

Contents of Headform Test Procedure

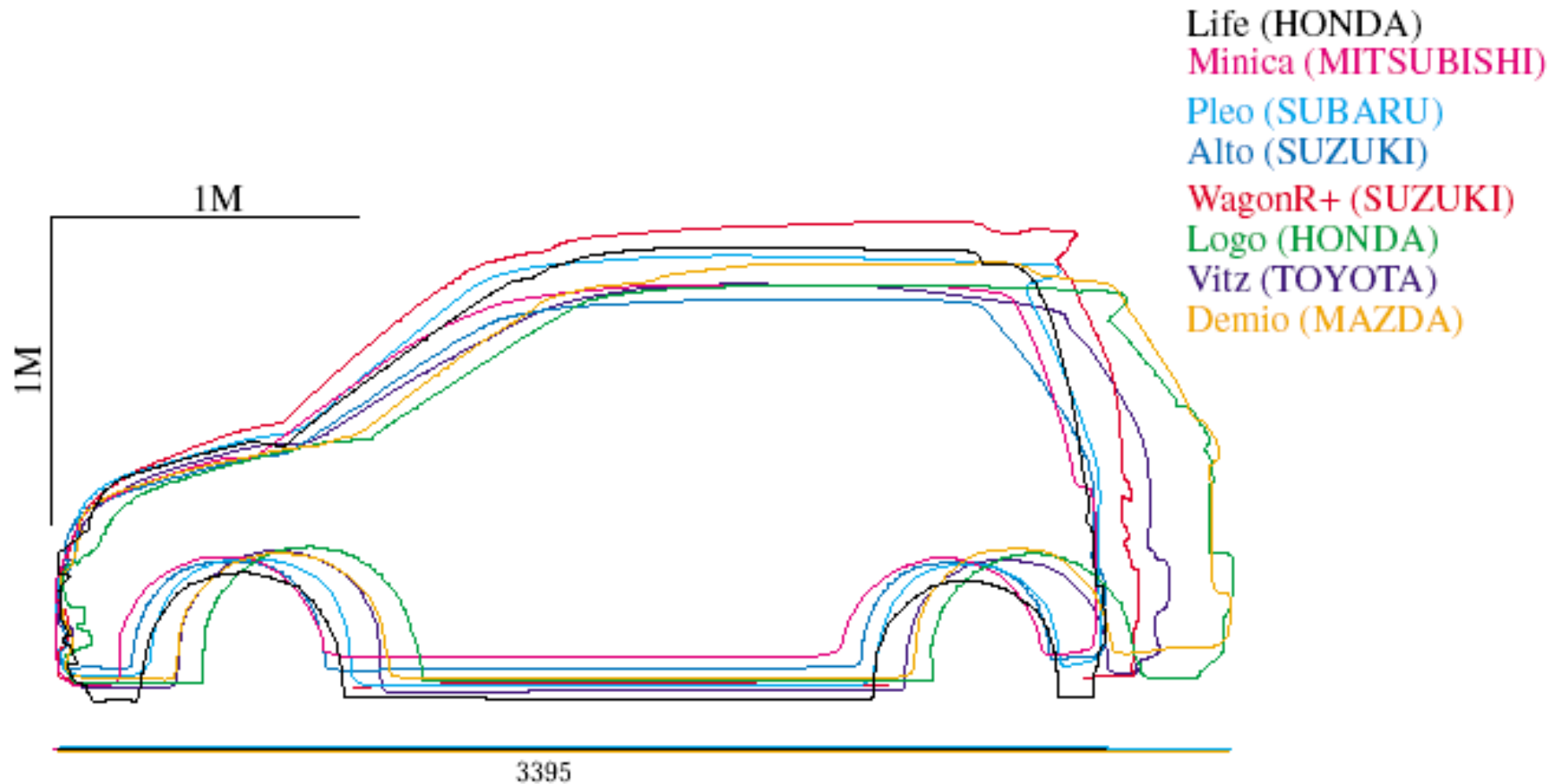
1. Vehicle Shape
2. Vehicle Shape Classification
3. Vehicle Shape Determination
4. Parameters for Computer Simulation
5. Effective Head Mass at Impact
6. Head Impact Speed Ratio for Bonnet
7. Head Impact Speed Ratio for Windshield
8. Bonnet Impact Angle for Adult & Child
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1. Vehicle Shape

	Toyota	Honda	Mazda	Nissan	Suzuki	Isuzu	Mitsubishi	Subaru	PSA/CITRO	Ford	
Sedan (+ light vehi (+ sports)	Celica	Accord	Demio	Sunny	Alto		Minica	Pleo	PEUGEOT 106	Cougar	
	Vitz	Logo	Familia S-wa	March	Cultus		Legnum	Impreza	PEUGEOT 306	Fiesta	
	Crown	Legend	Familia Sedan	Stagea	WagonR+			Legacy	PEUGEOT 406	Focus	
	Carolla	Life	Capera Wagon	Cefiro					PEUGEOT 406 COUPE	Ka	
		Civic	Capera Sedan	President					PEUGEOT 607	Mondeo	
		NSX	RX-7						CITROEN SAXO	Puma	
		S2000	Roadstar	Millenia					CITROEN XSARA		
									CITROEN XSARA PICASSO		
									CITROEN XANTIA		
											Total
	5	7	8	5	3		2	3	9	6	48
1Box	Estima	Vamos	Bongo				Space Gear				
	Town ace										
	Town ace Nc										
	Hiace										
	Granvia										Total
	5	1	1				1				8
RV	RAV4J V	CR-V		Terrano	Escudo	Wizard	Chariot Gran	Forester			
	Land cruiser	S-MX			Jimny	Elf					
	Hylux surf	Odyssey				Vehi Cross					
	Harrier					Bighorn					Total
		4	3		1	2	4	1	1		

•Two sedans (HOLDEN COMMODORE, FORD FALCON) provided from Australia, and four sedans and three SUVs provided from USA are not included in this table.

1-1. Vehicle Shape .Small & 1Liter Car.



Ref. : PS152,153,155.

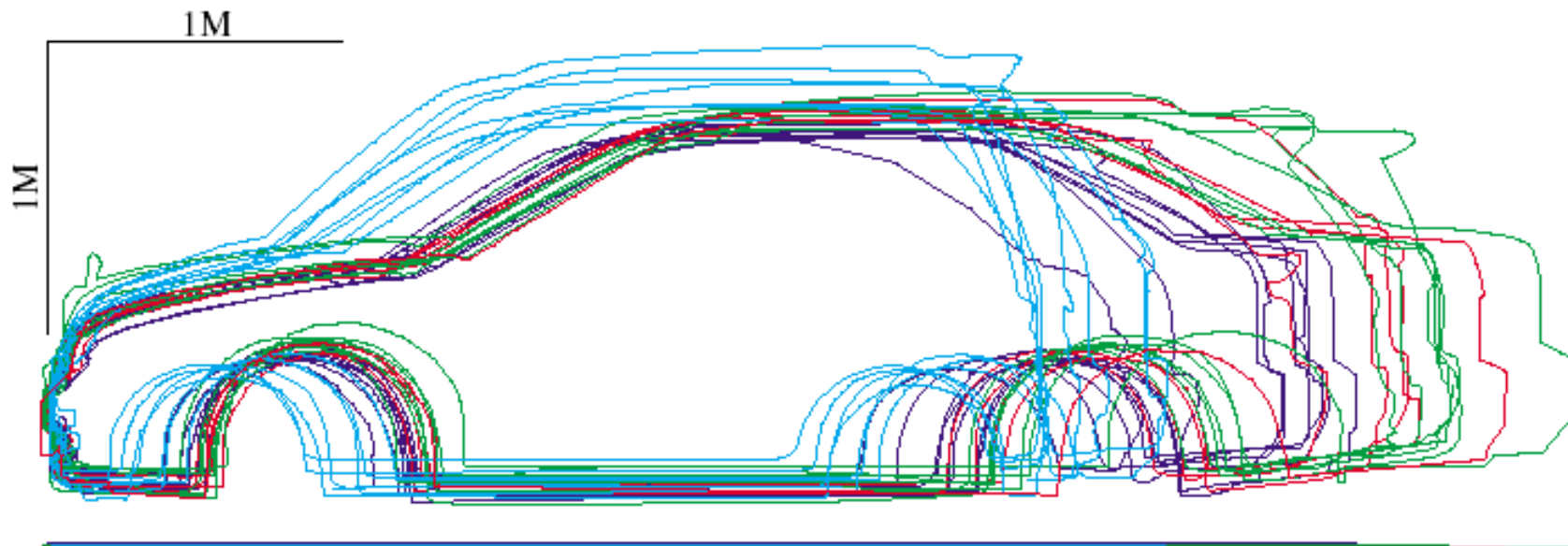
1-2. Vehicle Shape (Sedan . Wagon)

Life (HONDA)
Minica (MITSUBISHI)
Pleo (SUBARU)
Alto (SUZUKI)
WagonR+ (SUZUKI)
Logo (HONDA)
Vitz (TOYOTA)
Demio (MAZDA)

Familia S-wagon (MAZDA)
Familia Sedan (MAZDA)
Carolla (TOYOTA)
Cultus (SUZUKI)
Sunny (NISSAN)
March (NISSAN)
Civic 3D (HONDA)
Civic 4D (HONDA)

Impreza (SUBARU)
Capera Wagon (MAZDA)
Capera Sedan (MAZDA)
Accord (HONDA)
Legend (HONDA)

Cefiro (NISSAN)
Legacy (SUBARU)
Crown (TOYOTA)
Stagea (NISSAN)
Legnum (MITSUBISHI)
Millenia (MAZDA)
President (NISSAN)



Ref. : PS152,153,155.

