

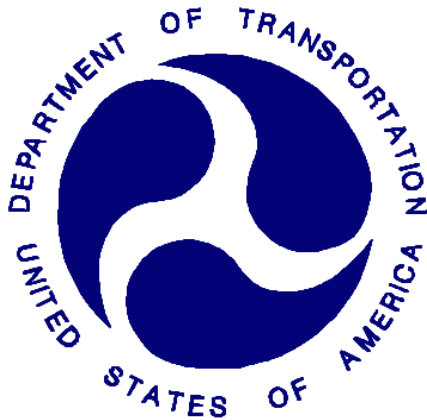
REPORT NUMBER TR-P24003-04-NC

**NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST**

**TOYOTA MOTOR CORPORATION
2004 TOYOTA HIGHLANDER
SUV**

NHTSA NUMBER: M45113

**Prepared By:
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2/26/04

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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Date: March 3, 2004

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Date of Acceptance

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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 2004 Toyota Highlander SUV 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 laboratories in Adelanto, California, on February 26, 2004. The impact velocity of the Moving Deformable Barrier was 61.95 km/h, and the outside ambient temperature at the struck (driver's) side of the vehicle was 25.6 deg. C. The target vehicle's maximum post test static crush was 331 mm located at level 3. The test vehicle's occupant performance data is as follows:																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 33%;">Measurement Description</th> <th style="width: 33%;">Driver SID/HIII</th> <th style="width: 33%;">Pass. SID/HIII</th> </tr> </thead> <tbody> <tr> <td>Left Upper Rib (LUR) G's</td> <td style="text-align: center;">32.7</td> <td style="text-align: center;">38.8</td> </tr> <tr> <td>Left Lower Rib (LLR) G's</td> <td style="text-align: center;">34.8</td> <td style="text-align: center;">48.3</td> </tr> <tr> <td>Lower Spine (T₁₂) G's</td> <td style="text-align: center;">40.4</td> <td style="text-align: center;">59.3</td> </tr> <tr> <td>Thoracic Trauma Index (TTI) G's</td> <td style="text-align: center;">38.0</td> <td style="text-align: center;">54.0</td> </tr> <tr> <td>Pelvis (PEV) G's</td> <td style="text-align: center;">58.0</td> <td style="text-align: center;">96.0</td> </tr> </tbody> </table>		Measurement Description	Driver SID/HIII	Pass. SID/HIII	Left Upper Rib (LUR) G's	32.7	38.8	Left Lower Rib (LLR) G's	34.8	48.3	Lower Spine (T ₁₂) G's	40.4	59.3	Thoracic Trauma Index (TTI) G's	38.0	54.0	Pelvis (PEV) G's	58.0	96.0		
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SECTION 1

PURPOSE and TEST PROCEDURE

1.1 PURPOSE

This Side Impact NCAP test is conducted as part of the FY' 2004 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-03-D-32005. The purpose of this test is to generate comparative side impact data on a 2004 Toyota Highlander SUV manufactured by Toyota Motor 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 and the corresponding KARCO Engineering Test Procedure KTP-214D, dated November 18, 1998. 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 2004 Toyota Highlander SUV 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 61.95 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 1916kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on February 26, 2004.

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front Driver		Left Rear (Passenger)	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	Not Deployd	N/A	N/A
Side Torso Airbag	N/A	N/A	N/A	N/A
Head Airbag	N/A	N/A	N/A	N/A
Curtain Airbag	N/A	N/A	N/A	N/A

One (1) real-time motion picture camera and eight (8) high-speed motion picture cameras were used to document the impact event. The pre-test and post-test conditions were recorded by one (1) real-time motion picture camera. 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-five (25) 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.

SECTION 2.....(CONTINUED)

2.2 GENERAL COMMENTS

The test vehicle sustained a maximum static crush of 331 mm at level 3, 1350mm rearward of the left vertical impact point. The driver SID/Hybrid III, Serial No. 274 and the passenger SID/Hybrid III, Serial No. 275 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	38.0	54.0
Peak Pelvic G's (PEV)	G's	58.0	96.0

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

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04

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

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

NHTSA No.: M45113
 Test Date: 2/26/04

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M45113	Anti-Lock Brakes	Yes
Make	Toyota	All Wheel Drive	No
Model	Highlander	Power Steering	Yes
Body Style	4 Door	Driver Front Airbag	Yes
Vin No.	JTEDP21A840011216	Driver Side Torso Airbag	No
Color	White	Driver Side Head Airbag	No
Delivery Date	2/20/2004	Driver Curtain Airbag	No
Odometer	80.0	Rear Pass. Airbag	No
Dealer	Sierra Toyota	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)	3.3	Load Limiters	Yes
Engine Placement	Transverse	Bucket Seats	Yes
Roof Rack	Yes	Air Cond.	Yes
Sunroof/T-Top	Yes	AM/Fm Cassette	Yes
Tinted Glass	Yes	Tilt Steering	Yes
Traction Control	Yes	Power Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	Yes
Rear Disc	Yes	Other	None

Does Owners Manual provide instructions for turning off automatic door locks.

Yes

Doors Locked Doors Unlocked Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Corporation	GWR (kg)	2430
Date of Manufacture	11/03	GAWR Front (kg)	1300
		GAWR Rear (kg)	1340

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Bench	
Number of Occupants	2	3	2	7
Capacity Weight (VCW) (kg)				526
Cargo Weight (RCLW) (kg)				49

DATA SHEET NO. 1.....(continued)

GENERAL TEST AND VEHICLE PARAMETER DATA

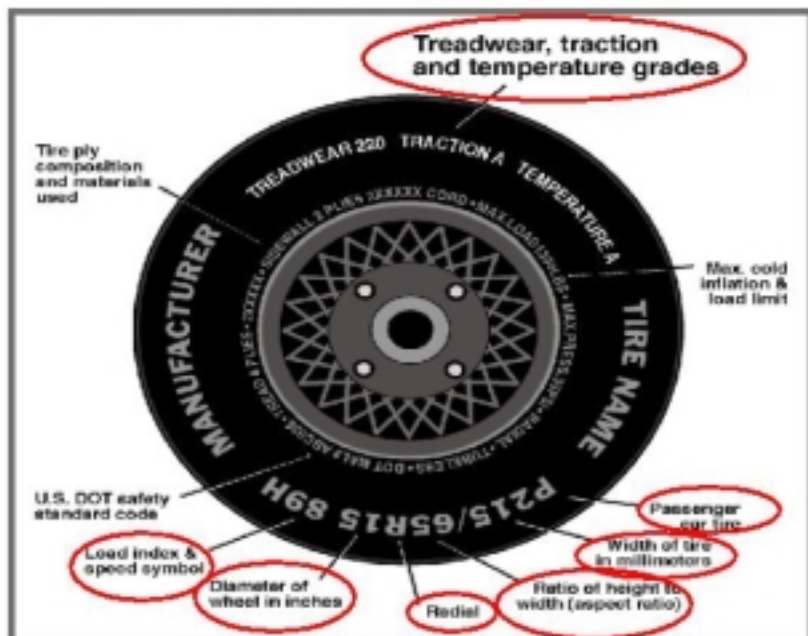
Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04

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



TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpg)	308	308
Cold Pressure (kpg)	210	210
Recommended Tire Size	P225/70R16	P225/70R16
Tire Size on Vehicle	P225/70R16	P225/70R16
Tire Manufacturer	Toyo	Michelin
Treadwear	300	300
Traction	B	B
Temperature Grades	B	B
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	101 S	101 S
Tire Material	Polyester/Steel/Nylon	Polyester/Steel/Nylon
DOT Safety Code Right	N3WA97H4303	N3WA97H4303
DOT Safety Code Left	N3WA97H4303	N3WA97H4303

DATA SHEET NO. 1.....(continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**Test Vehicle: 2004 Toyota Highlander SUVNHTSA No.: M45113Test Program: 55/28 km/h 90 Deg. Side Impact NCAPTest Date: 2/26/04**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UWW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	496	364		562	436	
Right	kg	491	363		522	396	
Ratio	%	57.6	42.4		56.6	43.4	
Totals	kg	987	727	1714	1084	832	1916

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UWW)	kg	1714
Weight of 2 P572 ATD's	kg	161
Rated Cargo/Luggage Wt. (RCLW)	kg	49
Calculated Vehicle Target Wt. (TVTW)	kg	1924

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	798	806	806	810	1153
As Tested	mm	786	802	789	796	1182
Fully Loaded	mm	786	801	776	789	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2720
Total Vehicle Length at Left Side	mm	3265
Total Vehicle Length at Centerline	mm	4695
Total Vehicle Length at Right Side	mm	3265
Weight of Ballast In Cargo Area	kg	0
Amount of Stoddard Solvent in Fuel Tank	Liters	67.2
1/3 of Usable Capacity	Liters	24.1

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2720
Target Impact Point Aft of Front Axle	mm	420
Actual Impact Point Aft of Front Axle	mm	423

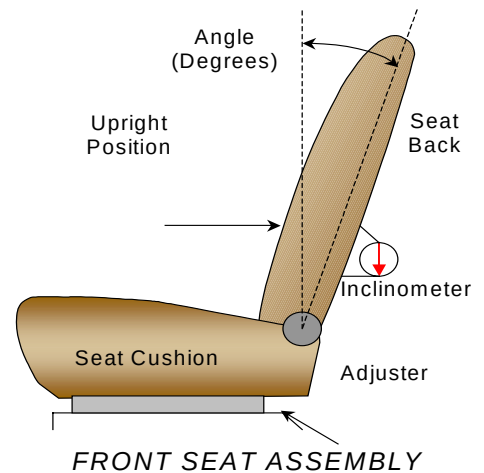
DATA SHEET NO. 1.....(continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2004 Toyota Highlander SUV
Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

NHTSA No.: M45113
Test Date: 2/26/04

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturers designated angle. The procedure is as follows: A special application tool with pointed probes is inserted through the fabric to make contact with the rigid portion of the lower seat frame assembly, approximately 13 inches above the pivot point of the seat back. An inclinometer is placed against the flat surface of the tool and the seat back angle is measured directly from the dial face.

**SEAT BACK ANGLES**

	Deg.
Driver Seat Back Angle	3.0
Rear Seat Back Angle	0.0

SEAT FORE/AFT POSITIONS

The Drivers seat is adjustable. The fore/aft position is set to the middle.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	240 mm	120 mm
Rear Seat	9	5

SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position.

SEAT BELT UPPER ANCHORAGE

	Total # of Positions	Placed in Position #
Driver Seat	5	3
Rear Seat	0	0

DATA SHEET NO. 1.....(continued)**GENERAL TEST AND VEHICLE PARAMETER DATA**

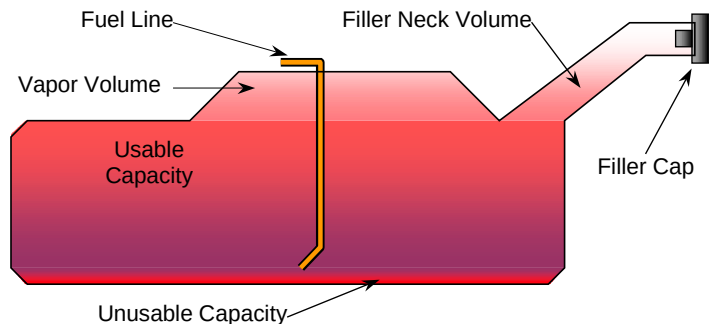
Test Vehicle: 2004 Toyota Highlander SUV
Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

NHTSA No.: M45113
Test Date: 2/26/04

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	72.3
Usable Capacity of "Optional" Tank	N/A
Usable Capacity used for FMVSS 301	66.51 to 67.96
Actual Amount of Solvent used	67.2
1/3 of Usable Capacity	24.1

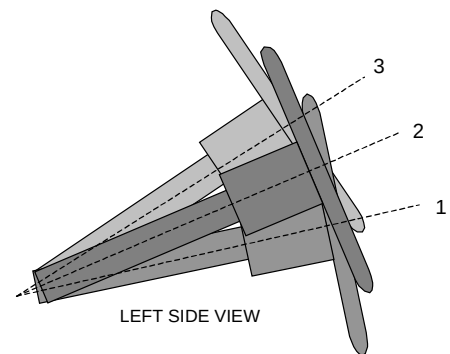
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately three (3) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender.



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
Lowermost position No. 1	26.0
Geometric center position No. 2	27.6
Uppermost position No. 3	29.3

DATA SHEET NO. 2**TEST VEHICLE SUMMARY OF RESULTS**Test Vehicle: 2004 Toyota Highlander SUVNHTSA No.: M45113Test Program: 55/28 km/h 90 Deg. Side Impact NCAPTest Date: 2/26/04**TEST VEHICLE WEIGHTS**

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	496	364		562	436	
Right	kg	491	363		522	396	
Ratio	%	57.6	42.4		56.6	43.4	
Totals	kg	987	727	1714	1084	832	1916

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	167	361
Level 2	Occupant H-Point	mm	311	696
Level 3	Mid Door	mm	331	739
Level 4	Window Sill	mm	245	1057
Level 5	Window top	mm	57	1585
N/A	Maximum Penetration	mm	331	

INSTRUMENTATION

Driver SID/Hybrid III Accelerometers	20
Passenger SID/Hybrid III Accelerometers	20
Vehicle Structure Accelerometers	25
MDB Accelerometers	5
Total	70

CAMERA COVERAGE

High Speed, Vehicle On-Board	3
High Speed, Off-Board	5
High Speed, MDB On-Board	0
Real Time, Panning	1
Total	9

DATA SHEET NO. 3**MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS**Test Vehicle: 2004 Toyota Highlander SUVNHTSA No.: M45113Test Program: 55/28 km/h 90 Deg. Side Impact NCAPTest Date: 2/26/04**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	61.95
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.97
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.5

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE (mm)

Vertical Location			From Centerline		Max. Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	208
B	Top of Bumper	533	120	Right	120
C	Mid Level	686	94	Right	94
D	Top of Stack	813	146	Right	146

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	2
High Speed Cameras	8

DATA SHEET NO. 4**POST TEST OBSERVATIONS**Test Vehicle: 2004 Toyota Highlander SUVNHTSA No.: M45113Test Program: 55/28 km/h 90 Deg. Side Impact NCAPTest Date: 2/26/04**TEST DUMMY INFORMATION AND CONTACT POINTS**

Description	Front Seat SID/HIII	Rear Seat SID/HIII
Dummy Type / Serial No.	P572F, SID / No. 274	P572F, SID / No. 275
Head Contact	None	Window/C-Pillar
Upper Torso Contact	Panel	Panel
Lower Torso Contact	Panel/Armrest	Panel/Armrest
Left Knee Contact	Panel	Panel/Right Knee
Right Knee Contact	None	Left Knee

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Remained closed/latched, inoperable	Remained closed/latched, inoperable
Right Side Door Opening	Remained closed/latched, operable	Remained closed/latched, 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 separation as noted in photos.
Sill Separation	No apparent visible failure
Windshield Damage	Glazing cracks on struck side only
Window Damage	Left front window intact, rear left window broke
Other Notable Effects	No other significant items to note

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	Not Deployed	N/A	N/A
Side Airbag	No	N/A	No	N/A
Head Airbag	No	N/A	No	N/A
Curtain Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	N/A	No	N/A
Seat Belt Load Limiter	Yes	N/A	No	N/A

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	3 right
Vertical Offset	mm	+/- 20	-6 below

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

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

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

Test Date: 2/26/04

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	32.7	41.9	-13.0	31.3	38.8	58.1	-8.3	86.9
Lower Rib (LLR)	Y	G's	34.8	24.4	-13.4	30.0	48.3	46.3	-7.1	87.5
Lower Spine (T ₁₂)	Y	G's	40.4	43.8	-4.6	89.4	59.3	46.3	-11.6	68.1
Pelvis (PEV)	Y	G's	58.0	38.8	-10.2	56.3	96.4	38.8	-15.1	67.5

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

Location	Driver				Passenger			
	LLR	T ₁₂	TTI(g)	PEV(g)	LLR	T ₁₂	TTI(g)	PEV(g)
Primary Rib, Spine, and Pelvis	34.772	40.378	38	58	48.333	59.290	54	96

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	32.2	41.9	-11.7	31.3	39.2	57.5	-8.3	86.3
Lower Rib (LLR)	Y	G's	34.3	24.4	-13.7	30.0	48.4	45.6	-7.5	86.9
Lower Spine (T ₁₂)	Y	G's	40.5	43.8	-4.8	89.4	59.3	46.3	-11.4	68.1
Pelvis (PEV)	Y	G's	57.7	38.8	-10.2	56.9	96.4	38.8	-14.8	67.5

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

Location	Driver				Passenger			
	LLR	T ₁₂	TTI(g)	PEV(g)	LLR	T ₁₂	TTI(g)	PEV(g)
Redundant Rib, Spine, and Pelvis	34.324	40.546	37	58	48.413	59.325	54	96

Positive Acceleration Polarities:

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

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

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

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

Test Date: 2/26/04

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	1.3	36.8	-10.7	84.7	87.9	178.9	-19.5	95.7
Head CG	Y	G's	15.5	83.5	-4.0	30.8	38.7	94.1	-22.2	179.1
Head CG	Z	G's	33.3	64.2	-5.1	20.3	66.0	77.3	-7.3	56.5
Head CG Resultant	N/A	G's	35.2	64.2			92.6	178.9		

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	108.8	53.5	89.5	24.7	506.6	69.6	105.6	45.6

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	1.3	36.9	-10.7	90.3	86.6	178.8	-19.4	95.5
Head CG	Y	G's	15.4	83.7	-4.0	31.0	38.6	94.0	-21.9	179.1
Head CG	Z	G's	33.1	64.4	-4.8	20.4	66.0	76.9	-6.9	56.4
Head CG Resultant	N/A	G's	35.0	64.4			90.7	178.9		

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	108.0	53.7	89.7	24.6	501.5	69.5	105.5	45.4

UPPER NECK PEAK FORCES AND MOMENTS

Location	Axis	Units	Driver				Passenger			
			Max	Time	Min	Time	Max	Time	Min	Time
Neck Force	X	Newtons	35.8	20.8	-516.4	91.7	45.2	60.3	-722.9	77.6
Neck Force	Y	Newtons	547.2	82.5	-121.4	30.5	790.4	96.9	-295.4	51.0
Neck Force	Z	Newtons	1355.4	61.7	-241.4	20.5	2656.0	77.2	-256.6	105.6
Neck Force Resultant	N/A	Newtons	1499.2	61.8			2760.3	77.2		
Neck Moment	X	N•m	49.4	75.5	-34.4	50.1	45.7	82.7	-65.8	58.9
Neck Moment	Y	N•m	30.1	87.9	-28.0	59.4	19.1	104.3	-36.6	74.3
Neck Moment	Z	N•m	15.8	87.3	-7.4	35.6	19.2	106.5	-14.9	200.0
Neck Moment Resultant	N/A	N•m	55.1	86.3			66.7	58.9		

DATA SHEET NO. 6

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

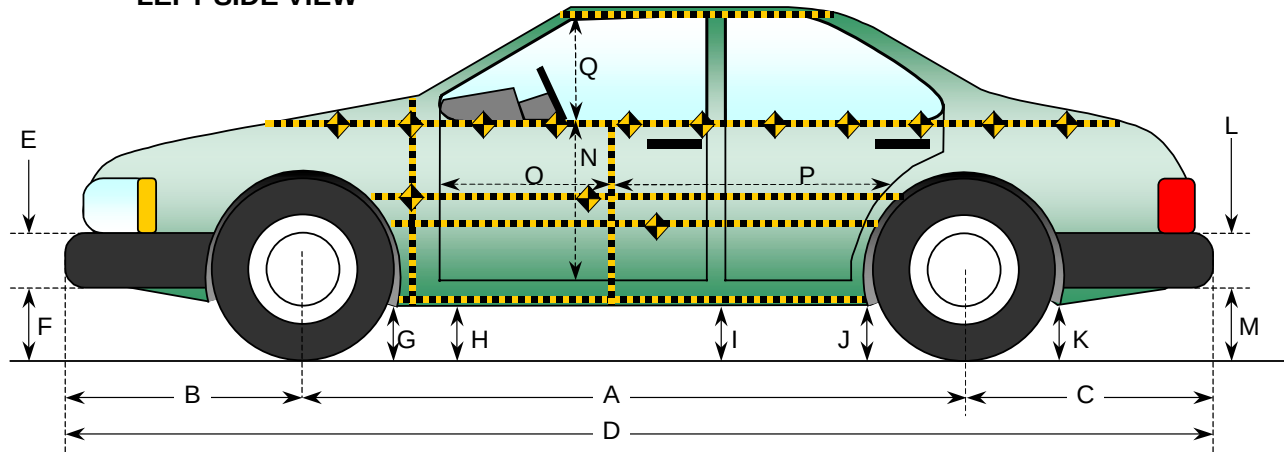
Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04

LEFT SIDE VIEW



VEHICLE PRE AND POST TEST MEASUREMENT INFORMATION

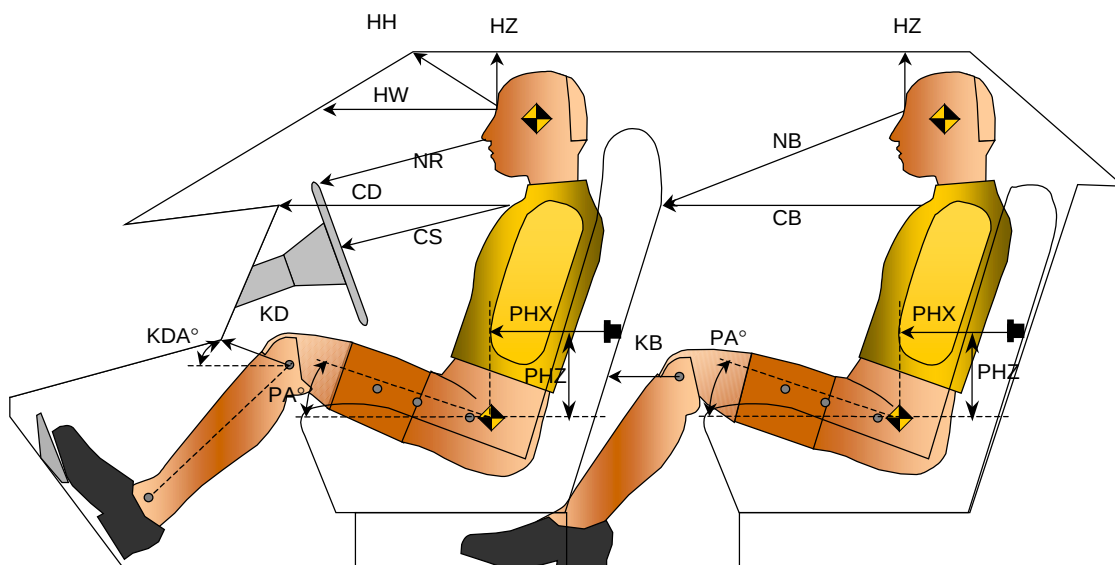
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2720	2700	-20
B	Front Axle to FSOV	925	935	10
C	Rear Axle to RSOV	1048	1060	12
D	Total Length at Centerline	4695	4700	5
E	Front Bumper Thickness	425	420	-5
F	Front Bumper Bottom to Ground	299	321	22
G	Sill Height at Front Wheel Well	199	246	47
H	Sill Height at Front Door Leading Edge	273	321	48
I	Sill Height at "B" Pillar	286	326	40
J1	Sill Height at Rear Wheel Well	243	285	42
J2	Pinch Weld Height at Rear Wheel Well	266	321	55
K	Sill Height aft of Rear Wheel Well	233	281	48
L	Rear Bumper Thickness	395	377	-18
M	Rear Bumper Bottom to Ground	263	408	145
N	Sill Height to Window Bottom Sill	724	740	16
O	Front Door Leading Edge to Impact CL	750	727	-23
P	Rear Door Trailing Edge to Impact CL	1300	1275	-25
Q	Front Window Opening	442	428	-14
R	Right Side Length	3265	3262	-3
S	Left Side Length	3265	3216	-49
T	Vehicle Width at "B" Post	1815	1620	-195

DATA SHEET NO. 7

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

NHTSA No.: M45113
 Test Date: 2/26/04



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length(mm)	Angle	Length(mm)	Angle
HH		Head to Header	425	19		
HW		Head to Windshield	616	0		
HZ	HZ	Head to Roof	202		182	90
NR	NB	Nose to Rim/Nose to Seatback	466	19	635	22
CD	CB	Chest to Dash or Seatback	540	4	560	5
CS		Chest to Steering Wheel	275	0		
KDL	KBL	Left Knee to Dash or Seatback	118	31	245	0
KDR	KBR	Right Knee to Dash or Seatback	140		250	
PA	PA	Pelvic Angle		25		23
PHX	PHX	H-Point to Striker (X-Axis)	282		438	
PHZ	PHZ	H-Point to Striker (Z-Axis)	143		318	

DATA SHEET NO. 8

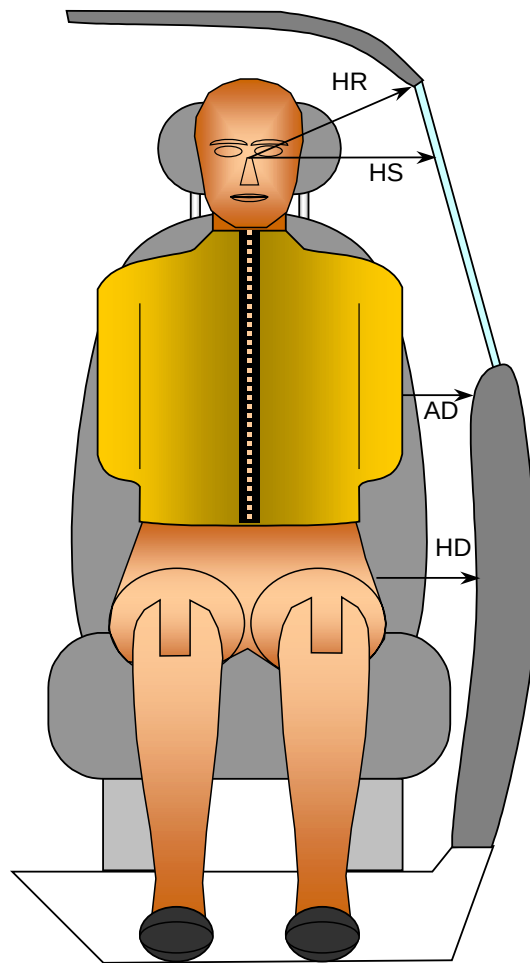
SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04



FRONT VIEW OF DUMMY

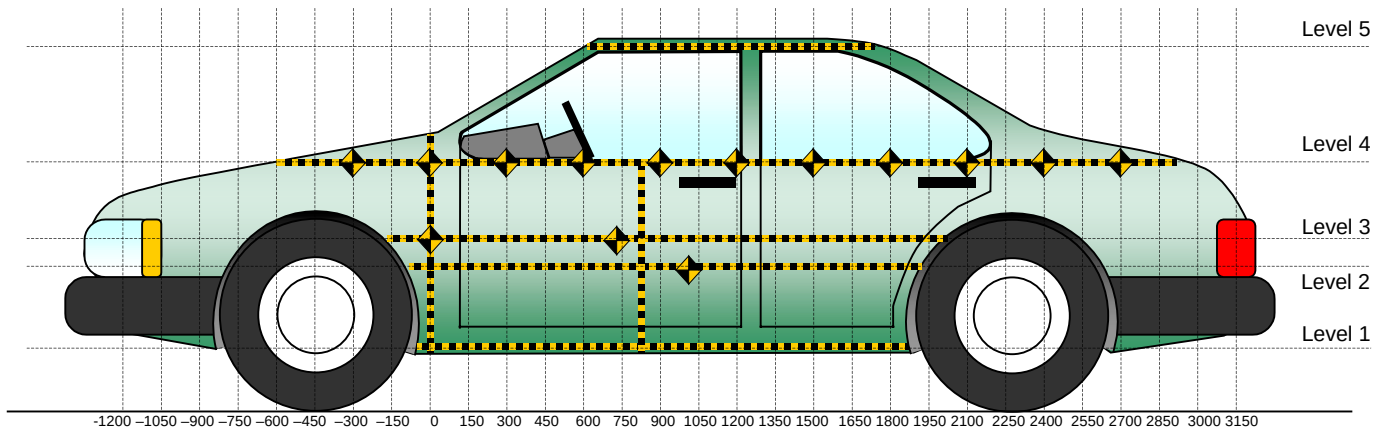
LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	245	235
HS	Head to Side Window	mm	325	340
AD	Arm to Door	mm	95	105
HD	H-Point to Door	mm	178	170

DATA SHEET NO. 9
VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

NHTSA No.: M45113
 Test Date: 2/26/04



All Measurements Shown in mm

LEFT SIDE VIEW

Measurements are taken with vehicle in the as tested condition.

Measurements taken 900mm right of impact reference.

All measurements below in mm.

Level	Measurement Description	Height Above Ground
1	Sill Top	361
2	Occupant H-Point	696
3	Mid Door	739
4	Window Sill	1057
5	Window Top	1585

DATA SHEET NO. 10

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04

	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				676					696					20	
-150				666					691					25	
0		591	591	651			694	711	686			103	120	35	
150	676	596	598	653		836	771	800	700		160	175	202	47	
300	690	595	601	644		851	826	848	716		161	231	247	72	
450	690	590	601	640		856	840	865	728		166	250	264	88	
600	690	588	600	637		854	848	876	742		164	260	276	105	
750	689	588	600	632	876	856	854	886	767	906	167	266	286	135	30
900	689	596	600	631	841	855	863	894	772	898	166	267	294	141	57
1050	689	586	600	631	868	844	866	896	796	894	155	280	296	165	26
1200	692	586	600	631	868	851	872	898	836	898	159	286	298	205	30
1350	688	588	603	631	868	849	891	934	876	899	161	303	331	245	31
1500	690	589	606	633	868	834	900	933	871	894	144	311	327	238	26
1650	690	590	602	634	869	824	891	923	796	895	134	301	321	162	26
1800	676	591	599	634	874	761	871	846	759	886	85	280	247	125	12
1950		598	595	630	876		736	771	696	891		138	176	66	15
2100			592	641	881			699	661	895			107	20	14
2250				646	894				690	896				44	2
2400				651	894				681	900				30	6
2550				666					670					4	
2700				669					661					-8	
2850															
3000															

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

DATA SHEET NO. 10.....(CONTINUED)

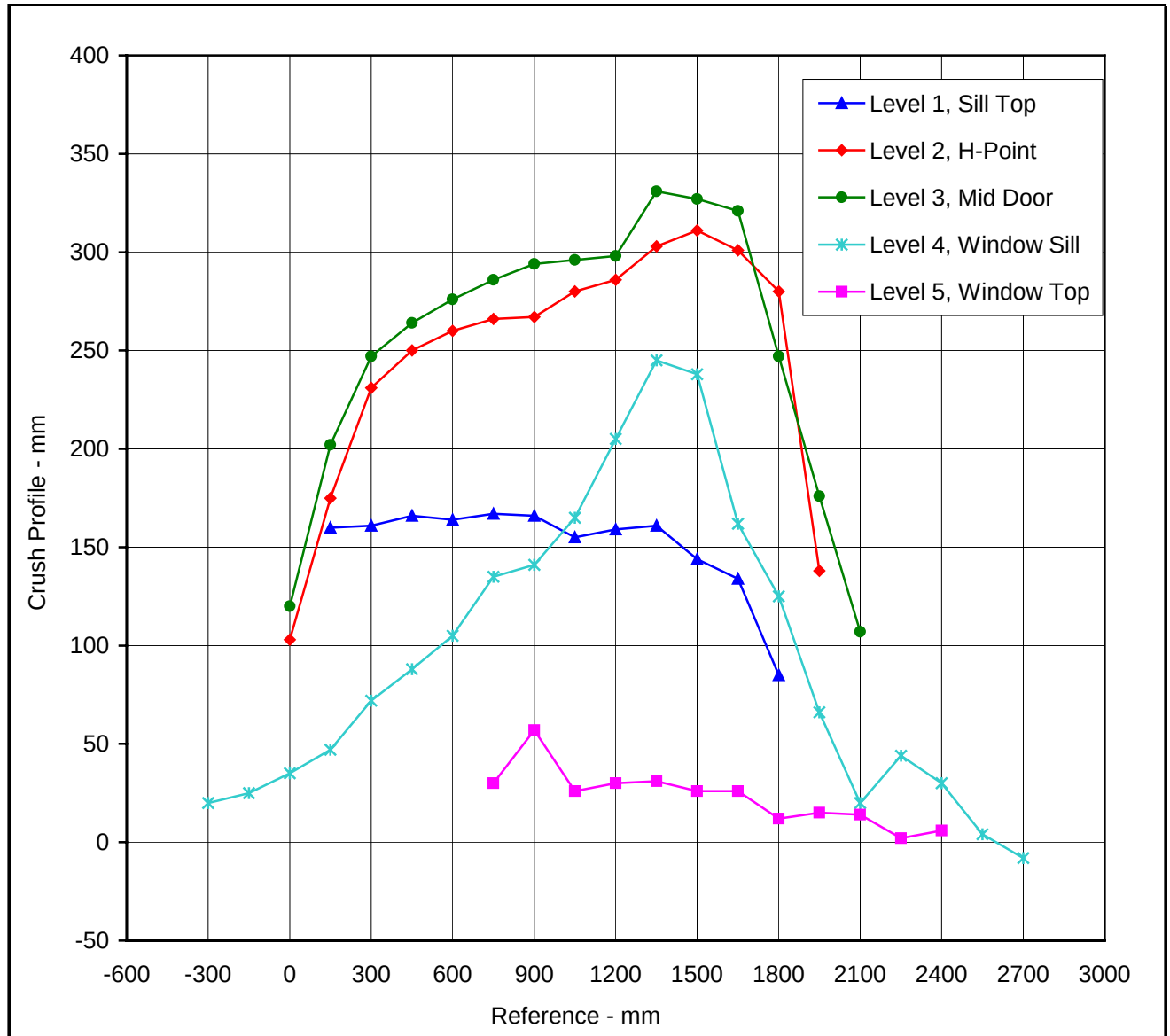
VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04



	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	167	311	331	245	57
Distance from Impact	mm	750	1500	1350	1350	900

DATA SHEET NO. 11

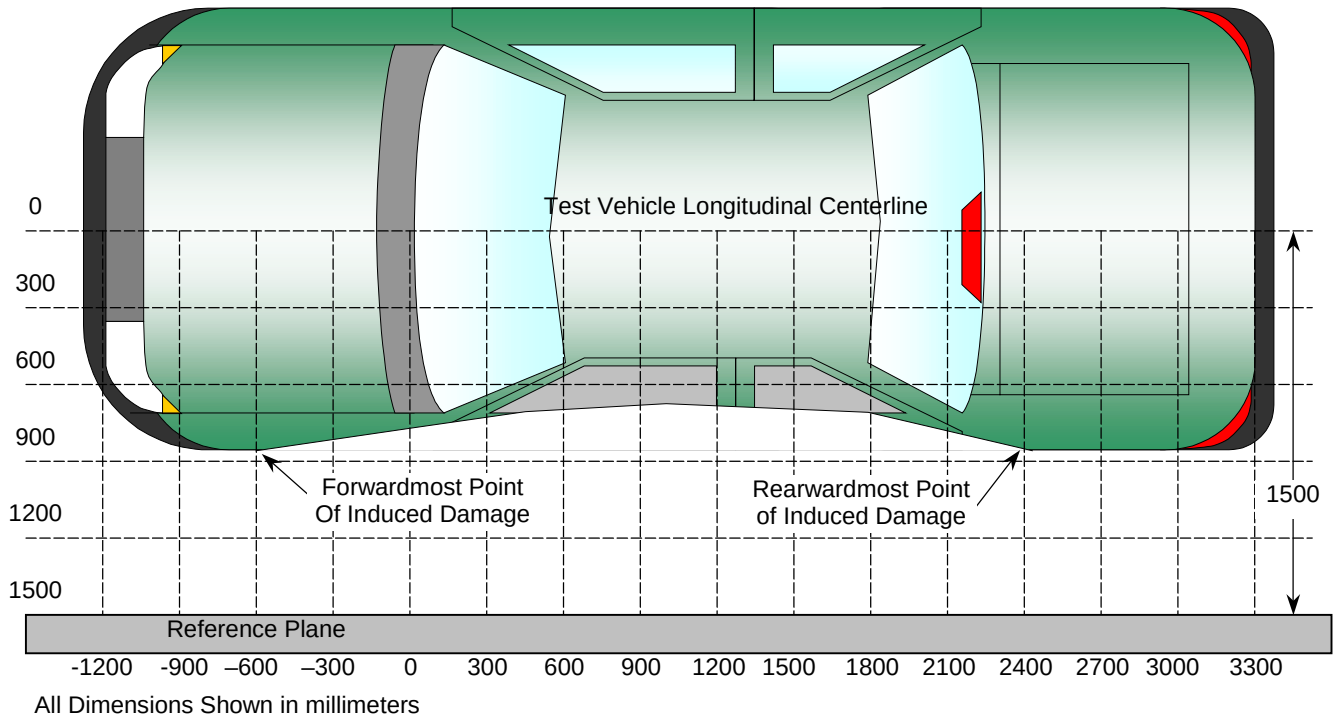
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04



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	4	676	696	20
2	300	3	601	848	247
3	900	3	600	894	294
4	1500	3	606	933	327
5	2100	3	592	699	107
6	2700	4	669	661	-8

DATA SHEET NO. 12

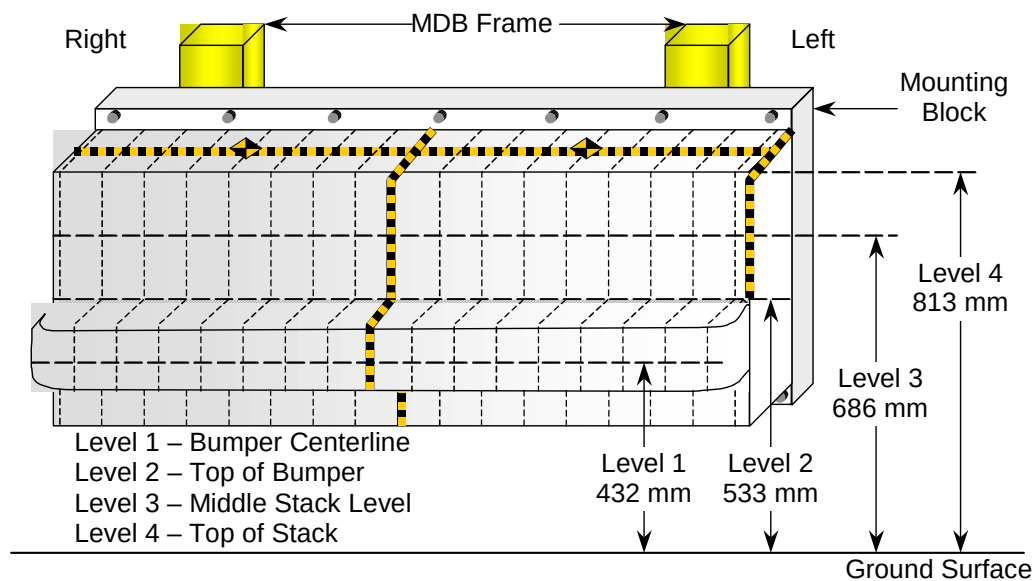
DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04



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	176	145	133	128	128	130	132	133	134	140	143	145	148	158	170	188	208
2	120	86	70	66	66	66	66	66	68	66	60	56	68	76	81	91	106
3	94	86	48	36	30	26	21	20	18	21	31	32	16	14	16	28	56
4	146	109	68	63	51	41	28	31	36	47	55	36	5	-4	4	22	44

All Dimensions in mm

DATA SHEET NO. 13

VEHICLE ACCELEROMETER LOCATION AND DATA SUMMARY

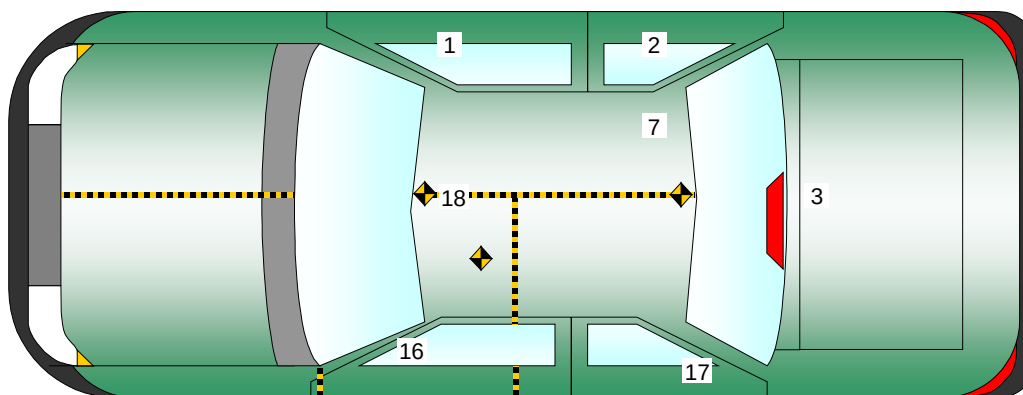
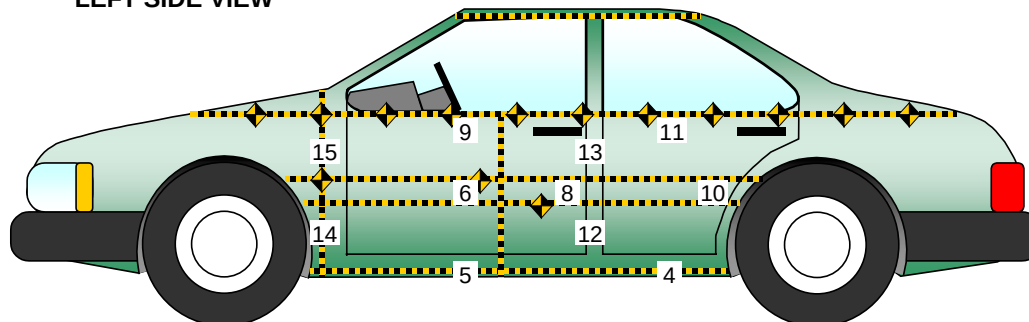
Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04

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: 2004 Toyota Highlander SUV

NHTSA No.: M45113

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

Test Date: 2/26/04

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	2860	700	430	X	5.6	72.8	-9.2	20.4
					Y	27.7	17.8	-1.7	148.1
					Z	3.2	59.6	-6.7	9.6
					RES	27.9	17.7		
2	Right Sill at Rear Seat	1950	710	420	X	3.3	59.0	-6.3	10.0
					Y	26.7	6.8	-1.4	130.8
					Z	4.9	63.0	-7.9	20.7
					RES	27.1	6.8		
3	Rear Floorpan Above Axle	570	600	531	X	4.1	60.7	-5.8	13.8
					Y	25.7	20.6	-2.8	81.7
					Z	4.1	97.9	-8.2	25.4
					RES	25.9	20.7		
4	Left Sill at Rear Door	2000	-760	270	Y	92.3	7.6	-77.5	12.0
5	Left Sill at Front Door	2750	-760	260	Y	47.6	7.0	-55.3	20.4
6	Front Door Centerline	2710	-815	820	Y	227.5	17.7	-121.9	22.0
7	Rt. Rear Occ. Compartment	2200	360	320	Y	33.5	16.2	-2.2	21.6
8	Front Door Mid-Rear	2390	-810	750	Y	0.0	0.0	0.0	0.0
9	Front Door Upper Centerline	2730	-810	950	Y	165.5	17.2	-130.5	22.4
10	Rear Door Mid-Rear	1610	-800	830	Y	250.8	18.4	-110.3	24.4
11	Rear Door Upper Centerline	1820	-810	920	Y	188.7	15.7	-104.8	27.8
12	B-Post Lower	2230	-720	760	Y	145.8	6.9	-61.0	17.7
13	B-Post Middle	2230	-730	1030	Y	101.3	13.0	-40.0	21.6
14	A-Post Lower	3330	-860	650	Y	71.5	11.0	-39.2	21.5
15	A-Post Middle	3335	-860	880	Y	41.1	10.0	-10.2	23.0
16	Front Seat Track	2740	-610	460	Y	91.2	14.8	-77.2	19.3
17	Rear Seat Structure				Y				
18	Vehicle CG	2940	225	310	X	2.6	56.4	-9.0	13.9
					Y	27.0	17.6	-1.6	177.6
					Z	21.0	14.7	-15.7	19.0
					RES	29.1	18.3		

1.) Not installed

2.) Channel failed, no data

3.) Channel failed at 37.7 msec.

DATA SHEET NO. 14
MDB ACCELEROMETER LOCATION AND DATA SUMMARY

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

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

Test Date: 2/26/04

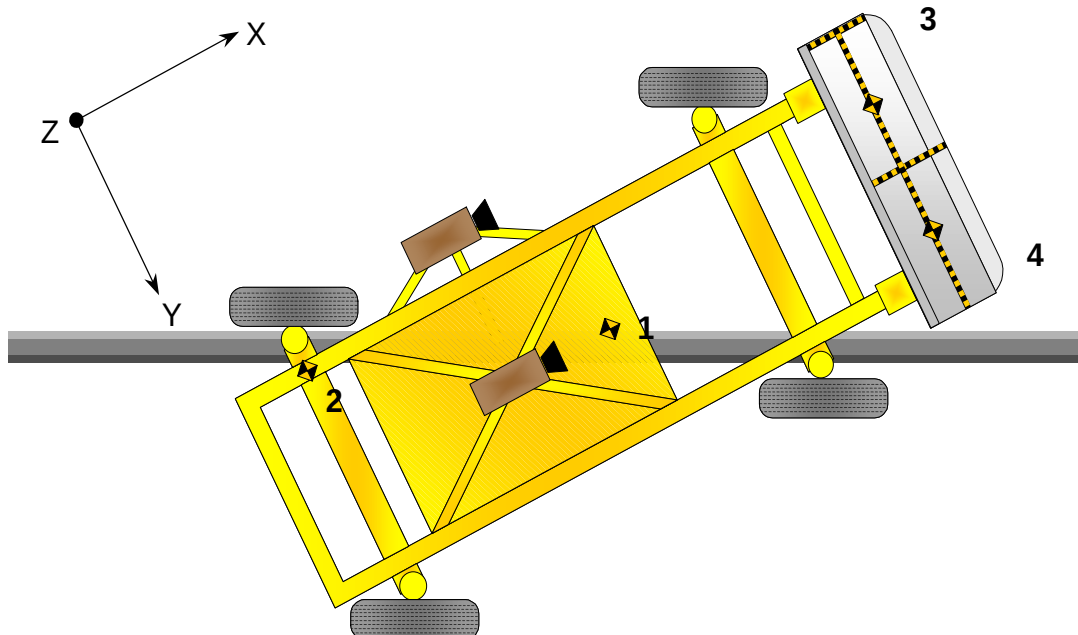
MDB ACCELEROMETER PEAK DATA AND LOCATIONS

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	5.3	151.6	-23.3	38.5
					Y	3.4	135.2	-7.4	29.5
					Z	19.7	112.6	-25.7	102.6
					RES	25.7	102.6		
2	MDB Rear	-2642	-593	608	X	2.7	88.8	-23.7	35.1
					Y	4.3	84.0	-6.1	23.3

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.	99.9	29.2	50.0	4.6



DATA SHEET NO. 15

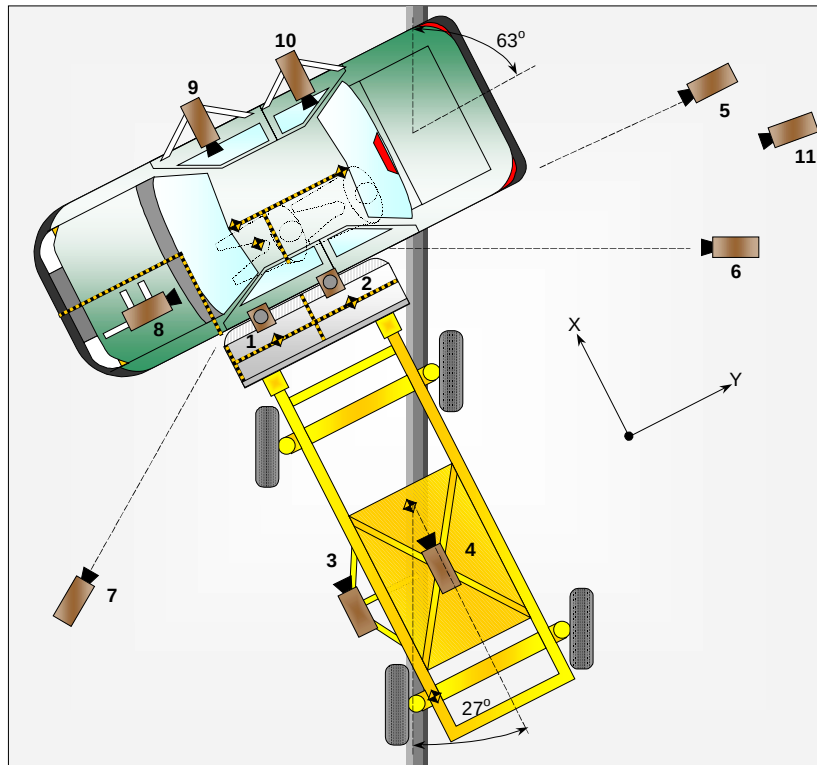
HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04



No.	Camera View	Location (mm)			Angle (deg.)	Lens (mm)
		X	Y	Z		
1	Real Time	22860	3658	1727	5	17-70
2	Overhead Overall	2438	609	5486	90	8
3	Overhead Close-Up	1676	-1067	5486	90	35
4	Impact Point	0	-2134	1143	7	13
5	Side Overall	838	-3912	1829	11	13
6	Rear	15545	228	1371	1	35-80
7	Left Rear	16459	-7188	939	1	80
8	Left Front	-4775	-2666	1473	7	13
8B	Left Front	-5080	-3531	1524	8	17
9	Driver Front	-381	483	1372	20	19
10	Driver Side	864	1219	1118	5	6
11	Rear Passenger	1676	1219	1118	5	6

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

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Vehicle: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04

Test Time: 11:34 AM

Temperature: 25.6 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

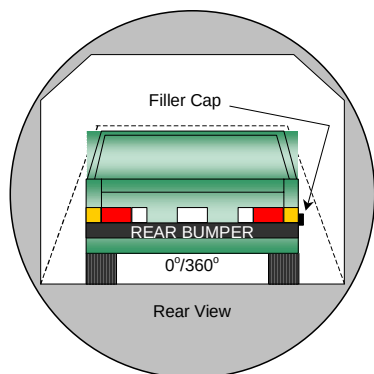
FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2004 Toyota Highlander SUV

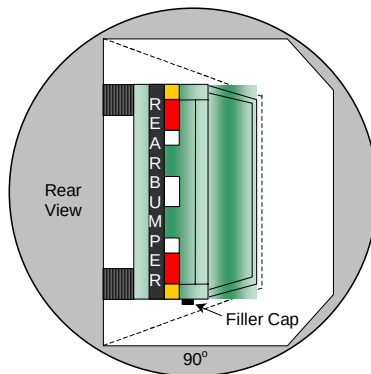
NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

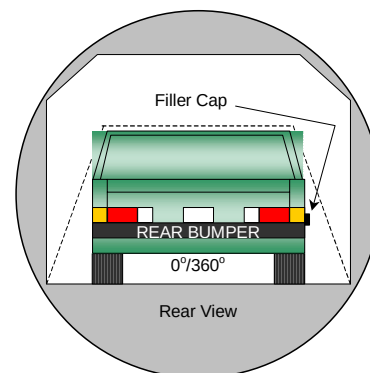
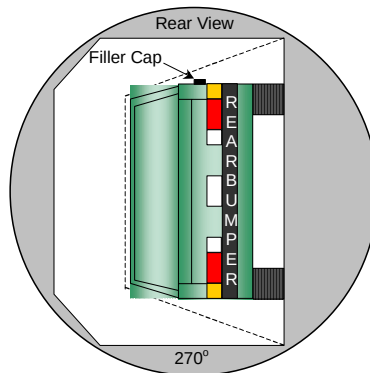
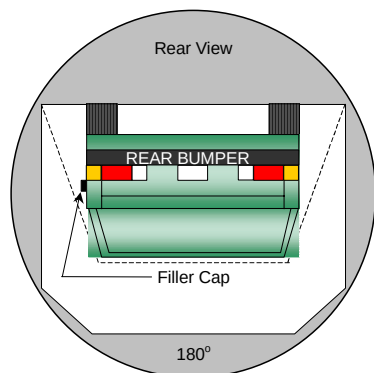
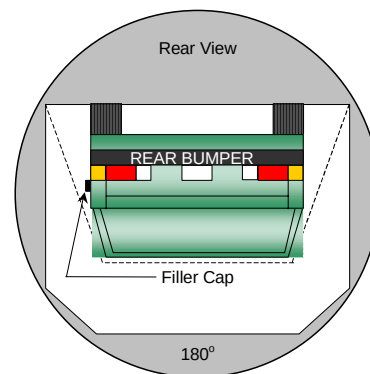
Test Date: 2/26/04



0° TO 90°



90° TO 180°



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: 2004 Toyota Highlander SUV

NHTSA No.: M45113

Test Program: 55/28 km/h 90 Deg. Side Impact NCAP

Test Date: 2/26/04

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	83	300	383
90° to 180°	78	300	378
180° to 270°	80	300	380
270° to 360°	76	300	376

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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Figure A-1: Left Front, as Received



Figure A-2: Right Rear, as Received

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MFD. BY: TOYOTA MOTOR CORPORATION

11/03

GVWR: 2430KG (5360LB)

GAWR: FRT. 1300KG (2865LB) WITH P225/70R16 TIRES.

16X6 1/2JJ RIMS, AT 210KPA (30PSI) COLD.

RR. 1340KG (2950LB) WITH P225/70R16 TIRES.

16X6 1/2JJ RIMS, AT 210KPA (30PSI) COLD.

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

JTEDP21A840011216 MPV



C/TR: 040/FA13

MCU23L-BRANKA

A/TM: -04A/U151E

MADE IN JAPAN

927

J

Figure A-3: Vehicle Certification Label



TIRE AND LOADING INFORMATION

SEATING CAPACITY: TOTAL 7
FRONT 2: REAR 5

The combined weight of occupants
and cargo should never exceed 526 kg or 1159 lbs.

