REPORT NUMBER: SNCAP-KAR-11-058

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

FORD MOTOR CO.

2011 FORD F-150 XLT SUPERCAB 2-DOOR TRUCK

NHTSA No: MB0210

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

FEBRUARY 14, 2011

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

1200 NEW JERSEY AVE, SE

ROOM W43-410

WASHINGTON, D.C. 20590

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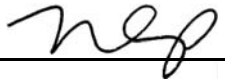
Reviewed By: 

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Approval Date: February 22, 2011

FINAL REPORT ACCEPTANCE BY OCWS:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date:

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date:

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Final Report of New Car Assessment Program Side Impact Testing of a 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210	February 22, 2011
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9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA, 92301	**10. Work Unit No.**
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15. Supplementary Notes

16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier NCAP Side Impact Test was conducted on the subject 2011 Ford F-150 XLT SuperCab 2-Door Truck 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 February 14, 2011.

The impact velocity of the Moving Deformable Barrier was 61.80 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 20.0 deg. C. The target vehicle's maximum post-test static crush was 301 mm located at level 1. 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	29.1
Maximum Thorax Rib Deflection	mm	44	11.9
Total Abdominal Force	N	2500	491
Pubic Symphysis Force	N	6000	1102

Measurement Description	Passenger ATD (SID-IIs)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})		1000	56.8
Lower Spine Resultant Acceleration	g	82	29
Total Pelvic Force (Sum of Acetubular and Iliac Forces)	N	5525	2161

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		18. Distribution Statement	
New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) ES-2re SID-IIs		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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UNCLASSIFIED	UNCLASSIFIED	134	

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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 Ford F-150 XLT SuperCab 2-Door Truck. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Laboratory Test Procedure dated January 2010.

SUMMARY

A 2011 Ford F-150 XLT SuperCab 2-Door Truck 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 61.80 km/h (38.40 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 February 14, 2011. 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	29.1
Maximum Thorax Rib Deflection	mm	44	11.9
Combined Abdominal Force	N	2500	491
Pubic Symphysis Force	N	6000	1102

Measurement Description	Units	Passenger ATD (SID-IIs)	
		Threshold	Result
Head Injury Criteria (HIC_{36})		1000	56.8
Lower Spine (T12) Resultant Acceleration	g	82	29
Total Pelvic Force (sum of acetabular and iliac forces	N	5525	2161

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver)		Left Rear (Passenger)	
	Mounted	Deployed	Mounted	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				

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. There were no ATD values that exceeded limits.

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

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	^oF	^oC	=(tf -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 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MB0210	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	No
Make	Ford	Power Steering	Yes
Model	F-150 XLT SuperCab	Driver Front Airbag	Yes
Body Style	2-Door Truck	Driver Curtain Airbag	Yes
VIN	1FTEX1CM4BFA13341	Driver Head/Torso Airbag	No
Body Color	Sterling Gray Metallic	Driver Torso Airbag	No
Delivery Date	1/26/2011	Driver Torso/Pelvis Airbag	Yes
Odometer Reading (km / mi)	212/132	Driver Pelvis Airbag	No
Dealer	Galpin Ford	Driver Knee Airbag	No
Transmission	6-Speed Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	Rear	Rear Pass. Head/Torso Airbag	No
Type / No. of Cylinders	V6	Rear Pass. Torso Airbag	No
Engine Displacement (L)	3.7	Rear Pass. Torso/Pelvis Airbag	No
Engine Placement	Longitudinal	Rear Pass. Pelvis Airbag	No
Roof Rack	No	Pretensioners	Yes
Sunroof / T-Top	No	Load Limiters	Yes
Tinted Glass	Yes	Automatic Door Locks	Yes
Traction Control	Yes	Bucket Seats	Yes
Power Brakes	Yes	Tilt Steering	Yes
Front Disc	Yes	Other	
Rear Disc	Yes	Other	

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.	GVWR (kg)	3039
		GAWR Front (kg)	1565
Date of Manufacture	Nov-10	GAWR Rear (kg)	1724

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	3	3		6	
Capacity Weight (VCW) (kg)				648.0	*A*
DSC x 68.04 (kg)				408.2	*B*
Cargo Weight (RCLW) (kg)				136.0	*A-B*

VEHICLE SEAT TYPE

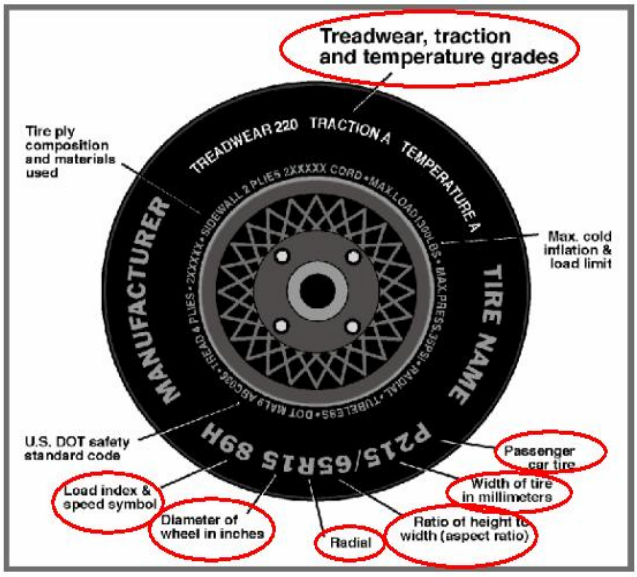
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes					Yes	
Rear or Second Row Seat		Yes			Yes		
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Cold Pressure (kpa)	240	240
Recommended Tire Size	P265/60R18	P265/60R18
Tire Size on Vehicle	P265/60R18	P265/60R18
Tire Model	LTX A/S	LTX A/S
Tire Manufacturer	Michelin	Michelin
Treadwear	420	420
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 1 Polyamide, 2 Steel	2 Polyester, 1 Polyamide, 2 Steel
Load Index/Speed Symbol	109T	109T
Tire Material	Polyester, Polyamide, Steel	Polyester, Polyamide, Steel
DOT Safety Code Right	APC4 WV1X 4410	APC4 WV1X 4410
DOT Safety Code Left	APC4 WV1X 4410	APC4 WV1X 4410

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	681.5	533.0		734.5	634.5		734.5	641.5	
Right	kg	638.5	508.0		651.5	594.0		651.0	597.0	
Ratio	%	55.9%	44.1%	100.0%	53.0%	47.0%	100.0%	52.8%	47.2%	100.0%
Total	kg	1320.0	1041.0	2361.0	1386.0	1228.5	2614.5	1385.5	1238.5	2624.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2361.0	A
Actual Weight of 2 P572 ATDs Used	kg	125.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	136.0	C
Calculated Vehicle Target Wt (TVTW)	kg	2622.0	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG (Aft of Front Axle
Fully Loaded	mm	900	924	946	954	1735
As Tested	mm	903	924	945	957	1727

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheelbase	mm	3675
Total Vehicle Length at Left Side	mm	5062
Total Vehicle Length at Centerline	mm	5884
Total Vehicle Length at Right Side	mm	5061
Weight of Ballast in Cargo Area	kg	115.0
Weight of Vehicle Components Removed	kg	14.0
Amount of Stoddard Solvent in Fuel Tank	L	91.52

Vehicle components removed to make Target Vehicle Test Weight:

Non-struck side door panels (9.0 kg), Spare tire tools (5.0 kg)

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Target Impact Point Aft of Front Axle	mm	507
Actual Impact Point Aft of Front Axle	mm	521

DATA SHEET NO. 2

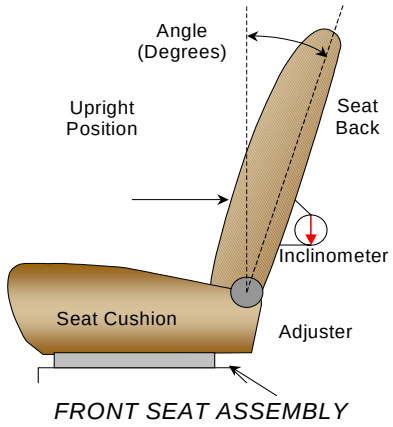
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

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. A digital inclinometer is used to measure the driver's seat back angle at the seat back and the passenger's seat back angle at the headrest post.



FRONT SEAT ASSEMBLY

SEAT BACK ANGLES

	Degrees (°)
Driver w/Seated Dummy	18.2
Passenger w/Seated Dummy	2.6

SEAT FORE/AFT POSITION

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	247 mm	124 mm
Rear Seat	Fixed	Fixed

SEAT BELT UPPER ANCHORAGE

The driver's seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD. The passenger's seat belt upper anchorage is fixed. Position zero (0) is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	1
Rear Seat	Fixed	Fixed

DATA SHEET NO. 2 … (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

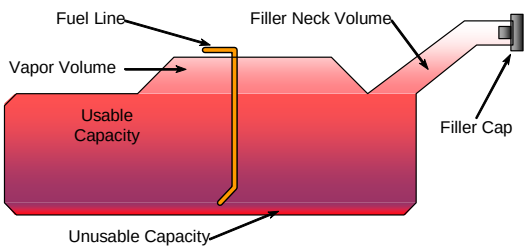
Test Program: MDB Side Impact Test Test Date: 02/14/11

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	98.41
Usable Capacity of "Optional Tank"	136.26
Usable Capacity Used for FMVSS 301	91.52
Actual Amount of Stoddard Solvent Used	91.52

FUEL PUMP

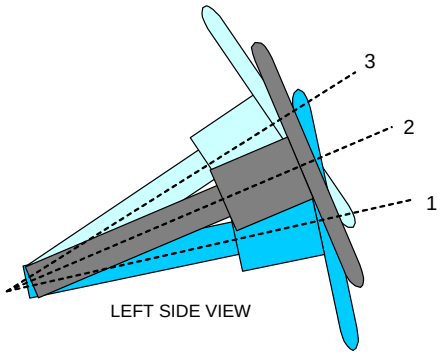
The test vehicle is equipped with an electric fuel pump. The fuel pump is activated when the ignition is turned to the "ON" position and continuously operates while the engine is running. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat and the bed on the left side of the vehicle.



VEHICLE FUEL TANK ASSEMBLY

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. The telescoping steering wheel travel is fixed.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

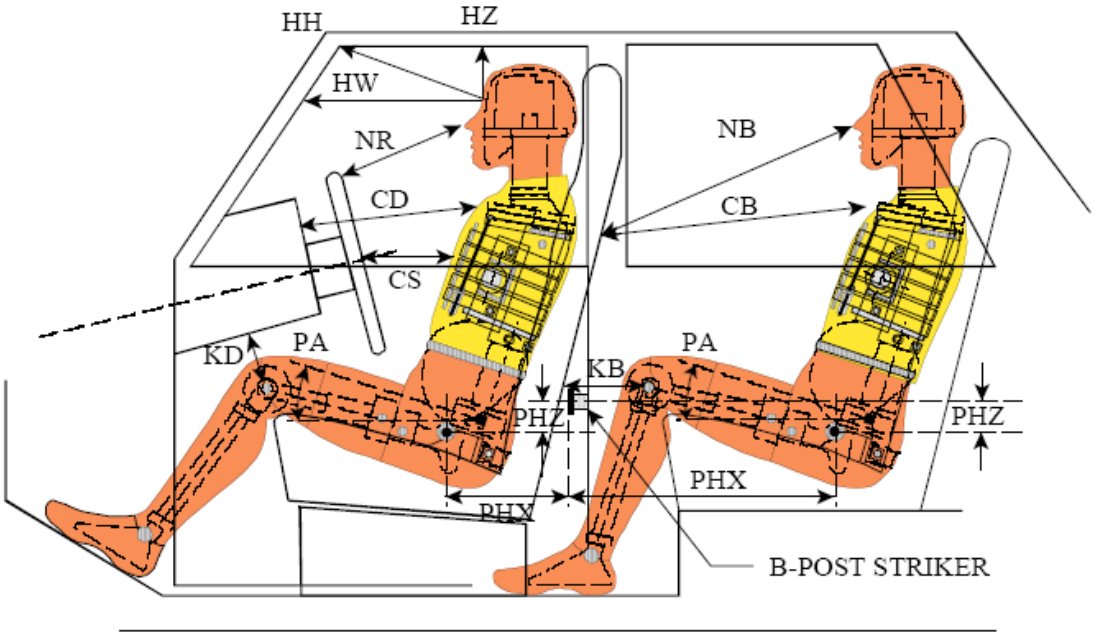
	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	20.5	
Geometric Center Position, No. 2	21.8	
Uppermost Position, No. 3	23.1	
Telescoping Steering Wheel Travel		0
Test Position	21.8	

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



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

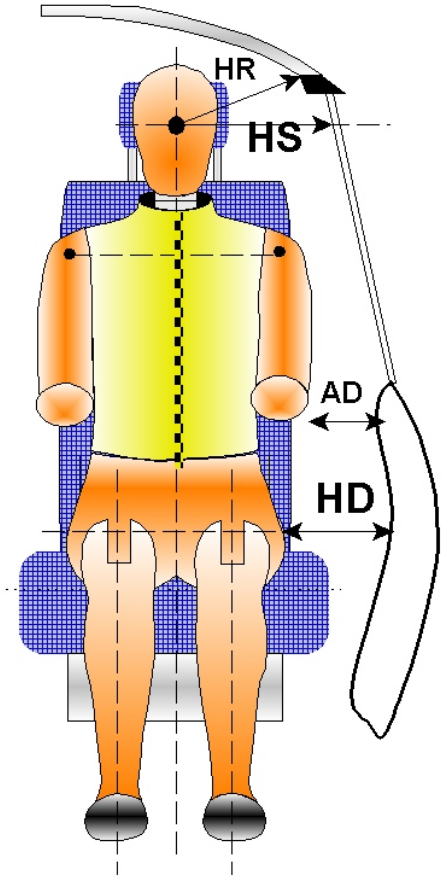
Driver Code	Pass. Code	Description	Driver		Passenger	
			Length (mm)	Angle (º)	Length (mm)	Angle (º)
HH		Head to Header	445	14.1		
HW		Head to Windshield	693	0.0		
HZ	HZ	Head to Roof	225	90.0	316	90.0
NR	NB	Nose to Rim/Seat Back	477	14.8	401	20.6
CD	CB	Chest to Dash/Seat Back	620	4.8	408	1.6
CS		Chest to Steering Wheel	401	15.5		
KDL	KBL	Left Knee to Dash/Seat Back	205	26.9	175	23.4
KDR	KBR	Right Knee to Dash/Seat Back	206	26.2	174	25.2
PA	PA	Pelvic Angle		12.8		16.4
PHX	PHX	H-Point to Striker (x-axis)	351	0.0	364	0.0
PHZ	PHZ	H-Point to Striker (z-axis)	52	90.0	783	90.0
SA	SA	Seat Back Angle		18.2		2.6

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

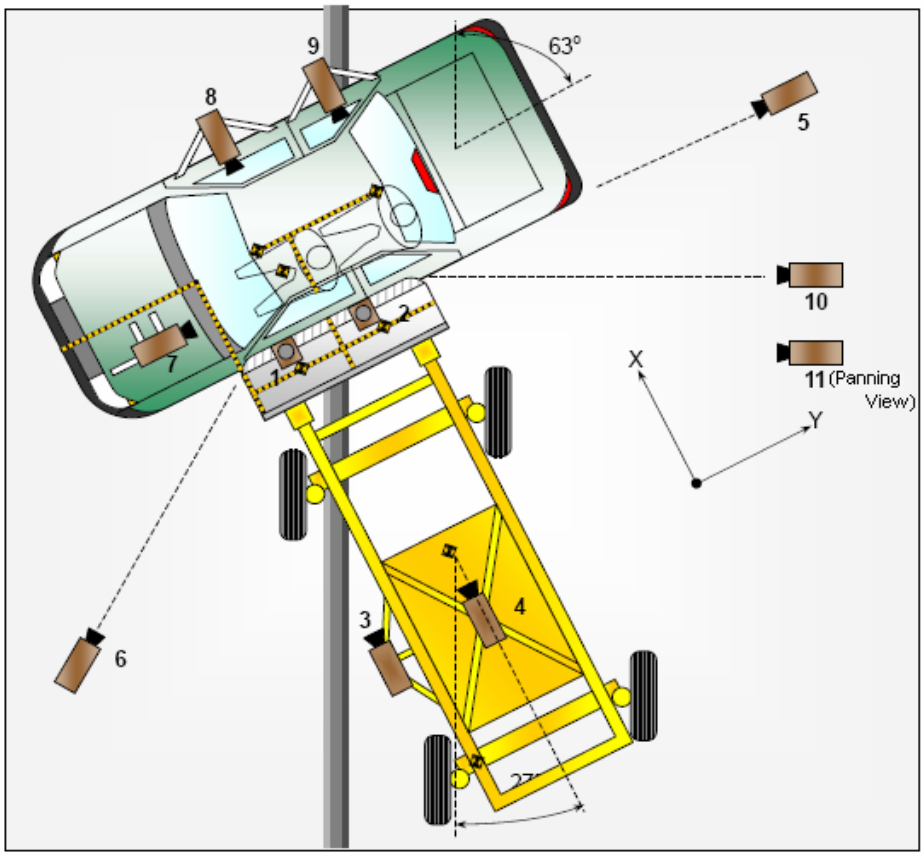
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	211	270
HS	Head to Side Window	mm	375	391
AD	Arm to Door	mm	128	180
HD	H-Point to Door	mm	164	221

DATA SHEET NO. 5

CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



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	105	1000
6	Left Front	-2266	-3564	-1475	0	24	1000
7	Driver Front (On-Board)	433	-967	-850	6.9	35	1000
8	Driver Side (On-Board)	1739	790	-594	8.2	14	1000
9	Passenger Side (On-Board)	1765	1611	-617	8.9	14	1000
10	Real Time Overall				-0.3	Zoom	30
11	Real Time Inrun					Zoom	30

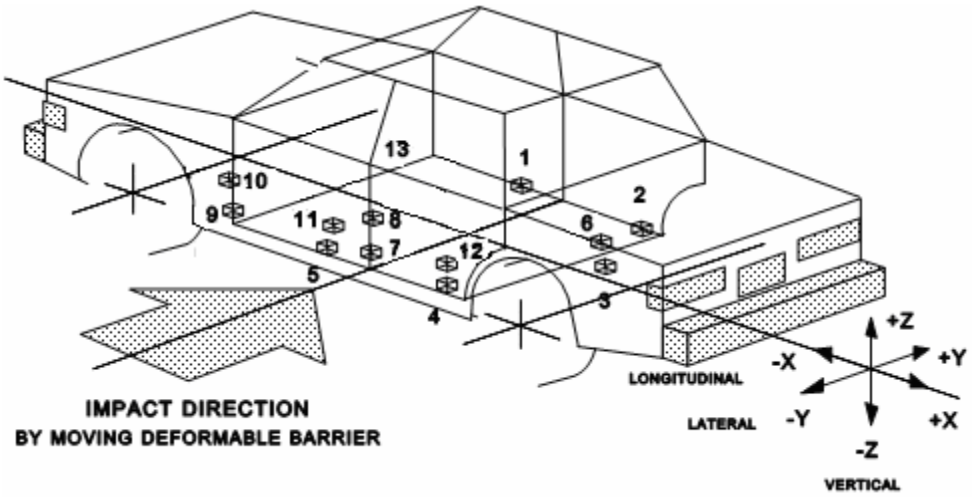
Reference: Impact Point Projected to Ground
+X = To Front of MDB, +Y = To Right of MDB, +Z = Down
*All measurements accurate to ±6 mm

DATA SHEET NO. 6

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Sensor Description	Coordinates (mm)		
		X	Y	Z
1	Right Sill at Front Seat	3317	752	-545
2	Right Sill at Rear Seat	3044	758	-590
3	Rear Floorpan Above Axle	1034	485	-778
4	Left Sill at Rear Door	2749	-505	-270
5	Left Sill at Front Door	3302	-505	-270
6	Right Rear Occupant Compartment	3081	486	-605
7	B-Pillar Lower			
8	B-Pillar Mid			
9	A-Pillar Lower	4273	-908	-720
10	A-Pillar Mid	4273	-908	-954
11	Front Seat Track	3355	-652	-675
12	Rear Seat Structure			
13	Vehicle CG	3006	0	-602

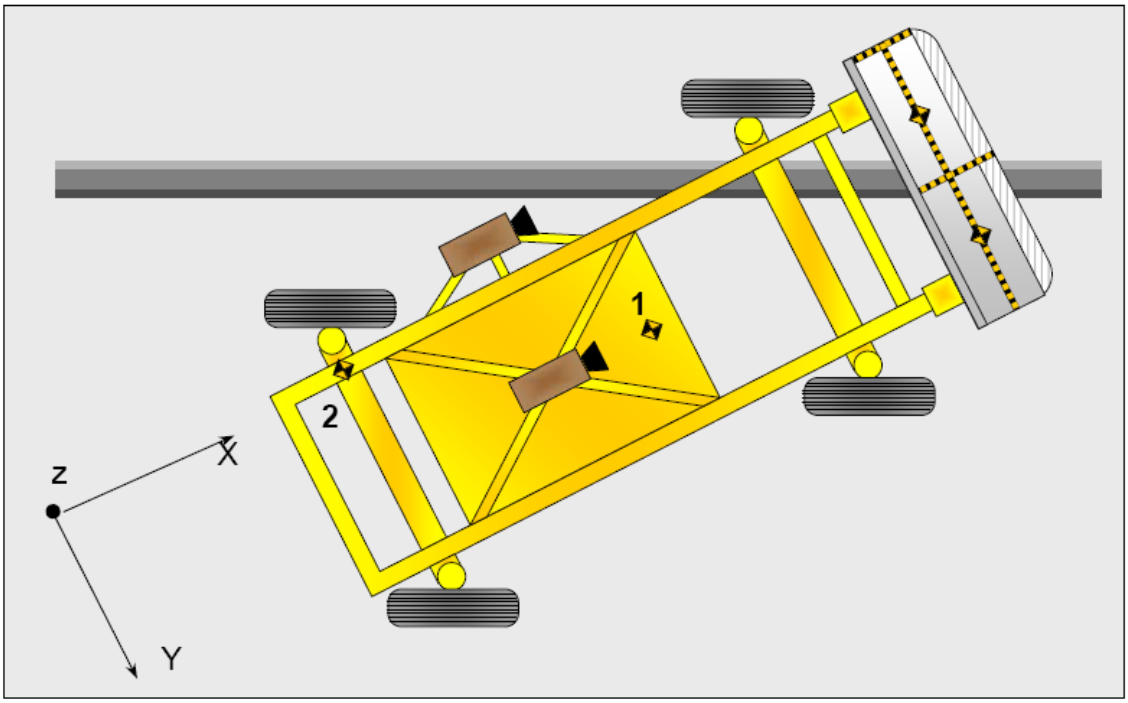
Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7

MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



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 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

MAXIMUM EXTERIOR CRUSH

Level	Description	Units	Maximum Crush	Above Ground
1	Sill Top Height	mm	301	474
2	Occupant H-Point Height	mm	252	869
3	Mid-Door Height	mm	278	813
4	Window Sill Height	mm	144	1174
5	Window Top Height	mm	85	1809
	Maximum Penetration	mm	301	

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	4
High-Speed MDB On-Board	2
Real Time	2
Total	11

DATA SHEET NO. 9

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

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	61.80
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	89.6

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	400	Right	212
2	Top of Bumper	533	800	Right	185
3	Mid Level	686	800	Right	161
4	Top of Stack	813	800	Right	192

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2

DATA SHEET NO. 10

POST-TEST OBSERVATIONS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

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	Curtain Airbag, Side Header, Head Restraint
Upper Torso Contact	Curtain Airbag, Seat Bolster	Curtain Airbag, Door Panel
Lower Torso Contact	Torso/Pelvis Airbag	Door Panel
Left Knee Contact	Door Panel	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 STRUCUTURAL 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

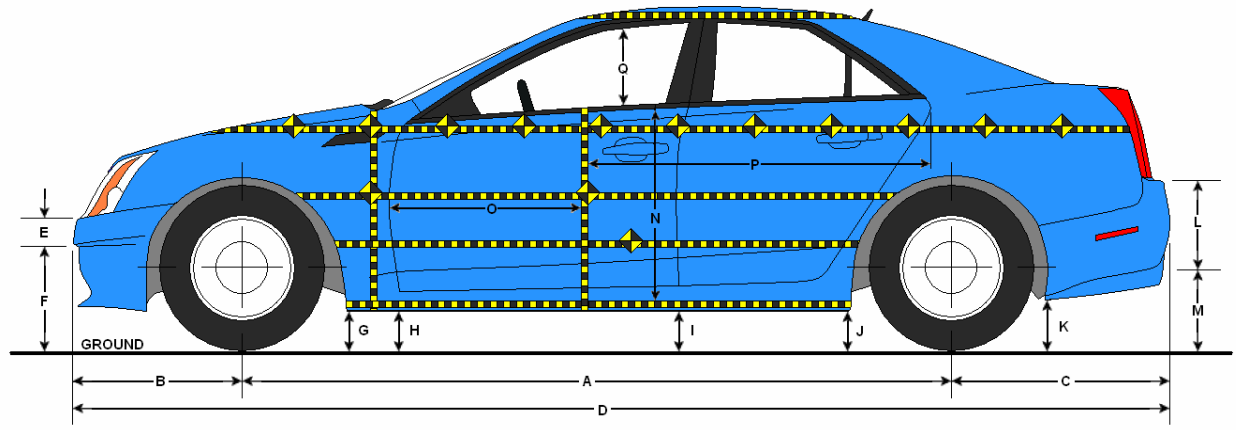
Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	+14 (Right)
Vertical Offset	mm	+/- 20	+5 (Up)

