



CORRELATION STUDIES FOR WORLDSID-50 AND Q10/Q6 CHILD DUMMIES IN LATEST OCCUPANT SIMULATIONS

Occupant Performance Astra K

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AGENDA



- Model Content Interior focused areas for Occupant Protection
- Opel Astra K Euro NCAP AE-MDB@50kph with WSID 50%

Dummy Arm Kinematic Injury Criteria Assessment Vehicle Kinematic **Dummy Kinematic**

- Opel Astra K Pole @32kph with WSID 50% Injury Criteria Assessment Vehicle Kinematic **Dummy Kinematic**
- Correlation Study Q10 / Q6 Child Dummies 4. Seat Model Development Sled Test / Component Testing Correlation **Full Vehicle Model Correlation**









Safety Assist



Pedestrian









MODEL CONTENT AND LOAD CASES

- Target is CY2015 EuroNCAP 5* compliance
- 50 kph AE-MDB and 32 kph 75° pole impacts
- CAE driven integrated development of structural behavior & occupant protection (adult & child safety)
- Additional focus on integrity of interior parts (door and IP) for ECE compliance
- Almost identical behavior of full roof and sun roof versions achieved by a common roof bow #2

AE-MDB 1300kg @50kph



75° Pole @32kph





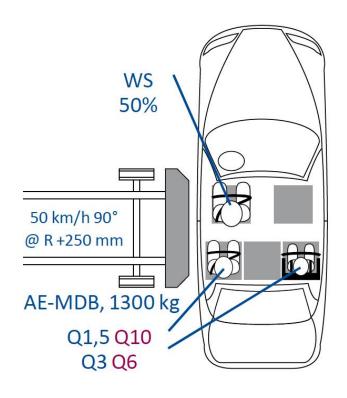


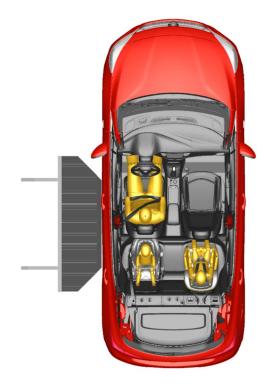




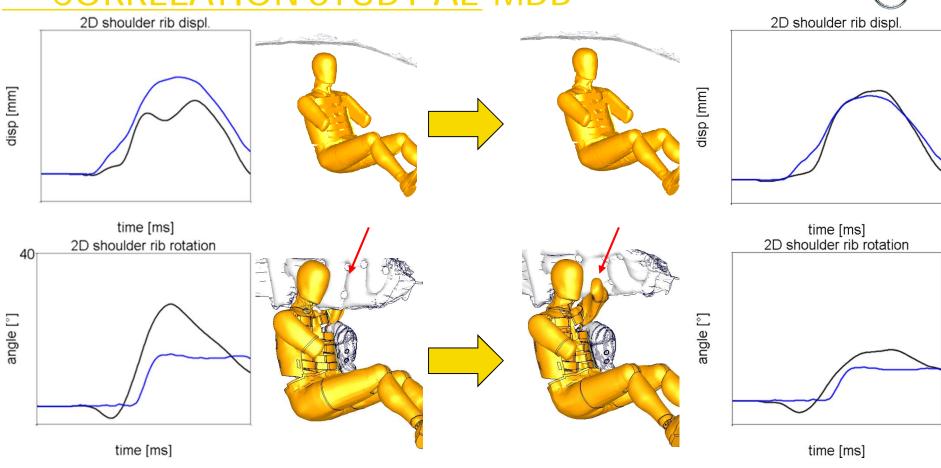
Astra K Euro NCAP 2015 Side Impact - AE-MDB -





