

REPORT NUMBER: NCAP-CAL-11-026

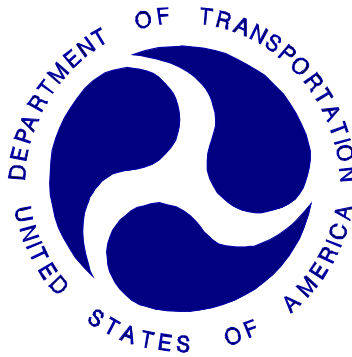
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**Toyota Canada
2011 Toyota RAV4
Utility Vehicle**

NHTSA NUMBER: MB5117

CALSPAN TEST NUMBER: TR2506

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



December 21, 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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Date: _____

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 Toyota RAV4 Utility Vehicle 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 11/15/2010. The impact velocity of the vehicle was 56.40 km/h, and the ambient temperature at the barrier face at the time of impact was 22°C. The target vehicle post-test maximum crush was 485mm of Vehicle. The test vehicle's performance is as follows:																																																																					
<table border="1"> <thead> <tr> <th></th> <th colspan="3">Driver ATD</th> <th colspan="3">Pass. ATD</th> </tr> <tr> <th>Measurement Description</th> <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>274.48</td> <td>N/A</td> <td>700</td> <td>611.47</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-25.05</td> <td>mm</td> <td>52</td> <td>-22.28</td> </tr> <tr> <td>Nij</td> <td>n/a</td> <td>1</td> <td>0.36</td> <td>n/a</td> <td>1</td> <td>0.46</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4170</td> <td>1,363.30</td> <td>Newtons</td> <td>2620</td> <td>886.60</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4000</td> <td>-69.50</td> <td>Newtons</td> <td>2520</td> <td>-408.61</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-3027.46</td> <td>Newtons</td> <td>6805</td> <td>-1803.65</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-4143.34</td> <td>Newtons</td> <td>6805</td> <td>-1343.84</td> </tr> </tbody> </table>								Driver ATD			Pass. ATD			Measurement Description	Units	Threshold	Result	Units	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	274.48	N/A	700	611.47	Maximum Chest Compression	mm	63	-25.05	mm	52	-22.28	Nij	n/a	1	0.36	n/a	1	0.46	Neck Tension	Newtons	4170	1,363.30	Newtons	2620	886.60	Neck Compression	Newtons	4000	-69.50	Newtons	2520	-408.61	Left Femur Force	Newtons	10008	-3027.46	Newtons	6805	-1803.65	Right Femur Force	Newtons	10008	-4143.34	Newtons	6805	-1343.84
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SECTION 1

PURPOSE AND SUMMARY OF TEST

1.1 PURPOSE

This 56.3 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 56.3 kph frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standard Frontal NCAP Laboratory Test procedure.

1.2 TEST PROCEDURE

A load cell barrier consisting of 36 load cells was impacted by a 2011 Toyota RAV4 Utility Vehicle at a velocity of 56.40 kph. The test was performed at Calspan on 11/15/2010. 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 (ATD), 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 485 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 lower dash panel. 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 lower glove box 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)	274.48	75.90	90.90	-25.05	0.36	1,363.30	-69.50	-3027.46	-4143.34
Passenger (5 th)	611.47	63.85	78.85	-22.28	0.46	886.60	-408.61	-1803.65	-1343.84

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

TEST VEHICLE INFORMATION

NHTSA No.	MB5117
Make	Toyota
Model	RAV4
Body Style	Utility Vehicle
VIN	2T3BF4DVXBW083536
Color	Red
Delivery Date	10/18/2010
Odometer Reading (mi)	48
Odometer Reading (km)	77.2
Dealer	Basil Toyota
Transmission	4 Speed Automatic
Final Drive	All Wheel Drive
Type/No. Cyl	4 Cylinder
Engine Disp. (L)	2.5
Engine Placement	Transverse
Roof Rack	Yes
Sunroof/T-Top	No
Tinted Glass	Yes
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

TEST VEHICLE OPTIONS

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

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

NA

DATA FROM CERTIFICATION LABEL

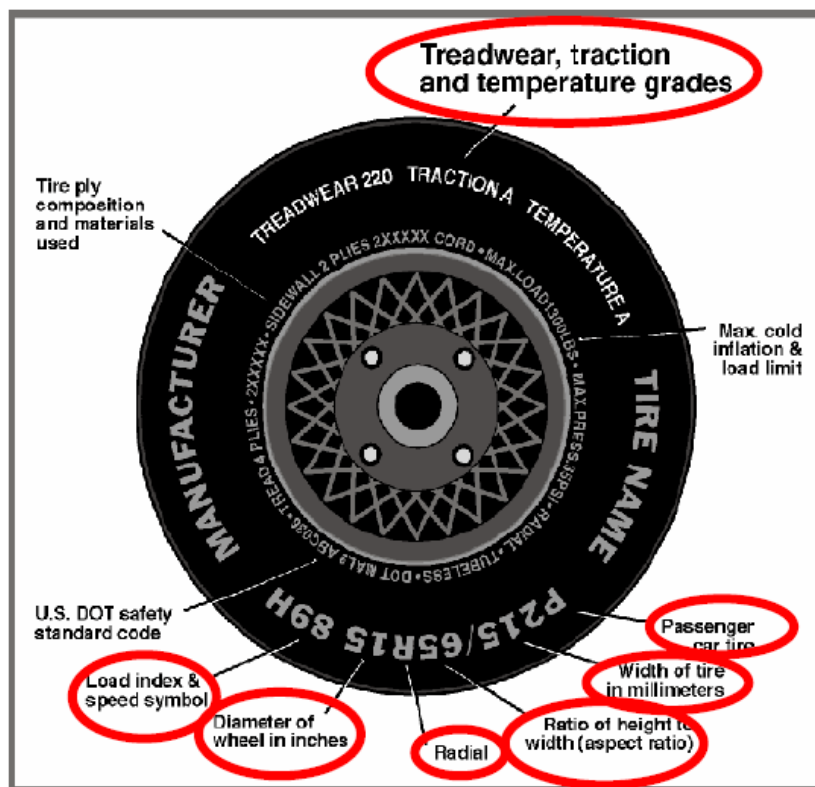
Manufactured By	Toyota Canada	GVWR (kg)	2,035
Date of Manufacture	9/10	GAWR Front (kg)	1,145
		GAWR Rear (kg)	1,100

VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	NA	
Number of Occupants	2	3		5
Capacity Wt. (VCW) (kg)				375
Cargo Wt. (RCLW) (kg)				34.8

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

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010



Measured Parameter	Front	Rear
Maximum Tire Pressure	300	300
Cold Pressure (kPa)	220	220
Recommended Tire Size	P225/65R17	P225/65R17
Tire Size on Vehicle	P225/65R17	P225/65R17
Tire Manufacturer	Toyo	Toyo
Tire Model	A20 Open Country	A20 Open Country
Treadwear	300	300
Traction	a	a
Temperature Grades	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Steel, 1 Polyester, 1 Nylon	2 Steel, 1 Polyester, 1 Nylon
Load Index/Speed Symbol	101H	101H
Tire Material	Rubber	Rubber
DOT Safety Code Right	CXF5FHM2610	CXF5FHM2610
DOT Safety Code Left	CXF5FHM2610	CXF5FHM2610

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

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	464	350		506	406	
Right	kg	454	326		472	379	
Ratio	%	58	42		55	45	
Totals	kg	918	676	1,594	978	785	1,763

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1,594
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	34.8
Calculated Vehicle Target Weight (TVTWT)	kg	1,769

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	825	826	841	853	1129
As Tested	mm	814	816	821	824	1185
Post Test	mm	877	885	838	837	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2,662
Total Vehicle Length at Left Side	mm	4,454
Total Vehicle Length at Centerline	mm	4,614
Total Vehicle Length at Right Side	mm	4,456
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	14
Amount of Stoddard Solvent in Fuel Tank	L	56.4

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Spare tire cover, outboard mirrors, tail lenses

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

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4614
2	Total Width	1786
3	Bumper Top Height	720
4	Bumper Bottom Height	318
5	Longitudinal Member Top Height	593
6	Distance Between Longitudinal Members	1056
7	Longitudinal Member Width	70
8	Engine Top Height	944
9	Engine Bottom Height	229
10	Engine and Gearbox Width	552
11	Front Bumper-Engine Distance	431
12	Front Shock Absorber Fixing Height	954
13	Bonnet Leading Edge Height	886
14	Front Shock Absorber Fixing Width	1192
15	Front Bumper – Front Axle Distance	878
16	Front Axle – A Pillar Distance	514
17	A- Pillar – B-Pillar Distance	1048
18	B-Pillar – Rear Axle Distance	1101
19	B-Pillar – C-Pillar Distance	980
20	Roof Sill Bottom Height	1592
21	Roof Sill Top Height	1525
22	Floor Sill Bottom Height	389
23	Floor Sill Top Height	458

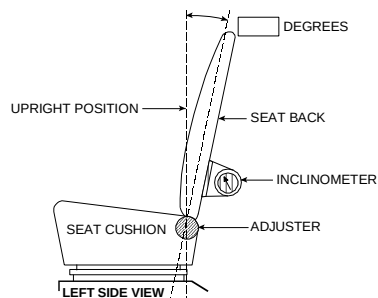
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

NORMAL DESIGN RIDING POSITION

Driver seat: The driver seat back was positioned according to the Nominal Design Riding position listed in FORM 1

Passenger Seat: The passenger seat back as positioned to allow for a zero head angle of the passenger SID-II's dummy



FRONT SEAT ASSEMBLY

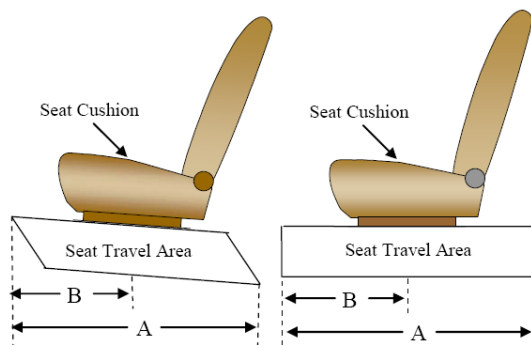
	Deg
Driver Seat Back Angle	2.2
Passenger Seat Back Angle	2.4

SEAT FORE/AFT POSITIONS

The driver's seat was positioned at the mid-point of fore/aft travel.

The passenger's seat was positioned at the most forward position of fore/aft travel.

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	16	7
Passenger Seat	16	1



SEAT BELT UPPER ANCHORAGES

The drivers upper belt anchorage was placed at the topmost position of 4 possible positions

The passenger's upper belt anchorage was placed at detent 1 of 4 possible positions

	Total # of Positions	Placed in Position #
Driver Seat	4	0
Passenger Seat	4	1

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

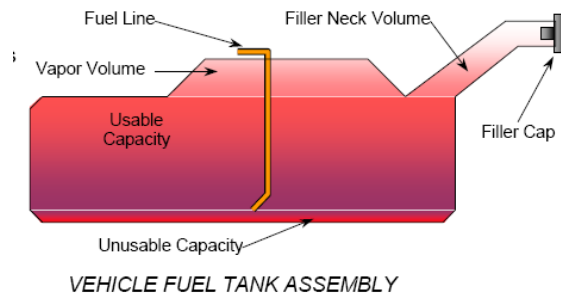
Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	60.0
Usable Capacity of "Optional Tank"	NA
92%-94% of Usable Capacity	55.2 – 56.4
Actual Amount of Solvent Used	56.4
1/3 of Usable Capacity	20.0

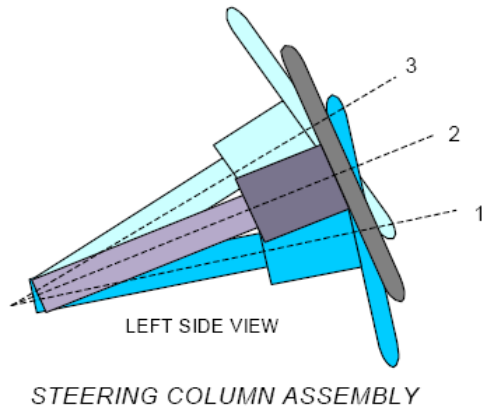
FUEL PUMP

Fuel evacuated according to the specifications provided by the manufacturer in Form 1



STEERING COLUMN ADJUSTMENT

The steering wheel was adjusted to the midpoint of Tilt angle range and the midpoint of the telescoping Travel (if applicable)

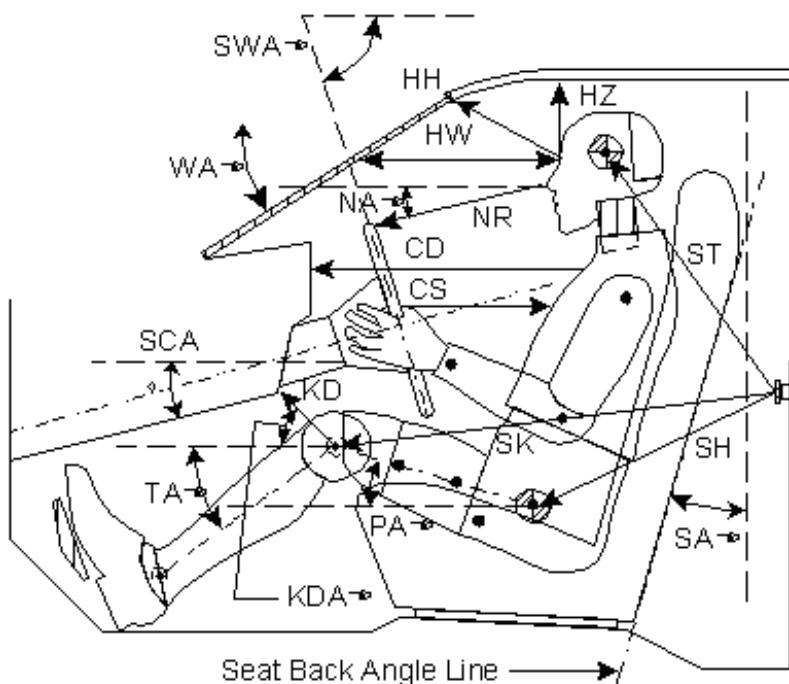


STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1	64	
Geometric center position No. 2	62	
Uppermost position No. 3	60	
Telescoping Steering Wheel Travel		40
Test Position	62	20

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

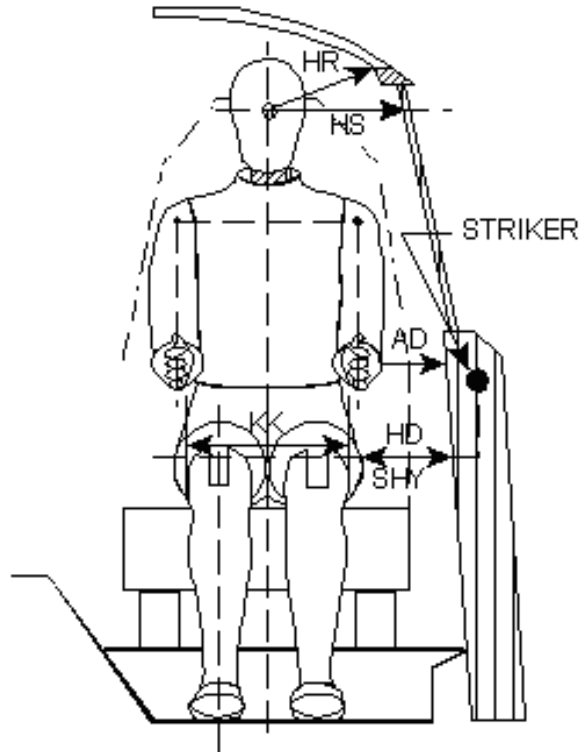
Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		32.6		
SWA°	Steering Wheel Angle		62.6		
SCA°	Steering Column Angle		34.8		
SA°	Seat Back Angle (on headrest post)		2.2		2.4
HZ	Head to Roof (Z)	239	90	282	90
HH	Head to Header	358	28	316	52
HW	Head to Windshield	563	0	619	0
NR	Nose to Rim	411	-15	466	-31
CD	Chest to Dash	543		434	
CS	Chest to Steering Hub	304	0		
RA	Rim to Abdomen	193	0		
KDL	Left Knee to Dash	143	20	66	21.6
KDR	Right Knee to Dash	85	22	80	35
PA°	Pelvic Angle		23.8		20.6
TA°	Tibia Angle		55.0		58.0
SK	Striker to Knee	694	-7	790	-12
ST	Striker to Head	586	52	580	38.5
SH	Striker to H-Point	421	-31	531	-22

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

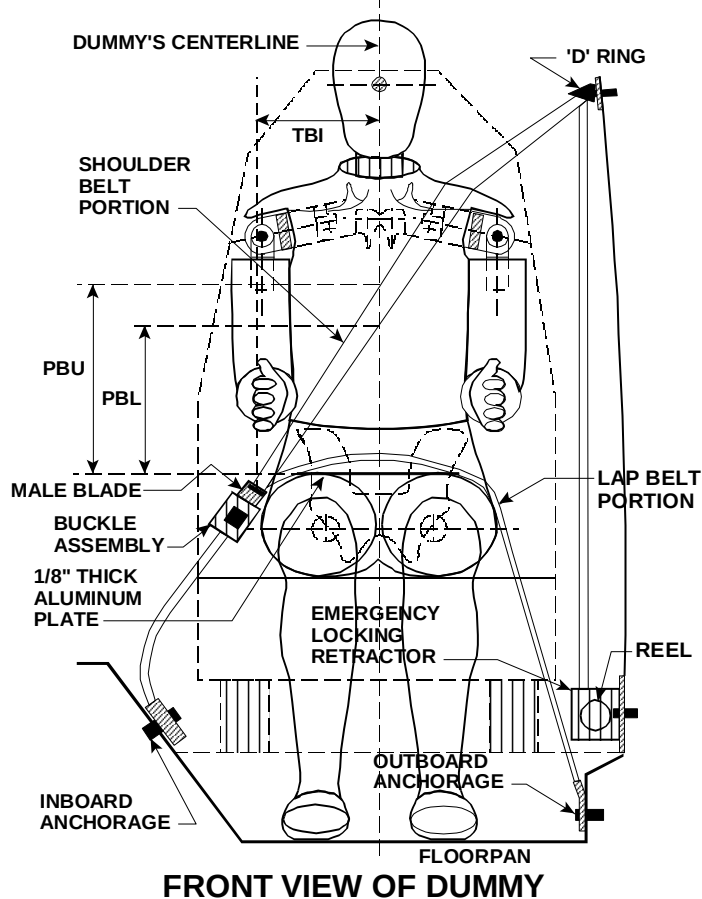


Code	Description	Driver	Passenger
AD	Arm to Door	50	88
HD	H-Point to Door	152	183
HR	Head to Side Header	241	267
HS	Head to Side Window	352	183
KK	Knee to Knee	335	230
SHY	Striker to H-Point (Y Direction)	223	290
AA	Ankle to Ankle	345	173

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

SEAT BELT POSITIONING DATA



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of aluminum plate to belt upper edge	mm	378	332
PBL — Top surface of aluminum plate to belt lower edge	mm	294	235

BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	950	1000
Lap Belt Length as measured on ATD	mm	820	900
Remainder of belt on reel	mm	0	0
Total belt length for continuous webbing systems	mm	1770	1900

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

The diagram illustrates the layout of the test facility, divided into two main views: TOP VIEW and LEFT SIDE VIEW.

TOP VIEW: This view shows the overall layout of the test area. A central horizontal track is labeled "TEST VEH." with an arrow pointing left. To the left of the track is a "CONCRETE BARRIER" with numbered markers 12 and 13. To the right is a "MONORAIL" track. Above the track is a "COVERED PHOTO PIT" with a "CONCRETE PAD" above it. Below the track is a "TOW ROAD" with a "COVERED PHOTO PIT" below it. Various numbered markers (1-17) and a "REAL TIME CAMERA" (1) are positioned around the test area. A "TEST VEH." is shown moving along the track.

LEFT SIDE VIEW: This view shows the side profile of the test area. A "CONCRETE BARRIER" is on the left. A "TEST VEH." is shown moving along the track. Below the track is a "COVERED PHOTO PIT" with markers 14 and 15. Above the track is a "MONORAIL" track. Various numbered markers (1-17) and a "REAL TIME CAMERA" (1) are positioned around the test area.

CAMERA FRAME RATES:

- #1 = 24 fps
- All Others = 1,000 fps

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

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

CAMERA LOCATIONS

No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Camera				-	24
2	Driver Left Side View	1680	1760	1120	50	1000
3	Left Side View	850	790	940	50	1000
4	Overall Right Side	1910	7189	950	50	1000
5	Steering Column (Bottom)	1820	8000	1215	28 - 70	1000
6	Steering Column (Top)	710	1955	1810	24 - 70	1000
7	Driver and Interior View	2910	3050	2360	24	1000
8	Right Side View	1310	9460	960	50	1000
9	Right Passenger View	1780	7830	1125	50	1000
10	Pass. And Interior View	2970	2970	2200	28	1000
11	Passenger Front View	620	-92	1987	25	500
12	Driver Front View	620	-92	1987	25	500
13	Windshield View	0	-530	3374	25	500
14	Pit View of Engine	0	615	-3048	12.5	1000
15	Pit View of Fuel Tank	0		-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

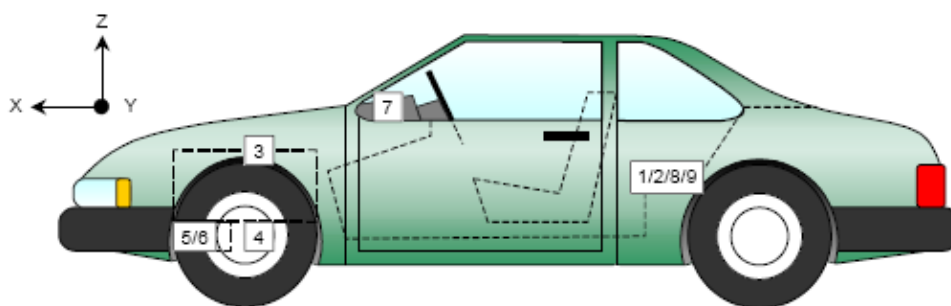
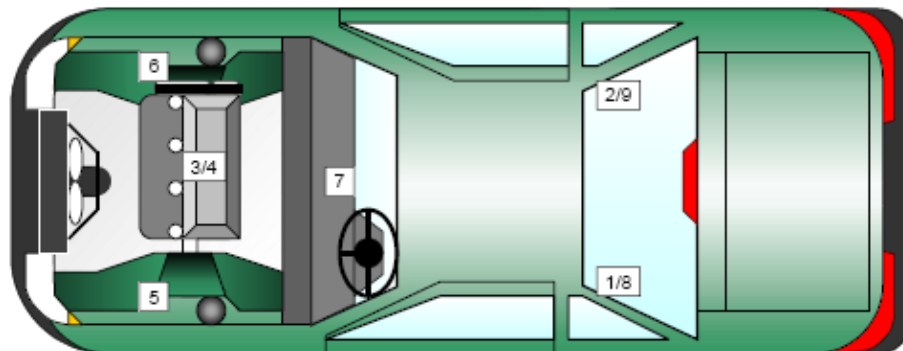
+Y = right of monorail center

+Z = into ground

(all measurements accurate to $\pm 6\text{mm}$)

**DATA SHEET NO. 7
VEHICLE ACCELEROMETER DATA**

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	1898	-650	417
2	Right Rear X-Member X	1906	638	421
3	Engine Top X	3818	79	942
4	Engine Bottom X	4073	123	248
5	Left Brake Caliper X	3869	824	421
6	Right Brake Caliper X	3884	-809	395
7	Instrument Panel X	-	-	-
8	Left Rear X-Member Z	1898	-650	417
9	Right Rear X-Member Z	1906	638	421

Reference Points:

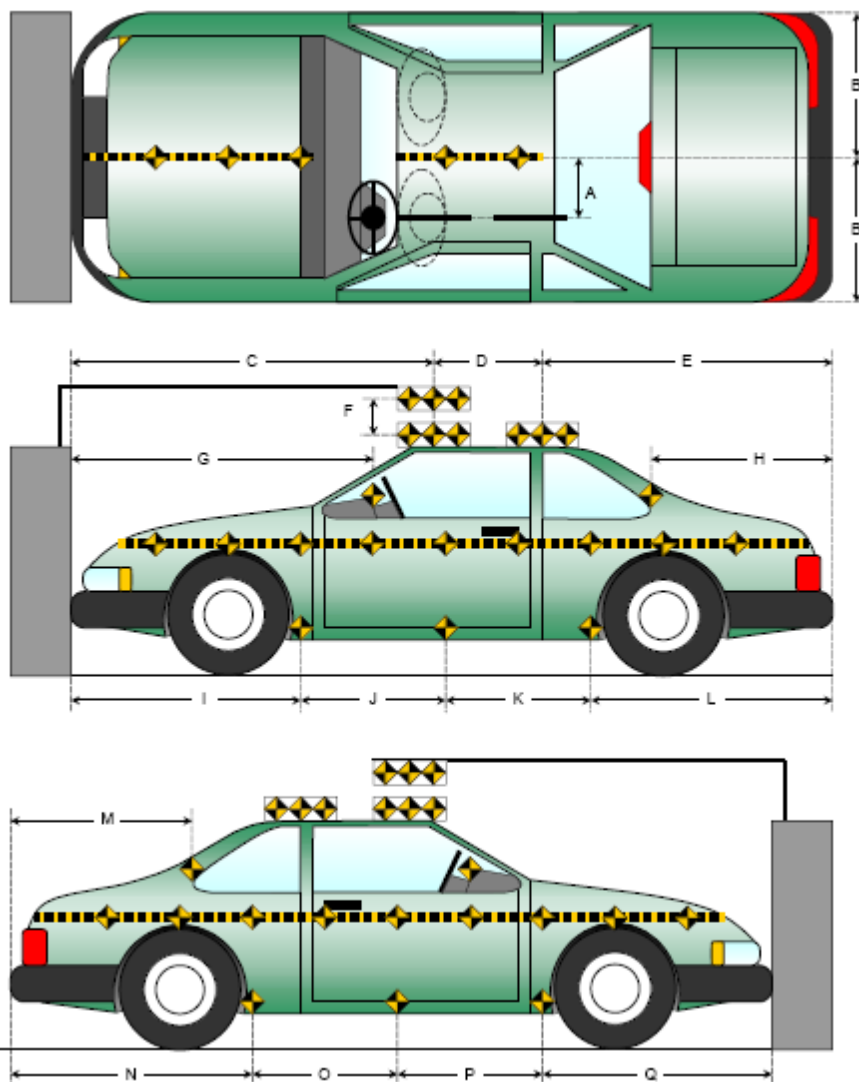
- X – Rear Surface of Vehicle (+ forward)
- Y – Vehicle Centerline (+ to right)
- Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

Item	Value
A	422
B	893
C	2128
D	1222
E	1263
F	
G	1625
H	1161
I	1366
J	850
K	844
L	1553
M	1156
N	1550
O	844
P	844
Q	1376

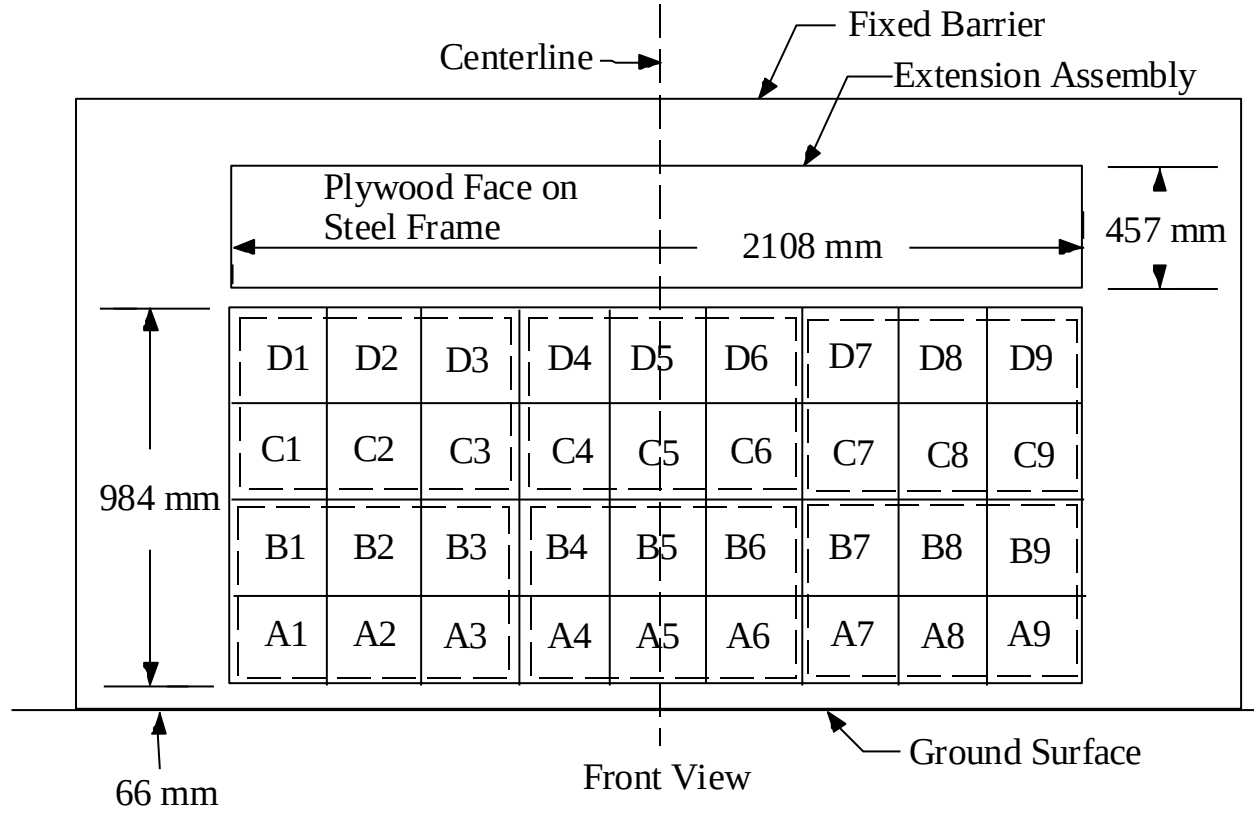
All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

