

REPORT NUMBER: NCAP-CAL-11-011

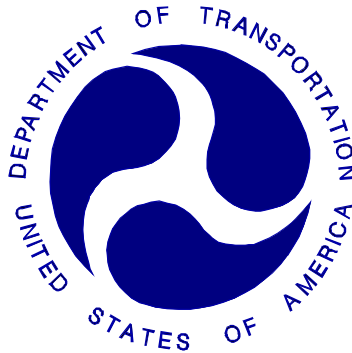
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**General Motors Corp.
2011 Chevrolet Malibu 1LS
4-Door Sedan**

NHTSA NUMBER: MB0111

CALSPAN TEST NUMBER: TR2464

**CALSPAN CORPORATION
TRANSPORTATION SCIENCES CENTER
P.O. BOX 400
BUFFALO, NEW YORK 14225**



November 19, 2010

FINAL REPORT

PREPARED FOR:

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

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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: _____

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16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2011 Chevrolet Malibu 4-Door Sedan 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 Calspan Corporation's crash test facility in Buffalo, New York on August 25, 2010. The impact velocity of the vehicle was 56.5 km/h, and the ambient temperature at the barrier face at the time of impact was 21.7°C. The target vehicle post-test maximum crush was 509 mm at the centerline of the vehicle. The test vehicle's performance is as follows:																																																																					
<table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD</th> <th colspan="3">Pass. ATD</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>222.5</td> <td>N/A</td> <td>700</td> <td>172.5</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-23.0</td> <td>mm</td> <td>52</td> <td>-21.1</td> </tr> <tr> <td>Nij</td> <td>n/a</td> <td>1</td> <td>0.20</td> <td>n/a</td> <td>1</td> <td>0.67</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4170</td> <td>841.8</td> <td>Newtons</td> <td>2620</td> <td>1005.4</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4000</td> <td>-420.4</td> <td>Newtons</td> <td>2520</td> <td>-676.5</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-254.9</td> <td>Newtons</td> <td>6805</td> <td>-1411.6</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-2363.4</td> <td>Newtons</td> <td>6805</td> <td>-1320.0</td> </tr> </tbody> </table>								Measurement Description	Driver ATD			Pass. ATD			Units	Threshold	Result	Units	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	222.5	N/A	700	172.5	Maximum Chest Compression	mm	63	-23.0	mm	52	-21.1	Nij	n/a	1	0.20	n/a	1	0.67	Neck Tension	Newtons	4170	841.8	Newtons	2620	1005.4	Neck Compression	Newtons	4000	-420.4	Newtons	2520	-676.5	Left Femur Force	Newtons	10008	-254.9	Newtons	6805	-1411.6	Right Femur Force	Newtons	10008	-2363.4	Newtons	6805	-1320.0
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.5 kph frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-06-D-00024. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.5 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standard Frontal NCAP Laboratory Test procedure.

1.2 TEST SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2011 Chevrolet Malibu 4-Door Sedan at a velocity of 56.5 kph. The test was performed at Calspan on August 25, 2010. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 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 (ATDs), was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck 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 dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No.143) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 129 channels of data were recorded on an on-board data acquisition system. Appendix B contains the dummy 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 509 mm and 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: Face and Upper Torso with Frontal airbag with the back of head with the head restraint; both knees contacted the knee bolster. The passenger's visible contact points were as follows: Face and Upper Torso with Frontal airbag with the back of head with the head restraint; both knees contacted the glovebox door.

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)	222.5	80.3	95.3	-22.8	0.20	841.8	-420.4	254.9	-2363.4
Passenger (5 th)	172.5	64.6	79.6	-21.1	0.67	1005.4	-676.5	-1411.6	-1320.1

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0111
 Test Program: Frontal NCAP Test Date: August 25, 2010

TEST VEHICLE INFORMATION

NHTSA No.	MB0111
Make	2011
Model	Chevrolet
Body Style	Malibu 1LS
VIN	4-Door Sedan
Color	1G1ZB5E10BF110751
Delivery Date	Blue
Odometer Reading (mi)	7/22/2010
Odometer Reading (km)	74 mi
Dealer	Paddock Chevrolet
Transmission	6 Speed Automatic
Final Drive	Front Wheel Drive
Type/No. Cyl	V4
Engine Disp. (L)	2.4
Engine Placement	Transverse
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

TEST VEHICLE OPTIONS

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
Tilt Steering	Yes
Other	

Does owner's manual provide instructions to turn off automatic door locks?

No

DATA FROM CERTIFICATION LABEL

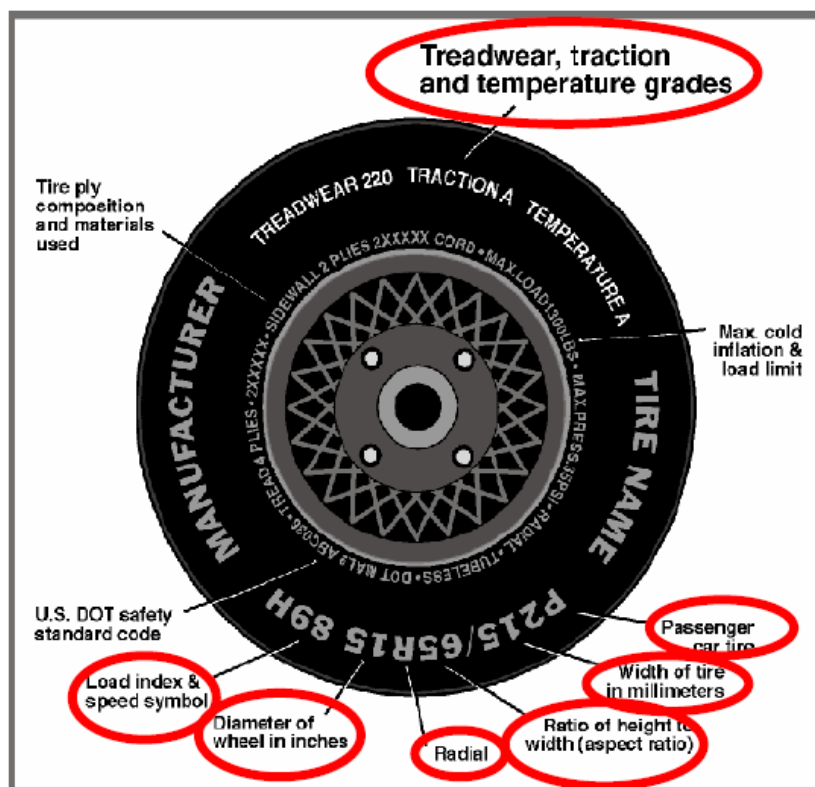
Manufactured By	General Motors LLC	GVWR (kg)	1983
Date of Manufacture	6/10	GAWR Front (kg)	1046
		GAWR Rear (kg)	937

VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench		
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				416.0
Cargo Wt. (RCLW) (kg)				75.8

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

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010



Measured Parameter	Front	Rear
Maximum Tire Pressure	300	300
Cold Pressure (kPa)	210	210
Recommended Tire Size	P215/55R17	P215/55R17
Tire Size on Vehicle	P215/55R17	P215/55R17
Tire Manufacturer	Optimo H725A	Optimo H725A
Tire Model	Hankook	Hankook
Treadwear	340	340
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Steel + 2 Polyester + 1 Nylon	2 Steel + 2 Polyester + 1 Nylon
Tire Plies Body	2 Polyester	2 Polyester
Load Index/Speed Symbol	93S	93S
Tire Material	-	-
DOT Safety Code Right	5MLP PDYH 1810	5MLP PDYH 1810
DOT Safety Code Left	5MLP PDYH 1810	5MLP PDYH 1810

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

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	481.5	308.0	789.5	508.0	390.5	898.5
Right	kg	464.0	295.0	759.0	492.0	369.0	861.0
Ratio	%	61.1%	38.9%		56.8%	43.2%	
Totals	kg	945.5	603.0	1548.5	1000.0	759.5	1759.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1548.5
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	75.8
Calculated Vehicle Target Weight (TVTW)	kg	1764.9

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	714	721	739	740	1110
As Tested	mm	709	716	710	710	1231
Post Test	mm	-	-	-	-	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2851
Total Vehicle Length at Left Side	mm	4763
Total Vehicle Length at Centerline	mm	4870
Total Vehicle Length at Right Side	mm	4763
Weight of Ballast in Cargo Area	kg	40.0
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	L	57.4

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

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

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4870
2	Total Width	1776
3	Bumper Top Height	745
4	Bumper Bottom Height	607
5	Longitudinal Member Top Height	786
6	Distance Between Longitudinal Members	1059
7	Longitudinal Member Width	91
8	Engine Top Height	1121
9	Engine Bottom Height	438
10	Engine and Gearbox Width	788
11	Front Bumper-Engine Distance	521
12	Front Shock Absorber Fixing Height	1096
13	Bonnet Leading Edge Height	1026
14	Front Shock Absorber Fixing Width	1152
15	Front Bumper – Front Axle Distance	981
16	Front Axle – A Pillar Distance	469
17	A- Pillar – B-Pillar Distance	1133
18	B-Pillar – Rear Axle Distance	1254
19	B-Pillar – C-Pillar Distance	1125
20	Roof Sill Bottom Height	1529
21	Roof Sill Top Height	1644
22	Floor Sill Bottom Height	504
23	Floor Sill Top Height	629

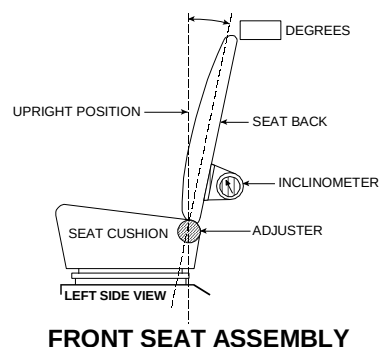
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

NORMAL DESIGN RIDING POSITION

Driver seat: An inclinometer was placed on the head restraint post and the seat was positioned to 18.9 degrees with the ATD in seat.

Passenger Seat: The seat back was set to the position to achieve the head level requirement for the HYIII 5th female final position. Measured from the head restraint post.

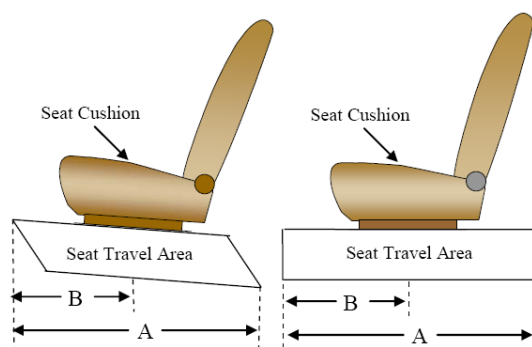


	Deg
Driver Seat Back Angle	18.9
Passenger Seat Back Angle	16.7

SEAT FORE/AFT POSITIONS

The front left outboard seat was placed in the mid-travel position while the seat cushion was placed in the lowest position. The front right outboard seat was placed in the most forward fore/aft position.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	336	Mid-Travel
Passenger Seat	258	0 (full forward)



SEAT BELT UPPER ANCHORAGES

The driver and front right passenger seating position was placed in the highest position.

	Total # of Positions	Placed in Position #
Driver Seat	2	0
Passenger Seat	2	0

DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

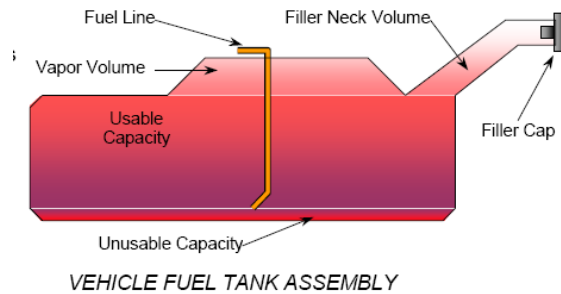
Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	71.9
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	66.2 – 67.8
Actual Amount of Solvent Used	67.0
1/3 of Usable Capacity	24.0

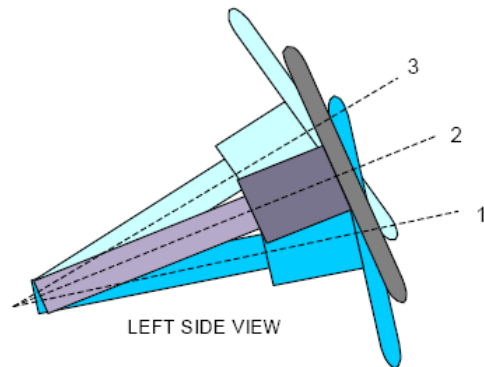
The fuel pump will operate continuously when the key is in the "ON" position.

The fuel filler pipe is located right rear side of Vehicle.



STEERING COLUMN ADJUSTMENT

A flat plate was placed on the top and bottom of the steering wheel. The inclinometer was placed on the flat plate to measure the angle



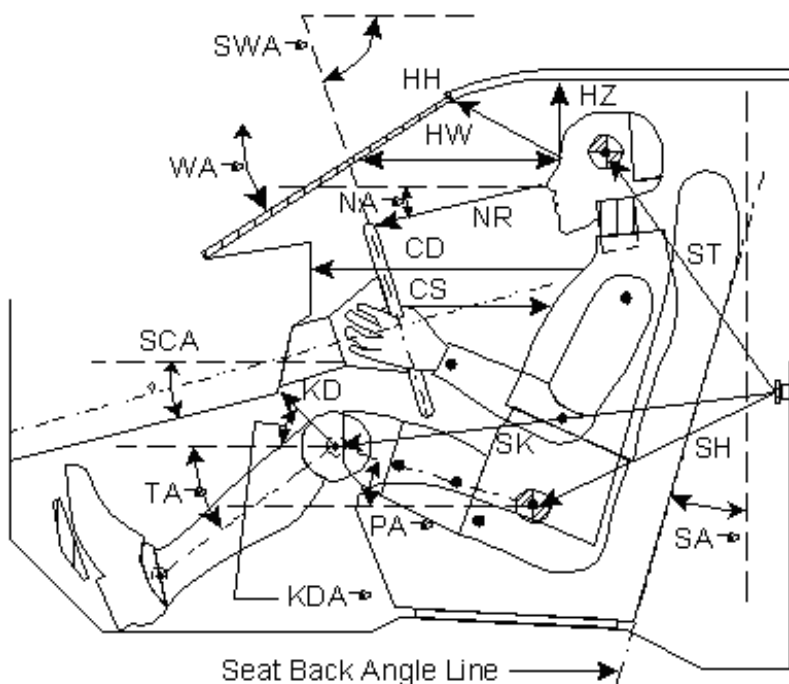
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1	21.4	
Geometric center position No. 2	24.2	
Uppermost position No. 3	27.0	
Telescoping Steering Wheel Travel		50
Test Position	24.2	25

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

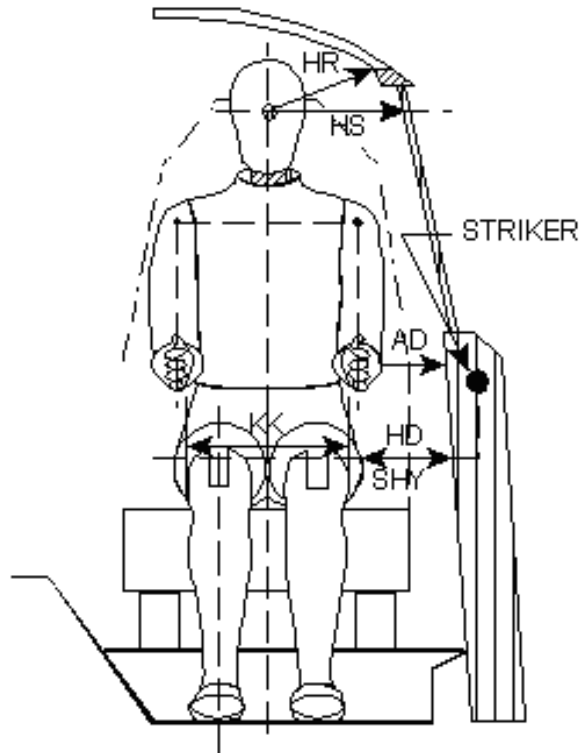


Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		24.7		
SWA°	Steering Wheel Angle		69.3		
SCA°	Steering Column Angle		20.7		
SA°	Seat Back Angle (on headrest post)		4.5 *		0.8
HZ	Head to Roof (Z)	190	90.0	202	90.0
HH	Head to Header	343	25.0	285	45.0
HW	Head to Windshield	654	0.0	632	0.0
NR	Nose to Rim	400	6.5		
CD	Chest to Dash	531		428	
CS	Chest to Steering Hub	330	0.0		
RA	Rim to Abdomen	210	0.0		
KDL	Left Knee to Dash	170	25.0	120	34.0
KDR	Right Knee to Dash	105	21.0	140	24.0
PA°	Pelvic Angle		24.7		20.2
TA°	Tibia Angle		46.0		45.0
SK	Striker to Knee		24.7		
ST	Striker to Head		69.3		
SH	Striker to H-Point		20.7		

* From the head restraint post – measured relative to sill

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

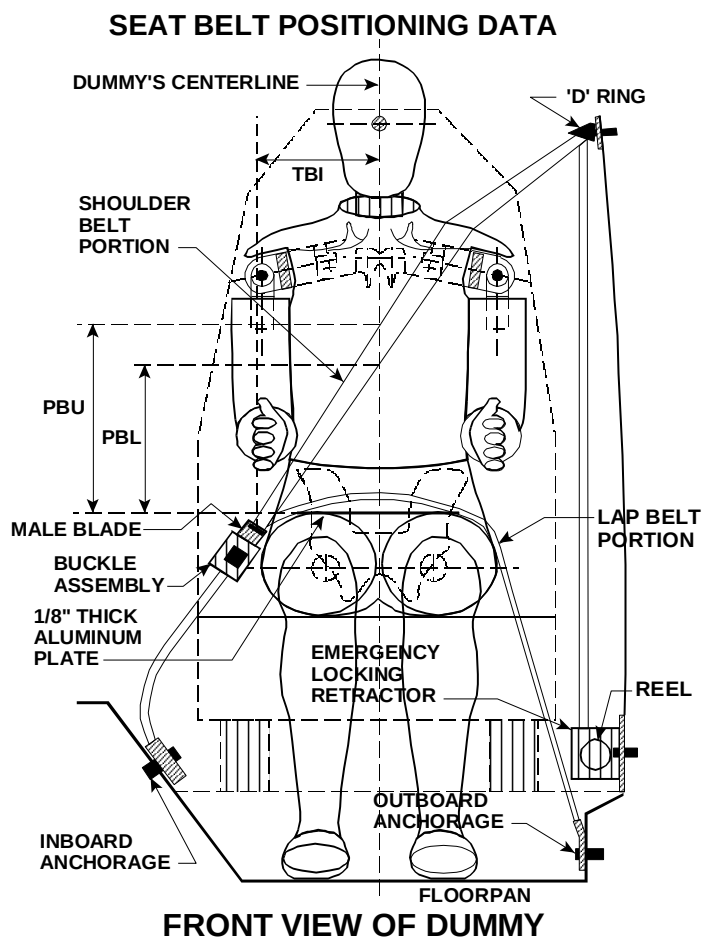
Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010



Code	Description	Driver	Passenger
AD	Arm to Door	112	168
HD	H-Point to Door	154	173
HR	Head to Side Header	198	245
HS	Head to Side Window	340	370
KK	Knee to Knee	355	215
SHY	Striker to H-Point (Y Direction)	275	285
AA	Ankle to Ankle	350	185

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of aluminum plate to belt upper edge	mm	360	250
PBL — Top surface of aluminum plate to belt lower edge	mm	280	170

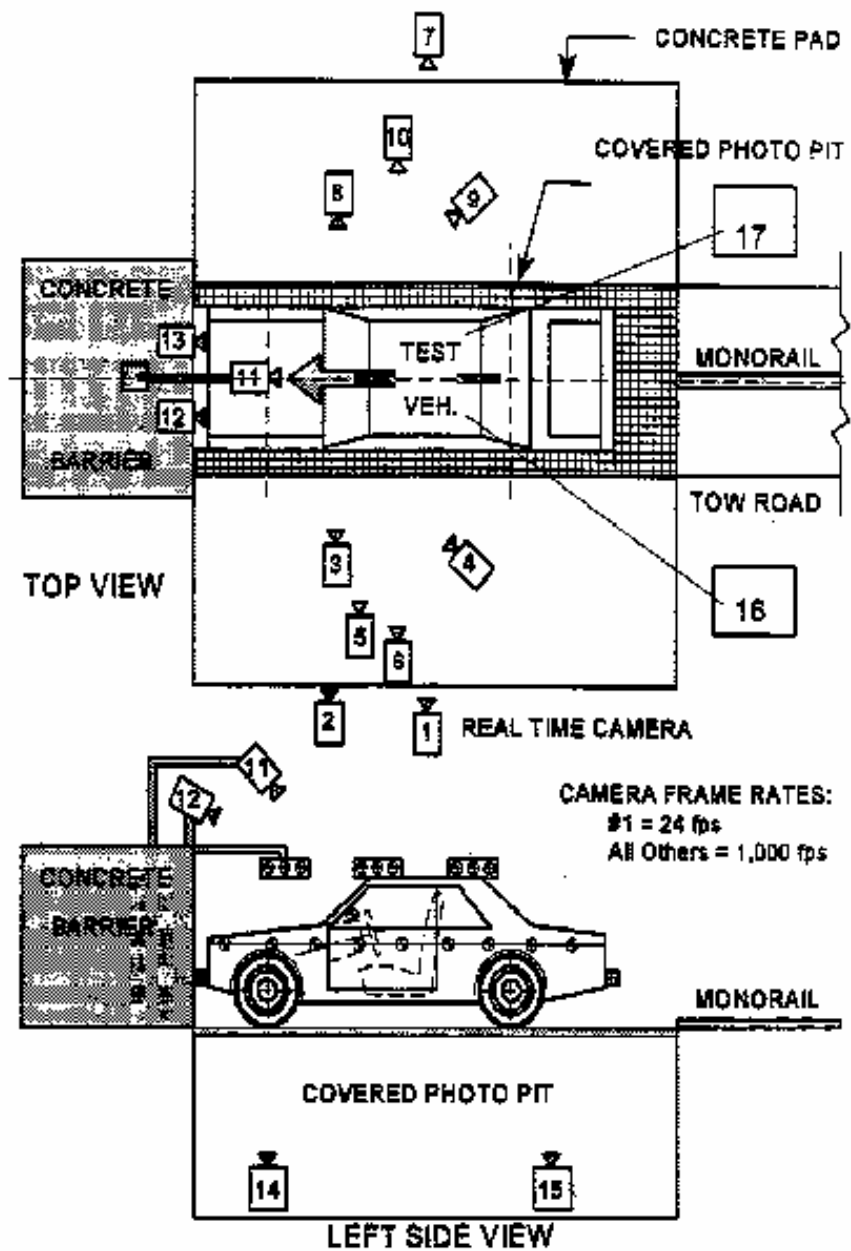
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	790	830
Lap Belt Length as measured on ATD	mm	425	360
Remainder of belt on reel	mm	0	0
Total belt length for continuous webbing systems	mm	1215	1190

DATA SHEET NO. 6
HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 (CONTINUED)
HIGH-SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

CAMERA LOCATIONS

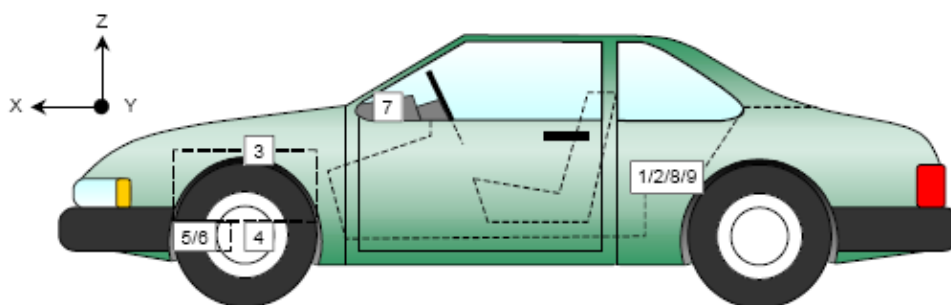
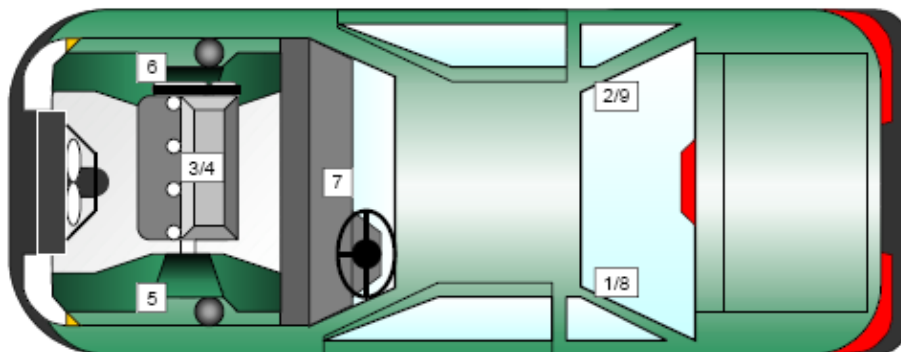
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View	-	-	-	-	24
2	Left Front View	890	9634	955	50	1000
3	Steering Column Top	1870	7316	1220	24-70	1000
4	Steering Column Bottom	1870	7316	1800	28-70	1000
5	Driver Close-Up	1510	7730	1040	50	1000
6	Driver Angle	2940	6391	1960	50	1000
7	Right Overall	1930	7506	945	24	1000
8	Right Passenger Half	1690	8050	1115	50	1000
9	Right Close-Up	1305	9500	955	50	1000
10	Right Angle	2780	6706	1830	50	1000
11	Windshield	0	-530	3374	25	500
12	Top Driver	620	-92	1987	24	500
13	Top Passenger	620	-92	1987	24	500
14	Pit Front	0	615	-3048	12.5	1000
15	Pit Rear	0	2870	-3048	12.5	1000
16	Onboard Driver Side (Optional)	N/A	N/A	N/A	N/A	N/A
17	Onboard Passenger Side (Optional)	N/A	N/A	N/A	N/A	N/A

* COORDINATES:

+X = forward of impact plane
+Y = right of monorail center
+Z = into ground

DATA SHEET NO. 7
VEHICLE ACCELEROMETER DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	2039	-654	529
2	Right Rear X-Member X	2074	667	504
3	Engine Top X	3973	376	1014
4	Engine Bottom X	3754	230	494
5	Left Brake Caliper X	3869	-642	886
6	Right Brake Caliper X	3853	630	882
7	Instrument Panel X	-	-	-
8	Left Rear X-Member Z	2039	-645	529
9	Right Rear X-Member Z	2074	667	504

Reference Points:

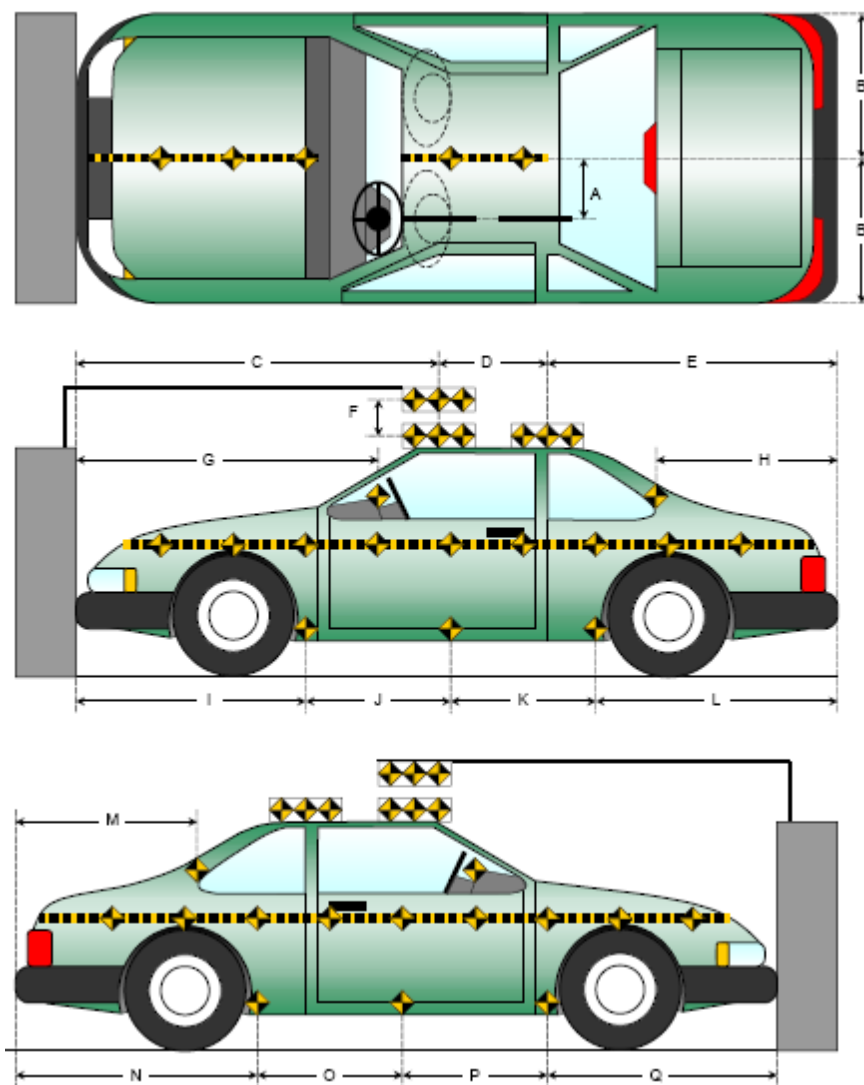
- X – Rear Surface of Vehicle (+ forward)
- Y – Vehicle Centerline (+ to right)
- Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

Item	Value
A	363
B	566
C	2262
D	1220
E	1387
F	103
G	1794
H	1135
I	1429
J	978
K	991
L	1471
M	1130
N	1471
O	983
P	987
Q	1429

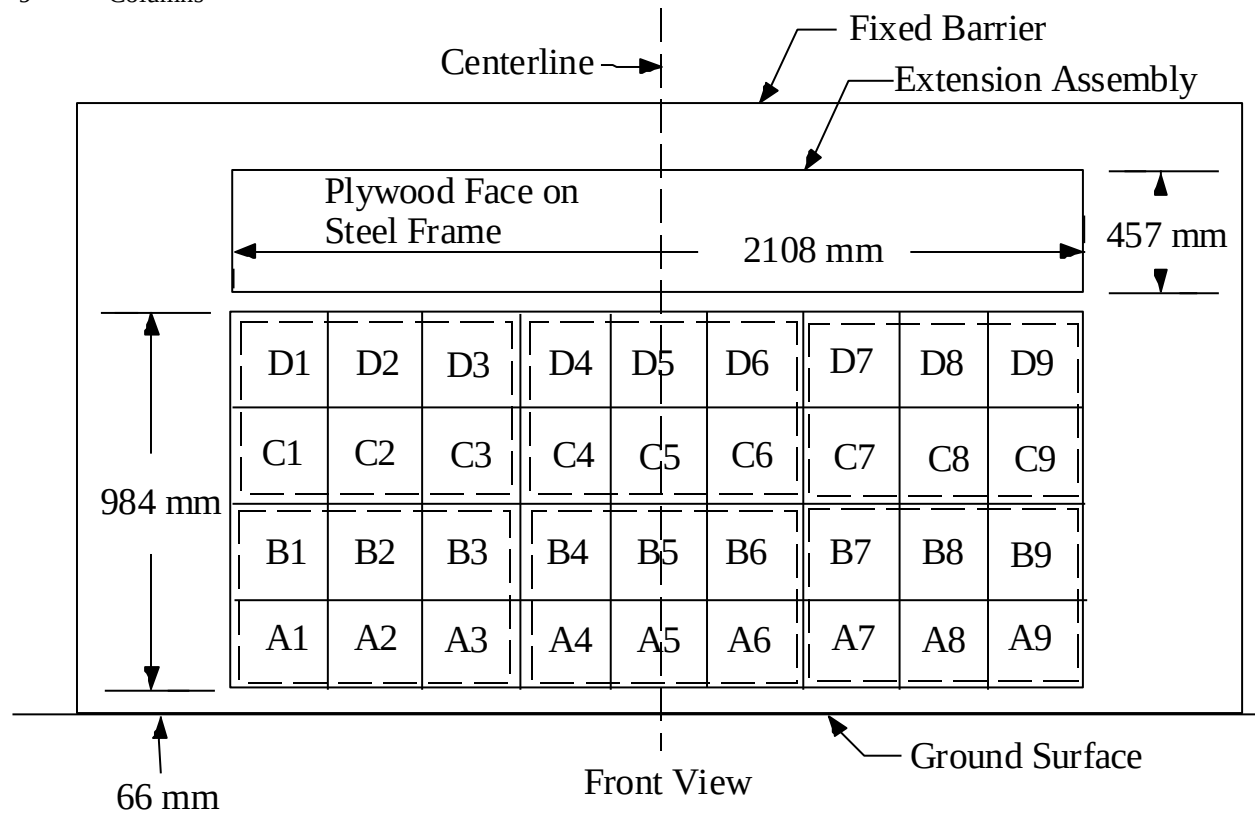
All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

36 Load Cells
 4 Rows
 9 Columns



DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0111
Test Program: Frontal NCAP Test Date: August 25, 2010

INSTRUMENTATION

Driver Dummy Channels	40
Passenger Dummy Channels	40
Belt load cells	4
Vehicle Structure Accelerometers	8
Barrier load cells	36
Total	128

CAMERA COVERAGE

High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time Panning	1
Total	15

DATA SHEET NO. 11
POST TEST OBSERVATIONS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	061	143
Head Contact	Face - Frontal Airbag Back of head – Head restraint	Face - Frontal Airbag Back of head – Head restraint
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	No Contact	No Contact
Left Knee Contact	Knee Bolster	Glover Box Door
Right Knee Contact	Knee Bolster	Glove Box Door

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Closed/Operational	Closed/Operational
Rear Door Opening	Closed/Operational	Closed/Operational
Seat Track Shift (mm)	18 mm forward	0
Seat Back Failure	None	None
Glazing Damage	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

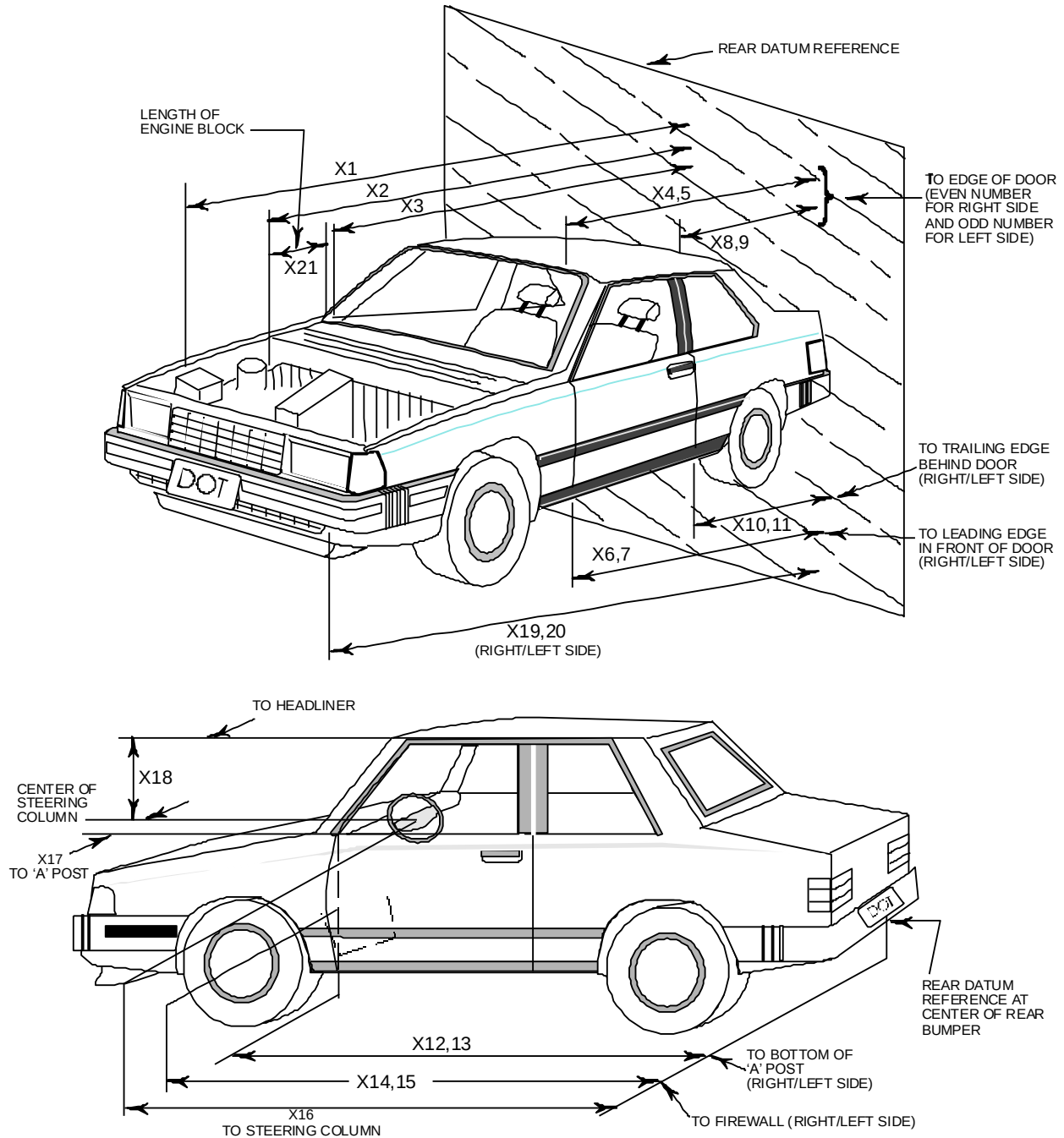
Measured Parameter	Units	Value
Left Side	mm	1355
Center	mm	1418
Right Side	mm	1510
Average	mm	1428

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver (Occupant 1)		Passenger (Occupant 2)	
	Installed	Operated	Installed	Operated
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 – Side Curtain	Yes	No	Yes	No
Side Airbag 2 – Side Torso/Pelvis	Yes	No	Yes	No
Knee Airbag	No	NA	No	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes

DATA SHEET NO. 12 **VEHICLE PROFILE MEASUREMENTS**

Test Vehicle:	<u>2011 Chevrolet Malibu 1LS</u>	NHTSA No:	<u>MB0111</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>August 25, 2010</u>



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4870	4332	538
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4349	4158	191
3	RSOV to Firewall	3772	3693	79
4	RSOV to Upper Leading Edge of Right Door	3418	3411	7
5	RSOV to Upper Leading Edge of Left Door	3419	3417	2
6	RSOV to Lower Leading Edge of Right Door	3389	3385	4
7	RSOV to Lower Leading Edge of Left Door	3387	3386	2
8	RSOV to Upper Trailing Edge of Right Door	2290	2290	0
9	RSOV to Upper Trailing Edge of Left Door	2291	2288	2
10	RSOV to Lower Trailing Edge of Right Door	2317	2313	4
11	RSOV to Lower Trailing Edge of Left Door	2316	2315	0
12	RSOV to Bottom of "A" Post of Right Side	3479	3477	1
13	RSOV to Bottom of "A" Post of Left Side	3476	3475	2
14	RSOV to Firewall, Right Side	3776	3730	46
15	RSOV to Firewall, Left Side	3778	3704	74
16	RSOV to Steering Column	2918	2948	-30
17	Center of Steering Column to "A" Post	304	286	18
18	Center of Steering Column to Headliner	411	442	-32
19	RSOV to Right Side of Front Bumper	4763	4265	498
20	RSOV to Left Side of Front Bumper	4763	4279	484
21	Length of Engine Block	205	205	0
RD	RSOV to Right Side of Dash Panel	3076	3075	2
CD	RSOV to Center of Dash Panel	3098	3084	14
LD	RSOV to Left Side of Dash Panel	3067	3063	4

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

VEHICLE INFORMATION

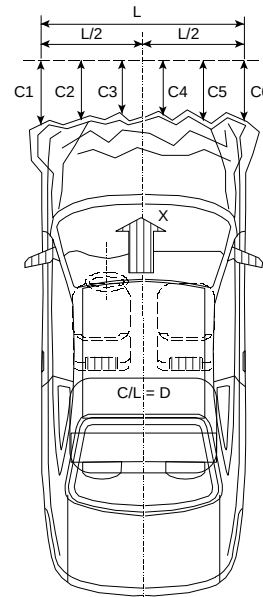
VIN	1G1ZB5E10BF110751	Wheelbase (mm)	2851
Vehicle Size Category	4 Door Sedan	Test Weight (kg)	1759.5

ACCELEROMETER DATA

Accelerometer Locations: As per measurements on page 2-13
 Cal. Procedure/Interval: Calspan Procedure / 6 month
 Integration Algorithm: Trapezoidal Linearity: > 99%
 Impact Velocity (km/h): 56.5
 Velocity Change (km/h): 65.6
 Time of Separation (msec): 238

CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1452
 Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4610	4286	324
C2	Crush zone 2 at left side	mm	4769	4278	491
C3	Crush zone 3 at left side	mm	4850	4312	537
C4	Crush zone 4 at right side	mm	4850	4308	542
C5	Crush zone 5 at right side	mm	4773	4260	513
C6	Crush zone 6 at right side	mm	4612	4272	341
L	C1 to C6	mm	1452	1538	-86

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

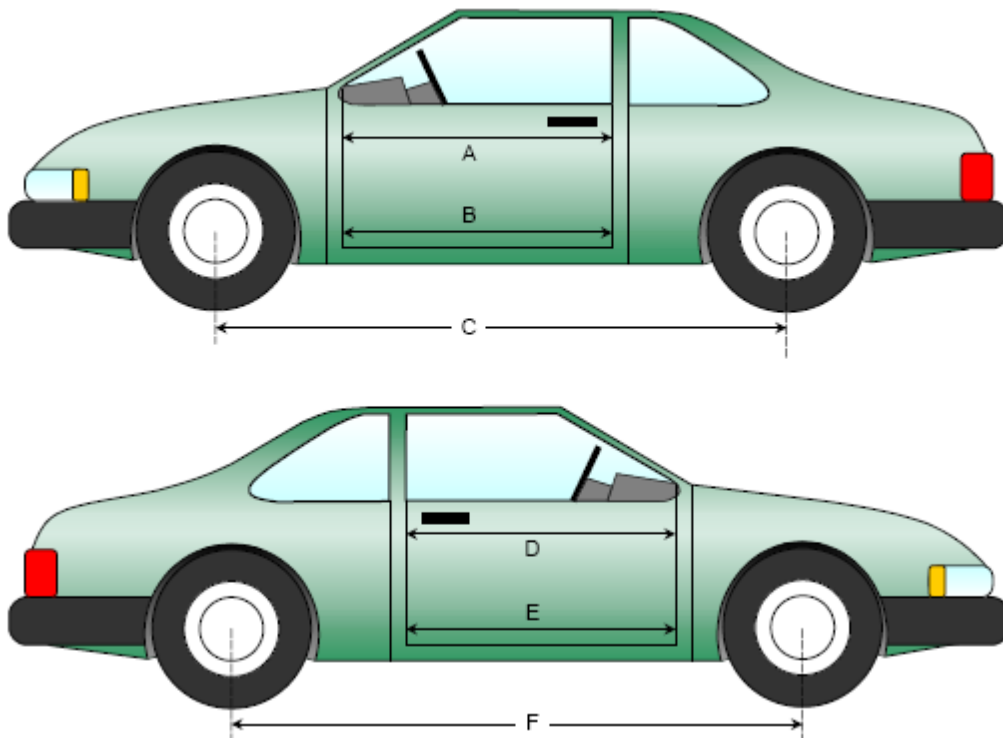
Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0111
Test Program: Frontal NCAP Test Date: August 25, 2010

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1044	1043	1
B	Left Side Lower	mm	883	883	0
D	Right Side Upper	mm	1044	1042	2
E	Right Side Lower	mm	851	851	0

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2856	2767	89
F	Right Side Wheelbase	mm	2847	2775	71



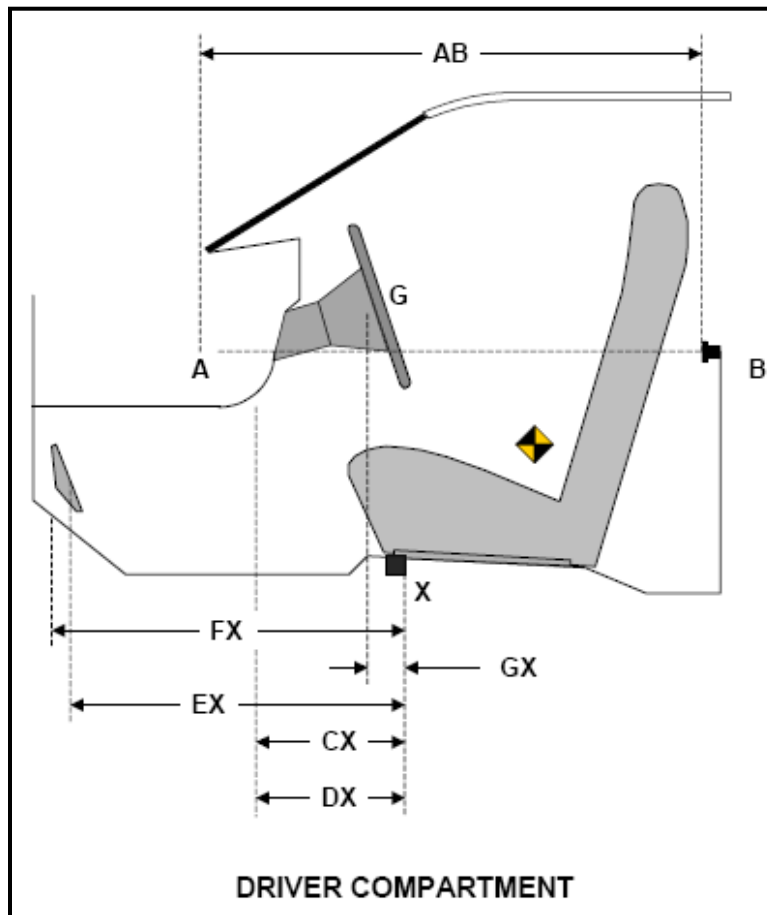
DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0111
 Test Program: Frontal NCAP Test Date: August 25, 2010

DRIVER COMPARTMENT INTRUSION

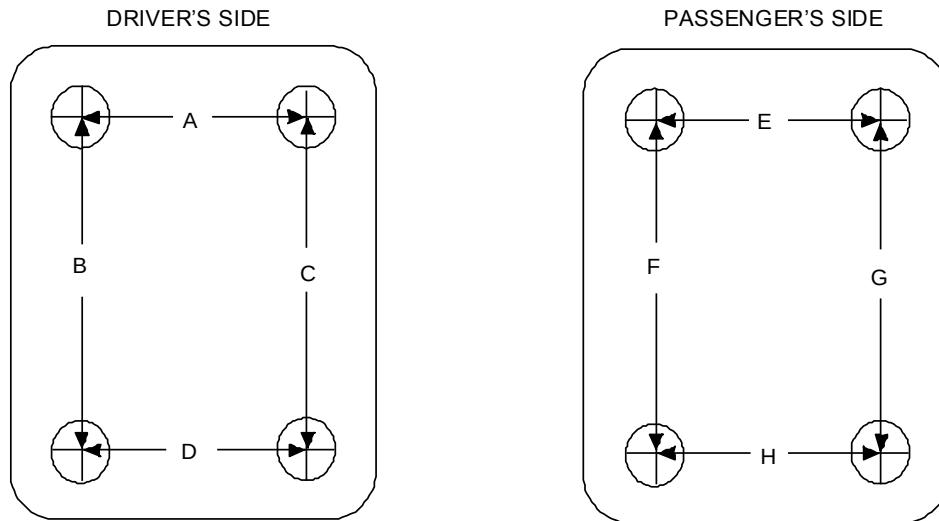
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	797	799	-2
CX	Left Knee Bolster to X	mm	295	283	12
DX	Right Knee Bolster to X	mm	281	261	20
EX	Brake Pedal to X	mm	592	520	72
FX	Foot Rest to X	mm	644	624	20
GX	Center of Steering Column Wheel Hub to X	mm	95	117	-22

X = Front of Seat Track (Stationary)



DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Chevrolet Malibu 1LS NHTSA No: MB0111
 Test Program: Frontal NCAP Test Date August 25, 2010



TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	473	472	-1
B	320	321	-1
C	325	314	11
D	452	453	-1
E	446	444	3
F	322	320	1
G	310	308	2
H	456	455	1

All units in millimeters

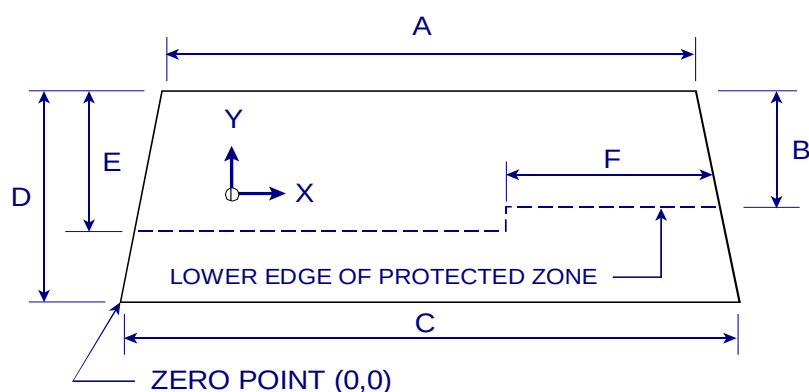
DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010

A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.
 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: 21.9°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2273	2273	100.0%
Right Side	2273	2273	100.0%
Total	4545	4546	100.0%



Item	Units	Value
A	mm	1195
B	mm	550
C	mm	1530
D	mm	910
E	mm	543
F	mm	493

AREAS OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than .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. 15 (CONTINUED)
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle:	<u>2011 Chevrolet Malibu 1LS</u>	NHTSA No:	<u>MB0111</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>August 25, 2010</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

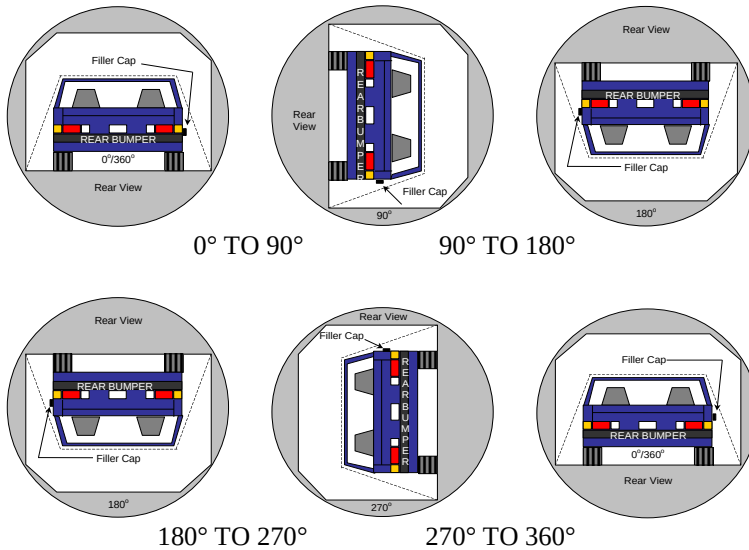
Temperature at Time of Impact:	<u>21.7° C</u>	Test Time:	<u>3:49 PM</u>
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Stoddard Solvent Spillage Measurements

A.	From impact until vehicle motion ceases: (Maximum allowable = 1 oz.)	<u>0</u>	oz
B.	For the 5-minute period after motion ceases: (Maximum allowable = 5 oz.	<u>0</u>	oz
C.	For the following 25 minutes: (Maximum allowable = 1 oz./minute	<u>0</u>	oz
D.	Spillage	<u>0</u>	oz

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 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).
2. Details of Stoddard Solvent spillage:
None

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	1:11	5:00	6:11
90° to 180°	1:03	5:00	6:03
180° to 270°	1:03	5:00	6:03
270° to 360°	1:09	5:00	6:09

FMVSS 301 SPILLAGE TABLE

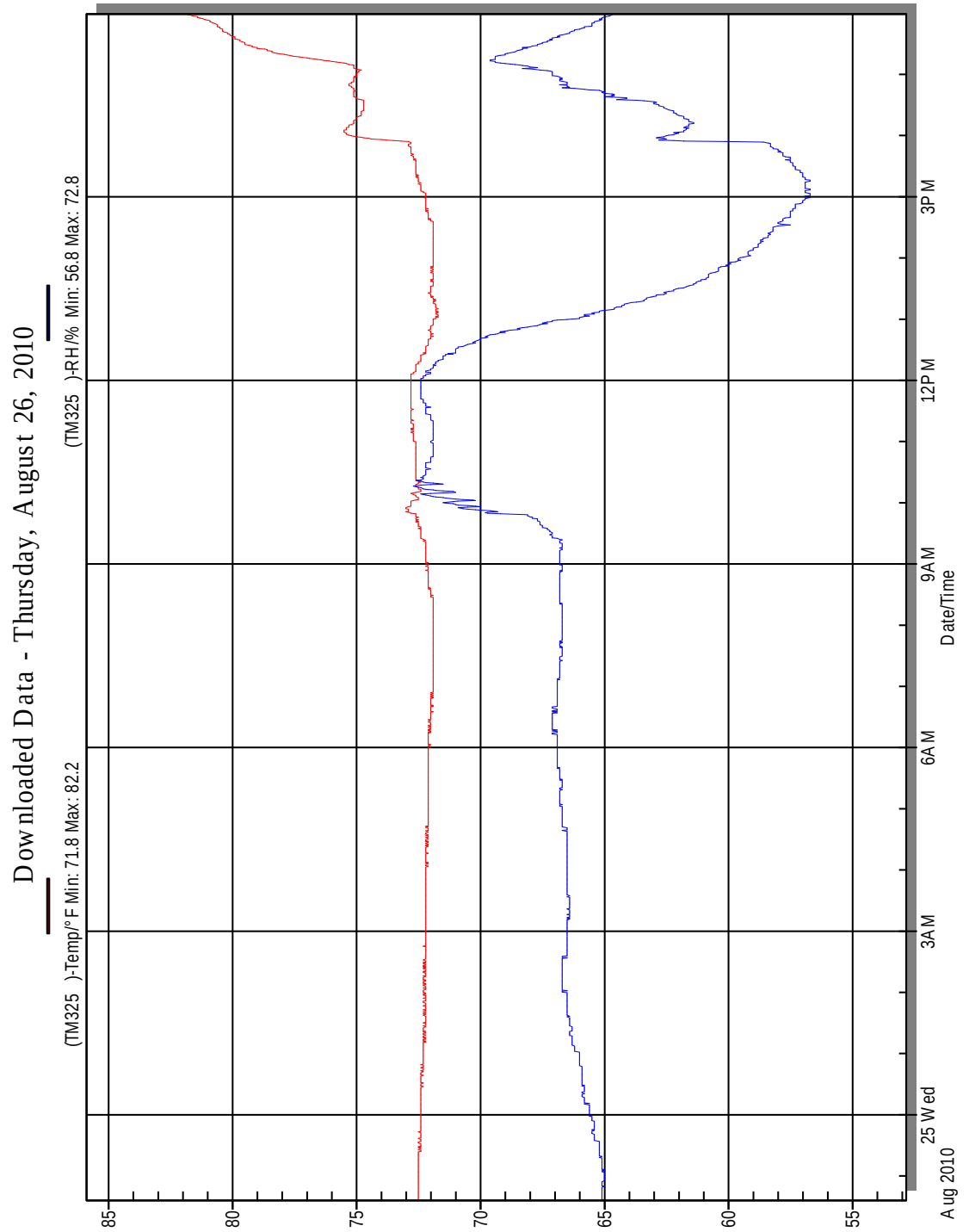
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle:	2011 Chevrolet Malibu 1LS	NHTSA No:	MB0111
Test Program:	Frontal NCAP	Test Date	August 25, 2010



