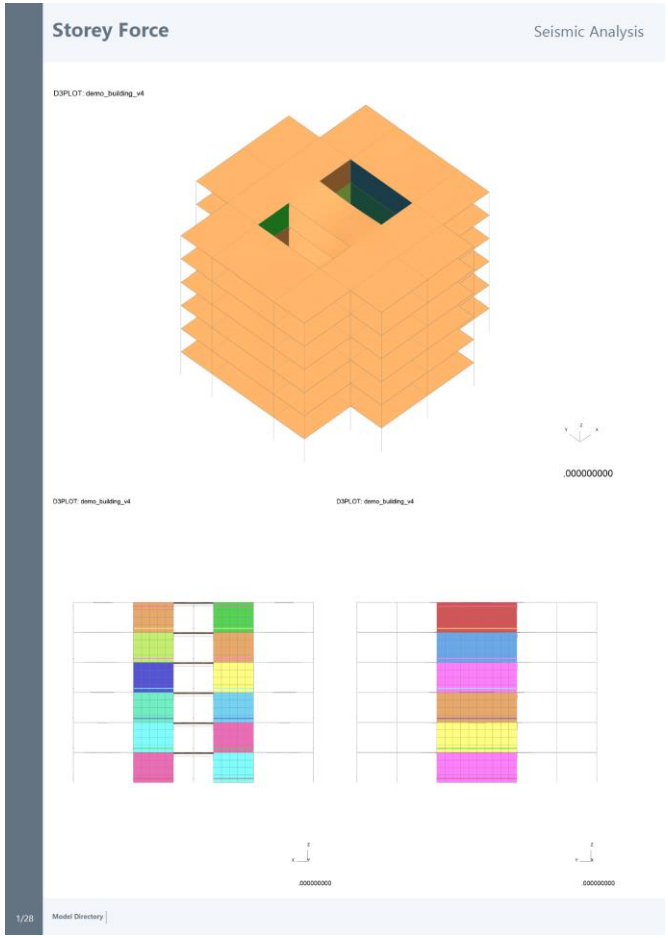
The Workflows can process a single model or a sweep of LS-DYNA runs for a set of ground motions.

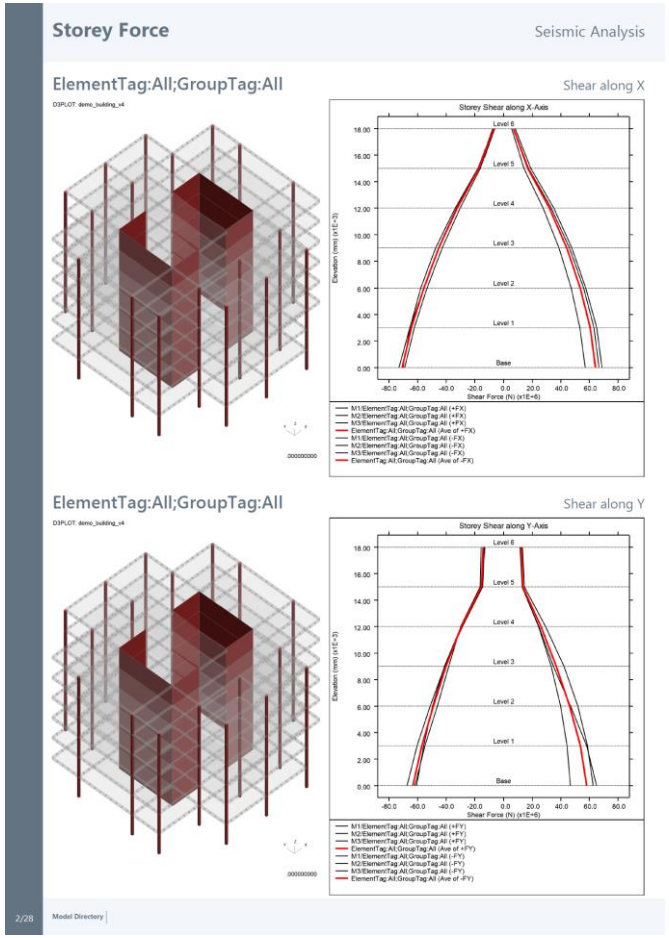


Seismic Workflows

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



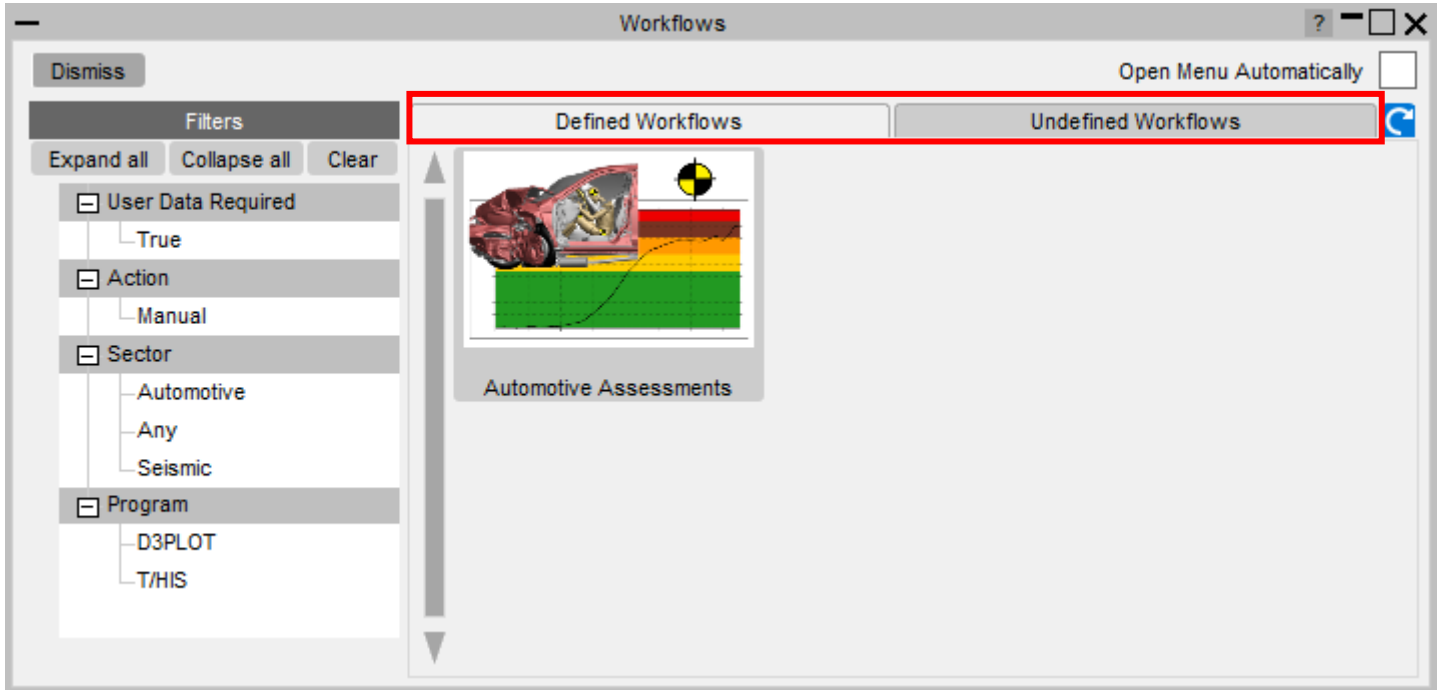




Defined and Undefined Workflows

The Workflows menu has been split into two tabs:

