

REPORT NUMBER: SNCAP-KAR-11-031

**NEW CAR ASSESSMENT PROGRAM (NCAP)
MOVING DEFORMABLE BARRIER SIDE IMPACT TEST**

**VOLVO CAR CORPORATION
2011 VOLVO XC60 FWD 5-DOOR MPV**

NHTSA No: MB5901

**PREPARED BY:
KARCO ENGINEERING, LLC.
9270 HOLLY ROAD
ADELANTO, CA 92301**



OCTOBER 20, 2010

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Volvo XC60 FWD 5-Door MPV in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedure for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering, LLC in Adelanto, CA, on October 20, 2010.

The impact velocity of the Moving Deformable Barrier was 61.84 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 15.6 deg. C. The target vehicle's maximum post-test static crush was 170 mm located at level 3. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (ES-2re)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	59.9
Maximum Thorax Rib Deflection	mm	44	19.2
Total Abdominal Force	N	2500	743
Pubic Symphysis Force	N	6000	1536

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	231.5
Lower Spine Resultant Acceleration	g	82	43
Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	2441

The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches, and the opposite doors did not open during the side impact event.

17. Key Words New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division 1200 New Jersey Ave., SE Room W43-410 Washington, DC 20590	
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This moving deformable barrier side impact test is part of the MY 2011 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract number DTNH22-09-D-00122. The purpose of this test is to generate comparative side impact performance in a 2011 Volvo XC60 FWD 5-Door MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated January 2010.

SUMMARY

A 2011 Volvo XC60 FWD 5-Door MPV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.84 km/h (38.42 mph). The target vehicle was stationary and was positioned at an angle of 63° to the line of forward motion. The side impact test was conducted by KARCO Engineering, LLC. in Adelanto, California, on October 20, 2010. Pre- and post-test photographs of the test vehicle, the MDB, and the dummies (ES-2re and SID-IIs) are included in Appendix A of this report.

Dummies were placed in the driver and left rear designated seating positions according to instructions specified in the OCWS Side Impact Laboratory Test Procedure, dated January 2010. The side impact event was documented by 11 cameras. Camera locations are included in Data Sheet No. 5 of this report.

The dummies were instrumented in the following manner:

DRIVER ATD (ES-2re)

Head Accelerometers

Thorax Rib 1 to Rib 3 Potentiometers

Abdomen Forward, Middle, and Rear Load Cells

Lower Spine Accelerometers

Pubic Load Cell

PASSENGER ATD (SID-IIs)

Head Accelerometers

Thorax Upper, Middle and Lower Rib Potentiometers

Abdomen Upper and Lower Rib Potentiometers
 Lower Spine Accelerometers
 Iliac Load Cell
 Acetabulum Load Cell

Dummy injury values were recorded as follows:

Measurement Description	Units	Driver ATD (ES-2re)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	59.9
Maximum Thorax Rib Deflection	mm	44	19
Combined Abdominal Force	N	2500	742.6
Pubic Symphysis Force	N	6000	1535.8

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC ₃₆)		1000	231.5
Lower Spine (T12) Resultant Acceleration	g	82	43
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2441.4

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver)		Left Rear (Passenger)	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes		
Knee Airbag	No		No	
Side Airbag 1 (Torso/Pelvis)	Yes	Yes	No	
Side Airbag 2 (Curtain)	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	
Other				

GENERAL COMMENTS

Both the front and rear doors on the struck side of the vehicle remained closed and latched. There was no separation at the hinges or latches. Both doors on the non-struck side remained closed and latched. No ATD values exceeded thresholds.

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MB5901
Model Year	2011
Make	Volvo
Model	XC60 FWD
Body Style	5-Door MPV
VIN	YV4940DL5B2148276
Body Color	Savile Grey Metallic
Delivery Date	9/10/2010
Odometer Reading (km / mi)	32 / 20
Dealer	Galpin Volvo
Transmission	6-Speed Automatic
Final Drive	Front
Type / No. of Cylinders	Inline 6
Engine Displacement (L)	3.2
Engine Placement	Transverse
Roof Rack	No
Sunroof / T-Top	Yes
Tinted Glass	Yes
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

Anti-Lock Brakes	Yes
All Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Pretensioners	Yes
Load Limiters	Yes
Automatic Door Locks	No
Bucket Seats	Yes
Tilt Steering	Yes
Other	
Other	

Does Owner's Manual provide instructions to turn off automatic door locks?

☐

DATA FROM CERTIFICATION LABEL

Manufactured By	Volvo Car Corporation
Date of Manufacture	Jul-10

GVWR (kg)	2358
GAWR Front (kg)	1242
GAWR Rear (kg)	1154

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity	2	3		5
Capacity Weight (VCW) (kg)				430.0
DSC x 68.04 (kg)				340.2
Cargo Weight (RCLW) (kg)				89.8

A
B
A-B

VEHICLE SEAT TYPE

Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						w/ Lever	w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 ... (CONTINUED)

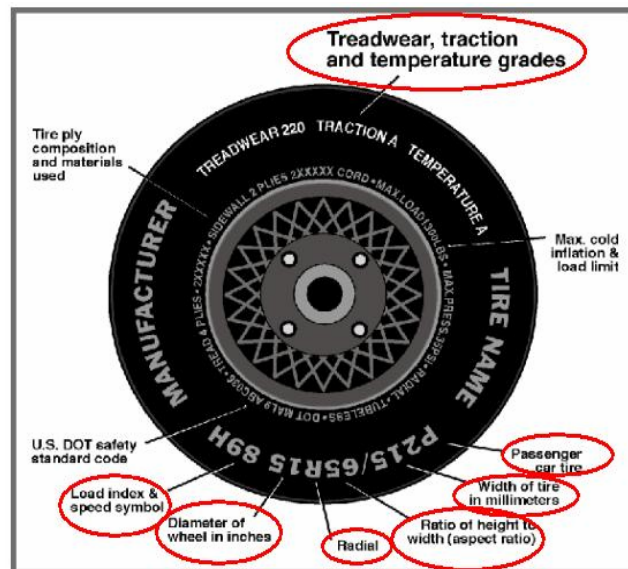
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Cold Pressure (kpa)	240	240
Recommended Tire Size	235/65R17	235/65R17
Tire Size on Vehicle	235/65R17	235/65R17
Tire Model	Scorpion Zero	Scorpion Zero
Tire Manufacturer	Pirelli	Pirelli
Treadwear	520	520
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Rayon	2 Rayon
Tire Plies Body	2 Rayon, 2 Steel, 2 Nylon	2 Rayon, 2 Steel, 2 Nylon
Load Index/Speed Symbol	104H	104H
Tire Material	Rayon, Steel, Nylon	Rayon, Steel, Nylon
DOT Safety Code Right	XND4 K206 1710	XND4 K206 1710
DOT Safety Code Left	XND4 K206 1710	XND4 K206 1710

DATA SHEET NO. 1 ... (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	535.0	389.0		569.0	482.0		572.0	491.5	
Right	kg	525.0	356.0		534.5	428.5		530.5	424.5	
Ratio	%	58.7%	41.3%	100.0%	54.8%	45.2%	100.0%	54.6%	45.4%	100.0%
Total	kg	1060.0	745.0	1805.0	1103.5	910.5	2014.0	1102.5	916.0	2018.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1805.0	A
Actual Weight of 2 P572 ATDs Used	kg	125.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	89.8	C
Calculated Vehicle Target Wt (TVTW)	kg	2019.8	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG (Aft of Front Axle)
Fully Loaded	mm	790	797	792	803	1258
As Tested	mm	789	790	788	797	1254

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheelbase	mm	2773
Total Vehicle Length at Left Side	mm	3244
Total Vehicle Length at Centerline	mm	4621
Total Vehicle Length at Right Side	mm	3245
Weight of Ballast in Cargo Area	kg	61.6
Weight of Vehicle Components Removed	kg	38.0
Amount of Stoddard Solvent in Fuel Tank	L	65.12

Vehicle components removed to make Target Vehicle Test Weight:

Right Side Door Panels (6.5 kg), Spare tire and tools (17.0 kg), Right Rear Passenger Door Glass (7.5 kg), Trunk Liner (7.0 kg)

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	445
Actual Impact Point Aft of Front Axle	mm	450

DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

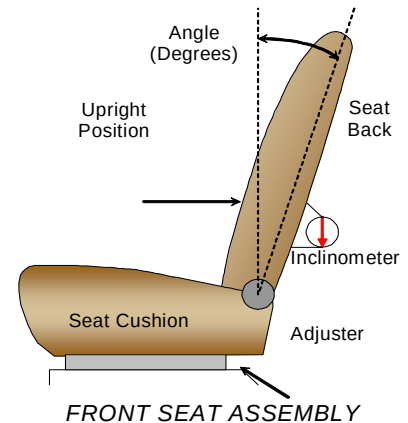
NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10

NOMINAL DESIGN RIDING POSITION

The driver's seat back is set to the manufacturer's designated seat back angle. The passenger's seat back is fixed. Seat back angles are measured at the seatback using a digital inclinometer.



SEAT BACK ANGLES

	Degrees (°)
Driver w/Seated Dummy	21.1
Passenger w/Seated Dummy	19.8

SEAT FORE/AFT POSITION

Driver seat travel is measured from the forward most possible position to the rear most possible position with the seat set at mid angle and lowest height. The driver's seat is set to the middle of the fore-aft travel. The passenger's seat is fixed.

SEAT FORE/AFT POSITIONS

Seating Position	Total Fore/Aft Travel	Placed in Position
Driver Seat	252 mm	126 mm
Rear Seat	Fixed	Fixed

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position, the driver for a 50th percentile adult male ATD, the left rear passenger for a 5th percentile adult female ATD. Both upper anchorages are fixed.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	Fixed	Fixed
Rear Seat	Fixed	Fixed

DATA SHEET NO. 2 ... (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

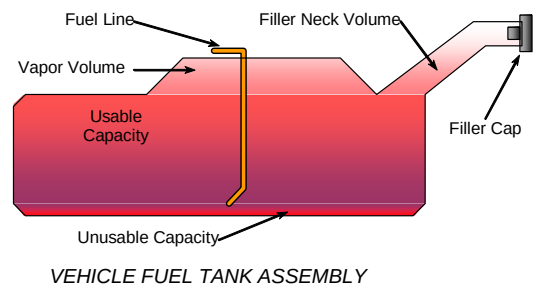
Test Date: 10/20/10

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	70.02
Usable Capacity of "Optional Tank"	
Usable Capacity Used for FMVSS 301	70.02
Actual Amount of Stoddard Solvent Used	65.12

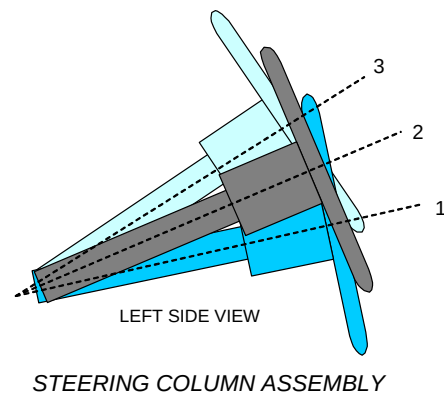
FUEL PUMP

The test vehicle is equipped with an electric fuel pump. The fuel pump operates when the engine is running. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the area along the center of the vehicle in front of the rear axle.



STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel for angular measurements. A tape measure is used with a reference mark on the steering column to measure telescoping travel.



STEERING COLUMN POSITIONING

	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	23.1	0
Geometric Center Position, No. 2	26.1	24
Uppermost Position, No. 3	29.0	48
Telescoping Steering Wheel Travel		48
Test Position	26.1	24

DATA SHEET NO. 3

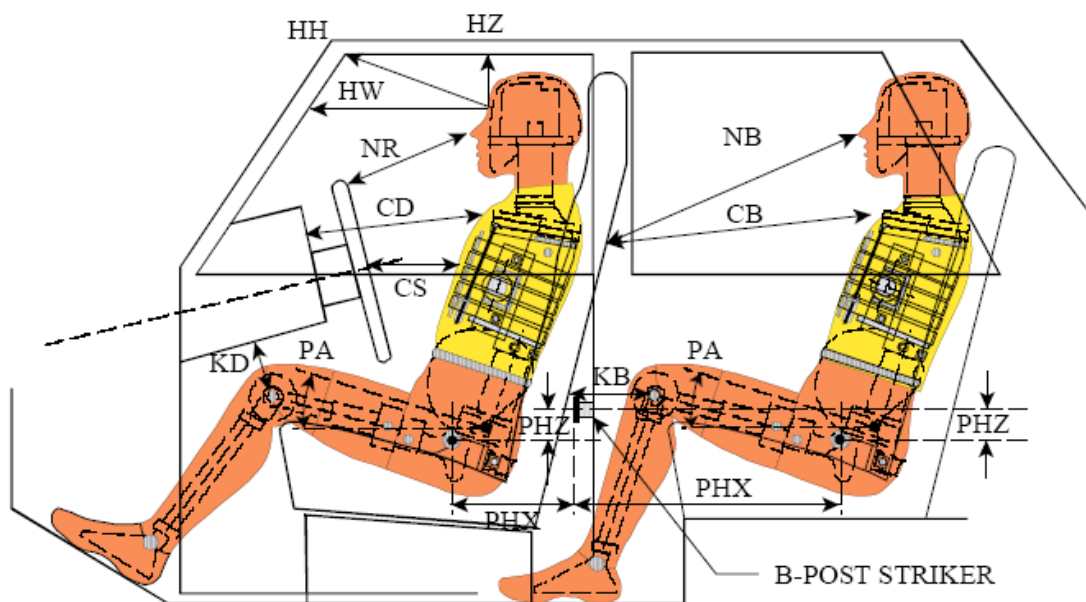
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



LEFT SIDE VIEW

NOTE: 2-DOOR VEHICLE SHOWN.
REAR DUMMY PHX & PHZ
MEASUREMENTS FOR A 4-DOOR
VEHICLE WOULD USE THE C-POST
STRIKER AS A REFERENCE POINT

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (°)	Length (mm)	Angle (°)
HH		Head to Header	405	17.0		
HW		Head to Windshield	660	0.0		
HZ	HZ	Head to Roof	170	90.0	273	90.0
NR	NB	Nose to Rim/Seat Back	486	10.6	543	13.7
CD	CB	Chest to Dash/Seat Back	605	2.5	538	3.1
CS		Chest to Steering Wheel	374	7.7		
KDL	KBL	Left Knee to Dash/Seat Back	186	18.5	212	18.0
KDR	KBR	Right Knee to Dash/Seat Back	176		266	29.4
PA	PA	Pelvic Angle		14.7		23.1
PHX	PHX	H-Point to Striker (x-axis)	147	0.0	202	0.0
PHZ	PHZ	H-Point to Striker (z-axis)	75	90.0	188	90.0
SA	SA	Seat Back Angle		21.1		19.8

DATA SHEET NO. 4

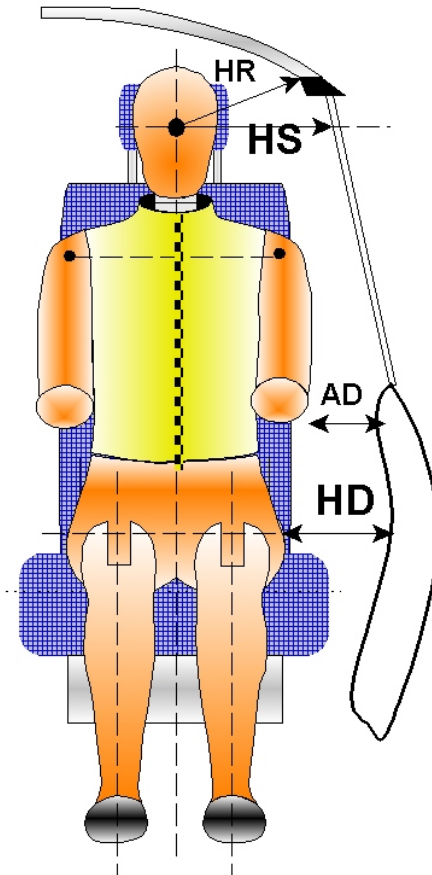
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	241	284
HS	Head to Side Window	mm	355	354
AD	Arm to Door	mm	120	118
HD	H-Point to Door	mm	146	128

DATA SHEET NO. 5

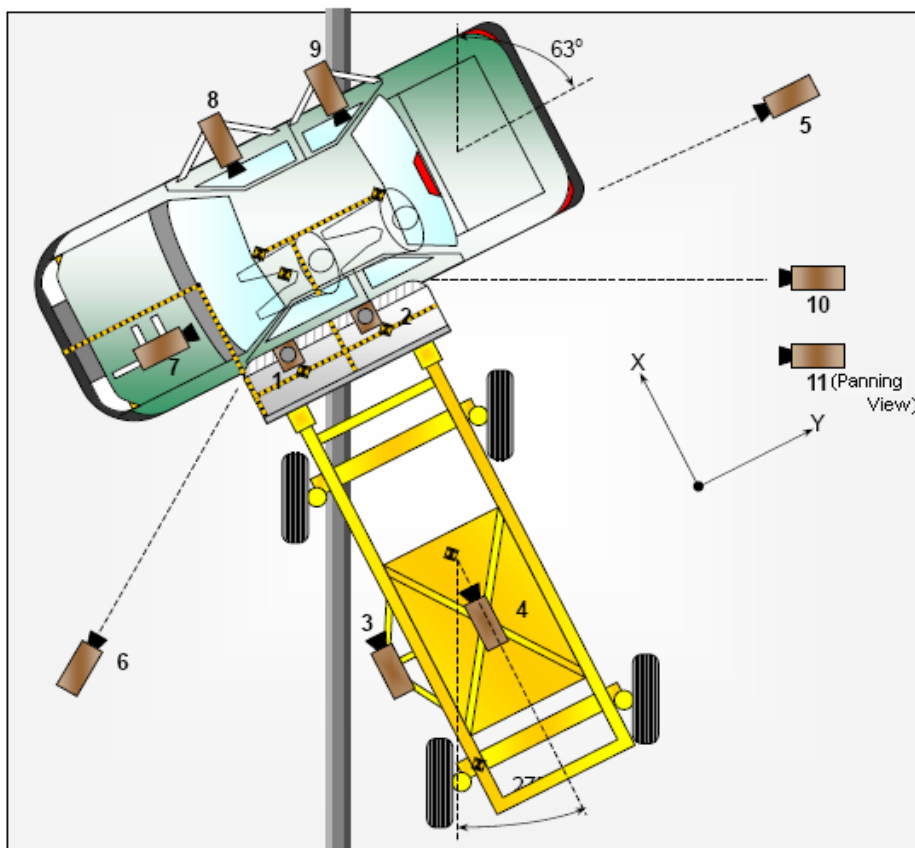
CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



CAMERA LOCATIONS AND DATA

Camera No.	View	Coordinates (mm)			Angle (°)	Lens (mm)	Film Speed (fps)
		X*	Y*	Z*			
1	Overhead Overall	1220	2287	-5486	90	14	1000
2	Overhead Close-Up	609	2287	-5102	90	Zoom	1000
3	Left Impact Point (MDB)	-2134	0	-1143	7.5	25	1000
4	Side Overall (MDB)	-3912	838	-1829	11.9	12	1000
5	Rear	-64	2485	-1348	0	85	1000
6	Left Front	-2266	-3564	-1475	0	24	1000
7	Driver Front (On-Board)	552	-663	529	8.8	35	1000
8	Driver Side (On-Board)	1589	733	446	8	14	1000
9	Passenger Side (On-Board)	1536	1682	486	12.8	14	1000
10	Real Time Left Rear					Zoom	30
11	Real Time Inrun	-2484	-3958	-1506		Zoom	30

Reference: Impact Point Projected to Ground

+X = To Front of MDB, +Y = To Right of MDB, +Z = Down

*All measurements accurate to ± 6 mm

DATA SHEET NO. 6

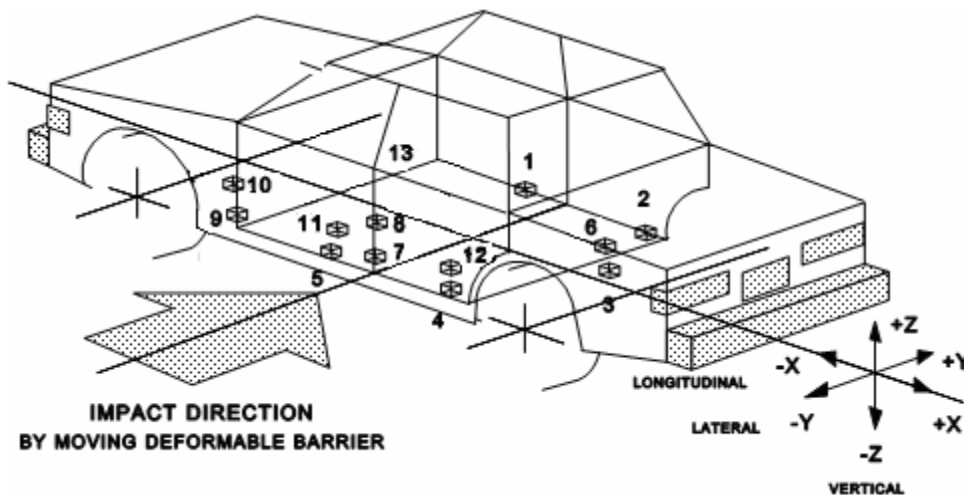
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

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VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Right Sill at Front Seat	-2695	715	460
2	Right Sill at Rear Seat	-1760	705	465
3	Rear Floorpan Above Axle	-915	430	615
4	Left Sill at Rear Door	-1790	-765	270
5	Left Sill at Front Door	-2605	-760	265
6	Right Rear Occupant Compartment	-1915	580	295
7	B-Pillar Lower	-2135	-760	680
8	B-Pillar Mid	-2135	-760	975
9	A-Pillar Lower	-3130	-775	650
10	A-Pillar Mid	-3130	-775	883
11	Front Seat Track	-2235	-575	405
12	Rear Seat Structure			
13	Vehicle CG	-1930	0	475

Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ up)

DATA SHEET NO. 7

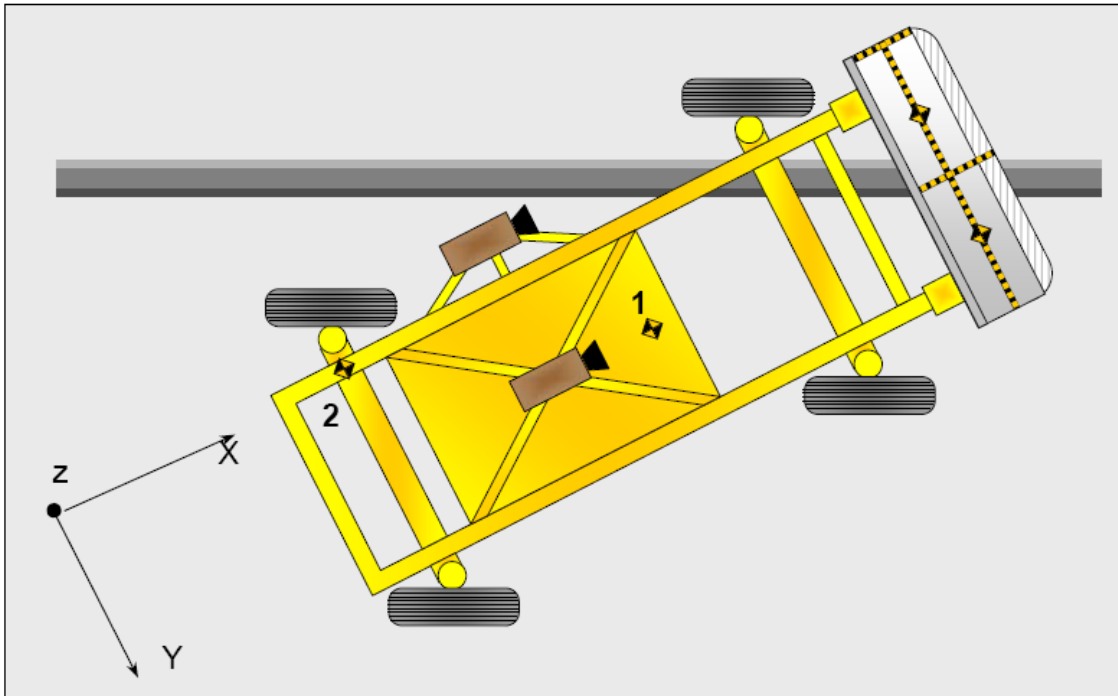
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

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Test Date: 10/20/10



MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Location	Measurement		
		X	Y	Z
1	MDB CG	-1195	0	-430
2	MDB Rear	-2642	-593	-608

Reference: X – Face of MDB (+ forward)
Y – MDB centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 8**TEST VEHICLE SUMMARY OF RESULTS**Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPVNHTSA No. MB5901Test Program: MDB Side Impact TestTest Date: 10/20/10**MAXIMUM EXTERIOR CRUSH**

Level	Description	Units	Maximum Crush	Above Ground
1	Sill Top Height	mm	16	320
2	Occupant H-Point Height	mm	155	645
3	Mid-Door Height	mm	170	747
4	Window Sill Height	mm	78	1031
5	Window Top Height	mm	9	1565
	Maximum Penetration	mm	170	

INSTRUMENTATION

Driver Dummy Channels	16
Passenger Dummy Channels	16
Airbag Timing Sensors	4
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total No. of Contact Switches	8
Total	70

CAMERA COVERAGE

High-Speed Vehicle On-Board	3
High-Speed Vehicle Off-Board	5
High-Speed MDB On-Board	2
Real Time Panning	1
Total	11

DATA SHEET NO. 9**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPVNHTSA No. MB5901Test Program: MDB Side Impact TestTest Date: 10/20/10**MDB SPECIFICATIONS**

Measurement Description	Length (mm)
Overall Width of Framework Carriage	1251
Overall Length including Honeycomb Face	4023
Wheel Base of Framework Carriage	2595
CG location aft of Front Axle	1118

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	402	298	
Right	kg	377	292	
Ratio	%	56.9%	43.1%	
Totals	kg	779	590	1368

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.84
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.77
MDB CL to Target Vehicle CL	degrees	88.5-91.5	90.0

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE

Vertical Location			From Centerline		Max. Crush (mm)
Row	Description	Height (mm)	Distance (mm)	Direction	
1	Center of Bumper	432	800	Left	269
2	Top of Bumper	533	800	Right	159
3	Mid Level	686	800	Left	161
4	Top of Stack	813	800	Right	228

