REPORT NUMBER: NCAP-KAR-11-046

NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST

TOYOTA MOTOR MANUFACTURING, INDIANA, INC.
2011 TOYOTA HIGHLANDER 4X4 5-DOOR MPV

NHTSA NUMBER: MB5111

PREPARED BY:
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9270 HOLLY ROAD
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DECEMBER 6, 2010

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
SAFETY PERFORMANCE STANDARDS
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVE, SE
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WASHINGTON, DC 20590

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Approval Date: December 20, 2010

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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NHTSA, Office of Crashworthiness Standards

Date: _____

_____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

TECHNICAL REPORT DOCUMENTATON PAGE

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NCAP-KAR-11-046		

4. Title and Subtitle	5. Report Date
Final Report of New Car Assessment Program Testing of a 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No. MB5111	December 20, 2010
	6. Performing Organization Code KAR
7. Authors Mr. Steven D. Matsusaka, Project Engineer, KARCO Mr. Frank Richardson, Program Manager, KARCO	**8. Performing Organization Report No.** TR-P30001-14-NC
9. Performing Organization Name and Address KARCO Engineering, LLC. 9270 Holly Rd. Adelanto, CA, 92301	**10. Work Unit No.**
	11. Contract or Grant No. DTNH22-06-D-00027
12. Sponsoring Agency Name and Address U. S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C 20590	**13. Type of Report and Period Covered** Final Test Report, December 2010
	14. Sponsoring Agency Code NVS-111

15. Supplementary Notes

16. Abstract

A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2011 Toyota Highlander 4x4 5-Door MPV in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301 and foot well intrusion performance. The test was conducted at the KARCO Engineering, LLC. facility in Adelanto, California on December 6, 2010.

The impact velocity of the vehicle was 56.84 km/h and the ambient temperature at the barrier face at the time of impact was 23.3 deg. C. The target vehicle's post-test maximum crush was 440 mm at DPD2 to the left of the centerline. The test vehicle's performance is as follows:

Measurement Description	Units	Driver ATD		Passenger ATD	
		Threshold	Result	Threshold	Result
Head Injury Criteria (HIC_{15})	N/A	700.0	326.9	700.0	267.5
Maximum Chest Compression	mm	63	-29	52	-18
Nij	N/A	1	0.39	1	0.50
Neck Tension	N	4170	2143.7	2620	902.5
Neck Compression	N	4000	-423.3	2520	-426.6
Left Femur Force	N	10008	-1787.5	6805	-2231.5
Right Femur Force	N	10008	-3792.0	6805	-1424.5

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)	Copies of this report are available from: National Highway Traffic Safety Admin. Technical Reference Division 1200 New Jersey Ave., SE Washington, DC 20590

19. Security Classification of this report	20. Security Classification of this page	21. No. of Pages	22. Price
UNCLASSIFIED	UNCLASSIFIED	124	

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SECTION 1
PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program, sponsored by the National Highway Traffic Safety Administration (NHTSA) under contract number DTNH22-06-D-00027. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure, dated January, 2010.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2011 Toyota Highlander 4x4 5-Door MPV at a velocity of 56.84 km/h. The test was performed at KARCO Engineering, LLC. on December 6, 2010. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A of this report.

Three (3) real-time camera and sixteen (16) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

One Part 572E 50th percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck force transducers, right / left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure the dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 034) and the right-front passenger (position 2) ATD (Serial No. 141) were calibrated prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 132 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy response data traces.

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

The maximum static crush of the test vehicle was 440 mm located at DPD2 to the left of the centerline. Both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: The driver ATD's head contacted the airbag and head restraint. The upper torso contacted the airbag. Both the left knee and right knee contacted the knee airbag.

The passenger's visible contact points were as follows: The passenger ATD's head contacted the airbag and head restraint. The upper torso contacted the airbag. Both the left knee and right knee contacted the glovebox.

The occupant data is summarized below:

ATD Position	HIC_{15}	T^1	T^2	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp. (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	326.9	63.5	78.5	-29	0.39	2143.7	-423.3	-1787.5	-3792.0
Passenger (5th)	267.5	62.8	77.8	-18	0.50	902.5	-426.6	-2231.5	-1424.5

SECTION 2

DATA SHEETS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

CONVERSION FACTORS

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	miles/hr	km/hr	1.609344
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	N•m	1.355

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA Number	MB5111	Anti-Lock Brakes	Yes
Make	Toyota	All Wheel Drive	Yes
Model	Highlander 4x4	Power Steering	Yes
Body Style	5-Door MPV	Driver Front Airbag	Yes
VIN	5TDBK3EH5BS049455	Driver Curtain Airbag	Yes
Body Color	Magnetic Gray Metallic	Driver Head/Torso Airbag	No
Delivery Date	11/29/2010	Driver Torso Airbag	No
Odometer Reading (mi)	62	Driver Torso/Pelvis Airbag	Yes
Odometer Reading (km)	100	Driver Pelvis Airbag	No
Dealer	Gilroy Toyota	Driver Knee Airbag	Yes
Transmission	5-Speed Automatic	Pass. Front Airbag	Yes
Final Drive	4WD	Pass. Curtain Airbag	Yes
Type / No. of Cylinders	V6	Pass. Head/Torso Airbag	No
Engine Displacement (L)	3.5	Pass. Torso Airbag	No
Engine Placement	Transverse	Pass. Torso/Pelvis Airbag	Yes
Roof Rack	Yes	Pass. Pelvis Airbag	No
Sunroof / T-Top	No	Pass. Knee Airbag	No
Tinted Glass	Yes	Pre-Tensioners	Yes
Traction Control	Yes	Load Limiters	Yes
Power Brakes	Yes	Automatic Door Locks	Yes
Front Disc	Yes	Tilt Steering	Yes
Rear Disc	Yes	Other	

Does Owner's Manual provide instructions to turn off automatic door locks?	Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Toyota Motor Manufacturing, Indiana, Inc.	GVWR (kg)	2720
Date of Manufacture	Oct-10	GAWR Front (kg)	1340
		GAWR Rear (kg)	1585

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

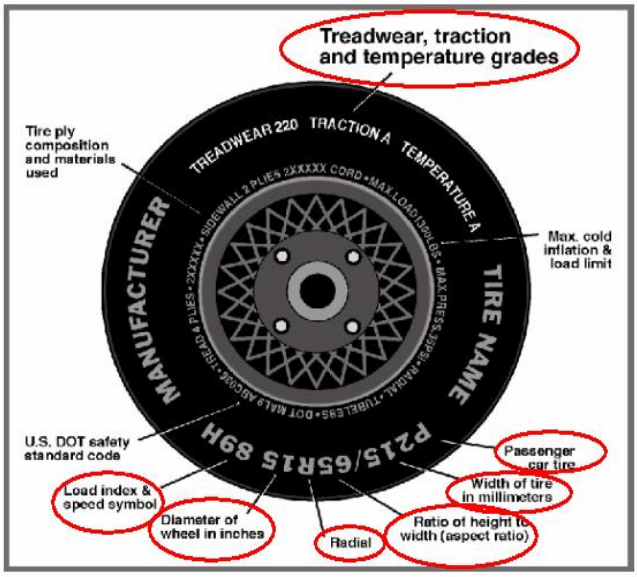
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Bench	
Number of Occupants	2	3	2	7
Capacity Weight (VCW) (kg)				534.0
Cargo Weight (RCLW) (kg)				57.7

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	210	210
Recommended Tire Size	P245/65R17	P245/65R17
Tire Size on Vehicle	P245/65R17	P245/65R17
Tire Manufacturer	Toyo	Toyo
Tire Model	Open Country	Open Country
Treadwear	300	300
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 2 Polyester, 1 Nylon	2 Steel, 2 Polyester, 1 Nylon
Load Index / Speed Symbol	105S	105S
Tire Material	Steel, Polyester, Nylon	Steel, Polyester, Nylon
DOT Safety Code Left	CX9R HPK 3410	CX9R HPK 3410
DOT Safety Code Right	CX9R HPK 3410	CX9R HPK 3410

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	569.5	448.5		605.0	525.0	
Right	kg	534.5	435.0		550.0	500.0	
Ratio	%	55.5%	44.5%	100.0%	53.0%	47.0%	100.0%
Total	kg	1104.0	883.5	1987.5	1155.0	1025.0	2180.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1987.5	A
Weight of 1 P572E ATD & 1 P572O ATD	kg	141.0	B
Rated Cargo/Luggage Weight (RCLW)	kg	57.7	C
Calculated Vehicle Target Weightt (TVTW)	kg	2186.2	A+B+C

TEST VEHICLE ATTITUDES

Condition	Units	LF	RF	LR	RR	CG Aft of Front Axle
As Delivered	mm	841	845	844	849	1236
As Tested	mm	826	832	818	831	1307
Post-Test	mm	874	841	833	818	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2780
Total Vehicle Length at Left Side	mm	4010
Total Vehicle Length at Centerline	mm	4783
Total Vehicle Length at Right Side	mm	4010
Weight of Ballast in Cargo Area	kg	100.0
Weight of Vehicle Components Removed	kg	52.5
Amount of Stoddard Solvent in Fuel Tank	L	67.60

VEHICLE COMPONENTS REMOVED TO MEET TEST WEIGHT:

Third row seats (32.5 kg), Spare tire tools (2.0 kg), Rear carpeting (15.5 kg), Engine bottom cover (2.5 kg)

DATA SHEET NO. 1 … (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

TARGET VEHICLE STRUCTURAL MEASUREMENTS

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length	4783	4358	-425
2	Total Width	1905	2006	101
3	Bumper Top Height	730	681	-49
4	Bumper Bottom Height	338	496	158
5	Longitudinal Member Top Height	640	630	-10
6	Distance Between Longitudinal Members	940	1160	220
7	Longitudinal Member Width	90	108	18
8	Engine Top Height	858	907	49
9	Engine Bottom Height	222	231	9
10	Engine and Gearbox Width	683	683	0
11	Front Bumper to Engine Distance	515	310	-205
12	Front Shock Absorber Fixing Height	1012	1060	48
13	Bonnet Leading Edge Height	965	1044	79
14	Front Shock Absorber Fixing Width	1240	1264	24
15	Front Bumper to Front Axle Distance	920	490	-430
16	Front Axle to A-Pillar Distance	545	465	-80
17	A-Pillar to B-Pillar Distance	999	1003	4
18	B-Pillar to Rear Axle Distance	1170	1171	1
19	B-Pillar to C-Pillar Distance	928	926	-2
20	Roof Sill Bottom Height	1477	1547	70
21	Roof Sill Top Height	1648	1658	10
22	Floor Sill Bottom Height	317	308	-9
23	Floor Sill Top Height	482	472	-10

All measurements in millimeters.

DATA SHEET NO. 2

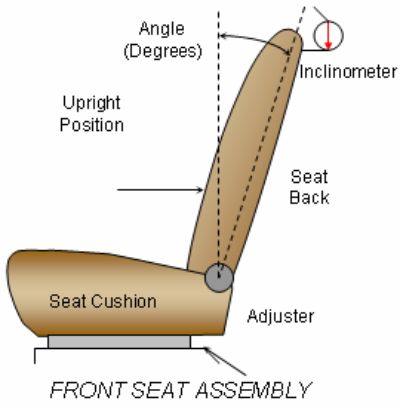
SEAT ADJUSTMENT, FUEL SYSTEMS, AND STEERING WHEEL DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

NOMINAL DESIGN RIDING POSITION

The procedure for the driver is as follows: the seat back is set to the manufacturer's designated angle. The procedure for the passenger is as follows: the seat back is set to position the transverse instrumentation platform of the dummy's head at 0° ± 0.5°. Seat back angle is measured at the headrest post using a digital inclinometer.

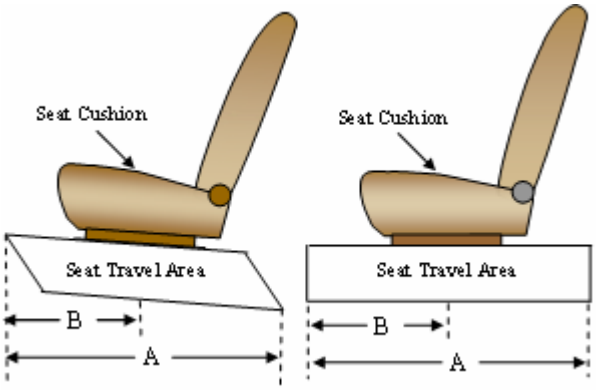


SEAT BACK ANGLE

Seating Position	Degrees
Driver Seat Back Angle	3.7
Passenger Seat Back Angle	1.4

SEAT FORE / AFT POSITIONING

The total seat travel is measured from the forward most possible position to the rear most possible position. The driver's seat is set to the middle of the fore-aft travel at lowest height and lowest angle. The passenger's seat is set to the forward most position where the ATD will not contact any interior panels, full forward for this test.



SEAT FORE/AFT POSITIONS

Seating Position	Total Fore-Aft Travel	Placed in Position
Driver Seat	284 mm	142 mm
Passenger Seat	226 mm	0 mm

SEAT BELT UPPER ANCHORAGE

The seat belt upper anchorage is positioned to the manufacturer's design position for a 50th percentile adult male ATD for the driver, and a 5th percentile adult female ATD for the passenger. Position zero (0) is the uppermost position.

SEAT BELT UPPER ANCHORAGES

Seating Position	Total No. of Positions	Placed in Position
Driver Seat	4	1
Passenger Seat	4	1

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

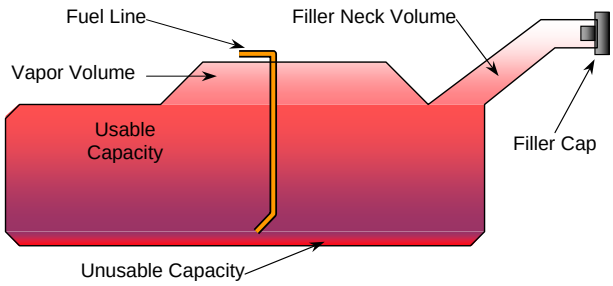
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	72.67
Usable Capacity of "Optional Tank"	
92 - 94% of Usable Capacit	66.86 to 68.31
Actual Amount of Stoddard Solvent Used	67.60
1/3 of Usable Capacity	24.22

FUEL PUMP

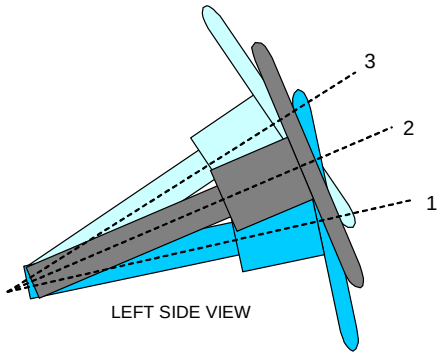
The test vehicle is equipped with an electric fuel pump. The fuel pump is activated when the ignition is switched to the “on” position. The fuel filler door is located on the left rear fender. The standard fuel tank occupies the area under the second row seat on the left side of the vehicle.



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. A digital inclinometer is used to measure a plate which is placed across the rim of the steering wheel for angular measurements. A tape measure is used with a reference mark on the steering column to measure telescoping travel.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONING

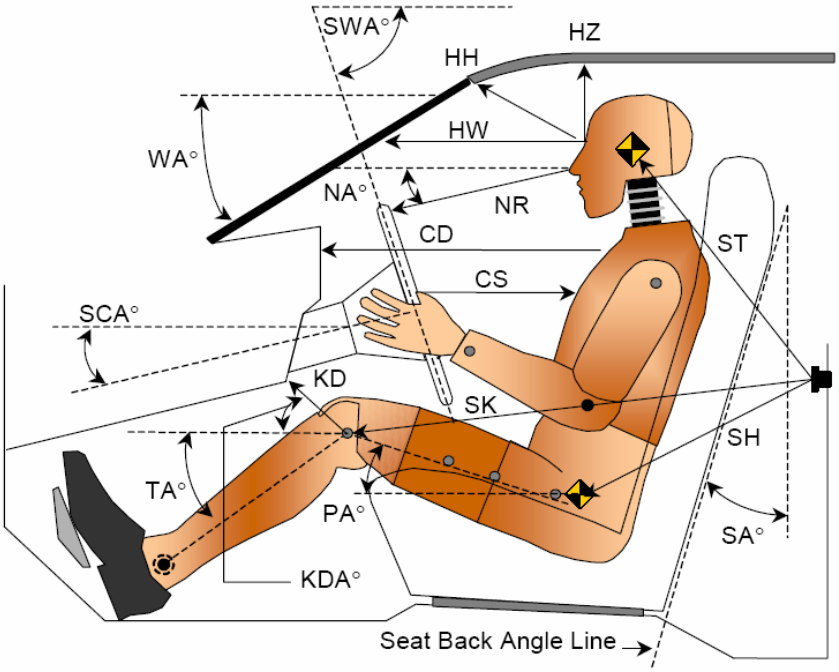
	Degrees	Fore-Aft Position (mm)
Lowermost Position, No. 1	24.5	92
Geometric Center Position, No. 2	26.0	113
Uppermost Position, No. 3	27.5	134
Telescoping Steering Wheel Travel		42
Test Position	26.3	113

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10



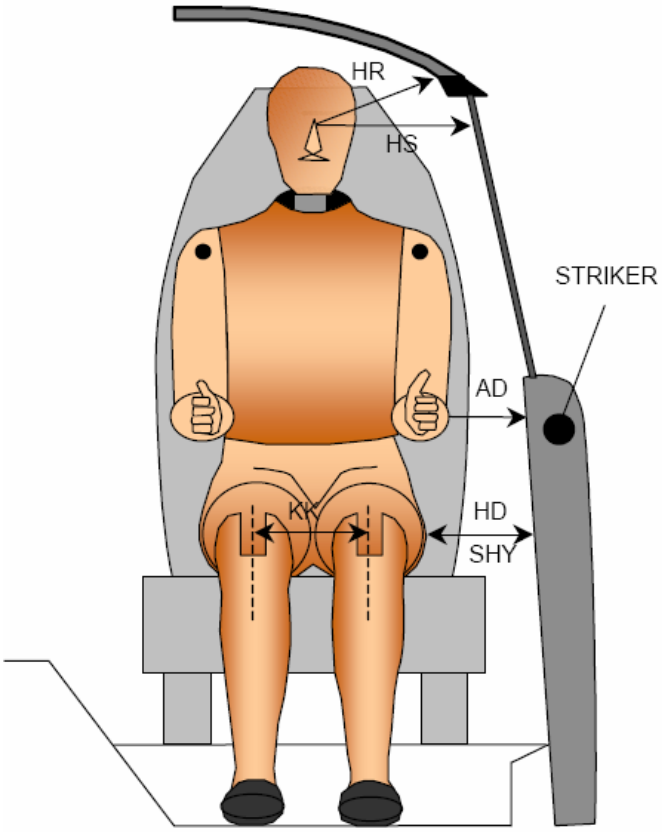
Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		27.4		
SWA°	Steering Wheel Angle		26.2		
SCA°	Steering Column Angle		63.8		
SA°	Seat Back Angle (On Headrest Post)		3.7		1.4
HZ	Head to Roof	250	90.0	247	90.0
HH	Head to Header	392	27.6	314	46.3
HW	Head to Windshield	752	0.0	697	0.0
HR	Head to Side Header	270	40.5	282	39.5
NR	Nose to Rim	420	9.5	523	31.8
CD	Chest to Dash	556	8.9	445	7.0
CS	Chest to Steering Hub	354	11.0		
RA	Rim to Abdomen	188	0.0		
KDL	Left Knee to Dash	150	22.5	89	37.2
KDR	Right Knee to Dash	85	41.5	114	35.3
PA°	Pelvic Angle		22.7		19.6
TA°	Tibia Angle		50.5		48.9
SK	Striker to Knee	624	6.8	698	11.2
ST	Striker to Head	466	75.5	456	57.8
SH	Striker to H-Point	308	39.5	407	25.6

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10



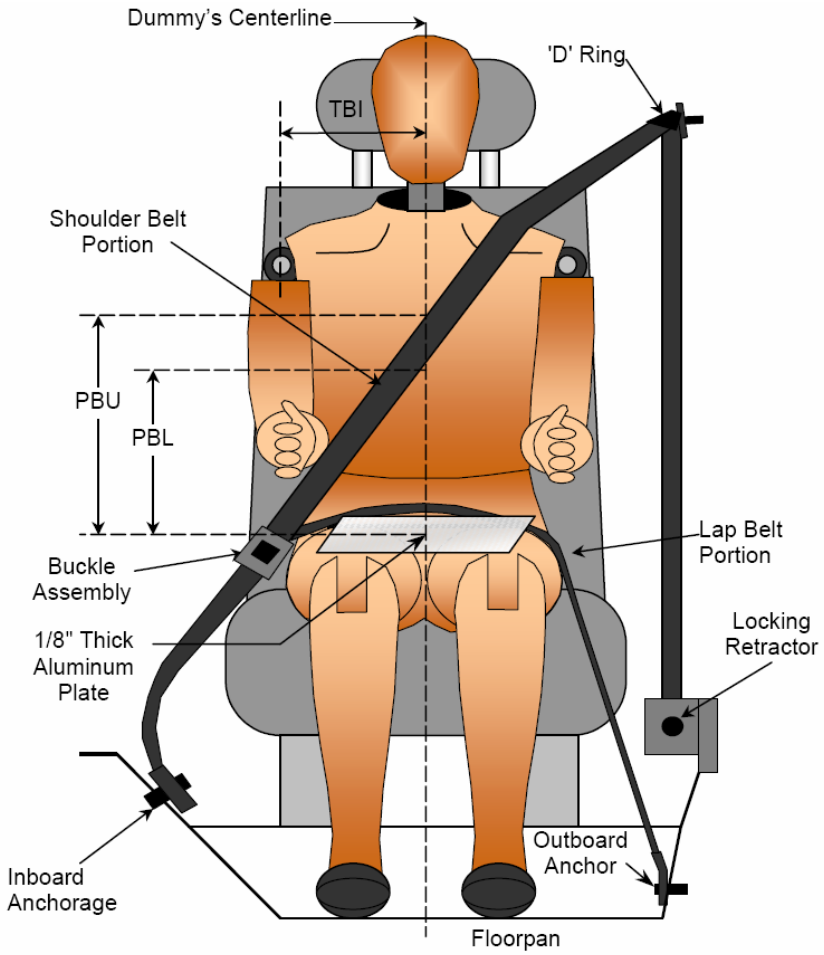
Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	155	94
HD	H-Point to Door	161	220
HR	Head to Side Header	270	282
HS	Head to Side Window	345	367
KK	Knee to Knee	351	227
SHY	Striker to H-Point (Y-Direction)	273	297
AA	Ankle to Ankle	335	165

DATA SHEET NO. 5

SEAT BELT POSITIONING DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Code	Measurement Description	Units	Driver	Passenger
PBU	Top Surface of Aluminum Plate to Belt Upper Edge	mm	412	281
PBL	Top Surface of Aluminum Plate to Belt Lower Edge	mm	336	202

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as Measured on ATD	mm	927	968
Lap Belt Length as Measured on ATD	mm	914	935
Remainder of Belt on Reel	mm	810	712
Total Belt Length for Continuous Webbing Systems	mm	2651	2615

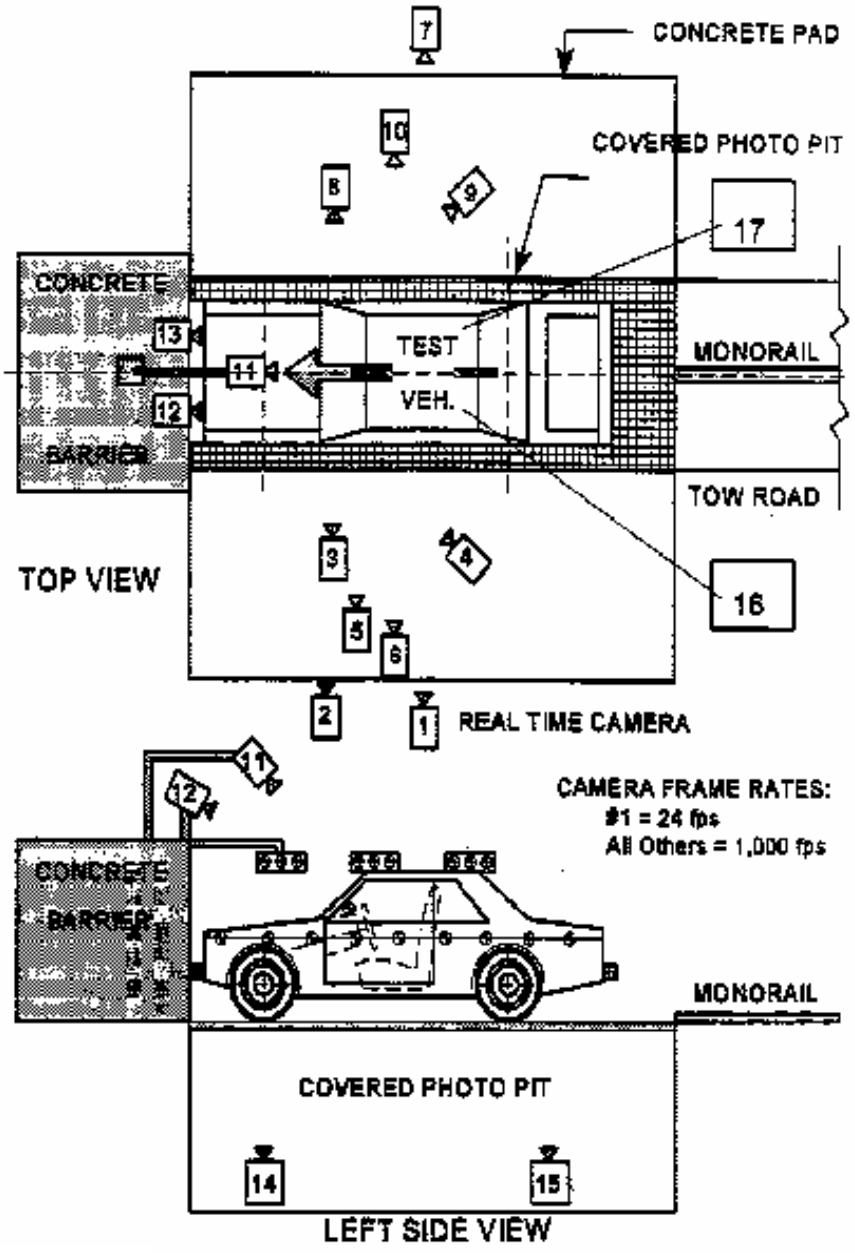
DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 … (CONTINUED)

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

CAMERA LOCATIONS

No.	Description	Location			Angle (°)	Film Plane to Head Target	Lens (mm)	Speed (fps)
		X	Y	Z				
1	Real-Time Camera	-11412	-8150	-1484				30
2	Overall Left Side	-2590	-7950	-1371	0	9881	24	1000
3	Left Side A-Pillar	-1701	-6197	-1701	0	7921	50	1000
4	Left Side B-Pillar	-6696	-10308	-3211	-17	11281	ZOOM	1000
5	Steering Column Upper	-1966	-10412	-3688	-13	9887	50	1000
6	Steering Column Lower	-1972	-10412	-3379	-13	9870	50	1000
7	Overall Right Side	-2336	7569	-1012	0	9417	24	1000
8	Right Side A-Pillar	-1733	7581	-1408	0	7789	50	1000
9	Passenger IP View	-1600	8214	-1811	0	7795	ZOOM	1000
10	Right Side B-Pillar	-6217	9516	-4830	-10	12626	ZOOM	1000
11	Overhead Windshield View	-354	0	-5749	-90		12	1000
12	Overhead Driver View	297	-366	-2460	-34		12	1000
13	Overhead Passenger View	297	366	-2460	-34		24	1000
14	Pit View of Engine Compartment	-756	0	1495	90		12	1000
15	Pit View of Fuel Tank	-3398	0	1495	90		8	1000
16	Driver's On Board View	-3520	-250	-1630	-22		12	1000
17	Passenger's On Board View	-3520	250	-1630	-22		12	1000

