REPORT NUMBER TR-P27131-01-NC

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

GENERAL MOTORS CORPORATION
2007 CADILLAC STS
4-DOOR SEDAN

NHTSA NUMBER: G70110

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FINAL REPORT

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16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2007 Cadillac STS 4-Door Sedan in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedures for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering, LLC in Adelanto, CA, on June 6, 2007. The impact velocity of the Moving Deformable Barrier was 61.80 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 18.3 deg. C. The target vehicle's maximum post-test static crush was 360 mm located at level 2. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver SID/HIII	Pass. SID/HIII
Left Upper Rib (LUR) G's	45.2	39.7
Left Lower Rib (LLR) G's	54.2	49.1
Lower Spine (T_{12}) G's	76.2	40.6
Thoracic Trauma Index (TTI) G's	65.0	45.0
Pelvis (PEV) G's	98.0	82.0

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SECTION 1
PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This Side Impact NCAP test is conducted as part of the FY' 2007 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-03-D-32005. The purpose of this test is to generate comparative side impact data on a 2007 Cadillac STS 4-Door Sedan manufactured by General Motors Corporation.

1.2 TEST PROCEDURE

The side impact test was conducted in accordance with the current National Highway Traffic Safety Administration (NHTSA), Office of Crashworthiness Standards (OCS), laboratory test procedure NCAP Side Impact Testing, dated November 2002. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

SECTION 2
SUMMARY OF SIDE IMPACT TEST

2.1 SUMMARY OF SIDE IMPACT NCAP TEST

A model year 2007 Cadillac STS 4-Door Sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.80 km/h. The specified impact velocity range is from 61.14 to 62.75 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1989 kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on June 6, 2007.

Two (2) real-time cameras and ten (10) high-speed video cameras were used to document the impact event. Camera locations and pertinent camera information is documented in the data sheets. Pre- and post-test photographs of the vehicle and SID/HIIIs can be found in Appendix A. Two 50th percentile adult male Side Impact Dummies, Hybrid III (SID/HIIIs) were placed in the driver's and left rear passenger designated seating positions according to the test procedure. Each SID/HIII is instrumented with contact switches on the pelvis, thorax and six-axis neck load cells, and fourteen accelerometers in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y, and Z axes primary and redundant)

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front Driver		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Torso Airbag	Yes	Yes	No	
Head Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes

The test vehicle was instrumented with twenty-one (21) structural accelerometers and the MDB was instrumented with five (5) accelerometers and one (1) contact switch on the right bumper to compare left side to right side bumper impact timing. All data channels were recorded with the fully self contained on-board Data Acquisition System (DAS). The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The driver and passenger doors remained closed during impact. The test vehicle sustained a maximum static crush of 360 mm at level 2, 1650 mm rearward of the left vertical impact point. The driver SID/Hybrid III, Serial No. 275 and the passenger SID/Hybrid III, Serial No. 274 were calibrated prior to this test. The SID/Hybrid III injury criteria is summarized as follows:

Measurement	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	65	45
Peak Pelvic G's (PEV)	G's	98	82

Tests summaries and post-test observations are presented in Section 3. Appendix A contains the still photograph prints. Appendix B contains the driver and passenger SID/HIIIs, vehicle, and MDB response data traces. Appendix C contains the SID Configuration and performance verification data. Appendix contains the Child Restraint System data.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
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

* Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	G70110	Anti-Lock Brakes	Yes
Make	Cadillac	All Wheel Drive	No
Model	STS	Power Steering	Yes
Body Style	4-Door Sedan	Driver Front Airbag	Yes
Vin No.	1G6DW677670142940	Driver Side Torso Airbag	Yes
Color	Silver	Driver Side Head Airbag	No
Delivery Date	5/25/2007	Driver Curtain/Airbag	Yes
Odometer (Miles)	244.0	Rear Pass. Airbag	No
Dealer	Mark Christopher Auto Center	Rear Pass. Side Airbag	No
Transmission	5-Speed Automatic	Rear Pass. Head Airbag	No
Final Drive	Rwd	Rear Pass. Curtain/Airbag	Yes
Type/No. Cyl.	V-6	Pre-Tensioners	Yes
Engine Disp. (L)	3.6	Load Limiters	Yes
Engine Placement	Longitudinal	Bucket Seats	Yes
Roof Rack	No	Air Cond.	Yes
Sunroof/T-Top	No	AM/FM CD	Yes
Tinted Glass	Yes	Tilt Steering	Yes
Traction Control	Yes	Automatic Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	Yes
Rear Disc	Yes	Other	None

Does Owners Manual provide instructions to turn off automatic door locks.	No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors Corporation	GVWR (kg)	2654
Date of Manufacture	Nov-06	GAWR Front (kg)	1384
		GAWR Rear (kg)	1452

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				404
Cargo Weight (RCLW) (kg)				64

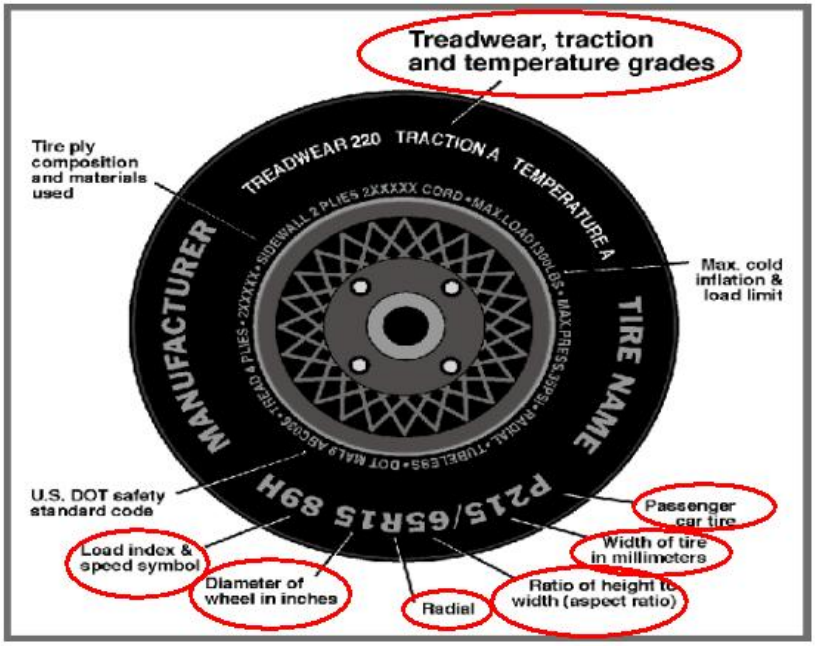
DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

Collect year, make, model, VIN, items circled in red, and tire manufacturer and tire name.



TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	308	308
Cold Pressure (kpa)	210	210
Recommended Tire Size	P235/50R17	P235/45R17
Tire Size on Vehicle	P235/50R17	P235/45R17
Tire Manufacturer	Michelin	Michelin
Treadwear	300	300
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	1 Polyester, 2 Steel	1 Polyester, 2 Steel
Load Index/Speed Symbol	95V	95V
Tire Material	Polyester, Steel	Polyester, Steel
DOT Safety Code Right	B9YD-FXCX-3806	B94M-FNAX-4206
DOT Safety Code Left	B9YD-FXCX-2606	B94M-FNAX-4206

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	482	406	888	528	500	1028
Right	kg	472	412	884	492	608	1100
Ratio	%	53.8	46.2	100	51	49	100
Totals	kg	953	818	1772	1019	971	1989

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1772
Weight of 2 P572 ATD's	kg	161
Rated Cargo/Luggage Wt. (RCLW)	kg	64
Calculated Vehicle Target Wt. (TVTW)	kg	1997

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	722	727	735	729	1367
As Tested	mm	709	714	693	706	1444
Fully Loaded	mm	708	712	690	704	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2960
Total Vehicle Length at Left Side	mm	3524
Total Vehicle Length at Centerline	mm	4990
Total Vehicle Length at Right Side	mm	3524
Weight of Ballast In Cargo Area	kg	35
Amount of Stoddard Solvent in Fuel Tank	liters	61.59

TEST VEHICLE VERTICAL IMPACT LINE DATA

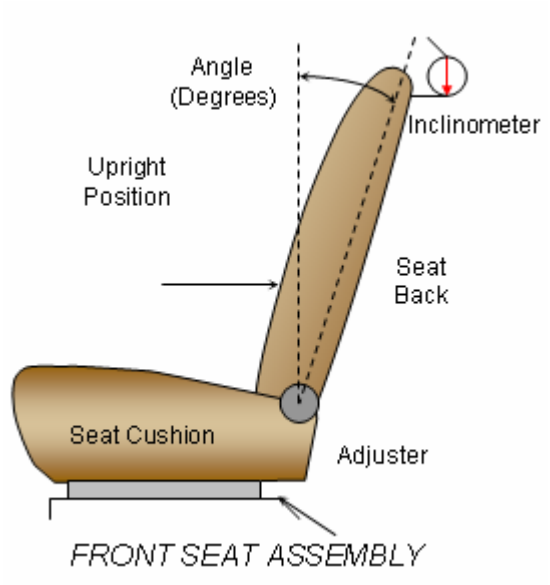
Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2960
Target Impact Point Aft of Front Axle	mm	540
Actual Impact Point Aft of Front Axle	mm	537

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows: Seat back angle was measured at the headrest using a digital inclinometer.



SEAT BACK ANGLES

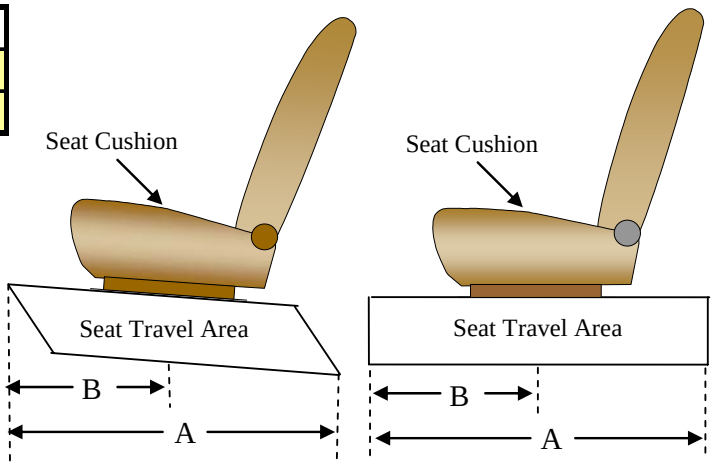
	Deg.
Driver w/seated Dummy	8.0 @ Headrest
Passenger w/seated Dummy	N/A

SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position at the highest vertical seat height to rearmost position at the lowest vertical seat height. The seat was set at the longitudinal mid position. There were vertical adjustments on the driver seat that was equipped with the vehicle. There were no adjustments on the passenger seat. The driver seat was placed at the lowermost position.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	250 mm	125 mm
Rear Seat	N/A	N/A



SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position

SEAT BELT UPPER ANCHORAGE

	Total # of Positions	Placed in Position #
Driver Seat	4	2
Rear Seat	Fixed	Fixed

DATA SHEET NO. 1…(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

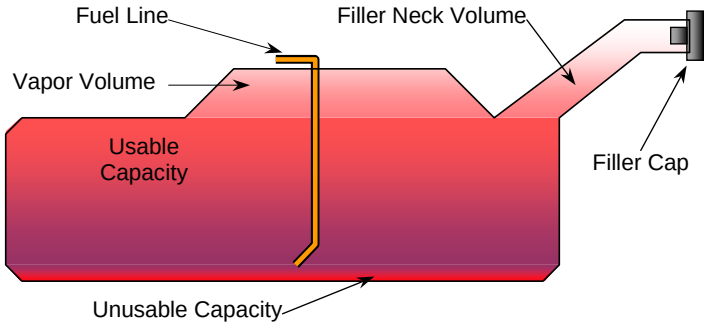
Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

.

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	67.24
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMVSS 301	60.94 to 62.26
Actual Amount of Solvent used	61.59

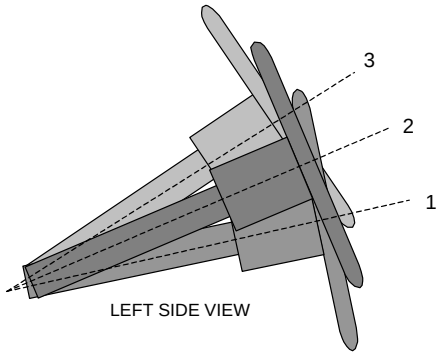
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately two (2) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the right rear fender. The standard fuel tank occupies the area under the rear seat.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost positon No. 1	10.2	0.0
Geometric center position No. 2	20.6	12.5
Uppermost position No. 3	32.7	25.0

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	46	474
Level 2	Occupant H-Point	mm	360	814
Level 3	Mid Door	mm	325	868
Level 4	Window Sill	mm	321	1183
Level 5	Window top	mm	28	1664
N/A	Maximum Penetration	mm	360	

INSTRUMENTATION

Driver SID/Hybrid III Accelerometers	20
Passenger SID/Hybrid III Accelerometers	20
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total No. of Contact Switches	5
Total	71

CAMERA COVERAGE

High Speed, Vehicle On-Board	3
High Speed, Off-Board	4
High Speed, MDB On-Board	3
Real Time, Panning	2
Total	12

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

MDB SPECIFICATIONS (mm)

Measurement Description	Length
Overall Width of Framework Carriage	1252
Overall Length including Honeycomb Face	4115
Wheel Base of Framework Carriage	2590
C.G. location aft of Front Axle	1127

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	384	308	
Right	kg	385	284	
Ratio	%	56.5	43.5	
Totals	kg	769	592	1361

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.80
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.77
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.5

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE (mm)

Vertical Location			From Centerline		Max. Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	200
B	Top of Bumper	533	800	Left	129
C	Mid Level	686	800	Left	181
D	Top of Stack	813	800	Left	187

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	1
High Speed Cameras	2

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/Hybrid III	Rear Seat SID/Hybrid III
Dummy Type / Serial No.	P572F, SID / No. 275	P572F, SID / No. 274
Head Contact	Curtain Airbag	Curtain Airbag / Head liner
Upper Torso Contact	Side Torso Bag	Door Panel
Lower Torso Contact	Door Panel	Door Panel
Left Knee Contact	Door Panel	Right Knee
Right Knee Contact	None	None

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Door remained closed and latched, jammed	Door remained closed and latched, jammed
Right Side Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Movement	None	None
Seat Back Failure	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation
Sill Separation	Front & Rear passenger side sill separated
Windshield Damage	None
Window Damage	Driver Window Cracked and Passenger Window Broken
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 01		Left Rear (Passenger) Occupant Location 04	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	No	No	
Side Torso Airbag	Yes	Yes	No	
Head Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes		No	
Seat Belt Load Limiter	Yes		No	

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	0
Vertical Offset	mm	+/- 20	-7 (Left)

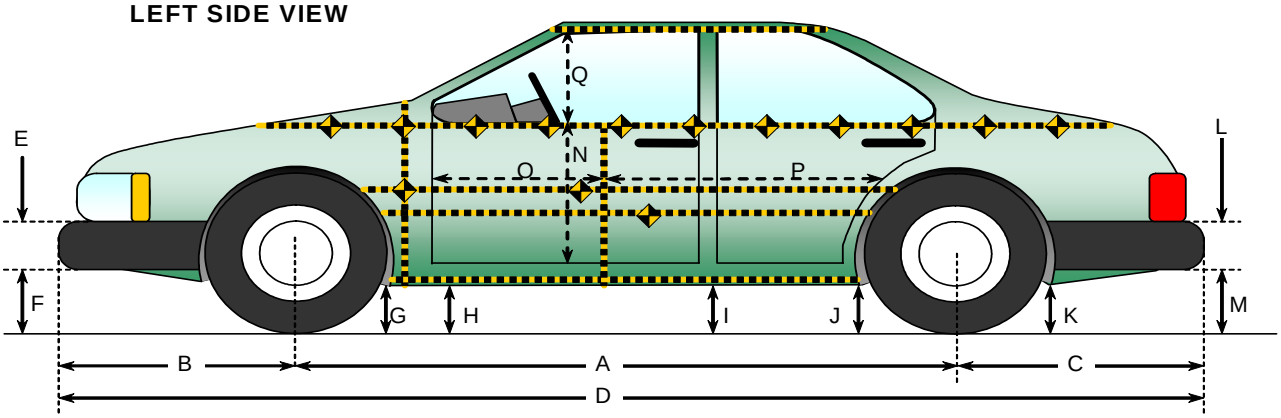
DATA SHEET NO. 5

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

LEFT SIDE VIEW



VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

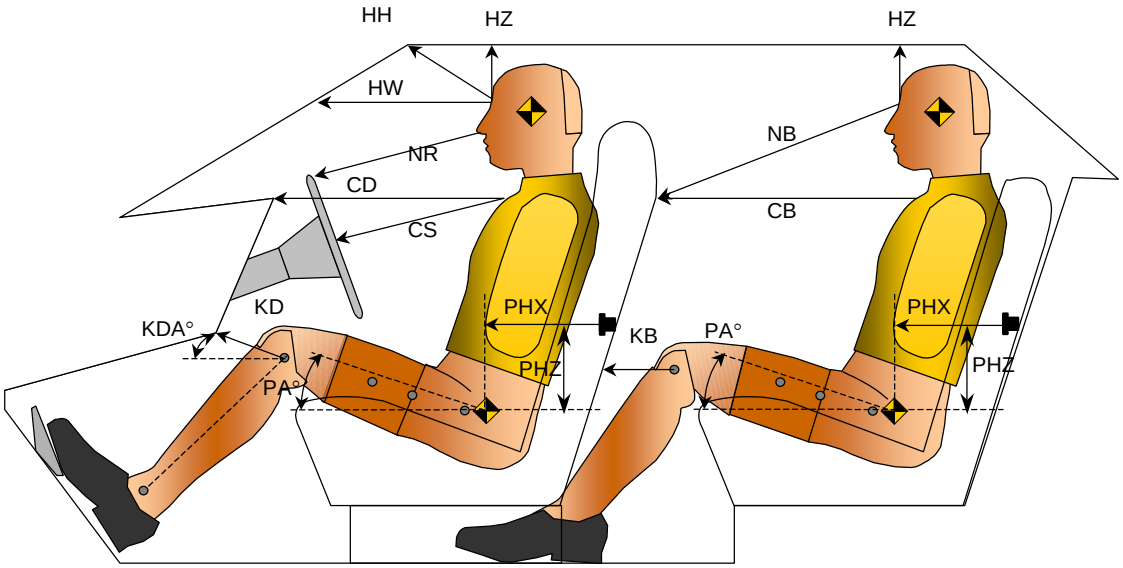
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2960	2950	-10
B	Front Axle to FSOV	916	913	-3
C	Rear Axle to RSOV	1113	1115	2
D	Total Length at Centerline	4990	4980	-10
E	Front Bumper Thickness	390	390	0
F	Front Bumper Bottom to Ground	146	148	2
G	Sill Height at Front Wheel Well	186	217	31
H	Sill Height at Front Door Leading Edge	186	253	67
I	Sill Height at "B" Pillar	186	259	73
J1	Sill Height at Rear Wheel Well	165	239	74
J2	Pinch Weld Height at Rear Wheel Well	177	267	90
K	Sill Height aft of Rear Wheel Well	202	283	81
L	Rear Bumper Thickness	340	340	0
M	Rear Bumper Bottom to Ground	262	355	93
N	Sill Height to Window Bottom Sill	715	607	-108
O	Front Door Leading Edge to Impact CL	713	720	7
P	Rear Door Trailing Edge to Impact CL	1535	1470	-65
Q	Front Window Opening	360	360	0
R	Right Side Length	3524	3532	8
S	Left Side Length	3524	3488	-36
T	Vehicle Width at "B" Post	1825	1600	-225

DATA SHEET NO. 6

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

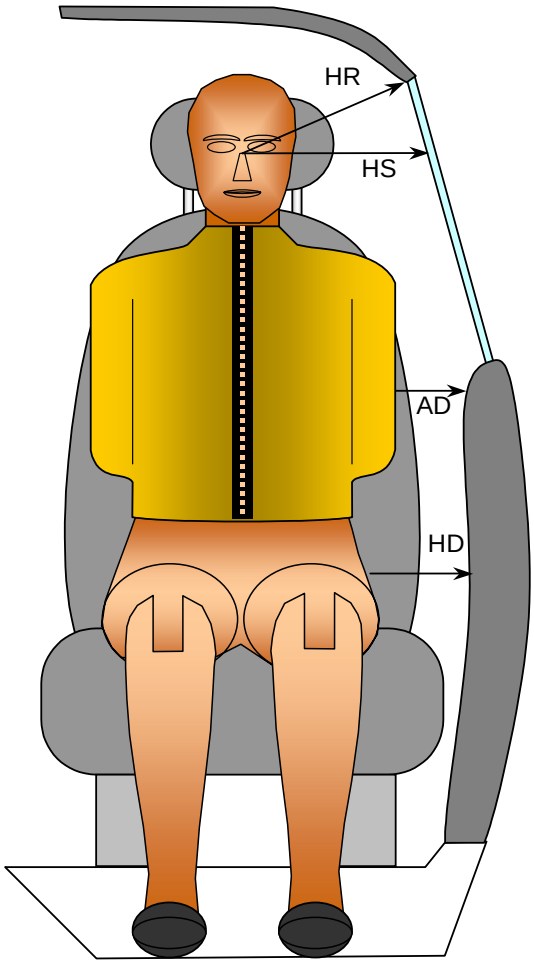
Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length(mm)	Angle	Length(mm)	Angle
HH		Head to Header	383	14.0		
HW		Head to Windshield	641	0.0		
HZ	HZ	Head to Roof	185	90.0	140	90.0
NR	NB	Nose to Rim/Nose to Seat Back	396	11.5	629	15.1
CD	CB	Chest to Dash or Seat Back	518	6.5	550	2.0
CS		Chest to Steering Wheel	290	14.6		
KDL	KBL	Left Knee to Dash or Seat Back	179	38.9	244	0.0
KDR	KBR	Right Knee to Dash or Seat Back	162		220	
PA	PA	Pelvic Angle		23.6		23.7
PHX	PHX	H-Point to Striker (X-Axis)	162		202	
PHZ	PHZ	H-Point to Striker (Z-Axis)	155		271	

DATA SHEET NO. 7

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



FRONT VIEW OF DUMMY

LATERAL CLEARANCE DIMENSION INFORMATION

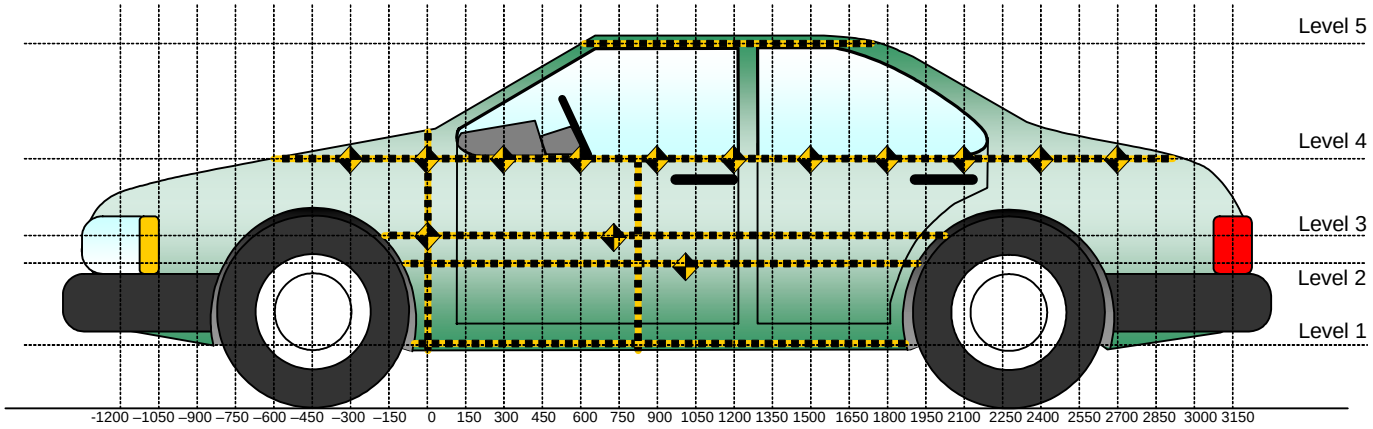
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	249	189
HS	Head to Side Window	mm	300	210
AD	Arm to Door	mm	114	110
HD	H-Point to Door	mm	125	120

DATA SHEET NO. 8

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



All Measurements Shown in mm

LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.
Measurments taken 900 mm right of impact reference.
All measurements below in mm.