DATA SHEET NO. 11

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



LEFT SIDE VIEW

VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

Code	Dimension	Measurement (mm)		
		Pre	Post	Difference
A	Wheelbase	3675	3664	-11
B	Front Axle to FSOV	969	987	18
C	Rear Axle to RSOV	1240	1233	-7
D	Total Length at Centerline	5884	5883	-1
E	Front Bumper Thickness	243	243	0
F	Front Bumper Bottom to Ground	386	390	4
G	Sill Height af Front Wheel Well	390	380	-10
H	Sill Height at Front Door Leading Edge	402	397	-5
I	Sill Height at B-Pillar	427	461	34
J1	Sill Height at Rear Wheel Well	444	477	33
J2	Pinch Weld Height at Rear Wheel Well	408	422	14
K	Sill Height Aft of Rear Wheel Well	475	515	40
L	Rear Bumper Thickness	215	216	1
M	Bottom of Rear Bumper to Ground	478	486	8
N	Sill Height to Window Bottom Sill	701	710	9
O	Front Door Leading Edge to Impact CL	732	730	-2
P	Rear Door Trailing Edge to Impact CL	1218	1180	-38
Q	Front Window Opening	562	603	41
R	Right Side Length	5061	5062	1
S	Left Side Length	5062	5050	-12
T	Vehicle Width at B-Pillar	1982	1905	-77

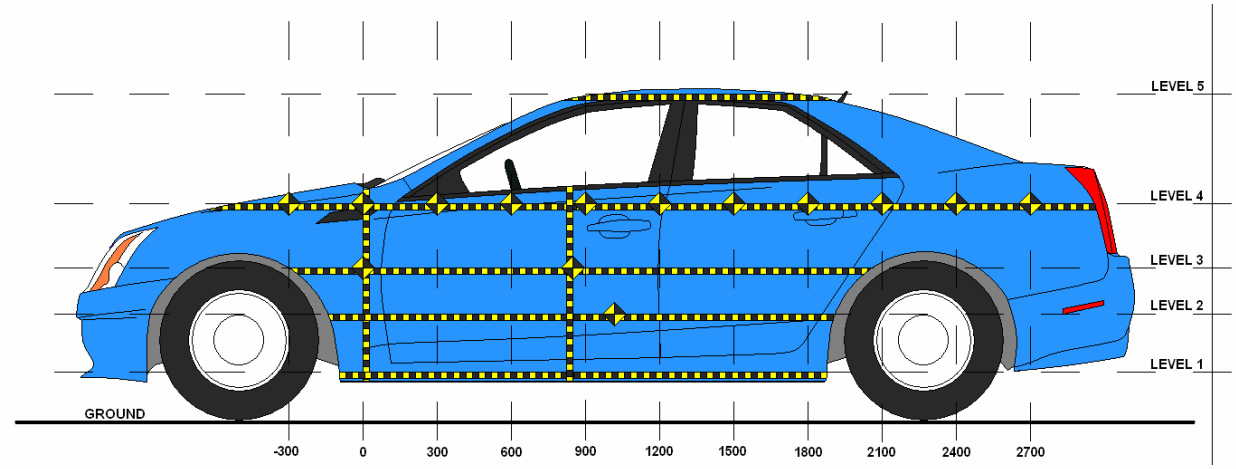
All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 12

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



LEFT SIDE VIEW

Level	Description	Height Above Ground (mm)
1	Sill Top Height	474
2	Occupant H-Point Height	869
3	Mid-Door Height	813
4	Window Sill Height	1174
5	Window Top Height	1809

DATA SHEET NO. 12 … (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

	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		520		578			587		680			67		102	
-150		523	521	566			590	596	653			67	75	87	
0	554	539	538	556		680	611	622	621		126	72	84	65	
150	555	536	539	552		769	666	690	603		214	130	151	51	
300	551	531	533	547		792	703	723	604		241	172	190	57	
450	548	526	529	541		794	719	745	607		246	193	216	66	
600	546	523	525	537		791	732	759	607		245	209	234	70	
750	543	520	522	533	784	791	747	769	612	850	248	227	247	79	66
900	542	517	520	529	791	792	742	773	613	857	250	225	253	84	66
1050	539	516	517	525	792	793	735	768	622	860	254	219	251	97	68
1200	537	515	516	523	792	795	736	777	636	863	258	221	261	113	71
1350	535	514	515	522	792	786	737	774	652	867	251	223	259	130	75
1500	536	515	515	522	792	823	762	793	666	869	287	247	278	144	77
1650	536	515	515	522	792	837	767	792	651	871	301	252	277	129	79
1800	538	516	515	521	792	796	752	765	640	874	258	236	250	119	82
1950	540	517	516	522	793	731	665	675	628	878	191	148	159	106	85
2100	546	525	523	529		584	570	567	580		38	45	44	51	
2250	546	523	521	526		581	565	562	576		35	42	41	50	
2400	547	522	520	526		577	562	558	573		30	40	38	47	
2550	547	523	520	525		574	559	555	570		27	36	35	45	
2700		508	504	525			542	537	567			34	33	42	
2850		496		524			527		564			31		40	

MAXIMUM CRUSH DATA

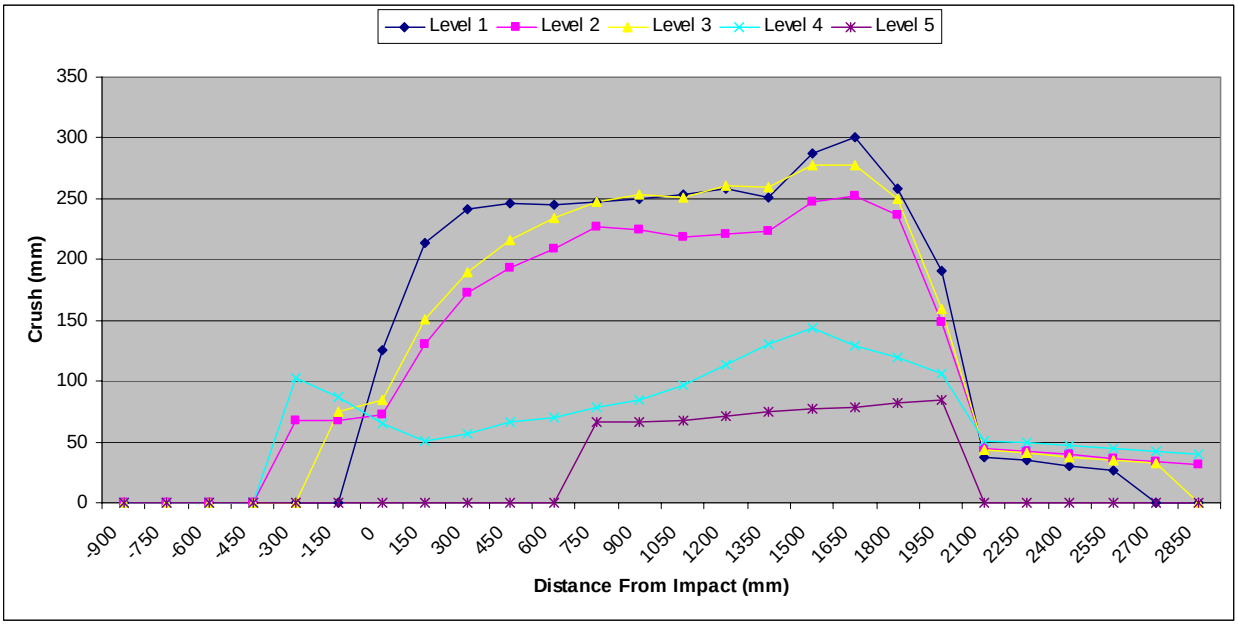
	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush (mm)	301	252	278	144	85
Distance from Impact (mm)	1650	1650	1500	1500	1950

DATA SHEET NO. 12 … (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

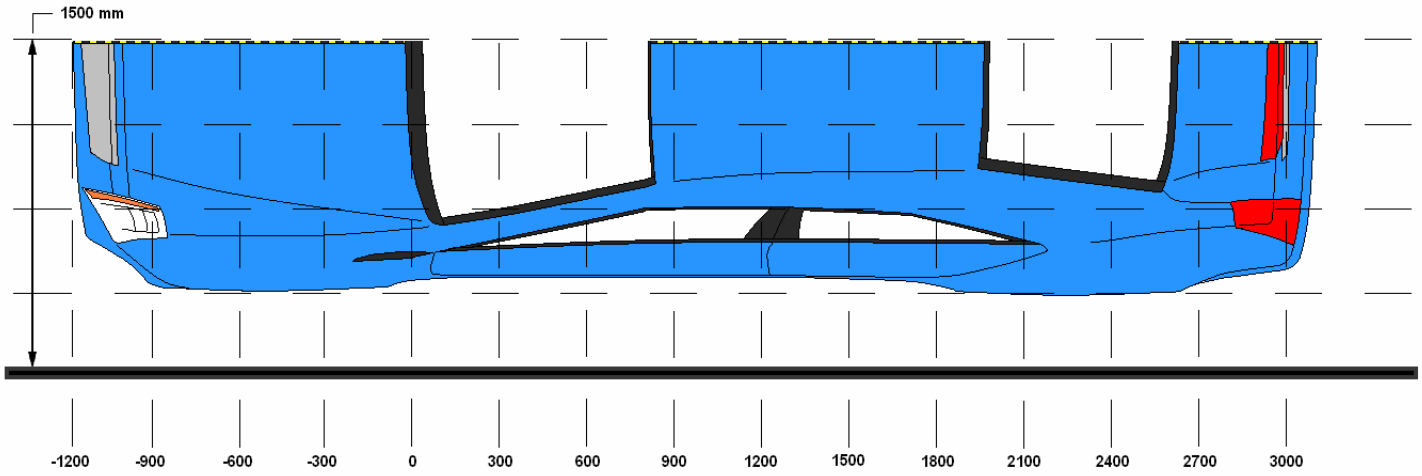


DATA SHEET NO. 13

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



TOP VIEW

DAMAGE PROFILE DISTANCES

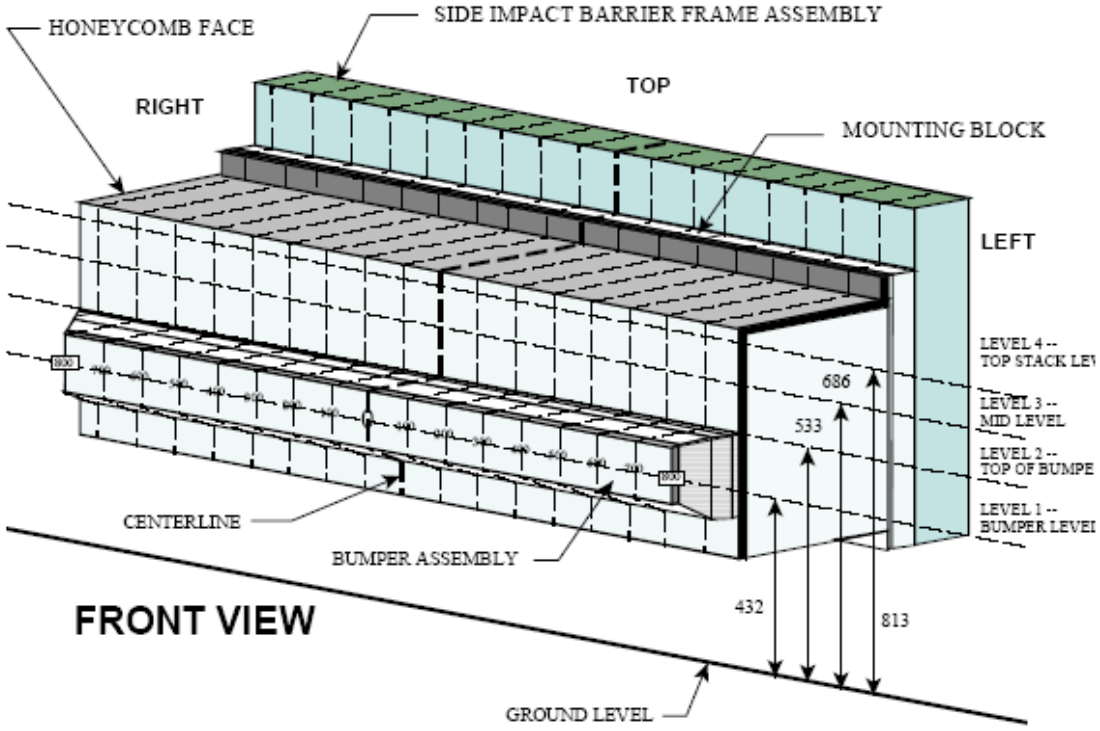
DPD	Distance From Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	2850	4	524	564	40
2	2250	4	526	576	50
3	1650	1	536	837	301
4	1050	1	539	793	254
5	450	1	548	794	246
6	-150	4	566	653	87

DATA SHEET NO. 14

EXTERIOR STATIC CRUSH FOR IMPACTOR FACE

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



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	0	100	200	300	400	500	600	700	800
1	198	162	155	156	212	145	138	135	131	125	124	122	122	118	114	112	125
2	185	181	170	177	160	163	147	153	147	132	138	139	142	137	135	131	126
3	161	140	114	104	109	114	89	88	85	78	75	75	72	76	83	91	130
4	192	150	123	109	117	132	103	92	82	77	75	76	88	107	119	133	159

All dimensions in millimeters.

DATA SHEET NO. 15

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

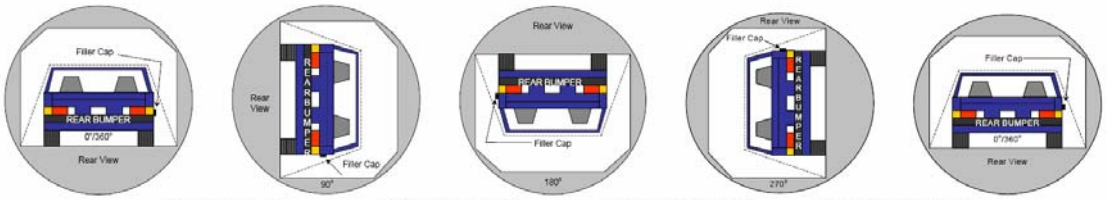
Temperature at Time of Impact: 20.0° C Test Time: 12:40 PM

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°	89	300	389
90° To 180°	78	300	378
180° To 270°	75	300	375
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

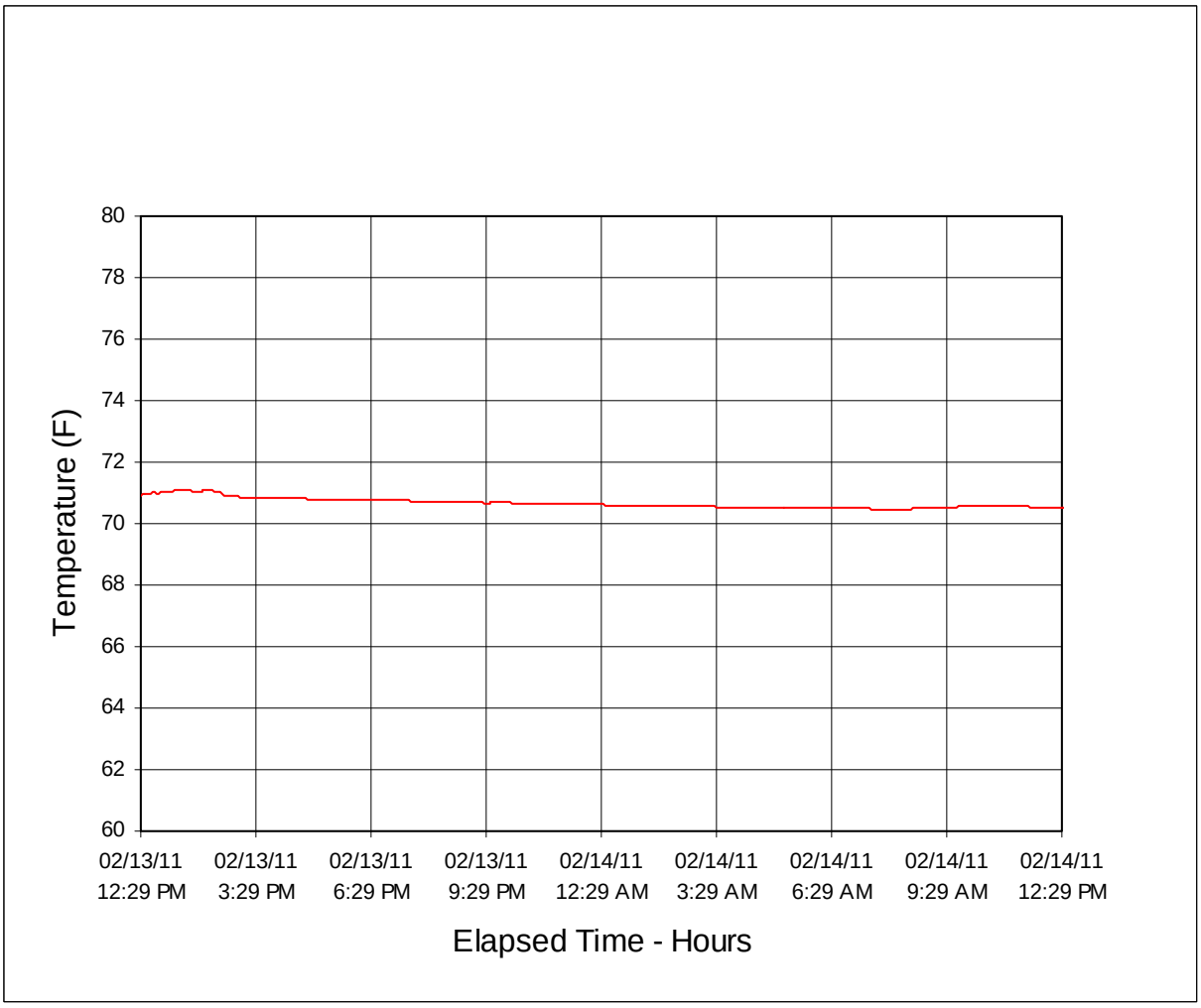
Test Phase	Spillage Location
0° To 90°	None
90° To 180°	None
180° To 270°	None
270° To 360°	None

DATA SHEET NO. 16

DUMMY / VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2011 Ford F-150 XLT SuperCab 2-Door Truck NHTSA No. MB0210

