Side Impact Test Results using WS & ES2 in AE-MDB

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Korea Automobile Testing & Research Institute

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Program Overview

- Assessment of WorldSID dummy in vehicle crash environment.
  - Test conditions
    - AE-MDB 1,300kg, 50km/h
  - Comparison of WorldSID 50th and ES2 dummies
    - for Compact & Midsized vehicles (4 times)
    - Injury parameters, Rib deflections etc.

Note : Test was conducted by a part of KATRI & HMC WorldSID & PSI Joint Research program

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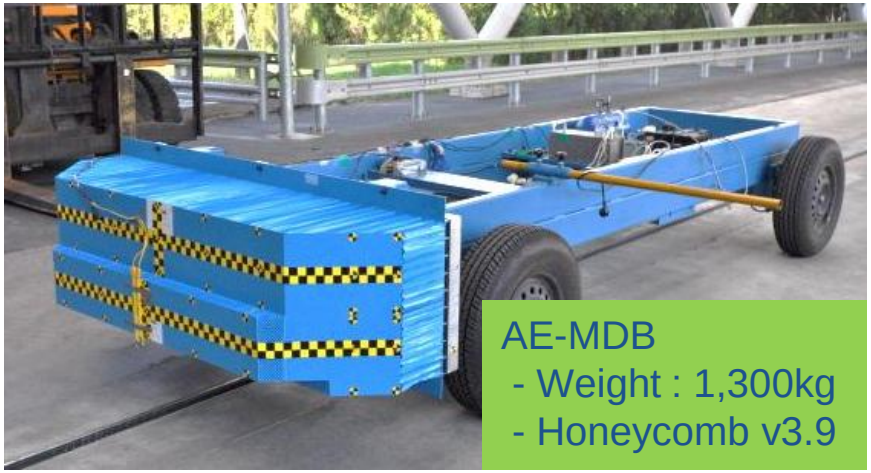
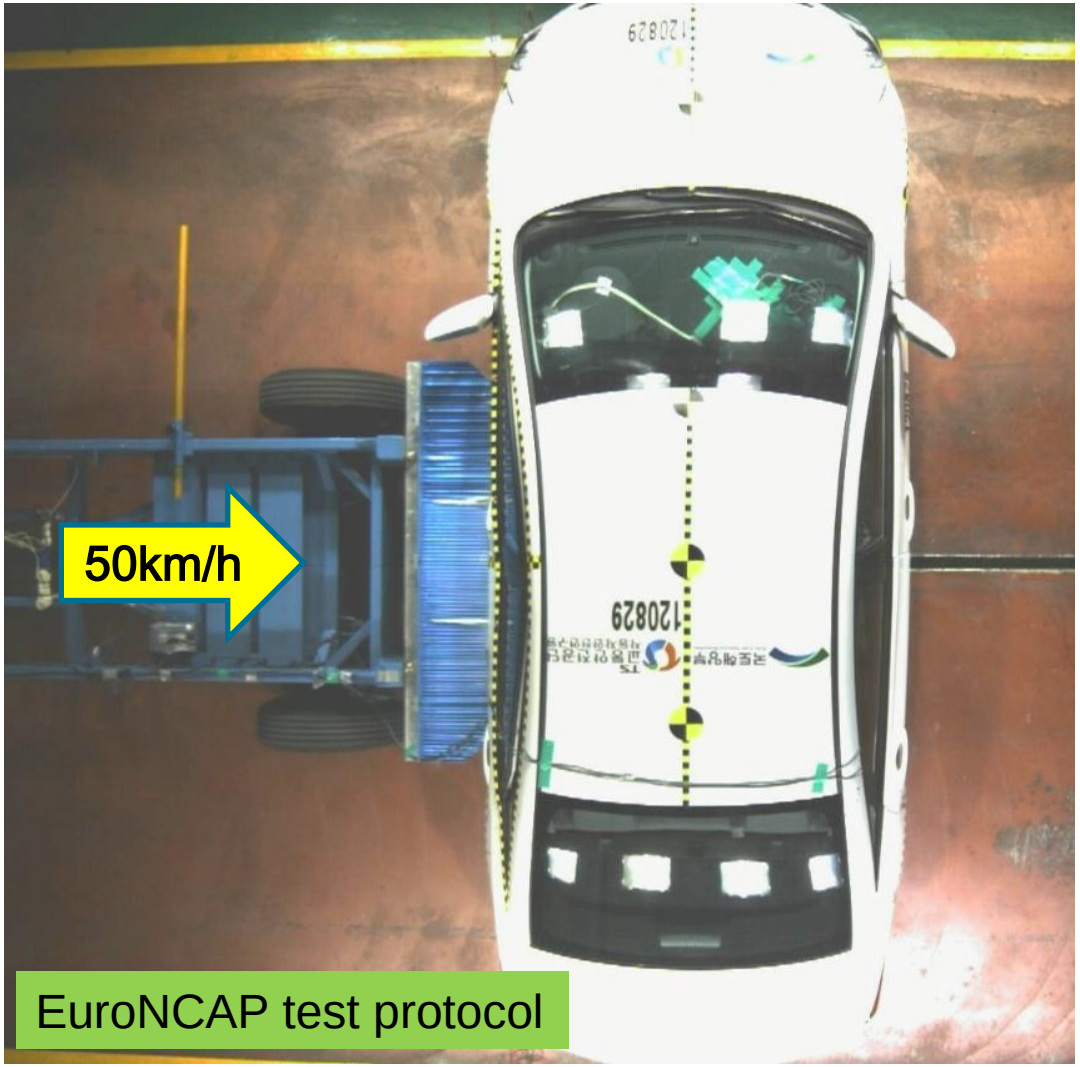
Test Setup