Level	Measurement Description	Height Above Ground
1	Sill Top	211
2	Occupant H-Point	503
3	Mid Door	617
4	Window Sill	890
5	Window Top	1376

All Dimensions shown in millimeters

DATA SHEET NO. 9

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300															
-150			598	671				629	689				31	18	
0	610	602	601	663		621	673	657	679		11	71	56	16	
150	613	600	599	662		656	803	744	712		43	203	145	50	
300	613	596	595	649		658	839	815	759		45	243	220	110	
450	613	592	592	639		657	856	838	788		44	264	246	149	
600	614	589	591	637		660	859	862	813		46	270	271	176	
750	614	589	591	635		655	884	869	834		41	295	278	199	
900	611	589	589	626	894	656	896	863	854	879	45	307	274	228	-15
1050	612	586	586	622	886	651	907	864	867	885	39	321	278	245	-1
1200	612	586	586	621	883	648	912	861	864	889	36	326	275	243	6
1350	614	589	589	619	890	646	936	890	883	907	32	347	301	264	17
1500	613	591	591	620	891	643	949	906	918	901	30	358	315	298	10
1650	610	591	594	615	890	642	951	919	936	820	32	360	325	321	-70
1800	616	591	601	619	893	638	906	887	888	791	22	315	286	269	-102
1950		593	582	623	900		767	817	795	928		174	235	172	28
2100				628	913				709	938				81	25
2250				625					640					15	
2400				629					670					41	
2550															
2700															
2850															

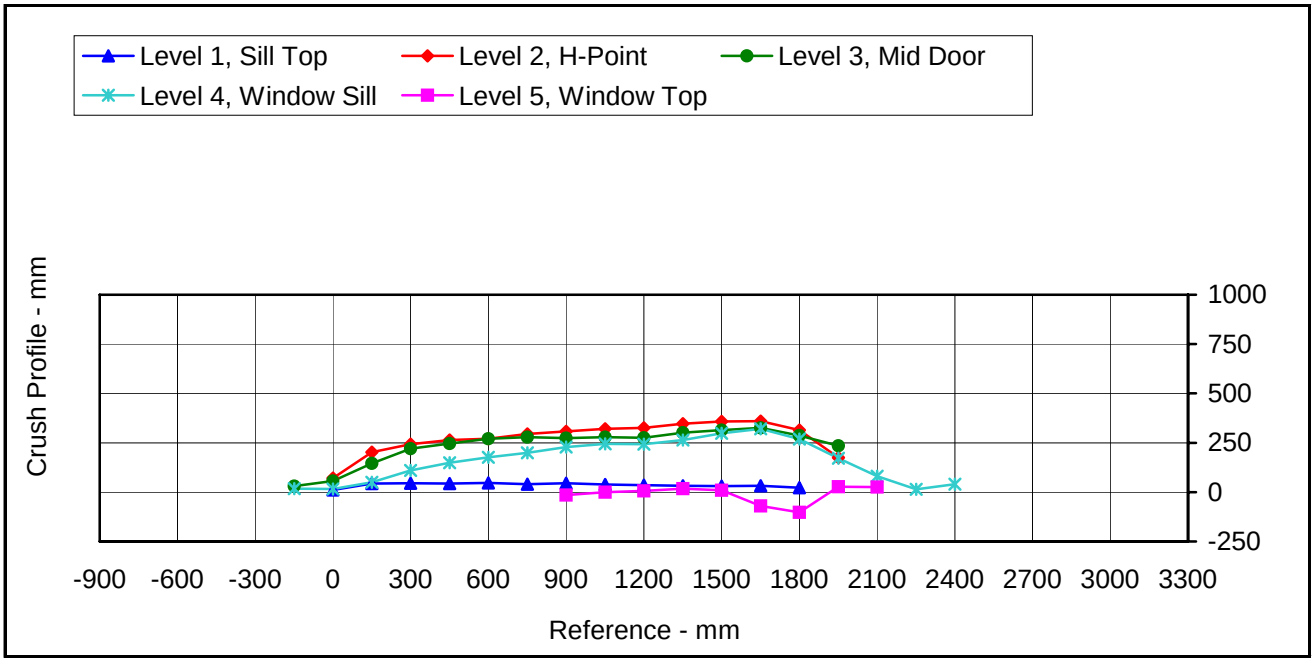
All Dimensions shown in millimeters

DATA SHEET NO. 9…(CONTINUED)

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



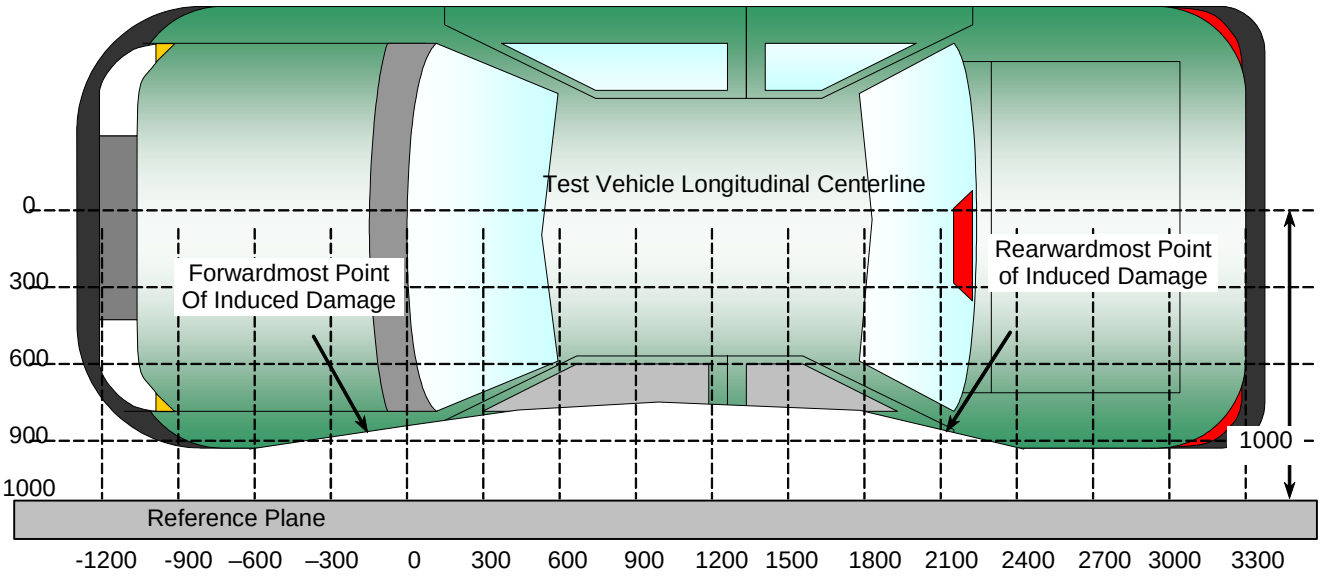
	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	46	360	325	321	28
Distance from Impact	mm	1500	1950	1950	900	2400

DATA SHEET NO. 10

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



All Dimensions Shown in millimeters

TOP VIEW

DAMAGE PROFILE DISTANCES

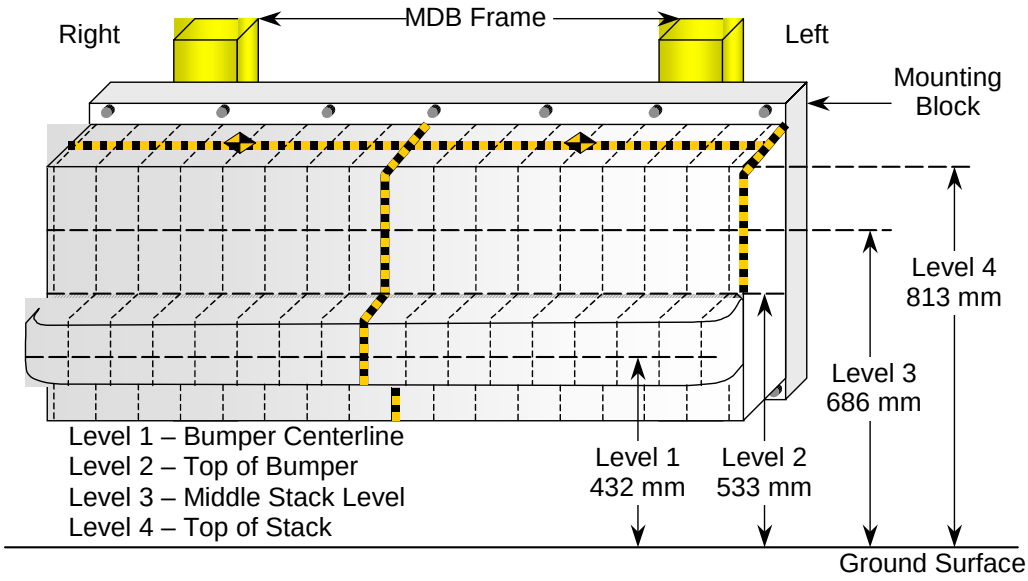
DPD	Distance From Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	2100	4	628	709	81
2	1650	1	591	951	360
3	1200	2	586	912	326
4	750	2	589	884	295
5	300	1	596	839	243
6	-150	4	598	629	31

DATA SHEET NO. 11

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	659	635	629	632	646	643	641	644	648	652	658	682	666	670	679	694	718
2	678	679	679	679	675	672	677	681	696	698	702	710	714	718	721	730	749
3	651	633	632	638	659	686	679	669	661	646	658	657	673	702	727	729	801
4	667	625	634	658	661	685	680	669	659	647	650	653	658	673	702	732	807

All Dimensions in mm

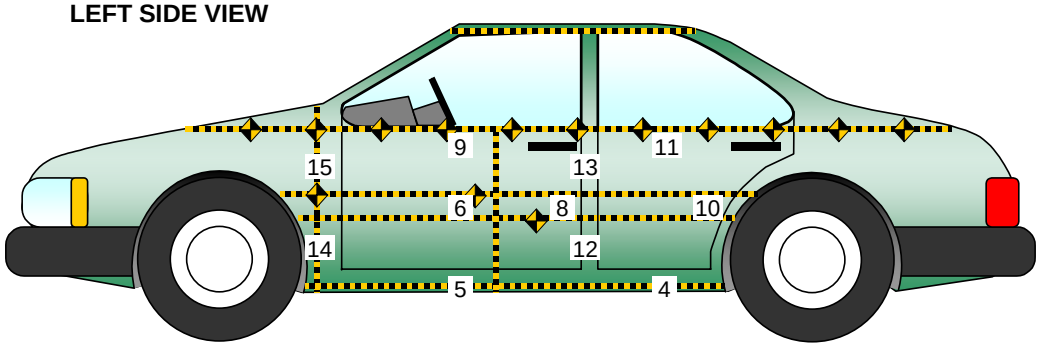
DATA SHEET NO. 12

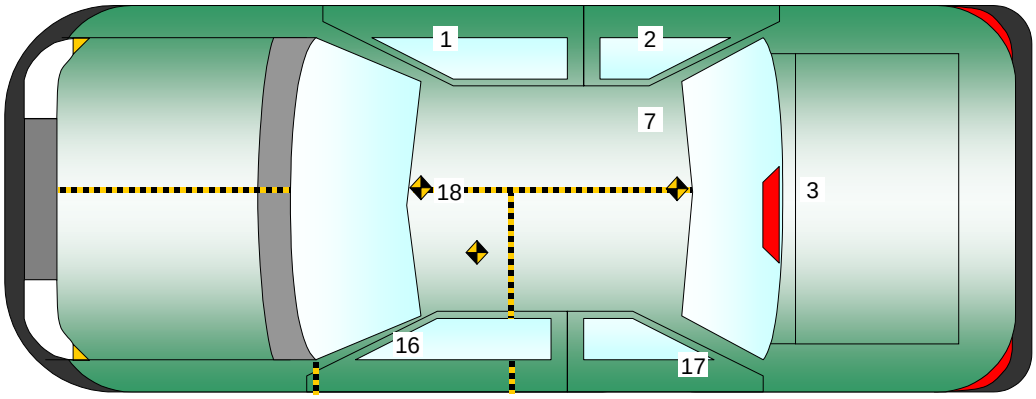
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

LEFT SIDE VIEW





No.	Location
1	Right Sill at Front Seat
2	Right Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Sill at Rear Door
5	Left Sill at Front Door
6	Left Front Door Centerline
7	Right Rear Occupant Compartment
8	Left Front Door Mid-Rear
9	Left Front Door Upper Centerline

No.	Location
10	Left Rear Door Mid-Rear
11	Left Rear Door Upper Centerline
12	Left Lower B-Post
13	Left Middle B-Post
14	Left Lower A-Post
15	Left Middle A-Post
16	Front Seat Track
17	Rear Seat Track or Structure
18	Vehicle CG

DATA SHEET NO. 12…(CONTINUED)
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)			
		X	Y	Z	
1	Right Sill at Front Seat	2778	730	351	
2	Right Sill at Rear Seat	1975	715	360	
3	Rear Floorpan Above Axle	805	0	300	
4	Left Sill at Rear Door	1690	-755	175	
5	Left Sill at Front Door	2630	-750	175	
6	Front Door Centerline				1
7	Rt. Rear Occ. Compartment	2335	355	200	
8	Front Door Mid-Rear				1
9	Front Door Upper Centerline				1
10	Rear Door Mid-Rear				1
11	Rear Door Upper Centerline				1
12	B-Post Lower	2300	-715	555	
13	B-Post Middle	2300	-715	750	
14	A-Post Lower	3419	-825	375	
15	A-Post Middle	3419	-825	495	
16	Front Seat Track	2719	400	385	
17	Rear Seat Structure				1
18	Vehicle CG	3110	270	280	

Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane

1.) Not installed

DATA SHEET NO. 13

MDB ACCELEROMETER LOCATIONS

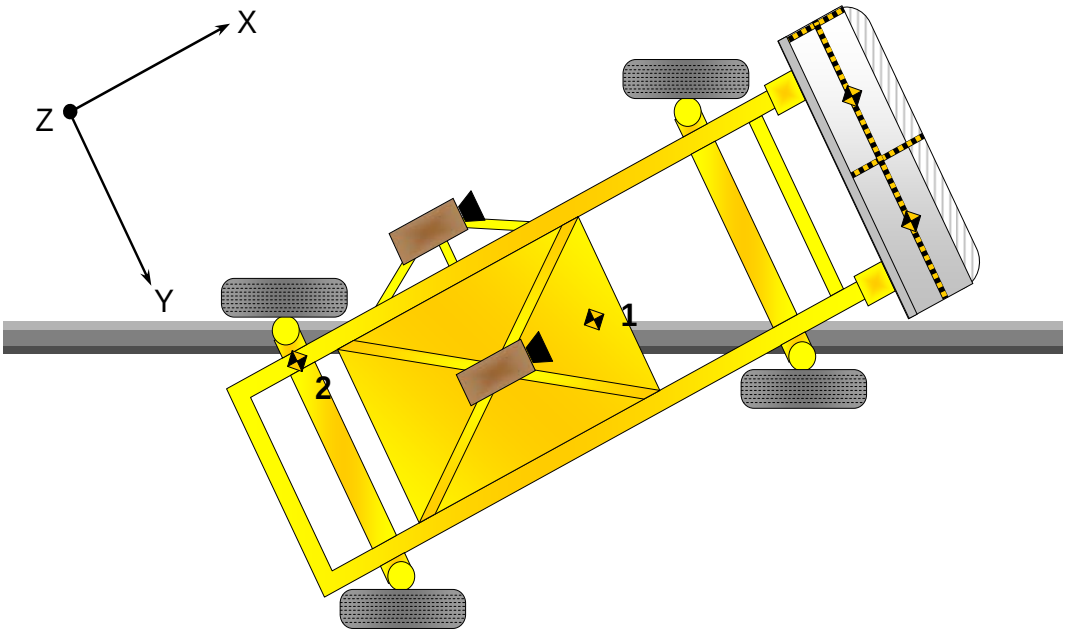
Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Locations	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1195	0	430
2	MDB Rear	-2642	-593	608

Reference Points: X - MDB Front Axle
Y - MDB Centerline
Z - Ground Plane

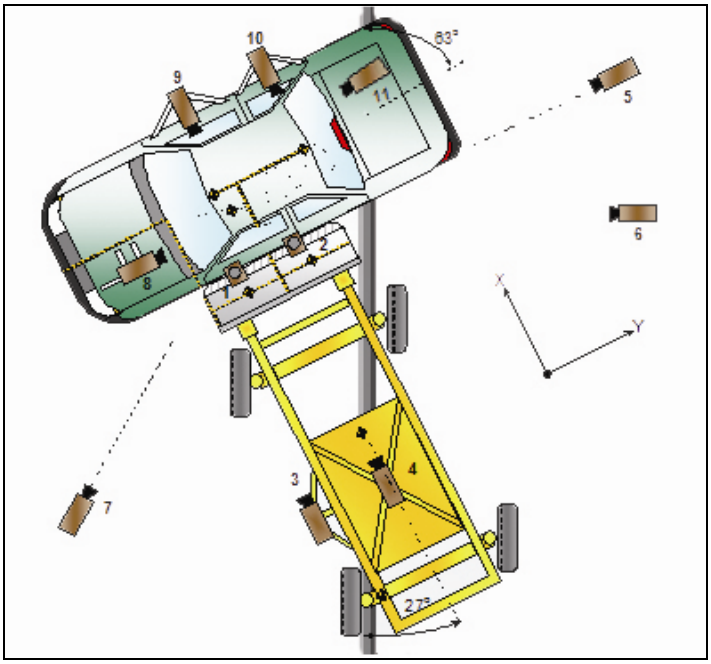


DATA SHEET NO. 14

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



No.	Camera View	Location (mm)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X	Y	Z			
Doc	Real Time Inrun	-2484	-3958	-1506	0		30
Doc	Real Time Left Front	-2266	3549	-1475	-2		30
1	Overhead Overall	1220	2287	-5486	-90	14mm	1000
2	Overhead Close Up	609	2287	-5102	-90	Zoom	1000
3	Left Impact Point (MDB)	-2134	0	-1143	-2	12mm	1000
4	Side Overall (MDB)	-3912	838	-1829	-4	12mm	1000
5	Rear	-64	20485	-1348	0	105mm	1000
6	Left Rear (MDB)	-2137	-1302	-339	-4	85mm	1000
7	Left Front	-2266	-3564	-1475	-2	24mm	1000
8	Driver Front (O.B.)	613	554	-1432	-7	35mm	1000
9	Driver Side (O.B.)	1815	982	-1125	-2	20mm	1000
10	Passenger Side (O.B.)	1815	1871	-1127	-2	20mm	1000

X = Barrier Face Y = Monorail Centerline Z = Ground DNR = Did Not Run NTM = No Timing Marks

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

Test Time: 12:05 PM Temperature: 18.3 Deg. C.