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2

DATA SHEET NO. 10
POST-TEST OBSERVATIONS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat Dummy (ES-2re)	Rear Seat Dummy (SID-IIs)
Dummy Type/Serial No.	ES-2re, S/N: F035	SID-IIs, S/N: 307
Head Contact	Curtain Airbag, Side Header, Head Restraint	Curtain Airbag, Seat Back
Upper Torso Contact	Curtain Airbag, Torso/Pelvis Airbag, Door Panel	Door Panel
Lower Torso Contact	Torso/Pelvis Airbag, Door Panel	Door Panel
Left Knee Contact	None	Door Panel
Right Knee Contact	None	None

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Jammed shut	Jammed shut
Right Side Door Opening	Remained closed and operational	Remained closed and operational
Hatch and Other Doors	Remained closed and operational	Remained closed and operational
Seat Movement	None	None
Seatback Failure	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions	
Pillar Performance	No separation occurred	
Sill Separation	No separation occurred	
Windshield Damage	None	
Window Damage	None	None
Other Notable Effects	None	

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Installed	Deployed	Installed	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	No		No	
Side Airbag 1 (Torso/Pelvis)	Yes	Yes	No	
Side Airbag 2 (Curtain)	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	No	
Seat Belt Load Limiter	Yes	Yes	No	
Other				

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	+5 (Right)
Vertical Offset	mm	+/- 20	+2 (Up)

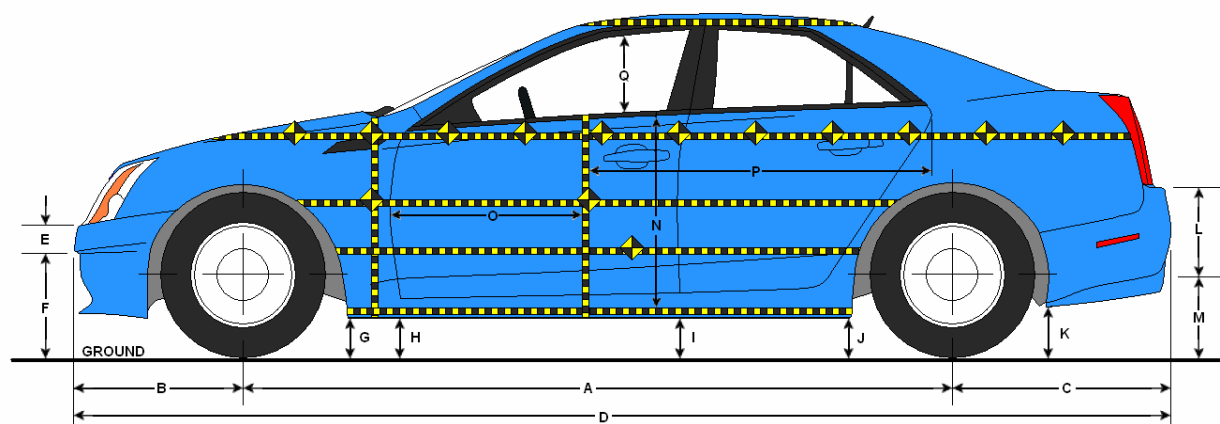
DATA SHEET NO. 11
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



LEFT SIDE VIEW

VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

Code	Dimension	Measurement (mm)		
		Pre	Post	Difference
A	Wheelbase	2773	3247	474
B	Front Axle to FSOV	909	936	27
C	Rear Axle to RSOV	940	943	3
D	Total Length at Centerline	4621	4643	22
E	Front Bumper Thickness	146	146	0
F	Front Bumper Bottom to Ground	468	476	8
G	Sill Height at Front Wheel Well	269	308	39
H	Sill Height at Front Door Leading Edge	267	305	38
I	Sill Height at B-Pillar	288	346	58
J1	Sill Height at Rear Wheel Well	280	355	75
J2	Pinch Weld Height at Rear Wheel Well	274	341	67
K	Sill Height Aft of Rear Wheel Well	335	426	91
L	Rear Bumper Thickness	185	184	-1
M	Bottom of Rear Bumper to Ground	497	601	104
N	Sill Height to Window Bottom Sill	646	673	27
O	Front Door Leading Edge to Impact CL	796	781	-15
P	Rear Door Trailing Edge to Impact CL	1282	1285	3
Q	Front Window Opening	428	466	38
R	Right Side Length	3245	3247	2
S	Left Side Length	3244	3277	33
T	Vehicle Width at B-Pillar	1829	1765	-64

All measurements in mm with tolerance of ± 3 mm

DATA SHEET NO. 12

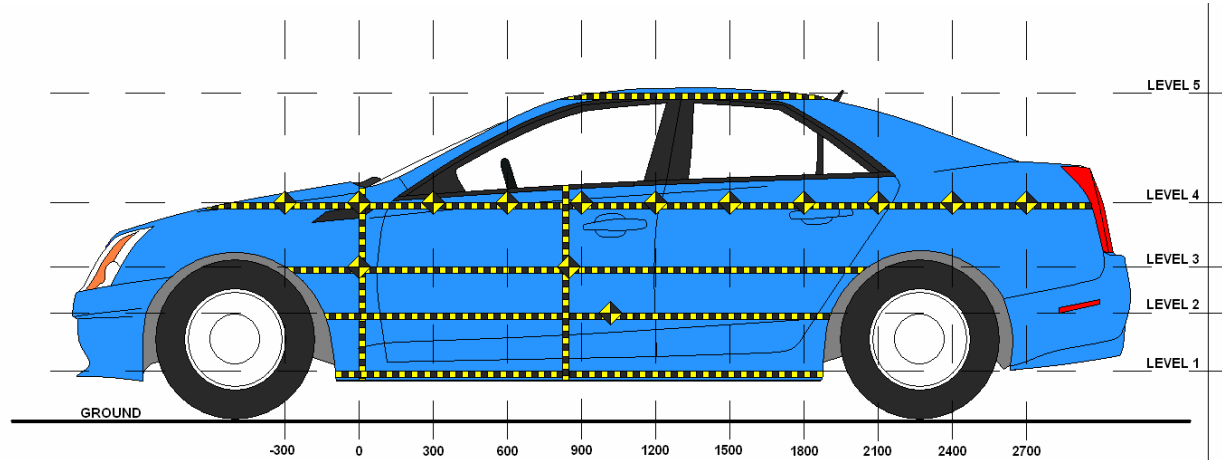
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



LEFT SIDE VIEW

Level	Description	Height Above Ground (mm)
1	Sill Top Height	320
2	Occupant H-Point Height	645
3	Mid-Door Height	747
4	Window Sill Height	1031
5	Window Top Height	1565

DATA SHEET NO. 12 ... (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10

	Pre-Test (mm)					Post-Test (mm)					Difference (mm)				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300				736					737					1	
-150			559	706				566	712				7	6	
0	619	572	578	680		613	574	579	680		-6	2	1	0	
150	622	587	587	656		622	676	667	648		0	89	80	-8	
300	627	586	585	636		628	717	665	633		1	131	80	-3	
450	632	585	583	620		632	708	672	622		0	123	89	2	
600	636	586	582	611		636	700	710	618		0	114	128	7	
750	642	587	582	605	897	641	717	726	618	906	-1	130	144	13	9
900	647	589	584	603	891	645	744	729	618	898	-2	155	145	15	7
1050	649	592	586	604	889	648	718	705	626	895	-1	126	119	22	6
1200	651	598	591	607	890	650	711	714	650	894	-1	113	123	43	4
1350	652	602	596	611	888	651	739	753	658	894	-1	137	157	47	6
1500	651	606	600	615	889	655	755	770	666	895	4	149	170	51	6
1650	649	604	599	618	892	659	734	765	677	898	10	130	166	59	6
1800	647	597	593	620	894	663	704	739	698	897	16	107	146	78	3
1950		587	583	620	900		608	664	675	900		21	81	55	0
2100			575	620	906			608	656	906			33	36	0
2250				622	914				626	913				4	-1
2400				624	925				631	923				7	-2
2550				630					634	943				4	
2700				638					637					-1	
2850				652					648					-4	

MAXIMUM CRUSH DATA

	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	16	155	170	78	9
Distance from Impact (mm)	1800	900	1500	1800	750

DATA SHEET NO. 12 ... (CONTINUED)

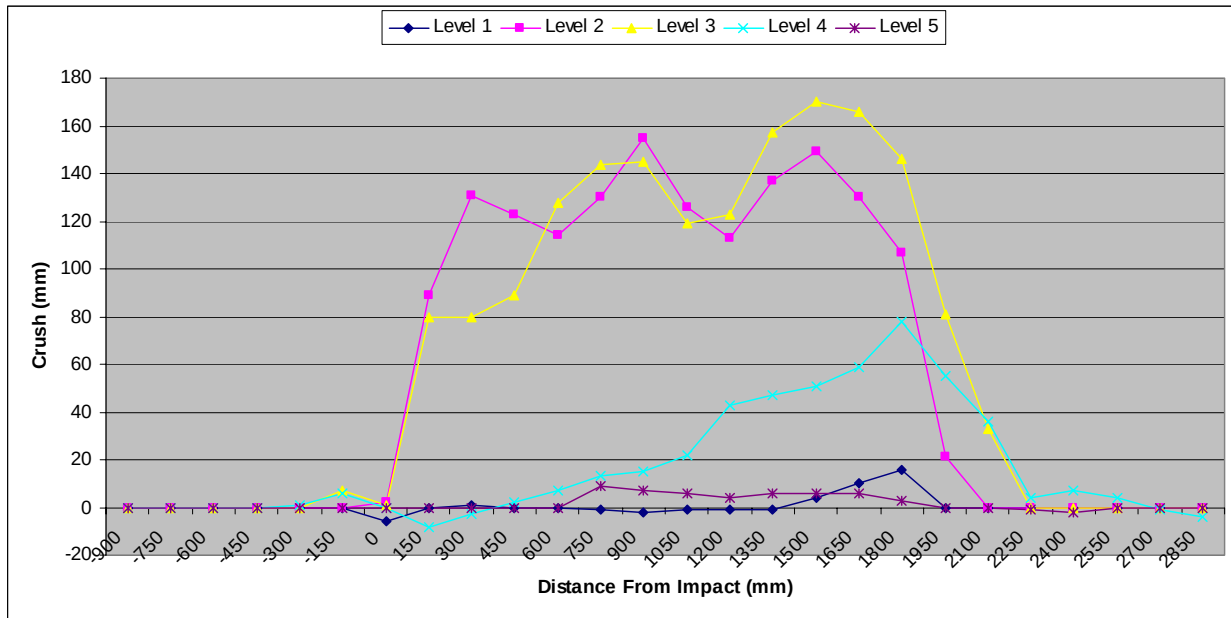
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



DATA SHEET NO. 13

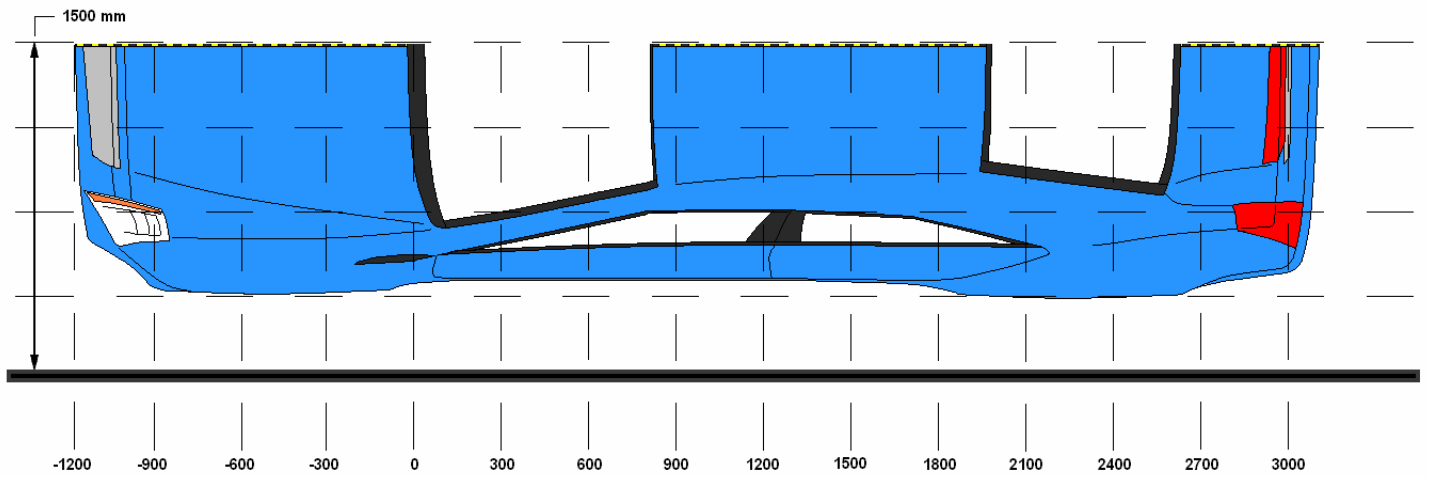
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	1950	3	583	664	81
2	1500	3	600	770	170
3	1050	2	592	718	126
4	600	3	582	710	128
5	150	2	587	676	89
6	-300	4	736	737	1

DATA SHEET NO. 14

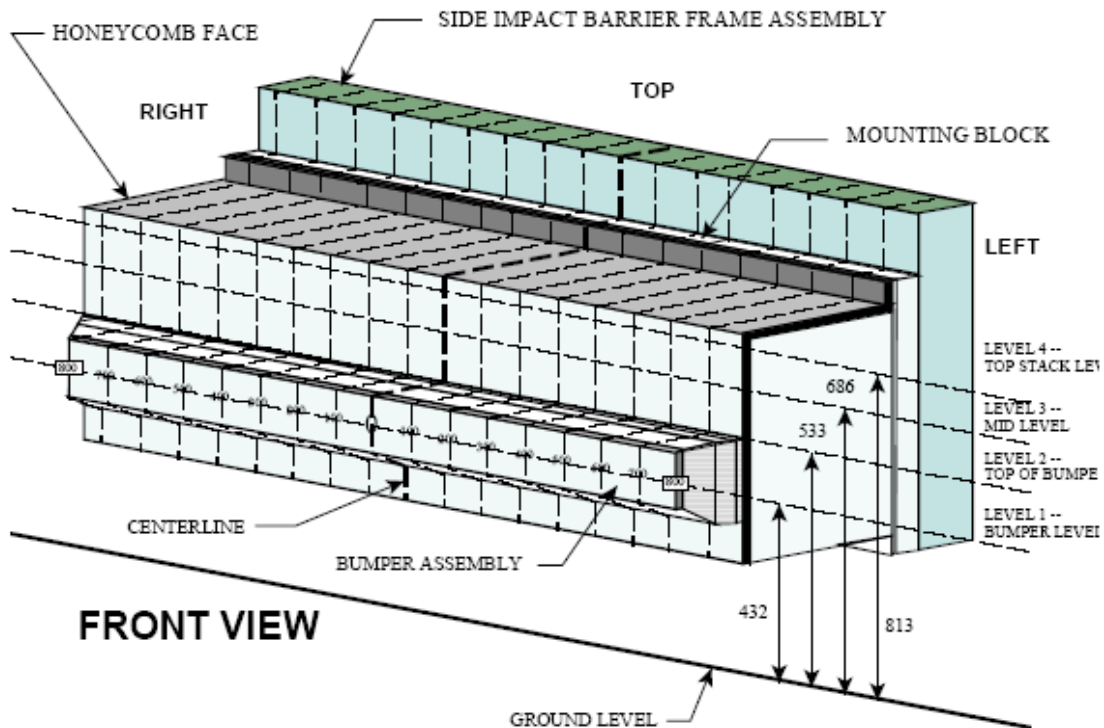
EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



NOTE: Dimensions are shown in millimeters, mm

DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	241	228	226	228	232	232	231	236	237	241	241	241	246	247	244	248	269
2	159	143	143	142	141	134	130	125	123	130	140	125	130	141	148	153	144
3	161	143	137	132	119	152	87	99	109	136	141	109	93	85	97	130	161
4	228	212	181	160	146	127	115	106	120	139	151	124	102	99	126	136	155

All dimensions in millimeters.

DATA SHEET NO. 15

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

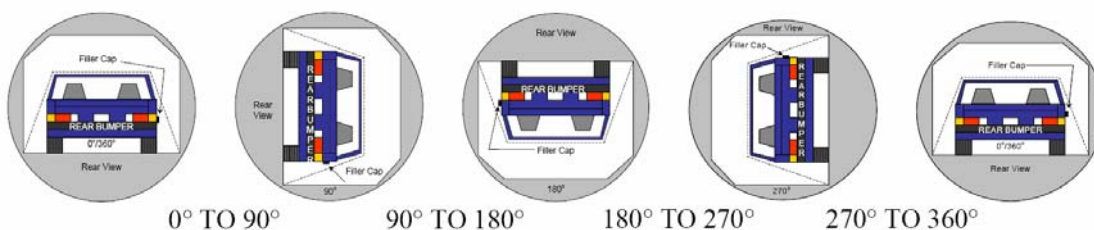
Test Date: 10/20/10

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 15.6° C

Test Time: 1:00 PM

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)
- D. Spillage Details: No spillage occurred



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	80	300	380
90° To 180°	81	300	381
180° To 270°	78	300	378
270° To 360°	77	300	377

FMVSS 301 SPILLAGE TABLE

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° To 90°	0			
90° To 180°	0			
180° To 270°	0			
270° To 360°	0			

SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° To 90°	None
90° To 180°	None
180° To 270°	None
270° To 360°	None

DATA SHEET NO. 16

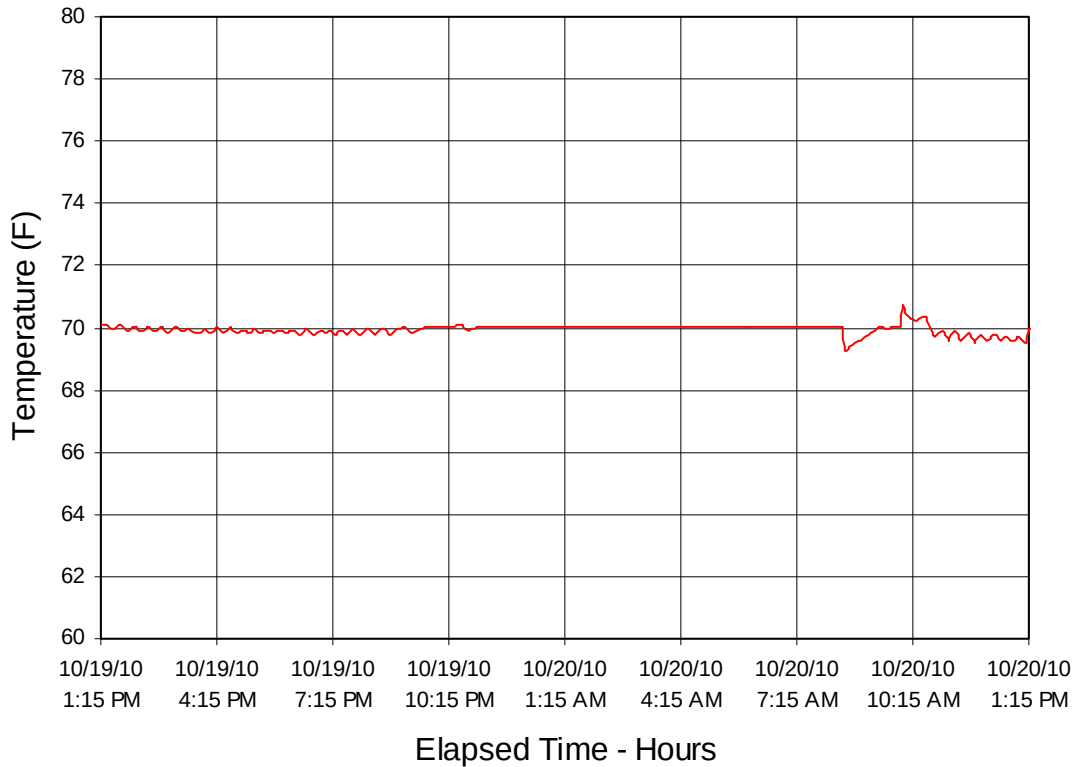
DUMMY / VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2011 Volvo XC60 FWD 5-Door MPV

NHTSA No. MB5901

Test Program: MDB Side Impact Test

Test Date: 10/20/10



APPENDIX A
PHOTOGRAPHS

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FIGURE 1. As-Delivered Right Front Three-Quarter View of Test Vehicle



FIGURE 2. As-Delivered Left Rear Three-Quarter View of Test Vehicle



FIGURE 3. Pre-Test Frontal View of Test Vehicle



FIGURE 4. Post-Test Frontal View of Test Vehicle



FIGURE 5. Pre-Test Left Front Three-Quarter View of the Test Vehicle



FIGURE 6. Post-Test Left Front Three-Quarter View of the Test Vehicle



FIGURE 7. Pre-Test Left Side View of Test Vehicle



FIGURE 8. Post-Test Left Side View of Test Vehicle



FIGURE 9. Pre-Test Left Rear Three-Quarter View of Test Vehicle



FIGURE 10. Post-Test Left Rear Three-Quarter View of Impact Zone



FIGURE 11. Pre-Test Rear View of Test Vehicle



FIGURE 12. Post-Test Rear View of Test Vehicle



FIGURE 13. Pre-Test Right Side View of Test Vehicle



FIGURE 14. Post-Test Right Side View of Test Vehicle



FIGURE 15. Pre-Test Overhead View of Test Vehicle
with MDB Positioned Against Side of Test Vehicle

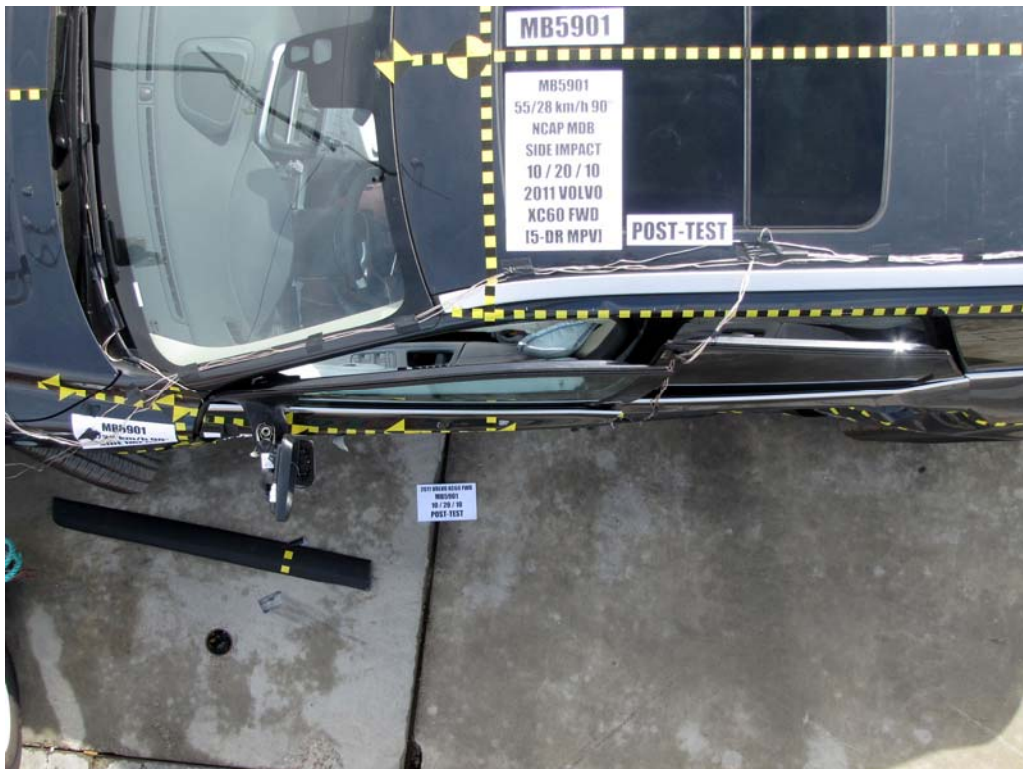


FIGURE 16. Post-Test Overhead View of Test Vehicle and MDB



FIGURE 17. Pre-Test Left Side View of MDB Positioned
Against Side of Test Vehicle at Ideal Impact Point



FIGURE 18. Pre-Test Right Side View of MDB Positioned
Against Side of Test Vehicle at Ideal Impact Point



FIGURE 19. Pre-Test Close-Up View of Impact Point Target

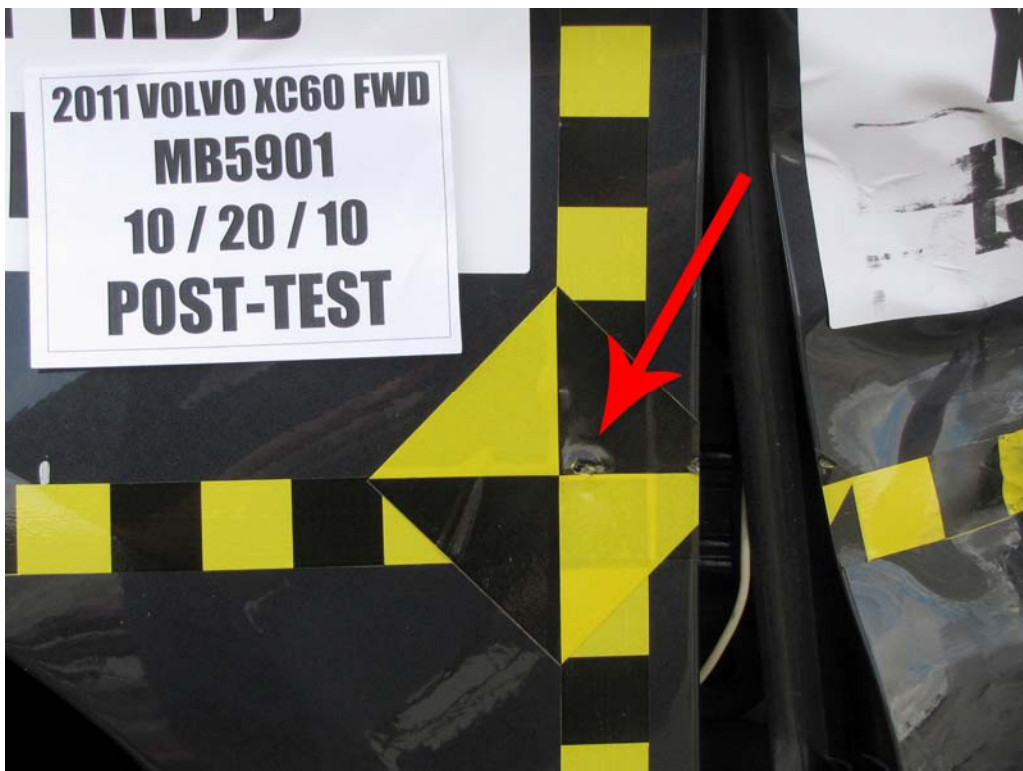


FIGURE 20. Post-Test Close-Up View of Impact Point Target
Showing Impact Point Location