**APPENDIX A
PHOTOGRAPHS**

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6	Left Rear $\frac{3}{4}$ View, as Received	A-7
7	Pre-test Front View of Test Vehicle	A-8
8	Post-test Front View of Test Vehicle	A-8
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12	Post-test Right View of Test Vehicle	A-10
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41	Pre-test Driver's Side Floorpan	A-25
42	Post-test Driver's Side Floorpan	A-25
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44	Pre-test View of the Steering Column Shear Capsule	A-27
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46	Pre-test Passenger Dummy Front View	A-28
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56	Pre-test Passenger's Side Knee Bolster	A-33
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68	Vehicle at 360° on Static Rollover Device	A-39
69	Impact Photograph (video still)	A-40
70	Monroney Label Photograph	A-40



Figure A-1: Load Cell Location



Figure A-2: Load Cell Wall



Figure A-3: Manufacturer Label

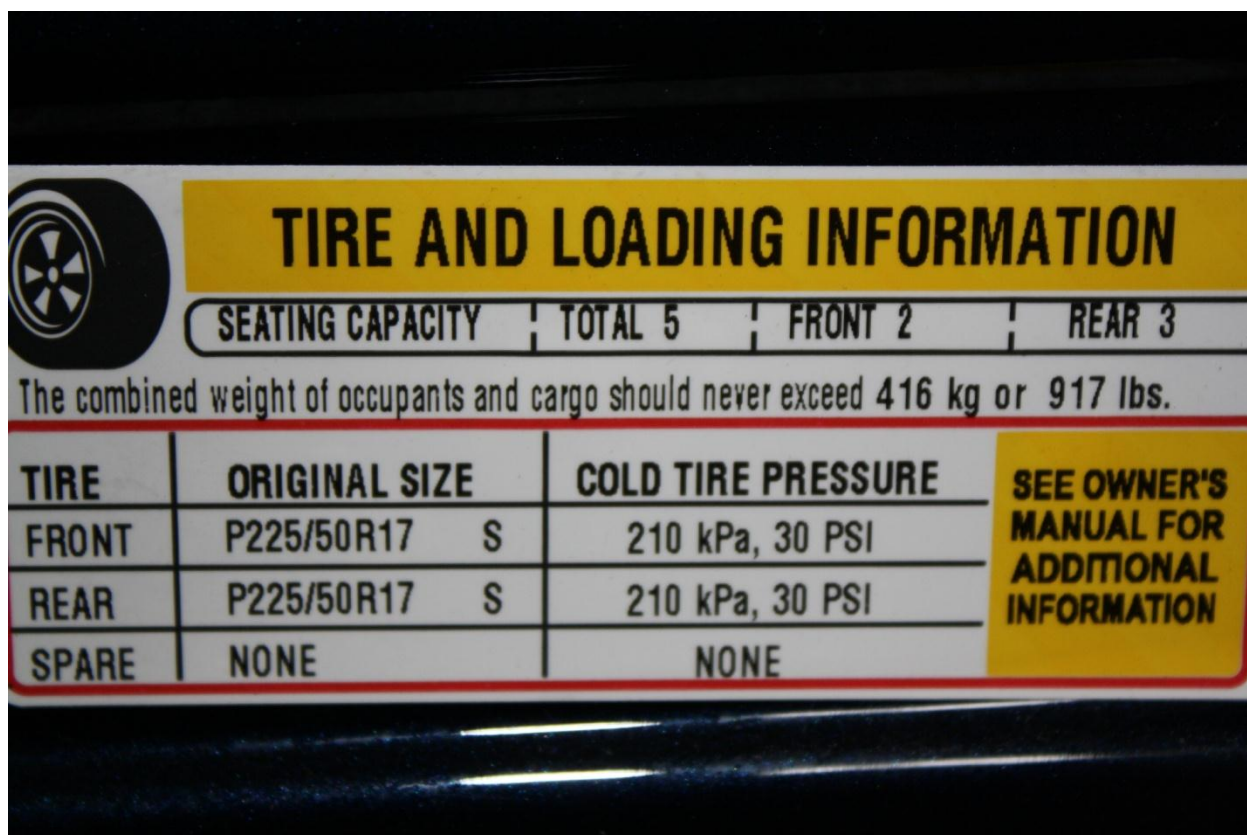


Figure A-4: Tire Placard



Figure A-5: Right Front 3/4 View, as Received



Figure A-6: Left Rear $\frac{3}{4}$ View, as Received



Figure A-7: Pre-Test Front View of Test Vehicle

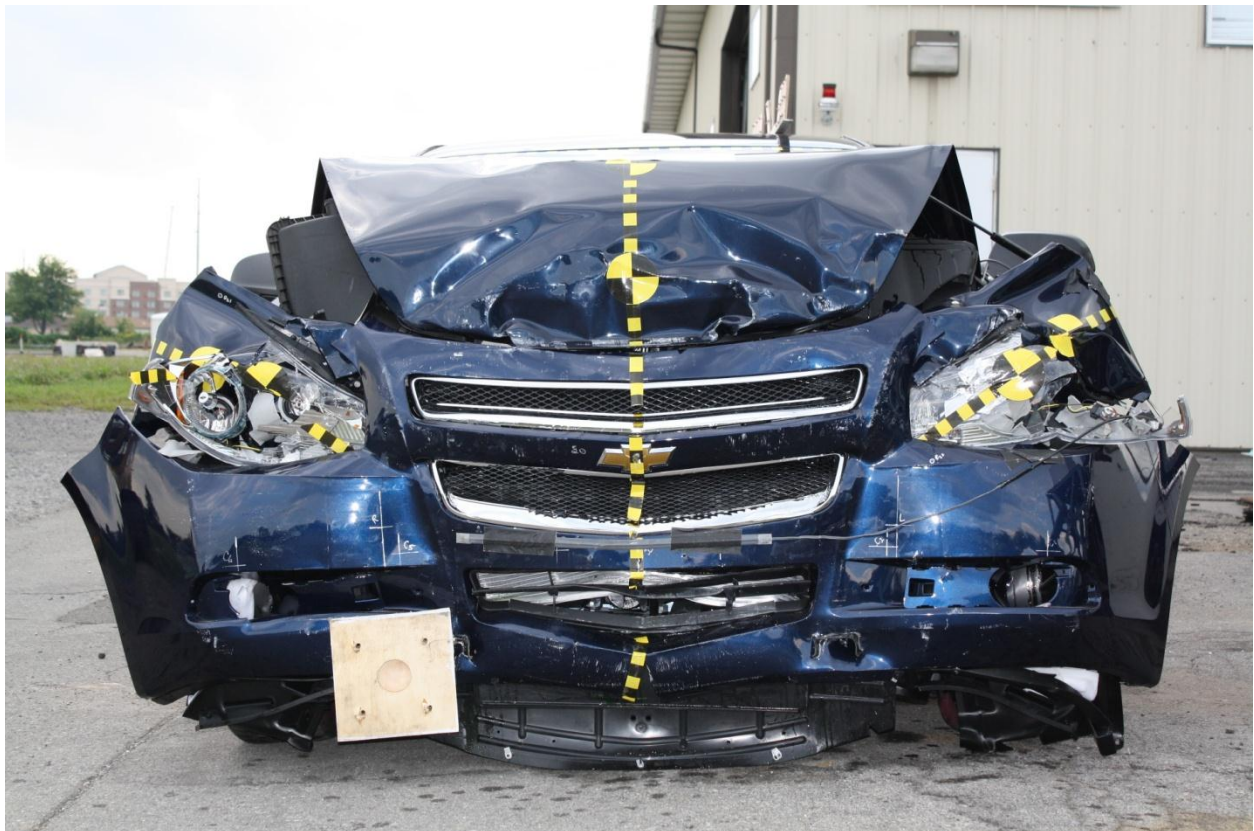


Figure A-8: Post-Test Front View of Test Vehicle



Figure A-9: Pre-Test Left View of Test Vehicle



Figure A-10: Post-Test Left View of Vehicle



Figure A-11: Pre-Test Right View of Test Vehicle



Figure A-12: Post-Test Right View of Test Vehicle



Figure A-13: Pre-Test Right $\frac{3}{4}$ View



Figure A-14: Post-Test Right $\frac{3}{4}$ View



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



Figure A-16: Post-Test Left Rear $\frac{3}{4}$ View



Figure A-17: Pre-Test Windshield View

Photograph Not Available

Figure A-18: Post-Test Windshield View



Figure A-19: Pre-Test Engine Compartment View



Figure A-20: Post-Test Engine Compartment View



Figure A-21: Pre-Test Fuel Filler Cap View



Figure A-22: Post-Test Fuel Filler Cap View

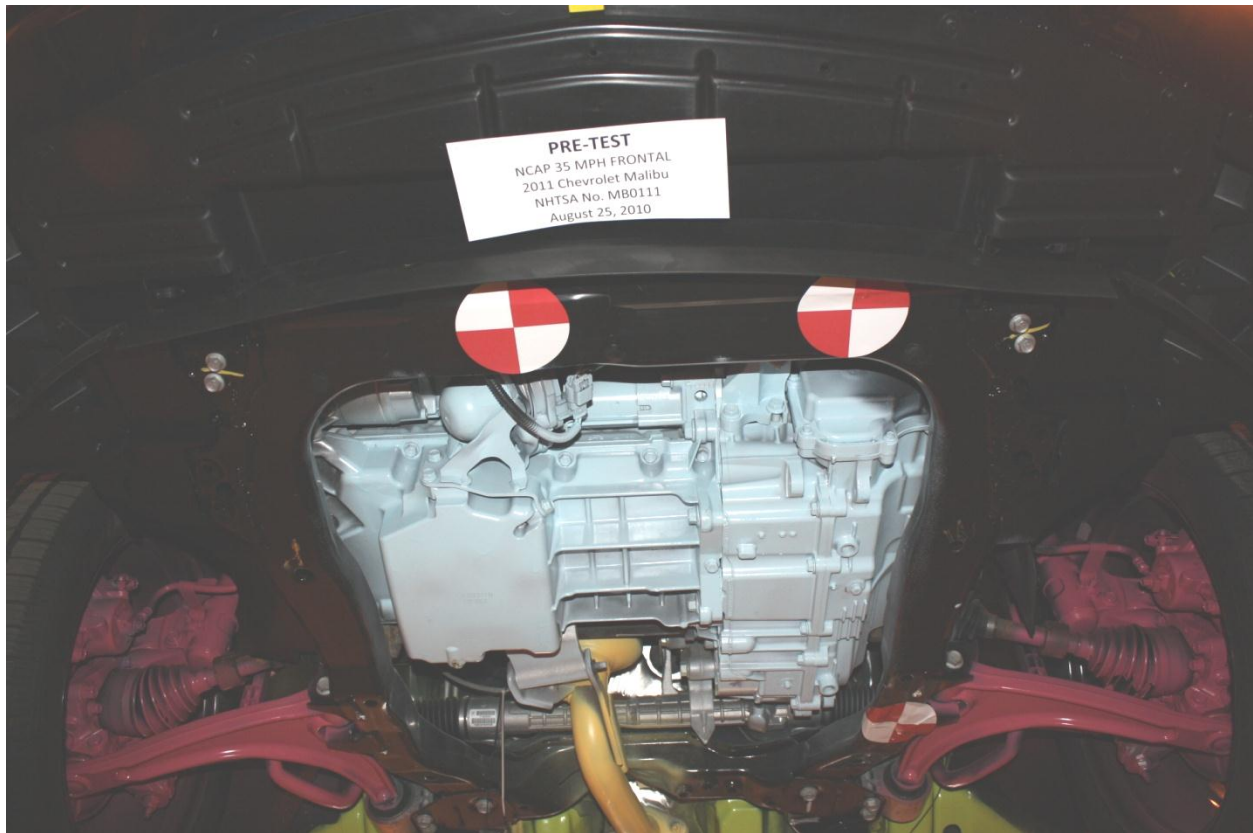


Figure A-23: Pre-Test Front Underbody View



Figure A-24: Post-Test Front Underbody View

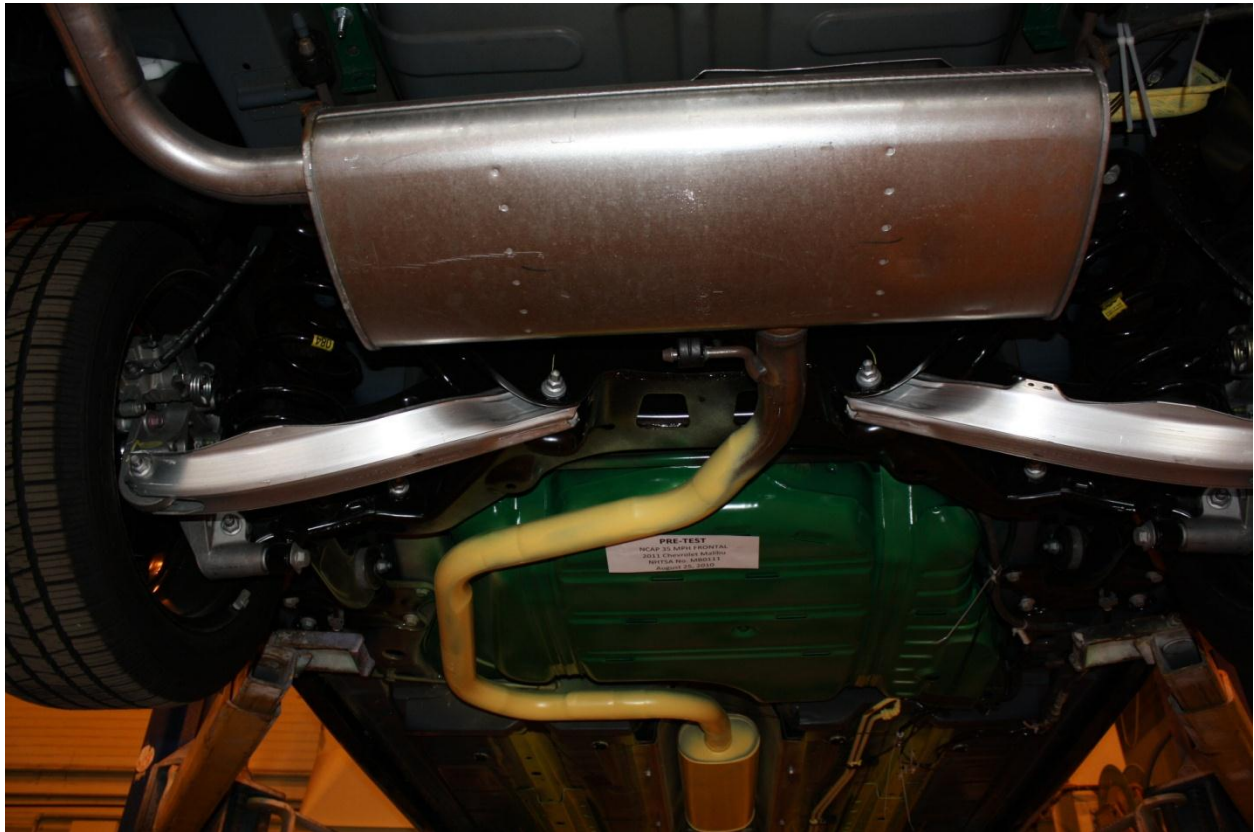


Figure A-25: Pre-Test Rear Underbody View

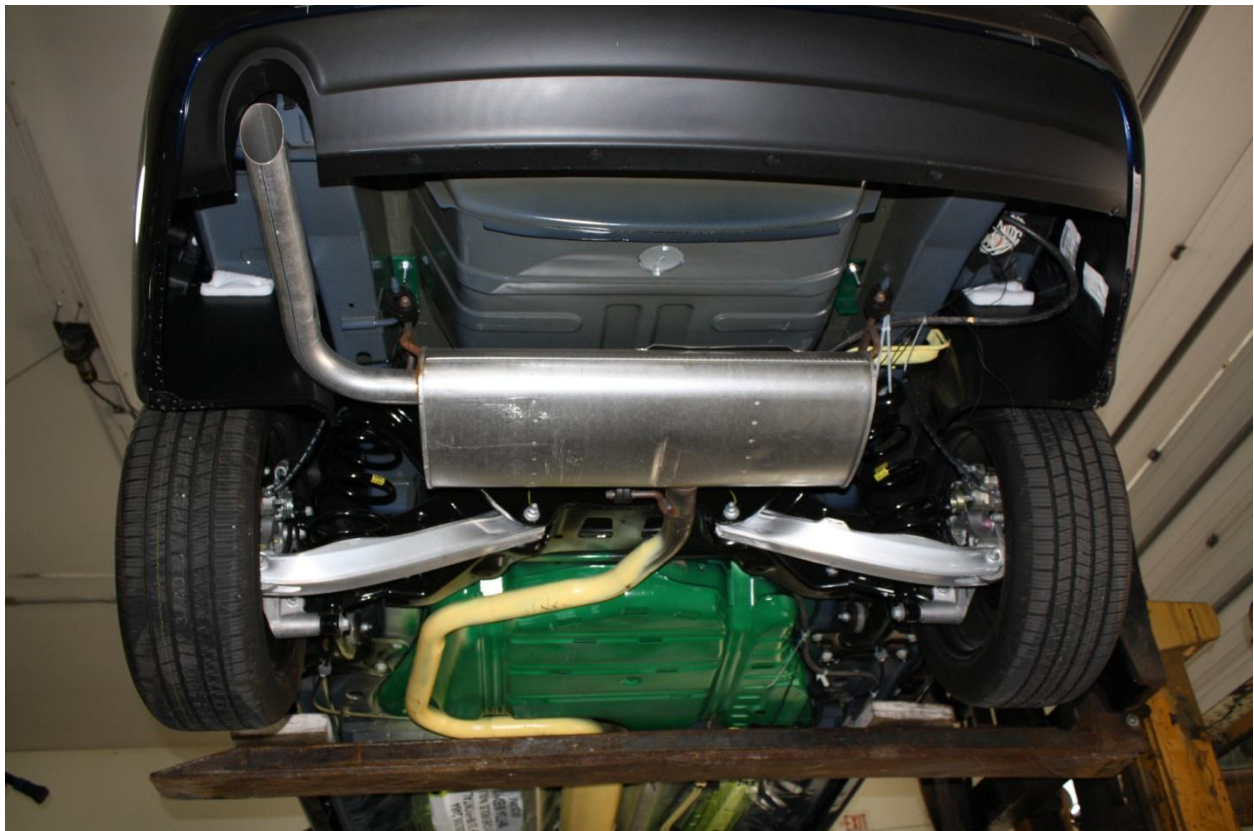


Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing



Figure A-28: Post-Test Dummy Cable Routing



Figure A-29: Pre-Test Driver Dummy Front View

Photograph Not Available

Figure A-30: Post-Test Driver Dummy Front View



Figure A-31: Pre-Test Driver Dummy Window View



Figure A-32: Post-Test Driver Dummy Window View



Figure A-33: Pre-Test Driver Dummy and Vehicle Interior View



Figure A-34: Post-Test Driver Dummy and Vehicle Interior View

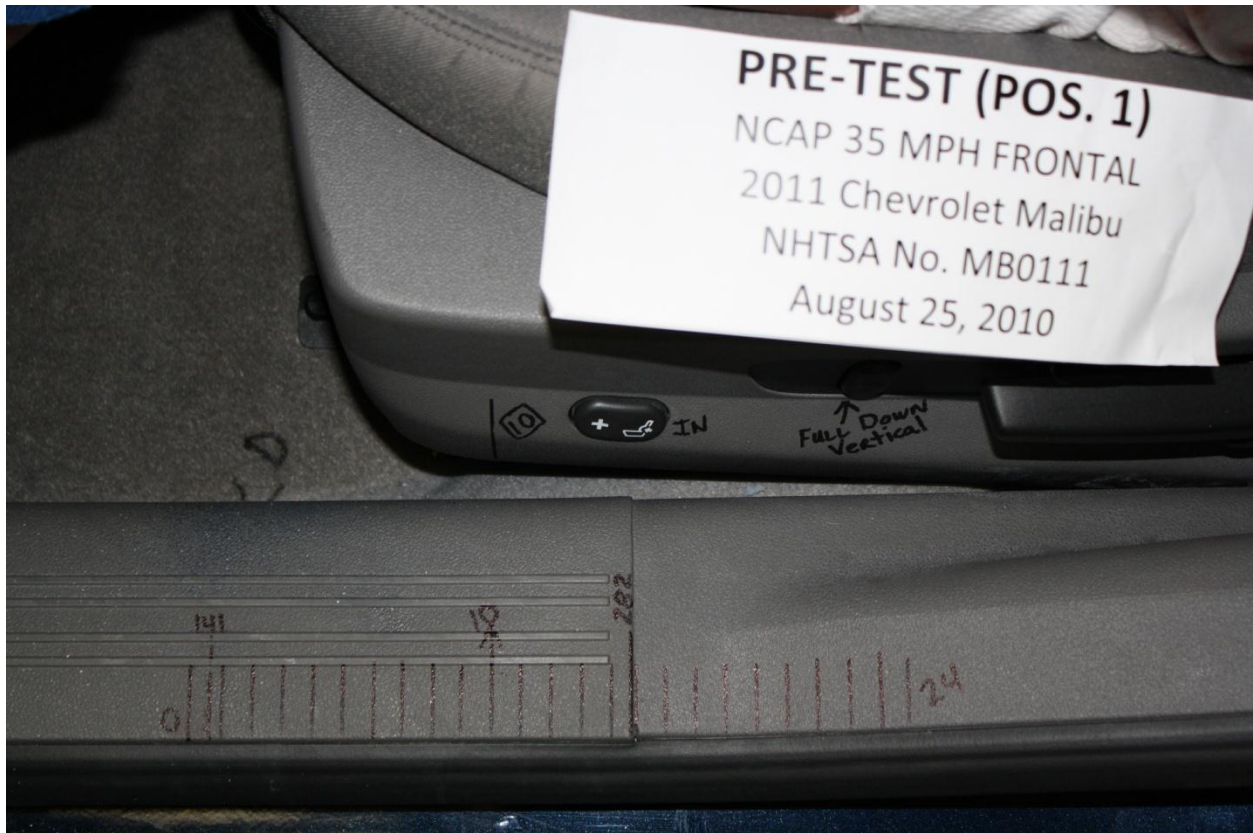


Figure A-35: Pre-Test Driver's Seat Fore-Aft Markings

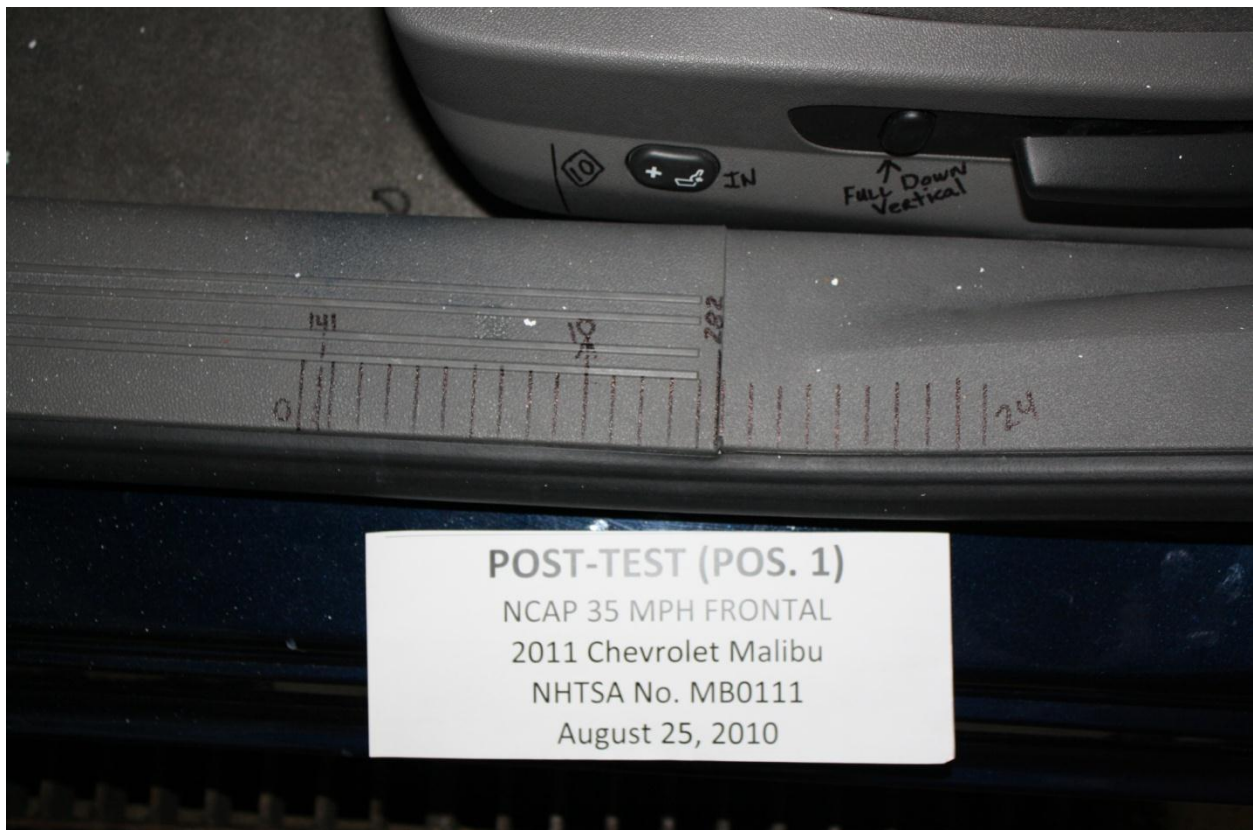


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



Figure A-37: Pre-Test Driver Dummy Feet



Figure A-38: Post-Test Driver Dummy Feet



Figure A-39: Pre-Test Driver's Side Knee Bolster

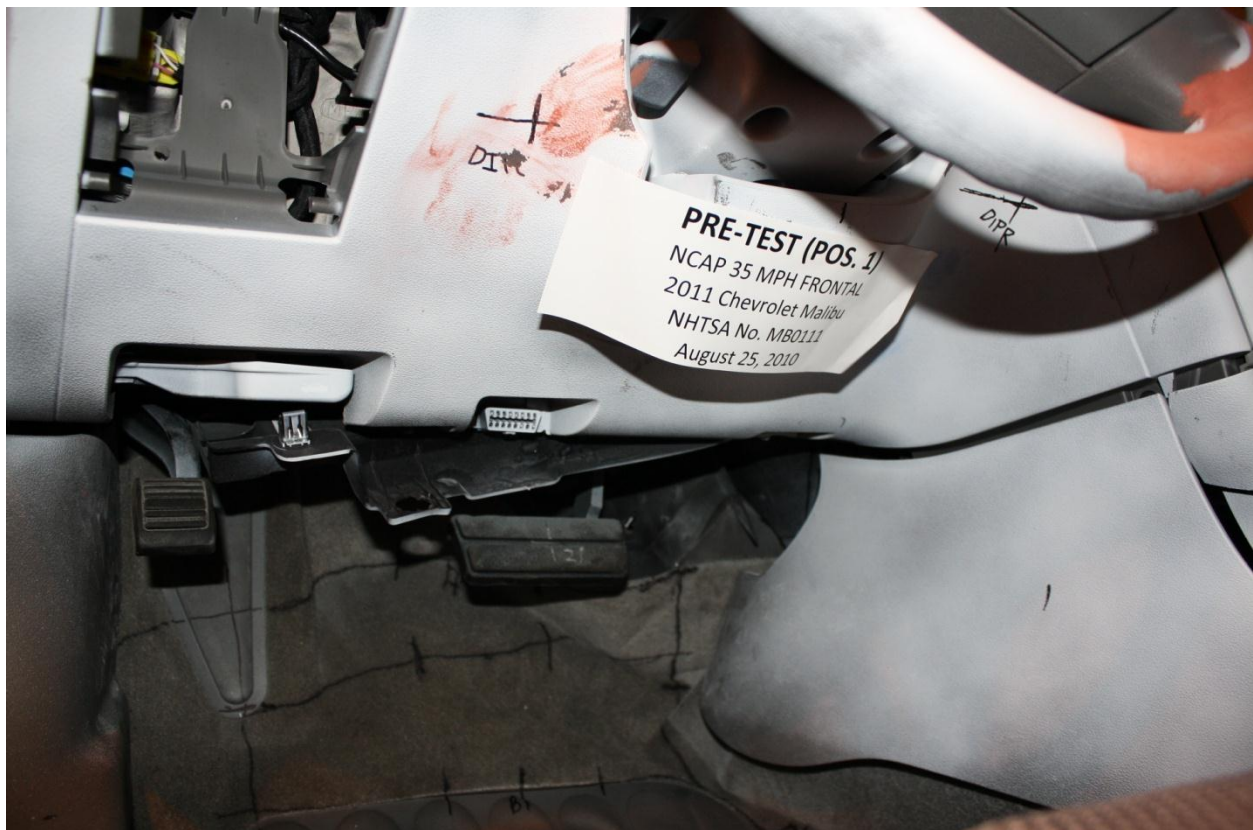


Figure A-40: Post-Test Driver's Side Knee Bolster



Figure A-41: Pre-Test Driver's Side Floorplan



Figure A-42: Post-Test Driver's Side Floorplan



Figure A-43: Post-Test Driver Dummy Contact with Airbag



Figure A-43a: Post-Test Driver Dummy Contact with Head Restraint

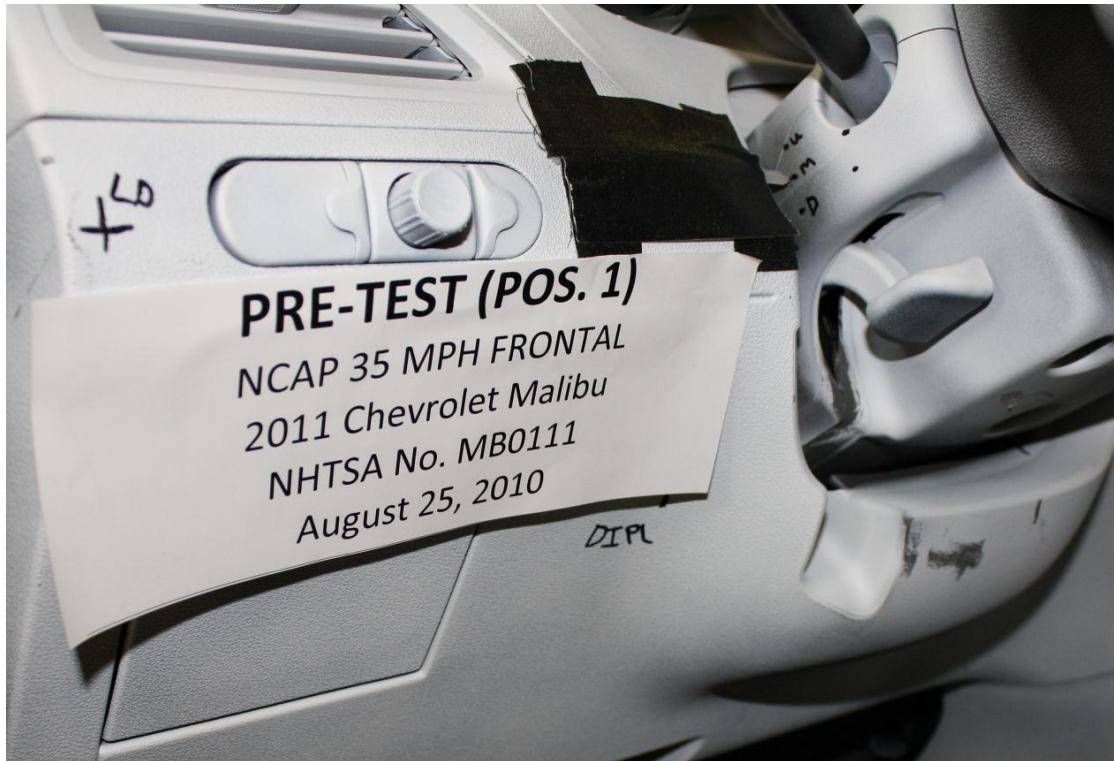


Figure A-44: Pre-Test View of the Steering Column Shear Capsule

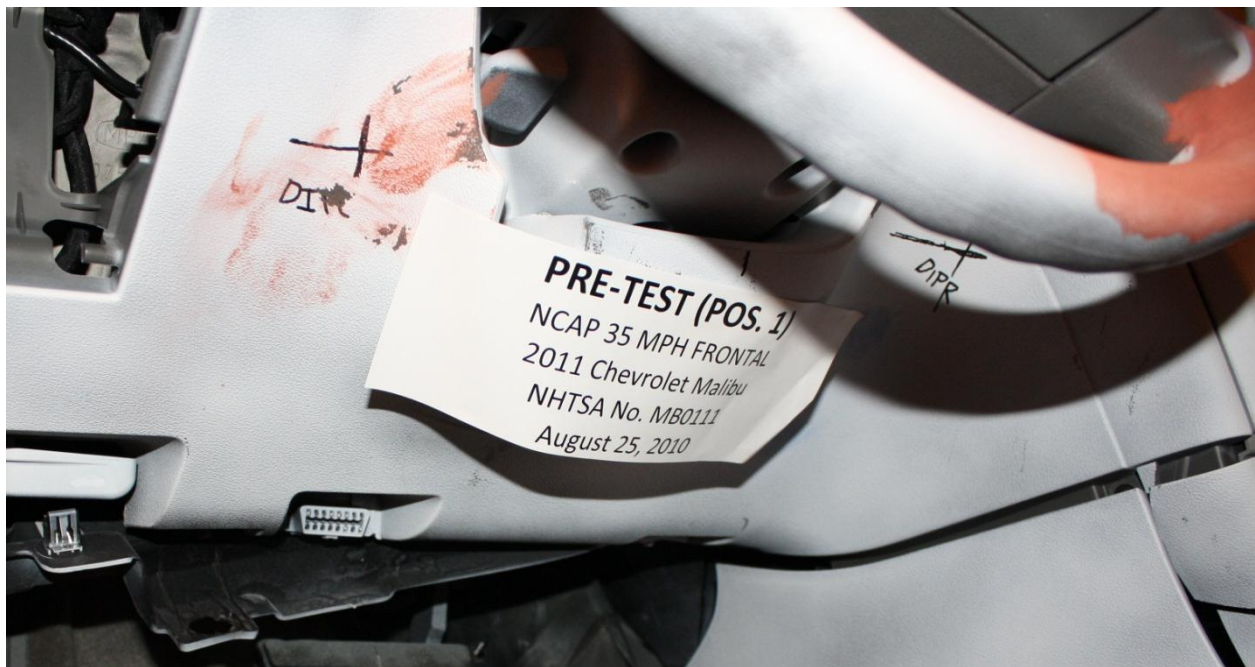


Figure A-45: Post-Test View of the Steering Column Shear Capsule



Figure A-46: Pre-Test Passenger Dummy Front View

Photograph Not Available

Figure A-47: Post-Test Passenger Dummy Front View



Figure A-48: Pre-Test Passenger Dummy Window View

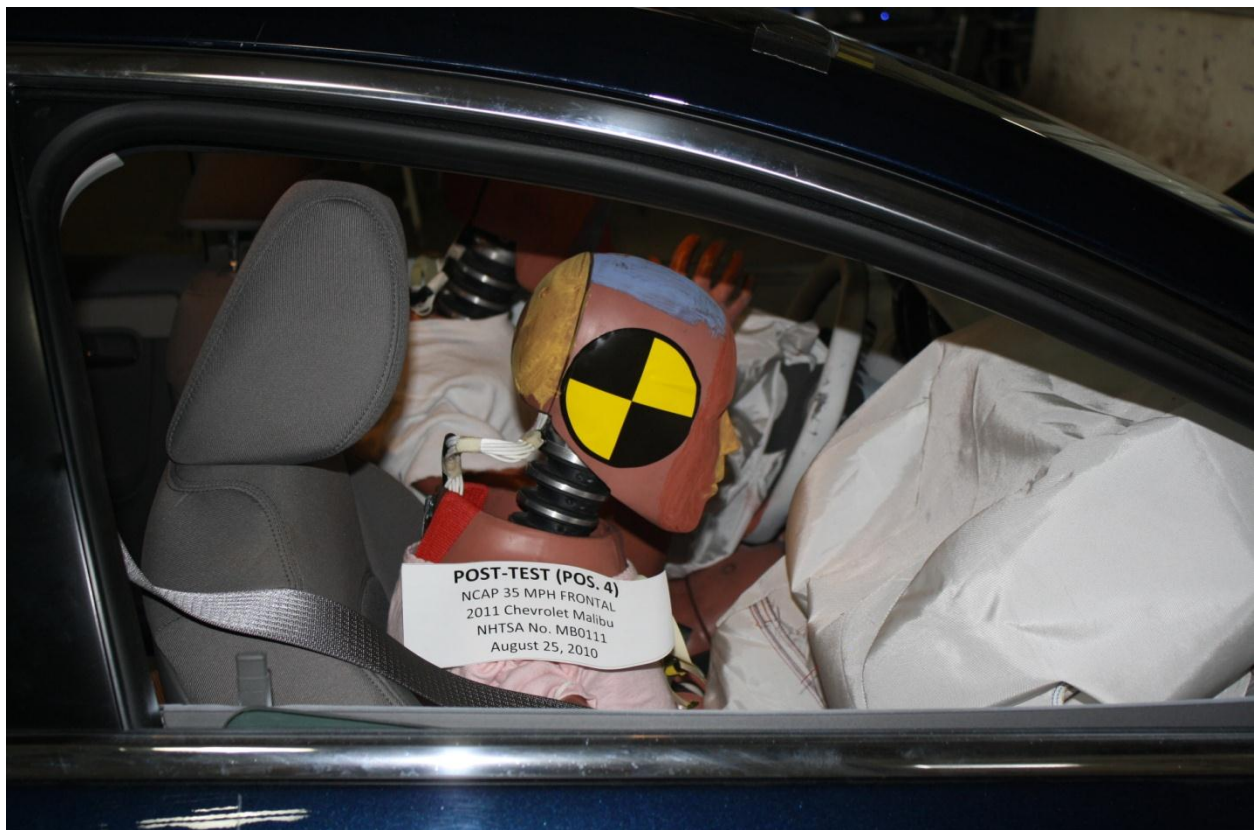


Figure A-49: Post-Test Passenger Dummy Window View



Figure A-50: Pre-Test Passenger Dummy and Vehicle Interior View



Figure A-51: Post-Test Passenger Dummy and Vehicle Interior View

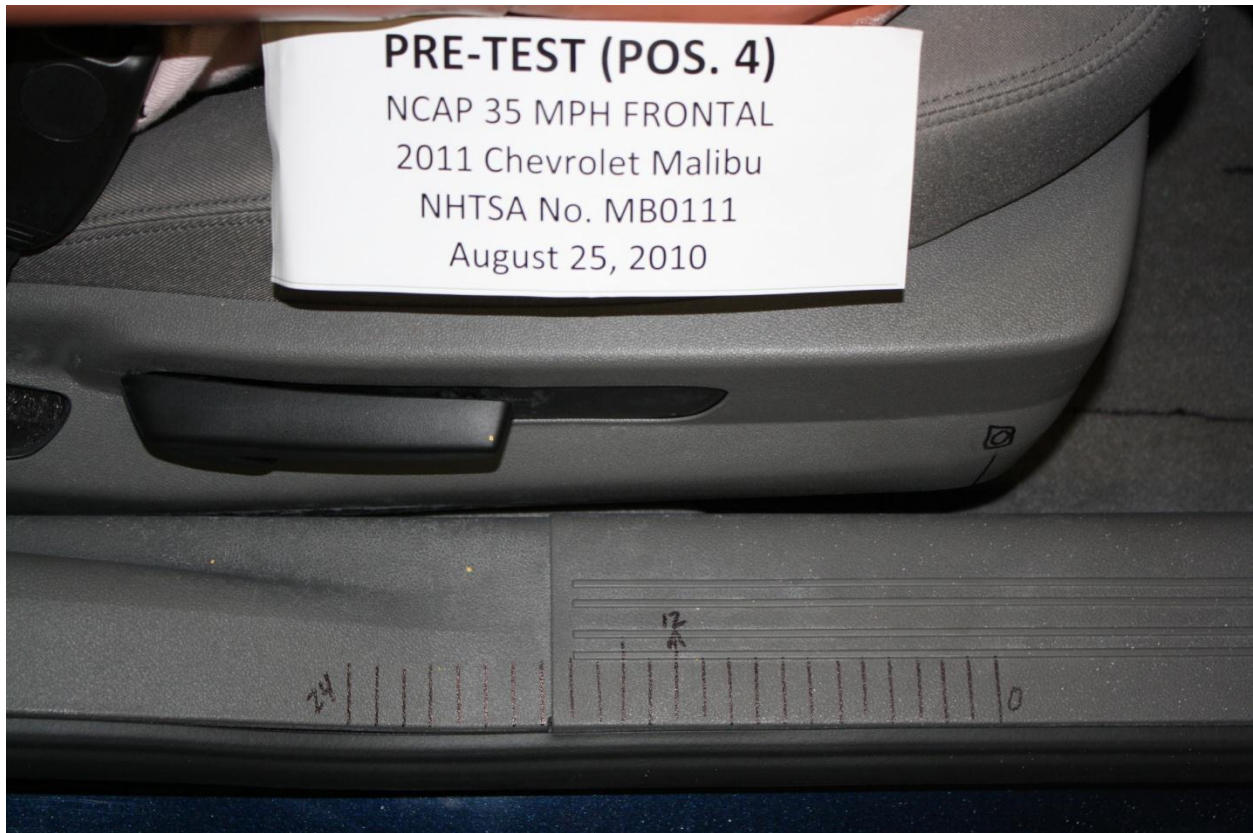


Figure A-52: Pre-Test Passenger's Seat Fore-Aft Markings

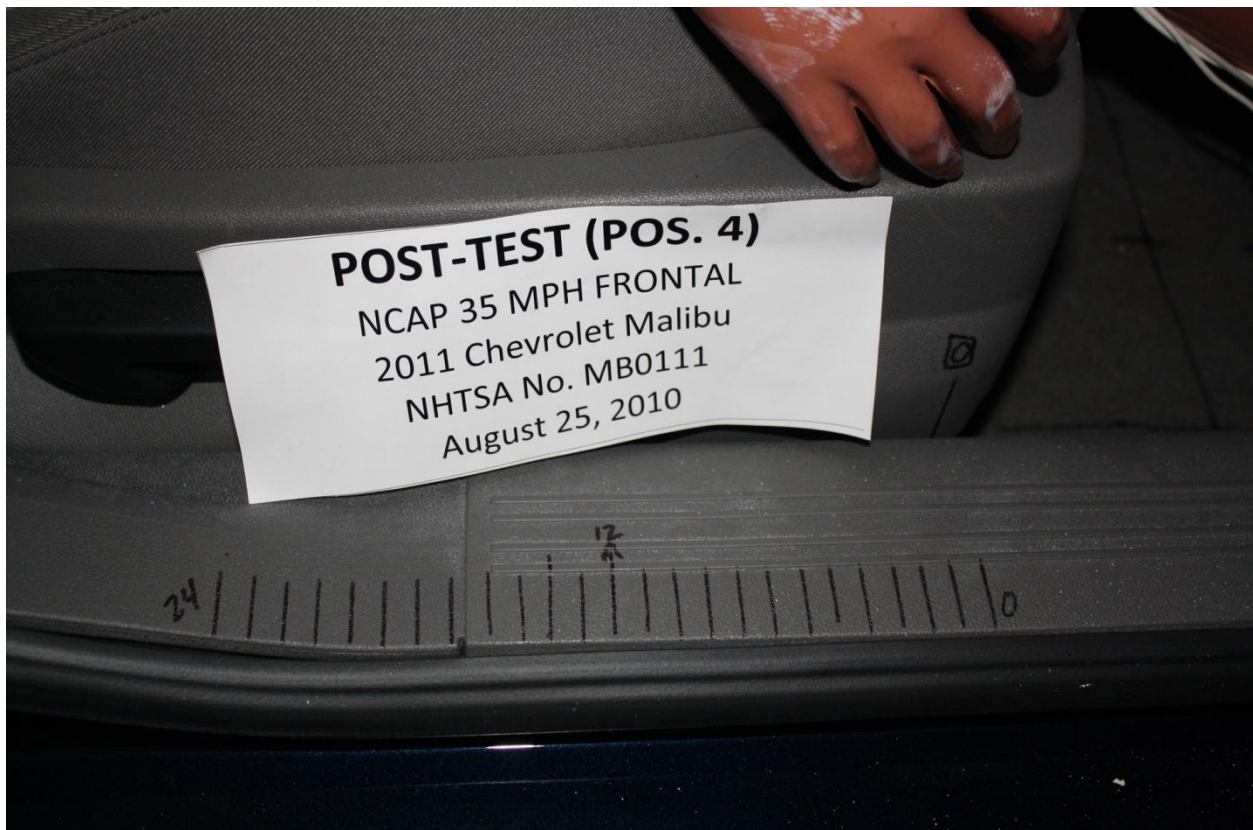


Figure A-53: Post-Test Passenger's Seat Fore-Aft Markings



Figure A-54: Pre-Test Passenger Dummy Feet



Figure A-55: Post-Test Passenger Dummy Feet

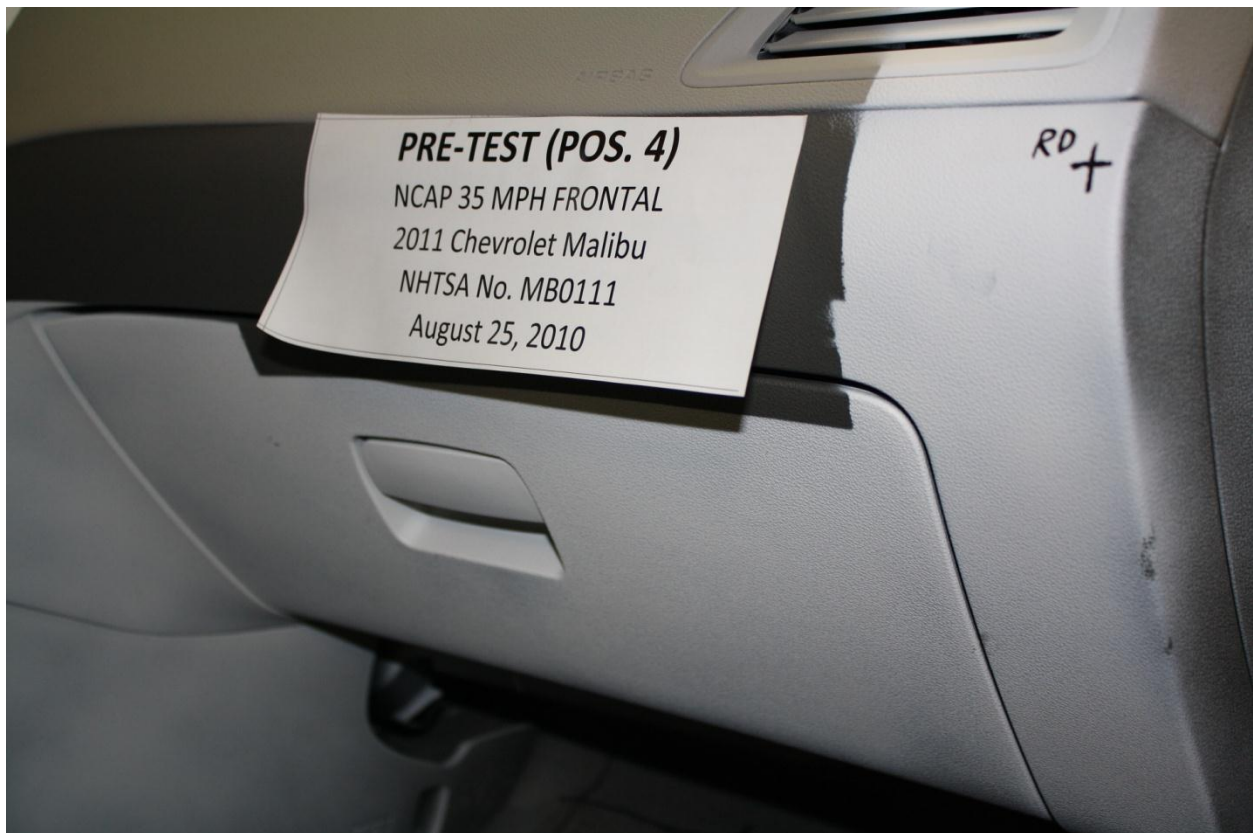


Figure A-56: Pre-Test Passenger's Side Knee Bolster

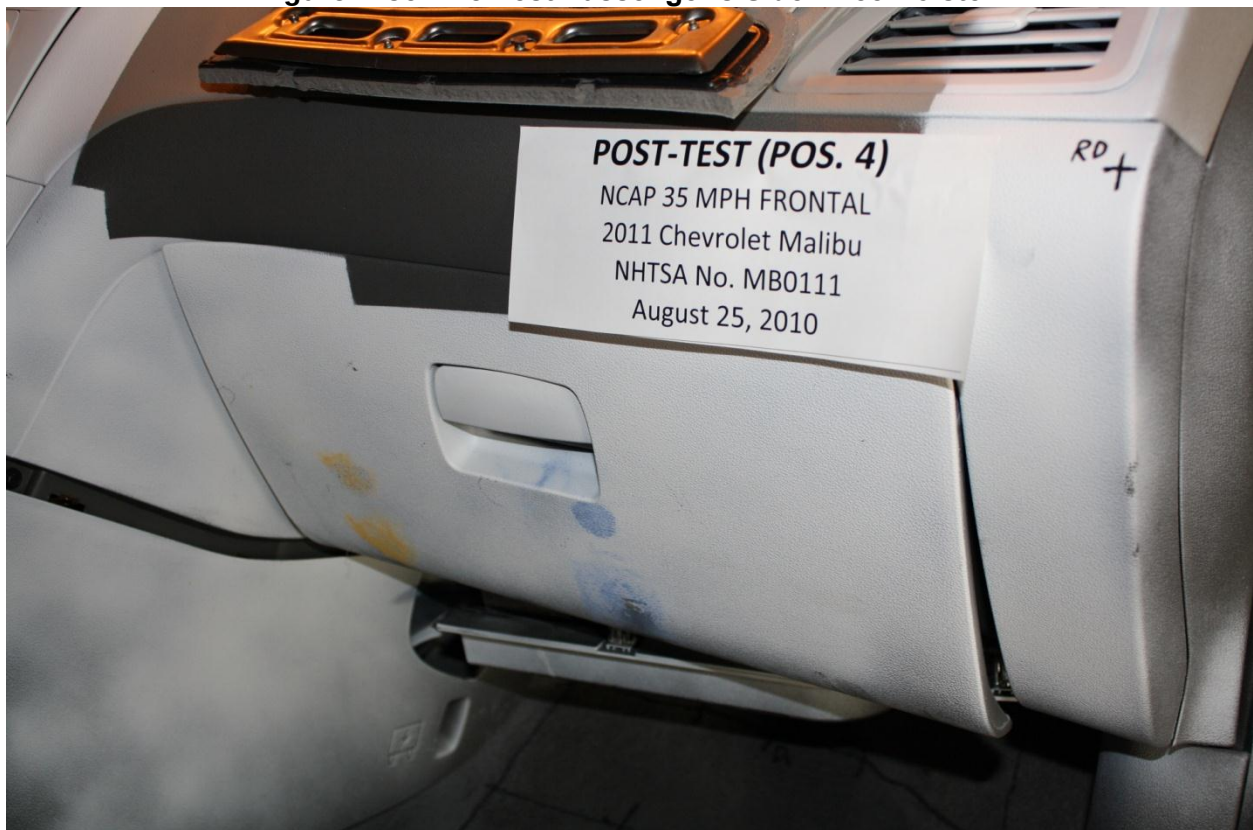


Figure A-57: Post-Test Passenger's Side Knee Bolster

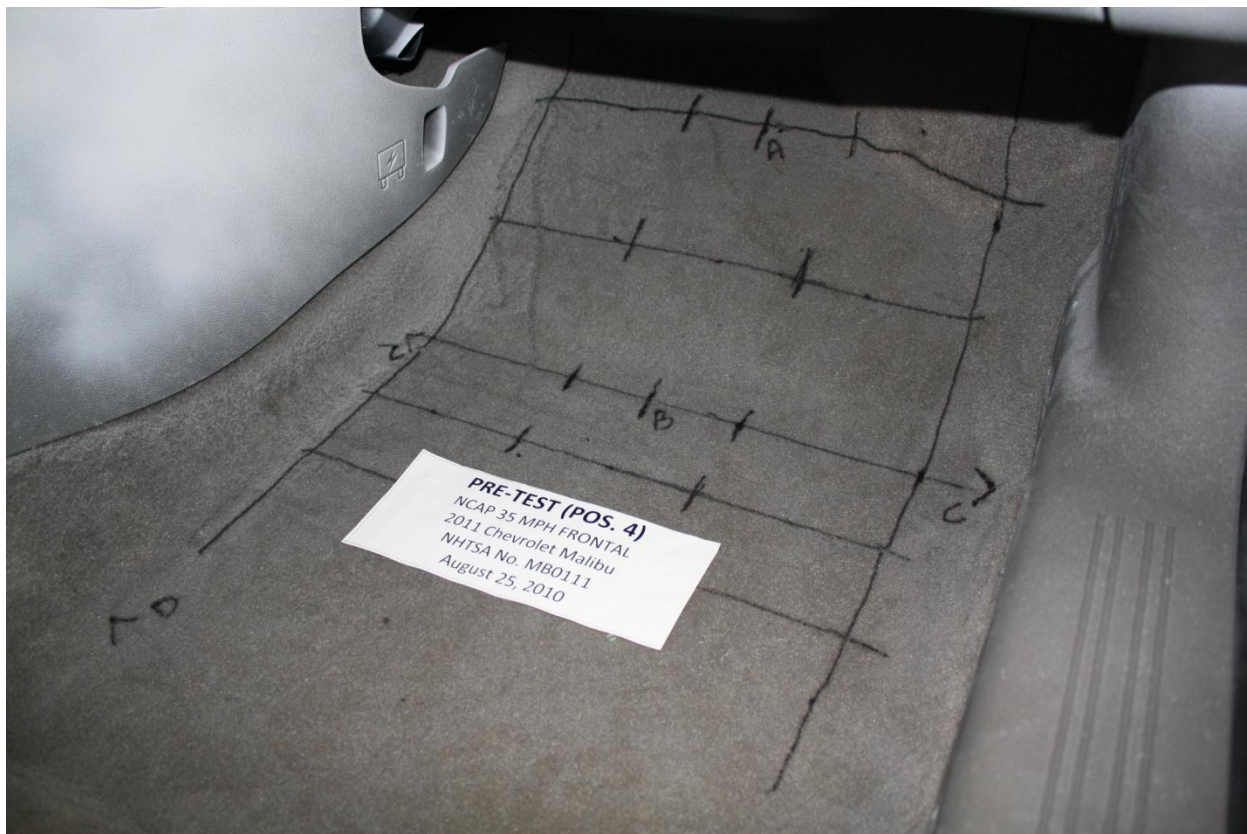


Figure A-58: Pre-Test Passenger's Side Floorplan



Figure A-59: Post-Test Passenger's Side Floorplan

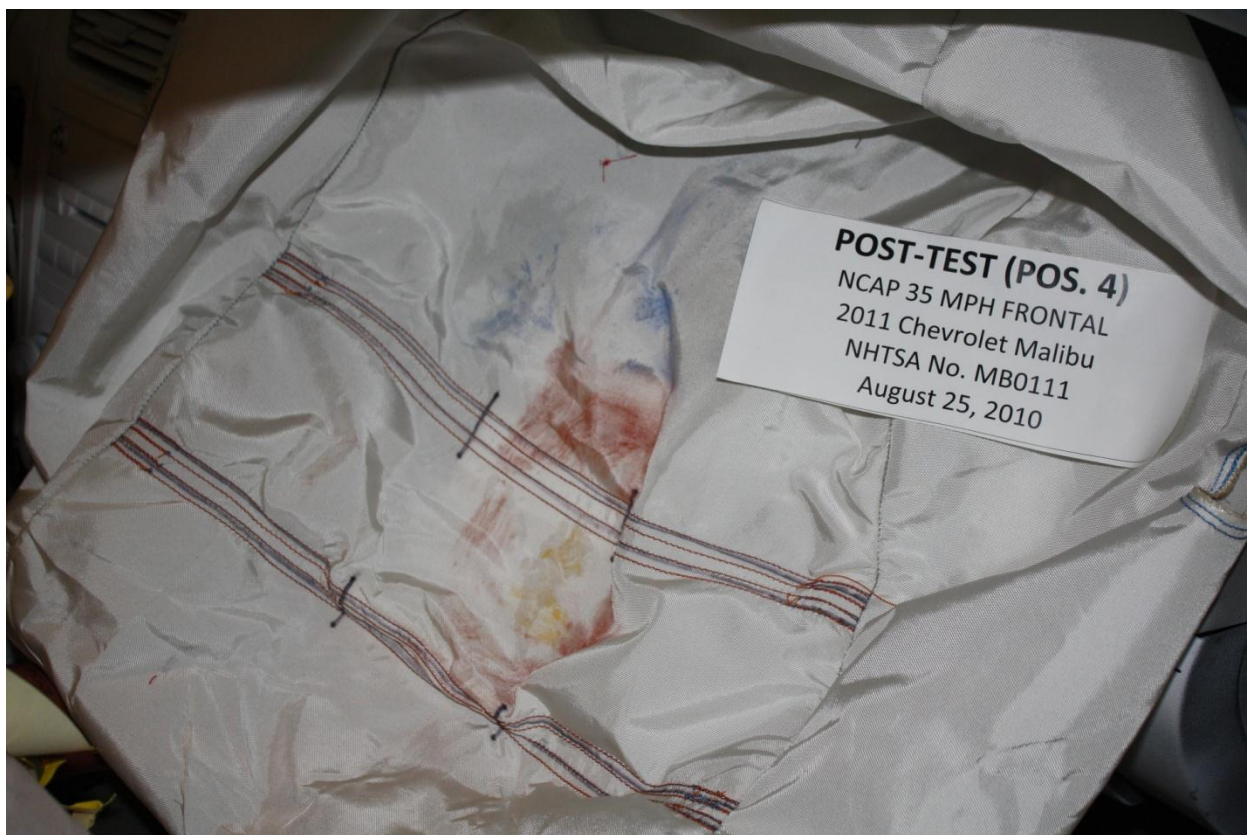


Figure A-60: Post-Test Passenger Dummy Contact with Airbag



Figure A-60a: Post-Test Passenger Dummy Contact with Head Restraint



Figure A-61: Photograph of Ballast Installed Vehicle

Photograph Not Available
No Solvent spillage

Figure A-62: Post-Test Stoddard Solvent Spillage Location View



Figure A-63: Post-Test Speed Trap Read Out

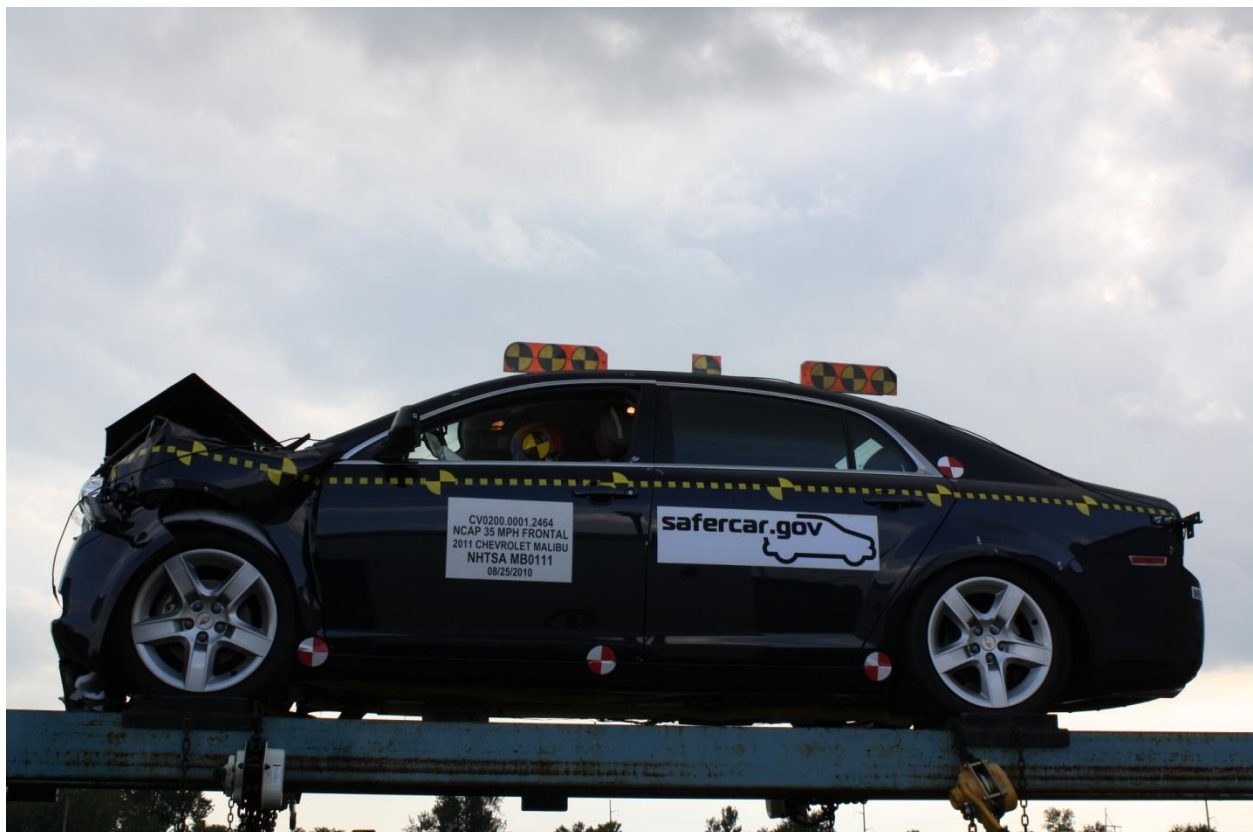


Figure A-64: Vehicle at 0° on Static Rollover Device



Figure A-65: Vehicle at 90° on Static Rollover Device



Figure A-66: Vehicle at 180° on Static Rollover Device



Figure A-67: Vehicle at 270° on Static Rollover Device



Figure A-68: Vehicle at 360° on Static Rollover Device



Figure A-69: Impact Photograph

CHEVROLET.		2011 MALIBU 1LS		EXTERIOR: IMPERIAL BLUE METALLIC INTERIOR: TITANIUM		ENGINE: 2.4L DOHC MFI TRANSMISSION: 6-SPEED AUTOMATIC													