Stoddard Solvent Spillage Measurements

A. From impact until vehicle motion ceases: 0.0 oz.
(Maximum Allowable = 1 ounce)

B. For the 5 minute period after motion ceases: 0.0 oz.
(Maximum Allowable = 5 ounces)

C. For the following 25 minutes: 0.0 oz.
(Maximum Allowable = 1 oz./minute)

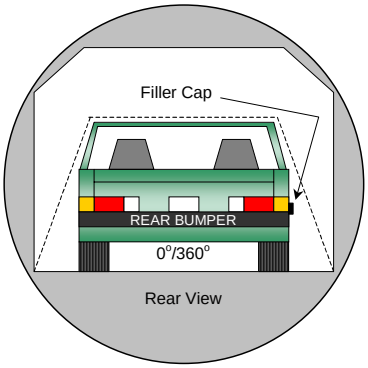
D. Spillage Details: No leakage occurred

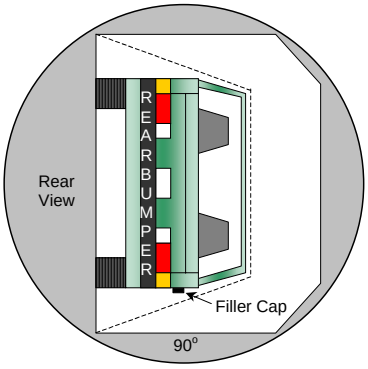
DATA SHEET NO. 16

FMVSS 301 STATIC ROLLOVER DATA

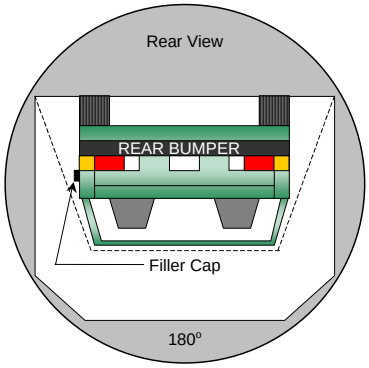
Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

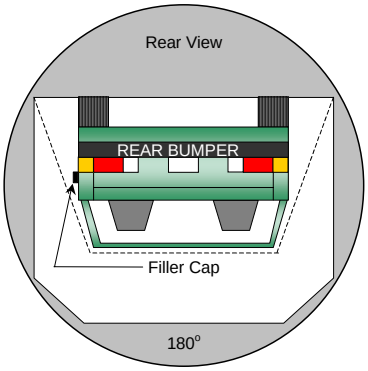




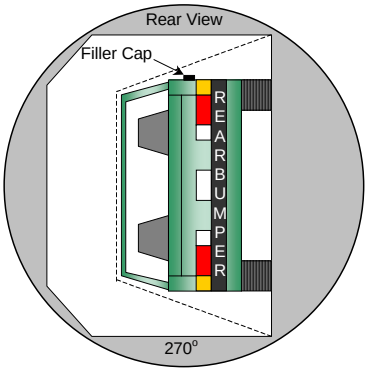
0° to 90°

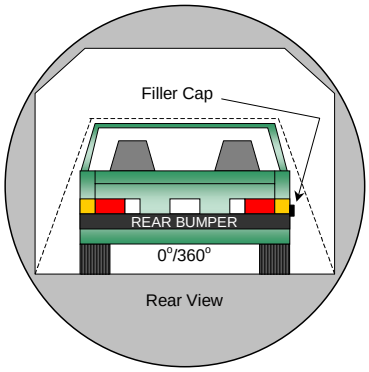


90° to 180°



180° to 270°





270° to 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage locations.

   No solvent leakage occurred during static rollover testing.

DATA SHEET NO. 16…(CONTINUED)

FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	82	300	382
90° to 180°	84	300	384
180° to 270°	81	300	381
270° to 360°	83	300	383

FMVSS 301 SPILLAGE TABLE REQUIREMENT (oz.)

First 5 Minutes	5.0
Sixth Minute	1.0
Seventh Minute	1.0
Eighth Minute	1.0

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

SOLVENT SPILLAGE LOCATION TABLE

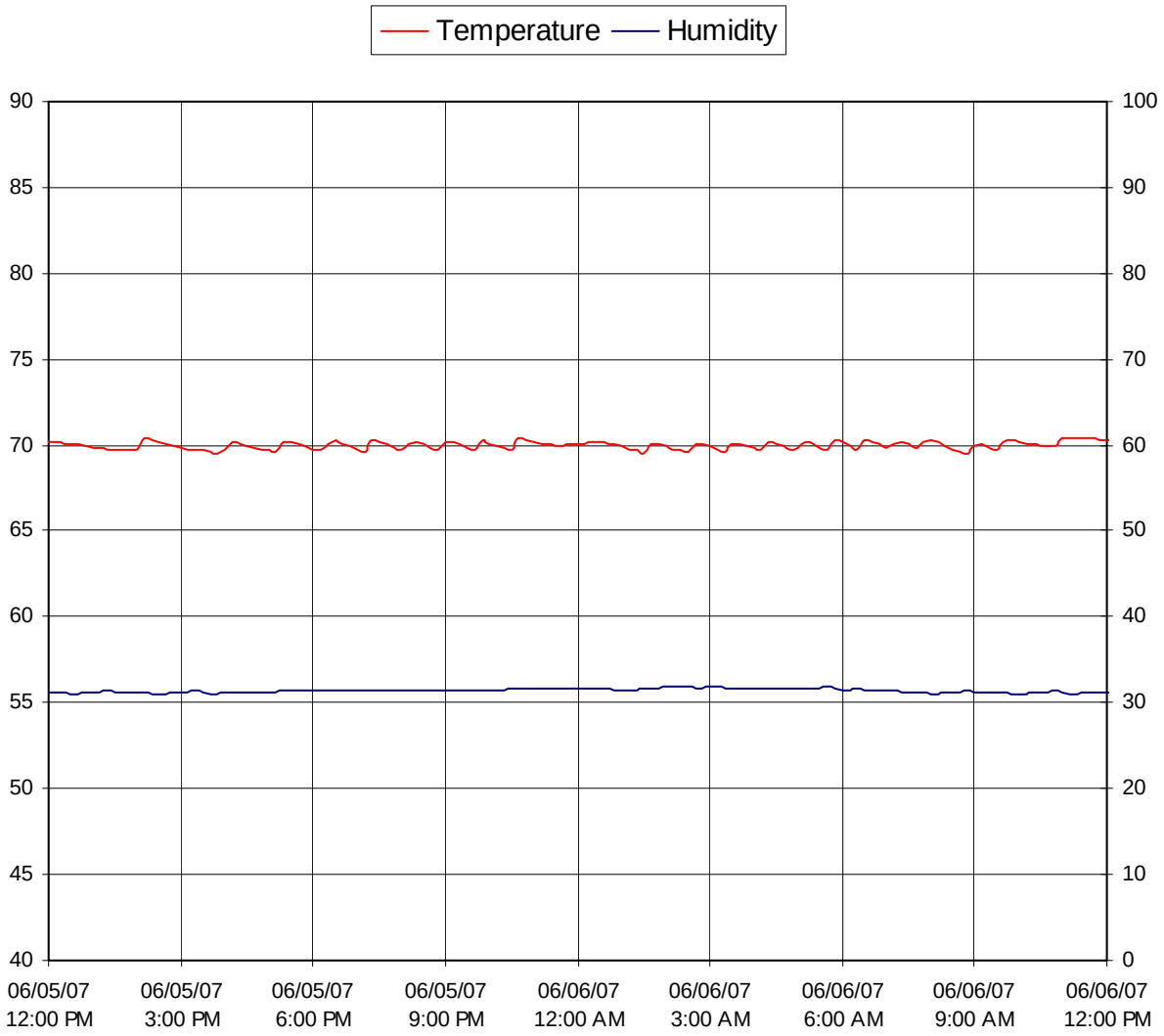
Test Phase	Spillage Location
0° to 90°	None
90° to 180°	None
180° to 270°	None
270° to 360°	None

DATA SHEET NO. 17

DUMMY / VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



APPENDIX A
PHOTOGRAPHS

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Figure A-1: Left Front ¾ View, as Received

Figure A-2: Right Rear ¾ View, as Received

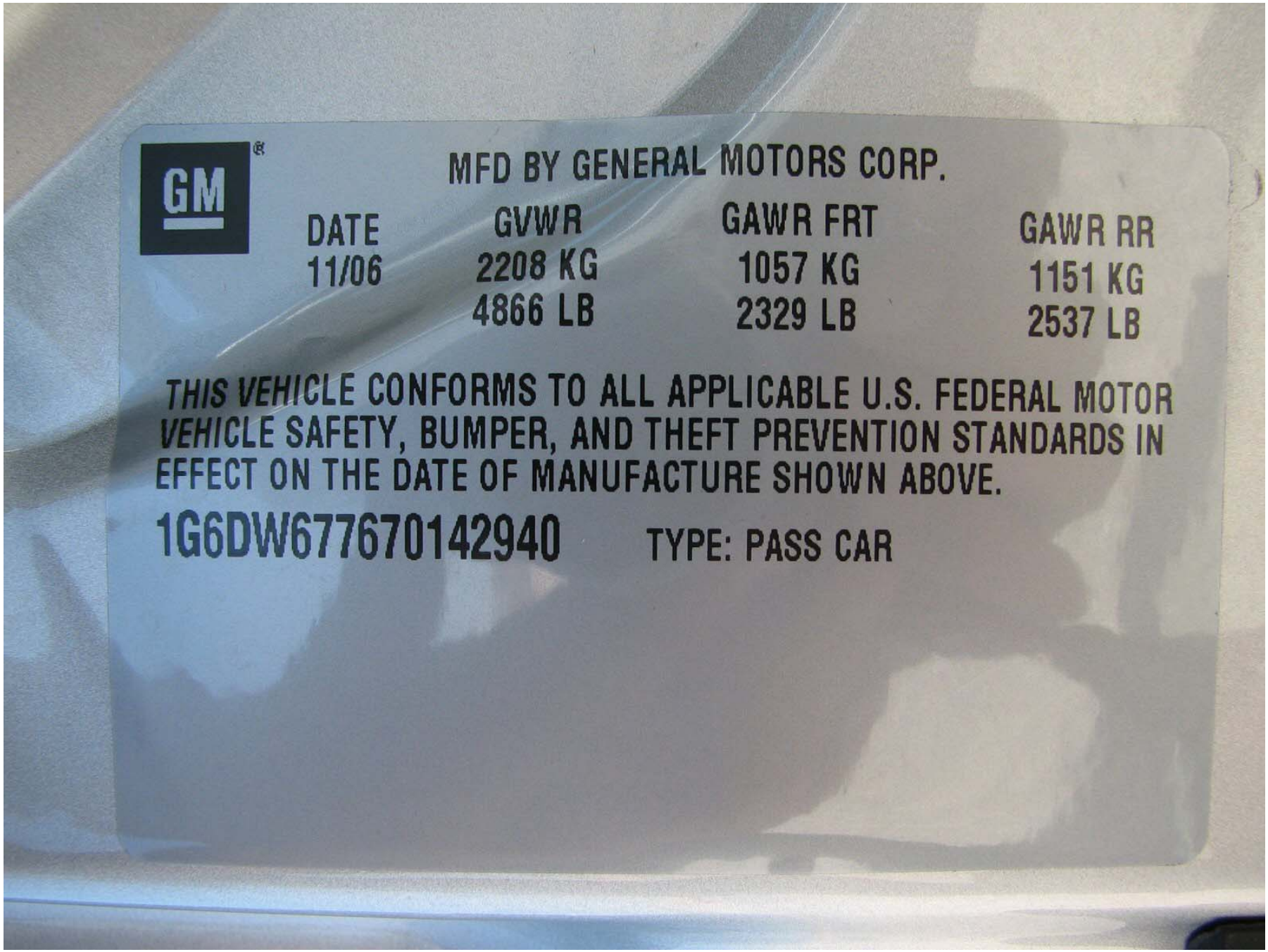

Figure A-3: Manufacturer's Label

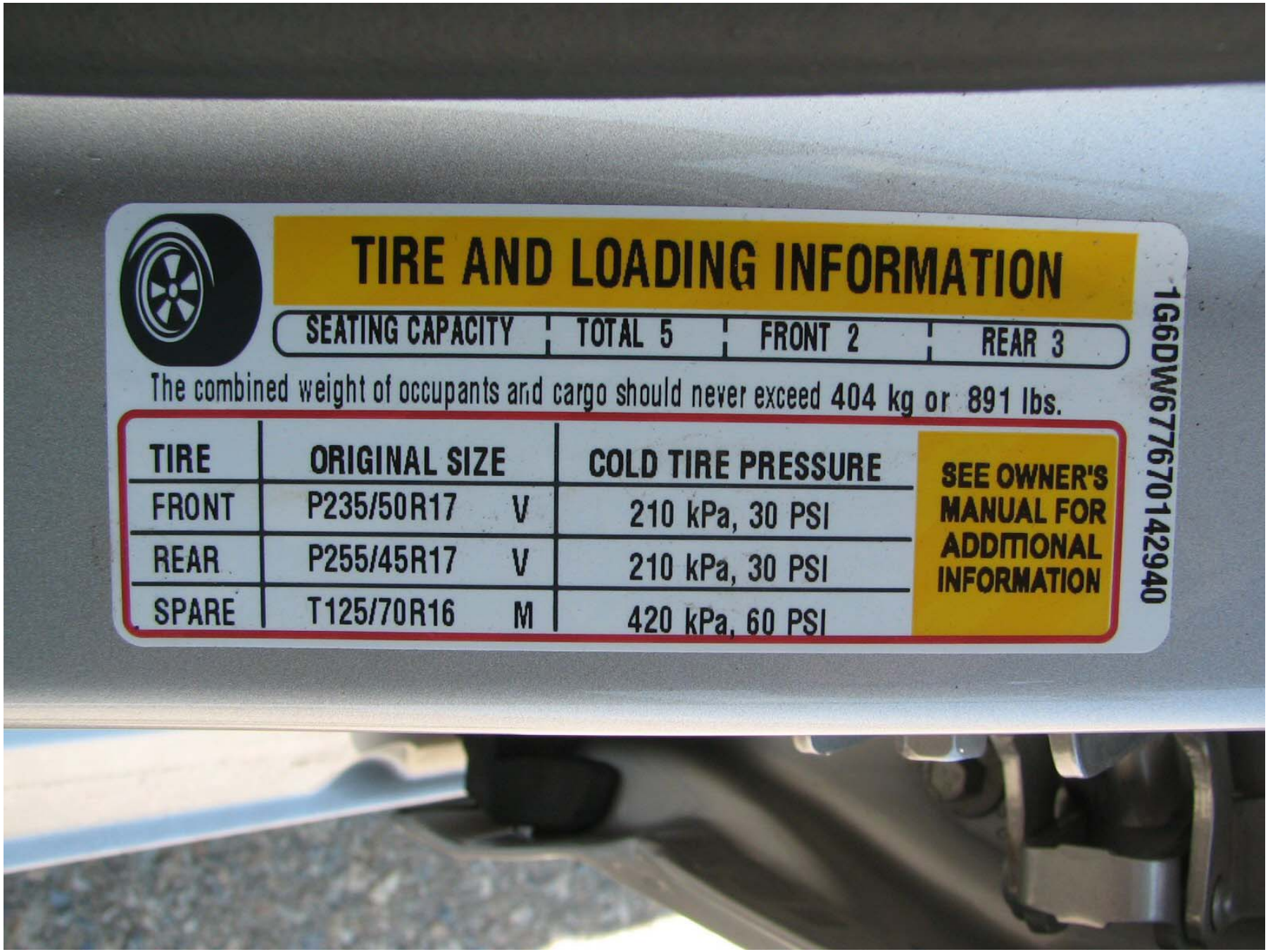

Figure A-4: Tire Placard

Figure A-5: Pre-Test Front View

Figure A-6: Post-Test Front View

Figure A-7: Pre-Test Left Front ¾ View

Figure A-8: Post-Test Left Front ¾ View

Figure A-9: Pre-Test Left Side View

Figure A-10: Post-Test Left Side View

Figure A-11: Pre-Test Left Rear ¾ View

Figure A-12: Post-Test Left Rear ¾ View

Figure A-13: Pre-Test Rear View

Figure A-14: Post-Test Rear View

Figure A-15: Pre-Test Right Rear ¾ View

Figure A-16: Post-Test Right Rear ¾ View

Figure A-17: Pre-Test Right Side View

Figure A-18: Post-Test Right Side View

Figure A-19: Pre-Test Right Front ¾ View

Figure A-20: Post-Test Right Front ¾ View

Figure A-21: Pre-Test Overhead View

Figure A-22: Post-Test Overhead View

Figure A-23: Pre-Test Overhead Close-up View

Figure A-24: Post-Test Overhead Close-up View

Figure A-25: Pre-Test Left Impact Point

Figure A-26: Post-Test Left Impact Point

Figure A-27: Pre-Test Front ¾ View of Left Side Door

Figure A-28: Post-Test Front ¾ View of Left Side Door

Figure A-29: Pre-Test Rear ¾ View of Left Side Door

Figure A-30: Post-Test Rear ¾ View of Left Side Door

Figure A-31: Pre-Test Left Front Door

Figure A-32: Post-Test Left Front Door

Figure A-33: Pre-Test Left Rear Door

Figure A-34: Post-Test Left Rear Door

Figure A-35: Pre-Test Driver Dummy (Door Open)

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Figure A-36: Pre-Test Driver Dummy (Through Window)

Figure A-37: Post-Test Driver Dummy (Through Window)

Figure A-38: Pre-Test Driver Dummy Clearance From Door

Figure A-39: Post-Test Driver Dummy Clearance From Door

Figure A-40: Pre-Test Driver Dummy Right Side View

Figure A-41: Post-Test Driver Dummy Right Side View

Figure A-42: Pre-Test Front Door Panel (Interior)

Figure A-43: Post-Test Front Door Panel (Interior)

Figure A-44: Pre-Test Passenger Dummy Left Side (Door Open)

This Space Intentionally Left Blank

Figure A-45: Pre-Test Passenger Dummy Left Side (Through Window)

Figure A-46: Post-Test Passenger Dummy Left Side (Through Window)

Figure A-47: Pre-Test Passenger Dummy Clearance From Door

Figure A-48: Post-Test Passenger Dummy Clearance From Door

Figure A-49: Pre-Test Passenger Dummy Right Side View

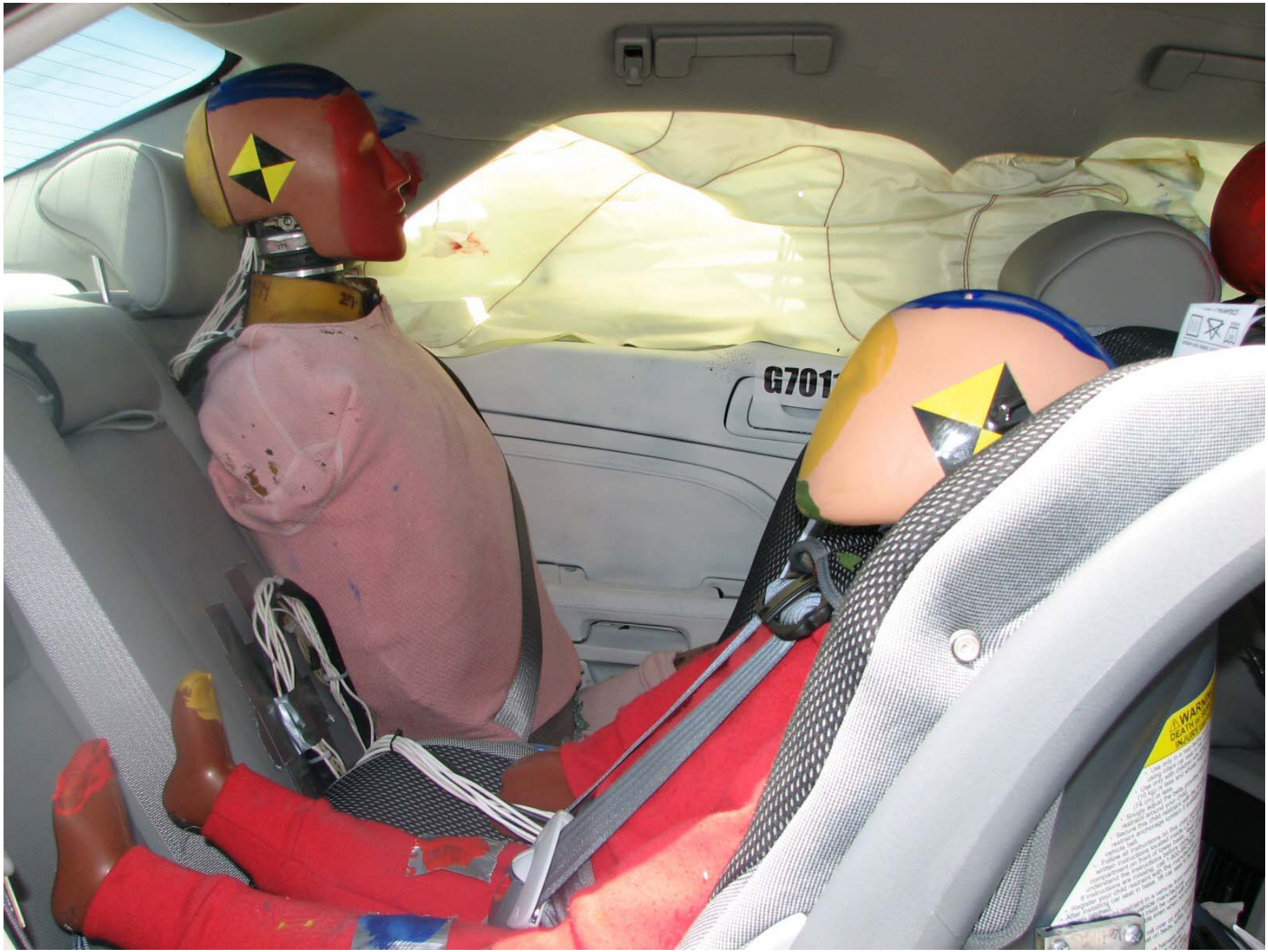


Figure A-50: Post-Test Passenger Dummy Right Side View

Figure A-51: Pre-Test Rear Door Panel (Interior)

Figure A-52: Post-Test Rear Door Panel (Interior)

Figure A-53: Pre-Test Front View of Deformable Barrier

Figure A-54: Post-Test Front View of Deformable Barrier

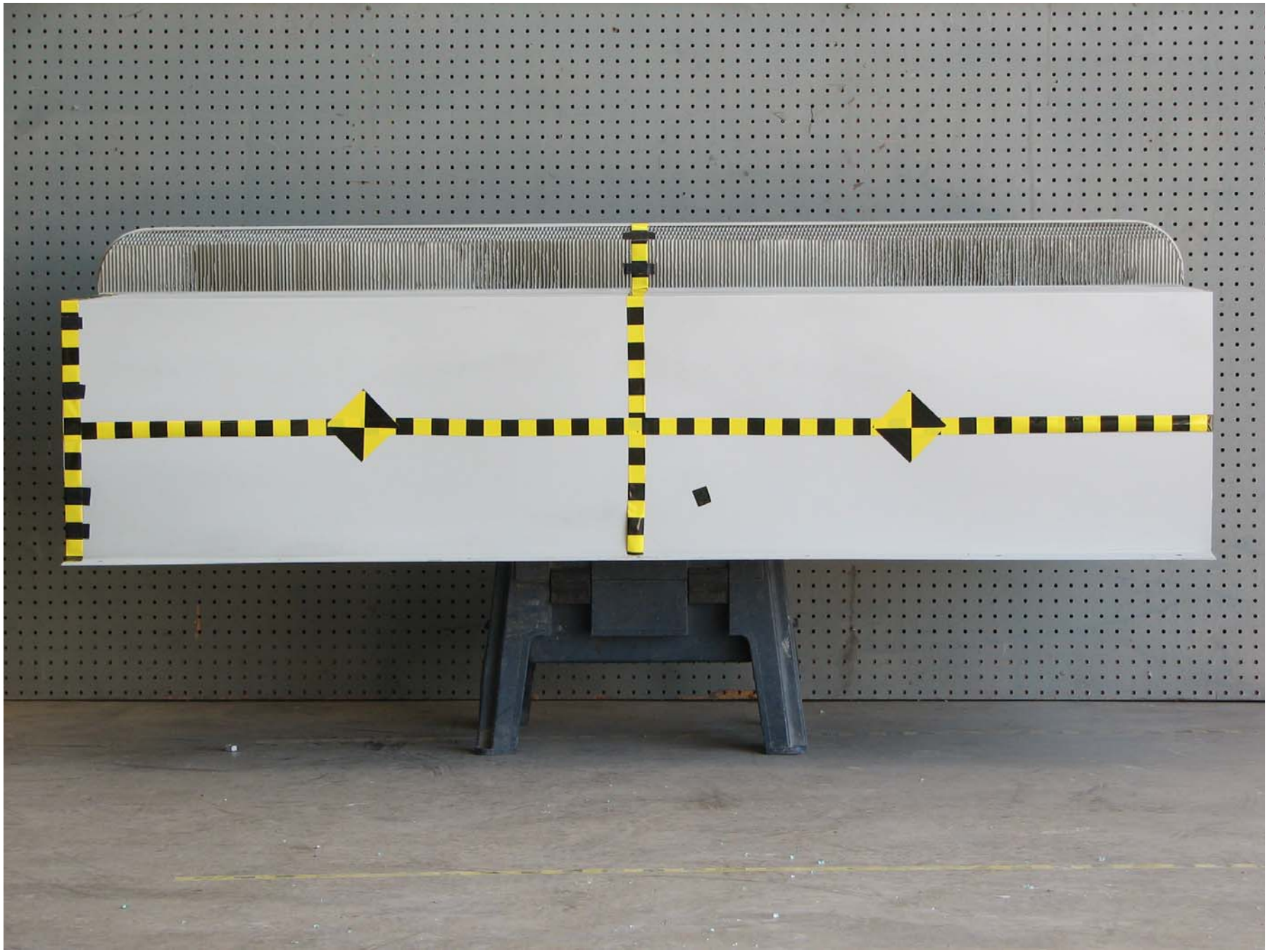


Figure A-55: Pre-Test Top View of Deformable Barrier

Figure A-56: Post-Test Top View of Deformable Barrier

Figure A-57: Pre-Test Right Side View of Deformable Barrier

Figure A-58: Post-Test Right Side View of Deformable Barrier

Figure A-59: Pre-Test Left Side View of Deformable Barrier

Figure A-60: Post-Test Left Side View of Deformable Barrier

Figure A-61: Vehicle on Rollover Device (0°)

Figure A-62: Vehicle on Rollover Device (90°)

Figure A-63: Vehicle on Rollover Device (180°)

Figure A-64: Vehicle on Rollover Device (270°)

Figure A-65: Vehicle Impact

APPENDIX B

SID/HIII, VEHICLE AND MDB RESPONSE DATA

LIST OF DATA PLOTS

Data Plot		Page
B-1	Driver Upper Rib Primary Y	B-1
	Driver Lower Rib Primary Y	B-1
	Driver Lower Spine Primary Y	B-1
	Driver Pelvis Primary Y	B-1
B-2	Passenger Upper Rib Primary Y	B-2
	Passenger Lower Rib Primary Y	B-2
	Passenger Lower Spine Primary Y	B-2
	Passenger Pelvis Primary Y	B-2

The following additional data plots 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

LIST OF DATA PLOTS…(CONTINUED)

Driver Head X Primary
Driver Head Y Primary
Driver Head Z Primary
Driver Head Resultant Primary
Driver Head Primary X Velocity
Driver Head Primary Y Velocity
Driver Head Primary Z Velocity
Driver Head X Redundant
Driver Head Y Redundant
Driver Head Z Redundant
Driver Head Resultant Redundant
Driver Head Redundant X Velocity
Driver Head Redundant Y Velocity
Driver Head Redundant Z Velocity
Driver Upper Neck Force X
Driver Upper Neck Force Y
Driver Upper Neck Force Z
Driver Upper Neck Force Resultant
Driver Upper Neck Moment X
Driver Upper Neck Moment Y
Driver Upper Neck Moment Z
Driver Upper Neck Moment Resultant
Driver Upper Rib Primary Y Velocity
Driver Lower Rib Primary Y Velocity
Driver Lower Spine Primary Y Velocity
Driver Pelvis Primary Y Velocity
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y

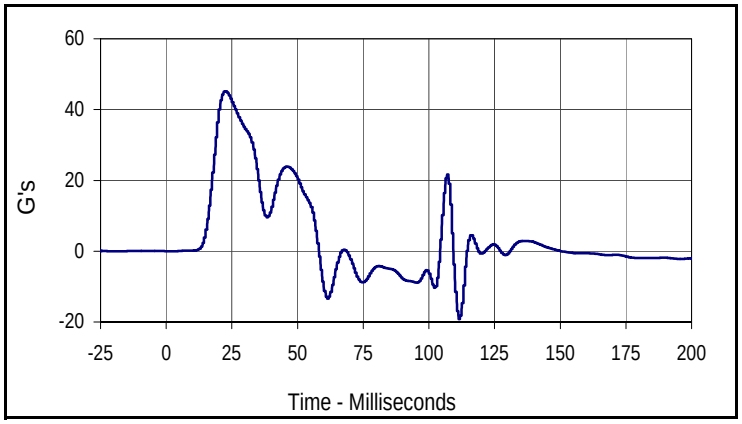
Driver Upper Rib Redundant Y Velocity
Driver Lower Rib Redundant Y Velocity
Driver Lower Spine Redundant Y Velocity
Driver Pelvis Redundant Y Velocity
Driver Thorax Contact
Driver Pelvis Contact
Passenger Head X Primary
Passenger Head Y Primary
Passenger Head Z Primary
Passenger Head Resultant Primary
Passenger Head Primary X Velocity
Passenger Head Primary Y Velocity
Passenger Head Primary Z Velocity
Passenger Head X Redundant
Passenger Head Y Redundant
Passenger Head Z Redundant
Passenger Head Resultant Redundant
Passenger Head Redundant X Velocity
Passenger Head Redundant Y Velocity
Passenger Head Redundant Z Velocity
Passenger Upper Neck Force X
Passenger Upper Neck Force Y
Passenger Upper Neck Force Z
Passenger Upper Neck Force Resultant
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Y
Passenger Upper Neck Moment Z
Passenger Upper Neck Moment Resultant

Passenger Upper Rib Primary Y Velocity
Passenger Lower Rib Primary Y Velocity
Passenger Lower Spine Primary Y Velocity
Passenger Pelvis Primary Y Velocity
Passenger Upper Rib Redundant Y
Passenger Lower Rib Redundant Y
Passenger Lower Spine Redundant Y
Passenger Pelvis Redundant Y
Passenger Upper Rib Redundant Y Velocity
Passenger Lower Rib Redundant Y Velocity
Passenger Lower Spine Redundant Y Velocity
Passenger Pelvis Redundant Y Velocity
Passenger Thorax Contact
Passenger Pelvis Contact
Vehicle Right Sill at Front Seat X
Vehicle Right Sill at Front Seat Y
Vehicle Right Sill at Front Seat Z
Vehicle Right Sill Front Seat Resultant
Vehicle Right Sill at Front Seat X Velocity
Vehicle Right Sill at Front Seat Y Velocity
Vehicle Right Sill at Front Seat Z Velocity
Vehicle Right Sill at Rear Seat X
Vehicle Right Sill at Rear Seat Y
Vehicle Right Sill at Rear Seat Z
Vehicle Right Sill Rear Seat Resultant
Vehicle Right Sill at Rear Seat X Velocity
Vehicle Right Sill at Rear Seat Y Velocity
Vehicle Right Sill at Rear Seat Z Velocity
Vehicle Rear Floor Above Axle X
Vehicle Rear Floor Above Axle Y
Vehicle Rear Floor Above Axle Z
Vehicle Rear Floor Above Axle Resultant
Vehicle Rear Floor Above Axle X Velocity
Vehicle Rear Floor Above Axle Y Velocity
Vehicle Rear Floor Above Axle Z Velocity

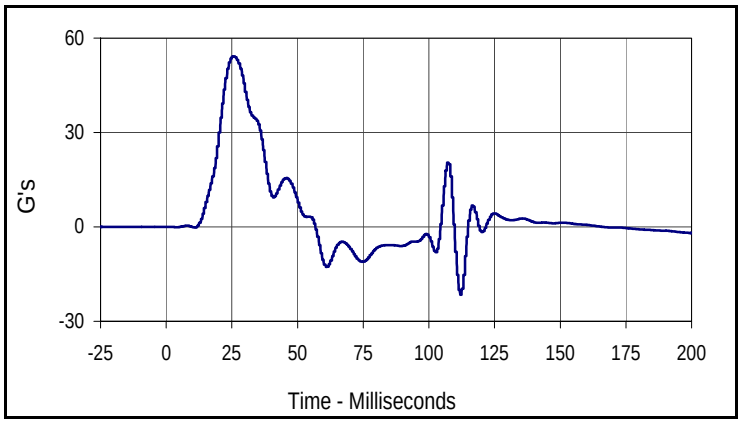
Vehicle Left Sill at Rear Door Y
Vehicle Left Sill at Front Door Y
Vehicle Left Sill at Rear Door Y Velocity
Vehicle Left Sill at Front Door Y Velocity
Vehicle Left Front Door C/L Y
Vehicle Right Rear Occupant Compartment
Vehicle Left Front Door Mid Rear Y
Vehicle Left Front Door Upper CL Y
Vehicle Left Front Door CL Y Velocity
Vehicle Right Rear Occupant Compartment Y Velocity
Vehicle Left Front Door Mid Rear Y Velocity
Vehicle Left Rear Door Upper CL Y Velocity
Vehicle Left Rear Door Mid Rear Y
Vehicle Left Rear Door Upper C/L Y
Vehicle Left Rear Door Mid Rear Y Velocity
Vehicle Left Rear Door Upper CL Y Velocity
Vehicle B-Post Lower Y
Vehicle B-Post Middle Y
Vehicle B-Post Lower Y Velocity
Vehicle B-Post Middle Y Velocity
Vehicle A-Post Lower Y
Vehicle A-Post Middle Y
Vehicle A-Post Lower Y Velocity
Vehicle A-Post Middle Y Velocity
Vehicle Left Front Seat Track
Vehicle Rear Seat Structure
Vehicle Left Front Seat Track Y Velocity
Vehicle Rear Seat Structure Y Velocity
Vehicle CG X
Vehicle CG Y
Vehicle CG Z
Vehicle CG Resultant
Vehicle CG X Velocity
Vehicle CG Y Velocity
Vehicle CG Z Velocity

Driver Upper Rib Primary Y
Driver Lower Rib Primary Y
Driver Lower Spine Primary Y
Driver Pelvis Primary Y
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Passenger Upper Rib Primary Y
Passenger Lower Rib Primary Y
Passenger Lower Spine Primary Y
Passenger Pelvis Primary Y
Passenger Upper Rib Redundant Y
Passenger Lower Rib Redundant Y
Passenger Lower Spine Redundant Y
Passenger Pelvis Redundant Y
MDB CG X
MDB CG Y
MDB CG Z
MDB CG Resultant
MDB CG X Velocity
MDB CG Y Velocity
MDB CG Z Velocity
MDB Rear X
MDB Rear Y
MDB Rear X Velocity
MDB Rear Y Velocity
MDB Right Bumper Contact

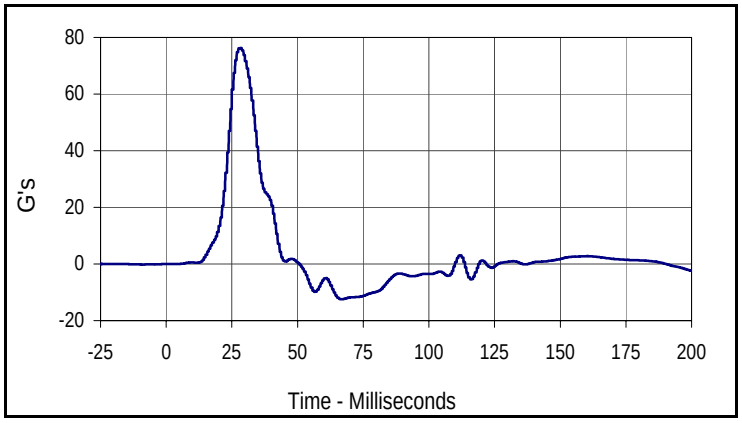
Test Vehicle:	2007 Cadillac STS 4-Door Sedan	Test Date:	6/6/07
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	G70110



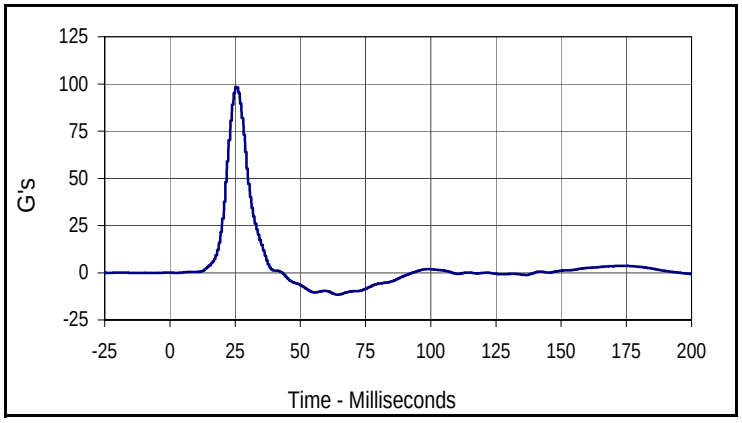
Curve Description			
Driver Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIR	FIR100	G's
Max	Time	Min	Time
45.2	22.5	-19.2	111.3



Curve Description			
Driver Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIR	FIR100	G's
Max	Time	Min	Time
54.2	25.7	-21.5	111.9

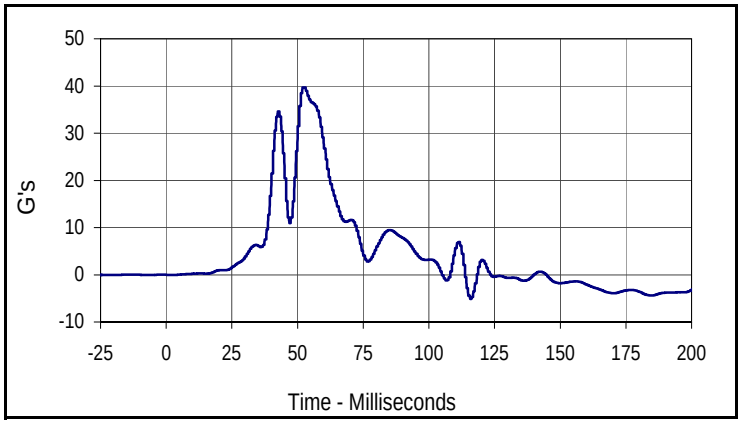


Curve Description			
Driver Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIR	FIR100	G's
Max	Time	Min	Time
76.2	28.2	-12.4	66.3

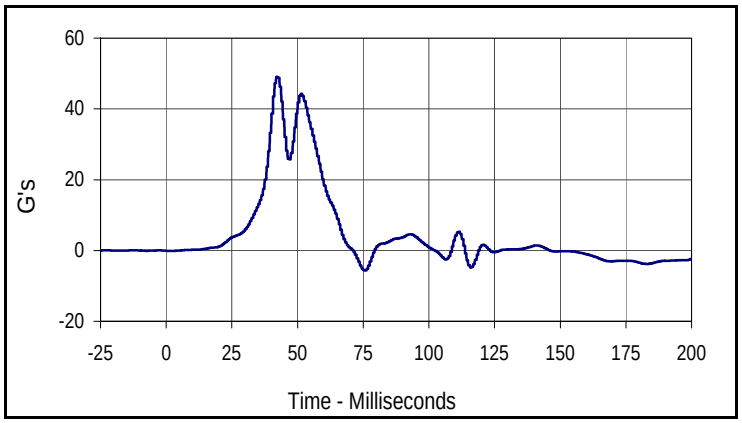


Curve Description			
Driver Pelvis Primary Y			
CURNO	Type	SAE Class	Units
004	FIR	FIR100	G's
Max	Time	Min	Time
98.3	25.0	-11.6	64.4

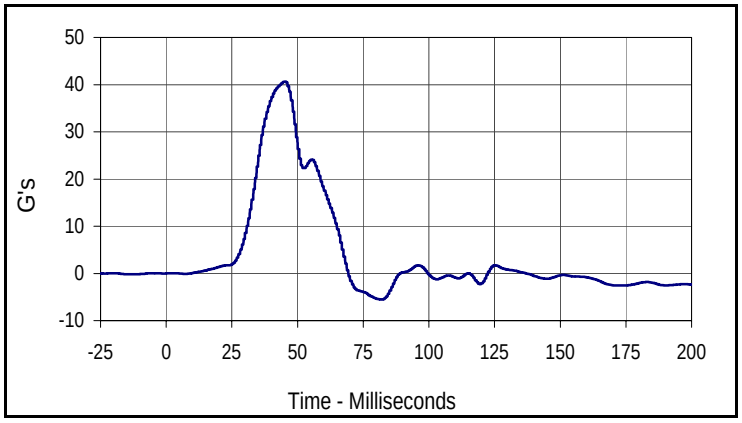
Test Vehicle:	2007 Cadillac STS 4-Door Sedan	Test Date:	6/6/07
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	G70110



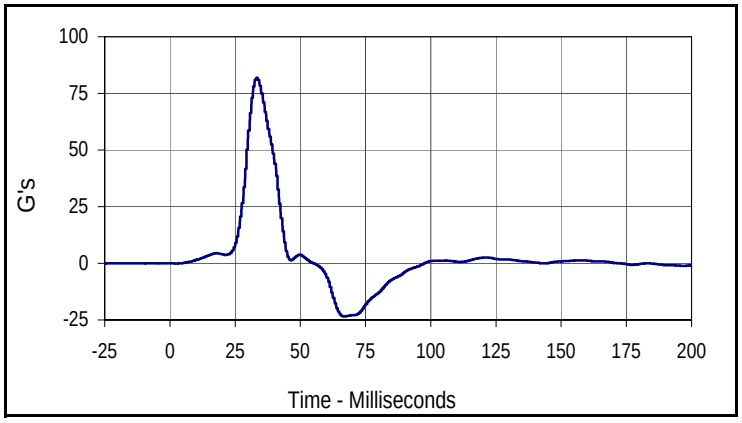
Curve Description			
Passenger Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
005	FIR	FIR100	G's
Max	Time	Min	Time
39.7	51.9	-6.8	213.8



Curve Description			
Passenger Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
006	FIR	FIR100	G's
Max	Time	Min	Time
49.1	41.9	-7.4	214.4



Curve Description			
Passenger Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
007	FIR	FIR100	G's
Max	Time	Min	Time
40.6	45.0	-5.5	81.9



Curve Description			
Passenger Pelvis Y Primary			
CURNO	Type	SAE Class	Units
008	FIR	FIR100	G's
Max	Time	Min	Time
82.0	33.2	-23.5	66.3