FIGURE 21. Pre-Test Left Front Door Latch Close-Up



FIGURE 22. Post-Test Left Front Door Latch Close-Up



FIGURE 23. Pre-Test Left Rear Door Latch Close-Up



FIGURE 24. Post-Test Left Rear Door Latch Close-Up



FIGURE 25. Pre-Test Front Close-Up View of Driver Dummy



FIGURE 26. Post-Test Front Close-Up View of Driver Dummy



FIGURE 27. Pre-Test Left Side View of Driver Dummy
Showing Belt, Chalking, and Contact Switches



FIGURE 28. Pre-Test Left Side View of Driver Dummy Shoulder and Door Top View



FIGURE 29. Post-Test Left Side View of Driver Dummy Shoulder and Door Top View



FIGURE 30. Pre-Test Frontal View of Driver Seat Back Prior to Dummy Positioning



FIGURE 31. Pre-Test Frontal View of Driver Dummy Head and Shoulders in Relation to Head Restraint



FIGURE 32. Pre-Test Frontal View of Driver Seat Pan Prior to Dummy Positioning



FIGURE 33. Pre-Test Overhead View of Driver Dummy Thighs on Seat Pan



FIGURE 34. Pre-Test Placement of Driver Dummy's Feet



FIGURE 35. Pre-Test View of Belt Anchorage for Driver Dummy



FIGURE 36. Pre-Test Left Side View of Steering Wheel



FIGURE 37. Pre-Test View of Parking Brake



FIGURE 38. Pre-Test Close-Up Left Side View of Driver Seat Track



FIGURE 39. Pre-Test Close-Up Left Side View of Driver Seat Back



FIGURE 40. Pre-Test Close-Up View of Driver Seat Back or Head Restraint



FIGURE 41. Pre-Test Driver Dummy and Door Clearance View



FIGURE 42. Post-Test Driver Dummy and Door Clearance View



FIGURE 43. Pre-Test Right Side View of Driver Dummy and Front Seat Occupant Compartment



FIGURE 44. Post-Test Right Side View of Driver Dummy and Front Seat Occupant Compartment



FIGURE 45. Pre-Test Driver Inner Door Panel View



FIGURE 46. Post-Test Driver Dummy Inner Door Panel View
Showing Driver Dummy Contact Locations



FIGURE 47. Post-Test Driver Dummy Close-Up Head Contact With Vehicle Interior View



FIGURE 48. Post-Test Driver Dummy Close-Up Head Contact with Side Airbag View



FIGURE 49. Post-Test Driver Dummy Close-Up Torso Contact with Vehicle Interior View

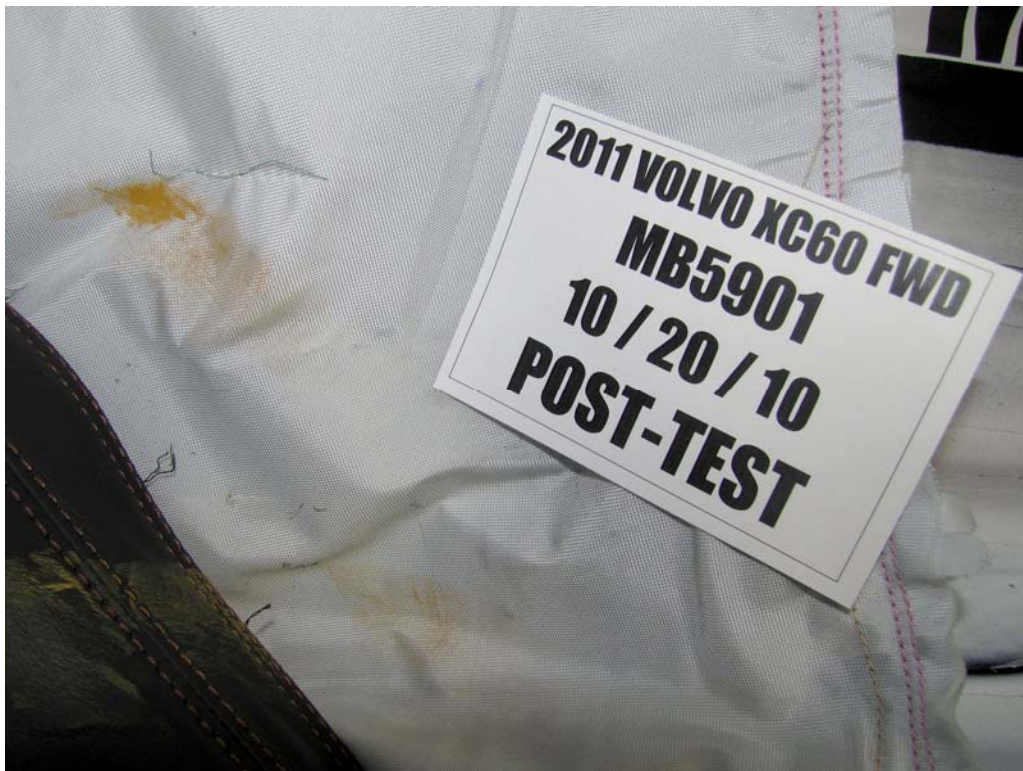


FIGURE 50. Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

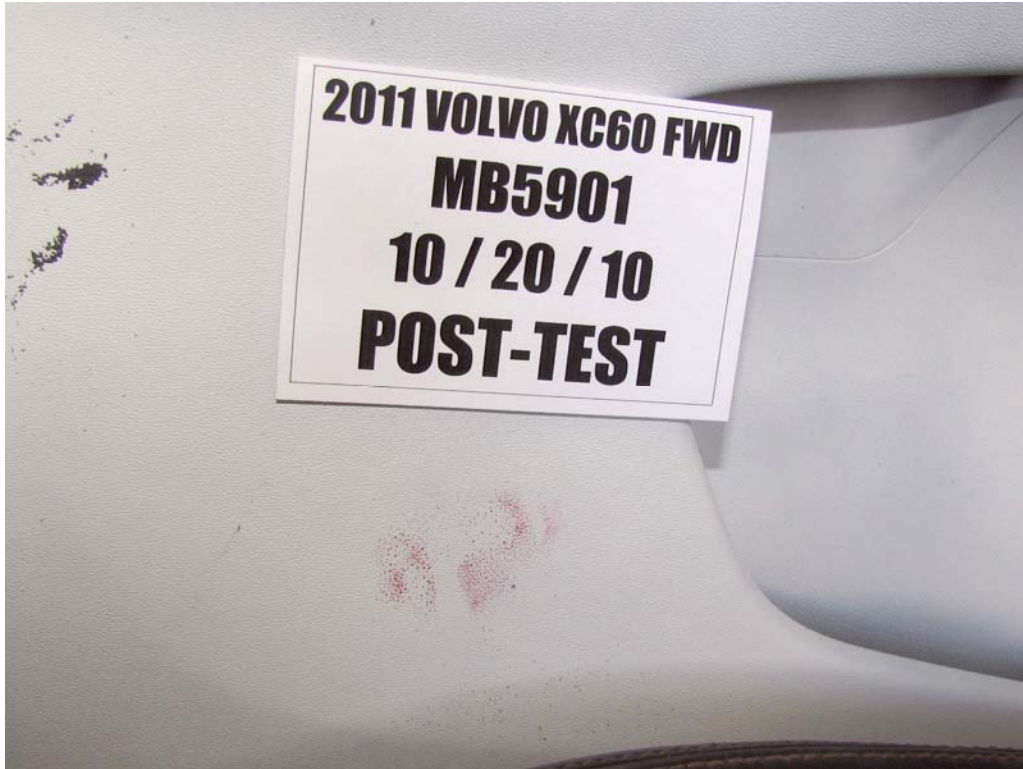


FIGURE 51. Post-Test Driver Dummy Close-Up Pelvis Contact with Vehicle Interior View

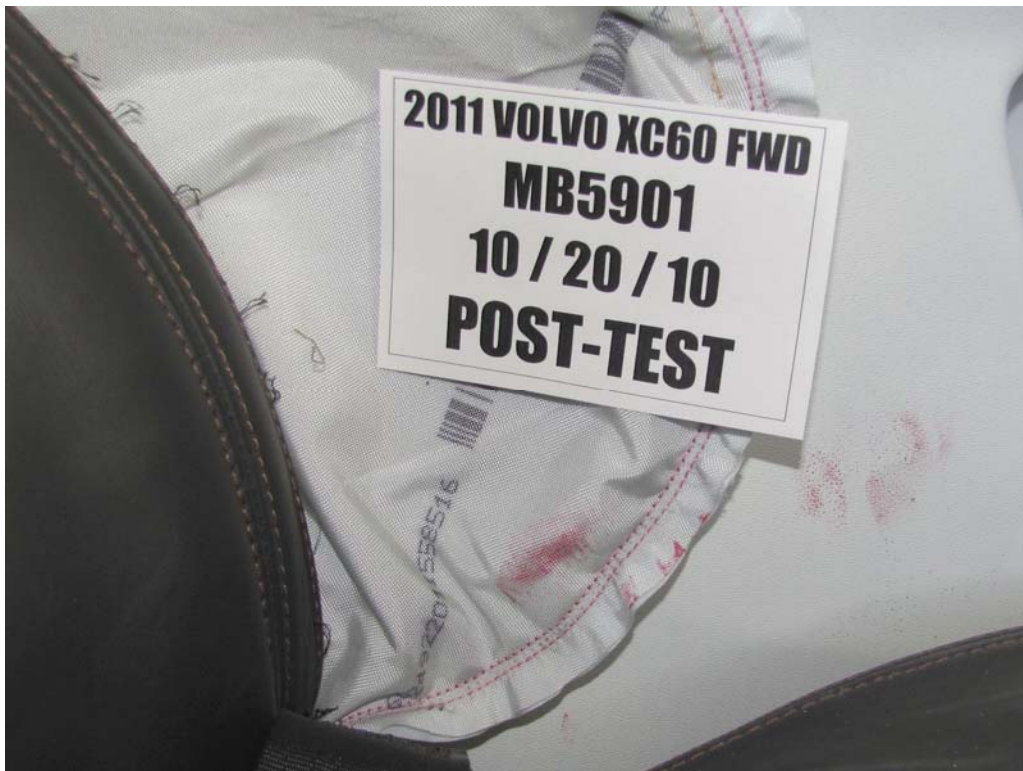


FIGURE 52. Post-Test Driver Dummy Close-Up Pelvis Contact with Side Airbag View



FIGURE 53. Pre-Test Left Side View of Rear Passenger Dummy
Showing Belt, Chalking, and Contact Switches



FIGURE 54. Pre-Test Left Side View of Rear Passenger Dummy
Shoulder and Door Top View



FIGURE 55. Post-Test Left Side View of Rear Passenger Dummy
Shoulder and Door Top View



FIGURE 56. Pre-Test Frontal View of Rear Passenger Seat Back Prior to Dummy Positioning



FIGURE 57. Pre-Test Frontal View of Rear Passenger Dummy
Head and Shoulders in Relation to Head Restraint



FIGURE 58. Pre-Test Overhead View of Rear Passenger
Seat Pan Prior to Dummy Positioning



FIGURE 59. Pre-Test Overhead View of Rear Passenger Dummy Thighs on Seat Pan



FIGURE 60. Pre-Test View of Rear Passenger Dummy's Neck
Showing Position of Adjustable Neck Bracket



FIGURE 61. Pre-Test View of Rear Passenger Dummy's Head
Showing Dummy's Head is Level



FIGURE 62. Pre-Test Placement of Rear Passenger Dummy's Feet



FIGURE 63. Pre-Test View of Belt Anchorage for Rear Passenger Dummy



FIGURE 64. Pre-Test Close-Up Left Side View of Rear Passenger Seat Track



FIGURE 65. Pre-Test Close-Up Left Side View of Rear Passenger Seat Back



FIGURE 66. Pre-Test Close-Up View of Rear Passenger Seat Back or Head Restraint



FIGURE 67. Pre-Test Rear Passenger Dummy and Door Clearance View



FIGURE 68. Post-Test Rear Passenger Dummy and Door Clearance View



FIGURE 69. Pre-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



FIGURE 70. Post-Test Right Side View of Rear Passenger Dummy and Rear Seat Occupant Compartment



FIGURE 71. Pre-Test Rear Passenger Inner Door Panel View



FIGURE 72. Post-Test Rear Passenger Inner Door Panel View
Showing Rear Passenger Dummy Contact Locations



FIGURE 73. Post-Test Rear Passenger Dummy Close-Up
Head Contact with Vehicle Interior View



FIGURE 74. Post-Test Rear Passenger Dummy Close-Up
Head Contact With Side Airbag View



FIGURE 75. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Vehicle Interior View

Photograph Not Applicable

No Rear Passenger
Side Airbag

FIGURE 76. Post-Test Rear Passenger Dummy Close-Up
Torso Contact with Side Airbag View



FIGURE 77. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Vehicle Interior View

Photograph Not Applicable

No Rear Passenger
Side Airbag

FIGURE 78. Post-Test Rear Passenger Dummy Close-Up
Pelvis Contact with Side Airbag View

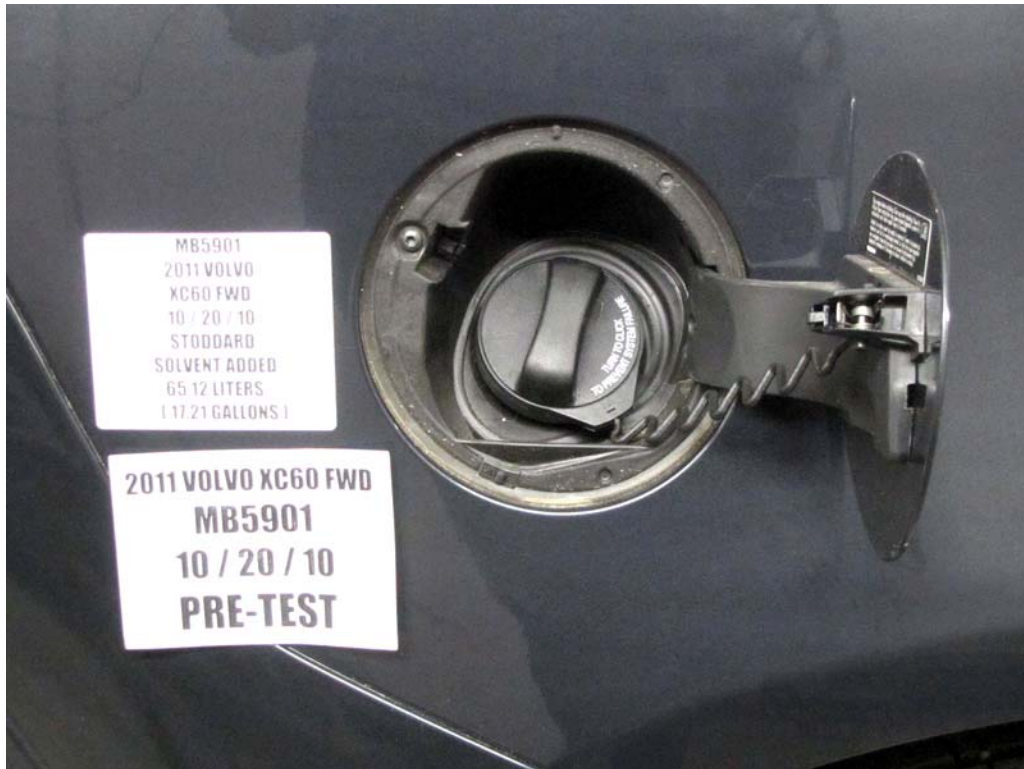


FIGURE 79. Pre-Test View of Fuel Filler Cap



FIGURE 80. Post-Test View of Fuel Filler Cap



FIGURE 81. Pre-Test Front View of MDB Impactor Face



FIGURE 82. Post-Test Front View of MDB Impactor Face



FIGURE 83. Pre-Test Top View of MDB Impactor Face



FIGURE 84. Post-Test Top View of MDB Impactor Face



FIGURE 85. Pre-Test Left Side View of MDB Impactor Face



FIGURE 86. Post-Test Left Side View of MDB Impactor Face



FIGURE 87. Pre-Test Right Side View of MDB Impactor Face



FIGURE 88. Post-Test Right Side View of MDB Impactor Face



FIGURE 89. Close-Up View of Vehicle's Certification Label



FIGURE 90. Close-Up View of Vehicle's Tire Information Placard



FIGURE 91. Pre-Test Ballast View



FIGURE 92. Post-Test Primary and Redundant Speed Trap Read-Out



FIGURE 93. FMVSS No. 301/305 Rollover 0 Degrees



FIGURE 94. FMVSS No. 301/305 Rollover 90 Degrees



FIGURE 95. FMVSS No. 301/305 Rollover 180 Degrees



FIGURE 96. FMVSS No. 301/305 Rollover 270 Degrees

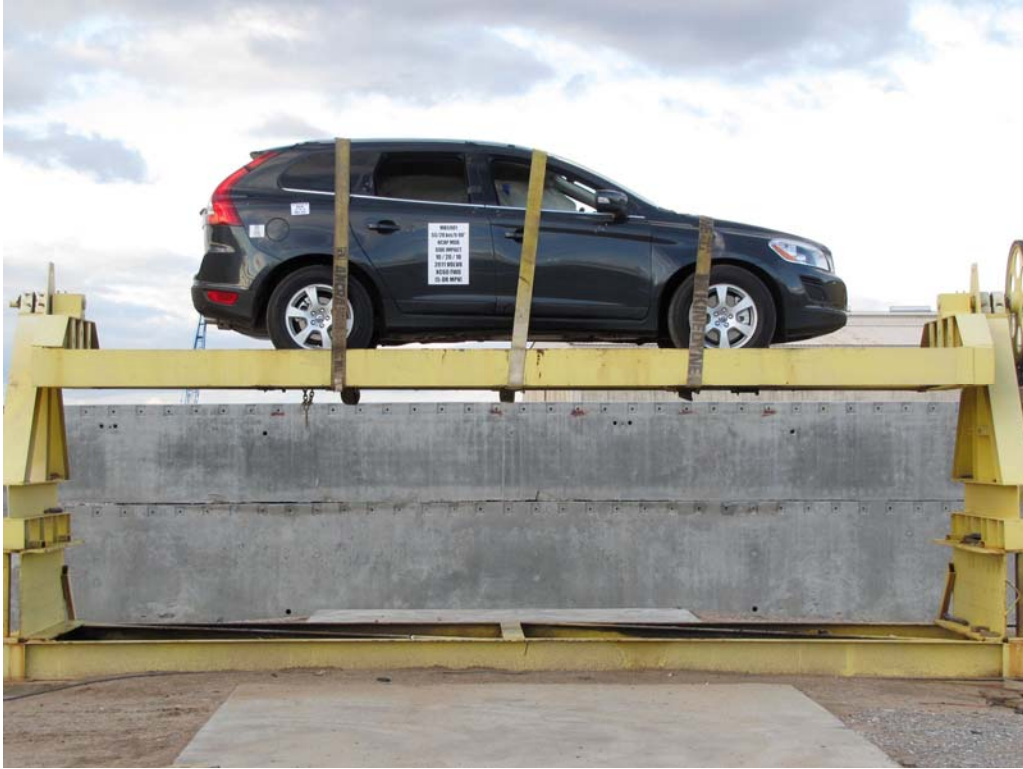


FIGURE 97. FMVSS No. 301/305 Rollover 360 Degrees



FIGURE 98. Impact Event

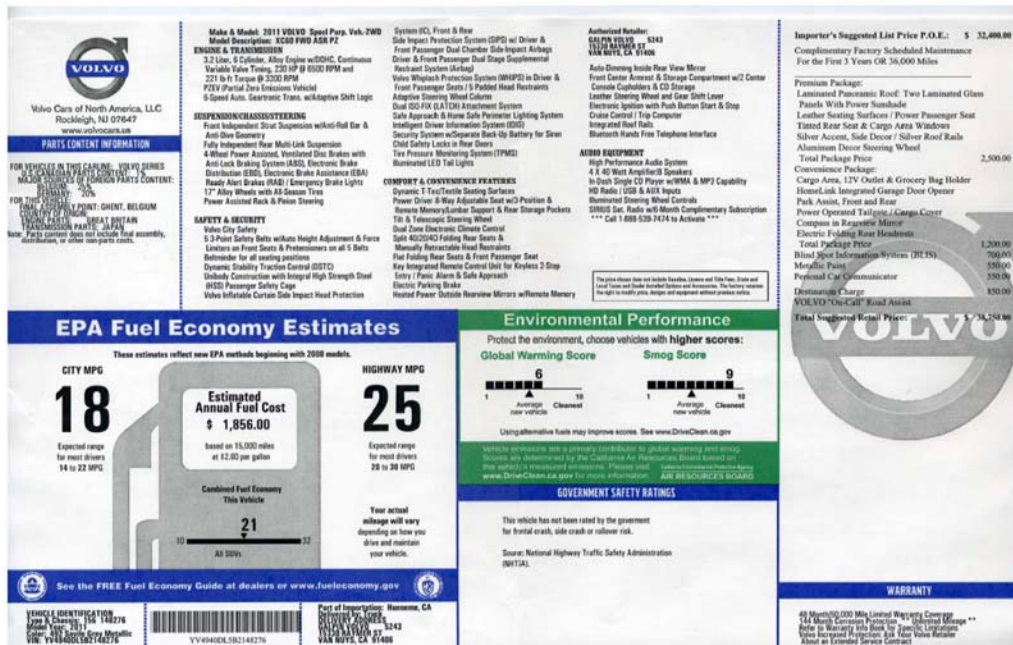


FIGURE 99. Monroney Label

Photograph Not Applicable

No Driver Head Restraint Use and Adjustment Information in Vehicle Manual

FIGURE 100. Driver Head Restraint Use and Adjustment Information from Vehicle Manual

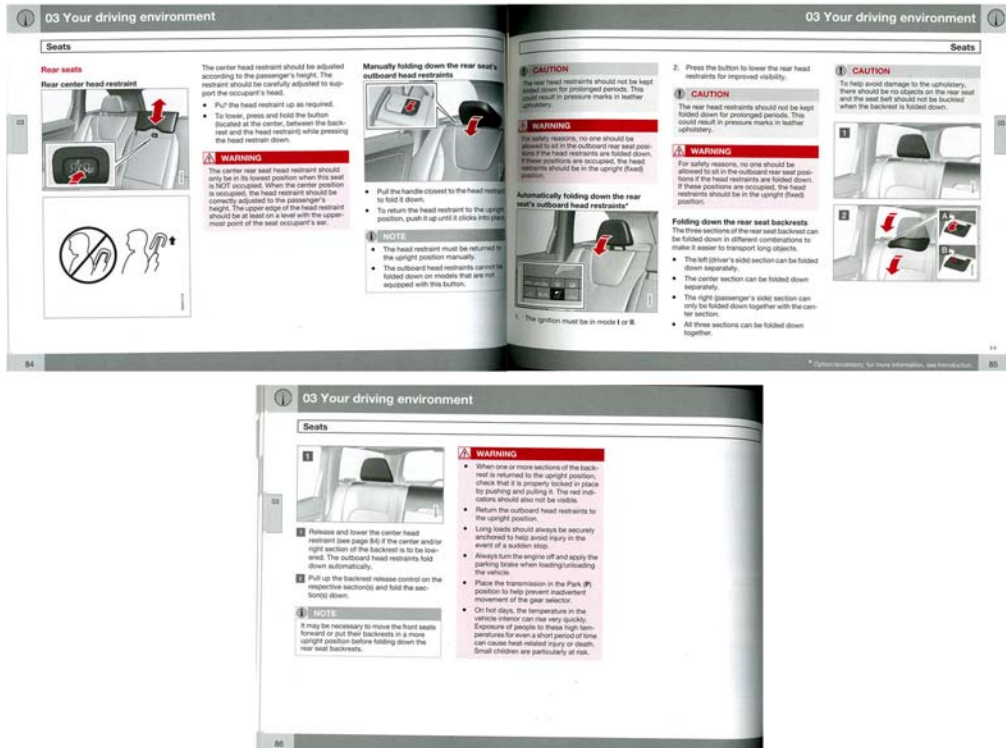


FIGURE 101. Left Rear Passenger Head Restraint Use and Adjustment
Information from Vehicle Manual

APPENDIX B
DUMMY RESPONSE DATA

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2	Driver Head Acceleration (Y) Primary vs. Time	B-1
3	Driver Head Acceleration (Z) Primary vs. Time	B-1
4	Driver Head Resultant Acceleration Primary vs. Time	B-1
5	Driver Upper Thorax Rib Deflection (Y) vs. Time	B-2
6	Driver Middle Thorax Rib Deflection (Y) vs. Time	B-2
7	Driver Lower Thorax Rib Deflection (Y) vs. Time	B-2
8	Driver Thorax Rib Deflection Maximum vs. Time	B-2
9	Driver Anterior Abdominal Force (Y) vs. Time	B-3
10	Driver Middle Abdominal Force (Y) vs. Time	B-3
11	Driver Posterior Abdominal Force (Y) vs. Time	B-3
12	Driver Total Abdominal Force (Y) vs. Time	B-3
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16	Passenger Head Acceleration (Z) vs. Time Primary	B-5
17	Passenger Head Resultant Acceleration Primary vs. Time	B-5
18	Passenger Lower Spine T12 Acceleration (X) vs. Time	B-6
19	Passenger Lower Spine T12 Acceleration (Y) vs. Time	B-6
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24	Passenger Total Pelvic Force on Impact Side (Y) vs. Time	B-7

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at

www.NHTSA.dot.gov.