Coordinates: +X = forward impact plane

+Y = right of monorail center

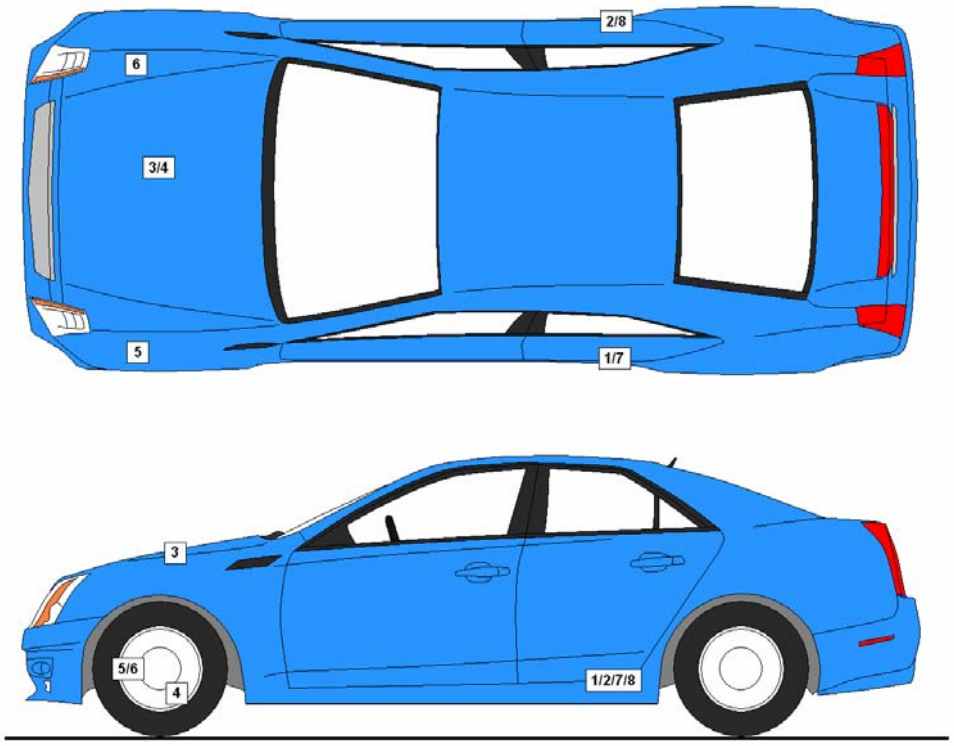
+Z = into ground

DATA SHEET NO. 7

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Description	Location		
		X	Y	Z
1	Left Rear Cross Member X	1880	-760	-450
2	Right Rear Cross Member X	1880	760	-450
3	Engine Top X	4163	30	-795
4	Engine Bottom X	4033	280	-210
5	Left Brake Caliper X	4003	-730	-310
6	Right Brake Caliper X	4003	730	-310
7	Left Rear Cross Member Z	1880	-760	-450
8	Right Rear Cross Member Z	1880	760	-450

Reference Points: X – Rear Surface of Vehicle (+ forward)

Y – Vehicle Centerline (+ to right)

Z – Ground Plane (+ down)

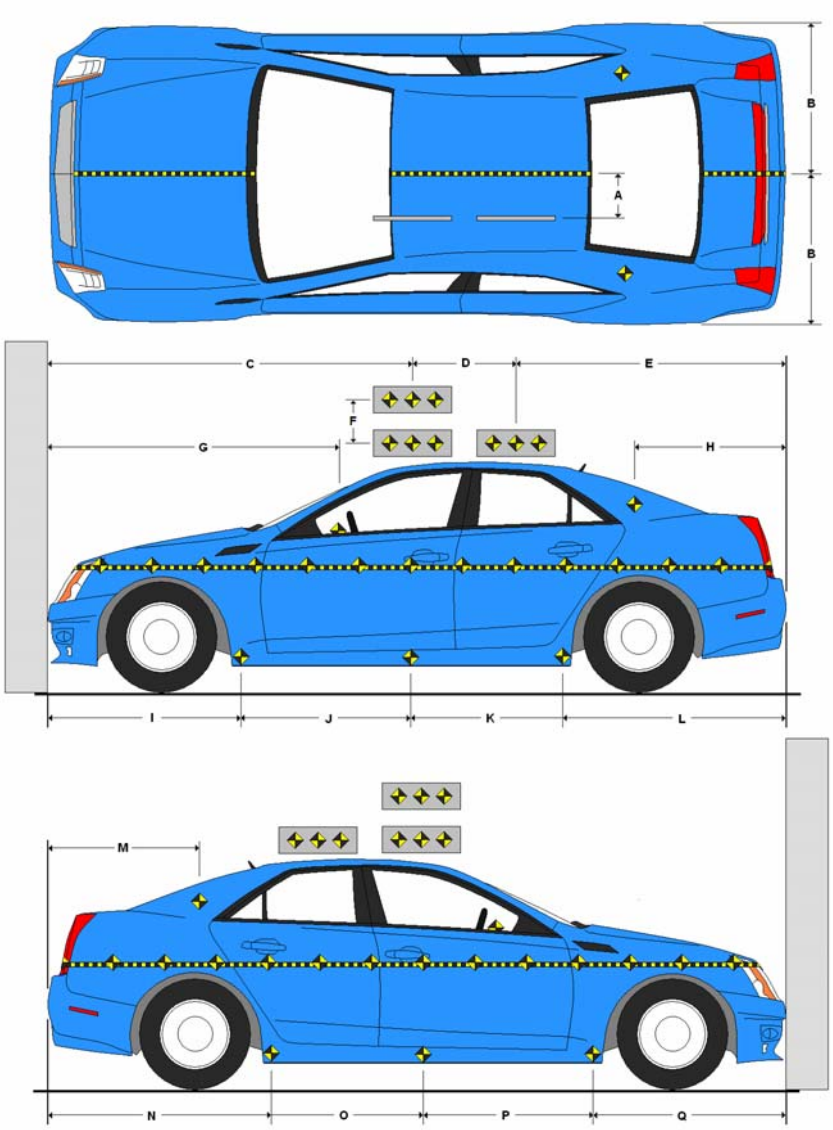
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

Item	Value
A	422
B	670
C	2197
D	612
E	1970
F	
G	1740
H	658
I	1429
J	891
K	891
L	1570
M	660
N	1565
O	890
P	890
Q	1432



All measurements in millimeters.

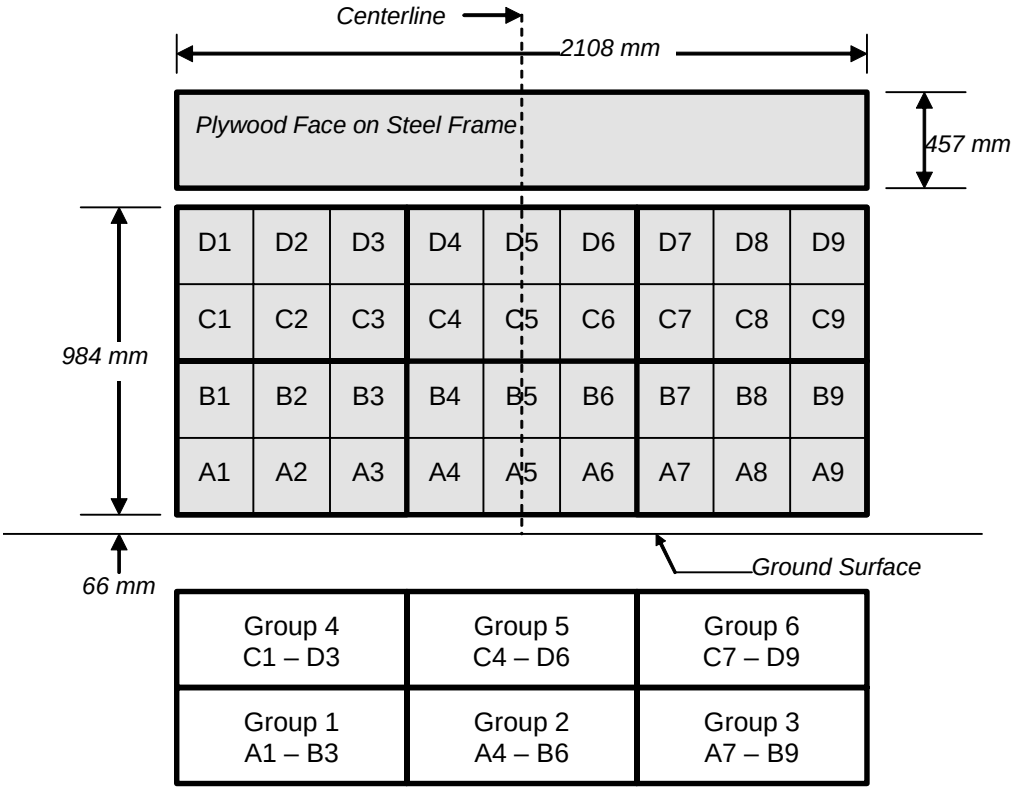
DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

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



6 Groups of 6 Load Cells Each

DATA SHEET NO. 10

TEST VEHICLE CAMERA AND INSTRUMENTATION SUMMARY

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

INSTRUMENTATION

Driver Dummy Accelerometers	44
Passenger Dummy Accelerometers	44
Vehicle Structure Accelerometers	8
Load Cell Barrier	36
Total	132

CAMERA COVERAGE

High-Speed Vehicle On Board	2
High-Speed Offboard	14
Real Time	3
Total	19

DATA SHEET NO. 11

POST-TEST OBSERVATIONS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	P572E 50th Percentile Male ATD / 034	P572O 5th Percentile Female ATD / 141
Head Contact	Airbag, Head Restraint	Airbag, Head Restraint
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Glovebox
Right Knee Contact	Knee Airbag	Glovebox

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Rear Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Track Shift (mm)	11	11
Seat Back Failure	None	None
Glazing Damage	None	None

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Cracked
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	879
Center	mm	906
Right Side	mm	942
Average	mm	909

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

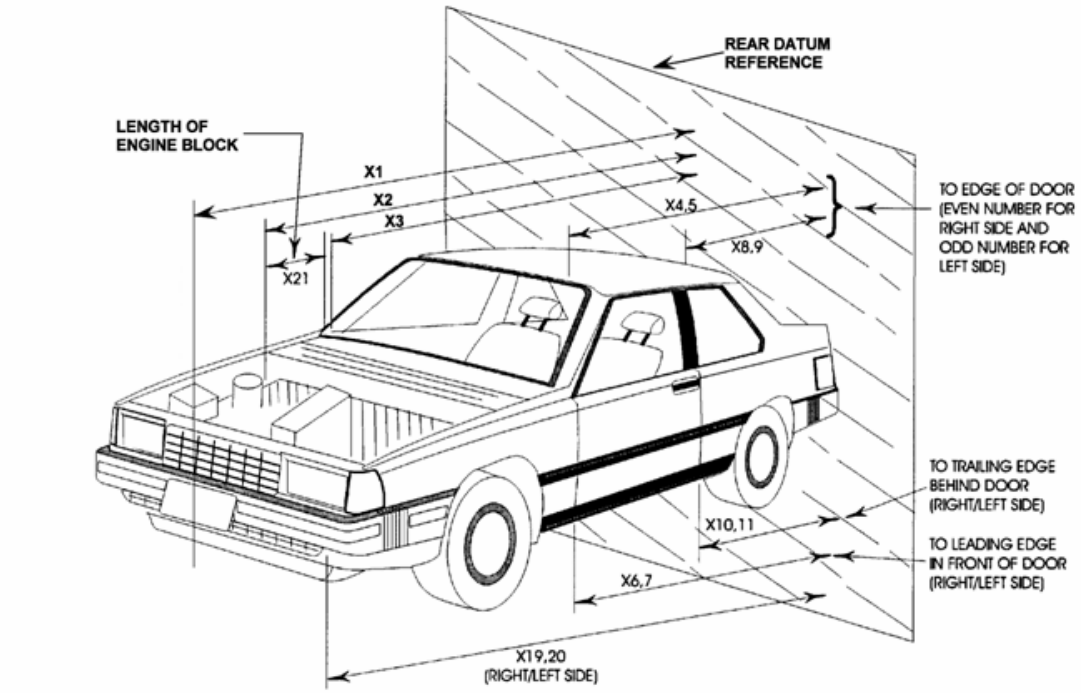
Restraint Type	Driver		Passenger	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Curtain Airbag	Yes	No	Yes	No
Torso/Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	Yes	Yes	No	
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

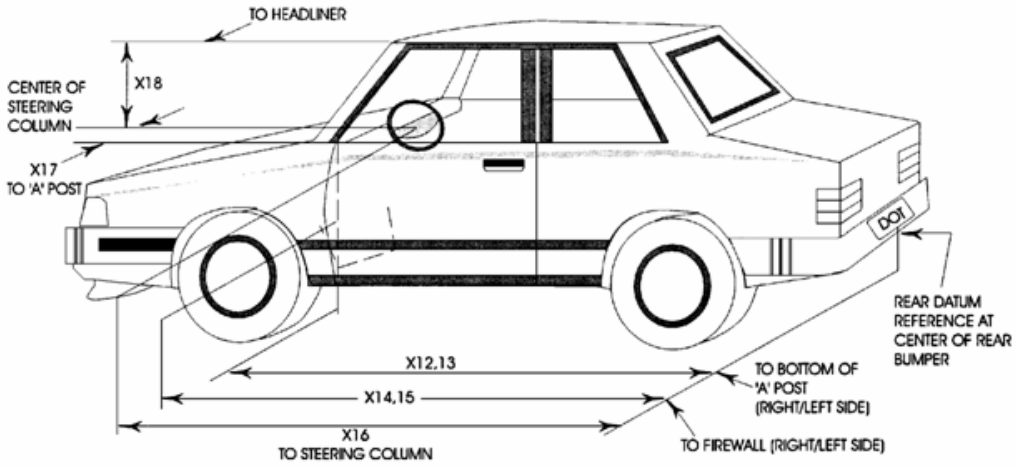
DATA SHEET NO. 12

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10





DATA SHEET NO. 12 … (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

No.	Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4783	4358	-425
2	Rear Surface of Vehicle to Front of Engine	4268	4082	-186
3	RSOV to Firewall	3871	3860	-11
4	RSOV to Upper Leading Edge of Right Door	3348	3364	16
5	RSOV to Upper Leading Edge of Left Door	3350	3353	3
6	RSOV to Lower Leading Edge of Right Door	3325	3332	7
7	RSOV to Lower Leading Edge of Left Door	3325	3334	9
8	RSOV to Upper Trailing Edge of Right Door	2250	2267	17
9	RSOV to Upper Trailing Edge of Left Door	2255	2256	1
10	RSOV to Lower Trailing Edge of Right Door	2245	2248	3
11	RSOV to Lower Trailing Edge of Left Door	2244	2251	7
12	RSOV to Bottom of A-Pillar of Right Side	3320	3335	15
13	RSOV to Bottom of A-Pillar Left Side	3321	3328	7
14	RSOV to Firewall, Right Side	3908	3848	-60
15	RSOV to Firewall, Left Side	3908	3833	-75
16	RSOV to Steering Column	2910	2915	5
17	Center of Steering Column to A-Pillar	431	430	-1
18	Center of Steering Column to Headliner	435	480	45
19	RSOV to Right Side of Front Bumper	4010	3784	-226
20	RSOV to Left Side of Front Bumper	4010	3867	-143
21	Length of Engine Block	525	525	0
RD	RSOV to Right Side of Dash Panel	3128	3118	-10
CD	RSOV to Center of Dash Panel	3065	3030	-35
LD	RSOV to Left Side of Dash Panel	3128	3105	-23

All measurements in millimeters.

DATA SHEET NO. 13

ACCIDENT INVESTIGATION DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

VEHICLE INFORMATION

VIN: 5TDBK3EH5BS049455 Wheelbase (mm): 2780

Vehicle Size Category: 5-Door MPV Test Weight (kg): 2180.0

ACCELEROMETER DATA

Accelerometer Locations: Left Rear Crossmember

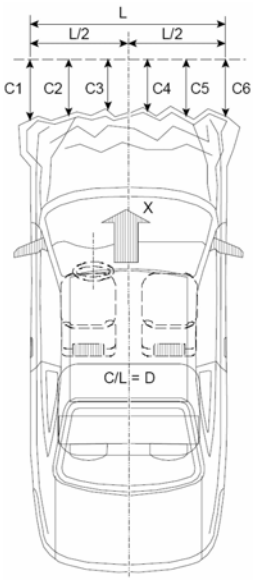
Cal. Procedure/Interval: Drop Test / 6 months

Integration Algorithm: NHTSA Standard Linearity: Good

Impact Velocity (km/h): 56.84

Velocity Change (km/h): 63.8

Time of Separation (msec): 66.7



CRUSH PROFILE

Collision Deformation Classification: 12FCEW3

Midpoint of Damage: Vehicle Centerline

Damage Region Length (mm): 1670

Impact Mode: Full Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	262	498	236
C2	Crush Zone 2 at Left Side	mm	50	490	440
C3	Crush Zone 3 at Left Side	mm	8	432	424
C4	Crush Zone 4 at Right Side	mm	8	410	402
C5	Crush Zone 5 at Right Side	mm	49	418	369
C6	Crush Zone 6 at Right Side	mm	270	543	273
L	C1 to C6	mm	1670		

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

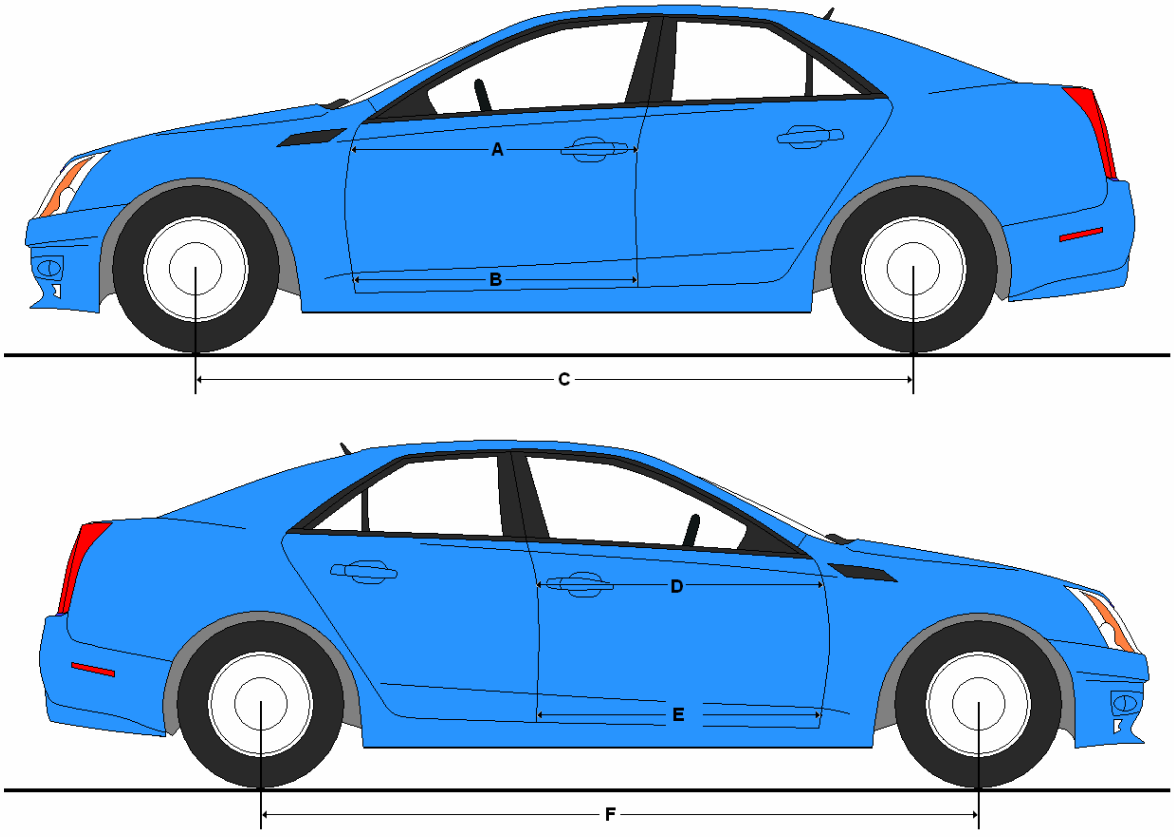
Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1002	1003	-1
B	Left Side Lower	mm	755	820	-65
D	Right Side Upper	mm	1003	1005	-2
E	Right Side Lower	mm	834	832	2

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2780	2721	59
F	Right Side Wheelbase	mm	2780	2752	28



DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

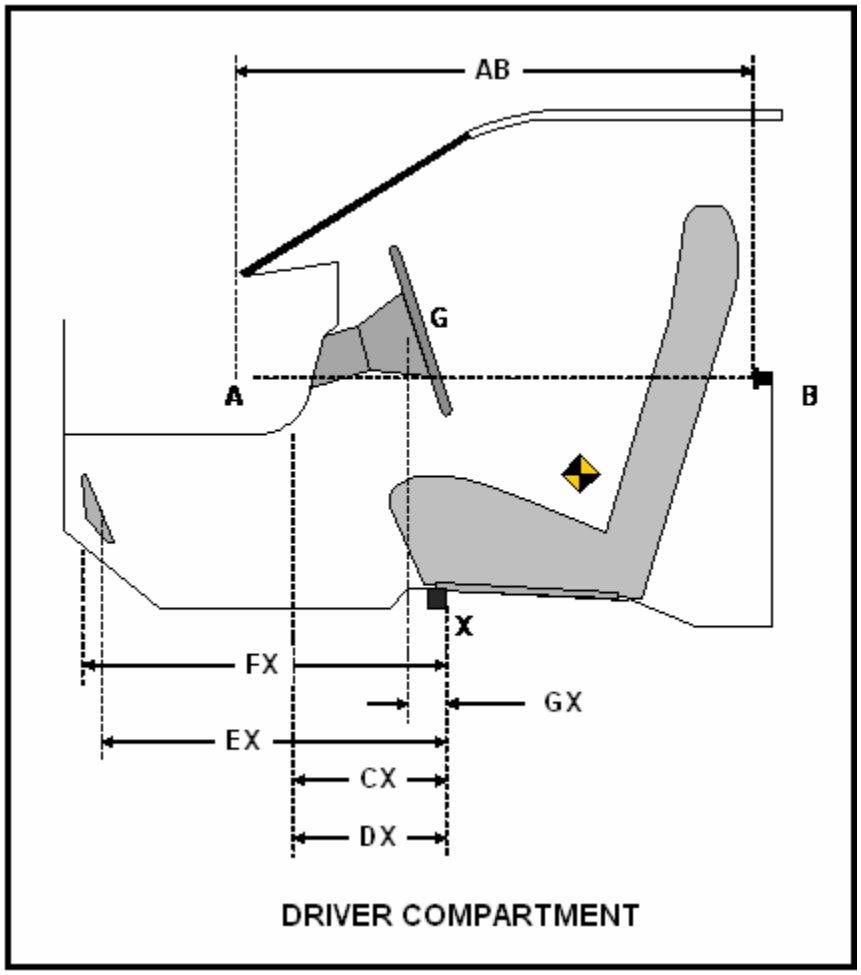
Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	876	875	1
CX	Left Knee Bolster to X	mm	270	204	66
DX	Right Knee Bolster to X	mm	290	224	66
EX	Brake Pedal to X	mm	560	443	117
FX	Foot Rest to X	mm	550	563	-13
GX	Center of Steering Wheel Hub to X	mm	25	72	-47

X = Front of Seat Track (Stationary)

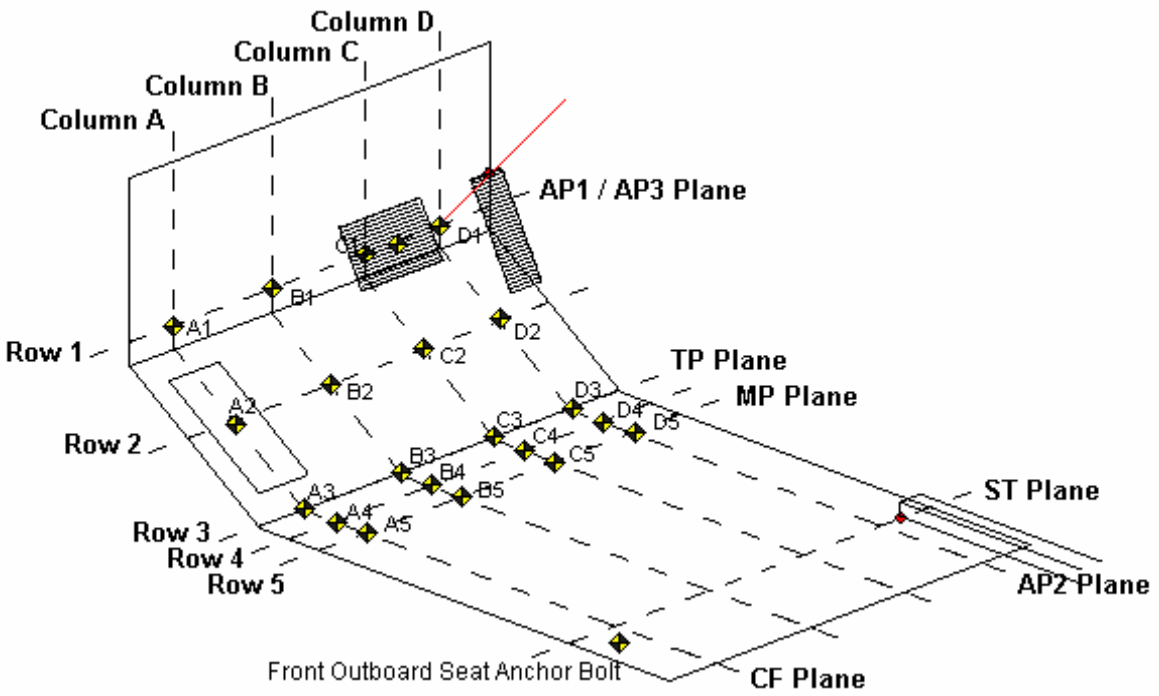


DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10



AP1: Y-Z Plane passing through D1

AP2: X-Z Plane passing through D1

AP3: X-Y plane passing through D1

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

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

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

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

Column A: intersection of vehicle and CF plane

Column D: Intersection of vehicle and AP2 plane

Row 1: intersection of the vehicle and the AP3 Plane

Row 3: intersection of the vehicle and TP plane

Row 5: intersection of the vehicle and MP plane

Row 2: evenly spaced between row 1 and 3

Row 4: evenly spaced between row 3 and 5

DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

DRIVER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	638	708	712	697	573	648	651	640	-65	-60	-61	-57
2	592	623	621	646	539	569	574	590	-53	-54	-47	-56
3	513	515	526	543	462	461	471	488	-51	-54	-55	-55
4	435	442	447	461	391	390	393	407	-44	-52	-54	-54
5	355	357	366	381	305	303	313	327	-50	-54	-53	-54

DRIVER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	-21	-105	-193	-387	-98	-191	-277	-471	-77	-86	-84	-84
2	-16	-114	-202	-395	-95	-196	-295	-476	-79	-82	-93	-81
3	-24	-121	-209	-403	-106	-200	-290	-485	-82	-79	-81	-82
4	-29	-122	-214	-407	-107	-201	-295	-491	-78	-79	-81	-84
5	-34	-125	-221	-411	-113	-204	-299	-490	-79	-79	-78	-79

DRIVER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	84	45	42	50	77	43	46	42	-7	-2	4	-8
2	-16	-47	-25	-35	-25	-50	-40	-45	-9	-3	-15	-10
3	-69	-58	-44	-67	-71	-69	-50	-87	-2	-11	-6	-20
4	-68	-65	-46	-70	-81	-75	-54	-89	-13	-10	-8	-19
5	-80	-68	-47	-73	-85	-82	-59	-94	-5	-14	-12	-21

All measurements in millimeters

DATA SHEET NO. 14 … (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

PASSENGER FLOORPAN X-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	687	689	691	637	649	668	672	618	-38	-21	-19	-19
2	622	604	615	592	602	588	603	583	-20	-16	-12	-9
3	541	521	516	510	522	505	504	498	-19	-16	-12	-12
4	464	441	433	429	447	427	420	419	-17	-14	-13	-10
5	367	354	349	343	351	340	336	333	-16	-14	-13	-10

PASSENGER FLOORPAN Y-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	382	219	133	64	390	230	143	72	8	11	10	8
2	394	228	130	51	401	236	137	56	7	8	7	5
3	401	234	137	50	406	239	143	57	5	5	6	7
4	405	239	144	57	409	243	149	62	4	4	5	5
5	410	244	153	62	413	247	155	63	3	3	2	1

PASSENGER FLOORPAN Z-AXIS

	Pre-Test				Post-Test				Difference			
	A	B	C	D	A	B	C	D	A	B	C	D
1	56	43	33	75	53	46	38	75	-3	3	5	0
2	-34	-20	-41	-8	-36	-23	-41	-11	-2	-3	0	-3
3	-57	-37	-57	-58	-62	-39	-58	-56	-5	-2	-1	2
4	-59	-38	-61	-61	-69	-42	-63	-62	-10	-4	-2	-1
5	-58	-39	-62	-72	-70	-45	-66	-67	-12	-6	-4	5

All measurements in millimeters

DATA SHEET NO. 15

SUMMARY OF FMVSS 212 AND 219 (PARTIAL) DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

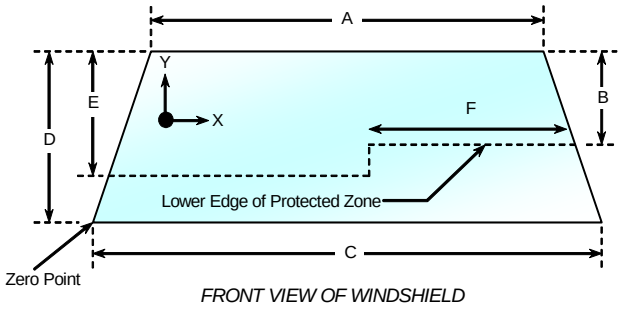
Windshield Mounting Details: Windshield glass is secured to the vehicle frame with rubber plastic and rubber molding sealed with rubber cement.