74 STANDARD EQUIPMENT ITEMS LISTED BELOW ARE INCLUDED AT NO EXTRA CHARGE IN THE STANDARD MSRP (SEE SHOWROOM) 5 YEAR / 100,000 MILE POWERTRAIN LIMITED WARRANTY (SEE DEALER FOR DETAILS) MECHANICAL 2.4L ECOTEC DOHC VTEC 4CYL. ENG. - TRANSMISSION, 6 SPD AUTOMATIC - TAPSHIFT MANUAL SHIFT CONTROL 4-WHL INDEPENDENT SUSPENSION SAFETY & SECURITY - AIR BAGS, DUAL FRONTAL, PASSENGER SENSING SYSTEM, HEAD CURTAIN SIDE AIR BAGS, FRONT/OUTBOARD REAR, SIDE IMPACT AIR BAGS, DRIVER AND FRONT PASSENGER - ANTI-LOCK BRAKE SYSTEM, 4-WHEEL DISC - STABILITRAK STABILITY CONTROL		SYSTEM W/ TRACTION CONTROL - REAR CHILD SEAT LATCH SYSTEM 6 MTHS ONSTAR DIRECTIONS & CONNECTIONS WITH AUTOMATIC CRASH RESPONSE AND TURN-BY-TURN NAVIGATION (ASK DEALER ABOUT GEOGRAPHIC COVERAGE) EXTERIOR 17" FASCIA SPOKE WHEELS - TOURING TIRES - POWER OUTSIDE MIRRORS, FOLDING, BLACK INTERIOR - AIR CONDITIONING - POWER DOOR LOCKS - POWER WINDOWS, DRIVER EXPRESS DOWN - POWER TRUNK RELEASE - AM/FM STEREO W/ CD PLAYER - XM RADIO - SERVICE SUBSCRIPTION SOLD SEPARATELY BY SIRIUSXM AFTER 3 MONTHS		OPTIONS & PRICING MANUFACTURER'S SUGGESTED RETAIL PRICE <table border="1"> <tr> <td>STANDARD VEHICLE PRICE</td> <td>\$21,975.00</td> </tr> <tr> <td>OPTIONAL EQUIPMENT (SEE DEALER FOR DETAILS)</td> <td>\$0.00</td> </tr> <tr> <td>SPARE TIRE & WHEEL NOT DESIRED</td> <td>INC.</td> </tr> <tr> <td>TOTAL OPTIONS</td> <td>\$0.00</td> </tr> <tr> <td>TOTAL VEHICLE & OPTIONS</td> <td>\$21,975.00</td> </tr> </table>		STANDARD VEHICLE PRICE	\$21,975.00	OPTIONAL EQUIPMENT (SEE DEALER FOR DETAILS)	\$0.00	SPARE TIRE & WHEEL NOT DESIRED	INC.	TOTAL OPTIONS	\$0.00	TOTAL VEHICLE & OPTIONS	\$21,975.00	Visit us at www.chevy.com DESTINATION CHARGE 720.00 TOTAL VEHICLE PRICE* \$22,695.00 Rec 7/22 74 miles MB0111			
STANDARD VEHICLE PRICE	\$21,975.00																		
OPTIONAL EQUIPMENT (SEE DEALER FOR DETAILS)	\$0.00																		
SPARE TIRE & WHEEL NOT DESIRED	INC.																		
TOTAL OPTIONS	\$0.00																		
TOTAL VEHICLE & OPTIONS	\$21,975.00																		
EPA Fuel Economy Estimates <table border="1"> <tr> <td>CITY MPG</td> <td>22</td> <td>Expected range for most drivers 18 to 26 MPG</td> </tr> <tr> <td>Estimated Annual Fuel Cost</td> <td>\$1,502</td> <td>based on 15,000 miles at \$2.60 per gallon</td> </tr> <tr> <td>Highway MPG</td> <td>33</td> <td>Expected range for most drivers 27 to 39 MPG</td> </tr> <tr> <td>Combined Fuel Economy</td> <td>26</td> <td>Your actual mileage will vary depending on how you drive and maintain your vehicle.</td> </tr> </table> See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov				CITY MPG	22	Expected range for most drivers 18 to 26 MPG	Estimated Annual Fuel Cost	\$1,502	based on 15,000 miles at \$2.60 per gallon	Highway MPG	33	Expected range for most drivers 27 to 39 MPG	Combined Fuel Economy	26	Your actual mileage will vary depending on how you drive and maintain your vehicle.	GOVERNMENT SAFETY RATINGS This vehicle has not been rated by the government for frontal crash, side crash or rollover risk. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4236		PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 75% NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS. FOR THIS VEHICLE: FINAL ASSEMBLY POINT: KANSAS CITY, KS U.S.A. COUNTRY OF ORIGIN: ENGINE: UNITED STATES TRANSMISSION: MEXICO SALES CODE E SALES MODEL CODE 12569 VIN 1G1ZB5E10BF110751 DEALER TO WHOM DELIVERED: PADDOCK CHEVROLET, INC. 3532 DELAWARE AVE KENNEMORE, NY 14217-1798 UL 1AG1410783	
CITY MPG	22	Expected range for most drivers 18 to 26 MPG																	
Estimated Annual Fuel Cost	\$1,502	based on 15,000 miles at \$2.60 per gallon																	
Highway MPG	33	Expected range for most drivers 27 to 39 MPG																	
Combined Fuel Economy	26	Your actual mileage will vary depending on how you drive and maintain your vehicle.																	

Figure A-70: Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

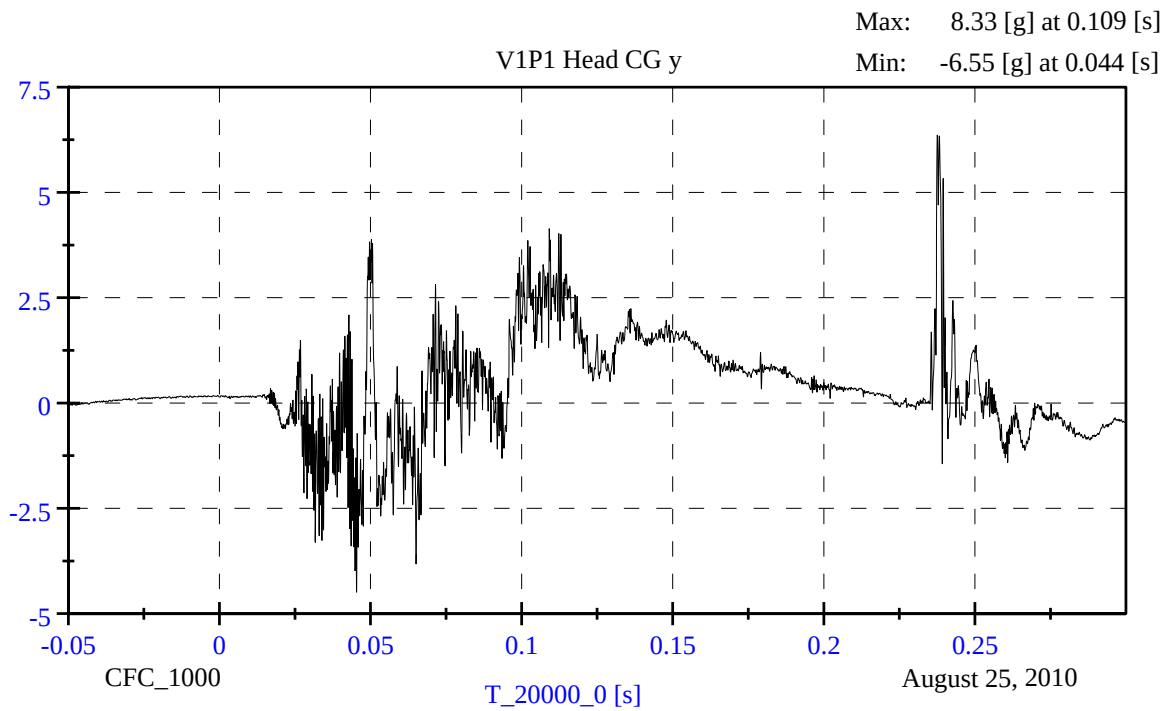
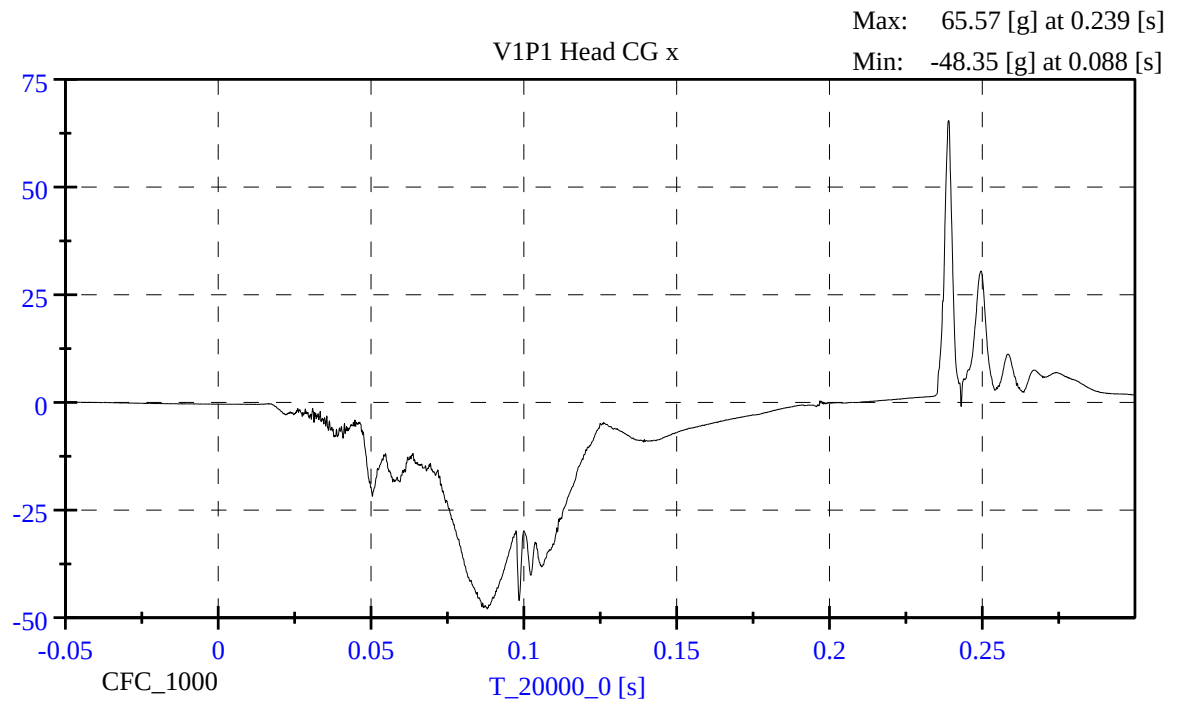
Fig. No.	List of Data Plots Provided In The Test Report	Page No.
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection vs. Time	B-7
6	Driver Chest X Acceleration vs. Time Primary	B-7
7	Driver Chest Y Acceleration vs. Time Primary	B-8
8	Driver Chest Z Acceleration vs. Time Primary	B-8
9	Driver Chest Resultant Acceleration vs. Time Primary	B-9
10	Driver Upper Neck Force X vs. Time Primary	B-9
11	Driver Upper Neck Force Z vs. Time Primary	B-10
12	Driver Upper Neck Moment Y vs. Time Primary	B-10
13	Driver Nij vs. Time Primary	B-11
14	Driver Left Femur Force vs. Time	B-11
15	Driver Right Femur Force vs. Time	B-12
16	Passenger Head X Acceleration vs. Time Primary	B-12
17	Passenger Head Y Acceleration vs. Time Primary	B-13
18	Passenger Head Z Acceleration vs. Time Primary	B-13
19	Passenger Head Resultant Acceleration vs. Time Primary	B-14
20	Passenger Chest X Deflection vs. Time	B-14
21	Passenger Chest X Acceleration vs. Time Primary	B-15
22	Passenger Chest Y Acceleration vs. Time Primary	B-15
23	Passenger Chest Z Acceleration vs. Time Primary	B-16
24	Passenger Chest Resultant Acceleration vs. Time Primary	B-16
25	Passenger Upper Neck Force X vs. Time Primary	B-17
26	Passenger Upper Neck Force Z vs. Time Primary	B-17
27	Passenger Upper Neck Moment Y vs. Time Primary	B-18
28	Passenger Nij vs. Time Primary	B-18

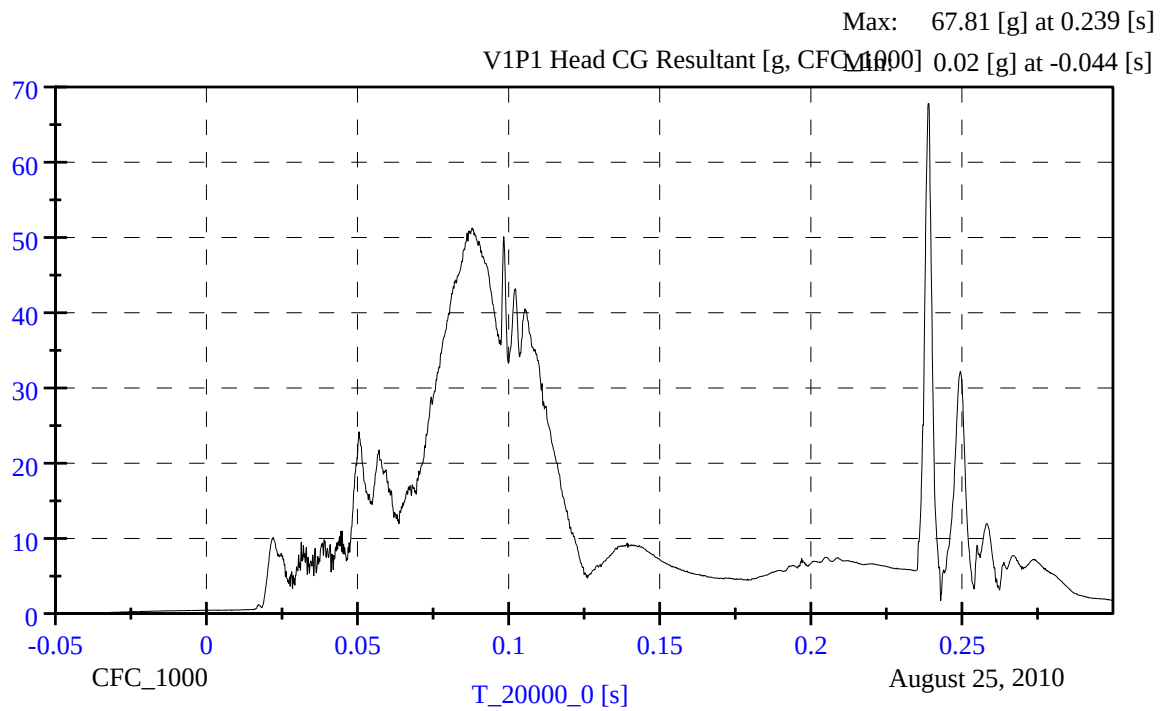
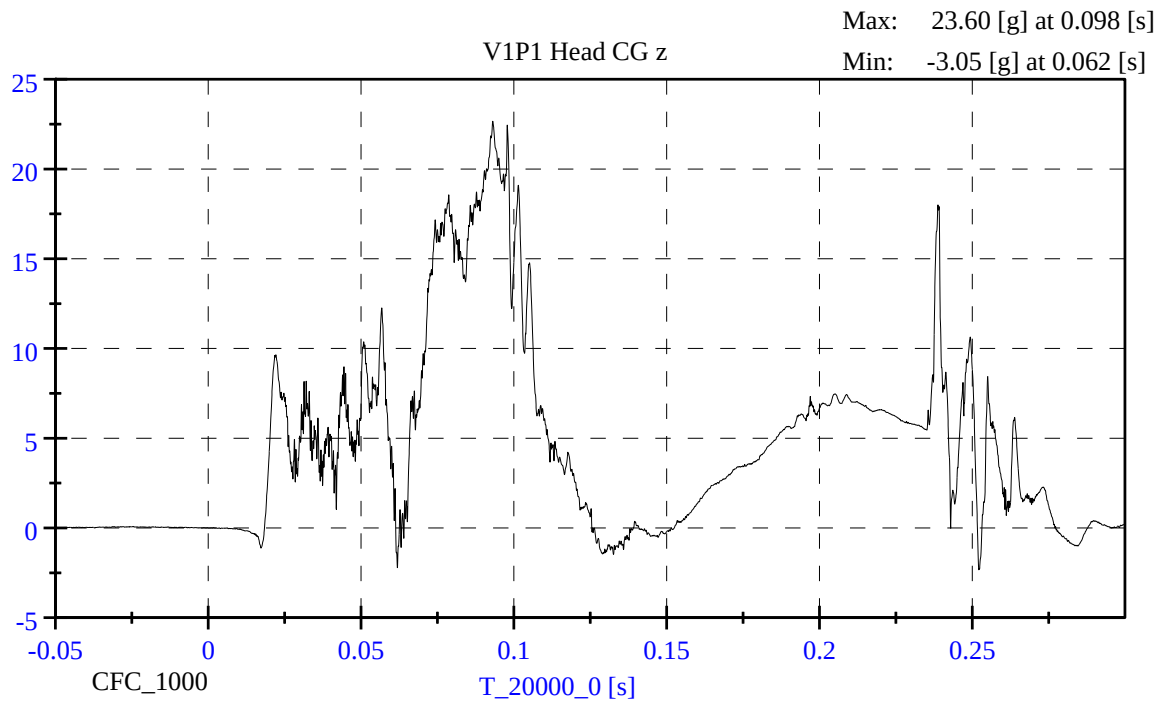
29	Passenger Left Femur Force vs. Time	B-19
30	Passenger Right Femur Force vs. Time	B-19

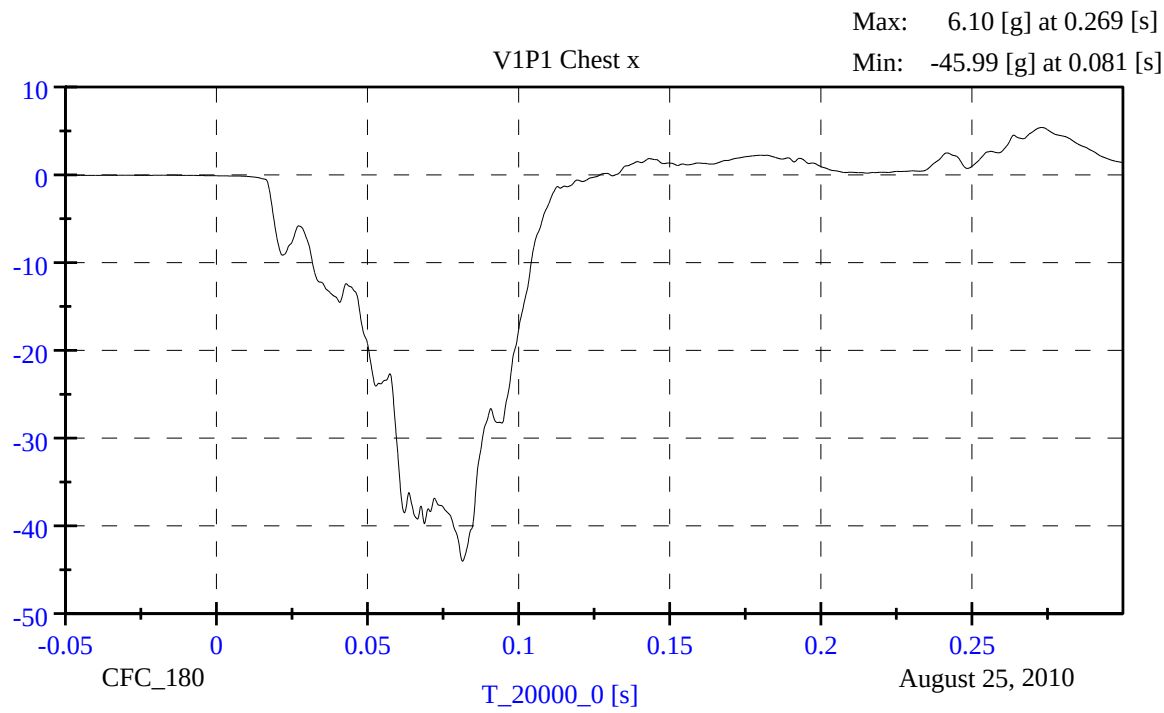
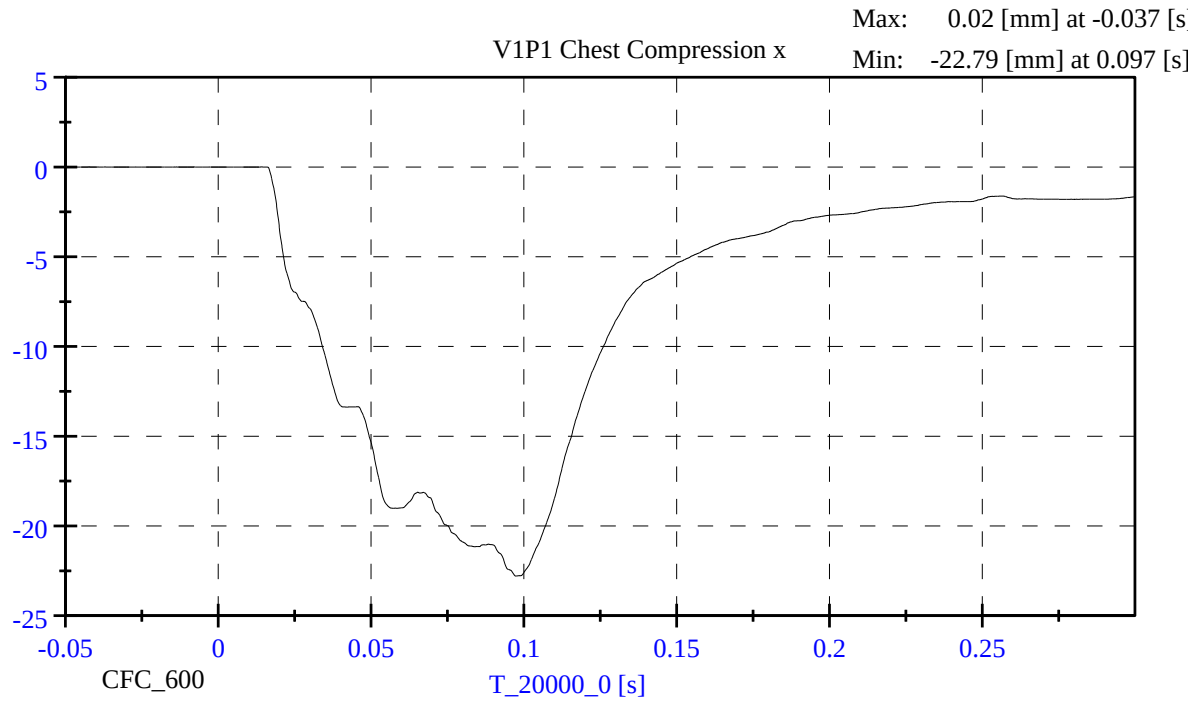
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

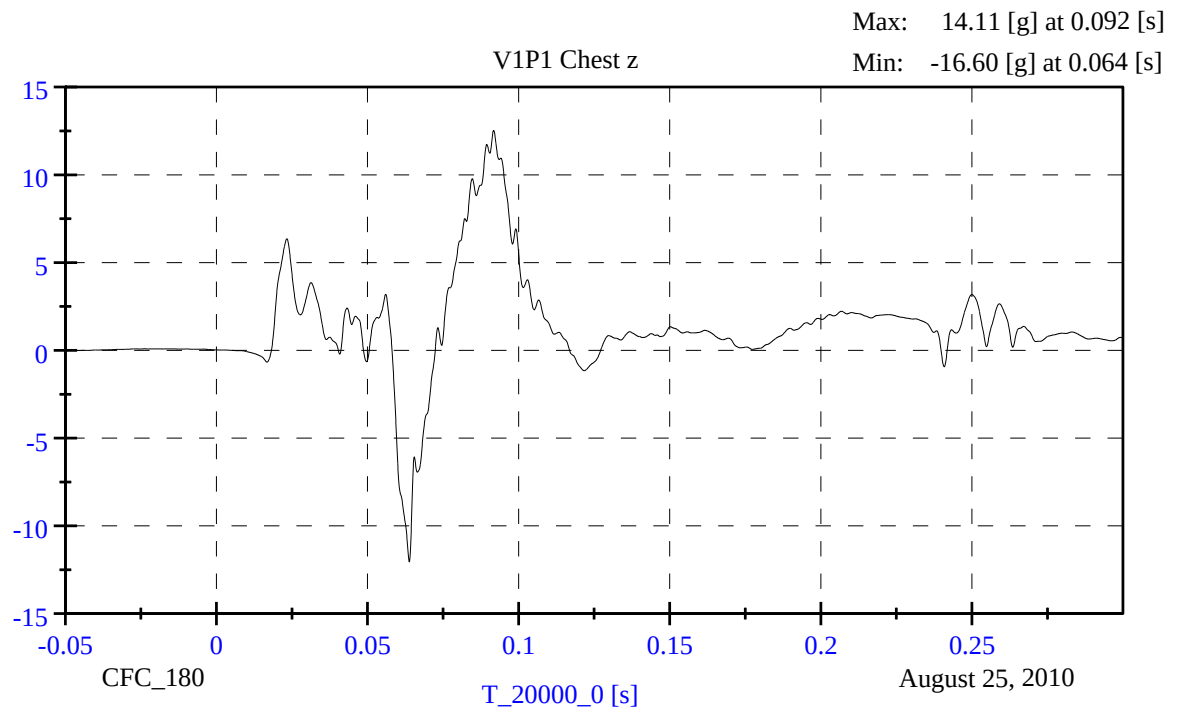
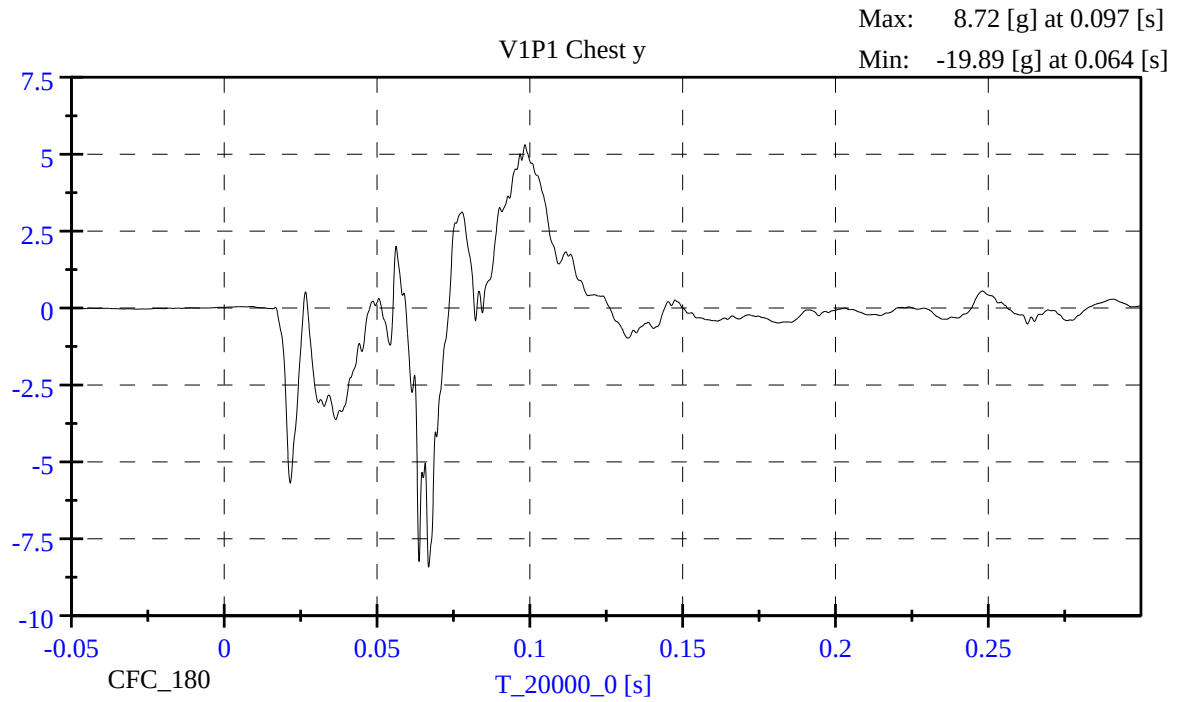
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 Driver Head Y Acceleration Redundant
 Driver Head Z Acceleration Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Acceleration Redundant
 Driver Chest Y Acceleration Redundant
 Driver Chest 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

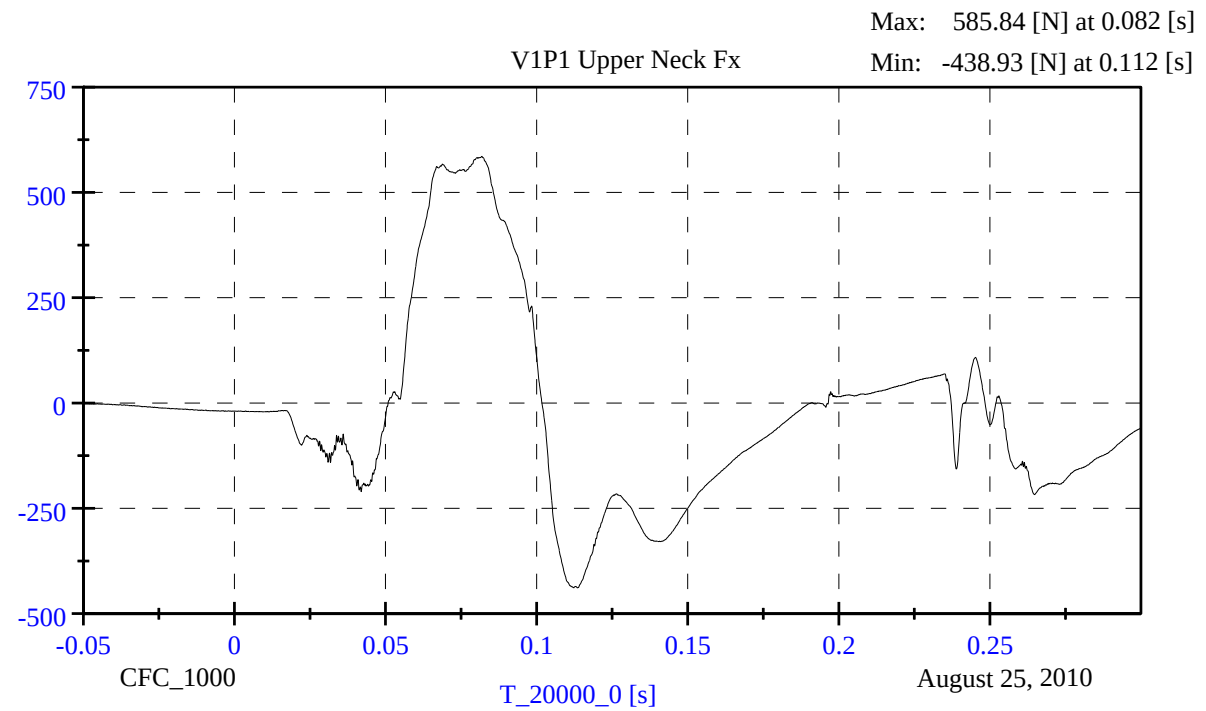
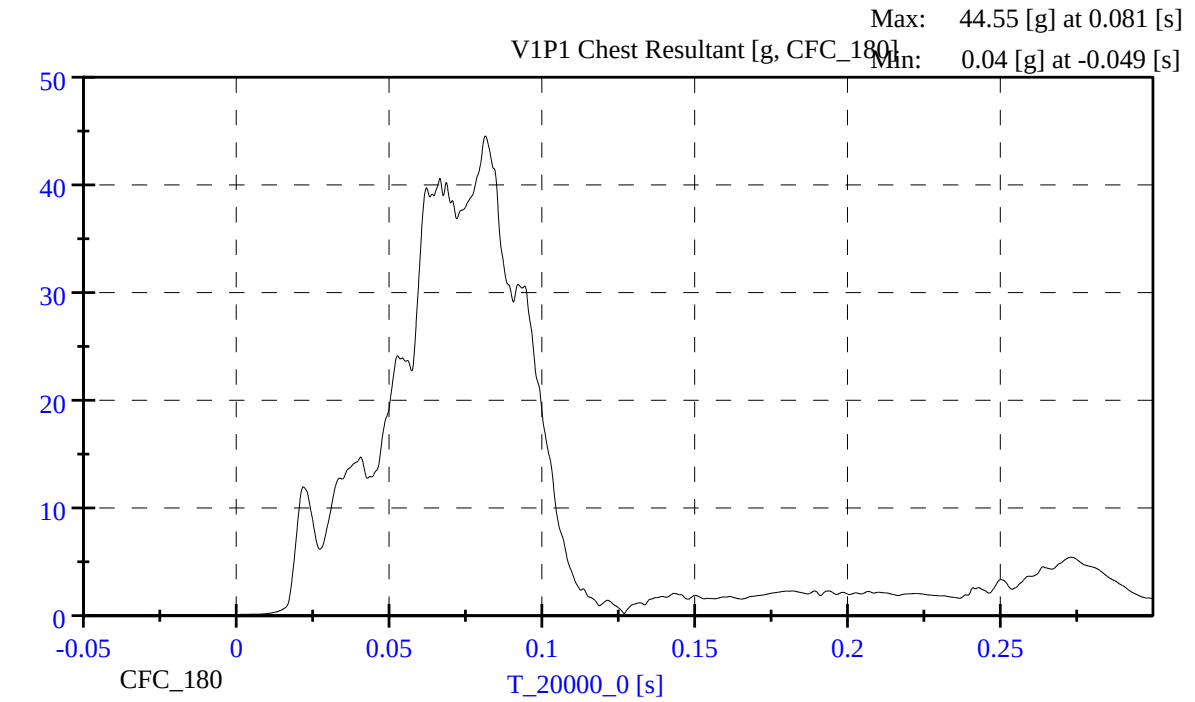
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right 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
Load Cell Barrier A1-A9
Load Cell Barrier B1-A9
Load Cell Barrier C1-A9
Load Cell Barrier D1-A9

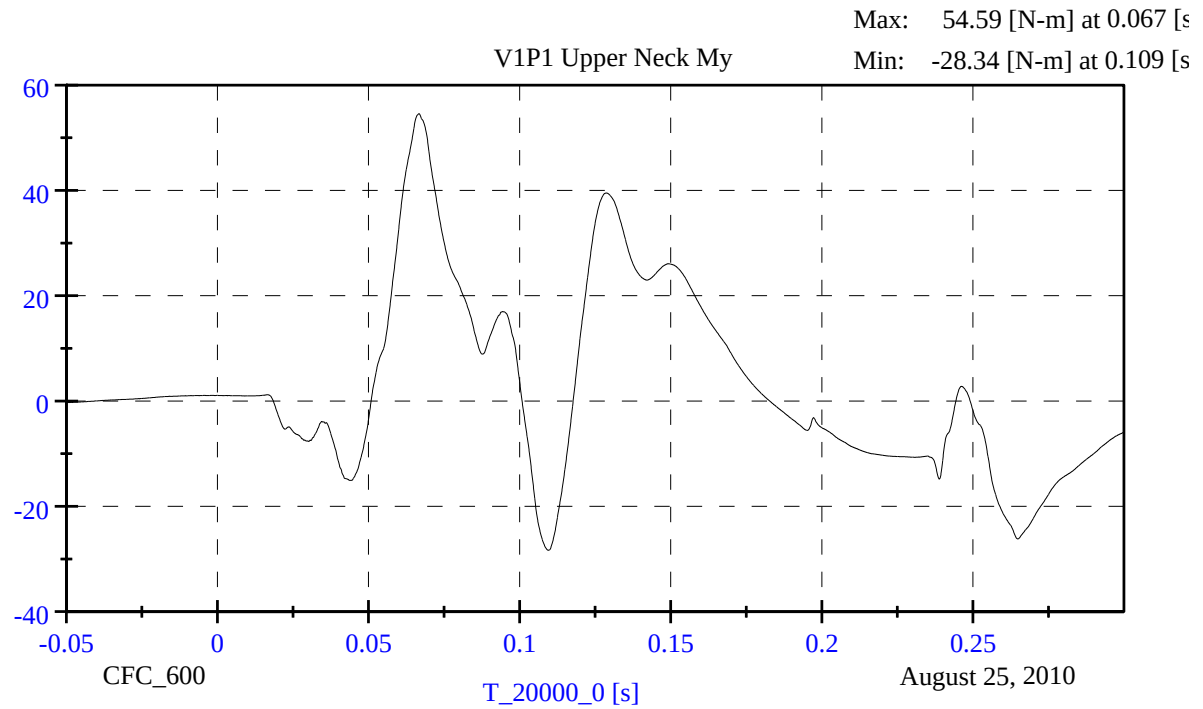
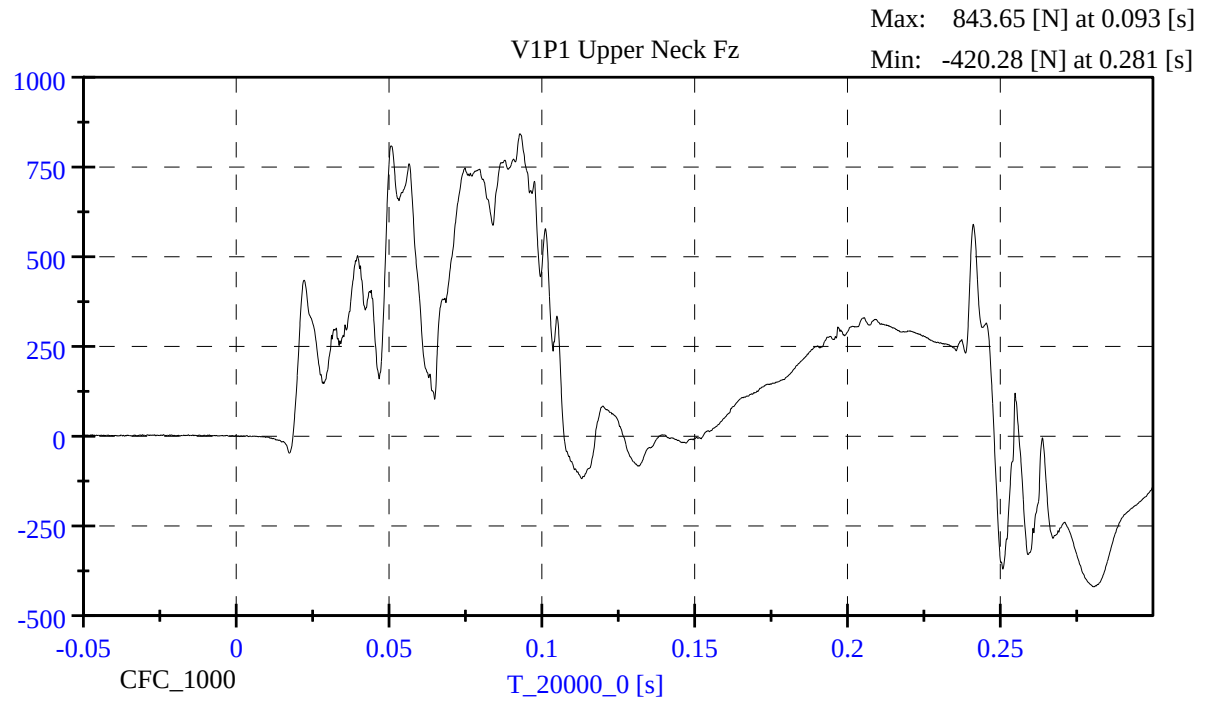


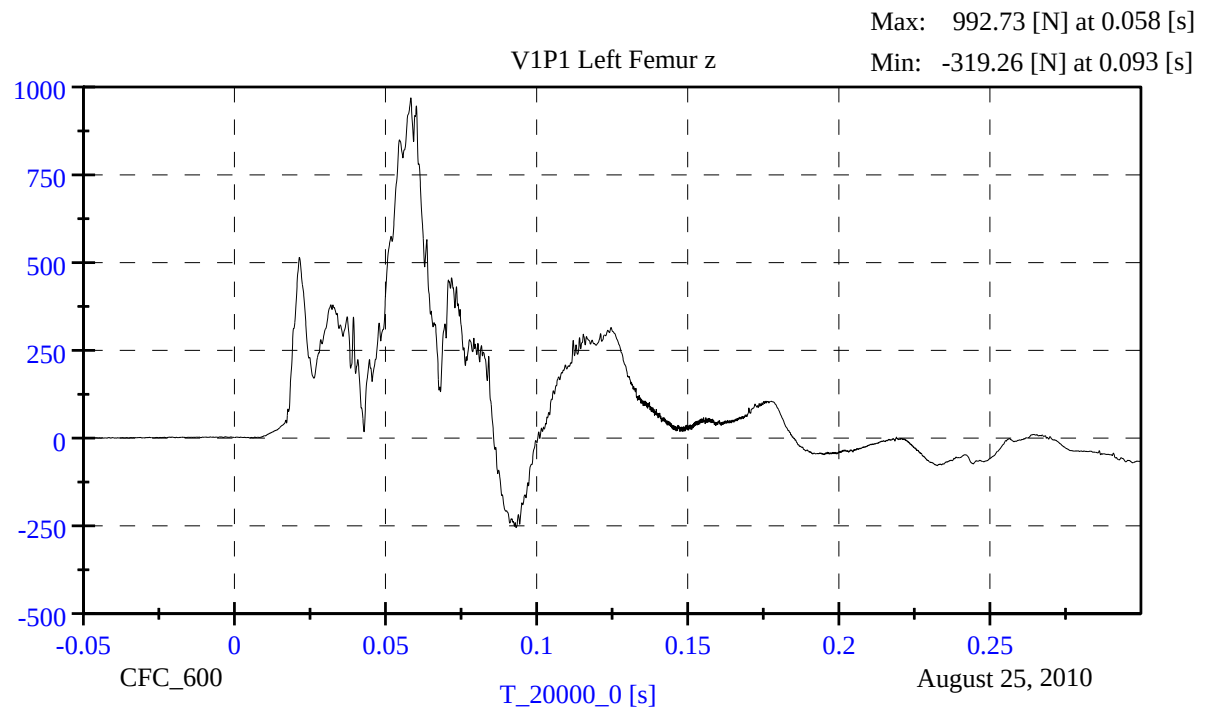
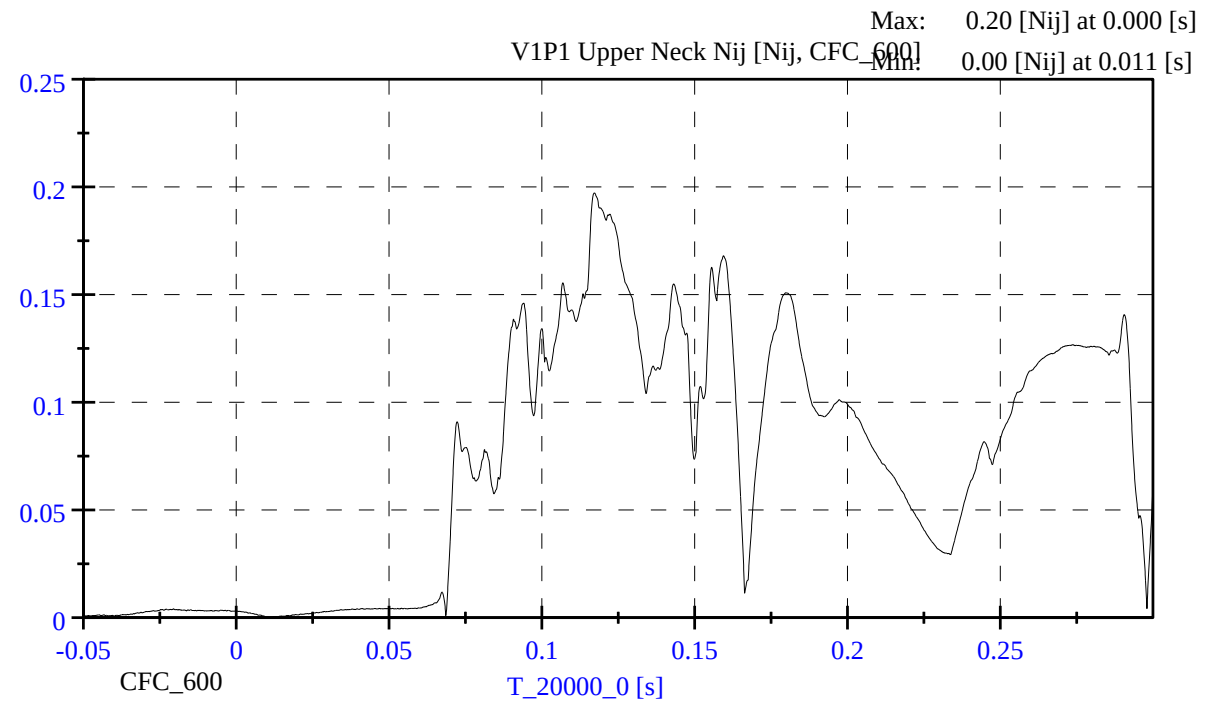