Test Condition & Matrix

Vehicle	GVW(kg)	Dummy
Compact vehicle	1,042	ES2
	1,039	WS 50th
Midsized vehicle	1,528	ES2
	1,533	WS 50th



AE-MDB
- Weight : 1,300kg
- Honeycomb v3.9



EuroNCAP test protocol

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Test Setup

Compact vehicle

Test Setup

Midsized vehicle

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Test Setup

Compact vehicle

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Test Setup

Compact vehicle

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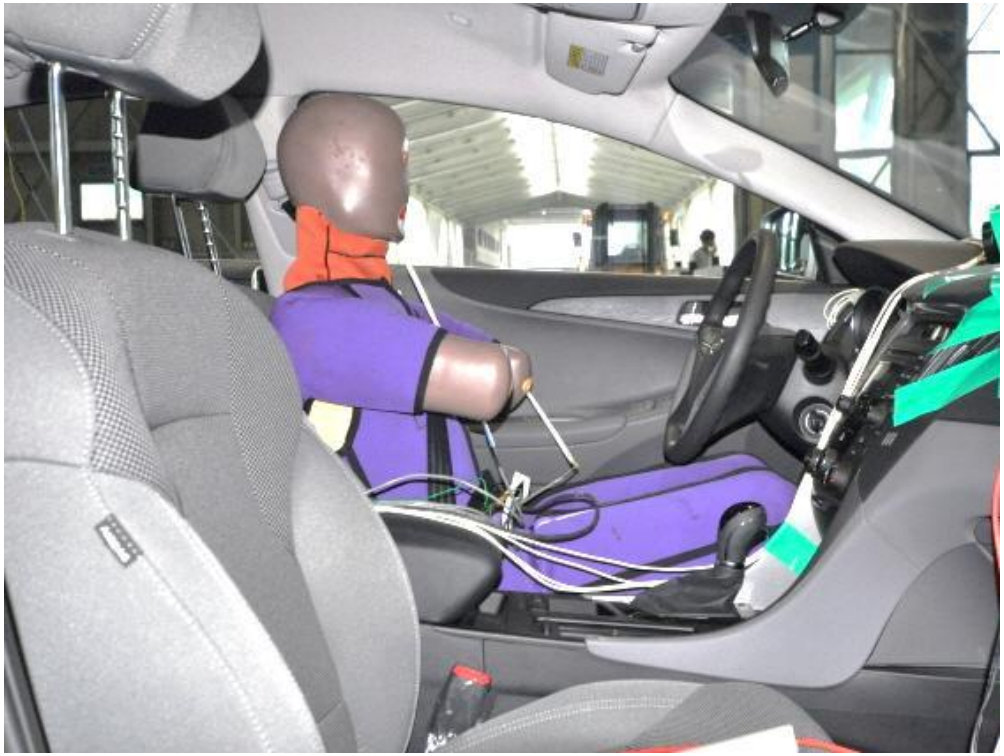
Test Setup