Test Program: MDB Side Impact Test Test Date: 02/14/11



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

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

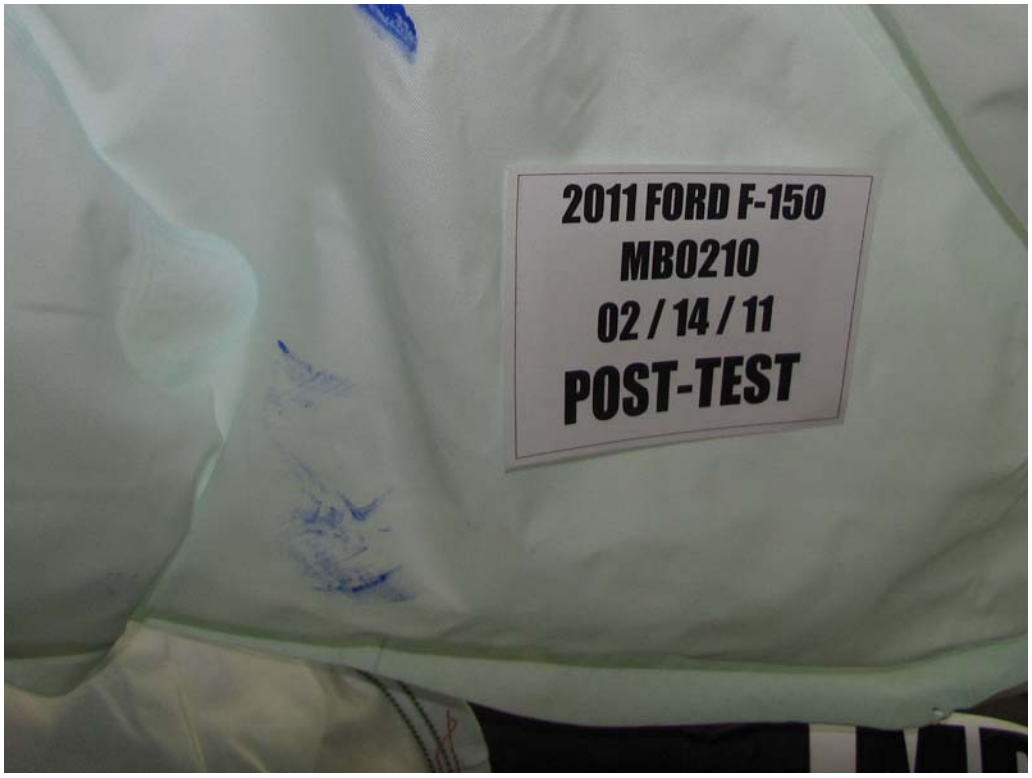


FIGURE 50. Post-Test Driver Dummy Close-Up Torso Contact with Side Airbag View

Photograph Not Applicable

No Dummy Pelvis Contact with Vehicle Interior

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

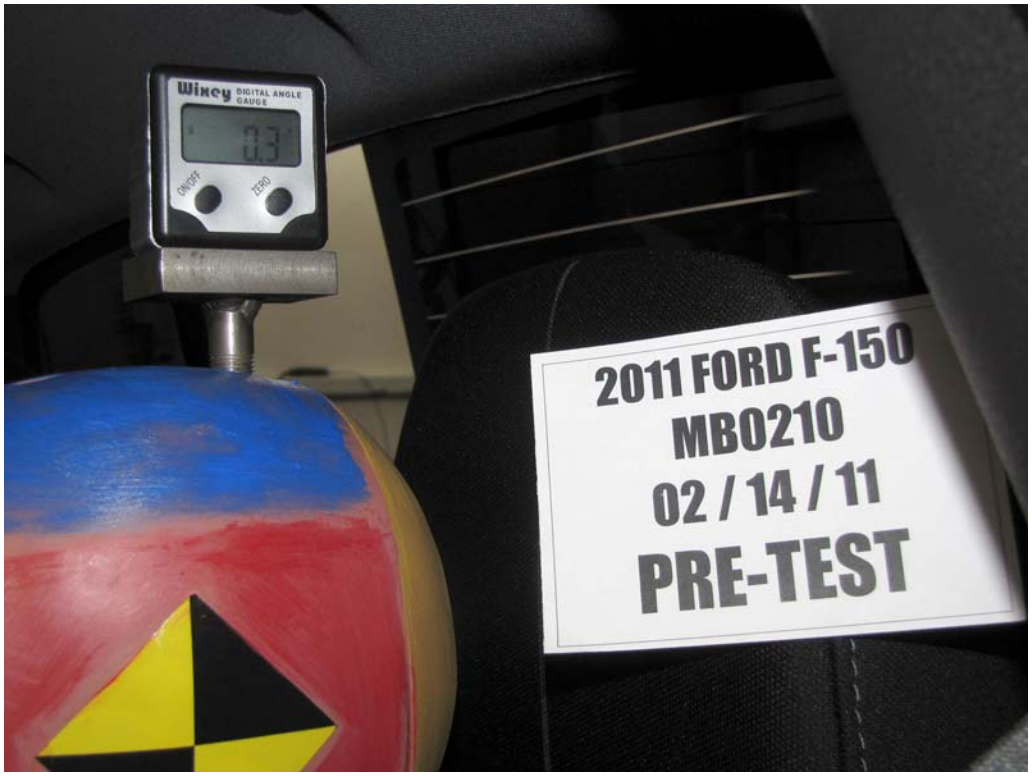


FIGURE 61. Pre-Test View of Rear Passenger Dummy's Head

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

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

Vehicle Not Equipped With
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

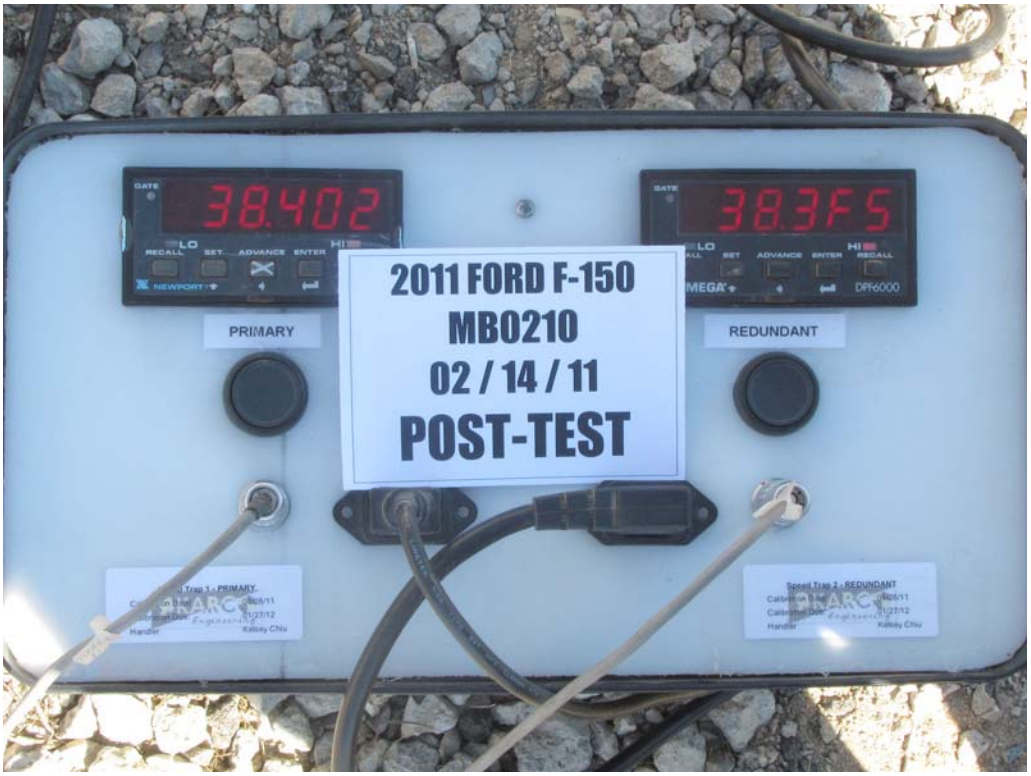


FIGURE 91. Pre-Test Ballast View

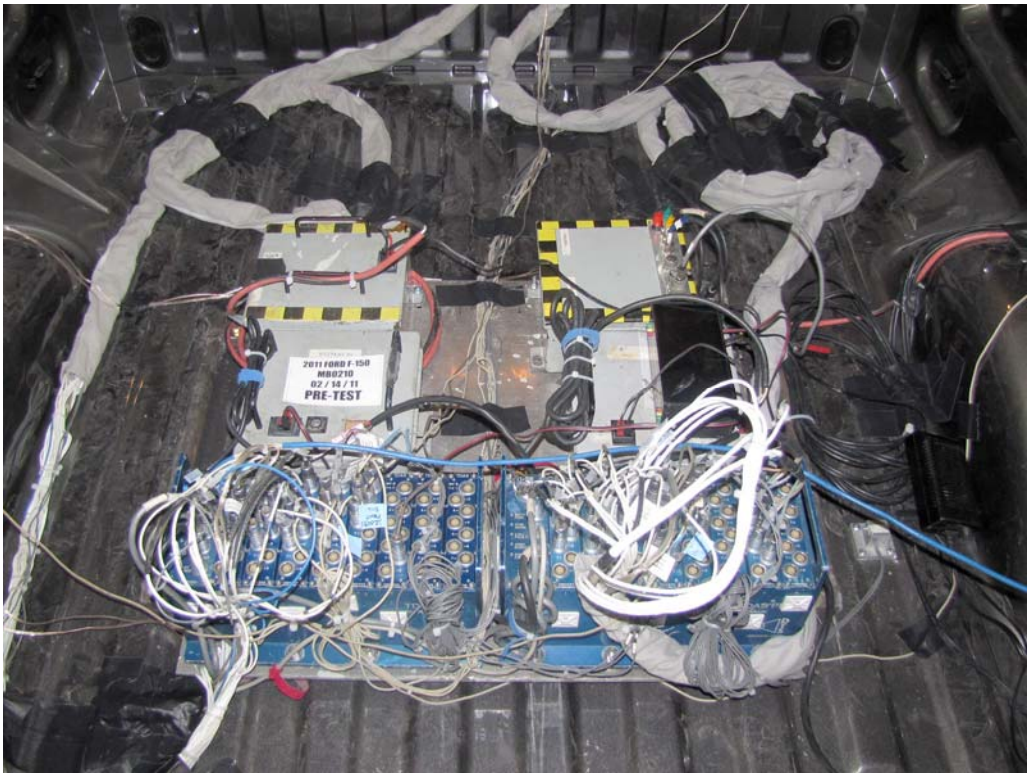


FIGURE 92. Post-Test Primary and Redundant Speed Trap Read-Out

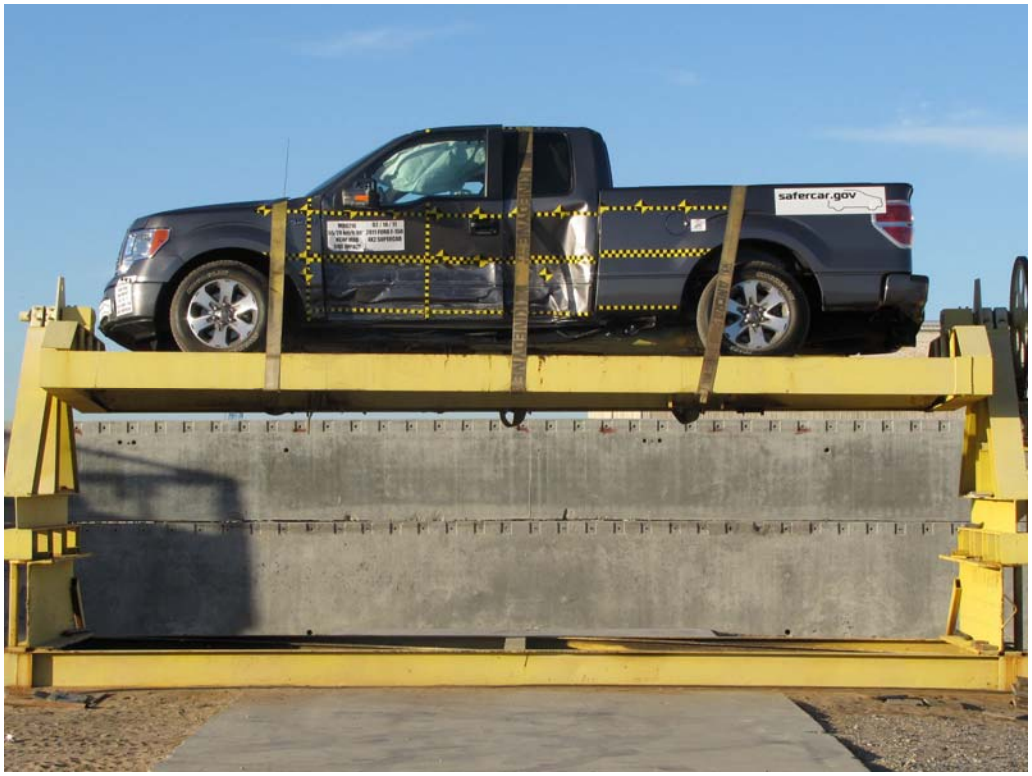


FIGURE 93. FMVSS No. 301/305 Rollover 0 Degrees

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

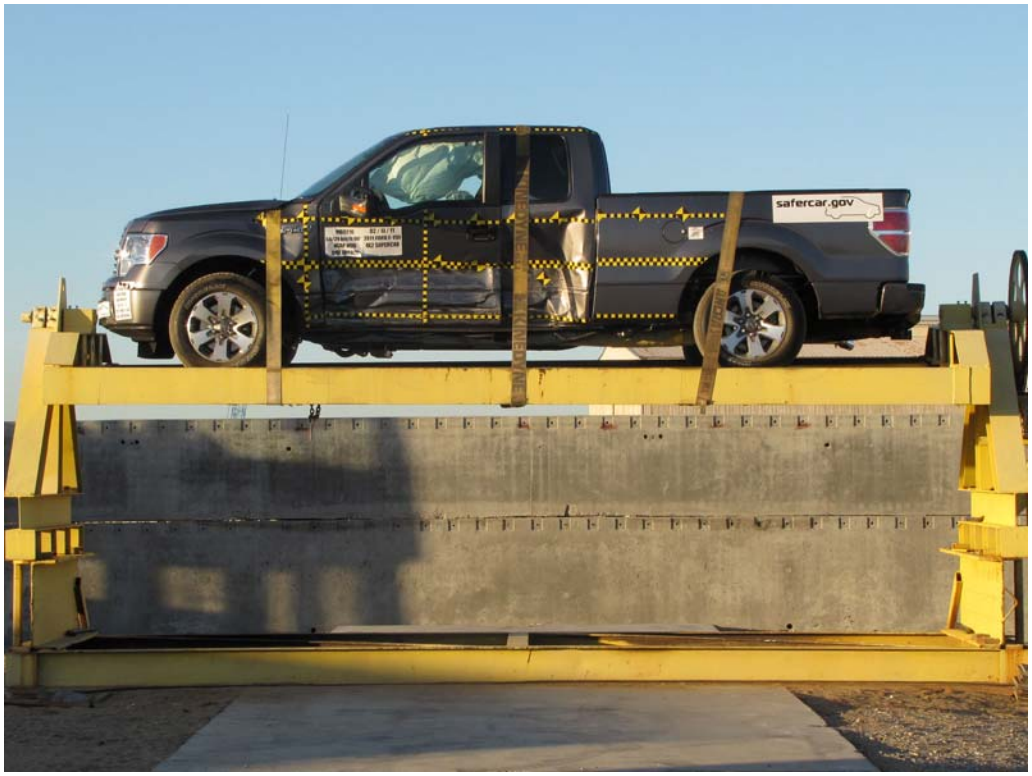


FIGURE 97. FMVSS No. 301/305 Rollover 360 Degrees

FIGURE 98. Impact Event

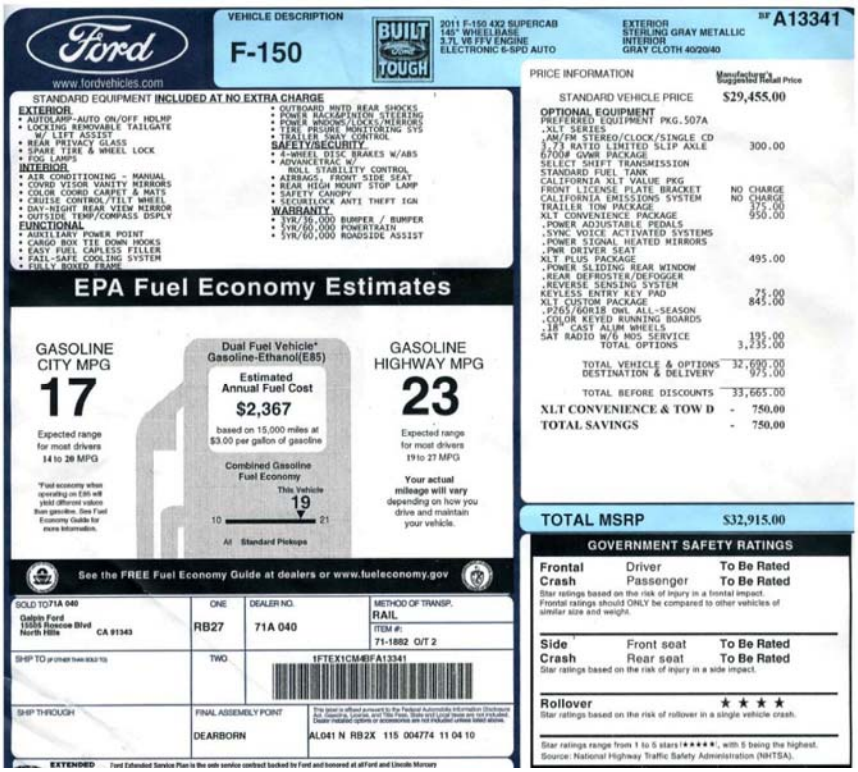


FIGURE 99. Monroney Label

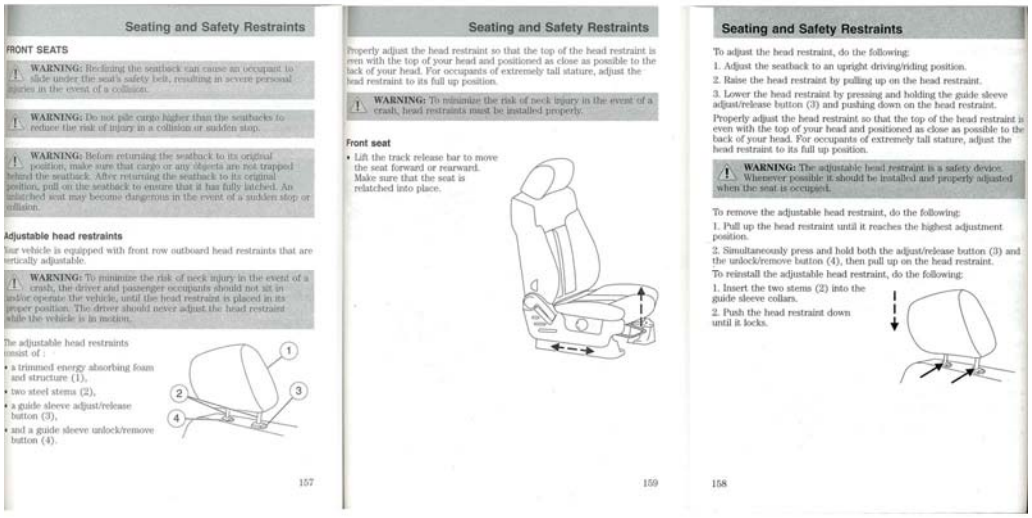
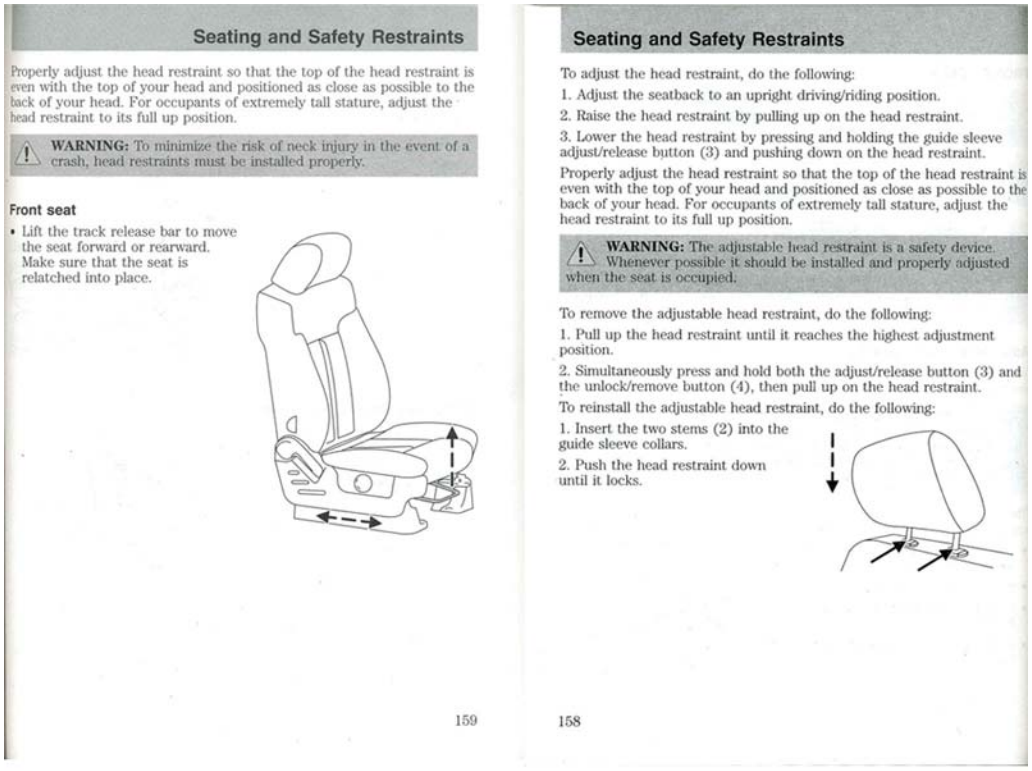


FIGURE 100. Driver Head Restraint Use and Adjustment Information from Vehicle Manual



Seating and Safety Restraints

Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.

WARNING: To minimize the risk of neck injury in the event of a crash, head restraints must be installed properly.

Front seat

- Lift the track release bar to move the seat forward or rearward. Make sure that the seat is relatched into place.

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Seating and Safety Restraints

To adjust the head restraint, do the following:

1. Adjust the seatback to an upright driving/riding position.
2. Raise the head restraint by pulling up on the head restraint.
3. Lower the head restraint by pressing and holding the guide sleeve adjust/release button (3) and pushing down on the head restraint.

Properly adjust the head restraint so that the top of the head restraint is even with the top of your head and positioned as close as possible to the back of your head. For occupants of extremely tall stature, adjust the head restraint to its full up position.

WARNING: The adjustable head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied.

To remove the adjustable head restraint, do the following:

1. Pull up the head restraint until it reaches the highest adjustment position.
2. Simultaneously press and hold both the adjust/release button (3) and the unlock/remove button (4), then pull up on the head restraint.

To reinstall the adjustable head restraint, do the following:

1. Insert the two stems (2) into the guide sleeve collars.
2. Push the head restraint down until it locks.

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

APPENDIX B
DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

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)

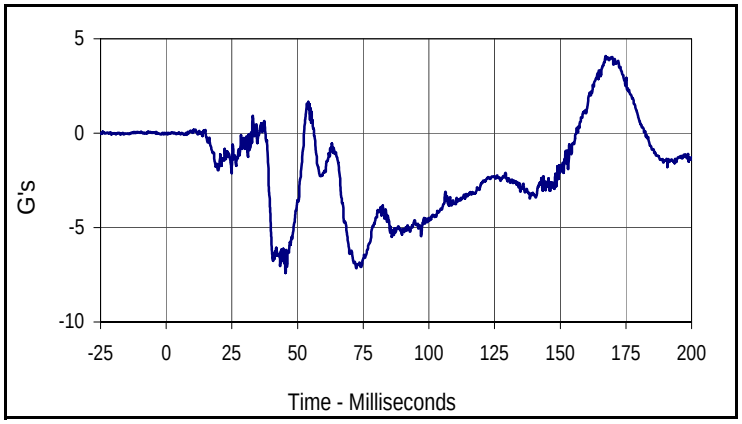
MDB Rear Acceleration (X)

MDB Rear Acceleration (Y)

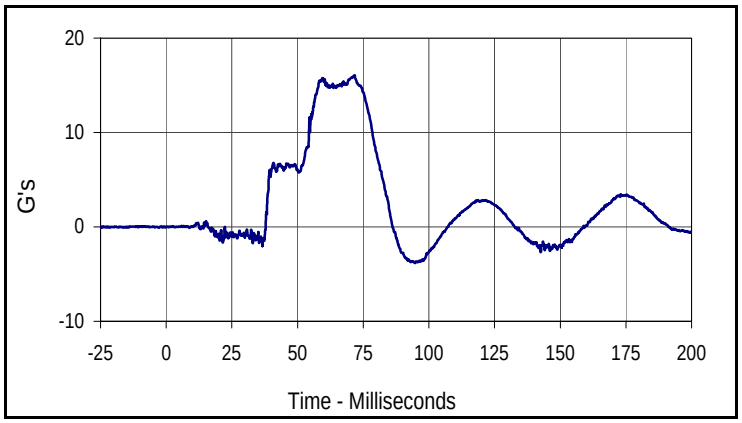
Left MDB Contact Switch

Right MDB Contact Switch

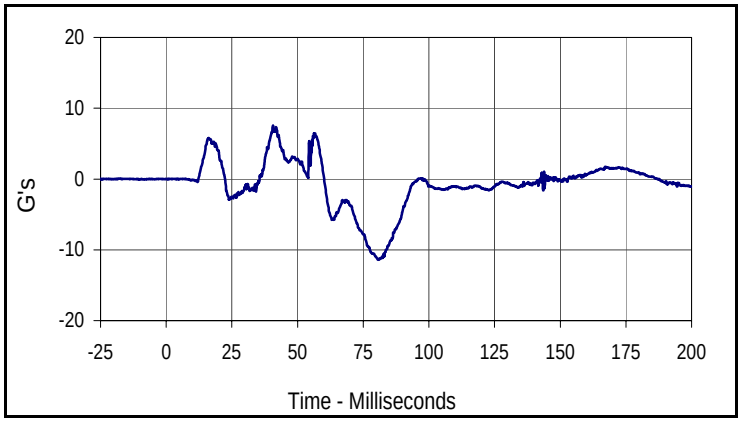
Test Vehicle:	2011 Ford F-150 XLT SuperCab 2-Door Truck	Test Date:	2/14/11
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	NHTSA No.:	MB0210



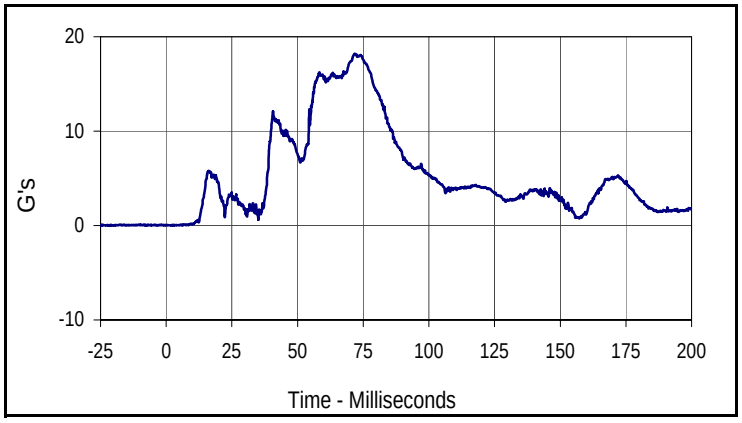
Curve Description			
Driver Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
4.1	167.3	-7.4	45.4



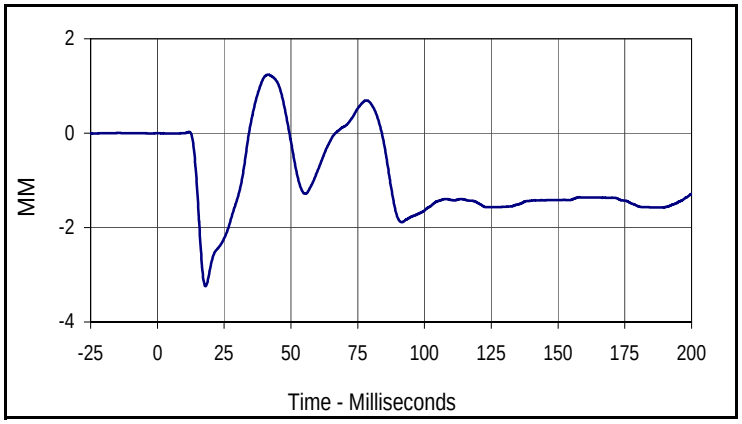
Curve Description			
Driver Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
16.1	71.7	-3.8	94.7



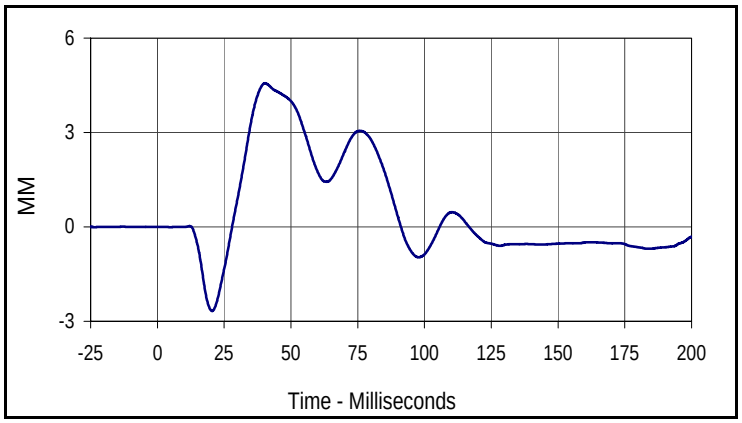
Curve Description			
Driver Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
7.5	40.6	-11.4	80.6



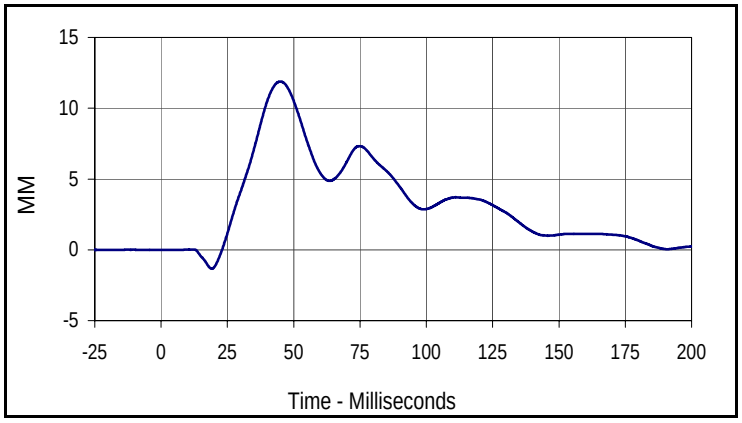
Curve Description			
Driver Head Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
18.2	71.7	0.0	6.2



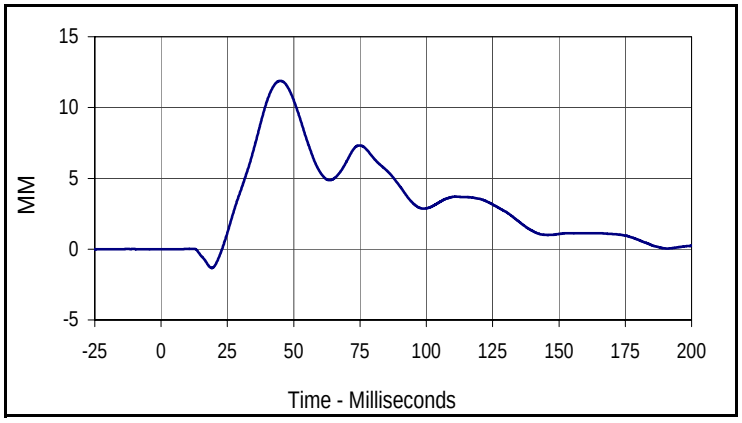
Curve Description			
Driver Upper Thorax Rib Deflection Y			
CURNO	Type	SAE Class	Units
007	FIL	180	MM
Max	Time	Min	Time
1.2	41.5	-3.2	18.0



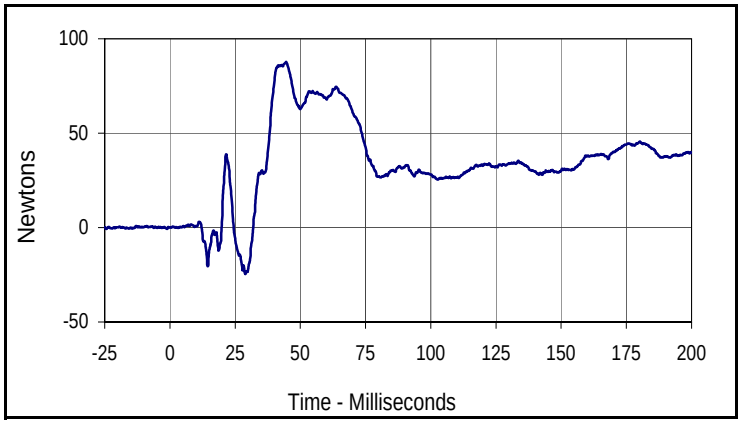
Curve Description			
Driver Middle Thorax Rib Deflection Y			
CURNO	Type	SAE Class	Units
008	FIL	180	MM
Max	Time	Min	Time
4.6	40.3	-2.7	20.5