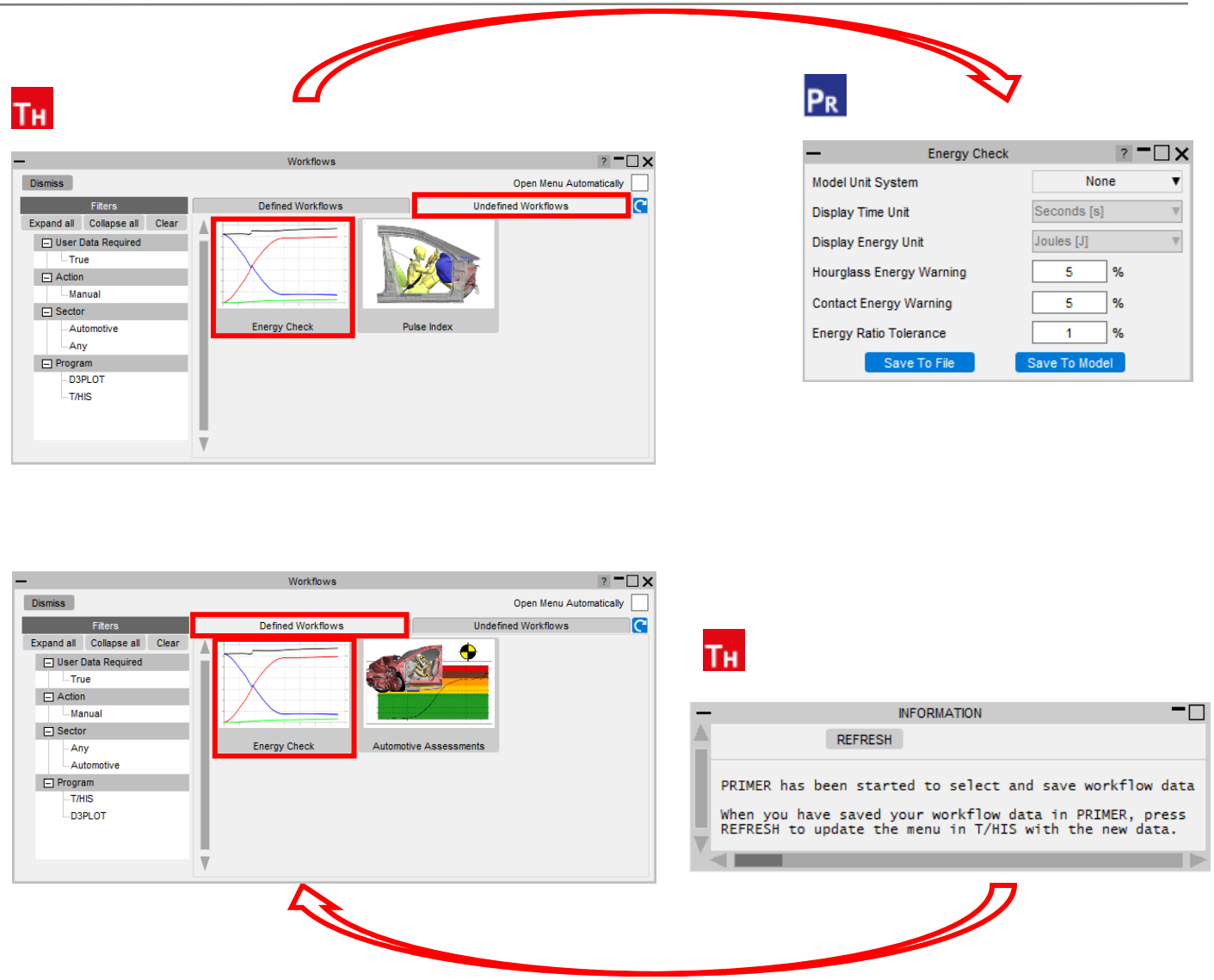
- **Defined Workflows** – shows workflows that can be run in T/HIS and have the required data
- **Undefined Workflows** – shows workflows that could be run in T/HIS, but don't have the require data



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.