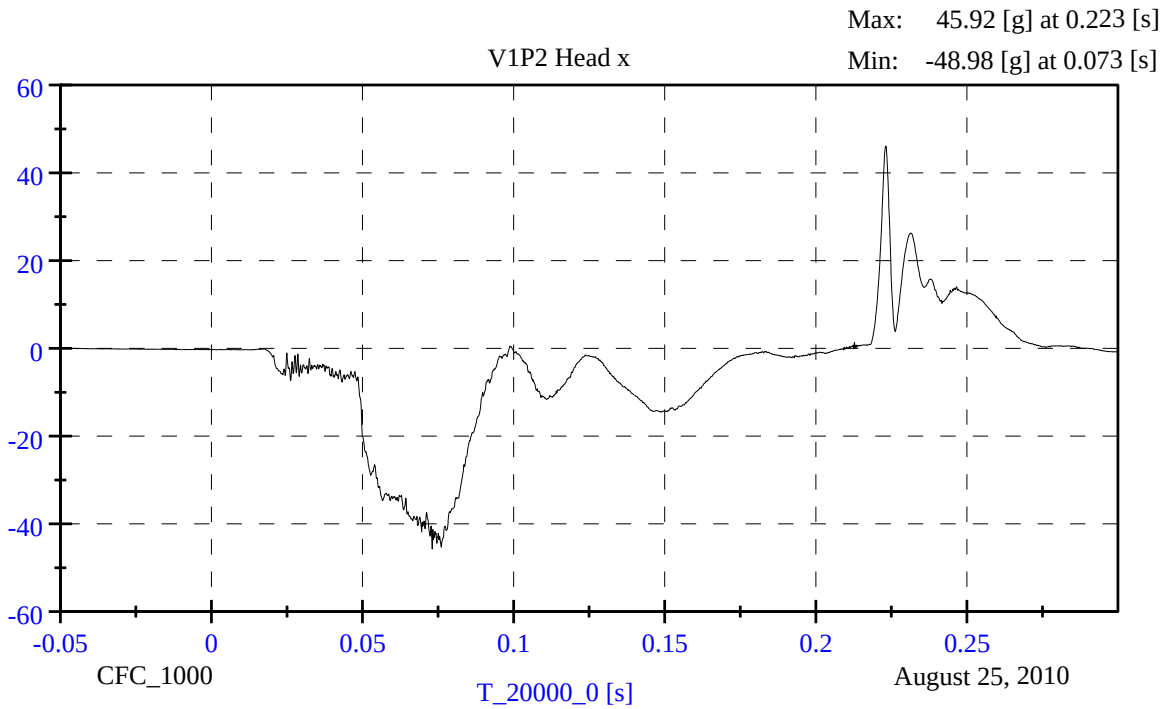
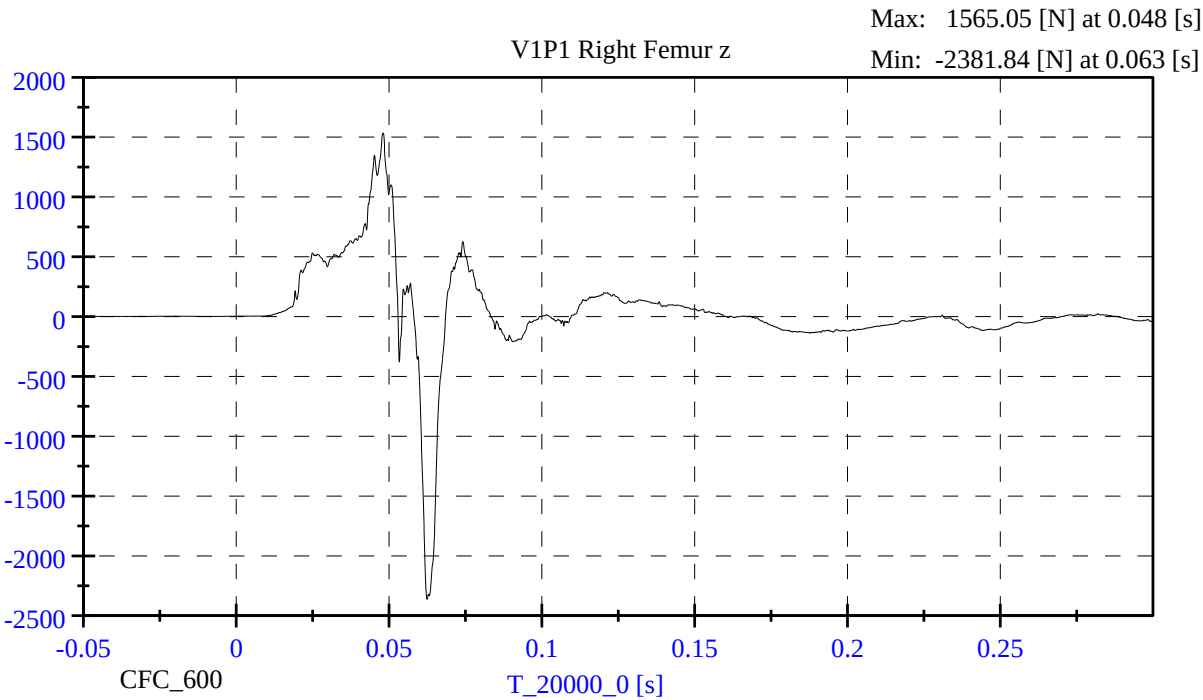


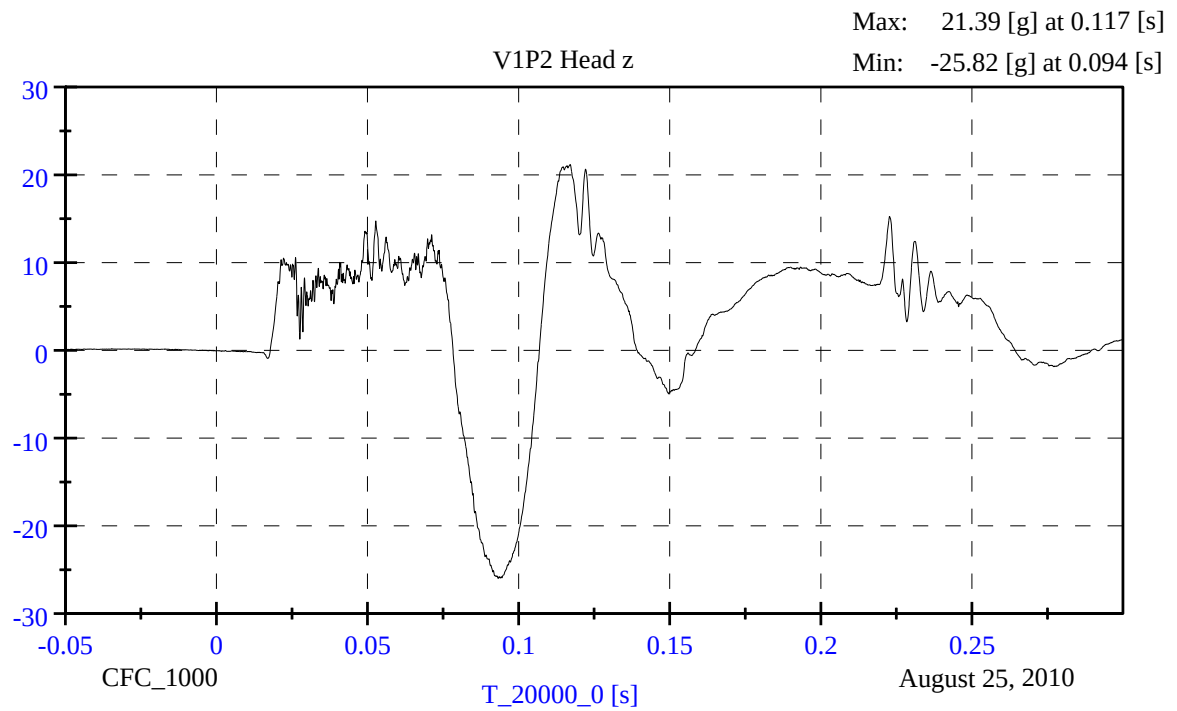
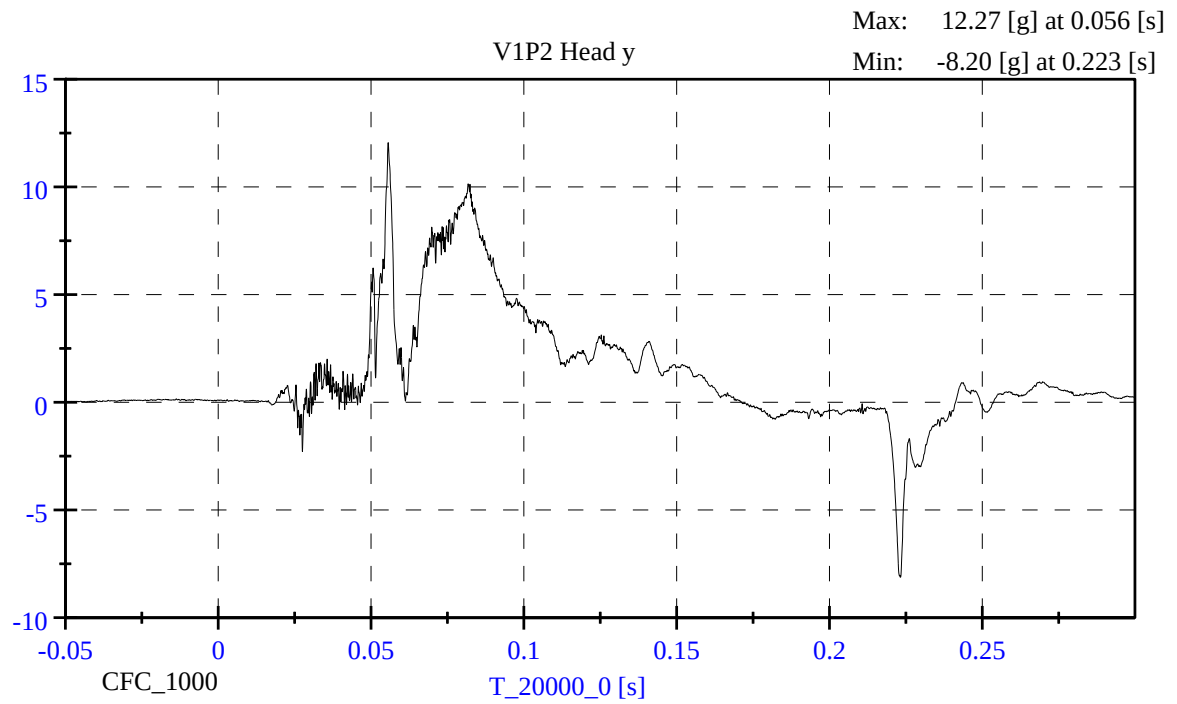


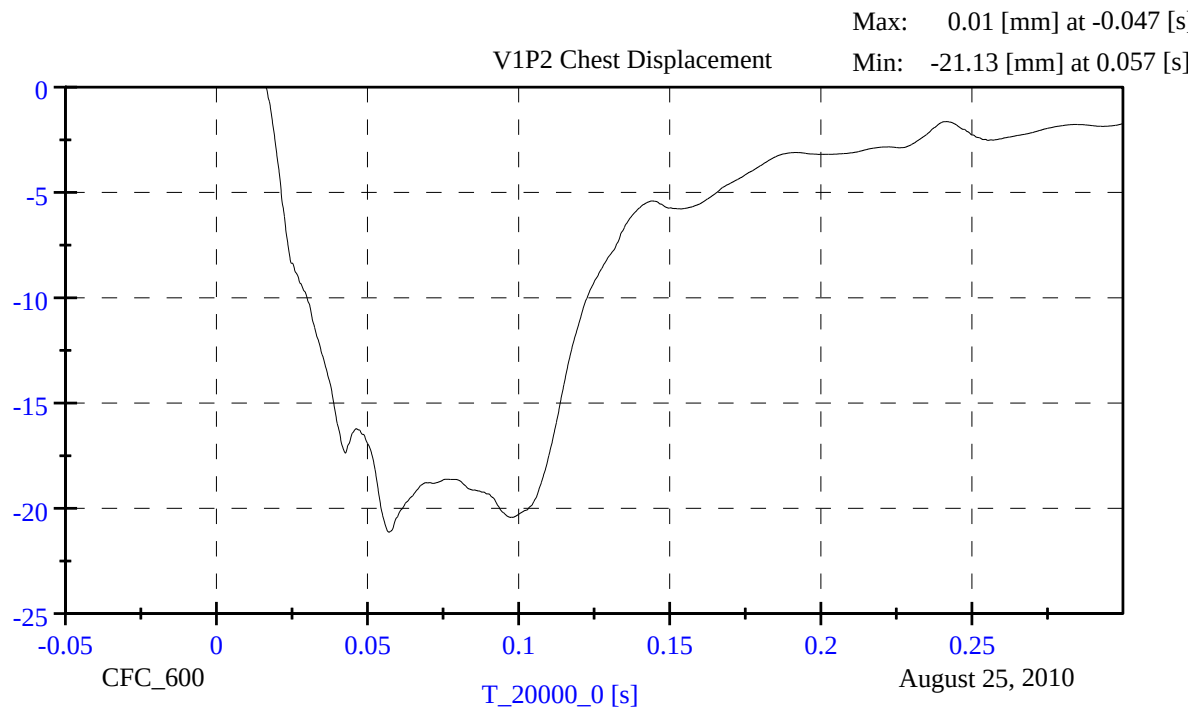
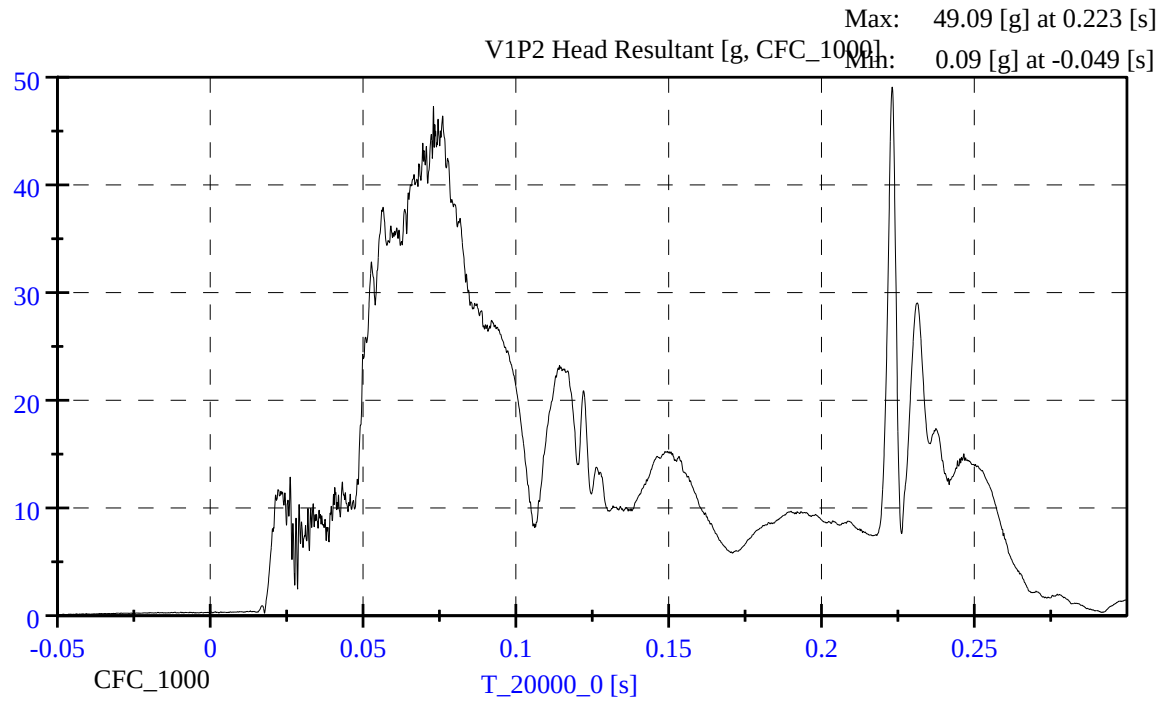


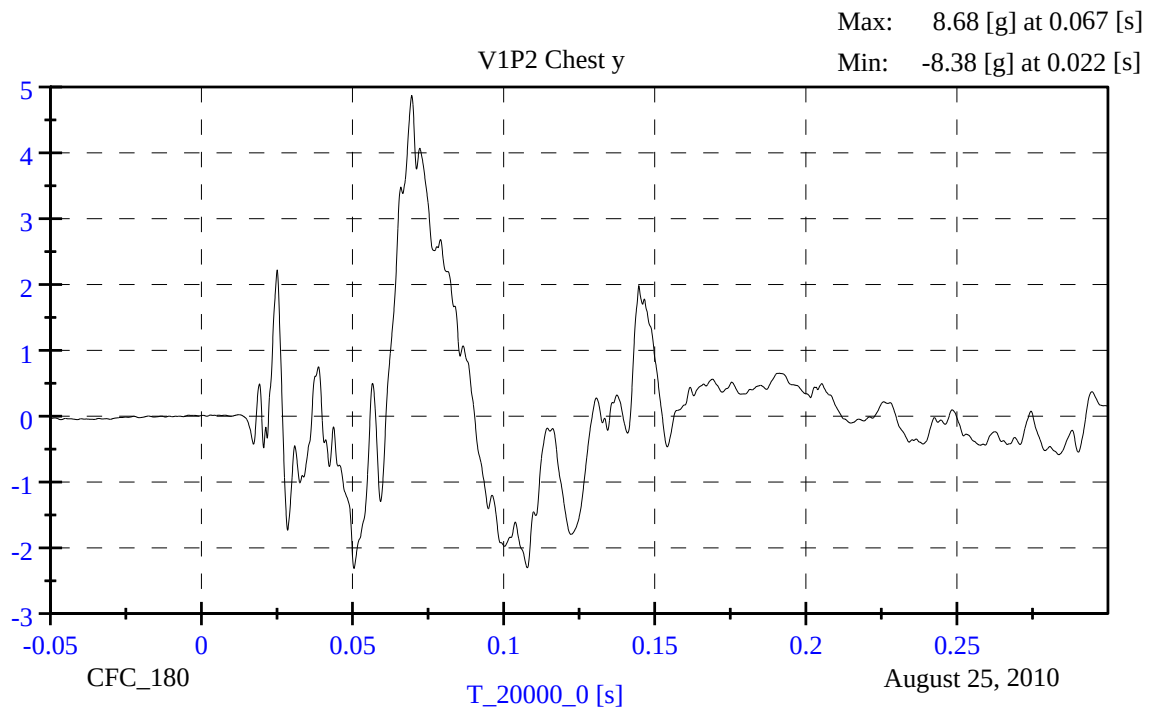
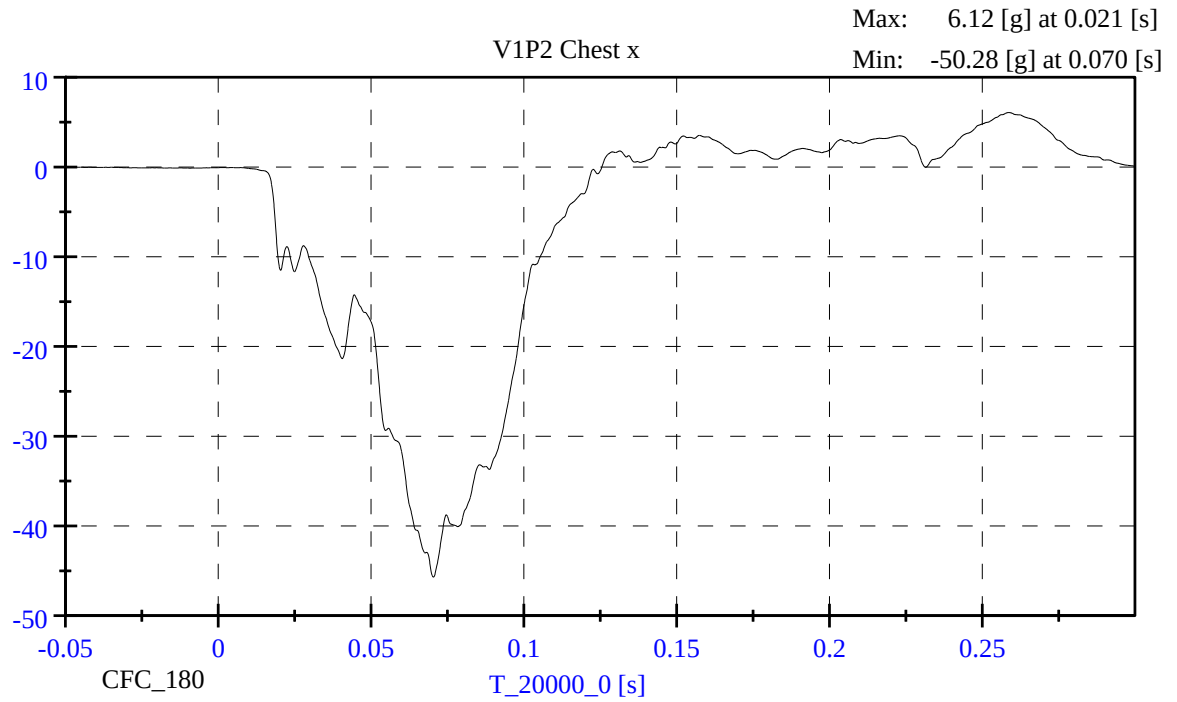


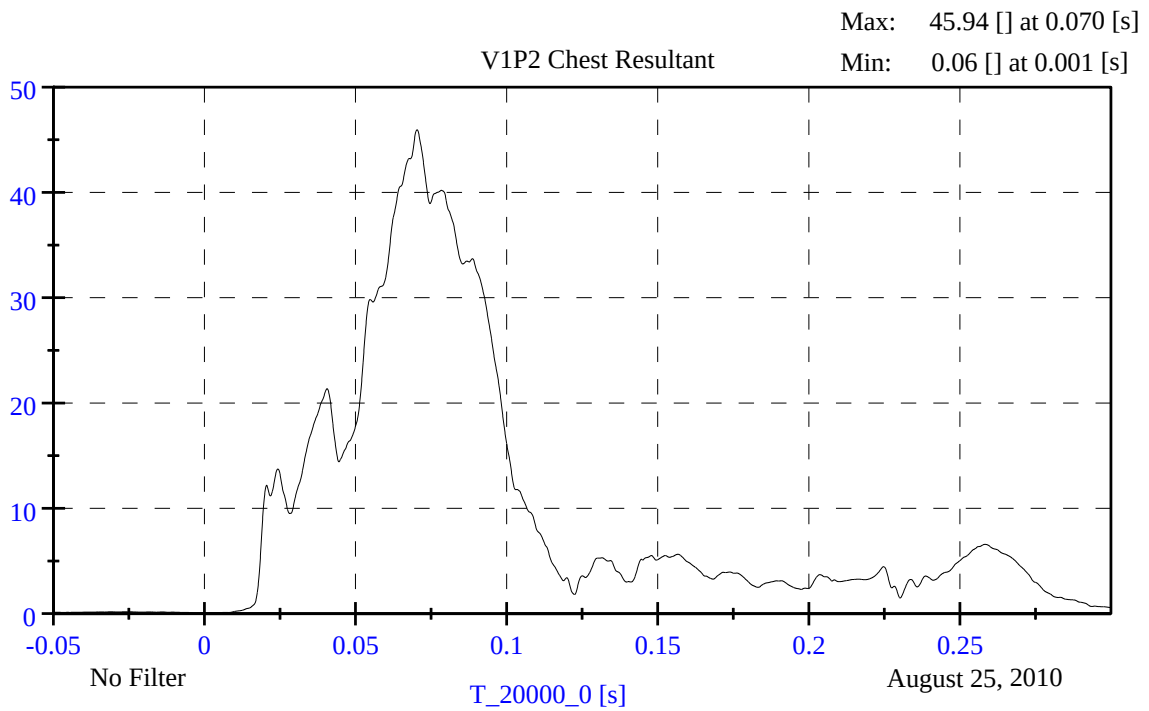
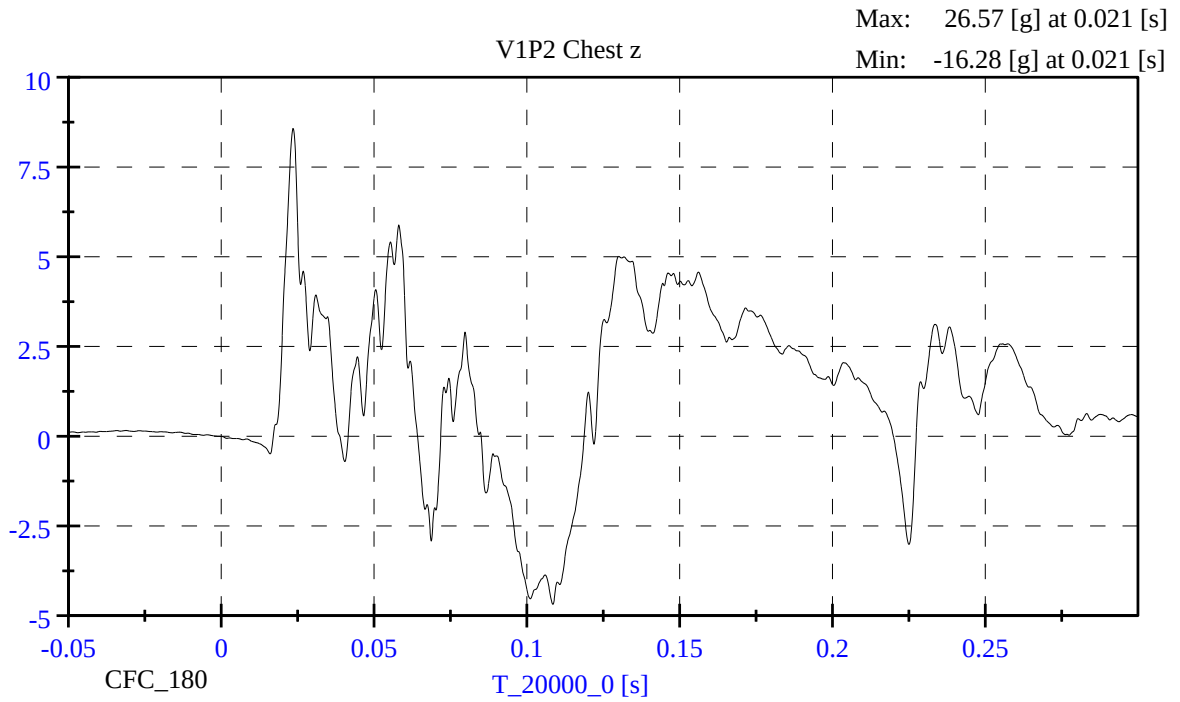


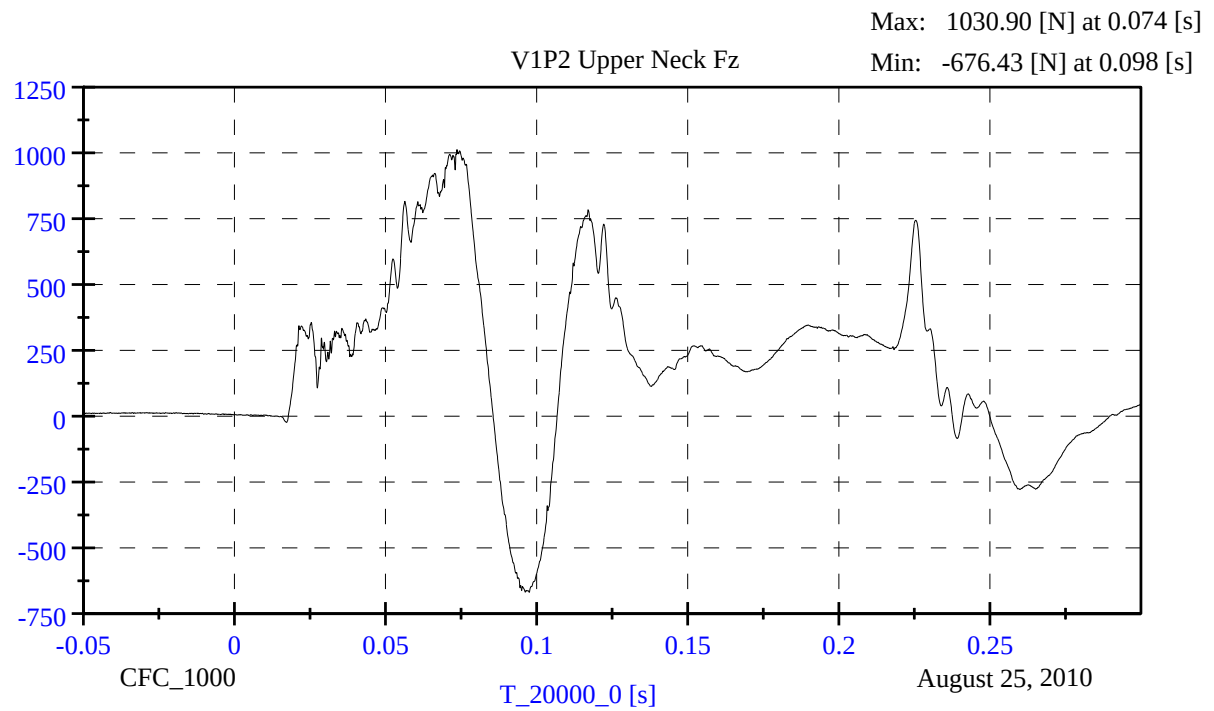
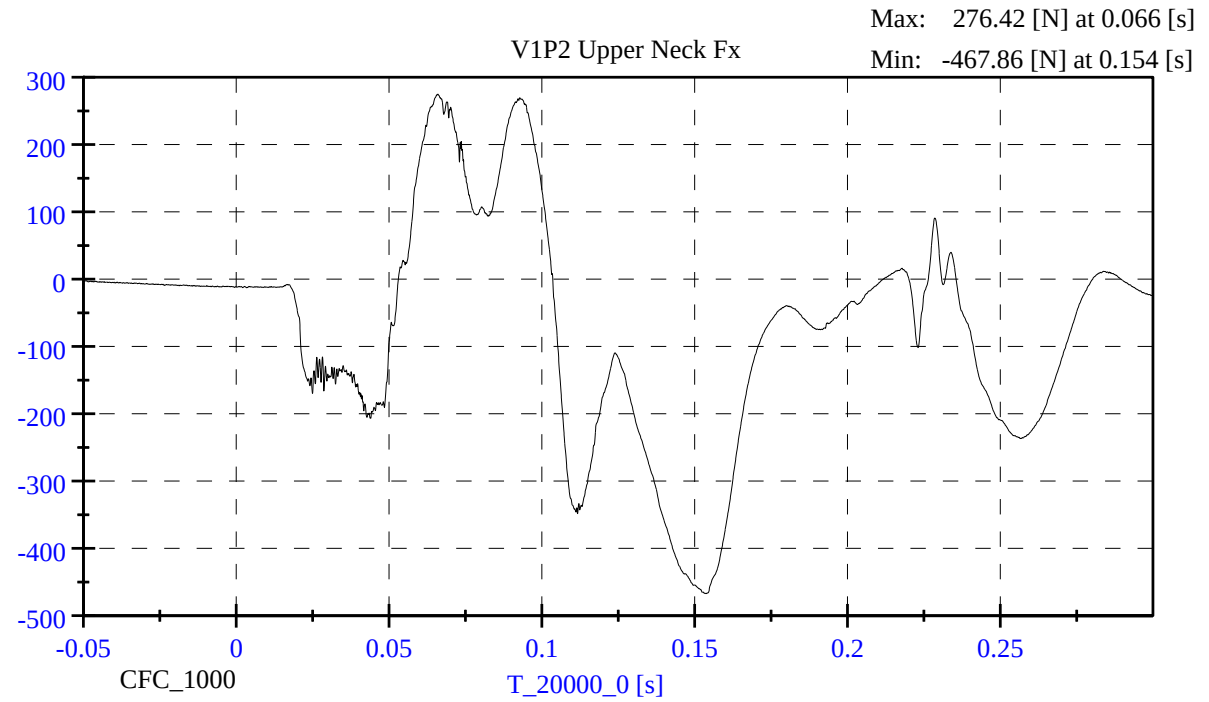


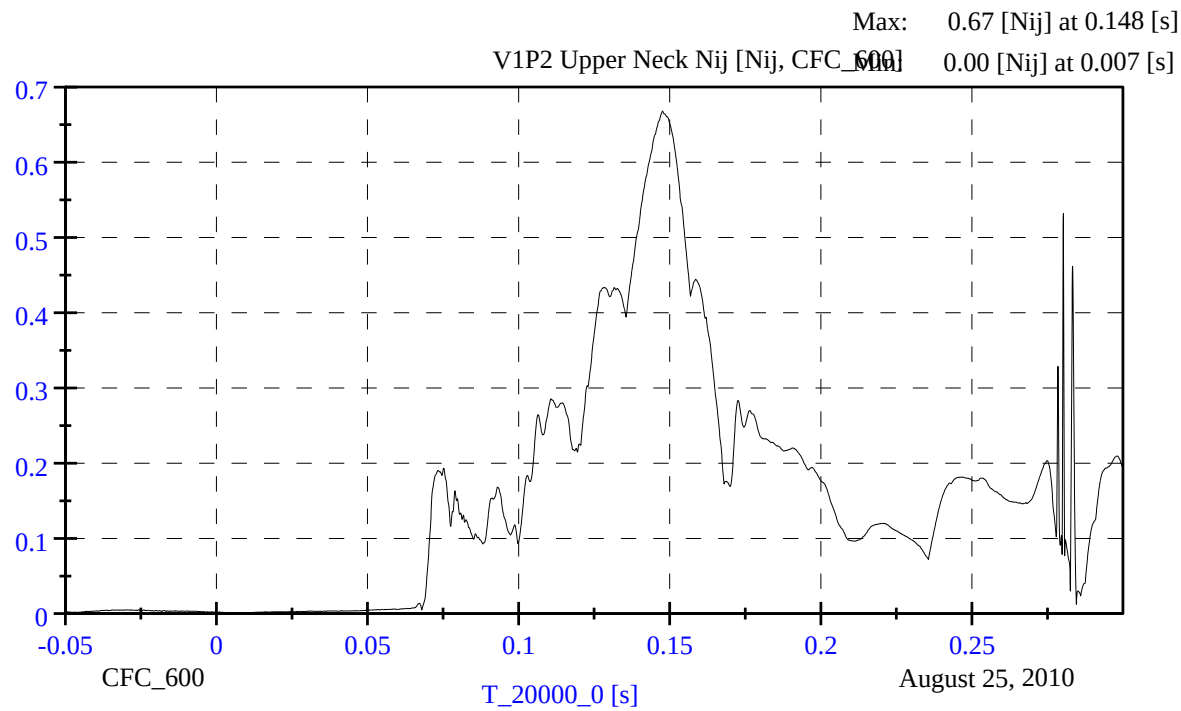
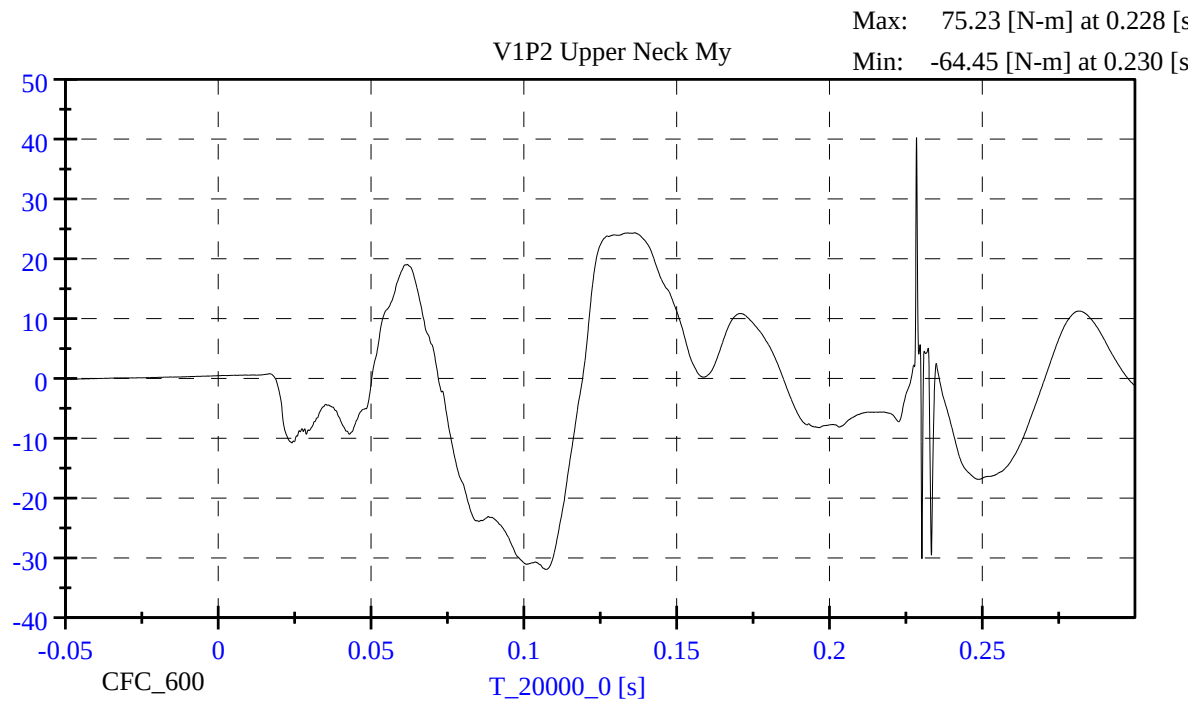


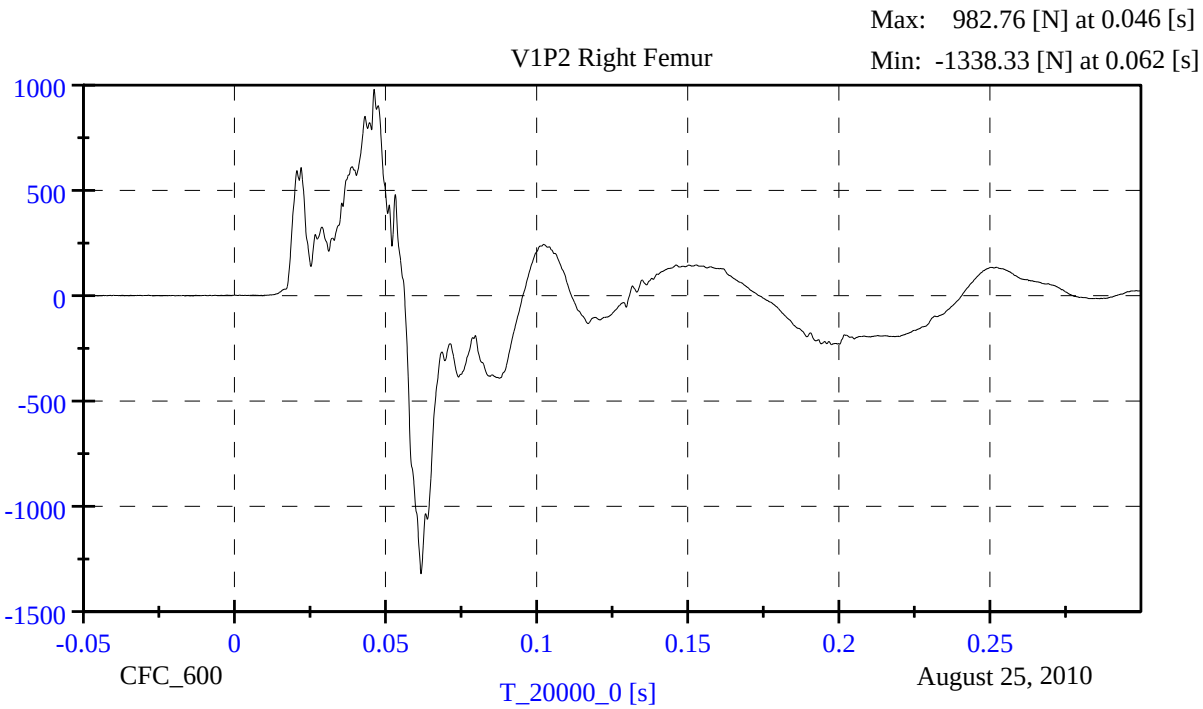
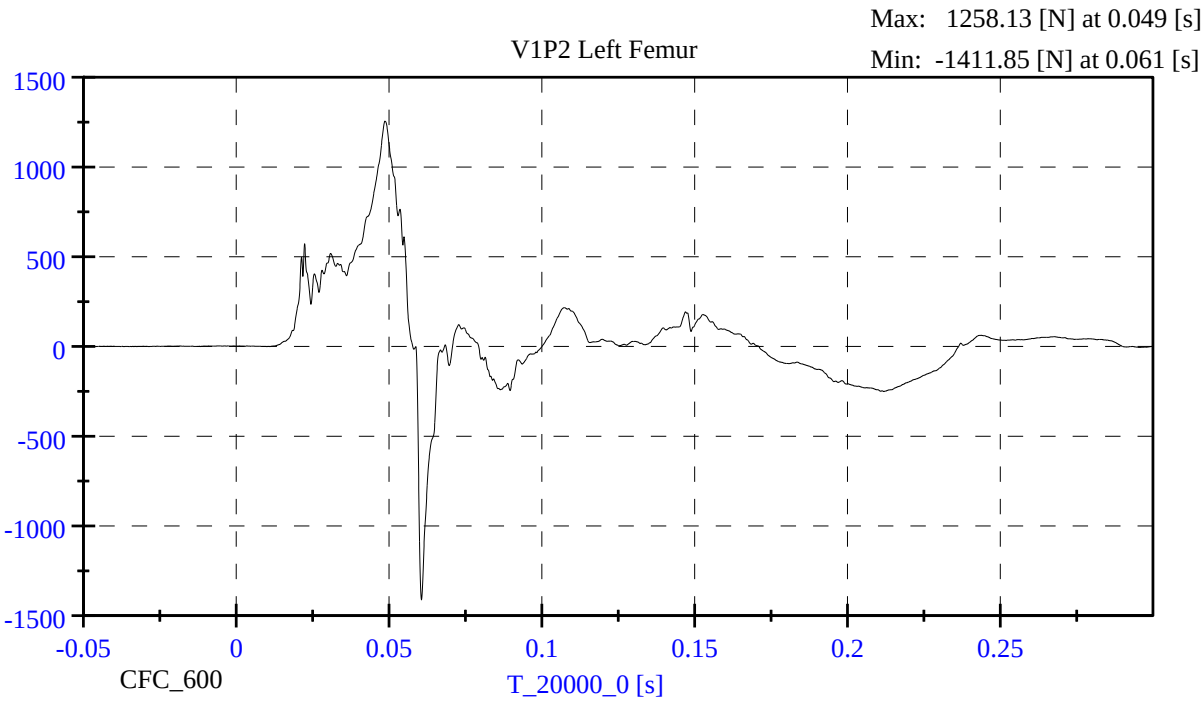












APPENDIX C

PART 572 E/O DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA SHEETS

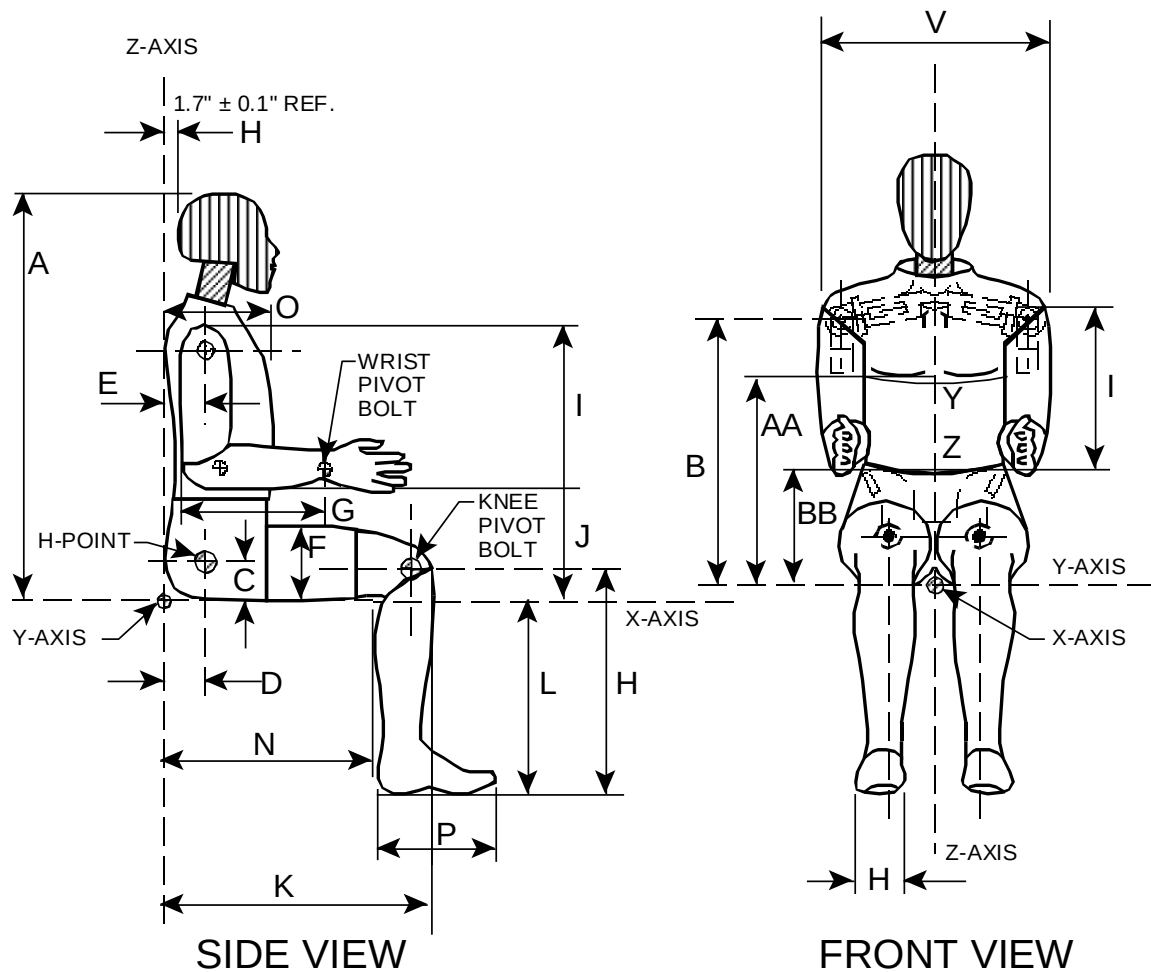
The tests were conducted at the Dummy Certification Test Facility of Calspan. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	061	
#2/Right Front Passenger	273	

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



NOTE: Figure is referenced to the erect seated position. The curved lumbar does not allow the Hybrid III to be positioned in a perfect erect attitude.
(REF: S572.31(A)(6))

CALIBRATION TEST RESULTS

PRE-TEST

DRIVER DUMMY

S/N: 061

50th Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	2.04	Yes
C	H-Point Height	3.3 - 3.5	3.5	Yes
D	H-Point from Backline	5.3 - 5.5	5.3	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.7	Yes
F	Thigh Clearance	5.5 - 6.1	6.1	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.2	Yes
J	Elbow Rest Height	7.5 - 8.3	8.0	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.4	Yes
L	Popliteal Height	16.9 - 17.9	17.5	Yes
M	Knee Pivot Height	19.1 - 19.7	19.2	Yes
N	Buttock Popliteal Length	17.8 - 18.8	18.7	Yes
O	Chest Depth without Jacket	8.4 - 9.0	8.5	Yes
P	Foot Length (right)	9.9 - 10.5	10.1	Yes
V	Shoulder Breadth	16.3 - 17.2	16.8	Yes
W	Foot Breadth	3.6 - 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.5	Yes
Z	Waist Circumference	32.9 - 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician : A. Rudniski

Date: 08/18/2010



www.calspan.com

Calspan - Transportation Research Group

4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	8/18/2010
Test Number:	1	Test Time:	5:47:13 PM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	50 %RH P
Resultant Acceleration	225 -- 275	254 g P
Oscillation	0.0 -- 10.0	7.9 % P
Lateral Acceleration	-15.00 -- 15.00	9.48 g P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Head Drop**

Test Time: **5:47:13 PM**

Test Date: **8/18/2010**



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4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66931	4/20/2010
Endevco	7264-2000	P66926	4/20/2010

Test ID: **Head Drop**

Test Time: **5:47:13 PM**

Test Date: **8/18/2010**

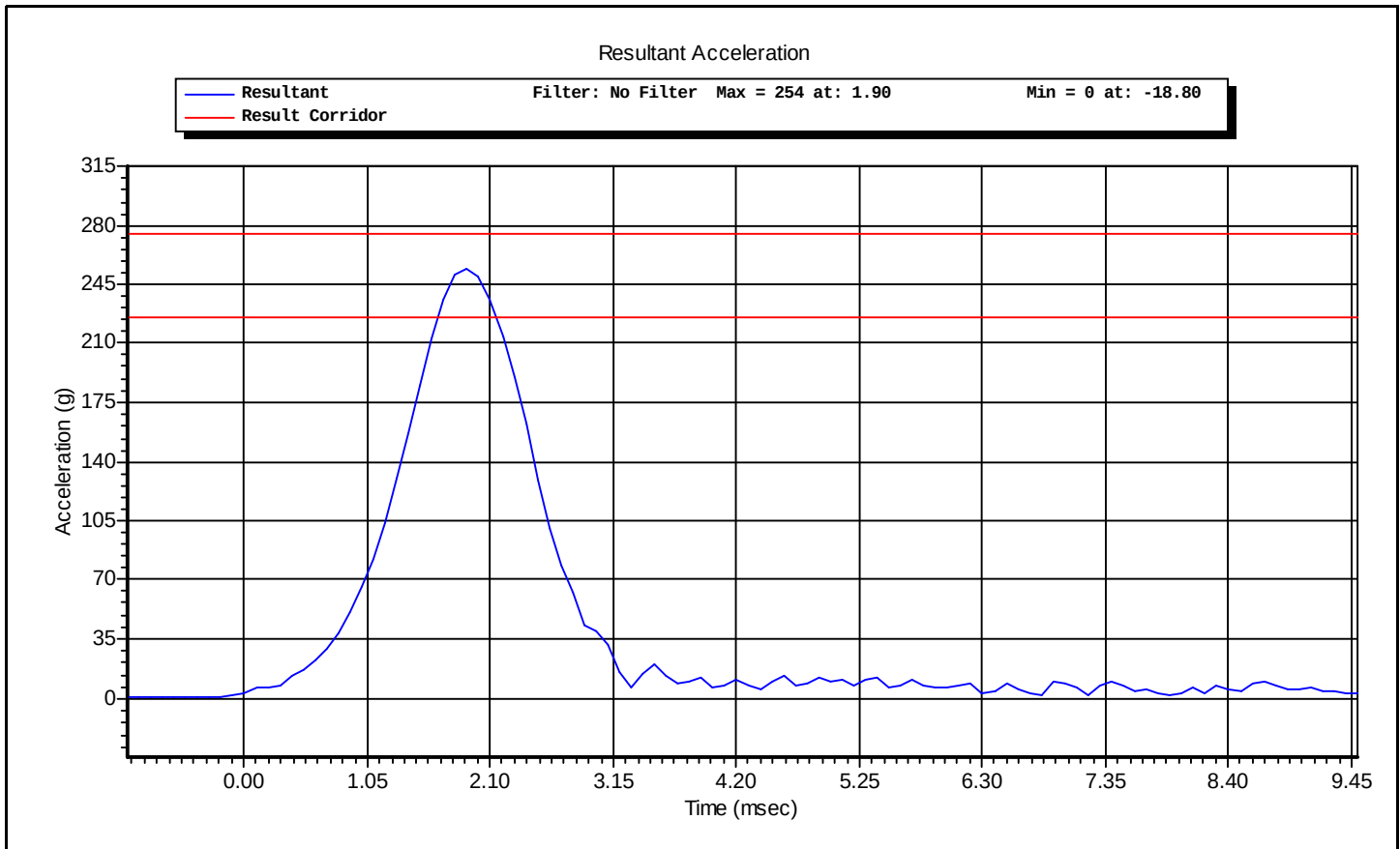


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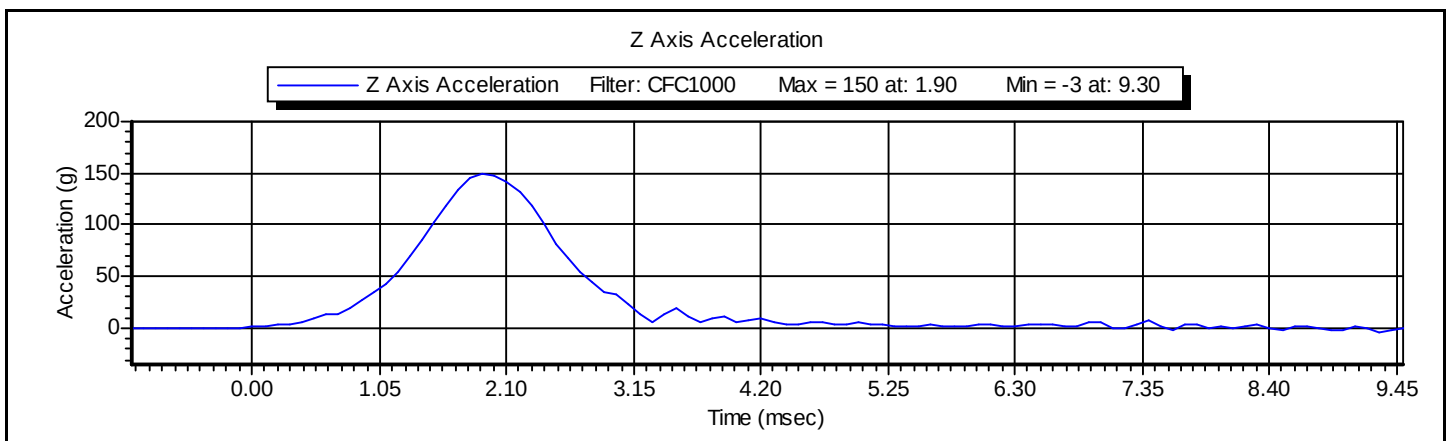
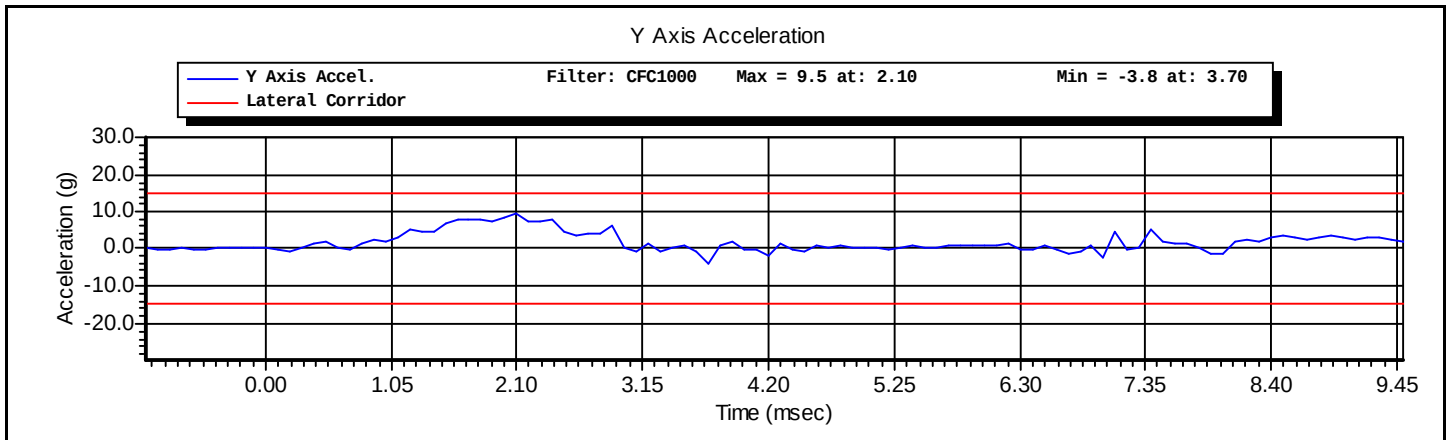
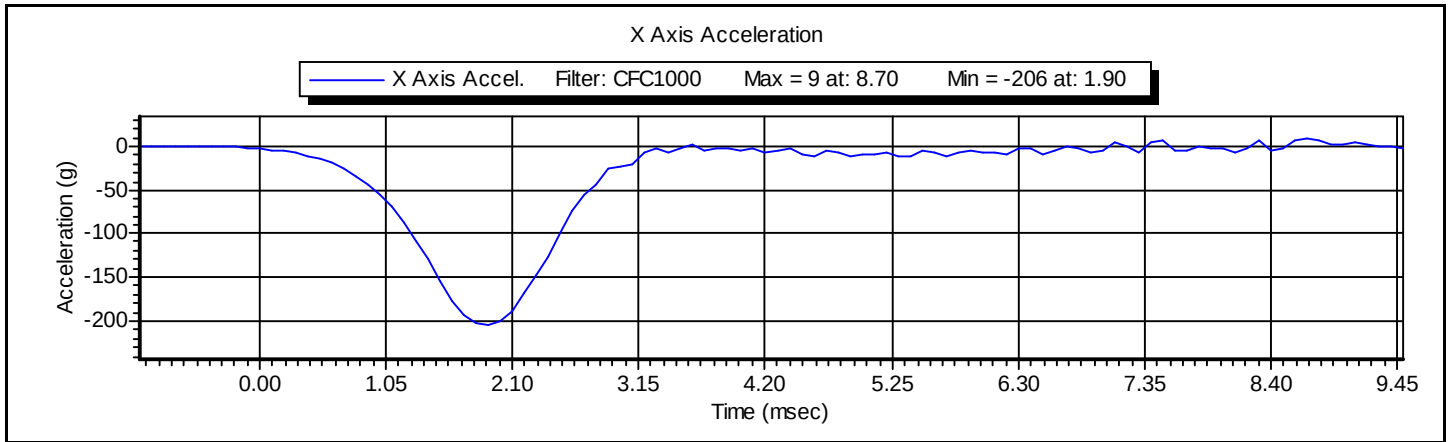
Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	8/18/2010
Test Number:	1	Test Time:	5:47:13 PM



