REPORT NUMBER: SPNCAP-KAR-11-018

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

CHRYSLER GROUP LLC
2011 JEEP GRAND CHEROKEE LAREDO 5-DOOR MPV

NHTSA No: MB0309

PREPARED BY:

KARCO ENGINEERING, LLC.

9270 HOLLY ROAD

ADELANTO, CA 92301

SEPTEMBER 14, 2010

FINAL REPORT

PREPARED FOR:

U.S. DEPARTMENT OF TRANSPORTATION

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

OFFICE OF CRASHWORTHINESS STANDARDS

MAIL CODE: NVS-111

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Approval Date: September 27, 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: _____

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16. Abstract

A 32.2 km/h (20 mph) 75° oblique impact Side NCAP test was conducted on the subject 2011 Jeep Grand Cherokee Laredo 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 September 14, 2010.

The impact velocity was 32.34 km/h and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 33.9° C. The test vehicle's post-test maximum crush was 463 mm at level 2. The test vehicle's performance was as follows:

Measurement Description	Passenger ATD		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})		1000	181.6
Resultant Lower Spine Acceleration	G	82	28
Combined Acetabulur and Iliac Pelvic Force	N	5525	2709

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
New Car Assessment Program (NCAP)
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Part 572V
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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 Jeep Grand Cherokee Laredo 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 Jeep Grand Cherokee Laredo 5-Door MPV. The subject vehicle was towed into the rigid pole at an angle of 74.5° and a velocity of 32.34 km/h. The test was conducted by KARCO Engineering, LLC. in Adelanto, California, on September 14, 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	182	28	Iliac Wing	658
			Acetabulur	2154
			Sum	2709

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	No		No	
Side Airbag 1 (Torso/Pelvis)	Yes	Yes	No	
Side Airbag 2 (Curtain)	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	No	No	
Seat Belt Load Limiter	Yes	No	No	
Other				

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 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10

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 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MB0309	Anti-Lock Brakes	Yes
Model Year	2011	All Wheel Drive	No
Make	Jeep	Power Steering	Yes
Model	Grand Cherokee Laredo	Driver Front Airbag	Yes
Body Style	5-Door MPV	Driver Curtain Airbag	Yes
VIN	1J4RS4GG8BC513259	Driver Head/Torso Airbag	No
Body Color	Bright Silver Metallic	Driver Torso Airbag	No
Delivery Date	7/30/2010	Driver Torso/Pelvis Airbag	Yes
Odometer Reading (km / mi)	201/125	Driver Pelvis Airbag	No
Dealer	Orange Coast Jeep	Driver Knee Airbag	No
Transmission	5-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)	3.6	Rear Pass. Toso/Pelvis Airbag	No
Engine Placement	Longitudinal	Rear Pass. Pelvis Airbag	No
Roof Rack	Yes	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? No

DATA FROM CERTIFICATION LABEL

Manufactured By	Chrysler Group LLC	GVWR (kg)	2949
Date of Manufacture	Jun-10	GAWR Front (kg)	1452
		GAWR Rear (kg)	1679

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity	2	3		5	
Capacity Weight (VCW) (kg)				476.0	*A*
DSC x 68.04 (kg)				340.2	*B*
Cargo Weight (RCLW) (kg)				135.8	*A-B*

VEHICLE SEAT TYPE

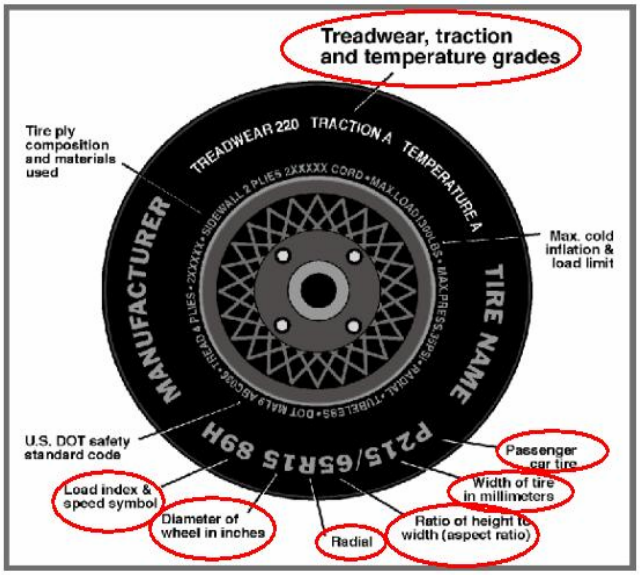
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable w/ Lever	Adjustable w/ Knob
Front Seat	Yes						Yes
Rear or Second Row Seat		Yes				Yes	
Third Row Seat							

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMATER DATA

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	350	350
Cold Pressure (kpa)	230	230
Recommended Tire Size	P245/70R17	P245/70R17
Tire Size on Vehicle	P245/70R17	P245/70R17
Tire Model	Fortera	Fortera
Tire Manufacturer	Goodyear	Goodyear
Treadwear	540	540
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel	2 Polyester, 2 Steel
Load Index/Speed Symbol	108T	108T
Tire Material	Polyester, Steel	Polyester, Steel
DOT Safety Code Right	4B83 JD1R 1510	4B83 JD1R 1510
DOT Safety Code Left	4B83 JD1R 1510	4B83 JD1R 1510

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMATER DATA

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	539.0	497.0		559.0	571.5		545.0	589.0	
Right	kg	508.0	503.5		519.5	575.0		505.5	592.5	
Ratio	%	51.1%	48.9%	100.0%	571.5%	51.5%	623.0%	47.1%	52.9%	100.0%
Total	kg	1047.0	1000.5	2047.5	1078.5	1146.5	2225.0	1050.5	1181.5	2232.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2047.5	A
Actual Weight of 1 P572V ATD Used	kg	49.0	B
Rated Cargo/Luggage Wt (RCLW)	kg	135.8	C
Calculated Vehicle Target Wt (TVTW)	kg	2232.3	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	As Delivered	As Tested	Fully Loaded
Driver Door Sill Angle (front-to-rear)	Deg	-0.9	-0.3	0.6
Front Passenger Sill Angle (front-to-rear)	Deg	-0.8	-0.3	0.5
Front Bumper Angle (left-to-right)	Deg	-0.2	0.2	0.1
Rear Bumper Angle (left-to-right)	Deg	-0.3	0.0	0.3
Vehicle CG (Aft of Front Axle)	mm	1422	1500	1541
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	10	13	13

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Weight of Ballast in Cargo Area	kg	150.0
Weight of Vehicle Components Removed	kg	59.5

Vehicle components removed to make Target Vehicle Test Weight:

Right Side Door Panels (8.0 kg), Trunk Lining (26.0 kg), Spare Tire (21.5 kg), Tools (4.0 kg)

TEST VEHICLE IMPACT POINT DATA

Measurement Description	Units	Value
Vertical Impact Reference Line (Aft of Front Axle)	mm	1290
Actual Impact Point (Aft of Front Axle)	mm	1288
Impact Point Difference (- forward/+ rearward)	mm	-2

DATA SHEET NO. 2

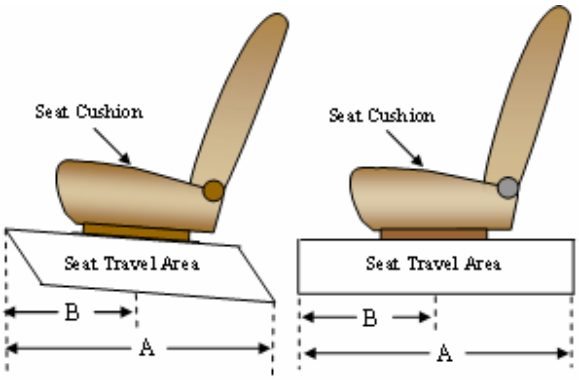
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10

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.

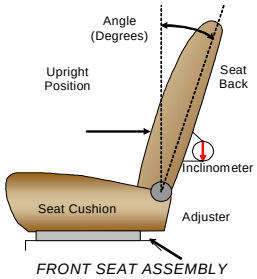


SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position	Cushion Range	Placed in Position
Driver Seat	276 mm	0 mm	2.4 - 5.7	4.1
Front Passenger Seat	270 mm	0 mm	Fixed	10.8
Rear Seat - Struck Side	Fixed	Fixed	Fixed	Fixed
Rear Seat - Non-Struck Side	Fixed	Fixed	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. The driver seat back angle is measured at the bottom of the headrest post parallel to the seat back using a digital inclinometer. The rear seat back angle is measured from vertical along the rearward surface of the seat back using a digital inclinometer.



SEAT BACK ANGLE POSITIONS

Seating Position	Degrees	Detent
Driver Seat Back Angle w/Seated Dummy	3.8	
Front Passenger Seat Back Angle	3.8	
Struck Side Rear Seat Back Angle	9.6	1
Non-Struck Side Rear Seat Back Angle	9.6	1

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 number 1 is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	5	1

DATA SHEET NO. 2 … (CONTINUED)

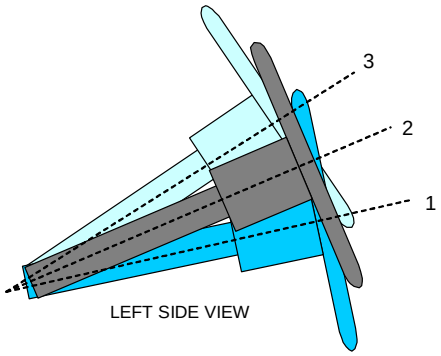
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10

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.



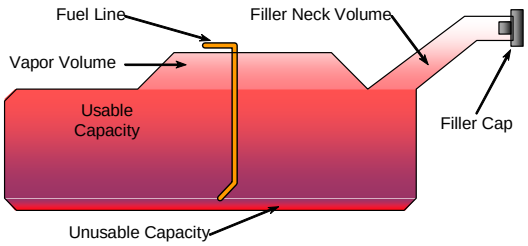
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Angle (°)	Fore-Aft Position (mm)
Lowermost Position, No. 1	20.5	0
Geometric Center Position, No. 2	22.5	28.5
Uppermost Position, No. 3	24.5	57
Steering Wheel Travel	4.0	57
Test Position	22.5	29

FUEL PUMP

The test vehicle is equipped with an electric fuel pump. The fuel pump starts pumping fuel when the ignition is in the on position. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the rear seat.



VEHICLE FUEL TANK ASSEMBLY

FUEL CAPACITY DATA

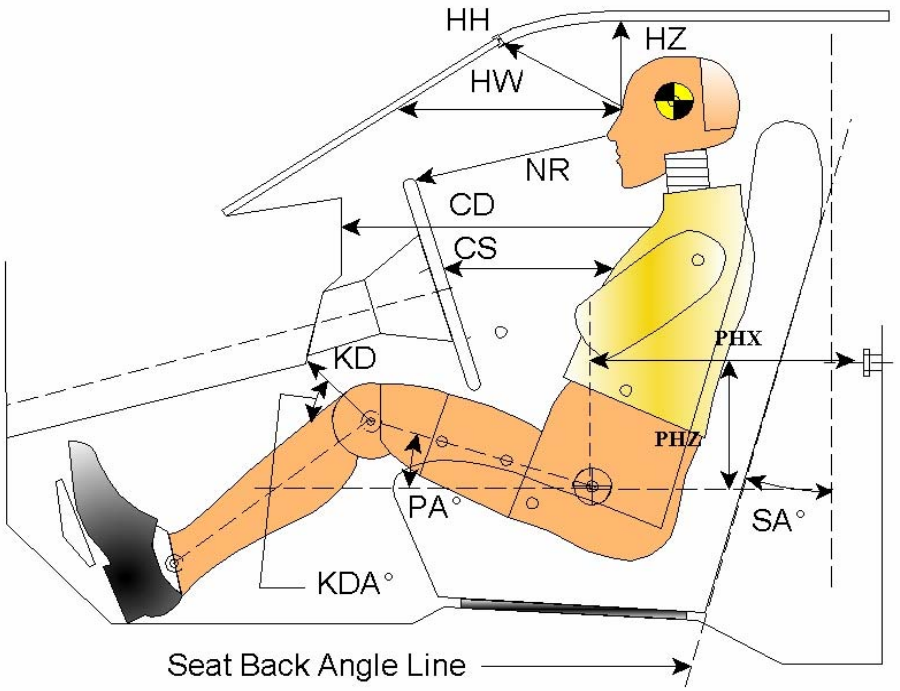
Description	Liters
Usable Capacity of "Standard Tank"	93.49
Usable Capacity of "Optional Tank"	
Usable Capacity of Standard Tank as Specified In Owner's Manual	
Usable Capacity of Optional Tank as Specified in Owner's Manual	
92 - 94% of Usable Capacity	86.01 to 87.88
Actual Amount of Stoddard Solvent Used	86.95
1/3 of Usable Capacity	31.16

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10



DUMMY LONGITUDINAL CLEARANCE DIMENSIONS (S/N: 307)

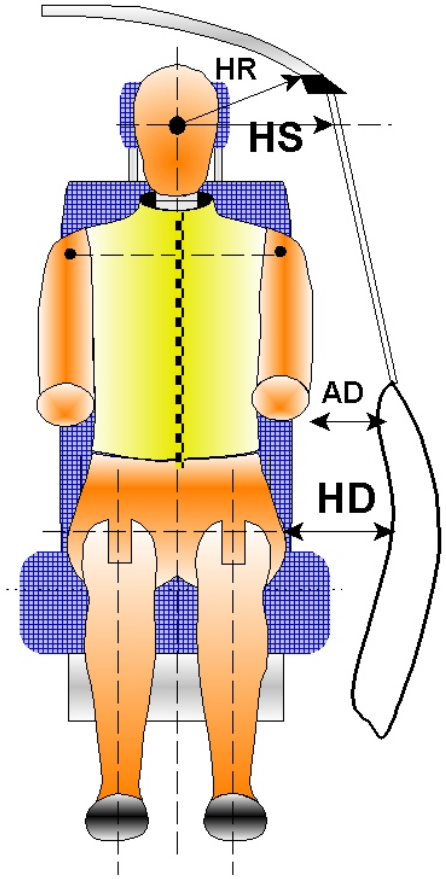
Driver Code	Description	Driver	
		Length (mm)	Angle (º)
HH	Head to Header	313	44.8
HW	Head to Windshield	620	
HZ	Head to Roof	205	
NR	Nose to Rim	238	6.5
CD	Chest to Dash	409	13.0
CS	Chest to Steering Wheel	202	17.2
KDL / KDAL°	Left Knee to Dash	110	42.8
KDR / KDAR°	Right Knee to Dash	80	
PA°	Pelvic Angle		24.6
PHX	H-Point to Striker (x-direction)	361	
PHZ	H-Point to Striker (z-direction)	51	
SA°	Seat Back Angle		3.8

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10



DUMMY LATERAL CLEARANCE DIMENSIONS (S/N: 307)

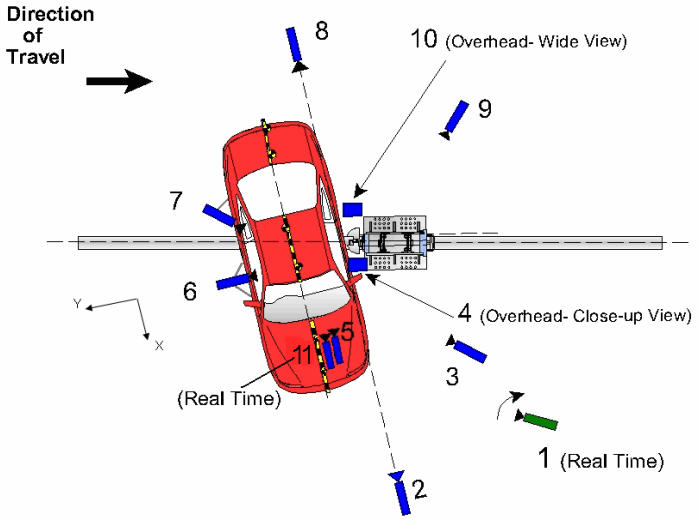
Code	Measurement Description	Units	Driver
HR	Head to Side Header	mm	310
HS	Head to Side Window	mm	385
AD	Arm to Door	mm	166
HD	H-Point to Door	mm	182

DATA SHEET NO. 5

CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10



CAMERA LOCATIONS

Camera No.	View	Coordinates (mm)			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	1.46	0.46	-1.43	35	400
6	On-Board - Dummy Side View	0.01	1.65	-1.36	14	1000
7	On-Board - Dummy Rear Oblique View	-0.84	1.58	-1.34	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	1.56	0.52	-1.43		30

Reference: +X = Forward of Vehicle
+Y = Right of Vehicle
+Z = Down

* All Measurements accurate to ± 6 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 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

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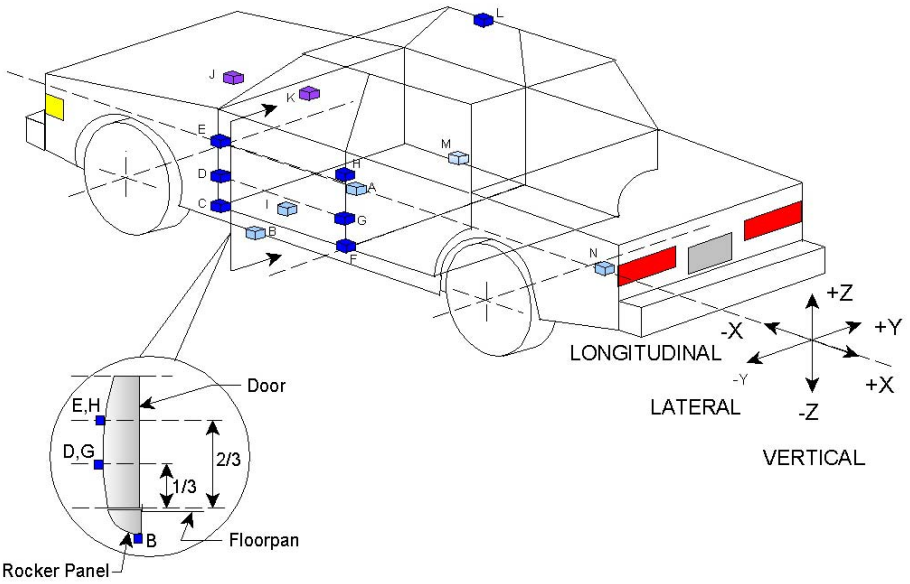