Driver & Passenger Dummy Instrumentation Data

Driver Lower Spine T12 Acceleration (X)

Driver Lower Spine T12 Acceleration (Y)

Driver Lower Spine T12 Acceleration (Z)

Passenger Upper Thorax Rib Deflection (Y)

Passenger Middle Thorax Rib Deflection (Y)

Passenger Lower Thorax Rib Deflection (Y)
Passenger Upper Abdomen Rib Deflection (Y)
Passenger Lower Abdomen Rib Deflection (Y)
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Shoulder Contact Switch
Driver Torso Contact Switch
Driver Pelvis Contact Switch
Passenger Head Acceleration Redundant (X)
Passenger Head Acceleration Redundant (Y)
Passenger Head Acceleration Redundant (Z)
Passenger Shoulder Contact Switch
Passenger Torso Contact Switch
Passenger Pelvis Contact Switch

Vehicle Instrumentation Data

Driver Side Airbag Timing
Driver Side Curtain Airbag Timing
Passenger Side Airbag Timing (if applicable)
Passenger Side Curtain Airbag Timing (if different from Driver)
Right Side Sill at Front Seat Acceleration (X)
Right Side Sill at Front Seat Acceleration (Y)
Right Side Sill at Front Seat Acceleration (Z)
Right Side Sill at Rear Seat Acceleration (X)
Right Side Sill at Rear Seat Acceleration (Y)
Right Side Sill at Rear Seat Acceleration (Z)
Rear Floorpan Above Axle Acceleration (X)
Rear Floorpan Above Axle Acceleration (Y)
Rear Floorpan Above Axle Acceleration (Z)
Left Side Sill at Front Seat Acceleration (Y)
Left Side Sill at Rear Seat Acceleration (Y)
Right Rear Occupant Compartment Acceleration (Y)
Lower A-Post Acceleration (Y)
Upper A-Post Acceleration (Y)
Lower B-Post Acceleration (Y)
Upper B-Post Acceleration (Y)

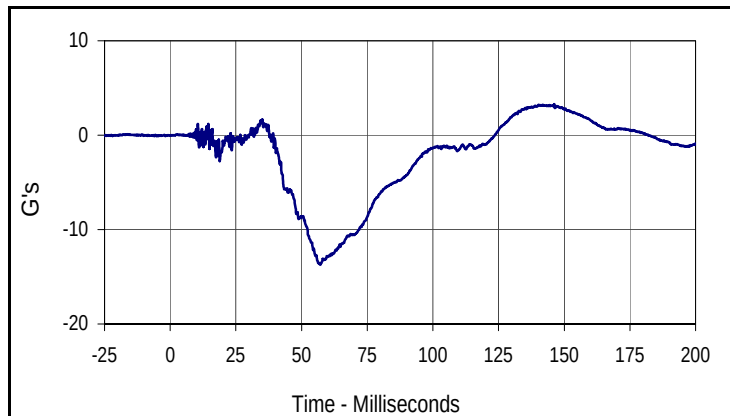
Front Seat Track Acceleration (Y)
Rear Seat Track Acceleration (Y)
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)

MDB Instrumentation Data

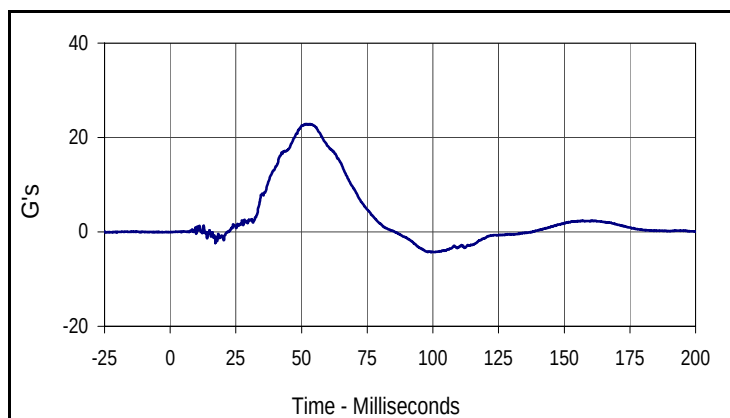
MDB Center of Gravity Acceleration (X)
MDB Center of Gravity Acceleration (Y)
MDB Center of Gravity Acceleration (Z)
MDB Rear Acceleration (X)
MDB Rear Acceleration (Y)
Left MDB Contact Switch
Right MDB Contact Switch

Test Vehicle: 2011 Volvo XC60 5-Door MPV
 Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test

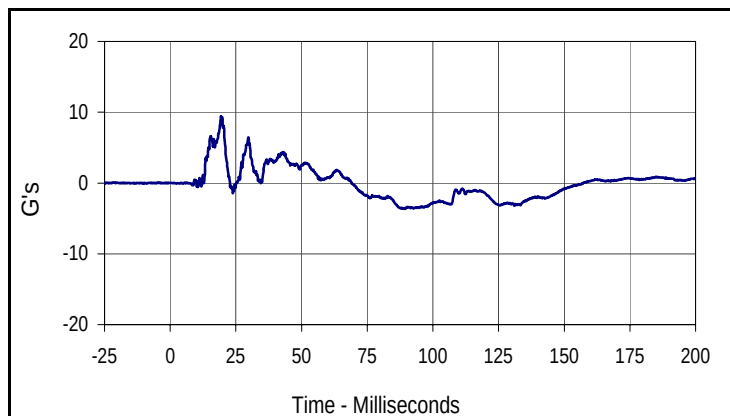
Test Date: 10/20/10
 NHTSA No.: MB5901



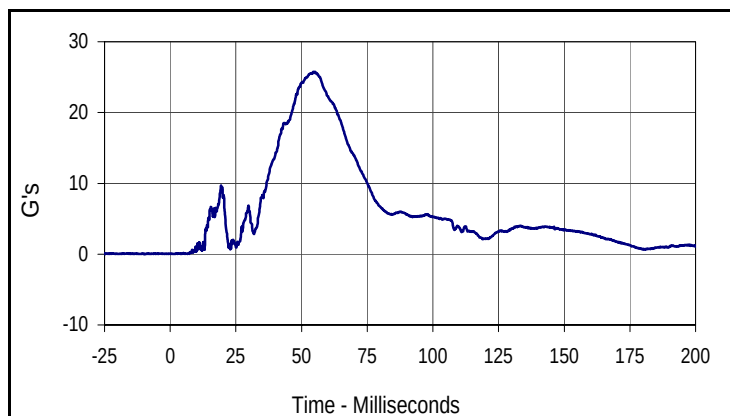
Curve Description			
Driver Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
3.3	146.1	-13.7	57.1



Curve Description			
Driver Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
22.9	52.8	-4.3	99.3



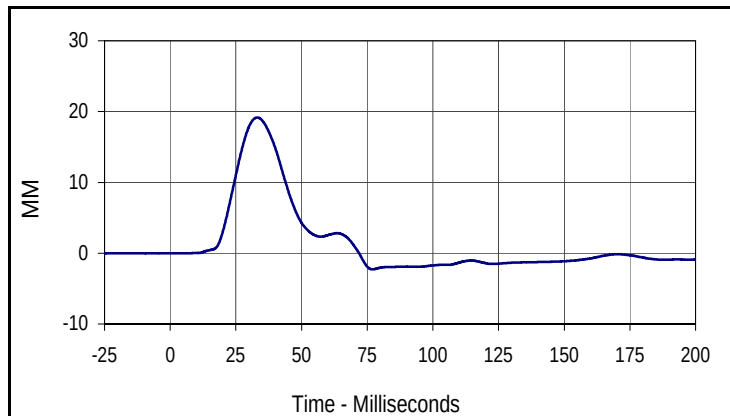
Curve Description			
Driver Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
9.4	19.3	-3.7	88.9



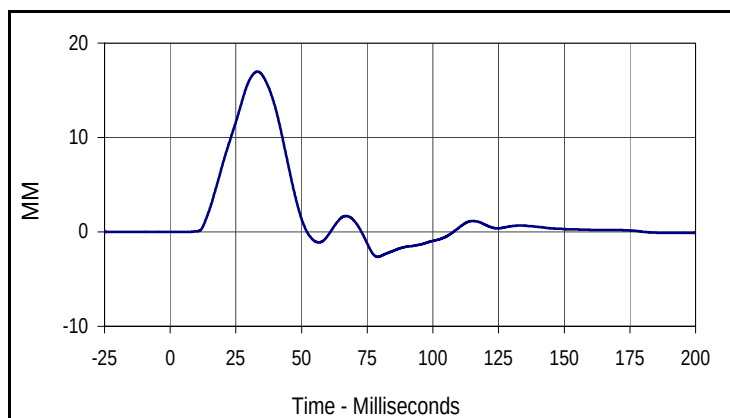
Curve Description			
Driver Head Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
25.8	55.0	0.0	0.3

Test Vehicle: 2011 Volvo XC60 5-Door MPV
 Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test

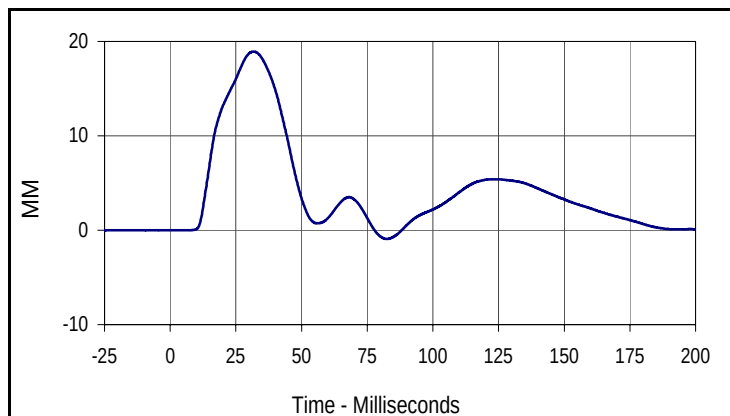
Test Date: 10/20/10
 NHTSA No.: MB5901



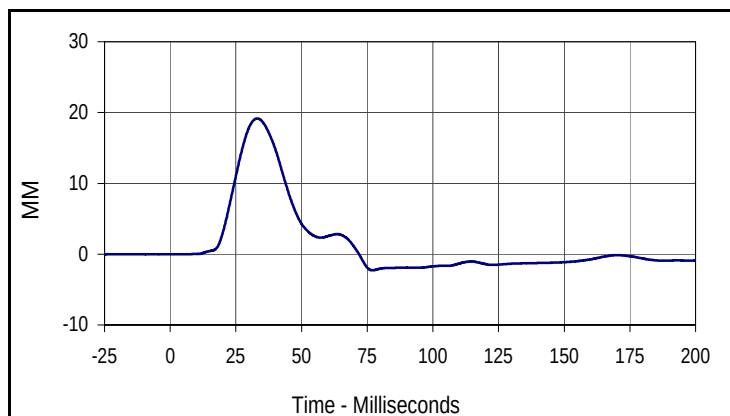
Curve Description			
Driver Upper Thorax Rib Deflection Y			
CURNO	Type	SAE Class	Units
007	FIL	180	MM
Max	Time	Min	Time
19.2	33.2	-2.3	77.0



Curve Description			
Driver Middle Thorax Rib Deflection Y			
CURNO	Type	SAE Class	Units
008	FIL	180	MM
Max	Time	Min	Time
17.0	33.2	-2.6	79.0



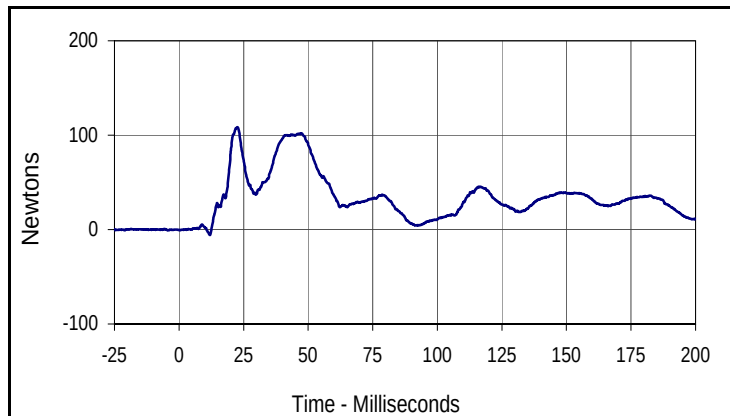
Curve Description			
Driver Lower Thorax Rib Deflection Y			
CURNO	Type	SAE Class	Units
009	FIL	180	MM
Max	Time	Min	Time
18.9	31.7	-0.9	82.5



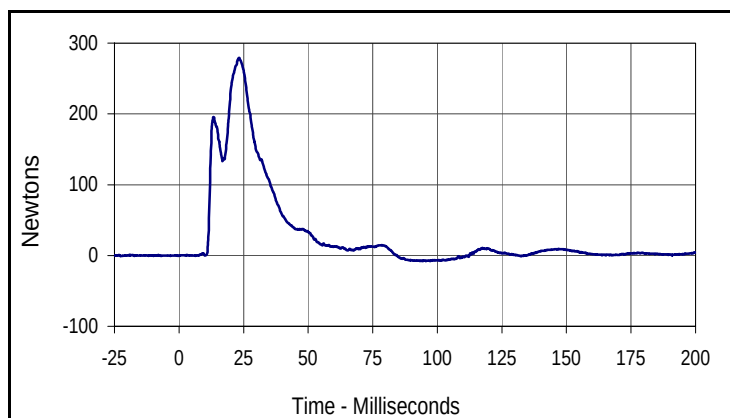
Curve Description			
Driver Thorax Rib Deflection Maximum			
CURNO	Type	SAE Class	Units
010	FIL	180	MM
Max	Time	Min	Time
19.2	33.2	-2.3	77.0

Test Vehicle: 2011 Volvo XC60 5-Door MPV
 Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test

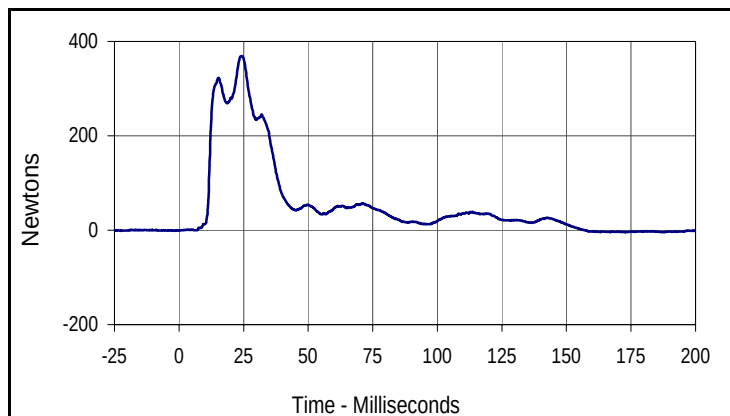
Test Date: 10/20/10
 NHTSA No.: MB5901



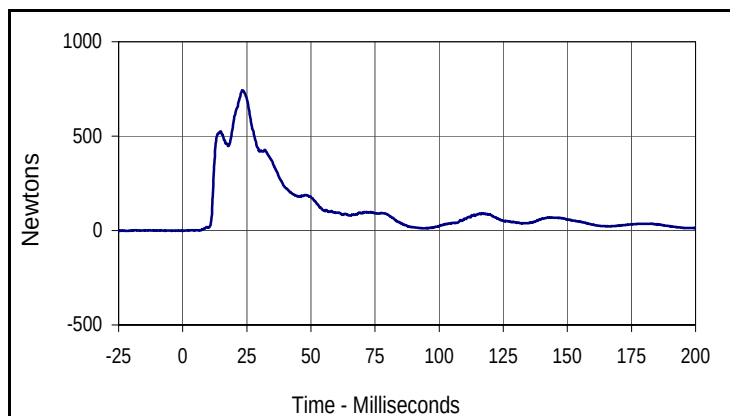
Curve Description			
Driver Anterior Abdominal Force Y			
CURNO	Type	SAE Class	Units
013	FIL	600	Newtons
Max	Time	Min	Time
108.6	22.6	-5.9	12.0



Curve Description			
Driver Middle Abdominal Force Y			
CURNO	Type	SAE Class	Units
014	FIL	600	Newtons
Max	Time	Min	Time
279.1	23.2	-7.7	97.2



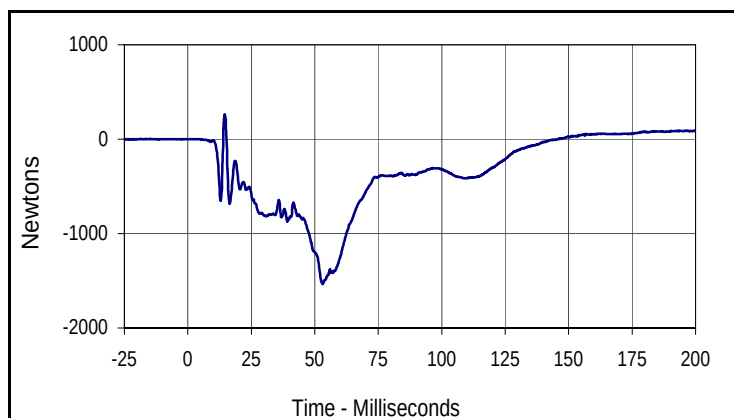
Curve Description			
Driver Posterior Abdominal Force Y			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
368.9	24.4	-4.3	187.3



Curve Description			
Driver Total Abdominal Force			
CURNO	Type	SAE Class	Units
013	RES	600	Newtons
Max	Time	Min	Time
742.6	23.4	-0.9	0.2

Test Vehicle: 2011 Volvo XC60 5-Door MPV
 Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test

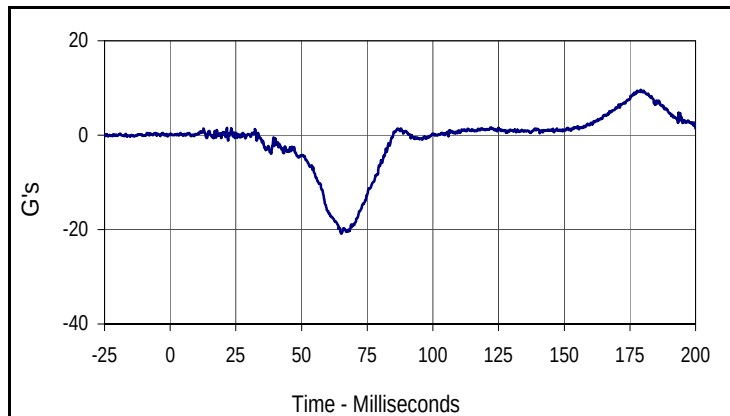
Test Date: 10/20/10
 NHTSA No.: MB5901



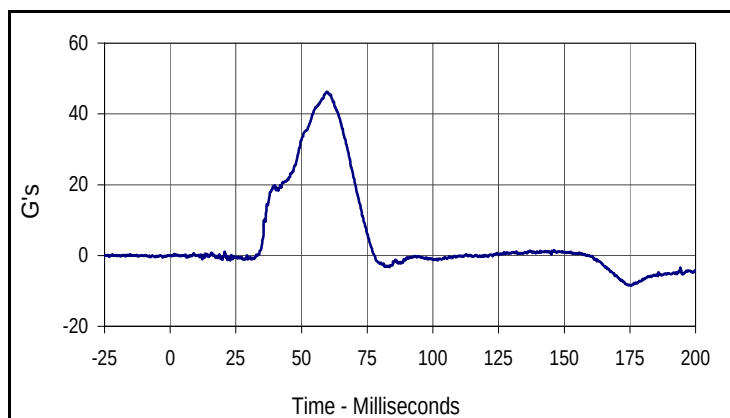
Curve Description			
Driver Pubic Symphysis Force Y			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
263.0	14.5	-1535.8	53.1

Test Vehicle: 2011 Volvo XC60 5-Door MPV
 Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test

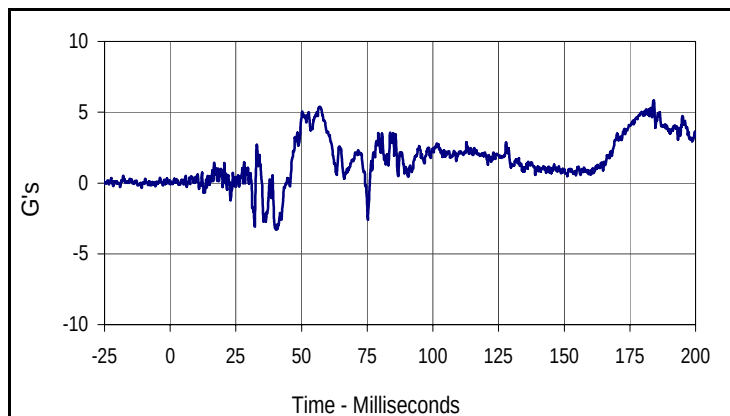
Test Date: 10/20/10
 NHTSA No.: MB5901



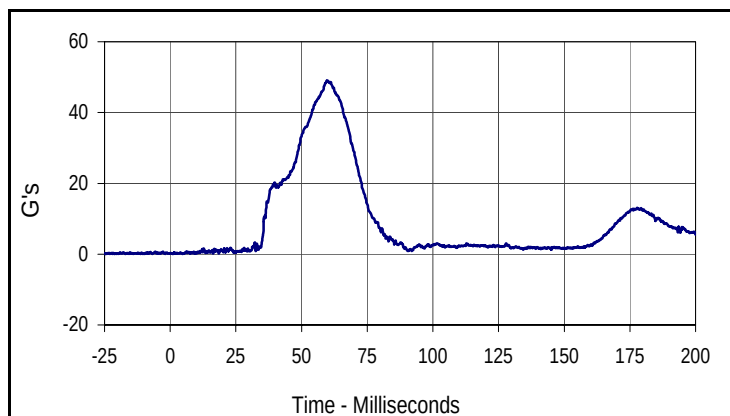
Curve Description			
Passenger Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
021	FIL	1000	G's
Max	Time	Min	Time
9.6	179.2	-20.9	65.1



Curve Description			
Passenger Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
022	FIL	1000	G's
Max	Time	Min	Time
46.3	59.8	-8.5	175.4



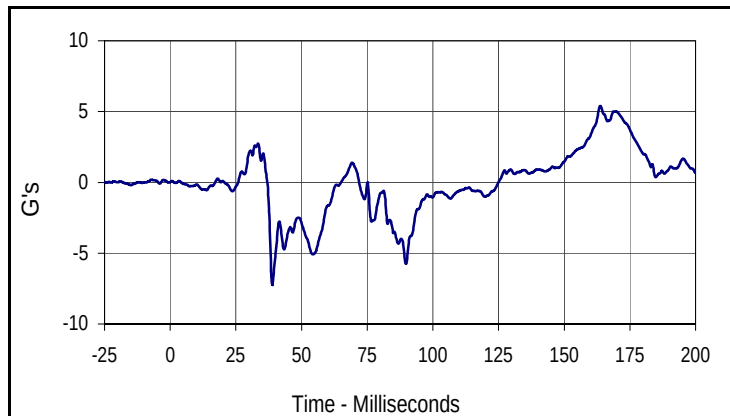
Curve Description			
Passenger Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
023	FIL	1000	G's
Max	Time	Min	Time
5.8	184.2	-3.3	40.4



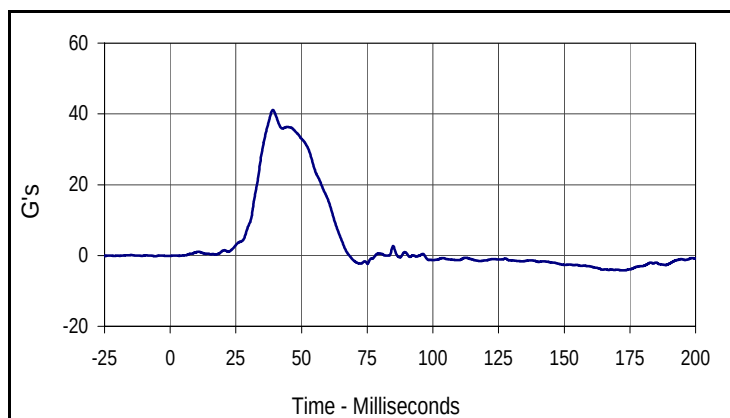
Curve Description			
Passenger Head Acceleration Resultant Primary			
CURNO	Type	SAE Class	Units
021	RES	1000	G's
Max	Time	Min	Time
49.1	59.8	0.1	0.8

Test Vehicle: 2011 Volvo XC60 5-Door MPV
 Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test

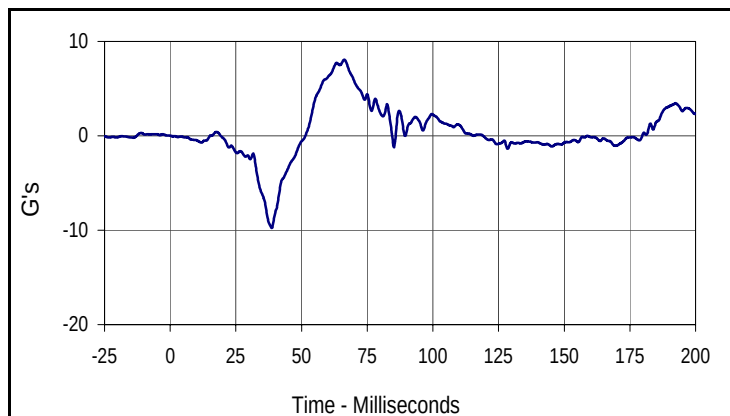
Test Date: 10/20/10
 NHTSA No.: MB5901



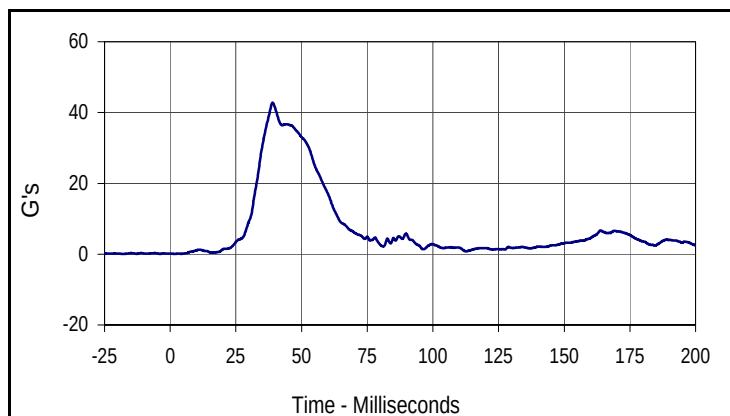
Curve Description			
Passenger Lower Spine T12 Acceleration X			
CURNO	Type	SAE Class	Units
037	FIL	180	G's
Max	Time	Min	Time
5.4	163.8	-7.2	38.9



Curve Description			
Passenger Lower Spine T12 Acceleration Y			
CURNO	Type	SAE Class	Units
038	FIL	180	G's
Max	Time	Min	Time
41.1	39.1	-4.2	172.6



