

**NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**GENERAL MOTORS CORPORATION
2007 CADILLAC STS
4-DOOR SEDAN**

NHTSA NUMBER: G70109

**PREPARED BY:
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JUNE 5, 2007

FINAL REPORT

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

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-06-D-00027

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Technical Report Documentation Page

1. Report No. TR-P27130-01-NC		2. Government Accession No.		3. Recipients Catalog No.	
4. Title and Subtitle Final Report of New Car Assessment Program Testing of a 2007 Cadillac STS 4-Door Sedan NHTSA No. G70109				5. Report Date 6/5/2007	
				6. Performing Organization Code KAR	
7. Authors Mr. Johnny H. Dutto, Project Engineer, Karco Mr. Frank Richardson, Program Manager, Karco				8. Performing Organization Report No. TR-P27130-01-NC	
9. Performing Organization Name and Address Karco Engineering, LLC 9270 Holly Rd. Adelanto, CA, 92301				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-06-D-00027	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Rulemaking Office of Crashworthiness Standards Mail Code NVS-111 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C 20590				13. Type of Report and Period Covered Final Test Report Base Year	
				14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS	
15. Supplementary Notes					
16. Abstract A 35 mph (56.3 km/h) frontal barrier impact was conducted on a 2007 Cadillac STS 4-Door Sedan at Karco Engineering, LLC on 6/5/07. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and footwell intrusion performance. The impact velocity is 56.14 km/h. The ambient temperature at the barrier face at the time of impact is 30.0 degrees Celcius. The vehicle's maximum post-test static crush is 557 mm at the vehicle's centerline. The test vehicle is equipped with a 3-point continuous belt system and second generation supplemental airbags in both front outboard seating positions. With respect to FMVSS 208 "Occupant Crash Protection", the occupant injury criteria summary is as follows:					
Measurement Description		Units	Threshold	Driver ATD	Passenger ATD
Head Injury Criteria (HIC)		N/A	1000	432.3	686.5
Max. Chest Accel. (3 msec Clip)		G's	60	45.0	50.2
Left Femur Force		Newtons	10008	-2500.3	-2949.9
Right Femur Force		Newtons	10008	-3036.6	-1121.0
17. Key Words 56.3 km/h NCAP Frontal Barrier Impact Test New Car Assessment Program (NCAP) 2007 Cadillac STS 4-Door Sedan NHTSA No. G70109				18. Distribution of Statement 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) Unclassified		20. Security Classification (this page) Unclassified		21. No. of Pages 202	22. Price

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SECTION 1

PURPOSE AND SUMMARY OF TEST G70109

1.1 PURPOSE

This 35 mph (56.3 km/h) frontal barrier impact test is part of the New Car Assessment Program (NCAP) sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00027. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for an impact speed in excess of the current 30 mph (48.3 km/h) requirements.

The 35 mph (56.3 km/h) frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards (OCS) New Car Assessment Program (NCAP) Laboratory Indicant Test Procedure, dated July 2005. Data was obtained indicant of FMVSS 208 "Occupant Crash Protection", FMVSS 212, "Windshield Retention", FMVSS 219, "Windshield Zone Intrusion (Partial)", and FMVSS 301 "Fuel System Integrity", performance. Procedures for receiving, inspection, testing and reporting of test results are described in the test procedures and are not repeated in this report.

1.2 SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2007 Cadillac STS 4-Door Sedan at a velocity of 56.14 km/h. The test was performed at Karco Engineering, LLC on June 5, 2007.

Three (3) real-time and fourteen (14) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet number 14 (page number 24) of this report.

Two Part 572E, 50th percentile male anthropomorphic test devices (ATDs), were placed in the driver and right-front passenger seating positions according to dummy placement instructions specified in the Laboratory Indicant Test Procedure.

Both ATDs were fully instrumented with head (primary and redundant), chest (primary and redundant) and pelvis triaxial accelerometers, chest displacement potentiometers, six-axis upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were placed on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. Shoulder belt spool-off was measured for the driver and passenger dummies. The driver (position 1) ATD (Serial No. 034) and the right-front passenger (position 2) ATD (Serial No. 035) were calibrated prior to this test.

One hundred and forty one (141) channels of data were recorded using a TDAS data acquisition system. Appendix A contains Pre and Post-Test Photographs, Appendix B contains the Dummy Response data traces, Appendix C contains the Dummy Calibration data, and Appendix D contains the Child Restraint System Report.

There was 100 percent windshield retention and there was no intrusion into the protected zone of the windshield during the impact event. There was no stoddard solvent leakage after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 557 mm at the vehicle's centerline and both the driver and the passenger side doors remained closed and latched during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver ATD's head and chest contacted the airbag and the abdomen had no contact. Both knees contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger ATD's head and chest contacted the airbag. The head also contacted the roof trim. Both knees contacted the glove box.

Occupant injury data is contained in table below.

OCCUPANT DATA SUMMARY					
ATD Position	HIC 36	3 msec Clip (g)	Chest Defl. (mm)	Left Femur (N)	Right Femur (N)
Driver	432.3	45.0	-23.7	-2500.3	-3036.6
Passenger	686.5	50.2	-31.5	-2949.9	-1121.0

Additional data plots for this test are available in the research and development section of the NHTSA website. The website can be found at: www.NHTSA.Dot.Gov

SECTION 2

OCCUPANT AND VEHICLE INFORMATION/DATA SHEETS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

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	miles/hr	km/hr	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	°F	°C	$=(\text{tf} - 32)/1.8$
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**CRASH TEST SUMMARY**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**PRIMARY IMPACT DATA**

Measured Parameter	Units	Value
Velocity at Impact	km/h	56.14
Test Weight	kg	2034
Impact Angle	degrees	0
Average Rebound	mm	854
Maximum Static Crush	mm	557

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Front Door opening	Remained closed and latched, opened w/o tools	Remained closed and latched, opened w/o tools
Rear Door Opening	Remained closed and latched, opened w/o tools	Remained closed and latched, opened w/o tools
Seat Track Shift (mm)	None	None
Seat Back Failure	No	No

TEST DUMMY INFORMATION

Description	Driver	Passenger
Dummy Type/ Serial No.	50% Male Hybrid III No. 034	50% Male Hybrid III No. 035
Head Contact	Airbag / Headrest	Airbag / Headliner
Chest Contact	Airbag	Airbag
Abdomen Contact	None	Airbag
Left Knee Contact	Knee Bolster	Glovebox
Right Knee Contact	Knee Bolster	Glovebox

MOVIE COVERAGE

Cameras	Standard	Additional
High Speed	14	0
Real Time	1	2
Total	15	2

DATA CHANNELS

Driver ATD Sensors	40
Passenger ATD Sensors	40
Belt Assessment Sensors	8
Vehicle Structure Accelerometers	8
Rigid Barrier Load Cells	45
Total	141

DATA SHEET NO. 2

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	G70109	Anti-Lock Brakes	Yes
Make	Cadillac	All Wheel Drive	Yes
Model	STS	Power Steering	Yes
Body Style	4-Door Sedan	Driver Front Airbag	Yes
Vin No.	1G6DW677670182256	Driver Side Airbag	Yes
Color	Gold	Driver Head Airbag	No
Delivery Date	5/21/2007	Driver Curtain Airbag	Yes
Odometer (Miles)	141.0	Pass. Airbag	Yes
Dealer	Dutton Motor Co.	Pass. Side Airbag	No
Transmission	5-Speed Automatic	Pass. Head Airbag	No
Final Drive	AWD	Pass. Curtain Airbag	Yes
Type/No. Cyl.	V6	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 MANUFACTURER

Manufactured By	General Motors Corp.	GWR (kg)	2290
Date of Manufacture	Apr-07	GAWR Front (kg)	1133
		GAWR Rear (kg)	1157

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. 2...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

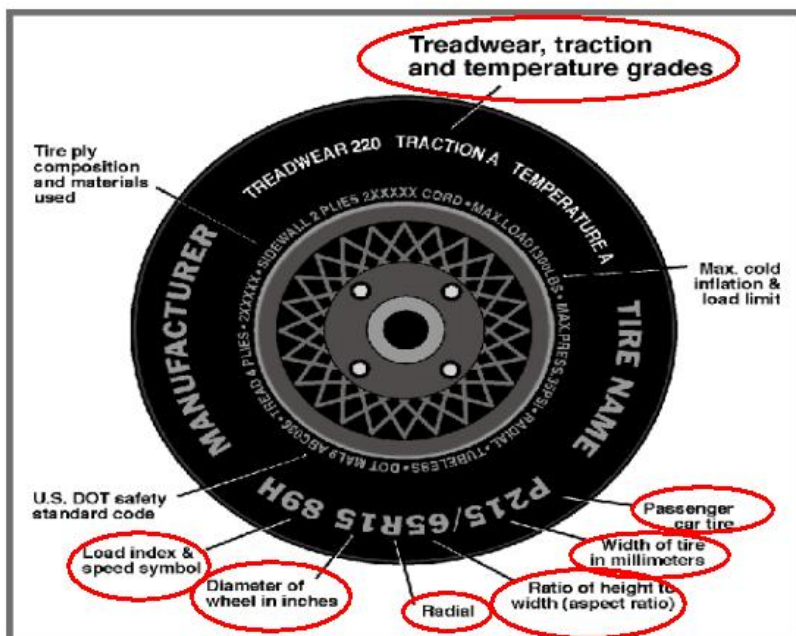
Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

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	P235/50R17
Tire Size on Vehicle	P235/50R17	P235/50R17
Tire Manufacturer	Michelin	Michelin
Treadwear	500	500
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	95S	95S
Tire Material	2 Polyester, 2 Steel	2 Polyester, 2 Steel
DOT Safety Code Right	B9YDHNHX0507	B9YDHNHX0507
DOT Safety Code Left	B9YDHNHX0507	B9YDHNHX0507

DATA SHEET NO. 2...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70109
 Test Program: 2007 NHTSA 35mph NCAP Test Date: 6/5/07

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UWW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	505	415	920	526	490	1016
Right	kg	498	406	904	526	492	1018
Ratio	%	55	45	100	52	48	100
Totals	kg	1003	821	1824	1052	982	2034

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UWW)	kg	1824
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Wt. (RCLW)	kg	64
Calculated Vehicle Target Wt. (TVTW)	kg	2040

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	731	726	738	733	1335
As Tested	mm	711	710	697	696	1431

Vehicle Wheel Base (mm) 2965

Weight of Ballast Secured in cargo area (kg) 0

Weight of Items Removed (kg) 82

Vehicle Components Removed Rear Door Panels/Windows, Trunk, Rear Bumper, Rear Glass
Trunk Carpeting, Spare Tire, Jack and Tools

* Ballast weight does not include cameras, instrumentation and brake abort system.

FUEL SYSTEM DATA

Fuel System Capacity From Owners Manual (L) 66.24

Actual Test Volume with entire fuel System Filled (L) 61.58

Test Fluid Type: Stoddard Solvent

Kinematic Viscosity: as per ASTM Standard D484-71 Red

Is Vehicle Fuel Pump Electric or Mechanical? Electric

If electric, does pump operate with ignition switch "On" & engine "OFF" Yes

Fuel System Particulars: Electric fuel pump. Activated when electrical system is activated.
Fuel pump will run during the operation of the engine.

DATA SHEET NO. 3**POST-TEST IMPACT DATA**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**SPEED TRAP DATA**

Measured Parameter	Units	Requirement	Value
Trap No.1 Velocity (Primary)	km/h	55.51 to 57.12	56.14
Trap No.2 Velocity (Redun.)	km/h	55.51 to 57.12	56.13

VEHICLE STATIC CRUSH

Measured Parameter	Units	Pre-Test	Post-Test	Difference
Left Side	mm	4803	4500	-303
Center	mm	4970	4413	-557
Right Side	mm	4803	4490	-313

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	873
Center	mm	840
Right Side	mm	850
Average	mm	854

DATA SHEET NO. 4

TEST VEHICLE INFORMATION

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

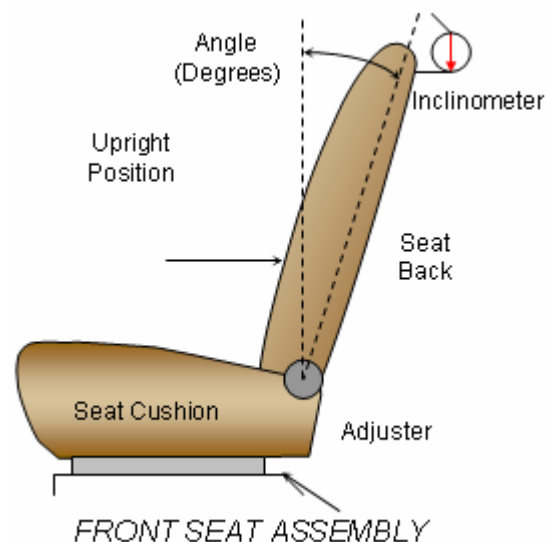
Test Date: 6/5/07

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 of the seat using a digital inclinometer.

SEAT BACK ANGLES

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

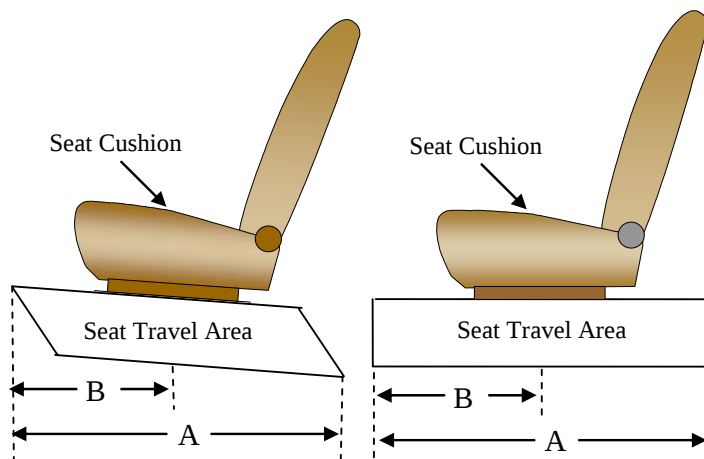


SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position, irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position. There were vertical adjustments on the seats that were equipped with the vehicle. They were placed at the lowermost position.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position
Driver Seat	254 mm	127 mm
Passenger Seat	260 mm	130 mm



SEAT BELT UPPER ANCHORAGE

Position number two (2) from the uppermost position.

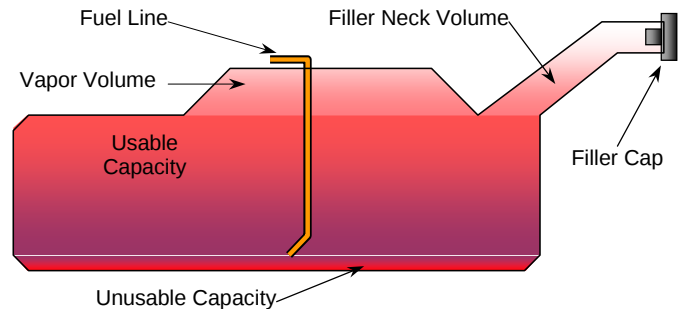
SEAT BELT UPPER ANCHORAGE

	Total # of Positions	Placed in Position #
Driver Seat	4	2
Passenger Seat	4	2

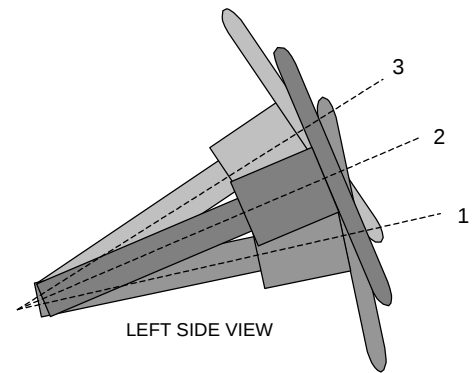
DATA SHEET NO. 4...(CONTINUED)**TEST VEHICLE INFORMATION**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**FUEL TANK CAPACITY**

	Liters
Usable Capacity of "Standard Tank"	66.24
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMSS 301	60.94 to 62.26
Actual Amount of Solvent used	61.58

The test vehicle is equipped with an electric fuel pump. The fuel pump operates for approximately two seconds after the ignition is placed 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 position No. 1	11.5	177
Geometric center position No. 2	23.7	190
Uppermost position No. 3	35.0	203

DATA SHEET NO. 5

DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

TEST DUMMY POSITION MEASUREMENTS

Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (deg)	Length (mm)	Angle (deg)
WA	Windshield Angle		22.9		
SWA	Steering Wheel Angle		66.3		
SCA	Steering Column Angle		23.7		
SA	Seat Back Angle		8.0 @ Headrest		8.0 @ Headrest
HZ	Head to Roof (Z)	220	90.0	200	
HH	Head to Header	369		365	
HW	Head to Windshield	702		645	
HR	Head to Side Header (Y)	260		260	
NR	Nose to Rim	368	3.3		
CD	Chest to Dash	544		490	
CS	Chest to Steering Hub	310			
RA	Rim to Abdomen	204			
KDL	Left Knee to Dash	170	30.5	164	
KDR	Right Knee to Dash	158		190	41.0
PA	Pelvic Angle		23.6		22.6
TA	Tibia Angle		40.2		33.6
KK	Knee to Knee (Y)	295		278	
SK	Striker to Knee	570	3.0	580	5.0
ST	Striker to Head	480	83.0	490	88.0
SH	Striker to H-Point	240	33.0	240	49.0
SHY	Striker to H-Point (Y)	240		235	
HS	Head to Side Window	320		330	
HD	H-Point to Door (Y)	110		115	
AD	Arm to Door (Y)	115		133	

DATA SHEET NO. 5...(CONTINUED)

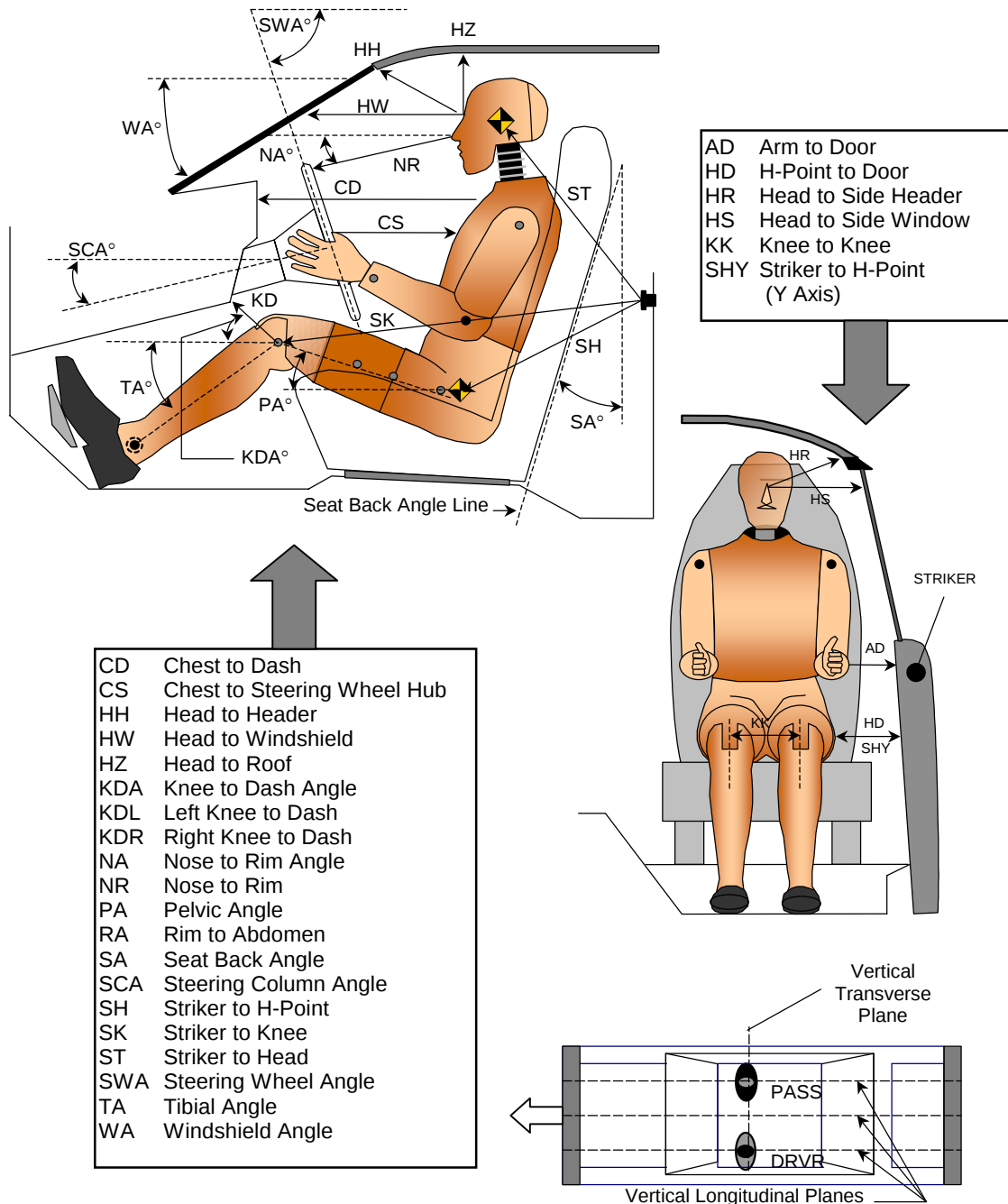
DUMMY POSITIONING IN VEHICLE

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07



DUMMY MEASUREMENTS FOR FRONT SEAT OCCUPANTS

DATA SHEET NO. 6

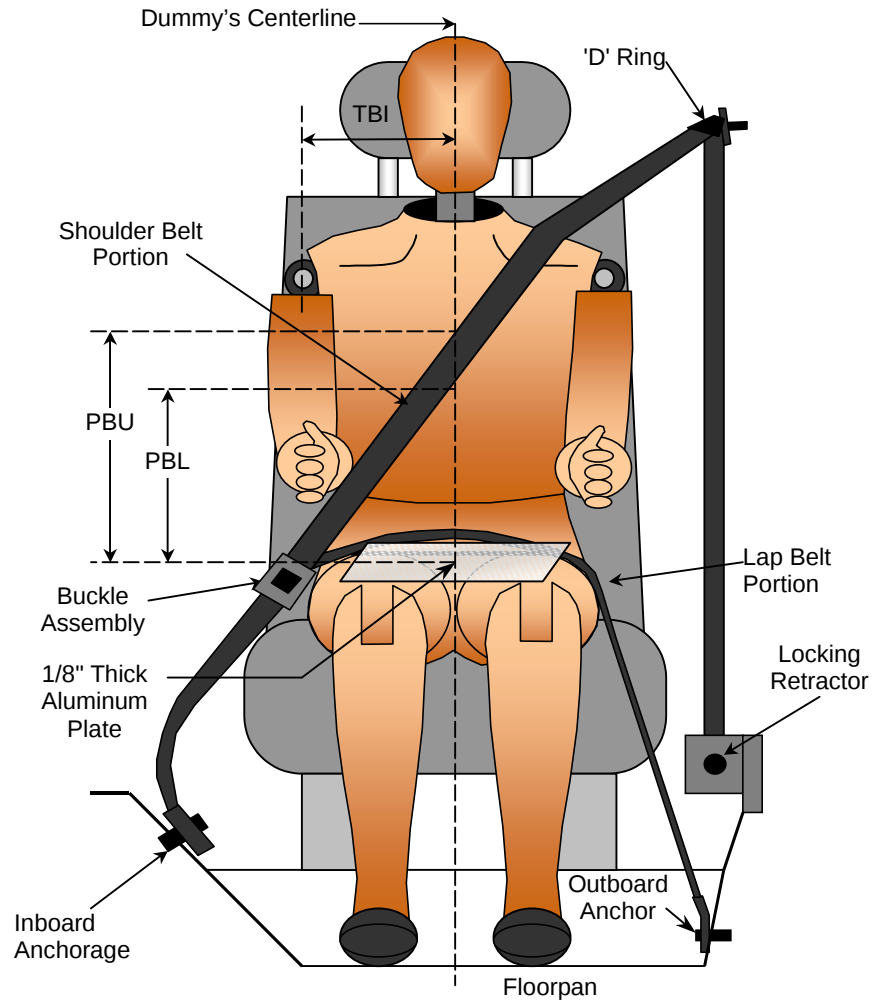
SEAT BELT POSITIONING DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07



SEAT BELT POSITIONING MEASUREMENTS

Measured Parameter	Units	Driver	Passenger
TBI - Dummy C/L to Lap/Shoulder Belt Intersect	mm	220	210
PBU - Top Surface of reference to belt upper edge	mm	355	310
PBL - Top Surface of reference to belt lower edge	mm	275	235
Lap Belt Tension	Newtons	10	10
Shoulder Belt Tension	N/A	Retractor	Retractor

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATION

Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan

Test Date: 6/5/07

Test Program: 2007 NHTSA 35mph NCAP

NHTSA No.: G70109

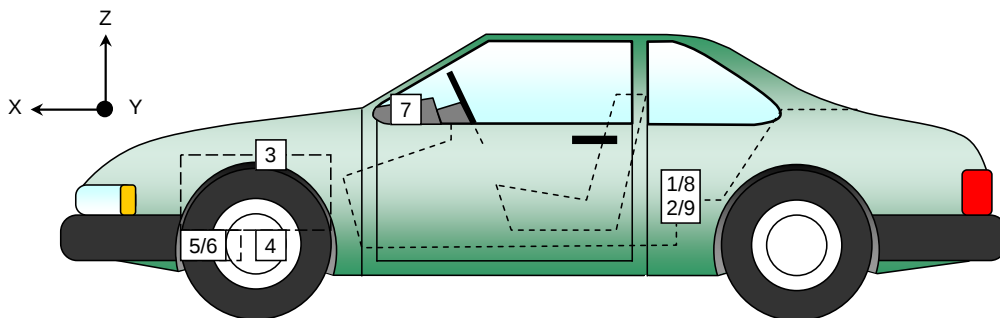
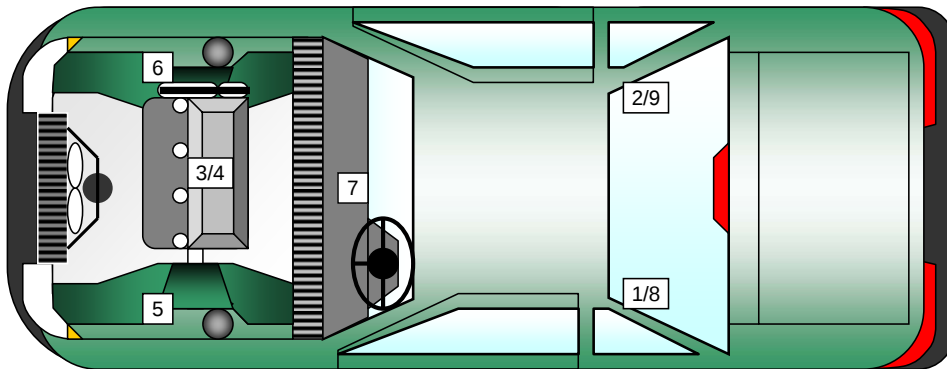
VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member	1821	-733	389
2	Right Rear X-Member	1779	731	390
3	Engine Top	3940	-14	945
4	Engine Bottom	4100	40	105
5	Left Brake Caliper	4201	-750	351
6	Right Brake Caliper	4201	750	351
7	Instrument Panel			
8	Left Rear X-Member (Z-Axis)	1821	-733	389
9	Right Rear X-Member (Z-Axis)	1779	731	390

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

1.) Instrument Panel no longer used by NHTSA

2.) Insufficient room for installation



DATA SHEET NO. 8**SEAT BELT ASSESSMENT TEST DATA**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**SEAT BELT POSITIONING MEASUREMENTS**

Measurement Description	Units	Driver	Passenger
Retractor Reel to "D" ring	mm	700	700
Shoulder Belt length as measured on ATD	mm	850	835
Lap Belt length as measured on ATD	mm	560	553
Remainder of belt on reel	mm	987	1000
Total belt length for continuous webbing systems	mm	3097	3088

SHOULDER BELT SPOOL-OFF DATA

Measurement Description	Units	Driver	Passenger
As determined mechanically	mm	250	186
As determined electronically	mm	295	345

** Channel Failed, No Data

BELT STRETCH DATA

Measurement Description	Units	Driver	Passenger
Electronically between belt load cell and "D" ring	mm/cm	*	*
Mechanically	mm/cm		

* Not used with shoulder belt pre-tensioner systems

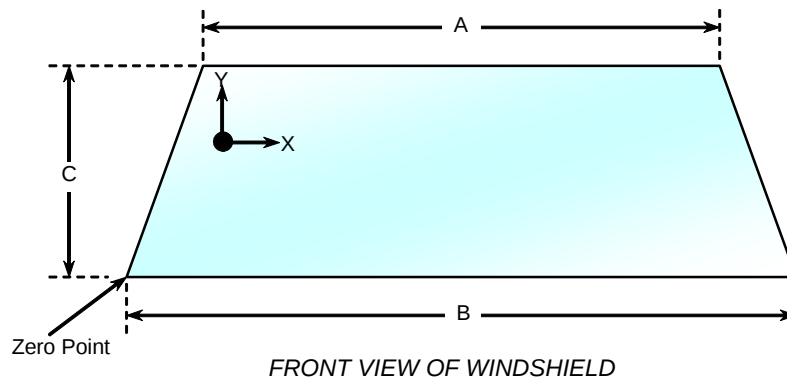
DATA SHEET NO. 9**SUMMARY OF FMVSS 212 DATA**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07

Windshield Mounting Details: Windshield glass is secured to the vehicle frame with a rubber type adhesive. No molding covers the windshield periphery at any point.