ORIGINAL TIRE SIZE	COLD TIRE INFLATION PRESSURE	
P225/70R16	FRONT	210kPa, 30PSI
	REAR	210kPa, 30PSI

SEE OWNER'S MANUAL FOR
ADDITIONAL INFORMATION

48190

INFORMATION SUR LES PNEUS ET LE CHARGEMENT

NOMBRE DE PLACES ASSISES : TOTAL 7
AVANT 2 : ARRIÈRE 5

Le poids total des occupants et du chargement ne
doit jamais être supérieur à 526 kg ou 1159 lb.

DIMENSION DES PNEUS D'ORIGINE	PRESSION DE GONFLAGE À FROID	
P225/70R16	AVANT	210kPa, 30PSI
	ARRIÈRE	210kPa, 30PSI

POUR DE PLUS AMPLES INFORMATIONS,
VOIR LE MANUEL DU PROPRIÉTAIRE

4 D

MFD
GVW
GAW

THIS
VEH
THE



C/TR
A/TN

Figure A-4: Vehicle Tire Label

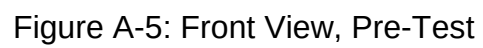




Figure A-6: Front View, Post-Test



Figure A-7: Left Front $\frac{3}{4}$ View, Pre-Test



Figure A-8: Left Front 3/4 View, Post-Test



Figure A-9: Left (Impacted) Side View, Pre-Test



Figure A-10: Left (Impacted) Side View, Post-Test



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



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



Figure A-13: Rear View, Pre-Test



Figure A-14: Rear View, Post-Test



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



Figure A-16: Right Rear 3/4 View, Post-Test



Figure A-17: Right Side View, Pre-Test



Figure A-18: Right Side View, Post-Test



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



Figure A-20: Right Front 3/4 View, Post-Test



Figure A-21: Overhead Overall View, Pre-Test



Figure A-22: Overhead Overall View, Post-Test



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



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



Figure A-25: Impact Point Target Set-up, Pre-Test

1111 AC 1
/ 26 / 04



Figure A-26: Impact Point Target, Post-Test



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



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



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

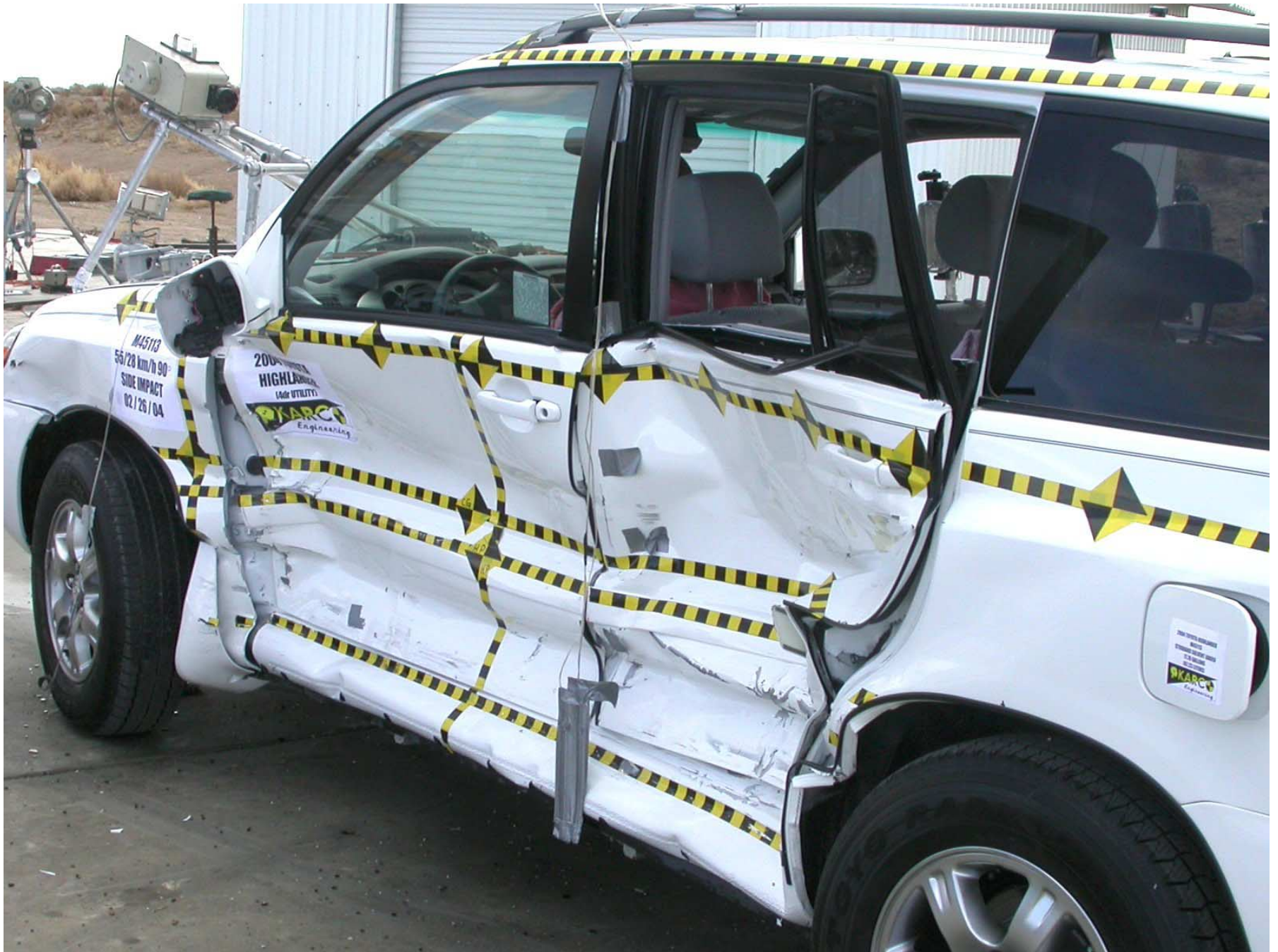


Figure A-30: Rear ¾ View of Left Side Doors, Post-Test



Figure A-31: Left Front Door Closed, Pre-Test

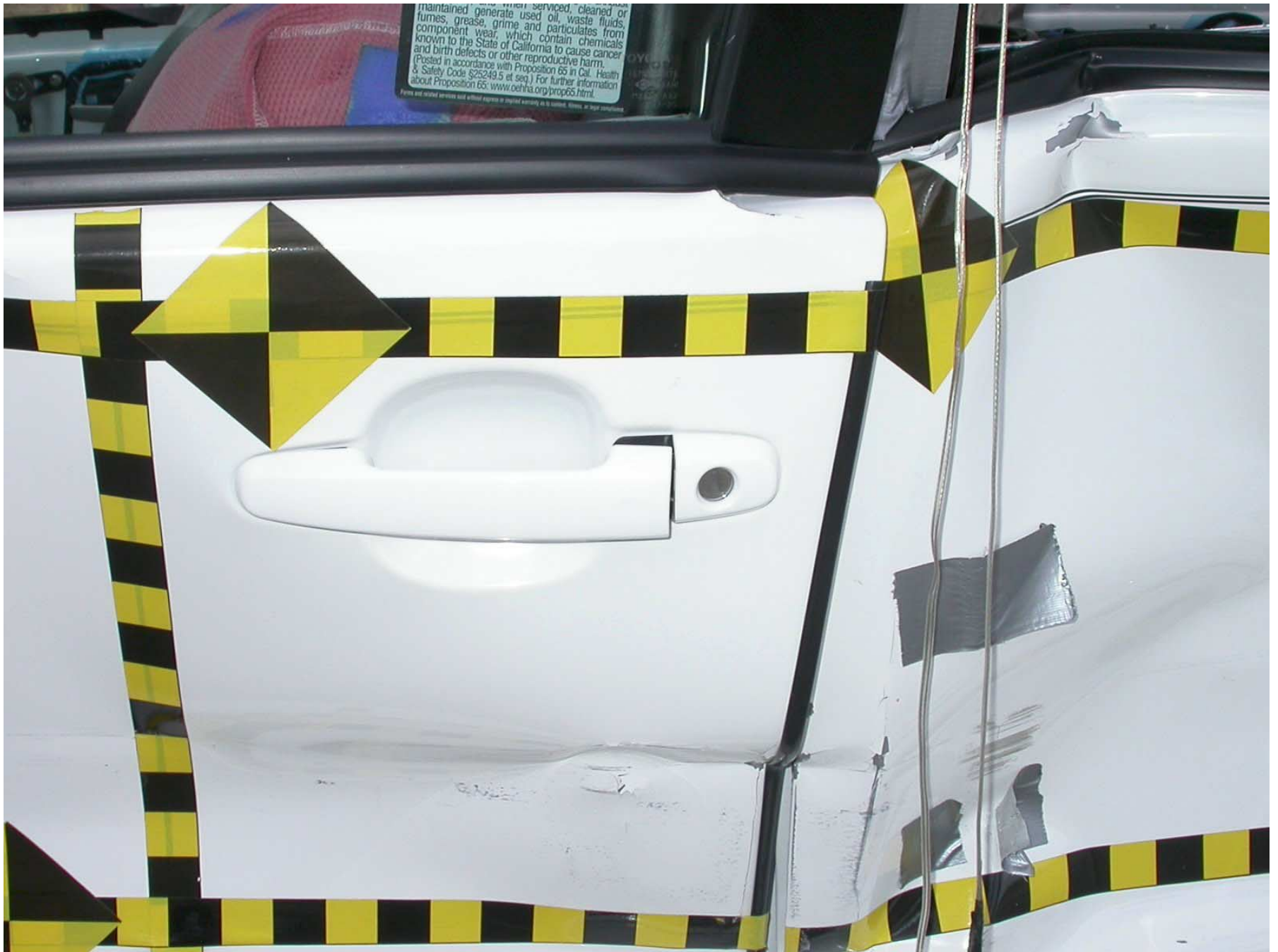


Figure A-32: Left Front Door Closed, Post-Test



Figure A-33: Left Rear Door Closed, Pre-Test



Figure A-34: Left Rear Door Closed, Post-Test



Figure A-35: Driver Dummy Left Side with Door Open, Pre-Test



Figure A-36: Driver Dummy Left Side, Pre-test



Figure A-37: Driver Dummy Left Side, Post-Test



Figure A-38: Driver Dummy Clearance, Pre-Test



Figure A-39: Driver Dummy Clearance, Post-Test



Figure A-40: Driver Dummy Inside View, Pre-Test



Figure A-41: Driver Dummy Inside View, Post-Test



Figure A-42: Driver Door Inside View, Pre-Test



Figure A-43: Driver Dummy Contact Points Inside View, Post-Test



Figure A-44: Passenger Dummy Left Side with Door Open, Pre-Test



Figure A-45: Passenger Dummy Left Side, Pre-Test



Figure A-46: Passenger Dummy Left Side, Post-Test



Figure A-47: Passenger Dummy Clearance, Pre-Test



Figure A-48: Passenger Dummy Clearance, Post-Test



Figure A-49: Passenger Dummy Inside View, Pre-Test



Figure A-50: Passenger Dummy Inside View, Post-Test



Figure A-51: Passenger Door Inside View, Pre-Test



Figure A-52: Passenger Dummy Contact Points Inside View, Post-Test



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



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

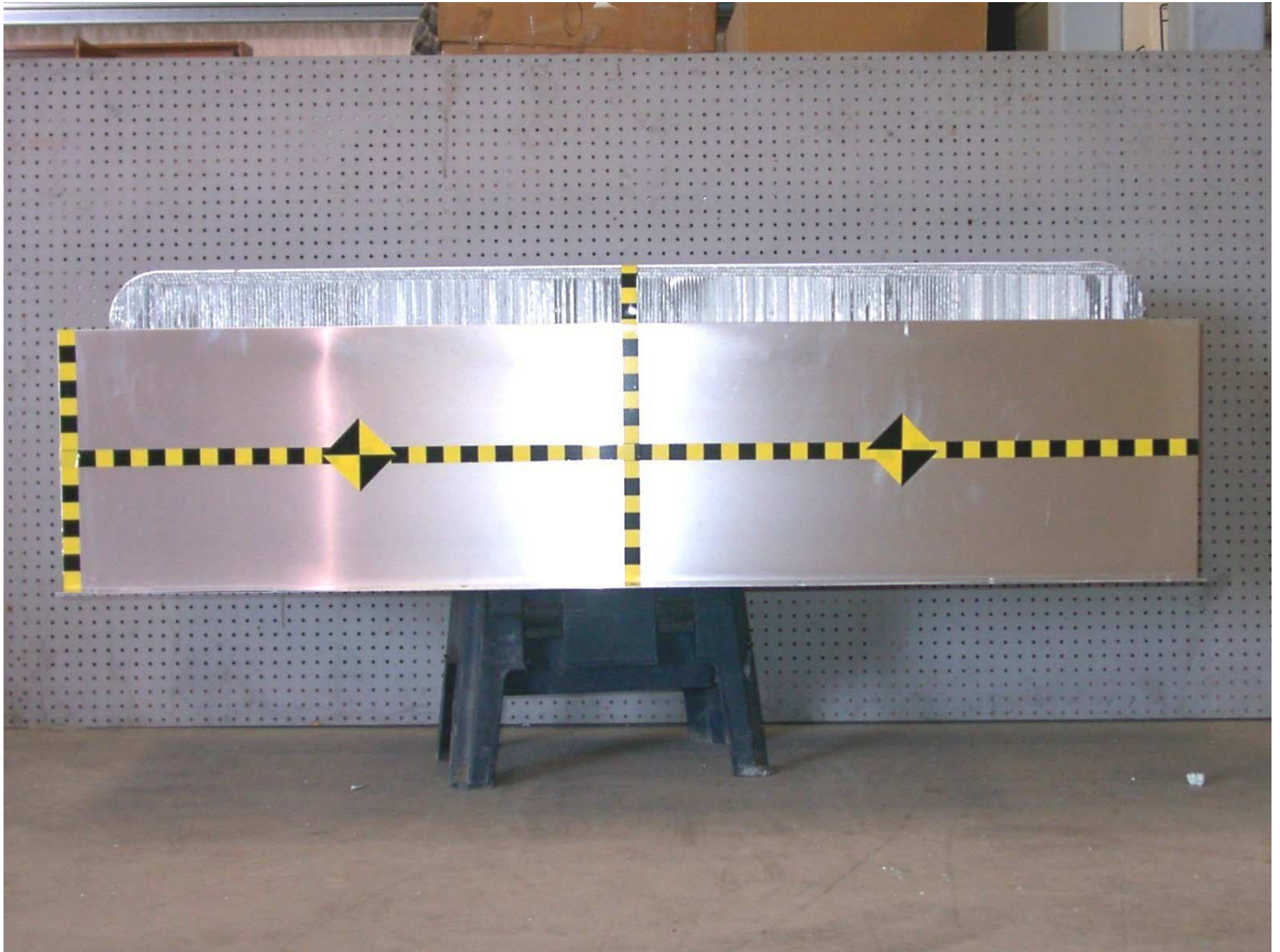


Figure A-55: Top View of Deformable Barrier, Pre-Test



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



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



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



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

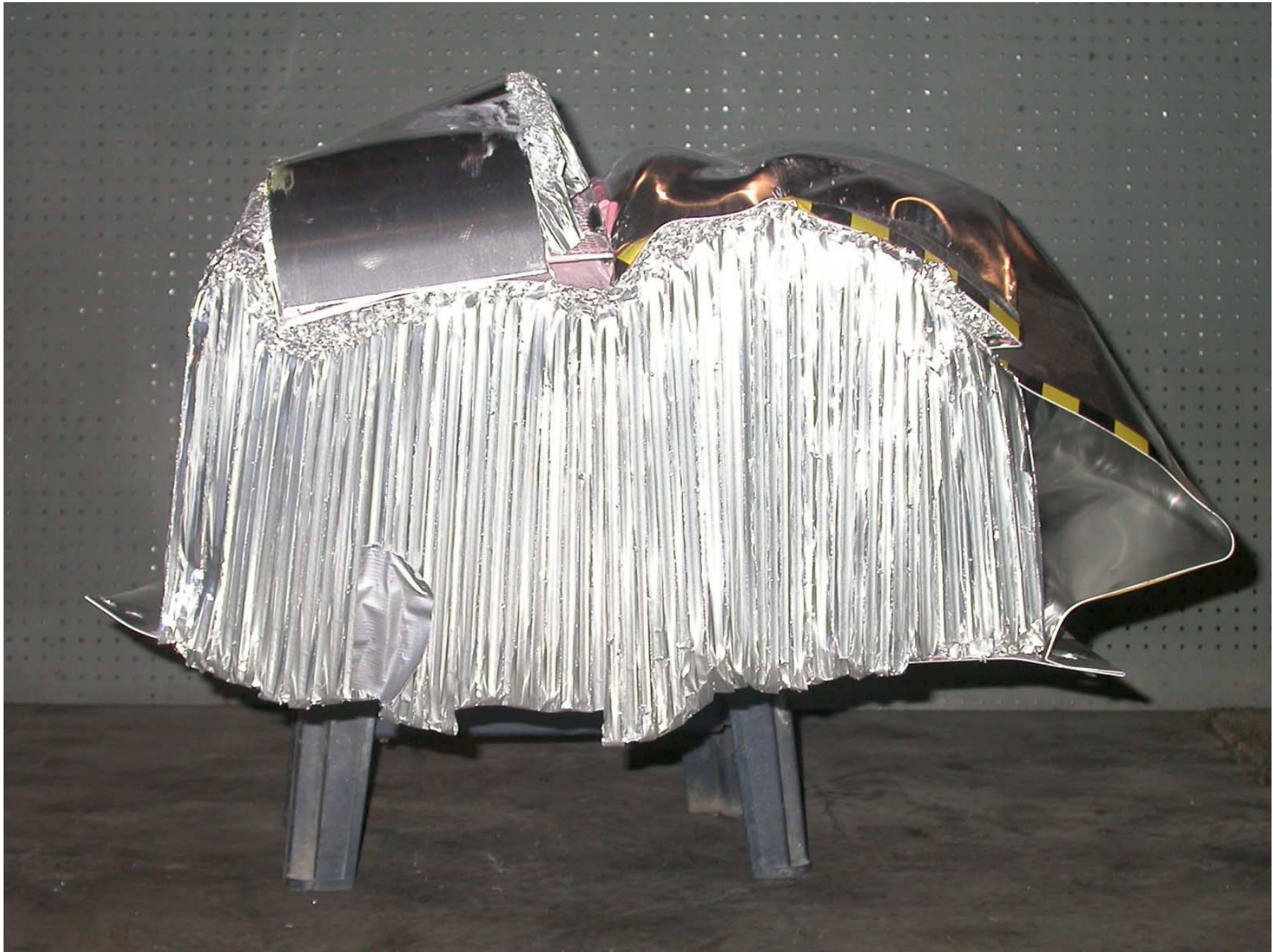


Figure A-60: Left Side View of Deformable Barrier, Post-Test



Figure A-61: Vehicle on Rollover Device, 0° View



Figure A-62: Vehicle on Rollover Device, 90° View



Figure A-63: Vehicle on Rollover Device, 180° View

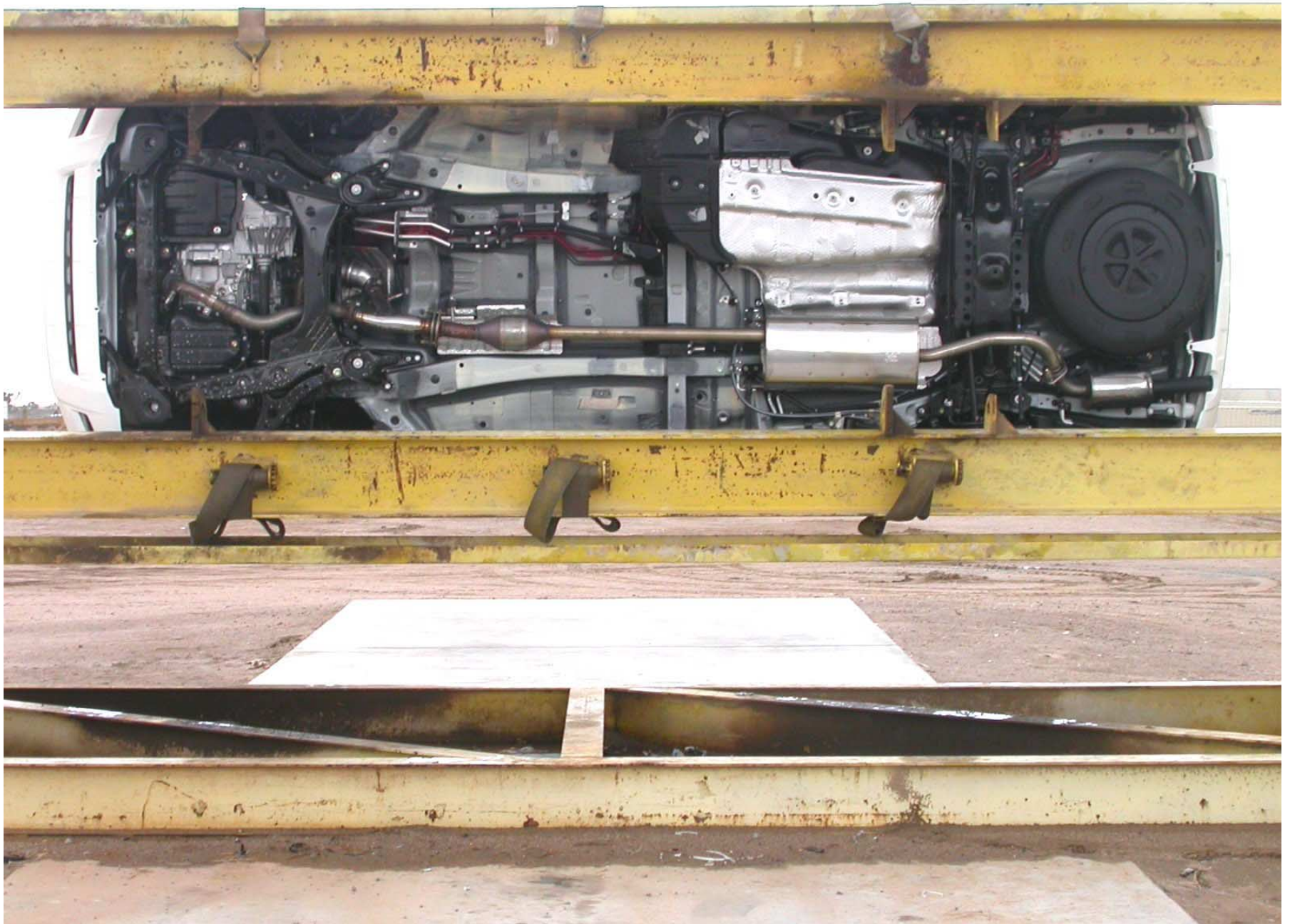


Figure A-64: Vehicle on Rollover Device, 270° View



Figure A-65: Vehicle During Impact



Figure A-66: Left Rear Door Window Separation, Post-Test



Figure A-67: Left Front Door Window Separation, Post-Test

APPENDIX B
SID/HIII, VEHICLE AND MDB RESPONSE DATA

LIST OF DATA PLOTS

<u>Data Plot</u>	<u>Page</u>
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)

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

LIST OF DATA PLOTS...(Continued)

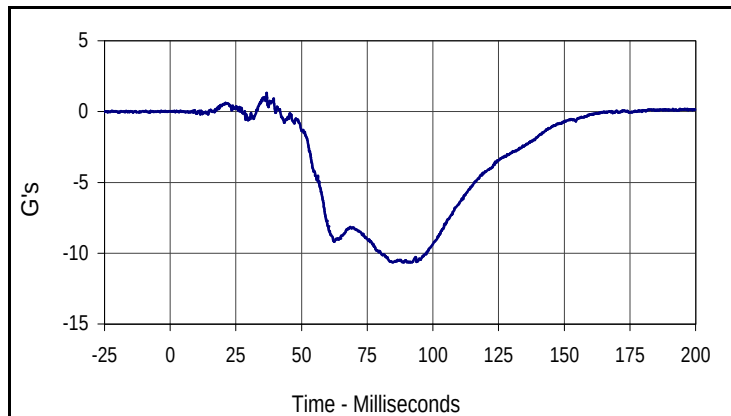
<u>Data Plot</u>	<u>Page</u>
B-29	Vehicle Left Sill at Rear Door Y
	Vehicle Left Sill at Front Door Y
	Vehicle Left Sill at Rear Door Y Velocity
	Vehicle Left Sill at Front Door Y Velocity
B-30	Vehicle Left Front Door C/L Y
	Vehicle Right Rear Occupant Compartment
	Vehicle Left Front Door Mid Rear Y
	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 C/L 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)

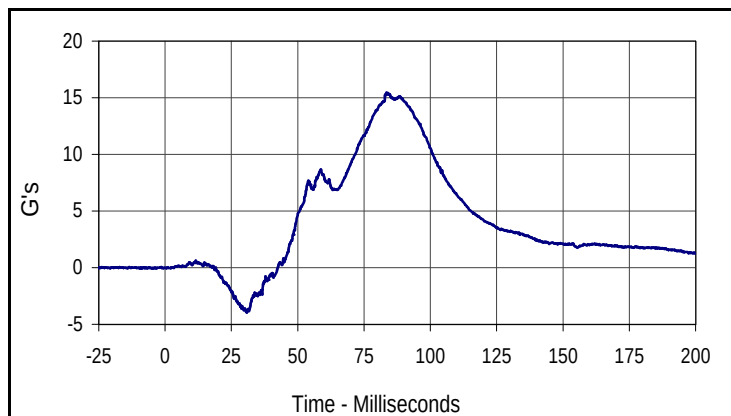
<u>Data Plot</u>	<u>Page</u>
B-38	Driver Upper Rib Primary Y
	Driver Lower Rib Primary Y
	Driver Lower Spine Primary Y
	Driver Pelvis Primary Y
B-39	Driver Upper Rib Redundant Y
	Driver Lower Rib Redundant Y
	Driver Lower Spine Redundant Y
	Driver Pelvis Redundant Y
B-40	Passenger Upper Rib Primary Y
	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 Z
	MDB Rear Y Velocity
B-45	MDB Right Bumper Contact

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

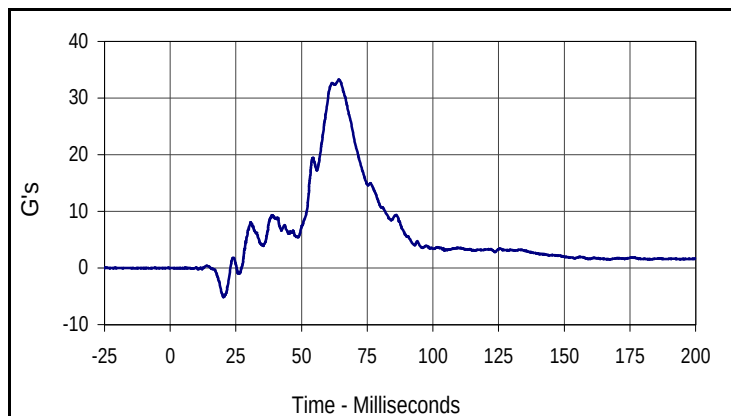
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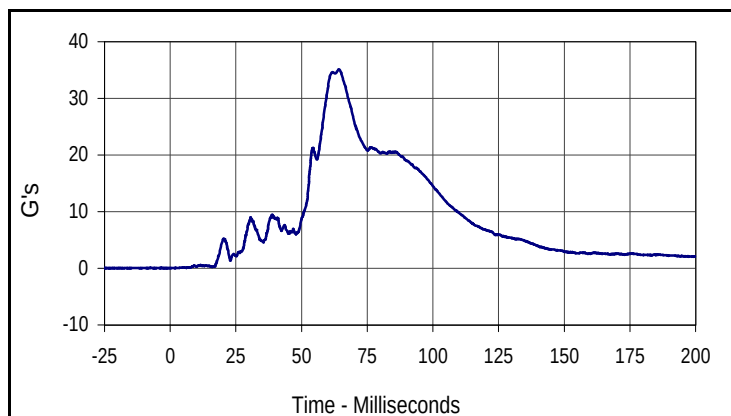
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CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
1.3	36.8	-10.7	84.7



Curve Description			
Driver Head Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
15.5	83.5	-4.0	30.8



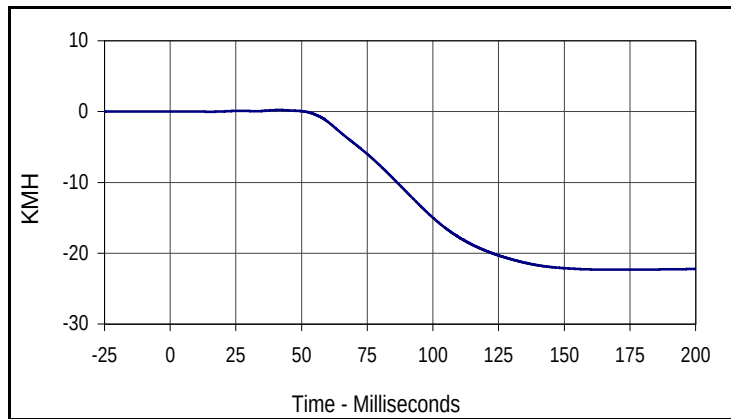
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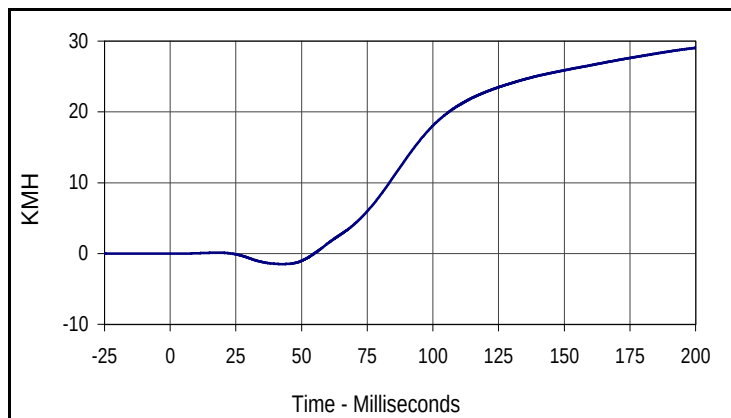
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Driver Head Resultant Primary			
CURNO	Type	SAE Class	Units
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Max	Time	Min	Time
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Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

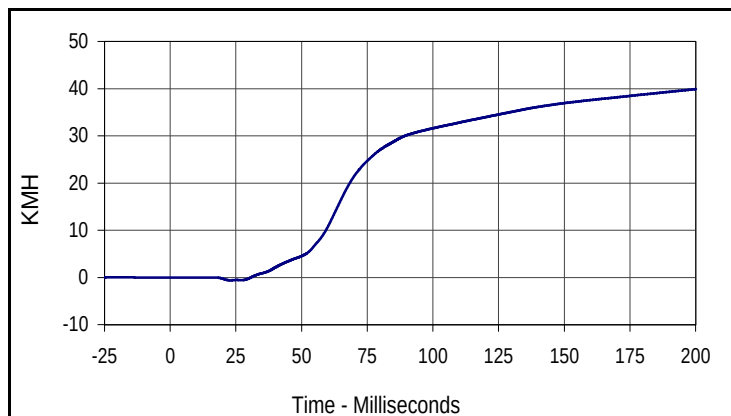
Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
Driver Head Primary X Velocity			
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Max	Time	Min	Time
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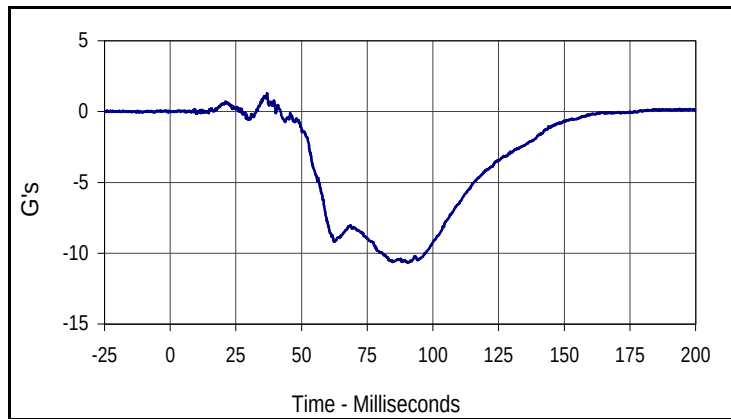
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Driver Head Primary Y Velocity			
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Max	Time	Min	Time
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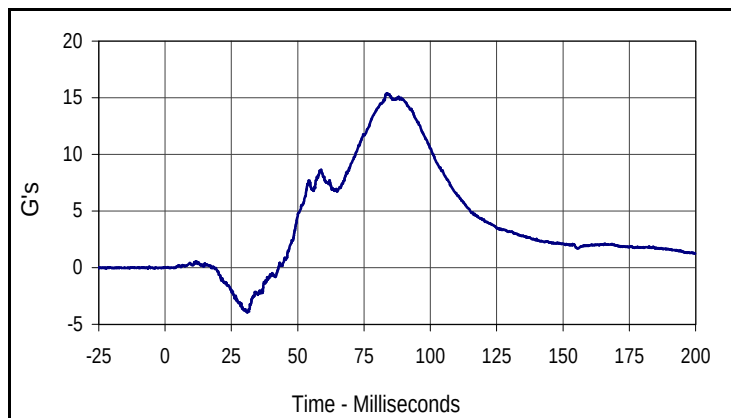
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Driver Head Primary Z Velocity			
CURNO	Type	SAE Class	Units
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Max	Time	Min	Time
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Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

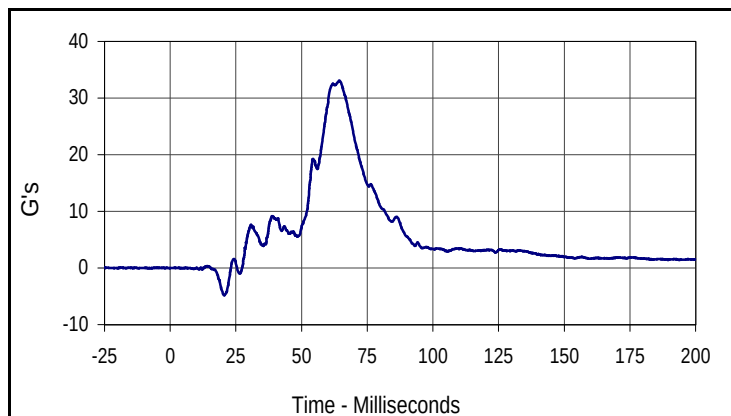
Test Date: 2/26/04
 NHTSA No.: M45113



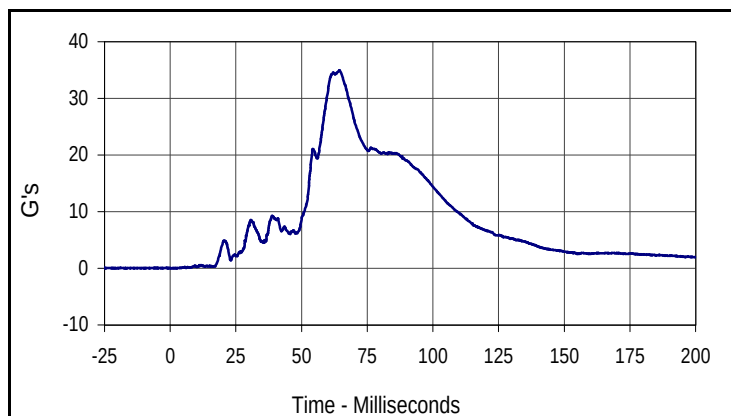
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Max	Time	Min	Time
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Curve Description			
Driver Head Y Redundant			
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Max	Time	Min	Time
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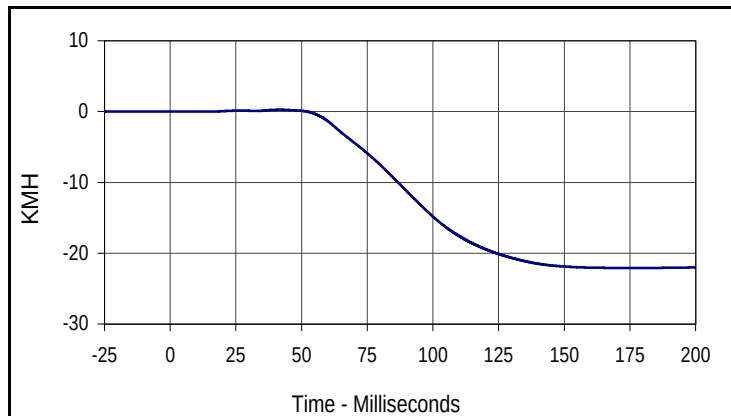
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Driver Head Z Redundant			
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Max	Time	Min	Time
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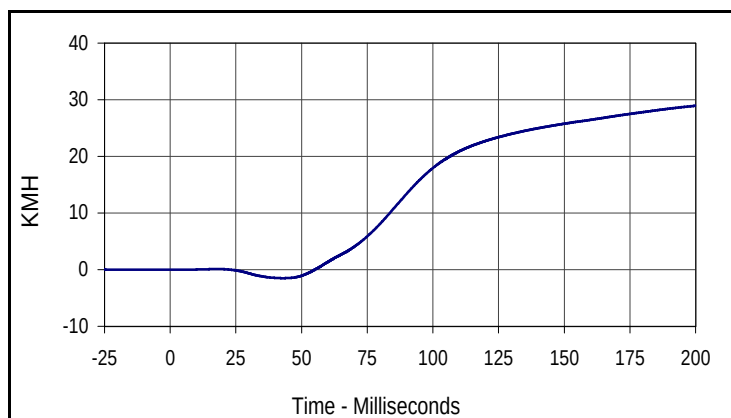
Curve Description			
Driver Head Resultant Redundant			
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004	RES	1000	G's
Max	Time	Min	Time
35.0	64.4	0.0	0.4

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

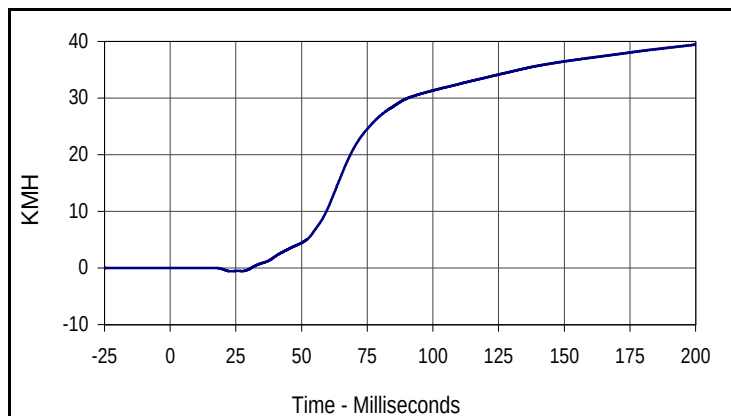
Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
Driver Head Redundant X Velocity			
CURNO	Type	SAE Class	Units
004	IN1	180	KMH
Max	Time	Min	Time
0.3	41.9	-22.1	178.0



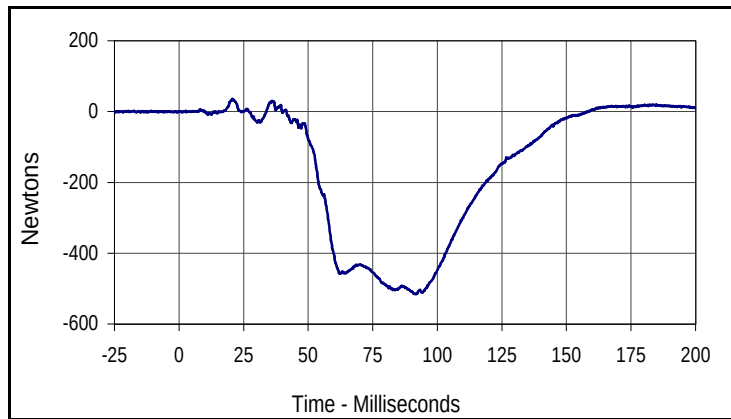
Curve Description			
Driver Head Redundant Y Velocity			
CURNO	Type	SAE Class	Units
005	IN1	180	KMH
Max	Time	Min	Time
28.9	200.0	-1.5	42.8



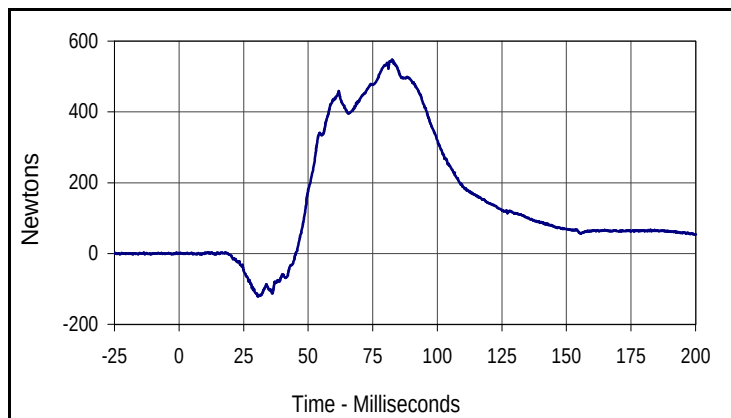
Curve Description			
Driver Head Redundant Z Velocity			
CURNO	Type	SAE Class	Units
006	IN1	180	KMH
Max	Time	Min	Time
39.4	200.0	-0.6	23.1

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

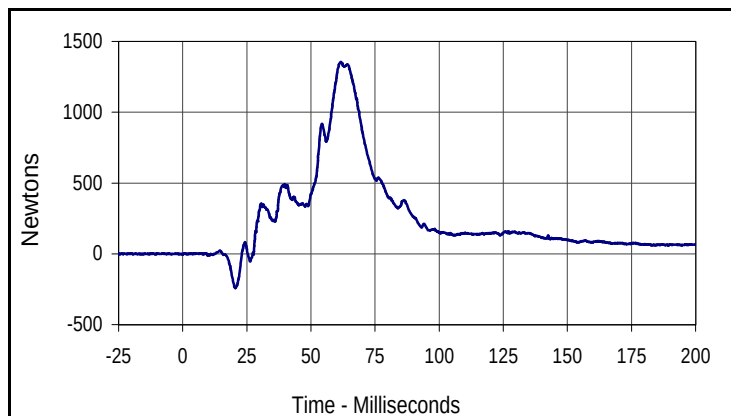
Test Date: 2/26/04
 NHTSA No.: M45113



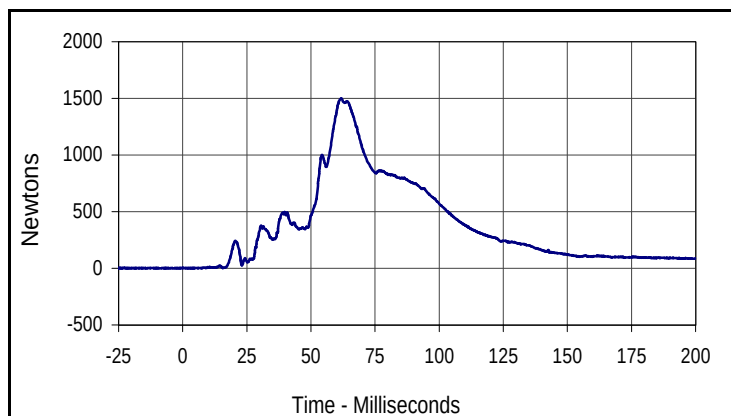
Curve Description			
Driver Upper Neck Force X			
CURNO	Type	SAE Class	Units
007	FIL	1000	Newtons
Max	Time	Min	Time
35.8	20.8	-516.4	91.7



Curve Description			
Driver Upper Neck Force Y			
CURNO	Type	SAE Class	Units
008	FIL	1000	Newtons
Max	Time	Min	Time
547.2	82.5	-121.4	30.5



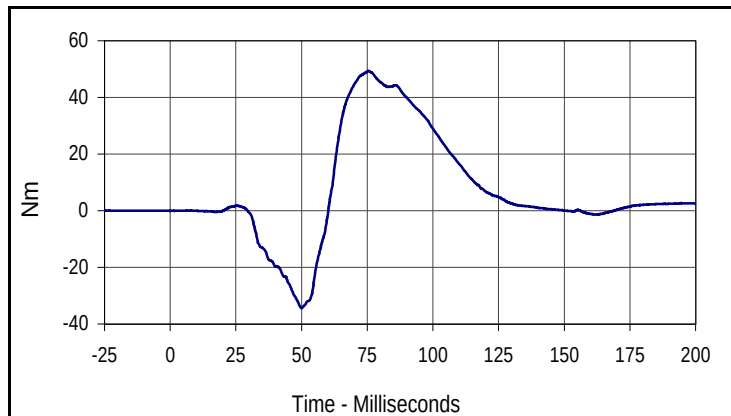
Curve Description			
Driver Upper Neck Force Z			
CURNO	Type	SAE Class	Units
009	FIL	1000	Newtons
Max	Time	Min	Time
1355.4	61.7	-241.4	20.5



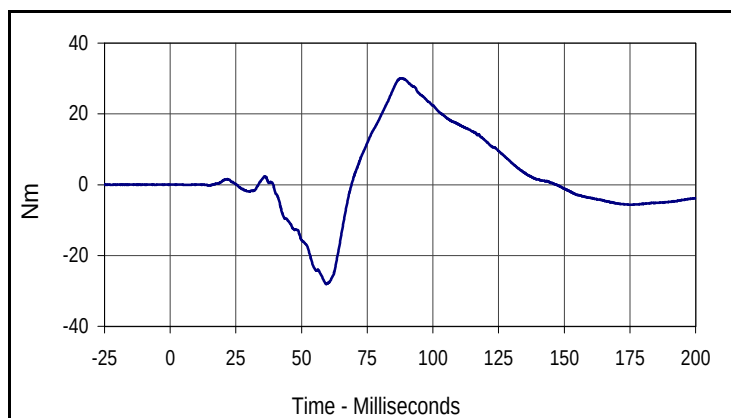
Curve Description			
Driver Upper Neck Force Resultant			
CURNO	Type	SAE Class	Units
007	RES	1000	Newtons
Max	Time	Min	Time
1499.2	61.8	0.5	1.9

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

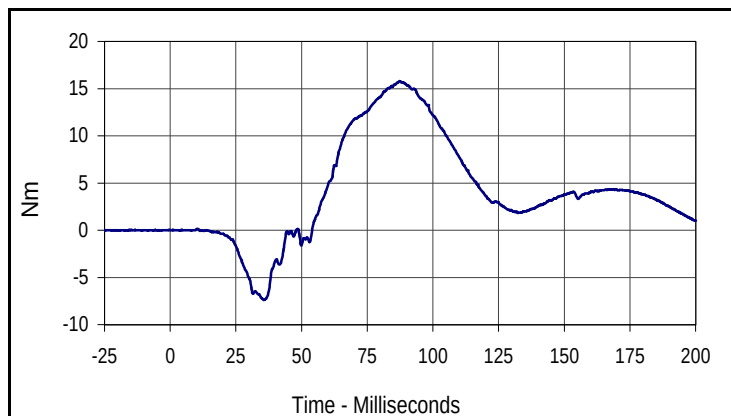
Test Date: 2/26/04
 NHTSA No.: M45113



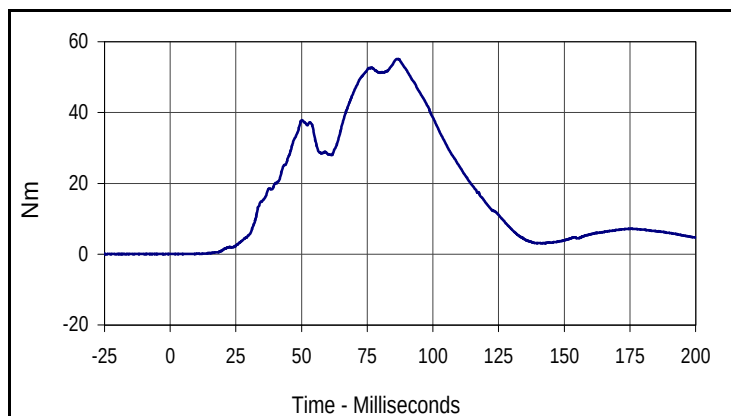
Curve Description			
Driver Upper Neck Moment X			
CURNO	Type	SAE Class	Units
010	FIL	600	Nm
Max	Time	Min	Time
49.4	75.5	-34.4	50.1



Curve Description			
Driver Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
011	FIL	600	Nm
Max	Time	Min	Time
30.1	87.9	-28.0	59.4



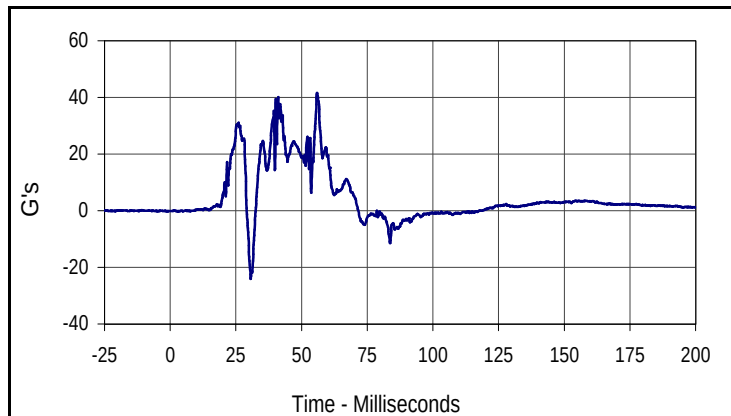
Curve Description			
Driver Upper Neck Moment Z			
CURNO	Type	SAE Class	Units
012	FIL	600	Nm
Max	Time	Min	Time
15.8	87.3	-7.4	35.6



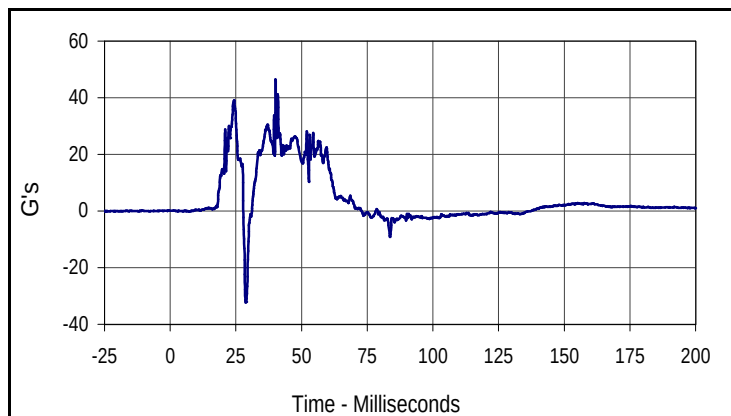
Curve Description			
Driver Upper Neck Moment Resultant			
CURNO	Type	SAE Class	Units
010	RES	600	Nm
Max	Time	Min	Time
55.1	86.3	0.0	9.3

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

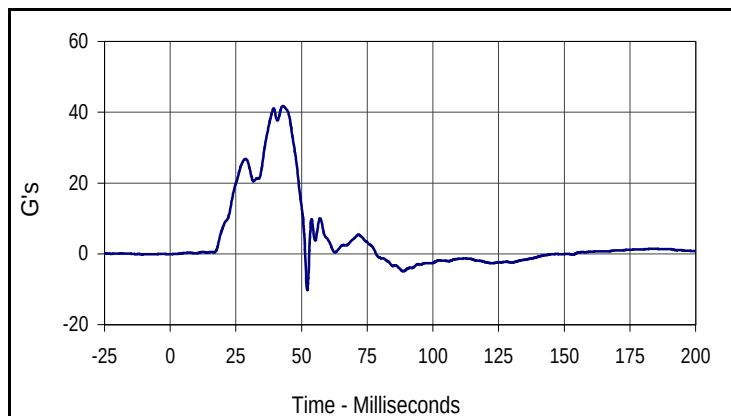
Test Date: 2/26/04
 NHTSA No.: M45113



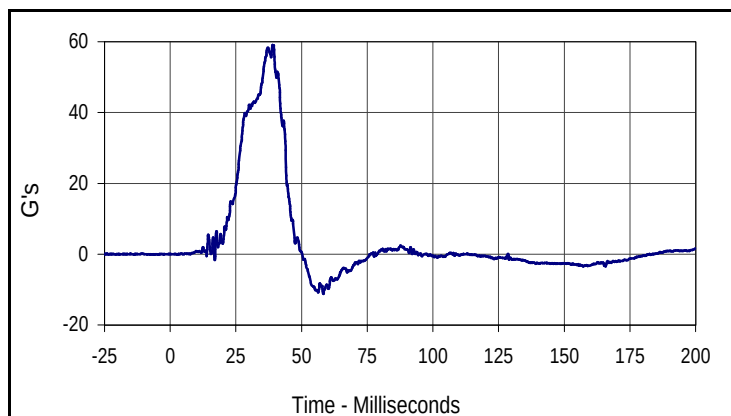
Curve Description			
Driver Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
013	FIL	1000	G's
Max	Time	Min	Time
41.6	55.9	-24.1	30.7



Curve Description			
Driver Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
014	FIL	1000	G's
Max	Time	Min	Time
46.4	40.1	-32.3	28.7



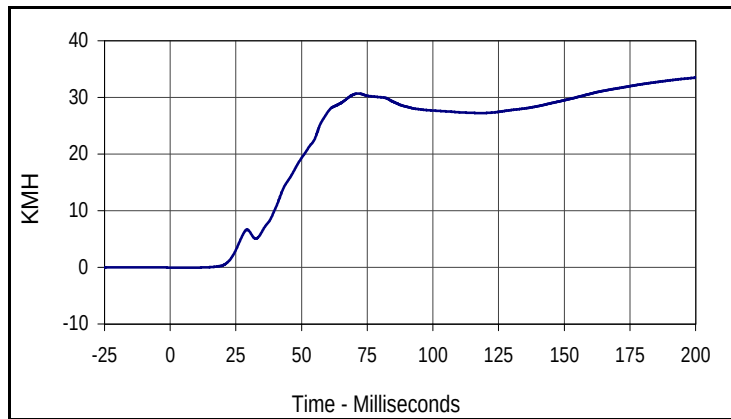
Curve Description			
Driver Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
015	FIL	180	G's
Max	Time	Min	Time
41.7	42.8	-10.3	52.2