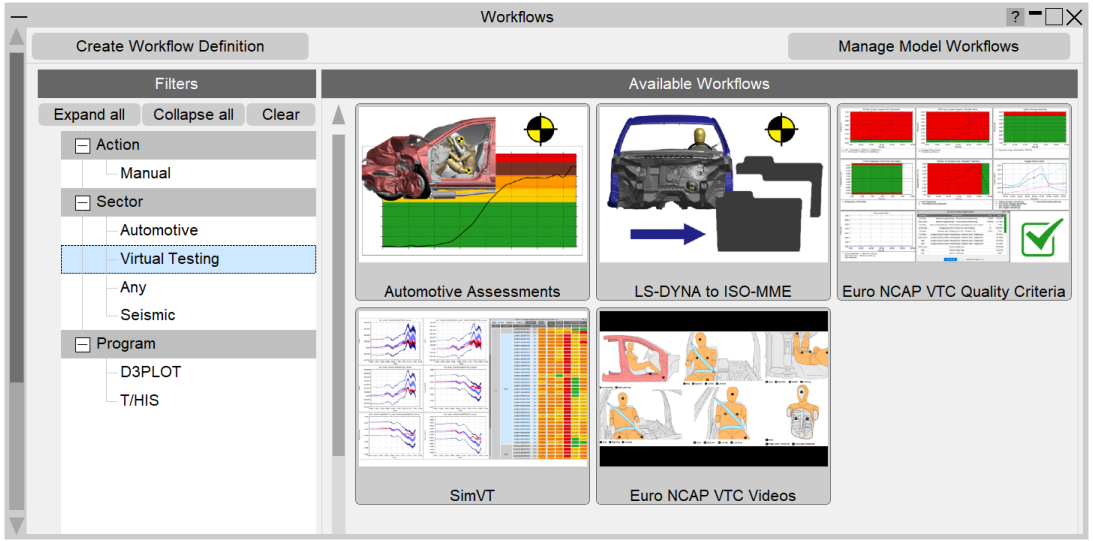
Virtual Testing

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?**

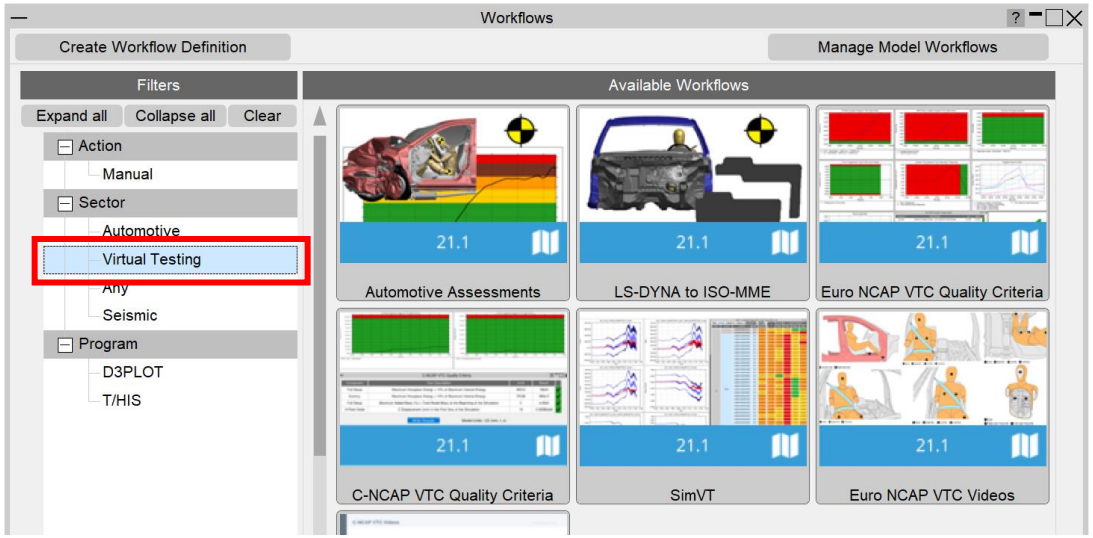
A3. The LS-DYNA to ISO-MME tool provides seamless transition between simulation and test formats. SimVT supports test data stored in ISO-MME format as well as a configurable CSV format.

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

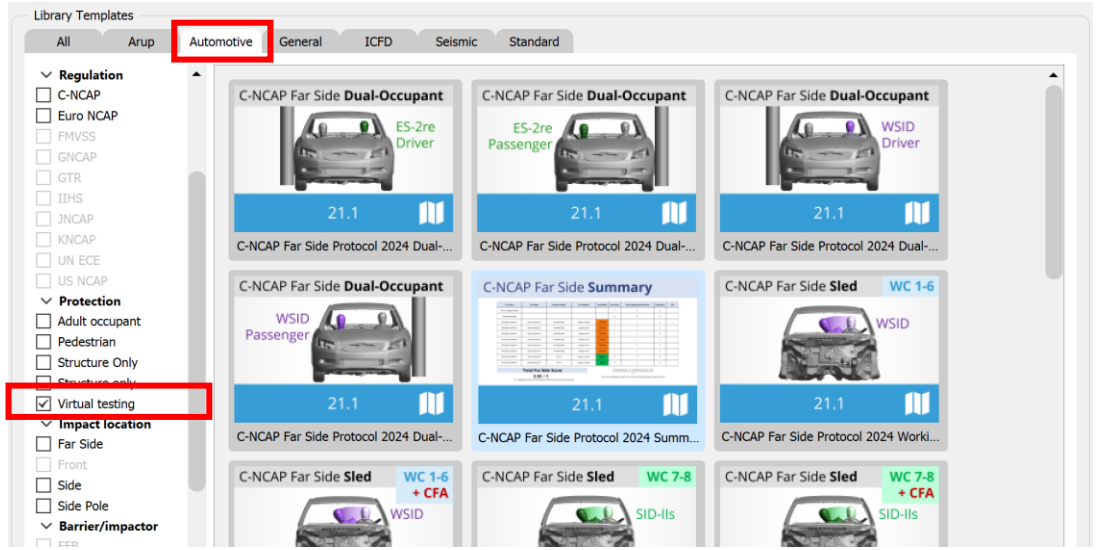
A.4 SimVT helps you summarise the correlation analysis results for all the occupant and structures data channels, as well as providing the ability to sift through the data in more detail. Other tools include REPORTER templates to automate the processing of data. Results tables, graphs and scores can 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**.

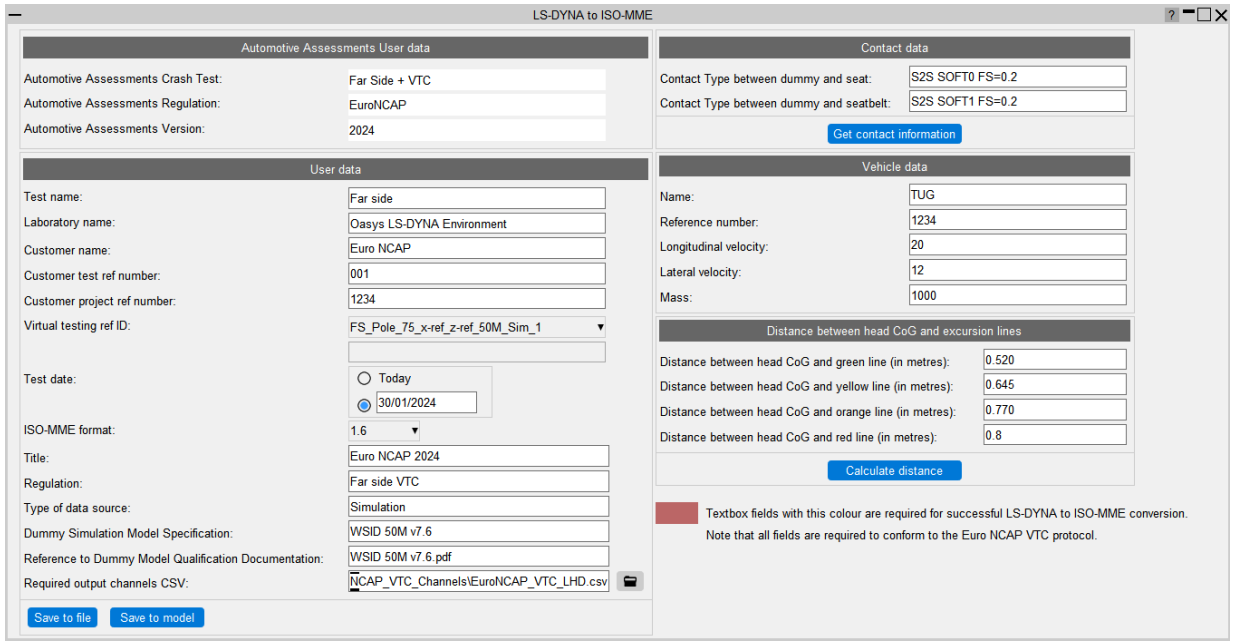


- REPORTER templates can be found at **File** → **Open Library Template...** by selecting the **Automotive** tab and filtering for **Virtual testing**.



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.

