Oasys REPORTER

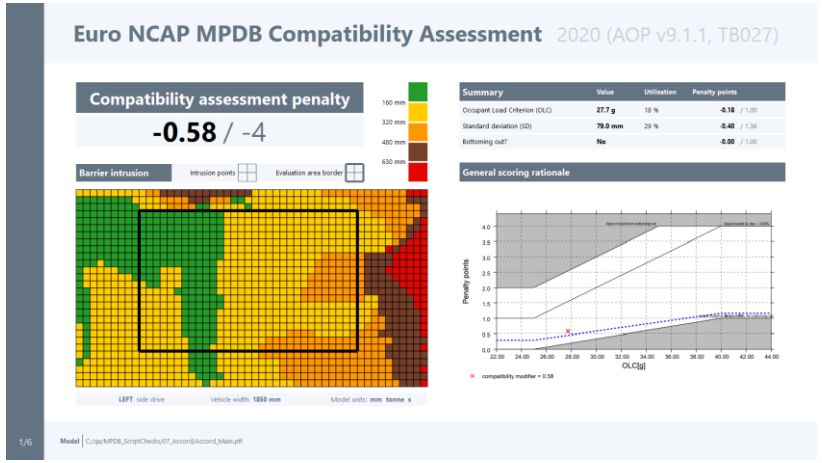
Euro NCAP MPDB Compatibility Assessment

REPORTER Instructions

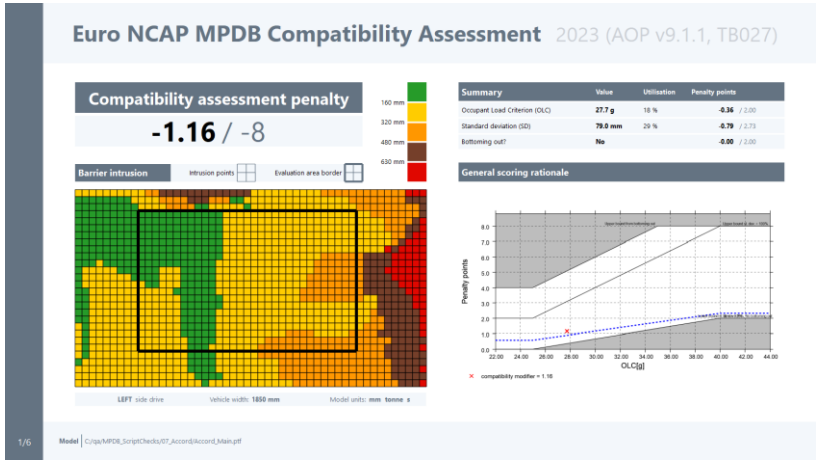
Updated February 2022

Introduction

This document explains how to use the REPORTER templates interactively and how to run them in batch. They are configured for use with the Arup Cellbond MPDB Shell Model. Alternatively, you can adapt the templates for other FE models.



Euro NCAP MPDB Compatibility Assessment **2020**



Euro NCAP MPDB Compatibility Assessment **2023**

There are two variants of the template to reflect the change in scoring described in the Euro NCAP Adult Occupant Protection Assessment Protocol v9.1.1 and Technical Bulletin (TB 027) v1.1.1. From 1st January 2023, the Compatibility assessment is a 0 to -8 point penalty applied to the overall test score. In 2020–2022, the compatibility penalty is 0 to -4 points. The templates are otherwise identical.

Using the template interactively

When you open the template in REPORTER, you will be prompted with a series of questions:

1. **Please select the results file**

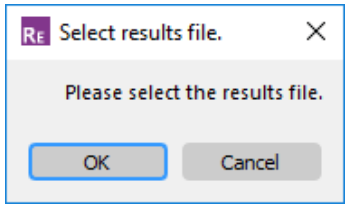
   Select the d3plot or PTF file from your LS-DYNA analysis results

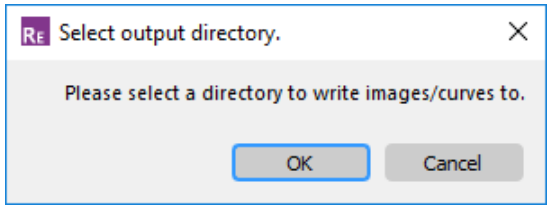
2. **Please select a directory to write images/curves to**