VEHICLE ACCELEROMETER LOCATIONS

	Sensor Description	Coordinates (mm)		
		X	Y	Z
A	Vehicle CG Accelerometer	-1985	0	585
	Vehicle CG ARS	-1985	0	585
B	Left Floor Sill	-2840	-610	275
C	A-Pillar Sill	-3265	-815	535
D	A-Pillar Lower	-3265	-815	800
E	A-Pillar Mid	-3265	-815	1065
F	B-Pillar Sill	-2085	735	505
G	B-Pillar Lower	-2085	-735	770
H	B-Pillar Mid	-2085	-735	995
I	Driver Seat	-2415	-610	515
J	Engine Top	-4095	110	905
K	Firewall	-3610	395	1040
L	Right Roof Sill	-2230	585	1685
M	Right Floor Sill	-2070	735	535
N	Rear Floorpan	-685	-450	565

DATA SHEET NO. 7

RIGID POLE LOAD CELL DATA

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

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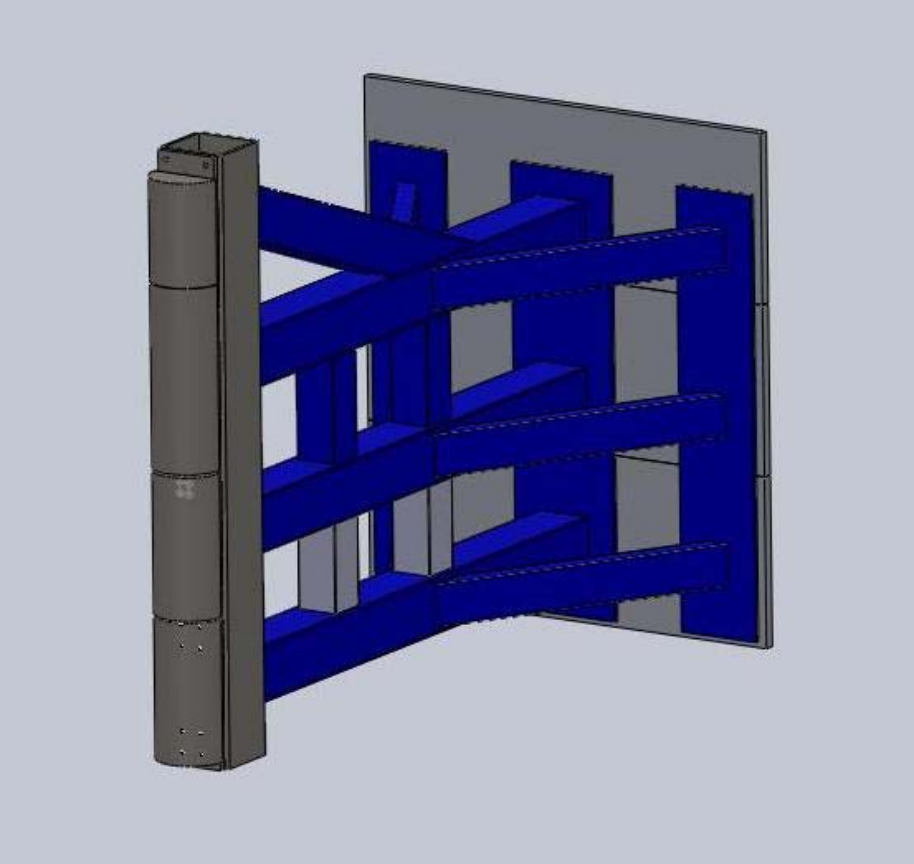


RIGID POLE LOAD CELL LOCATIONS

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 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Driver Dummy
Dummy Type/Serial No.	P572V (SID-IIs) / Serial No. 299
Head Contact	Curtain airbag, Head restraint
Upper Torso Contact	Torso/Pelvis airbag, Door panel
Lower Torso Contact	Torso/Pelvis airbag, Door panel
Left Knee Contact	Door panel, Right knee, Knee bolster
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	

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	No	No	
Seat Belt Load Limiter	Yes	No	No	
Other				

VEHICLE SPEED AND IMPACT DATA

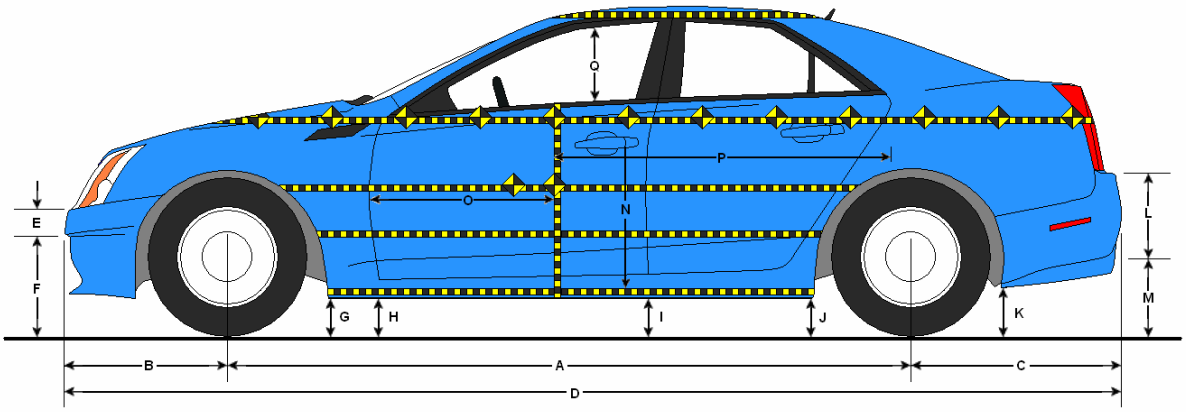
Measured Parameter	Units	Requirement	Value
Horizontal Offset From Vertical Reference Line	mm	+/- 38	-2 (Right)
Trap No. 1 Velocity (Primary)	km/h	30.4 to 32.0	32.3
Trap No. 2 Velocity (Redundant)	km/h	30.4 to 32.0	32.4

DATA SHEET NO. 9

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10



LEFT SIDE VIEW

VEHICLE PRE-AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2911	2823	-88
B	Front Axle to FSOV	887	902	15
C	Rear Axle to RSOV	1023	1049	26
D1	Total Vehicle Length at Left Side	3517	3397	-120
D2	Total Vehicle Length at Centerline	4803	4775	-28
D3	Total Vehicle Length at Right Side	3519	3540	21
E	Front Bumper Thickness	170	170	0
F	Front Bumper Bottom to Ground	524	596	72
G	Sill Height at Front Wheel Well	258	296	38
H	Sill Height at Front Door Leading Edge	266	306	40
I	Sill Height at B-Pillar	321	375	54
J1	Sill Height at Rear Wheel Well	280	347	67
J2	Pinch Weld Height at Rear Wheel Well	292	352	60
K	Sill Aft of Rear Wheel Well	331	380	49
L	Rear Bumper Thickness	131	130	-1
M	Rear Bumper Bottom to Ground	577	618	41
N	Sill Height to Window Bottom Sill	727	739	12
O	Front Door Leading Edge to Impact CL	663	542	-121
P	Rear Door Trailing Edge to Impact CL	1437	1303	-134
Q	Front Window Opening	444	465	21
R	Right Side Length	3519	3540	21
S	Left Side Length	3517	3397	-120
T	Vehicle Width at B-Pillar	1910	1818	-92

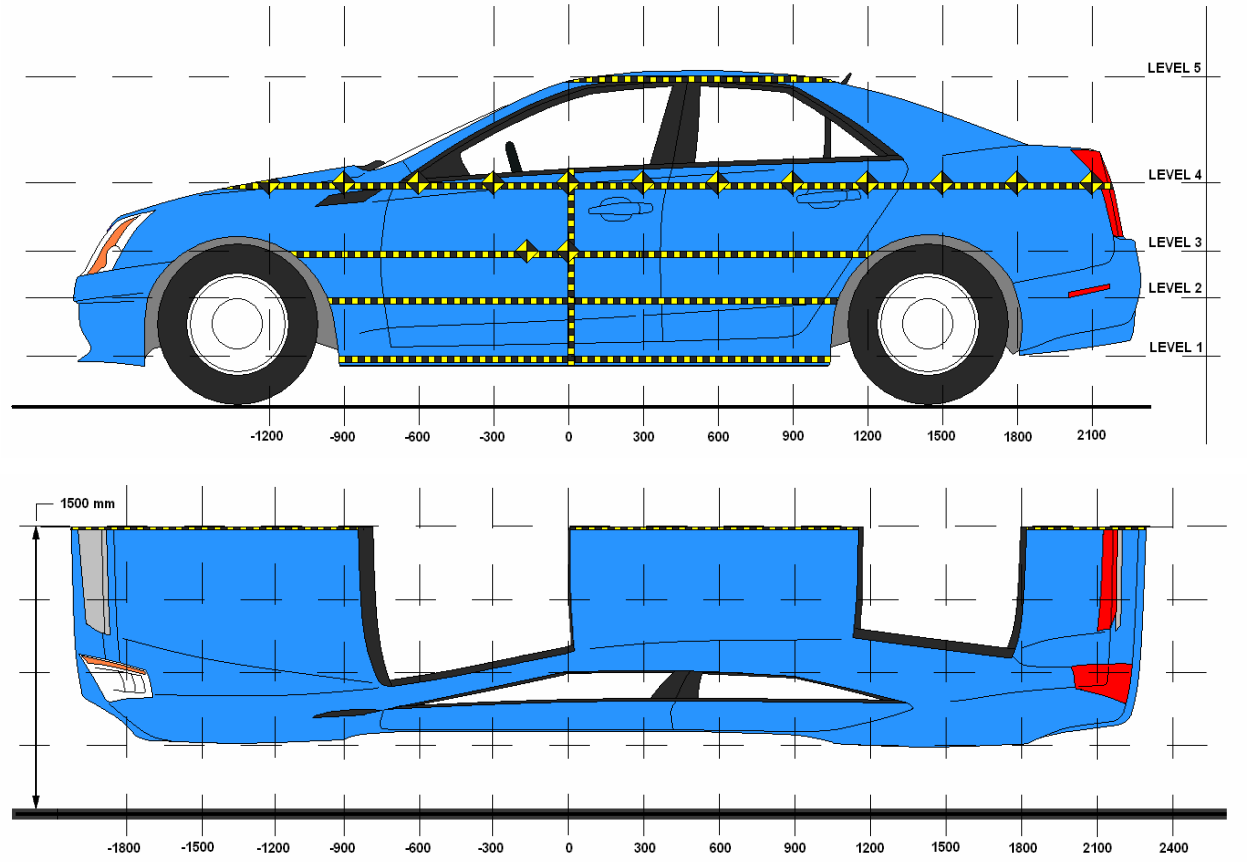
All measurements in mm with tolerance of ±3mm

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10



NOTE: All measurements are in millimeters (mm)

Level	Description	Height Above Ground (mm)
1	Sill Top Height	351
2	Occupant H-Point Height	808
3	Mid-Door Height	769
4	Window Sill Height	1141
5	Window Top Height	1653

DATA SHEET NO. 10 … (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900		541	542	662			630	636	742			89	94	80	
-750	603	556	554	643		692	635	639	732		89	79	85	89	
-600	612	566	569	630		747	686	684	725		135	120	115	95	
-450	612	564	567	620		804	771	767	783		192	207	200	163	
-300	612	562	566	612		865	867	864	855		253	305	298	243	
-150	612	561	565	606		931	956	955	935		319	395	390	329	
0	614	561	565	600		1018	1024	1024	1026		404	463	459	426	
150	614	562	565	597		955	988	993	1003		341	426	428	406	
300	612	563	567	594	826	841	859	858	874	1063	229	296	291	280	237
450	619	566	570	594	824	763	718	714	749	1011	144	152	144	155	187
600	622	571	575	594	821	724	700	696	724	966	102	129	121	130	145
750	625	577	581	594	821	702	683	679	704	919	77	106	98	110	98
900	628	583	586	595	822	680	665	663	686	907	52	82	77	91	85
1050	613	568	567	597	824	637	620	623	667	896	24	52	56	70	72
1200		540	541	563	825		570	571	618	888		30	30	55	63
1350				592	830				626	885				34	55
1500				602	837				648	884				46	47
1650				607	847				645	888				38	41
1800				614	860				647	890				33	30
1950				622	896				653	895				31	-1
2100				638	961				663	924				25	-37
2250															
2400															
2550															
2700															
2850															

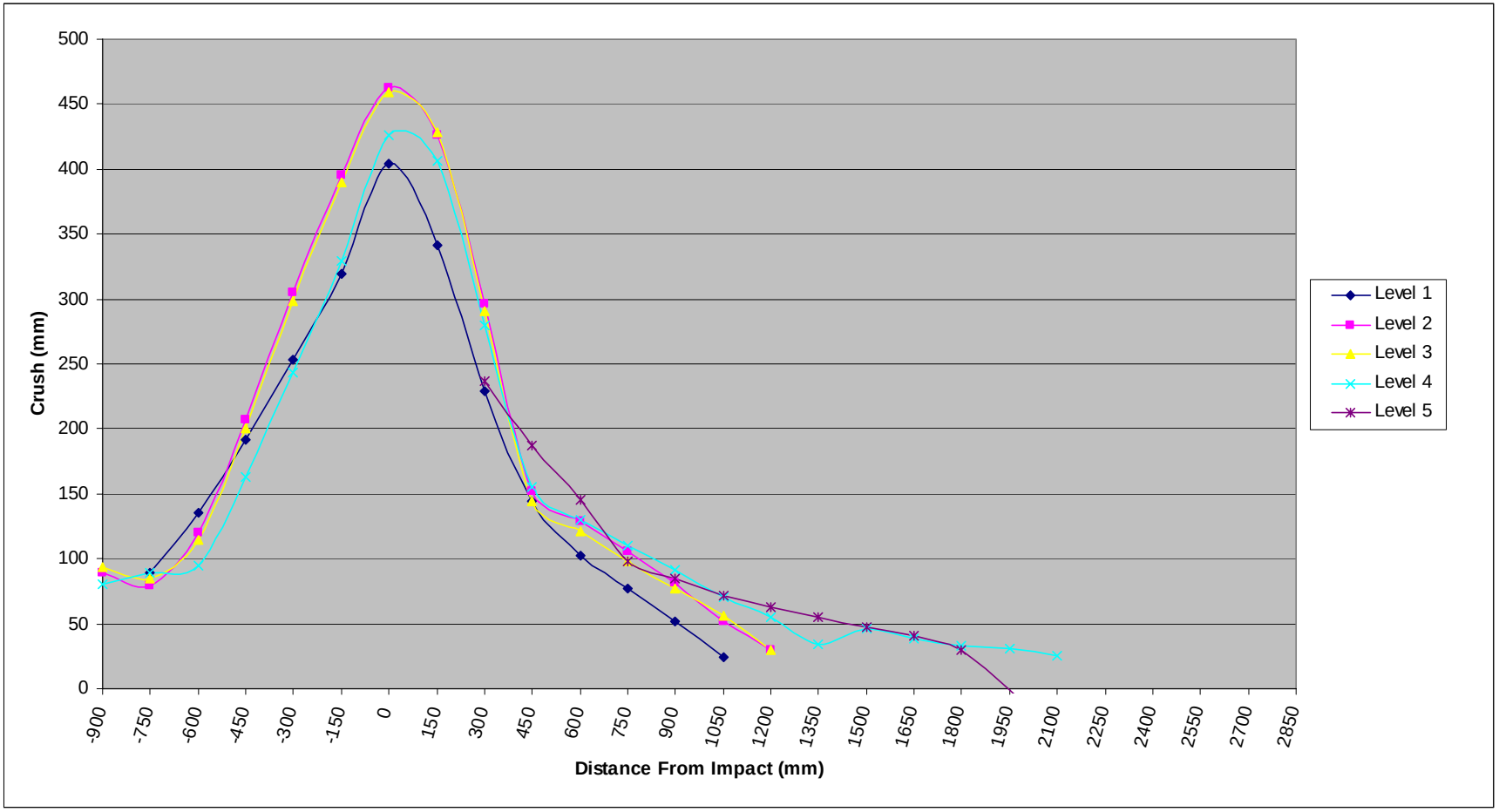
MAXIMUM CRUSH DATA

	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	404	463	459	426	237
Distance From Impact	mm	0	0	0	0	300

DATA SHEET NO. 10 … (CONTINUED)

VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2011 Jeep Grand Cherokee Laredo 5-Door MPV	NHTSA No.	MB0309
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole	Test Date:	09/14/10



DATA SHEET NO. 11

FMVSS NO. 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

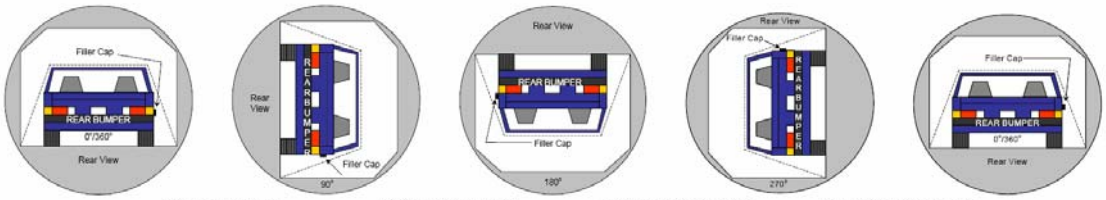
Temperature at Time of Impact: 33.9° C Test Time: 12:10 PM

A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)

B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)

C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)

D. Spillage Details: No spillage occurred



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	80	300	380
90° To 180°	85	305	390
180° To 270°	76	300	376
270° To 360°	78	300	378