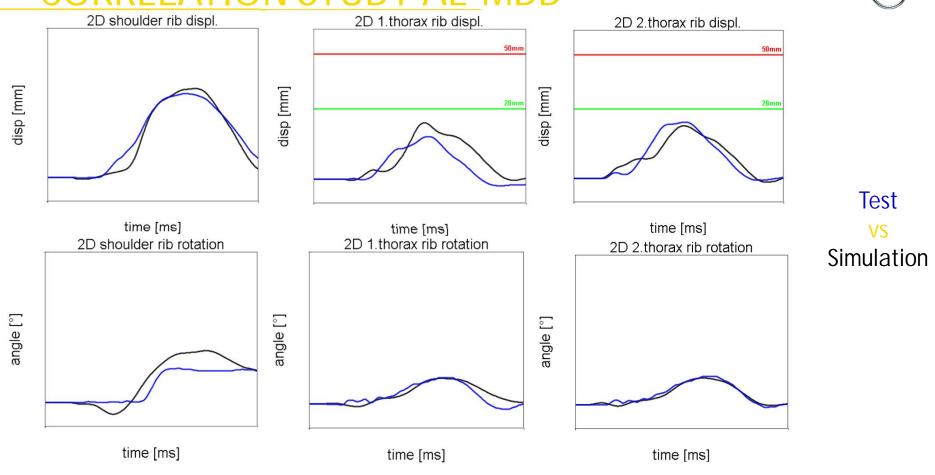


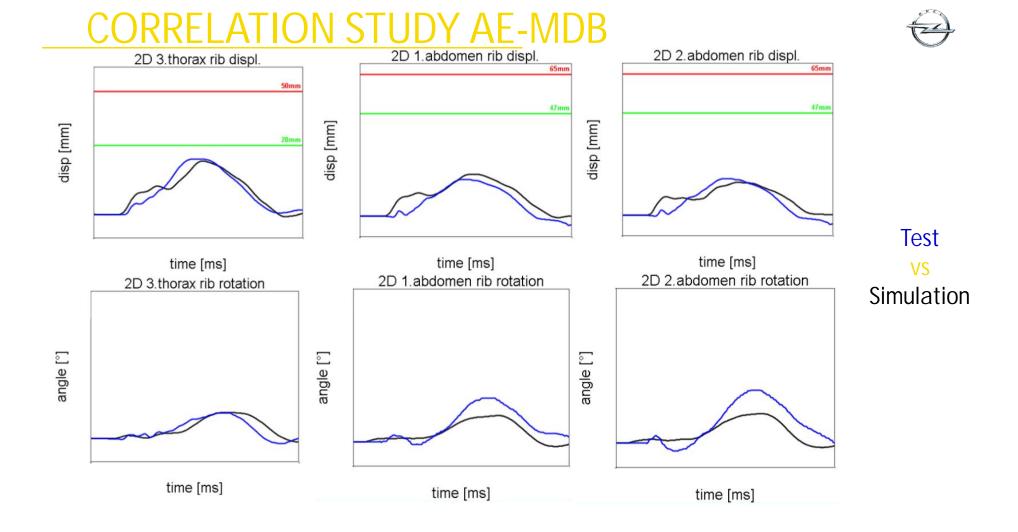
CORRELATION STUDY AE-MDB 2D shoulder rib displ.