APPENDIX C
SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

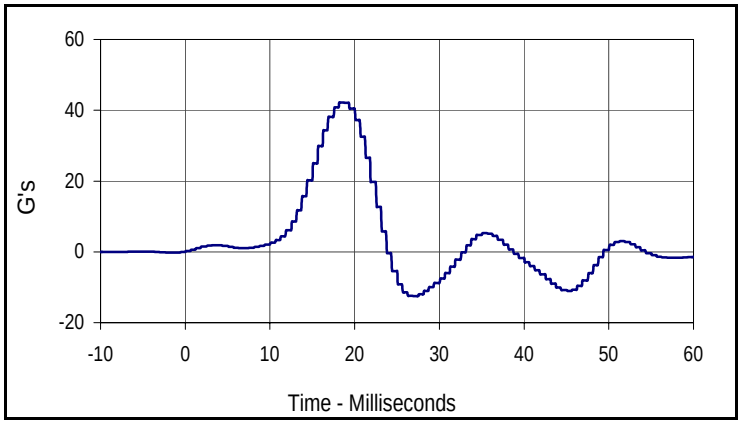
APPENDIX C
PRE-TEST SID / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID / HIII External Measurements	Test Date:	5/24/07
ATD Serial No.:	275	Test I.D.:	N/A

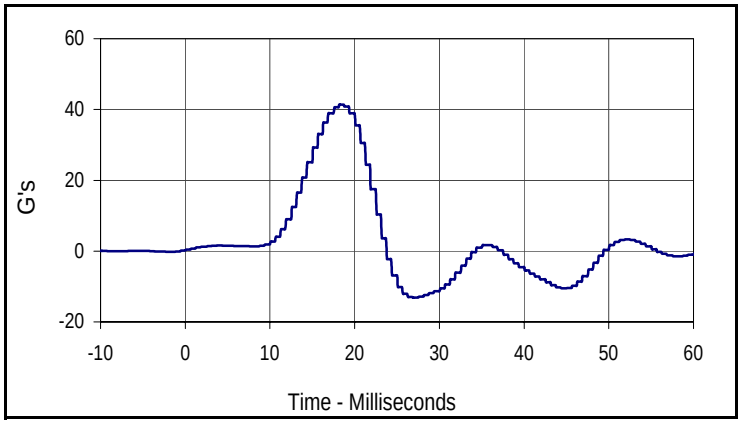
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	^{o}C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	895	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	515	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	513	Pass
KV- Knee Pivot From Floor	mm	490 to 505	498	Pass
HW- Hip Width	mm	356 to 391	377	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	5/31/07
ATD Serial No.:	275	Test I.D.:	TH05D

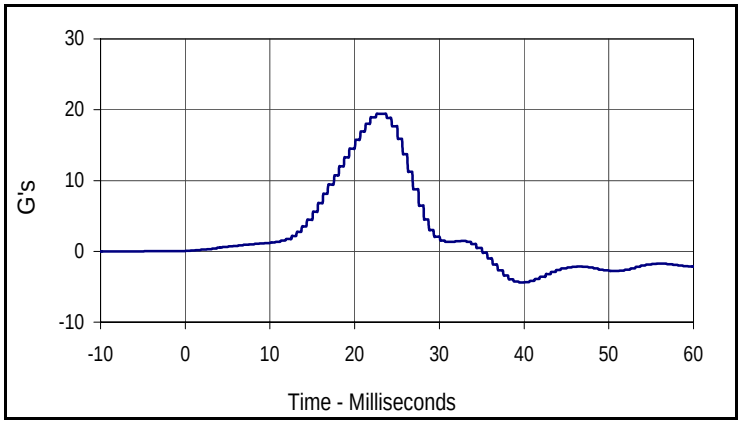
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.24	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	42.2	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	41.4	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.4	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.2	18.2	-12.5	26.9



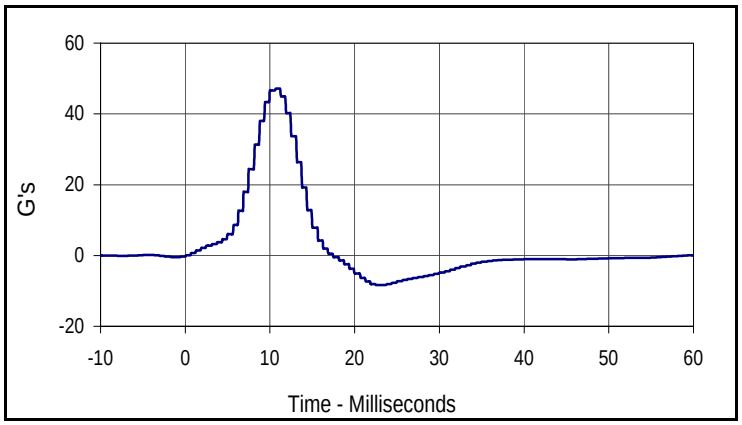
Curve Description			
Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
41.4	18.2	-13.1	26.9



Curve Description			
Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.4	23.2	-4.4	39.4

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	5/31/07
ATD Serial No.:	275	Test I.D.:	PL05D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	47.1	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	4.90	Pass
		Overall Test Results		Pass

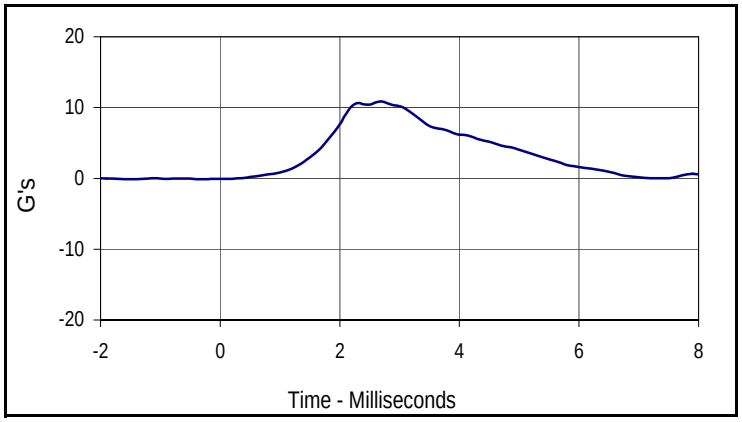


Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
47.1	10.7	-8.4	22.5

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	5/31/07
ATD Serial No.:	275	Test I.D.:	HD05D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	147.7	Pass
Peak Longitudinal Acceleration	G's	≤15.0	10.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	4.5	Pass
		Overall Test Results		Pass

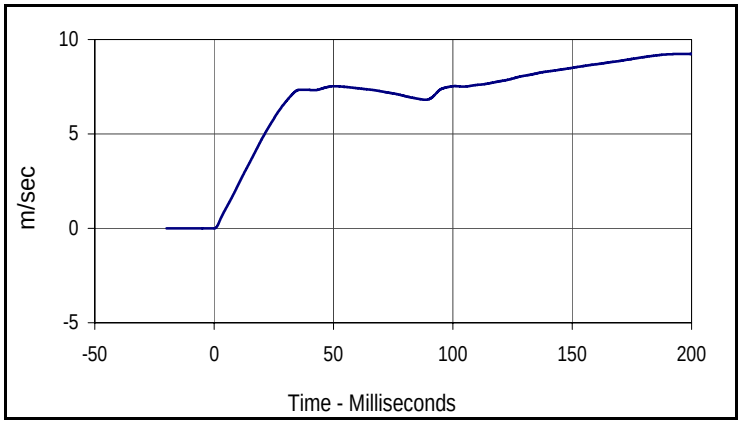
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
147.7	2.4	0.0	-0.7



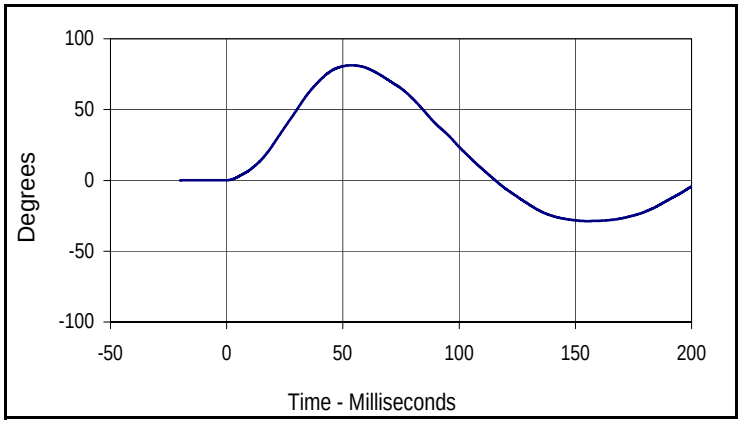
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
10.9	2.7	-0.1	-1.5

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	5/31/07
ATD Serial No.:	275	Test I.D.:	NB05D

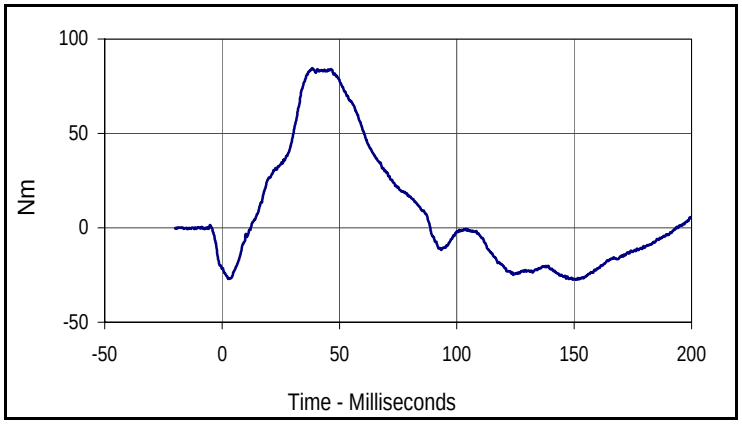
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.07	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.29	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.73	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.71	Pass
	40 to 70	m/sec	6.27 to 7.64	7.53	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	81.3	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	15.4	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	61.9	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	84.6	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	50.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.2	196.6	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
81.3	53.7	-28.8	155.3



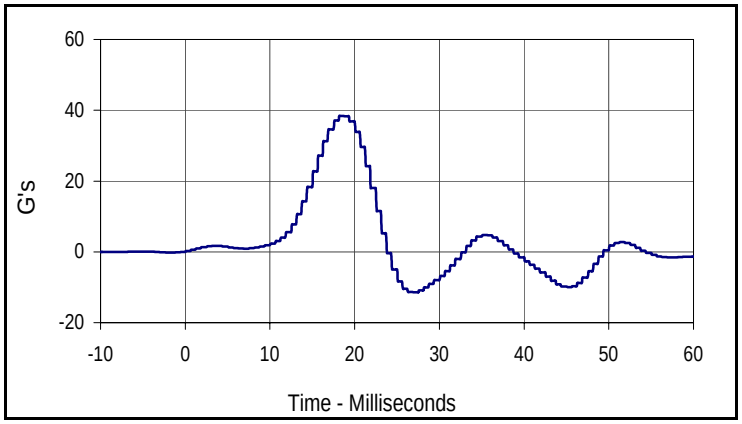
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
84.6	38.3	-27.5	151.0

Test Program:	SID / HIII External Measurements	Test Date:	5/31/07
ATD Serial No.:	274	Test I.D.:	N/A

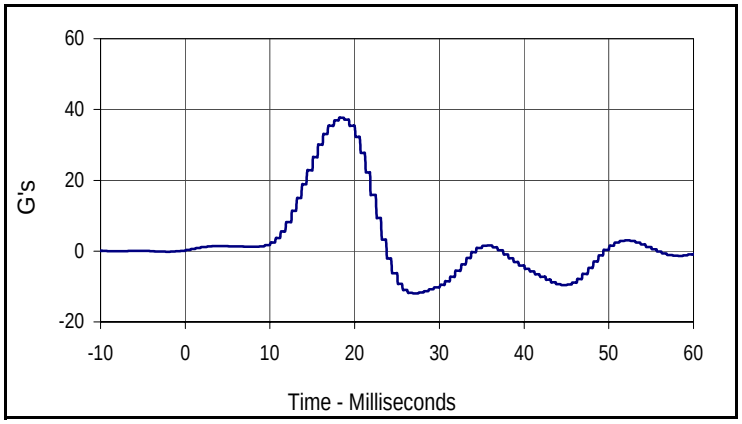
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	^{o}C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	895	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	514	Pass
KV- Knee Pivot From Floor	mm	490 to 505	498	Pass
HW- Hip Width	mm	356 to 391	379	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	5/31/07
ATD Serial No.:	274	Test I.D.:	TH05C

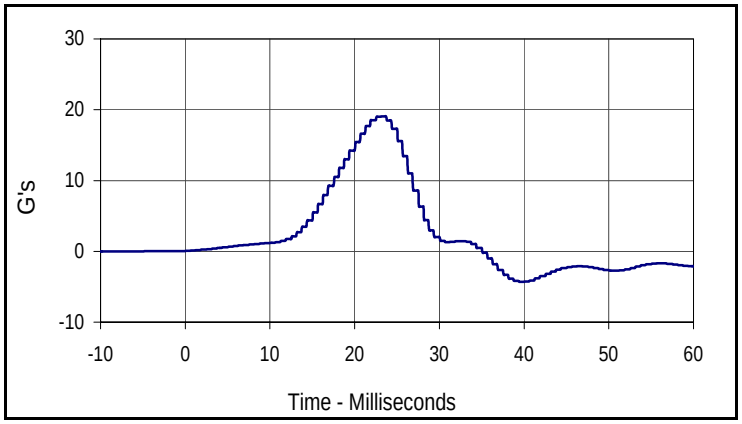
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.22	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	38.4	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	37.6	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.0	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
38.4	18.2	-11.4	26.9



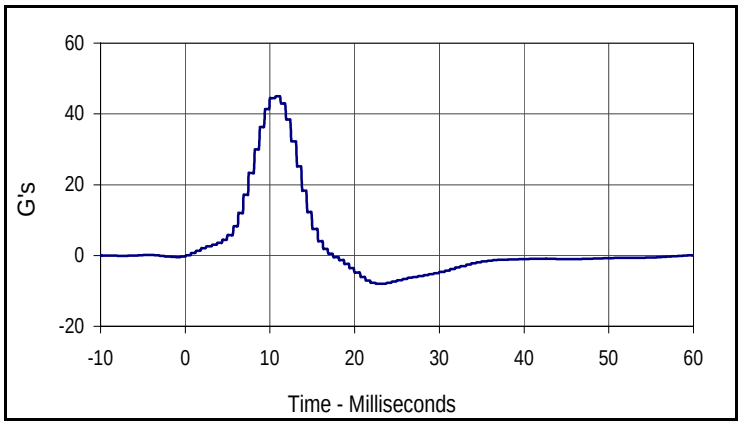
Curve Description			
Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
37.6	18.2	-11.9	26.9



Curve Description			
Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.0	23.2	-4.3	39.4

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	5/31/07
ATD Serial No.:	274	Test I.D.:	PL05C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.25	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	45.0	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	4.90	Pass
		Overall Test Results		Pass

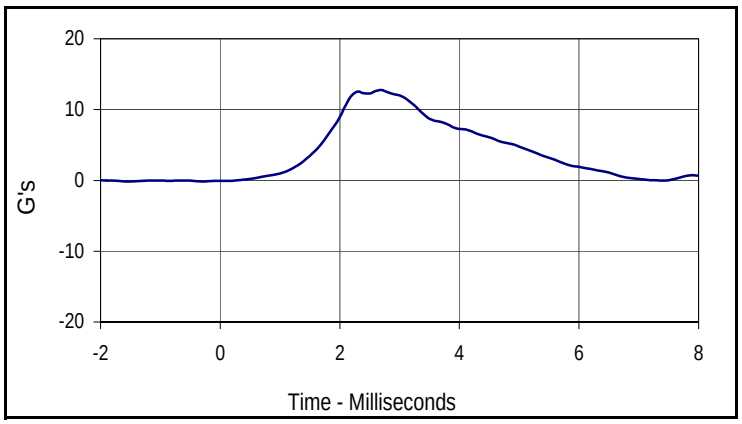


Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
45.0	10.7	-8.0	22.5

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	5/31/07
ATD Serial No.:	274	Test I.D.:	HD05C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	142.7	Pass
Peak Longitudinal Acceleration	G's	≤15.0	12.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	4.9	Pass
		Overall Test Results		Pass

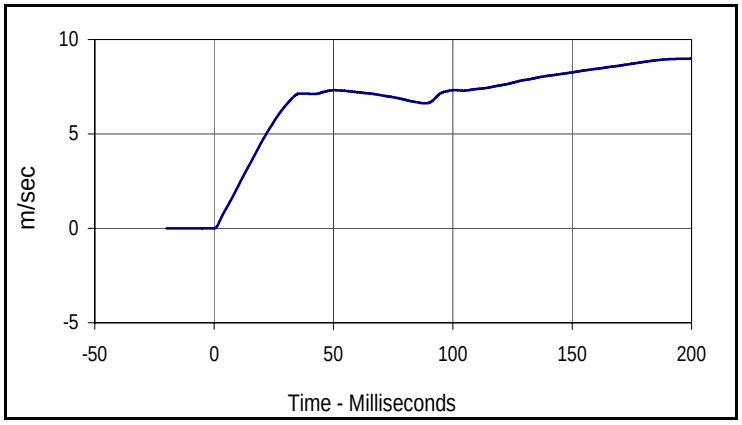
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
142.7	2.4	0.0	-0.7



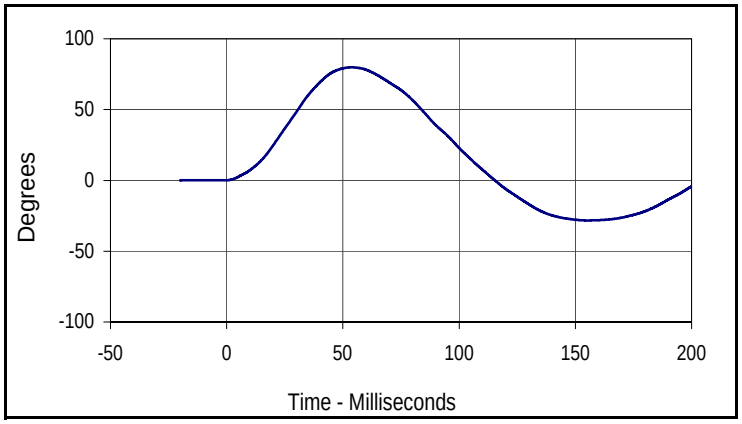
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
12.8	2.7	-0.1	-1.5

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	5/31/07
ATD Serial No.:	274	Test I.D.:	NB05C

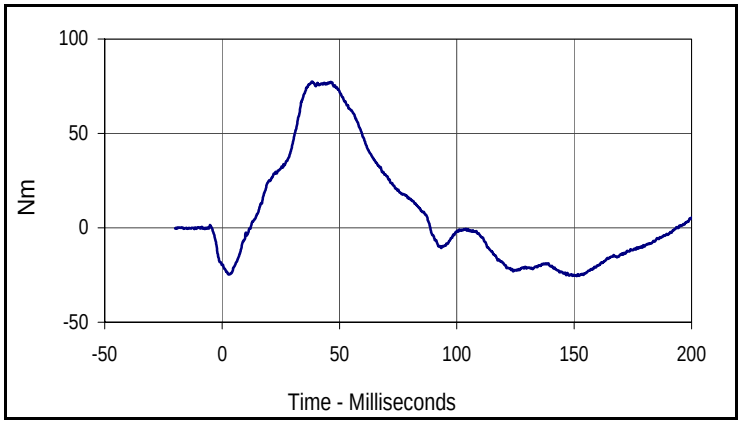
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.02	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.23	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.60	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.52	Pass
	40 to 70	m/sec	6.27 to 7.64	7.32	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	79.8	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	15.5	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	61.6	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	77.5	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	50.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.0	196.6	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
79.8	53.8	-28.3	155.3



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
77.5	38.3	-25.5	151.1

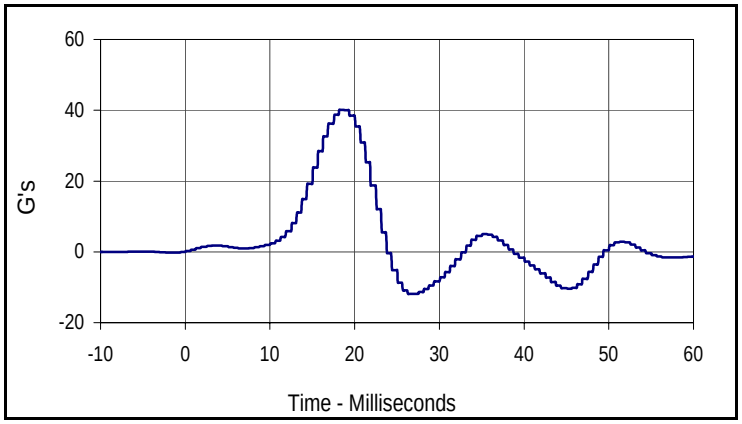
APPENDIX C
POST-TEST SID / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID / HIII External Measurements	Test Date:	6/7/07
ATD Serial No.:	275	Test I.D.:	N/A

