

REPORT NUMBER TR-P27119-01-NC

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**GENERAL MOTORS CORPORATION
2007 CHEVROLET COBALT LS
4-DOOR SEDAN**

NHTSA NUMBER: G70108

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



MAY 4, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
RULEMAKING
MAIL CODE: NVS-111
400 SEVENTH STREET, SW, ROOM 5311
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 DTNH22-03-D-32005.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by:  Date: May 4, 2007
Mr. Johnny H. Dutto Project Engineer
KARCO Engineering, LLC

Reviewed by:  Date: May 4, 2007
Mr. Michael L. Dunlap, Director of Operations
KARCO Engineering, LLC

Approved by:  Date: May 4, 2007
Mr. Frank D. Richardson, Program Manager
KARCO Engineering, LLC

FINAL REPORT ACCEPTED BY:

Manager, Side Impact NCAP

Date of Acceptance

Technical Report Documentation Page

1. Report No. TR-P27119-01-NC		2. Government Accession No.		3. Recipients Catalog No.	
4. Title and Subtitle Final Report of Side Impact New Car Assessment Program Testing of a 2007 Chevrolet Cobalt LS 4-Door Sedan NHTSA No. G70108				5. Report Date May 4, 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-P27119-01-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. DTNH22-03-D-32005	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Rulemaking Office of Crashworthiness Standards Mail Code NVS-111 400 Seventh Street, SW, Room 5311 Washington, D.C 20590				13. Type of Report and Period Covered Final Test Report	
				14. Sponsoring Agency Code DOT/NHTSA/NRM/OCS	
15. Supplementary Notes					
16. Abstract A 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2007 Chevrolet Cobalt 4-Door Sedan in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedures for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering, LLC in Adelanto, CA, on May 4, 2007. The impact velocity of the Moving Deformable Barrier was 61.75 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 22.0 deg. C. The target vehicle's maximum post-test static crush was 337 mm located at level 2. The test vehicle's occupant performance data is as follows:					
Measurement Description		Driver SID/HIII	Pass. SID/HIII		
Left Upper Rib (LUR) G's		87.8	42.5		
Left Lower Rib (LLR) G's		84.7	52.0		
Lower Spine (T ₁₂) G's		82.6	53.2		
Thoracic Trauma Index (TTI) G's		85.0	53.0		
Pelvis (PEV) G's		75.1	57.7		
17. Key Words New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) Side Impact Dummy (SID/HIII)				18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Admin. NHTSA Technical Reference Division 400 Seventh St., SW, Room 5108 Washington, DC 20590	
19. Security Classification of this report UNCLASSIFIED		20. Security Classification of this page UNCLASSIFIED		21. No. of Pages 178	22. Price

TABLE OF CONTENTS

Section		Page
1	Purpose and Test Procedure	1
2	Summary of Side Impact Test	2
3	Occupant and Vehicle Information Sheets	4

Data Sheet No.		Page
1	General Test and Vehicle Parameter Data	5
2	Test Vehicle Summary of Results	10
3	Moving Deformable Barrier (MDB) Summary of Results	11
4	Post-Test Observations	12
5	Vehicle Pre-Test and Post-Test Measurements	13
6	SID/HIII Longitudinal Clearance Dimensions	14
7	SID/HIII Lateral Clearance Dimensions	15
8	Vehicle Side Measurements	16
9	Vehicle Exterior Crush Profiles	17
10	Vehicle Damage Profile Distances	19
11	Deformable Barrier Honeycomb Face Static Crush	20
12	Vehicle Accelerometer Locations	21
13	MDB Accelerometer Locations	23
14	High Speed Camera Locations and Data	24
15	FMVSS 301 Fuel System Integrity Post-Impact Data	25
16	FMVSS 301 Static Rollover Data Sheet	26

Appendix		
A	Photographs	A
B	SID/HIII, Vehicle and MDB Response Data	B
C	SID/HIII Configuration and Performance Verification Data	C
D	Child Restraint System	D

SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

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

1.2 TEST PROCEDURE

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

SECTION 2

SUMMARY OF SIDE IMPACT TEST

2.1 SUMMARY OF SIDE IMPACT NCAP TEST

A model year 2007 Chevrolet Cobalt LS 4-Door Sedan was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.75 km/h. The specified impact velocity range is from 61.14 to 62.75 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 1497 kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on May 4, 2007.

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

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

SUPPLEMENTAL RESTRAINT INFORMATION

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

SECTION 2...(CONTINUED)

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

2.2 GENERAL COMMENTS

The driver and passenger doors remained closed during impact. The test vehicle sustained a maximum static crush of 311 mm at level 2, 1800 mm rearward of the left vertical impact point. The driver SID/Hybrid III, Serial No. 275 and the passenger SID/Hybrid III, Serial No. 274 were calibrated prior to this test. The SID/Hybrid III injury criteria is summarized as follows:

Measurement	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	85.0	53.0
Peak Pelvic G's (PEV)	G's	75.0	58.0

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

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in ²	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	°F	°C	$=(t_f - 32)/1.8$
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

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

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	G70108
Make	Chevrolet
Model	Cobalt
Body Style	4-Door Sedan
Vin No.	1G1AK58F677187730
Color	Red
Delivery Date	4/20/2007
Odometer (Miles)	107
Dealer	Crestview Chevrolet
Transmission	5-Speed Manual
Final Drive	Front
Type/No. Cyl.	4 Cylinder
Engine Disp. (L)	2.2
Engine Placement	Transverse
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	No
Power Brakes	Yes
Front Disc	Yes
Rear Disc	No

Anti-Lock Brakes	Yes
All Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Side Torso Airbag	No
Driver Side Head Airbag	No
Driver Curtain/Airbag	Yes
Rear Pass. Airbag	No
Rear Pass. Side Airbag	No
Rear Pass. Head Airbag	No
Rear Pass. Curtain/Airbag	Yes
Pre-Tensioners	Yes
Load Limiters	Yes
Bucket Seats	Yes
Air Cond.	Yes
AM/FM CD	Yes
Tilt Steering	Yes
Automatic Door Locks	No
Power Windows	No
Power Seats	No
Other	None

Does Owners Manual provide instructions to turn off automatic door locks.

N/A

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors Corporation
Date of Manufacture	Oct-06

GVWR (kg)	1689
GAWR Front (kg)	869
GAWR Rear (kg)	820

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

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

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

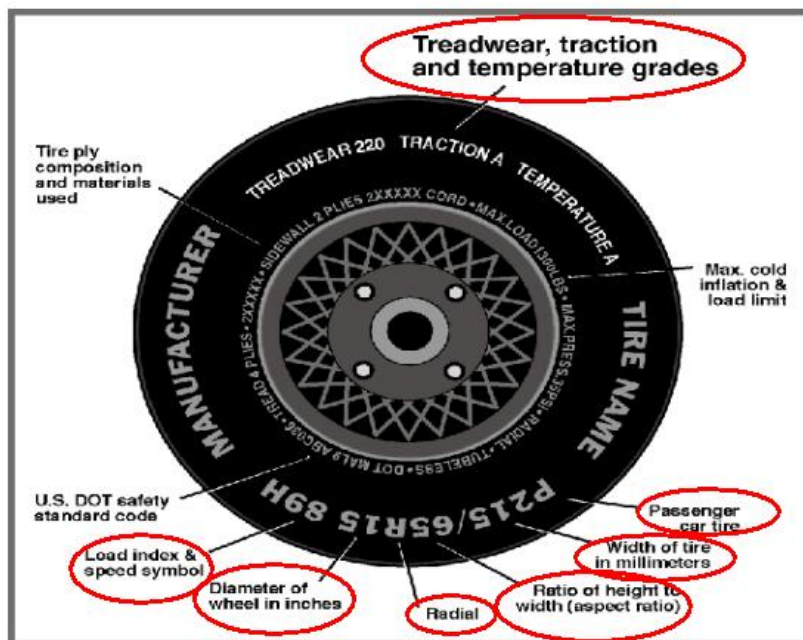
Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

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)	280	280
Cold Pressure (kpa)	210	210
Recommended Tire Size	P195/60R15	P195/60R15
Tire Size on Vehicle	P195/60R15	P195/60R15
Tire Manufacturer	Continental	Continental
Treadwear	520	520
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	1 Ply Polyester	1 Ply Polyester
Tire Plies Body	3 Plies Polyester + 2 Steel	3 Plies Polyester + 2 Steel
Load Index/Speed Symbol	875	875
Tire Material	1 Polyester + 2 Steel	1 Polyester + 2 Steel
DOT Safety Code Right	CPV9 BLC	CPV9 BLC
DOT Safety Code Left	CPV9 BLC	CPV9 BLC

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UWW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	375	264	639	438	337	775
Right	kg	387	250	637	422	300	722
Ratio	%	59.7	40.3	100	57.4	42.6	100
Totals	kg	762	514	1276	860	637	1497

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UWW)	kg	1276
Weight of 2 P572 ATD's	kg	161
Rated Cargo/Luggage Wt. (RCLW)	kg	64
Calculated Vehicle Target Wt. (TVTW)	kg	1501

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	690	690	700	707	1057
As Tested	mm	665	673	673	682	1116
Fully Loaded	mm	677	689	663	679	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2623
Total Vehicle Length at Left Side	mm	3075
Total Vehicle Length at Centerline	mm	4570
Total Vehicle Length at Right Side	mm	3075
Weight of Ballast In Cargo Area	kg	0
Amount of Stoddard Solvent in Fuel Tank	liters	46.33

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2623
Target Impact Point Aft of Front Axle	mm	372
Actual Impact Point Aft of Front Axle	mm	352

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

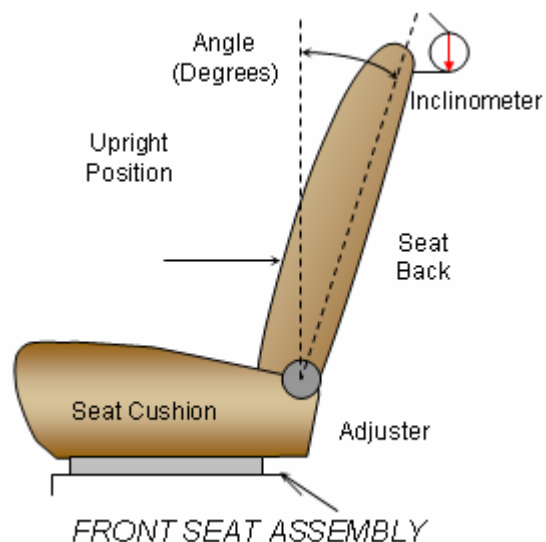
NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

NOMINAL DESIGN RIDING POSITION

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



SEAT BACK ANGLES

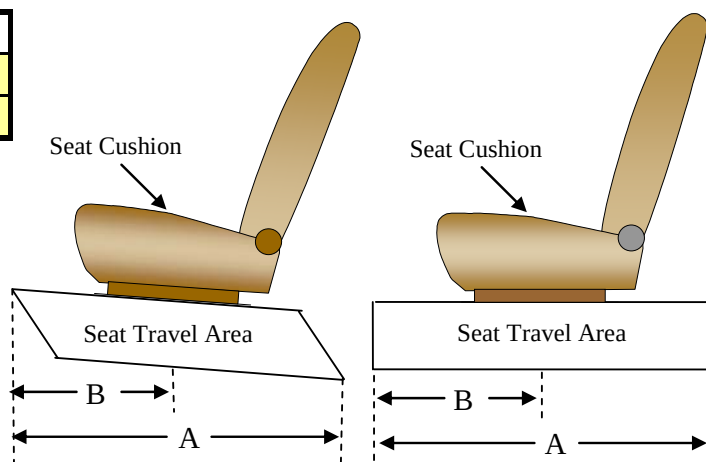
	Deg.
Driver w/seated Dummy	3.8 @ Headrest
Passenger w/seated Dummy	3.8 @ Headrest

SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position at the highest vertical seat height to rearmost position at the lowest vertical seat height. The seat was set at the longitudinal mid position. T

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	27 Detents	14th Detent
Rear Seat	N/A	N/A



SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position

SEAT BELT UPPER ANCHORAGE

	Total # of Positions	Placed in Position #
Driver Seat	5	1
Rear Seat	Fixed	Fixed

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

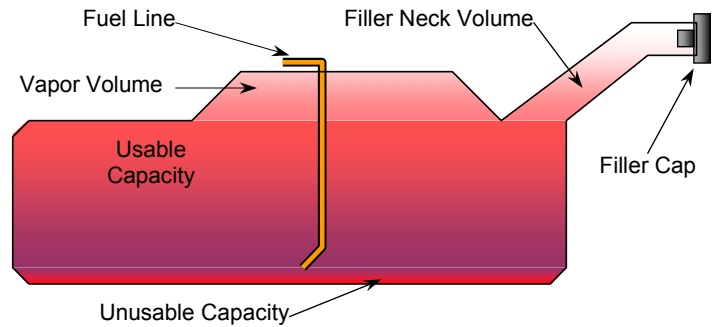
Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	50.00
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMVSS 301	45.84 to 46.82
Actual Amount of Solvent used	46.33

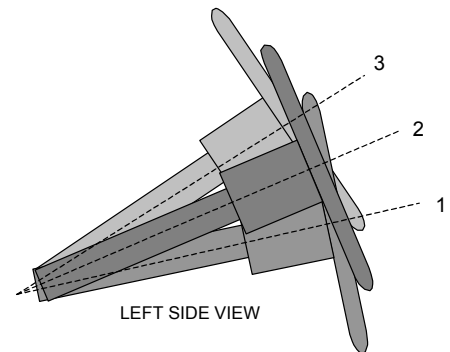
The test vehicle is equipped with an electric fuel pump. On while engine is running; On until system pressure is achieved for providing fuel during starter motor activation when key/ignition in the 'on' position (engine not running); On for approximately 10 seconds when ignition set to one detent short of 'on'. The fuel filler door is located on the right rear fender.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost positon No. 1	18.0	
Geometric center position No. 2	20.0	
Uppermost position No. 3	22.0	

DATA SHEET NO. 2**TEST VEHICLE SUMMARY OF RESULTS**Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door SedanNHTSA No.: G70108Test Program: 55/28 km/h Side Impact NCAPTest Date: 05/04/07**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UWW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	375	264		438	337	
Right	kg	387	250		422	300	
Ratio	%	59.7	40.3		57.4	42.6	
Totals	kg	762	514	1276	860	637	1497

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	157	233
Level 2	Occupant H-Point	mm	337	499
Level 3	Mid Door	mm	299	586
Level 4	Window Sill	mm	315	841
Level 5	Window top	mm	112	1361
N/A	Maximum Penetration	mm	337	

INSTRUMENTATION

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

CAMERA COVERAGE

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

DATA SHEET NO. 3**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door SedanNHTSA No.: G70108Test Program: 55/28 km/h Side Impact NCAPTest Date: 05/04/07**MDB SPECIFICATIONS (mm)**

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

MDB WEIGHTS

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

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.75
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.62
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.5

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE (mm)

Vertical Location			From Centerline		Max. Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Right	142
B	Top of Bumper	533	800	Right	72
C	Mid Level	686	800	Left	123
D	Top of Stack	813	800	Left	149

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	1
High Speed Cameras	2

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

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

POST-TEST STRUCTURAL OBSERVATIONS

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

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	-20 (left)
Vertical Offset	mm	+/- 20	-3 (below)

DATA SHEET NO. 5

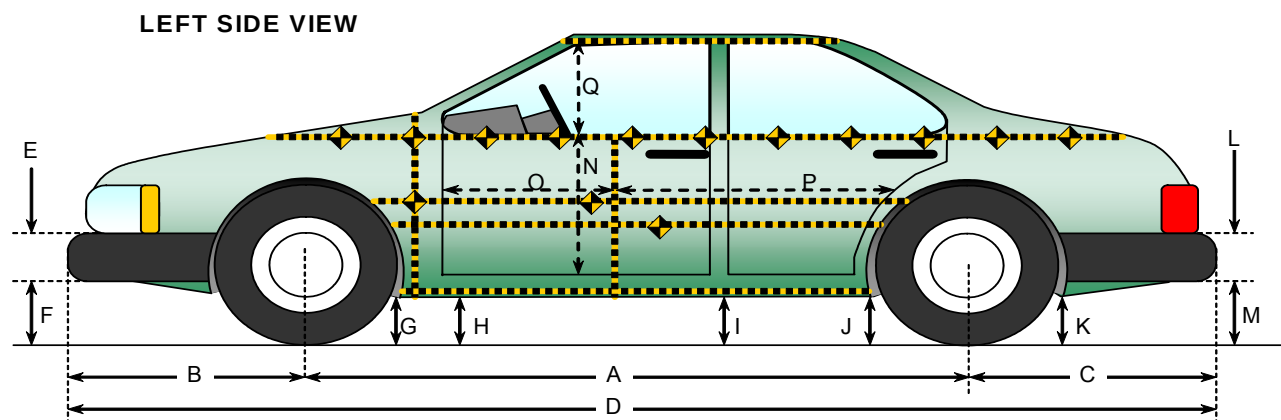
VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2623	2604	-19
B	Front Axle to FSOV	954	965	11
C	Rear Axle to RSOV	985	983	-2
D	Total Length at Centerline	4570	4570	0
E	Front Bumper Thickness	310	310	0
F	Front Bumper Bottom to Ground	231	242	11
G	Sill Height at Front Wheel Well	199	28	-171
H	Sill Height at Front Door Leading Edge	200	193	-7
I	Sill Height at "B" Pillar	202	285	83
J1	Sill Height at Rear Wheel Well	175	209	34
J2	Pinch Weld Height at Rear Wheel Well	200	206	6
K	Sill Height aft of Rear Wheel Well	252	297	45
L	Rear Bumper Thickness	353	340	-13
M	Rear Bumper Bottom to Ground	350	397	47
N	Sill Height to Window Bottom Sill	655	618	-37
O	Front Door Leading Edge to Impact CL	765	747	-18
P	Rear Door Trailing Edge to Impact CL	1205	1132	-73
Q	Front Window Opening	376	370	-6
R	Right Side Length	3075	3020	-55
S	Left Side Length	3075	3085	10
T	Vehicle Width at "B" Post	1710	1443	-267

All Dimensions shown in millimeters

DATA SHEET NO. 6

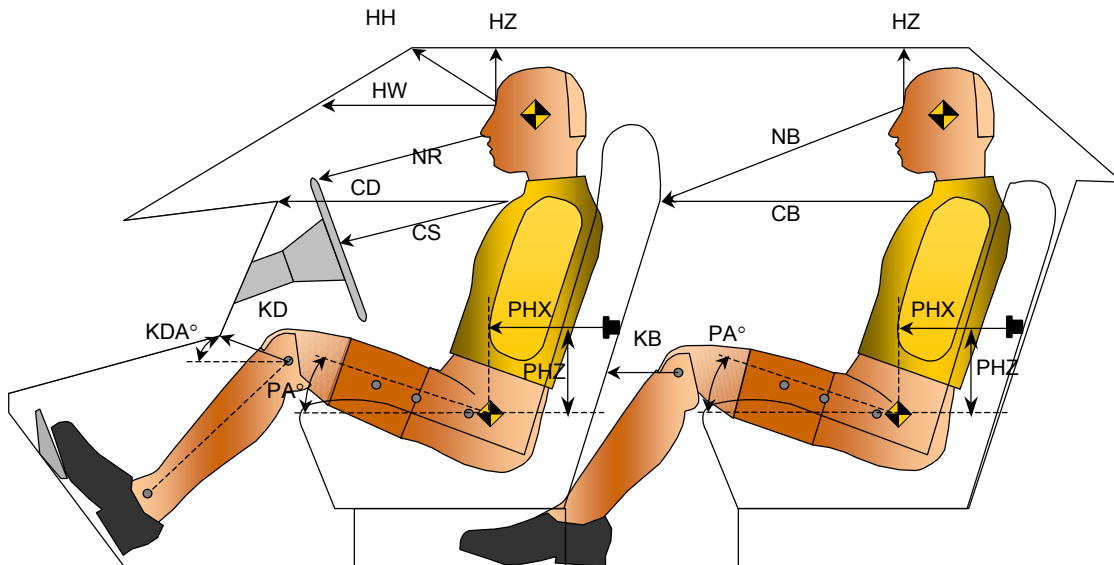
SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length(mm)	Angle	Length(mm)	Angle
HH		Head to Header	425	17.3		
HW		Head to Windshield	639	0.0		
HZ	HZ	Head to Roof	175	90.0	165	90.0
NR	NB	Nose to Rim/Nose to Seat Back	494	12.0	546	17.1
CD	CB	Chest to Dash or Seat Back	580	6.5	500	4.7
CS		Chest to Steering Wheel	348	0.5		
KDL	KBL	Left Knee to Dash or Seat Back	218	10.5	178	0.0
KDR	KBR	Right Knee to Dash or Seat Back	178		195	
PA	PA	Pelvic Angle		23.4		25.0
PHX	PHX	H-Point to Striker (X-Axis)	184		215	
PHZ	PHZ	H-Point to Striker (Z-Axis)	115		267	

DATA SHEET NO. 7

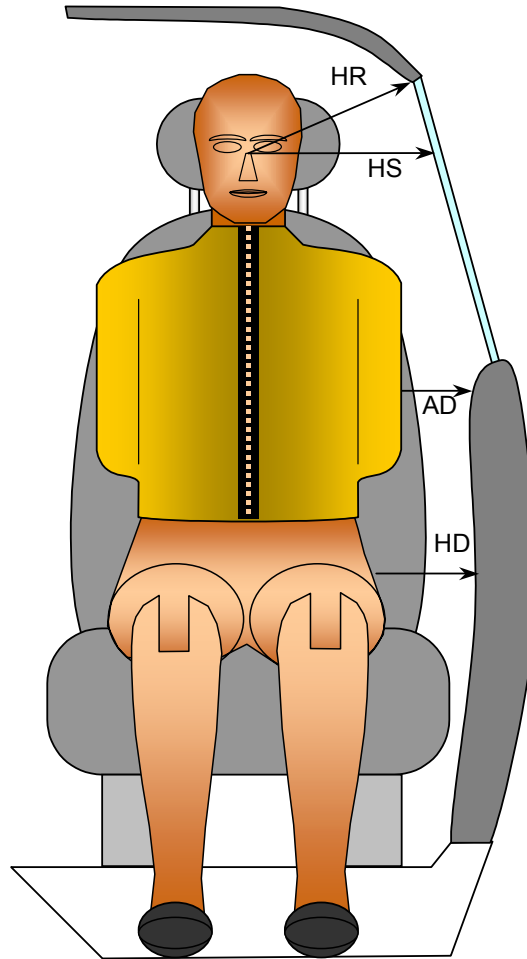
SID/HII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



FRONT VIEW OF DUMMY

LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	255	250
HS	Head to Side Window	mm	312	303
AD	Arm to Door	mm	80	78
HD	H-Point to Door	mm	114	112

DATA SHEET NO. 8

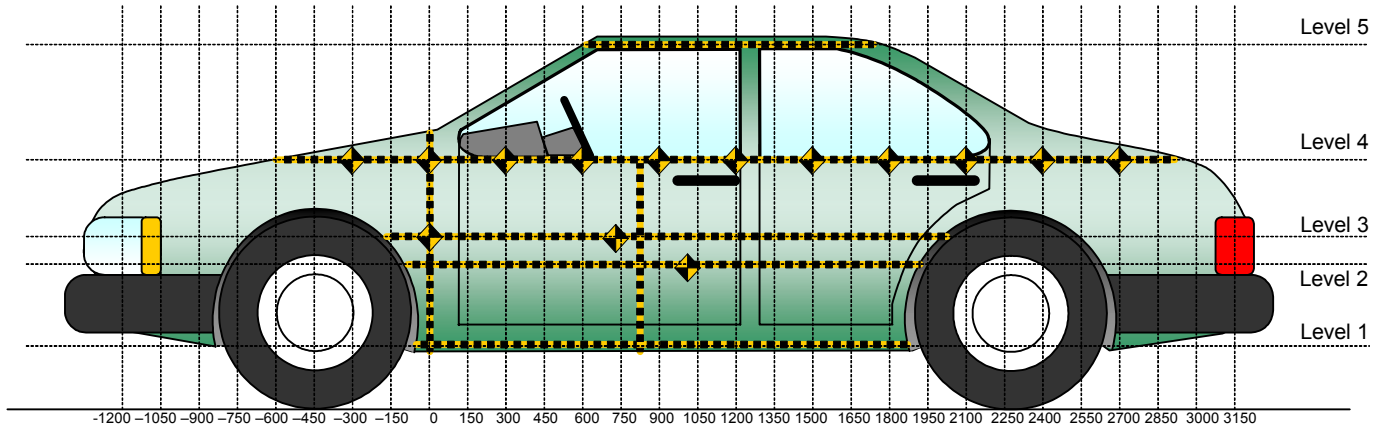
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



All Measurements Shown in mm

LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.

Measurements taken 900 mm right of impact reference.

All measurements below in mm.

Level	Measurement Description	Height Above Ground
1	Sill Top	233
2	Occupant H-Point	499
3	Mid Door	586
4	Window Sill	841
5	Window Top	1361

All Dimensions shown in millimeters

DATA SHEET NO. 9

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450				756					805					49	
-300				746					779					33	
-150			646	726				699	765				53	39	
0	681	652	656	714		756	754	741	776		75	102	85	62	
150	676	652	655	702		790	935	874	812		114	283	219	110	
300	676	652	651	693		797	957	900	875		121	305	249	182	
450	674	648	649	686		806	967	905	917		132	319	256	231	
600	673	646	648	685	963	811	974	910	939	1008	138	328	262	254	45
750	675	646	647	676	966	819	977	918	948	1006	144	331	271	272	40
900	679	648	646	673	946	825	981	924	958	1018	146	333	278	285	72
1050	680	647	646	673	950	828	984	934	951	1044	148	337	288	278	94
1200	681	651	649	673	951	834	976	942	959	1061	153	325	293	286	110
1350	682	654	652	673	956	834	966	942	988	1068	152	312	290	315	112
1500	684	656	655	674	956	819	940	954	979	1022	135	284	299	305	66
1650	689	661	659	678	956	817	921	956	951	1009	128	260	297	273	53
1800	693	656	663	683	958	850	849	935	877	1000	157	193	272	194	42
1950			644	684	964			744	778	1001			100	94	37
2100				686					695					9	
2250				700					733					33	
2400				708					744					36	
2550				722					744					22	
2700															
2850															
3000															

All Dimensions shown in millimeters

DATA SHEET NO. 9...(CONTINUED)

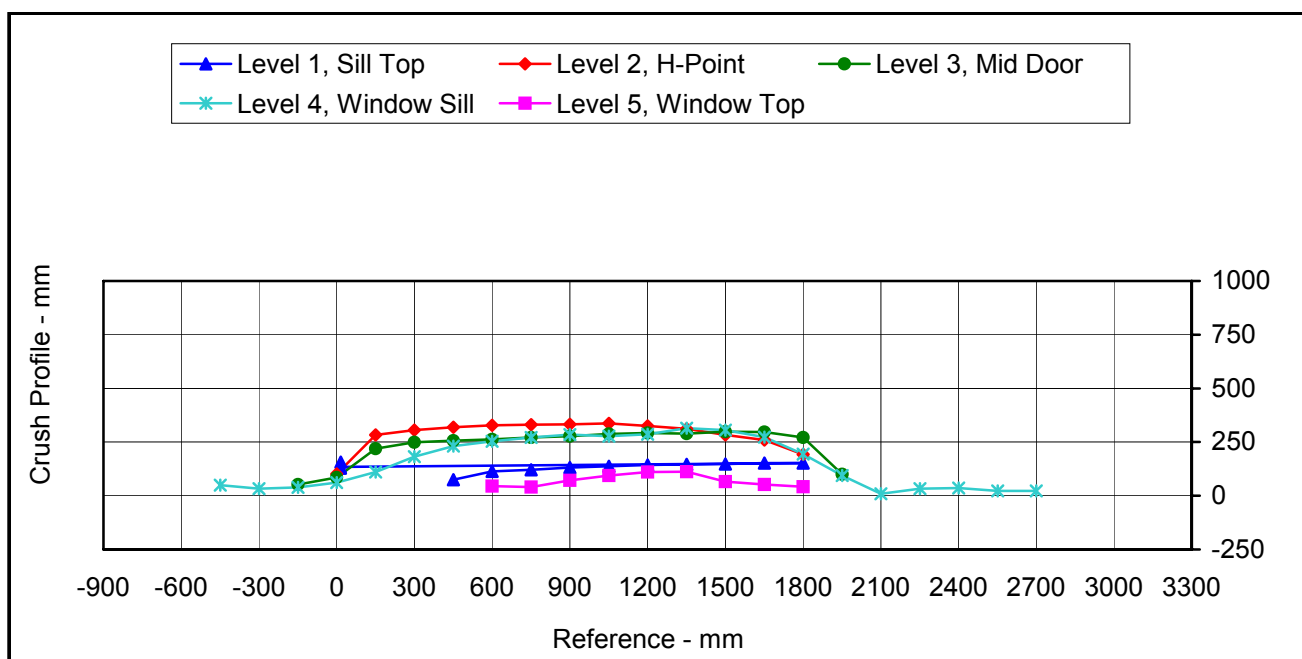
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	157	337	299	315	112
Distance from Impact	mm	1800	1050	1500	1350	1350

DATA SHEET NO. 10

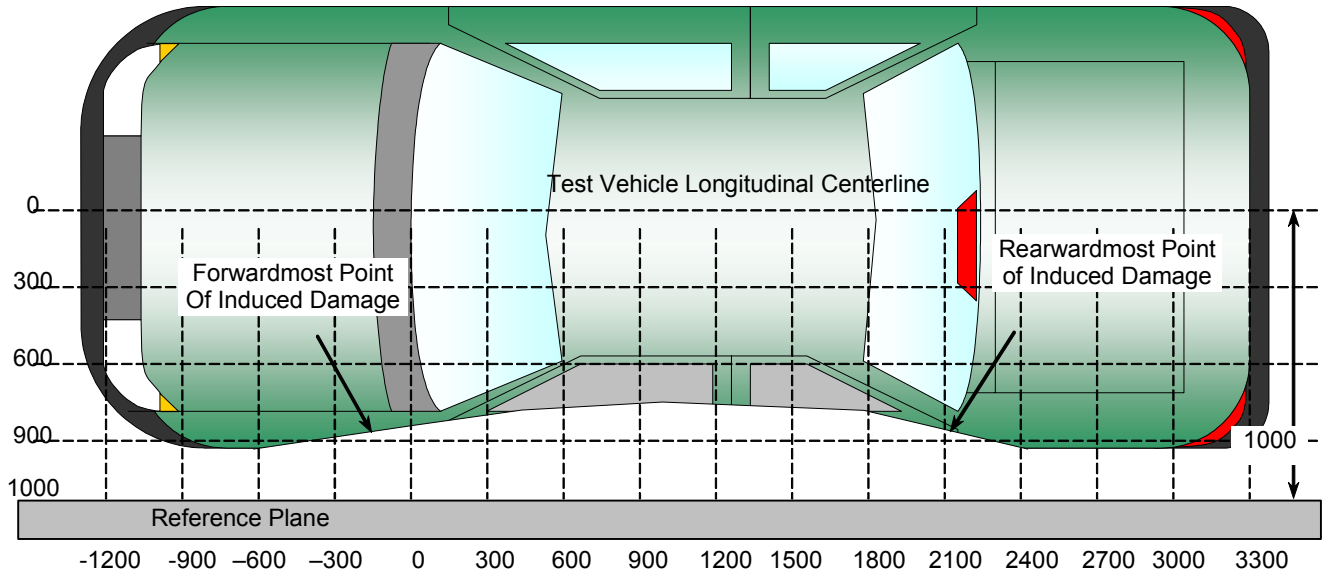
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



All Dimensions Shown in millimeters

TOP VIEW

DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	1950	3	644	744	100
2	1500	4	674	979	305
3	1050	2	647	984	337
4	600	2	646	974	328
5	150	2	652	935	283
6	-300	4	746	779	33

DATA SHEET NO. 11

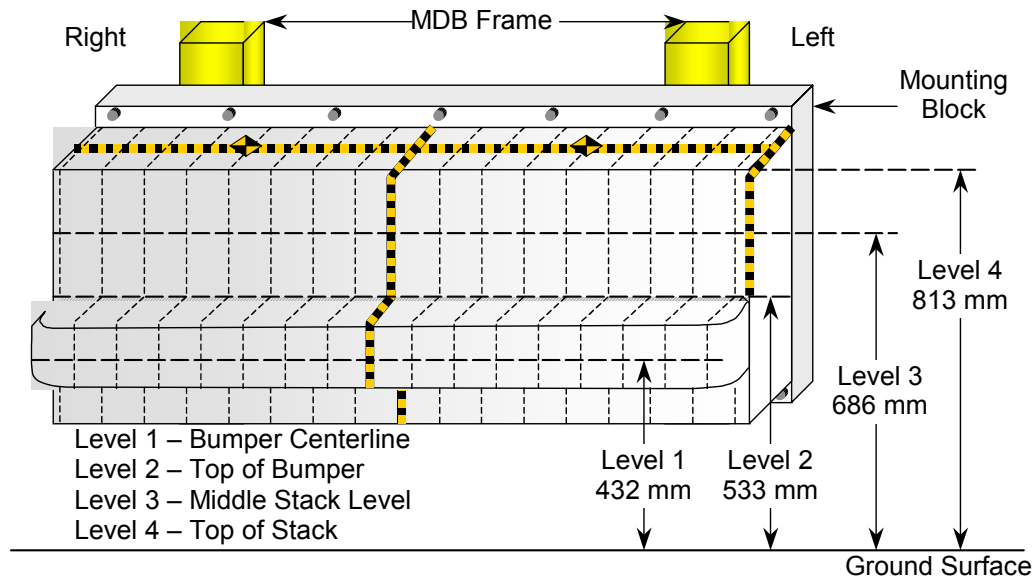
DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100		100	200	300	400	500	600	700	800
1	660	630	616	610	609	620	610	605	604	602	599	600	601	605	614	624	633
2	692	672	672	666	665	658	647	644	646	650	650	663	666	667	669	670	683
3	638	611	610	614	617	620	633	626	624	625	626	629	631	637	646	675	743
4	671	616	605	601	604	614	635	631	618	620	623	629	636	654	683	715	769

All Dimensions in mm

DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS

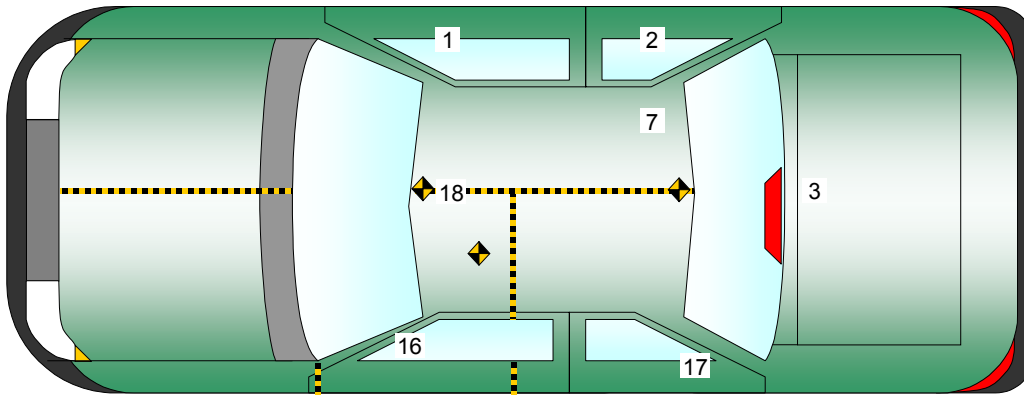
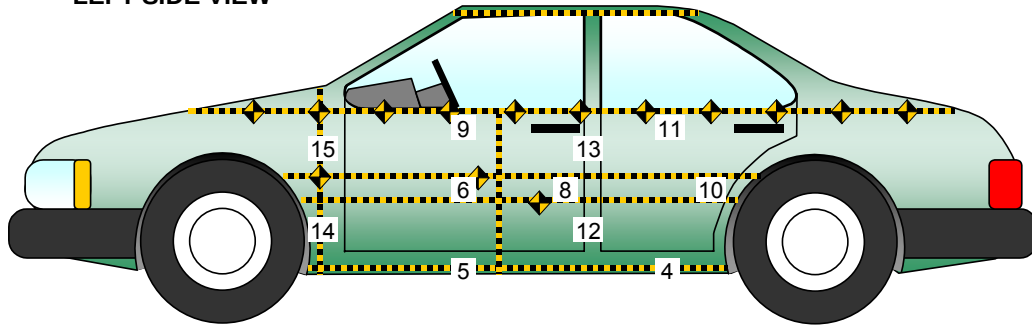
Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

LEFT SIDE VIEW



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

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

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

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 5/4/07

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2539	625	370
2	Right Sill at Rear Seat	1695	625	370
3	Rear Floorpan Above Axle	805	80	362
4	Left Sill at Rear Door	1514	-680	162
5	Left Sill at Front Door	2389	-680	162
6	Front Door Centerline			
7	Rt. Rear Occ. Compartment	2064	205	200
8	Front Door Mid-Rear			
9	Front Door Upper Centerline			
10	Rear Door Mid-Rear			
11	Rear Door Upper Centerline			
12	B-Post Lower	2021	-699	567
13	B-Post Middle	2021	-699	752
14	A-Post Lower	3135	-729	372
15	A-Post Middle	3135	-729	509
16	Front Seat Track	2615	-510	380
17	Rear Seat Structure			
18	Vehicle CG	2710	130	200

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

1.) Not installed

DATA SHEET NO. 13
MDB ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

Test Program: 55/28 km/h Side Impact NCAP

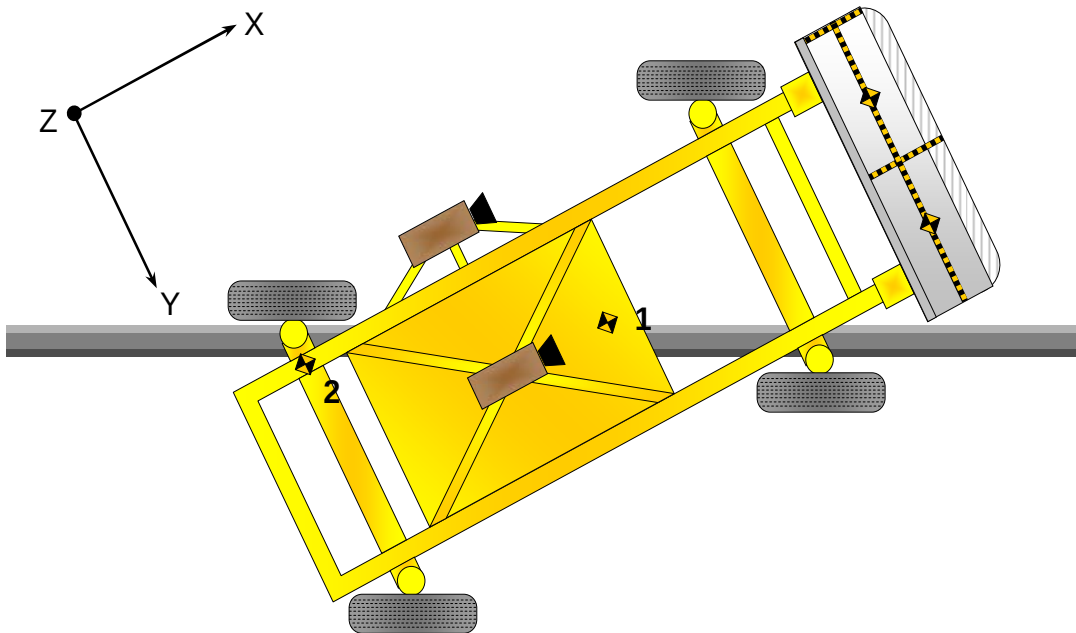
NHTSA No.: G70108

Test Date: 5/4/07

MDB ACCELEROMETER LOCATIONS

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

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



DATA SHEET NO. 14

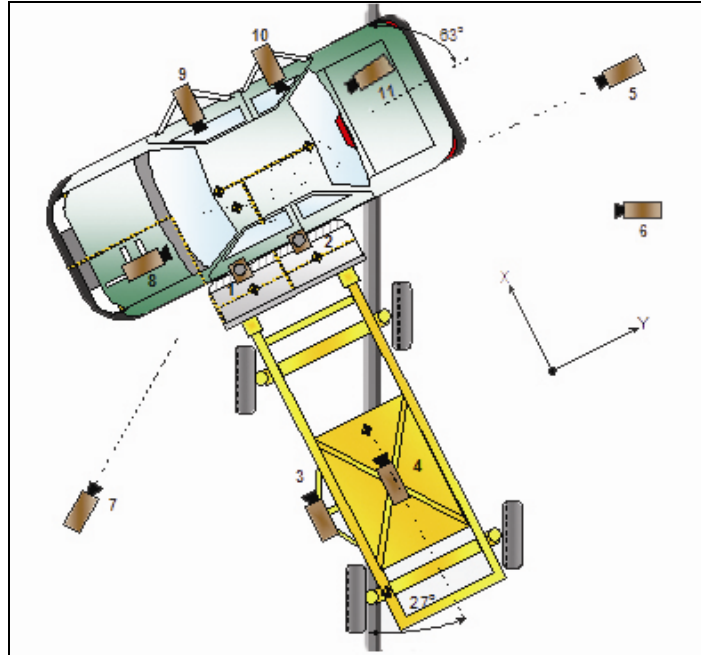
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



No.	Camera View	Location (mm)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X	Y	Z			
Doc	Real Time Inrun	-2484	-3958	-1506			30
Doc	Real Time Left Front	-2266	3549	-1475	-2		30
1	Overhead Overall	1220	2287	-5486	-90	14mm	1000
2	Overhead Close Up	609	2287	-5102	-90	Zoom	1000
3	Left Impact Point (MDB)	-2134	0	-1143	-2	12mm	1000
4	Side Overall (MDB)	-3912	838	-1829	-4	12mm	1000
5	Rear	-64	20485	-1348	0	105mm	1000
6	Left Rear (MDB)	-2137	-1302	-339	-4	85mm	1000
7	Left Front	-2266	-3564	-1475	-2	24mm	1000
8	Driver Front (O.B.)	540	-432	-1180	-12	35mm	1000
9	Driver Side (O.B.)	1630	716	1706	-2	20mm	1000
10	Passenger Side (O.B.)	1630	1748	1706	-2	20mm	1000

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

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP Test Date: 05/04/07

Test Time: 1:23 PM Temperature: 22.0 Deg. C.

Stoddard Solvent Spillage Measurements

- A. From impact until vehicle motion ceases: 0.0 oz.
(Maximum Allowable = 1 ounce)
- B. For the 5 minute period after motion ceases: 0.0 oz.
(Maximum Allowable = 5 ounces)
- C. For the following 25 minutes: 0.0 oz.
(Maximum Allowable = 1 oz./minute)
- D. Spillage Details: No leakage occurred

DATA SHEET NO. 16

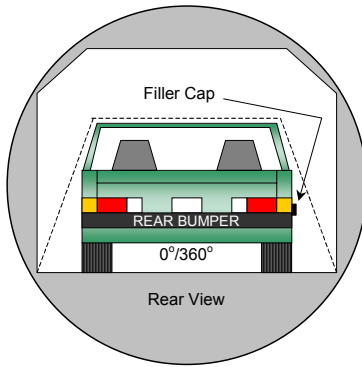
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

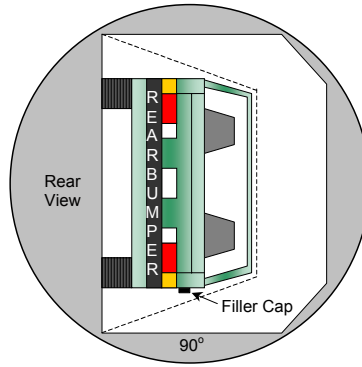
NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

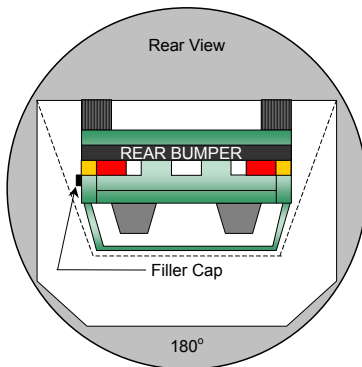
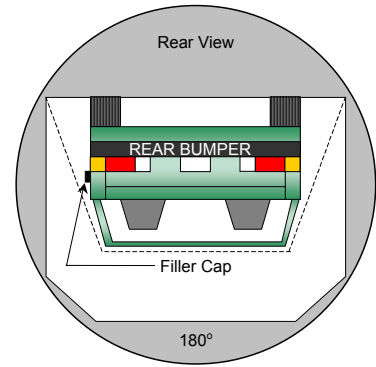
Test Date: 05/04/07



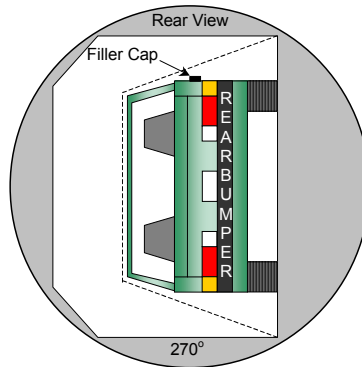
0° to 90°



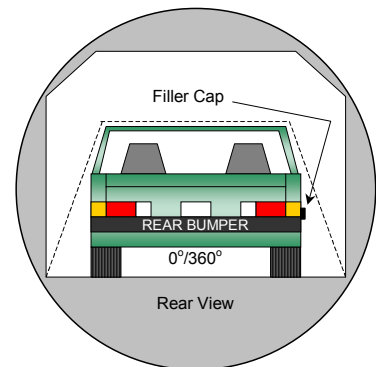
90° to 180°



180° to 270°



270° to 360°



1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
 2. The position hold time at each position is 300 seconds (minimum).
 3. Details of Stoddard Solvent spillage locations.
- No solvent leakage occurred during static rollover testing.

DATA SHEET NO. 16...(CONTINUED)**FMVSS 301 STATIC ROLLOVER DATA SHEET**Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door SedanNHTSA No.: G70108Test Program: 55/28 km/h Side Impact NCAPTest Date: 05/04/07**SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	87	303	390
90° to 180°	88	301	389
180° to 270°	89	302	391
270° to 360°	88	311	399

FMVSS 301 SPILLAGE TABLE REQUIREMENT (oz.)

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

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

SOLVENT SPILLAGE LOCATION TABLE

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

APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure		Page
A-1	Left Front $\frac{3}{4}$ View, as Received	A-1
A-2	Right Rear $\frac{3}{4}$ View, as Received	A-2
A-3	Manufacturer's Label	A-3
A-4	Tire Placard	A-4
A-5	Pre-Test Front View	A-5
A-6	Post-Test Front View	A-6
A-7	Pre-Test Left Front $\frac{3}{4}$ View	A-7
A-8	Post-Test Left Front $\frac{3}{4}$ View	A-8
A-9	Pre-Test Left Side View	A-9
A-10	Post-Test Left Side View	A-10
A-11	Pre-Test Left Rear $\frac{3}{4}$ View	A-11
A-12	Post-Test Left Rear $\frac{3}{4}$ View	A-12
A-13	Pre-Test Rear View	A-13
A-14	Post-Test Rear View	A-14
A-15	Pre-Test Right Rear $\frac{3}{4}$ View	A-15
A-16	Post-Test Right Rear $\frac{3}{4}$ View	A-16
A-17	Pre-Test Right Side View	A-17
A-18	Post-Test Right Side View	A-18
A-19	Pre-Test Right Front $\frac{3}{4}$ View	A-19
A-20	Post-Test Right Front $\frac{3}{4}$ View	A-20
A-21	Pre-Test Overhead View	A-21
A-22	Post-Test Overhead View	A-22
A-23	Pre-Test Overhead Close-up View	A-23
A-24	Post-Test Overhead Close-up View	A-24
A-25	Pre-Test Left Impact Point	A-25
A-26	Post-Test Left Impact Point	A-26
A-27	Pre-Test Front $\frac{3}{4}$ View of Left Side Doors	A-27
A-28	Post-Test Front $\frac{3}{4}$ View of Left Side Doors	A-28
A-29	Pre-Test Rear $\frac{3}{4}$ View of Left Side Doors	A-29
A-30	Post-Test Rear $\frac{3}{4}$ View of Left Side Doors	A-30
A-31	Pre-Test Left Front Door	A-31
A-32	Post-Test Left Front Door	A-32
A-33	Pre-Test Left Rear Door	A-33
A-34	Post-Test Left Rear Door	A-34

LIST OF PHOTOGRAPHS...(CONTINUED)

Figure		Page
A-35	Pre-Test Driver Dummy (Door Open)	A-35
A-36	Pre-Test Driver Dummy (Through Window)	A-36
A-37	Post-Test Driver Dummy (Through Window)	A-37
A-38	Pre-Test Driver Dummy Clearance from Door	A-38
A-39	Post-Test Driver Dummy Clearance from Door	A-39
A-40	Pre-Test Driver Dummy Right Side View	A-40
A-41	Post-Test Driver Dummy Right Side View	A-41
A-42	Pre-Test Front Door Panel (Interior)	A-42
A-43	Post-Test Front Door Panel (Interior)	A-43
A-44	Pre-Test Passenger Dummy Left Side (Door Open)	A-44
A-45	Pre-Test Passenger Dummy Left Side (Through Window)	A-45
A-46	Post-Test Passenger Dummy Left Side (Through Window)	A-46
A-47	Pre-Test Passenger Dummy Clearance from Door	A-47
A-48	Post-Test Passenger Dummy Clearance from Door	A-48
A-49	Pre-Test Passenger Dummy Right Side View	A-49
A-50	Post-Test Passenger Dummy Right Side View	A-50
A-51	Pre-Test Rear Door Panel (Interior)	A-51
A-52	Post-Test Rear Door Panel (Interior)	A-52
A-53	Pre-Test Front View of Deformable Barrier	A-53
A-54	Post-Test Front View of Deformable Barrier	A-54
A-55	Pre-Test Top View of Deformable Barrier	A-55
A-56	Post-Test Top View of Deformable Barrier	A-56
A-57	Pre-Test Right Side View of Deformable Barrier	A-57
A-58	Post-Test Right Side View of Deformable Barrier	A-58
A-59	Pre-Test Left Side View of Deformable Barrier	A-59
A-60	Post-Test Left Side View of Deformable Barrier	A-60
A-61	Vehicle on Rollover Device (0°)	A-61
A-62	Vehicle on Rollover Device (90°)	A-62
A-63	Vehicle on Rollover Device (180°)	A-63
A-64	Vehicle on Rollover Device (270°)	A-64
A-65	Vehicle Impact	A-65



Figure A-1: Left Front $\frac{3}{4}$ View, as Received



Figure A-2: Right Rear $\frac{3}{4}$ View, as Received

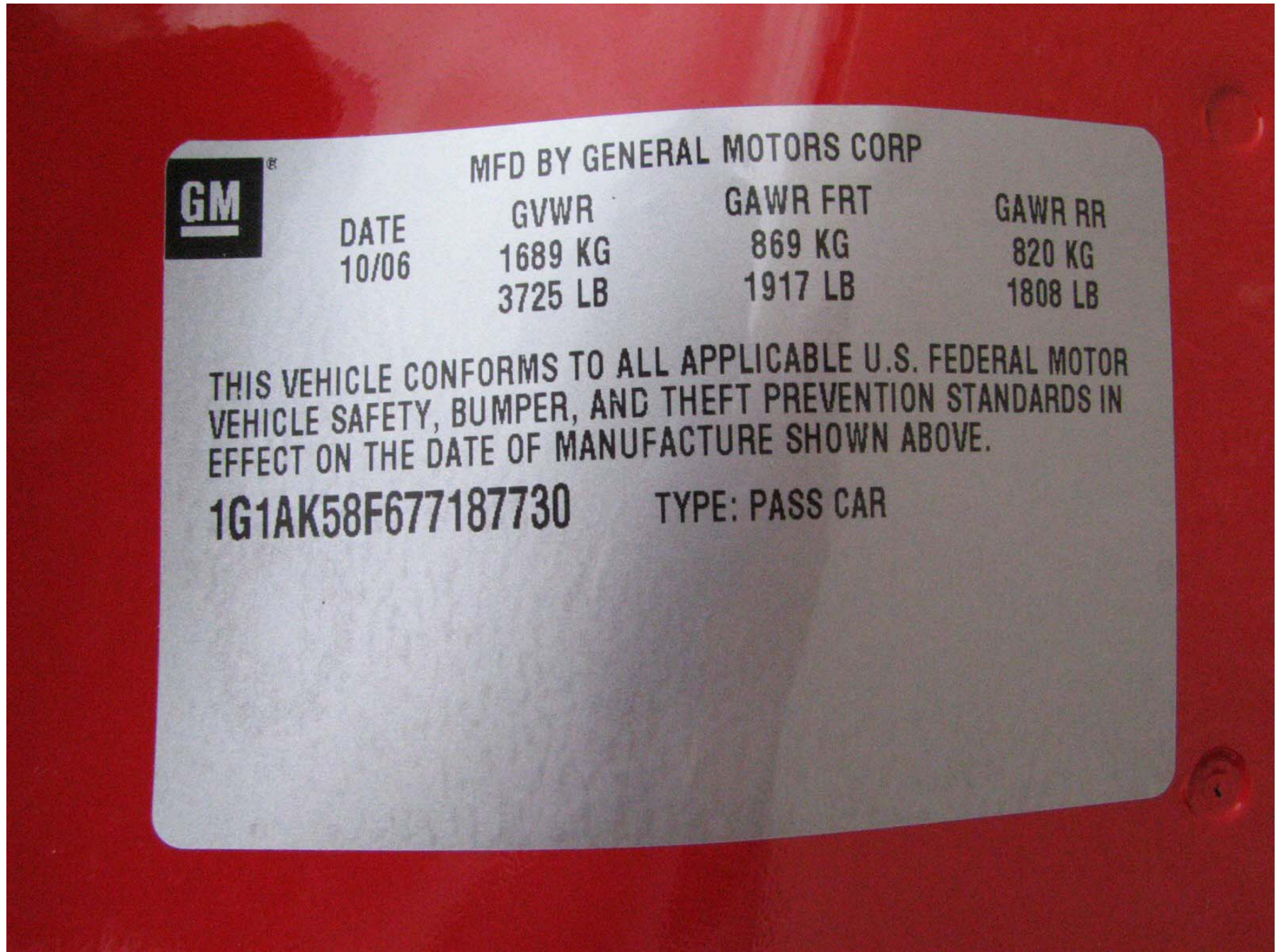


Figure A-3: Manufacturer's Label



Figure A-4: Tire Placard



Figure A-5: Pre-Test Front View



Figure A-6: Post-Test Front View



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



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



Figure A-9: Pre-Test Left Side View



Figure A-10: Post-Test Left Side View



Figure A-11: Pre-Test Left Rear $\frac{3}{4}$ View



Figure A-12: Post-Test Left Rear $\frac{3}{4}$ View



Figure A-13: Pre-Test Rear View



Figure A-14: Post-Test Rear View



Figure A-15: Pre-Test Right Rear $\frac{3}{4}$ View



Figure A-16: Post-Test Right Rear $\frac{3}{4}$ View



Figure A-17: Pre-Test Right Side View



Figure A-18: Post-Test Right Side View



Figure A-19: Pre-Test Right Front $\frac{3}{4}$ View

**Photograph Not
Available**

Figure A-20: Post-Test Right Front $\frac{3}{4}$ View



Figure A-21: Pre-Test Overhead View



Figure A-22: Post-Test Overhead View



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



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



Figure A-25: Pre-Test Left Impact Point



Figure A-26: Post-Test Left Impact Point



Figure A-27: Pre-Test Front $\frac{3}{4}$ View of Left Side Door



Figure A-28: Post-Test Front $\frac{3}{4}$ View of Left Side Door



Figure A-29: Pre-Test Rear $\frac{3}{4}$ View of Left Side Door



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



Figure A-31: Pre-Test Left Front Door



Figure A-32: Post-Test Left Front Door



Figure A-33: Pre-Test Left Rear Door



Figure A-34: Post-Test Left Rear Door



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

This Space Intentionally Left Blank



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



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



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



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



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



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



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



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



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

This Space Intentionally Left Blank



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



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



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



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



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



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



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



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



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



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



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

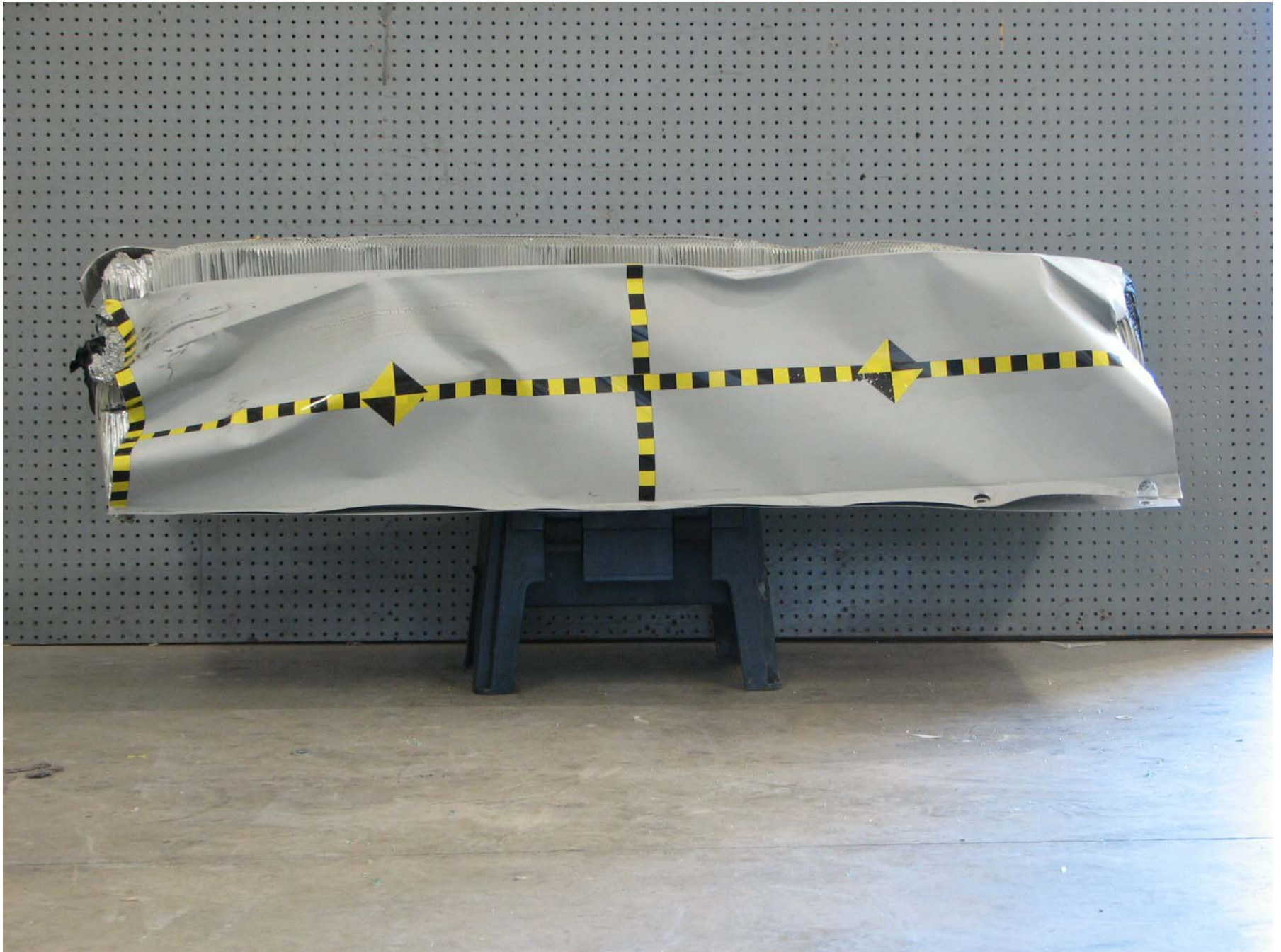


Figure A-56: Post-Test Top View of Deformable Barrier



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



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



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



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



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



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



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



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



Figure A-65: Vehicle Impact

APPENDIX B
SID/HIII, VEHICLE AND MDB RESPONSE DATA

LIST OF DATA PLOTS

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

The following additional data plots for this test can be obtained from the research and development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov

LIST OF DATA PLOTS...(CONTINUED)

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

LIST OF DATA PLOTS...(CONTINUED)

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

LIST OF DATA PLOTS...(CONTINUED)

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

LIST OF DATA PLOTS...(CONTINUED)

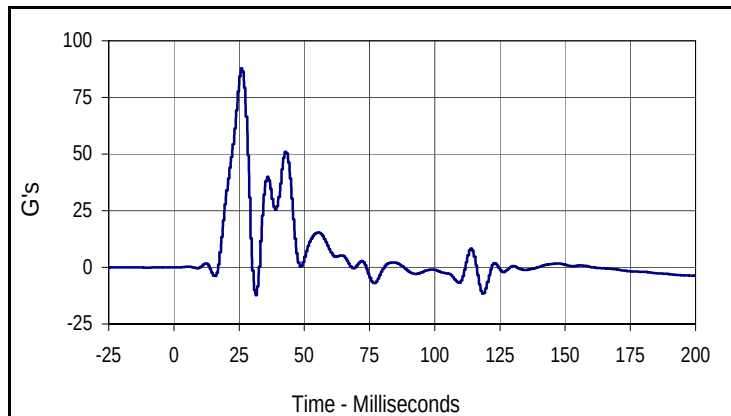
Vehicle Left Sill at Rear Door Y
Vehicle Left Sill at Front Door Y
Vehicle Left Sill at Rear Door Y Velocity
Vehicle Left Sill at Front Door Y Velocity
Vehicle Left Front Door C/L Y
Vehicle Right Rear Occupant Compartment
Vehicle Left Front Door Mid Rear Y
Vehicle Left Front Door Upper CL Y
Vehicle Left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

LIST OF DATA PLOTS...(CONTINUED)

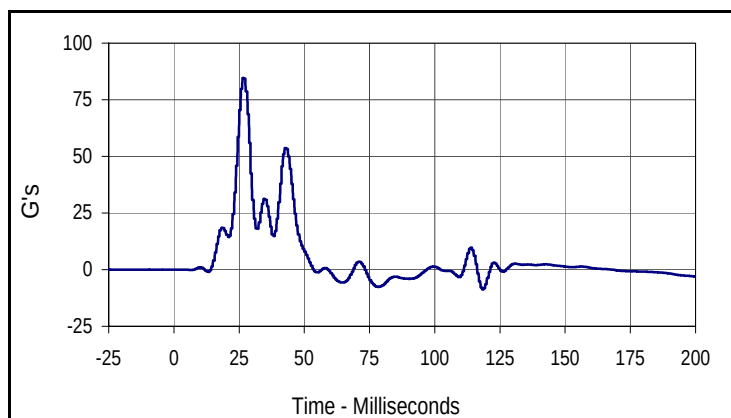
Driver Upper Rib Primary Y
Driver Lower Rib Primary Y
Driver Lower Spine Primary Y
Driver Pelvis Primary Y
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y
Passenger Upper Rib Primary Y
Passenger Lower Rib Primary Y
Passenger Lower Spine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

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan
 Test Program: 55/28 km/h Side Impact NCAP

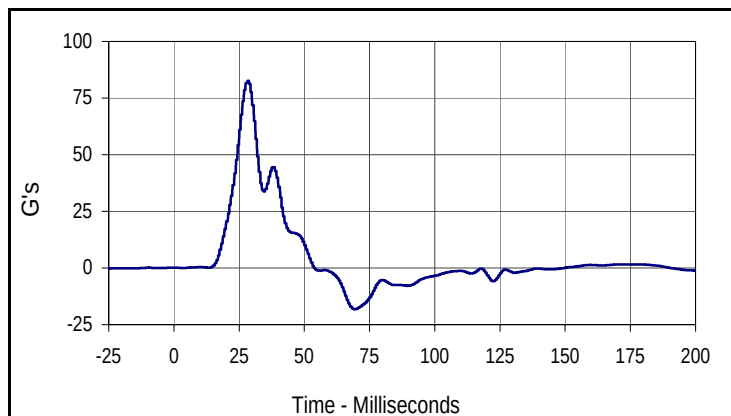
Test Date: 5/4/07
 NHTSA No.: G70108



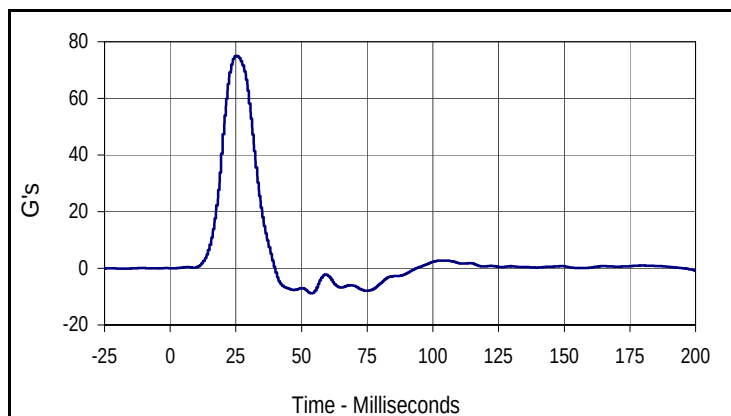
Curve Description			
Driver Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
001	FIR	FIR100	G's
Max	Time	Min	Time
87.8	25.7	-12.3	31.3



Curve Description			
Driver Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
002	FIR	FIR100	G's
Max	Time	Min	Time
84.7	26.3	-8.8	118.2



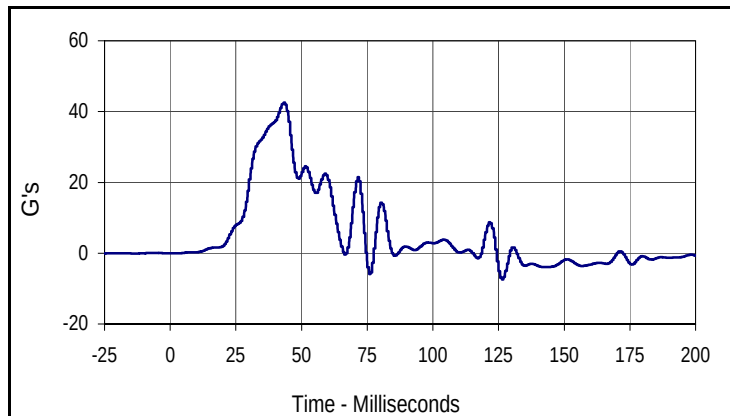
Curve Description			
Driver Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
003	FIR	FIR100	G's
Max	Time	Min	Time
82.6	28.2	-18.2	69.4



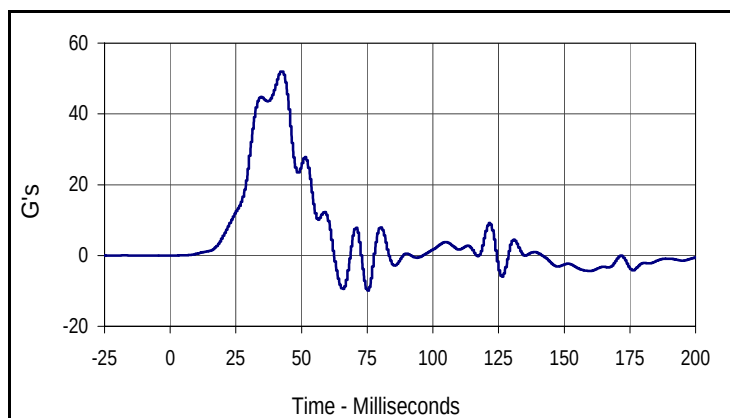
Curve Description			
Driver Pelvis Primary Y			
CURNO	Type	SAE Class	Units
004	FIR	FIR100	G's
Max	Time	Min	Time
75.1	25.0	-8.8	53.8

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan
 Test Program: 55/28 km/h Side Impact NCAP

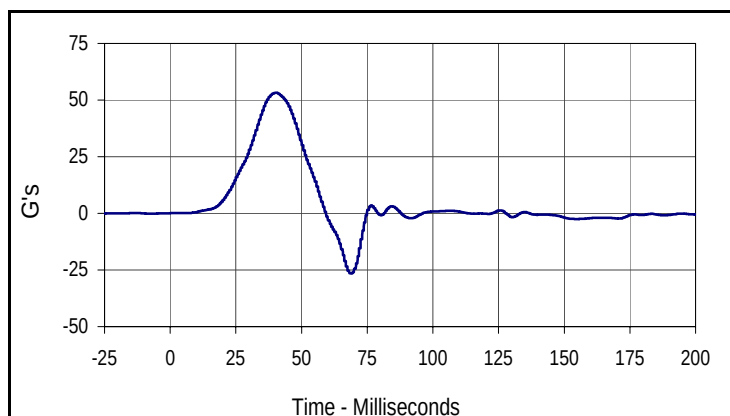
Test Date: 5/4/07
 NHTSA No.: G70108



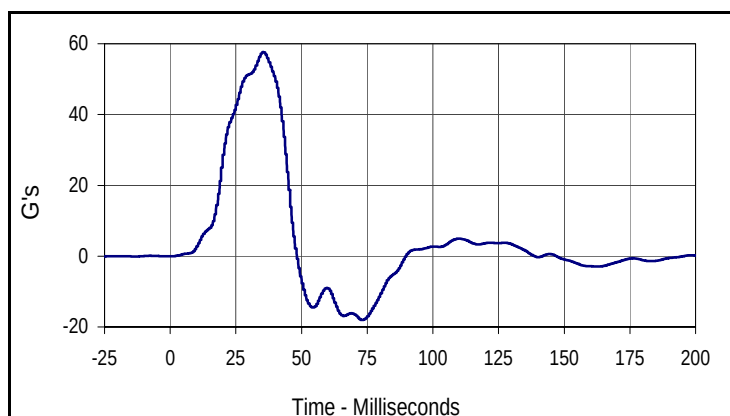
Curve Description			
Passenger Upper Rib Y Primary			
CURNO	Type	SAE Class	Units
005	FIR	FIR100	G's
Max	Time	Min	Time
42.5	43.2	-7.4	126.3



Curve Description			
Passenger Lower Rib Y Primary			
CURNO	Type	SAE Class	Units
006	FIR	FIR100	G's
Max	Time	Min	Time
52.0	42.5	-9.9	75.0



Curve Description			
Passenger Lower Spine Y Primary			
CURNO	Type	SAE Class	Units
007	FIR	FIR100	G's
Max	Time	Min	Time
53.2	40.0	-26.6	68.8



Curve Description			
Passenger Pelvis Y Primary			
CURNO	Type	SAE Class	Units
008	FIR	FIR100	G's
Max	Time	Min	Time
57.7	35.0	-18.0	73.2

APPENDIX C
SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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

Test Program: SID / HIII External Measurements
ATD Serial No.: 275

Test Date: 5/3/07
Test I.D.: N/A



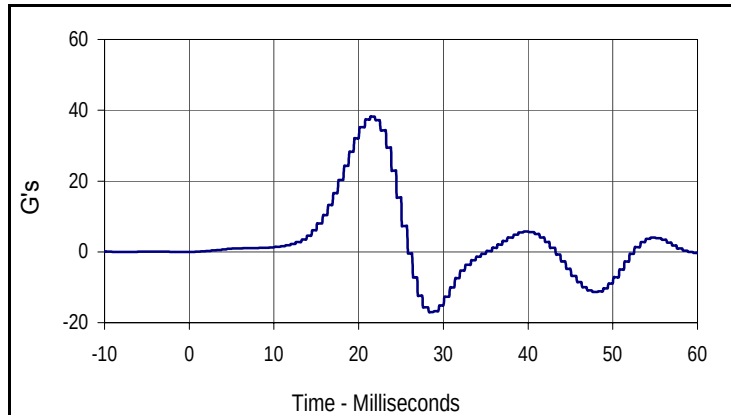
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	895	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	513	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	515	Pass
KV- Knee Pivot From Floor	mm	490 to 505	501	Pass
HW- Hip Width	mm	356 to 391	373	Pass
Overall Test Results				Pass

Test Program: SID / HIII Thorax Lateral Impact
 ATD Serial No.: 275

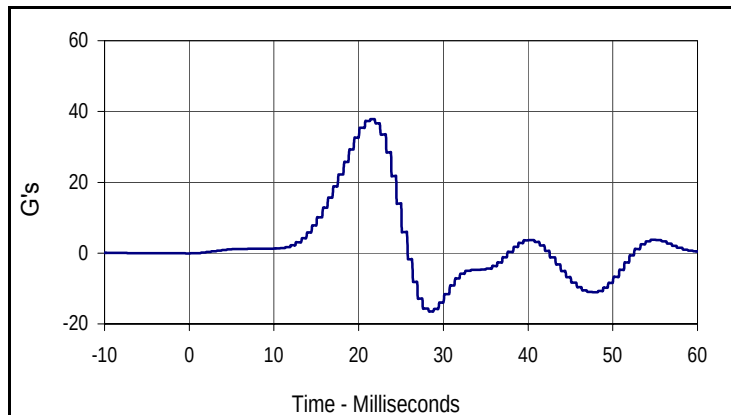
Test Date: 5/3/07
 Test I.D.: TH05P



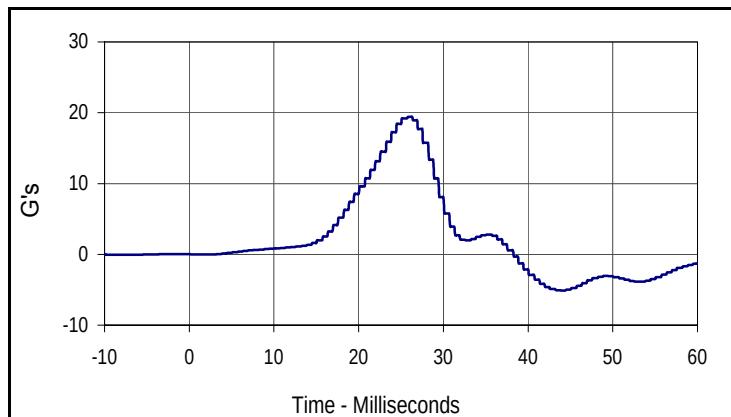
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	38.2	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	37.9	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.4	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
38.2	21.4	-17.0	28.3



Curve Description			
Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
37.9	21.4	-16.5	28.3



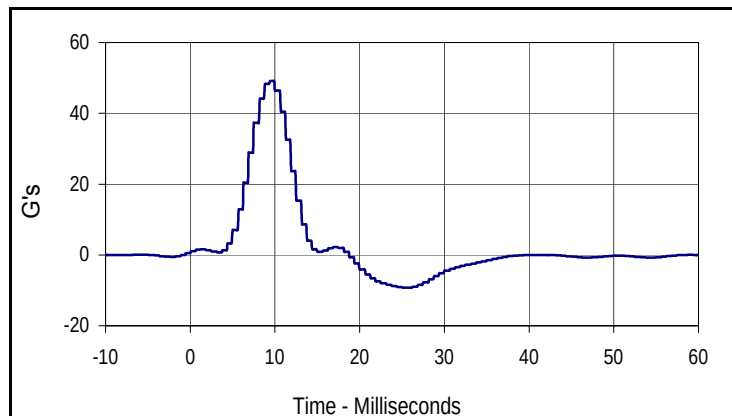
Curve Description			
Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.4	25.8	-5.1	43.9

Test Program: SID / HIII Pelvis Lateral Impact
 ATD Serial No.: 275

Test Date: 5/3/07
 Test I.D.: PL05E



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	49.2	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	4.90	Pass
Overall Test Results				Pass



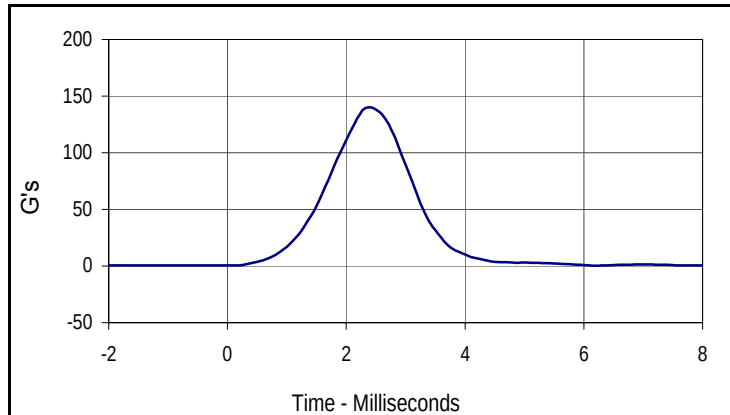
Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
49.2	9.4	-9.3	25.0

Test Program: SID / HIII Head Drop Lateral Impact Test
 ATD Serial No.: 275

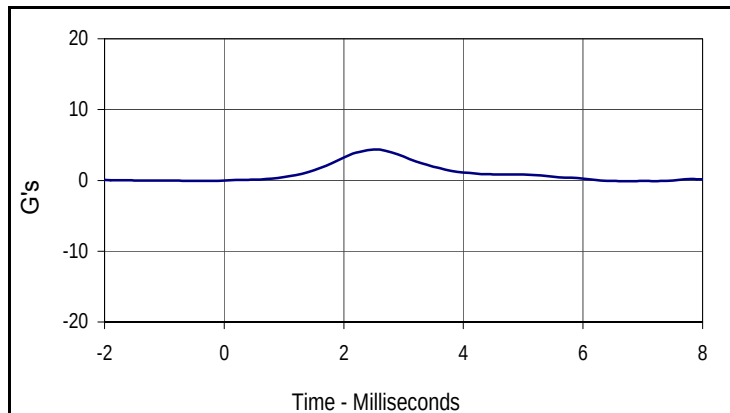
Test Date: 5/3/07
 Test I.D.: HD05K



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	120.0 to 150.0	140.2	Pass
Peak Longitudinal Acceleration	G's	≤15.0	4.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.1	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
140.2	2.4	0.4	0.1



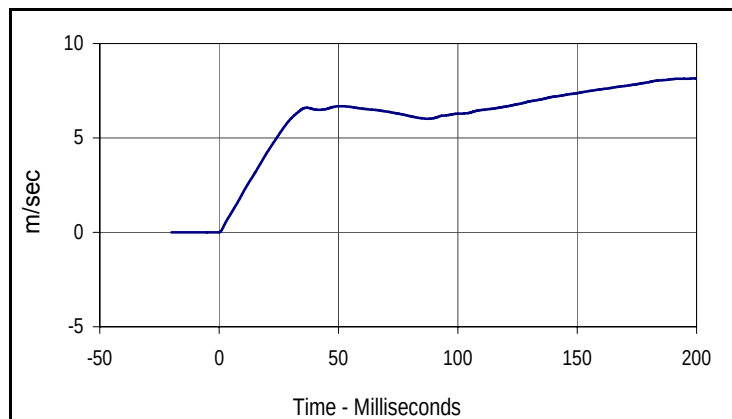
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
4.4	2.5	-0.1	-0.2

Test Program: SID / HIII Neck Pendulum Lateral Test
 ATD Serial No.: 275

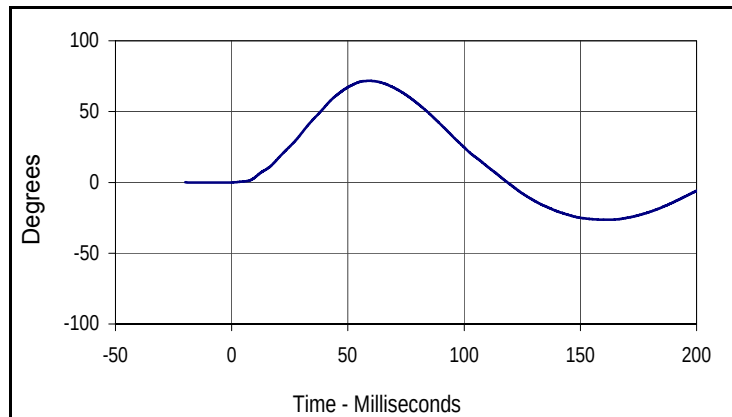
Test Date: 5/3/07
 Test I.D.: NB05H



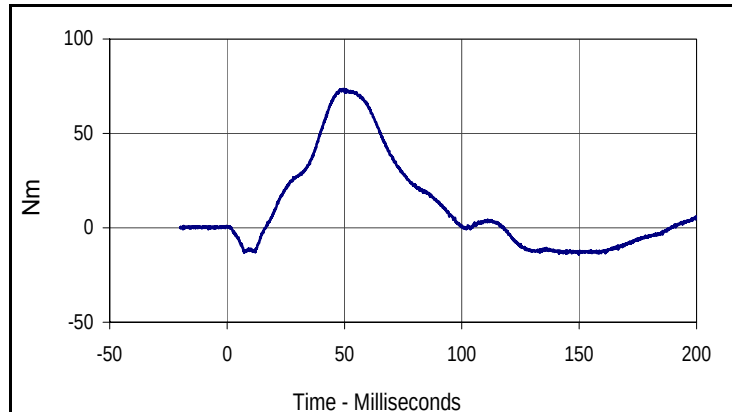
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.01	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.11	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.21	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.02	Pass
	40 to 70	m/sec	6.27 to 7.64	6.68	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	71.7	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	9.8	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	59.4	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	73.6	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	51.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.1	198.8	0.0	-0.5



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
71.7	59.2	-26.3	161.2



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	60	Nm
Max	Time	Min	Time
73.6	49.4	-14.1	149.8

Test Program: SID / HIII External Measurements
ATD Serial No.: 274

Test Date: 5/3/07
Test I.D.: N/A



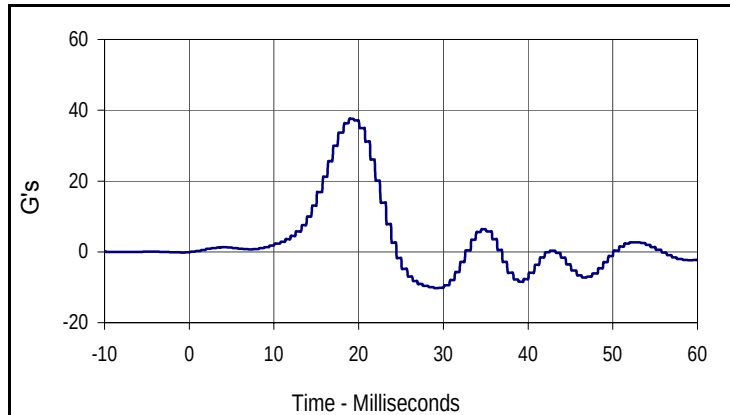
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	890	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	513	Pass
KV- Knee Pivot From Floor	mm	490 to 505	497	Pass
HW- Hip Width	mm	356 to 391	375	Pass
Overall Test Results				Pass

Test Program: SID / HIII Thorax Lateral Impact
 ATD Serial No.: 274

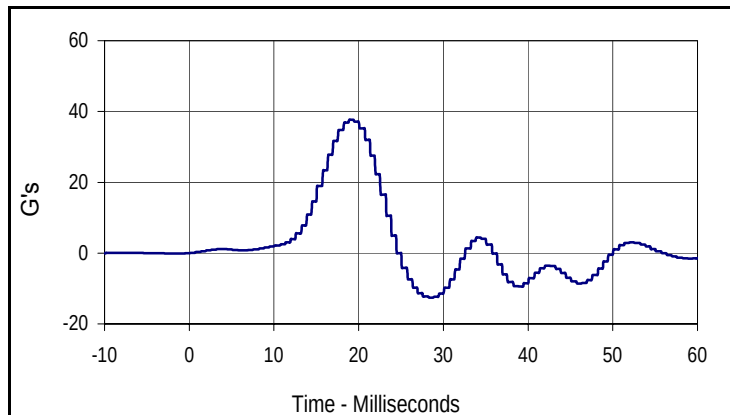
Test Date: 5/3/07
 Test I.D.: TH05D



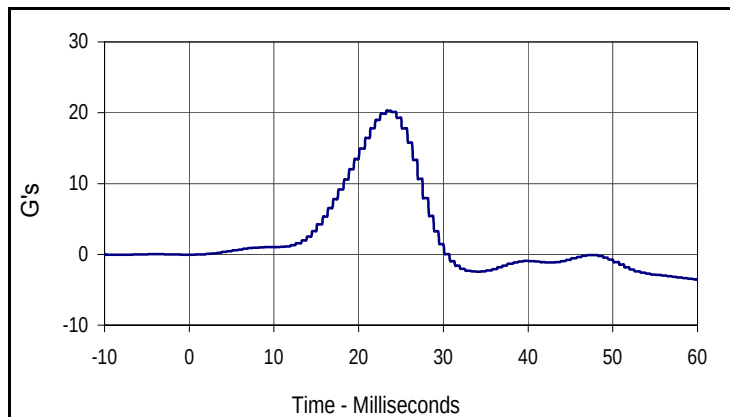
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.23	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	37.6	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	37.7	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.3	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
37.6	18.9	-10.2	28.9



Curve Description			
Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
37.7	18.9	-12.6	28.3



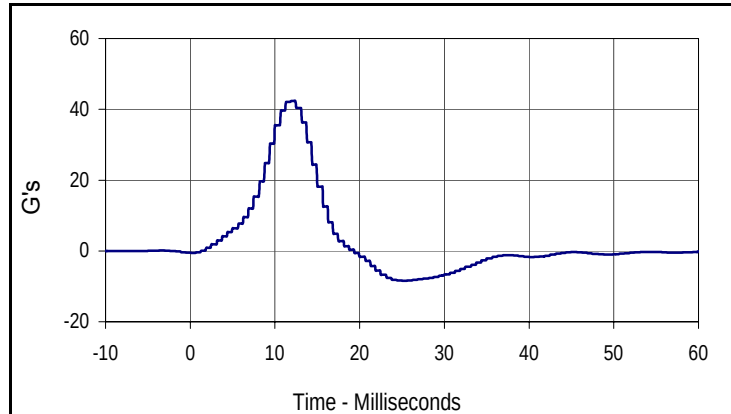
Curve Description			
Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.3	23.3	-3.6	60.8

Test Program: SID / HIII Pelvis Lateral Impact
 ATD Serial No.: 274

Test Date: 5/1/07
 Test I.D.: PL05C



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.22	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	42.4	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.10	Pass
Overall Test Results				Pass



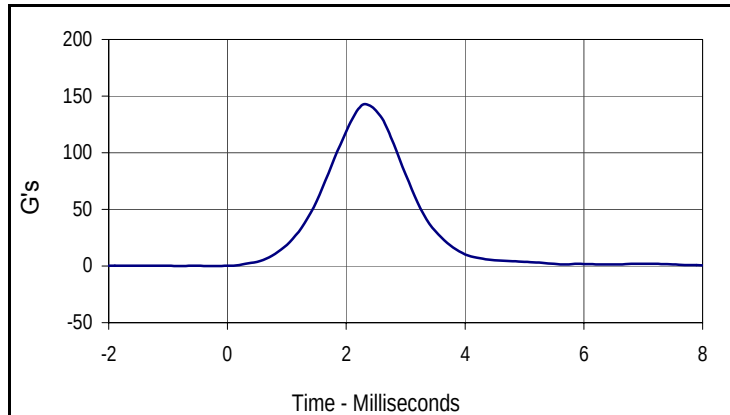
Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.4	11.9	-8.4	25.0

Test Program: SID / HIII Head Drop Lateral Impact Test
 ATD Serial No.: 274

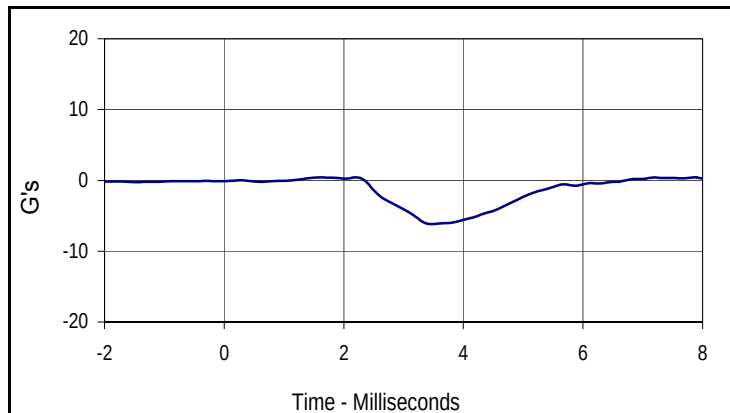
Test Date: 5/3/07
 Test I.D.: HD05L



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	142.8	Pass
Peak Longitudinal Acceleration	G's	≤15.0	6.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.6	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
142.8	2.3	0.1	-0.3



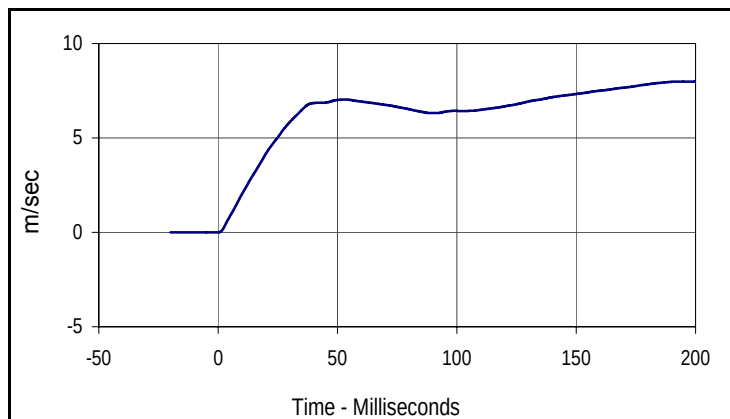
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.4	1.6	-6.2	3.5

Test Program: SID / HIII Neck Pendulum Lateral Test
 ATD Serial No.: 274

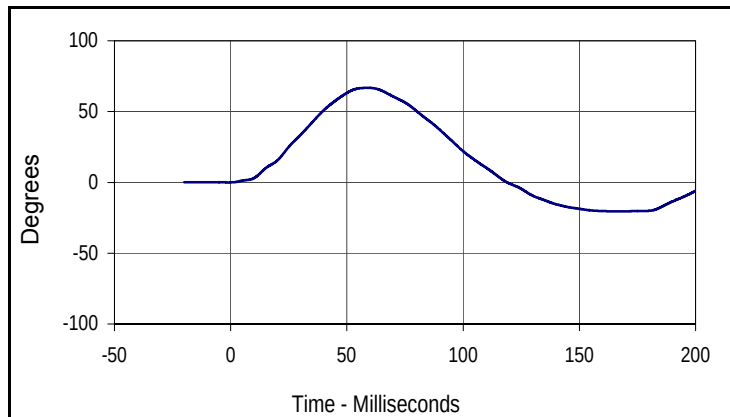
Test Date: 5/1/07
 Test I.D.: NB05L



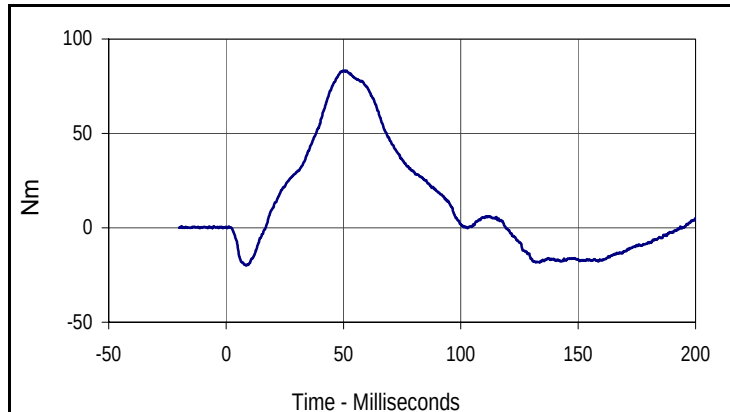
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.03	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.16	Pass
	30 Msec.	m/sec	5.73 to 7.01	5.84	Pass
	40 to 70	m/sec	6.27 to 7.64	7.04	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	66.7	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	7.9	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	59.9	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	83.3	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	51.5	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.0	192.7	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
66.7	59.1	-20.4	165.2



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
83.3	51.2	-20.0	8.6

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

Test Program: SID / HIII External Measurements
 ATD Serial No.: 275

Test Date: 5/7/07
 Test I.D.: N/A



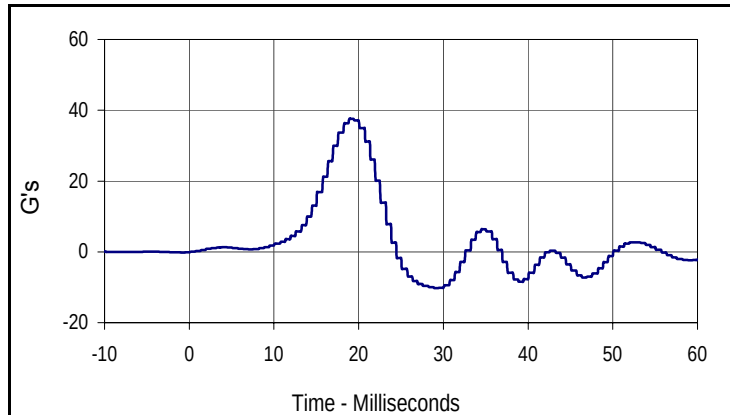
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	894	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	512	Pass
KV- Knee Pivot From Floor	mm	490 to 505	502	Pass
HW- Hip Width	mm	356 to 391	374	Pass
Overall Test Results				Pass

Test Program: SID / HIII Thorax Lateral Impact
 ATD Serial No.: 275

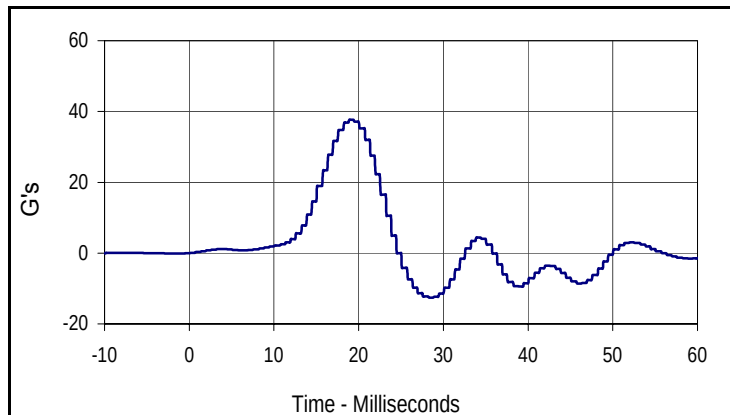
Test Date: 5/7/07
 Test I.D.: TH05T



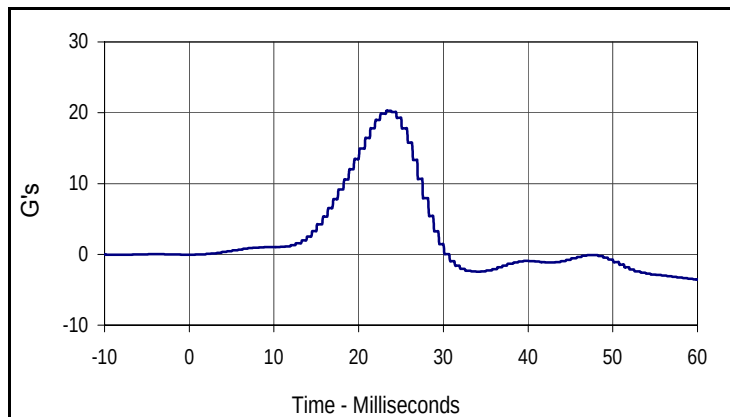
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.33	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	37.6	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	37.7	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.3	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
37.6	18.9	-10.2	28.9



Curve Description			
Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
37.7	18.9	-12.6	28.3



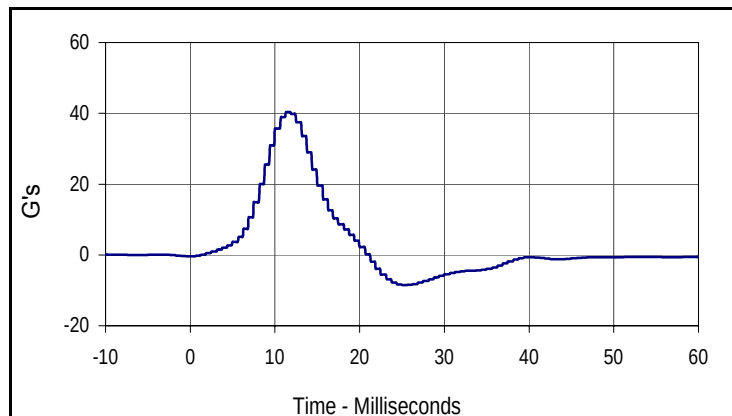
Curve Description			
Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.3	23.3	-3.6	60.8

Test Program: SID / HIII Pelvis Lateral Impact
 ATD Serial No.: 275

Test Date: 5/7/07
 Test I.D.: PL05Q



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.31	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	40.4	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.70	Pass
Overall Test Results				Pass



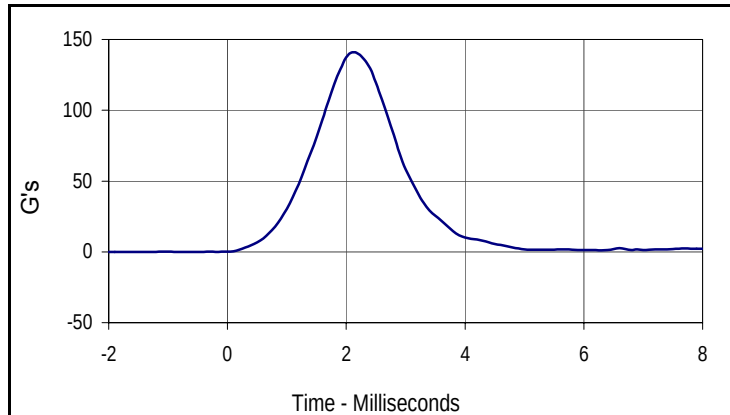
Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.4	11.3	-8.5	25.0

Test Program: SID / HIII Head Drop Lateral Impact Test
 ATD Serial No.: 275

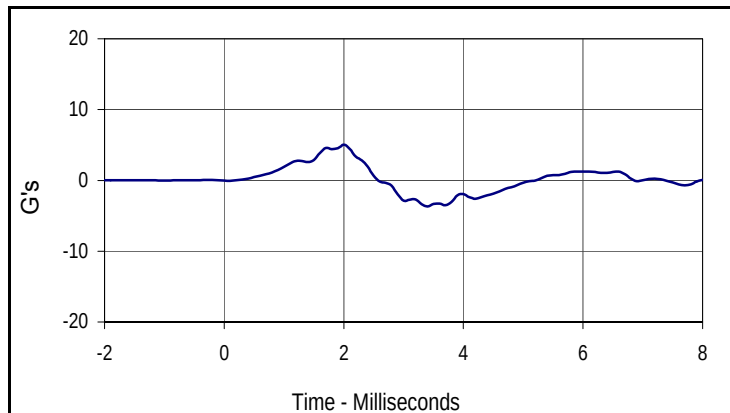
Test Date: 5/7/07
 Test I.D.: HD05T



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	120.0 to 150.0	140.9	Pass
Peak Longitudinal Acceleration	G's	≤15.0	5.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.9	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
140.9	2.1	0.0	-1.6



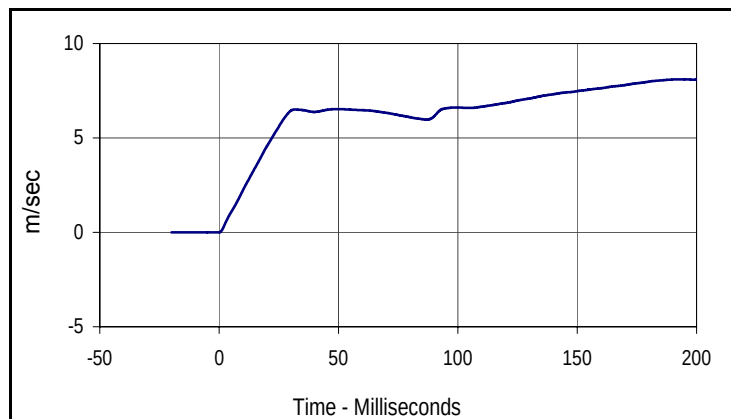
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.0	2.0	-3.7	3.4

Test Program: SID / HIII Neck Pendulum Lateral Test
 ATD Serial No.: 275

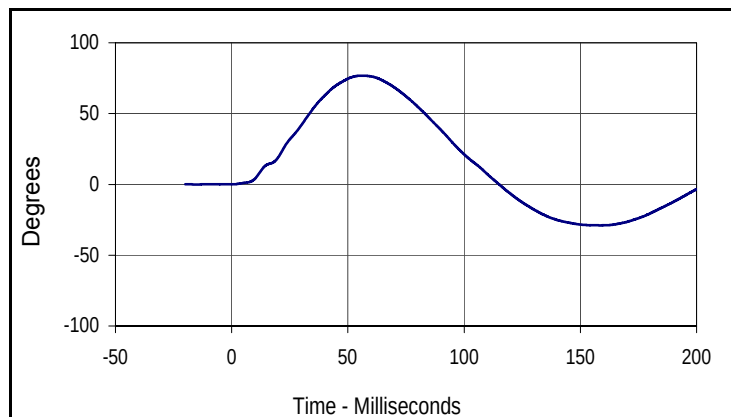
Test Date: 5/7/07
 Test I.D.: NB05T



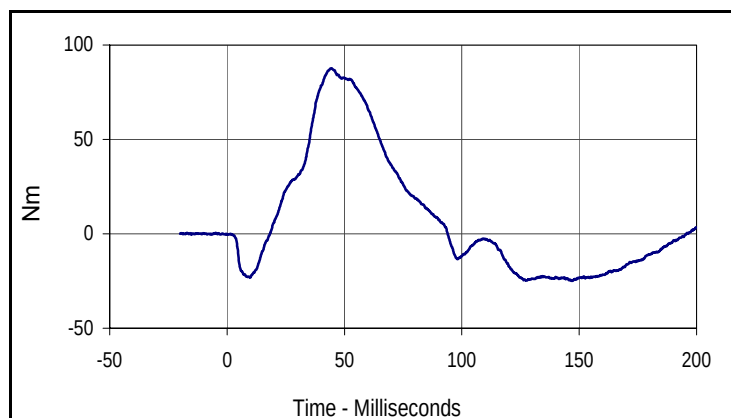
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.24	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.56	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.44	Pass
	40 to 70	m/sec	6.27 to 7.64	6.53	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	76.8	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	11.7	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	59.2	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	87.7	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.8	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.1	191.7	0.0	-0.3



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.8	55.9	-28.9	158.6



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
87.7	44.2	-24.9	146.6

Test Program: SID / HIII External Measurements
 ATD Serial No.: 274

Test Date: 5/7/07
 Test I.D.: N/A



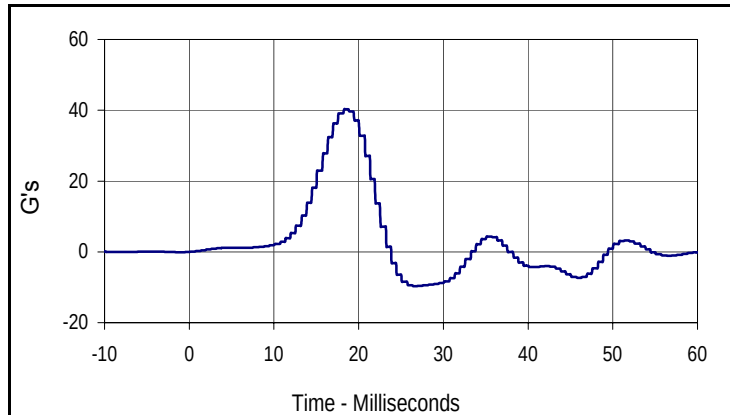
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	889	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	512	Pass
KV- Knee Pivot From Floor	mm	490 to 505	497	Pass
HW- Hip Width	mm	356 to 391	376	Pass
Overall Test Results				Pass

Test Program: SID / HIII Thorax Lateral Impact
 ATD Serial No.: 274

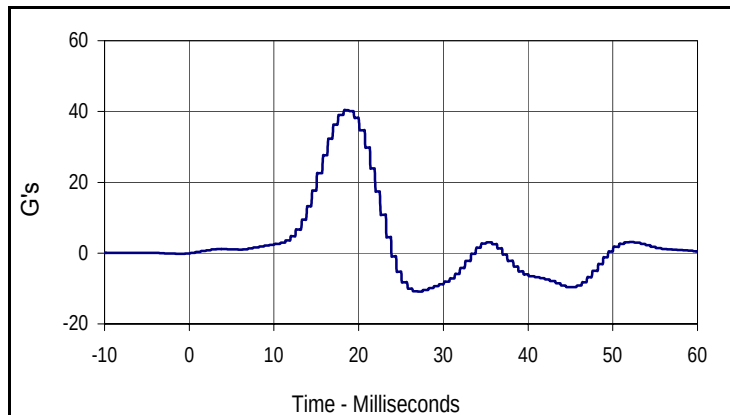
Test Date: 5/7/07
 Test I.D.: TH050



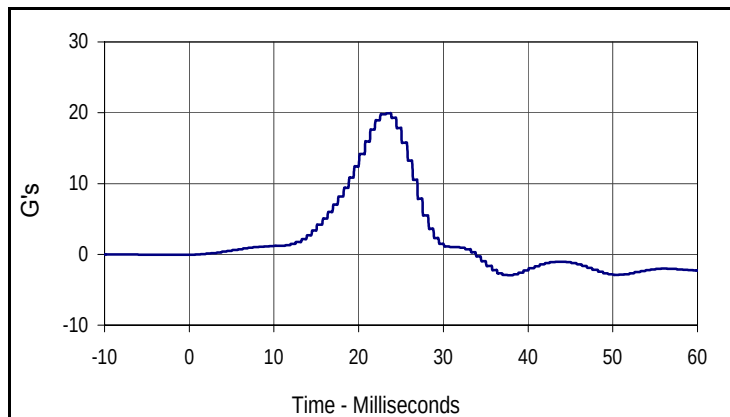
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.32	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	40.3	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	40.4	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.9	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.3	18.3	-9.7	26.4



Curve Description			
Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
40.4	18.3	-10.8	27.0



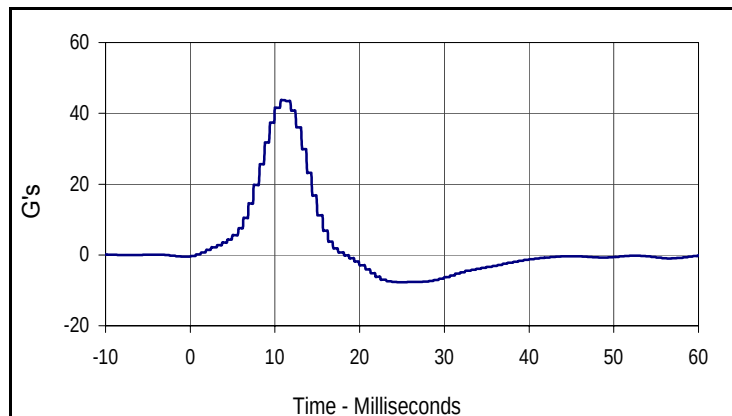
Curve Description			
Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.9	23.3	-2.9	37.6

Test Program: SID / HIII Pelvis Lateral Impact
 ATD Serial No.: 274

Test Date: 5/7/07
 Test I.D.: PL05P



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.31	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	43.7	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	5.40	Pass
Overall Test Results				Pass



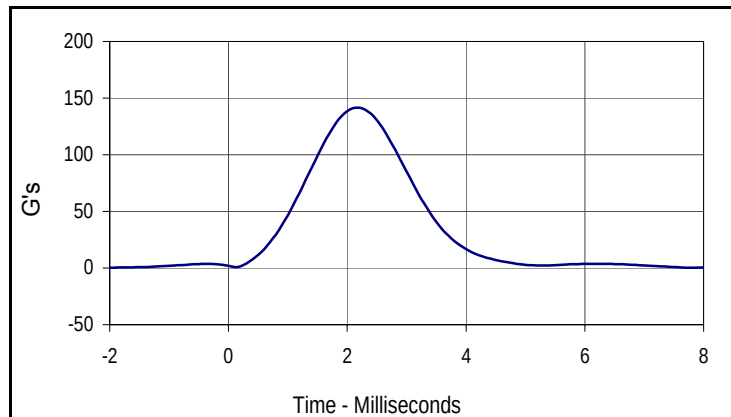
Curve Description			
Pelvis Y Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
43.7	10.7	-7.7	24.4

Test Program: SID / HIII Head Drop Lateral Impact Test
 ATD Serial No.: 274

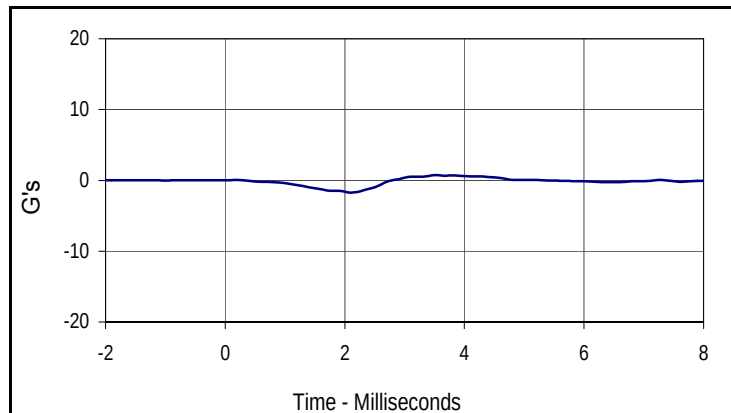
Test Date: 5/7/07
 Test I.D.: HD050



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	141.6	Pass
Peak Longitudinal Acceleration	G's	≤15.0	1.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.6	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
141.6	2.2	0.3	-2.0



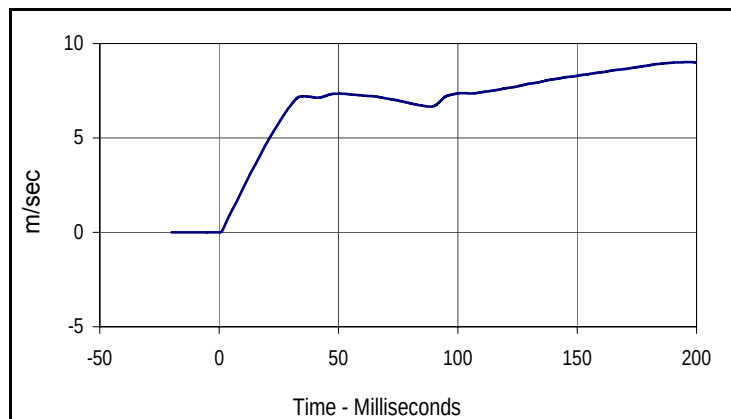
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.7	3.5	-1.8	2.1

Test Program: SID / HIII Neck Pendulum Lateral Test
 ATD Serial No.: 274

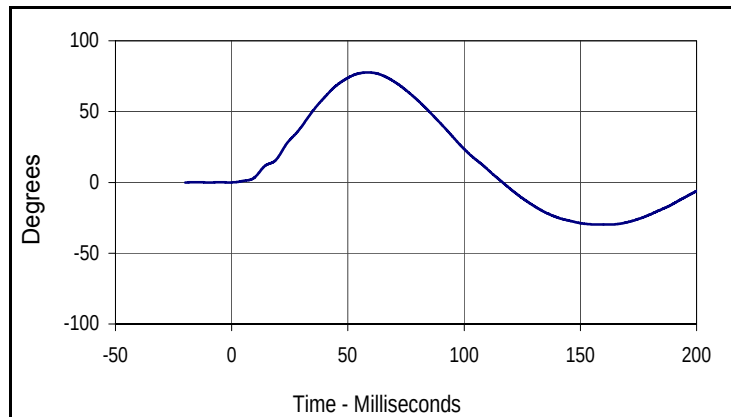
Test Date: 5/7/07
 Test I.D.: NB050



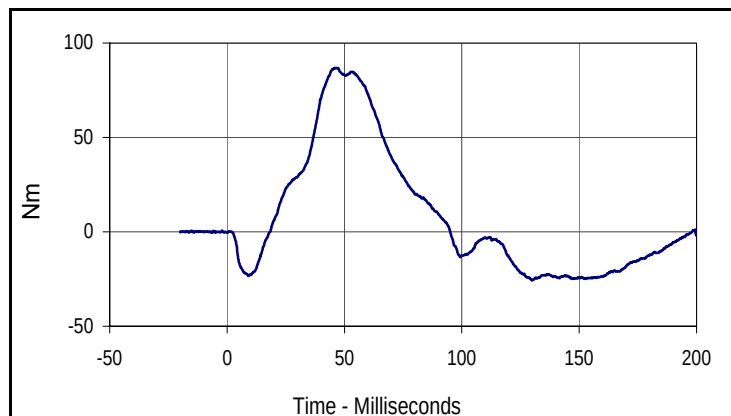
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.33	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.75	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.73	Pass
	40 to 70	m/sec	6.27 to 7.64	7.35	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	77.7	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	12.5	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	58.1	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	86.8	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.1	Pass
Overall Test Results					Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.0	197.3	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
77.7	58.5	-29.8	161.6



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
86.8	46.0	-25.8	129.9

APPENDIX D
CHILD RESTRAINT SYSTEM

REPORT NUMBER TR-P27119-01-NC

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**GENERAL MOTORS CORPORATION
2007 CHEVROLET COBALT LS
4-DOOR SEDAN**

NHTSA NUMBER: G70108

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



MAY 4, 2007

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
RULEMAKING
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NVS-111
400 SEVENTH STREET, SW, ROOM 5311
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 DTNH22-03-D-32005.

This publication is distributed by the U.S. Department of Transportation, National Highway Traffic Safety Administration, in the interest of information exchange. The opinions, findings and conclusions expressed in this publication are those of the author(s) and not necessarily those of the Department of Transportation or the National Highway Traffic Safety Administration. The United States Government assumes no liability for its contents or use thereof. If trade or manufacturers' names or products are mentioned, it is only because they are considered essential to the object of the publication and should not be construed as an endorsement. The United States Government does not endorse products or manufacturers.

Prepared by:		Date: <u>May 4, 2007</u>
	Mr. Johnny H. Dutto, Project Engineer KARCO Engineering, LLC	
Reviewed by:		Date: <u>May 4, 2007</u>
	Mr. Michael L. Dunlap, Quality Assurance Manager KARCO Engineering, LLC	
Approved by:		Date: <u>May 4, 2007</u>
	Mr. Frank D. Richardson, Program Manager KARCO Engineering, LLC	

FINAL REPORT ACCEPTED BY:

Manager, New Car Assessment Program

Date of Acceptance

COTR, NCAP Frontal Impact Program

Date of Acceptance

Technical Report Documentation Page

1. Report No. TR-P27119-01-NC		2. Government Accession No.		3. Recipients Catalog No.	
4. Title and Subtitle Final Report of a Peg Perego CRS NHTSA No. G70108				5. Report Date May 4, 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-P27119-01-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. DTNH22-03-D-32005	
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Rulemaking Office of Crashworthiness Standards Mail Code NPS-111 400 Seventh Street, SW, Room 5311 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 side impact test was conducted on the subject CRS Peg Perego in conjunction with side impact NCAP testing on a 2007 Chevrolet Cobalt LS 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 May 4, 2007.					
Measurement Description		Units	Threshold	Right Rear (P3)	
Head Injury Criteria (HIC15)		N/A	390	108.4	
3 msec. Chest Clip		G's	50	22.3	
17. Key Words New Car Assessment Program (Side Impact NCAP) Side Impact Moving Deformable Barrier (MDB) Final Report of a Peg Perego CRS				18. Distribution of Statement Copies of this report available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 400 Seventh St., SW, Room 5108 Washington, D.C. 20590	
19. Security Classification (this report) Unclassified		20. Security Classification (this page) Unclassified		21. No. of Pages 44	22. Price

Form DOT F1700.7 (8-72)

TR-P27119-01-NC

TABLE OF CONTENTS

<u>Section</u>	<u>Description</u>	<u>Page</u>
D-1	Purpose and Summary of Test G70108	D1-1 to D1-8
D-2	Photographs	D2-1 to D2-18
D-3	CRABI Response and CRS Data Traces	D3-1 to D3-2
D-4	CRABI Calibration Information	D4-1 to D4-6
<u>Data Sheet</u>	<u>Description</u>	<u>Page</u>
1	Crash Test Summary	D1-2
2	Vehicle Parameter Data	D1-3
3	CRABI Positioning in Vehicle	D1-4
4	CRS Performance Data	D1-6
5	CRS Accelerometer Locations	D1-7
6	CRS Camera Locations and Data	D1-8

SECTION D-1

PURPOSE AND SUMMARY OF TEST G70108

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

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

SUMMARY

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

The right rear (Serial No. 017) CRABI was 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)	108.4	22.3

DATA SHEET NO.1
CRASH TEST SUMMARY

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

CHILD RESTRAINT SYSTEM INFORMATION

Description	Position #3 CRS
Manufacturer	Peg Perego
Model Name	Segg. Auto Primo VIA
Serial No.	IMCC00US35BP53RU46
Type	Infant
Forward/Rearward	Rearward

VISIBLE DUMMY CONTACT POINTS

Description	Position #3 CRS
Head Contact	Both left and right side of CRS
Chest Contact	None
Abdomen Contact	None
Left Knee Contact	None
Right Knee Contact	None
Left Toe Contact	None
Right Toe Contact	None

POST-TEST DOOR OPENINGS

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

CAMERA COVERAGE

Description	Standard
High Speed	1
Real Time	0
Total	1

DATA CHANNELS

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

DATA SHEET NO.2
VEHICLE PARAMETER DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	375	264	639	438	337	775
Right	kg	387	250	637	422	300	722
Ratio	%	59.7	40.3	100	57.4	42.6	100
Totals	kg	762	514	1276	860	637	1497

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1276
Weight of 2 P572 ATD's	kg	161
Rated Cargo/Luggage Wt. (RCLW)	kg	64
Calculated Vehicle Target Wt. (TVTW)	kg	1501

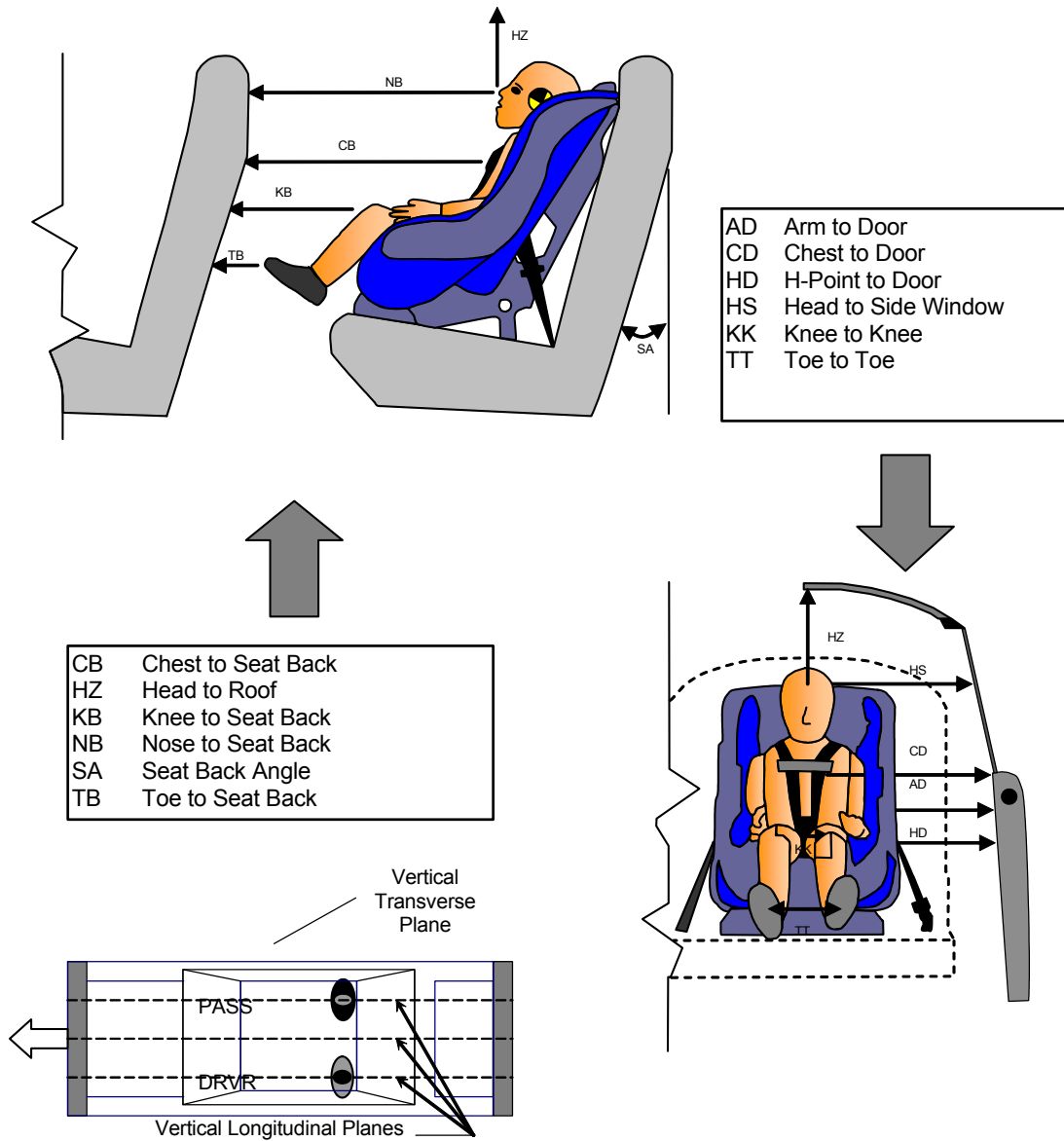
DATA SHEET NO.3 **CRABI POSITIONING IN VEHICLE**

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07



DUMMY MEASUREMENTS FOR REAR SEAT OCCUPANTS

DATA SHEET NO.3
CRABI POSITIONING IN VEHICLE...(CONTINUED)

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

CRABI POSITION MEASUREMENTS

Code	Measurement	Units	CRABI (P3) Serial No. 017
			Length
SA	Seat Back Angle	deg.	24.0
HZ	Head to Roof (Z)	mm	415
CD	Chest to Door	mm	3810
KK	Knee to Knee (Y)	mm	120
HS	Head to Side Window	mm	360
HD	H-Point to Door (Y)	mm	300
AD	Arm to Door	mm	250
NB	Nose to Seat Back	mm	442
CB	Chest to Seat Back	mm	392
FF	Foot to Foot	mm	142
KB-Left	Knee to Seat Back	mm	165
KB-Right	Knee to Seat Back	mm	160
TB-Left	Toe to Seat Back	mm	25
TB-Right	Toe to Seat Back	mm	35

DATA SHEET NO.4
CRS PERFORMANCE DATA

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

CRS PERFORMANCE DATA

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

DATA SHEET NO. 5
CRS ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 5/4/07

CRS ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	CRS	1742	520	705
2	CRS Base	1742	520	615

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 Chevrolet Cobalt LS 4-Door Sedan

NHTSA No.: G70108

Test Program: 55/28 km/h Side Impact NCAP

Test Date: 05/04/07

CAMERA LOCATIONS

No.	Camera View	Location(mm)			Angle (Deg.)	Film Plane to Head	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Passenger CRS (O.B.)	442	2390	1722	-2	n/a	10	1000

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

SECTION D2

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure		Page
1	Close-up, Position 3 CRS Label	D-1
2	Pre-Test Frontal View of Position 3 CRS	D-2
3	Post-Test Frontal View of Position 3 CRS	D-3
4	Pre-Test Rear View of Position 3 CRS	D-4
5	Post-Test Rear View of Position 3 CRS	D-5
6	Pre-Test Left Side View of Position 3 CRS	D-6
7	Post-Test Left Side View of Position 3 CRS	D-7
8	Pre-Test Right Side View of Position 3 CRS	D-8
9	Post-Test Right Side View of Position 3 CRS	D-9
10	Pre-Test Position 3 Front View (Head and Seat Belt Position)	D-10
11	Post-Test Position 3 Front View (Head and Seat Belt Position)	D-11
12	Pre-Test Position 3 Front View (Seat Belt Position)	D-12
13	Post-Test Position 3 Front View (Seat Belt Position)	D-13
14	Pre-Test Position 3 Right Side View	D-14
15	Post-Test Position 3 Right Side View	D-15
16	Pre-Test Position 3 Left Side View	D-16
17	Post-Test Position 3 Left Side View	D-17
18	Post-Test Position 3 Dummy Legs	D-18

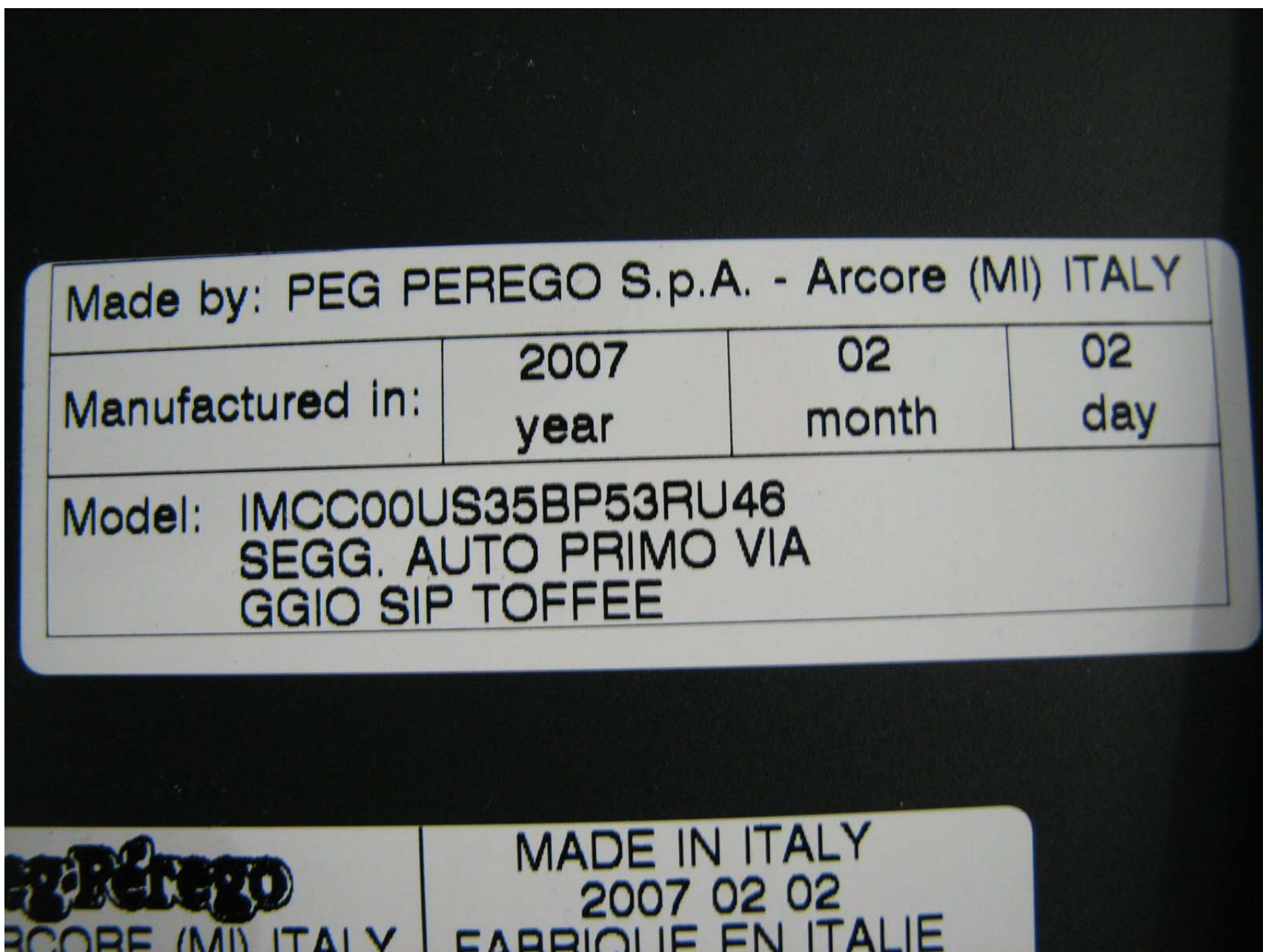


Figure D2-1: Position 3 CRS Label

This Space Intentionally Left Blank



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



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



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



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



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



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



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



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



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



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



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



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



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

**Photograph Not
Available**

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

SECTION D3

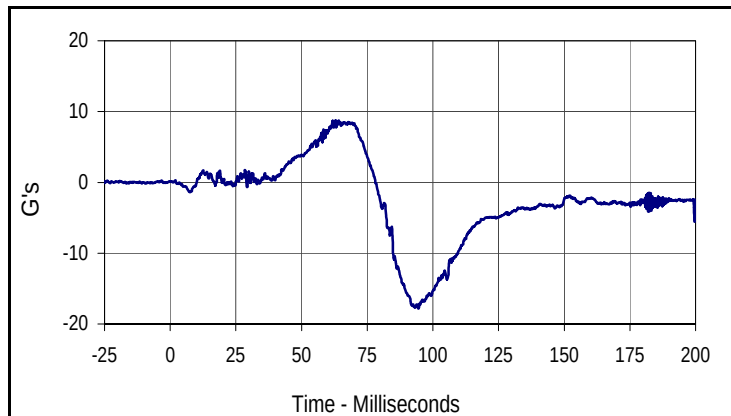
CRABI RESPONSE AND CRS DATA TRACES

LIST OF DATA PLOTS

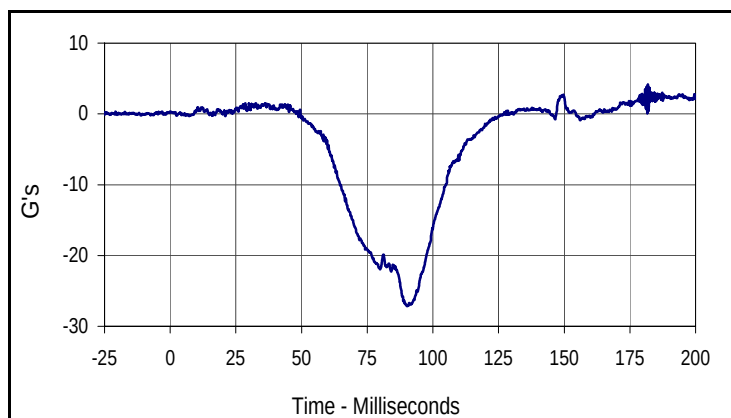
Data Plot		Page
D3-1	Right Rear CRABI Head X	D3-1
	Right Rear CRABI Head Y	D3-1
	Right Rear CRABI Head Z	D3-1
	Right Rear CRABI Head Resultant	D3-1
D3-2	Right Rear CRABI Chest X	D3-2
	Right Rear CRABI Chest Y	D3-2
	Right Rear CRABI Chest Z	D3-2
	Right Rear CRABI Chest Resultant	D3-2

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan
 Test Program: 55/28 km/h Side Impact NCAP

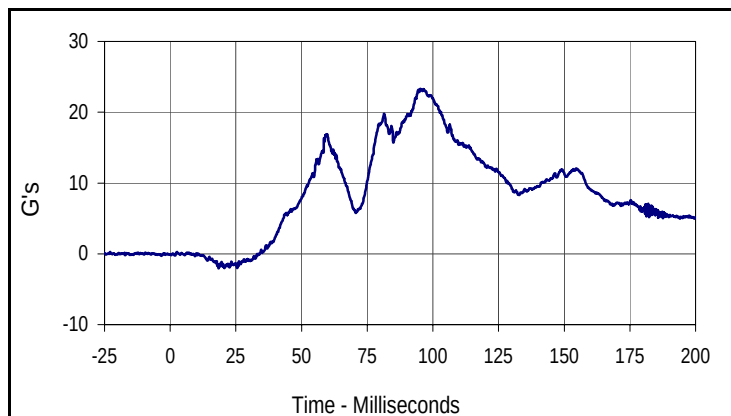
Test Date: 5/4/07
 NHTSA No.: G70108



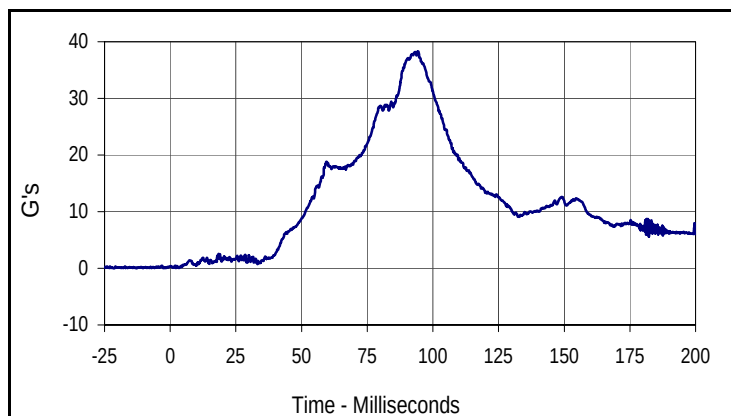
Curve Description			
CRABI Head X (P3)			
CURNO	Type	SAE Class	Units
072	FIL	1000	G's
Max	Time	Min	Time
8.7	64.2	-17.8	94.5



Curve Description			
CRABI Head Y (P3)			
CURNO	Type	SAE Class	Units
073	FIL	1000	G's
Max	Time	Min	Time
4.1	181.9	-27.2	90.2



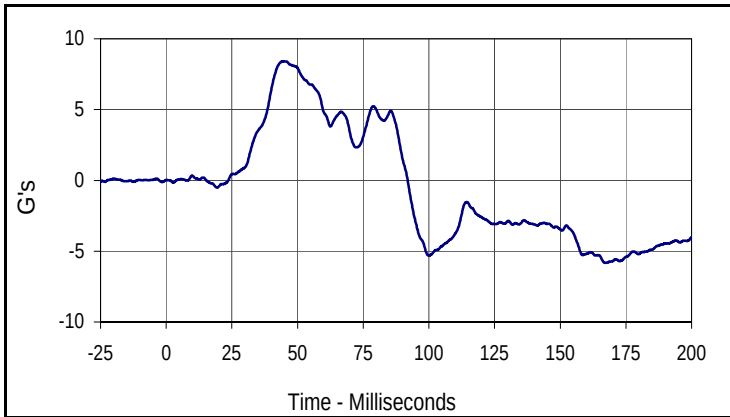
Curve Description			
CRABI Head Z (P3)			
CURNO	Type	SAE Class	Units
074	FIL	1000	G's
Max	Time	Min	Time
23.3	95.2	-2.0	18.5



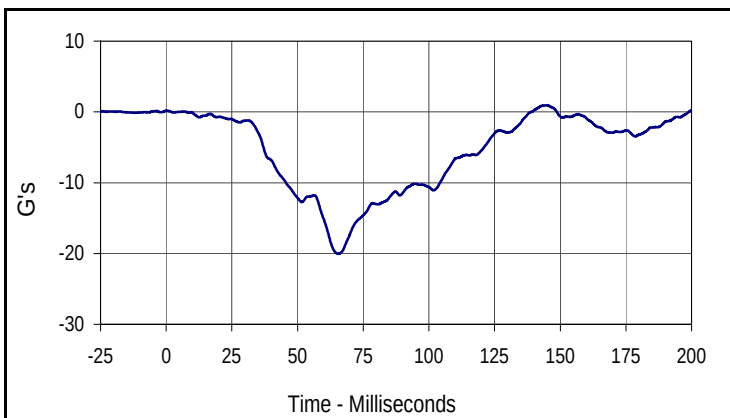
Curve Description			
CRABI Head Resultant (P3)			
CURNO	Type	SAE Class	Units
072	RES	1000	G's
Max	Time	Min	Time
38.3	94.4	0.1	2.2

Test Vehicle: 2007 Chevrolet Cobalt LS 4-Door Sedan
 Test Program: 55/28 km/h Side Impact NCAP

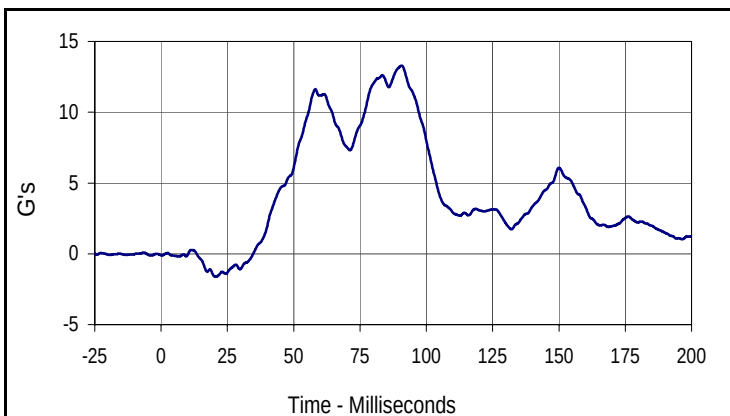
Test Date: 5/4/07
 NHTSA No.: G70108



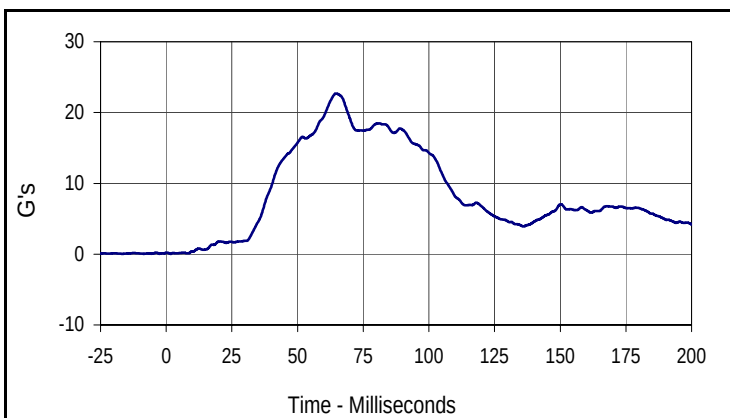
Curve Description			
CRABI Chest X (P3)			
CURNO	Type	SAE Class	Units
082	FIL	180	G's
Max	Time	Min	Time
8.4	44.6	-5.8	167.1



Curve Description			
CRABI Chest Y (P3)			
CURNO	Type	SAE Class	Units
083	FIL	180	G's
Max	Time	Min	Time
0.9	145.1	-20.0	65.5



Curve Description			
CRABI Chest Z (P3)			
CURNO	Type	SAE Class	Units
084	FIL	180	G's
Max	Time	Min	Time
13.3	90.6	-1.6	20.6



Curve Description			
CRABI Chest Resultant (P3)			
CURNO	Type	SAE Class	Units
082	RES	180	G's
Max	Time	Min	Time
22.7	64.7	0.0	1.8

SECTION D4

CRABI CALIBRATION INFORMATION

Test Program: CRABI 12 Month Old Frontal Head Drop Test

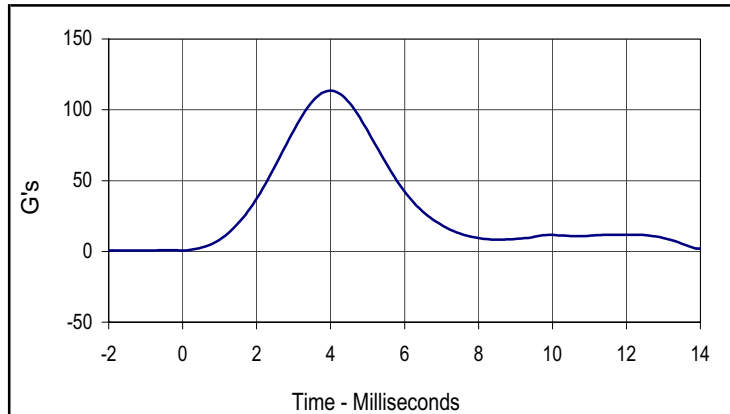
Test Date: 5/1/07

ATD Serial No.: 017

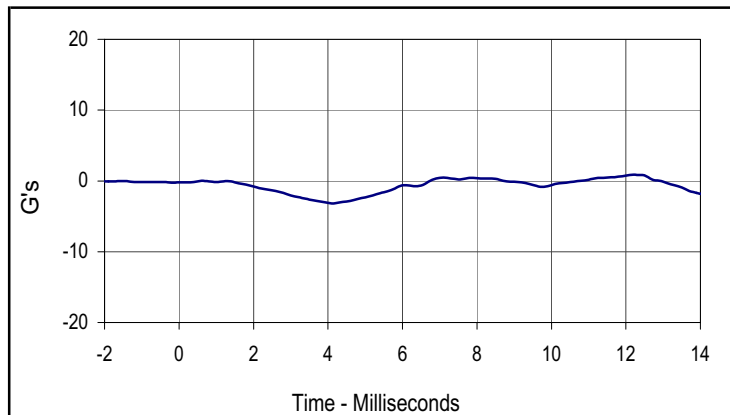
Test I.D.: HD017MA



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	113.5	Pass
Peak Lateral Acceleration	G's	≤15.0	3.2	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
113.5	4.0	0.5	0.0



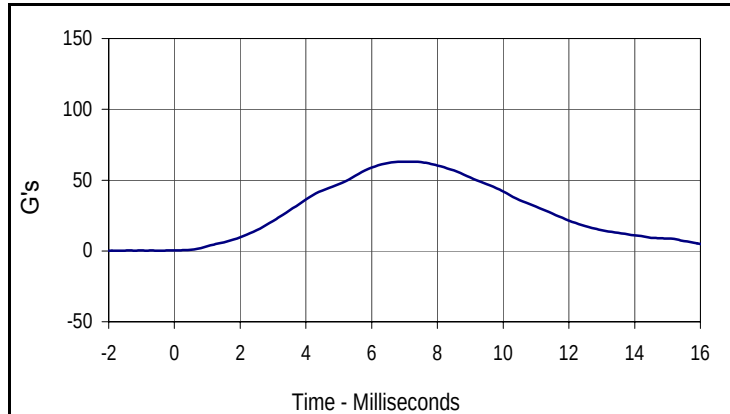
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.0	0.6	-3.2	4.1

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

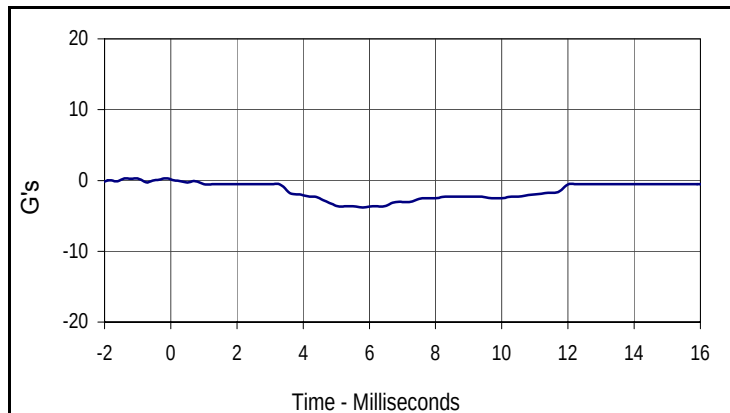
Test Date: 5/1/07
 Test I.D.: HDR17MG



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	58.9	Pass
Peak Lateral Acceleration	G's	≤15.0	3.8	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
58.9	6.0	0.1	-1.8



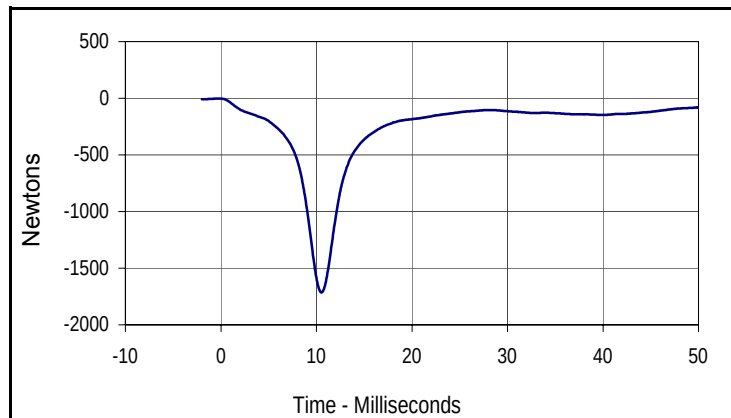
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.3	-0.2	-3.8	5.8

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

Test Date: 5/1/07
 Test I.D.: TH05D



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	4.91	Pass
Peak Probe Force	Newtons	-1514 to -1796	-1583	Pass
Overall Test Results				Pass



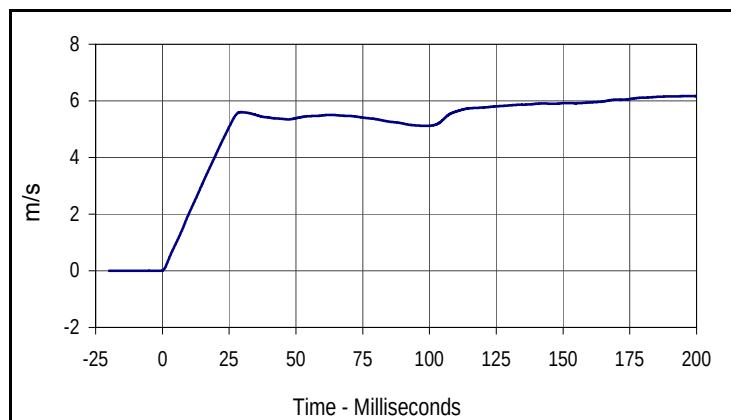
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	180	Newtons
Max	Time	Min	Time
-1.5	-0.2	-1582.5	10.0

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

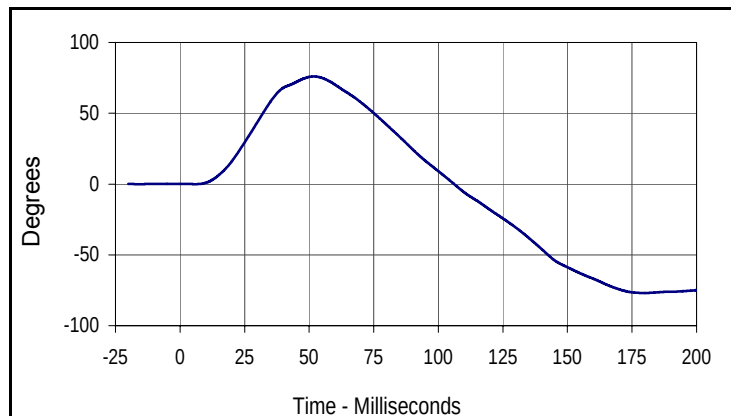
Test Date: 5/1/07
 Test I.D.: NF05F



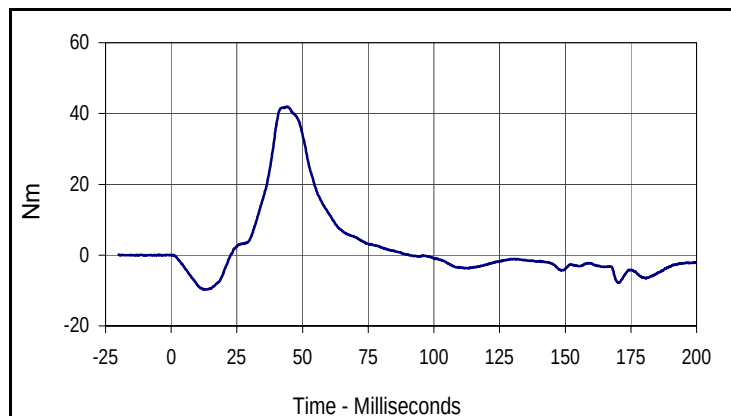
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.10 to 5.30	5.22	Pass
Pendulum Deceleration	10 Msec.	m/s	1.6 to 2.3	2.0	Pass
	20 Msec.	m/s	3.4 to 4.2	4.1	Pass
	25 Msec.	m/s	4.3 to 5.2	5.1	Pass
"D" Plane Rotation	Max	Degrees	75.0 to 86.0	76.0	Pass
Peak Moment in Rotation	Max	Nm	36.0 to 45.0	37.7	Pass
Positive Moment Decay, Time To 5 Nm		Msec.	60.0 to 80.0	70.6	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
76.0	51.8	-76.9	179.8



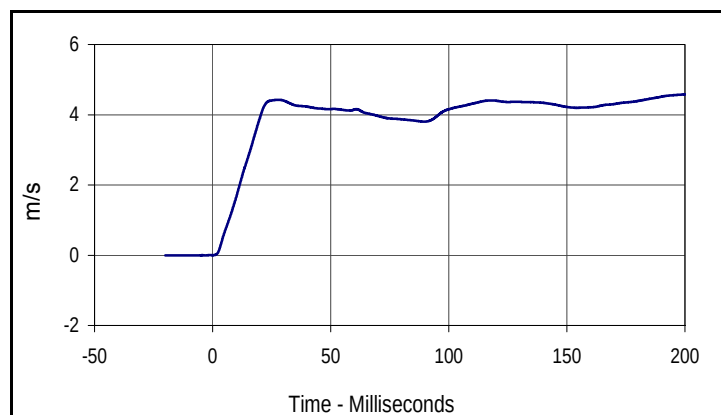
Curve Description			
Upper Neck Force Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
41.9	44.3	-9.7	13.5

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

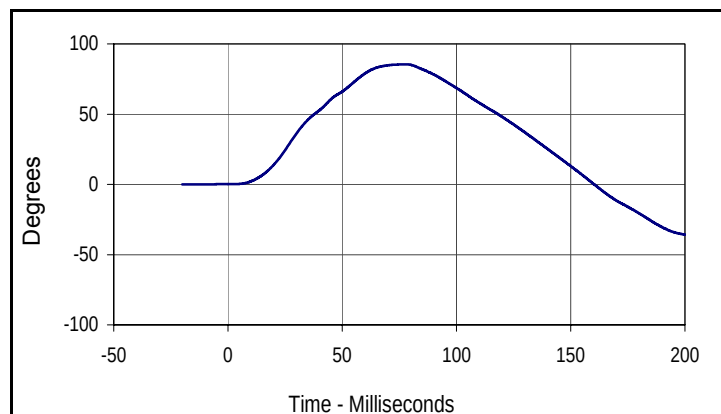
Test Date: 5/1/07
 Test I.D.: NE05F



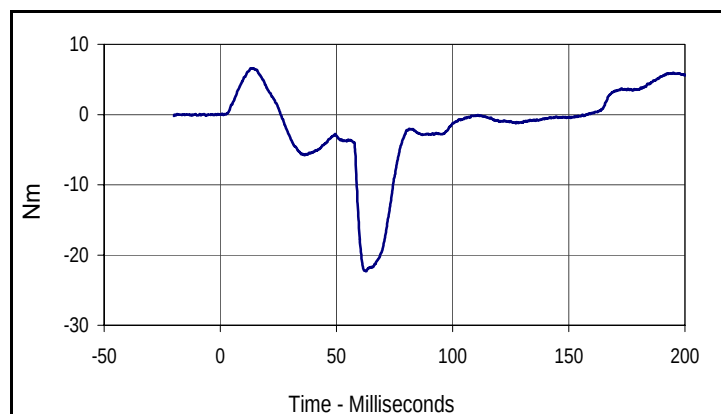
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	2.4 to 2.6	2.52	Pass
Pendulum Deceleration	6 Msec.	m/s	0.8 to 1.2	0.8	Pass
	10 Msec.	m/s	1.5 to 2.1	1.7	Pass
	14 Msec.	m/s	2.2 to 2.9	2.6	Pass
"D" Plane Rotation	Max	Degrees	80.0 to 92.0	85.5	Pass
Peak Moment in Rotation	Max	Nm	-12 to -23	-22.3	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
4.6	200.0	0.0	0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
85.5	77.7	-35.7	200.0



Curve Description			
Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
6.6	13.2	-22.3	62.8

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

Test Date: 5/1/07
 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	456	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	50	Pass
E - Shoulder pivot from back	mm	50.3 to 60.5	53	Pass
F - Thigh clearance	mm	63.0 to 73.2	70	Pass
G - Elbow pivot to fingertip	mm	176.6 to 191.8	185	Pass
I - Shoulder pivot to elbow pivot	mm	99.1 to 114.3	100	Pass
J - Elbow rest height	mm	150.1 to 165.3	153	Pass
K - Buttock to knee length	mm	202.7 to 217.9	204	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	150	Pass
O - Chest depth with jacket	mm	107.5 to 122.7	110	Pass
P - Foot length	mm	92.4 to 102.6	102	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	130	Pass
T - Head Depth	mm	149.9 to 165.1	155	Pass
U - Hip breadth	mm	158.5 to 173.7	162	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	461	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	264	Pass
BB - Reference Location For dimension Z	mm	106.7 to 116.9	108	Pass
CC - Shoulder Height	mm	299.7 to 314.9	307	Pass
DD - Chin Height	mm	289.6 to 304.8	300	Pass
Overall Test Results				Pass