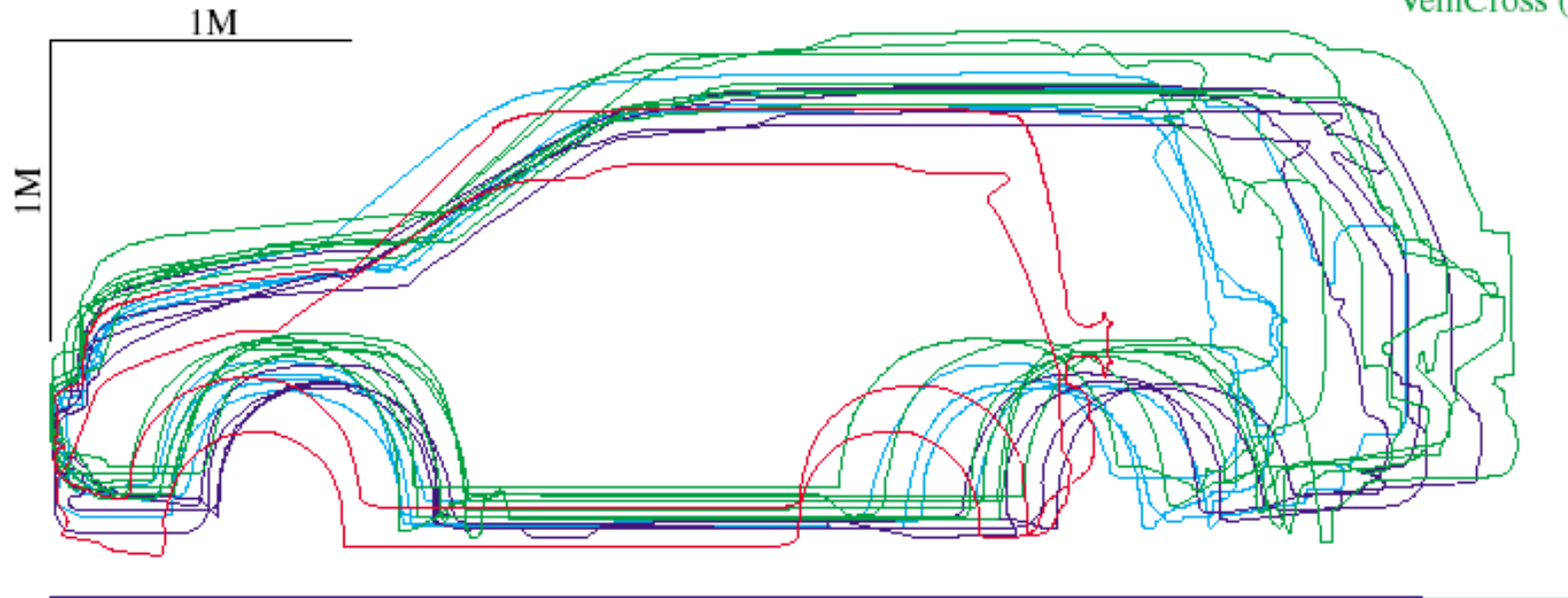
1-3. Vehicle Shape (SUV)

Jimny (SUZUKI)
Dingo (MITSUBISHI)

CR-V (HONDA)
S-MX (HONDA)
Escudo (SUZUKI)
RAV4J V (TOYOTA)

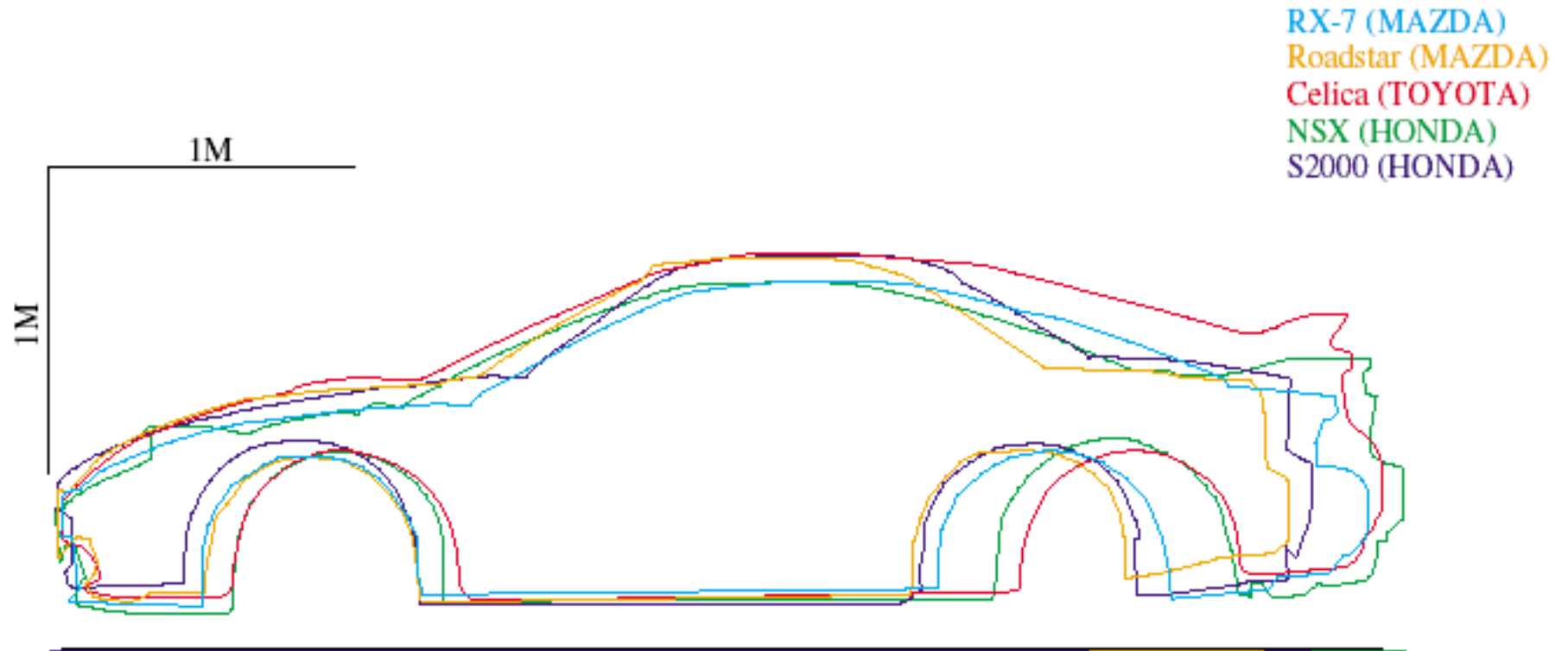
Odyssey (NISSAN)
Harrier (TOYOTA)
Chariot Grandis (MITSUBISHI)
Forester (SUBARU)

Land Cruiser (TOYOTA)
Bighorn (ISUZU)
Hylux Surf (TOYOTA)
Terrano (NISSAN)
Wizard (ISUZU)
VehiCross (ISUZU)



Ref. : PS152,153,155.

