REPORT NUMBER: NCAP-MGA-2011-049

NEW CAR ASSESSMENT PROGRAM (NCAP)
Frontal Barrier Impact Test

HONDA MFG. OF ALABAMA, LLC
2011 Honda Odyssey LX Minivan
NHTSA No.: MB5314

MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105

Test Date: December 3, 2010

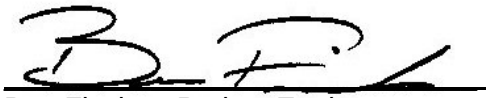
Final Report Date: January 7, 2011

FINAL REPORT

U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
1200 New Jersey Ave, SE
Mail Code: NVS 111, Room W43-410
Washington, DC 20590

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-06-D-00028.

Prepared by: 
Donna Janovicz, Project Manager

Approved by: 
Ben Fischer, Project Engineer

Approval Date: January 7, 2011

FINAL REPORT ACCEPTANCE BY OCWS:

_____
Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

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

Date: _____

Technical Report Documentation Page

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16. Abstract

A 56.3 km/h NCAP Frontal Impact Test was conducted on the 2011 Honda Odyssey LX Minivan in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure for the generation of consumer information on vehicle frontal crash protection. 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 MGA Research Corporation in Burlington, Wisconsin, on December 3, 2010.

The impact velocity was 56.2 km/h and the ambient temperature at the barrier face at the time of impact was 21°C. The target vehicle post-test maximum crush was 603 mm located at the vehicle's centerline. The test vehicle's performance was as follows:

Measurement Description	Units	Threshold		Driver ATD	Passenger ATD
		50th	5th		
Head Injury Criteria (HIC_{15})	N/A	700	700	84	191
Maximum Chest Compression	mm	63	52	14	8
Nij	N/A	1	1	0.35	0.34
Neck Tension	N	4170	2620	897	565
Neck Compression	N	4000	2520	87	116
Left Femur Force	N	10008	6805	167	2576
Right Femur Force	N	10008	6805	1741	2784

17. Key Words 35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)		*18. Distribution Statement* Copies of this report are available from: National Highway Traffic Safety Adm. Technical Reference Division 1200 New Jersey Ave, SE Washington, D.C. 20590	
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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-00028. 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 was conducted in accordance with the Office of Crashworthiness Standard's NCAP Frontal Laboratory Test Procedure dated January 2010.

SUMMARY

A load cell barrier was impacted by a 2011 Honda Odyssey LX Minivan at a velocity of 56.2 kph. The test was performed at MGA Research Corporation on December 3, 2010. Pre-and post-test photographs of the vehicle and dummies can be found in Appendix A.

Two real-time cameras and fourteen (14) high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in 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 test device (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 transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were on the driver's lap and shoulder belts and the passenger's lap belt to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 351) and the right-front passenger (position 2) ATD (Serial No. 634) were calibrated previous to this test. Certification details, along with verification data, are found in Appendix C of this report.

The 223 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy head, chest displacement, neck, and femur response data traces.

There was 100 percent 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 vehicle was 603 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's head and chest contacted the airbag. The driver's head also contacted the headrest. The driver's knees contacted the knee bolster. The passenger's head and chest contacted the airbag. The passenger's head also contacted the seatback. The passenger's knees 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 (50^{th})	84	77.5	92.5	14	0.35	897	87	167	1741
Passenger (5^{th})	191	71.2	86.2	8	0.34	565	116	2576	2784

The test data can be found on the NHTSA website at www.nhtsa.dot.gov.

TEST NOTES

There was no valid data collected for:
Top of Engine X after 60 msec.
Bottom of Engine X
Right Brake Caliper X after 30 msec.

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	MB5314
Model Year	2011
Make	Honda
Model	Odyssey
Body Style	Minivan
VIN	5FNRL5H21BB007206
Body Color	Mocha Metallic
Delivery Date	11/01/2010
Odometer (mi)	35
Odometer (km)	56
Dealer	Rosen Honda
Transmission	Automatic
Final Drive	Front
Type/No. Cylinders	6
Engine Displacement (L)	3.5
Engine Placement	Lateral
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	Yes
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes
Does owner's manual provide instructions to turn off automatic door locks?	Yes

Anti-Lock Brakes	Yes
All Wheel Drive	No
Power Steering	Yes
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Pass. Front Airbag	Yes
Pass. Curtain Airbag	Yes
Pass. Head/Torso Airbag	No
Pass. Torso Airbag	No
Pass. Torso/Pelvis Airbag	Yes
Pass. Pelvis Airbag	No
Pass. Knee Airbag	No
Pretensioners	Yes
Load Limiters	Yes
Automatic Door Locks	Yes
Bucket Seats	Yes
Tilt Steering	Yes
Other	

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda Mfg. of Alabama, LLC
Date of Manufacture	09/10

GVWR (kg)	2730
GAWR Front (kg)	1320
GAWR Rear (kg)	1450

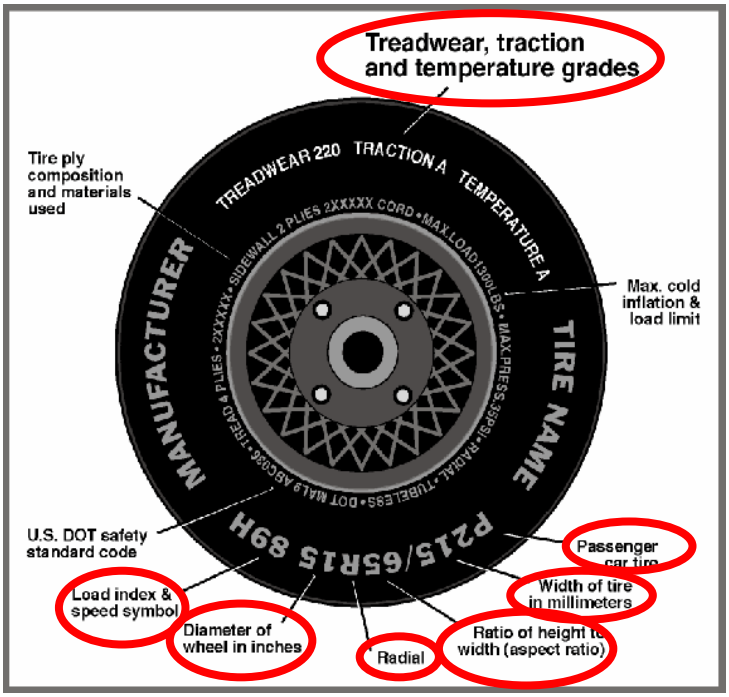
VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	Split Bench	
Designated Seating Capacity (DSC)	2	3	2	7
Capacity Weight (VCW) (kg)				608
Cargo Weight (RCLW) (kg)				132

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010



Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	230	230
Recommended Tire Size	P235/65R17	P235/65R17
Tire Size on Vehicle	P235/65R17	P235/65R17
Tire Manufacturer	Continental	Continental
Tire Model	Conti Pro Contact	Conti Pro Contact
Treadwear	500	500
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index & Speed Symbol	103T	103T
Tire Material	Rubber	Rubber
DOT Safety Code Right	A387 3VW	A387 3VW
DOT Safety Code Left	A387 3VW	A387 3VW

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	576.5	423.7		604.2	538.9	
Right	kg	548.9	426.8		574.7	523.9	
Ratio	%	57.0	43.0		52.6	47.4	
Totals	kg	1125.4	850.5	1975.9	1178.9	1062.8	2241.7

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1975.9
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	132
Calculated Target Vehicle Target Weight (TVTW)	kg	2248.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	763	768	778	784	1293
As Tested	mm	760	762	748	748	1425
Post Test	mm	879	885	761	743	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3005
Total Vehicle Length at Left Side	mm	4955
Total Vehicle Length at Centerline	mm	5166
Total Vehicle Length at Right Side	mm	4955
Weight of Ballast in Cargo Area	kg	95.3
Weight of Vehicle Components Removed	kg	1.8
Amount of Stoddard Solvent in Fuel Tank	L	73.8

List of components removed to meet test weight: Trunk carpet, rear floor mat, right tail light.

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5166
2	Total Width	1984
3	Bumper Top Height	557
4	Bumper Bottom Height	428
5	Longitudinal Member Top Height	540
6	Distance between Longitudinal Members	1030
7	Longitudinal Member Width	115
8	Engine Top Height	860
9	Engine Bottom Height	194
10	Engine and Gearbox Width	695
11	Front Bumper-Engine Distance	458
12	Front Shock Absorber Fixing Height	1018
13	Bonnet Leading Edge Height	837
14	Front Shock Absorber Fixing Width	1333
15	Front Bumper – Front Axle Distance	937
16	Front Axle – A-Pillar Distance	489
17	A-Pillar – B-Pillar Distance	1060
18	B-Pillar – Rear Axle Distance	1465
19	B-Pillar – C-Pillar Distance	983
20	Roof Sill Bottom Height	1519
21	Roof Sill Top Height	1637
22	Floor Sill bottom Height	192
23	Floor Sill Top Height	328

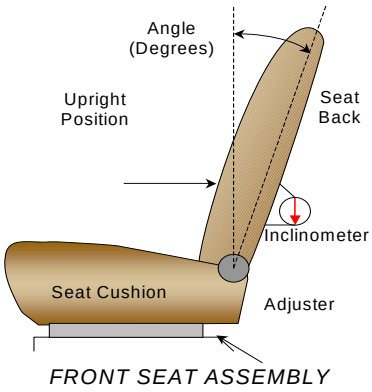
DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

NOMINAL DESIGN RIDING POSITION

The driver seat back is positioned as close as possible to the manufacturer's design angle. For the passenger seat back, seat back is adjusted following Appendix F, "Driver & Passenger Seating & Positioning Procedures" in the NCAP Test Procedure dated January 2010.



SEAT BACK ANGLE	Degrees
Driver Seat Back Angle	12.4° on headrest post guide
Passenger Seat Back Angle	5.8° on headrest post guide

SEAT FORE/AFT POSITIONS

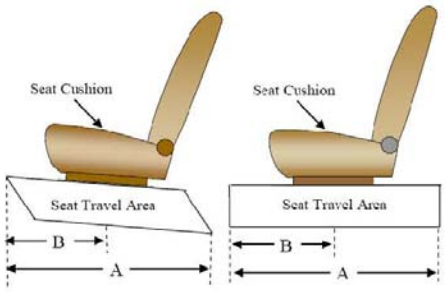
The driver and passenger seat fore/aft positions are adjusted following Appendix F, "Driver & Passenger Seating & Positioning Procedures" in the NCAP Test Procedure dated January 2010.

SEAT FORE/AFT POSITIONS	Total Fore/Aft Travel	Placed in Position #
Driver Seat	255 mm	128 mm (forward-most as 0)
Passenger Seat	21 detents (1st as 1)	0 detent (forward-most as 0)

SEAT BELT UPPER ANCHORAGES

The seat belt upper anchorages are positioning following the manufacturer's specified position as listed in Form 1.

SEAT BELT UPPER ANCHORAGES	Total # of Positions	Placed in Position #
Driver Seat	4	0 (uppermost as 0)
Passenger Seat	4	0 (uppermost as 0)



DATA SHEET NO. 2 (CONTINUED)

SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

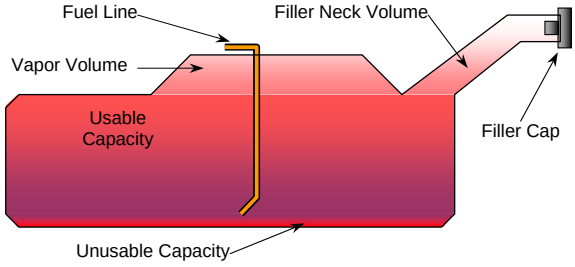
FUEL TANK CAPACITY DATA

	Liters
Usable Capacity of "Standard Tank"	79.5
Usable Capacity of "Optional" Tank	
92-94% of Usable Capacity	73.1 to 74.7
Actual Amount of Solvent used	73.8
1/3 of Usable Capacity	26.5

FUEL PUMP

Describe the fuel pump type, its behavior, and the location of the fuel filler pipe.

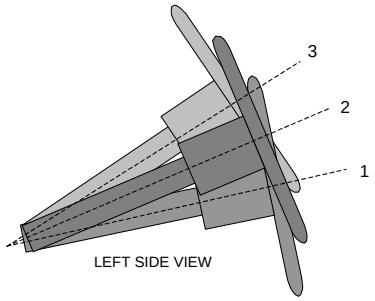
The vehicle is equipped with an electric fuel pump. After the ignition key is turned from LOCK (0) to ON (II) position, the pump will be filled up for two seconds, and then the pressure is maintained. The fuel filler pipe is on the left side.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

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



STEERING COLUMN ASSEMBLY

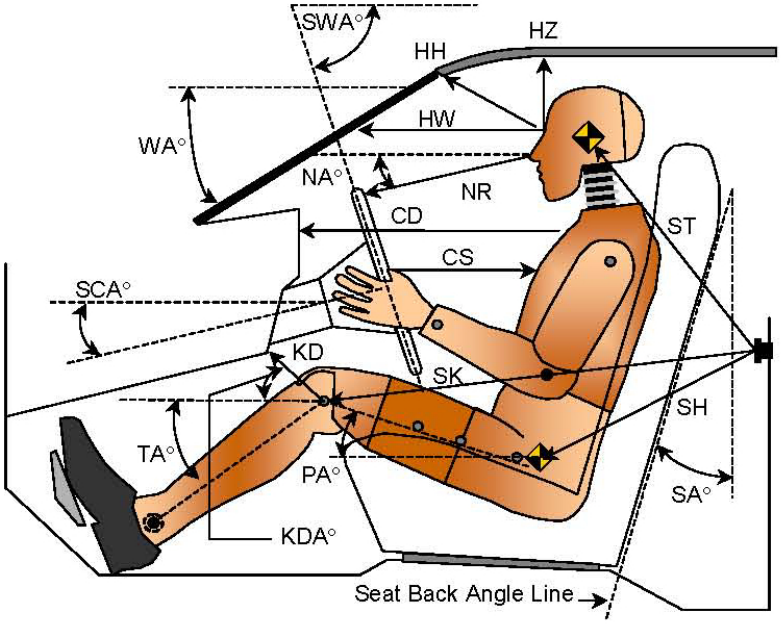
STEERING COLUMN POSITION

	Degrees	Fore/Aft Position (mm)
Lowermost – Position 1	68.4	250
Geometric Center – Position 2	65.2	230
Uppermost – Position 3	62.0	210
Telescoping Steering Wheel Travel		40
Test Position	65.2	230

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

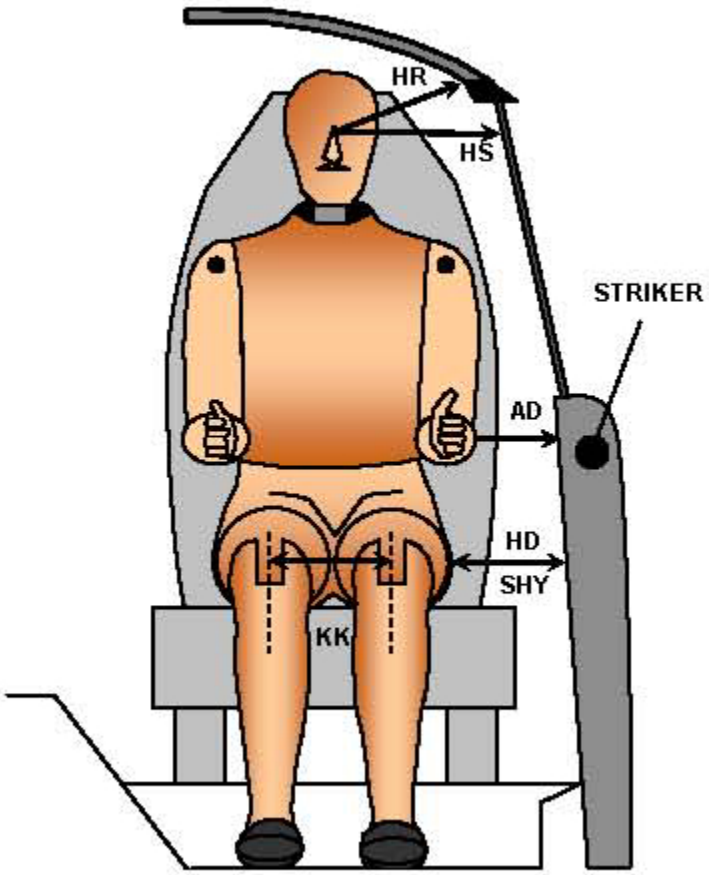


Code	Measurement Description	Driver S/N 351		Passenger S/N 634	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA	Windshield Angle		26.8		
SWA	Steering Wheel Angle		65.2		
SCA	Steering Column Angle		24.8		
SA	Seat Back Angle (headrest bezel)		12.4		5.8
HZ	Head to Roof (Z)	199	90	230	90
HH	Head to Header	352	24.5	291	42.7
HW	Head to Windshield	676	0	681	0
NR	Nose to Rim	400	10.8		
CD	Chest to Dash	532		429	
CS	Chest to Steering Hub	305	1.3		
RA	Rim to Abdomen	178	0		
KDL	Left Knee to Dash	130	31.6	78	34.1
KDR	Right Knee to Dash	95	30.8	80	35.5
PA	Pelvic Angle		23.9		21.3
TA	Tibia Angle		57.3		54.8
SK	Striker to Knee	618	81.8	680	83.0
ST	Striker to Head	649	7.3	595	20.5
SH	Striker to H-Point	222	105.2	365	93.8

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010



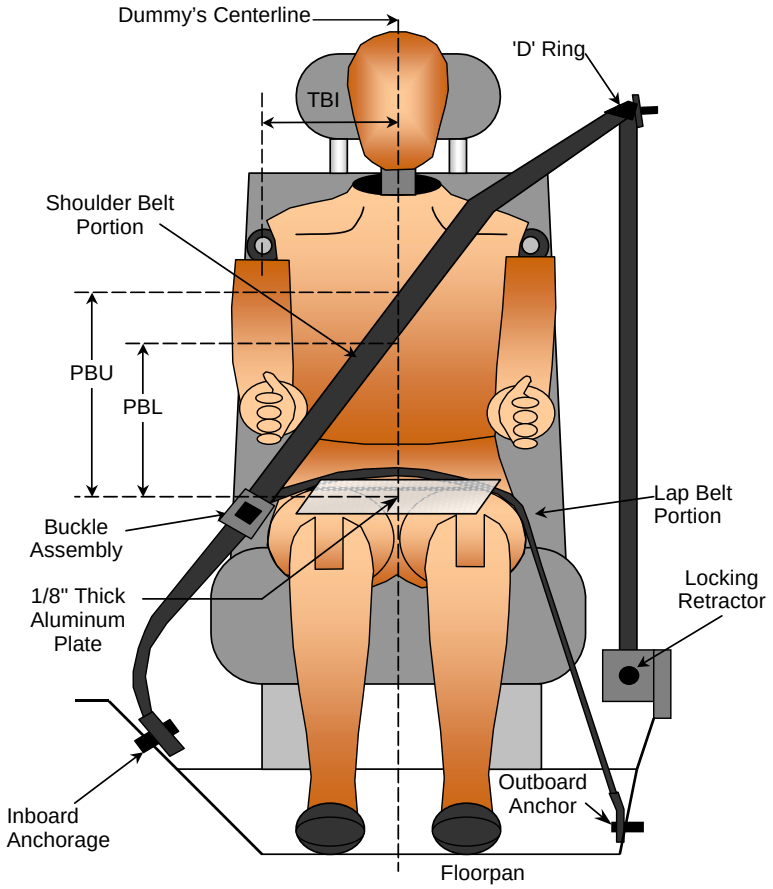
FRONT VIEW OF DUMMY

Code	Measurement Description	Driver S/N 351	Passenger S/N 634
		Length (mm)	
AD	Arm to Door	143	92
HD	H-Point to Door	153	168
HR	Head to Side Header	245	282
HS	Head to Side Window	370	395
KK	Knee to Knee	325	227
SHY	Striker to H-Point (Y Direction)	315	345
AA	Ankle to Ankle	335	201

DATA SHEET NO. 5

SEAT BELT POSITIONING DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU - Top surface of reference to belt upper edge	mm	375	320
PBL - To surface of reference to belt lower edge	mm	300	225

BELT LENGTH DATA

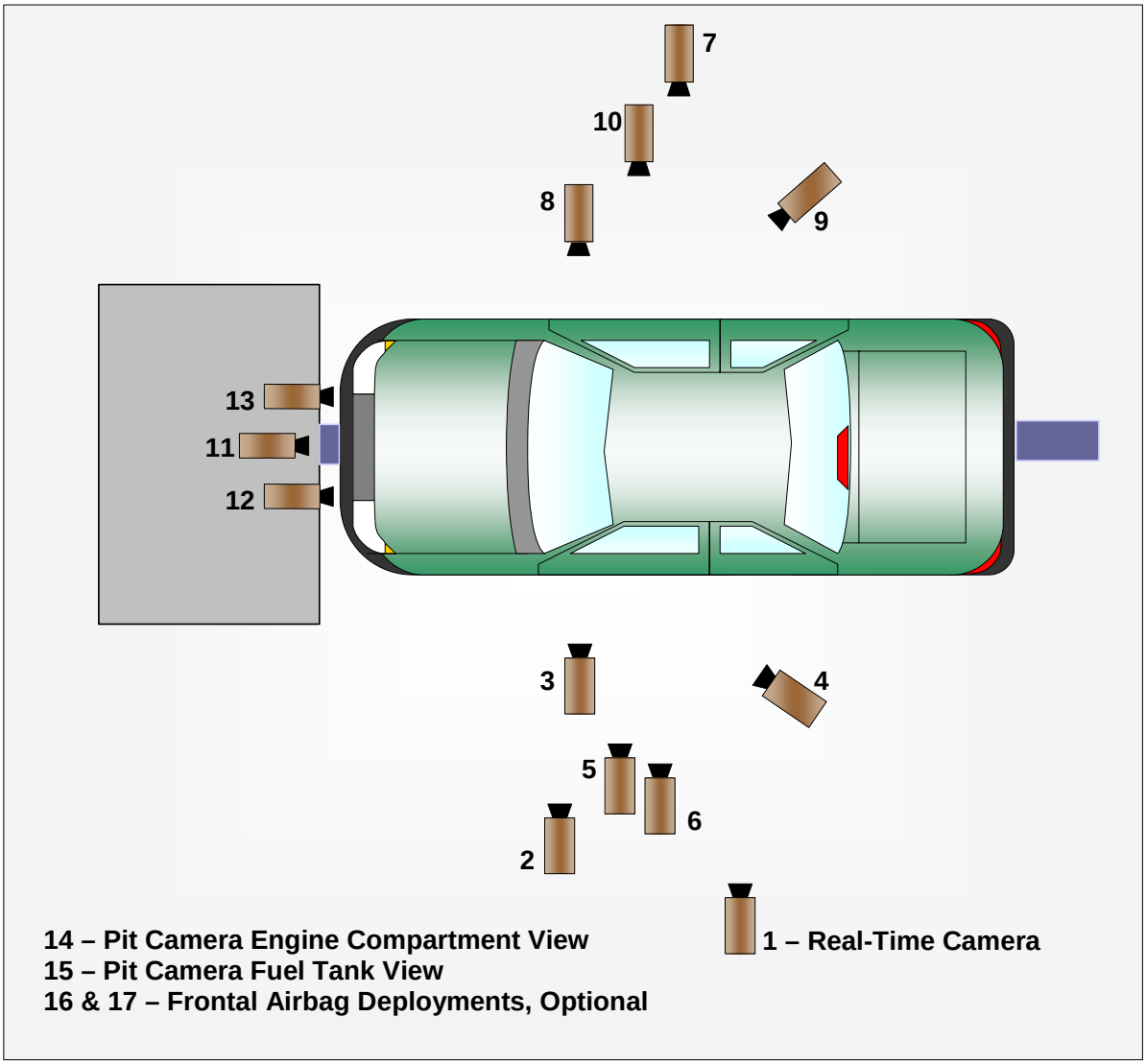
Measurement Description	Units	Driver	Passenger
Shoulder Belt Length as measured on ATD	mm	900	940
Lap Belt Length as measured on ATD	mm	720	530
Remainder of belt of reel	mm	1680	1880
Total Belt Length for Continuous Webbing Systems	mm	3300	3350

DATA SHEET NO. 6

HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: MB5314
Test Date: 12/03/2010

CAMERA POSITIONS FOR FRONTAL IMPACTS



14 – Pit Camera Engine Compartment View
15 – Pit Camera Fuel Tank View
16 & 17 – Frontal Airbag Deployments, Optional

1 – Real-Time Camera

DATA SHEET NO. 6 (CONTINUED)

CAMERA LOCATIONS AND DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

CAMERA LOCATIONS

No.	Camera View	Coordinates (mm)			Lens (mm)	Speed (fps)
		X*	Y*	Z*		
1	Real-Time Left Side View					30
2	Left Front Half	1240	-5170	-1210	24	1000
3	Driver Close-Up	1380	-6260	-1620	35	1000
4	Driver Angle	5730	-4790	-1800	50	1000
5	Steering Column Top	590	-5280	-1230	24	1000
6	Steering Column Bottom	570	-5250	-850	24	1000
7	Right Overall	2180	6390	-1240	20	1000
8	Passenger Close-Up	1350	6320	-1640	35	1000
9	Passenger Angle	5690	4720	-1840	50	1000
10	Right Front Half	1300	5210	-1270	24	1000
11	Windshield	-260	0	-2860	24	1000
12	Top Driver	50	-360	-2090	12.5	1000
13	Top Passenger	50	370	-2090	12.5	1000
14	Pit Front	1430	0	3150	24	1000
15	Pit Rear	3300	0	3150	24	1000
16	Onboard Driver Side (optional)					
17	Onboard Passenger Side (optional)					
18	Real-Time Pan View					30

*COORDINATES:

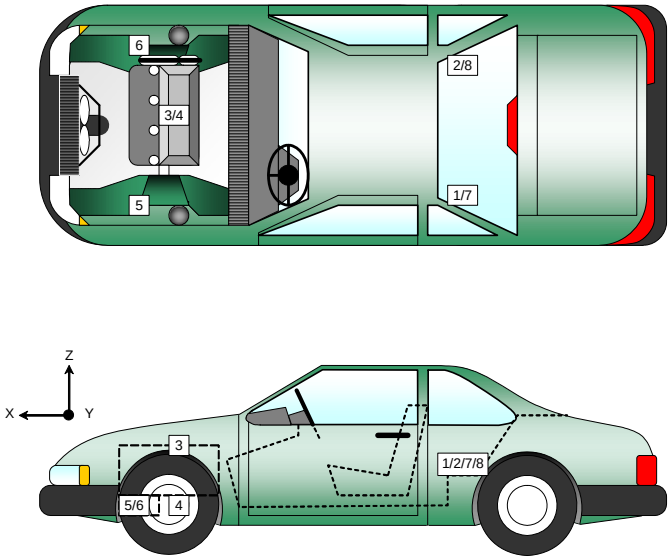
+X = forward of impact plane
+Y = right of monorail centerline
+Z = below ground level

Cameras 16 & 17 were not used for this test.

DATA SHEET NO. 7

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	2375	-460	-400
2	Right Rear X-Member X	2375	460	-400
3	Engine Top X	4446	0	-860
4	Engine Bottom X	4411	0	-267
5	Left Brake Caliper X	4362	-776	-282
6	Right Brake Caliper X	4362	776	-282
7	Left Rear X-Member Z	2375	-460	-400
8	Right Rear X-Member Z	2375	460	-400

Reference Points: X - Rear Surface of Vehicle (+ forward)
Y - Vehicle Centerline (+ to right)
Z - Ground Plane (+ down)

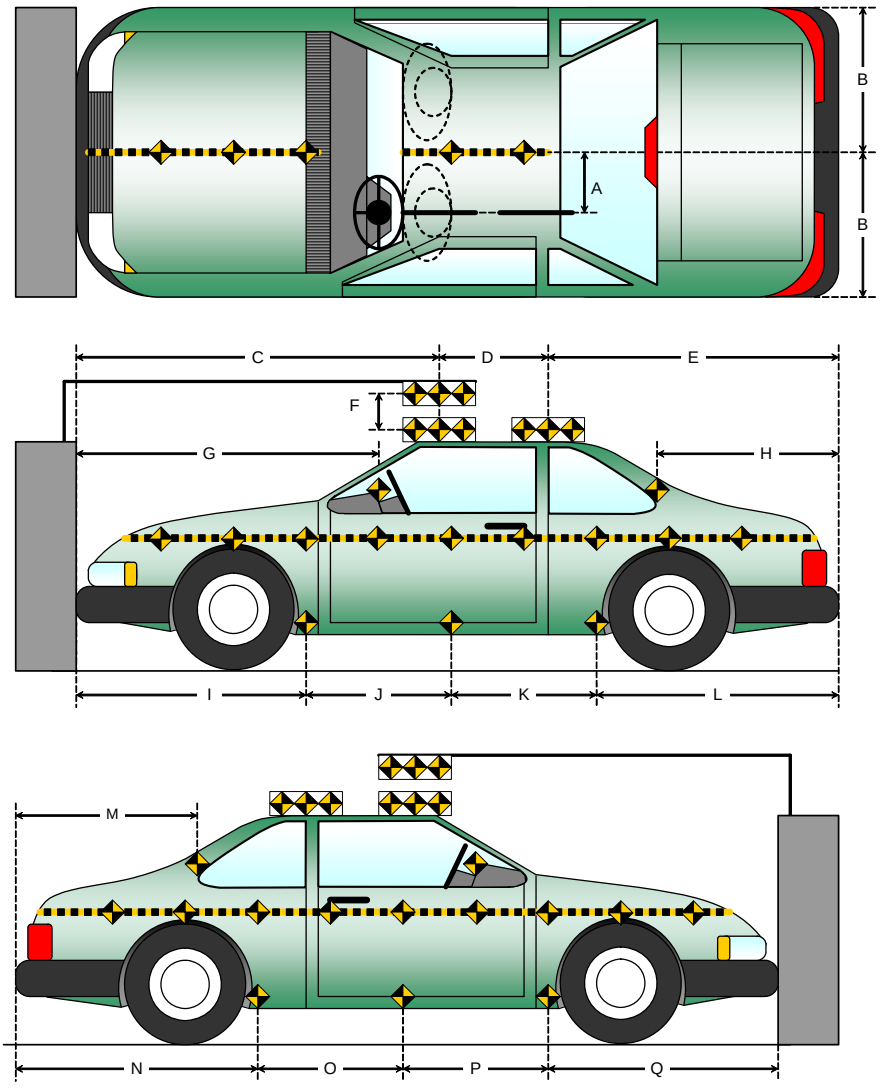
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2011 Honda Odyssey LX Minivan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: MB5314
Test Date: 12/03/2010

Item	Value (mm)
A	440
B	992
C	2325
D	670
E	2171
F	64
G	
H	1436
I	1435
J	1021
K	1021
L	1689
M	1436
N	1689
O	1021
P	1021
Q	1435

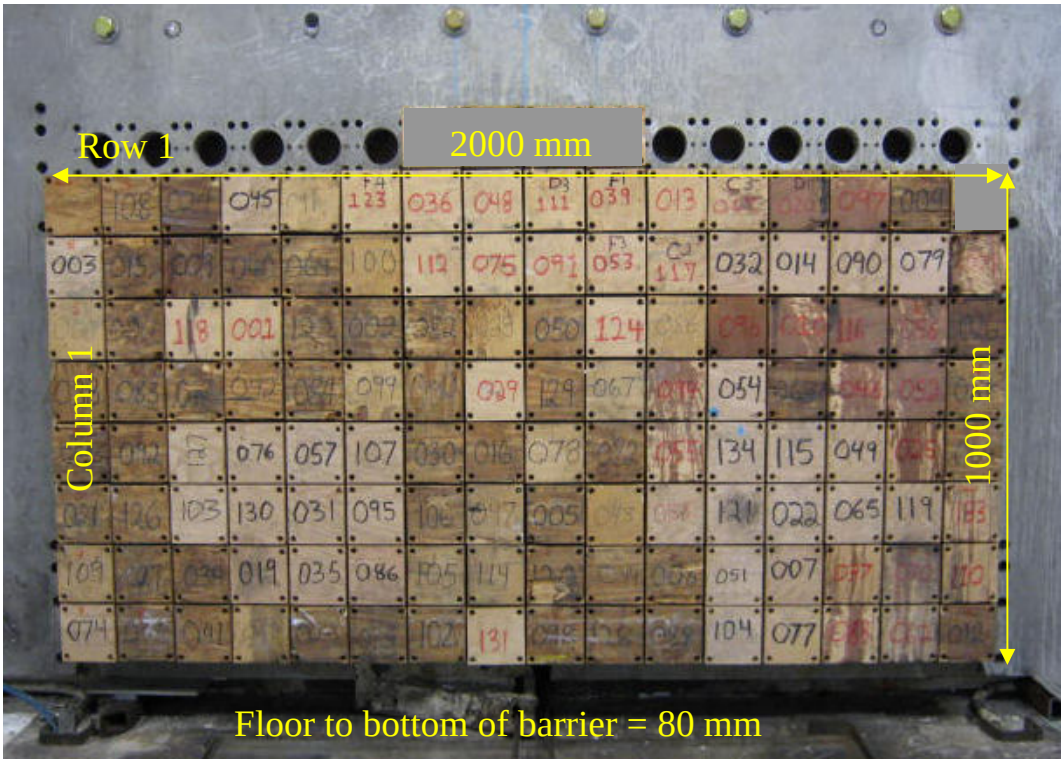


DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

Advanced Research Load Cell Barrier



1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9	1-10	1-11	1-12	1-13	1-14	1-15	1-16
2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8	2-9	2-10	2-11	2-12	2-13	2-14	2-15	2-16
3-1	3-2	3-3	3-4	3-5	3-6	3-7	3-8	3-9	3-10	3-11	3-12	3-13	3-14	3-15	3-16
4-1	4-2	4-3	4-4	4-5	4-6	4-7	4-8	4-9	4-10	4-11	4-12	4-13	4-14	4-15	4-16
5-1	5-2	5-3	5-4	5-5	5-6	5-7	5-8	5-9	5-10	5-11	5-12	5-13	5-14	5-15	5-16
6-1	6-2	6-3	6-4	6-5	6-6	6-7	6-8	6-9	6-10	6-11	6-12	6-13	6-14	6-15	6-16
7-1	7-2	7-3	7-4	7-5	7-6	7-7	7-8	7-9	7-10	7-11	7-12	7-13	7-14	7-15	7-16
8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8	8-9	8-10	8-11	8-12	8-13	8-14	8-15	8-16
9-1	9-2	9-3	9-4	9-5	9-6	9-7	9-8	9-9	9-10	9-11	9-12	9-13	9-14	9-15	9-16

Load Cells are 121 mm x 121 mm with a 7 mm gap in between each load cell.

DATA SHEET NO. 10

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

INSTRUMENTATION

Driver Dummy Data Channels	44
Passenger Dummy Data Channels	44
Vehicle Structure Accelerometers	8
Barrier Channels	127
Total	223

CAMERA COVERAGE

High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time	2
Total	16

DATA SHEET NO. 11

POST-TEST OBSERVATIONS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type / Serial No.	HIII 50% / 351	HIII 5% / 634
Head Contact	Airbag, Headrest	Airbag, Seatback
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	Airbag	Airbag
Left Knee Contact	Knee Bolster	Glovebox
Right Knee Contact	Knee Bolster	Glovebox

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Doors were unlocked	Doors were unlocked
Front Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Rear Door Opening	Door remained closed and latched; Door opened without tools	Door remained closed and latched; Door opened without tools
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	803
Center	mm	790
Right Side	mm	841
Average	mm	811

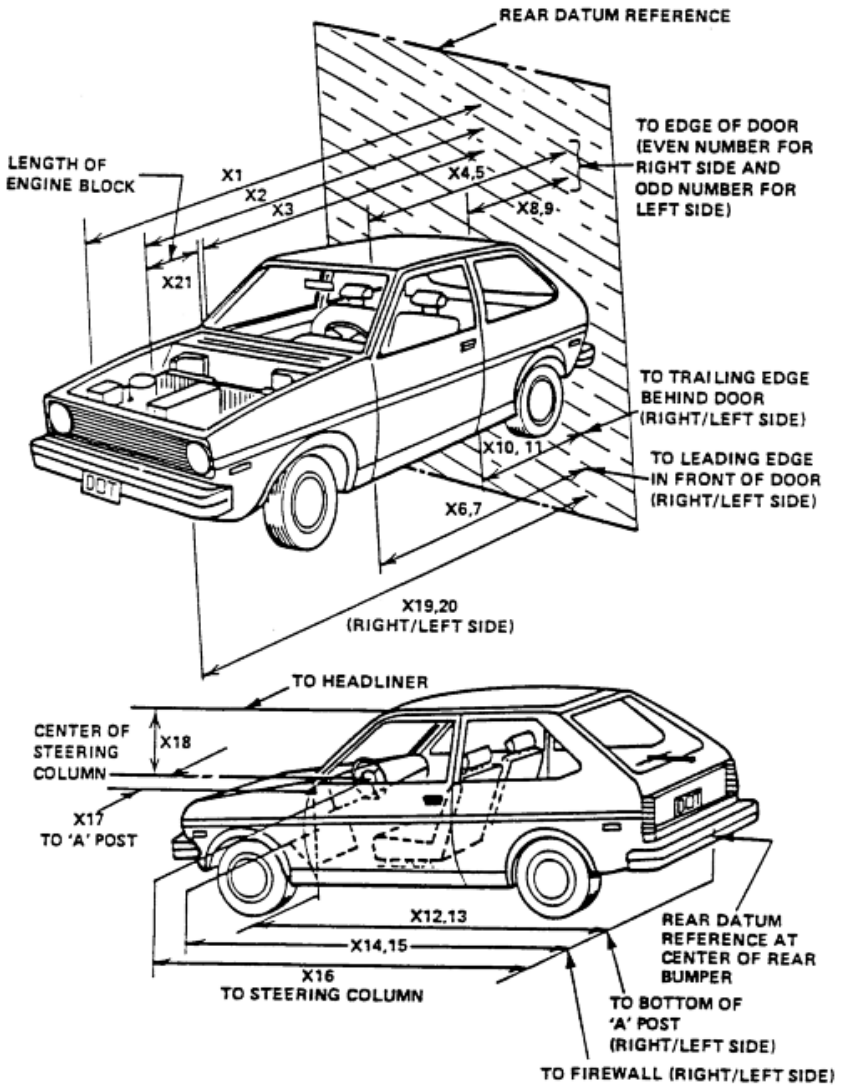
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) P1		Left Front (Passenger) P2	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	Yes	Yes	Yes
Knee Airbag	No		No	
Curtain Side Airbag	Yes	No	Yes	No
Torso/Pelvis Side Airbag	Yes	No	Yes	No
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes		Yes	

DATA SHEET NO. 12

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010



DATA SHEET NO. 12 (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

RSOV (Rear Surface of Vehicle)

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	mm	5166	4563	603
2	RSOV to Front of Engine	mm	4673	4390	283
3	RSOV to Firewall	mm	4325	4305	20
4	RSOV to Upper Leading Edge of Right Door	mm	3684	3672	12
5	RSOV to Upper Leading Edge of Left Door	mm	3687	3665	22
6	RSOV to Lower Leading Edge of Right Door	mm	3662	3663	-1
7	RSOV to Lower Leading Edge of Left Door	mm	3664	3663	1
8	RSOV to Upper Trailing Edge of Right Door	mm	2640	2638	2
9	RSOV to Upper Trailing Edge of Left Door	mm	2640	2627	13
10	RSOV to Lower Trailing Edge of Right Door	mm	2650	2648	2
11	RSOV to Lower Trailing Edge of Left Door	mm	2650	2643	7
12	RSOV to Bottom of “A” Post of Right Side	mm	3680	3682	-2
13	RSOV to Bottom of “A” Post of Left Side	mm	3680	3677	3
14	RSOV to Firewall, Right Side	mm	4271	4266	5
15	RSOV to Firewall, Left Side	mm	4271	4261	10
16	RSOV to Steering Column	mm	3289	3275	14
17	Center of Steering Column to “A” Post	mm	400	378	22
18	Center of Steering Column to Headliner	mm	434	420	14
19	RSOV to Right Side of Front Bumper	mm	4955	4532	423
20	RSOV to Left Side of Front Bumper	mm	4955	4562	393
21	Length of Engine Block	mm	520	520	0
RD	RSOV to Right Side of Dash Panel	mm	3545	3525	20
CD	RSOV to Center of Dash Panel	mm	3545	3580	-35
LD	RSOV to Left Side of Dash Panel	mm	3531	3535	-4

DATA SHEET NO. 13

ACCIDENT INVESTIGATION DIVISION DATA

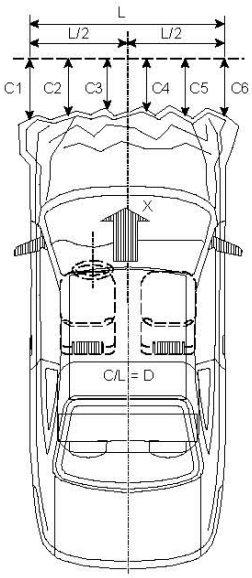
Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

VEHICLE INFORMATION

VIN: 5FNRL5H21BB007206 Wheelbase (mm): 3005
Vehicle Size Category: MPV Test Weight (kg): 2241.7

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on Page 15
Cal. Procedure/Interval: MGA procedure / 6 month
Integration Algorithm: Trapezoidal Linearity: > 99%
Impact Velocity (km/h): 56.2
Velocity Change (km/h): 60.8
Time of Separation (msec): 128



CRUSH PROFILE

Collision Deformation Classification: Frontal
Midpoint of Damage: Centerline
Damage Region Length (mm): 1464
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4955	4562	393
C2	Crush zone 2 at left side	mm	5061	4571	490
C3	Crush zone 3 at left side	mm	5109	4573	536
C4	Crush zone 4 at right side	mm	5109	4568	541
C5	Crush zone 5 at right side	mm	5061	4549	512
C6	Crush zone 6 at right side	mm	4955	4532	423
L	C1 TO C6	mm	1464	1465	-1

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

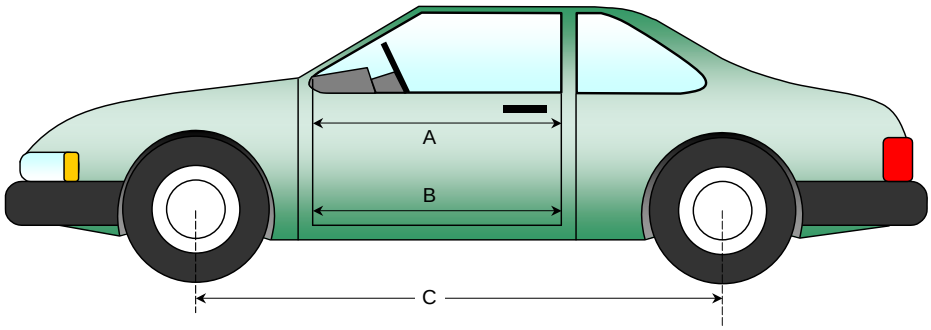
Test Vehicle: 2011 Honda Odyssey LX Minivan
Test Program: NCAP Frontal Barrier Impact Test
NHTSA No.: MB5314
Test Date: 12/03/2010

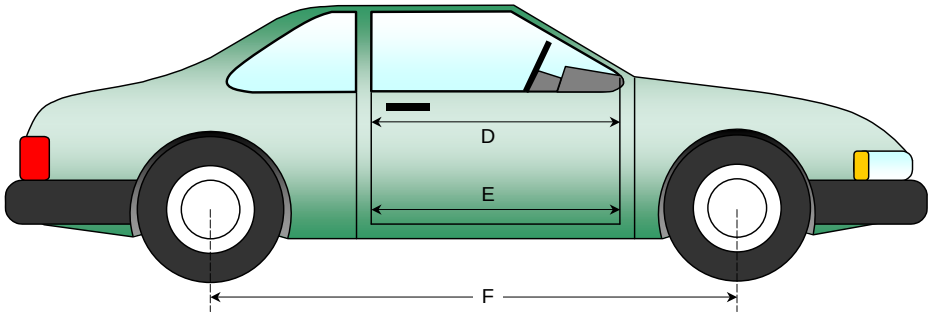
DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	960	960	0
B	Left Side Lower	mm	940	940	0
D	Right Side Upper	mm	960	960	0
E	Right Side Lower	mm	940	940	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3005	2930	75
F	Right Side Wheelbase	mm	3005	2915	90





DATA SHEET NO. 14 (CONTINUED)

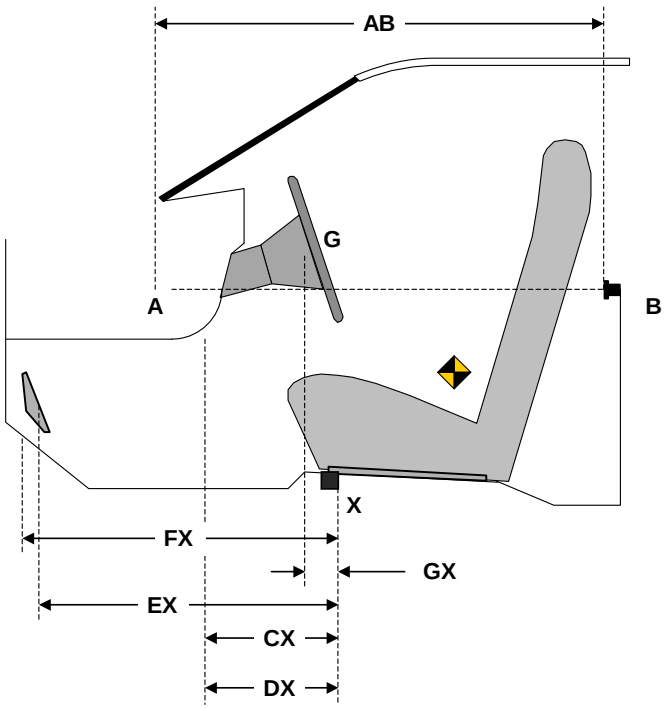
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside window jam)	mm	784	784	0
CX	Left Knee Bolster to X	mm	268	266	2
DX	Right Knee Bolster to X	mm	250	254	-4
EX	Brake Pedal to X	mm	525	510	15
FX	Foot Rest to X	mm	559	557	2
GX	Center of Steering Column Wheel Hub to X	mm	81	85	-4

X = Front of Seat Track (stationary)

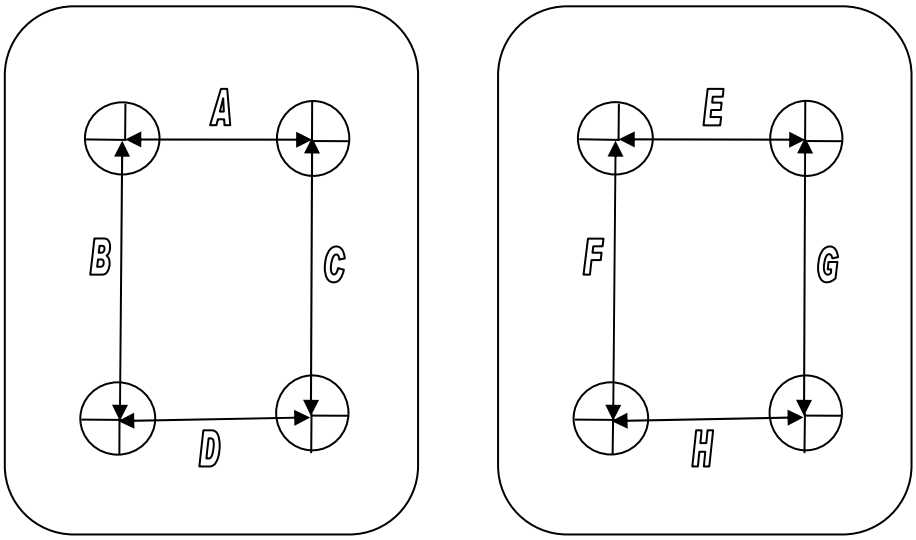


DRIVER COMPARTMENT

DATA SHEET NO. 14 (CONTINUED)

VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010



Driver Passenger

TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Units	Pre-Test	Post-Test	Difference
A	mm	130	130	0
B	mm	205	203	2
C	mm	205	190	15
D	mm	130	130	0
E	mm	130	130	0
F	mm	205	190	15
G	mm	205	195	10
H	mm	130	130	0

DATA SHEET NO. 15

SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

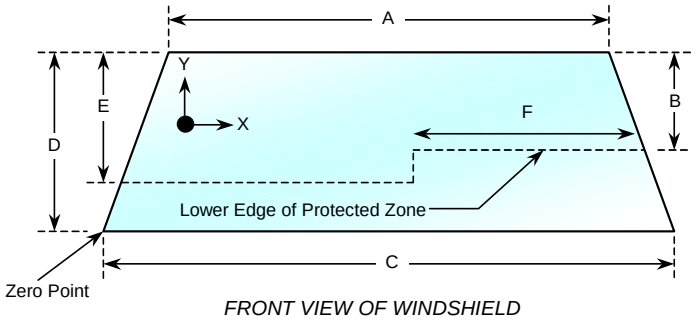
Windshield Mounting Details:
Windshield glass is secured to the vehicle frame with a rubber trim and glue.