Test ID: **Head Drop**

Test Time: **5:47:13 PM**

Test Date: **8/18/2010**





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Extension	Test Date:	8/19/2010
Test Number:	1	Test Time:	5:48:34 PM

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	53 %RH	P
Velocity		5.94	-- 6.19	6.14 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	18.7 g	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	16.9 g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	12.5 g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	12.8 g	P
Decel Time to	5 g	38.0	-- 46.0	44.1 ms	P
D Plane Rotation		81.0	-- 106.0	94.3 degrees	P
Time at Max Rotation		72.0	-- 82.0	76.0 ms	P
Rotation Decay to Zero		147.0	-- 174.0	156.7 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-66.9 Nm	P
Time at Max Moment		65.0	-- 79.0	71.3 ms	P
Moment Decay to Zero		120.0	-- 148.0	140.5 ms	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Extension**

Test Time: **5:48:34 PM**

Test Date: **8/19/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Extension**

Test Time: **5:48:34 PM**

Test Date: **8/19/2010**

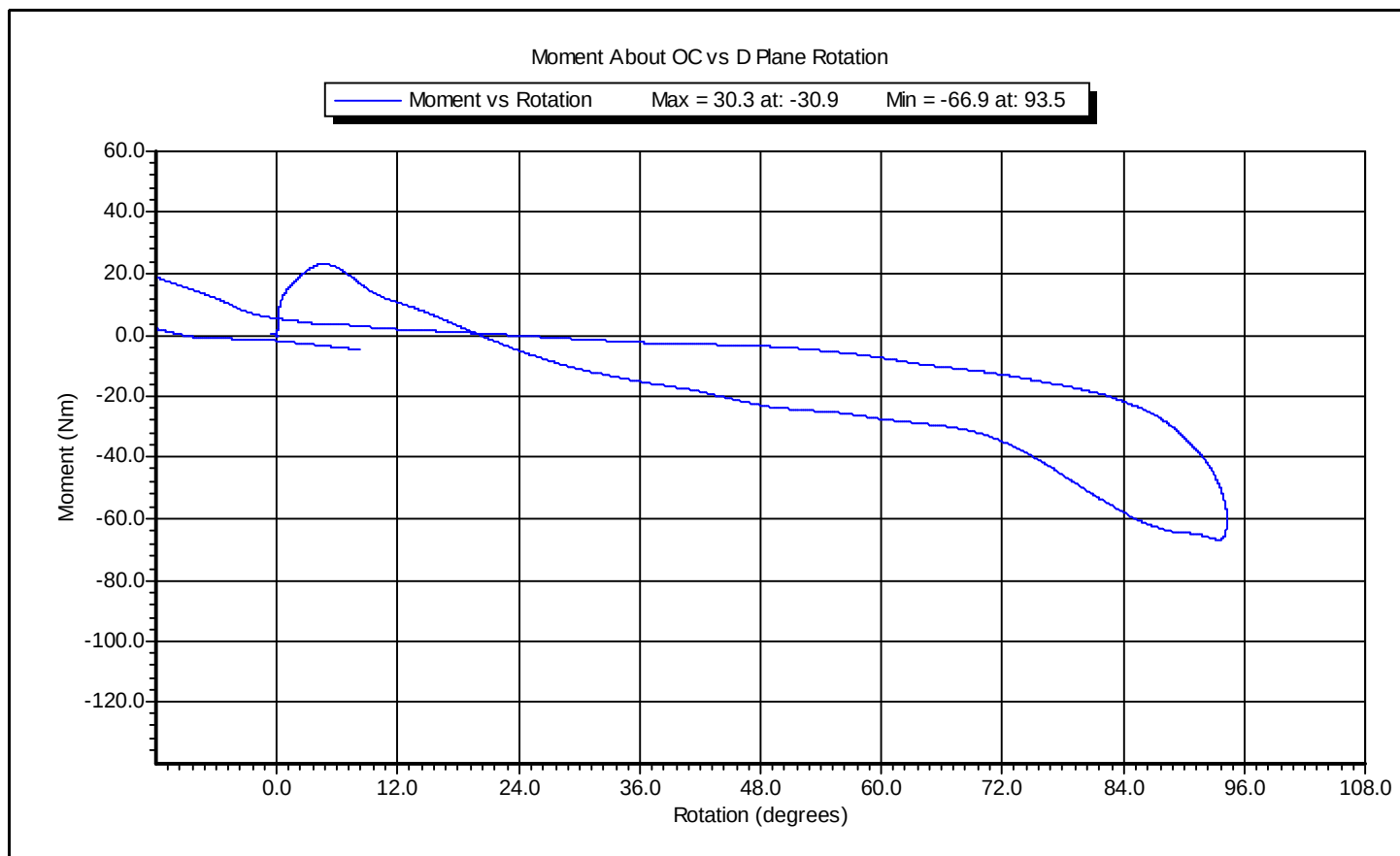


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Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	8/19/2010
Number of Test:	1	Time of Test:	5:48:34 PM

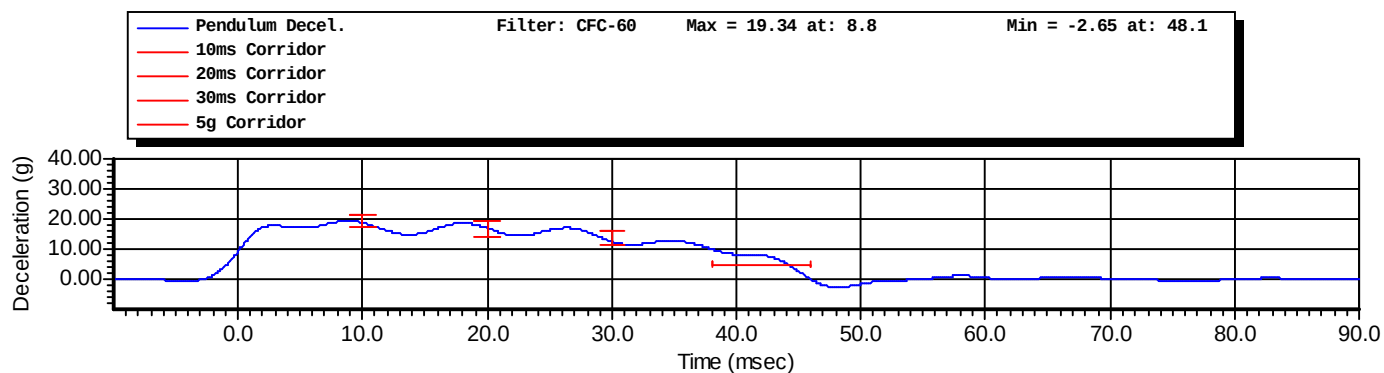


ID of Test: **Neck Extension**

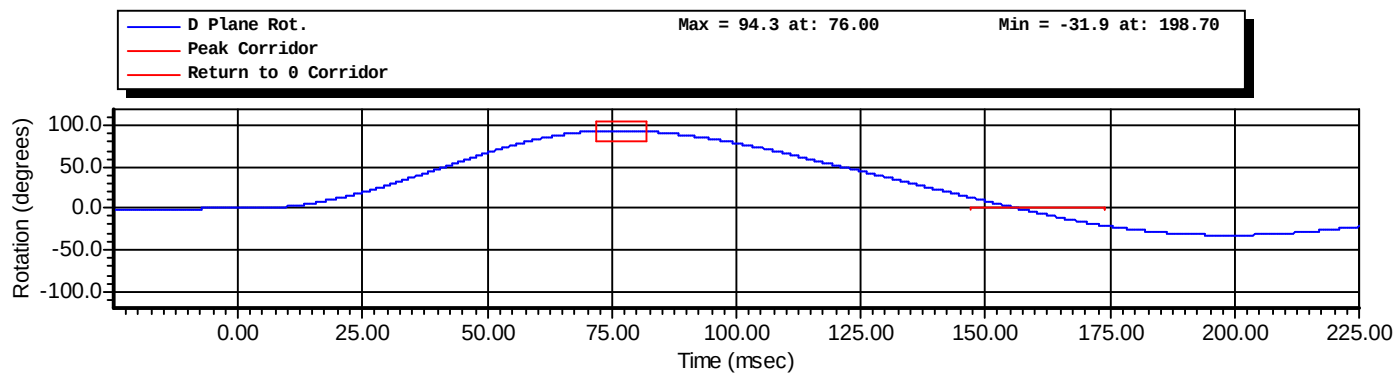
Time of Test: **5:48:34 PM**

Date of Test: **8/19/2010**

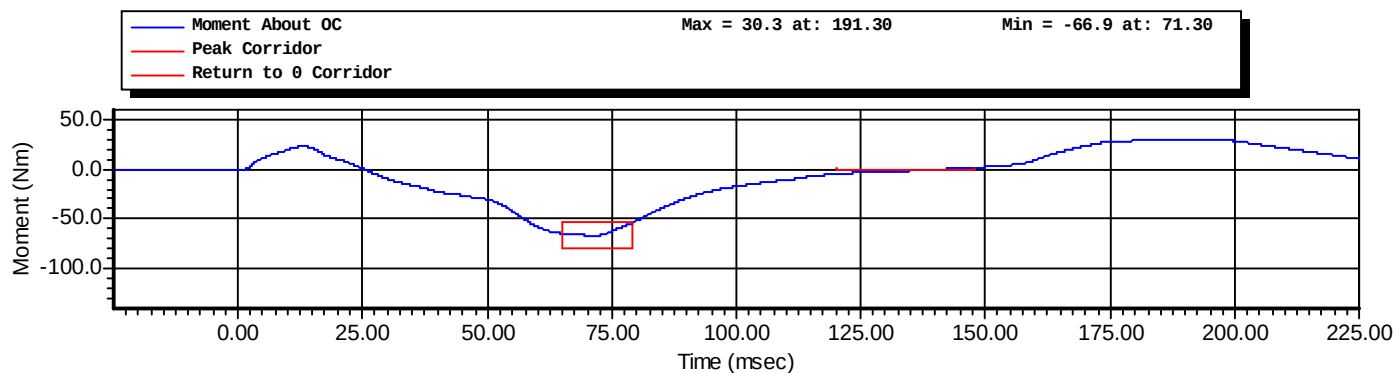
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Flexion	Test Date:	8/19/2010
Test Number:	2	Test Time:	5:27:48 PM

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	53 %RH	P
Velocity		6.89	-- 7.13	7.01 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	23.3 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.2 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	13.5 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	14.0 g	P
Deceleration time to	5 g	34.0	-- 42.0	41.3 ms	P
D Plane Rotation		-78.0	-- -64.0	-69.7 degrees	P
Time at max rotation		57.0	-- 64.0	59.3 ms	P
Rotation Decay to Zero		113.0	-- 128.0	119.0 ms	P
Moment about OC		88.1	-- 108.4	99.8 Nm	P
Time at Max Moment		47.0	-- 58.0	54.7 ms	P
Moment Decay to Zero		97.0	-- 107.0	99.1 ms	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Flexion**

Test Time: **5:27:48 PM**

Test Date: **8/19/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Flexion**

Test Time: **5:27:48 PM**

Test Date: **8/19/2010**

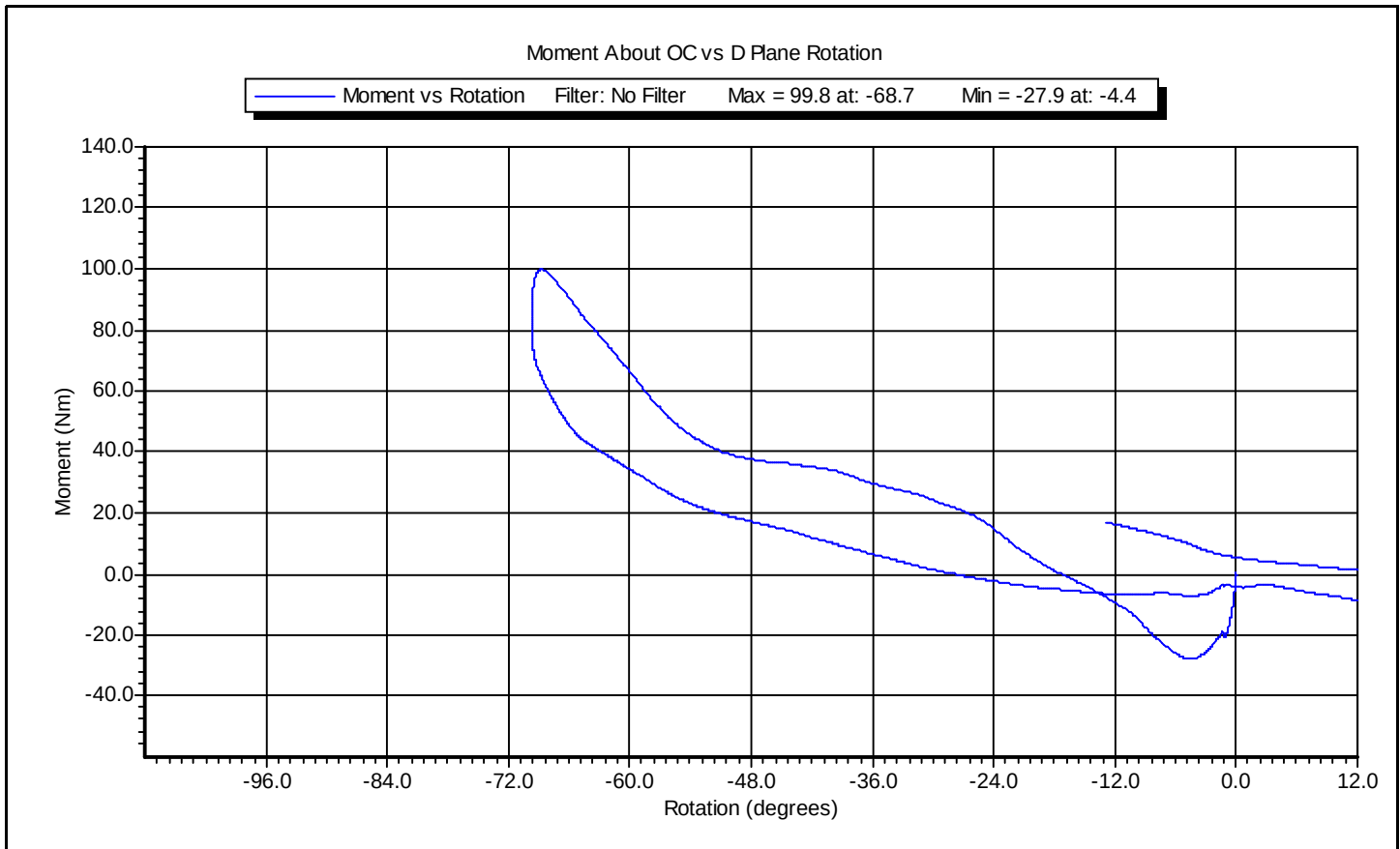


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Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	8/19/2010
Number of Test:	2	Time of Test:	5:27:48 PM

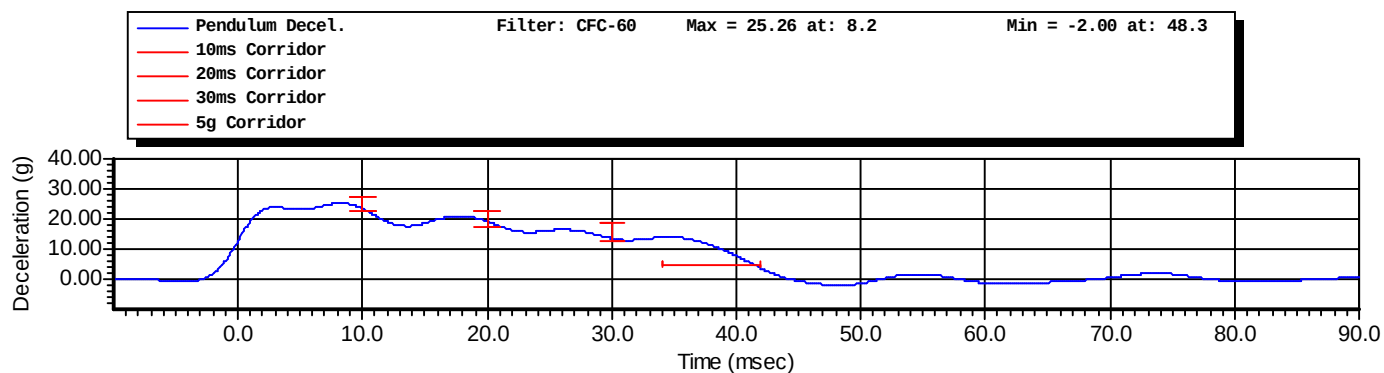


ID of Test: **Neck Flexion**

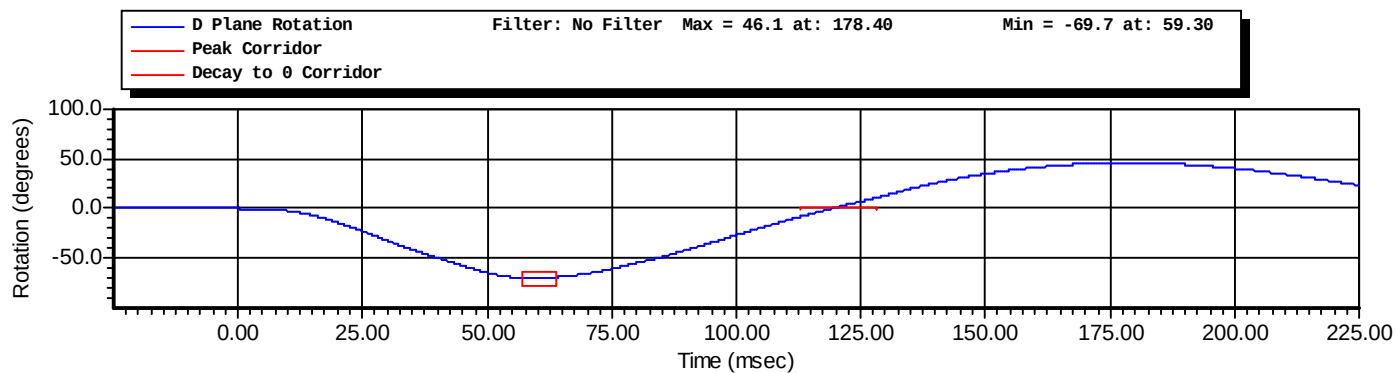
Time of Test: **5:27:48 PM**

Date of Test: **8/19/2010**

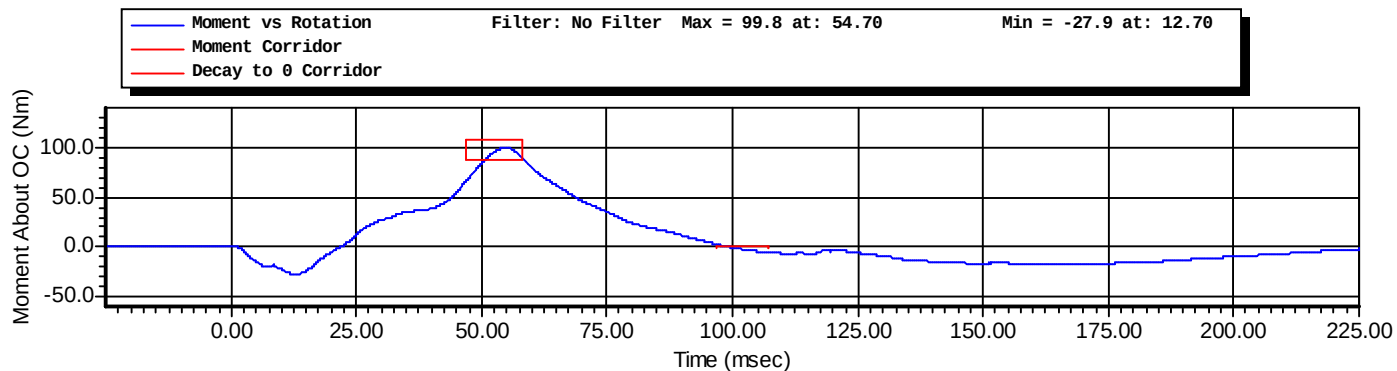
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	8/20/2010
Test Number:	1	Test Time:	9:57:26 AM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	61.0 %RH P
Velocity	6.59 -- 6.83	6.71 m/s P
Resistive Force	-5.894 -- -5.160	-5.475 kN P
Sternum Displacement	-72.6 -- -63.5	-68.0 mm P
Hysteresis	69 -- 85	72 % P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax**

Test Time: **9:57:26 AM**

Test Date: **8/20/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

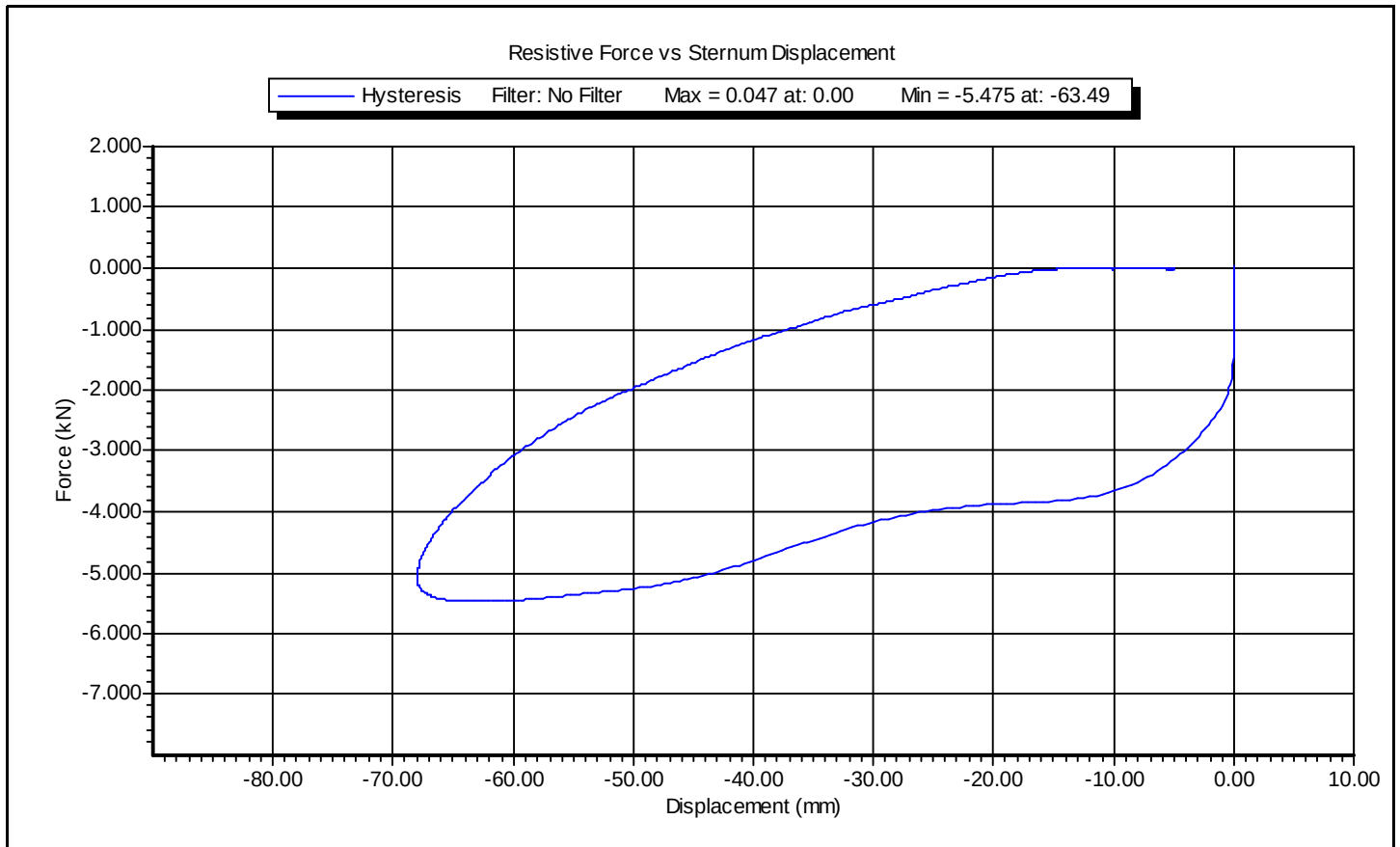
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
DentonATD	78051-342	DS-061	6/1/2010

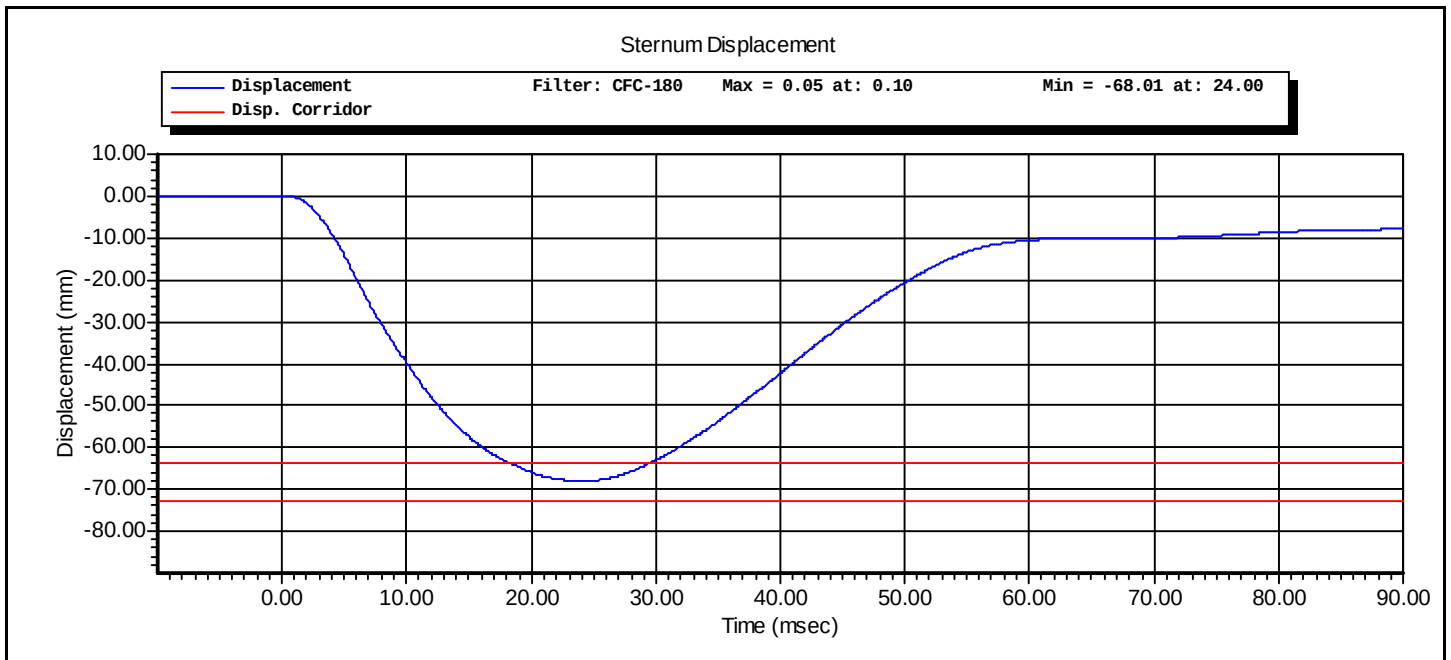
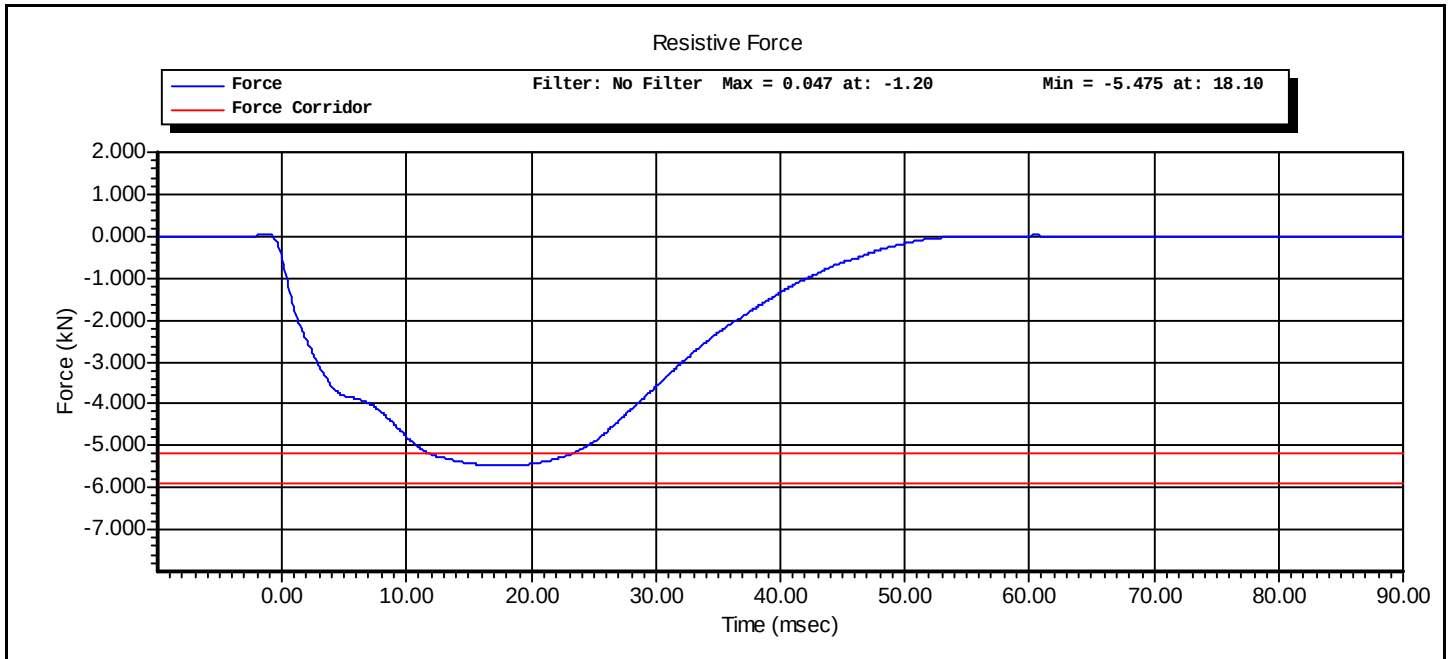
Test ID: **Thorax**

Test Time: **9:57:26 AM**

Test Date: **8/20/2010**

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	8/20/2010
Test Number:	1	Test Time:	9:57:26 AM





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Hybrid III Hip Range of Motion: Hybrid III 50th Male

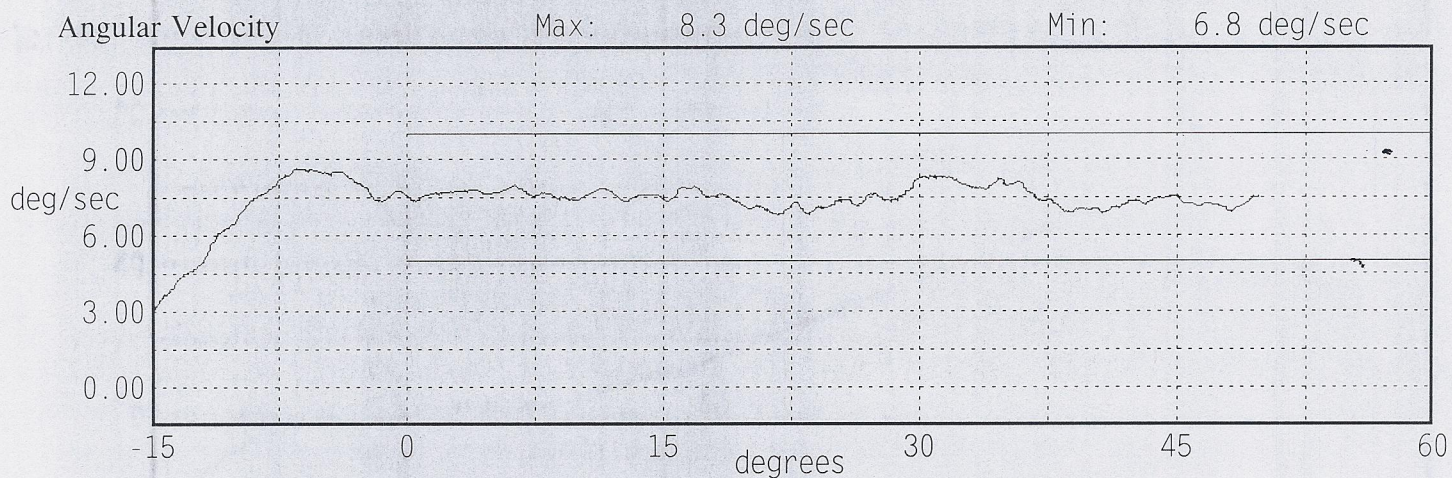
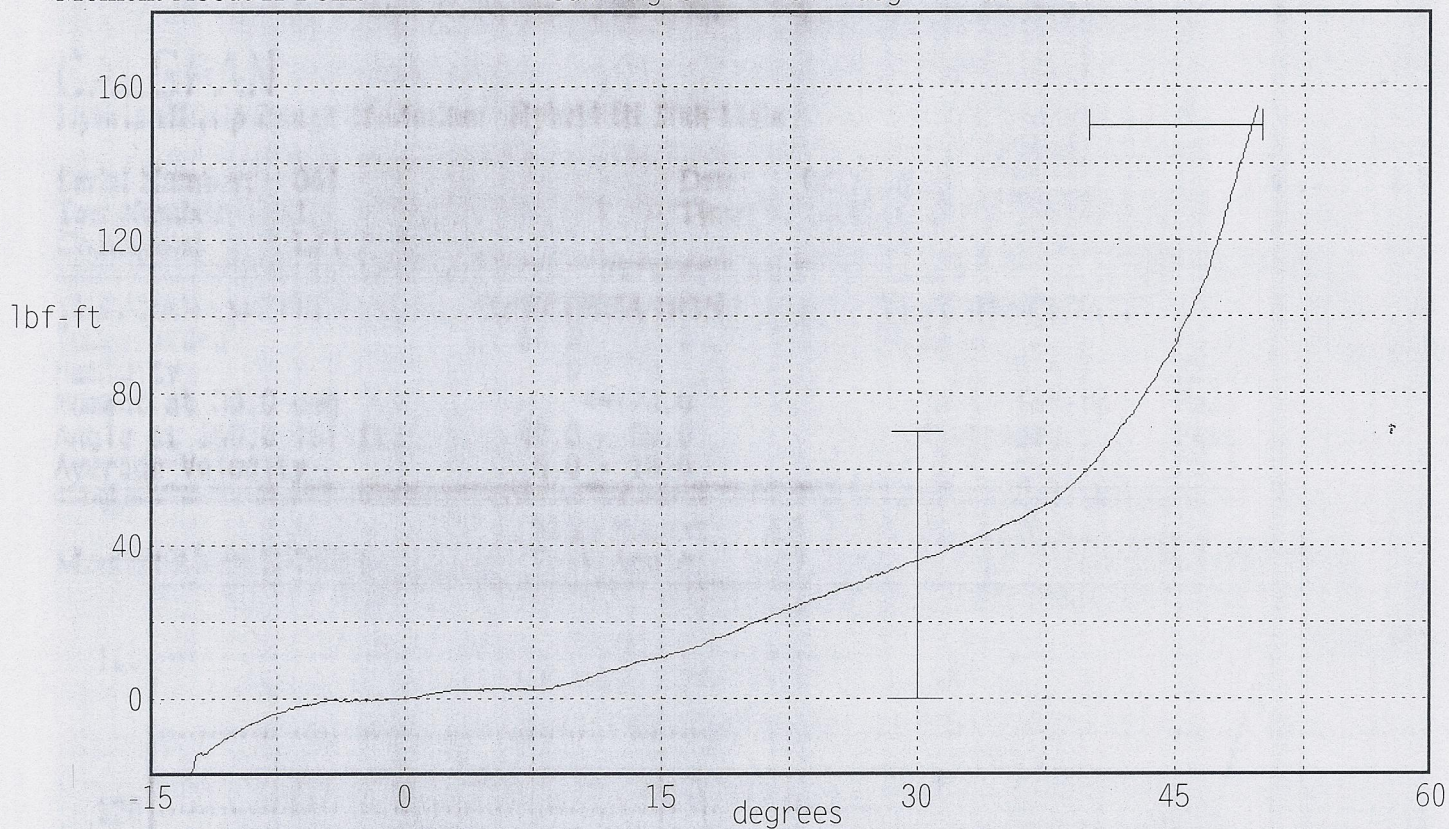
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 08/20/2010
Time: 14:57

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	48 % Pass
Moment at 30.0 deg	<= 70.0	36.4 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	49.4 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.2 lbf-ft at 49.7 deg
Peak Angle: 49.7 deg at 154.0 lbf-ft



CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

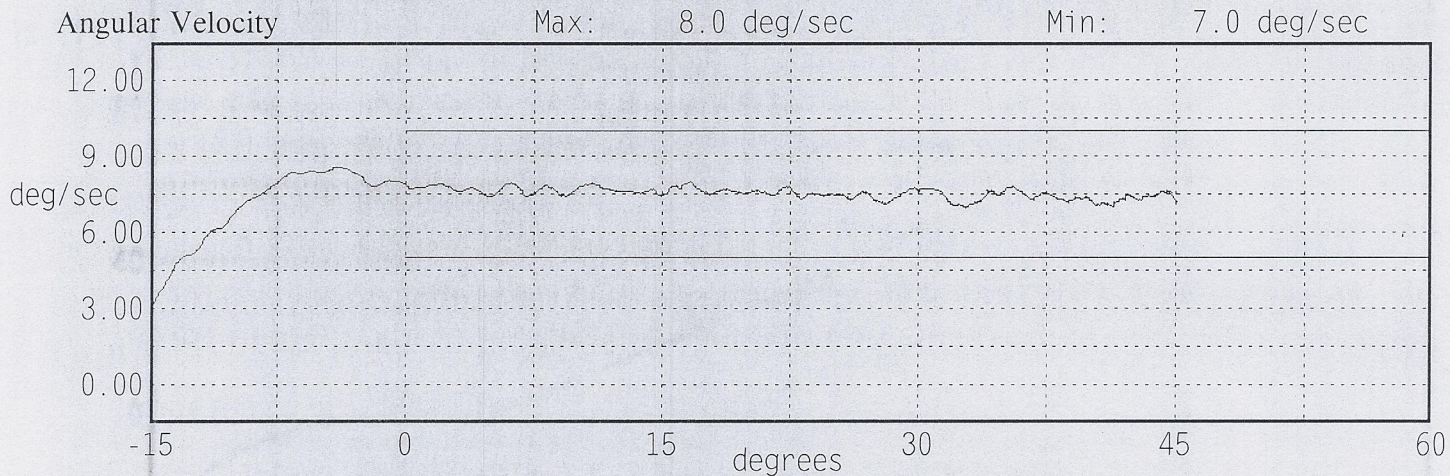
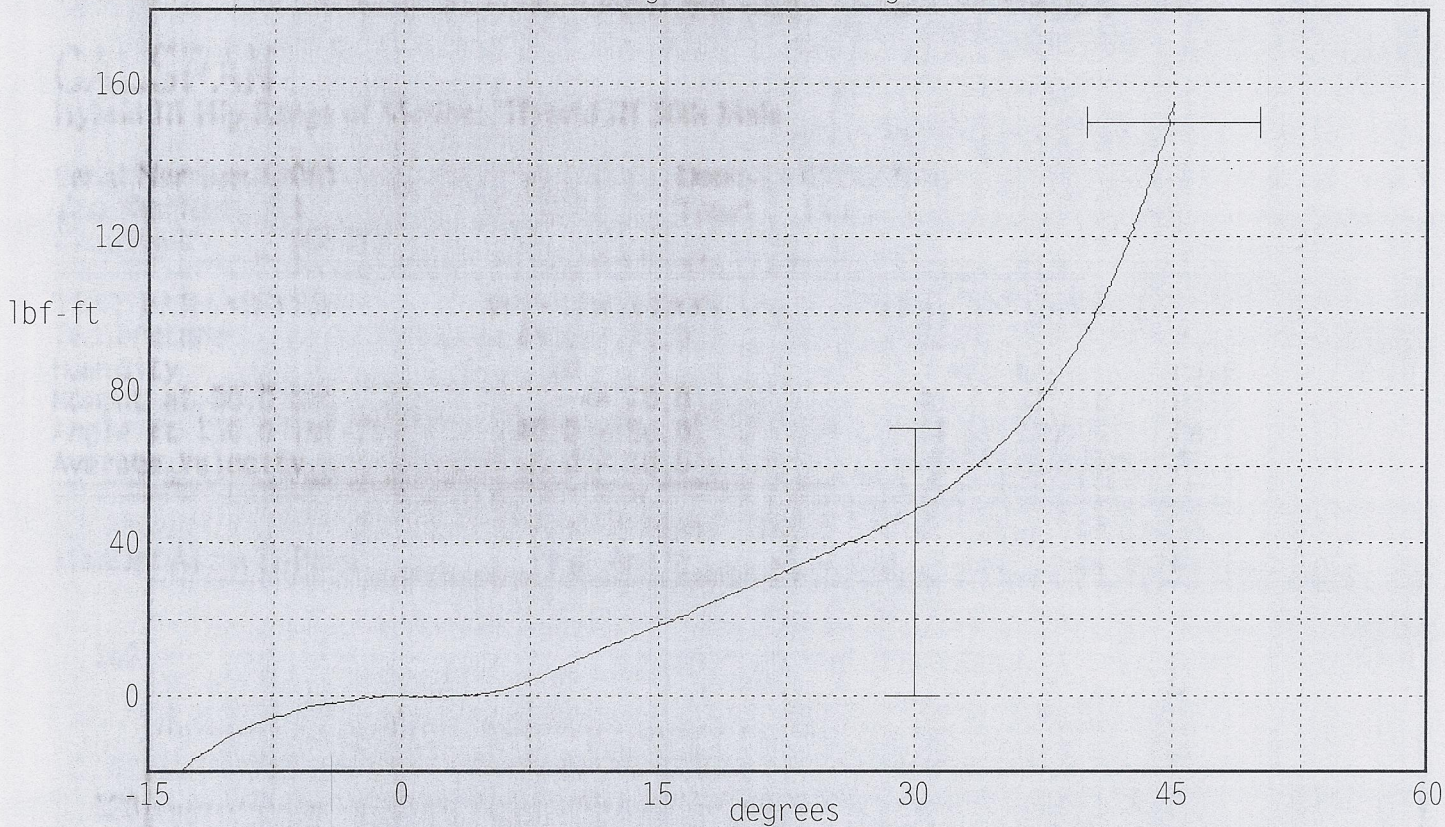
Serial Number: 061
Test Number: 1
Comments: RIGHT

Date: 08/20/2010
Time: 15:02

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	47 % Pass
Moment at 30.0 deg	<= 70.0	48.7 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.8 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 154.8 lbf-ft at 45.0 deg
Peak Angle: 45.0 deg at 154.8 lbf-ft





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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	8/20/2010
Test Number:	1	Test Time:	2:14:18 PM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	48.0 %RH P
Velocity	2.07 -- 2.13	2.13 m/s P
Resistive Force	-5.78 -- -4.72	-5.28 kN P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Left Knee**

Test Time: **2:14:18 PM**

Test Date: **8/20/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	AC-A160	4/9/2010

Test ID: **Left Knee**

Test Time: **2:14:18 PM**

Test Date: **8/20/2010**

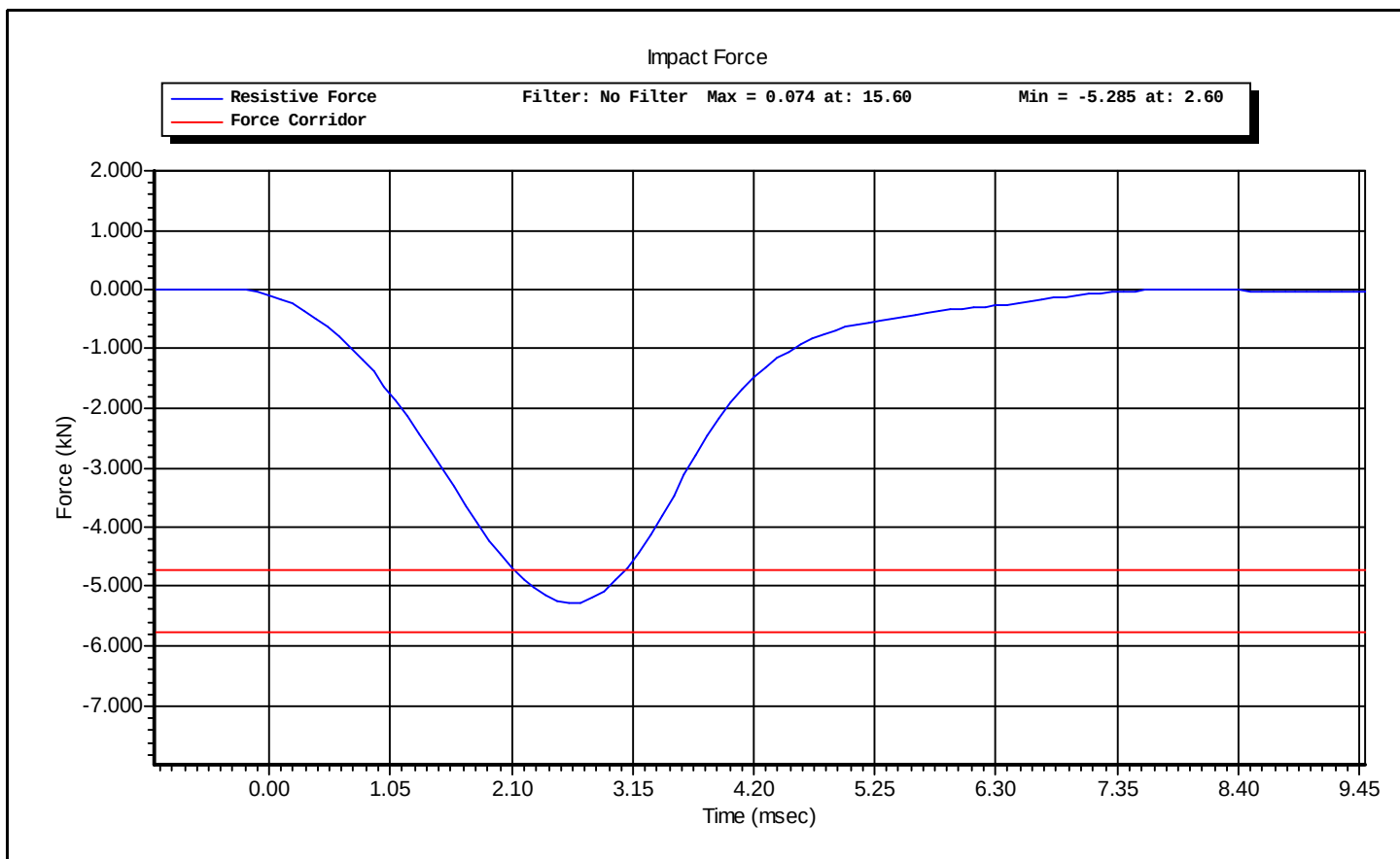


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	8/20/2010
Test Number:	1	Test Time:	2:14:18 PM



Test ID: **Left Knee**

Test Time: **2:14:18 PM**

Test Date: **8/20/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	8/20/2010
Test Number:	1	Test Time:	2:41:02 PM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	47.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-5.78 -- -4.72	-5.14 kN P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Right Knee**

Test Time: **2:41:02 PM**

Test Date: **8/20/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	4-202	AC-A160	4/9/2010

Test ID: **Right Knee**

Test Time: **2:41:02 PM**

Test Date: **8/20/2010**

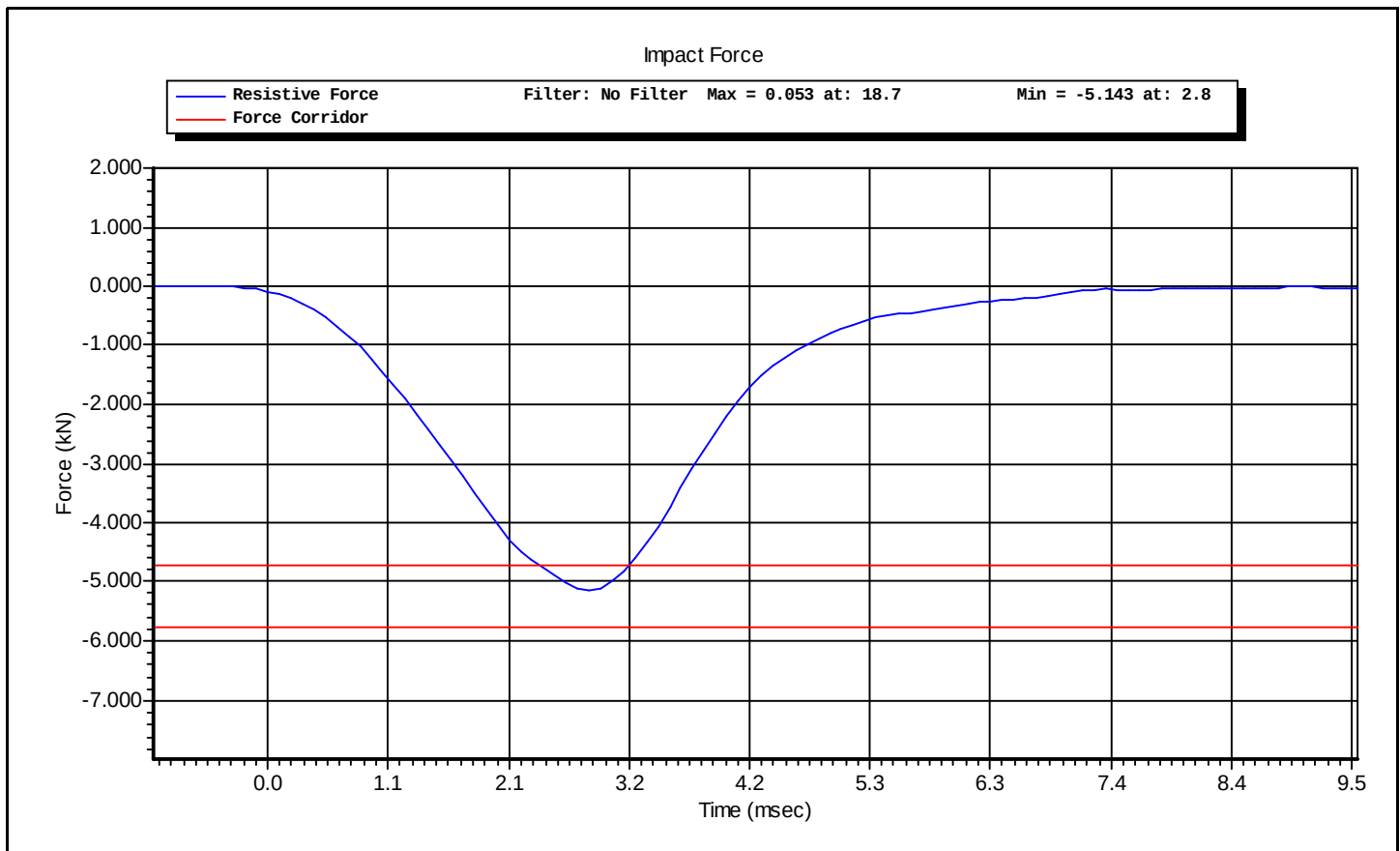


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	8/20/2010
Test Number:	1	Test Time:	2:41:02 PM



Test ID: Right Knee

Test Time: 2:41:02 PM

Test Date: 8/20/2010

CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

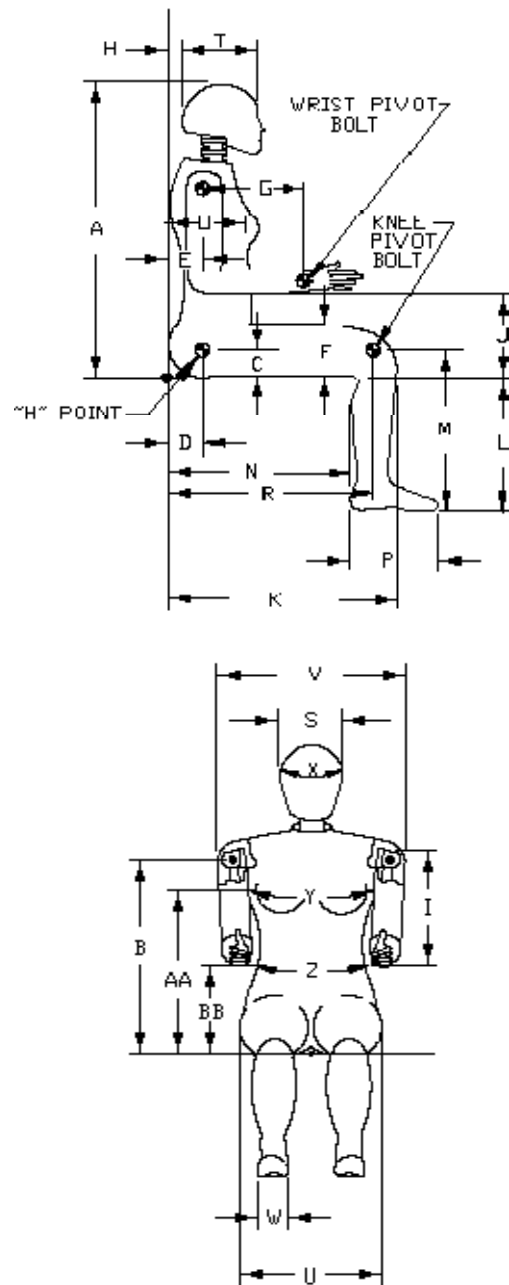
External Measurements

5th Female SN 273

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	78	Yes
F	Thigh Clearance	119.4 – 134.6	128	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	250	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	282	Yes
J	Elbow Rest Height	182.8 – 203.2	195	Yes
K	Buttock to Knee Length	520.7 – 546.1	530	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	401	Yes
N	Buttock Popliteal Length	414 – 439.4	425	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	222	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	479	Yes
S	Head Breadth	137.1 – 147.3	144	Yes
T	Head Depth	177.8 - 188	184	Yes
U	Hip Breadth	299.7 – 314.9	309	Yes
V	Shoulder Breadth	350.5 – 365.7	359	Yes
W	Foot Breadth	78.8 - 94	88	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	859	Yes
Z	Waist Circumference	759.5 – 789.9	775	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Hybrid 3 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	8/18/2010
Test Number:	1	Test Time:	2:47:55 PM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	53 %RH P
Resultant Acceleration	250 -- 300	265 g P
Oscillation	0.0 -- 10.0	6.3 % P
Lateral Acceleration	-15.00 -- 15.00	-4.45 g P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Head Drop**

