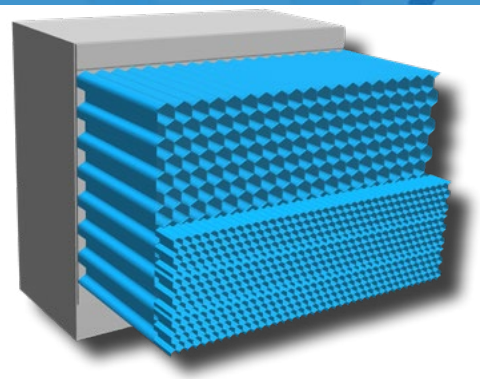
Arup Cellbond Barrier Models

Working in collaboration, Arup and Cellbond have developed a range of LS-DYNA finite element models based on the aluminium honeycomb barriers produced by Cellbond.



EEVC ODB

EEVC Offset Deformable Barrier
LS-DYNA Shell model for frontal impact

This European Enhanced Vehicle-safety Committee model is a requirement for the offset front impact safety regulations.

- Used for frontal impact testing.
- Replaced in EuroNCAP consumer tests by the MPDB.
- Model calibration and validation processes go beyond the barrier specification tests: the model is correlated to additional dynamic tests at component and full barrier levels.
- Arup has a track record with over 20 years of experience in barrier development using proven modelling techniques that demonstrate robustness and fidelity.

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EEVC ODB

EEVC Offset Deformable Barrier LS-DYNA Shell model for frontal impact

The specification used for the development of the EEVC Offset Deformable Frontal Impact Barrier has been taken from the 'ECE R94 Revision 1 -Frontal Impact Protection' document, dated May 2007.

The EEVC Offset Deformable Barrier (ODB) is used in the EU front impact regulation and by some consumer test organizations in their front offset impact test. It has been replaced in EuroNCAP consumer tests by the MPDB.

The ODB model consists of two different sized aluminium honeycomb blocks partially covered in aluminium sheets. It is also available in a Solid element version.

Validation

The LS-DYNA model calibration has been done using the test results provided by Cellbond for a 5 different impact tests: Rigid Wall, Half Rigid Wall, Low Horizontal Bar, High Horizontal Bar and Vertical Bar. The tests involve the impactors on a trolley impacting the barrier.

The force-deflection curves (generated from model analysis and test) have been compared.

This validation work has been carried out in both SMP and MPP versions of LS-DYNA R7.1.2 to ensure the correct performance and accuracy of the LS-DYNA model.

Specifications

Element Type	LS-DYNA Release Version	Total Number of Elements	Timestep	Regulation Test	Regulation Speed
Shell	LS-DYNA 971, R7.1.2 SMP/ MPP	298103	1320kg	EU Directive 96/79/EC Frontal Impact Protection	56kph
Shell	LS-DYNA 971, R7.1.2 SMP/ MPP	298103	1320kg	UN-ECE Reg.94 Rev.1 Frontal Impact Protection (ECE R94)	56kph
Shell	LS-DYNA 971, R7.1.2 SMP/ MPP	298103	1320kg	FMVSS 208 Occupant Crash Protection	40kph