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

Temperature of windshield molding during test: 21.1° C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2287.5	2287.5	100.0%
Right Side	2287.5	2287.5	100.0%
Total	4575	4575	100.0%



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1300
B	mm	492
C	mm	1545
D	mm	865
E	mm	570
F	mm	525

AREAS OF PROTECTED ZONE FAILURES

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

X	Y

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

X	Y

DATA SHEET NO. 16

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10

FMVSS 301 FUEL SYSTEM INTEGRITY DATA

Temperature at Time of Impact: 23.3° C Test Time: 12:20 PM

Stoddard Solvent Spillage Measurements

A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable = 1 oz.)

B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable = 5 oz.)

C. For the following 25 minutes: 0 oz.
(Maximum allowable = 1 oz./minute)

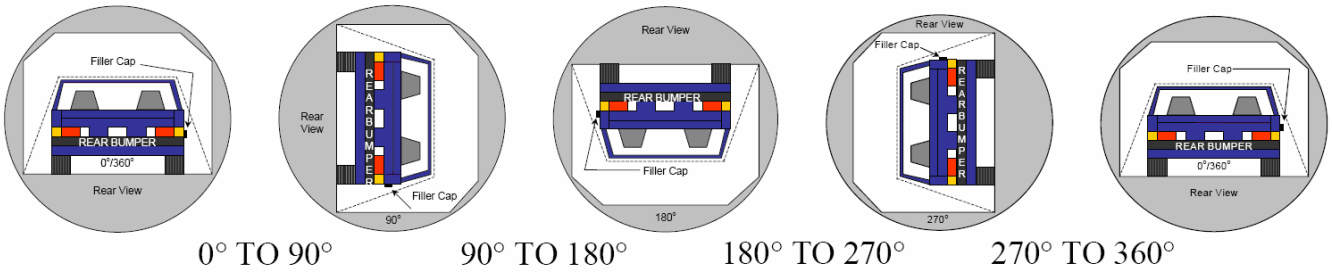
D. Spillage: No spillage occurred

DATA SHEET NO. 17

FMVSS 301 STATIC ROLLOVER

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10



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 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard solvent spillage: No spillage occurred

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° To 90°	85	300	385
90° To 180°	80	300	380
180° To 270°	79	300	379
270° To 360°	79	300	379

FMVSS 301 SPILLAGE TABLE

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

SOLVENT SPILLAGE LOCATION TABLE

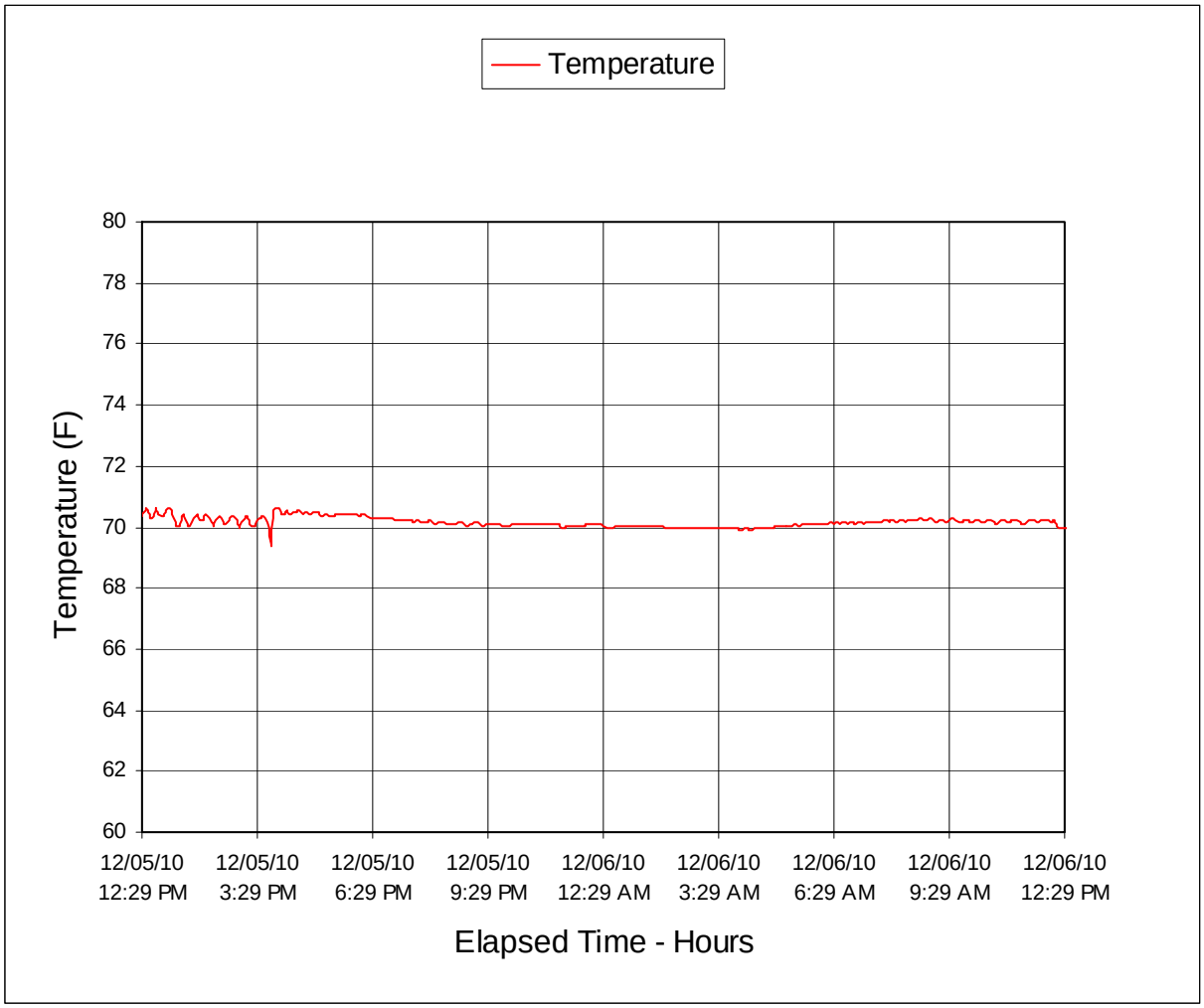
Test Phase	Spillage Location
0° To 90°	None
90° To 180°	None
180° To 270°	None
270° To 360°	None

DATA SHEET NO. 18

DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2011 Toyota Highlander 4x4 5-Door MPV NHTSA No.: MB5111

Test Program: 56 km/h Frontal Impact NCAP Test Test Date: 12/06/10



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS … (CONTINUED)

TABLE OF PHOTOGRAPHS … (CONTINUED)