Test Time: **2:47:55 PM**

Test Date: **8/18/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66931	4/20/2010
Endevco	7264-2000	P66926	4/20/2010

Test ID: **Head Drop**

Test Time: **2:47:55 PM**

Test Date: **8/18/2010**

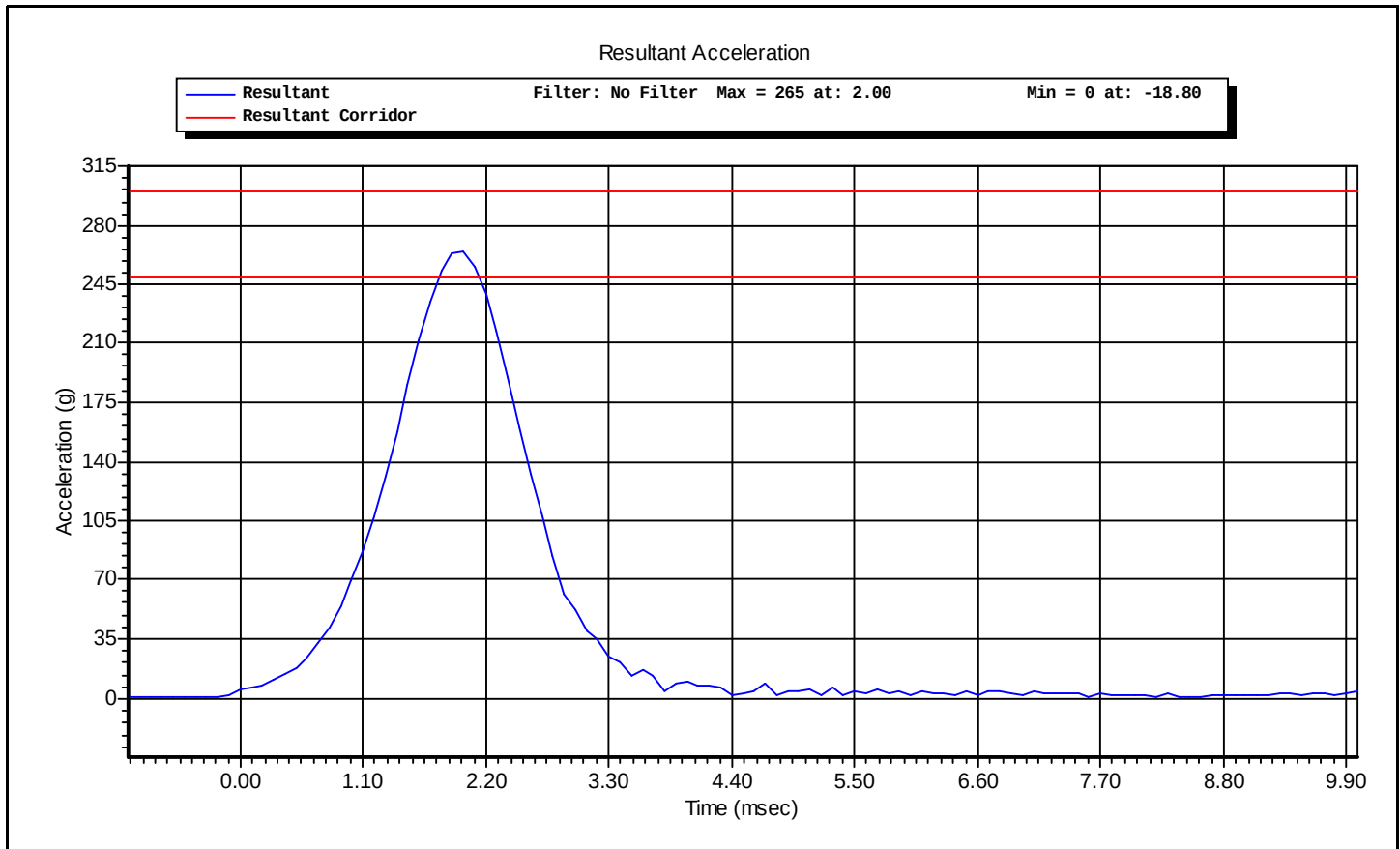


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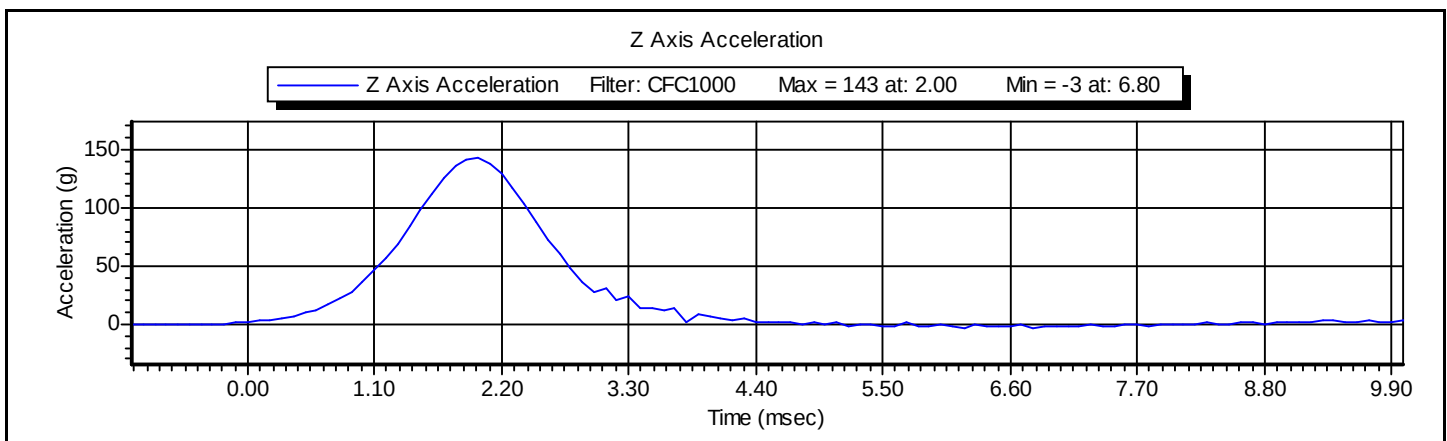
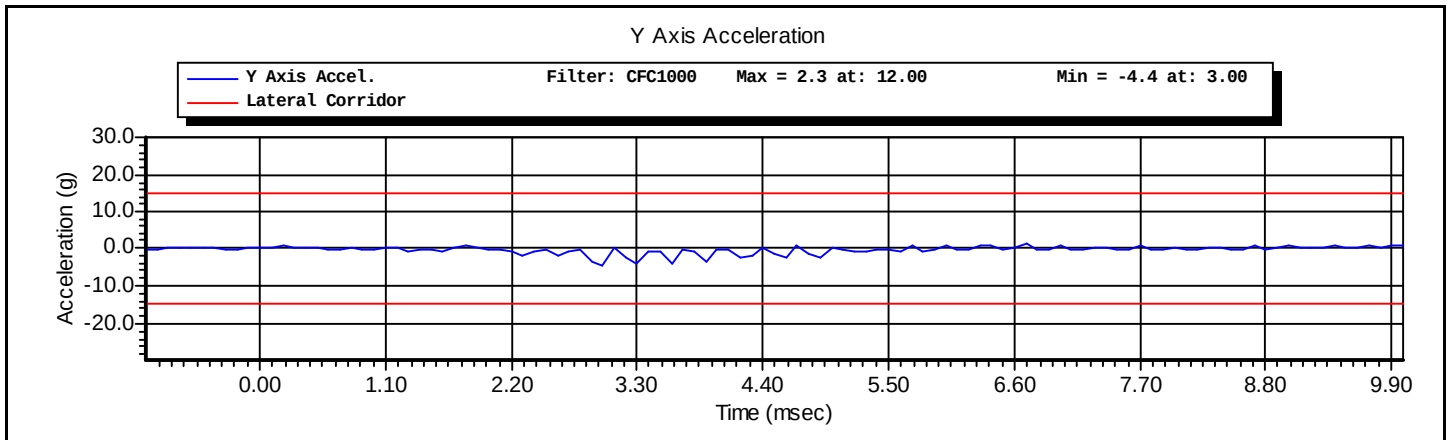
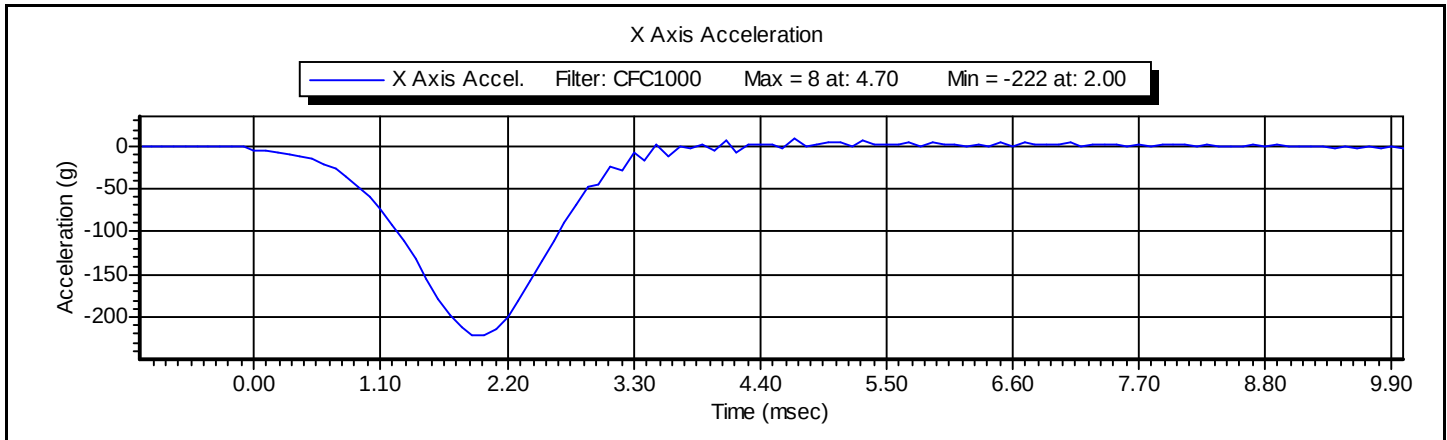
Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	8/18/2010
Test Number:	1	Test Time:	2:47:55 PM



Test ID: **Head Drop**

Test Time: **2:47:55 PM**

Test Date: **8/18/2010**





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	8/18/2010
Test Number:	2	Test Time:	6:19:48 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	52 %RH P
Velocity	5.95 -- 6.19	6.07 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.89 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.61 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.16 m/s P
D Plane Rotation	99.0 -- 114.0	109.1 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-57.5 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	104.6 ms P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Extension**

Test Time: **6:19:48 PM**

Test Date: **8/18/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1632 My	7/14/2010
Denton	1716A	LC-1632 Fx	7/14/2010

Test ID: **Neck Extension**

Test Time: **6:19:48 PM**

Test Date: **8/18/2010**

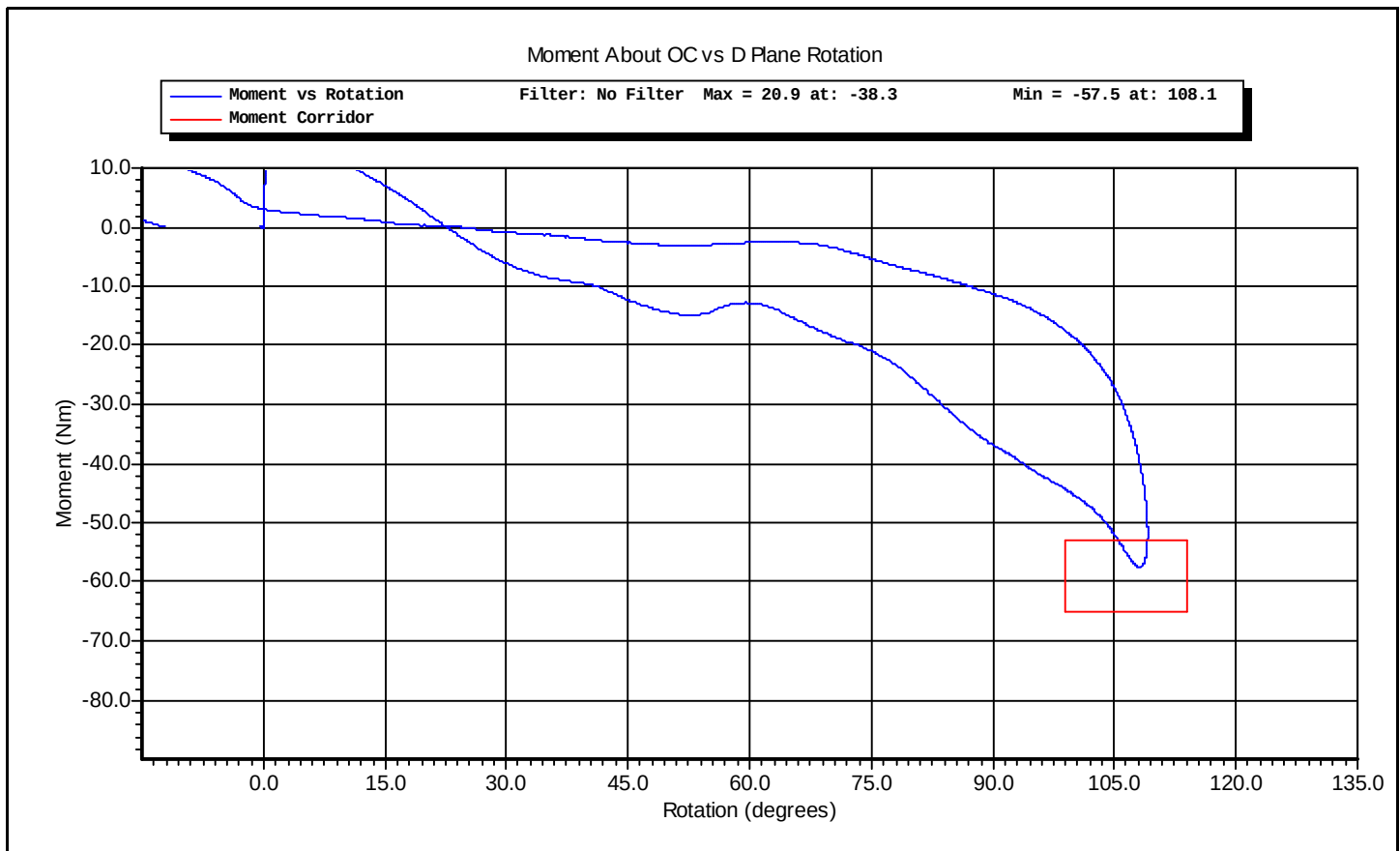


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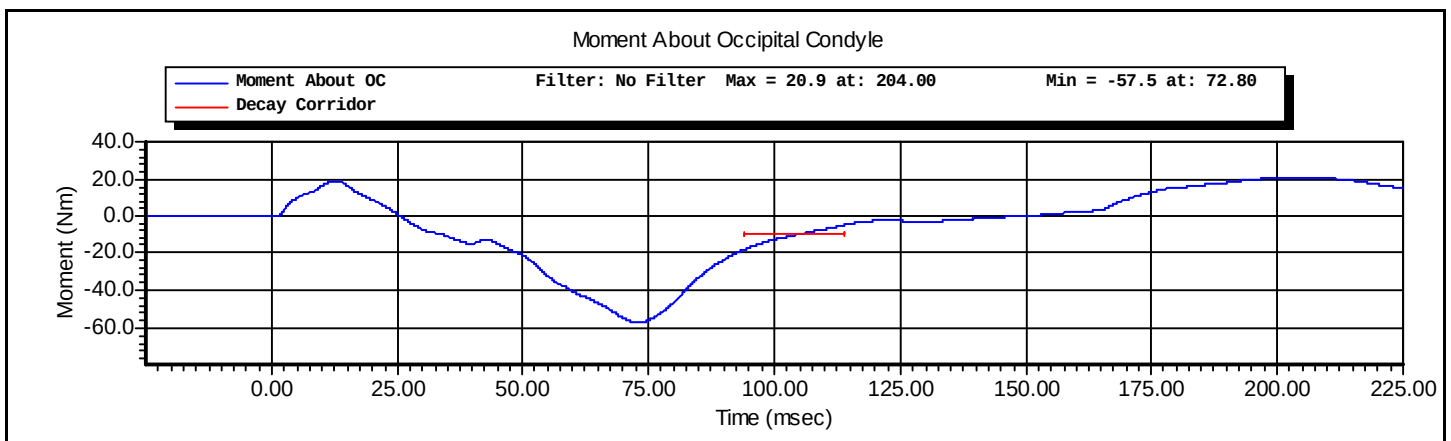
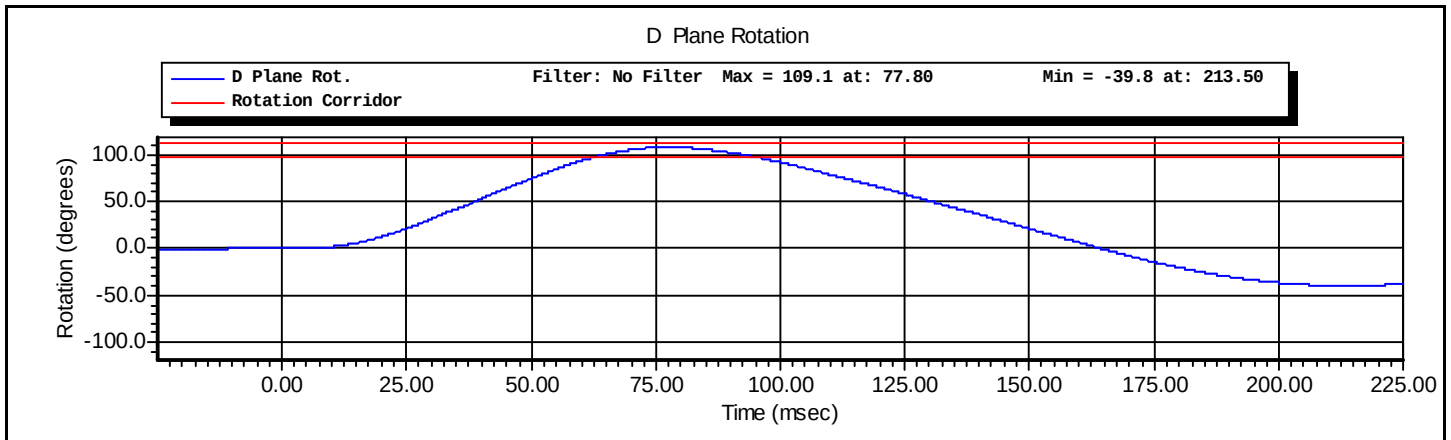
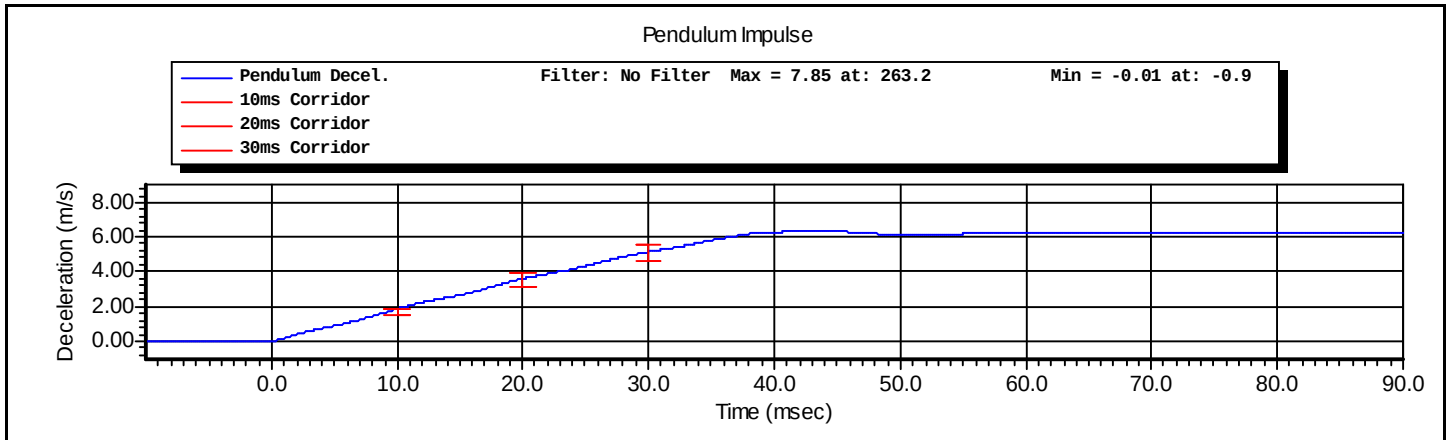
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Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	8/18/2010
Test Number:	2	Test Time:	6:19:48 PM



Test ID: Neck Extension Test Time: 6:19:48 PM

Test Date: 8/18/2010





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	8/18/2010
Test Number:	2	Test Time:	5:12:34 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	50 %RH P
Velocity	6.89 -- 7.13	7.03 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.43 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.76 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.83 m/s P
D Plane Rotation	-91.0 -- -77.0	-84.7 degrees P
Moment During Rotation Interval	69.0 -- 83.0	70.1 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	87.7 ms P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Flexion**

Test Time: **5:12:34 PM**

Test Date: **8/18/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1632 My	7/14/2010
Denton	1716A	LC-1632 Fx	7/14/2010

Test ID: **Neck Flexion**

Test Time: **5:12:34 PM**

Test Date: **8/18/2010**

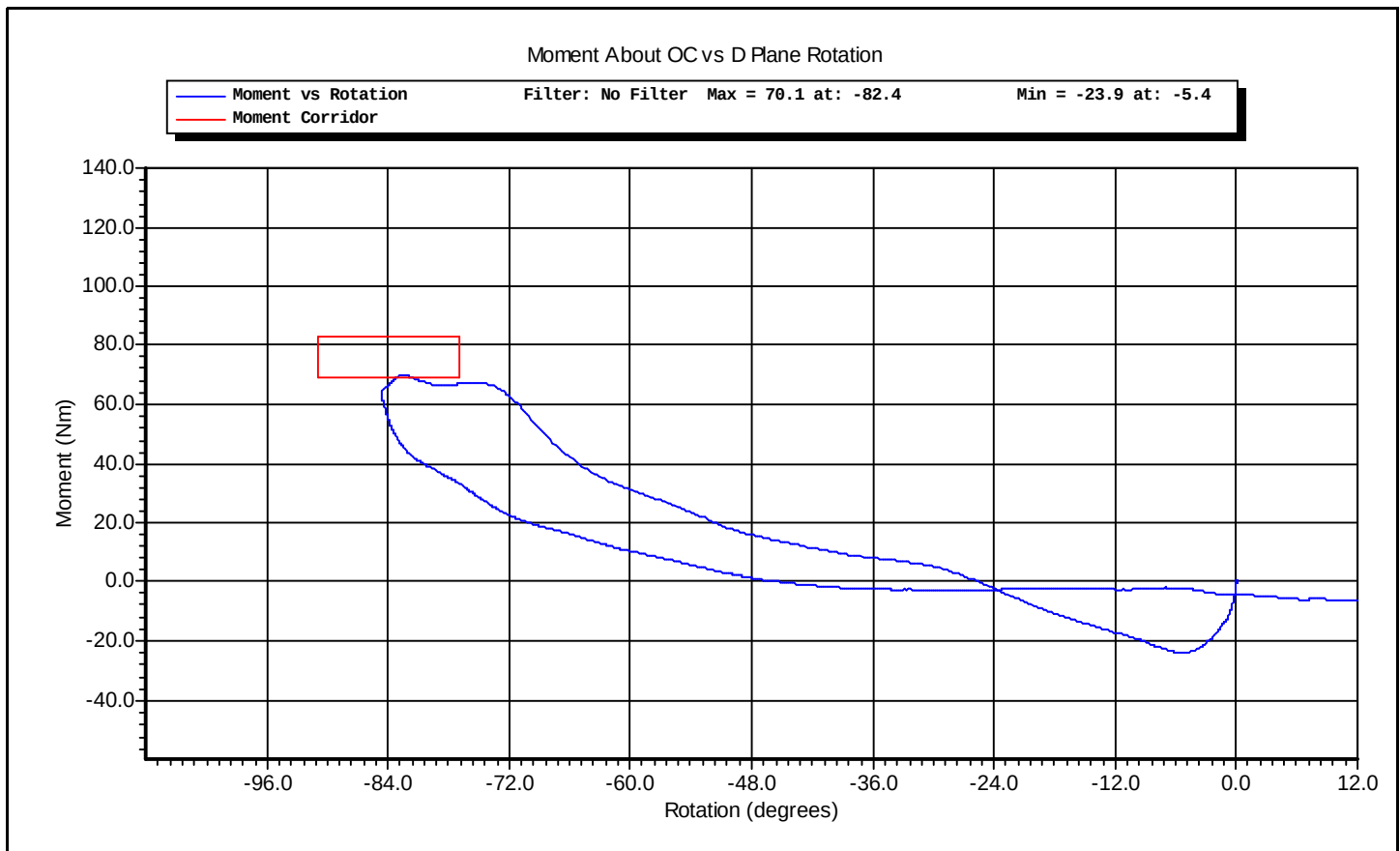


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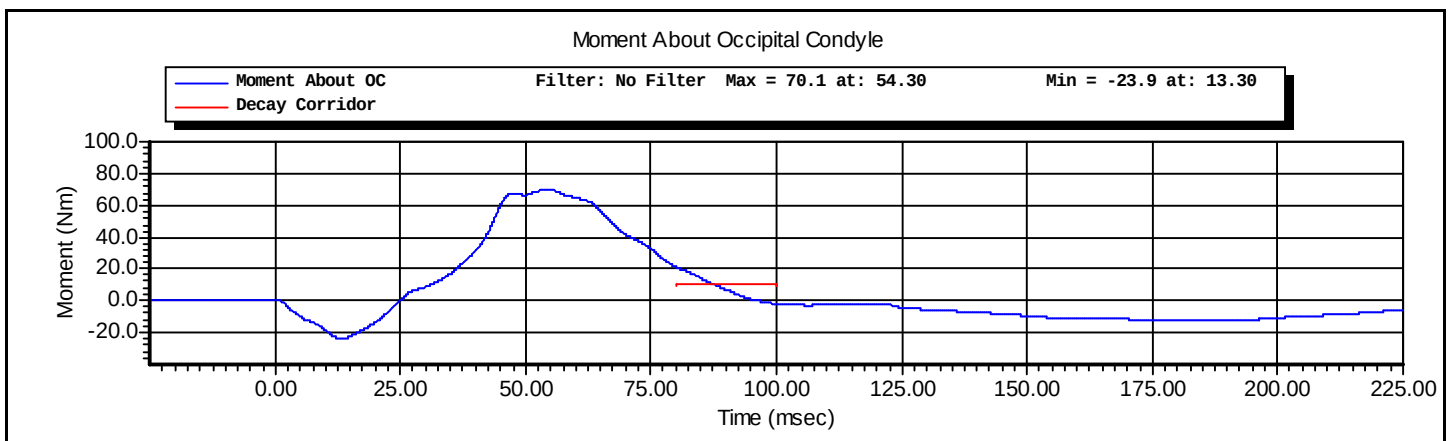
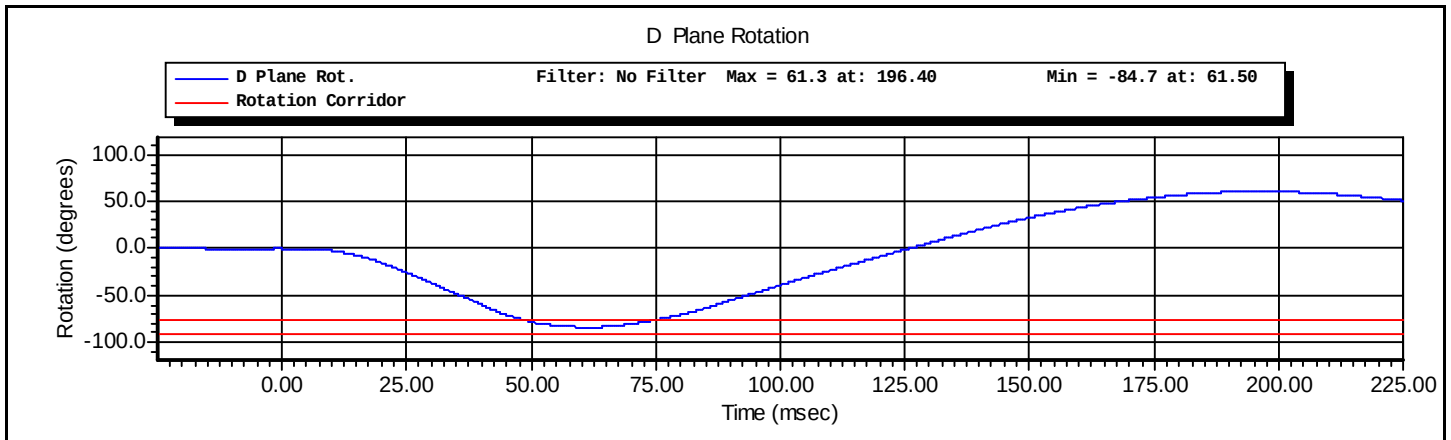
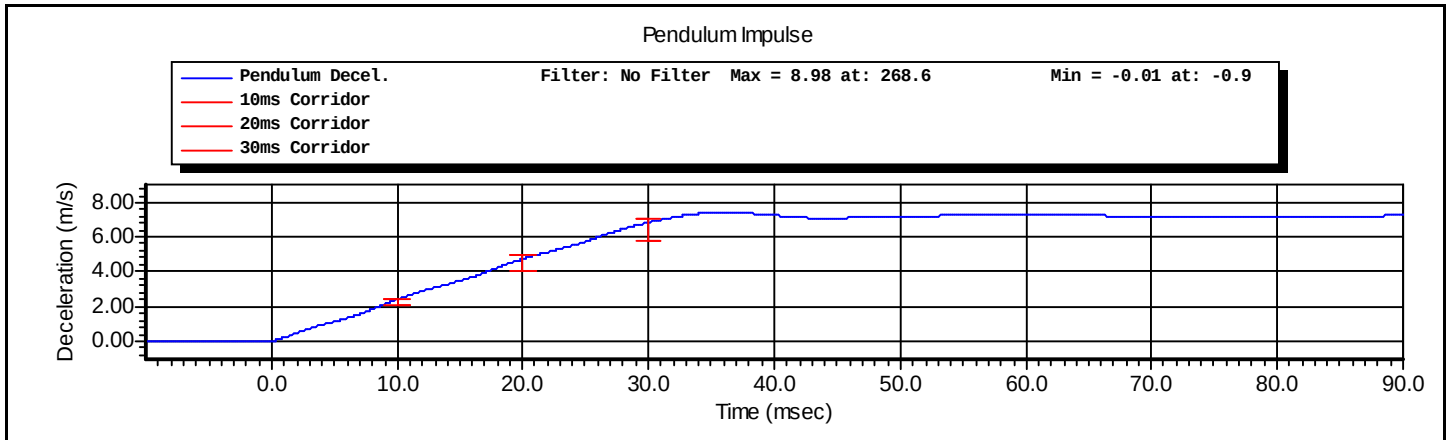
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	8/18/2010
Test Number:	2	Test Time:	5:12:34 PM



Test ID: Neck Flexion

Test Time: 5:12:34 PM

Test Date: 8/18/2010





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	8/19/2010
Test Number:	2	Test Time:	3:49:49 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10.0	--	70.0	52.0 %RH	P
Velocity	6.59	--	6.83	6.72 m/s	P
Sternum Displacement	-58.0	--	-50.0	-51.5 mm	P
Force During Displacement Interval	-4400	--	-3900	-4339 N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	-4347 N	P
Hysteresis	69	--	85	71 %	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax**

Test Time: **3:49:49 PM**

Test Date: **8/19/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
DentonATD	78051-342	DS-273	4/13/2010

Test ID: **Thorax**

Test Time: **3:49:49 PM**

Test Date: **8/19/2010**



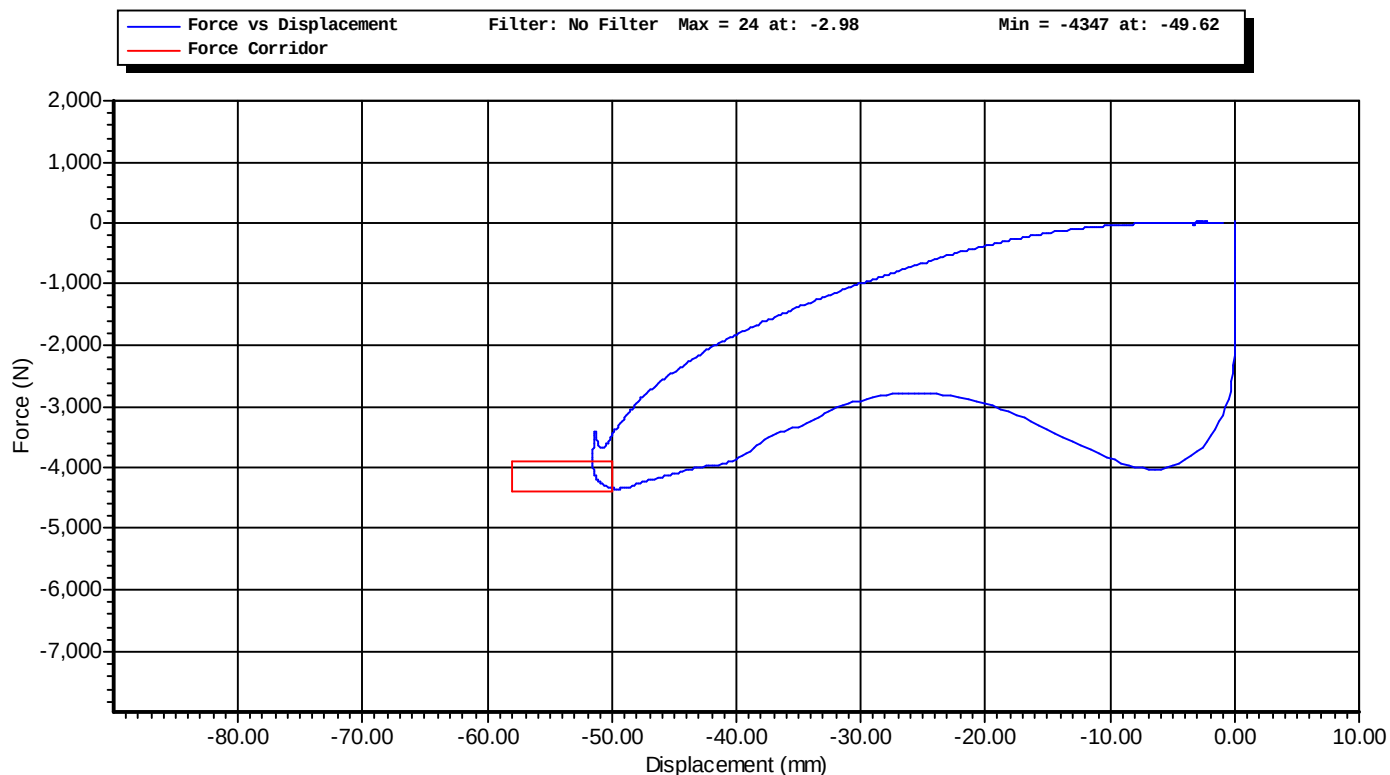
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	8/19/2010
Test Number:	2	Test Time:	3:49:49 PM

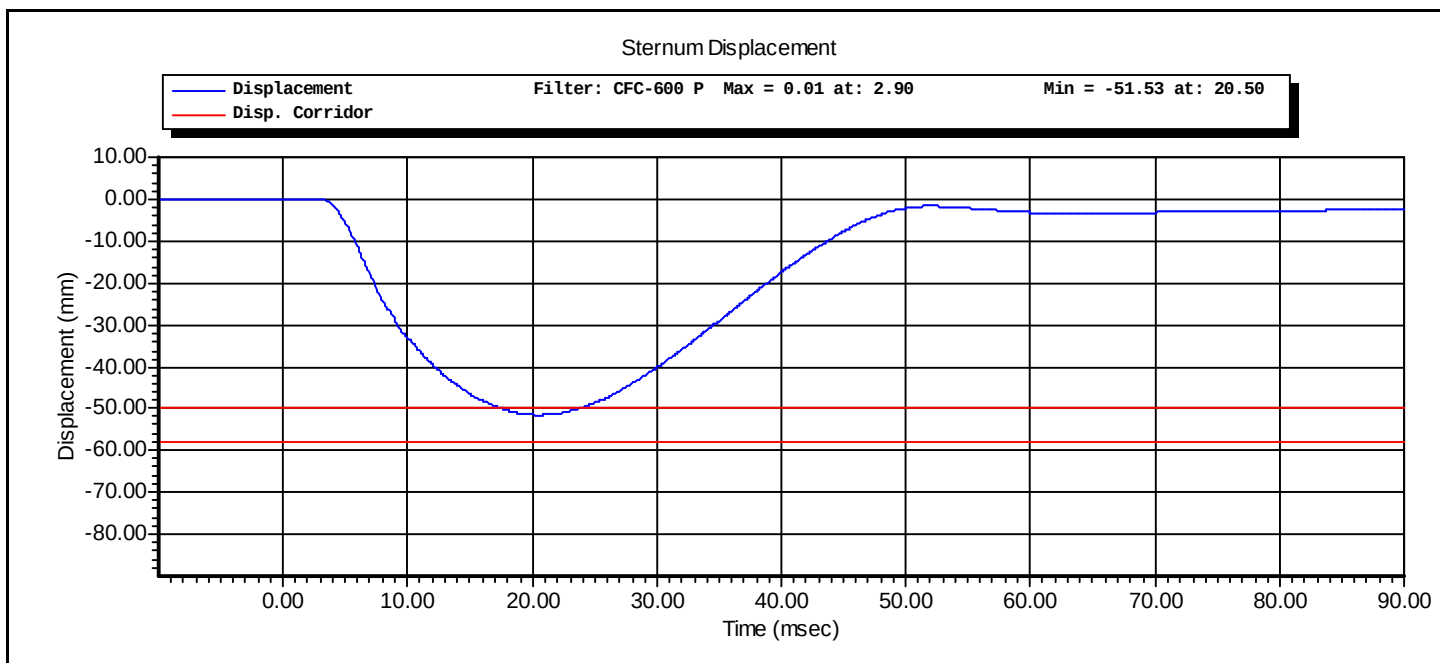
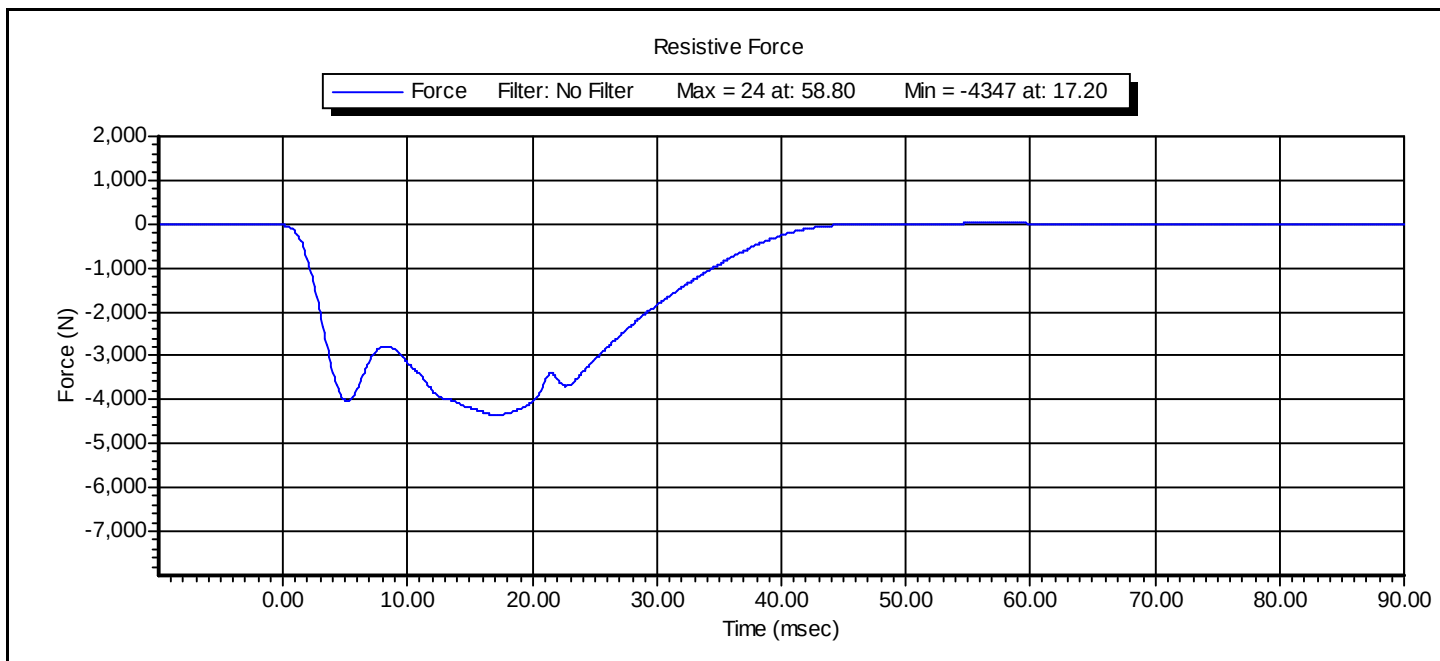
Resistive Force vs Sternum Displacement



Test ID: Thorax

Test Time: 3:49:49 PM

Test Date: 8/19/2010



Torso Flexion Test

Technician: AR

Calibration Date: 8/23/2010

ATD Serial Number: 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	21.7° C	P
Lab Humidity: 38%	10-70%	65%	P
Max Force @ 45 deg	320 – 390N	367N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	13°	P
Final ref plan angle	Initial ref plane ± 8 deg	19°	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	8/21/2010
Test Number:	1	Test Time:	10:16:21 AM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1726
Knee Insert - 880105-511	
Knee Cap - 880105-510	

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	53.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-4060 -- -3450	-3813 N P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Left Knee**

Test Time: **10:16:21 AM**

Test Date: **8/21/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A160	4/9/2010

Test ID: **Left Knee**

Test Time: **10:16:21 AM**

Test Date: **8/21/2010**

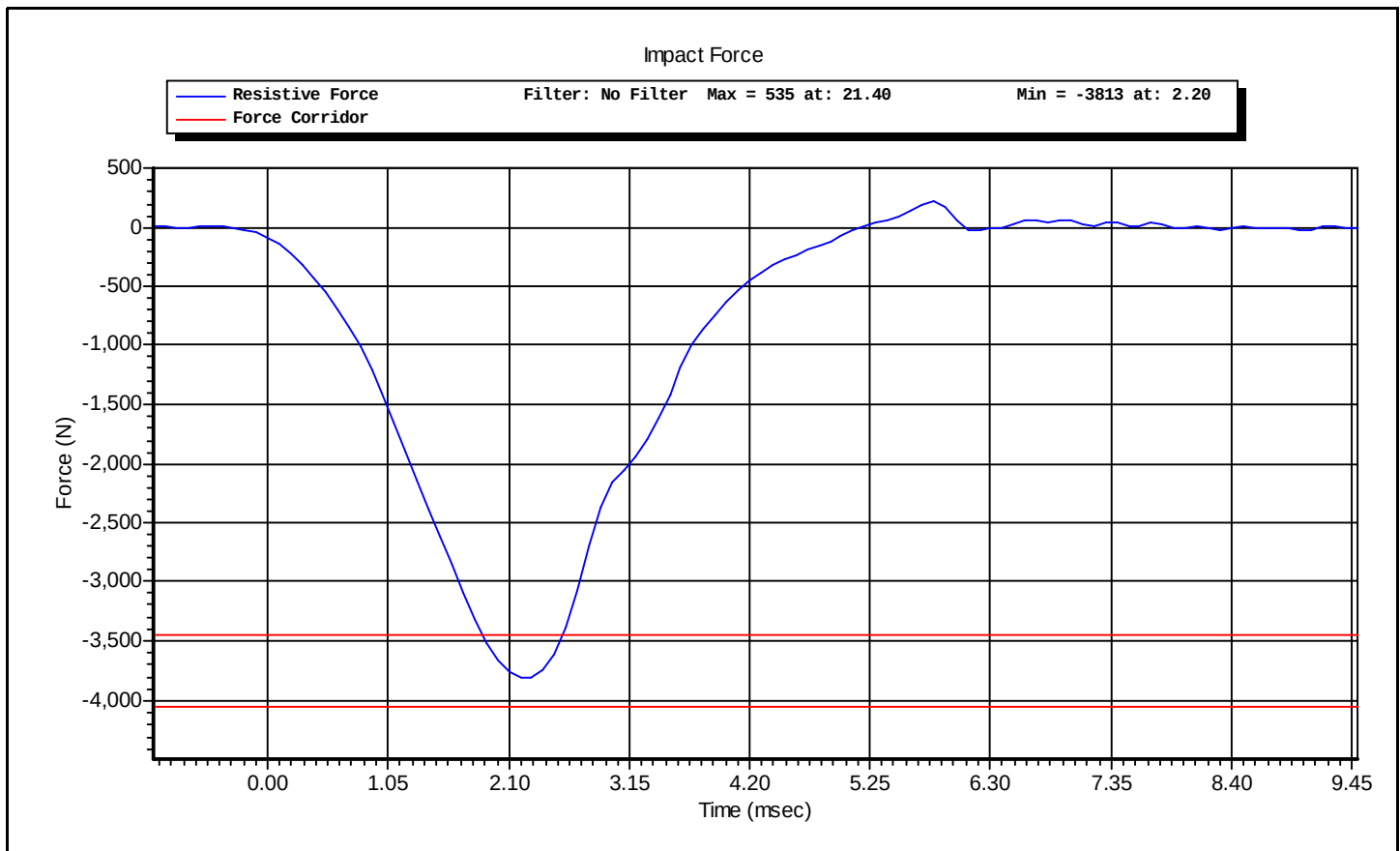


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	8/21/2010
Test Number:	1	Test Time:	10:16:21 AM



Test ID: **Left Knee**

Test Time: **10:16:21 AM**

Test Date: **8/21/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	8/20/2010
Test Number:	1	Test Time:	4:00:11 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1051
Knee Insert - 880105-511	
Knee Cap - 880105-510	

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	47.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-4060 -- -3450	-3659 N P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Right Knee**

Test Time: **4:00:11 PM**

Test Date: **8/20/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A160	4/9/2010

Test ID: **Right Knee**

Test Time: **4:00:11 PM**

Test Date: **8/20/2010**

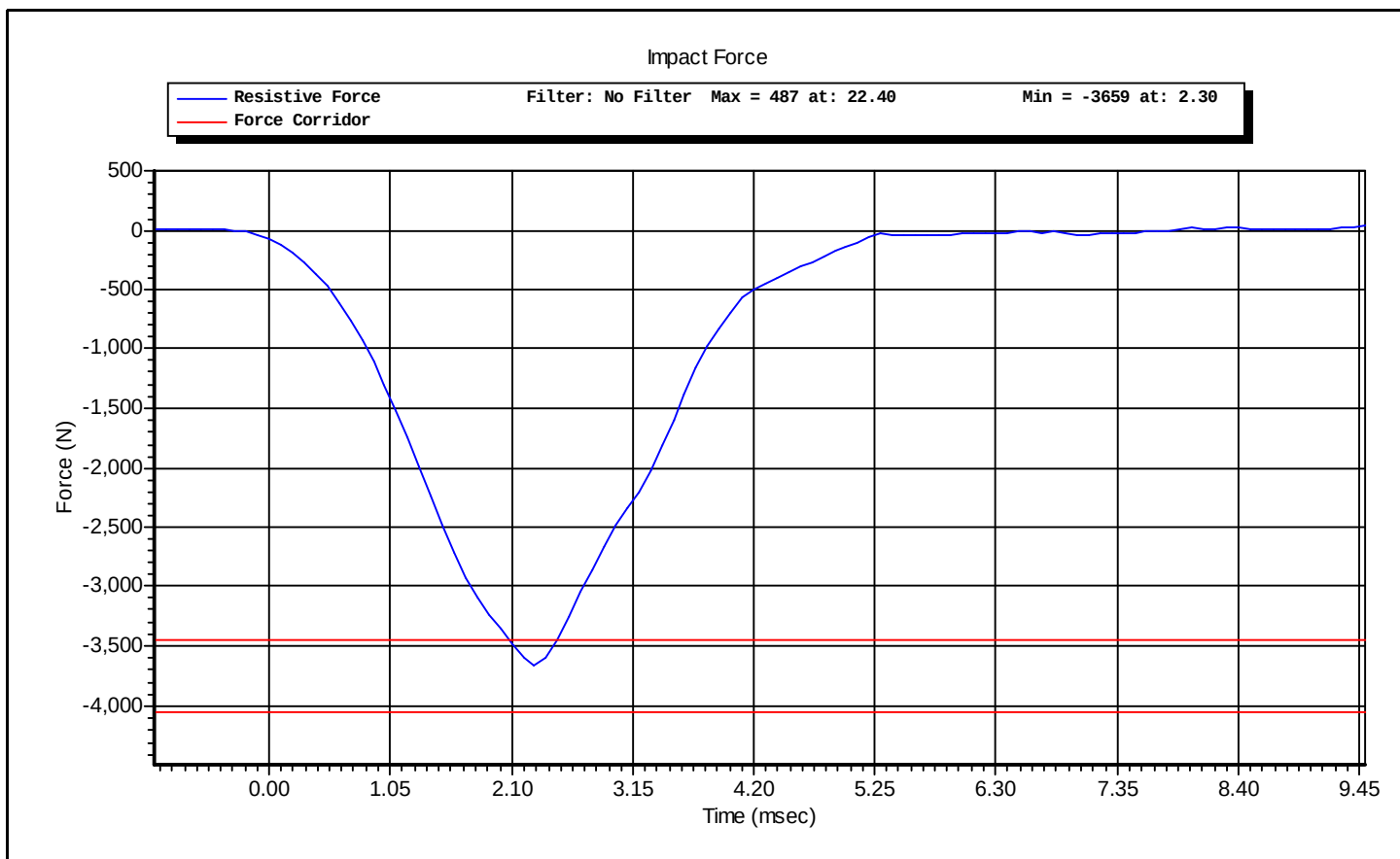


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	8/20/2010
Test Number:	1	Test Time:	4:00:11 PM



Test ID: **Right Knee**

Test Time: **4:00:11 PM**

Test Date: **8/20/2010**

CALIBRATION TEST RESULTS

POST-TEST

DRIVER DUMMY

S/N: 061

50th Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	2.04	Yes
C	H-Point Height	3.3 - 3.5	3.5	Yes
D	H-Point from Backline	5.3 - 5.5	5.3	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.7	Yes
F	Thigh Clearance	5.5 - 6.1	6.1	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.2	Yes
J	Elbow Rest Height	7.5 - 8.3	8.0	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.4	Yes
L	Popliteal Height	16.9 - 17.9	17.5	Yes
M	Knee Pivot Height	19.1 - 19.7	19.2	Yes
N	Buttock Popliteal Length	17.8 - 18.8	18.7	Yes
O	Chest Depth without Jacket	8.4 - 9.0	8.5	Yes
P	Foot Length (right)	9.9 - 10.5	10.1	Yes
V	Shoulder Breadth	16.3 - 17.2	16.8	Yes
W	Foot Breadth	3.6 - 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.5	Yes
Z	Waist Circumference	32.9 - 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician: AR

Date: 9/24/2010



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	3:05:29 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	243

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	56 %RH P
Resultant Acceleration	225 -- 275	256 g P
Oscillation	0.0 -- 10.0	4.4 % P
Lateral Acceleration	-15.00 -- 15.00	-7.69 g P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Head Drop**

Test Time: **3:05:29 PM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66931	4/20/2010
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Test ID: **Head Drop**