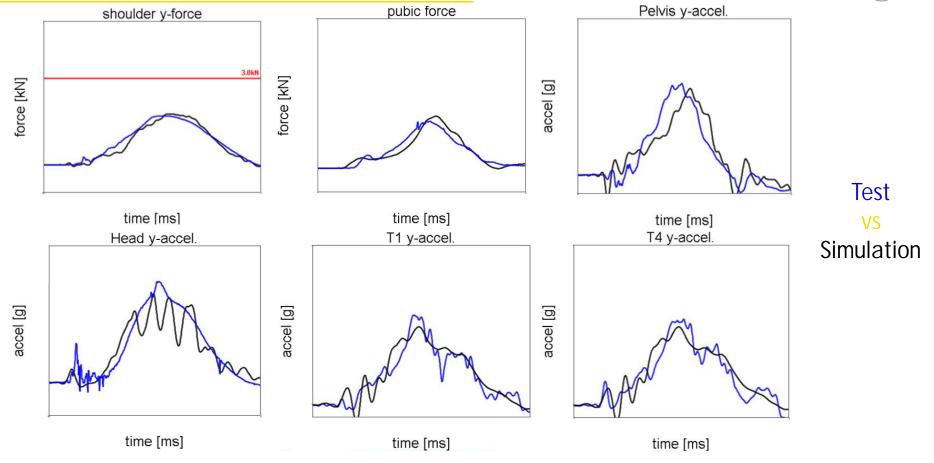












LATION STUDY AE-MDB OF SAFER CA **EURO NCAP Side Impact EURO NCAP Side Impact** WS50 WS50 50 km/h 90° AE-MDB Side Impact 50 km/h 90° AE-MDB Side Impact Score Score Score Score HIC 15 **+** Head a 3ms 4.00 Head Head a 3ms 9 4.00 Head Incorrect airbag deployment → 0.00 Incorrect airbag deployment → 0.00 → 4.00 Test Shoulder Peak Lateral force Shoulder | Shoulder Peak Lateral force <3 [kN] <3 [kN] 50 Compression, Top Compression, Top 50 <1 [m/s] Viscous Criterion, Top 0.00 Viscous Criterion, Top VS Compression, Mid Compression, Mid 4.00 Chest 4.00 Chest <1 [m/s] <1 [m/s] 0.00 Viscous Criterion, Mid → 0.00 Chest Viscous Criterion, Mid Simulation Compression, Bot 28 50 [mm] Compression, Bot Viscous Criterion, Bot → 0.00 Viscous Criterion, Bot <1 [m/s] 0.00 0.00 → 0.00 Incorrect airbag deployment Incorrect airbag deployment 47 65 [mm] Compression, Top Compression, Top → 0.00 Viscous Criterion, Top Viscous Criterion, Top <1 [m/s] Abdomen Compression, Bot 4.00 Abdomen Abdomen Compression, Bot 4.00 Abdomen 65 47 65 [mm] 0.00 <1 [m/s] 0.00 • 0.00 Viscous Criterion, Top Viscous Criterion, Top Incorrect airbag deployment → 0.00 Incorrect airbag deployment Pubic Symphysis force 2.80 [kN] Pubic Symphysis force 1.70 2.80 [kN] Pelvis Pelvis Incorrect airbag deployment → 0.00 Incorrect airbag deployment → 0.00 Doors opening during test → 0.00 → 16.00 of 16 Doors opening during test → 0.00 → 16.00 of 16 8.00 of 8 8.00 of 8 Total scaled points: Total scaled points: Protection Score Protection Score Good Good 2.67 - 3.99 Adequate 2.67 - 3.99