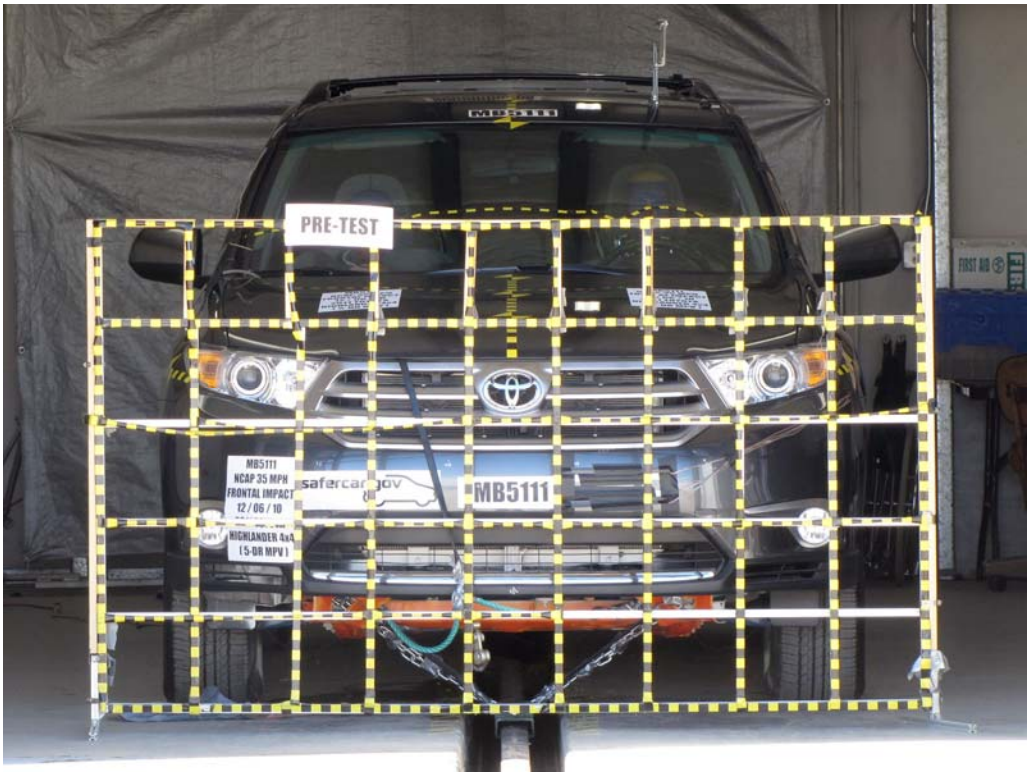


FIGURE 1. Load Cell Location

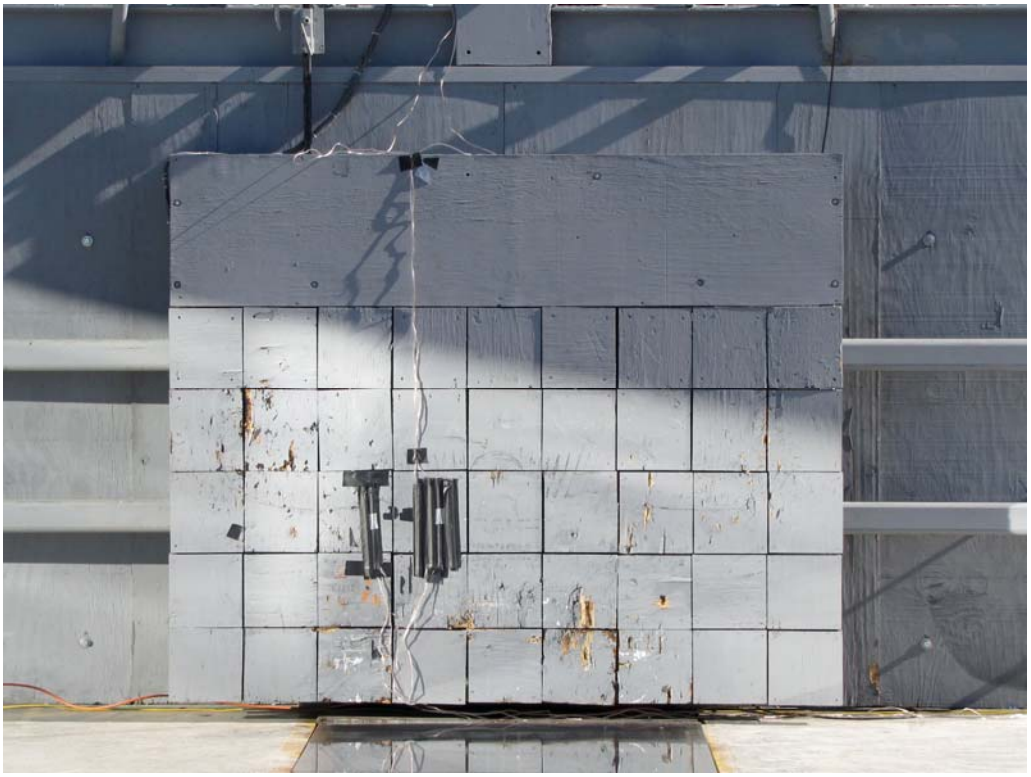


FIGURE 2. Load Cell Wall

FIGURE 3. Manufacturer's Label

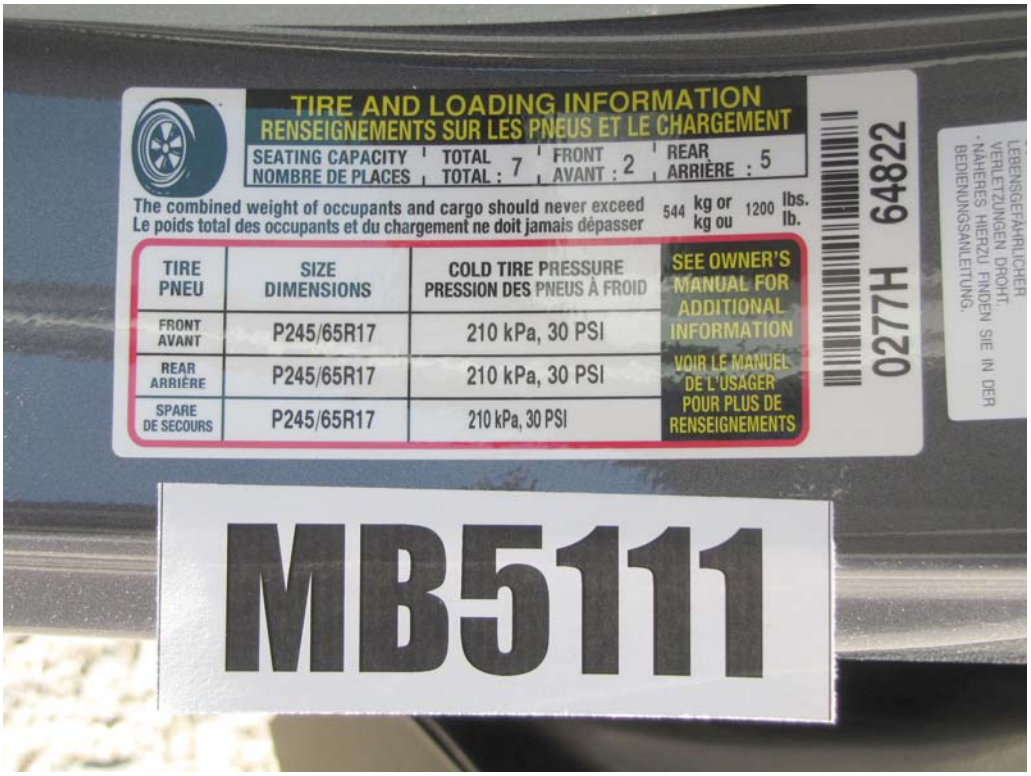


FIGURE 4. Tire Placard

FIGURE 5. Right Front ¾ View, As Received

FIGURE 6. Left Rear ¾ View of Vehicle, As Received

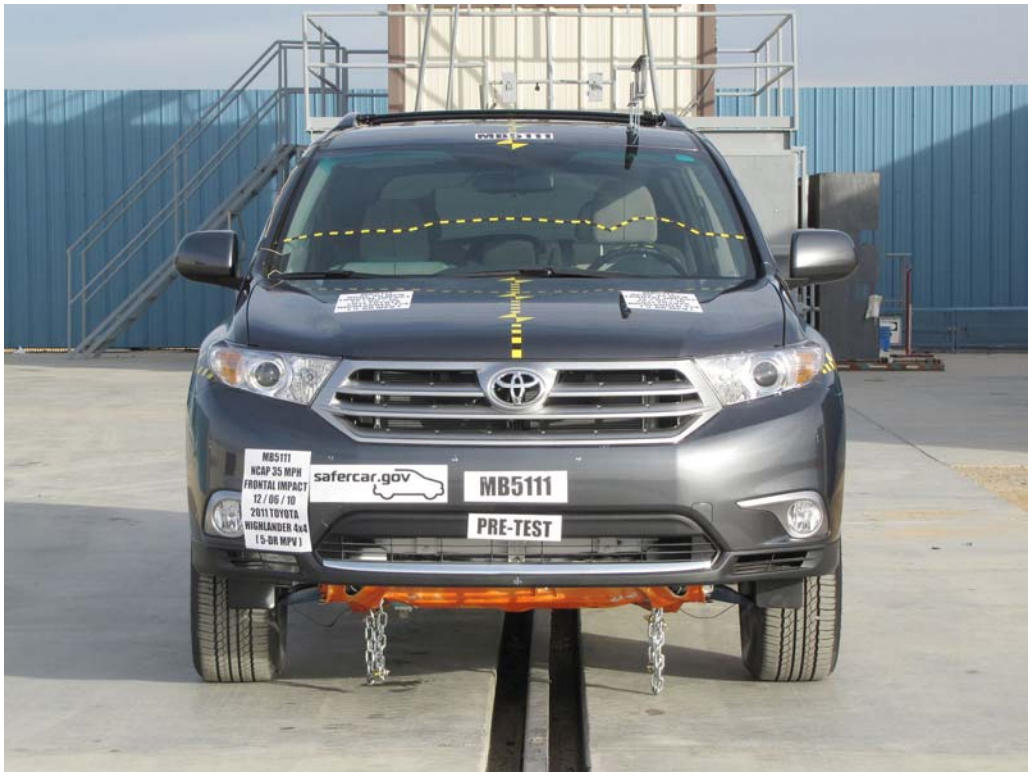


FIGURE 7. Pre-Test Front View of Test Vehicle

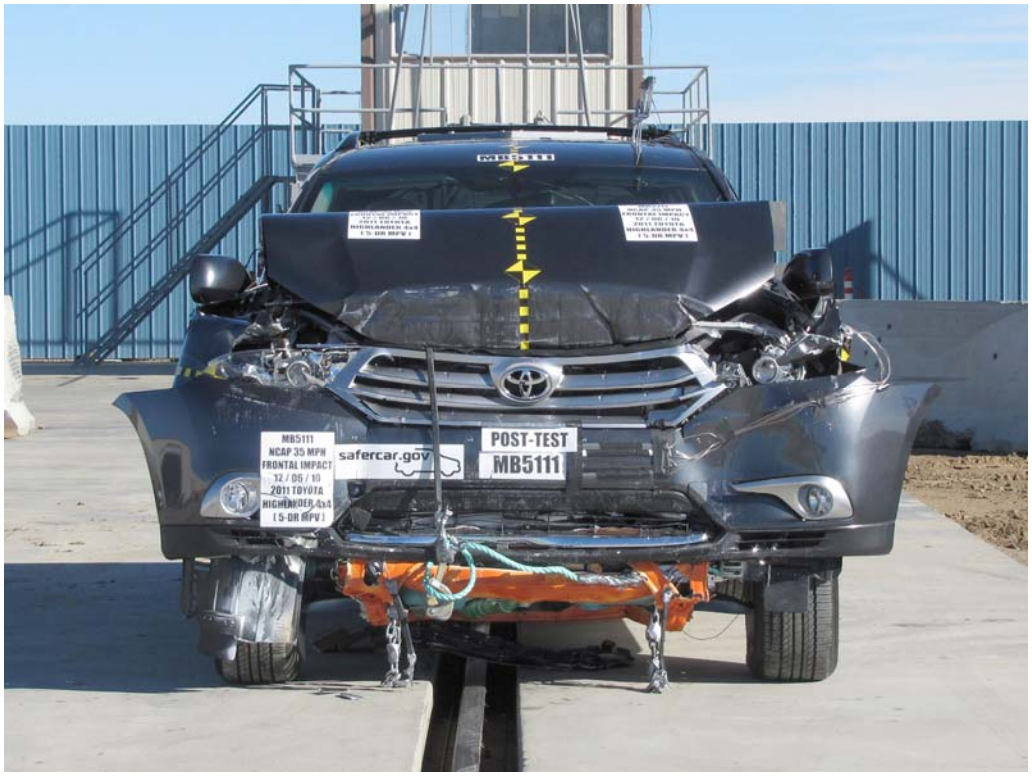


FIGURE 8. Post-Test Front View of Test Vehicle

FIGURE 9. Pre-Test Left View of Test Vehicle

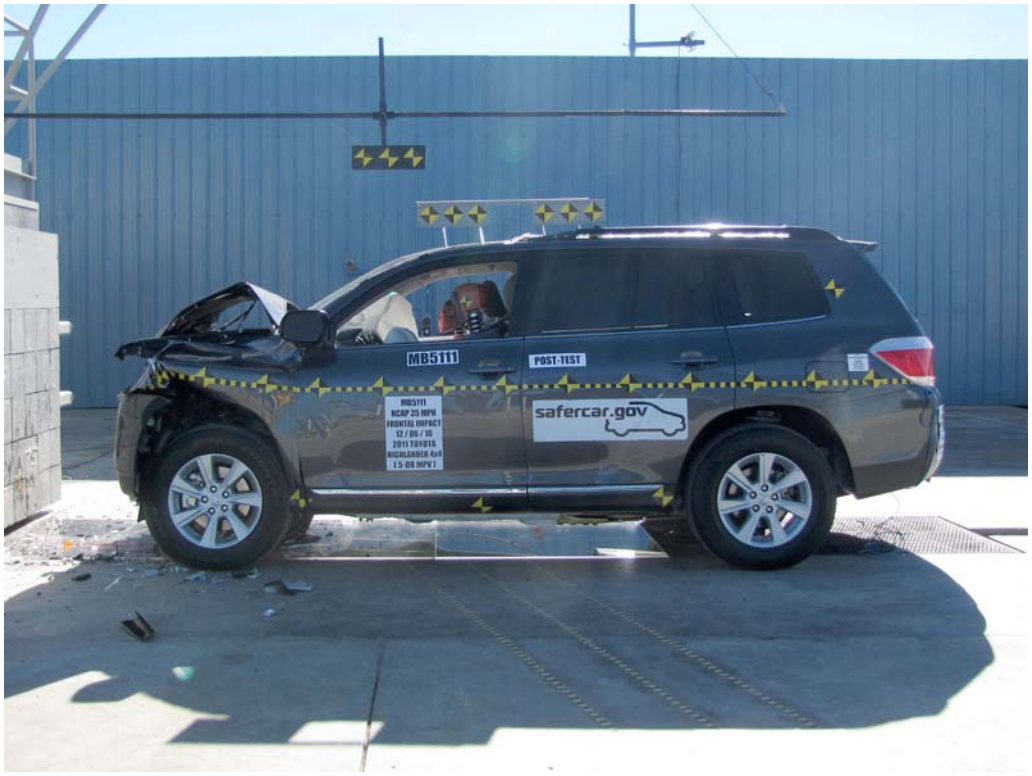


FIGURE 10. Post-Test Left View of Test Vehicle

FIGURE 11. Pre-Test Right View of Test Vehicle

FIGURE 12. Post-Test Right View of Test Vehicle

FIGURE 13. Pre-Test Right Front ¾ View

FIGURE 14. Post-Test Right Front ¾ View

FIGURE 15. Pre-Test Left Rear ¾ View

FIGURE 16. Post-Test Left Rear ¾ View

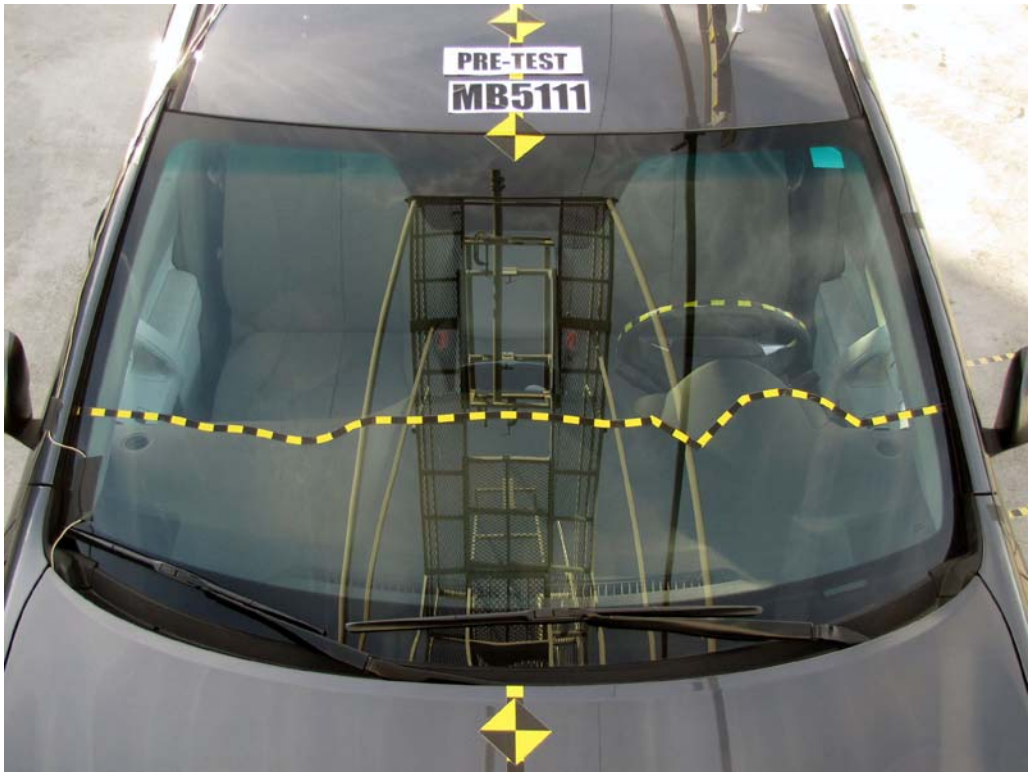


FIGURE 17. Pre-Test Windshield View

FIGURE 18. Post-Test Windshield View

FIGURE 19. Pre-Test Engine Compartment View

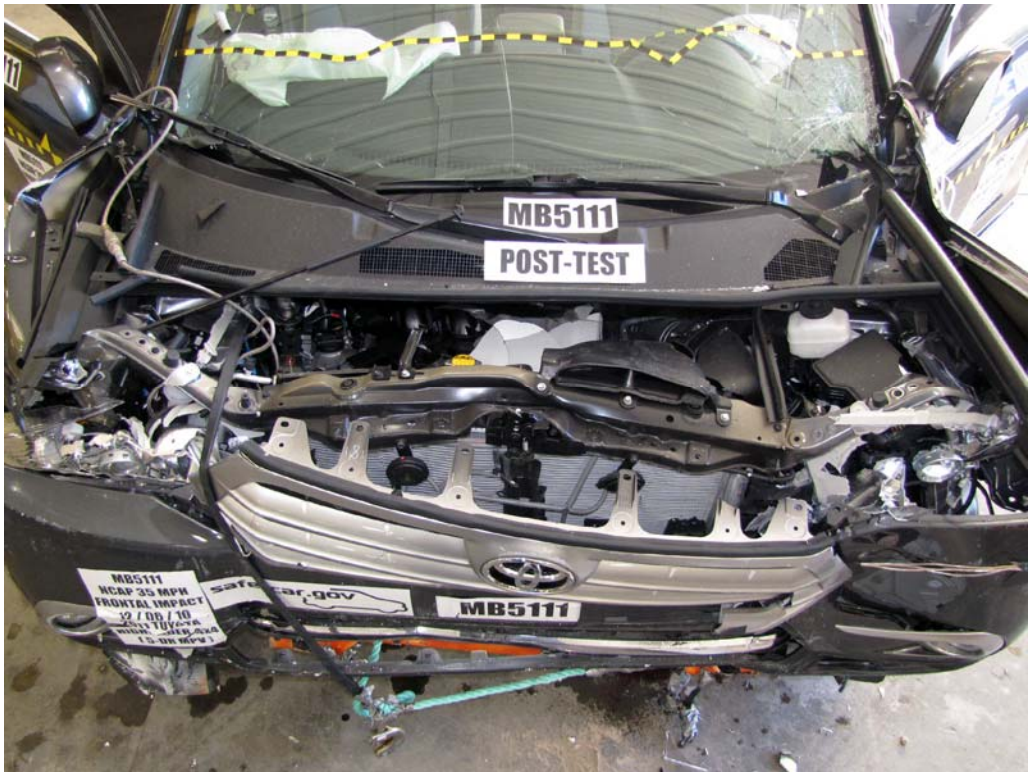


FIGURE 20. Post-Test Engine Compartment View

FIGURE 21. Pre-Test Fuel Filler Cap View

FIGURE 22. Post-Test Fuel Filler Cap View

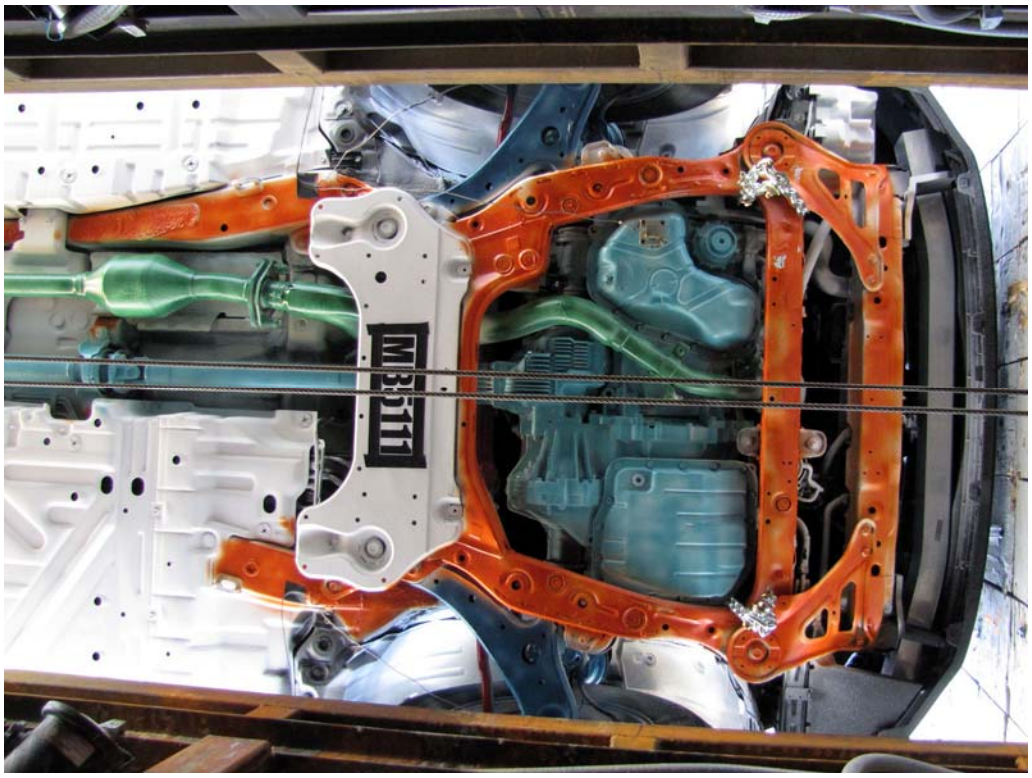


FIGURE 23. Pre-Test Front Underbody View

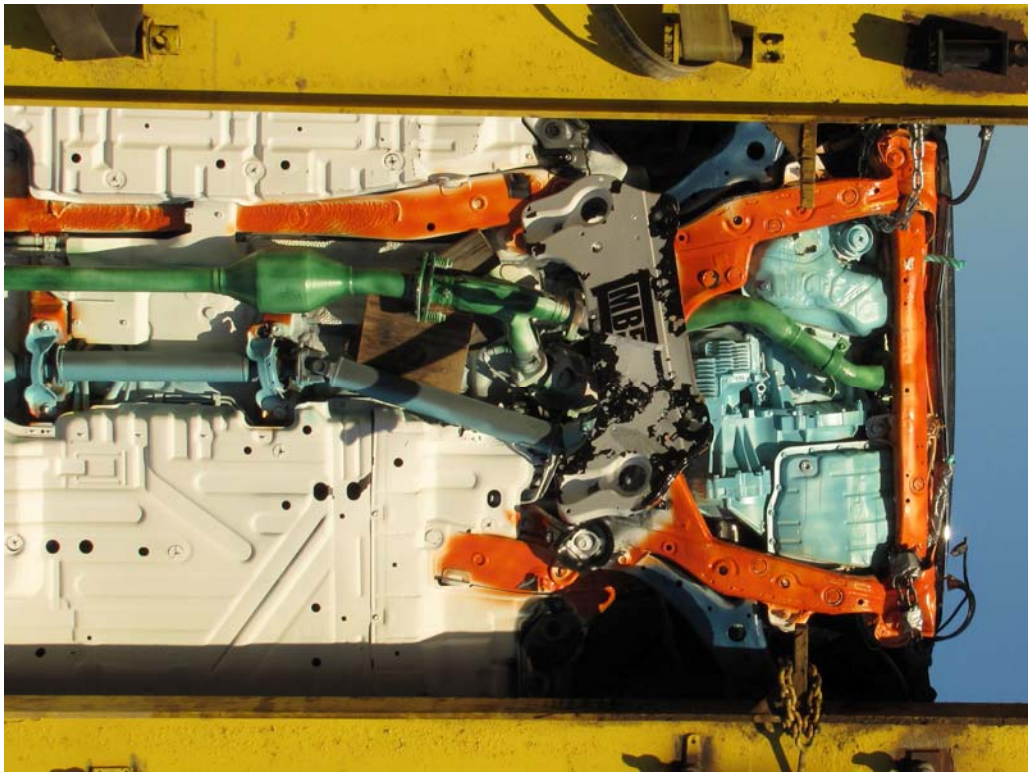


FIGURE 24. Post-Test Front Underbody View

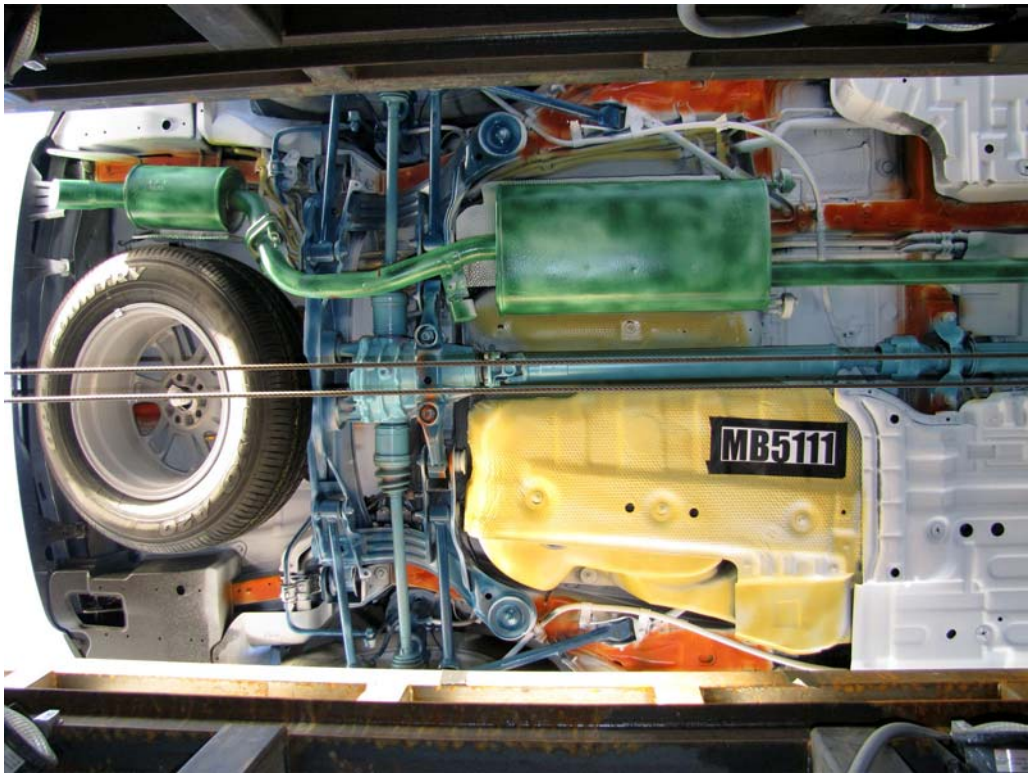


FIGURE 25. Pre-Test Rear Underbody View

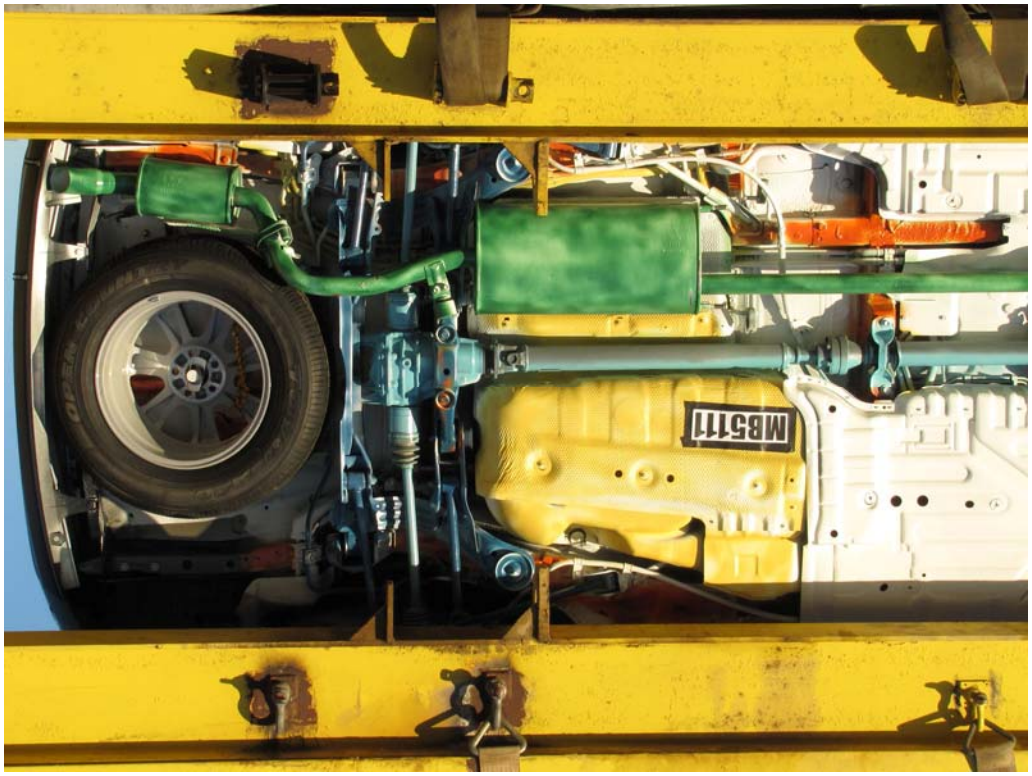


FIGURE 26. Post-Test Rear Underbody View

FIGURE 27. Pre-Test Dummy Cable Routing

FIGURE 28. Post-Test Dummy Cable Routing

FIGURE 29. Pre-Test Driver Dummy Front View

FIGURE 30. Post-Test Driver Dummy Front View

FIGURE 31. Pre-Test Driver Dummy Window View

FIGURE 32. Post-Test Driver Dummy Window View

FIGURE 33. Pre-Test Driver Dummy and Vehicle Interior View

FIGURE 34. Post-Test Driver Dummy and Vehicle Interior View

FIGURE 35. Pre-Test Driver's Seat Fore-Aft Markings

FIGURE 36. Post-Test Driver's Seat Fore-Aft Markings

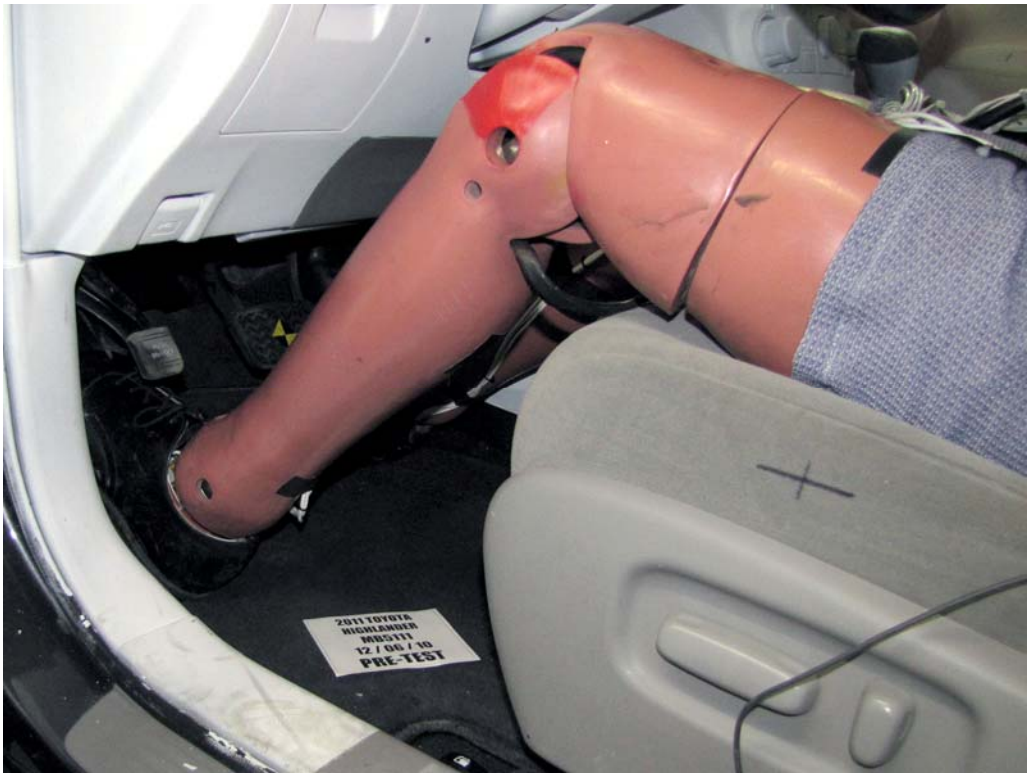


FIGURE 37. Pre-Test Driver Dummy Feet

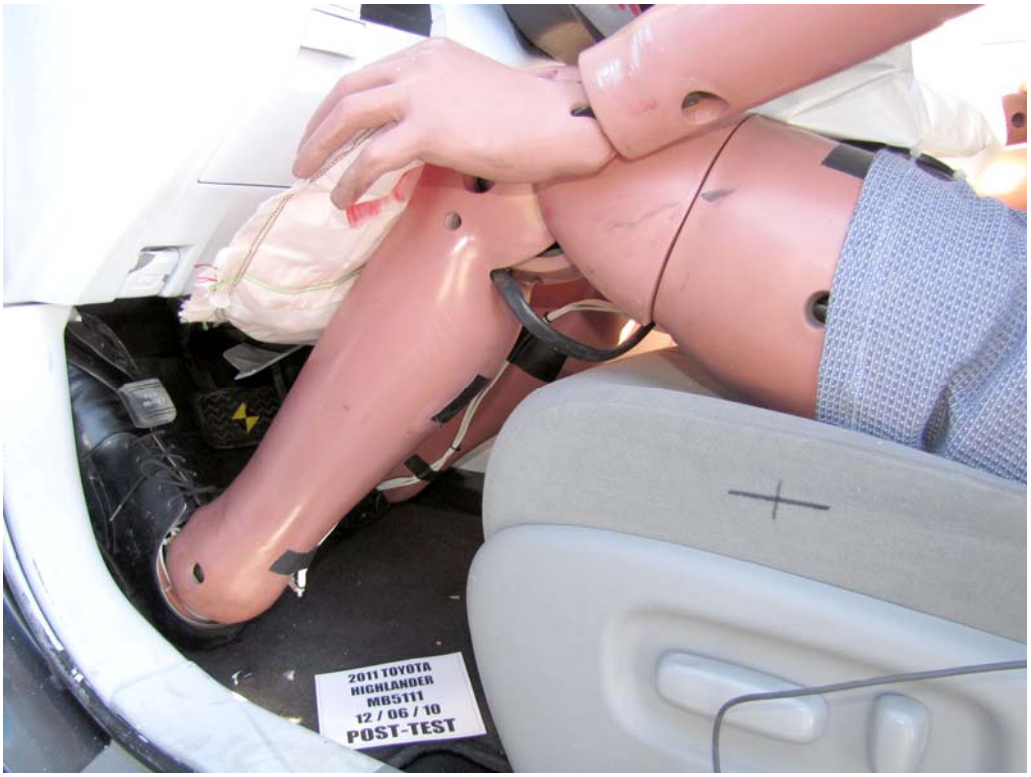


FIGURE 38. Post-Test Driver Dummy Feet

FIGURE 39. Pre-Test Driver's Side Knee Bolster

FIGURE 40. Post-Test Driver's Side Knee Bolster

FIGURE 41. Pre-Test Driver's Side Floorpan

FIGURE 42. Post-Test Driver's Side Floorpan

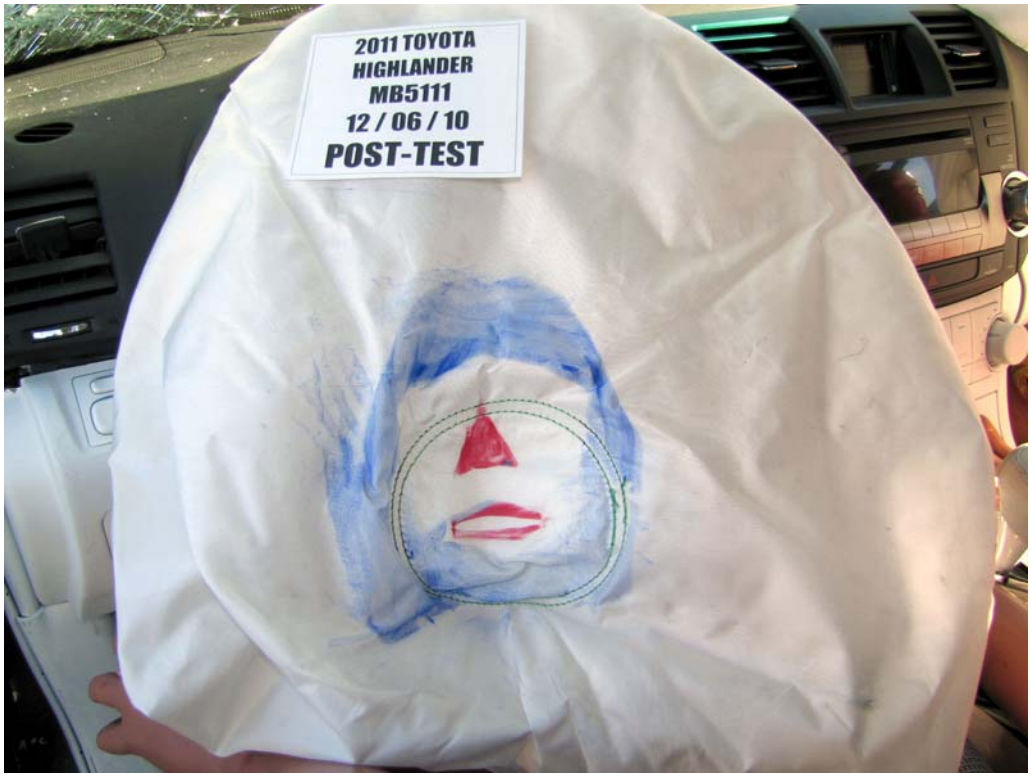


FIGURE 43. Post-Test Driver Dummy Contact With Airbag

FIGURE 43a. Post-Test Driver Dummy Contact With Head Restraint

FIGURE 43b. Post-Test Driver Dummy Contact With Knee Airbag

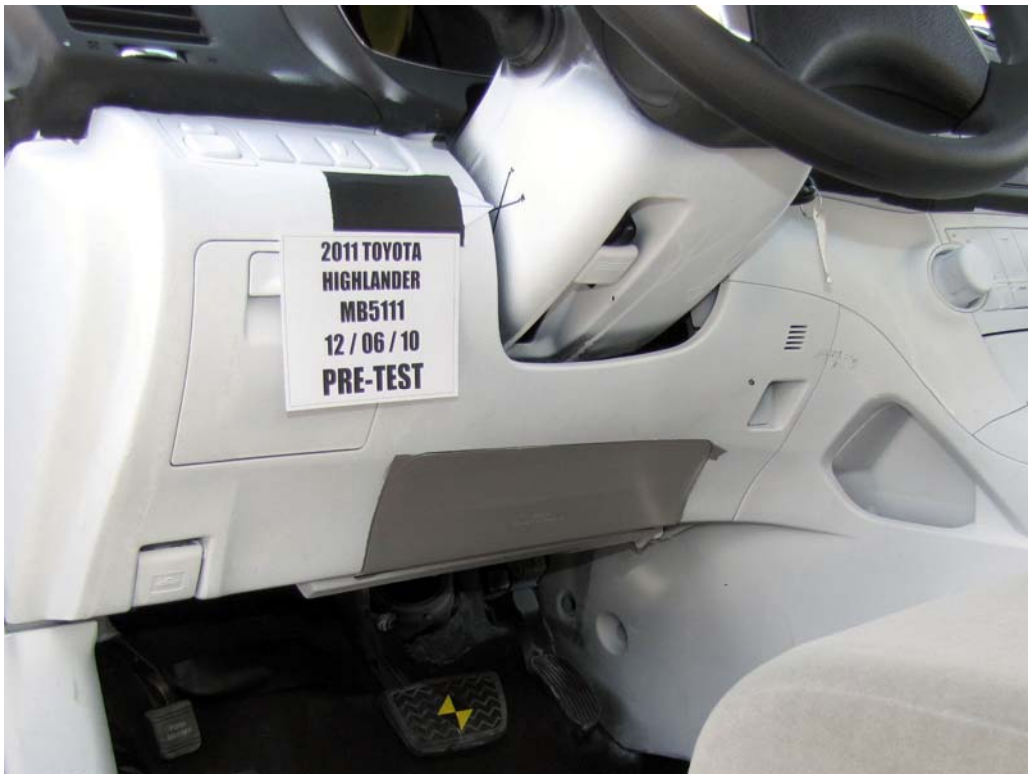


FIGURE 44. Pre-Test View of Steering Column Shear Capsule

FIGURE 45. Post-Test View of Steering Column Shear Capsule

FIGURE 46. Pre-Test Passenger Dummy Front View

FIGURE 47. Post-Test Passenger Dummy Front View

FIGURE 48. Pre-Test Passenger Dummy Window View

FIGURE 49. Post-Test Passenger Dummy Window View

FIGURE 50. Pre-Test Passenger Dummy and Vehicle Interior View

FIGURE 51. Post-Test Passenger Dummy and Vehicle Interior View

FIGURE 52. Pre-Test Passenger's Seat Fore-Aft Markings

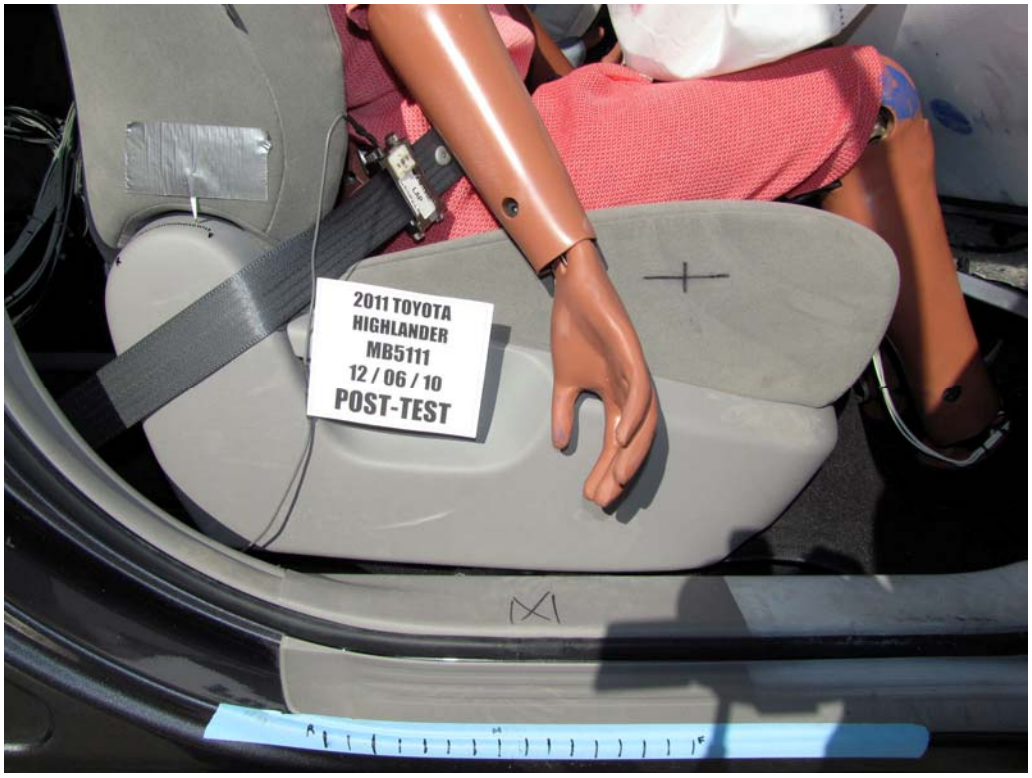


FIGURE 53. Post-Test Passenger's Seat Fore-Aft Markings

FIGURE 54. Pre-Test Passenger Dummy Feet

FIGURE 55. Post-Test Passenger Dummy Feet

FIGURE 56. Pre-Test Passenger's Side Knee Bolster

FIGURE 57. Post-Test Passenger's Side Knee Bolster

FIGURE 58. Pre-Test Passenger's Side Floorpan

FIGURE 59. Post-Test Passenger's Side Floorpan

FIGURE 60. Post-Test Passenger Dummy Contact With Airbag

FIGURE 60a. Post-Test Passenger Dummy Contact With Head Restraint

FIGURE 60b. Post-Test Passenger Dummy Contact With Glovebox

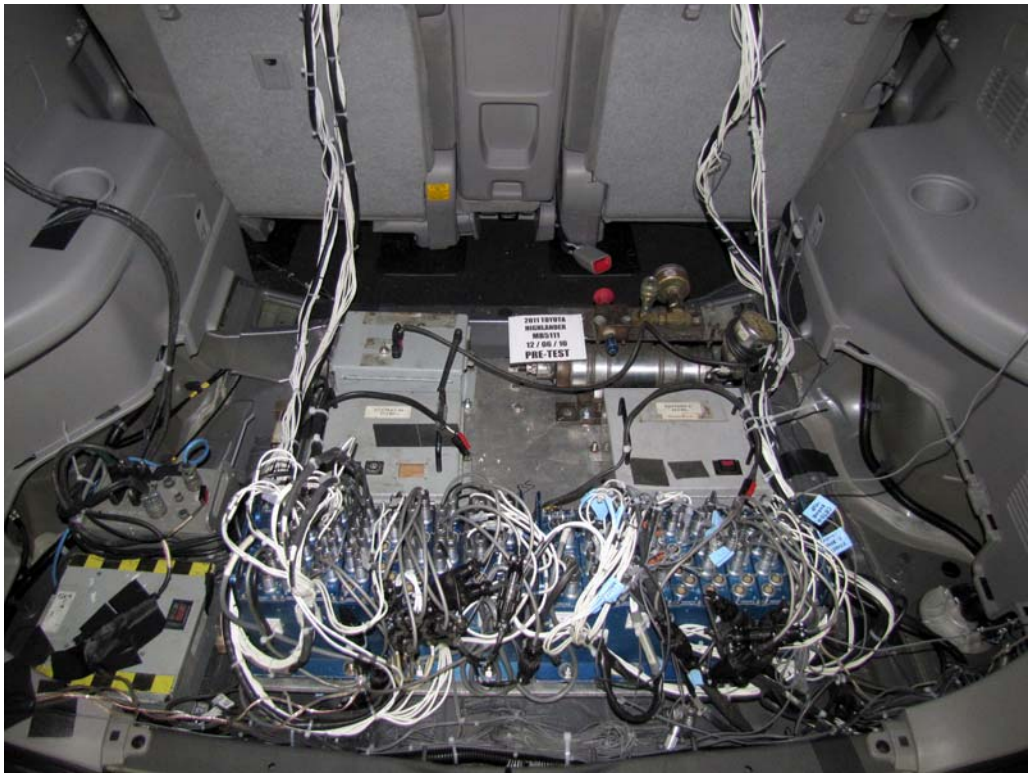


FIGURE 61. Pre-Test of Ballast Installed in Vehicle

Photograph Not Applicable

No Stoddard
Solvent Spillage

FIGURE 62. Post-Test Stoddard Solvent Spillage Location

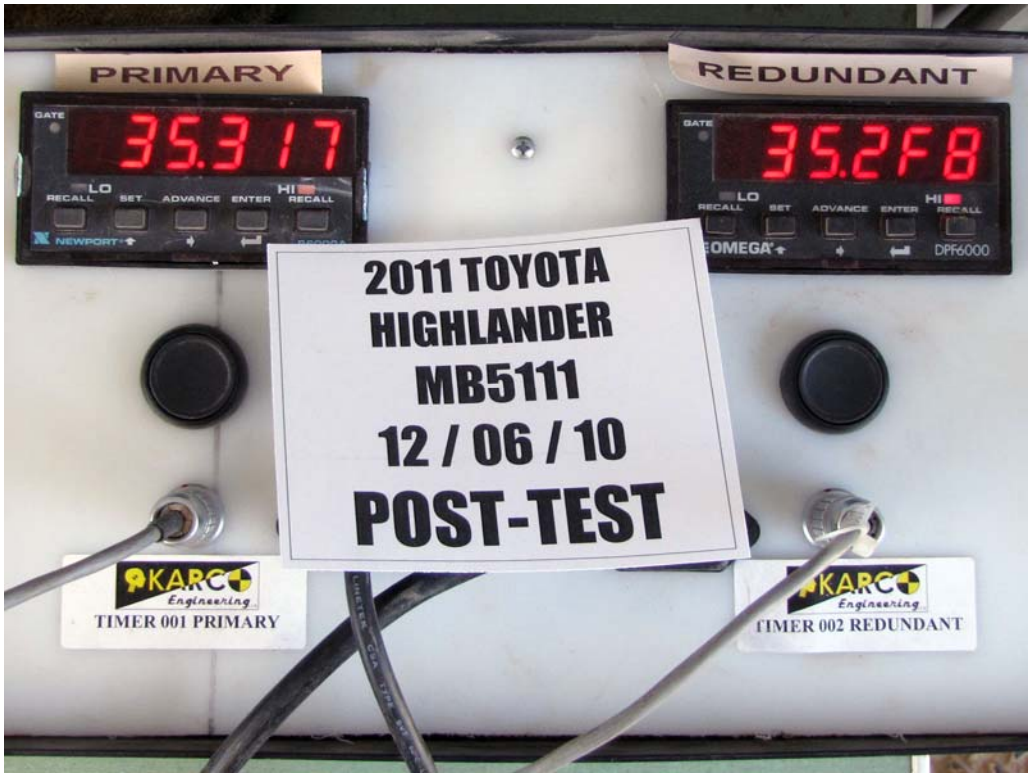


FIGURE 63. Post-Test Speed Trap Read Out

FIGURE 64. Vehicle at 0° on Static Rollover Device

FIGURE 65. Vehicle at 90° on Static Rollover Device

FIGURE 66. Vehicle at 180° on Static Rollover Device

FIGURE 67. Vehicle at 270° on Static Rollover Device

FIGURE 68. Vehicle at 360° on Static Rollover Device