Midsized vehicle



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Test Setup

Midsized vehicle

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Tests

Compact vehicle

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Midsized vehicle

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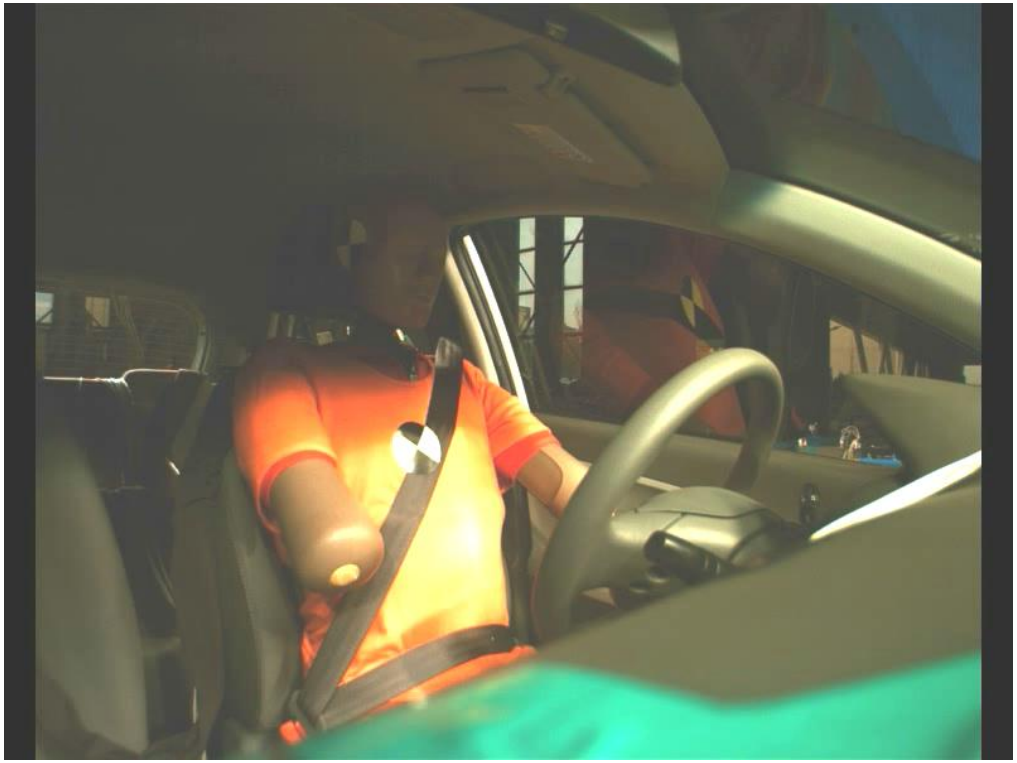
Compact vehicle



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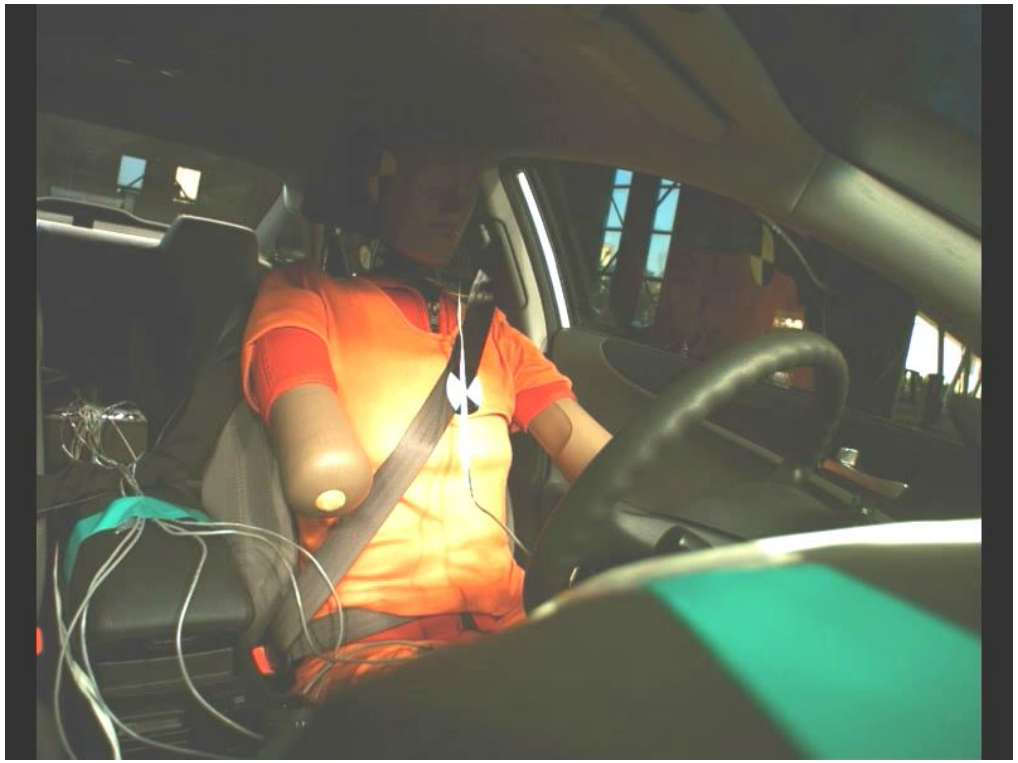
Tests