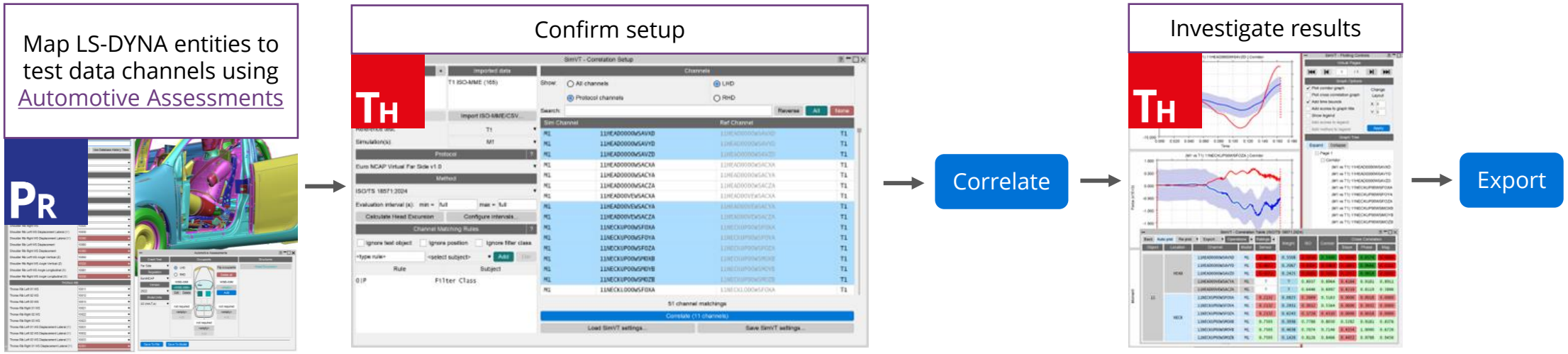


LS-DYNA to ISO-MME

- 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

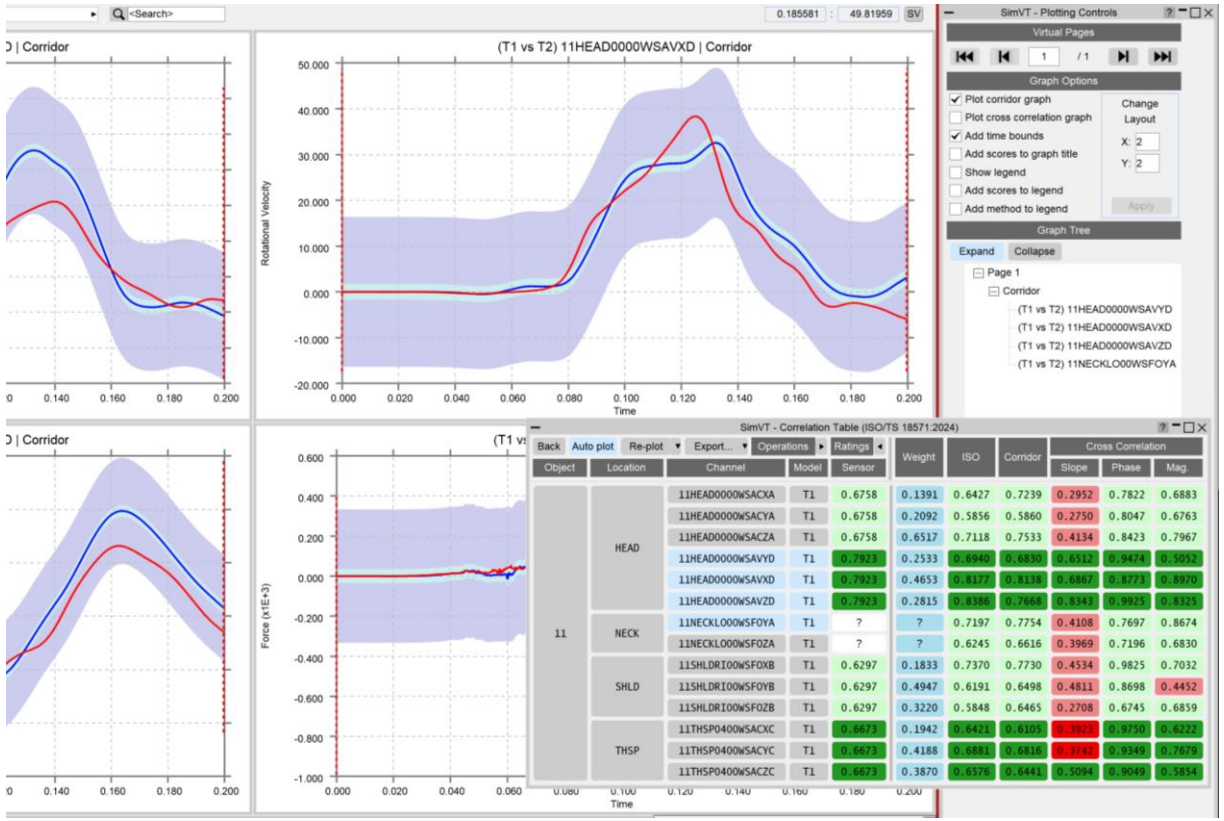
- SimVT is a powerful interactive tool for correlating simulation data vs test, or indeed any combination of: LS-DYNA models, ISO-MME data or CSV data.
- SimVT supports the Euro NCAP and C-NCAP Virtual Testing protocols and can be used to identify sensors that fail to pass Validation Criterion 1 or correlation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



The SimVT Workflow

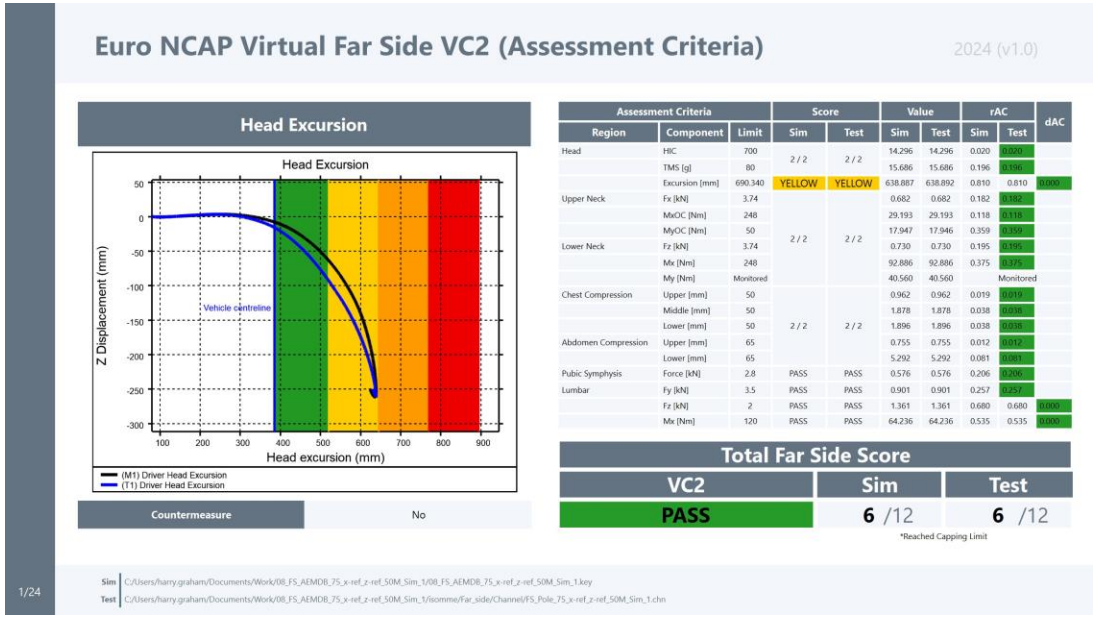
SimVT

- 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.