FIGURE 69. Impact Photograph

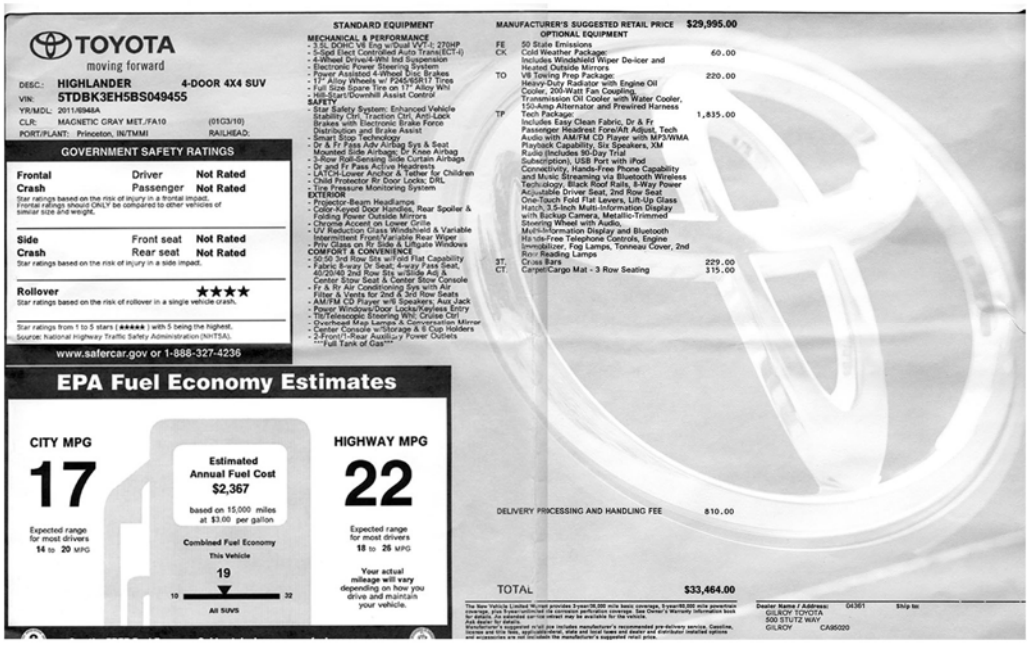


FIGURE 70. Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

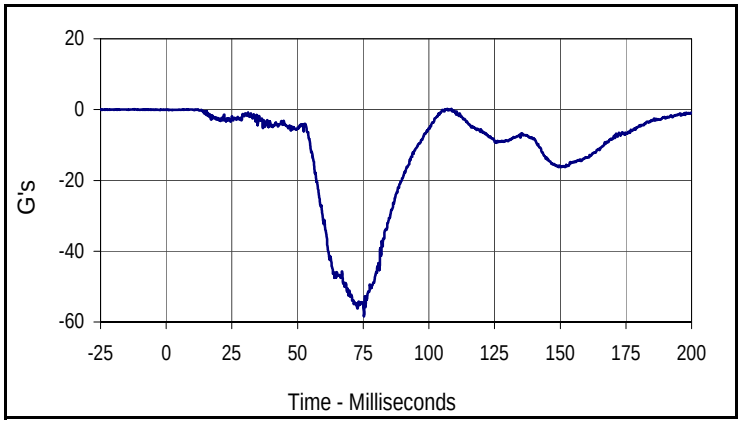
TABLE OF DATA PLOTS

The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

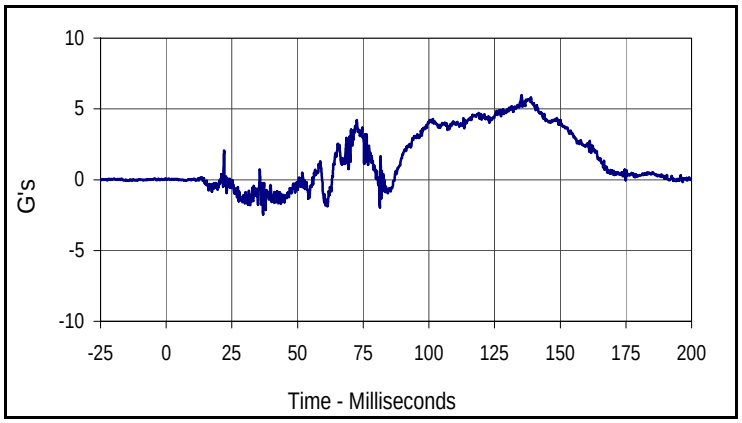
Driver Head X Acceleration Redundant
Driver Head Y Acceleration Redundant
Driver Head Z Acceleration Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Shoulder Belt Force
Driver Lap Belt Force
Driver Left Upper Tibia Moment X
Driver Left Upper Tibia Moment Y
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Fore Z
Driver Left Foot Aft X
Driver Left Foot Aft Z
Driver Right Foot Fore Z
Driver Right Foot Aft X
Driver Right Foot Aft Z
Passenger Head X Acceleration Redundant

Passenger Head Y Acceleration Redundant
Passenger Head Z Acceleration Redundant
Passenger Upper Neck Force X
Passenger Upper Neck Force Z
Passenger Upper Neck Moment Y
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Shoulder Belt Force
Passenger Lap Belt Force
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Food Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Vehicle Engine Top X

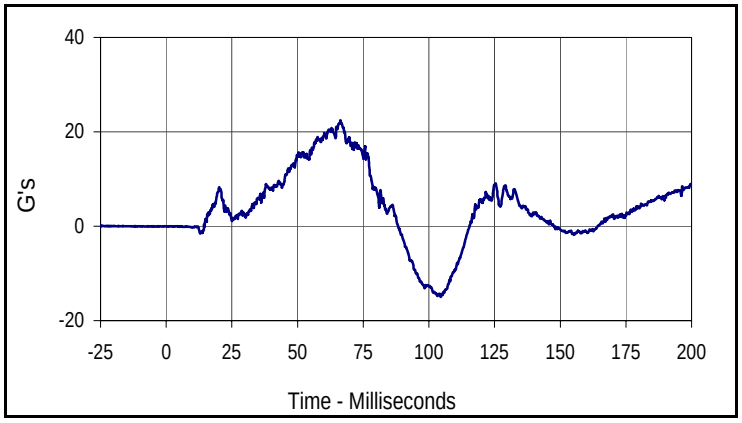
Test Vehicle:	2011 Toyota Highlander 4X4 5-Door MPV	Test Date:	12/6/10
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MB5111



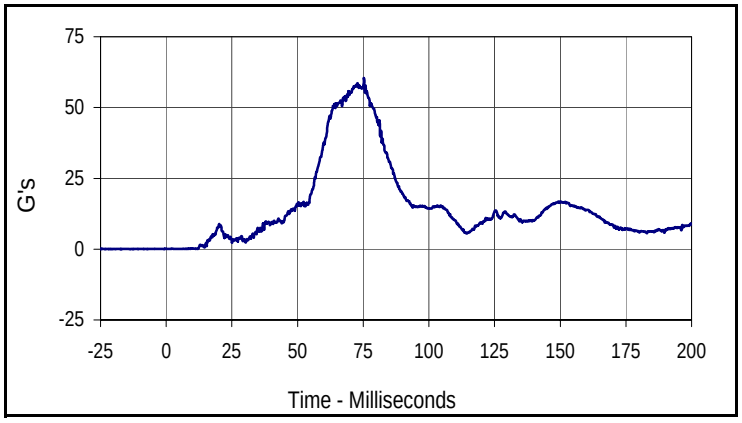
Curve Description			
Driver Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
001	FIL	1000	G's
Max	Time	Min	Time
0.2	107.0	-58.3	75.3



Curve Description			
Driver Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
6.0	135.3	-2.5	36.9

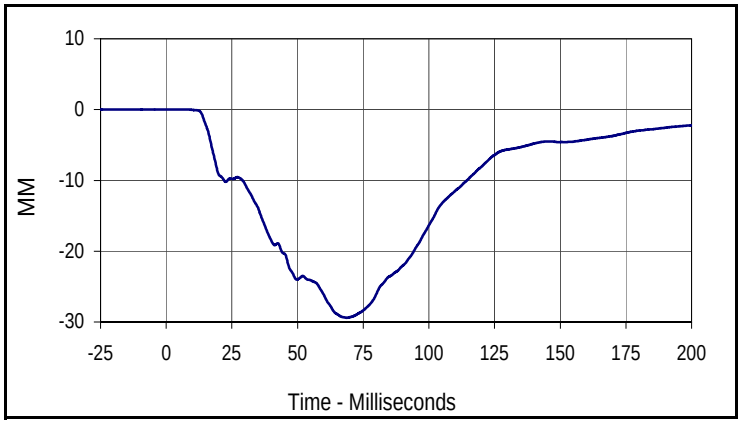


Curve Description			
Driver Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
003	FIL	1000	G's
Max	Time	Min	Time
22.5	66.4	-15.0	104.5

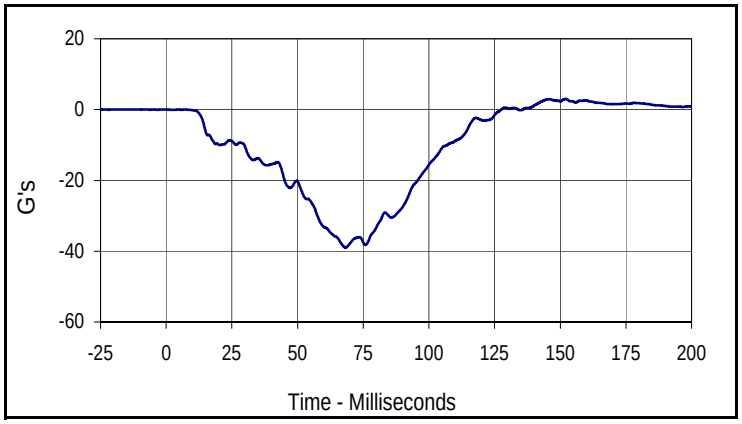


Curve Description			
Driver Head Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
60.4	75.3	0.0	8.2

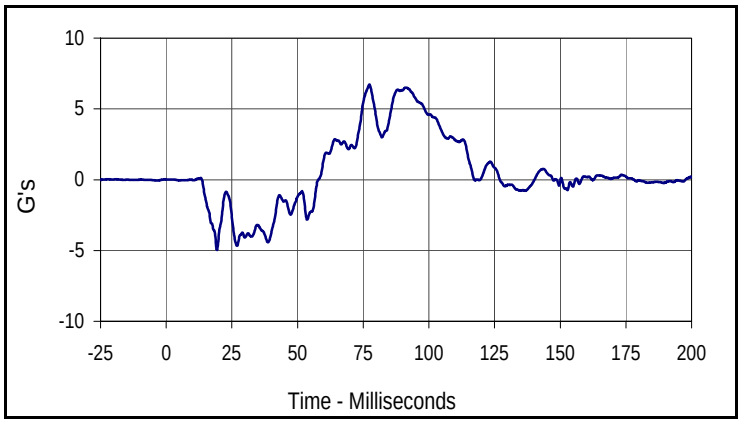
Test Vehicle:	2011 Toyota Highlander 4X4 5-Door MPV	Test Date:	12/6/10
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MB5111



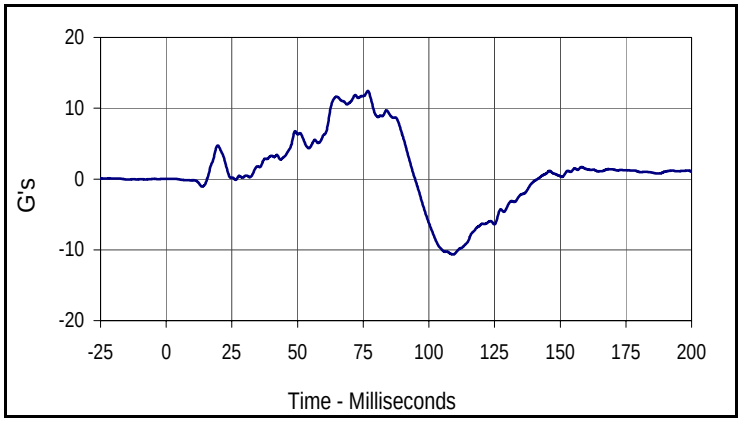
Curve Description			
Driver Chest Deflection			
CURNO	Type	SAE Class	Units
019	FIL	180	MM
Max	Time	Min	Time
0.0	4.5	-29.4	68.7



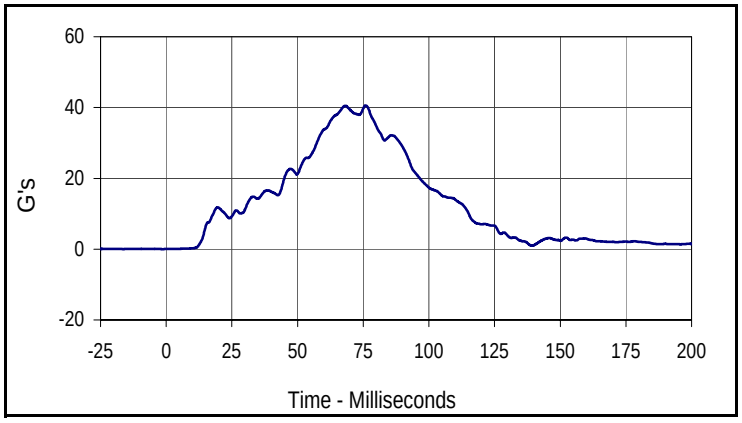
Curve Description			
Driver Chest Acceleration X Primary			
CURNO	Type	SAE Class	Units
013	FIL	180	G's
Max	Time	Min	Time
3.0	151.9	-39.0	68.3



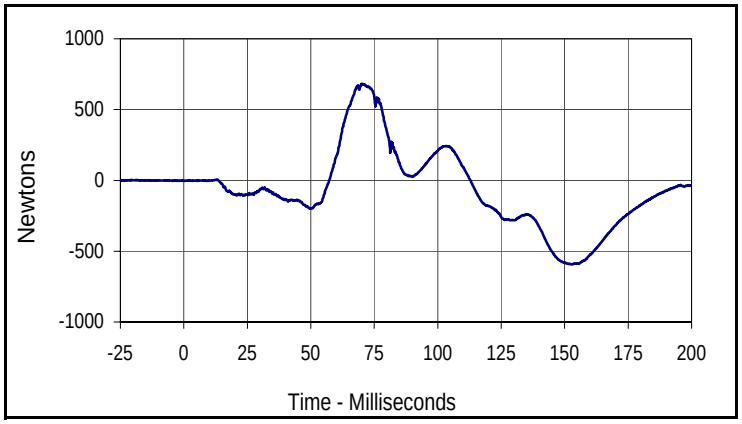
Curve Description			
Driver Chest Acceleration Y Primary			
CURNO	Type	SAE Class	Units
014	FIL	180	G's
Max	Time	Min	Time
6.7	77.4	-5.0	19.3



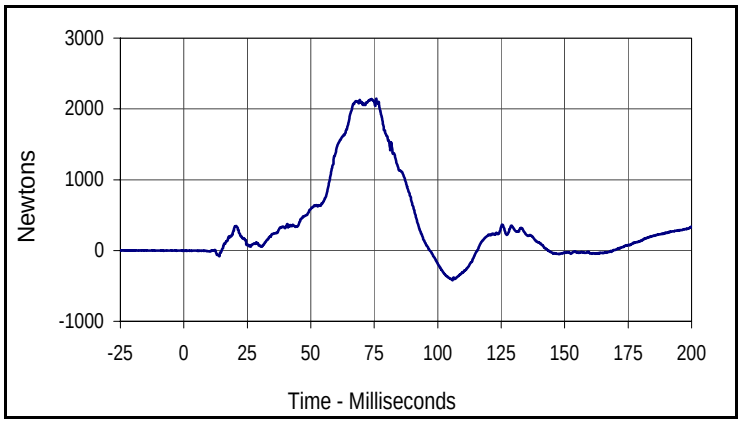
Curve Description			
Driver Chest Acceleration Z Primary			
CURNO	Type	SAE Class	Units
015	FIL	180	G's
Max	Time	Min	Time
12.4	76.8	-10.6	109.2



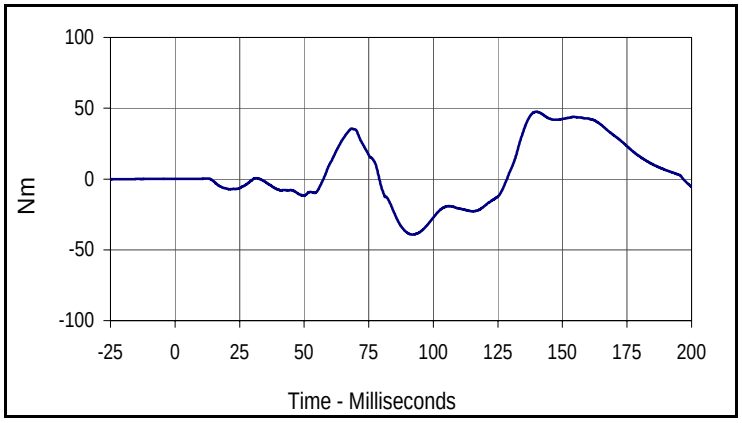
Curve Description			
Driver Chest Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
013	RES	180	G's
Max	Time	Min	Time
40.5	75.9	0.0	0.5



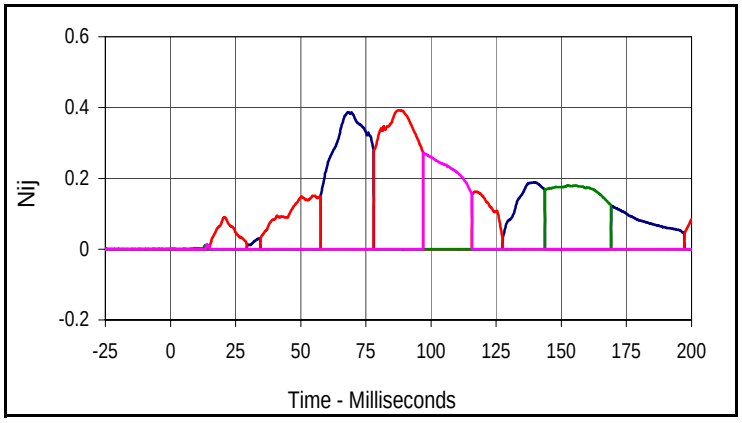
Curve Description			
Driver Upper Neck Force X			
CURNO	Type	SAE Class	Units
007	FIL	1000	Newtons
Max	Time	Min	Time
681.9	70.4	-593.5	152.7



Curve Description			
Driver Upper Neck Force Z			
CURNO	Type	SAE Class	Units
009	FIL	1000	Newtons
Max	Time	Min	Time
2143.7	75.8	-423.3	105.8

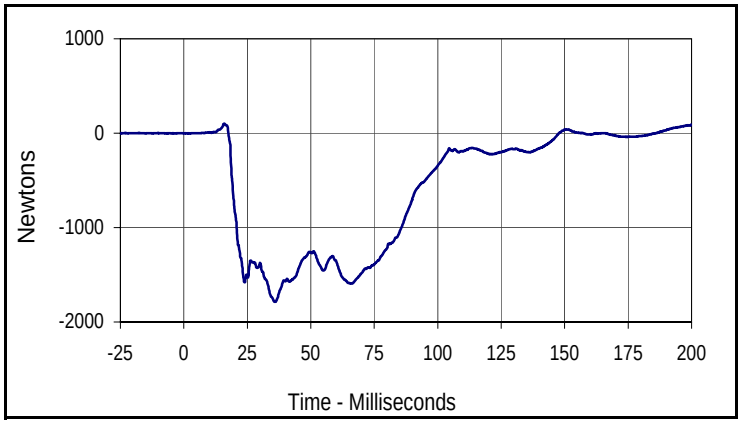


Curve Description			
Driver Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
011	FIL	600	Nm
Max	Time	Min	Time
47.5	139.8	-39.2	91.9

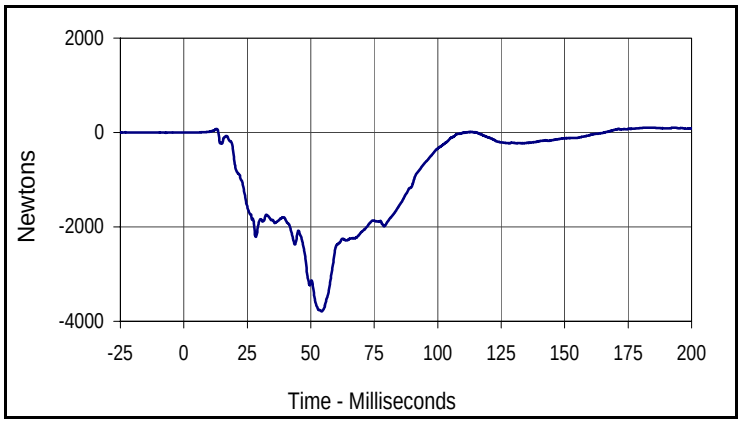


Curve Description			
Driver Nij			
Units	Type	Max	Time
Ntf	FIL	0.39	69.4
Units	Type	Max	Time
Nte	FIL	0.39	87.7
Units	Type	Max	Time
Ncf	FIL	0.18	152.6
Units	Type	Max	Time
Nce	FIL	0.27	97.0

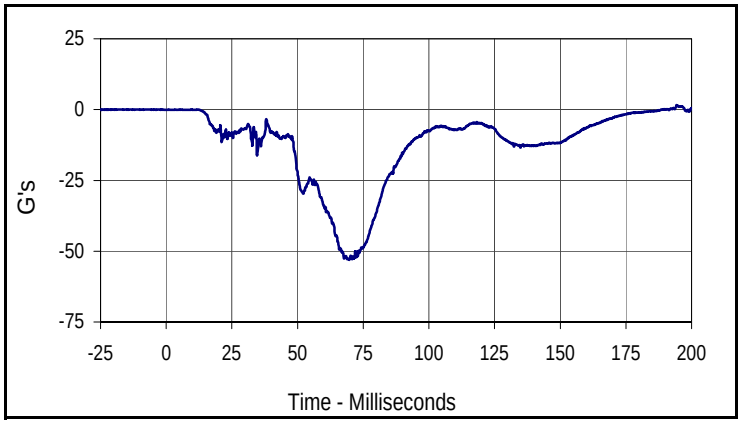
Test Vehicle:	2011 Toyota Highlander 4X4 5-Door MPV	Test Date:	12/6/10
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MB5111



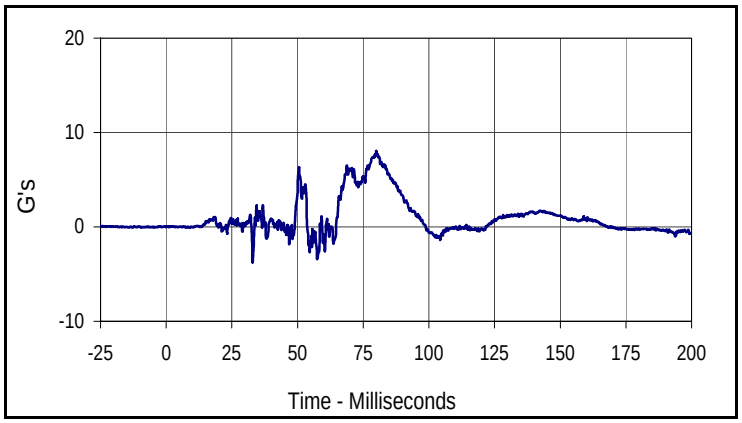
Curve Description			
Driver Left Femur Force Z			
CURNO	Type	SAE Class	Units
023	FIL	600	Newtons
Max	Time	Min	Time
101.9	15.9	-1787.5	35.9



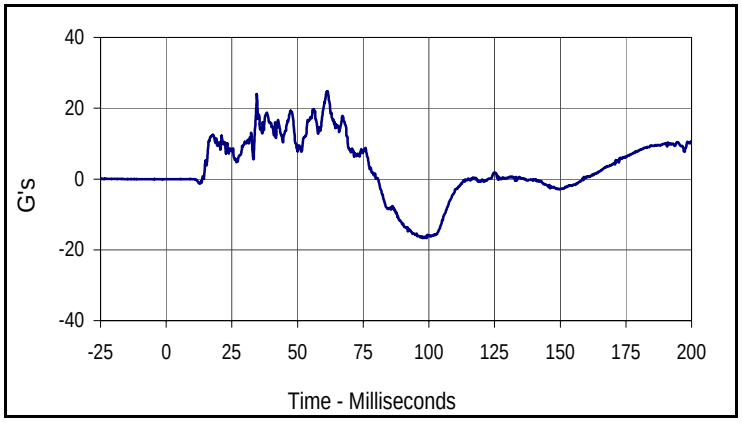
Curve Description			
Driver Right Femur Force Z			
CURNO	Type	SAE Class	Units
024	FIL	600	Newtons
Max	Time	Min	Time
104.7	182.6	-3792.0	54.3