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

Temperature of windshield molding during test: 21°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% of Retention
Left Side	2489	2489	100
Right Side	2489	2489	100
Total	4978	4978	100



FRONT VIEW OF WINDSHIELD

Item	Units	Value
A	mm	1432
B	mm	642
C	mm	1708
D	mm	919
E	mm	643
F	mm	544

AREA OF PROTECTED ZONE FAILURES - NONE

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. **None**

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. **None**

X	Y

DATA SHEET NO. 15 (CONTINUED)

SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle:	2011 Honda Odyssey LX Minivan	NHTSA No.:	MB5314
Test Program:	NCAP Frontal Barrier Impact Test	Test Date:	12/03/2010

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Test Time: 10:00 am Temperature: 21° C

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

B. For the 5 minute period after motion ceases: None
(Maximum allowable = 5 ounces)

C. For the following 25 minutes: None
(Maximum allowable = 1 oz./minute)

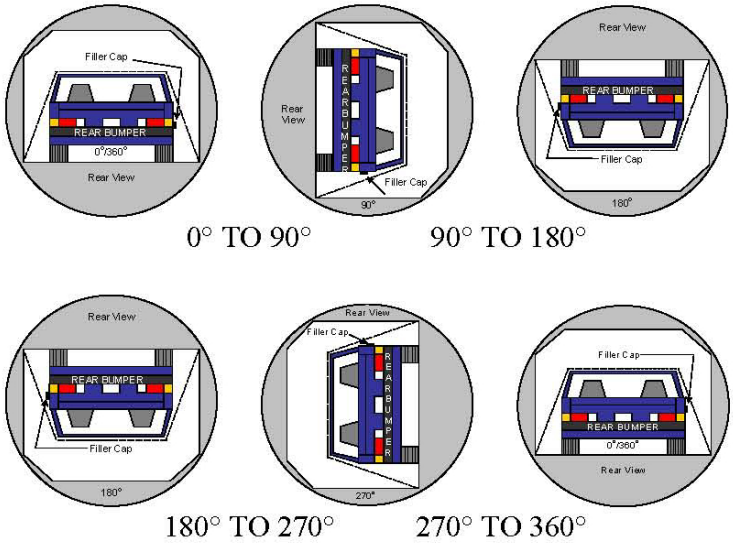
D. Spillage Details: None

DATA SHEET NO. 16

FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010

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: **None**



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	119	300	419
90° to 180°	113	300	413
180° to 270°	107	300	407
270° to 360°	111	300	411

FMVSS 301 ROLLOVER SPILLAGE TABLE (units in ounces)

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

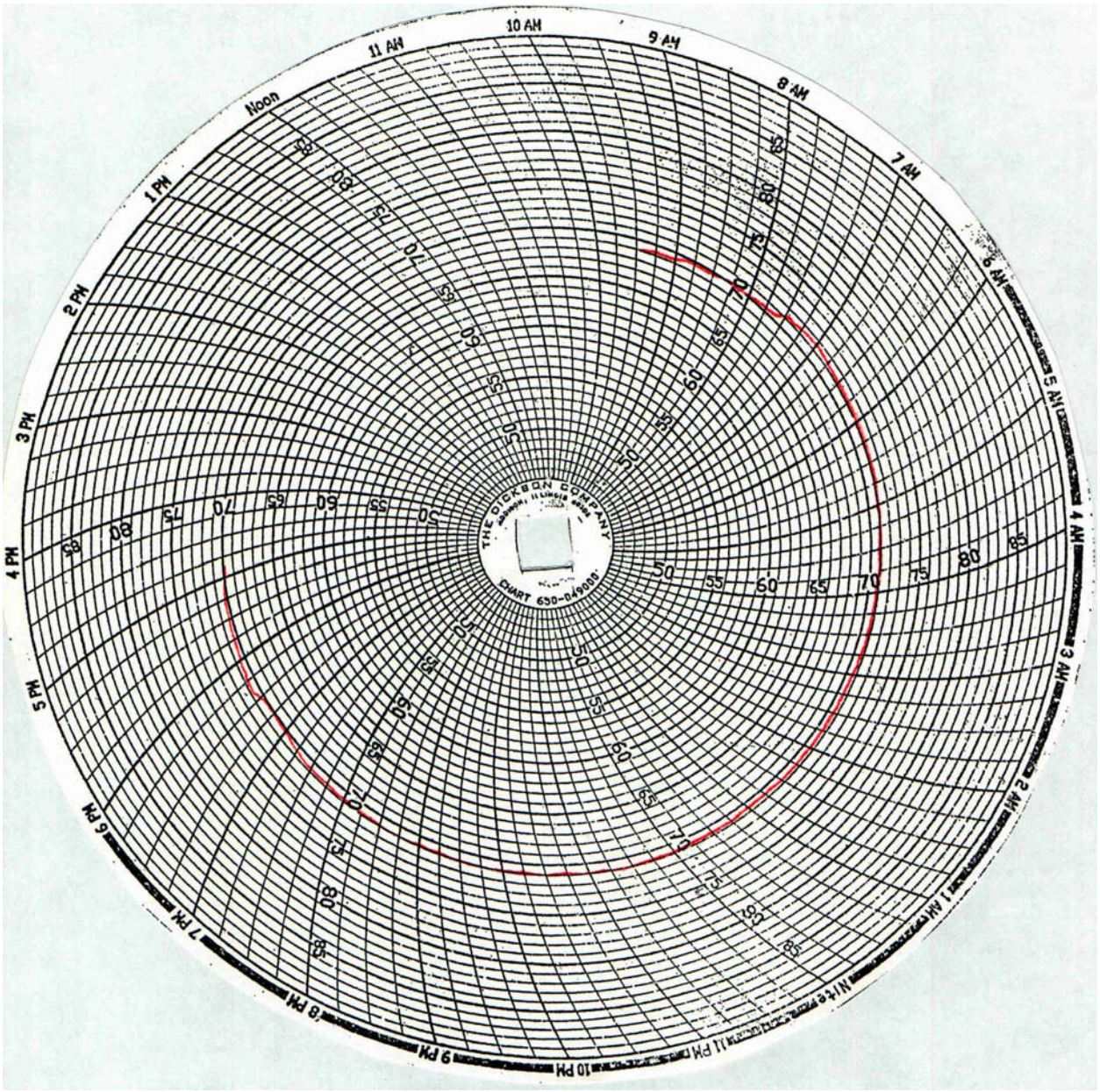
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	
90° to 180°	
180° to 270°	
270° to 360°	

DATA SHEET NO. 17

DUMMY/VEHICLE TEMPERATURE STABILIZATION DATA

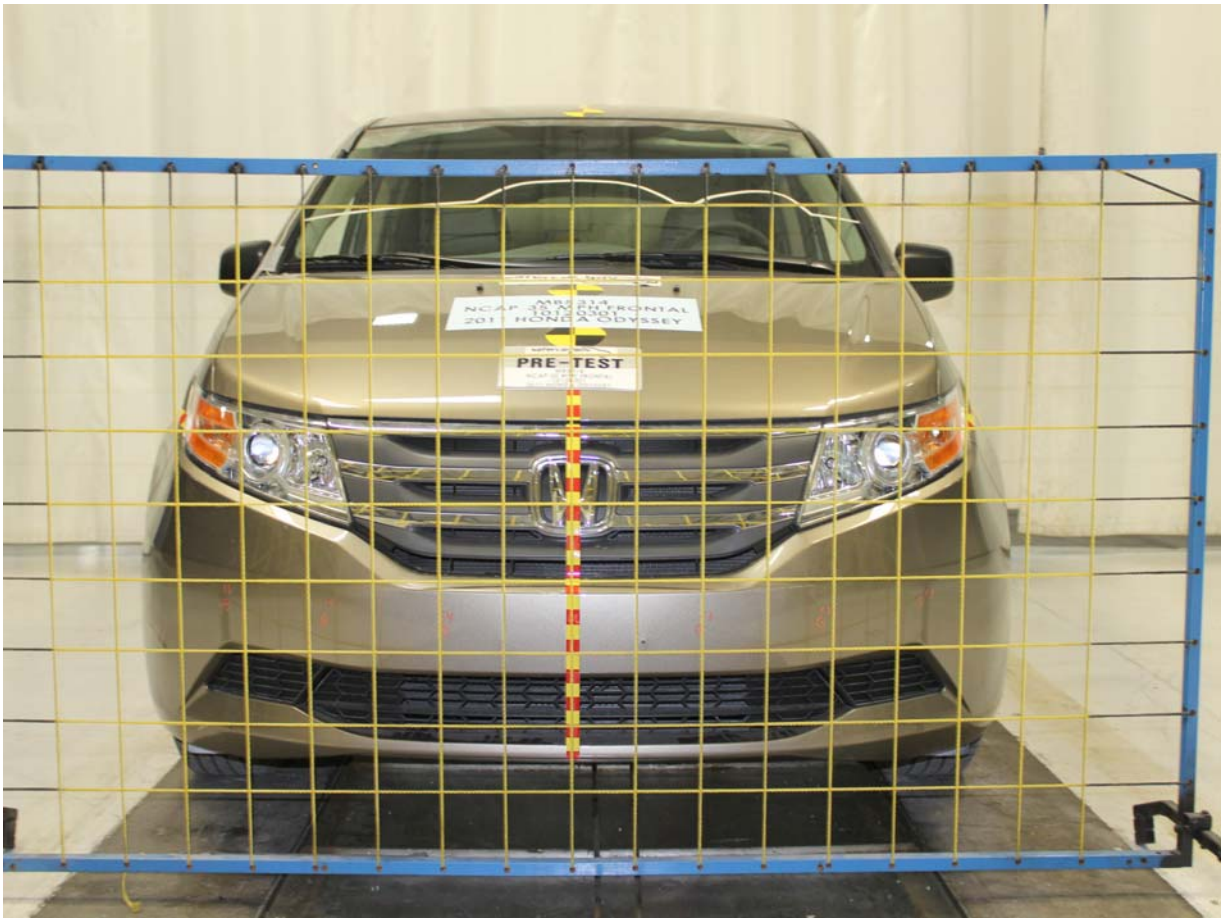
Test Vehicle: 2011 Honda Odyssey LX Minivan NHTSA No.: MB5314
Test Program: NCAP Frontal Barrier Impact Test Test Date: 12/03/2010



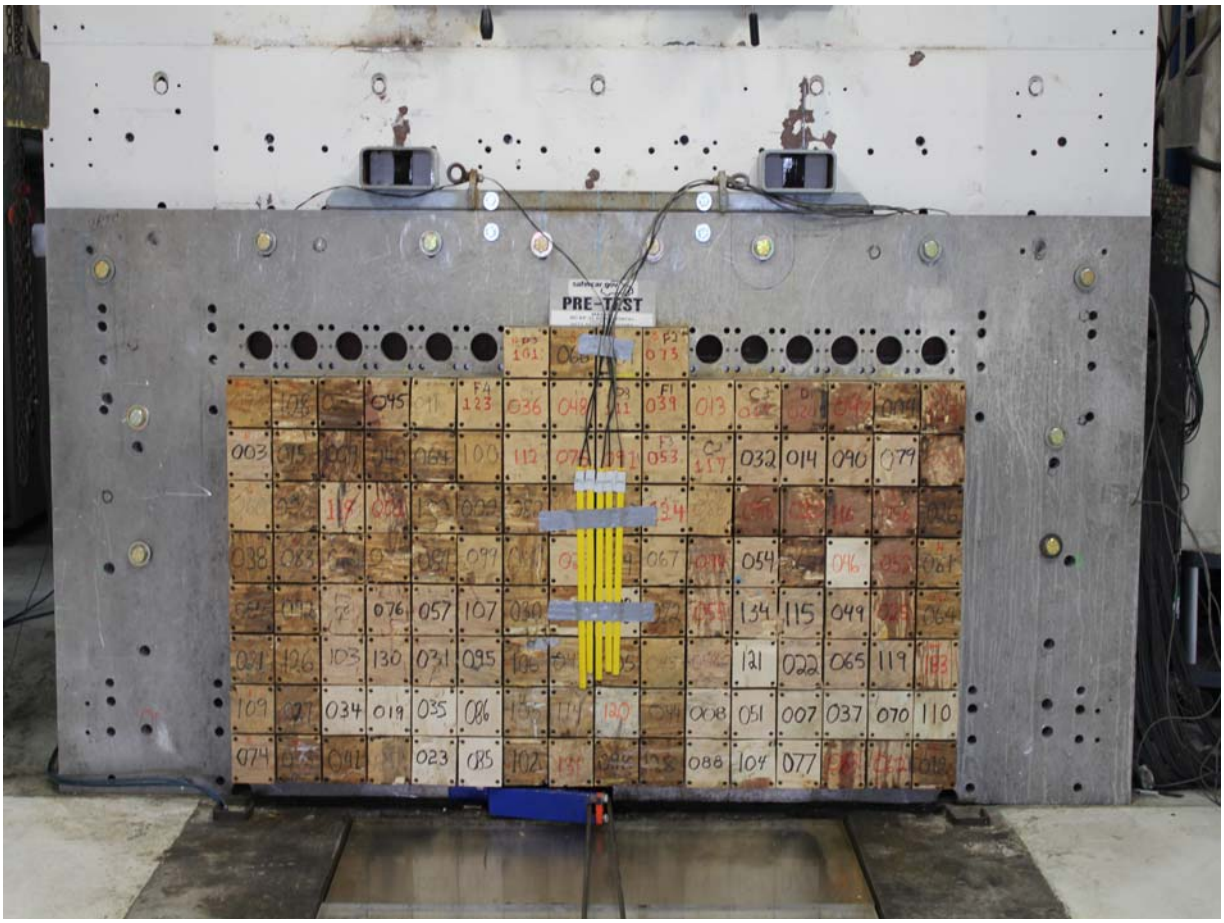
APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS



Load Cell Location



Load Cell Wall

Manufacturer's Label

Tire Placard

Right Front Three-Quarter View, As Received

Left Rear Three-Quarter View, As Received

Pre-Test Front View

Post-Test Front View

Pre-Test Left Side View (with vehicle at barrier)

Post-Test Left Side View

Pre-Test Right Side View (with vehicle at barrier)

Post-Test Right Side View

Pre-Test Right Front Three-Quarter View

Post-Test Right Front Three-Quarter View

Pre-Test Left Rear Three-Quarter View (with vehicle at barrier)

Post-Test Left Rear Three-Quarter View

Pre-Test Windshield View

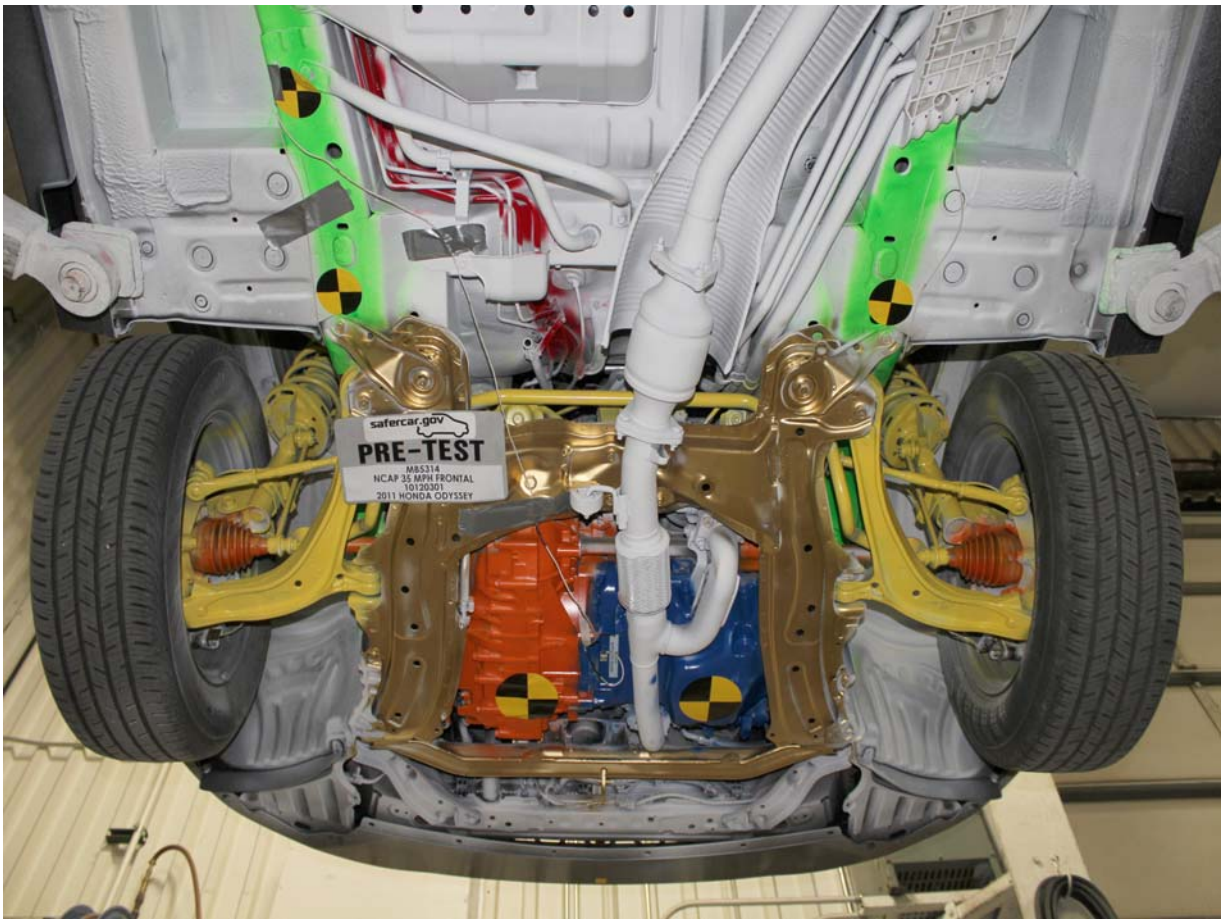
Post-Test Windshield View

Pre-Test Engine Compartment View

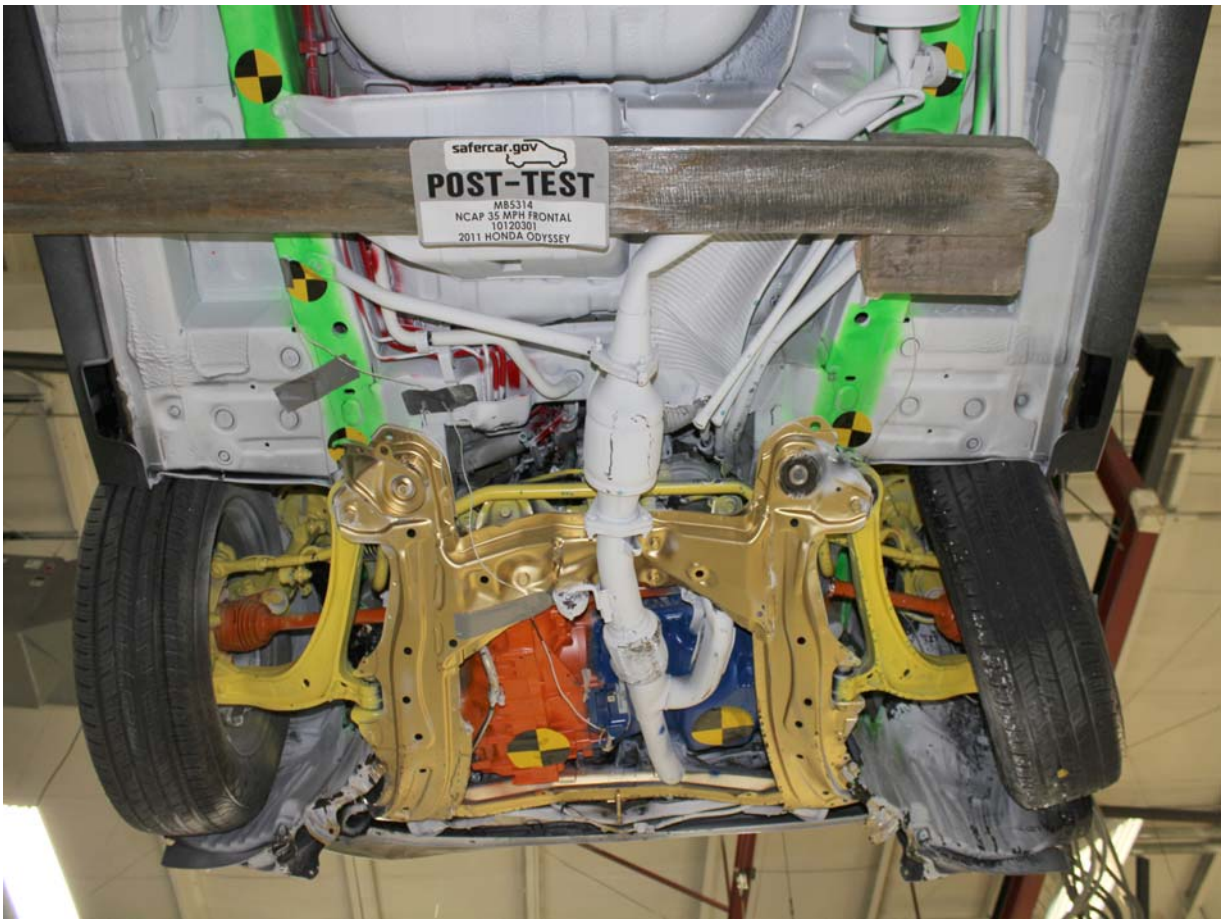
Post-Test Engine Compartment View

Pre-Test Fuel Cap View

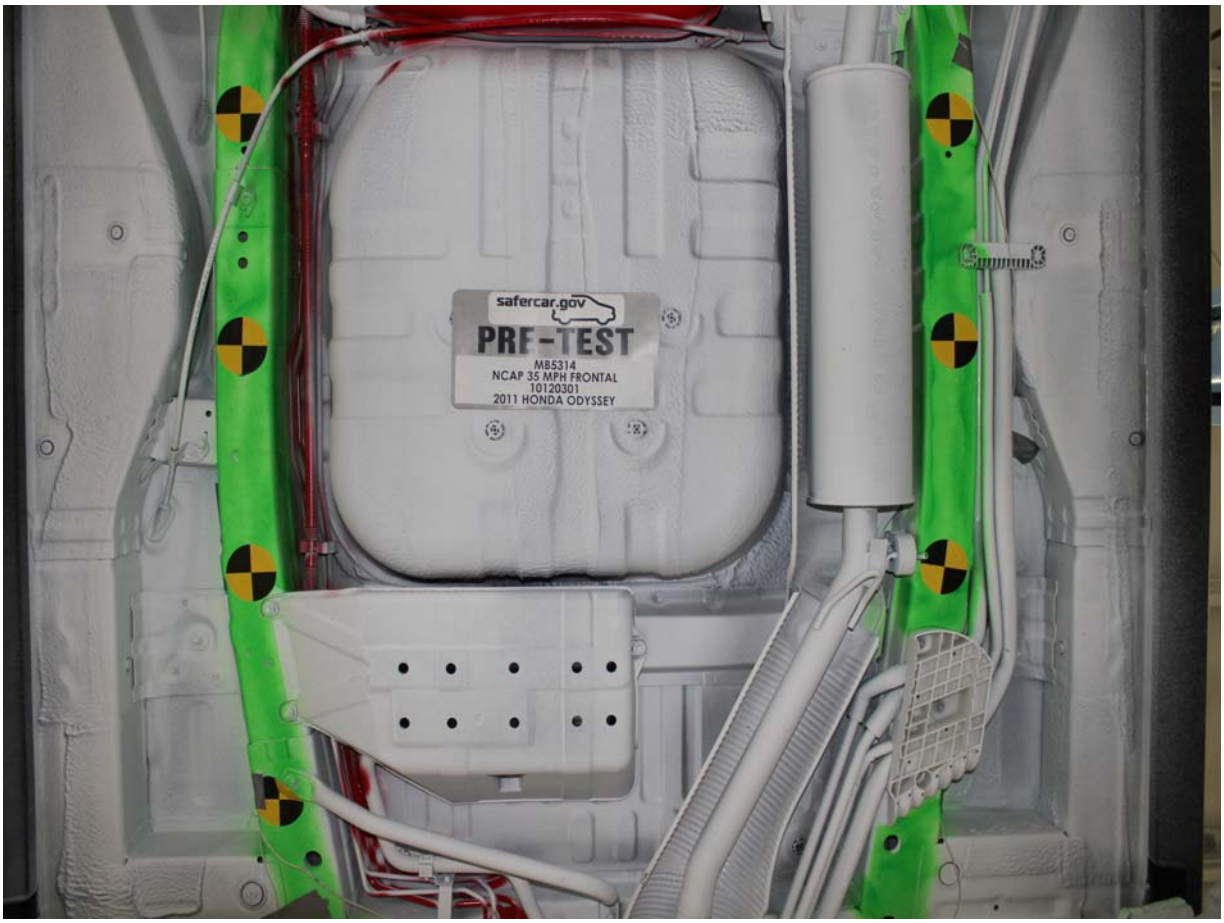
Post-Test Fuel Cap View



Pre-Test Front Underbody View

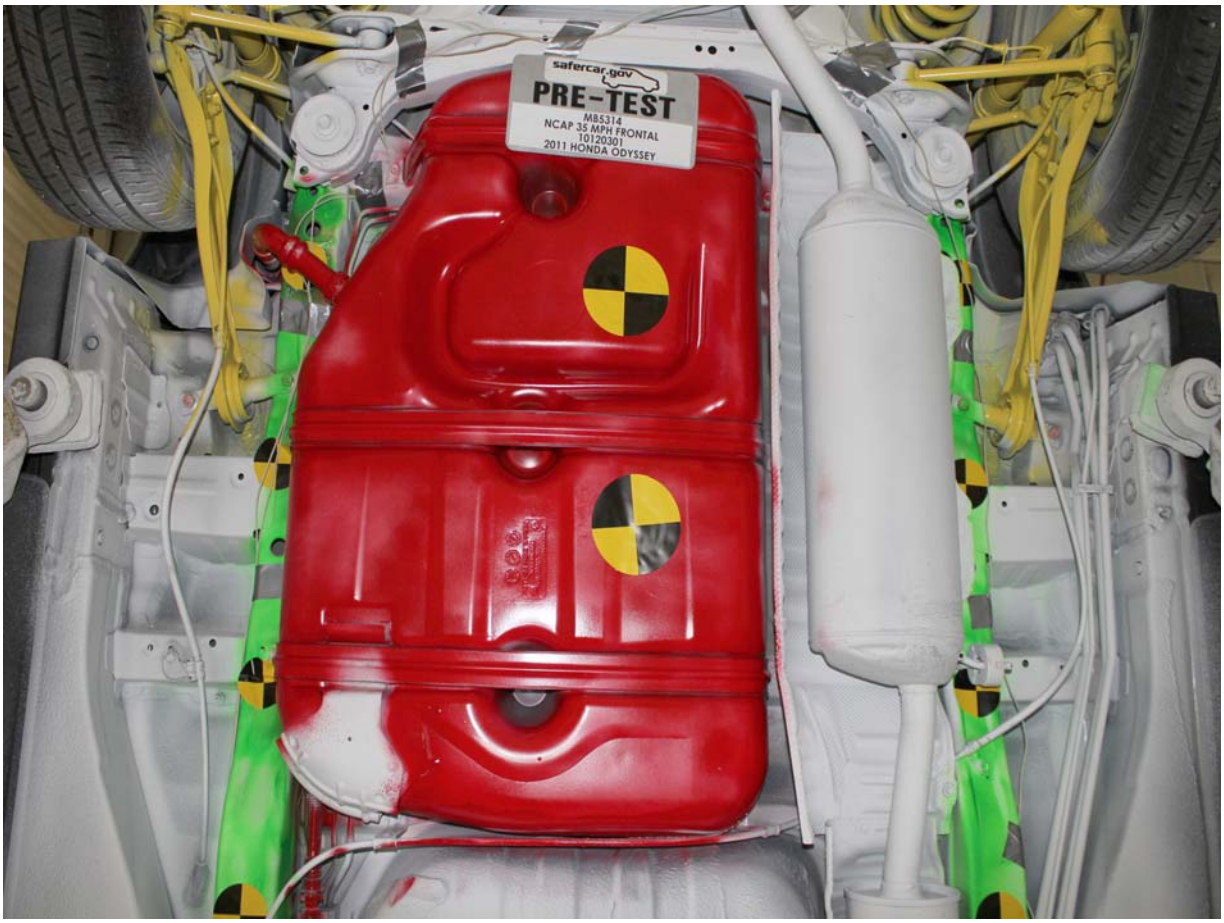


Post-Test Front Underbody View



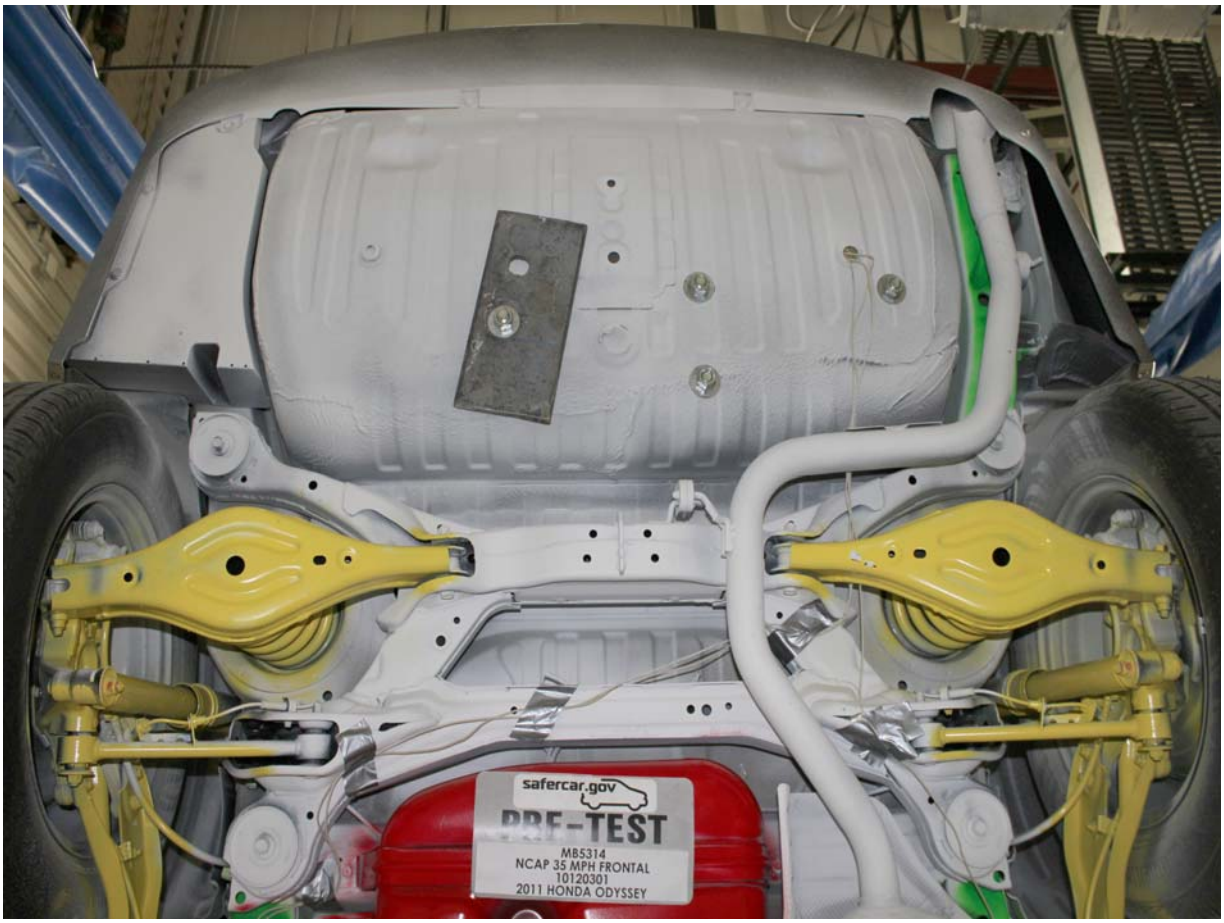
Pre-Test Mid Front Underbody View

Post-Test Mid Front Underbody View



Pre-Test Mid Rear Underbody View

Post-Test Mid Rear Underbody View



Pre-Test Rear Underbody View

Post-Test Rear Underbody View

Pre-Test Dummy Cable Routing

Post-Test Dummy Cable Routing

Pre-Test Driver Dummy Front View

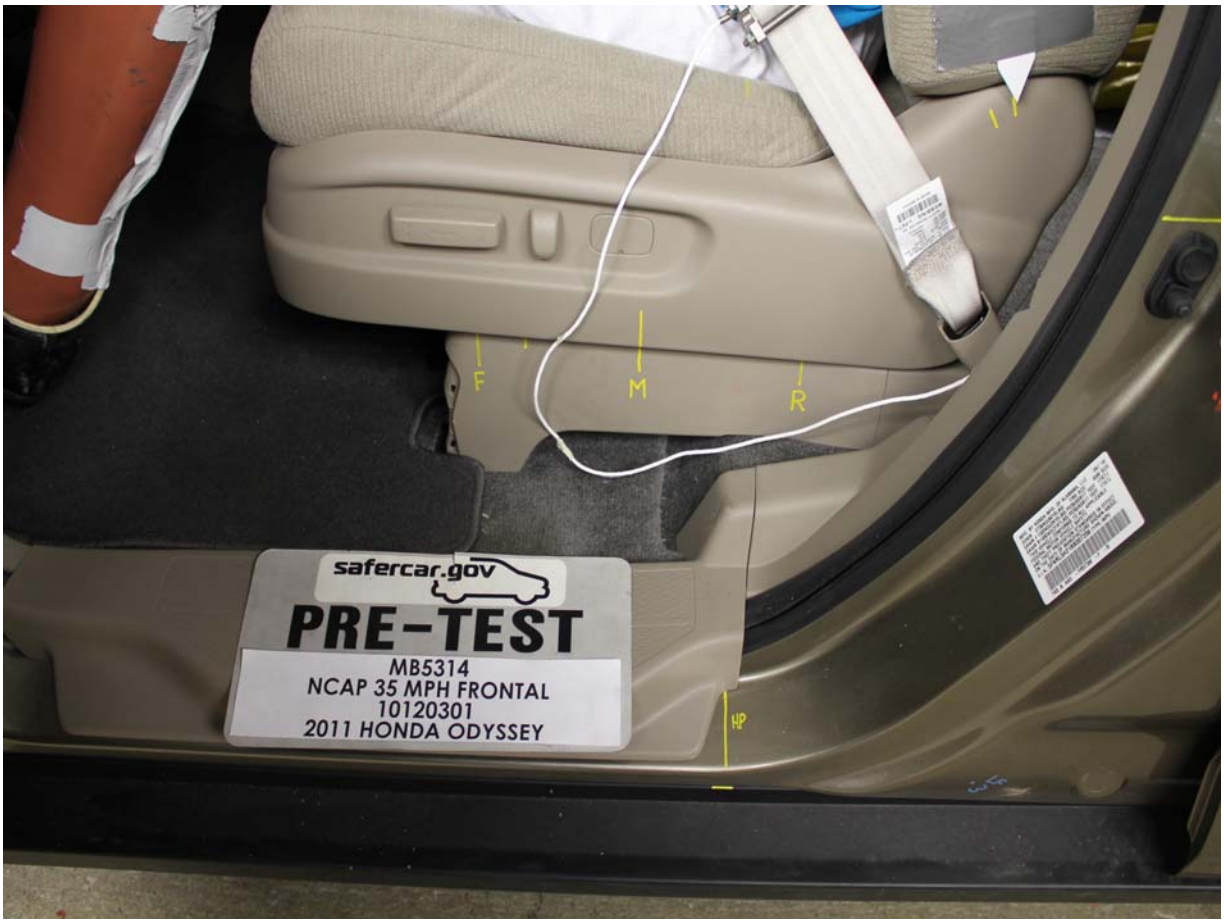
Post-Test Driver Dummy Front View

Pre-Test Driver Dummy Window View

Post-Test Driver Dummy Window View

Pre-Test Driver Dummy and Vehicle Interior (Door Open)

Post-Test Driver Dummy and Vehicle Interior (Door Open)



Pre-Test Driver's Seat Fore-Aft Markings

Post-Test Driver's Seat Fore-Aft Markings

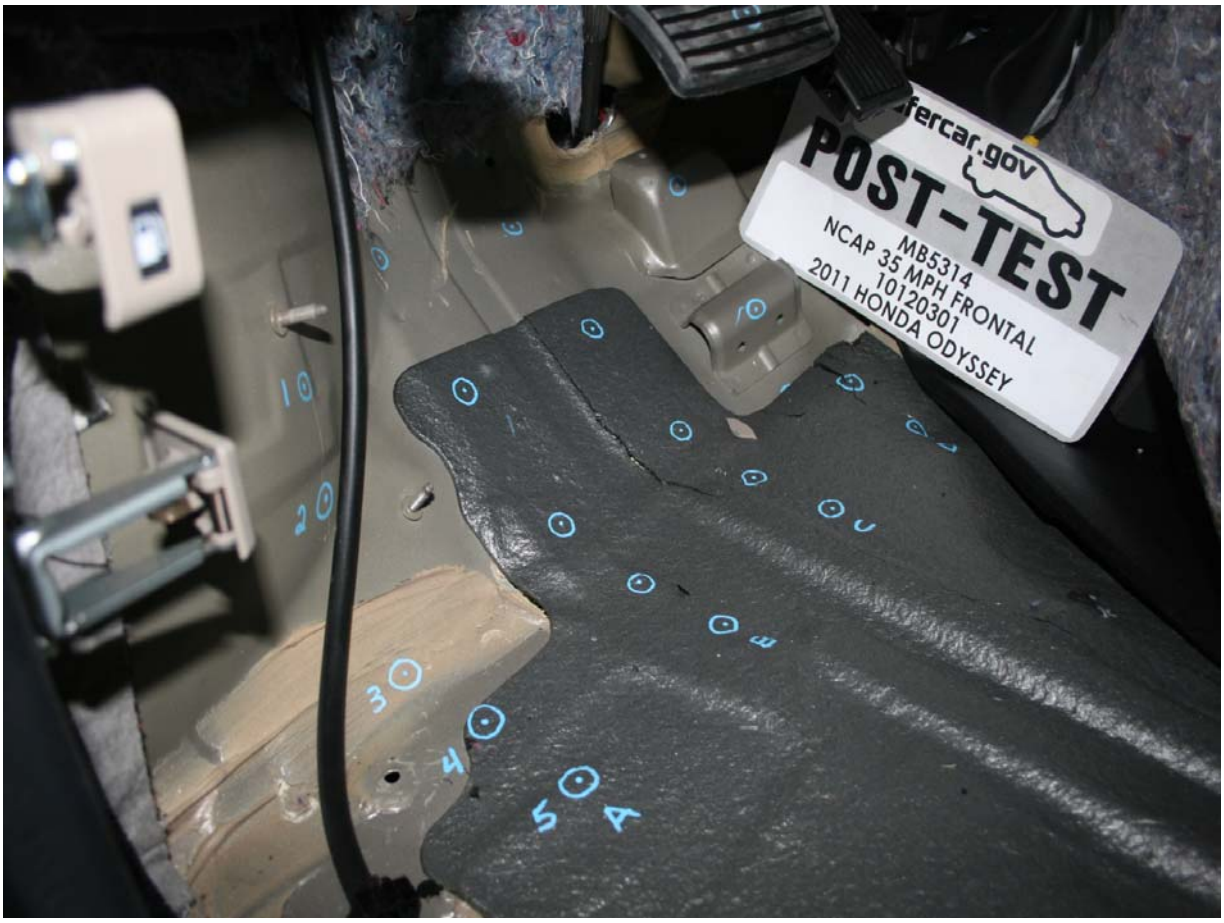
Pre-Test Driver Dummy Feet

Post-Test Driver Dummy Feet

Pre-Test Driver's Side Knee Bolster (without dummy)