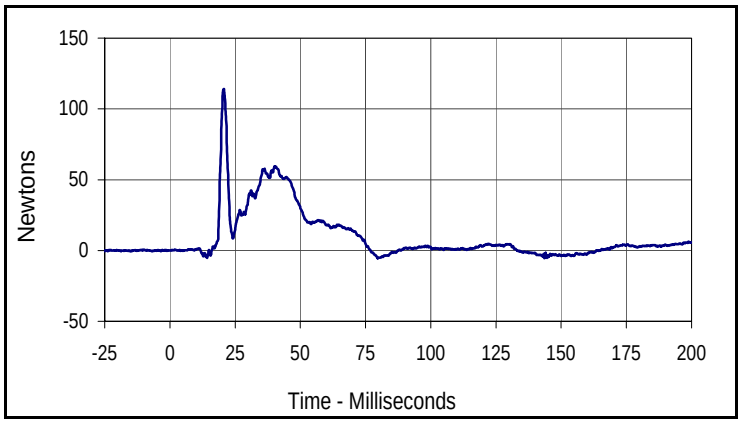
Curve Description			
Driver Lower Thorax Rib Deflection Y			
CURNO	Type	SAE Class	Units
009	FIL	180	MM
Max	Time	Min	Time
11.9	45.0	-1.3	19.1



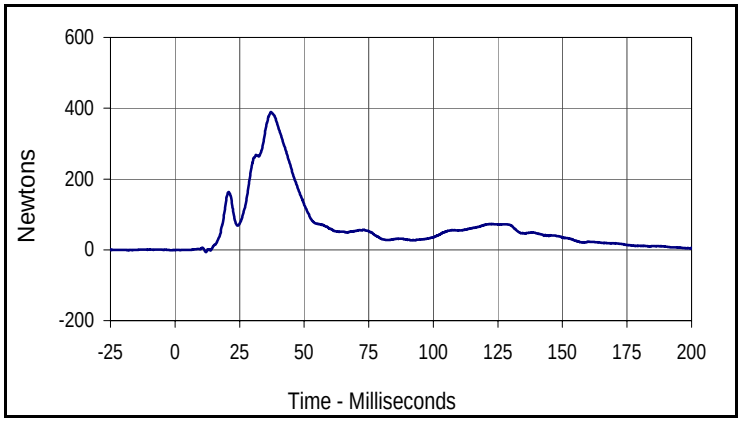
Curve Description			
Driver Thorax Rib Deflection Maximum			
CURNO	Type	SAE Class	Units
010	FIL	180	MM
Max	Time	Min	Time
11.9	45.0	-1.3	19.1



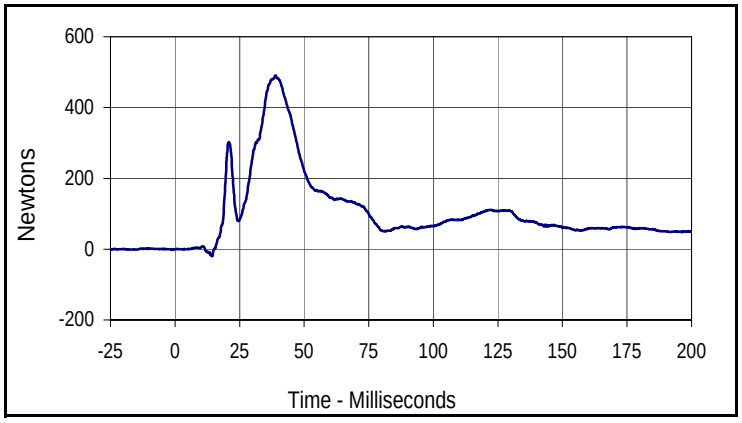
Curve Description			
Driver Anterior Abdminal Force Y			
CURNO	Type	SAE Class	Units
013	FIL	600	Newtons
Max	Time	Min	Time
87.7	44.5	-24.6	28.8



Curve Description			
Driver Middle Abdominal Force Y			
CURNO	Type	SAE Class	Units
014	FIL	600	Newtons
Max	Time	Min	Time
114.0	20.6	-5.4	143.6

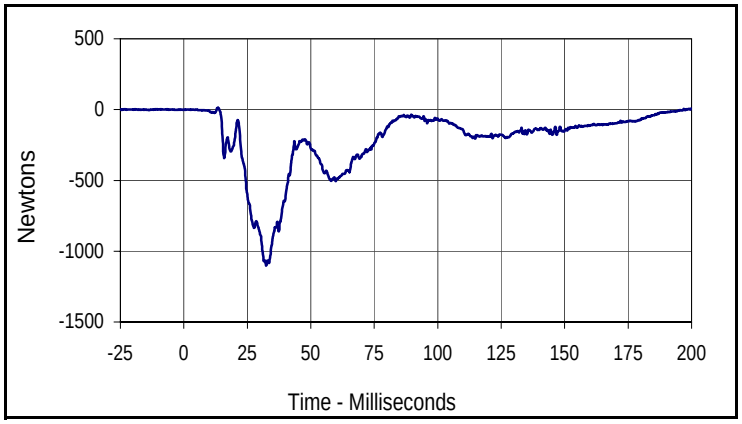


Curve Description			
Driver Posterior Abdominal Force Y			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
389.0	37.2	-6.4	11.9

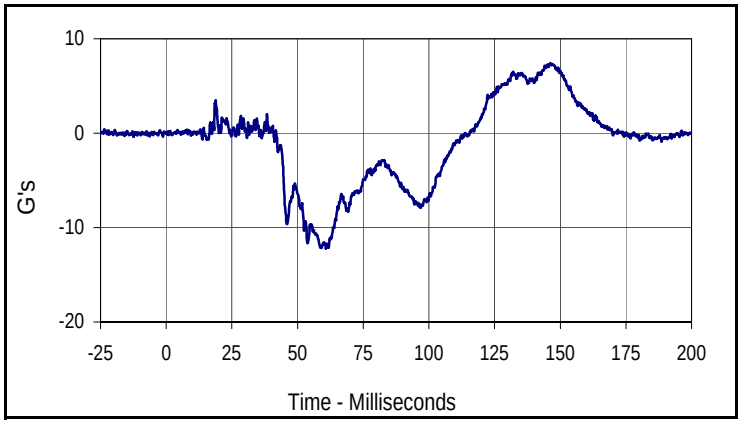


Curve Description			
Driver Total Abdominal Force			
CURNO	Type	SAE Class	Units
013	RES	600	Newtons
Max	Time	Min	Time
490.8	38.9	-20.3	14.3

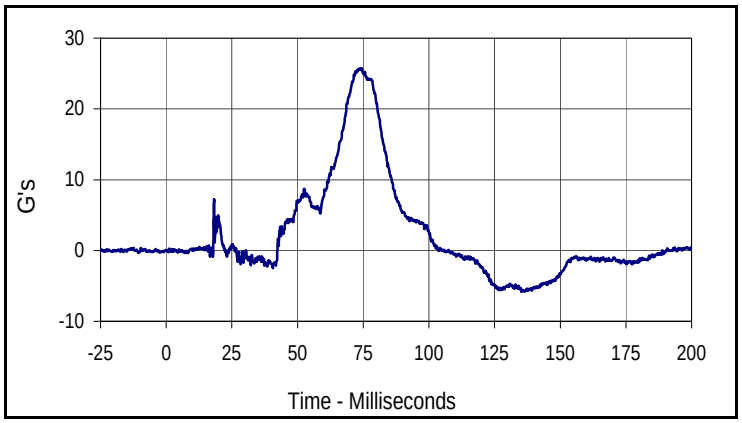
Test Vehicle:	2011 Ford F-150 XLT SuperCab 2-Door Truck	Test Date:	2/14/11
Test Program:	61 km/h (38 mph) Side Impact NCAP 27° Moving Deformable Barrier Test	NHTSA No.:	MB0210



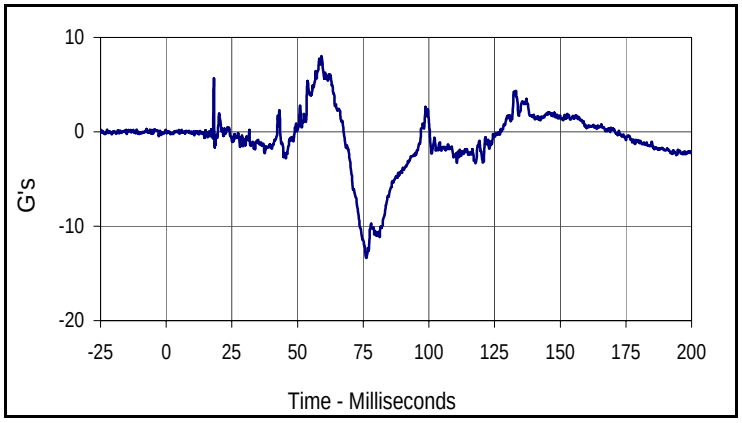
Curve Description			
Driver Pubic Symphysis Force Y			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
13.2	13.4	-1102.1	32.4



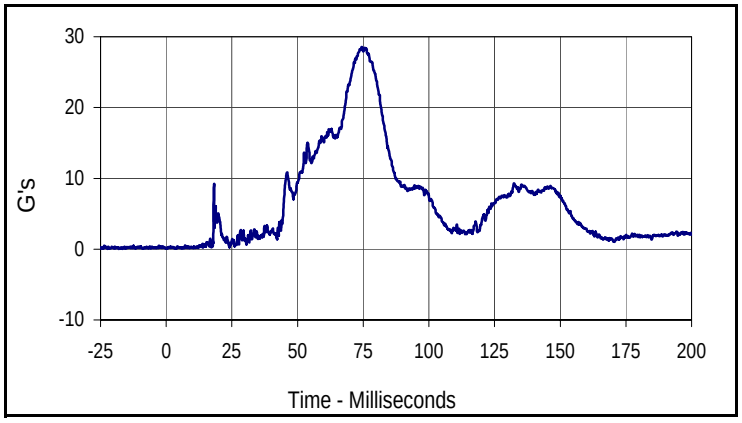
Curve Description			
Passenger Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
021	FIL	1000	G's
Max	Time	Min	Time
7.4	146.3	-12.2	60.8



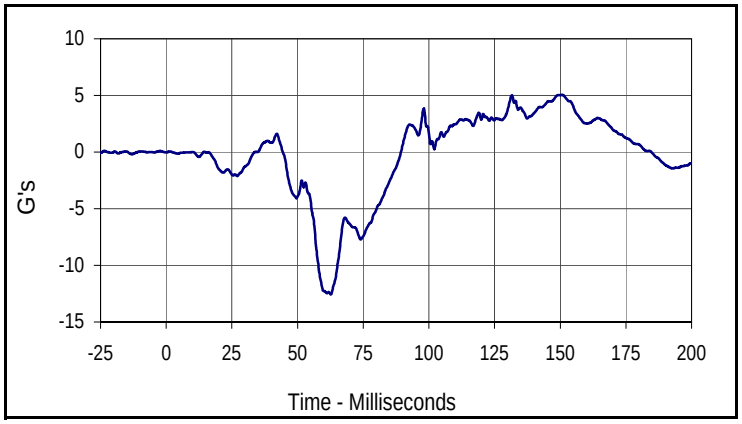
Curve Description			
Passenger Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
022	FIL	1000	G's
Max	Time	Min	Time
25.8	74.4	-5.9	135.3



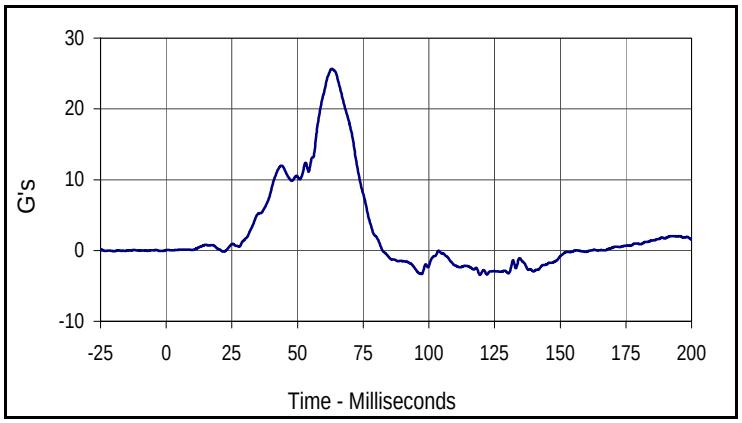
Curve Description			
Passenger Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
023	FIL	1000	G's
Max	Time	Min	Time
8.0	59.1	-13.4	76.1



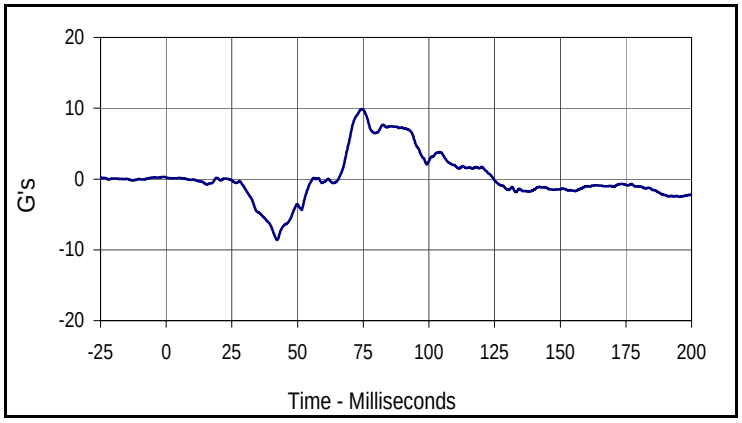
Curve Description			
Passenger Head Acceleration Resultant Primary			
CURNO	Type	SAE Class	Units
021	RES	1000	G's
Max	Time	Min	Time
28.6	74.5	0.1	3.7



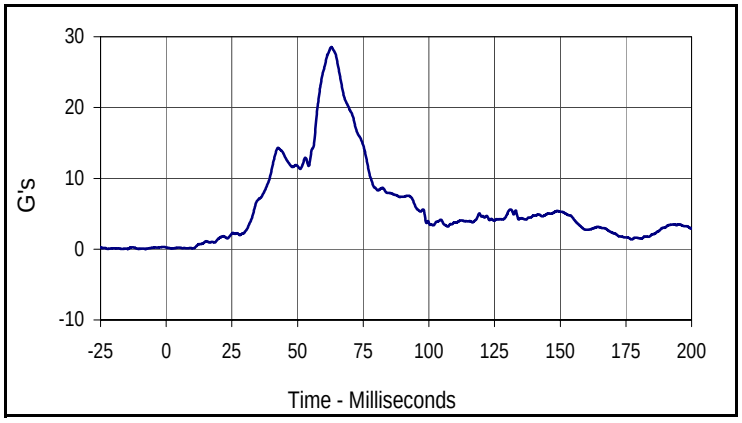
Curve Description			
Passenger Lower Spine T12 Acceleration X			
CURNO	Type	SAE Class	Units
037	FIL	180	G's
Max	Time	Min	Time
5.1	150.7	-12.6	62.7



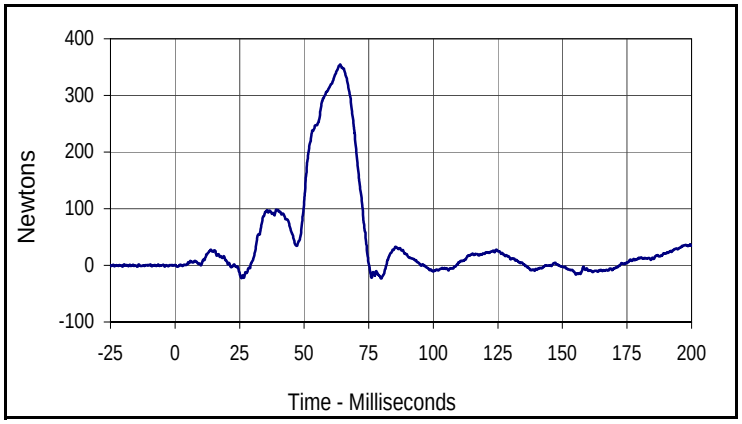
Curve Description			
Passenger Lower Spine T12 Acceleration Y			
CURNO	Type	SAE Class	Units
038	FIL	180	G's
Max	Time	Min	Time
25.7	63.0	-3.4	119.4



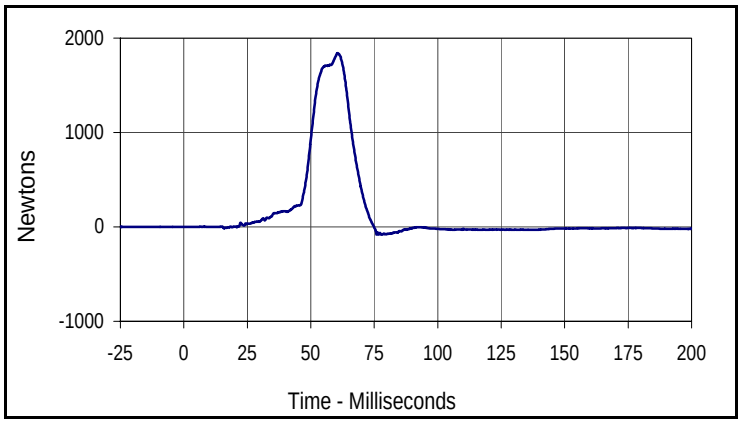
Curve Description			
Passenger Lower Spine T12 Acceleration Z			
CURNO	Type	SAE Class	Units
039	FIL	180	G's
Max	Time	Min	Time
9.9	74.6	-8.6	42.2



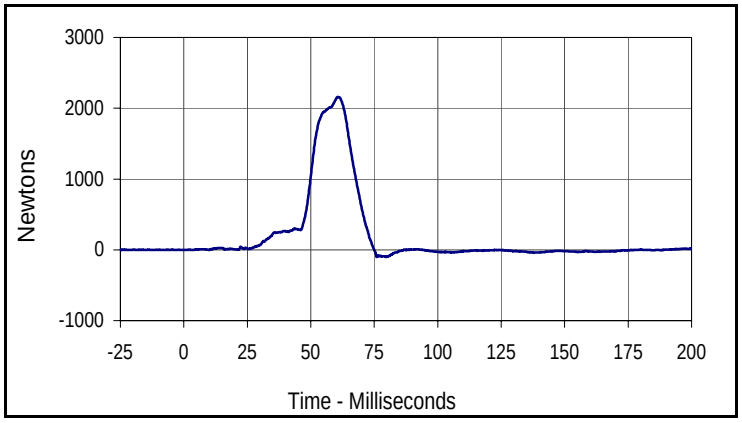
Curve Description			
Passenger Lower Spine T12 Acceleration Resultant			
CURNO	Type	SAE Class	Units
037	RES	180	G's
Max	Time	Min	Time
28.6	62.9	0.1	2.3



Curve Description			
Passenger Iliac Wing Force on Impact Side Y			
CURNO	Type	SAE Class	Units
043	FIL	600	Newtons
Max	Time	Min	Time
354.6	63.9	-22.9	79.8



Curve Description			
Passenger Acetabulum Force on Impact Side Y			
CURNO	Type	SAE Class	Units
042	FIL	600	Newtons
Max	Time	Min	Time
1840.4	60.6	-82.3	76.6



Curve Description			
Passenger Total Pelvic Force			
CURNO	Type	SAE Class	Units
042	SUM	600	Newtons
Max	Time	Min	Time
2161.0	60.6	-100.7	76.0

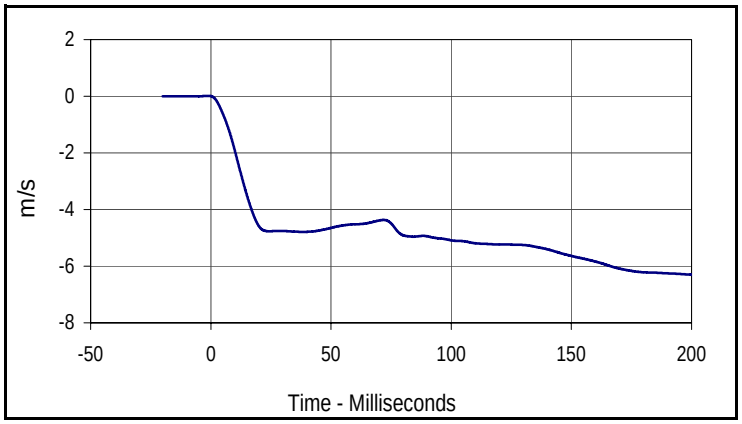
APPENDIX C

DUMMY CALIBRATION DATA

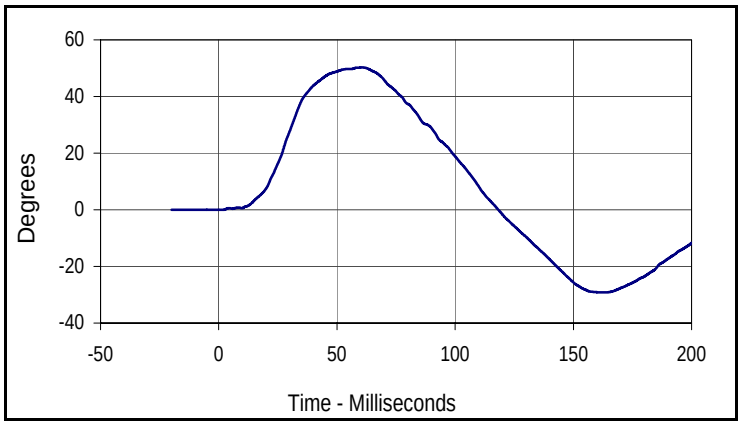
APPENDIX C
PRE-TEST / ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	ES2re Neck Calibration	Test Date:	2/12/11
ATD Serial No.:	F035	Test I.D.:	NBM02C

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.32	Pass
Laboratory Relative Humidity		%	10 to 70	22.58	Pass
Pendulum Velocity		m/s	3.30 to 3.50	3.38	Pass
Pendulum Deceleration	1 msec	m/s	0.0 to -.050	-0.032	Pass
	3 msec	m/s	-.250 to -.375	-0.250	Pass
	14 msec	m/s	-3.20 to -3.70	-3.20	Pass
Headform Rotation	Max	Degrees	49.0 to 58.0	50.2	Pass
	Time	msec	54.0 to 66.0	60.8	Pass
Maximum Rotation To Time Zero Crossing		msec	53.0 to 88.0	57.5	Pass
			Overall Test Results		Pass



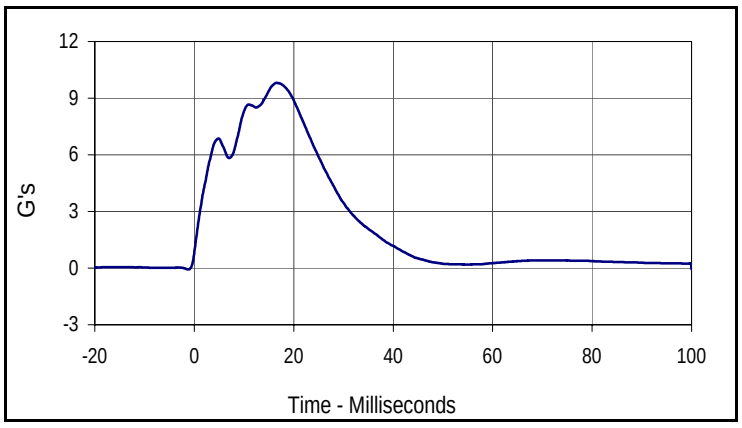
Curve Description			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.1	-6.3	200.0



Curve Description			
Headform Rotation			
CURNO	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
50.2	60.8	-29.2	162.5

Test Program:	ES2re Shoulder Calibration	Test Date:	2/12/11
ATD Serial No.:	F035	Test I.D.:	SHM02C

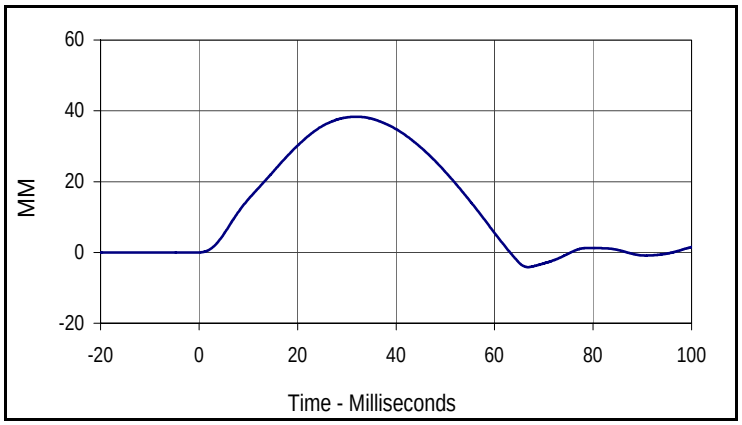
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.32	Pass
Laboratory Relative Humidity	%	10 to 70	22.58	Pass
Probe Velocity	m/s	4.20 to 4.40	4.23	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	9.81	Pass
		Overall Test Results		Pass



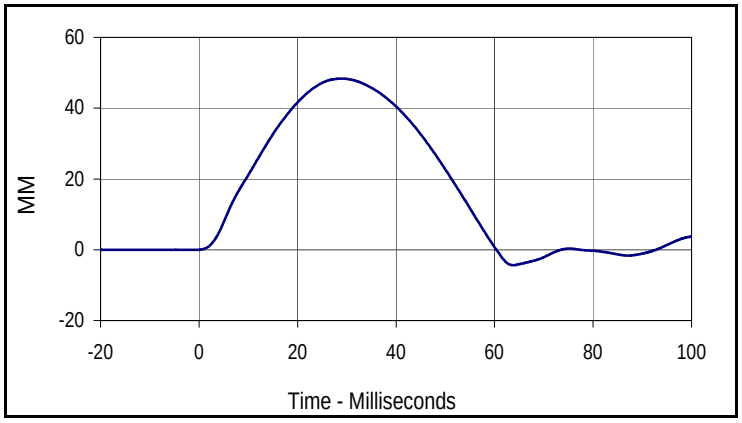
Curve Description			
Probe Accel			
CURNO	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
9.8	16.6	-0.1	-1.2

Test Program:	ES2re Rib Module Calibration	Test Date:	2/12/11
ATD Serial No.:	F035 Rib #1	Test I.D.:	RIB102C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.32	Pass
Laboratory Relative Humidity	%	10 to 70	22.45	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	38.3	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	48.3	Pass
		Overall Test Results		Pass