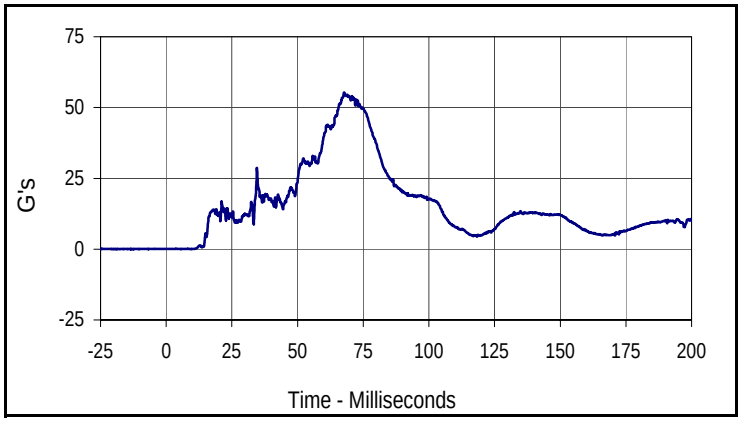
Curve Description			
Passenger Head Acceleration X Primary			
CURNO	Type	SAE Class	Units
045	FIL	1000	G's
Max	Time	Min	Time
1.6	194.3	-53.1	69.7



Curve Description			
Passenger Head Acceleration Y Primary			
CURNO	Type	SAE Class	Units
046	FIL	1000	G's
Max	Time	Min	Time
8.1	80.0	-3.8	32.9

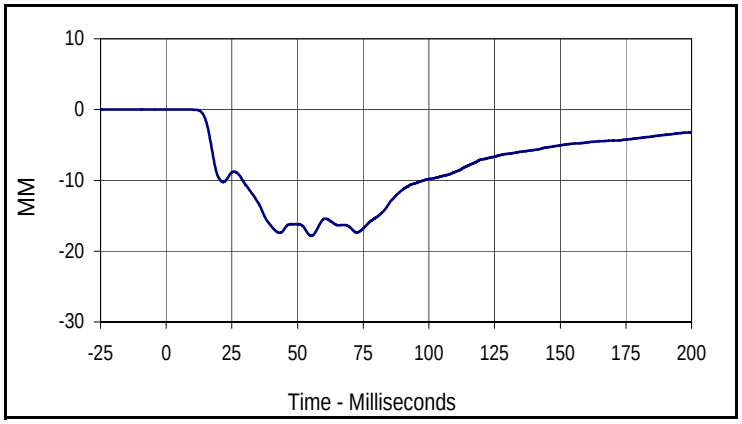


Curve Description			
Passenger Head Acceleration Z Primary			
CURNO	Type	SAE Class	Units
047	FIL	1000	G's
Max	Time	Min	Time
24.8	61.4	-16.7	99.1

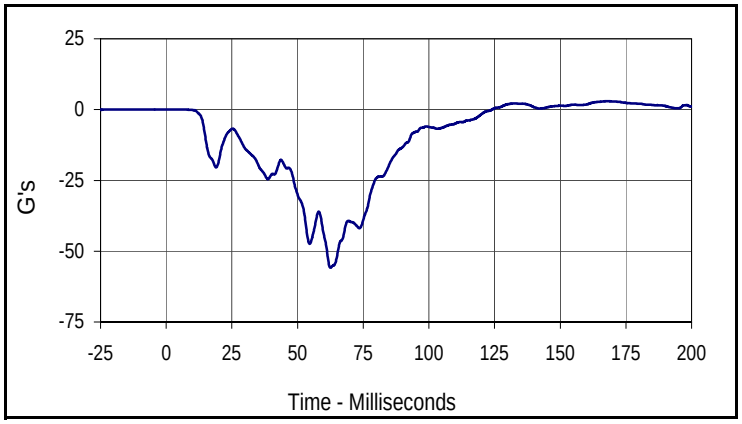


Curve Description			
Passenger Head Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
045	RES	1000	G's
Max	Time	Min	Time
55.3	67.7	0.0	5.7

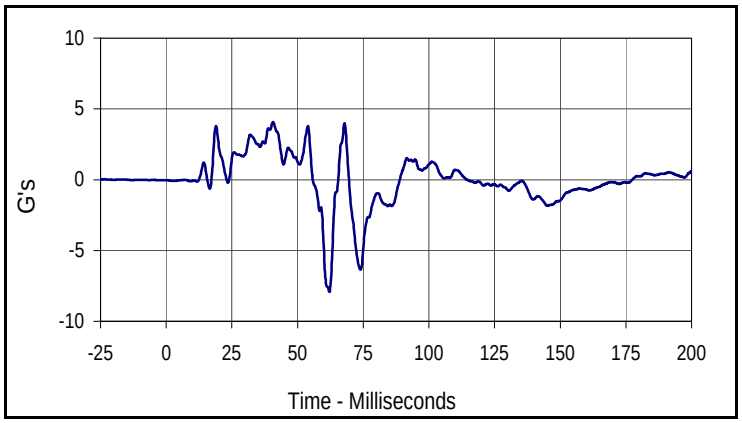
Test Vehicle:	2011 Toyota Highlander 4X4 5-Door MPV	Test Date:	12/6/10
Test Program:	56 km/h (35 mph) Frontal Impact NCAP Rigid Barrier Test	NHTSA No.:	MB5111



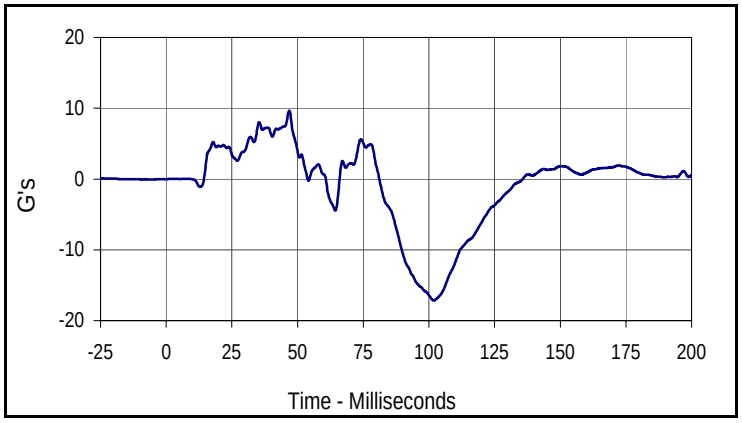
Curve Description			
Passenger Chest Deflection			
CURNO	Type	SAE Class	Units
063	FIL	180	MM
Max	Time	Min	Time
0.0	1.7	-17.8	55.2



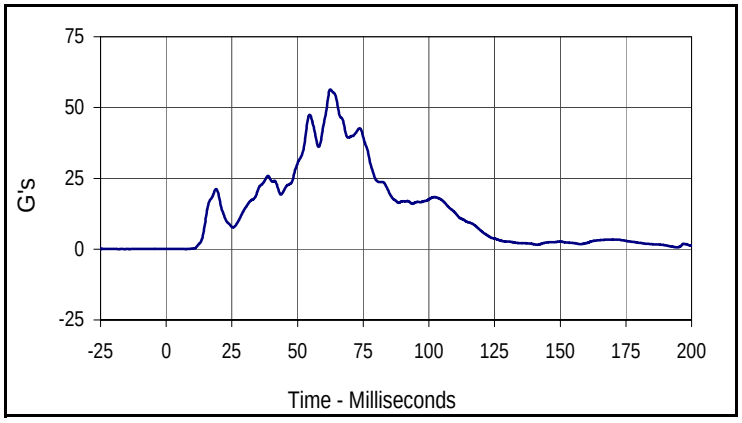
Curve Description			
Passenger Chest Acceleration X Primary			
CURNO	Type	SAE Class	Units
057	FIL	180	G's
Max	Time	Min	Time
3.0	167.7	-55.8	62.5



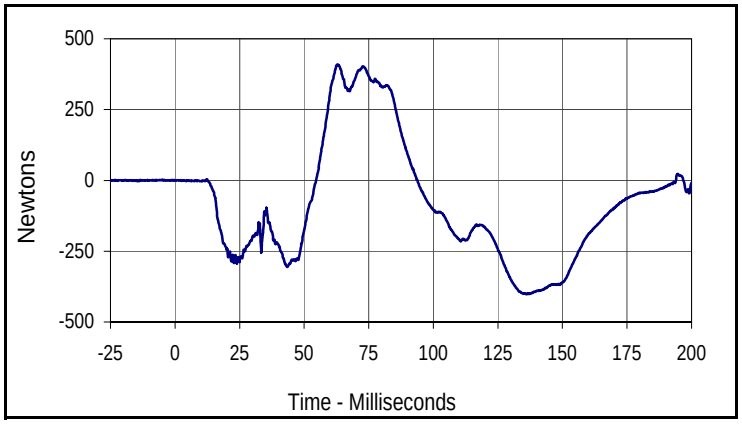
Curve Description			
Passenger Chest Acceleration Y Primary			
CURNO	Type	SAE Class	Units
058	FIL	180	G's
Max	Time	Min	Time
4.1	40.7	-7.9	62.1



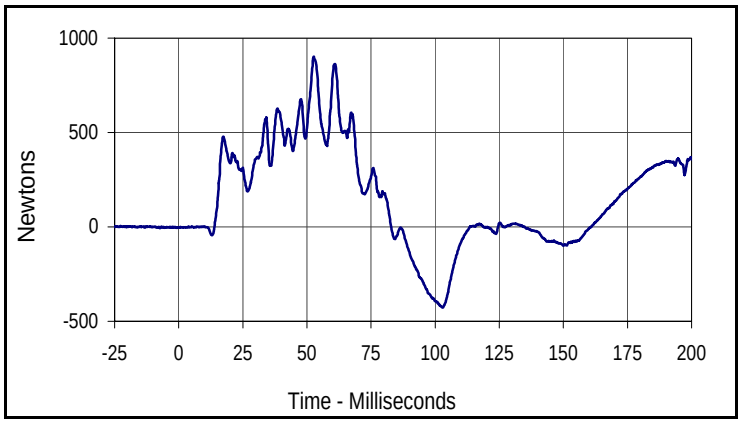
Curve Description			
Passenger Chest Acceleration Z Primary			
CURNO	Type	SAE Class	Units
059	FIL	180	G's
Max	Time	Min	Time
9.7	46.8	-17.1	101.9



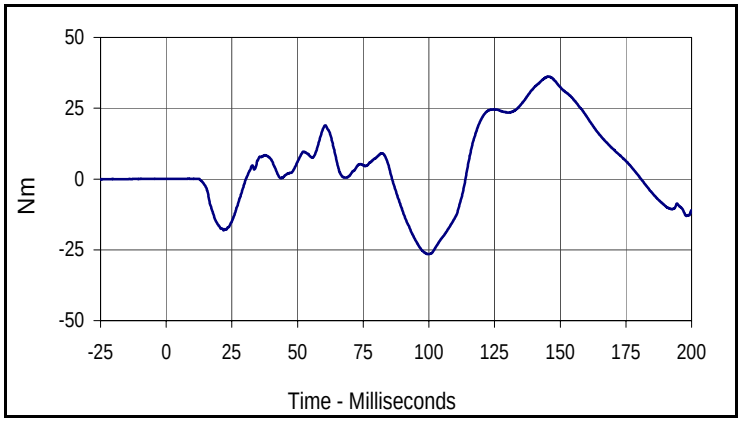
Curve Description			
Passenger Chest Resultant Acceleration Primary			
CURNO	Type	SAE Class	Units
057	RES	180	G's
Max	Time	Min	Time
56.4	62.4	0.0	7.6



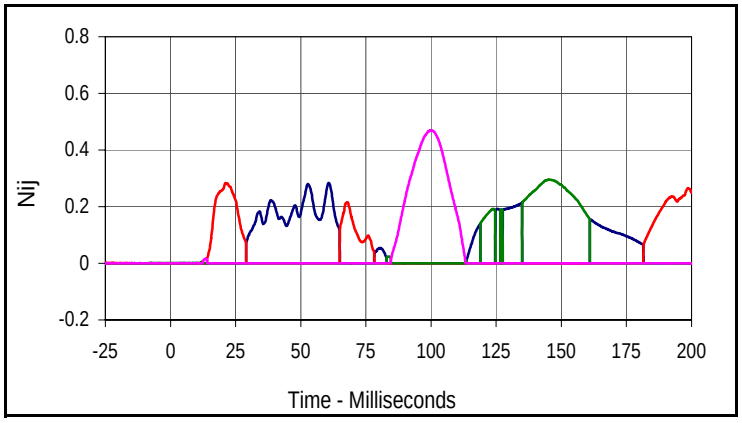
Curve Description			
Passenger Upper Neck Force X			
CURNO	Type	SAE Class	Units
051	FIL	1000	Newtons
Max	Time	Min	Time
409.5	62.9	-402.0	135.9



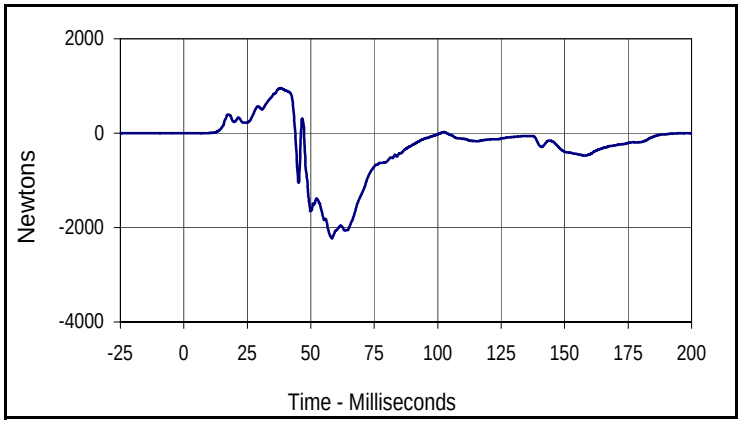
Curve Description			
Passenger Upper Neck Force Z			
CURNO	Type	SAE Class	Units
053	FIL	1000	Newtons
Max	Time	Min	Time
902.5	52.6	-426.6	102.9



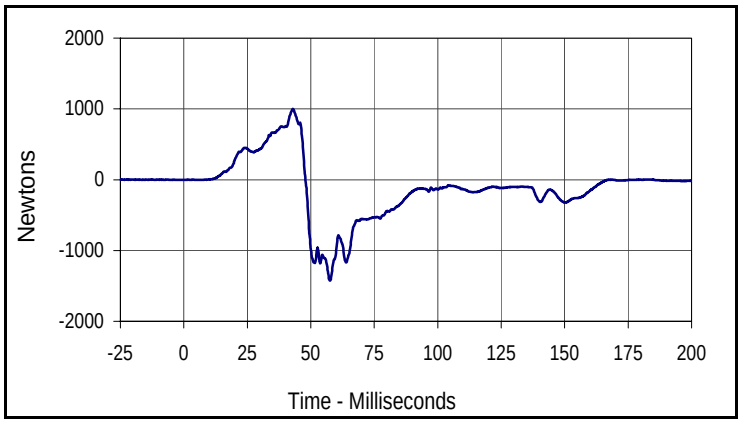
Curve Description			
Passenger Upper Neck Moment Y			
CURNO	Type	SAE Class	Units
055	FIL	600	Nm
Max	Time	Min	Time
36.2	145.4	-26.5	99.9



Curve Description			
Passenger Nij			
Units	Type	Max	Time
Ntf	FIL	0.28	60.7
Units	Type	Max	Time
Nte	FIL	0.28	21.1
Units	Type	Max	Time
Ncf	FIL	0.30	145.4
Units	Type	Max	Time
Nce	FIL	0.50	242.1



Curve Description			
Passenger Left Femur Force Z			
CURNO	Type	SAE Class	Units
067	FIL	600	Newtons
Max	Time	Min	Time
955.5	38.1	-2231.5	58.4



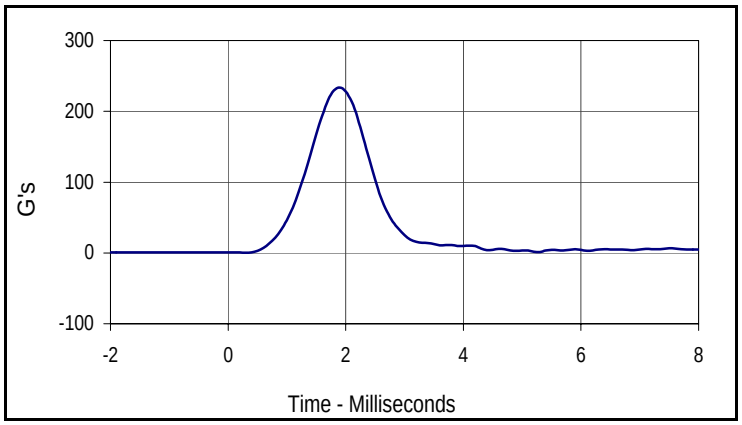
Curve Description			
Passenger Right Femur Force Z			
CURNO	Type	SAE Class	Units
068	FIL	600	Newtons
Max	Time	Min	Time
1000.3	42.9	-1424.5	57.5

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

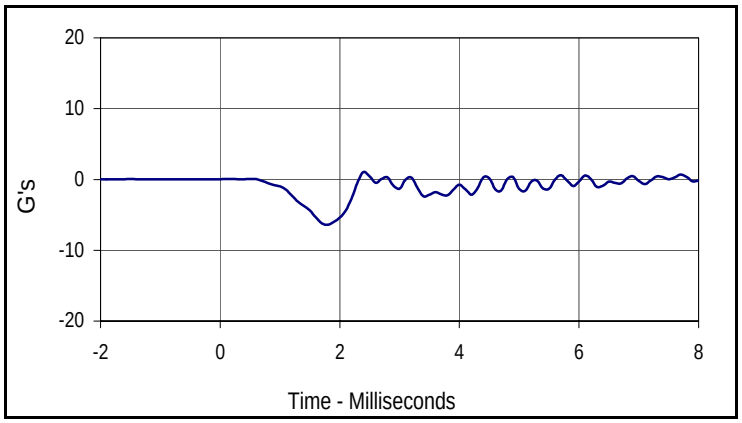
APPENDIX C
PRE-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	Hybrid III 50th Percentile Male Head Drop Test	Test Date:	12/3/10
ATD Serial No.:	034	Test I.D.:	HDM34C

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	233.8	Pass
Peak Lateral Acceleration	G's	≤15.0	6.4	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



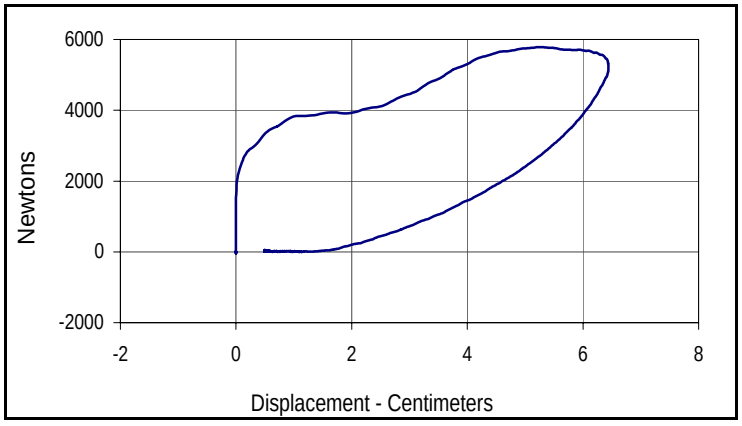
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
233.8	1.9	0.5	0.3



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.1	2.4	-6.4	1.8

Test Program:	Hybrid III 50th Percentile Male Thorax Impact Test	Test Date:	12/3/10
ATD Serial No.:	034	Test I.D.:	CHM34C

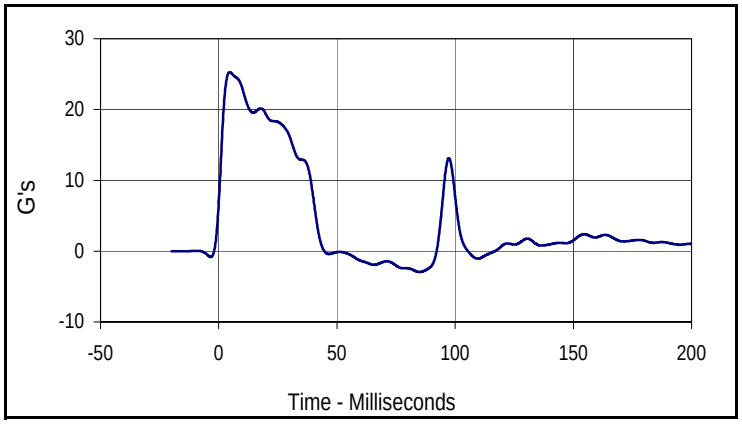
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	6.58 to 6.82	6.74	Pass
Peak Probe Force	Newtons	5159 to 5893	5786	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.44	Pass
Internal Hysterysis	%	69 to 85	71.6	Pass
		Overall Test Results		Pass



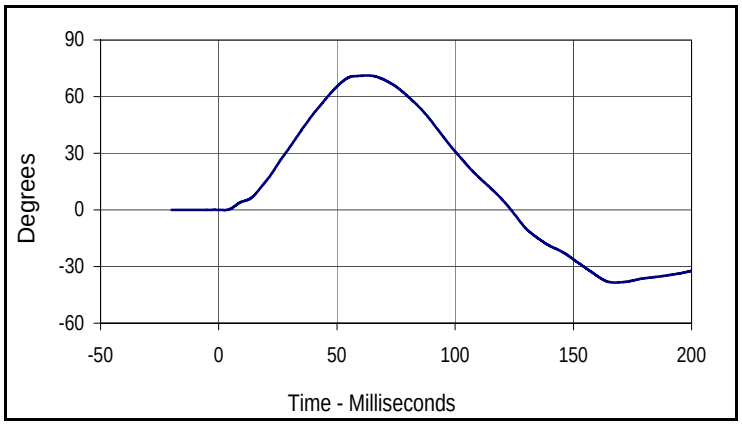
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
001	FIL	180	71.6
Peak Probe Force		Peak Chest Deflection	
5786		6.44	

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	12/3/10
ATD Serial No.:	034	Test I.D.:	NFM34C

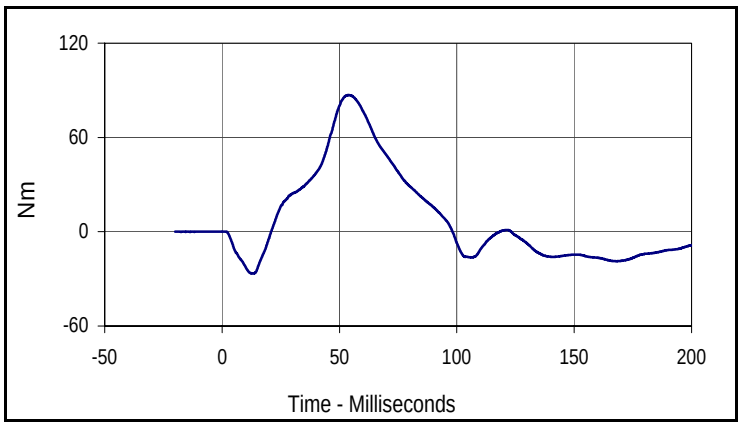
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.90	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	22.9	Pass
	20 Msec.	G's	17.6 to 22.6	19.3	Pass
	30 Msec.	G's	12.5 to 18.5	16.2	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	16.2	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	41.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	71.2	Pass
	Time	Msec.	57.0 to 64.0	62.9	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	123.7	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	87.0	Pass
	Time	Msec.	47.0 to 58.0	53.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
25.3	4.6	-2.9	84.9



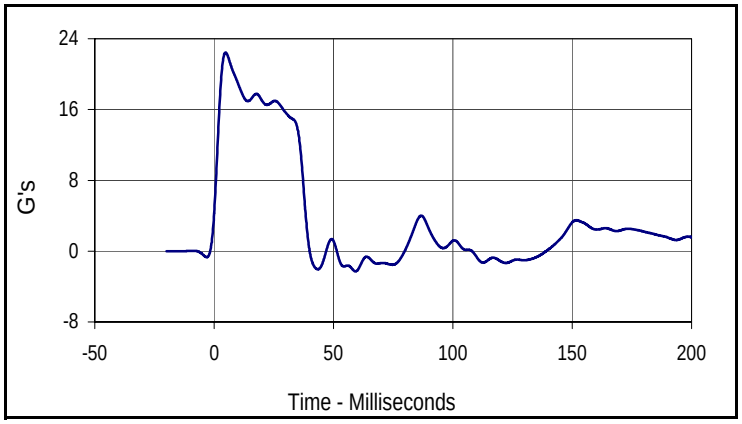
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
71.2	62.9	-38.4	167.6



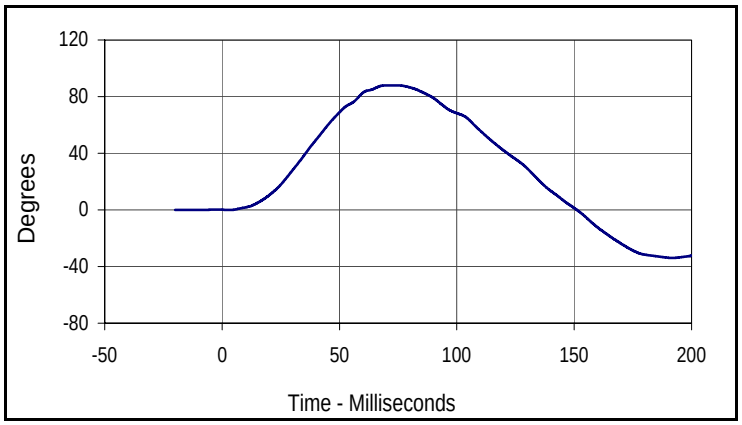
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
87.0	53.9	-26.7	13.3

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	12/3/10
ATD Serial No.:	034	Test I.D.:	NEM34C

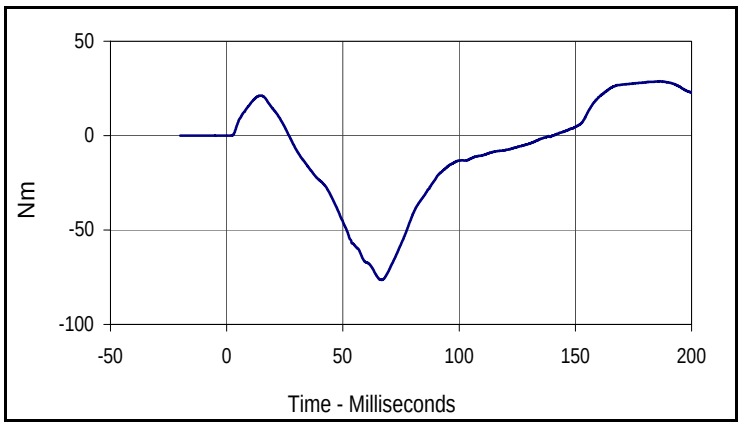
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.07	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.9	Pass
	20 Msec.	G's	14.0 to 19.0	17.0	Pass
	30 Msec.	G's	11.0 to 16.0	15.6	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.6	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	38.1	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	88.0	Pass
	Time	Msec.	72.0 to 82.0	73.9	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	151.2	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-76.4	Pass
	Time	Msec.	65.0 to 79.0	66.7	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	140.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
22.4	4.8	-2.3	59.2



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
88.0	73.9	-33.9	191.8



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
28.7	186.5	-76.4	66.7

Test Program:	Hybrid III 50th Percentile Male Knee Impact Test	Test Date:	12/3/10
ATD Serial No.:	034	Test I.D.:	LKM34C , RKM34C

