REPORT NUMBER TR-P25102-01-NC

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

FORD MOTOR COMPANY
2006 FORD FREESTAR SE
5-DOOR MPV

NHTSA NUMBER: F60200

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FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
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15. Supplementary Notes

16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2006 Ford Freestar SE 5-Door MPV in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedures for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering,LLC laboratories in Adelanto, California, on September 7, 2005. The impact velocity of the Moving Deformable Barrier was 62.41 km/h, and the outside ambient temperature at the struck (driver's) side of the vehicle was 39.9 deg. C. The target vehicle's maximum post-test static crush was 427 mm located at level 3. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver SID/HIII	Pass. SID/HIII
Left Upper Rib (LUR) G's	45.6	34.8
Left Lower Rib (LLR) G's	54.6	49.0
Lower Spine (T_{12}) G's	72.7	52.4
Thoracic Trauma Index (TTI) G's	64.0	51.0
Pelvis (PEV) G's	85.6	91.0

17. Key Words	18. Distribution Statement
New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) Side Impact Dummy (SID/HIII)	Copies of this report are available from: National Highway Traffic Safety Admin. NHTSA Technical Reference Division 400 Seventh St., SW, Room 5108 Washington, DC 20590

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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' 2006 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 2006 Ford Freestar SE 5-Door MPV manufactured by General Motors Corporation.

1.2 TEST PROCEDURE

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

SECTION 2

SUMMARY OF SIDE IMPACT TEST

2.1 SUMMARY OF SIDE IMPACT NCAP TEST

A model year 2006 Ford Freestar SE 5-Door MPV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 62.41 km/h. The specified impact velocity range is from 61.14 to 62.75 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 2170 kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on September 7, 2005.

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

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

SUPPLEMENTAL RESTRAINT INFORMATION

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

.

The test vehicle was instrumented with twenty-six (26) structural accelerometers and the MDB was instrumented with five (5) accelerometers and one (1) contact switch on the right bumper to compare left side to right side bumper impact timing. All data channels were recorded with the fully self contained on-board Data Acquisition System (DAS). The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The driver and passenger doors remained closed during impact. The test vehicle sustained a maximum static crush of 427 mm at level 3, 1350 mm rearward of the left vertical impact point. The driver SID/Hybrid III, Serial No. 275 and the passenger SID/Hybrid III, Serial No. 274 were calibrated prior to this test. The SID/Hybrid III injury criteria is summarized as follows:

Measurement	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	64.0	51.0
Peak Pelvic G's (PEV)	G's	85.6	91.0

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

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, response data traces. Appendix C contains the SID Configuration and performance verification data.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

CONVERSION FACTORS USED IN THIS REPORT*

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

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

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	F60200	Anti-Lock Brakes	Yes
Make	Ford	All Wheel Drive	No
Model	Freestar	Power Steering	Yes
Body Style	5-Door MPV	Driver Front Airbag	Yes
Vin No.	2FMZA51636BA03109	Driver Side Torso Airbag	No
Color	Blue	Driver Side Head Airbag	No
Delivery Date	8/30/2005	Driver Curtain/Airbag	No
Odometer	53.0	Rear Pass. Airbag	No
Dealer	Antelope Valley Ford	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.	V-6	Pre-Tensioners	Yes
Engine Disp. (L)	3.9	Load Limiters	Yes
Engine Placement	Transverse	Bucket Seats	Yes
Roof Rack	Yes	Air Cond.	Yes
Sunroof/T-Top	No	AM/FM Cassette	Yes
Tinted Glass	Yes	Tilt Steering	Yes
Traction Control	No	Automatic Door Locks	Yes
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	Yes
Rear Disc	Yes	Other	Yes

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.	GVWR (kg)	2621
Date of Manufacture	06/05	GAWR Front (kg)	1314
		GAWR Rear (kg)	1310

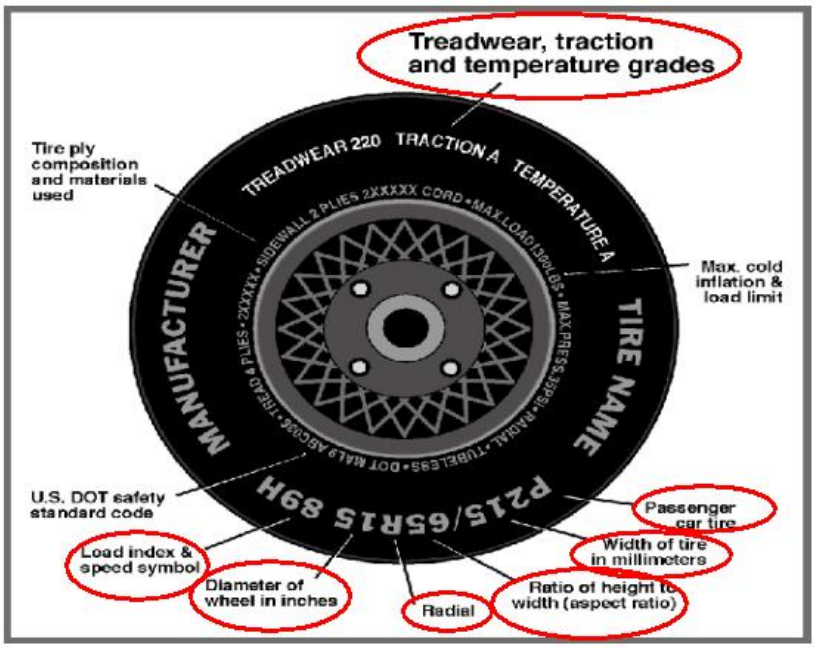
VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	None	
Number of Occupants	2	2	3	7
Capacity Weight (VCW) (kg)				544
Cargo Weight (RCLW) (kg)				68

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

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



TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	240	240
Cold Pressure (kpa)	240	240
Recommened Tire Size	P225/60R16	P225/60R16
Tire Size on Vehicle	P225/60R16	P225/60R16
Tire Manufacturer	Michelin	Michelin
Treadwear	460	460
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	1 Ply Polyester	1 Ply Polyester
Tire Plies Body	1 Polyester, 1 Polymide, 2 Steel	1 Polyester, 1 Polymide, 2 Steel
Load Index/Speed Symbol	97S	97S
Tire Material	Polyester/Steel	Polyester/Steel
DOT Safety Code Right	APXO-089X-2305	APXO-089X-2305
DOT Safety Code Left	APXO-089X-2305	APXO-089X-2305

DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	592	394		630	485	
Right	kg	559	403		580	475	
Ratio	%	59.1	40.9		55.7	44.3	
Totals	kg	1151	797	1948	1210	960	2170

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1948
Weight of 2 P572 ATD's	kg	161
Rated Cargo/Luggage Wt. (RCLW)	kg	68
Calculated Vehicle Target Wt. (TVTW)	kg	2177

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	760	760	770	768	1260
As Tested	mm	745	756	736	740	1364
Fully Loaded	mm	745	755	733	740	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3082
Total Vehicle Length at Left Side	mm	3650
Total Vehicle Length at Centerline	mm	5110
Total Vehicle Length at Right Side	mm	3650
Weight of Ballast In Cargo Area	kg	39
Amount of Stoddard Solvent in Fuel Tank	liters	91.5

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3082
Target Impact Point Aft of Front Axle	mm	1736
Actual Impact Point Aft of Front Axle	mm	1716

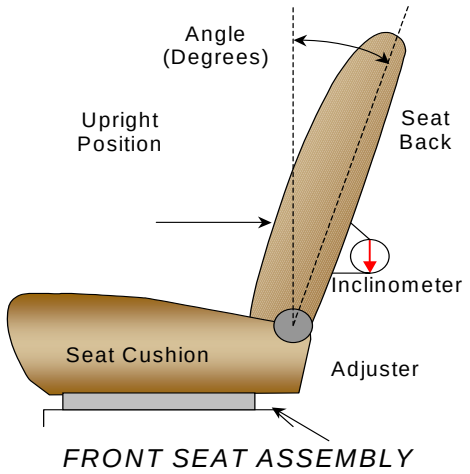
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

NOMINAL DESIGN RIDING POSITION

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



FRONT SEAT ASSEMBLY

SEAT BACK ANGLES

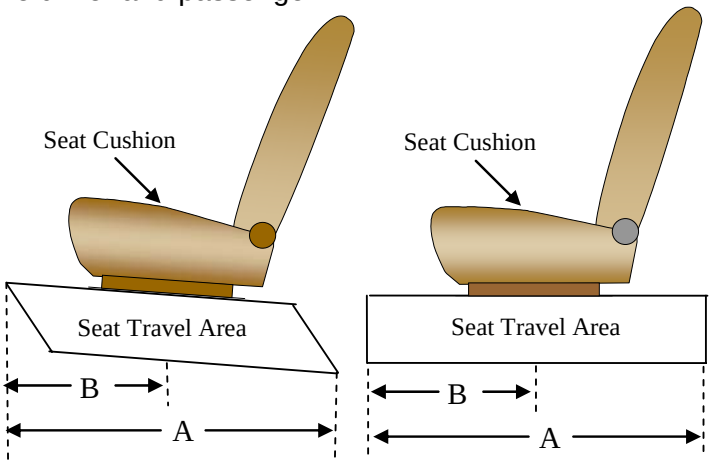
	Deg.
Driver Seat Back Angle	17.5
Rear Seat Back Angle	17.0

SEAT FORE/AFT POSITIONS

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

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	19	10
Rear Seat	23	12



SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position

SEAT BELT UPPER ANCHORAGE

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

GENERAL TEST AND VEHICLE PARAMETER DATA

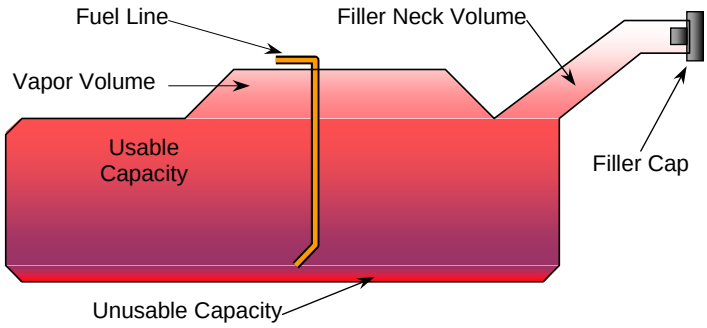
Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	98.4
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMVSS 301	90.5 to 92.5
Actual Amount of Solvent used	91.5

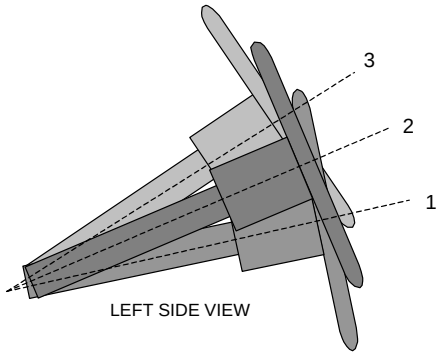
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately three (3) seconds with the ignition in the “ON” position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost positon No. 1	23.0	
Geometric center position No. 2	26.0	
Uppermost position No. 3	32.0	

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	592	394		630	485	
Right	kg	559	403		580	475	
Ratio	%	59.1	40.9		55.7	44.3	
Totals	kg	1151	797	1948	1210	960	2170

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	251	274
Level 2	Occupant H-Point	mm	406	761
Level 3	Mid Door	mm	427	653
Level 4	Window Sill	mm	348	984
Level 5	Window top	mm	130	1620
N/A	Maximum Penetration	mm	427	

INSTRUMENTATION

Driver SID/Hybrid III Accelerometers	20
Passenger SID/Hybrid III Accelerometers	20
Vehicle Structure Accelerometers	26
MDB Accelerometers	5
Total No. of Contact Switches	5
Total	76

CAMERA COVERAGE

High Speed, Vehicle On-Board	3
High Speed, Off-Board	5
High Speed, MDB On-Board	2
Real Time, Panning	2
Total	12

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

MDB SPECIFICATIONS (mm)

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

MDB WEIGHTS

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

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	62.41
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	62.43
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	130
B	Top of Bumper	533	800	Right	56
C	Mid Level	686	800	Left	38
D	Top of Stack	813	800	Left	90

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	1
High Speed Cameras	2

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST TEST DOOR OPENING AND SEAT TRACK INFORMATION

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

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation
Sill Separation	None
Windshield Damage	None
Window Damage	Driver front window intact, rear passenger window broken.
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

MDB LEFT EDGE IMPACT POINT DATA

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

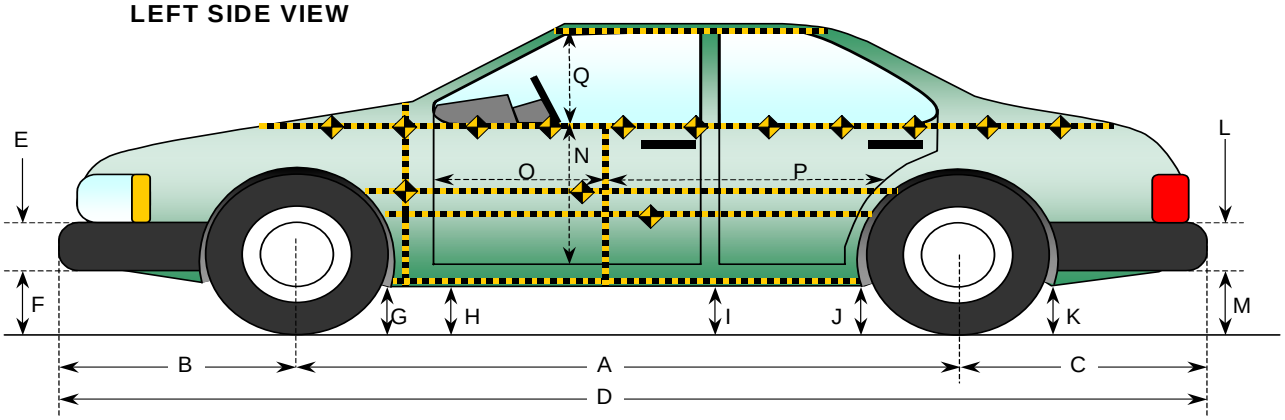
DATA SHEET NO. 5

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

LEFT SIDE VIEW



VEHICLE PRE AND POST TEST MEASUREMENT INFORMATION

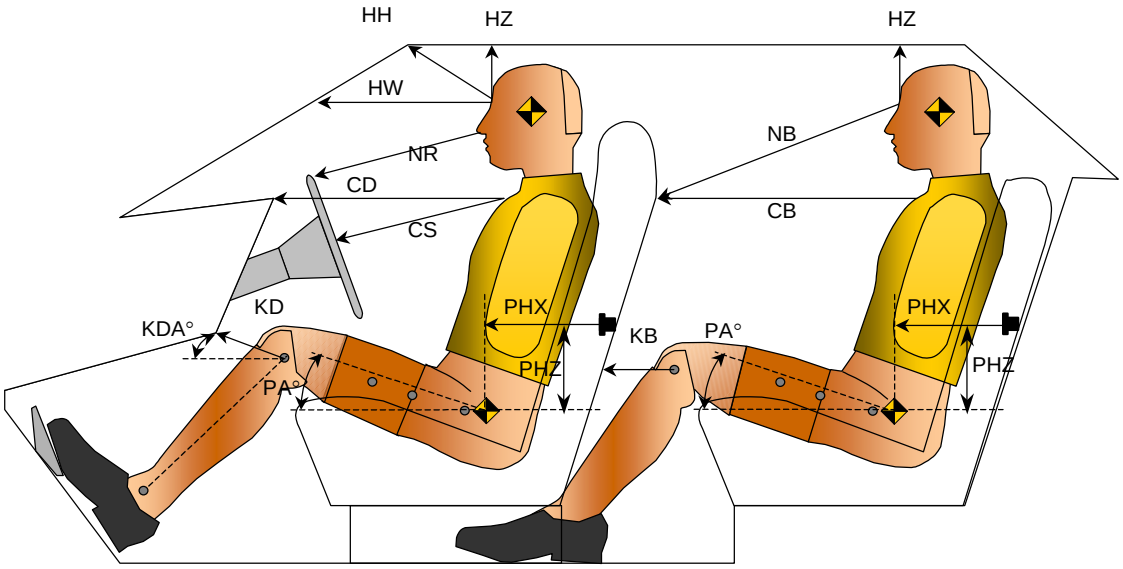
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3082	3070	-12
B	Front Axle to FSOV	990	955	-35
C	Rear Axle to RSOV	1030	988	-42
D	Total Length at Centerline	5110	5090	-20
E	Front Bumper Thickness	390	390	0
F	Front Bumper Bottom to Ground	236	330	94
G	Sill Height at Front Wheel Well	231	198	-33
H	Sill Height at Front Door Leading Edge	219	266	47
I	Sill Height at "B" Pillar	221	271	50
J1	Sill Height at Rear Wheel Well	208	241	33
J2	Pinch Weld Height at Rear Wheel Well	231	276	45
K	Sill Height aft of Rear Wheel Well	269	281	12
L	Rear Bumper Thickness	200	200	0
M	Rear Bumper Bottom to Ground	326	320	-6
N	Sill Height to Window Bottom Sill	742	644	-98
O	Front Door Leading Edge to Impact CL	950	750	-200
P	Rear Door Trailing Edge to Impact CL	1265	1020	-245
Q	Front Window Opening	552	520	-32
R	Right Side Length	3650	3660	10
S	Left Side Length	3650	3600	-50
T	Vehicle Width at "B" Post	1925	1602	-323