Post-Test Driver's Side Knee Bolster (without dummy)

Pre-Test Driver's Side Floorpan



Post-Test Driver's Side Floorpan

Post-Test Driver Dummy Contact with Airbag

Post-Test Driver Dummy Contact with Headrest

Post-Test Driver Dummy Contact with Knee Bolster

Pre-Test View of Steering Column Shear Capsule

Post-Test View of Steering Column Shear Capsule

Pre-Test Passenger Dummy Front View

Post-Test Passenger Dummy Front View

Pre-Test Passenger Dummy Window View

Post-Test Passenger Dummy Window View

Pre-Test Passenger Dummy and Vehicle Interior (Door Open)

Post-Test Passenger Dummy and Vehicle Interior (Door Open)

Pre-Test Passenger's Seat Fore-Aft Markings

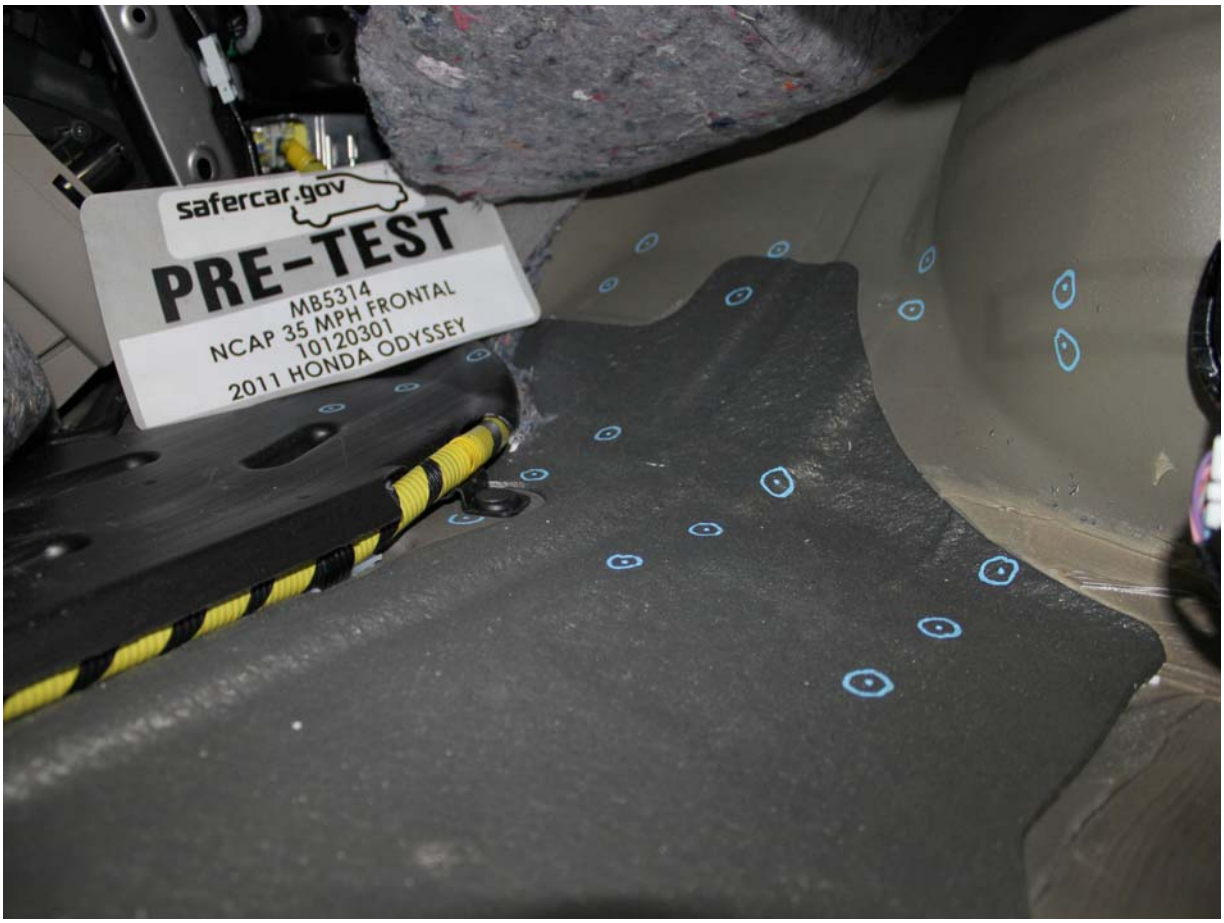
Post-Test Passenger's Seat Fore-Aft Markings

Pre-Test Passenger Dummy Feet

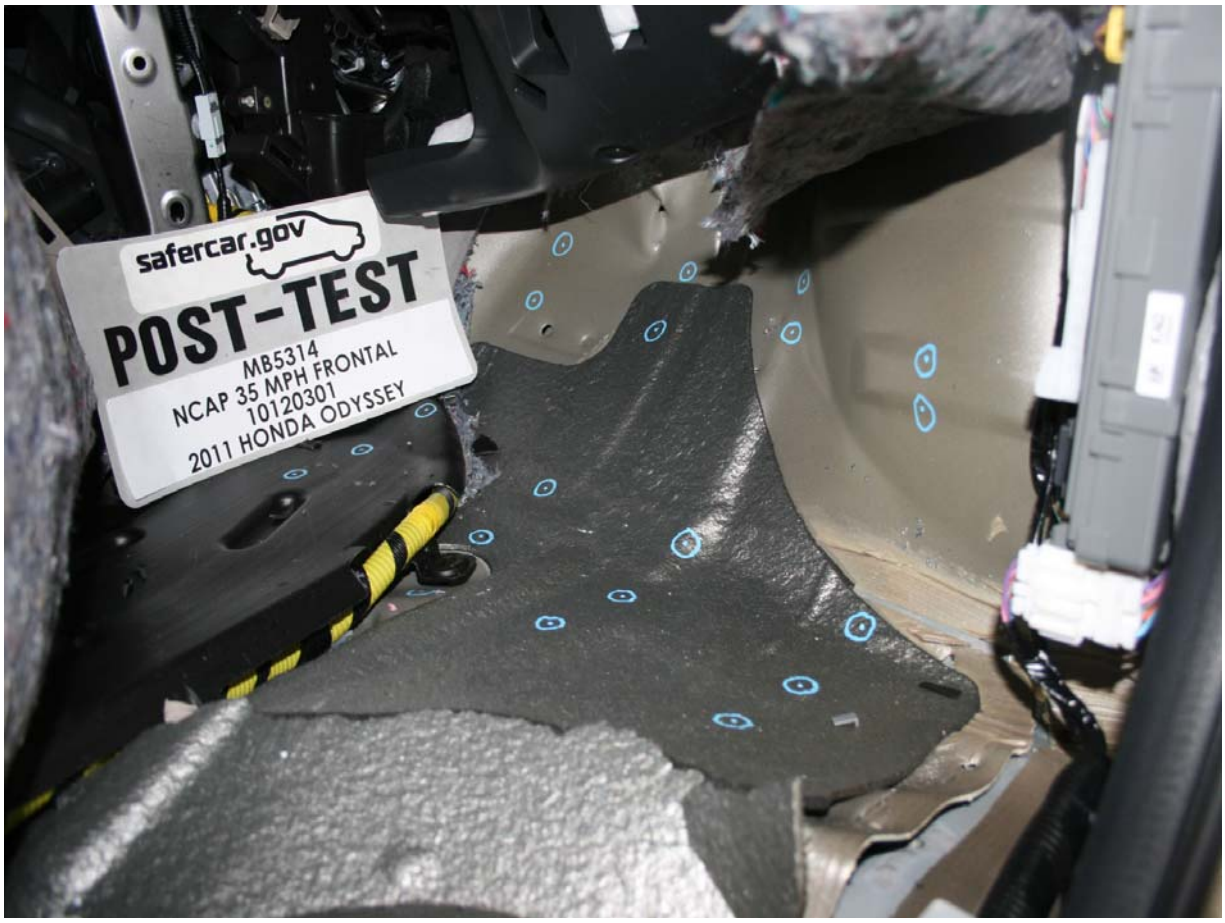
Post-Test Passenger Dummy Feet

Pre-Test Passenger's Side Knee Bolster (without dummy)

Post-Test Passenger's Side Knee Bolster (without dummy)



Pre-Test Passenger's Side Floorpan



Post-Test Passenger's Side Floorpan

Post-Test Passenger Dummy Contact with Airbag

Post-Test Passenger Dummy Contact with Seatback

Post-Test Passenger Dummy Contact with Glovebox

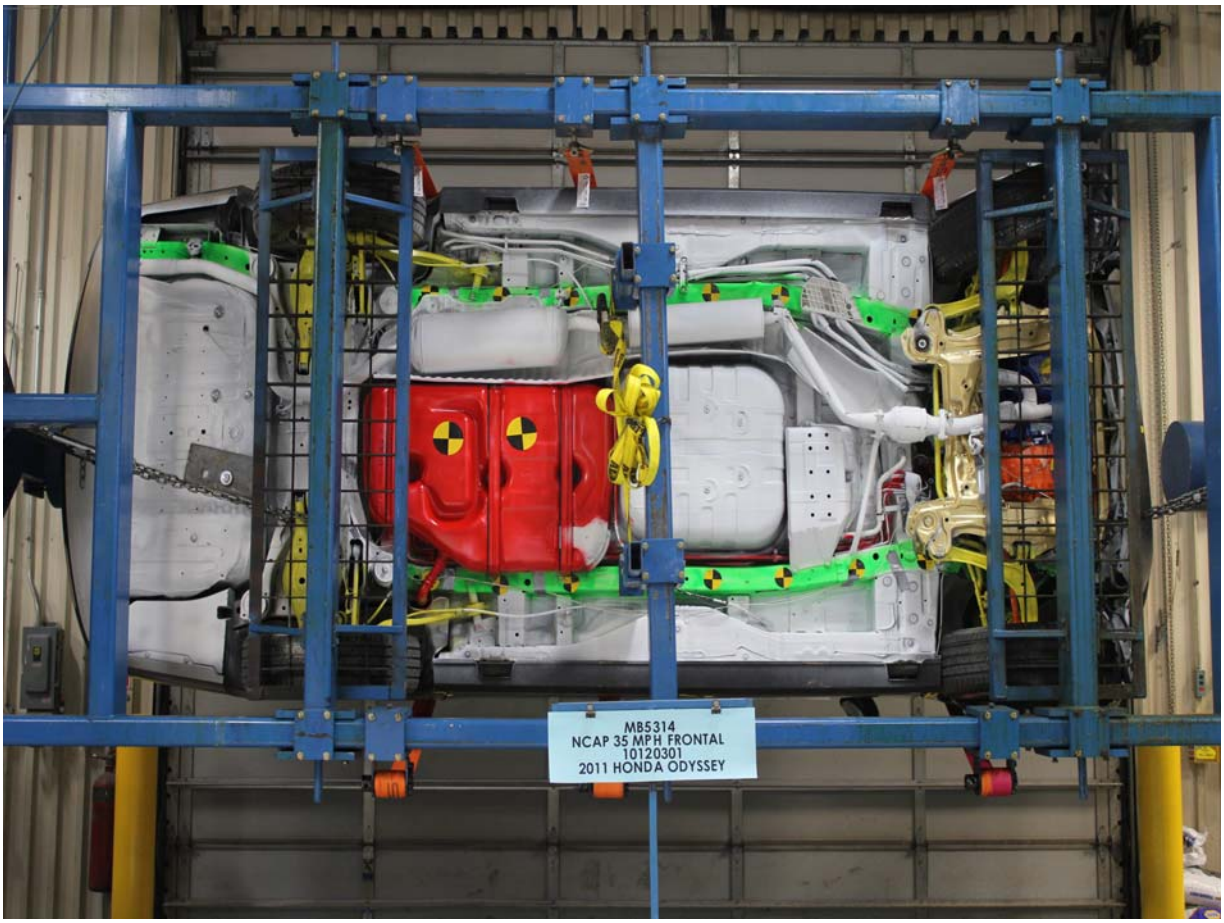
Ballast Installed in Vehicle

PHOTOGRAPH NOT APPLICABLE

Post-Test Stoddard Solvent Spillage Location View

Post-Test Speed Trap Read-Out

Vehicle at 0 Degrees on Static Rollover Device



Vehicle at 90 Degrees on Static Rollover Device

Vehicle at 180 Degrees on Static Rollover Device

Vehicle at 270 Degrees on Static Rollover Device

Vehicle at 360 Degrees on Static Rollover Device

Vehicle Impact

HONDA

2011 ODYSSEY 5DR LX
VEHICLE NUMBER: 5FNRL5H21BB007206
ENGINE NUMBER: J35Z8-1007767 EXT: MOCHA METALLIC
CONTROL NUMBER: 013896 INT: BEIGE

STANDARD EQUIPMENT AT NO EXTRA COST

*** TECHNICAL FEATURES ***
- 248hp 3.5-Liter SOHC 24-Valve i-VTEC V6 Engine with Variable Cylinder Management (VCM)
- 5-Speed Automatic Transmission with Grade Logic Control
- 4-Wheel Disc Brakes
- Front MacPherson Strut Suspension
- Rear Double-Wishbone Suspension
- Variable-Assist Rack-and-Pinion Power Steering
- Immobilizer Theft-Deterrent System

*** SAFETY FEATURES ***
- Driver's and Front Passenger's Dual-Stage Airbags (SRS)
- Driver's and Front Passenger's Side Airbags
- Side Curtain Airbags with Rollover Sensor
- Active Front Head Restraints
- Vehicle Stability Assist (VSA)
- Anti-Lock Braking System (ABS)
- Brake Assist
- Electronic Brake Distribution (EBD)
- Tire Pressure Monitoring System
- 3-Point Seat Belts
- Front Seat Belts with Automatic Tensioning System
- ACE Body Structure
- Daytime Running Lights (DRL)
- LATCH System for Child Seats

*** INTERIOR FEATURES ***
- AM/FM/CD Audio System w/ 5 Speakers Incl. MP3/WMA Playback
- MP3/Auxiliary Input Jack
- Tilt & Telescopic Steering Column
- Front and Rear Air Conditioning
- One-Motion 60/40 Split Folding 3rd-Row Magic Seat
- Two-Row Power Windows
- Driver's Auto Up/Down Window
- Power Door and Tailgate Locks
- Sunglasses Holder
- 12-Volt Power Outlets
- Floor Mats
- Maintenance Minder System

*** EXTERIOR FEATURES ***
- 17" x 7.0" Steel Wheels with Full Wheel Covers
- 235/65 R17 All-Season Tires
- Dual Sliding Doors
- Power Door Mirrors
- Remote Entry System

Manufacturer's Suggested Retail Price	$27,800.00
Full Tank of Fuel	No Charge
Destination and Handling	780.00
TOTAL VEHICLE PRICE (includes Pre-Delivery Service)	**$28,580.00**

#35775

License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.

Environmental Performance

Protect the environment, choose vehicles with **higher scores:**

Global Warming Score: 6 (1 – 10; Average new vehicle; Cleanest)

Smog Score: 5 (1 – 10; Average new vehicle; Cleanest)

Vehicle emissions are a primary contributor to global warming and smog. Scores are determined by the California Air Resources Board based on this vehicle's measured emissions. Please visit **www.DriveClean.ca.gov** for more information. California Environmental Protection Agency AIR RESOURCES BOARD

ROSEN HONDA
7000 GRAND AVENUE
GURNEE, IL 60031

ORIG. DLR: 207853
REF.NO: 40357
HN CODE: HN-0619
EMISSION: 50 STATE

PORT OF ENTRY: ALABAMA
DELIVERY POINT: SCHAUMBURG
SHIP#:
ROW/SPACE: 857-017
TRANS.METHOD: N50 ELWOOD

DEALER: 207853

VIN: 5FNRL5H21BB007206

EPA Fuel Economy Estimates

CITY MPG **18**
Expected range for most drivers 14 to 22 MPG

Estimated Annual Fuel Cost $2,142
based on 15,000 miles at $3.00 per gallon

Combined Fuel Economy
This Vehicle 21 (13 – 24)
All Special Purpose Vehicles - Minivans

HIGHWAY MPG **27**
Expected range for most drivers 22 to 32 MPG

Your actual mileage will vary depending on how you drive and maintain your vehicle

See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE
U.S./Canadian Parts Content: **75 %**
Major Sources of Foreign Parts Content:
JAPAN 15 %

NOTE: Parts content does not include final assembly, distribution or other non-parts costs.

FOR THIS VEHICLE
Final Assembly Point:
LINCOLN, ALABAMA USA
Country of Origin: Engine:
U.S.A.
Transmission:
U.S.A.

GOVERNMENT SAFETY RATINGS

Frontal Crash	Driver	Not Rated
	Passenger	Not Rated
Side Crash	Front seat	Not Rated
	Rear seat	Not Rated
Rollover		Not Rated

Star ratings based on the risk of injury in a frontal impact.
Frontal ratings should ONLY be compared to other vehicles of similar size and weight.

Star ratings based on the risk of injury in a side impact.

Star ratings based on the risk of rollover in a single vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA).

www.safercar.gov or 1-888-327-4236

Monroney Label

APPENDIX B

DUMMY RESPONSE DATA

TABLE OF DATA PLOTS

The following 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 Redundant

Driver Head Y Redundant

Driver Head Z Redundant

Driver Upper Neck Force Y

Driver Upper Neck Moment X

Driver Upper Neck Moment Z

Driver Chest X Redundant

Driver Chest Y Redundant

Driver Chest Z 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 Redundant

Passenger Head Y Redundant

Passenger Head Z Redundant

Passenger Upper Neck Force Y

Passenger Upper Neck Moment X

Passenger Upper Neck Moment Z

Passenger Chest X Redundant

Passenger Chest Y Redundant

Passenger Chest Z Redundant

Passenger Pelvis X

Passenger Pelvis Y

Passenger Pelvis Z

Passenger Lap Belt Force

Passenger Shoulder Belt Force – not installed

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 Foot 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

Vehicle Engine Bottom X

Vehicle Left Brake Caliper X

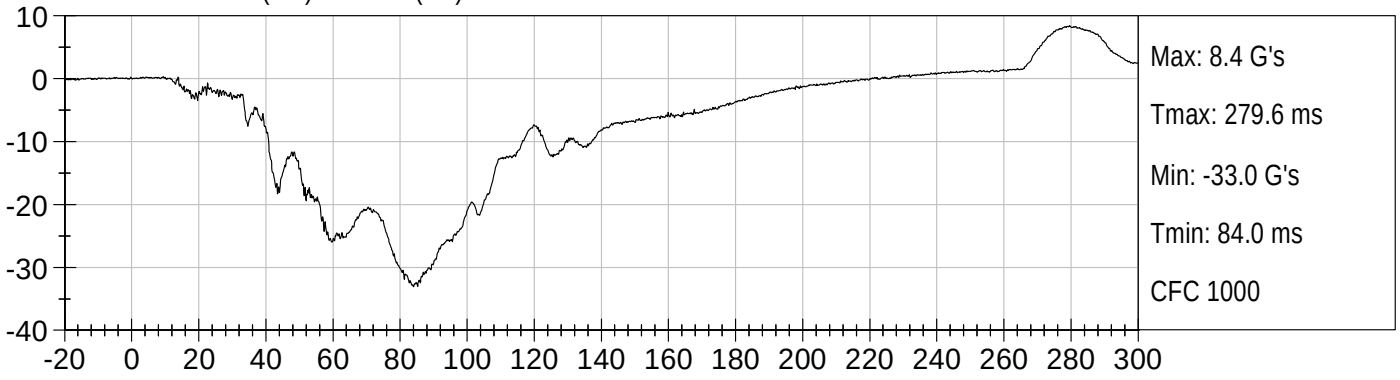
Vehicle Right Brake Caliper X

Advanced Research Load Cell Barrier – 127 channels

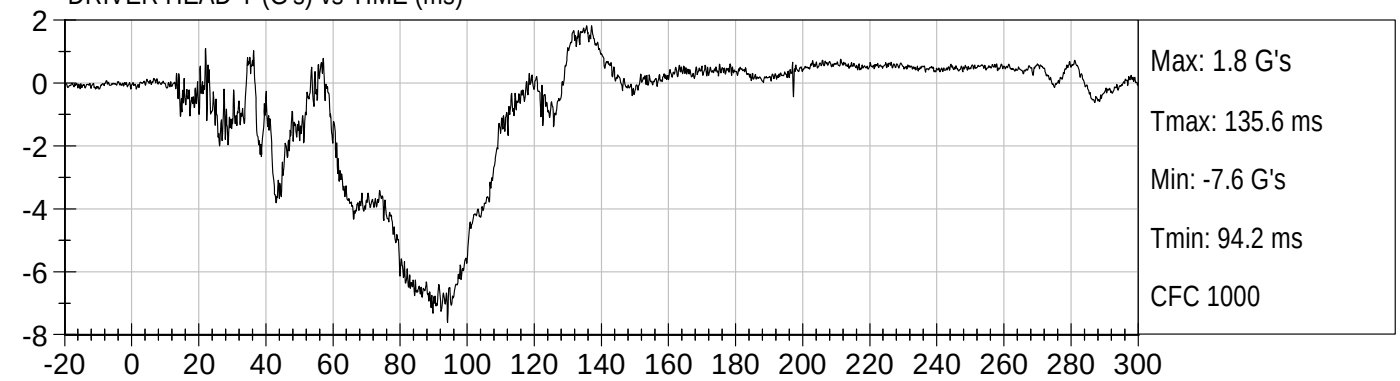
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

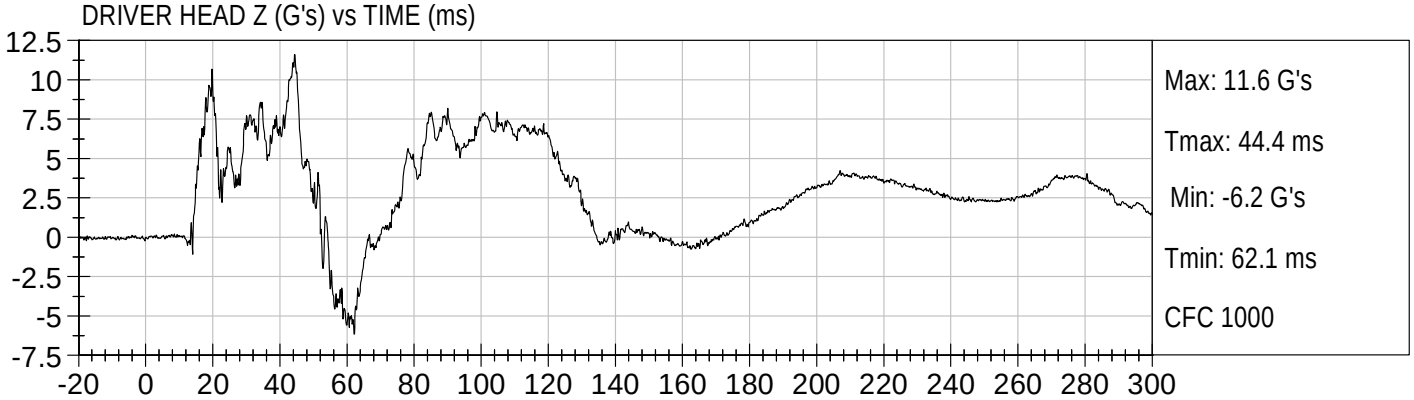
DRIVER HEAD X (G's) vs TIME (ms)



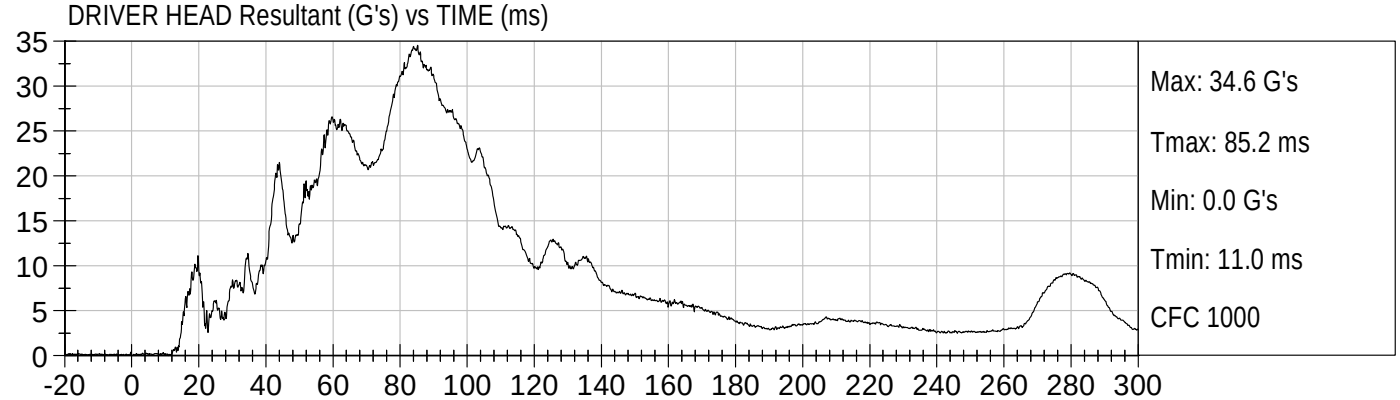
DRIVER HEAD Y (G's) vs TIME (ms)



DRIVER HEAD Z (G's) vs TIME (ms)



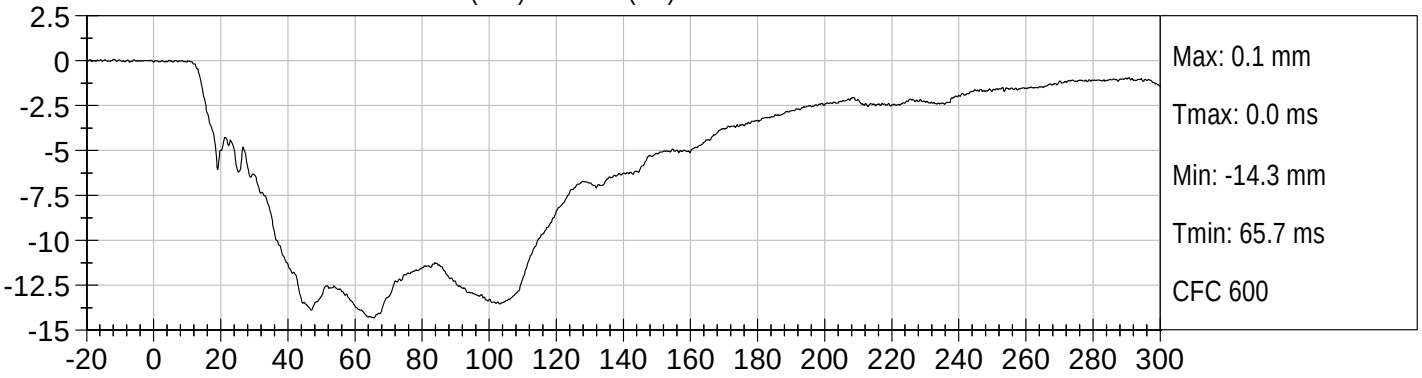
DRIVER HEAD Resultant (G's) vs TIME (ms)



NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

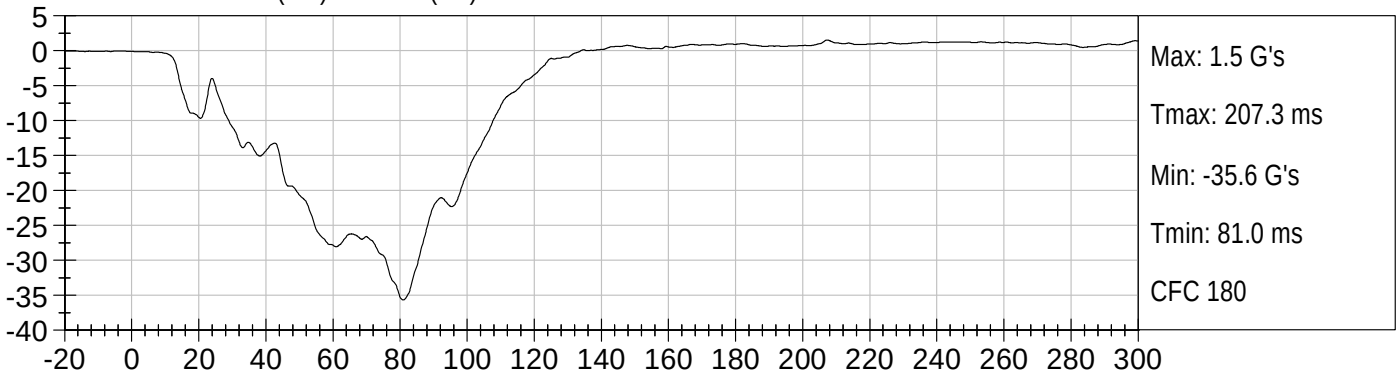
DRIVER CHEST DISPLACEMENT (mm) vs TIME (ms)



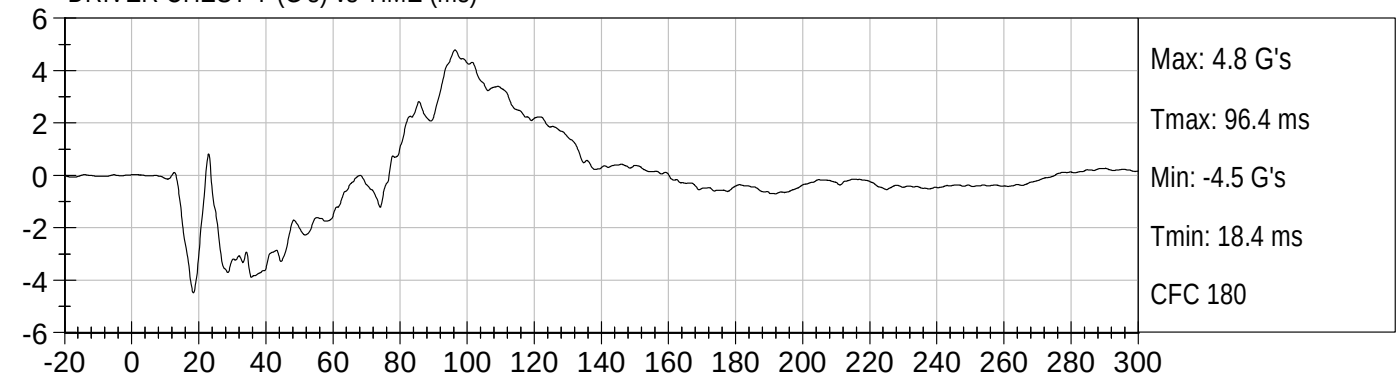
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

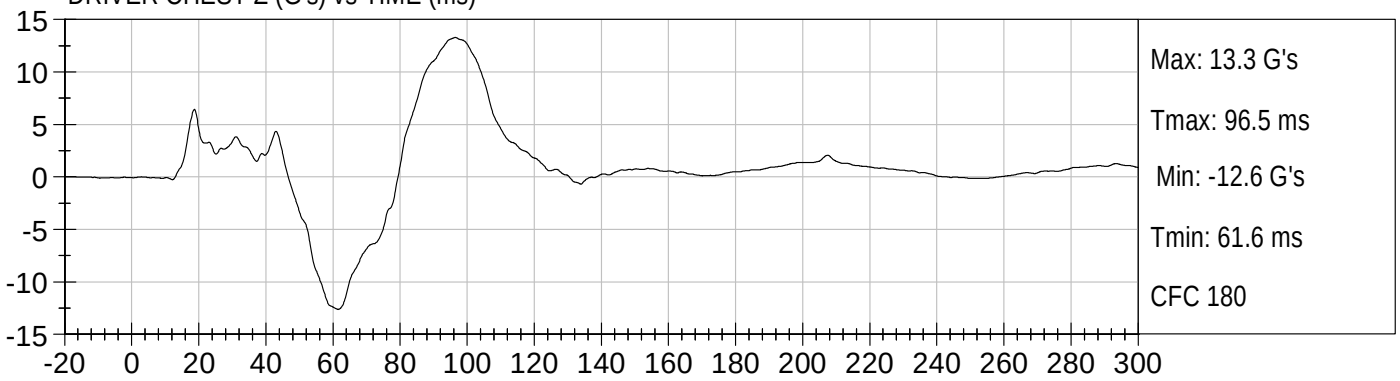
DRIVER CHEST X (G's) vs TIME (ms)



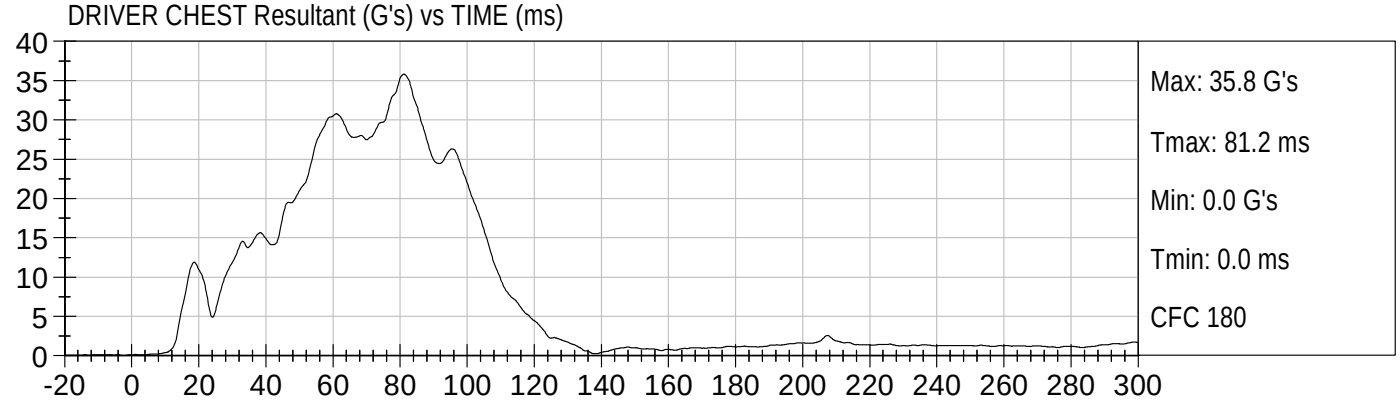
DRIVER CHEST Y (G's) vs TIME (ms)



DRIVER CHEST Z (G's) vs TIME (ms)



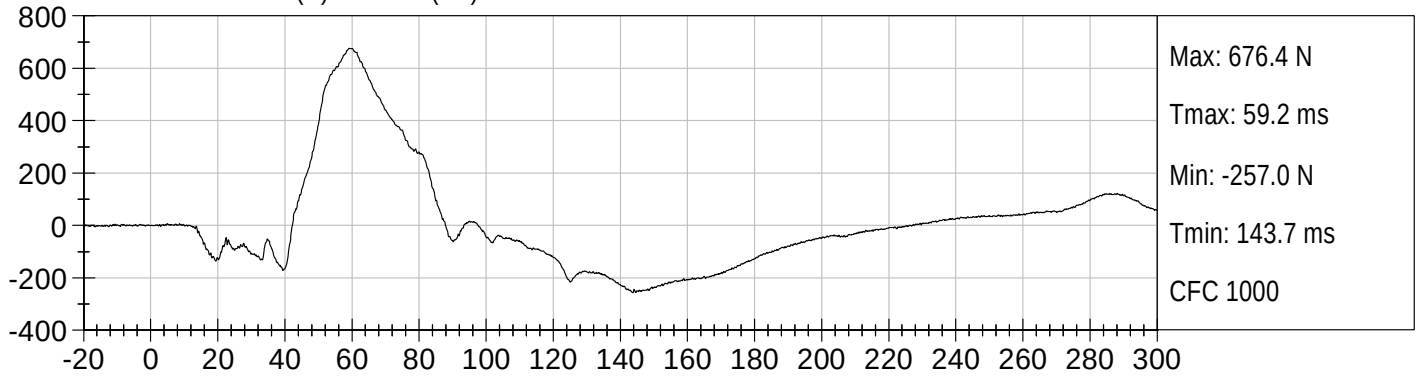
DRIVER CHEST Resultant (G's) vs TIME (ms)



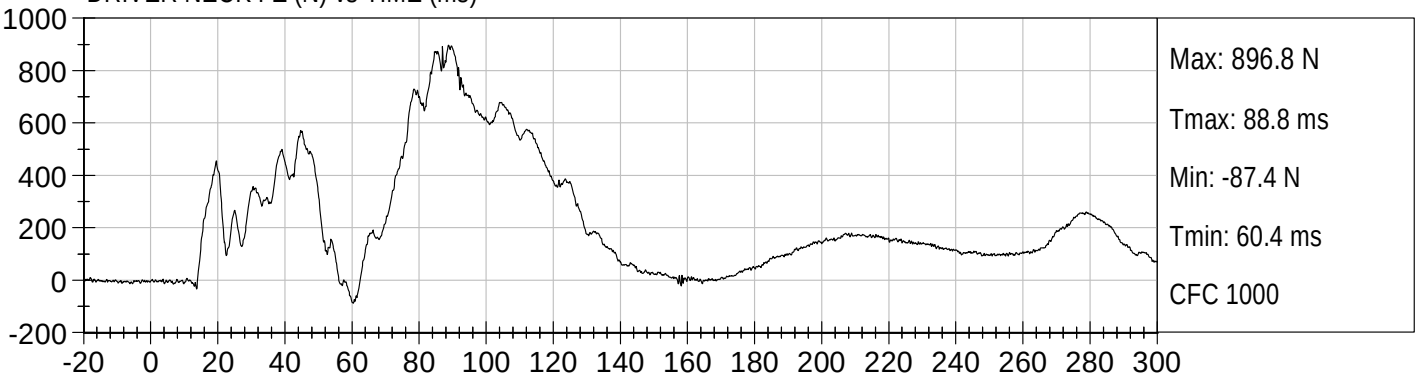
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

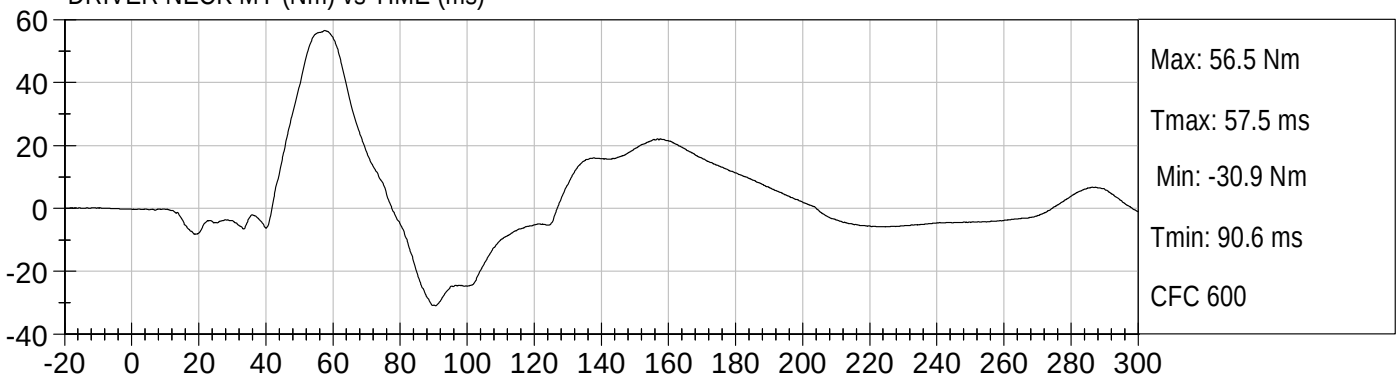
DRIVER NECK FX (N) vs TIME (ms)



DRIVER NECK FZ (N) vs TIME (ms)

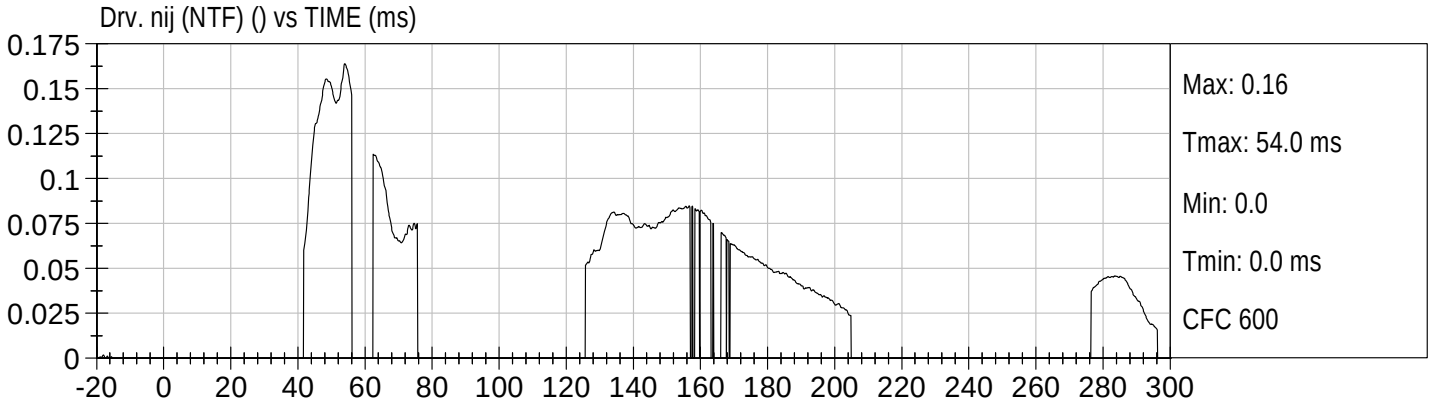


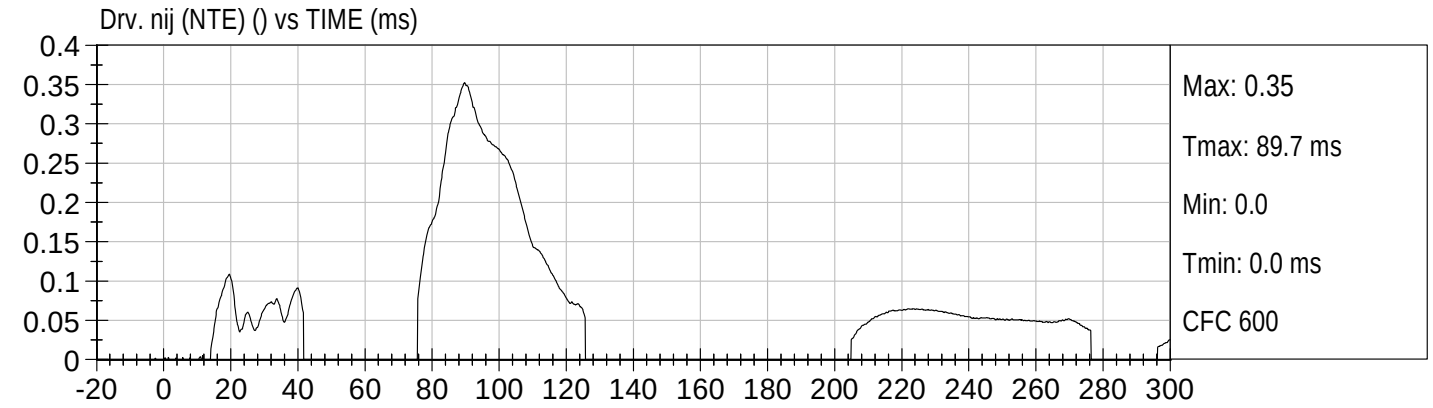
DRIVER NECK MY (Nm) vs TIME (ms)