The standard requires that the post-test retention measurement be a minimum of 75 percent of the pretest total periphery measurement for vehicles not equipped with occupant passive restraints and 50 percent for each side of the windshield for vehicles that are equipped with occupant passive restraints.

Temperature of windshield molding during test: 28.0 °C**WINDSHIELD PERIPHERY MEASUREMENTS**

Measurement	Pre-Test(mm)	Post-Test(mm)	% of Retention
Left Side	2183	2183	100
Right Side	2183	2183	100
Total	4365	5148	100

**WINDSHIELD DIMENSIONS**

Item	Units	Segment Length	Molding Width
A	mm	1190	5
B	mm	1495	50
C-Left	mm	840	17
C-Right	mm	840	17

DATA SHEET NO. 10

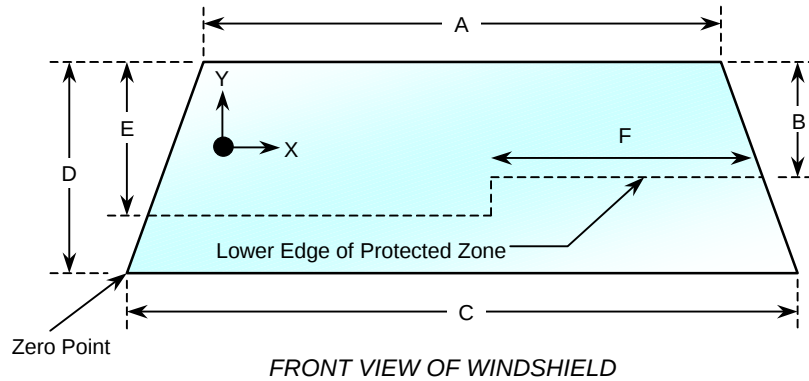
WINDSHIELD ZONE INTRUSION FMVSS 219 DATA (PARTIAL)

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07



WINDSHIELD AND PROTECTED ZONE

Item	Units	Value
A	mm	1190
B	mm	470
C	mm	1495
D	mm	840
E	mm	483
F	mm	558

AREA OF PROTECTED ZONE FAILURES

- A. Provide coordinates of the area that the protected zone was penetrated more than 0.25 in. by a vehicle component other than one that is normally in contact with the windshield.

X	Y

- B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

X	Y

DATA SHEET NO. 11

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan NHTSA No.: G70109
Test Program: 2007 NHTSA 35mph NCAP Test Date: 6/5/07

Test Time: 1:58 PM Temperature: 30.0 ° 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 Location Details: No leakage occurred

DATA SHEET NO. 12

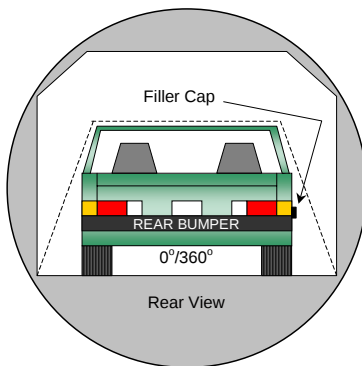
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

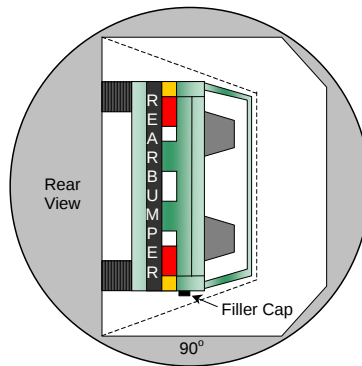
NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

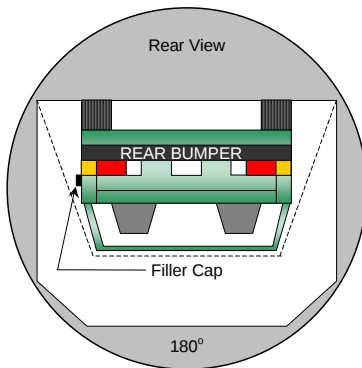
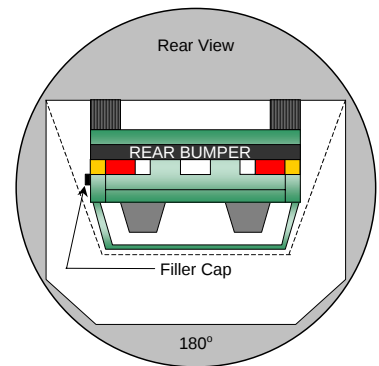
Test Date: 6/5/07



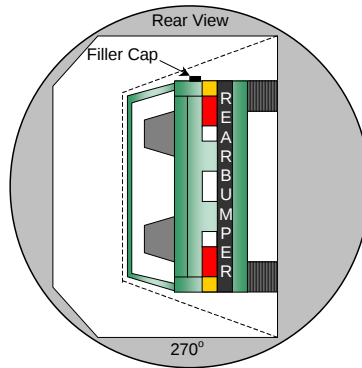
0° to 90°



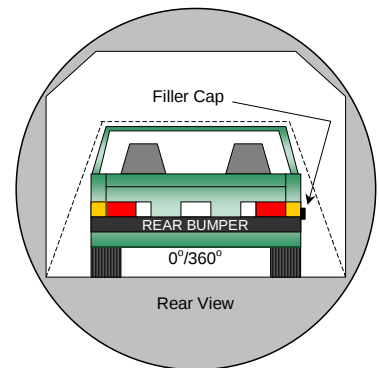
90° to 180°



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. No solvent leakage occurred during rollover.

DATA SHEET NO. 12...(CONTINUED)**FMVSS 301 STATIC ROLLOVER DATA**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	84	303	387
90° to 180°	85	305	390
180° to 270°	89	306	395
270° to 360°	82	309	391

FMVSS 301 SPILLAGE TABLE REQUIREMENT (oz.)

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

ACTUAL TEST VEHICLE SOLVENT SPILLAGE TABLE (oz.)

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. 13**VEHICLE MEASUREMENTS**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**VEHICLE MEASUREMENT TABLE**

No.	Measurement Description	Units	Pre-Test	Post-Test	Diff.
1	Total length of vehicle at centerline	mm	4970	4413	-557
2	RSOV to front of engine	mm	4275	4212	-63
3	RSOV to firewall centerline	mm	3825	3813	-12
4	RSOV to leading edge of right door	mm	3456	3457	1
5	RSOV to leading edge of left door	mm	3457	3462	5
6	RSOV to lower leading edge of right door	mm	3457	3446	-11
7	RSOV to lower leading edge of left door	mm	3451	3444	-7
8	RSOV to upper trailing edge of right door	mm	2284	2289	5
9	RSOV to upper trailing edge of left door	mm	2285	2295	10
10	RSOV to lower trailing edge of right door	mm	2300	2287	-13
11	RSOV to lower trailing edge of left door	mm	2293	2289	-4
12	RSOV to bottom of right 'A' pillar	mm	3367	3365	-2
13	RSOV to bottom of left 'A' pillar	mm	3357	3355	-2
14	RSOV to firewall on right side	mm	3791	3756	-35
15	RSOV to firewall on left side	mm	3725	3780	55
16	RSOV to steering column	mm	2880	2993	113
17	Center of steering column to left 'A' pillar	mm	415	387	-28
18	Center of steering column to headlining	mm	410	474	64
19	RSOV to right side of front bumper	mm	4803	4490	-313
20	RSOV to left side of front bumper	mm	4803	4500	-303
21	Length of engine block	mm	493	493	0
RD	RSOV to right side of dash panel	mm	3060	3063	3
CD	RSOV to center of dash panel	mm	3104	3102	-2
LD	RSOV to left side of dash panel	mm	3056	3060	4

DATA SHEET NO. 13...(CONTINUED)**VEHICLE STRUCTURAL MEASUREMENTS**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**VEHICLE STRUCTURAL MEASUREMENT TABLE**

No.	Measurement Description	Units	Pre-Test	Post-Test	Diff.
1	Total length	mm	4970	4413	-557
2	Total width	mm	1835	1836	1
3	Bumper top height	mm	543	566	23
4	Bumper bottom height	mm	163	173	10
5	Longitudinal member top height	mm	501	510	9
6	Longitudinal member bottom height	mm	428	410	-18
7	Distance between longitudinal members	mm	839	830	-9
8	Longitudinal member width	mm	65	74	9
9	Engine top height	mm	874	926	52
10	Engine bottom height	mm	169	195	26
11	Engine and gear box width	mm	404	404	0
12	Front bumper to engine distance	mm	699	273	-426
13	Front shock absorber fixing width	mm	806	864	58
14	Bonnet leading edge height	mm	748	784	36
15	Front shock absorber fixing width	mm	891	833	-58
16	Front bumper to front axle distance	mm	895	339	-556
17	Front axle to 'A' pillar distance	mm	590	544	-46
18	'A' pillar to 'B' pillar distance	mm	1182	1178	-4
19	'B' pillar to rear axle distance	mm	1189	1186	-3
20	'B' pillar to 'C' pillar distance	mm	1055	1050	-5
21	Roof sill bottom height	mm	1322	1305	-17
22	Roof sill top height	mm	1423	1406	-17
23	Floor sill bottom height	mm	217	200	-17
24	Floor sill top height	mm	352	335	-17

DATA SHEET NO. 13...(CONTINUED)

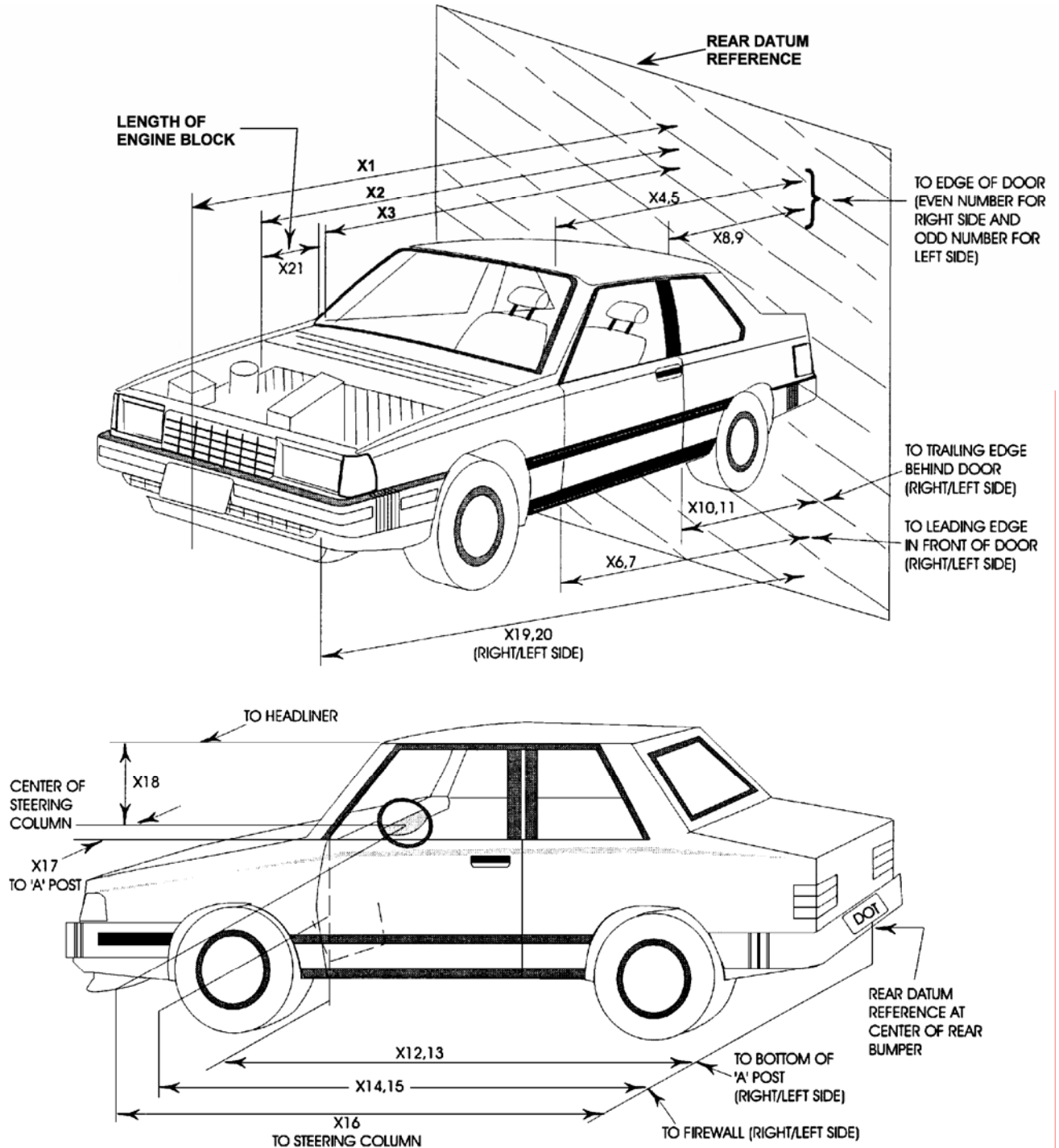
VEHICLE MEASUREMENTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07



DATA SHEET NO. 14

CAMERA LOCATIONS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

VEHICLE CAMERA MEASUREMENT TABLE

No.	Camera View	Location (mm)			Angle (deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real Time Camera (Panning)	-16589	-7485	-1475	0			30
2	Overall Left Side	-2798	-7397	-1048	0	8105	20mm	1000
3	Closeup Left Side	-2584	-7124	-1095	0	7844	50mm	1000
4	Driver and Interior View	-8696	-12562	-4511	-17	15570	ZOOM	1000
5	Steering Column (Bottom)	-1631	-8234	-2682	-13	9453	35mm	1000
6	Steering Column (Top)	-1663	-8153	-3078	-13	9549	35mm	1000
7	Overall Right Side	-2798	7384	-1048	0	7409	20mm	1000
8	Closeup Right Side	-2584	7052	-1048	0	7079	50mm	1000
9	Passenger and Interior View	-5330	9365	-2407	-10	10211	ZOOM	1000
10	Right Side View	-2006	6967	-1463	-6	7134	ZOOM	1000
11	Windshield View	-589	0	-5556	-90		24mm	1000
12	Driver Front View	378	-286	-2438	-34		25mm	1000
13	Passenger Front View	375	413	-2439	-34		25mm	1000
14	Pit View of Engine	-756	0	1495	90		12mm	1000
15	Pit View of Fuel Tank	-3398	0	1495	90		8mm	1000
16	Real Time Driver	-2458	-7598	1301	-1			30
17	Real Time Passenger	-2985	3981	-1284	-1			30

All measurements are made relative to the point of impact.

DATA SHEET NO. 15

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

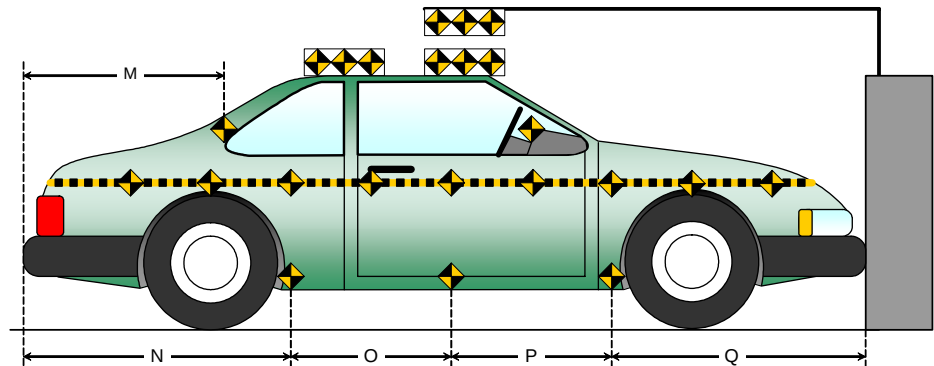
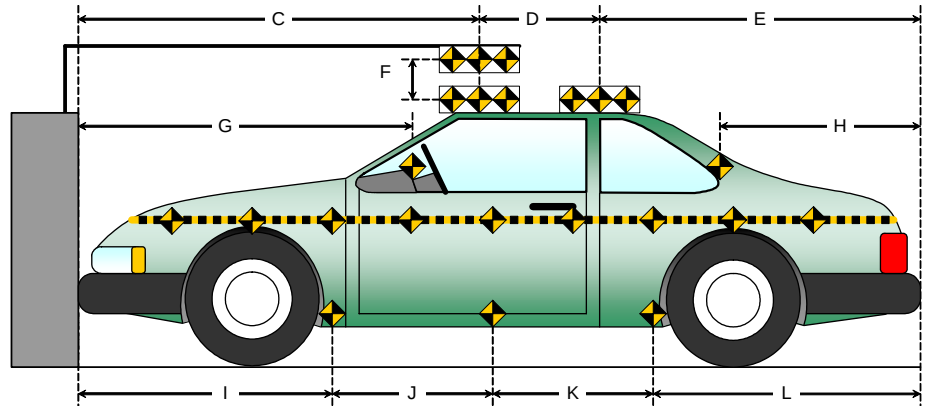
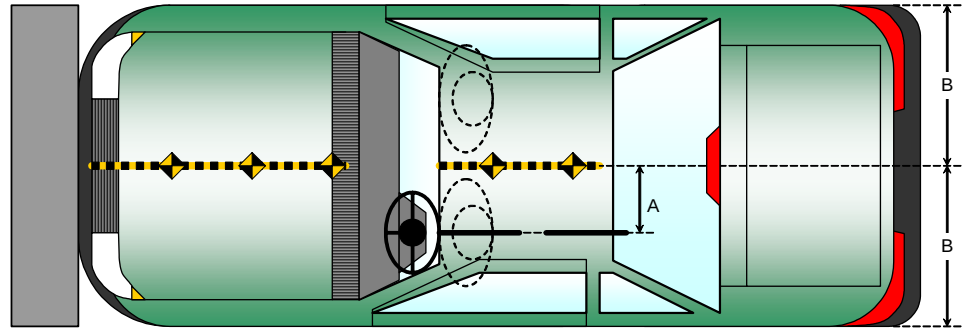
Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

All Dimensions in (mm)	
Item	Value
A	N/A
B	918
C	N/A
D	615
E	N/A
F	155
G	1856
H	1233
I	1385
J	1017
K	1017
L	1570
M	1215
N	1567
O	1027
P	1027
Q	1366



DATA SHEET NO. 16

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

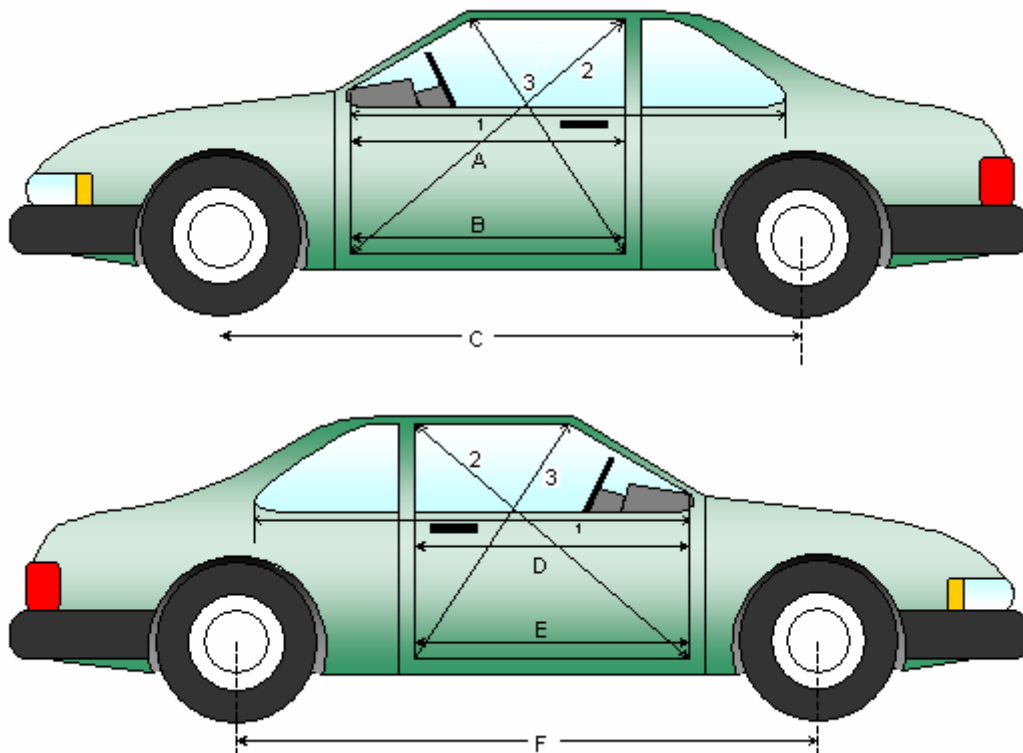
Test Date: 6/5/07

DOOR OPENING WIDTH TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
1L	Left Side	mm	890	890	0
2L	Left Side (Diagonally)	mm	1445	1443	-2
3L	Left Side (Diagonally)	mm	945	944	-1
1R	Right Side	mm	895	895	0
2R	Right Side (Diagonally)	mm	1433	1433	0
3R	Right Side (Diagonally)	mm	929	933	4

WHEELBASE MEASUREMENT TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
C	Left Side Wheel Base	mm	2965		-2965
F	Right Side Wheel Base	mm	2965		-2965



DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

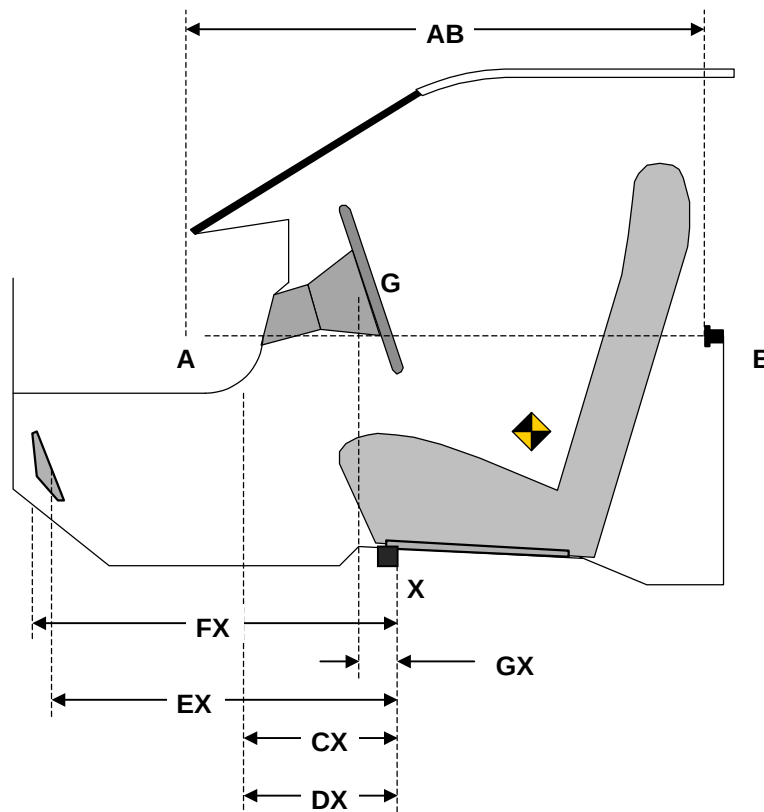
NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

DRIVER COMPARTMENT INTRUSION TABLE

Item	Description	Units	Pre-Test	Post-Test	Diff.
AB	Door Opening (Inside window jam)	mm	890	890	0
CX	Left Knee Bolster to X	mm	200	220	20
DX	Right Knee Bolster to X	mm	195	242	47
EX	Brake Pedal to X	mm	554	529	-25
FX	Foot Rest to X	mm	550	592	42
GX	Center of Steering Wheel Hub to X	mm	37	22	-15



DATA SHEET NO. 16...(CONTINUED)

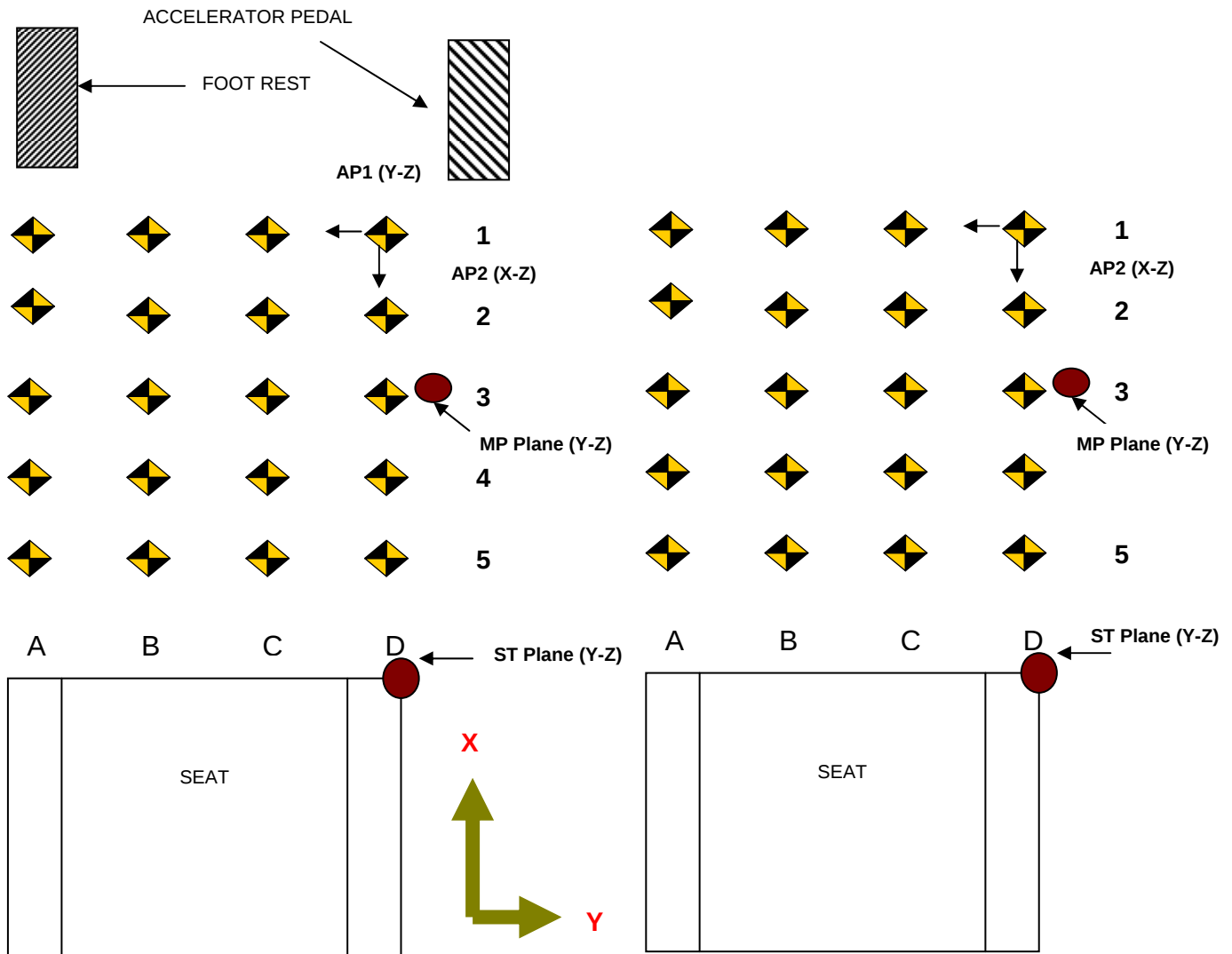
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07



AP1: Y-Z Plane passing through D1

AP2: X-Z Plane passing through D1

AP3: X-Y plane passing through D1

MP: Y-Z plane, halfway between the ST plane and AP1 plane

CF Plane: X-Z plane passes through center of footrest.

BP Plane: X-Z plane passes through center of brake pedal

TP Plane: Y-Z plane, intersection of BP Plane and the intersection of the toe pan and floorboard

Column A: intersection of vehicle and CF plane

Column D: Intersection of vehicle and AP2 plane

Row 1: intersection of the vehicle and the AP3 Plane

Row 3: intersection of the vehicle and TP plane

Row 5: intersection of the vehicle and MP plane

Row 2: evenly spaced between row 1 and 3

Row 4: evenly spaced between row 3 and 5

DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

All measurements in mm

DRIVER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	711	738	751	731	739	711	693	685	-28	27	58	46
2	626	662	692	682	666	646	620	608	-40	16	72	74
3	549	575	618	629	588	565	545	517	-39	10	73	112
4	458	489	526	580	491	469	454	423	-33	20	72	157
5	364	402	430	504	389	371	356	335	-25	31	74	169

DRIVER FLOOR PAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-231	-133	-42	91	110	219	316	474	-341	-352	-358	-383
2	-219	-113	-2	116	104	210	309	466	-323	-323	-311	-350
3	-185	-85	13	149	92	197	300	453	-277	-282	-287	-304
4	-159	-48	42	172	81	184	288	435	-240	-232	-246	-263
5	-116	-15	84	206	71	172	277	420	-187	-187	-193	-214

DRIVER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-71	-65	-122	-318	-74	-81	-80	-79	3	16	-42	-239
2	4	2	2	-200	3	3	-5	-6	1	-1	7	-194
3	70	60	50	-133	68	60	50	49	2	0	0	-182
4	72	80	69	20	72	80	64	51	0	0	5	-31
5	83	79	64	68	79	80	63	52	4	-1	1	16

DATA SHEET NO. 16...(CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

All measurements in mm

PASSENGER FLOOR PAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	658	704	726	723	734	719	725	722	-76	-15	1	1
2	631	645	656	656	663	659	657	658	-32	-14	-1	-2
3	566	569	571	571	577	576	573	575	-11	-7	-2	-4
4	462	465	465	464	471	469	468	467	-9	-4	-3	-3
5	363	366	362	361	375	365	364	366	-12	1	-2	-5

PASSENGER FLOOR PAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-293	-201	-102	38	-310	-204	-97	47	17	3	-5	-9
2	-315	-208	-107	38	-317	-204	-98	47	2	-4	-9	-9
3	-321	-211	-111	36	-317	-202	-99	43	-4	-9	-12	-7
4	-324	-212	-112	33	-315	-205	-104	44	-9	-7	-8	-11
5	-323	-210	-109	27	-315	-204	-103	36	-8	-6	-6	-9

PASSENGER FLOOR PAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-302	-193	-126	-89	-99	-97	-98	-88	-203	-96	-28	-1
2	-119	-83	-30	-31	-26	-27	-31	-30	-93	-56	1	-1
3	8	28	25	27	29	37	33	32	-21	-9	-8	-5
4	37	40	42	46	42	48	51	48	-5	-8	-9	-2
5	42	45	47	51	47	53	56	51	-5	-8	-9	0

DATA SHEET NO. 17

FIXED BARRIER LOAD CELL LOCATIONS

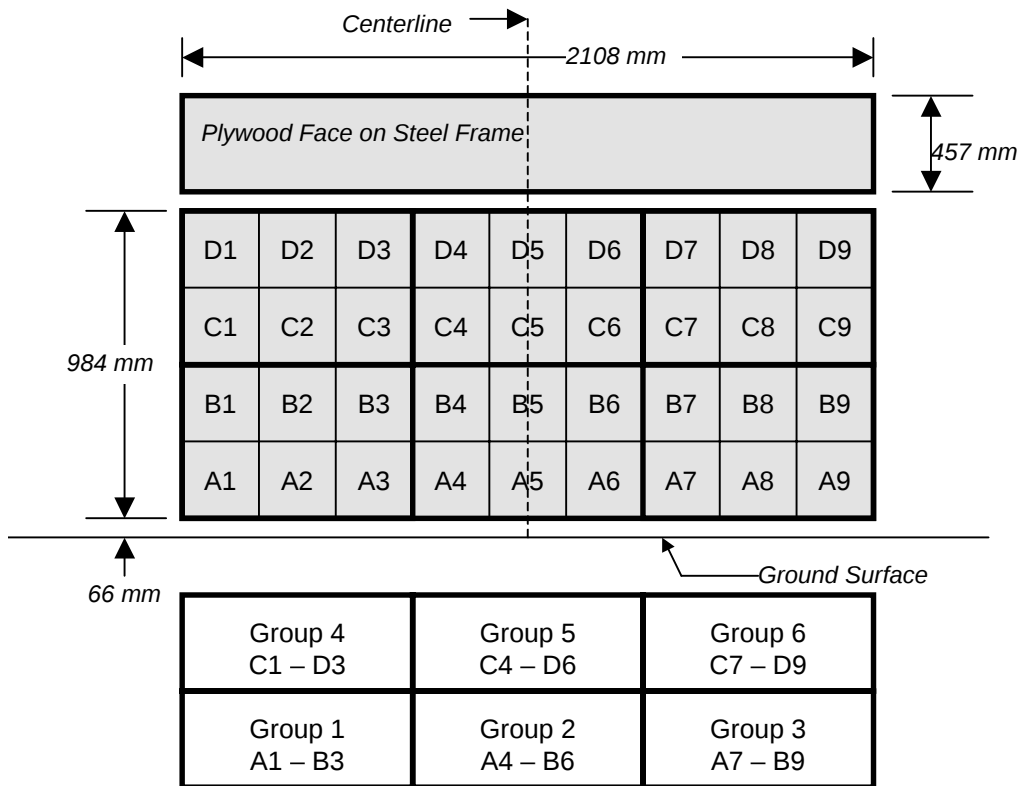
Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

36 Load Cell Rigid Barrier (NHTSA Standard) Load Cell Locations on Fixed Barrier



6 Groups of 6 Load Cells Each

DATA SHEET NO. 18

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

VEHICLE INFORMATION

VIN: 1G6DW677670182256

Wheel base (mm): 2965

Vehicle Size Category: 4-Door Sedan

Test Weight (kg): 2034

ACCELEROMETER DATA

Accelerometer Location: Left rear cross member

Cal. Procedure/Interval: 6 months / drop test

Integration Algorithm: NHTSA Standard

Linearity: Good

Impact Velocity (km/h): 56.14

Velocity Change (km/h): 62.2

Time of Separation (msec): 69.0

CRUSH PROFILE

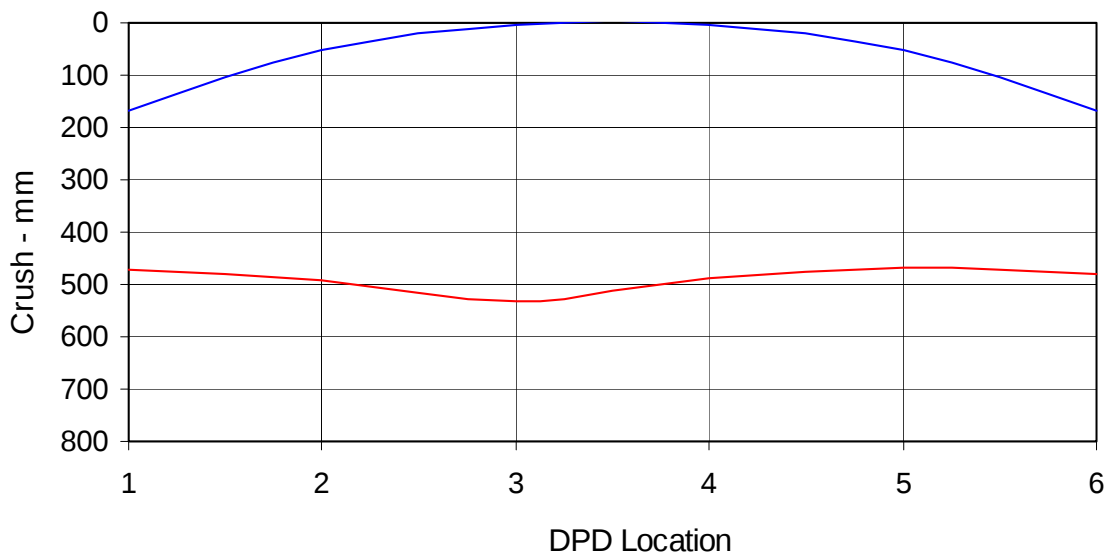
Collision Deformation Classification: 12FDEW6

Midpoint of Damage: Vehicle Centerline

Damage Region Length (mm): 1537

Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	167	473	-306
C2	Crush zone 2 on left side	mm	51	493	-442
C3	Crush zone 3 on left side	mm	5	531	-526
C4	Crush zone 4 on right side	mm	5	487	-482
C5	Crush zone 5 on right side	mm	51	468	-417
C6	Crush zone 6 at right side	mm	167	480	-313



DATA SHEET NO. 19

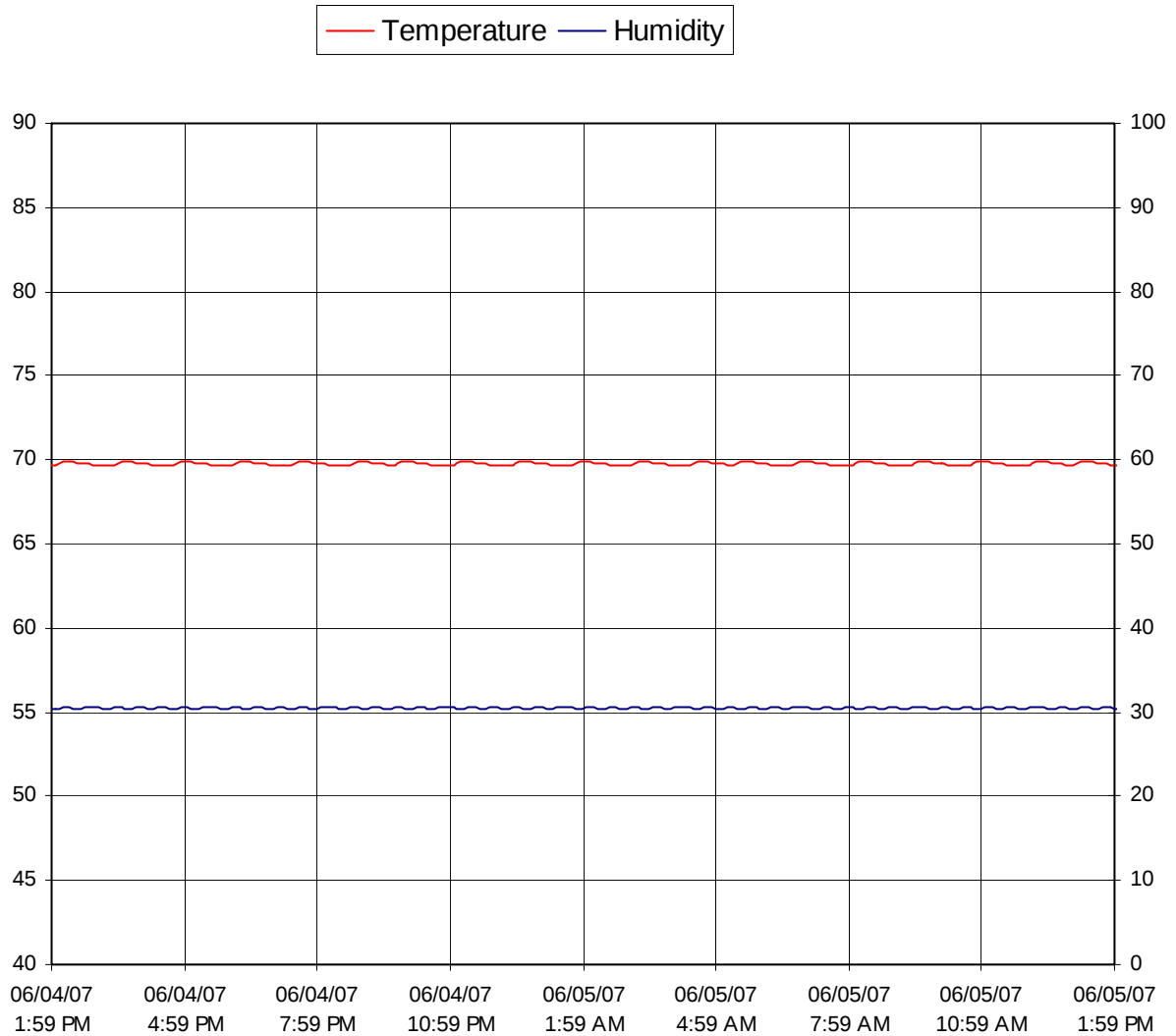
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07



APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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A-8	Pre-Test Left Side View	A-8
A-9	Post-Test Left Side View	A-9
A-10	Pre-Test Right Side View	A-10
A-11	Post-Test Right Side View	A-11
A-12	Pre-Test Right Front $\frac{3}{4}$ View	A-12
A-13	Post-Test Right Front $\frac{3}{4}$ View	A-13
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A-15	Post-Test Left Rear $\frac{3}{4}$ View	A-15
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A-18	Pre-Test Windshield	A-18
A-19	Post-Test Windshield	A-19
A-20	Pre-Test Engine Compartment	A-20
A-21	Post-Test Engine Compartment (Vehicle Moved)	A-21
A-22	Pre-Test Fuel Cap	A-22
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A-48	Pre-Test Passenger Dummy (Door Open)	A-48
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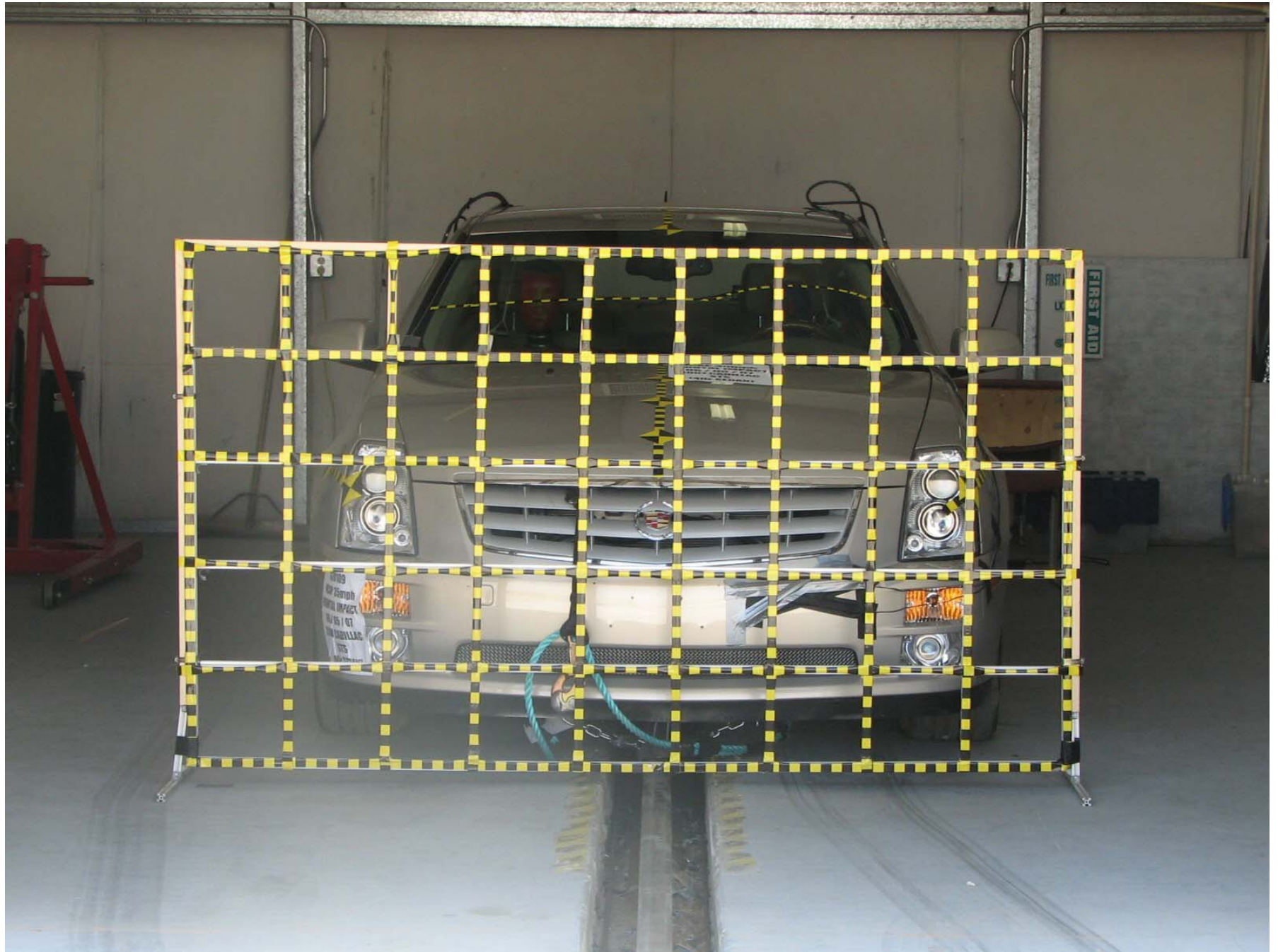


Figure A-1: Load Cell Location



MFD BY GENERAL MOTORS CORP.

DATE
04/07

GVWR
2290 KG
5048 LB

GAWR FRT
1133 KG
2498 LB

GAWR RR
1157 KG
2550 LB

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR
VEHICLE SAFETY, BUMPER, AND THEFT PREVENTION STANDARDS IN
EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

1G6DW677670182256

TYPE: PASS CAR

Figure A-2: Manufacturer's Label

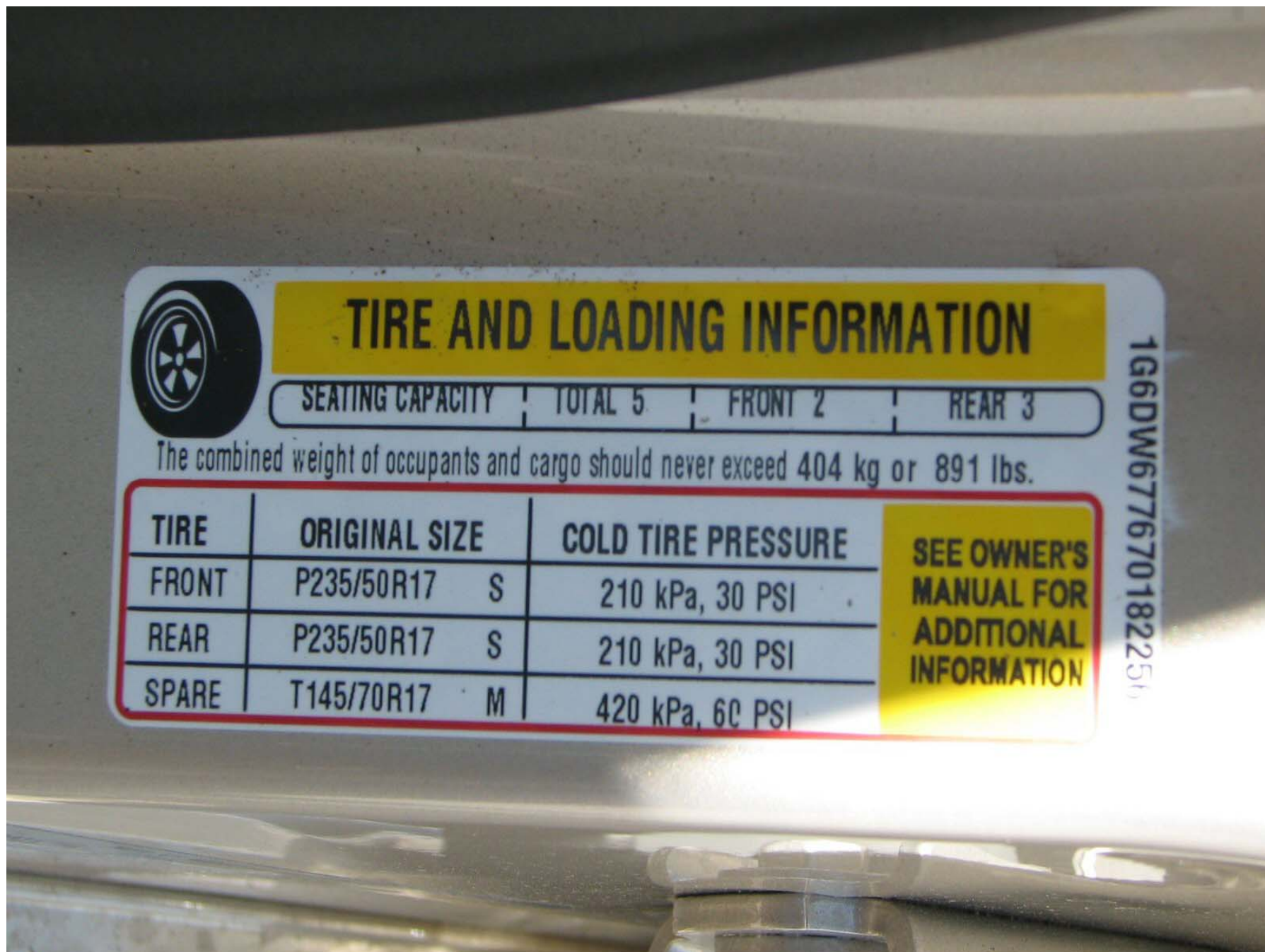


Figure A-3: Tire Placard



Figure A-4: Right Front $\frac{3}{4}$ View, As Received



Figure A-5: Left Rear $\frac{3}{4}$ View, as Received



Figure A-6: Pre-Test Front View



Figure A-7: Post-Test Front View (Vehicle Moved)



Figure A-8: Pre-Test Left Side View



Figure A-9: Post-Test Left Side View



Figure A-10: Pre-Test Right Side View



Figure A-11: Post-Test Right Side View



Figure A-12: Pre-Test Right Front ¾ View



Figure A-13: Post-Test Right Front ¾ View (Vehicle Moved)



Figure A-14: Pre-Test Left Rear $\frac{3}{4}$ View



Figure A-15: Post-Test Left Rear $\frac{3}{4}$ View



Figure A-16: Post-Test Left Side $\frac{3}{4}$ View of Doors After Impact



Figure A-17: Post-Test Right Side $\frac{3}{4}$ View of Doors After Impact

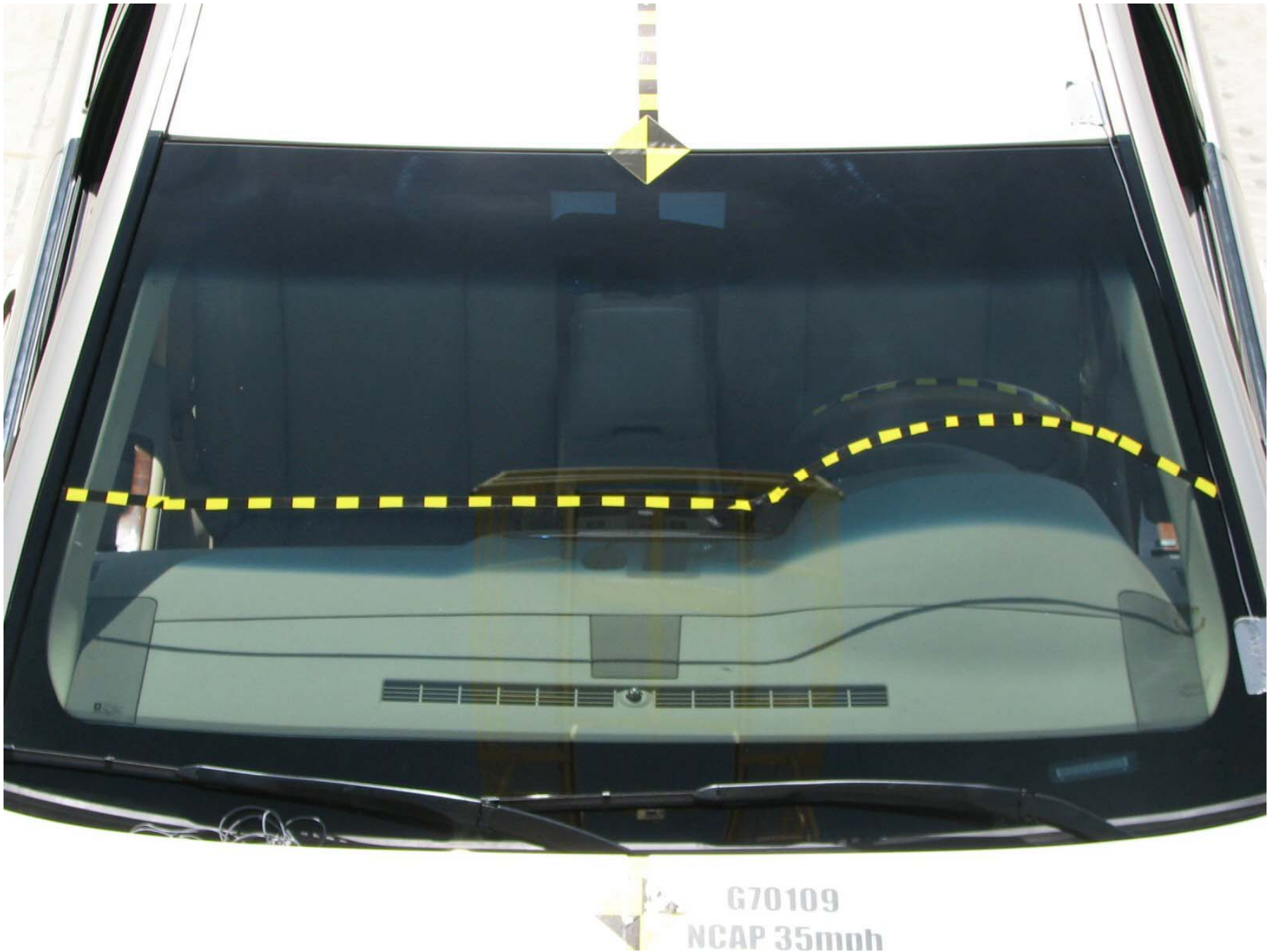


Figure A-18: Pre-Test Windshield

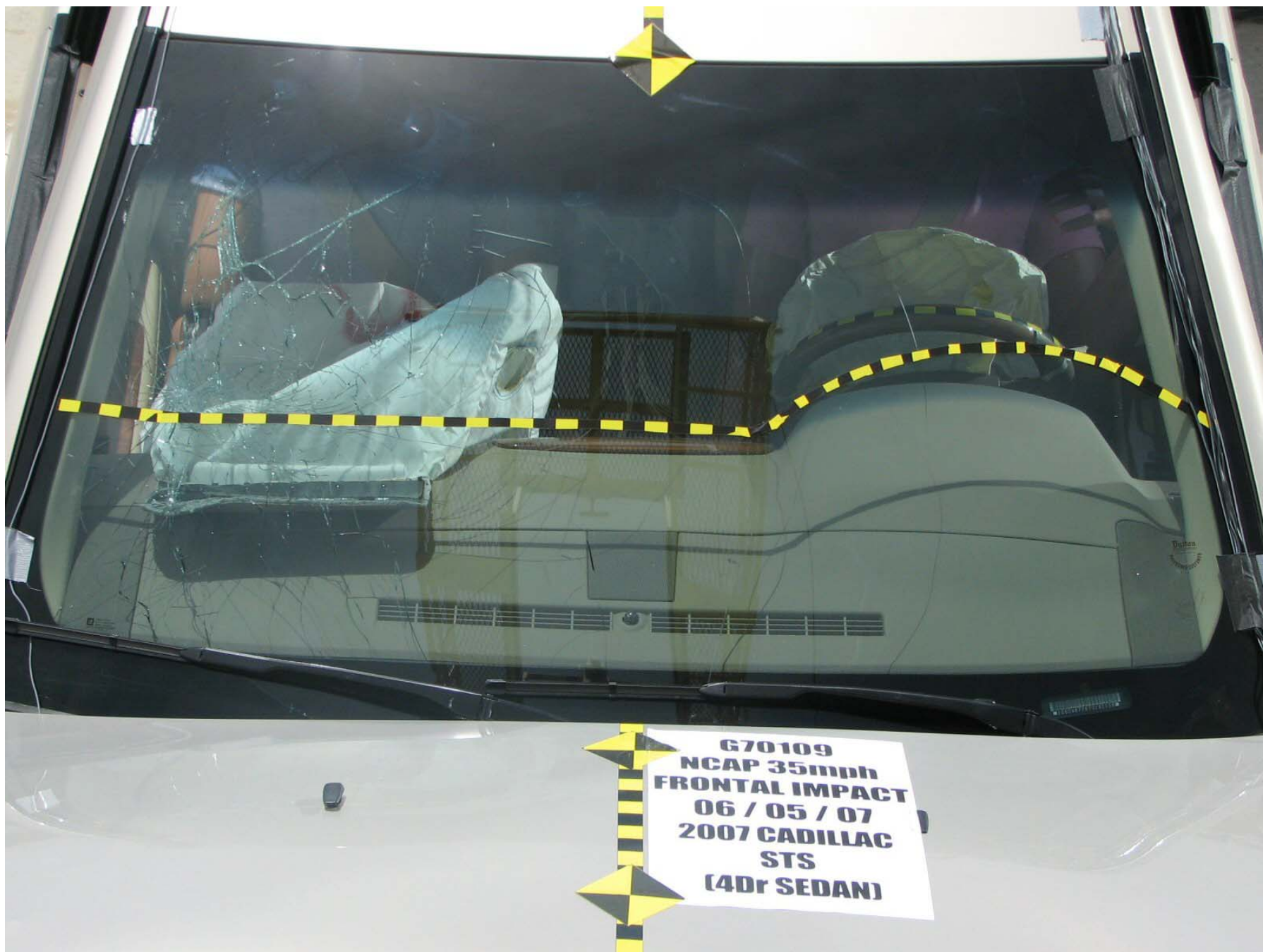


Figure A-19: Post-Test Windshield



Figure A-20: Pre-Test Engine Compartment



Figure A-21: Post-Test Engine Compartment (Vehicle Moved)

2007 CADILLAC STS
G70109
STODDARD SOLVENT ADDED
16.17 GALLONS
(61.59 LITERS)



Figure A-22: Pre-Test Fuel Cap



Figure A-23: Post-Test Fuel Cap

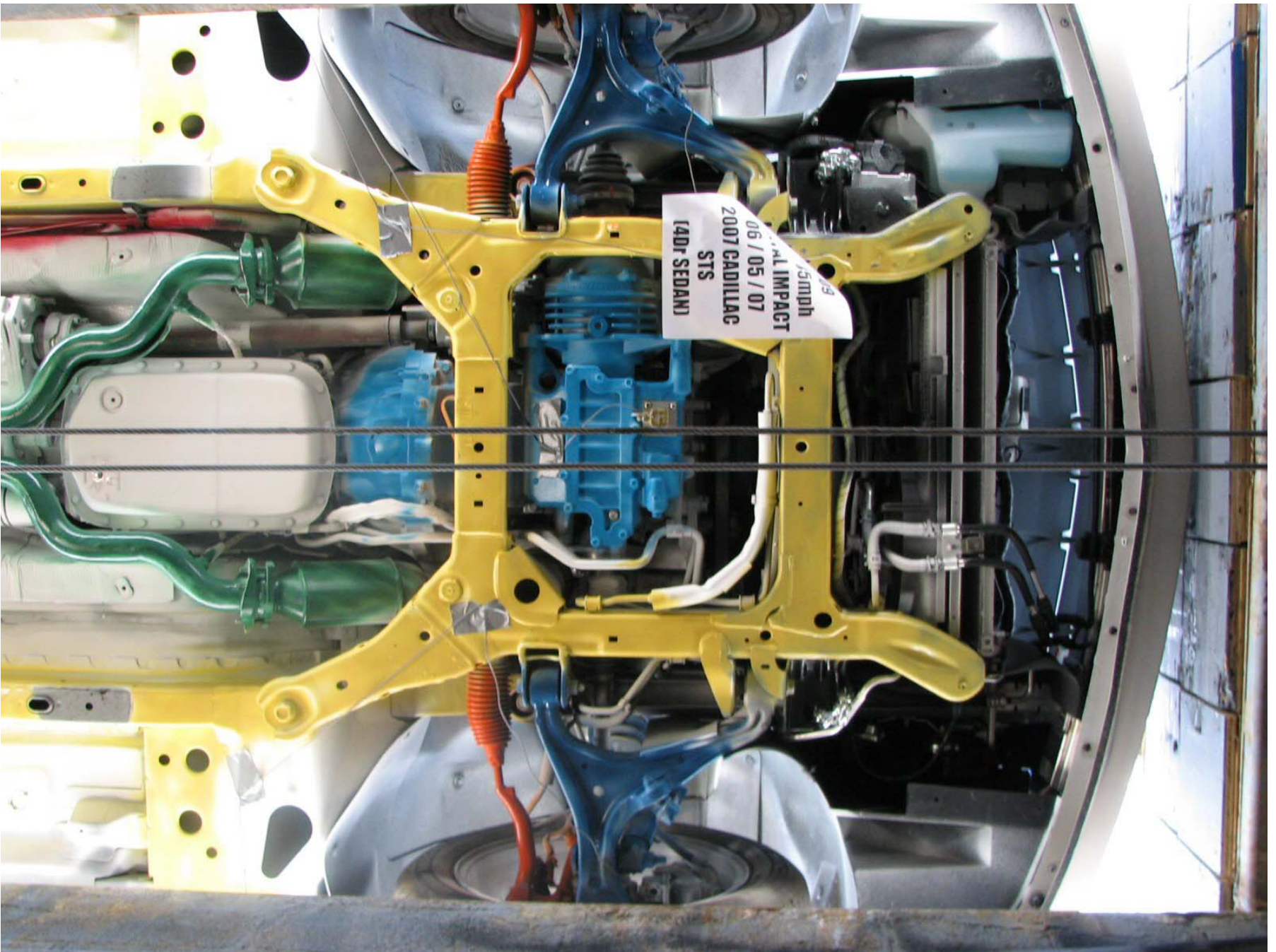


Figure A-24: Pre-Test Front Underbody

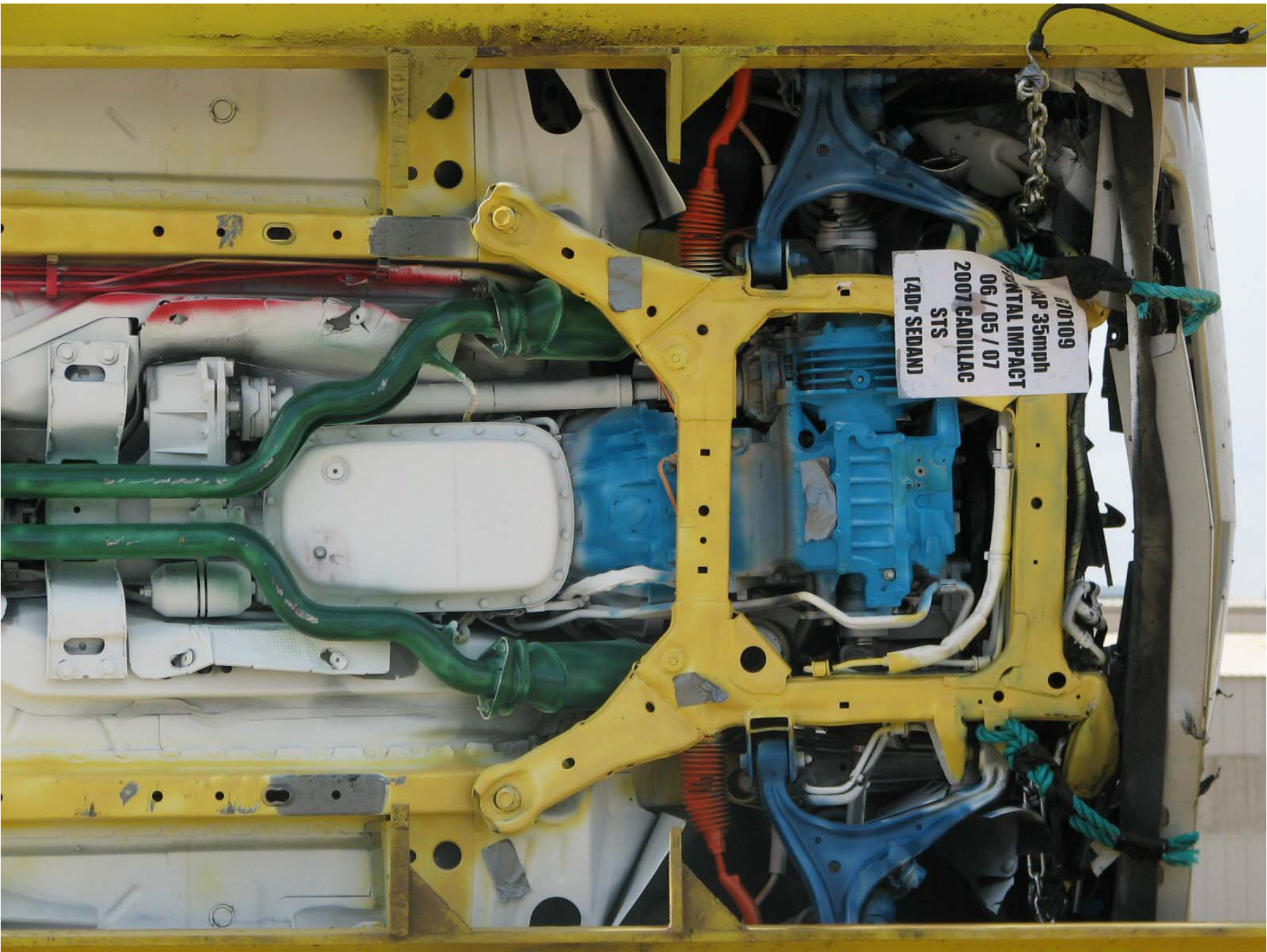


Figure A-25: Post-Test Front Underbody

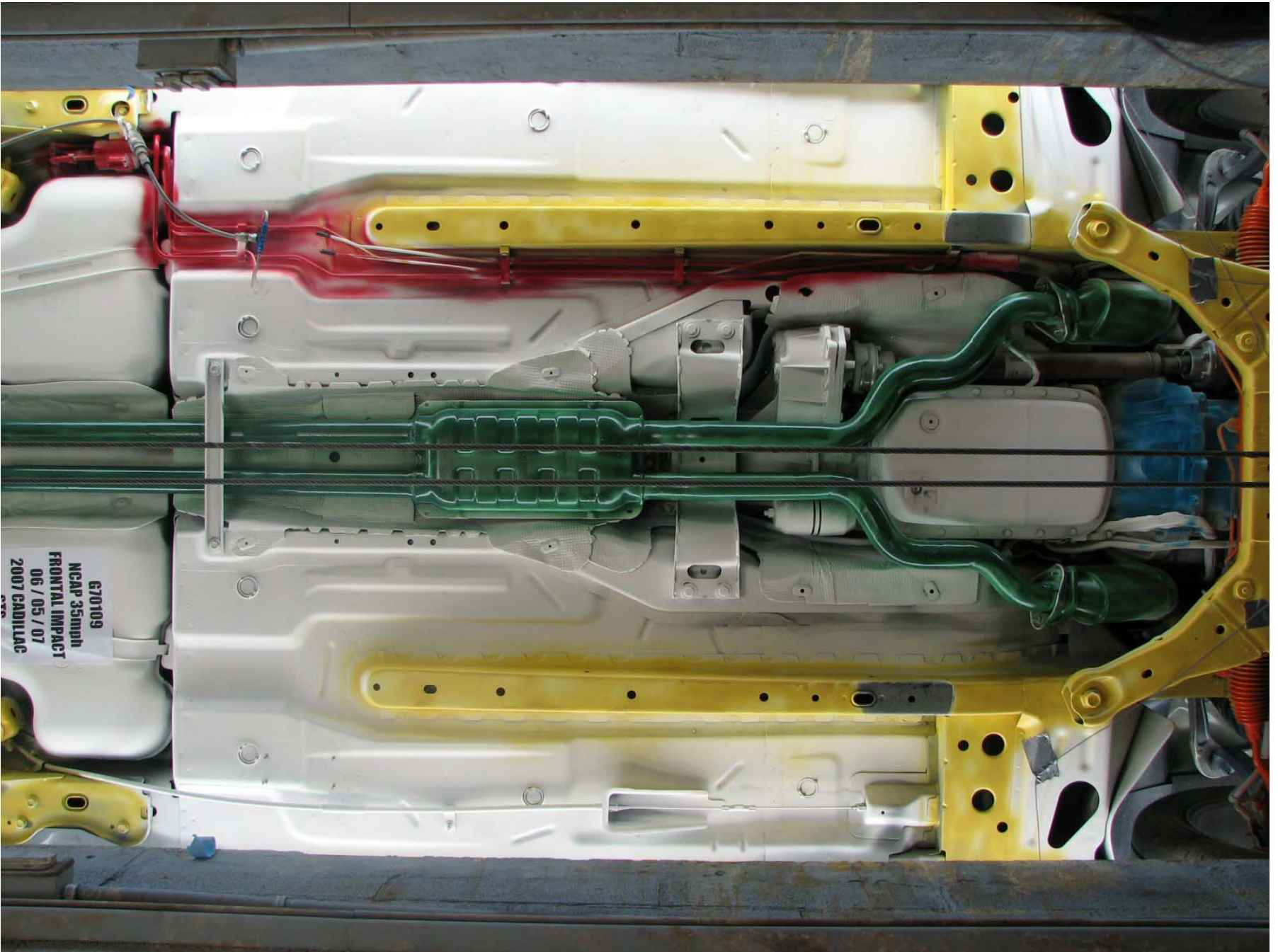


Figure A-26: Pre-Test Mid Underbody

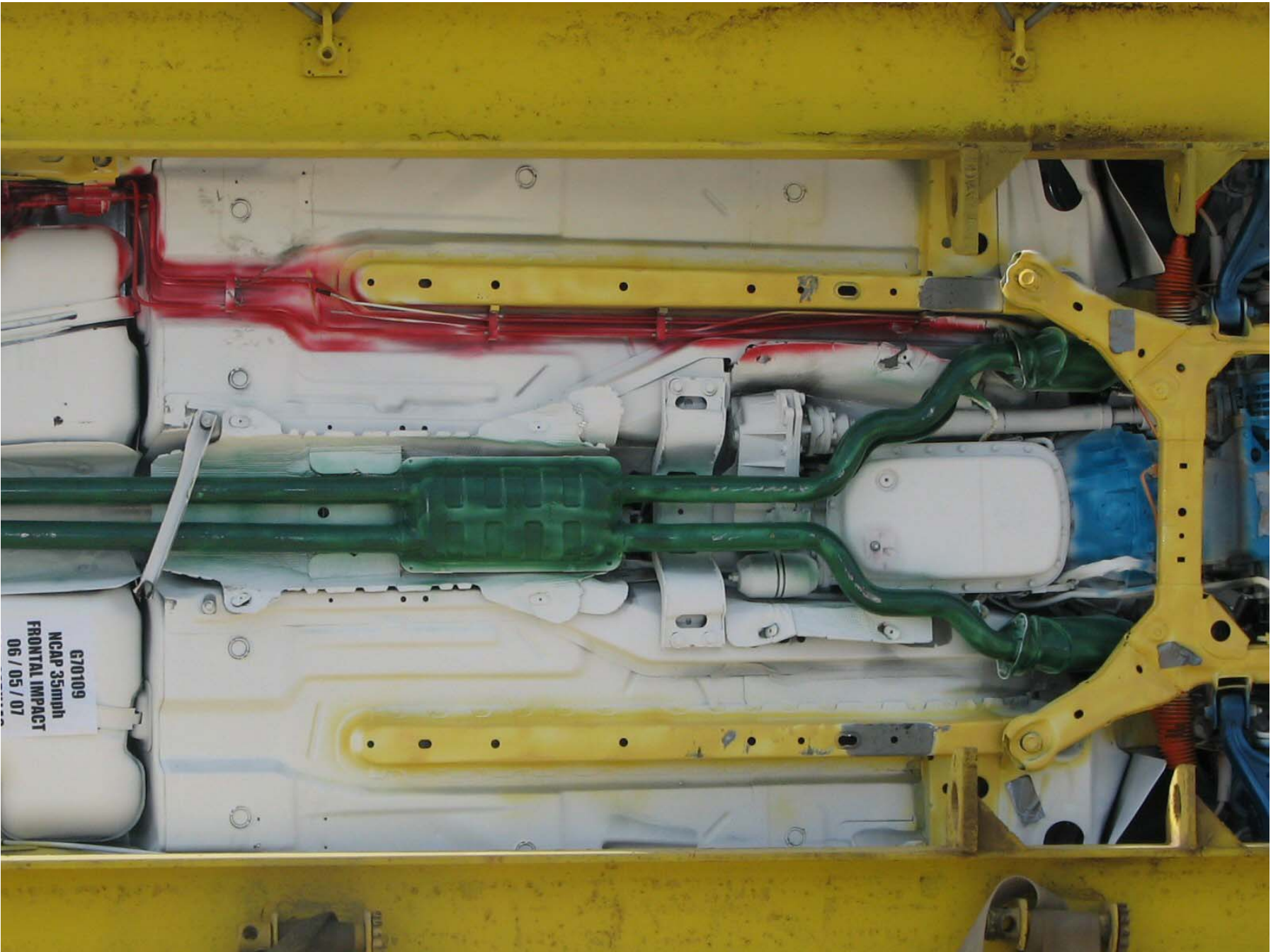
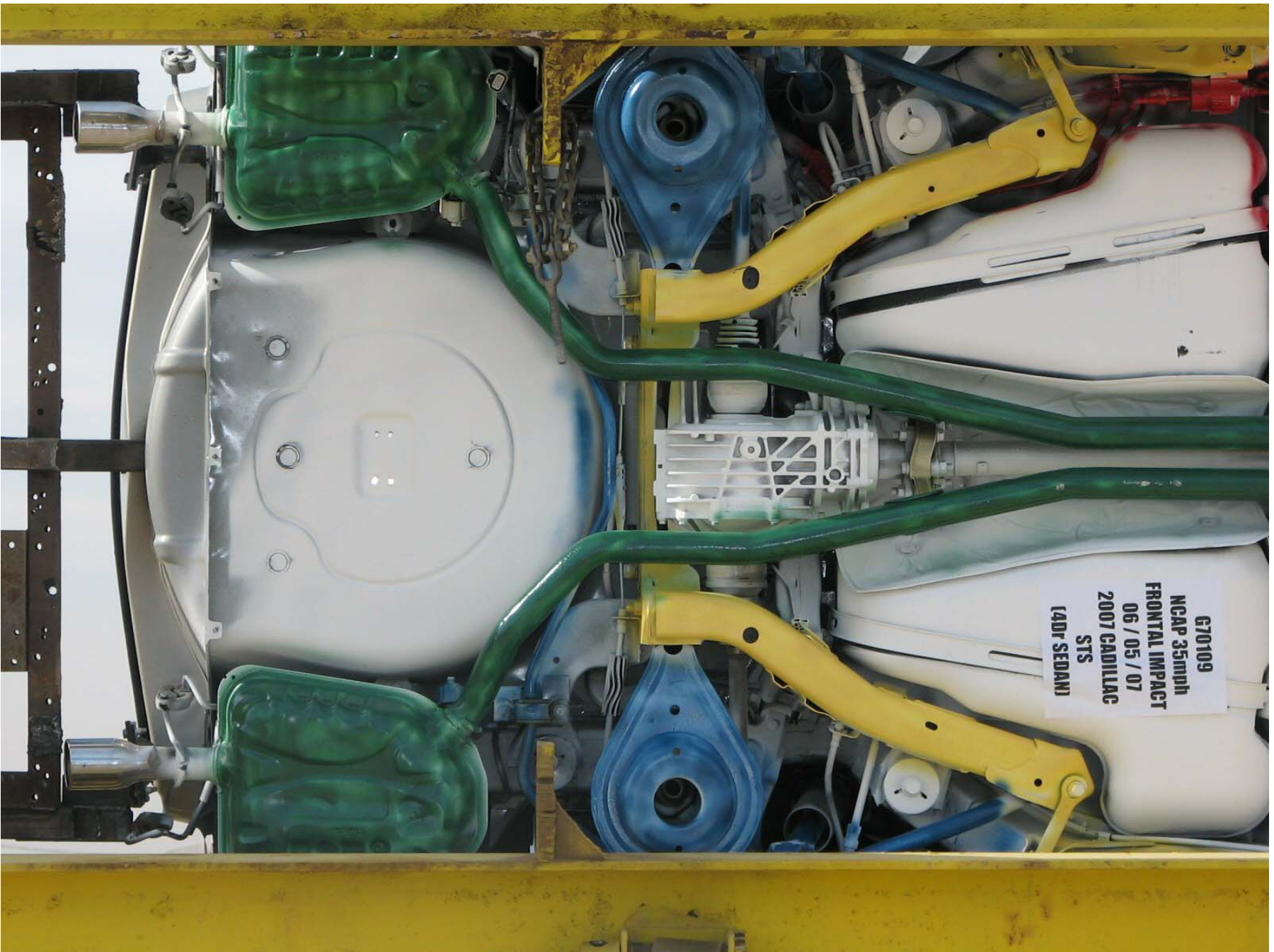


Figure A-27: Post-Test Mid Underbody



Figure A-28: Pre-Test Rear Underbody



G70109
NCAP 35mph
FRONTAL IMPACT
06 / 05 / 07
2007 CADILLAC
STS
(4DR SEDAN)

Figure A-29: Post-Test Rear Underbody



Figure A-30: Pre-Test Driver Dummy Front View (Head Position)



Figure A-31: Post-Test Driver Dummy Front View (Head Position)



Figure A-32: Pre-Test Driver Dummy (Through Window)



Figure A-33: Post-Test Driver Dummy (Through Window)



Figure A-34: Pre-Test Driver Dummy (Door Open)



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



Figure A-36: Pre-Test Driver Dummy Feet



Figure A-37: Post-Test Driver Dummy Feet



Figure A-38: Pre-Test Driver Side Knee Bolster



Figure A-39: Post-Test Driver Side Knee Bolster



Figure A-40: Pre-Test Driver Side Floor Pan



Figure A-41: Post-Test Driver Side Floor Pan



Figure A-42: Post-Test Driver Dummy Head



Figure A-43: Post-Test Driver Dummy Airbag Contact



Figure A-44: Pre-Test Passenger Dummy Front View (Head Position)



Figure A-45: Post-Test Passenger Dummy Front View (Head Position)



Figure A-46: Pre-Test Passenger Dummy (Through Window)



Figure A-47: Post-Test Passenger Dummy (Through Window)



Figure A-48: Pre-Test Passenger Dummy (Door Open)



Figure A-49: Post-Test Passenger Dummy (Door Open)



Figure A-50: Pre-Test Passenger Dummy Feet



Figure A-51: Post-Test Passenger Dummy Feet



Figure A-52: Pre-Test Passenger Side Glove Box



Figure A-53: Post-Test Passenger Side Glove Box



Figure A-54: Pre-Test Passenger Side Floor Pan

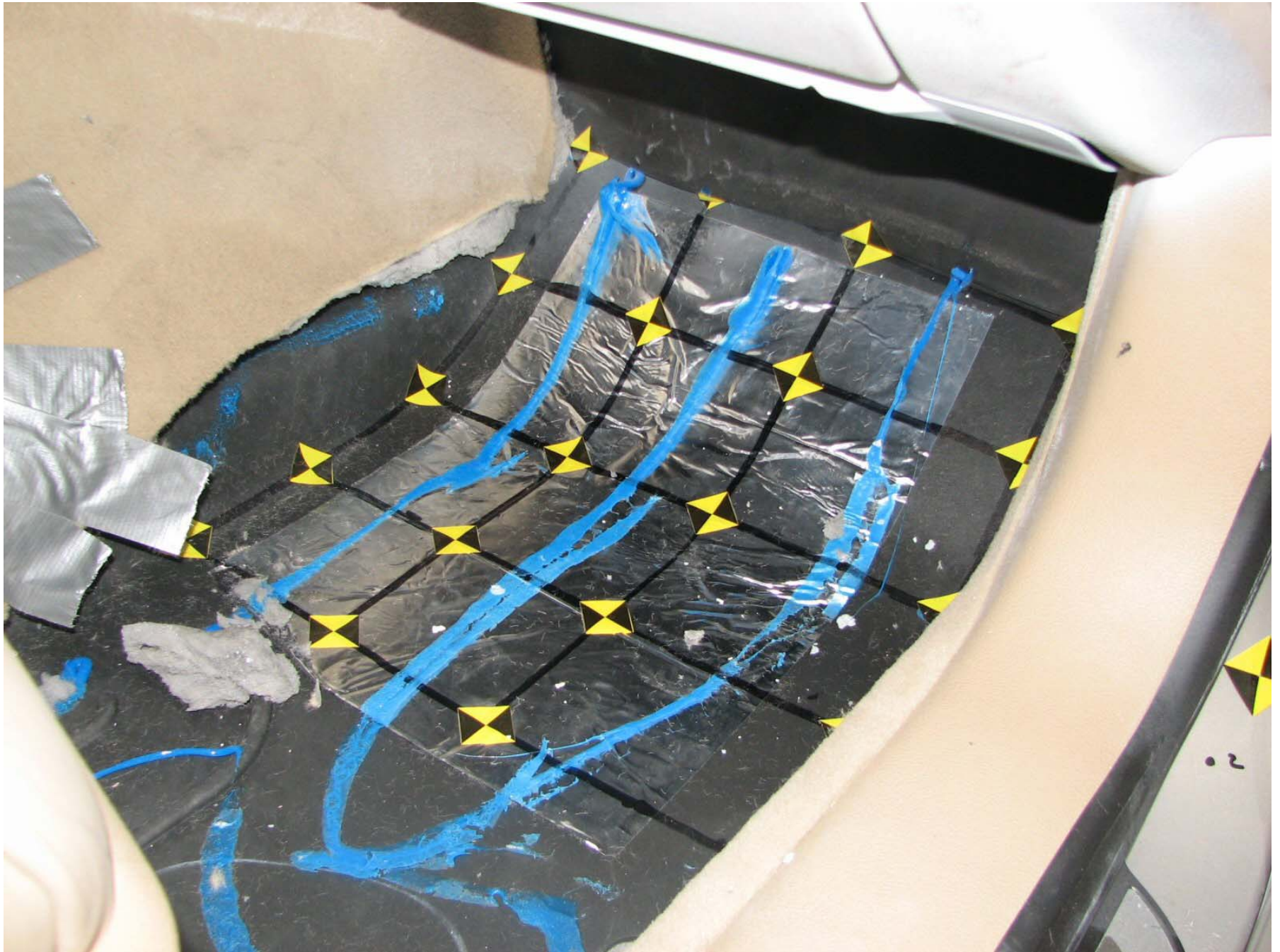


Figure A-55: Post-Test Passenger Side Floor Pan



Figure A-56: Post-Test Passenger Dummy Head



Figure A-57: Post-Test Passenger Dummy Airbag Contact



Figure A-58: Vehicle on Rollover Device (0°)



Figure A-59: Vehicle on Rollover Device (90°)



Figure A-60: Vehicle on Rollover Device (180°)

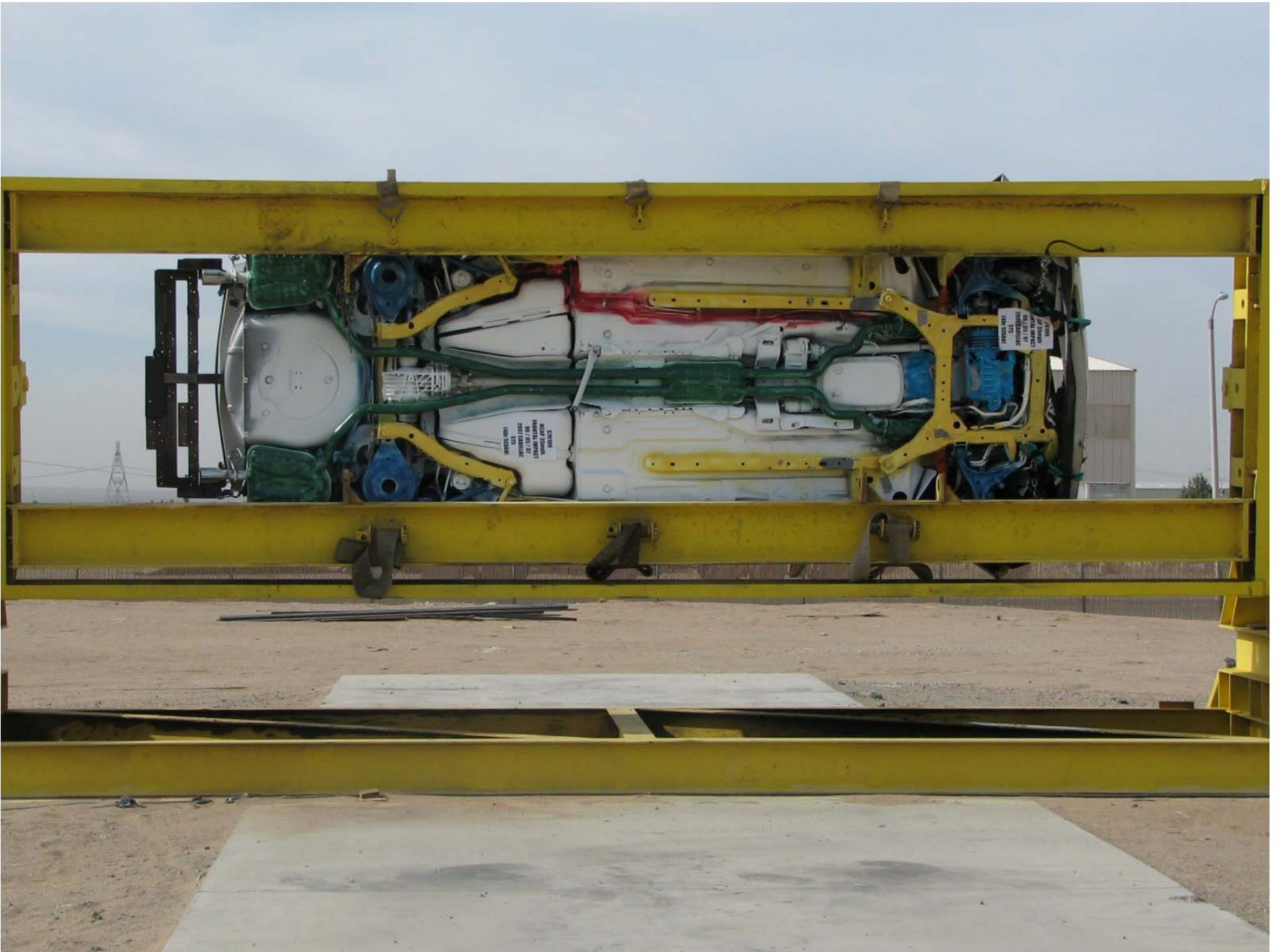


Figure A-61: Vehicle on Rollover Device (270°)



Figure A-62: Vehicle Impact

APPENDIX B
DATA PLOTS

LIST OF DATA PLOTS

Data Plot		Page
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	Driver Head Primary Y	B-1
	Driver Head Primary Z	B-1
	Driver Head Resultant Primary	B-1
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	Driver Chest Primary Y	B-2
	Driver Chest Primary Z	B-2
	Driver Chest Resultant Primary	B-2
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LIST OF DATA PLOTS...(CONTINUED)

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.

- Driver Head Primary X Velocity
- Driver Head Primary X Displacement
- Driver Head Redundant X
- Driver Head Redundant Y
- Driver Head Redundant Z
- Driver Head Resultant Redundant
- Driver Head Redundant X Velocity
- Driver Head Redundant X Displacement
- 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 Chest Primary X Velocity
- Driver Chest Primary X Displacement
- Driver Chest Redundant X
- Driver Chest Redundant Y
- Driver Chest Redundant Z
- Driver Chest Resultant Redundant
- Driver Chest Redundant X Velocity
- Driver Chest Redundant X Displacement
- Driver Chest Displacement
- Driver Pelvis X
- Driver Pelvis Y
- Driver Pelvis Z
- Driver Pelvis Resultant
- Driver Pelvis X Velocity
- Driver Pelvis X Displacement
- Driver Left Upper Tibia Moment X
- Driver Left Upper Tibia Moment Y
- Driver Right Upper Tibia Moment X

LIST OF DATA PLOTS...(CONTINUED)

Driver Right Upper Tibia Moment Y
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Aft X
Driver Left Foot Aft Z
Driver Left Foot Fore Z
Driver Right Foot Aft X
Driver Right Foot Aft Z
Driver Right Foot Fore Z
Driver Lap Belt Force
Driver Shoulder Belt Force
Driver Shoulder Belt Pullout
Driver Shoulder Belt Elongation
Passenger Head Primary X Velocity
Passenger Head Primary X Displacement
Passenger Head Redundant X
Passenger Head Redundant Y
Passenger Head Redundant Z
Passenger Head Resultant Redundant
Passenger Head Redundant X Velocity
Passenger Head Redundant X Displacement
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 Chest Primary X Velocity
Passenger Chest Primary X Displacement
Passenger Chest Redundant X

LIST OF DATA PLOTS...(CONTINUED)

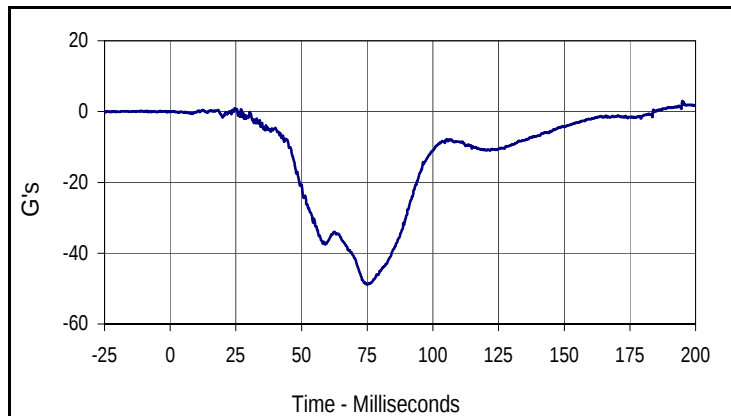
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Passenger Chest Redundant Z
Passenger Chest Resultant Redundant
Passenger Chest Redundant X Velocity
Passenger Chest Redundant X Displacement
Passenger Chest Displacement
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Pelvis Resultant
Passenger Pelvis X Velocity
Passenger Pelvis X Displacement
Passenger Left Femur Force
Passenger Right Femur Force
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Left Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Right Foot Fore Z
Passenger Lap Belt Force
Passenger Shoulder Belt Force
Passenger Shoulder Belt Pullout
Passenger Shoulder Belt Elongation
Vehicle Left Rear X
Vehicle Left Rear X Velocity

LIST OF DATA PLOTS...(CONTINUED)

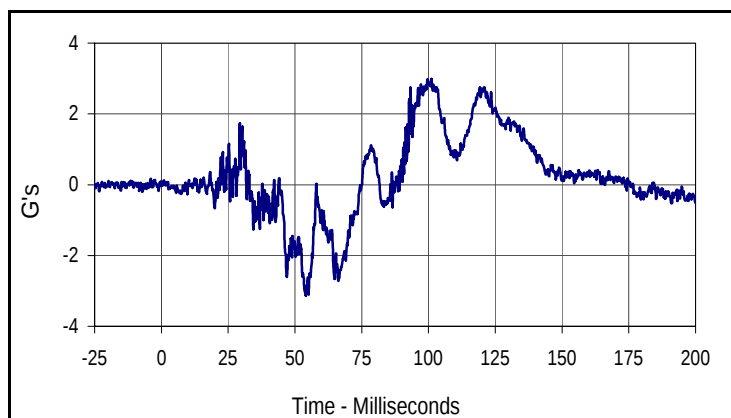
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Vehicle Right Rear X
Vehicle Right Rear X Velocity
Vehicle Right Rear X Displacement
Vehicle Engine Top
Vehicle Engine Top Velocity
Vehicle Engine Top Displacement
Vehicle Engine Bottom
Vehicle Engine Bottom Velocity
Vehicle Engine Bottom Displacement
Vehicle Left Brake Caliper
Vehicle Left Brake Caliper Velocity
Vehicle Left Brake Caliper Displacement
Vehicle Right Brake Caliper
Vehicle Right Brake Caliper Velocity
Vehicle Right Brake Caliper Displacement
Vehicle Instrument Panel
Vehicle Instrument Panel Velocity
Vehicle Instrument Panel Displacement
Vehicle Left Rear Z
Vehicle Left Rear Z Velocity
Vehicle Left Rear Z Displacement
Vehicle Right Rear Z
Vehicle Right Rear Z Velocity
Vehicle Right Rear Z Displacement

Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

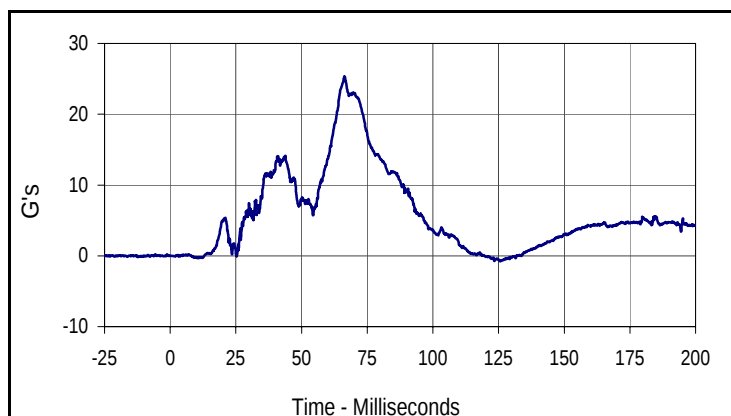
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 NHTSA No.: G70109



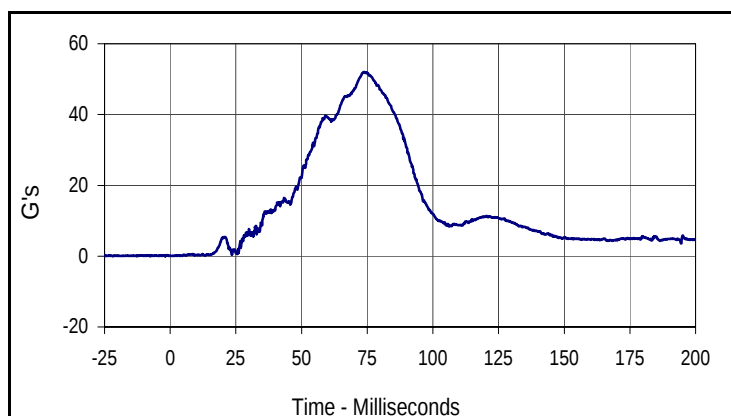
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CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
3.0	195.0	-48.9	75.0



Curve Description			
Driver Head Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.0	101.1	-3.1	54.1



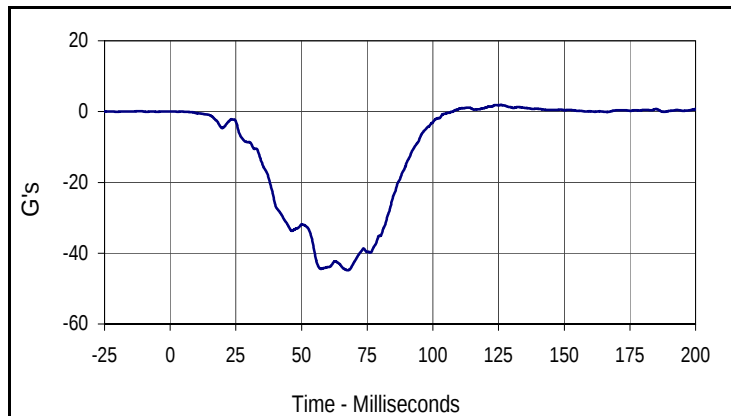
Curve Description			
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Max	Time	Min	Time
25.3	66.5	-0.8	125.6



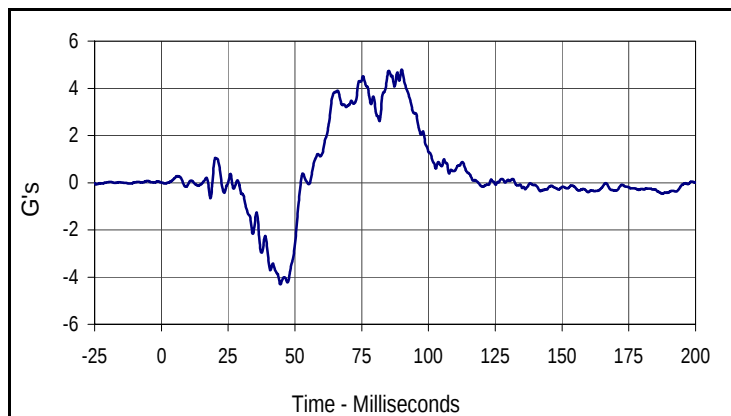
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Driver Head Resultant Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
52.0	73.8	0.0	0.4

Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

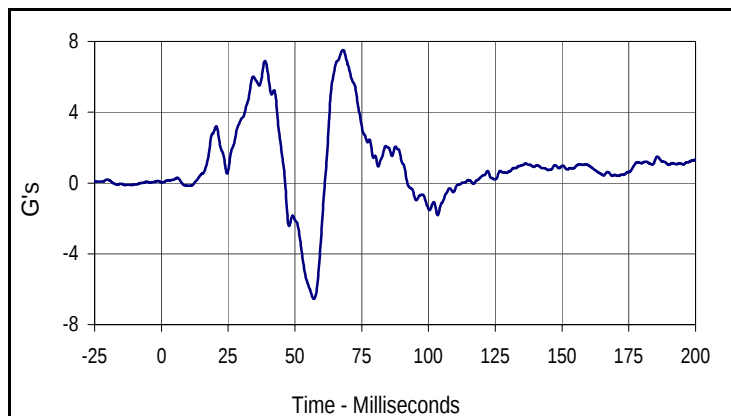
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 NHTSA No.: G70109



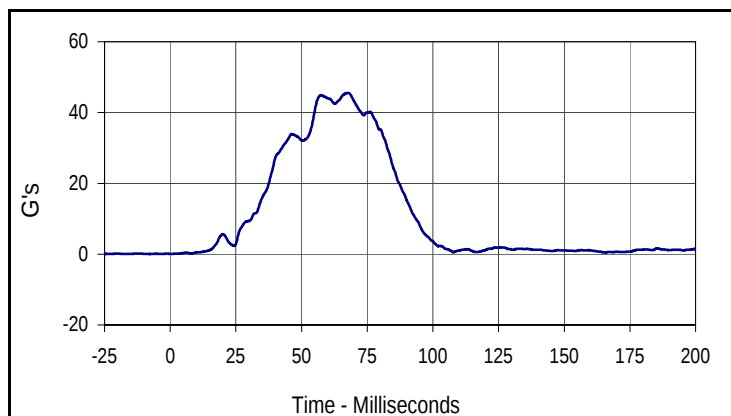
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1.9	125.8	-44.8	67.5



Curve Description			
Driver Chest Primary Y			
CURNO	Type	SAE Class	Units
005	FIL	180	G's
Max	Time	Min	Time
4.8	90.0	-4.3	44.6



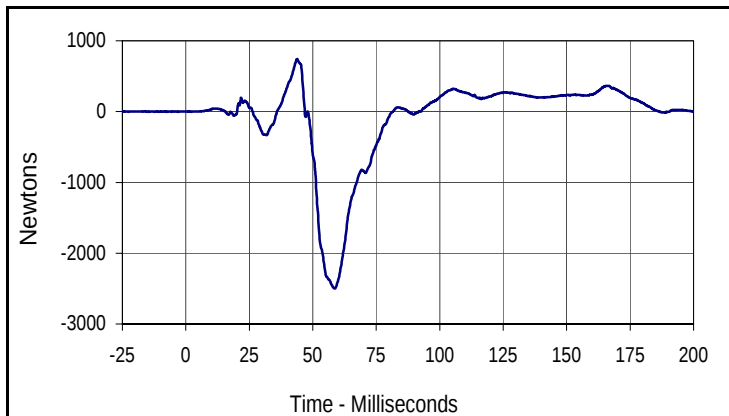
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Driver Chest Primary Z			
CURNO	Type	SAE Class	Units
006	FIL	180	G's
Max	Time	Min	Time
7.5	68.0	-6.5	57.0



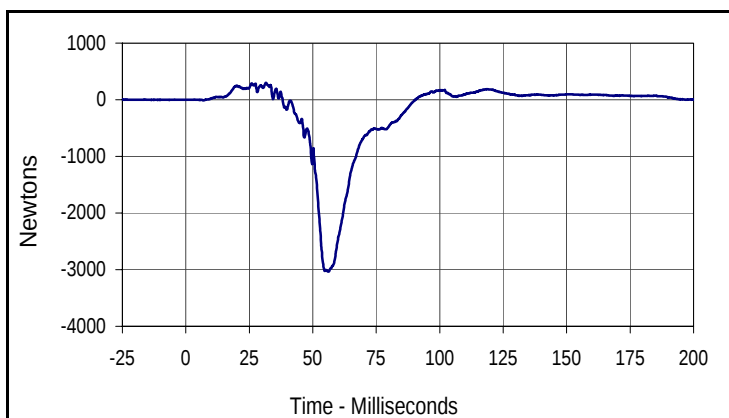
Curve Description			
Driver Chest Resultant Primary			
CURNO	Type	SAE Class	Units
004	RES	180	G's
Max	Time	Min	Time
45.6	67.6	0.1	0.0

Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07
 NHTSA No.: G70109



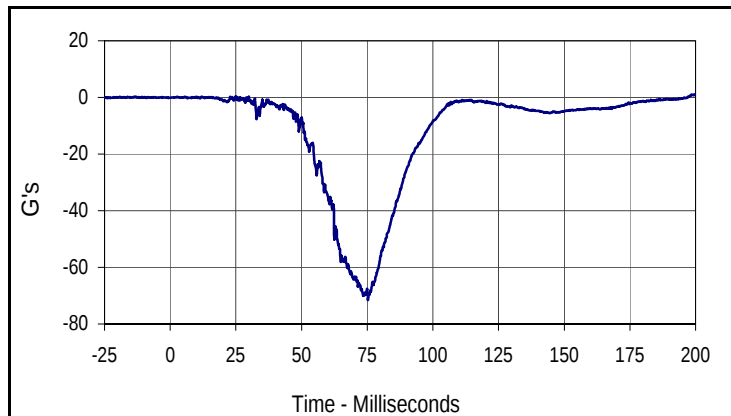
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Driver Left Femur Force Z			
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Max	Time	Min	Time
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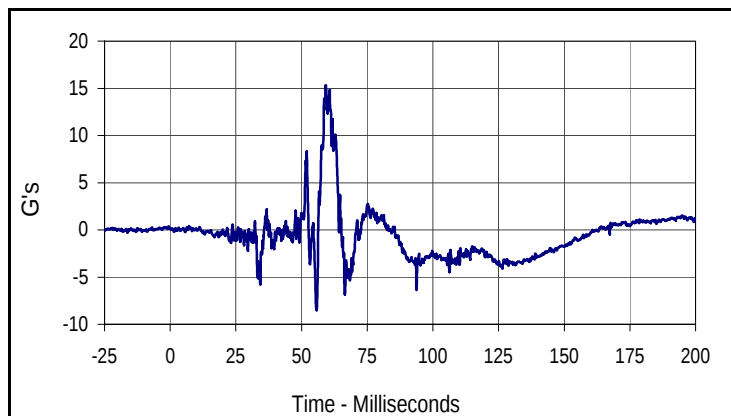
Curve Description			
Driver Right Femur Force Z			
CURNO	Type	SAE Class	Units
008	FIL	600	Newtons
Max	Time	Min	Time
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Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

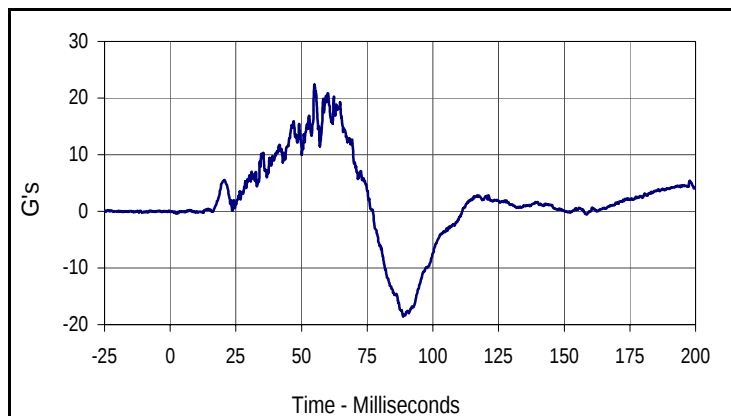
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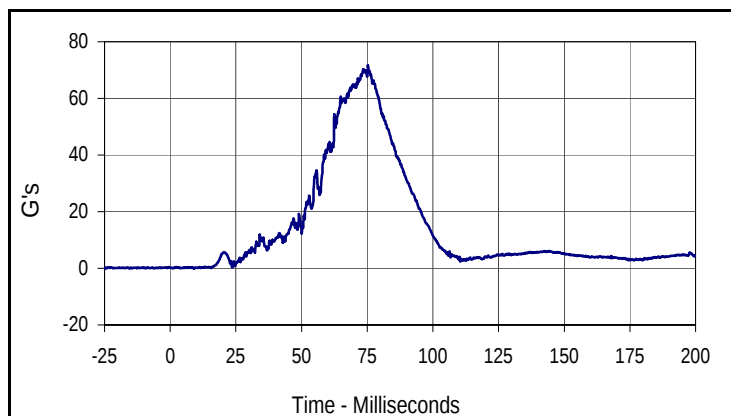
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Passenger Head Primary X			
CURNO	Type	SAE Class	Units
009	FIL	1000	G's
Max	Time	Min	Time
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Curve Description			
Passenger Head Primary Y			
CURNO	Type	SAE Class	Units
010	FIL	1000	G's
Max	Time	Min	Time
15.3	59.3	-8.5	55.8



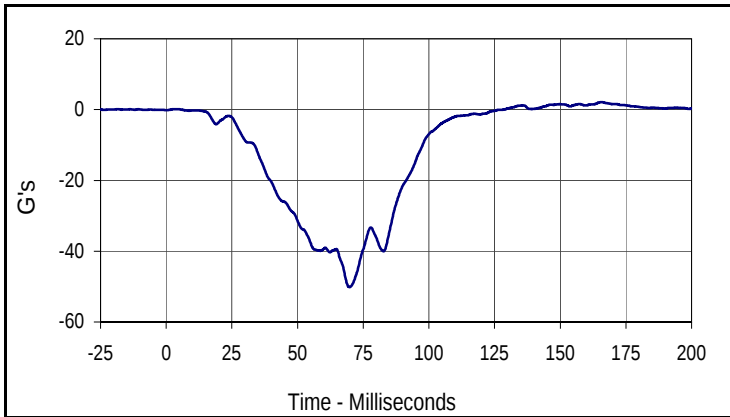
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Max	Time	Min	Time
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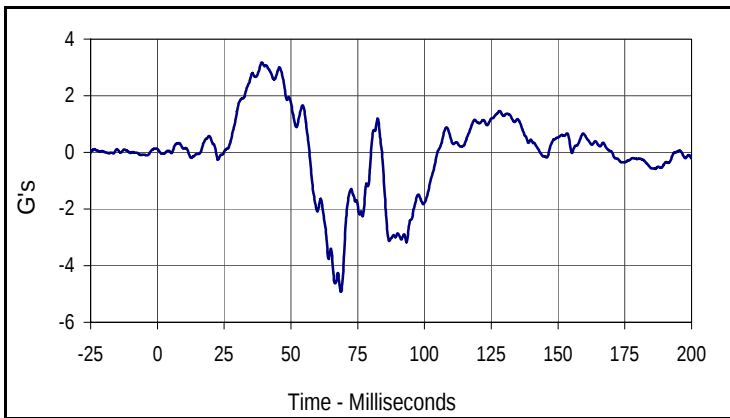
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Passenger Head Resultant Primary			
CURNO	Type	SAE Class	Units
009	RES	1000	G's
Max	Time	Min	Time
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Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

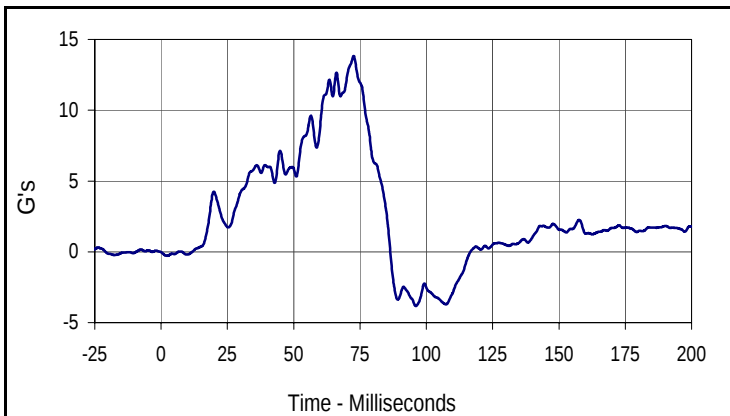
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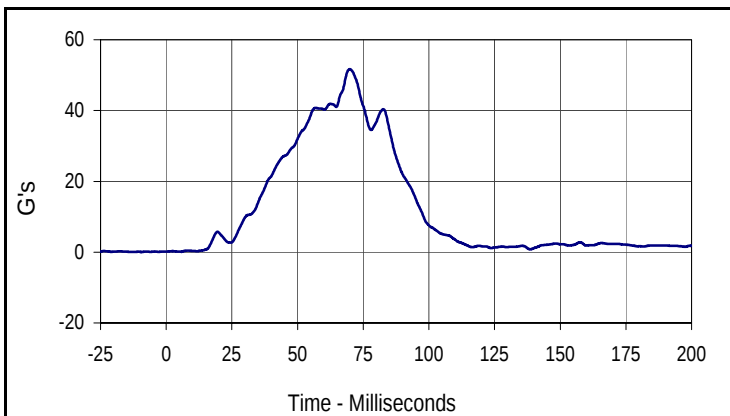
Curve Description			
Passenger Chest Primary X			
CURNO	Type	SAE Class	Units
012	FIL	180	G's
Max	Time	Min	Time
2.1	165.7	-50.2	69.8



Curve Description			
Passenger Chest Primary Y			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
3.2	39.1	-4.9	68.7



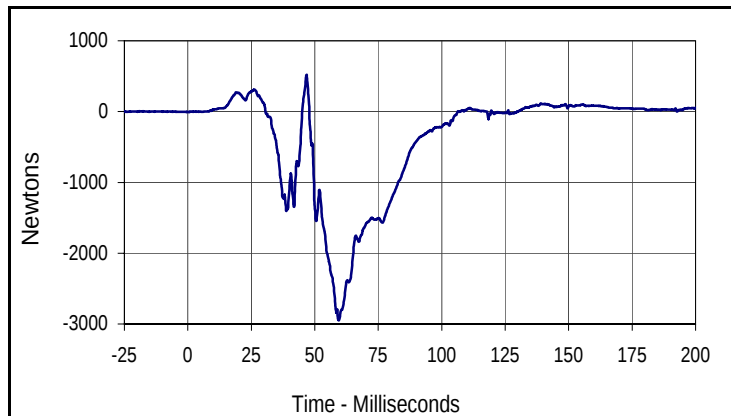
Curve Description			
Passenger Chest Primary Z			
CURNO	Type	SAE Class	Units
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13.8	72.6	-3.8	96.0



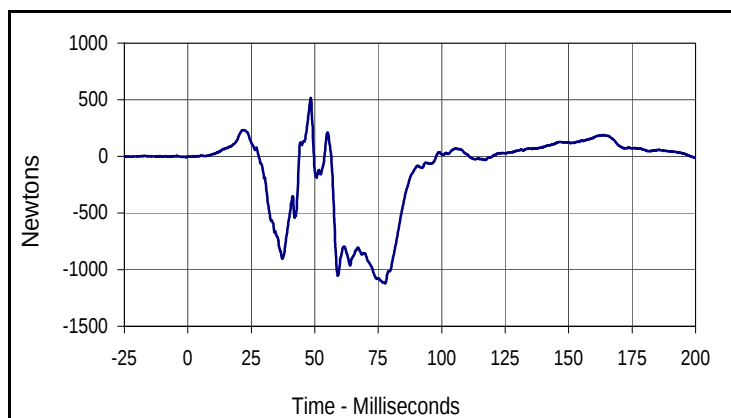
Curve Description			
Passenger Chest Resultant Primary			
CURNO	Type	SAE Class	Units
012	RES	180	G's
Max	Time	Min	Time
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Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07
 NHTSA No.: G70109



Curve Description			
Passenger Left Femur Force Z			
CURNO	Type	SAE Class	Units
015	FIL	600	Newtons
Max	Time	Min	Time
522.2	46.8	-2949.9	59.4



Curve Description			
Passenger Right Femur Force Z			
CURNO	Type	SAE Class	Units
016	FIL	600	Newtons
Max	Time	Min	Time
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APPENDIX C
DUMMY CALIBRATION DATA

Test Program: Hybrid III 50th Percentile Male Head Drop Test

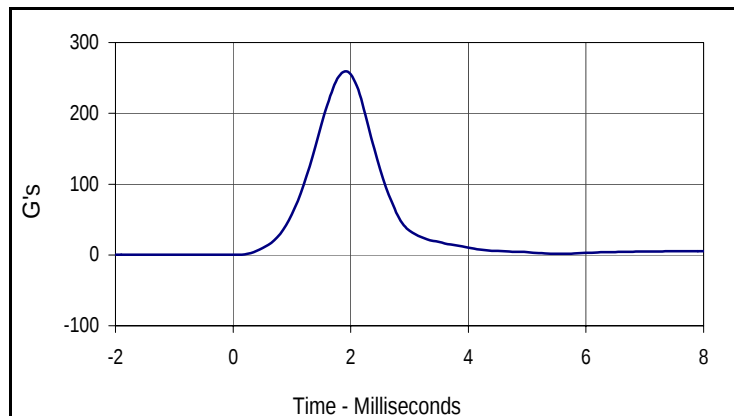
Test Date: 6/1/07

ATD Serial No.: 034

Test I.D.: HD06A



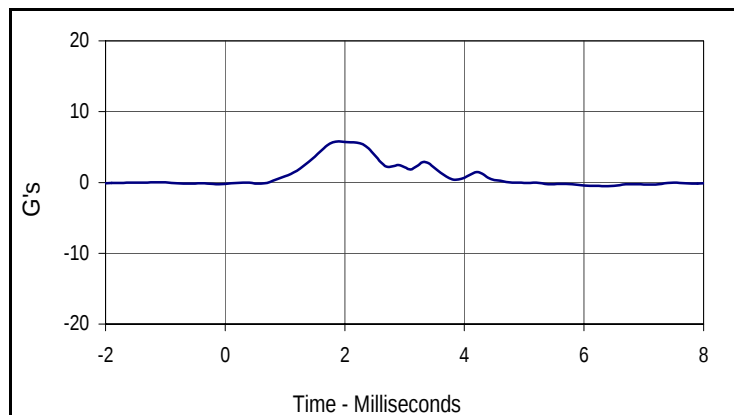
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	259.2	Pass
Peak Lateral Acceleration	G's	≤15.0	5.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results				Pass



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
259.2	1.9	0.1	-1.4



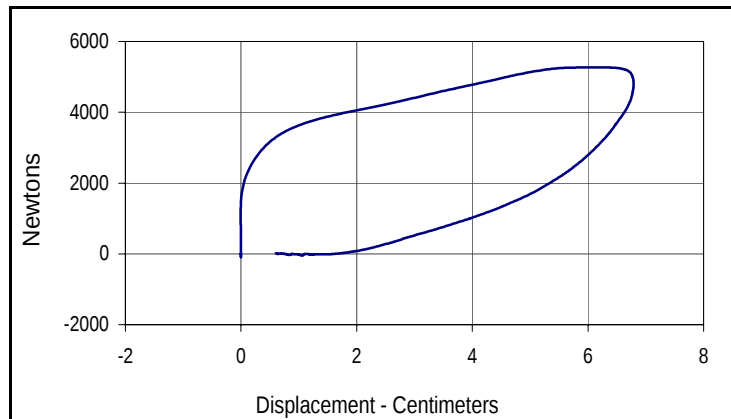
Curve Description

Head Y

CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.8	1.9	-0.4	6.0

Test Program: Hybrid III 50th Percentile Male Thorax Impact TestTest Date: 6/1/07ATD Serial No.: 034Test I.D.: CH06A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.63	Pass
Peak Probe Force	Newtons	5159 to 5893	5266	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.79	Pass
Internal Hysteresis	%	69 to 85	75.4	Pass
Overall Test Results				Pass



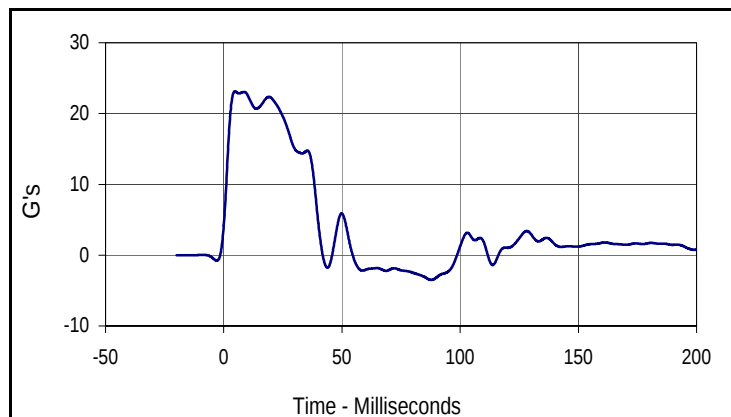
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	75.4
Peak Probe Force		Peak Chest Deflection	
5266		6.79	

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test
 ATD Serial No.: 034

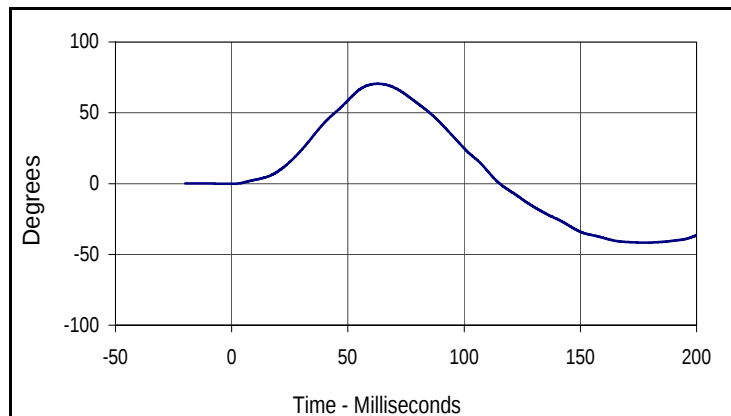
Test Date: 6/4/07
 Test I.D.: NF06A



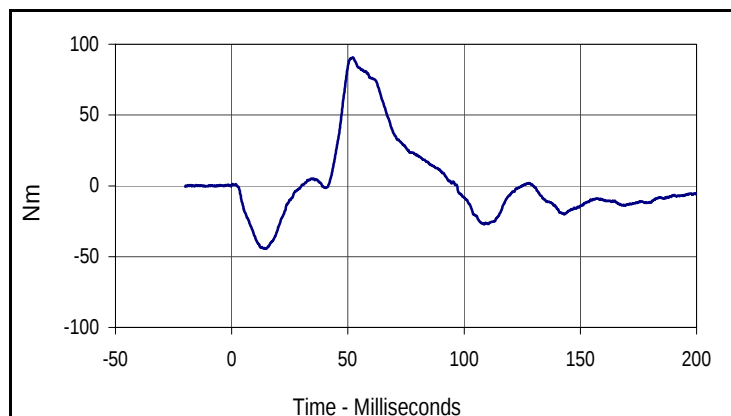
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.07	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.6	Pass
	20 Msec.	G's	17.6 to 22.6	22.2	Pass
	30 Msec.	G's	12.5 to 18.5	15.0	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	15.0	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	39.9	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	70.5	Pass
	Time	Msec.	57.0 to 64.0	62.7	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	115.4	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	90.7	Pass
	Time	Msec.	47.0 to 58.0	52.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	97.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
23.1	4.7	-3.5	87.8



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
70.5	62.7	-41.6	178.6



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
90.7	52.1	-44.4	14.7

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

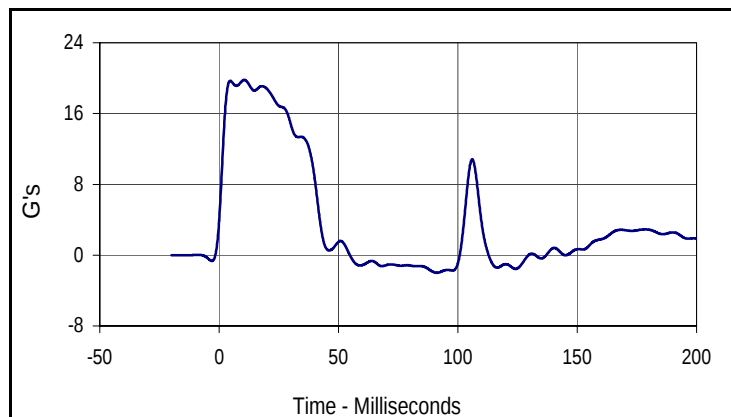
Test Date: 6/4/07

ATD Serial No.: 034

Test I.D.: NE06A



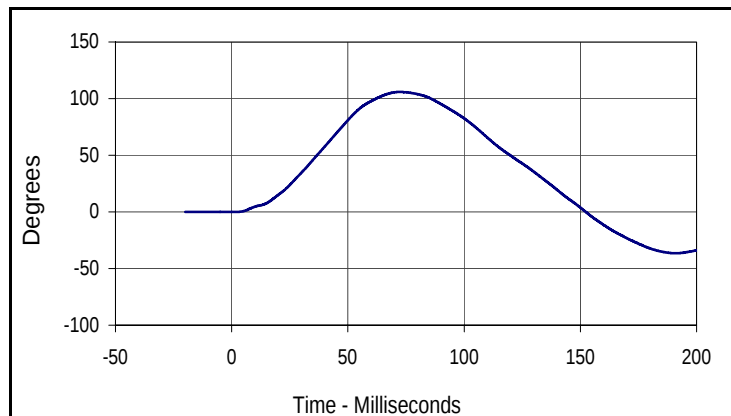
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.16	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	19.8	Pass
	20 Msec.	G's	14.0 to 19.0	18.8	Pass
	30 Msec.	G's	11.0 to 16.0	14.8	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	14.8	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	41.7	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	105.9	Pass
	Time	Msec.	72.0 to 82.0	72.3	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	152.4	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-78.7	Pass
	Time	Msec.	65.0 to 79.0	67.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	140.9	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

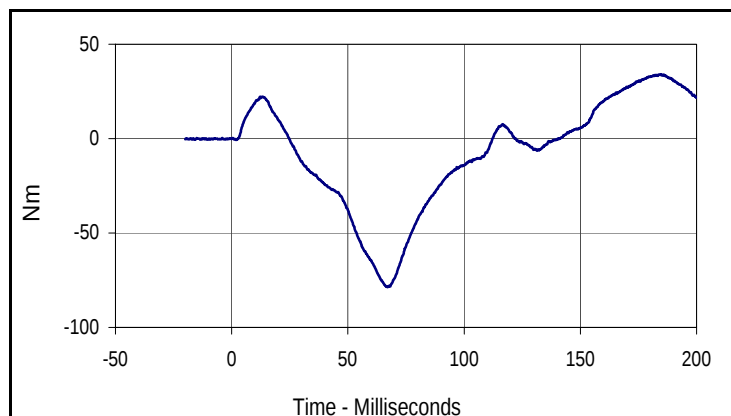
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
19.8	10.5	-2.0	91.2



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
105.9	72.3	-36.5	190.9



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
34.0	184.8	-78.7	67.0

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

Test Date: 6/4/07

ATD Serial No.: 034

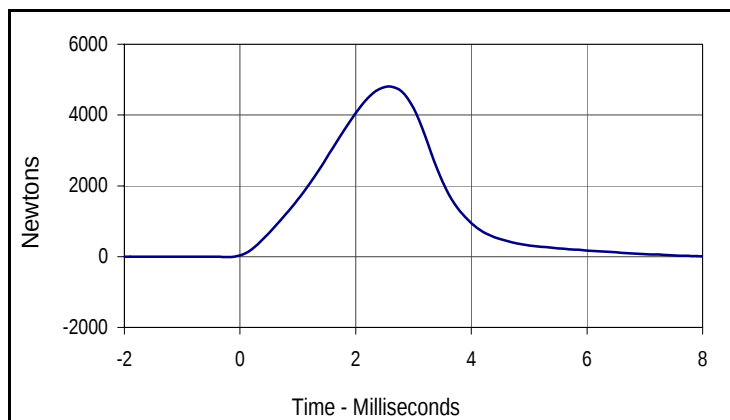
Test I.D.: LK06A , RK06A

**Left Knee**

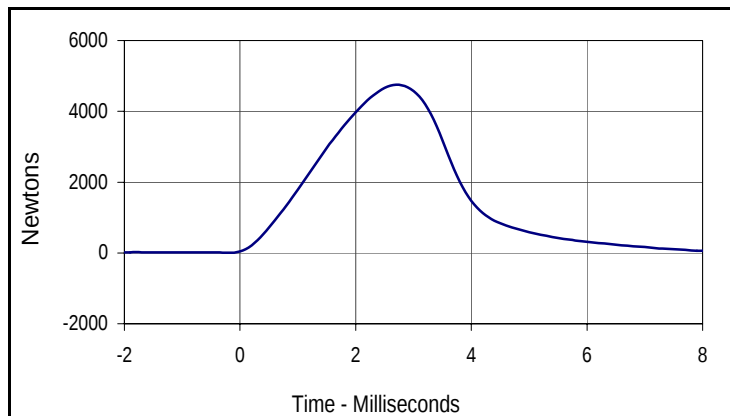
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	4804	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.08	Pass
Peak Probe Force	Newtons	4715 to 5782	4749	Pass
Overall Test Results				Pass

**Curve Description****Left Knee Probe Force**

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4803.5	2.6	-12.8	-0.2

**Curve Description****Right Knee Probe Force**

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
4748.6	2.7	-2.3	9.7

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 6/1/07

ATD Serial No.: 034

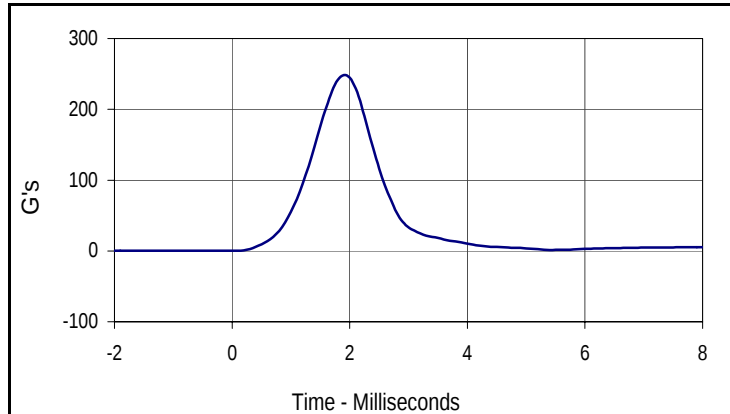
Test I.D.: N/A



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	879 to 889	880	Pass
B - Shoulder pivot height	mm	505 to 521	509	Pass
C - "H" point height	mm	84 to 89	86	Pass
D - "H" point from seat back	mm	135 to 140	138	Pass
E - Shoulder pivot from back	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	145	Pass
G - Elbow back to wrist pivot	mm	290 to 305	299	Pass
H - Skull cap to back line	mm	41 to 46	44	Pass
I - Shoulder to elbow length	mm	330 to 345	335	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	600	Pass
L - Popliteal length	mm	429 to 455	450	Pass
M - Knee pivot height	mm	485 to 500	490	Pass
N - Buttock popliteal length	mm	452 to 477	465	Pass
O - Chest depth	mm	213 to 229	227	Pass
P - Foot length	mm	251 to 267	256	Pass
V - Shoulder breadth	mm	422 to 437	434	Pass
W - Foot breadth	mm	91 to 107	101	Pass
Y - Chest circumference	mm	970 to 1001	987	Pass
Z - Waist circumference	mm	836 to 866	850	Pass
AA - Location for chest circumference	mm	429 to 434	430	Pass
BB - Location for waist circumference	mm	226 to 231	230	Pass
Overall Test Results				Pass

Test Program: Hybrid III 50th Percentile Male Head Drop TestTest Date: 6/1/07ATD Serial No.: 035Test I.D.: HD06B

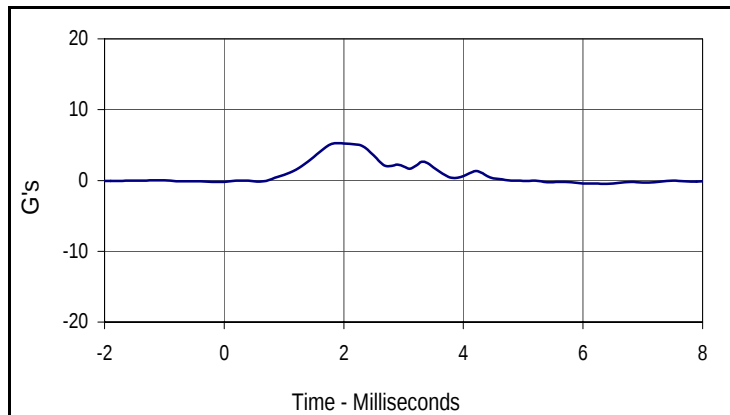
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	248.7	Pass
Peak Lateral Acceleration	G's	≤15.0	5.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Overall Test Results			Pass	



Curve Description

Head Resultant

CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
248.7	1.9	0.1	-1.4



Curve Description

Head Y

CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.3	1.9	-0.4	6.0

Test Program: Hybrid III 50th Percentile Male Thorax Impact Test

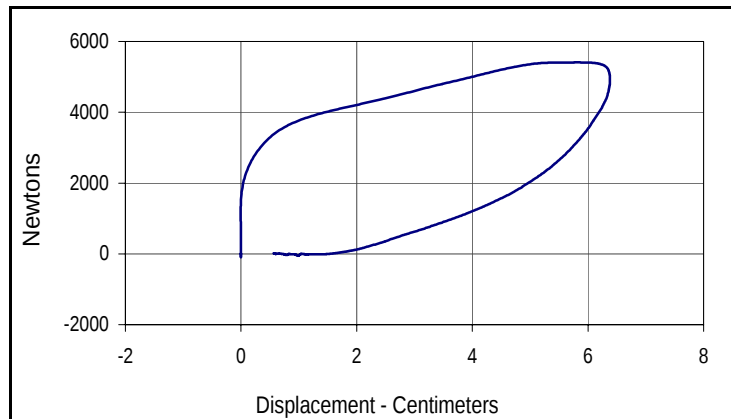
Test Date: 6/1/07

ATD Serial No.: 035

Test I.D.: CH06B



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.67	Pass
Peak Probe Force	Newtons	5159 to 5893	5408	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.38	Pass
Internal Hysteresis	%	69 to 85	75.4	Pass
Overall Test Results			Pass	



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysteresis
001	FIL	180	75.4
Peak Probe Force		Peak Chest Deflection	
5408		6.38	

Test Program: Hybrid III 50th Percentile Male Neck Flexion Test

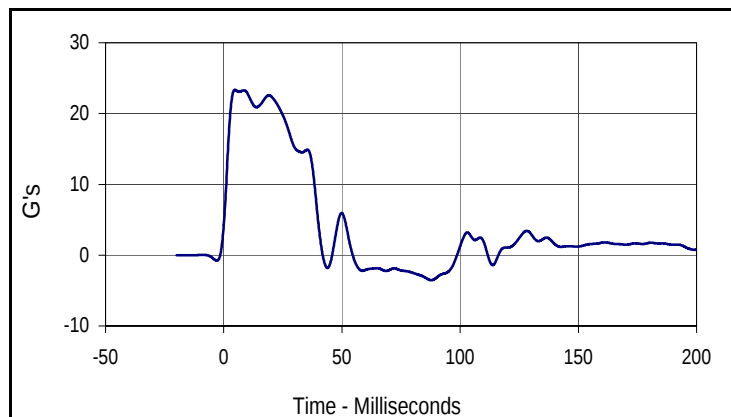
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ATD Serial No.: 035

Test I.D.: NF06B



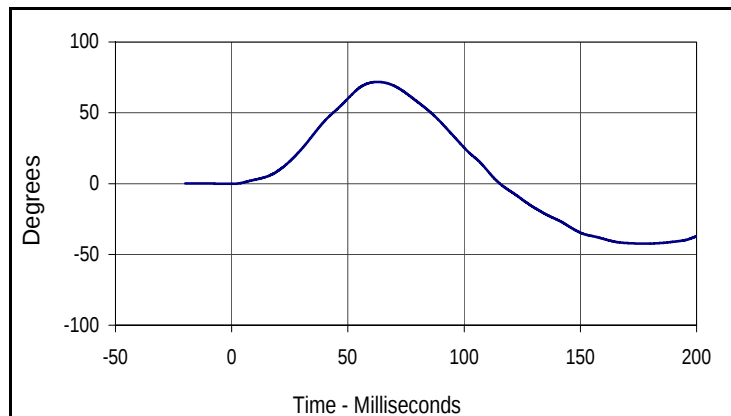
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.08	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.9	Pass
	20 Msec.	G's	17.6 to 22.6	22.5	Pass
	30 Msec.	G's	12.5 to 18.5	15.2	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	15.2	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	39.9	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	71.9	Pass
	Time	Msec.	57.0 to 64.0	62.7	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	115.4	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	97.0	Pass
	Time	Msec.	47.0 to 58.0	52.1	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	97.0	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

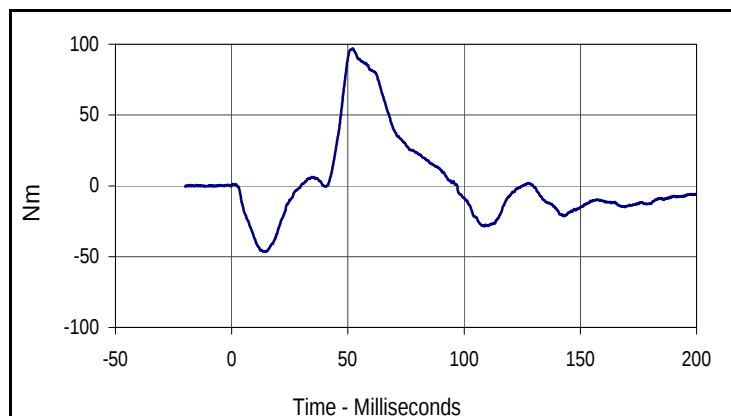
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
23.3	4.7	-3.5	87.8



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
71.9	62.7	-42.4	178.6



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
97.0	52.1	-46.6	14.7

Test Program: Hybrid III 50th Percentile Male Neck Extension Test

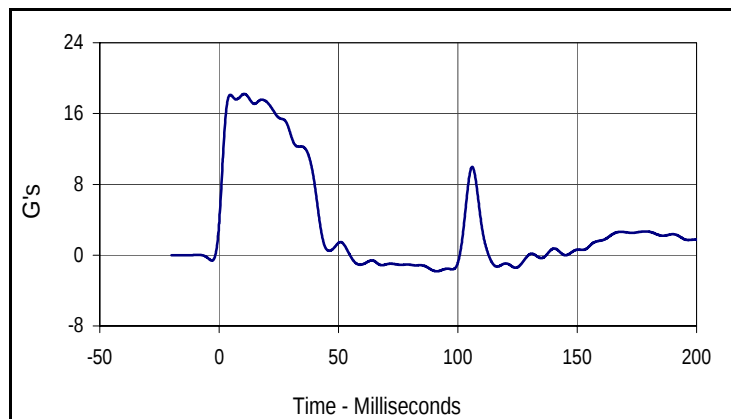
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ATD Serial No.: 035

Test I.D.: NE06B



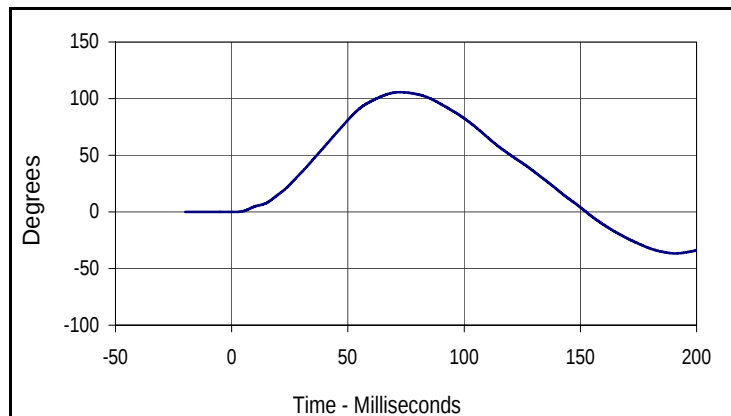
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.03	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.2	Pass
	20 Msec.	G's	14.0 to 19.0	17.3	Pass
	30 Msec.	G's	11.0 to 16.0	13.6	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	13.6	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	41.5	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	105.7	Pass
	Time	Msec.	72.0 to 82.0	72.4	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	152.5	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-78.7	Pass
	Time	Msec.	65.0 to 79.0	67.0	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	140.9	Pass
Overall Test Results					Pass



Curve Description

Pendulum Deceleration

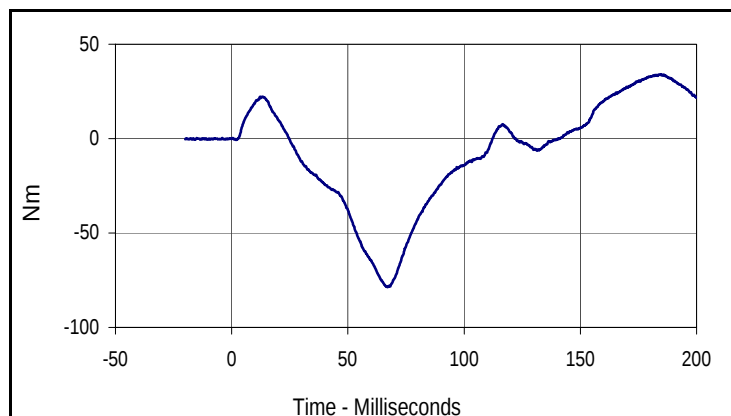
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
18.2	10.5	-1.8	91.2



Curve Description

"D" Plane Rotation

CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
105.7	72.4	-36.6	190.9



Curve Description

Moment About Occipital Condyle

CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
34.0	184.8	-78.7	67.0

Test Program: Hybrid III 50th Percentile Male Knee Impact Test

Test Date: 6/4/07

ATD Serial No.: 035

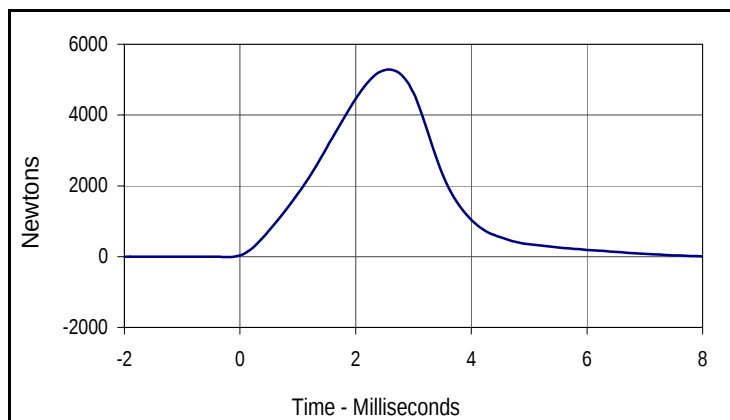
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**Left Knee**

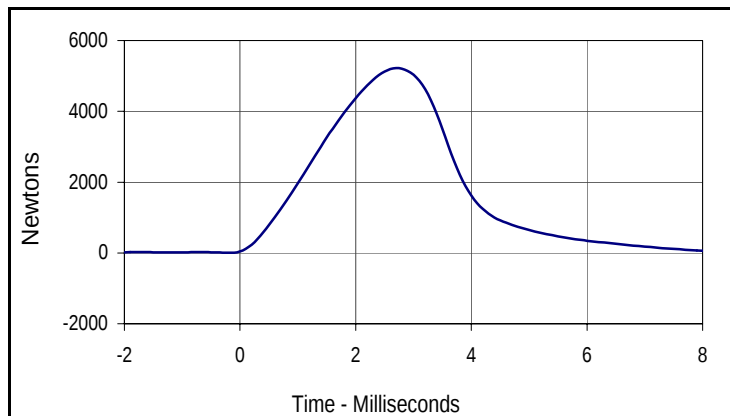
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.12	Pass
Peak Probe Force	Newtons	4715 to 5782	5284	Pass
Overall Test Results				Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5223	Pass
Overall Test Results				Pass

**Curve Description****Left Knee Probe Force**

CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5284.0	2.6	-14.2	-0.2

**Curve Description****Right Knee Probe Force**

CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5223.3	2.7	-2.6	9.8

Test Program: Hybrid III 50th Percentile Male External Measurements

Test Date: 6/1/07

ATD Serial No.: 035

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	879 to 889	882	Pass
B - Shoulder pivot height	mm	505 to 521	510	Pass
C - "H" point height	mm	84 to 89	86	Pass
D - "H" point from seat back	mm	135 to 140	137	Pass
E - Shoulder pivot from back	mm	84 to 94	88	Pass
F - Thigh clearance	mm	140 to 155	147	Pass
G - Elbow back to wrist pivot	mm	290 to 305	298	Pass
H - Skull cap to back line	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	336	Pass
J - Elbow rest height	mm	190 to 211	208	Pass
K - Buttock to knee length	mm	579 to 604	602	Pass
L - Popliteal length	mm	429 to 455	450	Pass
M - Knee pivot height	mm	485 to 500	492	Pass
N - Buttock popliteal length	mm	452 to 477	462	Pass
O - Chest depth	mm	213 to 229	225	Pass
P - Foot length	mm	251 to 267	253	Pass
V - Shoulder breadth	mm	422 to 437	430	Pass
W - Foot breadth	mm	91 to 107	102	Pass
Y - Chest circumference	mm	970 to 1001	982	Pass
Z - Waist circumference	mm	836 to 866	850	Pass
AA - Location for chest circumference	mm	429 to 434	432	Pass
BB - Location for waist circumference	mm	226 to 231	228	Pass
Overall Test Results				Pass

Test Program: Dummy Damage Checklist
 ATD Serial No.: 034

Test Date: 6/4/07
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

Test Program: Dummy Damage Checklist
 ATD Serial No.: 035

Test Date: 6/4/07
 Test I.D.: N/A



GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for looseness at the condyle joint		X
Nodding blocks- cracked or out of position		X
Ribs- Check all ribs and rib supports for damage (bent or broken)		X
Check damping material or separation or cracks		X
OTHER		
CHEST DISPLACEMENT ASSEMBLY		
Bent shaft		X
Slider arm riding correctly, in track		X
TRANSDUCER LEADS		
Torn cables		X
ACCELEROMETER MOUNTINGS		
Check for secure mounting		X
KNEES		
Check outer skin, insert and casting (without removing insert)		X
Knee sliders - Wires intact		X
Knee sliders- Rubber returned to "at rest position"		X
LIMBS		
Check for normal movement and adjustment		X
PELVIS		
Inspect for breakage, especially at iliac crest		X

Comments on repair or replacement parts:

APPENDIX D
CHILD RESTRAINT SYSTEM

REPORT NUMBER TR-P27130-01-NC

**NEW CAR ASSESSMENT PROGRAM
FRONTAL BARRIER IMPACT TEST**

**GENERAL MOTORS CORPORATION
2007 CADILLAC STS
4-DOOR SEDAN**

NHTSA NUMBER: G70109

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



JUNE 5, 2007

FINAL REPORT

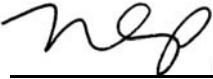
**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
1200 NEW JERSEY AVE, SE, ROOM W43-410
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-06-D-00027.

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Date: June 5, 2007

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Date: June 5, 2007

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Date: June 5, 2007

FINAL REPORT ACCEPTED BY:

Manager, New Car Assessment Program

Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

Technical Report Documentation Page

1. Report No. TR-P27130-01-NC		2. Government Accession No.		3. Recipients Catalog No.	
4. Title and Subtitle Final Report of one (1) Safety 1st CRS Final Report of one (1) Graco Snugride CRS NHTSA NO. G70109				5. Report Date 6/5/2007	
				6. Performing Organization Code KAR	
7. Authors Mr. Johnny H. Dutto, Project Engineer, Karco Mr. Frank Richardson, Program Manager, Karco				8. Performing Organization Report No. TR-P27130-01-NC	
9. Performing Organization Name and Address Karco Engineering, LLC 9270 Holly Rd. Adelanto, CA, 92301				10. Work Unit No.	
				11. Contract or Grant No. DTNH22-06-D-00027	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Rulemaking Office of Crashworthiness Standards Mail Code NVS-111 1200 New Jersey Ave, SE, Room W43-410 Washington, D.C 20590				13. Type of Report and Period Covered Final Test Report Base Year	
				14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS	
15. Supplementary Notes					
16. Abstract A frontal impact test was conducted on one (1) Safety 1st CRS and one (1) Graco Snugride CRS in conjunction with frontal barrier 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 5, 2007.					
Measurement Description		Units	Threshold	Left Rear (P4)	Right Rear (P3)
Head Injury Criteria (HIC15)		N/A	390	535.7	500.1
3 msec. Chest Clip		G's	50	54.4	58.2
17. Key Words New Car Assessment Program (Frontal NCAP) Frontal Barrier Impact Test Final Report of a Safety 1st CRS Final Report of a Graco Snugride CRS				18. Distribution of Statement 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) Unclassified		20. Security Classification (this page) Unclassified		21. No. of Pages 72	22. Price

Form DOT F1700.7 (8-72)

TR-P27130-01-NC

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SECTION D1

PURPOSE AND SUMMARY OF TEST G70109

The purpose of this test is to obtain CRS performance data during a 35 mph (56.3 km/h) frontal barrier impact NCAP test.

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

SUMMARY

Two 12-month old CRABI's (P3 & P4) were instrumented with head, chest, and six-axis upper neck load cells. A tri-axial accelerometer was installed on each CRS and each CRS base.

The left rear (Serial No. 017) and right rear (Serial No. 022) CRABI's were calibrated prior to this test. CRABI calibration information is found in Section D-4.

CHILD DUMMY VALUES		
Location	HIC15 Values	3 Msec. Chest Clip
CRABI (P3)	500.1	58.2
CRABI (P4)	535.7	54.4

DATA SHEET NO.1
CRASH TEST SUMMARY

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

CHILD RESTRAINT SYSTEM INFORMATION

Description	Position #3 CRS	Position #4 CRS
Manufacturer	Graco	Safety 1st
Model Name	Snugride	Starter
Serial No.	8645HEM3	22-325-VIN
Type	Infant	Infant
Forward/Rearward	Rearward	Rearward

VISIBLE DUMMY CONTACT POINTS

Description	Position #3 CRS	Position #4 CRS
Head Contact	Passenger Seatback	Driver Seatback
Chest Contact	None	None
Abdomen Contact	None	None
Left Knee Contact	None	None
Right Knee Contact	None	None
Left Toe Contact	Seatback	Seatback
Right Toe Contact	Seatback	Seatback

POST-TEST DOOR OPENINGS

Description	Position #3 CRS	Position #4 CRS
Right Rear Door	Remained closed and latched, opened w/o tools	Remained closed and latched, opened w/o tools

CAMERA COVERAGE

Description	Standard
High Speed	2
Real Time	0
Total	2

DATA CHANNELS

CRABI (P3 & P4) Sensors	26
Belt Sensors	4
CRS Sensors	12
Total	42

DATA SHEET NO.2**VEHICLE PARAMETER DATA**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	505	415	920	526	490	1016
Right	kg	498	406	904	526	492	1018
Ratio	%	55	45	100	52	48	100
Totals	kg	1003	821	1824	1052	982	2034

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1824
Weight of 2 P572 ATD's	kg	152
Rated Cargo/Luggage Wt. (RCLW)	kg	64
Calculated Vehicle Target Wt. (TVTW)	kg	2040

DATA SHEET NO.3

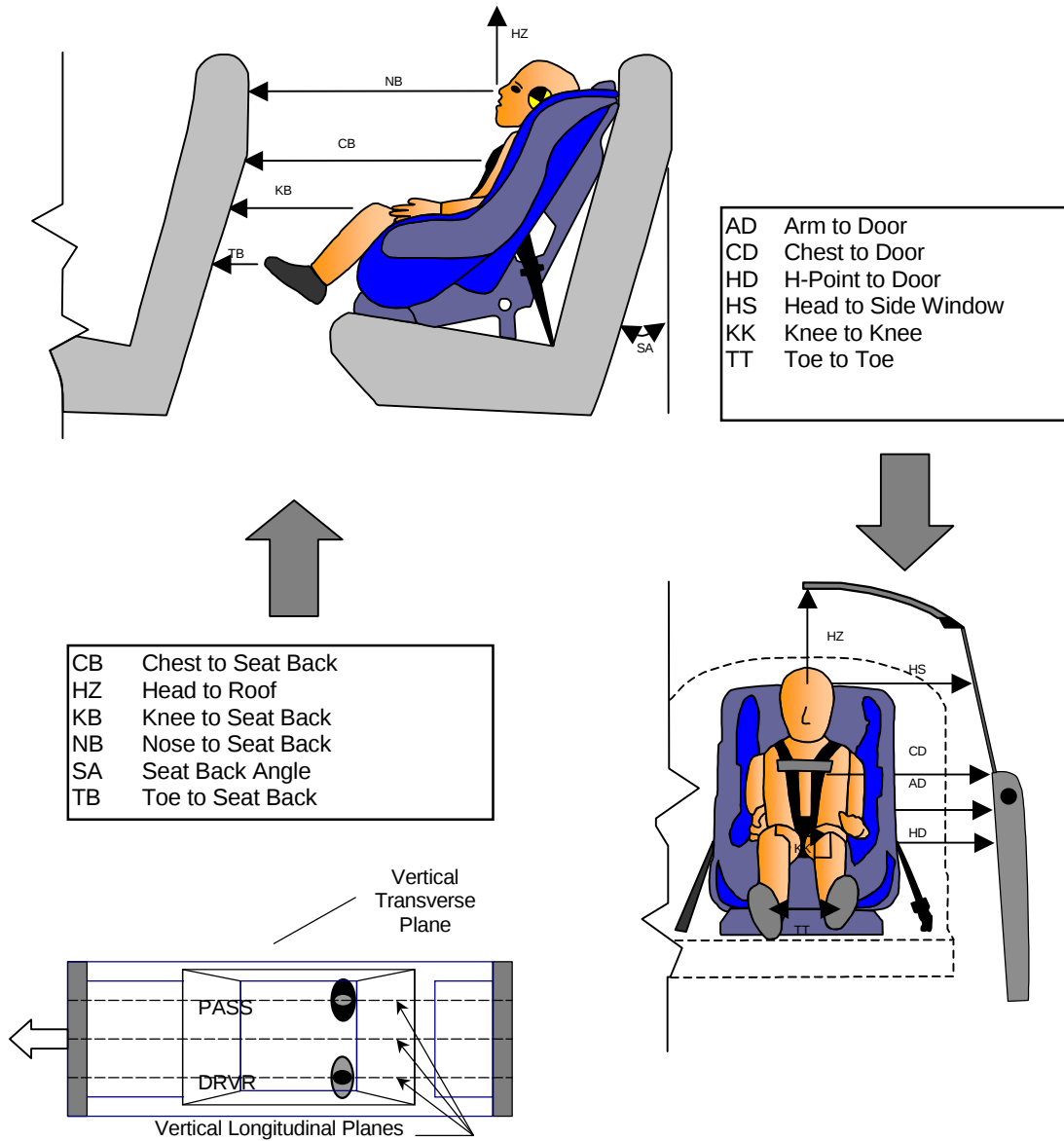
CRABI POSITIONING IN VEHICLE

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07



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.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

CRABI POSITION MEASUREMENTS

Code	Measurement	P3 (Passenger's Side)		P4 (Driver's Side)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
SA	Seat Back Angle		23.0		23.0
HZ	Head to Roof (Z)	410		400	
CD	Chest to Door	376		410	
KK	Knee to Knee (Y)	100		130	
HS	Head to Side Window	430		470	
HD	H-Point to Door (Y)	325		315	
AD	Arm to Door	310		305	
NB	Nose to Seat Back	548		551	
CB	Chest to Seat Back	480		460	
FF	Foot to Foot	20		100	
KB-Left	Knee to Seat Back	215		200	
KB-Right	Knee to Seat Back	220		200	
TB-Left	Toe to Seat Back	95		55	
TB-Right	Toe to Seat Back	95		60	

DATA SHEET NO.4**CRS PERFORMANCE DATA**Test Vehicle: 2007 Cadillac STS 4-Door SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**CRS PERFORMANCE DATA**

Location	CRS (P4)		CRS (P3)	
	Damage	Post-Test	Damage	Post-Test
Upper Tether Strap				
Upper Tether Buckle				
Upper Tether Hook				
Veh. Upper Tether Anchor				
Lower Anchor Strap				
Lower Anchor Buckle				
Lower Anchor Hooks	No	None	No	None
Veh. Lower CRS Anchors	No	None	No	None
5-Point Harness Connections	No	None	No	None
Cracks on CRS	No	None	No	None
Fabric Tears on CRS	No	None	No	None
Vehicle Seat Structure	No	None	No	None
Vehicle Seat Fabric Tears	No	None	No	None

DATA SHEET NO. 5
CRS ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Cadillac STS 4-Door Sedan

NHTSA No.: G70109

Test Program: 2007 NHTSA 35mph NCAP

Test Date: 6/5/07

CRS ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	CRS (P4)	1651	-529	666
2	CRS Base (P4)	1679	-556	620
3	CRS (P3)	1692	624	750
4	CRS Base (P3)	1700	566	570

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 SedanNHTSA No.: G70109Test Program: 2007 NHTSA 35mph NCAPTest Date: 6/5/07**CAMERA LOCATIONS**

No.	Camera View	Location(mm)			Angle (Deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Driver Side Upper CRS View	-3260	668	-1348	-2		12	1000
2	Passenger Side Upper CRS View	-3260	-668	-1348	2		12	1000
3	Driver Side Lower CRS View	-2834	654	-514	-2		10	1000
4	Passenger Side Lower CRS View	-2834	-654	-1187	2		12	1000

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

SECTION D2

PHOTOGRAPHS

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MODEL **8645HEM3**

NAME **SNUGRIDE**

Manufactured in 030507 10

GRACO CHILDREN'S PRODUCTS, INC.

EXTON, PA 19341 1-888-224-6549

Made in U.S.A.

PB-25777

Figure D2-1: Position 3 CRS Label

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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)



Figure D2-18: Post-Test Position 3 Dummy Legs

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do not place it in the front seat of a vehicle that has a passenger side air bag. Death or serious injury can occur.

Manufactured in



MODEL #: 22 – 325 – VIN

MFG: L#8B562492 10/30/06

Dorel Juvenile Group, Inc,
2525 State Street, Columbus, IN 47201

Figure D2-19: Position 4 CRS Label

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Figure D2-20: Pre-Test Frontal View of Position 4 CRS



Figure D2-21: Post-Test Frontal View of Position 4 CRS



Figure D2-22: Pre-Test Rear View of Position 4 CRS



Figure D2-23: Post-Test Rear View of Position 4 CRS



Figure D2-24: Pre-Test Left Side View of Position 4 CRS



Figure D2-25: Post-Test Left Side View of Position 4 CRS



Figure D2-26: Pre-Test Right Side View of Position 4 CRS



Figure D2-27: Post-Test Right Side View of Position 4 CRS



Figure D2-28: Pre-Test Position 4 Front View (Head & Seat Belt Position)



Figure D2-29: Post-Test Position 4 Front View (Head & Seat Belt Position)



Figure D2-30: Pre-Test Position 4 Front View (Seat Belt Position)



Figure D2-31: Post-Test Position 4 Front View (Seat Belt Position)



Figure D2-32: Pre-Test Position 4 Left Side View



Figure D2-33: Post-Test Position 4 Left Side View



Figure D2-34: Pre-Test Position 4 Right Side View



Figure D2-35: Post-Test Position 4 Right Side View



Figure D2-36: Post-Test Position 4 Dummy Legs

SECTION D3

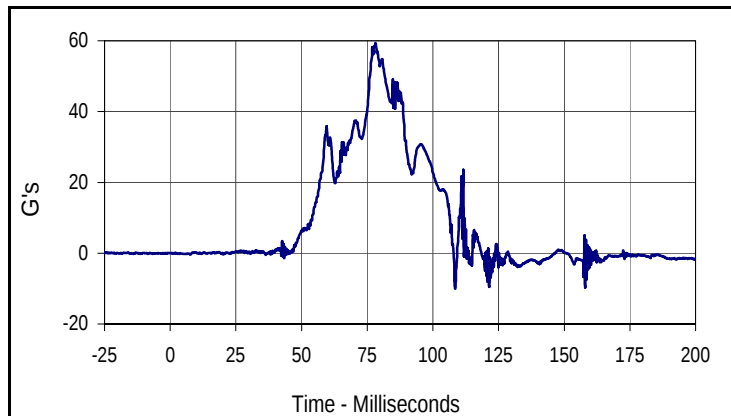
CRABI RESPONSE AND CRS DATA TRACES

LIST OF DATA PLOTS

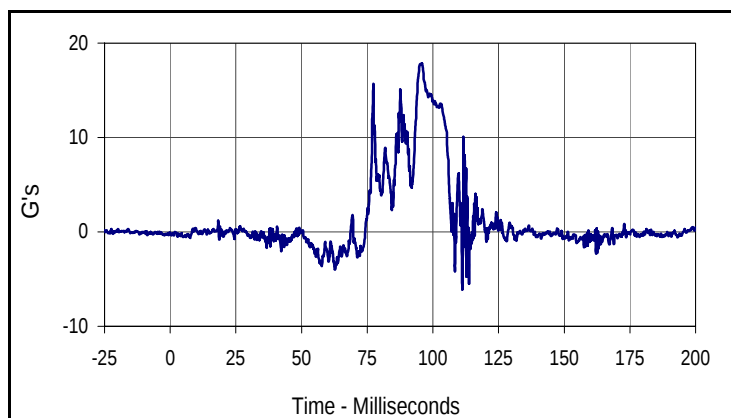
<u>Data Plot</u>		<u>Page</u>
D3-1	Right Rear CRABI (P3) Head X	D3-1
	Right Rear CRABI (P3) Head Y	D3-1
	Right Rear CRABI (P3) Head Z	D3-1
	Right Rear CRABI (P3) Head Resultant	D3-1
D3-2	Right Rear CRABI (P3) Chest X	D3-2
	Right Rear CRABI (P3) Chest Y	D3-2
	Right Rear CRABI (P3) Chest Z	D3-2
	Right Rear CRABI (P3) Chest Resultant	D3-2

Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

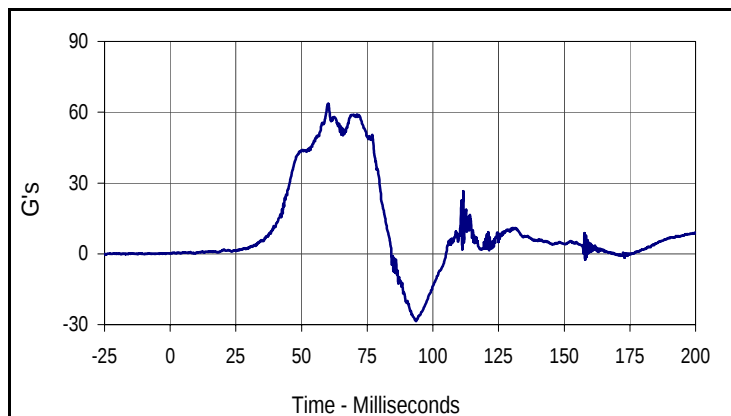
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 NHTSA No.: G70109



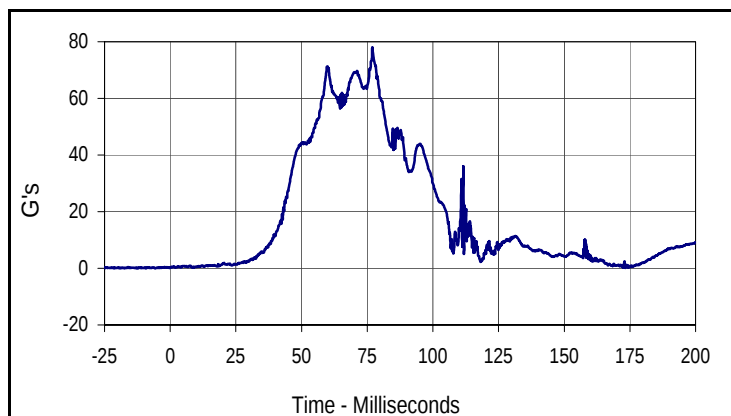
Curve Description			
CRABI Head X (P4)			
CURNO	Type	SAE Class	Units
142	FIL	1000	G's
Max	Time	Min	Time
59.4	78.2	-10.0	108.5



Curve Description			
CRABI Head Y (P4)			
CURNO	Type	SAE Class	Units
143	FIL	1000	G's
Max	Time	Min	Time
17.9	95.8	-6.1	111.2



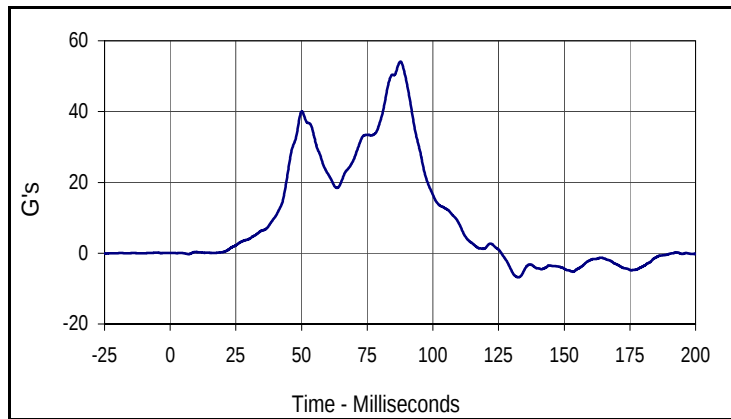
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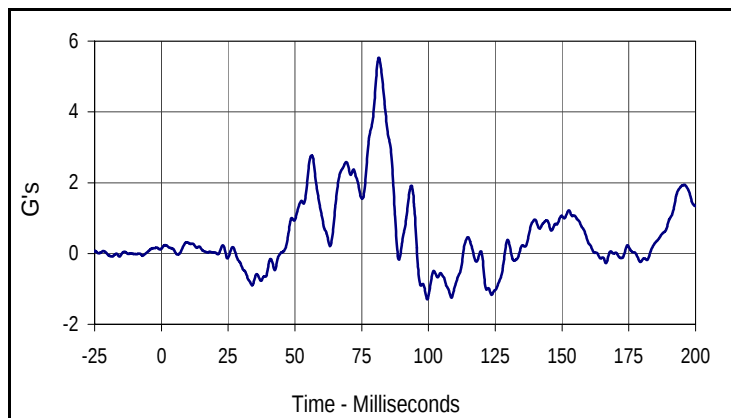
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CRABI Head Resultant (P4)			
CURNO	Type	SAE Class	Units
142	RES	1000	G's
Max	Time	Min	Time
78.0	77.0	0.1	173.2

Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

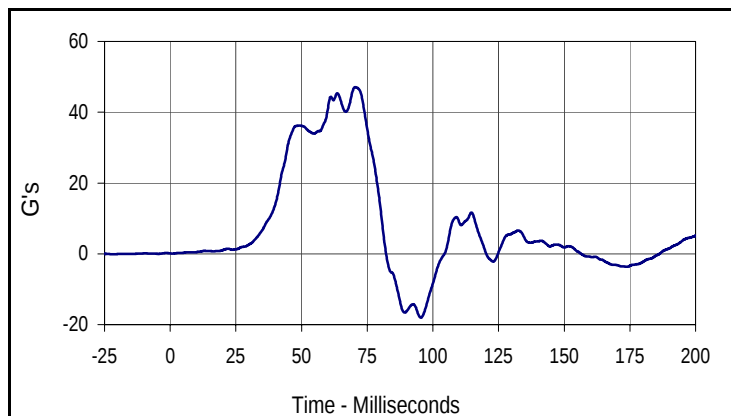
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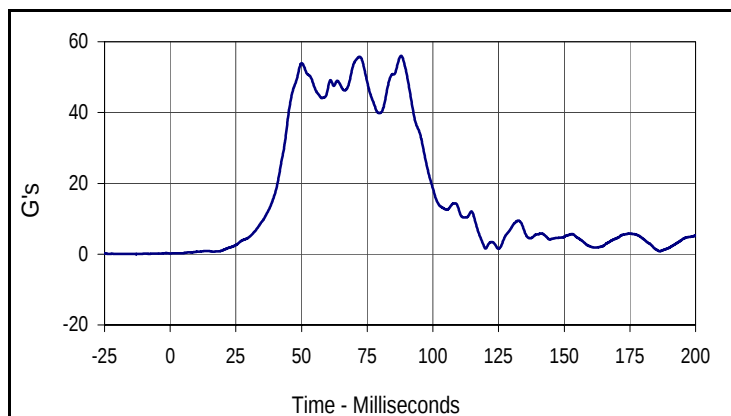
Curve Description			
CRABI Chest X (P4)			
CURNO	Type	SAE Class	Units
145	FIL	180	G's
Max	Time	Min	Time
54.1	87.7	-6.8	132.5



Curve Description			
CRABI Chest Y (P4)			
CURNO	Type	SAE Class	Units
146	FIL	180	G's
Max	Time	Min	Time
5.5	81.4	-1.3	99.6



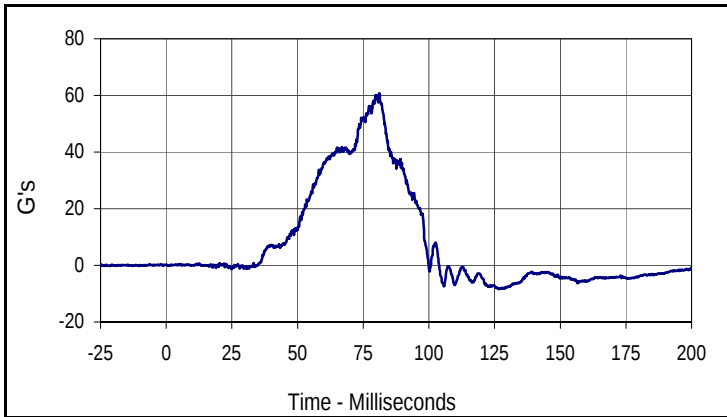
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CRABI Chest Z (P4)			
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Max	Time	Min	Time
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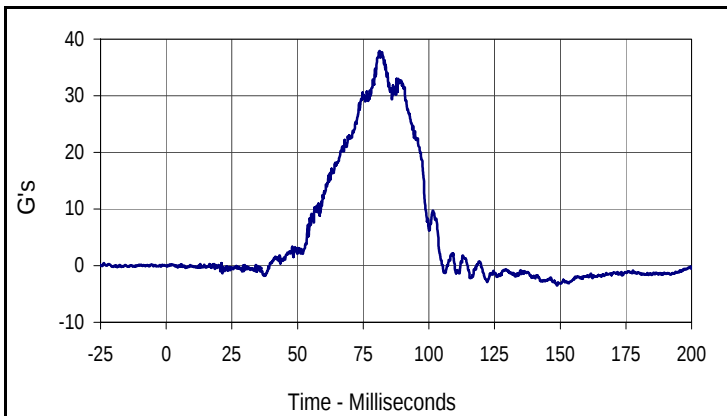
Curve Description			
CRABI Chest Resultant (P4)			
CURNO	Type	SAE Class	Units
145	RES	180	G's
Max	Time	Min	Time
56.0	87.9	0.2	0.1

Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

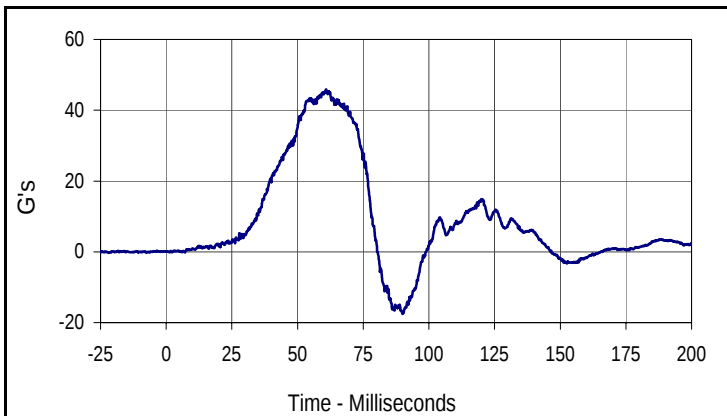
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 NHTSA No.: G70109



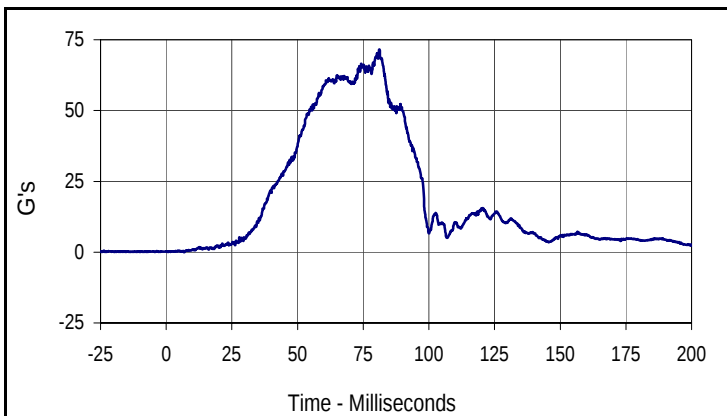
Curve Description			
CRABI Head X (P3)			
CURNO	Type	SAE Class	Units
163	FIL	1000	G's
Max	Time	Min	Time
60.8	81.1	-8.4	126.8



Curve Description			
CRABI Head Y (P3)			
CURNO	Type	SAE Class	Units
164	FIL	1000	G's
Max	Time	Min	Time
37.9	81.2	-3.5	148.8



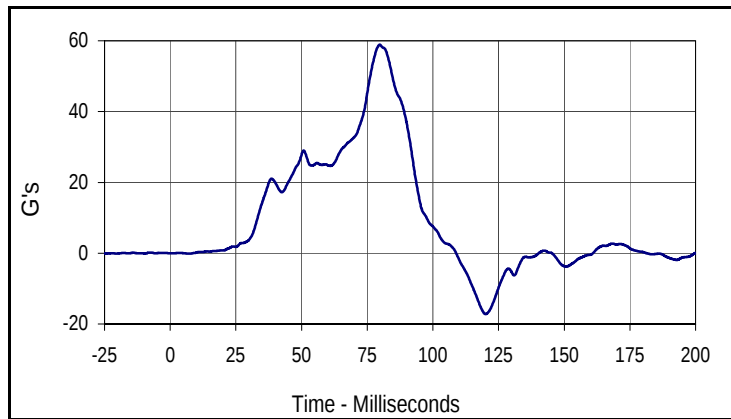
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CRABI Head Z (P3)			
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165	FIL	1000	G's
Max	Time	Min	Time
45.9	60.9	-17.5	90.0



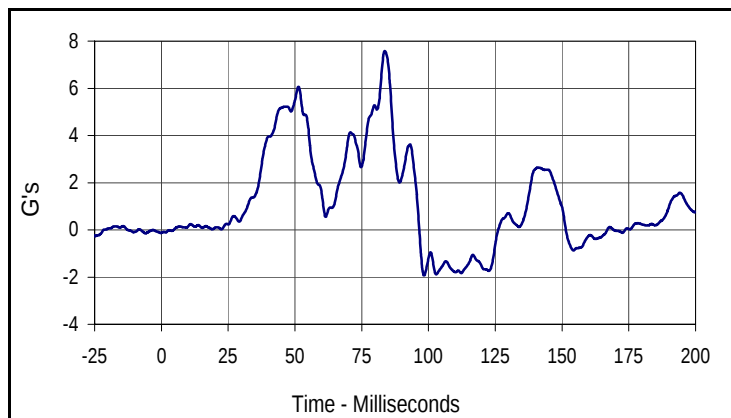
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CRABI Head Resultant (P3)			
CURNO	Type	SAE Class	Units
163	RES	1000	G's
Max	Time	Min	Time
71.6	81.1	0.0	6.9

Test Vehicle: 2007 Cadillac STS AWD 4-Door Sedan
 Test Program: 2007 NHTSA 35mph NCAP

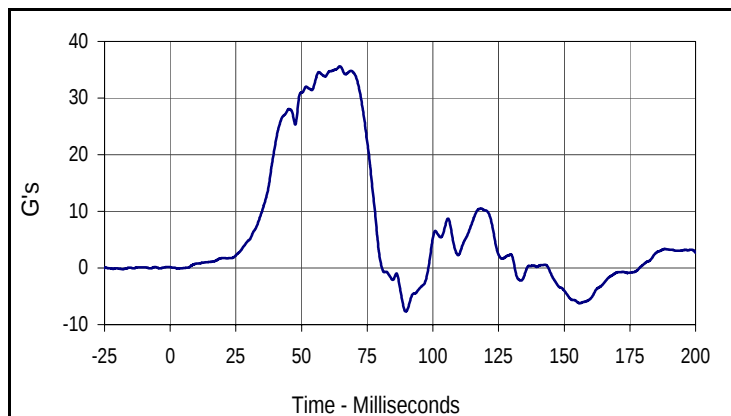
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 NHTSA No.: G70109



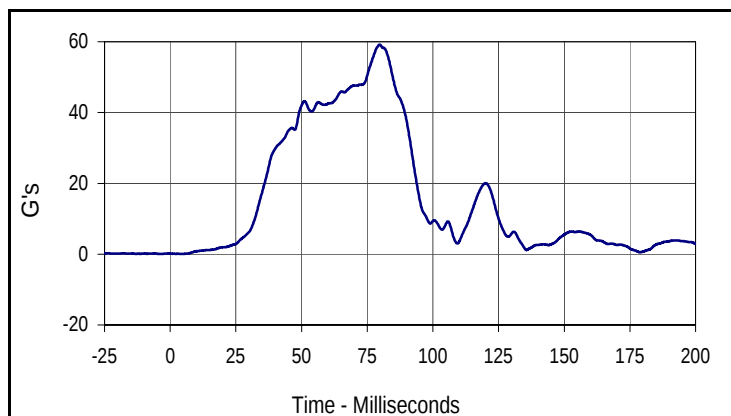
Curve Description			
CRABI Chest X (P3)			
CURNO	Type	SAE Class	Units
166	FIL	180	G's
Max	Time	Min	Time
58.9	79.7	-17.2	120.1



Curve Description			
CRABI Chest Y (P3)			
CURNO	Type	SAE Class	Units
167	FIL	180	G's
Max	Time	Min	Time
7.6	83.6	-1.9	98.3



Curve Description			
CRABI Chest Z (P3)			
CURNO	Type	SAE Class	Units
168	FIL	180	G's
Max	Time	Min	Time
35.6	64.7	-7.7	89.7



Curve Description			
CRABI Chest Resultant (P3)			
CURNO	Type	SAE Class	Units
166	RES	180	G's
Max	Time	Min	Time
59.2	79.7	0.0	4.8

SECTION D4

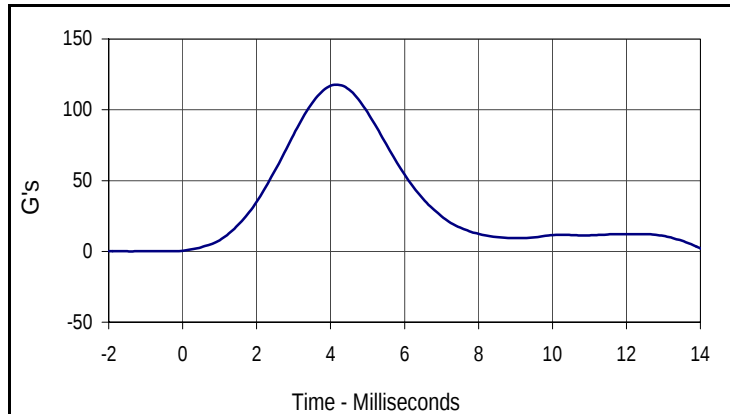
CRABI CALIBRATION INFORMATION

Test Program: CRABI 12 Month Old Frontal Head Drop Test
 ATD Serial No.: 022

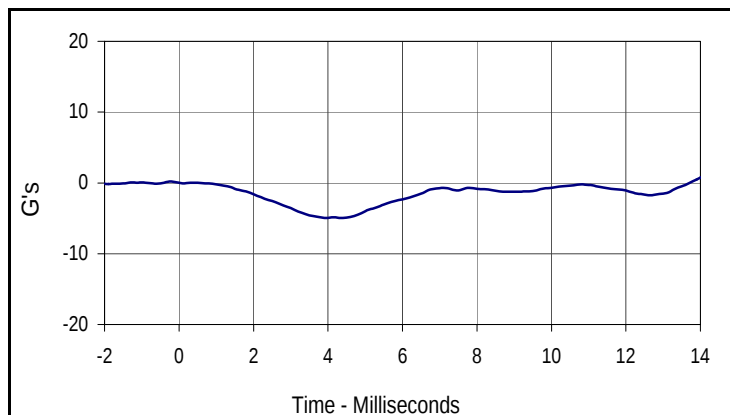
Test Date: 5/15/07
 Test I.D.: HD05Y



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	117.7	Pass
Peak Lateral Acceleration	G's	≤15.0	5.0	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
117.7	4.2	0.0	-1.4



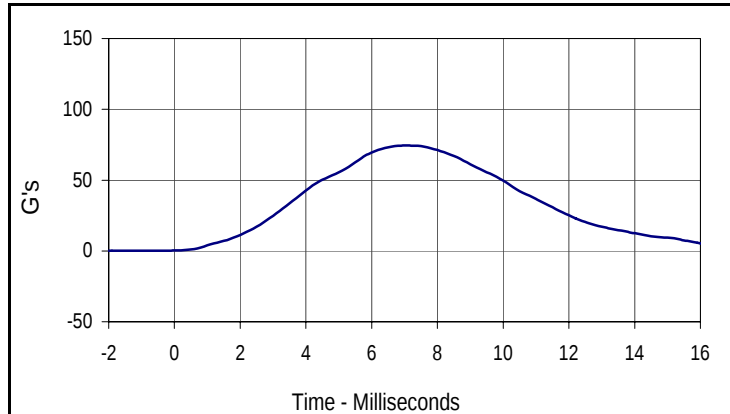
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.2	-0.2	-5.0	4.4

Test Program: CRABI 12 Month Old Rear Head Drop Test
 ATD Serial No.: 022

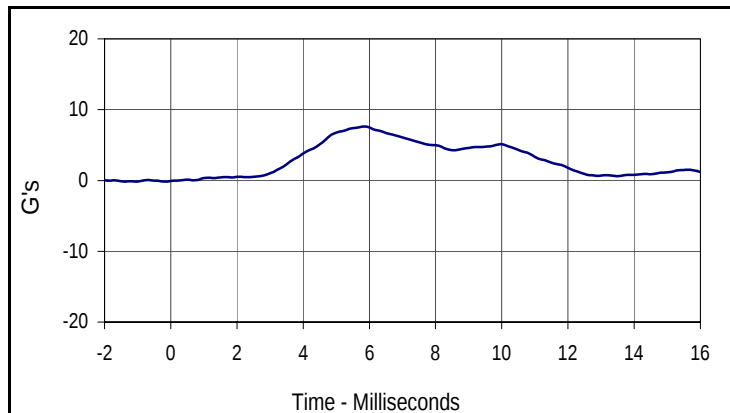
Test Date: 5/15/07
 Test I.D.: RHD05Y



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	69.5	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
69.5	6.0	0.1	-0.9



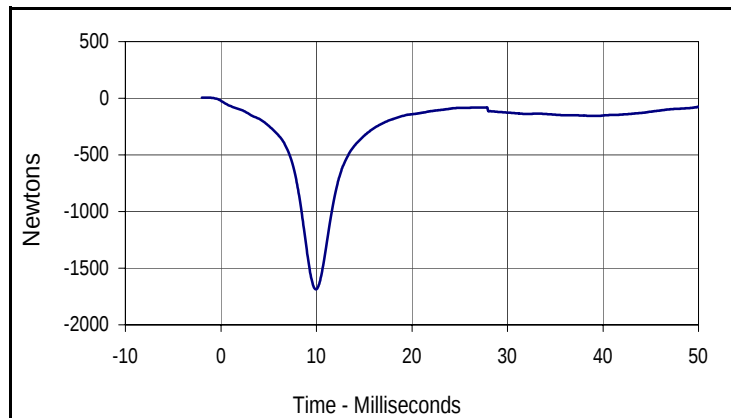
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.6	5.8	-0.2	-1.4

Test Program: CRABI 12 Month Old Thorax Impact Test
 ATD Serial No.: 022

Test Date: 5/15/07
 Test I.D.: CH05Y



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	4.90	Pass
Peak Probe Force	Newtons	-1514 to -1796	-1687	Pass
Overall Test Results				Pass



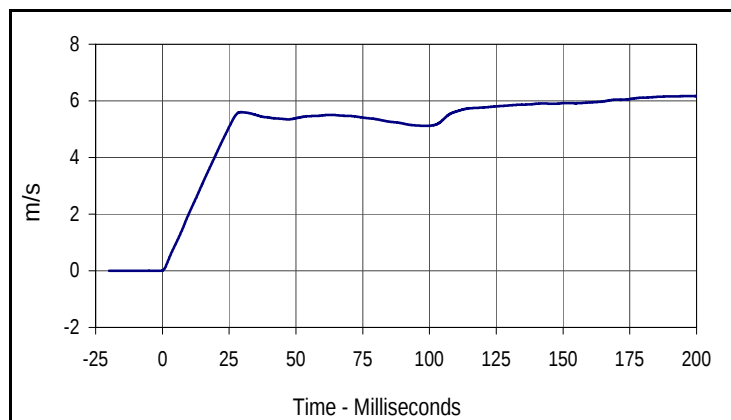
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
6.0	-1.7	-1687.4	10.0

Test Program: CRABI 12 Month Old Neck Flexion Test
 ATD Serial No.: 022

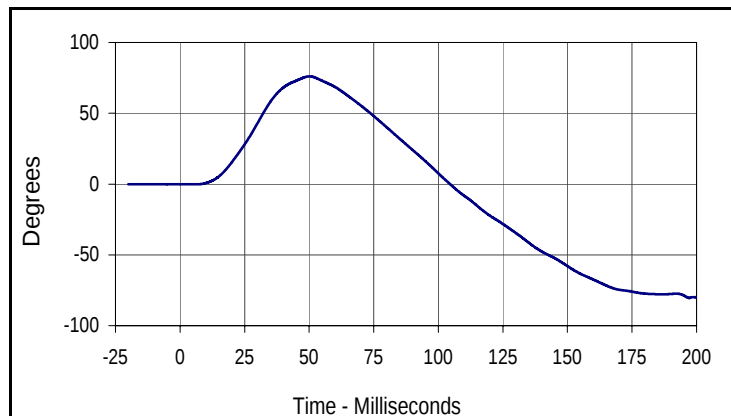
Test Date: 5/16/04
 Test I.D.: NF05Y



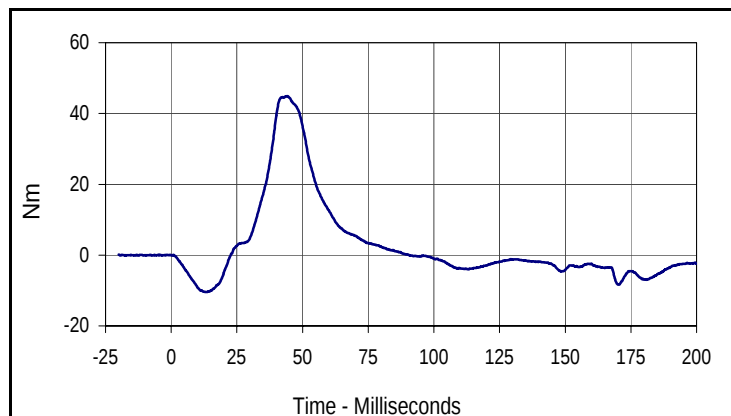
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.10 to 5.30	5.18	Pass
Pendulum Deceleration	10 Msec.	m/s	1.6 to 2.3	2.0	Pass
	20 Msec.	m/s	3.4 to 4.2	4.1	Pass
	25 Msec.	m/s	4.3 to 5.2	5.1	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
6.2	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



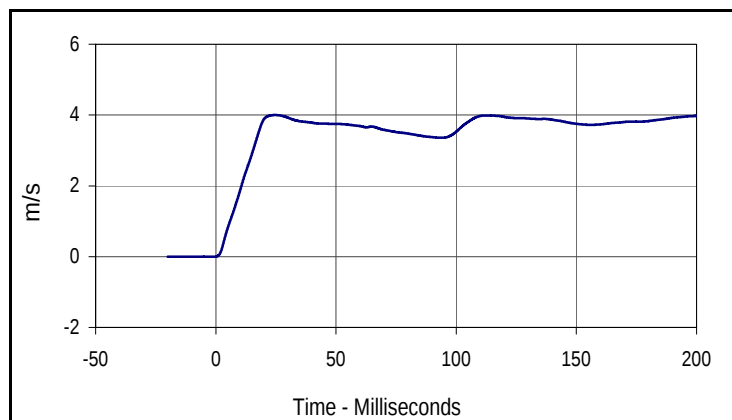
Curve Description			
Upper Neck Force Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
44.9	44.3	-10.4	13.5

Test Program: CRABI 12 Month Old Neck Extension Test
 ATD Serial No.: 022

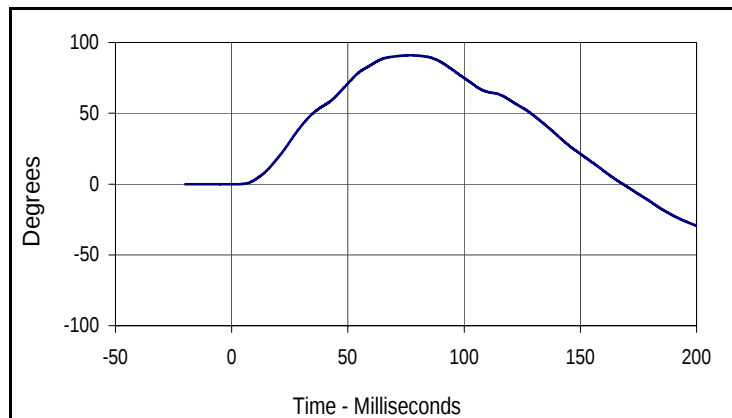
Test Date: 5/15/07
 Test I.D.: NE05Y



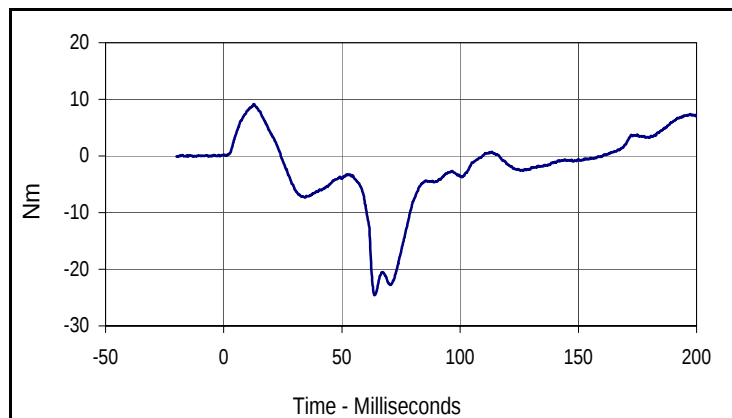
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	2.4 to 2.6	2.41	Pass
Pendulum Deceleration	6 Msec.	m/s	0.8 to 1.2	1.0	Pass
	10 Msec.	m/s	1.5 to 2.1	1.8	Pass
	14 Msec.	m/s	2.2 to 2.9	2.7	Pass
"D" Plane Rotation	Max	Degrees	80.0 to 92.0	90.9	Pass
Peak Moment in Rotation	Max	Nm	-12 to -23	-13.0	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	76.0 to 90.0	80.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
4.0	24.6	0.0	-0.7



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
90.9	77.0	-29.3	200.0



Curve Description			
Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
9.1	12.8	-24.6	63.8

Test Program: CRABI 12 Month Old External Dimensions
 ATD Serial No.: 022

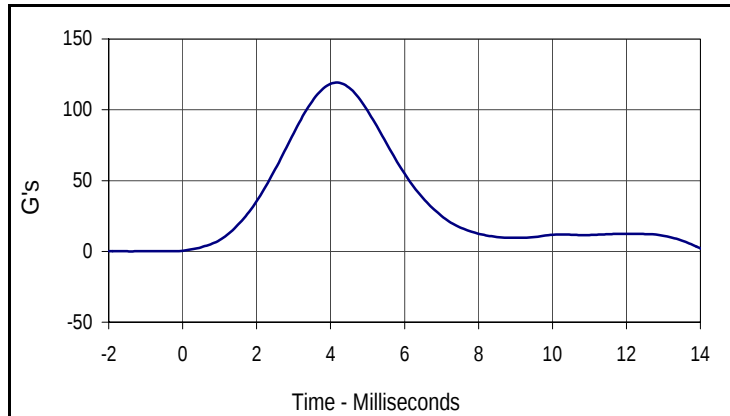
Test Date: 5/14/07
 Test I.D.: N/A



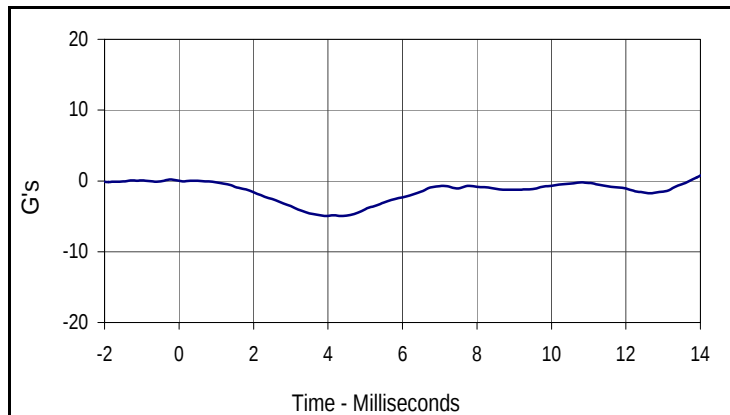
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	456.0 to 471.2	459	Pass
B - Shoulder pivot height	mm	276.6 to 291.8	280	Pass
C - "H" point height	mm	27.9 to 38.1	37	Pass
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	63	Pass
G - Elbow pivot to fingertip	mm	176.6 to 191.8	180	Pass
I - Shoulder pivot to elbow pivot	mm	99.1 to 114.3	104	Pass
J - Elbow rest height	mm	150.1 to 165.3	158	Pass
K - Buttock to knee length	mm	202.7 to 217.9	203	Pass
L - Popliteal length	mm	138.7 to 153.9	140	Pass
M - Knee pivot height	mm	165.1 to 180.3	167	Pass
N - Buttock popliteal length	mm	144.8 to 160.0	149	Pass
O - Chest depth with jacket	mm	107.5 to 122.7	110	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	180	Pass
S - Head Breadth	mm	124.4 to 134.6	132	Pass
T - Head Depth	mm	149.9 to 165.1	153	Pass
U - Hip breadth	mm	158.5 to 173.7	163	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	462	Pass
Z - Waist circumference	mm	447.0 to 472.4	454	Pass
AA - Reference location for dimension Y & O	mm	256.5 to 266.7	261	Pass
BB - Reference Location For dimension Z	mm	106.7 to 116.9	108	Pass
CC - Shoulder Height	mm	299.7 to 314.9	305	Pass
DD - Chin Height	mm	289.6 to 304.8	299	Pass
Overall Test Results			Pass	

Test Program: CRABI 12 Month Old Frontal Head Drop TestTest Date: 5/28/07ATD Serial No.: 017Test I.D.: FHD05B

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	119.2	Pass
Peak Lateral Acceleration	G's	≤15.0	5.0	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
119.2	4.2	0.0	-1.4



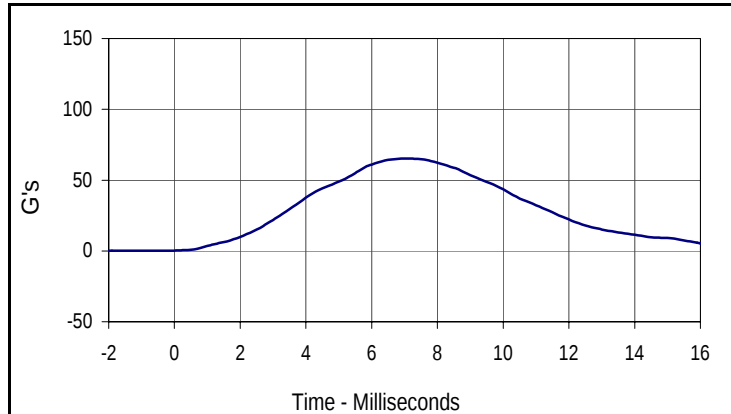
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.2	-0.2	-5.0	4.4

Test Program: CRABI 12 Month Old Rear Head Drop Test
 ATD Serial No.: 017

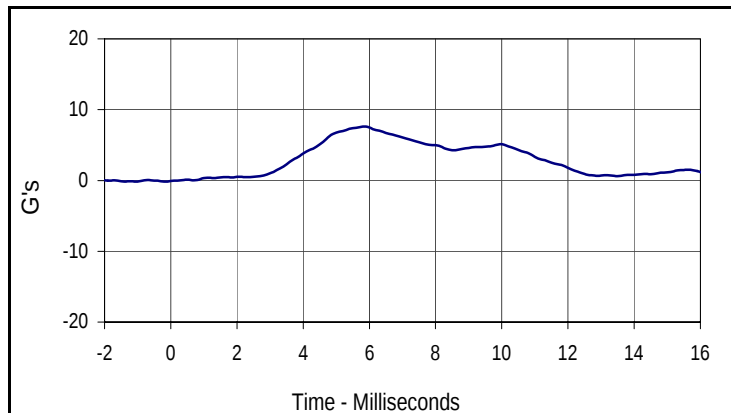
Test Date: 5/28/07
 Test I.D.: RHD05B



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	61.1	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			
Max	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
61.1	6.0	0.1	-0.9



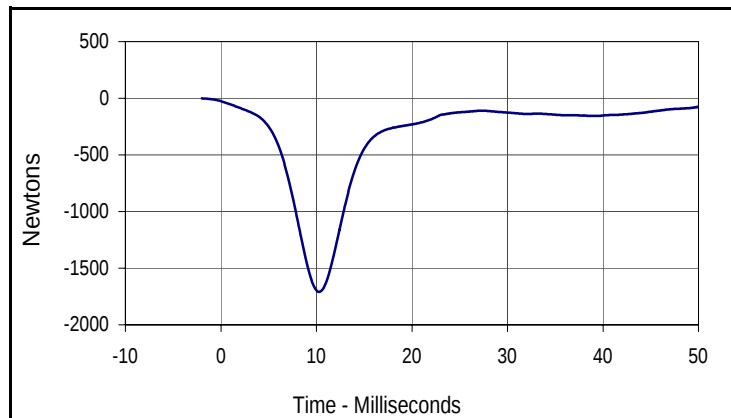
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.6	5.8	-0.2	-1.4

Test Program: CRABI 12 Month Old Thorax Impact Test
 ATD Serial No.: 017

Test Date: 5/28/07
 Test I.D.: TH05B



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	5.06	Pass
Peak Probe Force	Newtons	-1514 to -1796	-1696	Pass
Overall Test Results				Pass



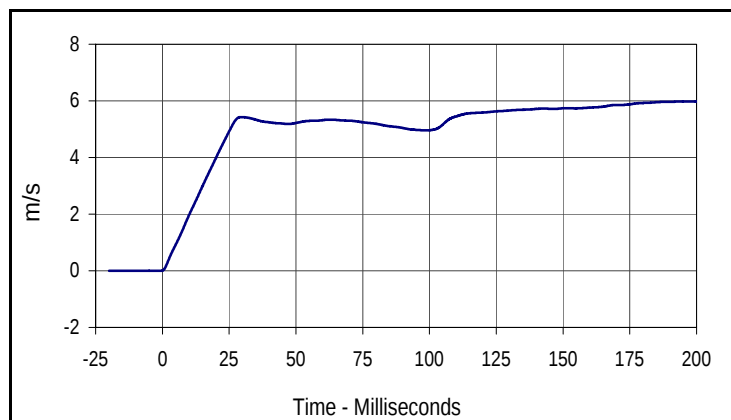
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	60	Newtons
Max	Time	Min	Time
-1.2	-2.0	-1695.8	10.0

Test Program: CRABI 12 Month Old Neck Flexion Test
 ATD Serial No.: 017

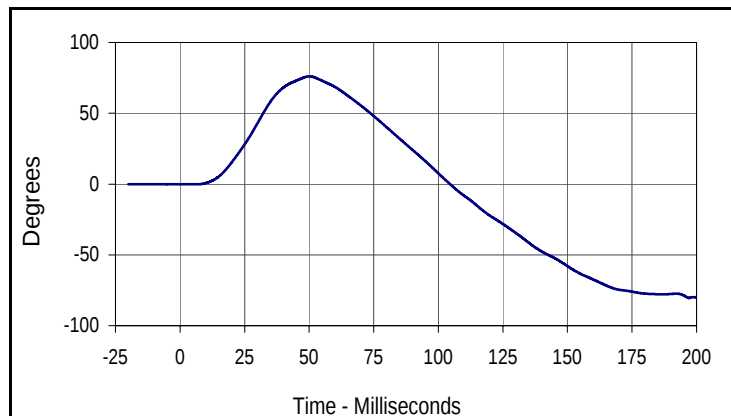
Test Date: 5/28/07
 Test I.D.: NF05B



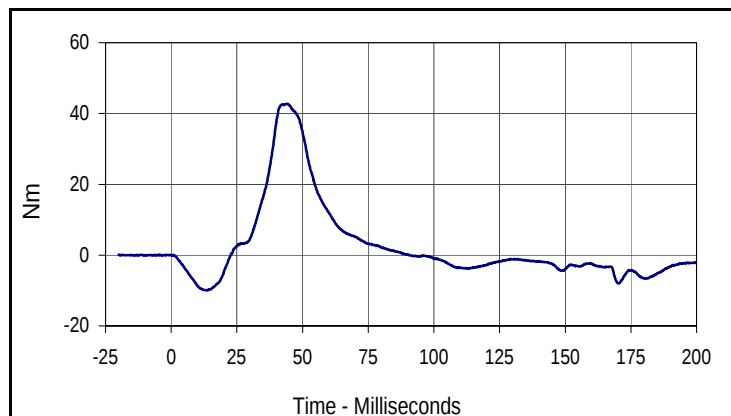
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.10 to 5.30	5.21	Pass
Pendulum Deceleration	10 Msec.	m/s	1.6 to 2.3	2.0	Pass
	20 Msec.	m/s	3.4 to 4.2	4.0	Pass
	25 Msec.	m/s	4.3 to 5.2	4.9	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	40.0	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	60.0 to 80.0	70.7	Pass
			Overall Test Results		Pass



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



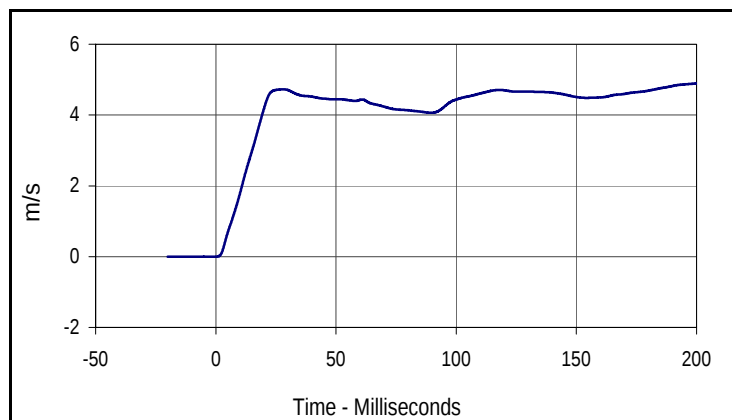
Curve Description			
Upper Neck Force Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
42.8	44.3	-9.9	13.5

Test Program: CRABI 12 Month Old Neck Extension Test
 ATD Serial No.: 017

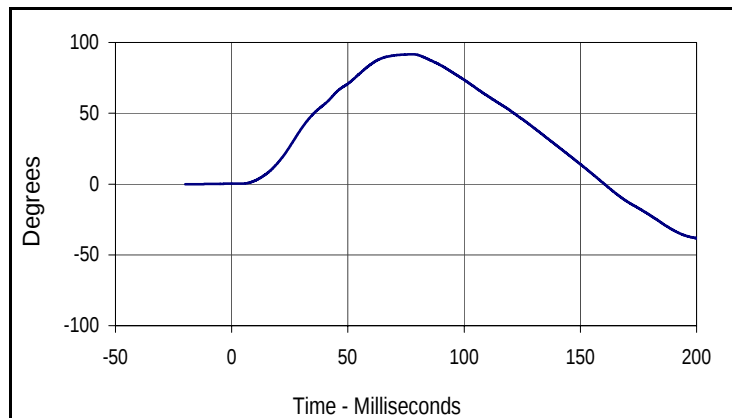
Test Date: 5/28/07
 Test I.D.: NE05B



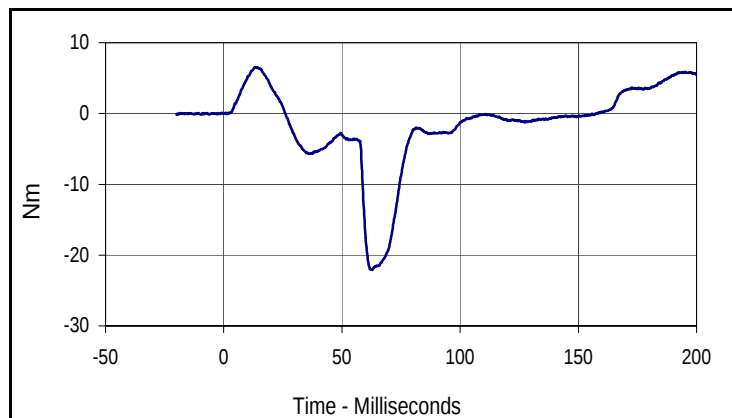
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	2.4 to 2.6	2.41	Pass
Pendulum Deceleration	6 Msec.	m/s	0.8 to 1.2	0.9	Pass
	10 Msec.	m/s	1.5 to 2.1	1.8	Pass
	14 Msec.	m/s	2.2 to 2.9	2.8	Pass
"D" Plane Rotation	Max	Degrees	80.0 to 92.0	91.7	Pass
Peak Moment in Rotation	Max	Nm	-12 to -23	-17.8	Pass
Positive Moment Decay, Time To -5 Nm		Msec.	76.0 to 90.0	77.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/s
Max	Time	Min	Time
4.9	200.0	0.0	0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
91.7	77.7	-38.2	200.0



Curve Description			
Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
6.5	13.2	-22.1	62.8

Test Program: CRABI 12 Month Old External Dimensions
 ATD Serial No.: 017

Test Date: 5/28/07
 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	457	Pass
B - Shoulder pivot height	mm	276.6 to 291.8	279	Pass
C - "H" point height	mm	27.9 to 38.1	35	Pass
D - "H" point from backline	mm	40.1 to 50.3	48	Pass
E - Shoulder pivot from back	mm	50.3 to 60.5	55	Pass
F - Thigh clearance	mm	63.0 to 73.2	64	Pass
G - Elbow pivot to fingertip	mm	176.6 to 191.8	184	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	158	Pass
K - Buttock to knee length	mm	202.7 to 217.9	205	Pass
L - Popliteal length	mm	138.7 to 153.9	139	Pass
M - Knee pivot height	mm	165.1 to 180.3	169	Pass
N - Buttock popliteal length	mm	144.8 to 160.0	155	Pass
O - Chest depth with jacket	mm	107.5 to 122.7	110	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	183	Pass
S - Head Breadth	mm	124.4 to 134.6	132	Pass
T - Head Depth	mm	149.9 to 165.1	155	Pass
U - Hip breadth	mm	158.5 to 173.7	160	Pass
V - Shoulder breadth	mm	200.7 to 215.9	214	Pass
W - Foot breadth	mm	39.1 to 49.3	45	Pass
Y - Chest circumference with jacket	mm	452.4 to 477.8	462	Pass
Z - Waist circumference	mm	447.0 to 472.4	454	Pass
AA - Reference location for dimension Y & O	mm	256.5 to 266.7	263	Pass
BB - Reference Location For dimension Z	mm	106.7 to 116.9	109	Pass
CC - Shoulder Height	mm	299.7 to 314.9	307	Pass
DD - Chin Height	mm	289.6 to 304.8	295	Pass
Overall Test Results			Pass	