DATA SHEET NO. 6

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

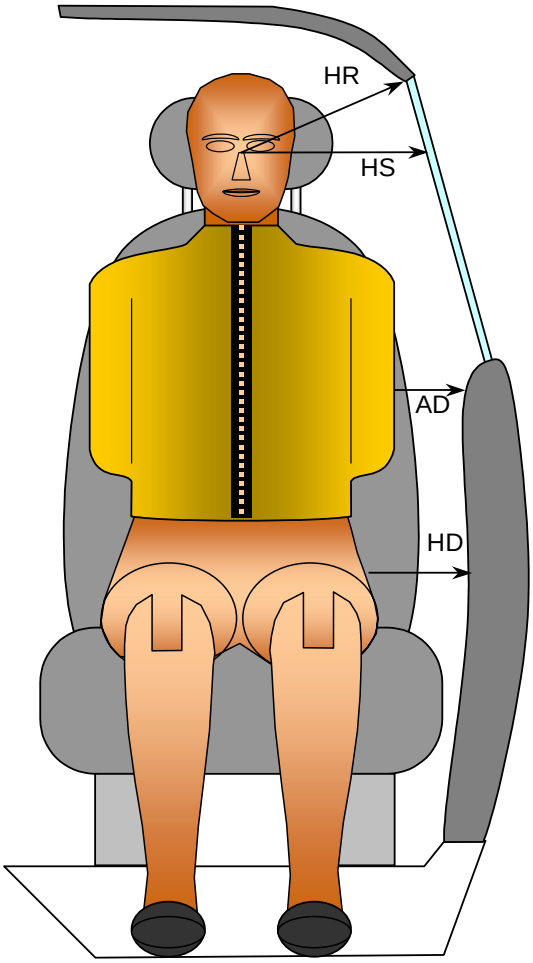
Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length(mm)	Angle	Length(mm)	Angle
HH		Head to Header	470	13.0		
HW		Head to Windshield	690			
HZ	HZ	Head to Roof	188		220	
NR	NB	Nose to Rim/Nose to Seat Back	495	18.0	560	21.0
CD	CB	Chest to Dash or Seat Back	610		492	
CS		Chest to Steering Wheel	310			
KDL	KBL	Left Knee to Dash or Seat Back	148	27.0	180	28.0
KDR	KBR	Right Knee to Dash or Seat Back	155		172	
PA	PA	Pelvic Angle		23.0		24.1
PHX	PHX	H-Point to Striker (X-Axis)	233		348	
PHZ	PHZ	H-Point to Striker (Z-Axis)	19		73	

DATA SHEET NO. 7

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05



FRONT VIEW OF DUMMY

LATERAL CLEARANCE DIMENSION INFORMATION

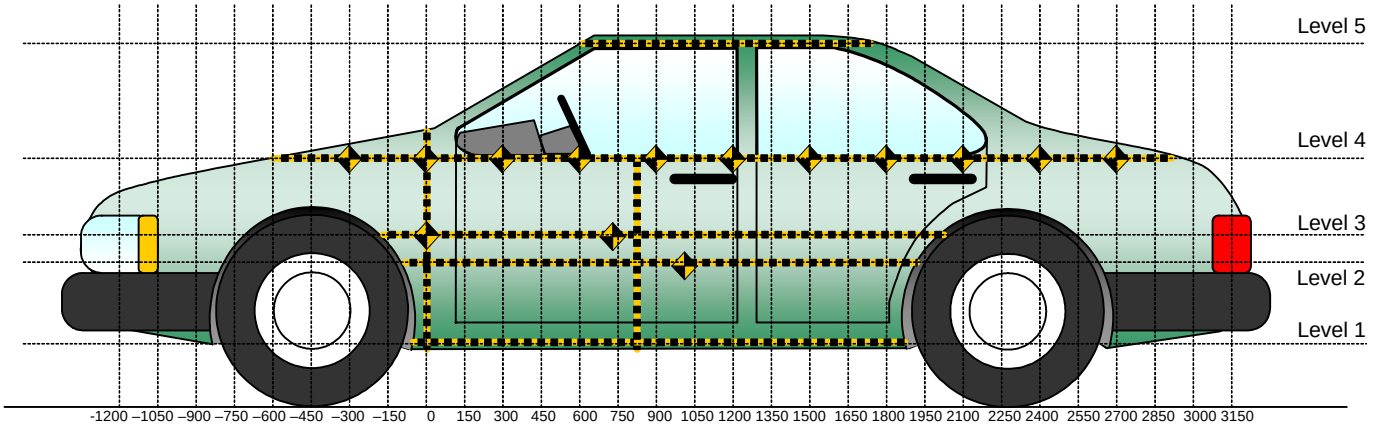
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	212	345
HS	Head to Side Window	mm	296	465
AD	Arm to Door	mm	100	290
HD	H-Point to Door	mm	100	395

DATA SHEET NO. 8

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05



All Measurements Shown in mm

LEFT SIDE VIEW

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

Level	Measurement Description	Height Above Ground
1	Sill Top	274
2	Occupant H-Point	761
3	Mid Door	653
4	Window Sill	984
5	Window Top	1620

DATA SHEET NO. 9

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450															
-300			32	86				56	146				24	60	
-150		42	29	79			86	81	166			44	52	87	
0	91	44	38	73		156	214	210	190		65	170	172	117	
150	91	44	38	70		166	323	316	210		75	279	278	140	
300	91	44	36	69		194	361	361	241		103	317	325	172	
450	91	41	36	68		224	386	383	261		133	345	347	193	
600	91	40	34	66	336	251	404	396	281	431	160	364	362	215	95
750	91	37	33	64	331	276	408	403	306	429	185	371	370	242	98
900	91	36	30	63	326	308	408	396	311	376	217	372	366	248	50
1050	90	35	30	63	316	341	401	385	346	408	251	366	355	283	92
1200	89	37	31	63	316	267	443	451	411	446	178	406	420	348	130
1350	89	37	32	63	320	237	421	459	401	418	148	384	427	338	98
1500	90	41	33	63	317	206	421	446	351	366	116	380	413	288	49
1650	91	41	40	67	316	168	415	422	305	288	77	374	382	238	-28
1800	92	41	43	67	320	138	268	296	278	196	46	227	253	211	-124
1950	91	44	44	70	320	116	146	161	172	128	25	102	117	102	-192
2100	92	46	42	71	328	97	86	74	81	66	5	40	32	10	-262
2250		37	36	71	330		96	106	173	428		59	70	102	98
2400			29	75	331			100	161	426			71	86	95
2550			28	81	333			97	156	443			69	75	110
2700			33	86	346			96	158	451			63	72	105
2850			46	88				101	161				55	73	
3000			61	91				111	166				50	75	

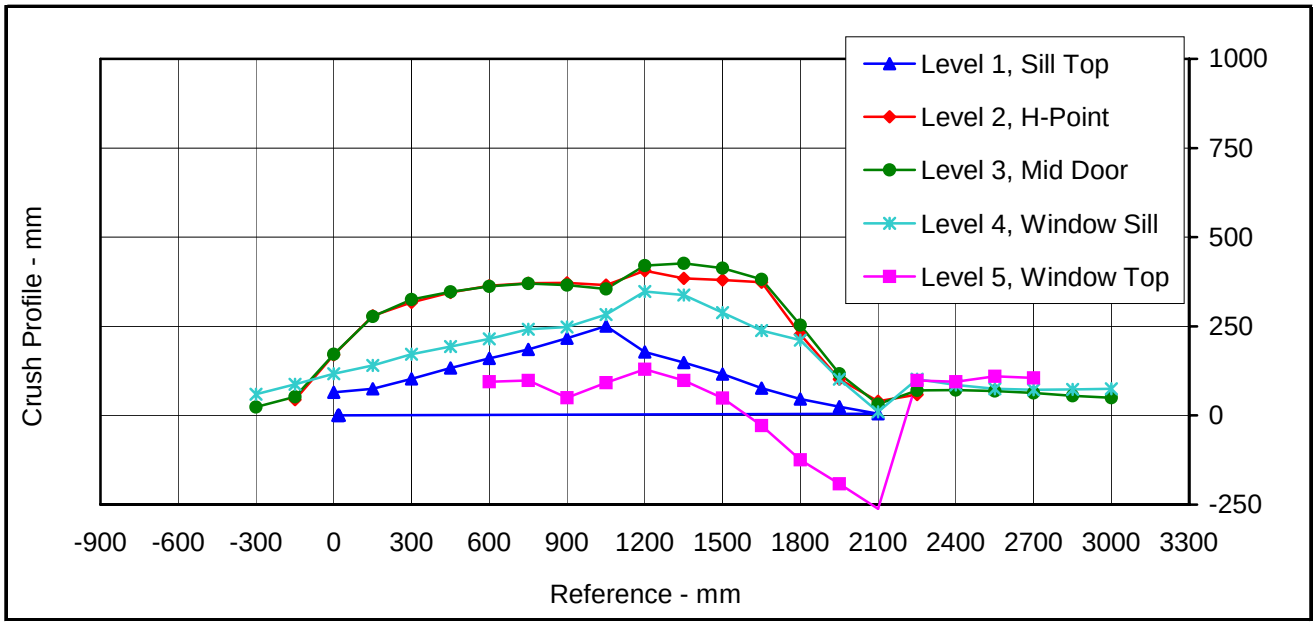
Measurements are taken from fixed reference 1000mm from vehicle CL.

DATA SHEET NO. 9…(CONTINUED)

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05



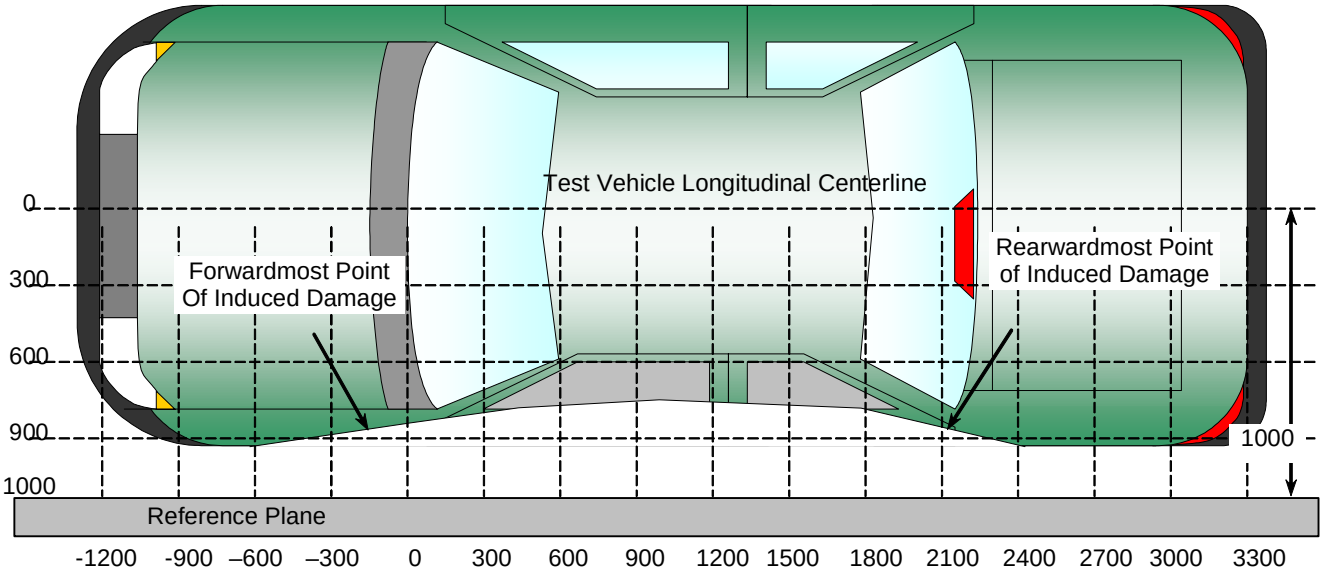
	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	251	406	427	348	130
Distance from Impact	mm	1050	1200	1350	1200	1200

DATA SHEET NO. 10

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05



All Dimensions Shown in millimeters

TOP VIEW

DAMAGE PROFILE DISTANCES

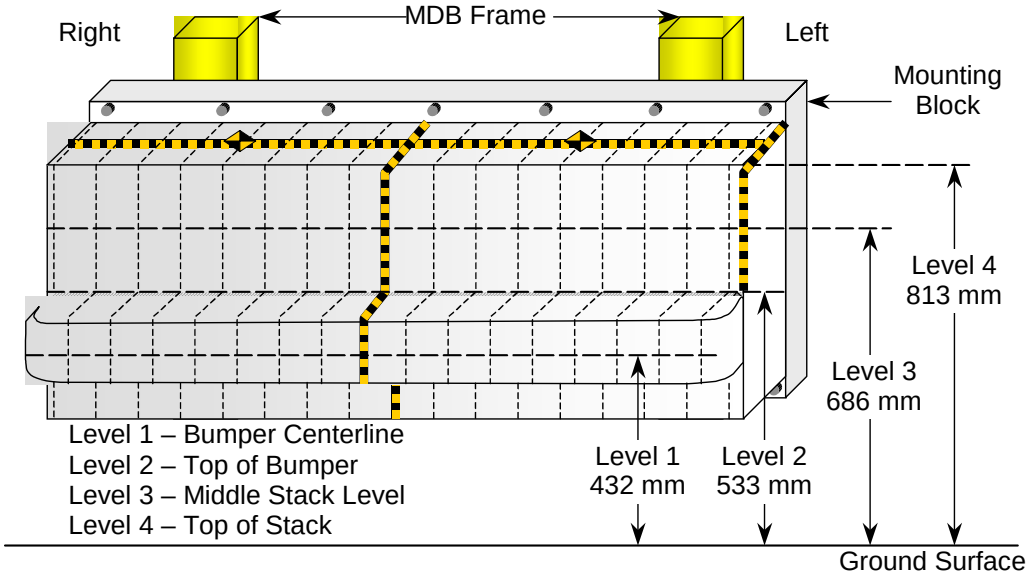
DPD	Distance From Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	-150	4	79	166	87
2	300	3	36	361	325
3	750	2	37	408	371
4	1200	3	31	451	420
5	1650	3	40	422	382
6	2100	5	328	66	-262