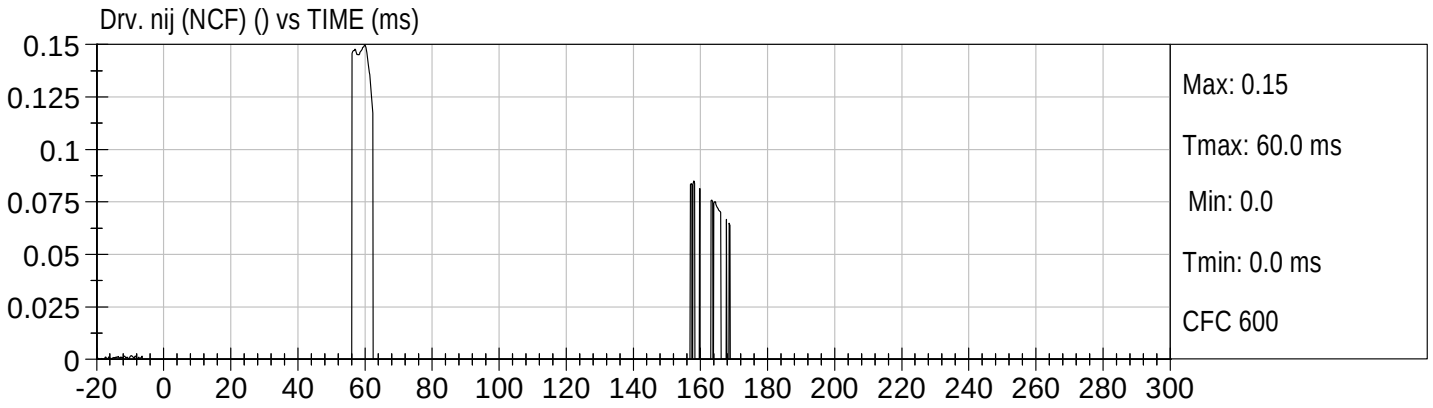


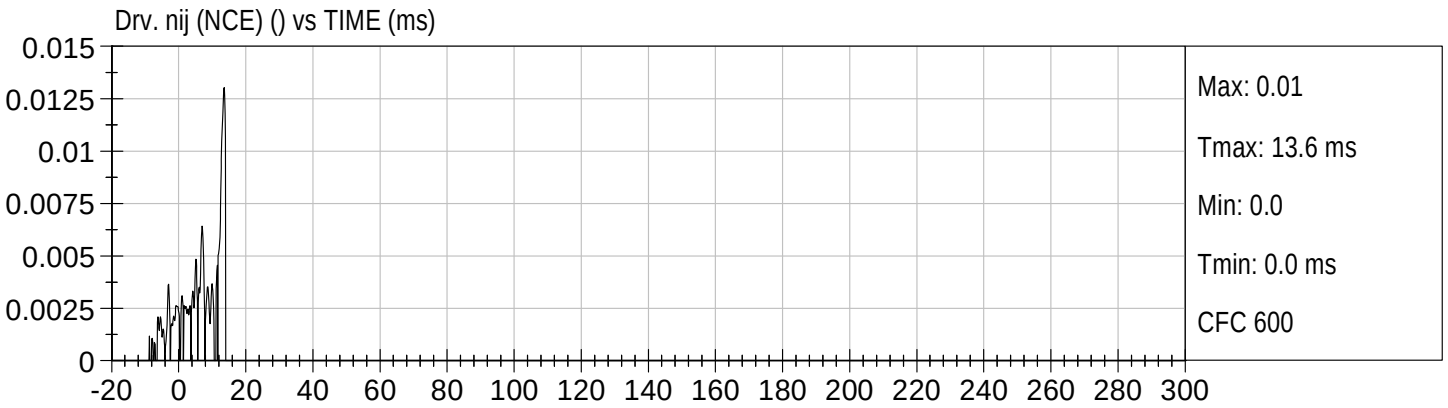
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)





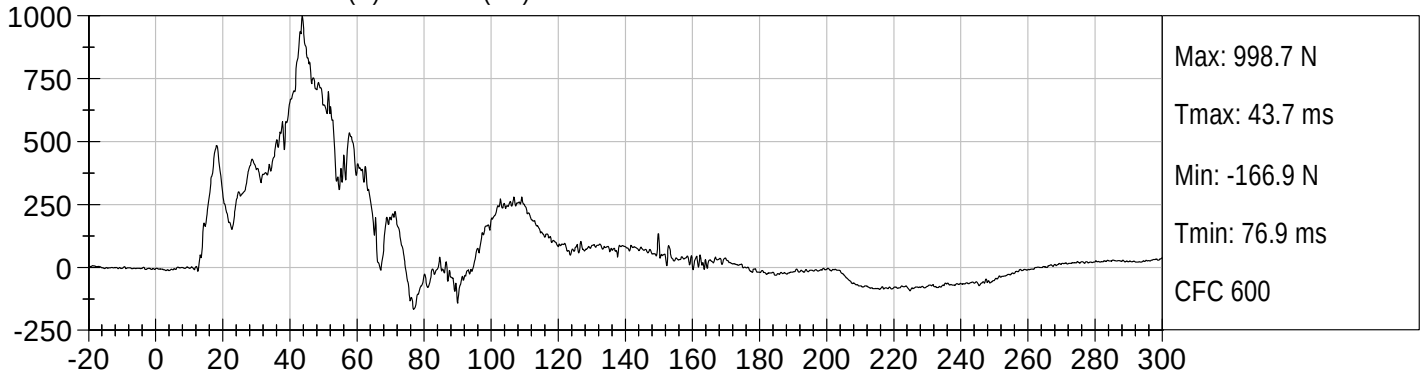




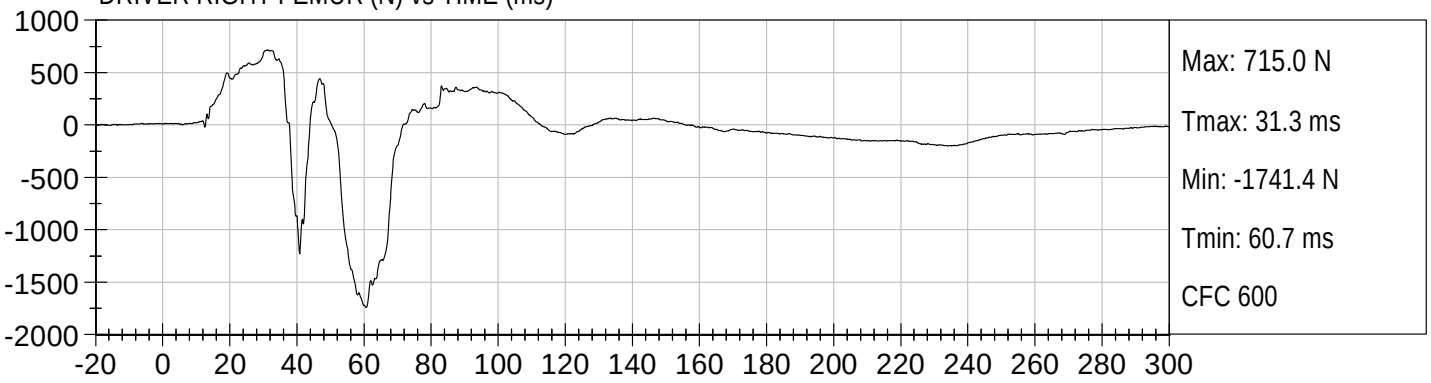
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

DRIVER LEFT FEMUR (N) vs TIME (ms)



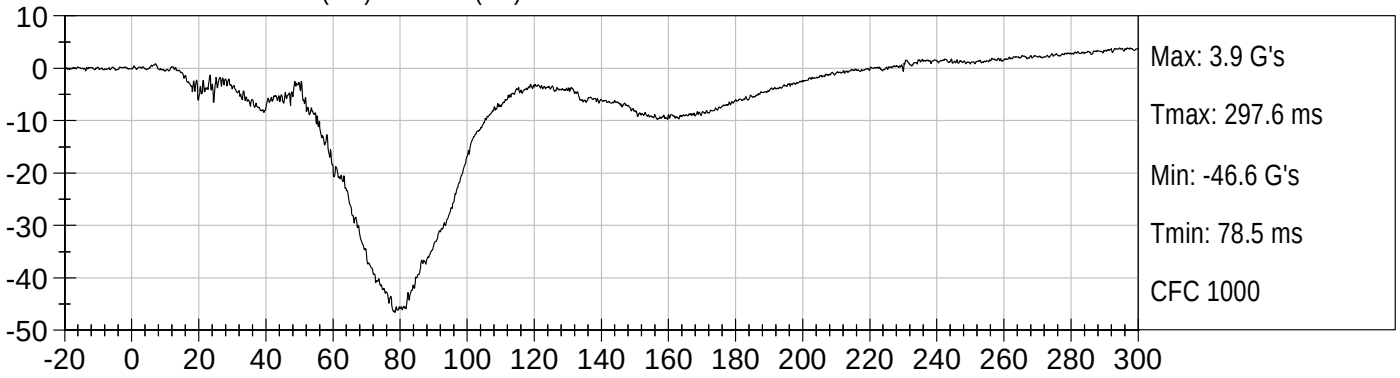
DRIVER RIGHT FEMUR (N) vs TIME (ms)



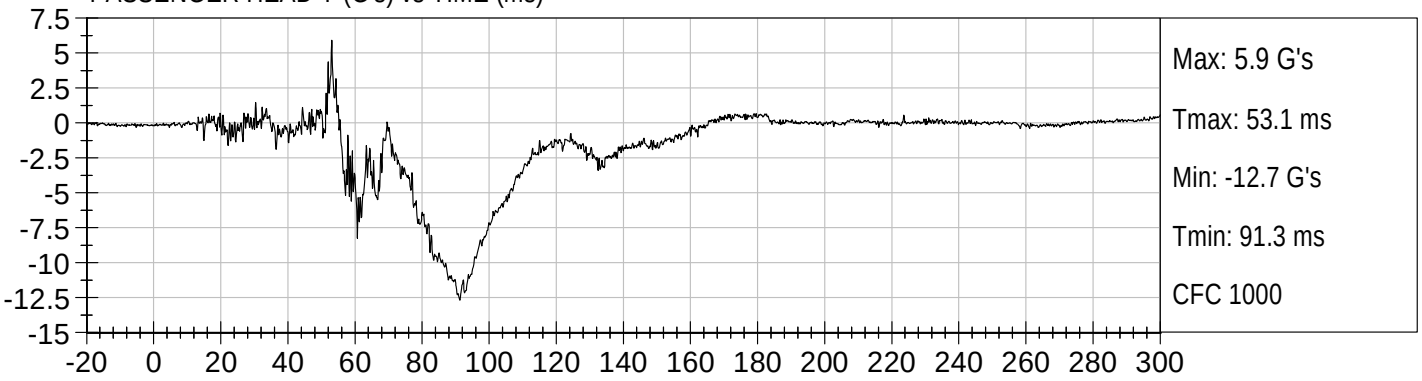
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

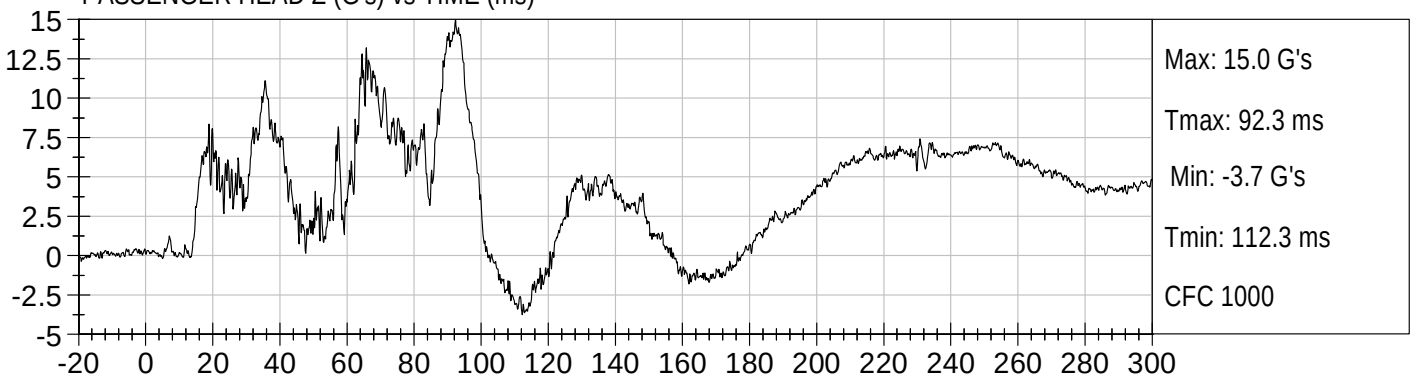
PASSENGER HEAD X (G's) vs TIME (ms)



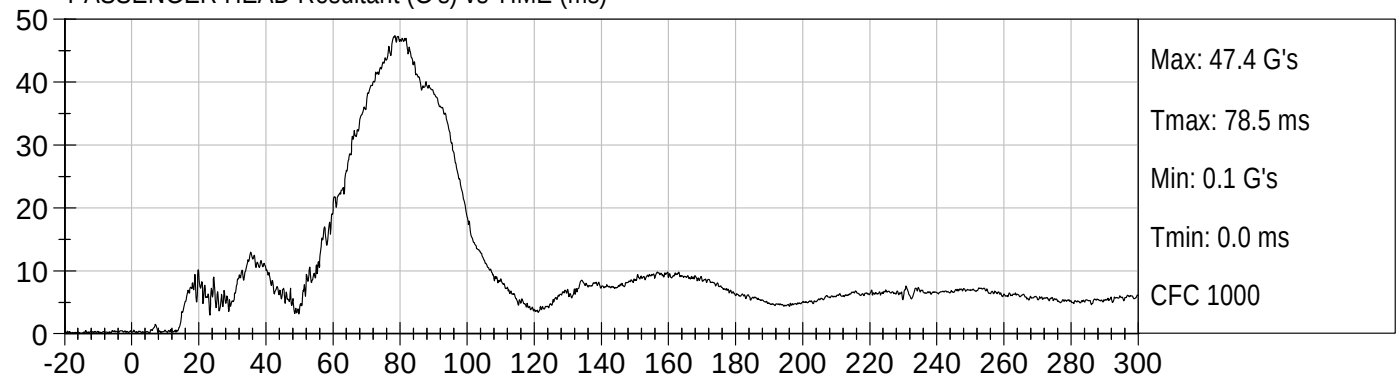
PASSENGER HEAD Y (G's) vs TIME (ms)

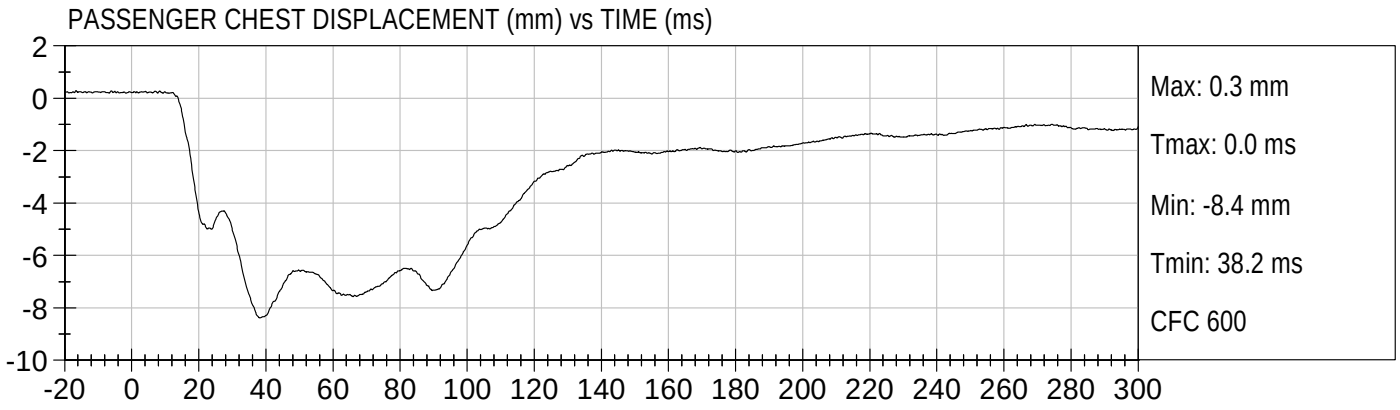


PASSENGER HEAD Z (G's) vs TIME (ms)



PASSENGER HEAD Resultant (G's) vs TIME (ms)

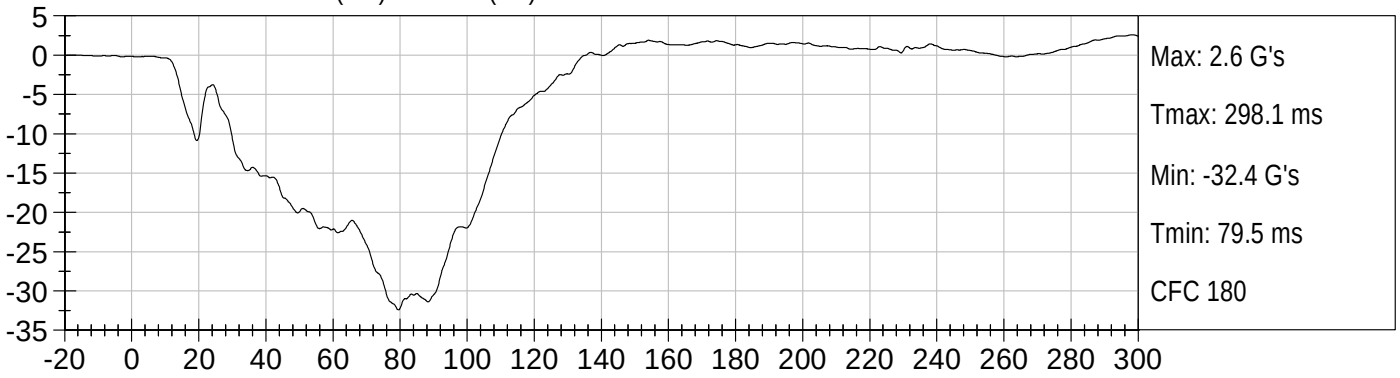



PASSENGER CHEST DISPLACEMENT (mm) vs TIME (ms)
2
0
-2
-4
-6
-8
-10
-20
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300
Max: 0.3 mm
Tmax: 0.0 ms
Min: -8.4 mm
Tmin: 38.2 ms
CFC 600

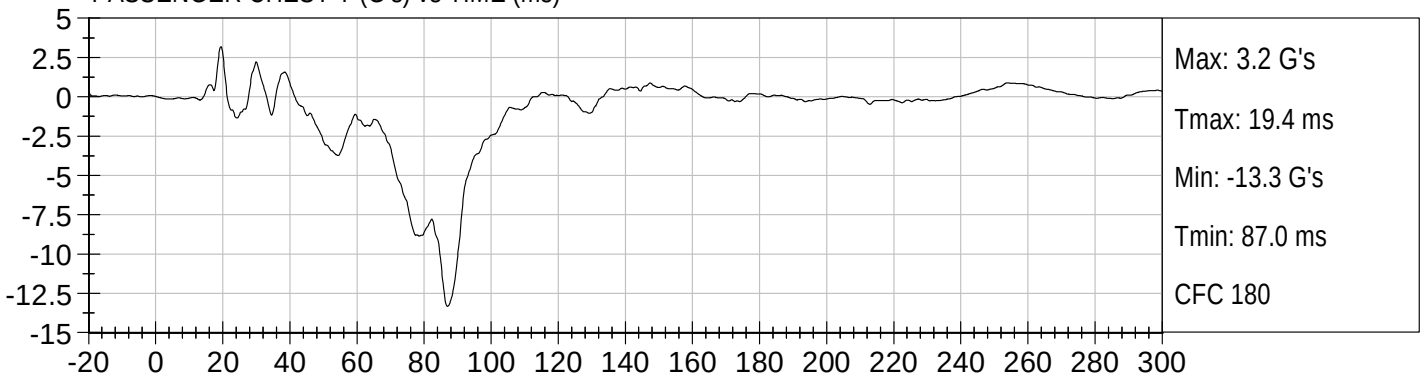
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

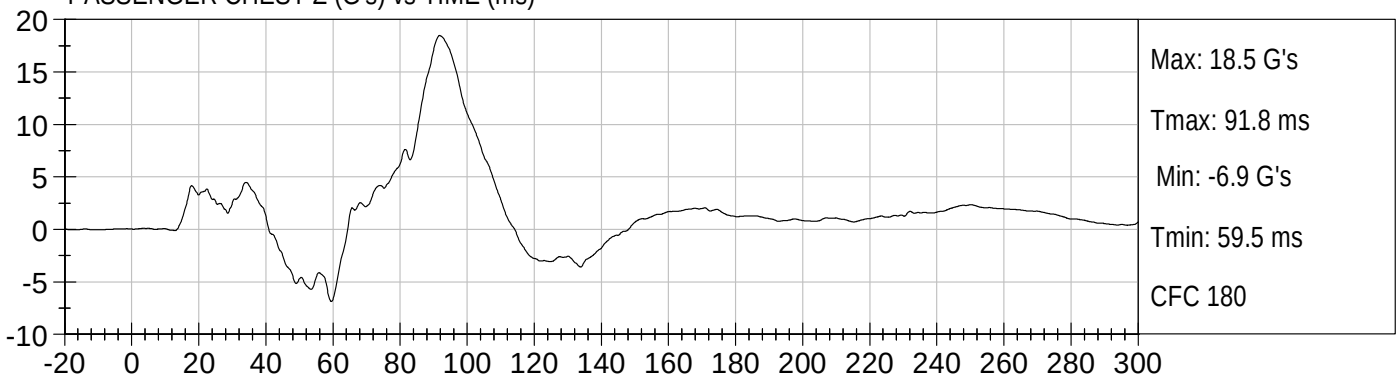
PASSENGER CHEST X (G's) vs TIME (ms)



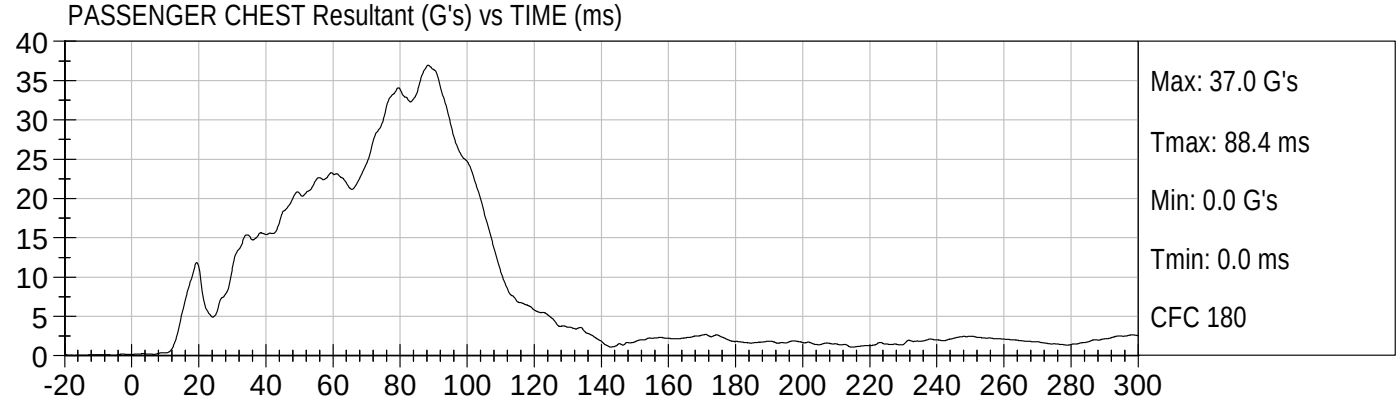
PASSENGER CHEST Y (G's) vs TIME (ms)



PASSENGER CHEST Z (G's) vs TIME (ms)



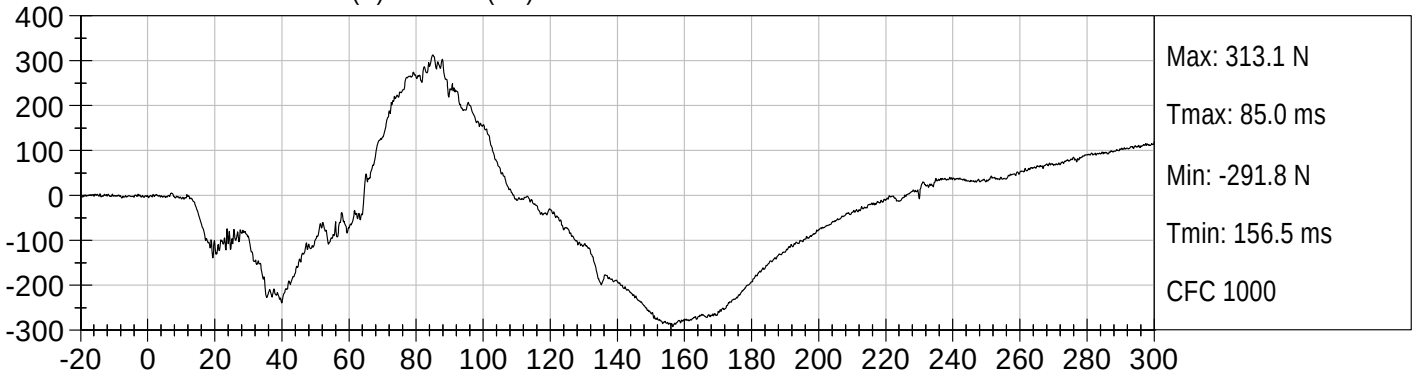
PASSENGER CHEST Resultant (G's) vs TIME (ms)



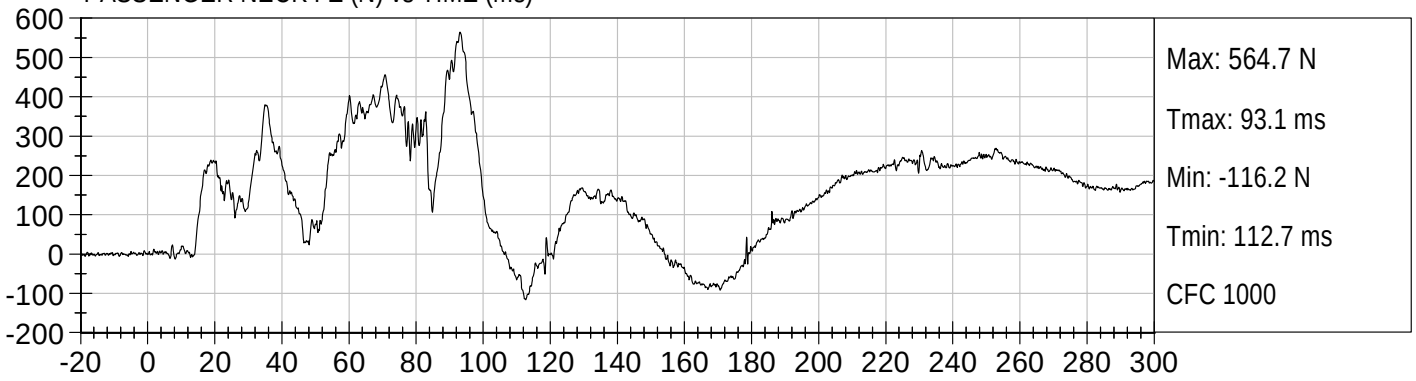
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

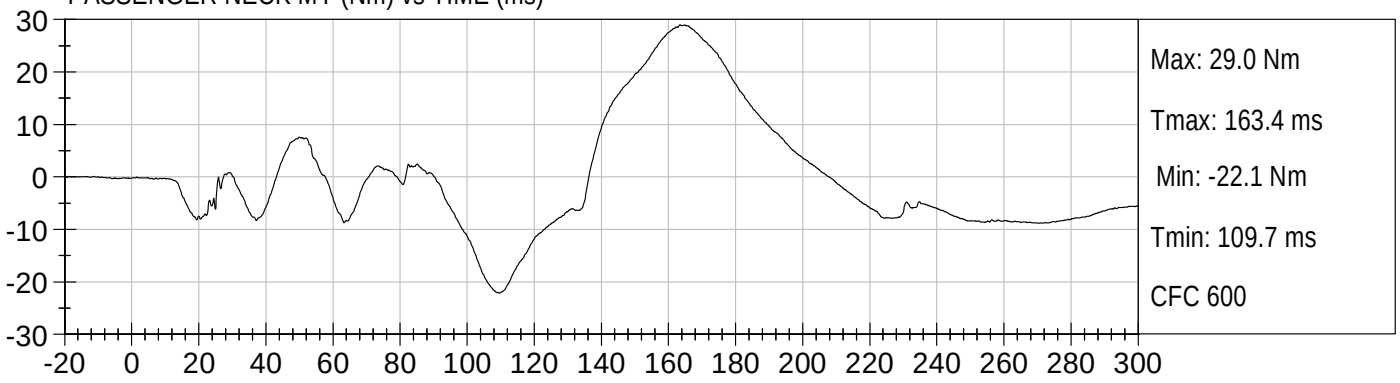
PASSENGER NECK FX (N) vs TIME (ms)



PASSENGER NECK FZ (N) vs TIME (ms)

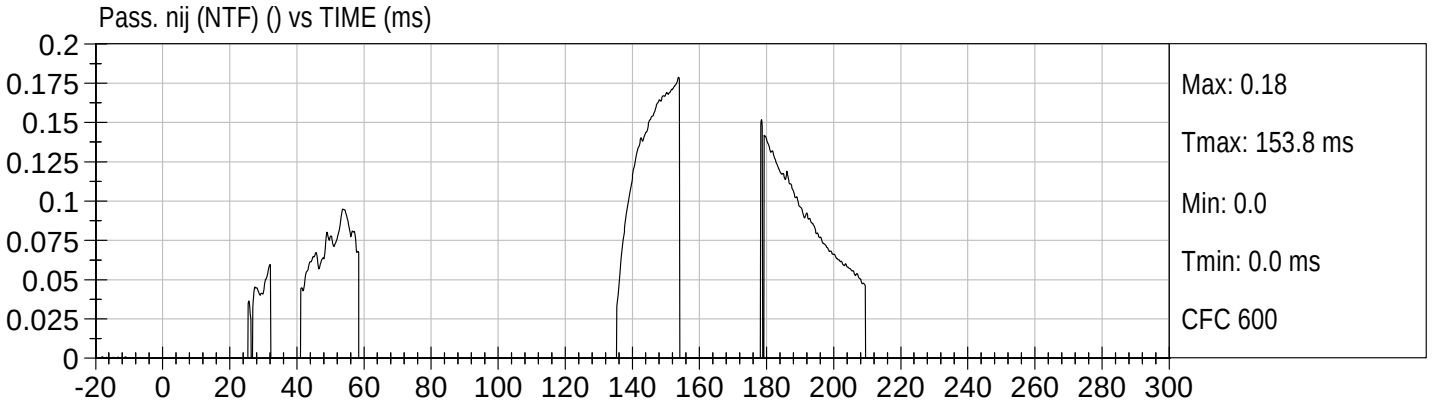


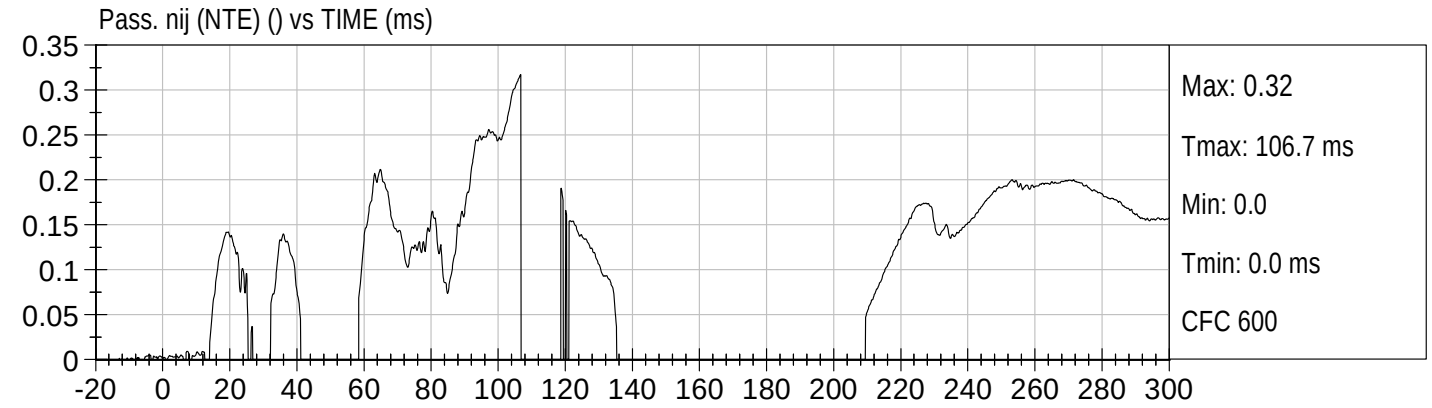
PASSENGER NECK MY (Nm) vs TIME (ms)

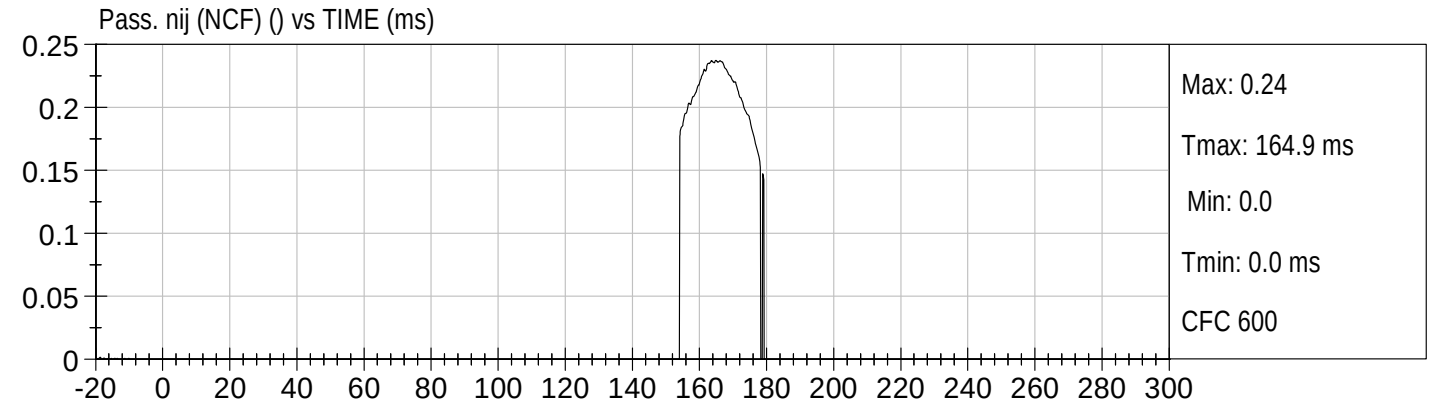


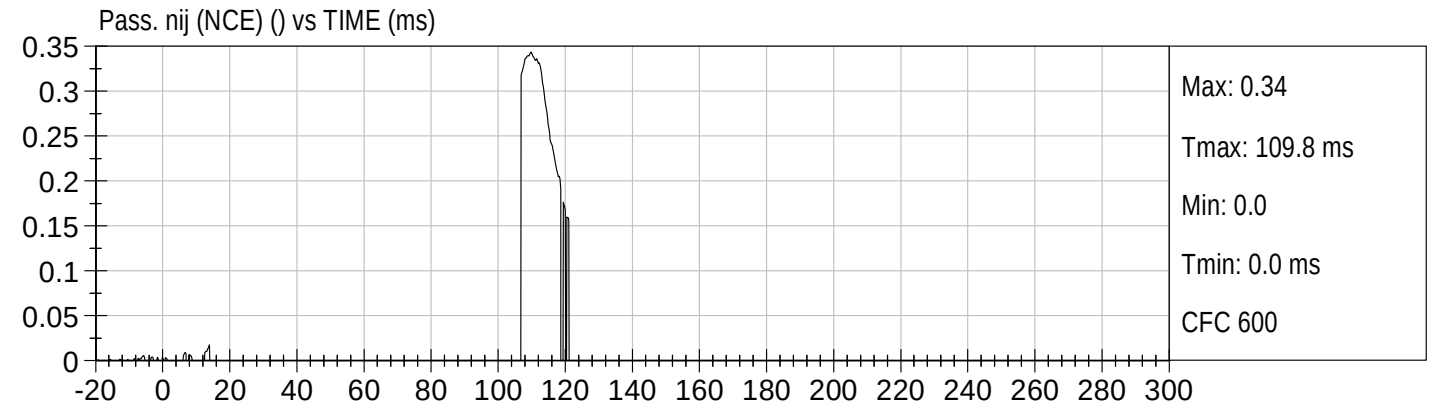
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)





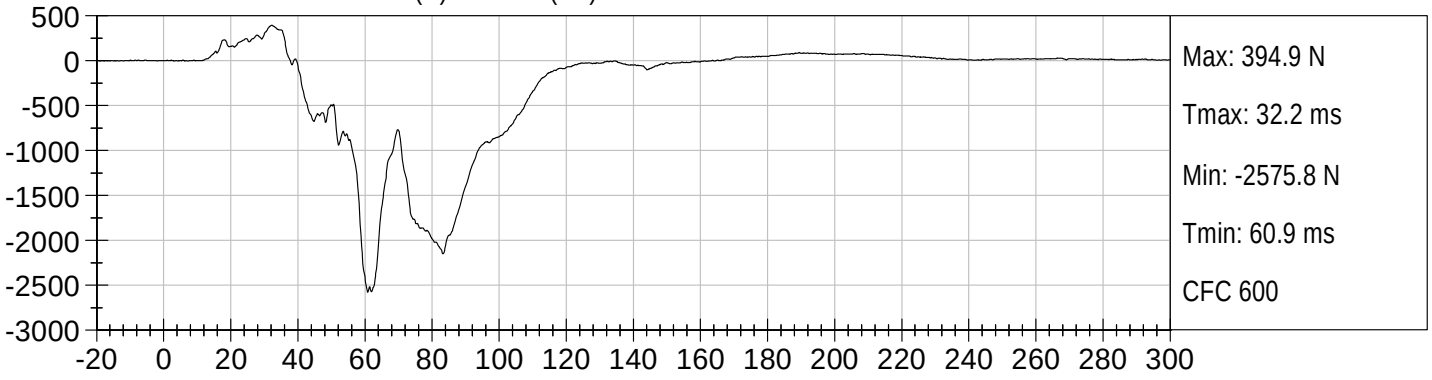




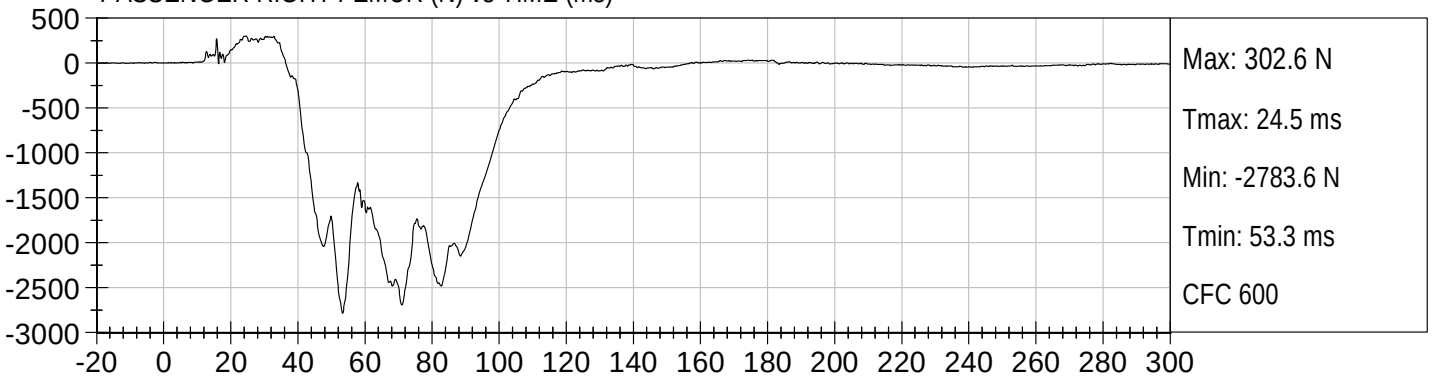
NCAP 35mph Frontal
2011 Honda Odyssey - MB5314

Test Date: 12/03/2010
Speed: 34.9 mph (56.2 km/h)

PASSENGER LEFT FEMUR (N) vs TIME (ms)



PASSENGER RIGHT FEMUR (N) vs TIME (ms)



APPENDIX C

DUMMY CALIBRATION DATA

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test ID:** D104101

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	56	Pass
Peak Resultant Acceleration	G's	225 - 275	259	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	2.0	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

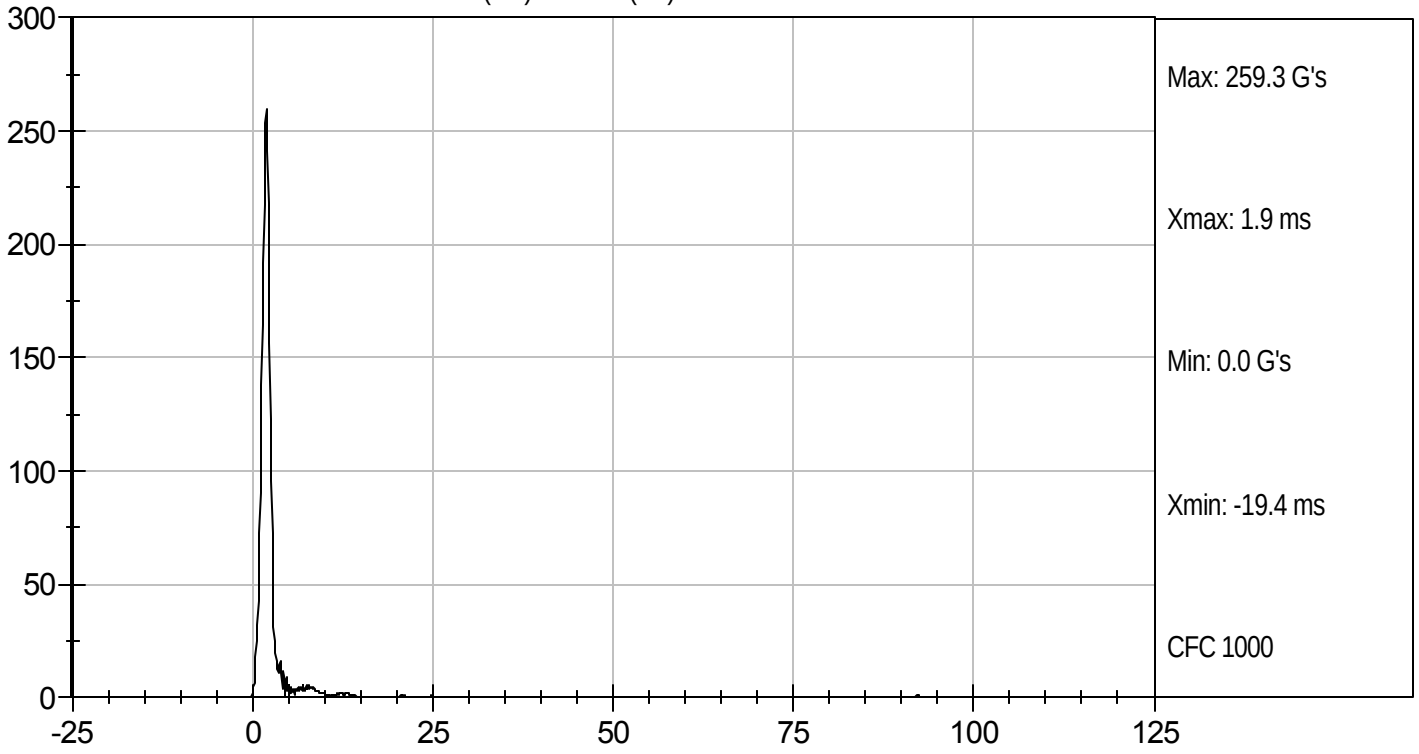
11/22/10
Test Date

David Winkelbauer
Approved By

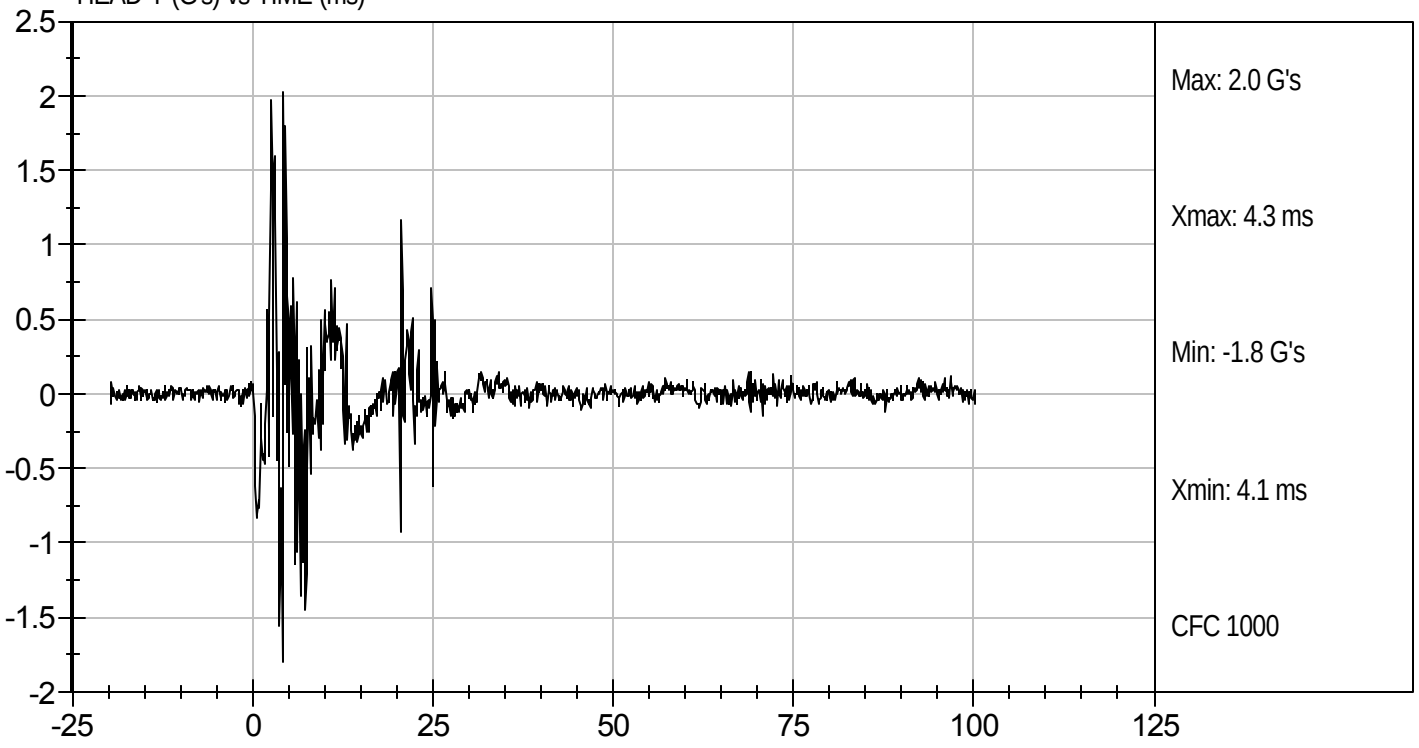
Test Desc: Head Drop
Component ID: D104101