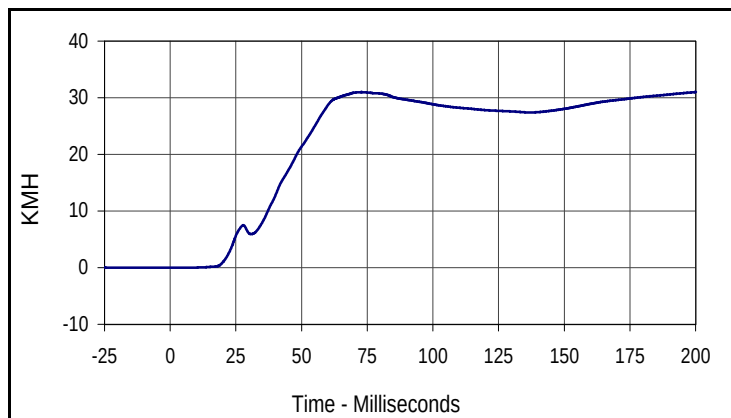
Curve Description			
Driver Pelvis Primary Y			
CURNO	Type	SAE Class	Units
016	FIL	1000	G's
Max	Time	Min	Time
59.1	38.9	-11.3	58.3

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

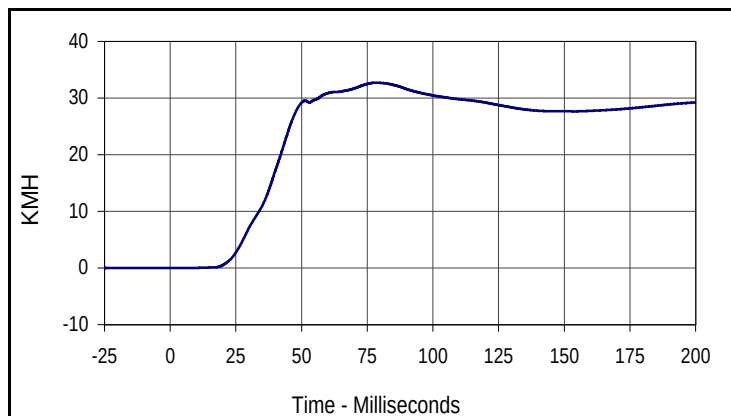
Test Date: 2/26/04
 NHTSA No.: M45113



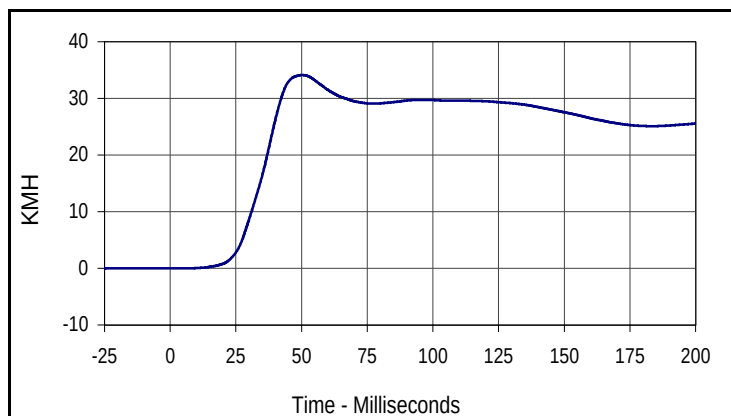
Curve Description			
Driver Upper Rib Primary Y Velocity			
CURNO	Type	SAE Class	Units
013	IN1	180	KMH
Max	Time	Min	Time
33.5	200.0	-0.1	8.7



Curve Description			
Driver Lower Rib Primary Y Velocity			
CURNO	Type	SAE Class	Units
014	IN1	180	KMH
Max	Time	Min	Time
31.0	200.0	0.0	0.0



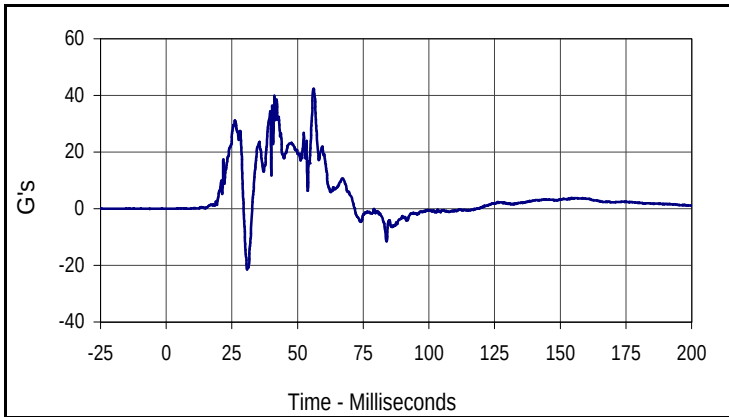
Curve Description			
Driver Lower Spine Primary Y Velocity			
CURNO	Type	SAE Class	Units
015	IN1	180	KMH
Max	Time	Min	Time
32.7	78.4	0.0	2.6



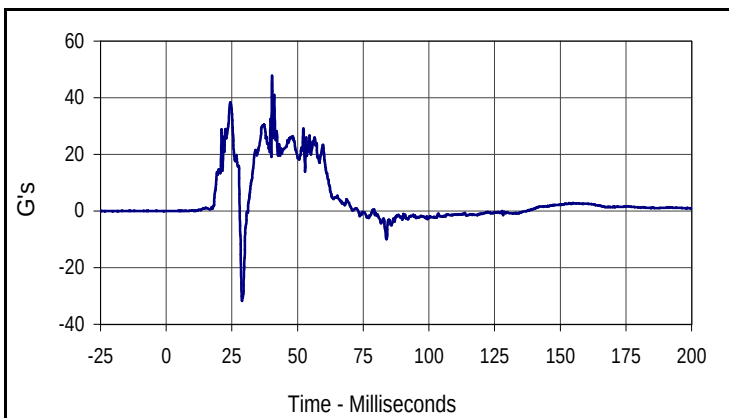
Curve Description			
Driver Pelvis Primary Y Velocity			
CURNO	Type	SAE Class	Units
016	IN1	180	KMH
Max	Time	Min	Time
34.1	50.2	0.0	3.1

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

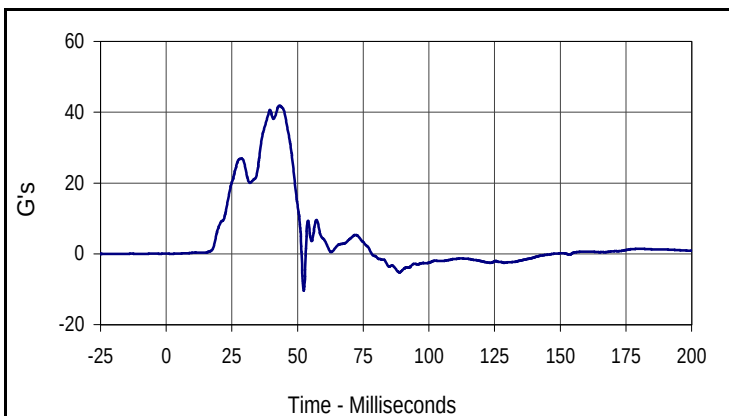
Test Date: 2/26/04
 NHTSA No.: M45113



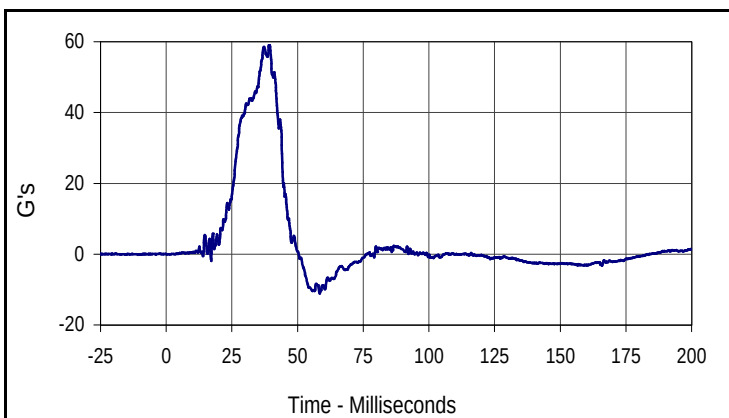
Curve Description			
Driver Upper Rib Redundant Y			
CURNO	Type	SAE Class	Units
017	FIL	1000	G's
Max	Time	Min	Time
42.4	56.1	-21.5	30.8



Curve Description			
Driver Lower Rib Redundant Y			
CURNO	Type	SAE Class	Units
018	FIL	1000	G's
Max	Time	Min	Time
47.8	40.3	-31.8	28.8



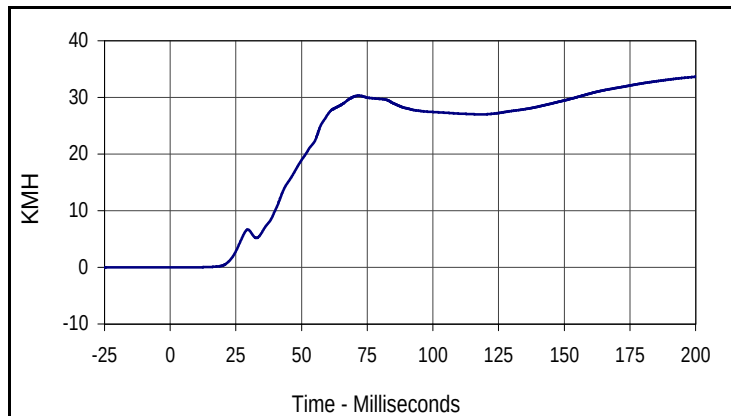
Curve Description			
Driver Lower Spine Redundant Y			
CURNO	Type	SAE Class	Units
019	FIL	180	G's
Max	Time	Min	Time
41.9	43.0	-10.4	52.4



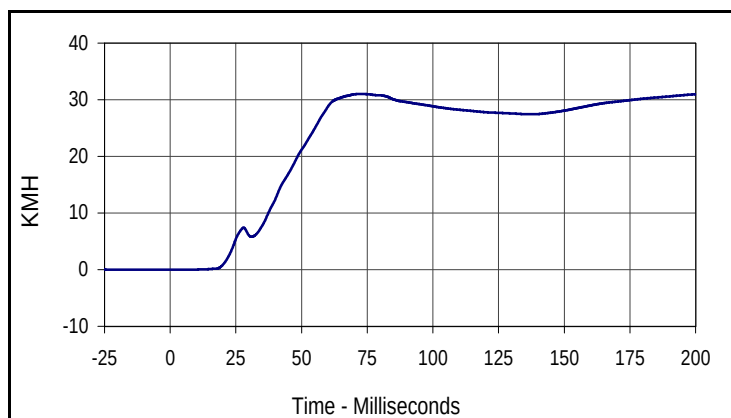
Curve Description			
Driver Pelvis Redundant Y			
CURNO	Type	SAE Class	Units
020	FIL	1000	G's
Max	Time	Min	Time
59.0	39.5	-11.2	58.4

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

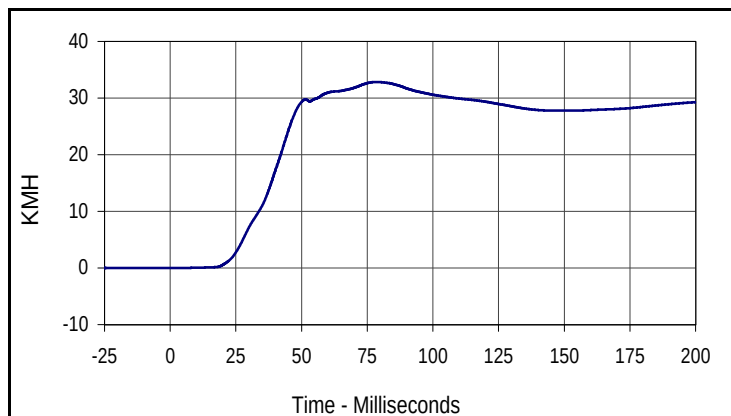
Test Date: 2/26/04
 NHTSA No.: M45113



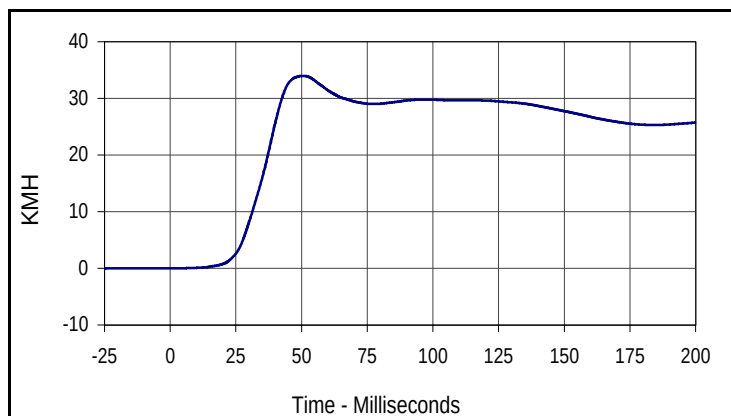
Curve Description			
Driver Upper Rib Redundant Y Velocity			
CURNO	Type	SAE Class	Units
017	IN1	180	KMH
Max	Time	Min	Time
33.7	200.0	0.0	2.3



Curve Description			
Driver Lower Rib Redundant Y Velocity			
CURNO	Type	SAE Class	Units
018	IN1	180	KMH
Max	Time	Min	Time
31.0	73.0	0.0	0.4



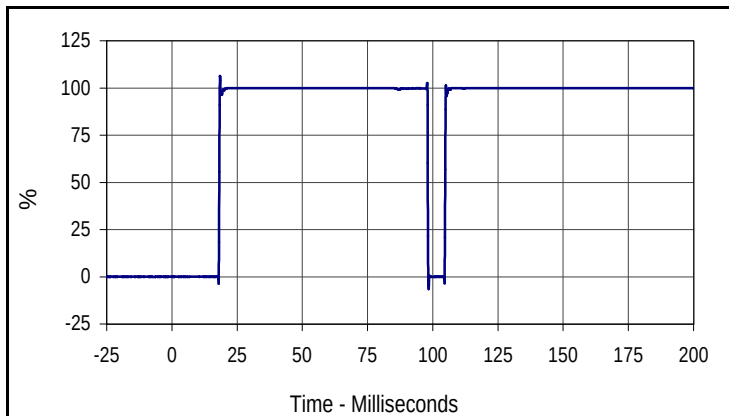
Curve Description			
Driver Lower Spine Redundant Y Velocity			
CURNO	Type	SAE Class	Units
019	IN1	180	KMH
Max	Time	Min	Time
32.8	78.2	0.0	0.0



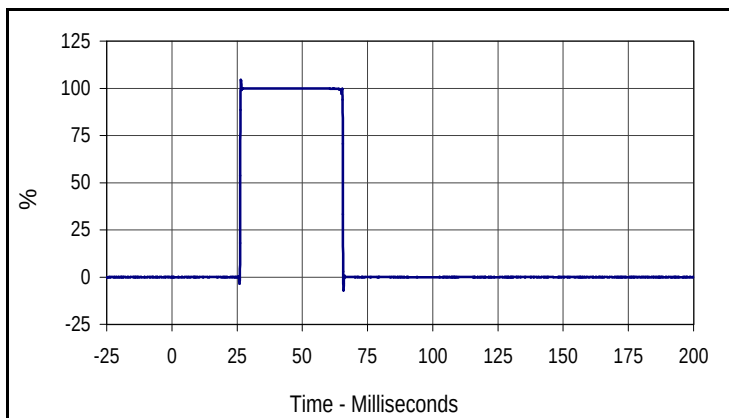
Curve Description			
Driver Pelvis Redundant Y Velocity			
CURNO	Type	SAE Class	Units
020	IN1	180	KMH
Max	Time	Min	Time
34.0	50.4	0.0	1.7

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/26/04
 NHTSA No.: M45113



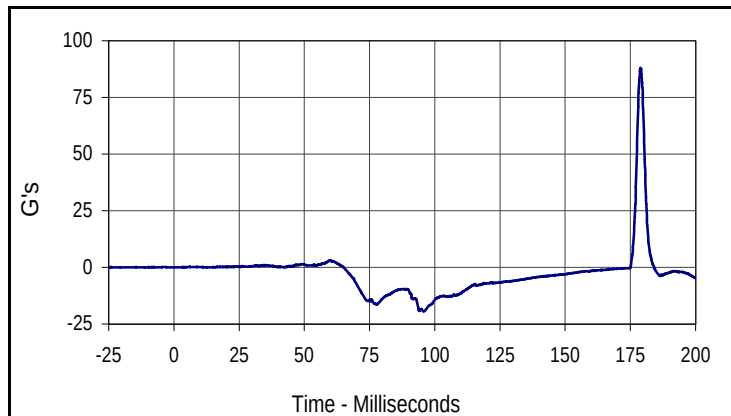
Curve Description			
Driver Thorax Contact			
CURNO	Type	SAE Class	Units
021	FIL	1000	%
Max	Time	Cross %	Time
106.2	18.4	50.0	17.8



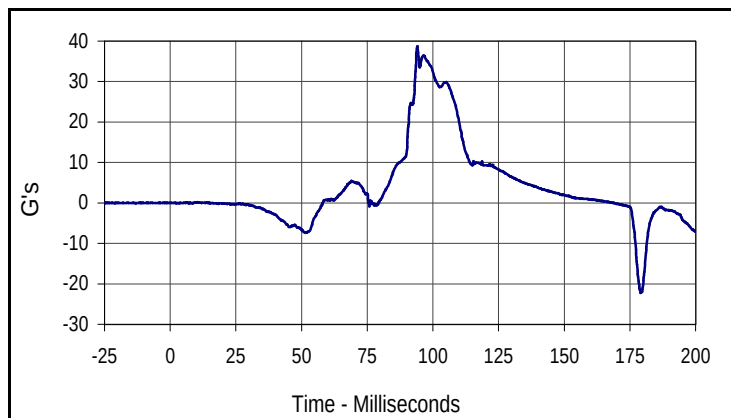
Curve Description			
Driver Pelvis Contact			
CURNO	Type	SAE Class	Units
022	FIL	1000	%
Max	Time	Cross %	Time
104.4	26.4	50.0	25.8

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

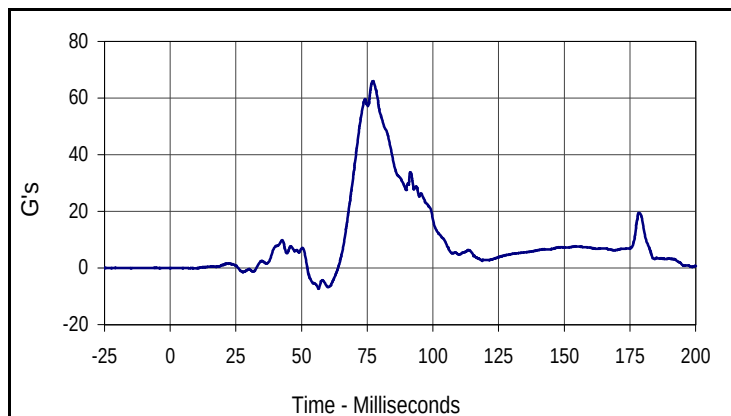
Test Date: 2/26/04
 NHTSA No.: M45113



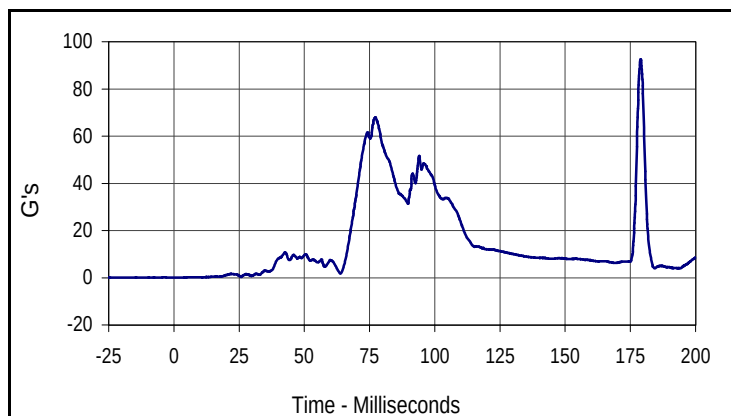
Curve Description			
Passenger Head X Primary			
CURNO	Type	SAE Class	Units
023	FIL	1000	G's
Max	Time	Min	Time
87.9	178.9	-19.5	95.7



Curve Description			
Passenger Head Y Primary			
CURNO	Type	SAE Class	Units
024	FIL	1000	G's
Max	Time	Min	Time
38.7	94.1	-22.2	179.1



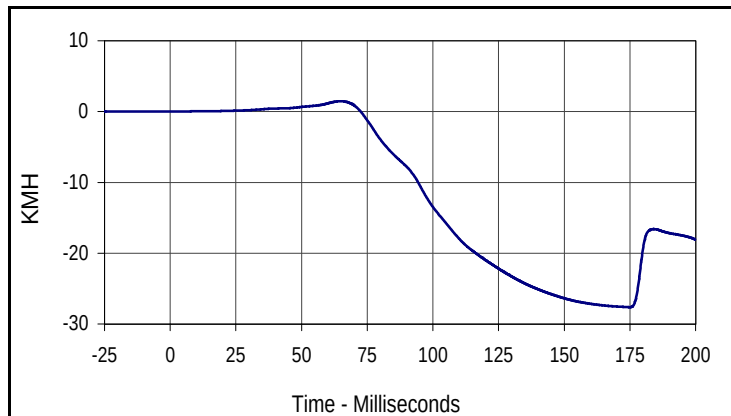
Curve Description			
Passenger Head Z Primary			
CURNO	Type	SAE Class	Units
025	FIL	1000	G's
Max	Time	Min	Time
66.0	77.3	-7.3	56.5



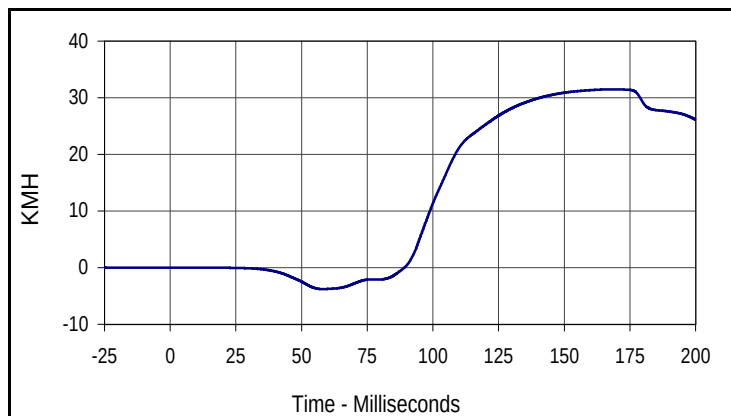
Curve Description			
Passenger Head Resultant Primary			
CURNO	Type	SAE Class	Units
023	RES	1000	G's
Max	Time	Min	Time
92.6	178.9	0.0	0.9

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

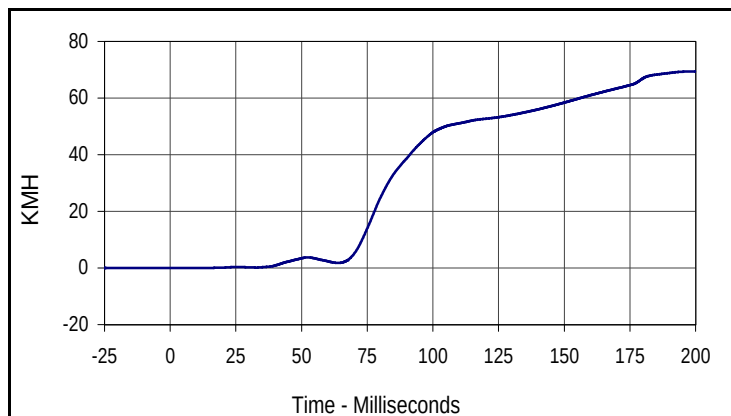
Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
Passenger Head Primary X Velocity			
CURNO	Type	SAE Class	Units
023	IN1	180	KMH
Max	Time	Min	Time
1.5	65.0	-27.6	174.9



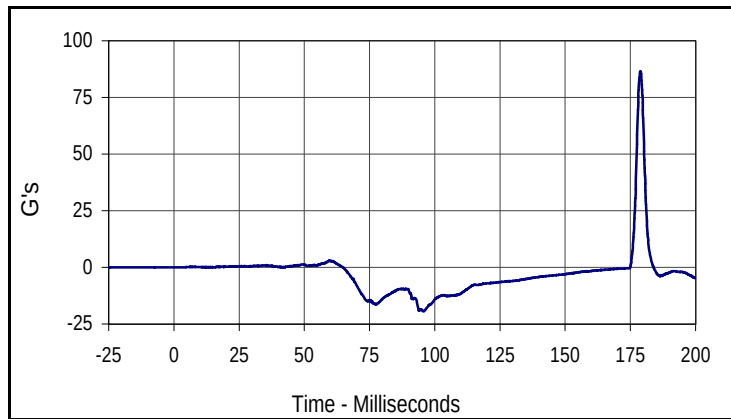
Curve Description			
Passenger Head Primary Y Velocity			
CURNO	Type	SAE Class	Units
024	IN1	180	KMH
Max	Time	Min	Time
31.5	168.7	-3.8	58.1



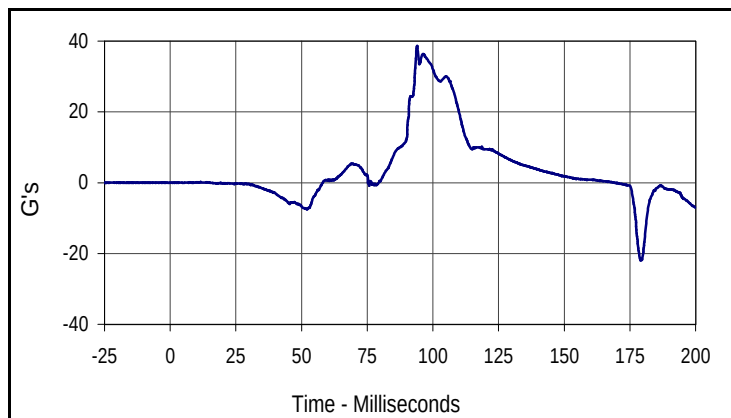
Curve Description			
Passenger Head Primary Z Velocity			
CURNO	Type	SAE Class	Units
025	IN1	180	KMH
Max	Time	Min	Time
69.4	200.0	0.0	10.7

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

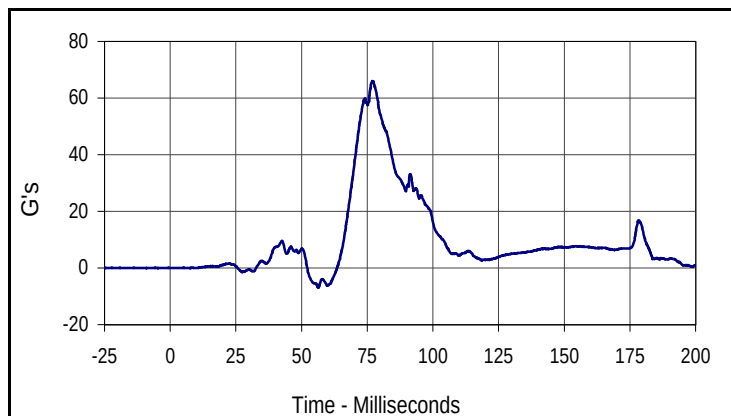
Test Date: 2/26/04
 NHTSA No.: M45113



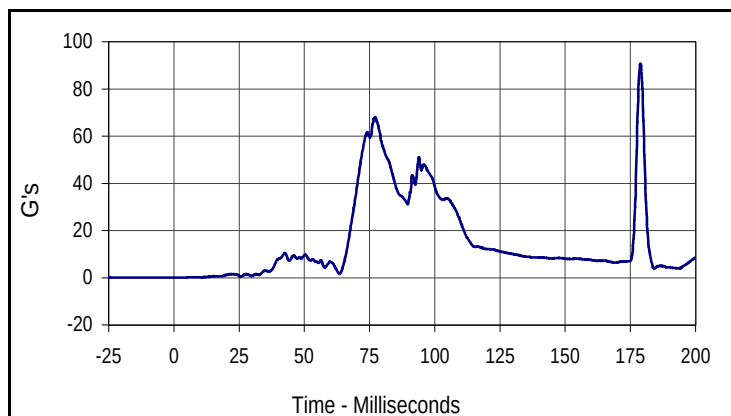
Curve Description			
Passenger Head X Redundant			
CURNO	Type	SAE Class	Units
026	FIL	1000	G's
Max	Time	Min	Time
86.6	178.8	-19.4	95.5



Curve Description			
Passenger Head Y Redundant			
CURNO	Type	SAE Class	Units
027	FIL	1000	G's
Max	Time	Min	Time
38.6	94.0	-21.9	179.1



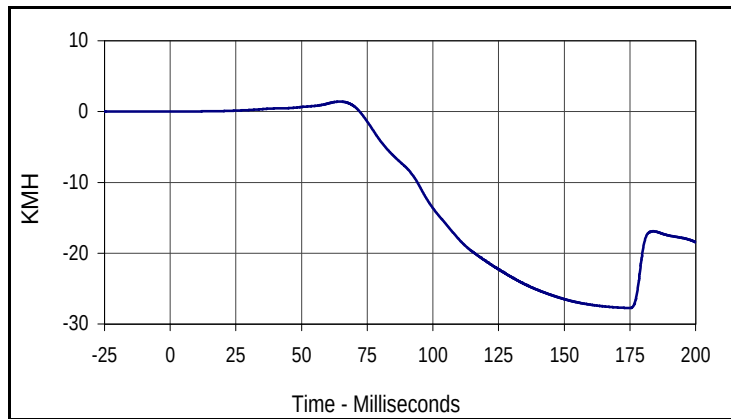
Curve Description			
Passenger Head Z Redundant			
CURNO	Type	SAE Class	Units
028	FIL	1000	G's
Max	Time	Min	Time
66.0	76.9	-6.9	56.4



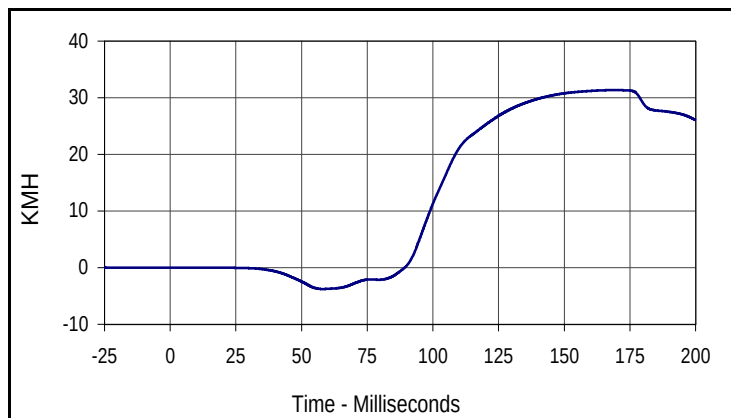
Curve Description			
Passenger Head Resultant Redundant			
CURNO	Type	SAE Class	Units
026	RES	1000	G's
Max	Time	Min	Time
90.7	178.9	0.0	1.1

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

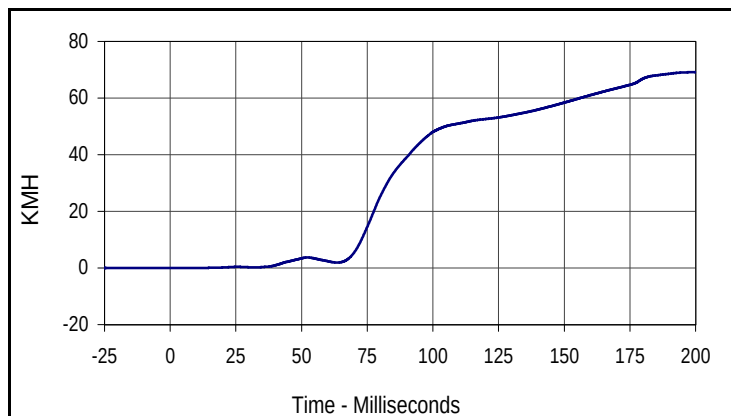
Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
Passenger Head Redundant X Velocity			
CURNO	Type	SAE Class	Units
026	IN1	180	KMH
Max	Time	Min	Time
1.4	64.7	-27.8	174.9



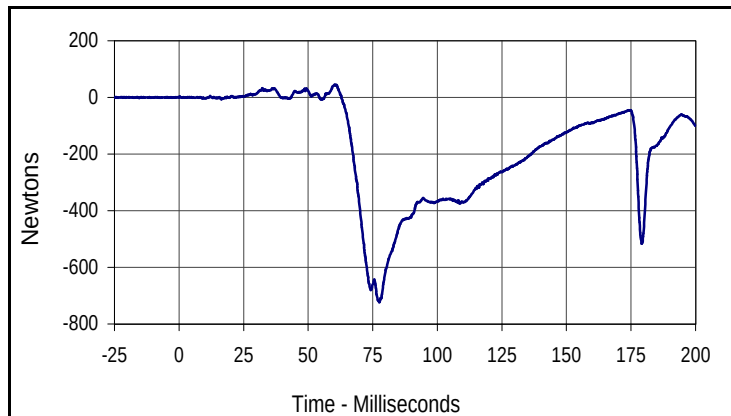
Curve Description			
Passenger Head Redundant Y Velocity			
CURNO	Type	SAE Class	Units
027	IN1	180	KMH
Max	Time	Min	Time
31.4	169.3	-3.8	58.0



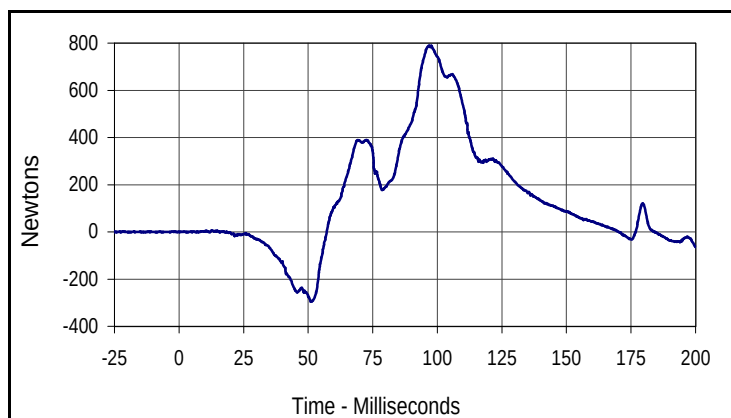
Curve Description			
Passenger Head Redundant Z Velocity			
CURNO	Type	SAE Class	Units
028	IN1	180	KMH
Max	Time	Min	Time
69.2	200.0	0.0	1.6

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

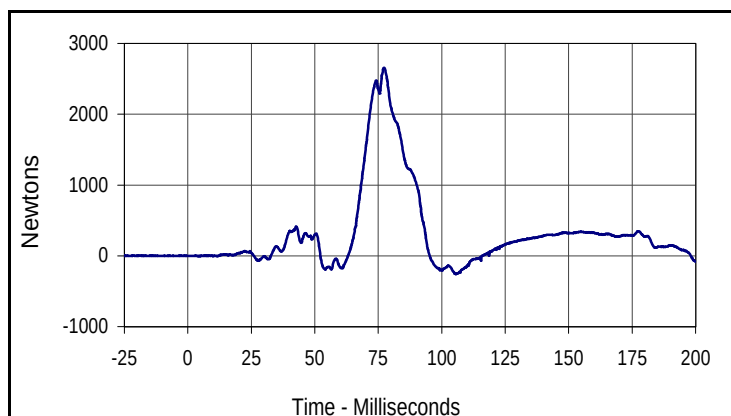
Test Date: 2/26/04
 NHTSA No.: M45113



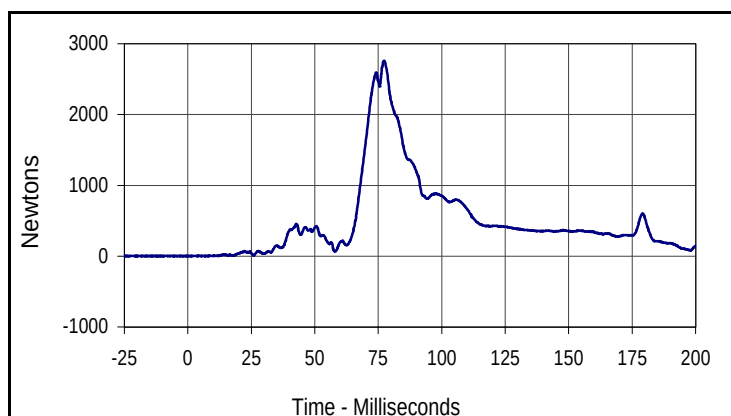
Curve Description			
Passenger Upper Neck Force X			
CURNO	Type	SAE Class	Units
029	FIL	1000	Newtons
Max	Time	Min	Time
45.2	60.3	-722.9	77.6



Curve Description			
Passenger Upper Neck Force Y			
CURNO	Type	SAE Class	Units
030	FIL	1000	Newtons
Max	Time	Min	Time
790.4	96.9	-295.4	51.0



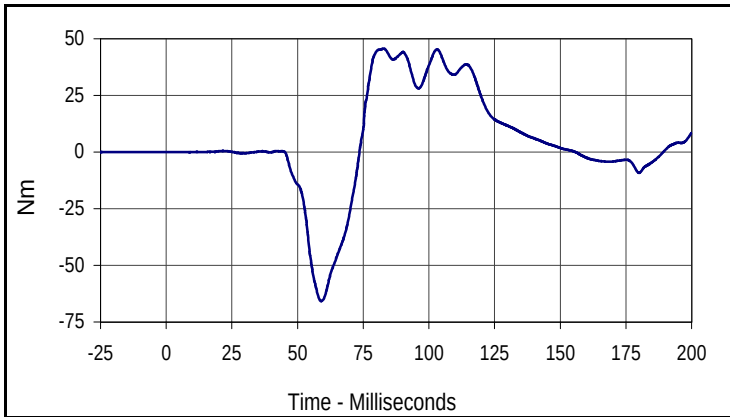
Curve Description			
Passenger Upper Neck Force Z			
CURNO	Type	SAE Class	Units
031	FIL	1000	Newtons
Max	Time	Min	Time
2656.0	77.2	-256.6	105.6



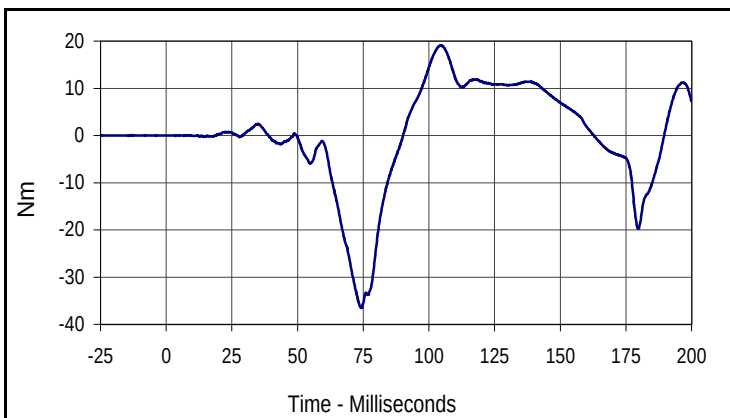
Curve Description			
Passenger Upper Neck Force Resultant			
CURNO	Type	SAE Class	Units
029	RES	1000	Newtons
Max	Time	Min	Time
2760.3	77.2	0.3	1.5

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

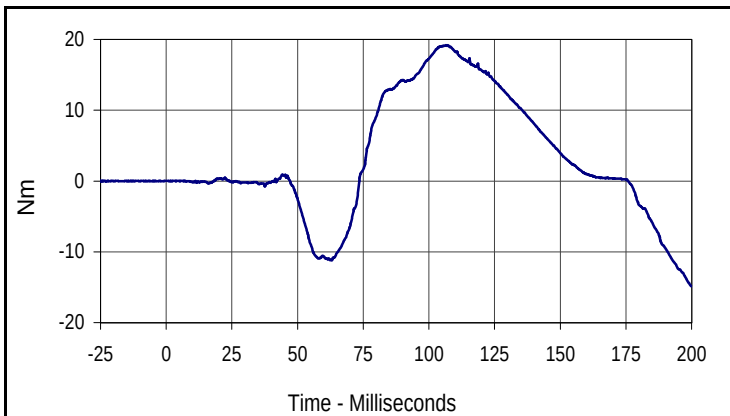
Test Date: 2/26/04
 NHTSA No.: M45113



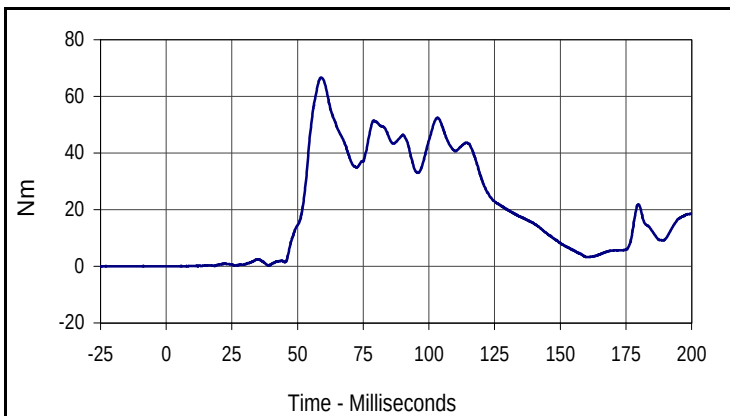
Curve Description			
Passenger Upper Neck Moment X			
CURNO	Type	SAE Class	Units
032	FIL	600	Nm
Max	Time	Min	Time
45.7	82.7	-65.8	58.9



Curve Description			
Passenger Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
033	FIL	600	Nm
Max	Time	Min	Time
19.1	104.3	-36.6	74.3



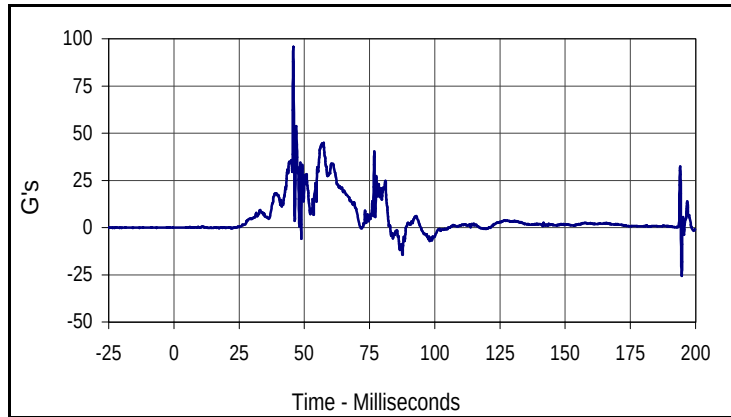
Curve Description			
Passenger Upper Neck Moment Z			
CURNO	Type	SAE Class	Units
034	FIL	600	Nm
Max	Time	Min	Time
19.2	106.5	-14.9	200.0



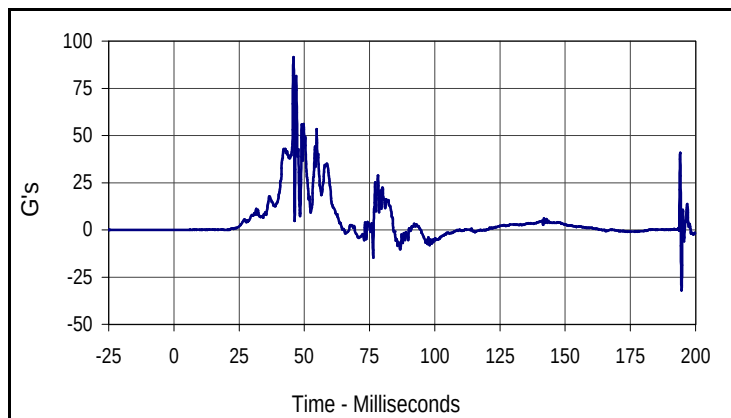
Curve Description			
Passenger Upper Neck Moment Resultant			
CURNO	Type	SAE Class	Units
032	RES	600	Nm
Max	Time	Min	Time
66.7	58.9	0.0	4.5

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

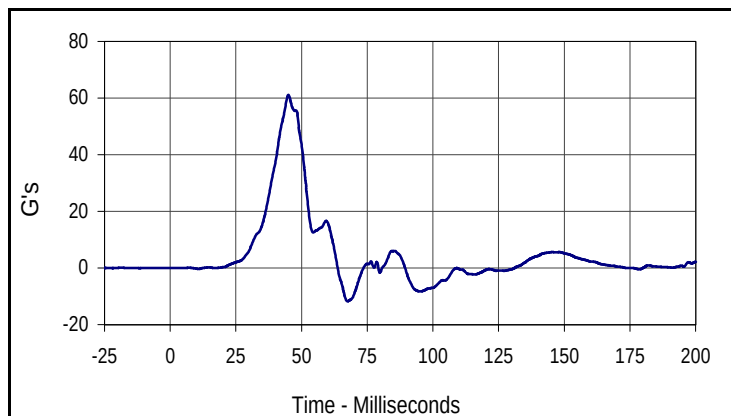
Test Date: 2/26/04
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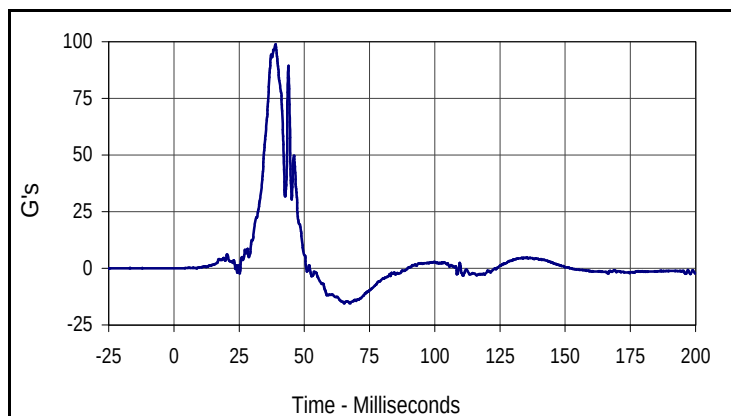
Curve Description			
Passenger Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
035	FIL	1000	G's
Max	Time	Min	Time
95.5	45.8	-25.6	194.7



Curve Description			
Passenger Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
036	FIL	1000	G's
Max	Time	Min	Time
91.5	45.9	-31.9	194.6



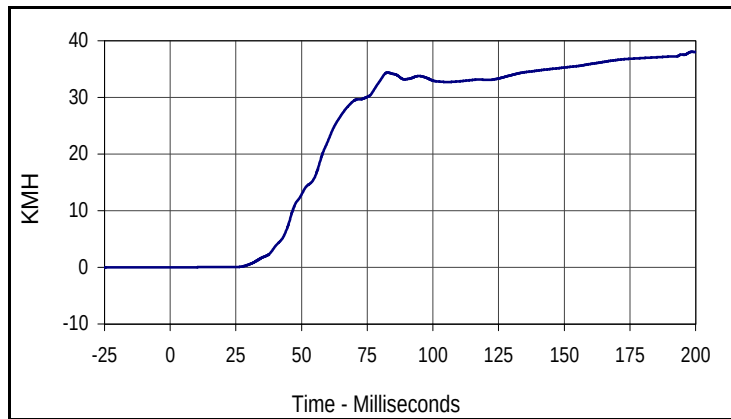
Curve Description			
Passenger Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
037	FIL	180	G's
Max	Time	Min	Time
61.1	45.0	-11.8	67.5



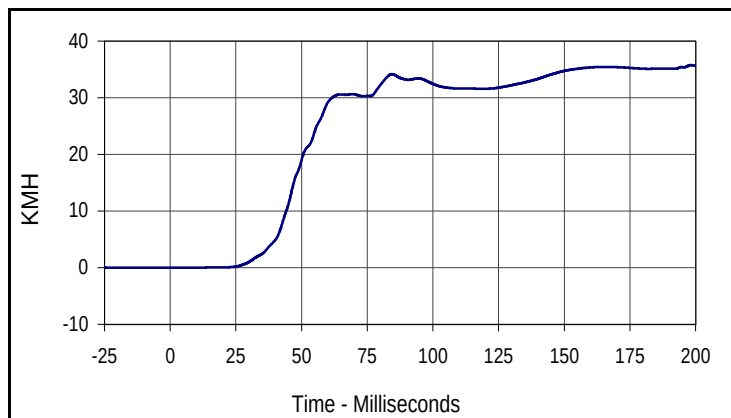
Curve Description			
Passenger Pelvis Primary Y			
CURNO	Type	SAE Class	Units
038	FIL	1000	G's
Max	Time	Min	Time
98.8	39.0	-15.5	67.5

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

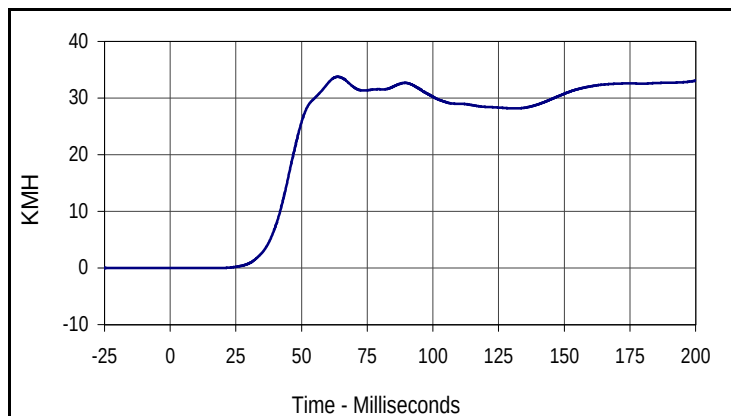
Test Date: 2/26/04
 NHTSA No.: M45113



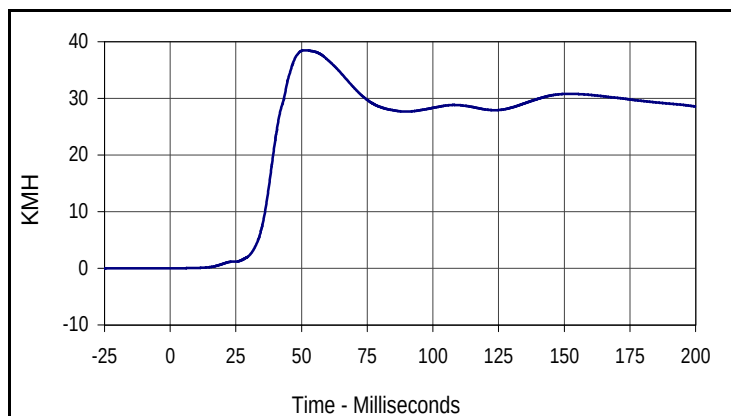
Curve Description			
Passenger Upper Rib Primary Y Velocity			
CURNO	Type	SAE Class	Units
035	IN1	180	KMH
Max	Time	Min	Time
38.1	198.6	0.0	4.1



Curve Description			
Passenger Lower Rib Primary Y Velocity			
CURNO	Type	SAE Class	Units
036	IN1	180	KMH
Max	Time	Min	Time
35.8	198.2	0.0	5.4



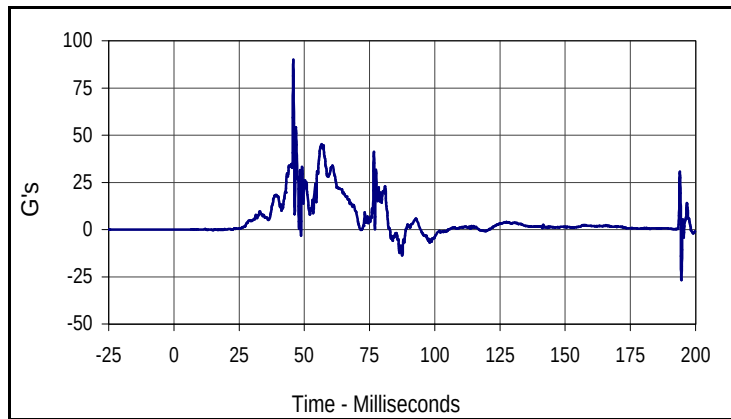
Curve Description			
Passenger Lower Spine Primary Y Velocity			
CURNO	Type	SAE Class	Units
037	IN1	180	KMH
Max	Time	Min	Time
33.8	63.8	0.0	12.7



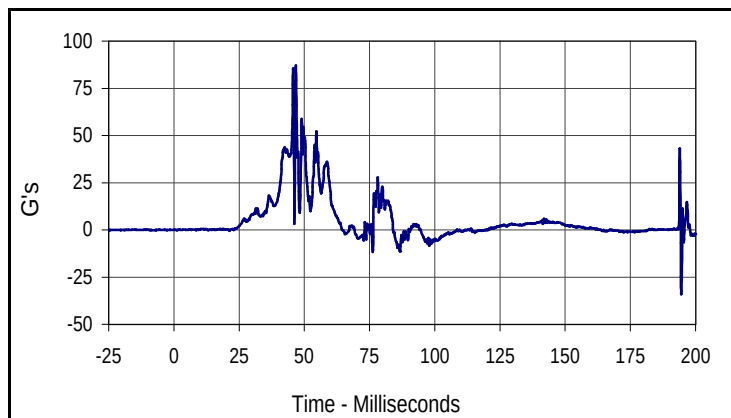
Curve Description			
Passenger Pelvis Primary Y Velocity			
CURNO	Type	SAE Class	Units
038	IN1	180	KMH
Max	Time	Min	Time
38.5	51.2	0.0	0.0

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

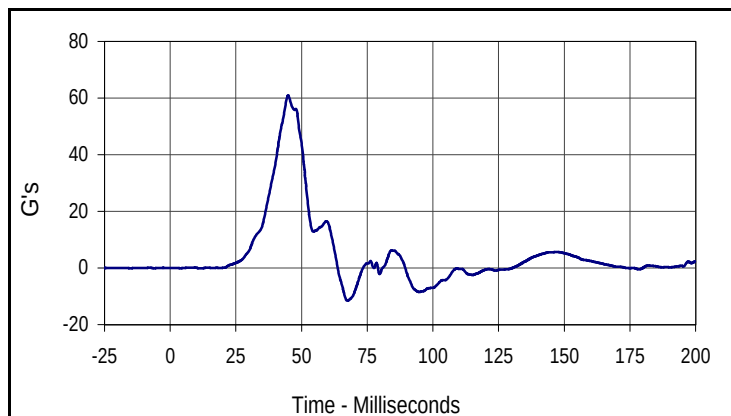
Test Date: 2/26/04
 NHTSA No.: M45113



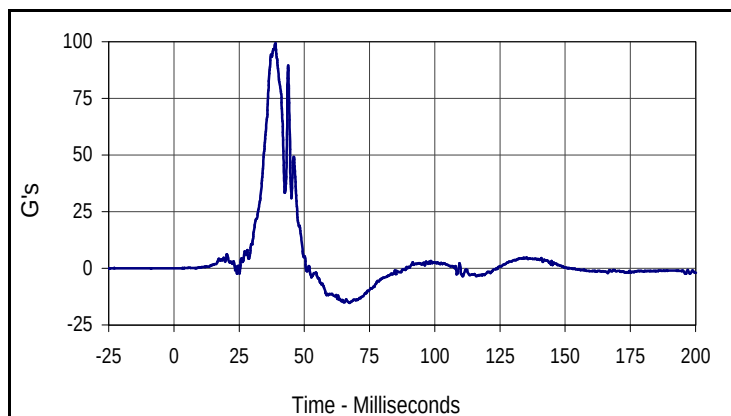
Curve Description			
Passenger Upper Rib Redundant Y			
CURNO	Type	SAE Class	Units
039	FIL	1000	G's
Max	Time	Min	Time
90.0	45.8	-26.8	194.6



