

Applied accident research – European consumer protection (crash) tests in the 21st century

European consumer protection activities for vehicle safety

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Euro NCAP Roadmap

Improve Methods to
Assess Occupant
Protection

Sustain Safety
Improvements for
Vulnerable Road Users

Reward & Assess
Emerging Avoidance
Technologies



Euro NCAP Roadmap

Update to front and side impact test procedures

Accidents & societal trends
New biomechanical tools & criteria
new technologies

Refocus on rear seat occupants (including children of different age)

Address different occupant sizes and ages

Take new safety assist systems into account

Update existing tests for better consumer information

Euro NCAP Test Procedures



Adult Occupant Protection

Frontal offset

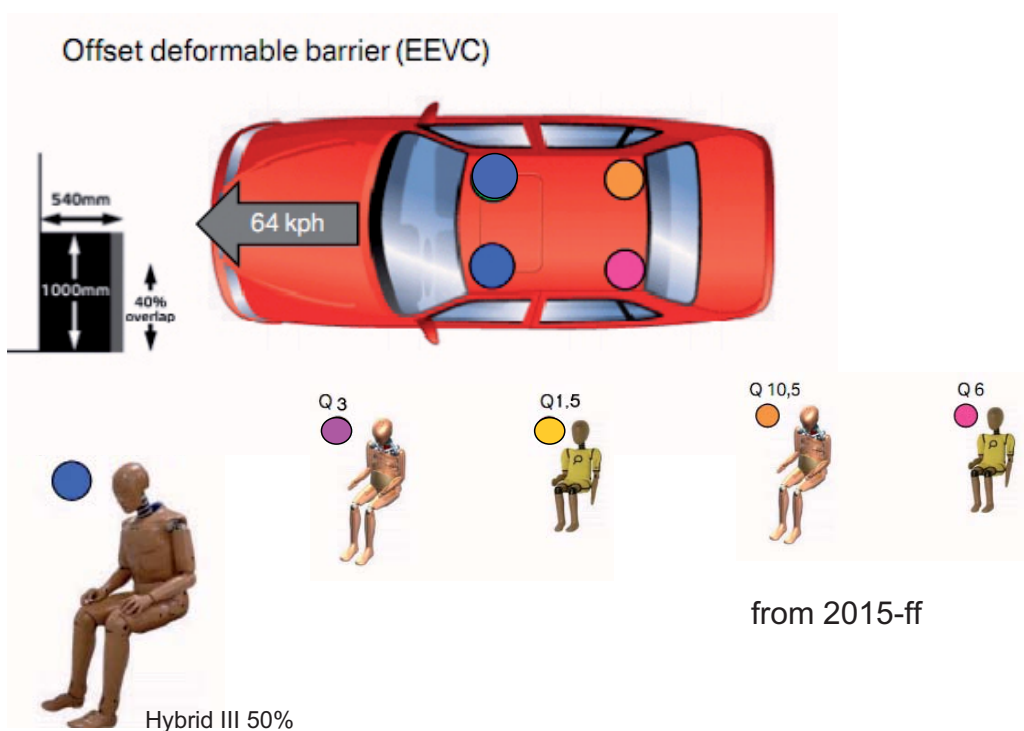
Change to Q-series dummies in 2013 and further change planned in 2015 bigger Q dummies

Implementation of a new chest criterium (DEQ just for monitoring, no RIB EYE up to now)

OEM data for 5% female on the front passenger seat, needed to assess this position

From 2015 ff, 16 pts scaled down to 8 pts

Frontal offset



Full Frontal Impact

Barrier front still in discussion most likely rigid wall

(rigid wall or full width deformable barrier proposed use of barrier face based on FIMCAR recommendation)

Test speed 50 kph

2times 5% female dummy on pos 1 and pos 6

Injury risk curves to be developed working limits issued for 50% male and 5% female

DEQ calculation methode updated and monitored in the test

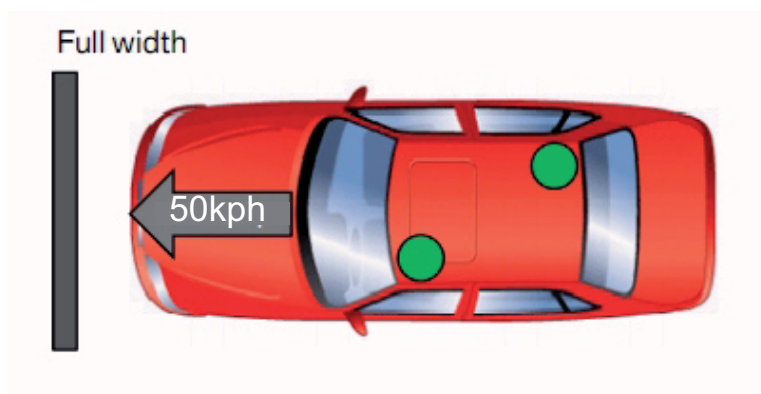
Change of modifiers, due to less deformation and ODB rating

OEM data for 5% female on the front passenger seat, needed to assess this position

From 2015 ff, 16 pts scaled down to 8 pts

Full frontal impact

2015 - ff

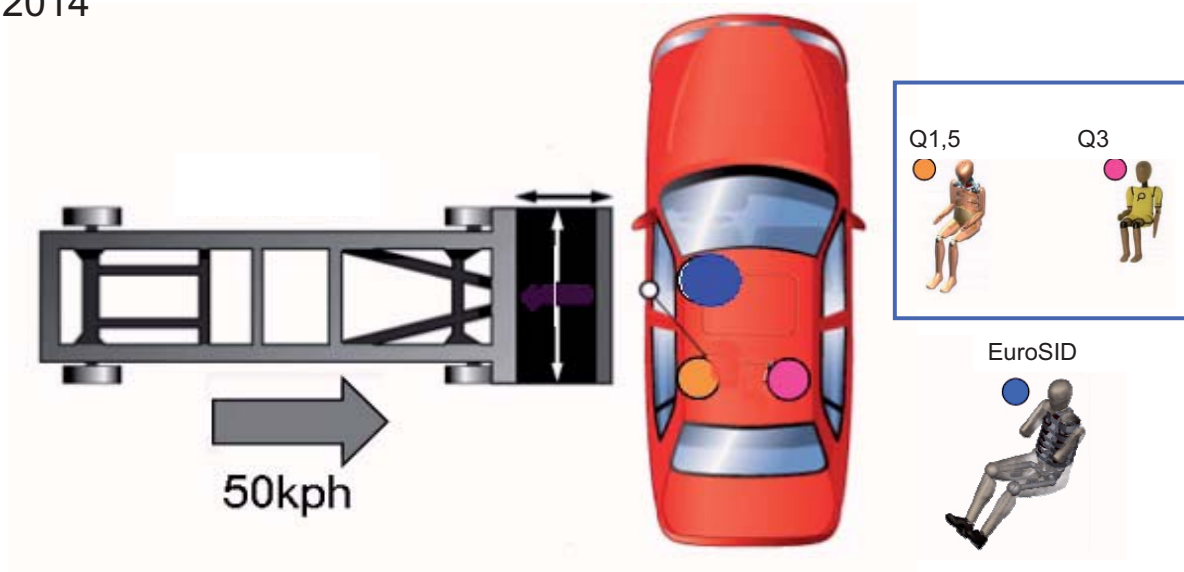


Hybrid III 5%



Side Impact

- 2014



- actual configuration
- child dummies Q1,5 and Q3

Side Impact

From 2015-ff

50kph, 90°, 1300kg

Impact point 250mm rearward of R-point

AE-MDB barrier V3.9; specification according APROSYS-project, validation of the barrier by the end of the year

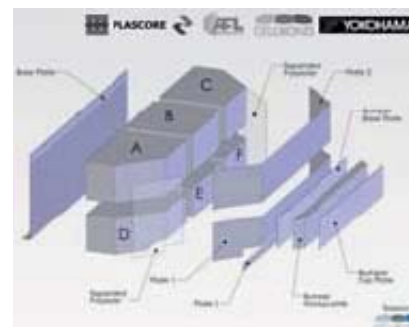
World SID 50% male, Q6 and Q10,5

Injury criteria under development

ISO seating position

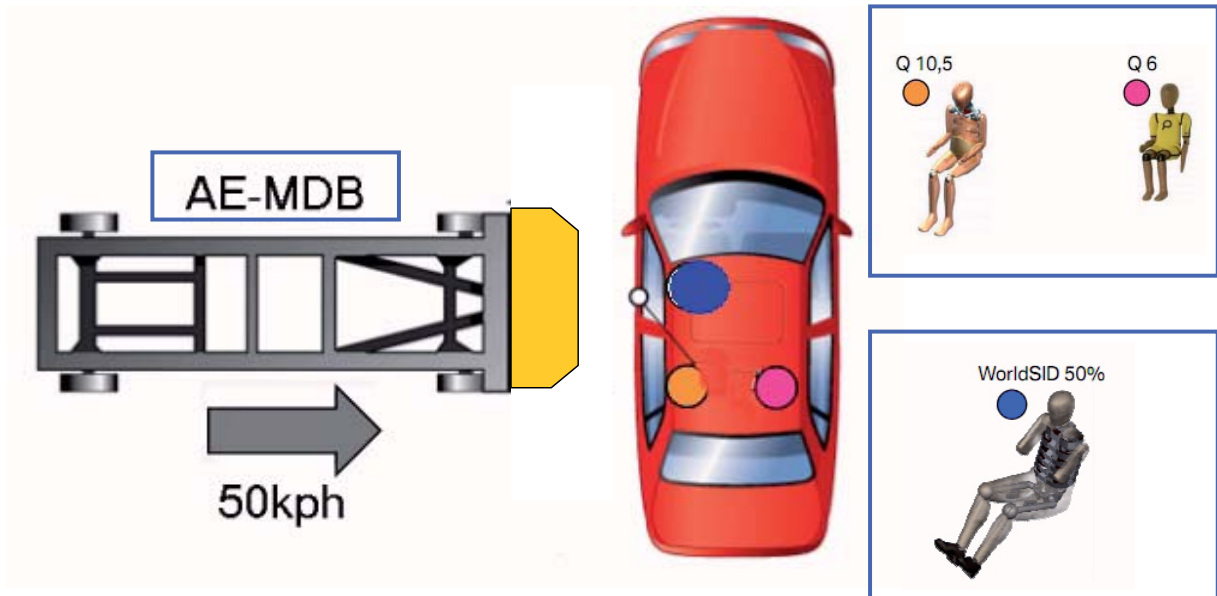
ISO injury risk curves

Dummy update according ISO group



Side Impact

2015 - ff



Pole Side Impact

Specification depending on GTR decision;

most likely:

32kph impact speed

75° impact angle

Flying floor procedure

World SID 50% male on driver seat

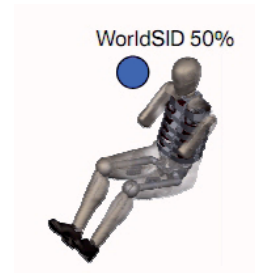
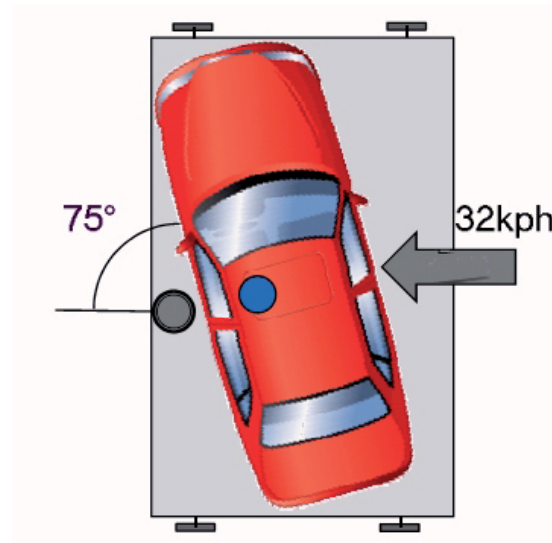
Seating procedure according ISO

Impact point CoG of driver head

Injury criteria under development see side impact

At a later stage, more type approval data could be used so the pole side impact may be not longer be done in the labs

Pole Side Impact



Whiplash

Whiplash front seats

3 Pulses, static and dynamic measurements

Rating criteria will not change

From 2014 onwards 2 instead of 4 points

Whiplash rear seats (FMVSS 202a)

Static measurement, no dynamic test, actual dimension under review

Worst seat counting, only outboard seats

Ease of use evaluation, $>10^\circ$ for uncomfortable position

From 2014 onwards 1pt

AEB city

Standing object ADAC V3 target

10kph to 50kph incremental test 5kph steps

Avoidance up to 20kph otherwise no points and mitigation assessed

Warning not assessed

3 pts from 2014 onwards

100% fitment rate

→ min of 1,5 points in the front whiplash assessment to gain AEB points!





Child Occupant Protection

Child Occupant Protection

Dynamic performance

Front impact

24p

Side impact

Vehicle based assessment

12p

CRS installation

13p

vehicle assessment

COP - Dynamic performance

2013/14: Q1,5 and Q3

2015: Q6 and Q10,5

new rating criteria under development, changing of upper and lower limits for chest and head (factor 1,2), neck assessment introduced (vertical acceleration will no longer be used), different body regions rated,

- head 4 points
- neck 2 points
- chest 2 points

24 pts dynamic overall

COP - CRS Installation

Seats from best pick list used for intallation process, covering all groups, isofix and universal seats, manufacturer requested and integrated CRS.

Installation assessment

- entrance in the vehicle
- fastening/tightening of seat belt
- stability of the seat
- Isofix connector accessibility
- attachment points for support leg and top tether
- max 12 pts



				Seating position						Scoring					
				Front		2nd row		3rd row		Pass	Fail	Exempt	Score		
				Center	Right	Left	Center	Right	Left					Center	Right
Universal	Group 0+	Maxi Cosi Cabriofix	B ___	N/A			Exempt					6	0	1	100,0%
	Group I	Roemer King	B ___	N/A			Exempt					6	0	1	100,0%
		Roemer Duo	_ I _ S	N/A			Exempt		Exempt	Exempt	Exempt	3	0	4	100,0%
	Group II/III	Roemer KidFix	B ___	N/A			Exempt					6	0	1	100,0%
Semi-Universal	Group 0+	Maxi Cosi Cabriofix plus Easybase2	B __ L _	N/A	Exempt							6	0	1	100,0%
		Maxi Cosi Cabriofix plus Easyfix	_ I L _	N/A	Exempt		Exempt		Exempt	Exempt	Exempt	2	0	5	100,0%
	Group 0+/I	HTS IZI Kid X3	_ I L _	N/A			Exempt		Exempt	Exempt	Exempt	3	0	4	100,0%
	Group I	Maxi Cosi Priorifix	_ I L _	N/A	Exempt	Exempt	Exempt		Exempt	Exempt	Exempt	1	0	6	100,0%
	Group II/III	Roemer KidFix	B I ___	N/A			Exempt		Exempt	Exempt	Exempt	3	0	4	100,0%
											Universal Score		6,000		
											Semi-Universal Score		6,000		
											Total Score		12,000		

Euro NCAP Test Procedures



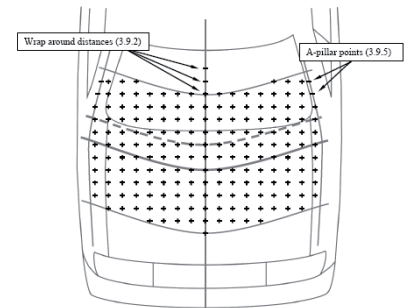
Pedestrian Protection

Pedestrian Protection from 2013

GRID 10 cm x 10 cm (X - wrap around / Y – vertical)

Testing as validation of OEM's prediction

10 test points selected randomly



OEM can nominate up to 10 additional test points (random selection)

Positive or negative calculation factor
the prediction

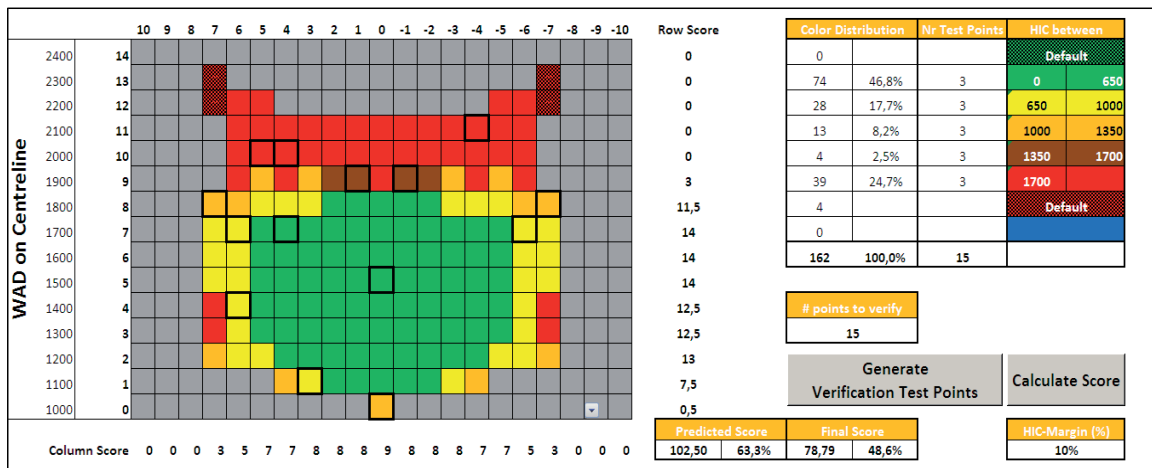
■ Assessment five color scheme

■ Green	HIC < 650	1.00 point
■ Yellow	650 < HIC < 1000	0.75 point
■ Orange	1000 < HIC < 1350	0.50 point
■ Brown	1350 < HIC < 1700	0.25 point
■ Red	1700 < HIC	0.00 point