Test Date: 11/22/10
Velocity: 0 ft/s, 0.00 m/s

RESULTANT HEAD ACCELERATION (G's) vs TIME (ms)



HEAD Y (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104102

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	58	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	23.21	Pass
	20 ms	G's	17.60 to 22.60	19.35	Pass
	30 ms	G's	12.50 to 18.50	13.85	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	13.80	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	34.5	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	67.7	Pass
	Time	ms	57.0 to 64.0	58.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.5	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	92.2	Pass
	Time	ms	47.0 to 58.0	47.1	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	98.3	Pass
			Overall Test Results		Pass

Jessica Gall
Laboratory Technician

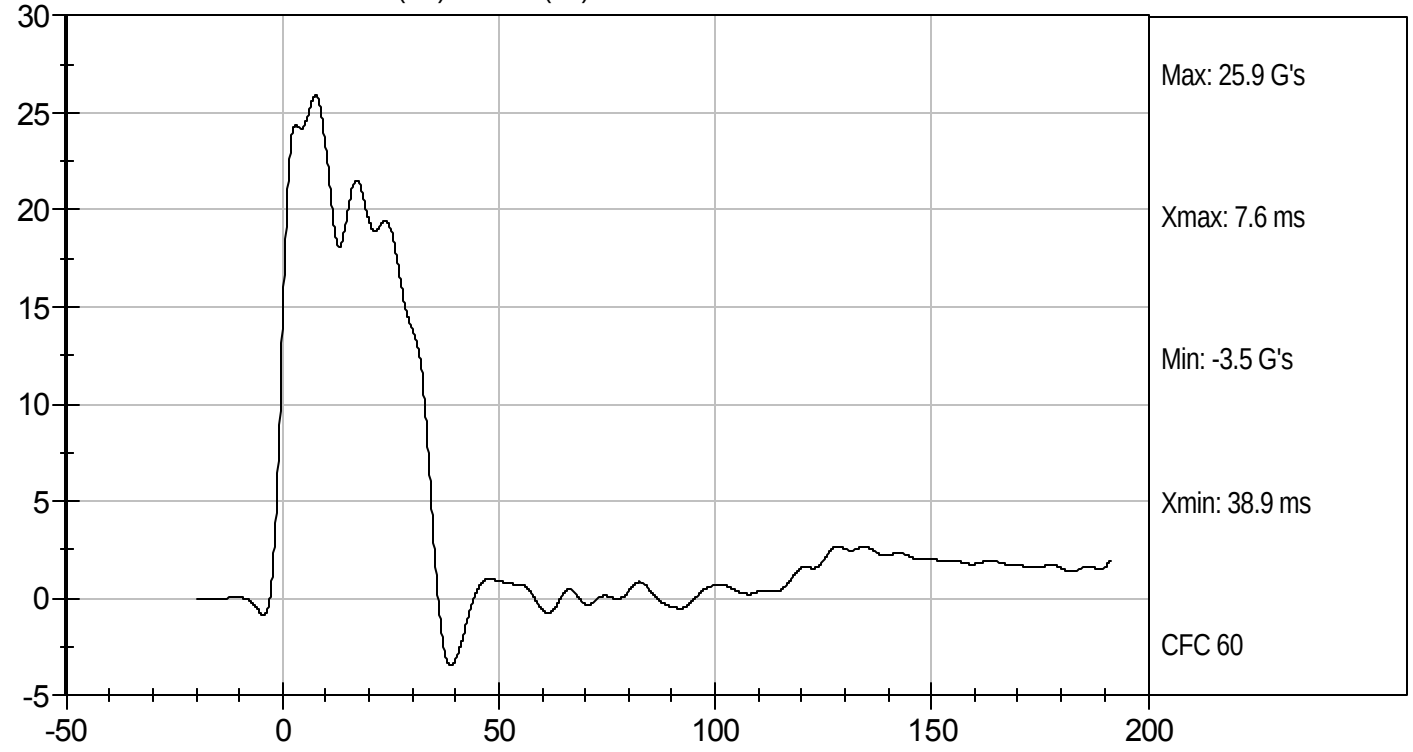
11/22/10
Test Date

David Winkelbauer
Approved By

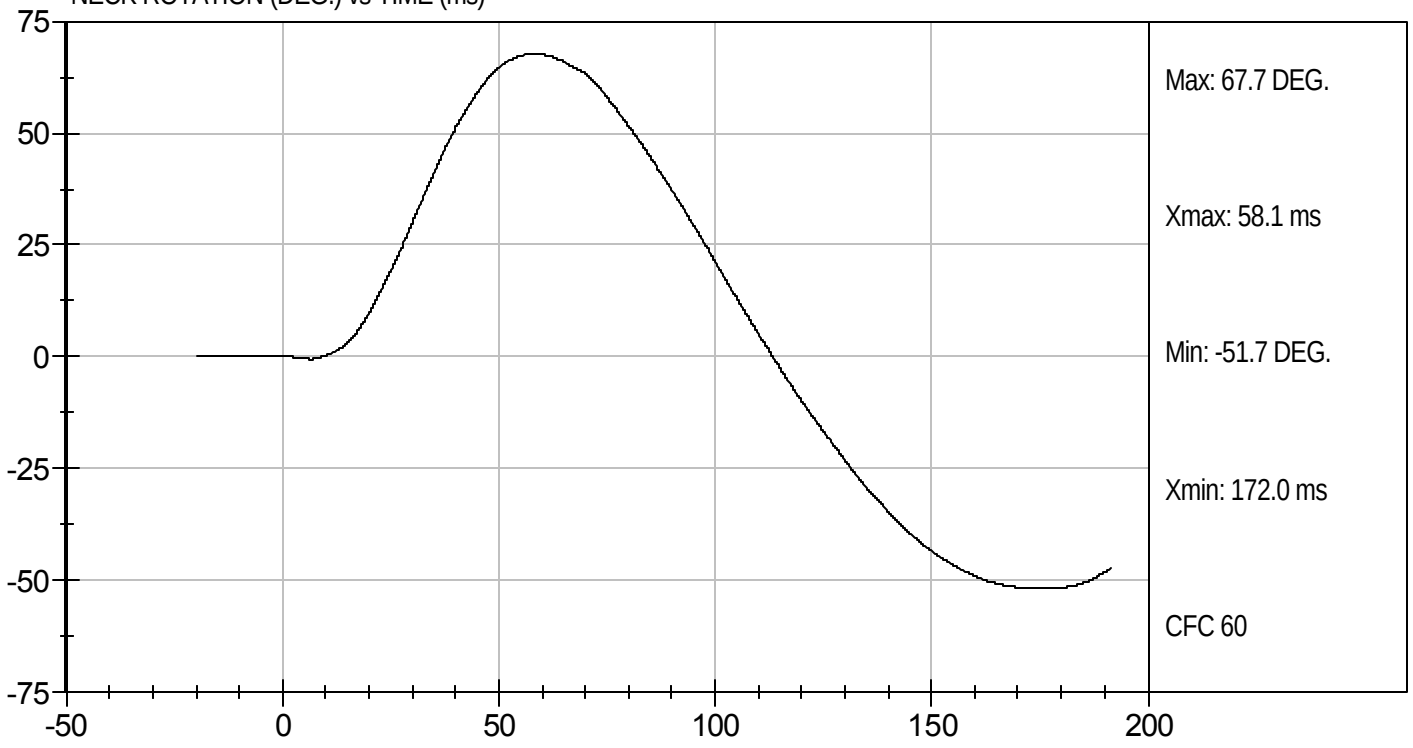
Test Desc: Neck Flexion
Component ID: D104102

Test Date: 11/22/10
Velocity: 22.83 ft/s, 6.96 m/s

PENDULUM DECELERATION (G's) vs TIME (ms)

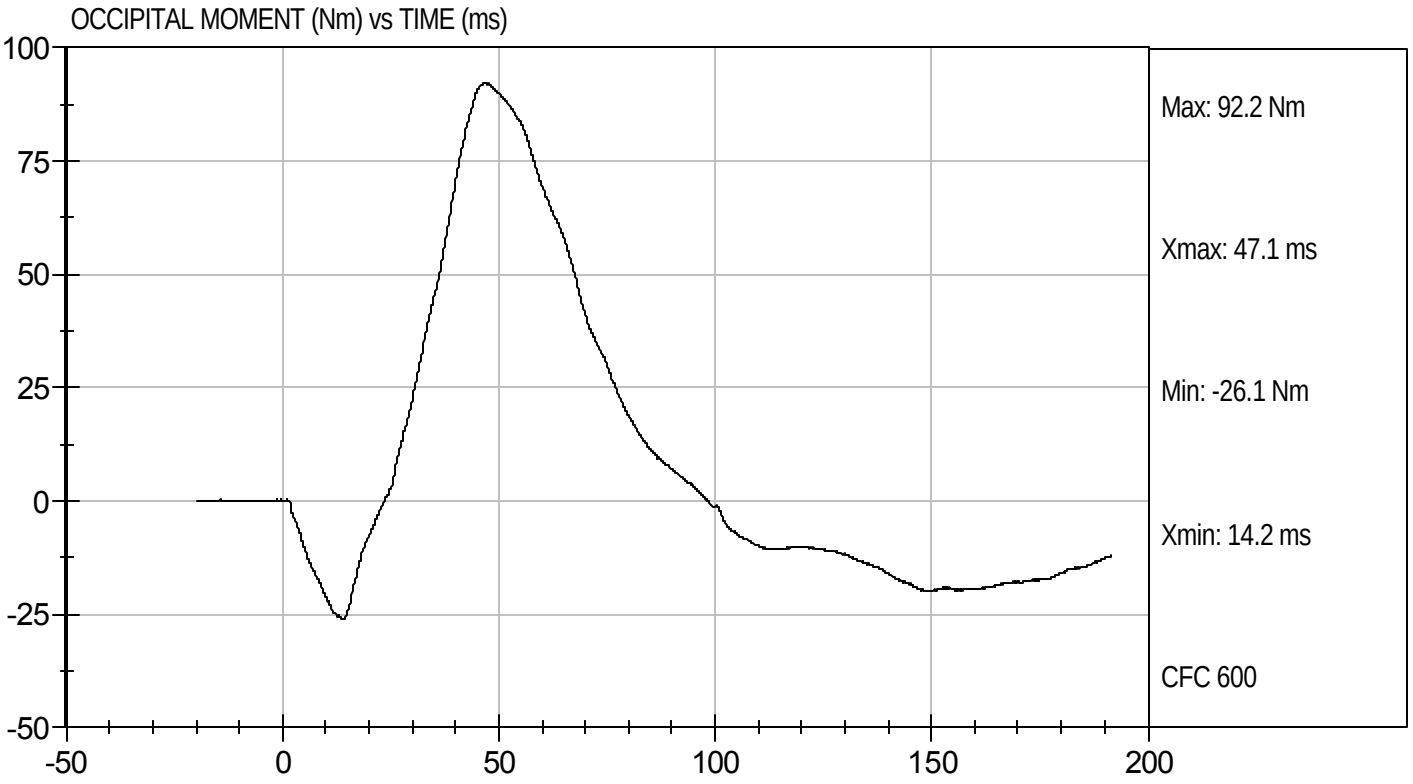


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Flexion
Component ID: D104102

Test Date: 11/22/10
Velocity: 22.83 ft/s, 6.96 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104103

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	58	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	20.20	Pass
	20 ms	G's	14.00 to 19.00	14.95	Pass
	30 ms	G's	11.00 to 16.00	13.34	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	13.3	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	38.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	93.4	Pass
	Time	ms	72.0 to 82.0	77.7	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	156.0	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-60.2	Pass
	Time	ms	65.0 to 79.0	70.2	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	140.3	Pass
			Overall Test Results		Pass

Jessica Gall
Laboratory Technician

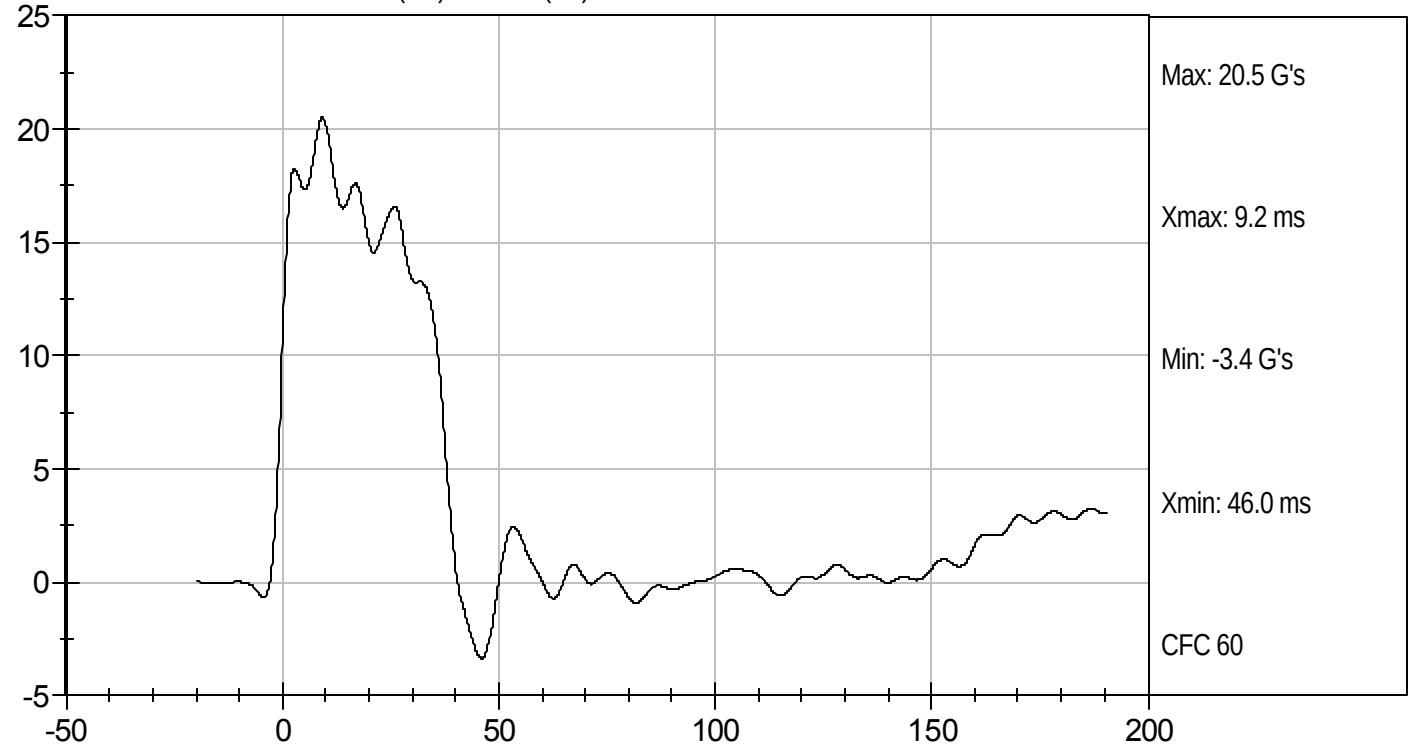
11/22/10
Test Date

David Winkelbauer
Approved By

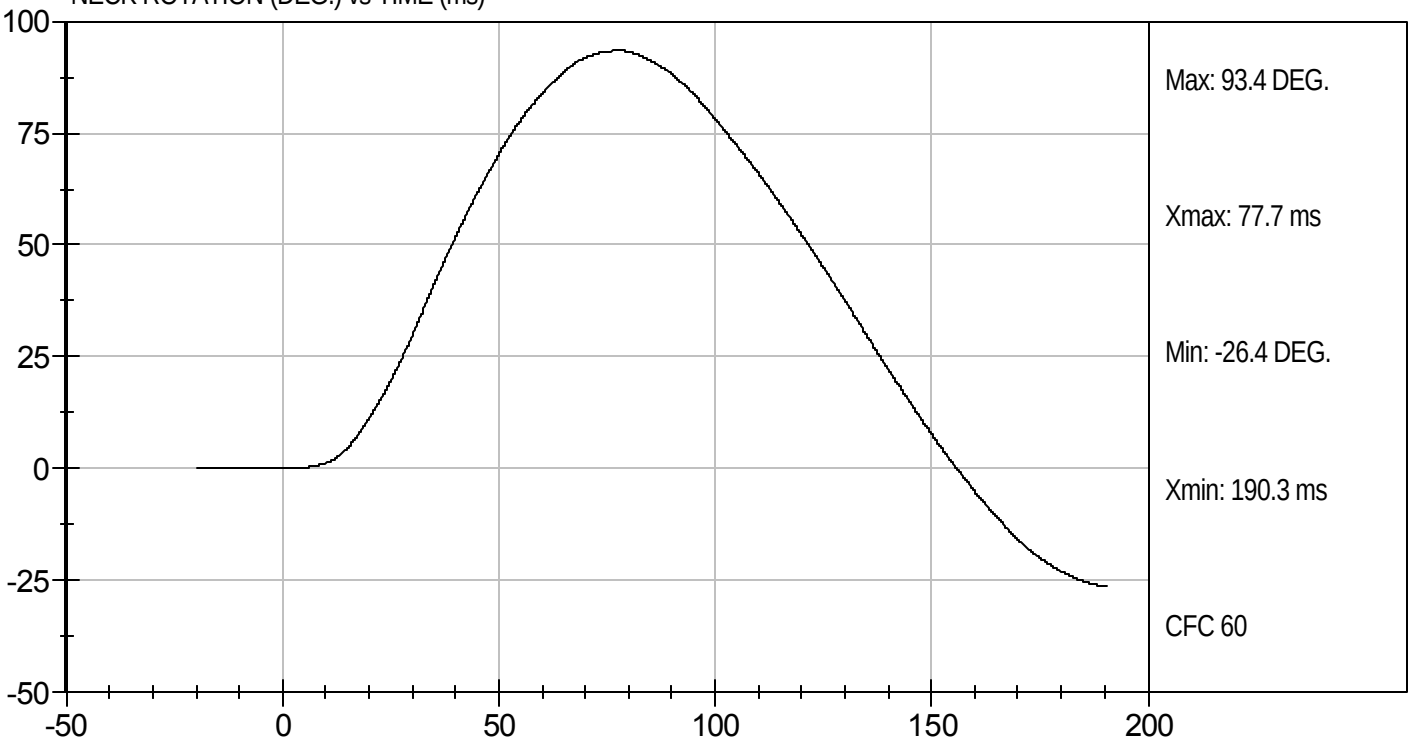
Test Desc: Neck Extension
Component ID: D104103

Test Date: 11/22/10
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM DECELERATION (G's) vs TIME (ms)

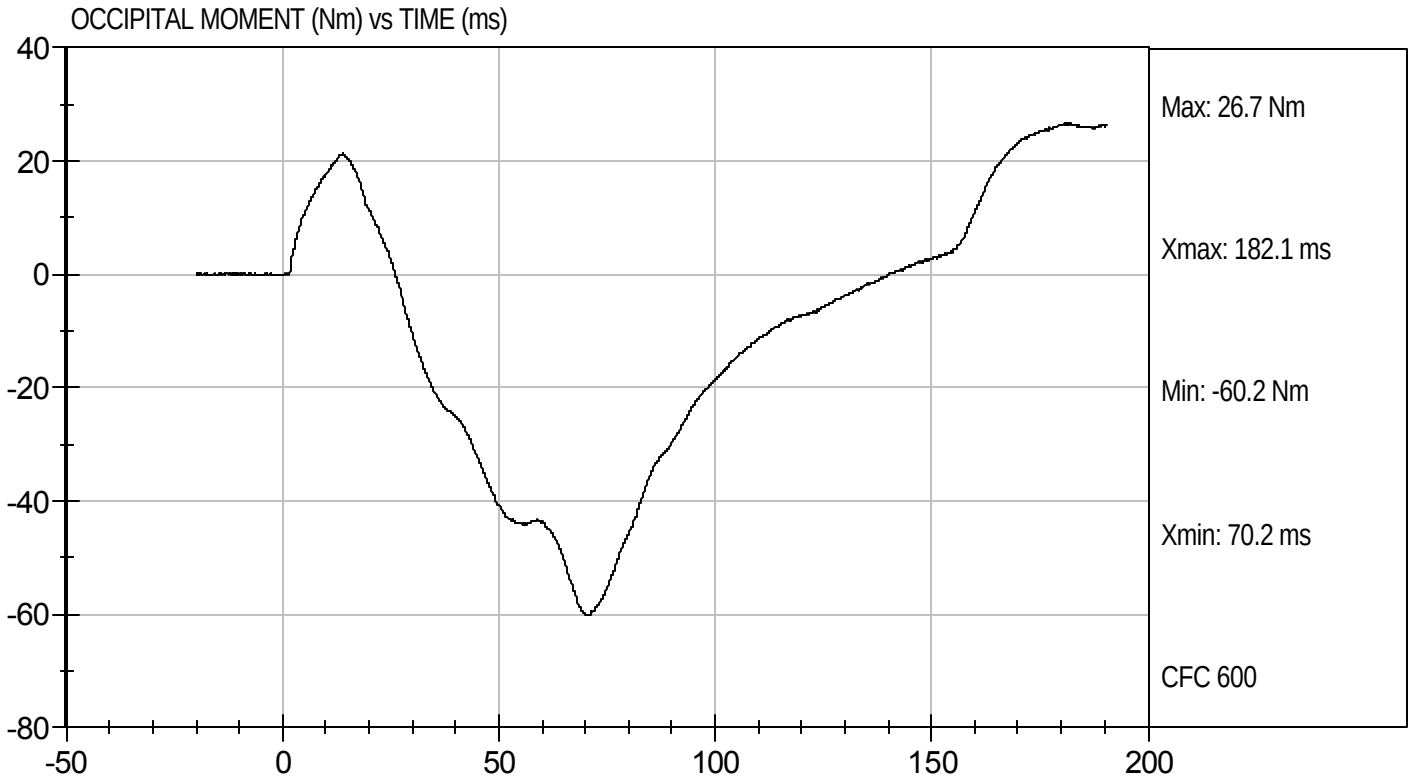


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Extension
Component ID: D104103

Test Date: 11/22/10
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104104

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	55	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,256	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.42	Pass
Internal Hysteresis	%	69 to 85	71	Pass
		Overall Test Results		Pass

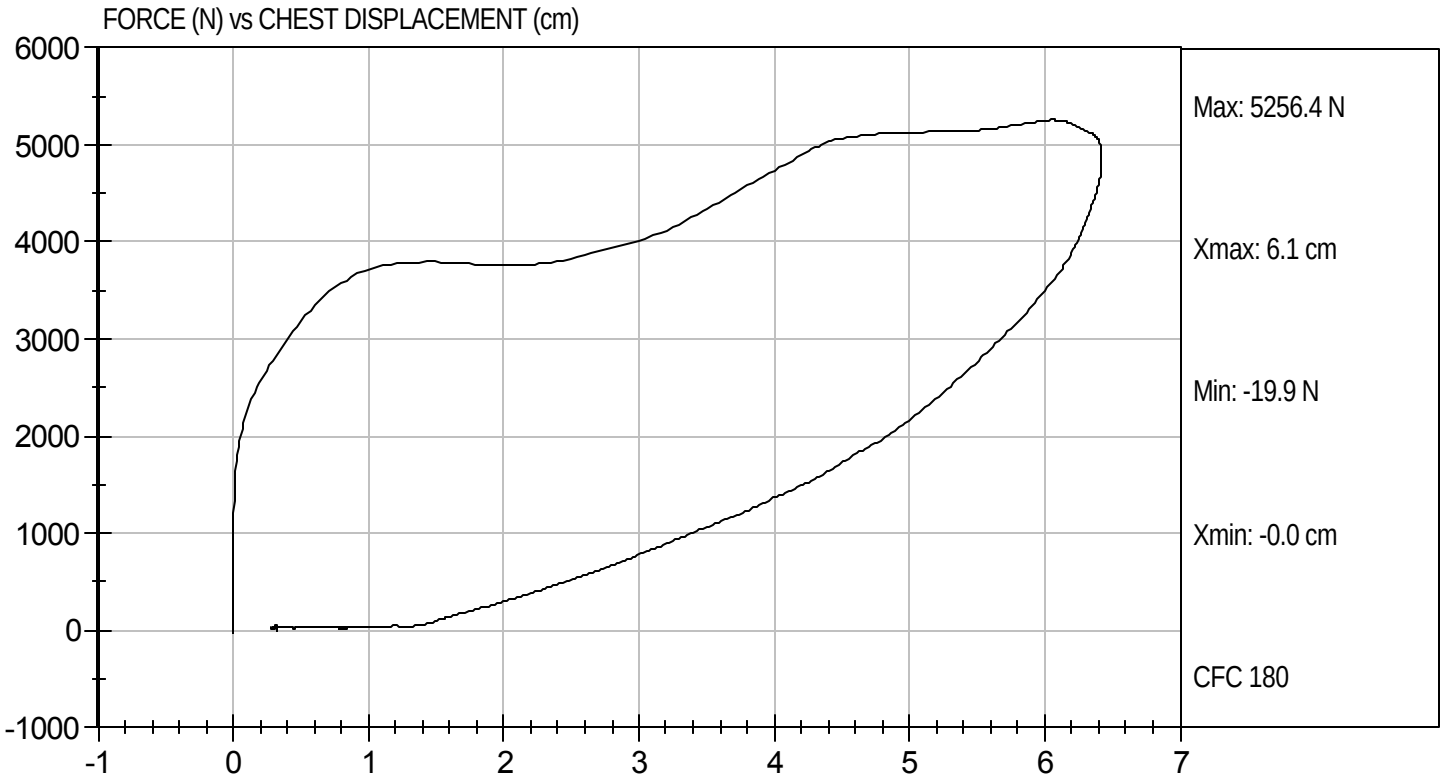
Jessica Hall
Laboratory Technician

11/22/10
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D104104

Test Date: 11/22/10
Velocity: 21.92 ft/s, 6.68 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104105

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	56	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5,407	Pass
		Overall Test Results		Pass

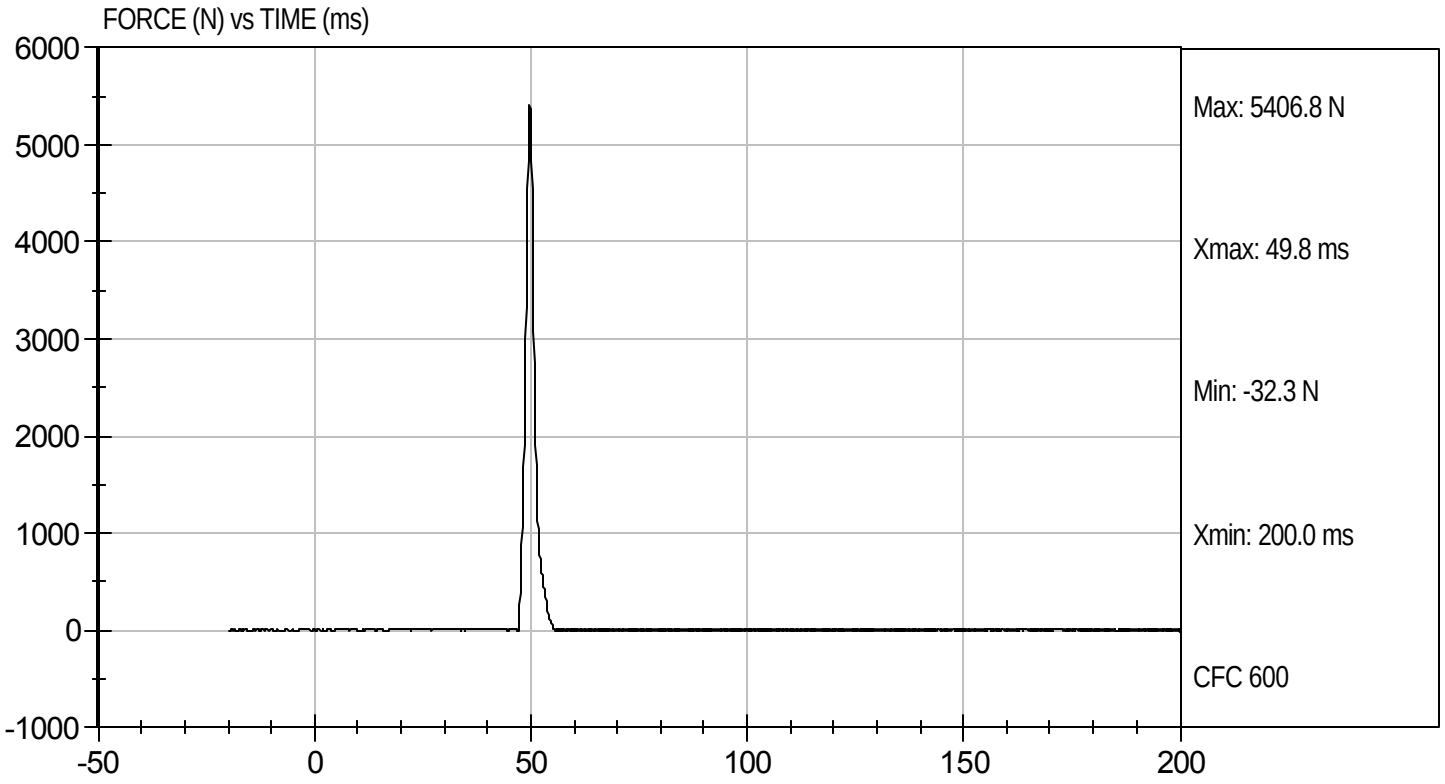
Jessica Gall
Laboratory Technician

11/22/10
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D104105

Test Date: 11/22/10
Velocity: 6.92 ft/s, 2.11 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104106

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	56	Pass
Probe Velocity	m/s	2.07 to 2.13	2.11	Pass
Peak Probe Force	Newtons	4715 to 5782	5,402	Pass
		Overall Test Results		Pass

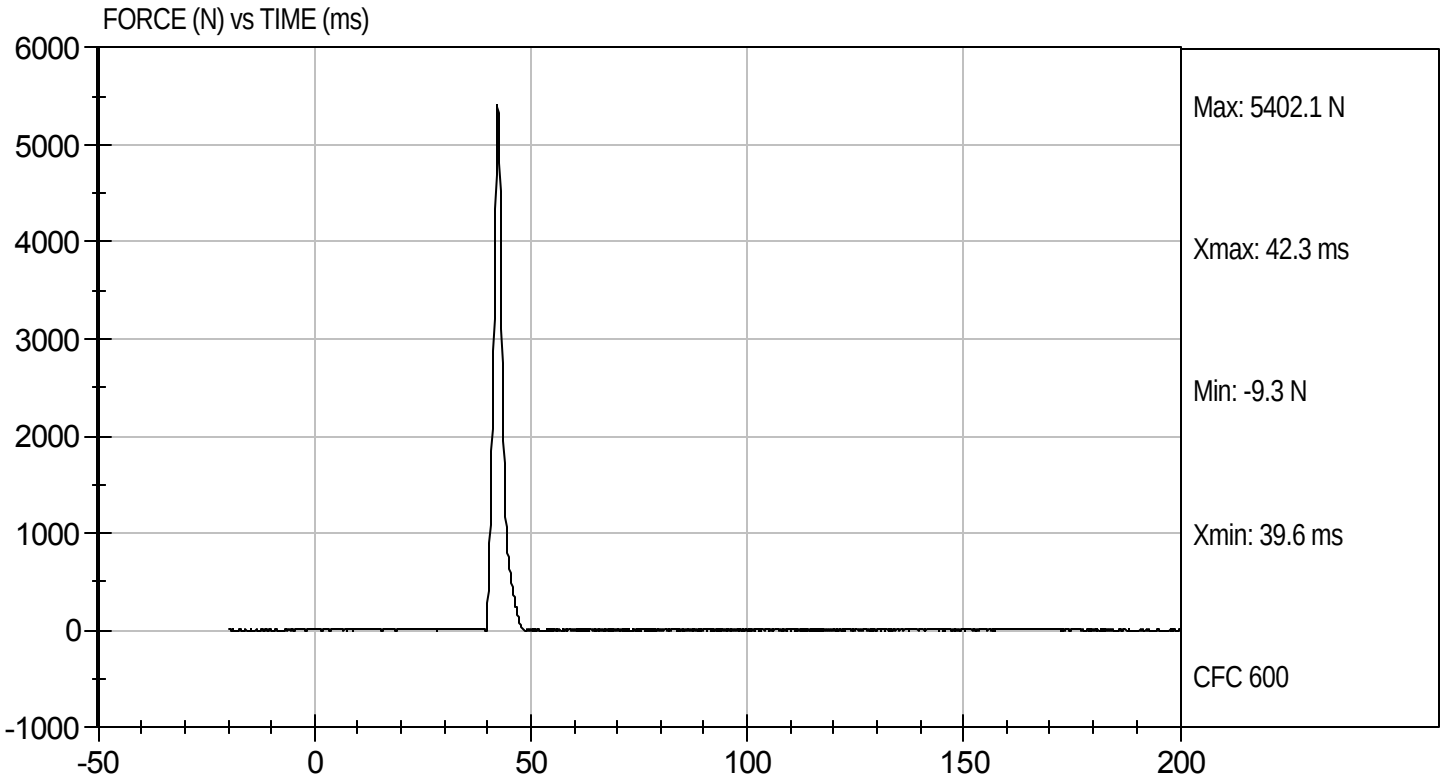
Jessica Hall
Laboratory Technician

11/22/10
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D104106

Test Date: 11/22/10
Velocity: 6.92 ft/s, 2.11 m/s



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104100

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	21.5	21.5	Pass
Laboratory Relative Humidity	%	10 to 70	56	56	Pass
Rotation Rate	deg/s	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	43.6	42.2	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	48	48	Pass
		Overall Test Results			Pass

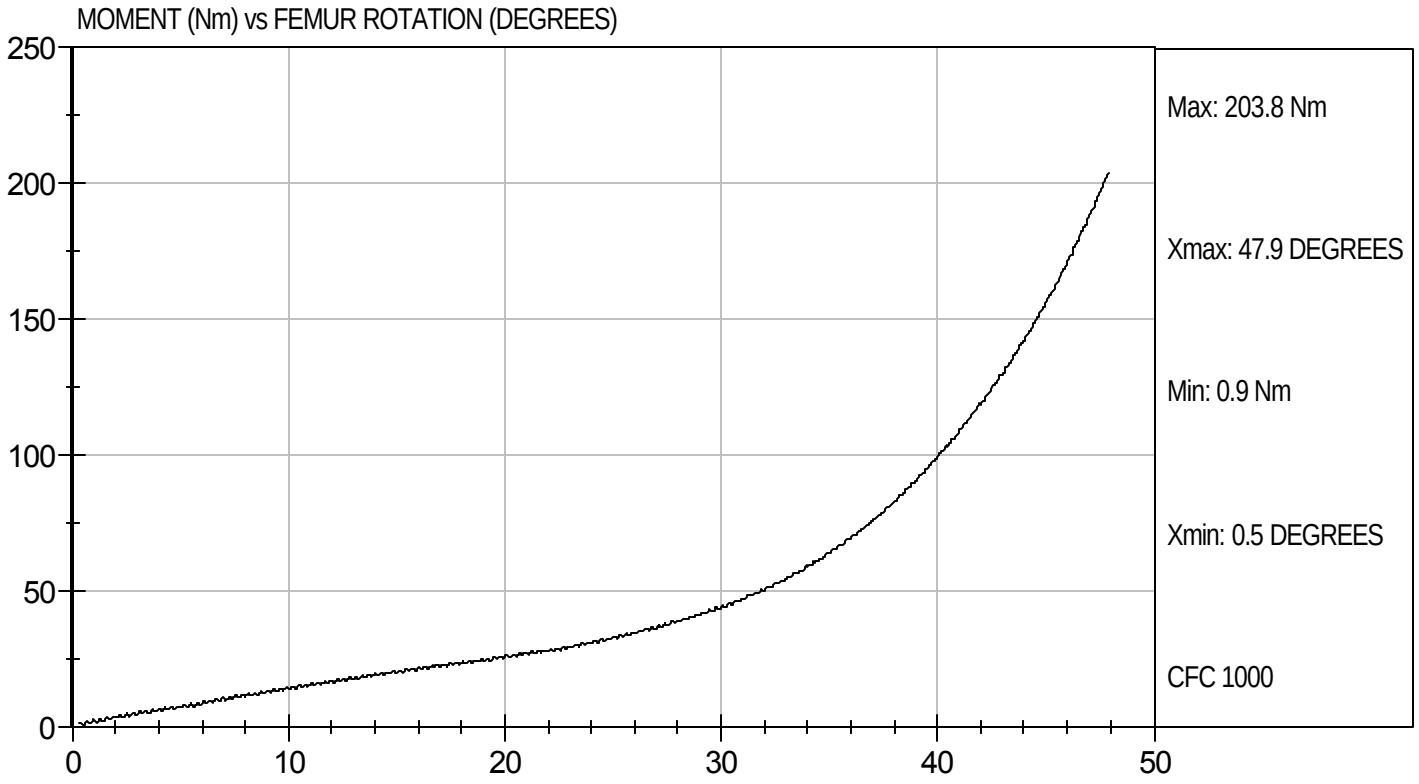
Jessica Hall
Laboratory Technician

11/22/10
Test Date

David Winkelbauer
Approved By

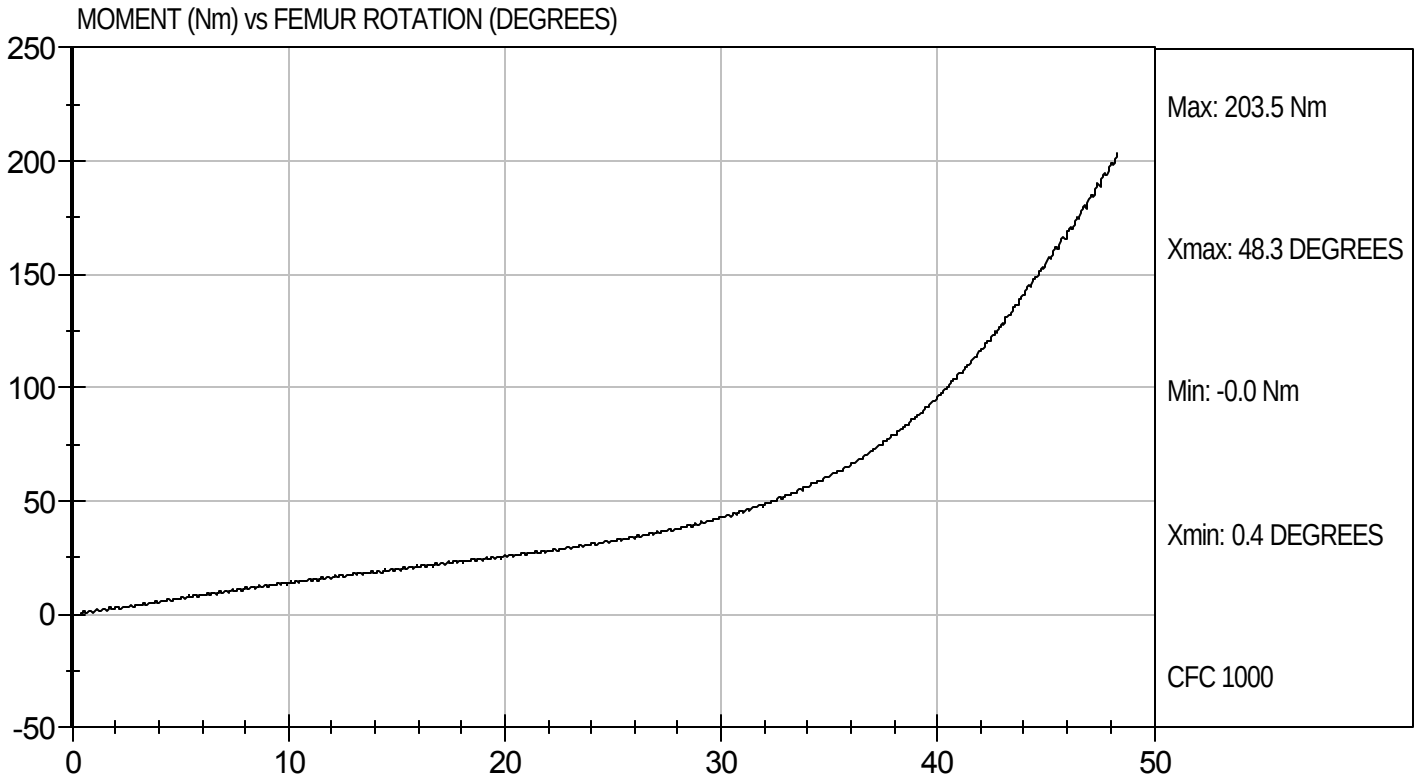
Test Desc: Hip Femur Flexion
Component ID: D104109

Test Date: 11/22/10
Velocity: 0 ft/s, 0.00 m/s



Test Desc: Hip Femur Flexion
Component ID: D104100

Test Date: 11/22/10
Velocity: 0 ft/s, 0.00 m/s



MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test ID:** D104261

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Peak Resultant Acceleration	G's	225 - 275	260	Pass
Peak Lateral Acceleration	G's	<= +/- 15.0	-9.4	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