Curve Description			
Passenger Lower Rib Redundant Y			
CURNO	Type	SAE Class	Units
040	FIL	1000	G's
Max	Time	Min	Time
87.0	46.8	-34.0	194.5



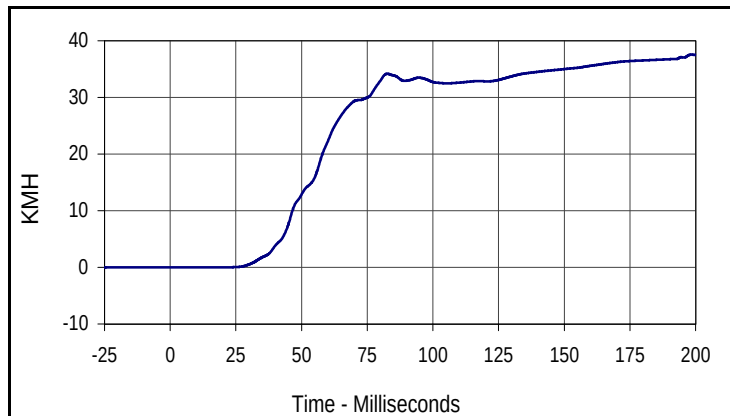
Curve Description			
Passenger Lower Spine Redundant Y			
CURNO	Type	SAE Class	Units
041	FIL	180	G's
Max	Time	Min	Time
60.8	44.9	-11.6	67.4



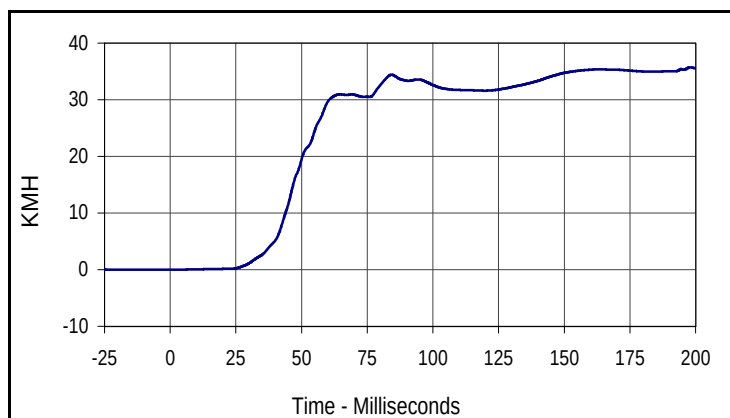
Curve Description			
Passenger Pelvis Redundant Y			
CURNO	Type	SAE Class	Units
042	FIL	1000	G's
Max	Time	Min	Time
99.3	38.9	-15.2	67.4

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

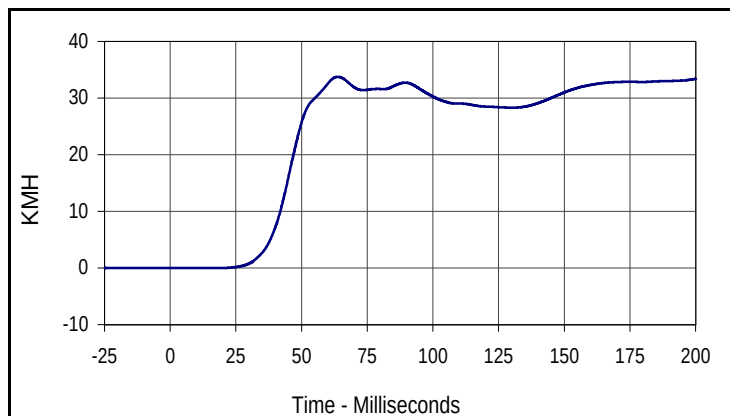
Test Date: 2/26/04
 NHTSA No.: M45113



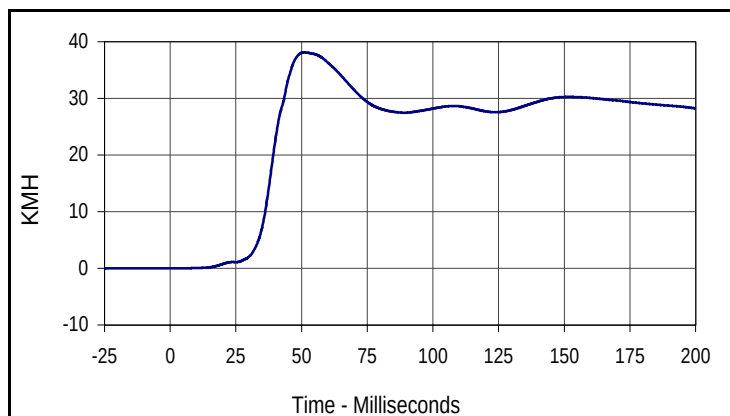
Curve Description			
Passenger Upper Rib Redundant Y Velocity			
CURNO	Type	SAE Class	Units
039	IN1	180	KMH
Max	Time	Min	Time
37.6	198.4	0.0	5.0



Curve Description			
Passenger Lower Rib Redundant Y Velocity			
CURNO	Type	SAE Class	Units
040	IN1	180	KMH
Max	Time	Min	Time
35.7	198.0	0.0	2.0



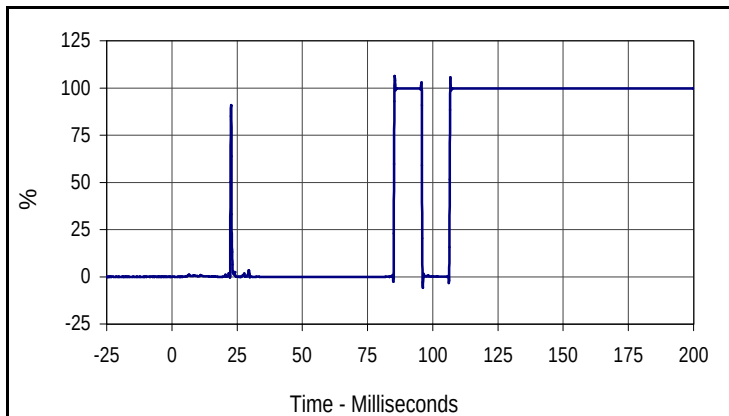
Curve Description			
Passenger Lower Spine Redundant Y Velocity			
CURNO	Type	SAE Class	Units
041	IN1	180	KMH
Max	Time	Min	Time
33.8	63.8	0.0	4.9



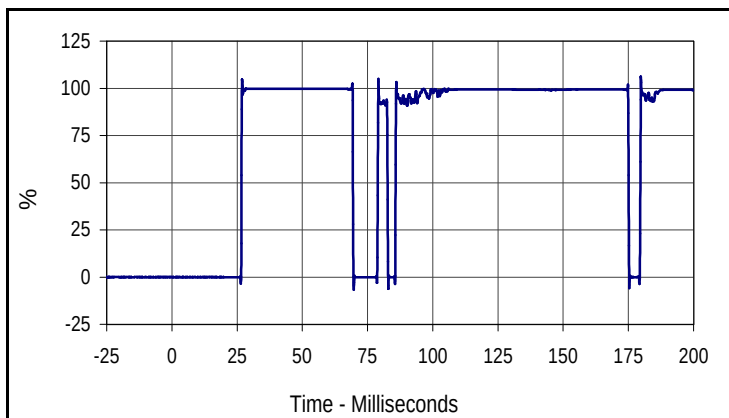
Curve Description			
Passenger Pelvis Redundant Y Velocity			
CURNO	Type	SAE Class	Units
042	IN1	180	KMH
Max	Time	Min	Time
38.1	51.0	0.0	0.9

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/26/04
 NHTSA No.: M45113



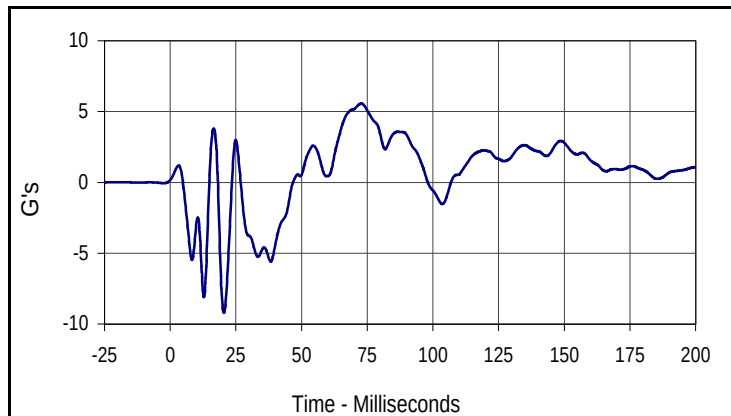
Curve Description			
Passenger Thorax Contact			
CURNO	Type	SAE Class	Units
043	FIL	1000	%
Max	Time	Cross %	Time
106.2	85.4	50.0	45.6



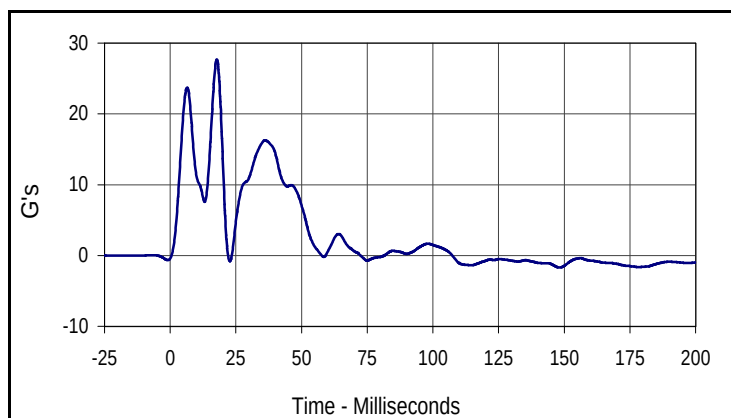
Curve Description			
Passenger Pelvis Contact			
CURNO	Type	SAE Class	Units
044	FIL	1000	%
Max	Time	Cross %	Time
105.9	179.8	50.0	26.3

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

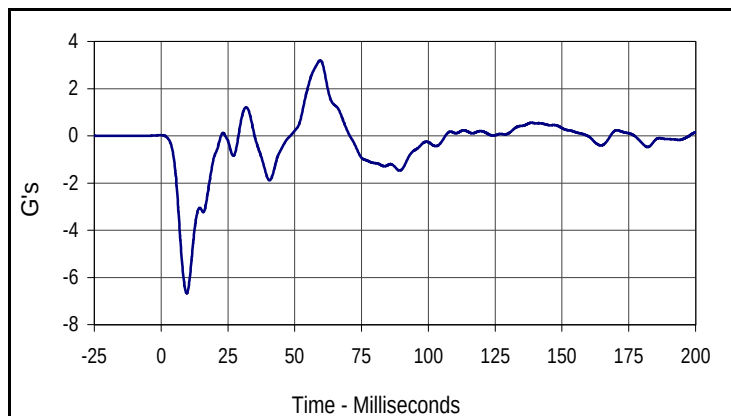
Test Date: 2/26/04
 NHTSA No.: M45113



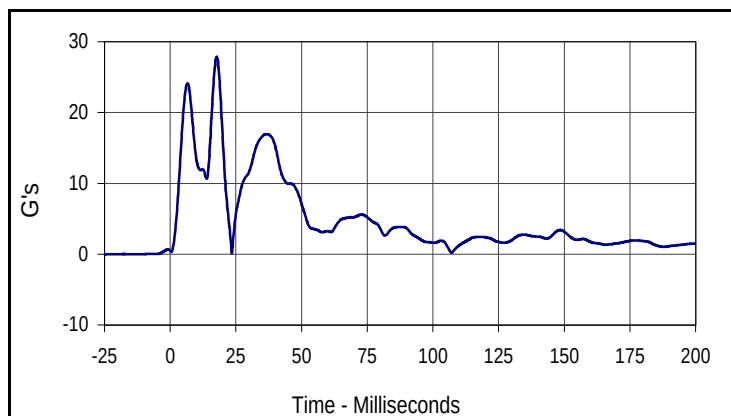
Curve Description			
Vehicle Right Sill at Front Seat X			
CURNO	Type	SAE Class	Units
045	FIL	60	G's
Max	Time	Min	Time
5.6	72.8	-9.2	20.4



Curve Description			
Vehicle Right Sill at Front Seat Y			
CURNO	Type	SAE Class	Units
046	FIL	60	G's
Max	Time	Min	Time
27.7	17.8	-1.7	148.1



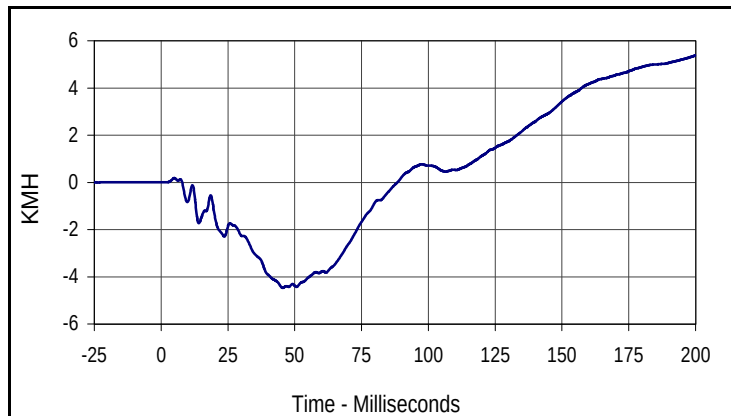
Curve Description			
Vehicle Right Sill at Front Seat Z			
CURNO	Type	SAE Class	Units
047	FIL	60	G's
Max	Time	Min	Time
3.2	59.6	-6.7	9.6



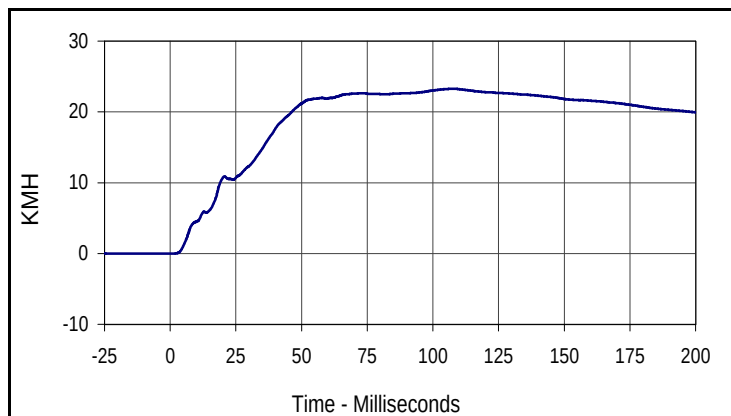
Curve Description			
Vehicle Right Sill Front Seat Resultant			
CURNO	Type	SAE Class	Units
045	RES	60	G's
Max	Time	Min	Time
27.9	17.7	0.1	23.5

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

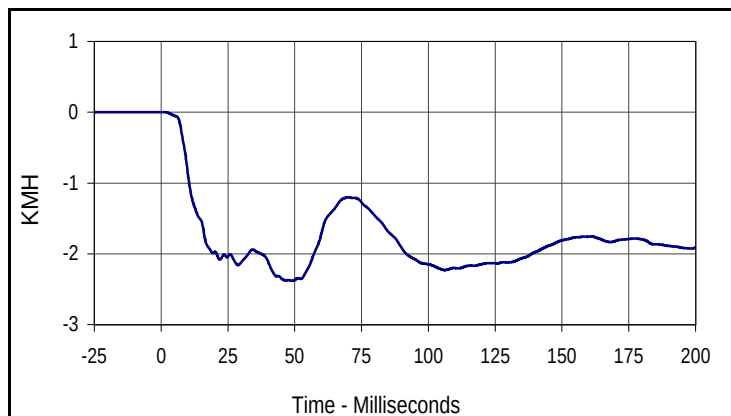
Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
Vehicle Right Sill at Front Seat X Velocity			
CURNO	Type	SAE Class	Units
045	IN1	180	KMH
Max	Time	Min	Time
5.4	200.0	-4.5	45.5



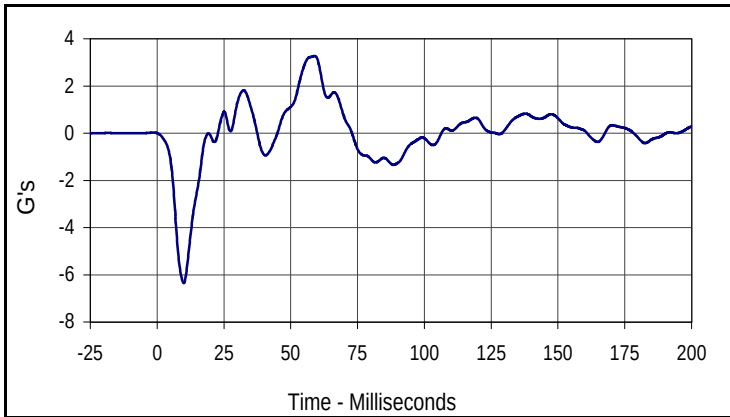
Curve Description			
Vehicle Right Sill at Front Seat Y Velocity			
CURNO	Type	SAE Class	Units
046	IN1	180	KMH
Max	Time	Min	Time
23.3	107.7	0.0	1.0



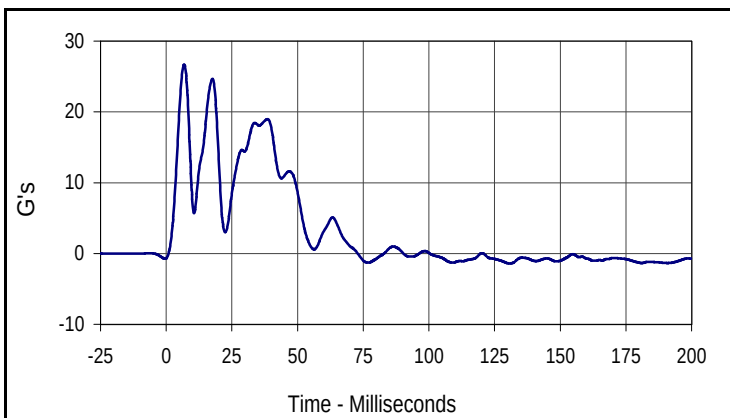
Curve Description			
Vehicle Right Sill at Front Seat Z Velocity			
CURNO	Type	SAE Class	Units
047	IN1	180	KMH
Max	Time	Min	Time
0.0	1.1	-2.4	49.0

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

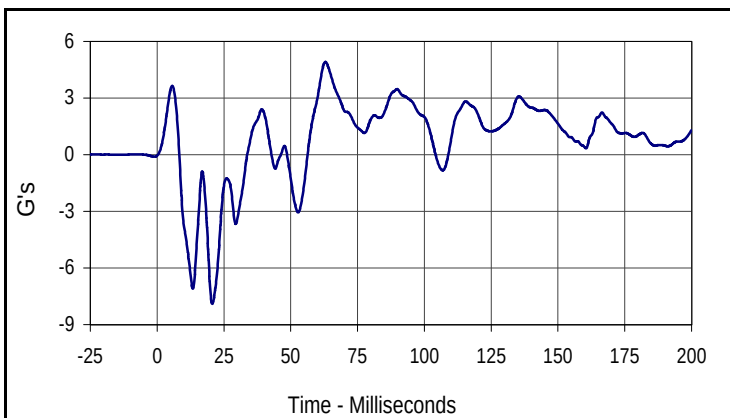
Test Date: 2/26/04
 NHTSA No.: M45113



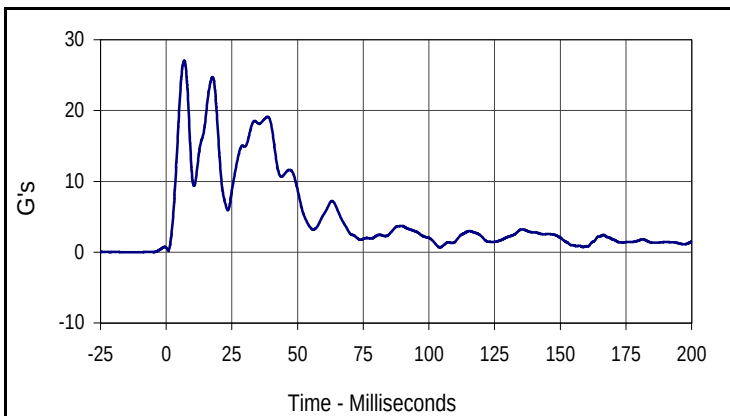
Curve Description			
Vehicle Right Sill at Rear Seat X			
CURNO	Type	SAE Class	Units
048	FIL	60	G's
Max	Time	Min	Time
3.3	59.0	-6.3	10.0



Curve Description			
Vehicle Right Sill at Rear Seat Y			
CURNO	Type	SAE Class	Units
049	FIL	60	G's
Max	Time	Min	Time
26.7	6.8	-1.4	130.8



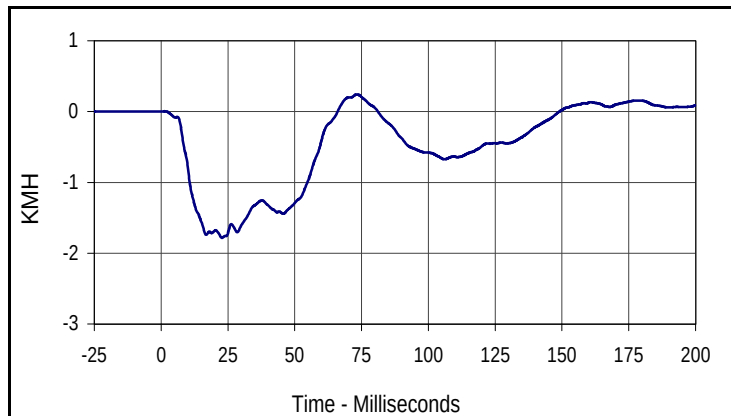
Curve Description			
Vehicle Right Sill at Rear Seat Z			
CURNO	Type	SAE Class	Units
050	FIL	60	G's
Max	Time	Min	Time
4.9	63.0	-7.9	20.7



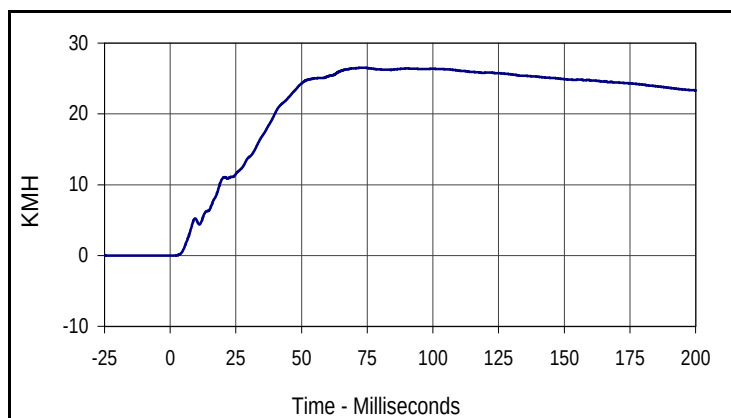
Curve Description			
Vehicle Right Sill Rear Seat Resultant			
CURNO	Type	SAE Class	Units
048	RES	60	G's
Max	Time	Min	Time
27.1	6.8	0.2	0.9

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

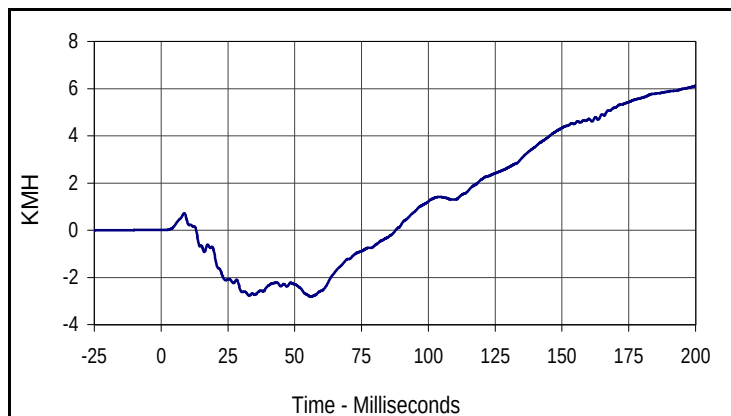
Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
Vehicle Right Sill at Rear Seat X Velocity			
CURNO	Type	SAE Class	Units
048	IN1	180	KMH
Max	Time	Min	Time
0.2	73.3	-1.8	22.7



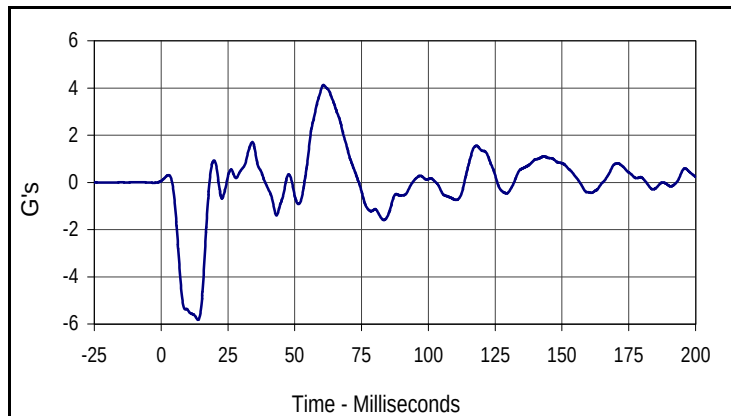
Curve Description			
Vehicle Right Sill at Rear Seat Y Velocity			
CURNO	Type	SAE Class	Units
049	IN1	180	KMH
Max	Time	Min	Time
26.5	72.8	0.0	1.3



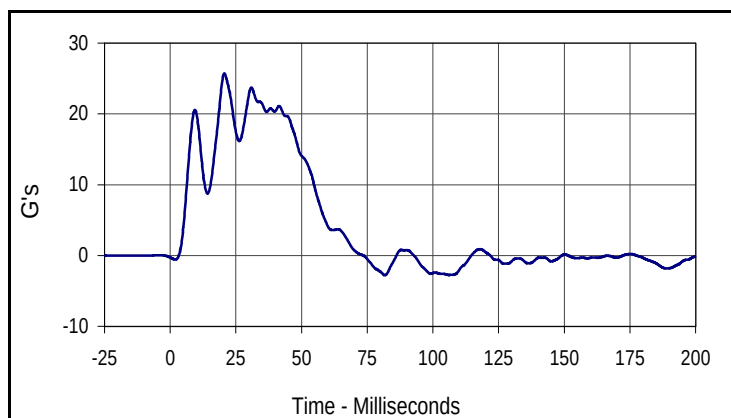
Curve Description			
Vehicle Right Sill at Rear Seat Z Velocity			
CURNO	Type	SAE Class	Units
050	IN1	180	KMH
Max	Time	Min	Time
6.1	200.0	-2.8	56.0

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

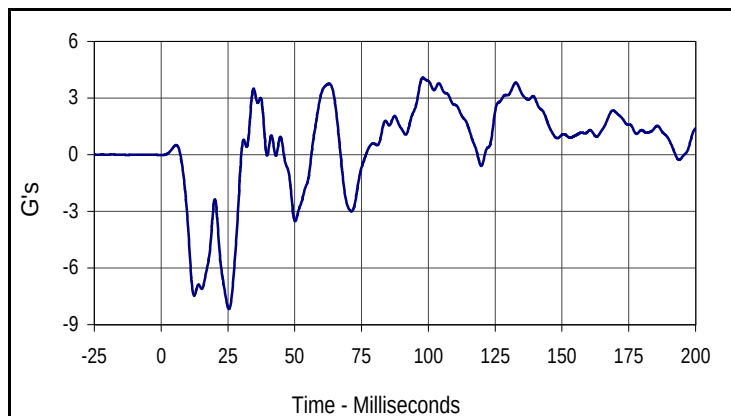
Test Date: 2/26/04
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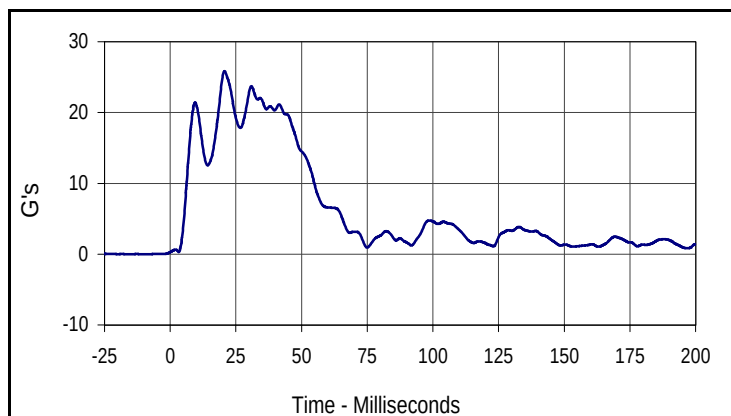
Curve Description			
Vehicle Rear Floor Above Axle X			
CURNO	Type	SAE Class	Units
051	FIL	60	G's
Max	Time	Min	Time
4.1	60.7	-5.8	13.8



Curve Description			
Vehicle Rear Floor Above Axle Y			
CURNO	Type	SAE Class	Units
052	FIL	60	G's
Max	Time	Min	Time
25.7	20.6	-2.8	81.7



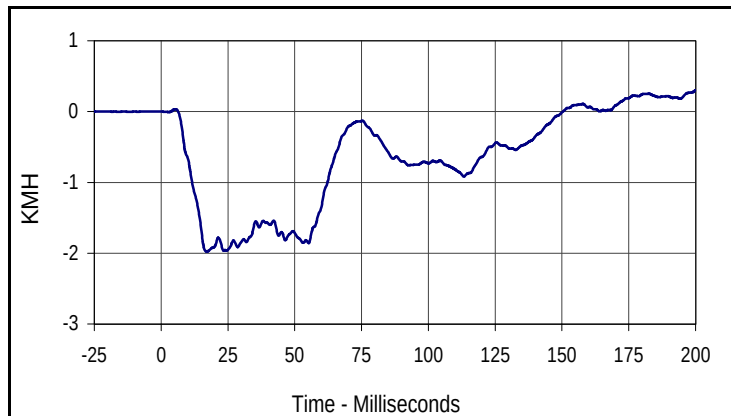
Curve Description			
Vehicle Rear Floor Above Axle Z			
CURNO	Type	SAE Class	Units
053	FIL	60	G's
Max	Time	Min	Time
4.1	97.9	-8.2	25.4



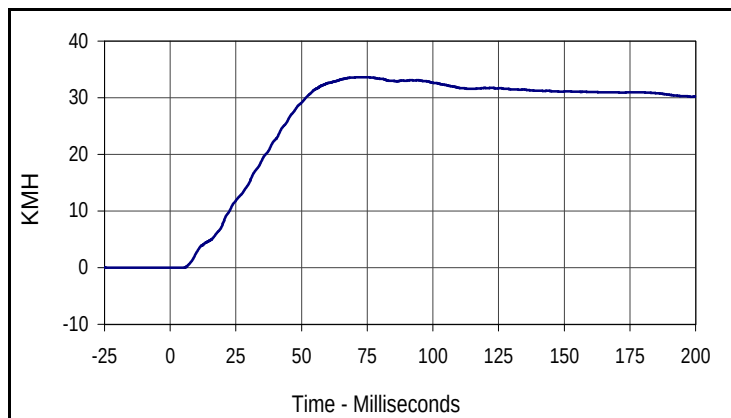
Curve Description			
Vehicle Rear Floor Above Axle Resultant			
CURNO	Type	SAE Class	Units
051	RES	60	G's
Max	Time	Min	Time
25.9	20.7	0.3	0.0

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

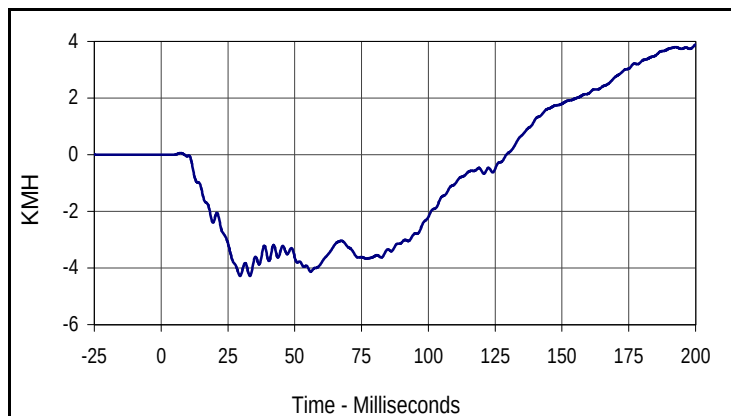
Test Date: 2/26/04
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Curve Description			
Vehicle Rear Floor Above Axle X Velocity			
CURNO	Type	SAE Class	Units
051	FIL	180	KMH
Max	Time	Min	Time
0.3	200.0	-2.0	17.0



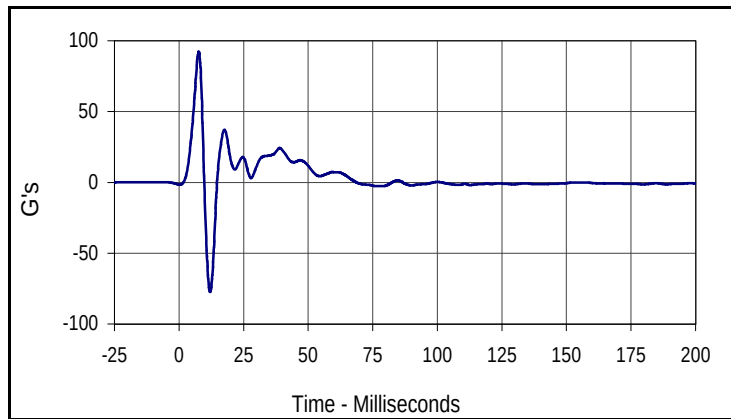
Curve Description			
Vehicle Rear Floor Above Axle Y Velocity			
CURNO	Type	SAE Class	Units
052	FIL	180	KMH
Max	Time	Min	Time
33.6	74.5	0.0	4.8



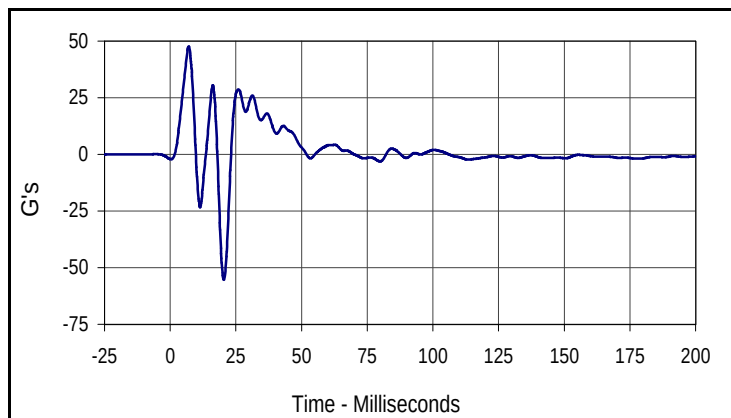
Curve Description			
Vehicle Rear Floor Above Axle Z Velocity			
CURNO	Type	SAE Class	Units
053	FIL	180	KMH
Max	Time	Min	Time
3.9	200.0	-4.3	33.2

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

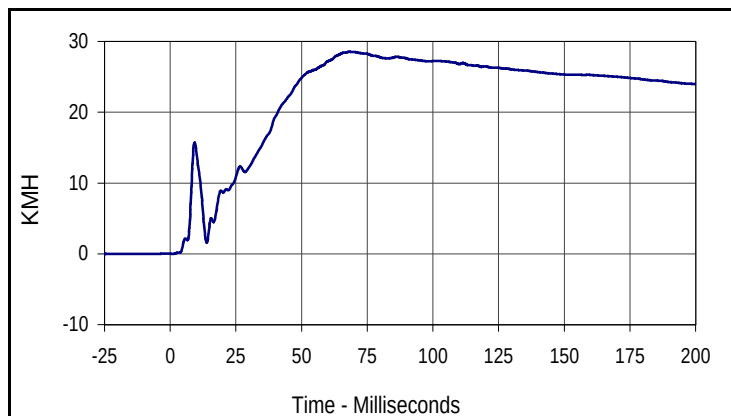
Test Date: 2/26/04
 NHTSA No.: M45113



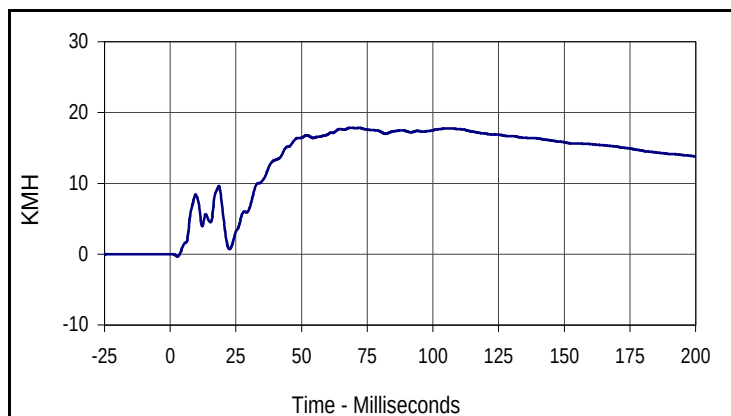
Curve Description			
Vehicle Left Sill at Rear Door Y			
CURNO	Type	SAE Class	Units
054	FIL	60	G's
Max	Time	Min	Time
92.3	7.6	-77.5	12.0



Curve Description			
Vehicle Left Sill at Front Door Y			
CURNO	Type	SAE Class	Units
055	FIL	60	G's
Max	Time	Min	Time
47.6	7.0	-55.3	20.4



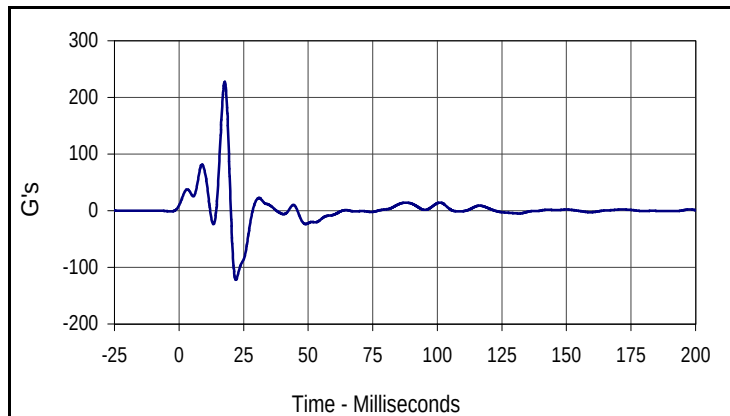
Curve Description			
Vehicle Left Sill at Rear Door Y Velocity			
CURNO	Type	SAE Class	Units
054	IN1	180	KMH
Max	Time	Min	Time
28.5	68.2	0.0	1.0



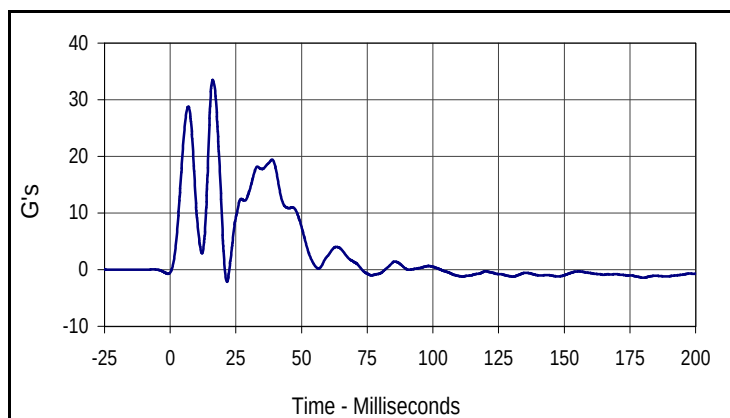
Curve Description			
Vehicle Left Sill at Front Door Y Velocity			
CURNO	Type	SAE Class	Units
055	IN1	180	KMH
Max	Time	Min	Time
17.9	68.9	-0.3	2.8

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

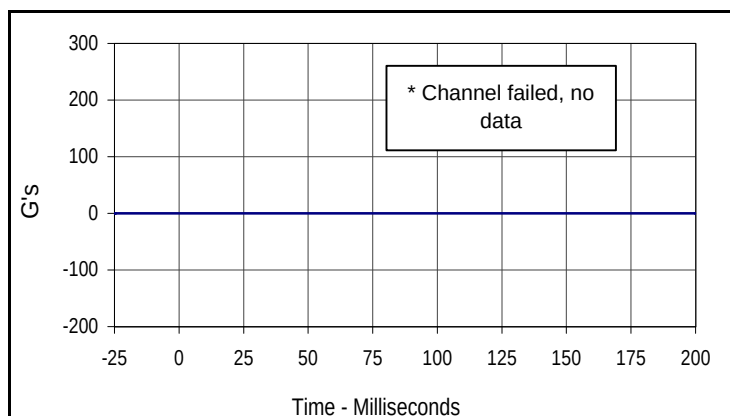
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Curve Description			
Vehicle Left Front Door CL Y			
CURNO	Type	SAE Class	Units
056	FIL	60	G's
Max	Time	Min	Time
227.5	17.7	-121.9	22.0

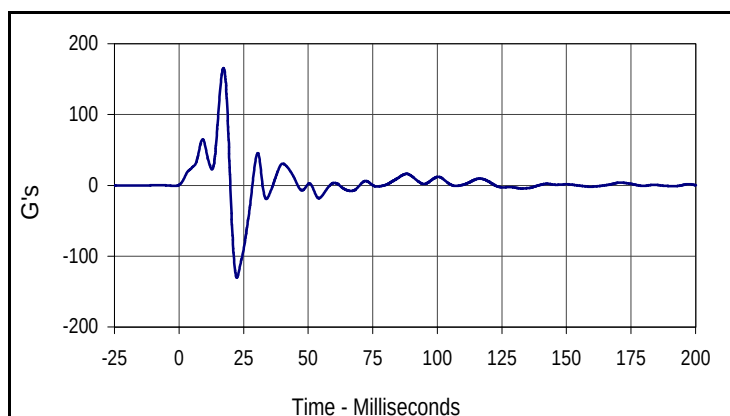


Curve Description			
Vehicle Right Rear Occupant Compartment			
CURNO	Type	SAE Class	Units
057	FIL	60	G's
Max	Time	Min	Time
33.5	16.2	-2.2	21.6



Curve Description			
Vehicle Left Front Door Mid Rear Y			
CURNO	Type	SAE Class	Units
058	FIL	60	G's
Max	Time	Min	Time
0.0	0.0	0.0	0.0

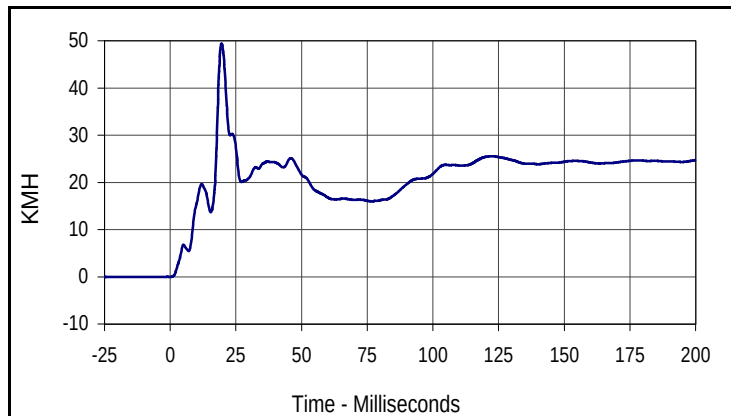
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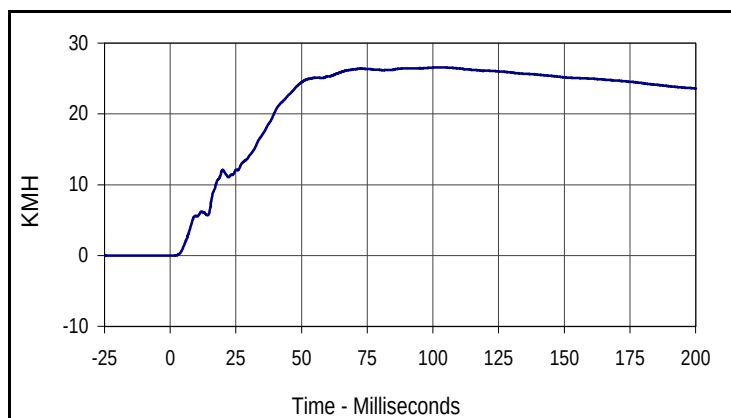
Curve Description			
Vehicle Left Front Door Upper CL Y			
CURNO	Type	SAE Class	Units
059	FIL	60	G's
Max	Time	Min	Time
165.5	17.2	-130.5	22.4

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

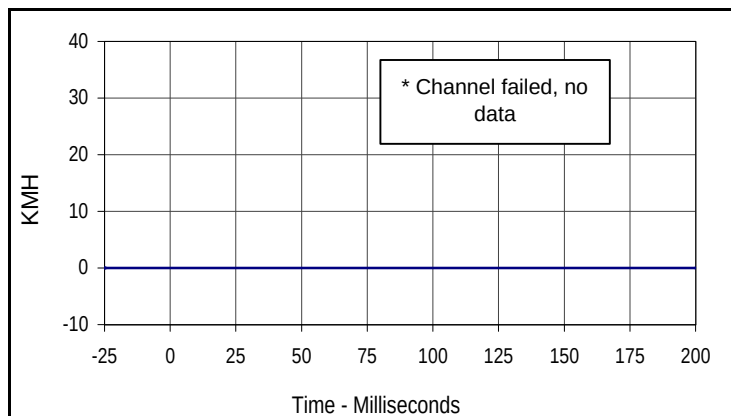
Test Date: 2/26/04
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Curve Description			
Vehicle Left Front Door CL Y Velocity			
CURNO	Type	SAE Class	Units
056	IN1	180	KMH
Max	Time	Min	Time
49.4	19.6	0.0	0.1

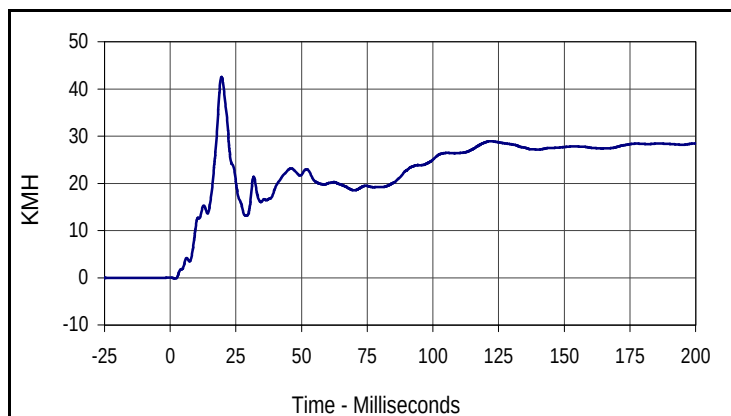


Curve Description			
Vehicle Right Rear Occupant Compartment Y Velocity			
CURNO	Type	SAE Class	Units
057	IN1	180	KMH
Max	Time	Min	Time
26.6	103.4	0.0	1.0



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

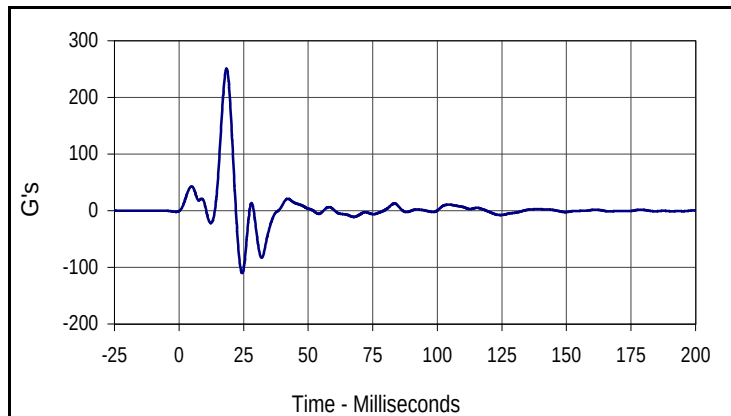
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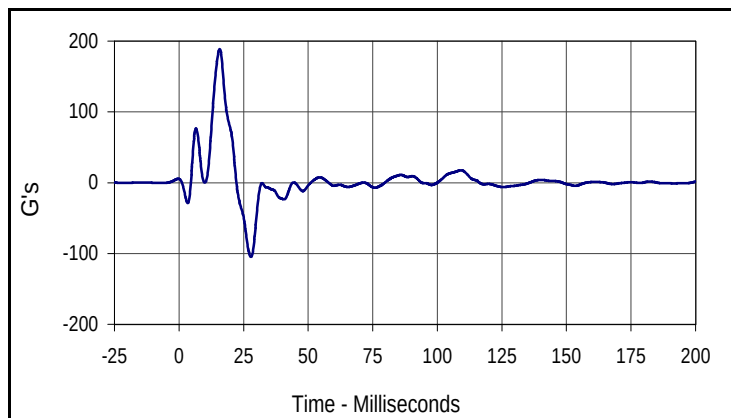
Curve Description			
Vehicle Left Front Door Upper CL Y Velocity			
CURNO	Type	SAE Class	Units
059	IN1	180	KMH
Max	Time	Min	Time
42.5	19.5	-0.2	2.0

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

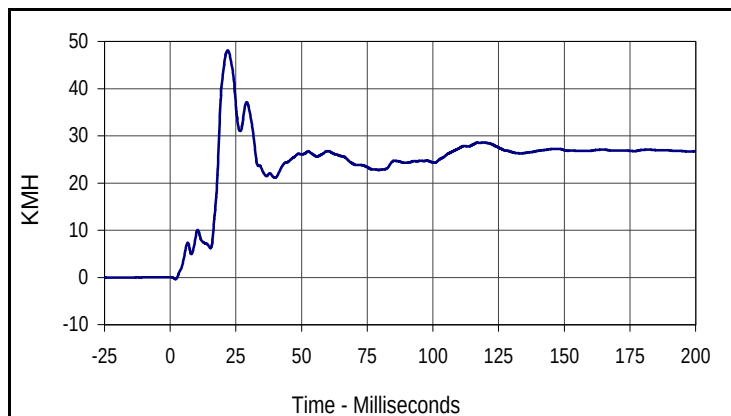
Test Date: 2/26/04
 NHTSA No.: M45113



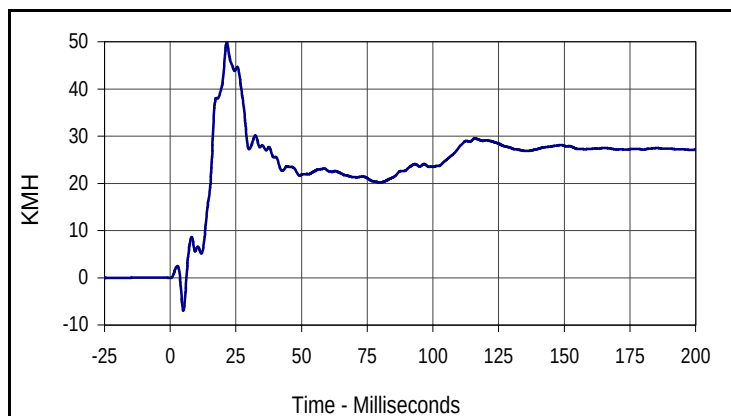
Curve Description			
Vehicle Left Rear Door Mid Rear Y			
CURNO	Type	SAE Class	Units
060	FIL	60	G's
Max	Time	Min	Time
250.8	18.4	-110.3	24.4



Curve Description			
Vehicle Left Rear Door Upper CL Y			
CURNO	Type	SAE Class	Units
061	FIL	60	G's
Max	Time	Min	Time
188.7	15.7	-104.8	27.8



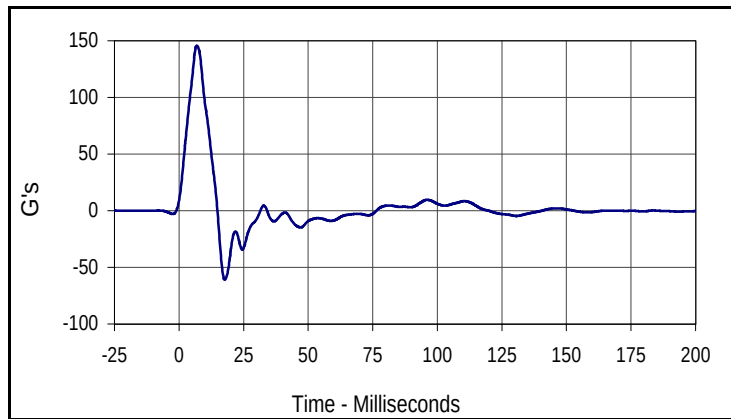
Curve Description			
Vehicle Left Rear Door Mid Rear Y Velocity			
CURNO	Type	SAE Class	Units
060	IN1	180	KMH
Max	Time	Min	Time
48.1	21.9	-0.4	2.1



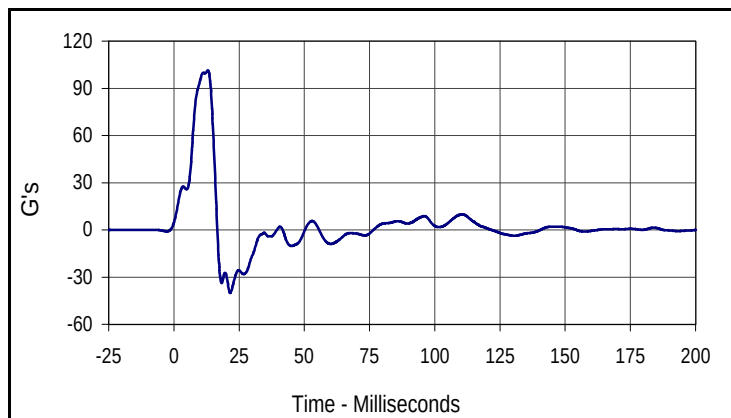
Curve Description			
Vehicle Left Rear Door Upper CL Y Velocity			
CURNO	Type	SAE Class	Units
061	IN1	180	KMH
Max	Time	Min	Time
49.8	21.5	-7.0	5.0

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

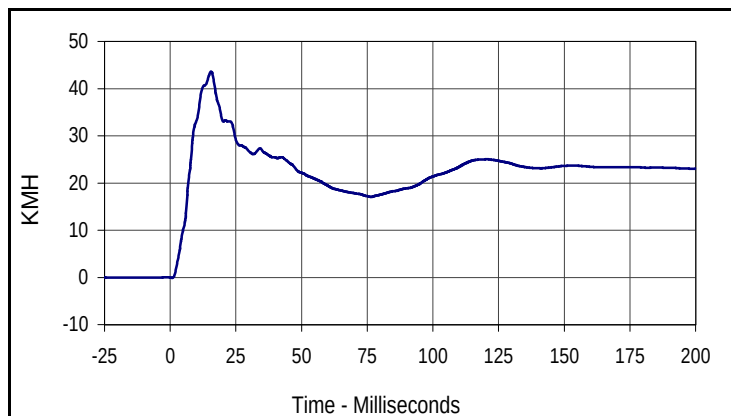
Test Date: 2/26/04
 NHTSA No.: M45113



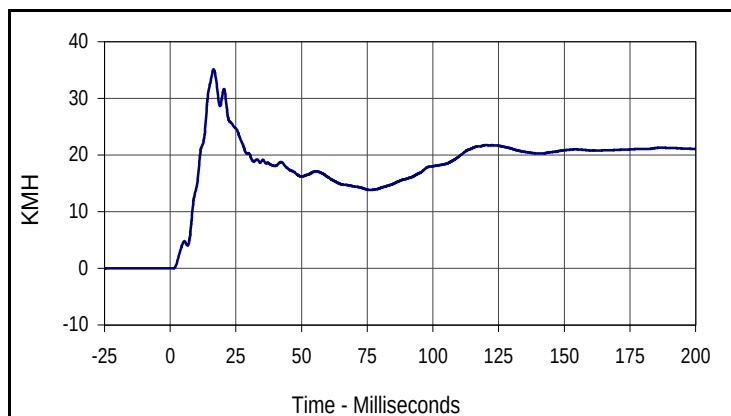
Curve Description			
Vehicle B-Post Lower Y			
CURNO	Type	SAE Class	Units
062	FIL	60	G's
Max	Time	Min	Time
145.8	6.9	-61.0	17.7



Curve Description			
Vehicle B-Post Middle Y			
CURNO	Type	SAE Class	Units
063	FIL	60	G's
Max	Time	Min	Time
101.3	13.0	-40.0	21.6



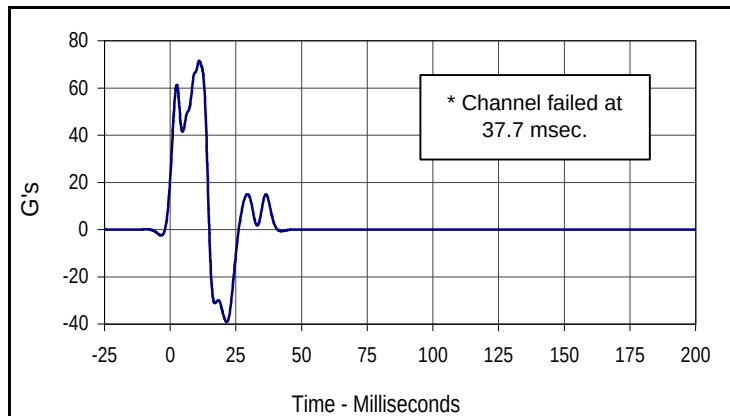
Curve Description			
Vehicle B-Post Lower Y Velocity			
CURNO	Type	SAE Class	Units
062	IN1	180	KMH
Max	Time	Min	Time
43.6	15.6	-0.1	0.7



Curve Description			
Vehicle B-Post Middle Y Velocity			
CURNO	Type	SAE Class	Units
063	IN1	180	KMH
Max	Time	Min	Time
35.1	16.5	0.0	1.0

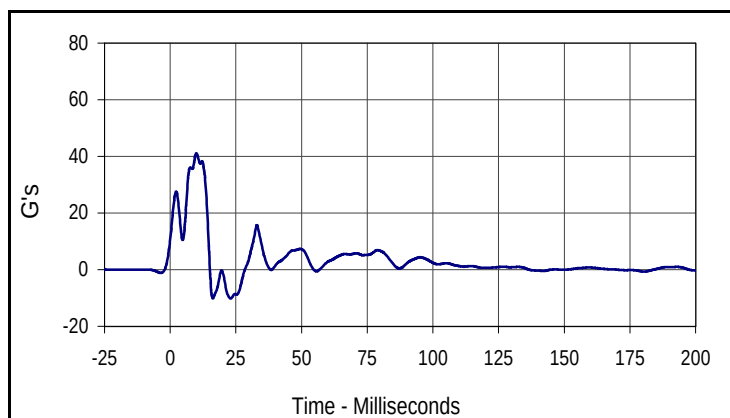
Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/26/04
 NHTSA No.: M45113

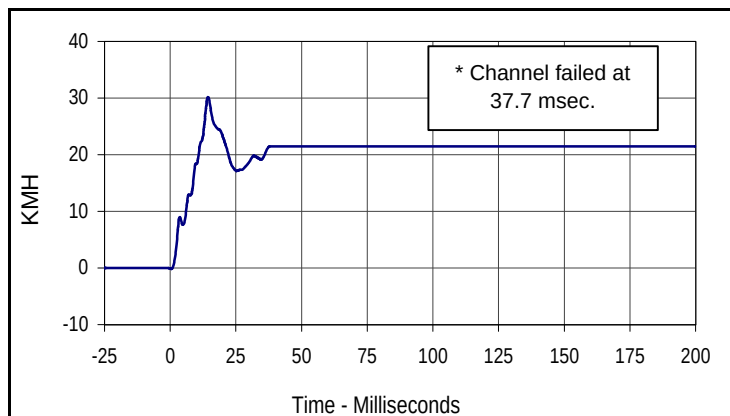


Curve Description			
Vehicle A-Post Lower Y			
CURNO	Type	SAE Class	Units
064	FIL	60	G's
Max	Time	Min	Time
71.5	11.0	-39.2	21.5

* Channel failed at 37.7 msec.

