

REPORT NUMBER TR-P25038-01-NC

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**GENERAL MOTORS CORPORATION.
2005 SATURN RELAY
5-DOOR MPV**

NHTSA NUMBER: G50102

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FINAL REPORT

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16. Abstract A 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2005 Saturn Relay 5-Door MPV 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, California, on February 24, 2005. The impact velocity of the Moving Deformable Barrier was 61.92 km/h (38.49 mph), and the outside ambient temperature at the struck (driver's) side of the vehicle was 15.0 deg. C. The target vehicle's maximum post-test static crush was 366 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="width: 35%;">Measurement Description</th> <th style="width: 15%;">Driver SID/HIII</th> <th style="width: 15%;">Pass. SID/HIII</th> <th style="width: 35%;"></th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) G's</td> <td style="text-align: center;">44.5</td> <td style="text-align: center;">45.5</td> <td rowspan="5" style="background-color: #cccccc;"></td> </tr> <tr> <td>Left Lower Rib (LLR) G's</td> <td style="text-align: center;">54.4</td> <td style="text-align: center;">43.3</td> </tr> <tr> <td>Lower Spine (T₁₂) G's</td> <td style="text-align: center;">61.9</td> <td style="text-align: center;">44.4</td> </tr> <tr> <td>Thoracic Trauma Index (TTI) G's</td> <td style="text-align: center;">58.0</td> <td style="text-align: center;">45.0</td> </tr> <tr> <td>Pelvis (PEV) G's</td> <td style="text-align: center;">96.4</td> <td style="text-align: center;">69.4</td> </tr> </tbody> </table>				Measurement Description	Driver SID/HIII	Pass. SID/HIII		Left Upper Rib (LUR) G's	44.5	45.5		Left Lower Rib (LLR) G's	54.4	43.3	Lower Spine (T ₁₂) G's	61.9	44.4	Thoracic Trauma Index (TTI) G's	58.0	45.0	Pelvis (PEV) G's	96.4	69.4
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SECTION 1

PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This Side Impact NCAP test was conducted as part of the FY 2005 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-03-D-32005. The purpose of this test was to generate comparative side impact data on a 2005 Saturn Relay 5-Door MPV 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 2005 Saturn Relay 5-Door MPV 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 61.92 km/h. The specified impact velocity range is from 61.1 to 62.7 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 2219 kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on February 24, 2005.

SUPPLEMENTAL RESTRAINT INFORMATION

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

† The airbag was disabled as requested by NHTSA.

Three (3) real-time and eleven (11) high-speed 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)

The test vehicle was instrumented with twenty-six (26) 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 (left side) remained latched, although there was separation near the top sill. The test vehicle sustained a maximum static crush of 366 mm at level 3, 900 mm rearward of the impact point. The driver SID/Hybrid III, Serial No. 275 and the passenger SID/Hybrid III, Serial No. 274 were calibrated just prior to this test. The SID/Hybrid III injury criteria is summarized as follows:

Measurement	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	58.0	45.0
Peak Pelvic G's (PEV)	G's	96.4	69.4

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

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 02/24/05

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: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	G50102	Anti-Lock Brakes	Yes
Make	Saturn	All Wheel Drive	No
Model	Relay	Power Steering	Yes
Body Style	5-Door MPV	Driver Front Airbag	Yes
Vin No.	5GZDV03L65D210609	Driver Side Torso Airbag	Yes†
Color	White	Driver Side Head Airbag	No
Delivery Date	2/18/2005	Driver Curtain Airbag	No
Odometer (miles)	266	Rear Pass. Airbag	No
Dealer	Saturn of Santa Clarita	Rear Pass. Side Airbag	No
Transmission	4-Speed Automatic	Rear Pass. Head Airbag	No
Final Drive	Front	Rear Pass. Curtain Airbag	No
Type/No. Cyl.	V6	Pre-Tensioners	Yes
Engine Disp. (L)	3.5	Load Limiters	Yes
Engine Placement	Transverse	Bucket Seats	Yes
Roof Rack	No	Air Cond.	Yes
Sunroof/T-Top	No	AM/FM Cassette	Yes
Tinted Glass	Yes	Tilt Steering	Yes
Traction Control	Yes	Automatic Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	Yes
Rear Disc	Yes	Other	On-Star

† The airbag was disabled as requested by NHTSA.

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors Corporation	GVWR (kg)	2550
Date of Manufacture	01/05	GAWR Front (kg)	1300
		GAWR Rear (kg)	1250

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket	Bench	
Number of Occupants	2	2	3	7
Capacity Weight (VCW) (kg)				573
Cargo Weight (RCLW) (kg)				97

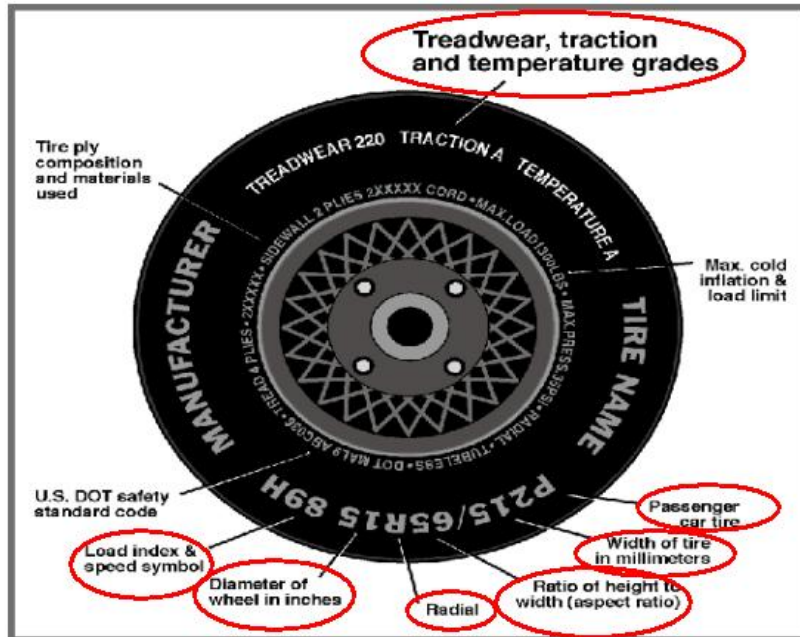
DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05

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



TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	308	308
Cold Pressure (kpa)	240	240
Recommended Tire Size	P225/60 R17	P225/60 R17
Tire Size on Vehicle	P225/60 R17	P225/60 R17
Tire Manufacturer	Goodyear	Goodyear
Treadwear	460	460
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester + 2 Steel	1 Polyester + 2 Steel
Load Index/Speed Symbol	98S	98S
Tire Material	Polyester + Steel	Polyester + Steel
DOT Safety Code Right	DOT M679-B3DR 0305	DOT M679-B3DR 0305
DOT Safety Code Left	DOT M679-B3DR 0305	DOT M679-B3DR 0305

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 02/24/05

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UWW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	550	436		623	516	
Right	kg	557	426		596	484	
Ratio	%	56.2	43.8		54.9	45.1	
Totals	kg	1107	862	1969	1219	1000	2219

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UWW)	kg	1969
Weight of 2 P572 ATD's	kg	161
Rated Cargo/Luggage Wt. (RCLW)	kg	97
Calculated Vehicle Target Wt. (TVTW)	kg	2227

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	779	780	789	797	1354
As Tested	mm	770	776	757	770	1394
Fully Loaded	mm	765	776	744	765	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3093
Total Vehicle Length at Left Side	mm	3450
Total Vehicle Length at Centerline	mm	5190
Total Vehicle Length at Right Side	mm	3450
Weight of Ballast In Cargo Area	kg	
Amount of Stoddard Solvent in Fuel Tank	Liters	88.4

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3093
Target Impact Point Aft of Front Axle	mm	508
Actual Impact Point Aft of Front Axle	mm	502

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

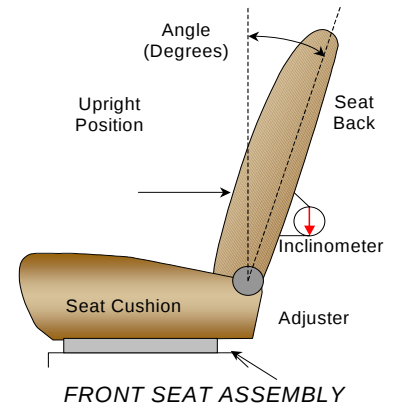
NHTSA No.: G50102
 Test Date: 02/24/05

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs were positioned to the manufacturers designated detent. The position number one (1) was the upright position.

SEAT BACK ANGLES

	Detent
Driver Seat Back Angle	7
Rear Seat Back Angle	1

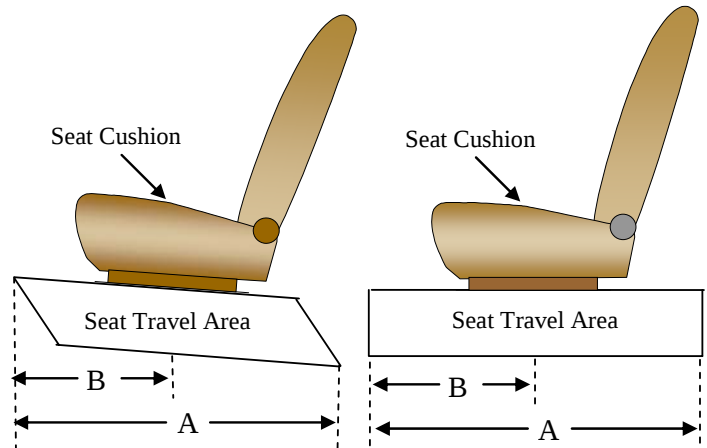


SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position to rearmost position, irrespective of vertical seat height in those positions. The seat was set at the longitudinal mid position with vertical adjustment at the lowest position obtainable for both the driver and passenger.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel (Detent)	Placed in Position (Detent)
Driver Seat	17	9
Passenger Seat	18	10



SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position.

SEAT BELT UPPER ANCHORAGE

	Total # of Positions	Placed in Position #
Driver Seat	3	2
Rear Seat	1	1

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

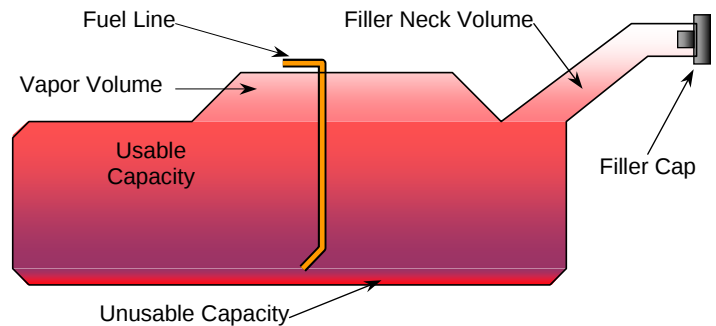
Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	95.0
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMVSS 301	87.4 to 89.3
Actual Amount of Solvent used	88.4

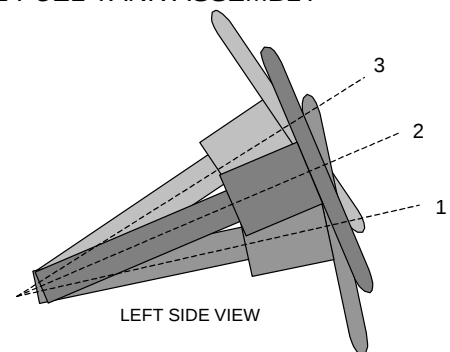
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately three (3) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender.



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 Position No.1	14.0	
Geometric Center Position No. 2	22.6	
Uppermost Position No.3	35.2	

DATA SHEET NO. 2**TEST VEHICLE SUMMARY OF RESULTS**

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	62	285
Level 2	Occupant H-Point	mm	342	761
Level 3	Mid Door	mm	366	668
Level 4	Window Sill	mm	235	1034
Level 5	Window top	mm	-235	1630
N/A	Maximum Penetration	mm	366	

INSTRUMENTATION

Driver SID/Hybrid III Accelerometers	20
Passenger SID/Hybrid III Accelerometers	20
Vehicle Structure Accelerometers	26
MDB Accelerometers	5
Total number of Contact Switches	5
Total	76

MOVIE COVERAGE

Cameras	Standard	Additional
High Speed	10	1
Real Time	1	2
Total	11	3

DATA SHEET NO. 3**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**Test Vehicle: 2005 Saturn Relay 5-Door MPVNHTSA No.: G50102Test Program: 55/28 km/h Side Impact NCAPTest Date: 02/24/05**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	61.92
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.78
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.50

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	253
B	Top of Bumper	533	800	Right	106
C	Mid Level	686	800	Left	81
D	Top of Stack	813	800	Left	131

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	1
High Speed Cameras	2

DATA SHEET NO. 4
POST-TEST OBSERVATIONS

Test Vehicle: 2005 Saturn Relay 5-Door MPV
Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
Test Date: 02/24/05

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	P572F, SID/HIII No. 275	P572F, SID/HIII No. 274
Head Contact	No Contact	No Contact
Upper Torso Contact	Door Panel	Door Panel
Lower Torso Contact	Door Panel	Door Panel
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	No Contact	No Contact

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Remained Closed/Latch Inoperable	Remained Closed/Latch Inoperable
Right Side Door Opening	Remained Closed/Latch Operable	Remained Closed/Latch Operable
Seat Movement	None	None
Seat Back Failure	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Pillars pushed inward with no apparent failure
Sill Separation	Front and Rear Door Separation Near Top Sill
Windshield Damage	None
Window Damage	Driver Side Window Broke
Other Notable Effects	

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 Deployment	No	
Side Airbag	Yes†	No Deployment	No	
Head Airbag	No		No	
Curtain Airbag	No		No	
Seat Belt Pretensioner	Yes		No	
Seat Belt Load Limiter	Yes		No	

† The airbag was disabled as requested by NHTSA

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	- 6 (Left)
Vertical Offset	mm	+/- 20	0

DATA SHEET NO. 5
SID/HIII INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 2/24/05

THORAX AND PELVIS PEAK ACCELERATIONS, PRIMARY (FIR 100 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	44.5	52.5	-8.3	90.0	45.5	56.3	-8.1	86.3
Lower Rib (LLR)	Y	G's	54.4	43.8	-6.5	74.4	43.3	41.9	-9.1	105.6
Lower Spine (T ₁₂)	Y	G's	61.9	41.9	-8.3	64.4	44.4	38.1	-6.1	101.9
Pelvis (PEV)	Y	G's	96.4	38.1	-24.4	60.0	69.4	29.4	-20.8	54.4

THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION, PRIMARY (FIR 100 Filtered)

Location	Driver				Passenger			
	LLR	T ₁₂	TTI(g)	PEV(g)	LUR	T ₁₂	TTI(g)	PEV(g)
Primary Rib, Spine, and Pelvis	54.410	61.909	58	96	45.492	44.415	45	69

THORAX AND PELVIS PEAK ACCELERATIONS, REDUNDANT (FIR 100 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Upper Rib (LUR)	Y	G's	44.8	52.5	-8.3	90.0	45.3	56.3	-8.1	86.3
Lower Rib (LLR)	Y	G's	54.7	43.8	-6.7	74.4	43.9	41.9	-9.2	105.0
Lower Spine (T ₁₂)	Y	G's	62.4	41.9	-8.3	63.8	44.8	38.1	-6.3	101.9
Pelvis (PEV)	Y	G's	96.0	38.1	-23.9	60.0	69.6	29.4	-20.7	54.4

THORACIC TRAUMA INDEX (TTI) AND PELVIC ACCELERATION, REDUNDANT (FIR 100 Filtered)

Location	Driver				Passenger			
	LLR	T ₁₂	TTI(g)	PEV(g)	LUR	T ₁₂	TTI(g)	PEV(g)
Redundant Rib, Spine, and Pelvis	54.655	62.447	59	96	45.349	44.761	45	70

Positive Acceleration Polarities:

- Longitudinal (X) = Forward
- Lateral (Y) = Right
- Vertical (Z) = Down

DATA SHEET NO. 5...(CONTINUED)
SID/HIII INJURY CRITERIA AND SENSOR DATA

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 2/24/05

HEAD PRIMARY PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	2.4	42.7	-11.0	95.7	51.4	184.3	-12.0	64.6
Head CG	Y	G's	20.3	95.0	-9.6	47.7	32.4	92.6	-47.6	184.3
Head CG	Z	G's	44.6	69.1	-4.2	55.1	63.3	65.4	-6.2	188.6
Head CG Resultant	N/A	G's	45.4	69.1			75.3	184.1		

HEAD PRIMARY INJURY CRITERIA (SAE CLASS 1000 Filtered)

Location	Driver				Passenger			
	HIC	T ¹	T ²	Avg G	HIC	T ¹	T ²	Avg G
Head CG	154.5	62.3	98.3	28.4	424.8	58.5	94.5	42.5

HEAD REDUNDANT PEAK ACCELERATIONS (SAE CLASS 1000 Filtered)

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Head CG	X	G's	2.5	42.8	-11.1	95.8	51.3	184.2	-11.4	65.0
Head CG	Y	G's	20.2	94.6	-9.7	47.7	32.5	91.5	-47.9	184.1
Head CG	Z	G's	44.8	68.9	-3.8	55.6	64.0	65.3	-5.6	188.5
Head CG Resultant	N/A	G's	45.6	68.9			75.1	184.0		

HEAD REDUNDANT INJURY CRITERIA (SAE CLASS 1000 Filtered)

Location	Driver				Passenger			
	HIC	T ¹	T ²	Avg G	HIC	T ¹	T ²	Avg G
Head CG	155.0	62.3	98.3	28.4	434.2	58.3	94.3	42.9

UPPER NECK PEAK FORCES AND MOMENTS

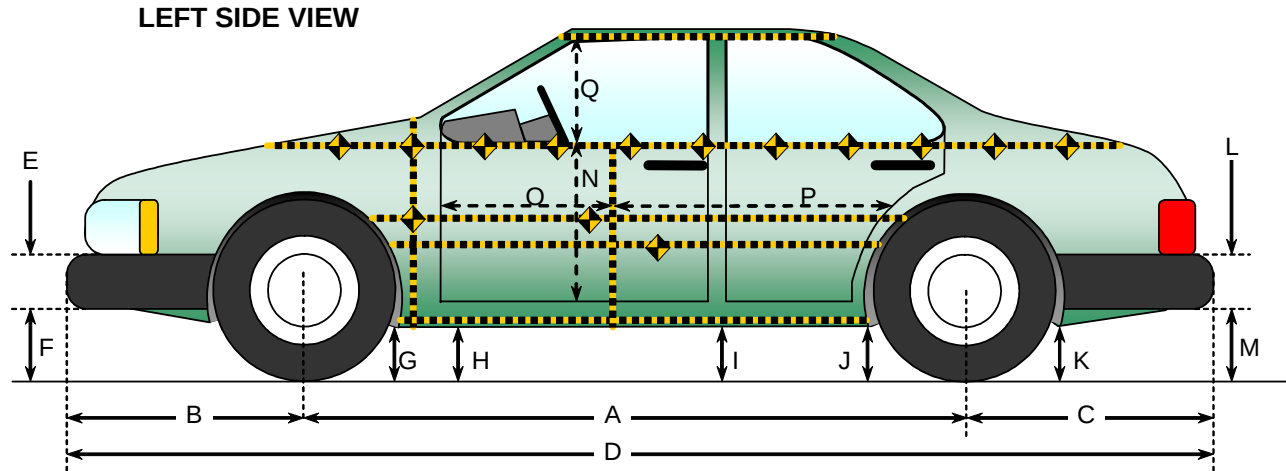
Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	85.5	43.4	-454.8	99.5	188.1	188.3	-595.2	64.6
Neck Force	Y	Newtons	691.2	94.8	-379.7	47.6	999.6	91.4	-398.5	39.4
Neck Force	Z	Newtons	1721.8	69.3	-71.0	27.7	2768.3	65.1	-1129.3	186.0
Neck Force Resultant	N/A	Newtons	1794.5	69.2			2886.6	65.1		
Neck Moment	X	Nm	52.3	91.1	-72.8	55.4	85.1	88.8	-72.4	50.3
Neck Moment	Y	Nm	24.3	100.9	-22.3	57.6	27.7	94.3	-51.8	60.2
Neck Moment	Z	Nm	17.3	103.2	-9.9	57.0	19.5	82.4	-12.9	200.0
Neck Moment Resultant	N/A	Nm	76.3	55.5			90.4	88.9		

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05



VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

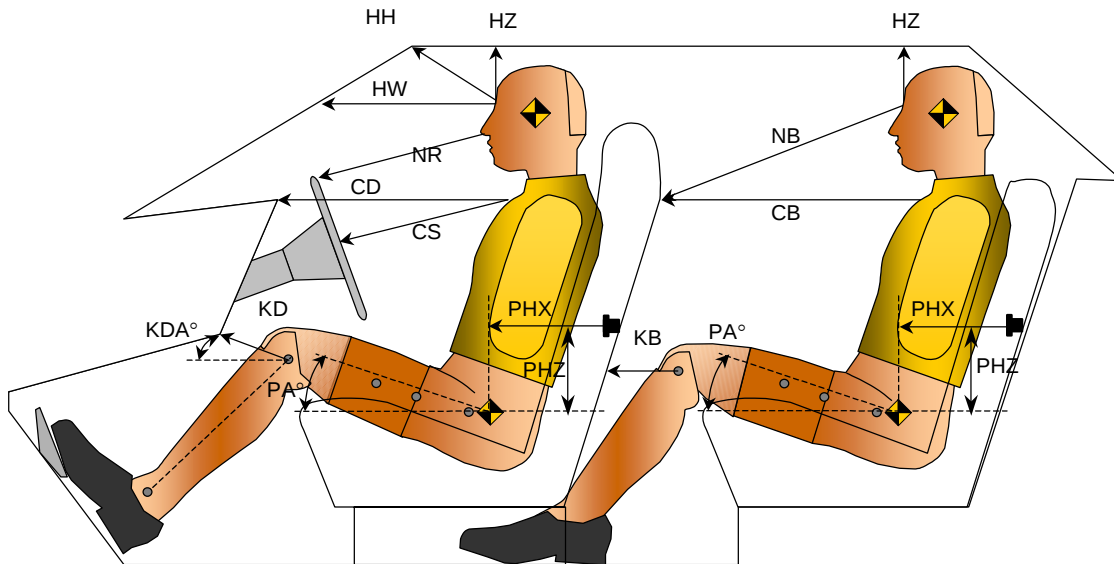
Code	Measurement Description	Pre-Test (mm)	Post-Test (mm)	Difference (mm)
A	Wheelbase	3093	3080	-13
B	Front Axle to FSOV	982	940	-42
C	Rear Axle to RSOV	1115	1050	-65
D	Total Length at Centerline	5190	5170	-20
E	Front Bumper Thickness	505	505	0
F	Front Bumper Bottom to Ground	221	256	35
G	Sill Height at Front Wheel Well	191	231	40
H	Sill Height at Front Door Leading Edge	206	246	40
I	Sill Height at "B" Pillar	201	316	115
J1	Sill Height at Rear Wheel Well	211	261	50
J2	Pinch Weld Height at Rear Wheel Well	216	261	45
K	Sill Height aft of Rear Wheel Well	206	231	25
L	Rear Bumper Thickness	232	232	0
M	Rear Bumper Bottom to Ground	321	336	15
N	Sill Height to Window Bottom Sill	800	640	-160
O	Front Door Leading Edge to Impact CL	940	900	-40
P	Rear Door Trailing Edge to Impact CL	1420	1395	-25
Q	Front Window Opening	505	500	-5
R	Right Side Length	3450	3460	10
S	Left Side Length	3450	3430	-20
T	Vehicle Width at "B" Post	1800	1590	-210

DATA SHEET NO. 7

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length(mm)	Angle	Length(mm)	Angle
HH		Head to Header	475	6.8		
HW		Head to Windshield	690			
HZ	HZ	Head to Roof	175		195	
NR	NB	Nose to Rim/Nose to Seatback	410	19.4	640	20.0
CD	CB	Chest to Dash or Seatback	525	1.3	570	1.0
CS		Chest to Steering Wheel	315	17.0		
KDL	KBL	Left Knee to Dash or Seatback	155	10.2	175	0.0
KDR	KBR	Right Knee to Dash or Seatback	165		160	
PA	PA	Pelvic Angle		15.7*		23.2
PHX	PHX	H-Point to Striker (X-Axis)	300		560	
PHZ	PHZ	H-Point to Striker (Z-Axis)	115		180	

* Correct pelvic angle was not obtainable, dummy was positioned according to the H-point location.

DATA SHEET NO. 8

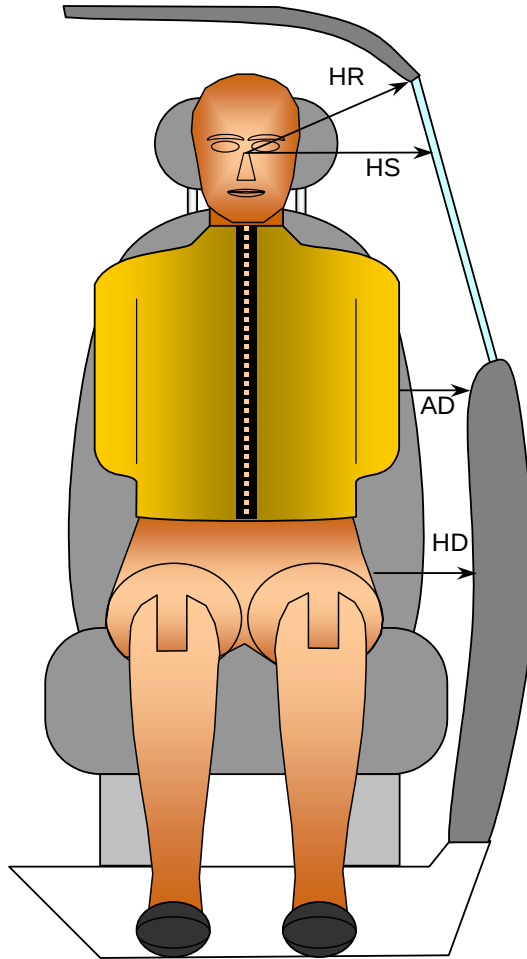
SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 02/24/05



FRONT VIEW OF DUMMY

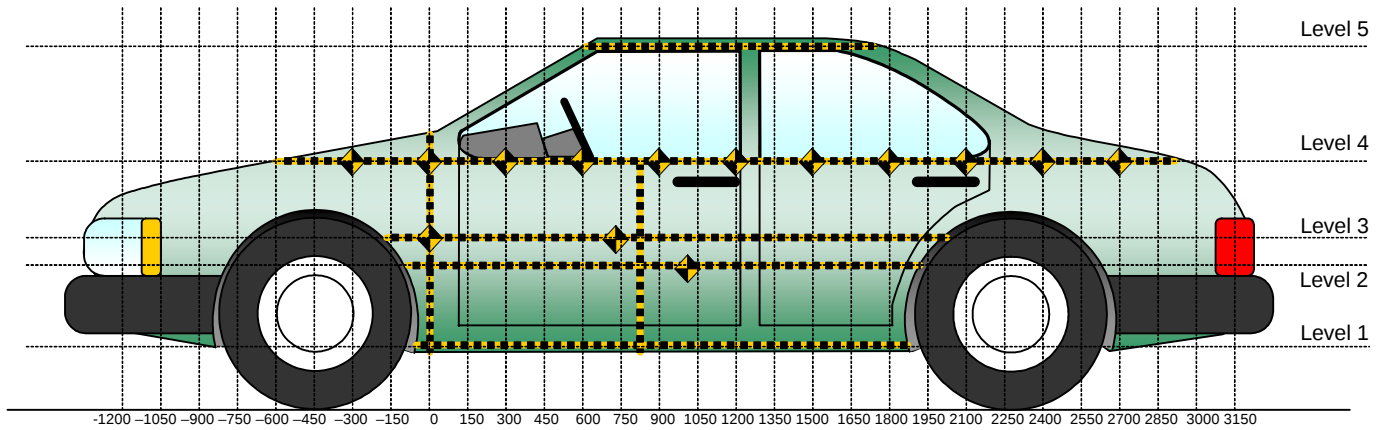
LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	270	200
HS	Head to Side Window	mm	355	290
AD	Arm to Door	mm	105	55
HD	H-Point to Door	mm	110	140

DATA SHEET NO. 9 **VEHICLE SIDE MEASUREMENTS**

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05



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	285
2	Occupant H-Point	761
3	Mid Door	668
4	Window Sill	1034
5	Window Top	1630

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05

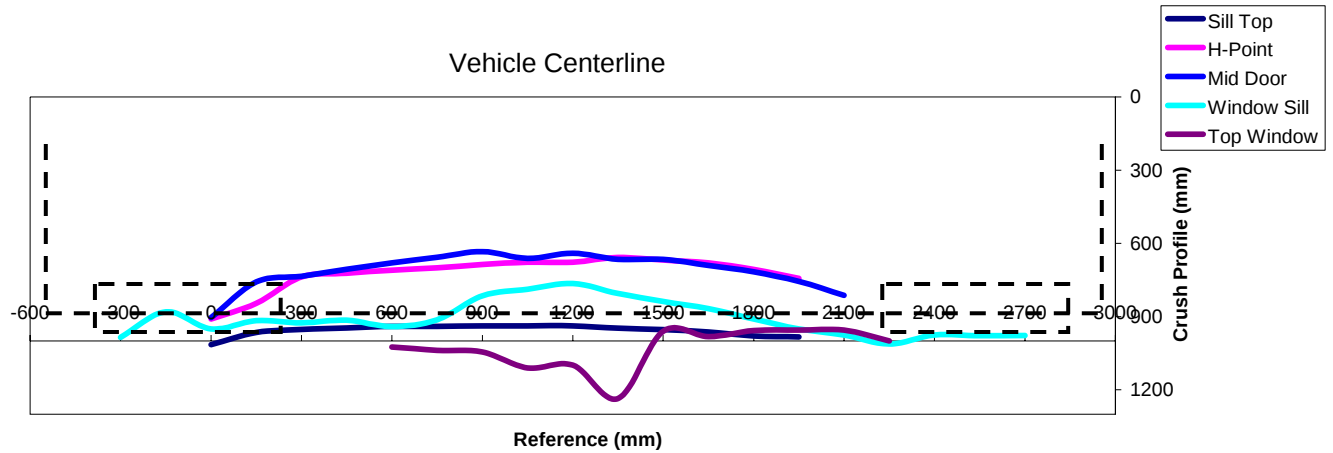
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300		91		171			111		186			20		15	
-150		113	121	151			161	166	271			48	45	120	
0	151	106	120	146		136	196	216	196		-15	90	96	50	
150	151	111	114	143		186	266	356	226		35	155	242	83	
300	148	109	111	141		196	371	376	216		48	262	265	75	
450	148	108	107	136		201	386	401	221		53	278	294	85	
600	146	106	106	162	366	206	396	426	221	336	60	290	320	59	-30
750	146	106	103	139	353	206	406	446	226	331	60	300	343	87	-22
900	144	103	100	126	346	206	416	466	311	321	62	313	366	185	-25
1050	144	103	98	124	344	206	426	436	336	306	62	323	338	212	-38
1200	144	123	96	121	346	206	446	456	356	301	62	323	360	235	-45
1350	144	104	96	121	346	196	446	431	316	236	52	342	335	195	-110
1500	144	104	96	119	340	191	436	431	281	241	47	332	335	162	-99
1650	144	106	96	119	336	181	426	406	251	101	37	320	310	132	-235
1800	145	108	92	116	336	166	401	376	206	376	21	293	284	90	40
1950	144	109	92	116	333	161	366	336	166	351	17	257	244	50	18
2100	143	109	99	116	333	151	331	286	141	376	8	222	187	25	43
2250	140	116	96	118	341	151	206	156	106	386	11	90	60	-12	45
2400		81		121	341		166		146	386		85		25	45
2550				124					146					22	
2700				128					151					23	
2850															
3000															

Measurements are taken from fixed reference 1000 mm from vehicle centerline.

DATA SHEET NO. 10...(CONTINUED)
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05



	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	62	342	366	235	-235
Distance from Impact	mm	900	1350	900	1200	1650

DATA SHEET NO. 11

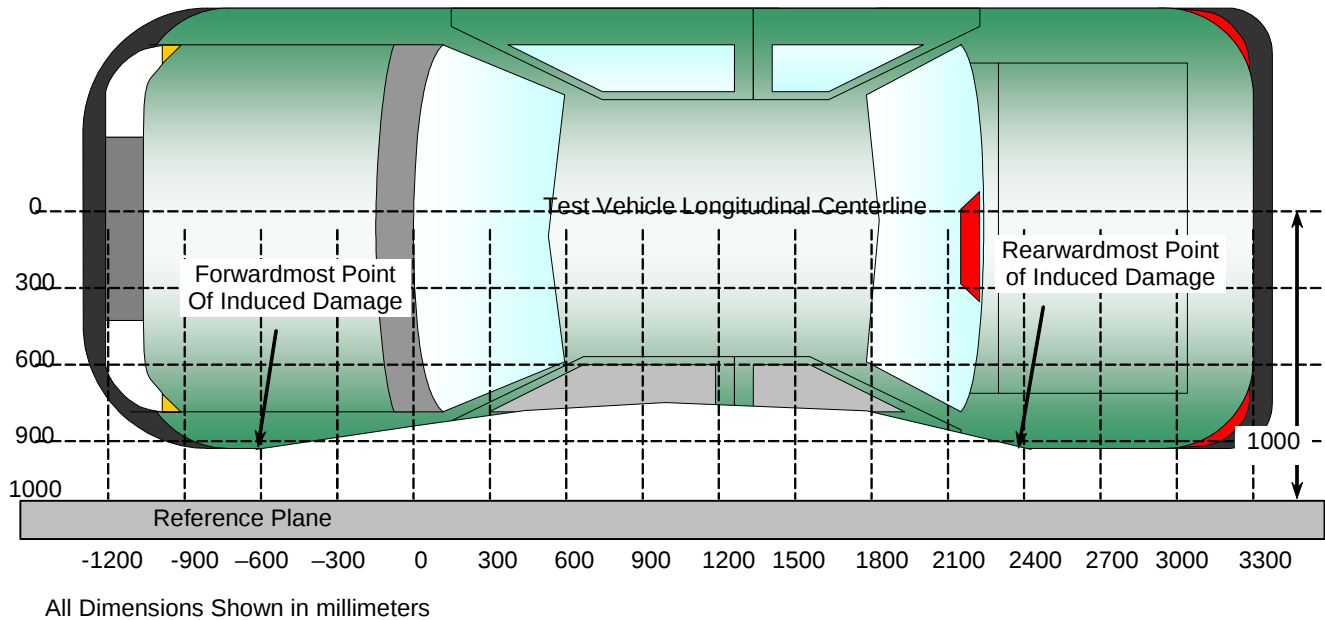
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 02/24/05



TOP VIEW

DAMAGE PROFILE DISTANCES

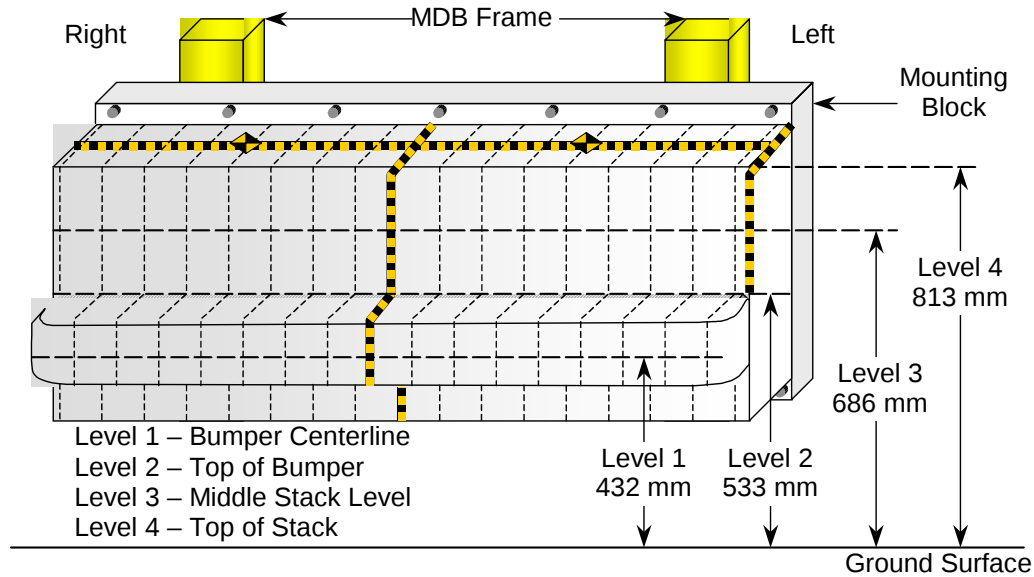
DPD	Distance From Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	-300	2	91	111	20
2	300	3	111	376	265
3	900	3	100	466	366
4	1500	3	96	431	335
5	2100	2	109	331	222
6	2700	4	128	151	23

DATA SHEET NO. 12

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05



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	253	238	233	203	218	208	200	188	173	173	173	160	158	170	163	166	167
2	106	106	98	91	81	73	64	64	61	56	46	51	51	56	58	66	84
3	72	61	41	24	13	5	3	5	8	-2	11	16	16	21	26	49	81
4	116	116	87	61	41	49	66	66	47	38	18	21	30	52	69	96	131

All Dimensions in mm

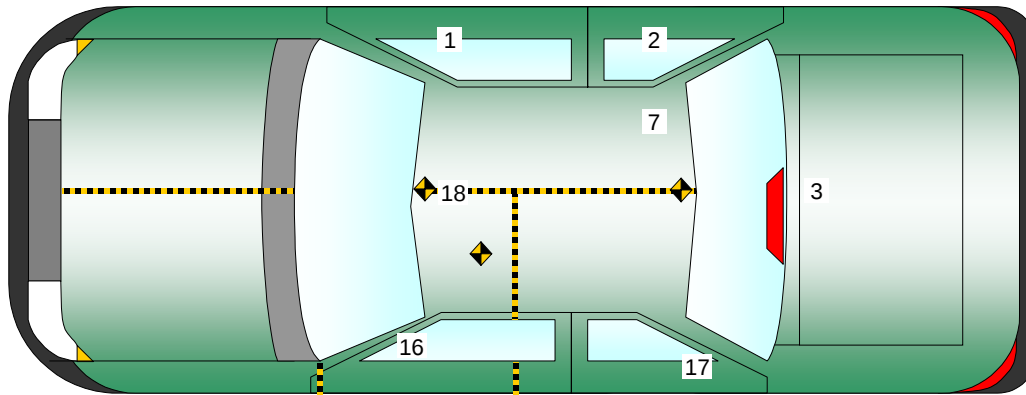
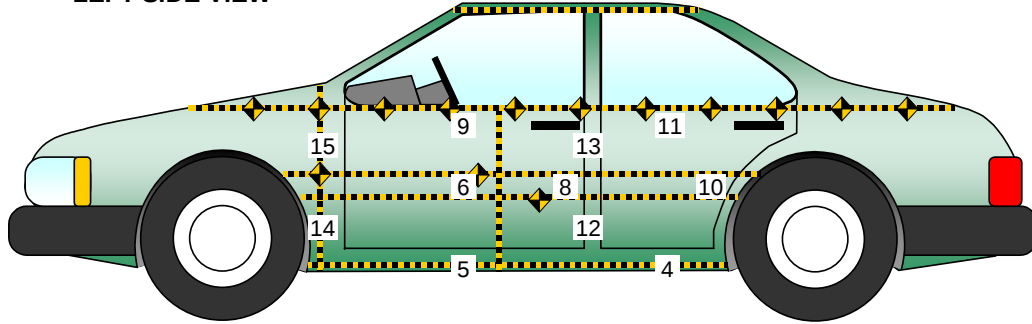
DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

NHTSA No.: G50102
 Test Date: 02/24/05

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. 13...(CONTINUED)
VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 2/24/05

VEHICLE ACCELEROMETER PEAK DATA AND PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	Right Sill at Front Seat	3060	760	400	X	2.4	69.5	-5.0	16.8
					Y	20.8	15.9	-1.9	182.7
					Z	4.2	93.4	-6.9	14.8
					RES	22.3	15.9		
2	Right Sill at Rear Seat	2030	750	470	X	2.5	68.4	-4.9	16.5
					Y	26.2	15.6	-3.2	182.3
					Z	5.6	112.5	-11.2	22.1
					RES	27.0	15.5		
3	Rear Floorpan Above Axle	750	0	540	X	2.3	169.2	-5.5	19.2
					Y	19.4	18.0	-2.2	129.3
					Z	9.6	30.8	-5.2	80.5
					RES	20.3	18.5		
4	Left Sill at Rear Door	2165	-720	430	Y	35.8	14.8	-8.2	19.8
5	Left Sill at Front Door	3215	-720	340	Y	41.0	17.3	-8.1	13.5
6	Front Door Centerline	3250	-820	800	Y	218.8	14.2	-278.1	28.2
7	Rt. Rear Occ. Compartment	2570	400	390	Y	20.8	14.7	-1.9	125.5
8	Front Door Mid-Rear	2900	-820	680	Y	206.3	8.1	-148.2	18.9 ¹
9	Front Door Upper Centerline	3330	-820	910	Y	224.6	14.6	-97.7	24.3
10	Rear Door Mid-Rear	1740	-820	730	Y	61.8	13.6	-76.0	18.3 ²
11	Rear Door Upper Centerline	2200	-820	940	Y	168.0	9.7	-110.3	13.9
12	B-Post Lower	2650	-810	660	Y	170.8	4.9	-78.0	16.4 ³
13	B-Post Middle	2650	-810	870	Y	139.5	5.9	-92.7	15.3
14	A-Post Lower	3770	-810	680	Y	25.4	4.5	-7.5	28.5 ⁴
15	A-Post Middle	3770	-810	780	Y	37.3	4.3	-3.4	28.1
16	Front Seat Track	3100	-660	470	Y	39.1	13.2	-13.7	56.7
17	Rear Seat Structure	2220	-700	510	Y	87.3	13.4	-50.7	20.6
18	Vehicle CG	3250	220	340	X	1.9	69.7	-5.2	17.1
					Y	20.8	15.1	-1.9	126.0
					Z	3.5	41.4	-7.0	58.0
					RES	21.4	15.4		

1.) Channel failed at 95.5 msec.