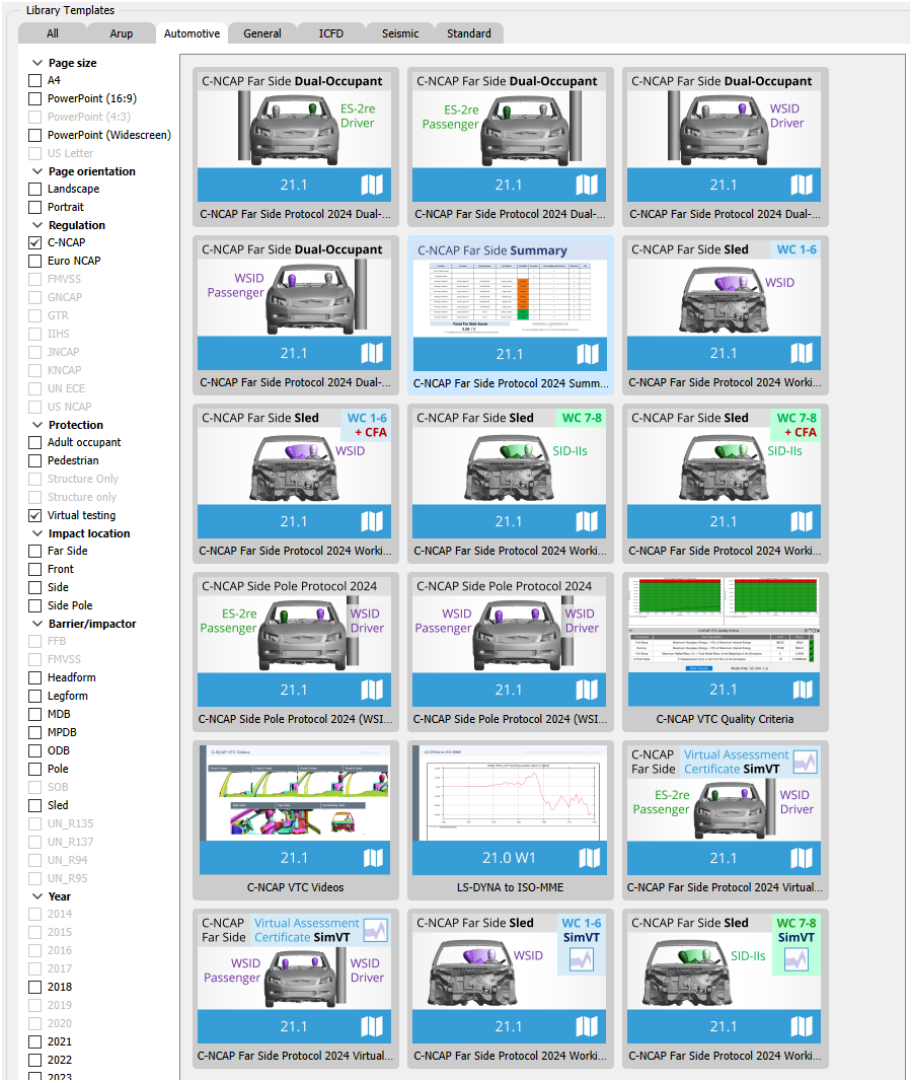


C-NCAP Management Regulation (2024 Edition)

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

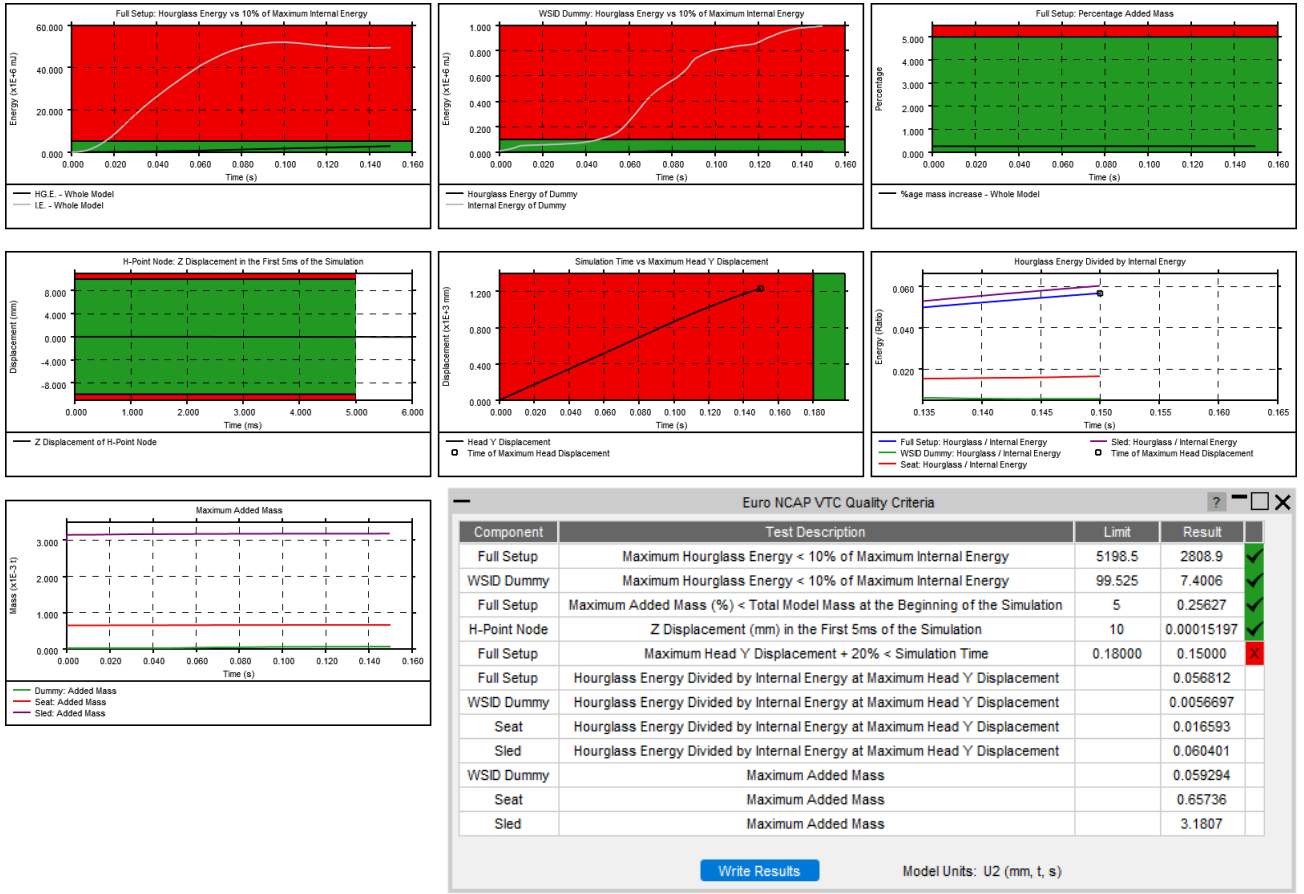
[Read the documentation to learn more]



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.