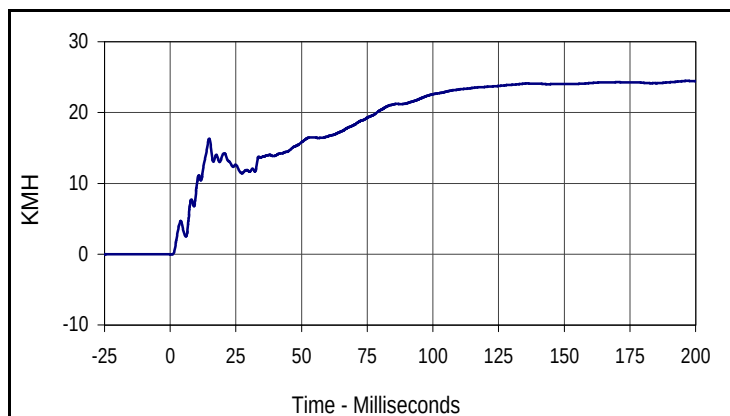


Curve Description			
Vehicle A-Post Middle Y			
CURNO	Type	SAE Class	Units
065	FIL	60	G's
Max	Time	Min	Time
41.1	10.0	-10.2	23.0



Curve Description			
Vehicle A-Post Lower Y Velocity			
CURNO	Type	SAE Class	Units
064	IN1	180	KMH
Max	Time	Min	Time
30.2	14.4	-0.2	0.4

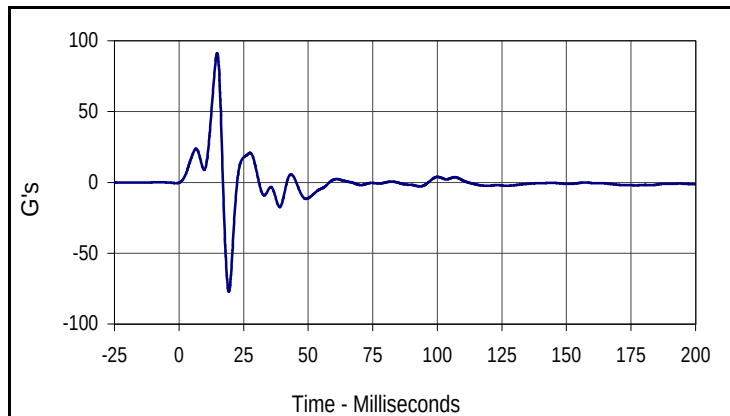
* Channel failed at 37.7 msec.



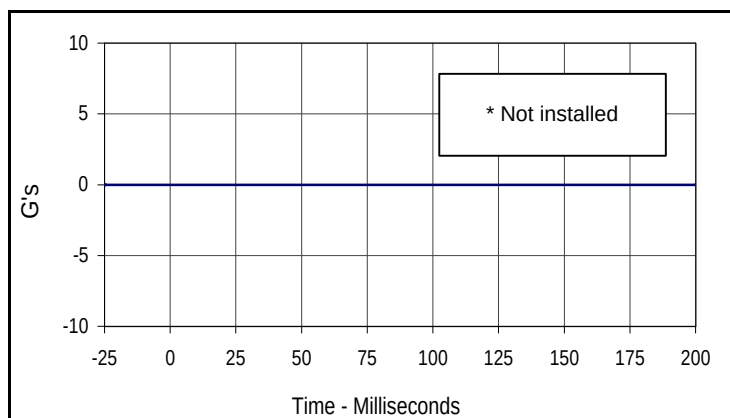
Curve Description			
Vehicle A-Post Middle Y Velocity			
CURNO	Type	SAE Class	Units
065	IN1	180	KMH
Max	Time	Min	Time
24.5	196.7	-0.1	0.6

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/26/04
 NHTSA No.: M45113

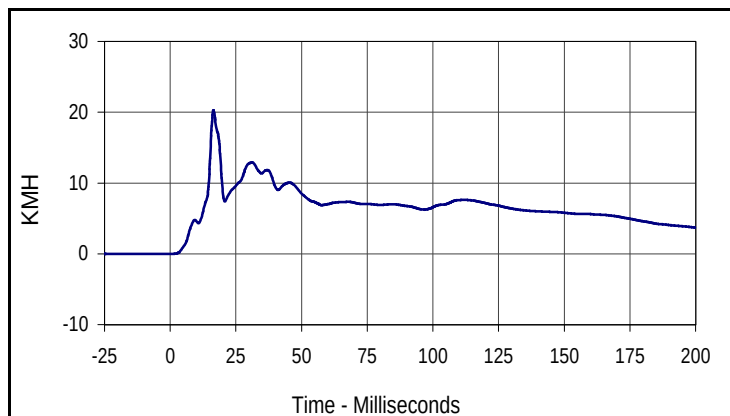


Curve Description			
Vehicle Left Front Seat Track			
CURNO	Type	SAE Class	Units
066	FIL	60	G's
Max	Time	Min	Time
91.2	14.8	-77.2	19.3

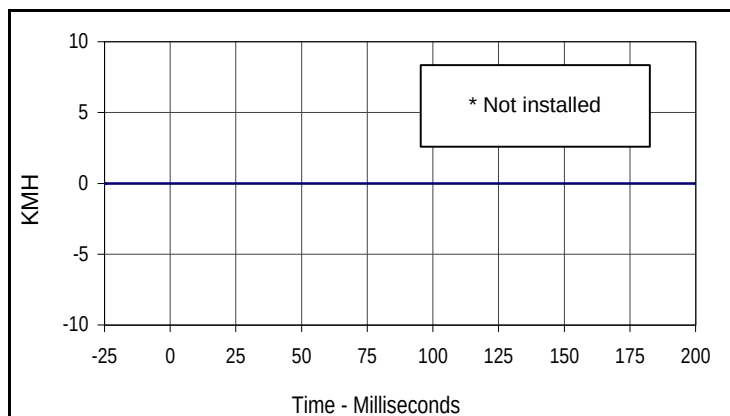


Curve Description			
Vehicle Rear Seat Structure			
CURNO	Type	SAE Class	Units
067	FIL	60	G's
Max	Time	Min	Time
0.0	0.0	0.0	0.0

* Not installed



Curve Description			
Vehicle Left Front Seat Track Y Velocity			
CURNO	Type	SAE Class	Units
066	IN1	180	KMH
Max	Time	Min	Time
20.3	16.5	0.0	0.6

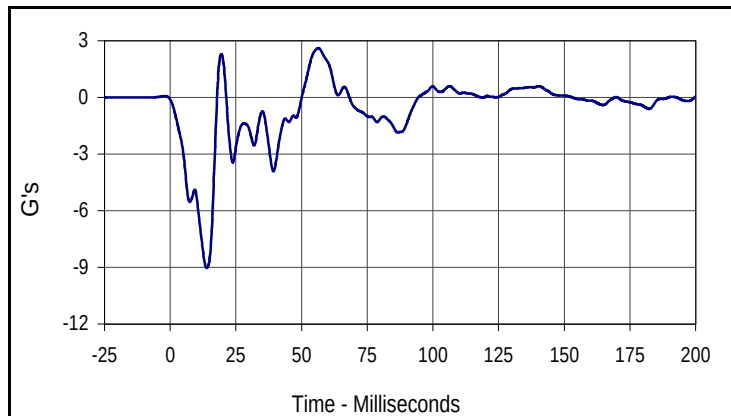


Curve Description			
Vehicle Rear Seat Structure Y Velocity			
CURNO	Type	SAE Class	Units
067	IN1	180	KMH
Max	Time	Min	Time
0.0	0.0	0.0	0.0

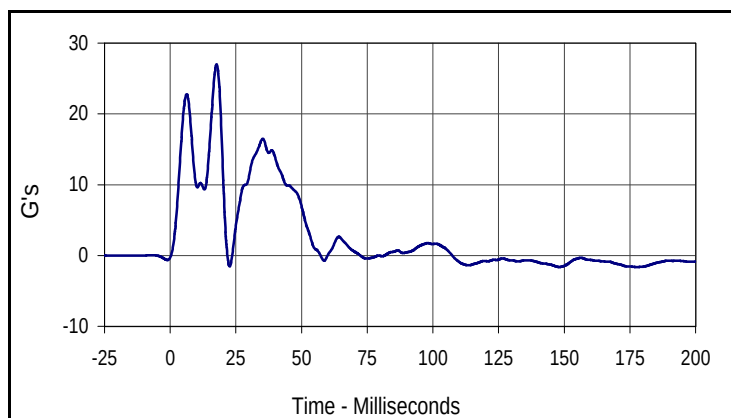
* Not installed

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

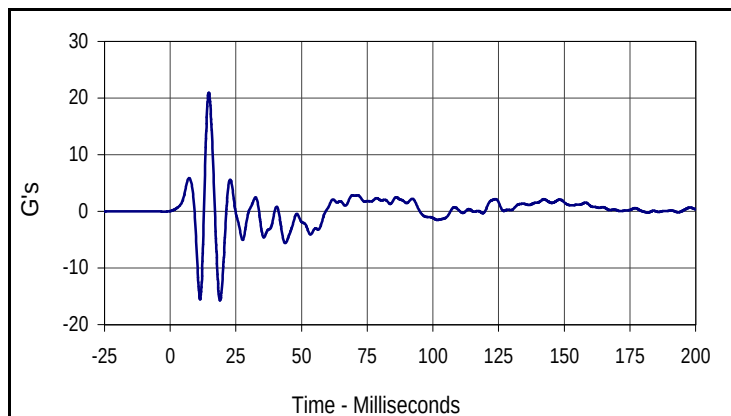
Test Date: 2/26/04
 NHTSA No.: M45113



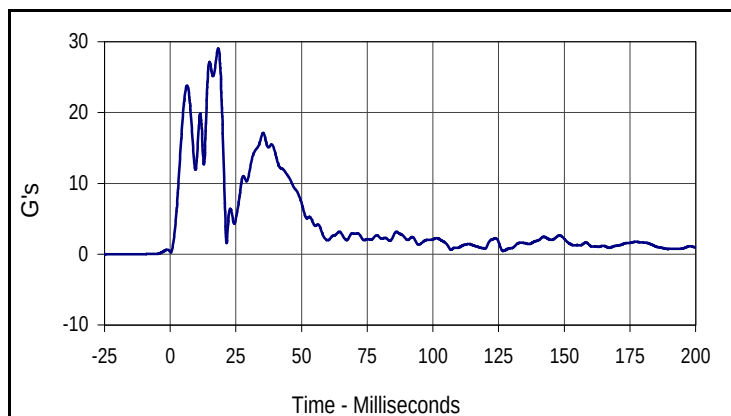
Curve Description			
Vehicle CG X			
CURNO	Type	SAE Class	Units
068	FIL	60	G's
Max	Time	Min	Time
2.6	56.4	-9.0	13.9



Curve Description			
Vehicle CG Y			
CURNO	Type	SAE Class	Units
069	FIL	60	G's
Max	Time	Min	Time
27.0	17.6	-1.6	177.6



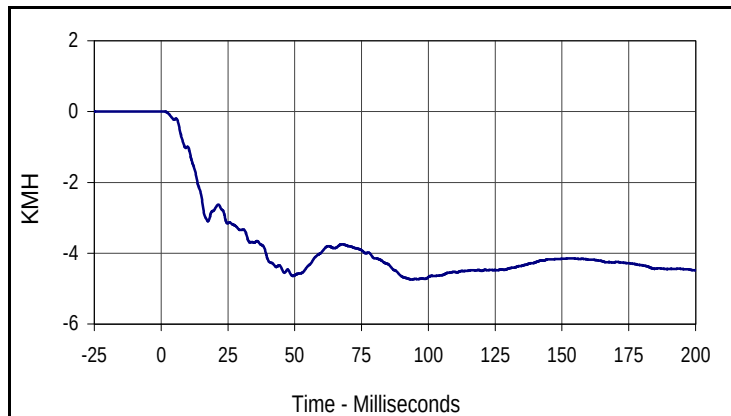
Curve Description			
Vehicle CG Z			
CURNO	Type	SAE Class	Units
070	FIL	60	G's
Max	Time	Min	Time
21.0	14.7	-15.7	19.0



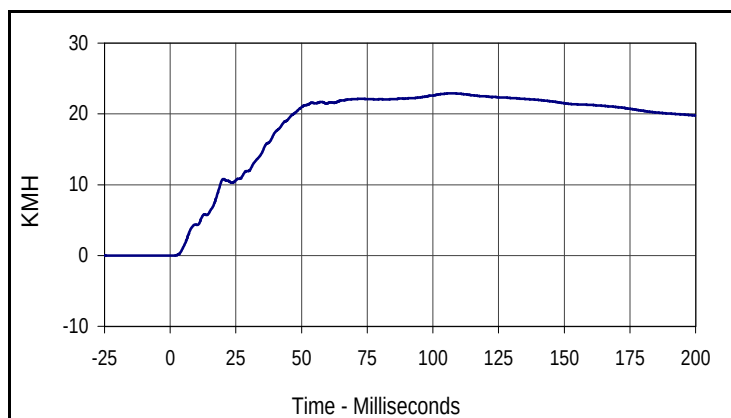
Curve Description			
Vehicle CG Resultant			
CURNO	Type	SAE Class	Units
068	RES	60	G's
Max	Time	Min	Time
29.1	18.3	0.2	0.3

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

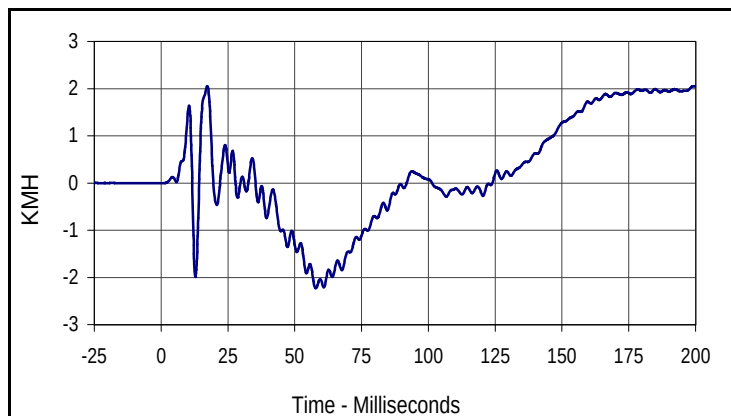
Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
Vehicle CG X Velocity			
CURNO	Type	SAE Class	Units
068	IN1	180	KMH
Max	Time	Min	Time
0.0	0.9	-4.7	93.7



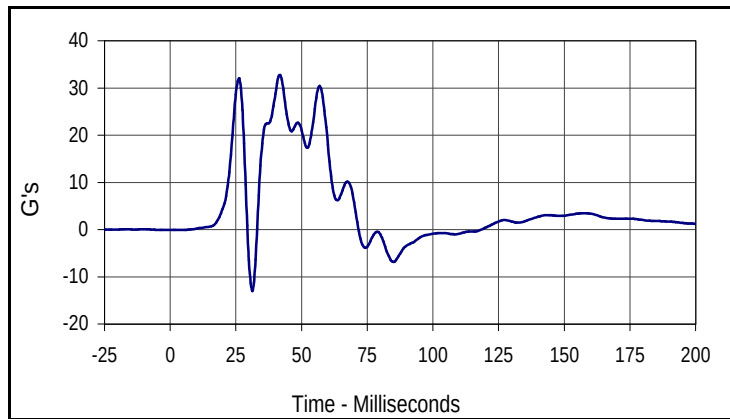
Curve Description			
Vehicle CG Y Velocity			
CURNO	Type	SAE Class	Units
069	IN1	180	KMH
Max	Time	Min	Time
22.9	107.4	0.0	1.0



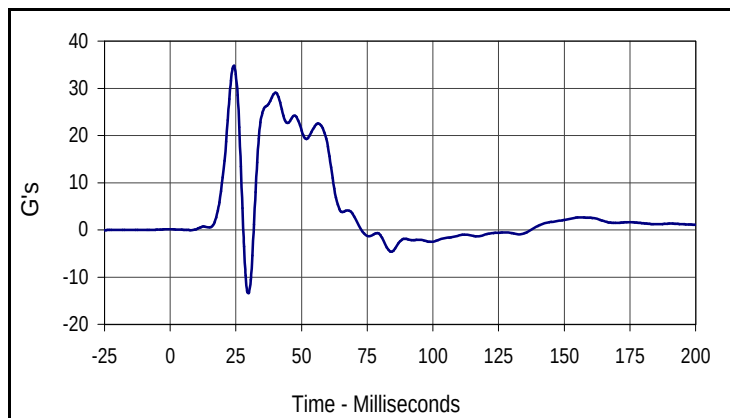
Curve Description			
Vehicle CG Z Velocity			
CURNO	Type	SAE Class	Units
070	IN1	180	KMH
Max	Time	Min	Time
2.1	199.2	-2.2	57.9

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

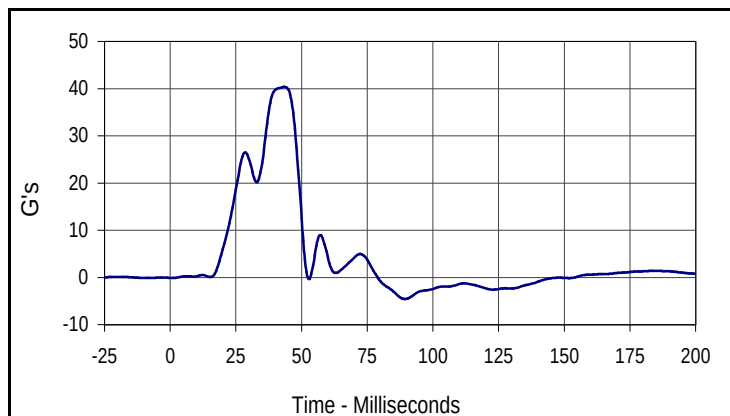
Test Date: 2/26/04
 NHTSA No.: M45113



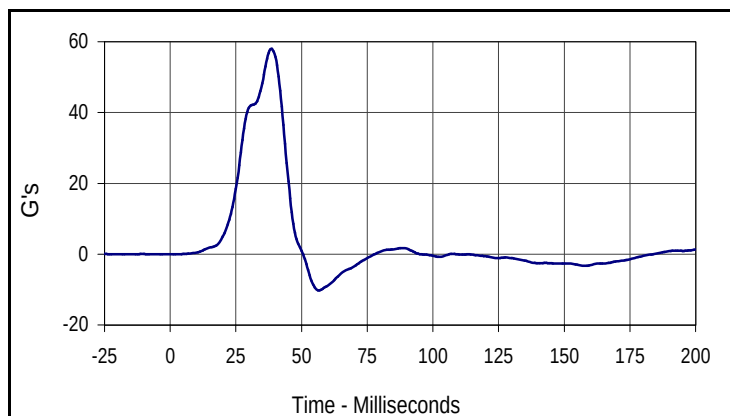
Curve Description			
Driver Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
013	FIR	FIR100	G's
Max	Time	Min	Time
32.7	41.9	-13.0	31.3



Curve Description			
Driver Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
014	FIR	FIR100	G's
Max	Time	Min	Time
34.8	24.4	-13.4	30.0



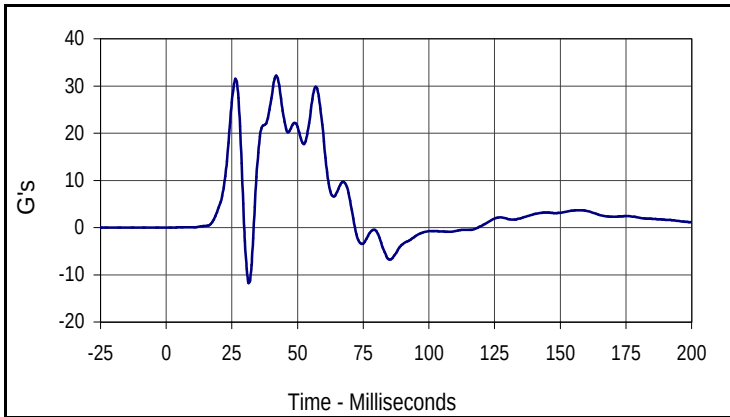
Curve Description			
Driver Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
015	FIR	FIR100	G's
Max	Time	Min	Time
40.4	43.8	-4.6	89.4



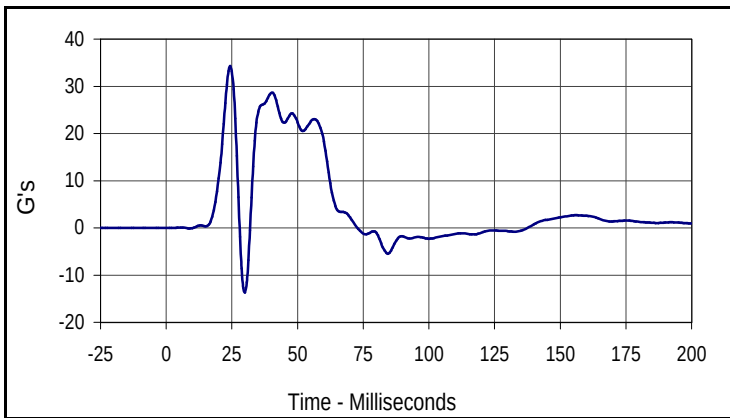
Curve Description			
Driver Pelvis Primary Y			
CURNO	Type	SAE Class	Units
016	FIR	FIR100	G's
Max	Time	Min	Time
58.0	38.8	-10.2	56.3

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

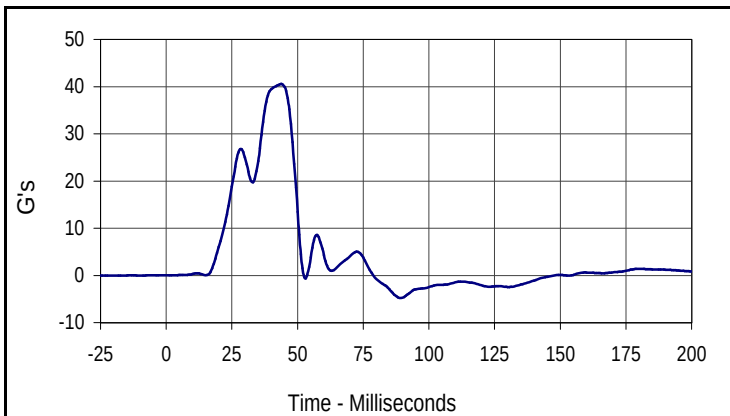
Test Date: 2/26/04
 NHTSA No.: M45113



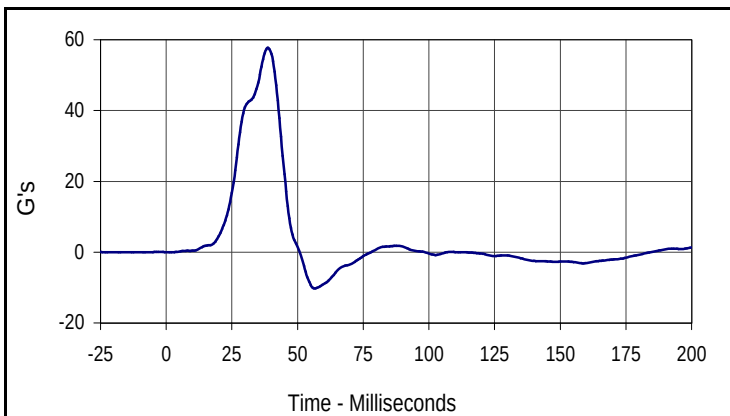
Curve Description			
Driver Upper Rib Redundant Y			
CURNO	Type	SAE Class	Units
017	FIR	FIR100	G's
Max	Time	Min	Time
32.2	41.9	-11.7	31.3



Curve Description			
Driver Lower Rib Redundant Y			
CURNO	Type	SAE Class	Units
018	FIR	FIR100	G's
Max	Time	Min	Time
34.3	24.4	-13.7	30.0



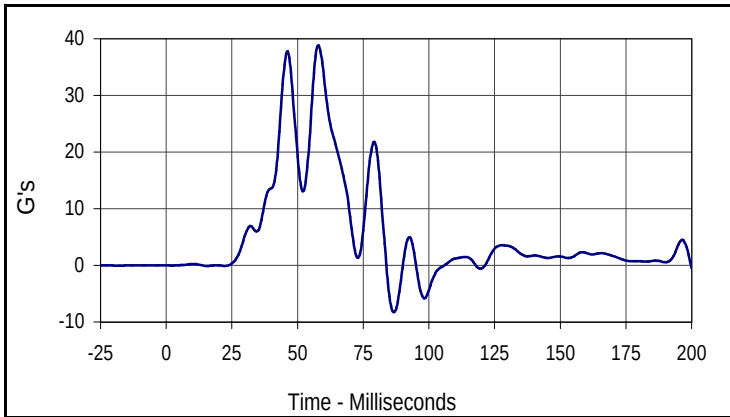
Curve Description			
Driver Lower Spine Redundant Y			
CURNO	Type	SAE Class	Units
019	FIR	FIR100	G's
Max	Time	Min	Time
40.5	43.8	-4.8	89.4



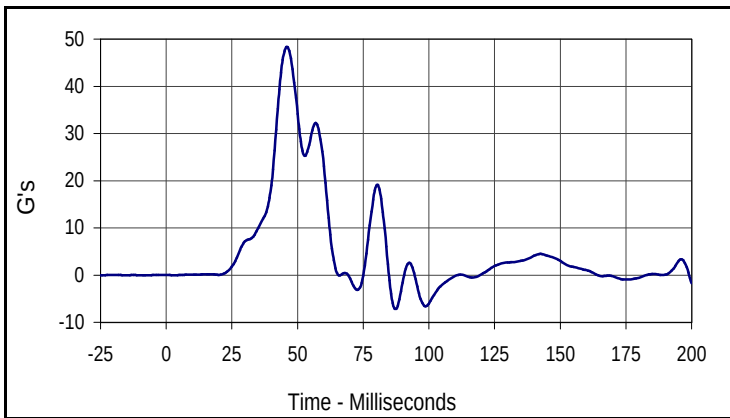
Curve Description			
Driver Pelvis Redundant Y			
CURNO	Type	SAE Class	Units
020	FIR	FIR100	G's
Max	Time	Min	Time
57.7	38.8	-10.2	56.9

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

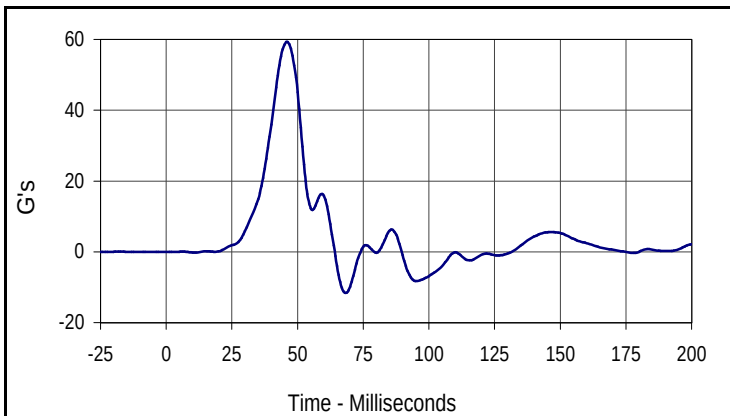
Test Date: 2/26/04
 NHTSA No.: M45113



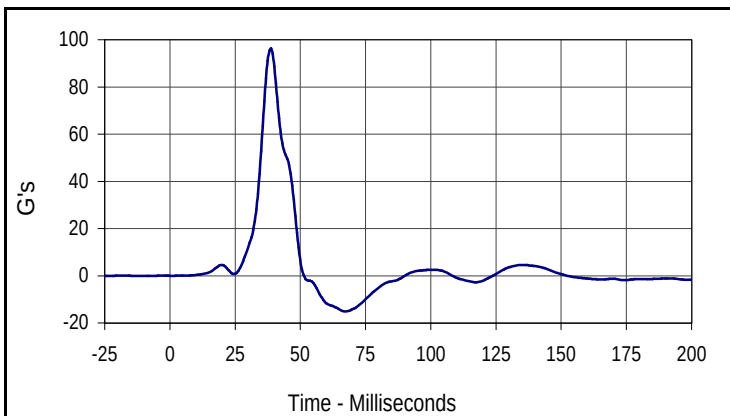
Curve Description			
Passenger Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
035	FIR	FIR100	G's
Max	Time	Min	Time
38.8	58.1	-8.3	86.9



Curve Description			
Passenger Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
036	FIR	FIR100	G's
Max	Time	Min	Time
48.3	46.3	-7.1	87.5



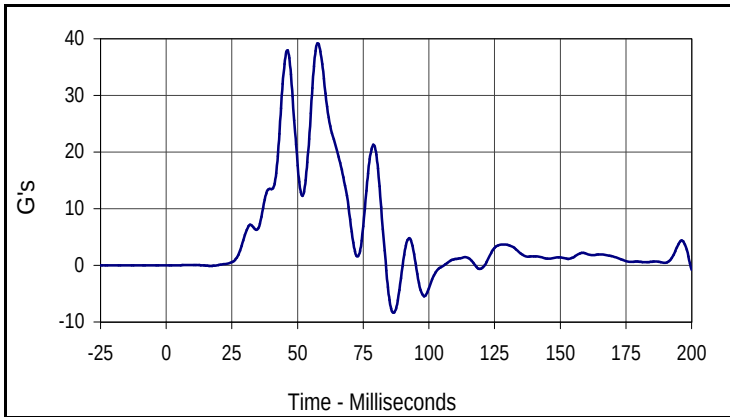
Curve Description			
Passenger Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
037	FIR	FIR100	G's
Max	Time	Min	Time
59.3	46.3	-11.6	68.1



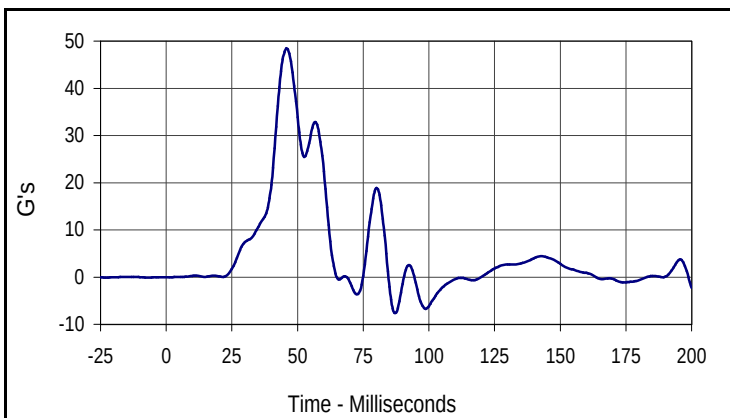
Curve Description			
Passenger Pelvis Primary Y			
CURNO	Type	SAE Class	Units
038	FIR	FIR100	G's
Max	Time	Min	Time
96.4	38.8	-15.1	67.5

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

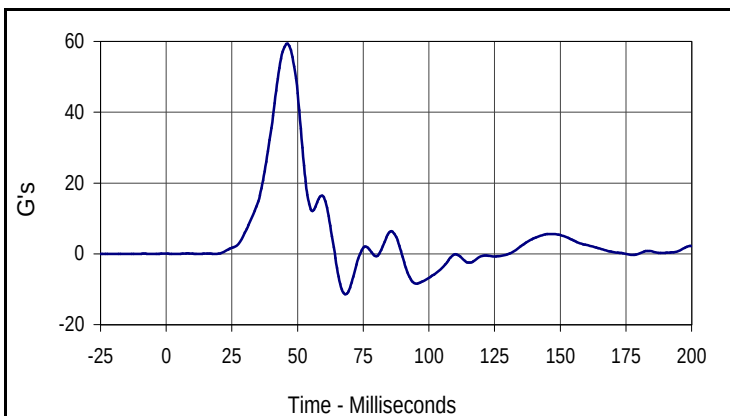
Test Date: 2/26/04
 NHTSA No.: M45113



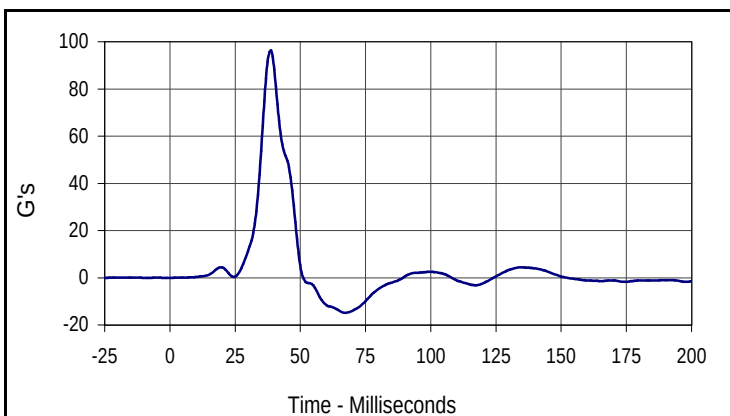
Curve Description			
Passenger Upper Rib Redundant Y			
CURNO	Type	SAE Class	Units
039	FIR	FIR100	G's
Max	Time	Min	Time
39.2	57.5	-8.3	86.3



Curve Description			
Passenger Lower Rib Redundant Y			
CURNO	Type	SAE Class	Units
040	FIR	FIR100	G's
Max	Time	Min	Time
48.4	45.6	-7.5	86.9



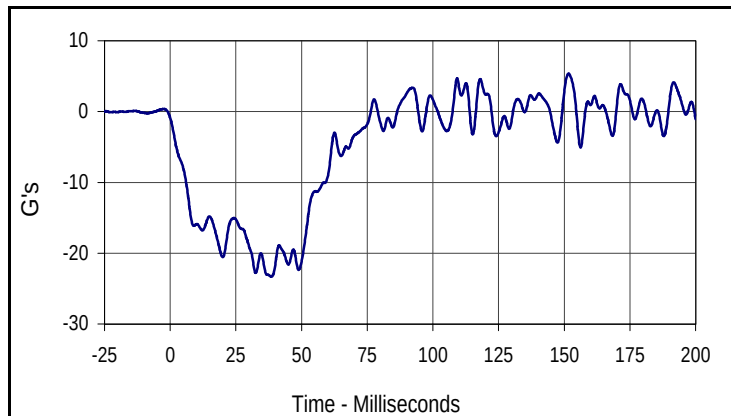
Curve Description			
Passenger Lower Spine Redundant Y			
CURNO	Type	SAE Class	Units
041	FIR	FIR100	G's
Max	Time	Min	Time
59.3	46.3	-11.4	68.1



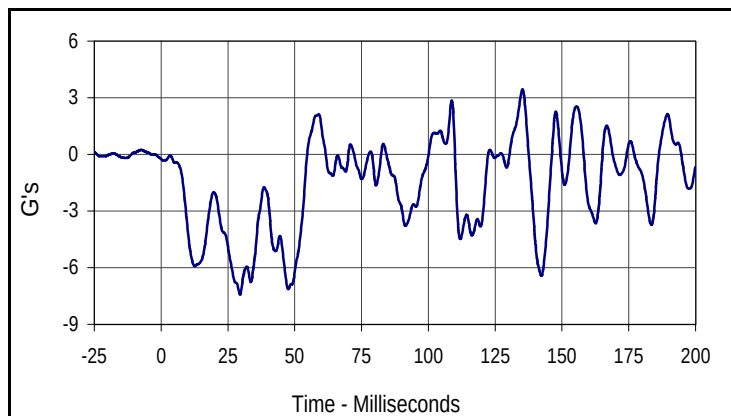
Curve Description			
Passenger Pelvis Redundant Y			
CURNO	Type	SAE Class	Units
042	FIR	FIR100	G's
Max	Time	Min	Time
96.4	38.8	-14.8	67.5

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

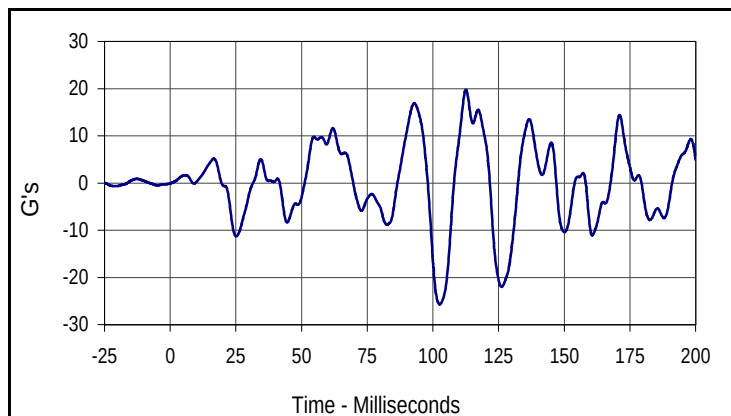
Test Date: 2/26/04
 NHTSA No.: M45113



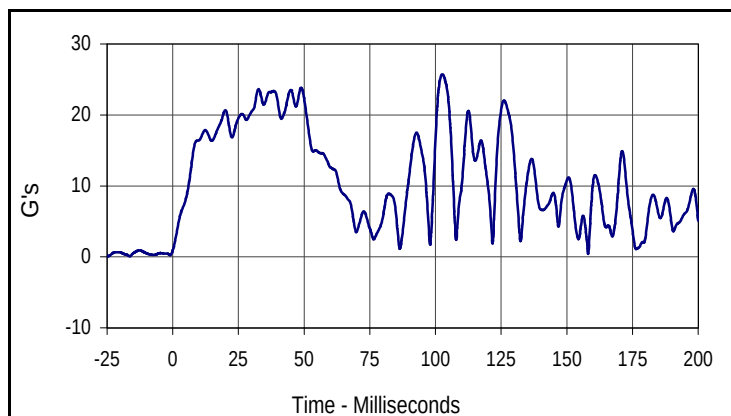
Curve Description			
MDB CG X			
CURNO	Type	SAE Class	Units
071	FIL	60	G's
Max	Time	Min	Time
5.3	151.6	-23.3	38.5



Curve Description			
MDB CG Y			
CURNO	Type	SAE Class	Units
072	FIL	60	G's
Max	Time	Min	Time
3.4	135.2	-7.4	29.5



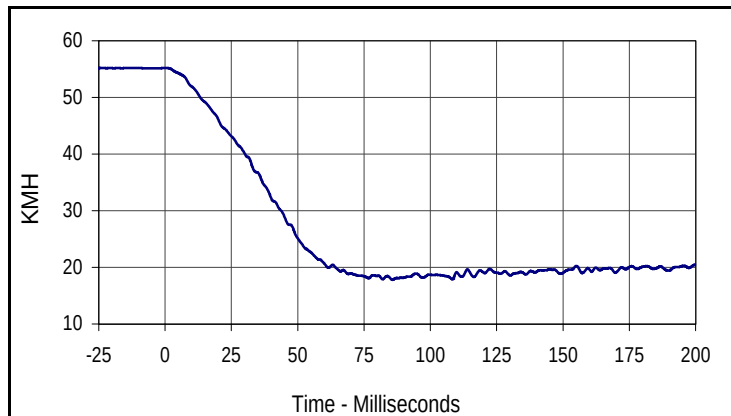
Curve Description			
MDB CG Z			
CURNO	Type	SAE Class	Units
073	FIL	60	G's
Max	Time	Min	Time
19.7	112.6	-25.7	102.6



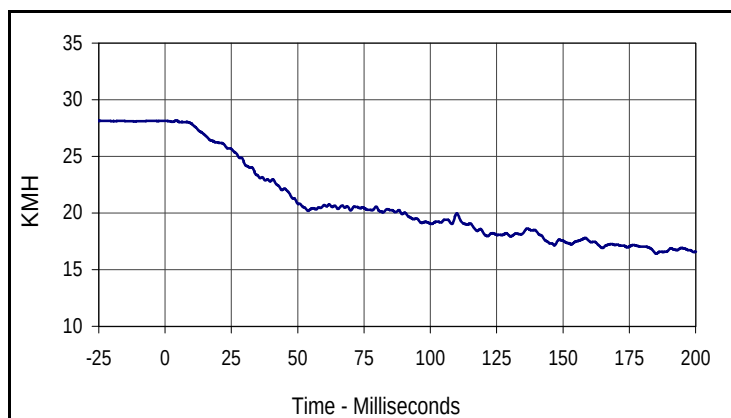
Curve Description			
CG Resultant			
CURNO	Type	SAE Class	Units
071	RES	60	G's
Max	Time	Min	Time
25.7	102.6	0.4	158.1

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

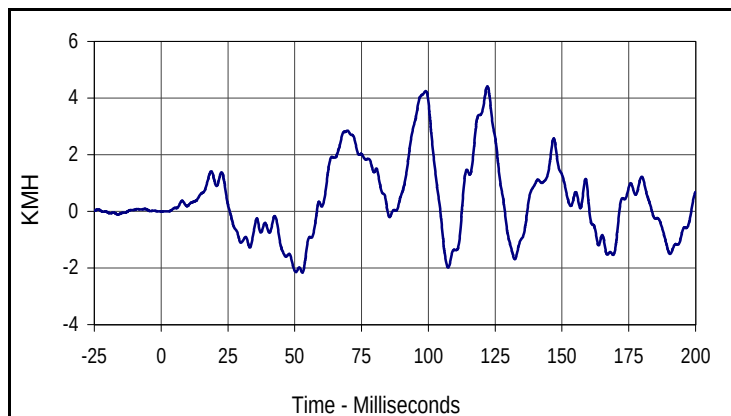
Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
MDB CG X Velocity			
CURNO	Type	SAE Class	Units
071	IN1	180	KMH
Max	Time	Min	Time
55.2	0.0	17.8	85.7



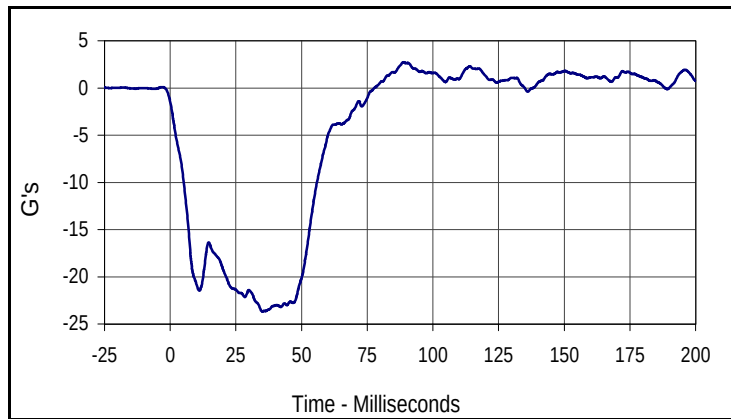
Curve Description			
MDB CG Y Velocity			
CURNO	Type	SAE Class	Units
072	IN1	180	KMH
Max	Time	Min	Time
28.2	4.1	16.4	185.1



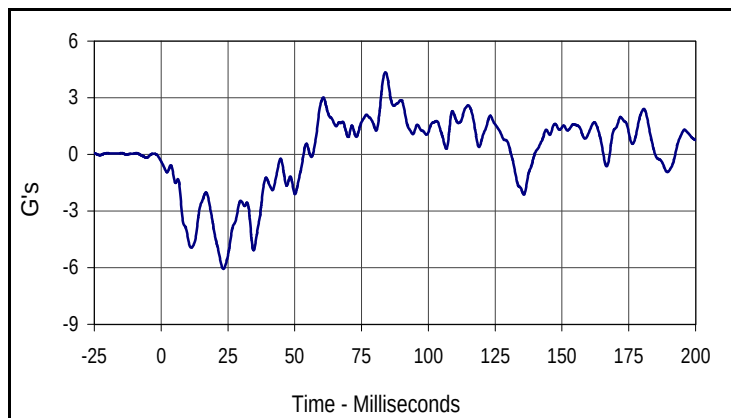
Curve Description			
MDB CG Z Velocity			
CURNO	Type	SAE Class	Units
073	IN1	180	KMH
Max	Time	Min	Time
4.4	122.1	-2.2	52.9

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

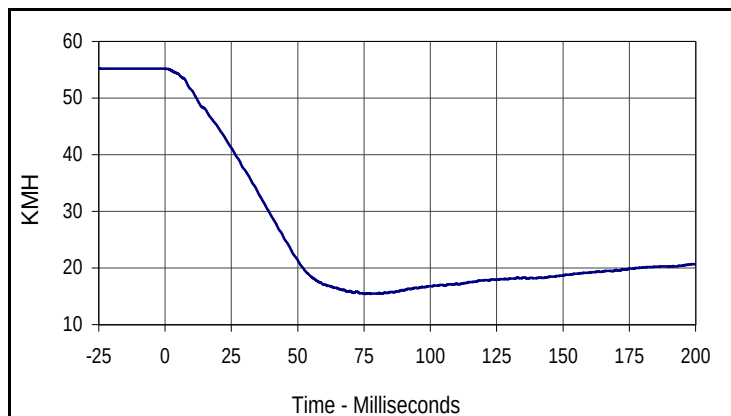
Test Date: 2/26/04
 NHTSA No.: M45113



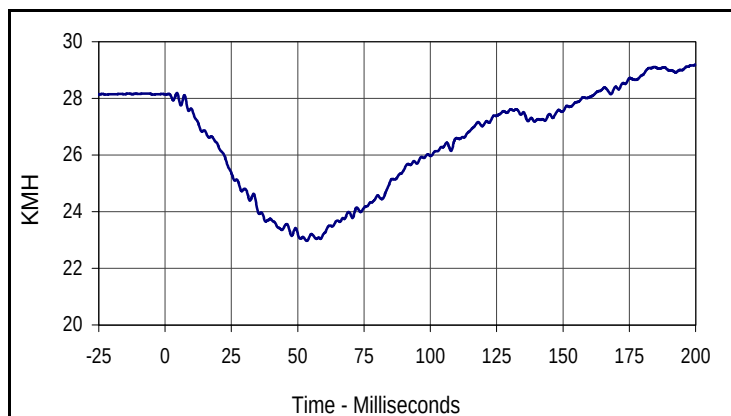
Curve Description			
MDB Rear X			
CURNO	Type	SAE Class	Units
074	FIL	60	G's
Max	Time	Min	Time
2.7	88.8	-23.7	35.1



Curve Description			
MDB Rear Y			
CURNO	Type	SAE Class	Units
075	FIL	60	G's
Max	Time	Min	Time
4.3	84.0	-6.1	23.3



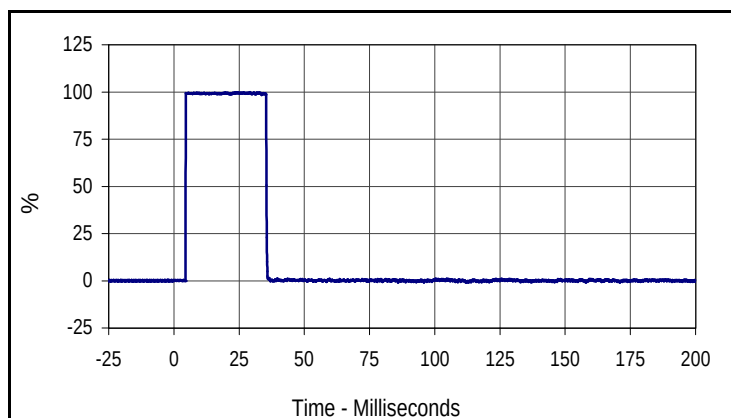
Curve Description			
MDB Rear X Velocity			
CURNO	Type	SAE Class	Units
074	IN1	180	KMH
Max	Time	Min	Time
55.2	0.0	15.4	75.5



Curve Description			
MDB Rear Y Velocity			
CURNO	Type	SAE Class	Units
075	IN1	180	KMH
Max	Time	Min	Time
29.2	200.0	23.0	53.4

Test Vehicle: 2004 Toyota Highlander SUV
 Test Program: 55/28 km/h Side Impact NCAP

Test Date: 2/26/04
 NHTSA No.: M45113



Curve Description			
MDB Right Bumper Contact			
CURNO	Type	SAE Class	Units
076	FIL	1000	%
Max	Time	Cross %	Time
99.9	29.2	50.0	4.6

APPENDIX C
SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

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



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

External Measurements

ATD Serial No.: 274

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	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	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