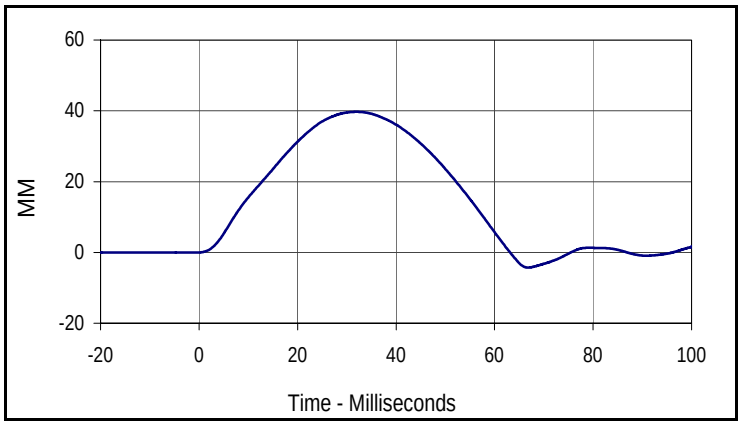
Curve Description			
Upper Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.3	32.0	-4.2	66.8



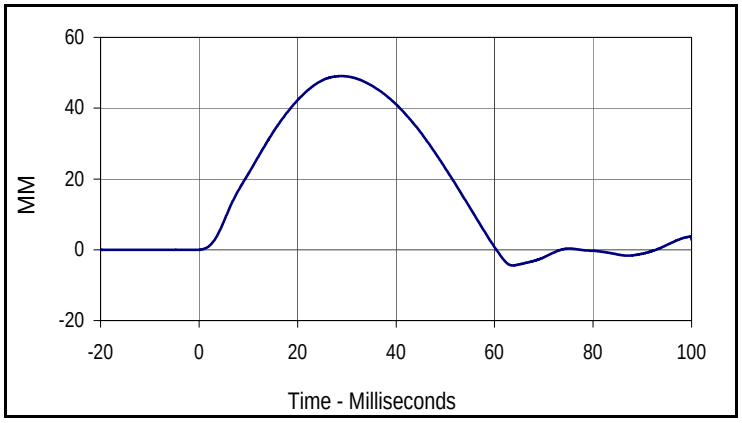
Curve Description			
Upper Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
48.3	28.9	-4.4	63.7

Test Program:	ES2re Rib Module Calibration	Test Date:	2/12/11
ATD Serial No.:	F035 Rib #2	Test I.D.:	RIB202C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.37	Pass
Laboratory Relative Humidity	%	10 to 70	22.41	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	39.7	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	49.0	Pass
		Overall Test Results		Pass



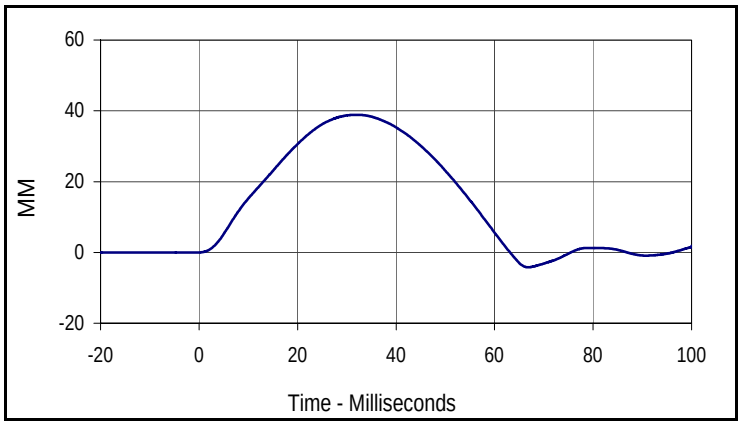
Curve Description			
Middle Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
39.7	32.0	-4.3	66.8



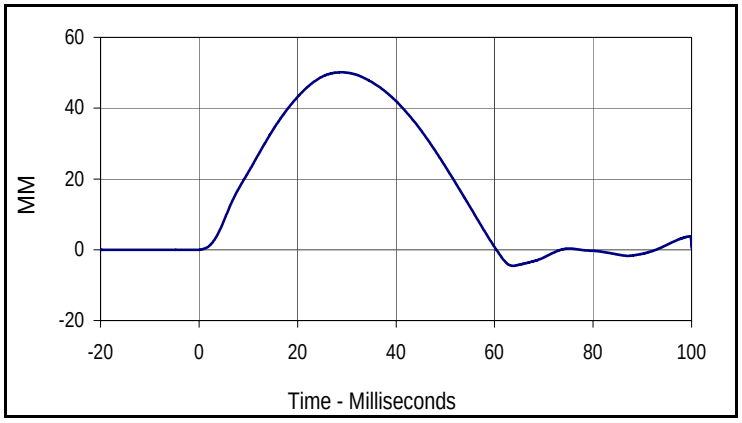
Curve Description			
Middle Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
49.0	28.9	-4.4	63.7

Test Program:	ES2re Rib Module Calibration	Test Date:	2/12/11
ATD Serial No.:	F035 Rib #3	Test I.D.:	RIB302C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.37	Pass
Laboratory Relative Humidity	%	10 to 70	22.43	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	38.9	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	50.1	Pass
		Overall Test Results		Pass



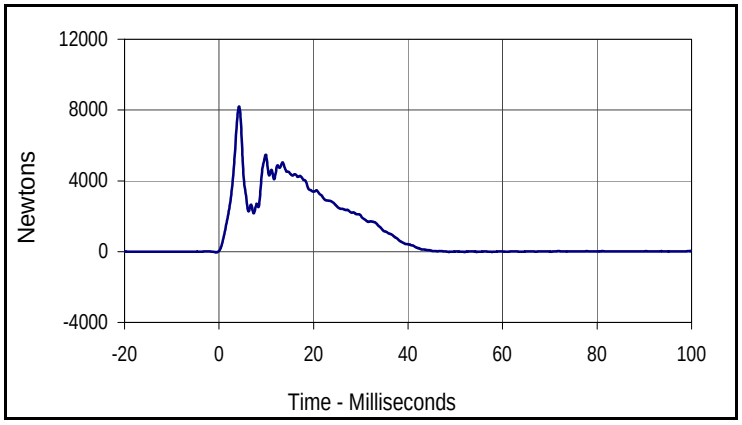
Curve Description			
Lower Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.9	32.0	-4.2	66.8



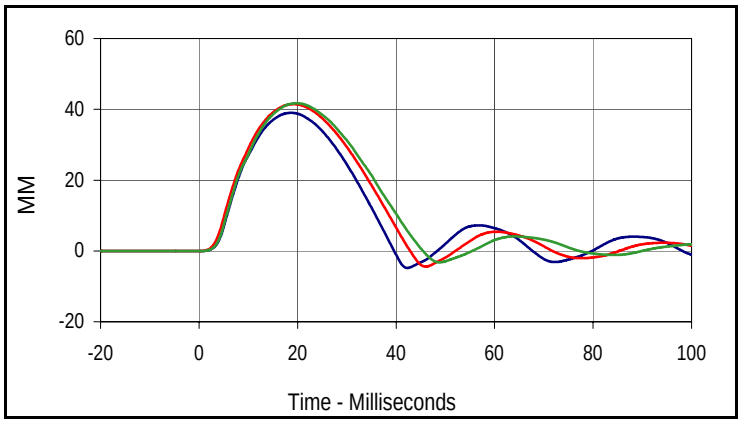
Curve Description			
Lower Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
50.1	28.9	-4.5	63.7

Test Program:	ES2re Thorax Calibration	Test Date:	2/12/11
ATD Serial No.:	F035	Test I.D.:	THM02C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.37	Pass
Laboratory Relative Humidity	%	10 to 70	22.29	Pass
Probe Velocity	m/s	5.40 to 5.60	5.45	Pass
Impactor Force	N	5100 to 6200	5476.5	Pass
	msec	> 6.0 msec	9.9	Pass
Upper Rib Deflection	MM	34 to 41	39.0	Pass
Middle Rib Deflection	MM	37 to 45	41.4	Pass
Lower Rib Deflection	MM	37 to 44	41.7	Pass
		Overall Test Results		Pass



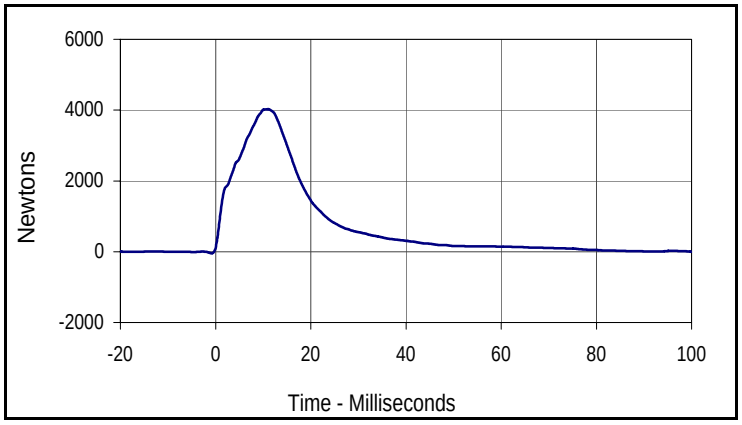
Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
8178.0	4.2	-33.6	-0.6



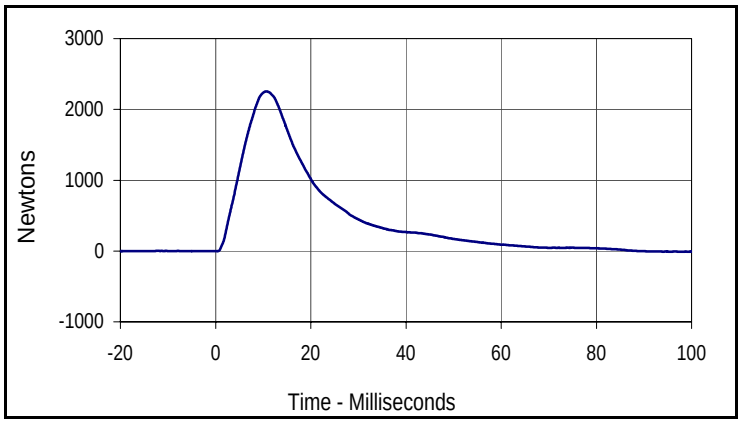
Curve Description			
Upper, Middle, Lower Rib Deflections			
CURNO(s)	Type	SAE Class	Units
002-003-004	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
39.0	18.7	-4.8	42.3
Max (Middle)	Time	Min (Middle)	Time
41.4	19.3	-4.4	46.0
Max (Lower)	Time	Min (Lower)	Time
41.7	19.8	-3.2	48.8

Test Program:	ES2re Abdomen Calibration	Test Date:	2/12/11
ATD Serial No.:	F035	Test I.D.:	ABDM02C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.37	Pass
Laboratory Relative Humidity	%	10 to 70	22.37	Pass
Probe Velocity	m/s	3.90 to 4.10	4.00	Pass
Impactor Force	N	4000 to 4800	4025.6	Pass
	msec	10.6 to 13.0	11.0	Pass
Abdominal Force	N	2200 to 2700	2255.3	Pass
	msec	10.0 to 12.3	10.7	Pass
		Overall Test Results		Pass



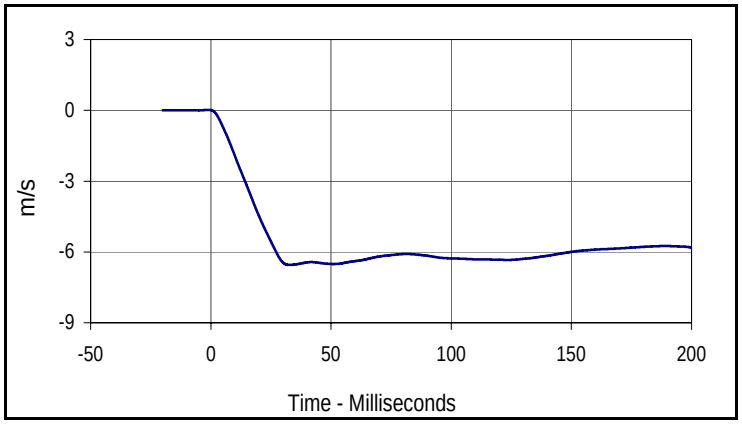
Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4025.6	11.0	-43.6	-0.8



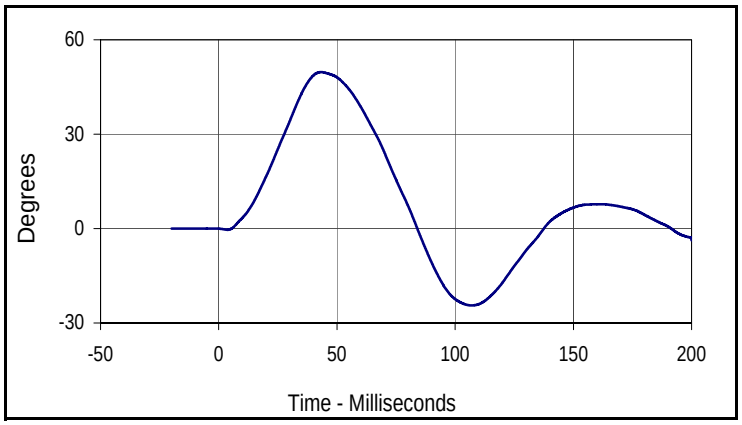
Curve Description			
Abdomen Sum Resultant			
CURNO	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2255.3	10.7	-9.4	97.8

Test Program:	ES2re Lumbar Spine Calibration	Test Date:	2/12/11
ATD Serial No.:	F035	Test I.D.:	SPM02C

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.37	Pass
Laboratory Relative Humidity		%	10 to 70	22.29	Pass
Pendulum Velocity		m/s	5.95 to 6.15	5.96	Pass
Pendulum Deceleration	1 msec	m/s	0.0 to -.050	-0.031	Pass
	3.7 msec	m/s	-.240 to -.425	-0.417	Pass
	27 msec	m/s	-5.80 to -6.50	-5.97	Pass
	30 msec	m/s	< -6.50	-6.45	Pass
Headform Rotation	Max	Degrees	45.0 to 55.0	49.7	Pass
	Time	msec	39.0 to 53.0	43.3	Pass
Maximum Rotation To Time Zero Crossing		msec	37.0 to 57.0	40.7	Pass
			Overall Test Results		Pass



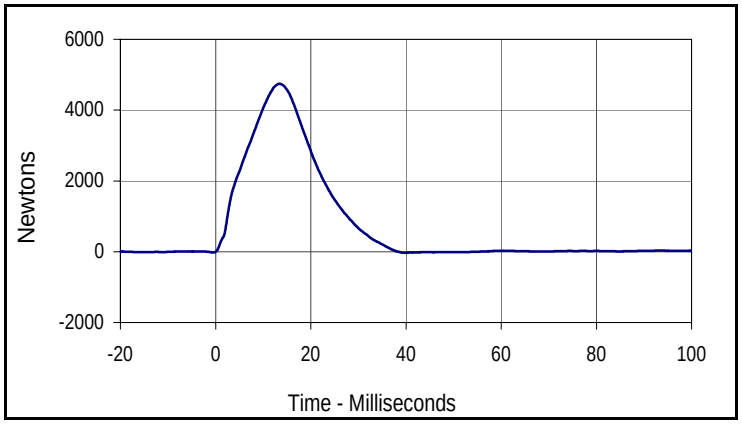
Curve Description			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-6.6	32.8



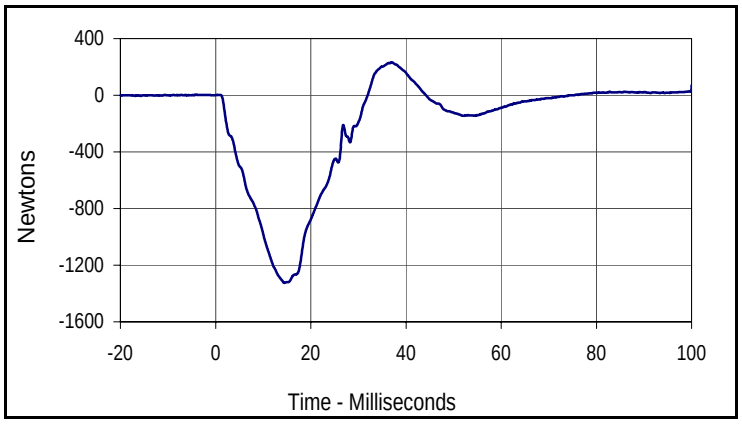
Curve Description			
Headform Rotation			
CURNO	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
49.7	43.3	-24.4	107.0

Test Program:	ES2re Pelvis Calibration	Test Date:	2/12/11
ATD Serial No.:	F035	Test I.D.:	PLM02C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.43	Pass
Laboratory Relative Humidity	%	10 to 70	22.22	Pass
Probe Velocity	m/s	4.20 to 4.40	4.29	Pass
Impactor Force	N	4700 to 5400	4745.3	Pass
	msec	11.8 to 16.1	13.4	Pass
Pubic Symphysis Load	N	-1230 to -1590	-1325.1	Pass
	msec	12.2 to 17.0	14.5	Pass
		Overall Test Results		Pass



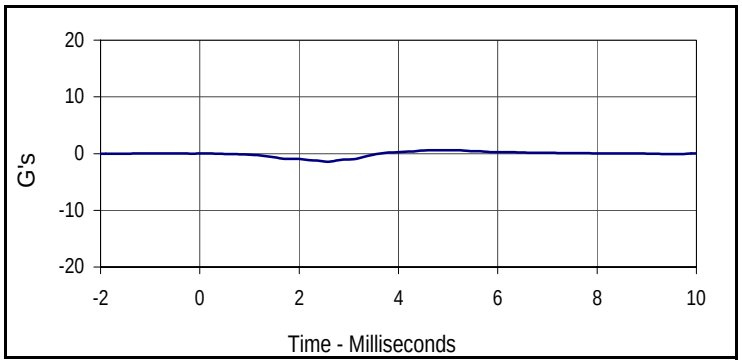
Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4745.3	13.4	-28.6	40.2



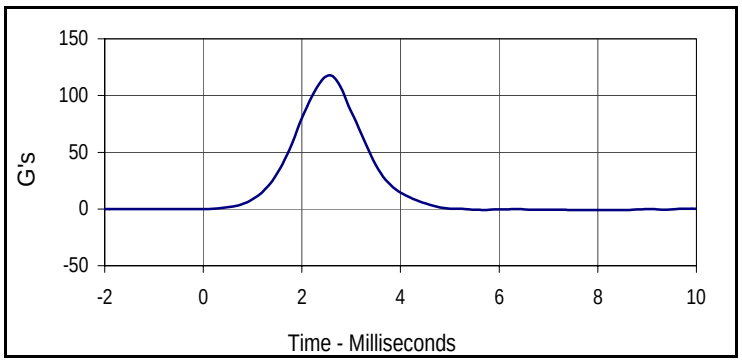
Curve Description			
Pubic FY			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
232.0	37.1	-1325.1	14.5

Test Program:	ES2re Lateral Head Drop Calibration	Test Date:	2/12/11
ATD Serial No.:	F035	Test I.D.:	HDM02C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.43	Pass
Laboratory Relative Humidity	%	10 to 70	22.28	Pass
Peak Resultant Acceleration	G's	125 to 155	145.2	Pass
Peak Longitudinal Acceleration	G's	≤15	0.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	5.1	Pass
		Overall Test Results		Pass



Curve Description			
Head X			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
0.6	5.1	-1.4	2.6



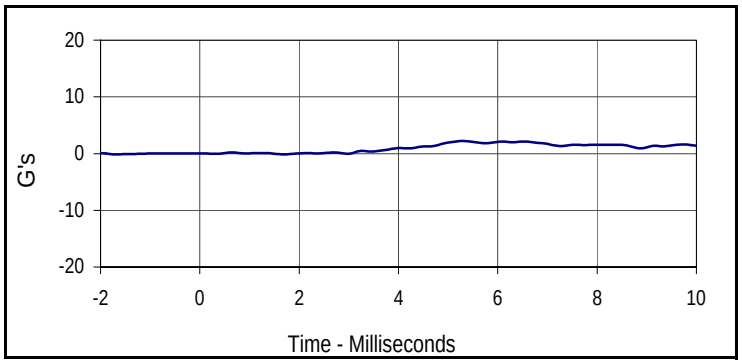
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
117.4	2.6	-1.0	7.7

Curve Description			
Head Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
85.6	2.5	-0.1	-1.7

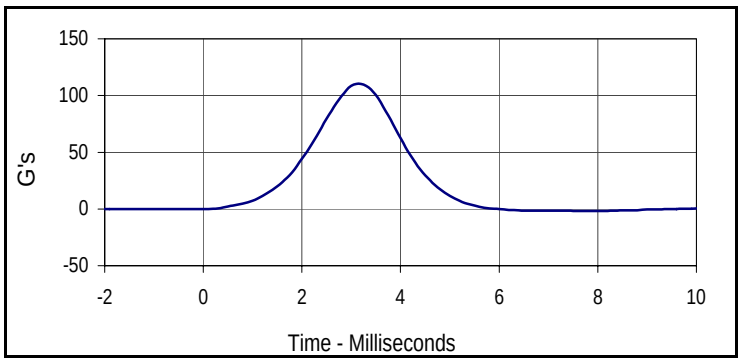
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
145.2	2.6	0.0	-0.2

Test Program:	SID IIs Lateral Head Drop Calibration	Test Date:	2/12/11
ATD Serial No.:	307	Test I.D.:	HDF02C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.34	Pass
Laboratory Relative Humidity	%	10 to 70	22.02	Pass
Peak Resultant Acceleration	G's	115 to 137	131.0	Pass
Peak Longitudinal Acceleration	G's	≤15	2.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	13.2	Pass
		Overall Test Results		Pass



Curve Description			
Head X			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
2.2	5.3	-0.1	1.7



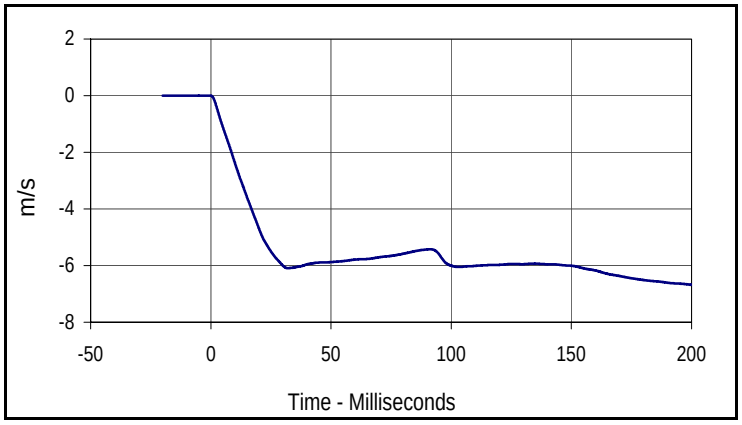
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
110.3	3.1	-1.8	7.7

Curve Description			
Head Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
70.9	3.2	-0.7	10.0

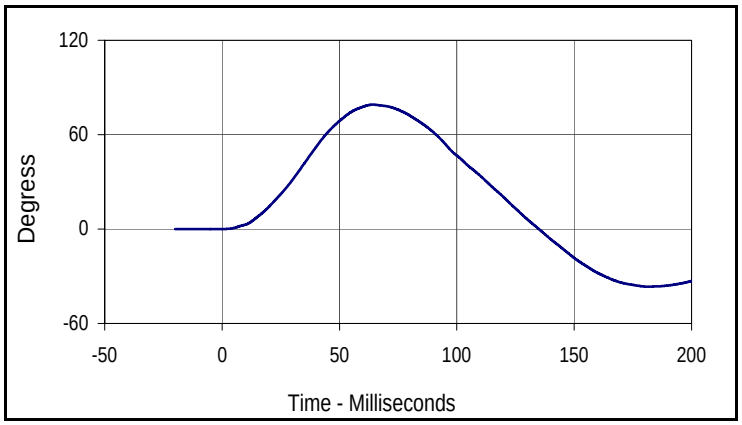
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
131.0	3.2	0.0	-0.6

Test Program:	SID IIs Neck Calibration	Test Date:	2/12/11
ATD Serial No.:	307	Test I.D.:	NBF02C

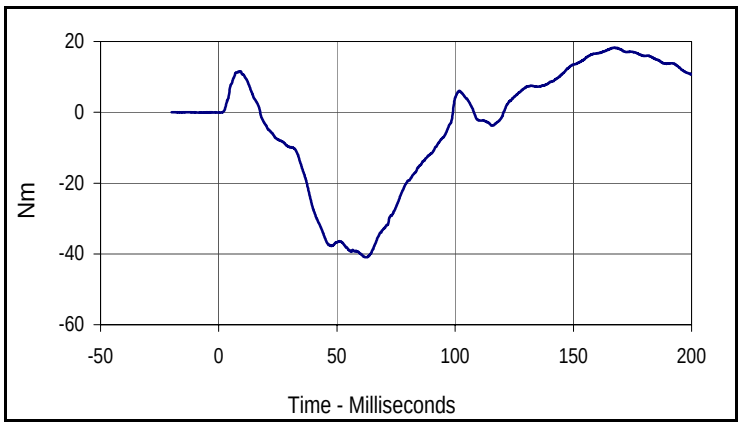
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.32	Pass
Laboratory Relative Humidity		%	10 to 70	22.01	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.51	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.37	Pass
	15 msec	m/s	-3.30 to -4.10	-3.58	Pass
	20 msec	m/s	-4.40 to -5.40	-4.69	Pass
	25 msec	m/s	-5.40 to -6.10	-5.50	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.09	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	79.09	Pass
	Time	msec	50.0 to 70.0	64.20	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	120.5	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	-0.4	-6.7	200.0



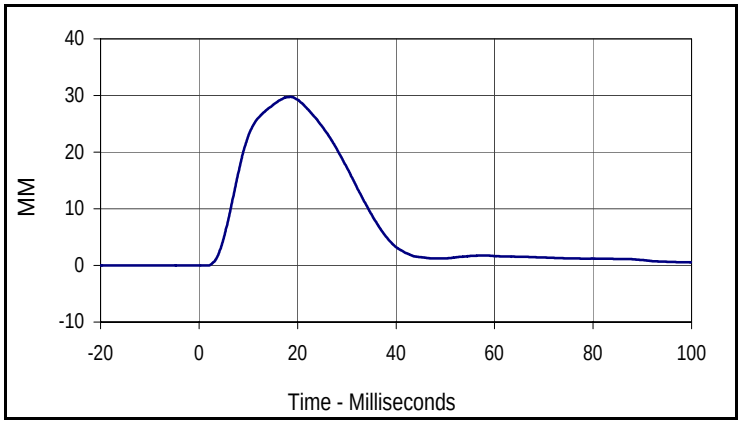
Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
79.1	64.2	-36.6	181.4