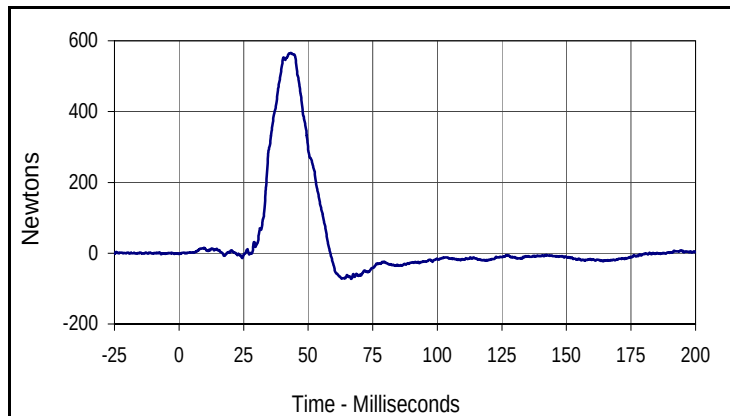
Curve Description			
Passenger Lower Spine T12 Acceleration Z			
CURNO	Type	SAE Class	Units
039	FIL	180	G's
Max	Time	Min	Time
8.1	66.3	-9.8	38.7



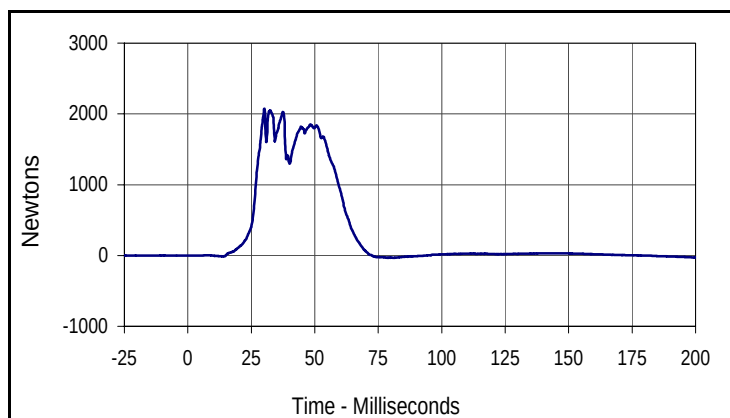
Curve Description			
Passenger Lower Spine T12 Acceleration Resultant			
CURNO	Type	SAE Class	Units
037	RES	180	G's
Max	Time	Min	Time
42.8	39.0	0.0	1.5

Test Vehicle: 2011 Volvo XC60 5-Door MPV
 Test Program: 61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test

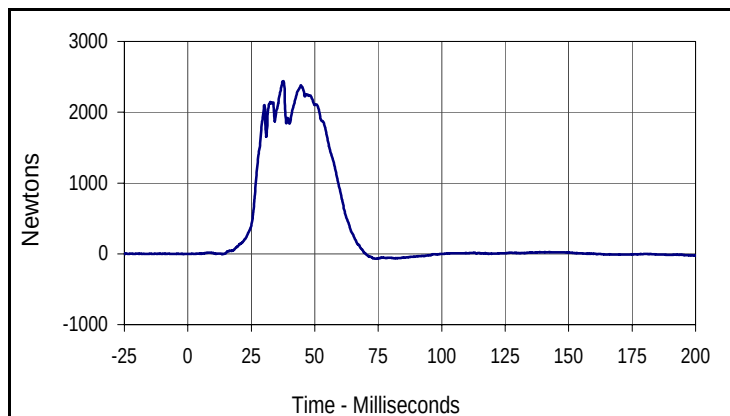
Test Date: 10/20/10
 NHTSA No.: MB5901



Curve Description			
Passenger Iliac Wing Force on Impact Side Y			
CURNO	Type	SAE Class	Units
043	FIL	600	Newtons
Max	Time	Min	Time
565.6	43.2	-72.6	66.7



Curve Description			
Passenger Acetabulum Force on Impact Side Y			
CURNO	Type	SAE Class	Units
042	FIL	600	Newtons
Max	Time	Min	Time
2075.2	30.1	-32.4	78.6



Curve Description			
Passenger Total Pelvic Force			
CURNO	Type	SAE Class	Units
042	SUM	600	Newtons
Max	Time	Min	Time
2441.4	37.6	-69.5	73.8

APPENDIX C
DUMMY CALIBRATION DATA

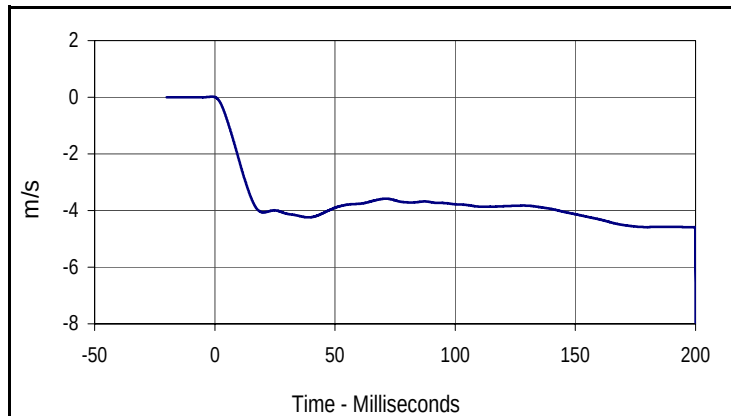
APPENDIX C
PRE-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: ES2re Neck Calibration
 ATD Serial No.: F035

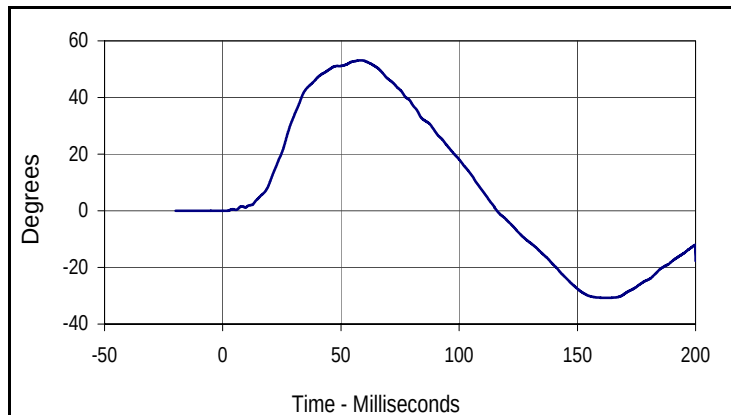
Test Date: 10/13/10
 Test I.D.: NB10B



Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	3.30 to 3.50	3.43	Pass
Pendulum Deceleration	1 msec	m/s	0.0 to -.050	-0.044	Pass
	3 msec	m/s	-.250 to -.375	-0.316	Pass
	14 msec	m/s	-3.20 to -3.70	-3.30	Pass
Headform Rotation	Max	Degrees	49.0 to 58.0	53.2	Pass
	Time	msec	54.0 to 66.0	58.4	Pass
Maximum Rotation To Time Zero Crossing		msec	53.0 to 88.0	57.6	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.2	-8.0	200.0



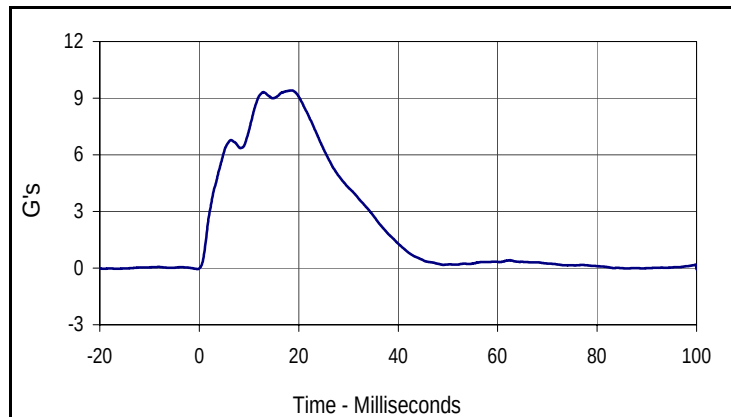
Curve Description			
Headform Rotation			
CURNO	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
53.2	58.4	-30.7	161.9

Test Program: ES2re Shoulder Calibration
 ATD Serial No.: F035

Test Date: 10/13/10
 Test I.D.: SH10B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.20 to 4.40	4.24	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	9.4	Pass
Overall Test Results				Pass



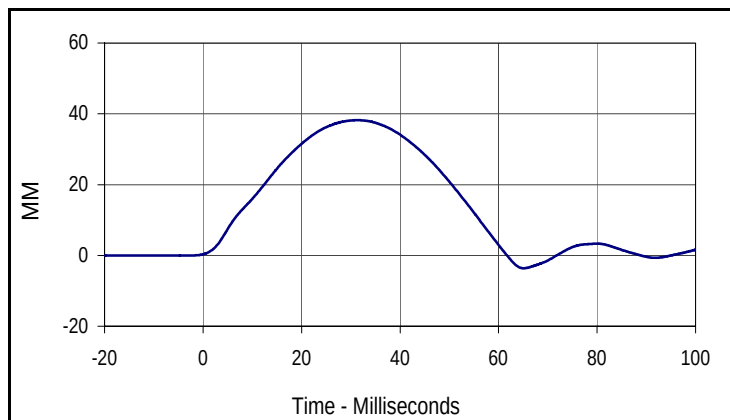
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
9.4	18.5	0.0	-0.4

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #1

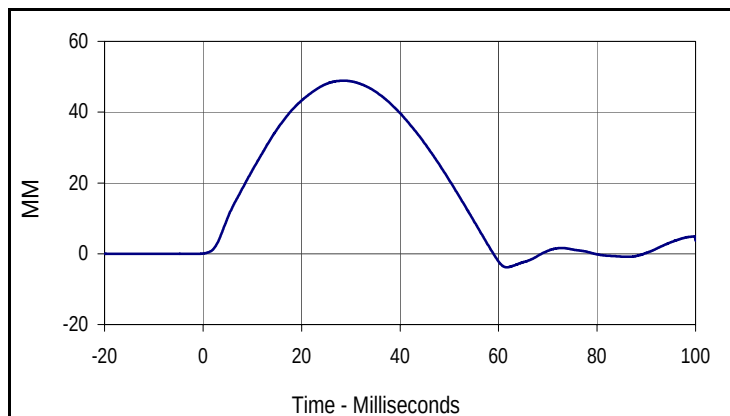
Test Date: 10/13/10
 Test I.D.: RIB10D



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	38.2	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	48.9	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.2	31.4	-3.6	65.1



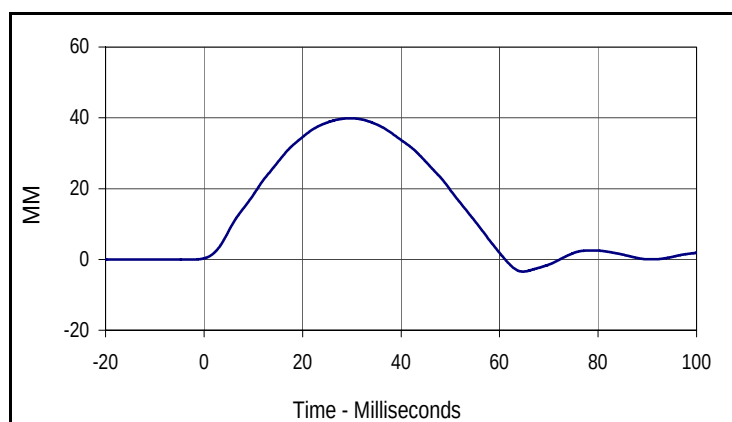
Curve Description			
Upper Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
48.9	28.6	-3.8	61.7

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #2

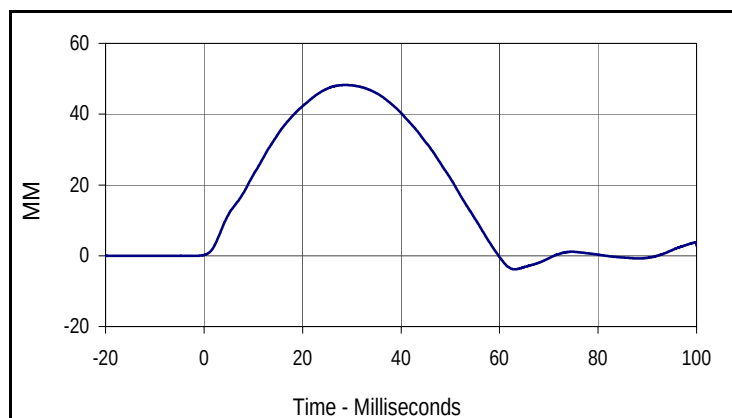
Test Date: 10/13/10
 Test I.D.: RIB10E



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	39.9	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	48.2	Pass
Overall Test Results			Pass	



Curve Description			
Middle Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
39.9	29.7	-3.4	64.7



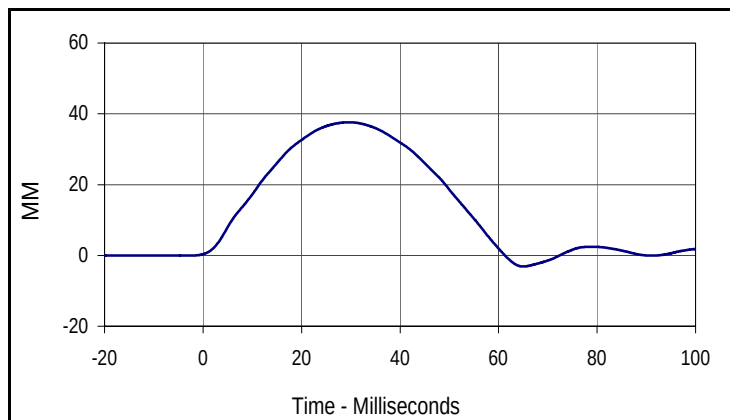
Curve Description			
Middle Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
48.2	28.7	-3.8	63.1

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #3

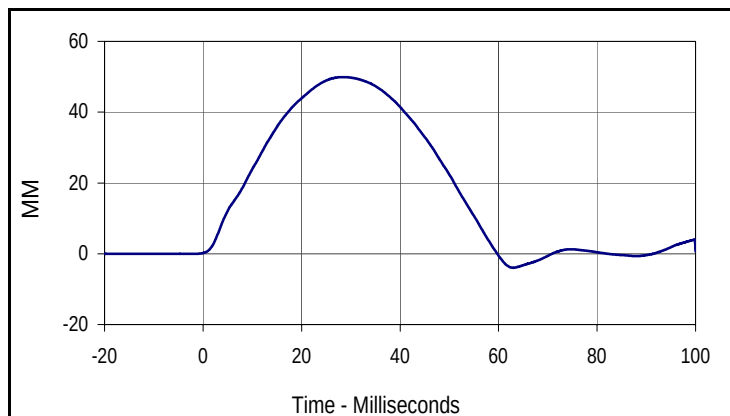
Test Date: 10/13/10
 Test I.D.: RIB10F



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	37.6	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	49.9	Pass
Overall Test Results			Pass	



Curve Description			
Lower Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.6	29.6	-3.1	65.0



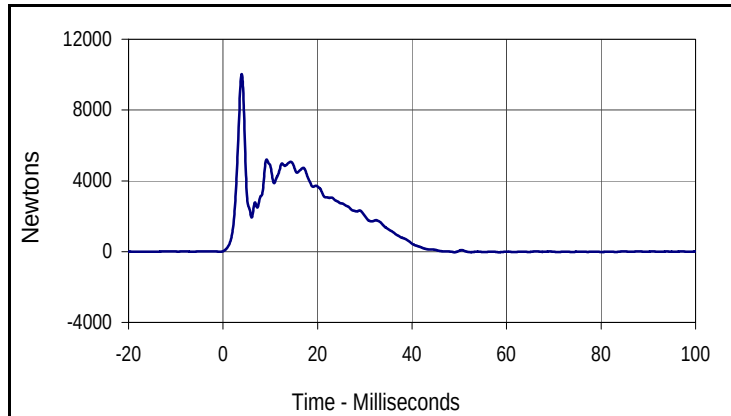
Curve Description			
Lower Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
49.9	28.4	-4.0	63.0

Test Program: ES2re Thorax Calibration
 ATD Serial No.: F035

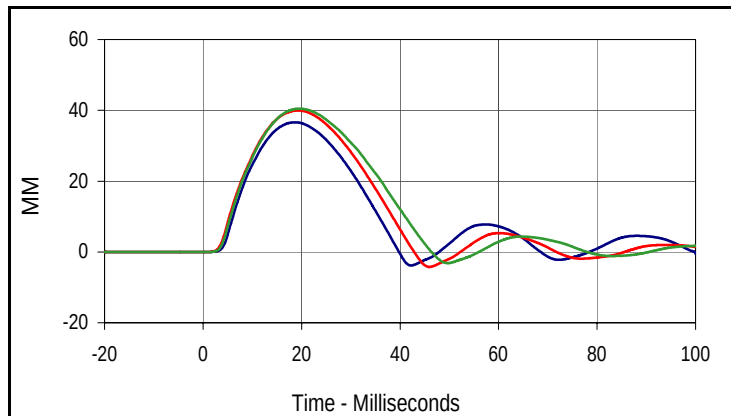
Test Date: 10/13/10
 Test I.D.: TH10B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	5.40 to 5.60	5.42	Pass
Impactor Force	N	5100 to 6200	5210.4	Pass
	msec	> 6.0 msec	9.9	Pass
Upper Rib Deflection	MM	34 to 41	36.6	Pass
Middle Rib Deflection	MM	37 to 45	39.9	Pass
Lower Rib Deflection	MM	37 to 44	40.5	Pass
Overall Test Results			Pass	



Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
10020.4	4.0	-33.9	58.3



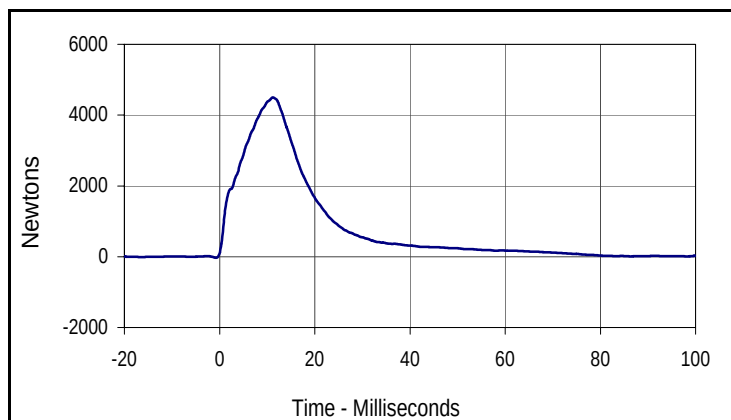
Curve Description			
Upper, Middle, Lower Rib Deflections			
CURNO(s)	Type	SAE Class	Units
002-003-004	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
36.6	18.7	-3.8	42.2
Max (Middle)	Time	Min (Middle)	Time
39.9	19.4	-4.2	46.0
Max (Lower)	Time	Min (Lower)	Time
40.5	19.5	-3.2	49.7

Test Program: ES2re Abdomen Calibration
 ATD Serial No.: F035

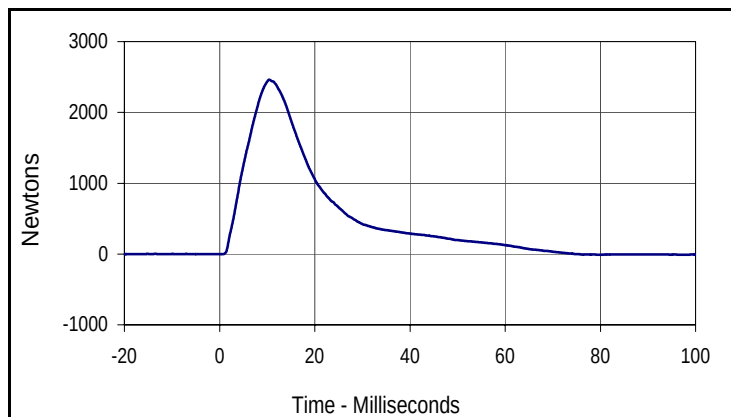
Test Date: 10/13/10
 Test I.D.: ABD10B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	3.90 to 4.10	3.98	Pass
Impactor Force	N	4000 to 4800	4498.0	Pass
	msec	10.6 to 13.0	11.2	Pass
Abdominal Force	N	2200 to 2700	2463.8	Pass
	msec	10.0 to 12.3	10.4	Pass
Overall Test Results				Pass



Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4498.0	11.2	-32.1	-0.8



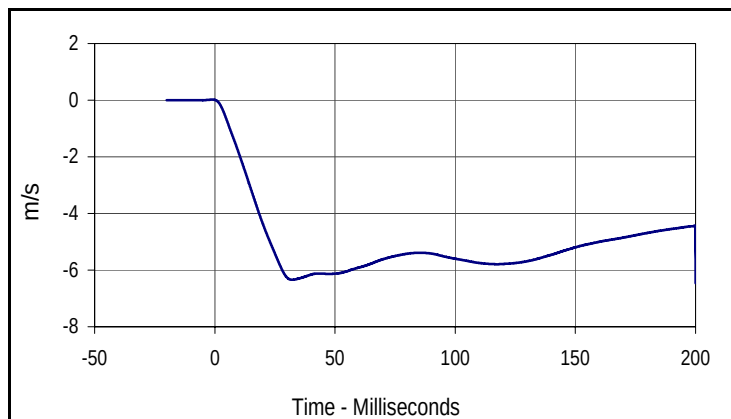
Curve Description			
Abdomen Sum Resultant			
CURNO	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2463.8	10.4	-9.3	80.5

Test Program: ES2re Lumbar Spine Calibration
 ATD Serial No.: F035

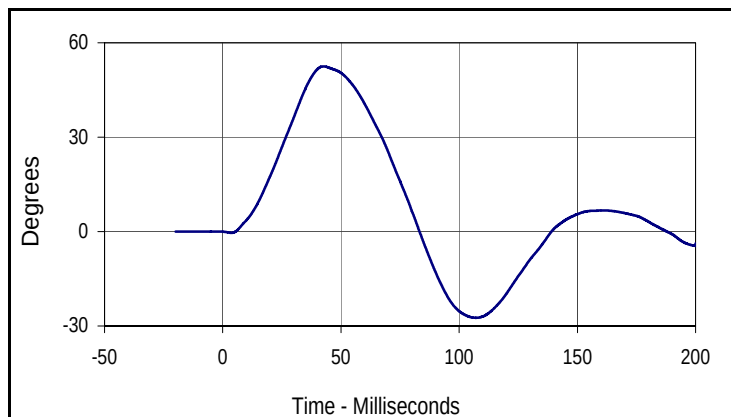
Test Date: 10/13/10
 Test I.D.: SP10B



Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.15	5.97	Pass
Pendulum Deceleration	1 msec	m/s	0.0 to -.050	-0.031	Pass
	3.7 msec	m/s	-.240 to -.425	-0.425	Pass
	27 msec	m/s	-5.80 to -6.50	-5.81	Pass
	30 msec	m/s	< -6.50	-6.26	Pass
Headform Rotation	Max	Degrees	45.0 to 55.0	52.5	Pass
	Time	msec	39.0 to 53.0	42.6	Pass
Maximum Rotation To Time Zero Crossing		msec	37.0 to 57.0	40.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-6.5	200.0



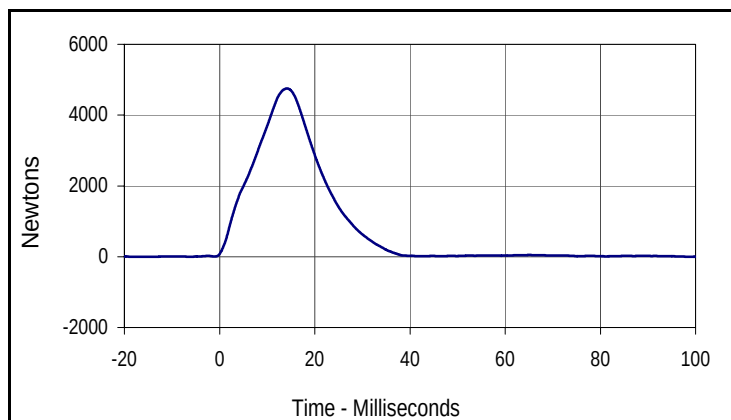
Curve Description			
Headform Rotation			
CURNO	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
52.5	42.6	-27.4	107.0

Test Program: ES2re Pelvis Calibration
 ATD Serial No.: F035

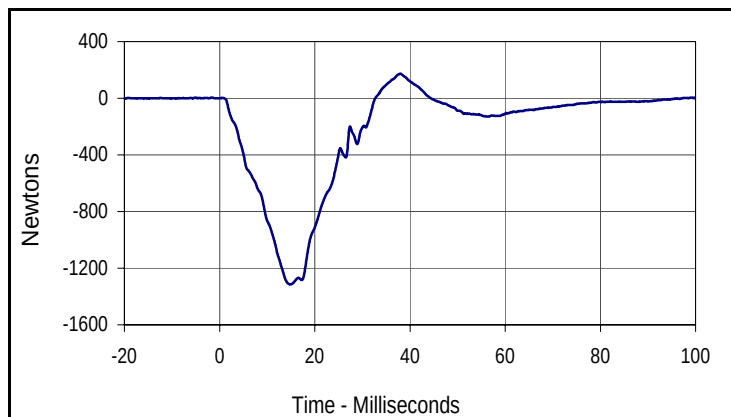
Test Date: 10/13/10
 Test I.D.: PL10B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.20 to 4.40	4.28	Pass
Impactor Force	N	4700 to 5400	4750.5	Pass
	msec	11.8 to 16.1	14.1	Pass
Pubic Symphysis Load	N	-1230 to -1590	-1314.4	Pass
	msec	12.2 to 17.0	14.8	Pass
Overall Test Results				Pass



Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4750.5	14.1	-3.3	-17.5



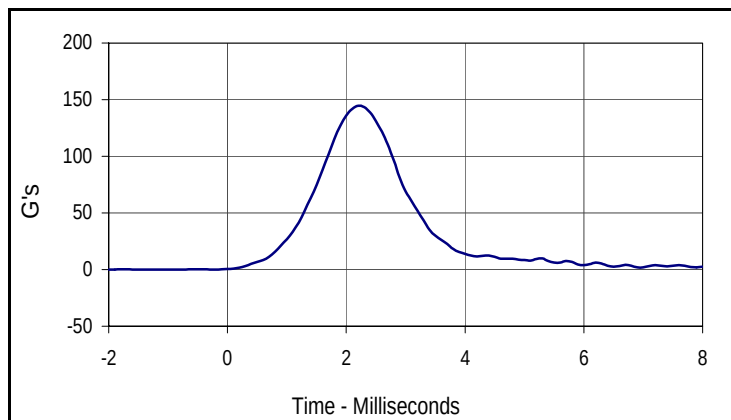
Curve Description			
Pubic FY			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
173.0	38.0	-1314.4	14.8