C-1

TR-P22003-04-NC

Laboratory Technician

February 21, 2004

Test Date



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Thorax Lateral Impact

ATD Serial No.: 274

Test I.D.: TH04A

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	44.2	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	44.1	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.9	Pass
Overall Test Results				Pass

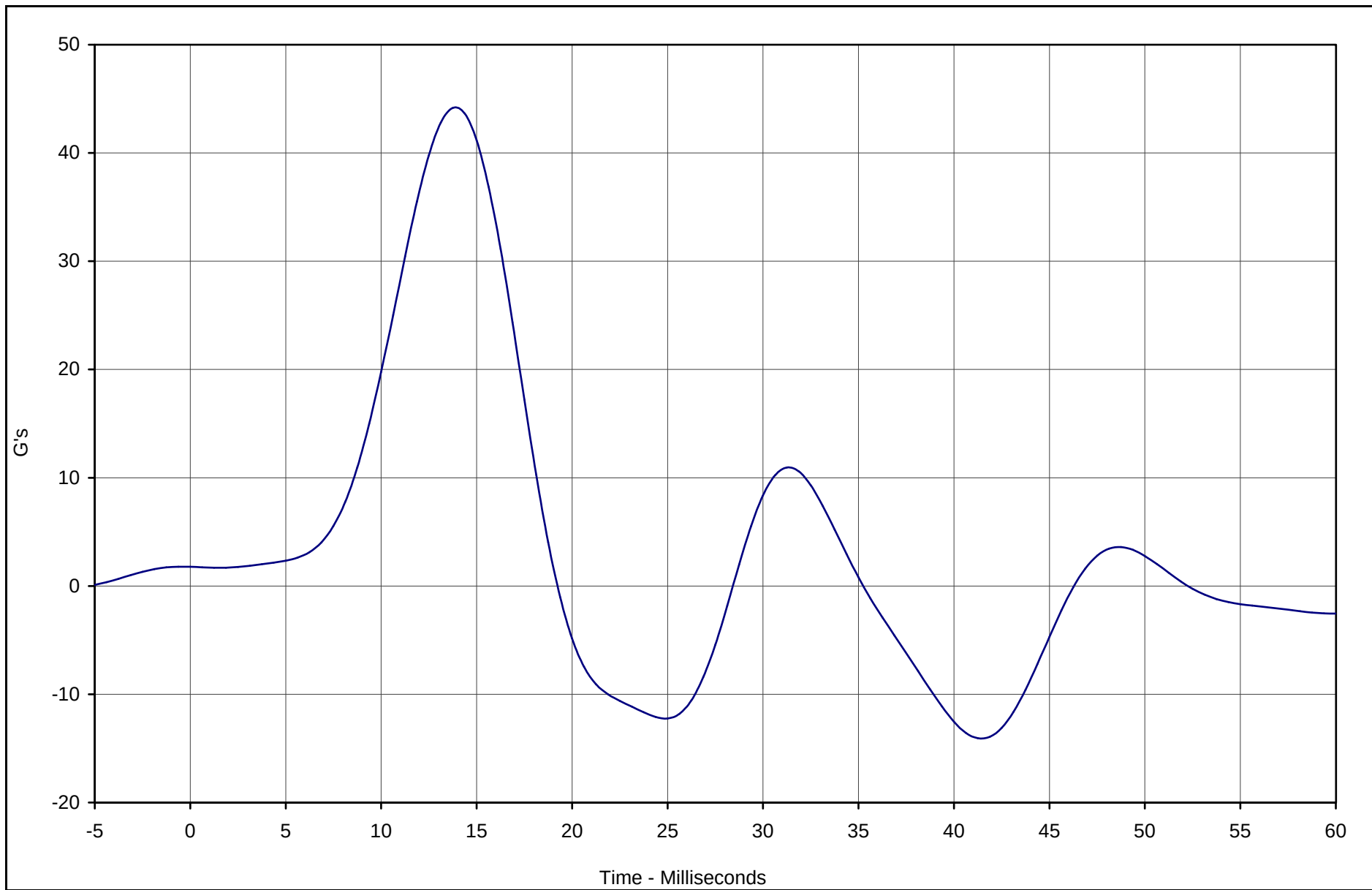
C-2

TR-P22003-04-NC

Laboratory Technician

February 20, 2004

Test Date



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Upper Rib Y Acceleration	001	FIL	G's	44.2	13.8	-14.1	41.3	FIR100

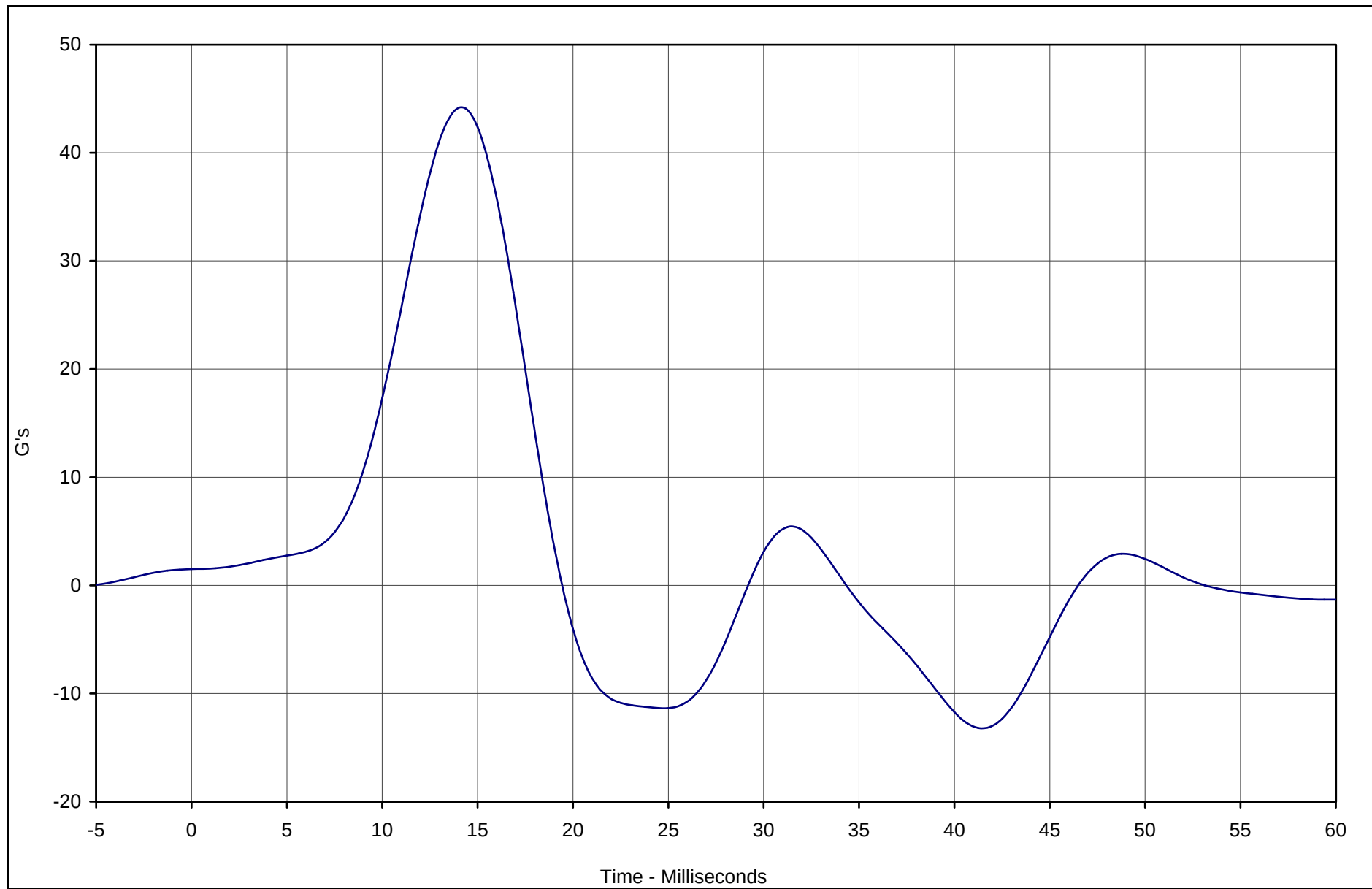


Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 274

Test Date: 2/20/04

Test I.D.: TH04A



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Lower Rib Y Acceleration	002	FIL	G's	44.1	14.4	-13.2	41.3	FIR100

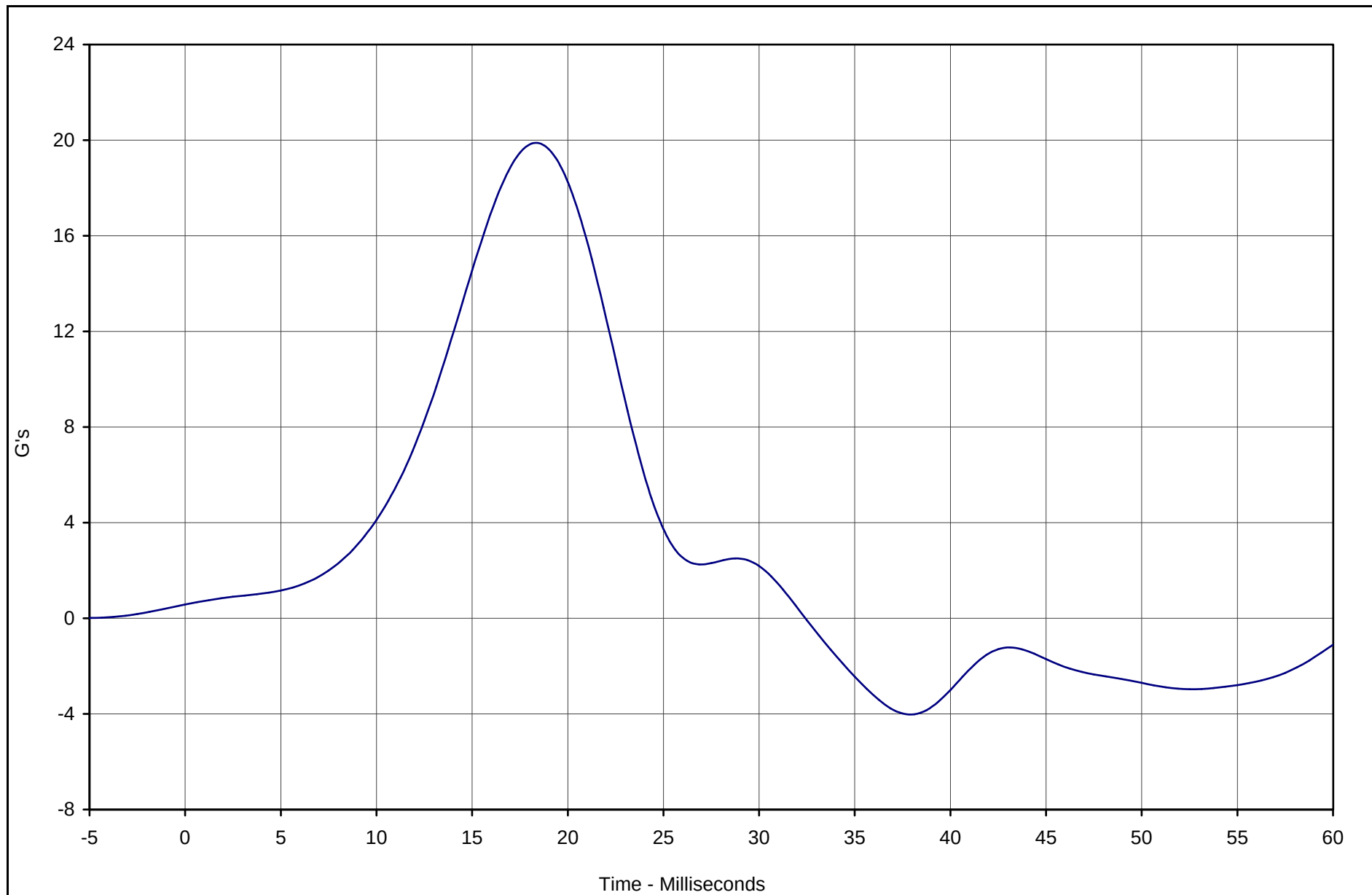


Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 274

Test Date: 2/20/04

Test I.D.: TH04A



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Lower Spine Y Acceleration	003	FIL	G's	19.9	18.1	-4.0	38.1	FIR100



Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 274

Test Date: 2/20/04

Test I.D.: TH04A



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Pelvis Lateral Impact

ATD Serial No.: 274

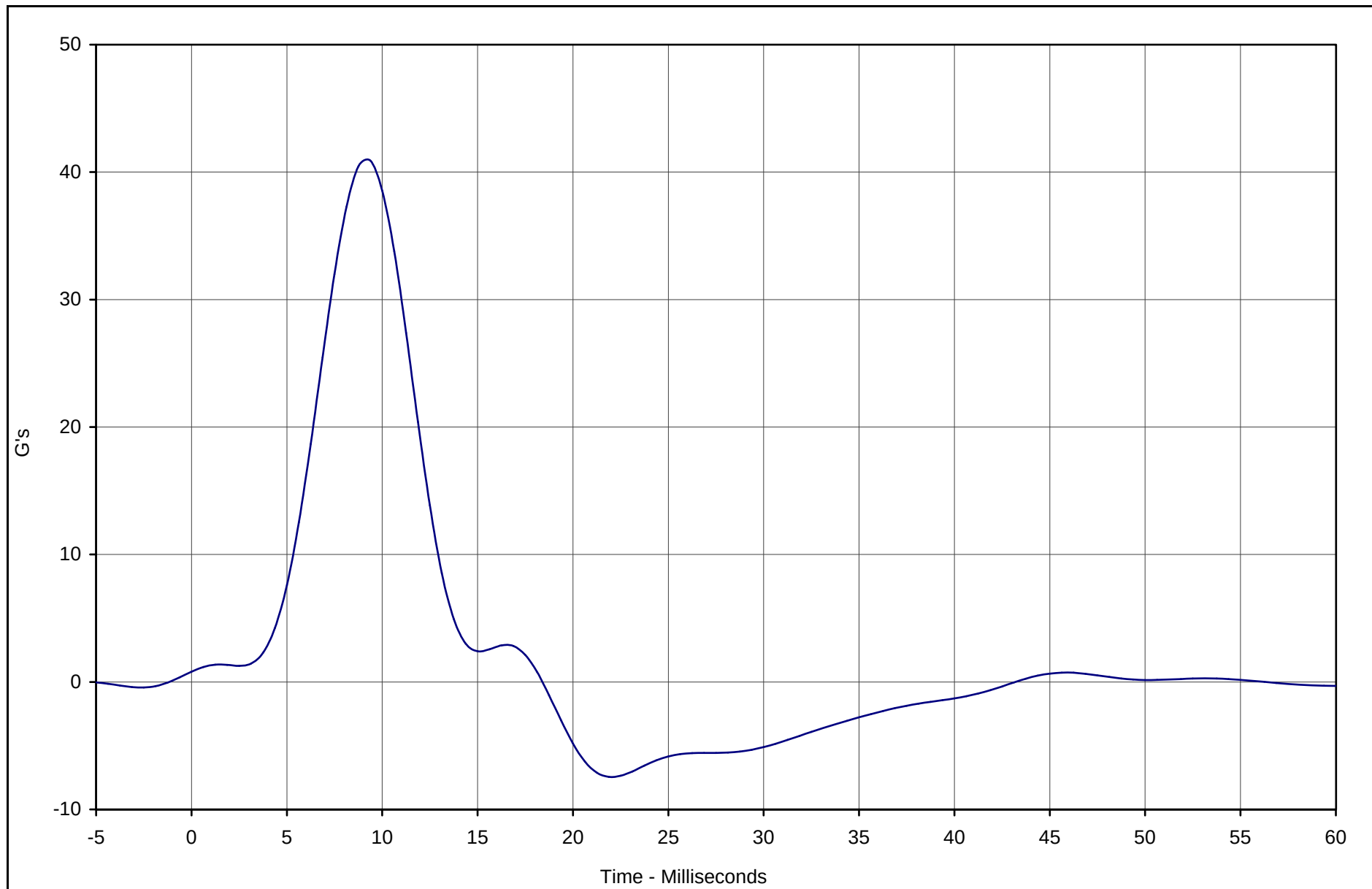
Test I.D.: PL04A

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
Peak Pelvis Acceleration	G's	40.0 to 60.0	40.9	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	5.6	Pass
Overall Test Results				Pass

Laboratory Technician

February 20, 2004

Test Date



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pelvis Y Acceleration	001	FIL	G's	40.9	9.4	-7.4	21.9	FIR100



Test Vehicle: Side Impact Dummy (SID) Pelvis Lateral Impact

SID Serial No.: 274

Test Date: 2/20/04

Test I.D.: PL04A



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Head Drop Lateral Impact Test

ATD Serial No.: 274

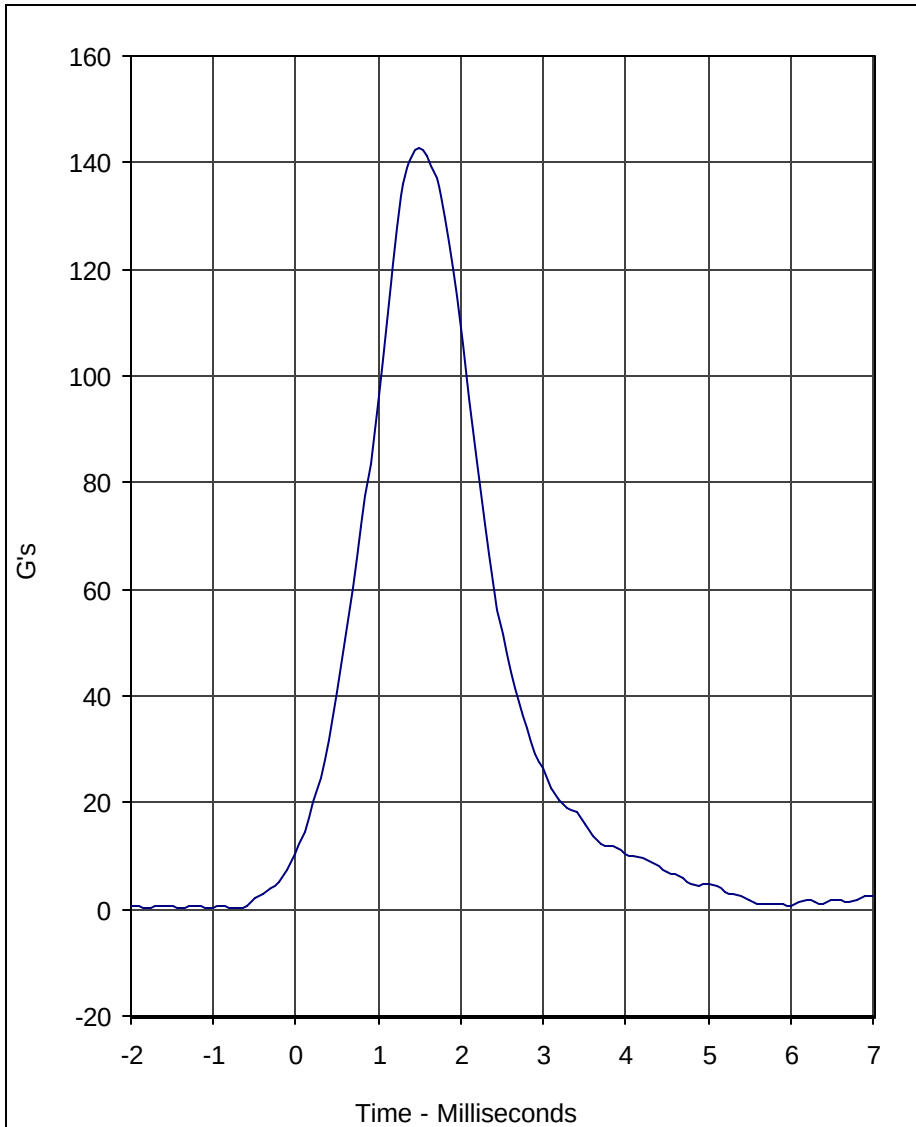
Test I.D.: HD04A

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	142.7	Pass
Peak Longitudinal Acceleration	G's	≤15.0	5.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<10	3.2	Pass
Overall Test Results				Pass

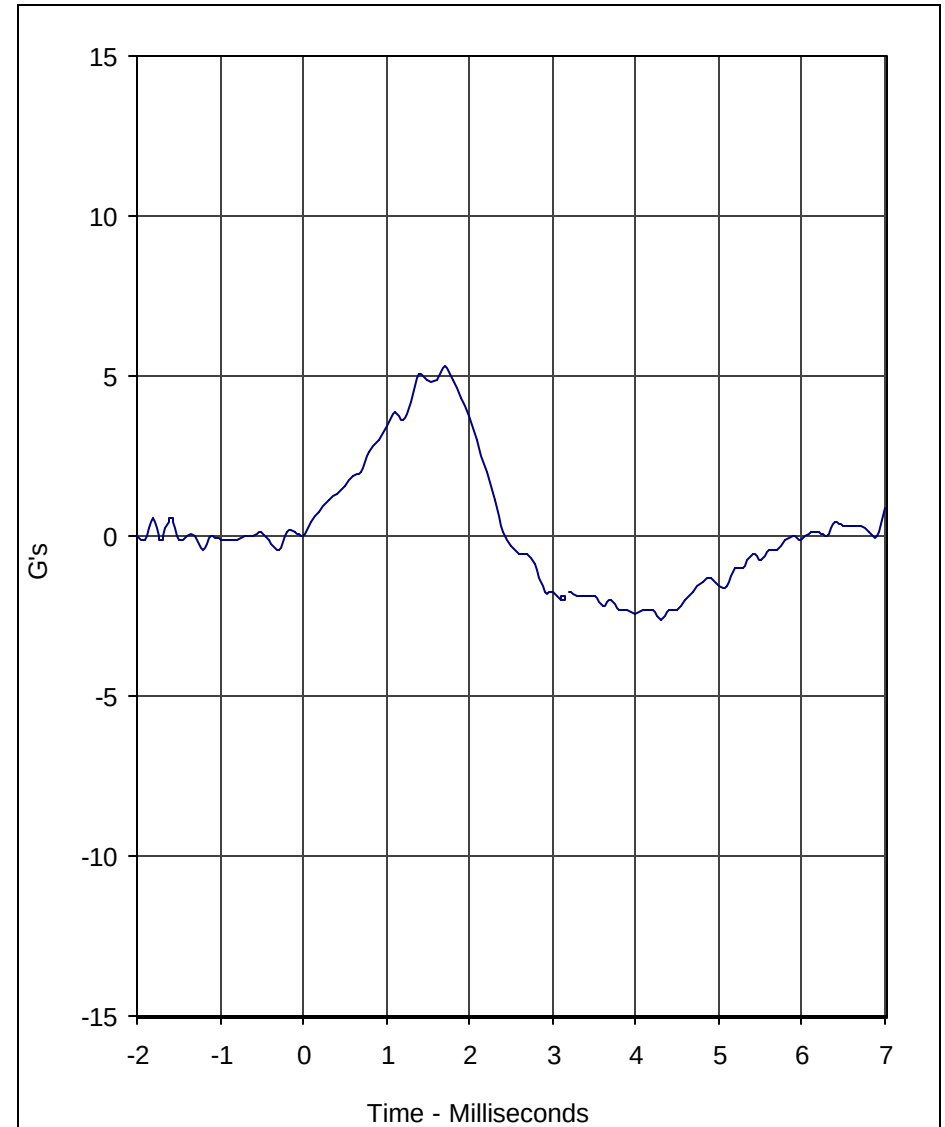
Laboratory Technician

February 21, 2004

Test Date



Curve Description				CURNO	Type
Head Resultant				001	RES
Units	Max	Time	Min	Time	SAE Class
G's	142.7	1.5	0.3	-1.4	1000



Curve Description				CURNO	Type
Head X				002	FIL
Units	Max	Time	Min	Time	SAE Class
G's	5.3	1.7	-2.6	4.3	1000

Test Program: SID / HIII Head Drop Lateral Impact Test
 Test Date: 2/21/04

A.T.D. Serial No.: 274
 Test I.D.: HD04A





Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Neck Pendulum Lateral Test

ATD Serial No.: 274

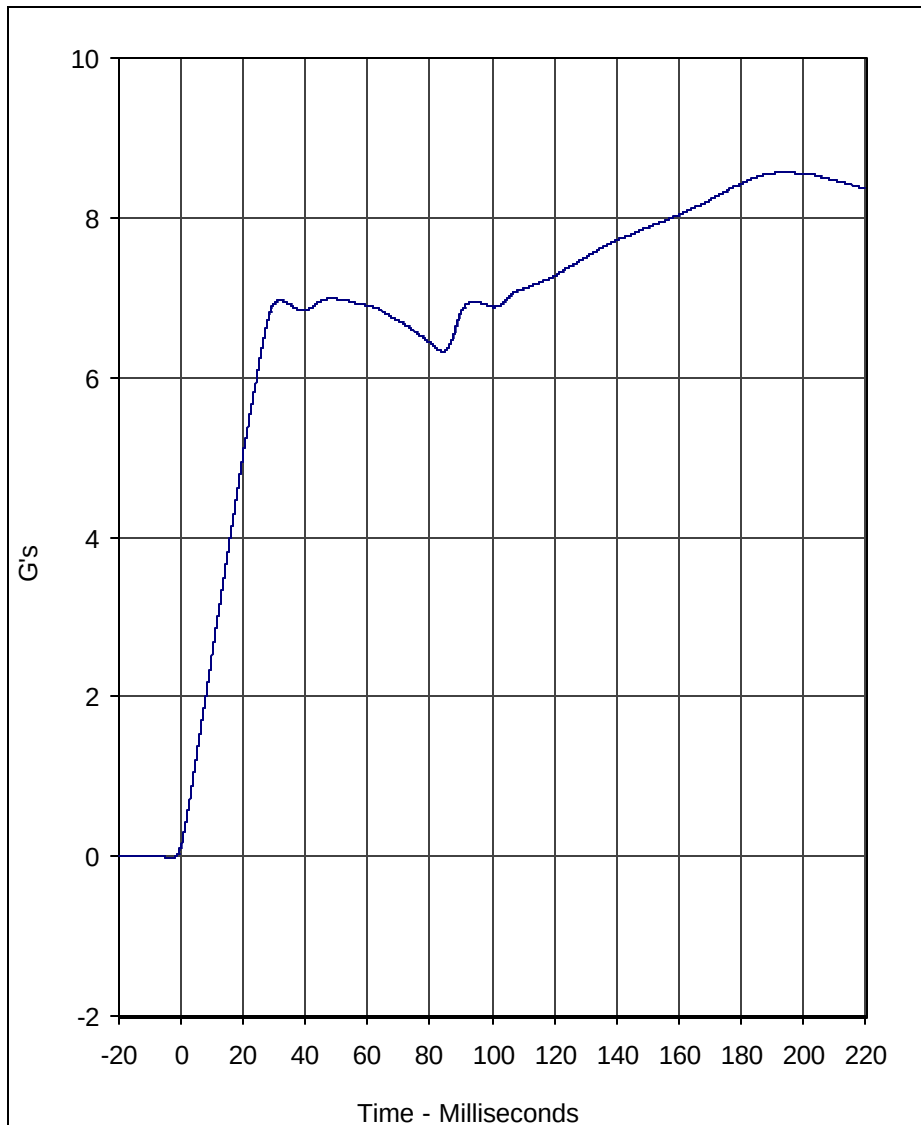
Test I.D.: NB04A

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.98	Pass
Pendulum Deceleration	10	Msec.	1.96 to 2.55	2.52	Pass
	20	Msec.	4.12 to 5.10	5.03	Pass
	30	Msec.	5.73 to 7.01	6.93	Pass
	40 to 70	Msec.	6.27 to 7.64	6.99	Pass
Maximum "D" Plane Rotation		Degrees	66.0 to 82.0	74.0	Pass
Maximum "D" Plane Rotation Time After Peak Moment		Msec.	2.0 to 15.0	5.2	Pass
"D" Plane Rotation Decay Time From Peak Angle to Zero Angle		Msec.	58.0 to 67.0	58.8	Pass
Calculated Moment About Occipital Condyle		N•m	73.0 to 88.0	82.1	Pass
Moment About Occipital Condyle Decay, Time From Positive Peak Value To 0 N•m		Msec.	49.0 to 64.0	61.5	Pass
Overall Test Results					Pass

Laboratory Technician

February 20, 2004

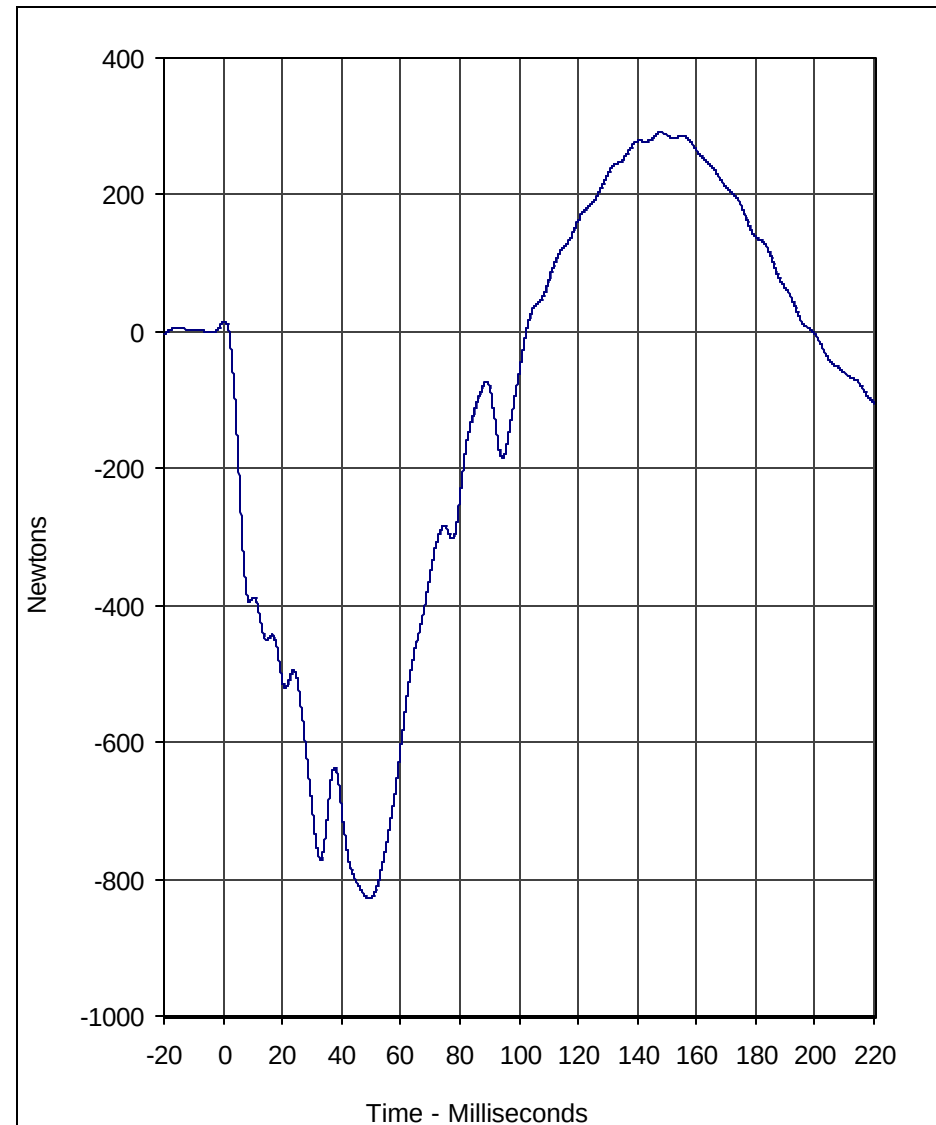
Test Date



Curve Description				CURNO	Type
Pendulum Velocity				001	FIL
Units	Max	Time	Min	Time	SAE Class
G's	8.6	194.1	0.0	-2.9	60

Test Program: SID / HIII Neck Pendulum Lateral Test

Test Date: 2/20/04

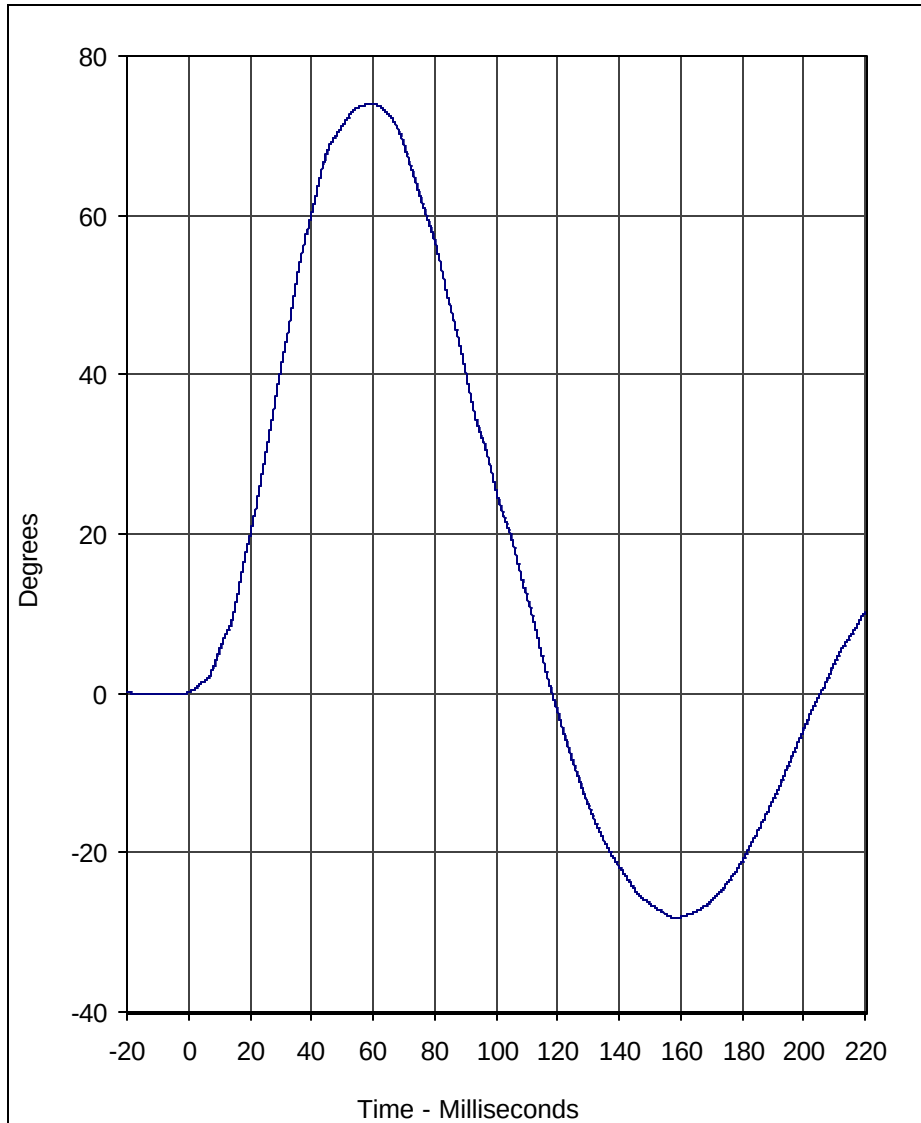


Curve Description				CURNO	Type
Neck Force Y				002	FIL
Units	Max	Time	Min	Time	SAE Class
Newtons	291.1	147.9	-828.9	49.3	60

A.T.D. Serial No.: 274

Test I.D.: NB04A

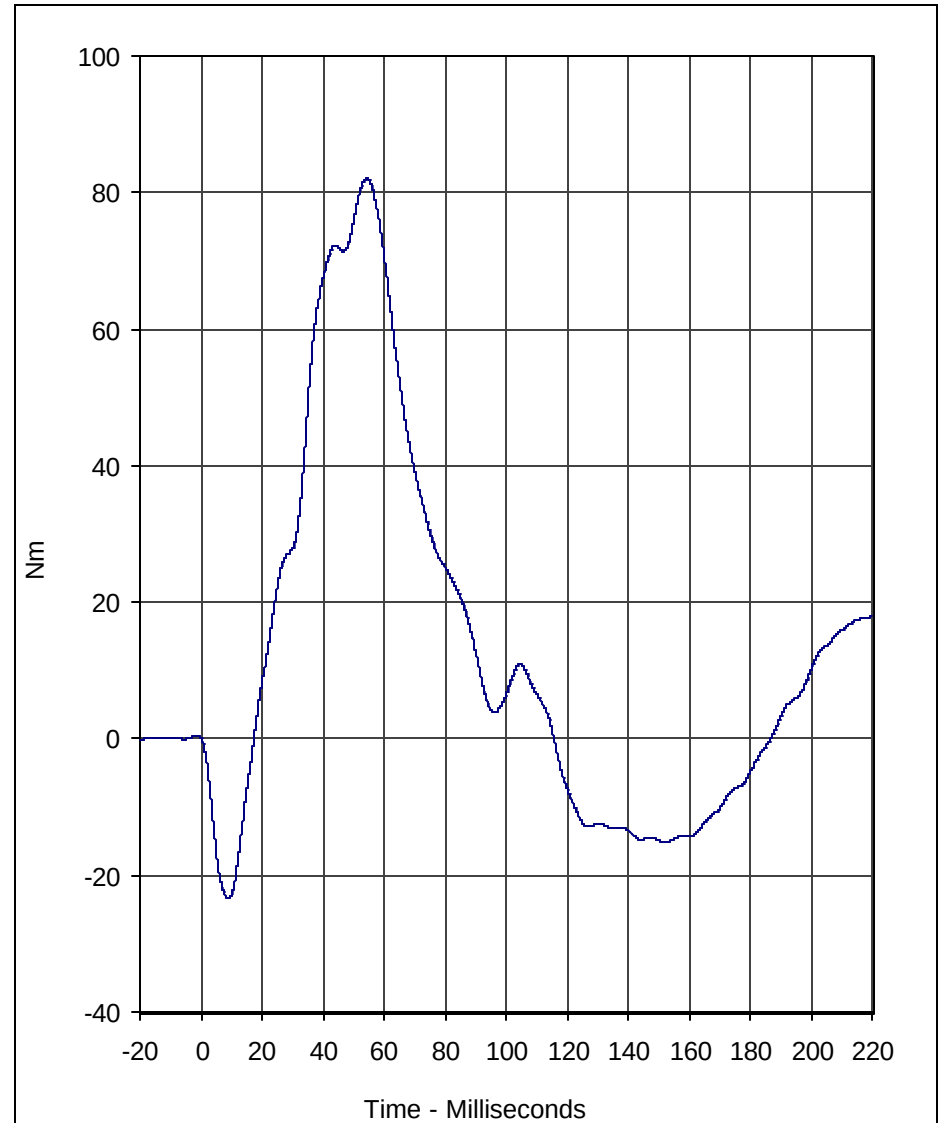




Curve Description				CURNO	Type
"D" Plane Rotation				003	FIL
Units	Max	Time	Min	Time	SAE Class
Degrees	74.0	59.5	-28.2	158.6	60

Test Program: SID / HIII Neck Pendulum Lateral Test

Test Date: 2/20/04



Curve Description				CURNO	Type
Moment About Occipital Condyle				004	FIL
Units	Max	Time	Min	Time	SAE Class
Nm	82.1	54.3	-23.4	8.9	60

A.T.D. Serial No.: 274

Test I.D.: NB04A





Calibration Data Sheet **Side Impact Hybrid Dummy (SID/HIII)** **External Measurements**

ATD Serial No.: 275

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	525	Pass
KV- Knee Pivot From Floor	mm	490 to 505	495	Pass
HW- Hip Width	mm	356 to 391	390	Pass
Overall Test Results				Pass

Laboratory Technician

February 21, 2004

Test Date



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Thorax Lateral Impact

ATD Serial No.: 285

Test I.D.: TH04B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	43.9	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	44.5	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.2	Pass
Overall Test Results				Pass

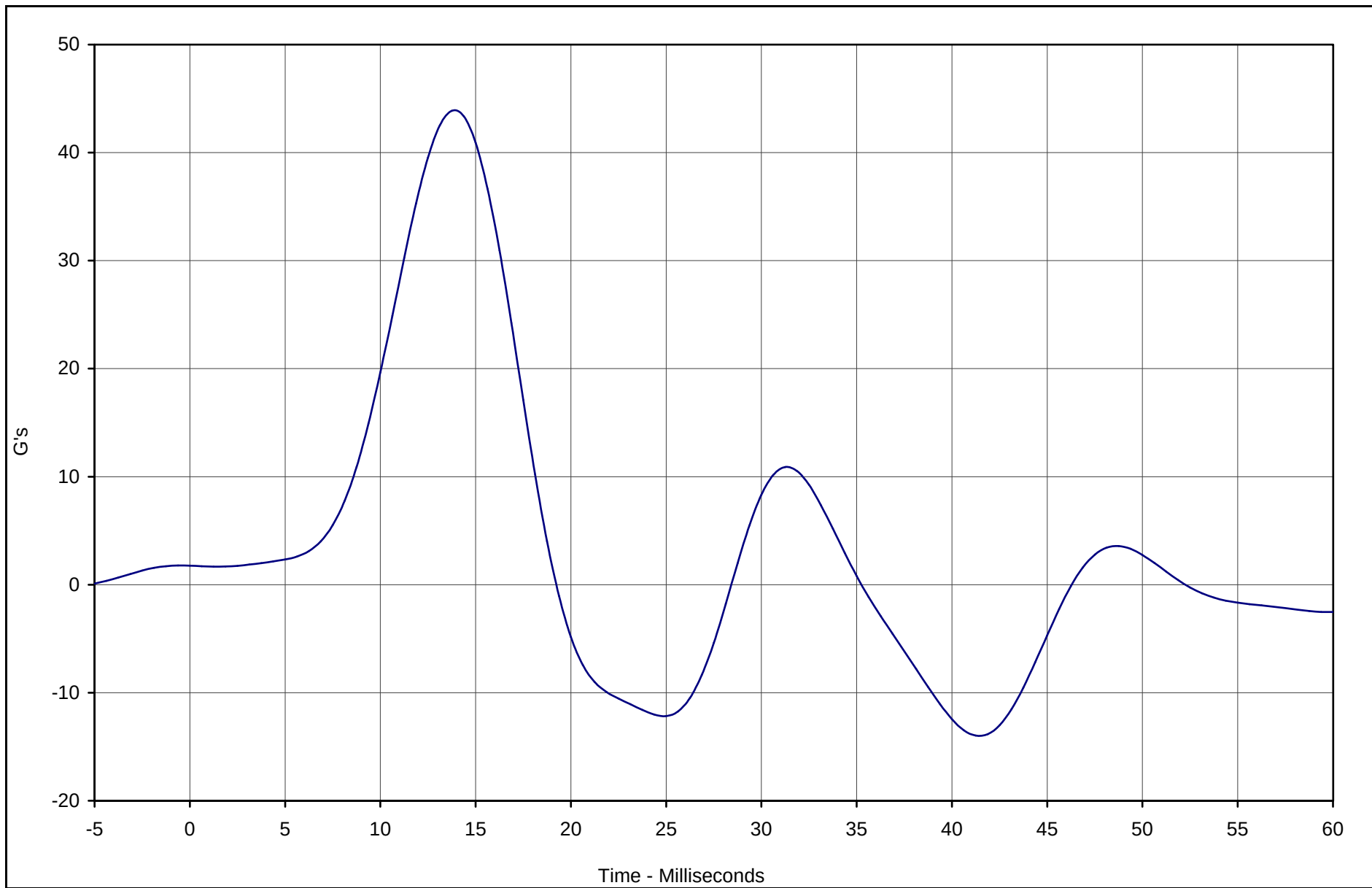
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Laboratory Technician

February 20, 2004

Test Date



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Upper Rib Y Acceleration	001	FIL	G's	43.9	13.8	-14.0	41.3	FIR100

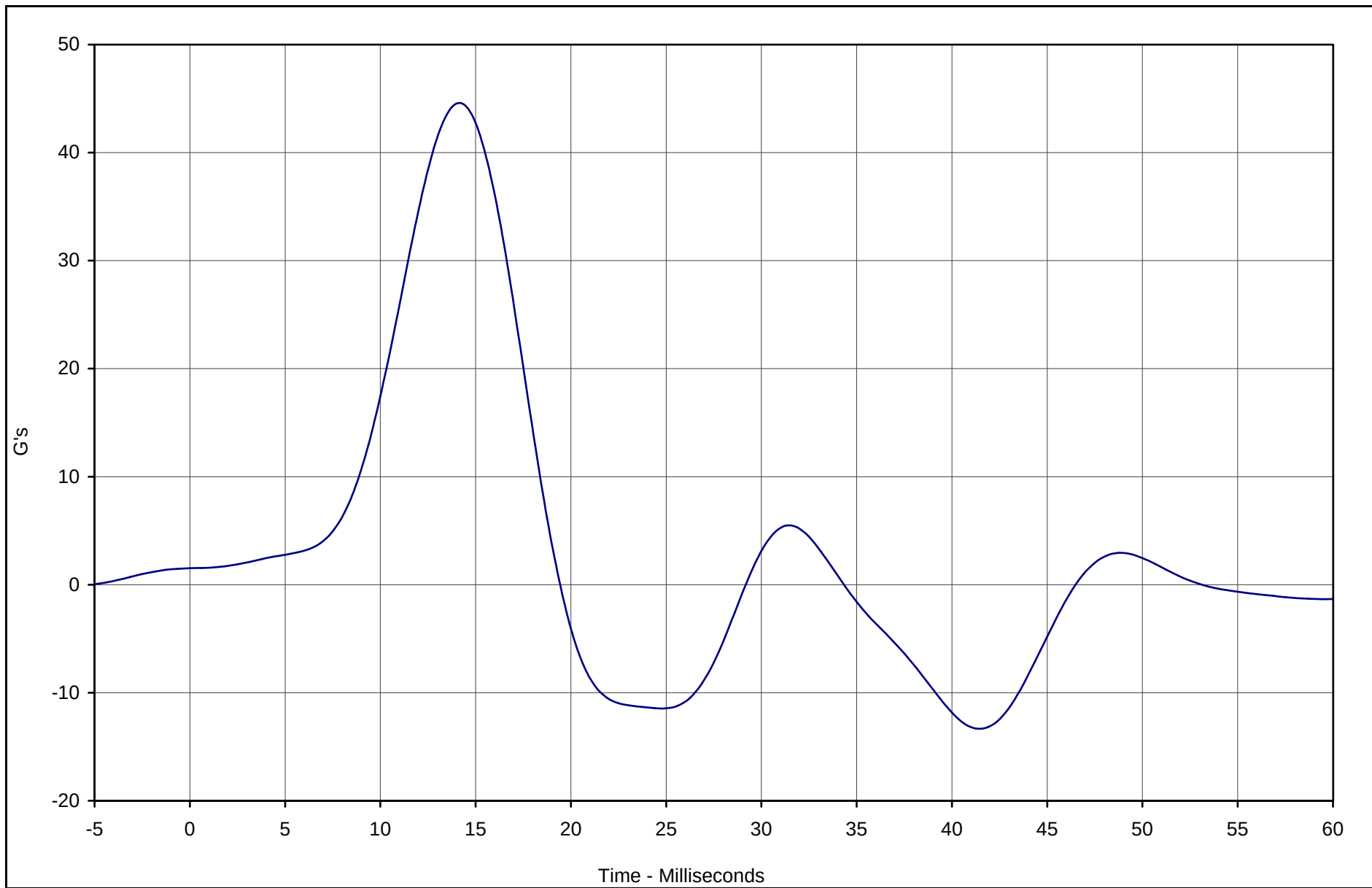


Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 285

Test Date: 2/20/04

Test I.D.: TH04B



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Lower Rib Y Acceleration	002	FIL	G's	44.5	14.4	-13.3	41.3	FIR100

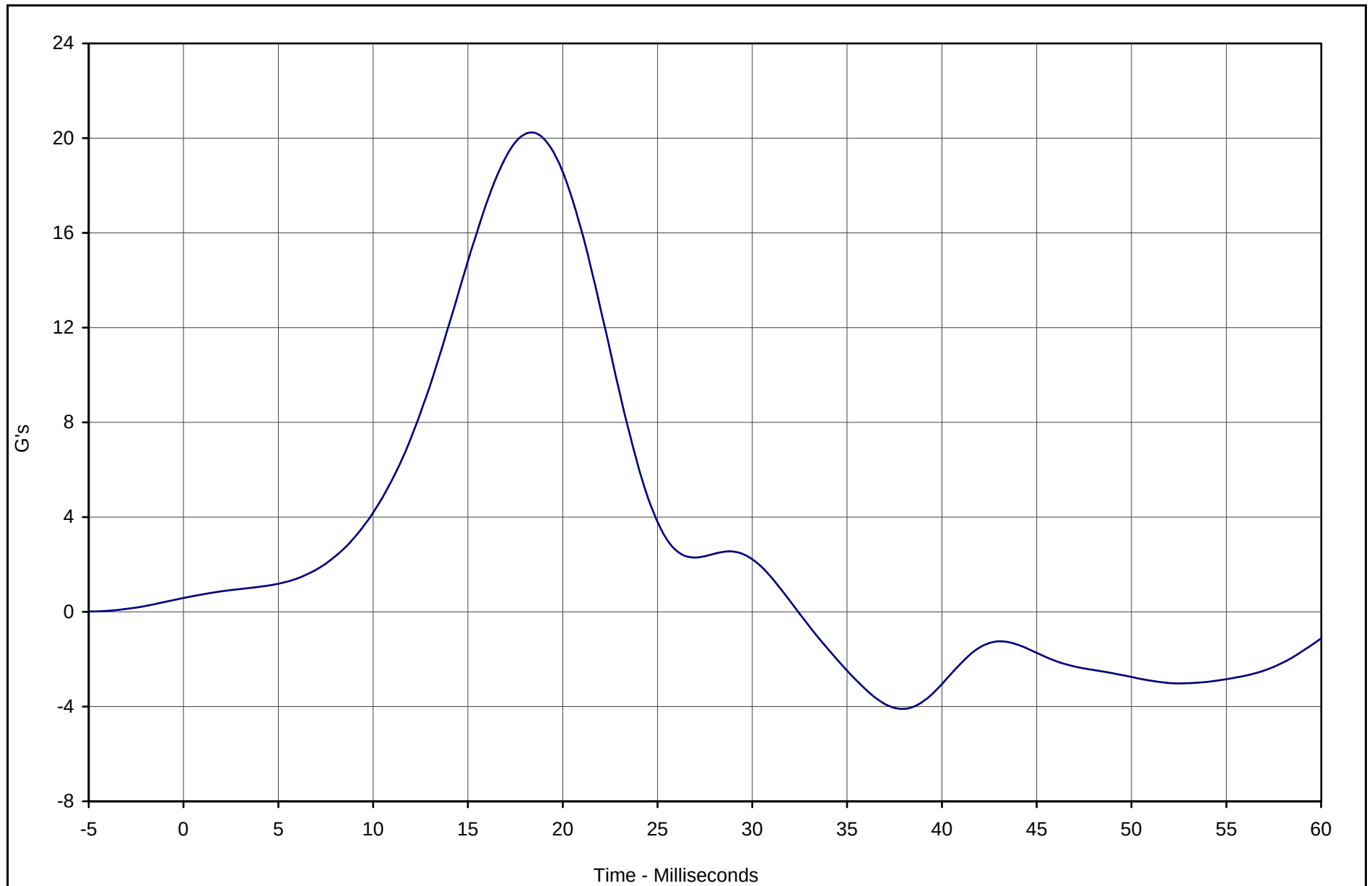


Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 285

Test Date: 2/20/04

Test I.D.: TH04B



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Lower Spine Y Acceleration	003	FIL	G's	20.2	18.1	-4.1	38.1	FIR100



Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 285

Test Date: 2/20/04

Test I.D.: TH04B



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Pelvis Lateral Impact

ATD Serial No.: 275

Test I.D.: PL04B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.25	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	45.1	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.9	Pass
Overall Test Results				Pass

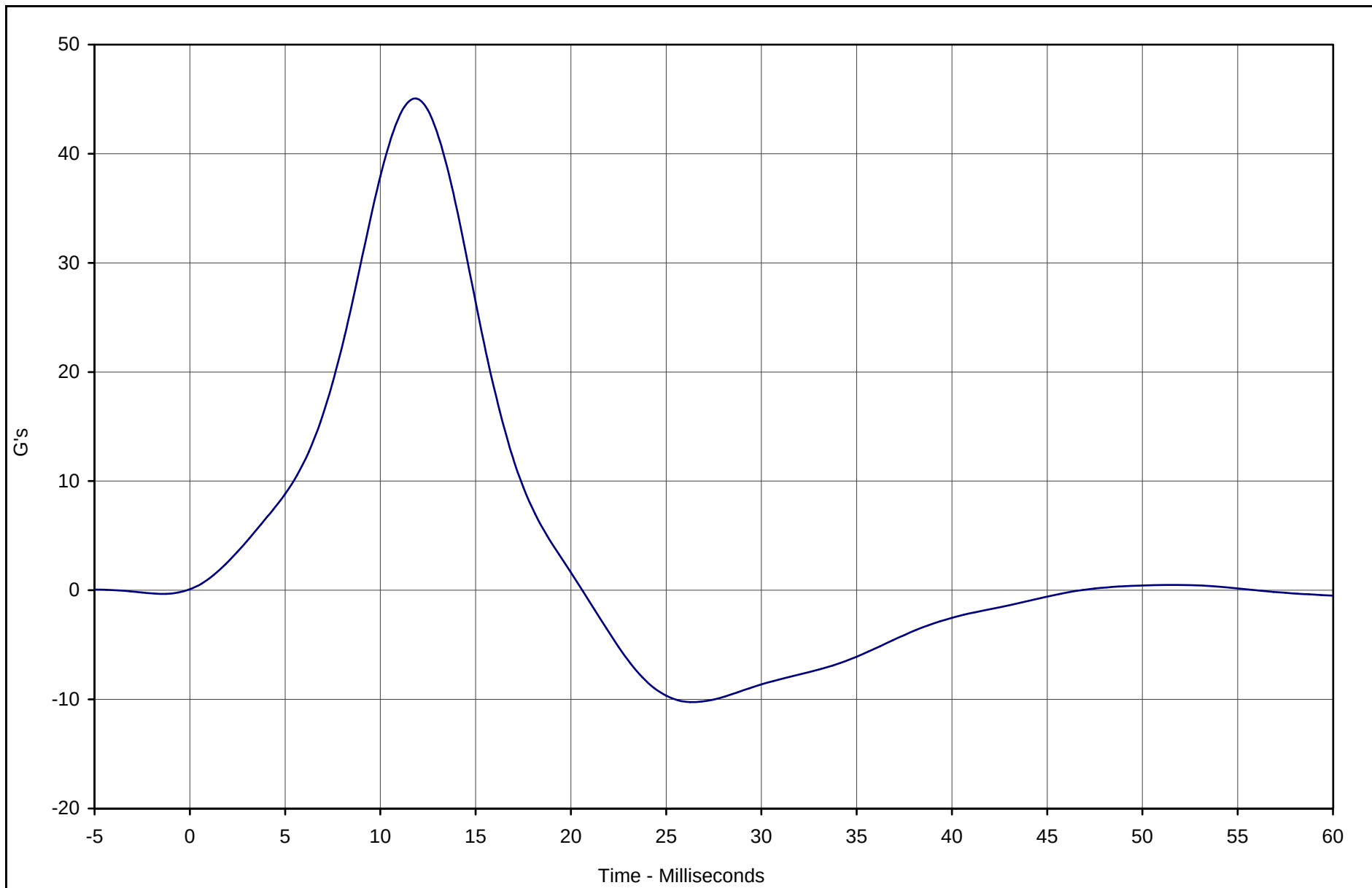
C-18

TR-P24003-04-NC

Laboratory Technician

February 20, 2004

Test Date



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pelvis Y Acceleration	001	FIL	G's	45.1	11.9	-10.2	26.3	FIR100