Midsized vehicle



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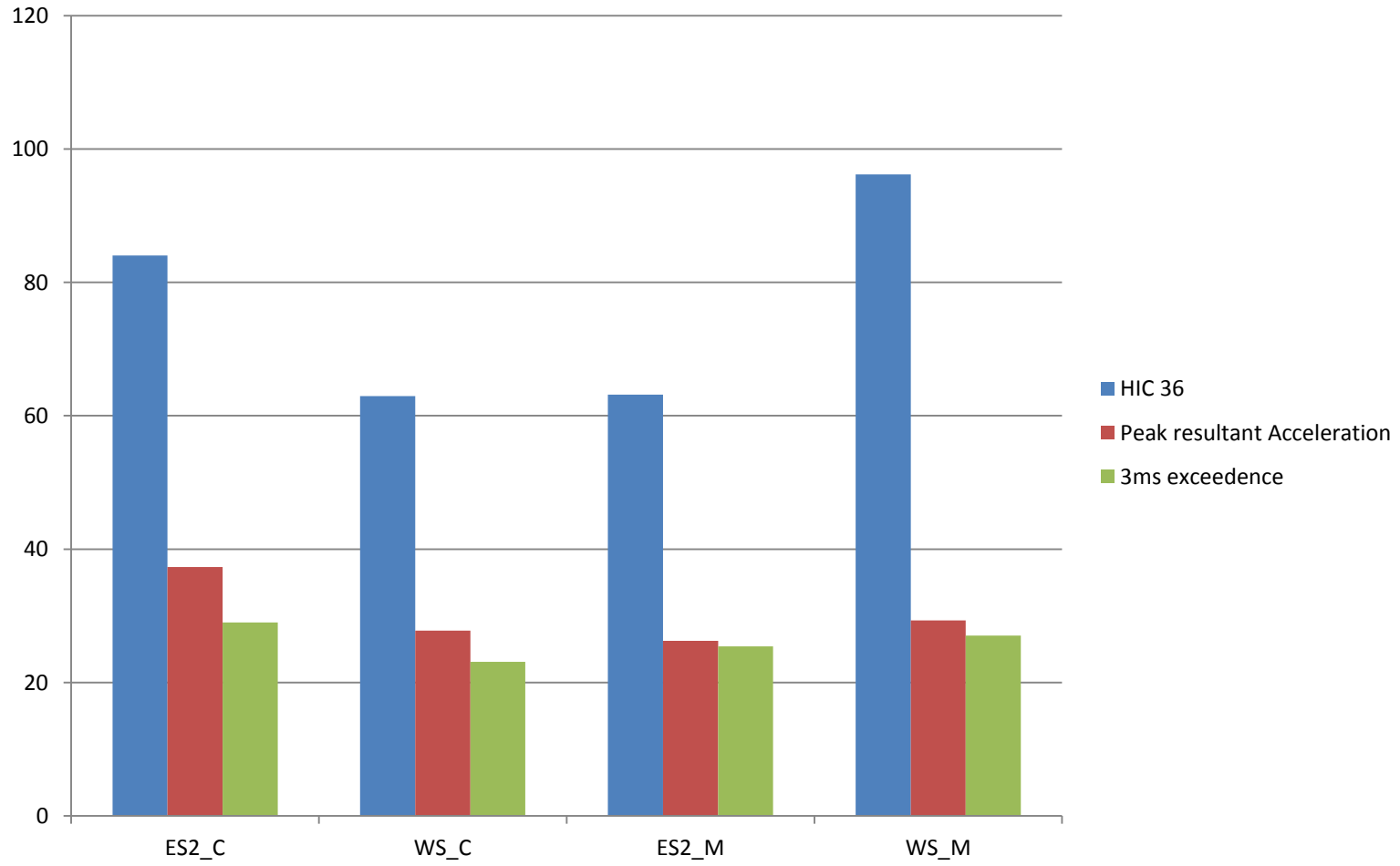
Test results

			Compact vehicle		Midsized vehicle	
			ES2	WS 50th	ES2	WS 50th
Head	HIC 36	-	84.03	62.93	63.15	96.2
	Peak resultant Acceleration	g	37.33	27.79	26.23	29.33
	3ms	g	29	23.09	25.41	27.05
Shoulder	Shoulder Rib Deflection(1)	mm	-	20.12	-	38.7
Thorax	Upper Rib Deflection(2)	mm	32.4	7.09	12.3	6.13
	Middle Rib Deflection(3)	mm	22.1	7.57	10.0	9.6
	Lower Rib Deflection(4)	mm	22.5	11.89	15.7	18.3
Pelvis	Abdomen Rib1 Deflection(5)	mm	-	16.66	-	20.6
	Abdomen Rib2 Deflection(6)	mm	-	31.03	-	21.9
	Pubic Symphysis Force(Fy)	kN	2.11	1.2	2.48	1.37

Test results

Head results for Compact and midsized vehicle tests



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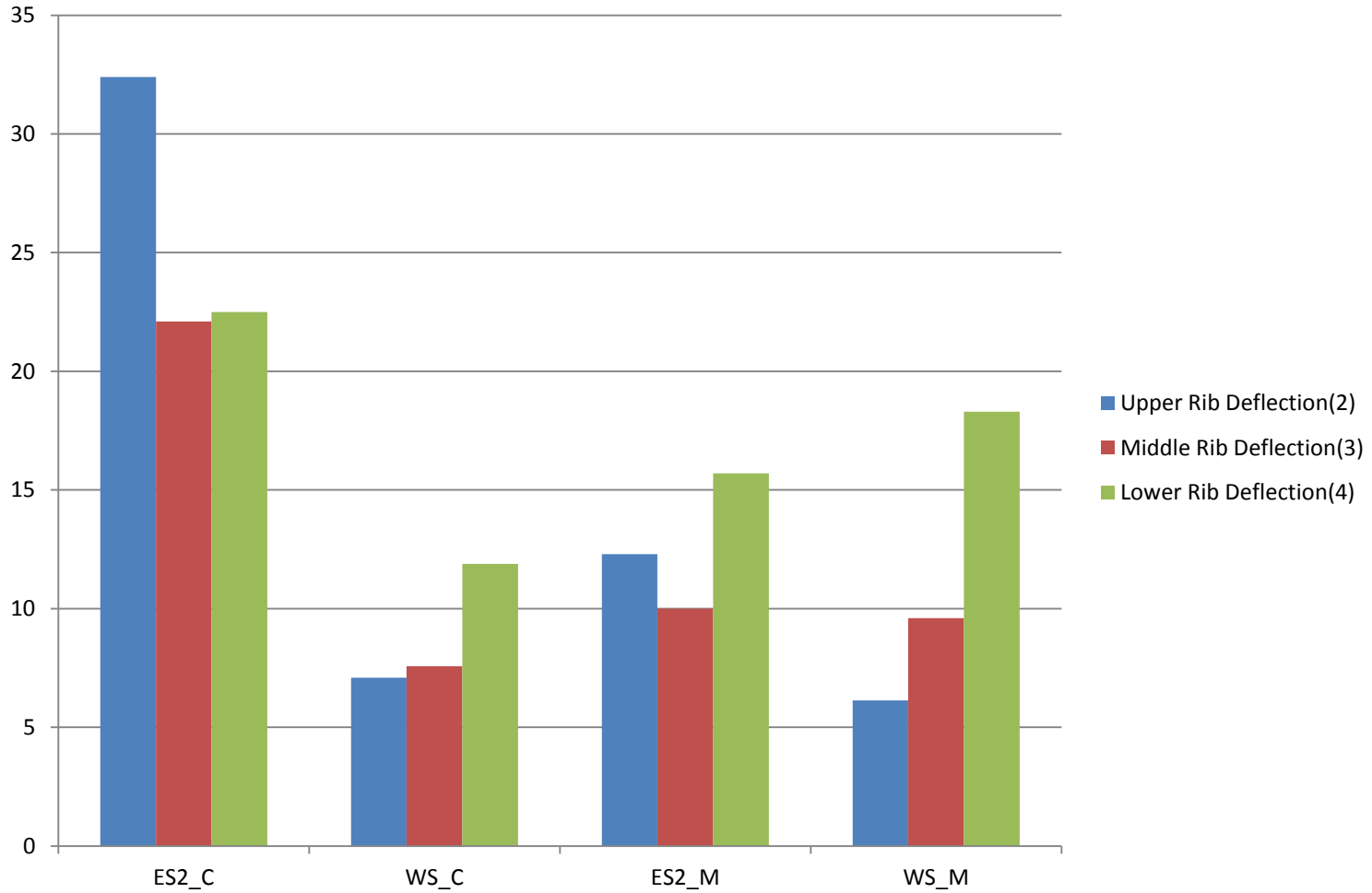
Test results

Thorax results for compact and midsized vehicle tests



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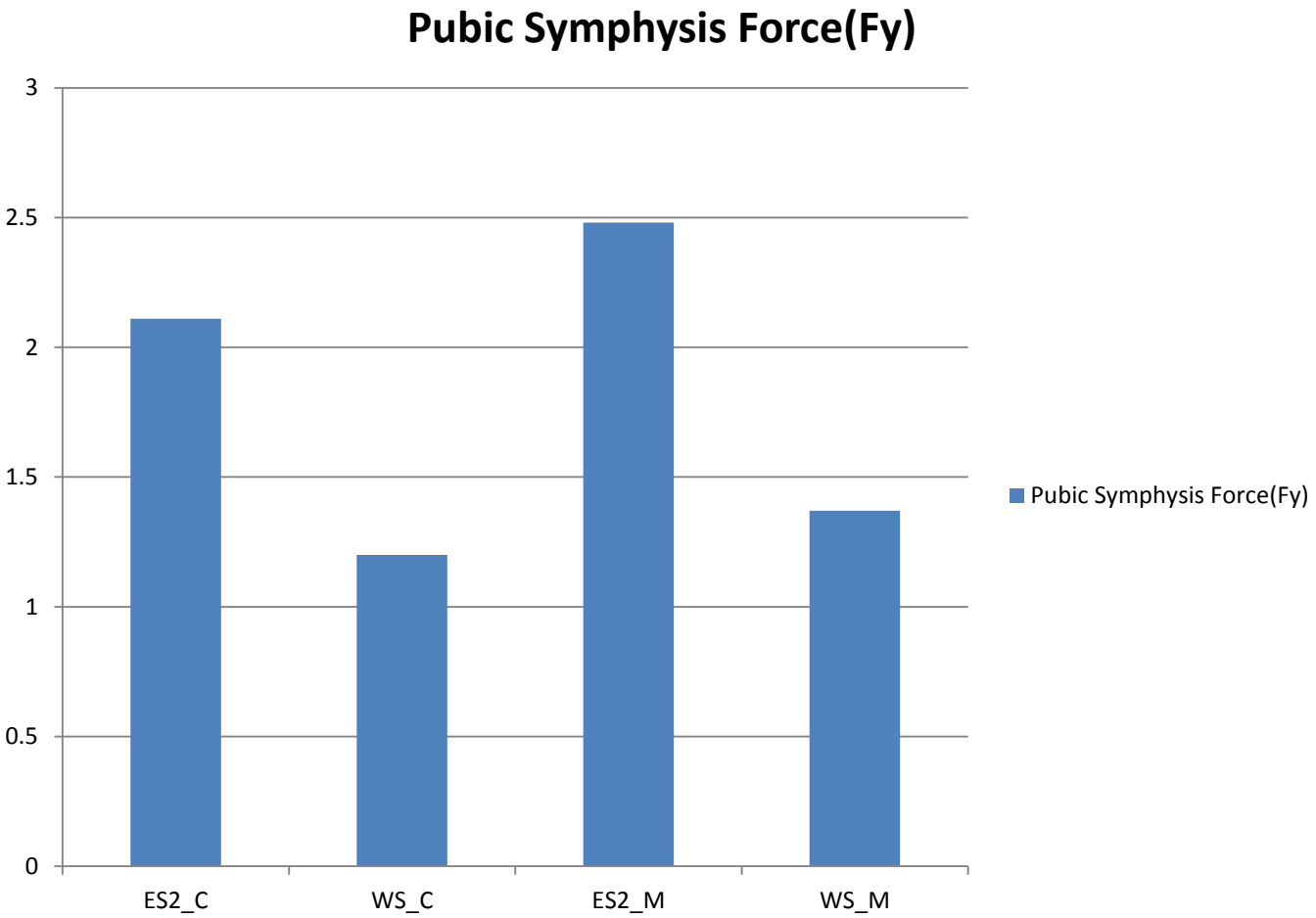
Test results

Pelvis results for compact and midsized vehicle tests



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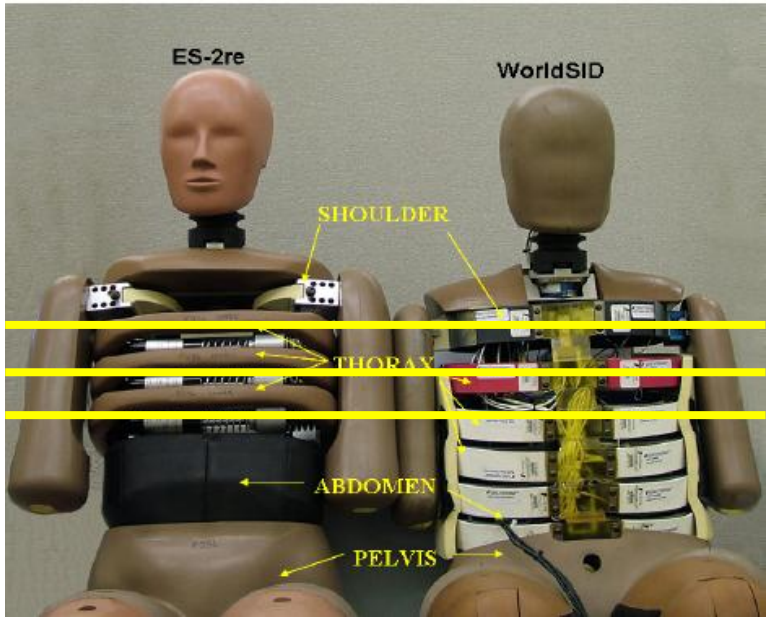
Test result Analysis



* Source : Dynamic side impact testing wit the 50th percentile male WorldSID compared to the ES2re, Allison E. Louden(NHTSA)

		Compact vehicle		Midsized vehicle	
		ES2	WS 50th	ES2	WS 50th
Shoulder Rib Deflection(1)	mm	-	20.12	-	38.7
Upper Rib Deflection(2)	mm	32.4	7.09	12.3	6.13
Middle Rib Deflection(3)	mm	22.1	7.57	10.0	9.6
Lower Rib Deflection(4)	mm	22.5	11.89	15.7	18.3

Conversion

Matching position for Rib

ES2	WS 50th
Upper Rib	Shoulder Rib
Middle Rib	Upper Rib
Lower Rib	Middle Rib

		Compact vehicle		Midsized vehicle	
		ES2	WS 50th	ES2	WS 50th
Shoulder Rib Deflection(1)	mm	32.4	20.12	12.3	38.7
Upper Rib Deflection(2)	mm	22.1	7.09	10.0	6.13
Middle Rib Deflection(3)	mm	22.5	7.57	15.7	9.6
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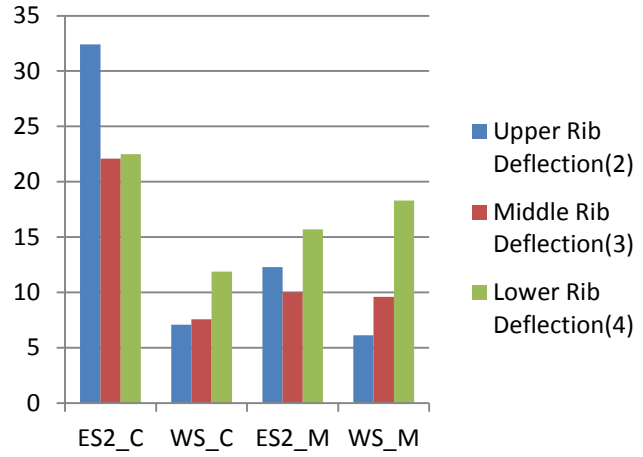
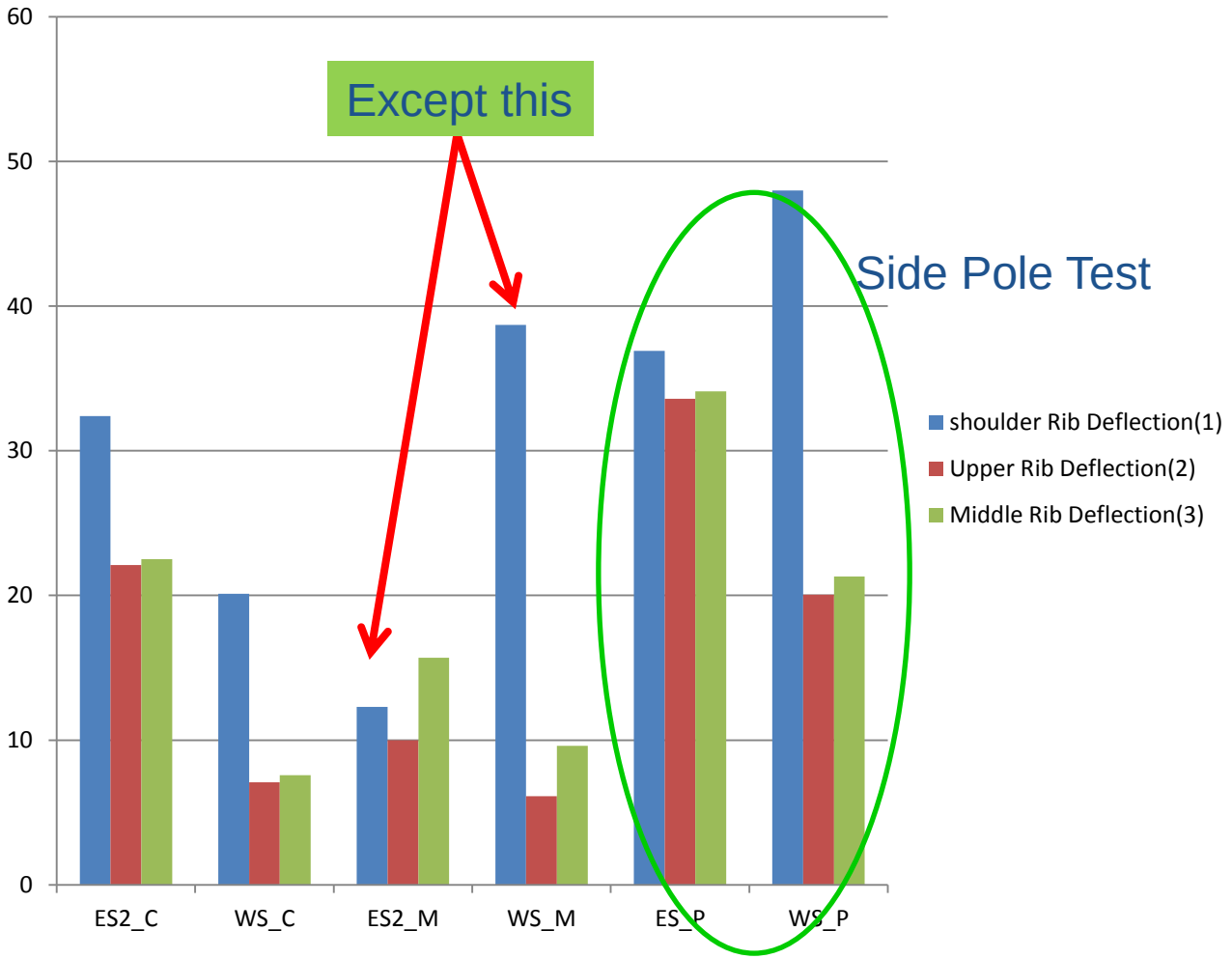
Test result Analysis



Before Conversion



After Conversion

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Summary

- Thoracic Injury responses (e.g location of maximum Rib deflections) of WorldSID and ES2 dummy are not consistent with each crash test.
  - This seems due to the differences of seating position & posture, dummy heights etc

- After aligned with heights of rib locations, the location of maximum rib deflection may consistent with two WS & ES2 dummies
  - ➢ It is needed to collect more crash test data and research to verify this results

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Thank you
for your attention!

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