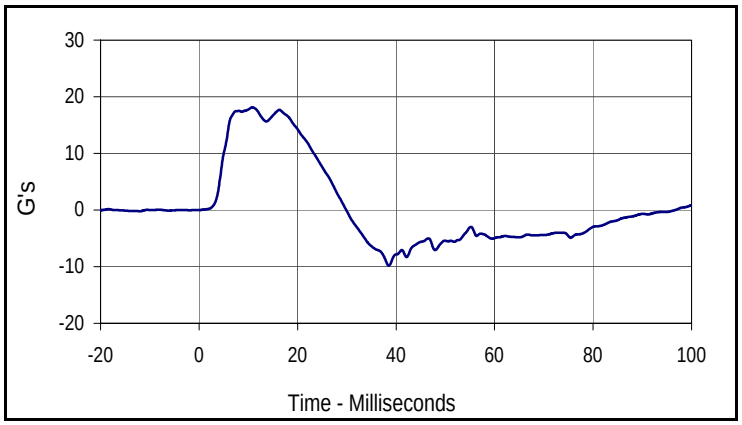
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
18.3	167.6	-41.0	62.0

Test Program:	SID IIs Shoulder Calibration	Test Date:	2/12/11
ATD Serial No.:	307	Test I.D.:	SHF02C

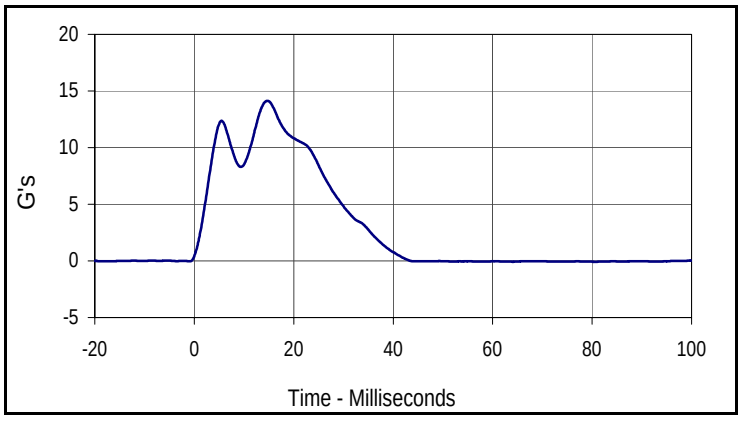
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.33	Pass
Laboratory Relative Humidity	%	10 to 70	21.94	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Shoulder Deflection	MM	28 to 37	29.8	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	18.1	Pass
Peak Impactor Acceleration	G's	13 to 18	14.1	Pass
		Overall Test Results		Pass



Curve Description			
Shoulder Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.8	18.6	0.0	0.3



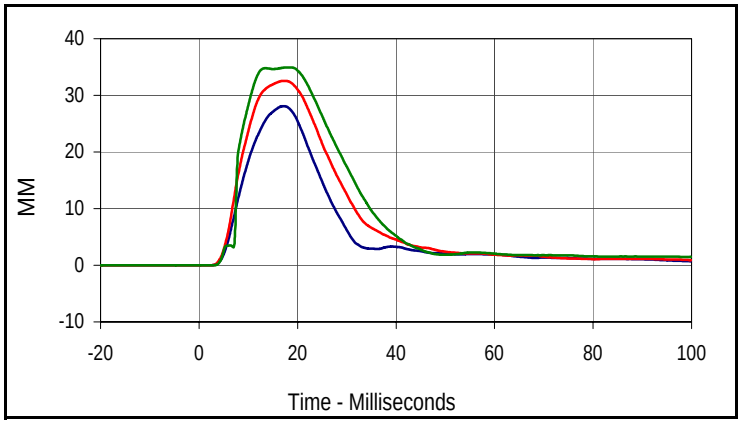
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
18.1	10.9	-9.8	38.5



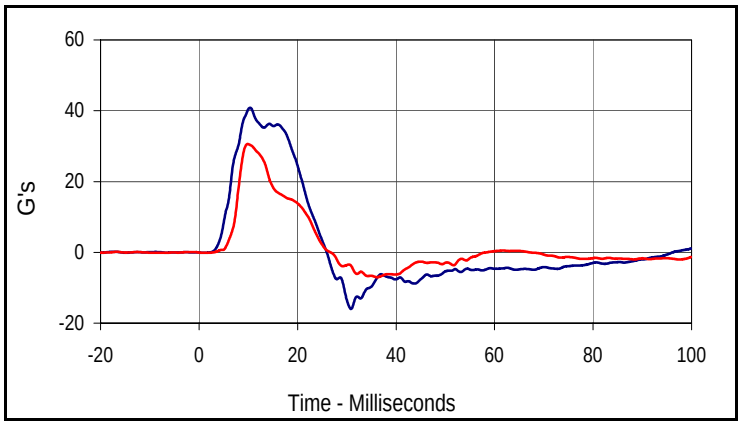
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
14.1	14.7	-0.1	80.6

Test Program:	SID IIs Thorax with Arm Calibration	Test Date:	2/12/11
ATD Serial No.:	307	Test I.D.:	THF02C

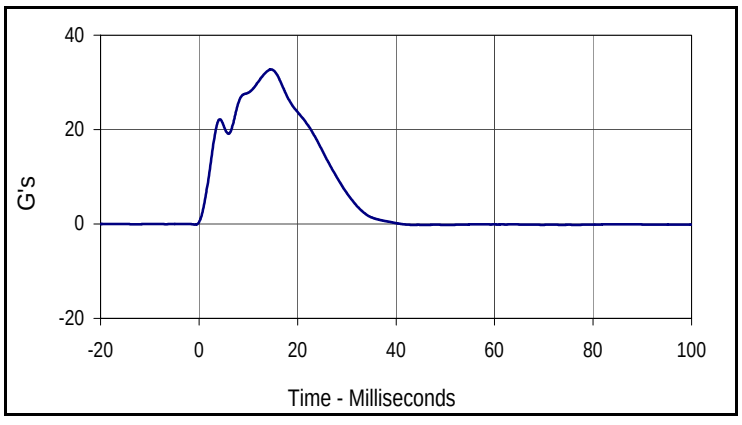
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.34	Pass
Laboratory Relative Humidity	%	10 to 70	21.84	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.68	Pass
Shoulder Deflection	MM	31 to 40	36.1	Pass
Upper Thorax Rib Deflection	MM	25 to 32	28.1	Pass
Middle Thorax Rib Deflection	MM	30 to 36	32.6	Pass
Lower Thorax Rib Deflection	MM	32 to 38	34.9	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	40.9	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	30.6	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	32.7	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
28.1	17.2	0.0	-12.8
Middle Thorax Deflection			
Max	Time	Min	Time
32.6	17.4	0.0	-3.0
Lower Thorax Deflection			
Max	Time	Min	Time
34.9	18.4	0.0	-17.7



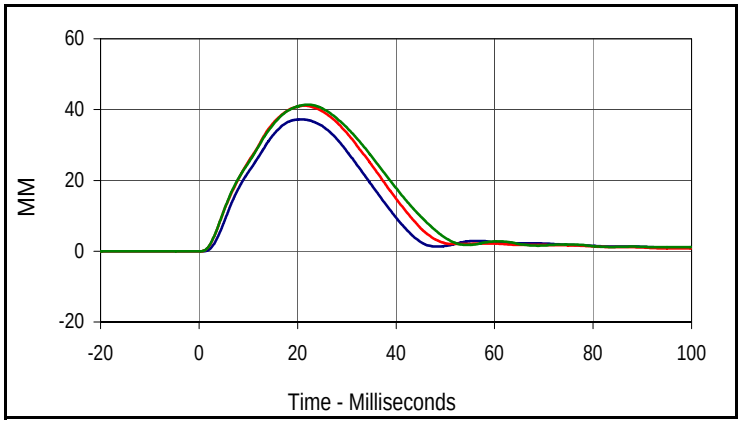
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
40.9	10.4	-16.0	30.8
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
30.6	9.9	-7.0	36.2



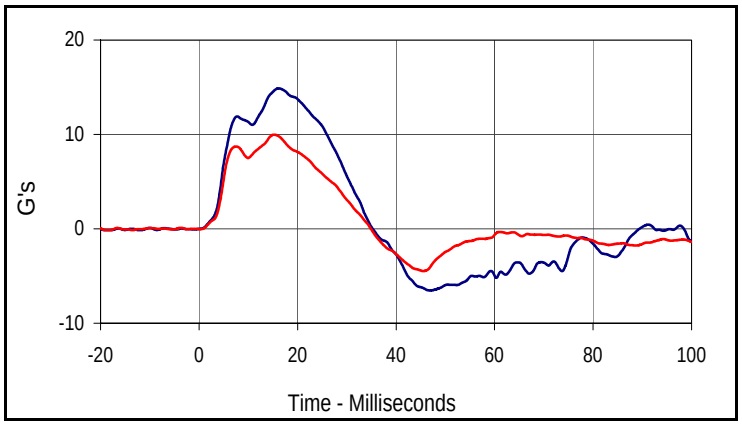
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
32.7	14.6	-0.2	50.4

Test Program:	SID IIs Thorax w/o Arm Calibration	Test Date:	2/12/11
ATD Serial No.:	307	Test I.D.:	TOA02C

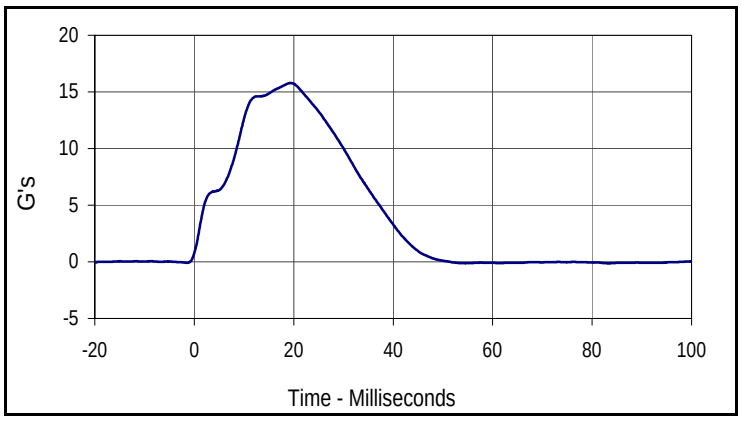
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.28	Pass
Laboratory Relative Humidity	%	10 to 70	21.76	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.29	Pass
Upper Thorax Rib Deflection	MM	32 to 40	37.2	Pass
Middle Thorax Rib Deflection	MM	39 to 45	41.1	Pass
Lower Thorax Rib Deflection	MM	35 to 43	41.4	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	14.9	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	10.0	Pass
Peak Impactor Acceleration	G's	14 to 18	15.8	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
37.2	20.9	0.0	-2.5
Middle Thorax Deflection			
Max	Time	Min	Time
41.1	21.5	0.0	-9.7
Lower Thorax Deflection			
Max	Time	Min	Time
41.4	22.1	0.0	-2.1



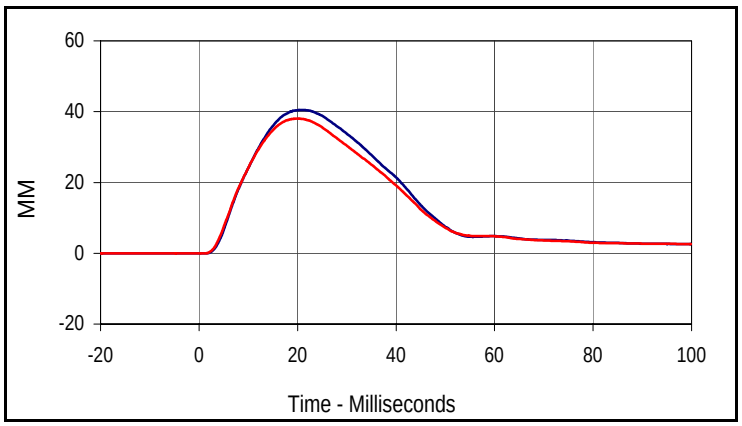
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.9	16.2	-6.5	46.9
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
10.0	15.3	-4.5	45.5



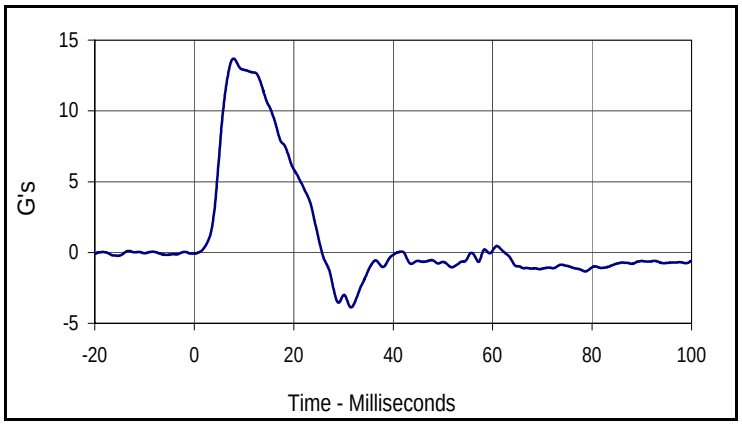
Curve Description			
Impactor Accleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.8	19.4	-0.1	83.2

Test Program:	SID IIs Abdomen Calibration	Test Date:	2/12/11
ATD Serial No.:	307	Test I.D.:	ABDF02C

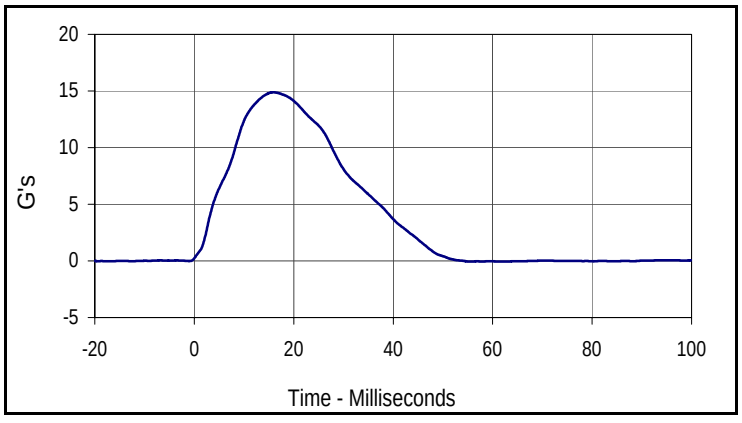
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.30	Pass
Laboratory Relative Humidity	%	10 to 70	21.82	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.33	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	40.5	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	38.1	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	13.7	Pass
Peak Impactor Acceleration	G's	12 to 16	14.9	Pass
		Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
40.5	20.9	0.0	-16.3
Curve Description			
Lower Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
38.1	20.0	0.0	-2.5



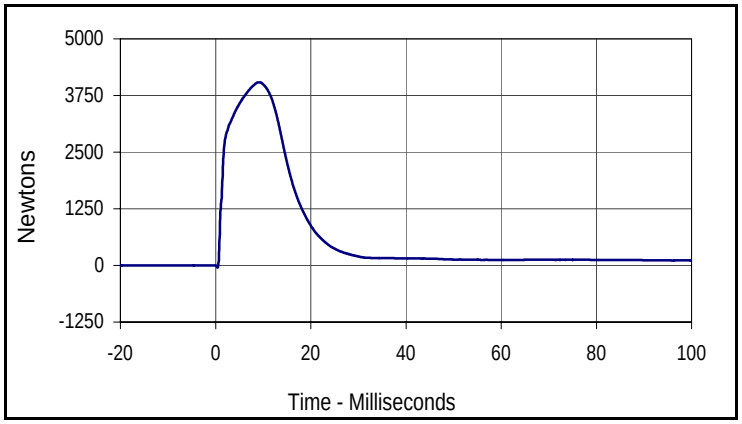
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
13.7	7.9	-3.9	31.5



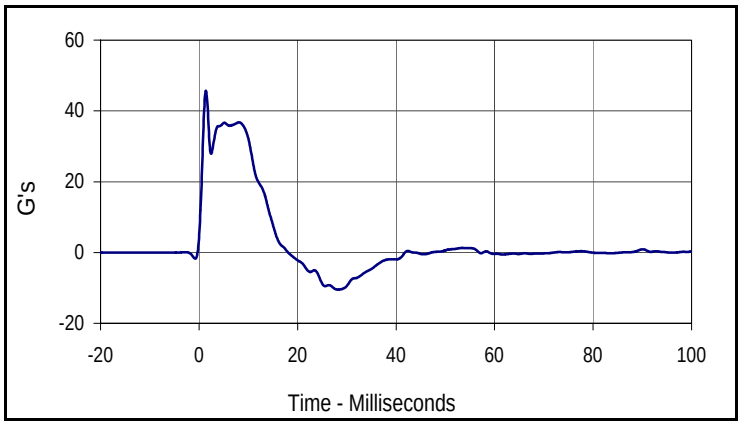
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.9	15.8	-0.1	55.4

Test Program:	SID IIs Pelvis Acetabulum Calibration	Test Date:	2/12/11
ATD Serial No.:	307	Test I.D.:	ACET02C

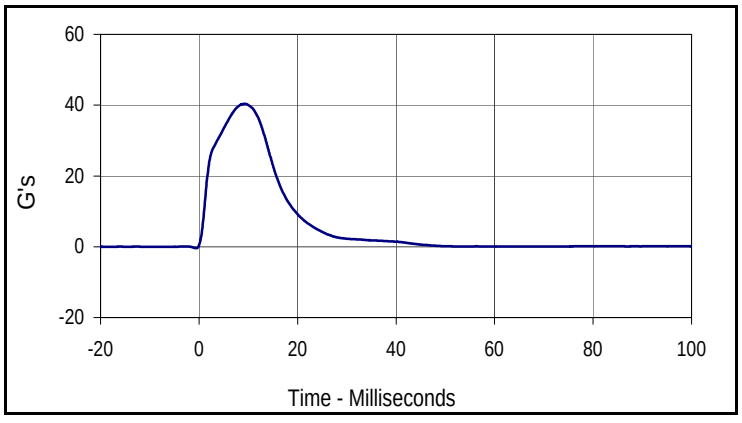
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.31	Pass
Laboratory Relative Humidity	%	10 to 70	21.92	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.61	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	4042.8	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	36.8	Pass
Peak Impactor Acceleration	G's	38 to 47	40.3	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4042.8	9.0	-43.5	0.4



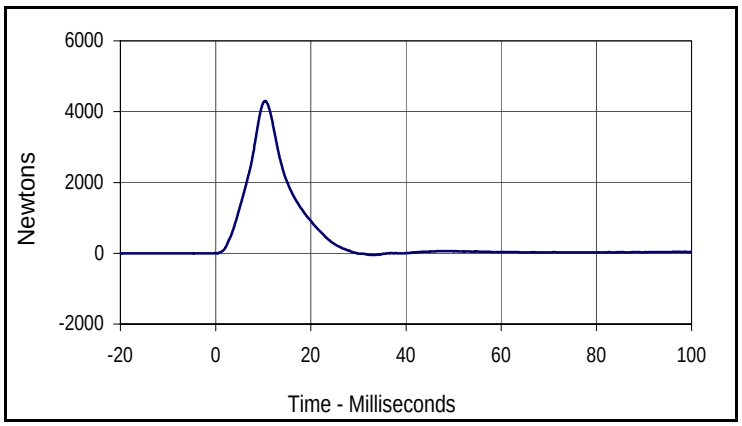
Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
45.7	1.4	-10.5	28.2



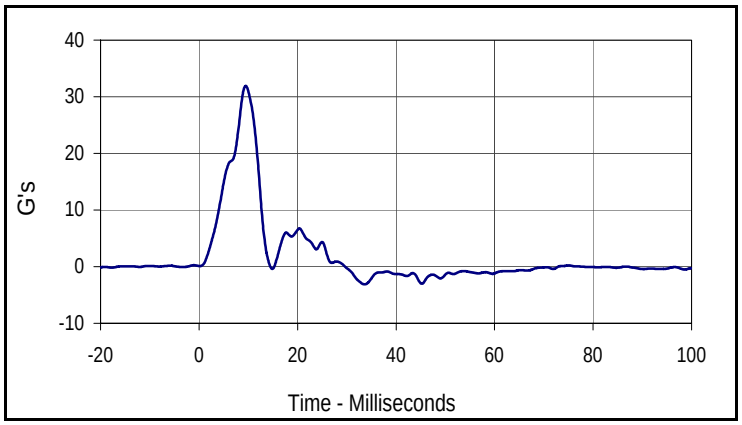
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.3	9.3	-0.4	-0.6

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	2/12/11
ATD Serial No.:	307	Test I.D.:	PLF02C

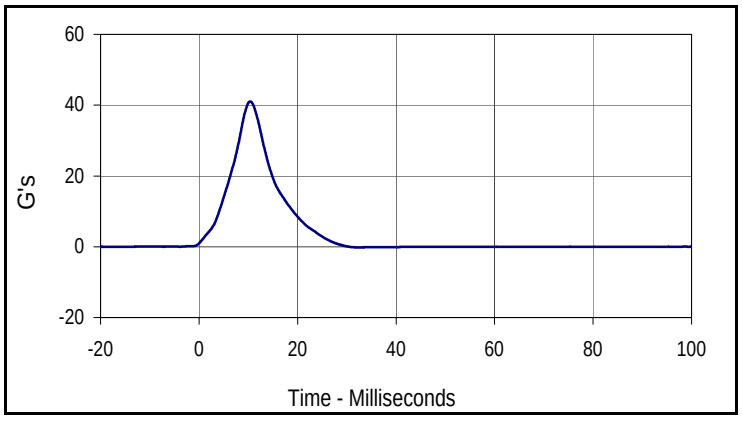
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.24	Pass
Laboratory Relative Humidity	%	10 to 70	21.89	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.29	Pass
Peak Iliac Force	Newtons	4100 to 5100	4301.8	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	31.9	Pass
Peak Impactor Acceleration	G's	36 to 45	41.0	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4301.8	10.4	-47.3	33.0



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
31.9	9.5	-3.1	33.6

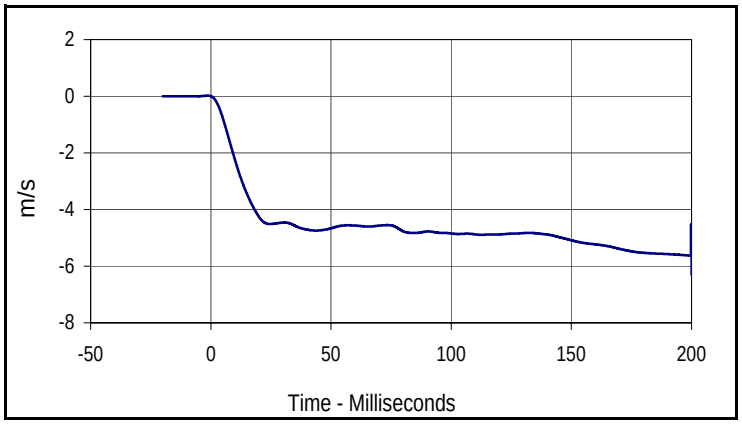


Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
41.0	10.4	-0.2	32.3

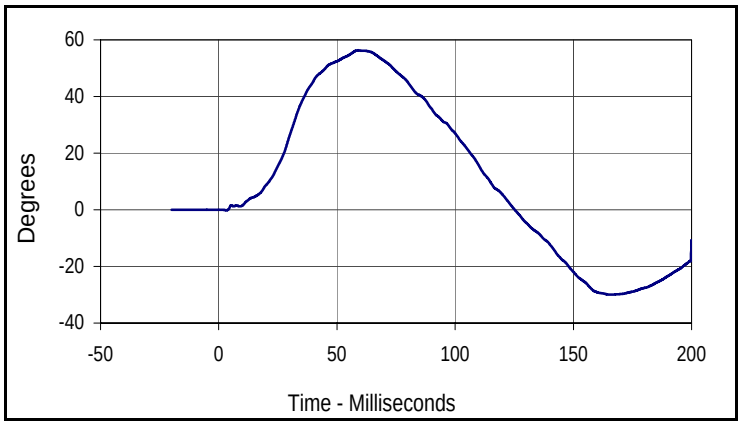
APPENDIX C
POST-TEST / ATD CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	ES2re Neck Calibration	Test Date:	2/17/11
ATD Serial No.:	F035	Test I.D.:	NBM02D

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.65	Pass
Laboratory Relative Humidity		%	10 to 70	23.23	Pass
Pendulum Velocity		m/s	3.30 to 3.50	3.44	Pass
Pendulum Deceleration	1 msec	m/s	0.0 to -.050	-0.046	Pass
	3 msec	m/s	-.250 to -.375	-0.310	Pass
	14 msec	m/s	-3.20 to -3.70	-3.24	Pass
Headform Rotation	Max	Degrees	49.0 to 58.0	56.3	Pass
	Time	msec	54.0 to 66.0	58.9	Pass
Maximum Rotation To Time Zero Crossing		msec	53.0 to 88.0	66.4	Pass
			Overall Test Results		Pass



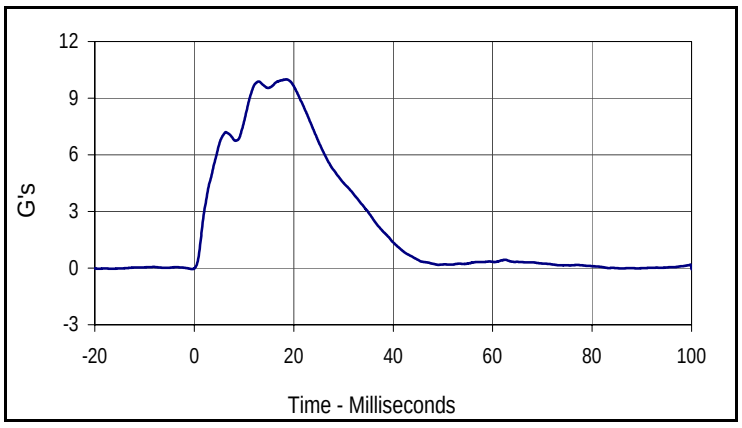
Curve Description			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.3	-6.3	200.0



Curve Description			
Headform Rotation			
CURNO	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
56.3	58.9	-29.9	164.9

Test Program:	ES2re Shoulder Calibration	Test Date:	2/17/11
ATD Serial No.:	F035	Test I.D.:	SHM02D

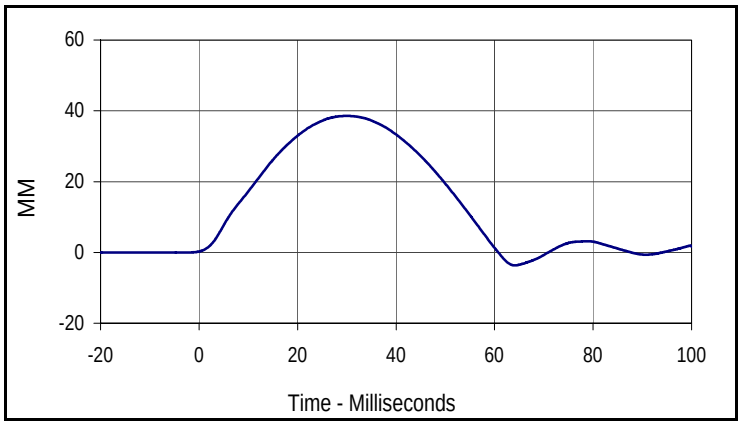
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.65	Pass
Laboratory Relative Humidity	%	10 to 70	23.23	Pass
Probe Velocity	m/s	4.20 to 4.40	4.27	Pass
Peak Impactor Acceleration	G's	7.5 to 10.5	10.00	Pass
		Overall Test Results		Pass



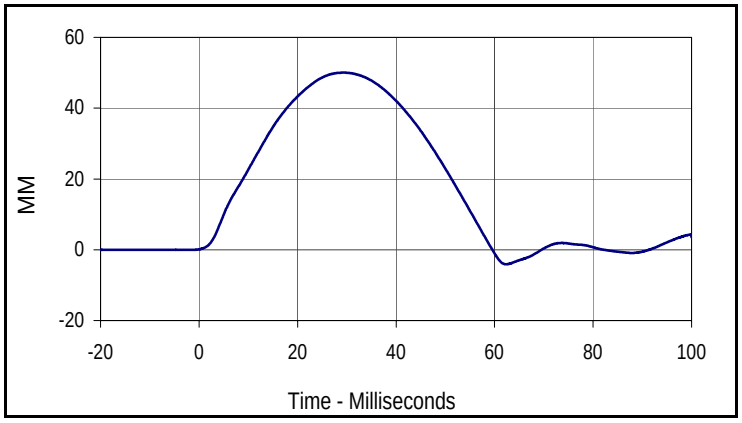
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	180	G's
Max	Time	Min	Time
10.0	18.5	-0.1	-0.4

Test Program:	ES2re Rib Module Calibration	Test Date:	2/17/11
ATD Serial No.:	F035 Rib #1	Test I.D.:	RIB102D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.65	Pass
Laboratory Relative Humidity	%	10 to 70	23.32	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	38.6	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	50.0	Pass
		Overall Test Results		Pass



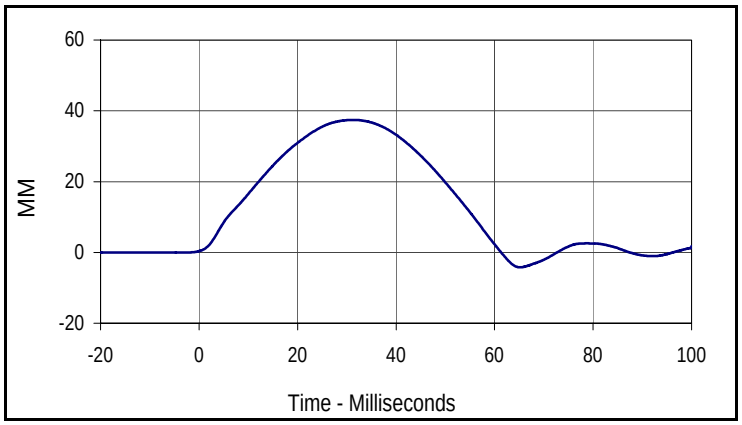
Curve Description			
Upper Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
38.6	30.0	-3.6	64.1



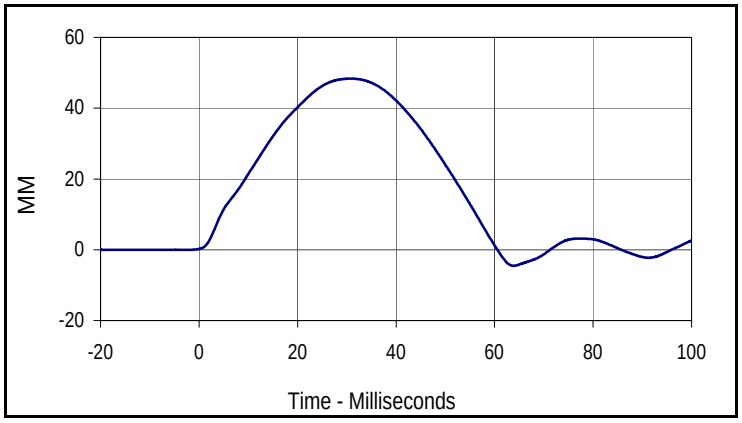
Curve Description			
Upper Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
50.0	29.3	-4.1	62.4

Test Program:	ES2re Rib Module Calibration	Test Date:	2/17/11
ATD Serial No.:	F035 Rib #2	Test I.D.:	RIB202D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.37	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	37.4	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	48.3	Pass
		Overall Test Results		Pass



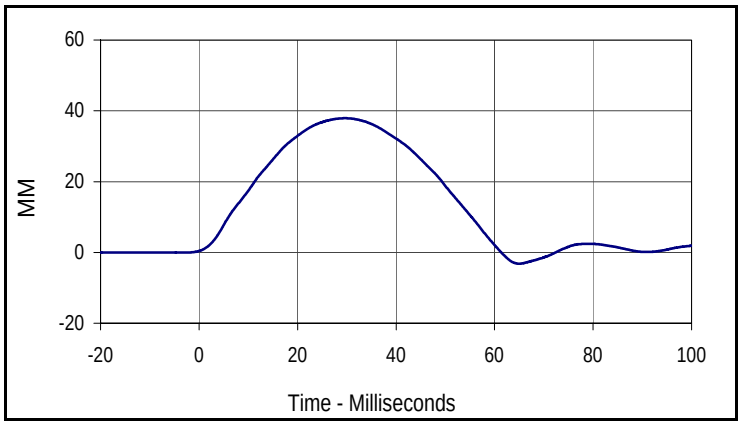
Curve Description			
Middle Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.4	31.3	-4.2	65.2



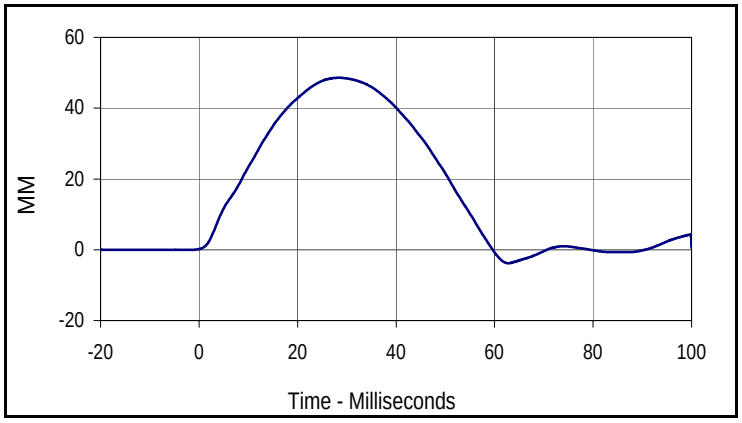
Curve Description			
Middle Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
48.3	30.8	-4.5	63.9

Test Program:	ES2re Rib Module Calibration	Test Date:	2/17/11
ATD Serial No.:	F035 Rib #3	Test I.D.:	RIB302D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.51	Pass
Peak Rib Deflection at 459 MM Drop Height	MM	36 to 40	37.9	Pass
Peak Rib Deflection at 815 MM Drop Height	MM	46 to 51	48.6	Pass
		Overall Test Results		Pass



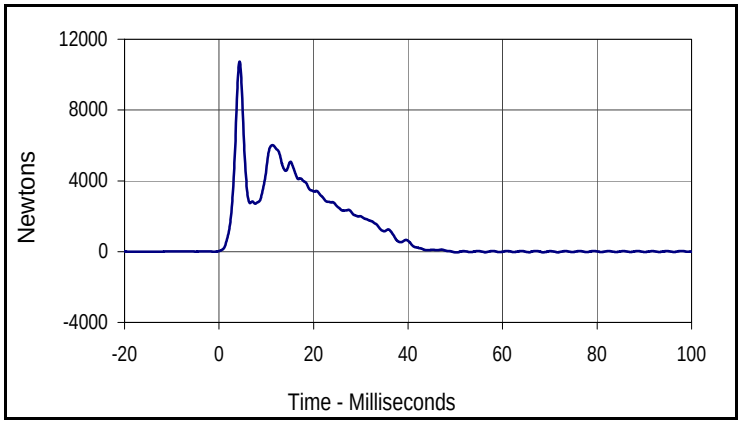
Curve Description			
Lower Rib Deflection (459 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
37.9	29.7	-3.2	65.0



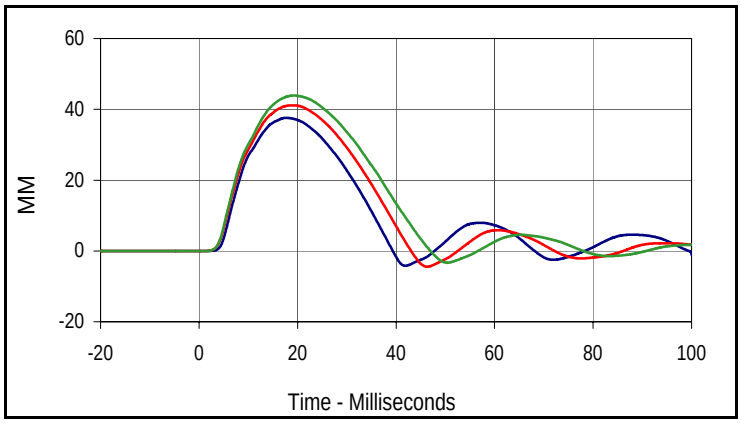
Curve Description			
Lower Rib Deflection (815 MM Drop Height)			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
48.6	28.4	-3.8	62.8

Test Program:	ES2re Thorax Calibration		Test Date:	2/17/11	
ATD Serial No.:	F035		Test I.D.:	THM02D	

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.37	Pass
Probe Velocity	m/s	5.40 to 5.60	5.48	Pass
Impactor Force	N	5100 to 6200	6017.9	Pass
	msec	> 6.0 msec	11.3	Pass
Upper Rib Deflection	MM	34 to 41	37.6	Pass
Middle Rib Deflection	MM	37 to 45	41.1	Pass
Lower Rib Deflection	MM	37 to 44	43.9	Pass
		Overall Test Results		Pass



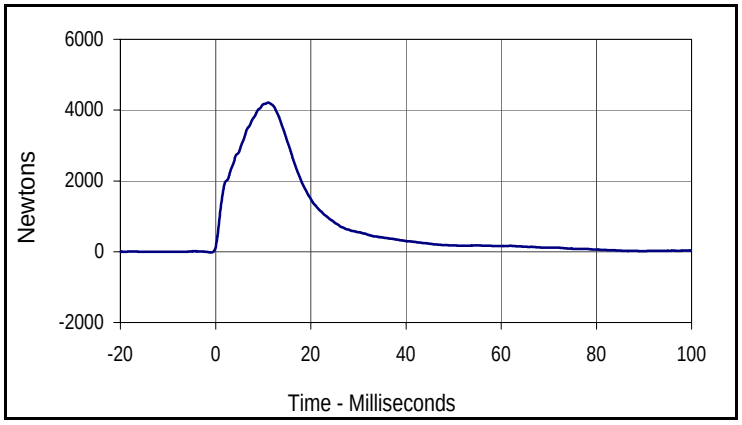
Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
10728.5	4.4	-44.7	50.3



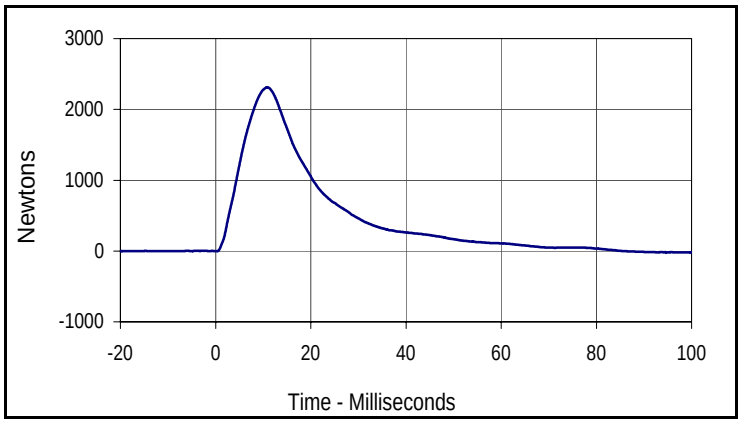
Curve Description			
Upper, Middle, Lower Rib Deflections			
CURNO(s)	Type	SAE Class	Units
002-003-004	FIL	180	MM
Max (Upper)	Time	Min (Upper)	Time
37.6	17.6	-4.2	41.9
Max (Middle)	Time	Min (Middle)	Time
41.1	19.1	-4.4	46.3
Max (Lower)	Time	Min (Lower)	Time
43.9	19.3	-3.3	50.4

Test Program:	ES2re Abdomen Calibration	Test Date:	2/17/11
ATD Serial No.:	F035	Test I.D.:	ABDM02D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.32	Pass
Probe Velocity	m/s	3.90 to 4.10	4.09	Pass
Impactor Force	N	4000 to 4800	4213.0	Pass
	msec	10.6 to 13.0	11.1	Pass
Abdominal Force	N	2200 to 2700	2312.3	Pass
	msec	10.0 to 12.3	10.9	Pass
		Overall Test Results		Pass



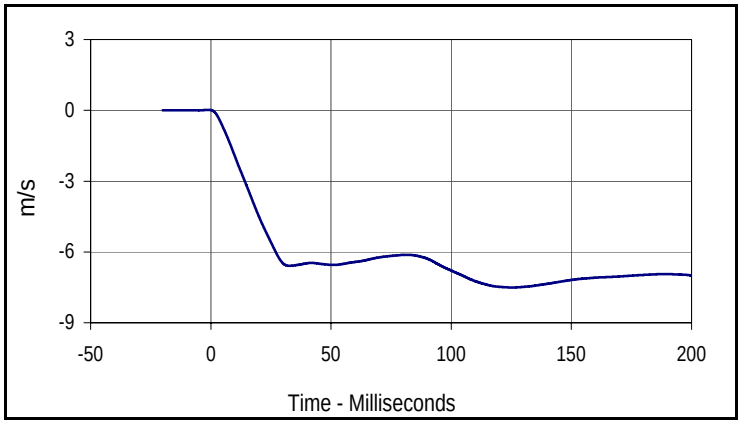
Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4213.0	11.1	-23.6	-0.9



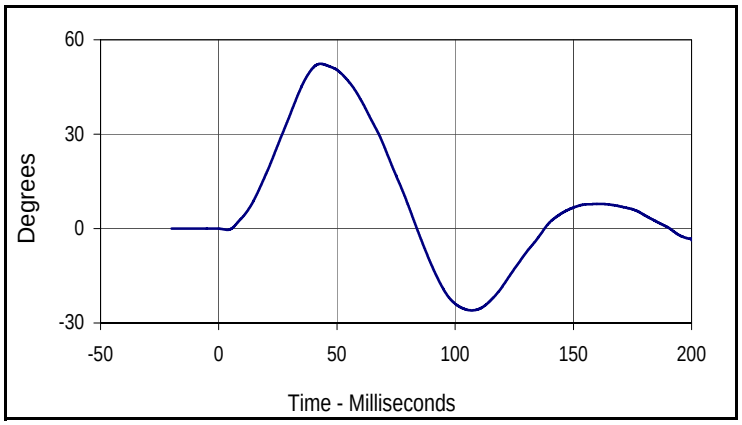
Curve Description			
Abdomen Sum Resultant			
CURNO	Type	SAE Class	Units
002	RES	600	Newtons
Max	Time	Min	Time
2312.3	10.9	-19.2	98.8

Test Program:	ES2re Lumbar Spine Calibration	Test Date:	2/17/11
ATD Serial No.:	F035	Test I.D.:	SPM02D

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.21	Pass
Laboratory Relative Humidity		%	10 to 70	23.36	Pass
Pendulum Velocity		m/s	5.95 to 6.15	5.98	Pass
Pendulum Deceleration	1 msec	m/s	0.0 to -.050	-0.029	Pass
	3.7 msec	m/s	-.240 to -.425	-0.418	Pass
	27 msec	m/s	-5.80 to -6.50	-6.00	Pass
	30 msec	m/s	< -6.50	-6.48	Pass
Headform Rotation	Max	Degrees	45.0 to 55.0	52.4	Pass
	Time	msec	39.0 to 53.0	43.0	Pass
Maximum Rotation To Time Zero Crossing		msec	37.0 to 57.0	40.9	Pass
			Overall Test Results		Pass



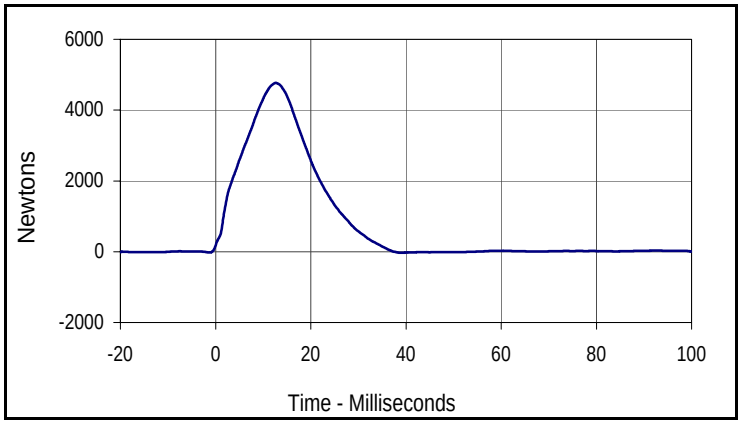
Curve Description			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
0.0	-1.0	-7.5	125.4



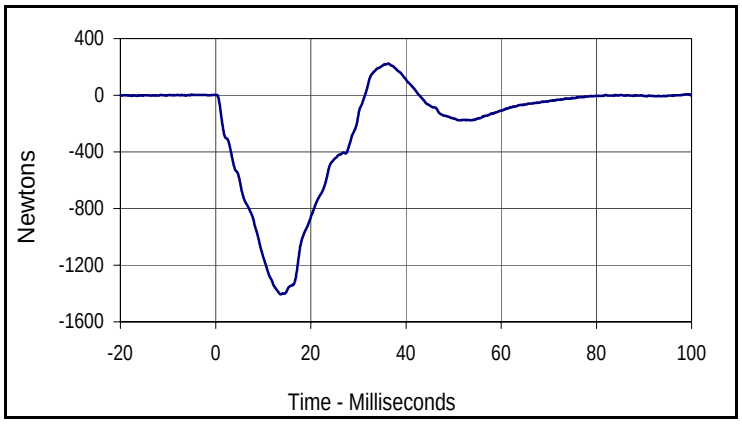
Curve Description			
Headform Rotation			
CURNO	Type	SAE Class	Units
002	FIL	180	Degrees
Max	Time	Min	Time
52.4	43.0	-26.0	107.0

Test Program:	ES2re Pelvis Calibration	Test Date:	2/17/11
ATD Serial No.:	F035	Test I.D.:	PLM02D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.21	Pass
Laboratory Relative Humidity	%	10 to 70	23.27	Pass
Probe Velocity	m/s	4.20 to 4.40	4.33	Pass
Impactor Force	N	4700 to 5400	4767.2	Pass
	msec	11.8 to 16.1	12.6	Pass
Pubic Symphysis Load	N	-1230 to -1590	-1406.2	Pass
	msec	12.2 to 17.0	13.7	Pass
		Overall Test Results		Pass



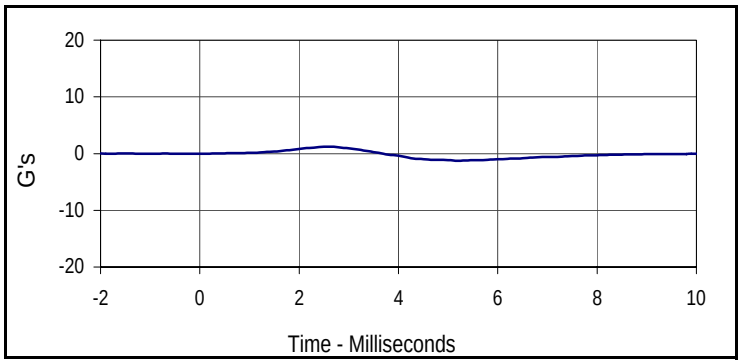
Curve Description			
Impactor Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
4767.2	12.6	-28.5	39.4



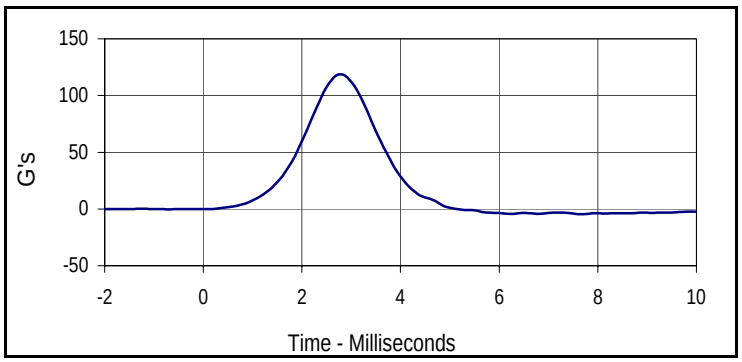
Curve Description			
Pubic Symphysis Load			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
224.2	36.3	-1406.2	13.7

Test Program:	ES2re Lateral Head Drop Calibration	Test Date:	2/17/11
ATD Serial No.:	F035	Test I.D.:	HDM02D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.21	Pass
Laboratory Relative Humidity	%	10 to 70	23.22	Pass
Peak Resultant Acceleration	G's	125 to 155	144.9	Pass
Peak Longitudinal Acceleration	G's	≤15	1.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	8.1	Pass
		Overall Test Results		Pass



Curve Description			
Head X			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
1.2	2.6	-1.2	5.2



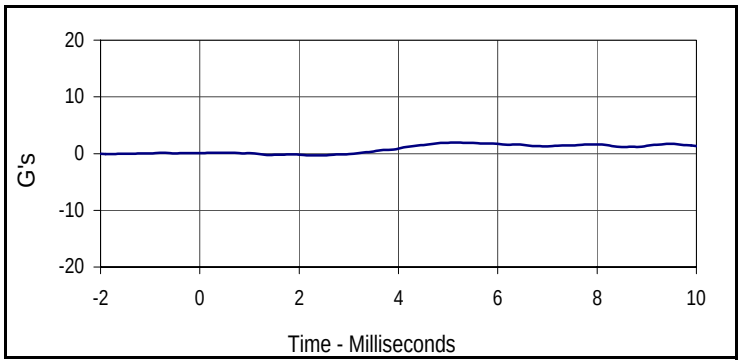
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
118.8	2.8	-4.6	7.7

Curve Description			
Head Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
83.0	2.8	-1.0	10.0

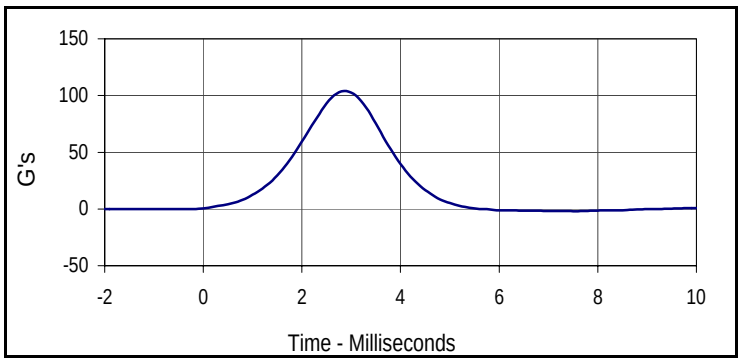
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
144.9	2.8	0.0	-2.0

Test Program:	SID IIs Lateral Head Drop Calibration	Test Date:	2/17/11
ATD Serial No.:	307	Test I.D.:	HDF02D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.18	Pass
Peak Resultant Acceleration	G's	115 to 137	127.9	Pass
Peak Longitudinal Acceleration	G's	≤15	1.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	8.2	Pass
		Overall Test Results		Pass



Curve Description			
Head X			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
1.9	5.1	-0.3	2.2



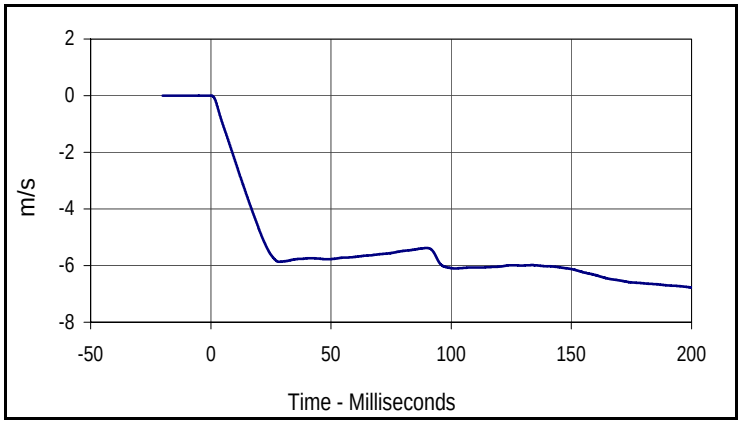
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
104.1	2.9	-2.0	7.6