Component	Test Description	Limit	Result	
Full Setup	Maximum Hourglass Energy < 10% of Maximum Internal Energy	5198.5	2808.9	✓
WSID Dummy	Maximum Hourglass Energy < 10% of Maximum Internal Energy	99.525	7.4006	✓
Full Setup	Maximum Added Mass (%) < Total Model Mass at the Beginning of the Simulation	5	0.25627	✓
H-Point Node	Z Displacement (mm) in the First 5ms of the Simulation	10	0.00015197	✓
Full Setup	Maximum Head Y Displacement + 20% < Simulation Time	0.18000	0.15000	X
Full Setup	Hourglass Energy Divided by Internal Energy at Maximum Head Y Displacement		0.056812	
WSID Dummy	Hourglass Energy Divided by Internal Energy at Maximum Head Y Displacement		0.0056697	
Seat	Hourglass Energy Divided by Internal Energy at Maximum Head Y Displacement		0.016593	
Sled	Hourglass Energy Divided by Internal Energy at Maximum Head Y Displacement		0.060401	
WSID Dummy	Maximum Added Mass		0.059294	
Seat	Maximum Added Mass		0.65736	
Sled	Maximum Added Mass		3.1807	

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]

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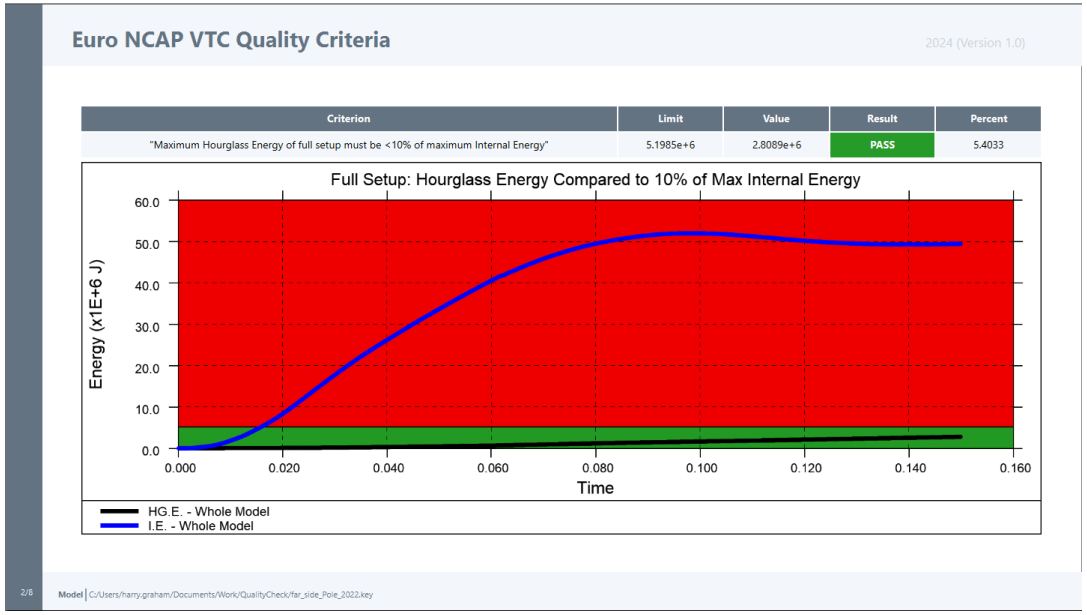
Model | C:/Users/harry.graham/Documents/Work/QualityCheck/far_side_Pole_2022.key



Euro NCAP VTC Quality Criteria

2024 (Version 1.0)

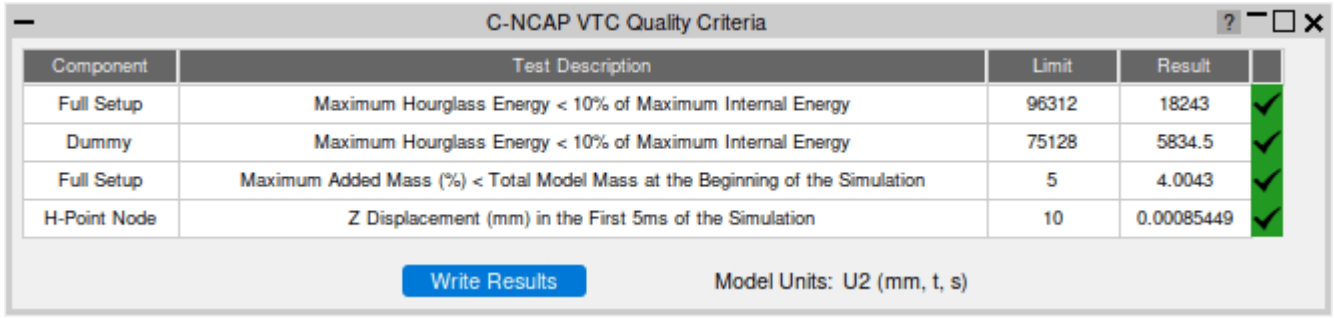
Criterion	Limit	Value	Result	Percent
"Maximum Hourglass Energy of full setup must be <10% of maximum Internal Energy"	5.1985e+6	2.8089e+6	PASS	5.4033

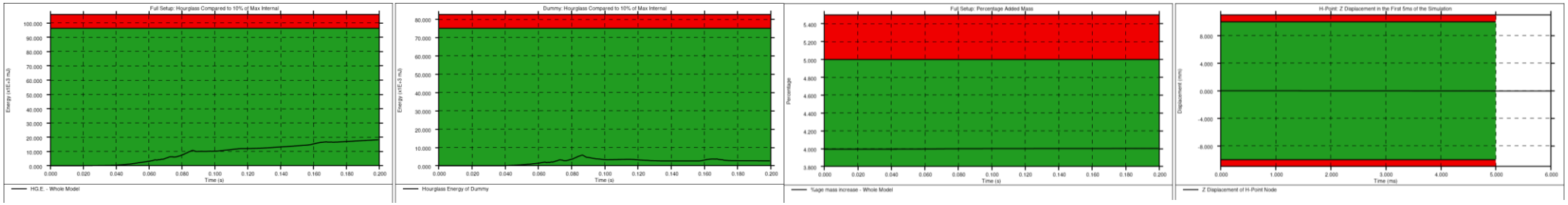
2/8

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.