36 Load Cells
 4 Rows
 9 Columns



DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

INSTRUMENTATION

Driver Dummy Channels	42
Passenger Dummy Channels	42
Belt load cells	4
Vehicle Structure Accelerometers	8
Barrier load cells	36
Total	132

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 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	H3 50 th ATD 061	H3 5 th ATD 143
Head Contact	Airbag and head restraint	Airbag and head restraint
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	Airbag	Airbag
Left Knee Contact	Lower dash panel	Glove box door panel
Right Knee Contact	Lower dash panel	Glove box door panel

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)	12	10
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

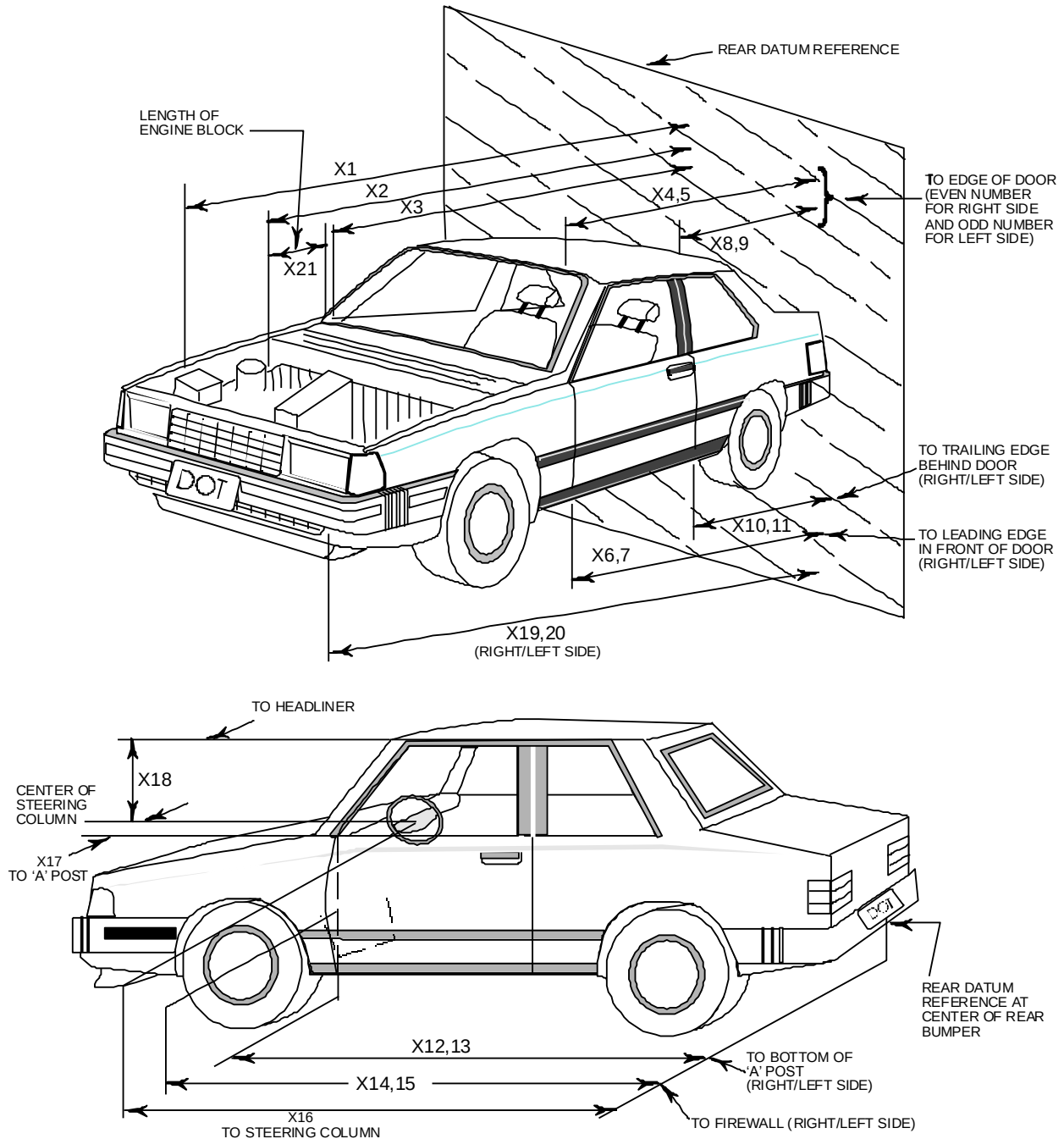
Measured Parameter	Units	Value
Left Side	mm	976
Center	mm	920
Right Side	mm	987
Average	mm	961

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4614	4129	-485
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4183	3879	-304
3	RSOV to Firewall	3621	3615	-6
4	RSOV to Upper Leading Edge of Right Door	3209	3209	0
5	RSOV to Upper Leading Edge of Left Door	3213	3211	-2
6	RSOV to Lower Leading Edge of Right Door	3224	3231	7
7	RSOV to Lower Leading Edge of Left Door	3229	3230	2
8	RSOV to Upper Trailing Edge of Right Door	2174	2179	5
9	RSOV to Upper Trailing Edge of Left Door	2177	2175	-2
10	RSOV to Lower Trailing Edge of Right Door	2186	2195	9
11	RSOV to Lower Trailing Edge of Left Door	2188	2188	0
12	RSOV to Bottom of "A" Post of Right Side	3287	3290	4
13	RSOV to Bottom of "A" Post of Left Side	3289	3290	0
14	RSOV to Firewall, Right Side	3584	3550	-34
15	RSOV to Firewall, Left Side	3616	3608	-8
16	RSOV to Steering Column	2813	2877	63
17	Center of Steering Column to "A" Post	272	297	25
18	Center of Steering Column to Headliner	468	468	0
19	RSOV to Right Side of Front Bumper	4122	3957	-166
20	RSOV to Left Side of Front Bumper	4113	3945	-169
21	Length of Engine Block	437	239	-198
RD	RSOV to Right Side of Dash Panel	3006	3011	5
CD	RSOV to Center of Dash Panel	3039	3043	4
LD	RSOV to Left Side of Dash Panel	3008	3013	5

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

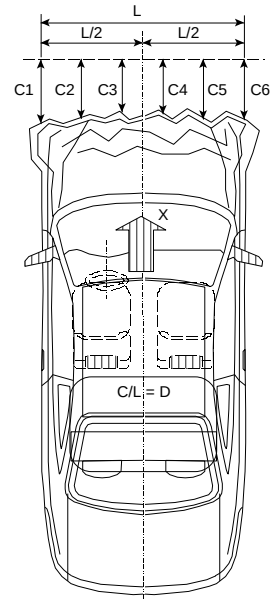
Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

VEHICLE INFORMATION

VIN	2T3BF4DVXBW083536	Wheelbase (mm)	2662
Vehicle Size Category	Utility Vehicle	Test Weight (kg)	1763

ACCELEROMETER DATA

Accelerometer Locations: As Described in Data Sheet No. 7
 Cal. Procedure/Interval: Calspan Procedure / 6 month
 Integration Algorithm: Trapezoidal Linearity: >99%
 Impact Velocity (km/h): 56.40
 Velocity Change (km/h): 65.60
 Time of Separation (msec): 186



CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1424
 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4444	4156	-288
C2	Crush zone 2 at left side	mm	4584	4075	-508
C3	Crush zone 3 at left side	mm	4611	4124	-487
C4	Crush zone 4 at right side	mm	4611	4123	-489
C5	Crush zone 5 at right side	mm	4584	4073	-511
C6	Crush zone 6 at right side	mm	4445	4106	-339
L	C1 to C6	mm	1424	1474	50

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

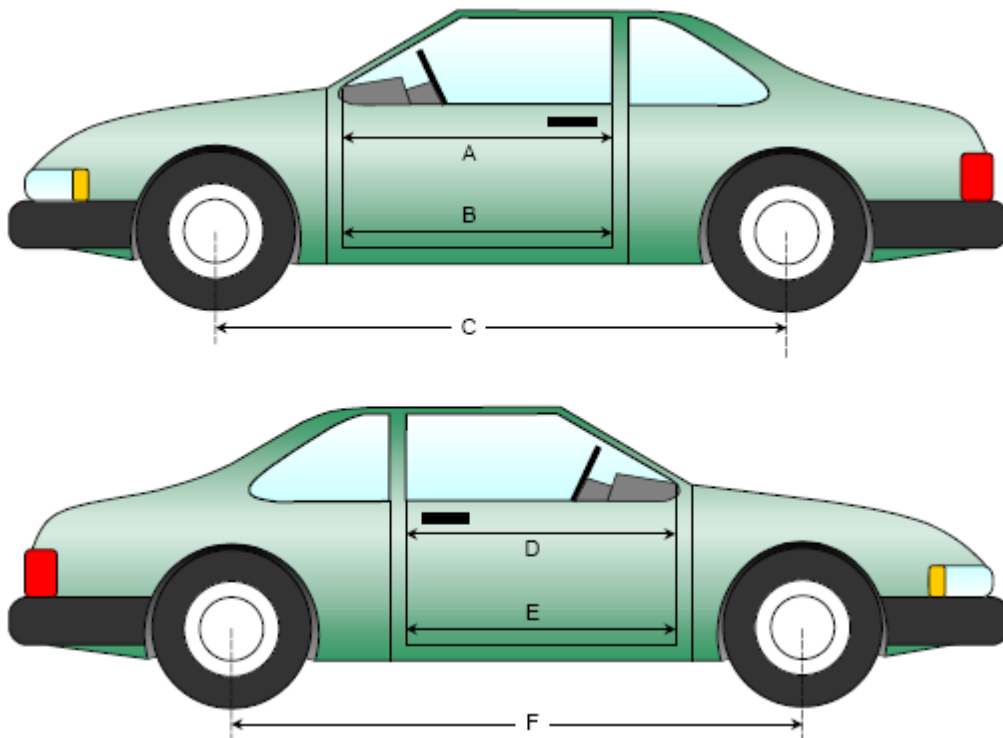
Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	973	972	-1
B	Left Side Lower	mm	850	850	0
D	Right Side Upper	mm	972	972	0
E	Right Side Lower	mm	872	871	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2663	2583	-80
F	Right Side Wheelbase	mm	2662	2583	-79



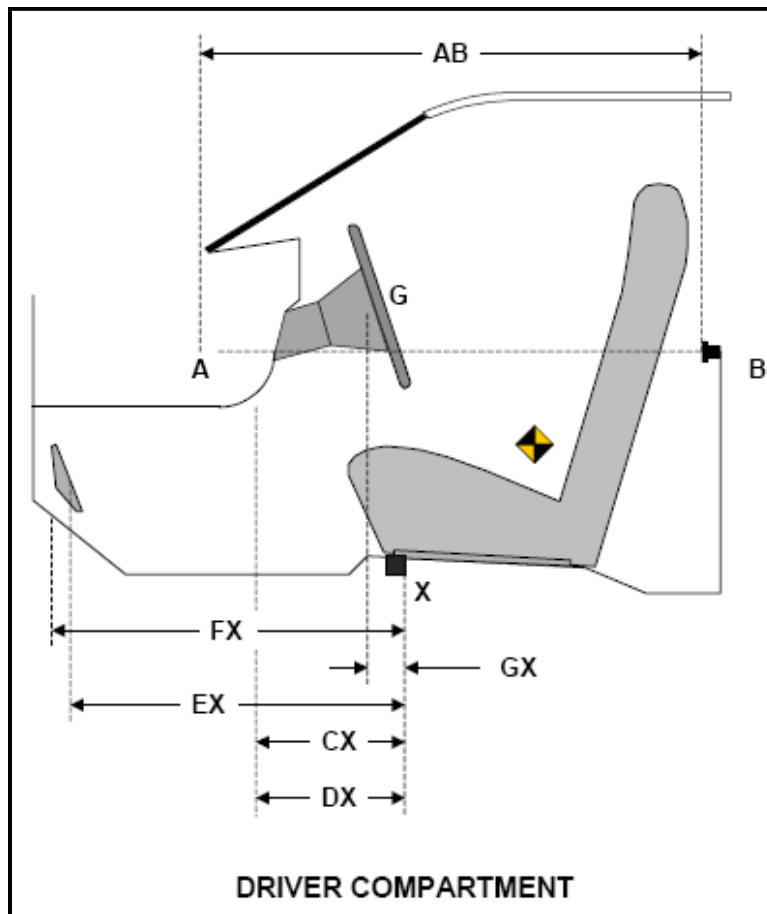
DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

DRIVER COMPARTMENT INTRUSION

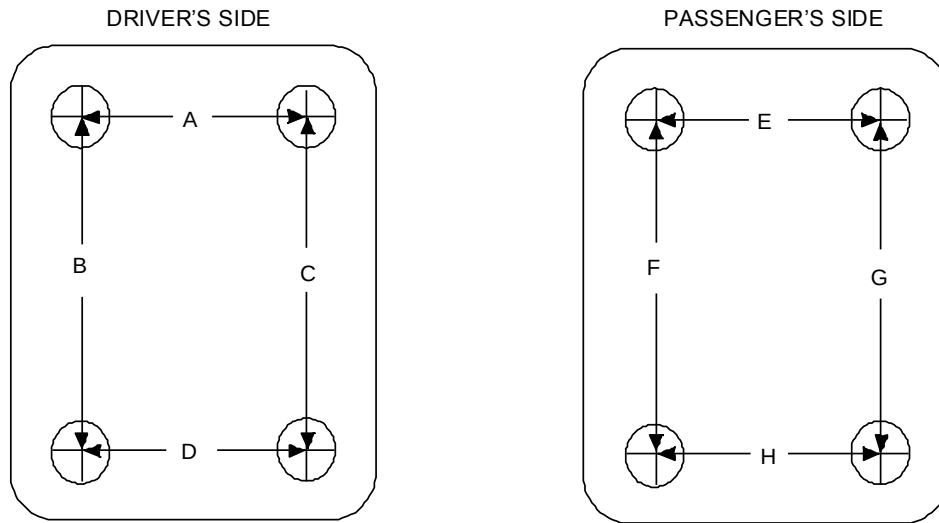
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	820	822	1
CX	Left Knee Bolster to X	mm	335	340	5
DX	Right Knee Bolster to X	mm	295	300	5
EX	Brake Pedal to X	mm	572	529	-43
FX	Foot Rest to X	mm	585	574	-11
GX	Center of Steering Column Wheel Hub to X	mm	115	179	64

X = Front of Seat Track (Stationary)



DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010



TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	488	487	0
B	243	246	3
C	214	215	1
D	461	462	1
E	483	490	7
F	263	263	0
G	160	160	0
H	487	489	2

All units in millimeters

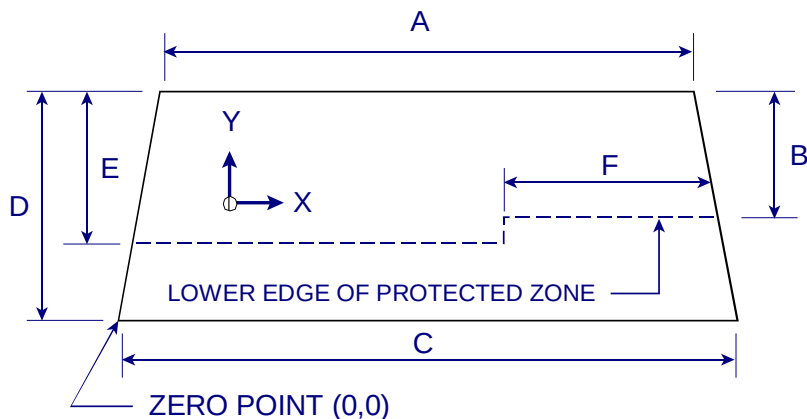
DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010

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: 21.3°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2001	2001	100%
Right Side	2001	2001	100%
Total	4001	4001	100%



Item	Units	Value
A	mm	1175
B	mm	520
C	mm	1400
D	mm	713
E	mm	526
F	mm	542

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 Toyota RAV4</u>	NHTSA No:	<u>MB5117</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>11/15/2010</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

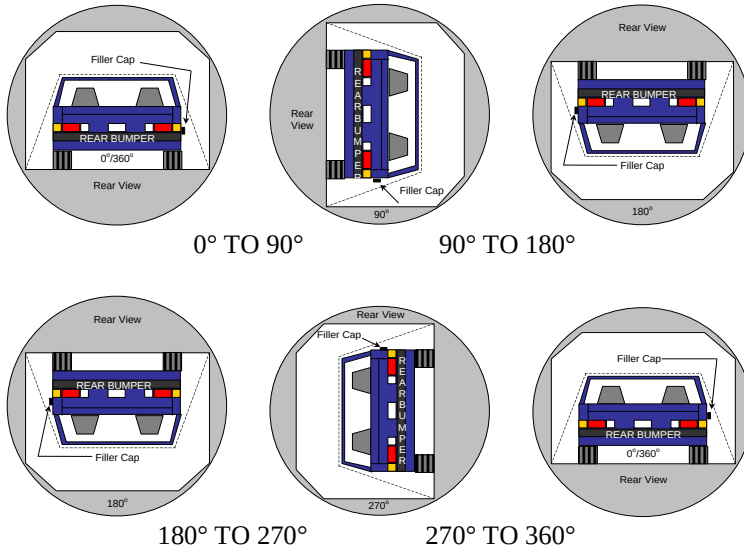
Temperature at Time of Impact: 12.0 C Test Time: 14:40

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>None</u>	oz

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle:	2011 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010



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°	1:10	5:00	6:10
90° to 180°	1:08	5:00	6:08
180° to 270°	1:07	5:00	6:07
270° to 360°	1:12	5:00	6:12

FMVSS 301 SPILLAGE TABLE

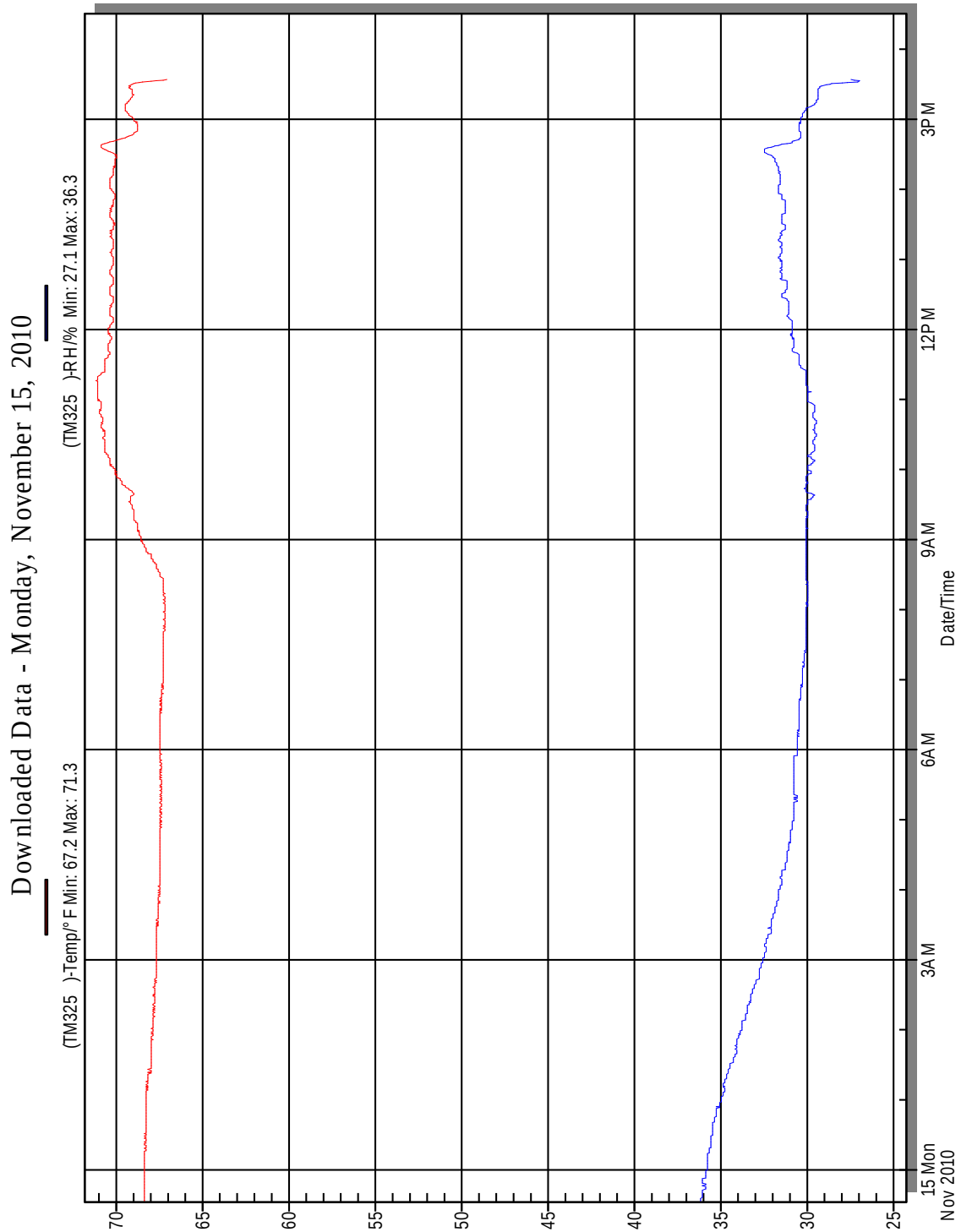
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	NA		
90° to 180°	0	NA		
180° to 270°	0	NA		
270° to 360°	0	NA		

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 Toyota RAV4	NHTSA No:	MB5117
Test Program:	Frontal NCAP	Test Date	11/15/2010



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS		
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2	Load Cell Wall	A-5
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4	Tire Placard	A-6
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6	Left Rear $\frac{3}{4}$ View, as Received	A-7
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11	Pre-test Right View of Test Vehicle	A-10
12	Post-test Right View of Test Vehicle	A-10
13	Pre-test Right Front $\frac{3}{4}$ View	A-11
14	Post-test Right Front $\frac{3}{4}$ View	A-11
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16	Post-test Left Rear $\frac{3}{4}$ View	A-12
17	Pre-test Windshield View	A-13
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22	Post-test Fuel Filler Cap View	A-15
23	Pre-test Front Underbody View	A-16
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48	Pre-test Passenger Dummy Window View	A-29
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50	Pre-test Passenger Dummy and Vehicle Interior View	A-30
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56	Pre-test Passenger's Side Knee Bolster	A-33
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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