2.) Channel failed at 59.5 msec.

3.) Channel failed at 54.0 msec.

4.) Channel failed at 34.5 msec.

DATA SHEET NO. 14
MDB ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 2/24/05

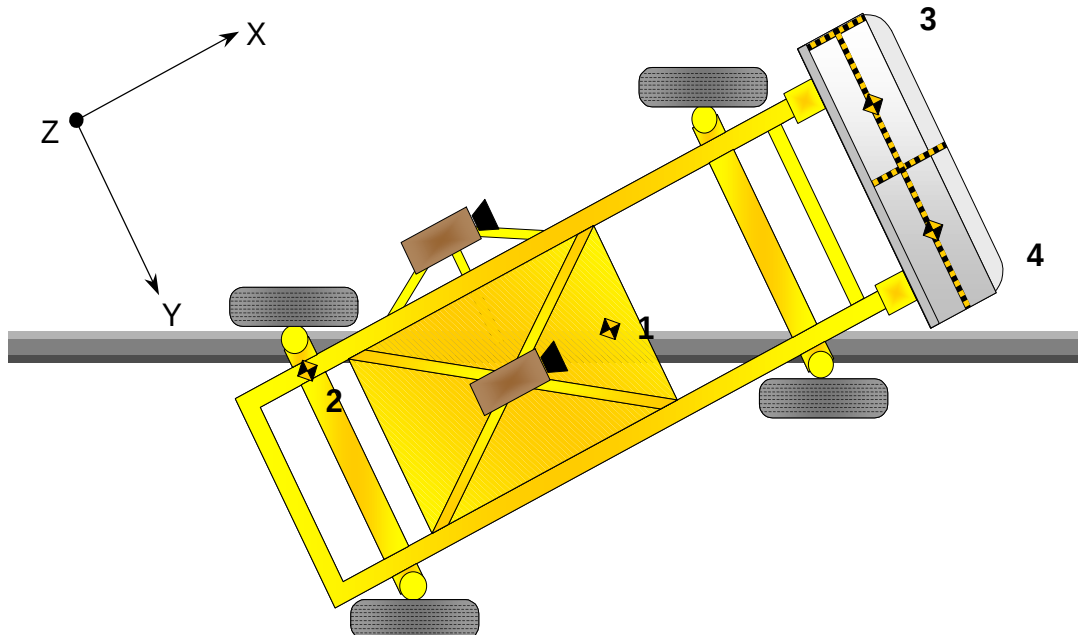
MDB ACCELEROMETER PEAK DATA AND LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)			Peak Values (G's)				
		X	Y	Z	Axis	Max	Time	Min	Time
1	MDB CG	-1195	0	430	X	3.3	154.9	-20.7	33.9
					Y	2.0	72.6	-9.2	29.7
					Z	15.3	117.8	-17.7	131.6
					RES	21.5	33.6		
2	MDB Rear	-2642	-593	608	X	2.4	181.5	-21.1	26.8
					Y	3.3	126.2	-4.3	36.0

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

MDB BUMPER CONTACT SWITCH DATA

Loc. No.	Contact Switch Location	Units	Peak and 50% Crossing Point			
			Max	Time	50%	Time
3	MDB Left Bumper (T=0)	% F.S.	100.0	0.0	50.0	0.0
4	MDB Right Bumper	% F.S.	99.8	50.4	50.0	-0.2



DATA SHEET NO. 15

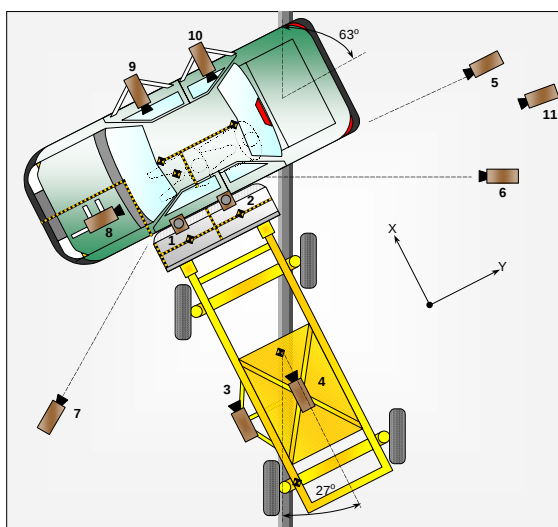
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 02/24/05



No.	Camera View	Location (mm)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X	Y	Z			
1	Overhead Overall	1220	2286	-5486	-90	12	1000
2	Overhead Close Up	609	1676	-5486	-90	25	1000
3	Impact Point	-2130	0	-1143	-7	13	TBD
4	Side Overall	-3910	838	-1829	-11	13	TBD
5	Rear	228	15545	-1371	-1	25	1000
6	Left Rear	-7180	16459	-939	-1	65	TBD
7	Left Front	-2965	-3550	-1473	-12	13	1000
8	Driver Front	-2710	-710	-1422	-20	35	1000
9	Driver Side	1220	610	-1220	-2	24	1000
10	Rear Passenger	1220	1470	-1220	-2	18	1000
11	Right Real Time	3655	22860	-1727	-5		30

Additional Cameras

1	Left Real Time	16459	-7100	-840	0		30
2	Left Real Time	-4700	-2600	-1473	-1		30
3	Left Front	-3475	-2875	-2430	-7	100	1000

X = Barrier Face Y = Monorail Centerline Z = Ground NTM: No Timing Marks

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2005 Saturn Relay 5-Door MPV

NHTSA No.: G50102

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

Test Date: 02/24/05

Test Time: 11:27 PM

Temperature: 15.0 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. 17

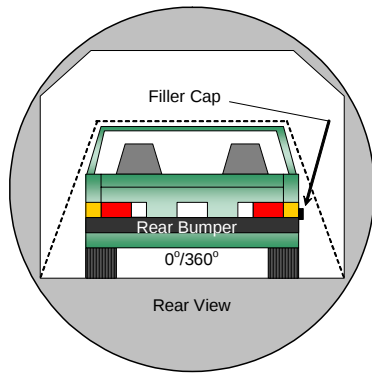
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2005 Saturn Relay 5-Door MPV

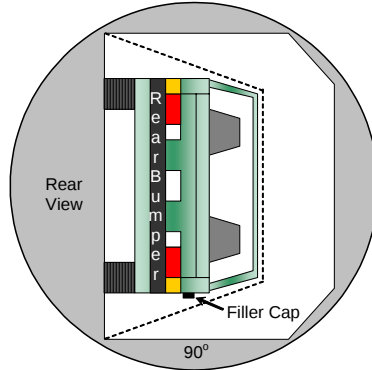
NHTSA No.: G50102

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

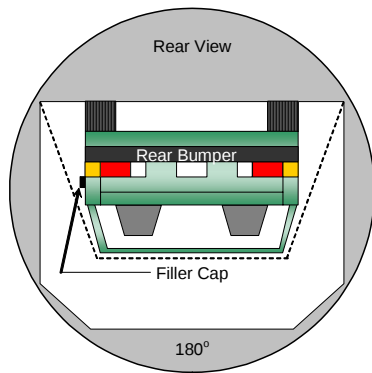
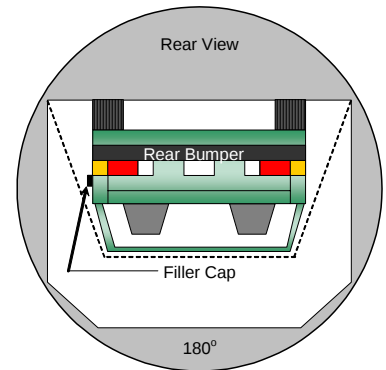
Test Date: 02/24/05



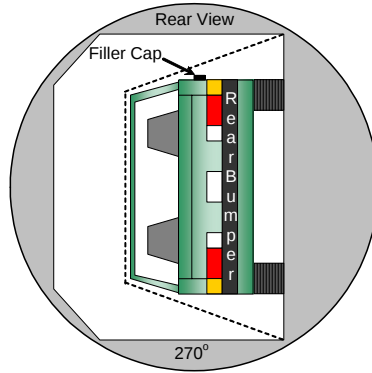
0° TO 90°



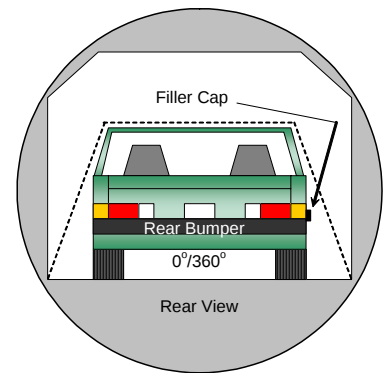
90° TO 180°



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. 17...(CONTINUED)**FMVSS 301 STATIC ROLLOVER DATA SHEET**Test Vehicle: 2005 Saturn Relay 5-Door MPVNHTSA No.: G50102Test Program: 55/28 km/h Side Impact NCAPTest Date: 02/24/05**SOLVENT COLLECTION TIME TABLE IN SECONDS**

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	81	300	381
90° to 180°	79	300	379
180° to 270°	78	300	378
270° to 360°	78	300	378

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

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A-33	Pre-Test Left Rear Door	A-33

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A-44	Pre-Test Passenger Dummy (Door Open)	A-44
A-45	Pre-Test Passenger Dummy (Through Window)	A-45
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Figure A-1: Left Front $\frac{3}{4}$ View, as Received



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

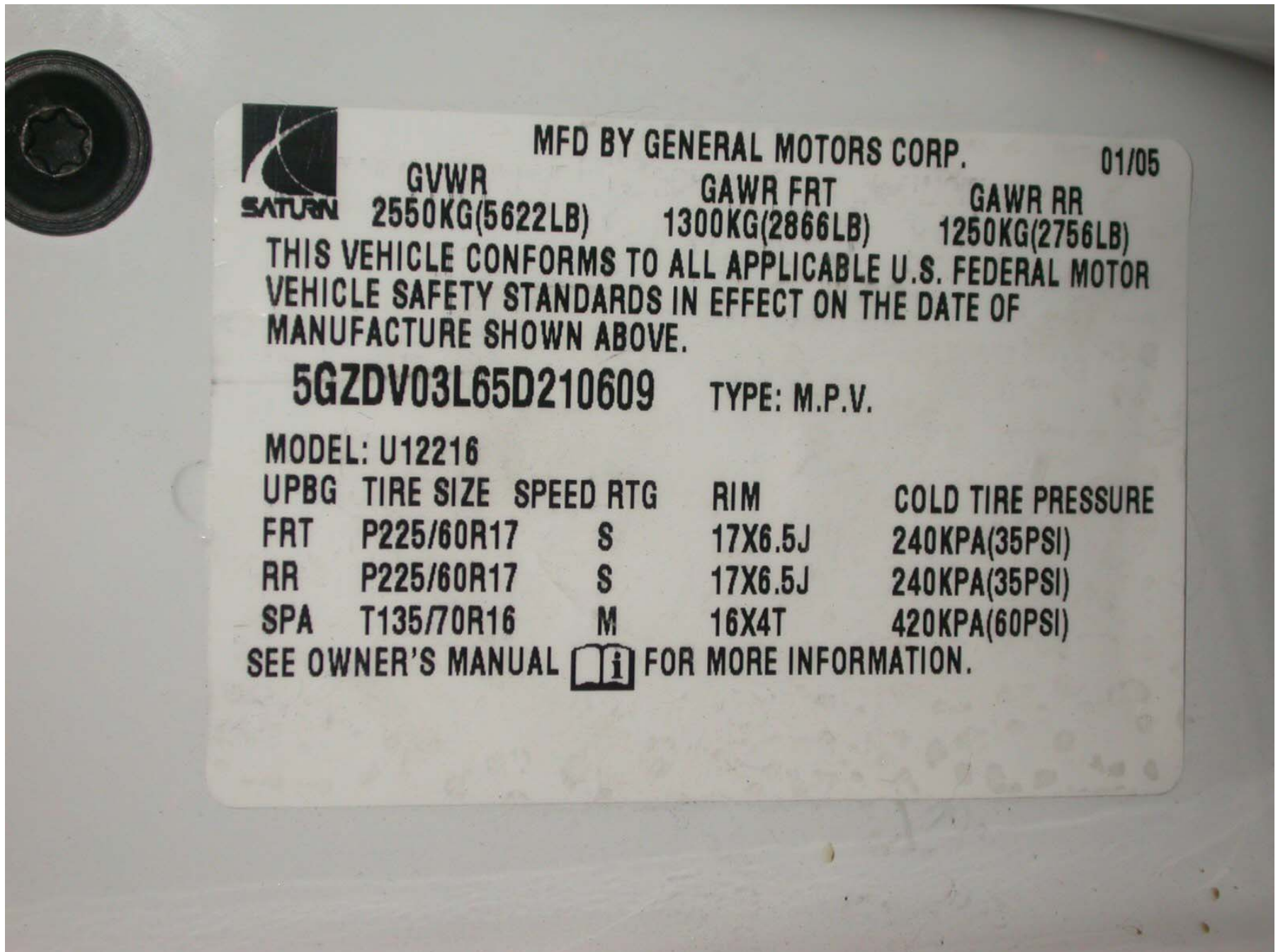


Figure A-3: Manufacturer's Label



TIRE AND LOADING INFORMATION

SEATING CAPACITY TOTAL 7 FRONT 2 CENTER 2 REAR 3

The combined weight of occupants and cargo should never exceed 573 kg or 1263 lbs.

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE		SEE OWNER'S MANUAL FOR ADDITIONAL INFORMATION
P225/60R17	FRONT	240 kPa, 35 PSI	
P225/60R17	REAR	240 kPa, 35 PSI	
T135/70R16	SPARE	420 kPa, 60 PSI	

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 $\frac{3}{4}$ 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

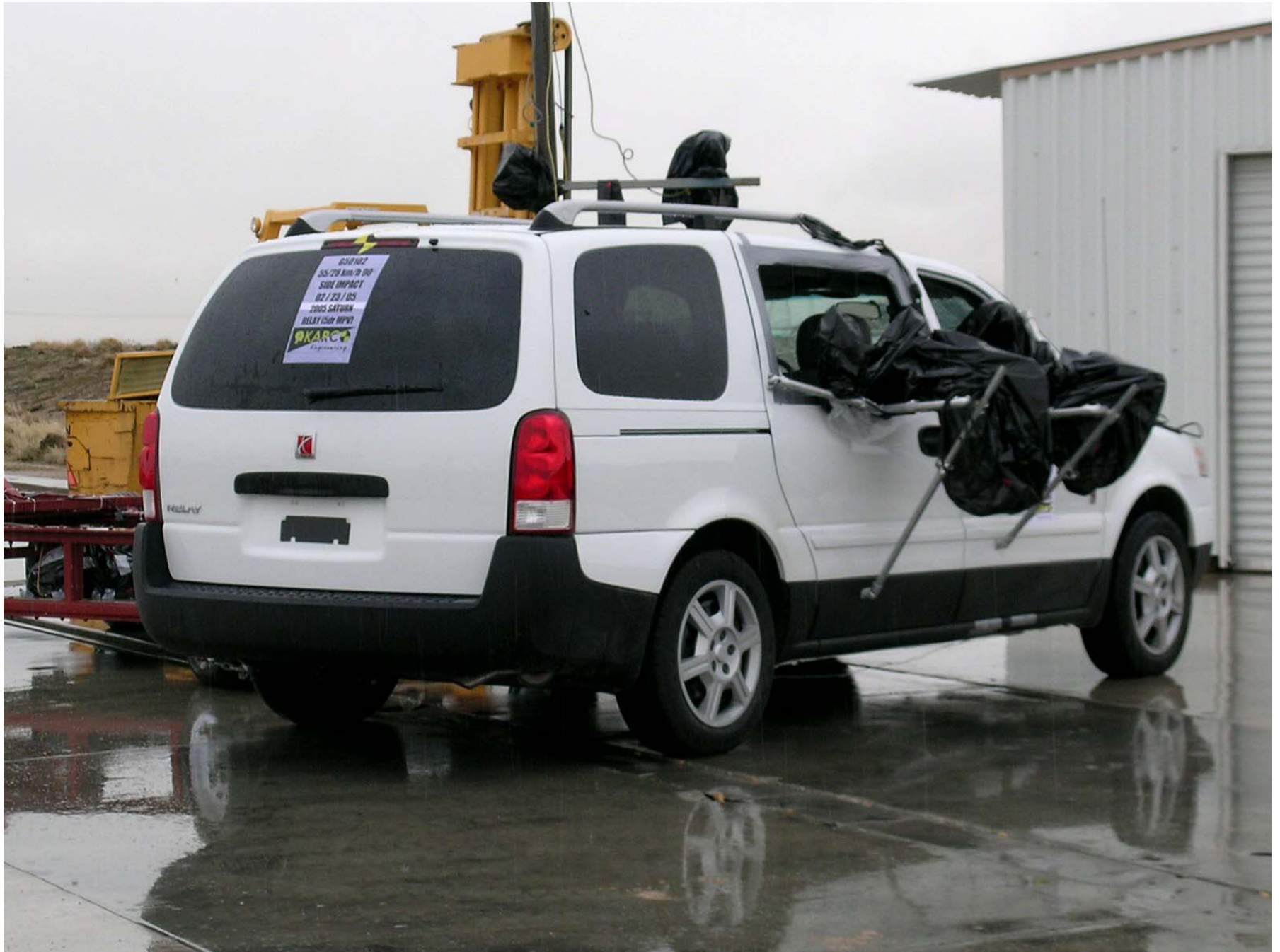


Figure A-15: Pre-Test Right Rear ¾ View



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

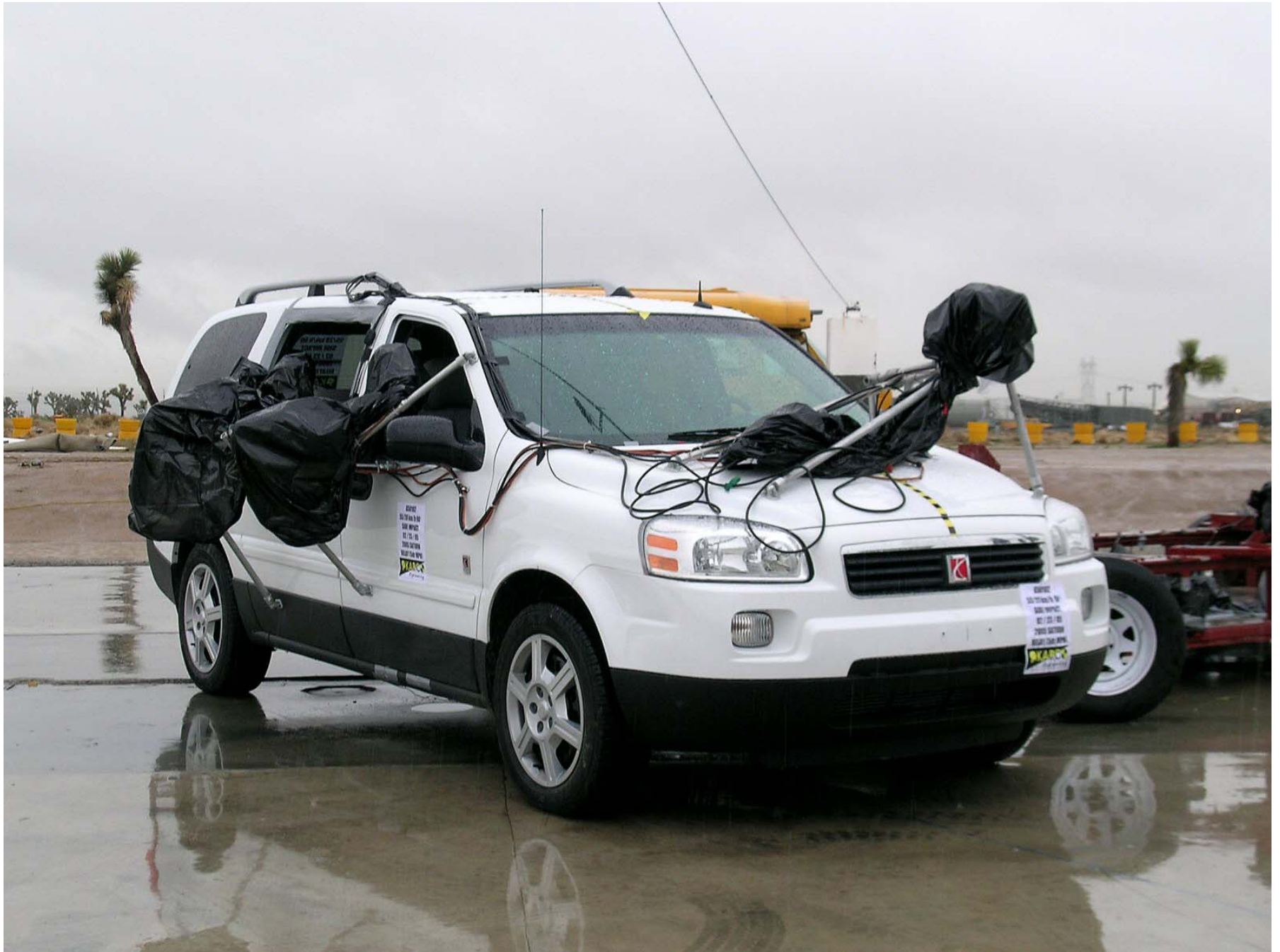


Figure A-19: Pre-Test Right Front ¾ View



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

A white SUV, possibly a Toyota RAV4, is parked on a wet concrete surface. The vehicle is wrapped in yellow caution tape with black diagonal stripes. A black bag is hanging from the rear of the vehicle. To the left of the SUV is a red metal trailer with a black bag on it. In the background, there is a white building with a large roll-up door and some equipment on the ground. The ground is wet and reflective.



Figure A-22: Post-Test Overhead View

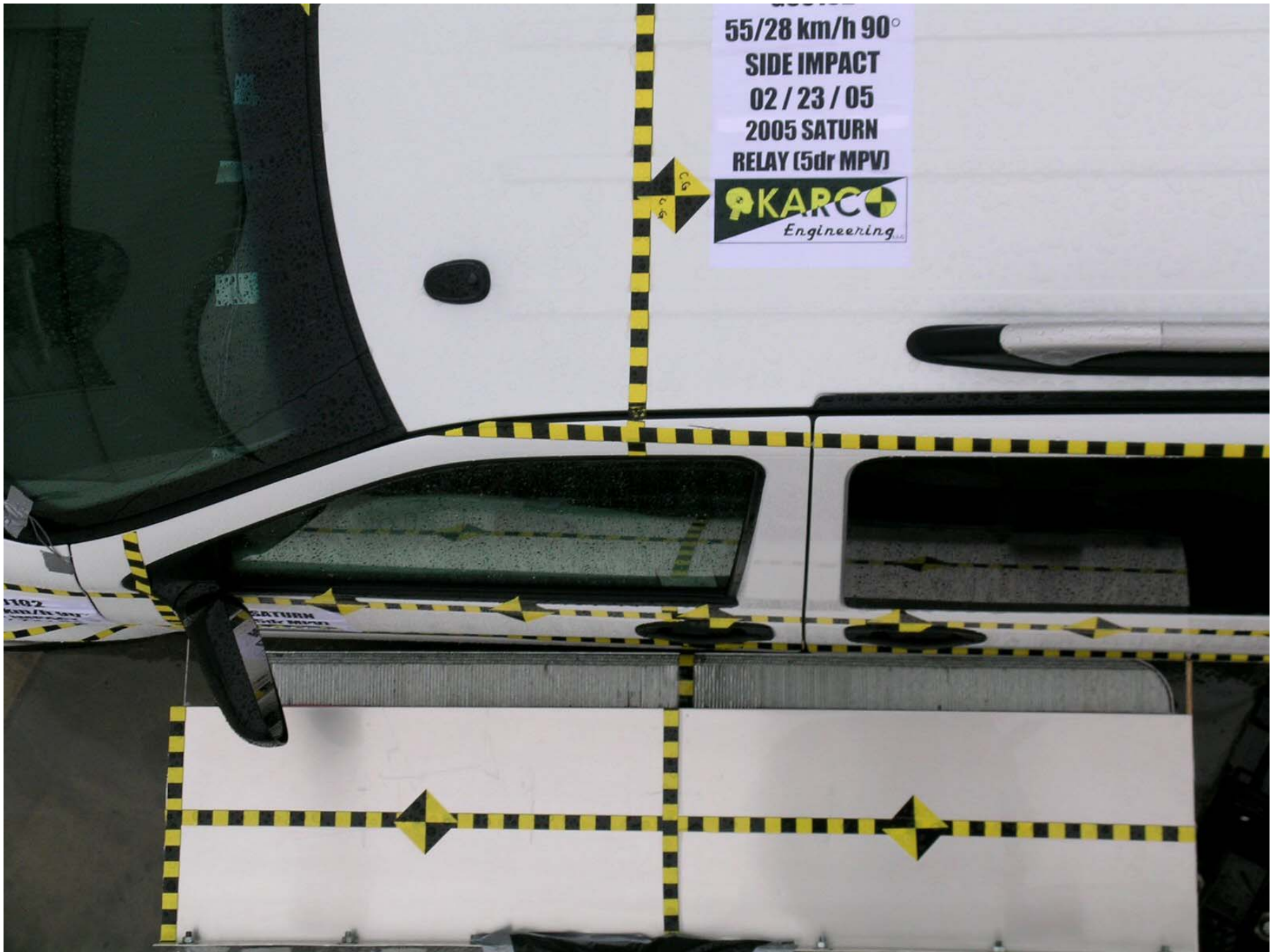


Figure A-23: Pre-Test Overhead Close-up View



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



Figure A-25: Pre-Test Impact Point



Figure A-26: Post-Test Impact Point



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



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



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



Figure A-30: Post-Test Rear $\frac{3}{4}$ View of Left Side Doors



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)



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)



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



Figure A-46: Post-Test Passenger Dummy (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

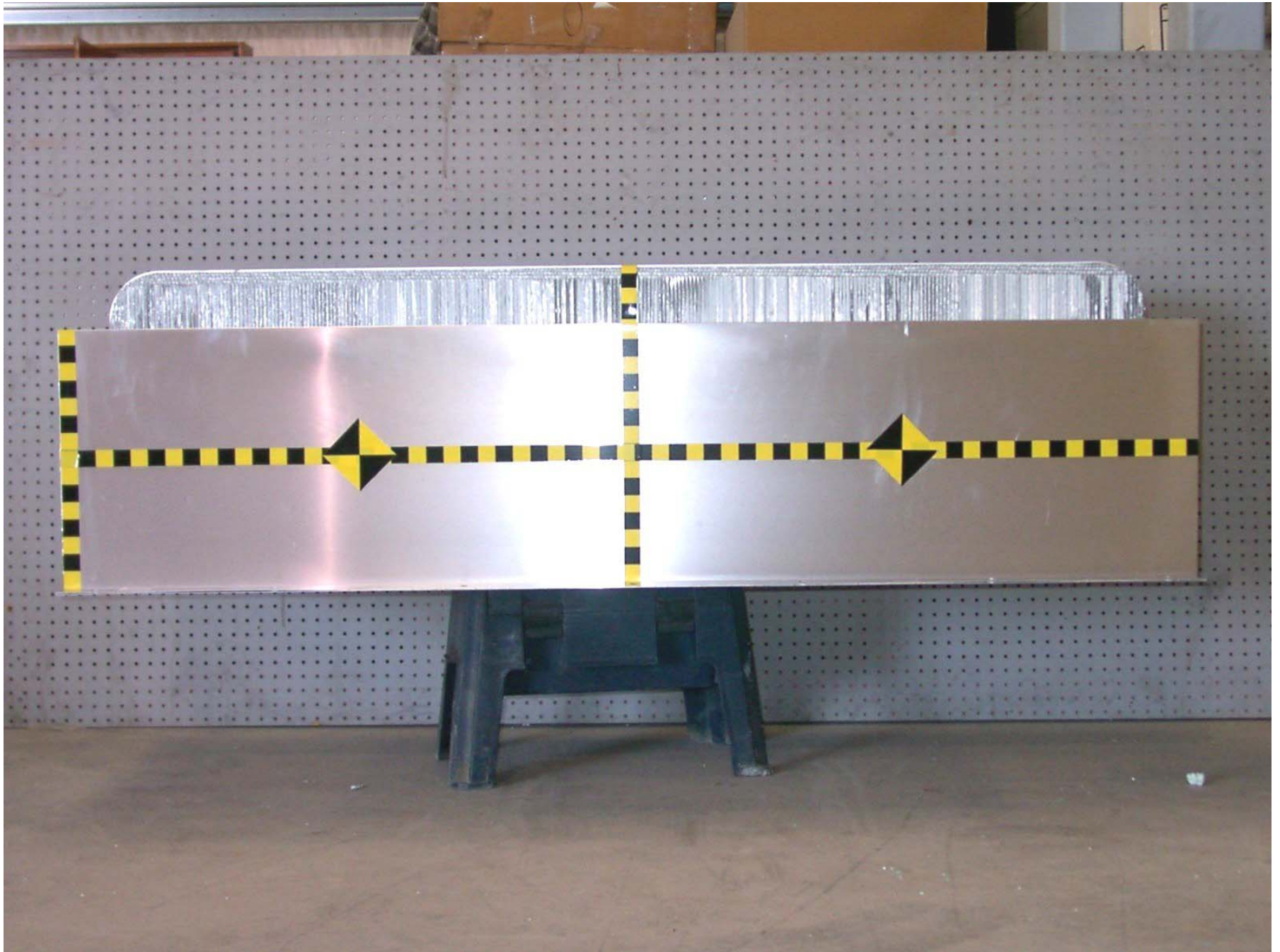


Figure A-55: Pre-Test Top View of Deformable Barrier

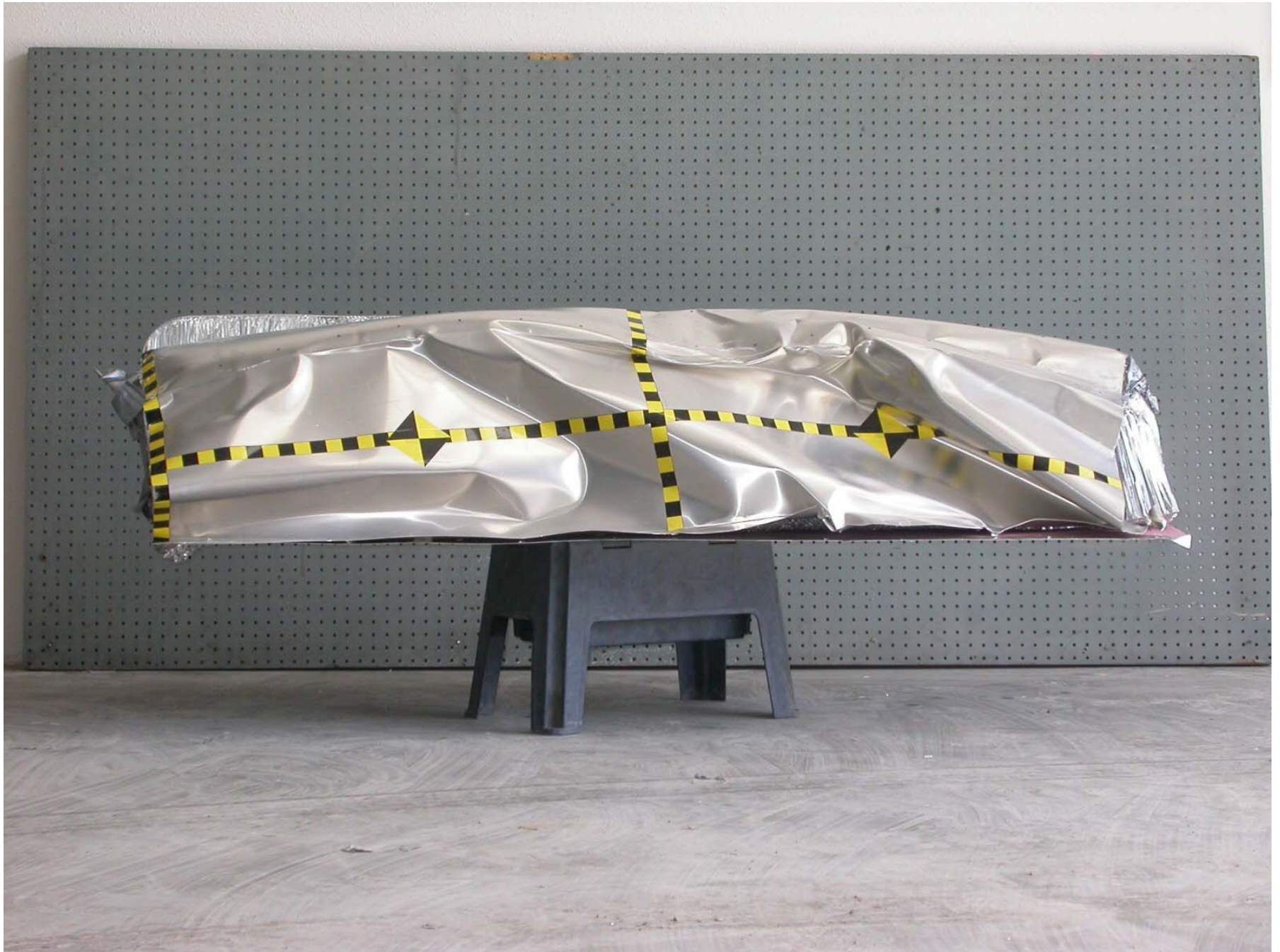


Figure A-56: Post-Test Top View of Deformable Barrier



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°)

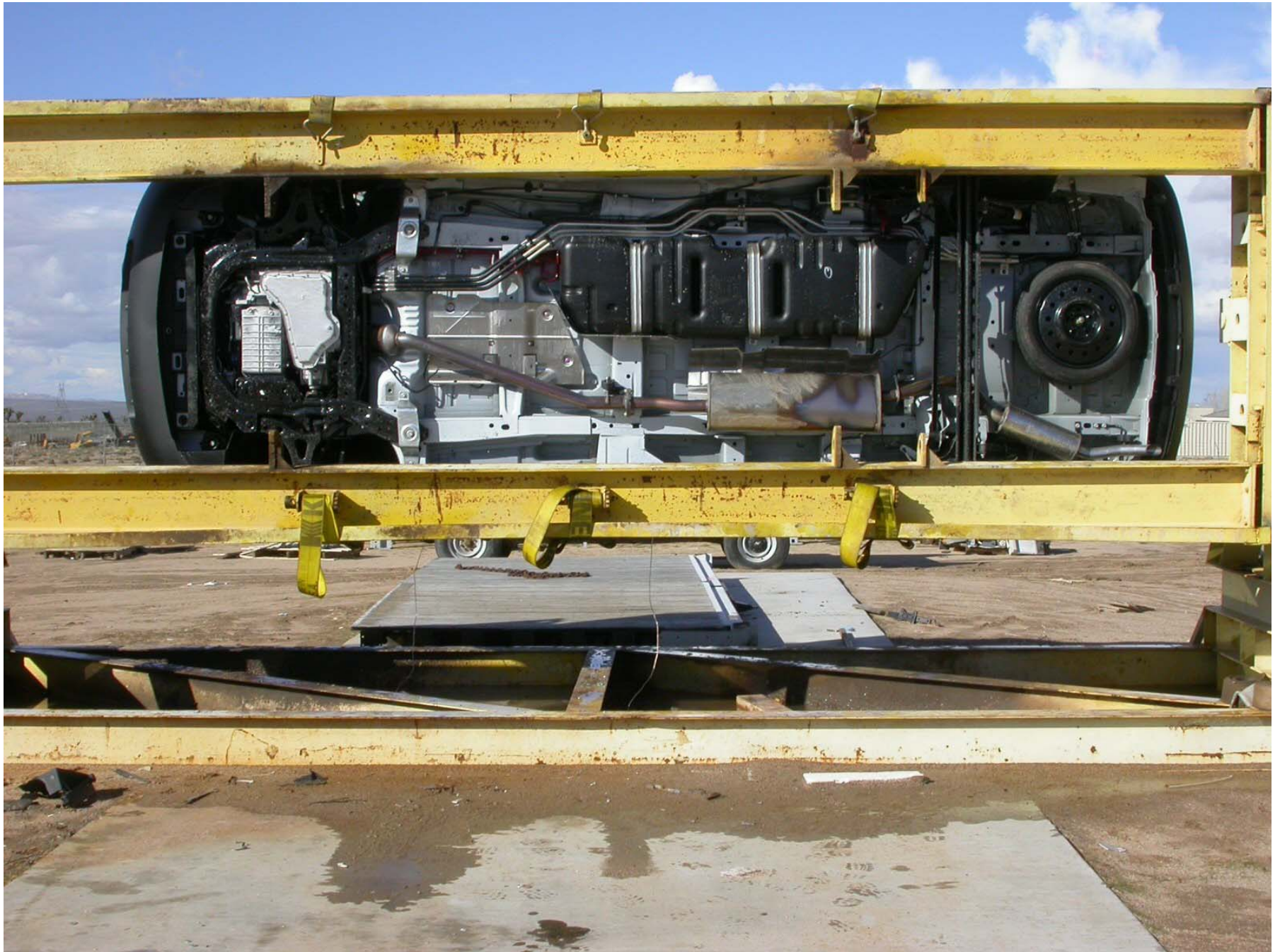


Figure A-64: Vehicle on Rollover Device (270°)



Figure A-65: Vehicle Impact



Figure A-66: Post-Test Passenger Door Overhead View



Figure A-67: Post-Test Passenger Door

APPENDIX B
SID/HIII, VEHICLE AND MDB RESPONSE DATA

LIST OF DATA PLOTS

Data Plot	Page
B-1	Driver Head X Primary
	Driver Head Y Primary
	Driver Head Z Primary
	Driver Head Resultant Primary
B-2	Driver Head Primary X Velocity
	Driver Head Primary Y Velocity
	Driver Head Primary Z Velocity
B-3	Driver Head X Redundant
	Driver Head Y Redundant
	Driver Head Z Redundant
	Driver Head Resultant Redundant
B-4	Driver Head Redundant X Velocity
	Driver Head Redundant Y Velocity
	Driver Head Redundant Z Velocity
B-5	Driver Upper Neck Force X
	Driver Upper Neck Force Y
	Driver Upper Neck Force Z
	Driver Upper Neck Force Resultant
B-6	Driver Upper Neck Moment X
	Driver Upper Neck Moment Y
	Driver Upper Neck Moment Z
	Driver Upper Neck Moment Resultant
B-7	Driver Upper Rib Primary Y
	Driver Lower Rib Primary Y
	Driver Lower Spine Primary Y
	Driver Pelvis Primary Y
B-8	Driver Upper Rib Primary Y Velocity
	Driver Lower Rib Primary Y Velocity
	Driver Lower Spine Primary Y Velocity
	Driver Pelvis Primary Y Velocity
B-9	Driver Upper Rib Redundant Y
	Driver Lower Rib Redundant Y
	Driver Lower Spine Redundant Y
	Driver Pelvis Redundant Y

LIST OF DATA PLOTS...(CONTINUED)

Data Plot	Page
B-10	Driver Upper Rib Redundant Y Velocity
	Driver Lower Rib Redundant Y Velocity
	Driver Lower Spine Redundant Y Velocity
	Driver Pelvis Redundant Y Velocity
B-11	Driver Thorax Contact
	Driver Pelvis Contact
B-12	Passenger Head X Primary
	Passenger Head Y Primary
	Passenger Head Z Primary
	Passenger Head Resultant Primary
B-13	Passenger Head Primary X Velocity
	Passenger Head Primary Y Velocity
	Passenger Head Primary Z Velocity
B-14	Passenger Head X Redundant
	Passenger Head Y Redundant
	Passenger Head Z Redundant
	Passenger Head Resultant Redundant
B-15	Passenger Head Redundant X Velocity
	Passenger Head Redundant Y Velocity
	Passenger Head Redundant Z Velocity
B-16	Passenger Upper Neck Force X
	Passenger Upper Neck Force Y
	Passenger Upper Neck Force Z
	Passenger Upper Neck Force Resultant
B-17	Passenger Upper Neck Moment X
	Passenger Upper Neck Moment Y
	Passenger Upper Neck Moment Z
	Passenger Upper Neck Moment Resultant
B-18	Passenger Upper Rib Primary Y
	Passenger Lower Rib Primary Y
	Passenger Lower Spine Primary Y
	Passenger Pelvis Primary Y