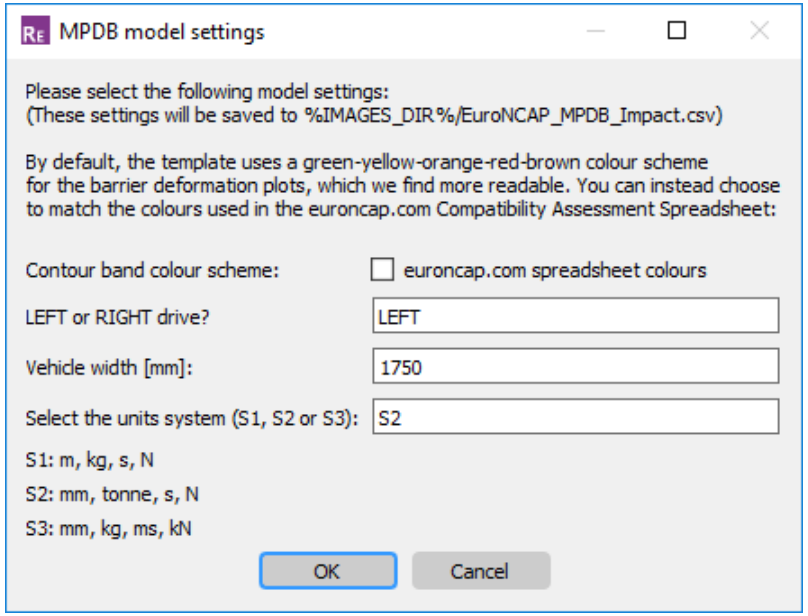
   This allows you to put all of the files that REPORTER generates in a separate folder (%IMAGES_DIR% – details on the files generated).

3. **MPDB model settings**

   Enter whether the vehicle is left or right-hand drive, the vehicle width, and the units system. The settings will be saved to the images/curves directory you selected in **2**, and you can use the CSV file as the **CSV_FILE** when running the template in batch.





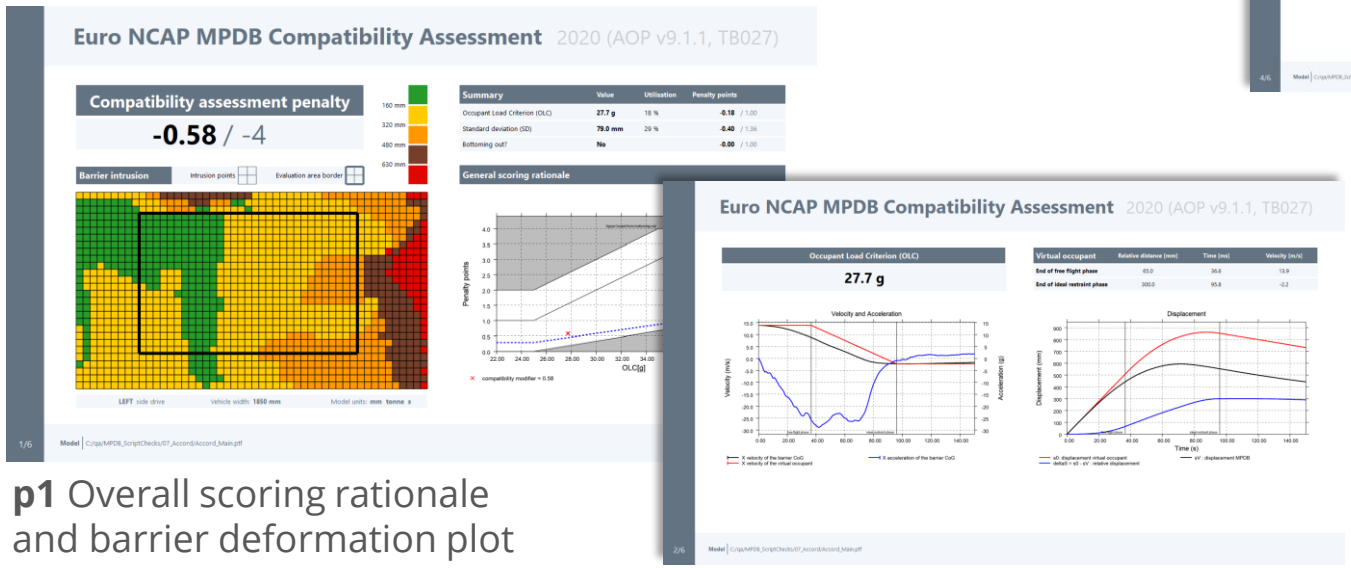


Using the template interactively

After completing the questions, the template will proceed with generation, launching instances of PRIMER, D3PLOT and T/HIS to complete the processing.