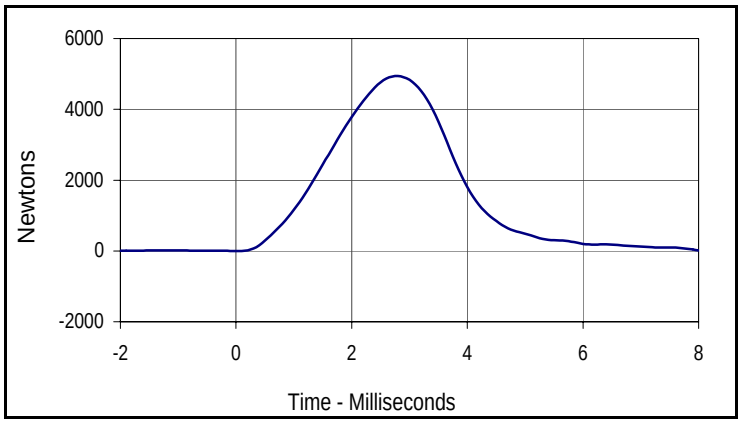
Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	4957	Pass
		Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.09	Pass
Peak Probe Force	Newtons	4715 to 5782	4939	Pass
		Overall Test Results		Pass

Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
4957.0	2.7	-28.2	7.9



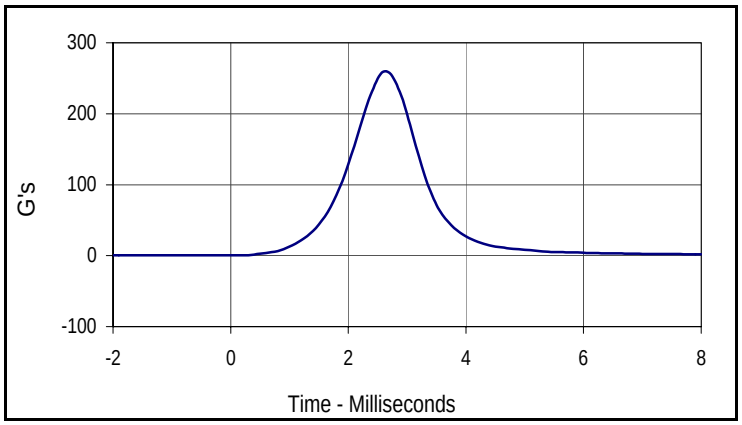
Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
4938.6	2.8	-44.3	9.0

Test Program:	Hybrid III 50th Percentile Male External Measurements	Test Date:	12/3/10
ATD Serial No.:	034	Test I.D.:	N/A

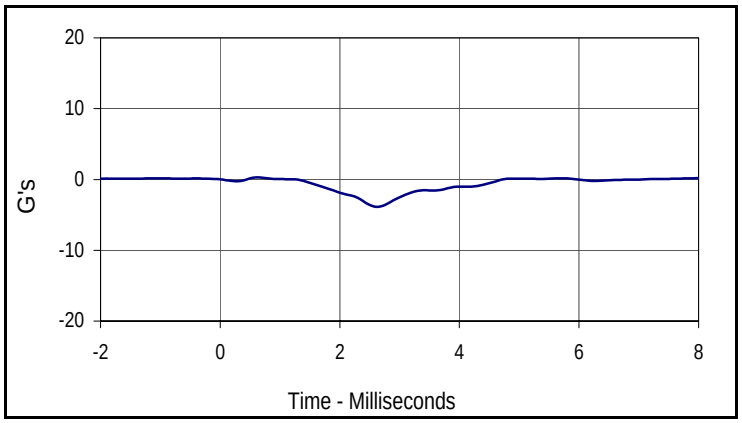
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	881	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - "H" point height	mm	84 to 89	85	Pass
D - "H" point from seat back	mm	135 to 140	138	Pass
E - Shoulder pivot from back	mm	84 to 94	86	Pass
F - Thigh clearance	mm	140 to 155	147	Pass
G - Elbow back to wrist pivot	mm	290 to 305	296	Pass
H - Skull cap to back line	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	333	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	587	Pass
L - Poplipteal length	mm	429 to 455	432	Pass
M - Knee pivot height	mm	485 to 500	486	Pass
N - Buttock poplipteal length	mm	452 to 477	468	Pass
O - Chest depth	mm	213 to 229	215	Pass
P - Foot length	mm	251 to 267	259	Pass
V - Shoulder breadth	mm	422 to 437	431	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference	mm	970 to 1001	986	Pass
Z - Waist circumference	mm	836 to 866	862	Pass
AA - Location for chest circumference	mm	429 to 434	431	Pass
BB - Location for waist circumference	mm	226 to 231	231	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female Head Drop Test	Test Date:	12/3/10
ATD Serial No.:	141	Test I.D.:	HDF12A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	259.3	Pass
Peak Lateral Acceleration	G's	≤15.0	3.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



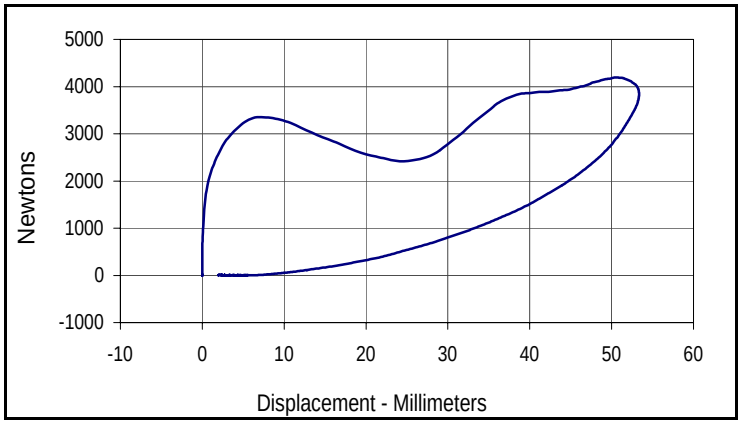
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
259.3	2.6	0.5	-1.2



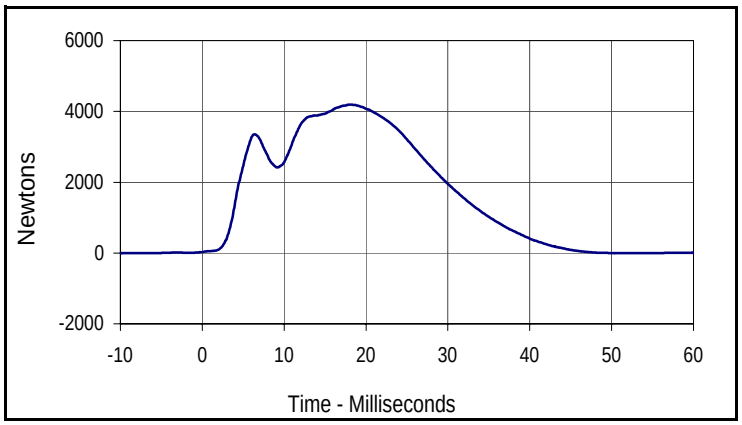
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.3	0.6	-3.9	2.6

Test Program:	Hybrid III 5th Percentile Female Thorax Impact Test	Test Date:	12/3/10
ATD Serial No.:	141	Test I.D.:	CH141A

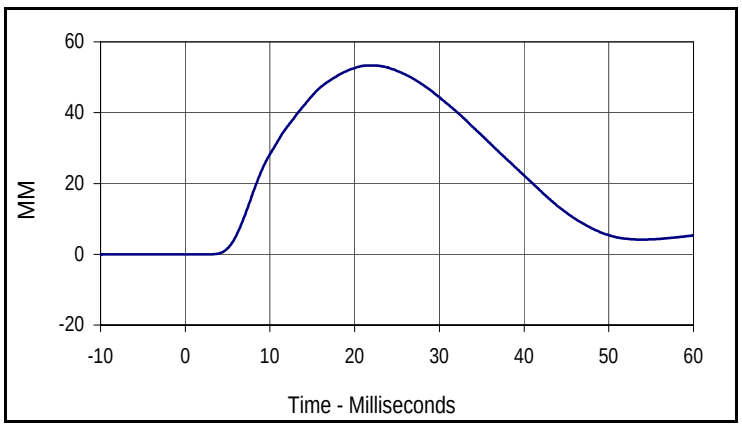
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	6.59 to 6.83	6.64	Pass
Peak Chest Deflection	MM	50.0 to 58.0	53.3	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4180	Pass
Peak Force Between 18 and 50 MM	Newtons	≤4600	4193	Pass
Internal Hysterysis	%	69 to 85	70.9	Pass
		Overall Test Results		Pass



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
003	FIL	180	70.9
Peak Probe Force		Peak Chest Displ.	
4192.8		53.3	



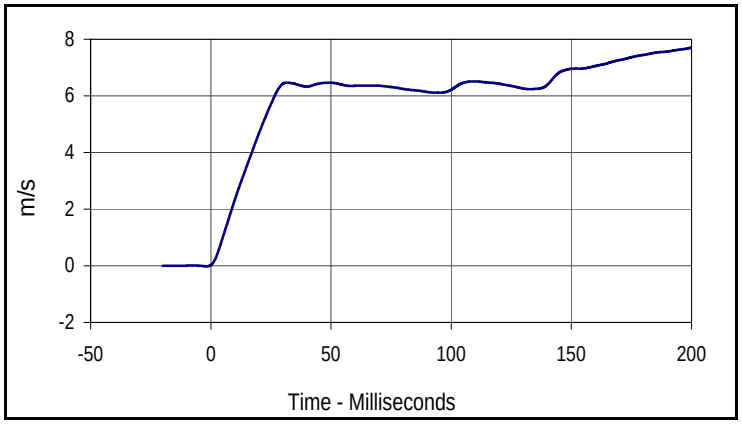
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4192.8	18.0	-6.0	144.8



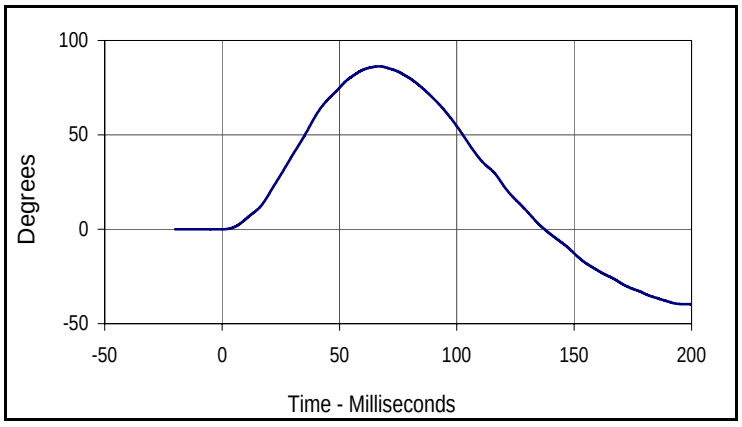
Curve Description			
Chest Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
53.3	22.0	0.0	2.7

Test Program:	Hybrid III 5th Percentile Female Neck Flexion Test	Test Date:	12/3/10
ATD Serial No.:	141	Test I.D.:	NF12A

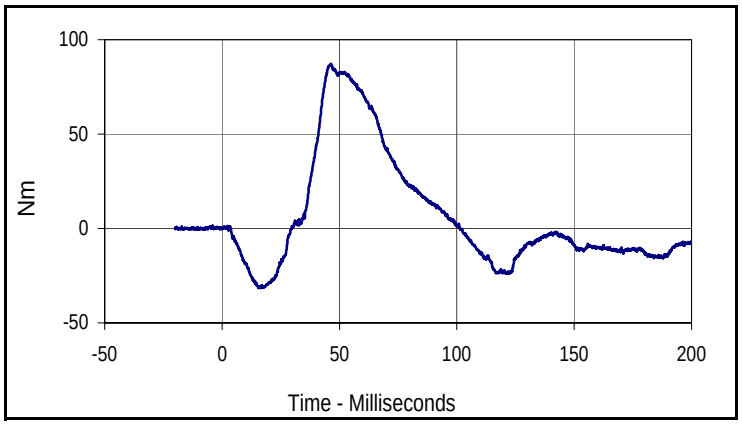
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.04	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.3	Pass
	20 Msec.	m/s	4.0 to 5.0	4.7	Pass
	30 Msec.	m/s	5.8 to 7.0	6.4	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	86.3	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	82.9	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	94.9	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
7.7	200.0	0.0	-1.7



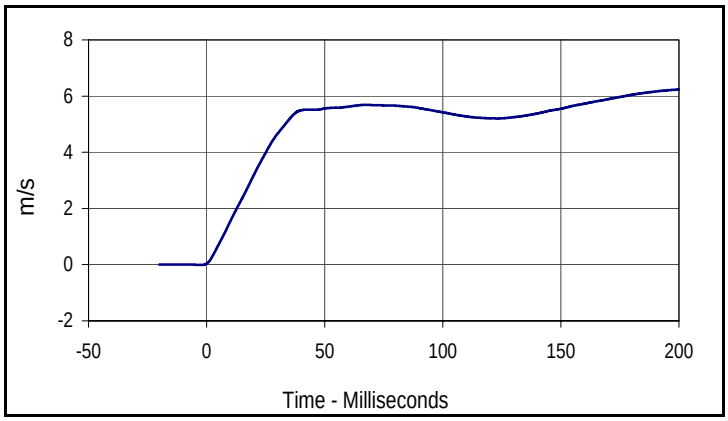
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
86.3	66.8	-39.8	200.0



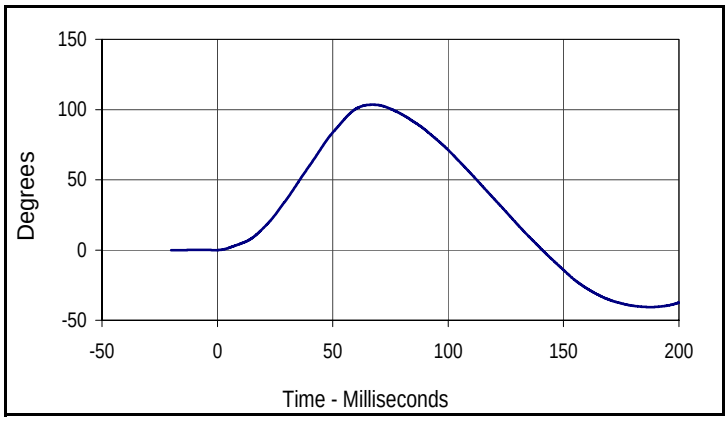
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
87.3	46.4	-31.5	16.1

Test Program:	Hybrid III 5th Percentile Female Neck Extension Test	Test Date:	12/3/10
ATD Serial No.:	141	Test I.D.:	NE12A

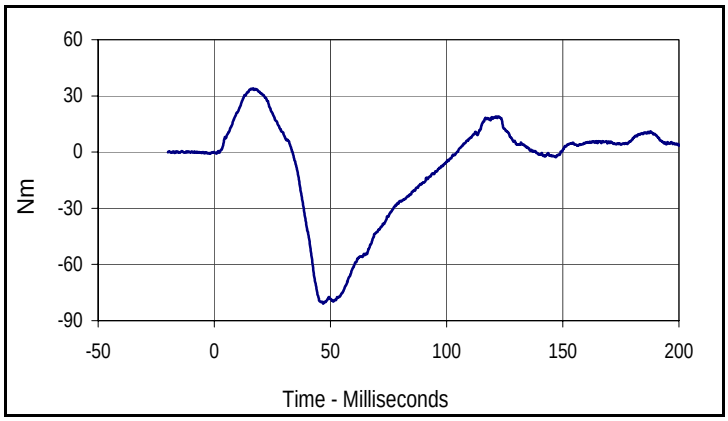
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.07	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.5	Pass
	20 Msec.	m/s	3.1 to 3.9	3.2	Pass
	30 Msec.	m/s	4.6 to 5.6	4.7	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	103.4	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-64.7	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	96.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
6.2	200.0	0.0	-2.3



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
103.4	67.2	-40.6	187.9



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
34.1	16.7	-80.9	46.9

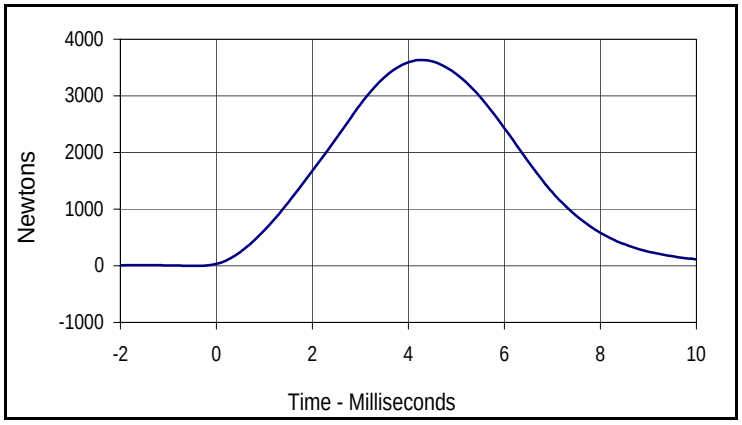
Test Program:	Hybrid III 5th Percentile Female Knee Impact Test	Test Date:	12/3/10
ATD Serial No.:	141	Test I.D.:	LKF12A , RKB12A

Left Knee

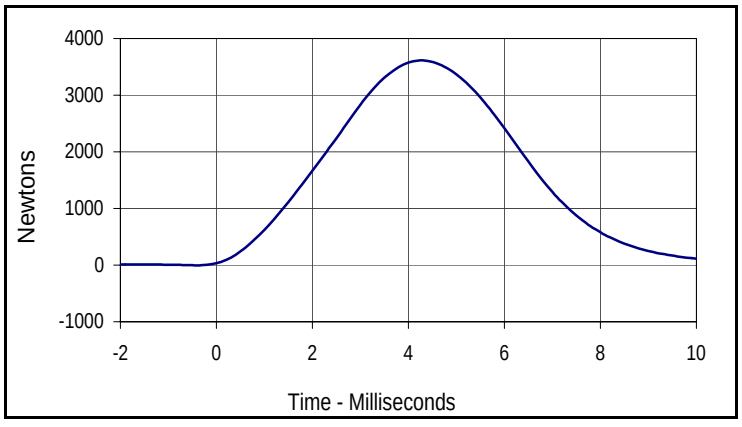
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.07	Pass
Peak Probe Force	Newtons	3450 to 4060	3634	Pass
		Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.07	Pass
Peak Probe Force	Newtons	3450 to 4060	3614	Pass
		Overall Test Results		Pass



Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3634.0	4.3	-2.2	-0.4



Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
3614.3	4.3	-2.9	-0.4

Test Program:	Hybrid III 5th Percentile Female Torso Flexion Test	Test Date:	12/3/10
ATD Serial No.:	141	Test I.D.:	TF12A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	^{o}C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Initial reference plane angle	Degrees	≤20.0	0.3	Pass
Peak Force at 45 +/-0.5 degrees	Newtons	320.0 to 390.0	329.0	Pass
Torso rotation rate	deg/sec	0.5 to 1.5	1.0	Pass
Final reference plane angle	Degrees	+/-8	0.5	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female External Measurements	Test Date:	12/3/10
ATD Serial No.:	141	Test I.D.:	N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	774.7 to 800.1	784	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	441	Pass
C - "H" point height (Reference)	mm	81.3 to 86.3	84	Pass
D - "H" point from seat back (Ref.)	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	78	Pass
F - Thigh clearance	mm	119.4 to 134.6	130	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	254	Pass
H - Head to back line	mm	40.7 to 45.7	43	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	281	Pass
J - Elbow rest heignt	mm	182.8 to 203.2	200	Pass
K - Buttock to knee length	mm	520.7 to 546.1	535	Pass
L - Poplipteal height	mm	355.6 to 376.0	365	Pass
M - Knee pivot height	mm	393.7 to 419.1	413	Pass
N - Buttock poplipteal length	mm	414.0 to 439.4	421	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	182	Pass
P - Foot length	mm	218.5 to 233.7	227	Pass
R - Buttock to knee pivot length	mm	457.2 to 482.6	464	Pass
S - Head breadth	mm	137.1 to 147.3	142	Pass
T - Head depth	mm	177.8 to 188.0	181	Pass
U - Hip breadth	mm	299.7 to 314.9	308	Pass
V - Shoulder breadth	mm	350.5 to 365.7	361	Pass
W - Foot breadth	mm	78.8 to 94.0	89	Pass
X - Head circumference	mm	528.3 to 548.7	542	Pass
Y - Chest circumference with jacket	mm	850.8 to 881.3	854	Pass
Z - Waist circumference	mm	759.5 to 789.9	778	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	302	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	167	Pass
		Overall Test Results		Pass

Test Program:	Dummy Damage Checklist	Test Date:	12/3/10
ATD Serial No.:	034	Test I.D.:	N/A

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

Comments on repair or replacement parts:

Test Program:	Dummy Damage Checklist	Test Date:	12/3/10
ATD Serial No.:	141	Test I.D.:	N/A

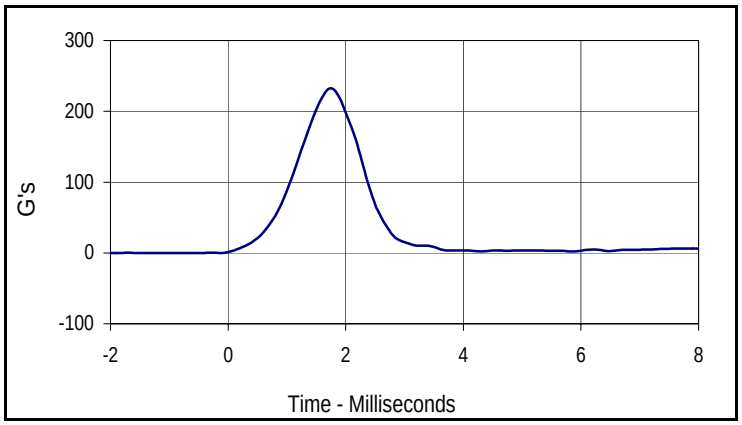
GENERAL	DAMAGED	OK
Outer skin on entire dummy		X
Head ballast secure		X
Gashes, rips, general appearance, etc.		X
Neck-Broken or cracks in rubber		X
Check that upper neck bracket is firmly attached to lwr neck bracket		X
Three rubber bumpers in place		X
Spine- Broken or cracks in rubber		X
Check for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

Comments on repair or replacement parts:

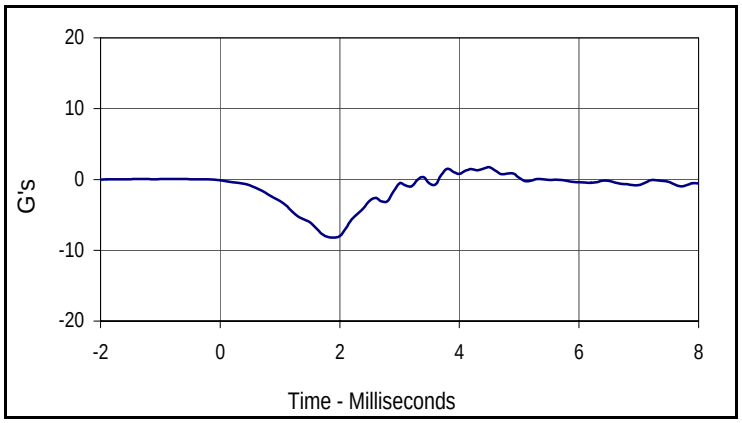
APPENDIX C
POST-TEST / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	Hybrid III 50th Percentile Male Head Drop Test	Test Date:	12/7/10
ATD Serial No.:	034	Test I.D.:	HDM34D

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	225.0 to 275.0	231.2	Pass
Peak Lateral Acceleration	G's	≤15.0	8.2	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



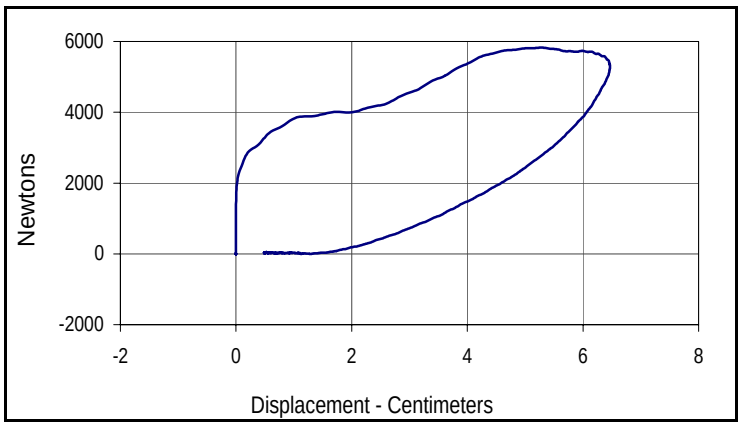
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
231.2	1.7	0.1	-0.5



Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
1.7	4.5	-8.2	1.9

Test Program:	Hybrid III 50th Percentile Male Thorax Impact Test	Test Date:	12/7/10
ATD Serial No.:	034	Test I.D.:	CHM34D

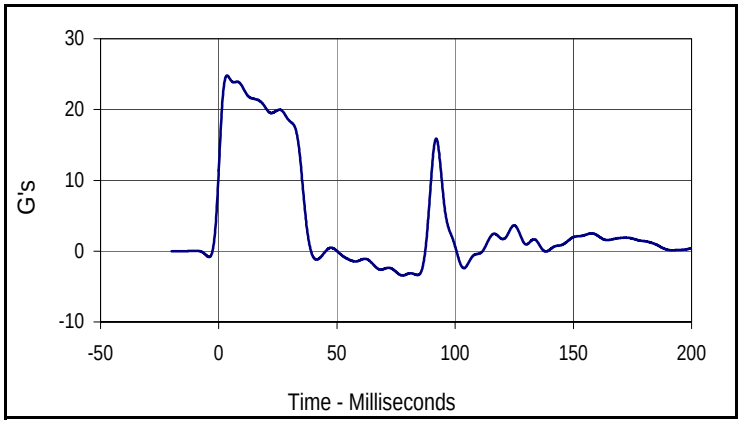
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	6.58 to 6.82	6.75	Pass
Peak Probe Force	Newtons	5159 to 5893	5826	Pass
Peak Sternum Deflection	CM	6.35 to 7.26	6.47	Pass
Internal Hysterysis	%	69 to 85	71.4	Pass
		Overall Test Results		Pass



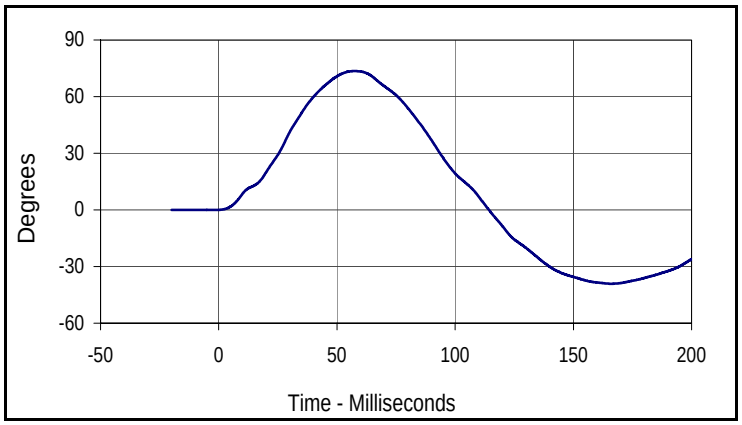
Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
001	FIL	180	71.4
Peak Probe Force		Peak Chest Deflection	
5826		6.47	

Test Program:	Hybrid III 50th Percentile Male Neck Flexion Test	Test Date:	12/7/10
ATD Serial No.:	034	Test I.D.:	NFM34D

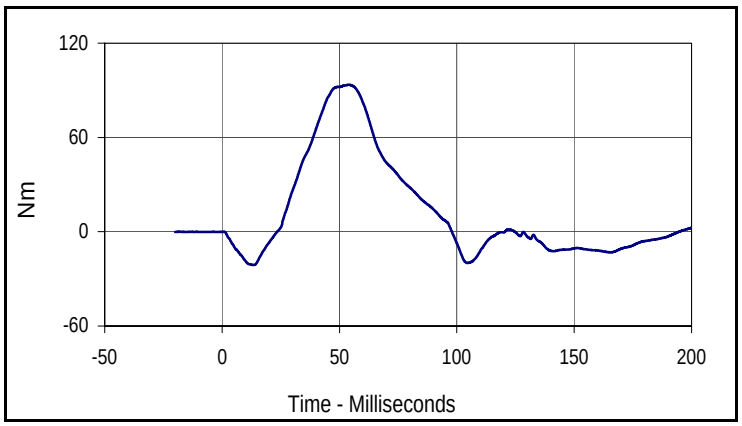
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	20.6	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.91	Pass
Pendulum Deceleration	10 Msec.	G's	22.5 to 27.5	23.2	Pass
	20 Msec.	G's	17.6 to 22.6	20.2	Pass
	30 Msec.	G's	12.5 to 18.5	18.4	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 29.0	18.4	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	34.0 to 42.0	36.7	Pass
Maximum "D" Plane Rotation	Max	Degrees	64.0 to 78.0	73.5	Pass
	Time	Msec.	57.0 to 64.0	57.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	113.0 to 128.0	114.3	Pass
Moment About Occ. Condyle	Max	Nm	84.1 to 108.5	93.6	Pass
	Time	Msec.	47.0 to 58.0	54.2	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	97.0 to 107.0	98.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
24.8	3.5	-3.4	77.8