DATA SHEET NO. 11

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	130	103	96	86	93	93	88	80	80	77	77	78	80	83	83	93	120
2	41	43	38	33	19	18	24	17	9	8	11	15	26	36	41	48	56
3	38	4	-3	-5	-4	-5	0	14	8	-2	-4	-3	-2	3	16	25	31
4	90	36	1	-11	-16	-5	17	36	33	11	13	11	20	31	41	63	88

All Dimensions in mm

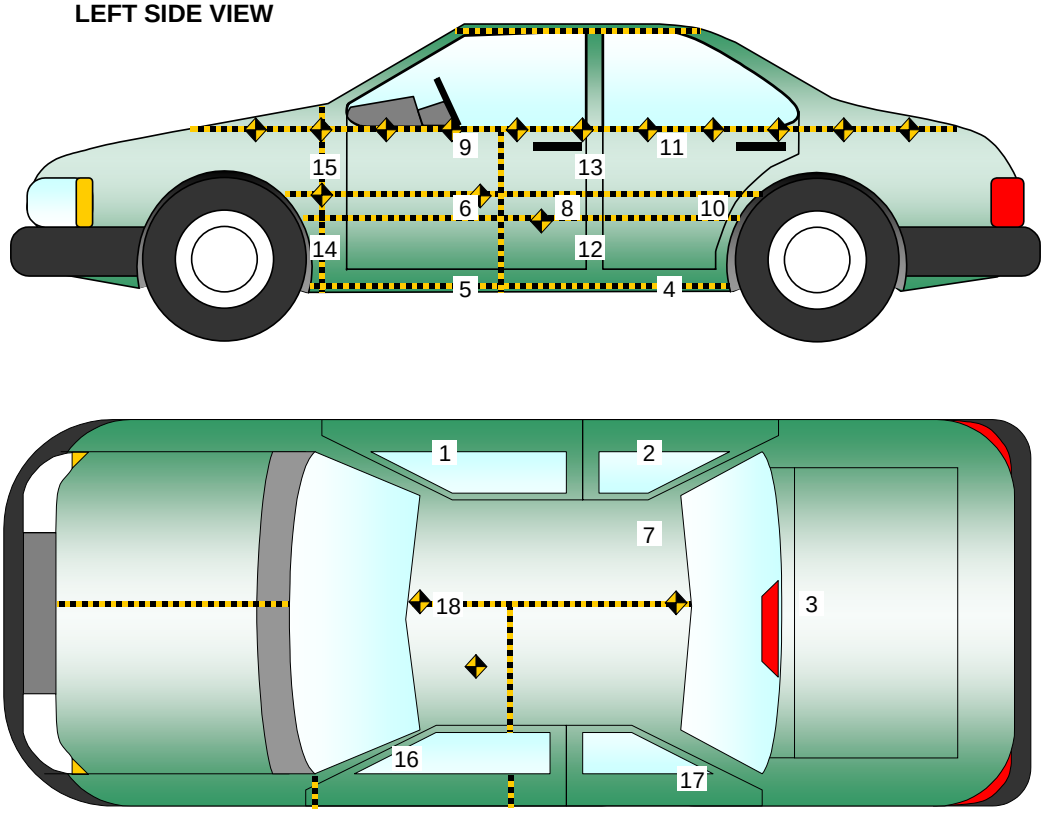
DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

LEFT SIDE VIEW



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

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

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

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 9/7/05

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Right Sill at Front Seat	2935	710	340
2	Right Sill at Rear Seat	2110	730	430
3	Rear Floorpan Above Axle	380	170	365
4	Left Sill at Rear Door	1720	-600	200
5	Left Sill at Front Door	3085	-600	210
6	Front Door Centerline	3210	-800	700
7	Rt. Rear Occ. Compartment	2600	390	380
8	Front Door Mid-Rear	2710	-800	715
9	Front Door Upper Centerline	3250	-800	860
10	Rear Door Mid-Rear	1800	-820	790
11	Rear Door Upper Centerline	2155	-820	965
12	B-Post Lower	2455	-755	700
13	B-Post Middle	2455	-755	900
14	A-Post Lower	3620	-845	490
15	A-Post Middle	3620	-845	700
16	Front Seat Track	2610	-560	400
17	Rear Seat Structure	2120	-305	425
18	Vehicle CG	3380	190	345

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

DATA SHEET NO. 13
MDB ACCELEROMETER LOCATIONS

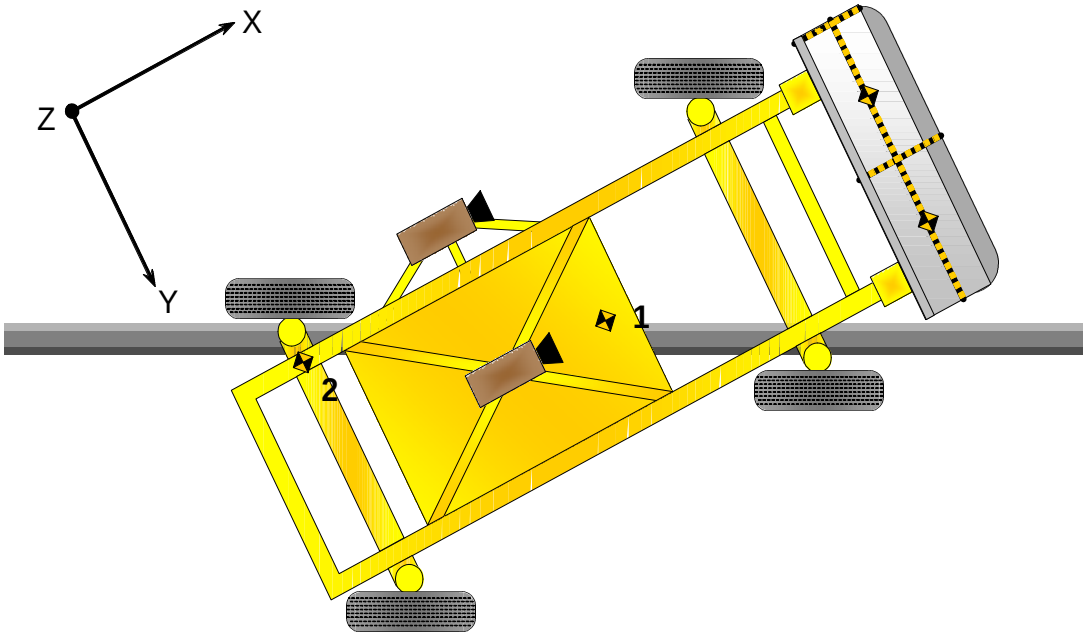
Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 9/7/05

MDB ACCELEROMETER LOCATIONS

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

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

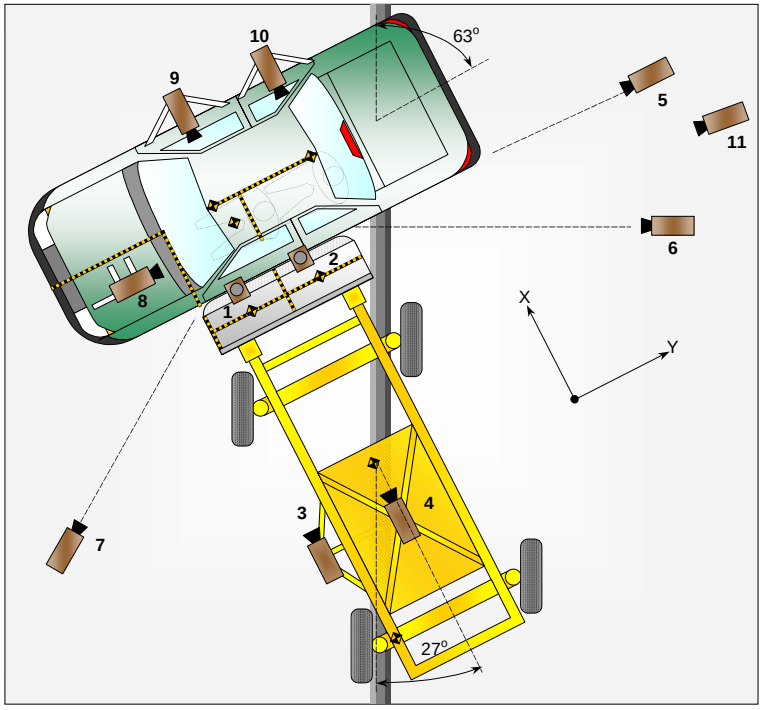


DATA SHEET NO. 14

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05



No.	Camera View	Location (mm)			Angle (deg.)	Lens (mm)	Film Speed (fps)
		X	Y	Z			
Doc	Real Time Digital	3658	22860	-1730	-5	N/A	30
1	Overhead Overall	1220	2286	-5485	-90	14	1000
2	Overhead Close Up	609	1675	-5485	-90	25	1000
3	Left Impact point (MDB)	-1860	-16	-980	-7	25	1000
4	Side Overall (MDB)	-3440	840	-1680	-11	12.5	1000
5	Rear	228	15545	-1371	-1	50	1000
6	Left Rear (MDB)	-1770	1750	-1010	-1	25	1000
7	Left Front	-2665	-3550	-1475	-10	13	1000
8	Driver Front (OB)	350	-920	-1470	-20	35	1000
9	Driver Side (OB)	1860	640	-1130	-2	20	1000
10	Passenger Side (OB)	1890	1640	-1175	-2	20	1000
11	Additional Real Time Digital	-2600	-4700	-1473	-1	N/A	30

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

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

Test Time: 12:28 PM Temperature: 39.9 Deg. C.

Stoddard Solvent Spillage Measurements

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

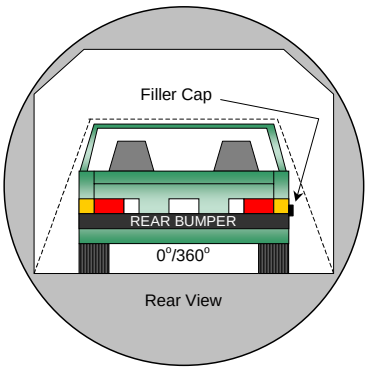
B. For the 5 minute period after motion ceases: 0.0 oz.
(Maximum Allowable = 5 ounces)

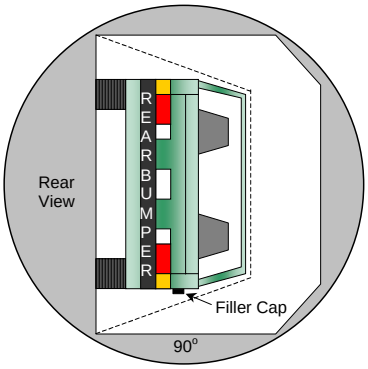
C. For the following 25 minutes: 0.0 oz.
(Maximum Allowable = 1 oz./minute)

D. Spillage Details: No leakage occurred

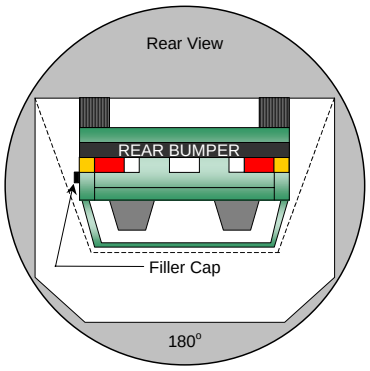
DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200
Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

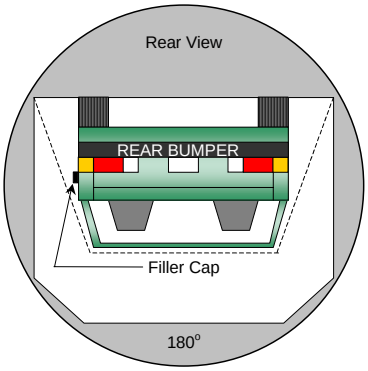




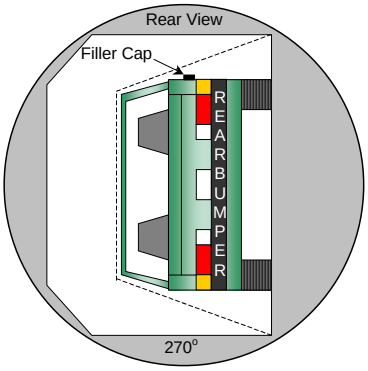
0° to 90°

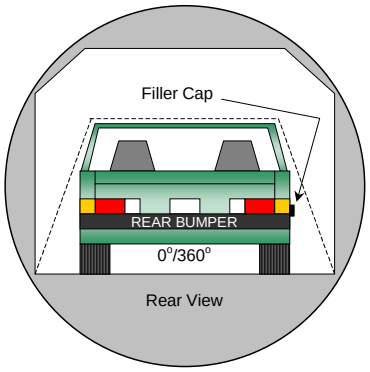


90° to 180°



180° to 270°





270° to 360°

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

   No solvent leakage occurred during static rollover testing.

FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2006 Ford Freestar SE 5-Door MPV NHTSA No.: F60200

Test Program: 55/28 km/h Side Impact NCAP Test Date: 09/7/05

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	84	300	384
90° to 180°	77	300	377
180° to 270°	78	300	378
270° to 360°	79	300	379

FMVSS 301 SPILLAGE TABLE REQUIREMENT (oz.)