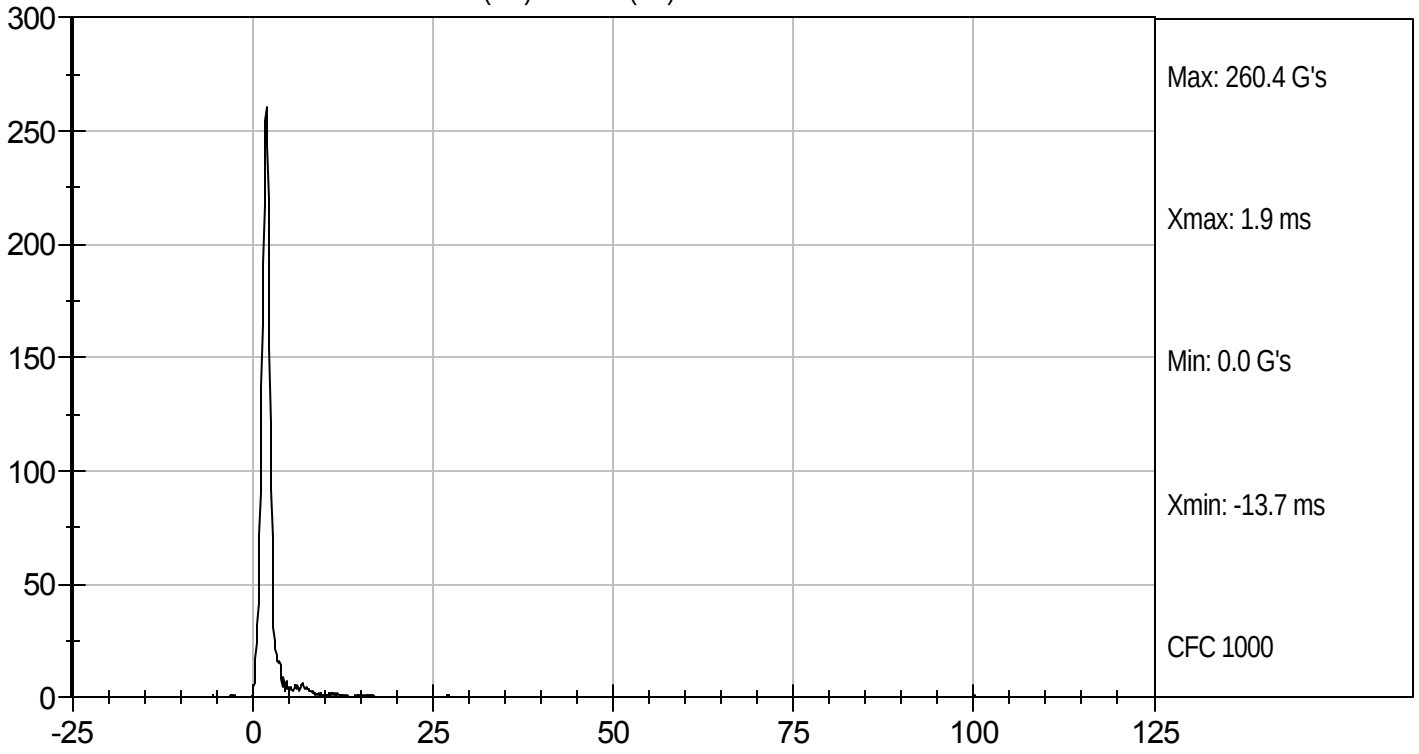
12/3/10
Test Date

David Winkelbauer
Approved By

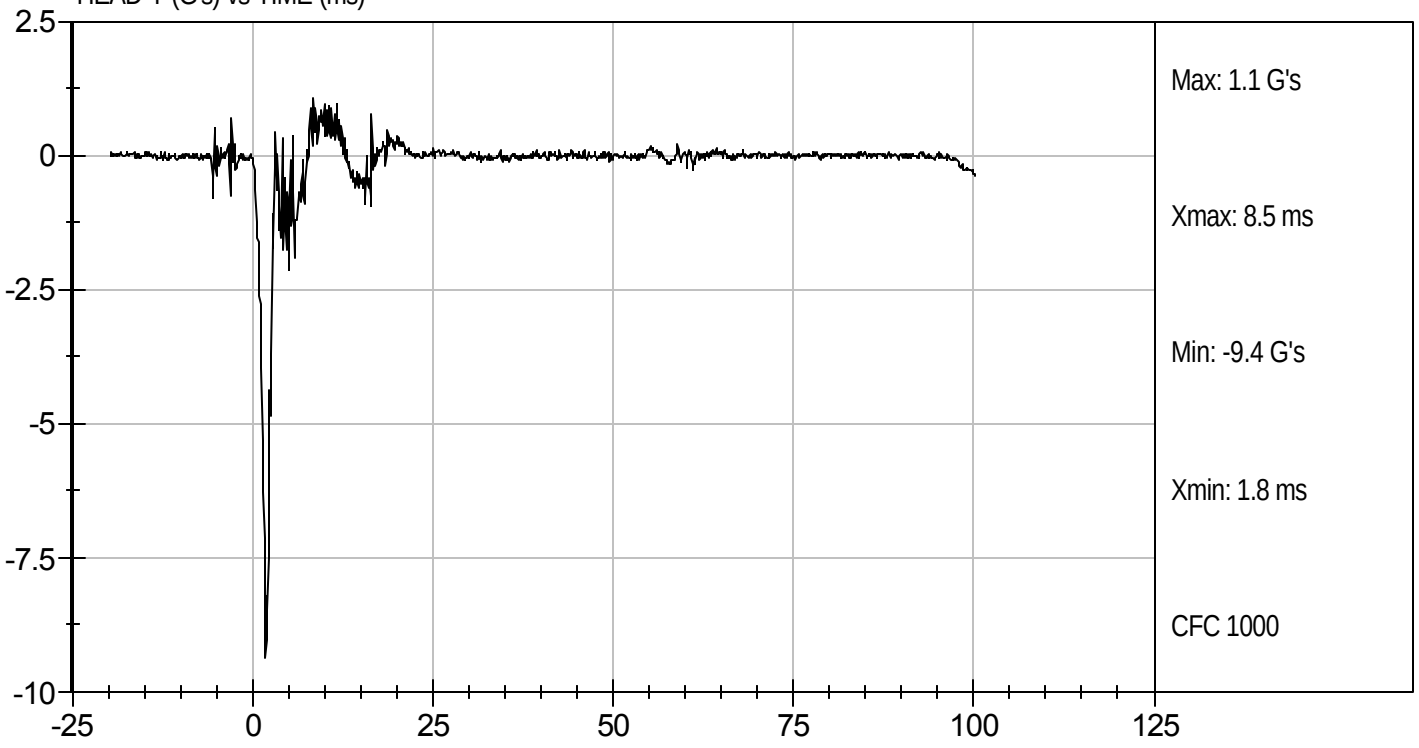
Test Desc: Head Drop
Component ID: D104261

Test Date: 12/3/10
Velocity: 0 ft/s, 0.00 m/s

RESULTANT HEAD ACCELERATION (G's) vs TIME (ms)



HEAD Y (G's) vs TIME (ms)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104262

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	15	Pass
Pendulum Velocity		m/s	6.89 to 7.13	6.95	Pass
Pendulum Deceleration	10 ms	G's	22.50 to 27.50	24.55	Pass
	20 ms	G's	17.60 to 22.60	21.71	Pass
	30 ms	G's	12.50 to 18.50	14.94	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 29.0	14.86	Pass
Deceleration Decay Time to Cross 5 G's		ms	34.0 to 42.0	37.1	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	64.0 to 78.0	69.5	Pass
	Time	ms	57.0 to 64.0	59.1	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	113.0 to 128.0	113.1	Pass
Moment About Occipital Condyle	Maximum	N m	88.1 to 108.5	96.6	Pass
	Time	ms	47.0 to 58.0	50.6	Pass
Positive Moment Decay Time To Zero Crossing		ms	97.0 to 107.0	100.0	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

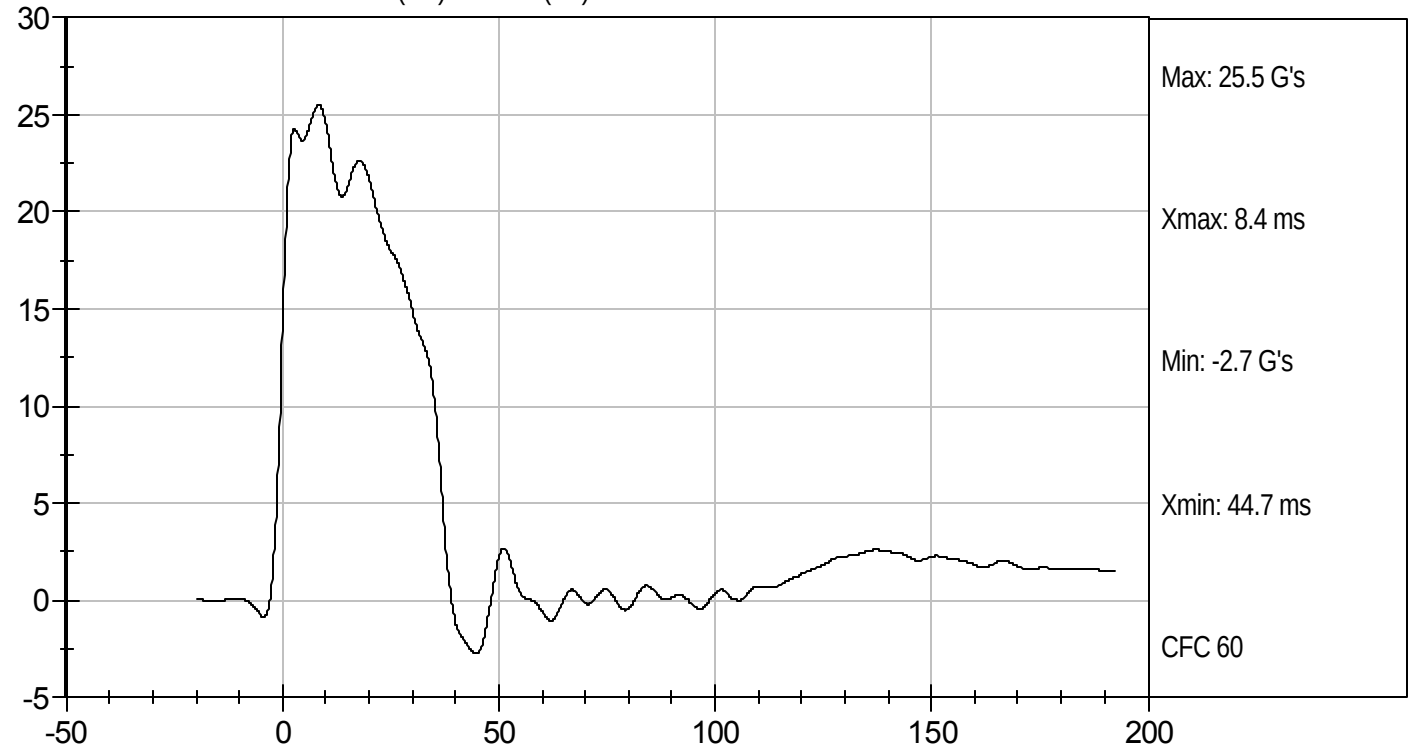
12/6/10
Test Date

David Winkelbauer
Approved By

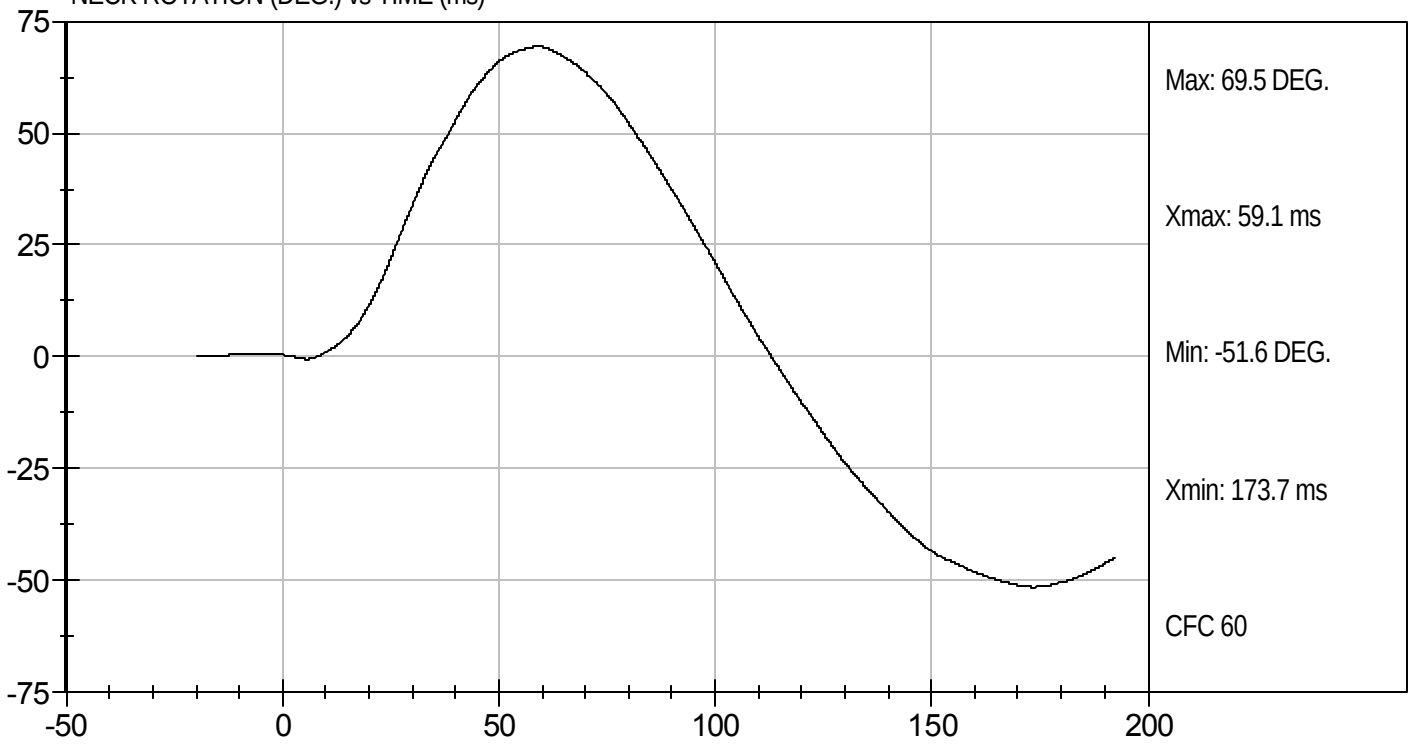
Test Desc: Neck Flexion
Component ID: D104262

Test Date: 12/6/10
Velocity: 0 ft/s, 0 m/s

PENDULUM DECELERATION (G's) vs TIME (ms)

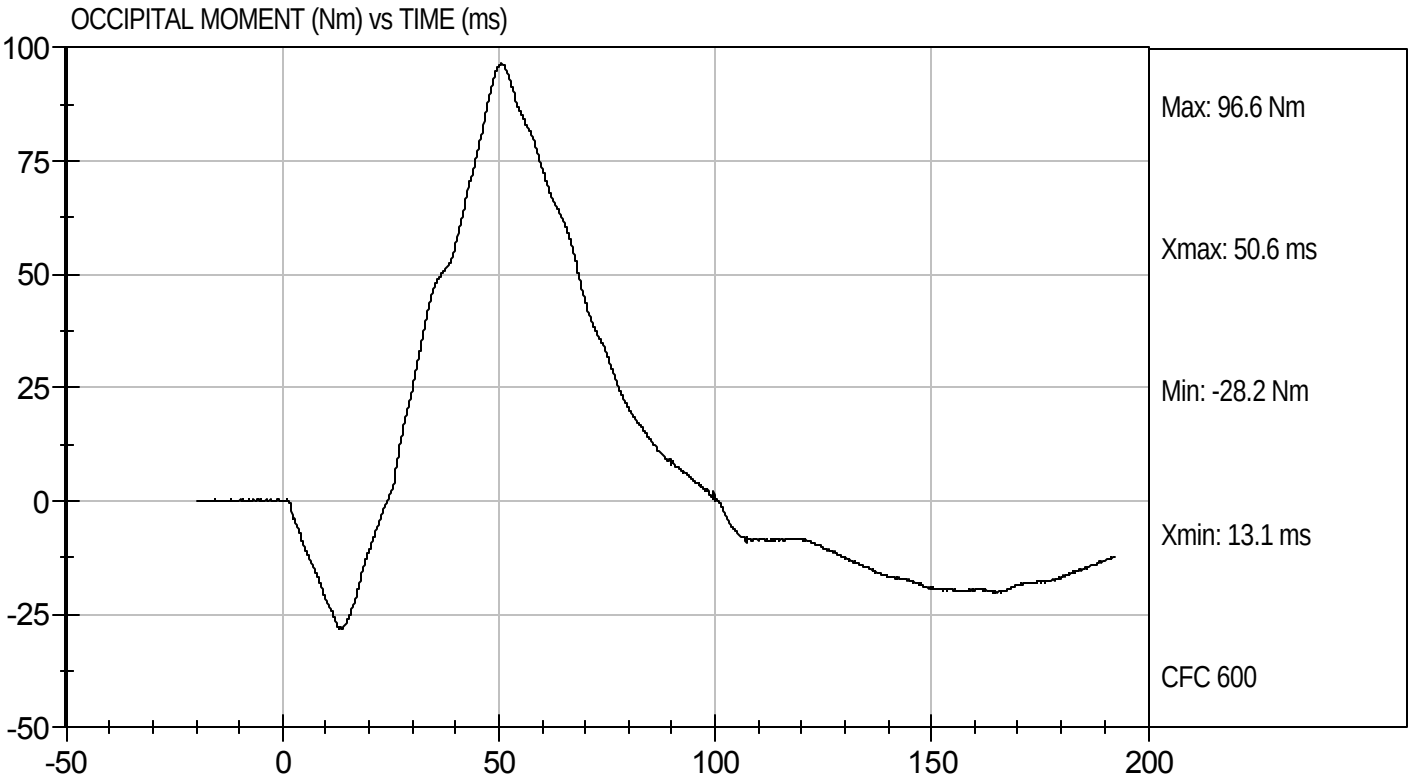


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Flexion
Component ID: D104262

Test Date: 12/6/10
Velocity: 22.8 ft/s, 6.95 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104263

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.7	Pass
Laboratory Relative Humidity		%	10 to 70	15	Pass
Pendulum Velocity		m/s	5.95 to 6.19	6.10	Pass
Pendulum Deceleration	10 ms	G's	17.20 to 21.20	19.34	Pass
	20 ms	G's	14.00 to 19.00	15.27	Pass
	30 ms	G's	11.00 to 16.00	12.94	Pass
Peak Pendulum Deceleration After 30 ms		G's	<= 22.0	12.88	Pass
Deceleration Decay Time to Cross 5 G's		ms	38.0 to 46.0	38.3	Pass
Maximum "D" Plane Rotation	Maximum	Degrees	81.0 to 106.0	95.6	Pass
	Time	ms	72.0 to 82.0	76.9	Pass
"D" Plane Rotation Decay Time To Zero Crossing		ms	147.0 to 174.0	155.4	Pass
Moment About Occipital Condyle	Maximum	Nm	-52.9 to -79.9	-61.7	Pass
	Time	ms	65.0 to 79.0	70.8	Pass
Negative Moment Decay Time To Zero Crossing		ms	120.0 to 148.0	143.6	Pass
			Overall Test Results		Pass

Jessica Hall
Laboratory Technician

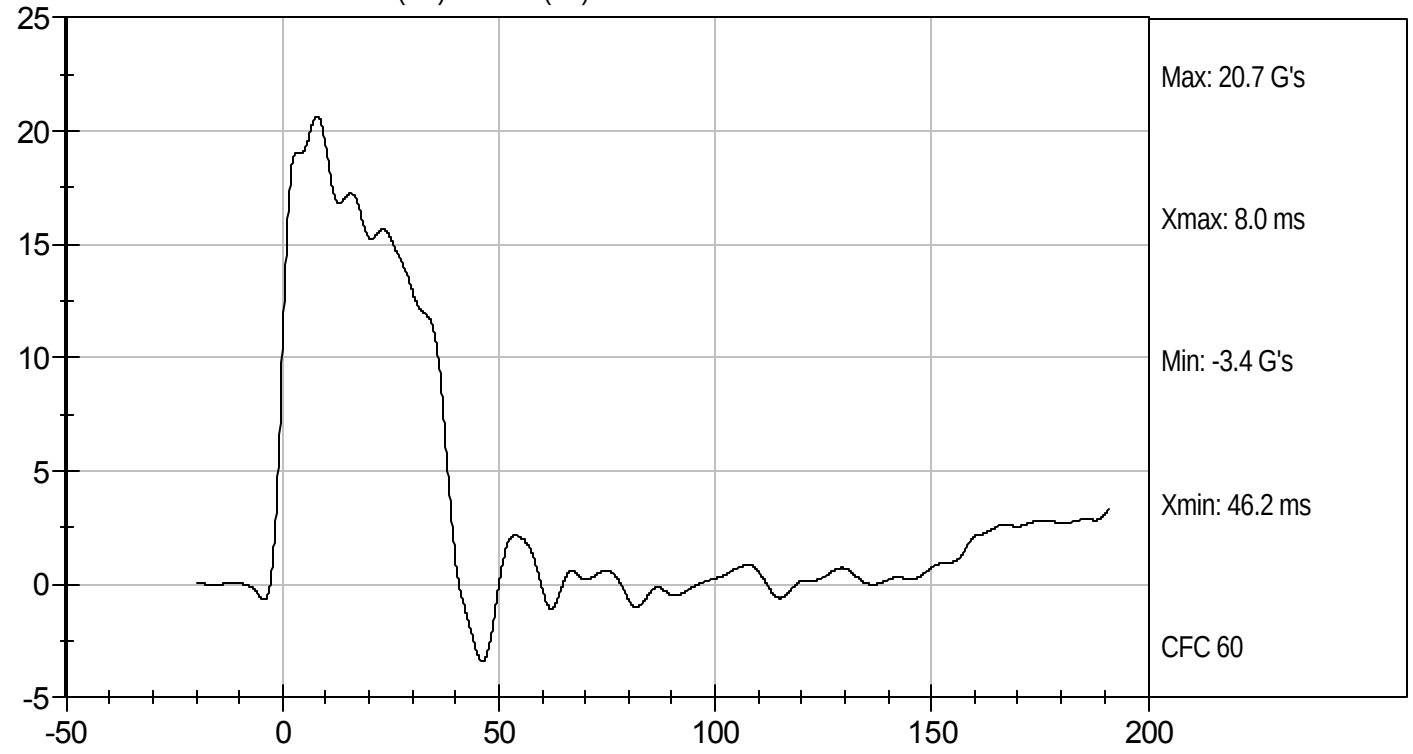
12/6/10
Test Date

David Winkelbauer
Approved By

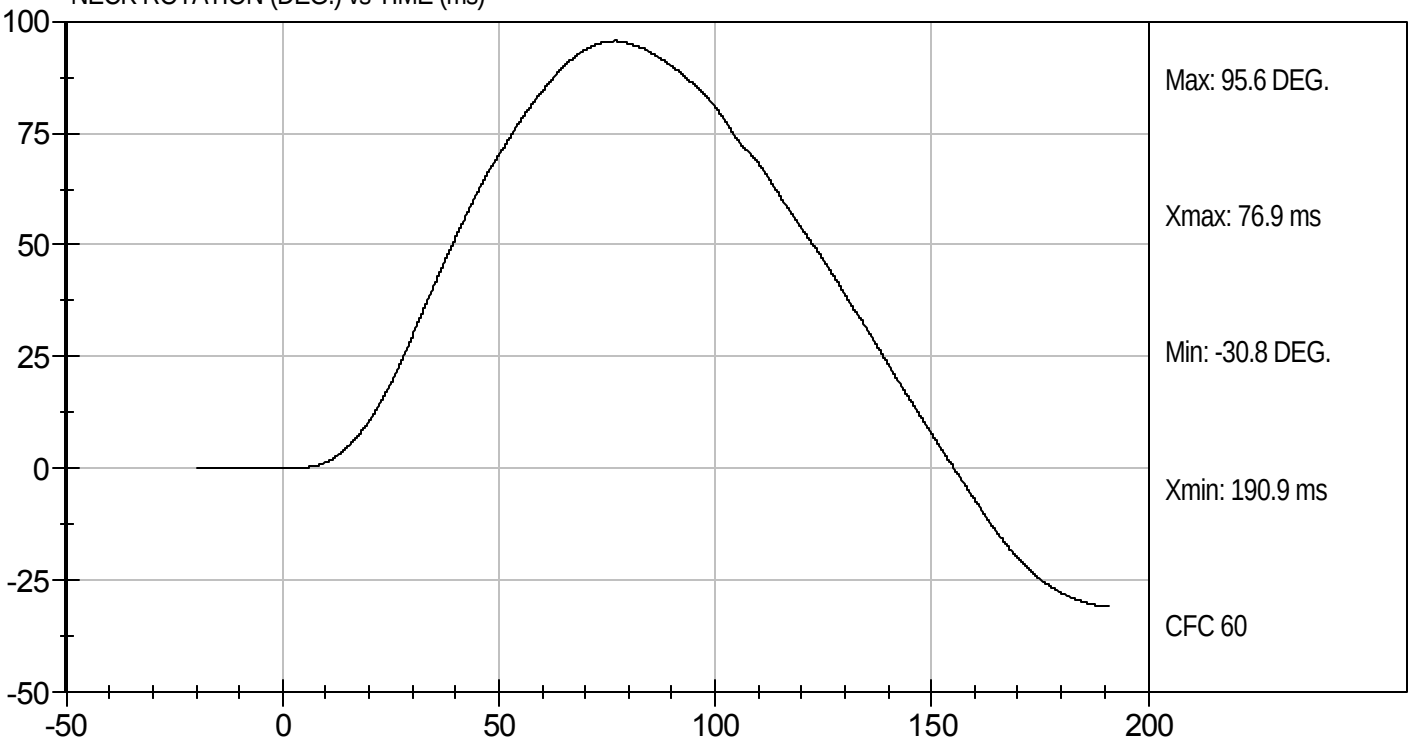
Test Desc: Neck Extension
Component ID: D104263

Test Date: 12/6/10
Velocity: 0 ft/s, 0 m/s

PENDULUM DECELERATION (G's) vs TIME (ms)

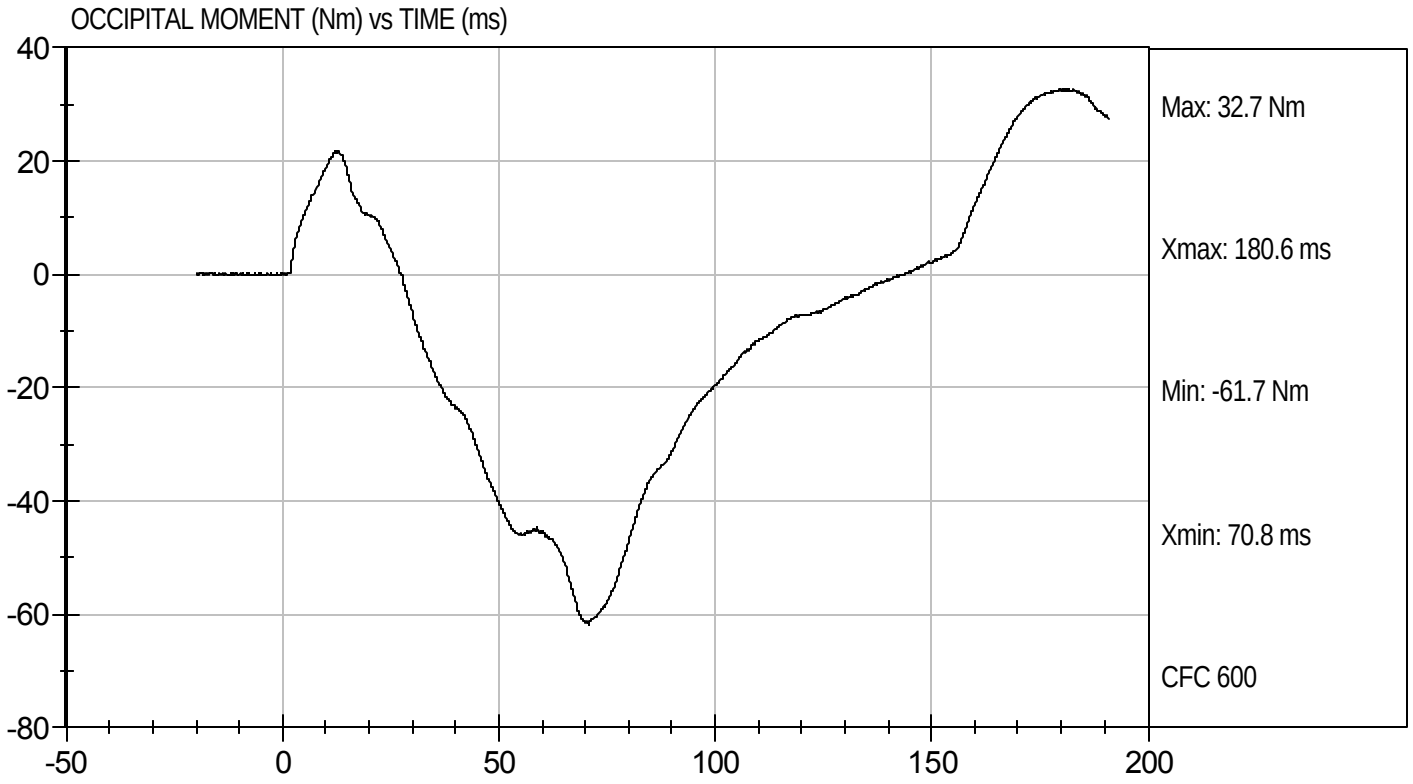


NECK ROTATION (DEG.) vs TIME (ms)



Test Desc: Neck Extension
Component ID: D104263

Test Date: 12/6/10
Velocity: 20.0 ft/s, 6.10 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104264

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	20.6 to 22.2	21.0	Pass
Laboratory Relative Humidity	%	10 to 70	18	Pass
Probe Velocity	m/s	6.58 to 6.82	6.68	Pass
Peak Probe Force	N	5159 to 5893	5,282	Pass
Peak Sternum Displacement	cm	6.35 to 7.26	6.63	Pass
Internal Hysteresis	%	69 to 85	69	Pass
		Overall Test Results		Pass

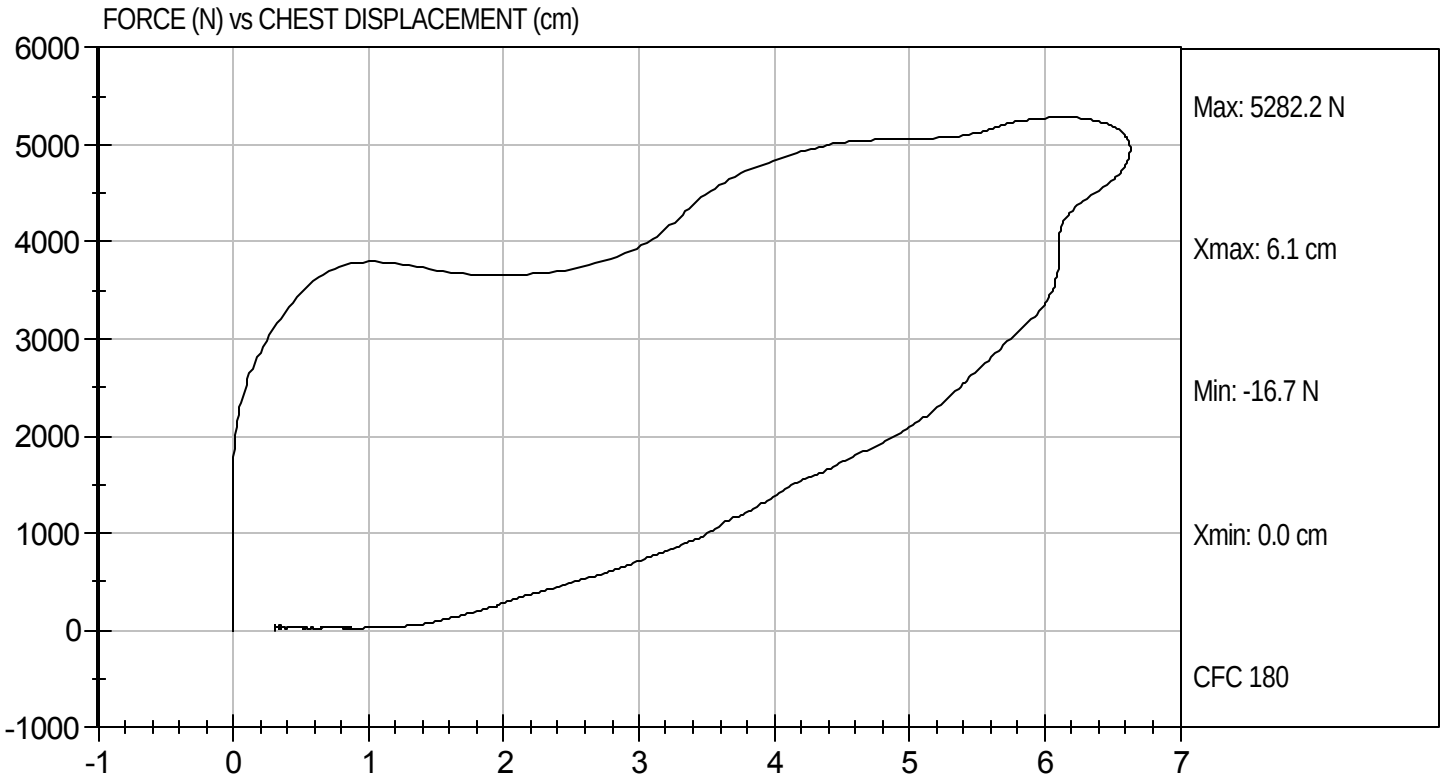
Jessica Hall
Laboratory Technician

12/3/10
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D104264

Test Date: 12/3/10
Velocity: 21.93 ft/s, 6.68 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104265

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Probe Velocity	m/s	2.07 to 2.13	2.07	Pass
Peak Probe Force	Newtons	4715 to 5782	5,048	Pass
		Overall Test Results		Pass

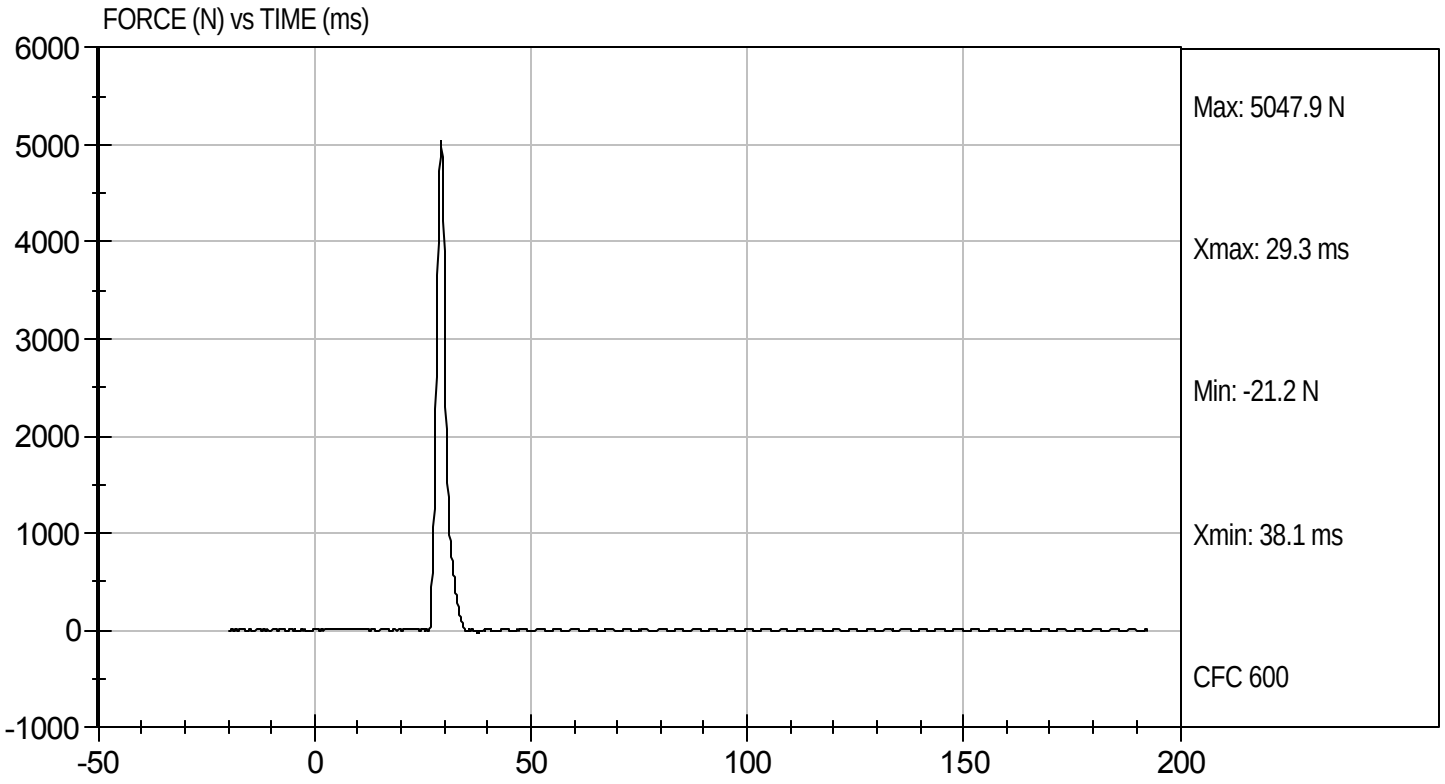
Jessica Gall
Laboratory Technician

12/6/10
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D104265

Test Date: 12/6/10
Velocity: 6.8 ft/s, 2.07 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104266

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	15	Pass
Probe Velocity	m/s	2.07 to 2.13	2.10	Pass
Peak Probe Force	Newtons	4715 to 5782	5,198	Pass
		Overall Test Results		Pass

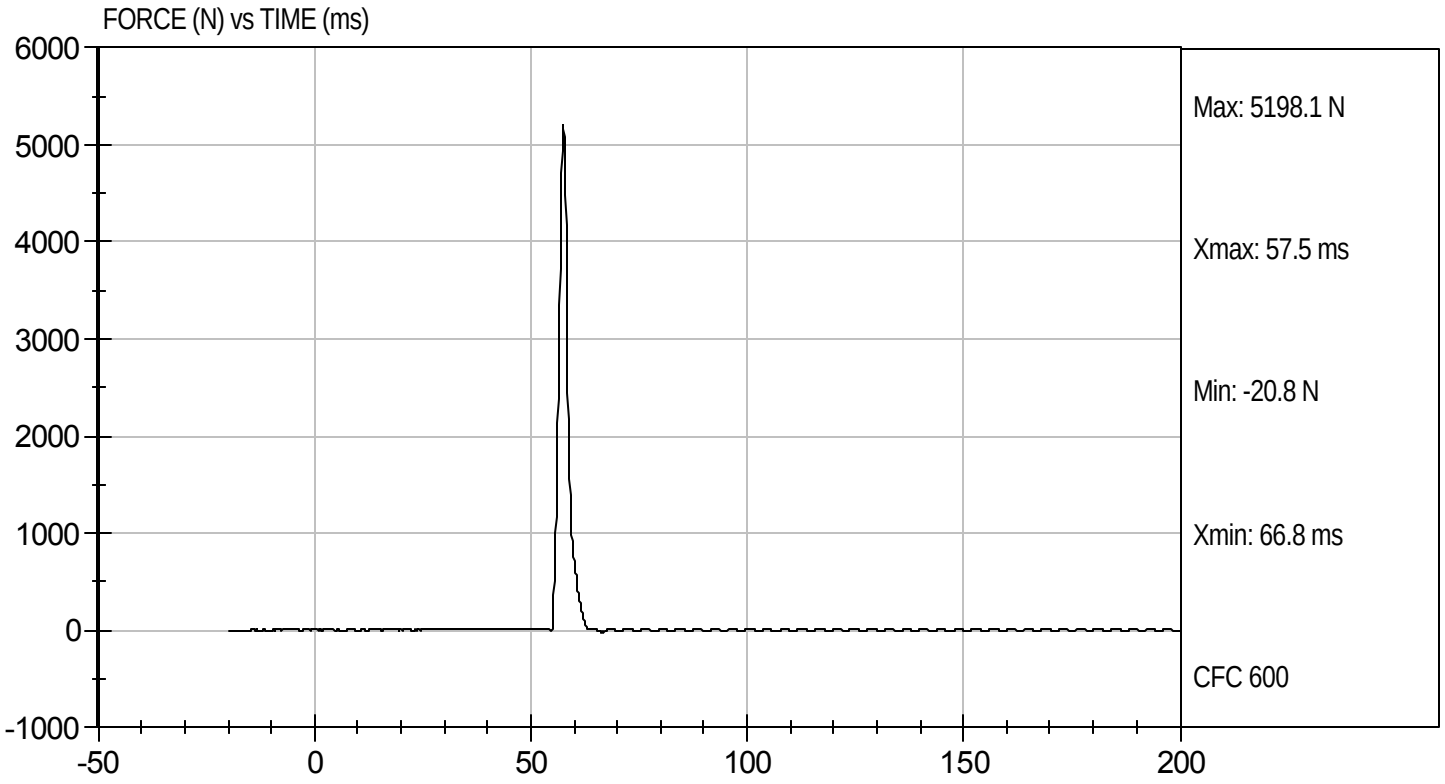
Jessica Gall
Laboratory Technician

12/6/10
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D104266

Test Date: 12/6/10
Velocity: 6.88 ft/s, 2.10 m/s



MGA RESEARCH CORPORATION

HIP-FEMUR FLEXION TEST

HYBRID III 50TH PERCENTILE MALE

ATD Serial No: 351 **Test I.D:** D104260

Tested Parameter	Units	Specification	Result		Pass/Fail
			Right	Left	
Laboratory Temperature	deg C	18.9 to 25.6	22.0	22.0	Pass
Laboratory Relative Humidity	%	10 to 70	14	14	Pass
Rotation Rate	deg/s	5 -10	8	8	Pass
30 Degrees	Nm	94.9 Nm Max	46.0	36.7	Pass
150 ft-lbf / 203.4 Nm	Deg	40- 50 Degree Max Rotation	47	50	Pass
		Overall Test Results			Pass