Test Time: **3:05:29 PM**

Test Date: **9/23/2010**

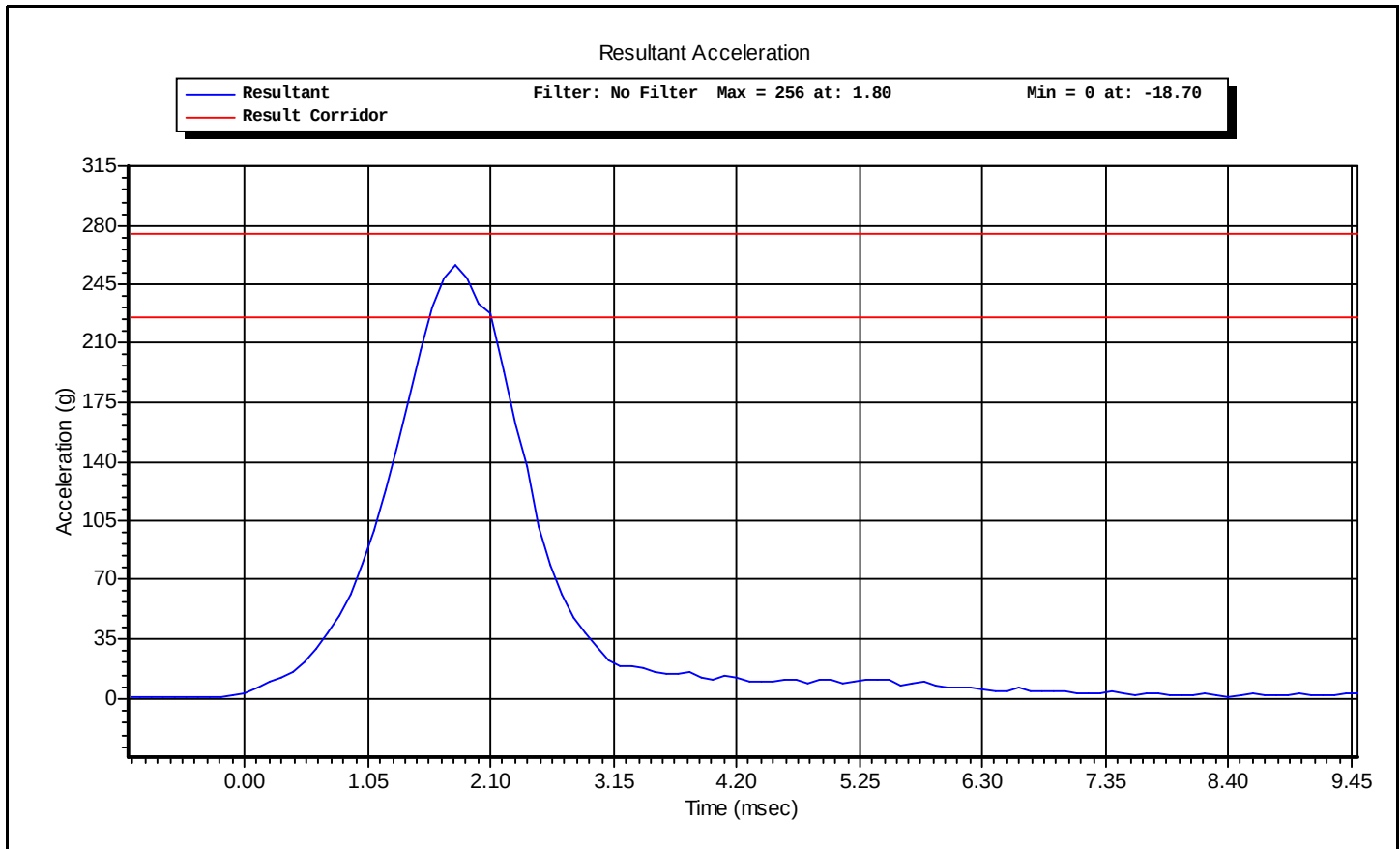


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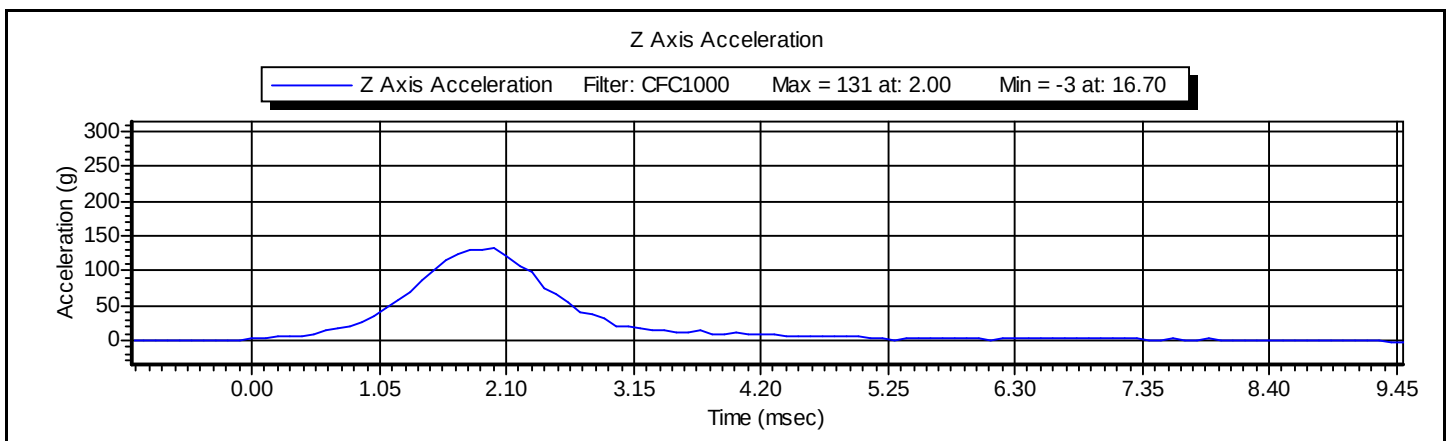
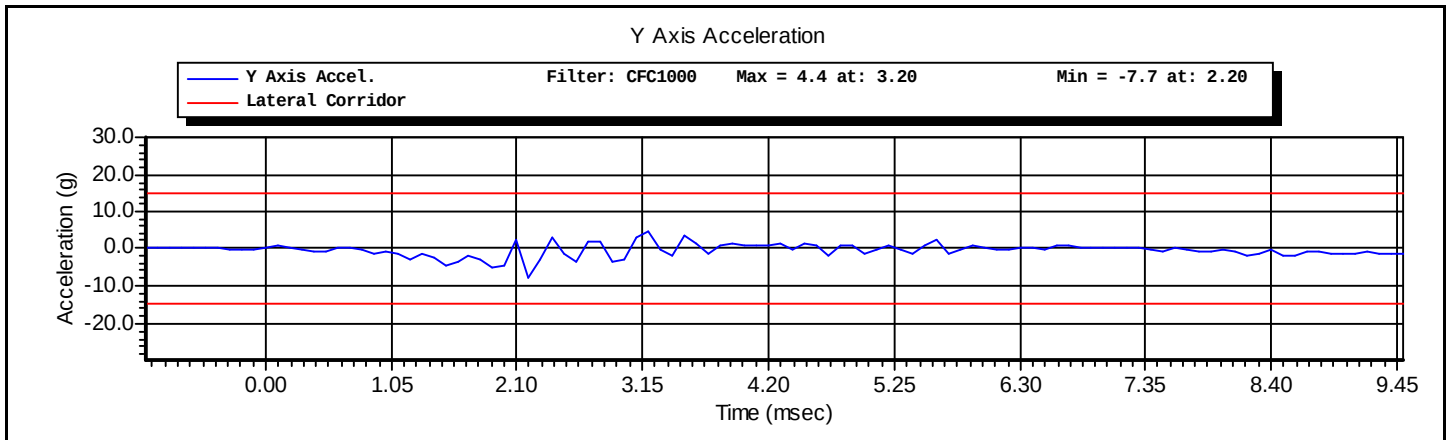
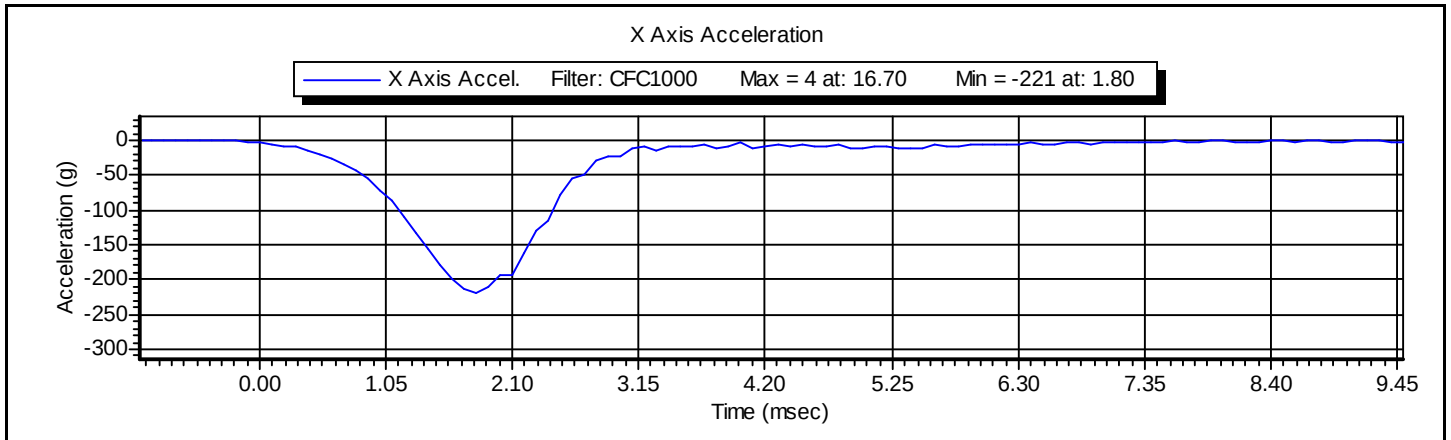
Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	3:05:29 PM



Test ID: Head Drop

Test Time: 3:05:29 PM

Test Date: 9/23/2010





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Extension	Test Date:	9/24/2010
Test Number:	2	Test Time:	9:45:55 AM

Component Part Number	Component Serial Number
Neck - 78051-336	4194

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	59 %RH	P
Velocity		5.94	-- 6.19	6.13 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	19.0 g	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	17.2 g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	13.5 g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	13.7 g	P
Decel Time to	5 g	38.0	-- 46.0	43.3 ms	P
D Plane Rotation		81.0	-- 106.0	94.3 degrees	P
Time at Max Rotation		72.0	-- 82.0	77.4 ms	P
Rotation Decay to Zero		147.0	-- 174.0	158.7 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-68.2 Nm	P
Time at Max Moment		65.0	-- 79.0	72.3 ms	P
Moment Decay to Zero		120.0	-- 148.0	142.8 ms	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Extension**

Test Time: **9:45:55 AM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Extension**

Test Time: **9:45:55 AM**

Test Date: **9/24/2010**

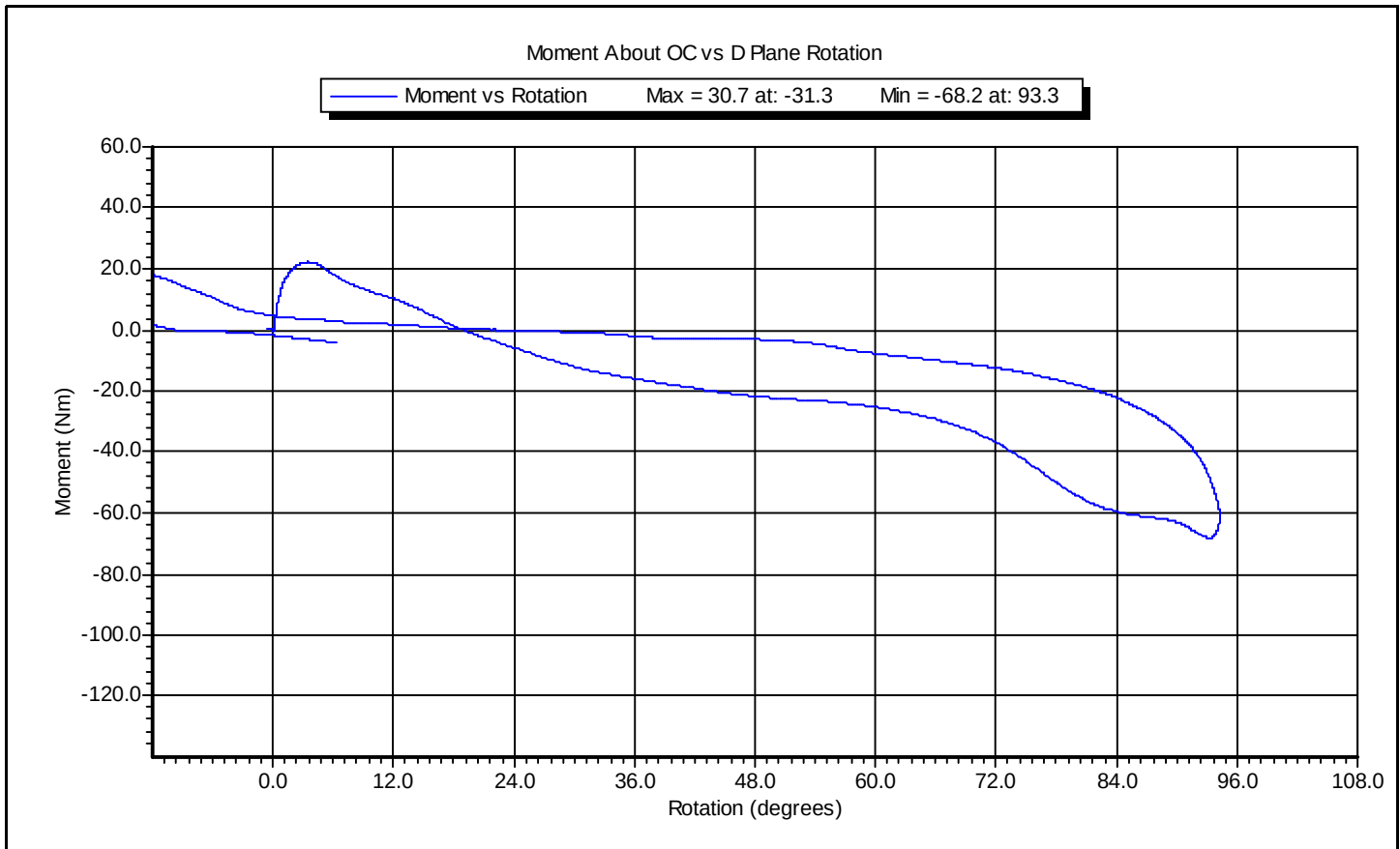


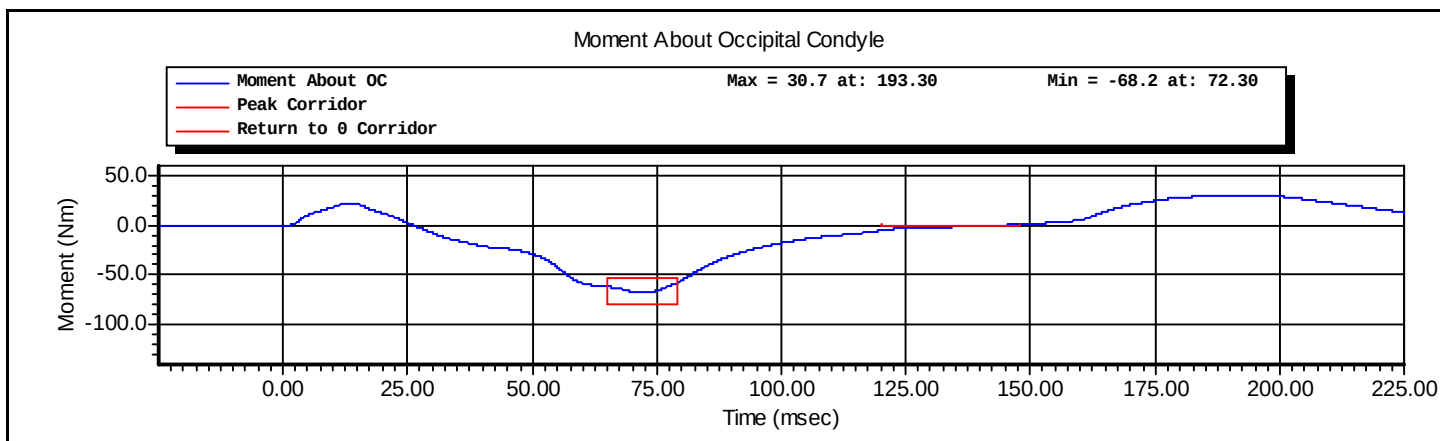
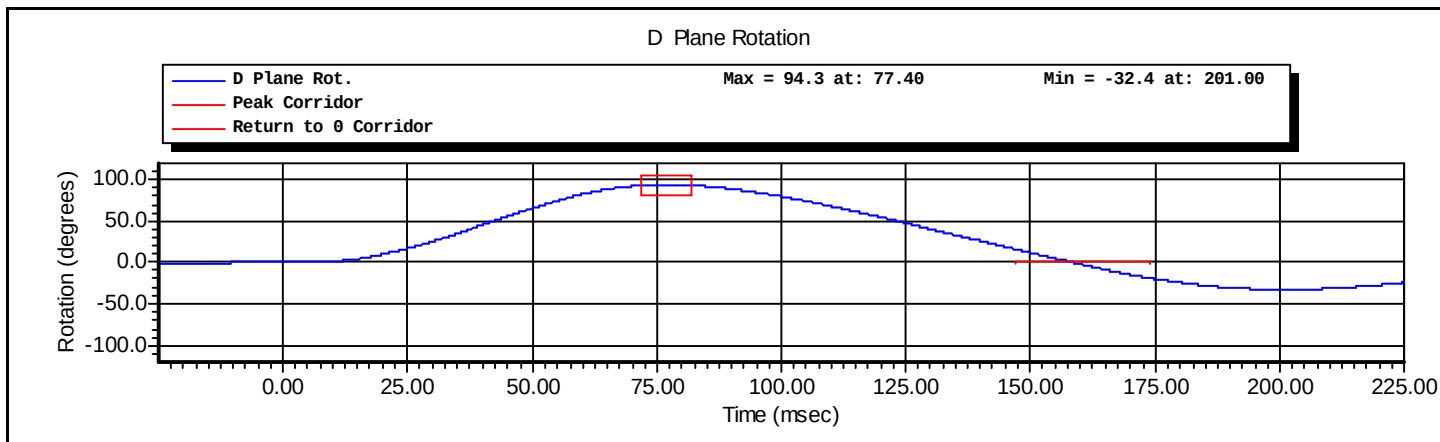
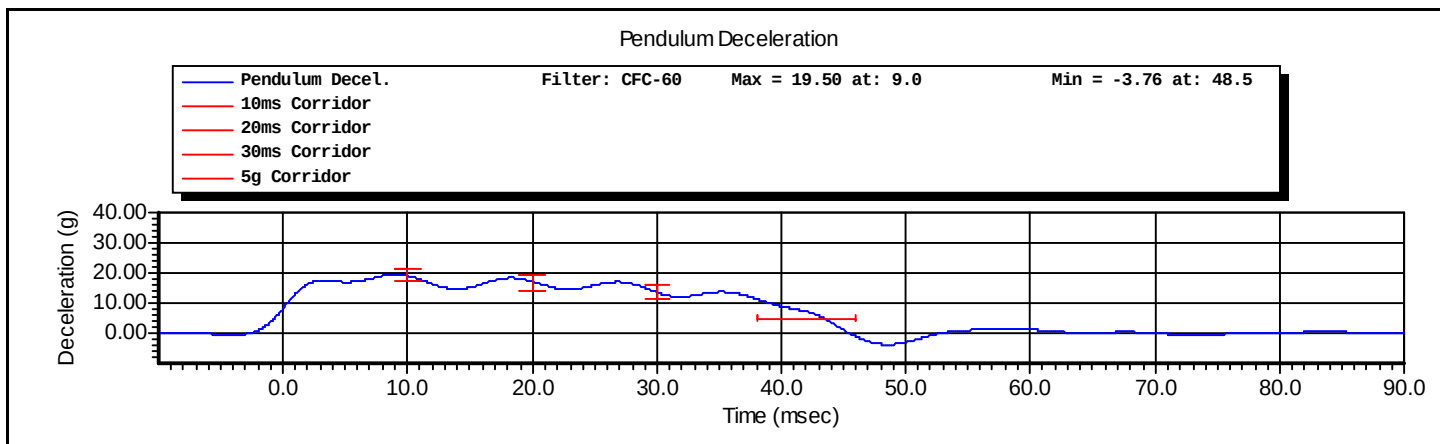
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Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	9/24/2010
Number of Test:	2	Time of Test:	9:45:55 AM







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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Flexion	Test Date:	9/23/2010
Test Number:	1	Test Time:	7:05:58 PM

Component Part Number	Component Serial Number
Neck - 78051-336	4194

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	53 %RH	P
Velocity		6.89	-- 7.13	7.09 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	26.4 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	21.0 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	16.3 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	16.3 g	P
Deceleration time to	5 g	34.0	-- 42.0	37.4 ms	P
D Plane Rotation		-78.0	-- -64.0	-71.4 degrees	P
Time at max rotation		57.0	-- 64.0	58.6 ms	P
Rotation Decay to Zero		113.0	-- 128.0	118.8 ms	P
Moment about OC		88.1	-- 108.4	98.9 Nm	P
Time at Max Moment		47.0	-- 58.0	49.8 ms	P
Moment Decay to Zero		97.0	-- 107.0	97.0 ms	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Flexion**

Test Time: **7:05:58 PM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Flexion**

Test Time: **7:05:58 PM**

Test Date: **9/23/2010**

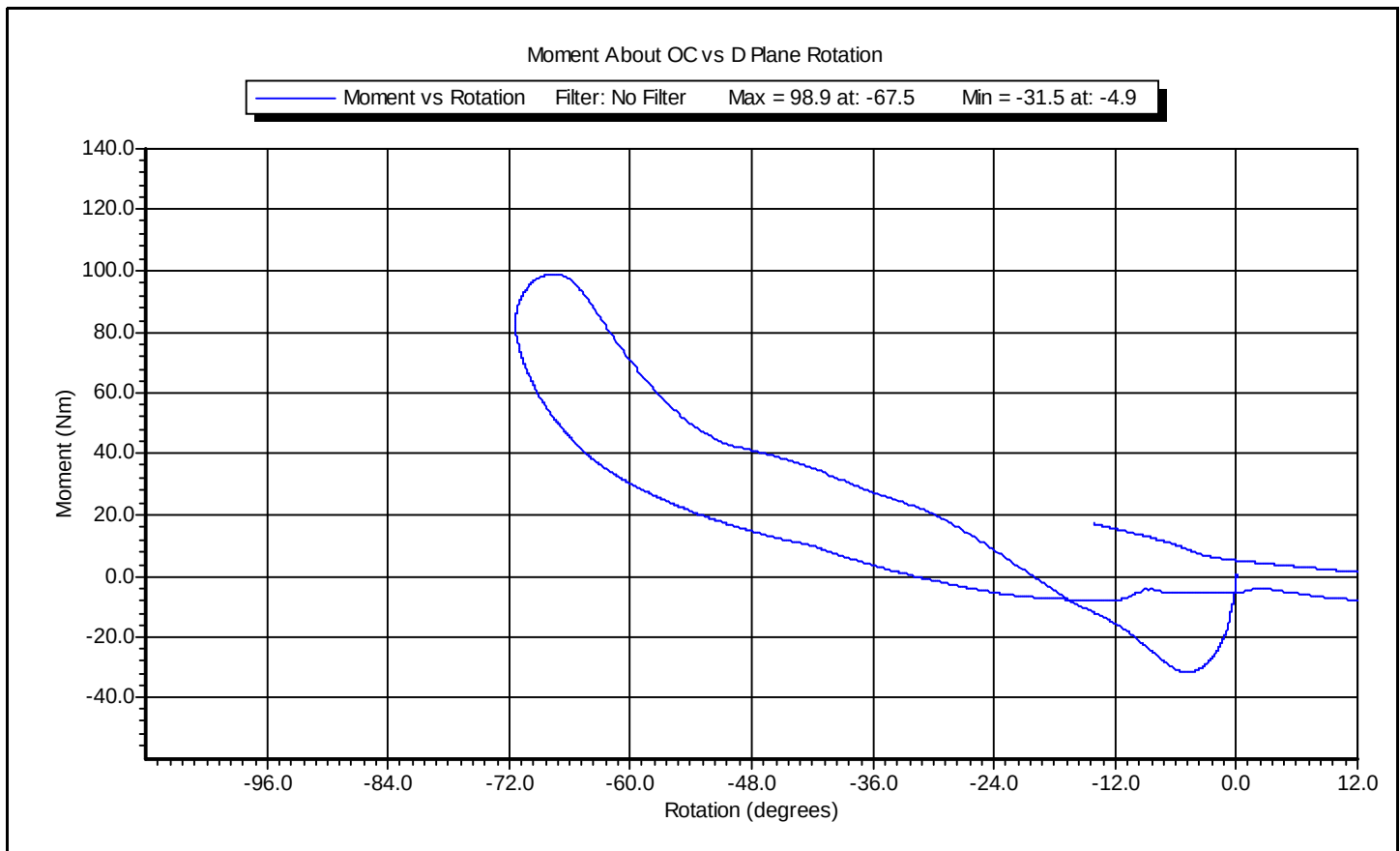


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Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	9/23/2010
Number of Test:	1	Time of Test:	7:05:58 PM

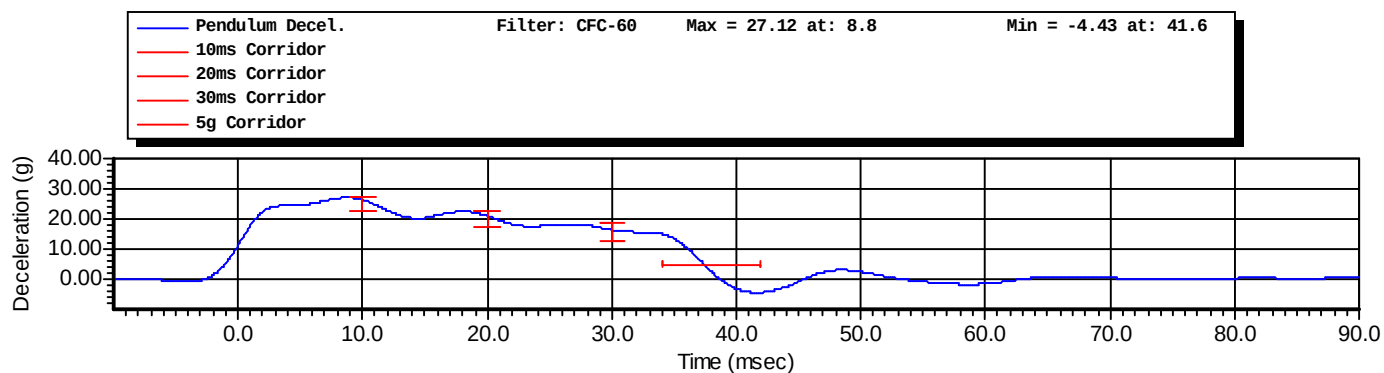


ID of Test: Neck Flexion

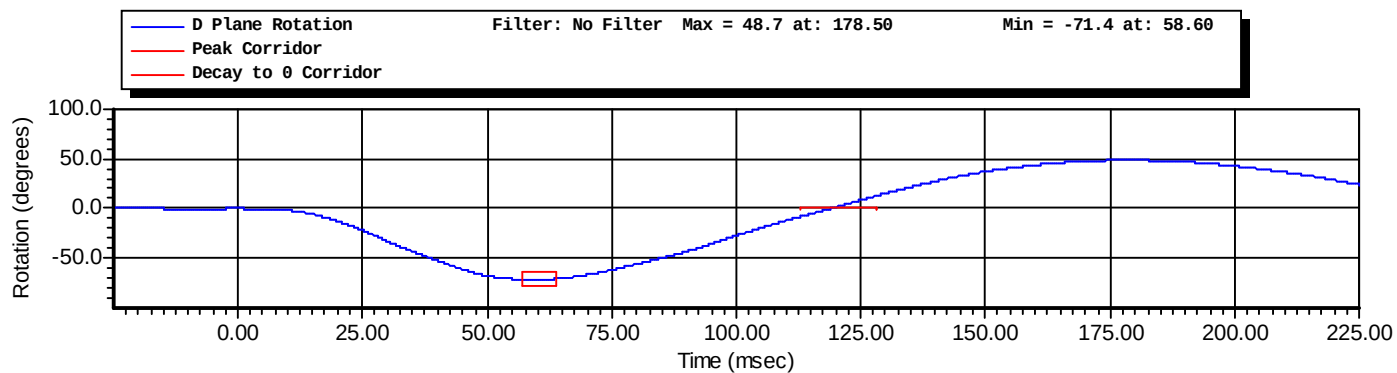
Time of Test: 7:05:58 PM

Date of Test: 9/23/2010

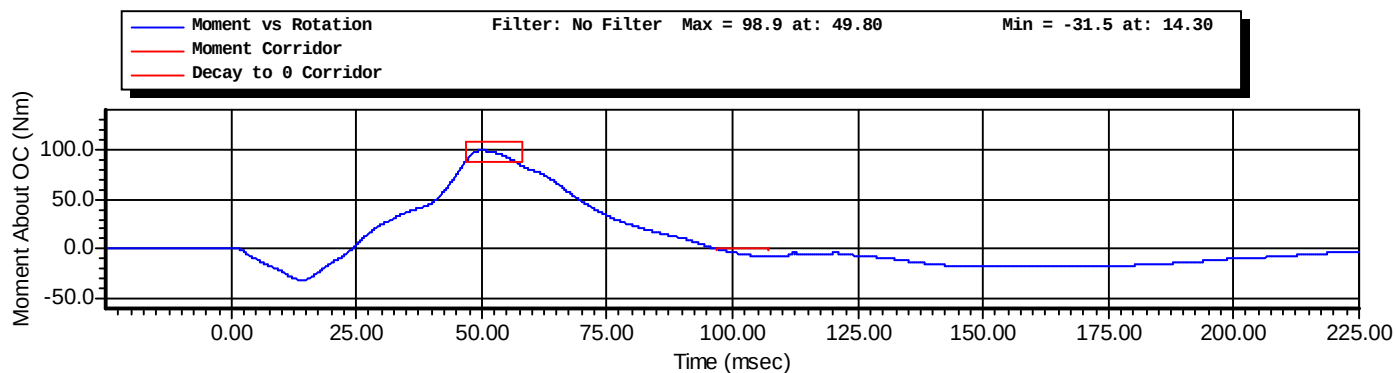
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	1:53:57 PM

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	53.0 %RH P
Velocity	6.59 -- 6.83	6.70 m/s P
Resistive Force	-5.894 -- -5.160	-5.396 kN P
Sternum Displacement	-72.6 -- -63.5	-71.4 mm P
Hysteresis	69 -- 85	72 % P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax**

Test Time: **1:53:57 PM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

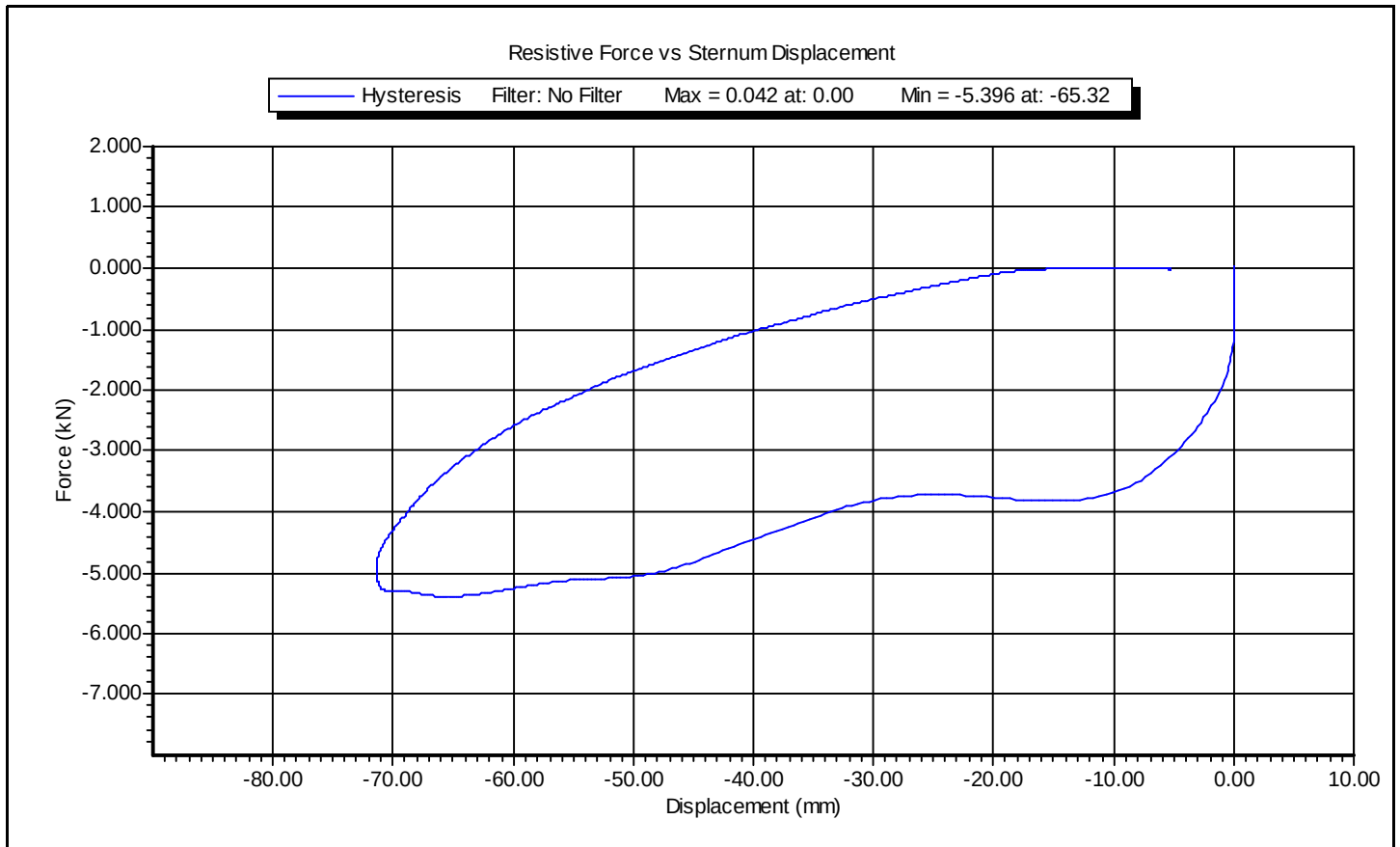
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
DentonATD	78051-342	DS-061	6/1/2010

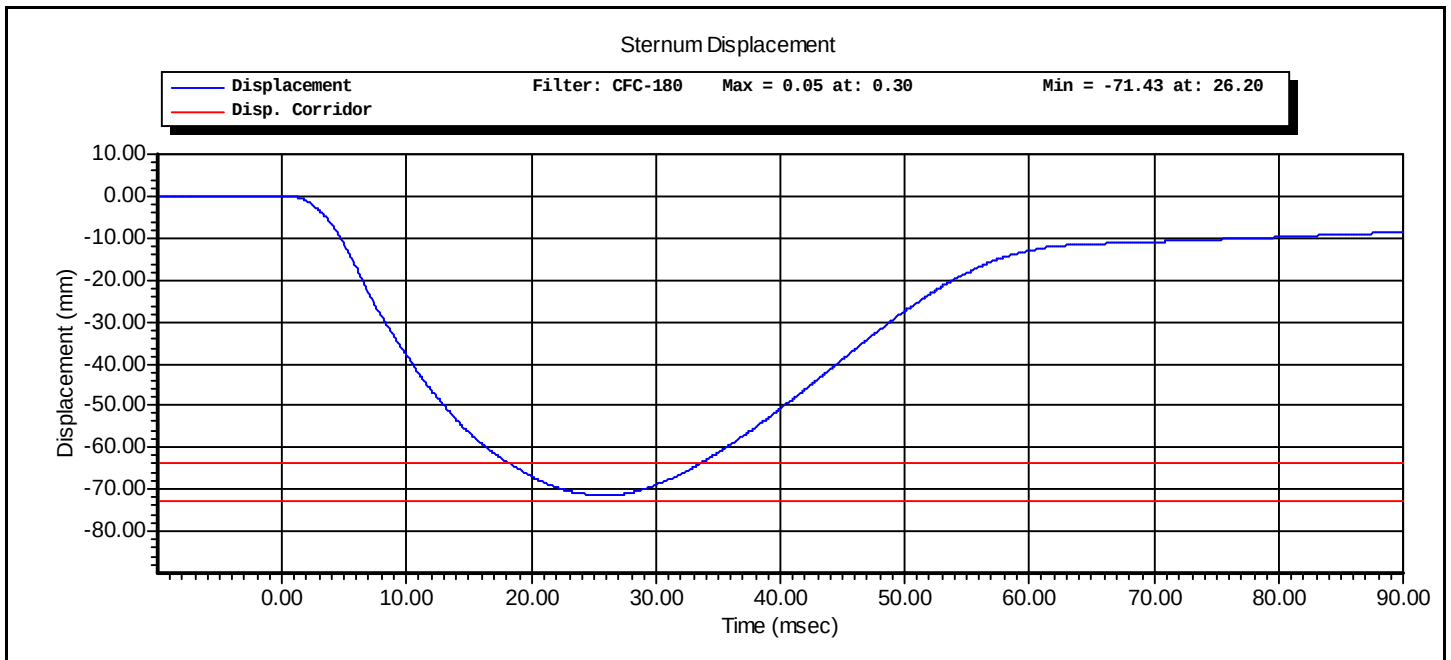
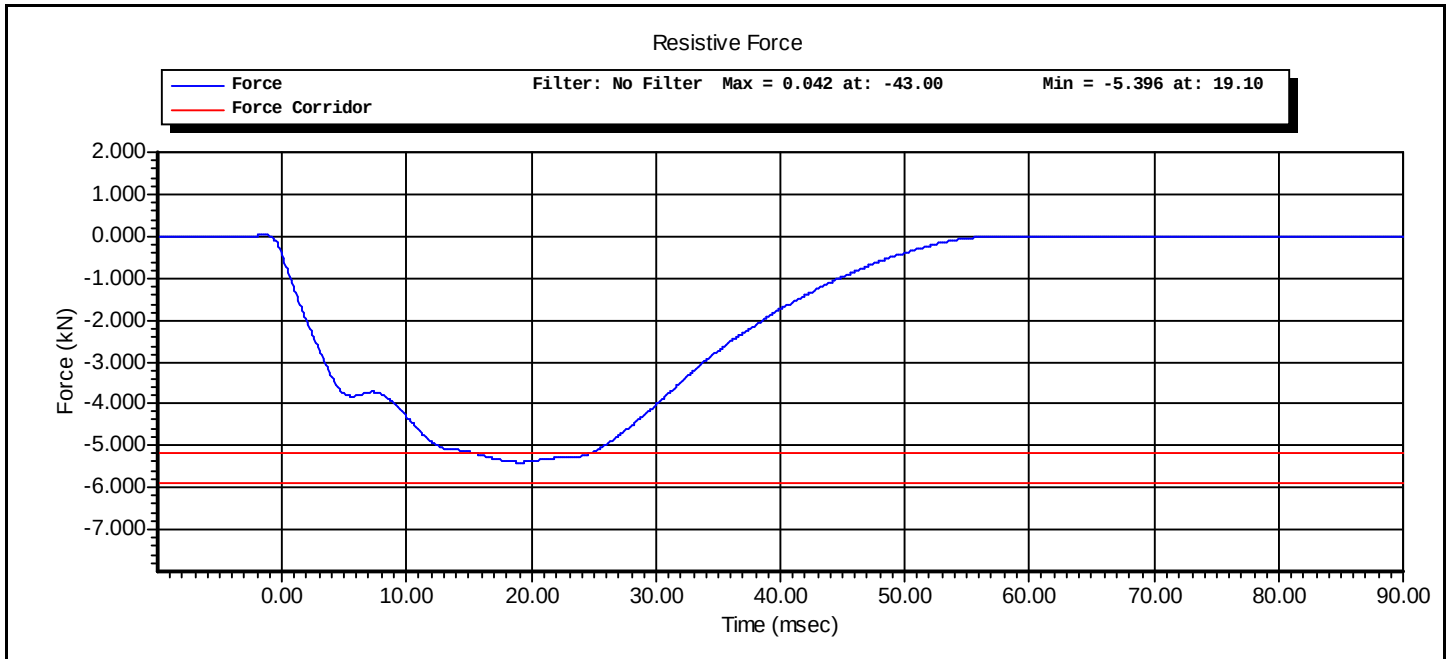
Test ID: **Thorax**

Test Time: **1:53:57 PM**

Test Date: **9/23/2010**

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	1:53:57 PM





CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

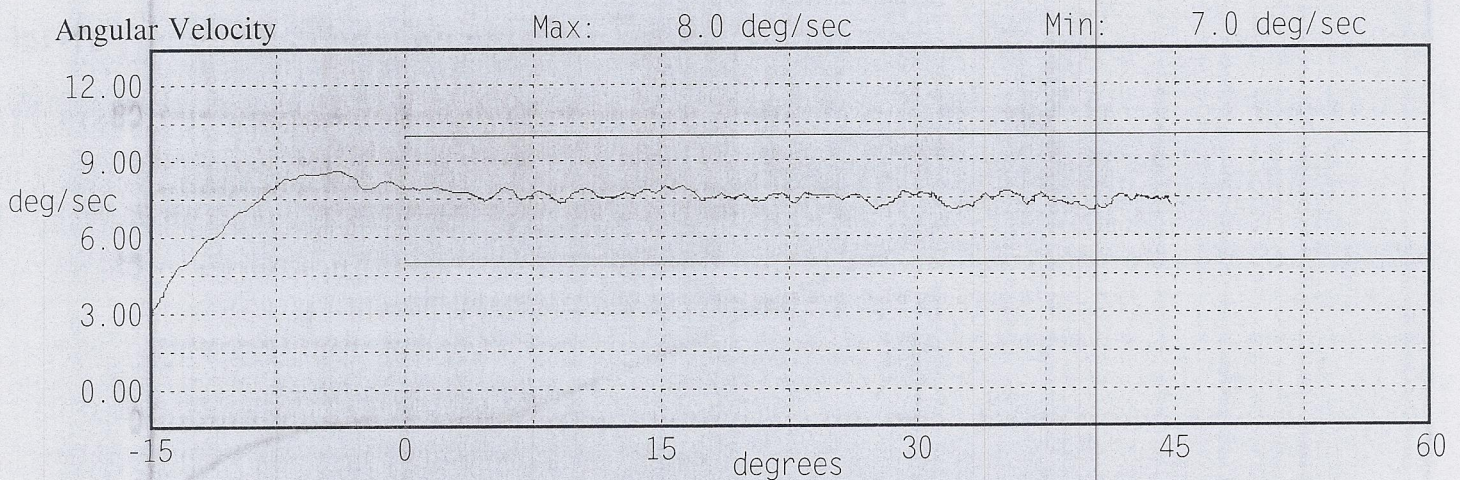
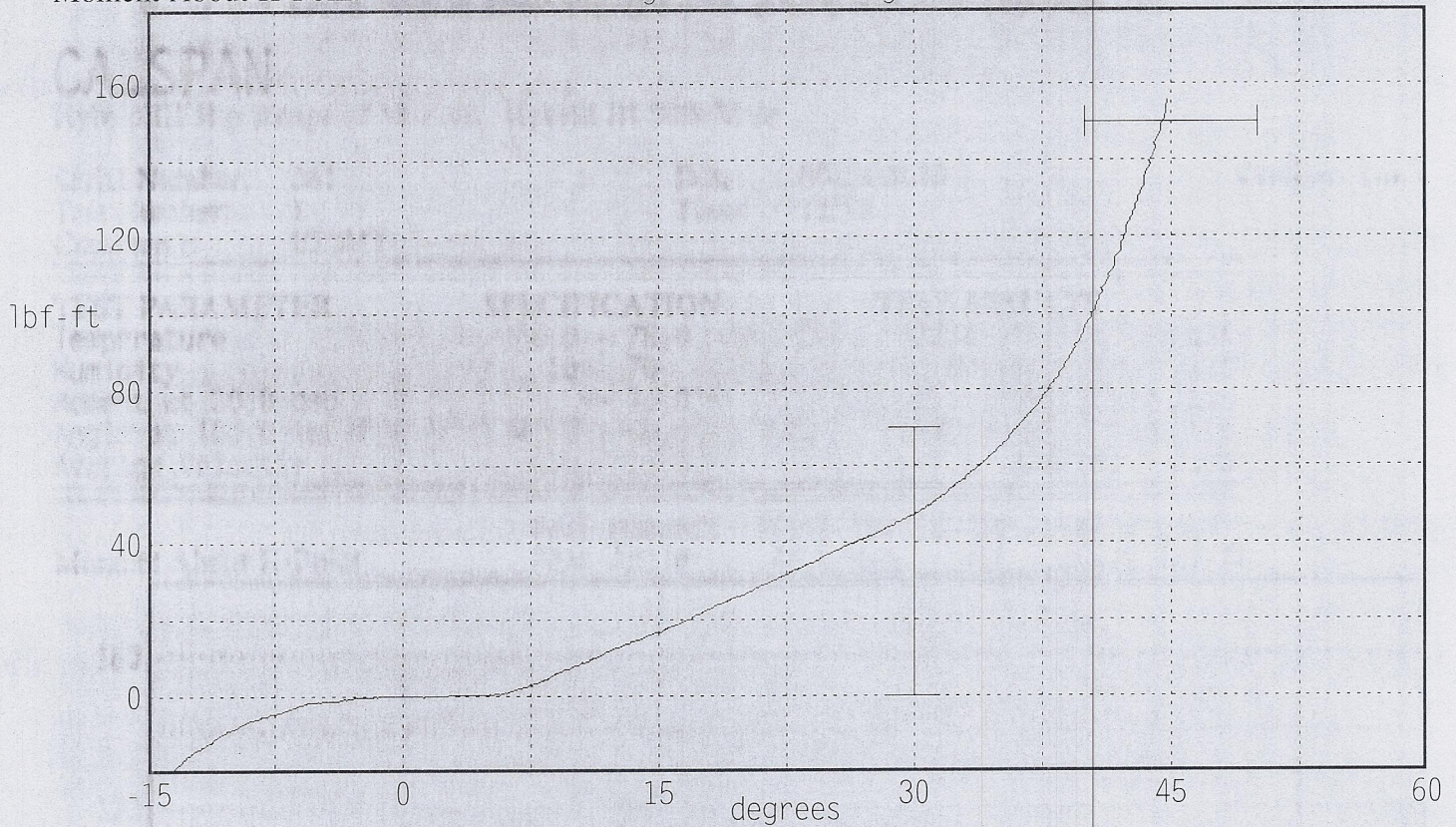
Serial Number: 061
Test Number: 1
Comments: RIGHT

Date: 09/24/2010
Time: 12:56

Version: 1.6.3,

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	52 % Pass
Moment at 30.0 deg	<= 70.0	47.3 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.6 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.5 lbf-ft at 44.8 deg
Peak Angle: 44.8 deg at 155.5 lbf-ft



CALSPAN

Hybrid III Hip Range of Motion: Hybrid III 50th Male

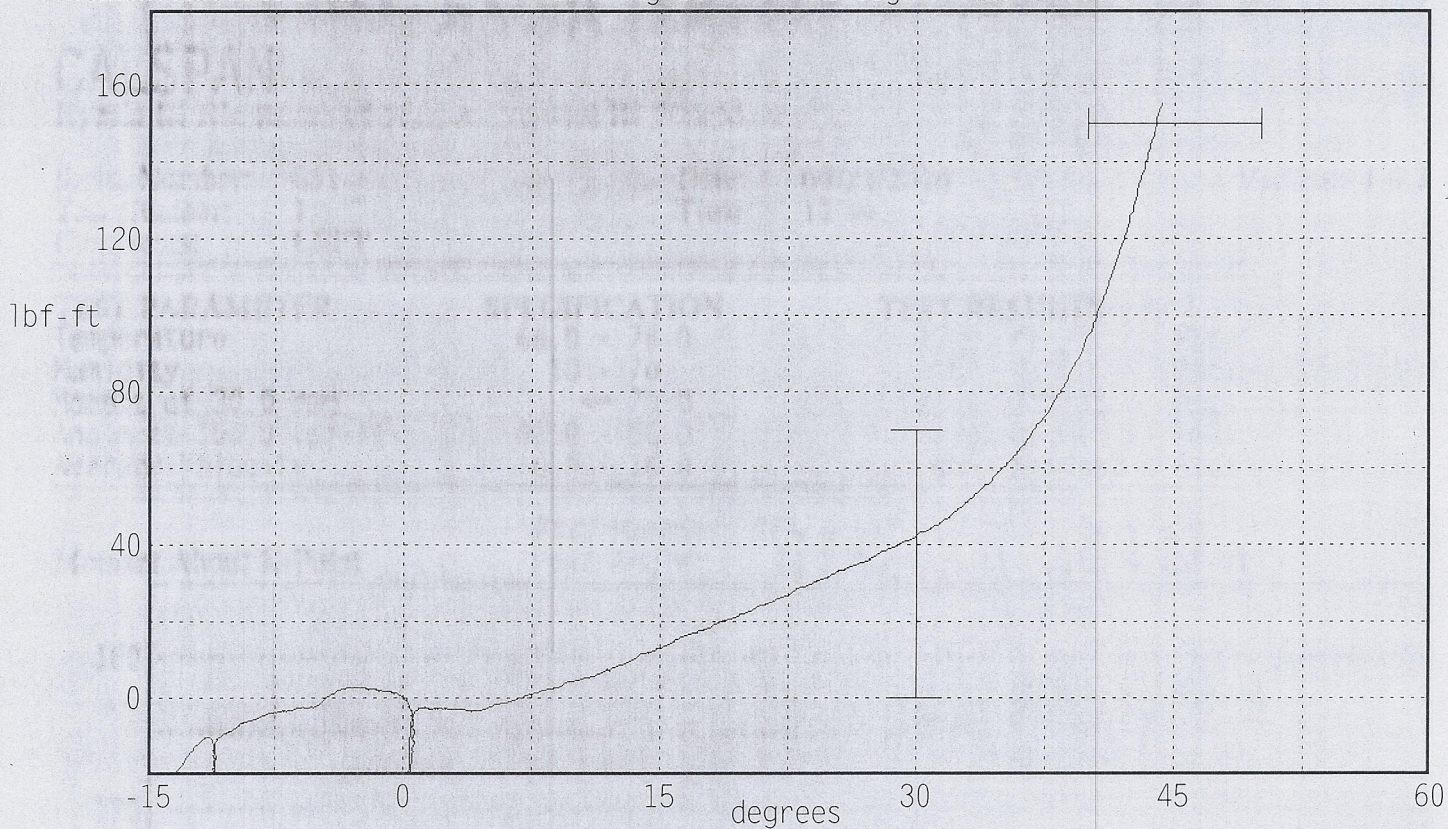
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 09/24/2010
Time: 12:49

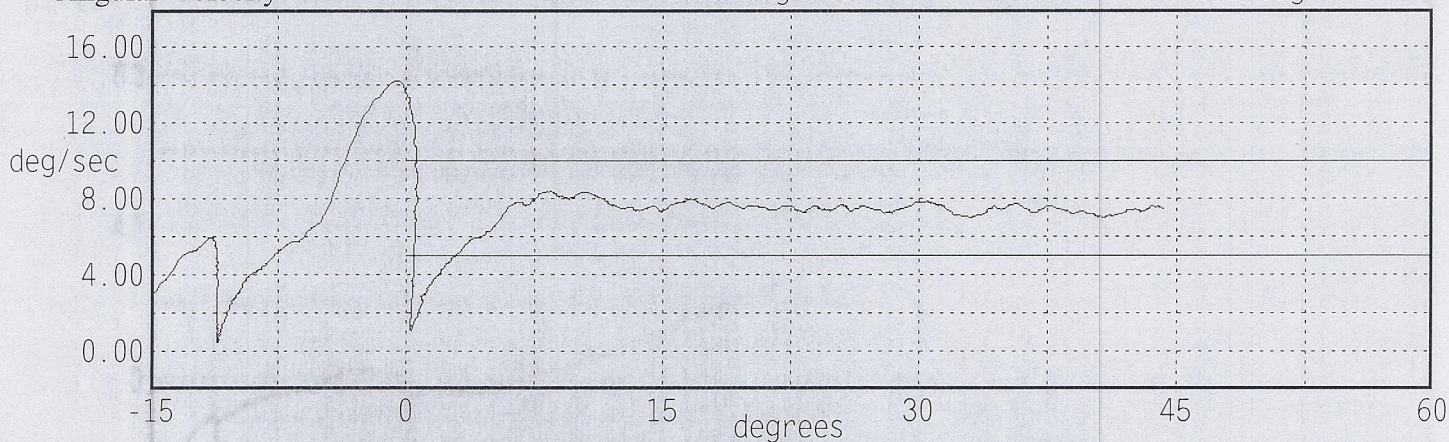
Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	52 % Pass
Moment at 30.0 deg	<= 70.0	42.6 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.9 deg Pass
Average Velocity	5.0 - 10.0	6.9 deg/sec Pass

Moment About H-Point
Peak Moment: 155.4 lbf-ft at 44.2 deg
Peak Angle: 44.2 deg at 155.4 lbf-ft



Angular Velocity
Max: 13.6 deg/sec
Min: 1.1 deg/sec





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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	2	Test Time:	2:37:59 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	077

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	50.0 %RH P
Velocity	2.07 -- 2.13	2.12 m/s P
Resistive Force	-5.78 -- -4.72	-4.96 kN P

All test parameters are within specifications

Technician: **A Rudniski** Signature: _____

Supervisor: **D Travale** Signature: _____

Test ID: **Left Knee**

Test Time: **2:37:59 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Left Knee**

Test Time: **2:37:59 PM**

Test Date: **9/24/2010**

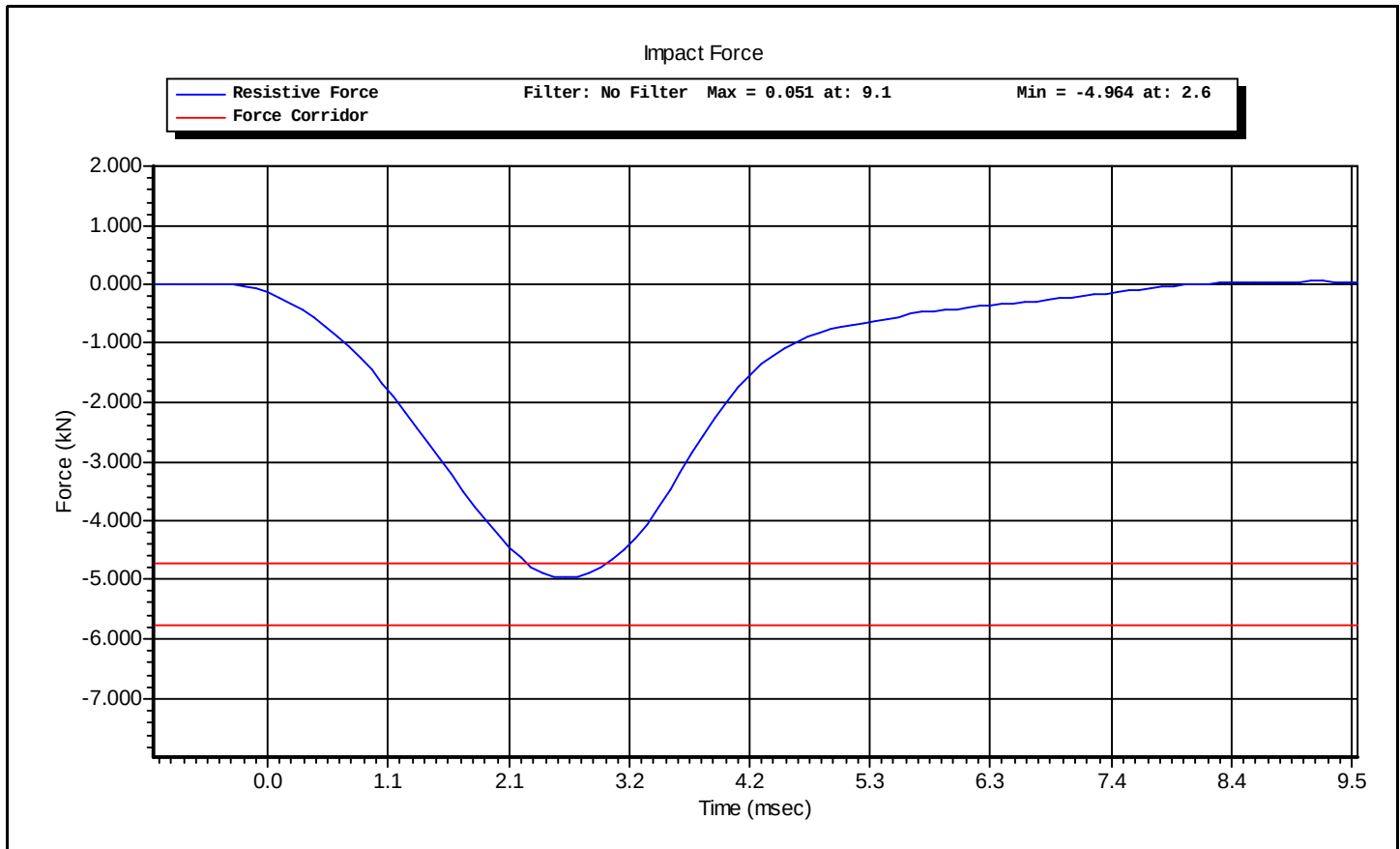


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	2	Test Time:	2:37:59 PM



Test ID: **Left Knee**

Test Time: **2:37:59 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	2:47:45 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	3266

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	50.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-4.89 kN P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Right knee**

Test Time: **2:47:45 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Right knee**