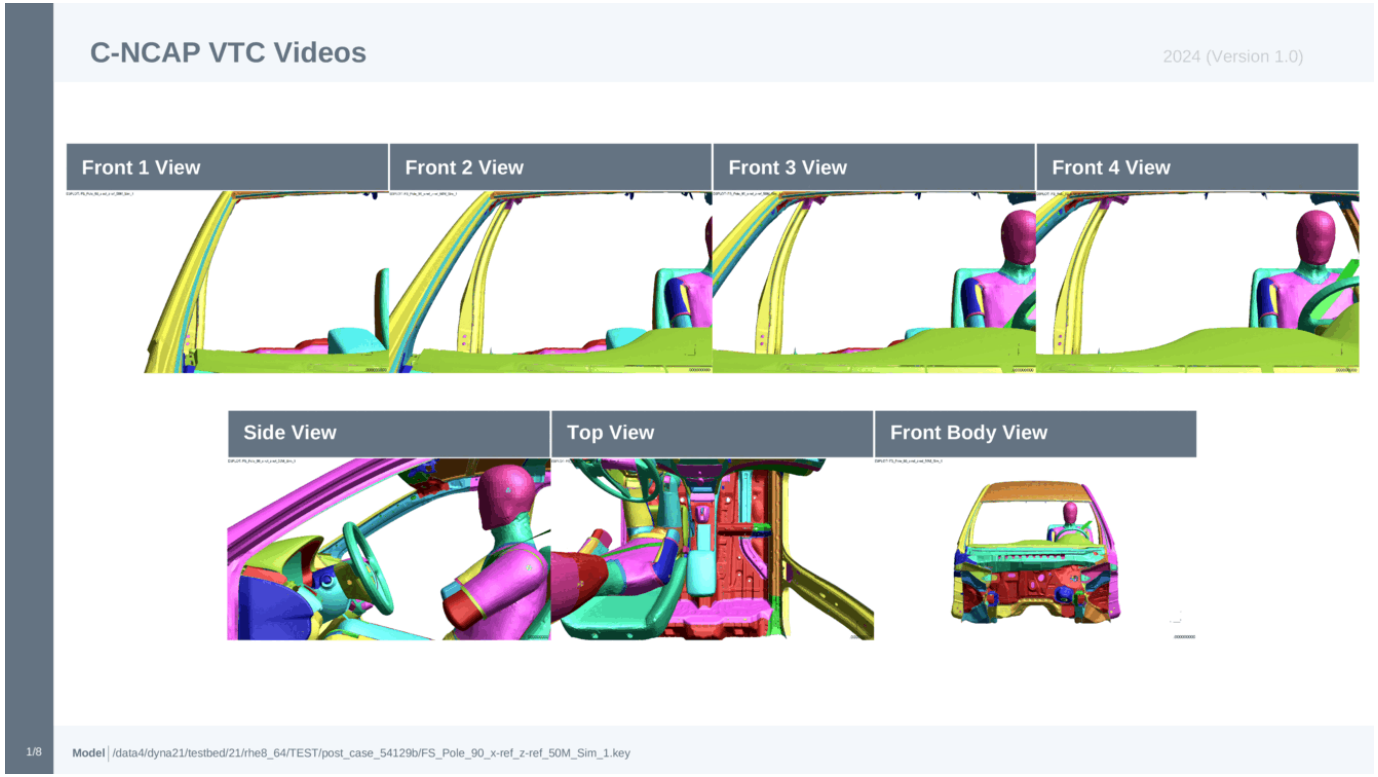


Euro NCAP VTC Videos

- 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.



Automotive Library Templates

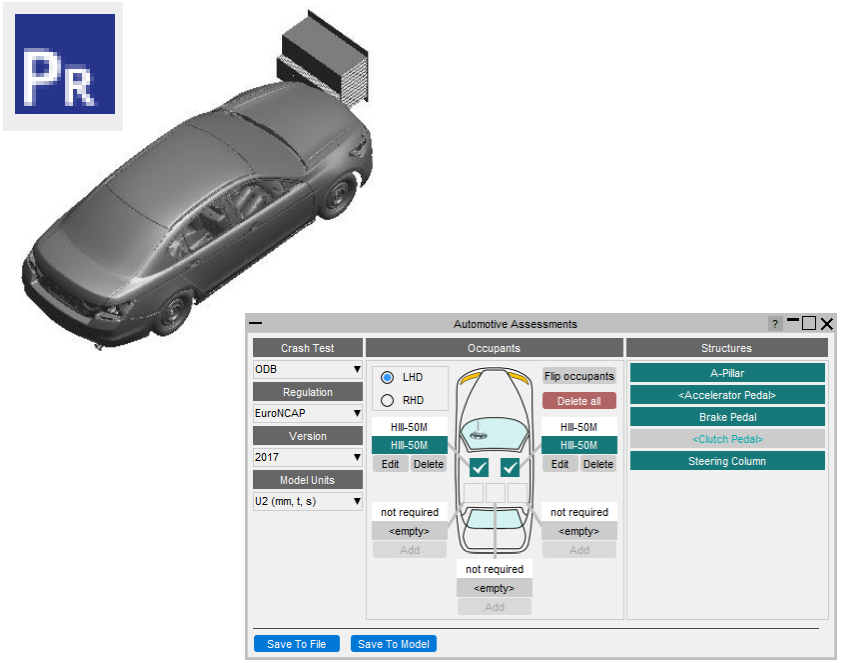
Migration to Workflows

The following Automotive templates have been migrated to use data saved from the Automotive Assessments Workflow:

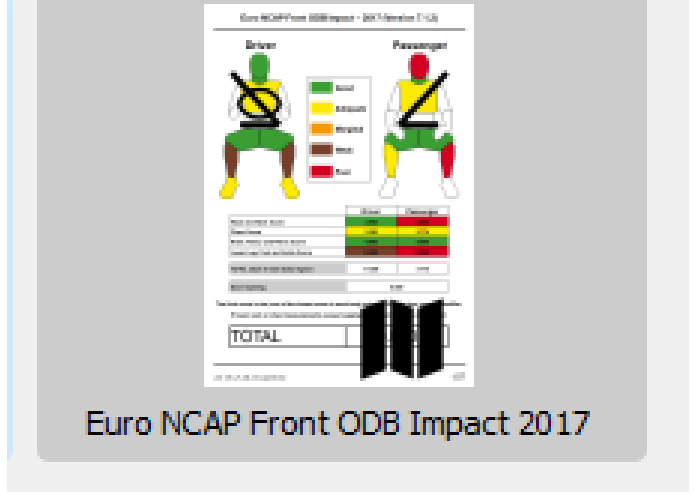
- EuroNCAP_Front_FFB_Impact_2017
- EuroNCAP_Front_MPDB_Impact_2020_Occupant_Assessment
- EuroNCAP_Front_ODB_Impact_2017
- EuroNCAP_Side_MDB_Impact_2022
- EuroNCAP_Side_Pole_Impact_2022
- CNCAP_Front_MPDB_Impact_2022_Occupant_Assessment
- IIHS_Front_ODB_Impact_2021 (***new in v21.1***)
- IIHS_Front_ODB_Impact_2021_StructureOnly (***new in v21.1***)
- IIHS_Front_SOB_Impact_2021 (***new in v21.1***)
- IIHS_Front_SOB_Impact_2021_StructureOnly (***new in v21.1***)
- IIHS_Side_MDB_Impact_2021 (***new in v21.1***)
- IIHS_Side_MDB_Impact_2021_StructureOnly (***new in v21.1***)
- USNCAP_Front_FFB_Impact_2015 (***new in v21.1***)
- USNCAP_Side_MDB_Impact_2015 (***new in v21.1***)
- USNCAP_Side_Pole_Impact_2015 (***new in v21.1***)

Migration to Workflows

To use the new templates you need to specify and save the required data from the Automotive Assessments Workflow in PRIMER



In REPORTER the templates can be run from **File -> Open Library Templates**. The new templates that use Workflow data are indicated by the icon.