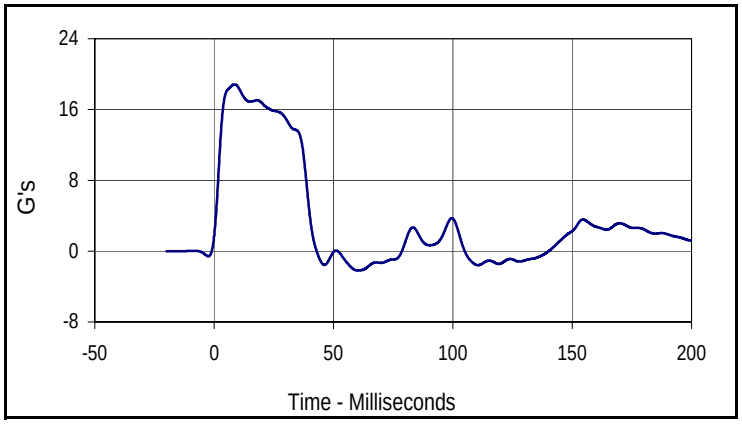
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
73.5	57.5	-39.1	166.0



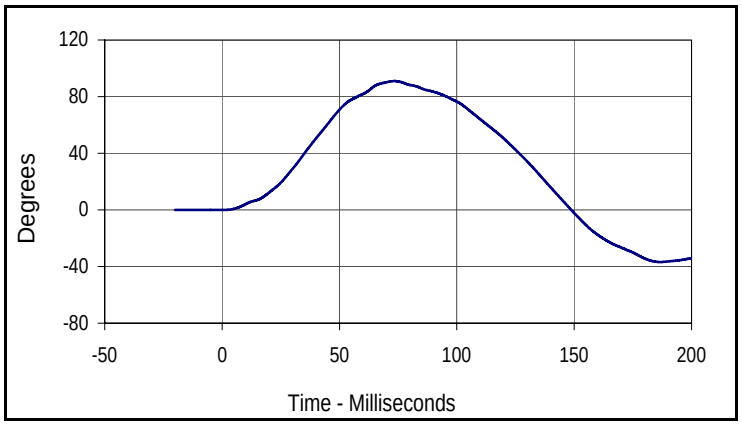
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
93.6	54.2	-21.2	13.0

Test Program:	Hybrid III 50th Percentile Male Neck Extension Test	Test Date:	12/7/10
ATD Serial No.:	034	Test I.D.:	NEM34D

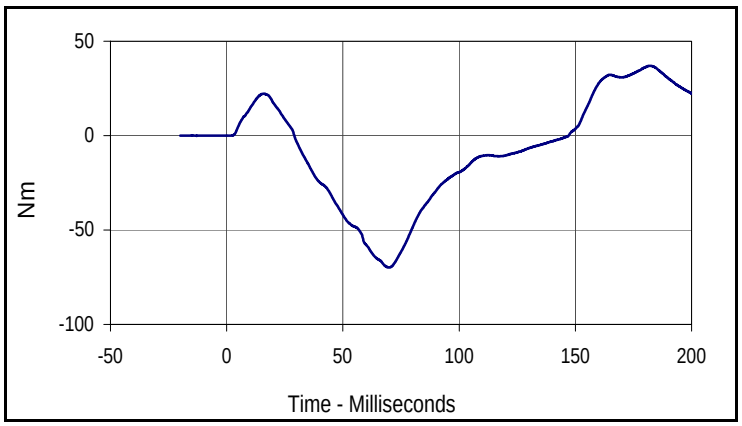
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	20.6	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/s	5.94 to 6.19	6.05	Pass
Pendulum Deceleration	10 Msec.	G's	17.2 to 21.2	18.6	Pass
	20 Msec.	G's	14.0 to 19.0	16.8	Pass
	30 Msec.	G's	11.0 to 16.0	15.0	Pass
Peak Pendulum Decel. after 30 Msec.		G's	≤ 22.0	15.0	Pass
Deceleration Decay, Time to Cross 5 G's		Msec.	38.0 to 46.0	39.7	Pass
Maximum "D" Plane Rotation	Max	Degrees	81.0 to 106.0	91.0	Pass
	Time	Msec.	72.0 to 82.0	73.5	Pass
"D" Plane Rotation Decay, Time To Zero Crossing		Msec.	147.0 to 174.0	148.8	Pass
Moment About Occ. Condyle	Max	Nm	-52.9 to- 79.9	-69.8	Pass
	Time	Msec.	65.0 to 79.0	69.9	Pass
Positive Moment Decay, Time To Zero Crossing		Msec.	120.0 to 148.0	147.2	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Deceleration			
CURNO	Type	SAE Class	Units
001	FIL	60	G's
Max	Time	Min	Time
18.8	8.6	-2.2	60.2



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
91.0	73.5	-36.8	186.5



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
36.9	181.8	-69.8	69.9

Test Program:	Hybrid III 50th Percentile Male Knee Impact Test	Test Date:	12/7/10
ATD Serial No.:	034	Test I.D.:	LKM34D , RKM34D

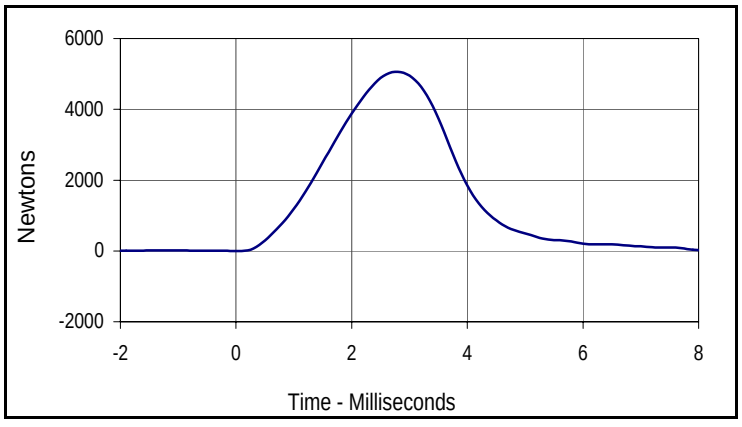
Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5057	Pass
		Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5064	Pass
		Overall Test Results		Pass

Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
5056.6	2.7	-28.2	7.9



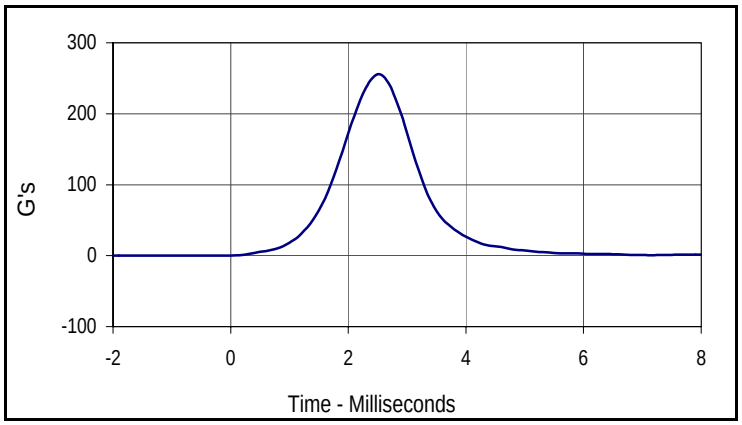
Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
5063.7	2.8	-43.3	10.0

Test Program:	Hybrid III 50th Percentile Male External Measurements	Test Date:	12/7/10
ATD Serial No.:	034	Test I.D.:	N/A

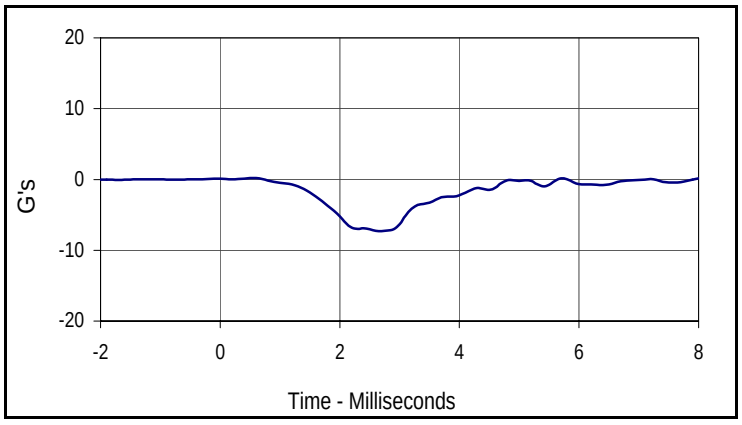
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	879 to 889	881	Pass
B - Shoulder pivot height	mm	505 to 521	515	Pass
C - "H" point height	mm	84 to 89	85	Pass
D - "H" point from seat back	mm	135 to 140	138	Pass
E - Shoulder pivot from back	mm	84 to 94	87	Pass
F - Thigh clearance	mm	140 to 155	147	Pass
G - Elbow back to wrist pivot	mm	290 to 305	296	Pass
H - Skull cap to back line	mm	41 to 46	43	Pass
I - Shoulder to elbow length	mm	330 to 345	333	Pass
J - Elbow rest height	mm	190 to 211	206	Pass
K - Buttock to knee length	mm	579 to 604	587	Pass
L - Poplipteal length	mm	429 to 455	432	Pass
M - Knee pivot height	mm	485 to 500	486	Pass
N - Buttock poplipteal length	mm	452 to 477	468	Pass
O - Chest depth	mm	213 to 229	215	Pass
P - Foot length	mm	251 to 267	259	Pass
V - Shoulder breadth	mm	422 to 437	431	Pass
W - Foot breadth	mm	91 to 107	99	Pass
Y - Chest circumference	mm	970 to 1001	986	Pass
Z - Waist circumference	mm	836 to 866	862	Pass
AA - Location for chest circumference	mm	429 to 434	431	Pass
BB - Location for waist circumference	mm	226 to 231	231	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female Head Drop Test	Test Date:	12/7/10
ATD Serial No.:	141	Test I.D.:	HDF12B

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	20.6	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	250.0 to 300.0	255.6	Pass
Peak Lateral Acceleration	G's	≤15.0	7.3	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
		Overall Test Results		Pass



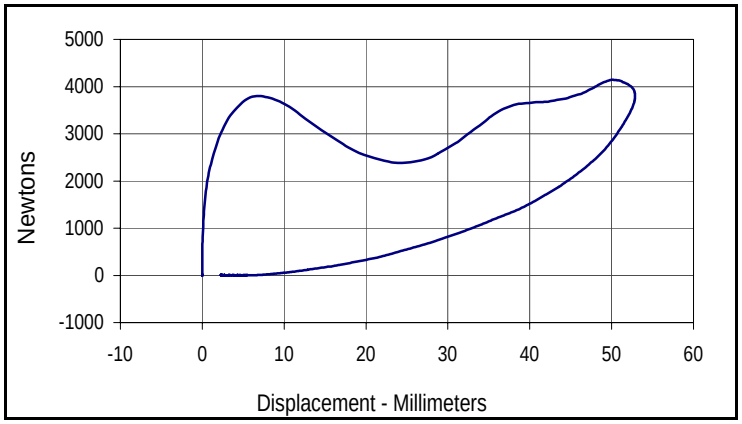
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
255.6	2.5	0.0	-2.0



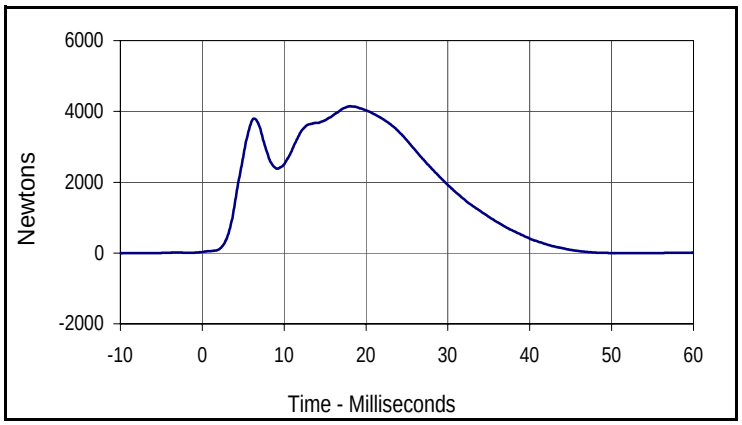
Curve Description			
Head Y			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
0.2	0.5	-7.3	2.7

Test Program:	Hybrid III 5th Percentile Female Thorax Impact Test	Test Date:	12/7/10
ATD Serial No.:	141	Test I.D.:	CH141B

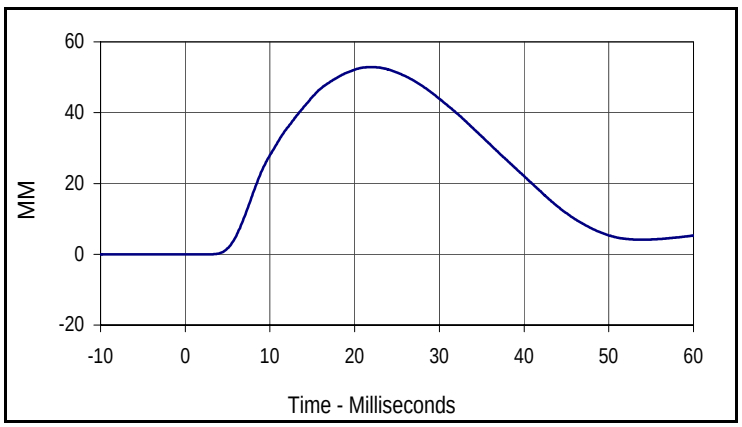
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Velocity	m/s	6.59 to 6.83	6.64	Pass
Peak Chest Deflection	MM	50.0 to 58.0	52.9	Pass
Peak Force Between 50 and 58 MM	Newtons	3900 to 4400	4143	Pass
Peak Force Between 18 and 50 MM	Newtons	≤4600	4143	Pass
Internal Hysterysis	%	69 to 85	71.3	Pass
		Overall Test Results		Pass



Curve Description			
Probe Force vs. Chest Deflection			
CURNO	Type	SAE Class	Hysterysis
003	FIL	180	71.3
Peak Probe Force		Peak Chest Displ.	
4142.7		52.9	



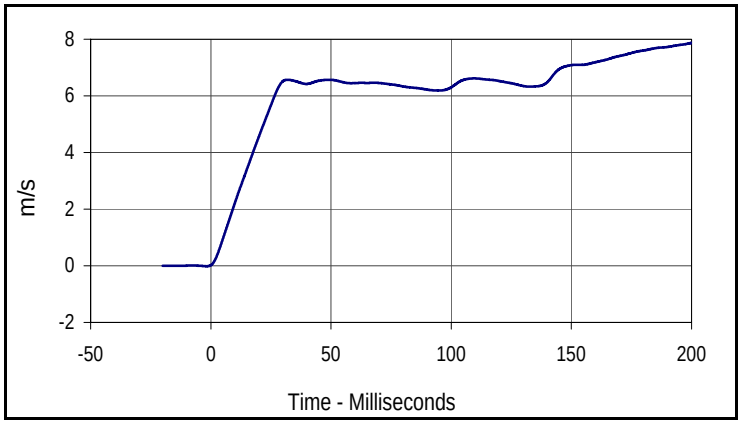
Curve Description			
Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	180	Newtons
Max	Time	Min	Time
4142.7	18.0	-6.0	144.8



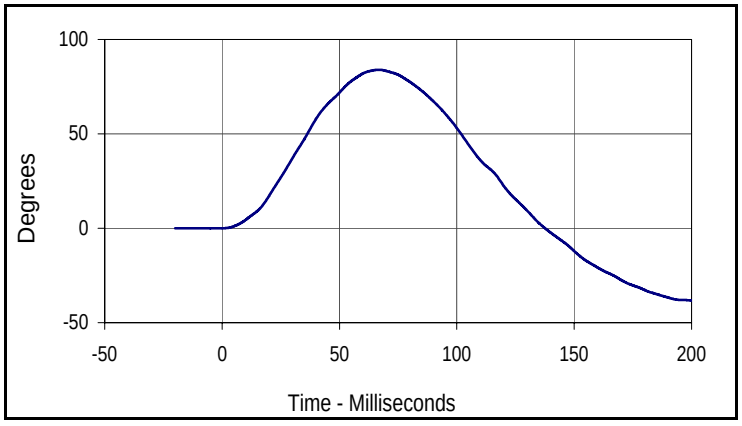
Curve Description			
Chest Deflection			
CURNO	Type	SAE Class	Units
001	FIL	180	MM
Max	Time	Min	Time
52.9	22.0	0.0	2.7

Test Program:	Hybrid III 5th Percentile Female Neck Flexion Test	Test Date:	12/7/10
ATD Serial No.:	141	Test I.D.:	NF12B

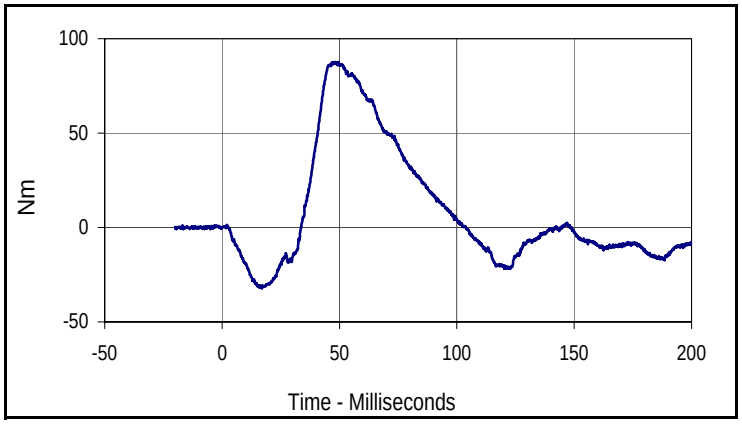
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Velocity		m/s	6.89 to 7.13	7.03	Pass
Pendulum Deceleration	10 Msec.	m/s	2.1 to 2.5	2.2	Pass
	20 Msec.	m/s	4.0 to 5.0	4.6	Pass
	30 Msec.	m/s	5.8 to 7.0	6.5	Pass
"D" Plane Rotation	Max	Degrees	77.0 to 91.0	84.0	Pass
Peak Moment in Rotation	Max	Nm	69.0 to 83.0	81.7	Pass
Positive Moment Decay, Time To 10 Nm		Msec.	80.0 to 100.0	93.6	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
7.9	200.0	0.0	-1.7



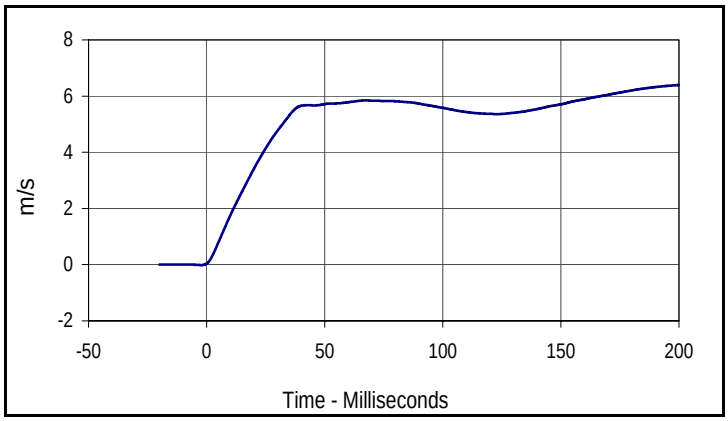
Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
84.0	66.8	-38.1	200.0



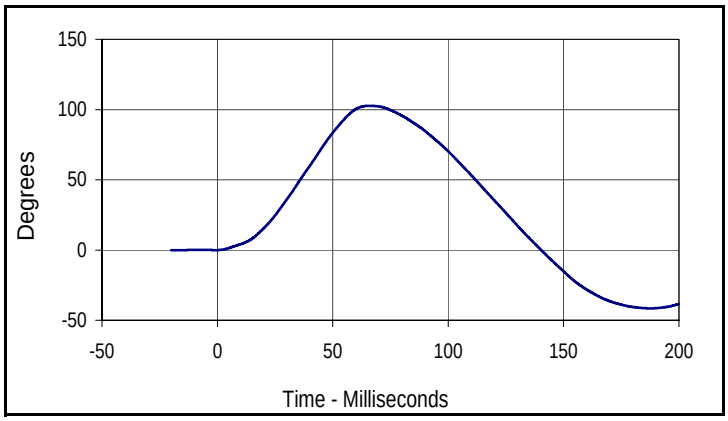
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
87.7	48.0	-32.4	16.9

Test Program:	Hybrid III 5th Percentile Female Neck Extension Test	Test Date:	12/7/10
ATD Serial No.:	141	Test I.D.:	NE12B

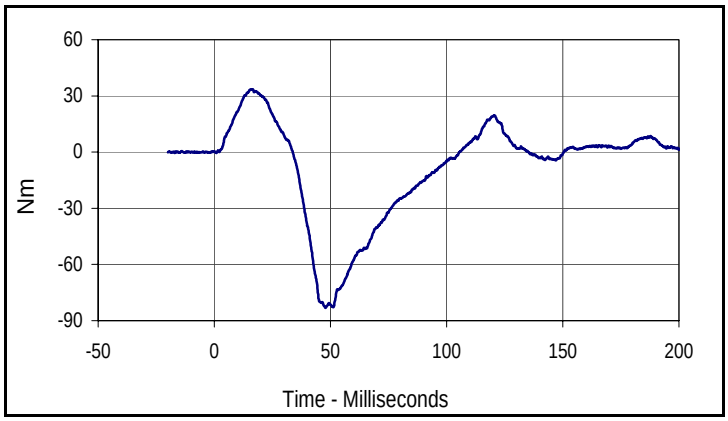
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.1	Pass
Laboratory Relative Humidity		%	10 to 70	29	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.07	Pass
Pendulum Deceleration	10 Msec.	m/s	1.5 to 1.9	1.8	Pass
	20 Msec.	m/s	3.1 to 3.9	3.4	Pass
	30 Msec.	m/s	4.6 to 5.6	4.8	Pass
"D" Plane Rotation	Max	Degrees	99.0 to 114.0	102.6	Pass
Peak Moment in Rotation	Max	Nm	-53.0 to -65.0	-60.9	Pass
Positive Moment Decay, Time To -10 Nm		Msec.	94.0 to 114.0	95.1	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	60	m/s
Max	Time	Min	Time
6.4	200.0	0.0	-2.2



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
102.6	65.4	-41.5	187.9



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
002	FIL	600	Nm
Max	Time	Min	Time
33.6	15.8	-83.2	47.8

Test Program:	Hybrid III 5th Percentile Female Knee Impact Test	Test Date:	12/7/10
ATD Serial No.:	141	Test I.D.:	LKF12B , RKB12B

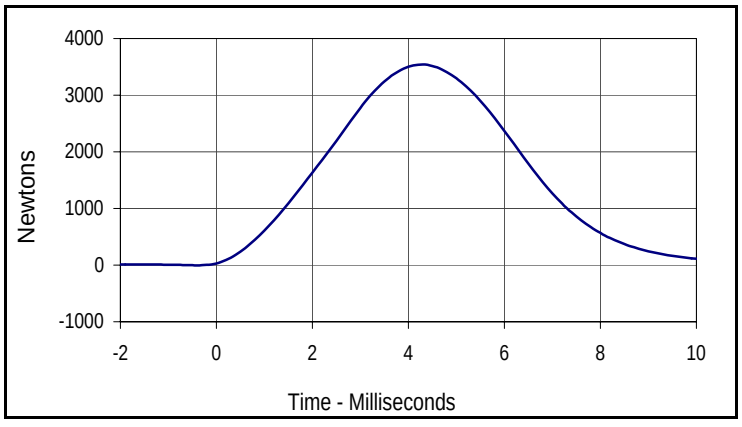
Left Knee

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.07	Pass
Peak Probe Force	Newtons	3450 to 4060	3561	Pass
		Overall Test Results		Pass

Right Knee

Pendulum Velocity at T=0	m/sec	2.07 to 2.13	2.07	Pass
Peak Probe Force	Newtons	3450 to 4060	3542	Pass
		Overall Test Results		Pass

Curve Description			
Left Knee Probe Force			
CURNO	Type	SAE Class	Units
001	FIL	600	Newtons
Max	Time	Min	Time
3561.3	4.3	-2.2	-0.4



Curve Description			
Right Knee Probe Force			
CURNO	Type	SAE Class	Units
002	FIL	600	Newtons
Max	Time	Min	Time
3542.0	4.3	-2.9	-0.4

Test Program:	Hybrid III 5th Percentile Female Torso Flexion Test	Test Date:	12/7/10
ATD Serial No.:	141	Test I.D.:	TF12B

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	29	Pass
Initial reference plane angle	Degrees	≤20.0	0.25	Pass
Peak Force at 45 +/-0.5 degrees	Newtons	320.0 to 390.0	329.0	Pass
Torso rotation rate	deg/sec	0.5 to 1.5	1.23	Pass
Final reference plane angle	Degrees	+/-8	0.47	Pass
		Overall Test Results		Pass

Test Program:	Hybrid III 5th Percentile Female External Measurements	Test Date:	12/7/10
ATD Serial No.:	141	Test I.D.:	N/A

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory temperature	°C	20.6 to 22.2	21.1	Pass
Laboratory relative humidity	%	10 to 70	30	Pass
A - Total sitting height	mm	774.7 to 800.1	784	Pass
B - Shoulder pivot height	mm	431.8 to 457.2	441	Pass
C - "H" point height (Reference)	mm	81.3 to 86.3	84	Pass
D - "H" point from seat back (Ref.)	mm	144.8 to 149.8	146	Pass
E - Shoulder pivot from backline	mm	68.6 to 83.8	78	Pass
F - Thigh clearance	mm	119.4 to 134.6	130	Pass
G - Back of elbow to wrist pivot	mm	243.9 to 259.1	254	Pass
H - Head to back line	mm	40.7 to 45.7	43	Pass
I - Shoulder to elbow length	mm	276.8 to 297.2	281	Pass
J - Elbow rest heignt	mm	182.8 to 203.2	200	Pass
K - Buttock to knee length	mm	520.7 to 546.1	535	Pass
L - Poplipteal height	mm	355.6 to 376.0	365	Pass
M - Knee pivot height	mm	393.7 to 419.1	413	Pass
N - Buttock poplipteal length	mm	414.0 to 439.4	421	Pass
O - Chest depth without jacket	mm	175.3 to 190.5	182	Pass
P - Foot length	mm	218.5 to 233.7	227	Pass
R - Buttock to knee pivot length	mm	457.2 to 482.6	464	Pass
S - Head breadth	mm	137.1 to 147.3	142	Pass
T - Head depth	mm	177.8 to 188.0	181	Pass
U - Hip breadth	mm	299.7 to 314.9	308	Pass
V - Shoulder breadth	mm	350.5 to 365.7	361	Pass
W - Foot breadth	mm	78.8 to 94.0	89	Pass
X - Head circumference	mm	528.3 to 548.7	542	Pass
Y - Chest circumference with jacket	mm	850.8 to 881.3	854	Pass
Z - Waist circumference	mm	759.5 to 789.9	778	Pass
AA - Location for chest circumference	mm	299.7 to 309.9	302	Pass
BB - Location for waist circumference	mm	160.1 to 170.2	167	Pass
		Overall Test Results		Pass

Test Program:	Dummy Damage Checklist	Test Date:	12/7/10
ATD Serial No.:	034	Test I.D.:	N/A

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

Comments on repair or replacement parts:

Test Program:	Dummy Damage Checklist	Test Date:	12/7/10
ATD Serial No.:	141	Test I.D.:	N/A

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

Comments on repair or replacement parts: