REPORT NUMBER: SPNCAP-KAR-11-037

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

TOYOTA MOTOR MANUFACTURING
2011 LEXUS RX350 5-DOOR MPV

NHTSA No: MB5118

PREPARED BY:
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NOVEMBER 8, 2010

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
1200 NEW JERSEY AVE, SE, ROOM W43-410
WASHINGTON, D.C. 20590

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Approval Date: November 15, 2010

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: _____

TECHNICAL REPORT DOCUMENTATON PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
SPNCAP-KAR-11-037		

4. Title and Subtitle	5. Report Date
Final Report of New Car Assessment Program Side Impact Pole Testing of a 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118	November 15, 2010
	6. Performing Organization Code KAR
7. Authors Mr. Denver J. Schaffarzick, Project Engineer, KARCO Mr. Frank D. Richardson, Program Manager, KARCO	**8. Performing Organization Report No** TR-P30032-13-NC
9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA, 92301	**10. Work Unit No.**
	11. Contract or Grant No. DTNH22-09-D-00122
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NVS-111) 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C 20590	**13. Type of Report and Period Covered** Final Test Report, November 2010
	14. Sponsoring Agency Code NVS-111

15. Supplementary Notes

16. Abstract

A 32.2 km/h (20 mph) 75° oblique impact Side NCAP test was conducted on the subject 2011 Lexus RX350 5-Door MPV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on November 8, 2010.

The impact velocity was 31.91 km/h and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 15.4° C. The test vehicle's post-test maximum crush was 483 mm at level 2 and level 3. The test vehicle's performance was as follows:

Measurement Description	Passenger ATD		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})		1000	629.8
Resultant Lower Spine Acceleration	G	82	42
Combined Acetabulur and Iliac Pelvic Force	N	5525	2162

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

17. Key Words	18. Distribution Statement
New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs	Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division 1200 New Jersey Ave., SE Washington, DC 20590

19. Security Classification of this report	20. Security Classification of this page	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	87	

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SECTION 1
TEST PURPOSE AND PROCEDURE

This 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 No. DTNH22-09-D-00122. The purpose of this test is to generate comparative side impact performance in a 2011 Lexus RX350 5-Door MPV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated January 25, 2010.

SECTION 2
SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2011 Lexus RX350 5-Door MPV. The subject vehicle was towed into the rigid pole at an angle of 72.7° and a velocity of 31.91 km/h. The test was conducted by KARCO Engineering, LLC. in Adelanto, California, on November 8, 2010. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated January 25, 2010. Camera location and other pertinent camera information are included in this report.

The Part 572V (SID-IIs) dummy was instrumented as follows:

Head CG Triaxial Accelerometers
Thorax Upper, Middle, and Lower Rib Displacement Potentiometers
Abdomen Upper and Lower Rib Displacement Potentiometers
Lower Spine Triaxial Accelerometers
Illiac Load Cell
Acetabulum Load Cell

Appendix B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report.

The following table summarizes the results of the test:

Dummy	HIC (36ms)	Resultant Lower Spine Acceleration	Pelvic Force (N)	
SID-IIs 5th Percentile Adult Female	630	42	Iliac Wing	1029
			Acetabulur	1140
			Sum	2162

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No	No	
Knee Airbag	Yes	No	No	
Side Airbag 1 (Torso/Pelvis)	Yes	Yes	No	
Side Airbag 2 (Curtain)	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	No	Yes	No
Seat Belt Load Limiter	Yes	No	Yes	No
Side Airbag 3 (Torso)	No		Yes	Yes

GENERAL COMMENTS

Both of the struck side doors of the test vehicle remained closed and latched and were jammed shut after the impact. There was no separation at the hinges or the latches. The non-struck side doors remained closed and latched. There were no driver injury values that exceeded their limits. There was no FMVSS 301 Stoddard solvent spillage as a result of the impact.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in^2	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	^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 PARAMATER DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MB5118	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	No
Make	Lexus	Power Steering	Yes
Model	RX350	Driver Front Airbag	Yes
Body Style	5-Door MPV	Driver Curtain Airbag	Yes
VIN	2T2ZK1BA5BC042925	Driver Head/Torso Airbag	No
Body Color	Tungsten Pearl	Driver Torso Airbag	No
Delivery Date	10/28/2010	Driver Torso/Pelvis Airbag	Yes
Odometer Reading (km / mi)	232/144	Driver Pelvis Airbag	No
Dealer	Motor City Lexus of Bakersfield	Driver Knee Airbag	Yes
Transmission	6-Speed Automatic	Rear Pass. Curtain Airbag	Yes
Final Drive	Front	Rear Pass. Head/Torso Airbag	No
Type / No. of Cylinders	V6	Rear Pass. Torso Airbag	Yes
Engine Displacement (L)	3.5	Rear Pass. Toso/Pelvis Airbag	No
Engine Placement	Transverse	Rear Pass. Pelvis Airbag	No
Roof Rack	No	Pretensioners	Yes
Sunroof / T-Top	Yes	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? No

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Manufacturing	GVWR (kg)	2520
Date of Manufacture	Sep-10	GAWR Front (kg)	1360
		GAWR Rear (kg)	1385

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				395.0	*A*
DSC x 68.04 (kg)				340.2	*B*
Cargo Weight (RCLW) (kg)				54.8	*A-B*

VEHICLE SEAT TYPE

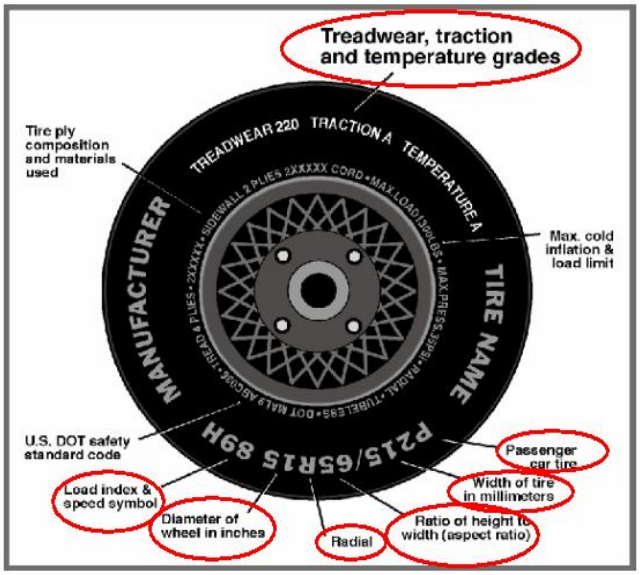
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes						Yes
Rear or Second Row Seat			Yes			Yes	
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMATER DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kpa)	220	220
Recommended Tire Size	P235/60R18	P235/60R18
Tire Size on Vehicle	P235/60R18	P235/60R18
Tire Model	Dueler H/L	Dueler H/L
Tire Manufacturer	Bridgestone	Bridgestone
Treadwear	260	260
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	102V	102V
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Right	0B7A 702 3310	0B7A 702 3310
DOT Safety Code Left	0B7A 702 3310	0B7A 702 3310

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMATER DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	560.0	411.0		578.0	449.5		574.0	462.0	
Right	kg	528.5	398.5		536.5	431.5		528.0	438.5	
Ratio	%	57.3%	42.7%	100.0%	55.9%	44.1%	100.0%	55.0%	45.0%	100.0%
Total	kg	1088.5	809.5	1898.0	1114.5	881.0	1995.5	1102.0	900.5	2002.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1898.0	A
Actual Weight of 1 P572V ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	54.8	C
Calculated Vehicle Target Wt (TVTW)	kg	2001.8	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)	Deg	0.0	-0.1	-0.2
Front Passenger Sill Angle (front-to-rear)	Deg	-0.4	-0.2	-0.1
Front Bumper Angle (left-to-right)	Deg	-0.4	-0.4	-0.5
Rear Bumper Angle (left-to-right)	Deg	-0.3	-0.3	-0.3
Vehicle CG (Aft of Front Axle)	mm	1169	1210	1233
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	19	24	28

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	72.0
Weight of Vehicle Components Removed	kg	52.5

Vehicle components removed to make Target Vehicle Test Weight:

Non-struck side door panels and windows (13.0 kg), Spare tire and tools (25.0 kg), Trunk liner and mat (14.5 kg)

TEST VEHICLE IMPACT POINT DATA

Measurement Description	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1089
Actual Impact Point (Aft of Front Axle)	mm	1090
Impact Point Difference (- forward/+ rearward)	mm	1

DATA SHEET NO. 2

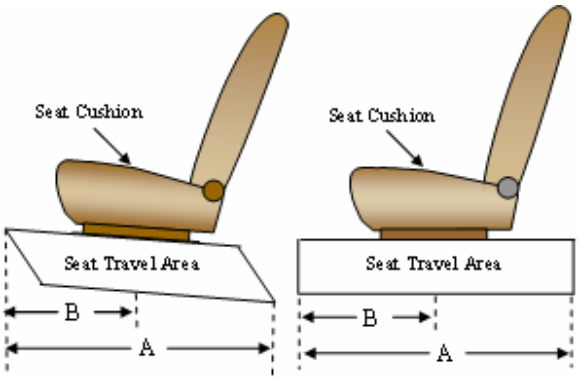
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10

SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rearmost possible position with the seat set at mid angle and lowest height. The driver's seat is set to the forward most position where the ATD will not contact any interior panels at the mid angle and mid height positions.

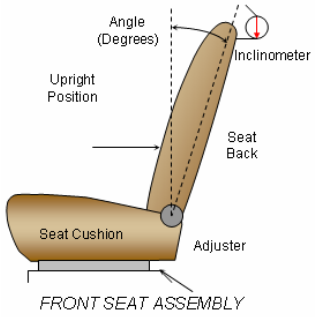


SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position	Cushion Range	Placed in Position
Driver Seat	260 mm	0 mm	15.8 - 18.6	17.2
Front Passenger Seat	260 mm	0 mm	13.8 - 16.8	15.3
Rear Seat - Struck Side	118 mm	118 mm	Fixed	Fixed
Rear Seat - Non-Struck Side	118 mm	118 mm	Fixed	Fixed

SEAT BACK ANGLE POSITIONING

The procedure for the driver is as follows: the seat back is set to level the driver ATD's (SID-IIs) head transverse instrumentation platform; seat back angle is measured at the headrest post using a digital inclinometer. Detent zero (0) is the full forward position.



SEAT BACK ANGLE POSITIONS

Seating Position	Degrees	Detent
Driver Seat Back Angle w/Seated Dummy	9.2	
Front Passenger Seat Back Angle	9.2	
Struck Side Rear Seat Back Angle	2.9	0
Non-Struck Side Rear Seat Back Angle	2.9	0

SEAT BELT UPPER ANCHORAGE POSITIONING

The seat belt upper anchorage is positioned to the manufacturer's design position for a 5th percentile adult female ATD. Position zero (0) is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	0

DATA SHEET NO. 2 … (CONTINUED)

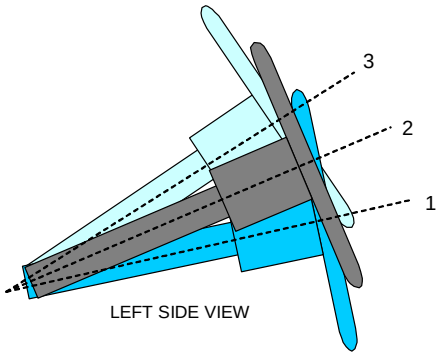
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10

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 placed across the rim of the steering wheel for angle. A tape measure is used with a reference mark on the steering column to measure telescoping travel.



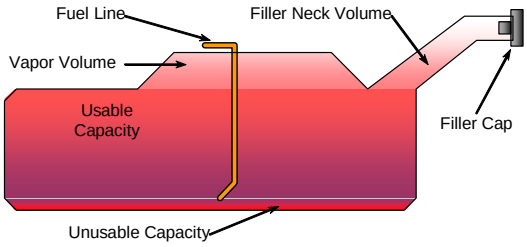
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Angle (°)	Fore-Aft Position (mm)
Lowermost Position, No. 1	25.0	0
Geometric Center Position, No. 2	27.0	21.5
Uppermost Position, No. 3	29.0	43
Steering Wheel Travel	4.0	43
Test Position	27.0	21

FUEL PUMP

The test vehicle is equipped with an electric fuel pump. The fuel pump is activated when the ignition is turned on. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat on the left side of the vehicle.



VEHICLE FUEL TANK ASSEMBLY

FUEL CAPACITY DATA

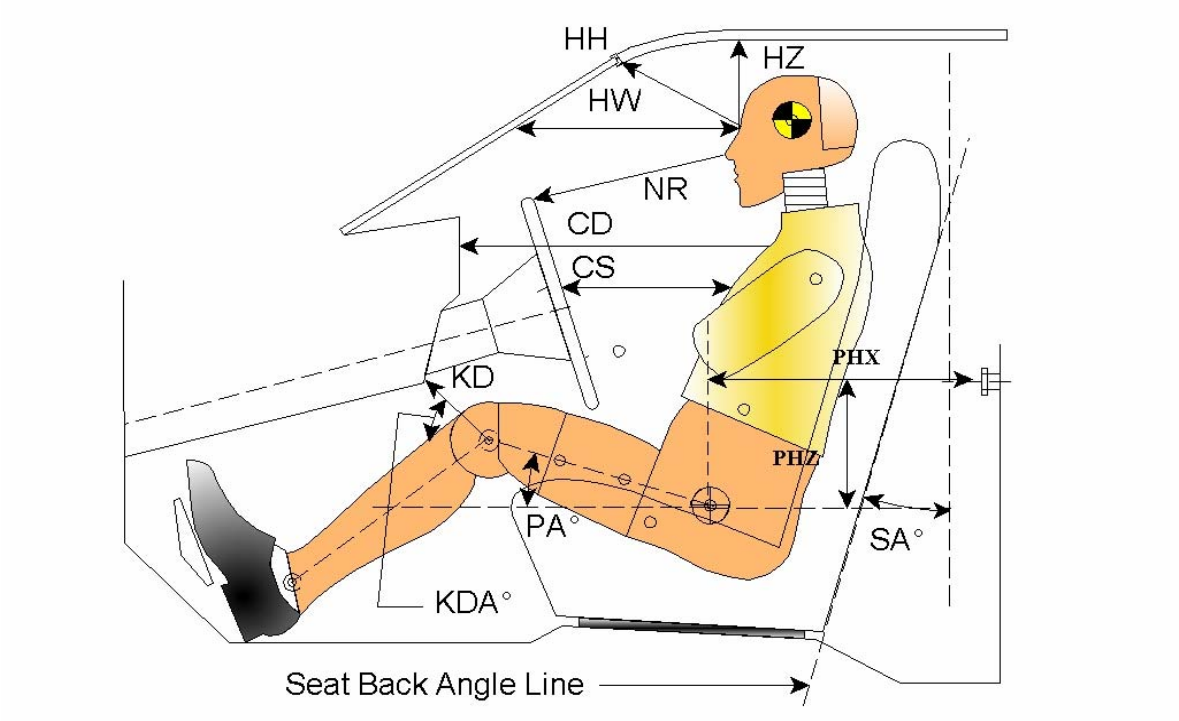
Description	Liters
Usable Capacity of "Standard Tank"	72.67
Usable Capacity of "Optional Tank"	
Usable Capacity of Standard Tank as Specified In Owner's Manual	
Usable Capacity of Optional Tank as Specified in Owner's Manual	
92 - 94% of Usable Capacity	66.86 to 68.31
Actual Amount of Stoddard Solvent Used	67.60
1/3 of Usable Capacity	24.22

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10



DUMMY LONGITUDINAL CLEARANCE DIMENSIONS (S/N: 299)

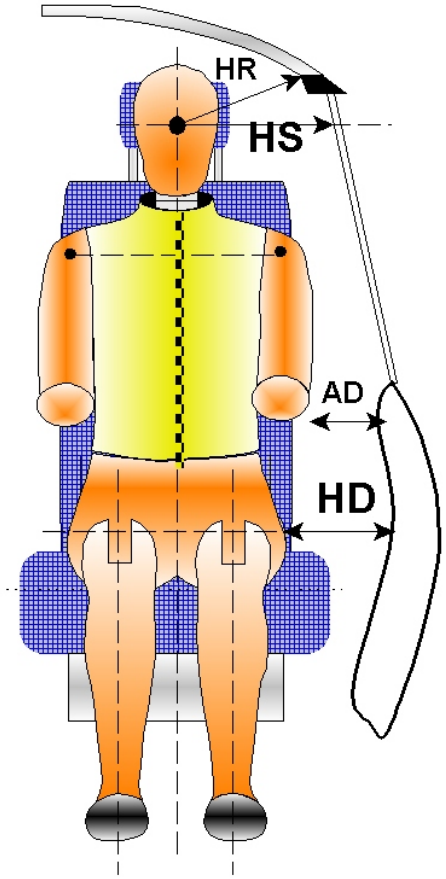
Driver Code	Description	Driver	
		Length (mm)	Angle (º)
HH	Head to Header	275	48.6
HW	Head to Windshield	698	0.0
HZ	Head to Roof	214	90.0
NR	Nose to Rim	228	12.1
CD	Chest to Dash	383	12.7
CS	Chest to Steering Wheel	166	13.8
KDL / KDAL°	Left Knee to Dash	121	32.0
KDR / KDAR°	Right Knee to Dash	104	46.8
PA°	Pelvic Angle		18.6
PHX	H-Point to Striker (x-direction)	388	
PHZ	H-Point to Striker (z-direction)	164	
SA°	Seat Back Angle		9.2

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10



DUMMY LATERAL CLEARANCE DIMENSIONS (S/N: 299)

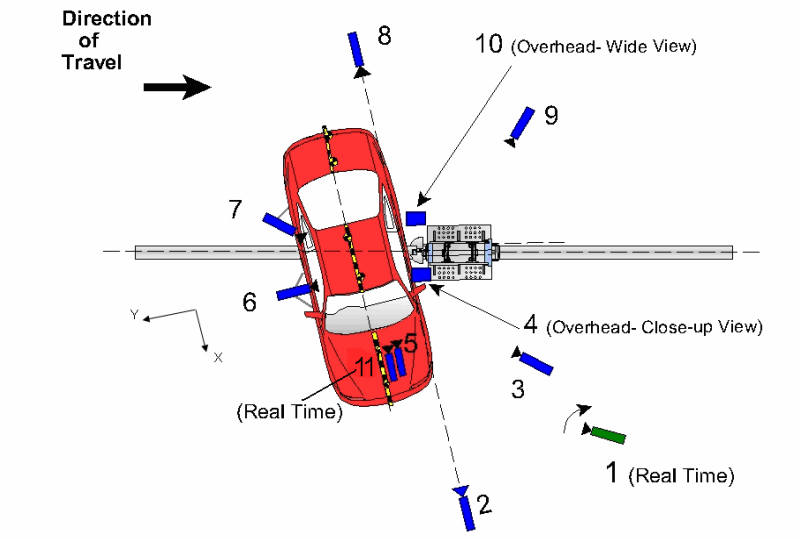
Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	252
HS	Head to Side Window	mm	355
AD	Arm to Door	mm	185
HD	H-Point to Door	mm	256

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10



Reference: +X = Forward of Vehicle (from Point of Impact)
+Y = Right of Vehicle (from Point of Impact)
+Z = Down (from Ground)

CAMERA LOCATIONS

Camera No.	View	Coordinates (m)			Lens (mm)	Film Speed (fps)
		X*	Y*	Z*		
1	Real Time Pan View of Impact	8.89	46.57	-3.04		30
2	Front Ground Level - Impact View	8.34	-0.05	-0.93	24	1000
3	Impact Side 45° - Forward Pole View	4.10	-2.15	-1.15	8.5	1000
4	Overhead Close-Up View of Impact	0.00	0.00	-5.79	12.5	1000
5	On-Board - Dummy Front View	1.42	0.45	-1.44	35	400
6	On-Board - Dummy Side View	0.01	1.70	-1.29	14	1000
7	On-Board - Dummy Rear Oblique View	-0.94	1.65	-1.30	20	1000
8	Rear Ground Level - Impact View	-6.12	-6.23	-0.96	24	1000
9	Impact Side 45° - Rearward Pole View	-8.02	0.04	-1.01	35	1000
10	Overhead Wide View of Impact	-0.06	0.22	-5.79	14	1000
11	Real Time Dummy Front View	1.46	0.55	-1.36		30

* All measurements accurate to ± 3 mm

NOTE: Vehicle was at a 15° angle to the rigid pole

INSTRUMENTATION

	Number of Channels
Driver Dummy	16
Vehicle Structure	21
Pole Load Cells	8
Contact Switches	3
Airbag Timing Sensor	2
Total No. of Data Channels	50

DATA SHEET NO. 6

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

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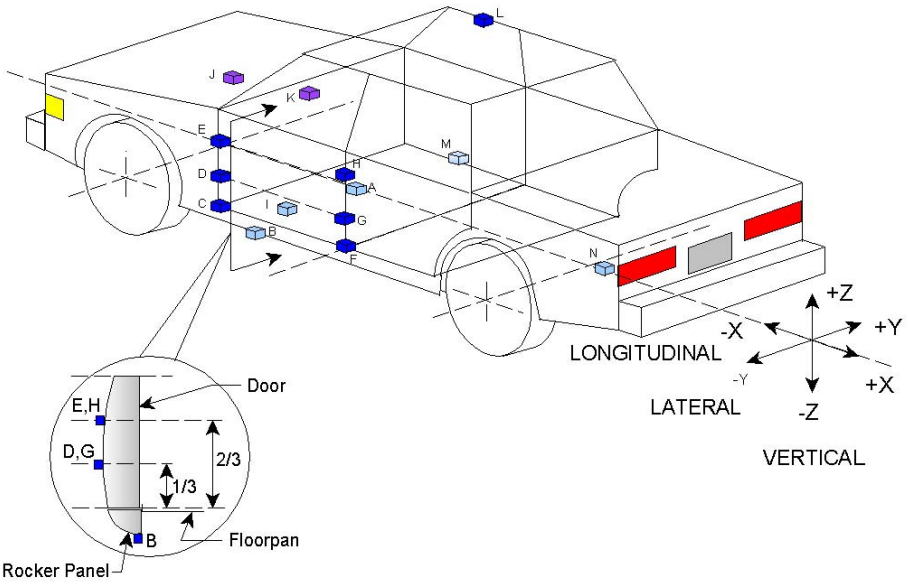

VEHICLE ACCELEROMETER LOCATIONS

	Sensor Description	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG Accelerometer	2098	0	-378
	Vehicle CG ARS	2098	0	-378
B	Left Floor Sill	2834	-678	-285
C	A-Pillar Sill	3262	-834	-519
D	A-Pillar Lower	3262	-834	-730
E	A-Pillar Mid	3262	-834	-917
F	B-Pillar Sill	2125	-730	-438
G	B-Pillar Lower	2143	-735	-779
H	B-Pillar Mid	2143	-735	-1002
I	Driver Seat	2228	-574	-445
J	Engine Top	3894	393	-834
K	Firewall	3708	482	-880
L	Right Roof Sill	2336	470	-1650
M	Right Floor Sill	2130	730	-431
N	Rear Floorpan	875	-332	-618

Reference: X = + Forward
Y = + To Right
Z = + Down

DATA SHEET NO. 7

RIGID POLE LOAD CELL DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

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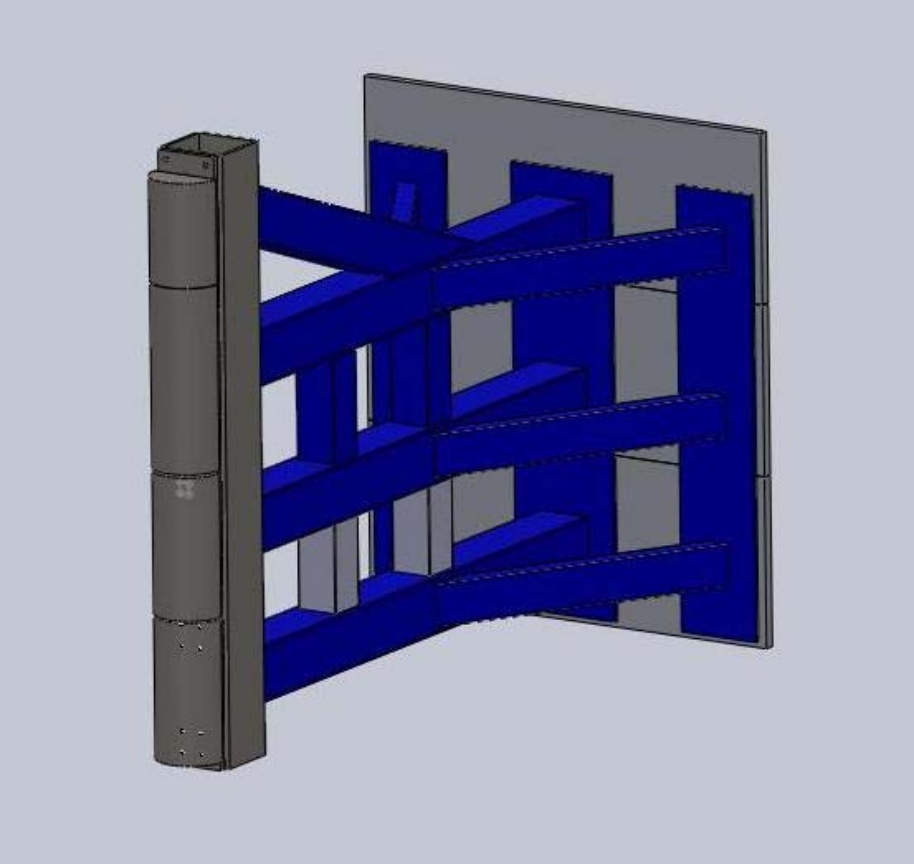


RIGID POLE LOAD CELL LOCATIONS

ID	Units	Height From Ground
1	mm	87
2	mm	468
3	mm	648
4	mm	978
5	mm	1168
6	mm	1651
7	mm	1816
8	mm	2057

DATA SHEET NO. 8

POST-TEST OBSERVATIONS

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver Dummy
Dummy Type/Serial No.	P572V (SID-IIs) / Serial No. 299
Head Contact	Curtain Airbag, Front Passenger Seat Back
Upper Torso Contact	Torso/Pelvis Airbag
Lower Torso Contact	Torso/Pelvis Airbag, Door Panel
Left Knee Contact	Door Panel, Right Knee
Right Knee Contact	Left knee

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
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 Seperation	No separation occurred
Windshield Damage	Broken
Window Damage	Left front window broken
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	Yes	No	No	
Side Airbag 1 (Torso/Pelvis)	Yes	Yes	No	
Side Airbag 2 (Curtain)	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	No	Yes	No
Seat Belt Load Limiter	Yes	No	Yes	No
Side Airbag 3 (Torso)	No		Yes	Yes

VEHICLE SPEED AND IMPACT DATA

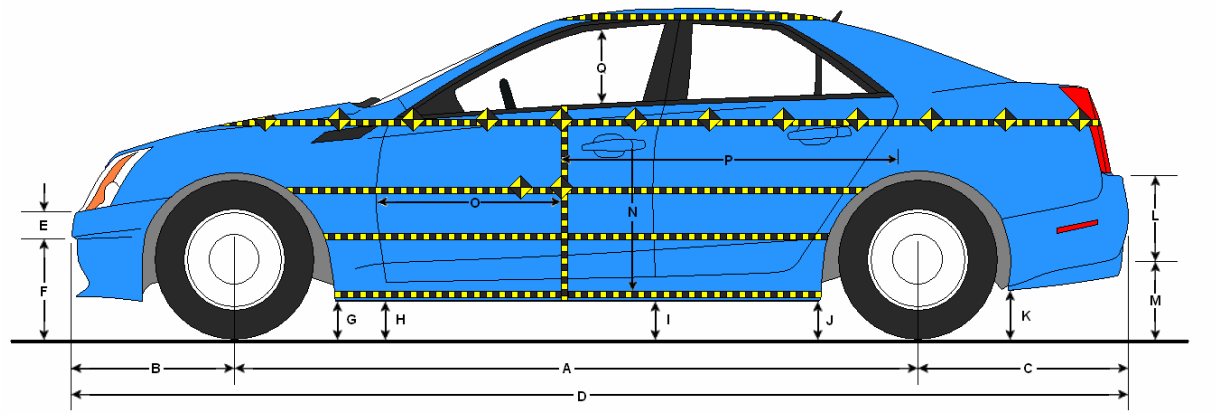
Measured Parameter	Units	Requirement	Value
Horizontal Offset From Vertical Reference Line	mm	+/- 38	1 (Right)
Trap No. 1 Velocity (Primary)	km/h	30.4 to 33.0	31.9
Trap No. 2 Velocity (Redundant)	km/h	30.4 to 33.0	32.0

DATA SHEET NO. 9

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2741	2655	-86
B	Front Axle to FSOV	986	995	9
C	Rear Axle to RSOV	1029	1060	31
D1	Total Vehicle Length at Left Side	3273	3167	-106
D2	Total Vehicle Length at Centerline	4691	4711	20
D3	Total Vehicle Length at Right Side	3274	3297	23
E	Front Bumper Thickness	197	197	0
F	Front Bumper Bottom to Ground	489	506	17
G	Sill Height at Front Wheel Well	257	263	6
H	Sill Height at Front Door Leading Edge	269	295	26
I	Sill Height at B-Pillar	281	314	33
J1	Sill Height at Rear Wheel Well	252	287	35
J2	Pinch Weld Height at Rear Wheel Well	285	322	37
K	Sill Aft of Rear Wheel Well	288	305	17
L	Rear Bumper Thickness	315	315	0
M	Rear Bumper Bottom to Ground	409	430	21
N	Sill Height to Window Bottom Sill	703	841	138
O	Front Door Leading Edge to Impact CL	564	492	-72
P	Rear Door Trailing Edge to Impact CL	1512	1399	-113
Q	Front Window Opening	421	466	45
R	Right Side Length	3274	3297	23
S	Left Side Length	3273	3167	-106
T	Vehicle Width at B-Pillar	1848	1764	-84

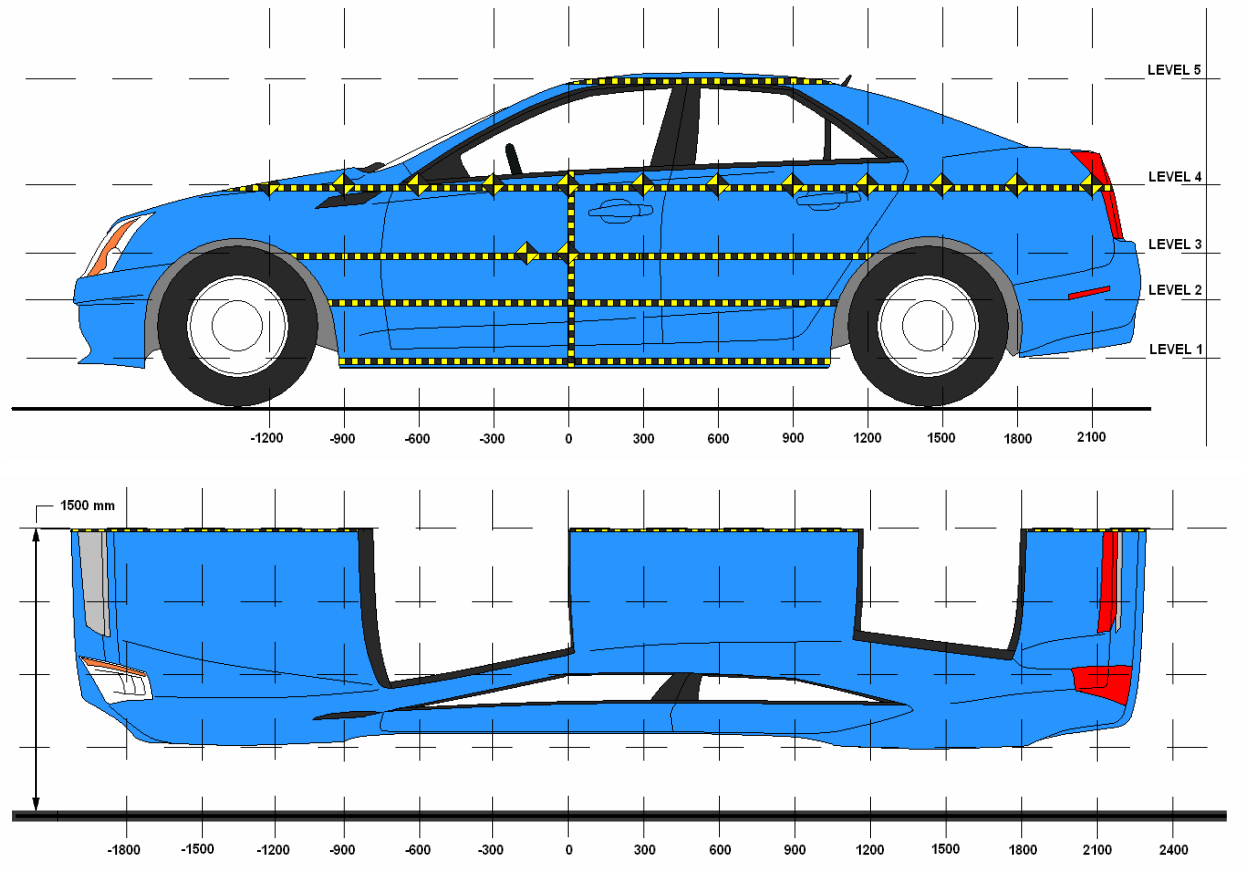
* All measurements accurate to ± 3 mm

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10



NOTE: All measurements are in millimeters (mm)

Level	Description	Height Above Ground (mm)
1	Sill Top Height	361
2	Occupant H-Point Height	694
3	Mid-Door Height	731
4	Window Sill Height	1038
5	Window Top Height	1617

DATA SHEET NO. 10 … (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900				652					724					72	
-750		561	561	643			642	640	720			81	79	77	
-600	574	561	562	636		685	662	662	727		111	101	100	91	
-450	574	562	563	630		789	745	742	771		215	183	179	141	
-300	576	563	563	623		856	857	853	850		280	294	290	227	
-150	578	563	562	617		908	956	952	935		330	393	390	318	
0	580	563	562	611	915	973	1046	1045	1037	1110	393	483	483	426	195
150	581	564	562	607	902	1046	1031	1033	1042	1100	465	467	471	435	198
300	583	565	563	606	896	1035	906	911	932	1051	452	341	348	326	155
450	584	567	564	600	893	934	773	774	797	1014	350	206	210	197	121
600	585	569	567	600	892	840	705	702	738	977	255	136	135	138	85
750	585	571	569	600	891	743	685	680	719	951	158	114	111	119	60
900	584	572	569	600	891	718	665	659	700	940	134	93	90	100	49
1050	583	568	567	599	892	694	644	637	681	937	111	76	70	82	45
1200	580	562	562	595	896	670	623	617	658	938	90	61	55	63	42
1350		561	559	575	903		597	595	620	941		36	36	45	38
1500				579	910				606	945				27	35
1650				591	919				634	951				43	32
1800				595	928				632	957				37	29
1950				602	942				635	967				33	25
2100				622					648					26	
2250				667					688					21	
2400															
2550															
2700															
2850															

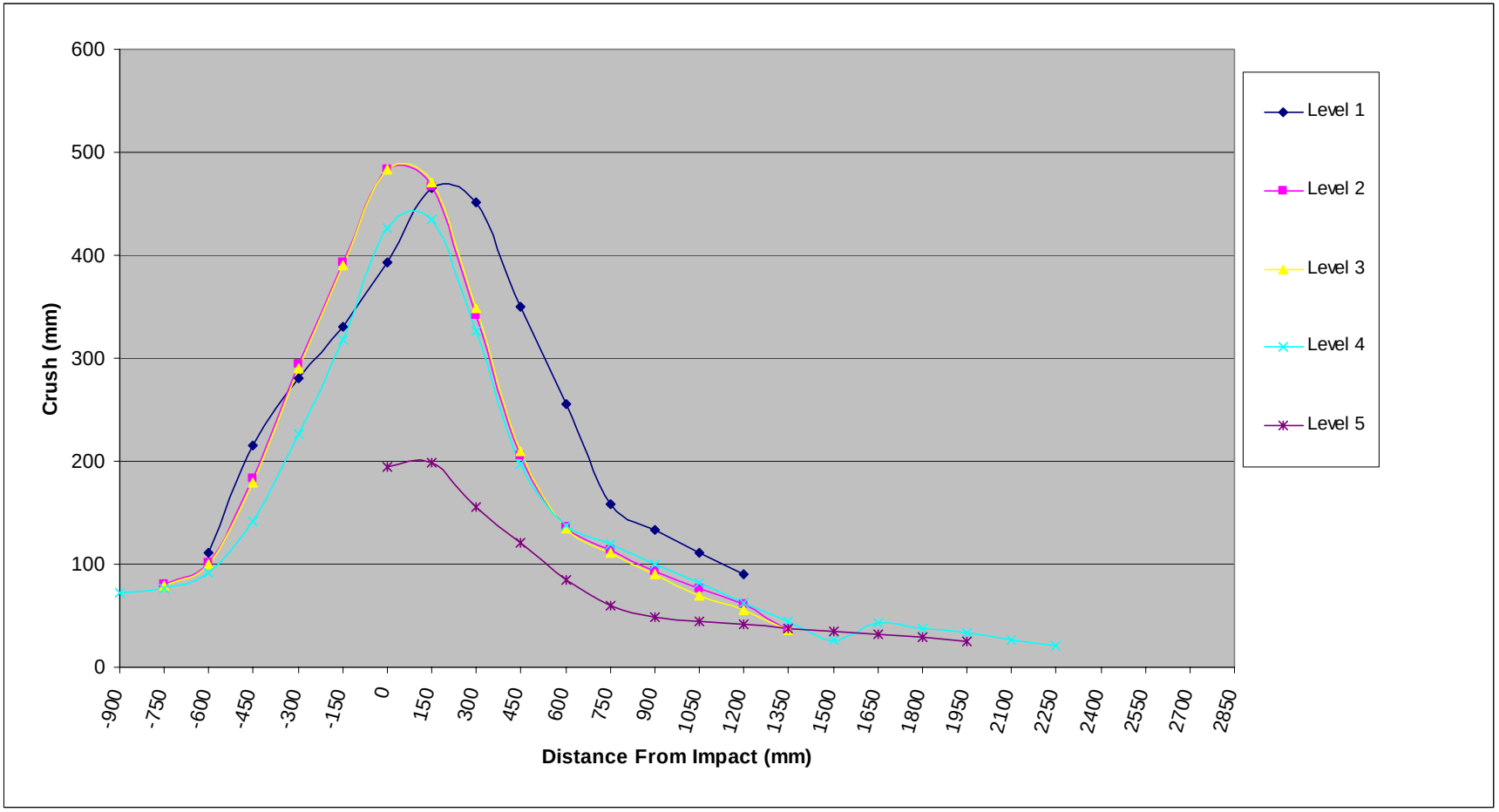
MAXIMUM CRUSH DATA

	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	465	483	483	435	198
Distance From Impact	mm	150	0	0	150	150

DATA SHEET NO. 10 … (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2011 Lexus RX350 5-Door MPV	NHTSA No.	MB5118
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole	Test Date:	11/08/10



DATA SHEET NO. 11

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

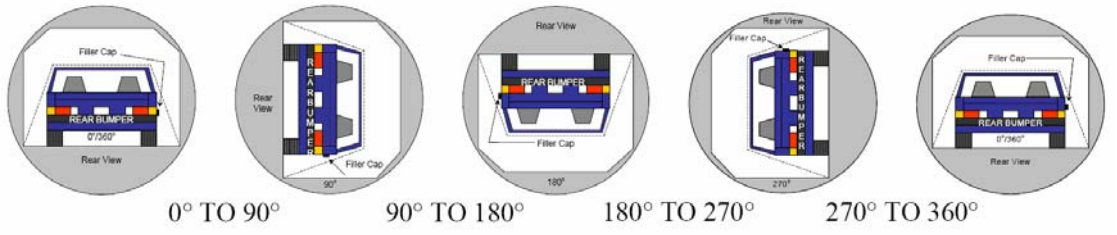
Temperature at Time of Impact: 15.4° C Test Time: 11:21 AM

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°	83	300	383
90° To 180°	83	300	383
180° To 270°	75	300	375
270° To 360°	80	300	380

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

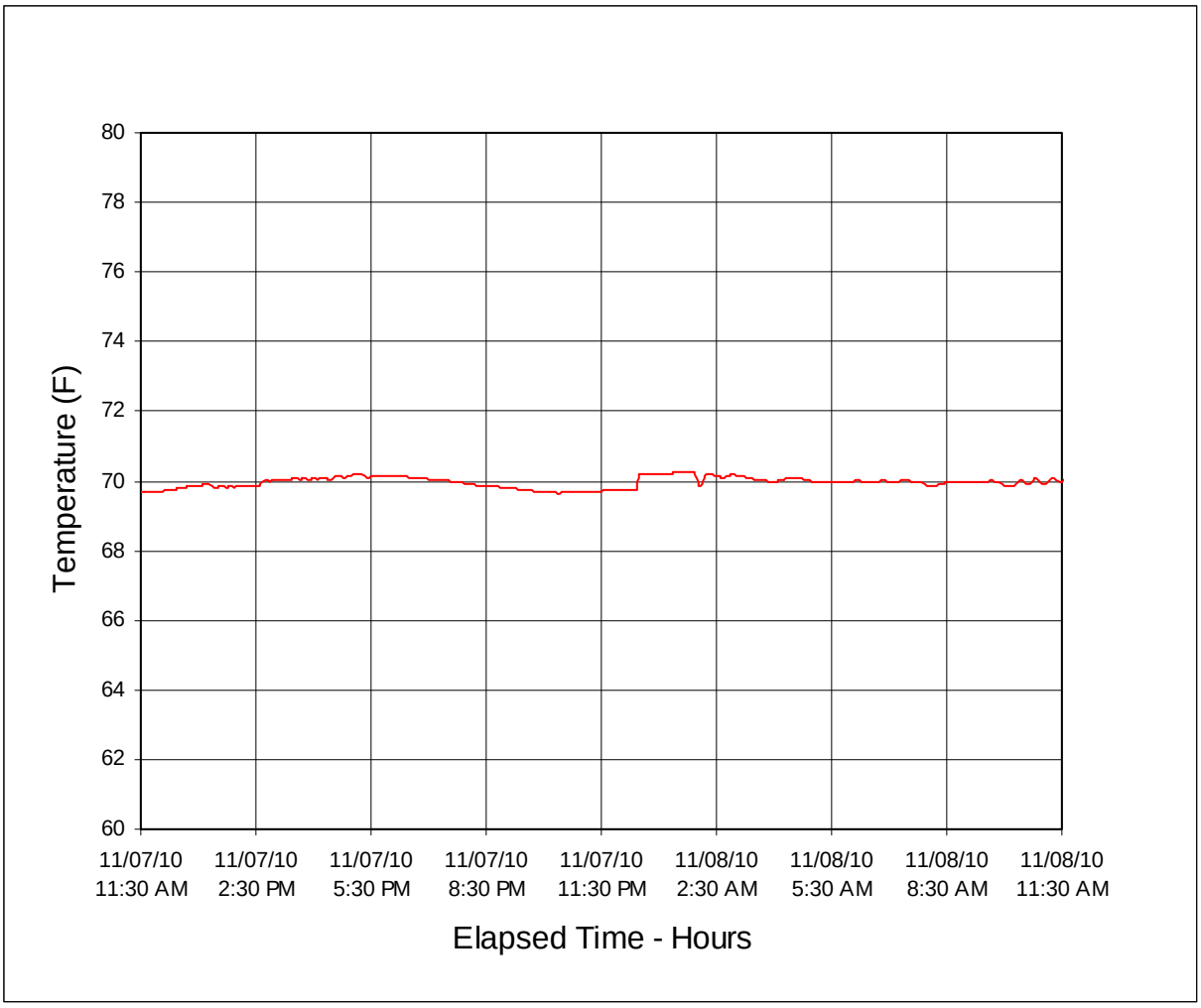
Test Phase	Spillage Location
0° To 90°	None
90° To 180°	None
180° To 270°	None
270° To 360°	None

DATA SHEET NO. 12

DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2011 Lexus RX350 5-Door MPV NHTSA No. MB5118

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 11/08/10



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

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 Test Vehicle

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

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

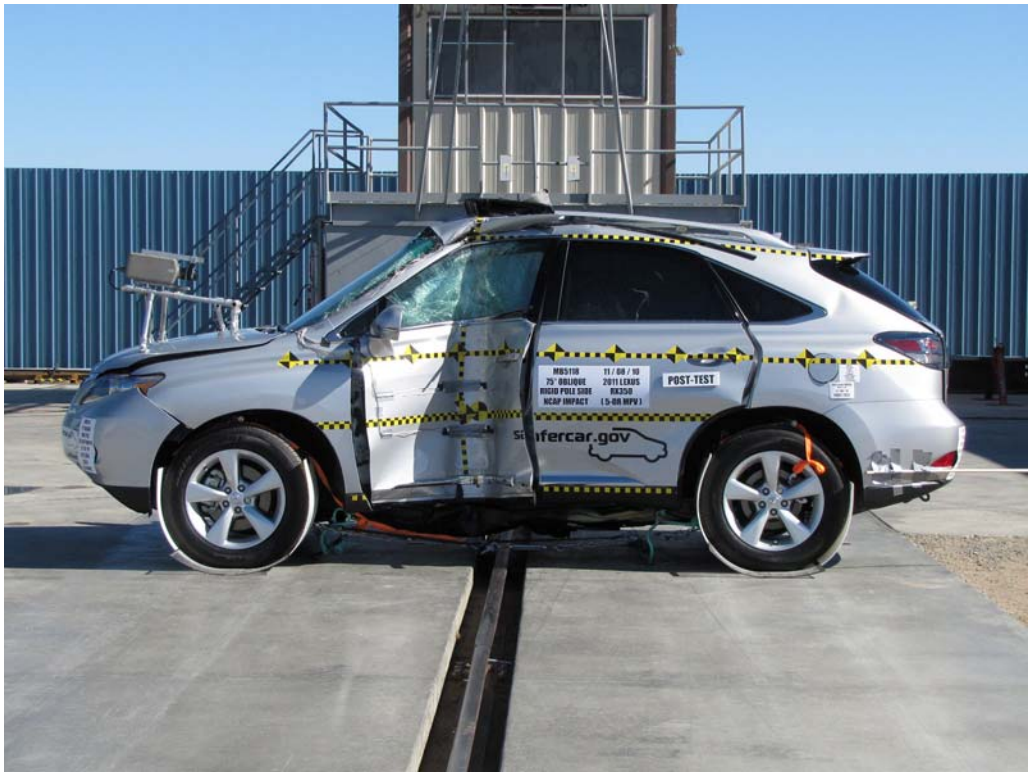


FIGURE 8. Post-Test Left Side View of Test Vehicle

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

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

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 and Pole

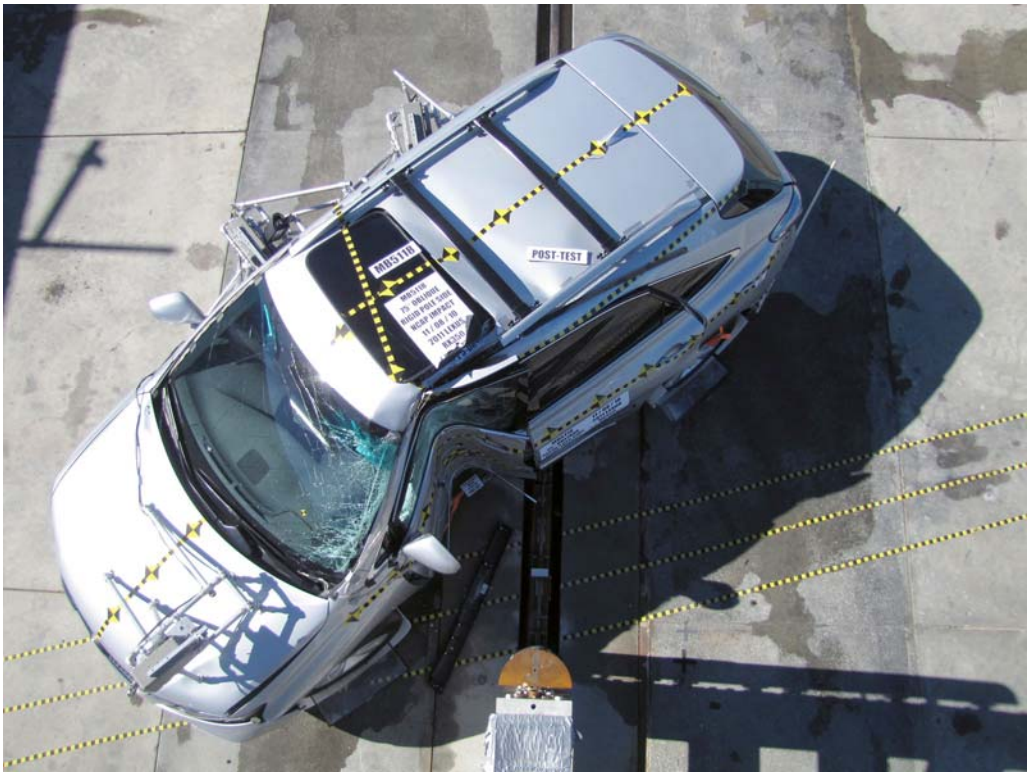


FIGURE 16. Post-Test Overhead View of Test Vehicle and Pole

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

FIGURE 18. Pre-Test Right Side View of Pole
Positioned Against Side of 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 Location

FIGURE 21. Pre-Test Front Close-Up View of Dummy

FIGURE 22. Post-Test Front Close-Up View of Dummy

FIGURE 23. Pre-Test Left Side View of Dummy
Showing Belt, Chalking, and Contact Switches

FIGURE 24. Pre-Test Left Side View of Dummy Shoulder and Driver Door Top View

FIGURE 25. Post-Test Left Side View of Dummy Shoulder and Door Top View

FIGURE 26. Pre-Test Frontal View of Seat Back Prior to Dummy

FIGURE 27. Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint

FIGURE 28. Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning

FIGURE 29. Pre-Test Overhead View of Dummy Thighs on Seat Pan

FIGURE 30. Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket

FIGURE 31. Pre-Test View of Dummy's Head Showing Dummy's Head Is Level

FIGURE 32. Pre-Test Placement of Dummy's Feet

FIGURE 33. Pre-Test View of Belt Anchorage for Dummy

FIGURE 34. Pre-Test Left Side View of Steering Wheel

FIGURE 35. Pre-Test View of Parking Brake

FIGURE 36. Pre-Test Close-Up Left Side View of Driver Seat Track

FIGURE 37. Pre-Test Close-Up Left Side View of Driver Seat Back

FIGURE 38. Pre-Test Close-Up View of Driver Seat Back or Head Restraint

FIGURE 39. Pre-Test Driver Dummy and Door Clearance

FIGURE 40. Post-Test Driver Dummy and Door Clearance

FIGURE 41. Pre-Test Right Side View of Dummy and Front Seat Occupant Compartment

FIGURE 42. Post-Test Right Side View of Dummy and Front Seat Occupant Compartment

FIGURE 43. Pre-Test Inner Driver Door Panel View

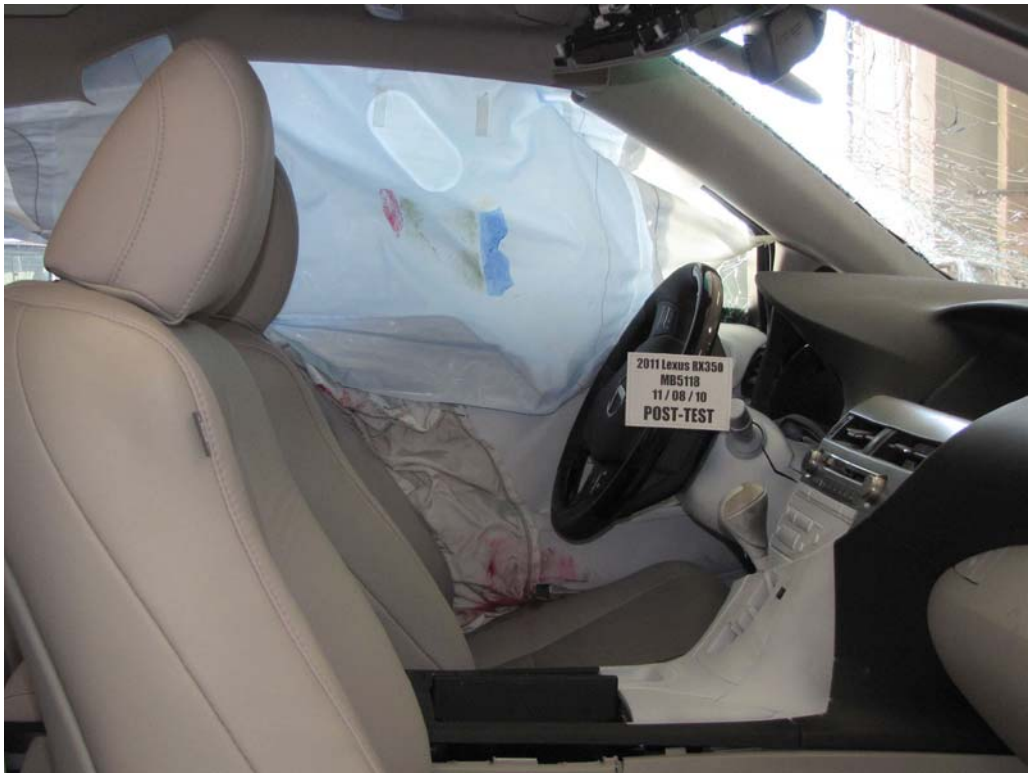


FIGURE 44. Post-Test Inner Driver Door Panel View
Showing Dummy Contact Locations