Test Program: ES2re Lateral Head Drop Calibration
 ATD Serial No.: F035

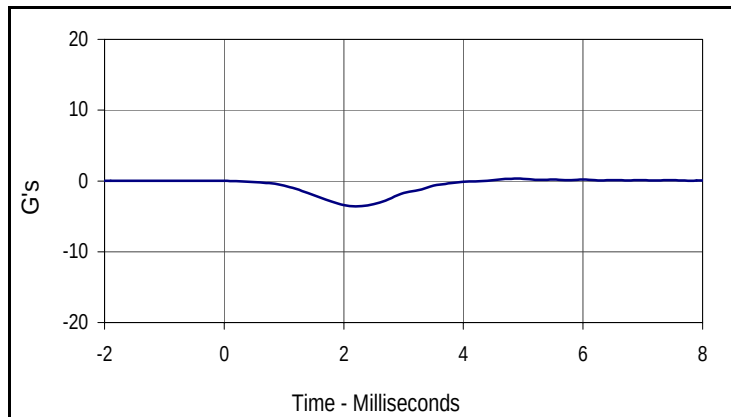
Test Date: 10/13/10
 Test I.D.: HD10B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	125 to 155	144.5	Pass
Peak Longitudinal Acceleration	G's	≤15	3.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	6.8	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
144.5	2.2	0.1	-1.2



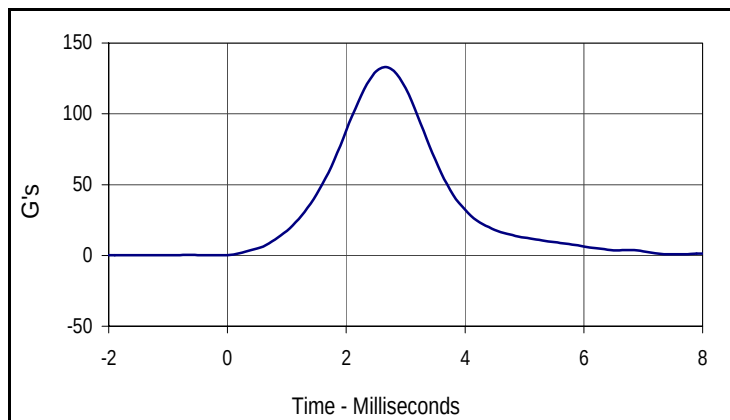
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.3	4.9	-3.6	2.2

Test Program: SID IIs Lateral Head Drop Calibration
 ATD Serial No.: 307

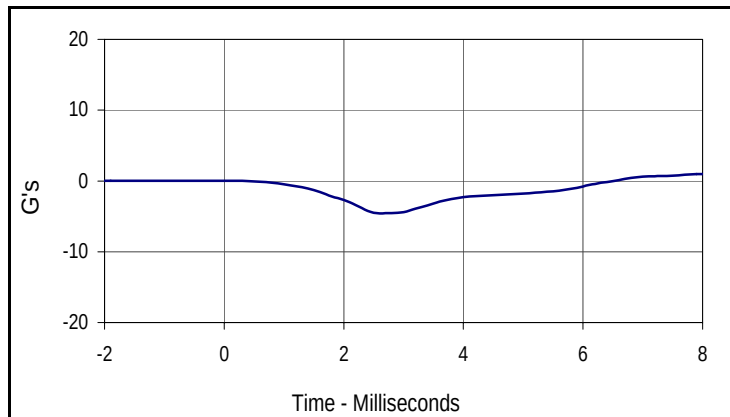
Test Date: 10/14/10
 Test I.D.: HDF10B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	115 to 137	132.8	Pass
Peak Longitudinal Acceleration	G's	≤15	4.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	9.5	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
132.8	2.7	0.1	-2.0



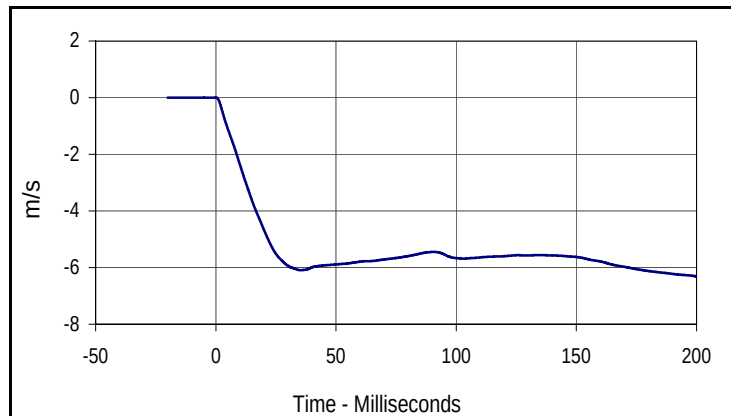
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.0	-1.7	-4.6	2.6

Test Program: SID IIs Neck Calibration
 ATD Serial No.: 307

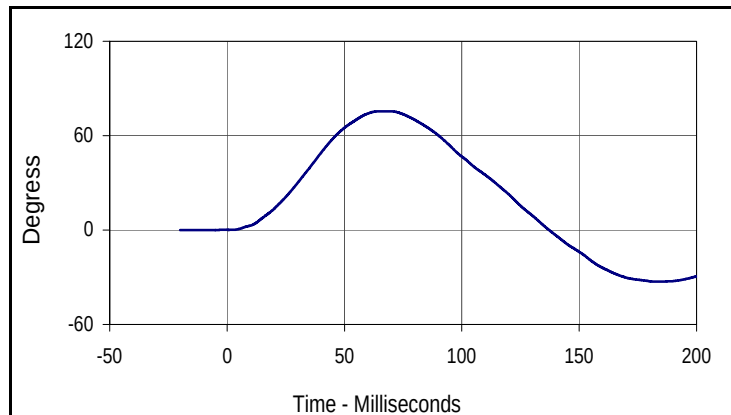
Test Date: 10/14/10
 Test I.D.: NBF10B



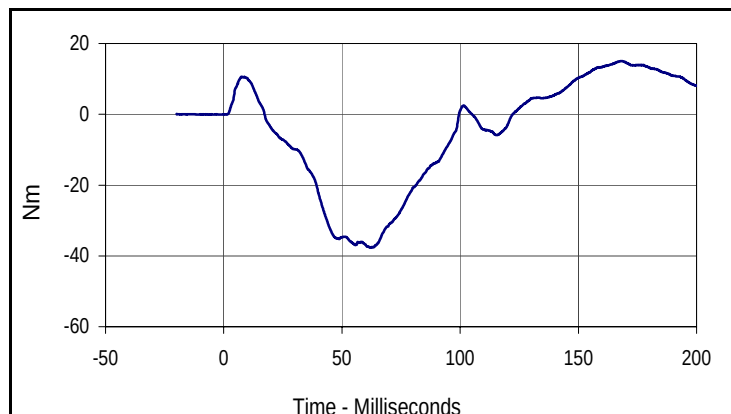
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.61	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.4	Pass
	15 msec	m/s	-3.30 to -4.10	-3.6	Pass
	20 msec	m/s	-4.40 to -5.40	-4.7	Pass
	25 msec	m/s	-5.40 to -6.10	-5.5	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.1	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	75.5	Pass
	Time	msec	50.0 to 70.0	64.9	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-37.7	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	122.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.2	-6.3	200.0



Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
75.5	64.9	-32.8	182.6



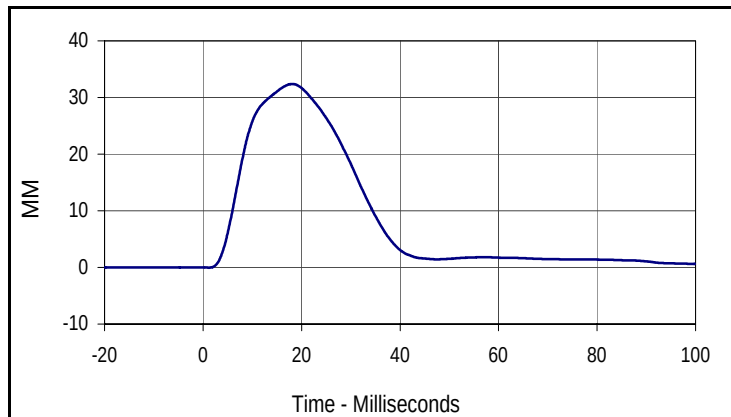
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
15.1	168.3	-37.7	61.9

Test Program: SID IIs Shoulder Calibration
 ATD Serial No.: 307

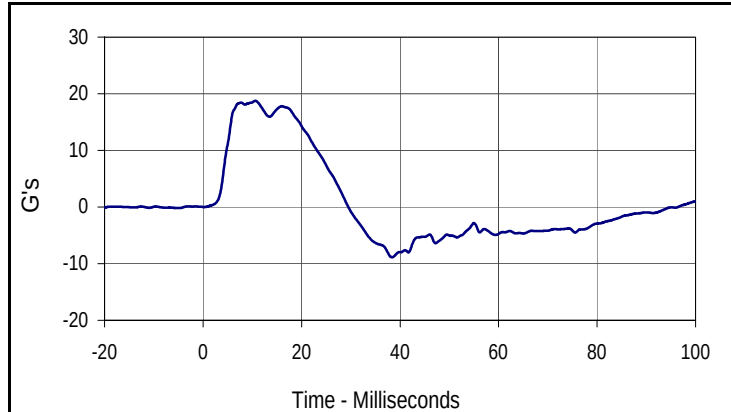
Test Date: 10/14/10
 Test I.D.: SHF10B



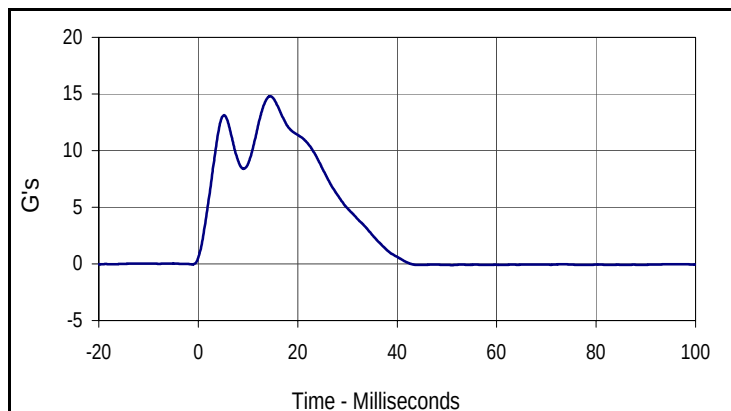
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.35	Pass
Shoulder Deflection	MM	28 to 37	32.4	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	18.8	Pass
Peak Impactor Acceleration	G's	13 to 18	14.8	Pass
Overall Test Results			Pass	



Curve Description			
Shoulder Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
32.4	18.1	0.0	1.3



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.8	10.6	-8.9	38.4



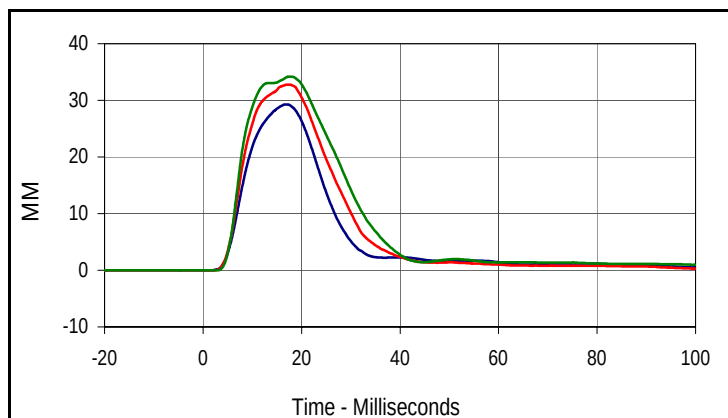
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
14.8	14.5	-0.1	51.1

Test Program: SID IIs Thorax with Arm Calibration
 ATD Serial No.: 307

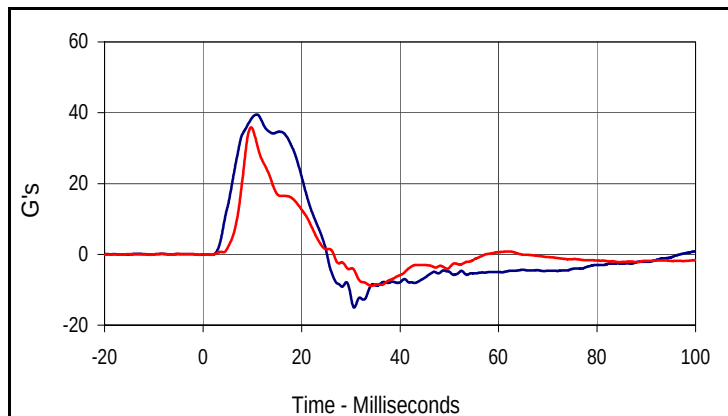
Test Date: 10/14/10
 Test I.D.: THF10B



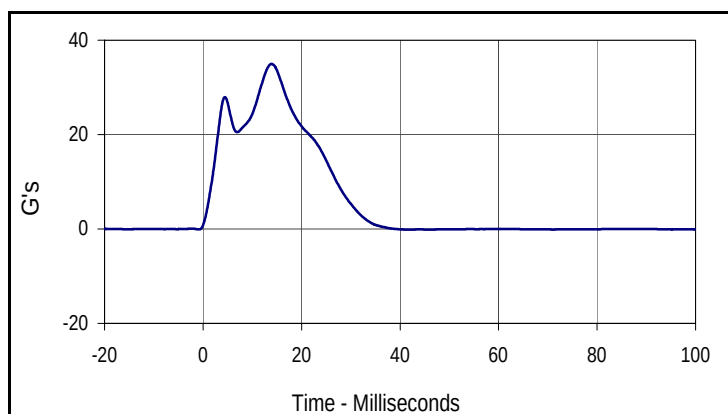
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.66	Pass
Shoulder Deflection	MM	31 to 40	38.7	Pass
Upper Thorax Rib Deflection	MM	25 to 32	29.3	Pass
Middle Thorax Rib Deflection	MM	30 to 36	32.8	Pass
Lower Thorax Rib Deflection	MM	32 to 38	34.2	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	39.5	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	35.9	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	35.0	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.3	16.8	0.0	-5.9
Middle Thorax Deflection			
Max	Time	Min	Time
32.8	17.2	0.0	-7.0
Lower Thorax Deflection			
Max	Time	Min	Time
34.2	17.7	0.0	-3.3



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
39.5	10.9	-15.1	30.7
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
35.9	9.7	-8.9	34.2



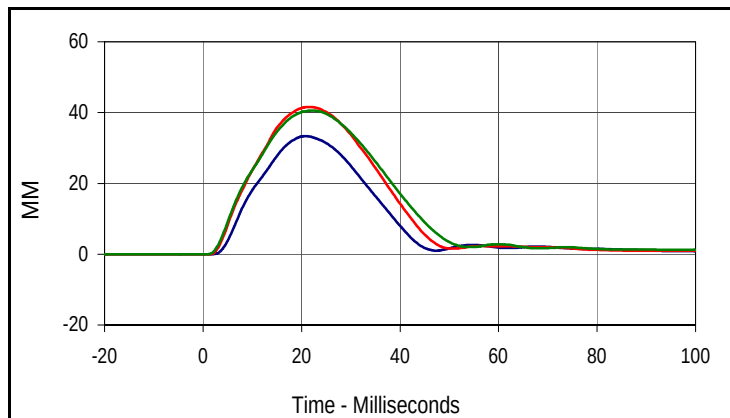
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
35.0	13.9	-0.1	42.5

Test Program: SID IIs Thorax w/o Arm Calibration
 ATD Serial No.: 307

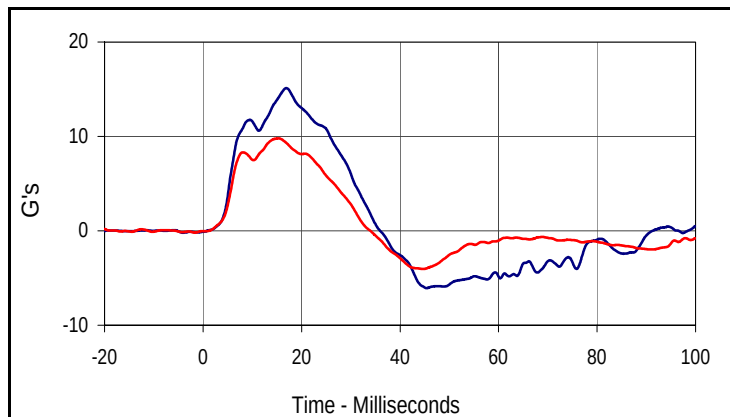
Test Date: 10/14/10
 Test I.D.: TOA10B



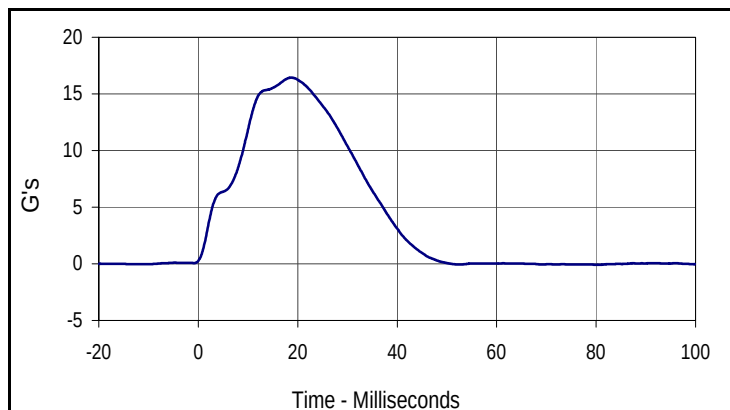
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.20	Pass
Upper Thorax Rib Deflection	MM	32 to 40	33.3	Pass
Middle Thorax Rib Deflection	MM	39 to 45	41.6	Pass
Lower Thorax Rib Deflection	MM	35 to 43	40.6	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	15.1	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	9.8	Pass
Peak Impactor Acceleration	G's	14 to 18	16.4	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
33.3	20.8	0.0	-18.5
Middle Thorax Deflection			
Max	Time	Min	Time
41.6	21.5	0.0	-11.3
Lower Thorax Deflection			
Max	Time	Min	Time
40.6	22.2	0.0	-12.5



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.1	16.9	-6.1	45.4
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.8	15.3	-4.0	44.7



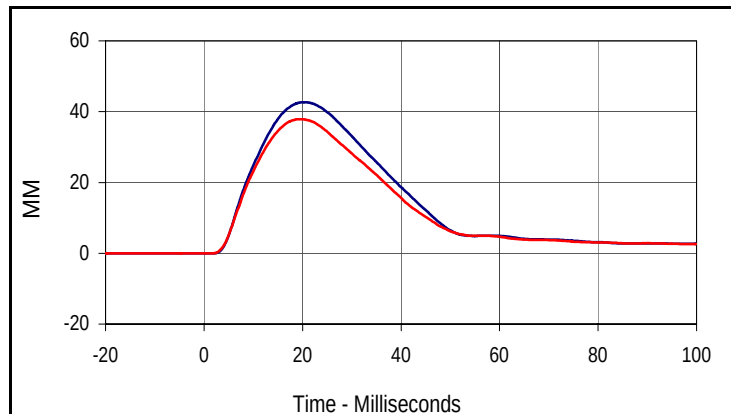
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.4	18.7	-0.1	80.0

Test Program: SID IIs Abdomen Calibration
 ATD Serial No.: 307

Test Date: 10/14/10
 Test I.D.: ABDF10B

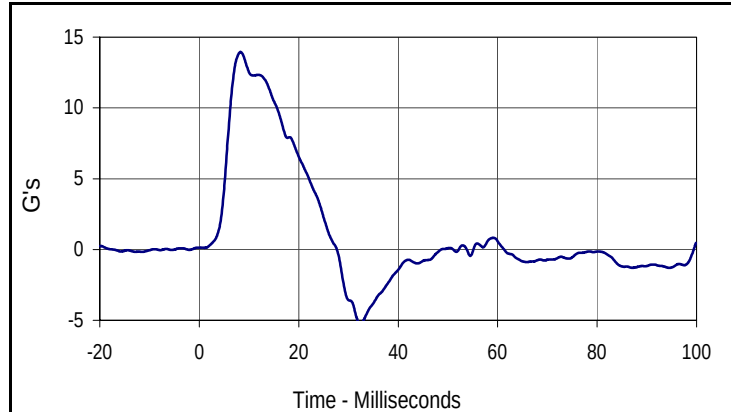


Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.35	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	42.7	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	37.9	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	14.0	Pass
Peak Impactor Acceleration	G's	12 to 16	15.3	Pass
Overall Test Results			Pass	

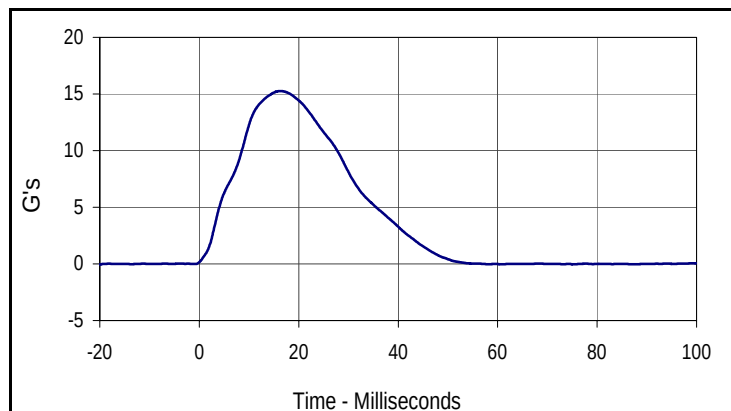


Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
42.7	20.2	0.0	-2.7

Curve Description			
Lower Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
37.9	19.5	0.0	-2.3



Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
14.0	8.3	-5.2	32.4



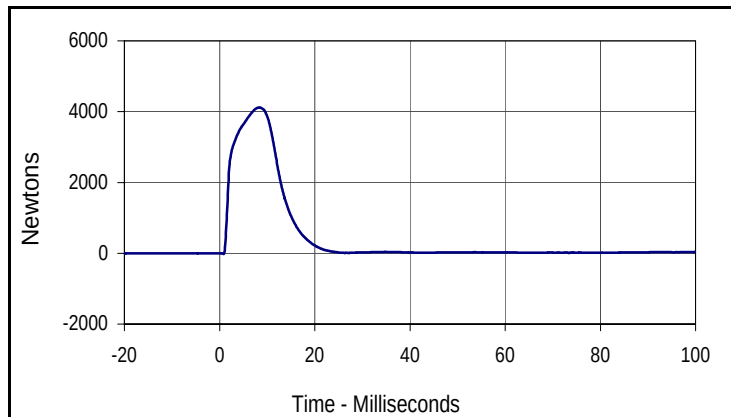
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.3	16.3	0.0	-20.0

Test Program: SID IIs Pelvis Acetabulum Calibration
 ATD Serial No.: 307

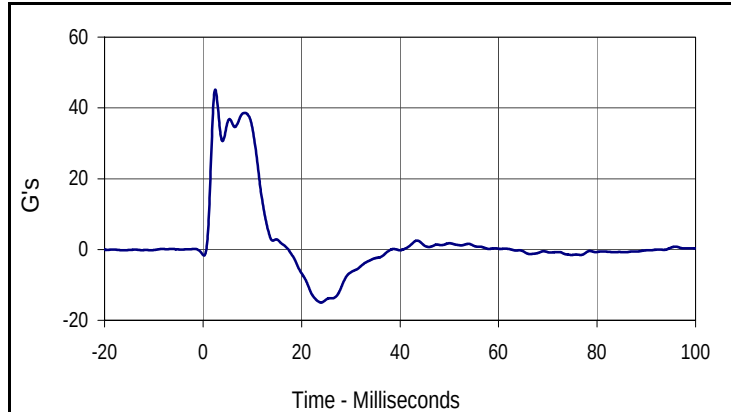
Test Date: 10/14/10
 Test I.D.: PA10B



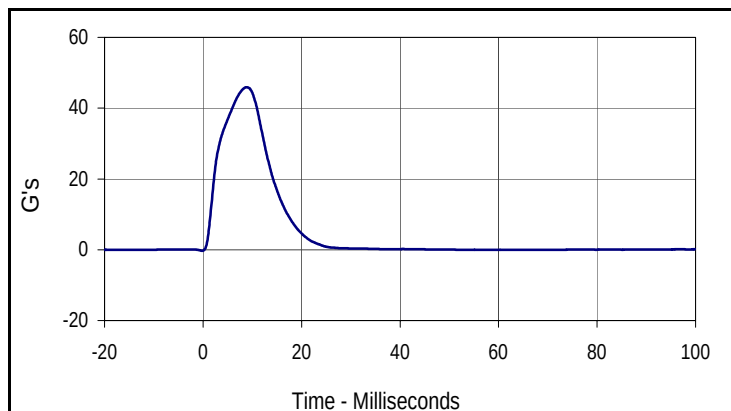
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.71	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	4116.7	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	38.6	Pass
Peak Impactor Acceleration	G's	38 to 47	45.9	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4116.7	8.4	-22.0	0.8



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
45.2	2.5	-15.0	24.0



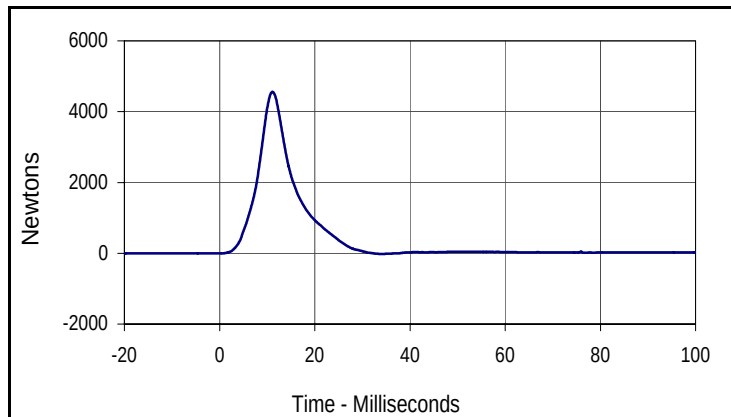
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
45.9	8.8	-0.3	-0.2