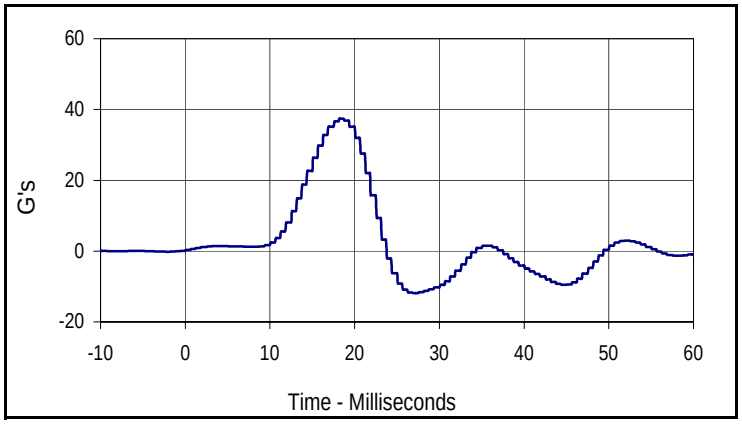
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	^{o}C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	895	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	513	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	Pass
KV- Knee Pivot From Floor	mm	490 to 505	501	Pass
HW- Hip Width	mm	356 to 391	378	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	6/7/07
ATD Serial No.:	275	Test I.D.:	TH06C

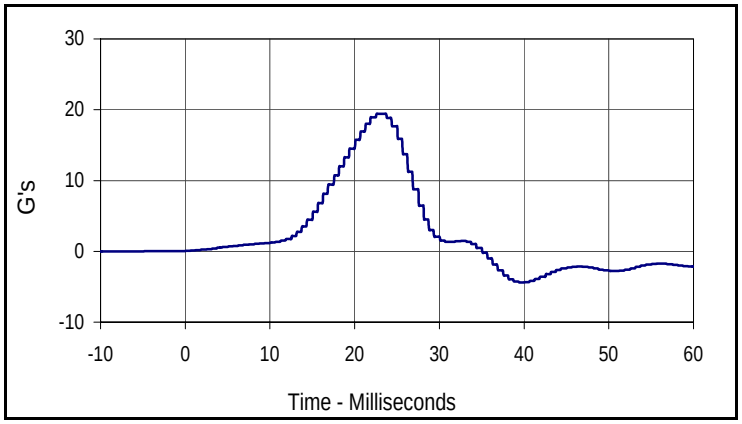
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.25	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	40.1	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	37.4	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.4	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.1	18.2	-11.9	26.9



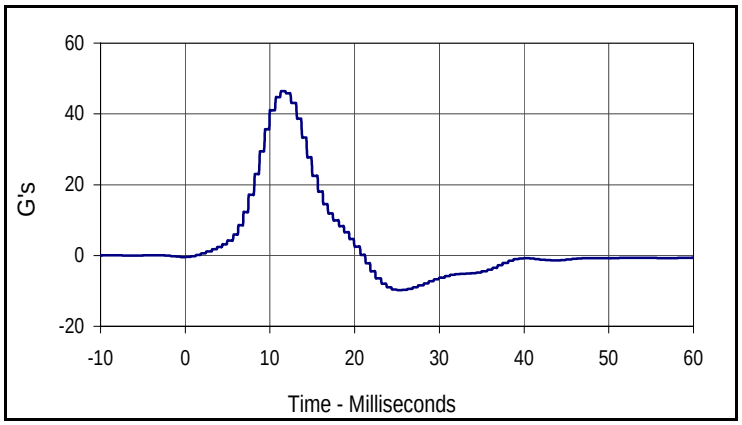
Curve Description			
Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
37.4	18.2	-11.8	26.9



Curve Description			
Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.4	23.2	-4.4	39.4

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	6/7/07
ATD Serial No.:	275	Test I.D.:	PL06C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.28	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	46.4	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.70	Pass
		Overall Test Results		Pass

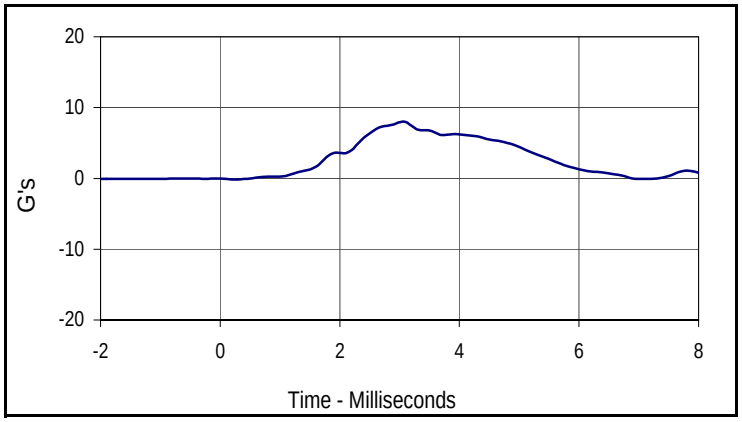


Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
46.4	11.3	-9.8	25.0

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	6/7/07
ATD Serial No.:	275	Test I.D.:	HD06C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	138.8	Pass
Peak Longitudinal Acceleration	G's	≤15.0	8.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	4.0	Pass
		Overall Test Results		Pass

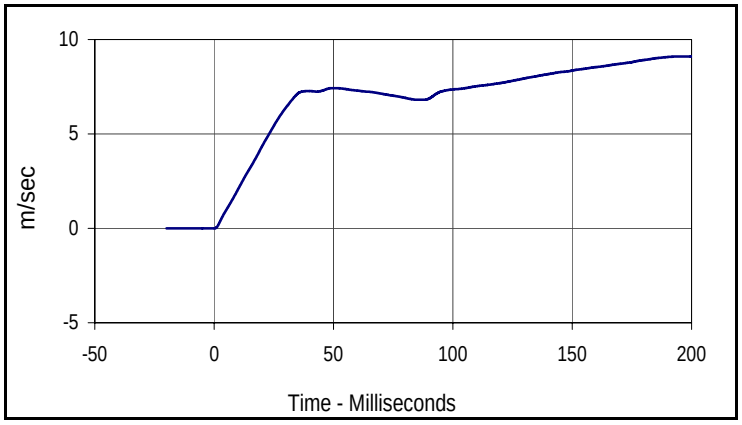
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
138.8	2.3	0.1	-0.9



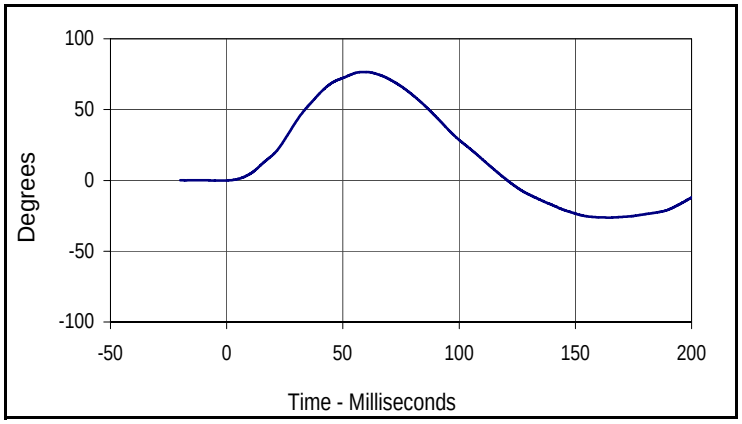
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
8.0	3.1	-0.1	0.2

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	6/7/07
ATD Serial No.:	275	Test I.D.:	NB06C

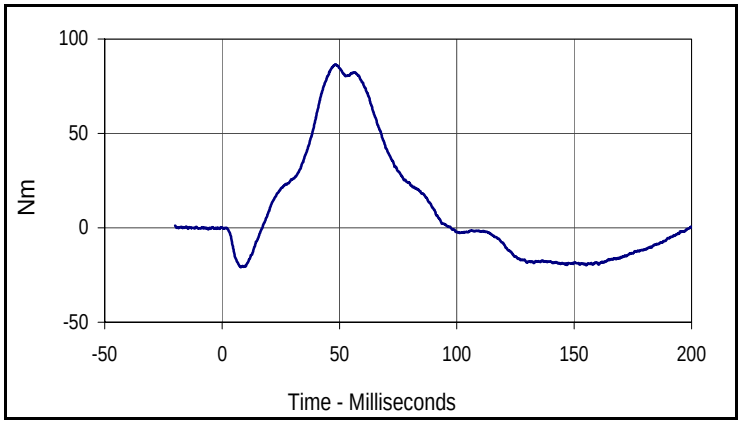
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.10	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.07	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.33	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.39	Pass
	40 to 70	m/sec	6.27 to 7.64	7.43	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	76.6	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	11.0	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	61.5	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	86.6	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.1	195.5	0.0	-0.2



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.6	59.3	-26.3	164.5



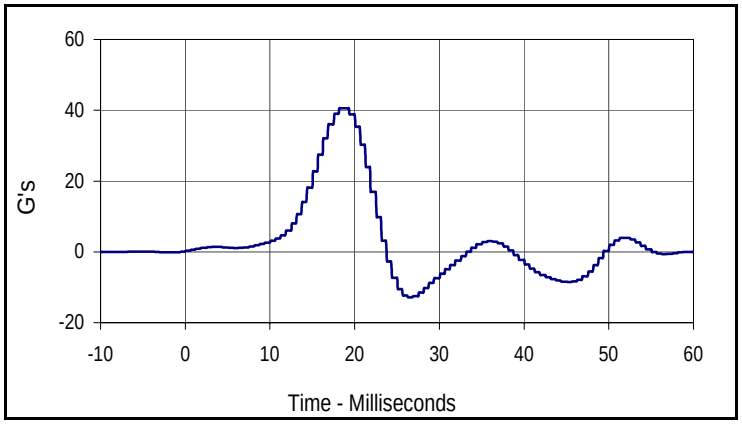
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
86.6	48.3	-20.8	8.1

Test Program:	SID / HIII External Measurements	Test Date:	6/7/07
ATD Serial No.:	274	Test I.D.:	N/A

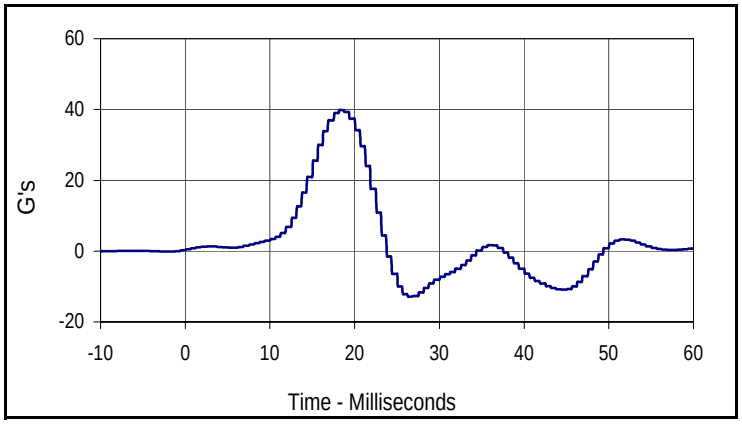
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	^{o}C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	892	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	518	Pass
KV- Knee Pivot From Floor	mm	490 to 505	500	Pass
HW- Hip Width	mm	356 to 391	375	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	6/7/07
ATD Serial No.:	274	Test I.D.:	TH06D

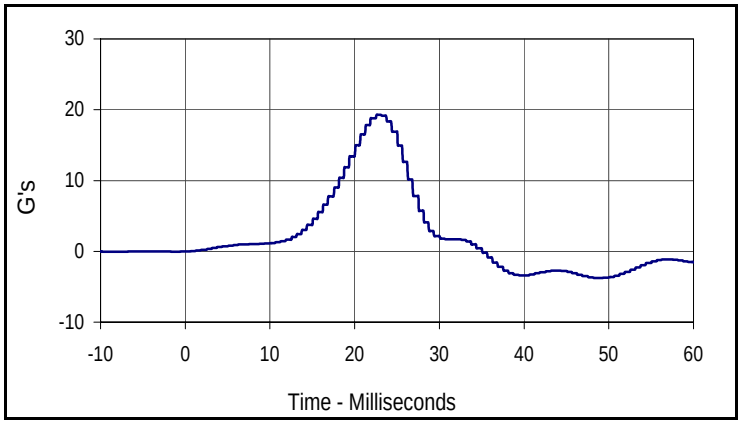
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	40.6	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	39.8	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.3	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.6	18.2	-12.8	26.3



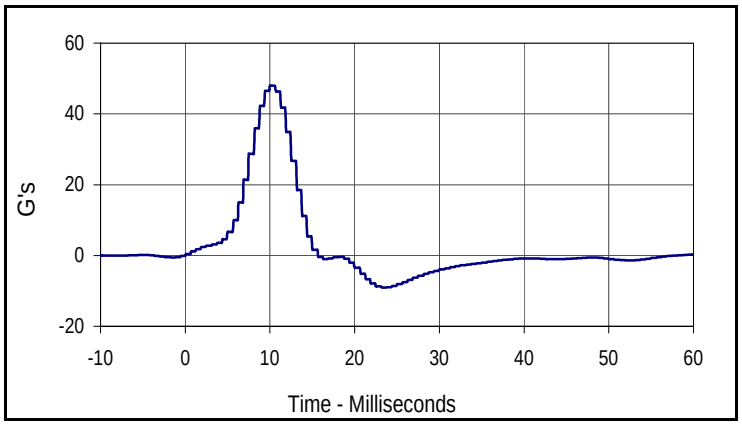
Curve Description			
Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
39.8	18.2	-12.9	26.3



Curve Description			
Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.3	22.6	-3.8	48.8

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	6/7/07
ATD Serial No.:	274	Test I.D.:	PL06D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.32	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	48.0	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	4.90	Pass
		Overall Test Results		Pass

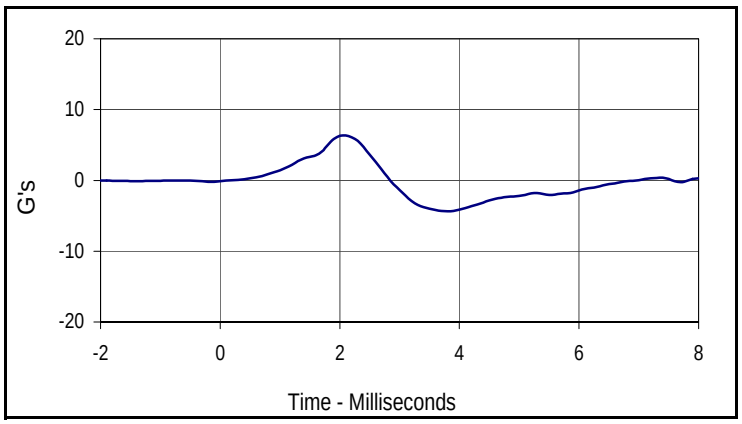


Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
48.0	10.0	-9.0	23.2

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	6/7/07
ATD Serial No.:	274	Test I.D.:	HD06D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	145.0	Pass
Peak Longitudinal Acceleration	G's	≤15.0	6.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	3.1	Pass
		Overall Test Results		Pass

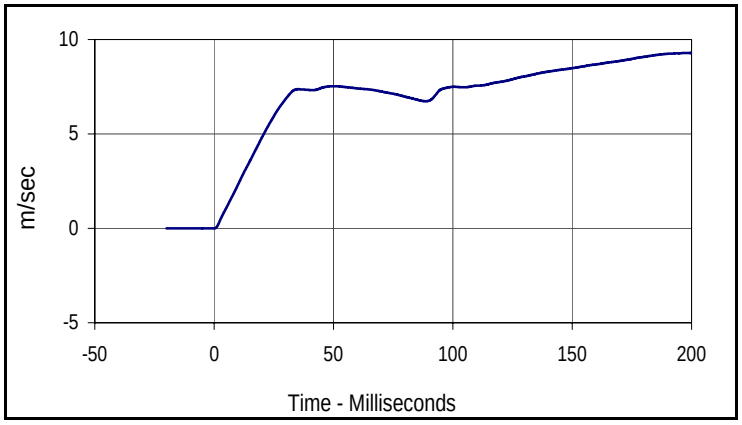
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
145.0	2.2	0.1	-1.9



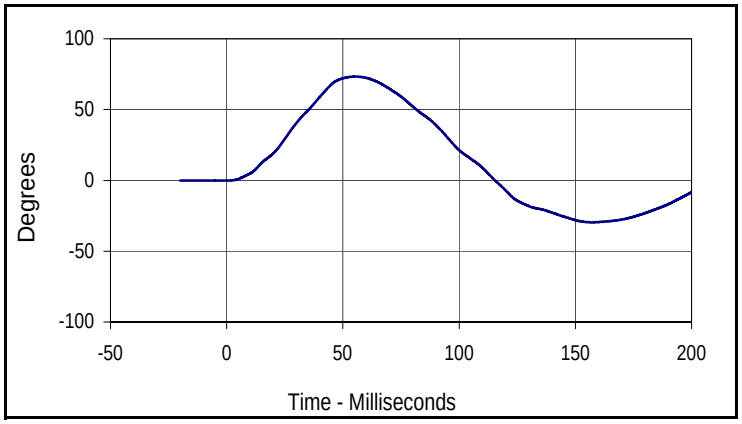
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.3	2.1	-4.4	3.8

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	6/7/07
ATD Serial No.:	274	Test I.D.:	NB06D

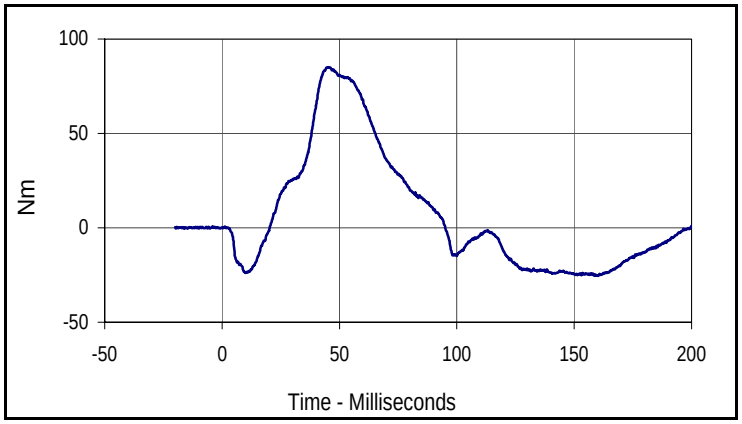
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.10	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.32	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.81	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.86	Pass
	40 to 70	m/sec	6.27 to 7.64	7.53	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	73.3	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	9.7	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	60.3	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	85.1	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.3	198.6	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
73.3	55.2	-29.6	157.1



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
85.1	45.5	-25.5	160.2

APPENDIX D

CHILD RESTRAINT SYSTEM

REPORT NUMBER TR-P27131-01-NC

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

GENERAL MOTORS CORPORATION
2007 CADILLAC STS
4-DOOR SEDAN

NHTSA NUMBER: G70110

Prepared By:
KARCO ENGINEERING, LLC
9270 HOLLY ROAD
ADELANTO, CALIFORNIA 92301

JUNE 6, 2007

FINAL REPORT

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

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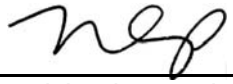
Prepared by:  Date: June 6, 2007

Mr. Johnny H. Dutto, Project Engineer
KARCO Engineering, LLC

Reviewed by:  Date: June 6, 2007

Mr. Michael L. Dunlap, Quality Assurance Manager
KARCO Engineering, LLC

Approved by:  Date: June 6, 2007

Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

FINAL REPORT ACCEPTED BY:

_____
Manager, New Car Assessment Program

_____
Date of Acceptance

_____
COTR, NCAP Frontal Impact Program

_____
Date of Acceptance

Technical Report Documentation Page

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TR-P27131-01-NC		

4. Title and Subtitle	5. Report Date
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	6. Performing Organization Code KAR

7. Authors	8. Performing Organization Report No.
Mr. Johnny H. Dutto, Project Engineer, Karco Mr. Frank Richardson, Program Manager, Karco	TR-P27131-01-NC

9. Performing Organization Name and Address	10. Work Unit No.
Karco Engineering, LLC 9270 Holly Rd. Adelanto, CA, 92301	**11. Contract or Grant No.** DTNH22-03-D-32005

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U. S. Department of Transportation National Highway Traffic Safety Administration Rulemaking Office of Crashworthiness Standards Mail Code NVS-111 1200 New Jersey Ave., SE, W43-410 Washington, D.C 20590	Final Test Report **14. Sponsoring Agency Code** DOT/NHTSA/NRM/OCS

15. Supplementary Notes

16. Abstract

A side impact test was conducted on the subject CRS Combi Tyro Base in conjunction with side impact NCAP testing on a 2007 Cadillac STS 4-Door Sedan and in accordance with the specifications of the Office of Crashworthiness Standards Test Procedure for the determination of CRS crashworthiness. This test was conducted at Karco Engineering, LLC on June 6, 2007.

Measurement Description	Units	Threshold	Right Rear (P3)
Head Injury Criteria (HIC15)	N/A	390	32.0
3 msec. Chest Clip	G's	50	18.4

17. Key Words	18. Distribution of Statement
New Car Assesment Program (Side Impact NCAP) Side Impact Moving Deformable Barrier (MDB) Final Report of a Combi Tyro Base CRS	Copies of this report available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590

19. Security Classification (this report)	20. Security Classification (this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	44	

Form DOT F1700.7 (8-72)

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SECTION D-1

PURPOSE AND SUMMARY OF TEST G70110

The purpose of this test is to obtain CRS performance data during a 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test

The Side Impact NCAP test was conducted in accordance with the Office of Crashworthiness Standards (OCS) NCAP Laboratory Test Procedure.

SUMMARY

One 12-month old CRABI (P3) was instrumented with head, chest, and six-axis upper neck load cells. A tri-axial accelerometer was installed on the CRS and the CRS base. Seat belt load cells were placed on the inboard and outboard lower tethers.

The right rear (Serial No. 022) CRABI was calibrated prior to this test. CRABI calibration information is found in Section D-4.