Photograph Not Applicable
No Dummy Head Contact
with Vehicle

FIGURE 45. Post-Test Dummy Close-Up Head Contact with Vehicle Interior View

FIGURE 46. Post-Test Dummy Close-Up Head Contact with Side Airbag View

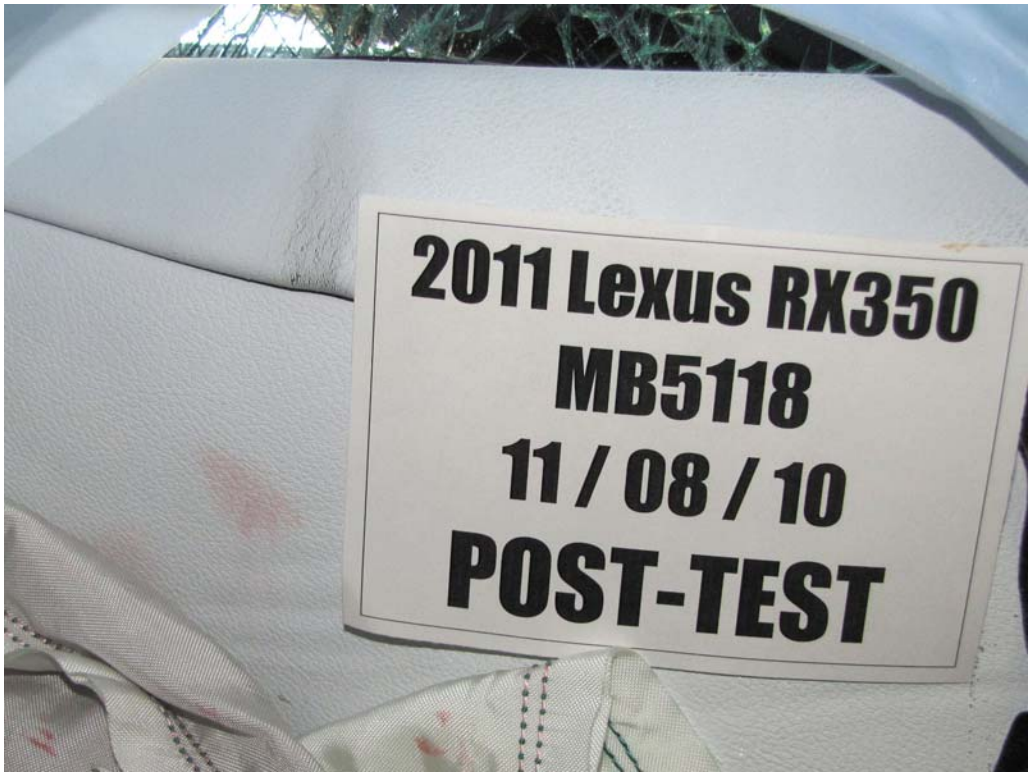


FIGURE 47. Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View

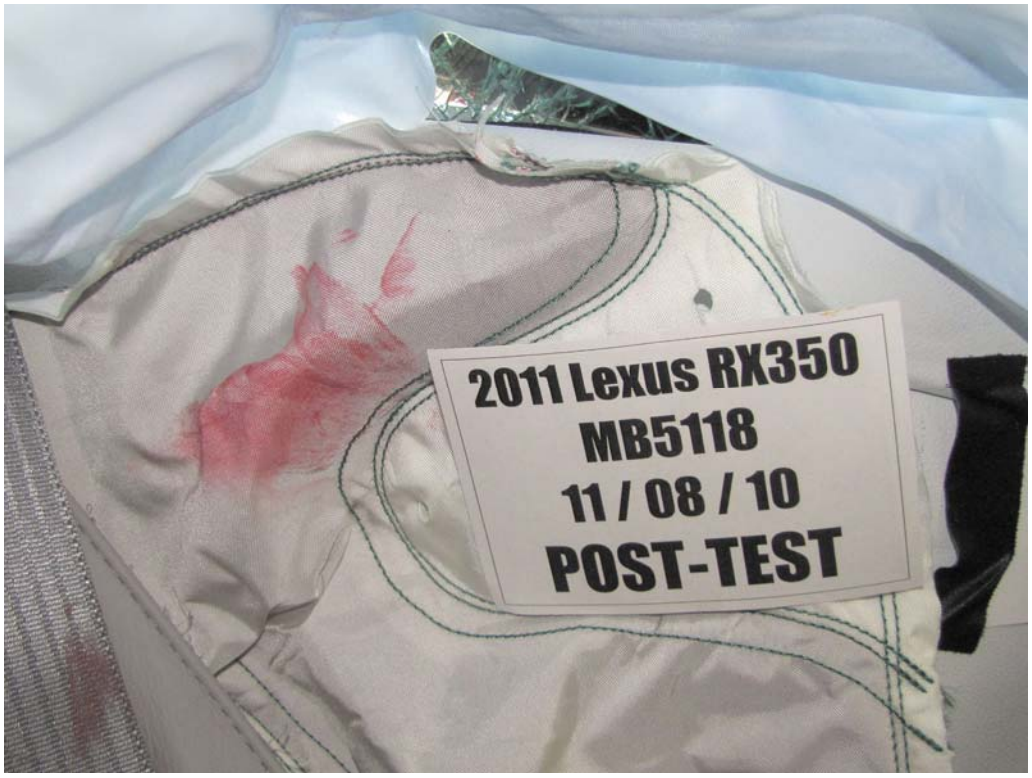


FIGURE 48. Post-Test Dummy Close-Up Torso Contact with Side Airbag View

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

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

FIGURE 51. Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

FIGURE 52. Post-Test View of Fuel Filler Cap or Fuel Filler Neck

FIGURE 53. Close-Up View of Vehicle's Certification Label

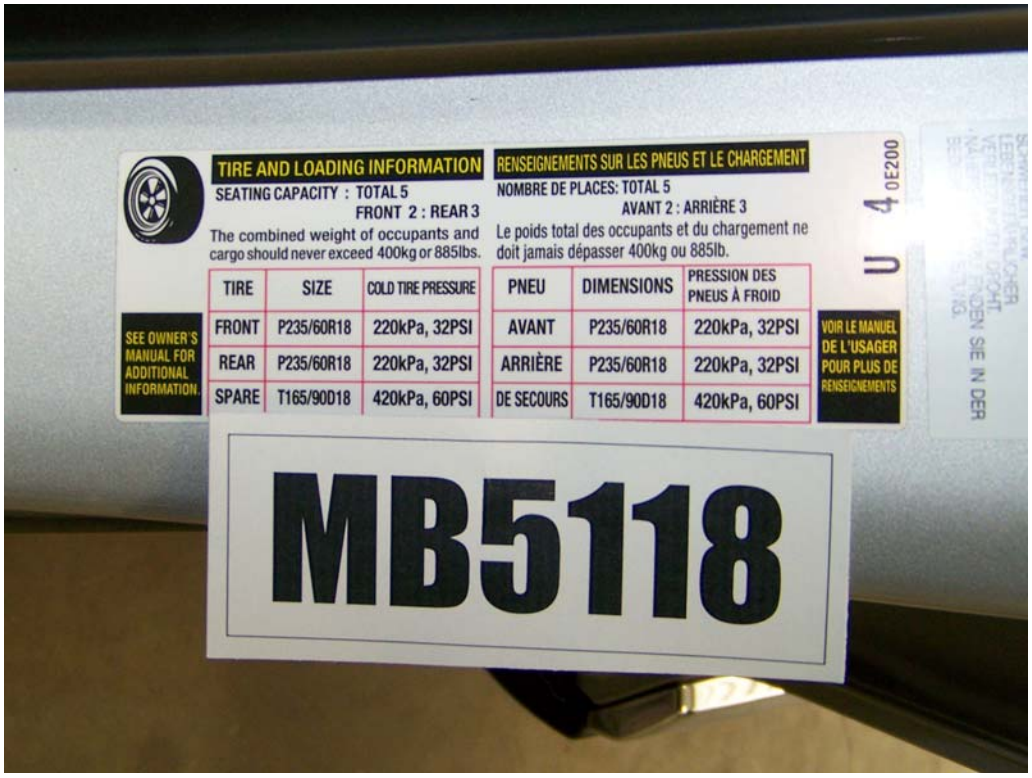


FIGURE 54. Close-Up View of Vehicle's Tire Information Placard

FIGURE 55. Pre-Test Pole Barrier Front View

FIGURE 56. Post-Test Pole Barrier Front View

FIGURE 57. Pre-Test Pole Barrier Side View

FIGURE 58. Post-Test Pole Barrier Side View

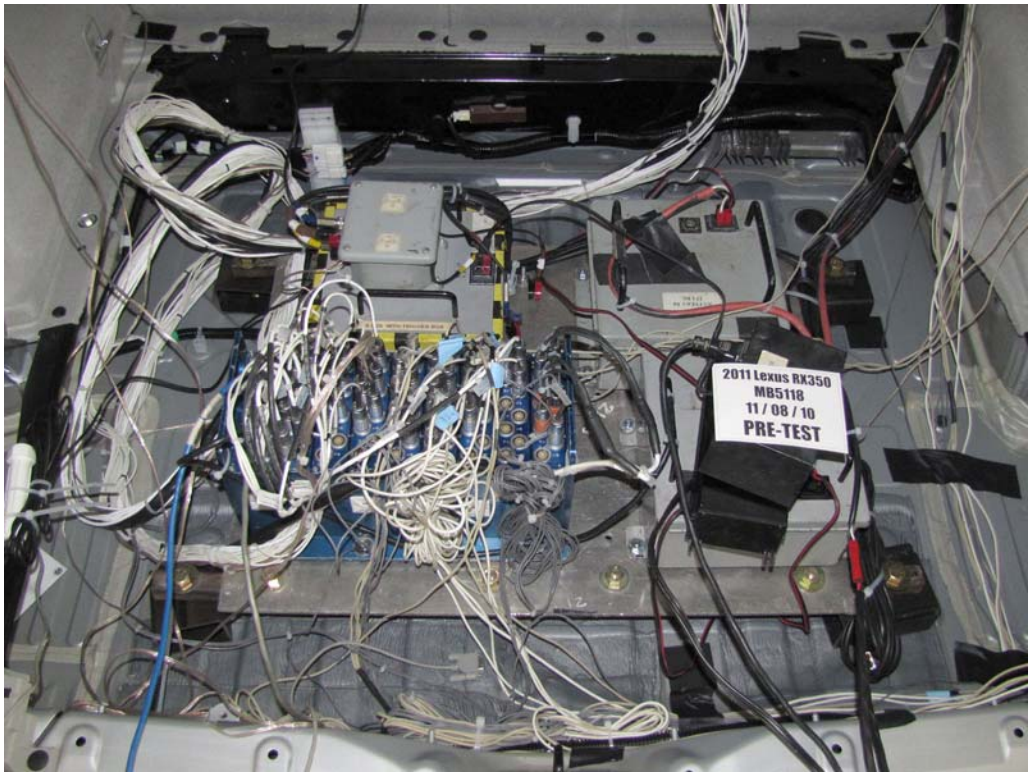


FIGURE 59. Pre-Test Ballast View

FIGURE 60. Post-Test Primary and Redundant Speed Trap Read-Out

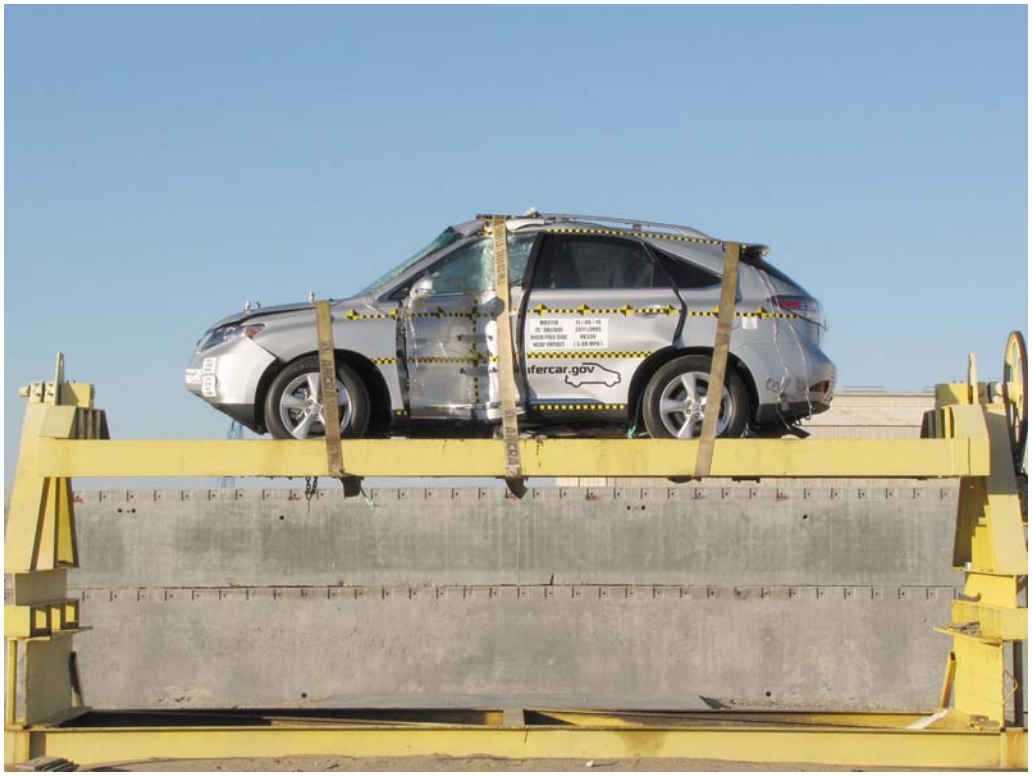


FIGURE 61. FMVSS No. 301-305 Rollover 0 Degrees

FIGURE 62. FMVSS No. 301-305 Rollover 90 Degrees

FIGURE 63. FMVSS No. 301-305 Rollover 180 Degrees

FIGURE 64. FMVSS No. 301-305 Rollover 270 Degrees

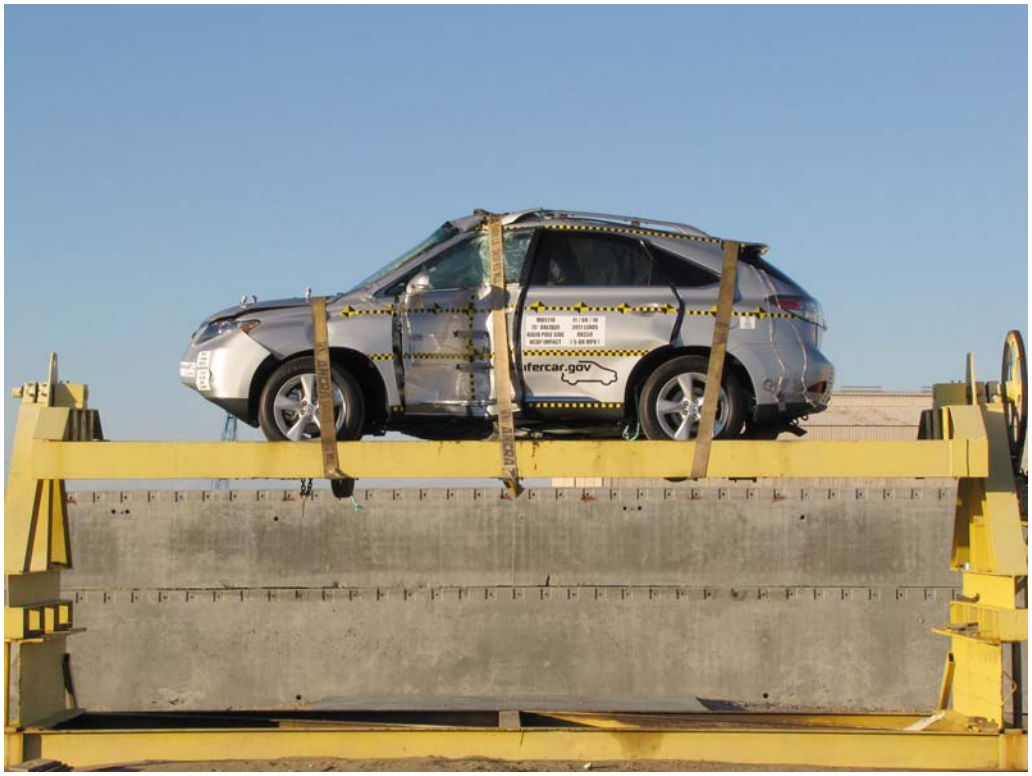


FIGURE 65. FMVSS No. 301-305 Rollover 360 Degrees

FIGURE 66. Impact Event

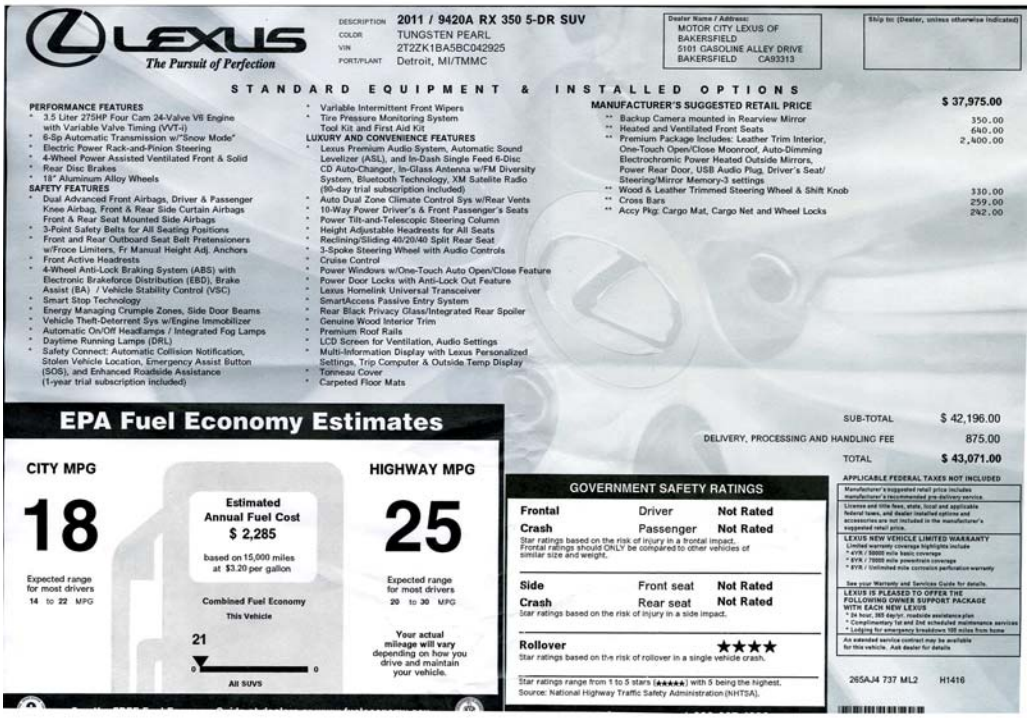


FIGURE 67. Monroney Label

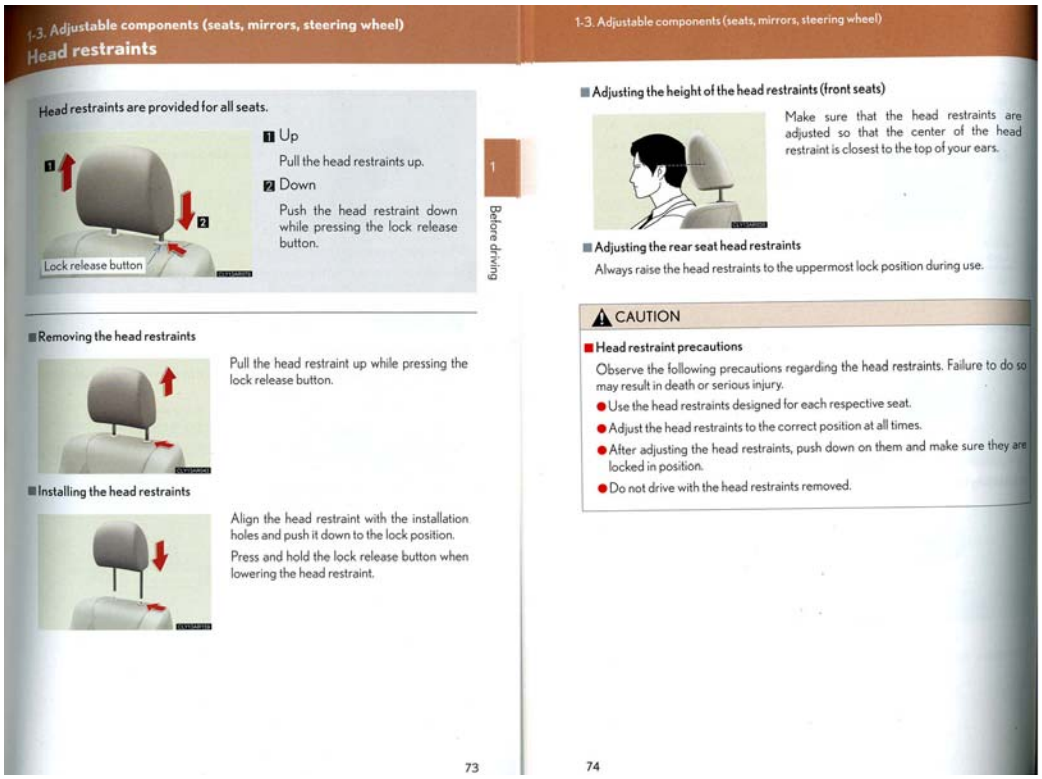


FIGURE 68. Head Restraint Use and Adjustment Information from Vehicle Manual

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

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.

Additional Driver Dummy Instrumentation Data

Driver Head Acceleration (X) Redundant
Driver Head Acceleration (Y) Redundant
Driver Head Acceleration (Z) Redundant
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)
Driver Shoulder Contact Switch
Driver Torso Contact Switch
Driver Pelvis Contact Switch
Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Vehicle Center of Gravity Angular Rate About X (Roll)
Vehicle Center of Gravity Angular Rate About Y (Pitch)
Vehicle Center of Gravity Angular Rate About Z (Yaw)

Left Floor Sill Acceleration (Y)

Left A-Pillar Sill Acceleration (Y)

Left Lower A-Pillar Acceleration (Y)

Left Mid A-Pillar Acceleration (Y)

Left B-Pillar Sill Acceleration (Y)

Left Lower B-Pillar Acceleration (Y)

Left Mid B-Pillar Acceleration (Y)

Driver Seat Track at Dummy H-Point Acceleration (Y)

Engine Top Acceleration (X)

Engine Top Acceleration (Y)

Firewall Center Acceleration (Y)

Right Roof at Vertical Impact Reference Line Acceleration (Y)

Right Sill at Vertical Impact Reference Line Acceleration (Y)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)

Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Driver Side Airbag Timing

Driver Side Curtain Airbag Timing

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)

Load Cell Pole Barrier #2 Force (Y)

Load Cell Pole Barrier #3 Force (Y)

Load Cell Pole Barrier #4 Force (Y)

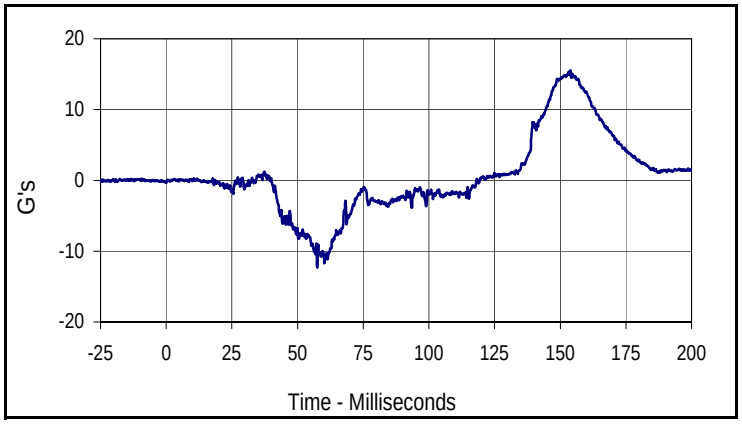
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

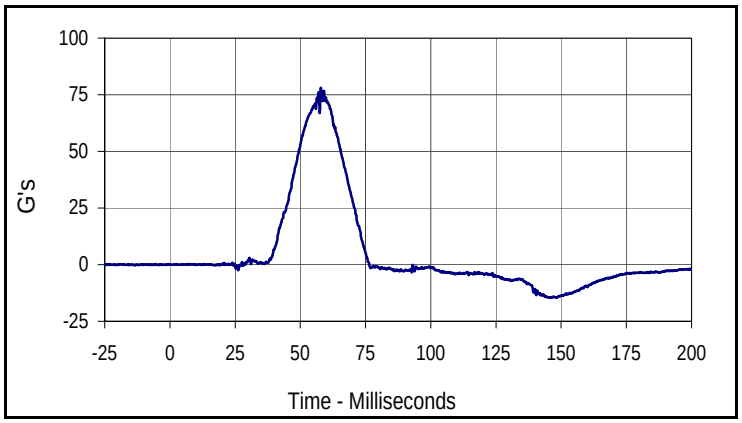
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

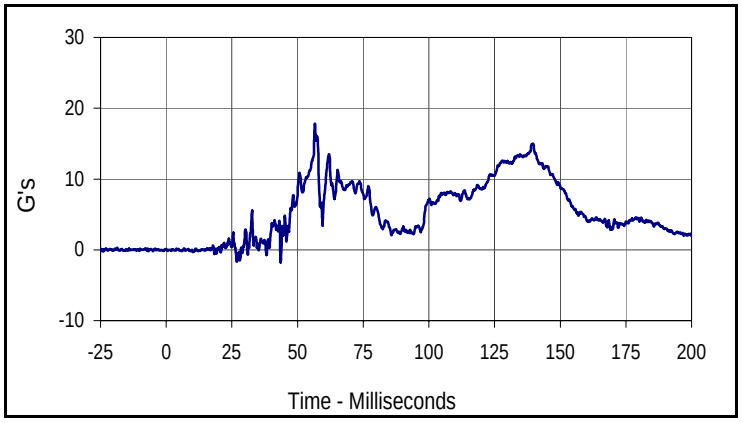
Test Vehicle:	2011 Lexus RX350 5-Door MPV	Test Date:	11/8/10
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test	NHTSA No.:	MB5118



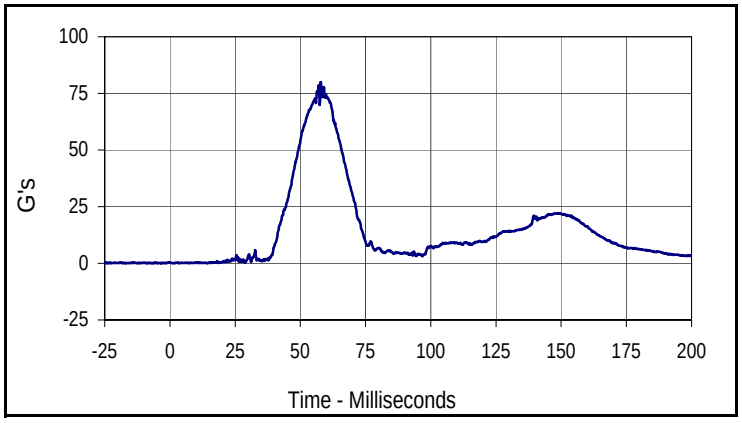
Curve Description			
Driver Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
15.5	153.8	-12.3	57.5



Curve Description			
Driver Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
78.1	57.8	-14.6	146.3

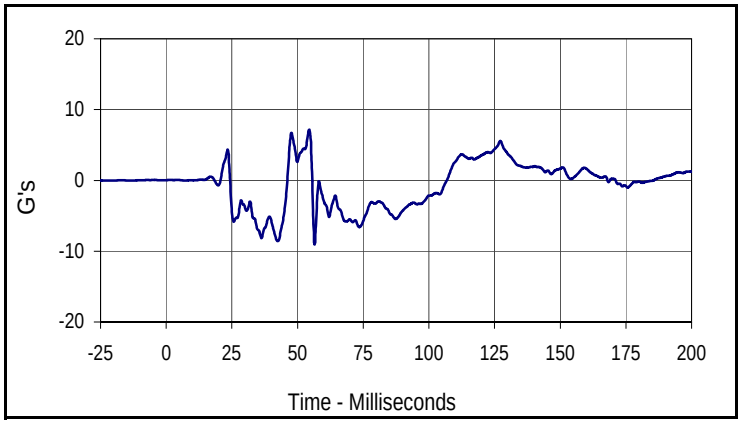


Curve Description			
Driver Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
17.8	56.6	-1.8	43.6

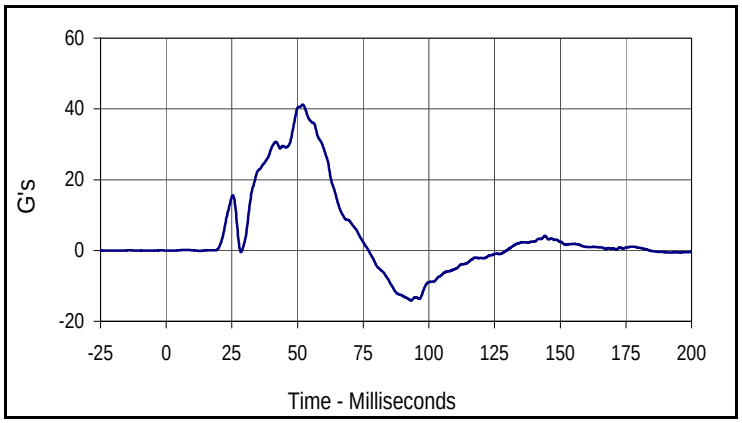


Curve Description			
Driver Head Acceleration Primary Res.			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
80.0	57.8	0.0	1.7

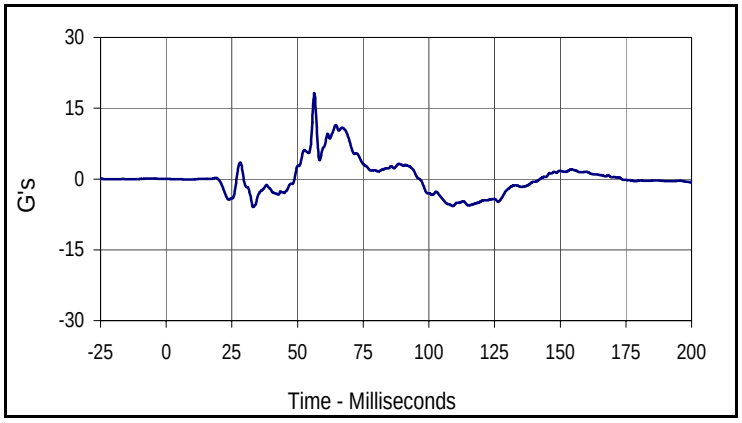
Test Vehicle:	2011 Lexus RX350 5-Door MPV	Test Date:	11/8/10
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test	NHTSA No.:	MB5118



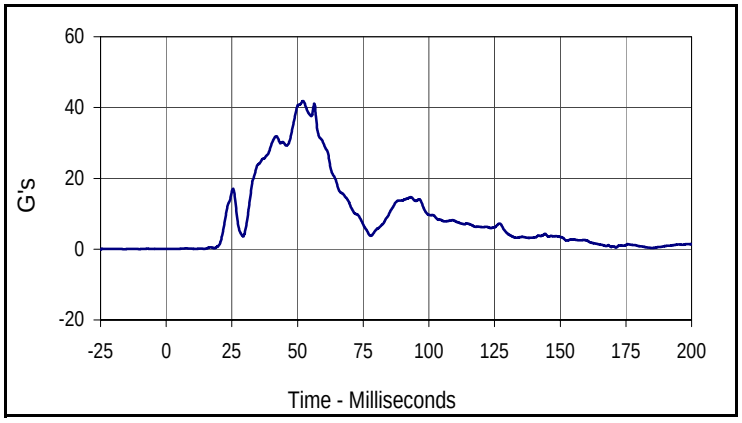
Curve Description			
Driver Lower Spine T12 Acceleration X			
CURNO	Type	SAE Class	Units
012	FIL	180	G's
Max	Time	Min	Time
7.2	54.4	-9.0	56.5



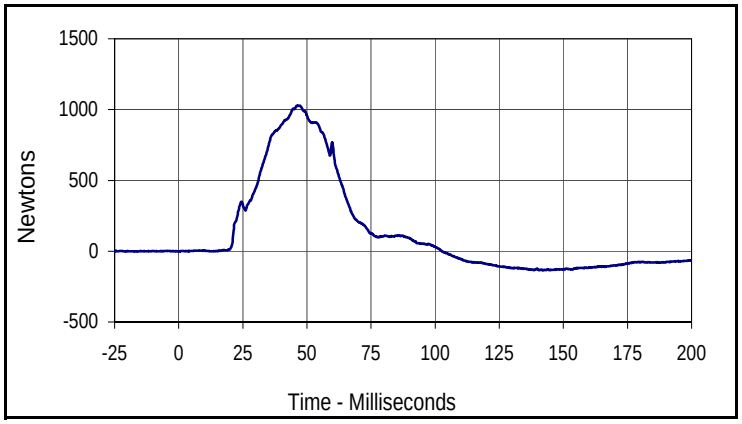
Curve Description			
Driver Lower Spine T12 Acceleration Y			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
41.2	52.0	-14.1	93.2



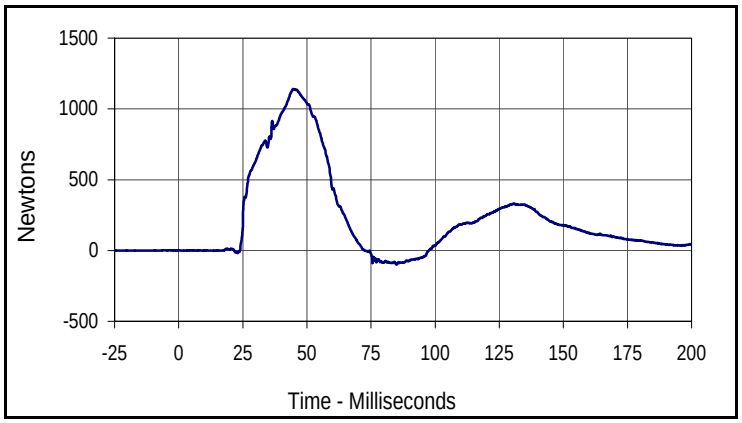
Curve Description			
Driver Lower Spine T12 Acceleration Z			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
18.2	56.4	-5.9	33.1



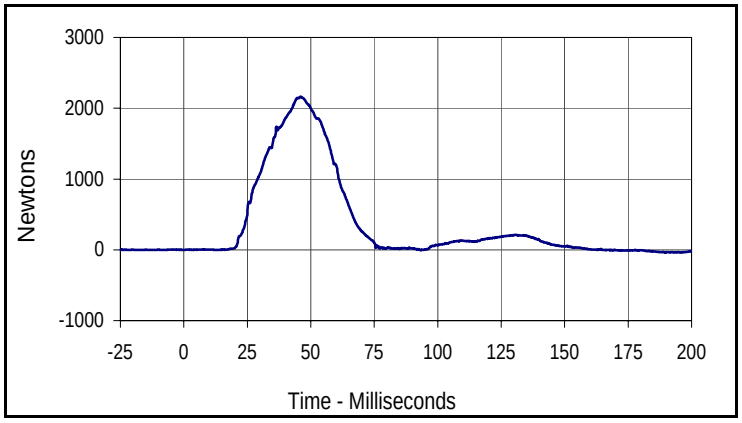
Curve Description			
Driver Lower Spine T12 Acceleration Res.			
CURNO	Type	SAE Class	Units
012	RES	180	G's
Max	Time	Min	Time
41.8	52.1	0.0	11.5



Curve Description			
Driver Iliac Wing Force on Impact Side Y			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
1028.7	47.0	-135.1	142.0



Curve Description			
Driver Acetabulum Force on Impact Side Y			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
1139.6	44.6	-99.2	85.0



Curve Description			
Driver Total Pelvic Force on Impact Side Y			
CURNO	Type	SAE Class	Units
015	SUM	600	Newtons
Max	Time	Min	Time
2162.0	46.0	-37.4	191.4

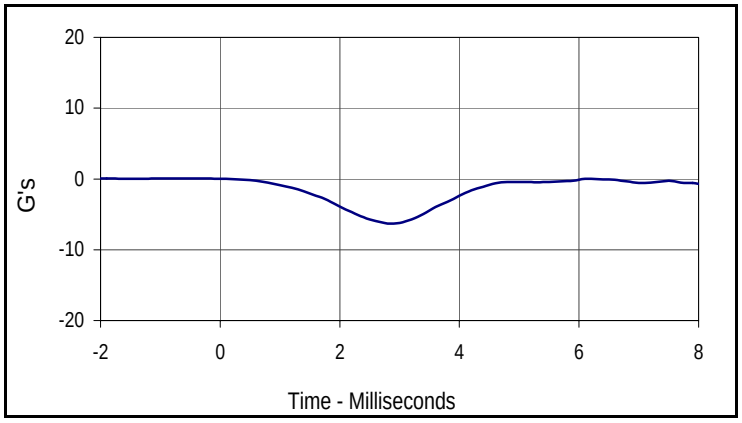
APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

Test Program:	SID IIs Lateral Head Drop Calibration	Test Date:	11/3/10
ATD Serial No.:	299	Test I.D.:	HDP10E

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	115 to 137	127.6	Pass
Peak Longitudinal Acceleration	G's	≤15	6.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	11.7	Pass
		Overall Test Results		Pass

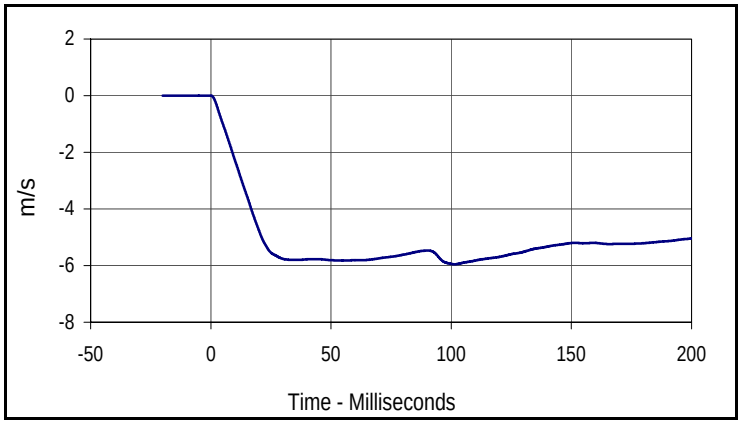
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
127.6	2.8	0.1	-1.8



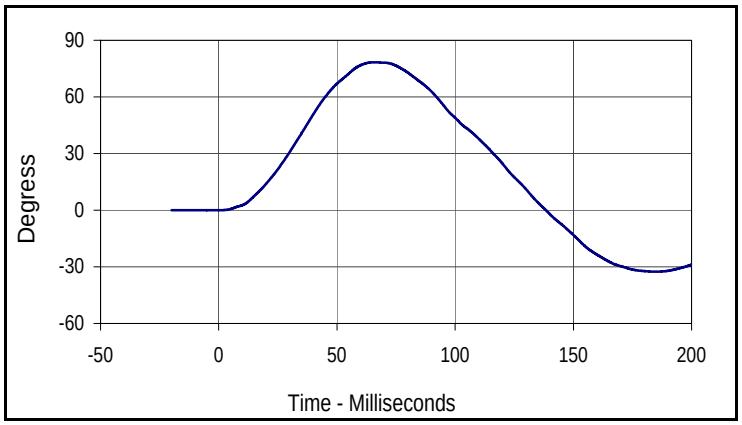
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.1	-0.5	-6.3	2.9

Test Program:	SID IIs Neck Calibration	Test Date:	11/3/10
ATD Serial No.:	299	Test I.D.:	NBP10E

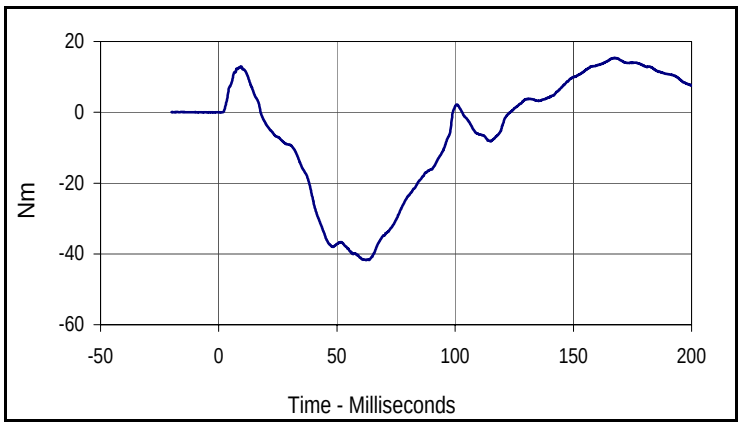
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.6	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.3	Pass
	15 msec	m/s	-3.30 to -4.10	-3.5	Pass
	20 msec	m/s	-4.40 to -5.40	-4.8	Pass
	25 msec	m/s	-5.40 to -6.10	-5.5	Pass
	25-100 msec	m/s	-5.50 to -6.20	-5.9	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	78.4	Pass
	Time	msec	50.0 to 70.0	65.5	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-41.7	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	123.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.4	-6.0	101.4



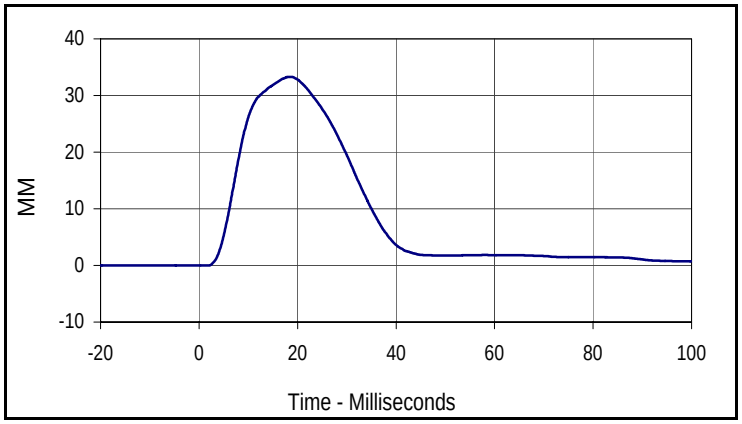
Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
78.4	65.5	-32.5	184.7



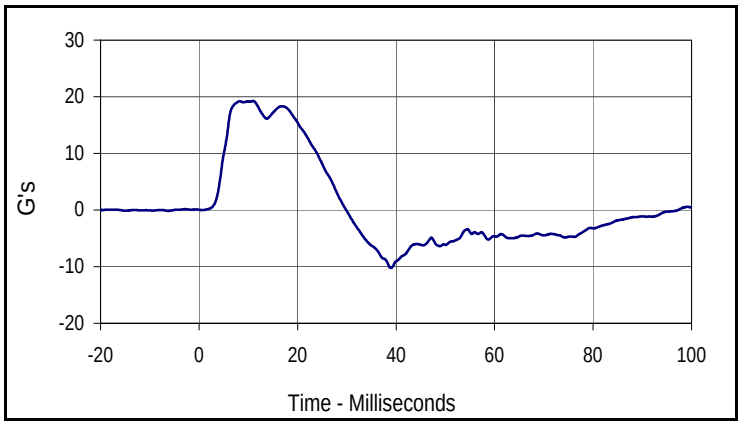
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
15.4	167.2	-41.7	62.5

Test Program:	SID IIs Shoulder Calibration	Test Date:	11/3/10
ATD Serial No.:	299	Test I.D.:	SHP10E

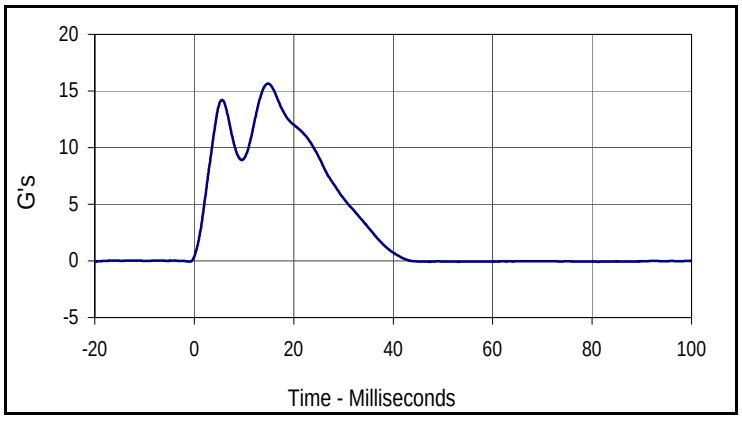
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.33	Pass
Shoulder Deflection	MM	28 to 37	33.3	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	19.3	Pass
Peak Impactor 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
33.3	18.6	0.0	1.0



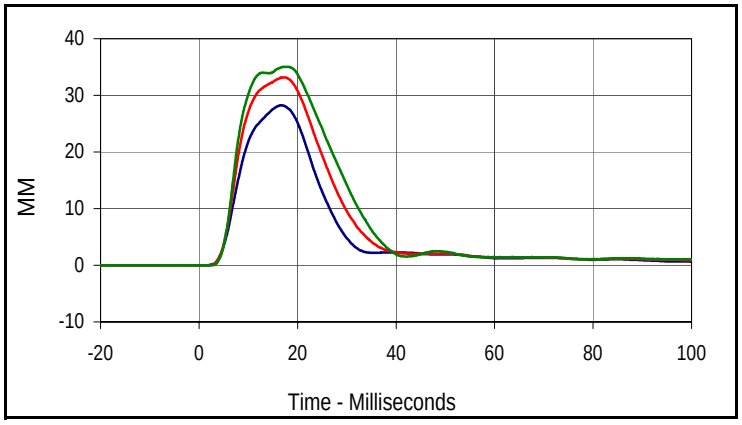
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
19.3	11.0	-10.2	39.0



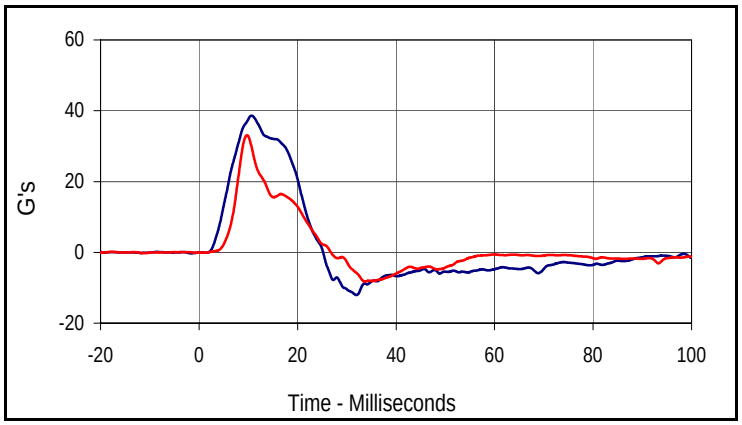
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.7	14.8	-0.1	81.3

Test Program:	SID IIs Thorax with Arm Calibration	Test Date:	11/3/10
ATD Serial No.:	299	Test I.D.:	TWAP10E

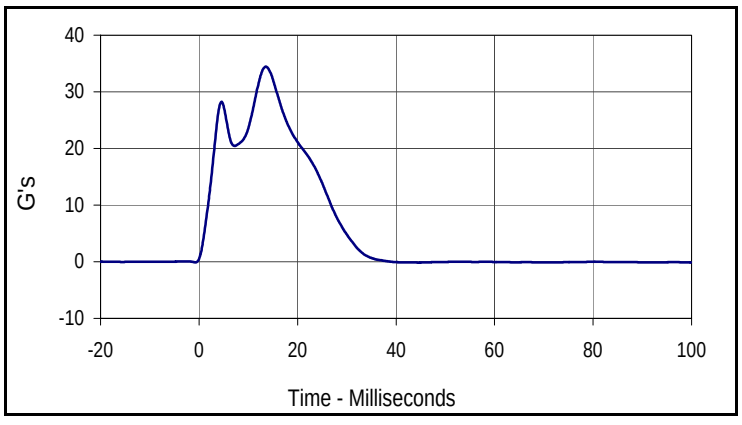
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.71	Pass
Shoulder Deflection	MM	31 to 40	36.0	Pass
Upper Thorax Rib Deflection	MM	25 to 32	28.2	Pass
Middle Thorax Rib Deflection	MM	30 to 36	33.2	Pass
Lower Thorax Rib Deflection	MM	32 to 38	35.0	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	38.6	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	33.1	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	34.4	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
28.2	16.7	0.0	-8.9
Middle Thorax Deflection			
Max	Time	Min	Time
33.2	17.3	0.0	-10.9
Lower Thorax Deflection			
Max	Time	Min	Time
35.0	17.5	0.0	-5.1



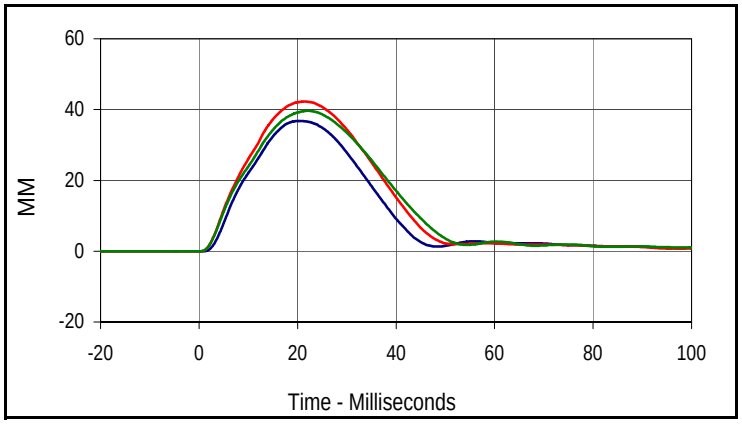
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
38.6	10.6	-12.0	32.0
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
33.1	9.7	-8.2	33.7



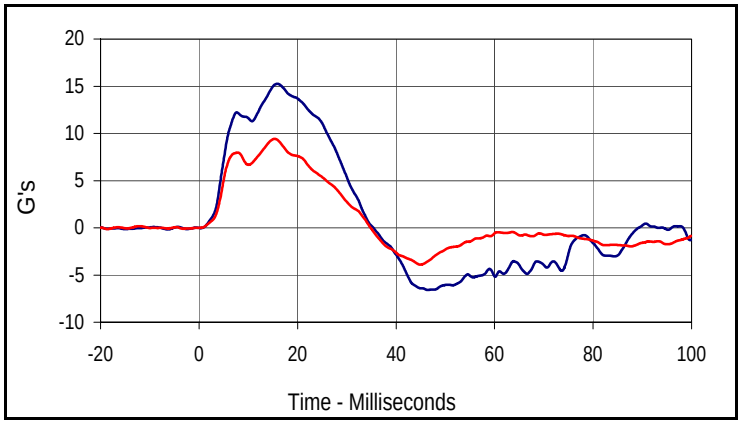
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
34.4	13.5	-0.1	44.6

Test Program:	SID IIs Thorax w/o Arm Calibration	Test Date:	11/3/10
ATD Serial No.:	299	Test I.D.:	TOAP10E

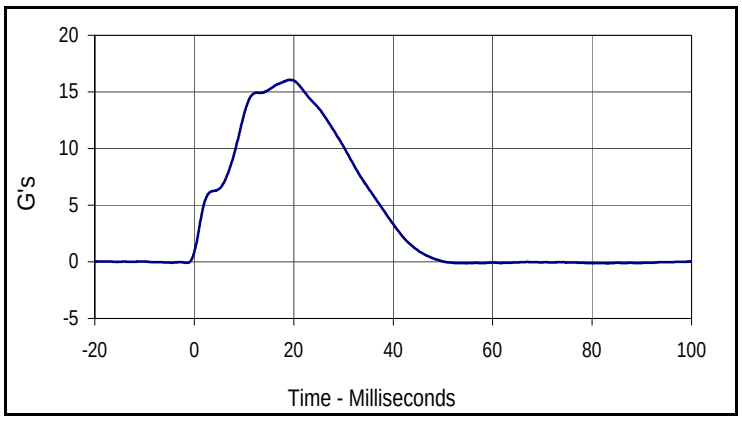
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Upper Thorax Rib Deflection	MM	32 to 40	36.8	Pass
Middle Thorax Rib Deflection	MM	39 to 45	42.3	Pass
Lower Thorax Rib Deflection	MM	35 to 43	39.6	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	15.3	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	9.4	Pass
Peak Impactor Acceleration	G's	14 to 18	16.1	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
36.8	20.5	0.0	-0.1
Middle Thorax Deflection			
Max	Time	Min	Time
42.3	21.4	0.0	-4.1
Lower Thorax Deflection			
Max	Time	Min	Time
39.6	22.0	0.0	0.2



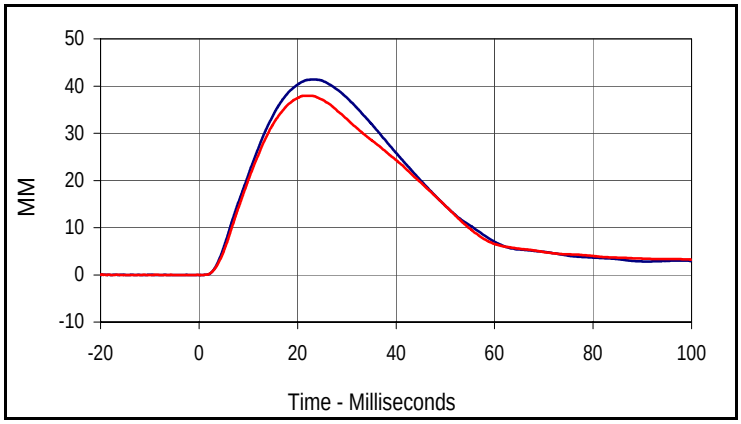
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.3	15.9	-6.6	46.5
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.4	15.3	-3.9	45.0



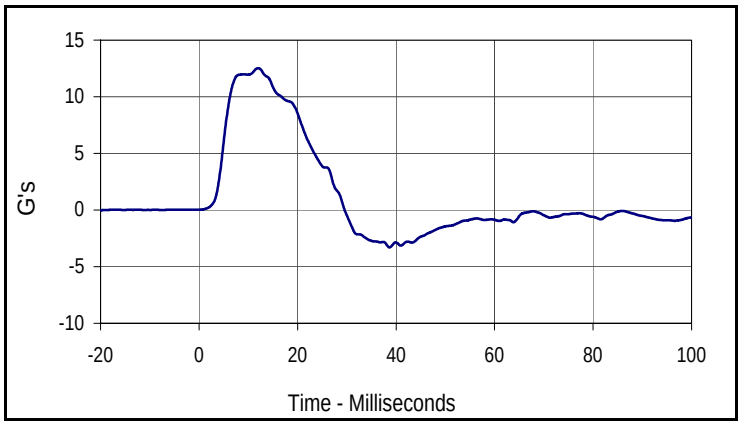
Curve Description			
Impactor Accleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.1	19.2	-0.1	83.0

Test Program:	SID IIs Abdomen Calibration	Test Date:	11/3/10
ATD Serial No.:	299	Test I.D.:	ABDP10E

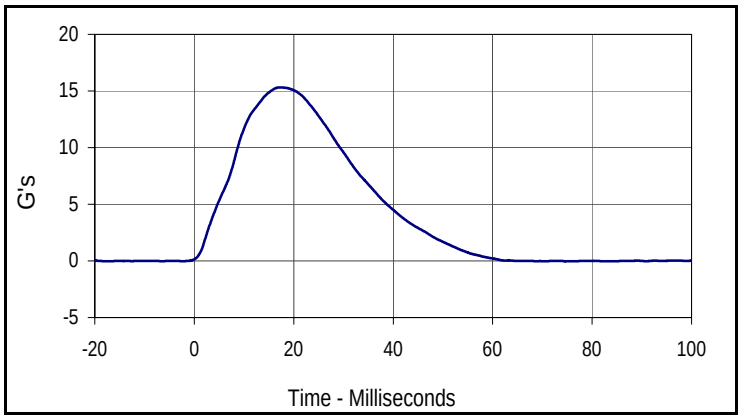
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.26	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	41.4	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	38.0	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.5	Pass
Peak Impactor Acceleration	G's	12 to 16	15.3	Pass
		Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
41.4	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
38.0	22.2	0.0	-6.3



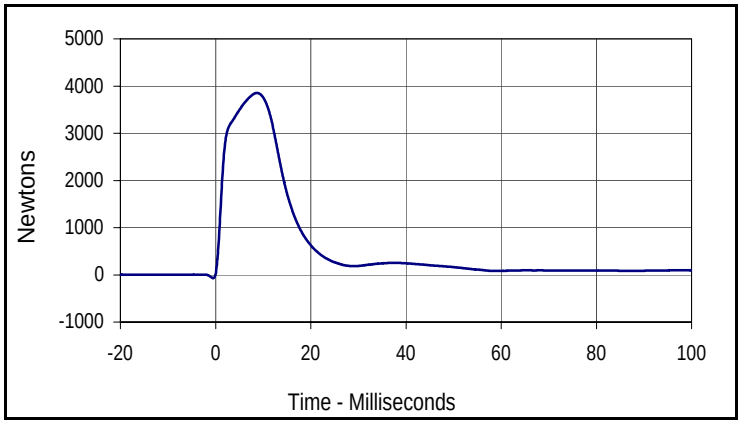
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.5	12.0	-3.3	38.7



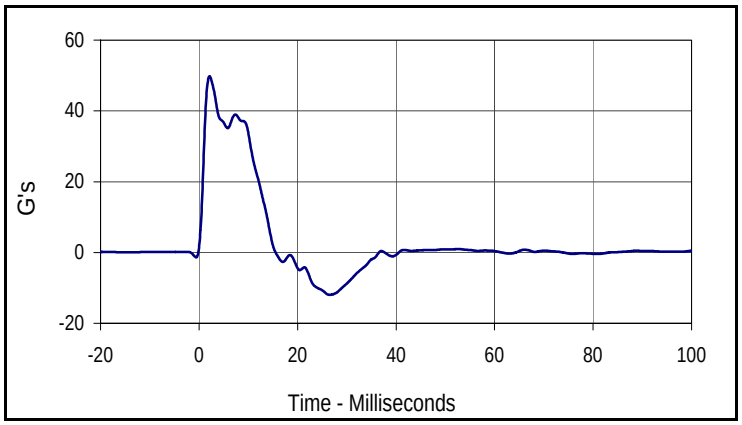
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.3	17.3	0.0	76.2

Test Program:	SID IIs Pelvis Acetabulum Calibration	Test Date:	11/3/10
ATD Serial No.:	299	Test I.D.:	PAP10E

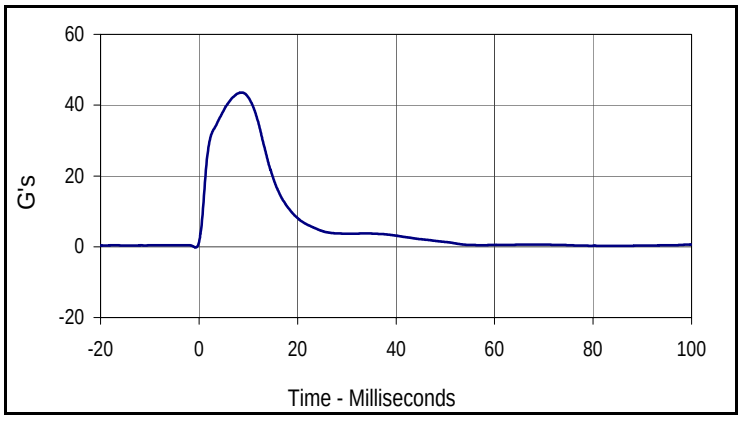
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.61	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	3853.4	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	39.0	Pass
Peak Impactor Acceleration	G's	38 to 47	43.6	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
3853.4	8.7	-70.2	-0.5



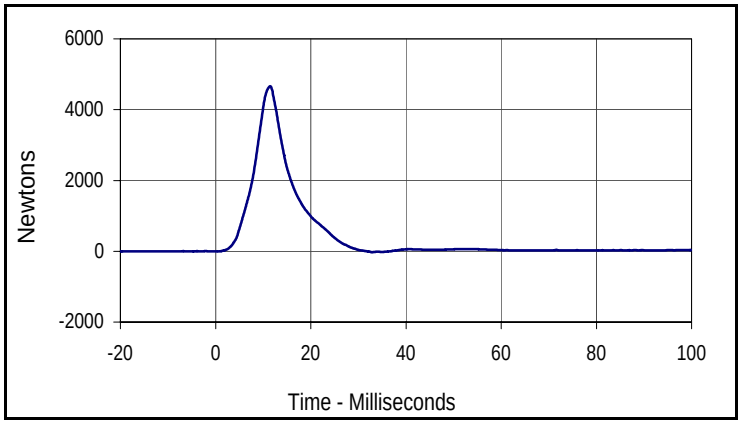
Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
49.8	2.1	-12.0	26.5



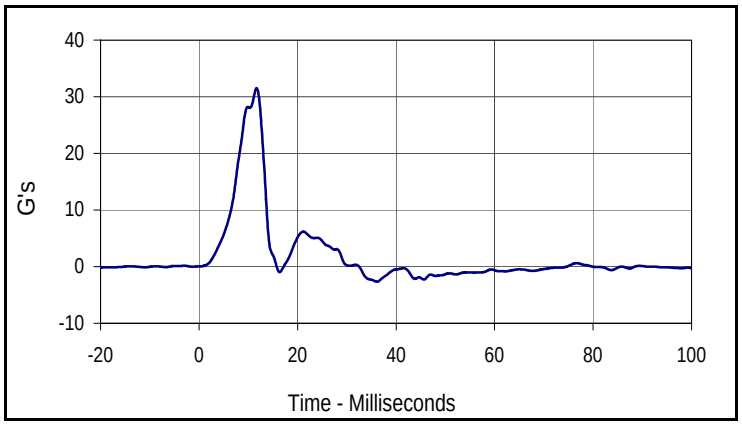
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
43.6	8.7	-0.2	-0.7

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	11/3/10
ATD Serial No.:	299	Test I.D.:	PLP10E

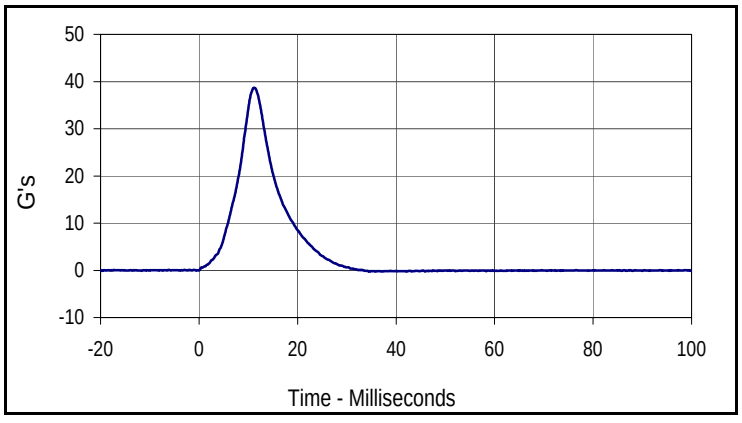
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.28	Pass
Peak Iliac Force	Newtons	4100 to 5100	4662.1	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	31.5	Pass
Peak Impactor Acceleration	G's	36 to 45	38.7	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4662.1	11.5	-25.7	32.9



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
31.5	11.7	-2.6	36.1

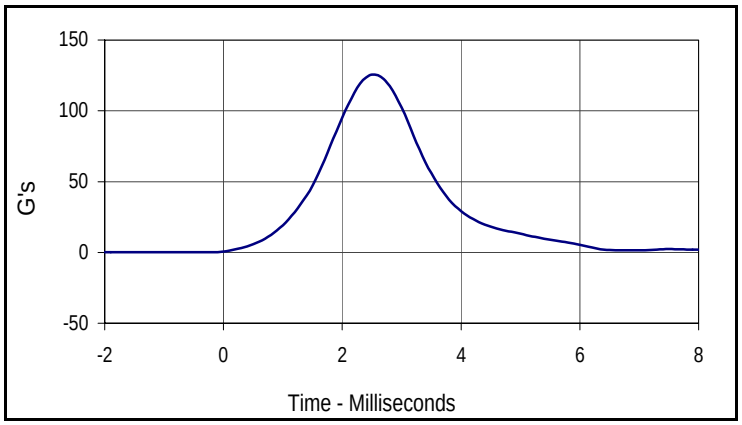


Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
38.7	11.2	-0.2	34.6

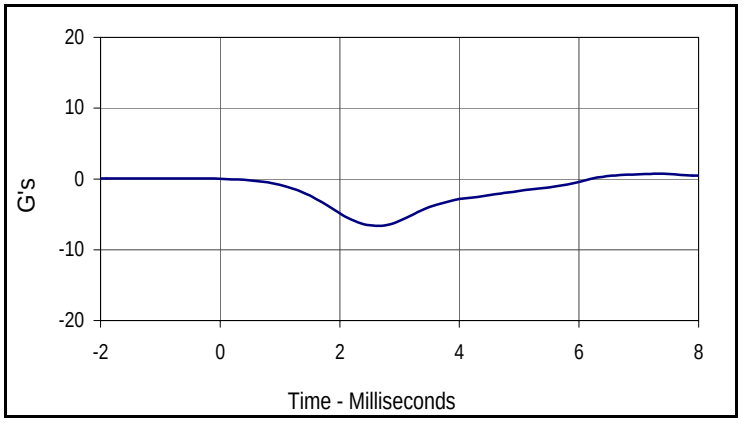
APPENDIX C
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID IIs Lateral Head Drop Calibration	Test Date:	11/9/10
ATD Serial No.:	299	Test I.D.:	HDP11A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	115 to 137	125.5	Pass
Peak Longitudinal Acceleration	G's	≤15	6.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	10.5	Pass
		Overall Test Results		Pass



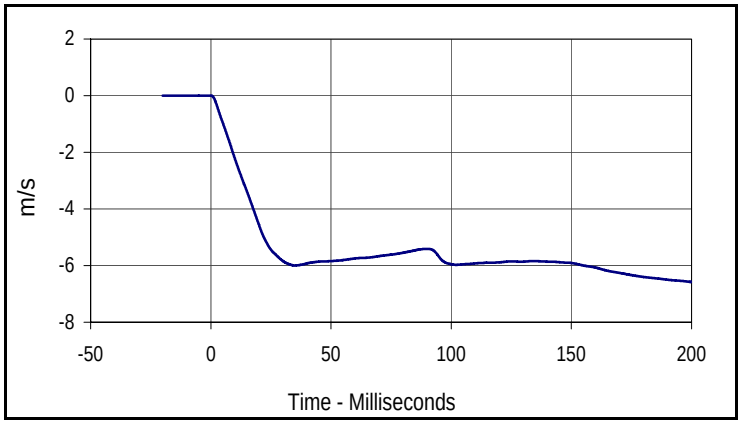
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
125.5	2.5	0.1	-2.0



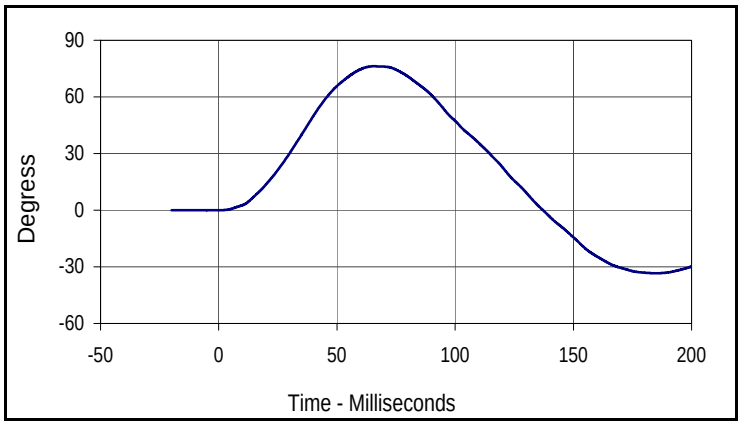
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.1	-0.2	-6.6	2.6

Test Program:	SID IIs Neck Calibration	Test Date:	11/9/10
ATD Serial No.:	299	Test I.D.:	NBP11A

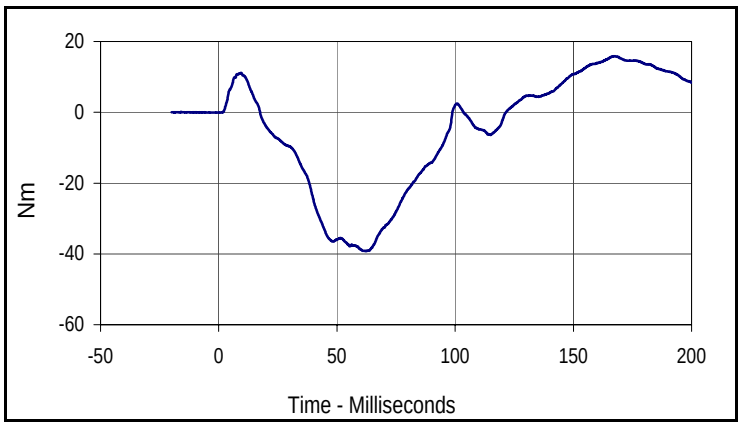
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.6	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.2	Pass
	15 msec	m/s	-3.30 to -4.10	-3.4	Pass
	20 msec	m/s	-4.40 to -5.40	-4.6	Pass
	25 msec	m/s	-5.40 to -6.10	-5.4	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.0	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	76.2	Pass
	Time	msec	50.0 to 70.0	65.6	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-39.2	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	121.5	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	-0.2	-6.6	200.0



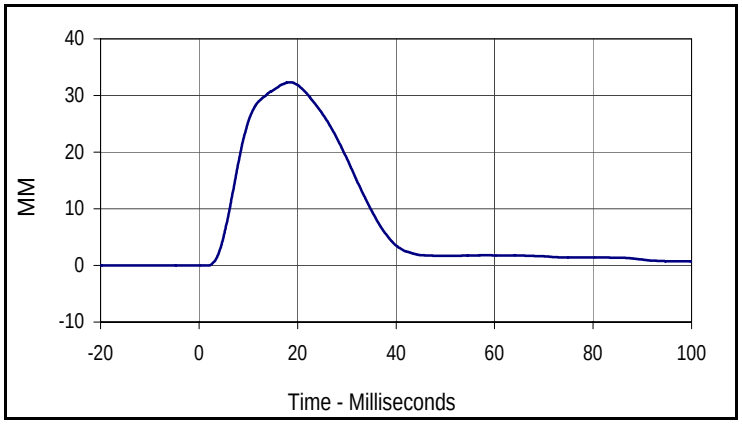
Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
76.2	65.6	-33.4	184.8



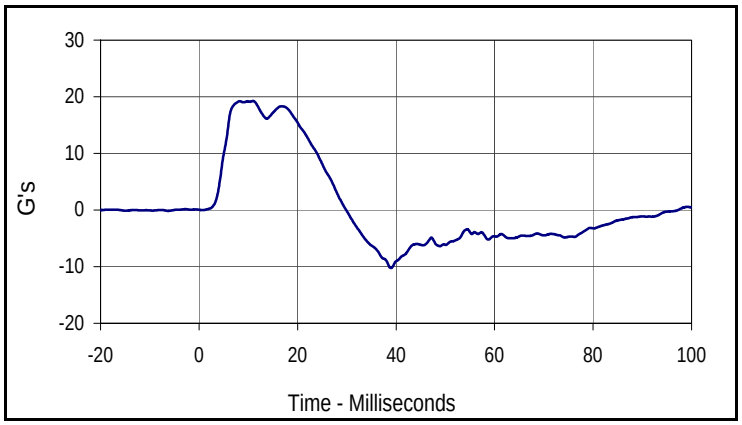
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
15.8	167.2	-39.2	62.5

Test Program:	SID IIs Shoulder Calibration	Test Date:	11/9/10
ATD Serial No.:	299	Test I.D.:	SHP11A

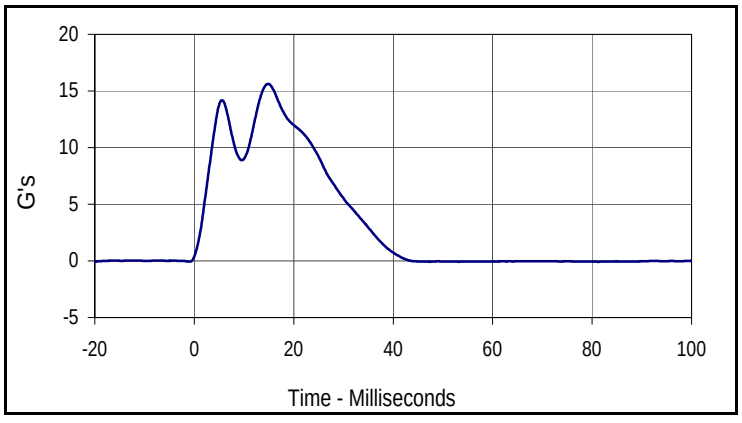
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.33	Pass
Shoulder Deflection	MM	28 to 37	32.3	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	19.3	Pass
Peak Impactor Acceleration	G's	13 to 18	15.6	Pass
		Overall Test Results		Pass



Curve Description			
Shoulder Acceleration			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
32.3	18.6	0.0	1.0



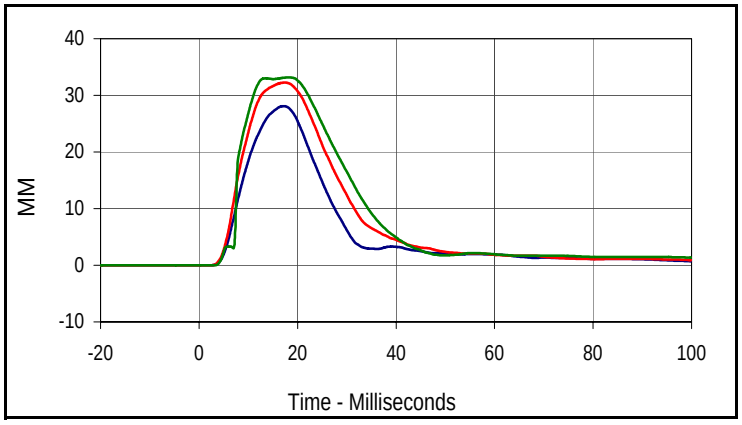
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
19.3	11.0	-10.2	39.0



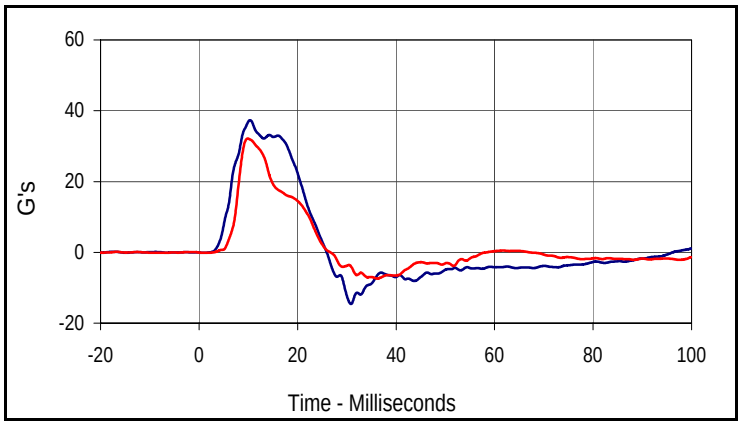
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.6	14.8	-0.1	81.3

Test Program:	SID IIs Thorax with Arm Calibration	Test Date:	11/9/10
ATD Serial No.:	299	Test I.D.:	TWAP11A

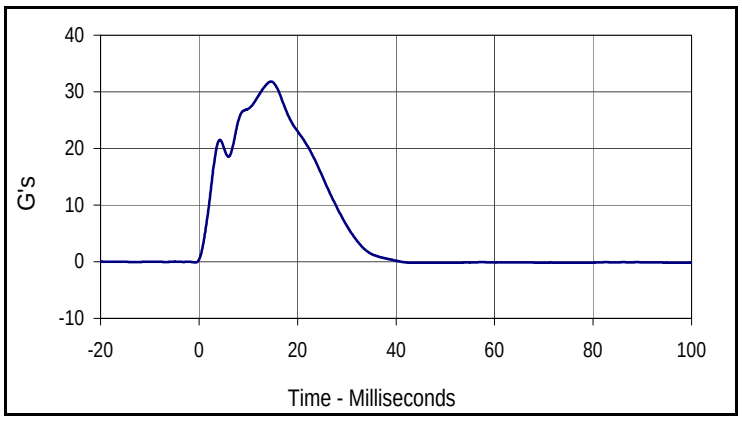
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.70	Pass
Shoulder Deflection	MM	31 to 40	33.4	Pass
Upper Thorax Rib Deflection	MM	25 to 32	28.1	Pass
Middle Thorax Rib Deflection	MM	30 to 36	32.3	Pass
Lower Thorax Rib Deflection	MM	32 to 38	33.1	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	37.3	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	32.2	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	31.8	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
32.3	17.4	0.0	-3.0
Lower Thorax Deflection			
Max	Time	Min	Time
33.1	18.4	0.0	-17.7



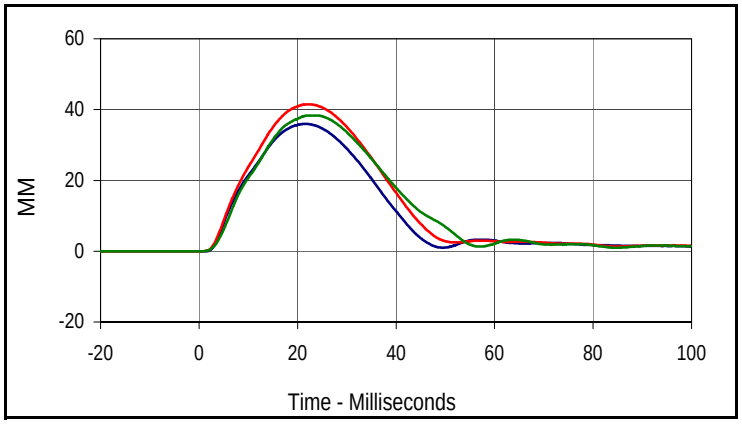
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
37.3	10.4	-14.6	30.8
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.2	9.9	-7.4	36.2



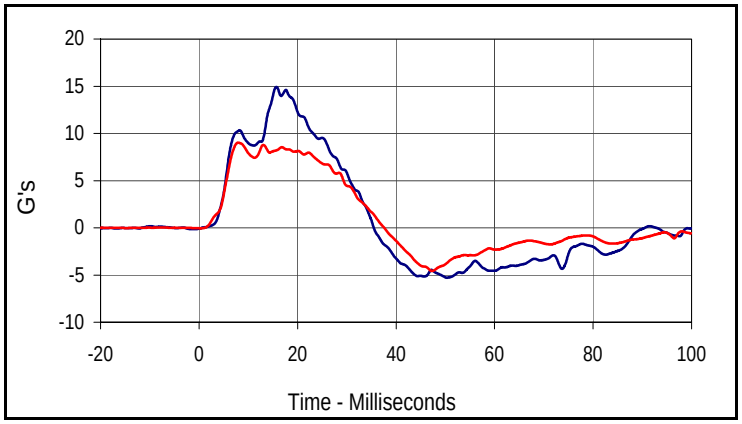
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
31.8	14.6	-0.2	50.4

Test Program:	SID IIs Thorax w/o Arm Calibration	Test Date:	11/9/10
ATD Serial No.:	299	Test I.D.:	TOAP11A

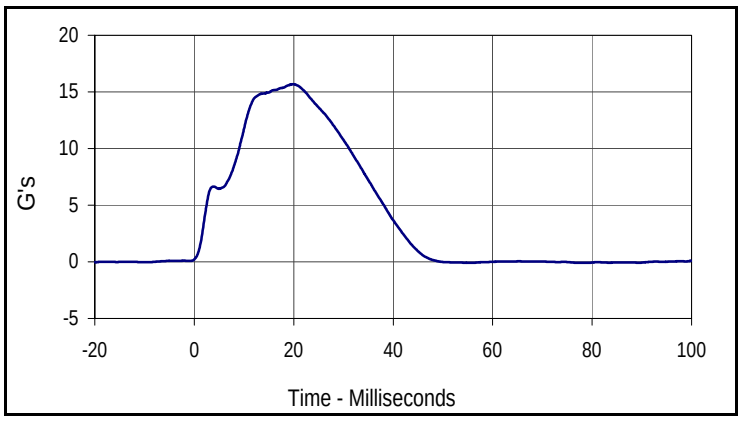
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Upper Thorax Rib Deflection	MM	32 to 40	35.9	Pass
Middle Thorax Rib Deflection	MM	39 to 45	41.5	Pass
Lower Thorax Rib Deflection	MM	35 to 43	38.3	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	14.9	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	9.0	Pass
Peak Impactor Acceleration	G's	14 to 18	15.7	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
35.9	21.5	0.0	-19.5
Middle Thorax Deflection			
Max	Time	Min	Time
41.5	22.1	0.0	-10.0
Lower Thorax Deflection			
Max	Time	Min	Time
38.3	22.6	0.0	-9.3



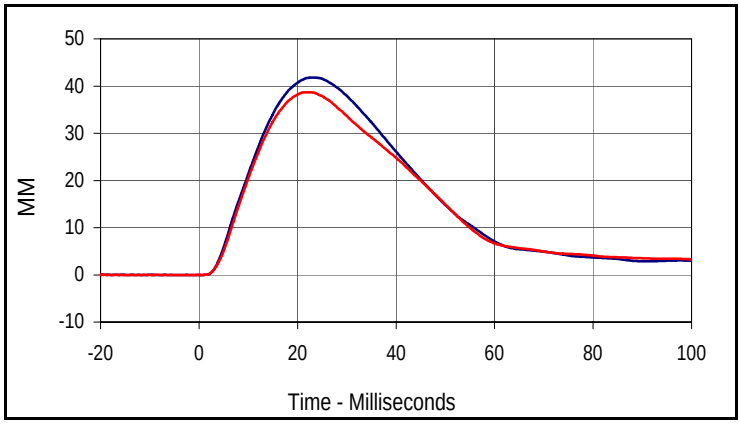
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.9	15.7	-5.3	50.3
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.0	8.0	-4.6	47.3



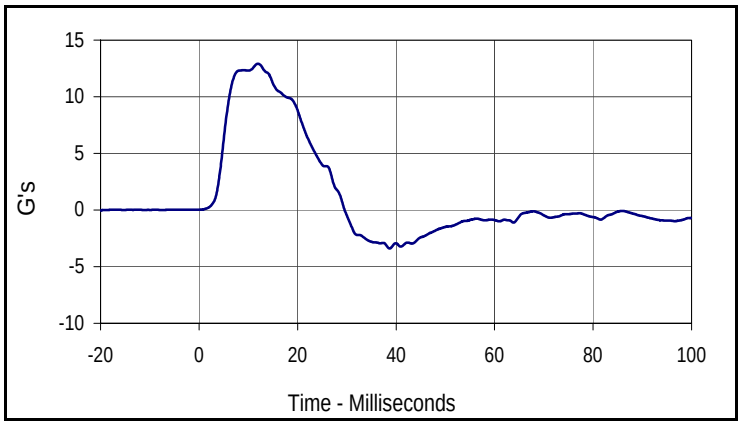
Curve Description			
Impactor Accleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.7	19.8	-0.1	0.0

Test Program:	SID IIs Abdomen Calibration	Test Date:	11/9/10
ATD Serial No.:	299	Test I.D.:	ABDP11A

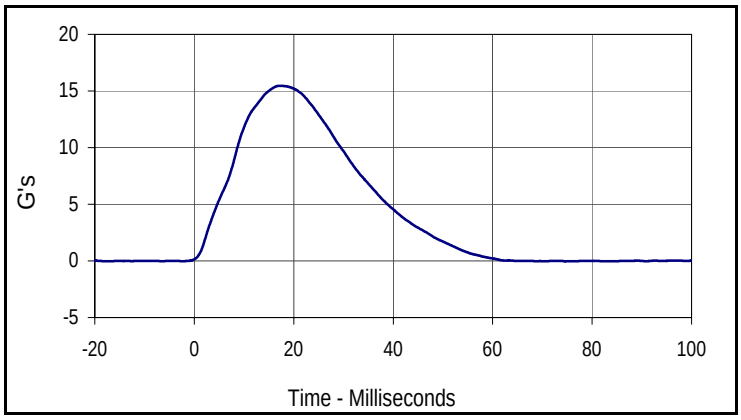
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	41.8	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	38.7	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.9	Pass
Peak Impactor Acceleration	G's	12 to 16	15.5	Pass
		Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
41.8	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
38.7	22.2	0.0	-6.3



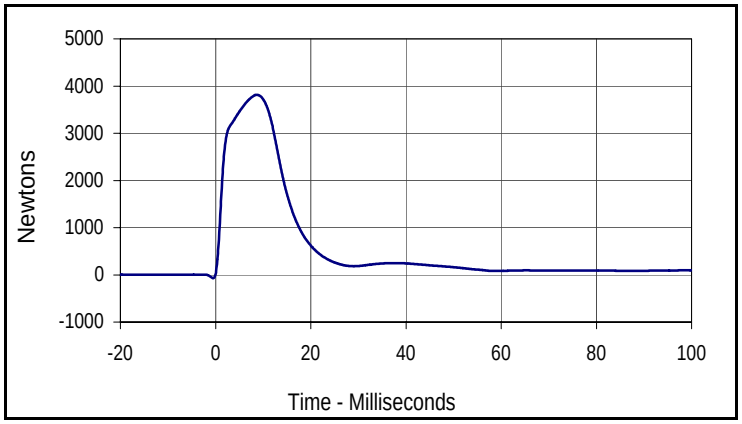
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.9	12.0	-3.4	38.7



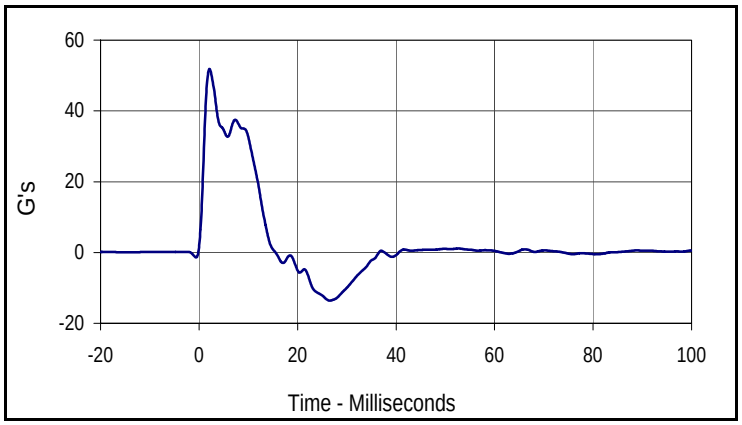
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.5	17.3	0.0	76.2

Test Program:	SID IIs Pelvis Acetabulum Calibration	Test Date:	11/9/10
ATD Serial No.:	299	Test I.D.:	PAP11A

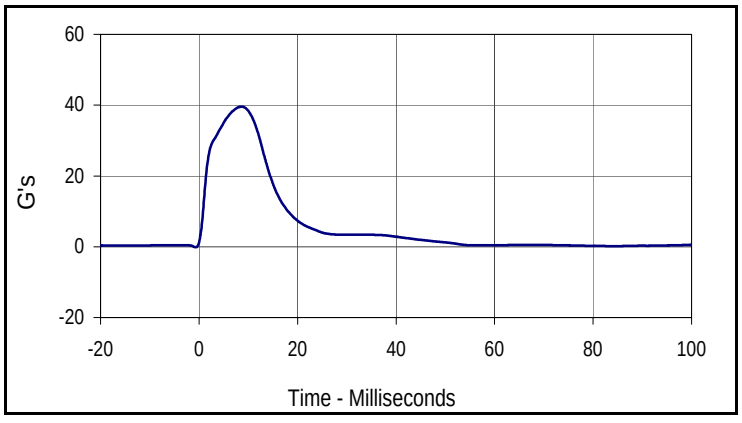
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.61	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	3814.9	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	37.5	Pass
Peak Impactor Acceleration	G's	38 to 47	39.6	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
3814.9	8.7	-69.4	-0.5



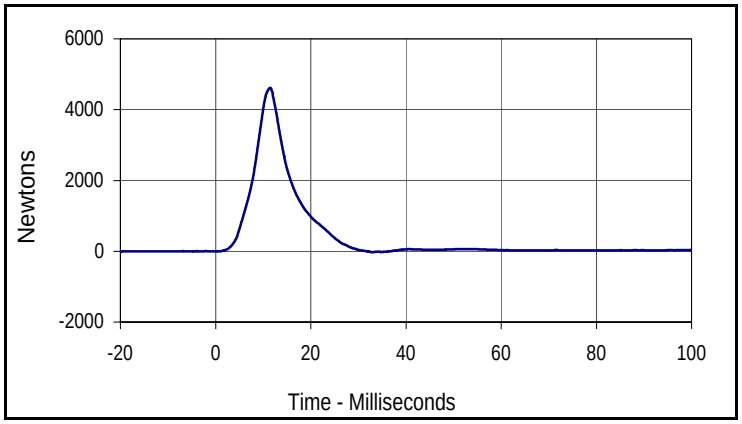
Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
51.9	2.1	-13.6	26.5



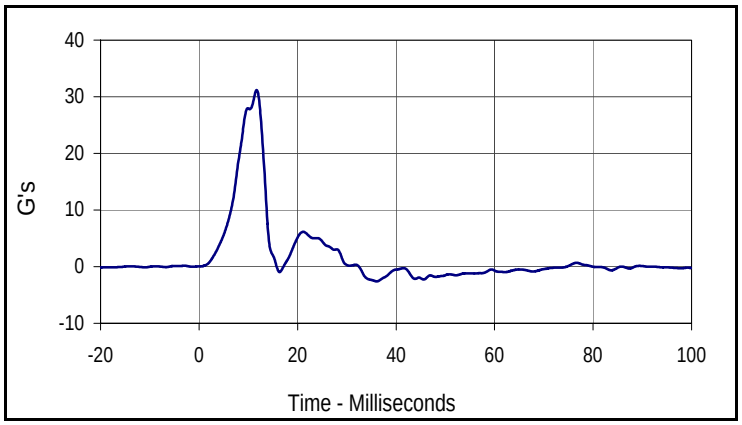
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
39.6	8.7	-0.1	-0.7

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	11/9/10
ATD Serial No.:	299	Test I.D.:	PLP11A

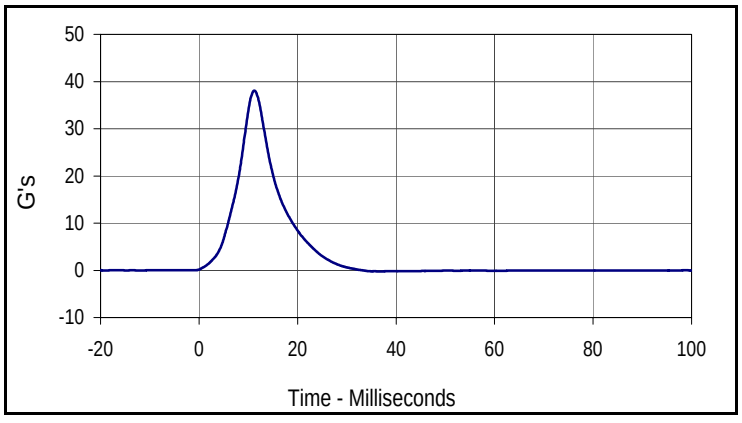
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.27	Pass
Peak Iliac Force	Newtons	4100 to 5100	4616.1	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	31.2	Pass
Peak Impactor Acceleration	G's	36 to 45	38.1	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4616.1	11.5	-26.1	32.9



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
31.2	11.7	-2.6	36.0



Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
38.1	11.2	-0.2	37.1