Marginal

Weak

Poor

1,33 - 2,66

0,01 - 1,32

Adequate Marginal

Weak

Poor

1,33 - 2,66

0,01 - 1,32

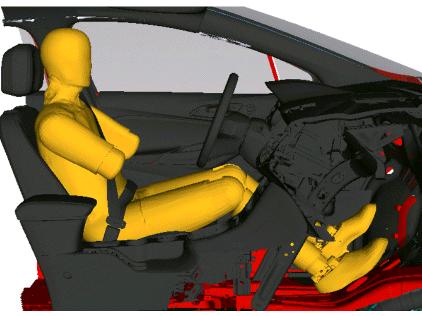






Test vs Simulation





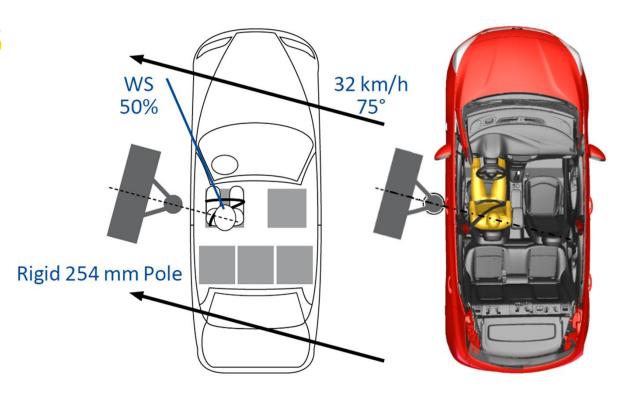
CORRELATION STUDY POLE





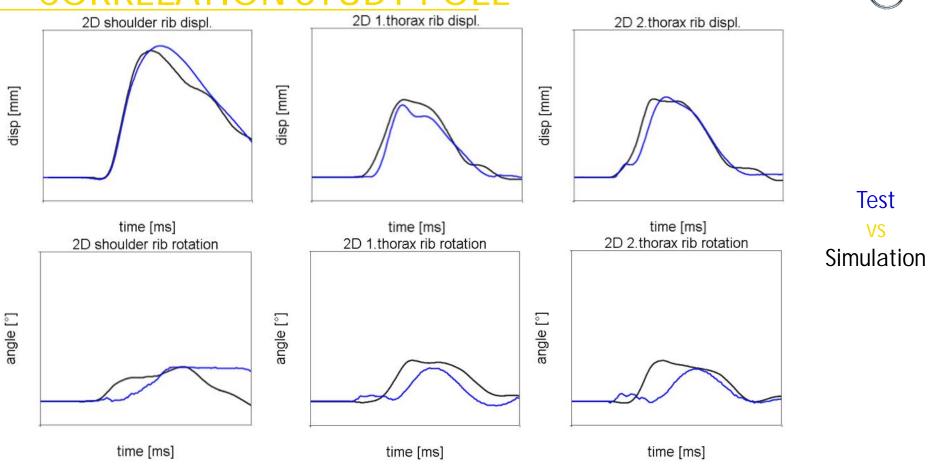
Astra K Euro NCAP 2015 Side Impact - AE-MDB -