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

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

SOLVENT SPILLAGE LOCATION TABLE

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

APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

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

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

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

Figure A-3: Manufacturer's Label

Figure A-4: Tire Placard

Figure A-5: Pre-Test Front View

Figure A-6: Post-Test Front View

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

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

Figure A-9: Pre-Test Left Side View

Figure A-10: Post-Test Left Side View

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

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

Figure A-13: Pre-Test Rear View

Figure A-14: Post-Test Rear View

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

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

Figure A-17: Pre-Test Right Side View

Figure A-18: Post-Test Right Side View

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

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

Figure A-21: Pre-Test Overhead View

Figure A-22: Post-Test Overhead View

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

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

Figure A-25: Pre-Test Left Impact Point

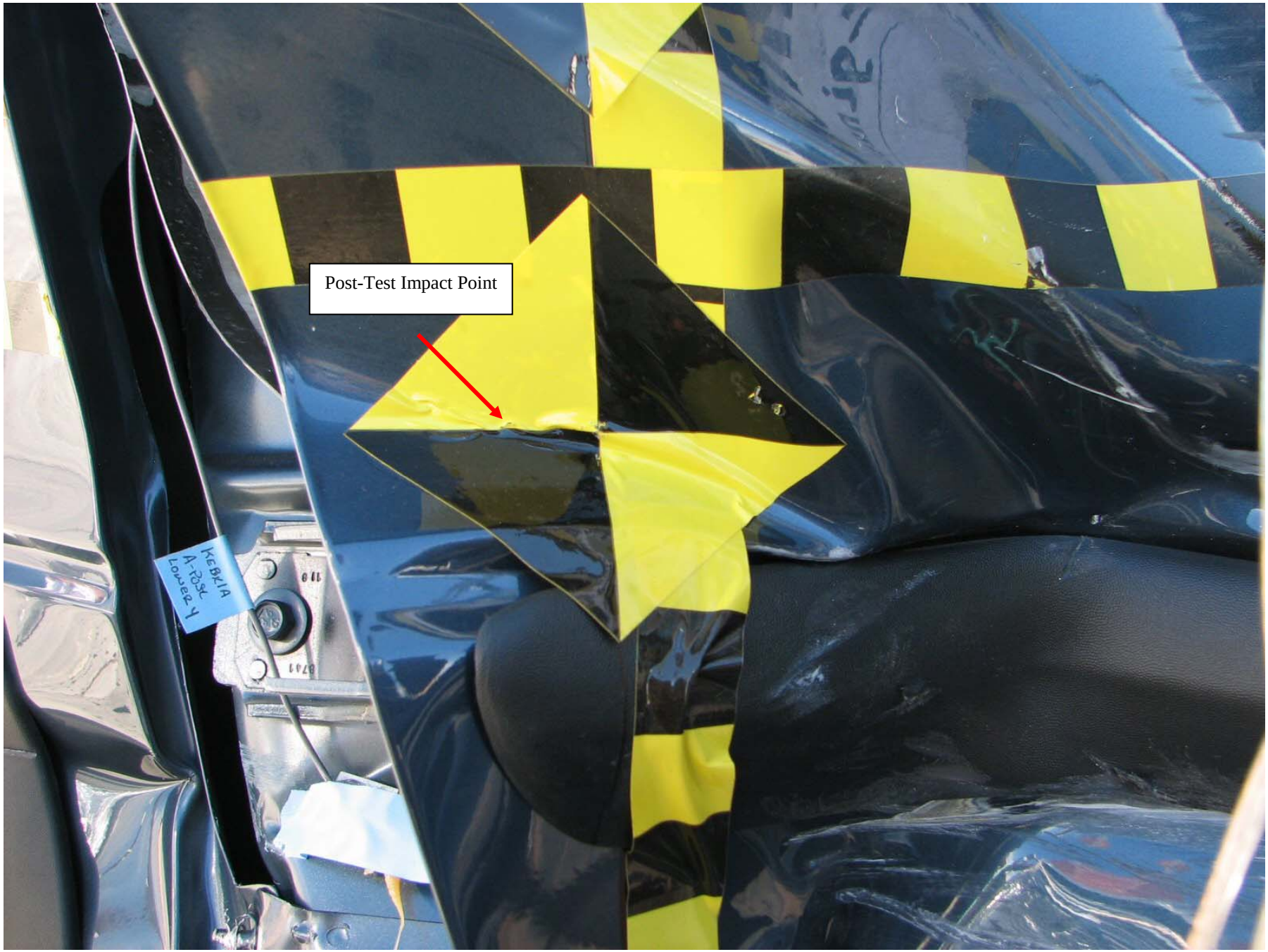


Figure A-26: Post-Test Left Impact Point

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

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

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

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

Figure A-31: Pre-Test Left Front Door

Figure A-32: Post-Test Left Front Door

Figure A-33: Pre-Test Left Rear Door

Figure A-34: Post-Test Left Rear Door

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

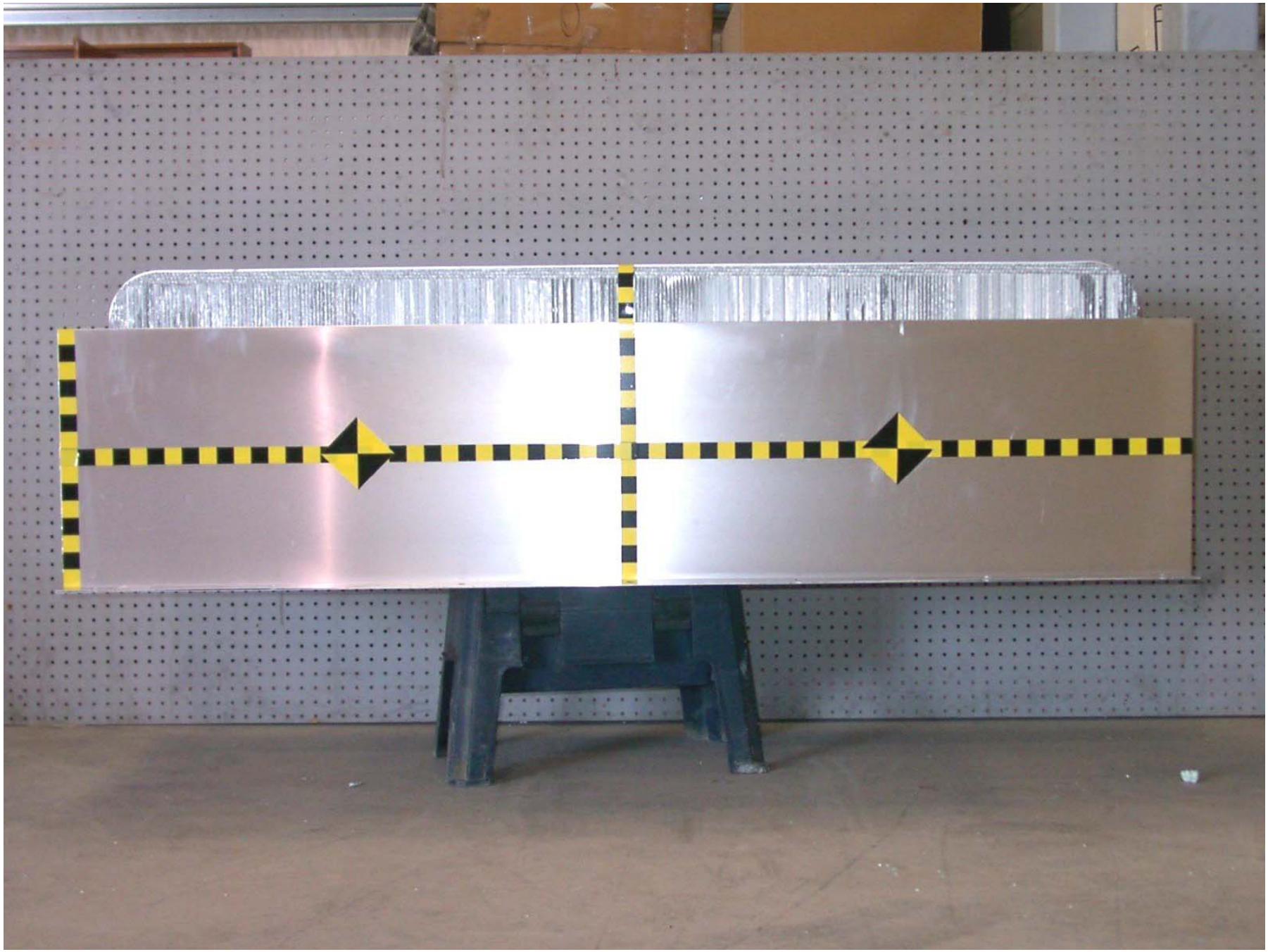


Figure A-55: Pre-Test Top View of Deformable Barrier

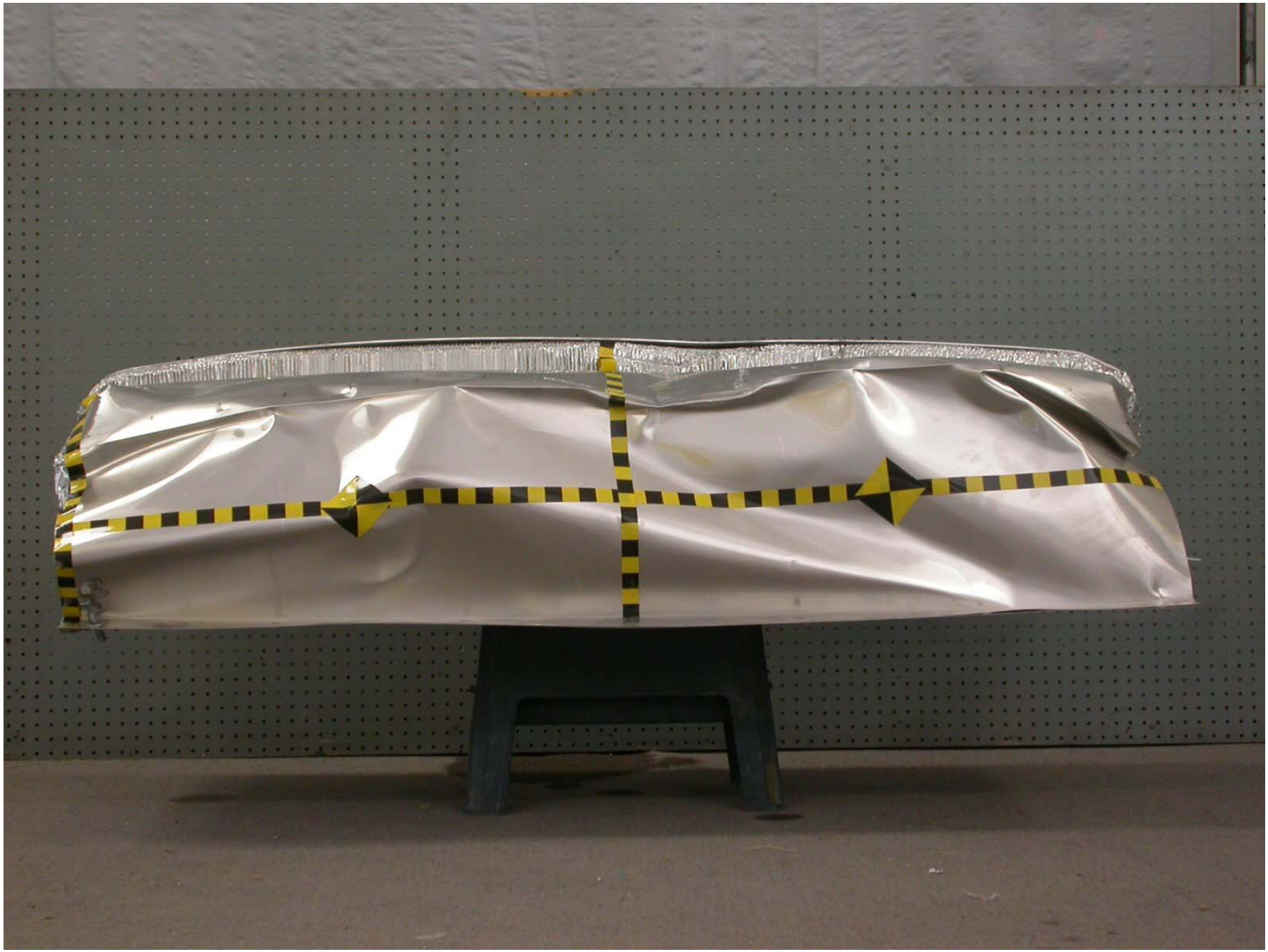


Figure A-56: Post-Test Top View of Deformable Barrier

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

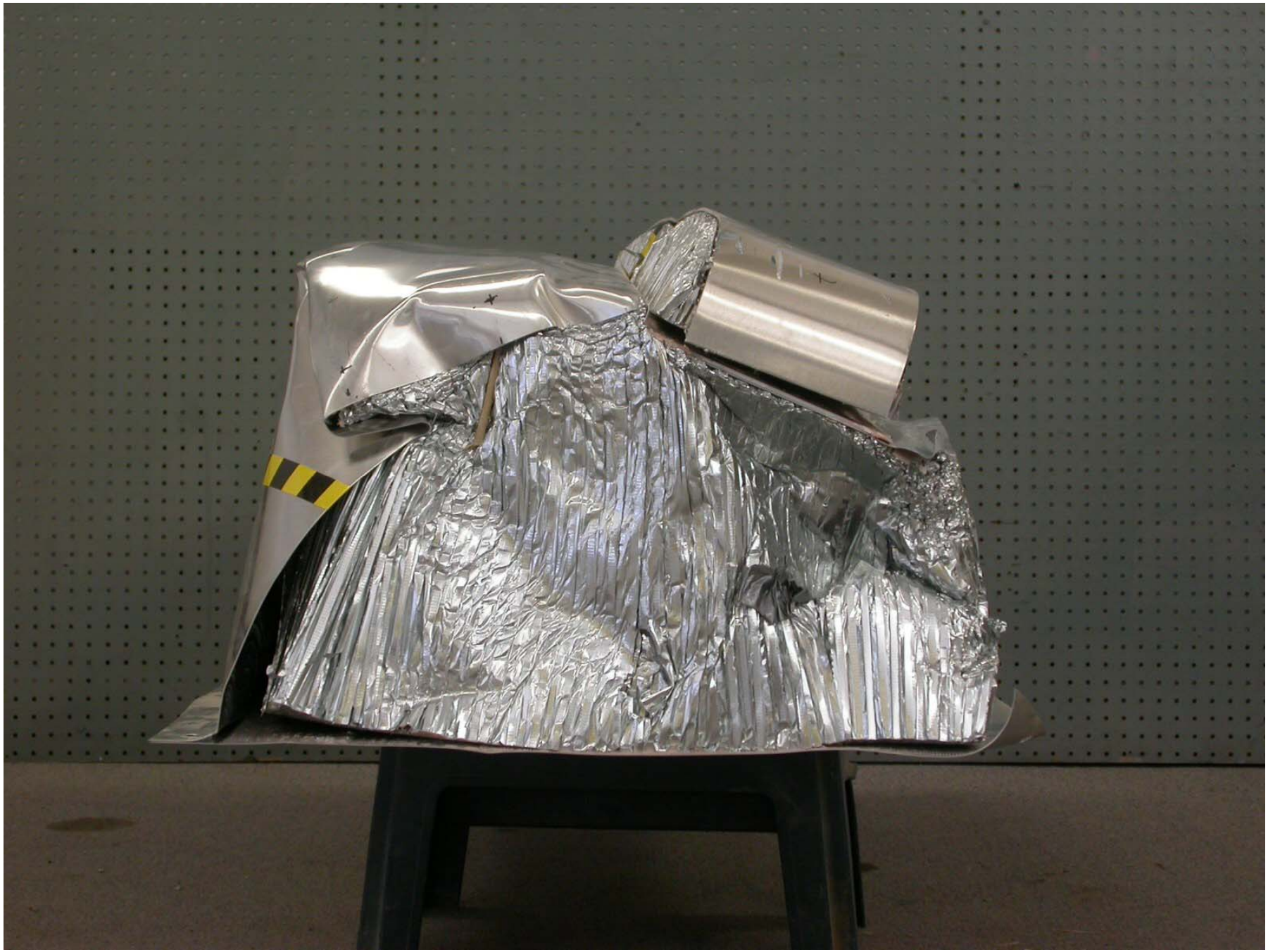


Figure A-58: Post-Test Right Side View of Deformable Barrier

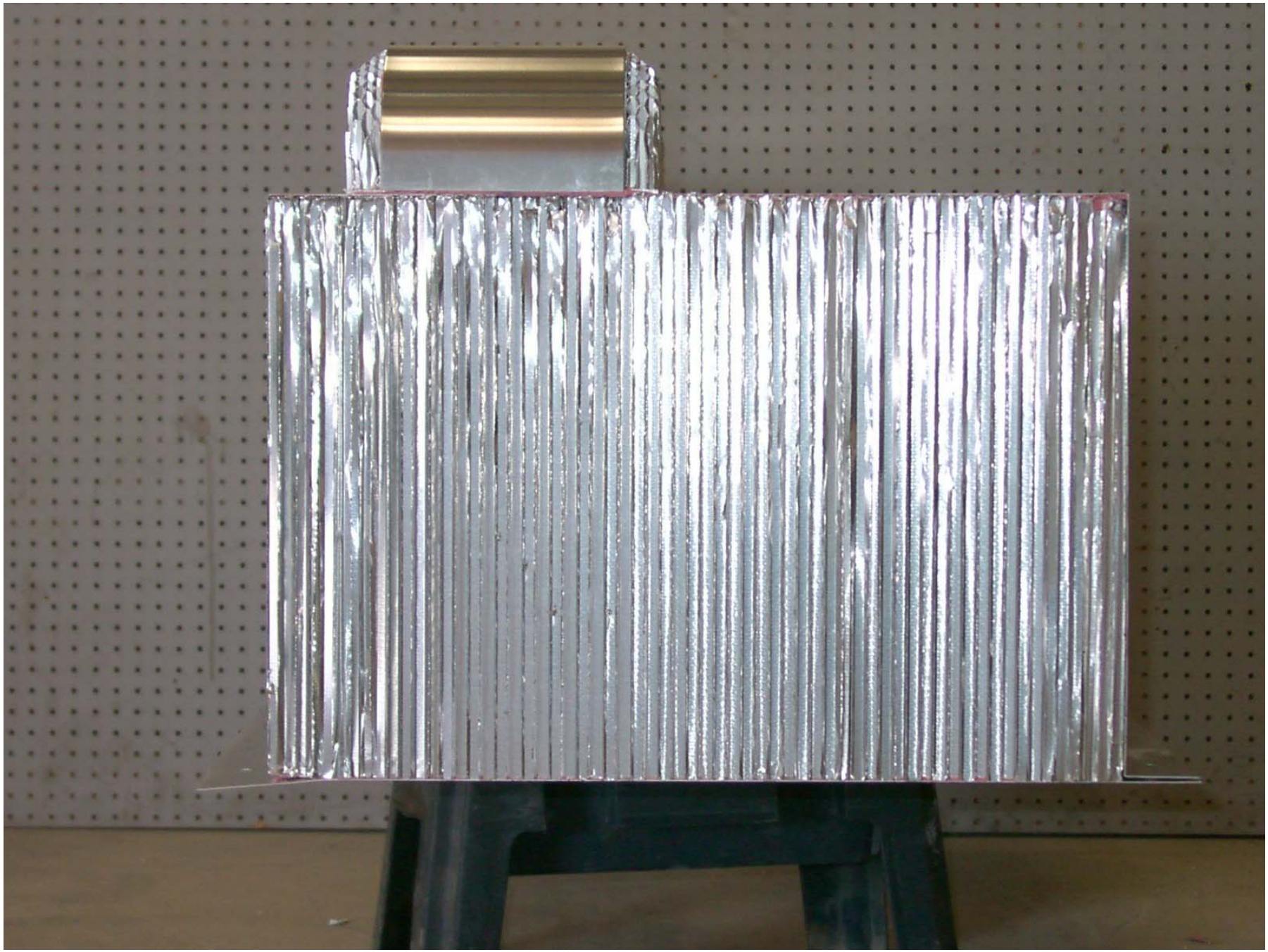


Figure A-59: Pre-Test Left Side View of Deformable Barrier

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

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

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

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

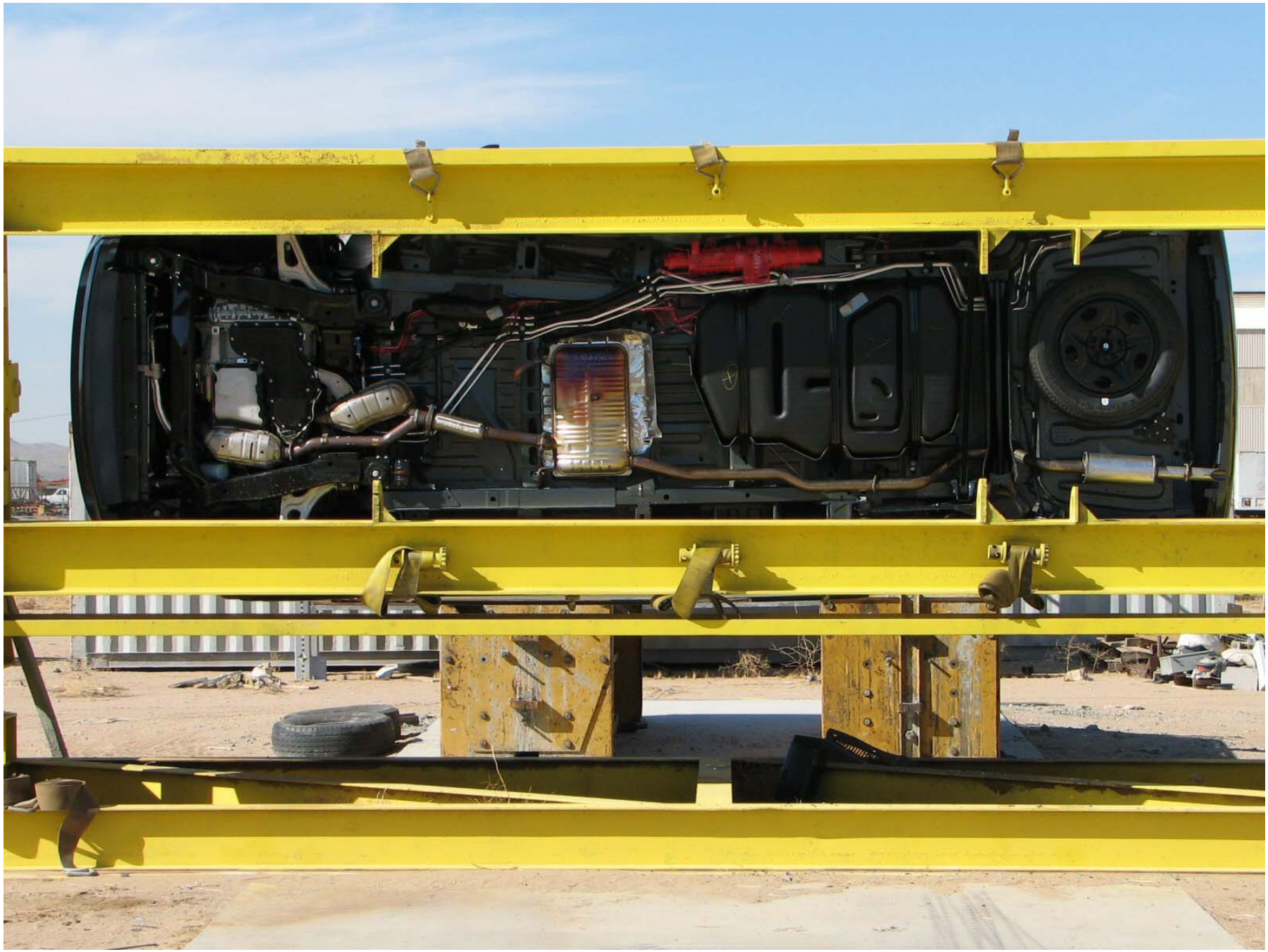


Figure A-64: Vehicle on Rollover Device (270°)

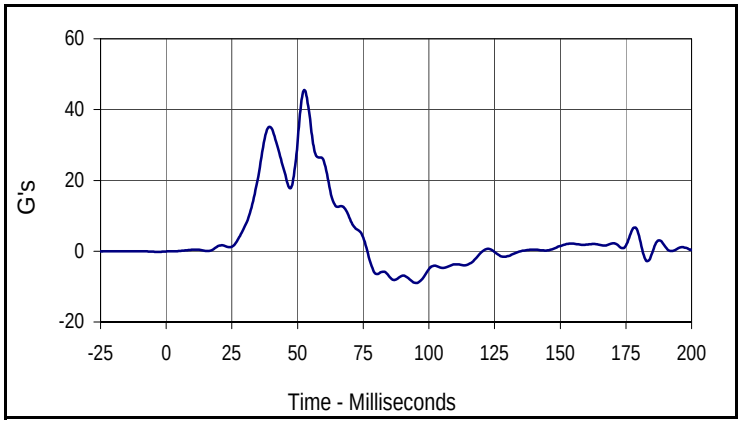
Figure A-65: Vehicle Impact

APPENDIX B
SID/HIII, RESPONSE DATA TRACES

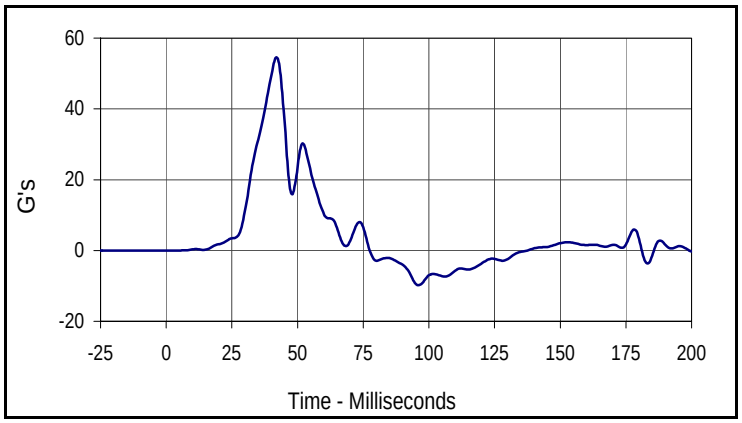
LIST OF DATA PLOTS

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

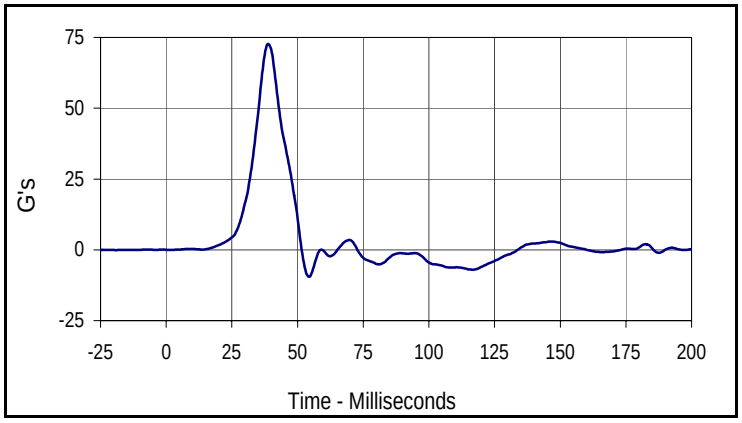
Test Vehicle:	2006 Ford Freestar SE 5-Door MPV	Test Date:	9/7/05
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	F60200



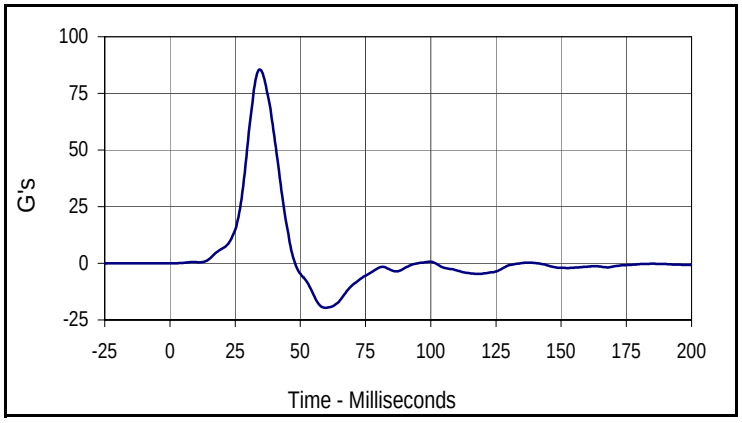
Curve Description			
Driver Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
001	FIR	FIR100	G's
Max	Time	Min	Time
45.6	52.5	-9.0	95.0



Curve Description			
Driver Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
002	FIR	FIR100	G's
Max	Time	Min	Time
54.6	41.9	-9.8	96.3

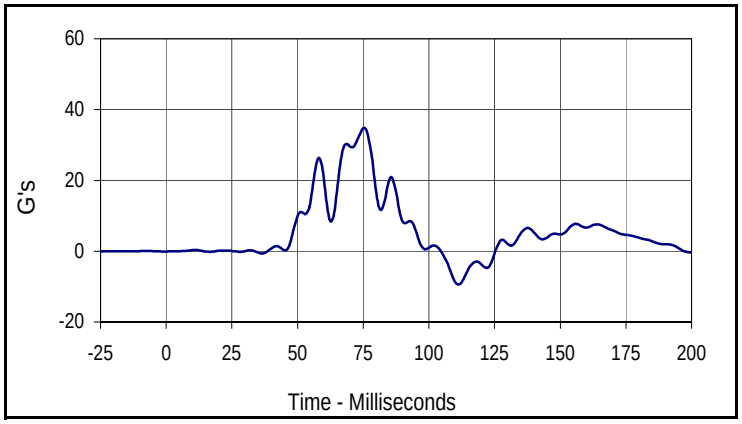


Curve Description			
Driver Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
003	FIR	FIR100	G's
Max	Time	Min	Time
72.7	38.8	-9.5	54.4

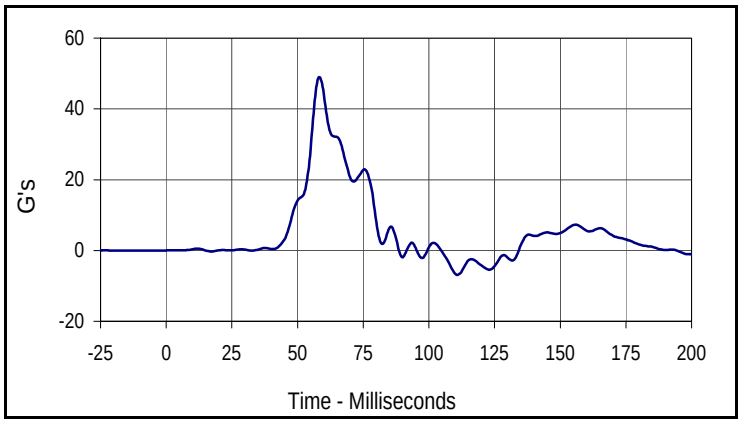


Curve Description			
Driver Pelvis Primary Y			
CURNO	Type	SAE Class	Units
004	FIR	FIR100	G's
Max	Time	Min	Time
85.6	34.4	-19.7	59.4