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

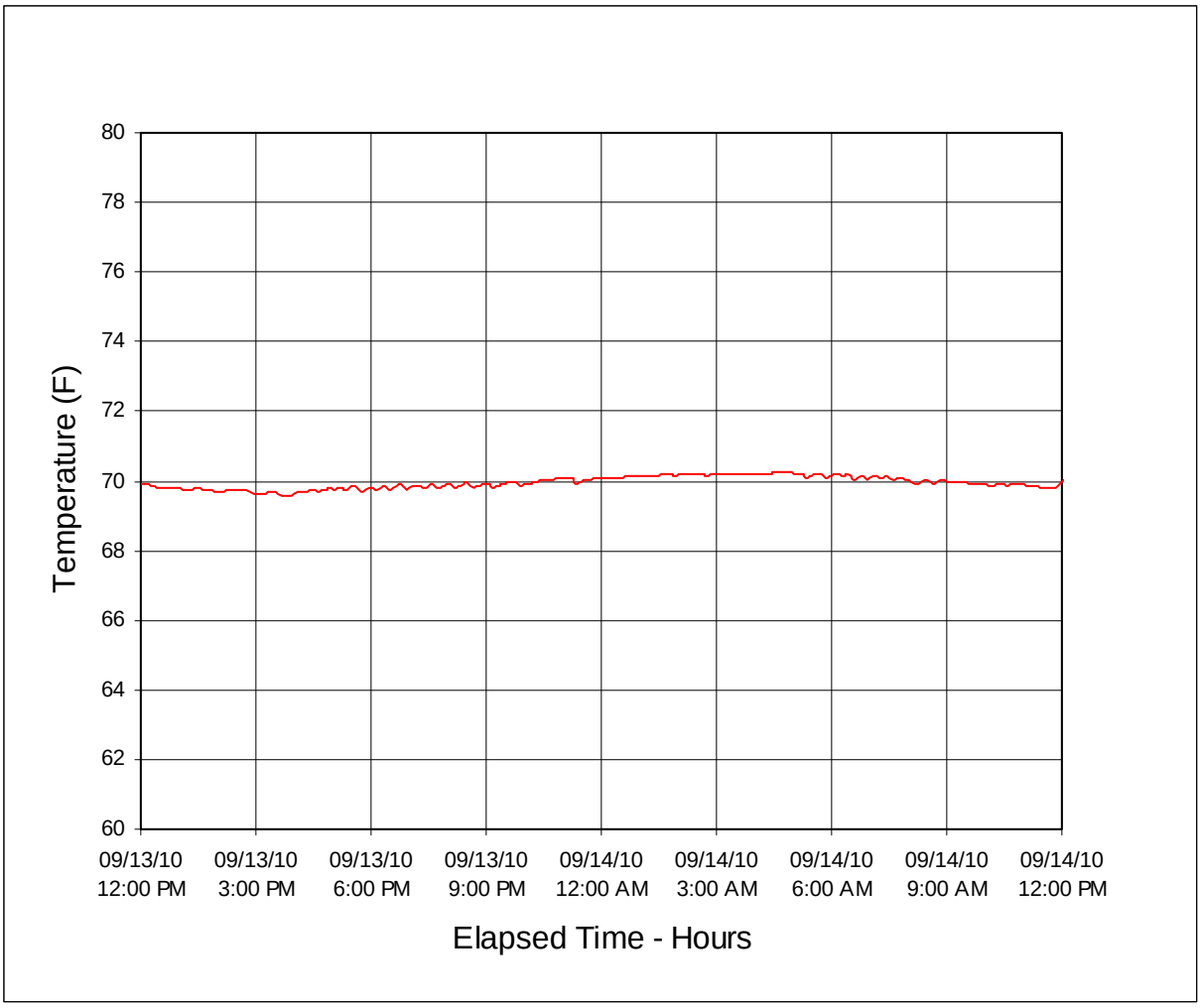
Test Phase	Spillage Location
0° To 90°	None
90° To 180°	None
180° To 270°	None
270° To 360°	None

DATA SHEET NO. 12

DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2011 Jeep Grand Cherokee Laredo 5-Door MPV NHTSA No. MB0309

Test Program: 32 km/h (20 mph) Side Impact NCAP 75°Rigid Pole Test Date: 09/14/10



APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

FIGURE 1. 2011 Jeep Grand Cherokee Laredo 4x2 Side Pole As Delivered

FIGURE 2. 2011 Jeep Grand Cherokee Laredo 4x2 Side Pole As Delivered

FIGURE 3. Pre-Test Frontal View of Test Vehicle

FIGURE 4. Post-Test Frontal View of Test Vehicle

FIGURE 5. Pre-Test Left Front ¾ View of Vehicle

FIGURE 6. Post-Test Left Front ¾ View of Vehicle

FIGURE 7. Pre-Test Left Side View of Vehicle

FIGURE 8. Post-Test Left Side View of Vehicle

FIGURE 9. Pre-Test Left Rear ¾ View of Test Vehicle

FIGURE 10. Post-Test Left Rear ¾ 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

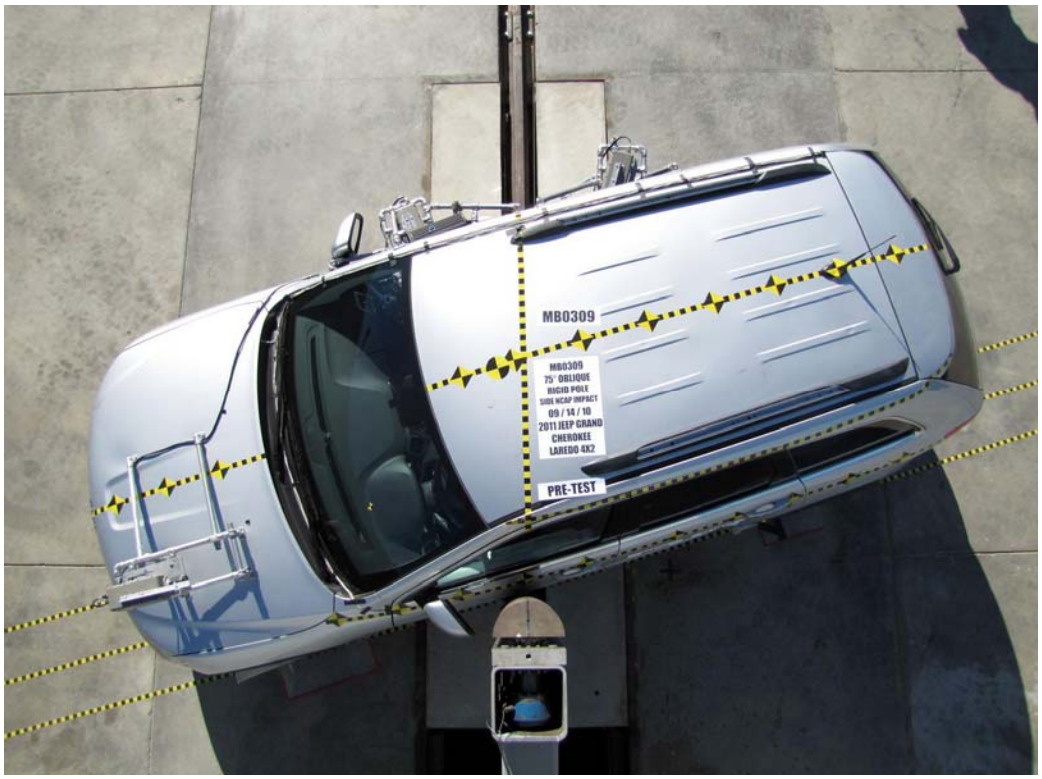


FIGURE 15. Pre-Test Overhead View of Test Vehicle and Pole

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 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

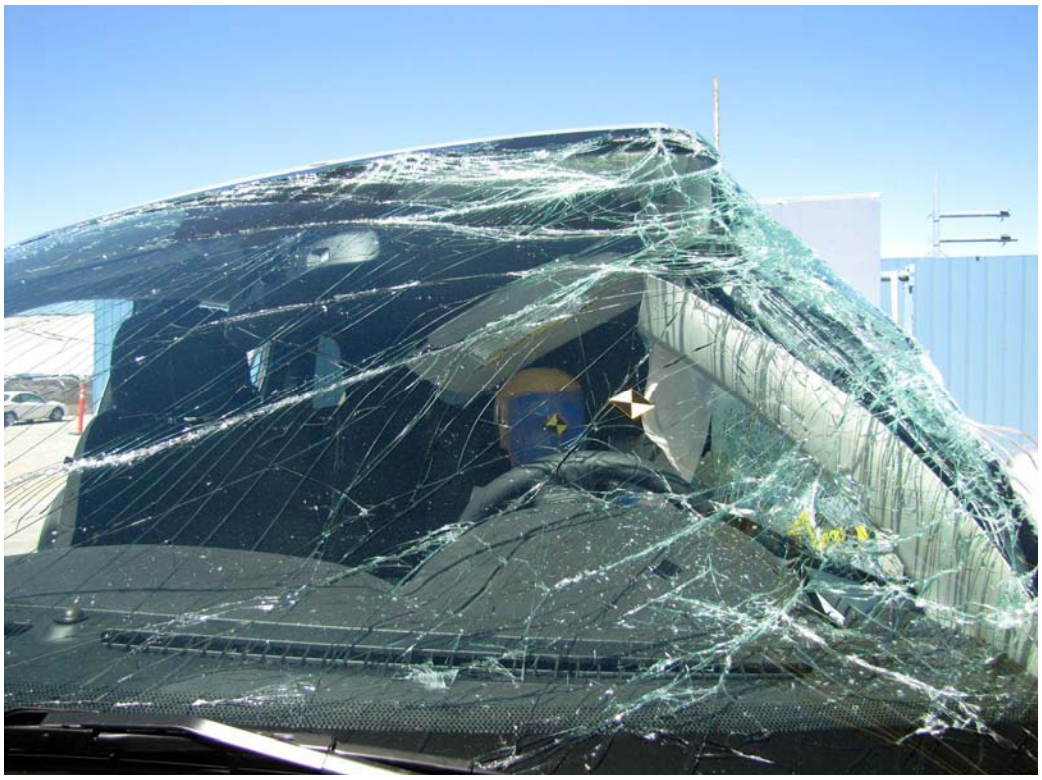


FIGURE 22. Post-Test Front Close-Up View of Dummy

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

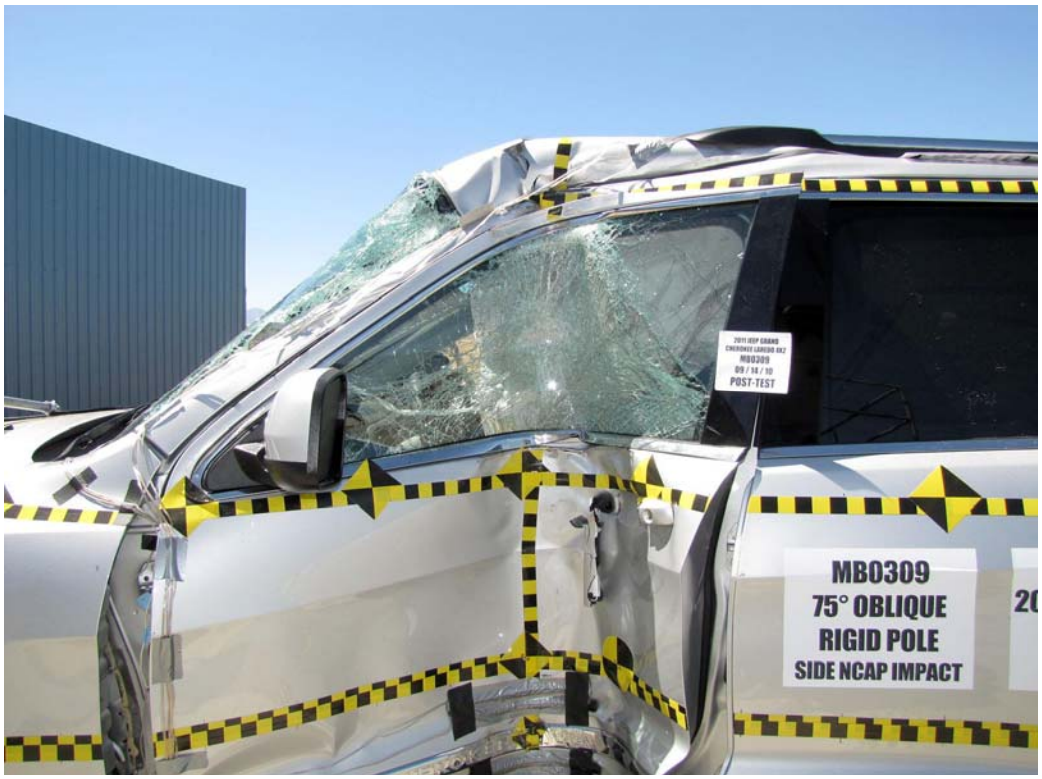


FIGURE 25. Post-Test Left Side View of Dummy Shoulder and Driver Door Top View

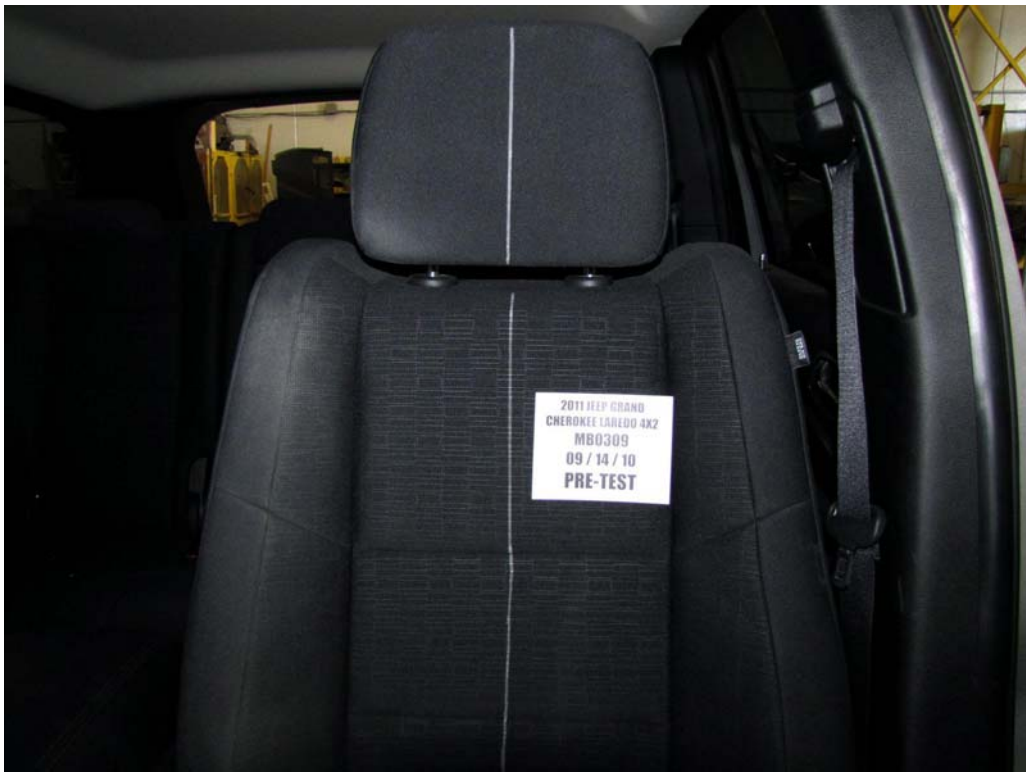


FIGURE 26. Pre-Test Frontal View of Seat Back Prior to Dummy Positioning

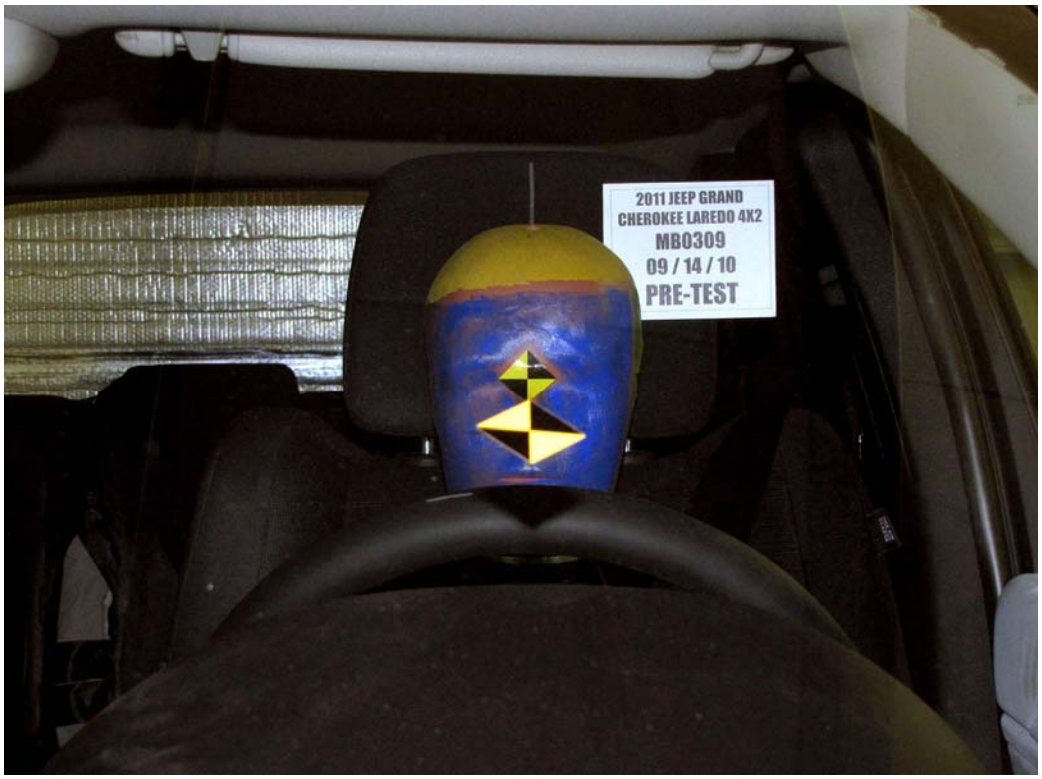


FIGURE 27. Pre-Test Frontal View of Dummy Head and Shoulders in Relation to Head Restraint