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 307

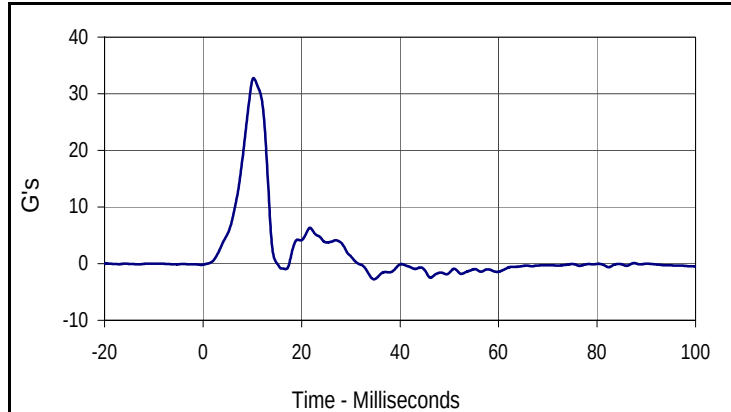
Test Date: 10/14/10
 Test I.D.: PLF10B



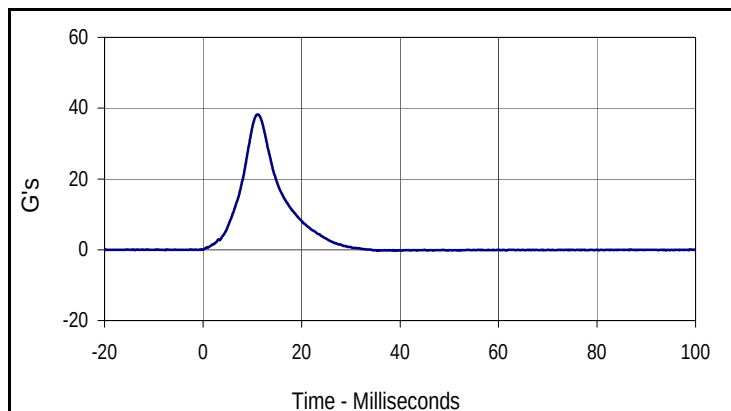
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.31	Pass
Peak Iliac Force	Newtons	4100 to 5100	4558.5	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	32.8	Pass
Peak Impactor Acceleration	G's	36 to 45	38.2	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4558.5	11.1	-19.8	34.5



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
32.8	10.3	-2.8	34.7



Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
38.2	11.0	-0.3	39.2

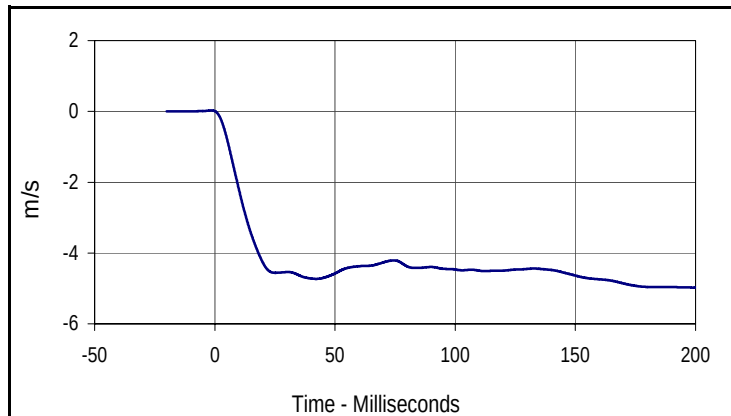
APPENDIX C
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program: ES2re Neck Calibration
 ATD Serial No.: F035

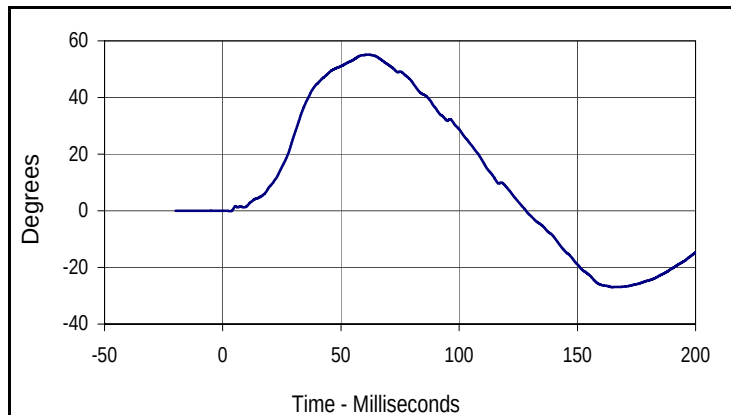
Test Date: 10/20/10
 Test I.D.: NB10C



Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	3.30 to 3.50	3.41	Pass
Pendulum Deceleration	1 msec	m/s	0.0 to -.050	-0.043	Pass
	3 msec	m/s	-.250 to -.375	-0.304	Pass
	14 msec	m/s	-3.20 to -3.70	-3.23	Pass
Headform Rotation	Max	Degrees	49.0 to 58.0	55.2	Pass
	Time	msec	54.0 to 66.0	61.5	Pass
Maximum Rotation To Time Zero Crossing		msec	53.0 to 88.0	66.8	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.4	-5.0	200.0



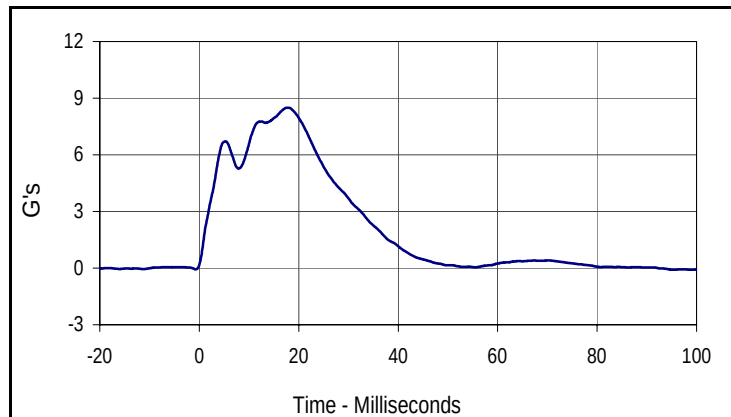
Curve Description			
Headform Rotation			
CURNO	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
55.2	61.5	-27.0	164.8

Test Program: ES2re Shoulder Calibration
 ATD Serial No.: F035

Test Date: 10/20/10
 Test I.D.: SH10C



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.20 to 4.40	4.22	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	8.5	Pass
Overall Test Results				Pass



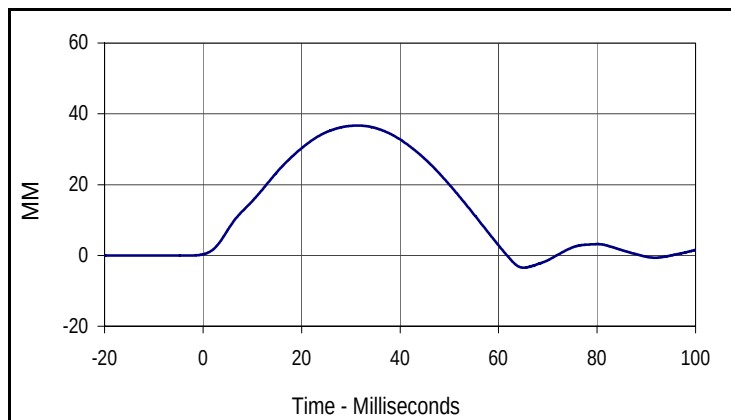
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
8.5	17.7	-0.1	98.7

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #1

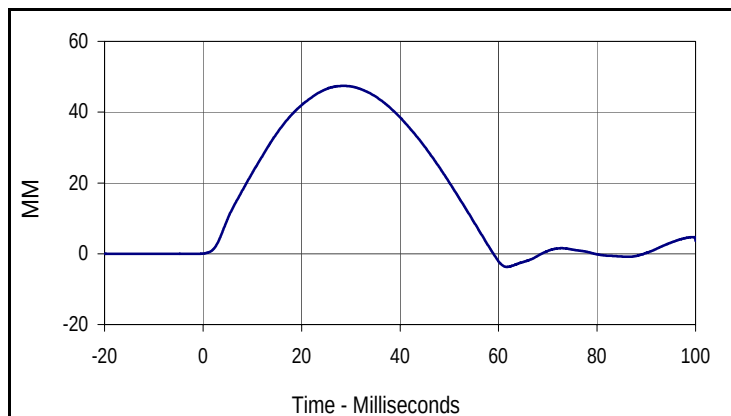
Test Date: 10/20/10
 Test I.D.: RIB10G



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	36.7	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	47.4	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
36.7	31.4	-3.5	65.1



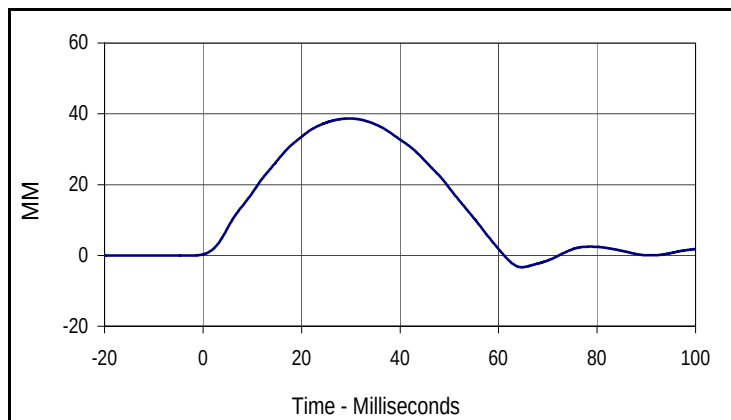
Curve Description			
Upper Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
47.4	28.6	-3.7	61.7

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #2

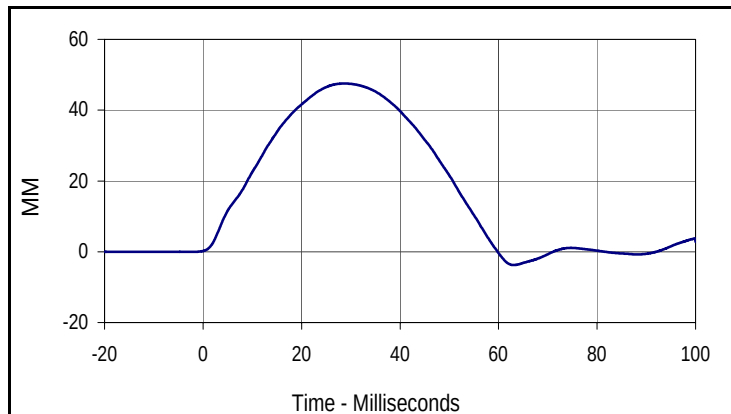
Test Date: 10/20/10
 Test I.D.: RIB10H



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	38.7	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	47.5	Pass
Overall Test Results			Pass	



Curve Description			
Middle Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.7	29.7	-3.3	64.7



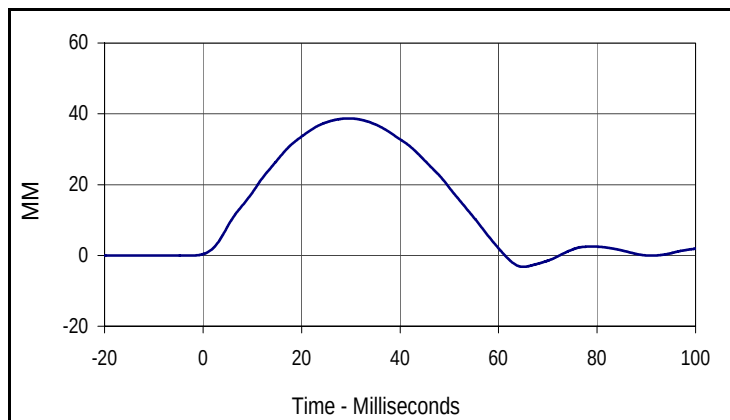
Curve Description			
Middle Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
47.5	28.7	-3.8	63.1

Test Program: ES2re Rib Module Calibration
 ATD Serial No.: F035 Rib #3

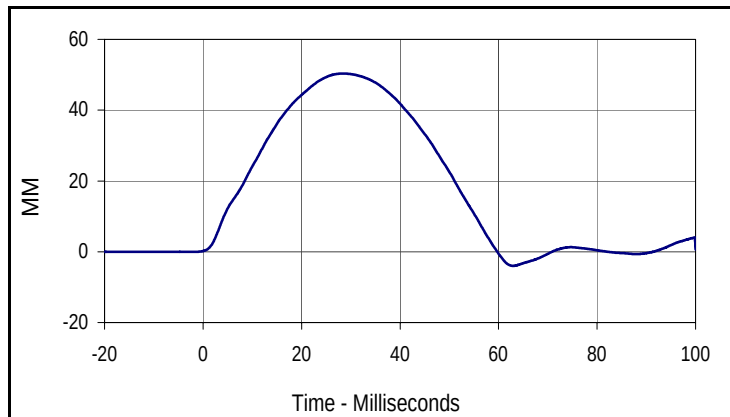
Test Date: 10/20/10
 Test I.D.: RIB10I



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	38.7	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	50.3	Pass
Overall Test Results			Pass	



Curve Description			
Lower Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.7	29.6	-3.2	65.0



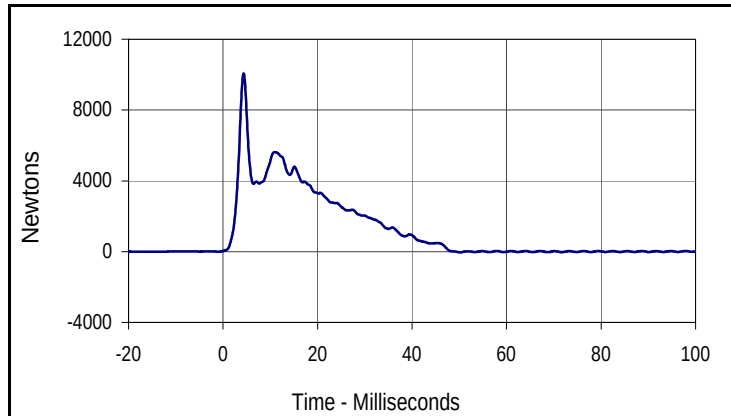
Curve Description			
Lower Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
50.3	28.4	-4.0	63.0

Test Program: ES2re Thorax Calibration
 ATD Serial No.: F035

Test Date: 10/20/10
 Test I.D.: TH10C



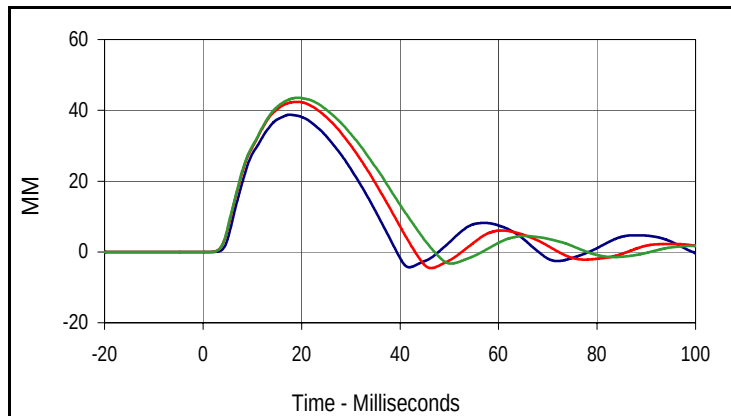
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	5.40 to 5.60	5.50	Pass
Impactor Force	N	5100 to 6200	5617.1	Pass
	msec	> 6.0 msec	10.9	Pass
Upper Rib Deflection	MM	34 to 41	38.7	Pass
Middle Rib Deflection	MM	37 to 45	42.4	Pass
Lower Rib Deflection	MM	37 to 44	43.6	Pass
Overall Test Results			Pass	



Curve Description

Impactor Force

CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
10071.9	4.4	-39.4	50.3



Curve Description

Upper, Middle, Lower Rib Deflections

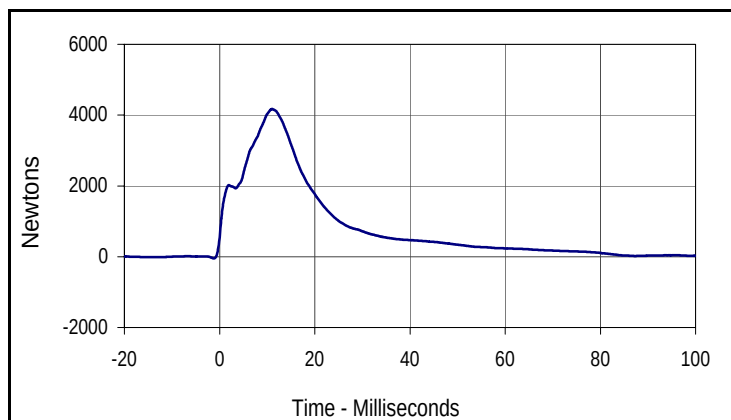
CURNO(s)	Type	SAE Class	Units
002-003-004	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
38.7	17.6	-4.3	41.9
Max (Middle)	Time	Min (Middle)	Time
42.4	19.1	-4.6	46.3
Max (Lower)	Time	Min (Lower)	Time
43.6	19.3	-3.3	50.4

Test Program: ES2re Abdomen Calibration
 ATD Serial No.: F035

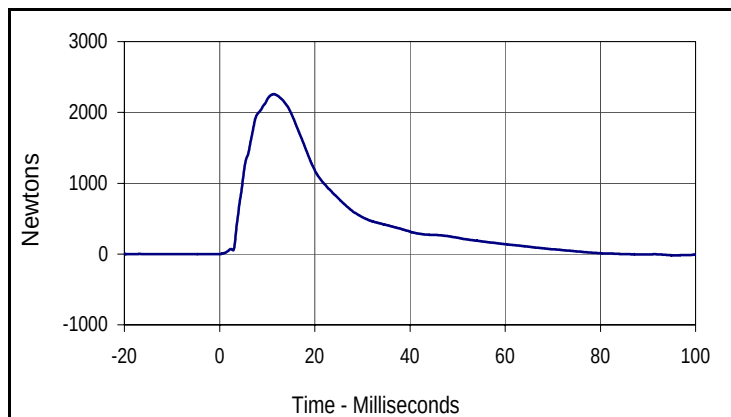
Test Date: 10/20/10
 Test I.D.: ABD10C



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	3.90 to 4.10	3.92	Pass
Impactor Force	N	4000 to 4800	4171.7	Pass
	msec	10.6 to 13.0	11.0	Pass
Abdominal Force	N	2200 to 2700	2257.7	Pass
	msec	10.0 to 12.3	11.4	Pass
Overall Test Results				Pass



Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4171.7	11.0	-49.2	-1.2



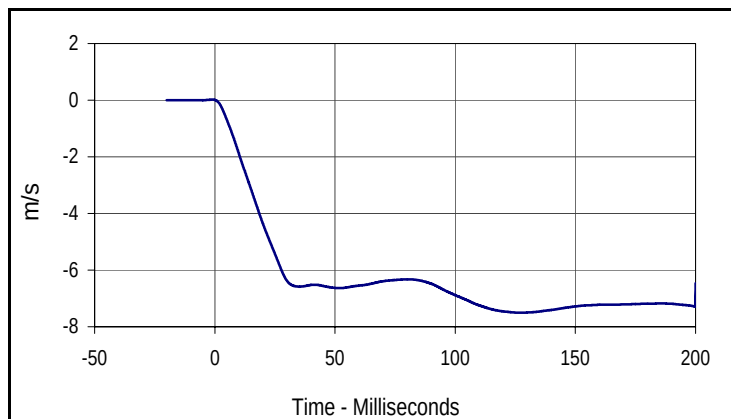
Curve Description			
Abdomen Sum Resultant			
CURNO	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2257.7	11.4	-19.3	95.8

Test Program: ES2re Lumbar Spine Calibration
 ATD Serial No.: F035

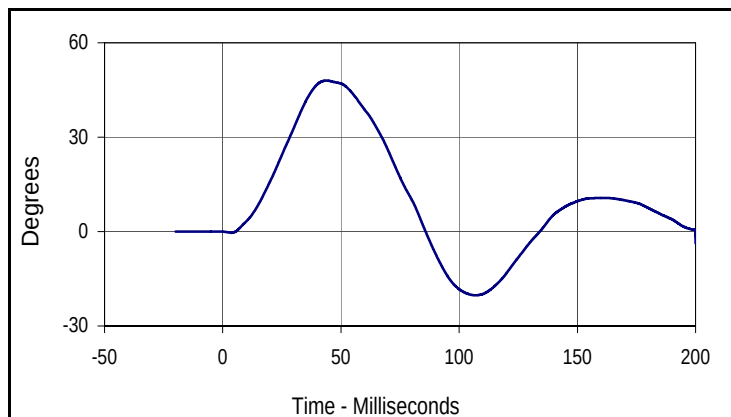
Test Date: 10/20/10
 Test I.D.: SP10C



Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.15	6.07	Pass
Pendulum Deceleration	1 msec	m/s	0.0 to -.050	-0.035	Pass
	3.7 msec	m/s	-.240 to -.425	-0.419	Pass
	27 msec	m/s	-5.80 to -6.50	-5.85	Pass
	30 msec	m/s	< -6.50	-6.38	Pass
Headform Rotation	Max	Degrees	45.0 to 55.0	48.0	Pass
	Time	msec	39.0 to 53.0	43.9	Pass
Maximum Rotation To Time Zero Crossing		msec	37.0 to 57.0	42.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-7.5	127.0



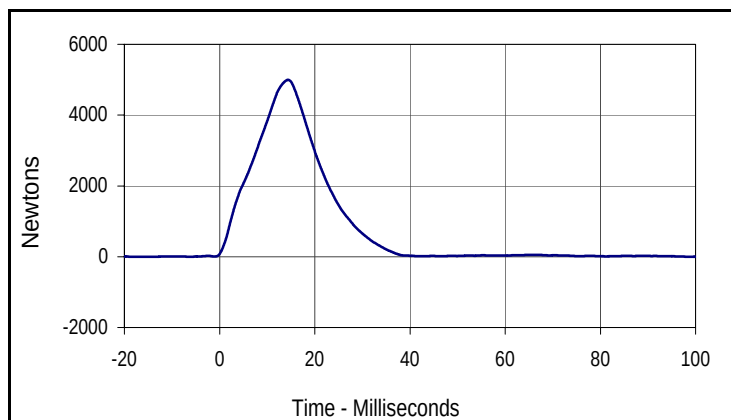
Curve Description			
Headform Rotation			
CURNO	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
48.0	43.9	-20.2	107.0

Test Program: ES2re Pelvis Calibration
 ATD Serial No.: F035

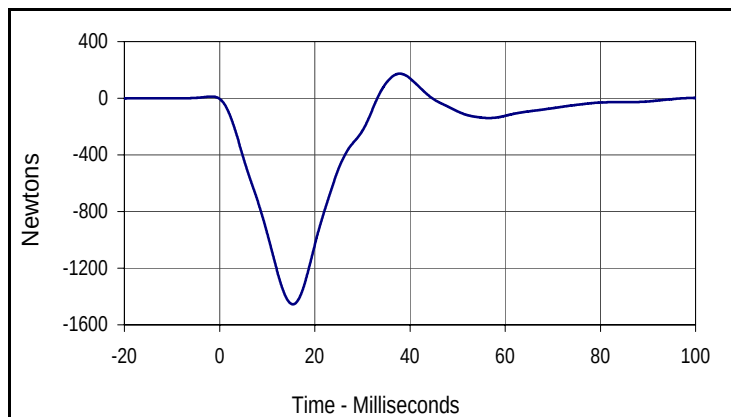
Test Date: 10/20/10
 Test I.D.: PL10C



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.20 to 4.40	4.28	Pass
Impactor Force	N	4700 to 5400	4994.5	Pass
	msec	11.8 to 16.1	14.4	Pass
Pubic Symphysis Load	N	-1230 to -1590	-1455.0	Pass
	msec	12.2 to 17.0	15.4	Pass
Overall Test Results				Pass



Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4994.5	14.4	-3.3	-17.5



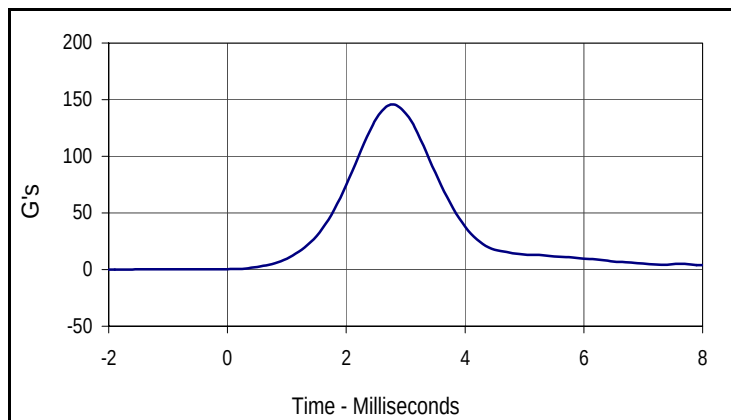
Curve Description			
Pubic FY			
CURNO	Type	SAE Class	Units
002	FIL	60	Newtons
Max	Time	Min	Time
173.7	37.9	-1455.0	15.4

Test Program: ES2re Lateral Head Drop Calibration
 ATD Serial No.: F035

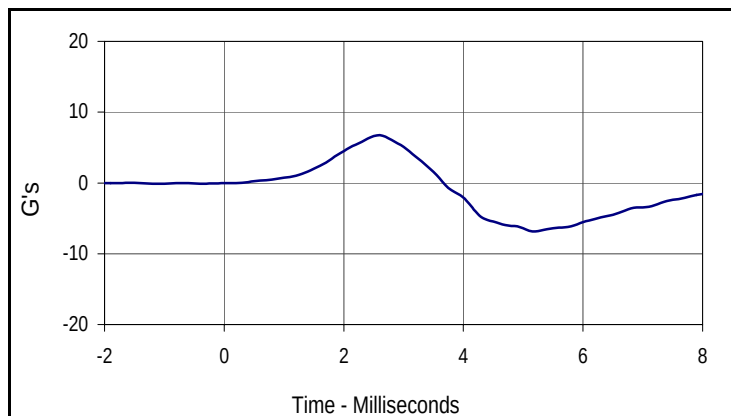
Test Date: 10/20/10
 Test I.D.: HD10C



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	125 to 155	145.8	Pass
Peak Longitudinal Acceleration	G's	≤15	6.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	9.2	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
145.8	2.8	0.0	-2.0



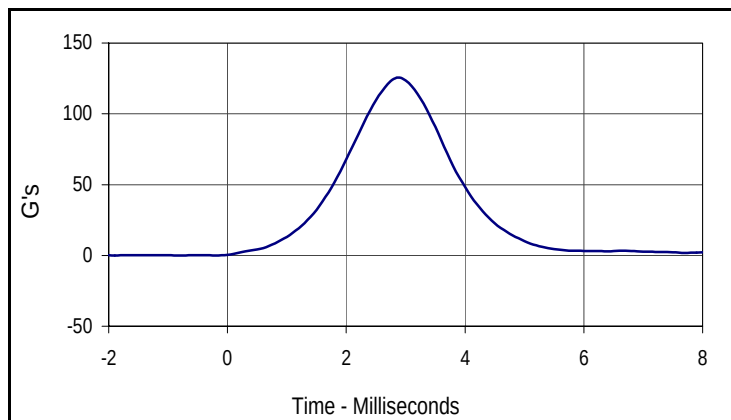
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.8	2.6	-6.9	5.2