LIST OF DATA PLOTS...(CONTINUED)

Data Plot	Page
B-19	Passenger Upper Rib Primary Y Velocity
	Passenger Lower Rib Primary Y Velocity
	Passenger Lower Spine Primary Y Velocity
	Passenger Pelvis Primary Y Velocity
B-20	Passenger Upper Rib Redundant Y
	Passenger Lower Rib Redundant Y
	Passenger Lower Spine Redundant Y
	Passenger Pelvis Redundant Y
B-21	Passenger Upper Rib Redundant Y Velocity
	Passenger Lower Rib Redundant Y Velocity
	Passenger Lower Spine Redundant Y Velocity
	Passenger Pelvis Redundant Y Velocity
B-22	Passenger Thorax Contact
	Passenger Pelvis Contact
B-23	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
B-24	Vehicle Right Sill at Front Seat X Velocity
	Vehicle Right Sill at Front Seat Y Velocity
	Vehicle Right Sill at Front Seat Z Velocity
B-25	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
B-26	Vehicle Right Sill at Rear Seat X Velocity
	Vehicle Right Sill at Rear Seat Y Velocity
	Vehicle Right Sill at Rear Seat Z Velocity
B-27	Vehicle Rear Floor Above Axle X
	Vehicle Rear Floor Above Axle Y
	Vehicle Rear Floor Above Axle Z
	Vehicle Rear Floor Above Axle Resultant
B-28	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)

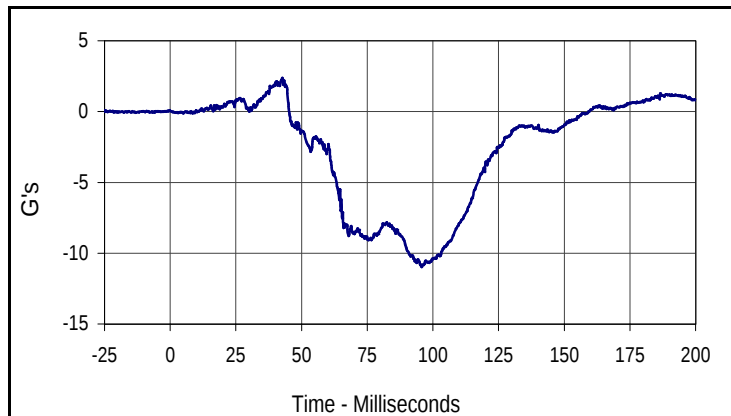
Data Plot	Page
B-29	Vehicle Left Sill at Rear Door Y
	Vehicle Left Sill at Front Door Y
	Vehicle Left Sill at Rear Door Y Velocity
	Vehicle Left Sill at Front Door Y Velocity
B-30	Vehicle Left Front Door CL Y
	Vehicle Right Rear Occupant Compartment
	Vehicle Left Front Door Mid Rear Y
	Vehicle Left Front Door Upper CL Y
B-31	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
B-32	Vehicle Left Rear Door Mid Rear Y
	Vehicle Left Rear Door Upper CL Y
	Vehicle Left Rear Door Mid Rear Y Velocity
	Vehicle Left Rear Door Upper CL Y Velocity
B-33	Vehicle B-Post Lower Y
	Vehicle B-Post Middle Y
	Vehicle B-Post Lower Y Velocity
	Vehicle B-Post Middle Y Velocity
B-34	Vehicle A-Post Lower Y
	Vehicle A-Post Middle Y
	Vehicle A-Post Lower Y Velocity
	Vehicle A-Post Middle Y Velocity
B-35	Vehicle Left Front Seat Track
	Vehicle Rear Seat Structure
	Vehicle Left Front Seat Track Y Velocity
	Vehicle Rear Seat Structure Y Velocity
B-36	Vehicle CG X
	Vehicle CG Y
	Vehicle CG Z
	Vehicle CG Resultant
B-37	Vehicle CG X Velocity
	Vehicle CG Y Velocity
	Vehicle CG Z Velocity

LIST OF DATA PLOTS...(CONTINUED)

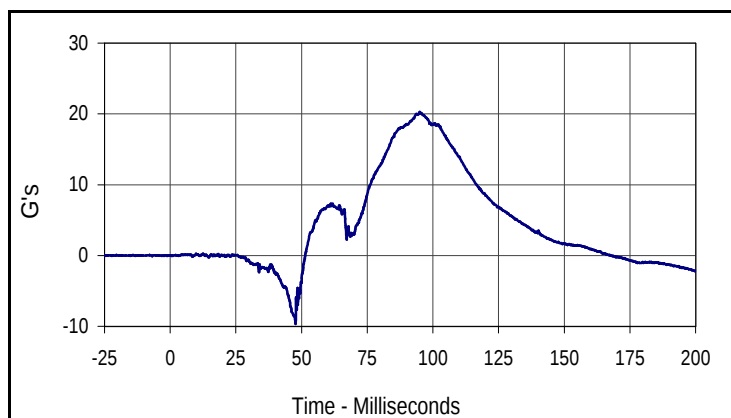
Data Plot	Page
B-38	Driver Upper Rib Primary Y
	Driver Lower Rib Primary Y
	Driver Lower Spine Primary Y
	Driver Pelvis Primary Y
B-39	Driver Upper Rib Redundant Y
	Driver Lower Rib Redundant Y
	Driver Lower Spine Redundant Y
	Driver Pelvis Redundant Y
B-40	Passenger Upper Rib Primary Y
	Passenger Lower Rib Primary Y
	Passenger Lower Spine Primary Y
	Passenger Pelvis Primary Y
B-41	Passenger Upper Rib Redundant Y
	Passenger Lower Rib Redundant Y
	Passenger Lower Spine Redundant Y
	Passenger Pelvis Redundant Y
B-42	MDB CG X
	MDB CG Y
	MDB CG Z
	MDB CG Resultant
B-43	MDB CG X Velocity
	MDB CG Y Velocity
	MDB CG Z Velocity
B-44	MDB Rear X
	MDB Rear Y
	MDB Rear X Velocity
	MDB Rear Y Velocity
B-45	MDB Right Bumper Contact

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

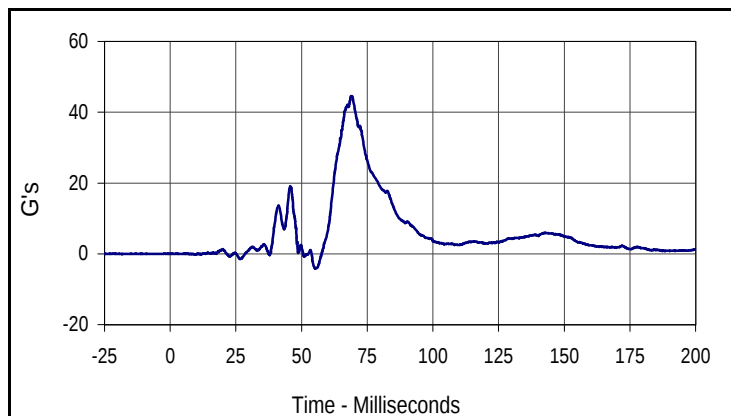
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 NHTSA No.: G50102



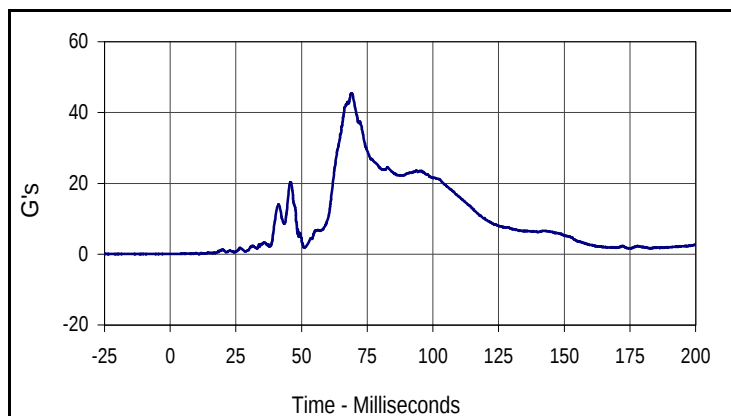
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Max	Time	Min	Time
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Max	Time	Min	Time
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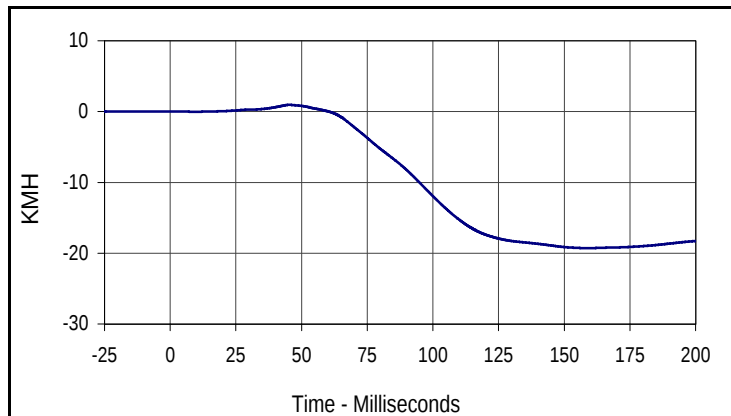
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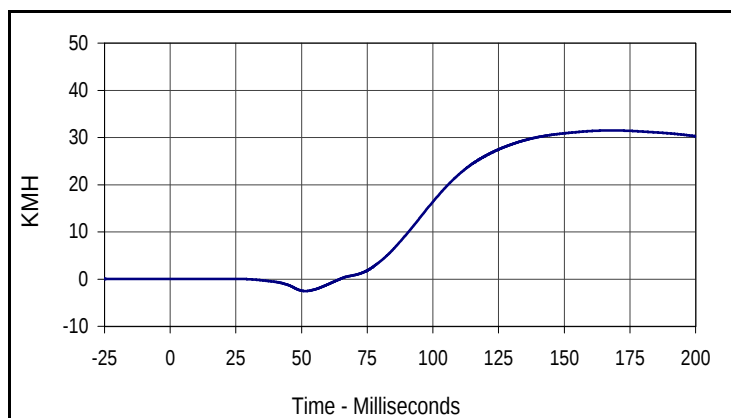
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Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

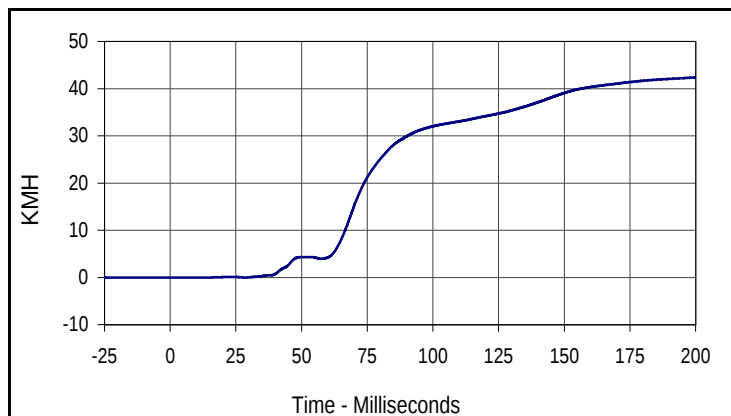
Test Date: 2/24/05
 NHTSA No.: G50102



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Max	Time	Min	Time
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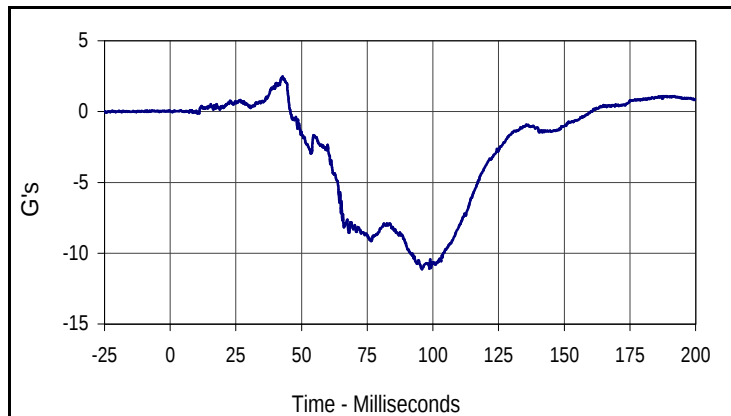
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Driver Head Primary Y Velocity			
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002	IN1	180	KMH
Max	Time	Min	Time
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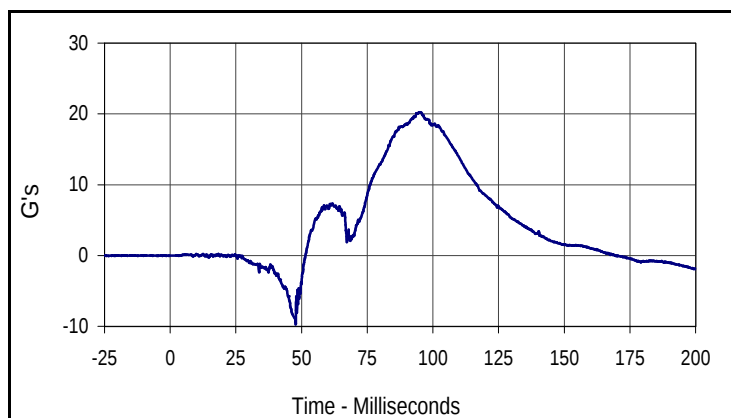
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Driver Head Primary Z Velocity			
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Max	Time	Min	Time
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Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

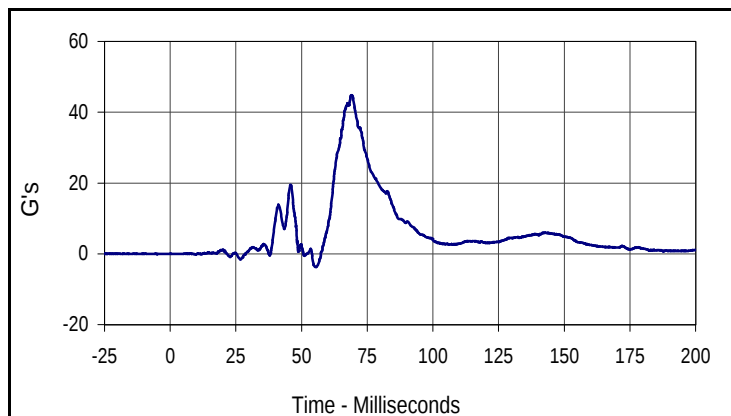
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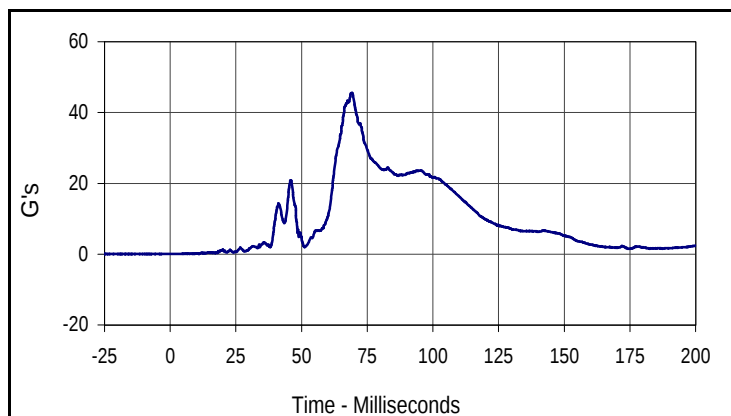
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Curve Description			
Driver Head Y Redundant			
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Max	Time	Min	Time
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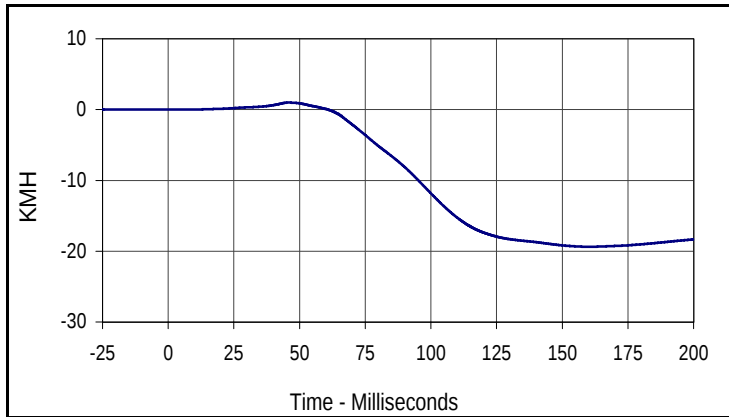
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Driver Head Z Redundant			
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Max	Time	Min	Time
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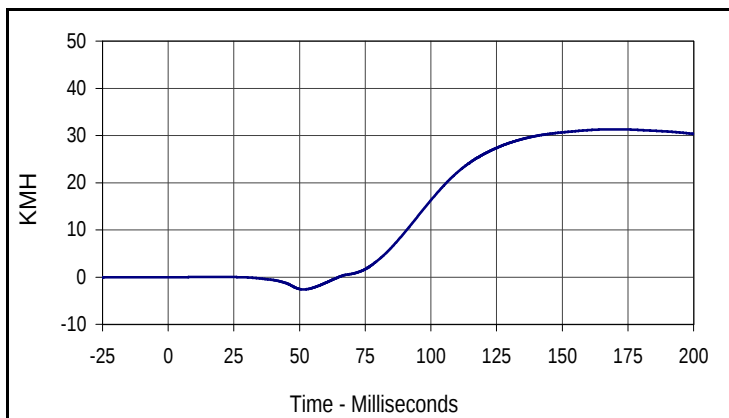
Curve Description			
Driver Head Resultant Redundant			
CURNO	Type	SAE Class	Units
004	RES	1000	G's
Max	Time	Min	Time
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Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

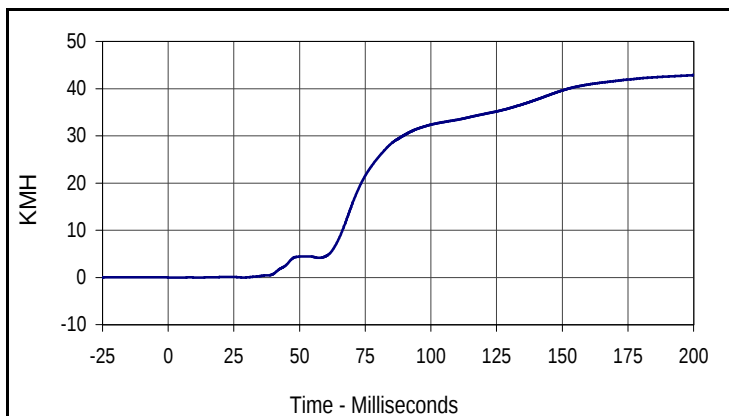
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Driver Head Redundant X Velocity			
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004	IN1	180	KMH
Max	Time	Min	Time
1.0	45.8	-19.4	160.2



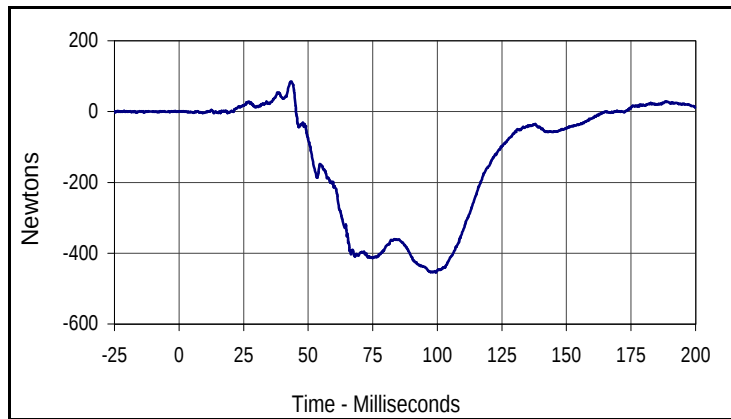
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Driver Head Redundant Y Velocity			
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005	IN1	180	KMH
Max	Time	Min	Time
31.3	169.4	-2.6	51.5



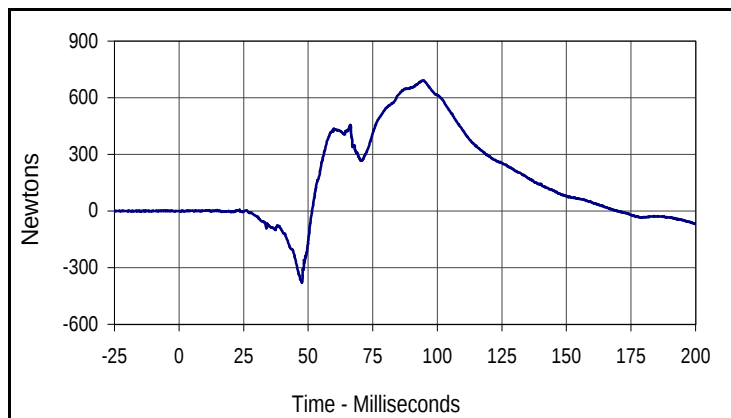
Curve Description			
Driver Head Redundant Z Velocity			
CURNO	Type	SAE Class	Units
006	IN1	180	KMH
Max	Time	Min	Time
42.9	200.0	0.0	28.6

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

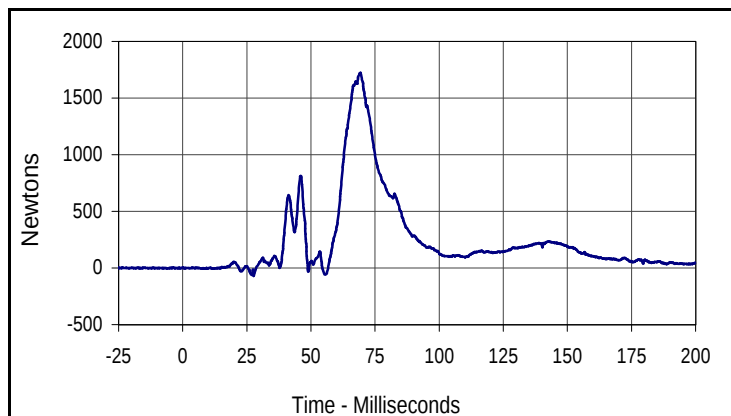
Test Date: 2/24/05
 NHTSA No.: G50102



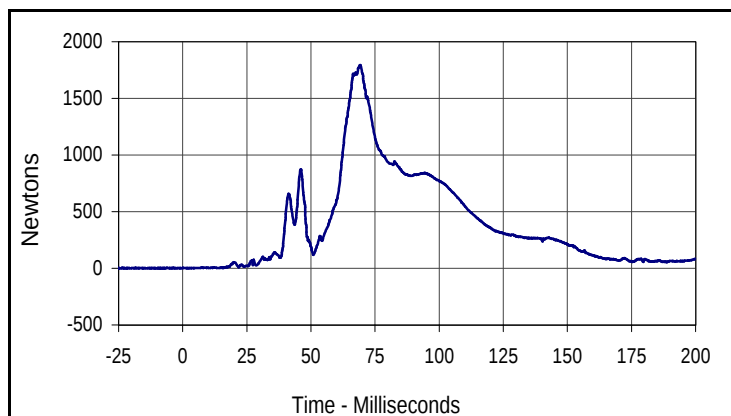
Curve Description			
Driver Upper Neck Force X			
CURNO	Type	SAE Class	Units
007	FIL	1000	Newtons
Max	Time	Min	Time
85.5	43.4	-454.8	99.5



Curve Description			
Driver Upper Neck Force Y			
CURNO	Type	SAE Class	Units
008	FIL	1000	Newtons
Max	Time	Min	Time
691.2	94.8	-379.7	47.6



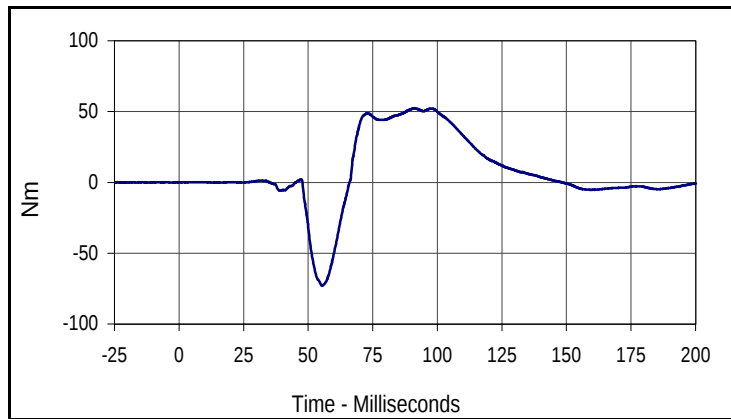
Curve Description			
Driver Upper Neck Force Z			
CURNO	Type	SAE Class	Units
009	FIL	1000	Newtons
Max	Time	Min	Time
1721.8	69.3	-71.0	27.7



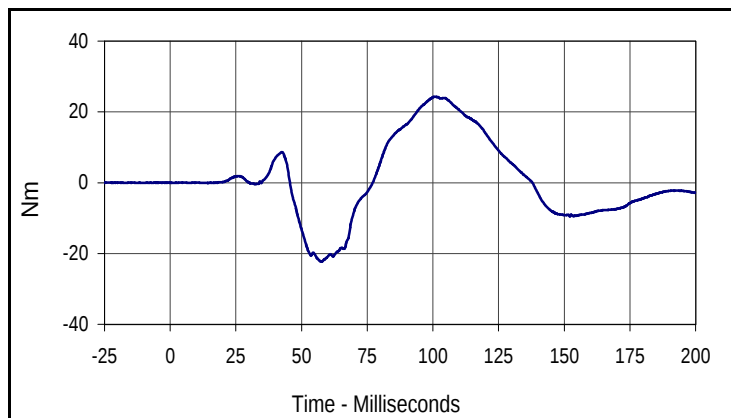
Curve Description			
Driver Upper Neck Force Resultant			
CURNO	Type	SAE Class	Units
007	RES	1000	Newtons
Max	Time	Min	Time
1794.5	69.2	0.7	1.6

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

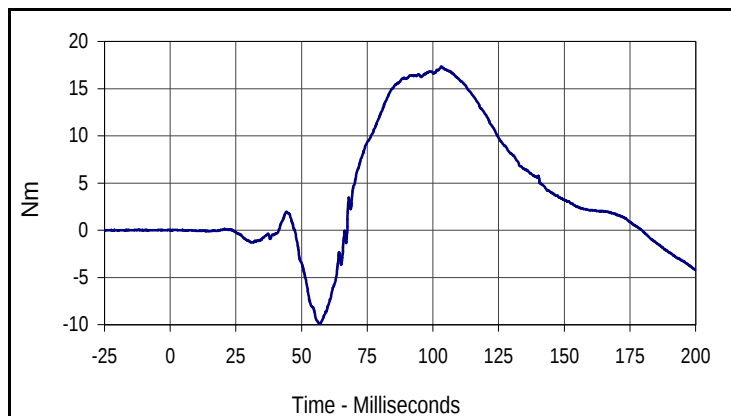
Test Date: 2/24/05
 NHTSA No.: G50102



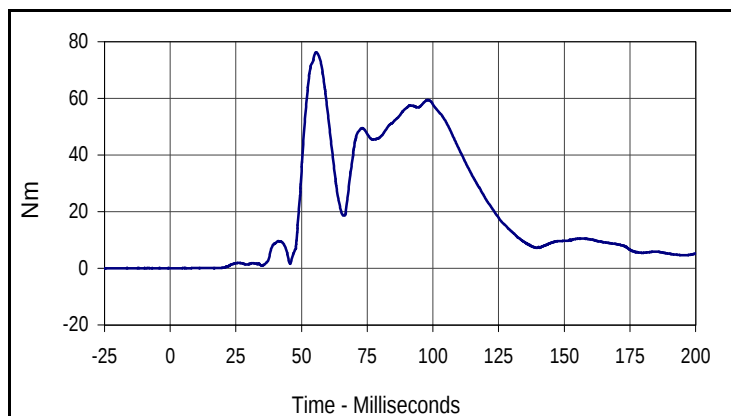
Curve Description			
Driver Upper Neck Moment X			
CURNO	Type	SAE Class	Units
010	FIL	600	Nm
Max	Time	Min	Time
52.3	91.1	-72.8	55.4



Curve Description			
Driver Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
011	FIL	600	Nm
Max	Time	Min	Time
24.3	100.9	-22.3	57.6



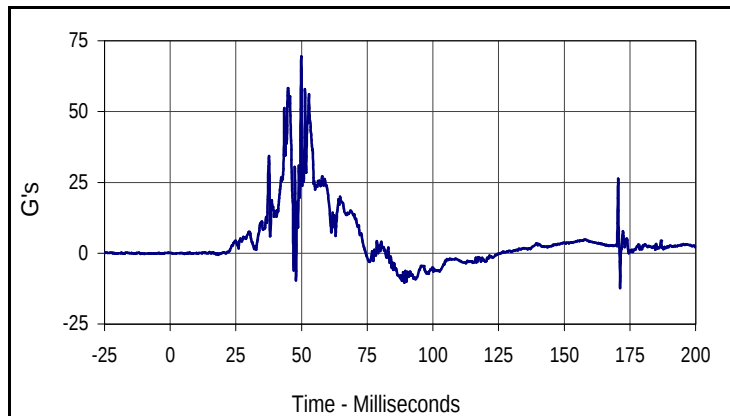
Curve Description			
Driver Upper Neck Moment Z			
CURNO	Type	SAE Class	Units
012	FIL	600	Nm
Max	Time	Min	Time
17.3	103.2	-9.9	57.0



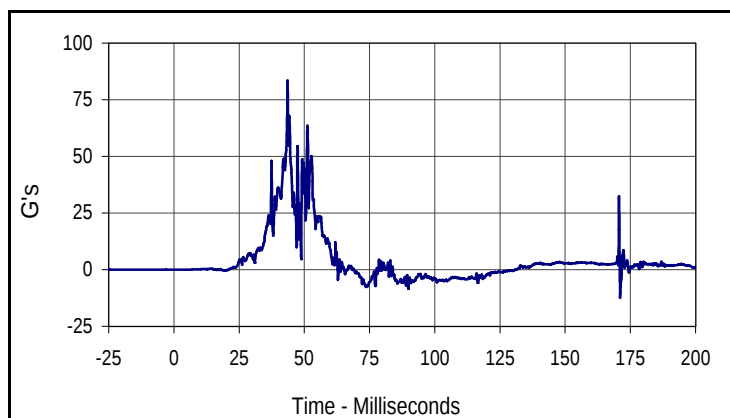
Curve Description			
Driver Upper Neck Moment Resultant			
CURNO	Type	SAE Class	Units
010	RES	600	Nm
Max	Time	Min	Time
76.3	55.5	0.0	3.2

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

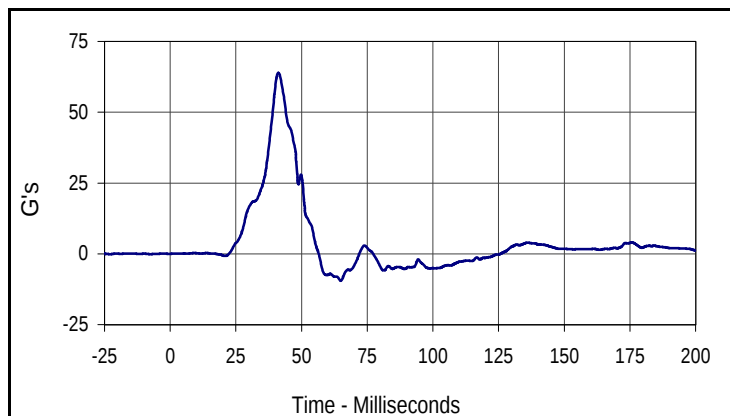
Test Date: 2/24/05
 NHTSA No.: G50102



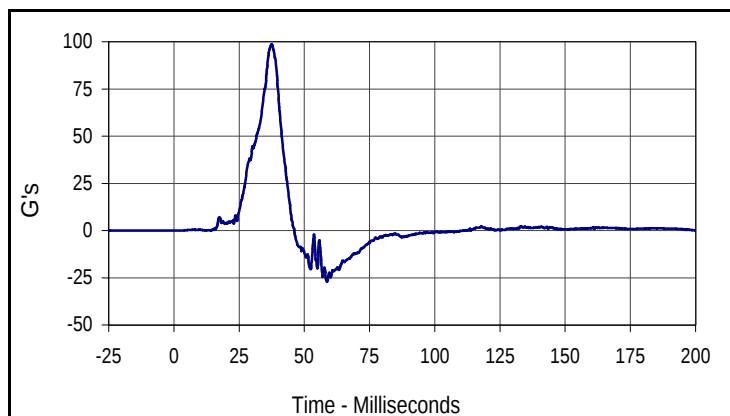
Curve Description			
Driver Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
013	FIL	1000	G's
Max	Time	Min	Time
69.3	49.9	-12.4	171.3



Curve Description			
Driver Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
014	FIL	1000	G's
Max	Time	Min	Time
83.5	43.6	-12.5	171.1



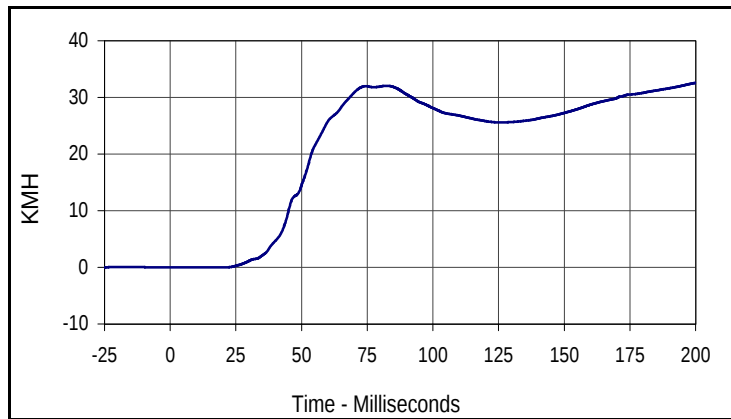
Curve Description			
Driver Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
015	FIL	180	G's
Max	Time	Min	Time
63.9	41.2	-9.5	64.9



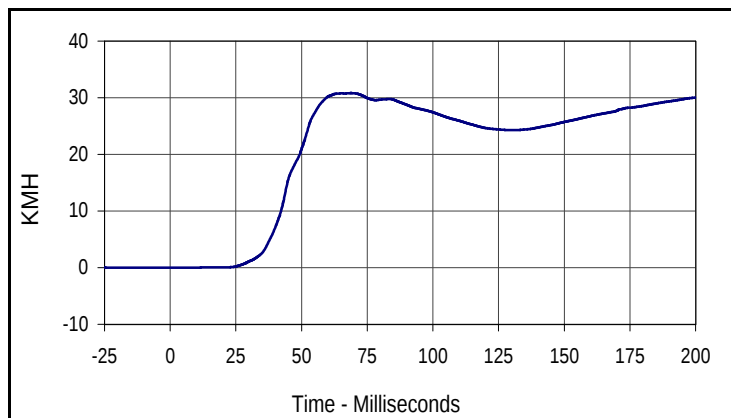
Curve Description			
Driver Pelvis Primary Y			
CURNO	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
98.7	37.5	-27.0	58.7

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

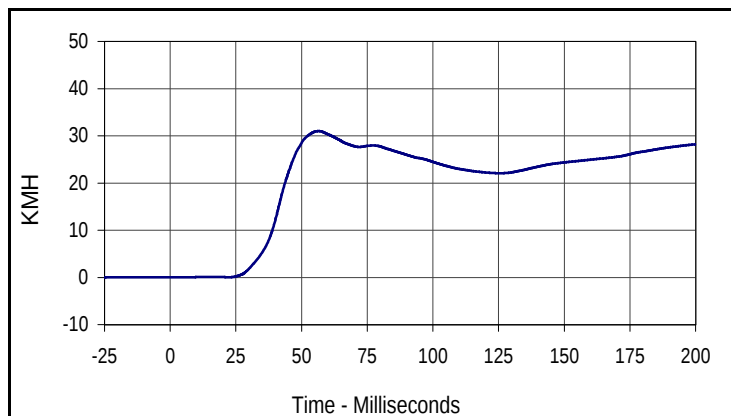
Test Date: 2/24/05
 NHTSA No.: G50102



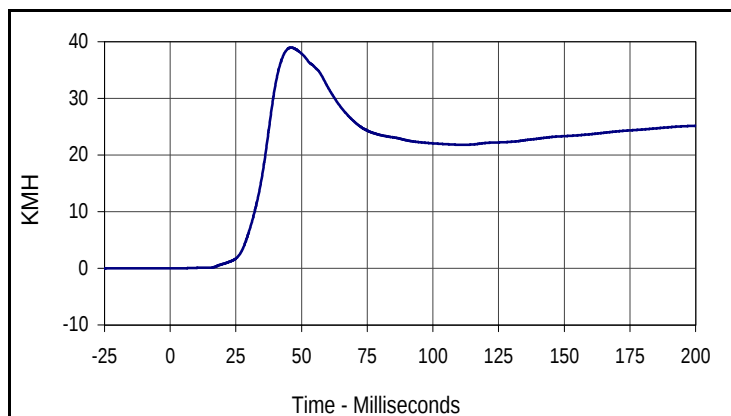
Curve Description			
Driver Upper Rib Primary Y Velocity			
CURNO	Type	SAE Class	Units
013	IN1	180	KMH
Max	Time	Min	Time
32.6	200.0	0.0	10.2



Curve Description			
Driver Lower Rib Primary Y Velocity			
CURNO	Type	SAE Class	Units
014	IN1	180	KMH
Max	Time	Min	Time
30.8	68.8	0.0	0.1



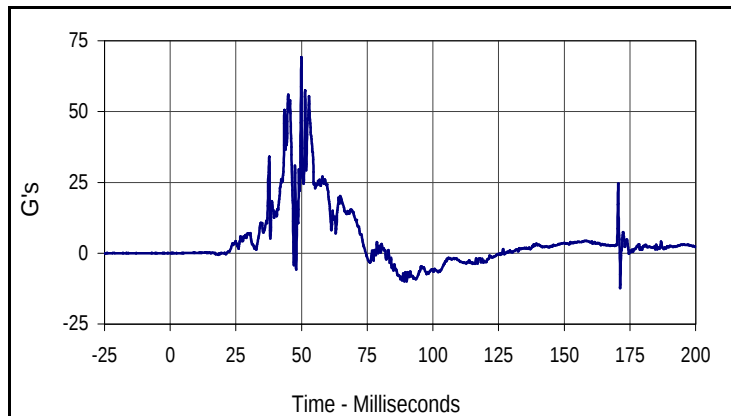
Curve Description			
Driver Lower Spine Primary Y Velocity			
CURNO	Type	SAE Class	Units
015	IN1	180	KMH
Max	Time	Min	Time
31.0	56.5	0.0	0.1



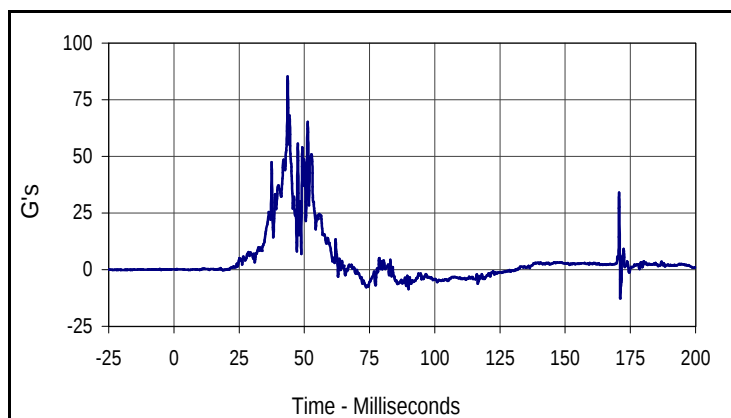
Curve Description			
Driver Pelvis Primary Y Velocity			
CURNO	Type	SAE Class	Units
016	IN1	180	KMH
Max	Time	Min	Time
39.0	46.0	0.0	0.0

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

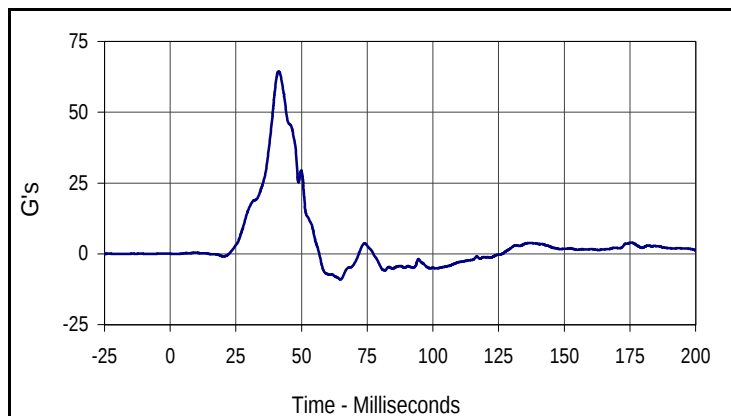
Test Date: 2/24/05
 NHTSA No.: G50102



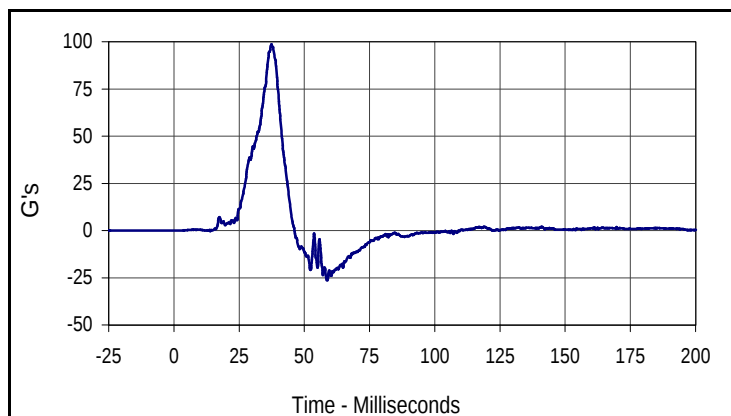
Curve Description			
Driver Upper Rib Redundant Y			
CURNO	Type	SAE Class	Units
017	FIL	1000	G's
Max	Time	Min	Time
69.1	49.9	-12.2	171.3