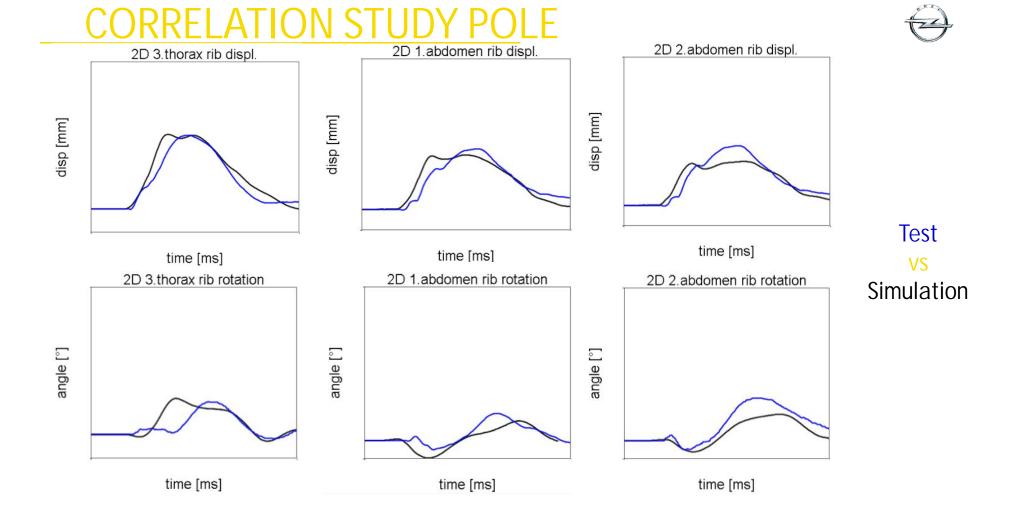


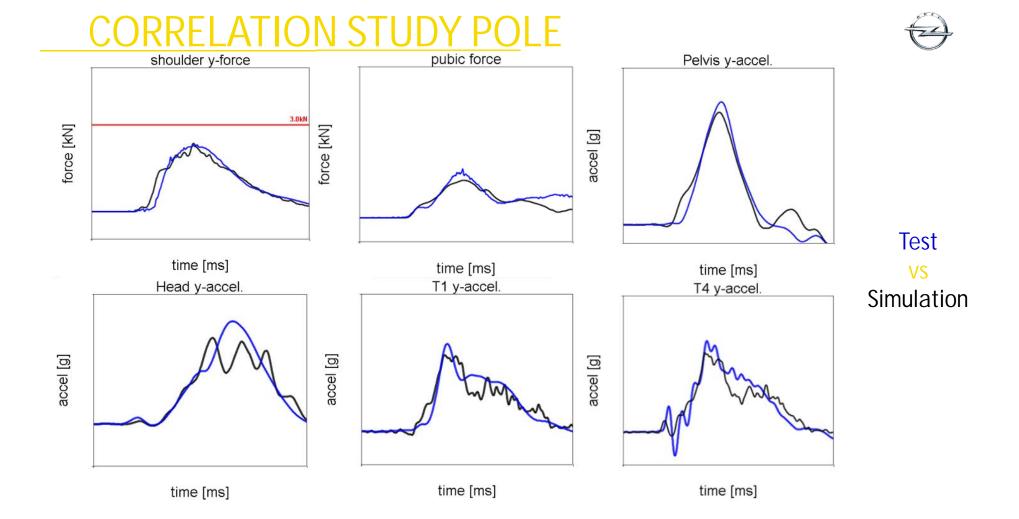










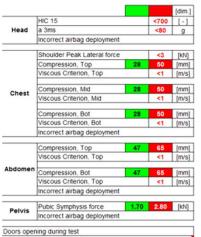






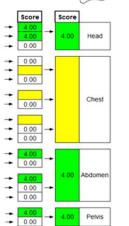
EURO NCAP Side Impact

32 km/h 75° Rigid Pole Side Impact



Head protection assessment Protection Score Good Adequate 2.67 - 3.99 Marginal 1,33 - 2,66 Weak 0,01 - 1,32 Poor 0





of 16

of 8

0.00

0.00

Total scaled points:



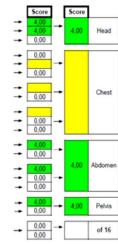


32 km/h 75° Rigid Pole Side Impact



				[dim.]
Head	HIC 15		<700	[-]
	a 3ms		<80	9
	Incorrect airbag deployment			_
	Shoulder Peak Lateral force	-	<3	[kN]
Chest	Compression, Top	28	50	[mm]
	Viscous Criterion, Top	20	<1	[m/s]
	Compression, Mid	28	50	[mm]
	Viscous Criterion, Mid	-	<1	[m/s]
	Compression, Bot	28	50	[mm]
	Viscous Criterion, Bot		<1	[m/s]
	Incorrect airbag deployment			
Abdomen	Compression, Top	47	65	[mm]
	Viscous Criterion, Top		<1	[m/s]
	Compression, Bot	47	65	[mm]
	Viscous Criterion, Top		<1	[m/s]
	Incorrect airbag deployment			
Pelvis	Pubic Symphysis force	1.70	2,80	[kN]
	Incorrect airbag deployment			
	ng during test tion assessment			

Protection	Score
Good	4
Adequate	2,67 - 3,99
Marginal	1,33 - 2,66
Weak	0.01 - 1.32
Poor	



Total scaled points:

of 8

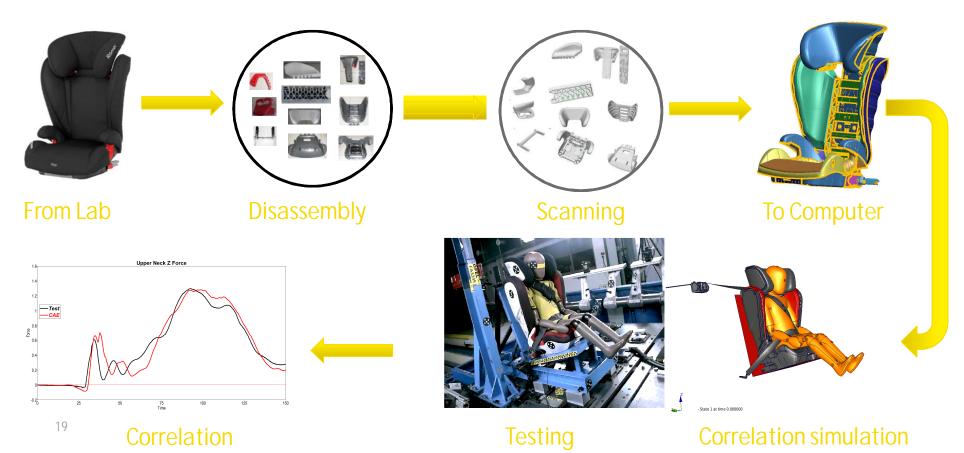


Test vs Simulation



CHILD SEAT DEVELOPMENT (Q10/Q6)





Q6 CORRELATION STUDY





Rigid fixture test with generic pulse:

Dummy:Humanetics_Q6_V2.0.3_S3

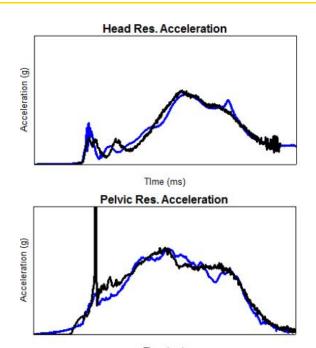
CRS: Römer Kidfix XP



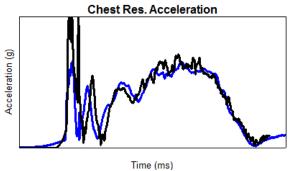


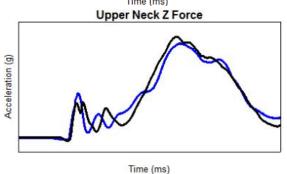
Q6 CORRELATION STUDY







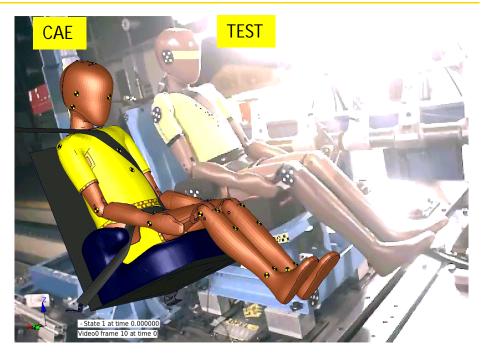




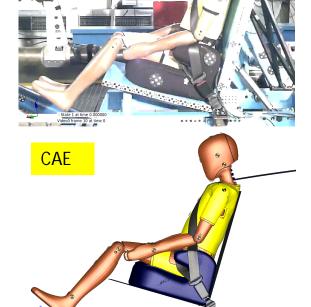
Test VS Simulation

Q10 CORRELATION STUDY





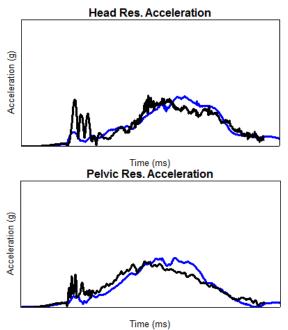
Rigid fixture test with generic pulse: Dummy:Humanetics_Q10_V1.5_S3 CRS: Fisher Price



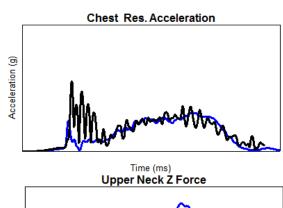
TEST

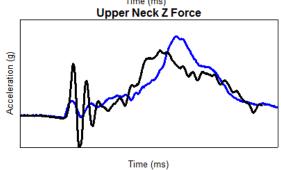
Q10 CORRELATION STUDY











Test VS Simulation



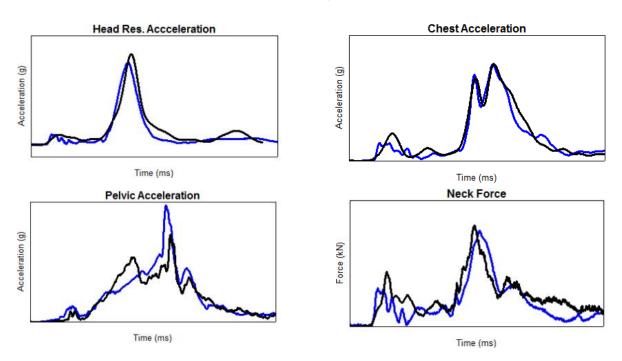
Test

Simulation vs





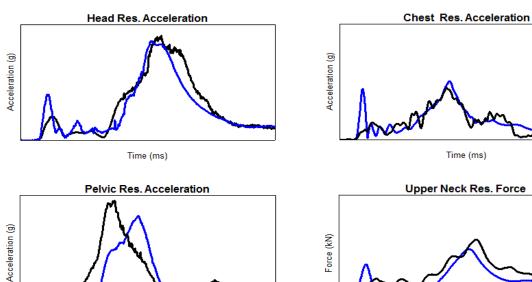
Q10 Dummy



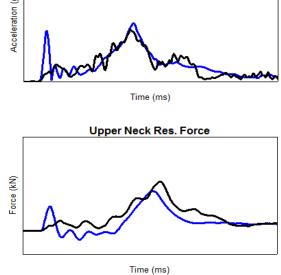
Test VS Simulation



Q6 Dummy



Time (ms)



Test VS Simulation