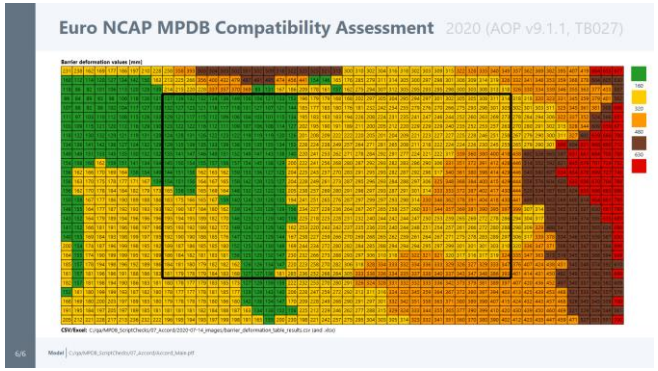
Once the template has finished, you can browse the report, and save it in *.orr*, *.pdf*, *.pptx* and *.html* format.

pp3-5 Animations/views of barrier deformation



p1 Overall scoring rationale and barrier deformation plot

p2 OLC calculation details



p6 Detailed barrier deformation plot

Running the template in batch

1. Create a CSV file for each run that you wish to process, or use/modify the CSV file created during the interactive process: *%IMAGES_DIR%/**EuroNCAP_MPDB_Impact.csv***
   The CSV file should contain the variables and values in the format shown in the example [below]. You can use the same CSV file for multiple runs if the models have the same properties.

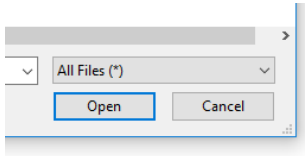
2. You can either run in batch from SHELL or use the command line. The steps required are explained in the following pages:
   - Oasys SHELL
   - Command line

CSV file example:

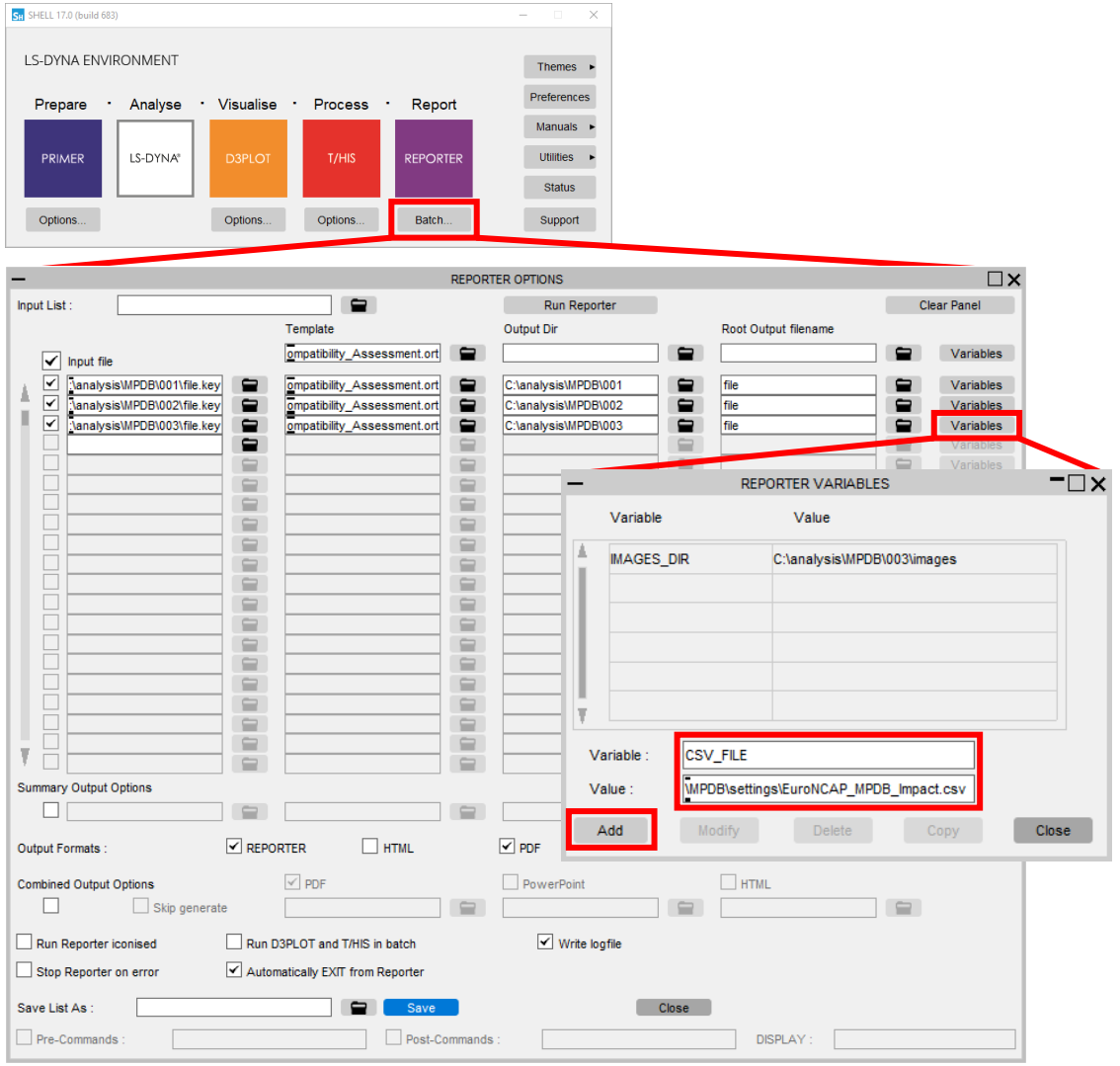
```
UNIT_LENGTH,mm                          (m or mm)
UNIT_MASS,tonne                         (kg or tonne)
UNIT_TIME,s                             (s or ms)
VEHICLE_WIDTH,1750                      (in mm)
LEFT_OR_RIGHT,LEFT                      (LEFT or RIGHT)
BARRIER_DEFORMATION_COLOURS,DEFAULT     (DEFAULT or SPREADSHEET)
```