Curve Description			
Driver Lower Rib Redundant Y			
CURNO	Type	SAE Class	Units
018	FIL	1000	G's
Max	Time	Min	Time
85.4	43.6	-12.7	171.2



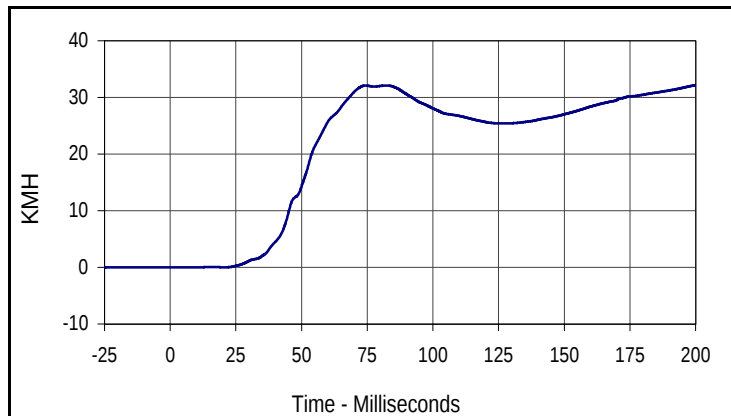
Curve Description			
Driver Lower Spine Redundant Y			
CURNO	Type	SAE Class	Units
019	FIL	180	G's
Max	Time	Min	Time
64.4	41.3	-9.0	64.8



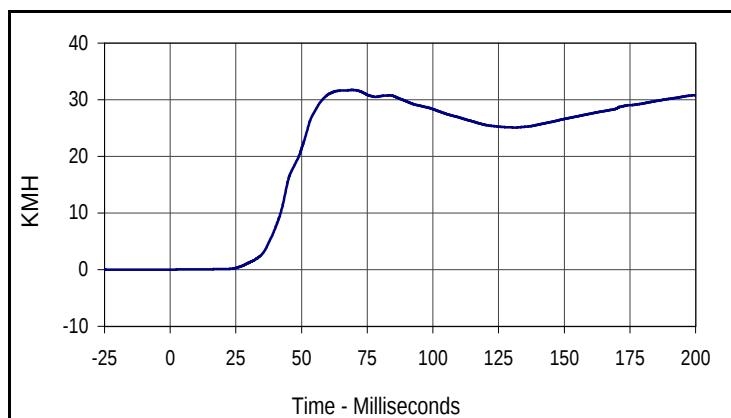
Curve Description			
Driver Pelvis Redundant Y			
CURNO	Type	SAE Class	Units
020	FIL	1000	G's
Max	Time	Min	Time
98.6	37.4	-26.5	58.8

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

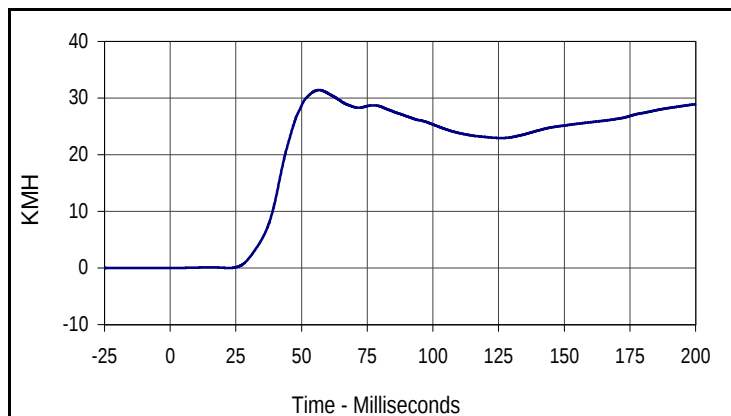
Test Date: 2/24/05
 NHTSA No.: G50102



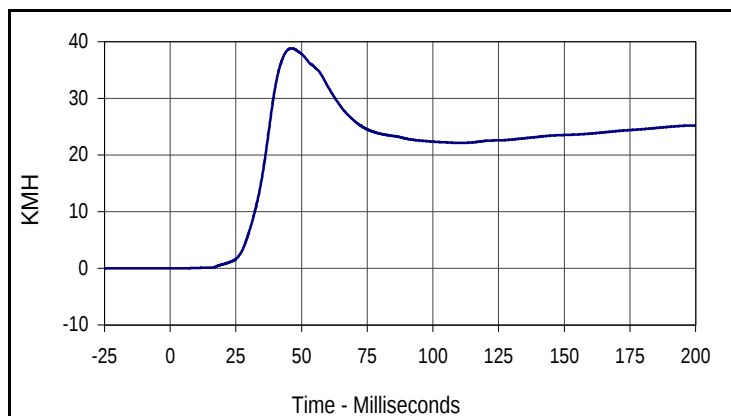
Curve Description			
Driver Upper Rib Redundant Y Velocity			
CURNO	Type	SAE Class	Units
017	IN1	180	KMH
Max	Time	Min	Time
32.2	200.0	0.0	0.0



Curve Description			
Driver Lower Rib Redundant Y Velocity			
CURNO	Type	SAE Class	Units
018	IN1	180	KMH
Max	Time	Min	Time
31.7	69.2	0.0	0.0



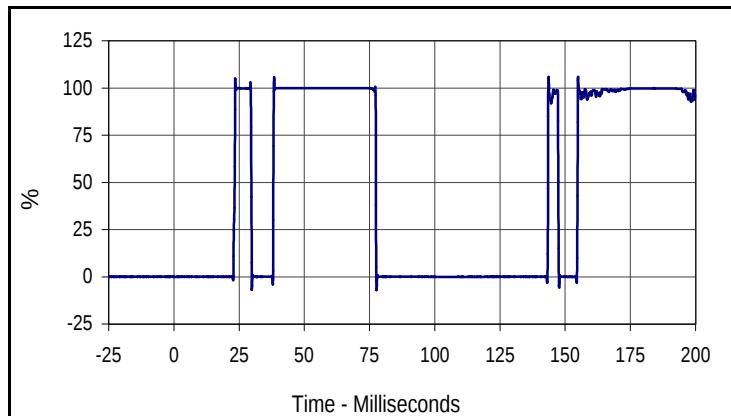
Curve Description			
Driver Lower Spine Redundant Y Velocity			
CURNO	Type	SAE Class	Units
019	IN1	180	KMH
Max	Time	Min	Time
31.4	56.8	0.0	22.4



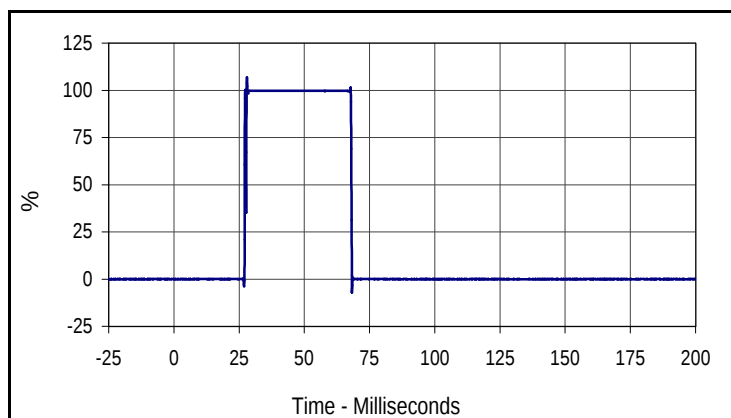
Curve Description			
Driver Pelvis Redundant Y Velocity			
CURNO	Type	SAE Class	Units
020	IN1	180	KMH
Max	Time	Min	Time
38.8	46.2	0.0	2.9

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/24/05
 NHTSA No.: G50102



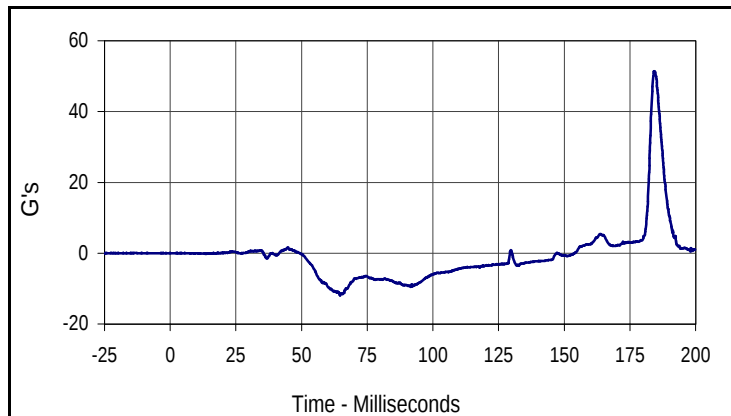
Curve Description			
Driver Thorax Contact			
CURNO	Type	SAE Class	Units
021	FIL	1000	%
Max	Time	Cross %	Time
105.9	155.0	50.0	23.3



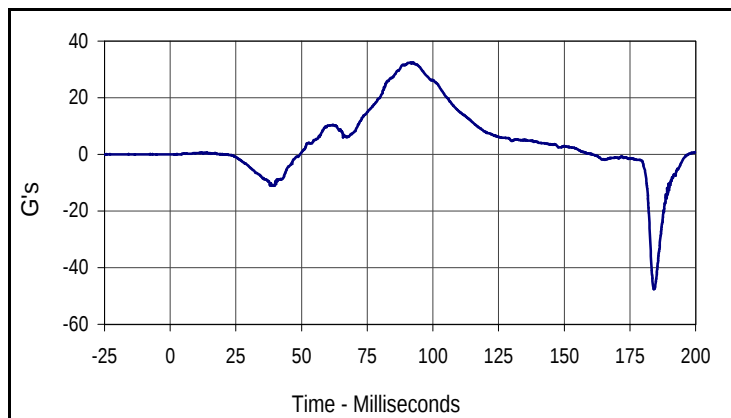
Curve Description			
Driver Pelvis Contact			
CURNO	Type	SAE Class	Units
022	FIL	1000	%
Max	Time	Cross %	Time
106.9	28.0	50.0	27.2

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

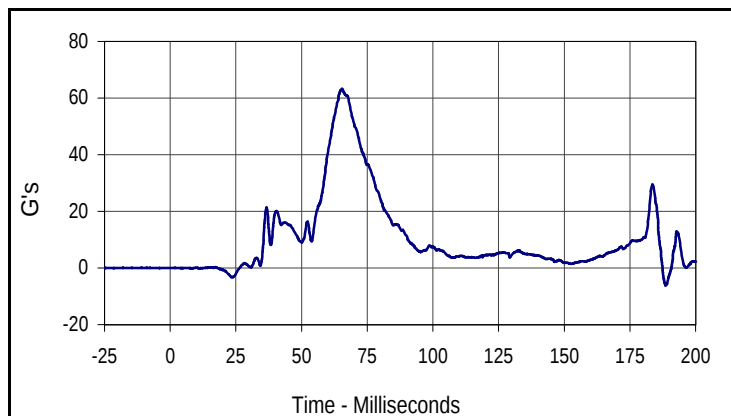
Test Date: 2/24/05
 NHTSA No.: G50102



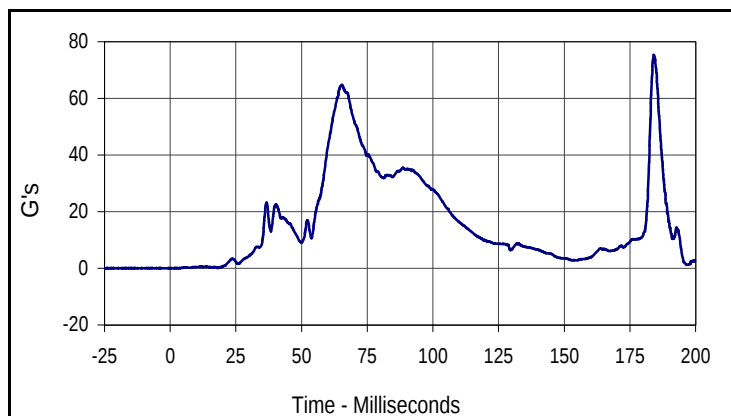
Curve Description			
Passenger Head X Primary			
CURNO	Type	SAE Class	Units
023	FIL	1000	G's
Max	Time	Min	Time
51.4	184.3	-12.0	64.6



Curve Description			
Passenger Head Y Primary			
CURNO	Type	SAE Class	Units
024	FIL	1000	G's
Max	Time	Min	Time
32.4	92.6	-47.6	184.3



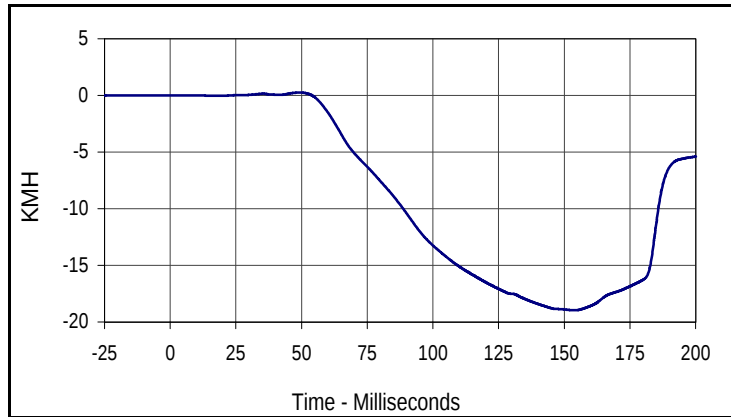
Curve Description			
Passenger Head Z Primary			
CURNO	Type	SAE Class	Units
025	FIL	1000	G's
Max	Time	Min	Time
63.3	65.4	-6.2	188.6



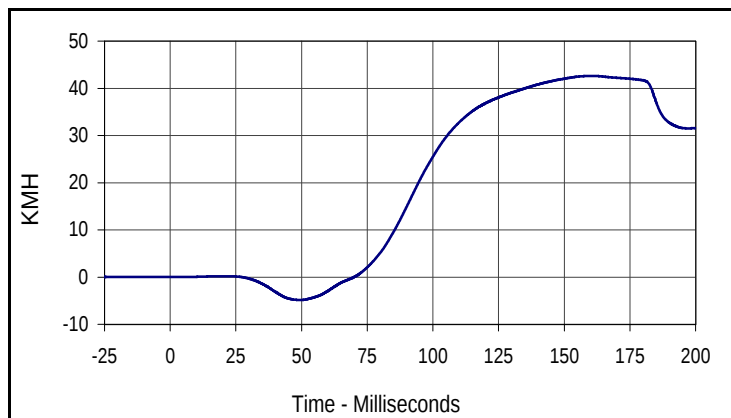
Curve Description			
Passenger Head Resultant Primary			
CURNO	Type	SAE Class	Units
023	RES	1000	G's
Max	Time	Min	Time
75.3	184.1	0.0	0.7

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

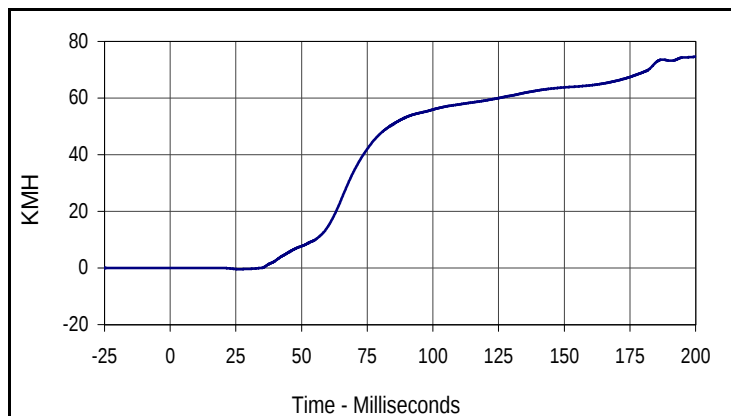
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Passenger Head Primary X Velocity			
CURNO	Type	SAE Class	Units
023	IN1	180	KMH
Max	Time	Min	Time
0.3	49.3	-19.0	154.0



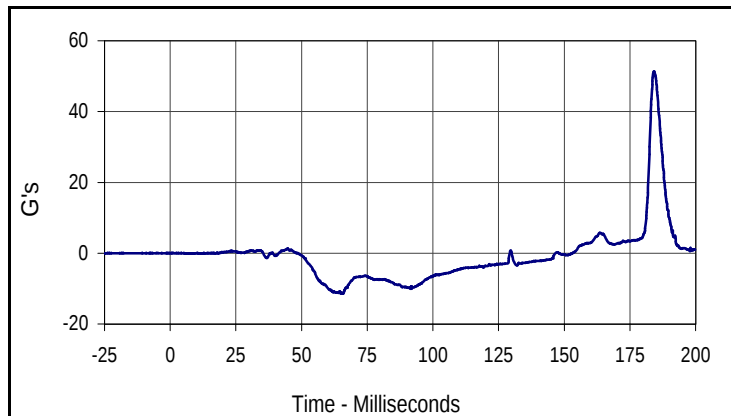
Curve Description			
Passenger Head Primary Y Velocity			
CURNO	Type	SAE Class	Units
024	IN1	180	KMH
Max	Time	Min	Time
42.6	160.6	-4.8	49.4



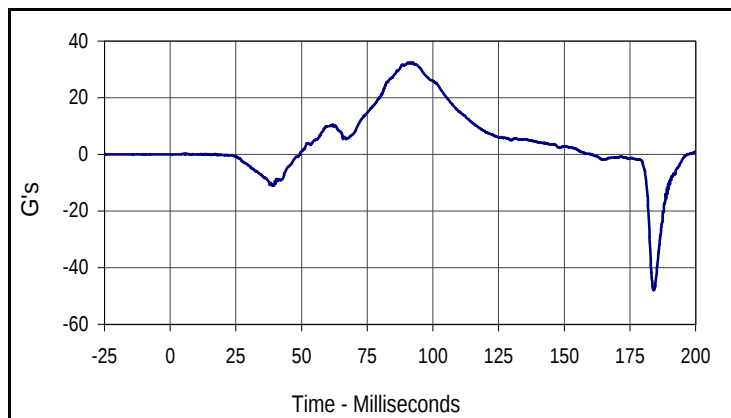
Curve Description			
Passenger Head Primary Z Velocity			
CURNO	Type	SAE Class	Units
025	IN1	180	KMH
Max	Time	Min	Time
74.6	200.0	-0.4	26.4

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

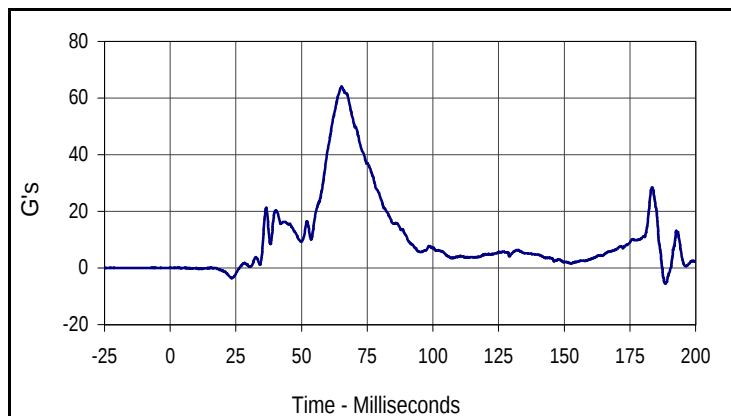
Test Date: 2/24/05
 NHTSA No.: G50102



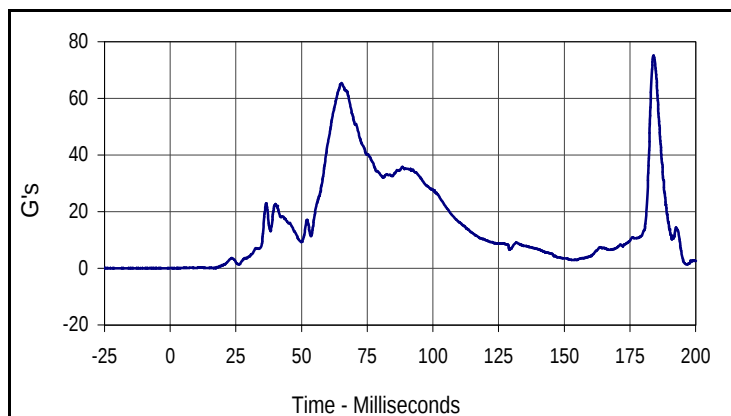
Curve Description			
Passenger Head X Redundant			
CURNO	Type	SAE Class	Units
026	FIL	1000	G's
Max	Time	Min	Time
51.3	184.2	-11.4	65.0



Curve Description			
Passenger Head Y Redundant			
CURNO	Type	SAE Class	Units
027	FIL	1000	G's
Max	Time	Min	Time
32.5	91.5	-47.9	184.1



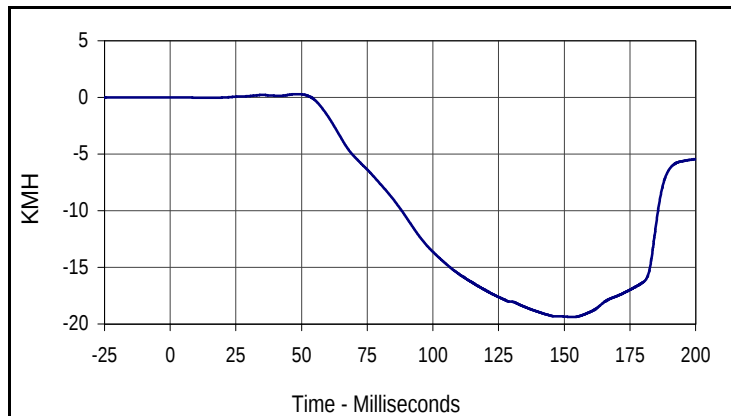
Curve Description			
Passenger Head Z Redundant			
CURNO	Type	SAE Class	Units
028	FIL	1000	G's
Max	Time	Min	Time
64.0	65.3	-5.6	188.5



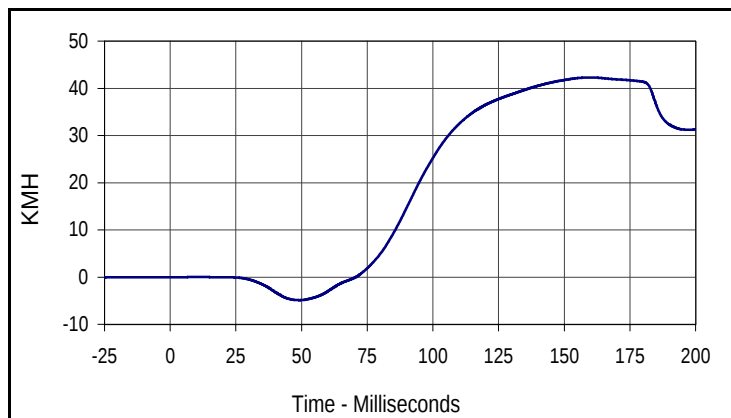
Curve Description			
Passenger Head Resultant Redundant			
CURNO	Type	SAE Class	Units
026	RES	1000	G's
Max	Time	Min	Time
75.1	184.0	0.0	2.1

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

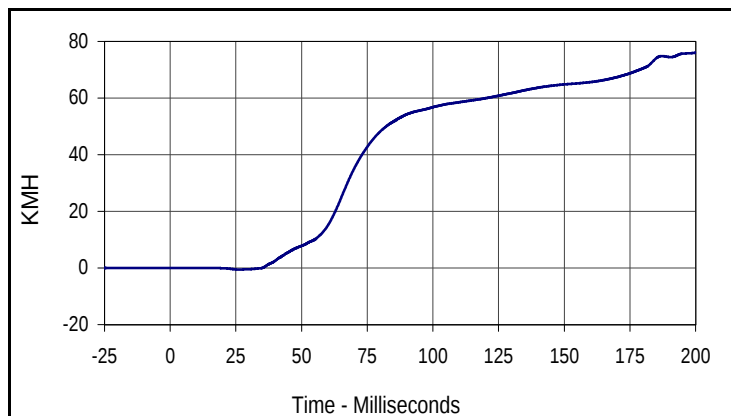
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Passenger Head Redundant X Velocity			
CURNO	Type	SAE Class	Units
026	IN1	180	KMH
Max	Time	Min	Time
0.3	48.3	-19.4	153.2



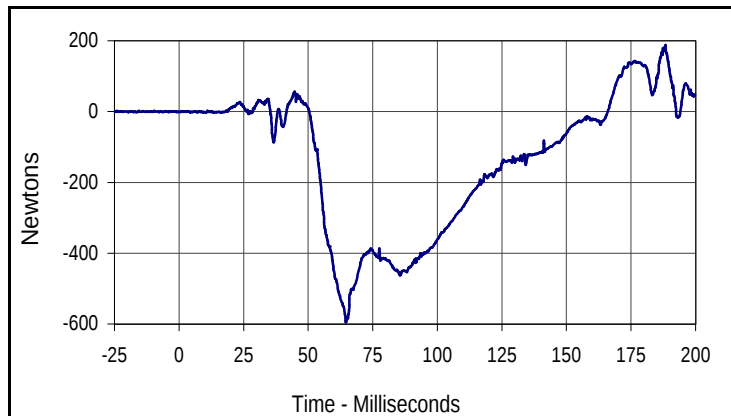
Curve Description			
Passenger Head Redundant Y Velocity			
CURNO	Type	SAE Class	Units
027	IN1	180	KMH
Max	Time	Min	Time
42.3	160.2	-4.9	49.3



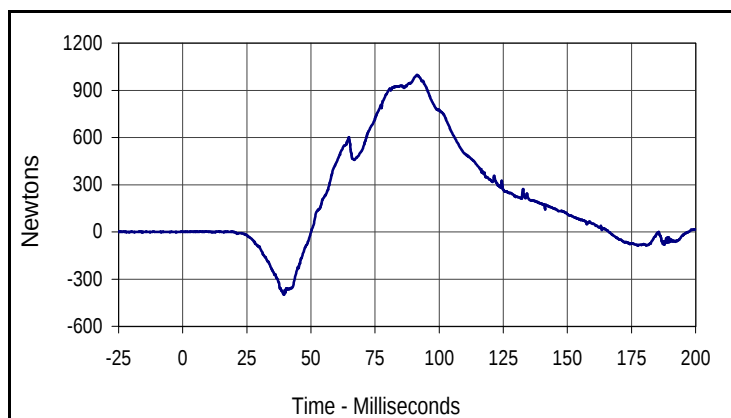
Curve Description			
Passenger Head Redundant Z Velocity			
CURNO	Type	SAE Class	Units
028	IN1	180	KMH
Max	Time	Min	Time
76.0	200.0	-0.6	26.3

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

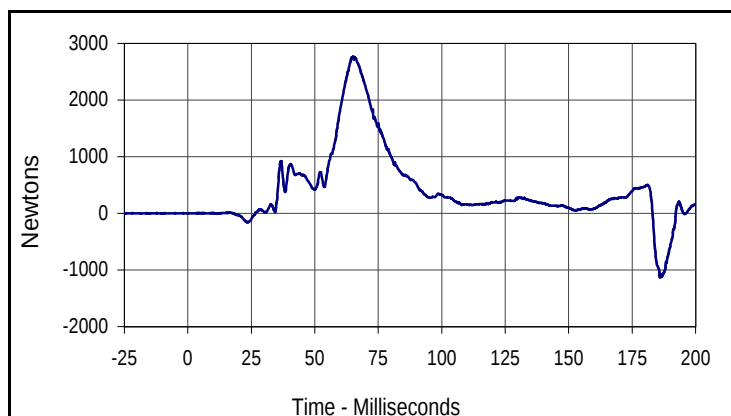
Test Date: 2/24/05
 NHTSA No.: G50102



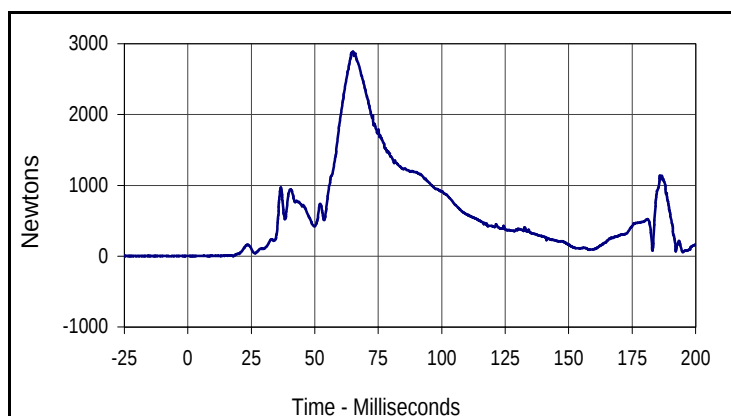
Curve Description			
Passenger Upper Neck Force X			
CURNO	Type	SAE Class	Units
029	FIL	1000	Newtons
Max	Time	Min	Time
188.1	188.3	-595.2	64.6



Curve Description			
Passenger Upper Neck Force Y			
CURNO	Type	SAE Class	Units
030	FIL	1000	Newtons
Max	Time	Min	Time
999.6	91.4	-398.5	39.4



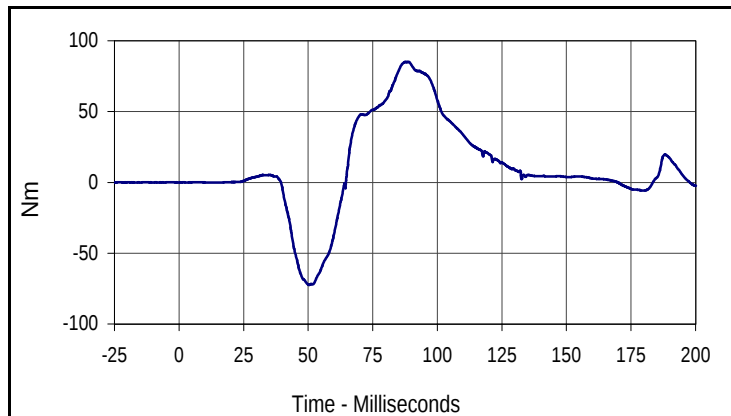
Curve Description			
Passenger Upper Neck Force Z			
CURNO	Type	SAE Class	Units
031	FIL	1000	Newtons
Max	Time	Min	Time
2768.3	65.1	-1129.3	186.0



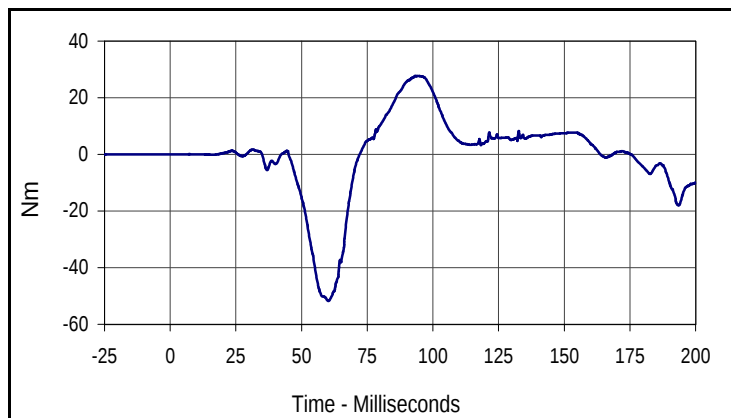
Curve Description			
Passenger Upper Neck Force Resultant			
CURNO	Type	SAE Class	Units
029	RES	1000	Newtons
Max	Time	Min	Time
2886.6	65.1	0.4	2.5

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

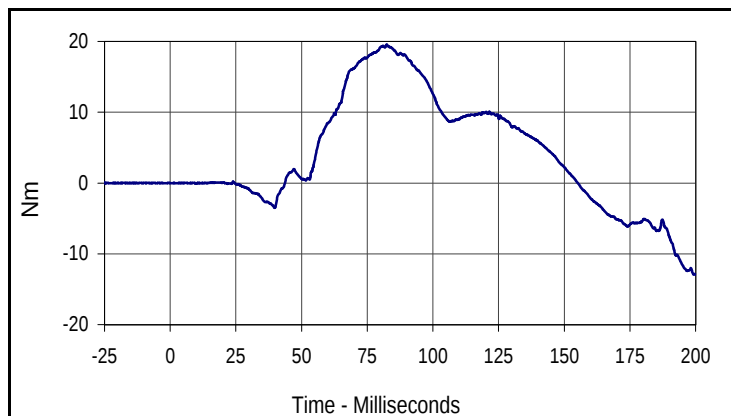
Test Date: 2/24/05
 NHTSA No.: G50102



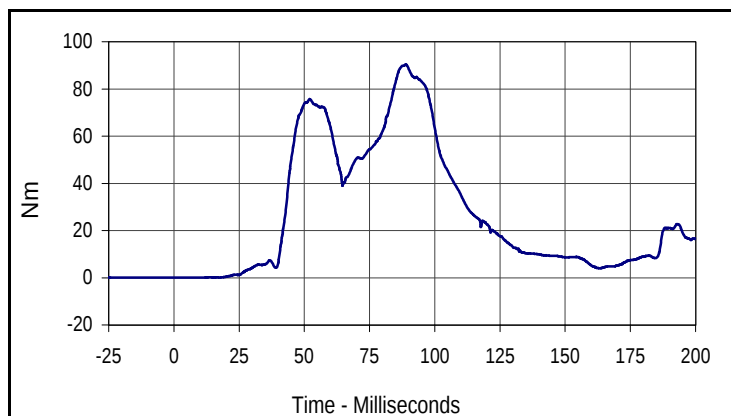
Curve Description			
Passenger Upper Neck Moment X			
CURNO	Type	SAE Class	Units
032	FIL	600	Nm
Max	Time	Min	Time
85.1	88.8	-72.4	50.3



Curve Description			
Passenger Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
033	FIL	600	Nm
Max	Time	Min	Time
27.7	94.3	-51.8	60.2



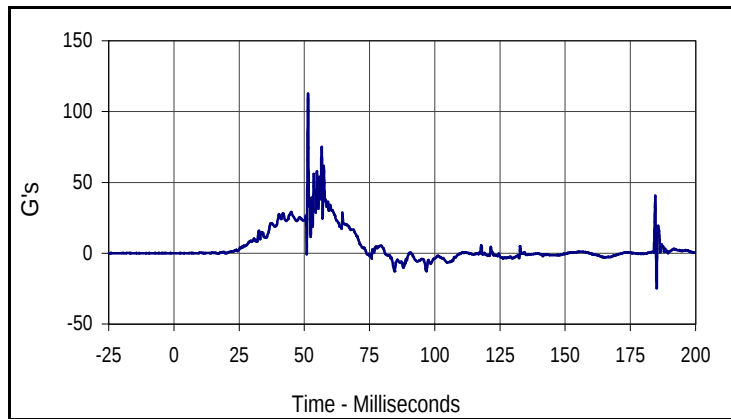
Curve Description			
Passenger Upper Neck Moment Z			
CURNO	Type	SAE Class	Units
034	FIL	600	Nm
Max	Time	Min	Time
19.5	82.4	-12.9	200.0



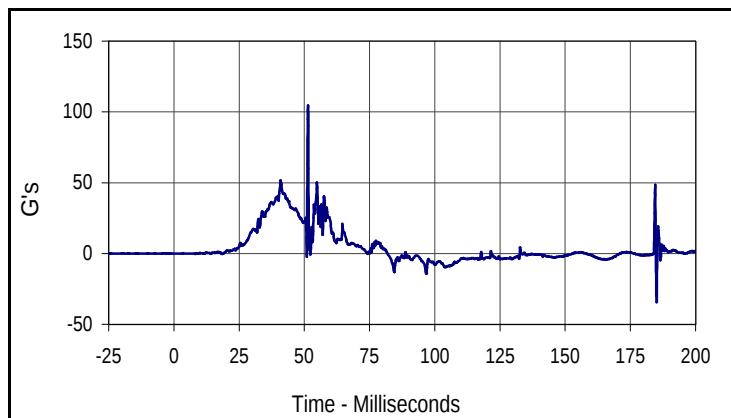
Curve Description			
Passenger Upper Neck Moment Resultant			
CURNO	Type	SAE Class	Units
032	RES	600	Nm
Max	Time	Min	Time
90.4	88.9	0.0	2.3

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

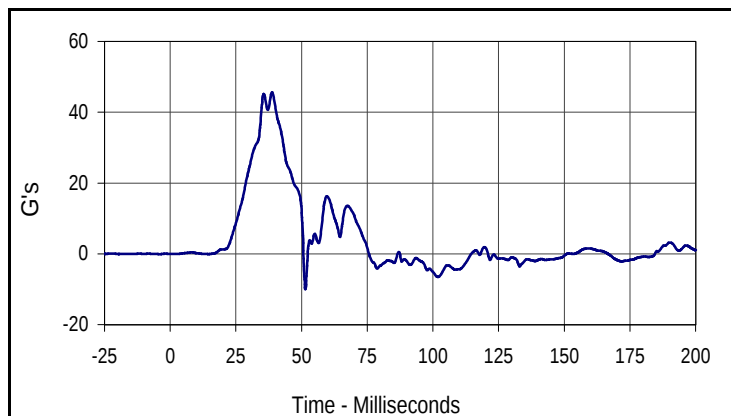
Test Date: 2/24/05
 NHTSA No.: G50102



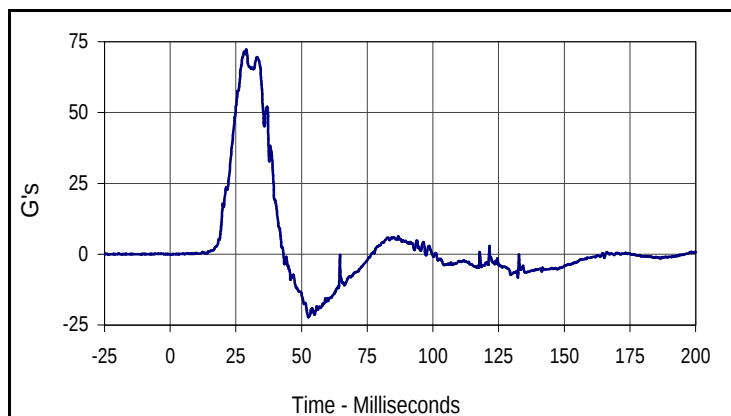
Curve Description			
Passenger Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
035	FIL	1000	G's
Max	Time	Min	Time
112.7	51.4	-24.6	185.1



Curve Description			
Passenger Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
036	FIL	1000	G's
Max	Time	Min	Time
104.6	51.4	-34.5	185.0



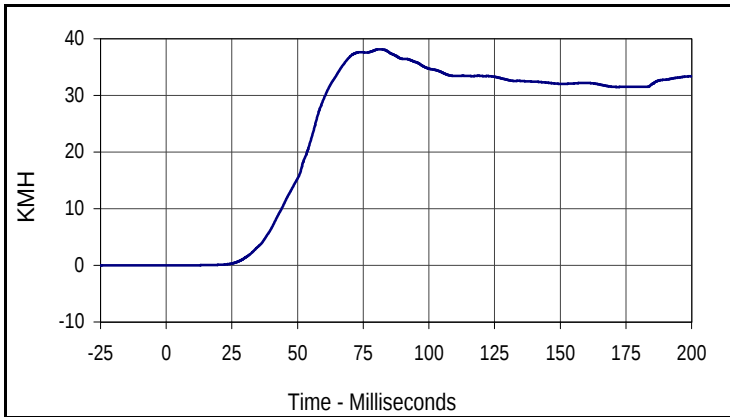
Curve Description			
Passenger Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
037	FIL	180	G's
Max	Time	Min	Time
45.6	38.8	-10.0	51.4



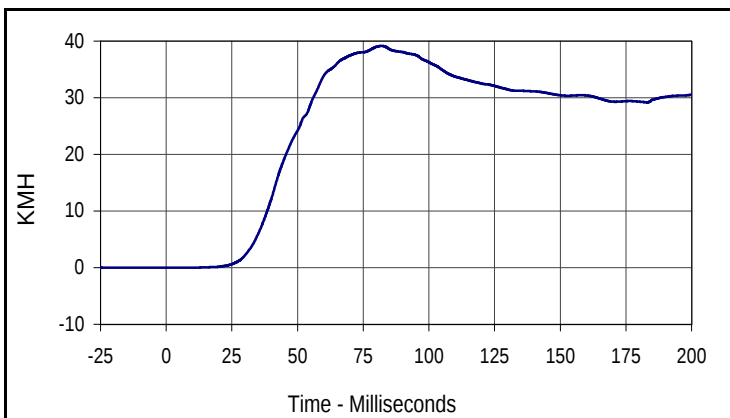
Curve Description			
Passenger Pelvis Primary Y			
CURNO	Type	SAE Class	Units
038	FIL	1000	G's
Max	Time	Min	Time
72.2	29.0	-22.2	52.6