Test Time: **2:47:45 PM**

Test Date: **9/24/2010**

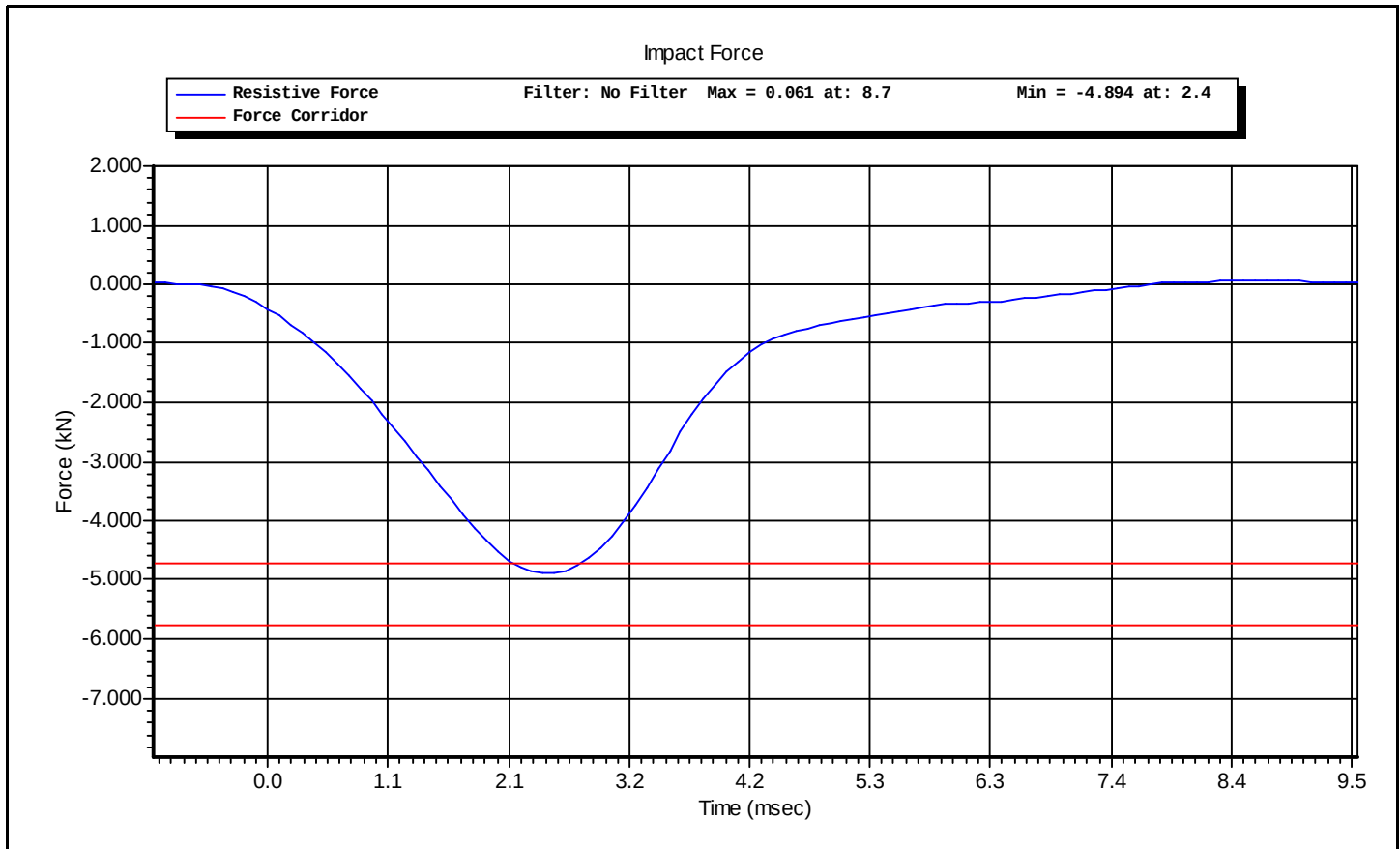


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	2:47:45 PM



Test ID: **Right knee**

Test Time: **2:47:45 PM**

Test Date: **9/24/2010**

CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

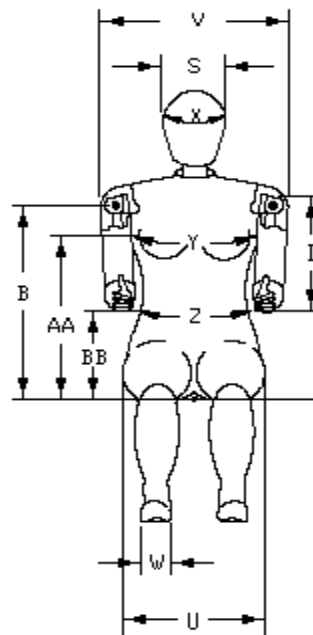
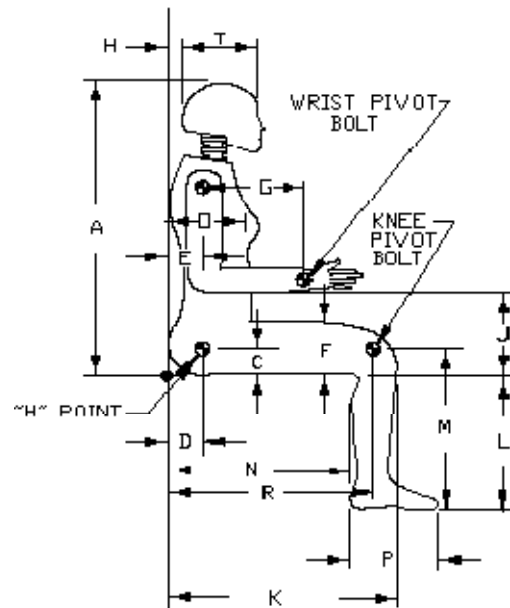
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	78	Yes
F	Thigh Clearance	119.4 – 134.6	128	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	250	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	282	Yes
J	Elbow Rest Height	182.8 – 203.2	195	Yes
K	Buttock to Knee Length	520.7 – 546.1	530	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	401	Yes
N	Buttock Popliteal Length	414 – 439.4	425	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	222	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	479	Yes
S	Head Breadth	137.1 – 147.3	144	Yes
T	Head Depth	177.8 - 188	184	Yes
U	Hip Breadth	299.7 – 314.9	309	Yes
V	Shoulder Breadth	350.5 – 365.7	359	Yes
W	Foot Breadth	78.8 - 94	88	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	859	Yes
Z	Waist Circumference	759.5 – 789.9	775	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: AR

Date: 9/27/2010

Hybrid 3 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	4:03:03 PM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	52 %RH P
Resultant Acceleration	250 -- 300	275 g P
Oscillation	0.0 -- 10.0	7.9 % P
Lateral Acceleration	-15.00 -- 15.00	-3.60 g P

All test parameters are within specifications

Technician: A. Rudniski Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: **Head Drop**

Test Time: **4:03:03 PM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	7/27/2010
Endevco	7264-2000	P66931	4/20/2010
Endevco	7264-2000	P66926	4/20/2010

Test ID: **Head Drop**

Test Time: **4:03:03 PM**

Test Date: **9/23/2010**

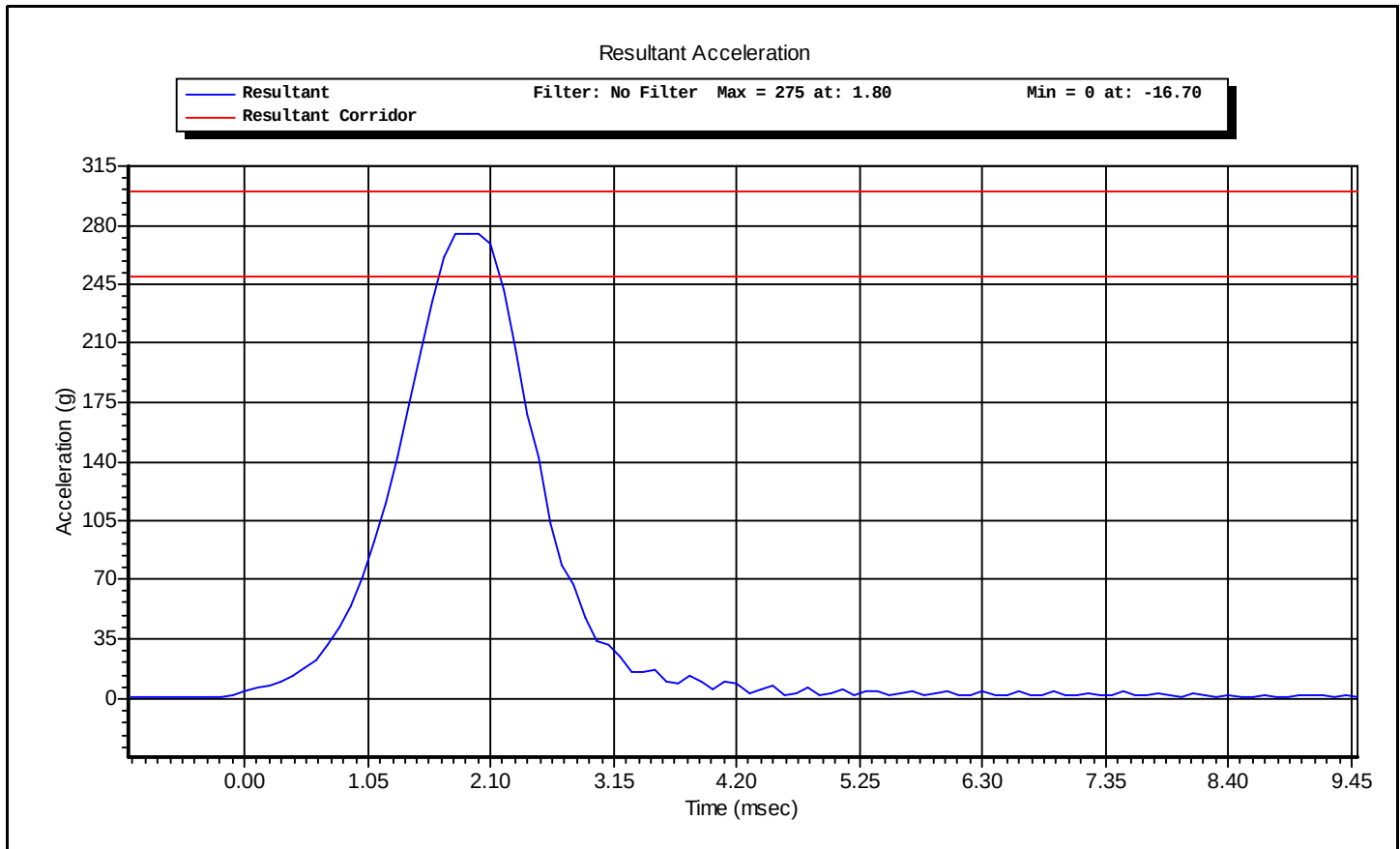


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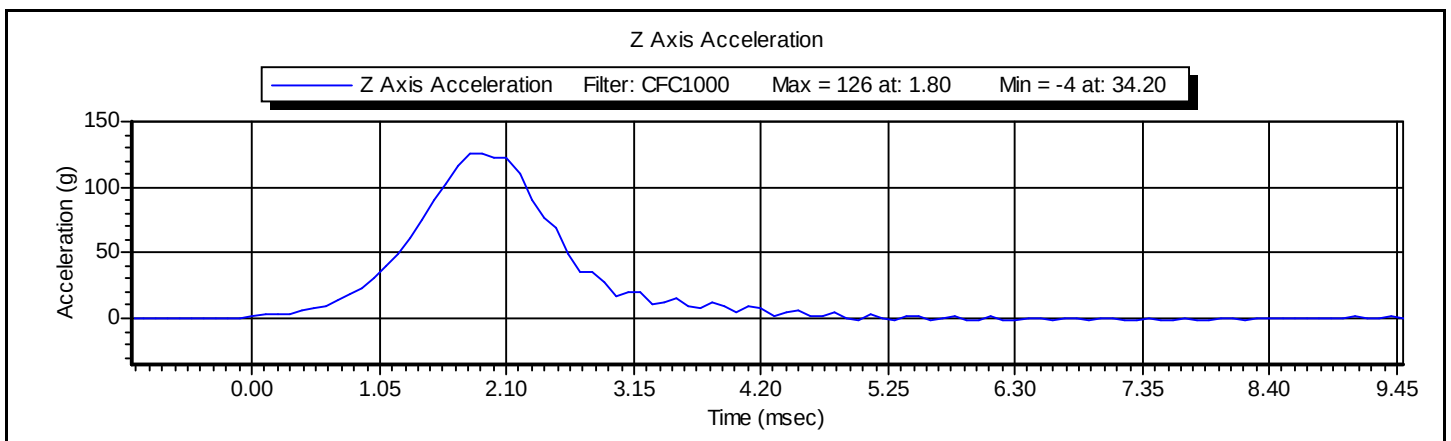
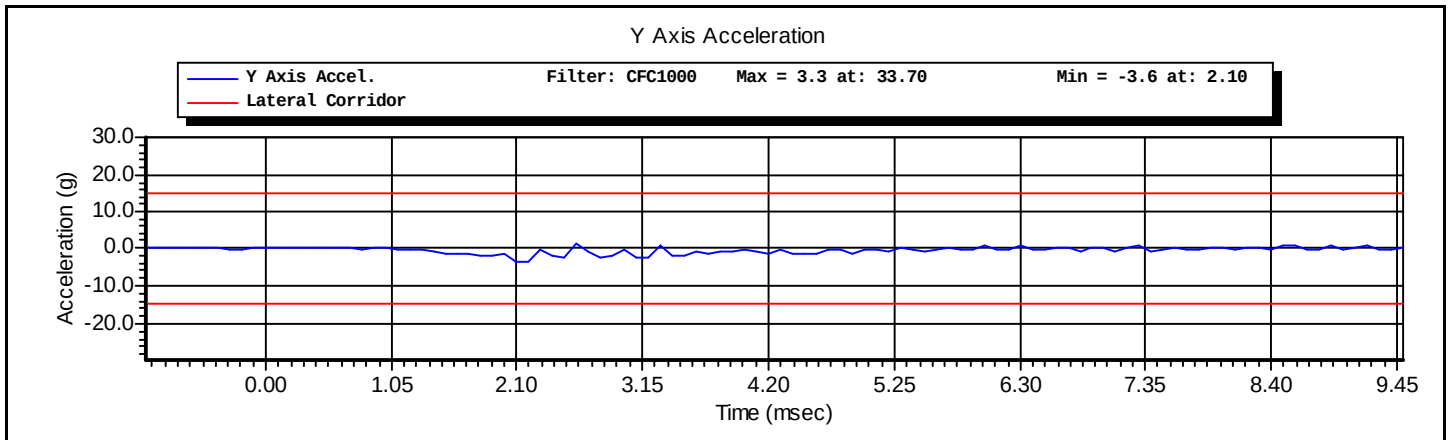
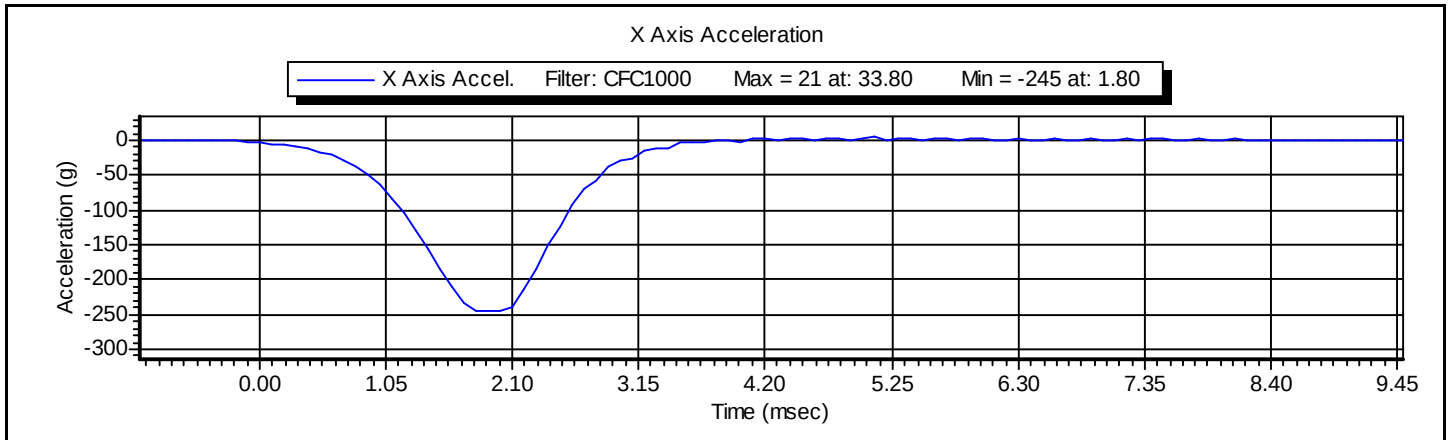
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	9/23/2010
Test Number:	1	Test Time:	4:03:03 PM



Test ID: Head Drop

Test Time: 4:03:03 PM

Test Date: 9/23/2010





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:56:13 AM

Component Part Number	Component Serial Number
Neck - 880105-255	713

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	53 %RH P
Velocity	5.95 -- 6.19	6.06 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.82 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.58 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.16 m/s P
D Plane Rotation	99.0 -- 114.0	111.0 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-56.9 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	103.5 ms P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Extension**

Test Time: **11:56:13 AM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1632 My	7/14/2010
Denton	1716A	LC-1632 Fx	7/14/2010

Test ID: **Neck Extension**

Test Time: **11:56:13 AM**

Test Date: **9/24/2010**

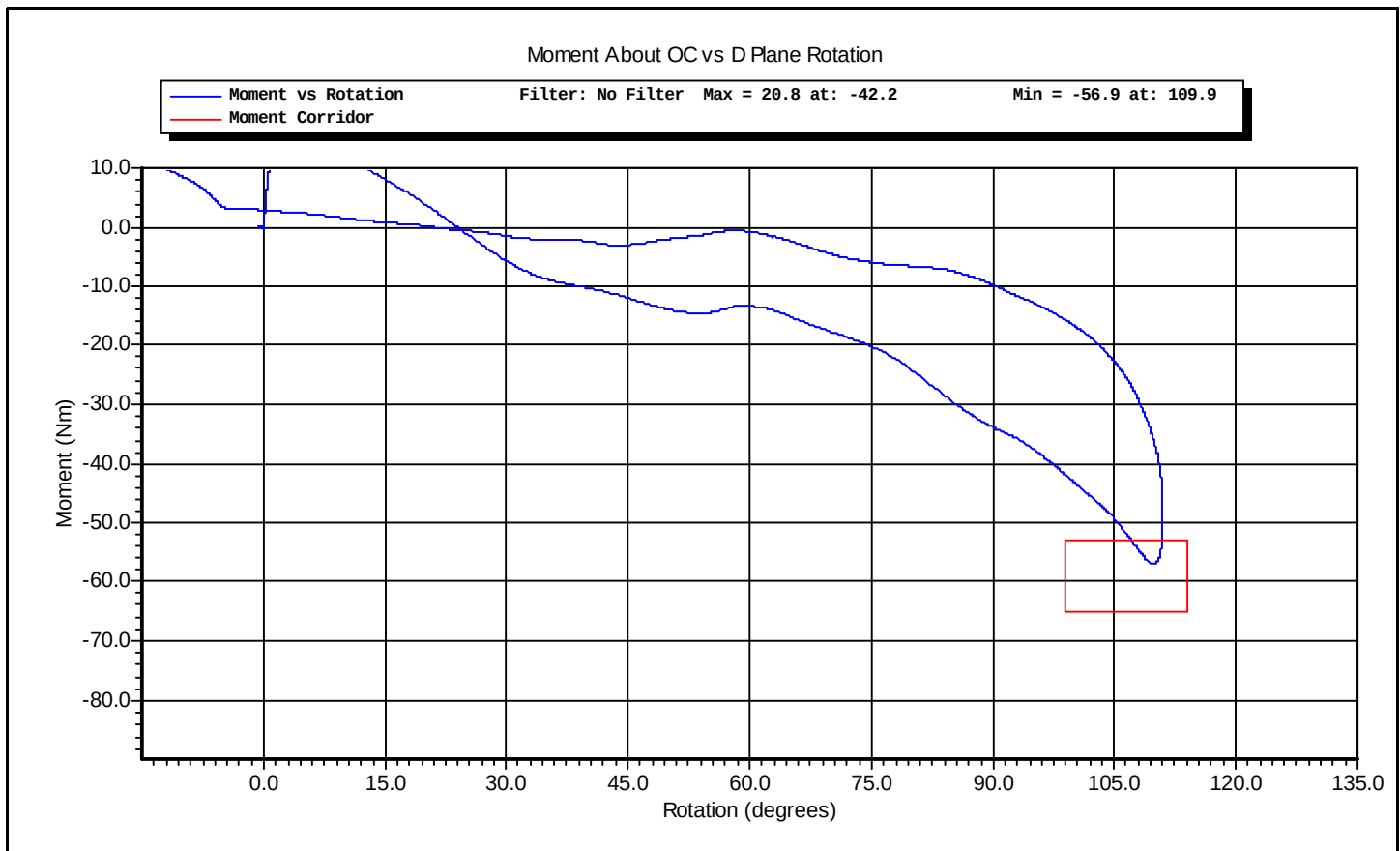


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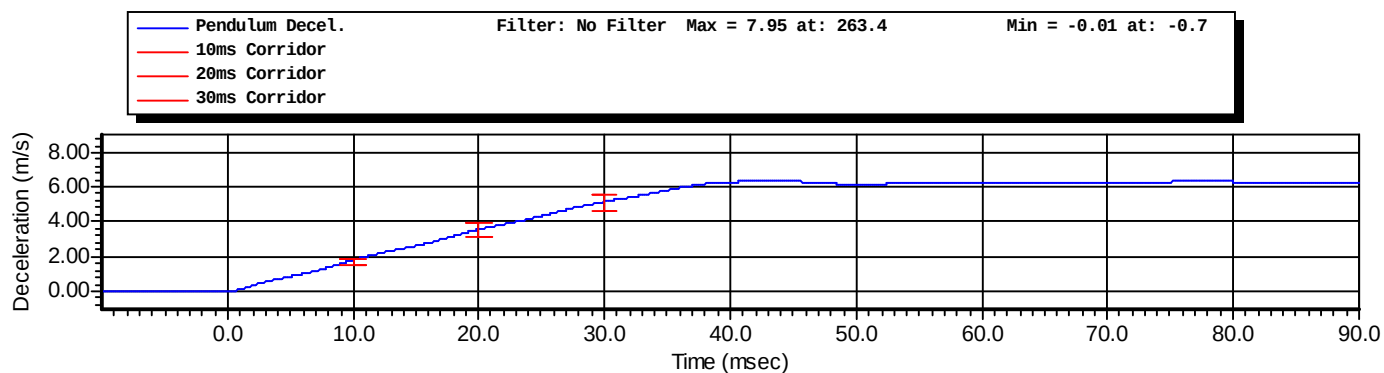
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:56:13 AM



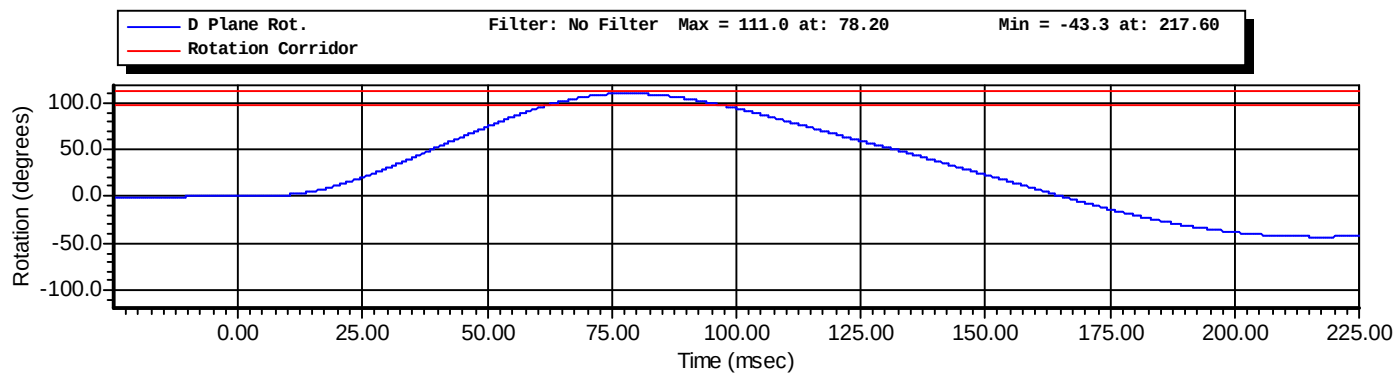
Test ID: Neck Extension Test Time: 11:56:13 AM

Test Date: 9/24/2010

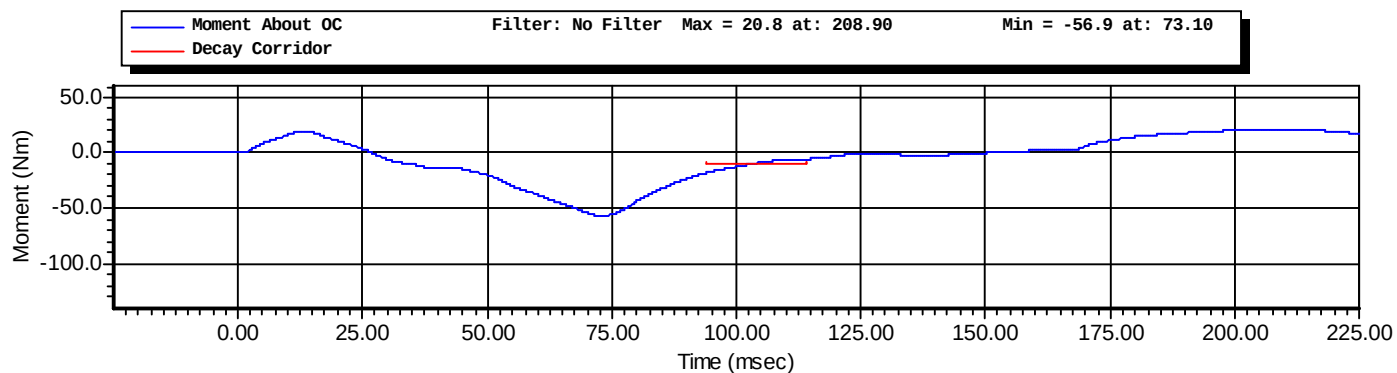
Pendulum Impulse



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:29:30 AM

Component Part Number	Component Serial Number
Neck - 880105-255	713

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	53 %RH P
Velocity	6.89 -- 7.13	7.02 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.47 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.86 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.94 m/s P
D Plane Rotation	-91.0 -- -77.0	-88.1 degrees P
Moment During Rotation Interval	69.0 -- 83.0	69.9 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	88.6 ms P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Neck Flexion**

Test Time: **11:29:30 AM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1632 My	7/14/2010
Denton	1716A	LC-1632 Fx	7/14/2010

Test ID: **Neck Flexion**

Test Time: **11:29:30 AM**

Test Date: **9/24/2010**

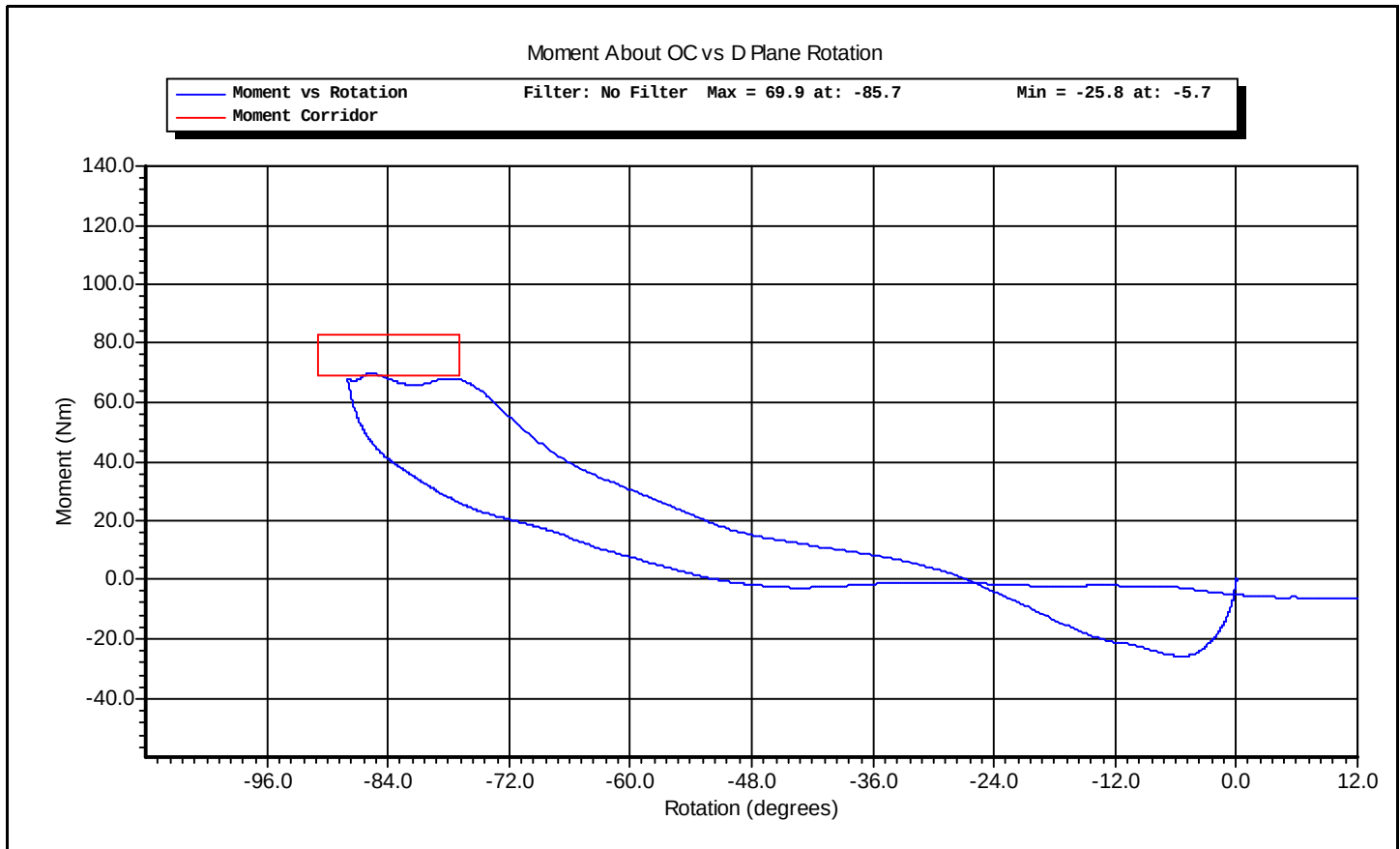


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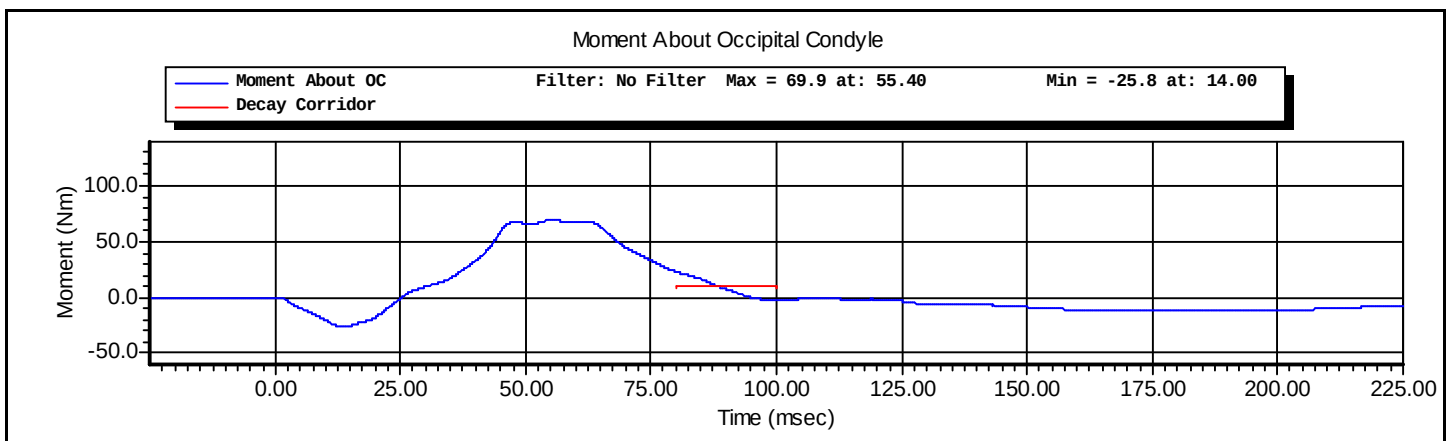
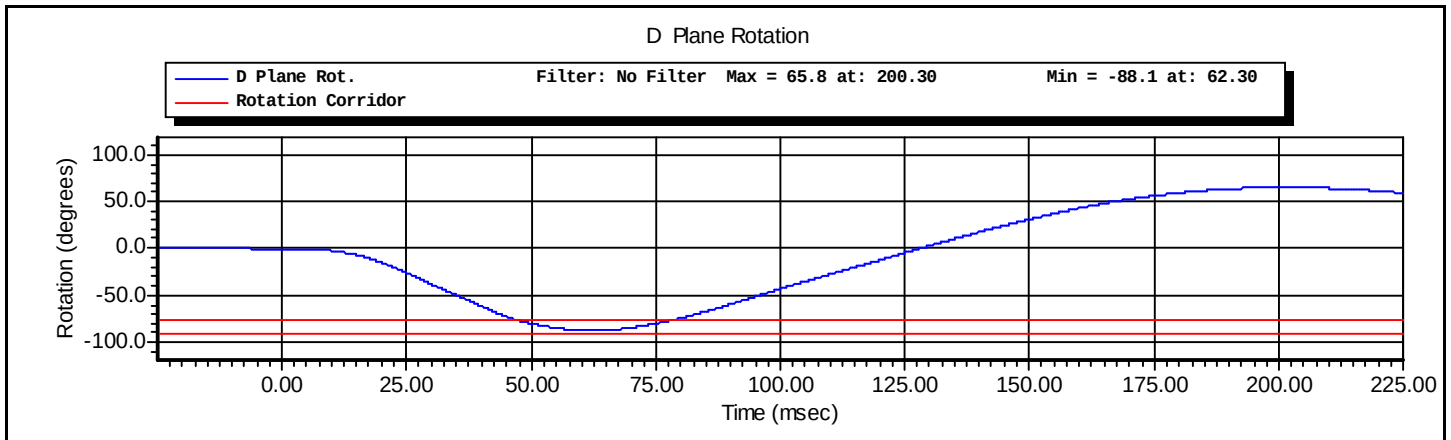
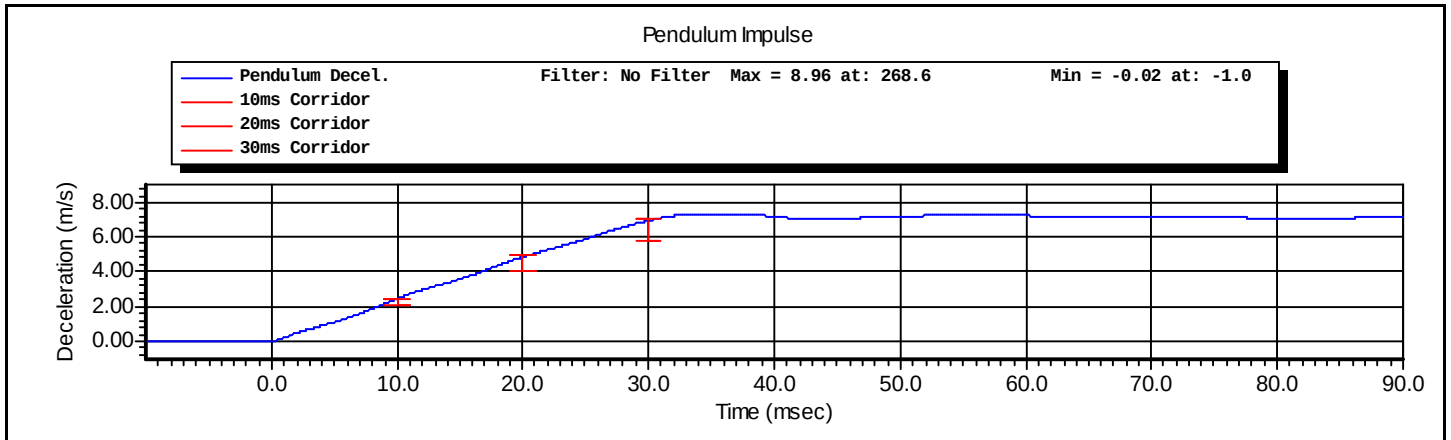
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	9/24/2010
Test Number:	1	Test Time:	11:29:30 AM



Test ID: Neck Flexion

Test Time: 11:29:30 AM

Test Date: 9/24/2010





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	11:40:40 AM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10.0	--	70.0	52.0 %RH	P
Velocity	6.59	--	6.83	6.69 m/s	P
Sternum Displacement	-58.0	--	-50.0	-52.8 mm	P
Force During Displacement Interval	-4400	--	-3900	-4048 N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	-3993 N	P
Hysteresis	69	--	85	70 %	P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax**

Test Time: **11:40:40 AM**

Test Date: **9/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
DentonATD	78051-342	DS-273	4/13/2010

Test ID: **Thorax**

Test Time: **11:40:40 AM**

Test Date: **9/23/2010**



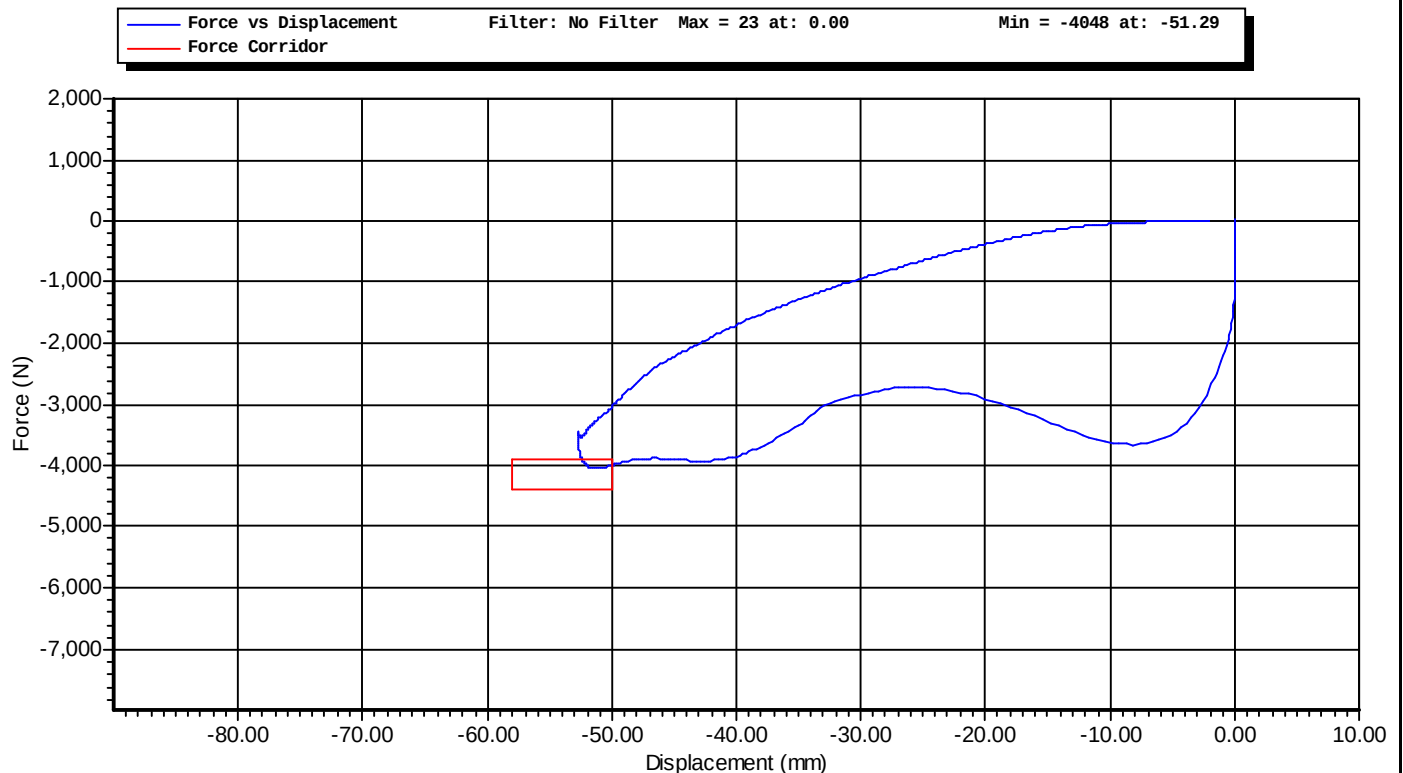
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	9/23/2010
Test Number:	1	Test Time:	11:40:40 AM

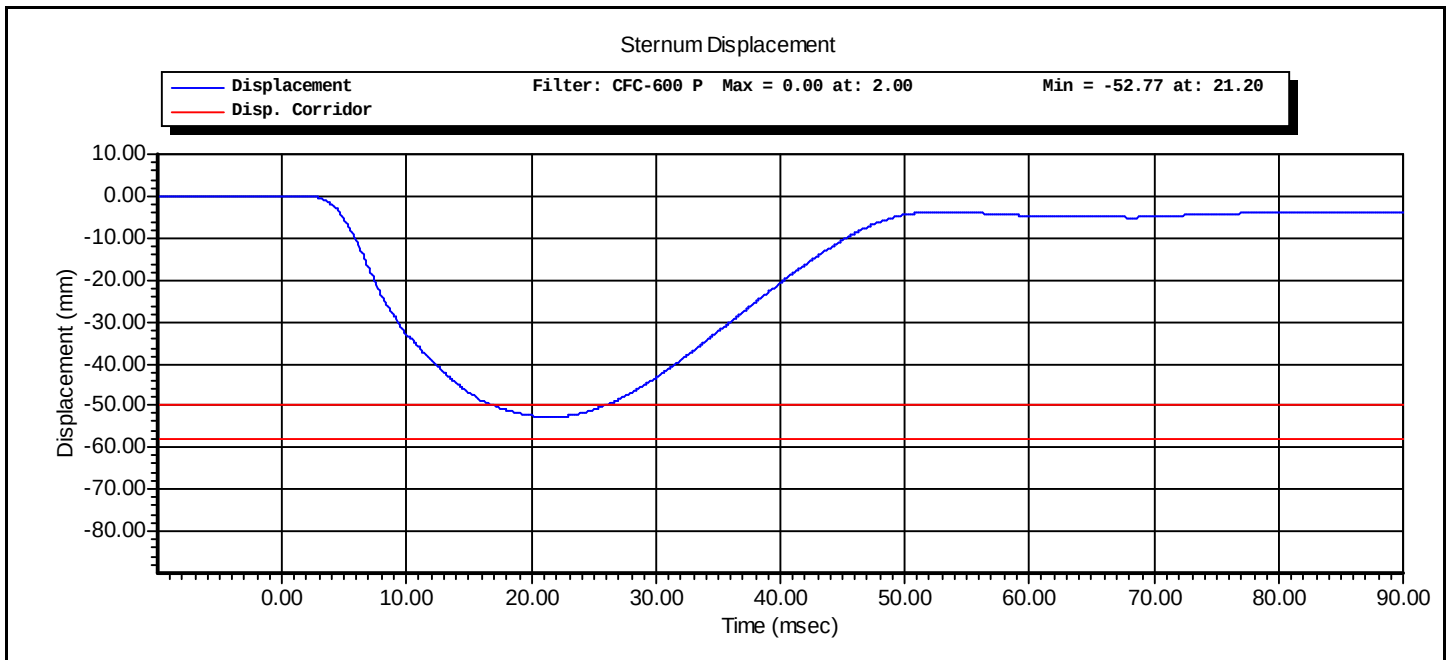
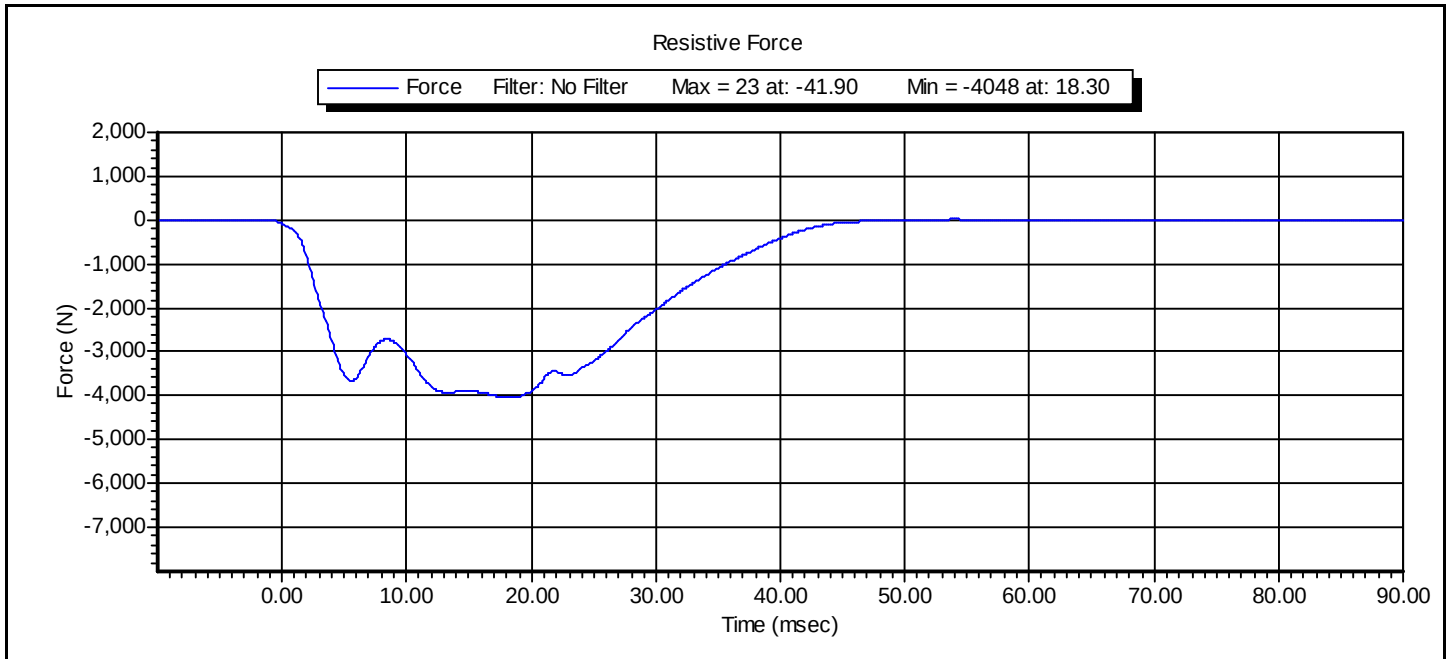
Resistive Force vs Sternum Displacement



Test ID: **Thorax**

Test Time: **11:40:40 AM**

Test Date: **9/23/2010**



Torso Flexion Test

Technician: AR

Calibration Date: 9/27/2010

ATD Serial Number: 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	22.2° C	P
Lab Humidity: 38%	10-70%	45%	P
Max Force @ 45 deg	320 – 390N	350N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	15°	P
Final ref plan angle	Initial ref plane ± 8 deg	21°	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:07:26 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1726

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	51.0 %RH P
Velocity	2.07 -- 2.13	2.08 m/s P
Resistive Force	-4060 -- -3450	-3505 N P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Left Knee**

Test Time: **4:07:26 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Left Knee**

Test Time: **4:07:26 PM**

Test Date: **9/24/2010**

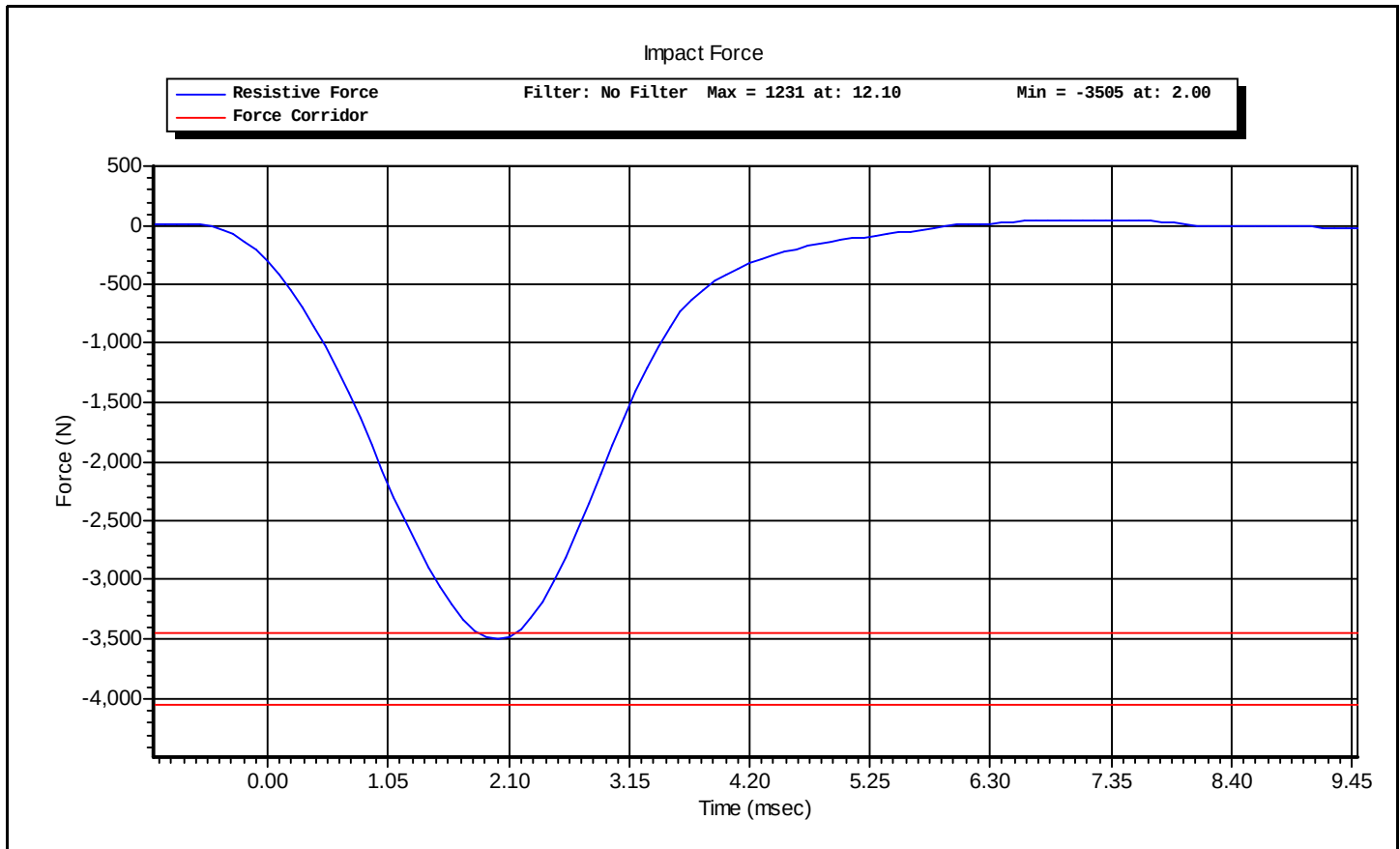


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:07:26 PM



Test ID: **Left Knee**

Test Time: **4:07:26 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:23:39 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1051

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	51.0 %RH P
Velocity	2.07 -- 2.13	2.12 m/s P
Resistive Force	-4060 -- -3450	-3491 N P

All test parameters are within specifications

Technician: **A. Rudniski** Signature: _____

Supervisor: **D. Travale** Signature: _____

Test ID: **Right Knee**

Test Time: **4:23:39 PM**

Test Date: **9/24/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
CEC	4-202	AC-A44	8/26/2010

Test ID: **Right Knee**

Test Time: **4:23:39 PM**

Test Date: **9/24/2010**

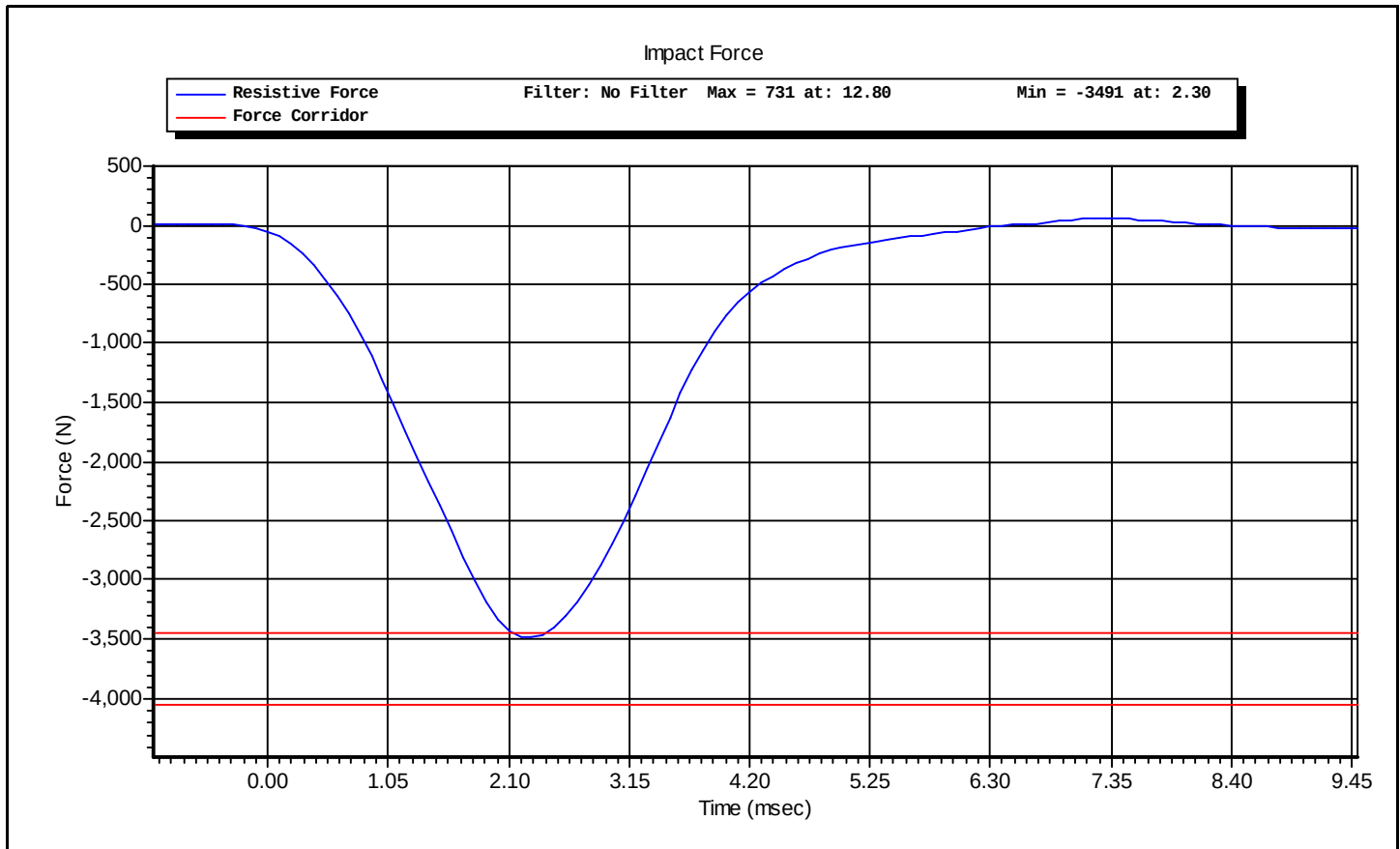


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
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Test ID:	Right Knee	Test Date:	9/24/2010
Test Number:	1	Test Time:	4:23:39 PM



Test ID: **Right Knee**

Test Time: **4:23:39 PM**

Test Date: **9/24/2010**