CHILD DUMMY VALUES		
Location	HIC15 Value	3 Msec. Chest Clip
CRABI (P3)	32.0	18.4

DATA SHEET NO.1

CRASH TEST SUMMARY

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

CHILD RESTRAINT SYSTEM INFORMATION

Description	Position #3 CRS
Manufacturer	Combi
Model Name	Tyro Base
Serial No.	B21243436
Type	Infant
Forward/Rearward	Rearward

VISIBLE DUMMY CONTACT POINTS

Description	Position #3 CRS
Head Contact	None
Chest Contact	None
Abdomen Contact	None
Left Knee Contact	None
Right Knee Contact	None
Left Toe Contact	Seat back
Right Toe Contact	Seat back

POST-TEST DOOR OPENINGS

Description	Position #3 CRS
Right Rear Door	Opened without tools, Remained closed during test

CAMERA COVERAGE

Description	Standard
High Speed	1
Real Time	0
Total	1

DATA CHANNELS

CRABI (P3) Sensors	13
Belt Sensors	2
CRS Sensors	6
Total	21

DATA SHEET NO.2

VEHICLE PARAMETER DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	482	406	888	528	500	1028
Right	kg	472	412	884	492	608	1100
Ratio	%	53.8	46.2	100	51	49	100
Totals	kg	953	818	1772	1019	971	1989

TARGET TEST WEIGHT CALCULATION

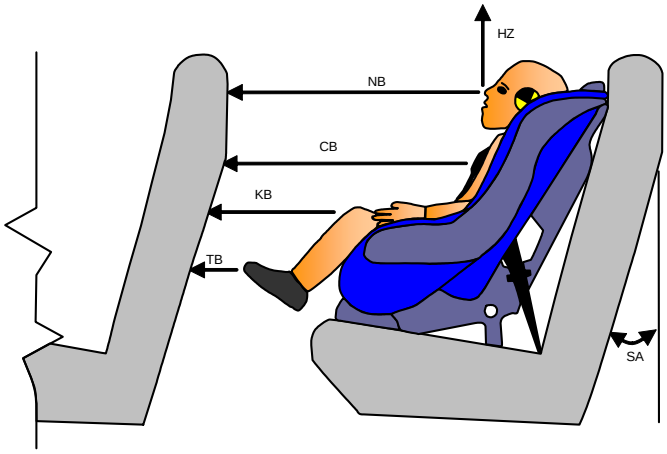
Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1772
Weight of 2 P572 ATD's	kg	161
Rated Cargo/Luggage Wt. (RCLW)	kg	64
Calculated Vehicle Target Wt. (TVTW)	kg	1997

DATA SHEET NO.3

CRABI POSITIONING IN VEHICLE

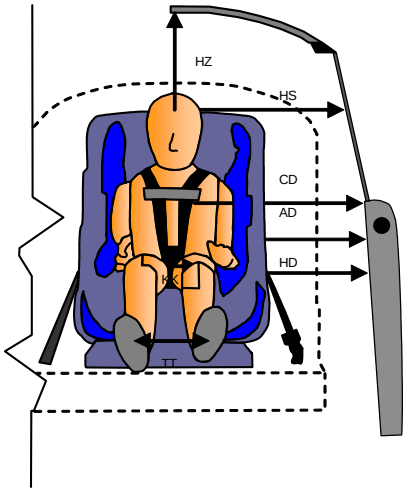
Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

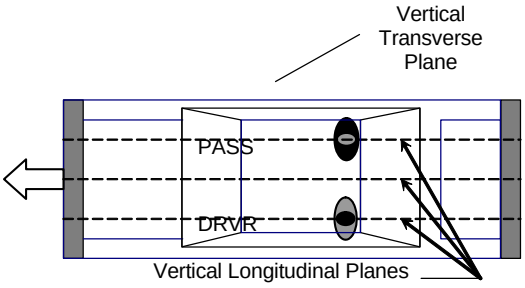
Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07



AD	Arm to Door
CD	Chest to Door
HD	H-Point to Door
HS	Head to Side Window
KK	Knee to Knee
TT	Toe to Toe

CB	Chest to Seat Back
HZ	Head to Roof
KB	Knee to Seat Back
NB	Nose to Seat Back
SA	Seat Back Angle
TB	Toe to Seat Back





DUMMY MEASUREMENTS FOR REAR SEAT OCCUPANTS

DATA SHEET NO.3

CRABI POSITIONING IN VEHICLE…(CONTINUED)

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

CRABI POSITION MEASUREMENTS

Code	Measurement	P3 (Passenger's Side)	
		Length (mm)	Angle (°)
SA	Seat Back Angle		27.2
HZ	Head to Roof (Z)	388	
CD	Chest to Door	380	
KK	Knee to Knee (Y)	140	
HS	Head to Side Window	455	
HD	H-Point to Door (Y)	262	
AD	Arm to Door	255	
NB	Nose to Seat Back	584	
CB	Chest to Seat Back	485	
FF	Foot to Foot	120	
KB-Left	Knee to Seat Back	240	
KB-Right	Knee to Seat Back	240	
TB-Left	Toe to Seat Back	110	
TB-Right	Toe to Seat Back	140	

DATA SHEET NO.4

CRS PERFORMANCE DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

CRS PERFORMANCE DATA

Location	CRS (P3)	
	Damage	Post-Test
Upper Tether Strap		
Upper Tether Buckle		
Upper Tether Hook		
Veh. Upper Tether Anchor		
Lower Anchor Strap	No	None
Lower Anchor Buckle	No	None
Lower Anchor Hooks	No	None
Veh. Lower CRS Anchors	No	None
5-Point Harness Connections	No	None
Cracks on CRS	No	None
Fabric Tears on CRS	No	None
Vehicle Seat Structure	No	None
Vehicle Seat Fabric Tears	No	None

DATA SHEET NO. 5

CRS ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

CRS ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	CRS	1943	600	760
2	CRS Base	1915	621	650

Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane

DATA SHEET NO.6

CRS CAMERA LOCATIONS AND DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70110

Test Program: 55/28 km/h Side Impact NCAP Test Date: 6/6/07

CAMERA LOCATIONS

No.	Camera View	Location(mm)			Angle (Deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Passenger CRS (O.B.)	1148	2378	-1283	-2	n/a	10	1000

X = Barrier Face Y = Monorail Centerline Z = Ground DNR = Did Not Run NTM = No Time Marks

SECTION D2

PHOTOGRAPHS

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Figure D2-1: Position 3 CRS Label

This Space Intentionally Left Blank

Figure D2-2: Pre-Test Frontal View of Position 3 CRS

Figure D2-3: Post-Test Frontal View of Position 3 CRS

Figure D2-4: Pre-Test Rear View of Position 3 CRS

Figure D2-5: Post-Test Rear View of Position 3 CRS

Figure D2-6: Pre-Test Left Side View of Position 3 CRS

Figure D2-7: Post-Test Left Side View of Position 3 CRS

Figure D2-8: Pre-Test Right Side View of Position 3 CRS

Figure D2-9: Post-Test Right Side View of Position 3 CRS

Figure D2-10: Pre-Test Position 3 Front View (Head and Seat Belt Position)

Figure D2-11: Post-Test Position 3 Front View (Head and Seat Belt Position)

Figure D2-12: Pre-Test Position 3 Front View (Seat Belt Position)

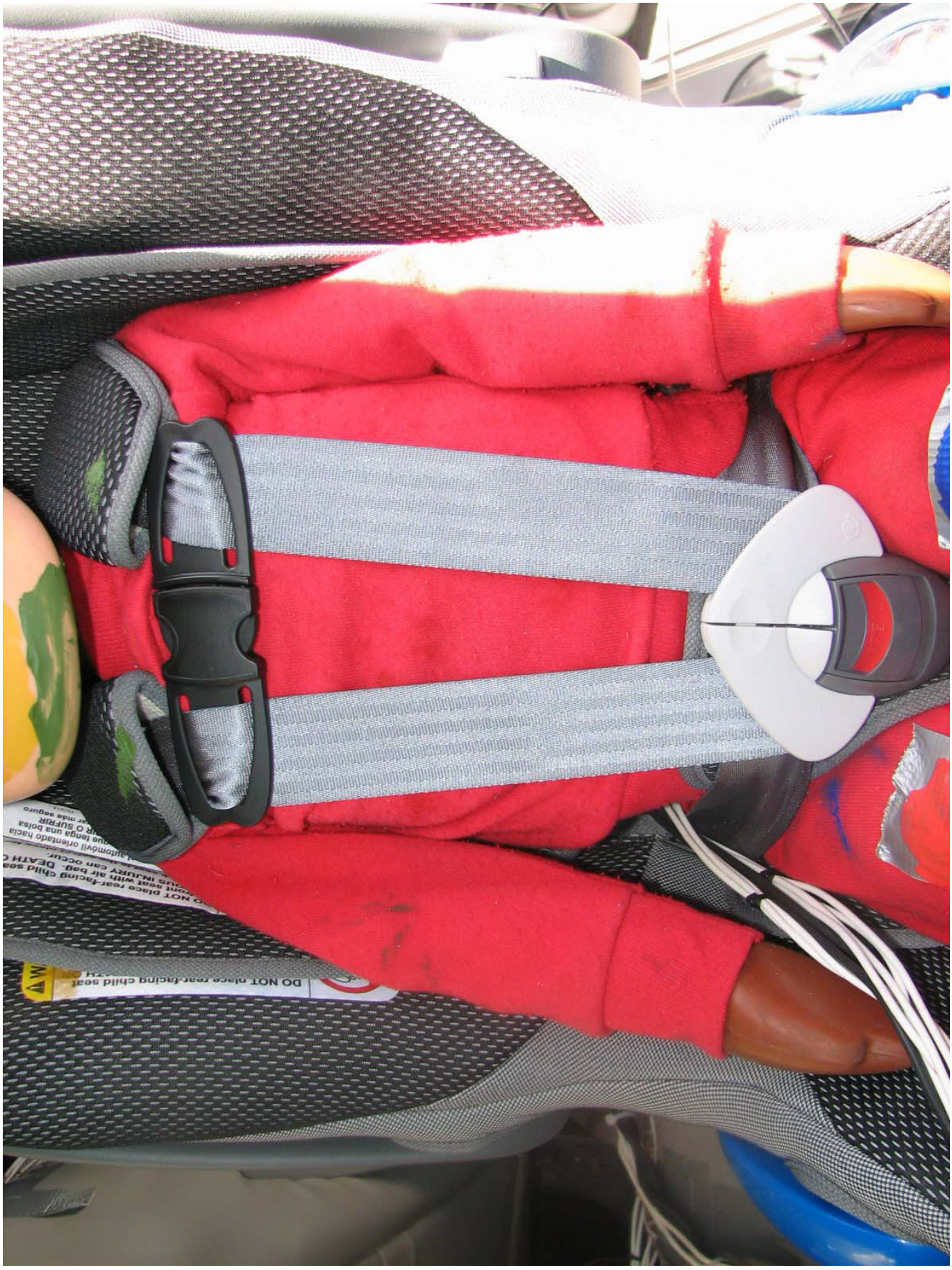

Figure D2-13: Post-Test Position 3 Front View (Seat Belt Position)

Figure D2-14: Pre-Test Position 3 Right Side View

Figure D2-15: Post-Test Position 3 Right Side View

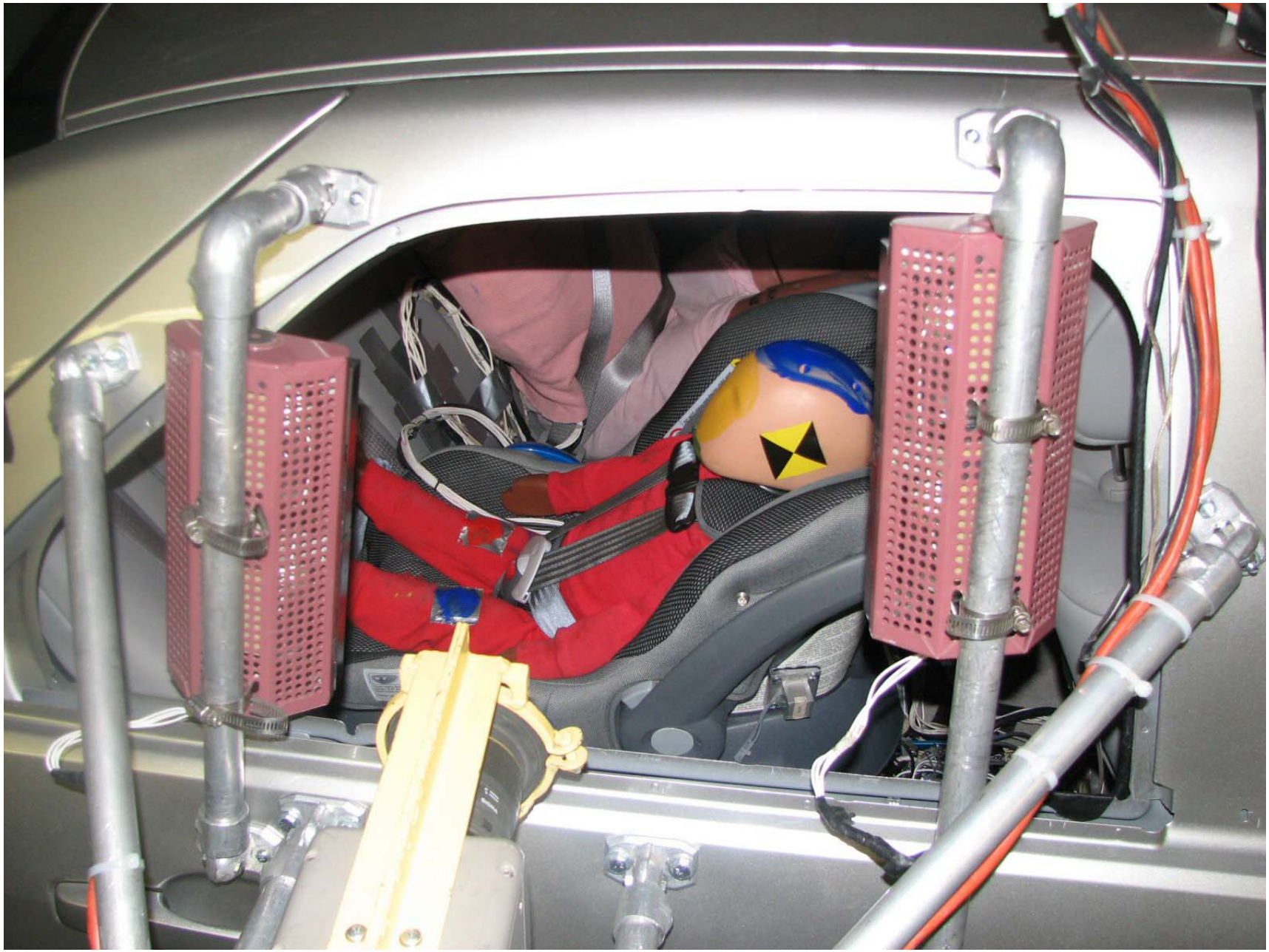

Figure D2-16: Pre-Test Position 3 Right Side View (Through Window)

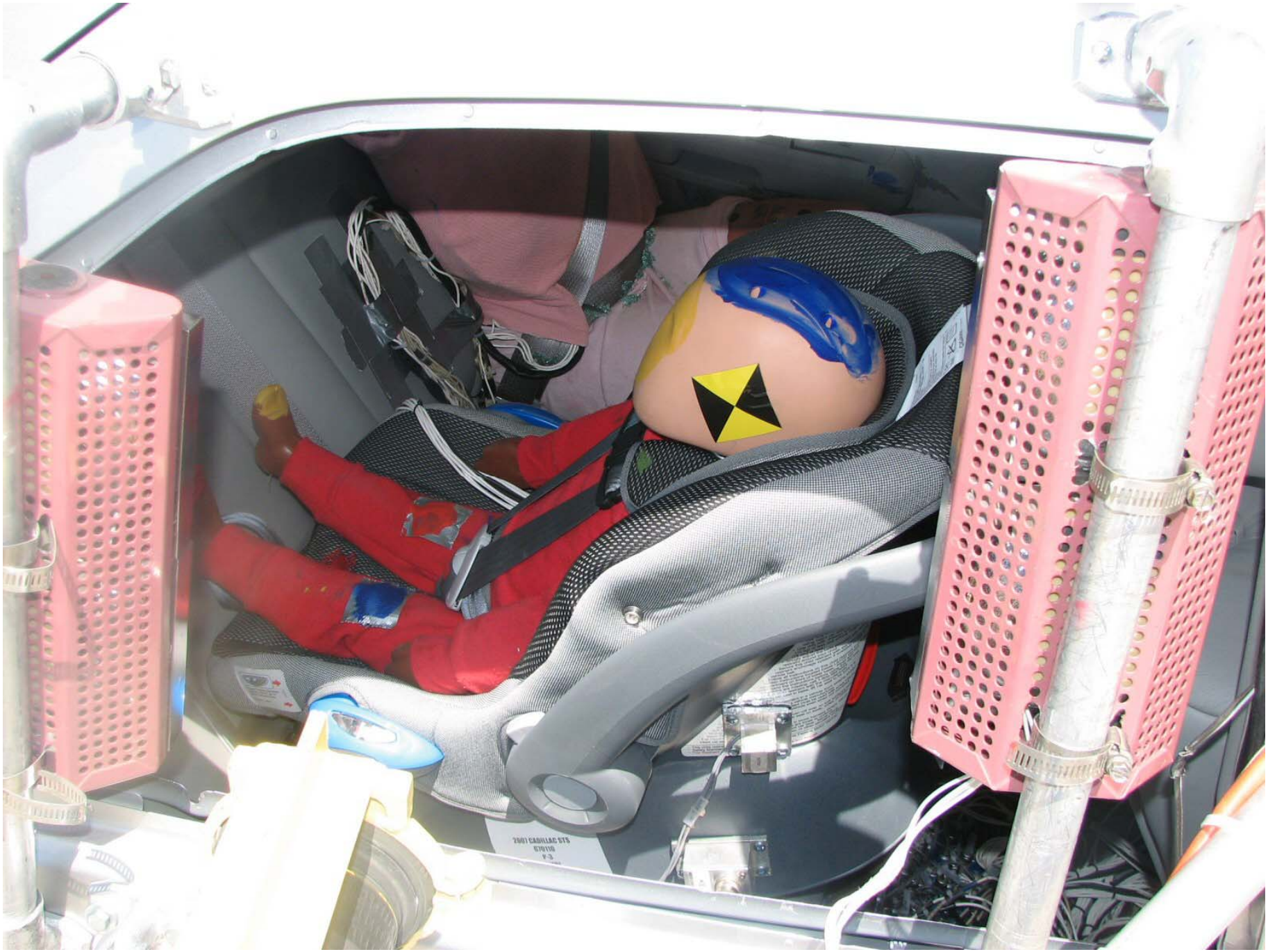

Figure D2-17: Post-Test Position 3 Right Side View (Through Window)

SECTION D3

CRABI RESPONSE AND CRS DATA TRACES

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	Right Rear CRABI Head Y	D3-1
	Right Rear CRABI Head Z	D3-1
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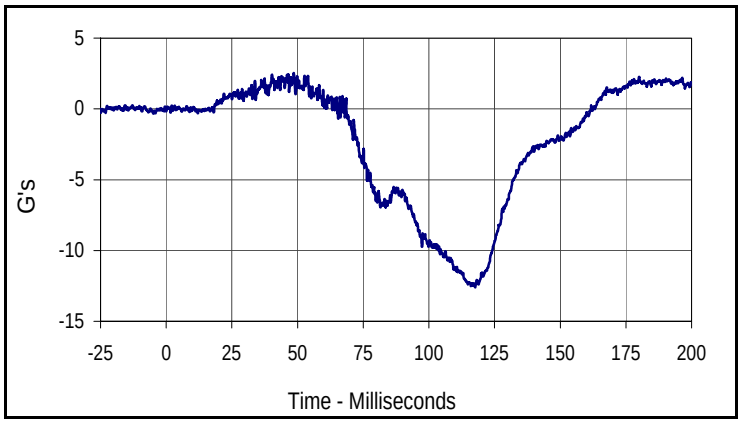
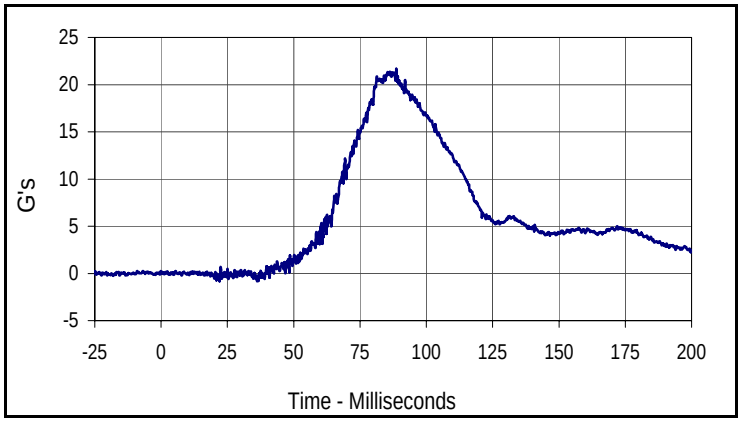
D3-2	Right Rear CRABI Chest X	D3-2
	Right Rear CRABI Chest Y	D3-2
	Right Rear CRABI Chest Z	D3-2
	Right Rear CRABI Chest Resultant	D3-2

Test Vehicle:	2007 Cadillac STS 4-Door Sedan	Test Date:	6/6/07
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	G70110

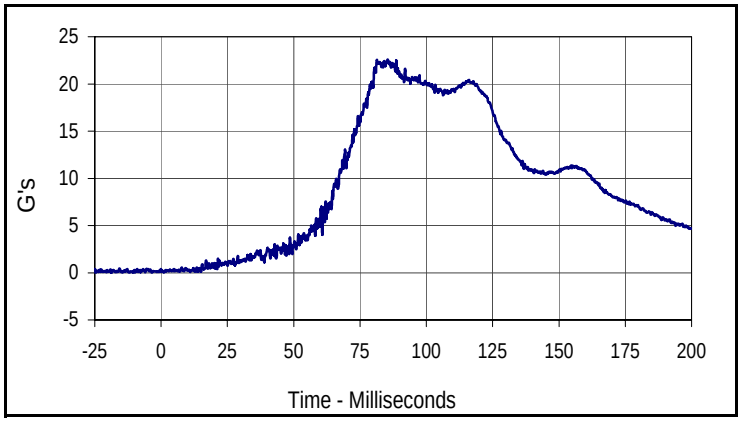
Curve Description			
CRABI Head X			
CURNO	Type	SAE Class	Units
072	FIL	1000	G's
Max	Time	Min	Time
6.2	80.3	-14.0	118.2



Curve Description			
CRABI Head Y			
CURNO	Type	SAE Class	Units
073	FIL	1000	G's
Max	Time	Min	Time
2.5	48.6	-12.6	117.6

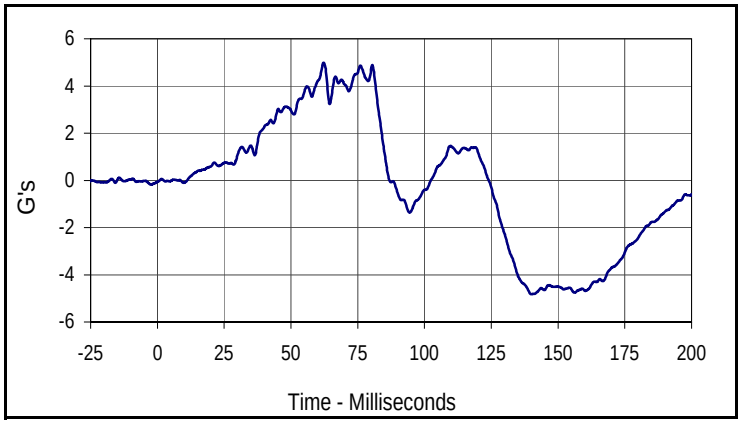


Curve Description			
CRABI Head Z			
CURNO	Type	SAE Class	Units
074	FIL	1000	G's
Max	Time	Min	Time
21.7	88.7	-0.8	22.1

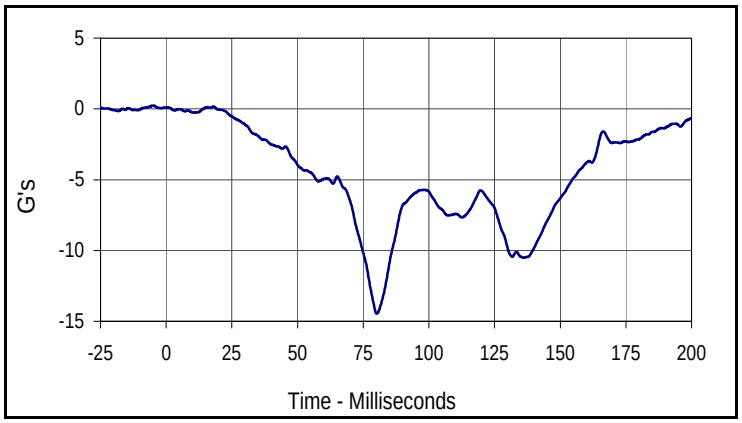


Curve Description			
CRABI CRABI Head Resultant			
CURNO	Type	SAE Class	Units
072	RES	1000	G's
Max	Time	Min	Time
22.6	85.4	0.0	1.1

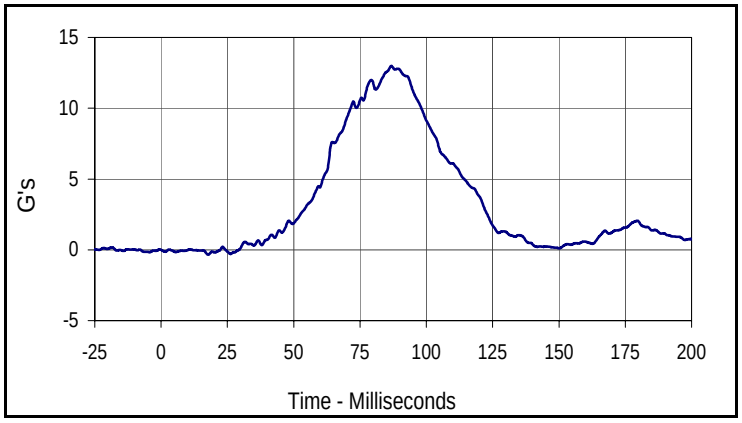
Test Vehicle:	2007 Cadillac STS 4-Door Sedan	Test Date:	6/6/07
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	G70110



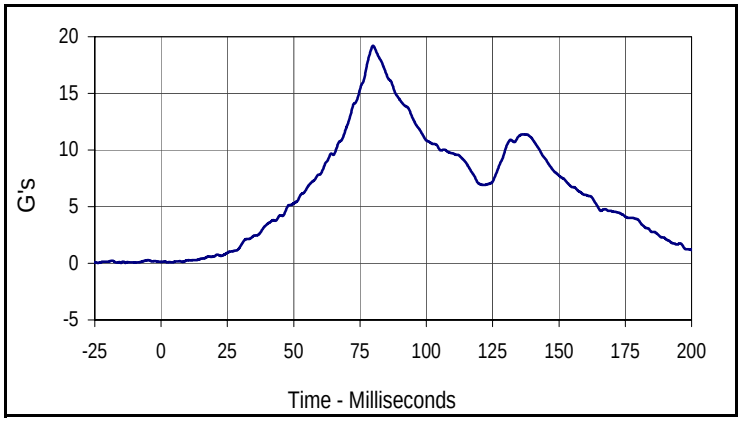
Curve Description			
CRABI Chest X			
CURNO	Type	SAE Class	Units
082	FIL	180	G's
Max	Time	Min	Time
5.0	62.2	-4.8	139.9



Curve Description			
CRABI Chest Y			
CURNO	Type	SAE Class	Units
083	FIL	180	G's
Max	Time	Min	Time
0.2	18.1	-14.5	80.1



Curve Description			
CRABI Chest Z			
CURNO	Type	SAE Class	Units
084	FIL	180	G's
Max	Time	Min	Time
13.0	86.8	-0.3	17.7



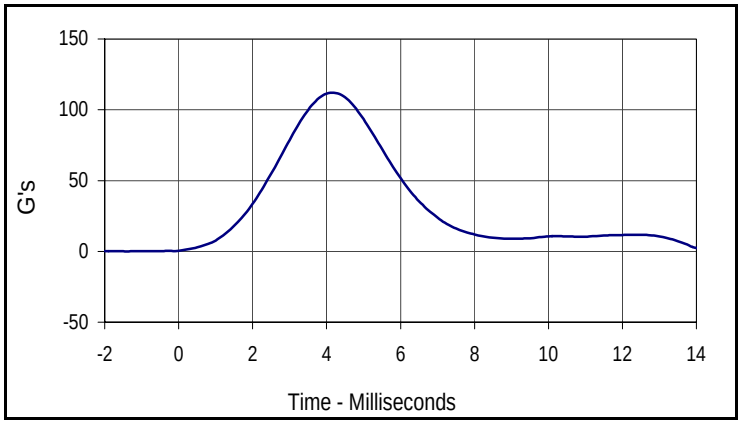
Curve Description			
CRABI CRABI Chest Resultant			
CURNO	Type	SAE Class	Units
082	RES	180	G's
Max	Time	Min	Time
19.2	79.9	0.1	2.4

SECTION D4

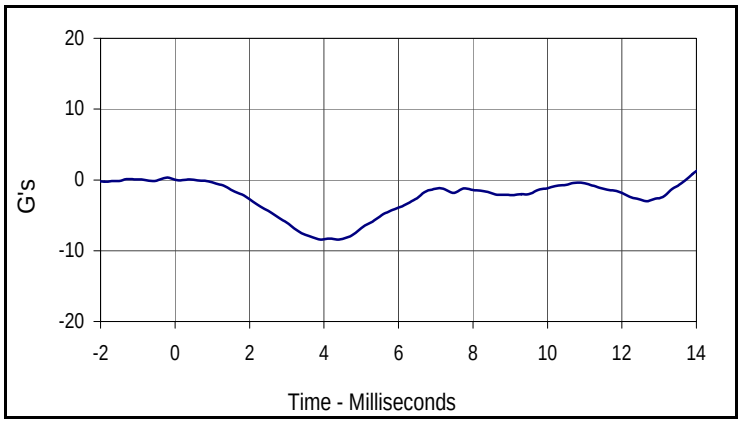
CRABI CALIBRATION INFORMATION

Test Program:	CRABI 12 Month Old Frontal Head Drop Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	FHD06E

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	100.0 to 120.0	112.1	Pass
Peak Lateral Acceleration	G's	≤15.0	8.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
112.1	4.2	0.0	-1.4

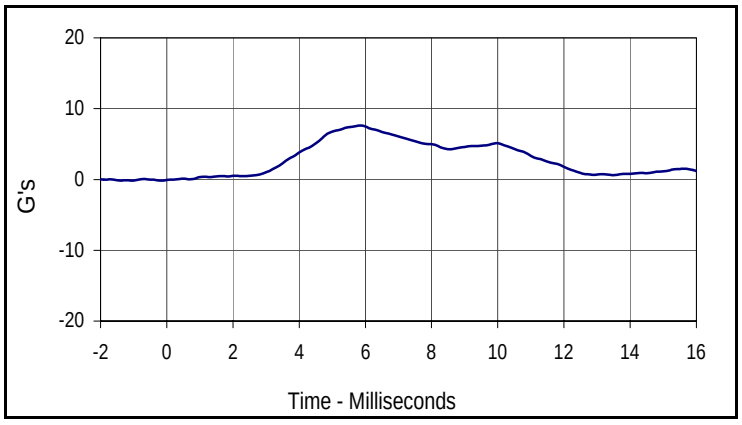


Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.3	-0.2	-8.4	4.4

Test Program:	CRABI 12 Month Old Rear Head Drop Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	RHD06E

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	55.0 to 71.0	56.2	Pass
Peak Lateral Acceleration	G's	≤15.0	7.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass

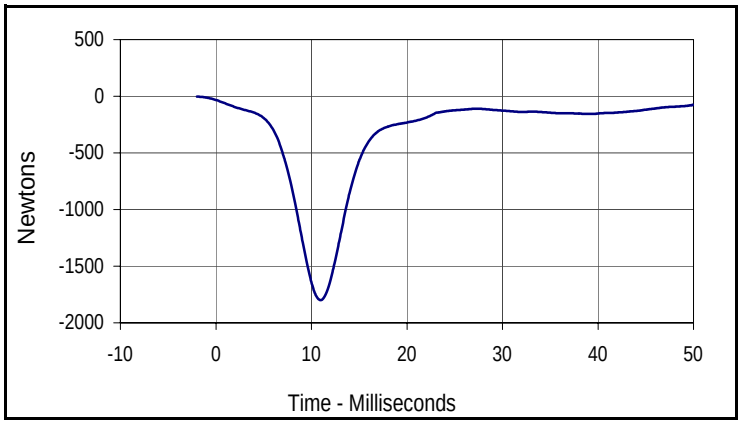
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
56.2	6.0	0.1	-0.9



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.6	5.8	-0.2	-1.4

Test Program:	CRABI 12 Month Old Thorax Impact Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	CH06E

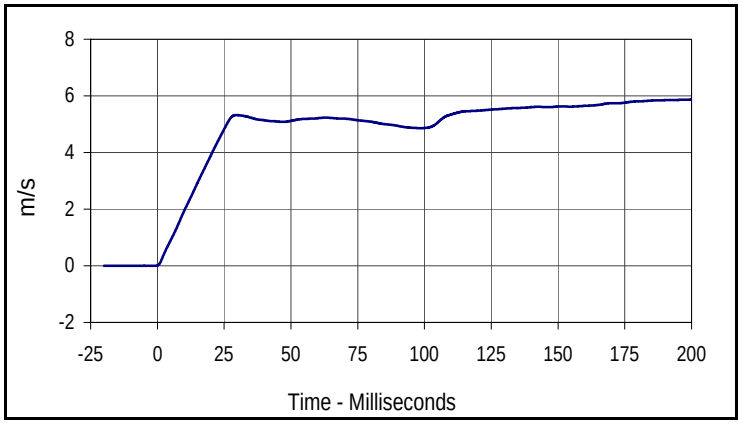
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	4.90 to 5.10	4.95	Pass
Peak Probe Force	Newtons	-1514 to -1796	-1641	Pass
		Overall Test Results		Pass



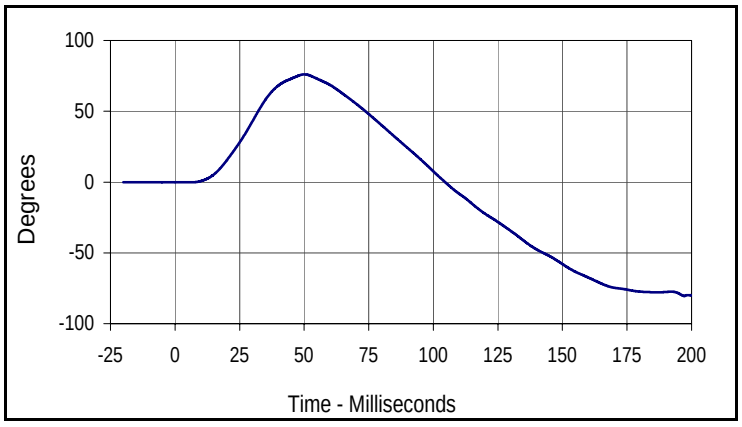
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	60	Newtons
Max	Time	Min	Time
-2.3	-2.0	-1640.6	10.0

Test Program:	CRABI 12 Month Old Neck Flexion Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	NF06E

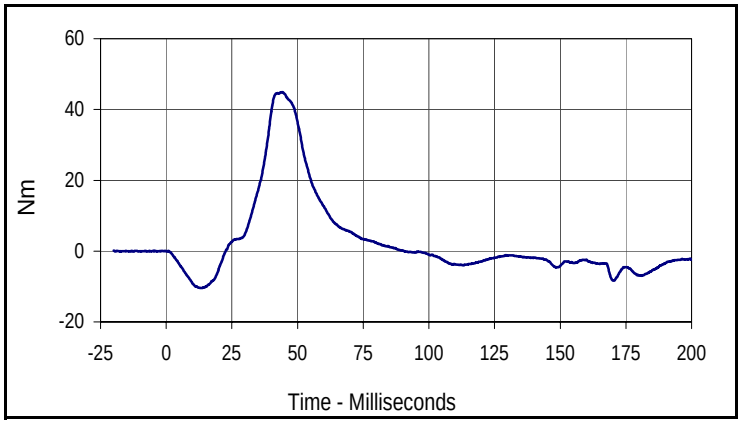
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.10 to 5.30	5.11	Pass
Pendulum Deceleration	10 Msec.	m/s	1.6 to 2.3	1.9	Pass
	20 Msec.	m/s	3.4 to 4.2	3.9	Pass
	25 Msec.	m/s	4.3 to 5.2	4.8	Pass
"D" Plane Rotation	Max	Degrees	75.0 to 86.0	76.1	Pass
Peak Moment in Rotation	Max	Nm	36.0 to 45.0	42.0	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	60.0 to 80.0	71.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
5.9	199.3	0.0	-0.7



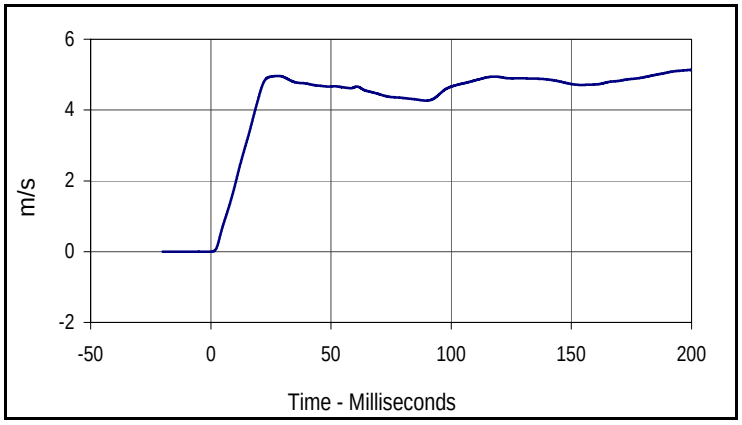
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.1	50.1	-80.5	197.1



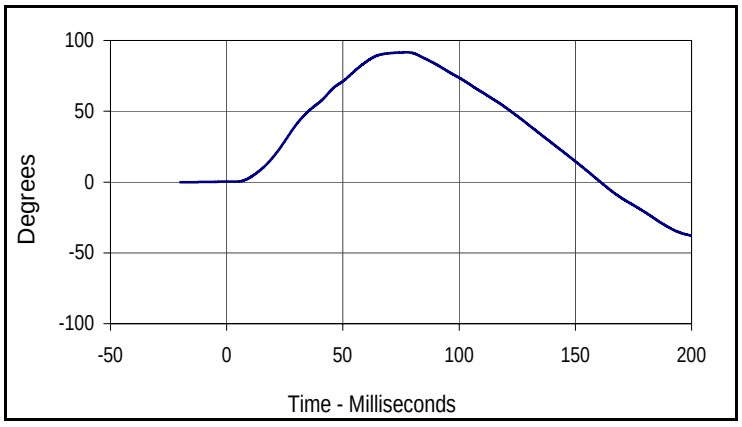
Curve Description			
Upper Neck Force Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
44.9	44.3	-10.4	13.5

Test Program:	CRABI 12 Month Old Neck Extension Test	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	NE06E

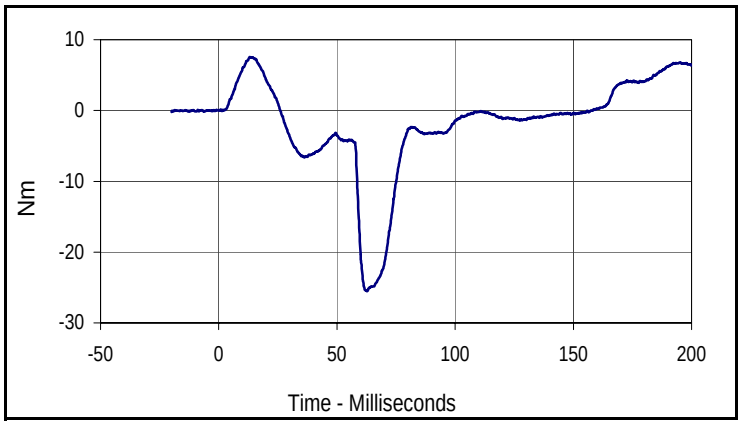
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	2.4 to 2.6	2.42	Pass
Pendulum Deceleration	6 Msec.	m/s	0.8 to 1.2	0.9	Pass
	10 Msec.	m/s	1.5 to 2.1	1.9	Pass
	14 Msec.	m/s	2.2 to 2.9	2.9	Pass
"D" Plane Rotation	Max	Degrees	80.0 to 92.0	91.6	Pass
Peak Moment in Rotation	Max	Nm	-12 to -23	-21.5	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	76.0 to 90.0	77.8	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
5.1	200.0	0.0	0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
91.6	77.5	-37.8	200.0



Curve Description			
Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
7.5	13.2	-25.5	62.8

Test Program:	CRABI 12 Month Old External Dimensions	Test Date:	6/5/07
ATD Serial No.:	022	Test I.D.:	N/A

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
A - Total sitting height	mm	456.0 to 471.2	460	Pass
B - Shoulder pivot height	mm	276.6 to 291.8	284	Pass
C - "H" point height	mm	27.9 to 38.1	36	Pass
D - "H" point from backline	mm	40.1 to 50.3	47	Pass
E - Shoulder pivot from back	mm	50.3 to 60.5	54	Pass
F - Thigh clearance	mm	63.0 to 73.2	66	Pass
G - Elbow pivot to fingertip	mm	176.6 to 191.8	185	Pass
I - Shoulder pivot to elbow pivot	mm	99.1 to 114.3	106	Pass
J - Elbow rest height	mm	150.1 to 165.3	160	Pass
K - Buttock to knee length	mm	202.7 to 217.9	205	Pass
L - Poplipteal length	mm	138.7 to 153.9	140	Pass
M - Knee pivot height	mm	165.1 to 180.3	170	Pass
N - Buttock poplipteal length	mm	144.8 to 160.0	155	Pass
O - Chest depth with jacket	mm	107.5 to 122.7	108	Pass
P - Foot length	mm	92.4 to 102.6	101	Pass
Q- Stature	mm	727.7 to 753.1	N/A	N/A
R - Buttock to knee pivot length	mm	178.5 to 188.7	182	Pass
S - Head Breadth	mm	124.4 to 134.6	130	Pass
T - Head Depth	mm	149.9 to 165.1	152	Pass
U - Hip breadth	mm	158.5 to 173.7	161	Pass
V - Shoulder breadth	mm	200.7 to 215.9	213	Pass
W - Foot breadth	mm	39.1 to 49.3	45	Pass
Y - Chest circumference with jacket	mm	452.4 to 477.8	460	Pass
Z - Waist circumference	mm	447.0 to 472.4	452	Pass
AA - Refrence location for dimension Y & O	mm	256.5 to 266.7	262	Pass
BB - Reference Location For dimension Z	mm	106.7 to 116.9	107	Pass
CC - Shoulder Height	mm	299.7 to 314.9	300	Pass
DD - Chin Height	mm	289.6 to 304.8	299	Pass
		Overall Test Results		Pass