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

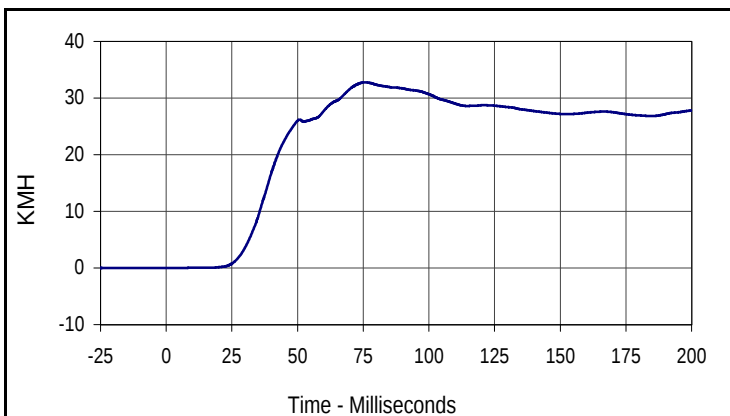
Test Date: 2/24/05
 NHTSA No.: G50102



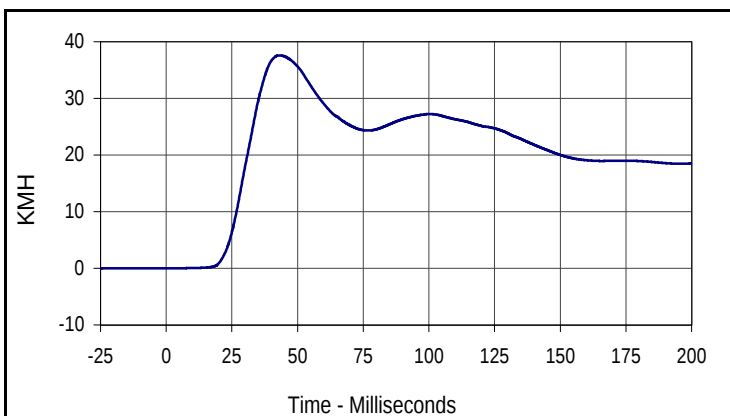
Curve Description			
Passenger Upper Rib Primary Y Velocity			
CURNO	Type	SAE Class	Units
035	IN1	180	KMH
Max	Time	Min	Time
38.2	81.1	0.0	1.9



Curve Description			
Passenger Lower Rib Primary Y Velocity			
CURNO	Type	SAE Class	Units
036	IN1	180	KMH
Max	Time	Min	Time
39.1	81.9	0.0	8.9



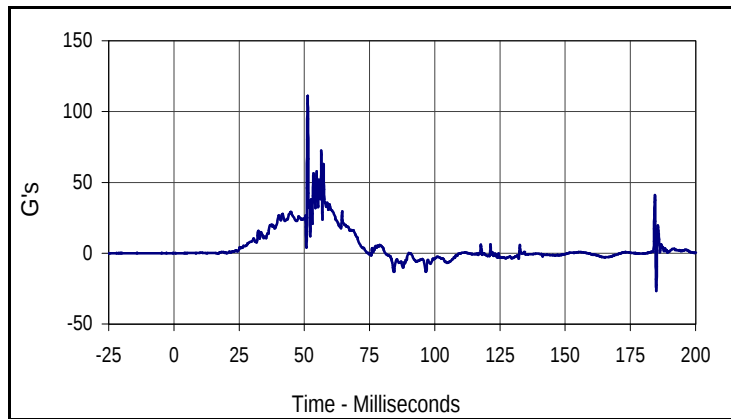
Curve Description			
Passenger Lower Spine Primary Y Velocity			
CURNO	Type	SAE Class	Units
037	IN1	180	KMH
Max	Time	Min	Time
32.8	75.6	0.0	3.2



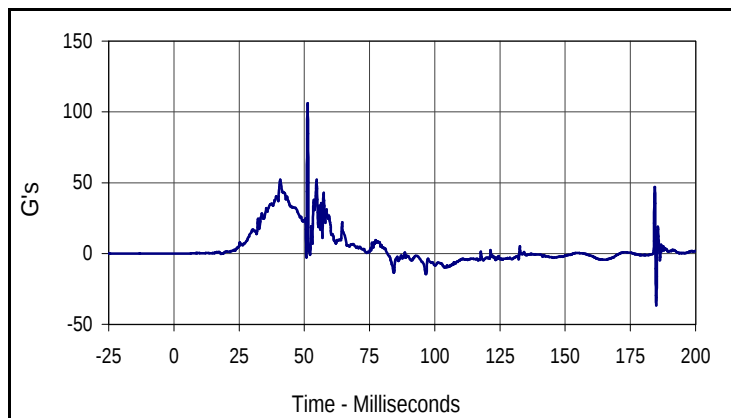
Curve Description			
Passenger Pelvis Primary Y Velocity			
CURNO	Type	SAE Class	Units
038	IN1	180	KMH
Max	Time	Min	Time
37.6	43.0	0.0	1.8

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

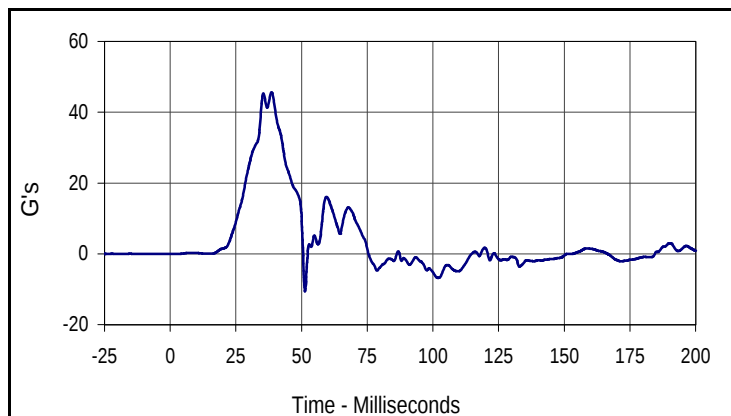
Test Date: 2/24/05
 NHTSA No.: G50102



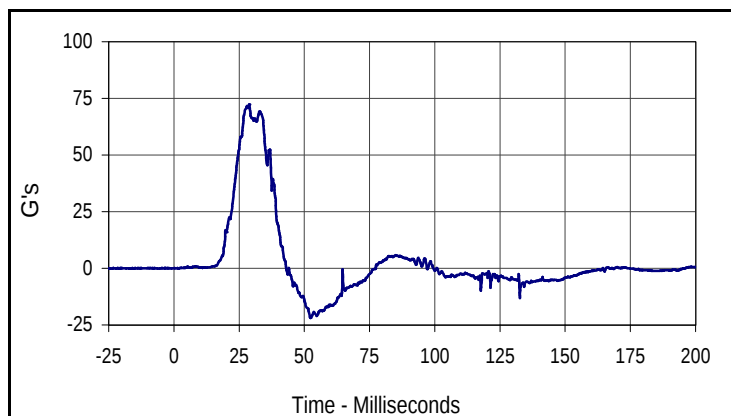
Curve Description			
Passenger Upper Rib Redundant Y			
CURNO	Type	SAE Class	Units
039	FIL	1000	G's
Max	Time	Min	Time
111.0	51.3	-26.8	184.9



Curve Description			
Passenger Lower Rib Redundant Y			
CURNO	Type	SAE Class	Units
040	FIL	1000	G's
Max	Time	Min	Time
106.2	51.3	-36.8	184.9



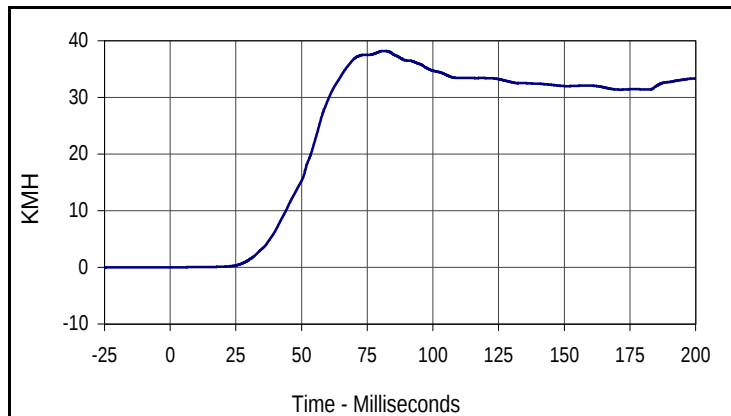
Curve Description			
Passenger Lower Spine Redundant Y			
CURNO	Type	SAE Class	Units
041	FIL	180	G's
Max	Time	Min	Time
45.6	38.6	-10.6	51.3



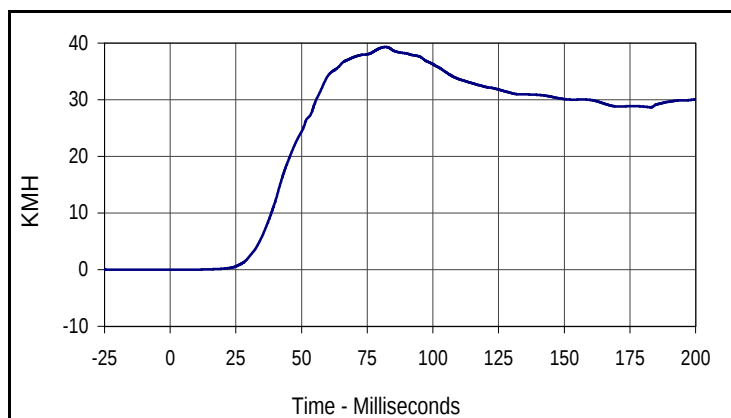
Curve Description			
Passenger Pelvis Redundant Y			
CURNO	Type	SAE Class	Units
042	FIL	1000	G's
Max	Time	Min	Time
72.3	28.9	-22.0	52.4

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

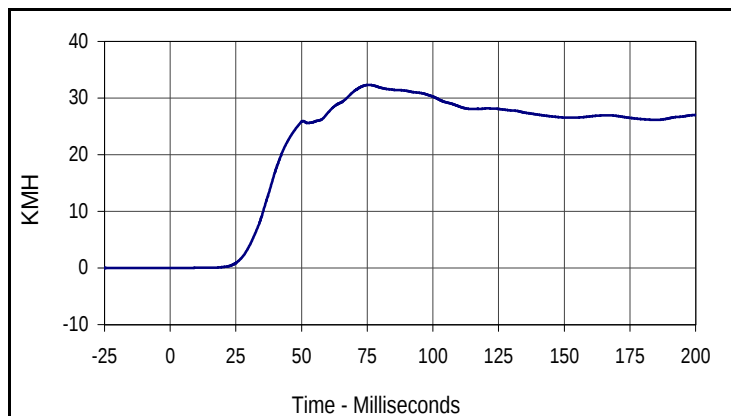
Test Date: 2/24/05
 NHTSA No.: G50102



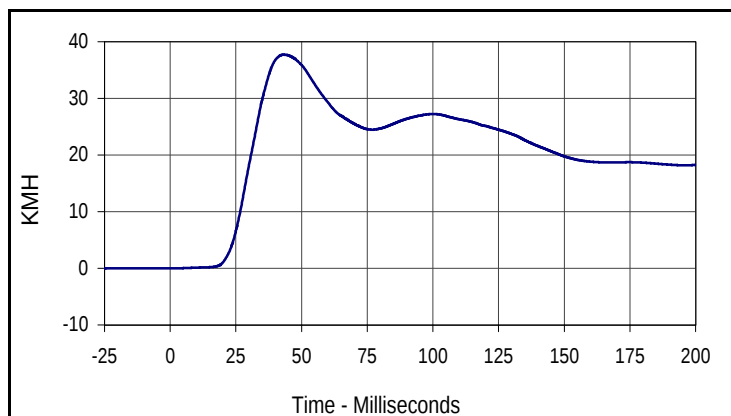
Curve Description			
Passenger Upper Rib Redundant Y Velocity			
CURNO	Type	SAE Class	Units
039	IN1	180	KMH
Max	Time	Min	Time
38.2	81.2	0.0	0.0



Curve Description			
Passenger Lower Rib Redundant Y Velocity			
CURNO	Type	SAE Class	Units
040	IN1	180	KMH
Max	Time	Min	Time
39.3	81.9	0.0	4.4



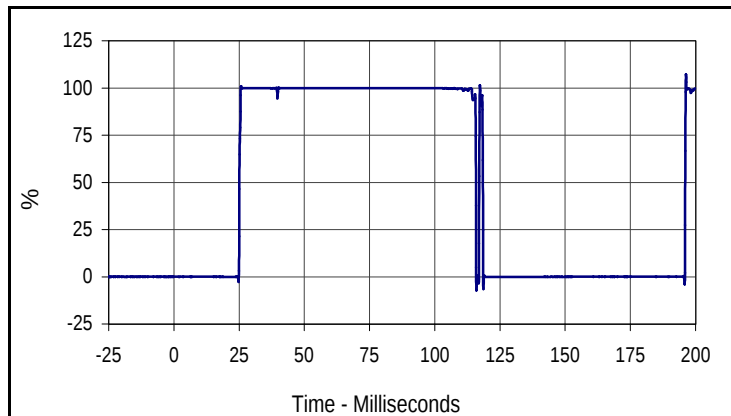
Curve Description			
Passenger Lower Spine Redundant Y Velocity			
CURNO	Type	SAE Class	Units
041	IN1	180	KMH
Max	Time	Min	Time
32.3	75.5	0.0	0.0



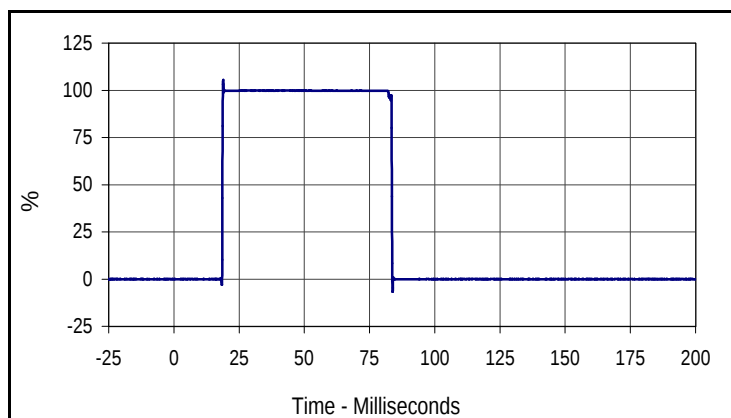
Curve Description			
Passenger Pelvis Redundant Y Velocity			
CURNO	Type	SAE Class	Units
042	IN1	180	KMH
Max	Time	Min	Time
37.7	43.2	0.0	0.1

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/24/05
 NHTSA No.: G50102



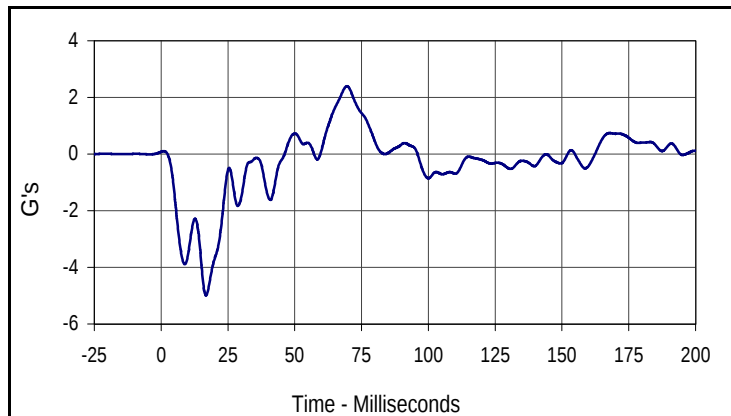
Curve Description			
Passenger Thorax Contact			
CURNO	Type	SAE Class	Units
043	FIL	1000	%
Max	Time	Cross %	Time
107.0	196.3	50.0	25.2



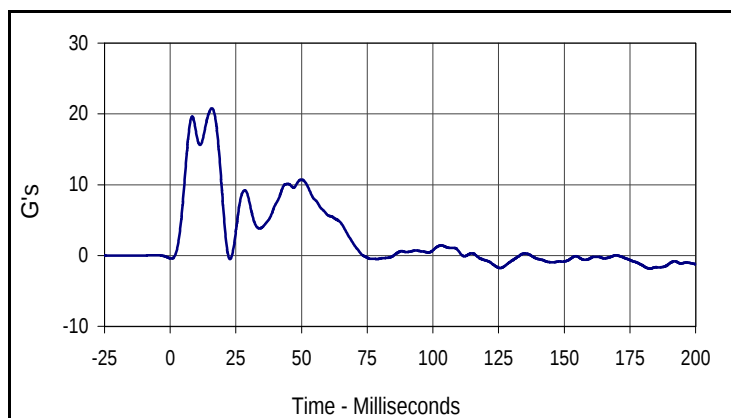
Curve Description			
Passenger Pelvis Contact			
CURNO	Type	SAE Class	Units
044	FIL	1000	%
Max	Time	Cross %	Time
105.4	18.9	50.0	18.7

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

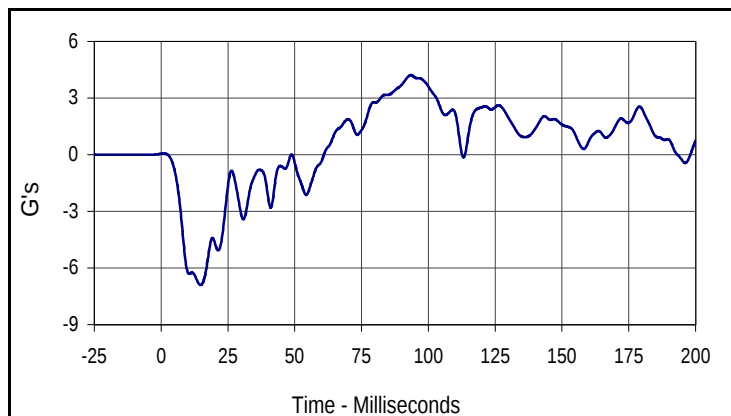
Test Date: 2/24/05
 NHTSA No.: G50102



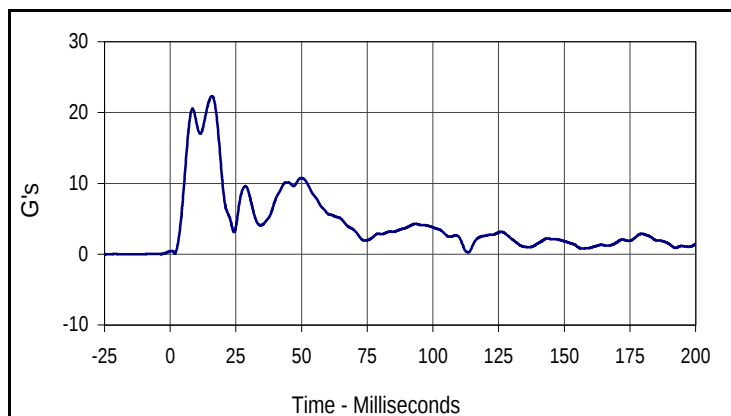
Curve Description			
Vehicle Right Sill at Front Seat X			
CURNO	Type	SAE Class	Units
045	FIL	60	G's
Max	Time	Min	Time
2.4	69.5	-5.0	16.8



Curve Description			
Vehicle Right Sill at Front Seat Y			
CURNO	Type	SAE Class	Units
046	FIL	60	G's
Max	Time	Min	Time
20.8	15.9	-1.9	182.7



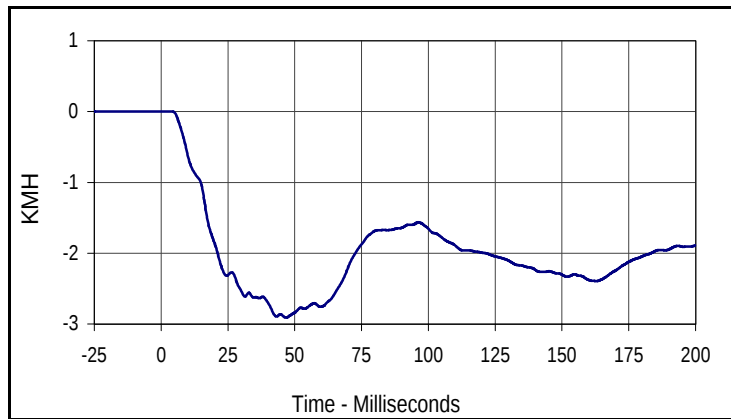
Curve Description			
Vehicle Right Sill at Front Seat Z			
CURNO	Type	SAE Class	Units
047	FIL	60	G's
Max	Time	Min	Time
4.2	93.4	-6.9	14.8



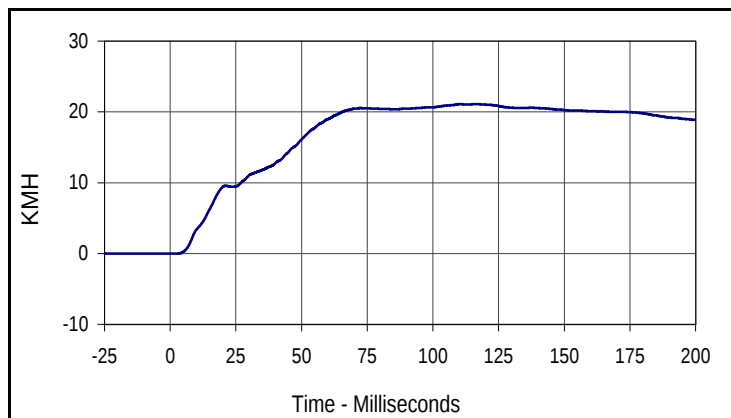
Curve Description			
Vehicle Right Sill Front Seat Resultant			
CURNO	Type	SAE Class	Units
045	RES	60	G's
Max	Time	Min	Time
22.3	15.9	0.1	1.8

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

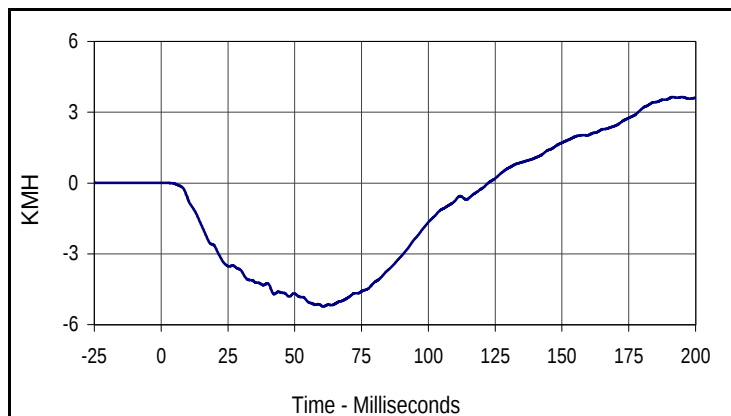
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Vehicle Right Sill at Front Seat X Velocity			
CURNO	Type	SAE Class	Units
045	IN1	180	KMH
Max	Time	Min	Time
0.0	0.0	-2.9	46.7



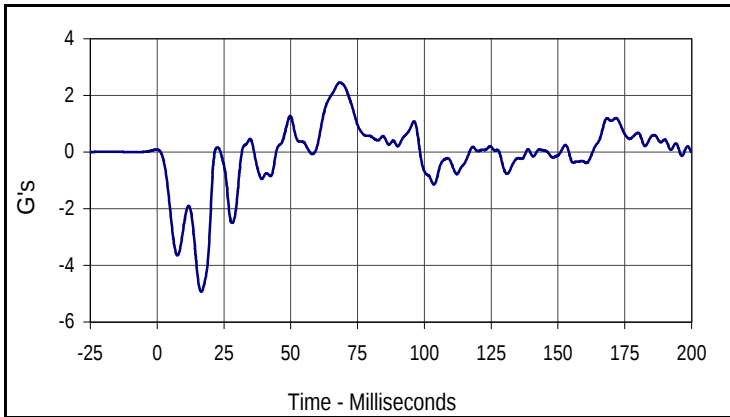
Curve Description			
Vehicle Right Sill at Front Seat Y Velocity			
CURNO	Type	SAE Class	Units
046	IN1	180	KMH
Max	Time	Min	Time
21.1	116.2	0.0	0.0



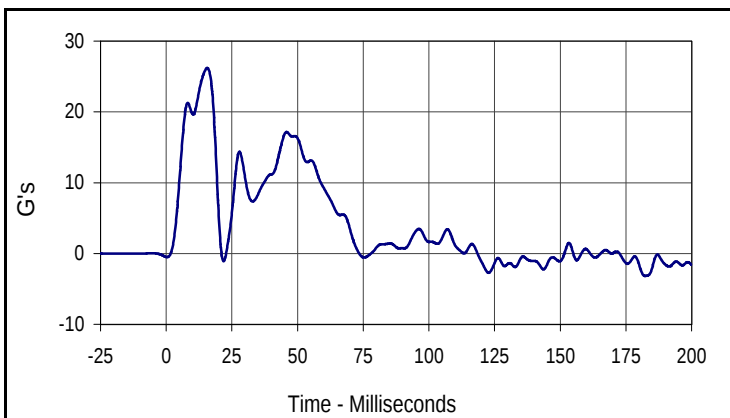
Curve Description			
Vehicle Right Sill at Front Seat Z Velocity			
CURNO	Type	SAE Class	Units
047	IN1	180	KMH
Max	Time	Min	Time
3.6	191.5	-5.2	60.7

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

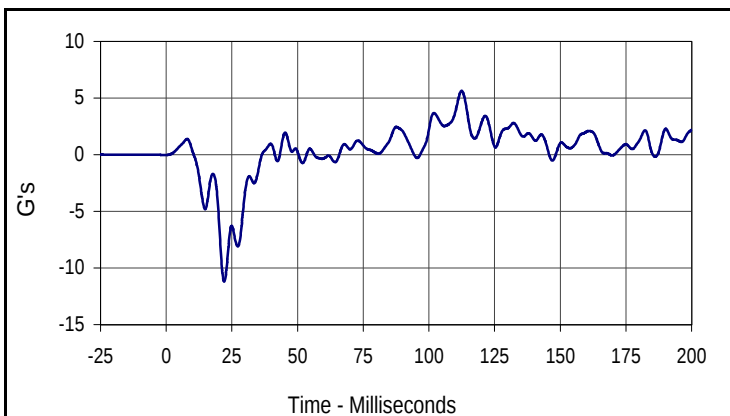
Test Date: 2/24/05
 NHTSA No.: G50102



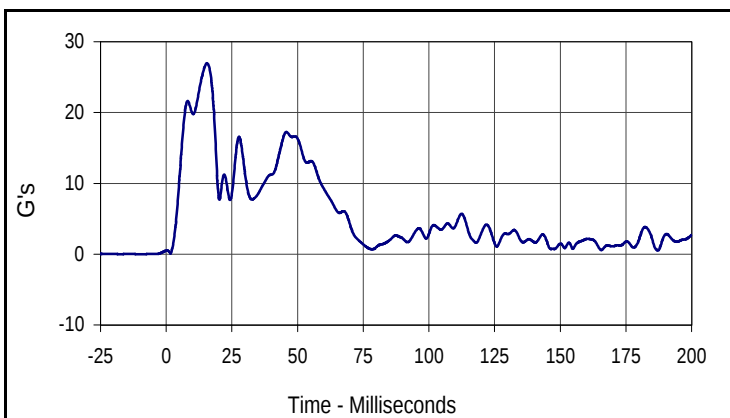
Curve Description			
Vehicle Right Sill at Rear Seat X			
CURNO	Type	SAE Class	Units
048	FIL	60	G's
Max	Time	Min	Time
2.5	68.4	-4.9	16.5



Curve Description			
Vehicle Right Sill at Rear Seat Y			
CURNO	Type	SAE Class	Units
049	FIL	60	G's
Max	Time	Min	Time
26.2	15.6	-3.2	182.3



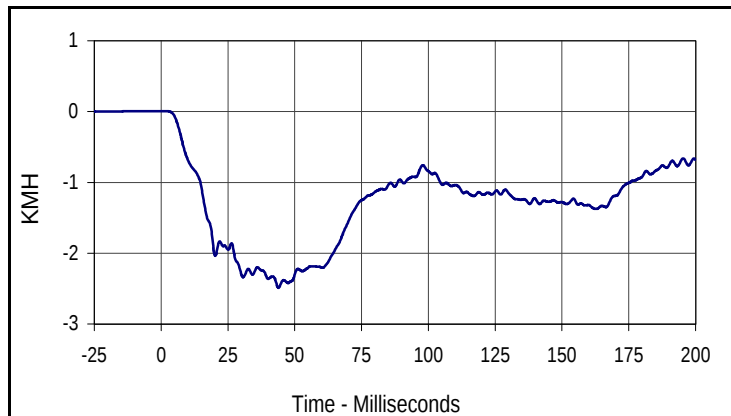
Curve Description			
Vehicle Right Sill at Rear Seat Z			
CURNO	Type	SAE Class	Units
050	FIL	60	G's
Max	Time	Min	Time
5.6	112.5	-11.2	22.1



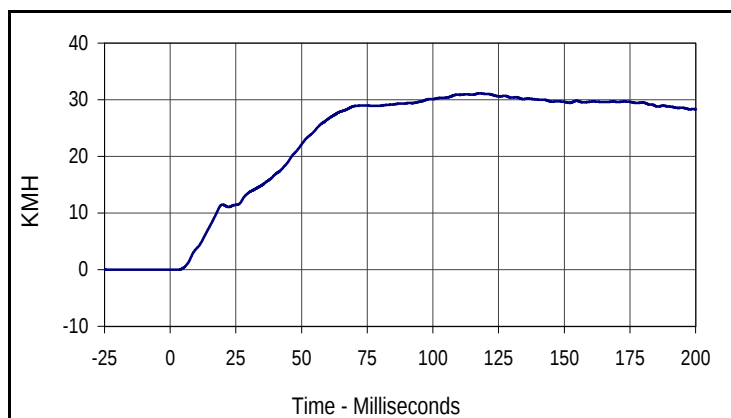
Curve Description			
Vehicle Right Sill Rear Seat Resultant			
CURNO	Type	SAE Class	Units
048	RES	60	G's
Max	Time	Min	Time
27.0	15.5	0.1	1.7

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

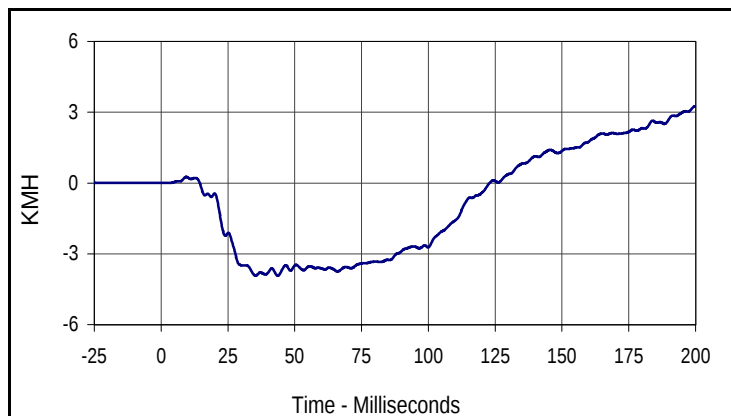
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Vehicle Right Sill at Rear Seat X Velocity			
CURNO	Type	SAE Class	Units
048	IN1	180	KMH
Max	Time	Min	Time
0.0	0.0	-2.5	43.9



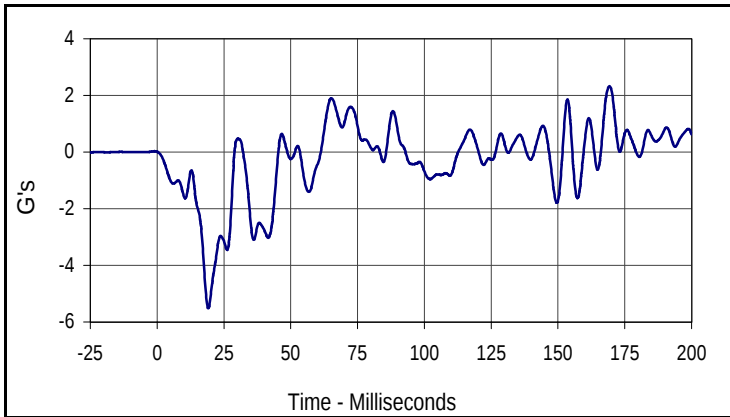
Curve Description			
Vehicle Right Sill at Rear Seat Y Velocity			
CURNO	Type	SAE Class	Units
049	IN1	180	KMH
Max	Time	Min	Time
31.1	117.9	0.0	0.2



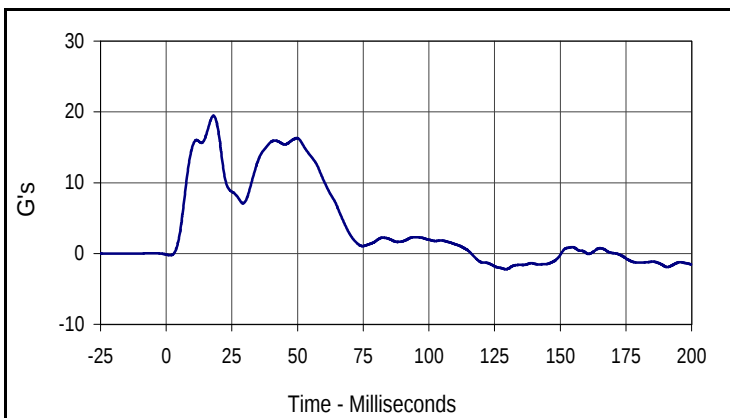
Curve Description			
Vehicle Right Sill at Rear Seat Z Velocity			
CURNO	Type	SAE Class	Units
050	IN1	180	KMH
Max	Time	Min	Time
3.3	199.9	-3.9	43.7

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

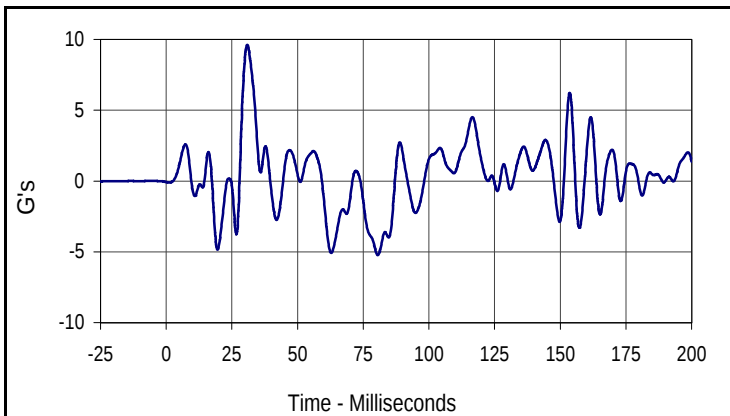
Test Date: 2/24/05
 NHTSA No.: G50102



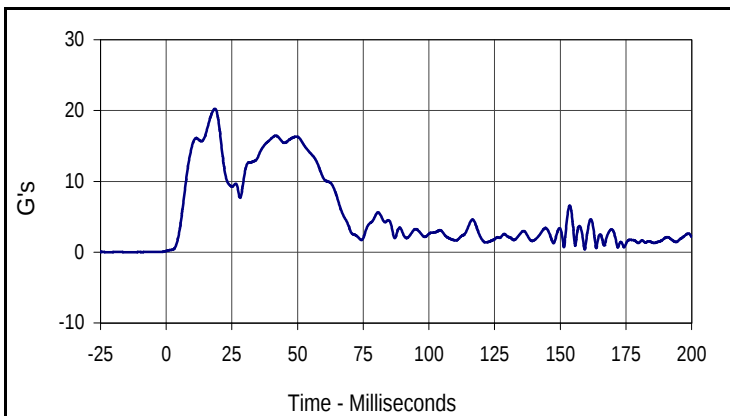
Curve Description			
Vehicle Rear Floor Above Axle X			
CURNO	Type	SAE Class	Units
051	FIL	60	G's
Max	Time	Min	Time
2.3	169.2	-5.5	19.2



Curve Description			
Vehicle Rear Floor Above Axle Y			
CURNO	Type	SAE Class	Units
052	FIL	60	G's
Max	Time	Min	Time
19.4	18.0	-2.2	129.3



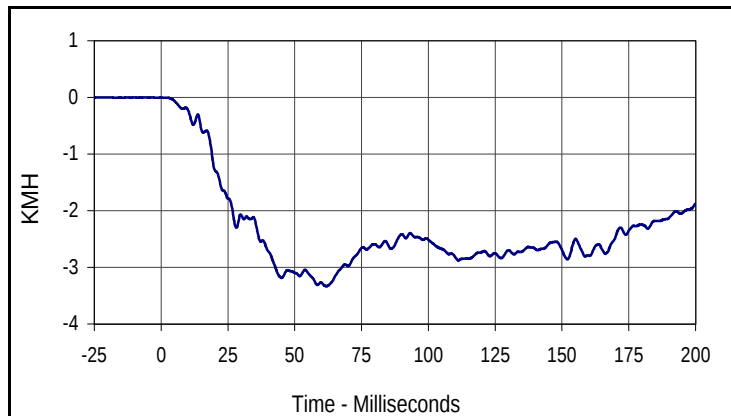
Curve Description			
Vehicle Rear Floor Above Axle Z			
CURNO	Type	SAE Class	Units
053	FIL	60	G's
Max	Time	Min	Time
9.6	30.8	-5.2	80.5



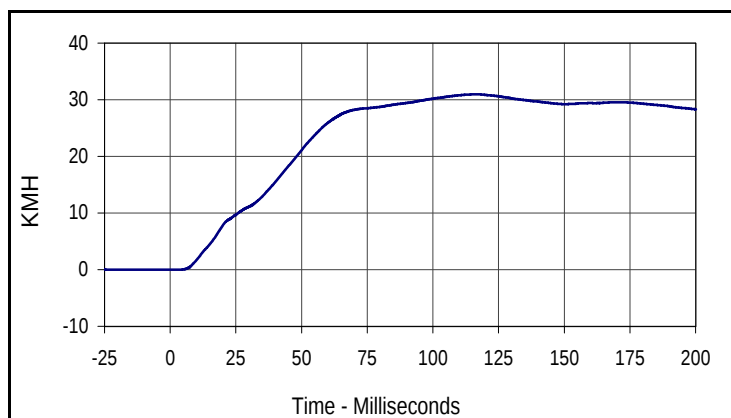
Curve Description			
Vehicle Rear Floor Above Axle Resultant			
CURNO	Type	SAE Class	Units
051	RES	60	G's
Max	Time	Min	Time
20.3	18.5	0.2	0.0

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

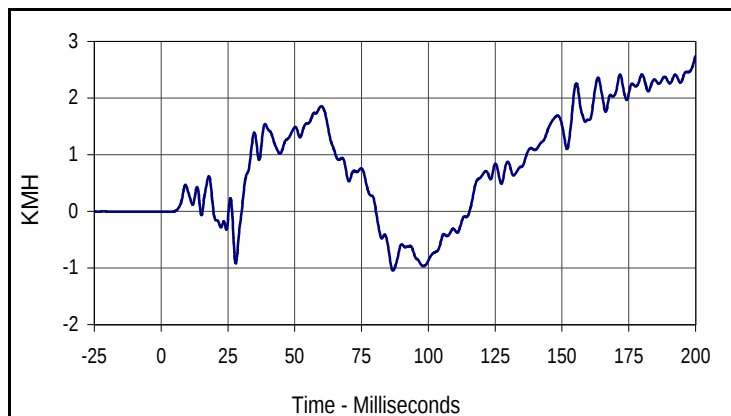
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Vehicle Rear Floor Above Axle X Velocity			
CURNO	Type	SAE Class	Units
051	FIL	180	KMH
Max	Time	Min	Time
0.0	0.0	-3.3	61.9



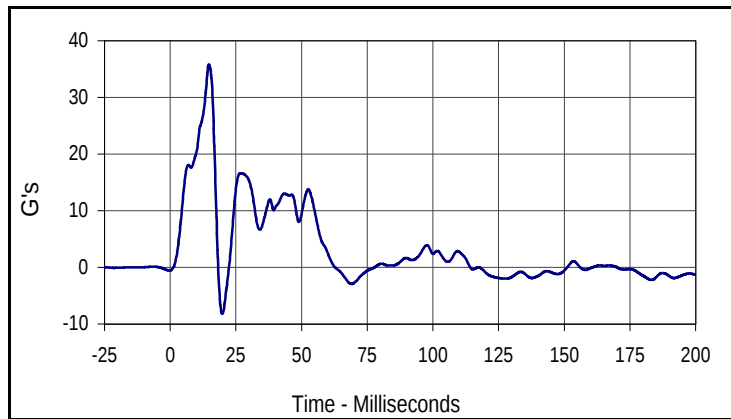
Curve Description			
Vehicle Rear Floor Above Axle Y Velocity			
CURNO	Type	SAE Class	Units
052	FIL	180	KMH
Max	Time	Min	Time
31.0	116.2	0.0	0.2