Figure A-18: Post-Test Windshield View

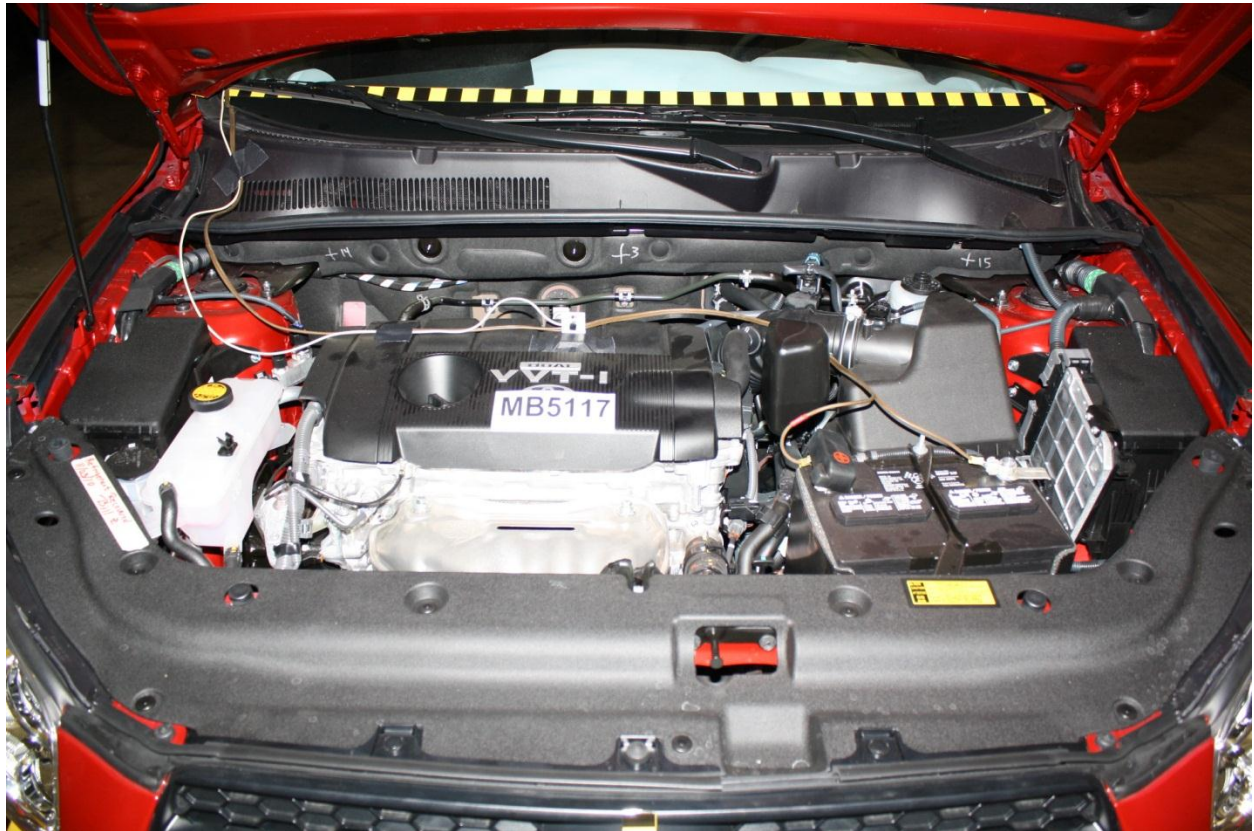


Figure A-19: Pre-Test Engine Compartment View



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

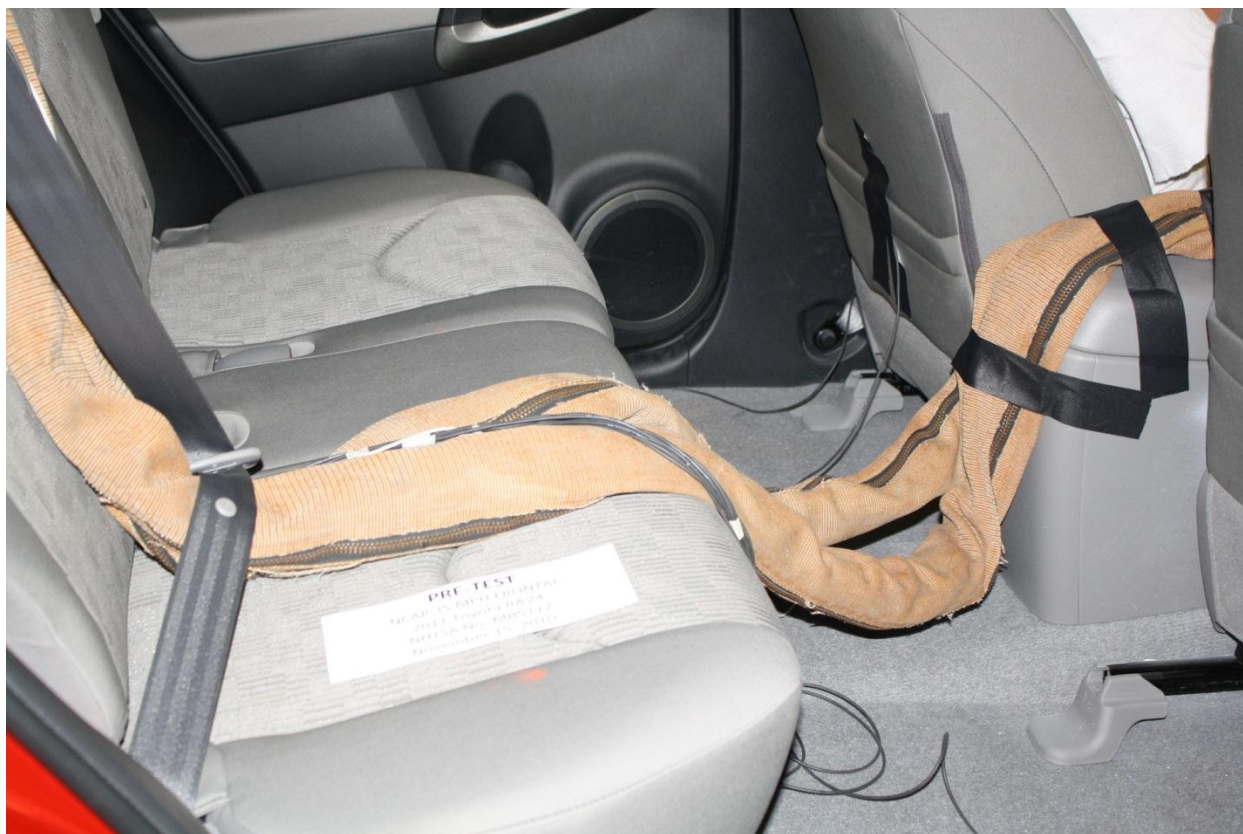


Figure A-27: Pre-Test Dummy Cable Routing

Photo Not Available

Figure A-28: Post-Test Dummy Cable Routing



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



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

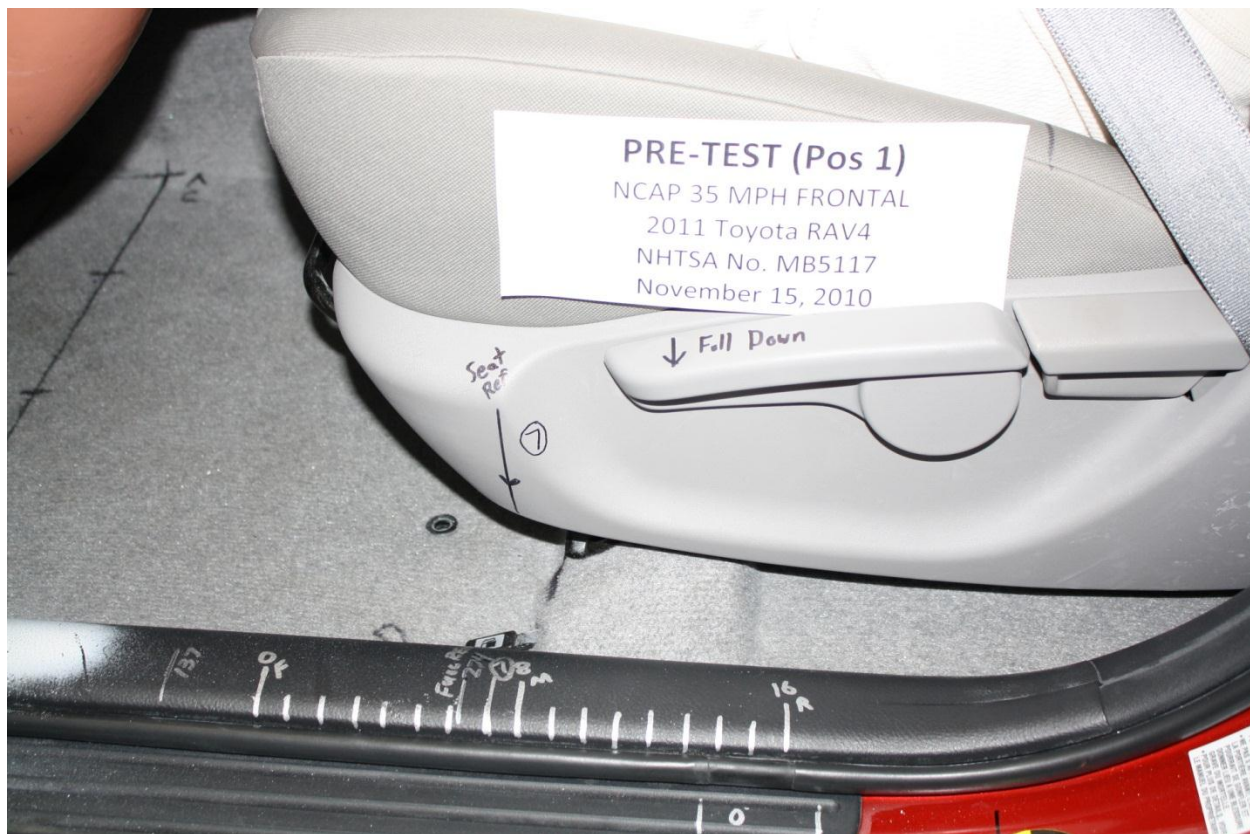


Figure A-35: Pre-Test Driver's Seat Fore-Aft Markings

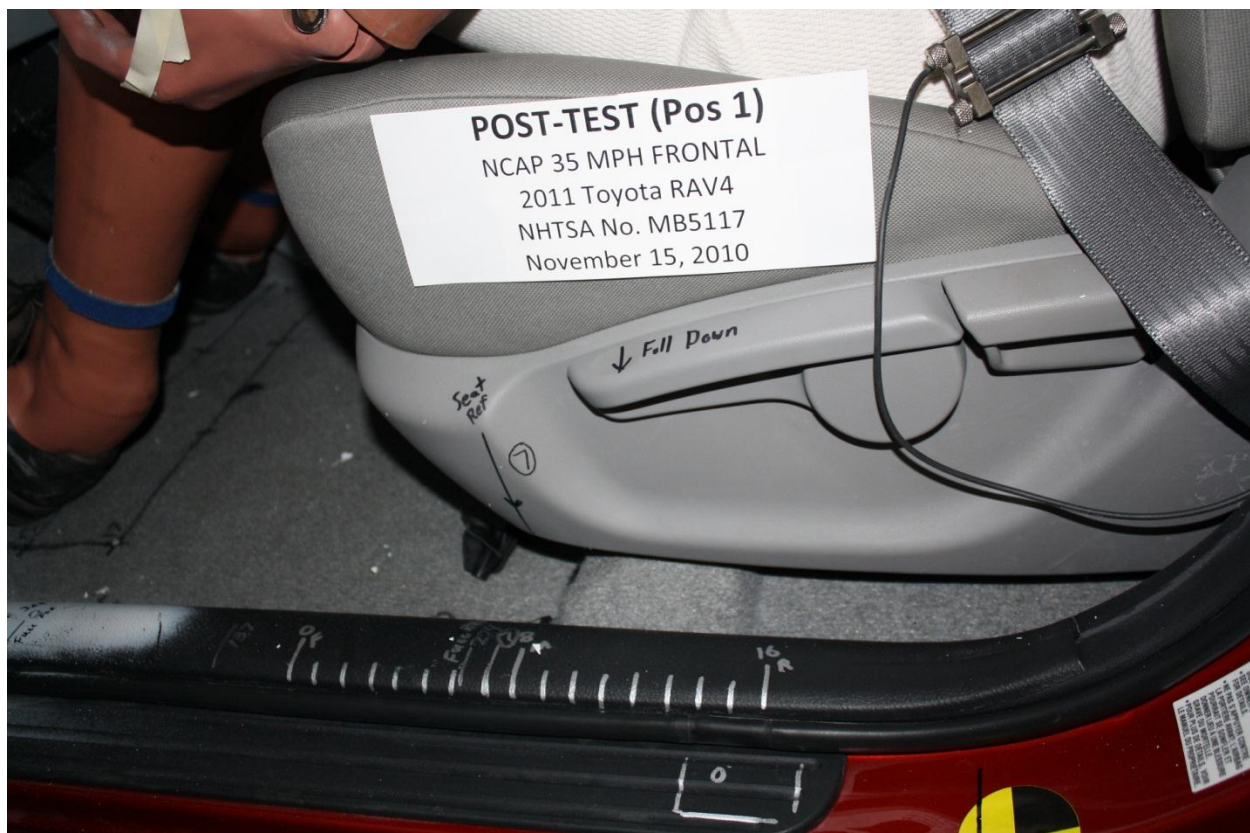


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



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

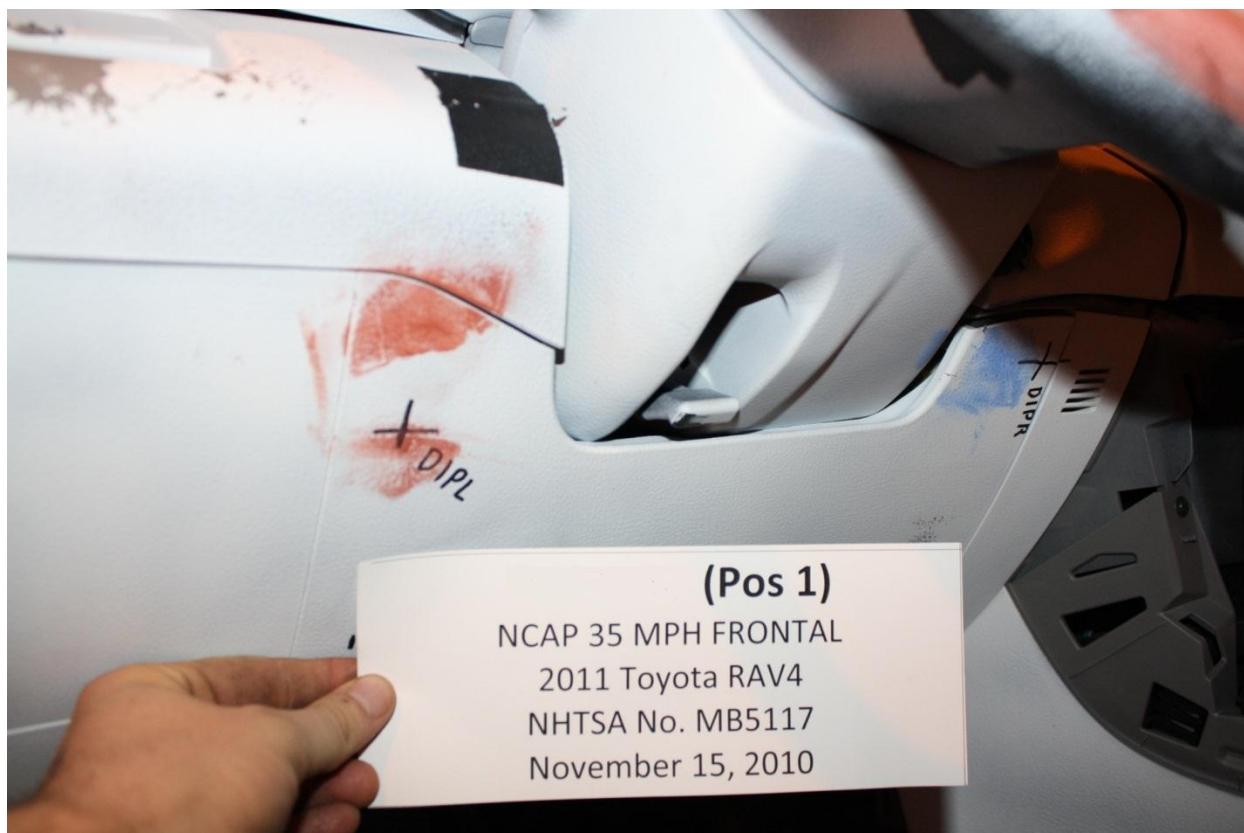


Figure A-40: Post-Test Driver's Side Knee Bolster

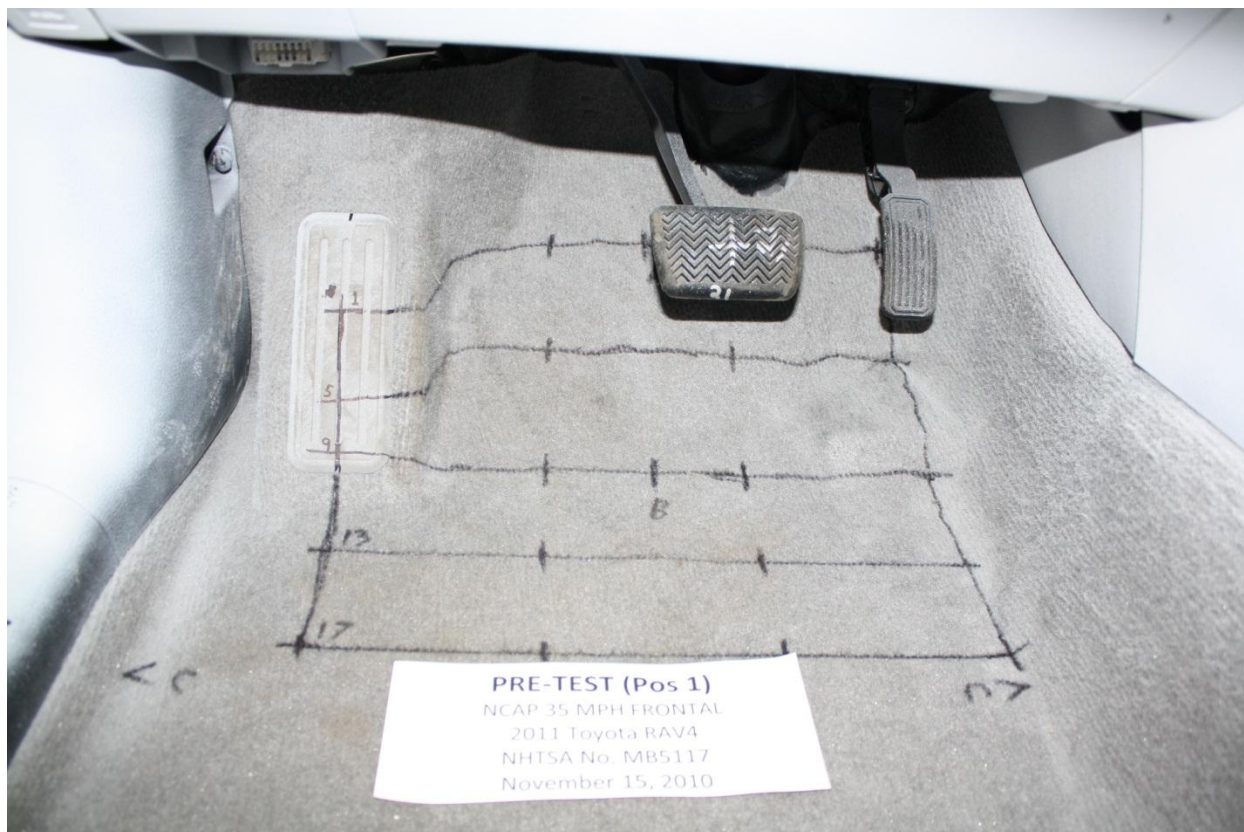


Figure A-41: Pre-Test Driver's Side Floorpan



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



Figure A-43a: Post-Test Diver Dummy Contact with Airbag



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



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

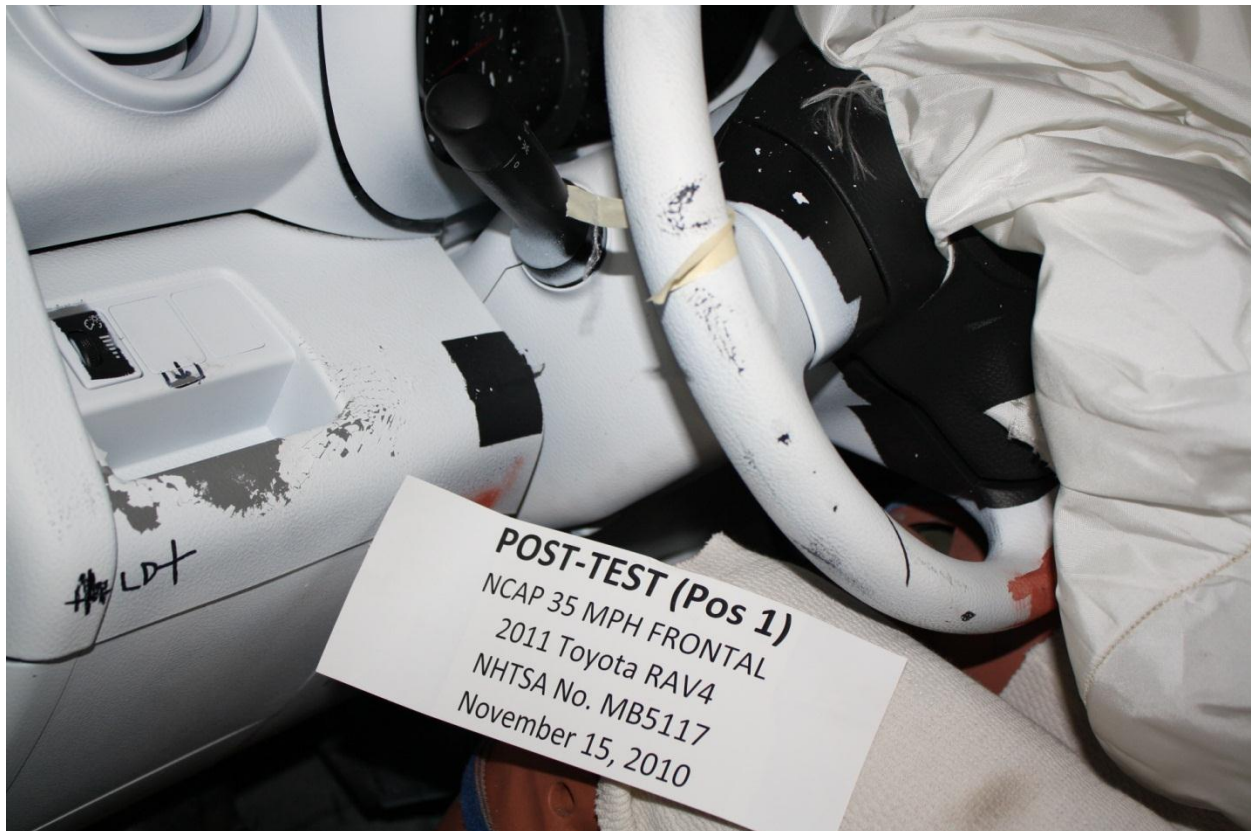


Figure A-45: Post-Test View of the Steering Column Shear Capsule



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



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

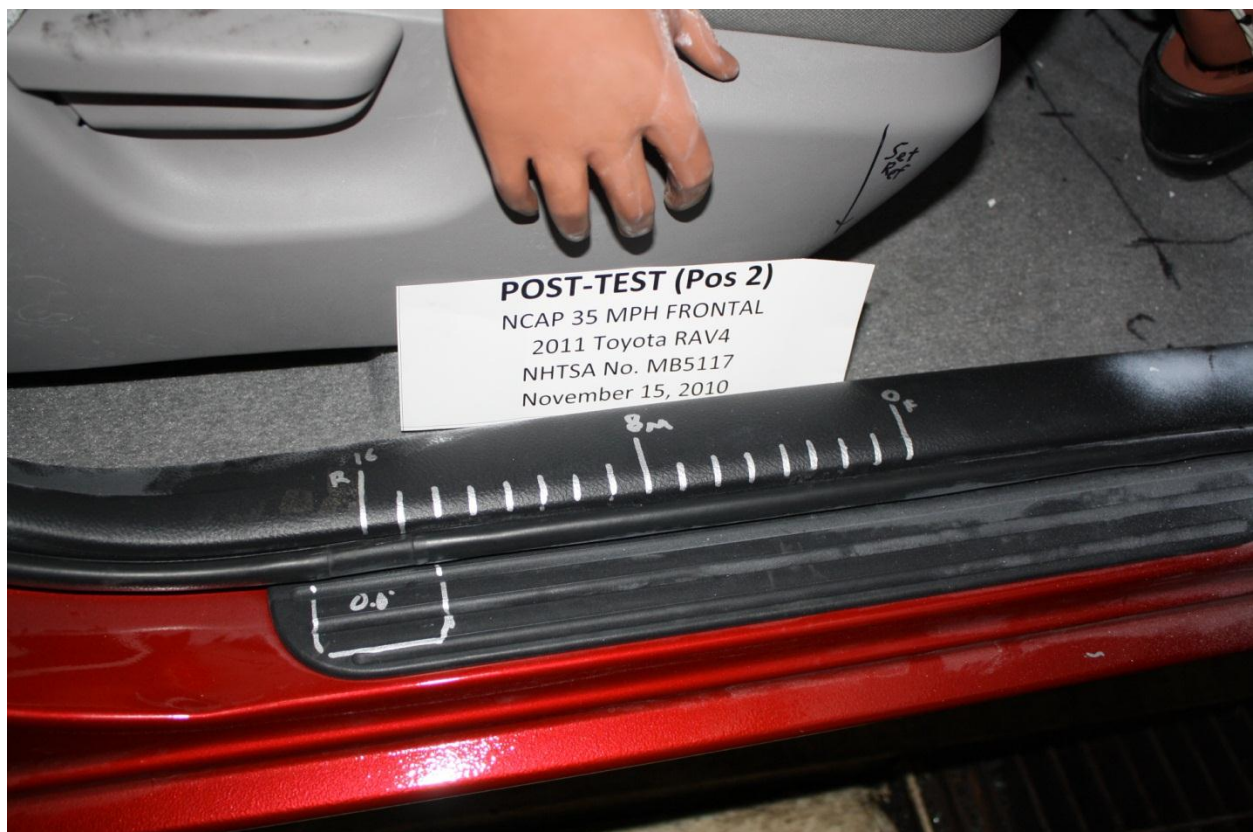


Figure A-53: Post-Test Passenger's Seat Fore-Aft Markings



Figure A-54: Pre-Test Passenger Dummy Feet



Figure A-54: Post-Test Passenger Dummy Feet



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

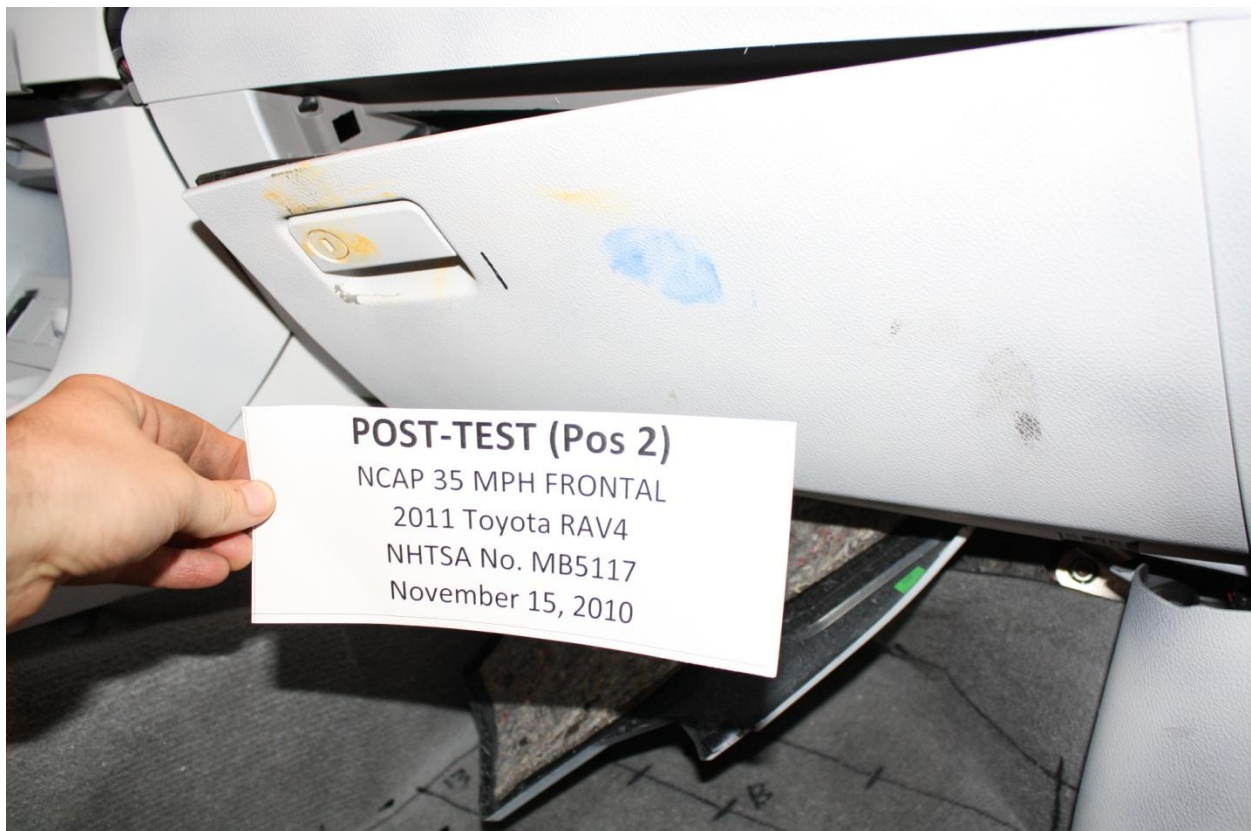


Figure A-57: Post-Test Passenger's Side Knee Bolster

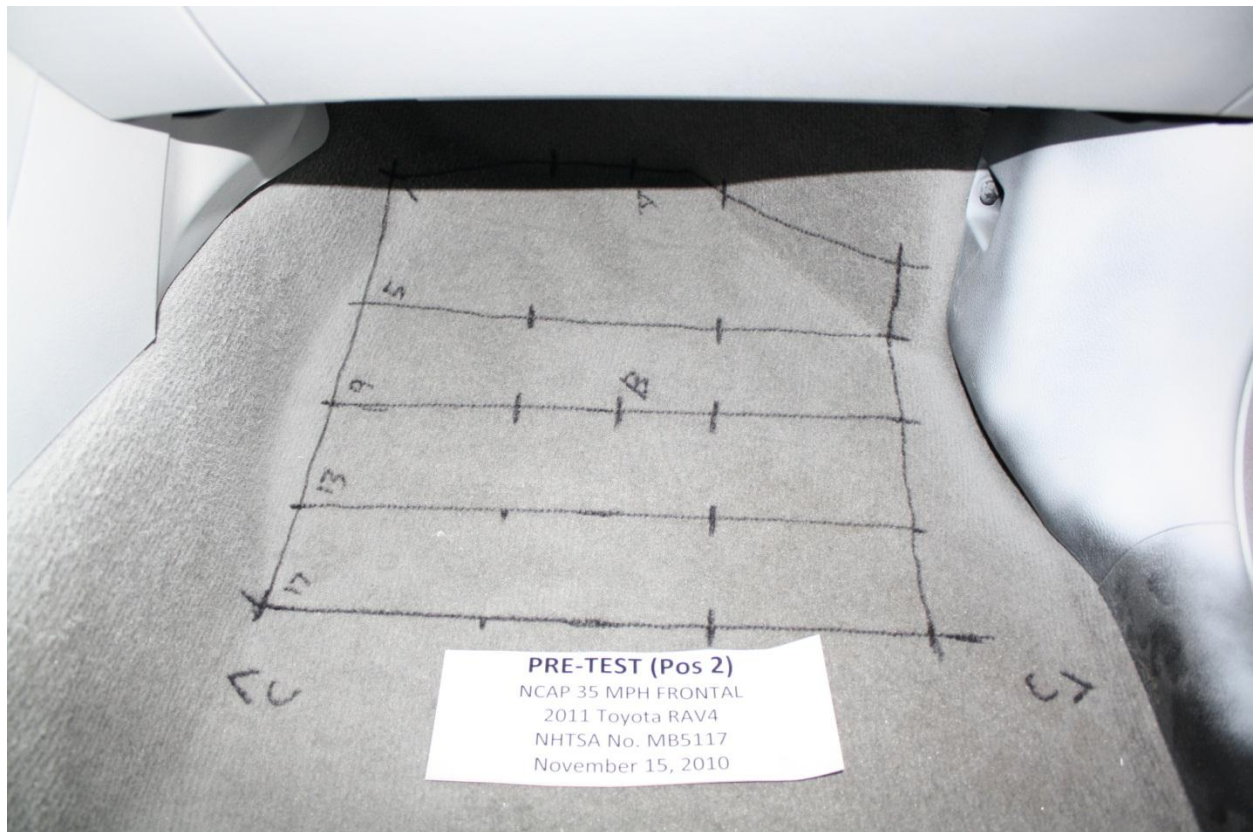


Figure A-58: Pre-Test Passenger's Side Floorpan



Figure A-59: Post-Test Passenger's Floorpan



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



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

Photo Not Applicable

Figure A-61: Photograph of Ballast Installed Vehicle

Photo Not Applicable

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

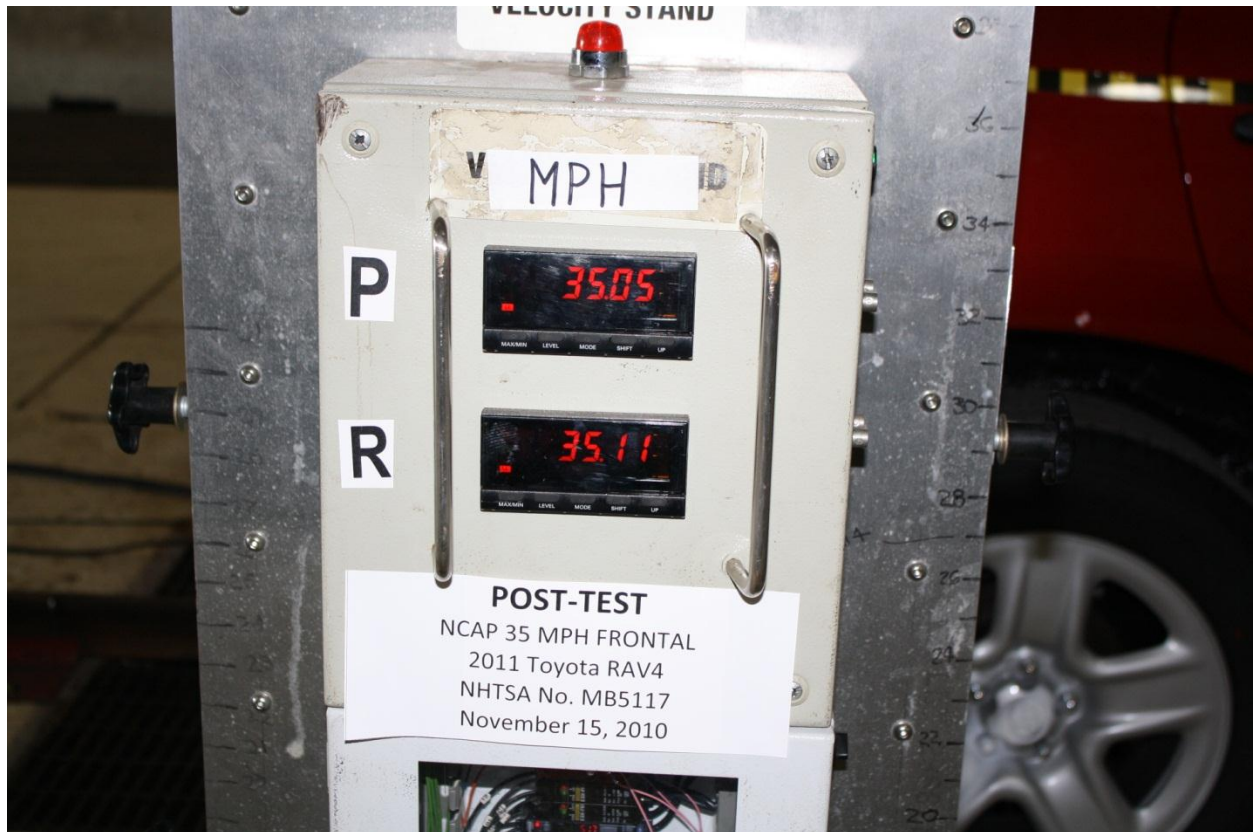


Figure A-63: Post-Test Speed Trap Read Out



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

[illegible]

Figure A-70: Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

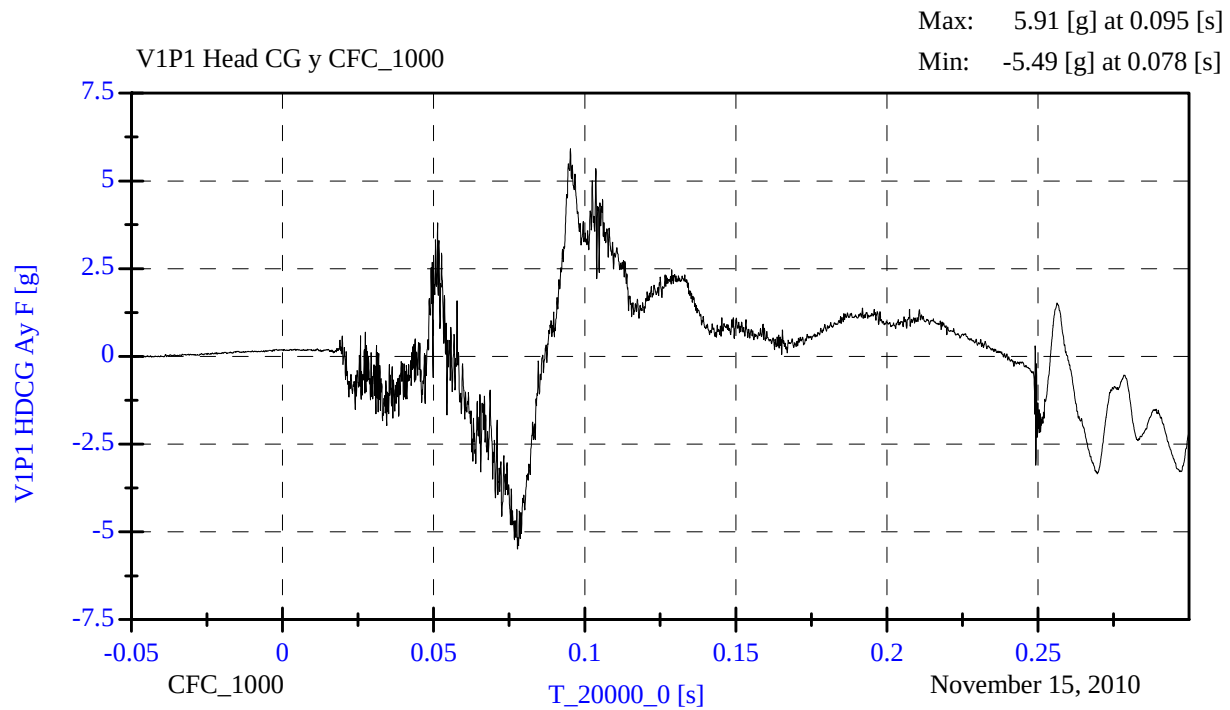
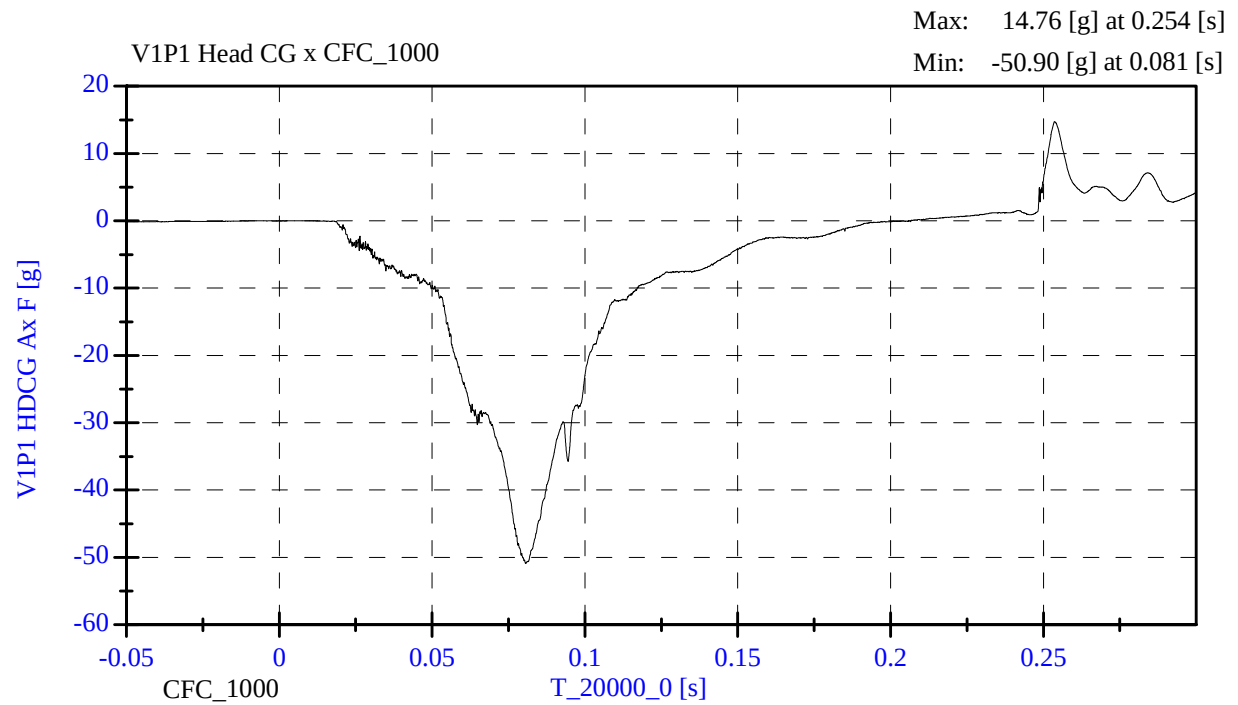
Fig. No.	List of Data Plots Provided In The Test Report	Page No.
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection 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

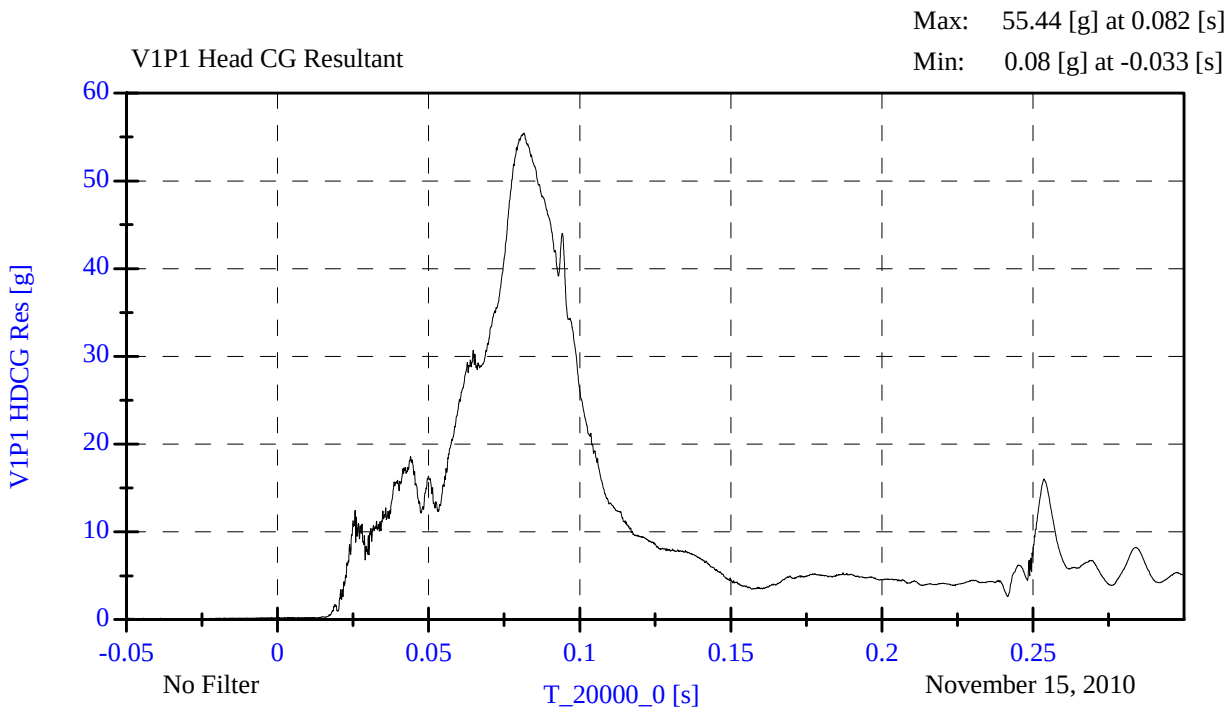
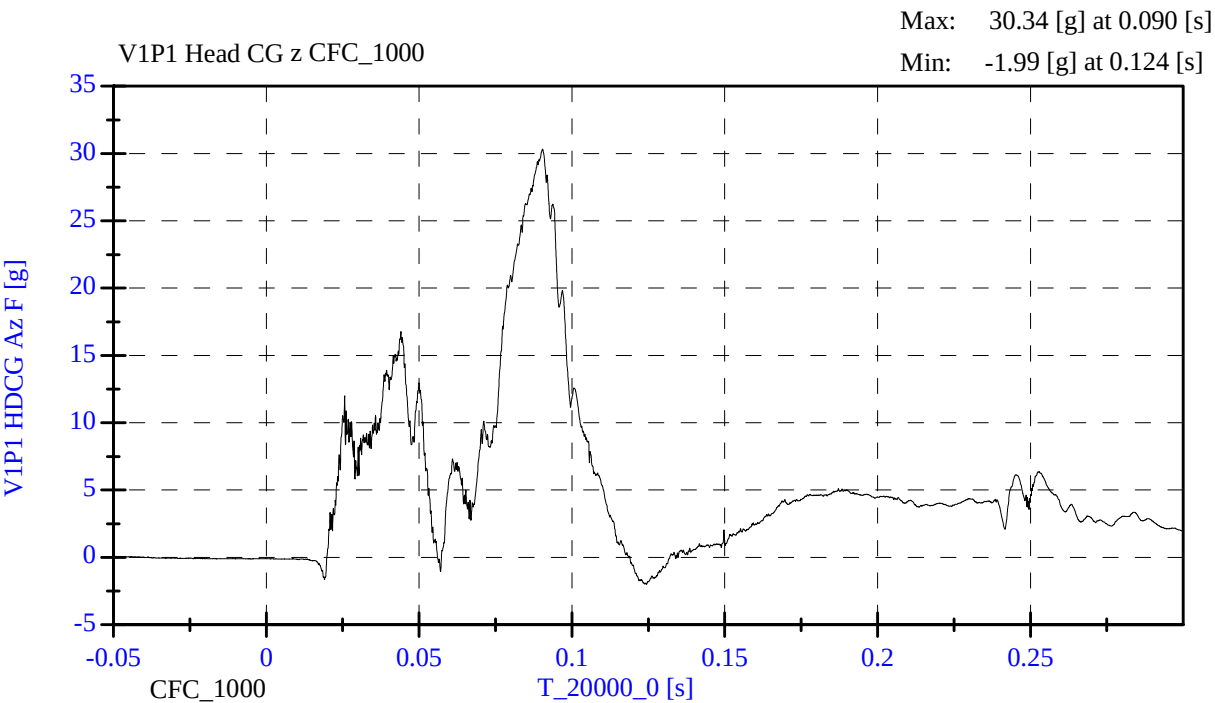
30	Passenger Right Femur Force vs. Time	B-19
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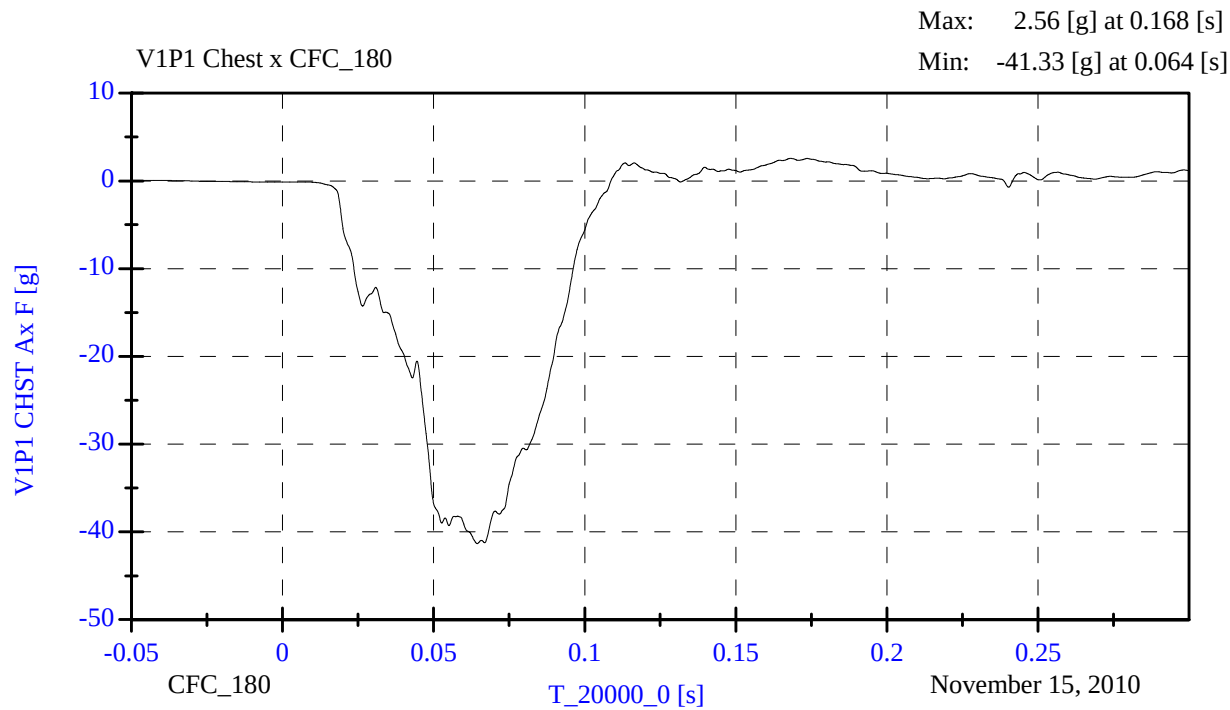
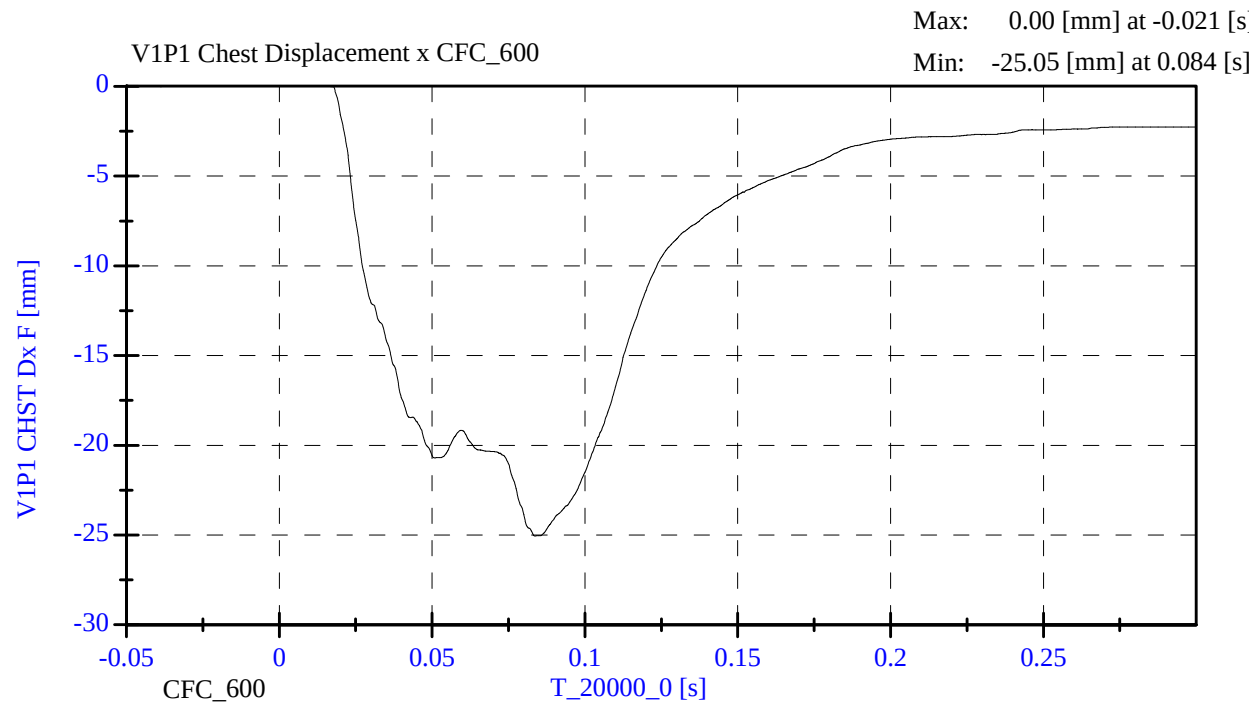
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

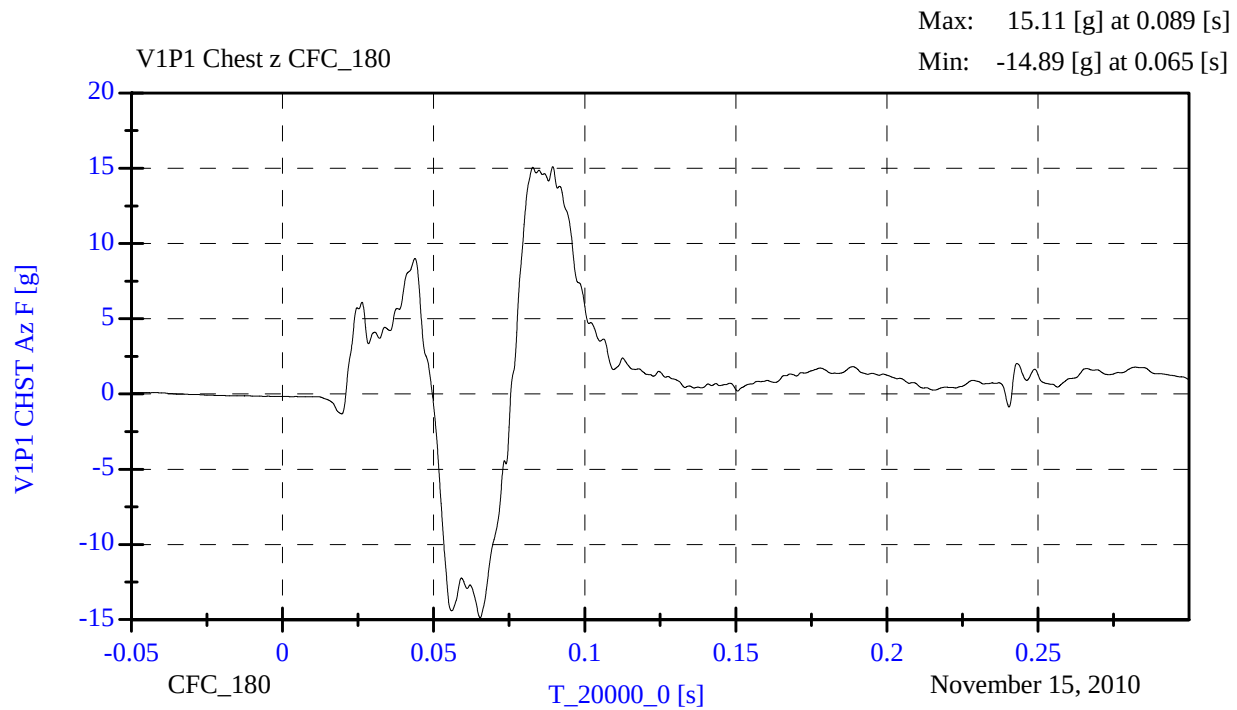
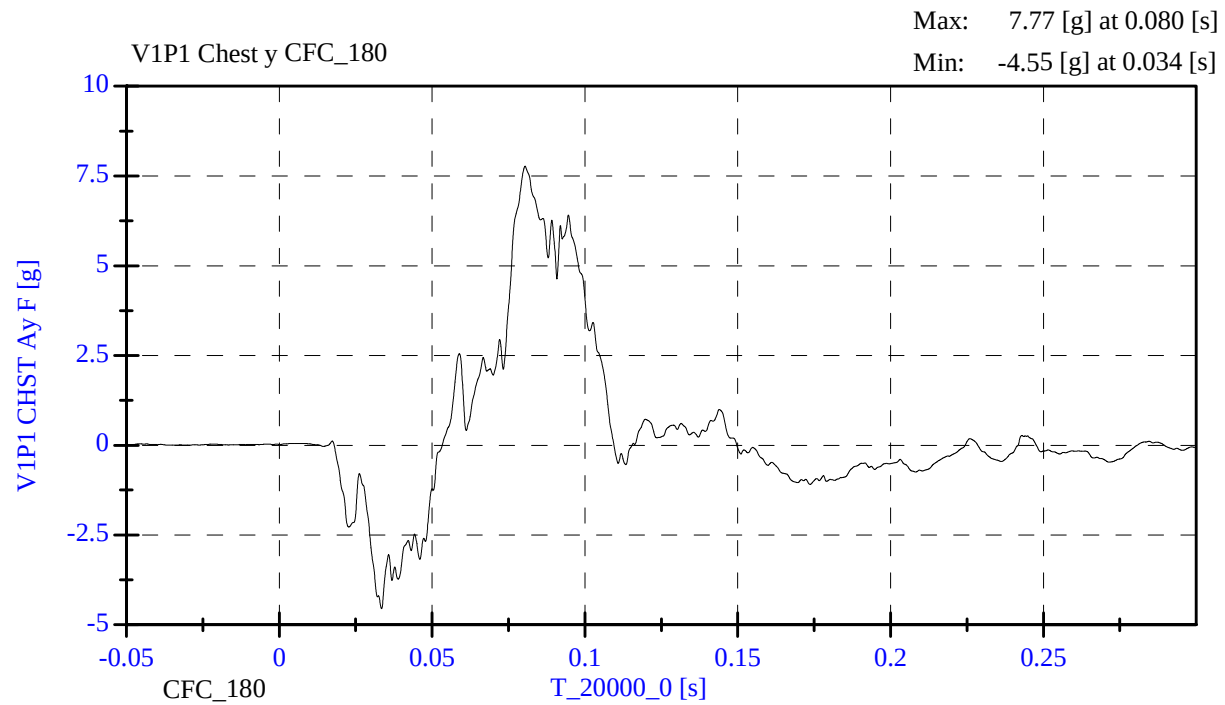
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 Driver Head Y Acceleration Redundant
 Driver Head Z Acceleration Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Acceleration Redundant
 Driver Chest Y Acceleration Redundant
 Driver Chest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

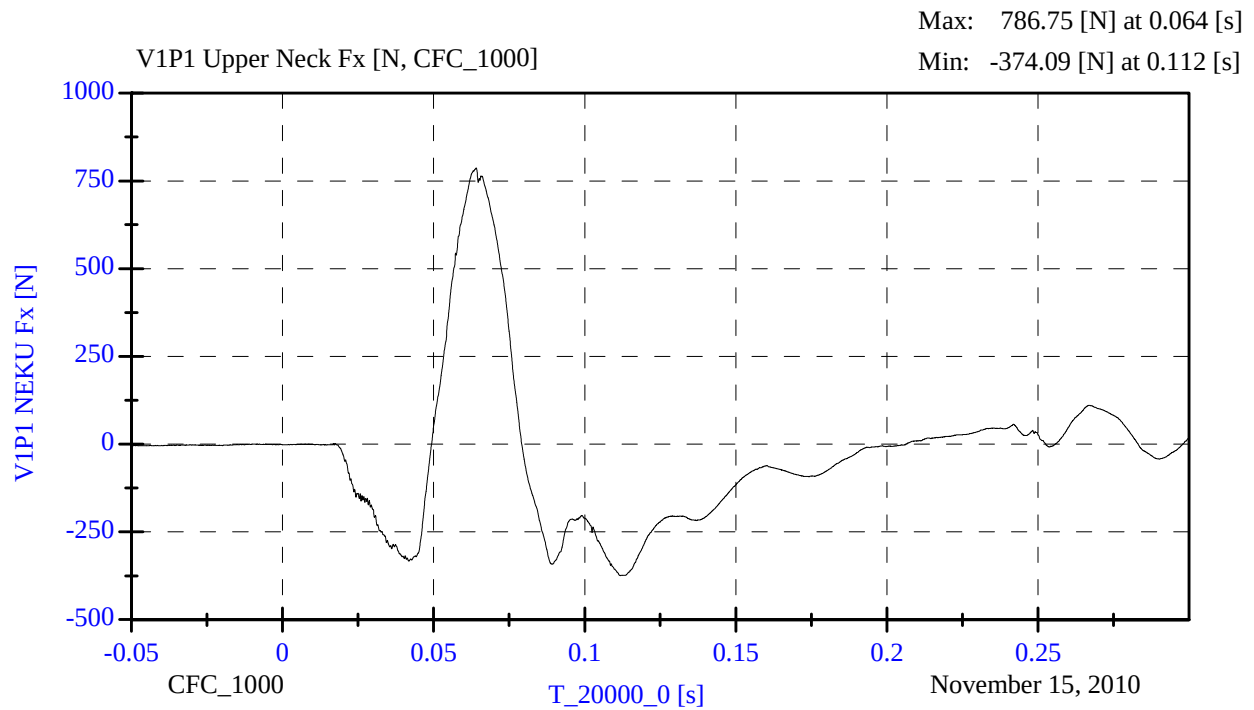
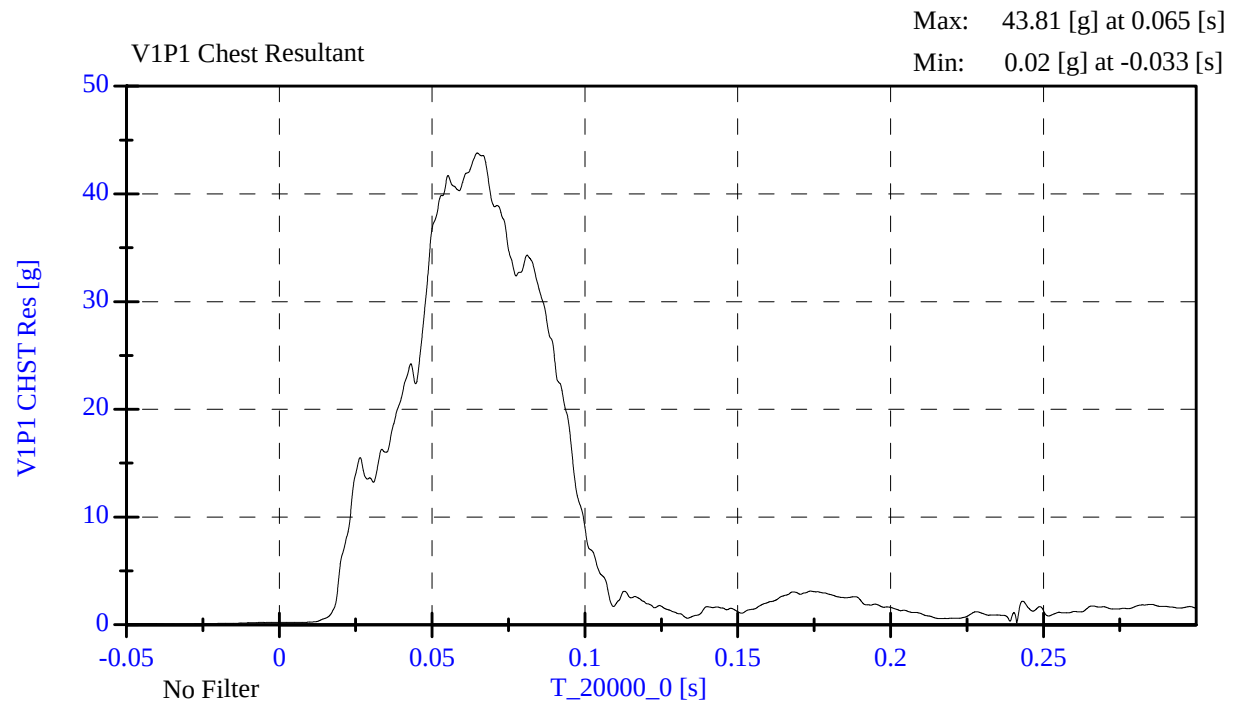
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot 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

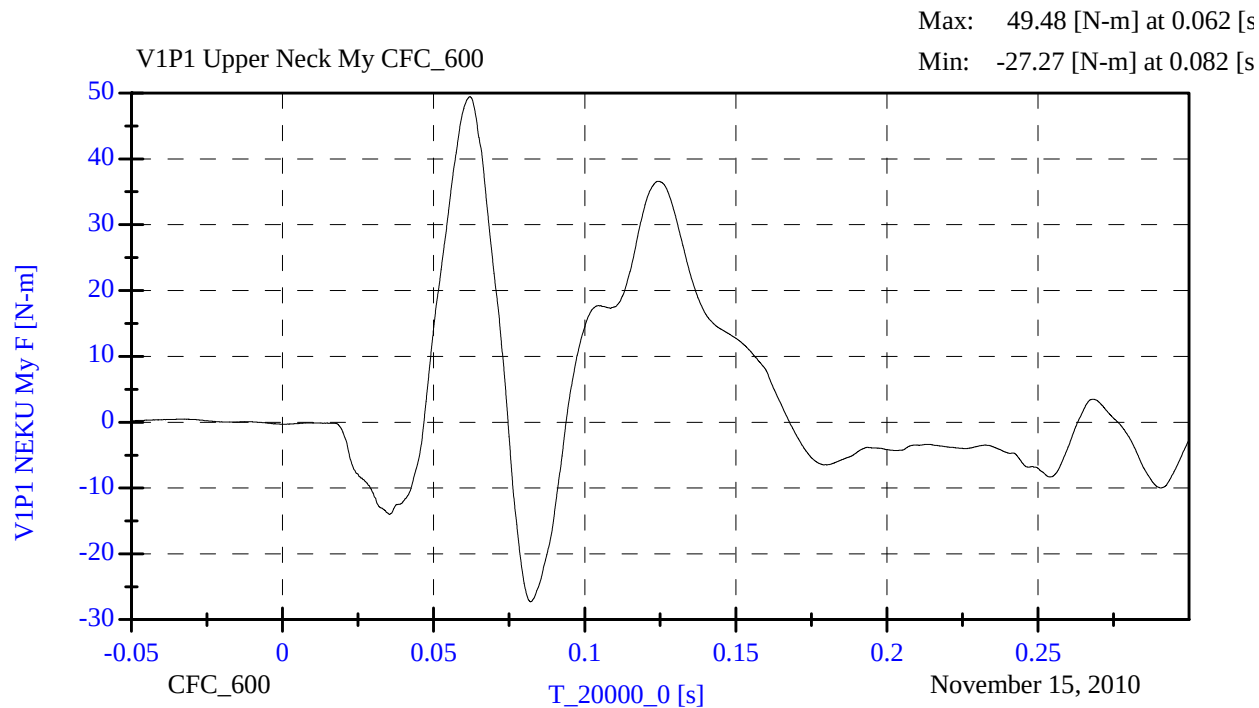
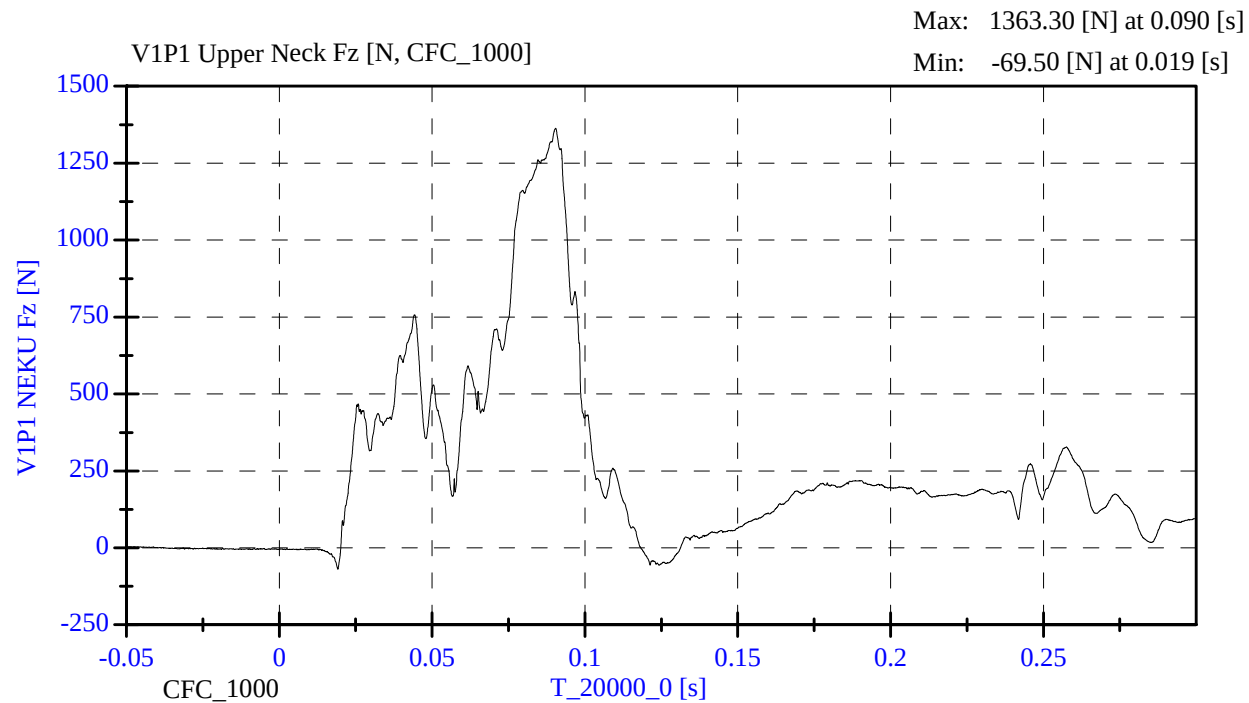


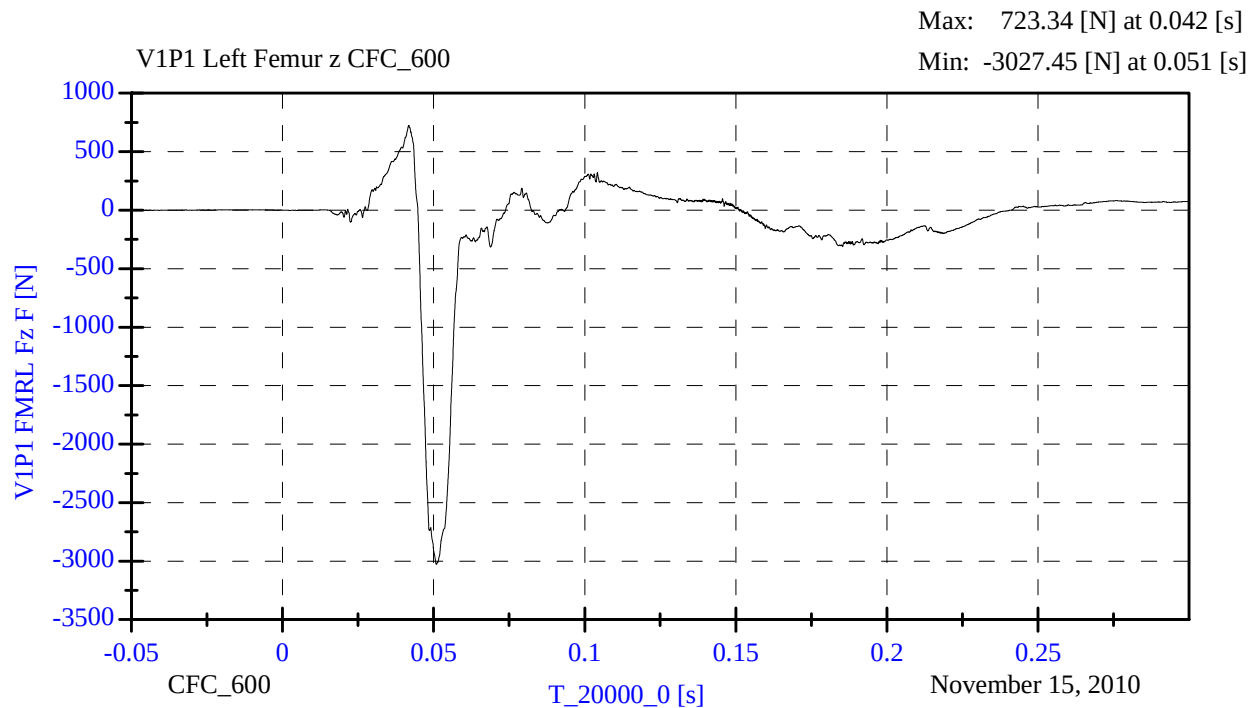
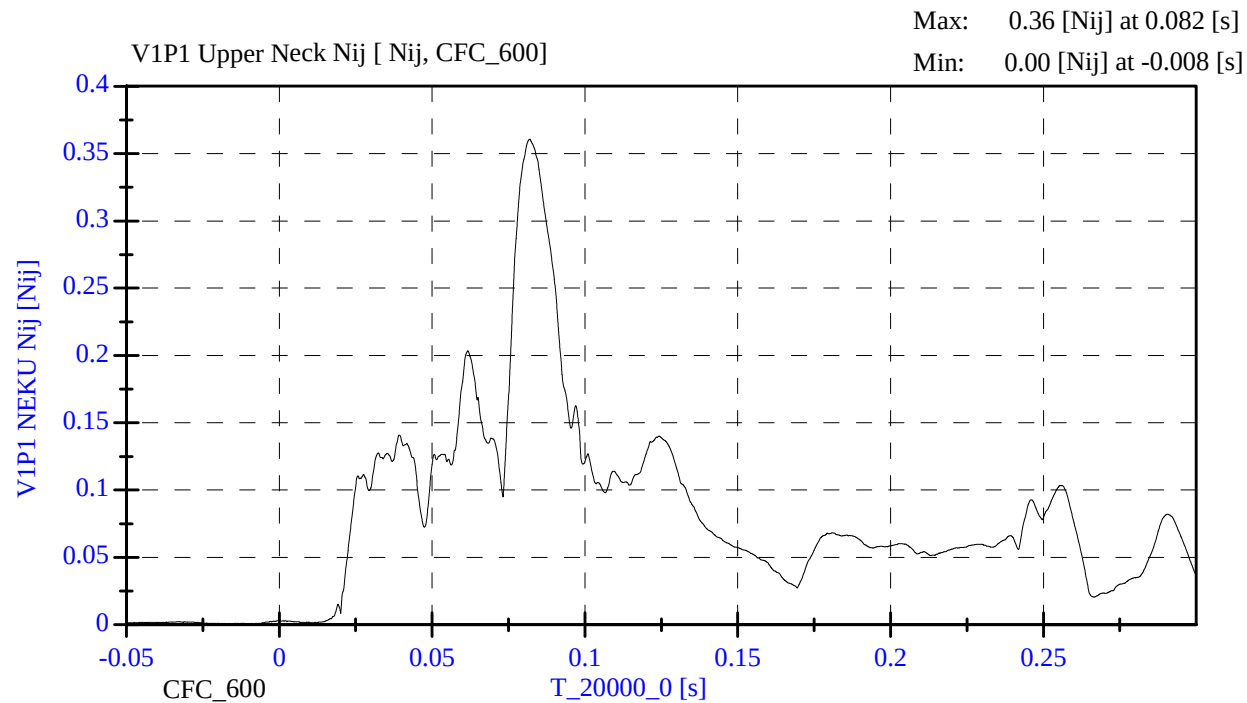


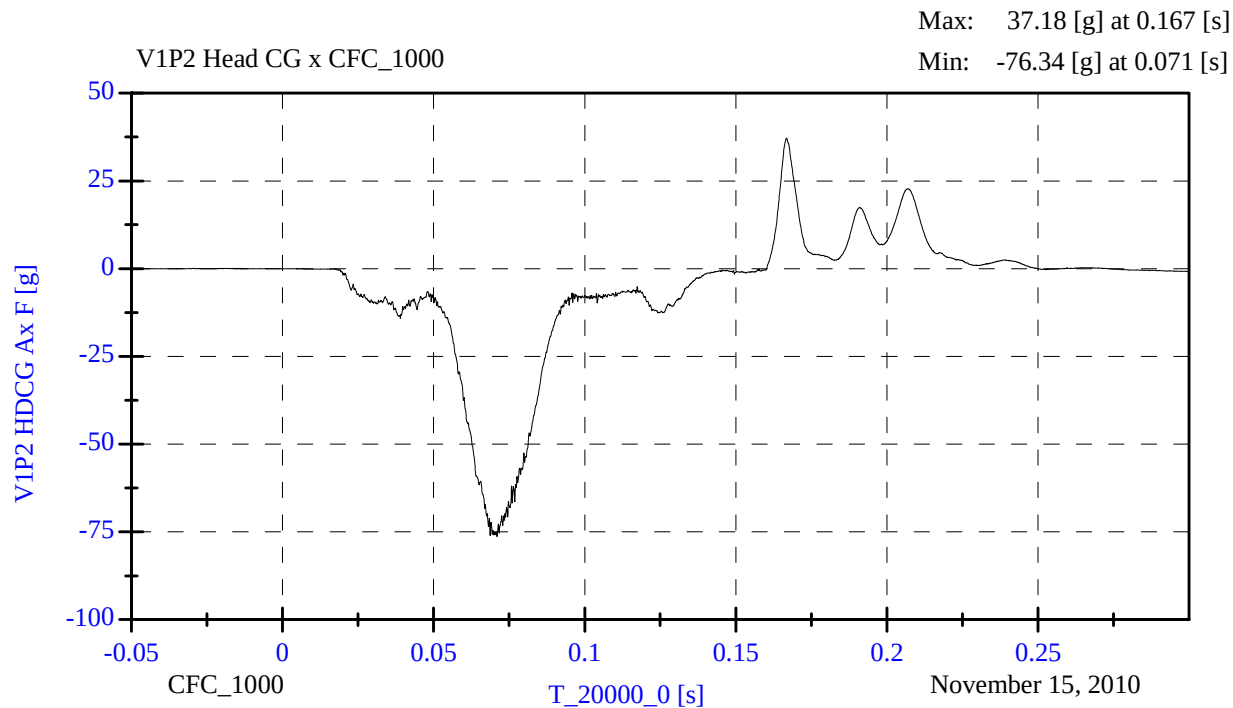
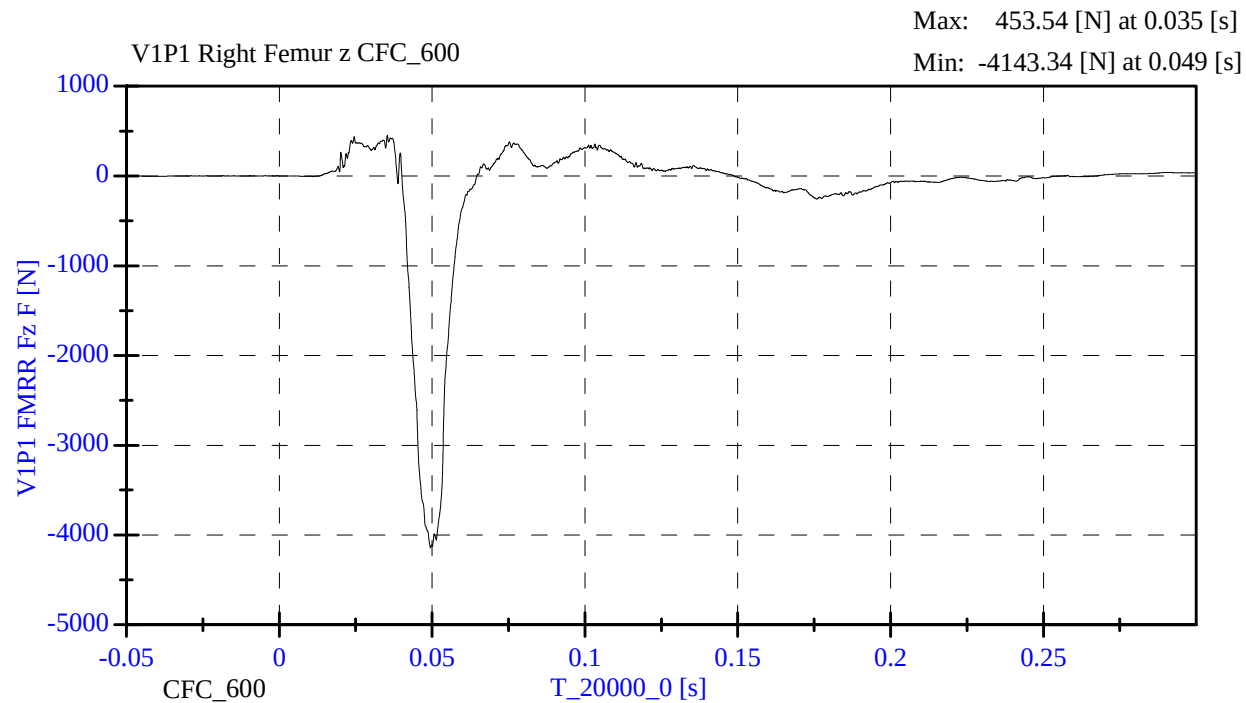


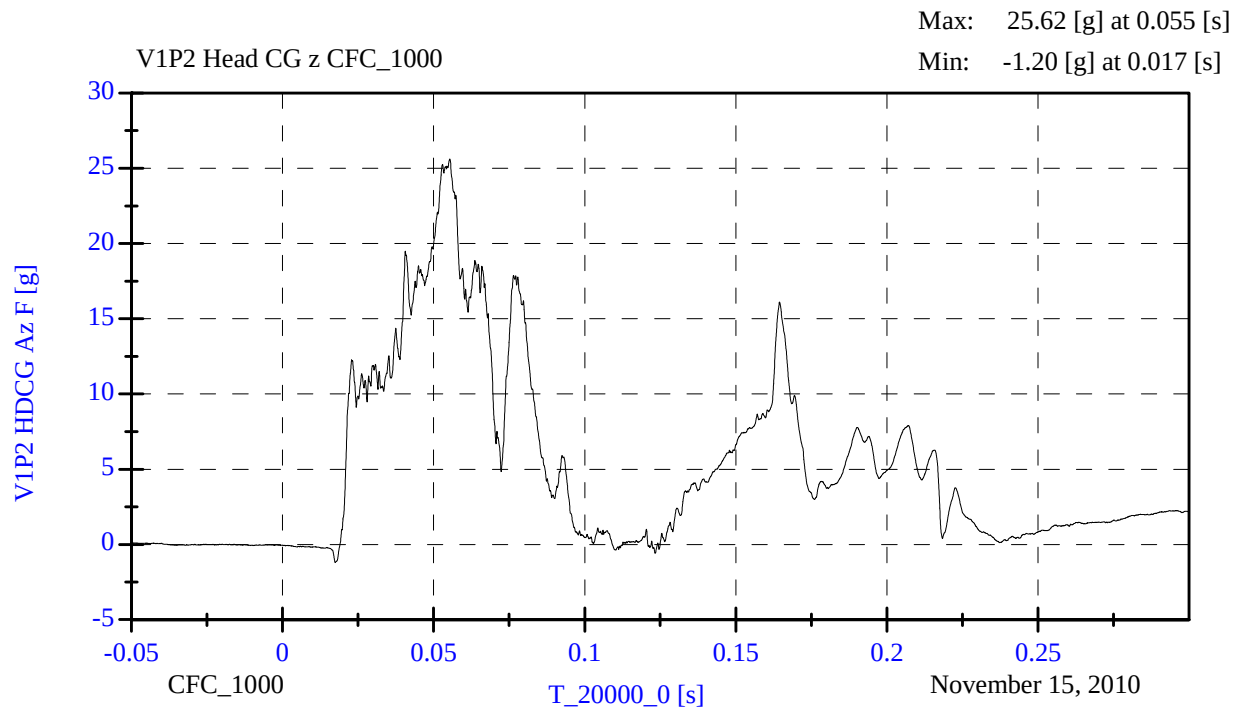
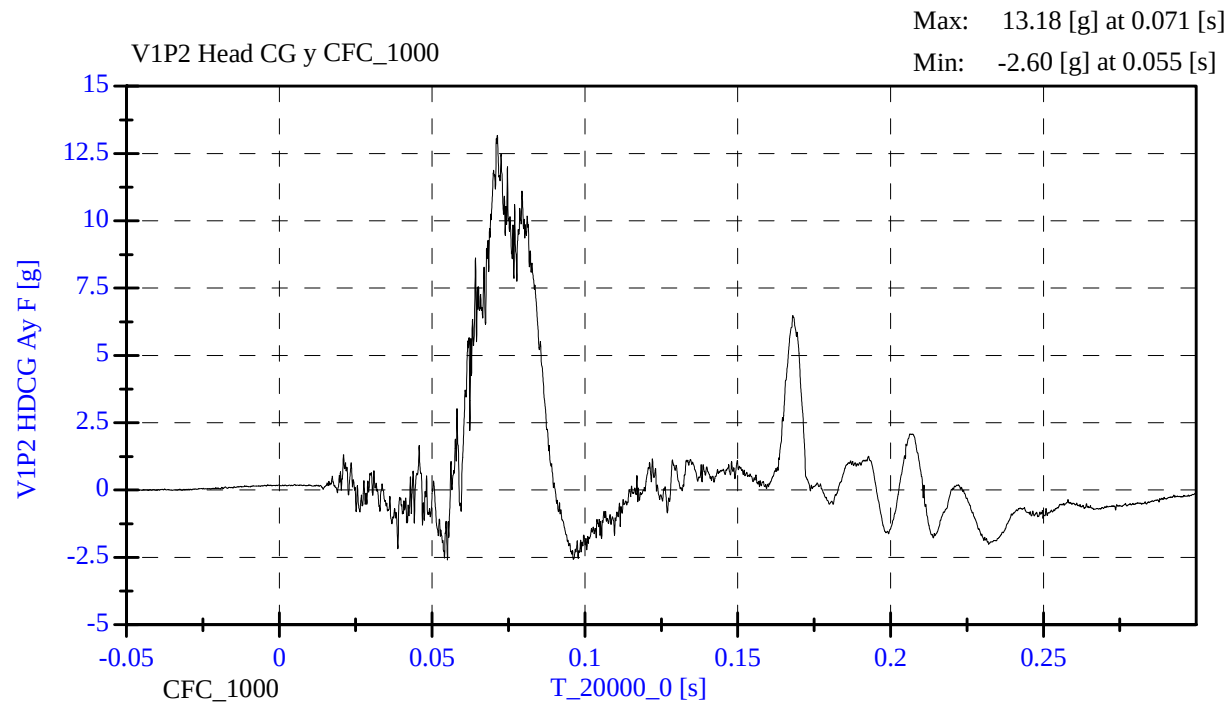


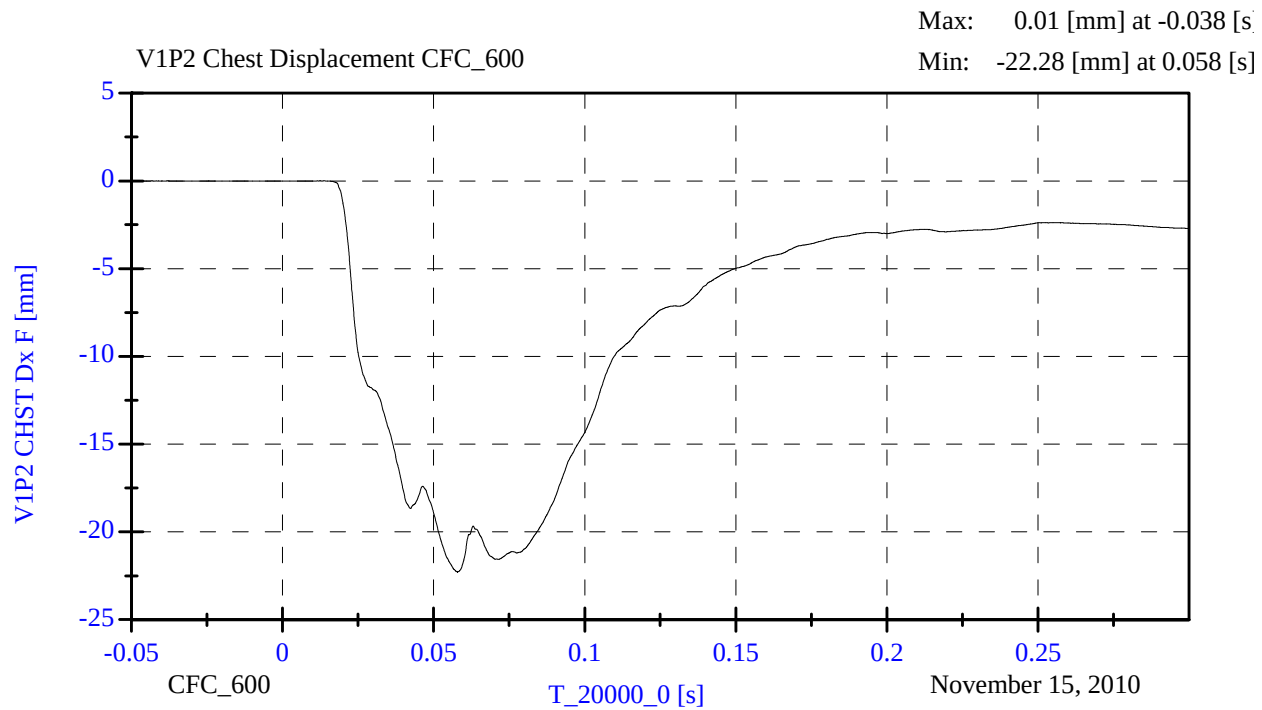
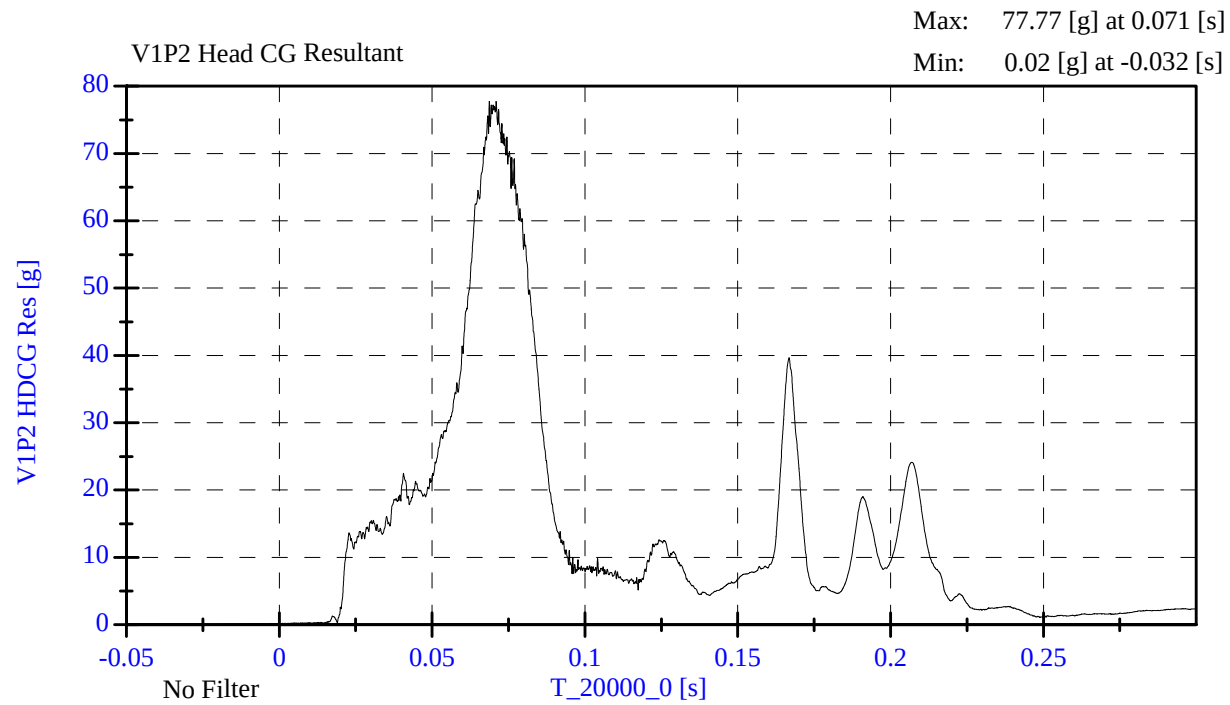


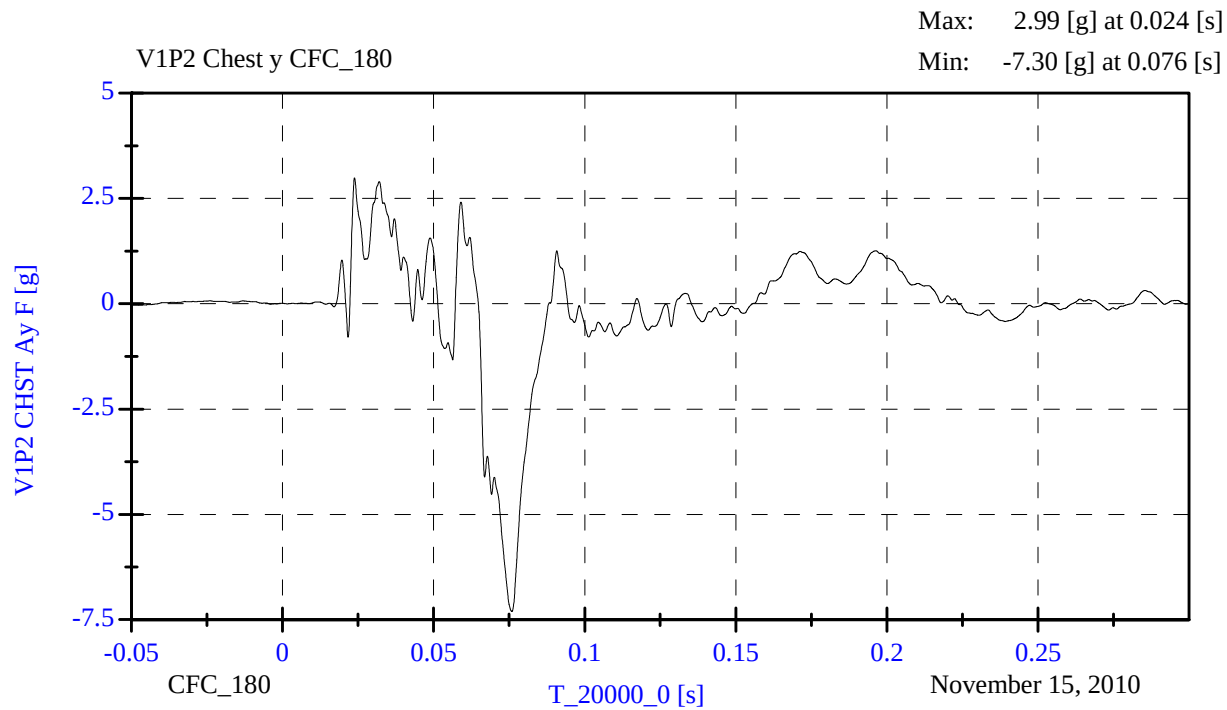
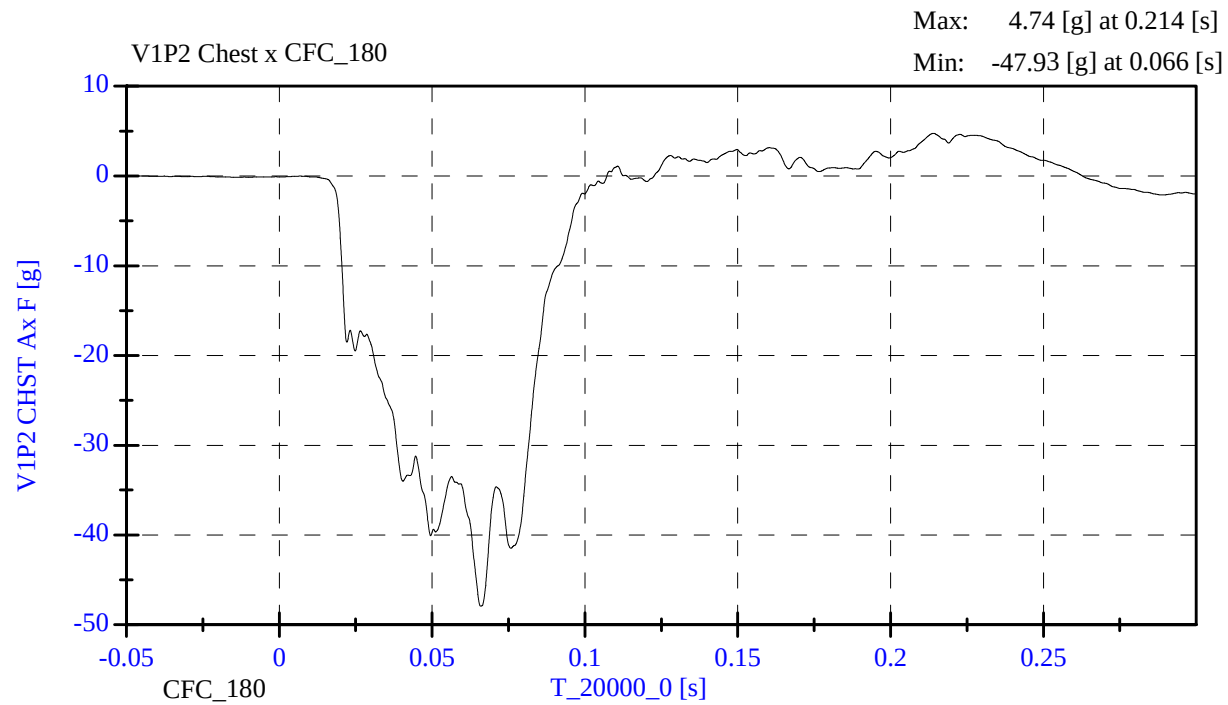


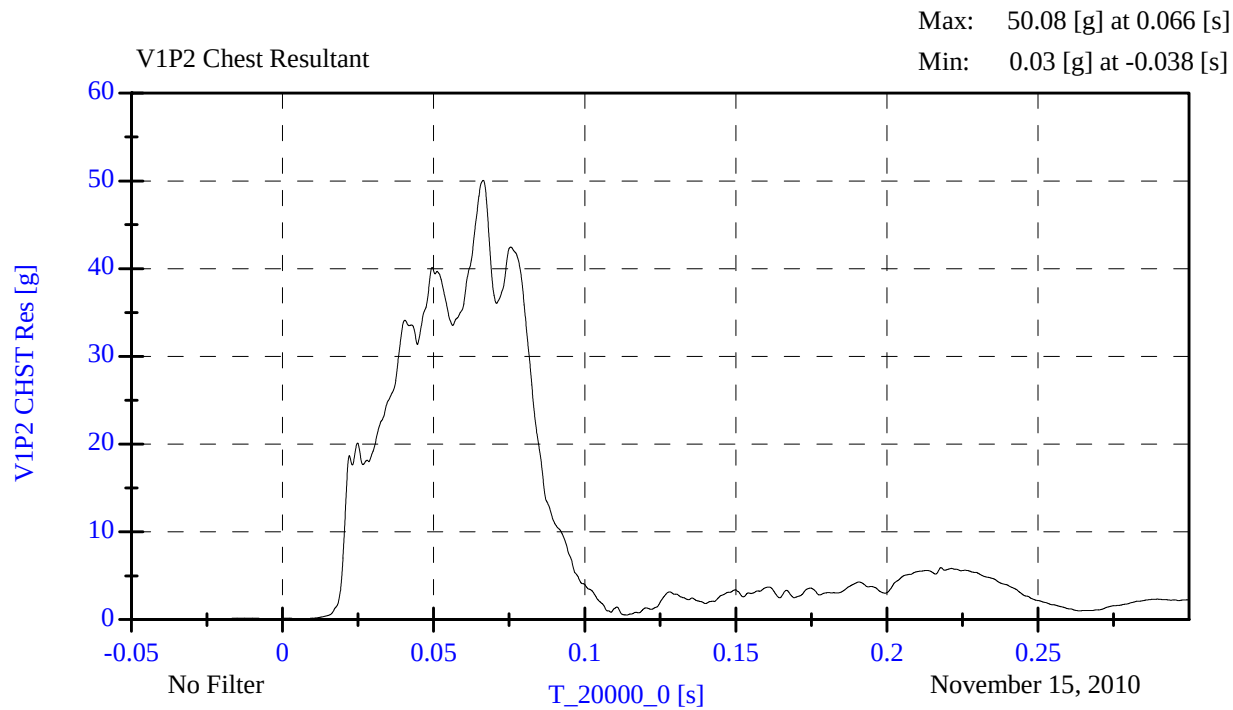
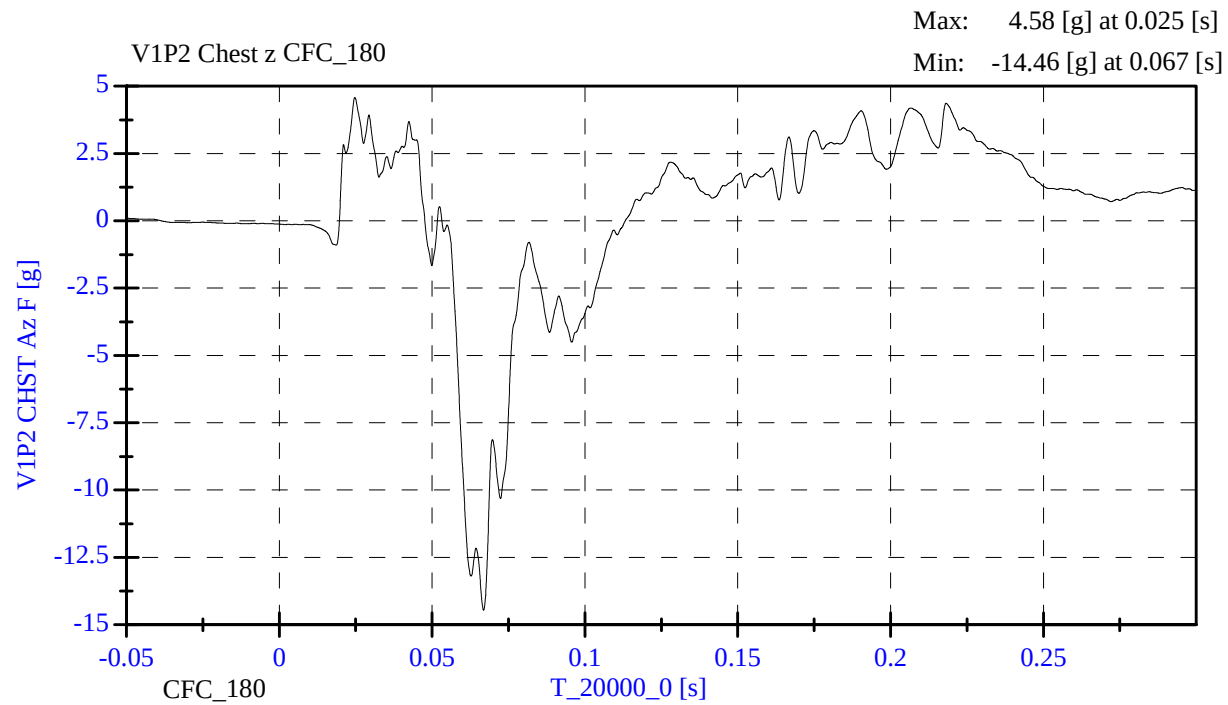


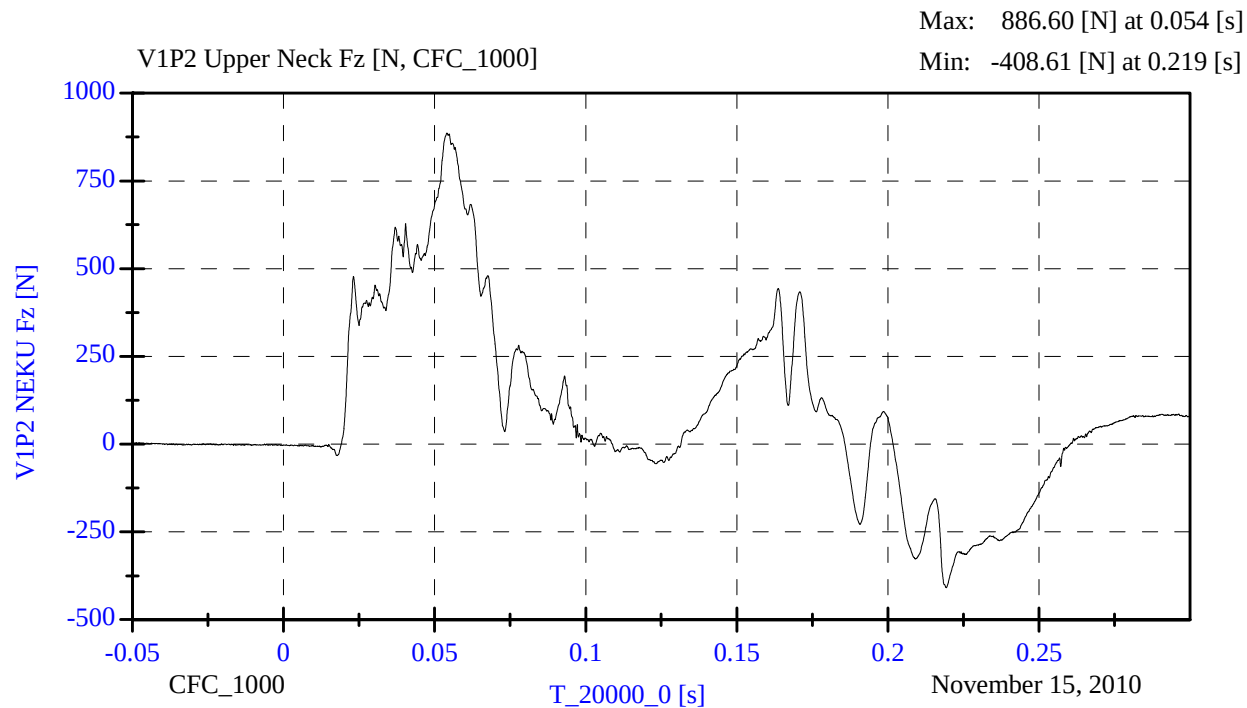
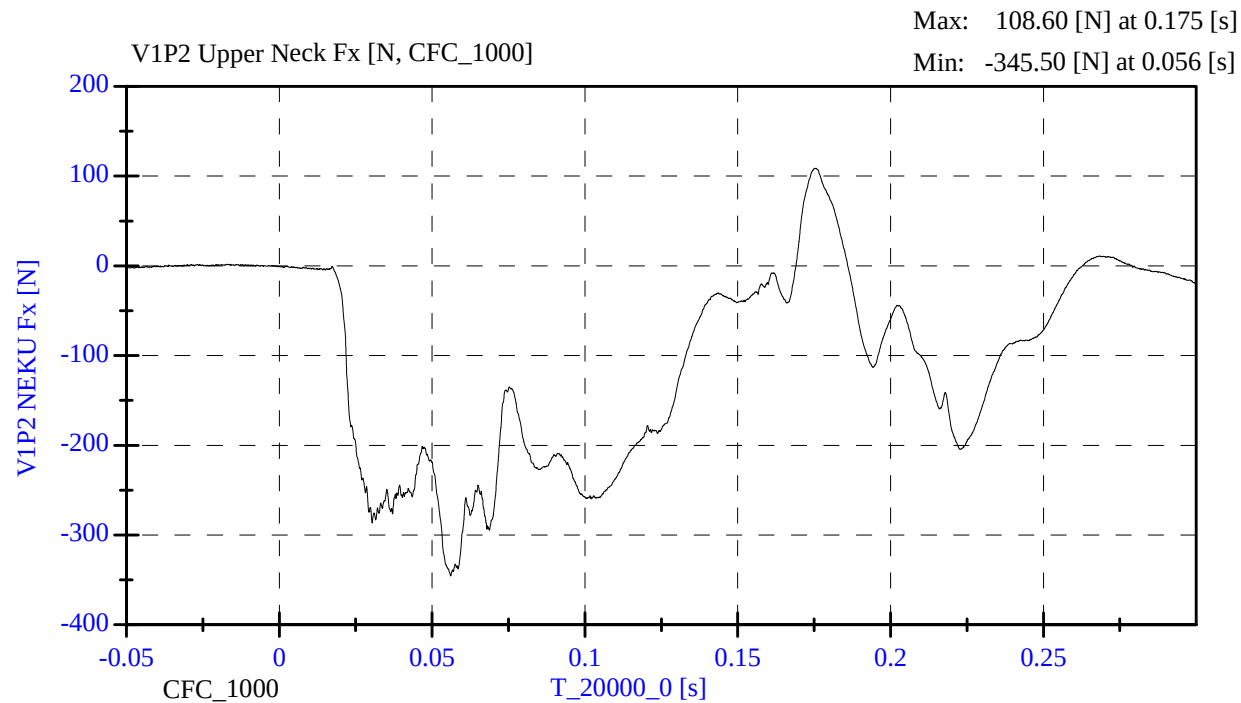


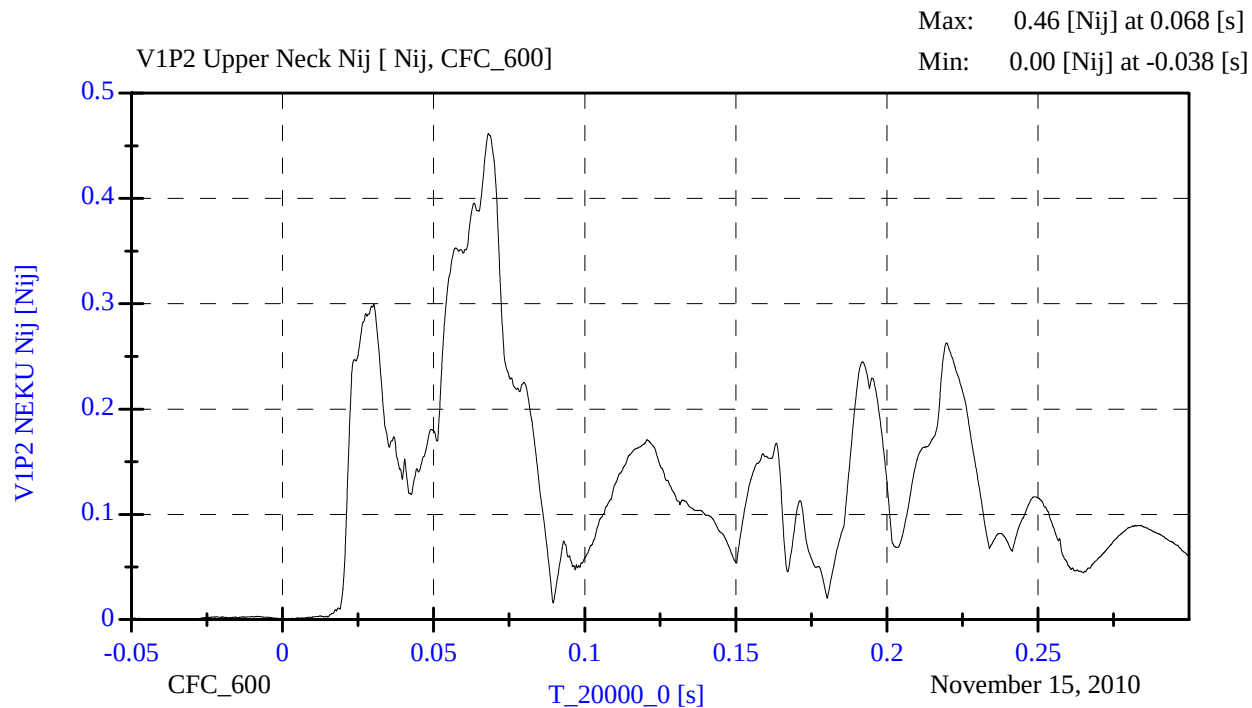
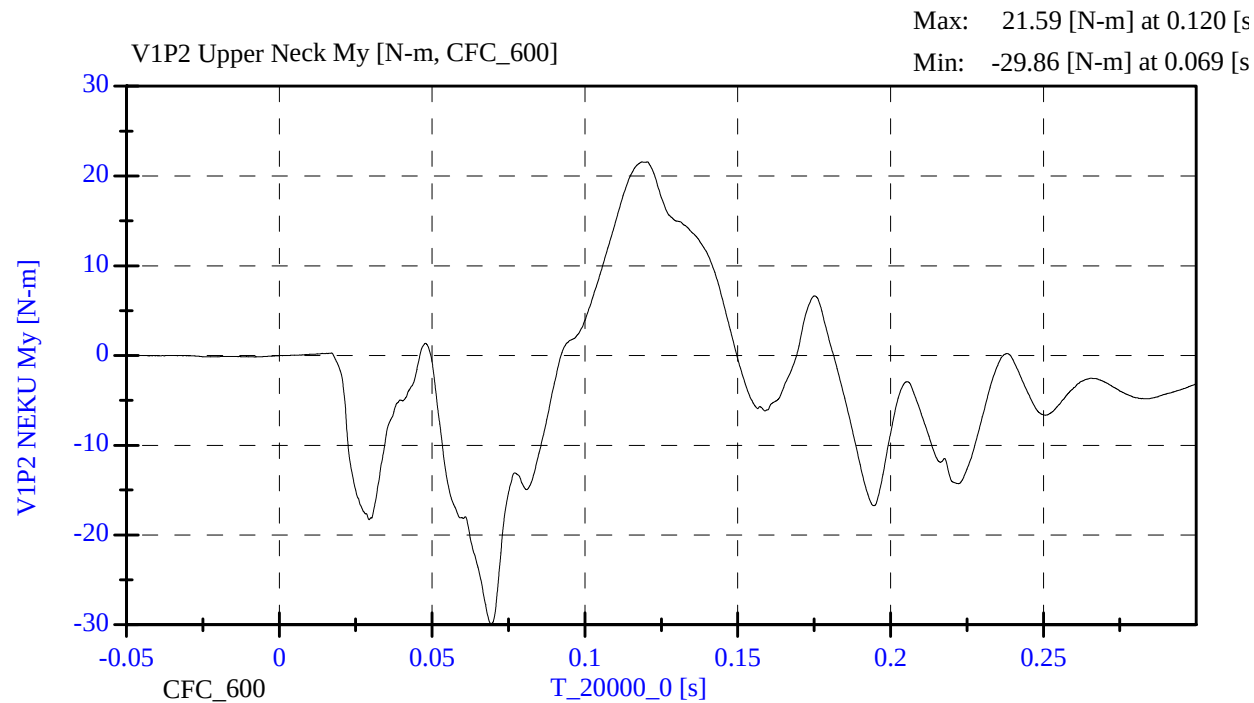


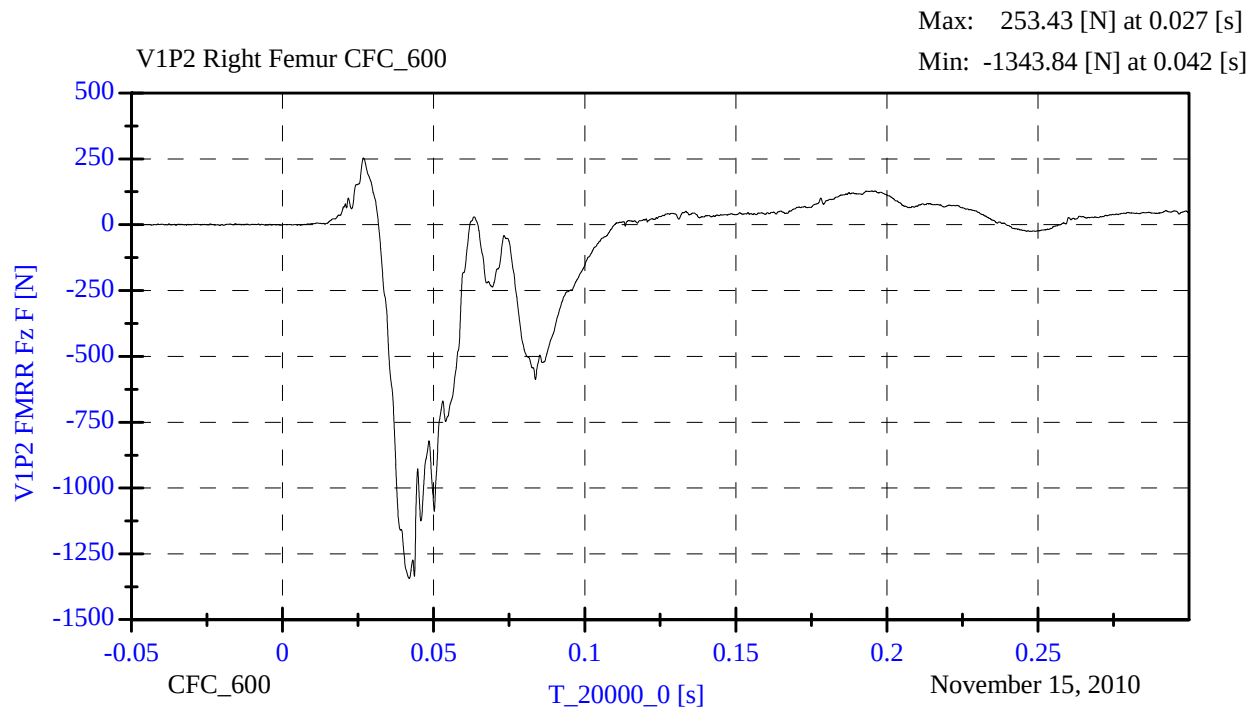
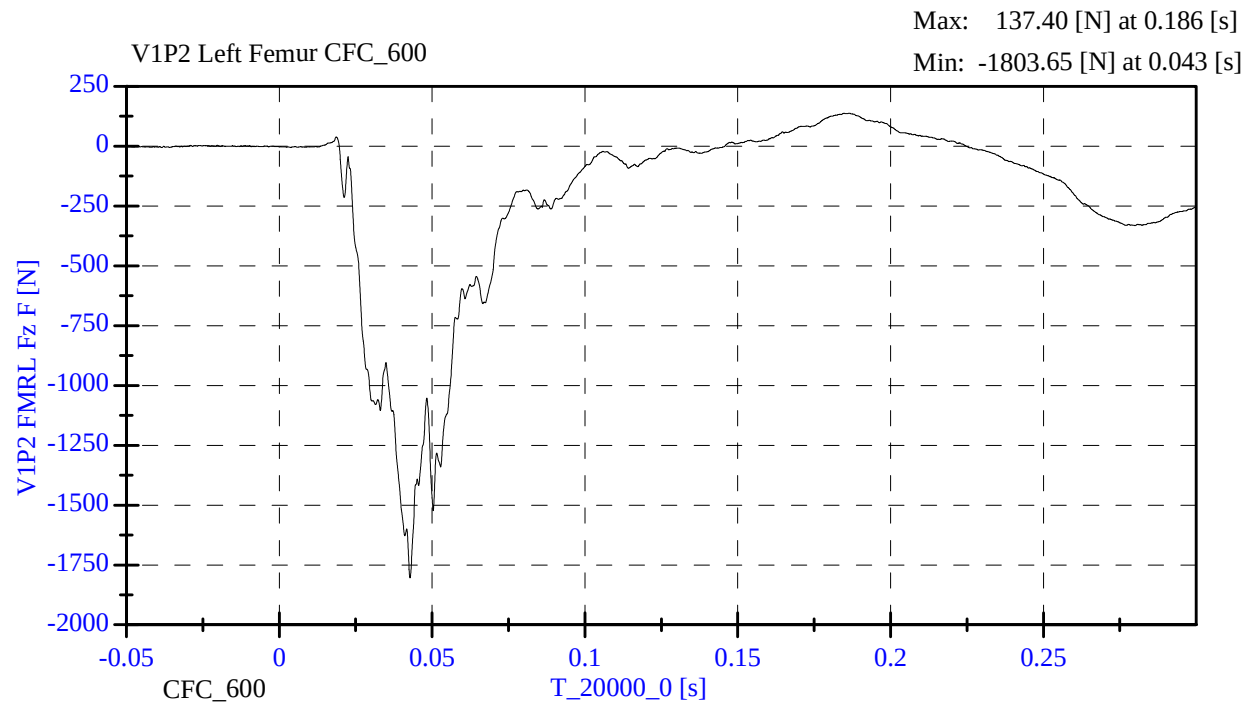












APPENDIX C

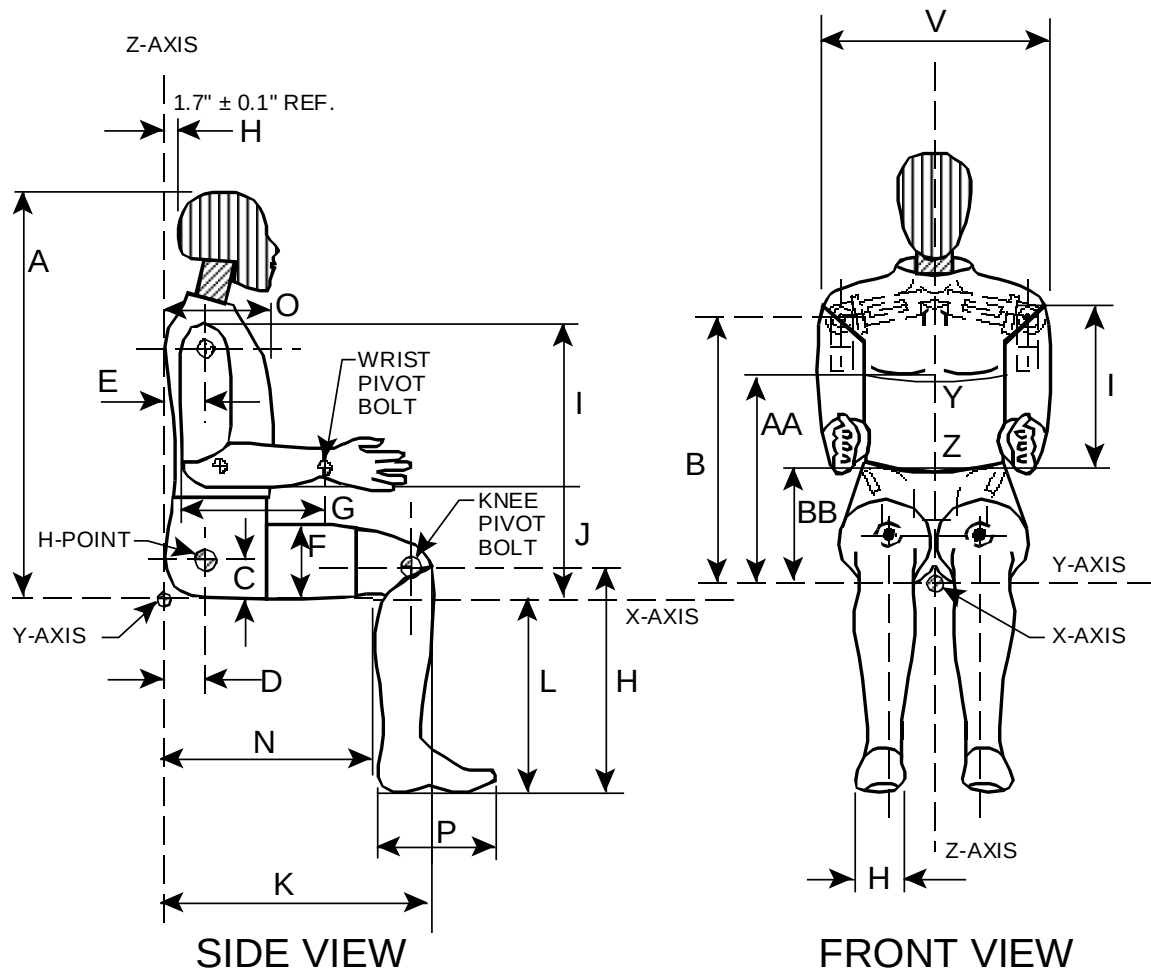
PART 572 E/O DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA SHEETS

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	11/05/2010
#2/Right Front Passenger	143	07/09/2010

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	20.2	Yes
C	H-Point Height	3.3 - 3.5	3.5	Yes
D	H-Point from Backline	5.3 - 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.6	Yes
F	Thigh Clearance	5.5 - 6.1	6.1	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.6	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.3	Yes
J	Elbow Rest Height	7.5 - 8.3	8.1	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.6	Yes
L	Popliteal Height	16.9 - 17.9	17.1	Yes
M	Knee Pivot Height	19.1 - 19.7	19.4	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	10.0	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	33.6	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: SZ

Date: 11/05/2010



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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:	11/8/2010
Test Number:	1	Test Time:	10:48:36 AM

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	26 %RH P
Resultant Acceleration	225 -- 275	253 g P
Oscillation	0.0 -- 10.0	8.5 % P
Lateral Acceleration	-15.00 -- 15.00	-10.42 g P

All test parameters are within specifications

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

Test ID: **Head Drop**

Test Time: **10:48:36 AM**

Test Date: **11/8/2010**



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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	P16658	11/2/2010
Endevco	7264-2000	P17462	11/2/2010
Endevco	7264-2000	P16596	11/2/2010

Test ID: **Head Drop**

Test Time: **10:48:36 AM**

Test Date: **11/8/2010**

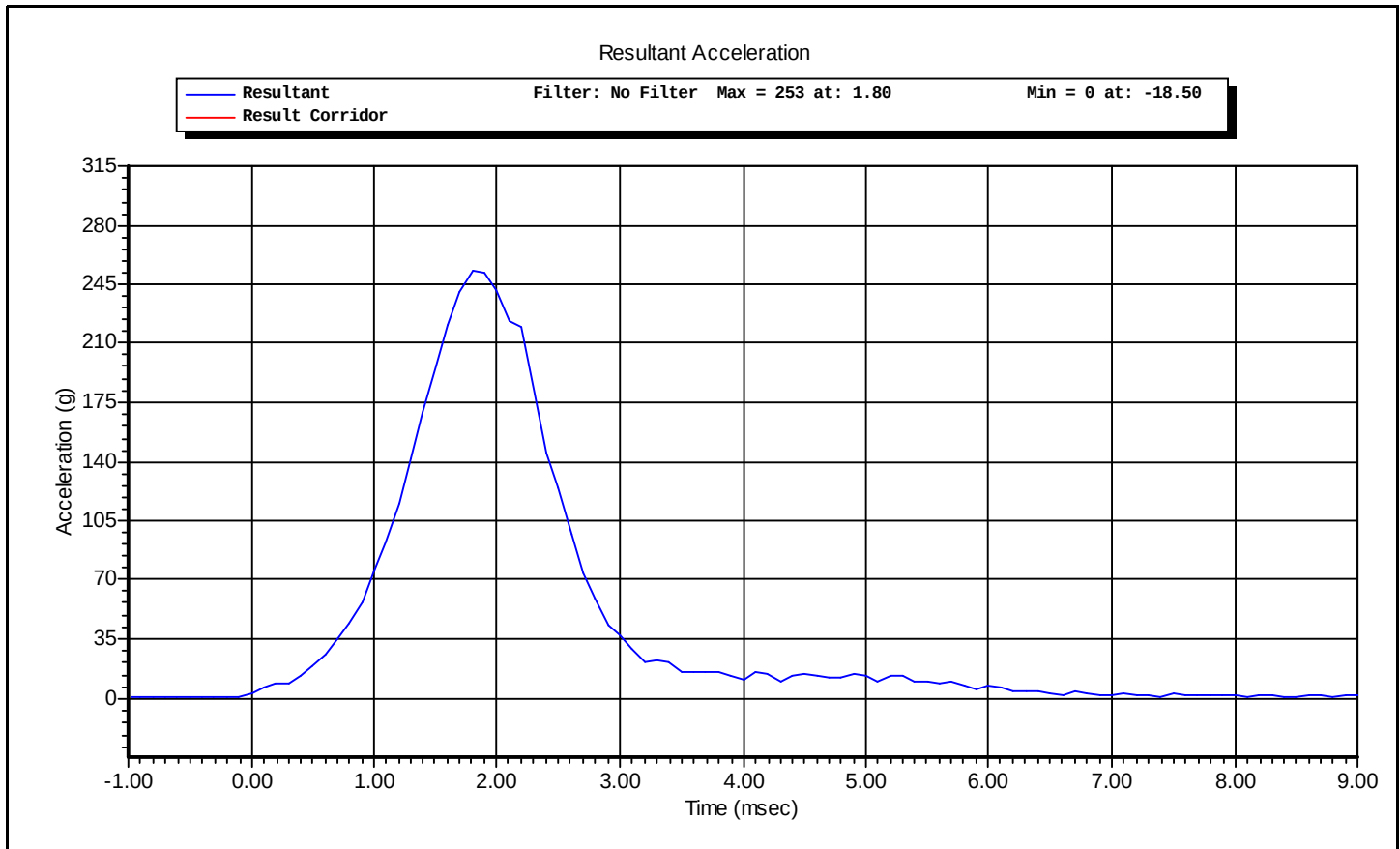


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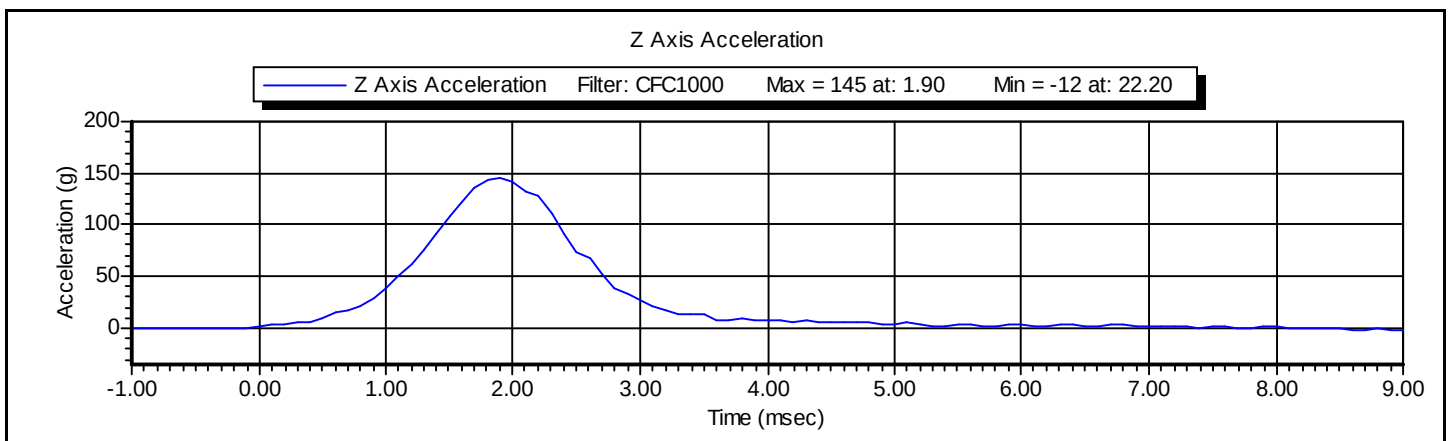
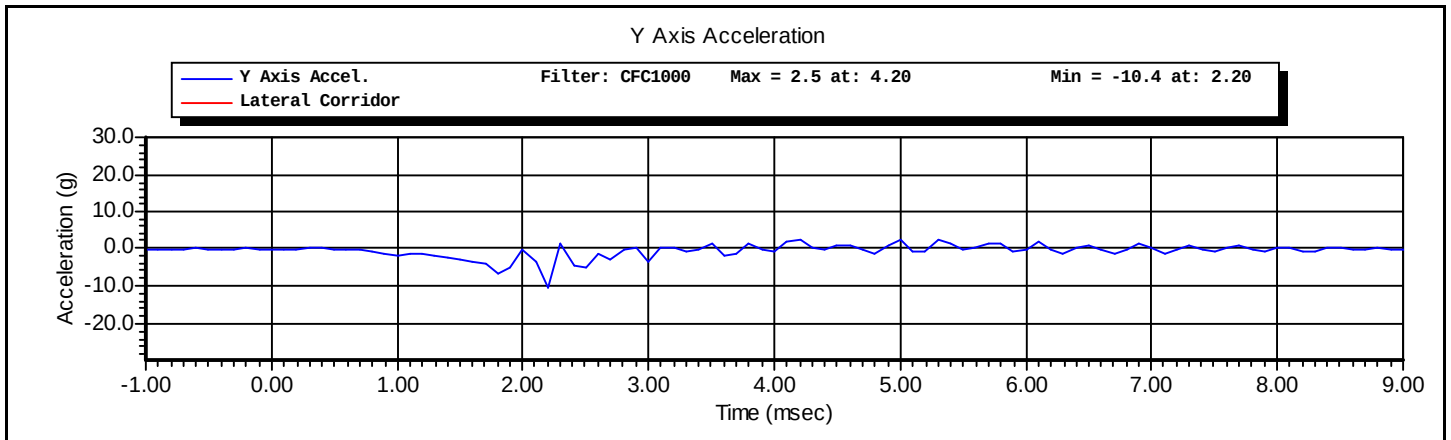
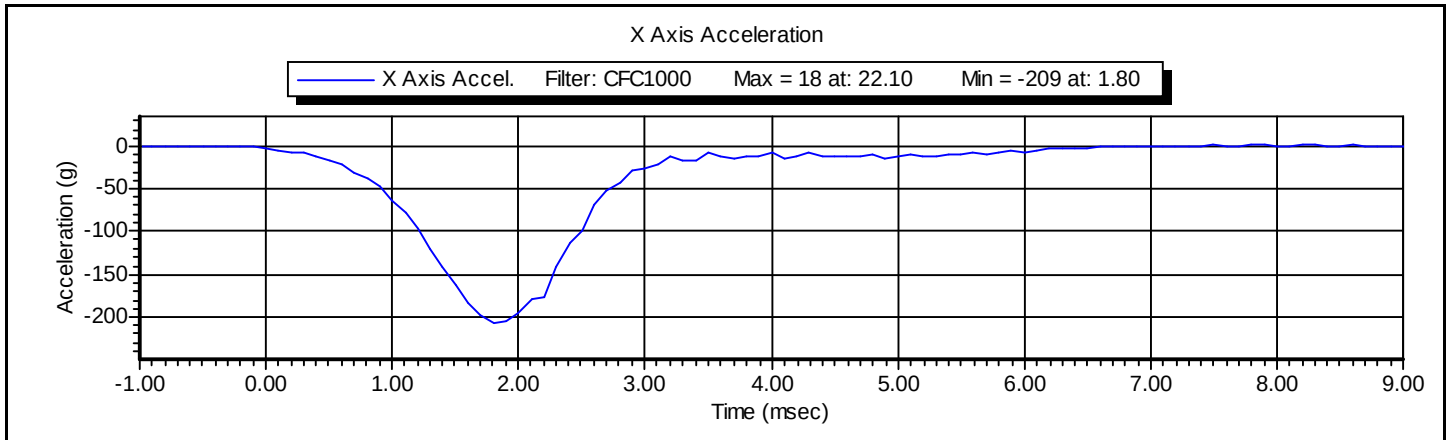
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	11/8/2010
Test Number:	1	Test Time:	10:48:36 AM



Test ID: **Head Drop**

Test Time: **10:48:36 AM**

Test Date: **11/8/2010**





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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:			
Test ID:		Test Date:	11/5/2010
Test Number:	1	Test Time:	1:19:40 PM

Component Part Number	Component Serial Number
Ribs 78051-RS	4273
Chest Jacket - 78051-169	2437
Spine	555

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.2 deg C P
Humidity	10.0 -- 70.0	34.0 %RH P
Velocity	6.59 -- 6.83	6.69 m/s P
Resistive Force	-5.894 -- -5.160	-5.639 kN P
Sternum Displacement	-72.6 -- -63.5	-69.9 mm P
Hysteresis	69 -- 85	72 % P

All test parameters are within specifications

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

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

Test ID:

Test Time: **1:19:40 PM**

Test Date: **11/5/2010**



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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	P66930	10/5/2010
DentonATD	78051-342	DS-061	6/1/2010

Test ID:

Test Time: **1:19:40 PM**

Test Date: **11/5/2010**



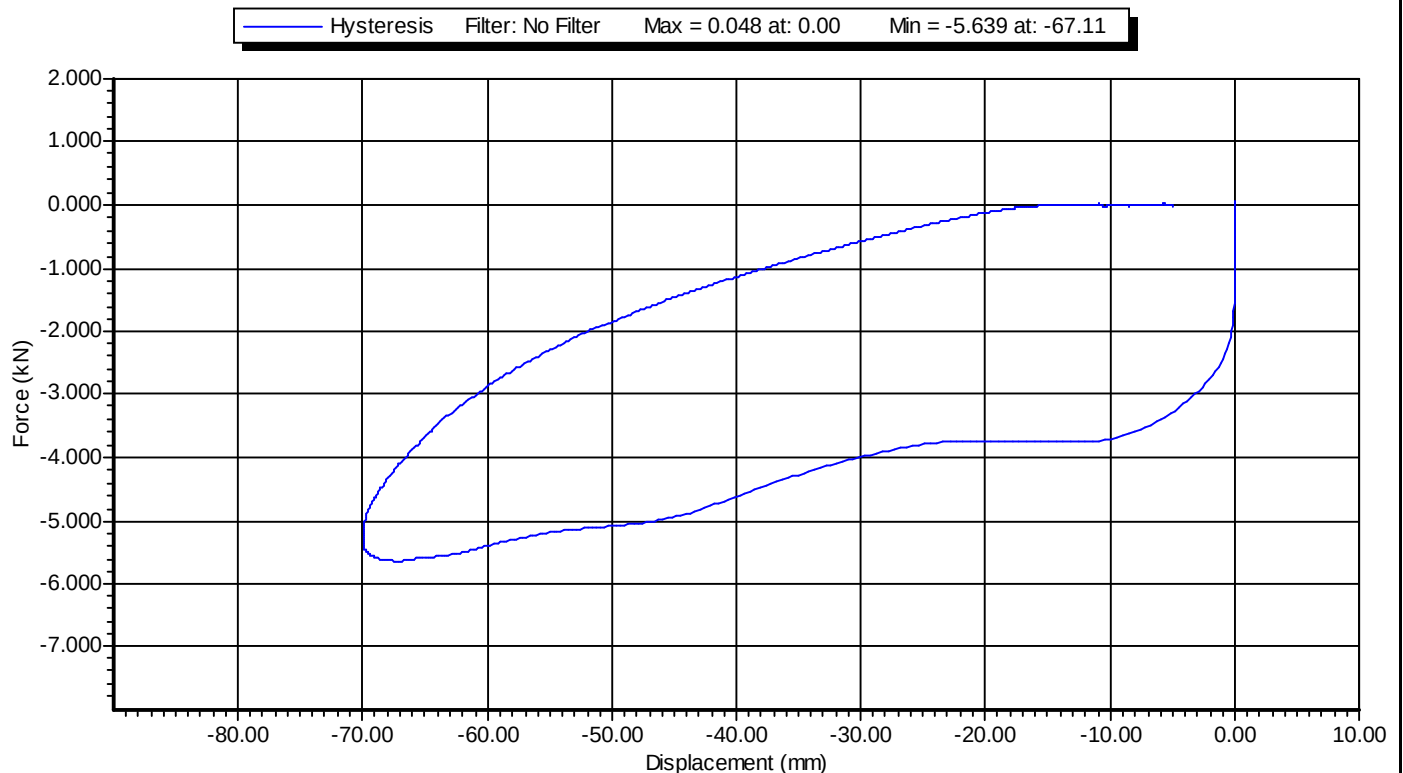
www.calspan.com

Calspan - Transportation Research Group

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

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:			
Test ID:		Test Date:	11/5/2010
Test Number:	1	Test Time:	1:19:40 PM

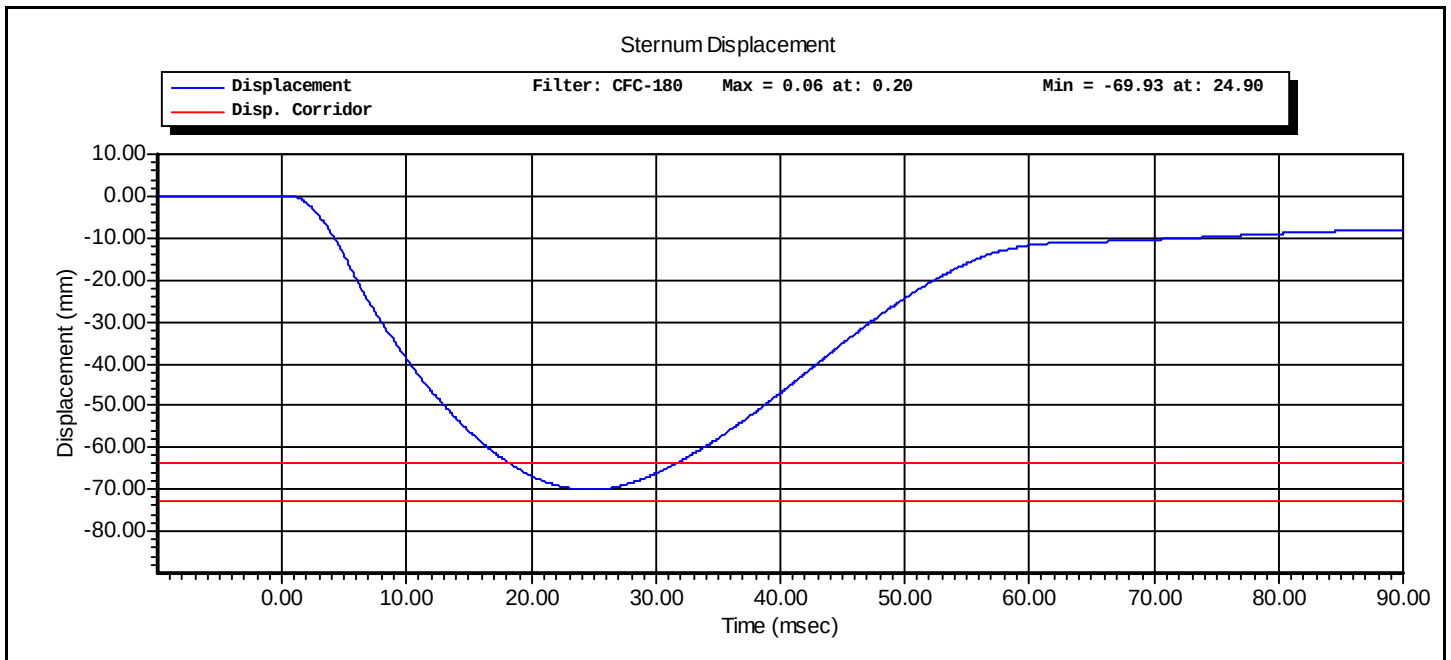
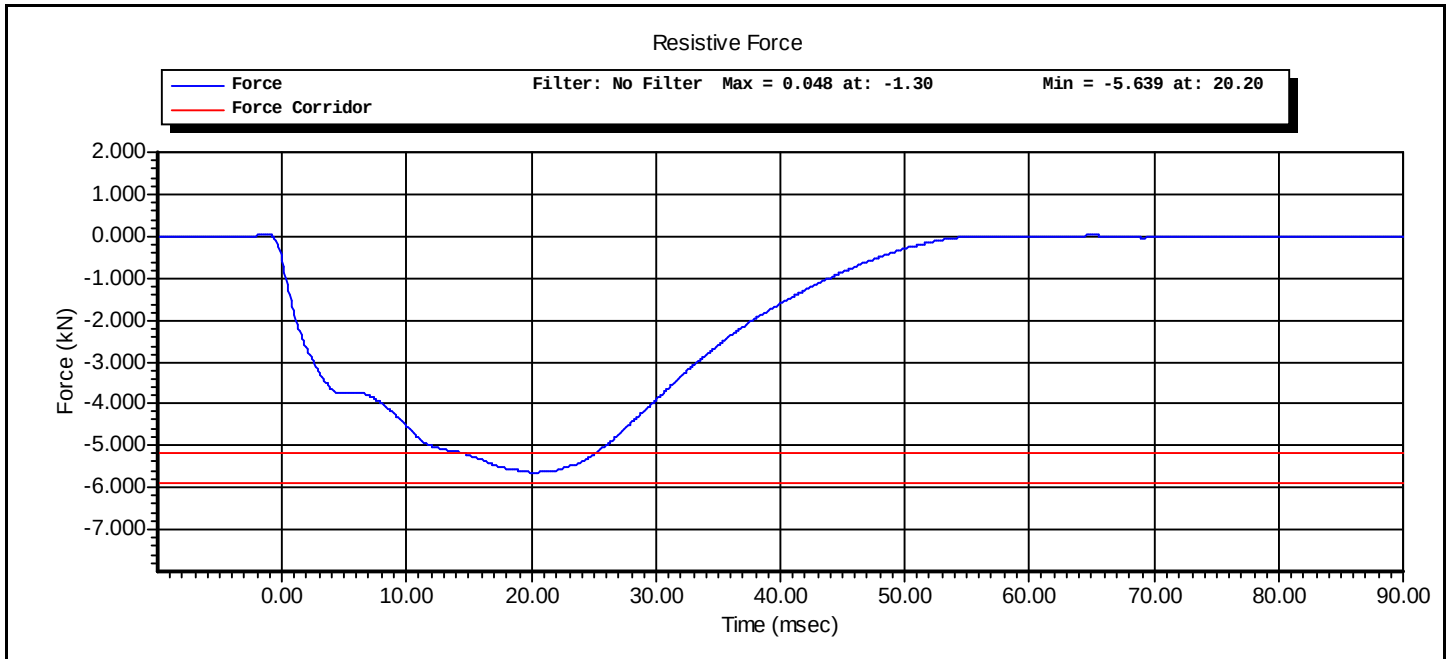
Resistive Force vs Sternum Displacement



Test ID:

Test Time: 1:19:40 PM

Test Date: 11/5/2010





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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:	11/9/2010
Test Number:	2	Test Time:	1:06:27 PM

Component Part Number	Component Serial Number
Neck - 78051-336	4194
Front Nodding Block - 78051-351	1797
Rear Nodding Block - 78051-351	1799
Head Skin - 78051-220	243

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.7 deg C	P
Humidity		10	-- 70	30 %RH	P
Velocity		5.94	-- 6.19	6.12 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	17.9 g	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	15.5 g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	11.8 g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	12.9 g	P
Decel Time to	5 g	38.0	-- 46.0	45.5 ms	P
D Plane Rotation		81.0	-- 106.0	97.2 degrees	P
Time at Max Rotation		72.0	-- 82.0	79.7 ms	P
Rotation Decay to Zero		147.0	-- 174.0	162.5 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-61.0 Nm	P
Time at Max Moment		65.0	-- 79.0	73.9 ms	P
Moment Decay to Zero		120.0	-- 148.0	142.5 ms	P

All test parameters are within specifications

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

Supervisor: **D. travale** Signature: _____

Test ID: **Neck Extension**

Test Time: **1:06:27 PM**

Test Date: **11/9/2010**



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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: **1:06:27 PM**

Test Date: **11/9/2010**

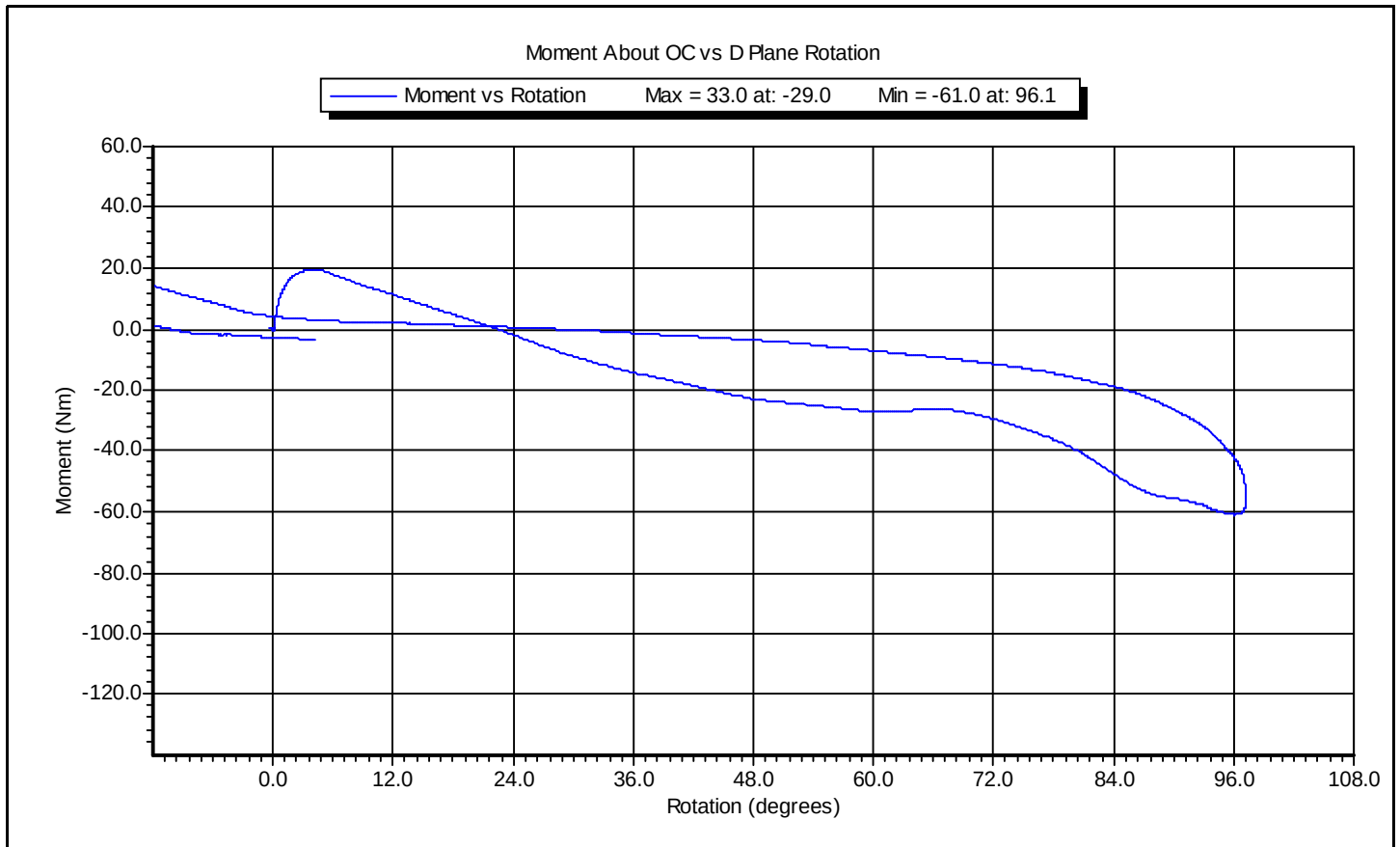


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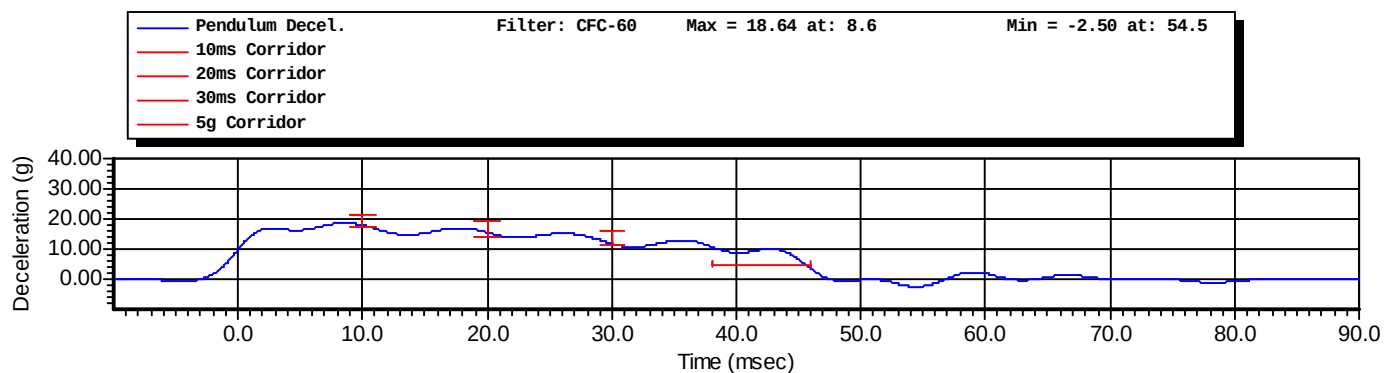
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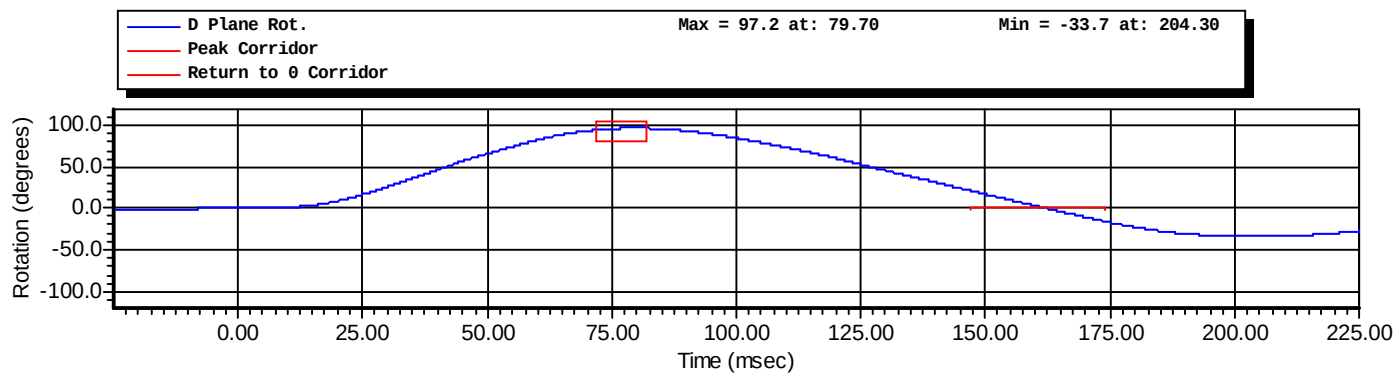
Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	11/9/2010
Number of Test:	2	Time of Test:	1:06:27 PM