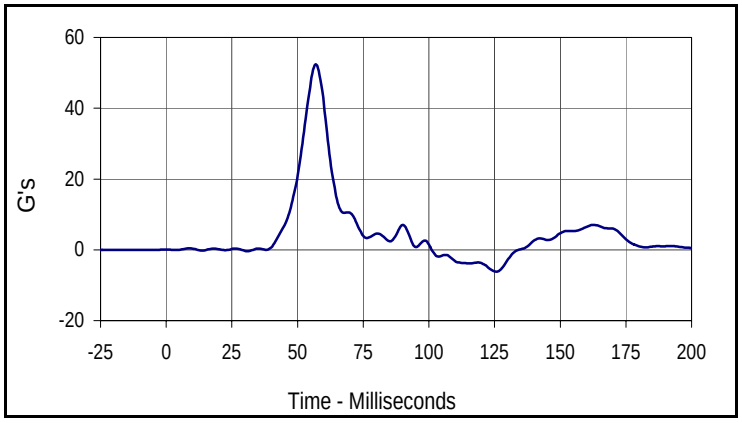
Test Vehicle:	2006 Ford Freestar SE 5-Door MPV	Test Date:	9/7/05
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	F60200



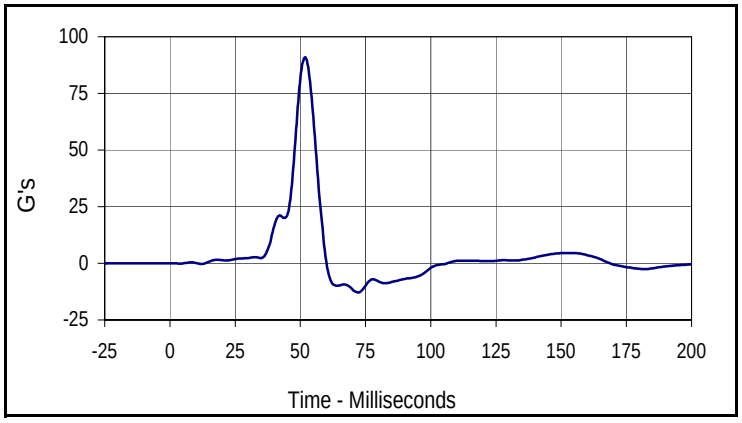
Curve Description			
Passenger Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
005	FIR	FIR100	G's
Max	Time	Min	Time
34.8	75.6	-9.4	111.3



Curve Description			
Passenger Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
006	FIR	FIR100	G's
Max	Time	Min	Time
49.0	58.1	-6.9	110.6



Curve Description			
Passenger Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
007	FIR	FIR100	G's
Max	Time	Min	Time
52.4	56.9	-6.1	125.6



Curve Description			
Passenger Pelvis Primary Y			
CURNO	Type	SAE Class	Units
008	FIR	FIR100	G's
Max	Time	Min	Time
91.0	51.9	-12.9	71.9

APPENDIX C
SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

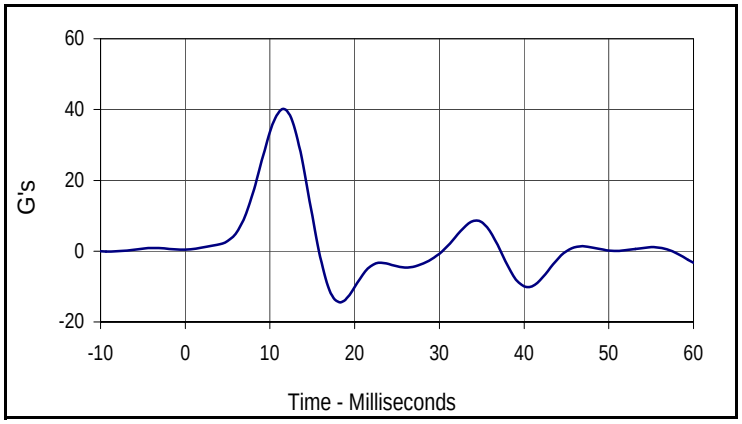
APPENDIX C
PRE-TEST SID / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID / HIII External Measurements	Test Date:	8/19/05
ATD Serial No.:	274	Test I.D.:	N/A

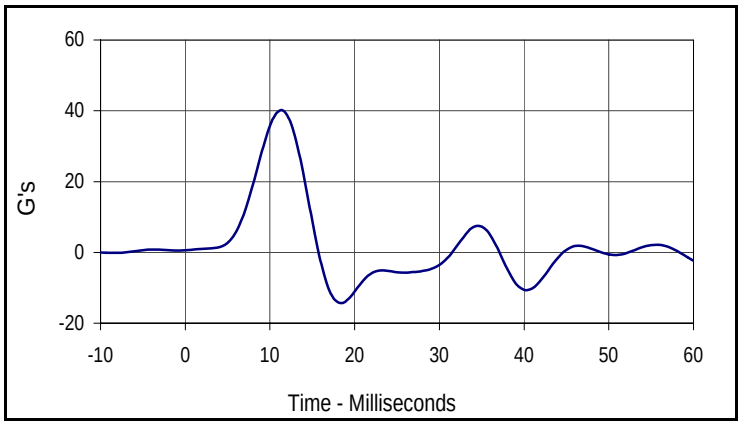
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	^{o}C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	900	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	510	Pass
KH- Knee Pivot From Back 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

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	8/17/05
ATD Serial No.:	274	Test I.D.:	TH08A

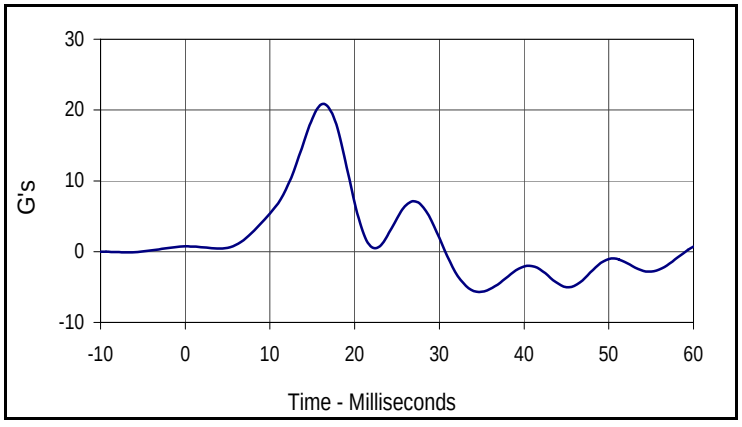
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.28	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	39.9	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	40.2	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.9	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
39.9	11.9	-14.4	18.1



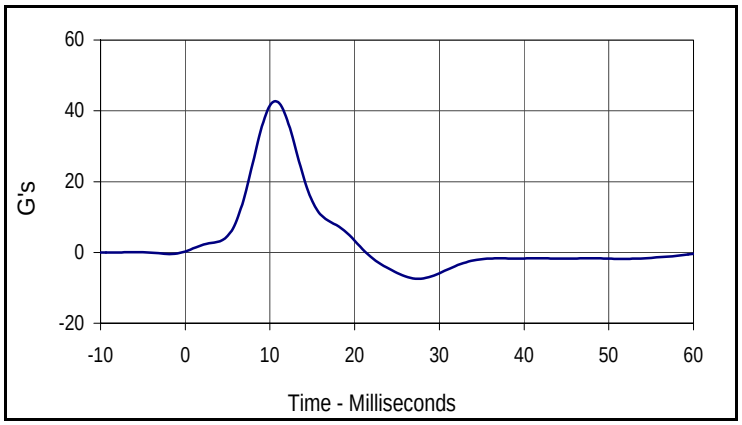
Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
40.2	11.3	-14.3	18.1



Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.9	16.3	-5.7	35.0

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	8/17/05
ATD Serial No.:	274	Test I.D.:	PI08A

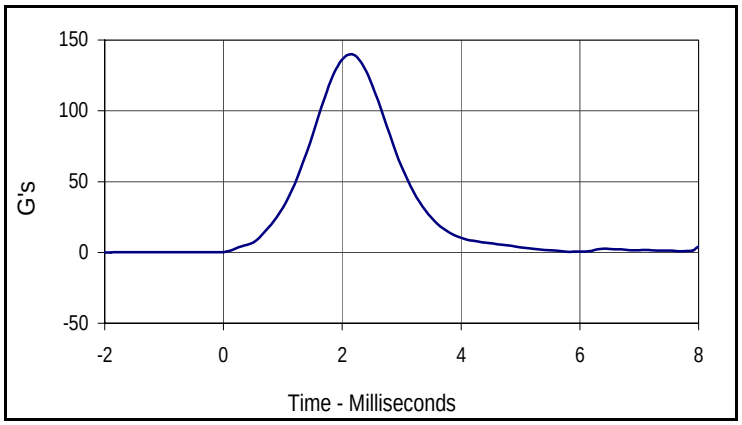
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	42.7	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.88	Pass
		Overall Test Results		Pass



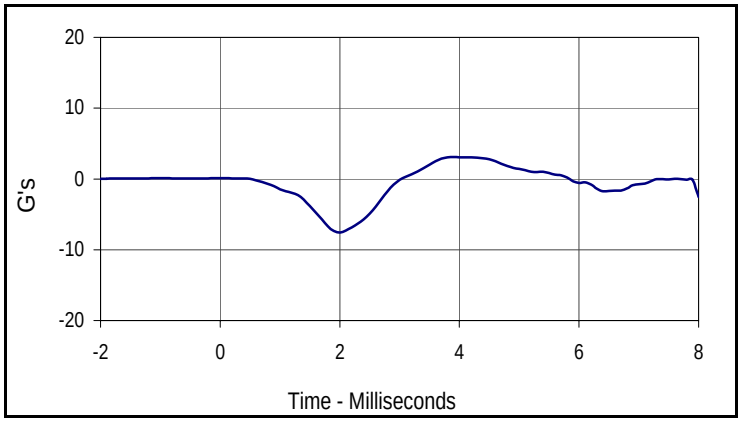
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.7	10.6	-7.5	27.5

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	8/18/05
ATD Serial No.:	274	Test I.D.:	HD08A

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	139.6	Pass
Peak Longitudinal Acceleration	G's	≤15.0	7.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.6	Pass
		Overall Test Results		Pass



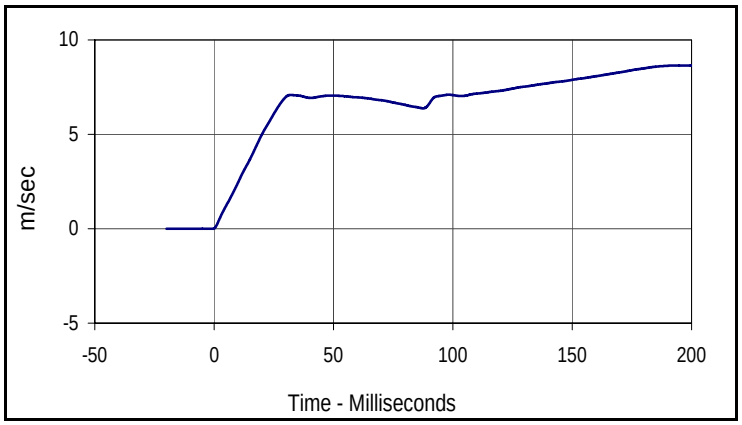
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
139.6	2.1	0.0	-2.0



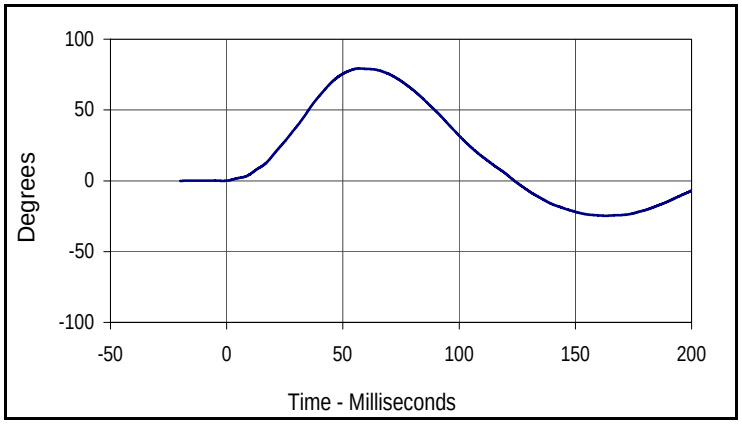
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.1	3.9	-7.6	2.0

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	8/18/05
ATD Serial No.:	274	Test I.D.:	NB08C

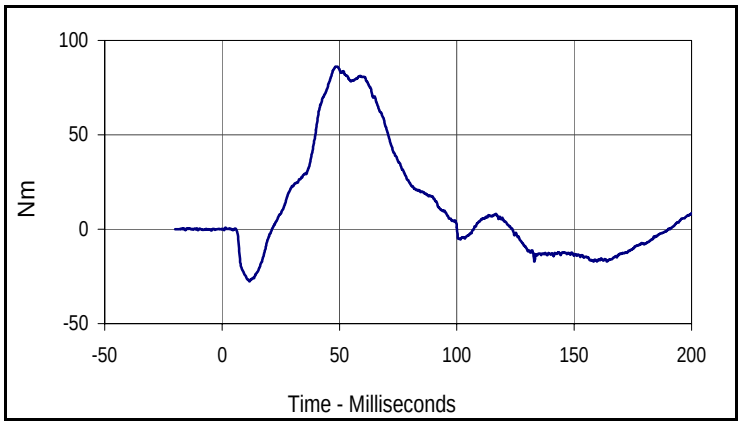
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.06	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.44	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.99	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.98	Pass
	40 to 70	m/sec	6.27 to 7.64	7.06	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	79.3	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	8.2	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	66.9	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	86.1	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	51.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.6	194.7	0.0	-0.8



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
79.3	56.9	-24.7	163.0



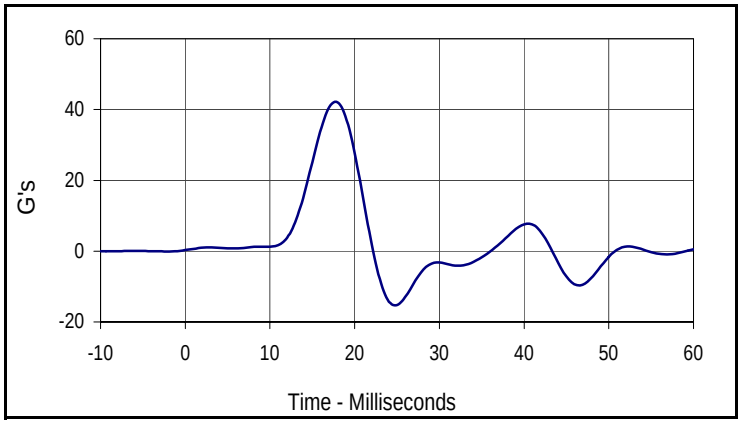
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
86.1	48.7	-27.6	11.7

Test Program:	SID / HIII External Measurements	Test Date:	8/19/05
ATD Serial No.:	275	Test I.D.:	N/A

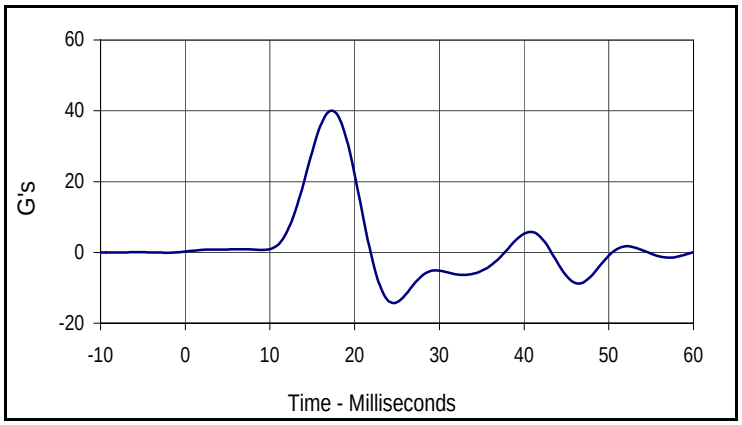
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	902	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	508	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	512	Pass
KV- Knee Pivot From Floor	mm	490 to 505	500	Pass
HW- Hip Width	mm	356 to 391	370	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	8/17/05
ATD Serial No.:	275	Test I.D.:	TH08B

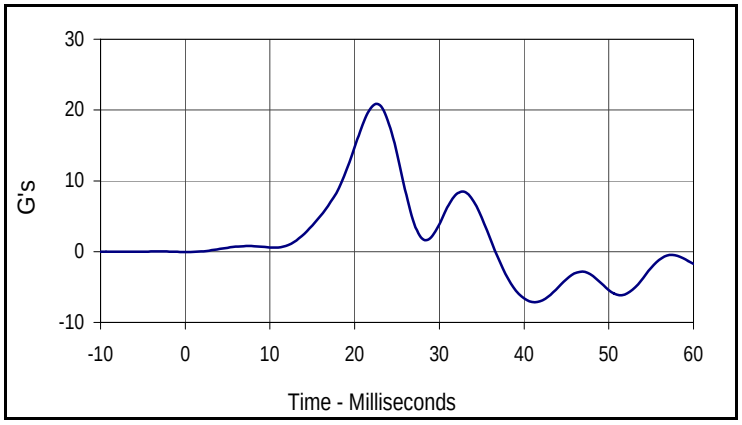
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.30	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	42.0	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	39.9	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.9	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.0	17.5	-15.2	25.0



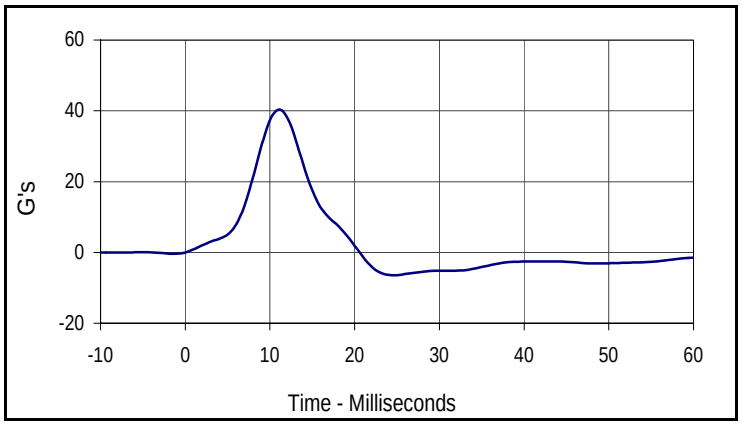
Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
39.9	17.5	-14.2	24.4



Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.9	22.5	-7.1	41.3

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	8/17/05
ATD Serial No.:	275	Test I.D.:	PI08B

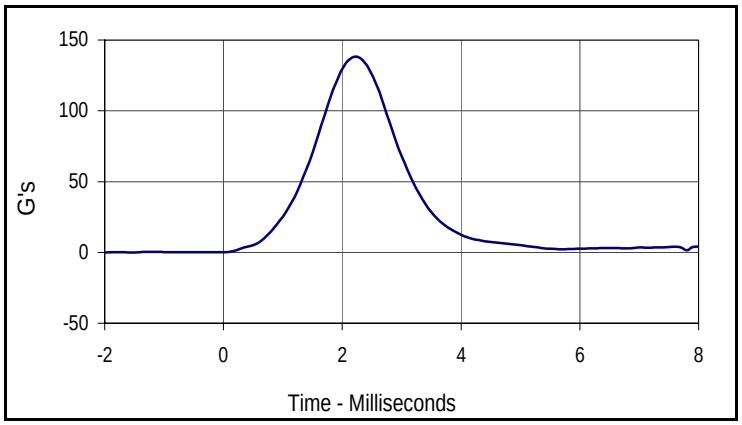
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.30	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	40.3	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.88	Pass
		Overall Test Results		Pass



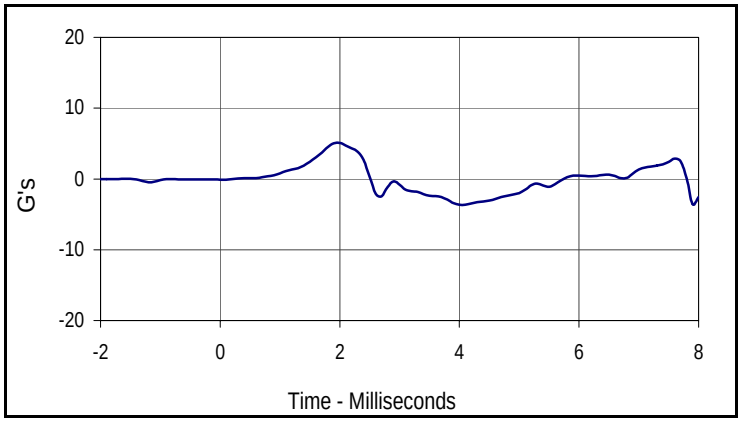
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.3	11.3	-6.5	24.4

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	8/18/05
ATD Serial No.:	275	Test I.D.:	HD08B

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	138.3	Pass
Peak Longitudinal Acceleration	G's	≤15.0	5.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	3.7	Pass
		Overall Test Results		Pass



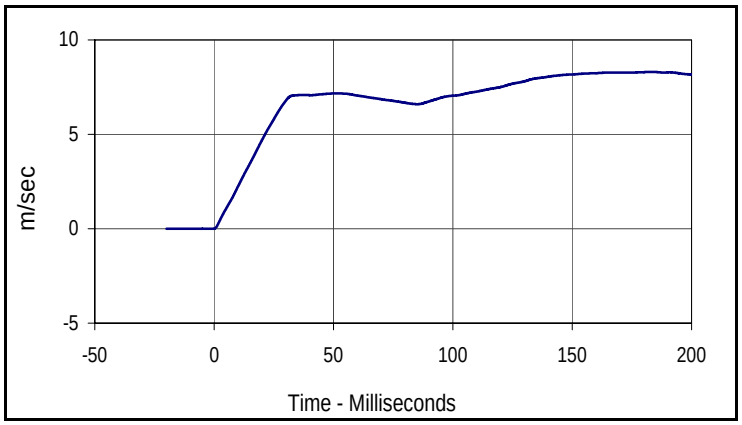
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
138.3	2.2	0.0	-1.5



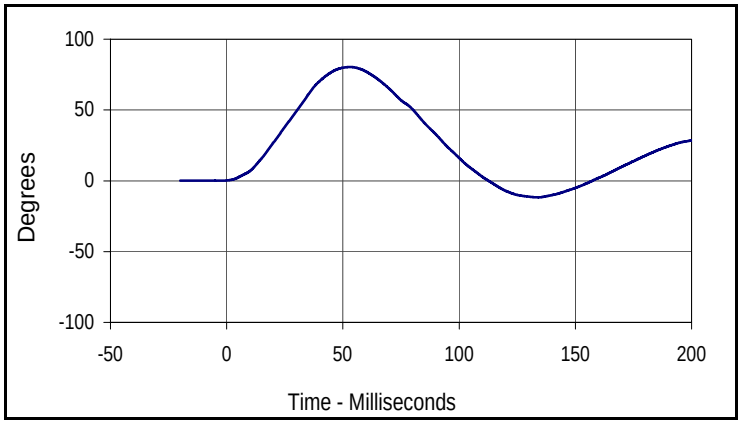
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
5.1	2.0	-3.7	4.0

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	8/18/05
ATD Serial No.:	275	Test I.D.:	NB08D

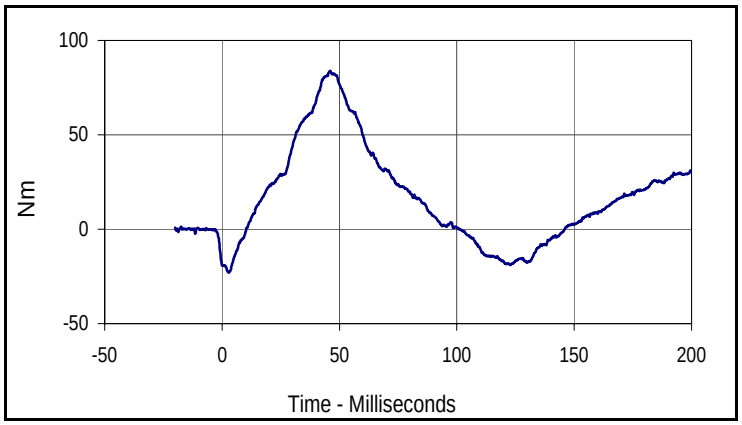
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	7.09	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.25	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.68	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.79	Pass
	40 to 70	m/sec	6.27 to 7.64	7.17	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	80.3	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	7.0	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	59.6	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	83.9	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	55.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.3	183.4	0.0	-0.5



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
80.3	53.1	-11.7	133.8



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
83.9	46.1	-23.0	2.8

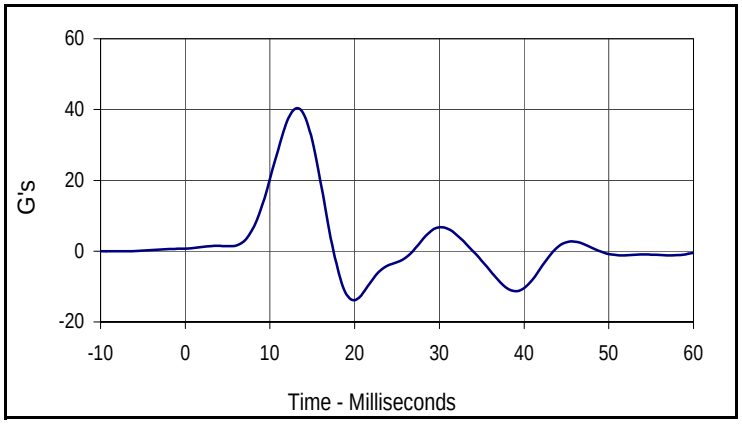
APPENDIX C
POST-TEST SID / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID / HIII External Measurements	Test Date:	9/7/05
ATD Serial No.:	274	Test I.D.:	N/A

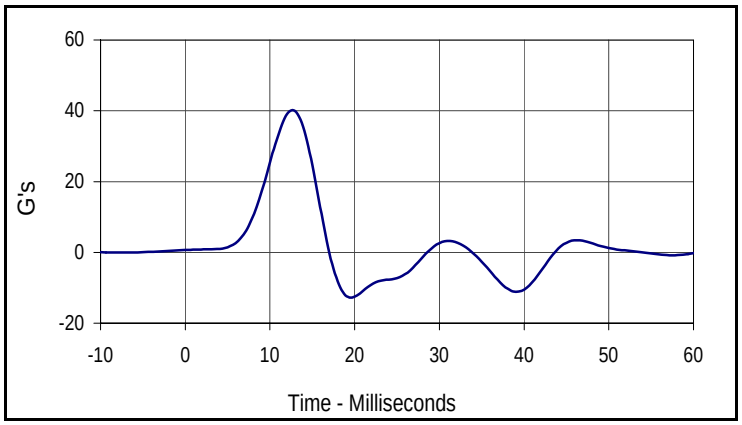
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	901	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	507	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	519	Pass
KV- Knee Pivot From Floor	mm	490 to 505	495	Pass
HW- Hip Width	mm	356 to 391	362	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	9/705
ATD Serial No.:	274	Test I.D.:	TH08C

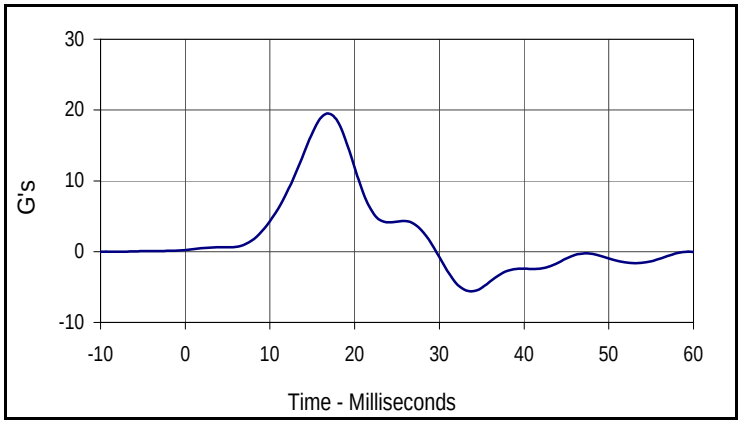
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.25	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	40.4	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	40.2	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.5	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.4	13.1	-13.8	20.0



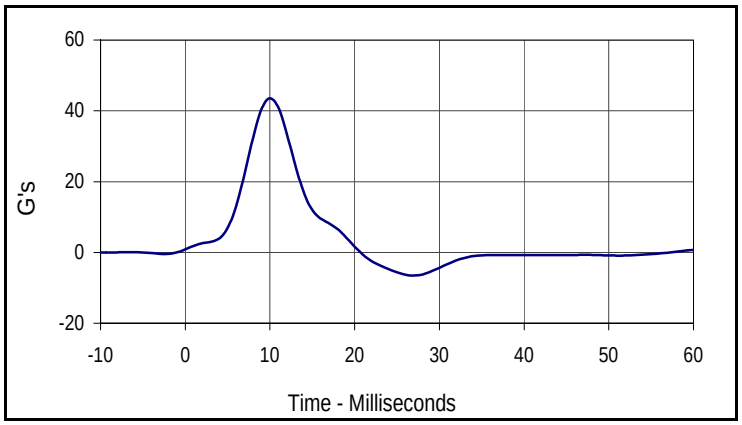
Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
40.2	12.5	-12.7	19.4



Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.5	16.9	-5.6	33.8

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	9/7/05
ATD Serial No.:	274	Test I.D.:	PI08C

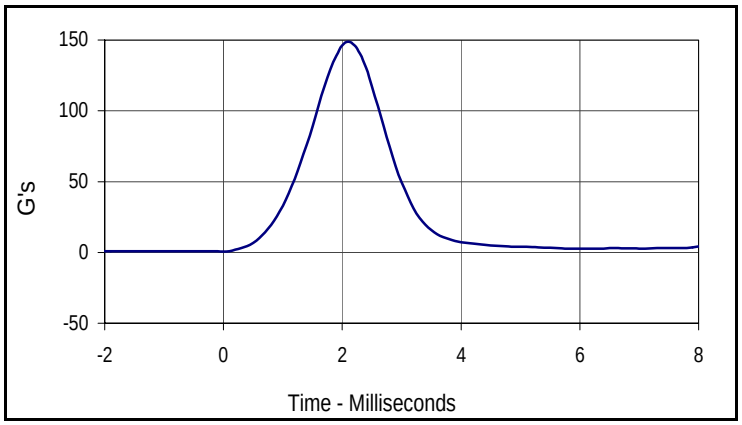
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	43.6	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.88	Pass
		Overall Test Results		Pass