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

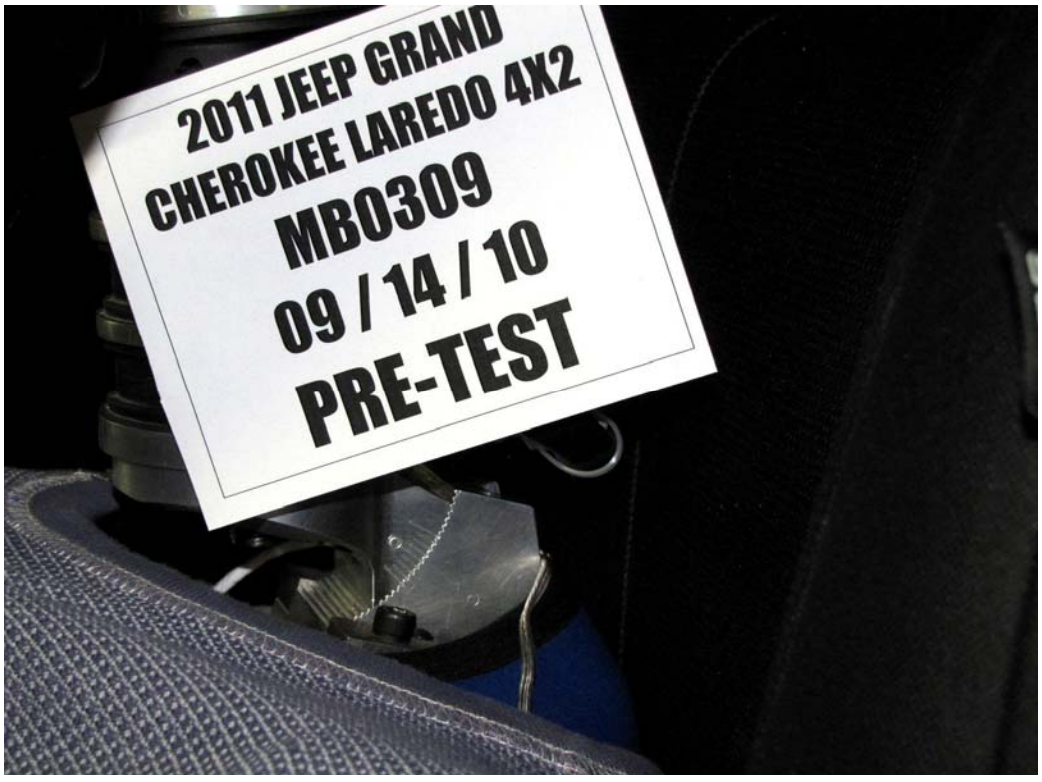


FIGURE 30. Pre-Test View of Dummy's Neck Showing Position of Adjustable Neck Bracket

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 Dummy and Driver Door Clearance

FIGURE 40. Post-Test Dummy and Driver 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

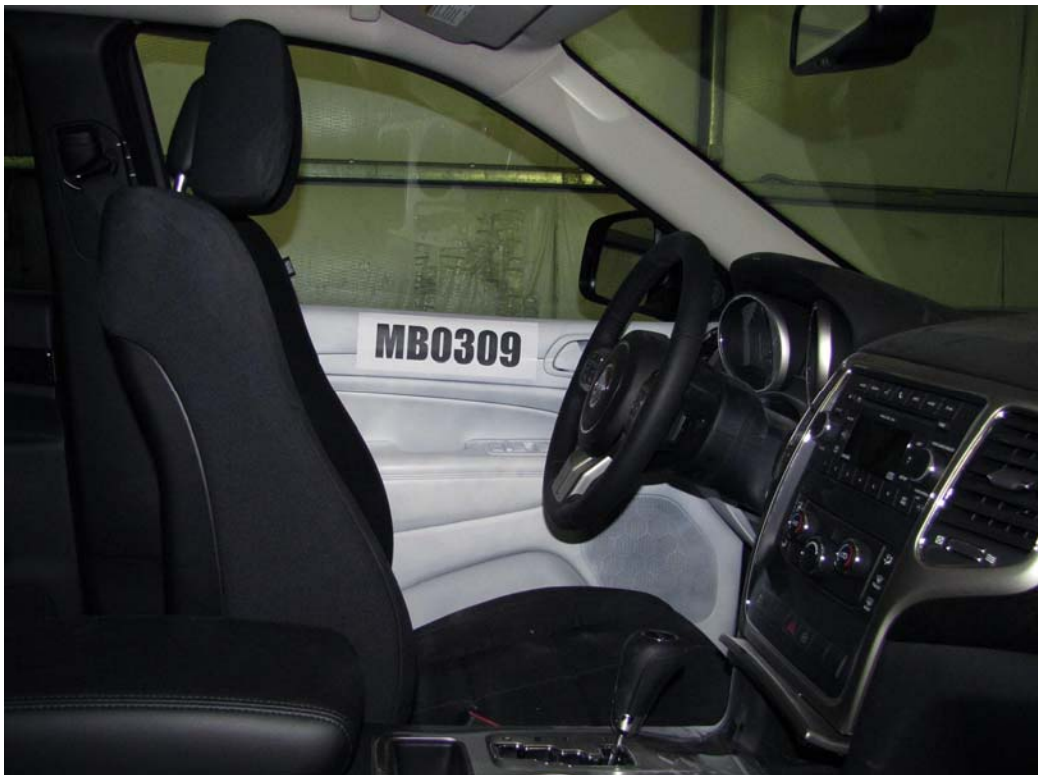


FIGURE 43. Pre-Test Inner Driver Door Panel View

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

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

FIGURE 52. Post-Test View of Fuel Filler Cap

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

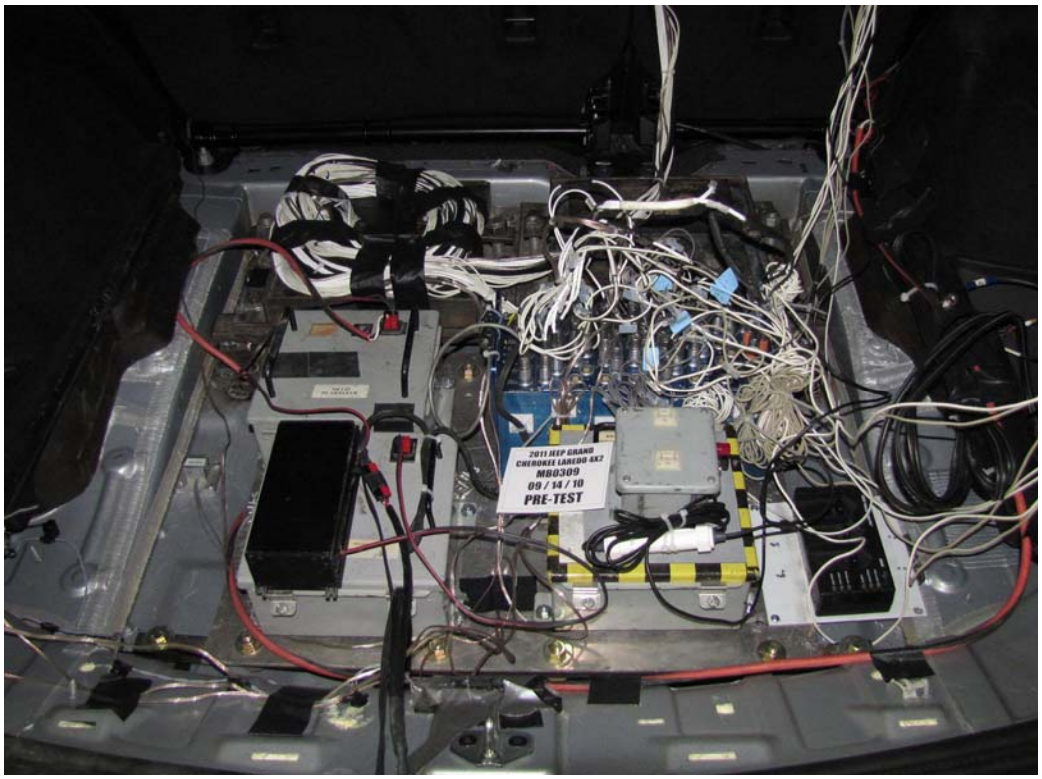


FIGURE 59. Pre-Test Ballast View

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

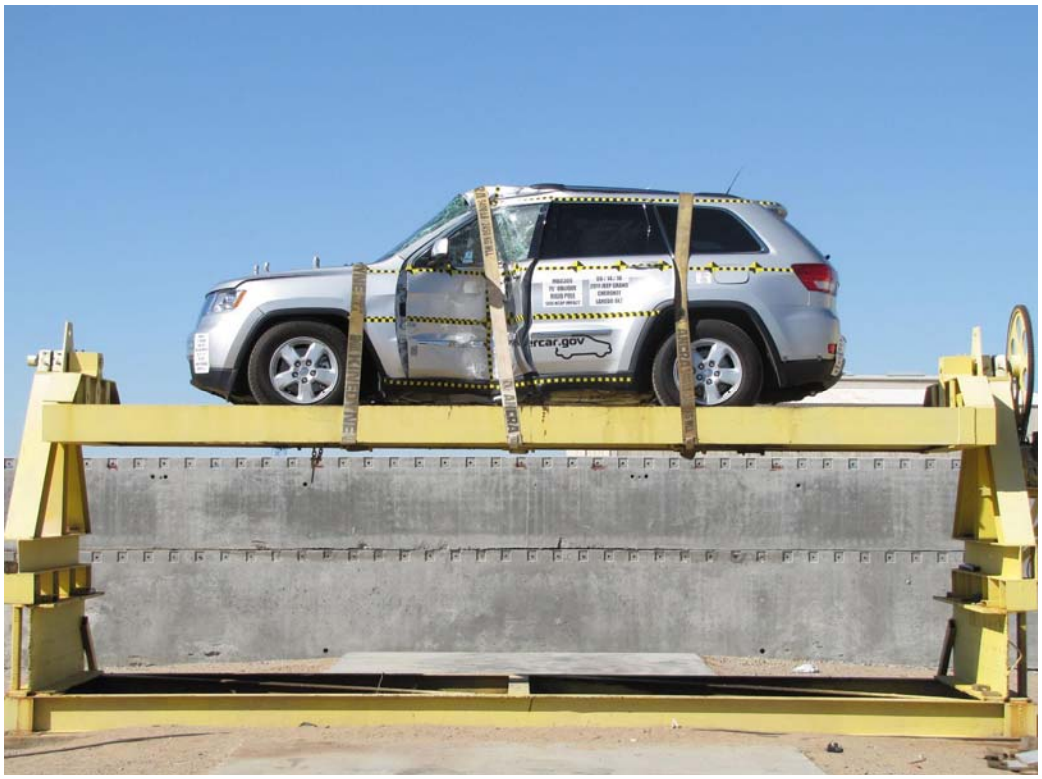


FIGURE 61. FMVSS No. 301-305 Rollover 0 Degrees

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. 2011 Jeep Grand Cherokee Laredo 4x2 Side Pole Impact Event

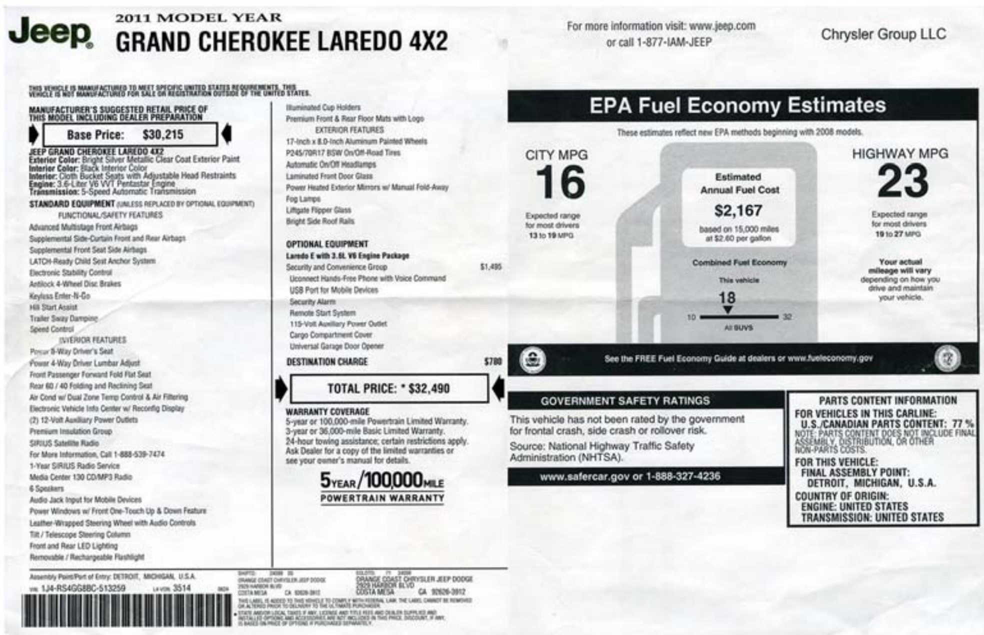
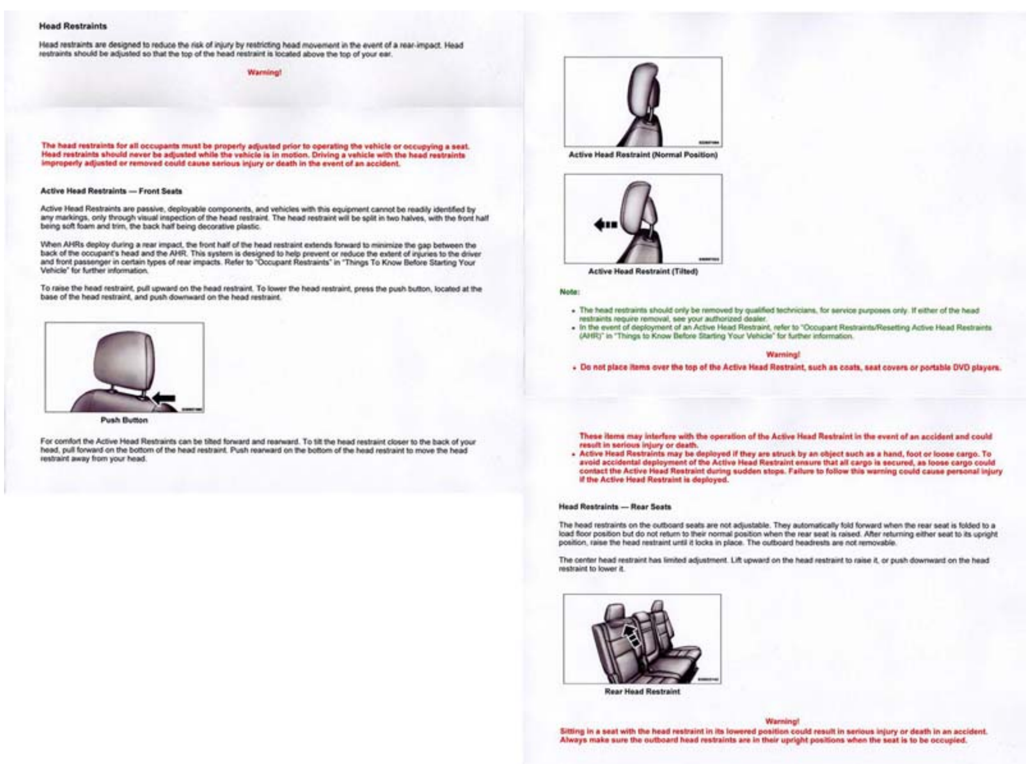


FIGURE 67. Monroney Label



Head Restraints

Head restraints are designed to reduce the risk of injury by restricting head movement in the event of a rear-impact. Head restraints should be adjusted so that the top of the head restraint is located above the top of your ear.

Warning!

The head restraints for all occupants must be properly adjusted prior to operating the vehicle or occupying a seat. Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of an accident.

Active Head Restraints — Front Seats

Active Head Restraints are passive, deployable components, and vehicles with this equipment cannot be readily identified by any markings, only through visual inspection of the head restraint. The head restraint will be split in two halves, with the front half being soft foam and trim, the back half being decorative plastic.

When AHRs deploy during a rear impact, the front half of the head restraint extends forward to minimize the gap between the back of the occupant's head and the AHR. This system is designed to help prevent or reduce the extent of injuries to the driver and front passenger in certain types of rear impacts. Refer to "Occupant Restraints" in "Things To Know Before Starting Your Vehicle" for further information.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, press the push button, located at the base of the head restraint, and push downward on the head restraint.

Push Button

For comfort the Active Head Restraints can be tilted forward and rearward. To tilt the head restraint closer to the back of your head, pull forward on the bottom of the head restraint. Push rearward on the bottom of the head restraint to move the head restraint away from your head.

Active Head Restraint (Normal Position)

Active Head Restraint (Tilted)

Note:

- The head restraints should only be removed by qualified technicians, for service purposes only. If either of the head restraints require removal, see your authorized dealer.
- In the event of deployment of an Active Head Restraint, refer to "Occupant Restraints/Resetting Active Head Restraints (AHR)" in "Things to Know Before Starting Your Vehicle" for further information.

Warning!

- **Do not place items over the top of the Active Head Restraint, such as coats, seat covers or portable DVD players. These items may interfere with the operation of the Active Head Restraint in the event of an accident and could result in serious injury or death.**
- **Active Head Restraints may be deployed if they are struck by an object such as a hand, foot or loose cargo. To avoid accidental deployment of the Active Head Restraint ensure that all cargo is secured, as loose cargo could contact the Active Head Restraint during sudden stops. Failure to follow this warning could cause personal injury if the Active Head Restraint is deployed.**

Head Restraints — Rear Seats

The head restraints on the outboard seats are not adjustable. They automatically fold forward when the rear seat is folded to a load floor position but do not return to their normal position when the rear seat is raised. After returning either seat to its upright position, raise the head restraint until it locks in place. The outboard headrests are not removable.

The center head restraint has limited adjustment. Lift upward on the head restraint to raise it, or push downward on the head restraint to lower it.

Rear Head Restraint

Warning!

Sitting in a seat with the head restraint in its lowered position could result in serious injury or death in an accident. Always make sure the outboard head restraints are in their upright positions when the seat is to be occupied.