5 color scheme
(HIC 650 – 1700)

Pedestrian Protection from 2013

- Manufacturer predicted data -> Colors, not HIC
- Random points generator selects 10 – 20 verification points (10 standard, 10 additional sponsored by manufacturer)



Flex PLI and upper legform impactor

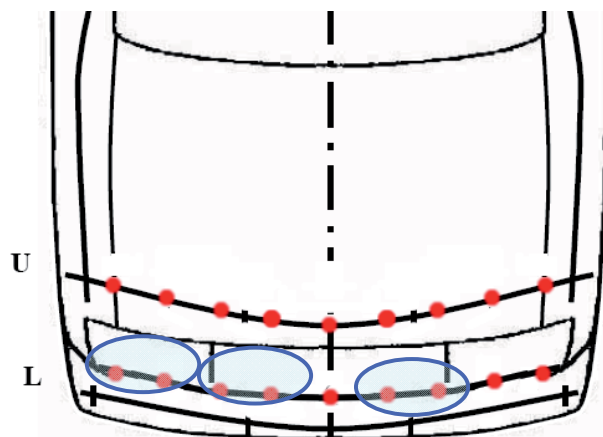
Introduction of Flex PLI in 2014, back to back tests finalized

Grid method for upper and lower legform impactor in 2014 (100mm)

Groups of 2-3 points selected, symmetry applied

max. 4 lab-tests

OEM can nominate any other point



Flex PLI and upper legform impactor

New upper legform to bonnet leading edge test, with modified upper legform impactor, industry proposal awaited there.

repeatability, reproducibility

latest status: no industry proposal

Active pedestrian protection protocol (V6.1)

pedestrian stands

physical testing reduced (actuators, just some tests to show the performance)

protection below the deployment threshold

simulation models



source: Humanetics

AEB Pedestrian from 2016

2 scenarios confirmed:

Obstructed running child 8 kph nearside

Unobstructed adult walking 5 kph nearside

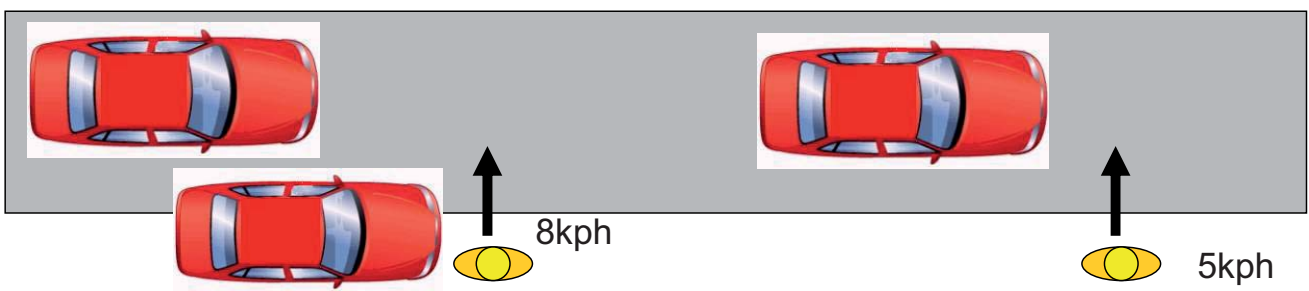
Possible 3rd scenario: unobstructed adult running 10 kph farside

Tests from 10 to 60 kph, avoidance and mitigation assessed

Incremental steps of 5 kph

Warning not yet included in the assessment (3rd scenario possible)

Aiming point centre of vehicle in all situations





Safety Assist

Safety Assist

SBR seat belt reminder

SLD/ISA speed limitation device, intelligence speed assist

ESC electronic stability control

AEBS

LDW/LKA lane departure warning and lane keeping assist

From 2014: 20% weighting

SBR/ESC

SBR

3 pts in total

2 pts frontal 1 pt rear seats, 1 pt for driver no longer available

ESC

Sine with dwell test in 2012 and 2013 based on ECE R13H

From 2014 multiple scenarios were no longer discussed, no further ESC testing, only if vehicle is not fulfilling the ECE requirements

Double lane change: ADAC + ISO 3888 (1+2)

Step-steer + power off: ISO 7401

Highway exit: ISO 4138

Brake in a turn: ISO 7975

Tests of actual cars should show the performance and collect data to check if there are different behaviours, pending on board decision, there might be a freeze of this group

3 pts in total

AEBS

- 3 test scenarios
- 3 pts
- from 2014 onwards