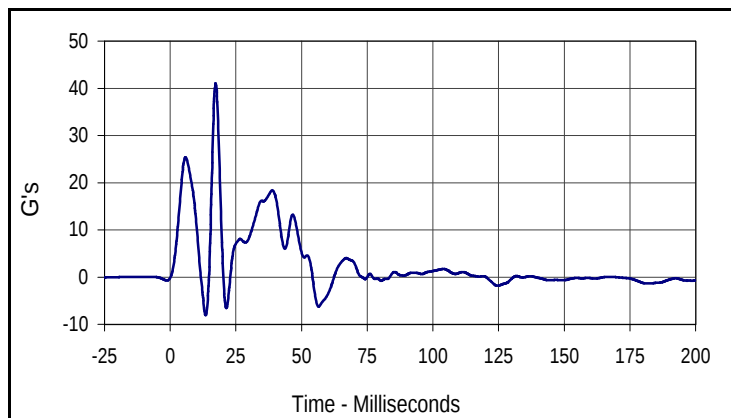
Curve Description			
Vehicle Rear Floor Above Axle Z Velocity			
CURNO	Type	SAE Class	Units
053	FIL	180	KMH
Max	Time	Min	Time
2.7	200.0	-1.0	86.8

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

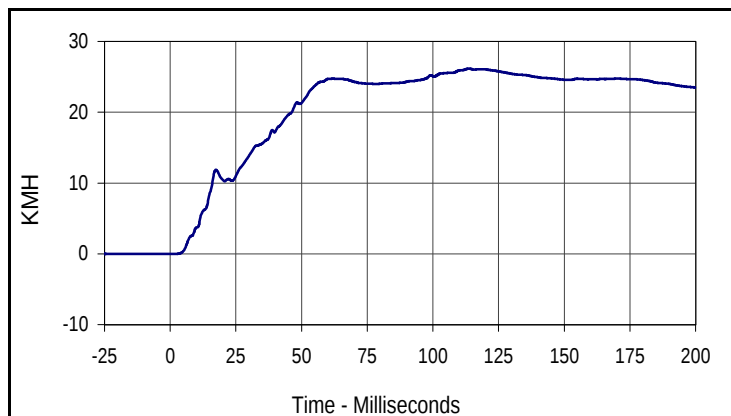
Test Date: 2/24/05
 NHTSA No.: G50102



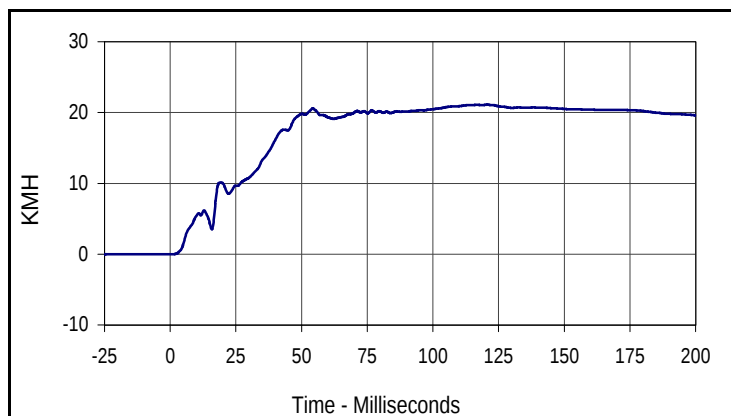
Curve Description			
Vehicle Left Sill at Rear Door Y			
CURNO	Type	SAE Class	Units
054	FIL	60	G's
Max	Time	Min	Time
35.8	14.8	-8.2	19.8



Curve Description			
Vehicle Left Sill at Front Door Y			
CURNO	Type	SAE Class	Units
055	FIL	60	G's
Max	Time	Min	Time
41.0	17.3	-8.1	13.5



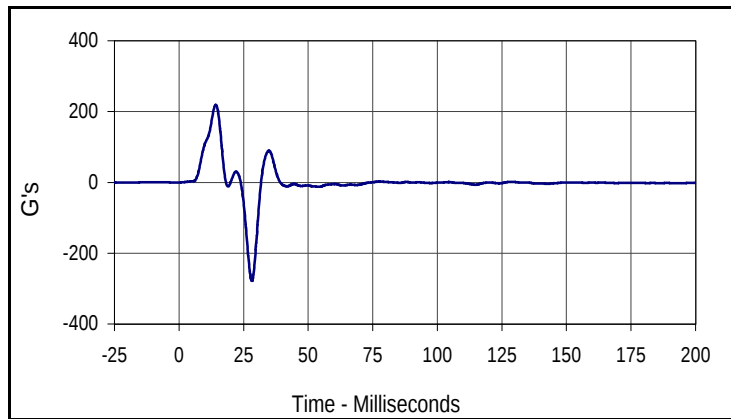
Curve Description			
Vehicle Left Sill at Rear Door Y Velocity			
CURNO	Type	SAE Class	Units
054	IN1	180	KMH
Max	Time	Min	Time
26.2	113.7	0.0	0.8



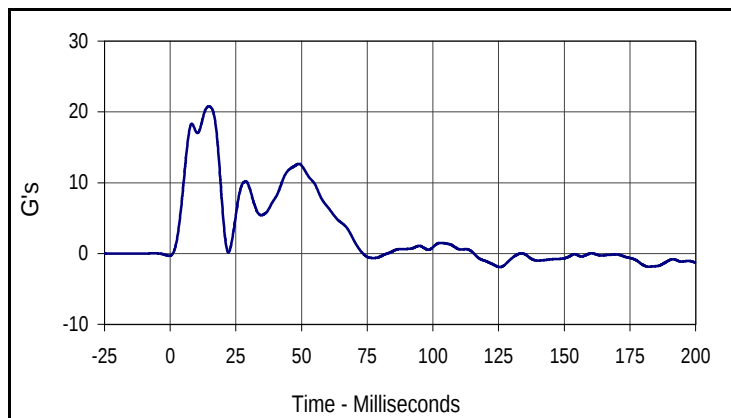
Curve Description			
Vehicle Left Sill at Front Door Y Velocity			
CURNO	Type	SAE Class	Units
055	IN1	180	KMH
Max	Time	Min	Time
21.1	120.7	0.0	1.0

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

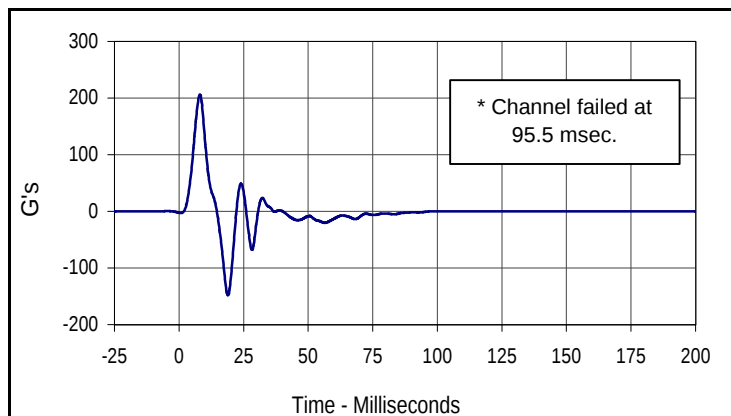
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Vehicle Left Front Door CL Y			
CURNO	Type	SAE Class	Units
056	FIL	60	G's
Max	Time	Min	Time
218.8	14.2	-278.1	28.2

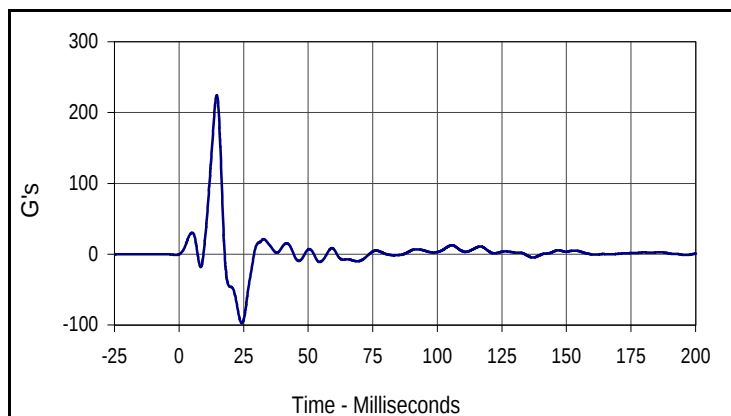


Curve Description			
Vehicle Right Rear Occupant Compartment			
CURNO	Type	SAE Class	Units
057	FIL	60	G's
Max	Time	Min	Time
20.8	14.7	-1.9	125.5



Curve Description			
Vehicle Left Front Door Mid Rear Y			
CURNO	Type	SAE Class	Units
058	FIL	60	G's
Max	Time	Min	Time
206.3	8.1	-148.2	18.9

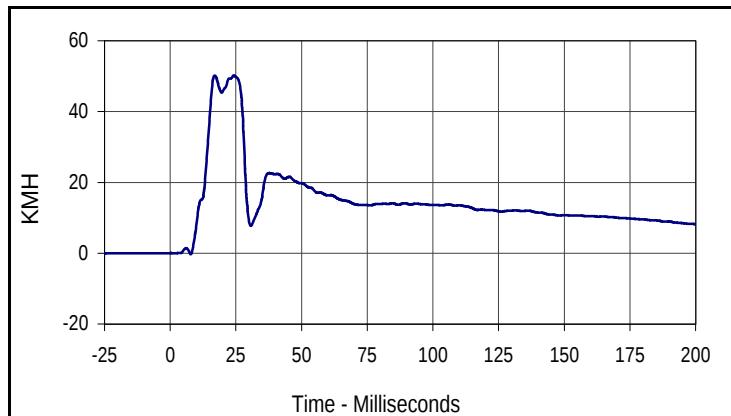
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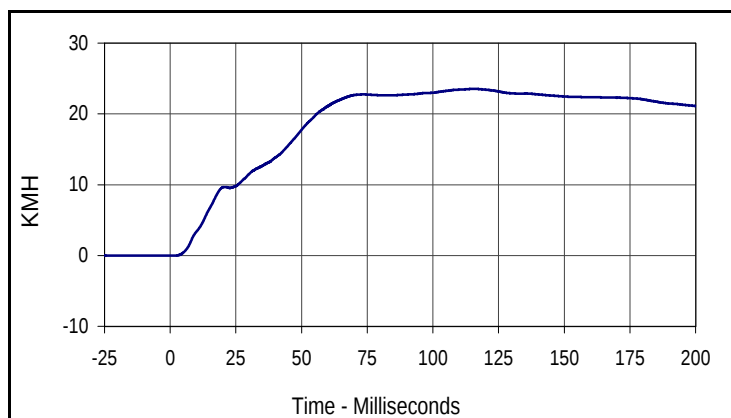
Curve Description			
Vehicle Left Front Door Upper CL Y			
CURNO	Type	SAE Class	Units
059	FIL	60	G's
Max	Time	Min	Time
224.6	14.6	-97.7	24.3

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

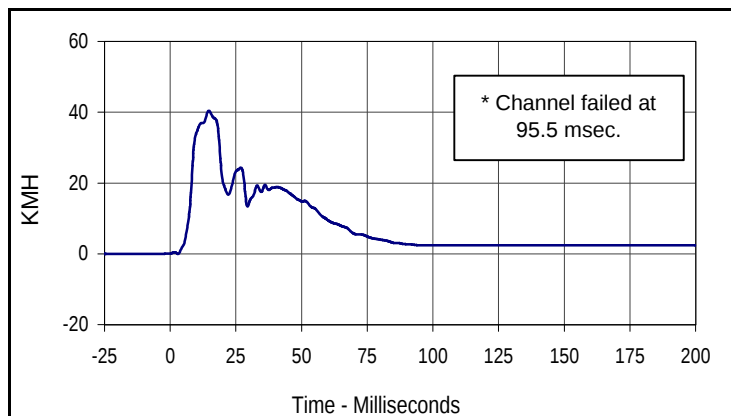
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Vehicle Left Front Door CL Y Velocity			
CURNO	Type	SAE Class	Units
056	IN1	180	KMH
Max	Time	Min	Time
50.2	16.9	-0.3	7.8

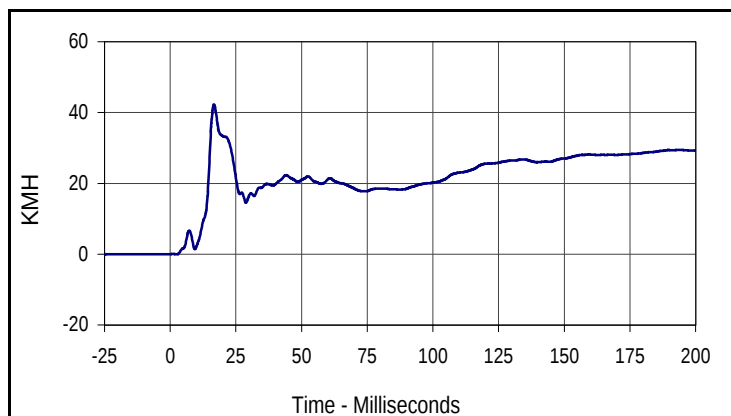


Curve Description			
Vehicle Right Rear Occupant Compartment Y Velocity			
CURNO	Type	SAE Class	Units
057	IN1	180	KMH
Max	Time	Min	Time
23.5	115.6	0.0	0.0



Curve Description			
Vehicle Left Front Door Mid Rear Y Velocity			
CURNO	Type	SAE Class	Units
058	IN1	180	KMH
Max	Time	Min	Time
40.4	14.7	-0.1	3.0

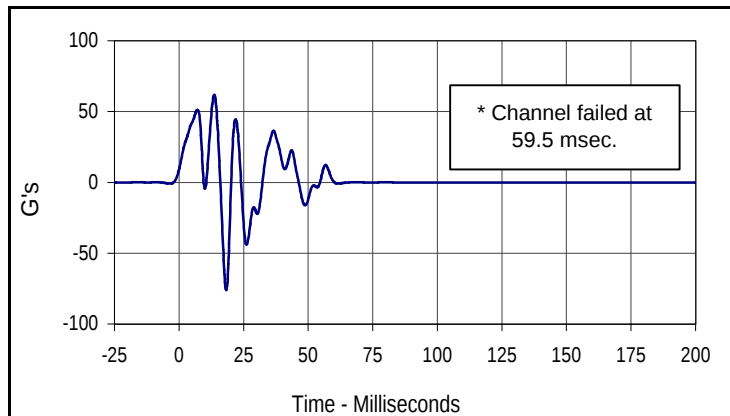
* Channel failed at 95.5 msec.



Curve Description			
Vehicle Left Front Door Upper CL Y Velocity			
CURNO	Type	SAE Class	Units
059	IN1	180	KMH
Max	Time	Min	Time
42.3	16.7	-0.1	2.5

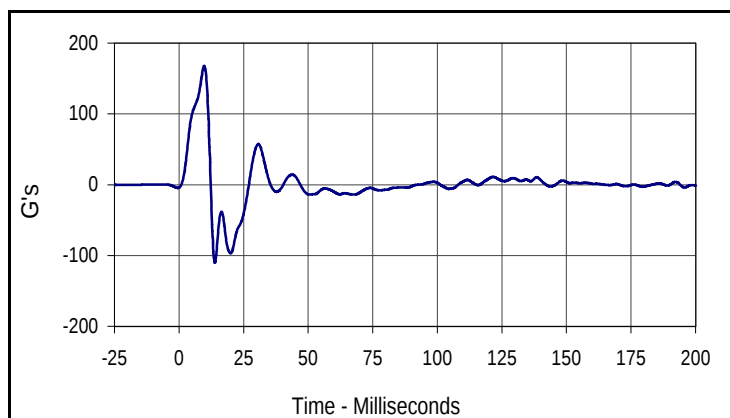
Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/24/05
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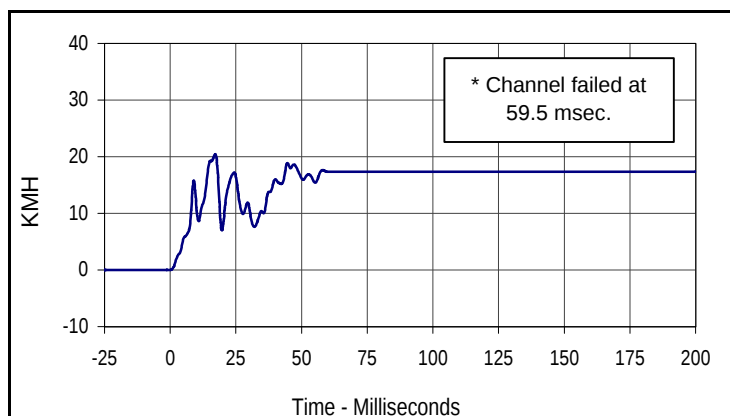


Curve Description			
Vehicle Left Rear Door Mid Rear Y			
CURNO	Type	SAE Class	Units
060	FIL	60	G's
Max	Time	Min	Time
61.8	13.6	-76.0	18.3

* Channel failed at 59.5 msec.

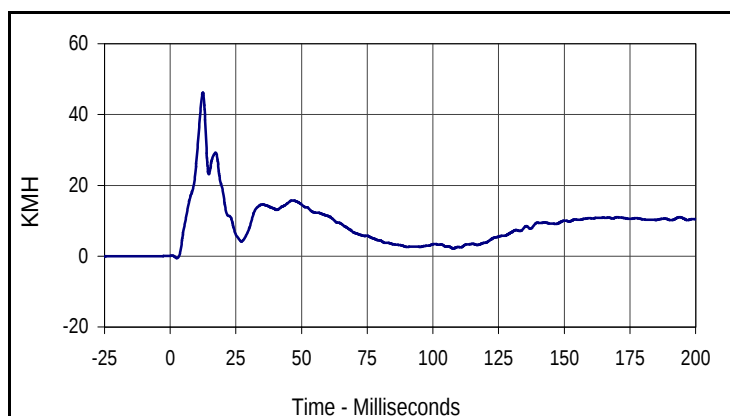


Curve Description			
Vehicle Left Rear Door Upper CL Y			
CURNO	Type	SAE Class	Units
061	FIL	60	G's
Max	Time	Min	Time
168.0	9.7	-110.3	13.9



Curve Description			
Vehicle Left Rear Door Mid Rear Y Velocity			
CURNO	Type	SAE Class	Units
060	IN1	180	KMH
Max	Time	Min	Time
20.4	17.1	0.0	0.0

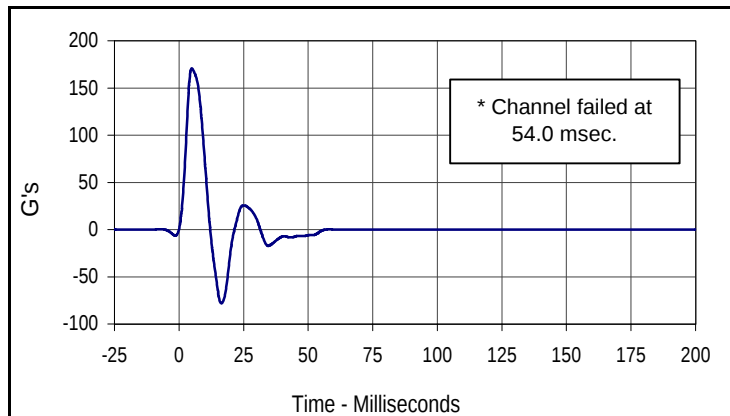
* Channel failed at 59.5 msec.



Curve Description			
Vehicle Left Rear Door Upper CL Y Velocity			
CURNO	Type	SAE Class	Units
061	IN1	180	KMH
Max	Time	Min	Time
46.2	12.4	-0.6	2.6

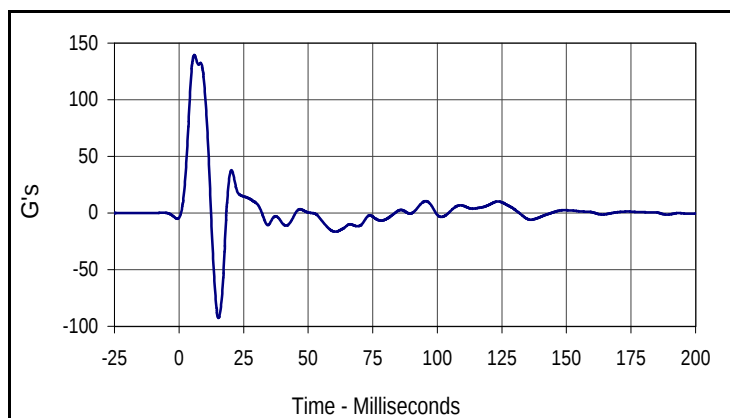
Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/24/05
 NHTSA No.: G50102

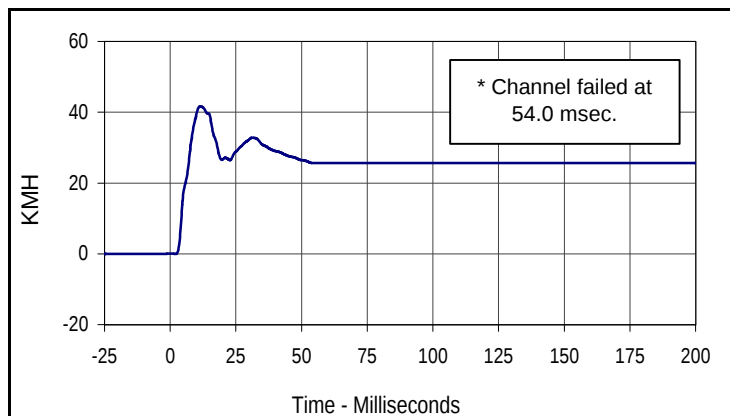


Curve Description			
Vehicle B-Post Lower Y			
CURNO	Type	SAE Class	Units
062	FIL	60	G's
Max	Time	Min	Time
170.8	4.9	-78.0	16.4

* Channel failed at 54.0 msec.

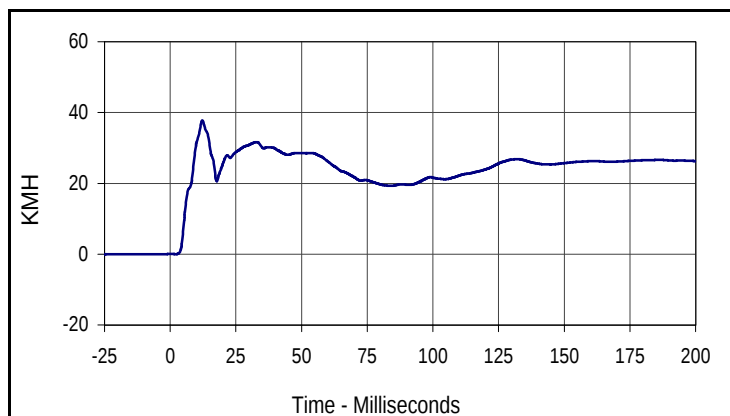


Curve Description			
Vehicle B-Post Middle Y			
CURNO	Type	SAE Class	Units
063	FIL	60	G's
Max	Time	Min	Time
139.5	5.9	-92.7	15.3



Curve Description			
Vehicle B-Post Lower Y Velocity			
CURNO	Type	SAE Class	Units
062	IN1	180	KMH
Max	Time	Min	Time
41.6	11.5	0.0	2.0

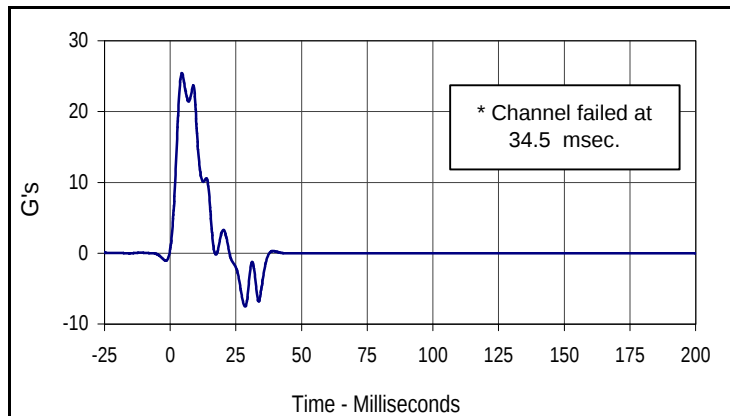
* Channel failed at 54.0 msec.



Curve Description			
Vehicle B-Post Middle Y Velocity			
CURNO	Type	SAE Class	Units
063	IN1	180	KMH
Max	Time	Min	Time
37.8	12.2	0.0	2.1

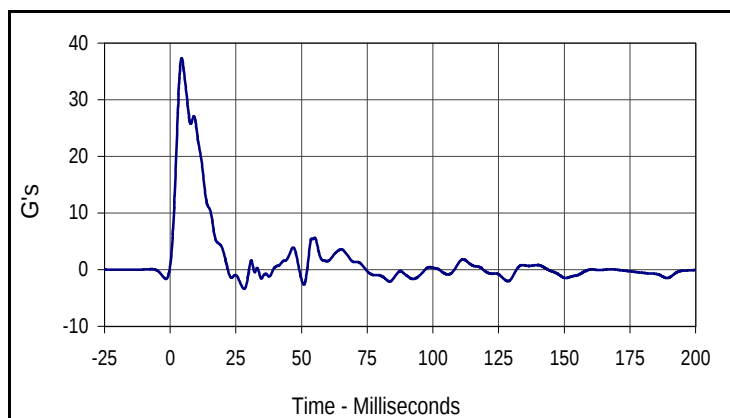
Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/24/05
 NHTSA No.: G50102

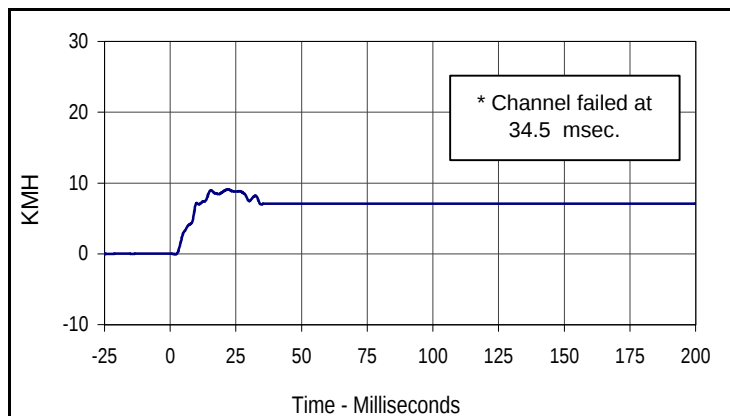


Curve Description			
Vehicle A-Post Lower Y			
CURNO	Type	SAE Class	Units
064	FIL	60	G's
Max	Time	Min	Time
25.4	4.5	-7.5	28.5

* Channel failed at 34.5 msec.

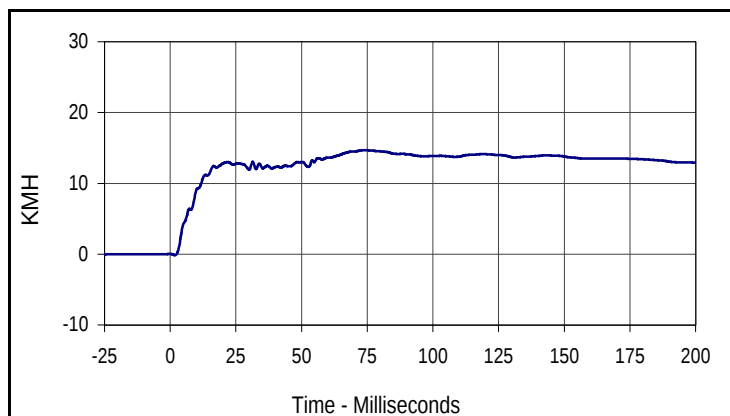


Curve Description			
Vehicle A-Post Middle Y			
CURNO	Type	SAE Class	Units
065	FIL	60	G's
Max	Time	Min	Time
37.3	4.3	-3.4	28.1



Curve Description			
Vehicle A-Post Lower Y Velocity			
CURNO	Type	SAE Class	Units
064	IN1	180	KMH
Max	Time	Min	Time
9.1	22.2	-0.1	2.0

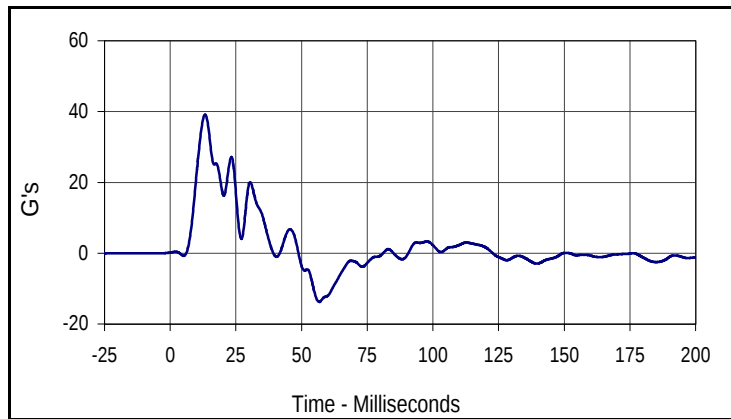
* Channel failed at 34.5 msec.



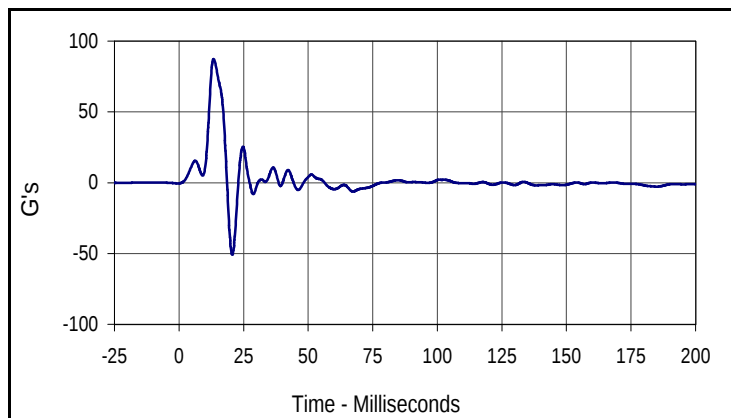
Curve Description			
Vehicle A-Post Middle Y Velocity			
CURNO	Type	SAE Class	Units
065	IN1	180	KMH
Max	Time	Min	Time
14.7	74.7	-0.2	1.9

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

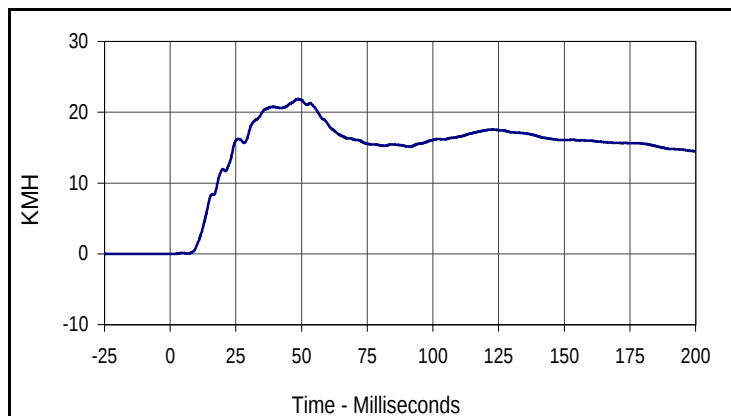
Test Date: 2/24/05
 NHTSA No.: G50102



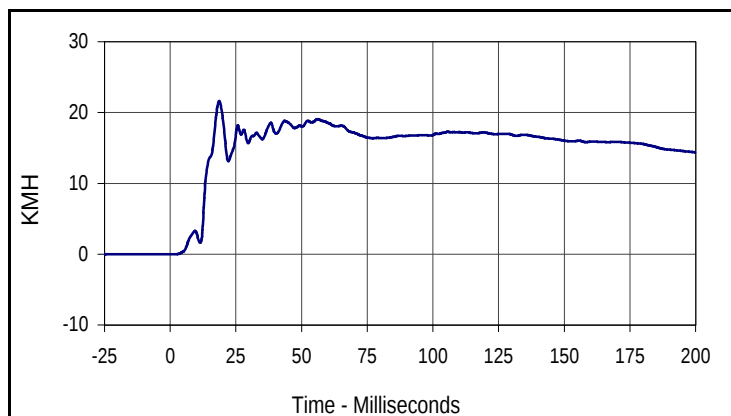
Curve Description			
Vehicle Left Front Seat Track			
CURNO	Type	SAE Class	Units
066	FIL	60	G's
Max	Time	Min	Time
39.1	13.2	-13.7	56.7



Curve Description			
Vehicle Rear Seat Structure			
CURNO	Type	SAE Class	Units
067	FIL	60	G's
Max	Time	Min	Time
87.3	13.4	-50.7	20.6



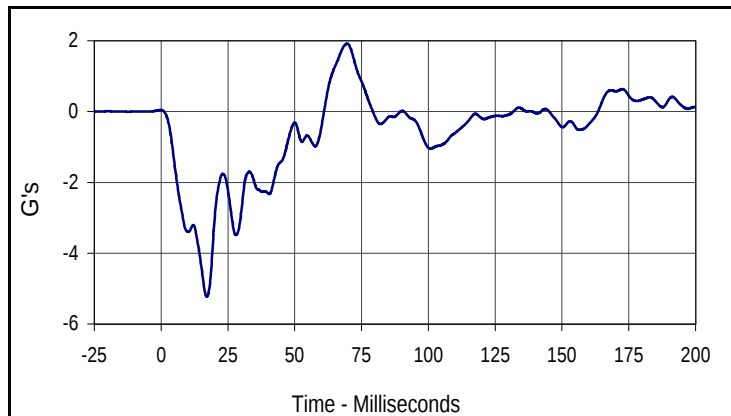
Curve Description			
Vehicle Left Front Seat Track Y Velocity			
CURNO	Type	SAE Class	Units
066	IN1	180	KMH
Max	Time	Min	Time
21.8	48.7	0.0	1.3



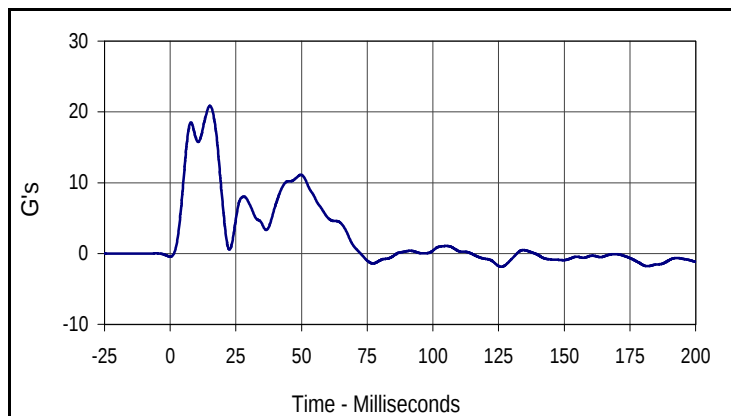
Curve Description			
Vehicle Rear Seat Structure Y Velocity			
CURNO	Type	SAE Class	Units
067	IN1	180	KMH
Max	Time	Min	Time
21.6	18.6	0.0	2.1

Test Vehicle: 2005 Saturn Relay 5-Door MPV
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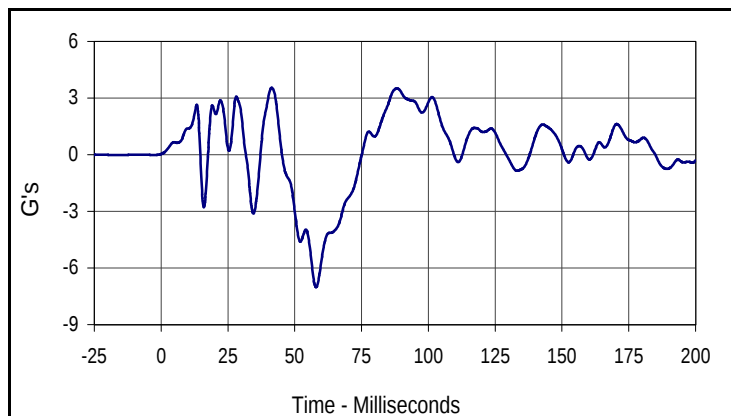
Test Date: 2/24/05
 NHTSA No.: G50102



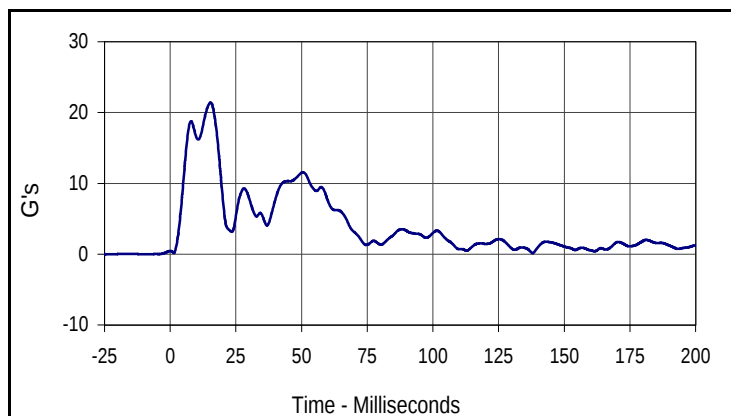
Curve Description			
Vehicle CG X			
CURNO	Type	SAE Class	Units
068	FIL	60	G's
Max	Time	Min	Time
1.9	69.7	-5.2	17.1



Curve Description			
Vehicle CG Y			
CURNO	Type	SAE Class	Units
069	FIL	60	G's
Max	Time	Min	Time
20.8	15.1	-1.9	126.0



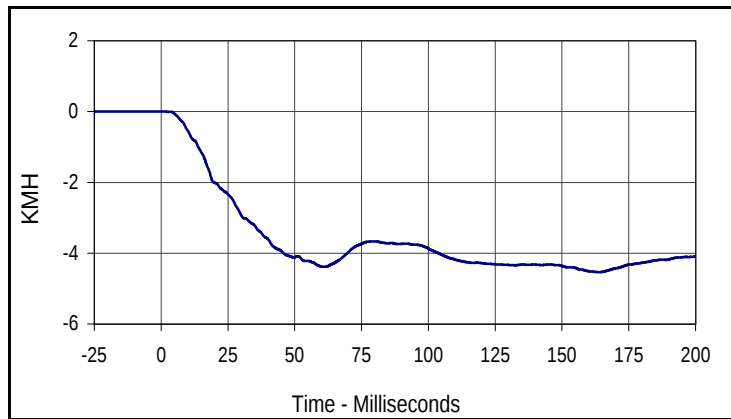
Curve Description			
Vehicle CG Z			
CURNO	Type	SAE Class	Units
070	FIL	60	G's
Max	Time	Min	Time
3.5	41.4	-7.0	58.0



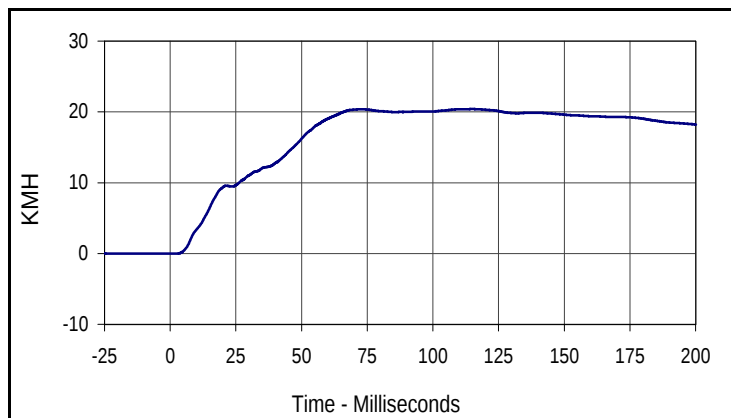
Curve Description			
Vehicle CG Resultant			
CURNO	Type	SAE Class	Units
068	RES	60	G's
Max	Time	Min	Time
21.4	15.4	0.1	138.0

Test Vehicle: 2005 Saturn Relay 5-Door MPV
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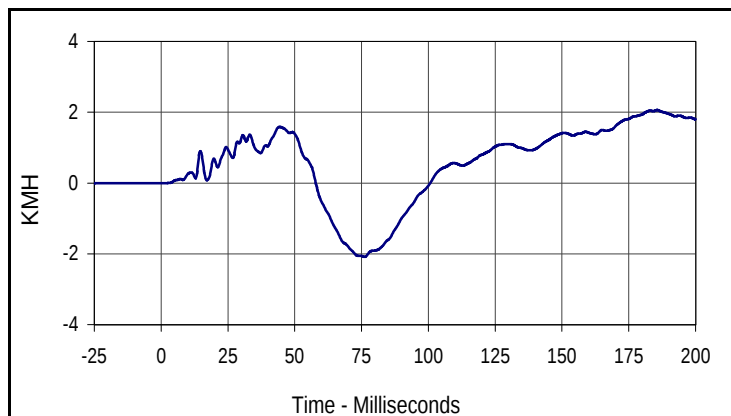
Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
Vehicle CG X Velocity			
CURNO	Type	SAE Class	Units
068	IN1	180	KMH
Max	Time	Min	Time
0.0	0.0	-4.5	164.0