Test Program: SID IIs Lateral Head Drop Calibration
 ATD Serial No.: 307

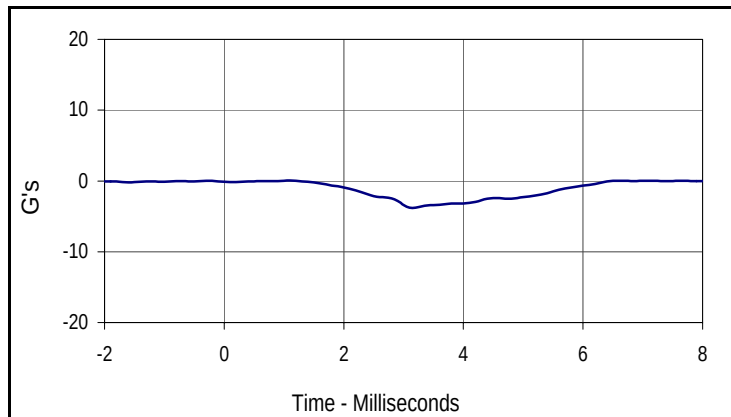
Test Date: 10/20/10
 Test I.D.: HDF10C



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	115 to 137	125.6	Pass
Peak Longitudinal Acceleration	G's	≤15	3.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	8.0	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
125.6	2.9	0.0	-0.8



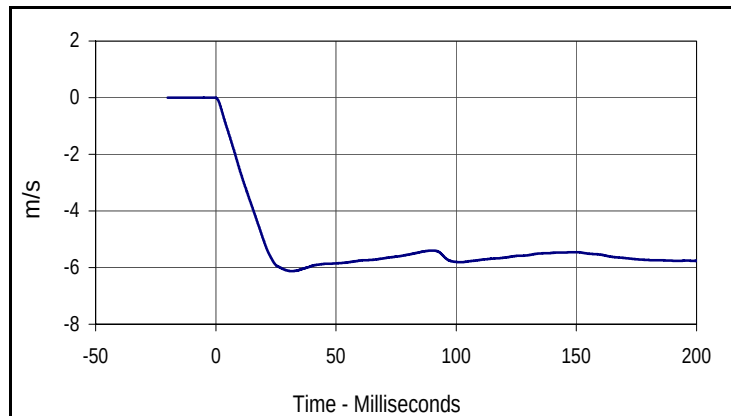
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.1	1.1	-3.8	3.1

Test Program: SID IIs Neck Calibration
 ATD Serial No.: 307

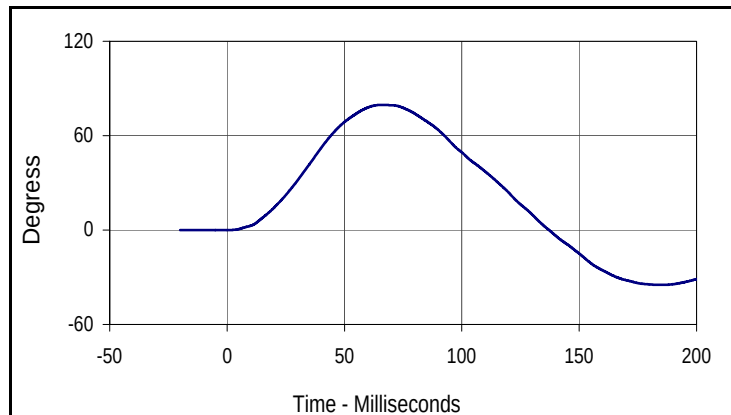
Test Date: 10/20/10
 Test I.D.: NBF10C



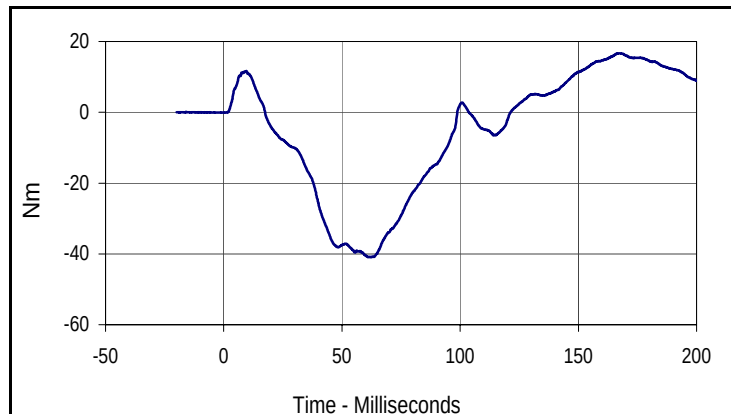
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.62	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.6	Pass
	15 msec	m/s	-3.30 to -4.10	-3.8	Pass
	20 msec	m/s	-4.40 to -5.40	-5.1	Pass
	25 msec	m/s	-5.40 to -6.10	-5.9	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.1	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	79.6	Pass
	Time	msec	50.0 to 70.0	65.6	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-41.0	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	121.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.6	-6.1	31.4



Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
79.6	65.6	-34.8	184.8



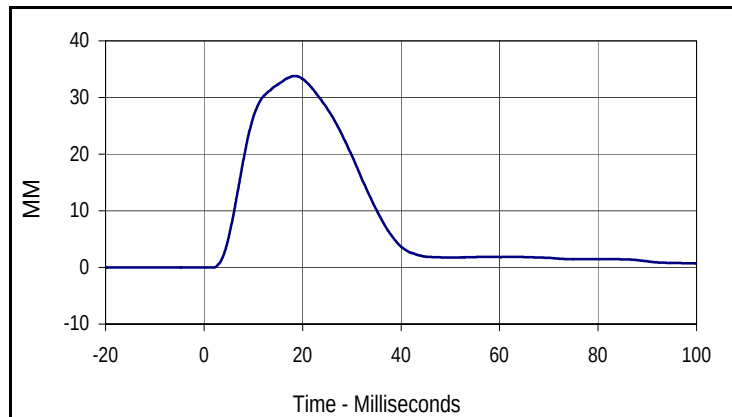
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
16.7	167.2	-41.0	62.5

Test Program: SID IIs Shoulder Calibration
 ATD Serial No.: 307

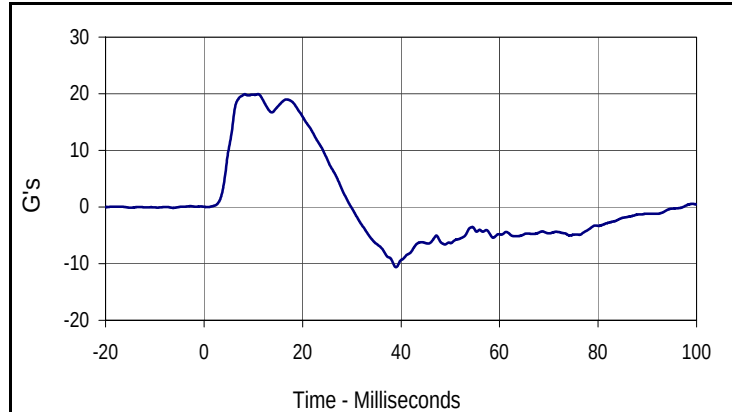
Test Date: 10/20/10
 Test I.D.: SHF10C



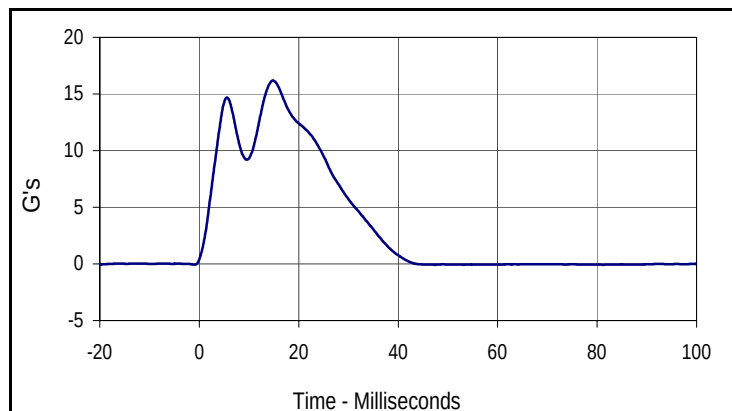
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.36	Pass
Shoulder Deflection	MM	28 to 37	33.8	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	19.9	Pass
Peak Impactor Acceleration	G's	13 to 18	16.2	Pass
Overall Test Results			Pass	



Curve Description			
Shoulder Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
33.8	18.6	0.0	1.0



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
19.9	11.0	-10.6	39.0



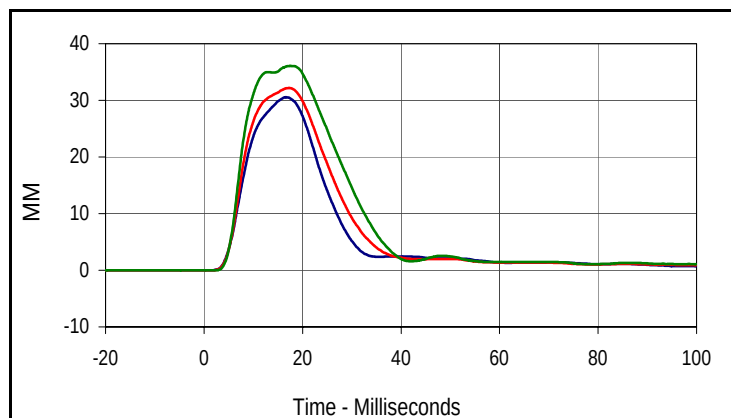
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.2	14.8	-0.1	81.3

Test Program: SID IIs Thorax with Arm Calibration
 ATD Serial No.: 307

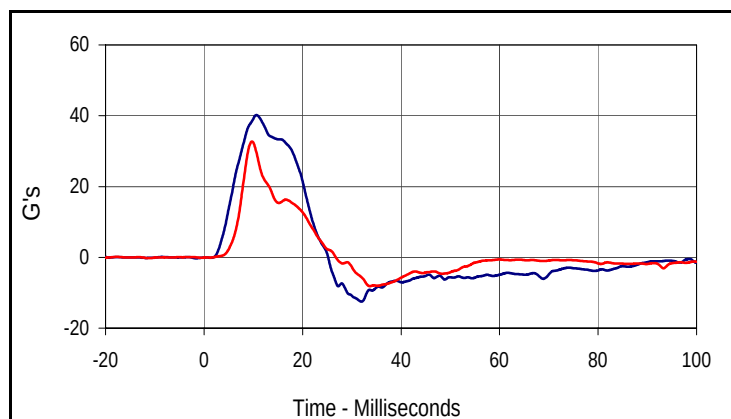
Test Date: 10/20/10
 Test I.D.: THF10C



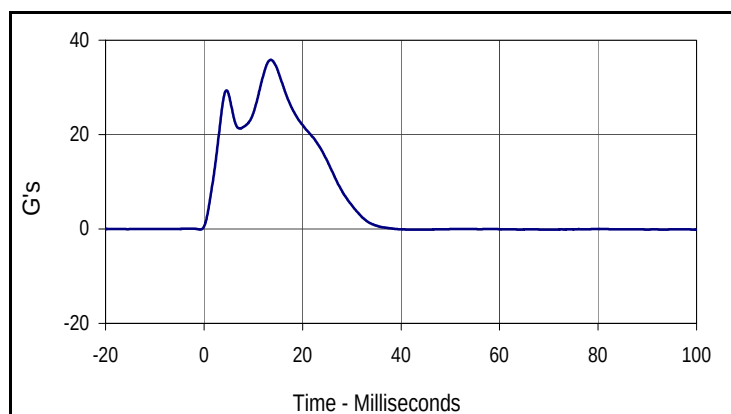
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.68	Pass
Shoulder Deflection	MM	31 to 40	37.5	Pass
Upper Thorax Rib Deflection	MM	25 to 32	30.5	Pass
Middle Thorax Rib Deflection	MM	30 to 36	32.2	Pass
Lower Thorax Rib Deflection	MM	32 to 38	36.1	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	40.2	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	32.7	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	35.8	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
30.5	16.7	0.0	-8.9
Middle Thorax Deflection			
Max	Time	Min	Time
32.2	17.3	0.0	-10.9
Lower Thorax Deflection			
Max	Time	Min	Time
36.1	17.5	0.0	-5.1



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
40.2	10.6	-12.5	32.0
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.7	9.7	-8.1	33.7



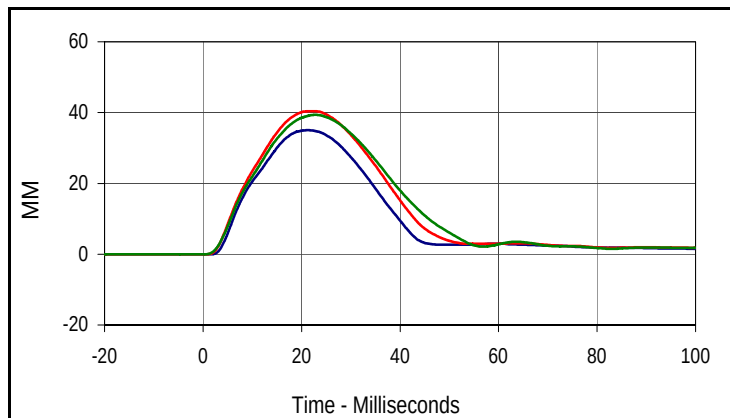
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
35.8	13.5	-0.1	44.6

Test Program: SID IIs Thorax w/o Arm Calibration
 ATD Serial No.: 307

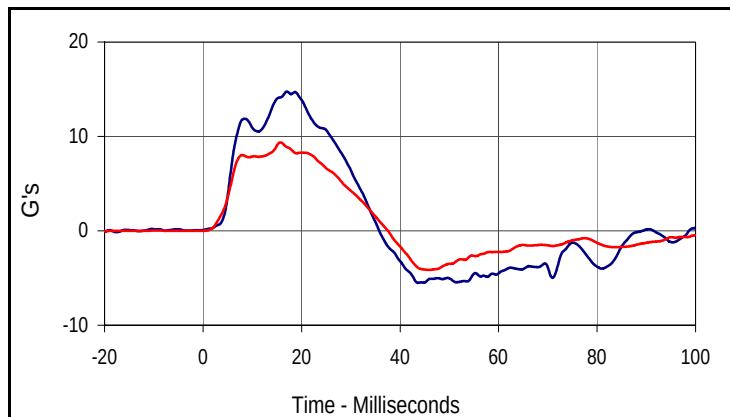
Test Date: 10/20/10
 Test I.D.: TOA10C



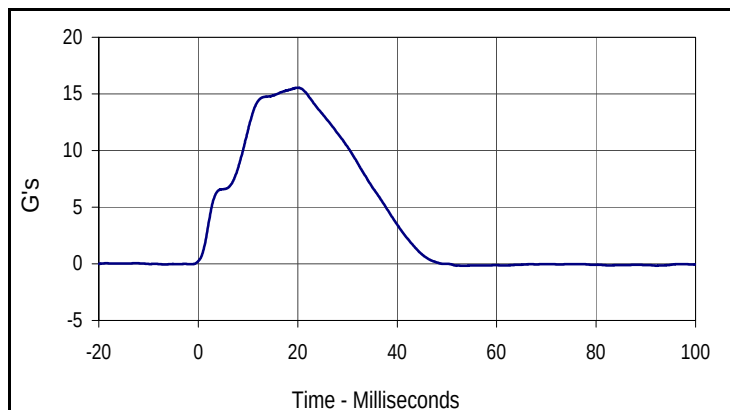
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.20	Pass
Upper Thorax Rib Deflection	MM	32 to 40	35.0	Pass
Middle Thorax Rib Deflection	MM	39 to 45	40.4	Pass
Lower Thorax Rib Deflection	MM	35 to 43	39.4	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	14.8	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	9.4	Pass
Peak Impactor Acceleration	G's	14 to 18	15.5	Pass
Overall Test Results			Pass	



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
35.0	21.3	0.0	1.0
Middle Thorax Deflection			
Max	Time	Min	Time
40.4	22.1	0.0	-3.0
Lower Thorax Deflection			
Max	Time	Min	Time
39.4	22.8	0.0	-4.7



Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.8	17.0	-5.5	43.7
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.4	15.7	-4.2	45.8



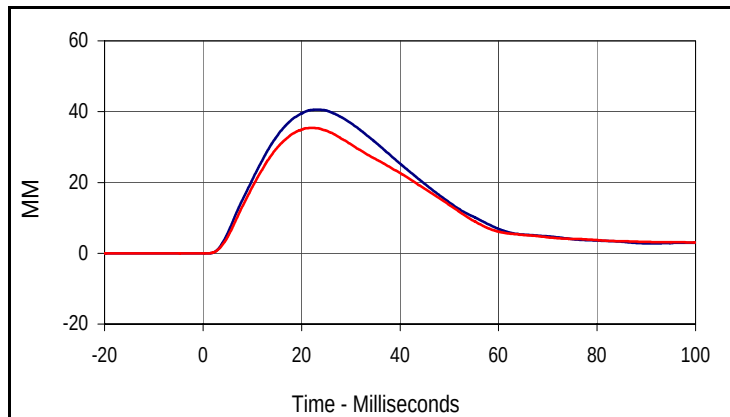
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.5	20.0	-0.2	53.5

Test Program: SID IIs Abdomen Calibration
 ATD Serial No.: 307

Test Date: 10/20/10
 Test I.D.: ABDF10C

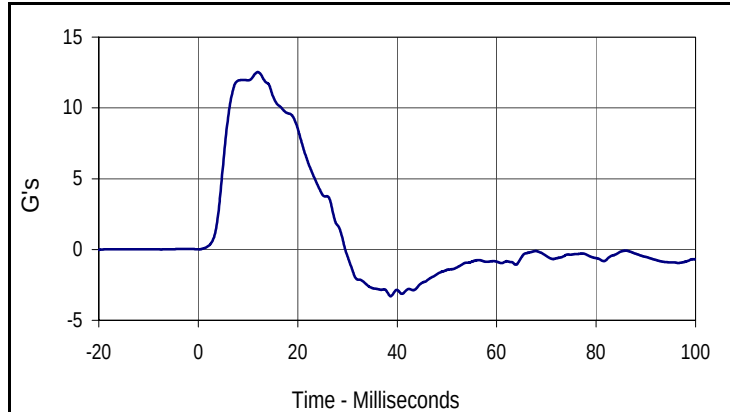


Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.31	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	40.6	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	35.4	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.5	Pass
Peak Impactor Acceleration	G's	12 to 16	14.7	Pass
Overall Test Results			Pass	

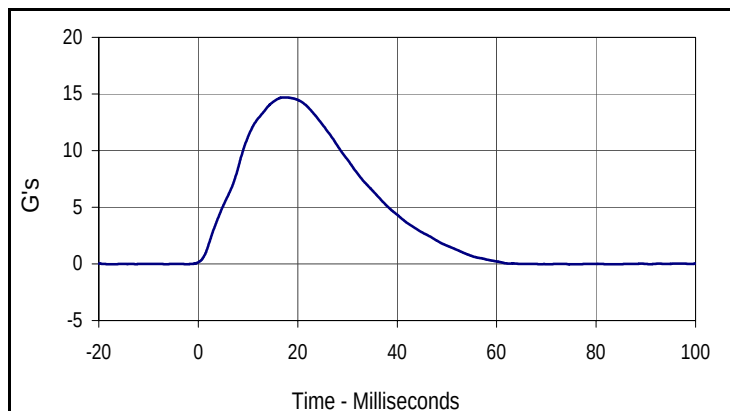


Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
40.6	23.2	0.0	-11.2

Curve Description			
Lower Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
35.4	22.2	0.0	-6.3



Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.5	12.0	-3.3	38.7



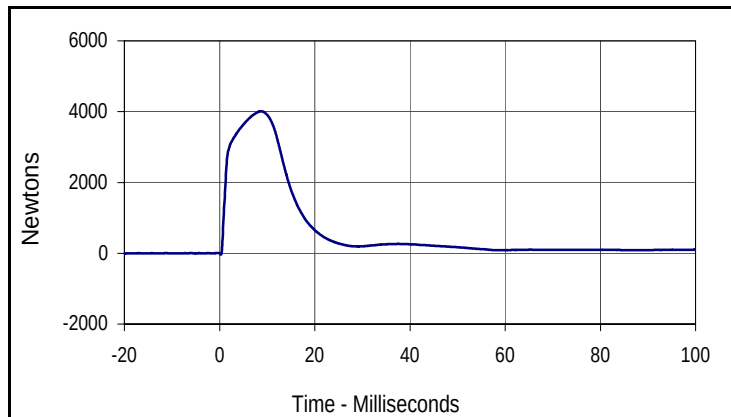
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.7	17.3	0.0	76.2

Test Program: SID IIs Pelvis Acetabulum Calibration
 ATD Serial No.: 307

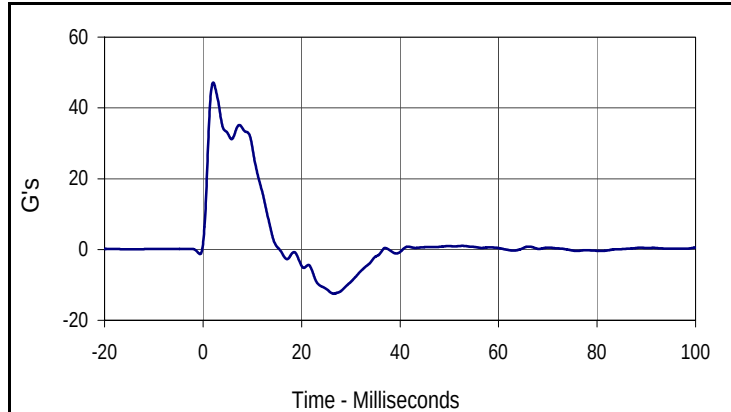
Test Date: 10/20/10
 Test I.D.: PA10C



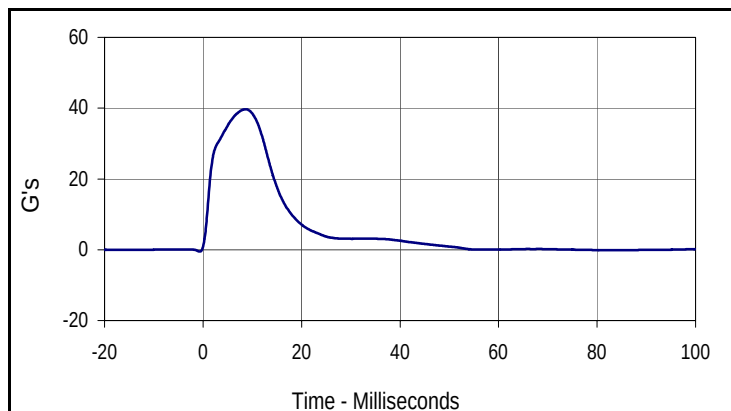
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.70	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	4015.5	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	35.2	Pass
Peak Impactor Acceleration	G's	38 to 47	39.7	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4015.5	8.6	-34.8	0.3



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
47.2	2.1	-12.5	26.5



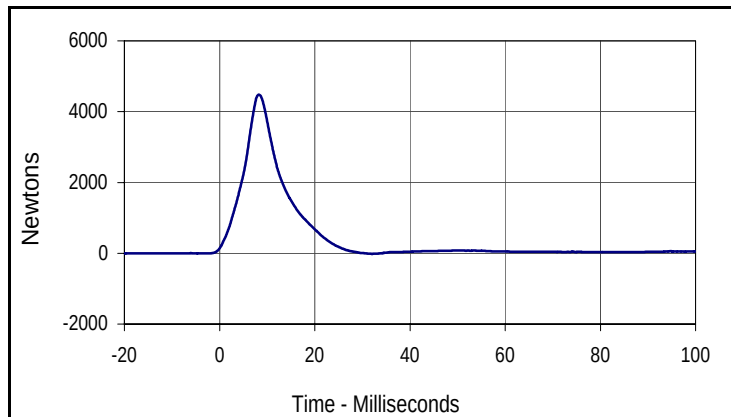
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
39.7	8.7	-0.5	-0.7

Test Program: SID IIs Pelvis Iliac Calibration
 ATD Serial No.: 307

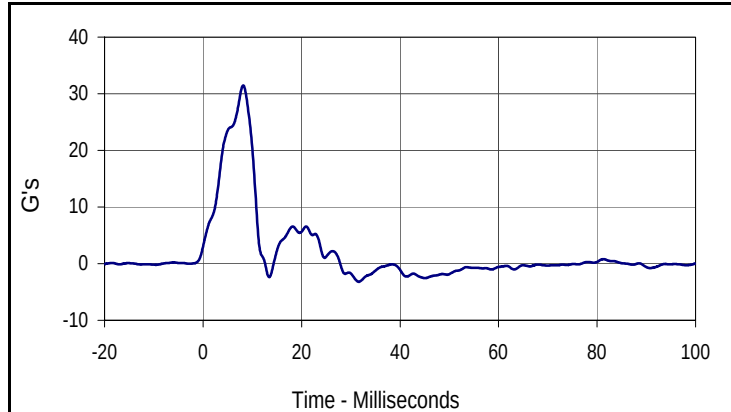
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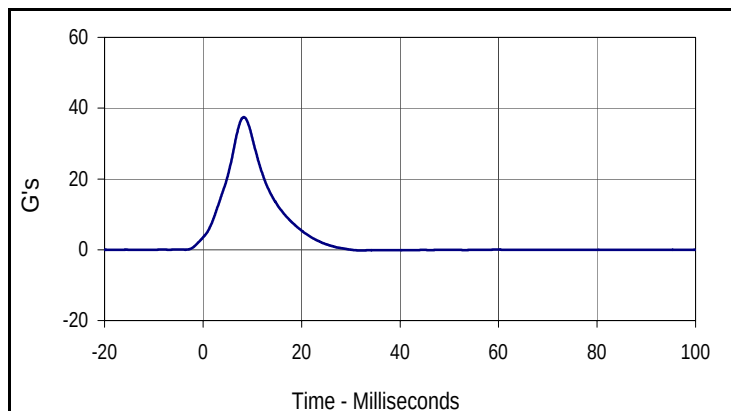
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.31	Pass
Peak Iliac Force	Newtons	4100 to 5100	4481.4	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	31.5	Pass
Peak Impactor Acceleration	G's	36 to 45	37.4	Pass
Overall Test Results			Pass	



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4481.4	8.3	-17.2	32.0



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
31.5	8.1	-3.2	31.6



Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
37.4	8.3	-0.2	31.9