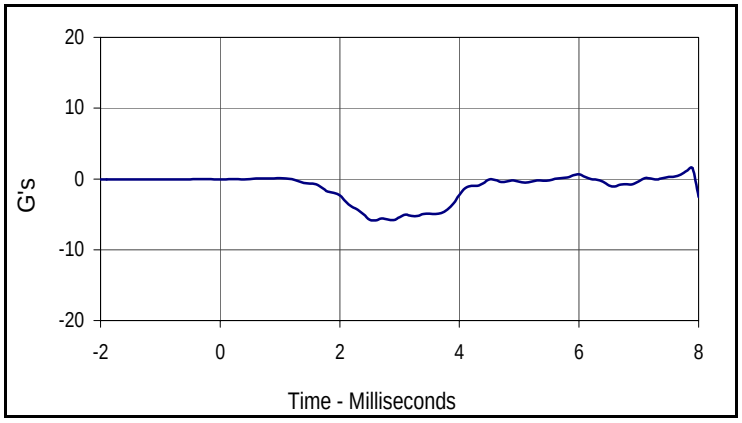
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
43.6	10.0	-6.5	26.9

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	9/7/05
ATD Serial No.:	274	Test I.D.:	HD08C

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	148.8	Pass
Peak Longitudinal Acceleration	G's	≤15.0	5.8	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.8	Pass
		Overall Test Results		Pass



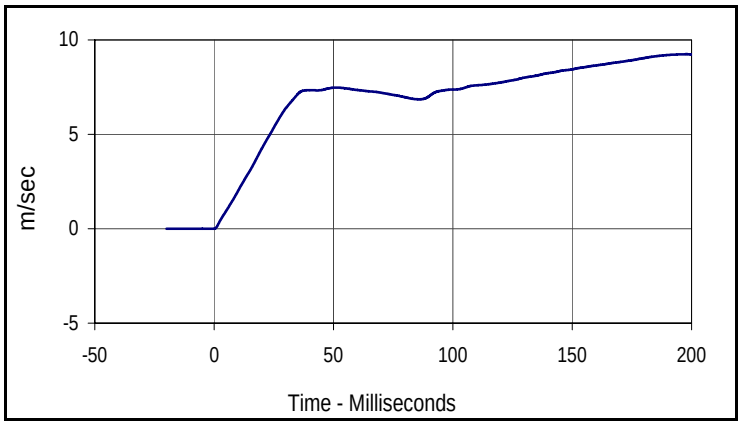
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
148.8	2.1	0.6	0.0



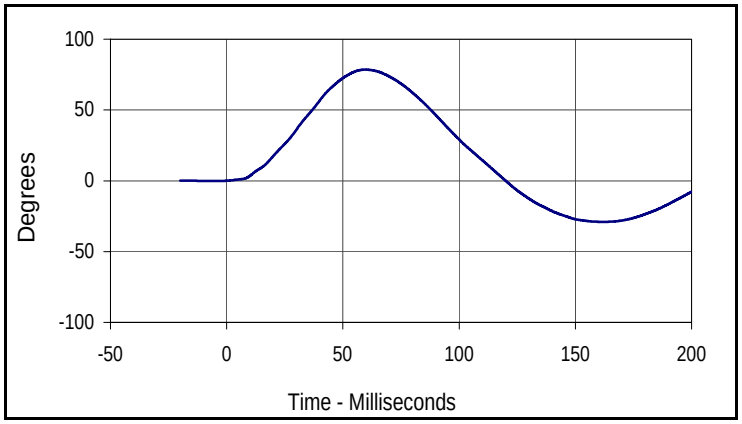
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.6	6.0	-5.8	2.6

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	9/7/05
ATD Serial No.:	274	Test I.D.:	NB09H

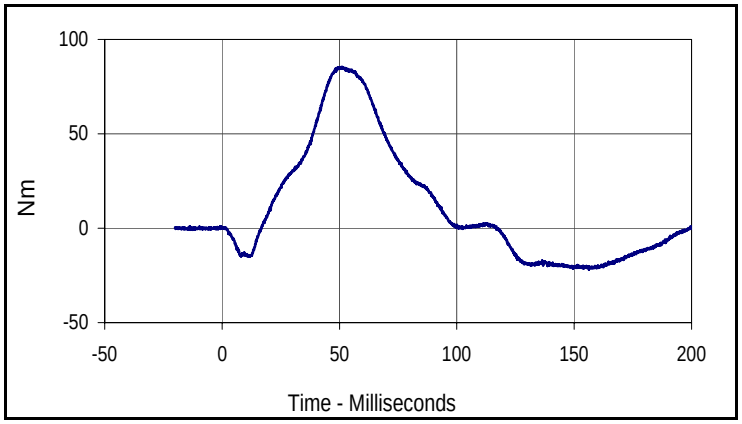
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.94	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.00	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.25	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.38	Pass
	40 to 70	m/sec	6.27 to 7.64	7.48	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	78.5	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	8.6	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	60.4	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	85.4	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.7	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.2	197.9	0.0	-0.3



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
78.5	59.7	-29.0	161.4



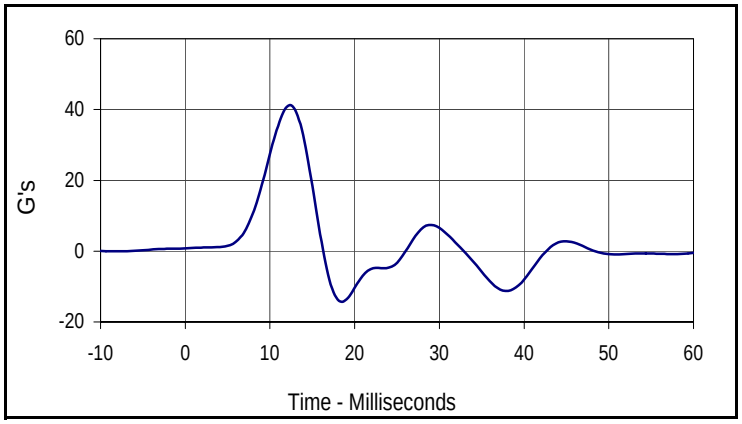
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	60	Nm
Max	Time	Min	Time
85.4	51.1	-21.9	156.3

Test Program:	SID / HIII External Measurements	Test Date:	9/7/05
ATD Serial No.:	275	Test I.D.:	N/A

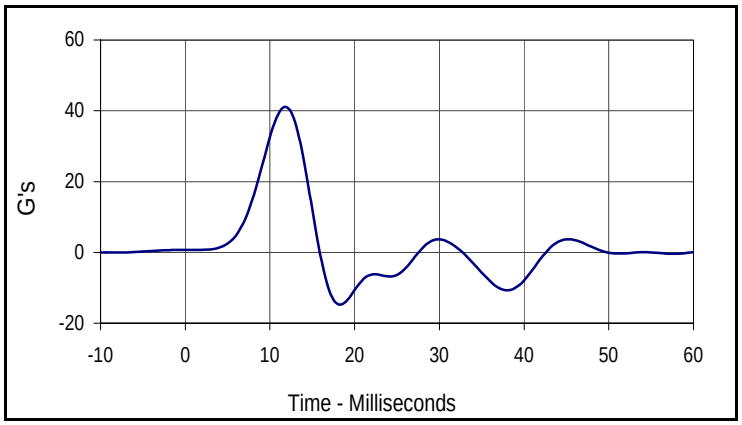
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	905	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	505	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	518	Pass
KV- Knee Pivot From Floor	mm	490 to 505	500	Pass
HW- Hip Width	mm	356 to 391	368	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	9/7/05
ATD Serial No.:	275	Test I.D.:	TH08D

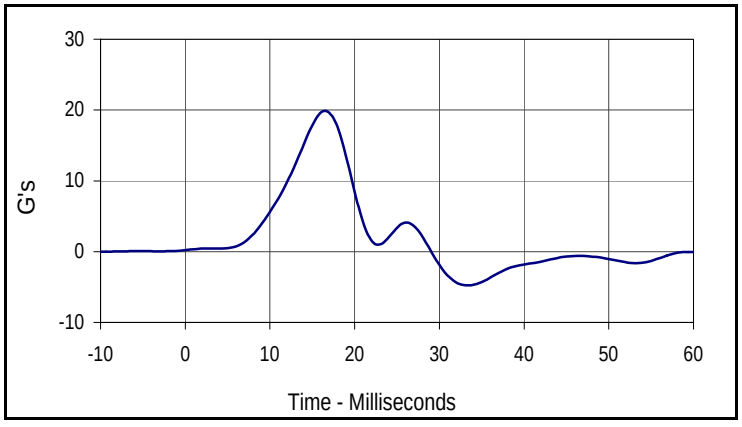
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.24	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	41.2	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	41.1	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	19.8	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
41.2	12.5	-14.2	18.8



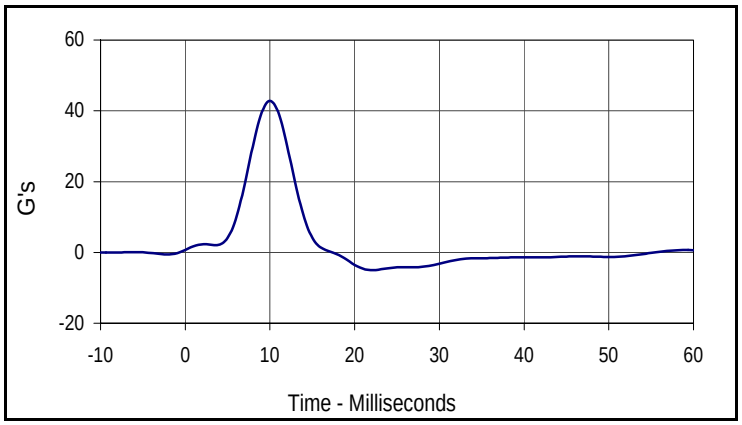
Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
41.1	11.9	-14.7	18.1



Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
19.8	16.3	-4.8	33.1

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	9/7/05
ATD Serial No.:	275	Test I.D.:	PI08D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.29	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	42.8	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	5.63	Pass
		Overall Test Results		Pass

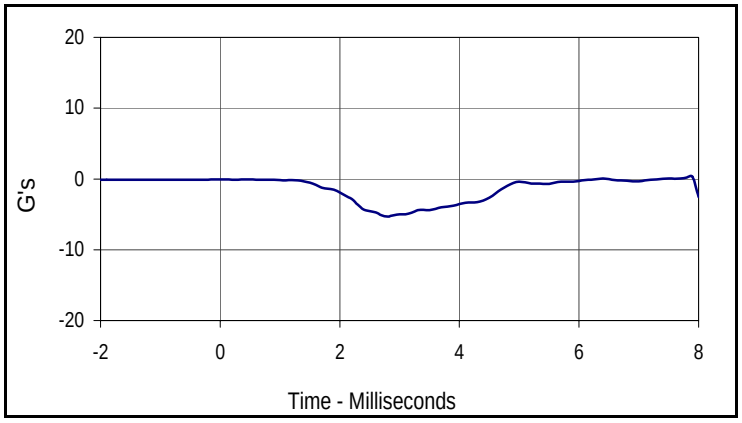


Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.8	10.0	-5.0	21.9

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	9/7/05
ATD Serial No.:	275	Test I.D.:	HD08D

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	147.6	Pass
Peak Longitudinal Acceleration	G's	≤15.0	5.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	2.4	Pass
		Overall Test Results		Pass

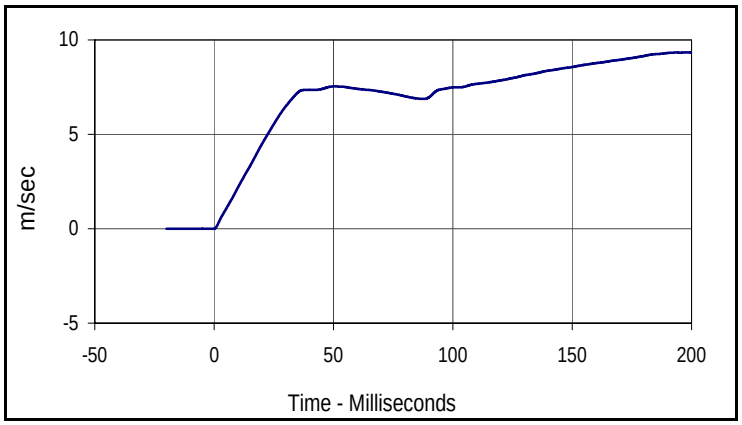
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
147.6	2.4	0.5	0.2



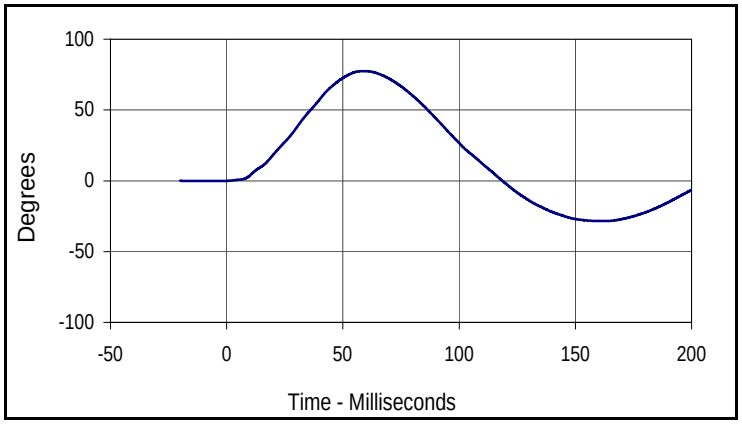
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
-0.1	0.5	-5.3	2.8

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	9/7/05
ATD Serial No.:	275	Test I.D.:	NB09J

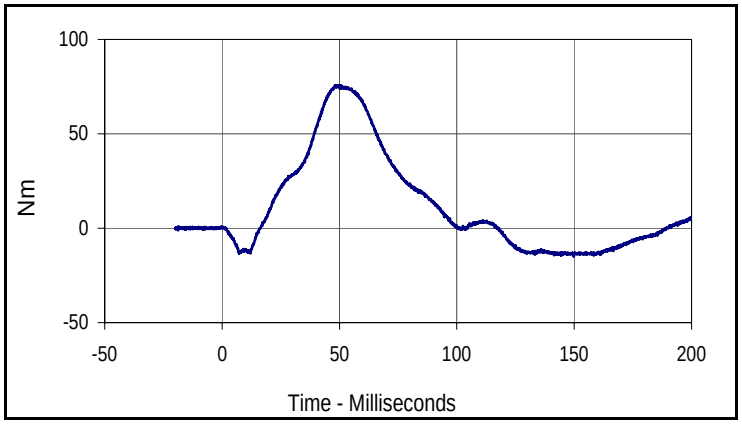
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.93	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.20	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.48	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.49	Pass
	40 to 70	m/sec	6.27 to 7.64	7.54	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	77.5	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	9.4	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	59.4	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	75.8	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	50.4	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.3	198.8	0.0	-0.5



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
77.5	59.2	-28.4	161.2



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	60	Nm
Max	Time	Min	Time
75.8	49.8	-14.9	149.8