Migration to Workflows

Migrating the templates to use data saved from the Automotive Assessment Workflow has the following benefits:

- Setting up the data and generating the templates is simpler with fewer steps required
- The same data can be used in in the Automotive Assessment workflow in T/HIS to interactively plot and interrogate results
- It makes it easier to add templates for new protocol versions and protocols not currently supported

Eigout Table

Extract eigenvalues (modal frequencies) from LS-DYNA's eigout file

Eigout Table

A new script has been added for Library Program items to extract eigenvalues (modal frequencies) from LS-DYNA's eigout file. The script creates REPORTER variables, allowing the eigout results to be tabulated in a report. The following library templates and pages are now provided:

- Eigout Table (A4 Portrait Layout)
- Eigout Table (PowerPoint Layout)

Mode	Eigenvalue	Frequency (rad)	Frequency (Hz)	Period (s)
1	71889.1	268.12	42.67	0.0234
2	88703.7	297.83	47.40	0.0211
3	102198.0	319.68	50.88	0.0197
4	109448.3	330.83	52.65	0.0190
5	112211.7	334.98	53.31	0.0188
6	113456.6	336.83	53.61	0.0187
7	113688.1	337.18	53.66	0.0186
8	116641.0	341.53	54.36	0.0184
9	125036.7	353.61	56.28	0.0178
10	125326.4	354.01	56.34	0.0177
11	166304.4	407.80	64.90	0.0154
12	181088.1	425.54	67.73	0.0148
13	189493.3	435.31	69.28	0.0144
14	196922.2	443.76	70.63	0.0142
15	208863.8	457.02	72.74	0.0137
16	209988.9	458.25	72.93	0.0137
17	210390.3	458.68	73.00	0.0137
18	211030.8	459.38	73.11	0.0137
19	213627.6	462.20	73.56	0.0136
20	221216.5	470.34	74.86	0.0134

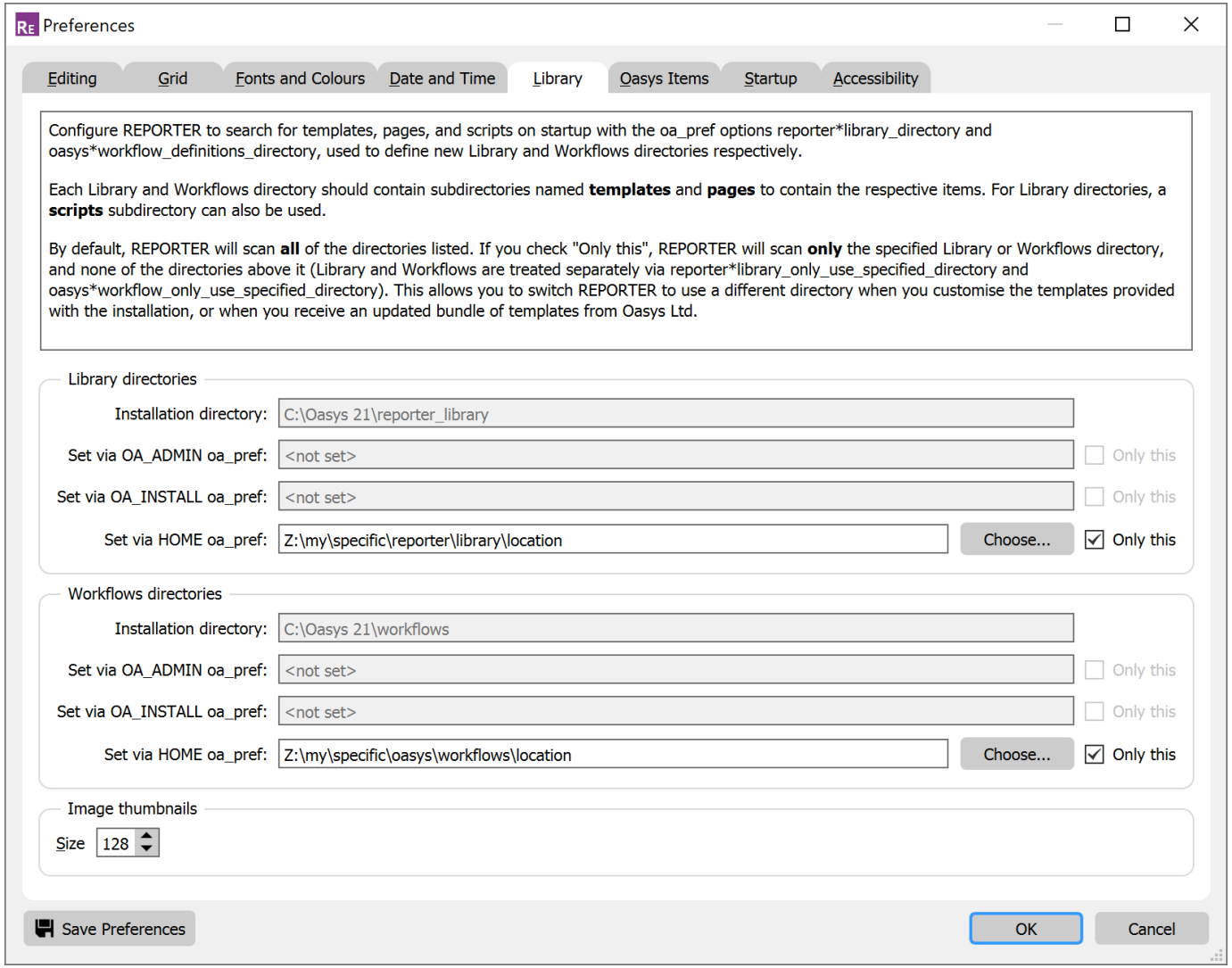
REPORTER Variables

Default names for REPORTER variables

- Before Oasys 21, the default names for variables created by D3PLOT and T/HIS items were prefixed with ITEM_*n*, where *n* was the number of the item on the page in the D3PLOT or T/HIS item tree. Because items in the 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 (or “this6”, “this6_1” for T/HIS items). Since item names in REPORTER are unique, this ensures default variable names generated in D3PLOT and T/HIS are also unique.

Preferences

Libraries and Workflows



You can now define a single location for each of Libraries and Workflows. This allows you to switch REPORTER to use a different directory when you customise the templates provided with the installation, or when you receive an updated bundle of templates from Oasys Ltd.

New Preferences

Preference	Description
oasys*workflow_only_use_specified_directory	Only scan location set by preference oasys*workflow_definitions_directory for Workflow definitions.
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
oasys*initial_view_orientation	Initial view orientation for the graphics window
reporter*library_only_use_specified_directory	Only scan location set by preference reporter*library_directory for Library templates, pages and scripts.

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