Run in batch from SHELL

1. In SHELL, select (REPORTER) **Batch…** to open the batch options panel. For each run, select the *Input file* (.key). **Important:** if your results files are stored in a separate directory from your input keyword file, instead choose your **results** file (*d3plot* or *PTF*) by switching the file selector filter to *All Files (*).*



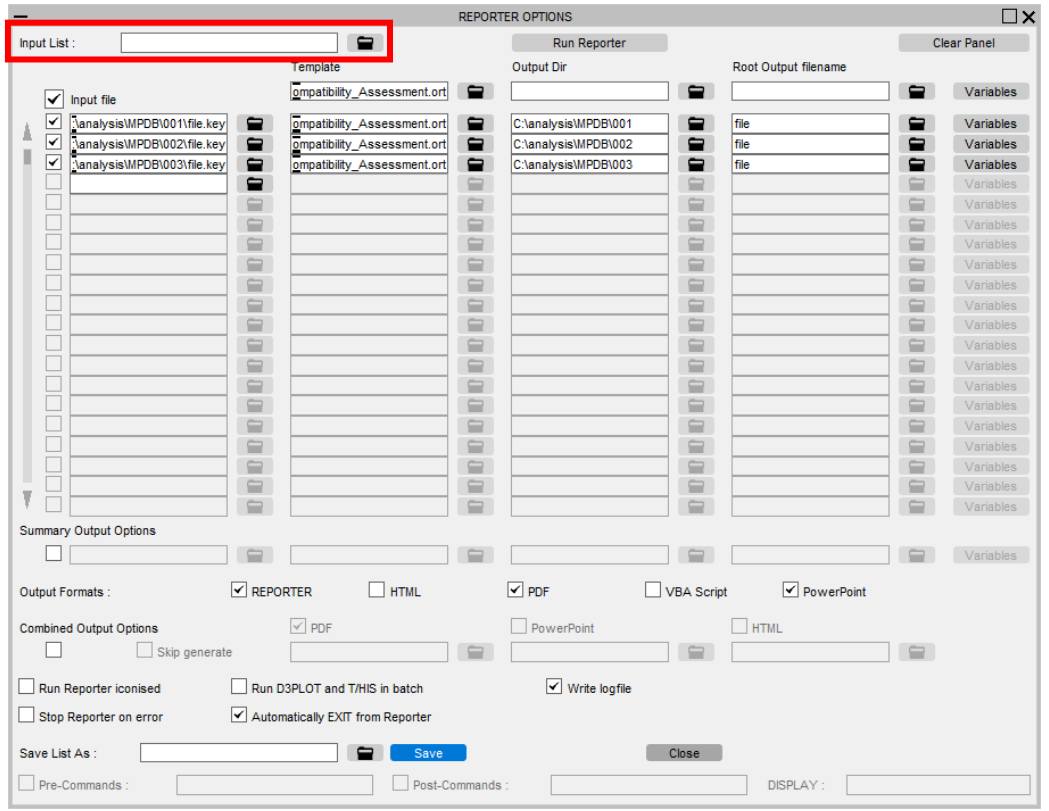
2. Select the *Template.*
3. Click *Variables* and add a variable **CSV_FILE** for your CSV file containing the MPDB model settings.
4. The *Output Dir* and *Root Output filename* control the destination of any report, HTML, PDF or PowerPoint files you select in *Output Formats*. The MPDB template creates additional images/curve files. The destination of these files is controlled separately via the **IMAGES_DIR** variable, which can also be defined via *Variables*.