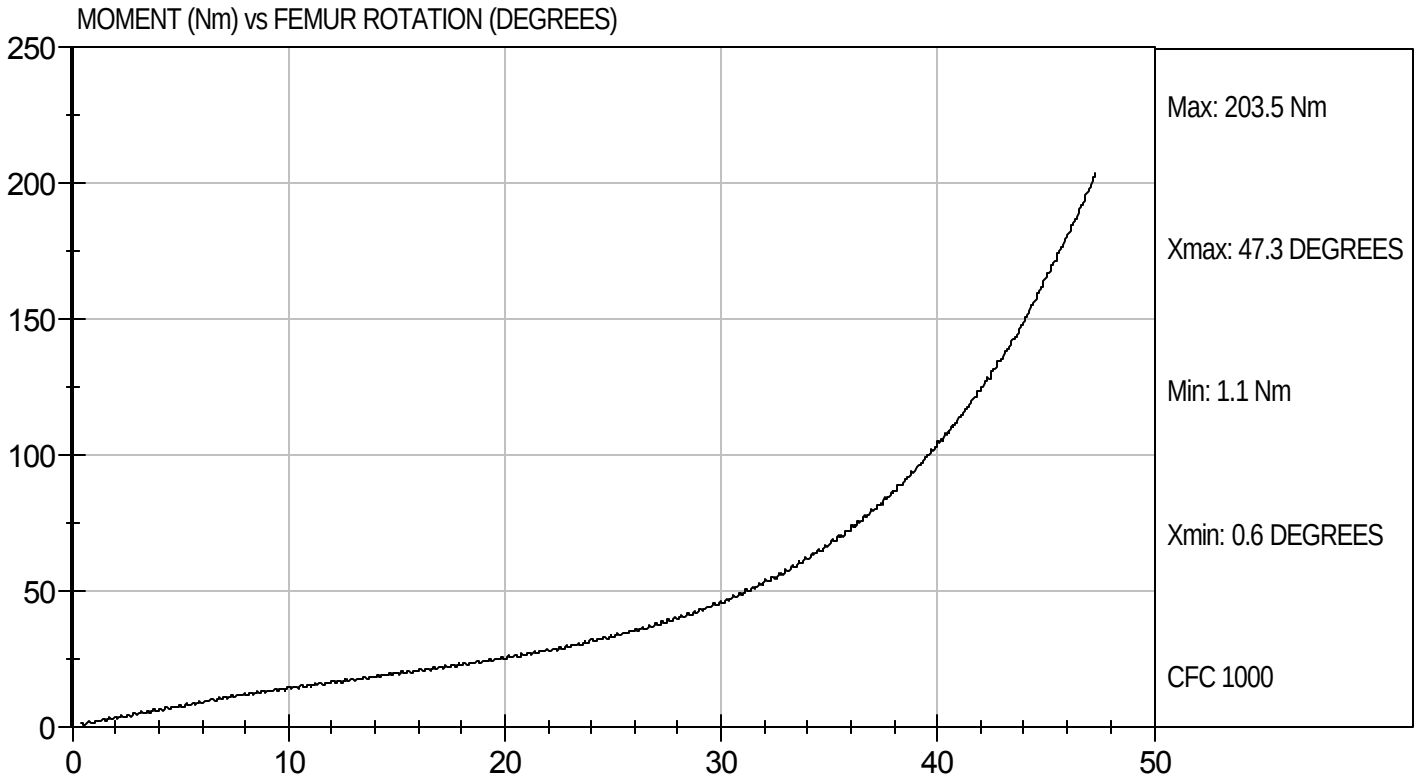
Jessica Gall
Laboratory Technician

12/6/10
Test Date

David Winkelbauer
Approved By

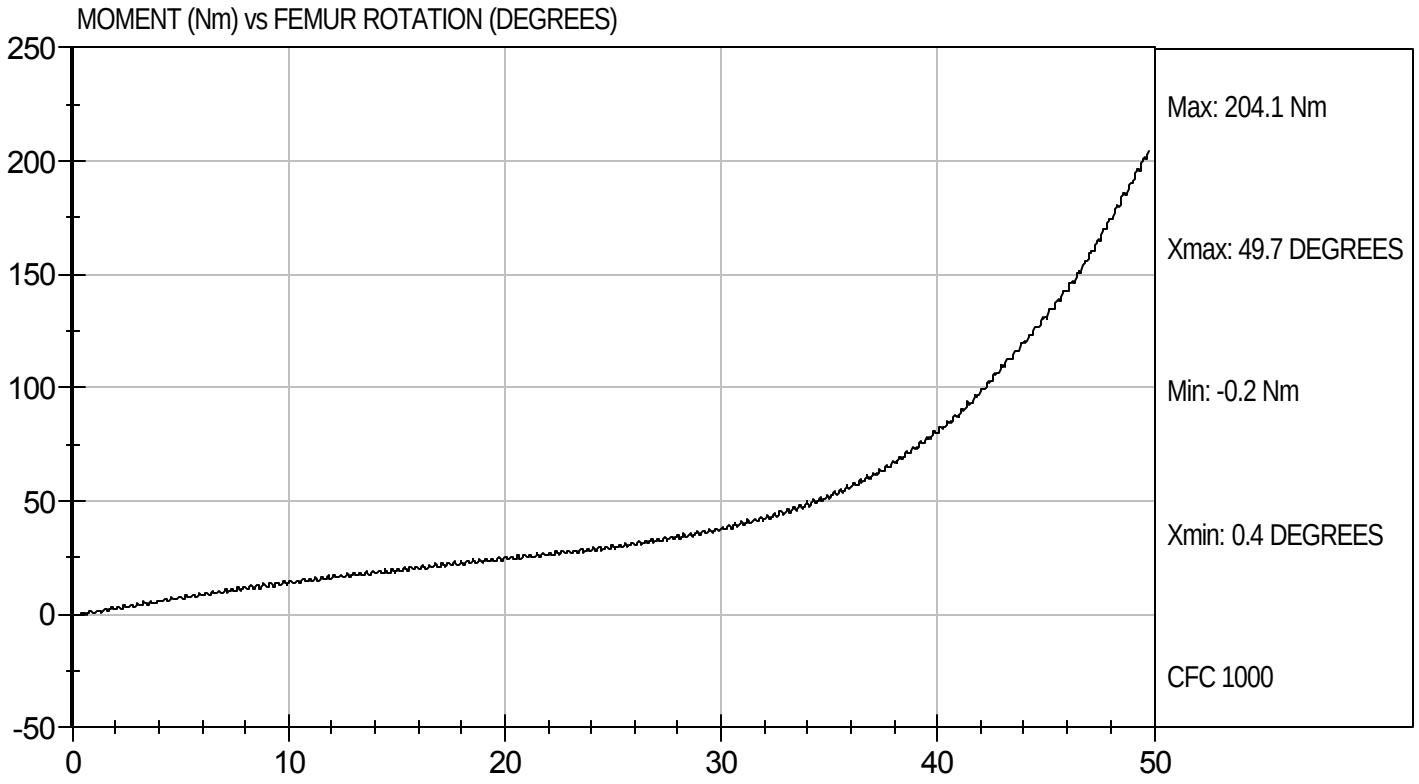
Test Desc: Hip Femur Flexion
Component ID: D104269

Test Date: 12/6/10
Velocity: 0 ft/s, 0.00 m/s



Test Desc: Hip Femur Flexion
Component ID: D104260

Test Date: 12/6/10
Velocity: 0 ft/s, 0.00 m/s



MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test ID:** D104111

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	21.4	Pass
Laboratory Relative Humidity	%	10 to 70	60	Pass
Peak Resultant Acceleration	G's	250 to 300	277	Pass
Peak Lateral Acceleration	G's	+/- 15	-2	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Gall
Laboratory Technician

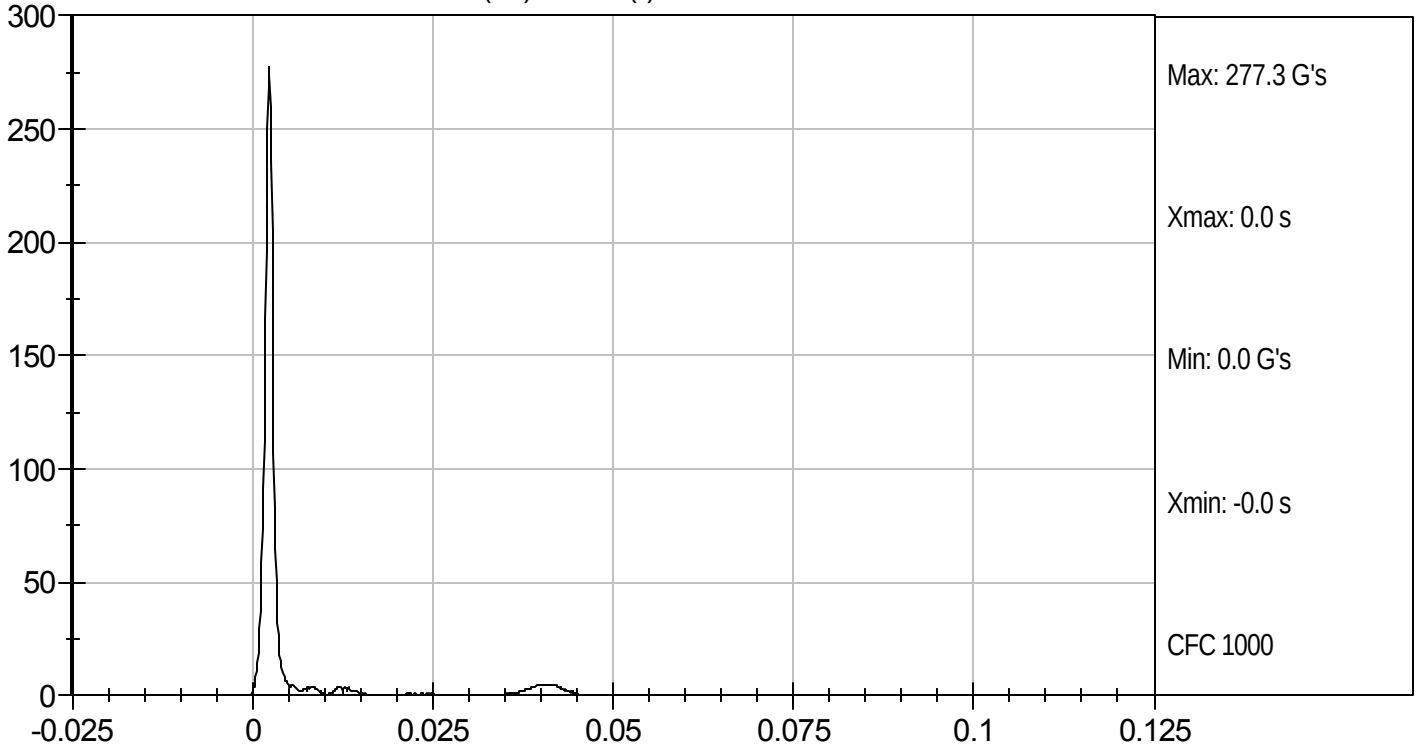
11/22/10
Test Date

David Winkelbauer
Approved By

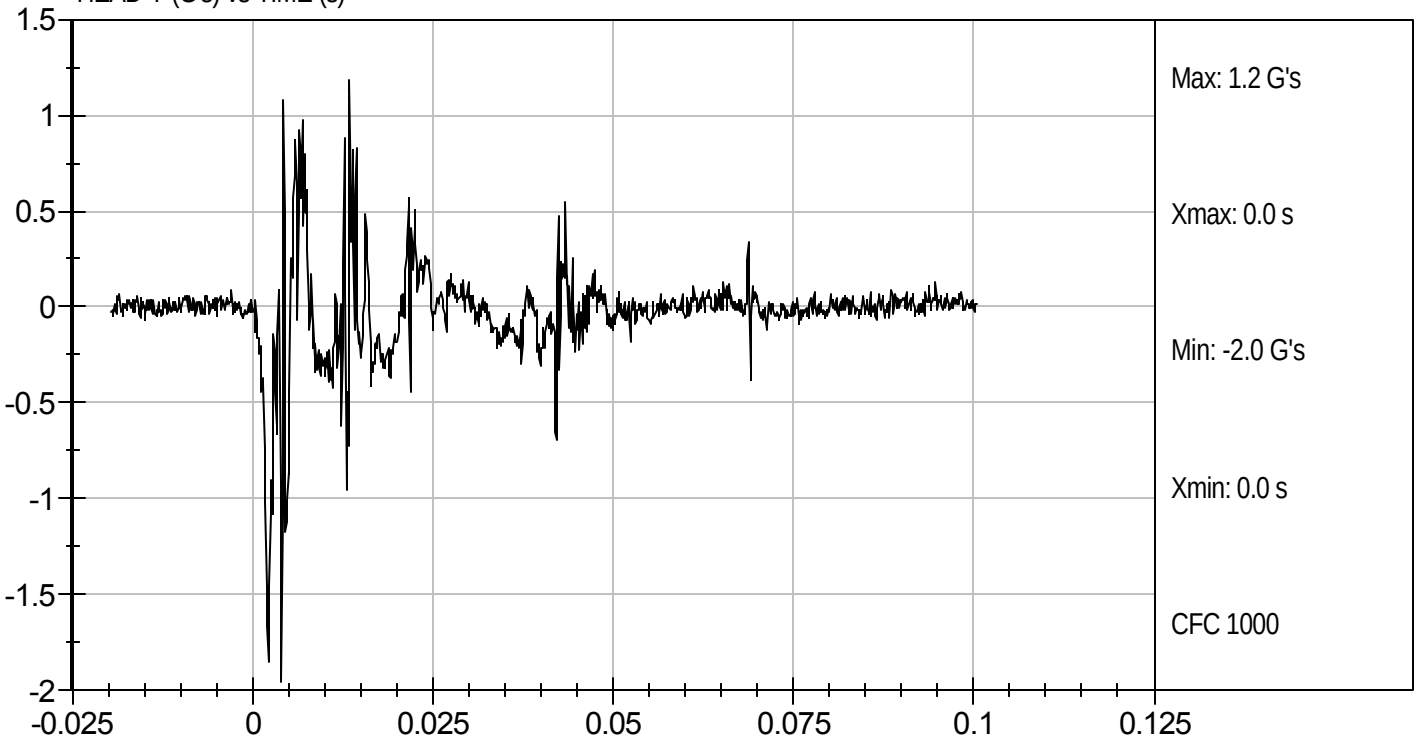
Test Desc: Head Drop
Component ID: D104111

Test Date: 11/22/10
Velocity: 0 ft/s, 0 m/s

RESULTANT HEAD ACCELERATION (G's) vs TIME (s)



HEAD Y (G's) vs TIME (s)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104112

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	56	Pass
Pendulum Speed		m/s	6.89 to 7.13	6.96	Pass
Pendulum Deceleration	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.3	Pass
	30 ms	m/s	5.8 to 7.0	6.1	Pass
D Plane Rotation	Max	deg	77 to 91	77	Pass
Occipital Condyle Moment within Deflection Corridor		Nm	69 to 83	70	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	86	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

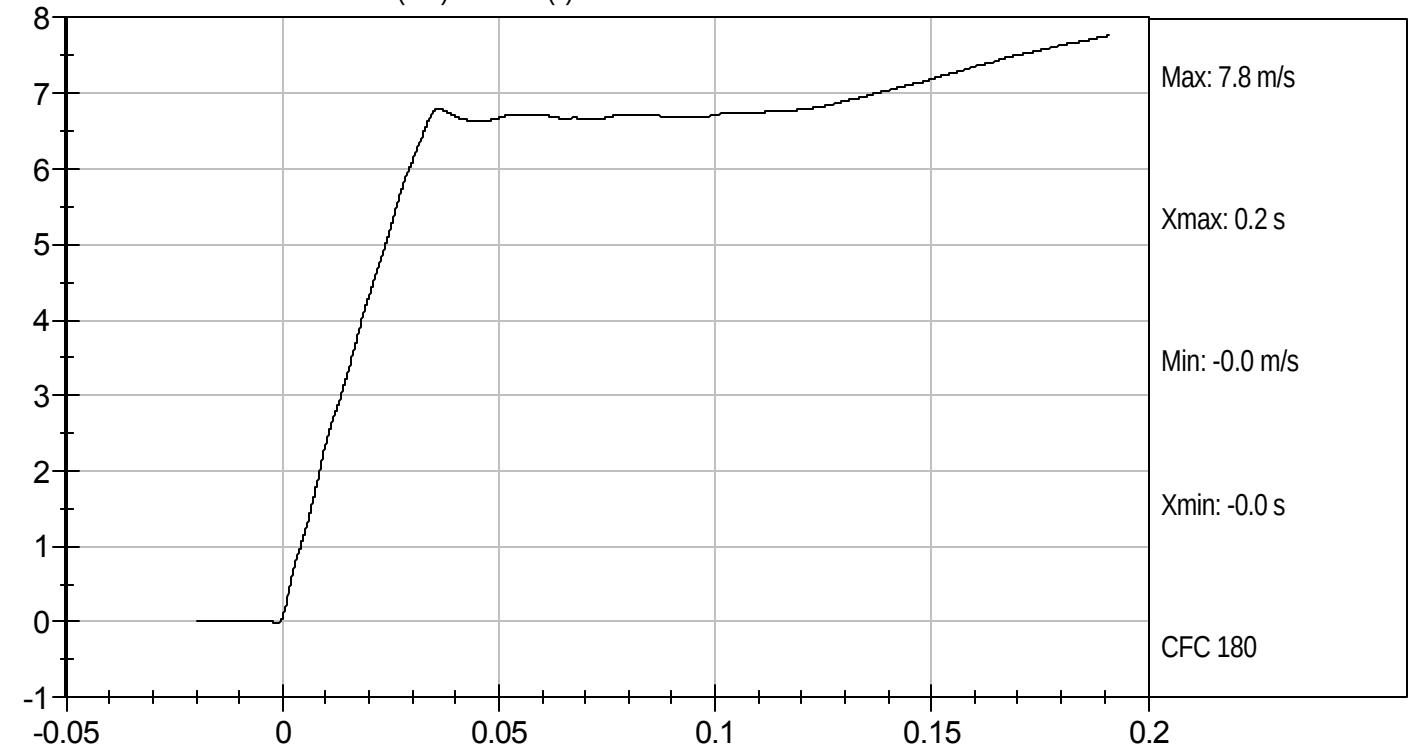
11/22/10
Test Date

David Winkelbauer
Approved By

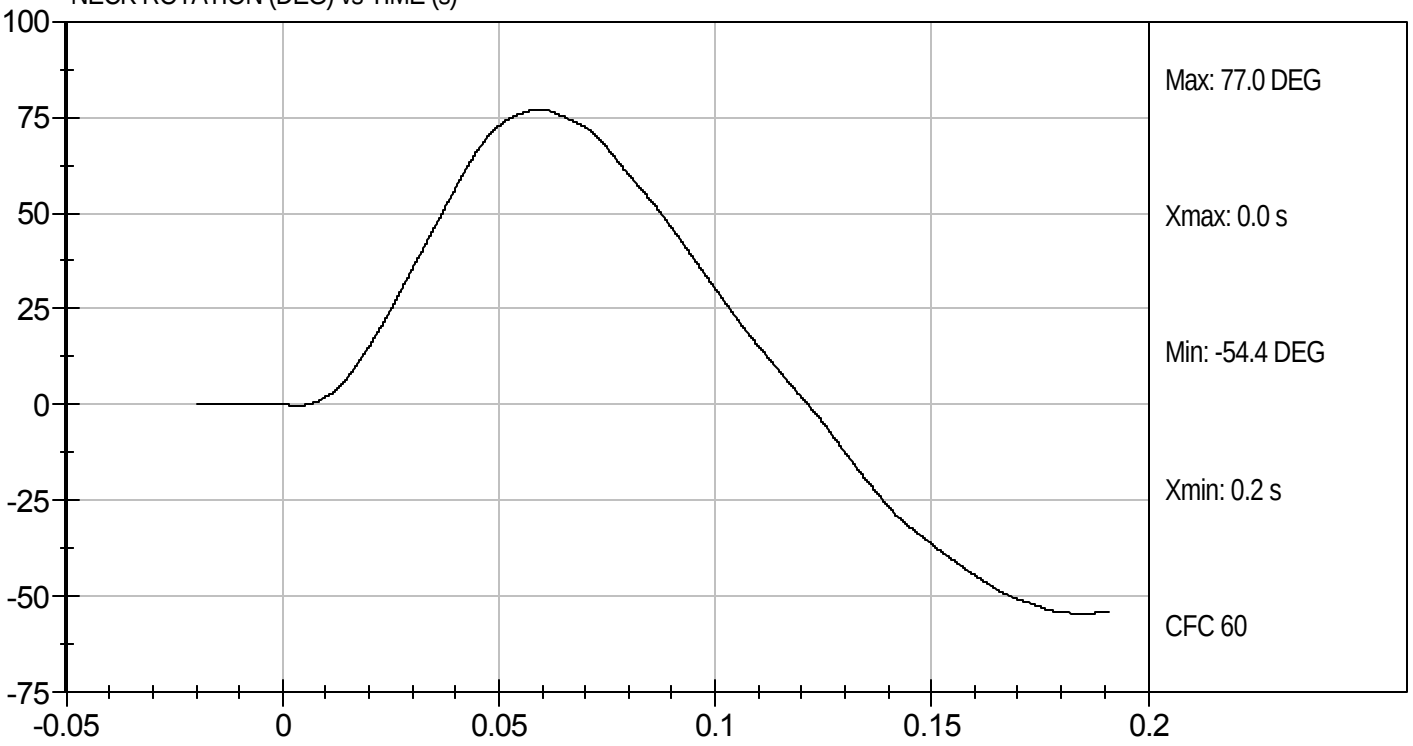
Test Desc: Neck Flexion
Component ID: D104112

Test Date: 11/22/10
Velocity: 22.83 ft/s, 6.96 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)

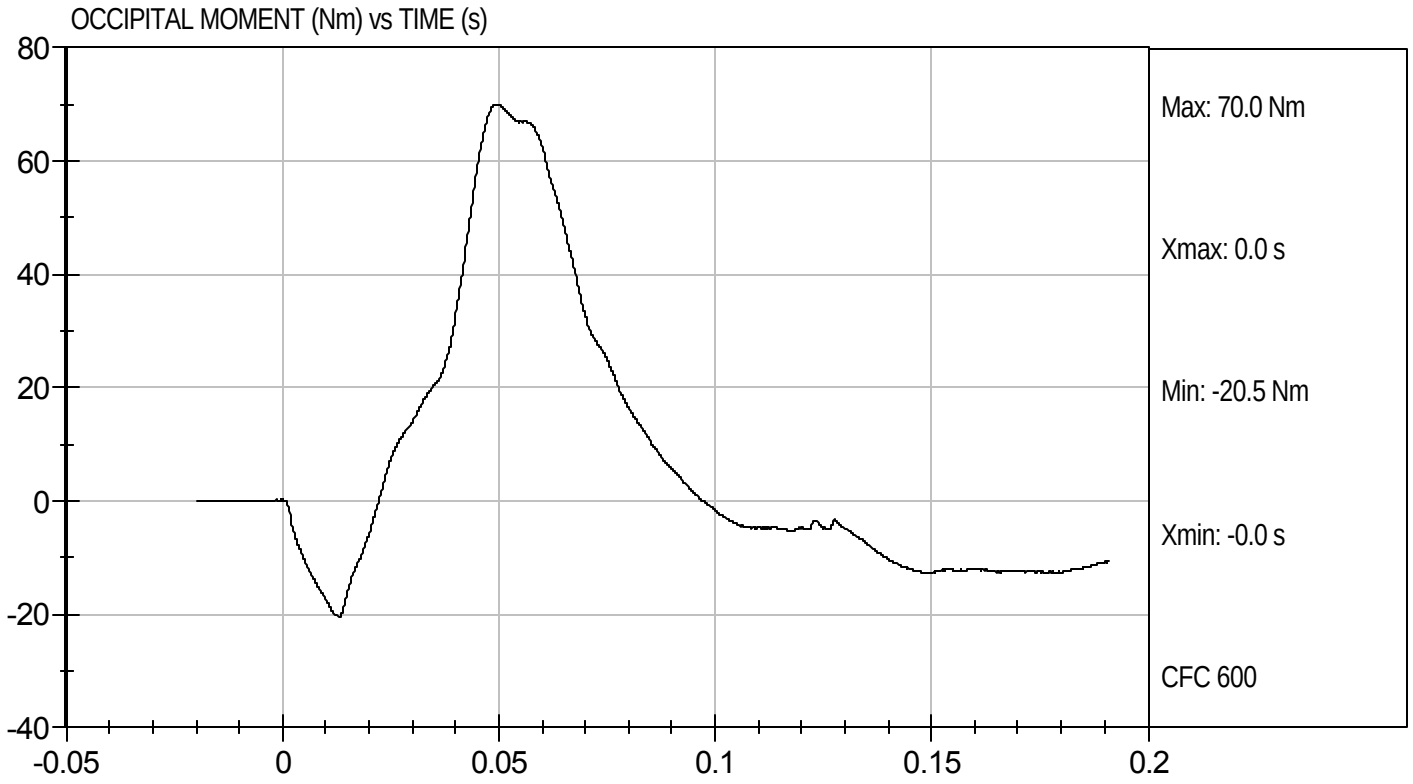


NECK ROTATION (DEG) vs TIME (s)



Test Desc: Neck Flexion
Component ID: D104112

Test Date: 11/22/10
Velocity: 22.83 ft/s, 6.96 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104113

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	21.5	Pass
Laboratory Relative Humidity		%	10 to 70	56	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.12	Pass
Pendulum Deceleration	10 ms	m/s	1.5 to 1.9	1.9	Pass
	20 ms	m/s	3.1 to 3.9	3.6	Pass
	30 ms	m/s	4.6 to 5.6	5.2	Pass
D Plane Rotation	Max	deg	99 to 114	104	Pass
Occipital Condyle Moment within Deflection Corridor		Nm	-65 to -53	-53	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	103	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

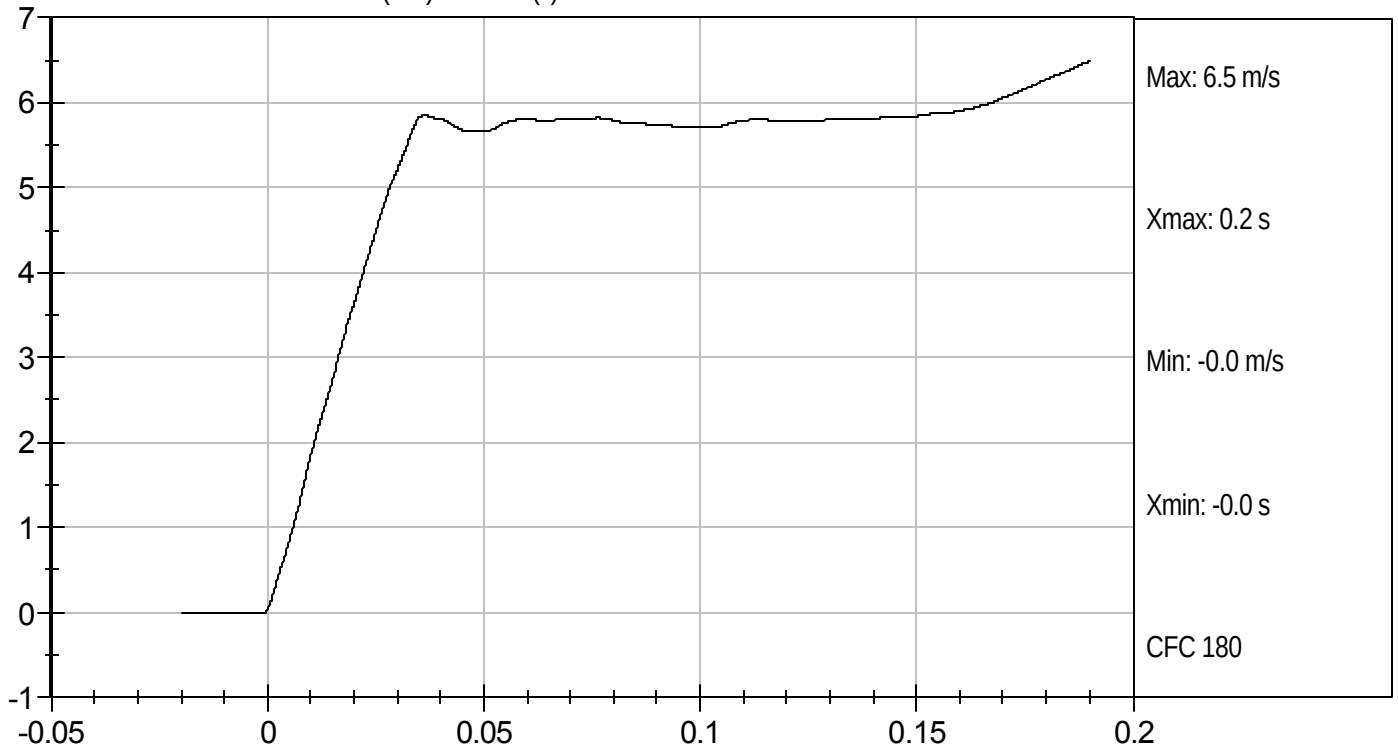
11/22/10
Test Date

David Winkelbauer
Approved By

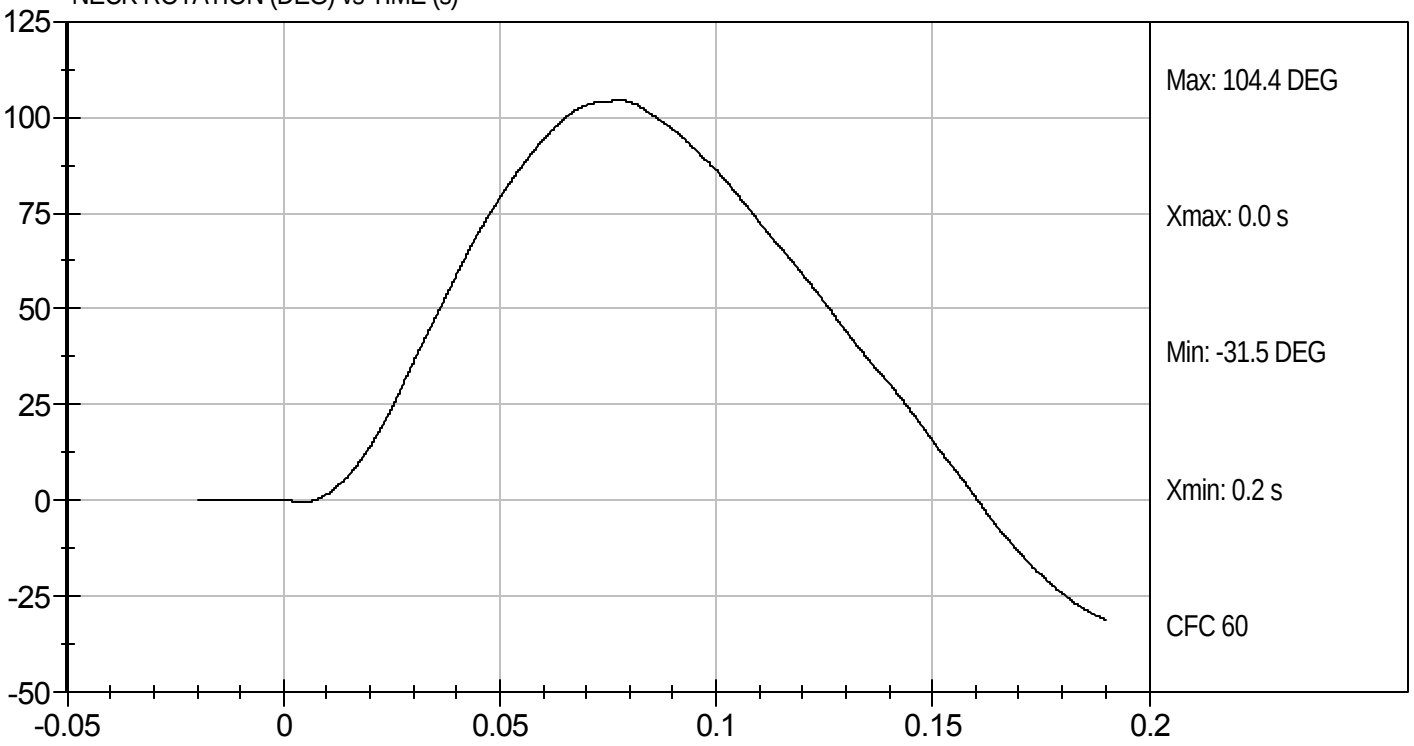
Test Desc: Neck Extension
Component ID: D104113

Test Date: 11/22/10
Velocity: 20.08 ft/s, 6.12 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)

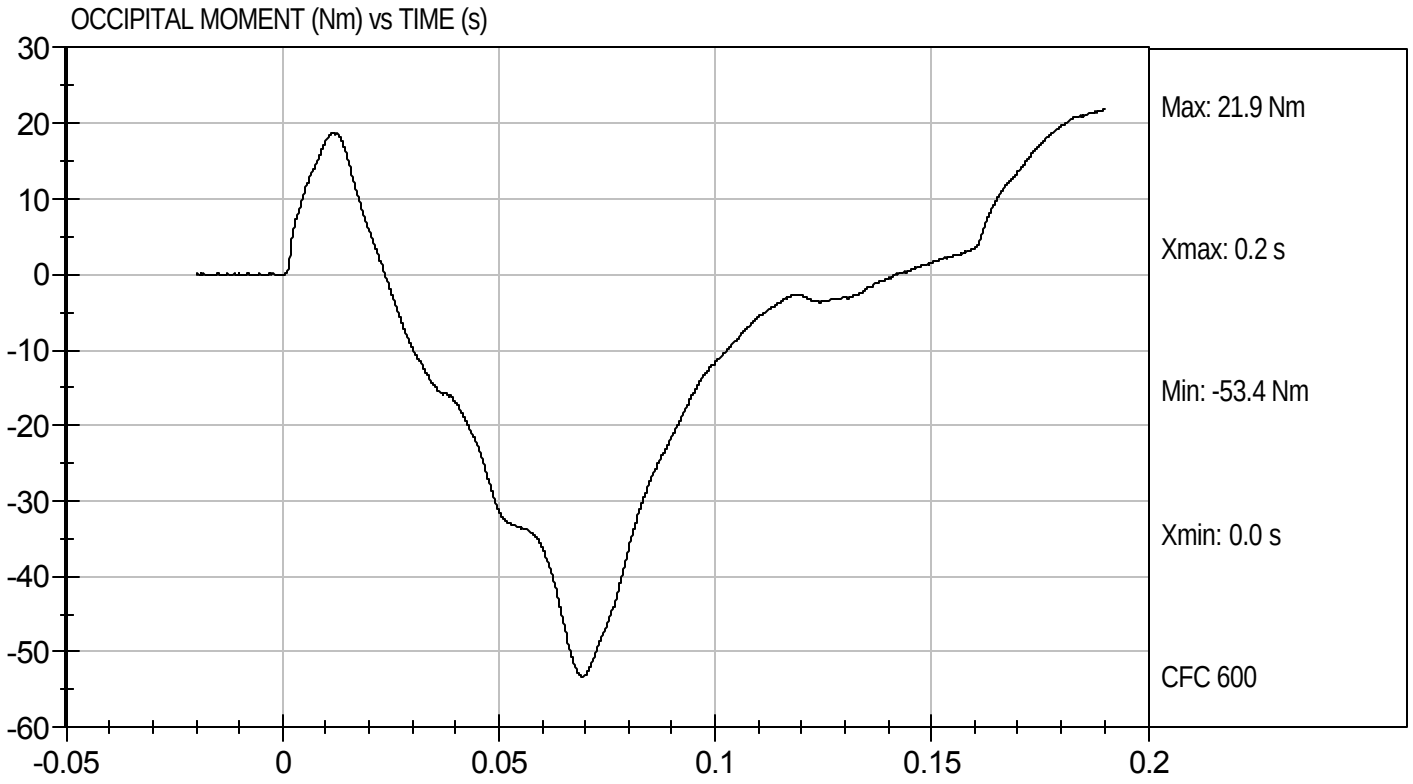


NECK ROTATION (DEG) vs TIME (s)



Test Desc: Neck Extension
Component ID: D104113

Test Date: 11/22/10
Velocity: 20.08 ft/s, 6.12 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104114

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	21.6	Pass
Relative Humidity	%	10 to 70	29	Pass
Probe Speed	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	54	Pass
Peak Resistive Force w/in Deflection Corridor	kN	3.9 to 4.4	4.17	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Peak Force 18 mm - 50 mm	N	<= 4,600 N	4127	Pass
		Overall Test Results		Pass

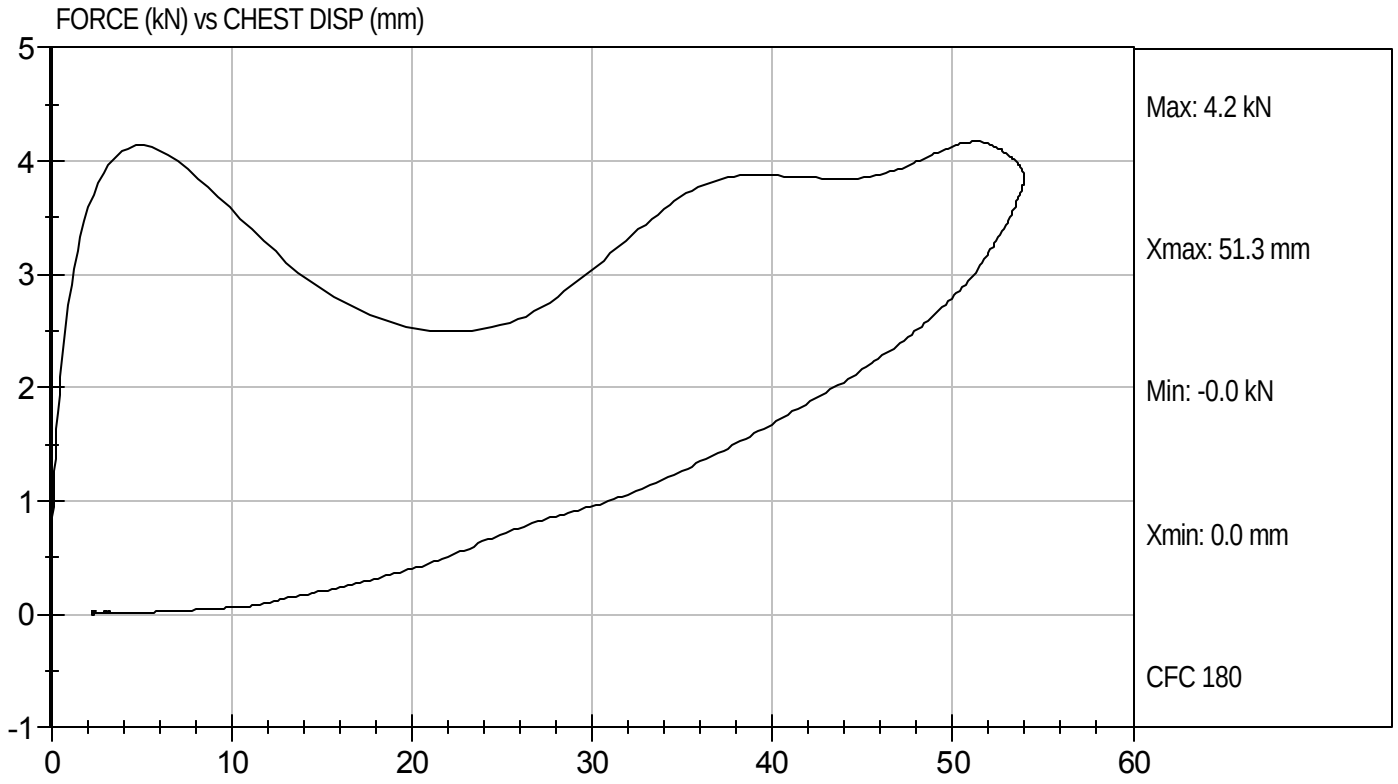
Jessica Hall
Laboratory Technician

11/23/10
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D104114

Test Date: 11/23/10
Velocity: 21.93 ft/s, 6.68 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104115

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Speed	m/s	2.07 to 2.13	2.10	Pass
Maximum Force	kN	3.45 to 4.06	3.58	Pass
		Overall Test Results		Pass

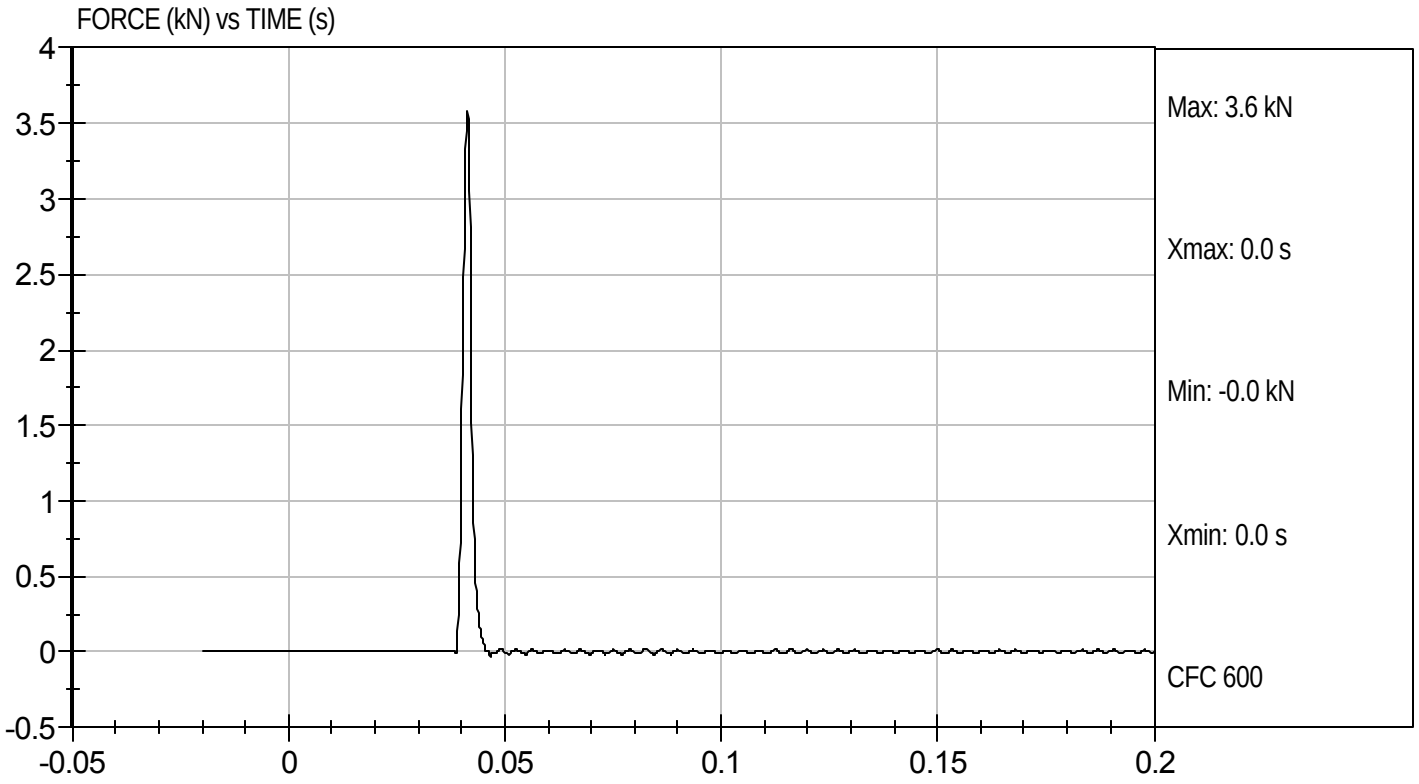
Jessica Gall
Laboratory Technician

11/23/10
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D104115

Test Date: 11/23/10
Velocity: 6.89 ft/s, 2.10 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104116

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	29	Pass
Probe Speed	m/s	2.07 to 2.13	2.10	Pass
Maximum Force	kN	3.45 to 4.06	3.52	Pass
		Overall Test Results		Pass

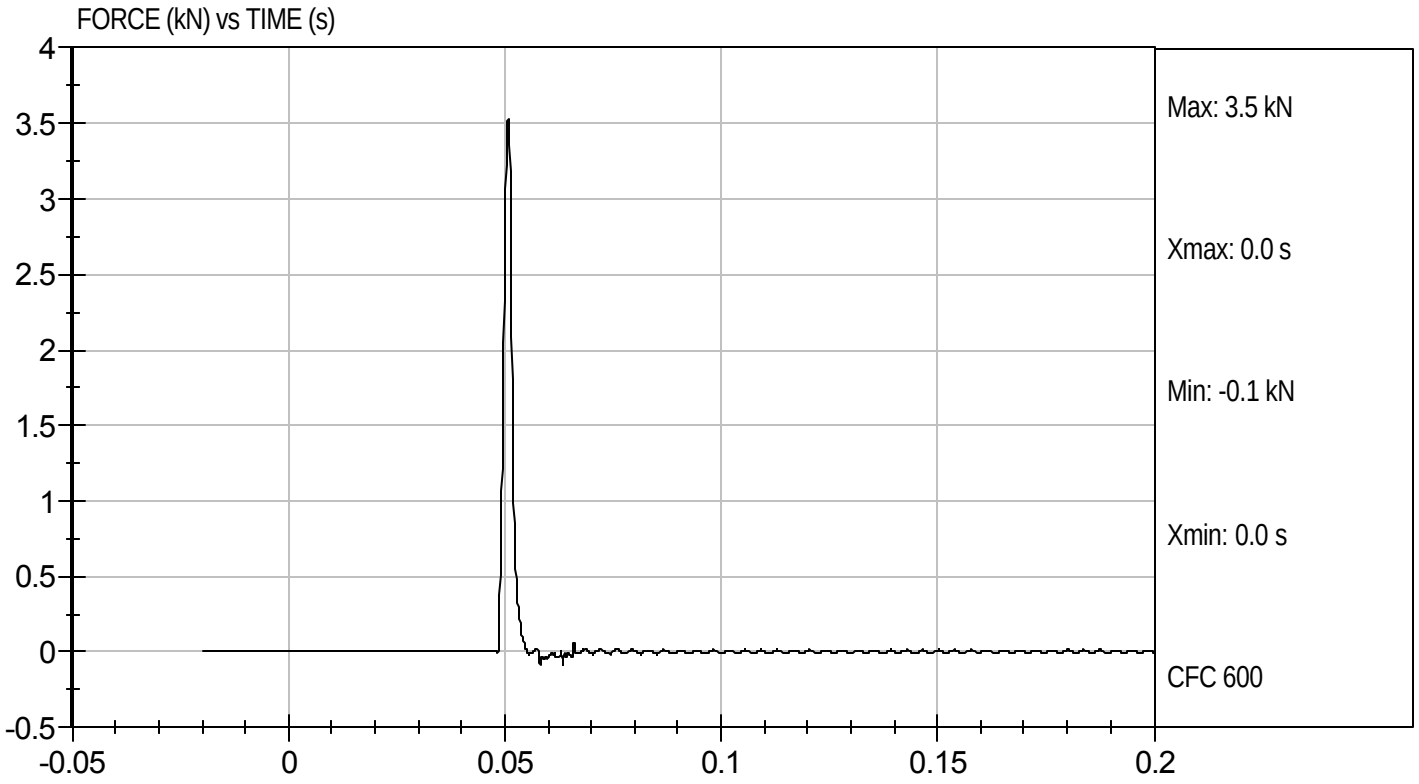
Jessica Gall
Laboratory Technician

11/23/10
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D104116

Test Date: 11/23/10
Velocity: 6.89 ft/s, 2.10 m/s



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104117

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 - 25.6	21.6	Pass
Laboratory Relative Humidity	%	10 to 70	56	Pass
Initial Angle	deg	0 to 20	19	Pass
Return Angle	deg	+/- 8	2	Pass
Force at 45 deg	N	320 to 390	347	Pass
Upper Torso Deflection Rate	Deg/sec	0.5 - 1.5	1.0	Pass
		Overall Result		Pass