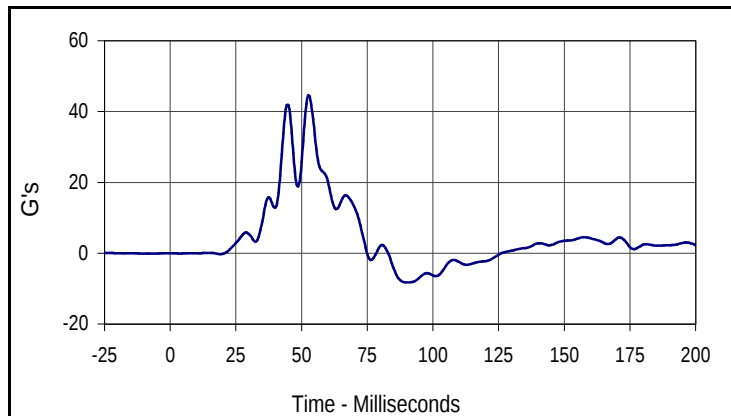
Curve Description			
Vehicle CG Y Velocity			
CURNO	Type	SAE Class	Units
069	IN1	180	KMH
Max	Time	Min	Time
20.4	115.2	0.0	2.5



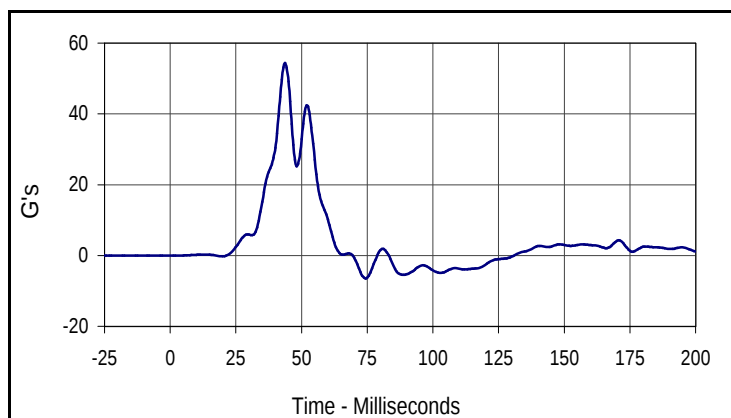
Curve Description			
Vehicle CG Z Velocity			
CURNO	Type	SAE Class	Units
070	IN1	180	KMH
Max	Time	Min	Time
2.1	185.6	-2.1	76.2

Test Vehicle: 2005 Saturn Relay 5-Door MPV
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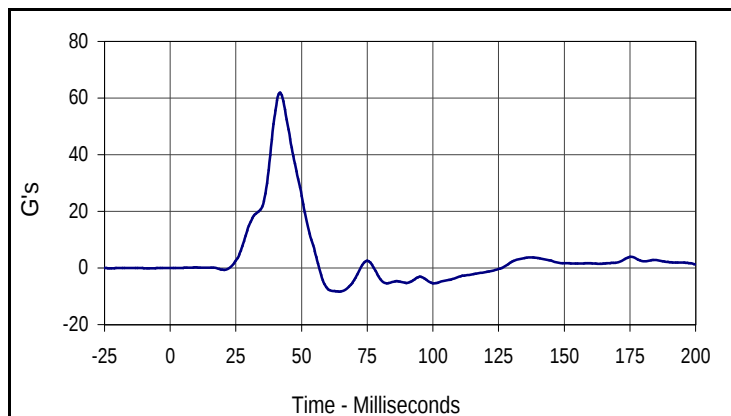
Test Date: 2/24/05
 NHTSA No.: G50102



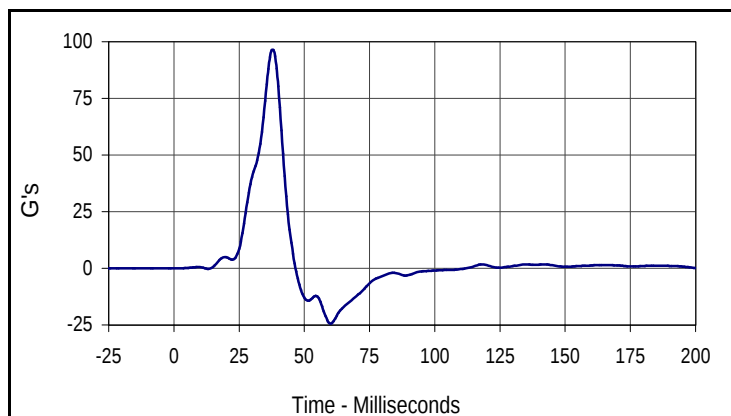
Curve Description			
Driver Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
013	FIR	FIR100	G's
Max	Time	Min	Time
44.5	52.5	-8.3	90.0



Curve Description			
Driver Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
014	FIR	FIR100	G's
Max	Time	Min	Time
54.4	43.8	-6.5	74.4



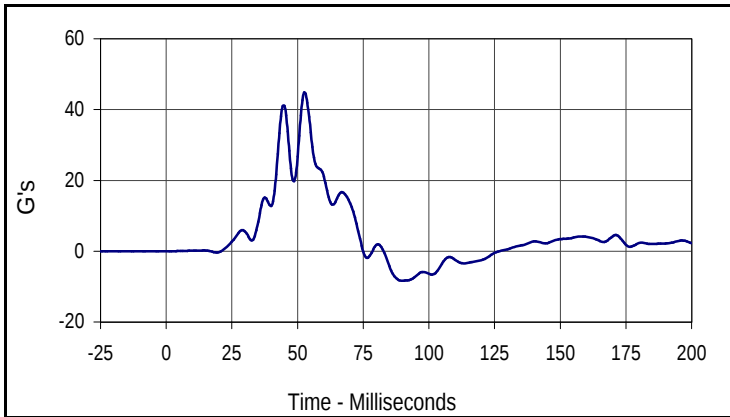
Curve Description			
Driver Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
015	FIR	FIR100	G's
Max	Time	Min	Time
61.9	41.9	-8.3	64.4



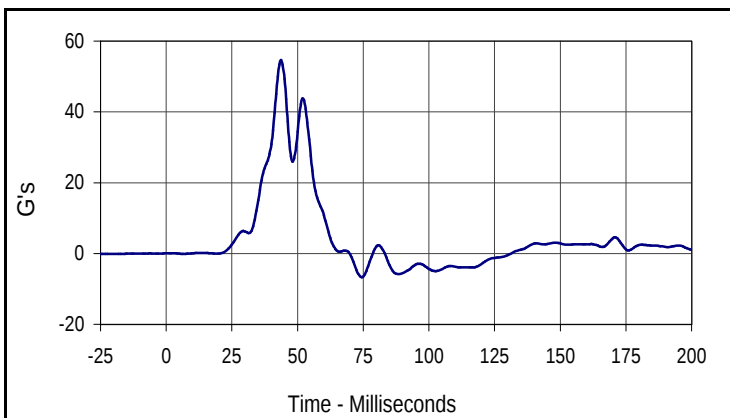
Curve Description			
Driver Pelvis Primary Y			
CURNO	Type	SAE Class	Units
016	FIR	FIR100	G's
Max	Time	Min	Time
96.4	38.1	-24.4	60.0

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

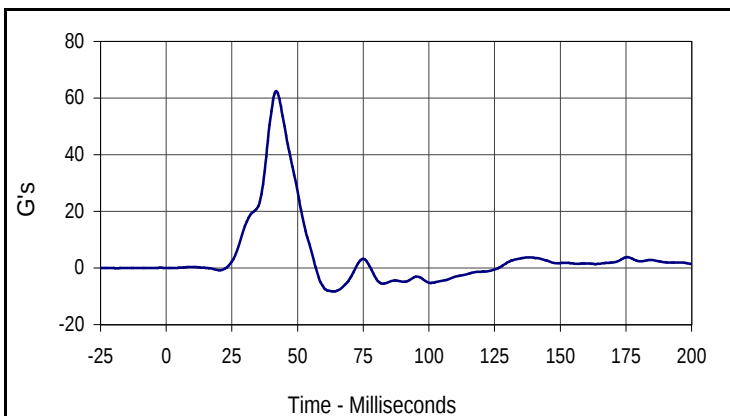
Test Date: 2/24/05
 NHTSA No.: G50102



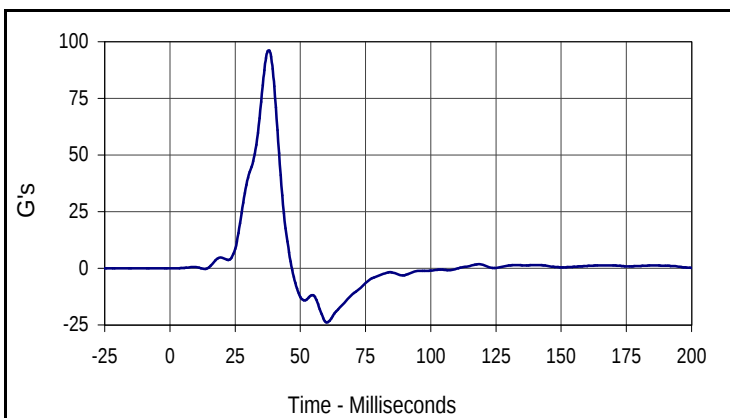
Curve Description			
Driver Upper Rib Redundant Y			
CURNO	Type	SAE Class	Units
017	FIR	FIR100	G's
Max	Time	Min	Time
44.8	52.5	-8.3	90.0



Curve Description			
Driver Lower Rib Redundant Y			
CURNO	Type	SAE Class	Units
018	FIR	FIR100	G's
Max	Time	Min	Time
54.7	43.8	-6.7	74.4



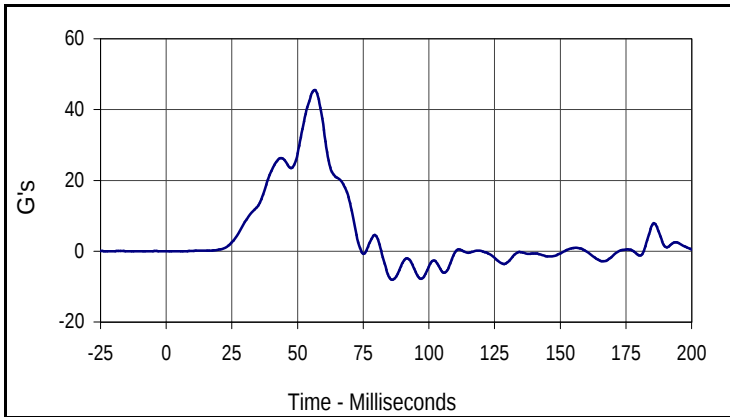
Curve Description			
Driver Lower Spine Redundant Y			
CURNO	Type	SAE Class	Units
019	FIR	FIR100	G's
Max	Time	Min	Time
62.4	41.9	-8.3	63.8



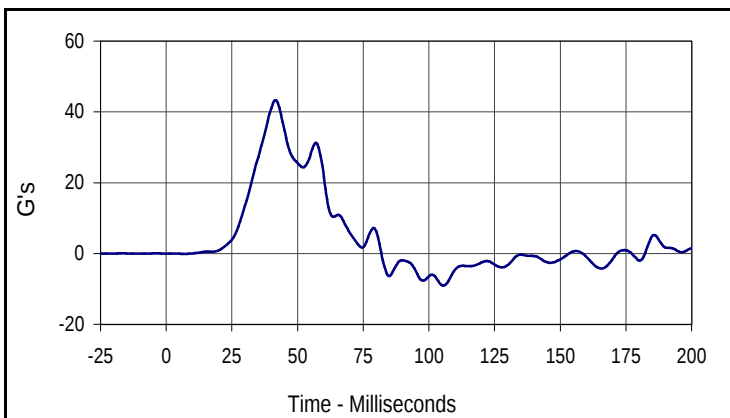
Curve Description			
Driver Pelvis Redundant Y			
CURNO	Type	SAE Class	Units
020	FIR	FIR100	G's
Max	Time	Min	Time
96.0	38.1	-23.9	60.0

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

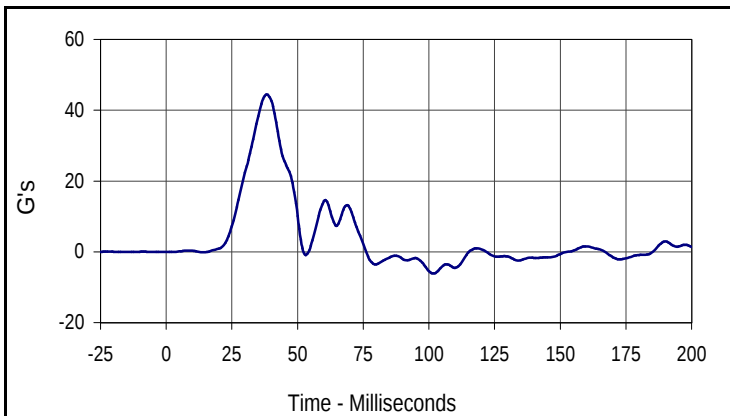
Test Date: 2/24/05
 NHTSA No.: G50102



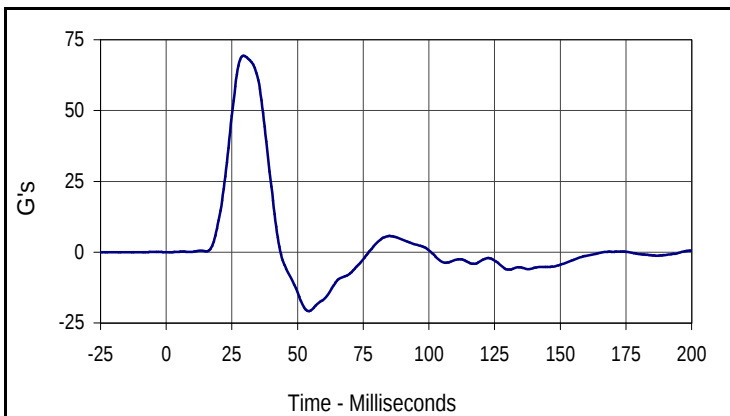
Curve Description			
Passenger Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
035	FIR	FIR100	G's
Max	Time	Min	Time
45.5	56.3	-8.1	86.3



Curve Description			
Passenger Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
036	FIR	FIR100	G's
Max	Time	Min	Time
43.3	41.9	-9.1	105.6



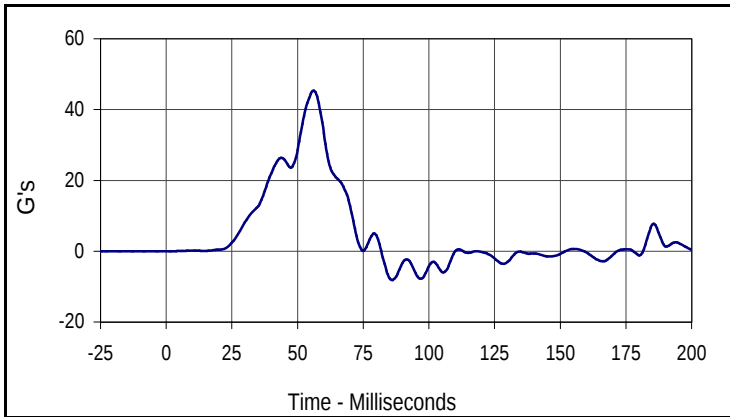
Curve Description			
Passenger Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
037	FIR	FIR100	G's
Max	Time	Min	Time
44.4	38.1	-6.1	101.9



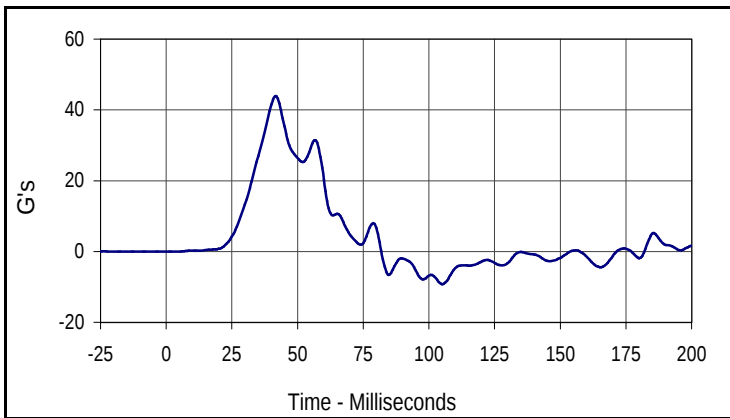
Curve Description			
Passenger Pelvis Primary Y			
CURNO	Type	SAE Class	Units
038	FIR	FIR100	G's
Max	Time	Min	Time
69.4	29.4	-20.8	54.4

Test Vehicle: 2005 Saturn Relay 5-Door MPV
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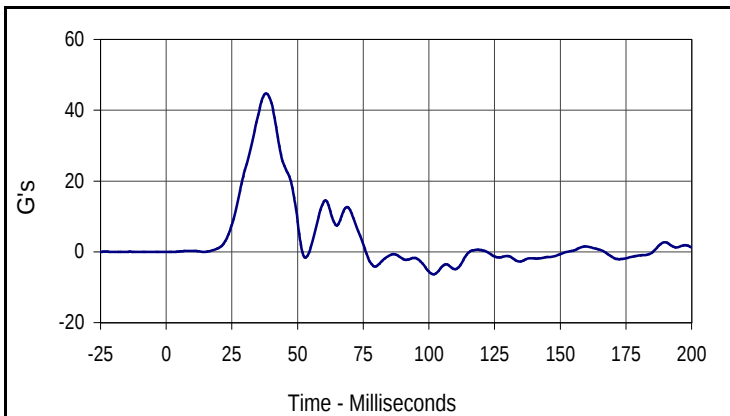
Test Date: 2/24/05
 NHTSA No.: G50102



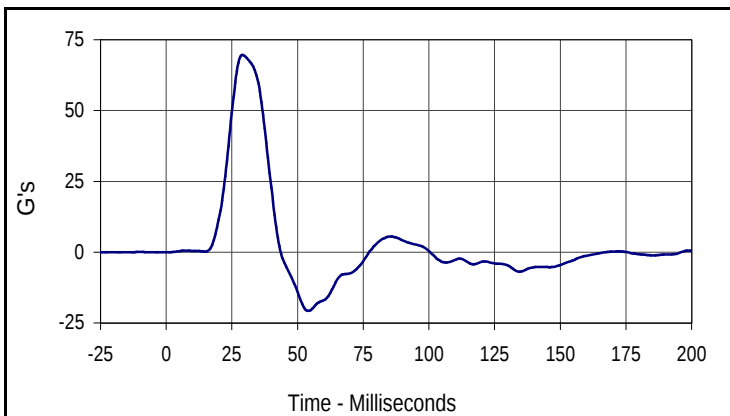
Curve Description			
Passenger Upper Rib Redundant Y			
CURNO	Type	SAE Class	Units
039	FIR	FIR100	G's
Max	Time	Min	Time
45.3	56.3	-8.1	86.3



Curve Description			
Passenger Lower Rib Redundant Y			
CURNO	Type	SAE Class	Units
040	FIR	FIR100	G's
Max	Time	Min	Time
43.9	41.9	-9.2	105.0



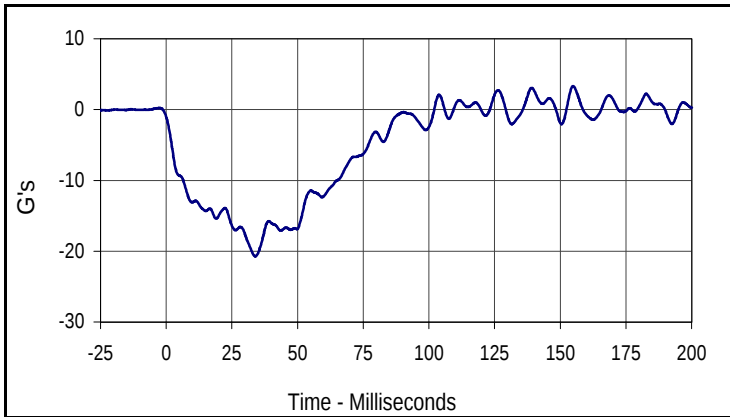
Curve Description			
Passenger Lower Spine Redundant Y			
CURNO	Type	SAE Class	Units
041	FIR	FIR100	G's
Max	Time	Min	Time
44.8	38.1	-6.3	101.9



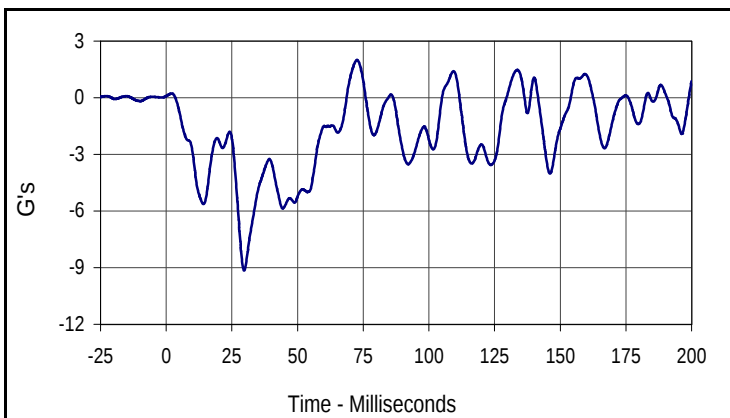
Curve Description			
Passenger Pelvis Redundant Y			
CURNO	Type	SAE Class	Units
042	FIR	FIR100	G's
Max	Time	Min	Time
69.6	29.4	-20.7	54.4

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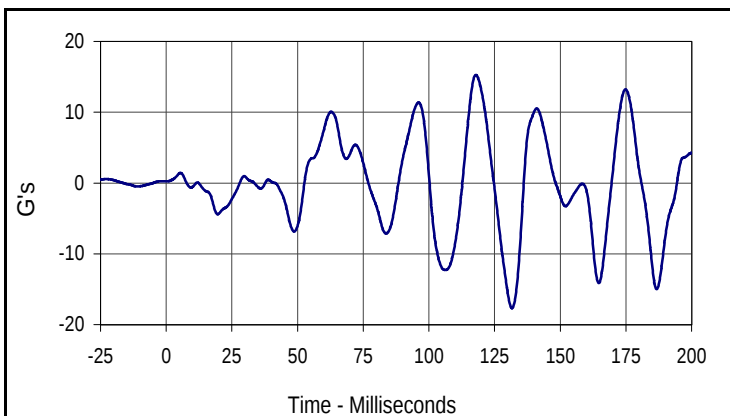
Test Date: 2/24/05
 NHTSA No.: G50102



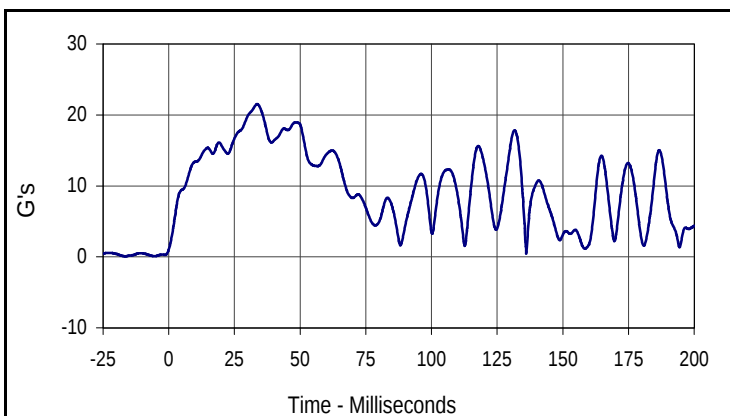
Curve Description			
MDB CG X			
CURNO	Type	SAE Class	Units
071	FIL	60	G's
Max	Time	Min	Time
3.3	154.9	-20.7	33.9



Curve Description			
MDB CG Y			
CURNO	Type	SAE Class	Units
072	FIL	60	G's
Max	Time	Min	Time
2.0	72.6	-9.2	29.7



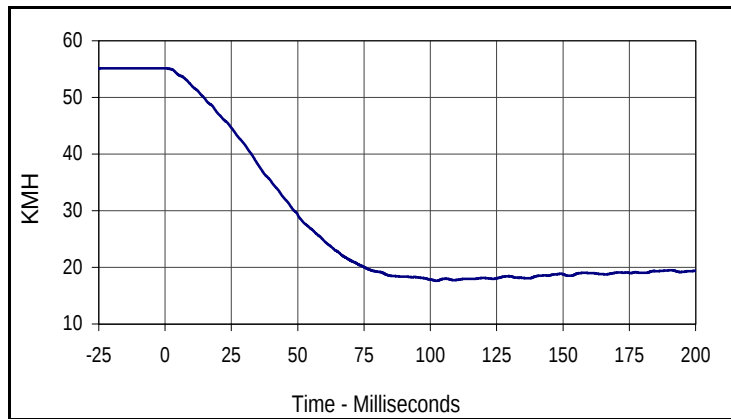
Curve Description			
MDB CG Z			
CURNO	Type	SAE Class	Units
073	FIL	60	G's
Max	Time	Min	Time
15.3	117.8	-17.7	131.6



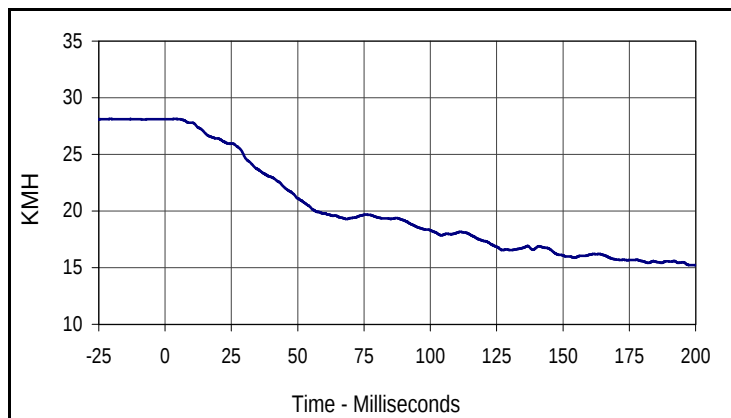
Curve Description			
MDB CG Resultant			
CURNO	Type	SAE Class	Units
071	RES	60	G's
Max	Time	Min	Time
21.5	33.6	0.4	136.1

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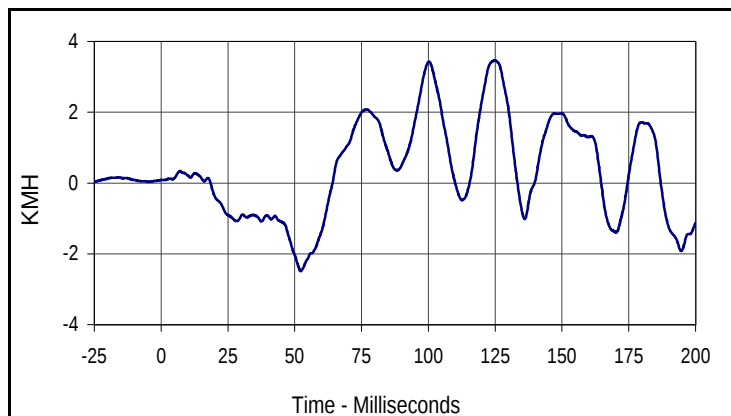
Test Date: 2/24/05
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Curve Description			
MDB CG X Velocity			
CURNO	Type	SAE Class	Units
071	IN1	180	KMH
Max	Time	Min	Time
55.1	0.0	17.6	102.3



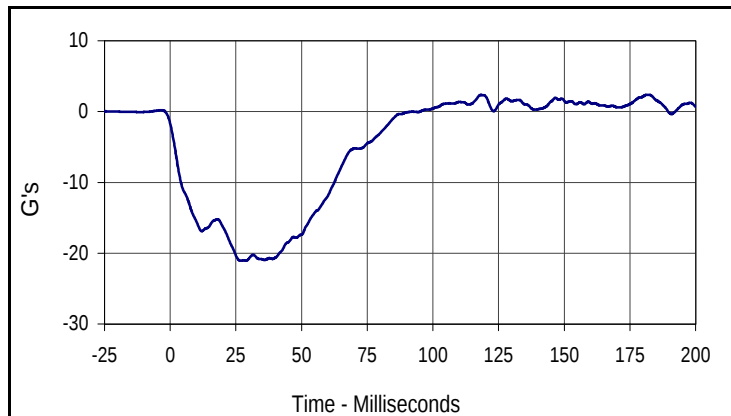
Curve Description			
MDB CG Y Velocity			
CURNO	Type	SAE Class	Units
072	IN1	180	KMH
Max	Time	Min	Time
28.1	3.7	15.2	198.3



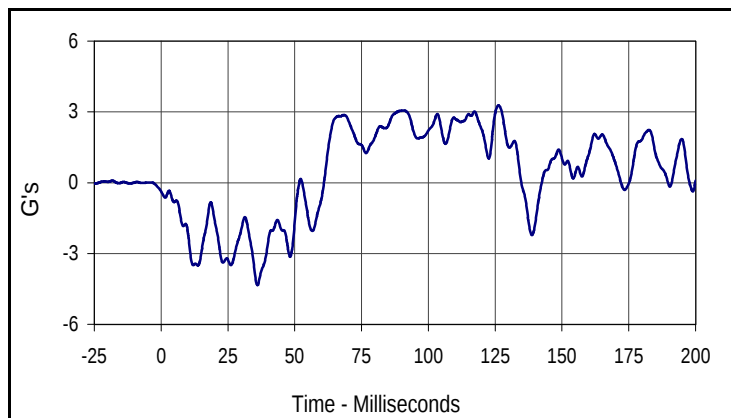
Curve Description			
MDB CG Z Velocity			
CURNO	Type	SAE Class	Units
073	IN1	180	KMH
Max	Time	Min	Time
3.5	124.8	-2.5	52.2

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

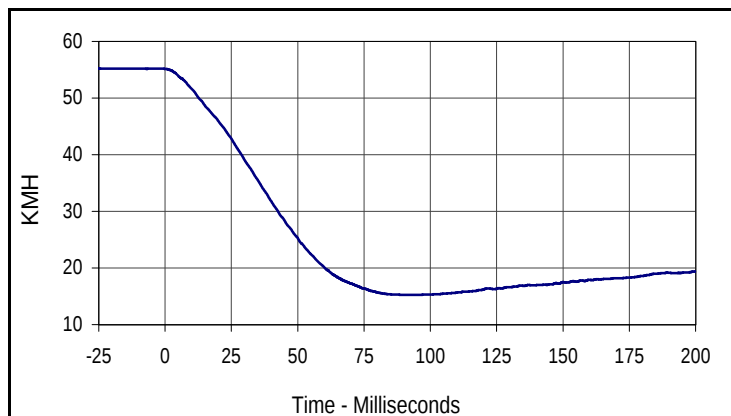
Test Date: 2/24/05
 NHTSA No.: G50102



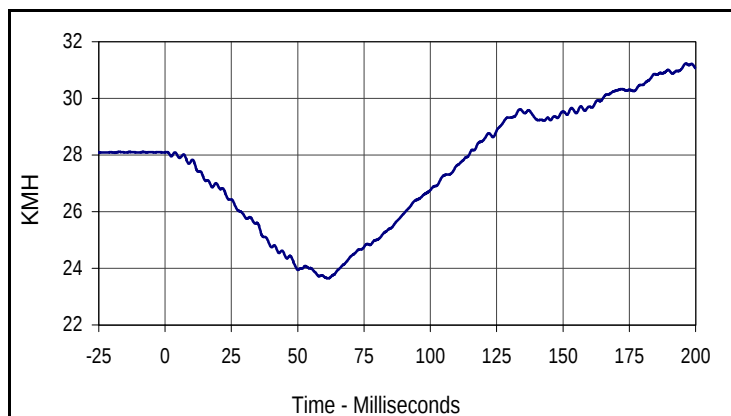
Curve Description			
MDB Rear X			
CURNO	Type	SAE Class	Units
074	FIL	60	G's
Max	Time	Min	Time
2.4	181.5	-21.1	26.8



Curve Description			
MDB Rear Y			
CURNO	Type	SAE Class	Units
075	FIL	60	G's
Max	Time	Min	Time
3.3	126.2	-4.3	36.0



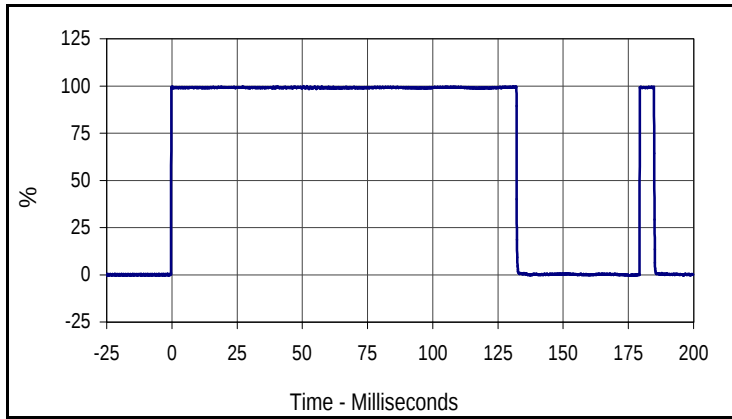
Curve Description			
MDB Rear X Velocity			
CURNO	Type	SAE Class	Units
074	IN1	180	KMH
Max	Time	Min	Time
55.2	0.0	15.2	95.5



Curve Description			
MDB Rear Y Velocity			
CURNO	Type	SAE Class	Units
075	IN1	180	KMH
Max	Time	Min	Time
31.2	196.3	23.6	61.6

Test Vehicle: 2005 Saturn Relay 5-Door MPV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/24/05
 NHTSA No.: G50102



Curve Description			
MDB Right Bumper Contact			
CURNO	Type	SAE Class	Units
076	FIL	1000	%
Max	Time	Cross %	Time
99.8	50.4	50.0	-0.2

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.: 274

Test Date: 2/8/05
Test I.D.: N/A



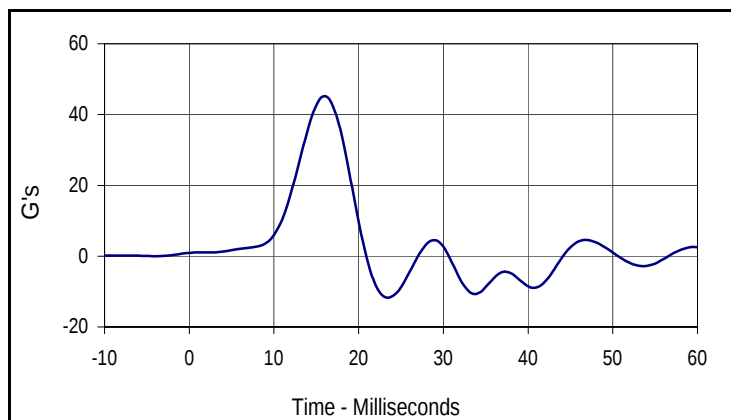
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	905	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	515	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	518	Pass
KV- Knee Pivot From Floor	mm	490 to 505	495	Pass
HW- Hip Width	mm	356 to 391	385	Pass
Overall Test Results				Pass

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

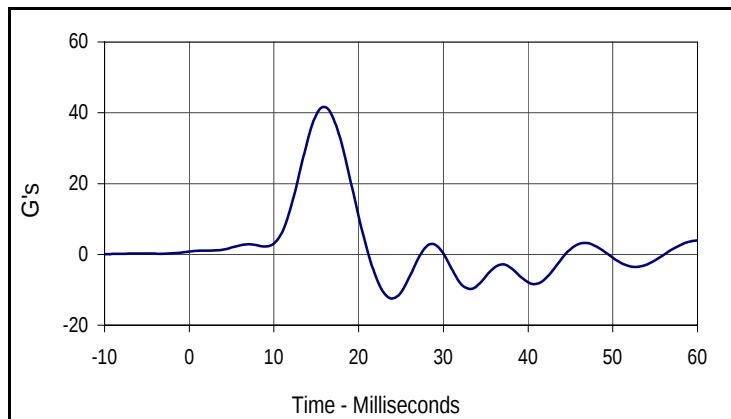
Test Date: 2/8/05
 Test I.D.: TH02A



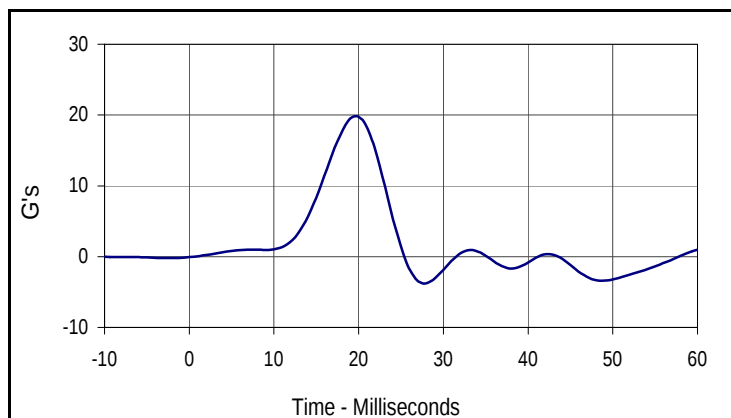
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.25	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	45.0	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	41.5	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.8	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
45.0	16.3	-11.6	23.8



Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
41.5	15.6	-12.4	23.8



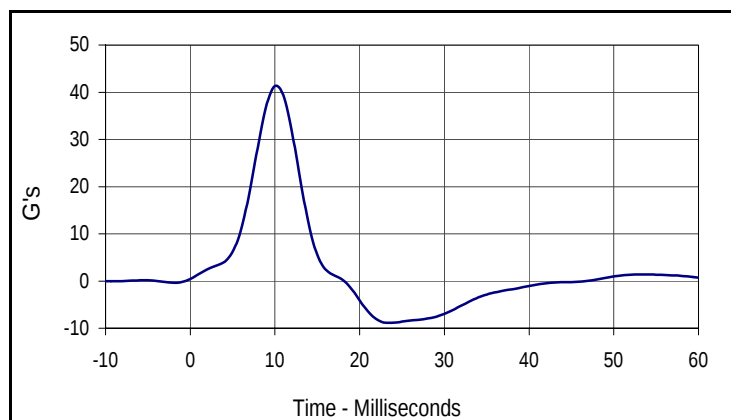
Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.8	19.4	-3.7	27.5

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

Test Date: 2/8/05
 Test I.D.: PI02A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.25	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	41.3	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.25	Pass
Overall Test Results				Pass



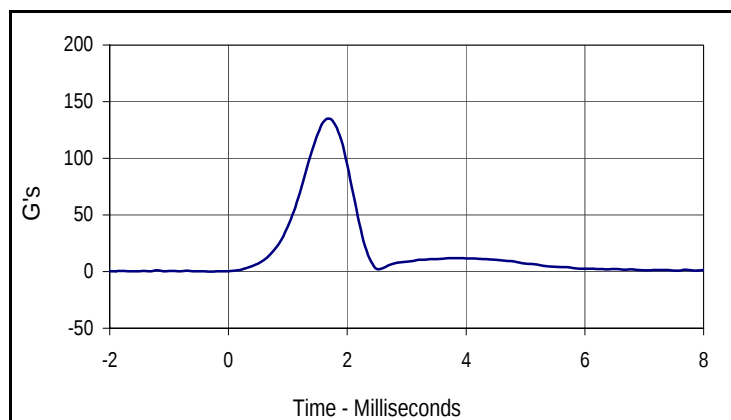
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
41.3	10.0	-8.9	23.8

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

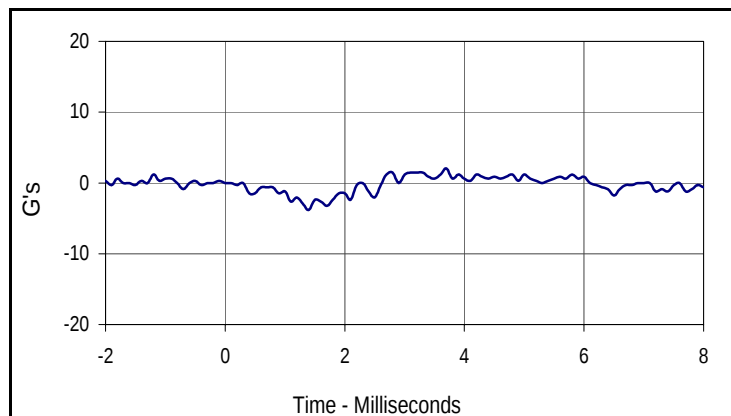
Test Date: 2/4/05
 Test I.D.: HD02A



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	135.0	Pass
Peak Longitudinal Acceleration	G's	≤15.0	3.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	5.3	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
135.0	1.7	0.1	-0.3



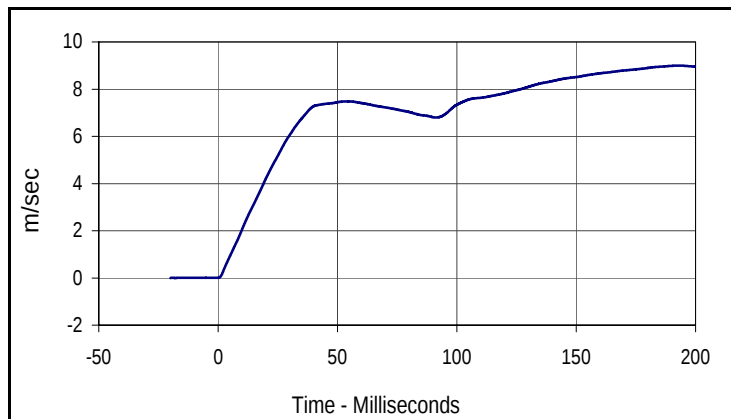
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.1	3.7	-3.8	1.4