Test Vehicle: Side Impact Dummy (SID) Pelvis Lateral Impact

SID Serial No.: 275

Test Date: 2/20/04

Test I.D.: PL04B



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Head Drop Lateral Impact Test

ATD Serial No.: 275

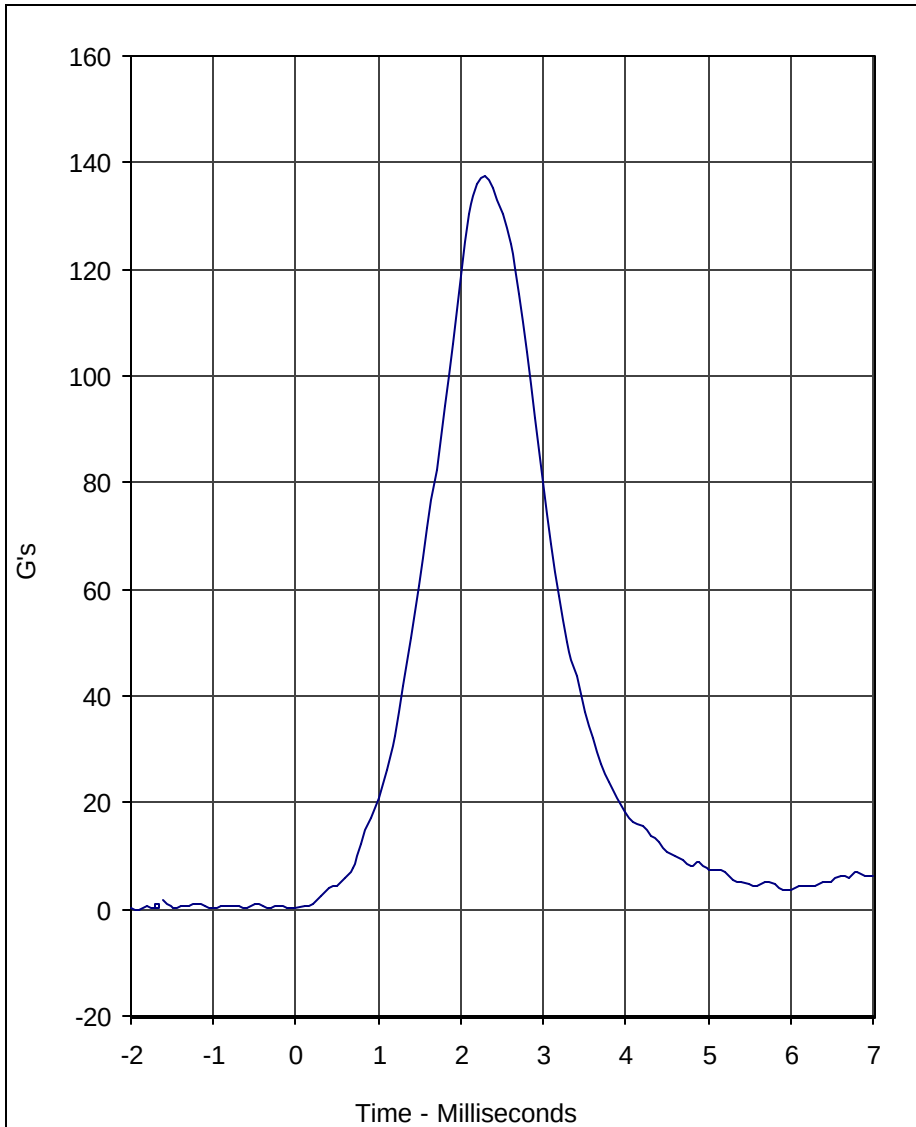
Test I.D.: HD04B

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	137.4	Pass
Peak Longitudinal Acceleration	G's	≤15.0	3.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<10	5.5	Pass
Overall Test Results				Pass

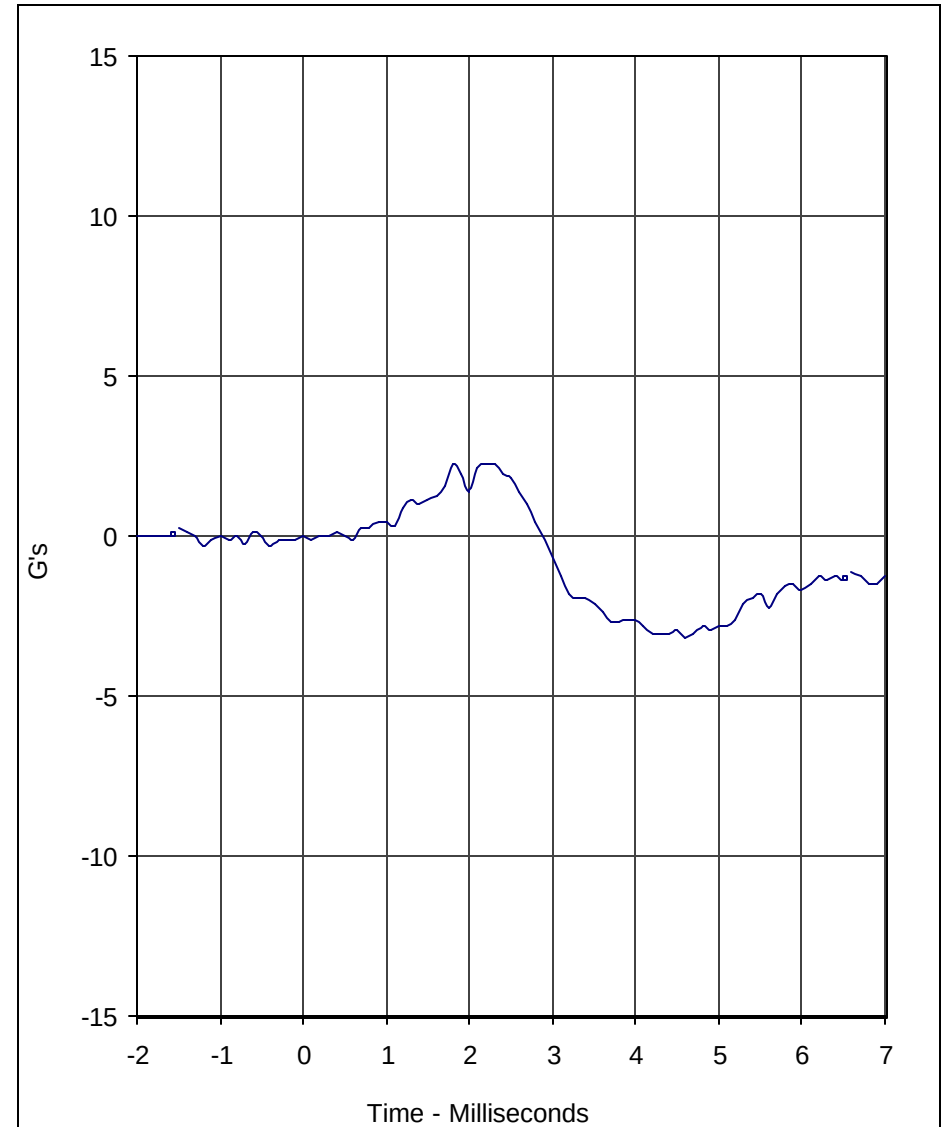
Laboratory Technician

February 21, 2004

Test Date



Curve Description				CURNO	Type
Head Resultant				001	RES
Units	Max	Time	Min	Time	SAE Class
G's	137.4	2.3	0.0	-1.9	1000



Curve Description				CURNO	Type
Head X				002	FIL
Units	Max	Time	Min	Time	SAE Class
G's	2.3	1.8	-3.2	4.6	1000

Test Program: SID / HIII Head Drop Lateral Impact Test
 Test Date: 2/21/04

A.T.D. Serial No.: 275
 Test I.D.: HD04B





Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Neck Pendulum Lateral Test

ATD Serial No.: 275

Test I.D.: NB04B

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.11	Pass
Pendulum Deceleration	10	Msec.	1.96 to 2.55	2.18	Pass
	20	Msec.	4.12 to 5.10	4.32	Pass
	30	Msec.	5.73 to 7.01	6.24	Pass
	40 to 70	Msec.	6.27 to 7.64	7.06	Pass
Maximum "D" Plane Rotation		Degrees	66.0 to 82.0	71.2	Pass
Maximum "D" Plane Rotation Time After Peak Moment		Msec.	2.0 to 15.0	4.8	Pass
"D" Plane Rotation Decay Time From Peak Angle to Zero Angle		Msec.	58.0 to 67.0	58.3	Pass
Calculated Moment About Occipital Condyle		N•m	73.0 to 88.0	79.1	Pass
Moment About Occipital Condyle Decay, Time From Positive Peak Value To 0 N•m		Msec.	49.0 to 64.0	61.8	Pass
Overall Test Results					Pass

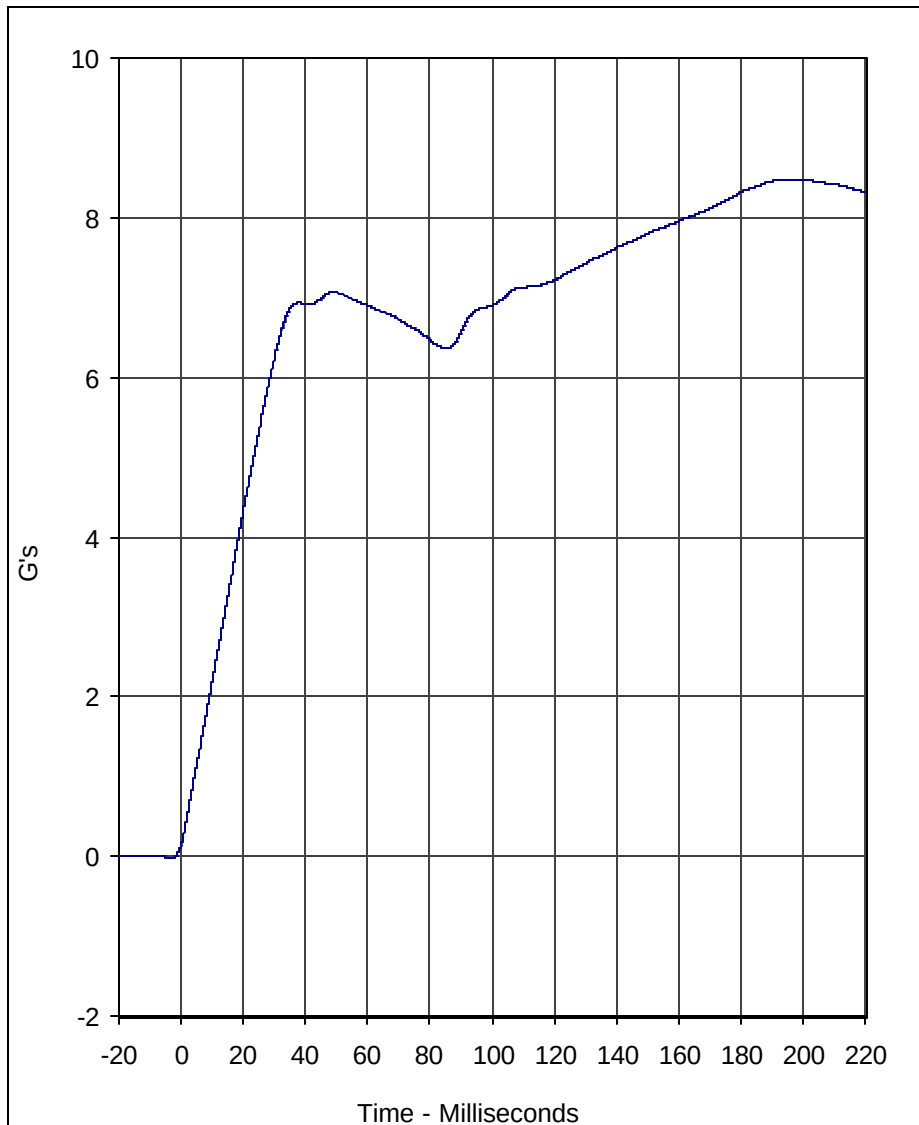
Laboratory Technician

February 20, 2004

Test Date

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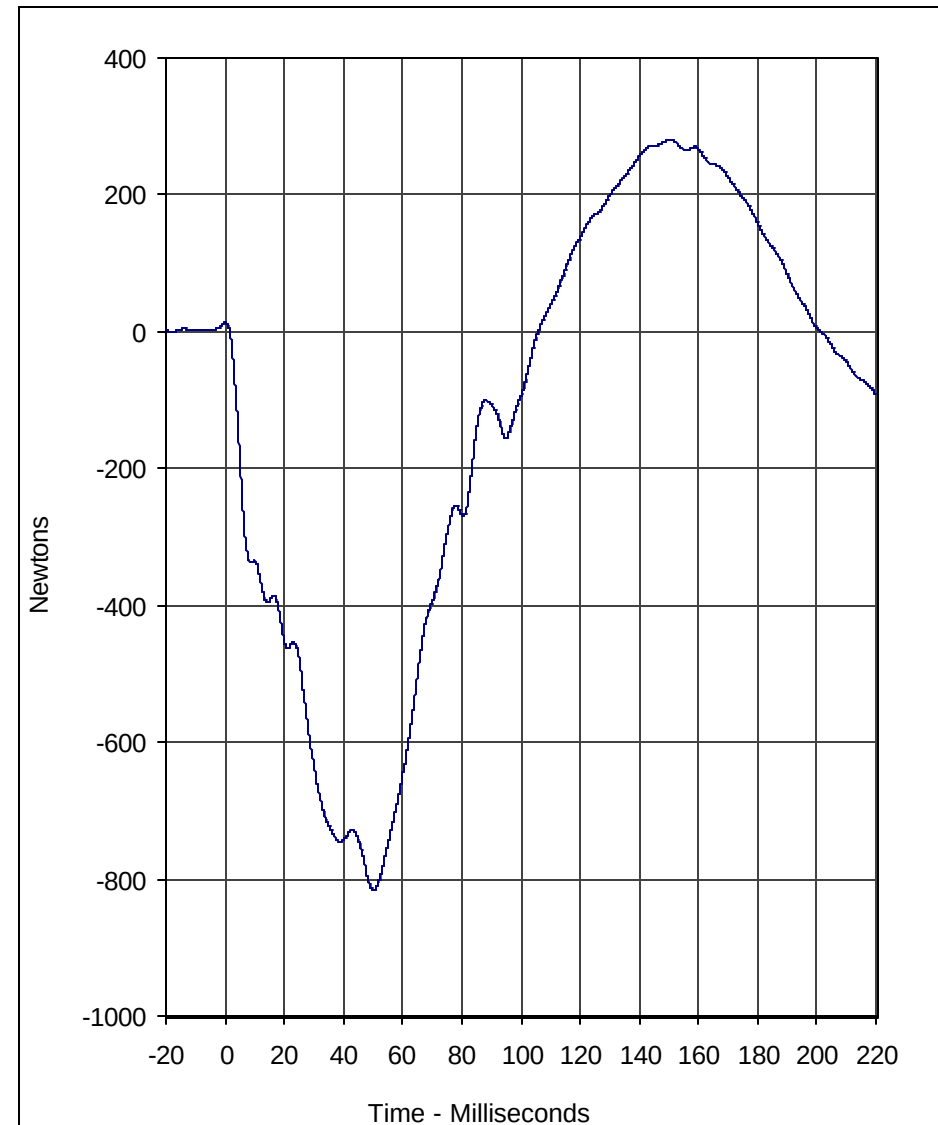
TR-P24003-04-NC



Curve Description				CURNO	Type
Pendulum Velocity				001	FIL
Units	Max	Time	Min	Time	SAE Class
G's	8.5	196.9	0.0	-3.2	60

Test Program: SID / HIII Neck Pendulum Lateral Test

Test Date: 2/20/04

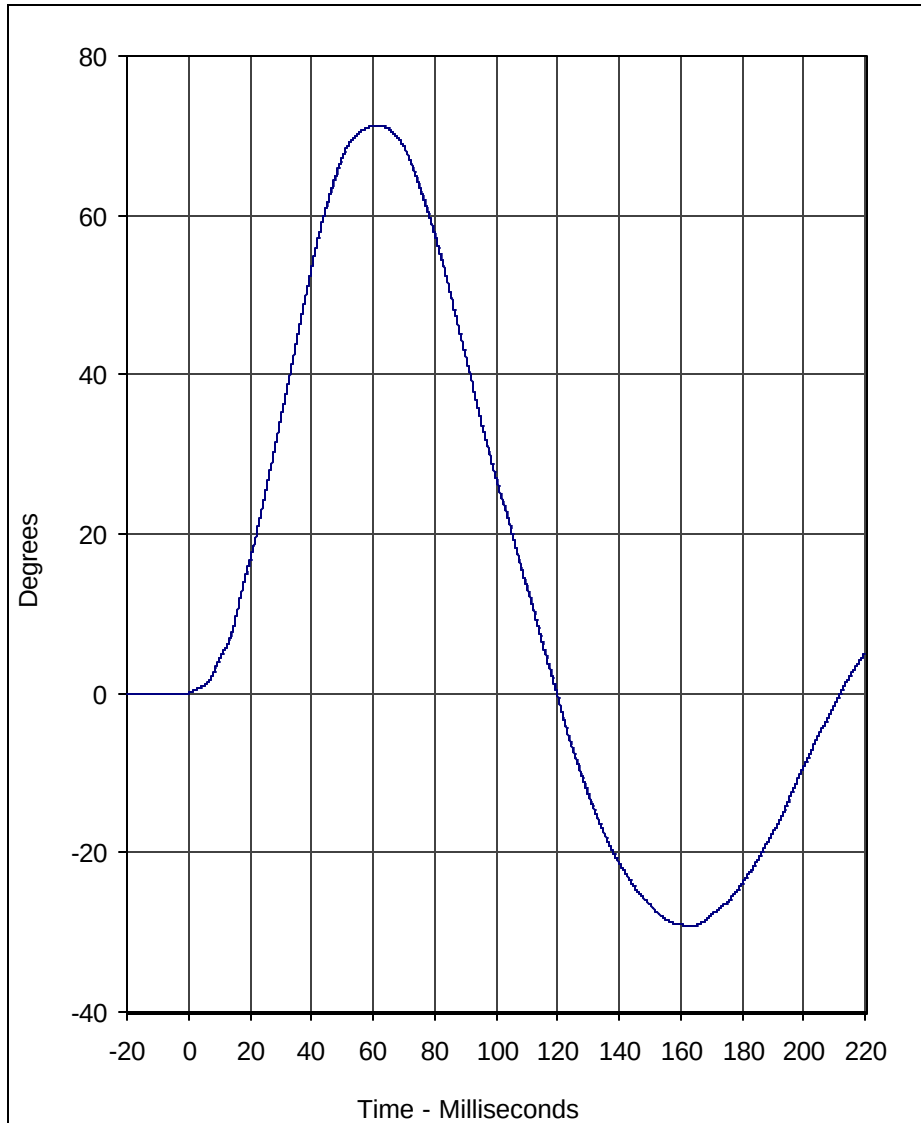


Curve Description				CURNO	Type
Neck Force Y				002	FIL
Units	Max	Time	Min	Time	SAE Class
Newtons	280.8	150.6	-816.7	50.0	60

A.T.D. Serial No.: 275

Test I.D.: NB04B

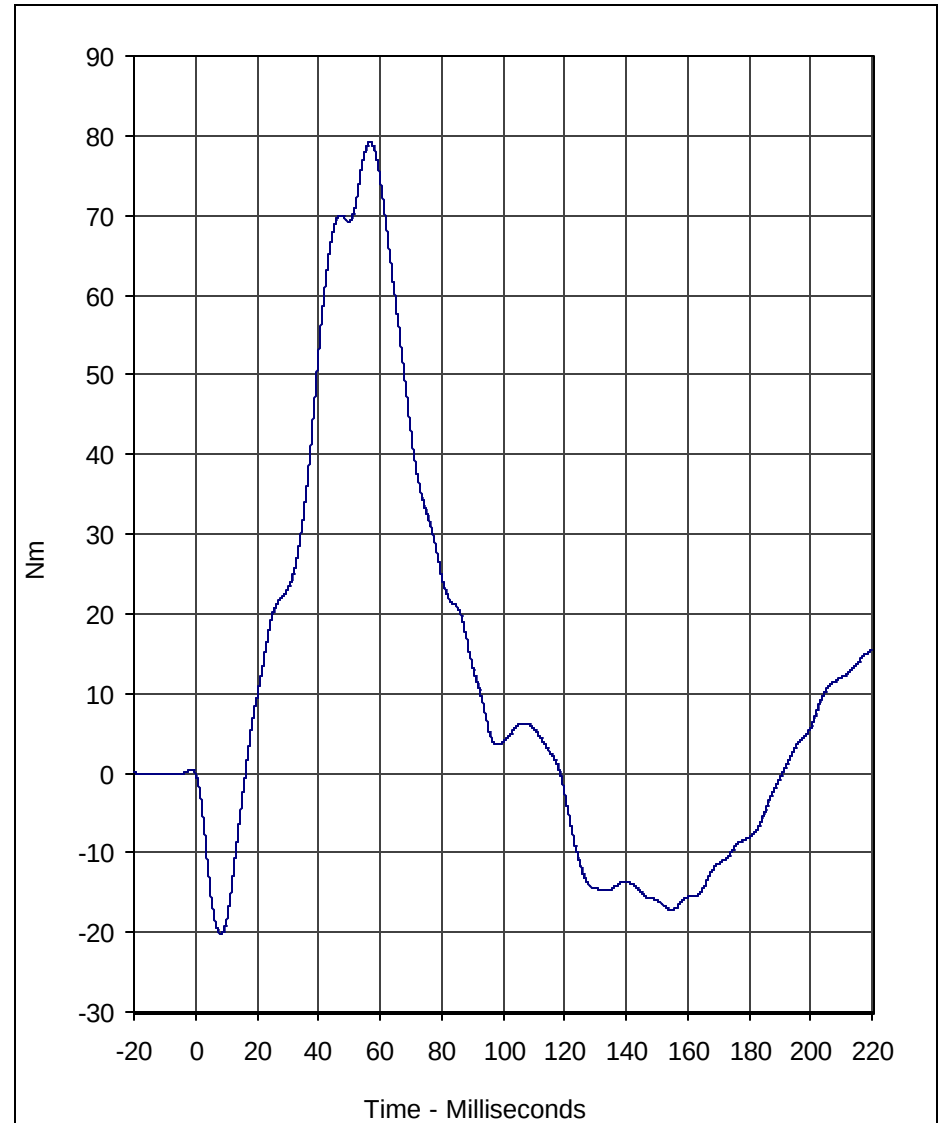




Curve Description				CURNO	Type
"D" Plane Rotation				003	FIL
Units	Max	Time	Min	Time	SAE Class
Degrees	71.2	61.6	-29.2	163.1	60

Test Program: SID / HIII Neck Pendulum Lateral Test

Test Date: 2/20/04



Curve Description				CURNO	Type
Moment About Occipital Condyle				004	FIL
Units	Max	Time	Min	Time	SAE Class
Nm	79.1	56.8	-20.2	8.2	60

A.T.D. Serial No.: 275

Test I.D.: NB04B



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



Calibration Data Sheet Side Impact Hybrid Dummy (SID/HIII) External Measurements

ATD Serial No.: 274

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	510	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	515	Pass
KV- Knee Pivot From Floor	mm	490 to 505	495	Pass
HW- Hip Width	mm	356 to 391	365	Pass
Overall Test Results				Pass

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TR-P24003-04-NC

Laboratory Technician

March 7, 2004

Test Date



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Thorax Lateral Impact

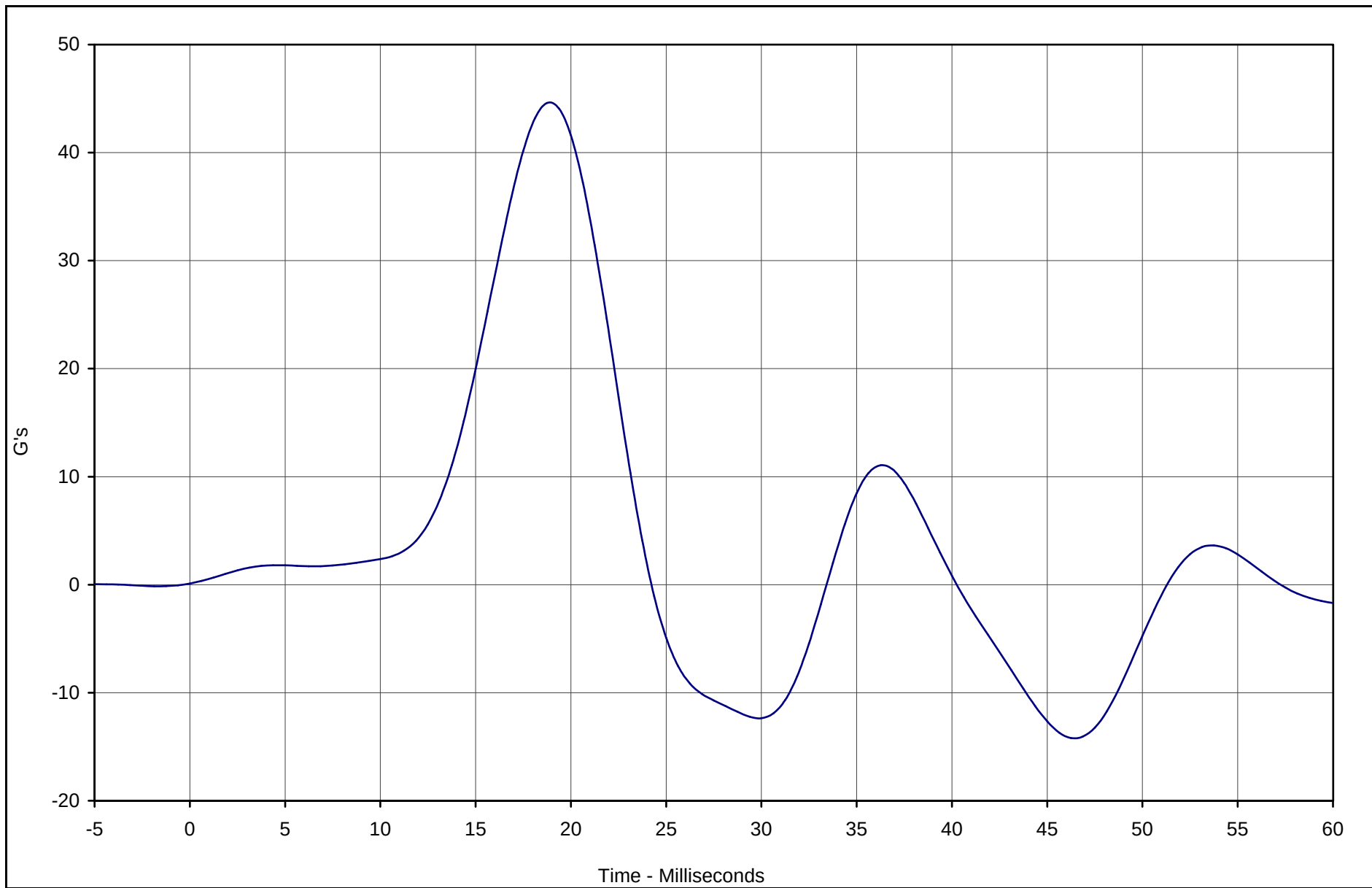
ATD Serial No.: 274

Test I.D.: TH04D

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	44.6	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	44.5	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	21.3	Pass
Overall Test Results				Pass

Laboratory Technician

March 6, 2004
Test Date



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Upper Rib Y Acceleration	001	FIL	G's	44.6	18.8	-14.2	46.3	FIR100

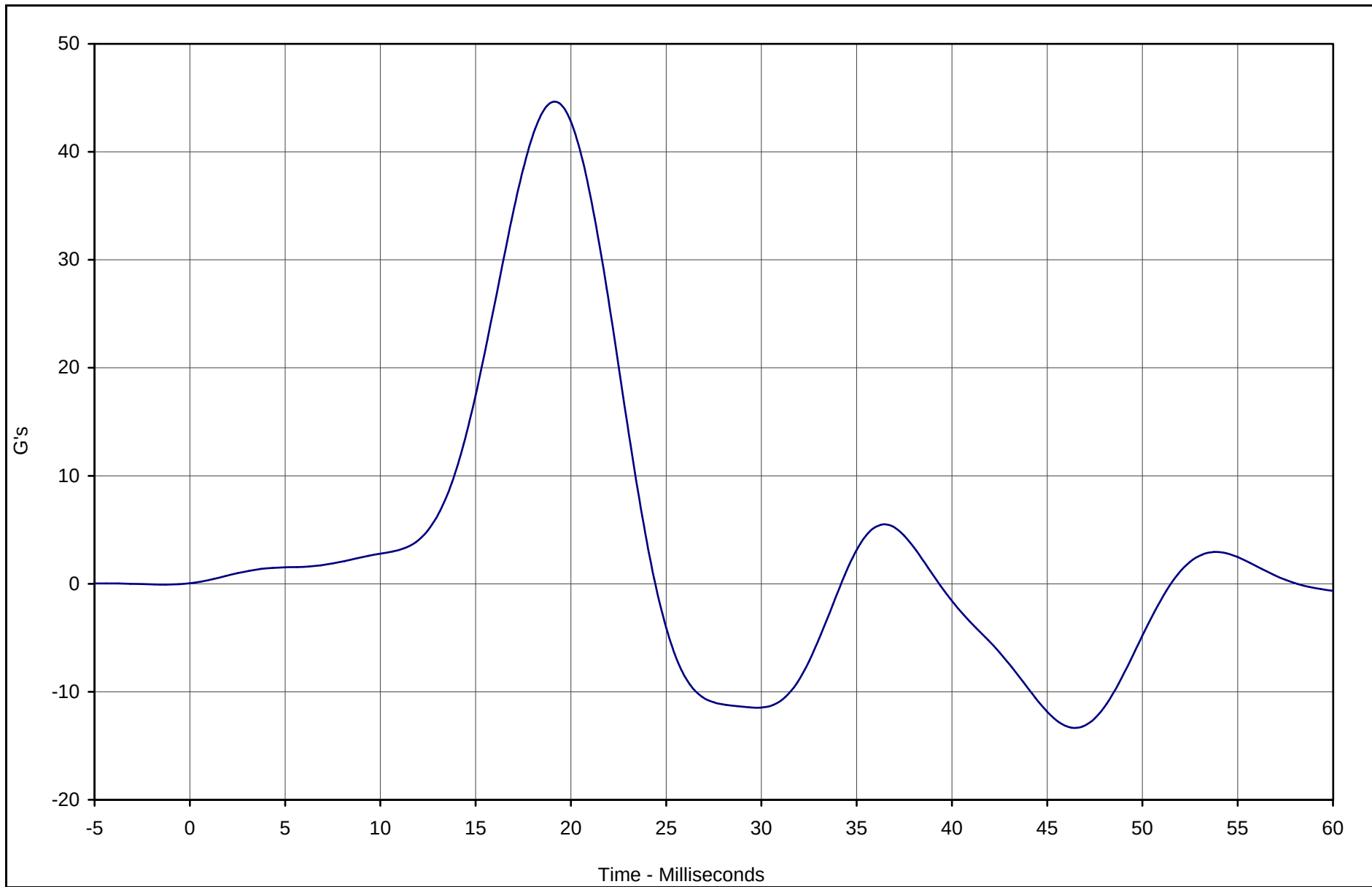


Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 274

Test Date: 3/6/04

Test I.D.: TH04D



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Lower Rib Y Acceleration	002	FIL	G's	44.5	19.4	-13.3	46.3	FIR100

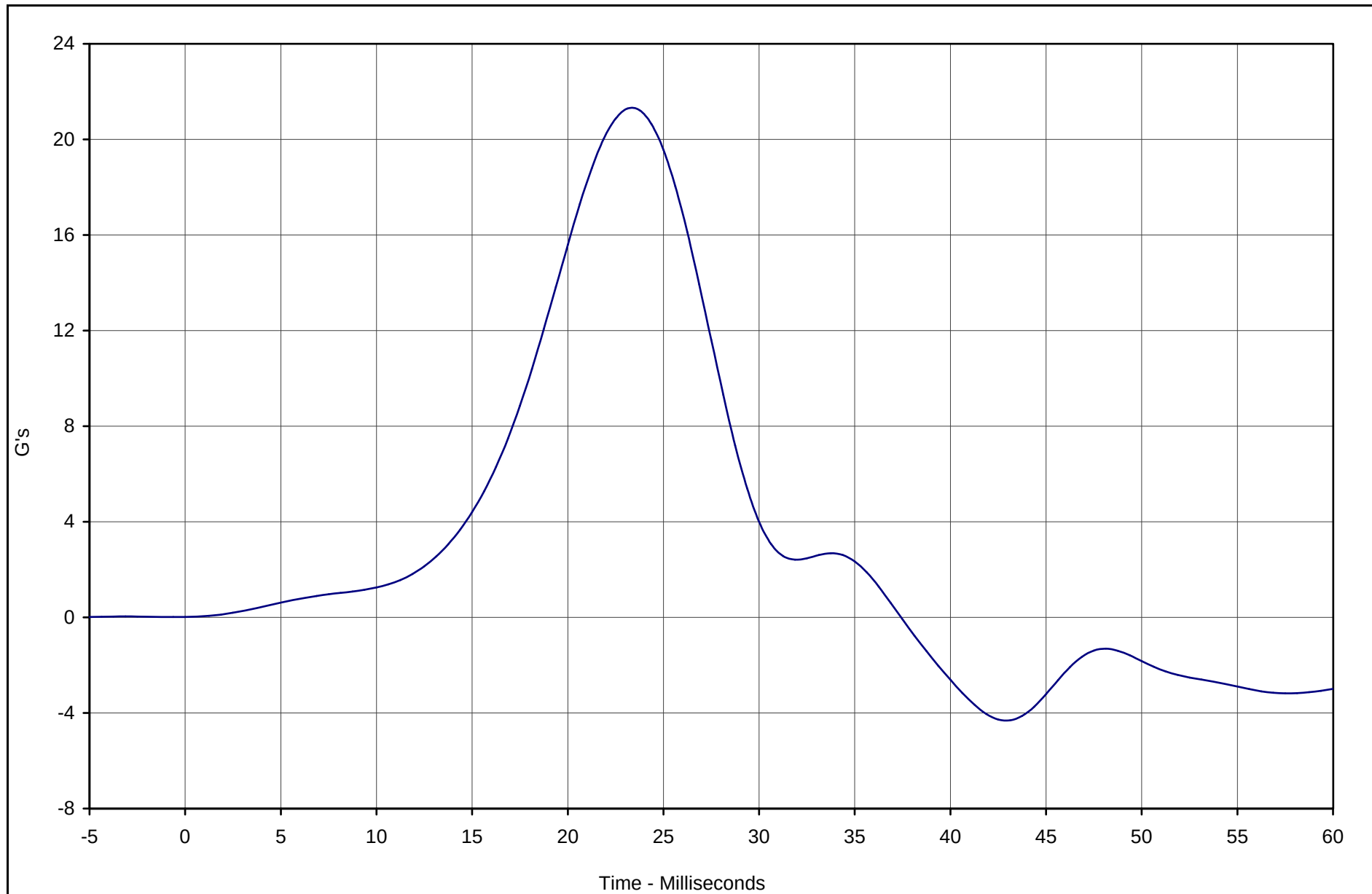


Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 274

Test Date: 3/6/04

Test I.D.: TH04D



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Lower Spine Y Acceleration	003	FIL	G's	21.3	23.1	-4.3	43.1	FIR100



Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 274

Test Date: 3/6/04

Test I.D.: TH04D



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Pelvis Lateral Impact

ATD Serial No.: 274

Test I.D.: PL04D

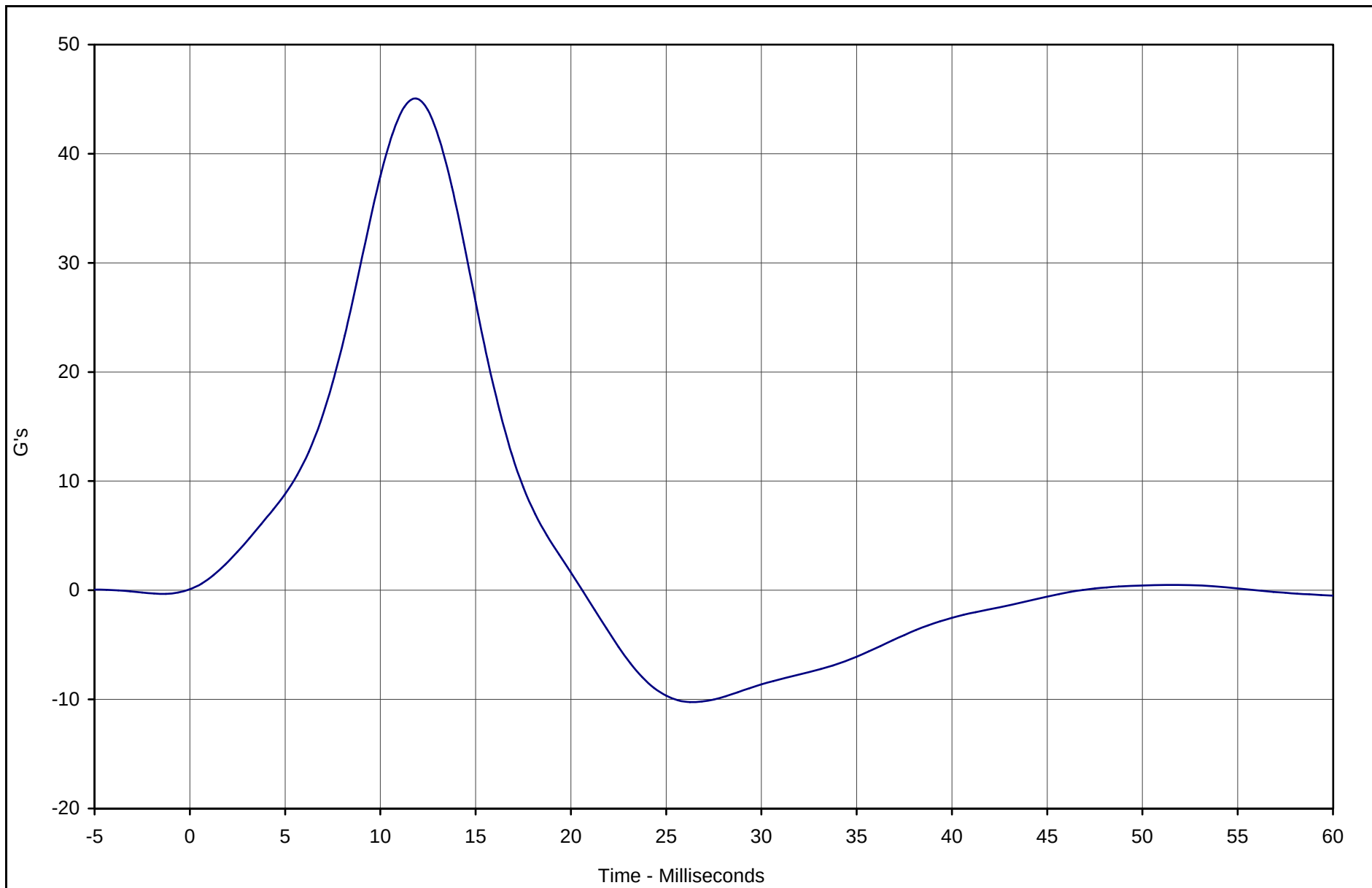
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.31	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	45.1	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.9	Pass
Overall Test Results				Pass

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TR-P24003-04-NC

Laboratory Technician

March 6, 2004
Test Date



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pelvis Y Acceleration	001	FIL	G's	45.1	11.9	-10.2	26.3	FIR100



Test Vehicle: Side Impact Dummy (SID) Pelvis Lateral Impact

SID Serial No.: 274

Test Date: 3/6/04

Test I.D.: PL04D



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Head Drop Lateral Impact Test

ATD Serial No.: 274

Test I.D.: HD04J

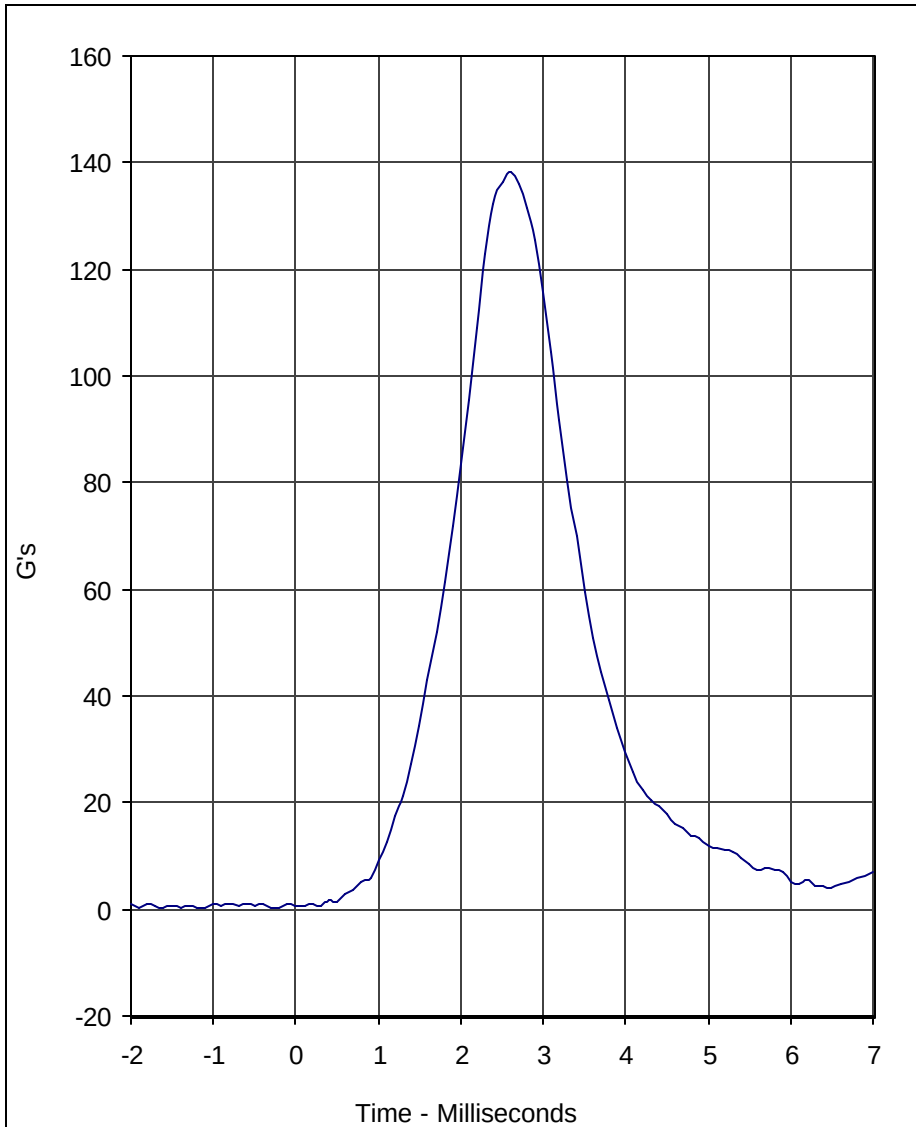
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	138.1	Pass
Peak Longitudinal Acceleration	G's	≤15.0	8.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<10	8.7	Pass
Overall Test Results				Pass

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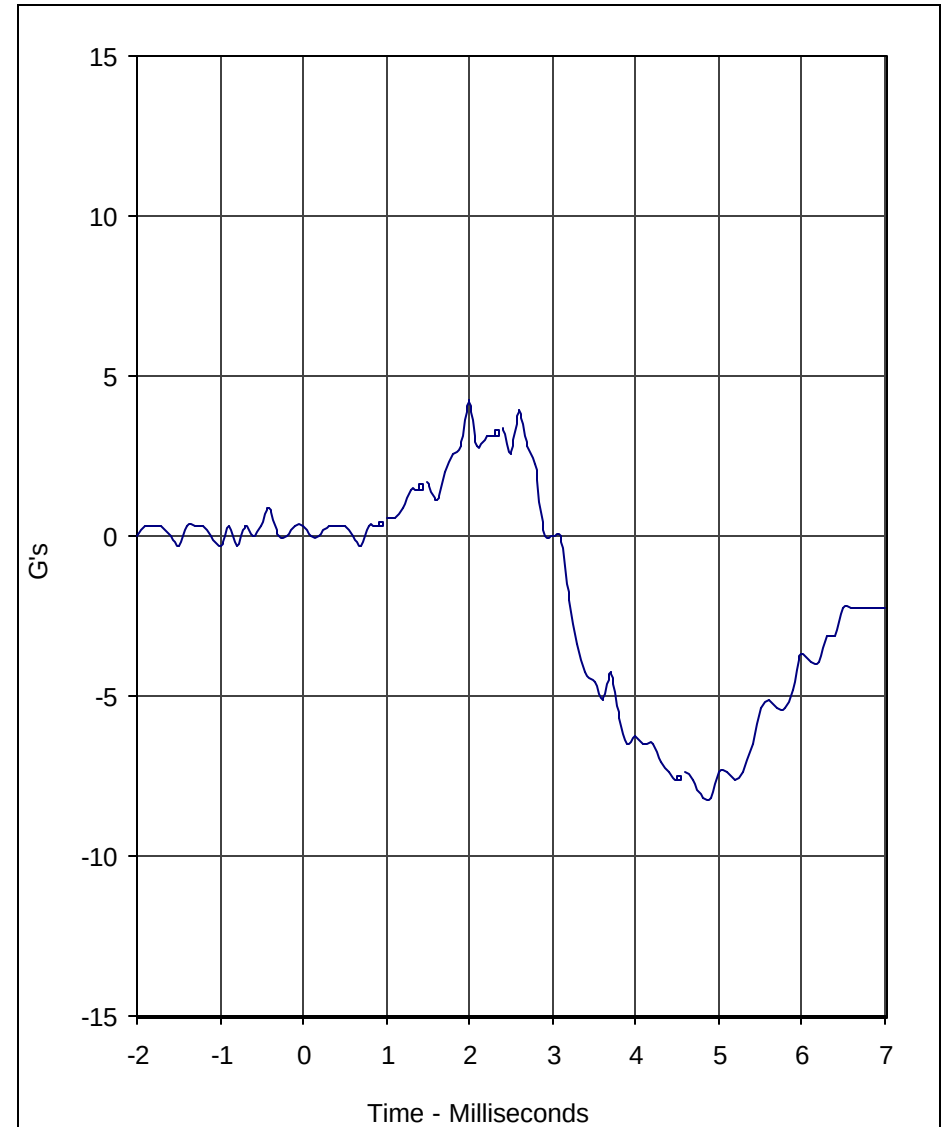
TR-P24003-04-NC

Laboratory Technician

March 7, 2004
Test Date



Curve Description				CURNO	Type
Head Resultant				001	RES
Units	Max	Time	Min	Time	SAE Class
G's	138.1	2.6	0.3	-1.9	1000



Curve Description				CURNO	Type
Head X				002	FIL
Units	Max	Time	Min	Time	SAE Class
G's	4.3	2.0	-8.2	4.8	1000

Test Program: SID / HIII Head Drop Lateral Impact Test

Test Date: 3/7/04

A.T.D. Serial No.: 274

Test I.D.: HD04J





Calibration Data Sheet Side Impact Hybrid Dummy (SID/HIII) Neck Pendulum Lateral Test

ATD Serial No.: 274

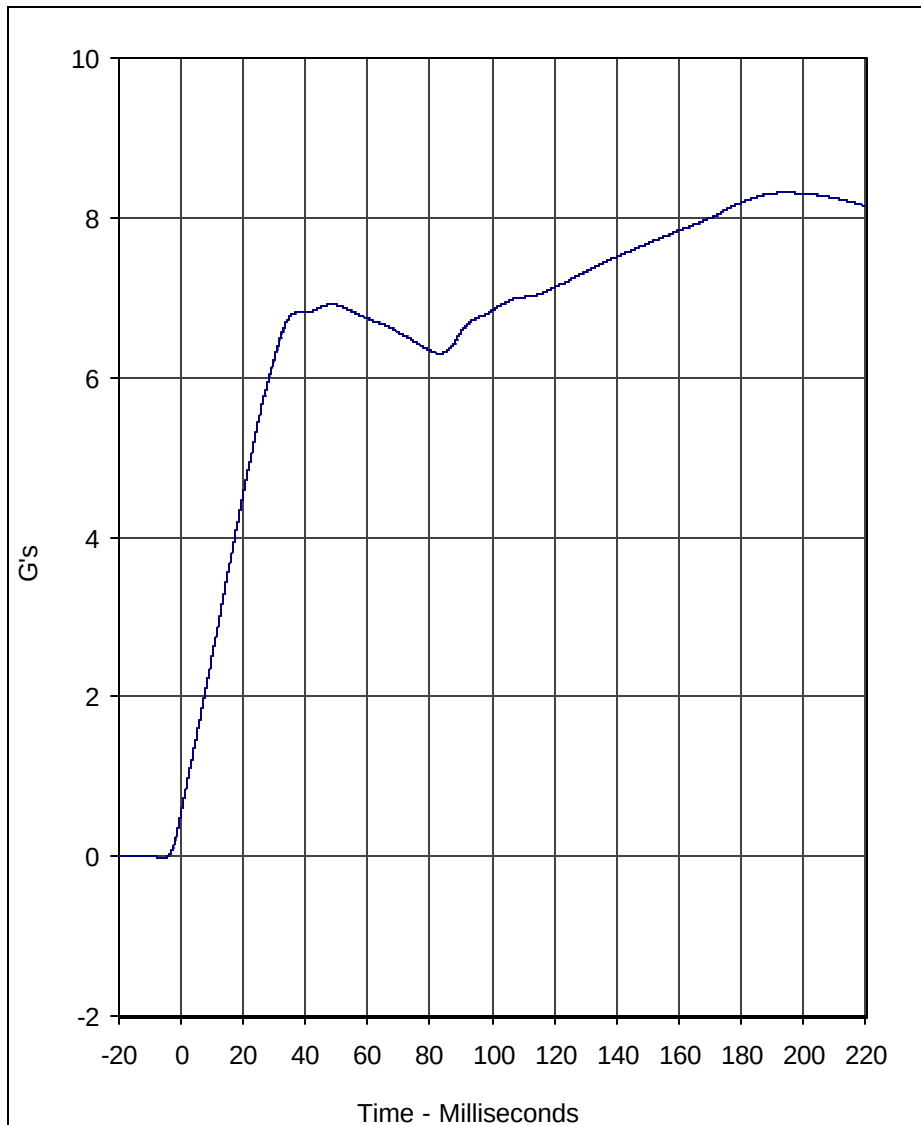
Test I.D.: NB04G

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10	Msec.	1.96 to 2.55	2.50	Pass
	20	Msec.	4.12 to 5.10	4.53	Pass
	30	Msec.	5.73 to 7.01	6.24	Pass
	40 to 70	Msec.	6.27 to 7.64	6.91	Pass
Maximum "D" Plane Rotation		Degrees	66.0 to 82.0	79.8	Pass
Maximum "D" Plane Rotation Time After Peak Moment		Msec.	2.0 to 15.0	4.8	Pass
"D" Plane Rotation Decay Time From Peak Angle to Zero Angle		Msec.	58.0 to 67.0	59.8	Pass
Calculated Moment About Occipital Condyle		N•m	73.0 to 88.0	83.4	Pass
Moment About Occipital Condyle Decay, Time From Positive Peak Value To 0 N•m		Msec.	49.0 to 64.0	61.5	Pass
Overall Test Results					Pass