FIGURE 68. Driver Head Restraint Use and Adjustment Information from Vehicle Owner's 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)

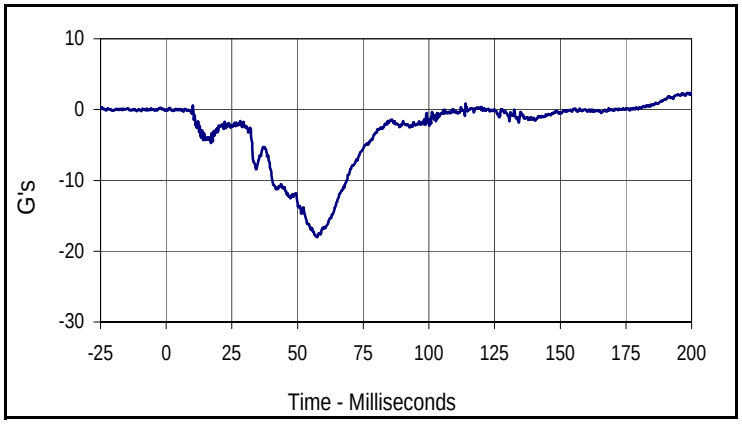
Load Cell Pole Barrier #5 Force (Y)

Load Cell Pole Barrier #6 Force (Y)

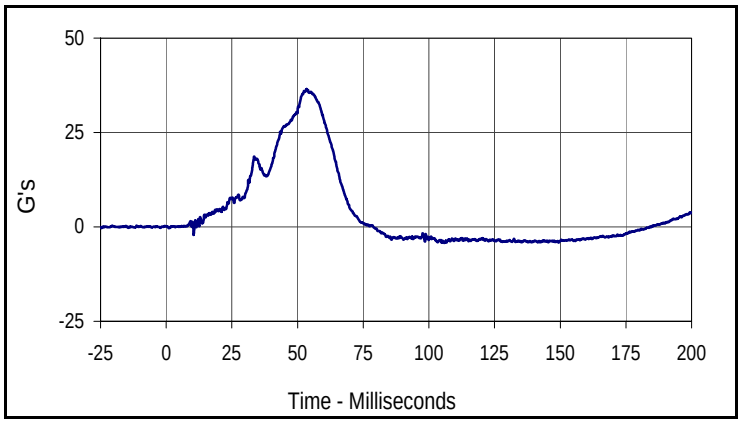
Load Cell Pole Barrier #7 Force (Y)

Load Cell Pole Barrier #8 Force (Y)

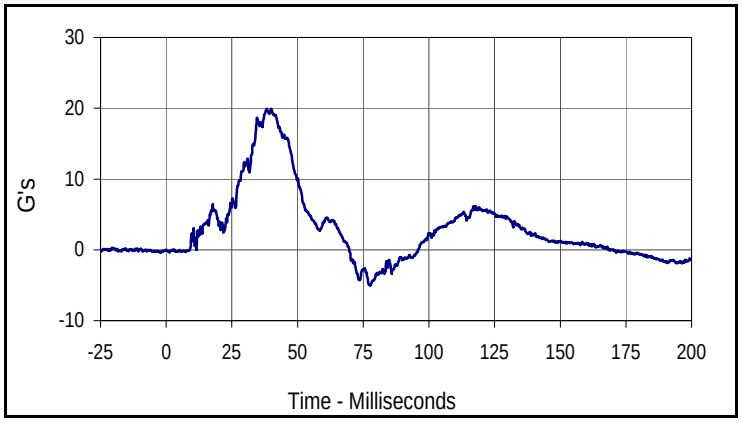
Test Vehicle:	2011 Jeep Grand Cherokee Laredo 5-Door MPV	Test Date:	9/14/10
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test	NHTSA No.:	MB0309



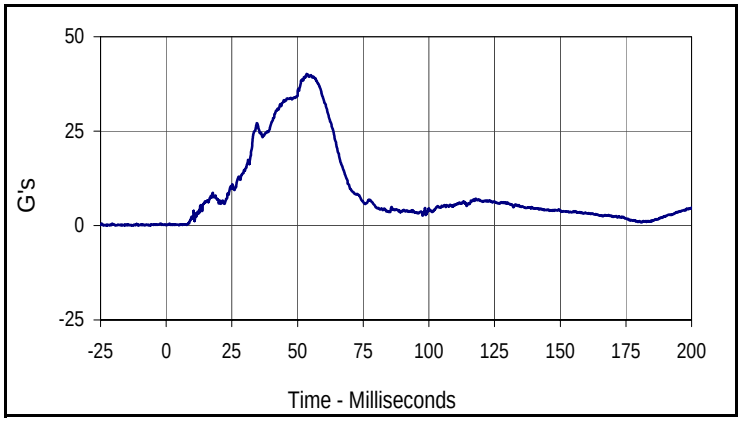
Curve Description			
Driver Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
2.4	200.0	-18.0	57.5



Curve Description			
Driver Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
36.5	53.4	-4.2	105.8

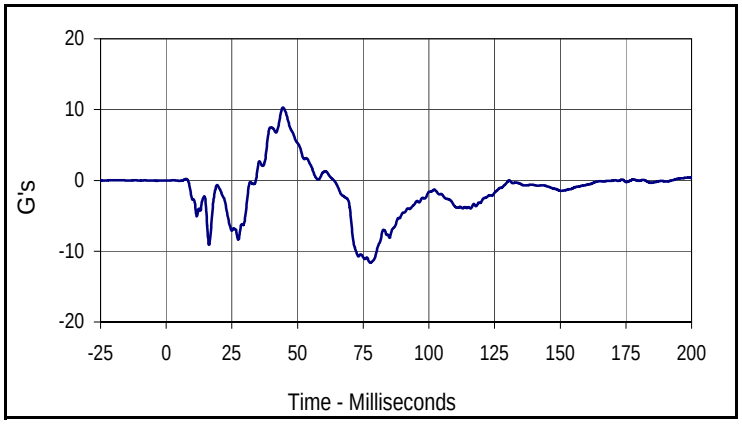


Curve Description			
Driver Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
19.9	39.9	-5.1	77.7

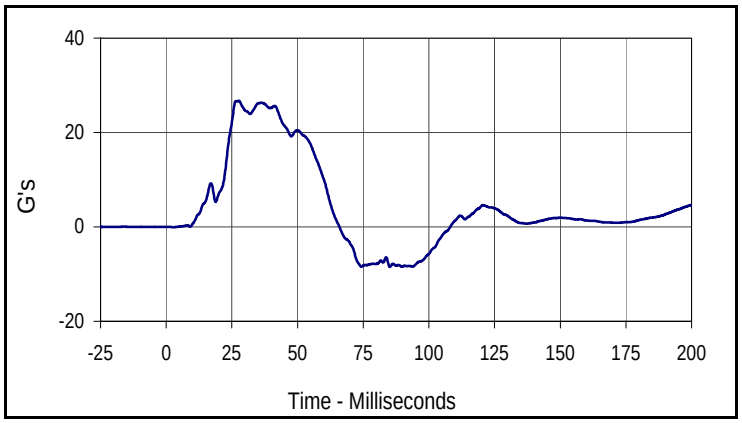


Curve Description			
Driver Head Acceleration Primary Res.			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
40.2	53.5	0.1	0.1

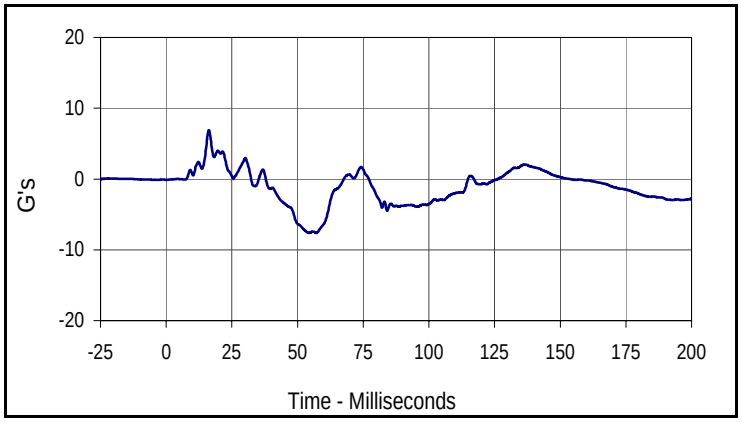
Test Vehicle:	2011 Jeep Grand Cherokee Laredo 5-Door MPV	Test Date:	9/14/10
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test	NHTSA No.:	MB0309



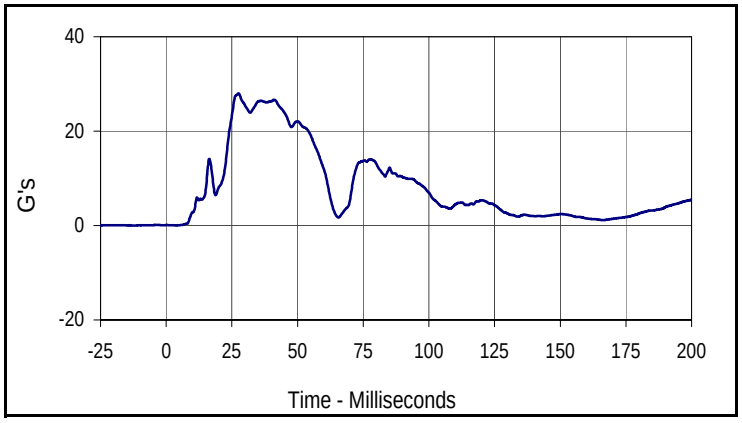
Curve Description			
Driver Lower Spine T12 Acceleration X			
CURNO	Type	SAE Class	Units
012	FIL	180	G's
Max	Time	Min	Time
10.3	44.5	-11.6	77.7



Curve Description			
Driver Lower Spine T12 Acceleration Y			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
26.7	27.6	-8.5	85.1

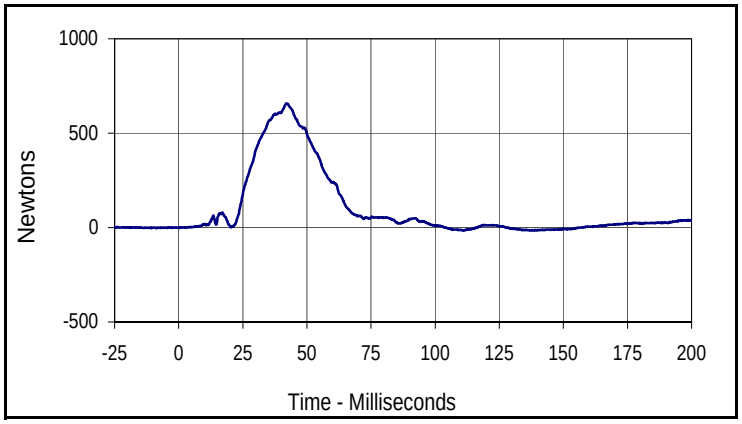


Curve Description			
Driver Lower Spine T12 Acceleration Z			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
6.9	16.2	-7.6	57.1

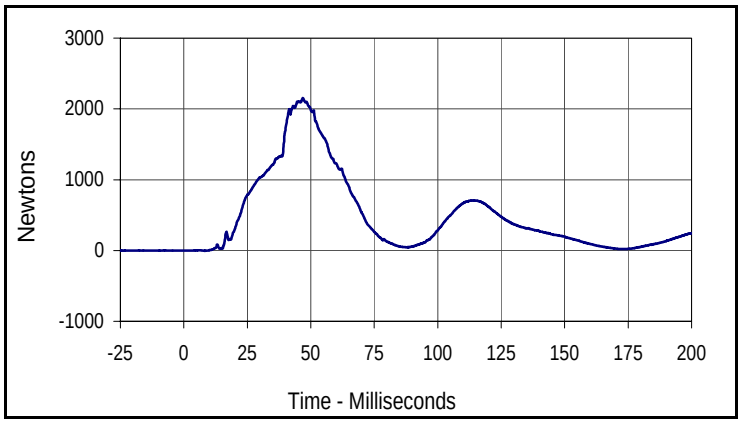


Curve Description			
Driver Lower Spine T12 Acceleration Res.			
CURNO	Type	SAE Class	Units
012	RES	180	G's
Max	Time	Min	Time
28.0	27.5	0.0	3.8

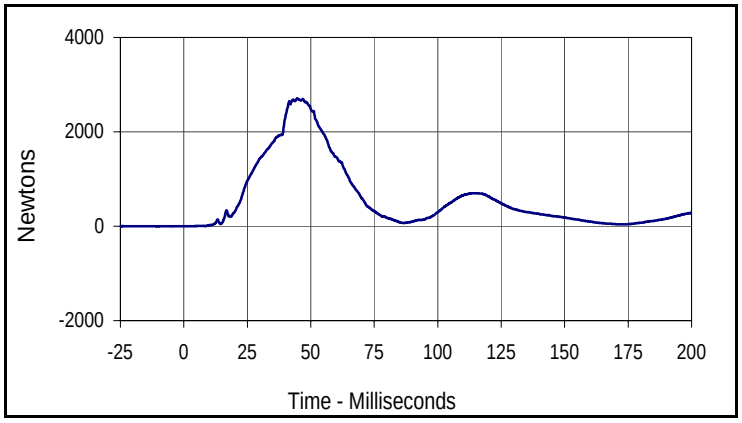
Test Vehicle:	2011 Jeep Grand Cherokee Laredo 5-Door MPV	Test Date:	9/14/10
Test Program:	32 km/h (20 mph) Side Impact NCAP 75° Rigid Pole Test	NHTSA No.:	MB0309



Curve Description			
Driver Iliac Wing Force on Impact Side Y			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
657.6	42.1	-15.5	138.3



Curve Description			
Driver Acetabulum Force on Impact Side Y			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
2154.4	46.9	-4.5	8.3



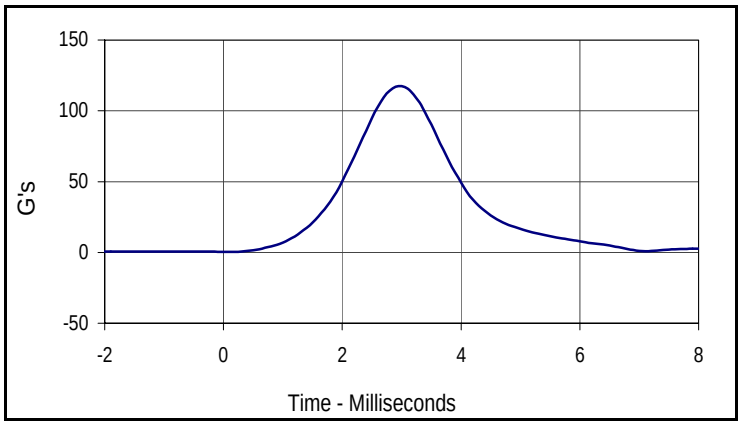
Curve Description			
Driver Total Pelvic Force on Impact Side Y			
CURNO	Type	SAE Class	Units
015	SUM	600	Newtons
Max	Time	Min	Time
2709.3	44.6	-2.1	0.2

APPENDIX C
DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

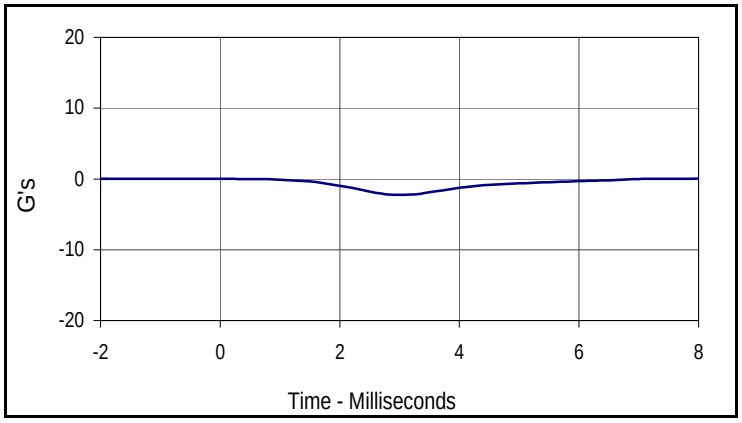
APPENDIX C
PRE-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID IIs Lateral Head Drop Calibration	Test Date:	9/13/10
ATD Serial No.:	299	Test I.D.:	HDP09A

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	117.5	Pass
Peak Longitudinal Acceleration	G's	≤15	2.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	14.1	Pass
		Overall Test Results		Pass



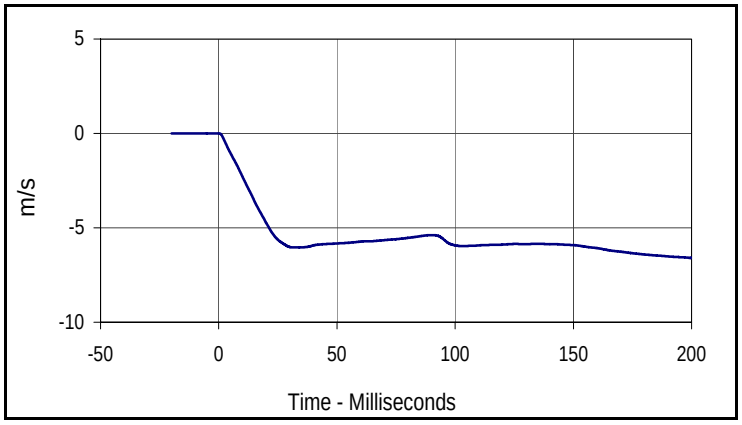
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
117.5	3.0	0.4	0.1



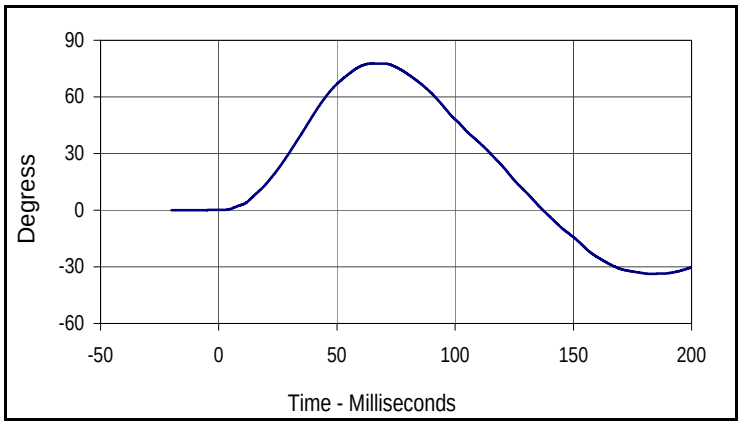
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.0	-0.2	-2.3	3.0

Test Program:	SID IIs Neck Calibration	Test Date:	9/13/10
ATD Serial No.:	299	Test I.D.:	NBP09B

