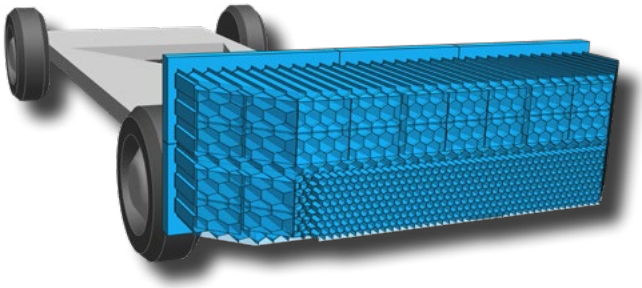
Arup Cellbond Barrier Models

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.



AE-MDB C-NCAP

Advanced European Mobile Deformable Barrier
LS-DYNA Shell model for side impact

This barrier has been adopted by C-NCAP from 2018. The design is based on the EuroNCAP AE-MDB with modifications to the total mass and height.

- Used for side mobile impact testing.
- 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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AE-MDB C-NCAP

Advanced European Mobile Deformable Barrier LS-DYNA Shell model for side impact

The specification used for the develop the AE-MDB C-NCAP deformable impact barrier has been taken from the C-NCAP 2018 document 'C-NCAP Management Regulation 2018' dated April 2017 and the Euro-NCAP document 'AE-MDB Specification, Version 1.0', dated 26th February 2013.

The C-NCAP 2018 AE-MDB Side Impact Barrier is based on the Euro-NCAP AE-MDB Barrier with two main modifications: a total mass increase of 100kg and a 50mm increase in height.

Specifications

Element Type	LS-DYNA Release Version	Total Number of Elements	Mass	Regulation Test	Regulation Speed
Shell	LS-DYNA 971, R7.1.2 SMP/MPP	382080	1400kg	UN R95 Lateral Collision Protection	50kph

Validation

The LS-DYNA model calibration has been done using the test results provided by Cellbond for a 35kph dynamic impact against a rigid wall. The test involves the barrier on a trolley impacting a rigid wall.

The force-deflection curves (generated from model's analyses and tests) for the individual block of the barrier have been compared. The results have also been checked against the force-deflection corridors from the specification document.

This validation work has been carried out in both SMP and MPP versions of LS-DYNA R9.2.0 and R7.1.2 to ensure the performance and accuracy.