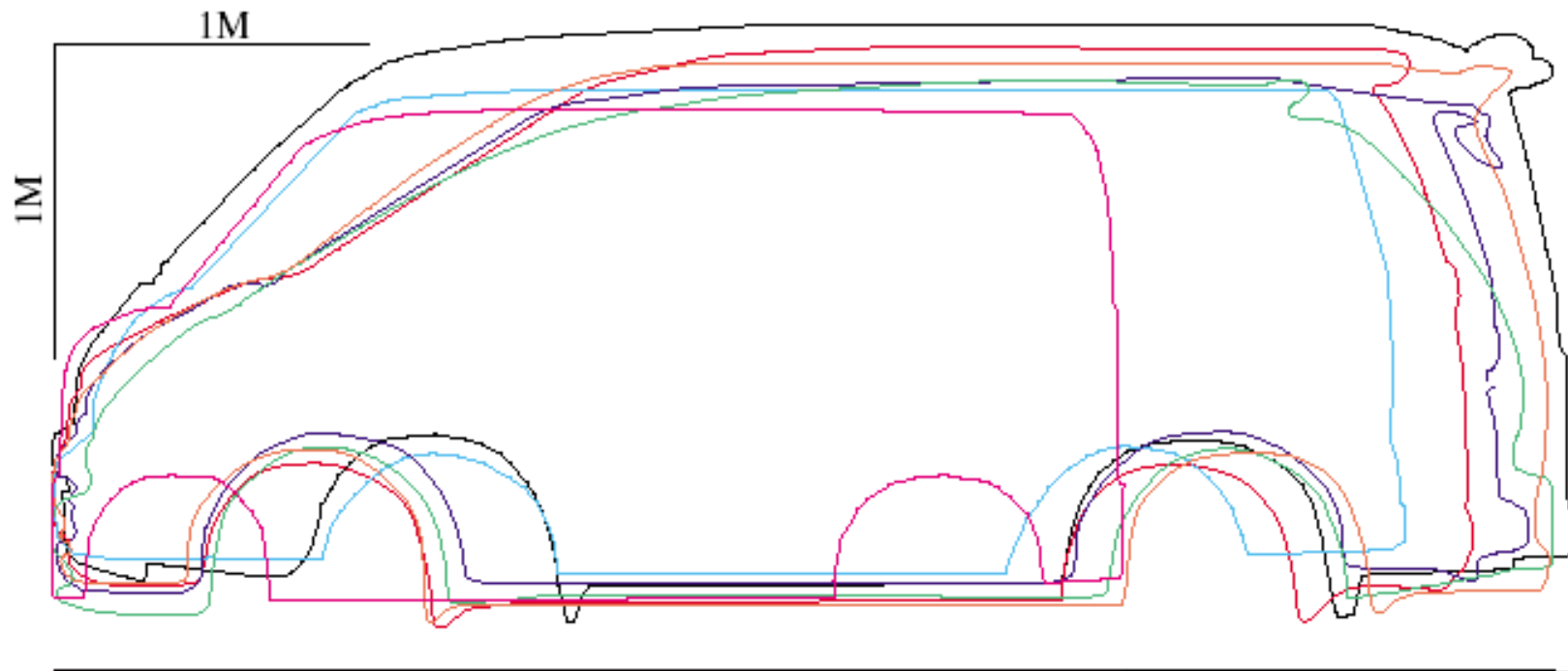
1-4. Vehicle Shape (Sport Type)



Ref. : PS152,153,155.

1-5. Vehicle Shape (One Box)

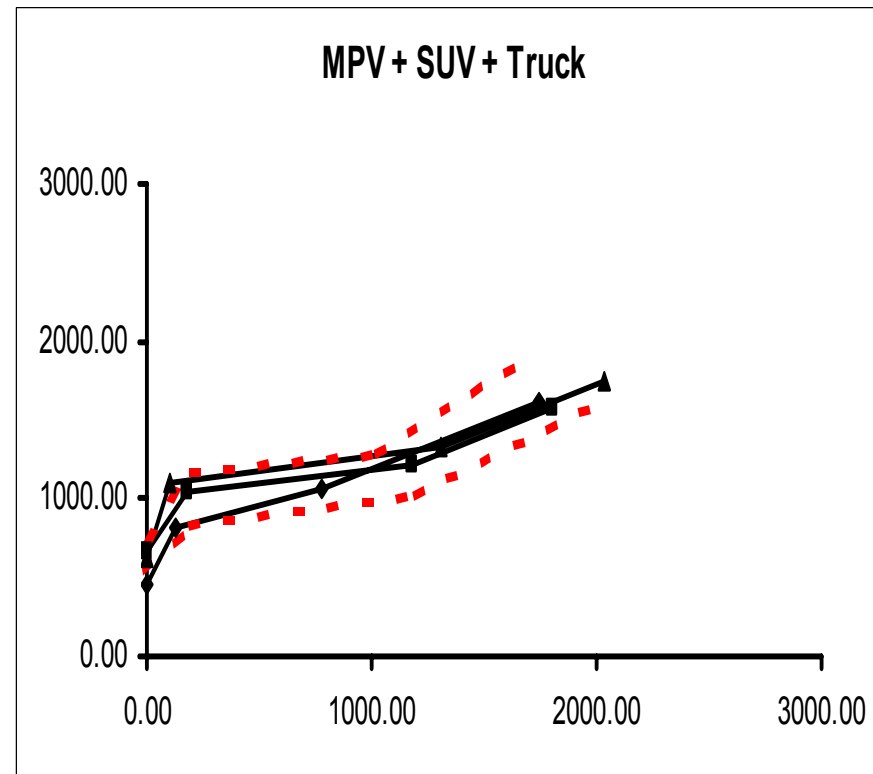
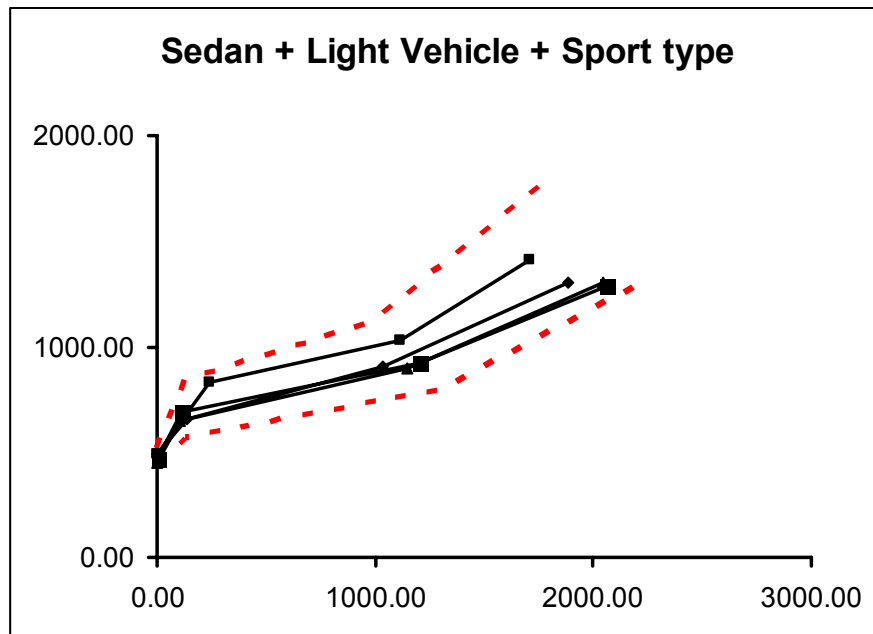
Hiace (TOYOTA)
Bongovan (MAZDA)
Space Gear (MITSUBISHI)
Townace Noah (TOYOTA)
Estima (TOYOTA)
Granvia (TOYOTA)
Vamos (HONDA)



Ref. : PS152,153,155.

1-6. Vehicle Shape Provided By US

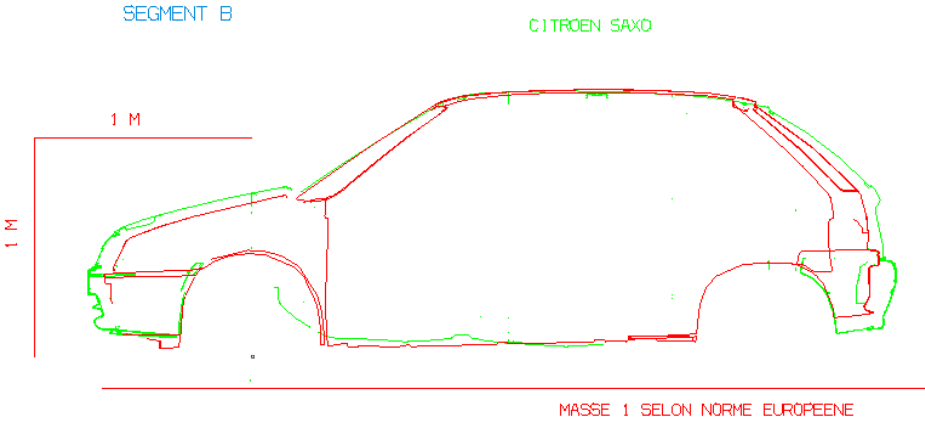
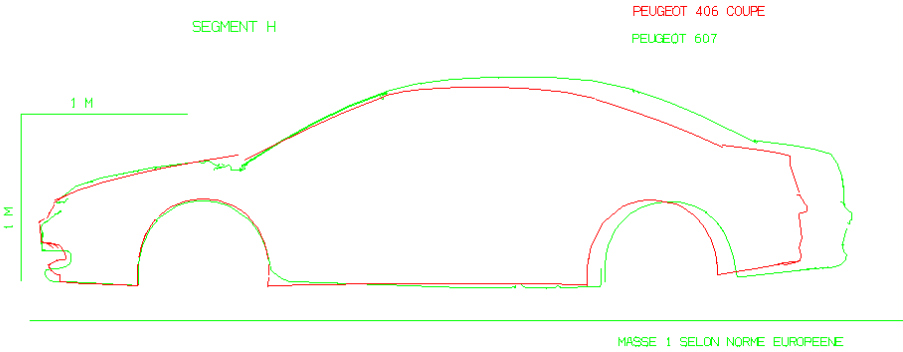
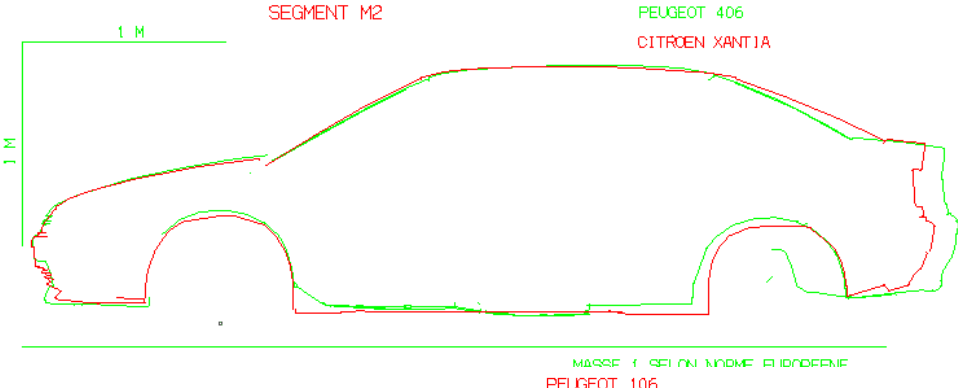
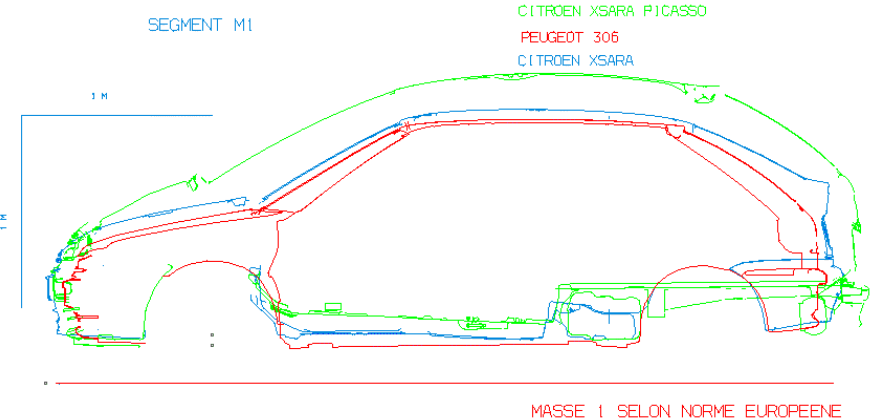
< IHRA PS153-2 >



1-7. Vehicle Shape Provided By EU

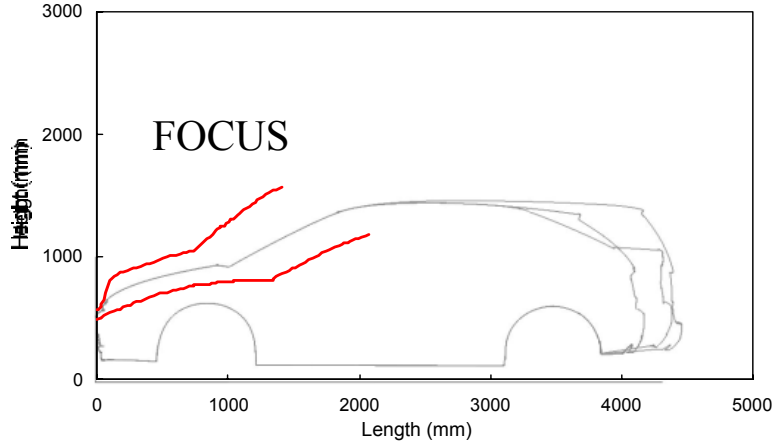
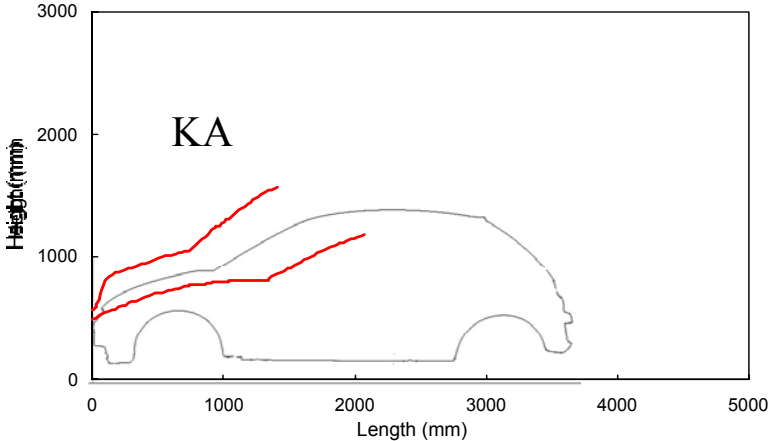
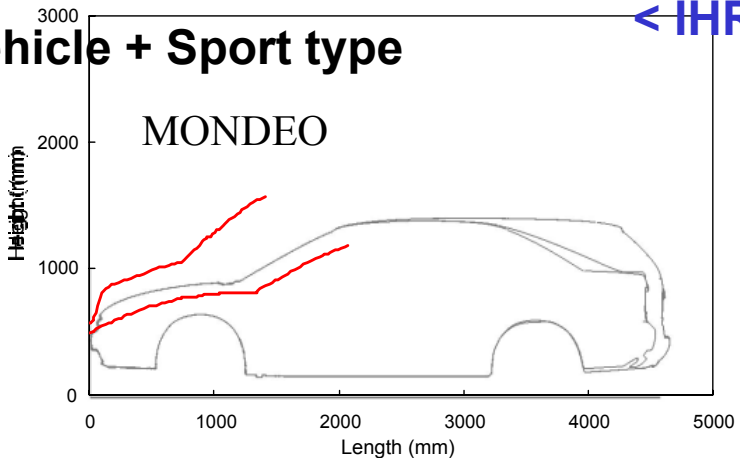
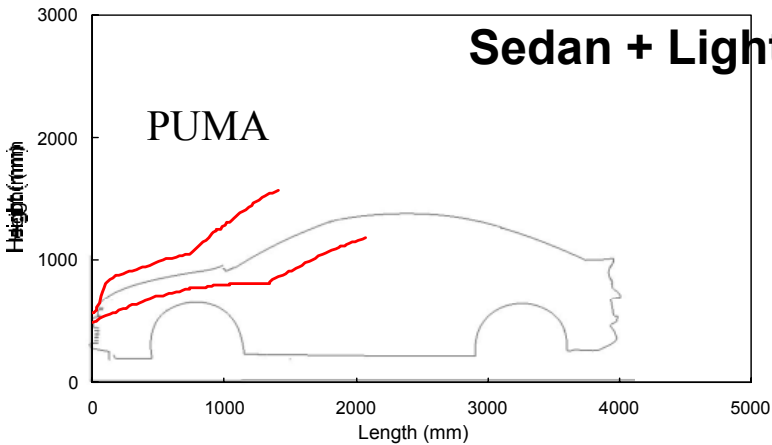
Sedan + Light vehicle + Sport type

< IHRA PS153 >

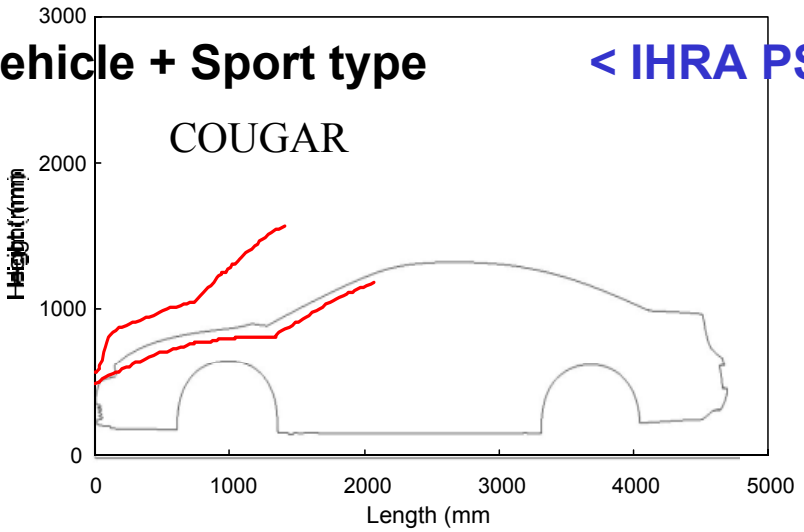
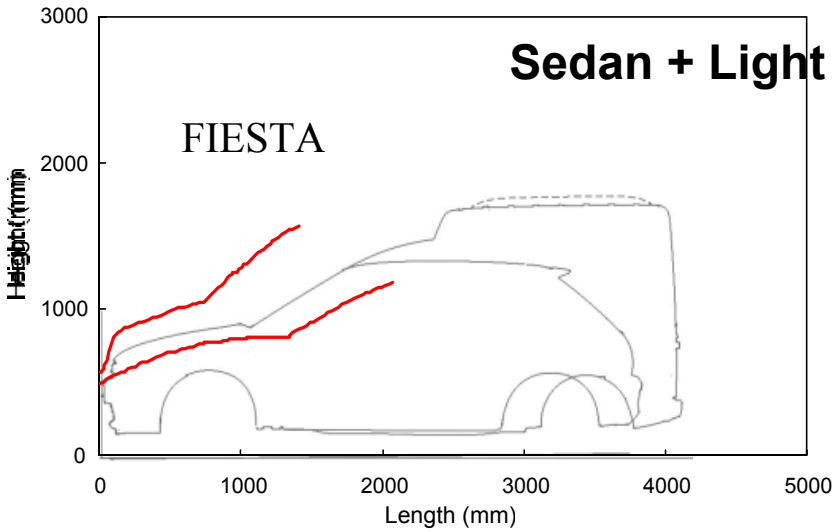


1-8. Vehicle Shape Provided By EU

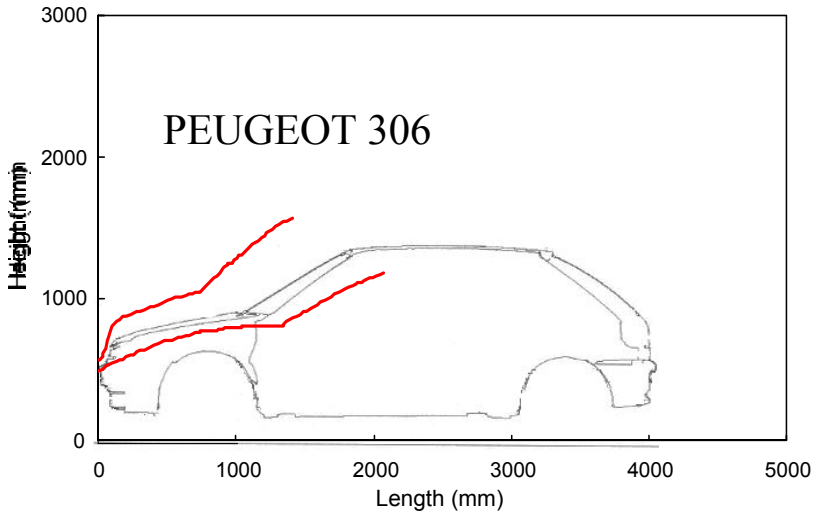
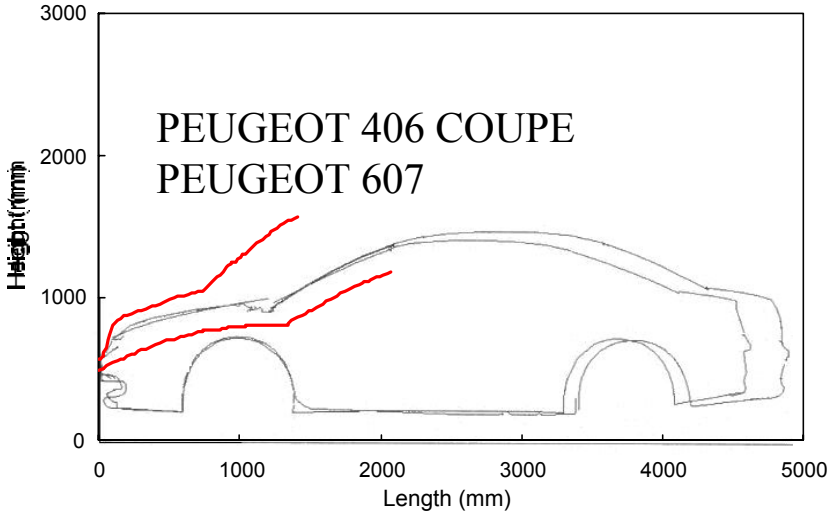
< IHRA PS153 >



1-9. Vehicle Shape Provided By EU

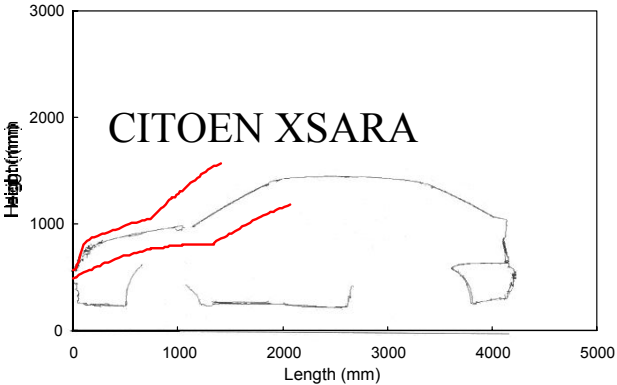
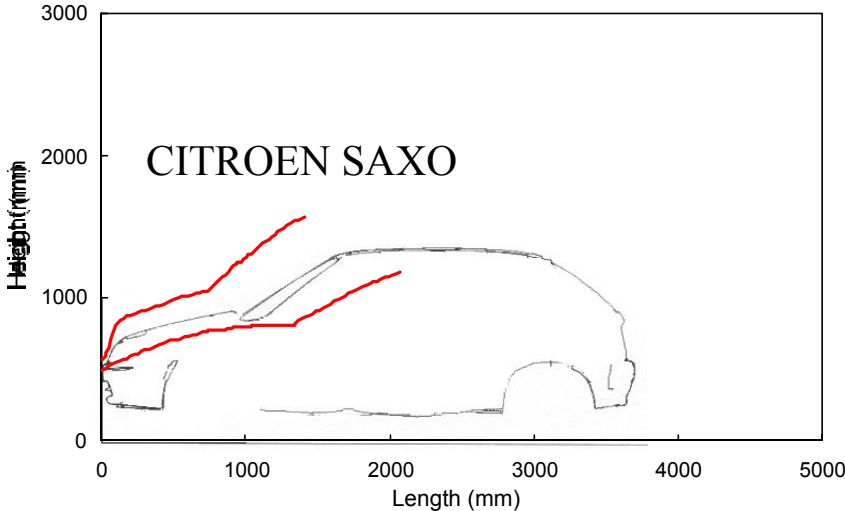
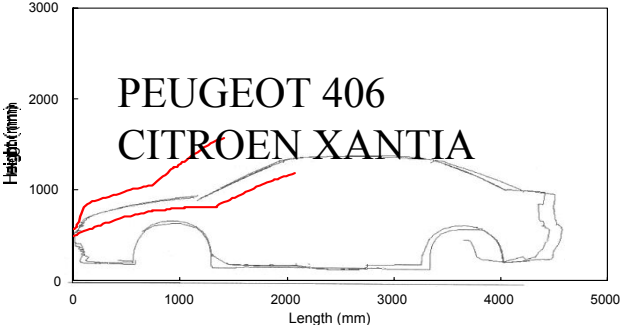
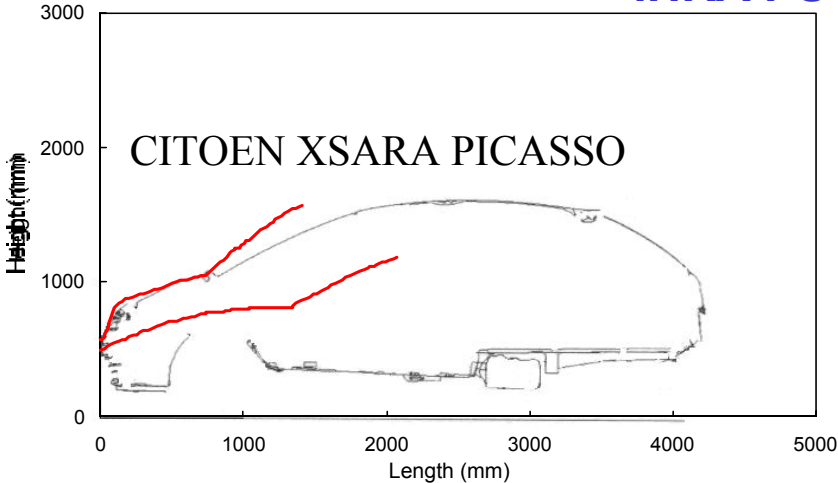
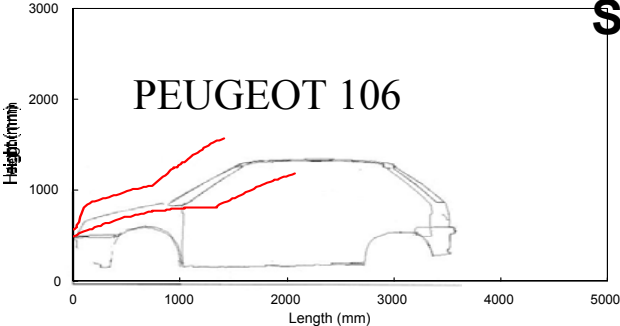


< IHRA PS153 >



1-10. Vehicle Shape Provided By EU

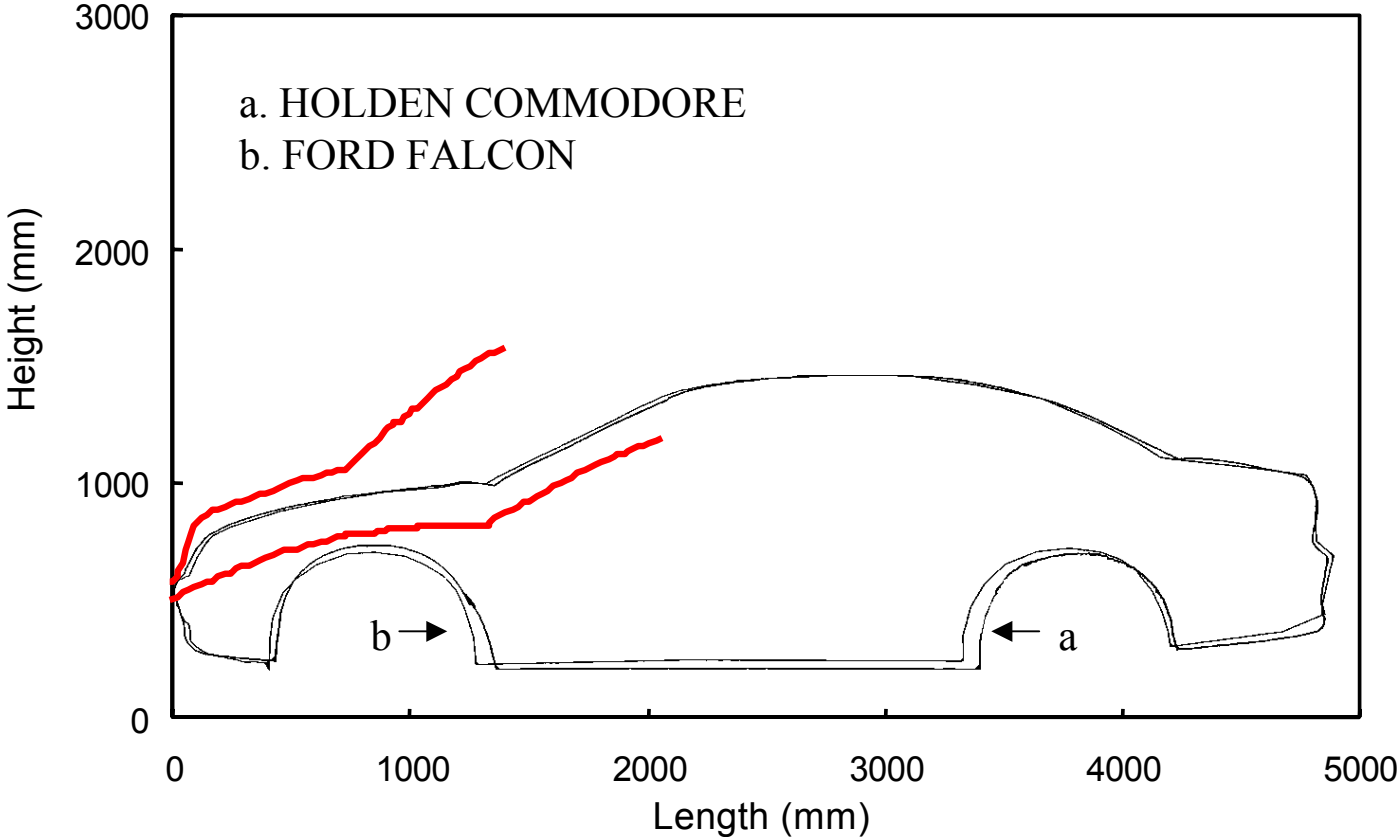
Sedan + Light vehicle + Sport type < IHRA PS153 >



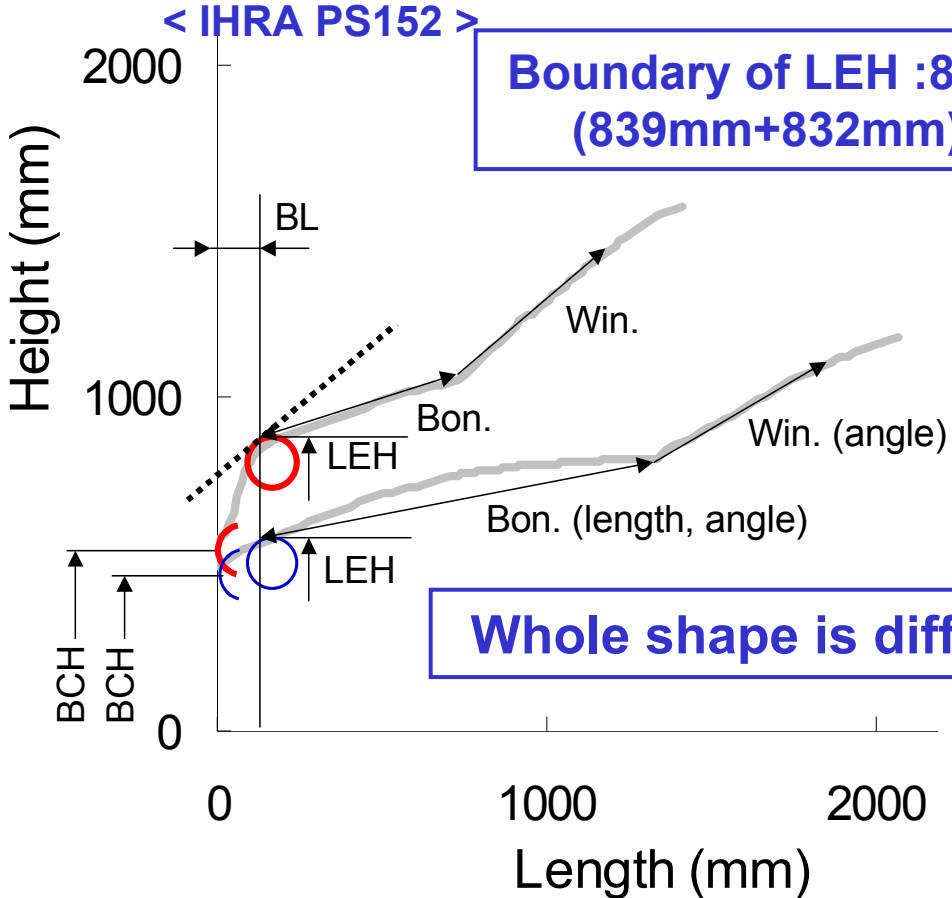
1-11. Vehicle Shape Provided By Australia

Sedan + Light vehicle + Sport type

< IHRA PS155 >



2. Vehicle Shape Classification



**Boundary of LEH :835mm
(839mm+832mm) / 2**

Whole shape is different.

Sedan + Light vehicle + Sports type

	Lower	Middle	Upper
BL (mm)	127	127	127
BCH (mm)	435	475.5	516
LEH (mm)	565	702	839
Bon. length (mm)	1200	917.5	635
Bon. angle (deg.)	11	14.5	18
Win. angle (deg.)	29	34.5	40
Bottom depth (mm)	42	98	154
Bootm hight (mm)	182	225.5	269

SUV

	Lower	Middle	Upper
BL (mm)	195	195	195
BCH (mm)	544	640	736
LEH (mm)	832	1000	1168
Bon. length (mm)	1023	933.5	844
Bon. angle (deg.)	11	9.75	8.5
Win. angle (deg.)	36	39.5	43
Bottom depth (mm)	48	123	198
Bootm hight (mm)	248	348	448

1Box

	Lower	Middle	Upper
BL (mm)	188	188	188
BCH (mm)	448	576	704
LEH (mm)	864	1004	1144
Bon. length (mm)	361	259	157
Bon. angle (deg.)	40	40	40
Win. angle (deg.)	30	38	46
Bottom depth (mm)	63	95	127
Bootm hight (mm)	214	292.5	371

Keep the IHRA computer simulation results as it is.

3. Vehicle Shape Determination

- **Order of determination**

1st. Bonnet angle $\geq 30^\circ \rightarrow$ Category Z (. One Box)

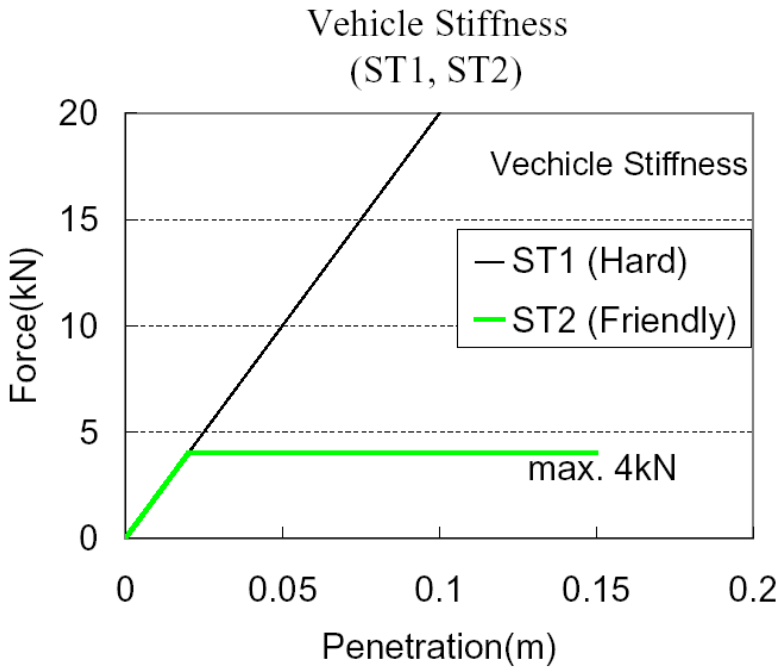
2nd. BLE height $\geq 835\text{mm} \rightarrow$ Category Y (. SUV)

BLE height $< 835\text{mm} \rightarrow$ Category X (. Sedan)

(835mm: Boundary of BLE height)

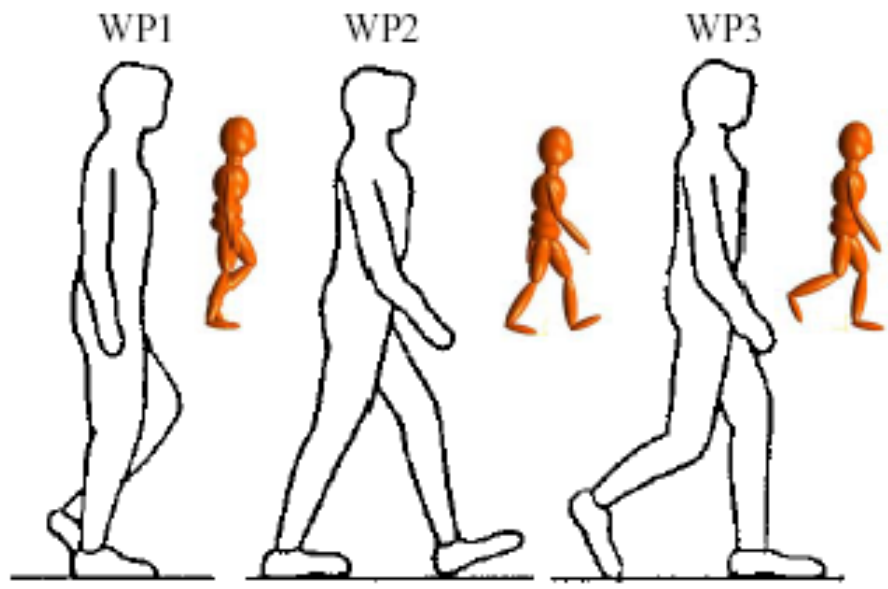
4. Parameters for Computer Simulation

< IHRA PS215 >



Walking Position

⊗ Car Impact Direction (Impact from Right side of Pedestrian)



- .WP1-ST1
- .WP1-ST2
- .WP2-ST1
- ▲.WP2-ST2
- .WP3-ST1
- .WP3-ST2

5. Effective Head Mass at Impact

<IHRA/PS167>

- Effective head mass varies significantly according to the impact conditions such as vehicle shape, stiffness, walking stance and so on.
- Average effective head mass . Head mass
 - Adult head: 4.5 kg (Ref. IHRA/PS150, ISO/N354)
 - Child head: 3.5 kg (Ref. IHRA/PS178, SAE973317)

<IHRA/PS178, SAE973317>

- * 3-Year Child Head Mass = 2.7 kg
- .. * 6-Year Child Head Mass = 3.5 kg
- .. * 5th % Adult Female Head Mass = 3.6 kg

6. Head Impact Speed Ratio for Bonnet

Round number = 0.8
for all vehicle shape

- Bonnet Contact -

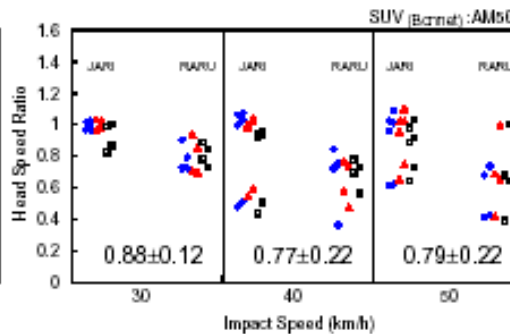
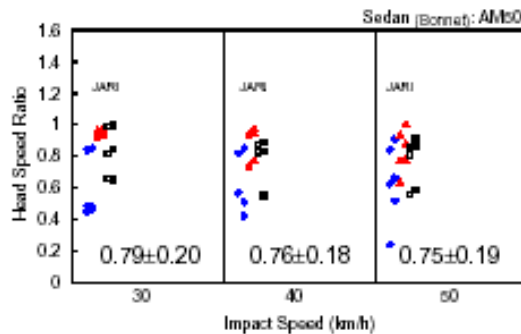
< IHRA PS237 >

AM50

Sedan

SUV

1BOX



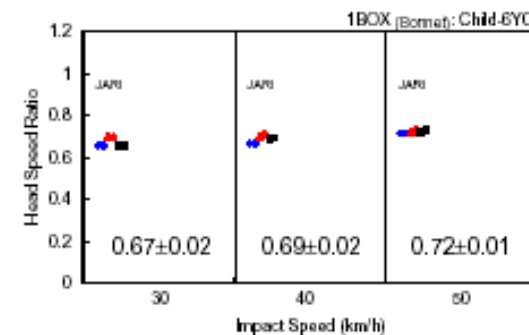
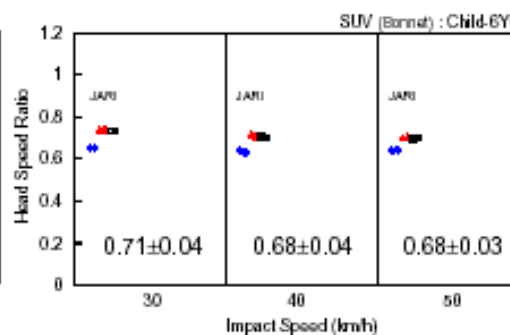
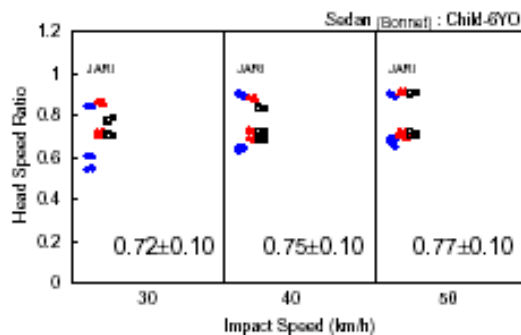
No Bonnet Contact

Child-6YO

Sedan

SUV

1BOX



7. Head Impact Speed Ratio for Windshield

Round number = 0.8
for all vehicle shape

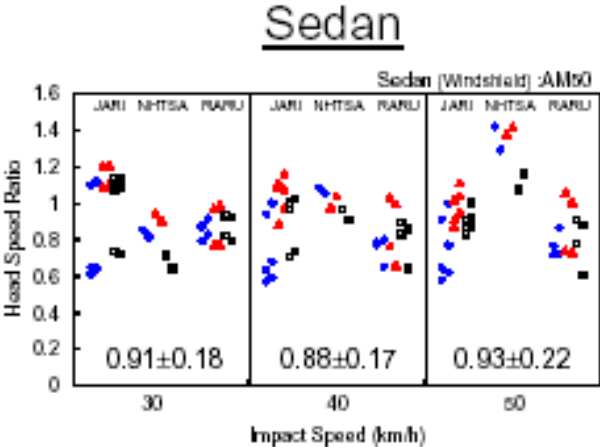
- Windshield Contact -

< IHRA PS237 >

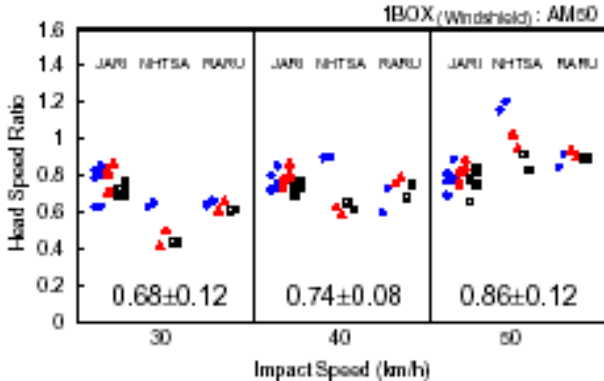
AM50

SUV

1BOX



No Windshield Contact



Child-6YO

SUV

1BOX

Sedan

No Windshield Contact

No Windshield Contact

No Windshield Contact

8-1. Bonnet Impact Angle for Adult & Child

- Bonnet Contact -

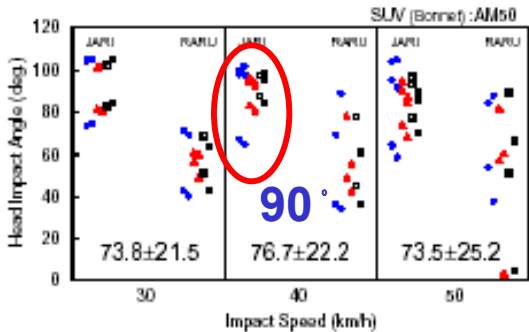
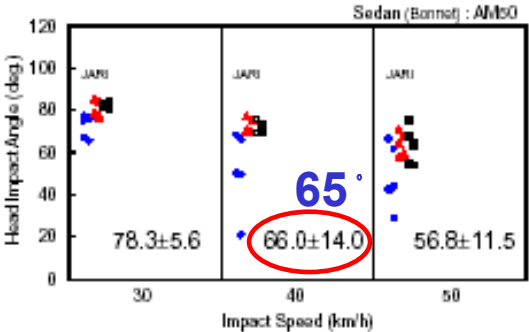
AM50

< IHRA PS237 >

Sedan

SUV

1BOX



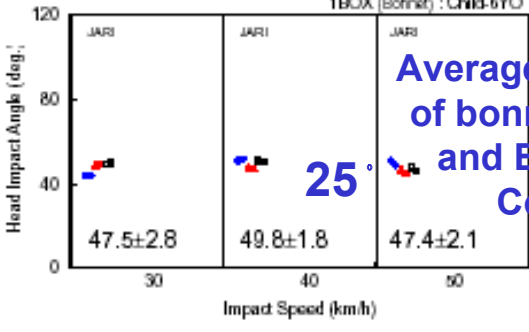
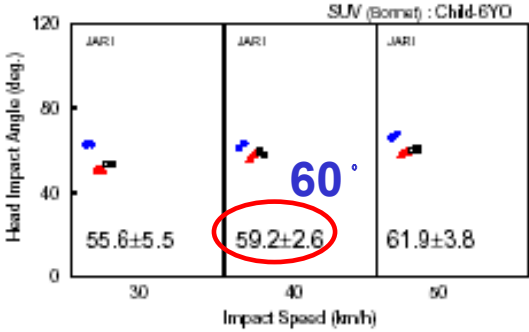
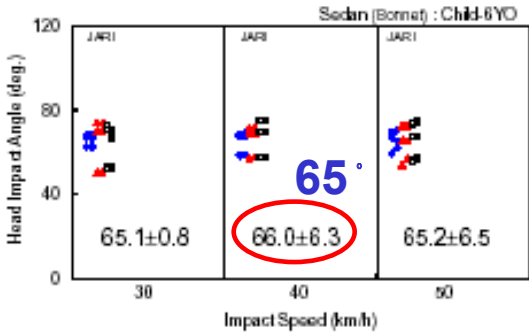
No Bonnet Contact
Windshield Impact Angle is used.
50°

Child-6YO

Sedan

SUV

1BOX



Average the values of bonnet contact and BLE/Grille Contact
25°

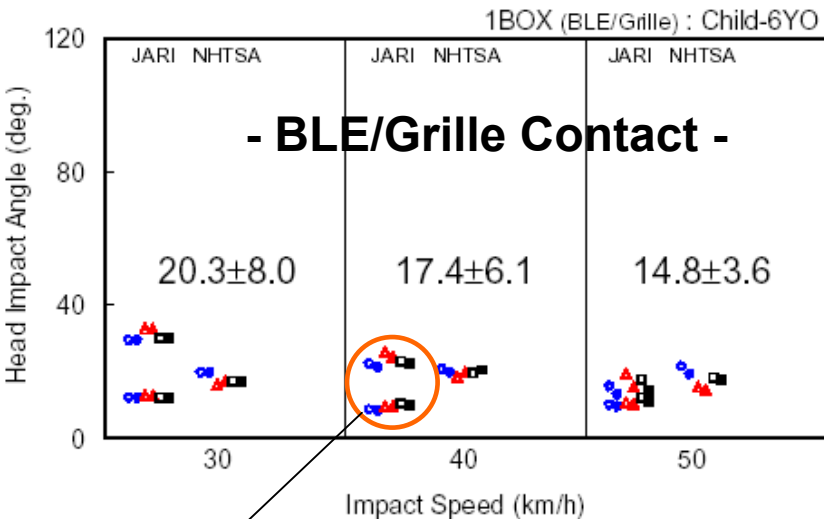
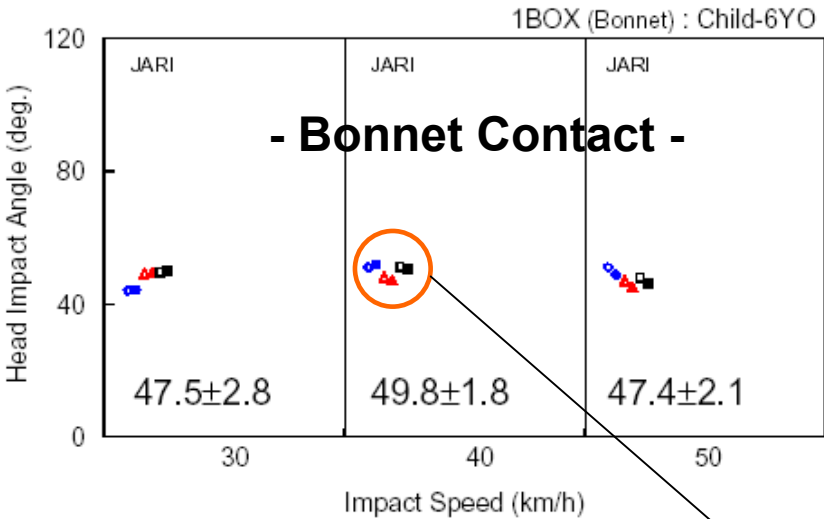
8-2. Bonnet Impact Angle for Child for 1BOX

Child-6YO

< IHRA PS237 >

1BOX

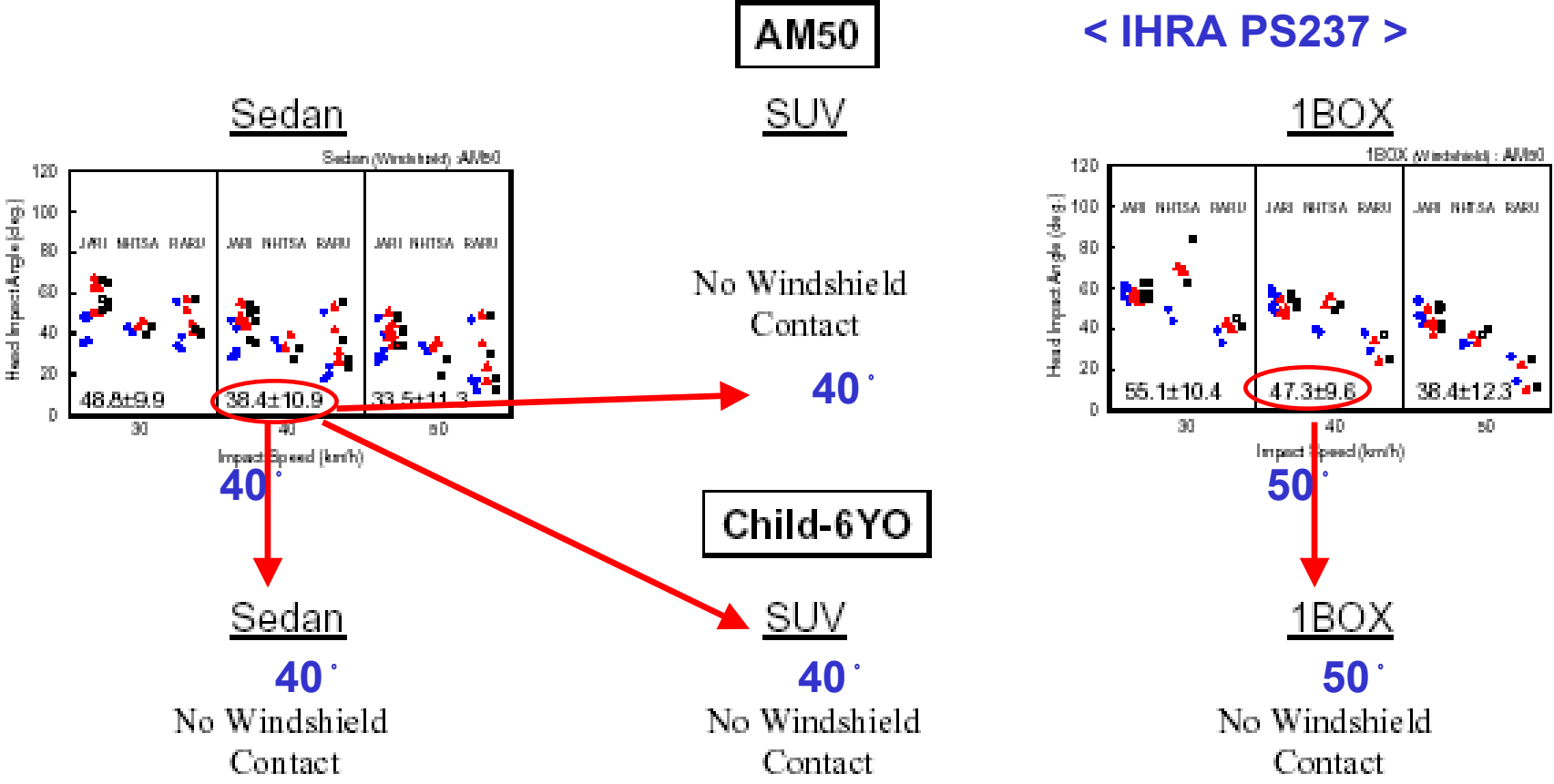
1BOX



Average the values

Child Head Bonnet Impact Angle = 25°

9. Windshield Impact Angle for Adult & Child



	Sedan	SUV	1BOX
Adult	40°	40°	50°
Child	40°	40°	50°

10. Relief Ratio of Boundary Line Method Comparing with Overlap Method

<IHRA PS209>

- Overlap method and boundary line method differ not significantly
- Difference to the theoretical maximum of relief ratio is less than 5%