Run in batch from SHELL

The REPORTER batch options panel (especially the Variables panel) can be a bit fiddly to use – we are working on improving it. In the meantime, if you prefer, you can instead prepare a list file (*.lst*) and open and run it from SHELL. You can use this example as a template:

```
$
$ Setup job 1
$
$variables,CSV_FILE,IMAGES_DIR
$output_dir,Z:\path\to\output_directory
$output_root_name,output_reports_name
Z:\path\to\results_file.d3plot,Z:\path\to\EuroNCAP_Front_MPDB_Imp
act_2023_Compatibility_Assessment.ort,Z:\path\to\csv_file.csv,Z:\
path\to\images_dir
$
$ Setup job 2
$
$variables,CSV_FILE,IMAGES_DIR
$output_dir,Z:\path\to\output_directory
$output_root_name,output_reports_name
Z:\path\to\results_file.d3plot,Z:\path\to\EuroNCAP_Front_MPDB_Imp
act_2023_Compatibility_Assessment.ort,Z:\path\to\csv_file.csv,Z:\
path\to\images_dir
$
```



Run from the command line

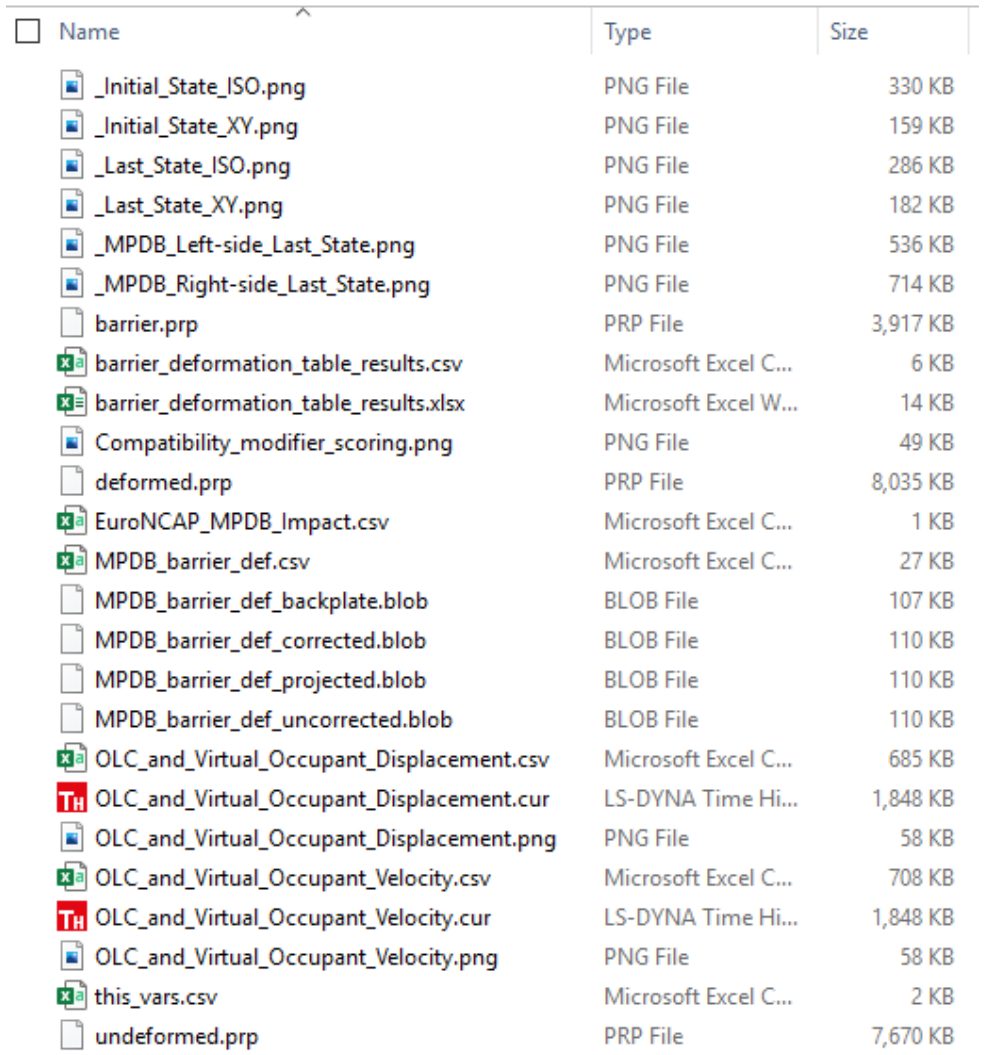
To run the template in batch from the command line, you can use the following example. Here, each argument is written on a separate line for clarity, but you need to enter as a single line on your command line:

`"C:\Program Files\Ove Arup\v17.0_x64\reporter17_x64.exe"`	The REPORTER executable
`"Z:\path\to\EuroNCAP_Front_MPDB_Impact_2023_Compatibility_Assessment.ort"`	The REPORTER template to be generated
`-varDEFAULT_DIR="Z:\path\to\results_directory"`	Directory containing your d3plot or PTF files
`-varDEFAULT_JOB="results_file_root_name"`	The d3plot/PTF file root name (no extension)
`-varCSV_FILE="Z:\path\to\csv_file.csv"`	The MPDB model settings CSV file
`-varIMAGES_DIR="Z:\path\to\images_dir"`	The output directory for images and curves etc.
`-report="Z:\path\to\output_report.orr"`	Include to output a REPORTER report (.orr) file
`-pdf="Z:\path\to\output_report.pdf"`	
`-pptx="Z:\path\to\output_report.pptx"`	
`-log="Z:\path\to\output_logfile.log"`	Include to output a logfile (aids troubleshooting)
`-batch`	
`-iconise`	Omit when troubleshooting
`-exit`	Omit when troubleshooting

Output files

During generation, REPORTER writes various files to %IMAGES_DIR%:

- Copies of the images that appear in the report
- Copies of the curve data used in the report graphs – you can read this into Microsoft Excel or back into T/HIS if desired
- The CSV file ***EuroNCAP_MPDB_Impact.csv*** containing the model settings (units, vehicle width, left/right drive)
- A CSV file **MPDB_barrier_def.csv**, which contains the barrier deformation data in the format compatible with the 'Input Scan' worksheet in the Microsoft Excel Compatibility Assessment Spreadsheet (Jan 2020) provided by Euro NCAP. You can use this CSV file to compare the REPORTER template output with the spreadsheet calculation
- Various *.blob* and *.prp* files used by the template



Name	Type	Size
_Initial_State_ISO.png	PNG File	330 KB
_Initial_State_XY.png	PNG File	159 KB
_Last_State_ISO.png	PNG File	286 KB
_Last_State_XY.png	PNG File	182 KB
_MPDB_Left-side_Last_State.png	PNG File	536 KB
_MPDB_Right-side_Last_State.png	PNG File	714 KB
barrier.prp	PRP File	3,917 KB
barrier_deformation_table_results.csv	Microsoft Excel C...	6 KB
barrier_deformation_table_results.xlsx	Microsoft Excel W...	14 KB
Compatibility_modifier_scoring.png	PNG File	49 KB
deformed.prp	PRP File	8,035 KB
EuroNCAP_MPDB_Impact.csv	Microsoft Excel C...	1 KB
MPDB_barrier_def.csv	Microsoft Excel C...	27 KB
MPDB_barrier_def_backplate.blob	BLOB File	107 KB
MPDB_barrier_def_corrected.blob	BLOB File	110 KB
MPDB_barrier_def_projected.blob	BLOB File	110 KB
MPDB_barrier_def_uncorrected.blob	BLOB File	110 KB
OLC_and_Virtual_Occupant_Displacement.csv	Microsoft Excel C...	685 KB
OLC_and_Virtual_Occupant_Displacement.cur	LS-DYNA Time Hi...	1,848 KB
OLC_and_Virtual_Occupant_Displacement.png	PNG File	58 KB
OLC_and_Virtual_Occupant_Velocity.csv	Microsoft Excel C...	708 KB
OLC_and_Virtual_Occupant_Velocity.cur	LS-DYNA Time Hi...	1,848 KB
OLC_and_Virtual_Occupant_Velocity.png	PNG File	58 KB
this_vars.csv	Microsoft Excel C...	2 KB
undeformed.prp	PRP File	7,670 KB

Adapting the template for other FE models

The templates are configured for use with the Arup Cellbond MPDB Shell Model. Alternatively, you can adapt the templates for other FE models.

OLC calculation

The OLC calculation requires an accelerometer at the centre of gravity (CoG) of the barrier. In the script:

%TEMPLATE_DIR%/scripts/MPDB/**this_MPDB_Impact_common.js**

Replace the name of the accelerometer with the name used in your model:

```
// Read the barrier CoG ID
    var node = "accelerometer: 1";
```

Adapting the template for other FE models

Barrier deformation

In order to perform the barrier deformation calculation, and also to produce images of the deformed barrier, the template requires information about various groups of parts in the barrier. These lists are defined in the script:

%TEMPLATE_DIR%/scripts/MPDB/**d3plot_MPDB_barrier_parts_blanking.js**

In the area marked USER INPUT, choose option 1 or option 2 to identify the parts by name or number. Enter these from your model for each of the components described.

You must also define a seed part. This is used to identify the elements still attached to the main body of the barrier and exclude elements which have detached during impact. Pick one part with elements near to the rear of the barrier which are unlikely to be detached in the final state. See comments in the script for additional details.

```
function GetBarrierPartLists()
{
    ////////////////////////
    // USER INPUT

    var option1 = true;   // user will define parts by name
    var option2 = false;  // user will define parts by number

    // Name of part that defines rigid backplate
    var backplate = ["Backplate_grid"];

    // Name(s) of parts that define honeycomb elements (i.e. shell
    // normals are parallel to plane of backplate)
    var hc = ["Block A single thickness", "Block A double
              thickness", "Block B single thickness", ... ];

    // Name(s) of parts that define intermediate plates parallel to
    // backplate
    var plate = ["Intermediate plate front", "Intermediate plate
                 rear", "Trolley-MountPlate-Rigid", ... ];

    // Name(s) of parts that are connected by tied contact to other
    // parts named elsewhere and are therefore redundant
    var excluded = ["Contact plate OVERLAPPING LAYER2", "Contac
                    plate OVERLAPPING LAYER3", ... ];

    // Name of part that will be used to identify a seed element.
    // The seed element is used to identify the elements still attached
    // to the main body of the barrier and exclude elements which have
    // detached during impact.
    // Pick one part with elements near to the rear of the barrier which
    // are unlikely to be detached in the final state.
    // This part MUST also be named in one of the lists above.
    // It MUST be made up of shell elements.
    var seed = ["Cladding plate OVERLAPPING LAYER1: Front"];
```

Contact Information

ARUP

www.arup.com/dyna

For more information please contact us:

UK
The Arup Campus
Blythe Valley Park
Solihull
B90 8AE
United Kingdom

T: +44 121 213 3399
dyna.support@arup.com

China
Arup China
39/F-41/F Huaihai Plaza
1045 Huaihai Road (M)
Xuhui District, Shanghai
200031
China

T: +86 21 3118 8875
china.support@arup.com

India
Arup India
Ananth Info Park, HiTec City
Madhapur Phase-II
Hyderabad
500081, Telangana
India

T: +91 40 44369797 / 98
india.support@arup.com

USA West
Arup Americas
c/o 560 Mission Street Suite 700
San Francisco
CA 94105
United States

T: +1 415 940 0959
us.support@arup.com

or your local Oasys distributor