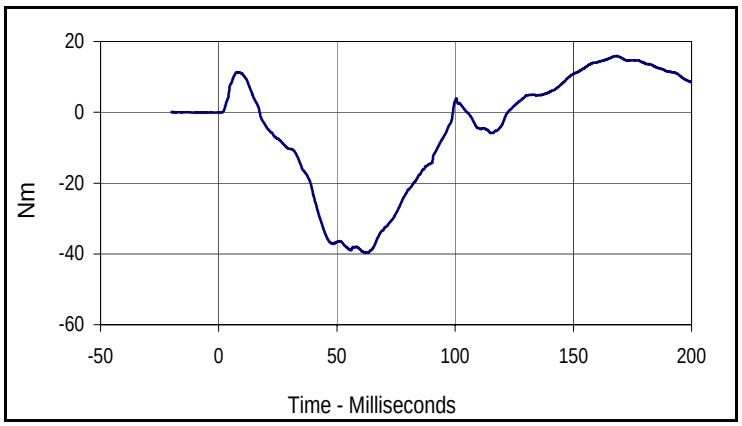
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.6	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.3	Pass
	15 msec	m/s	-3.30 to -4.10	-3.6	Pass
	20 msec	m/s	-4.40 to -5.40	-4.7	Pass
	25 msec	m/s	-5.40 to -6.10	-5.6	Pass
	25-100 msec	m/s	-5.50 to -6.20	-6.0	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	77.7	Pass
	Time	msec	50.0 to 70.0	64.9	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-39.7	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	122.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.2	-6.6	200.0



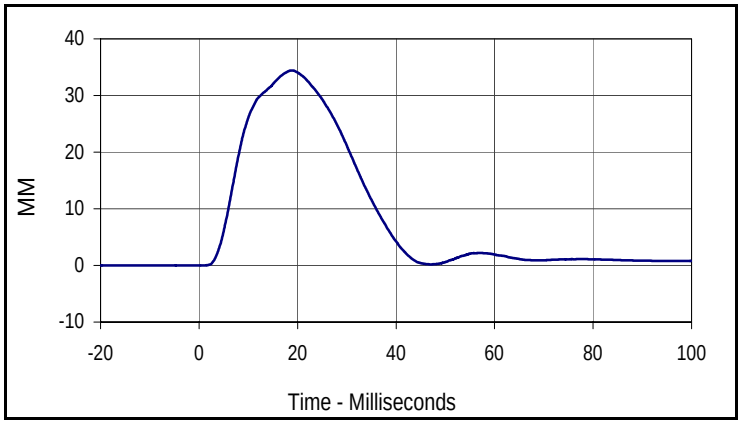
Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
77.7	64.9	-33.8	182.6



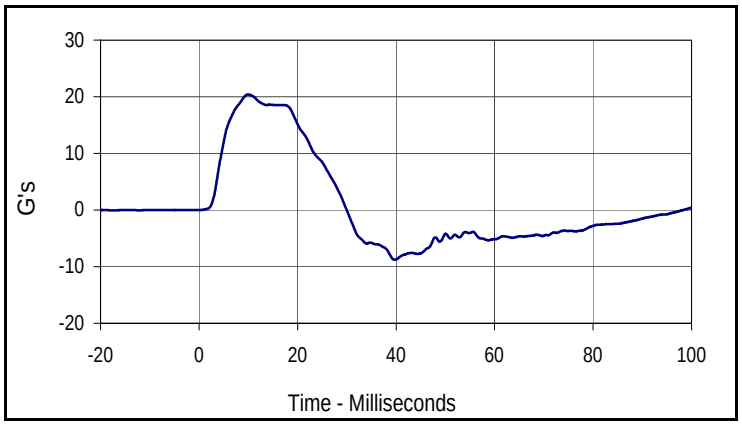
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
15.9	168.3	-39.7	61.9

Test Program:	SID IIs Shoulder Calibration	Test Date:	9/13/10
ATD Serial No.:	299	Test I.D.:	SHP09B

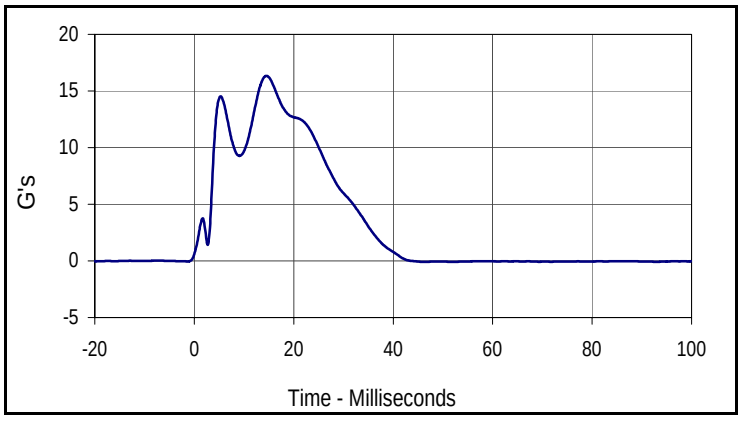
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.22	Pass
Shoulder Deflection	MM	28 to 37	34.4	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	20.4	Pass
Peak Impactor Acceleration	G's	13 to 18	16.3	Pass
		Overall Test Results		Pass



Curve Description			
Shoulder Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
34.4	18.8	0.0	0.0



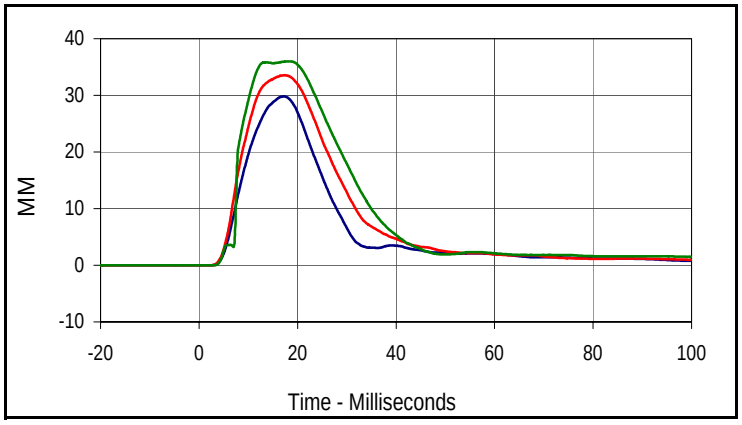
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
20.4	9.9	-8.8	39.7



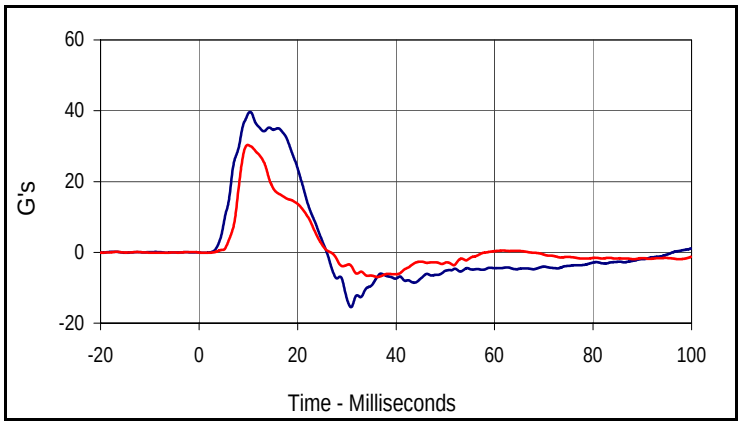
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
16.3	14.5	-0.1	46.1

Test Program:	SID IIs Thorax with Arm Calibration	Test Date:	9/13/10
ATD Serial No.:	299	Test I.D.:	THP09B

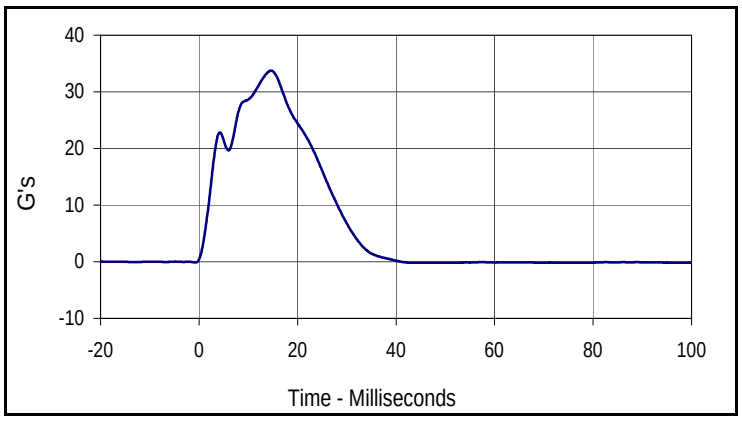
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.65	Pass
Shoulder Deflection	MM	31 to 40	35.4	Pass
Upper Thorax Rib Deflection	MM	25 to 32	29.8	Pass
Middle Thorax Rib Deflection	MM	30 to 36	33.5	Pass
Lower Thorax Rib Deflection	MM	32 to 38	36.0	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	39.7	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	30.3	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	33.7	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
29.8	17.2	0.0	-12.8
Middle Thorax Deflection			
Max	Time	Min	Time
33.5	17.4	0.0	-3.0
Lower Thorax Deflection			
Max	Time	Min	Time
36.0	18.4	0.0	-17.7



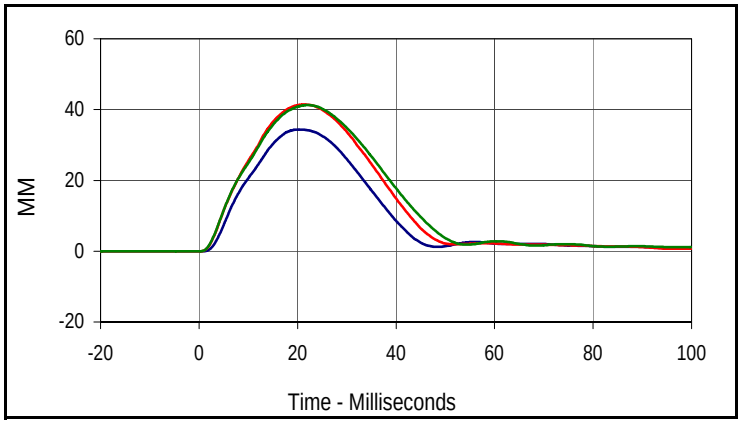
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
39.7	10.4	-15.5	30.8
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
30.3	9.9	-7.0	36.2



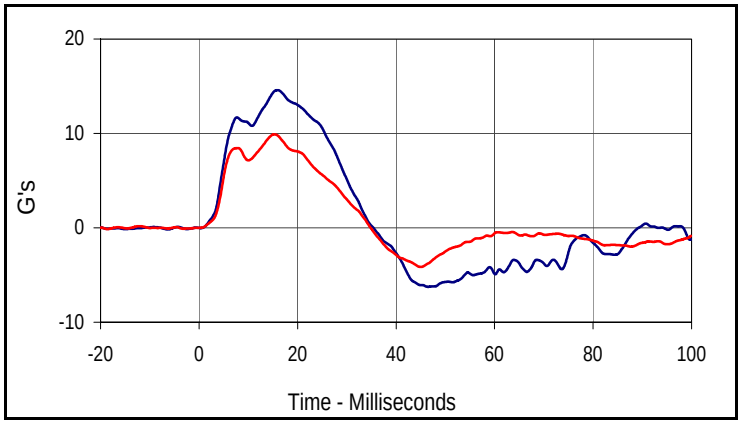
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
33.7	14.6	-0.2	50.4

Test Program:	SID IIs Thorax w/o Arm Calibration	Test Date:	9/13/10
ATD Serial No.:	299	Test I.D.:	TOAP09A

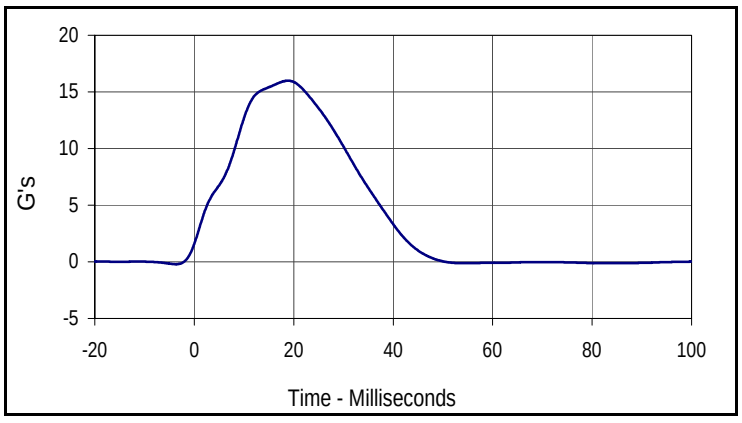
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.33	Pass
Upper Thorax Rib Deflection	MM	32 to 40	34.3	Pass
Middle Thorax Rib Deflection	MM	39 to 45	41.4	Pass
Lower Thorax Rib Deflection	MM	35 to 43	41.3	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	14.6	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	9.9	Pass
Peak Impactor Acceleration	G's	14 to 18	16.0	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
34.3	20.5	0.0	-0.1
Middle Thorax Deflection			
Max	Time	Min	Time
41.4	21.4	0.0	-4.1
Lower Thorax Deflection			
Max	Time	Min	Time
41.3	22.0	0.0	0.2



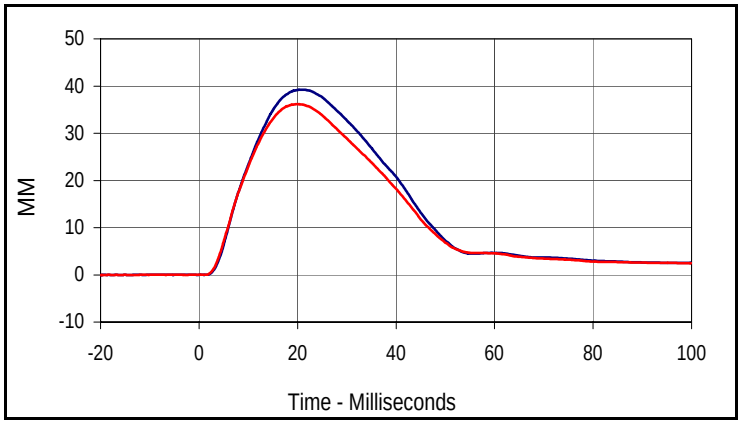
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.6	15.9	-6.3	46.5
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.9	15.3	-4.2	45.0



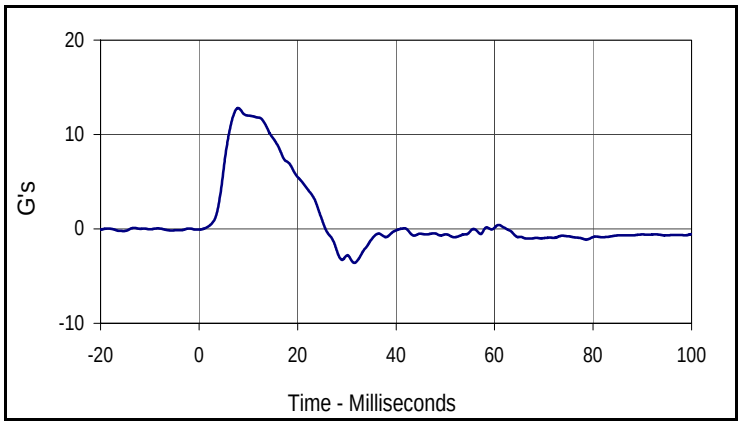
Curve Description			
Impactor Accleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
16.0	18.8	-0.2	-3.7

Test Program:	SID IIs Abdomen Calibration	Test Date:	9/13/10
ATD Serial No.:	299	Test I.D.:	ABDP09B

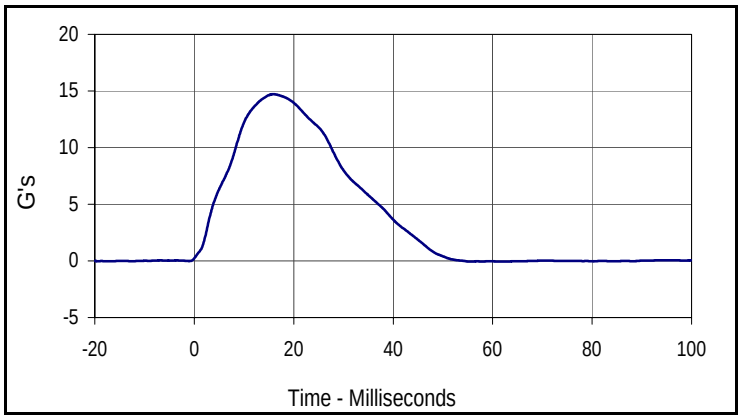
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.20	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	39.2	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	36.2	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	12.8	Pass
Peak Impactor Acceleration	G's	12 to 16	14.7	Pass
		Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
39.2	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
36.2	20.0	0.0	-2.5



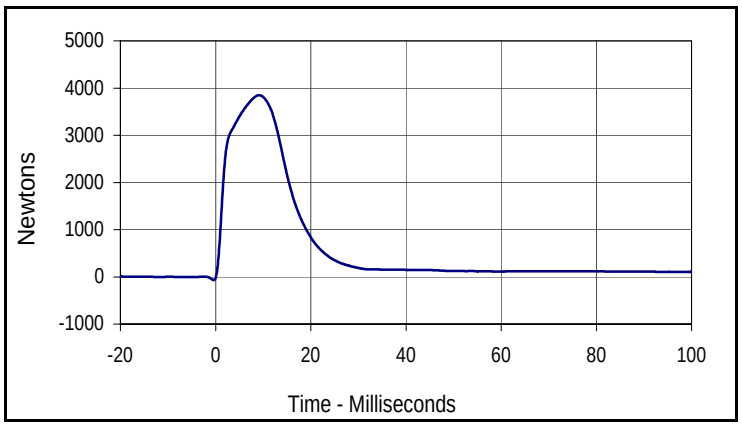
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
12.8	7.9	-3.6	31.5



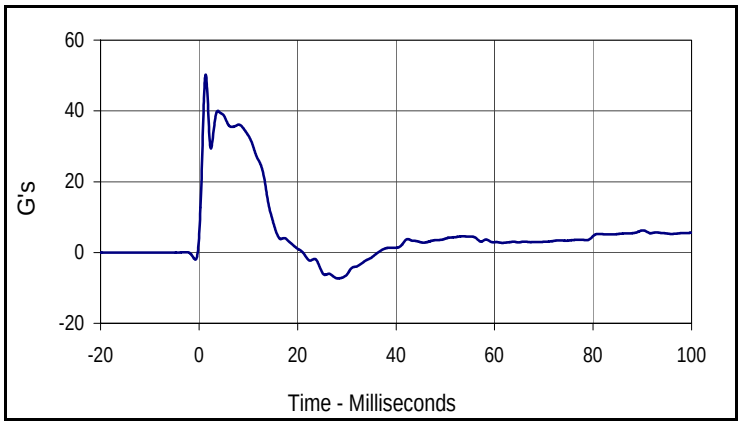
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.7	15.9	-0.1	55.4

Test Program:	SID IIs Pelvis Acetabulum Calibration	Test Date:	9/13/10
ATD Serial No.:	299	Test I.D.:	PAP09B

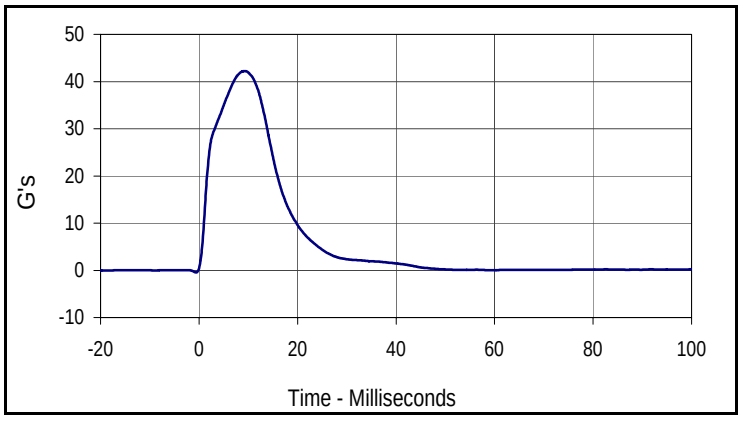
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.78	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	3848.4	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	36.1	Pass
Peak Impactor Acceleration	G's	38 to 47	42.2	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
3848.4	9.1	-67.8	-0.4



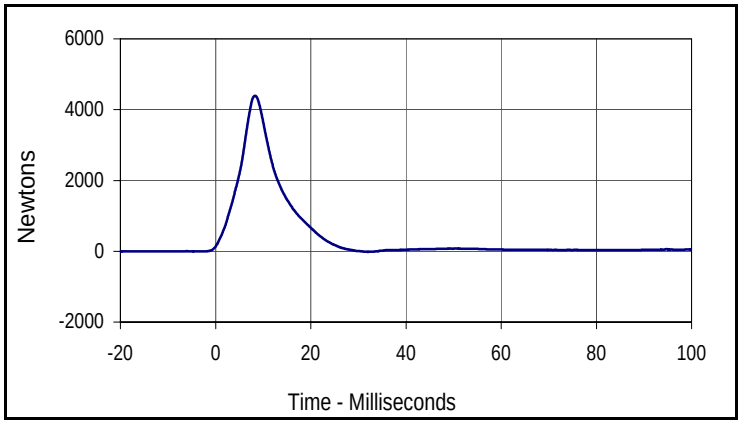
Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
50.2	1.4	-7.3	28.2



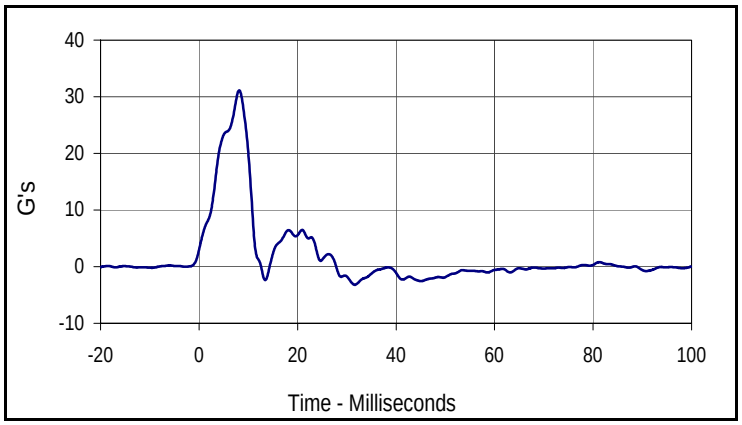
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
42.2	9.3	-0.4	-0.6

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	09/13/10
ATD Serial No.:	299	Test I.D.:	PLP09B

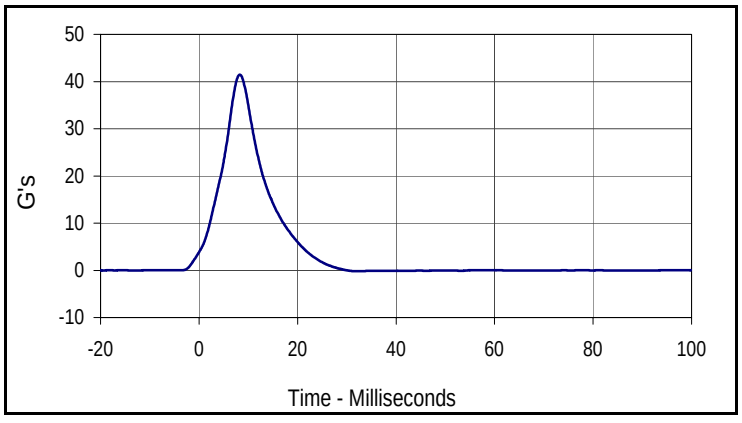
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.25	Pass
Peak Iliac Force	Newtons	4100 to 5100	4393.5	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	31.1	Pass
Peak Impactor Acceleration	G's	36 to 45	41.4	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4393.5	8.3	-16.7	32.0



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
31.1	8.1	-3.2	31.6

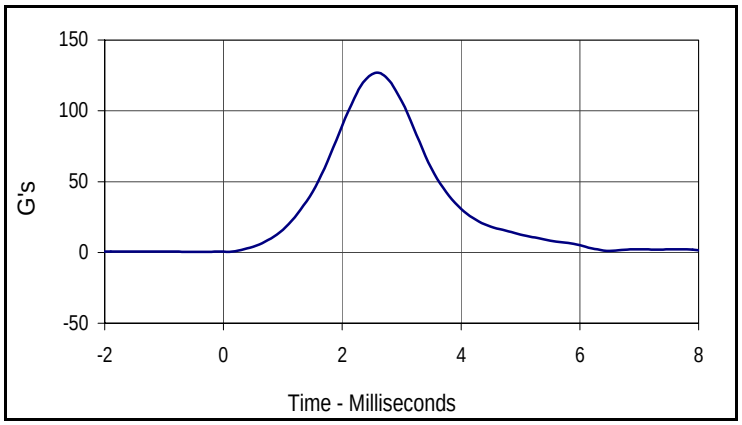


Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
41.4	8.3	-0.2	31.9

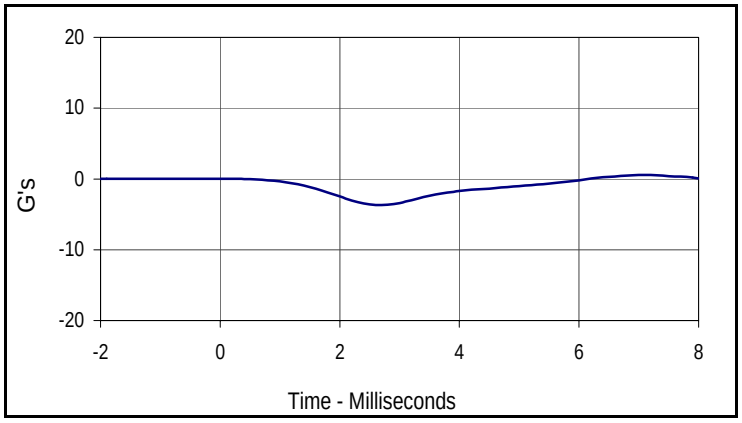
APPENDIX C
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID IIs Lateral Head Drop Calibration	Test Date:	09/16/10
ATD Serial No.:	299	Test I.D.:	HDP09E

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	126.8	Pass
Peak Longitudinal Acceleration	G's	≤15	3.7	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	9.9	Pass
		Overall Test Results		Pass



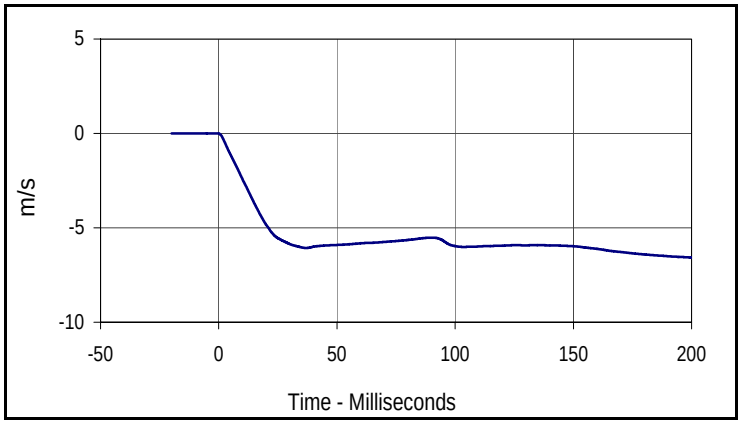
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
126.8	2.6	0.4	0.1



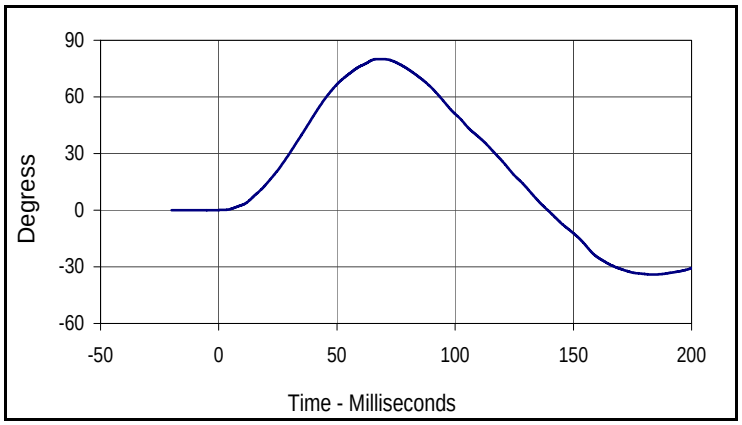
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.0	-2.0	-3.7	2.7

Test Program:	SID IIs Neck Calibration	Test Date:	09/16/10
ATD Serial No.:	299	Test I.D.:	NBP09E

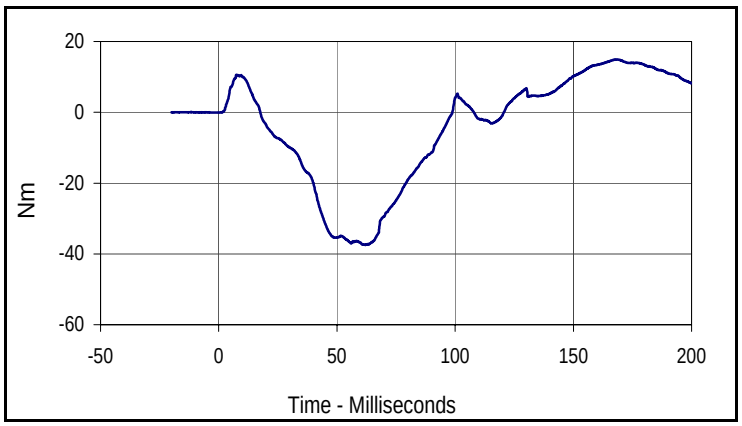
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.51 to 5.63	5.6	Pass
Pendulum Deceleration	10 msec	m/s	-2.20 to -2.80	-2.4	Pass
	15 msec	m/s	-3.30 to -4.10	-3.7	Pass
	20 msec	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	-6.1	Pass
Translation-Rotation	Max	Degrees	71.0 to 81.0	80.1	Pass
	Time	msec	50.0 to 70.0	67.2	Pass
Peak Occipital Condyle Moment		Nm	-36.0 to -44.0	-37.5	Pass
Decaying Moment Time to Cross 0 Nm		msec	102.0 to 126.0	120.6	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
0.0	-0.6	-6.6	200.0



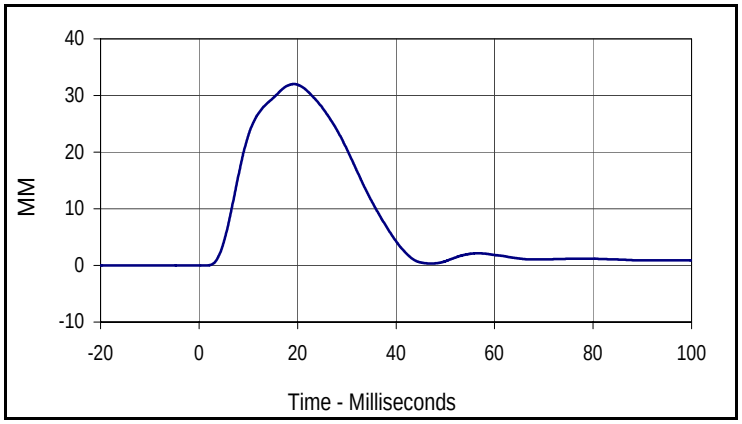
Curve Description			
Maximum Translation Rotation			
CURNO	Type	SAE Class	Units
002	FIL	60	Degress
Max	Time	Min	Time
80.1	67.2	-34.1	183.4



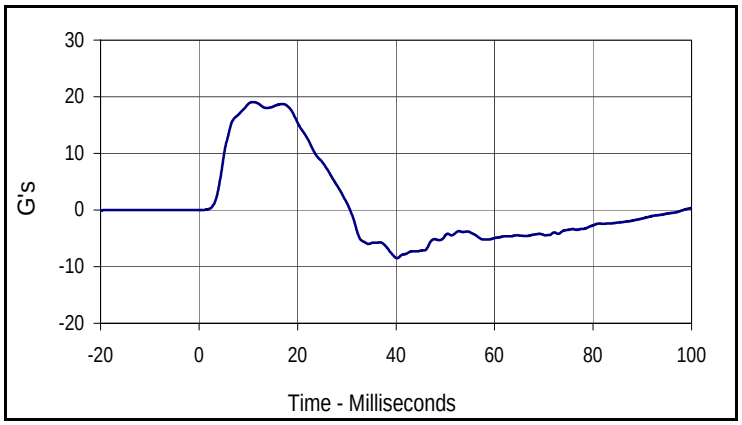
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
003	FIL	600	Nm
Max	Time	Min	Time
14.9	168.5	-37.5	62.0

Test Program:	SID IIs Shoulder Calibration	Test Date:	09/16/10
ATD Serial No.:	299	Test I.D.:	SHP09E

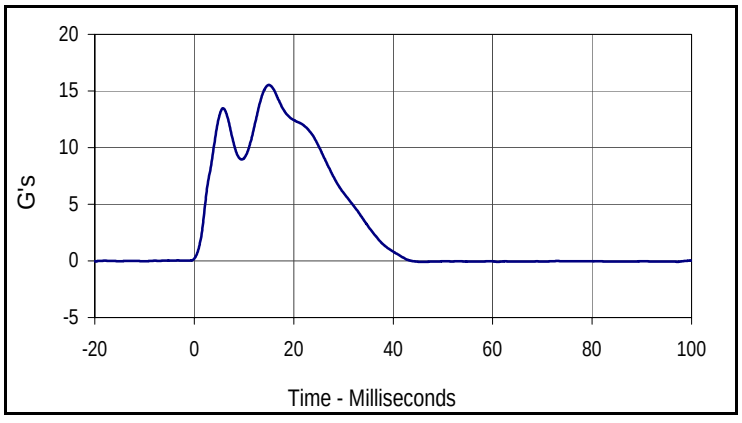
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Shoulder Deflection	MM	28 to 37	32.0	Pass
Peak Upper Spine Y Acceleration	G's	17 to 22	19.1	Pass
Peak Impactor Acceleration	G's	13 to 18	15.5	Pass
		Overall Test Results		Pass



Curve Description			
Shoulder Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
32.0	19.3	0.0	1.4



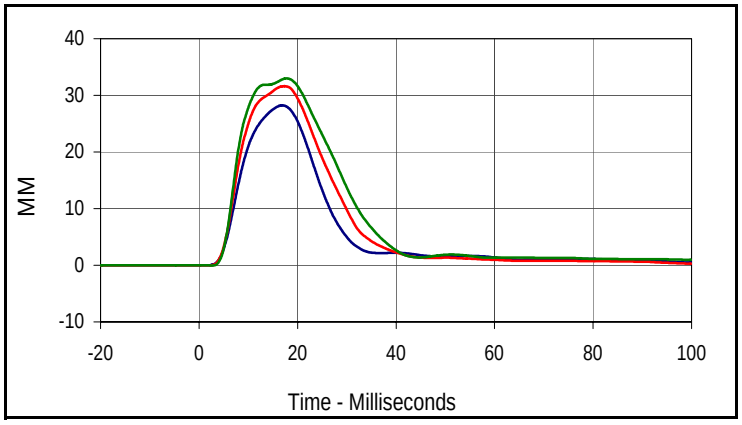
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
19.1	10.9	-8.5	40.2



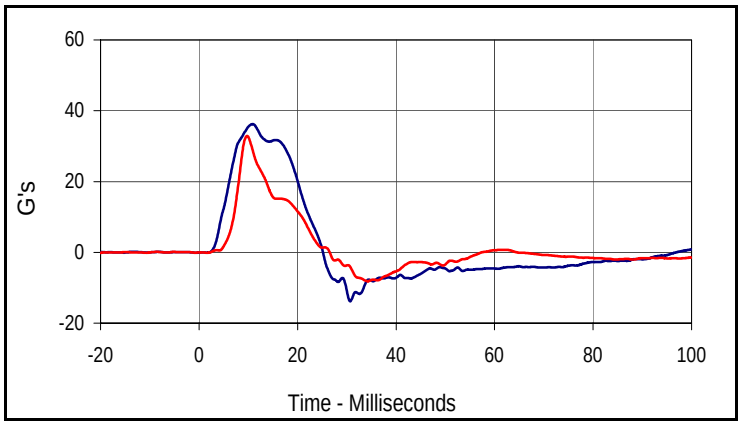
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
15.5	15.0	-0.1	45.7

Test Program:	SID IIs Thorax with Arm Calibration	Test Date:	09/16/10
ATD Serial No.:	299	Test I.D.:	TWAP09E

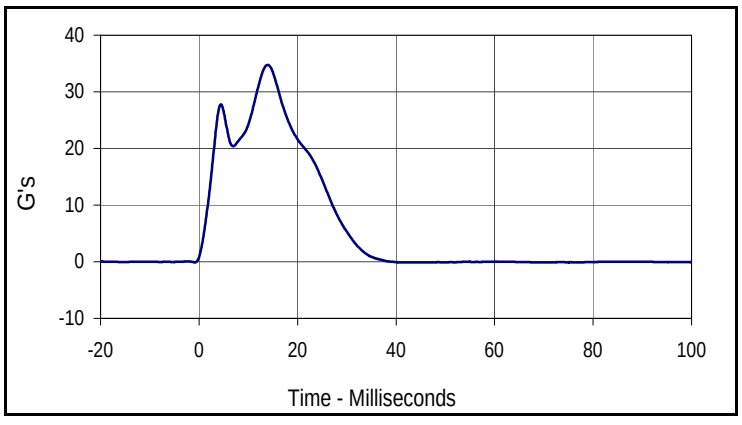
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.63	Pass
Shoulder Deflection	MM	31 to 40	37.3	Pass
Upper Thorax Rib Deflection	MM	25 to 32	28.2	Pass
Middle Thorax Rib Deflection	MM	30 to 36	31.6	Pass
Lower Thorax Rib Deflection	MM	32 to 38	33.0	Pass
Peak Upper Spine Y Acceleration	G's	34 to 43	36.2	Pass
Peak Lower Spine Y Acceleration	G's	29 to 37	32.9	Pass
Peak Impactor Acceleration After 5 msec.	G's	30 to 36	34.8	Pass
		Overall Test Results		Pass



Curve Description			
Upper Thorax Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
28.2	16.9	0.0	-5.8
Middle Thorax Deflection			
Max	Time	Min	Time
31.6	17.4	0.0	2.2
Lower Thorax Deflection			
Max	Time	Min	Time
33.0	17.7	0.0	2.7



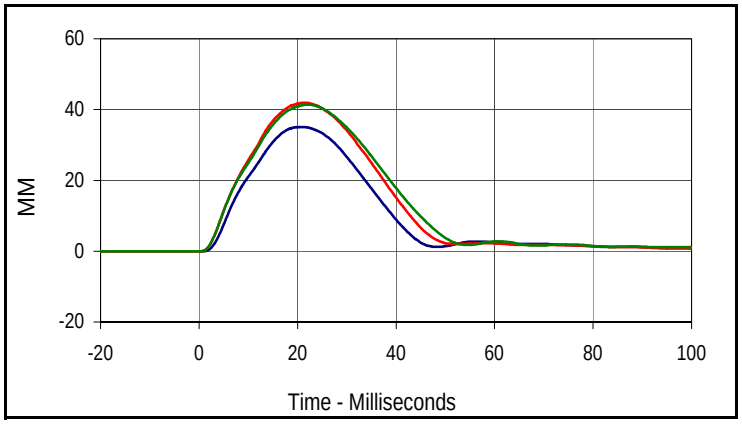
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
36.2	10.9	-13.8	30.7
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
32.9	9.7	-8.1	34.2



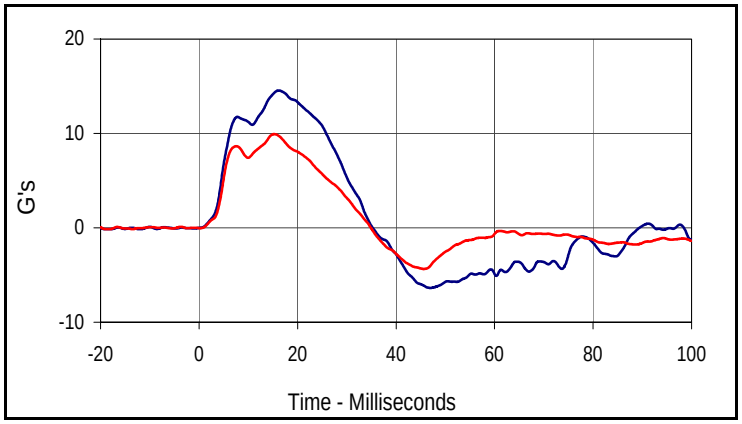
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
34.8	13.9	-0.1	42.5

Test Program:	SID IIs Thorax w/o Arm Calibration	Test Date:	09/16/10
ATD Serial No.:	299	Test I.D.:	TOAP09E

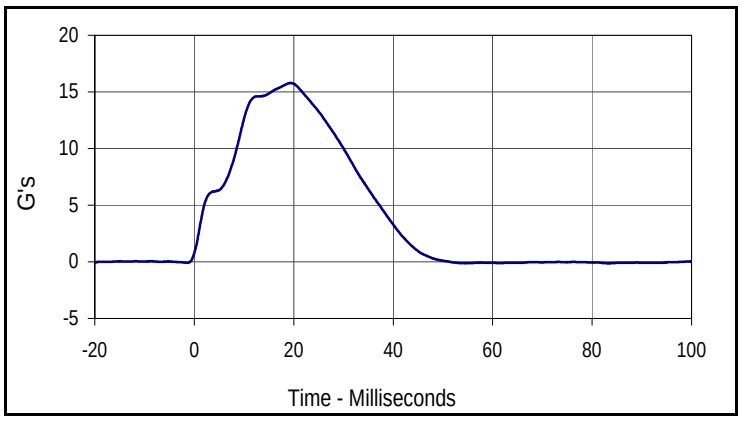
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.34	Pass
Upper Thorax Rib Deflection	MM	32 to 40	35.1	Pass
Middle Thorax Rib Deflection	MM	39 to 45	41.9	Pass
Lower Thorax Rib Deflection	MM	35 to 43	41.4	Pass
Peak Upper Spine Y Acceleration	G's	13 to 17	14.5	Pass
Peak Lower Spine Y Acceleration	G's	7 to 11	9.9	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
35.1	20.9	0.0	-2.5
Middle Thorax Deflection			
Max	Time	Min	Time
41.9	21.5	0.0	-9.7
Lower Thorax Deflection			
Max	Time	Min	Time
41.4	22.1	0.0	-2.1



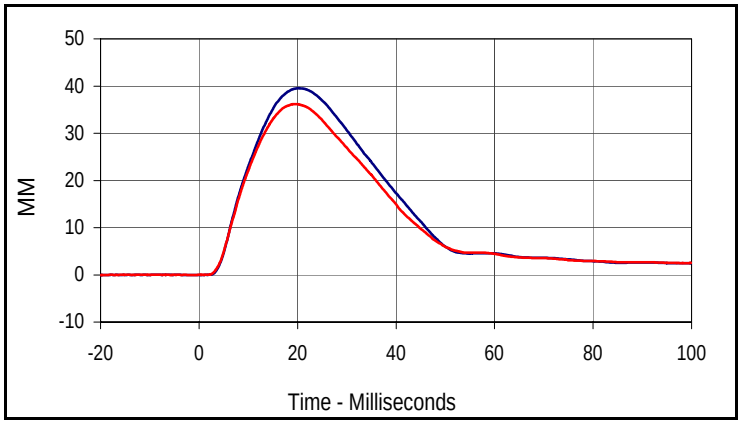
Curve Description			
Upper Spine Y Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
14.5	16.2	-6.4	46.9
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
9.9	15.2	-4.4	45.6



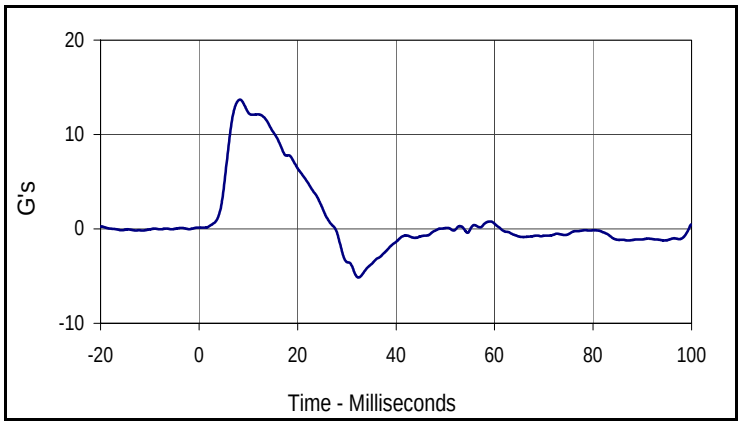
Curve Description			
Impactor Accleration			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
15.8	19.4	-0.1	83.2

Test Program:	SID IIs Abdomen Calibration	Test Date:	09/16/10
ATD Serial No.:	299	Test I.D.:	ABDP09E

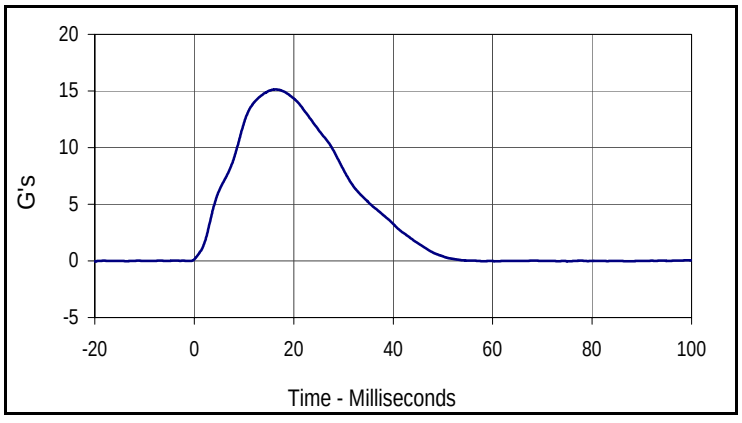
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.20 to 4.40	4.27	Pass
Upper Abdominal Rib Deflection	MM	36 to 47	39.5	Pass
Lower Abdominal Rib Deflection	MM	33 to 44	36.2	Pass
Peak Lower Spine Y Acceleration	G's	9 to 14	13.7	Pass
Peak Impactor Acceleration	G's	12 to 16	15.1	Pass
		Overall Test Results		Pass



Curve Description			
Upper Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
001	FIL	600	MM
Max	Time	Min	Time
39.5	20.2	0.0	-2.7
Curve Description			
Lower Abdominal Rib Deflection			
CURNO	Type	SAE Class	Units
002	FIL	600	MM
Max	Time	Min	Time
36.2	19.5	0.0	-2.3



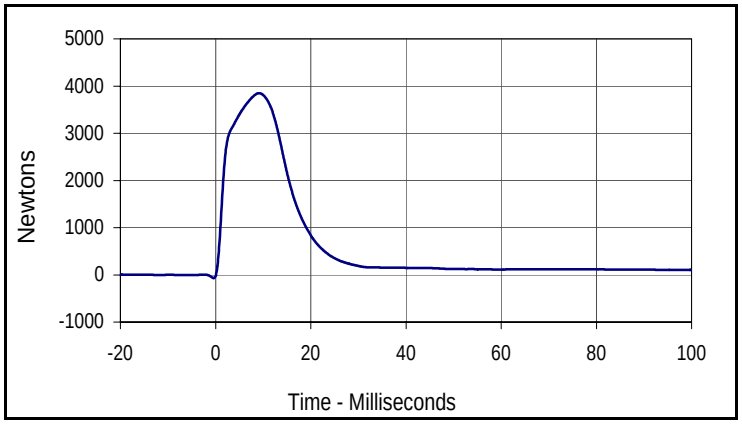
Curve Description			
Lower Spine Y Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
13.7	8.3	-5.1	32.3



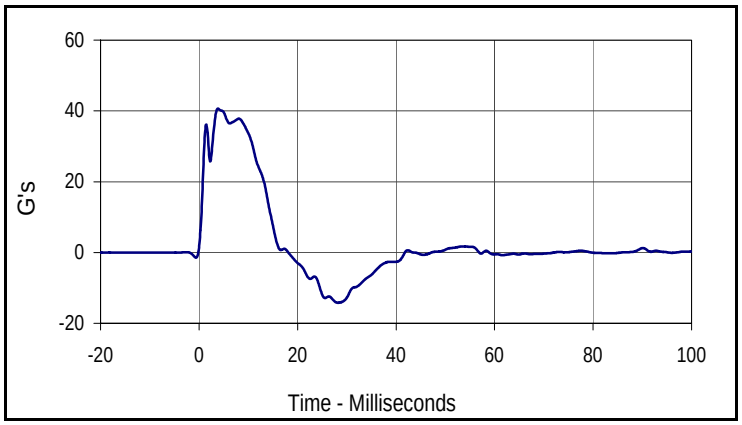
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
004	FIL	180	G's
Max	Time	Min	Time
15.1	16.3	0.0	-20.0

Test Program:	SID IIs Pelvis Acetabulum Calibration	Test Date:	09/16/10
ATD Serial No.:	299	Test I.D.:	PAP09E

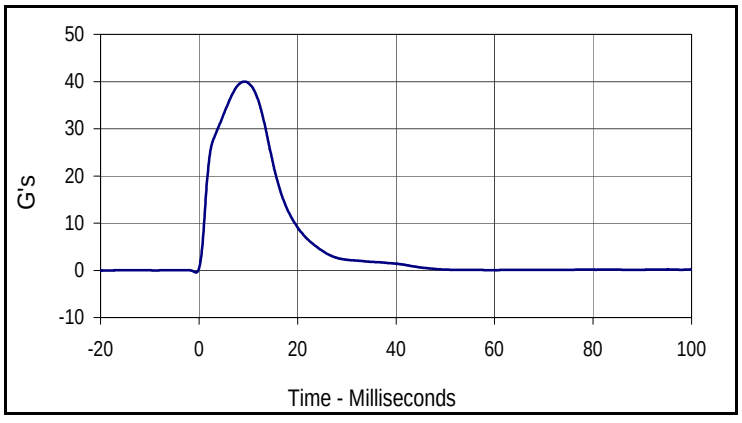
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	6.60 to 6.80	6.76	Pass
Peak Acetabulum Force	Newtons	3600 to 4300	3848.4	Pass
Peak Pelvis Y Acceleration After 6 msec.	G's	34 to 42	37.8	Pass
Peak Impactor Acceleration	G's	38 to 47	40.0	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Acetabulum Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
3848.4	9.1	-67.8	-0.4



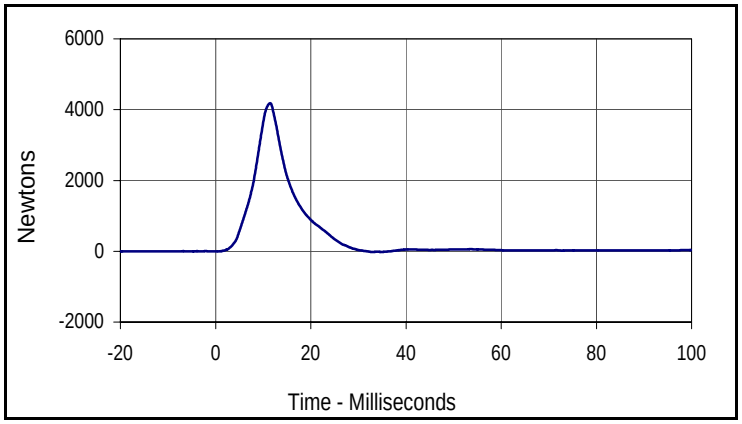
Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
40.7	3.8	-14.2	28.2



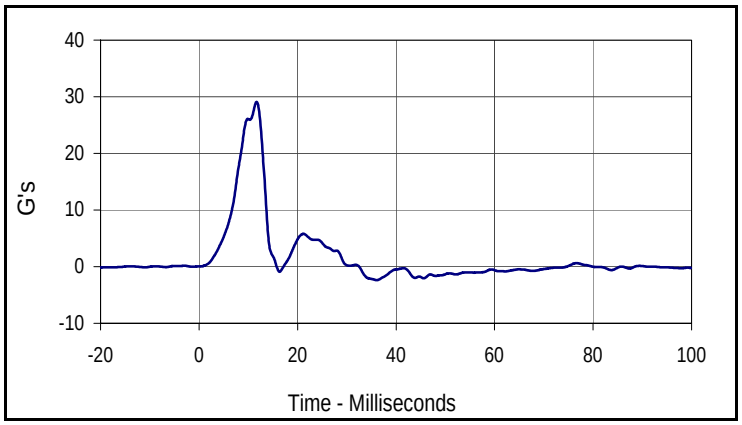
Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	180	G's
Max	Time	Min	Time
40.0	9.3	-0.4	-0.6

Test Program:	SID IIs Pelvis Iliac Calibration	Test Date:	09/16/10
ATD Serial No.:	299	Test I.D.:	PLP09E

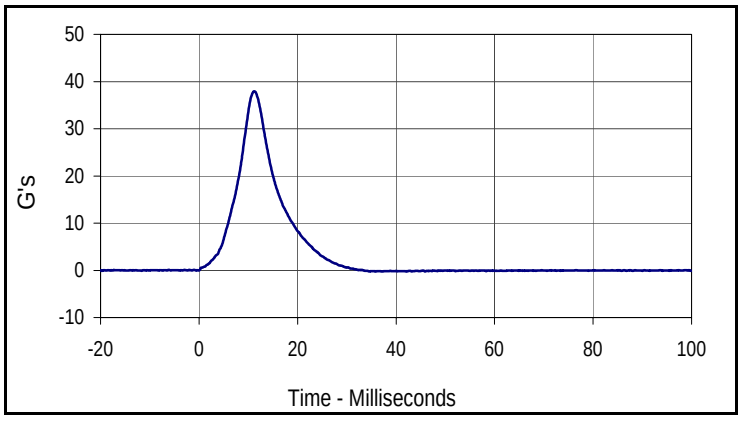
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity	m/s	4.2 to 4.4	4.21	Pass
Peak Iliac Force	Newtons	4100 to 5100	4182.9	Pass
Peak Pelvis Y Acceleration	G's	28 to 39	29.1	Pass
Peak Impactor Acceleration	G's	36 to 45	37.9	Pass
		Overall Test Results		Pass



Curve Description			
Pelvis Iliac Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4182.9	11.5	-23.5	32.9



Curve Description			
Pelvis Y Acceleration			
CURNO	Type	SAE Class	Units
002	FIL	180	G's
Max	Time	Min	Time
29.1	11.7	-2.4	36.0



Curve Description			
Impactor Acceleration			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
37.9	11.2	-0.2	34.6