Laboratory Technician

March 6, 2004

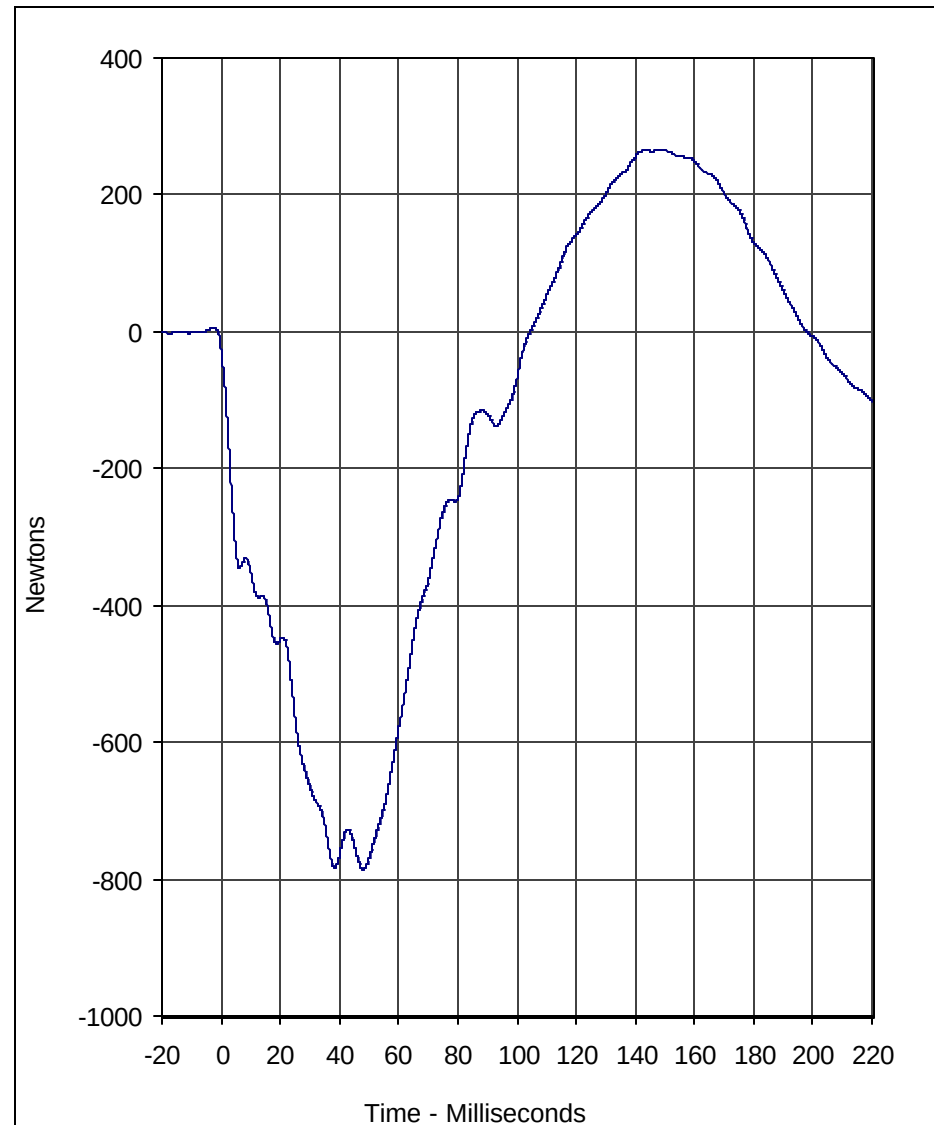
Test Date



Curve Description				CURNO	Type
Pendulum Velocity				001	FIL
Units	Max	Time	Min	Time	SAE Class
G's	8.3	194.7	0.0	-5.7	60

Test Program: SID / HIII Neck Pendulum Lateral Test

Test Date: 3/6/04

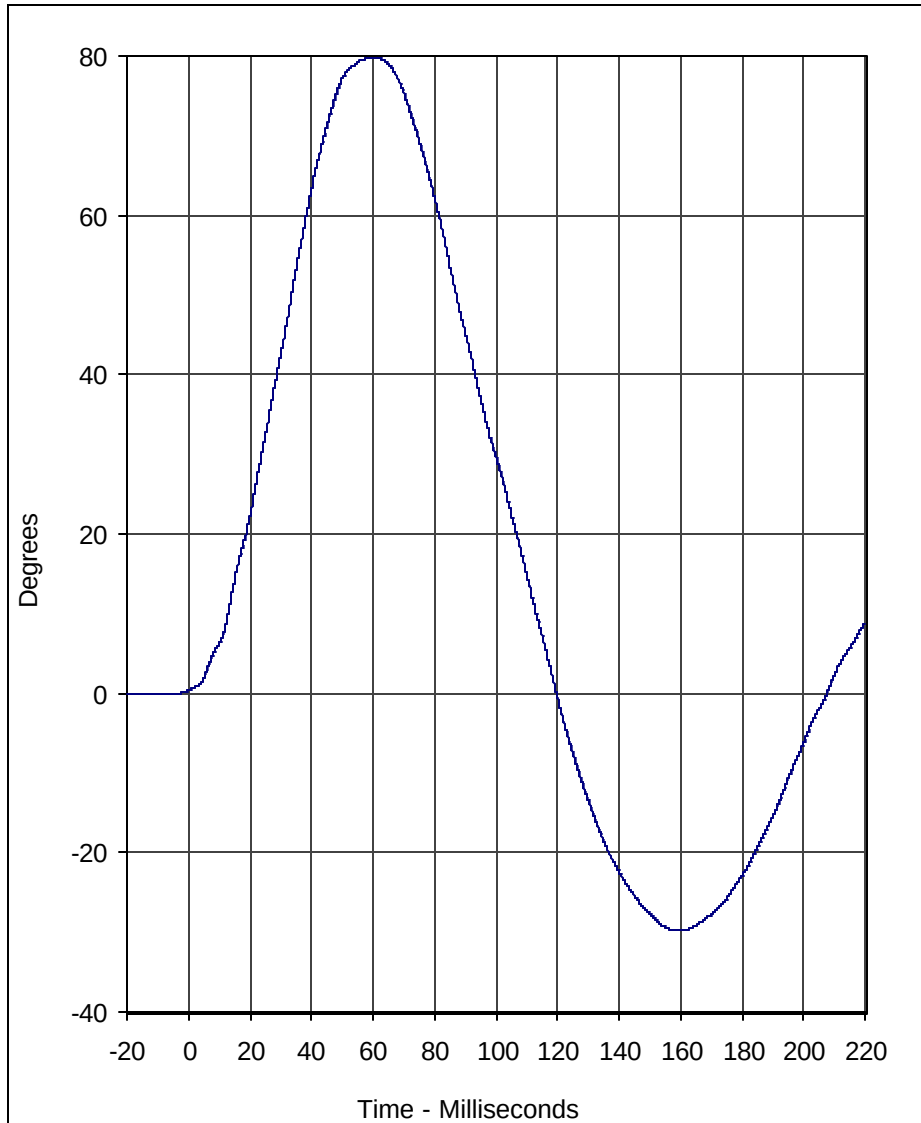


Curve Description				CURNO	Type
Neck Force Y				002	FIL
Units	Max	Time	Min	Time	SAE Class
Newtons	265.7	148.7	-786.5	48.0	60

A.T.D. Serial No.: 274

Test I.D.: NB04G

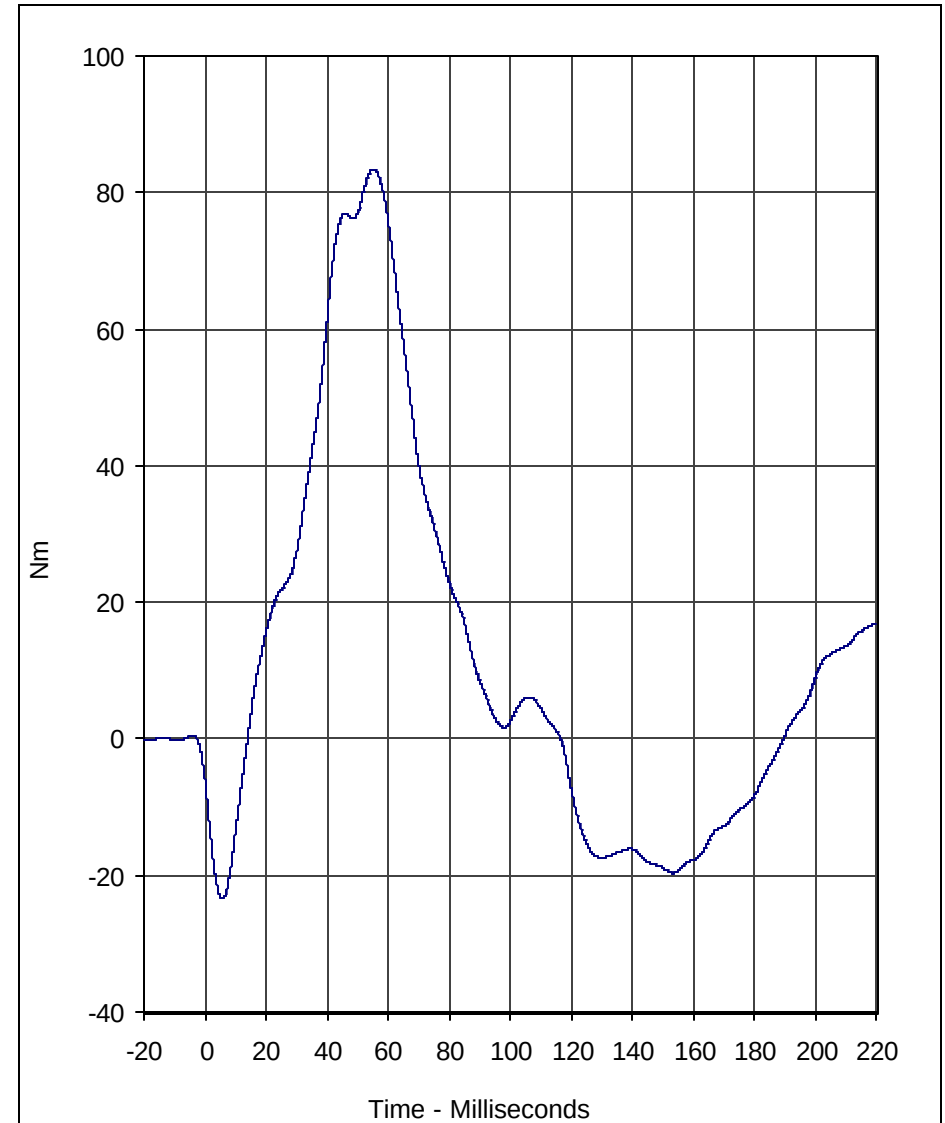




Curve Description				CURNO	Type
"D" Plane Rotation				003	FIL
Units	Max	Time	Min	Time	SAE Class
Degrees	79.8	59.9	-29.8	158.8	60

Test Program: SID / HIII Neck Pendulum Lateral Test

Test Date: 3/6/04



Curve Description				CURNO	Type
Moment About Occipital Condyle				004	FIL
Units	Max	Time	Min	Time	SAE Class
Nm	83.4	55.1	-23.4	5.7	60

A.T.D. Serial No.: 274

Test I.D.: NB04G





Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

External Measurements

ATD Serial No.: 275

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	525	Pass
KV- Knee Pivot From Floor	mm	490 to 505	500	Pass
HW- Hip Width	mm	356 to 391	380	Pass
Overall Test Results				Pass

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Laboratory Technician

March 7, 2004

Test Date



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Thorax Lateral Impact

ATD Serial No.: 275

Test I.D.: TH04E

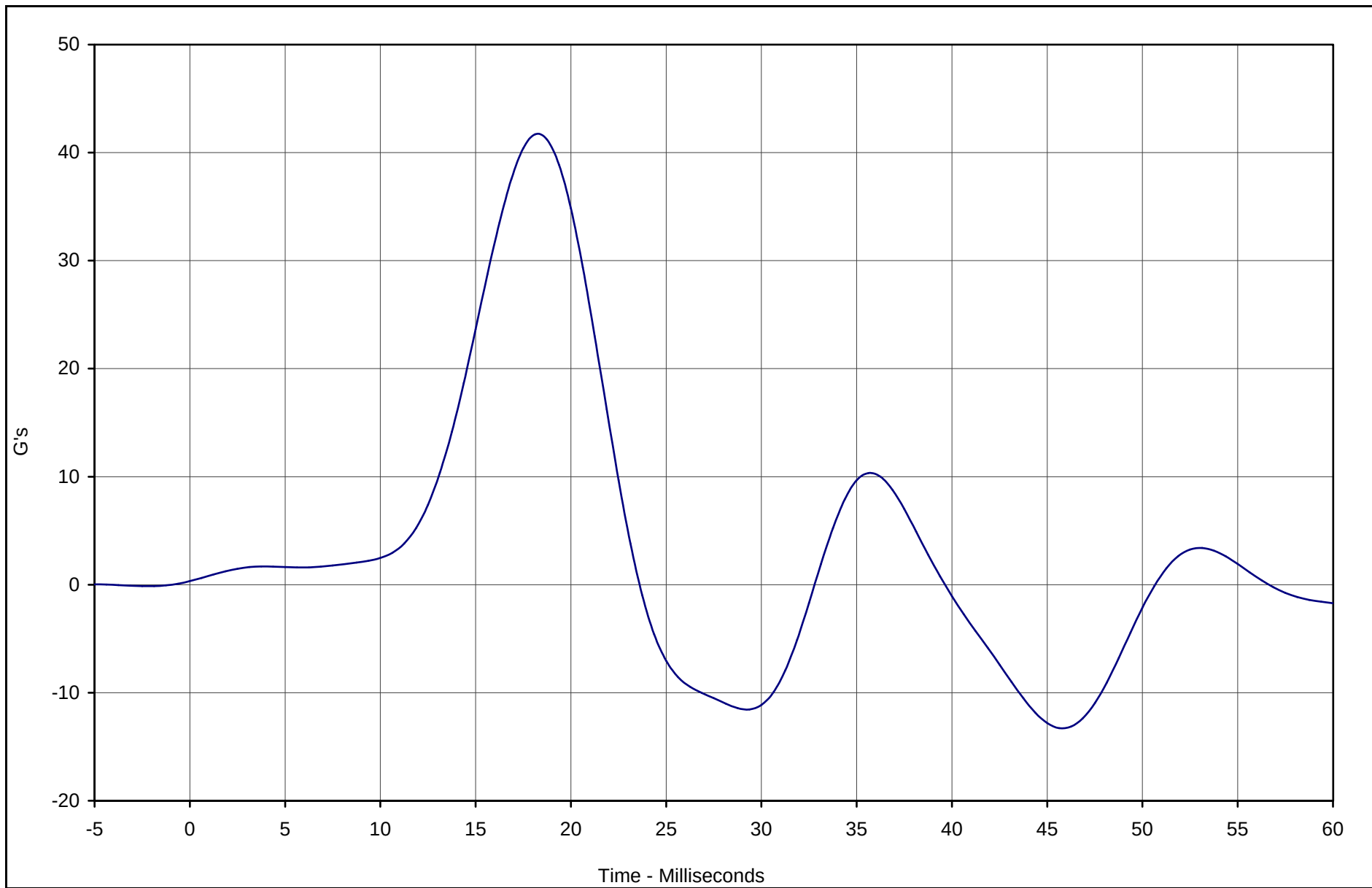
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	41.7	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	42.0	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	21.9	Pass
Overall Test Results				Pass

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TR-P23004-04-NC

Laboratory Technician

March 6, 2004
Test Date



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Upper Rib Y Acceleration	001	FIL	G's	41.7	18.1	-13.3	45.6	FIR100

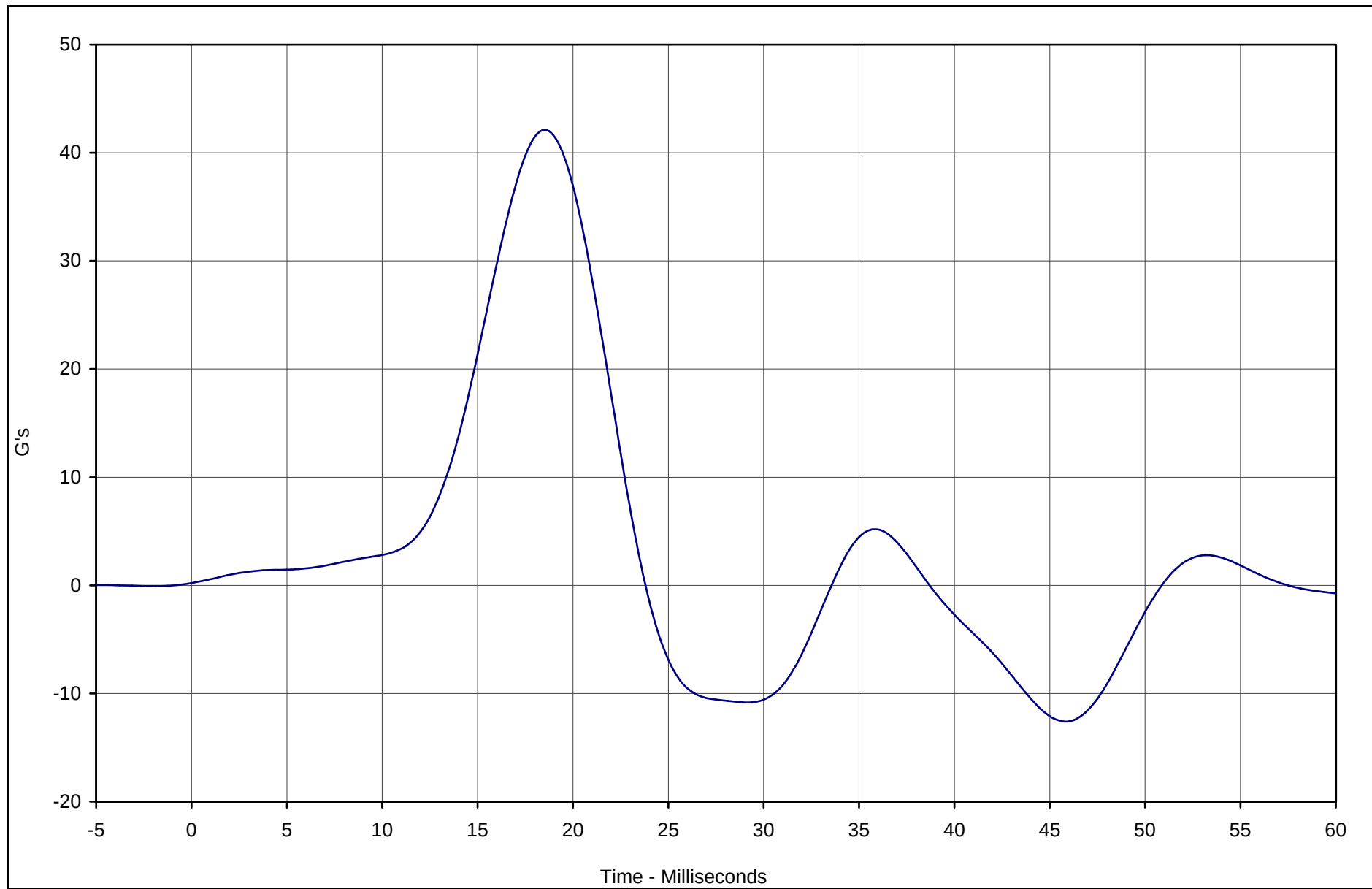


Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 275

Test Date: 3/6/04

Test I.D.: TH04E



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Lower Rib Y Acceleration	002	FIL	G's	42.0	18.8	-12.6	45.6	FIR100

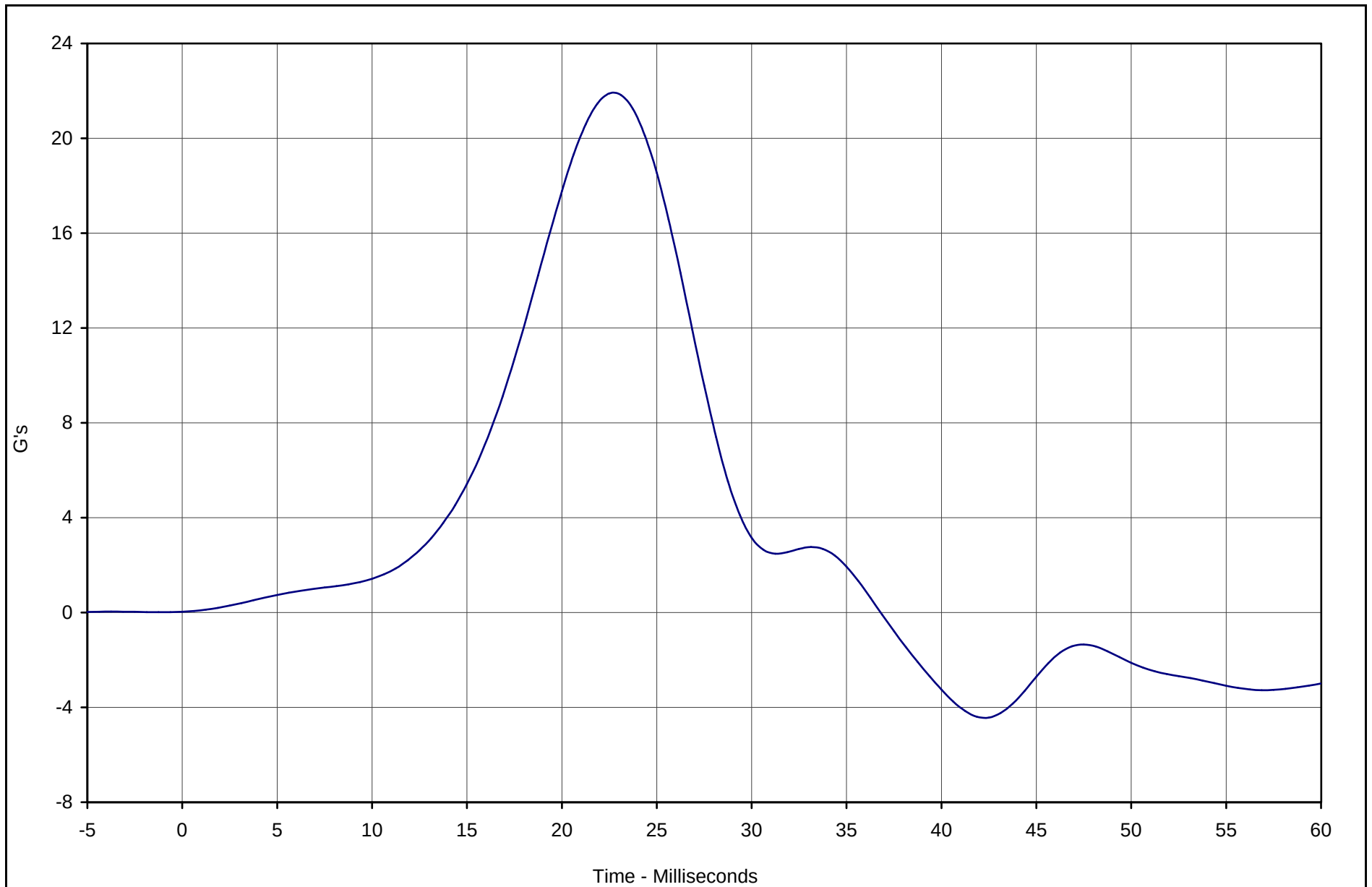


Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 275

Test Date: 3/6/04

Test I.D.: TH04E



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Lower Spine Y Acceleration	003	FIL	G's	21.9	22.5	-4.4	42.5	FIR100



Test Vehicle: SID / HIII Thorax Lateral Impact

SID Serial No.: 275

Test Date: 3/6/04

Test I.D.: TH04E



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Pelvis Lateral Impact

ATD Serial No.: 275

Test I.D.: PL04G

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	40.9	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	5.6	Pass
Overall Test Results				Pass

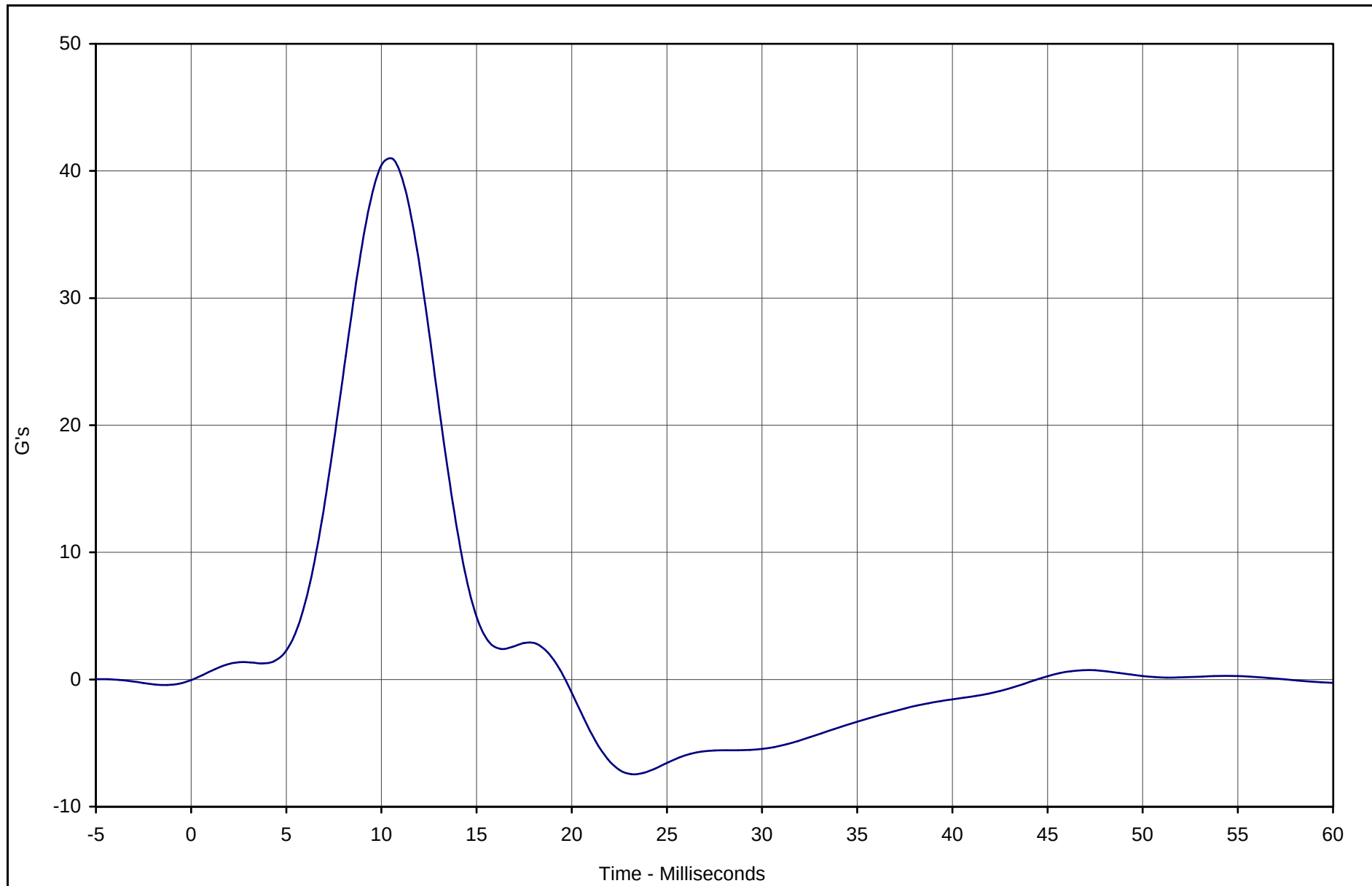
C-42

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Laboratory Technician

March 6, 2004

Test Date



Curve Description	CURNO	Type	Units	Max	Time	Min	Time	SAE Class
Pelvis Y Acceleration	001	FIL	G's	40.9	10.6	-7.4	23.1	FIR100



Test Vehicle: Side Impact Dummy (SID) Pelvis Lateral Impact

SID Serial No.: 275

Test Date: 3/6/04

Test I.D.: PL04G



Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Head Drop Lateral Impact Test

ATD Serial No.: 275

Test I.D.: HD04H

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	136.1	Pass
Peak Longitudinal Acceleration	G's	≤15.0	8.5	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<10	8.1	Pass
Overall Test Results				Pass

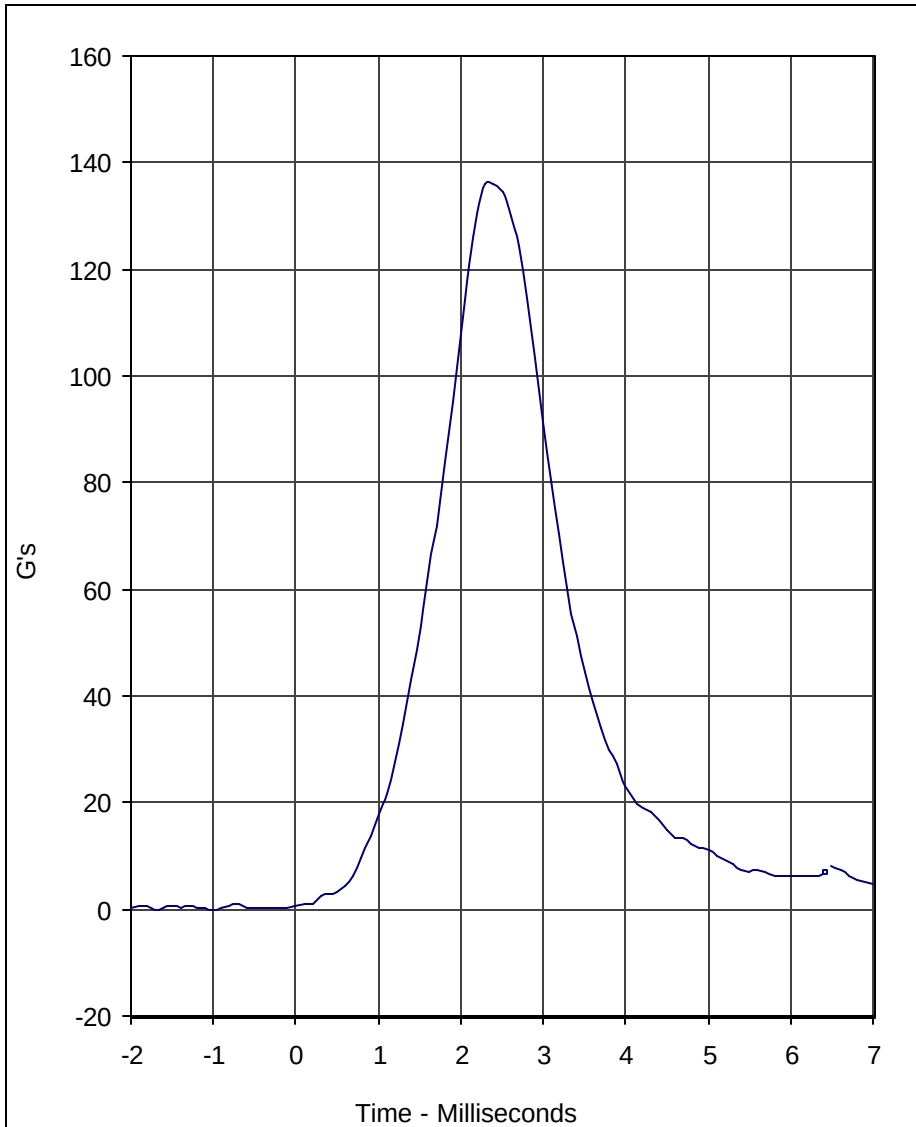
C-44

TR-P24003-04-NC

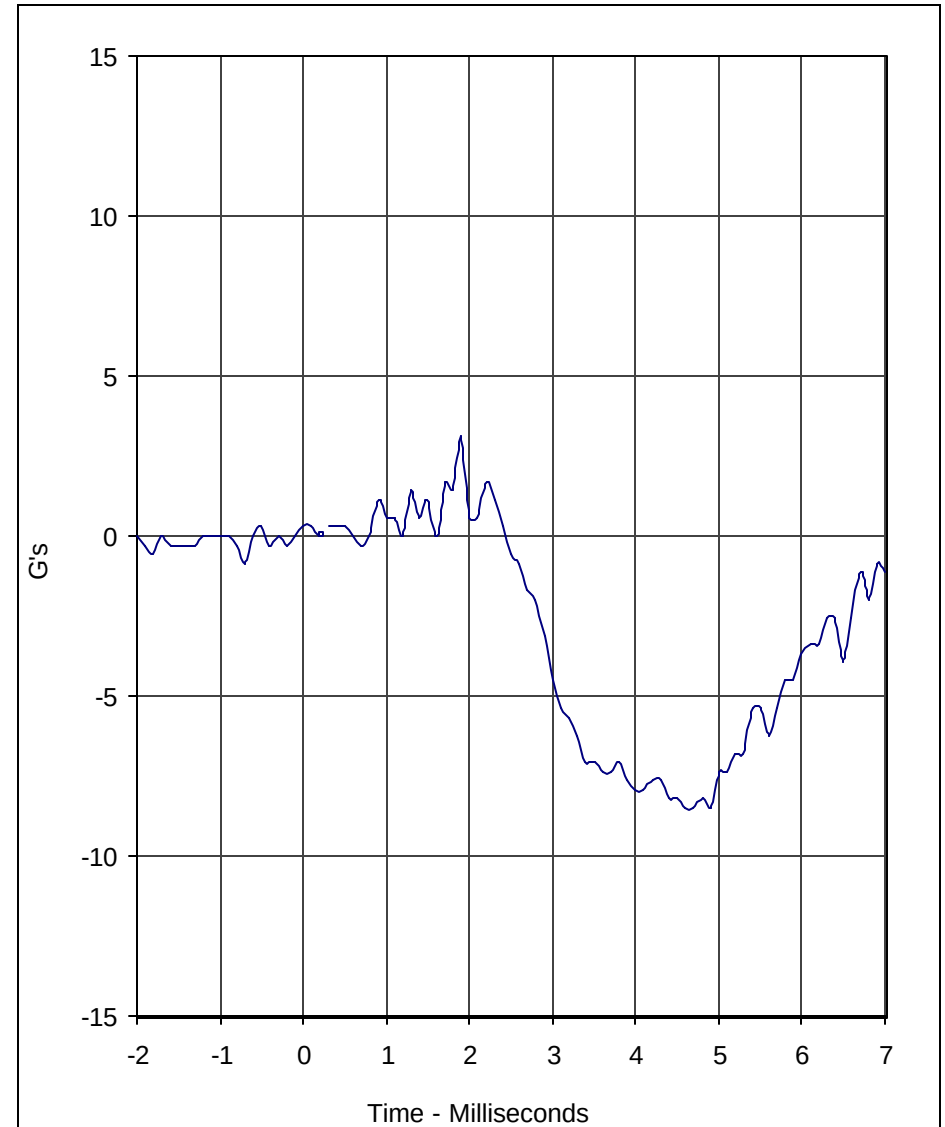
Laboratory Technician

March 7, 2004

Test Date



Curve Description				CURNO	Type
Head Resultant				001	RES
Units	Max	Time	Min	Time	SAE Class
G's	136.1	2.4	0.0	-1.7	1000



Curve Description				CURNO	Type
Head X				002	FIL
Units	Max	Time	Min	Time	SAE Class
G's	3.1	1.9	-8.5	4.6	1000

Test Program: SID / HIII Head Drop Lateral Impact Test
 Test Date: 3/7/04

A.T.D. Serial No.: 275
 Test I.D.: HD04H





Calibration Data Sheet

Side Impact Hybrid Dummy (SID/HIII)

Neck Pendulum Lateral Test

ATD Serial No.: 275

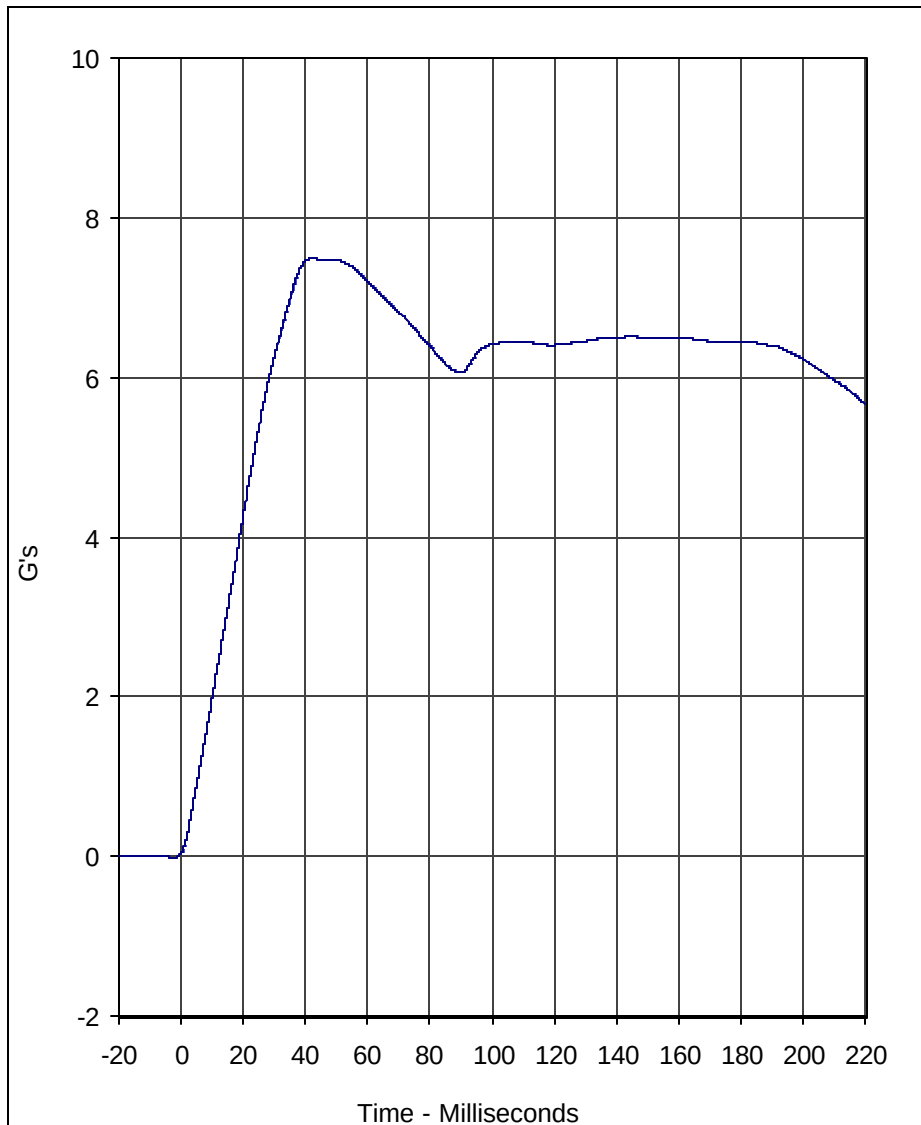
Test I.D.: NB04G

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10	Msec.	1.96 to 2.55	1.98	Pass
	20	Msec.	4.12 to 5.10	4.26	Pass
	30	Msec.	5.73 to 7.01	6.26	Pass
	40 to 70	Msec.	6.27 to 7.64	7.49	Pass
Maximum "D" Plane Rotation		Degrees	66.0 to 82.0	78.5	Pass
Maximum "D" Plane Rotation Time After Peak Moment		Msec.	2.0 to 15.0	14.6	Pass
"D" Plane Rotation Decay Time From Peak Angle to Zero Angle		Msec.	58.0 to 67.0	60.0	Pass
Calculated Moment About Occipital Condyle		N•m	73.0 to 88.0	84.3	Pass
Moment About Occipital Condyle Decay, Time From Positive Peak Value To 0 N•m		Msec.	49.0 to 64.0	49.7	Pass
Overall Test Results					Pass

Laboratory Technician

March 6, 2004

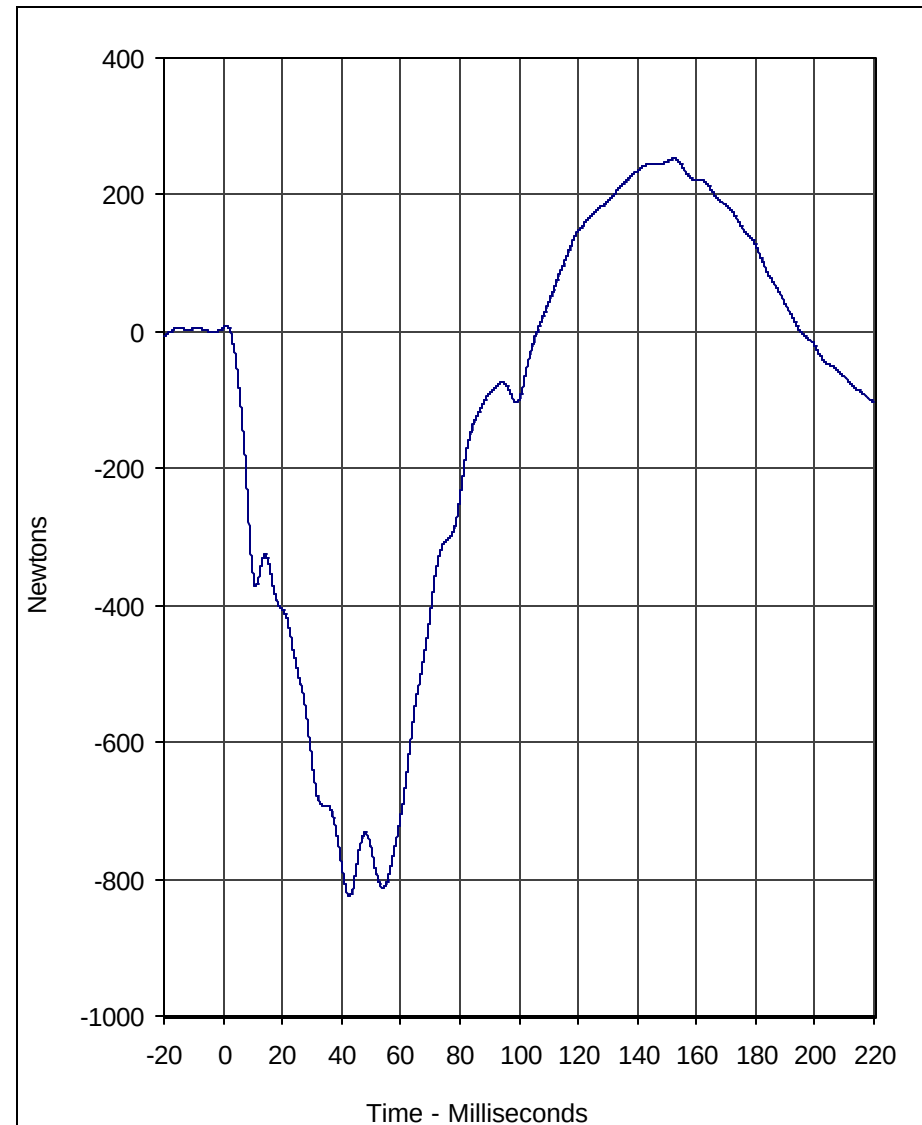
Test Date



Curve Description				CURNO	Type
Pendulum Velocity				001	FIL
Units	Max	Time	Min	Time	SAE Class
G's	7.5	42.3	0.0	-2.1	60

Test Program: SID / HIII Neck Pendulum Lateral Test

Test Date: 3/6/04

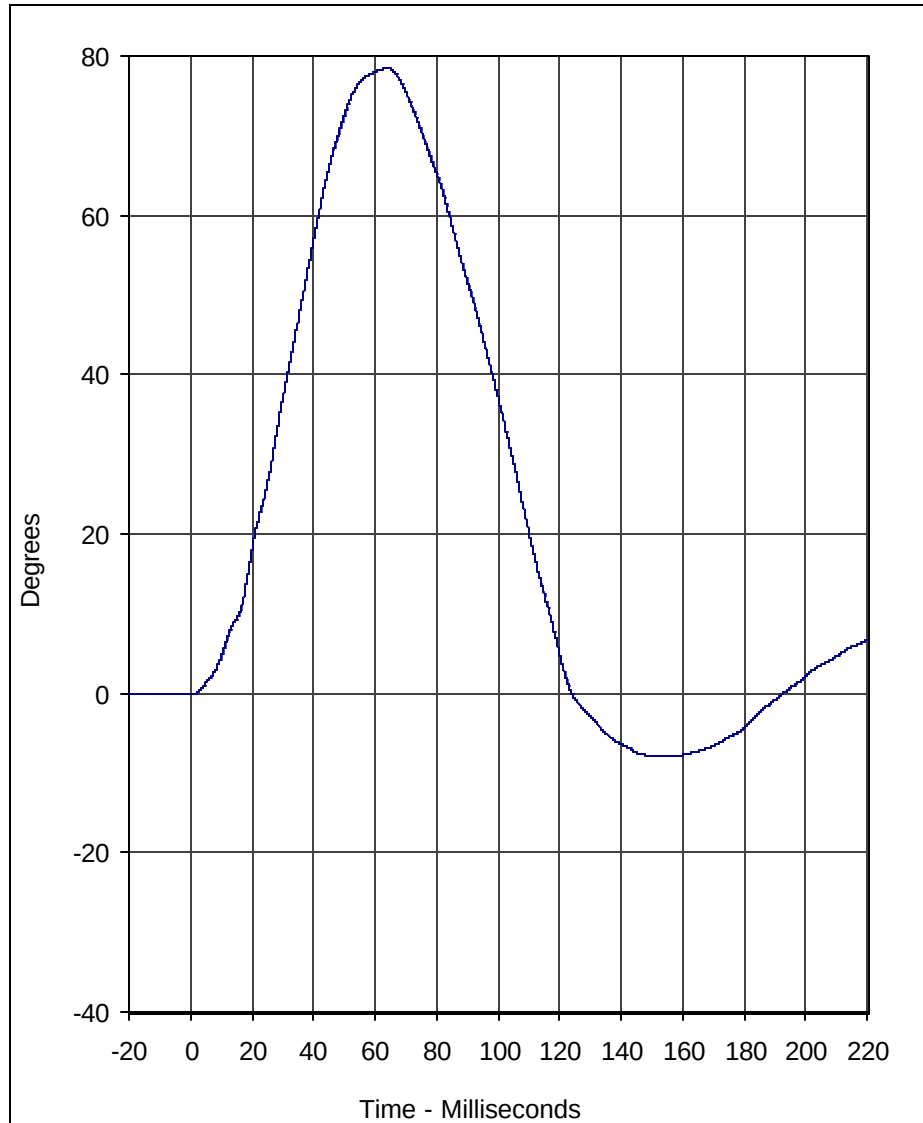


Curve Description				CURNO	Type
Neck Force Y				002	FIL
Units	Max	Time	Min	Time	SAE Class
Newtons	253.1	152.4	-825.6	42.7	60

A.T.D. Serial No.: 275

Test I.D.: NB04G

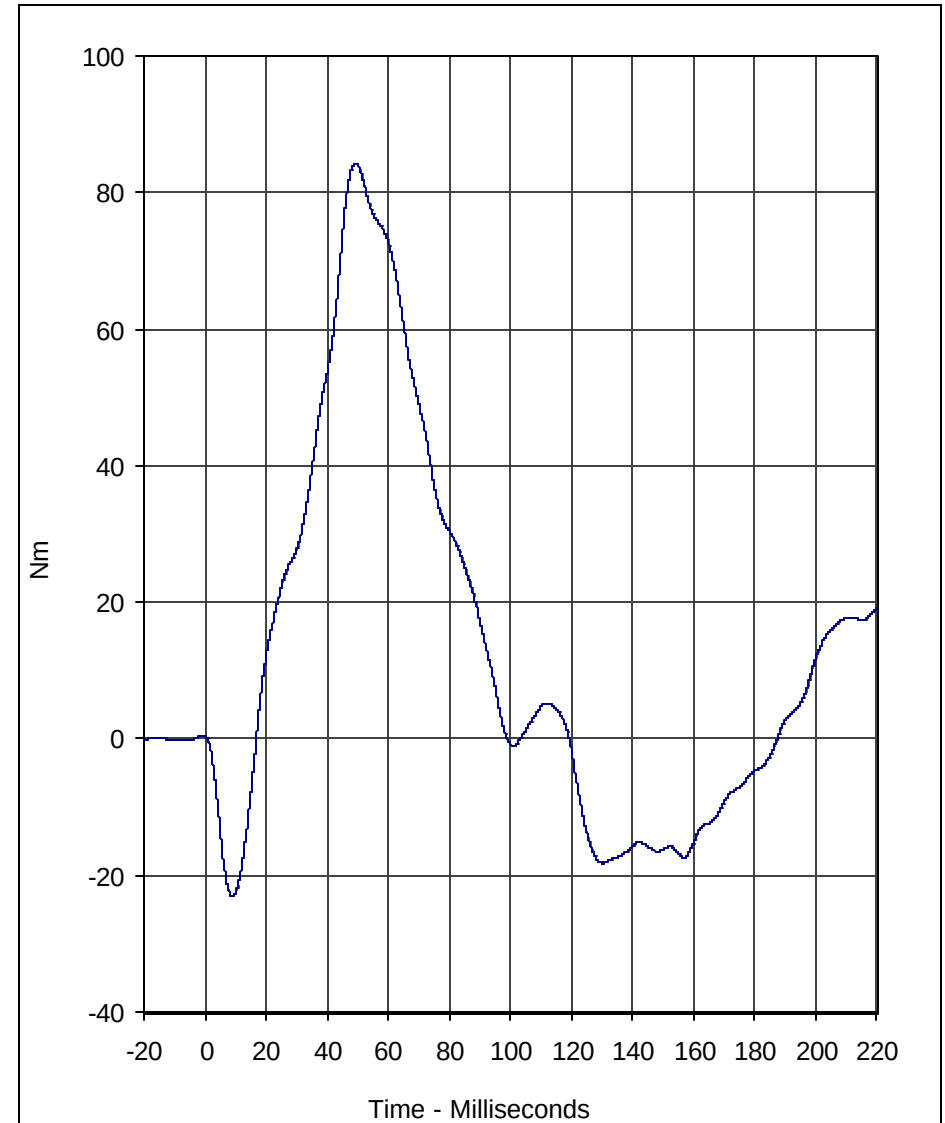




Curve Description				CURNO	Type
"D" Plane Rotation				003	FIL
Units	Max	Time	Min	Time	SAE Class
Degrees	78.5	64.0	-7.8	157.6	60

Test Program: SID / HIII Neck Pendulum Lateral Test

Test Date: 3/6/04



Curve Description				CURNO	Type
Moment About Occipital Condyle				004	FIL
Units	Max	Time	Min	Time	SAE Class
Nm	84.3	49.4	-23.0	9.0	60

A.T.D. Serial No.: 275

Test I.D.: NB04G



APPENDIX D
TEST EQUIPMENT LIST AND CALIBRATION INFORMATION

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Driver SID/HIII Serial Number 274
2/26/04
2004 Toyota Highlander SUV

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
1	Head CG	X	GPAC066X	Accel., Full Bridge	Entran	2000JF	G
2	Head CG	Y	GPAC067Y	Accel., Full Bridge	Entran	2000JF	G
3	Head CG	Z	GPAC068Z	Accel., Full Bridge	Entran	2000JF	G
4	Head CG, Redundant	X	GPAC069X	Accel., Full Bridge	Entran	2000JF	G
5	Head CG, Redundant	Y	GPAC070Y	Accel., Full Bridge	Entran	2000JF	G
6	Head CG, Redundant	Z	GPAC071Z	Accel., Full Bridge	Entran	2000JF	G
7	Neck Force	X	274_NFX	Load cell, six axis neck	R. A. Denton	1716A	N
8	Neck Force	Y	274_NFY	Load cell, six axis neck	R. A. Denton	1716A	N
9	Neck Force	Z	274_NFZ	Load cell, six axis neck	R. A. Denton	1716A	N
10	Neck Moment	X	274_NMX	Load cell, six axis neck	R. A. Denton	1716A	Nm
11	Neck Moment	Y	274_NMY	Load cell, six axis neck	R. A. Denton	1716A	Nm
12	Neck Moment	Z	274_NMZ	Load cell, six axis neck	R. A. Denton	1716A	Nm
13	Upper Rib Primary	Y	KEAC070X	Accel.,1/2 bridge	Endevco	7264-2000X	G
14	Lower Rib, Primary	Y	KEAC071Y	Accel.,1/2 bridge	Endevco	7264-2000Y	G
15	Lower Spine, Primary	Y	KEAC072Z	Accel.,1/2 bridge	Endevco	7264-2000Z	G
16	Pelvis, Primary	Y	GPAC065X	Accel.,Full bridge	Endevco	7264A-2000	G
17	Upper Rib Redundant	Y	KEAC076X	Accel.,1/2 bridge	Endevco	7264-2000X	G
18	Lower Rib, Redundant	Y	KEAC077Y	Accel.,1/2 bridge	Endevco	7264-2000Y	G
19	Lower Spine, Redundant	Y	KEAC078Z	Accel.,1/2 bridge	Endevco	7264-2000Z	G
20	Pelvis, Redundant	Y	KEAC089X	Accel.,1/2 bridge	Endevco	7264-2000X	G
21	Thorax Contact	N/A	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%
22	Pelvis Contact	N/A	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Passenger SID/HIII Serial Number 275
2/26/04
2004 Toyota Highlander SUV

CH.	LOCATION	AXIS	IDENT. NO.	DESCRIPTION	MFR	MODEL	UNITS
23	Head CG	X	GPAC072X	Accel., Full Bridge	Entran	2000JF	G
24	Head CG	Y	GPAC073Y	Accel., Full Bridge	Entran	2000JF	G
25	Head CG	Z	GPAC074Z	Accel., Full Bridge	Entran	2000JF	G
26	Head CG, Redundant	X	GPAC075X	Accel., Full Bridge	Entran	2000JF	G
27	Head CG, Redundant	Y	GPAC077Y	Accel., Full Bridge	Entran	2000JF	G
28	Head CG, Redundant	Z	GPAC078Z	Accel., Full Bridge	Entran	2000JF	G
29	Neck Force	X	275_NFX	Load cell, six axis neck	R. A. Denton	1716A	N
30	Neck Force	Y	275_NFY	Load cell, six axis neck	R. A. Denton	1716A	N
31	Neck Force	Z	275_NFZ	Load cell, six axis neck	R. A. Denton	1716A	N
32	Neck Moment	X	275_NMX	Load cell, six axis neck	R. A. Denton	1716A	Nm
33	Neck Moment	Y	275_NMY	Load cell, six axis neck	R. A. Denton	1716A	Nm
34	Neck Moment	Z	275_NMZ	Load cell, six axis neck	R. A. Denton	1716A	Nm
35	Upper Rib Primary	Y	KEAC066X	Accel.,1/2 bridge	Endevco	7264-2000X	G
36	Lower Rib, Primary	Y	KEAC067Y	Accel.,1/2 bridge	Endevco	7264-2000Y	G
37	Lower Spine, Primary	Y	KEAC068Z	Accel.,1/2 bridge	Endevco	7264-2000Z	G
38	Pelvis, Primary	Y	KEAC079X	Accel.,1/2 bridge	Endevco	7264-2000X	G
39	Upper Rib Redundant	Y	KEAC073X	Accel.,1/2 bridge	Endevco	7264-2000X	G
40	Lower Rib, Redundant	Y	KEAC074Y	Accel.,1/2 bridge	Endevco	7264-2000Y	G
41	Lower Spine, Redundant	Y	KEAC075Z	Accel.,1/2 bridge	Endevco	7264-2000Z	G
42	Pelvis, Redundant	Y	KEAC081X	Accel.,1/2 bridge	Endevco	7264-2000X	G
43	Thorax Contact	Y	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%
44	Pelvis Contact	Y	T0	Contact Switch	Tapeswitch	8 oz. Yellow	%

55/28 km/h Side Impact NCAP
Instrumentation Data Channel Assignments
Vehicle Accelerometers
2/26/04

2004 Toyota Highlander SUV

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
2/26/04
2004 Toyota Highlander SUV**

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