Jessica Gall
Laboratory Technician

11/22/2010
Test Date

David Winkelbauer
Approved By

MGA RESEARCH CORPORATION

HEAD DROP TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test ID:** D104251

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Peak Resultant Acceleration	G's	250 to 300	284	Pass
Peak Lateral Acceleration	G's	+/- 15	11.5	Pass
Unimodal	N/A	Yes	Yes	Pass
Oscillations	N/A	within 10% of peak	Yes	Pass
		Overall Test Results		Pass

Jessica Hall
Laboratory Technician

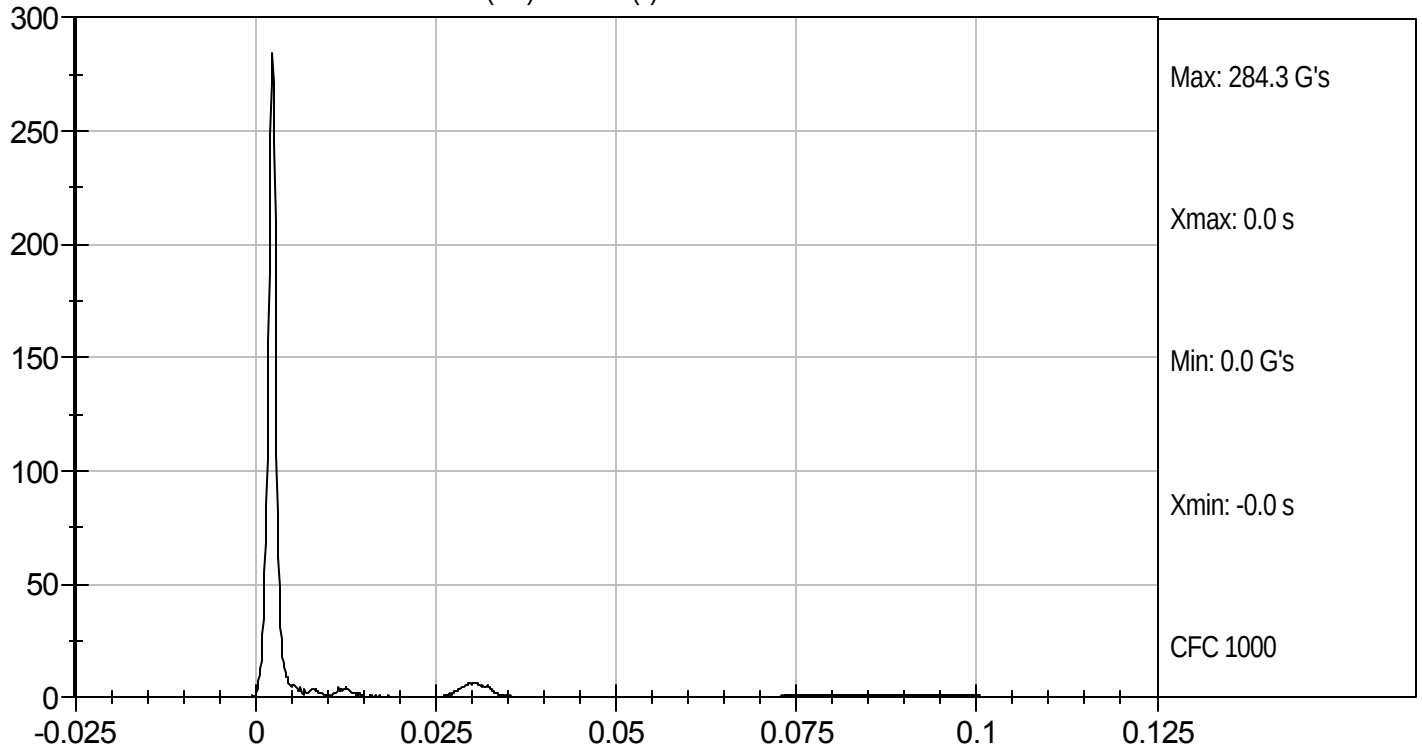
12/3/10
Test Date

David Winkelbauer
Approved By

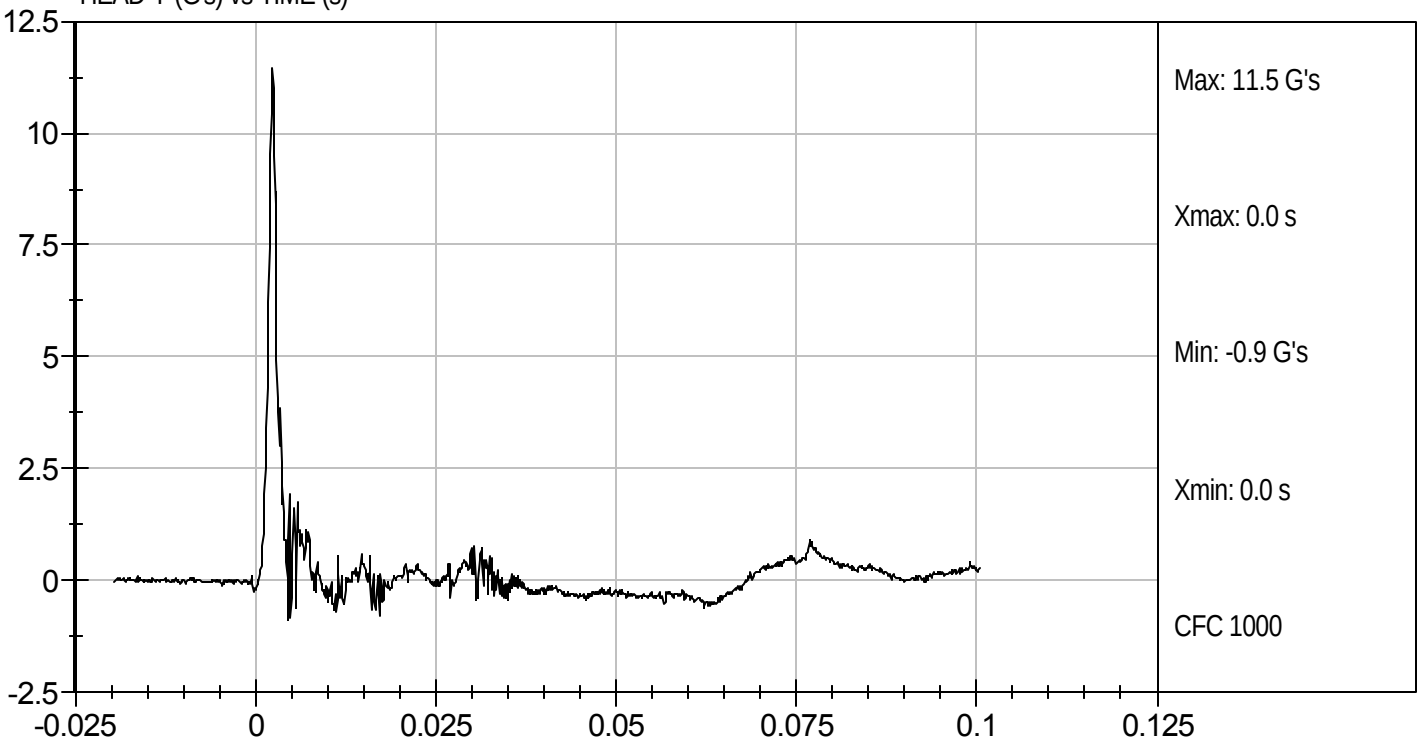
Test Desc: Head Drop
Component ID: D104251

Test Date: 12/3/10
Velocity: 0 ft/s, 0 m/s

RESULTANT HEAD ACCELERATION (G's) vs TIME (s)



HEAD Y (G's) vs TIME (s)



MGA RESEARCH CORPORATION

NECK FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104252

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity		%	10 to 70	16	Pass
Pendulum Speed		m/s	6.89 to 7.13	7.11	Pass
Pendulum Deceleration	10 ms	m/s	2.1 to 2.5	2.4	Pass
	20 ms	m/s	4.0 to 5.0	4.5	Pass
	30 ms	m/s	5.8 to 7.0	6.2	Pass
D Plane Rotation	Max	deg	77 to 91	81	Pass
Occipital Condyle Moment within Deflection Corridor		Nm	69 to 83	74	Pass
Positive Moment Time Curve Decay to 10 Nm		ms	80 to 100	86	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

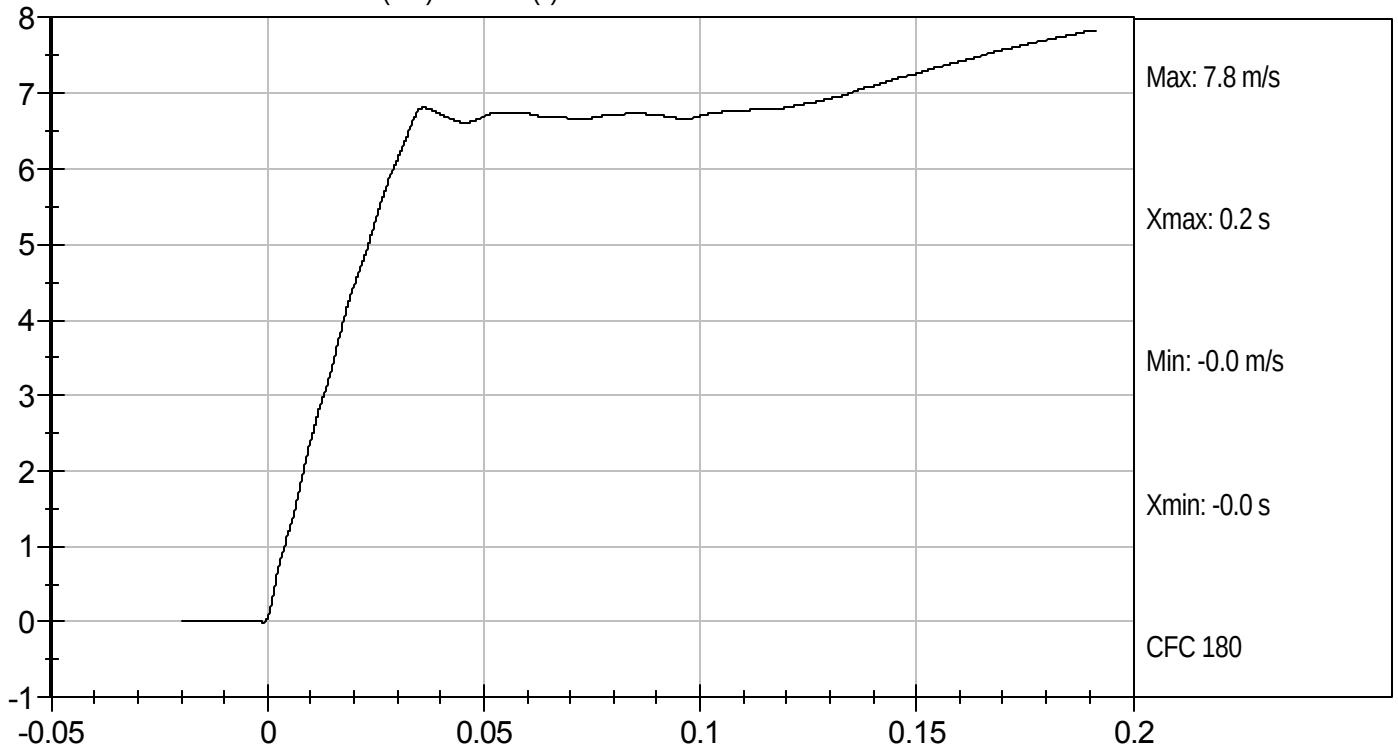
12/3/10
Test Date

David Winkelbauer
Approved By

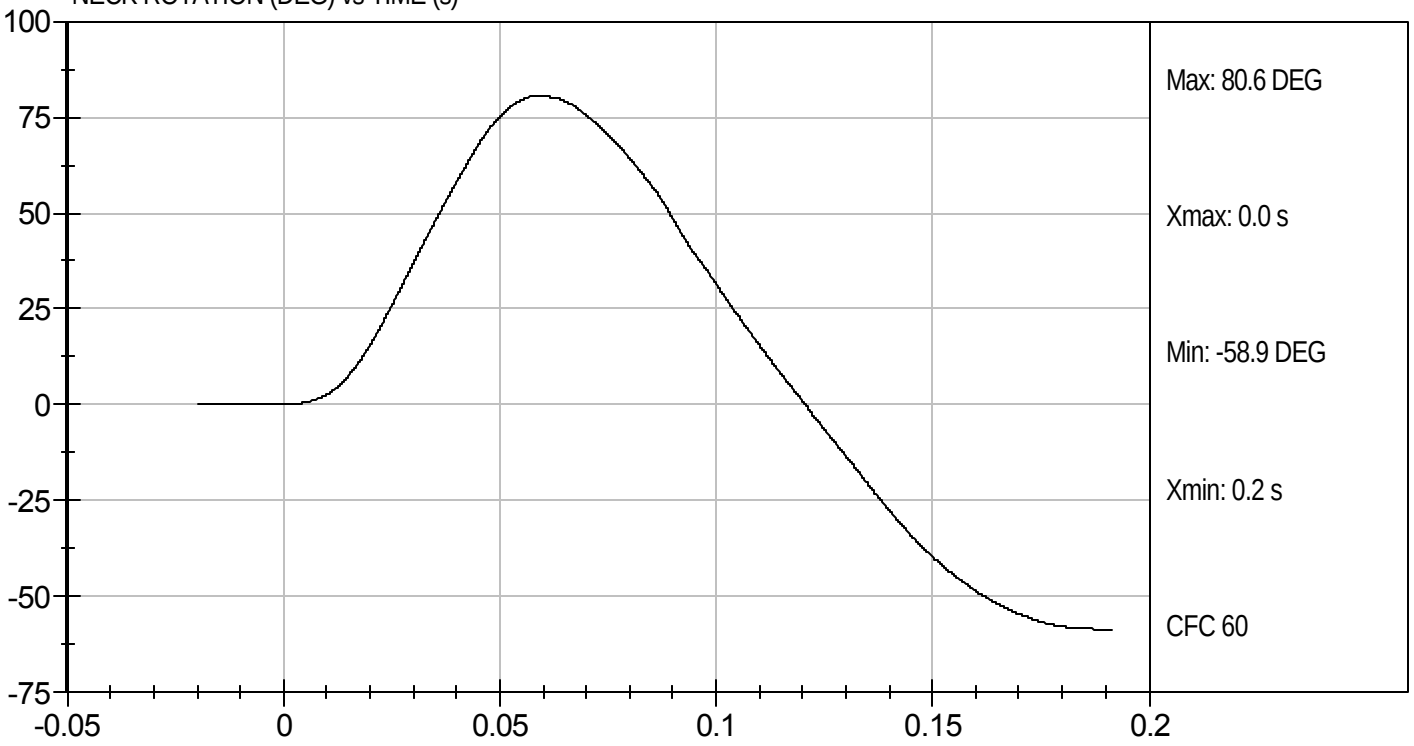
Test Desc: Neck Flexion
Component ID: D104252

Test Date: 12/3/10
Velocity: 23.32 ft/s, 7.11 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)

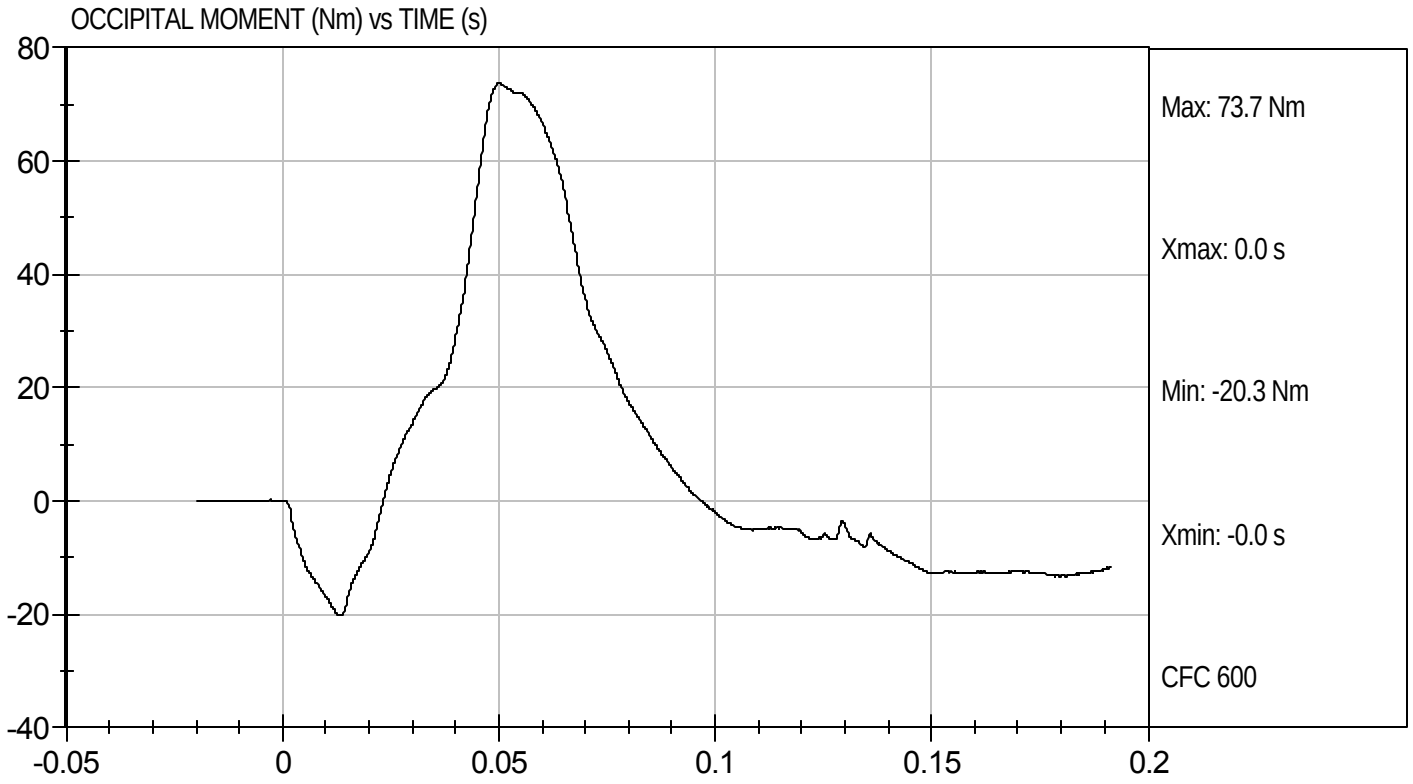


NECK ROTATION (DEG) vs TIME (s)



Test Desc: Neck Flexion
Component ID: D104252

Test Date: 12/3/10
Velocity: 23.32 ft/s, 7.11 m/s



MGA RESEARCH CORPORATION

NECK EXTENSION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104253

Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		deg C	20.6 to 22.2	20.7	Pass
Laboratory Relative Humidity		%	10 to 70	16	Pass
Pendulum Speed		m/s	5.95 to 6.19	6.16	Pass
Pendulum Deceleration	10 ms	m/s	1.5 to 1.9	1.8	Pass
	20 ms	m/s	3.1 to 3.9	3.5	Pass
	30 ms	m/s	4.6 to 5.6	5.0	Pass
D Plane Rotation	Max	deg	99 to 114	104	Pass
Occipital Condyle Moment within Deflection Corridor		Nm	-65 to -53	-53	Pass
Negative Moment Time Curve Decay to -10 Nm		ms	94 to 114	103	Pass
			Overall Results		Pass

Jessica Hall
Laboratory Technician

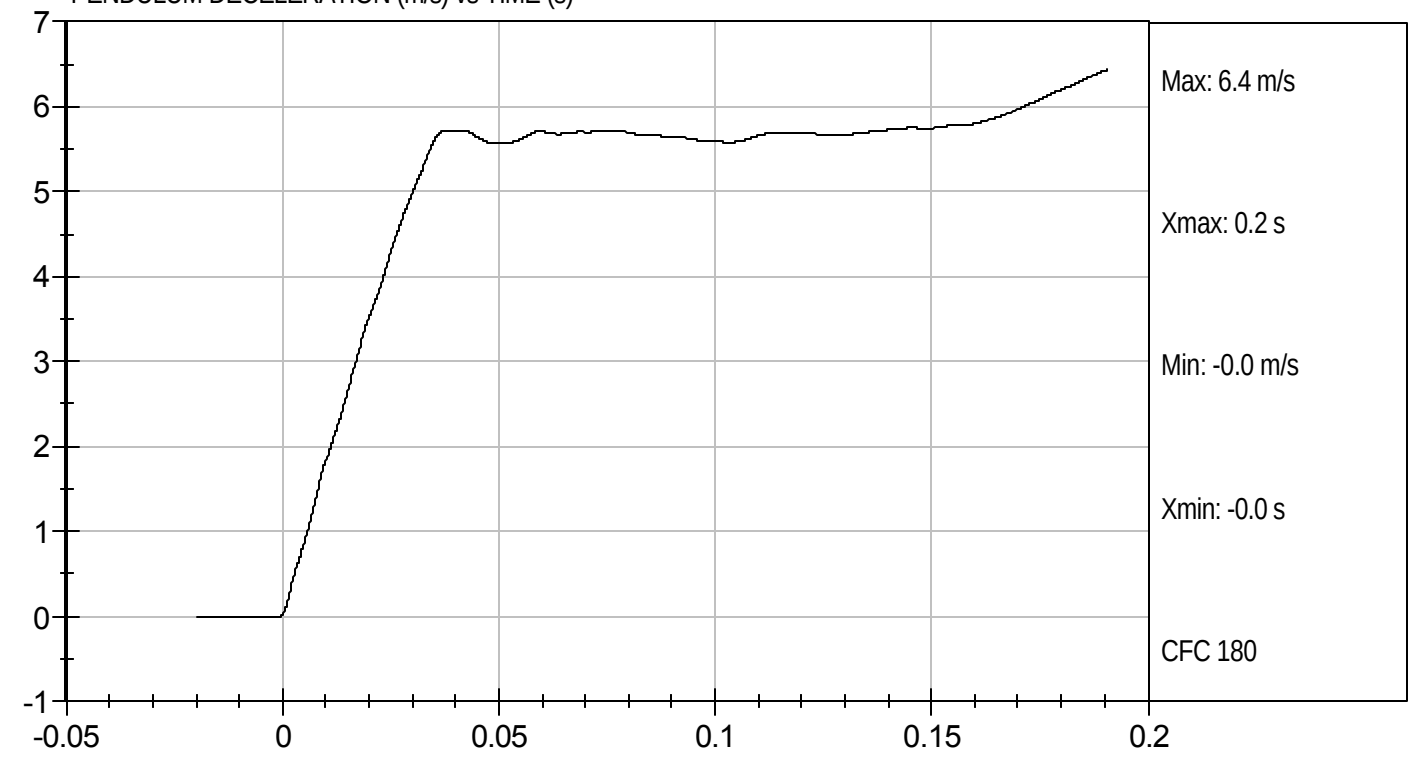
12/3/10
Test Date

David Winkelbauer
Approved By

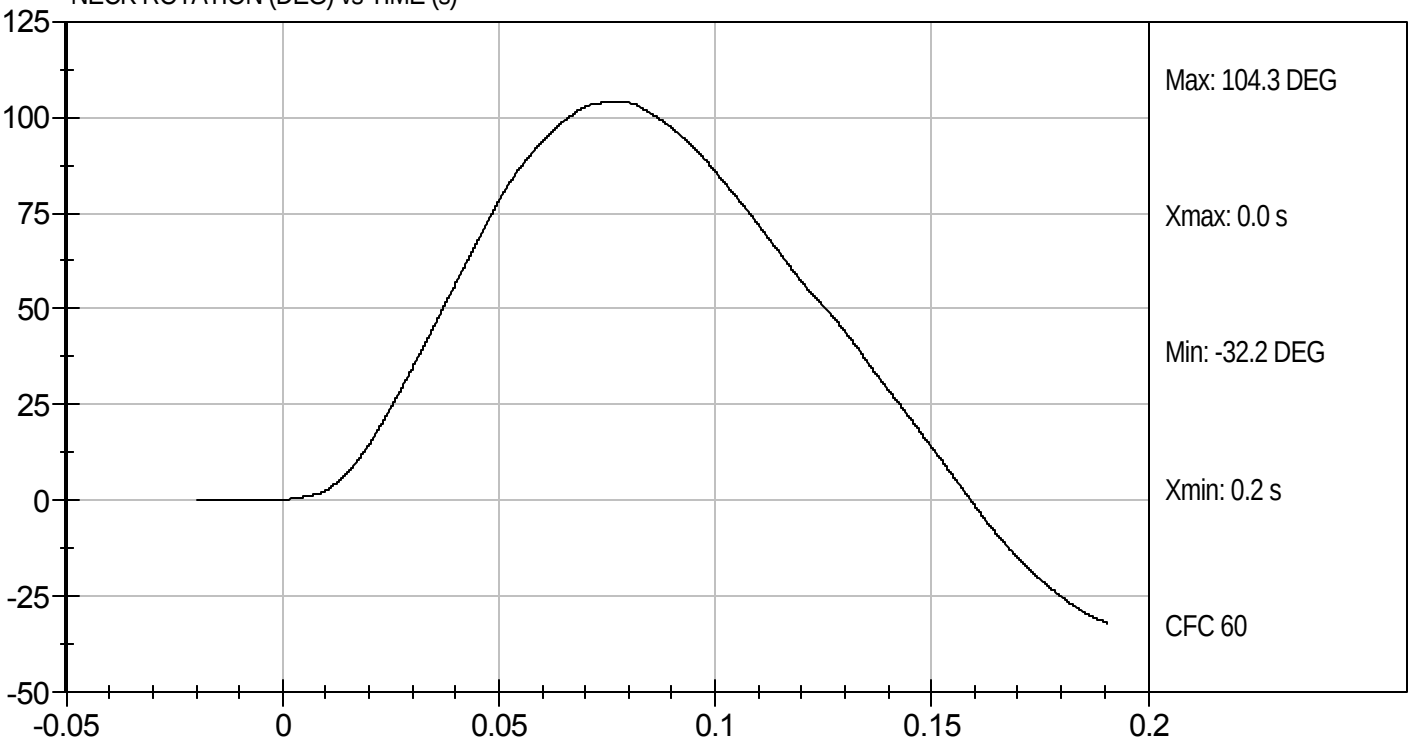
Test Desc: Neck Extension
Component ID: D104253

Test Date: 12/3/10
Velocity: 20.21 ft/s, 6.16 m/s

PENDULUM DECELERATION (m/s) vs TIME (s)

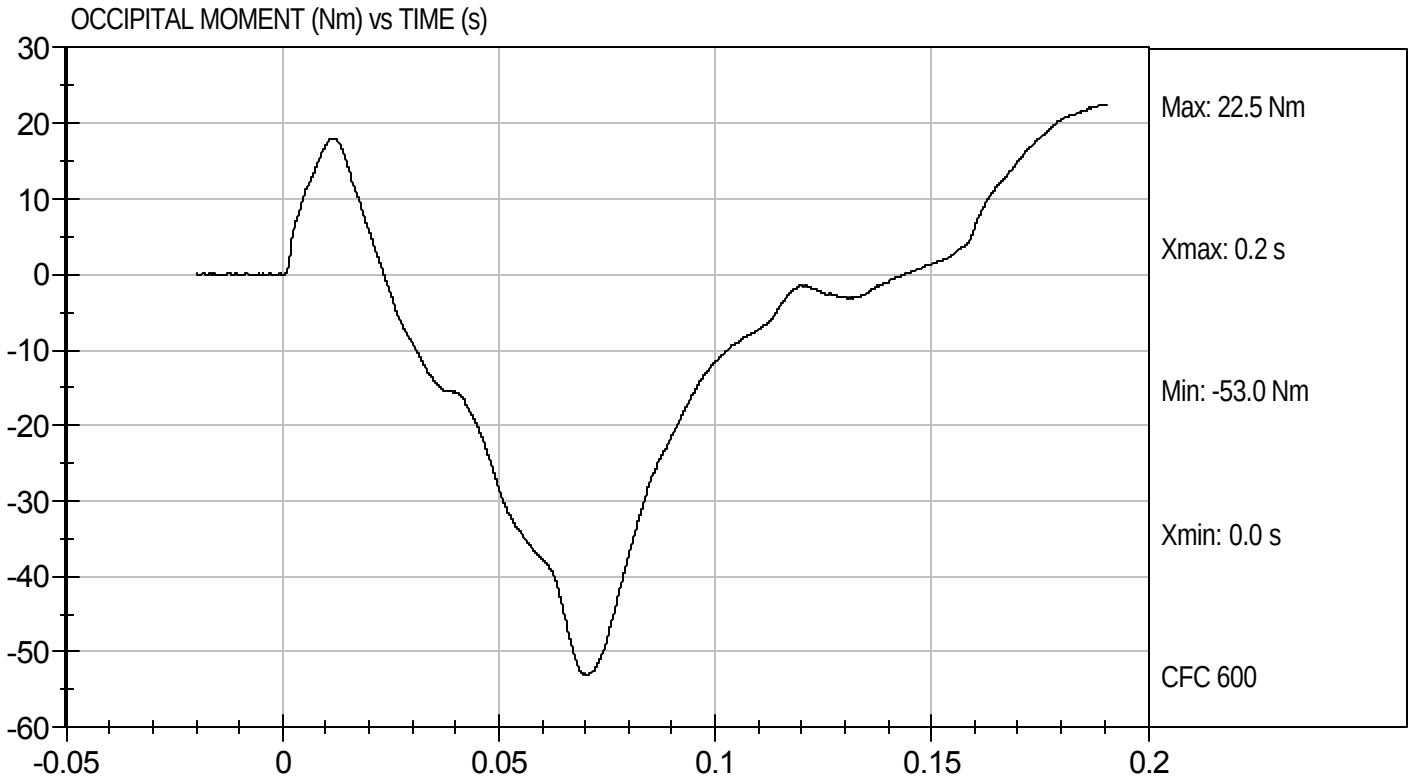


NECK ROTATION (DEG) vs TIME (s)



Test Desc: Neck Extension
Component ID: D104253

Test Date: 12/3/10
Velocity: 20.21 ft/s, 6.16 m/s



MGA RESEARCH CORPORATION

THORAX IMPACT

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104254

Tested Parameter	Units	Specification	Result	Pass/Fail
Temperature	deg C	20.6 to 22.2	20.6	Pass
Relative Humidity	%	10 to 70	17	Pass
Probe Speed	m/s	6.59 to 6.83	6.68	Pass
Peak Deflection	mm	50 to 58	52	Pass
Peak Resistive Force w/in Deflection Corridor	kN	3.9 to 4.4	4.26	Pass
Internal Hysteresis	%	69 to 85	69	Pass
Peak Force 18 mm - 50 mm	N	<= 4,600 N	4256	Pass
		Overall Test Results		Pass

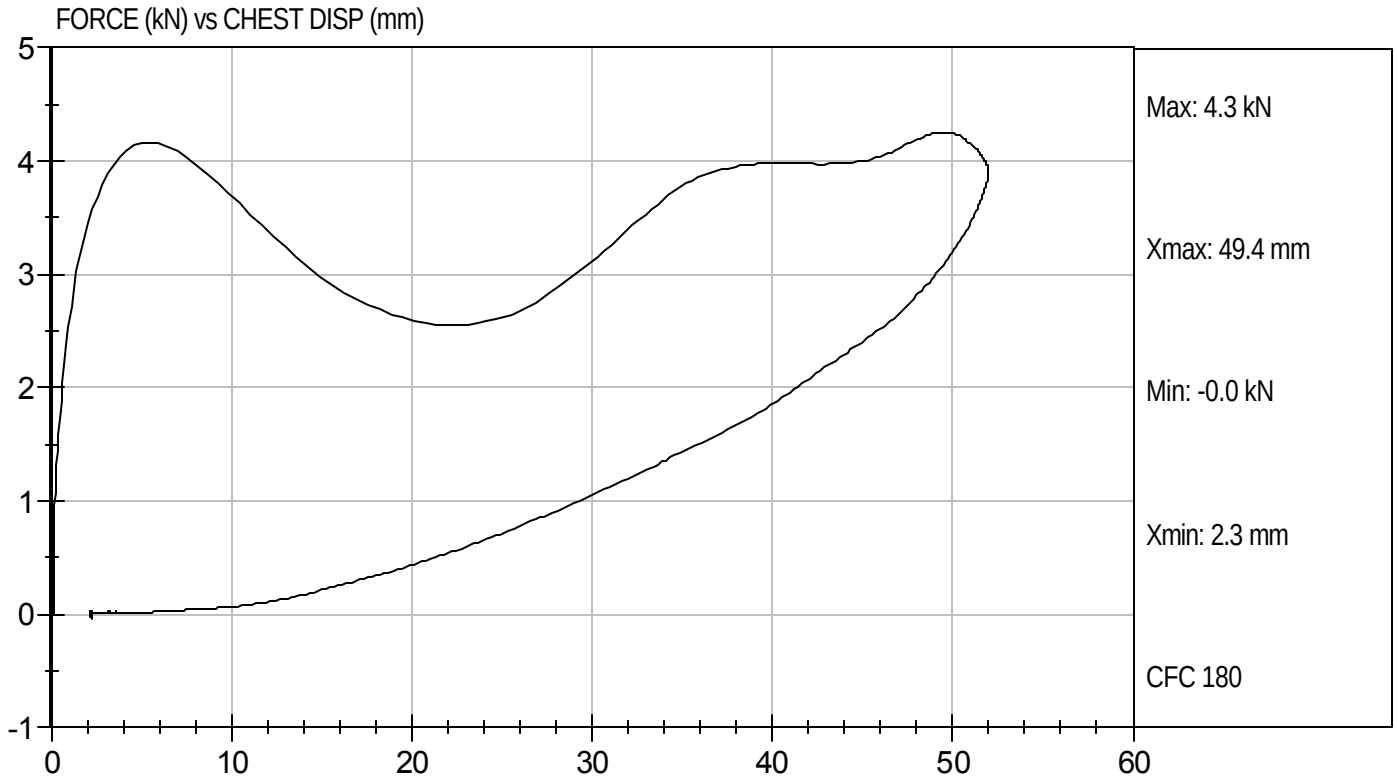
Jessica Hall
Laboratory Technician

12/3/10
Test Date

David Winkelbauer
Approved By

Test Desc: Thorax Impact
Component ID: D104254

Test Date: 12/3/10
Velocity: 21.93 ft/s, 6.68 m/s



MGA RESEARCH CORPORATION

RIGHT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104255

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Probe Speed	m/s	2.07 to 2.13	2.08	Pass
Maximum Force	kN	3.45 to 4.06	3.73	Pass
		Overall Test Results		Pass

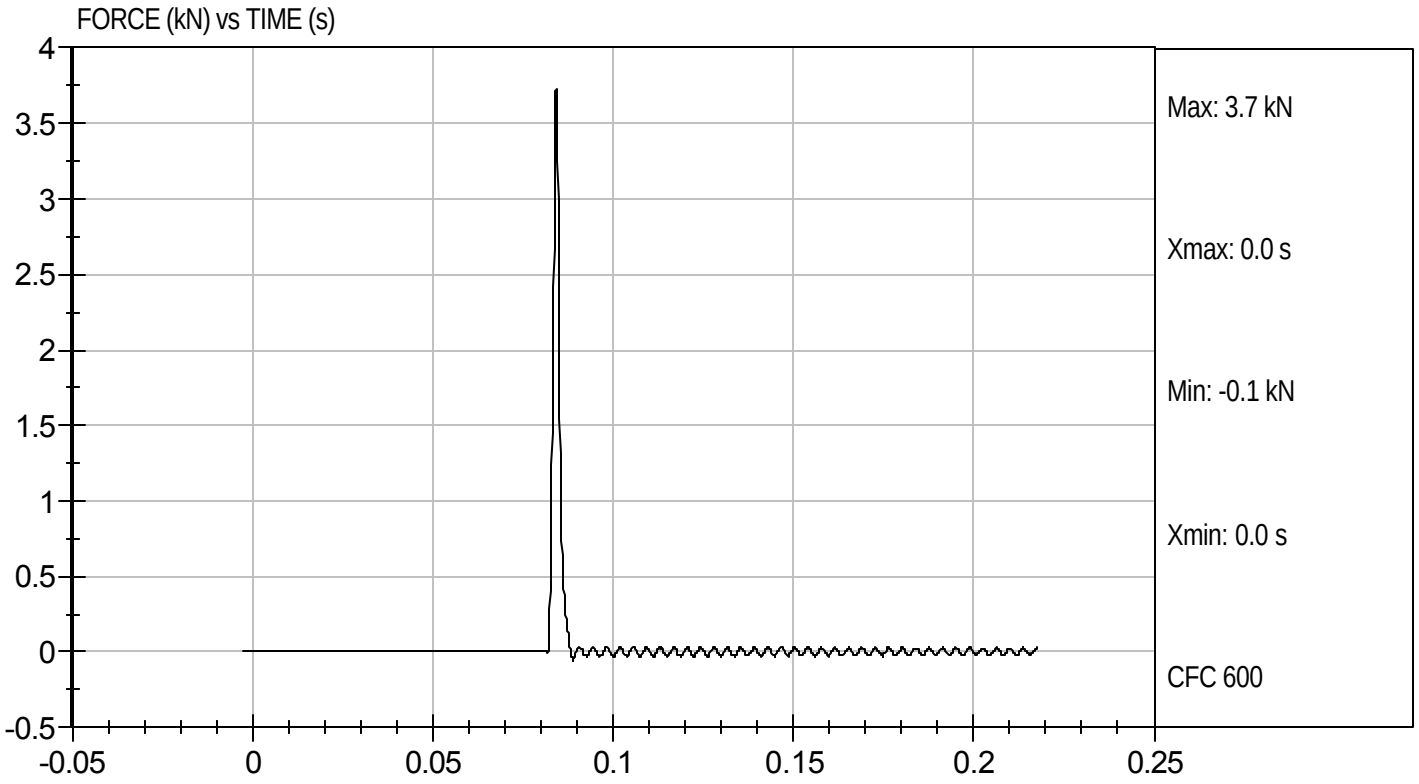
Jessica Gall
Laboratory Technician

12/3/10
Test Date

David Winkelbauer
Approved By

Test Desc: Right Knee
Component ID: D104255

Test Date: 12/3/10
Velocity: 6.83 ft/s, 2.08 m/s



MGA RESEARCH CORPORATION

LEFT KNEE IMPACT TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104256

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.5	20.7	Pass
Laboratory Relative Humidity	%	10 to 70	16	Pass
Probe Speed	m/s	2.07 to 2.13	2.12	Pass
Maximum Force	kN	3.45 to 4.06	3.78	Pass
		Overall Test Results		Pass

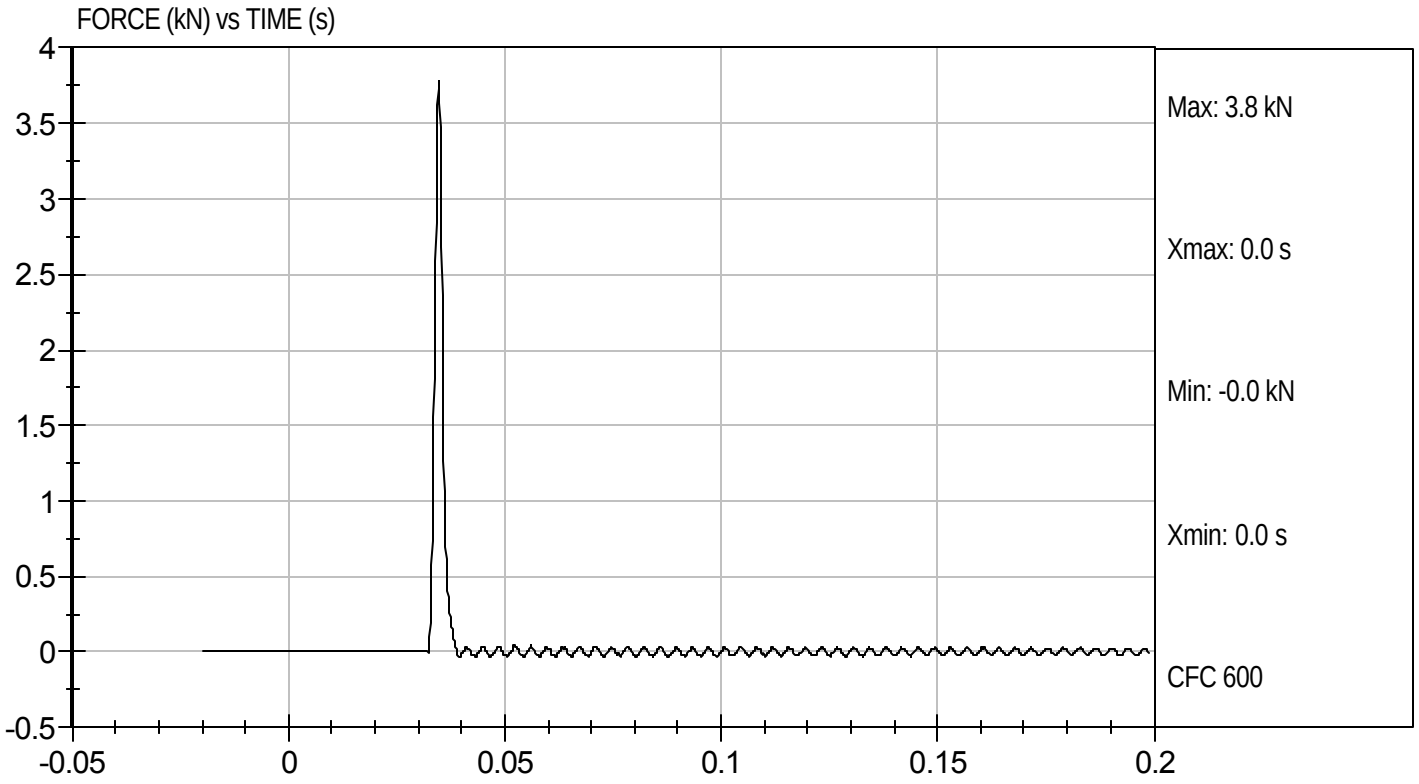
Jessica Gall
Laboratory Technician

12/3/10
Test Date

David Winkelbauer
Approved By

Test Desc: Left Knee
Component ID: D104256

Test Date: 12/3/10
Velocity: 6.94 ft/s, 2.12 m/s



MGA RESEARCH CORPORATION

TORSO FLEXION TEST

HYBRID III 5TH PERCENTILE

ATD Serial No: 634 **Test I.D:** D104257

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	deg C	18.9 to 25.6	20.8	Pass
Laboratory Relative Humidity	%	10 to 70	17	Pass
Initial Angle	deg	0 to 20	17	Pass
Return Angle	deg	+/- 8	4	Pass
Force at 45 deg	N	320 to 390	369	Pass
Upper Torso Deflection Rate	Deg/sec	0.5 to 1.5	1.0	Pass
		Overall Result		Pass

Jessica Hall
Laboratory Technician

12/3/10
Test Date

David Winkelbauer
Approved By