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

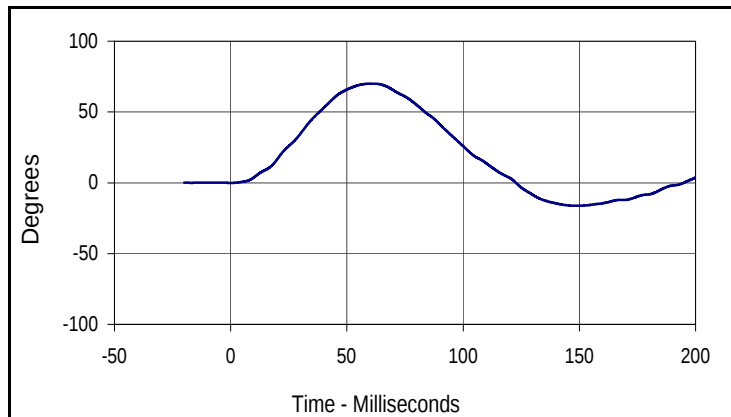
Test Date: 2/8/05
 Test I.D.: NB02A



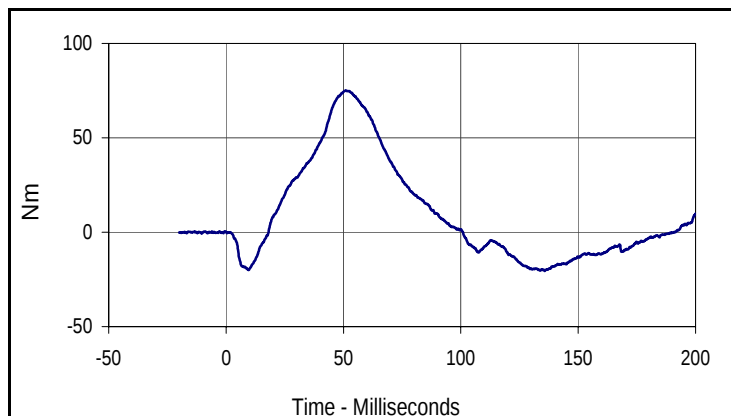
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.05	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.21	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.06	Pass
	40 to 70	m/sec	6.27 to 7.64	7.48	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	70.0	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	61.8	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	75.0	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.0	192.9	0.0	-17.9



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
70.0	61.0	-16.2	148.8



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
75.0	51.2	-20.6	135.8

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

Test Date: 2/8/05
 Test I.D.: N/A



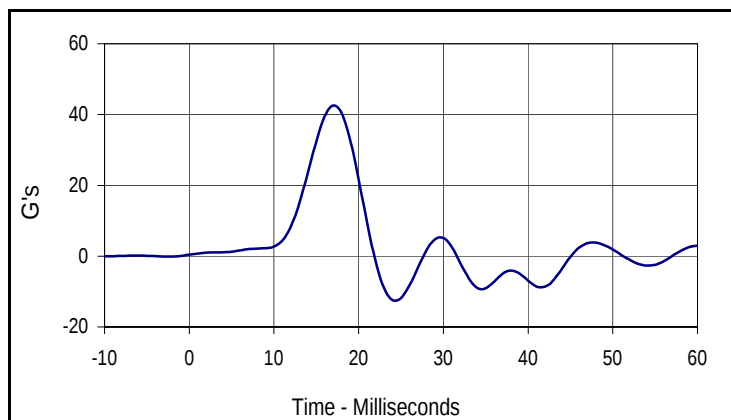
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	894	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	521	Pass
KV- Knee Pivot From Floor	mm	490 to 505	500	Pass
HW- Hip Width	mm	356 to 391	385	Pass
Overall Test Results				Pass

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

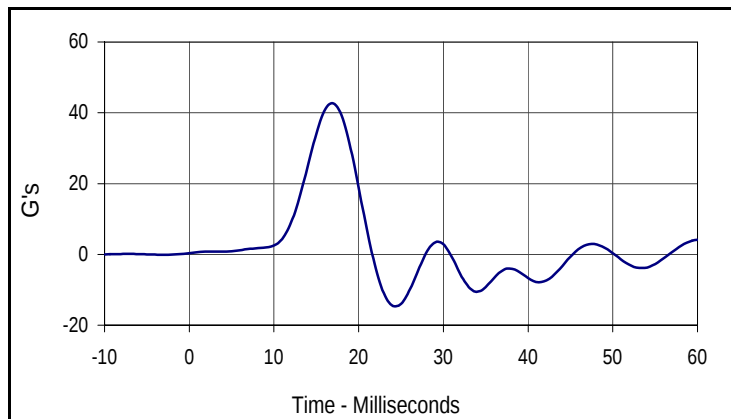
Test Date: 2/8/05
 Test I.D.: TH02B



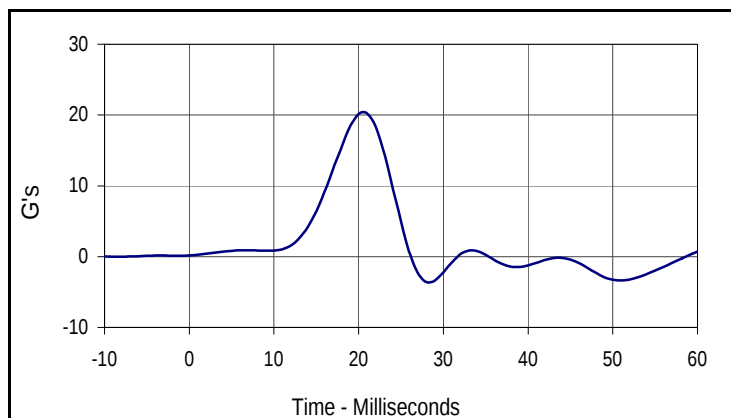
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.30	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	42.4	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	42.8	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.4	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.4	16.9	-12.6	24.4



Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
42.8	16.9	-14.7	24.4



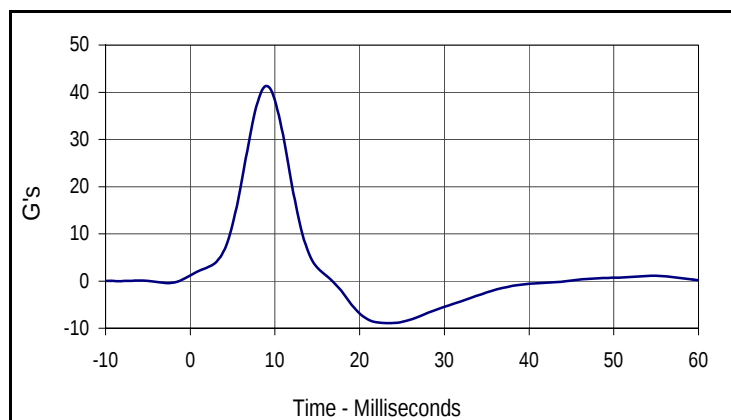
Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.4	20.6	-3.6	28.1

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

Test Date: 2/8/05
 Test I.D.: PI02B



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
Peak Pelvis Acceleration	G's	40.0 to 60.0	41.1	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.25	Pass
Overall Test Results				Pass



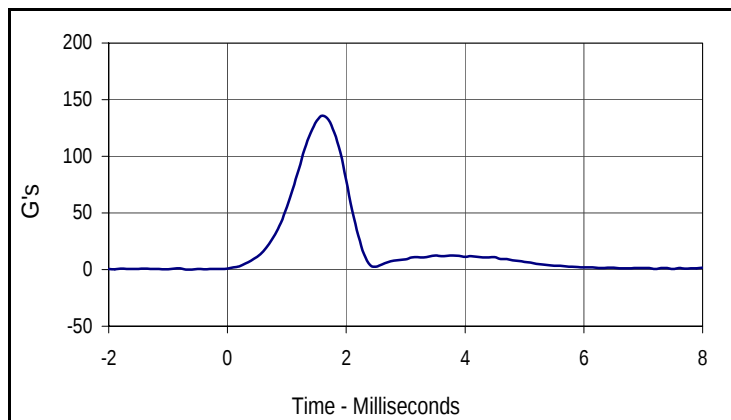
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
41.1	8.8	-8.9	23.1

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

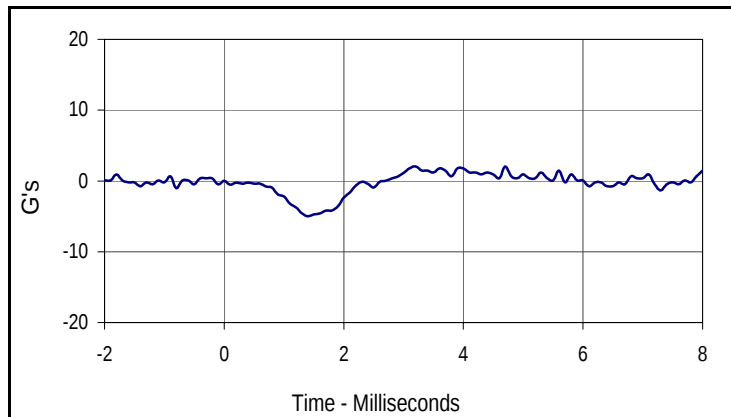
Test Date: 2/4/05
 Test I.D.: HD02B



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



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
135.7	1.6	0.1	-0.6



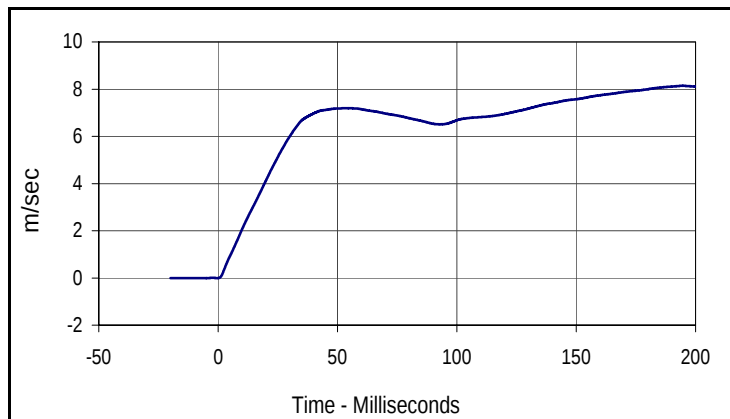
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
2.1	3.2	-5.0	1.4

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

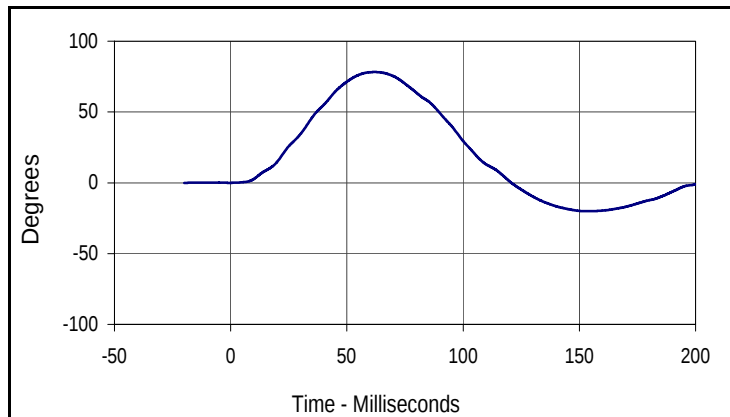
Test Date: 2/8/05
 Test I.D.: NB02B



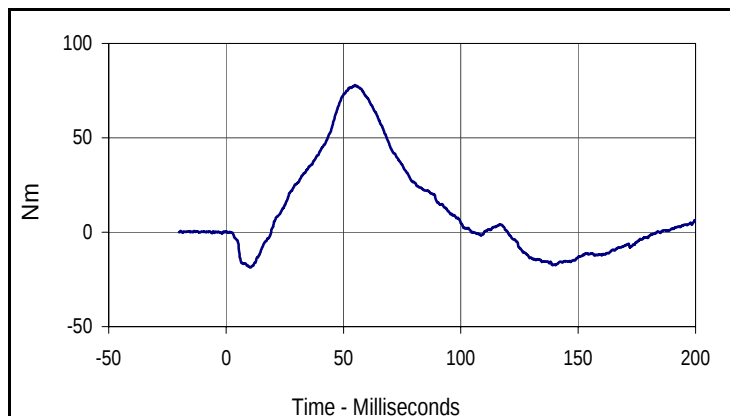
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.06	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.12	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.00	Pass
	40 to 70	m/sec	6.27 to 7.64	7.19	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	78.2	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	7.0	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	58.9	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	78.0	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.6	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	194.6	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
78.2	61.9	-20.1	153.6



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
78.0	54.9	-18.7	10.4

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

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

Test Date: 3/3/05
 Test I.D.: N/A



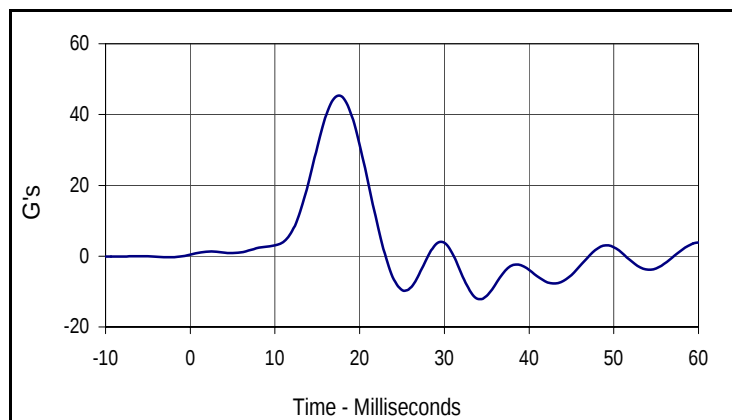
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	900	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	515	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	516	Pass
KV- Knee Pivot From Floor	mm	490 to 505	502	Pass
HW- Hip Width	mm	356 to 391	377	Pass
Overall Test Results				Pass

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

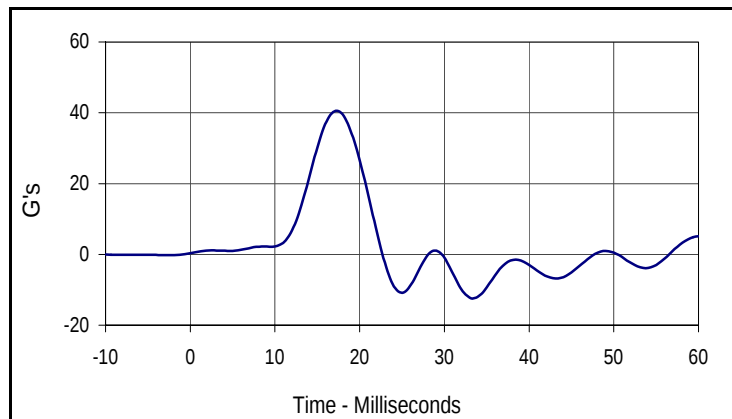
Test Date: 3/1/05
 Test I.D.: TH03A



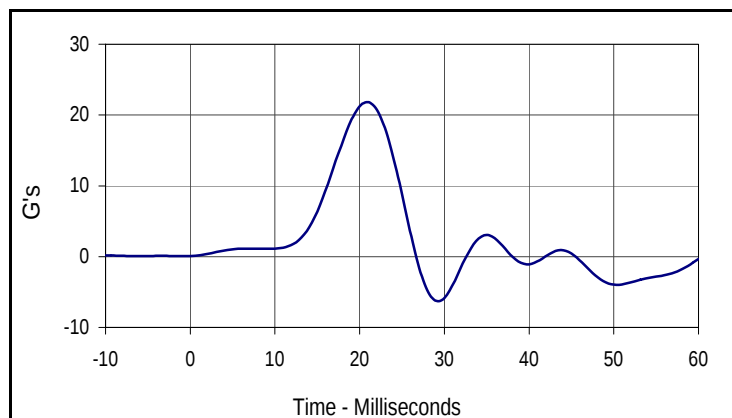
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.29	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	45.4	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	40.4	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	21.8	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
45.4	17.5	-12.2	34.4



Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
40.4	17.5	-12.4	33.1



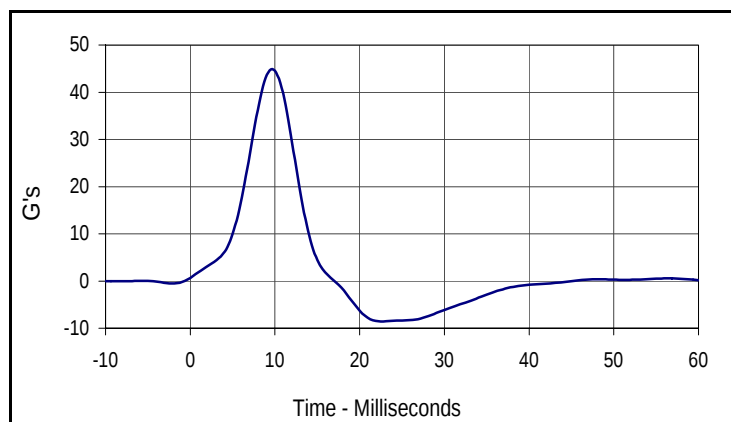
Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
21.8	20.6	-6.3	29.4

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

Test Date: 3/1/05
 Test I.D.: PI03A



Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.24	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	44.7	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.25	Pass
Overall Test Results				Pass



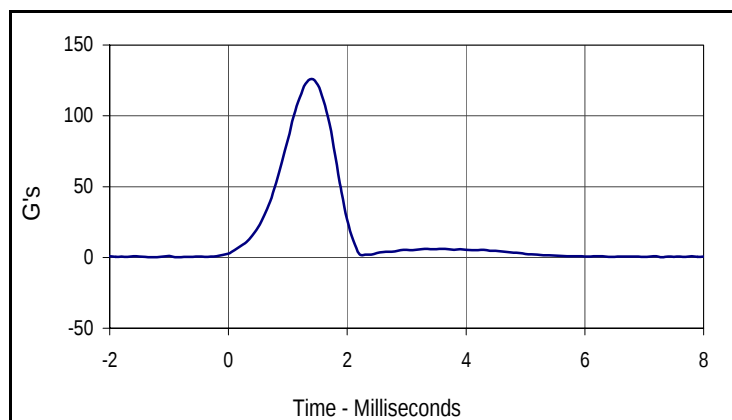
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
44.7	9.4	-8.6	22.5

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

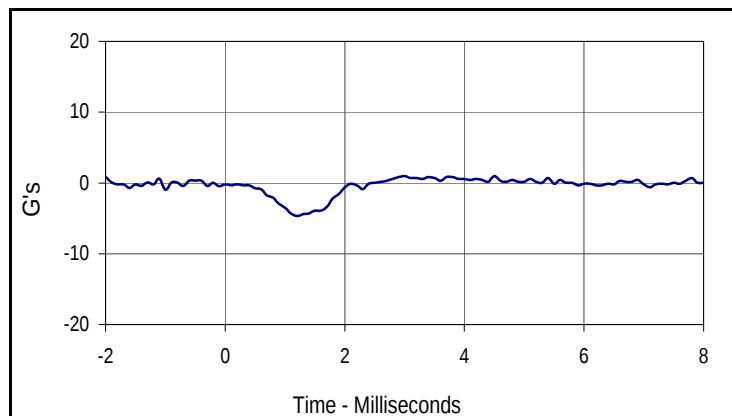
Test Date: 3/2/05
 Test I.D.: HD03A



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	126.0	Pass
Peak Longitudinal Acceleration	G's	≤15.0	4.7	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.0	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
126.0	1.4	0.1	-0.8



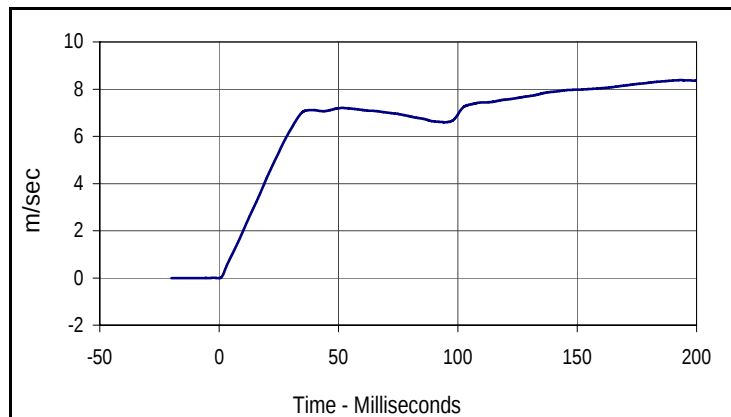
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.0	3.0	-4.7	1.2

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

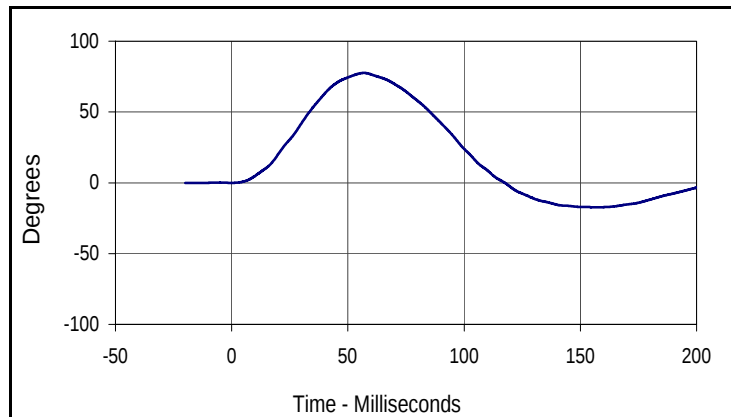
Test Date: 3/2/05
 Test I.D.: NB03A



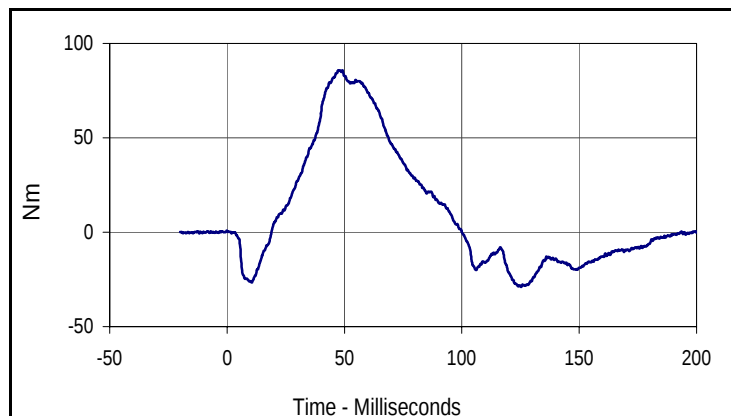
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	1.99	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.25	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.30	Pass
	40 to 70	m/sec	6.27 to 7.64	7.20	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	77.6	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	7.6	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	60.7	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	85.8	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	50.9	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.4	193.4	0.0	0.0



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
77.6	56.8	-17.3	157.2



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
85.8	49.2	-29.0	125.3

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

Test Date: 3/3/05
 Test I.D.: N/A



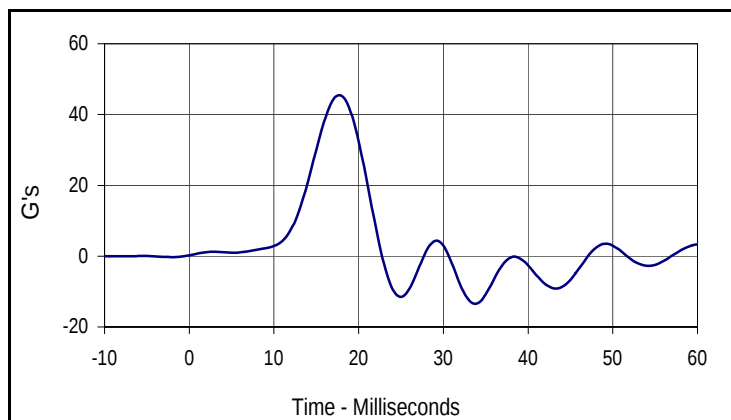
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	895	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	505	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	521	Pass
KV- Knee Pivot From Floor	mm	490 to 505	498	Pass
HW- Hip Width	mm	356 to 391	384	Pass
Overall Test Results				Pass

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

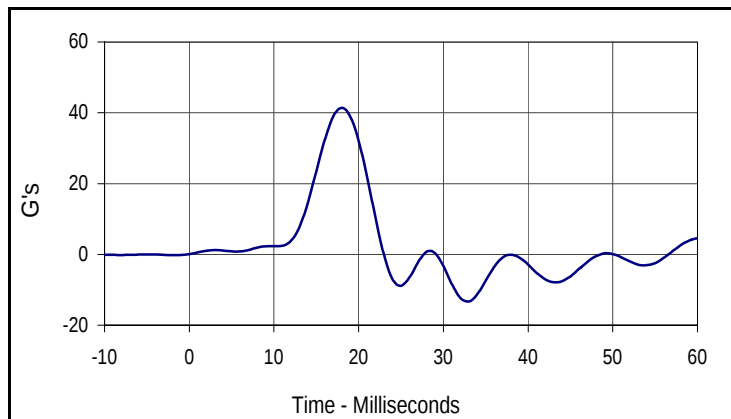
Test Date: 3/1/05
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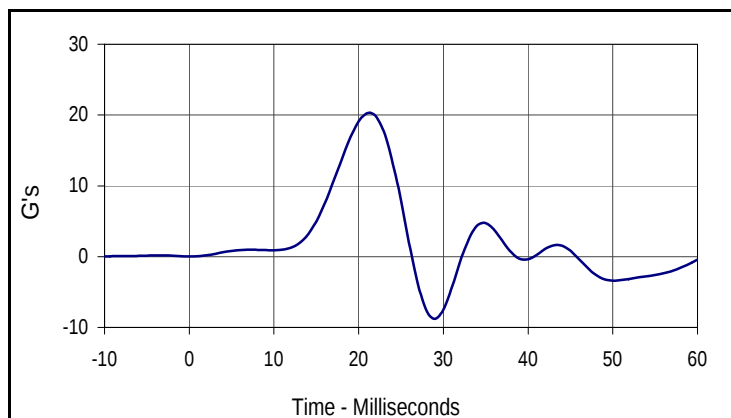
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.30	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	45.3	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	41.3	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.3	Pass
Overall Test Results			Pass	



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
45.3	17.5	-13.5	33.8



Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
41.3	18.1	-13.2	33.1



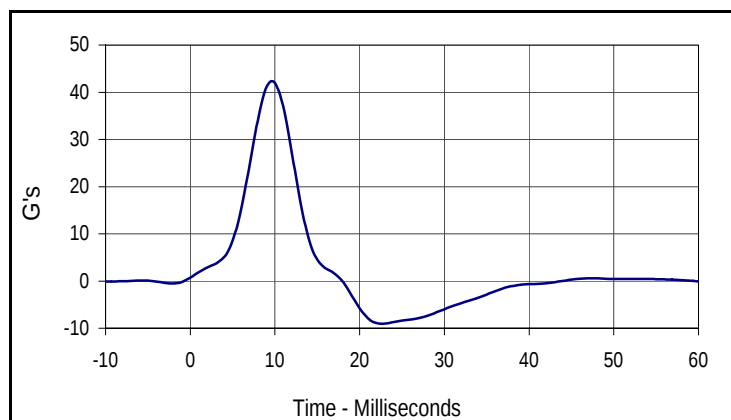
Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.3	21.3	-8.7	28.8

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

Test Date: 3/1/05
 Test I.D.: PI03B



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
Peak Pelvis Acceleration	G's	40.0 to 60.0	42.2	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.25	Pass
Overall Test Results				Pass



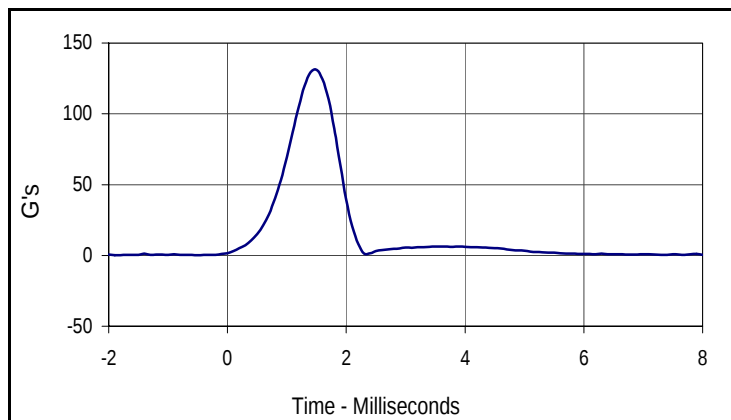
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.2	9.4	-9.0	22.5

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

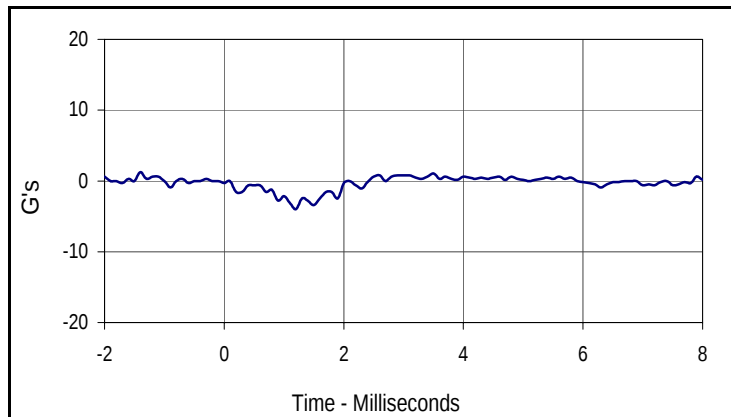
Test Date: 3/2/05
 Test I.D.: HD03B



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	131.0	Pass
Peak Longitudinal Acceleration	G's	≤15.0	4.0	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.5	Pass
Overall Test Results			Pass	



Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
131.0	1.5	0.1	-0.5



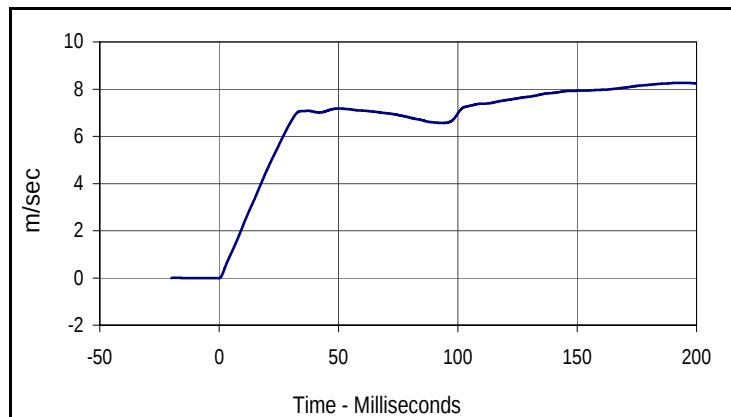
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.2	-1.4	-4.0	1.2

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

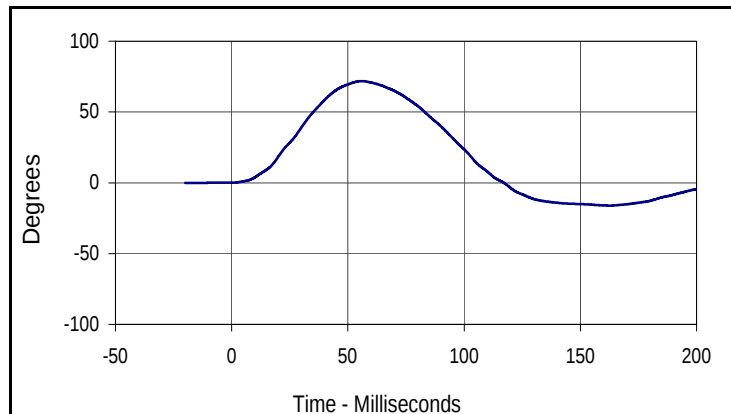
Test Date: 3/2/05
 Test I.D.: NB03B



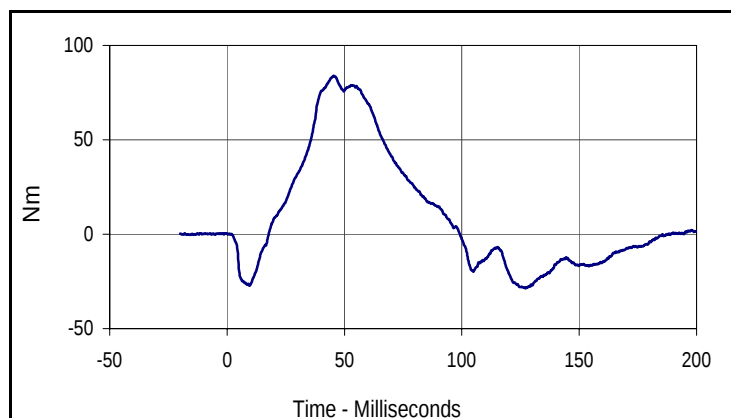
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.23	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.57	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.61	Pass
	40 to 70	m/sec	6.27 to 7.64	7.18	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	71.9	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	10.5	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	61.2	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	83.8	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	53.8	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.3	192.4	0.0	-0.3



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
71.9	55.9	-16.1	162.7



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
83.8	45.4	-28.7	127.0

APPENDIX D

INSTRUMENTATION AND DATA CHANNEL ASSIGNMENTS

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Driver SID/HIII Serial Number 275
2/24/05
2005 Saturn Relay 5-Door MPV

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	Head CG	X	GPAC072X	Accel., Full Bridge	Entran	2000JF	G
2	Head CG	Y	GPAC073Y	Accel., Full Bridge	Entran	2000JF	G
3	Head CG	Z	GPAC074Z	Accel., Full Bridge	Entran	2000JF	G
4	Head CG, Redundant	X	GPAC075X	Accel., Full Bridge	Entran	2000JF	G
5	Head CG, Redundant	Y	GPAC077Y	Accel., Full Bridge	Entran	2000JF	G
6	Head CG, Redundant	Z	GPAC078Z	Accel., Full Bridge	Entran	2000JF	G
7	Neck Force	X	275_NFX	Load cell, six axis neck	R. A. Denton	1716A	N
8	Neck Force	Y	275_NFY	Load cell, six axis neck	R. A. Denton	1716A	N
9	Neck Force	Z	275_NFZ	Load cell, six axis neck	R. A. Denton	1716A	N
10	Neck Moment	X	275_NMX	Load cell, six axis neck	R. A. Denton	1716A	Nm
11	Neck Moment	Y	275_NMY	Load cell, six axis neck	R. A. Denton	1716A	Nm
12	Neck Moment	Z	275_NMZ	Load cell, six axis neck	R. A. Denton	1716A	Nm
13	Upper Rib Primary	Y	KEAC066X	Accel.,1/2 bridge	Endevco	7264-2000X	G
14	Lower Rib, Primary	Y	KEAC067Y	Accel.,1/2 bridge	Endevco	7264-2000Y	G
15	Lower Spine, Primary	Y	KEAC068Z	Accel.,1/2 bridge	Endevco	7264-2000Z	G
16	Pelvis, Primary	Y	KEAC079X	Accel.,1/2 bridge	Endevco	7264-2000X	G
17	Upper Rib Redundant	Y	KEAC073X	Accel.,1/2 bridge	Endevco	7264-2000X	G
18	Lower Rib, Redundant	Y	KEAC074Y	Accel.,1/2 bridge	Endevco	7264-2000Y	G
19	Lower Spine, Redundant	Y	KEAC075Z	Accel.,1/2 bridge	Endevco	7264-2000Z	G
20	Pelvis, Redundant	Y	KEAC081X	Accel.,1/2 bridge	Endevco	7264-2000X	G
21	Thorax Contact	Y	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%
22	Pelvis Contact	Y	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Passenger SID/HIII Serial Number 274
2/24/05
2005 Saturn Relay 5-Door MPV

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
23	Head CG	X	GPAC066X	Accel., Full Bridge	Entran	2000JF	G
24	Head CG	Y	GPAC067Y	Accel., Full Bridge	Entran	2000JF	G
25	Head CG	Z	GPAC068Z	Accel., Full Bridge	Entran	2000JF	G
26	Head CG, Redundant	X	GPAC069X	Accel., Full Bridge	Entran	2000JF	G
27	Head CG, Redundant	Y	GPAC070Y	Accel., Full Bridge	Entran	2000JF	G
28	Head CG, Redundant	Z	GPAC071Z	Accel., Full Bridge	Entran	2000JF	G
29	Neck Force	X	274_NFX	Load cell, six axis neck	R. A. Denton	1716A	N
30	Neck Force	Y	274_NFY	Load cell, six axis neck	R. A. Denton	1716A	N
31	Neck Force	Z	274_NFZ	Load cell, six axis neck	R. A. Denton	1716A	N
32	Neck Moment	X	274_NMX	Load cell, six axis neck	R. A. Denton	1716A	Nm
33	Neck Moment	Y	274_NMY	Load cell, six axis neck	R. A. Denton	1716A	Nm
34	Neck Moment	Z	274_NMZ	Load cell, six axis neck	R. A. Denton	1716A	Nm
35	Upper Rib Primary	Y	KEAC070X	Accel.,1/2 bridge	Endevco	7264-2000X	G
36	Lower Rib, Primary	Y	KEAC071Y	Accel.,1/2 bridge	Endevco	7264-2000Y	G
37	Lower Spine, Primary	Y	KEAC072Z	Accel.,1/2 bridge	Endevco	7264-2000Z	G
38	Pelvis, Primary	Y	GPAC065X	Accel.,Full bridge	Endevco	7264A-2000	G
39	Upper Rib Redundant	Y	KEAC076X	Accel.,1/2 bridge	Endevco	7264-2000X	G
40	Lower Rib, Redundant	Y	KEAC077Y	Accel.,1/2 bridge	Endevco	7264-2000Y	G
41	Lower Spine, Redundant	Y	KEAC078Z	Accel.,1/2 bridge	Endevco	7264-2000Z	G
42	Pelvis, Redundant	Y	KEAC089X	Accel.,1/2 bridge	Endevco	7264-2000X	G
43	Thorax Contact	N/A	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%
44	Pelvis Contact	N/A	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Vehicle Accelerometers
2/24/05

2005 Saturn Relay 5-Door MPV

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
45	Right at Sill Front Seat	X	KETX1A	Accel., Triax	I.C. Sensor	3031-200	G
46	Right at Sill Front Seat	Y	KETX1B	Accel., Triax	I.C. Sensor	3031-200	G
47	Right at Sill Front Seat	Z	KETX1C	Accel., Triax	I.C. Sensor	3031-200	G
48	Right at Sill Rear Seat	X	KETX4A	Accel., Triax	I.C. Sensor	3031-500	G
49	Right at Sill Rear Seat	Y	KETX4B	Accel., Triax	I.C. Sensor	3031-500	G
50	Right at Sill Rear Seat	Z	KETX4C	Accel., Triax	I.C. Sensor	3031-500	G
51	Rear Floorpan Above Axle	X	KETX5A	Accel., Triax	I.C. Sensor	3031-500	G
52	Rear Floorpan Above Axle	Y	KETX5B	Accel., Triax	I.C. Sensor	3031-500	G
53	Rear Floorpan Above Axle	Z	KETX5C	Accel., Triax	I.C. Sensor	3031-500	G
54	Left Sill at Rear Door	Y	KEVA012	Accel., Vehicle block	I.C. Sensor	3031-500	G
55	Left Sill at Front Door	Y	KEVA010	Accel., Vehicle block	I.C. Sensor	3031-500	G
56	Left Front Door Centerline	Y	ICST004X	Accel., Triax	I.C. Sensor	3031-500	G
57	Rear Occupant Compartment	Y	KEVA013	Accel., Vehicle block	I.C. Sensor	3031-200	G
58	Left Front Door Mid-Rear	Y	ICST004Y	Accel., Triax	I.C. Sensor	3031-500	G
59	Left Front Door Upper Centerline	Y	ICST004Z	Accel., Triax	I.C. Sensor	3031-500	G
60	Rear Door Mid-Rear	Y	ICST005X	Accel., Triax	I.C. Sensor	3031-500	G
61	Rear Door Upper Centerline	Y	ICST005Y	Accel., Triax	I.C. Sensor	3031-500	G
62	B-Post Lower	Y	KEBX2A	Accel., Biax	I.C. Sensor	3031-500	G
63	B-Post Middle	Y	KEBX2B	Accel., Biax	I.C. Sensor	3031-500	G
64	A-Post Lower	Y	KEBX1A	Accel., Biax	I.C. Sensor	3031-500	G
65	A-Post Middle	Y	KEBX1B	Accel., Biax	I.C. Sensor	3031-500	G
66	Front Seat Track	Y	KEIC008Y	Single	I.C. Sensor	3031-500	G
67	Rear Seat Structure	Y	N/A	N/A	N/A	N/A	N/A
68	Vehicle CG	X	KETX2A	Accel., Triax	I.C. Sensor	3031-200	G
69	Vehicle CG	Y	KETX2B	Accel., Triax	I.C. Sensor	3031-200	G
70	Vehicle CG	Z	KETX2C	Accel., Triax	I.C. Sensor	3031-200	G

**55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Moving Deformable Barrier
2/24/05
2005 Saturn Relay 5-Door MPV**

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
71	MDB CG	X	ICST001X	Accel., Triax	I.C. Sensor	3031-500	G
72	MDB CG	Y	ICST001Y	Accel., Triax	I.C. Sensor	3031-500	G
73	MDB CG	Z	ICST001Z	Accel., Triax	I.C. Sensor	3031-500	G
74	MDB Rear Centerline	X	ICST002X	Accel., Triax	I.C. Sensor	3031-50	G
75	MDB Rear Centerline	Y	ICST002Y	Accel., Triax	I.C. Sensor	3031-50	G
76	Right Bumper Contact	N/A	T0	Contact Switch	Tapeswitch	40 oz. Grey	%