Curve Description			
Head Z			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
74.4	2.9	-0.3	9.3

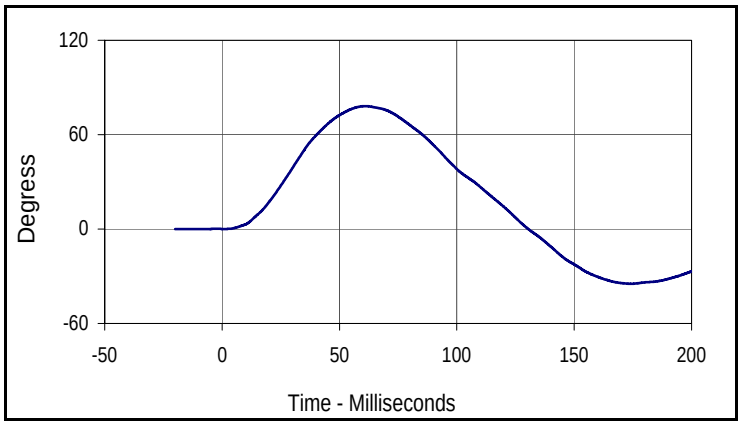
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
127.9	2.9	0.0	-1.4

Test Program:	SID IIs Neck Calibration	Test Date:	2/17/11
ATD Serial No.:	307	Test I.D.:	NBF02D

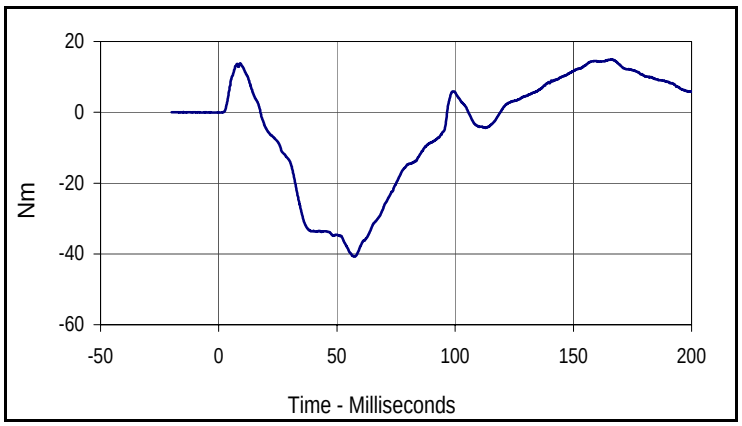
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity		%	10 to 70	23.32	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.54	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.27	Pass
	15 msec	m/s	-3.30 to -4.10	-3.54	Pass
	20 msec	m/s	-4.40 to -5.40	-4.71	Pass
	25 msec	m/s	-5.40 to -6.10	-5.62	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.09	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	78.1	Pass
	Time	msec	50.0 to 70.0	61.0	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-40.7	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	119.1	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	-13.2	-6.8	200.0



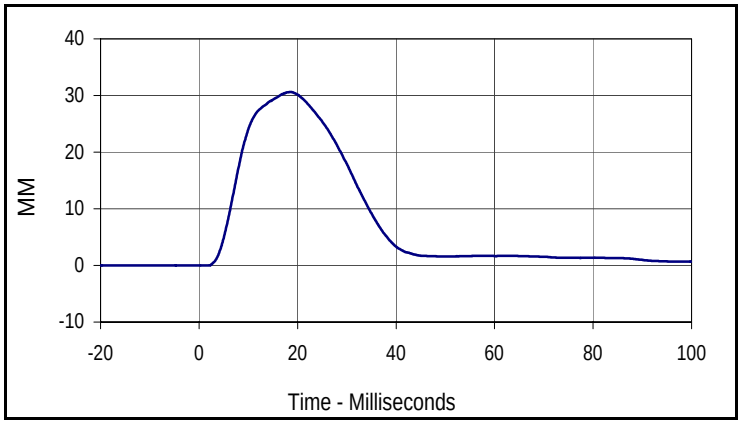
Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
78.1	61.0	-34.7	174.1



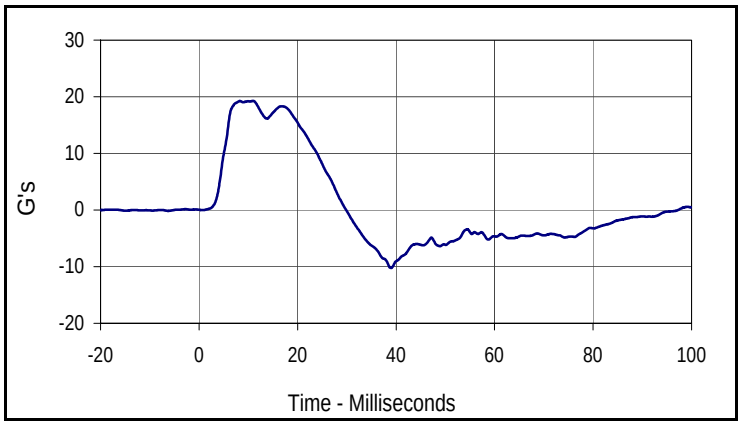
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
14.9	166.3	-40.7	57.4

Test Program:	SID IIs Shoulder Calibration	Test Date:	2/17/11
ATD Serial No.:	307	Test I.D.:	SHF02D

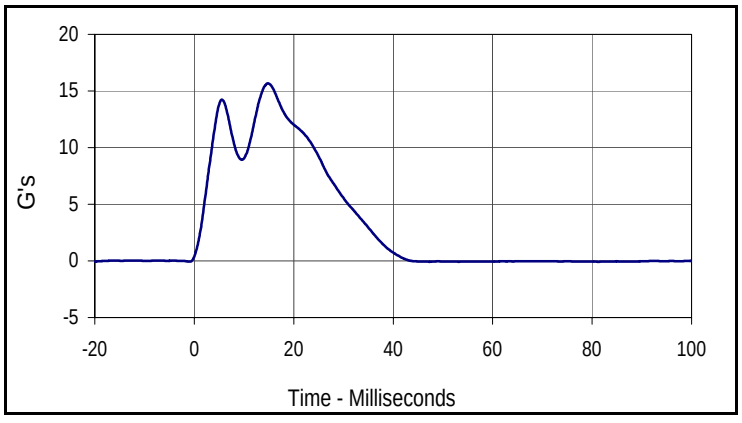
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.37	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.30	Pass
Shoulder Deflection	MM	28 to 37	30.6	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	19.3	Pass
Peak Impactor Acceleration	G's	13 to 18	15.7	Pass
		Overall Test Results		Pass



Curve Description			
Shoulder Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
30.6	18.6	0.0	1.0



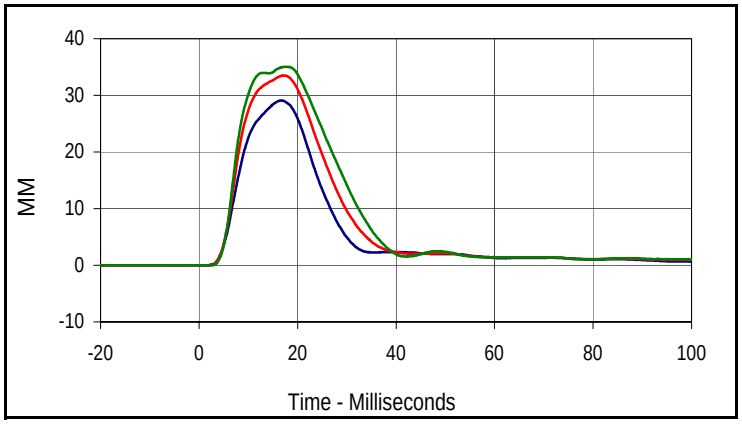
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
19.3	11.0	-10.2	39.0



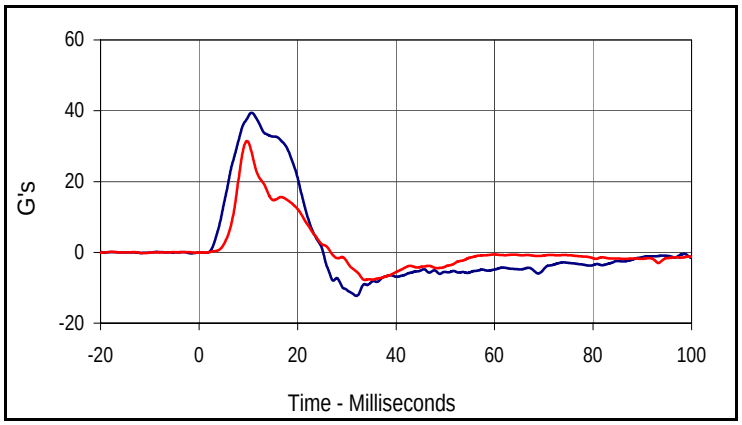
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.7	14.8	-0.1	81.3

Test Program:	SID IIs Thorax with Arm Calibration	Test Date:	2/17/11
ATD Serial No.:	307	Test I.D.:	THF02D

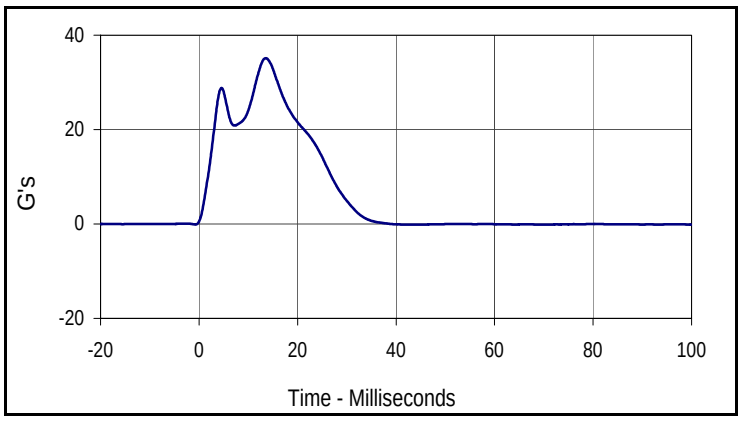
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.27	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.73	Pass
Shoulder Deflection	MM	31 to 40	37.5	Pass
Upper Thorax Rib Deflection	MM	25 to 32	29.1	Pass
Middle Thorax Rib Deflection	MM	30 to 36	33.5	Pass
Lower Thorax Rib Deflection	MM	32 to 38	35.0	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	39.4	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	31.5	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	35.1	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.1	16.7	0.0	-8.9
Middle Thorax Deflection			
Max	Time	Min	Time
33.5	17.3	0.0	-10.9
Lower Thorax Deflection			
Max	Time	Min	Time
35.0	17.5	0.0	-5.1



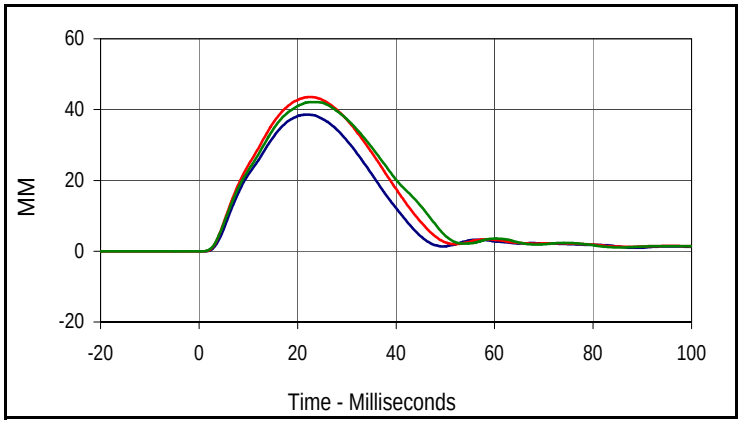
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
39.4	10.6	-12.3	32.0
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
31.5	9.7	-7.8	33.7



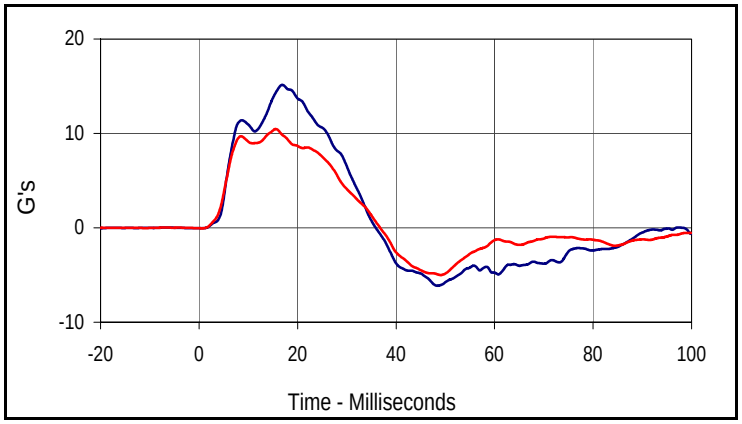
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
35.1	13.5	-0.1	44.6

Test Program:	SID IIs Thorax w/o Arm Calibration	Test Date:	2/17/11
ATD Serial No.:	307	Test I.D.:	TOA02D

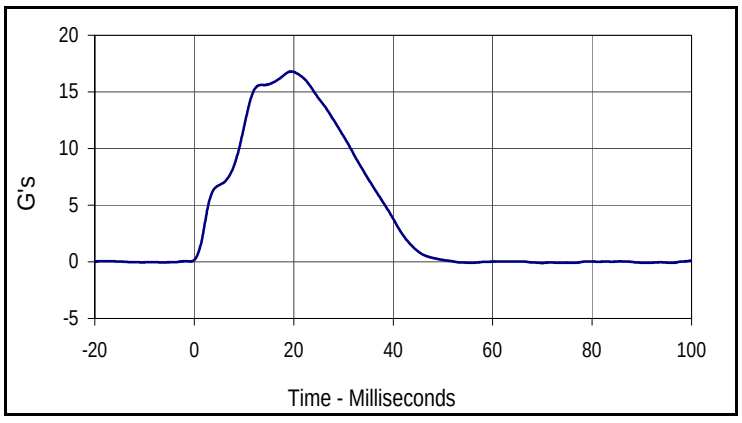
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.41	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.30	Pass
Upper Thorax Rib Deflection	MM	32 to 40	38.6	Pass
Middle Thorax Rib Deflection	MM	39 to 45	43.5	Pass
Lower Thorax Rib Deflection	MM	35 to 43	42.1	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	15.1	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	10.5	Pass
Peak Impactor Acceleration	G's	14 to 18	16.8	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
38.6	21.9	0.0	-4.7
Middle Thorax Deflection			
Max	Time	Min	Time
43.5	22.5	0.0	-4.4
Lower Thorax Deflection			
Max	Time	Min	Time
42.1	23.4	0.0	-7.9



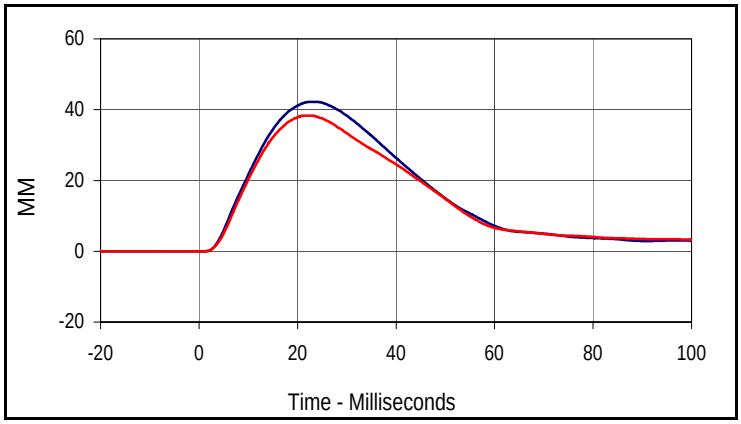
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.1	16.9	-6.1	48.4
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
10.5	15.6	-5.0	49.1



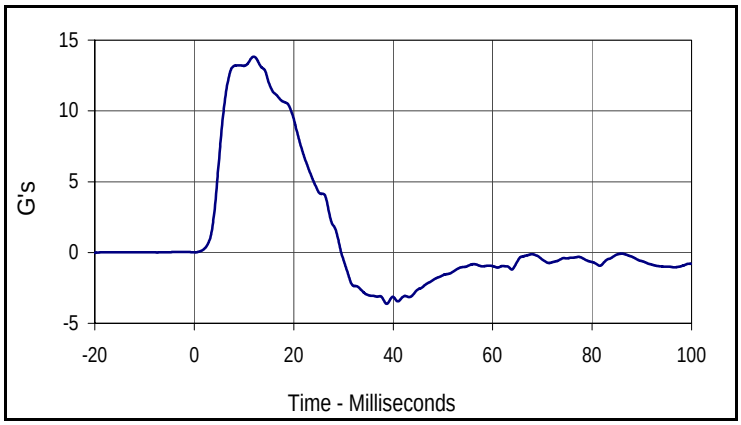
Curve Description			
Impactor Accleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.8	19.5	-0.1	69.9

Test Program:	SID IIs Abdomen Calibration	Test Date:	2/17/11
ATD Serial No.:	307	Test I.D.:	ABDF02D

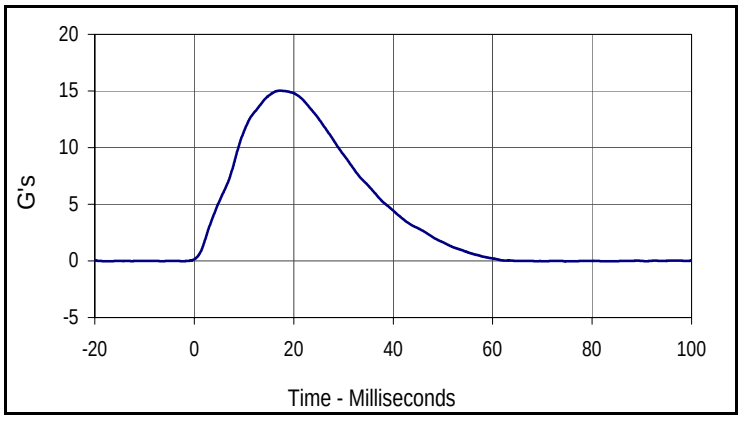
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.15	Pass
Laboratory Relative Humidity	%	10 to 70	23.37	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.35	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	42.2	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	38.3	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	13.8	Pass
Peak Impactor Acceleration	G's	12 to 16	15.0	Pass
		Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
42.2	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
38.3	22.2	0.0	-6.3



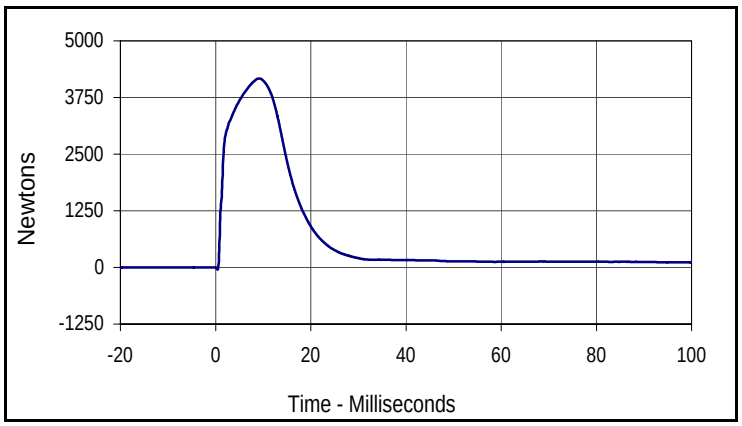
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
13.8	12.0	-3.6	38.7



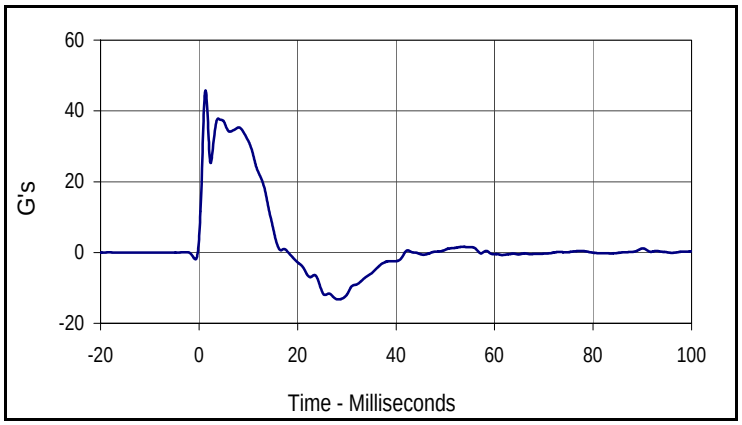
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.0	17.2	0.0	76.2

Test Program:	SID IIs Pelvis Acetabulum Calibration	Test Date:	2/17/11
ATD Serial No.:	307	Test I.D.:	ACET02D

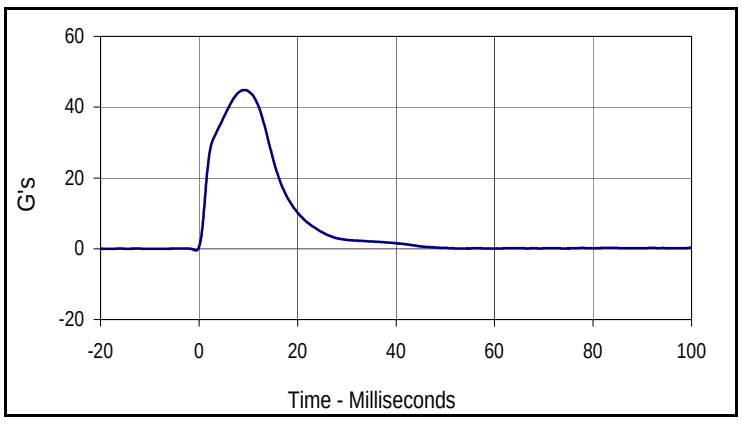
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.65	Pass
Laboratory Relative Humidity	%	10 to 70	23.37	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.63	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	4169.7	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	35.3	Pass
Peak Impactor Acceleration	G's	38 to 47	44.8	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4169.7	9.0	-45.0	0.4



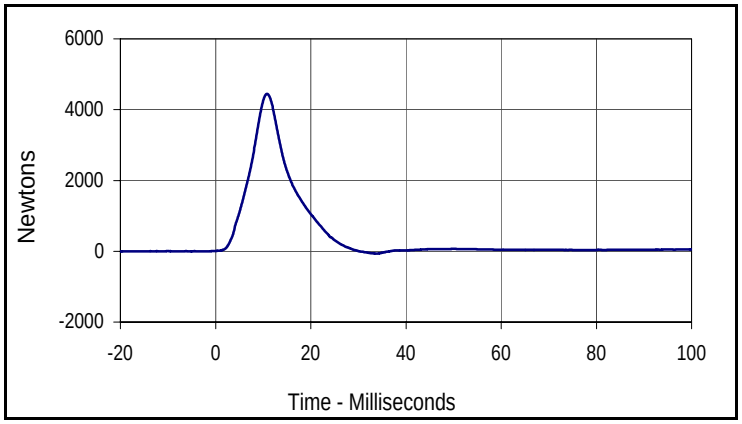
Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
45.8	1.3	-13.2	28.2



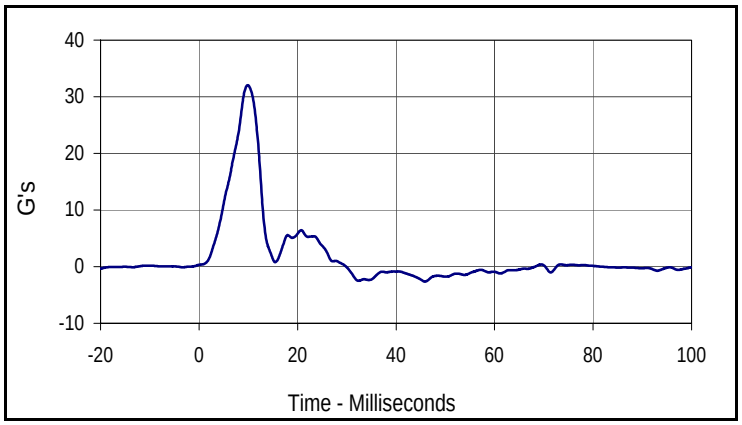
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
44.8	9.3	-0.5	-0.6

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	2/17/11
ATD Serial No.:	307	Test I.D.:	PLF02D

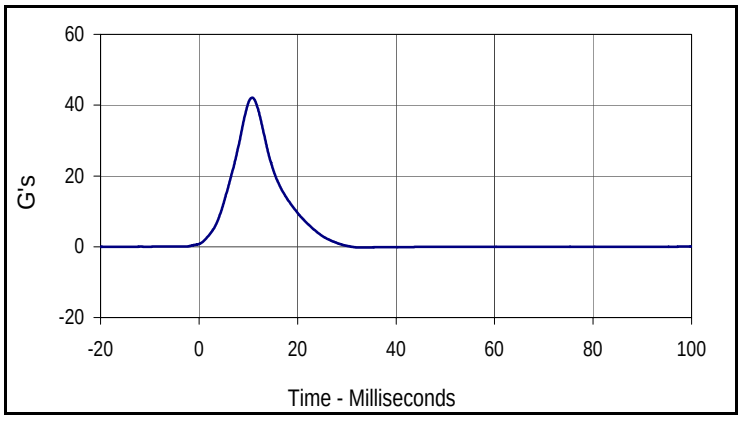
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.65	Pass
Laboratory Relative Humidity	%	10 to 70	23.37	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.31	Pass
Peak Iliac Force	Newtons	4100 to 5100	4449.3	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	32.0	Pass
Peak Impactor Acceleration	G's	36 to 45	42.1	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4449.3	10.8	-63.6	34.1



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
32.0	9.9	-2.6	45.9



Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
42.1	10.8	-0.2	32.6