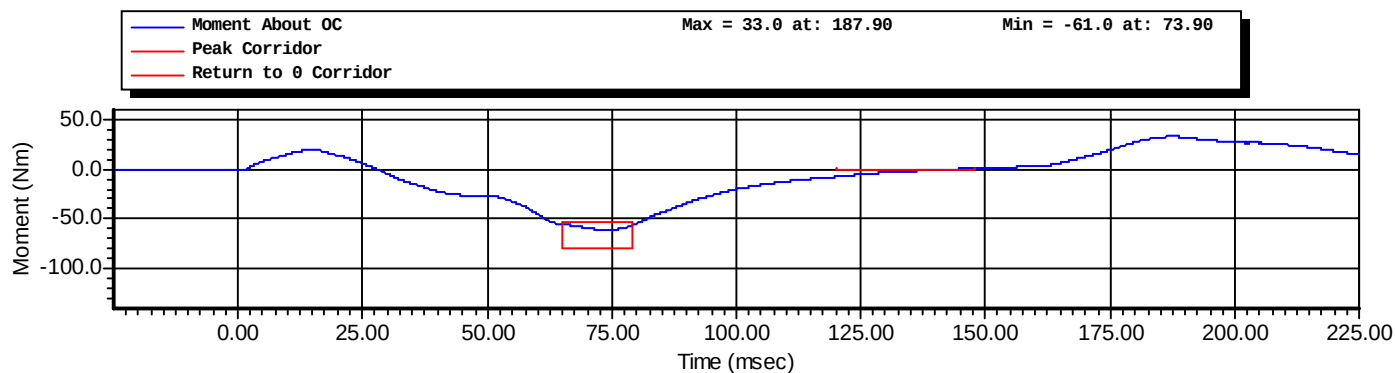
Pendulum Deceleration



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:	11/9/2010
Test Number:	3	Test Time:	11:02:44 AM

Component Part Number	Component Serial Number
Neck - 78051-336	4194
Front Nodding Block - 78051-351	1797
Rear Nodding Block - 78051-351	1799
Head Skin - 78051-220	243

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.7 deg C	P
Humidity		10	-- 70	27 %RH	P
Velocity		6.89	-- 7.13	7.10 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	25.9 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.4 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	15.0 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	15.4 g	P
Deceleration time to	5 g	34.0	-- 42.0	39.6 ms	P
D Plane Rotation		-78.0	-- -64.0	-73.4 degrees	P
Time at max rotation		57.0	-- 64.0	59.3 ms	P
Rotation Decay to Zero		113.0	-- 128.0	118.6 ms	P
Moment about OC		88.1	-- 108.4	96.5 Nm	P
Time at Max Moment		47.0	-- 58.0	53.0 ms	P
Moment Decay to Zero		97.0	-- 107.0	98.4 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **11:02:44 AM**

Test Date: **11/9/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

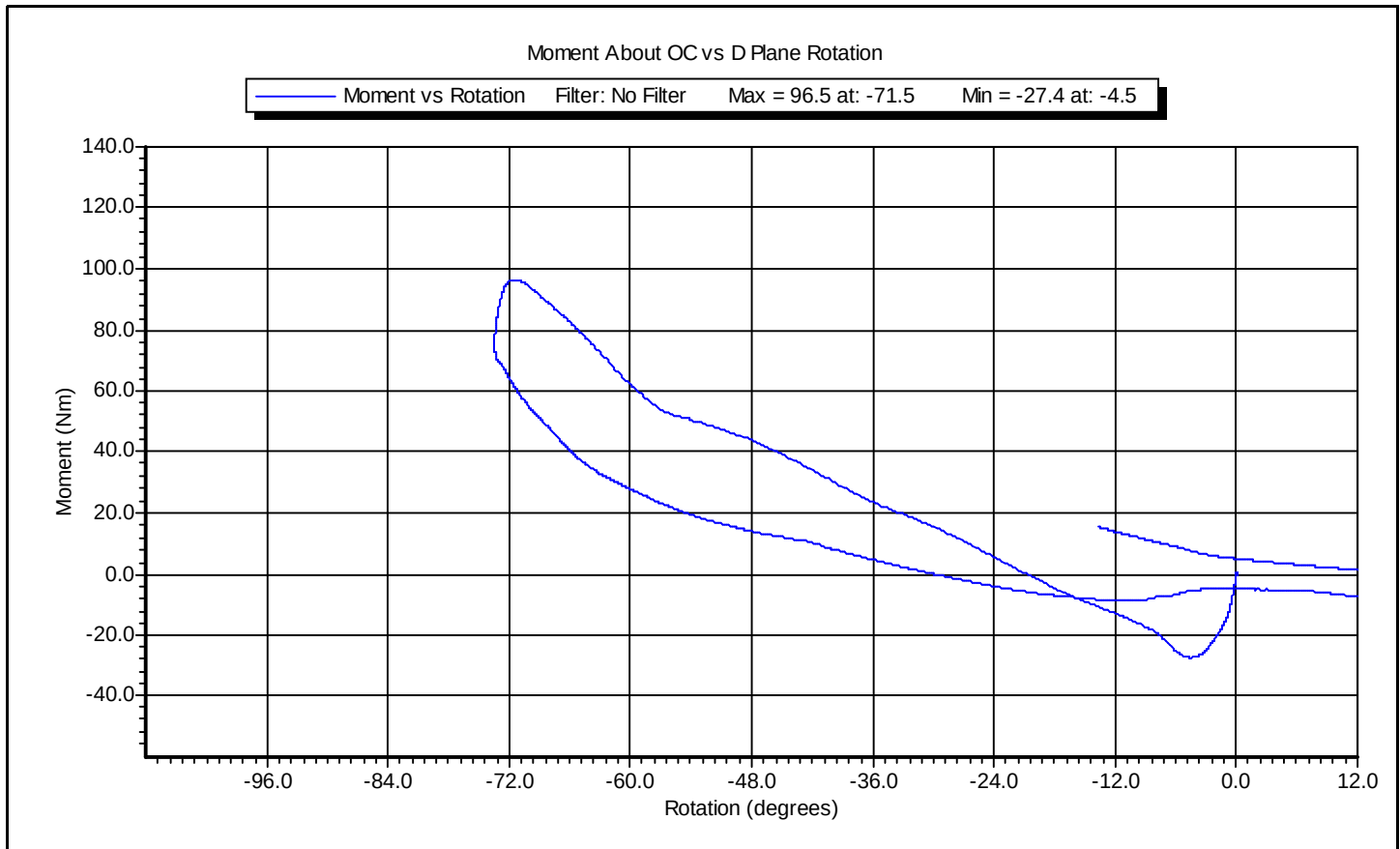
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010
Endevco	7231CT	P35758	10/5/2010

Test ID: **Neck Flexion**

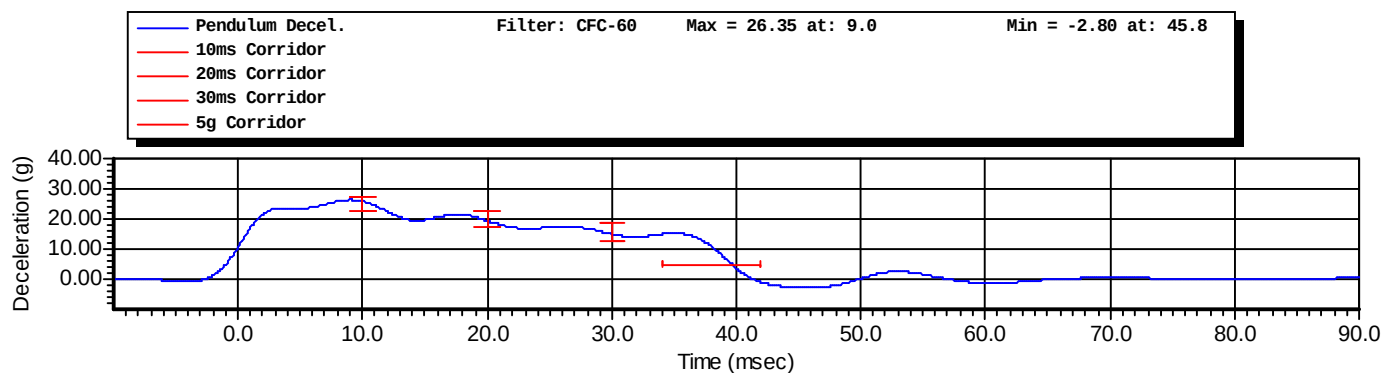
Test Time: **11:02:44 AM**

Test Date: **11/9/2010**

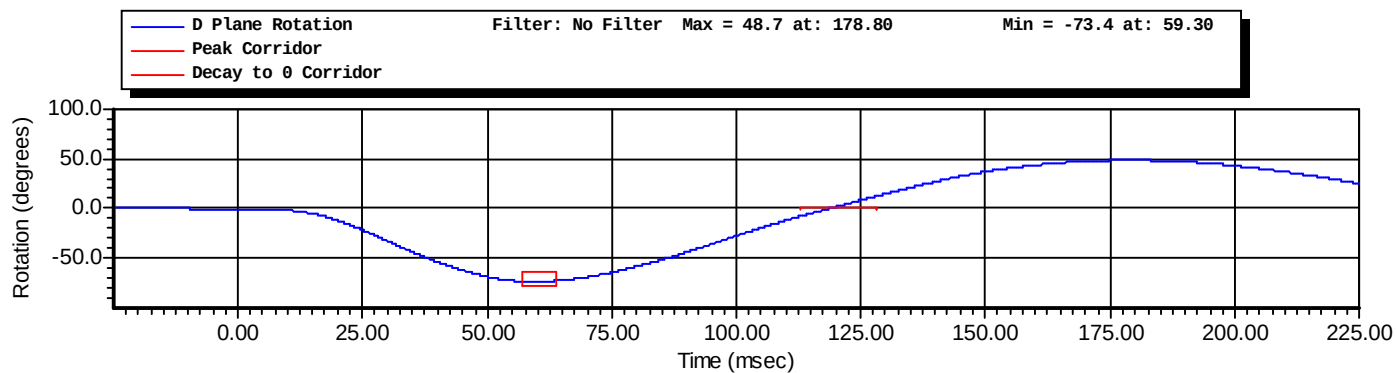
Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	11/9/2010
Number of Test:	3	Time of Test:	11:02:44 AM



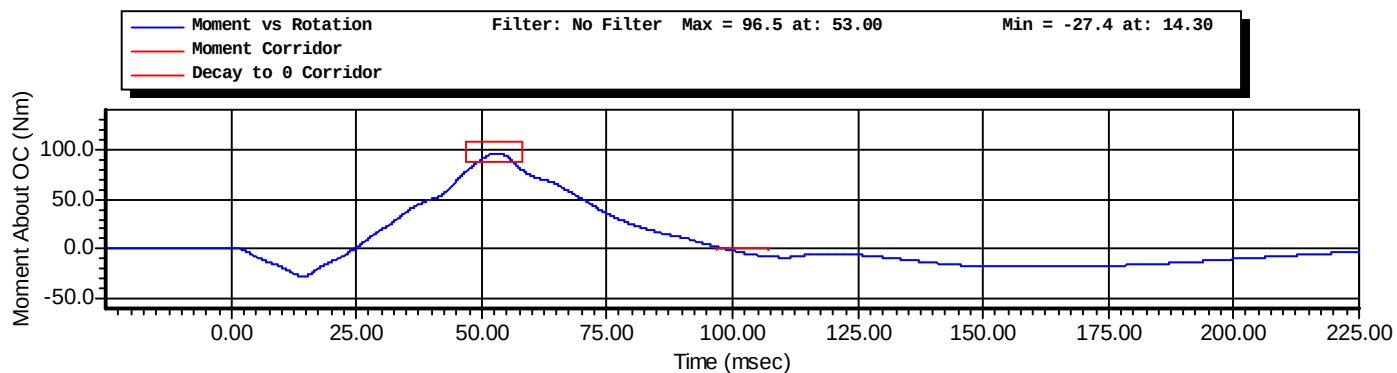
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle



CALSPAN

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

Serial Number: 061
Test Number: 1
Comments: LEFT

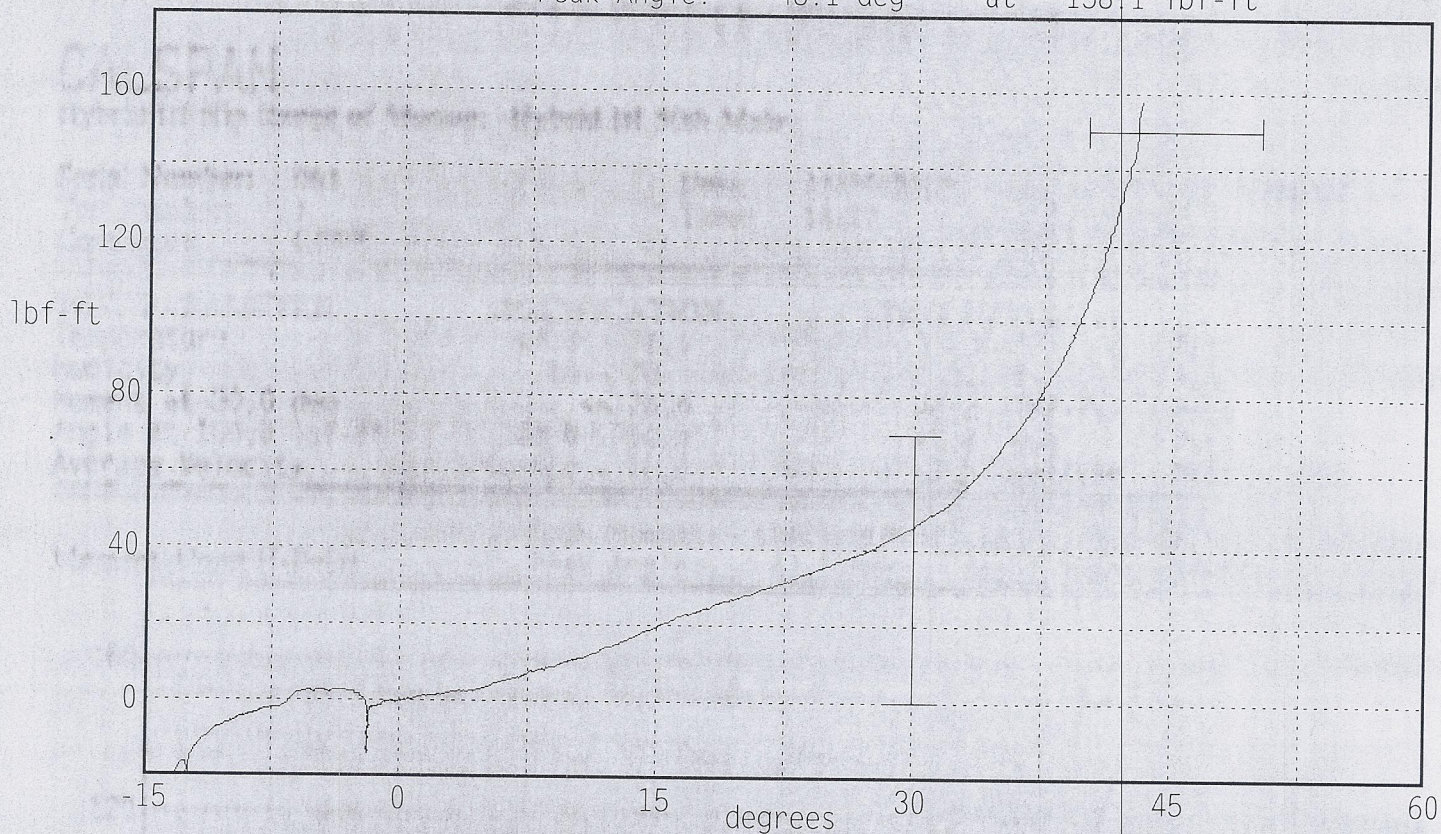
Date: 11/05/2010
Time: 14:37

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	71.0 °F Pass
Humidity	10 - 70	34 % Pass
Moment at 30.0 deg	<= 70.0	46.2 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	42.8 deg Pass
Average Velocity	5.0 - 10.0	7.3 deg/sec Pass

Moment About H-Point

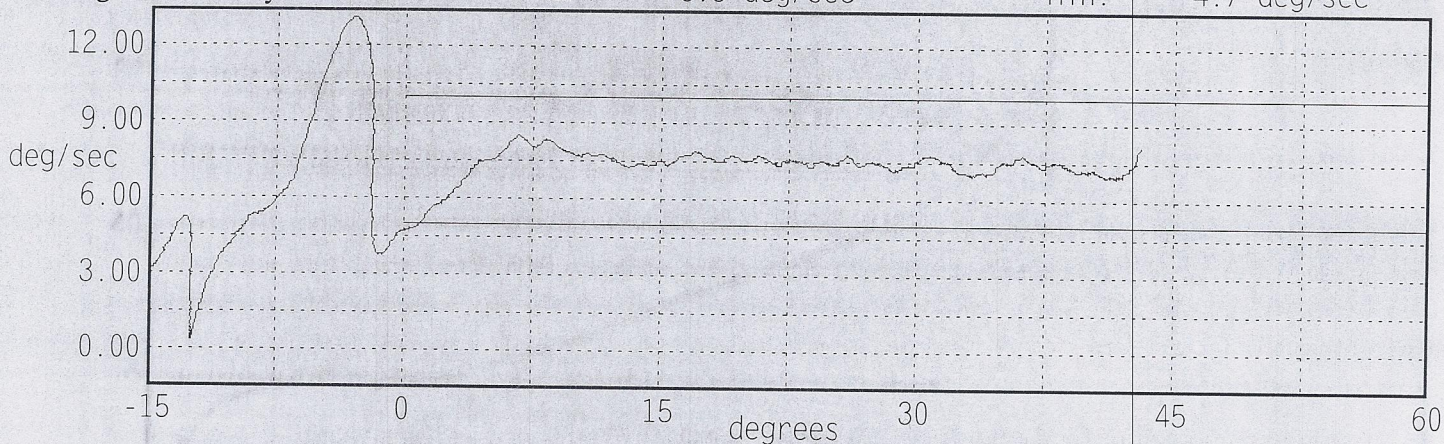
Peak Moment: 158.1 lbf-ft at 43.1 deg
Peak Angle: 43.1 deg at 158.1 lbf-ft



Angular Velocity

Max: 8.5 deg/sec

Min: 4.7 deg/sec



CALSPAN

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

Serial Number: 061
Test Number: 1
Comments: RIGHT

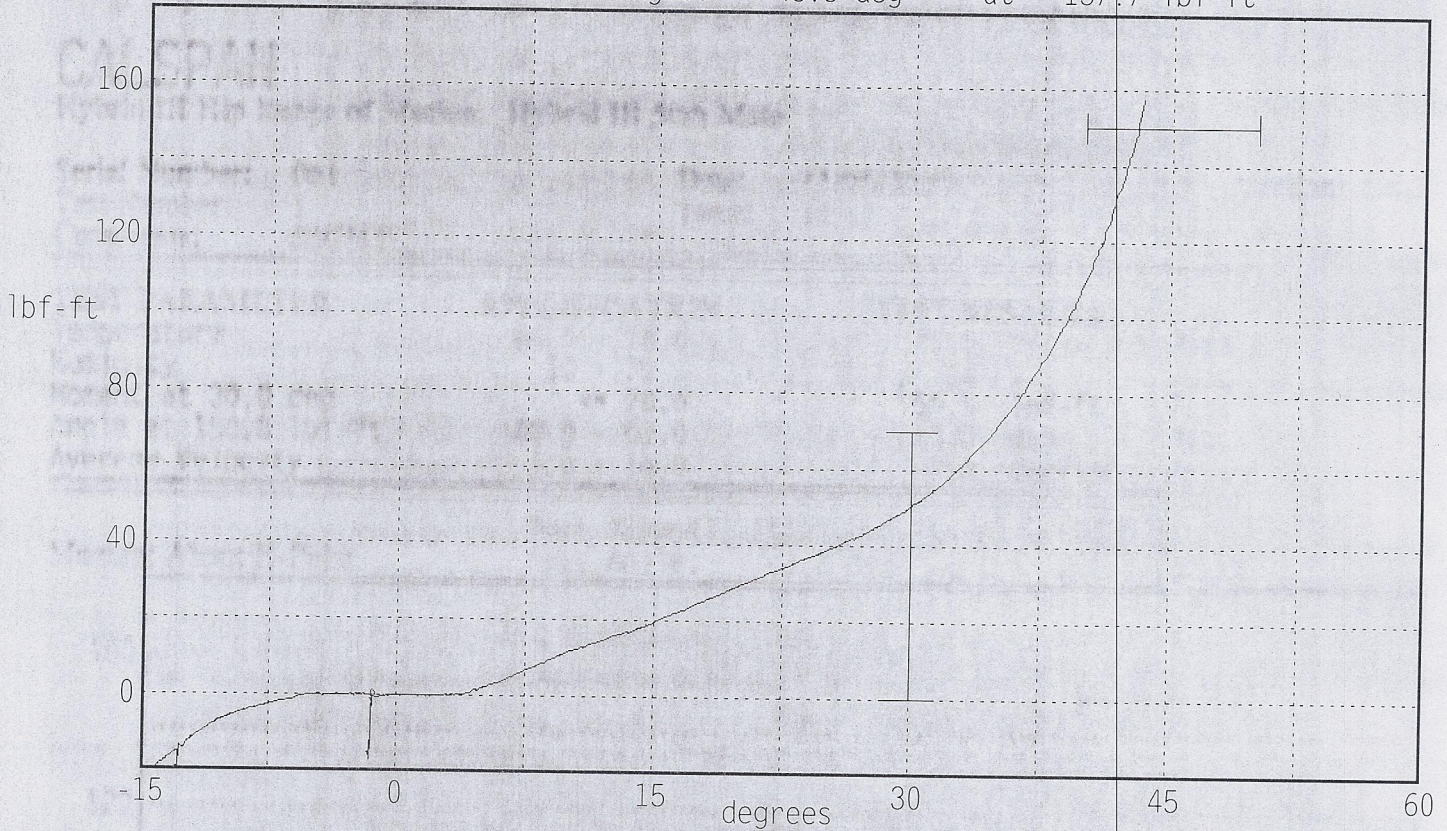
Date: 11/05/2010
Time: 14:41

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	71.0 °F Pass
Humidity	10 - 70	34 % Pass
Moment at 30.0 deg	<= 70.0	50.5 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.0 deg Pass
Average Velocity	5.0 - 10.0	7.3 deg/sec Pass

Peak Moment: 157.7 lbf-ft at 43.3 deg
Peak Angle: 43.3 deg at 157.7 lbf-ft

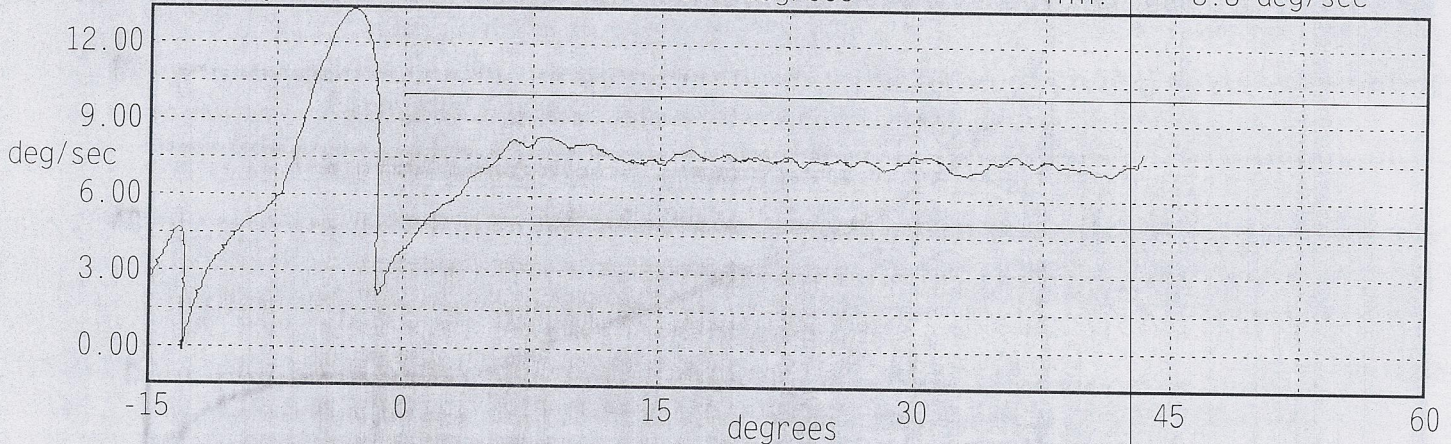
Moment About H-Point



Angular Velocity

Max: 8.4 deg/sec

Min: 3.8 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:	11/5/2010
Test Number:	1	Test Time:	2:00:24 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.2 deg C P
Humidity	10.0 -- 70.0	34.0 %RH P
Velocity	2.07 -- 2.13	2.07 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: **Left Knee**

Test Time: **2:00:24 PM**

Test Date: **11/5/2010**



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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: **2:00:24 PM**

Test Date: **11/5/2010**

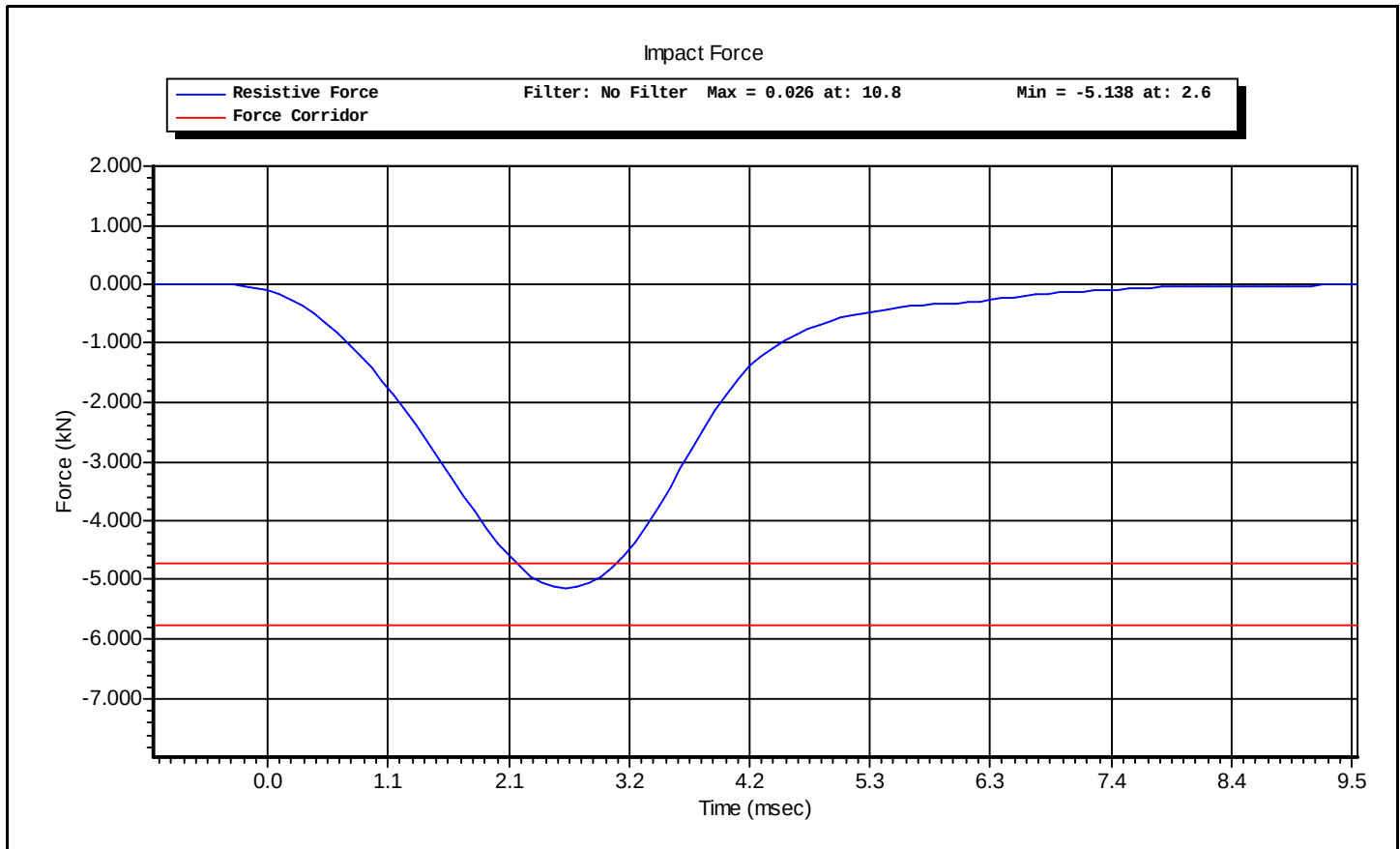


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	11/5/2010
Test Number:	1	Test Time:	2:00:24 PM



Test ID: **Left Knee**

Test Time: **2:00:24 PM**

Test Date: **11/5/2010**



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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:	11/5/2010
Test Number:	1	Test Time:	2:07:11 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	21.3 deg C P
Humidity	10.0 -- 70.0	34.0 %RH P
Velocity	2.07 -- 2.13	2.11 m/s P
Resistive Force	-5.78 -- -4.72	-5.29 kN P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **2:07:11 PM**

Test Date: **11/5/2010**



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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: **2:07:11 PM**

Test Date: **11/5/2010**

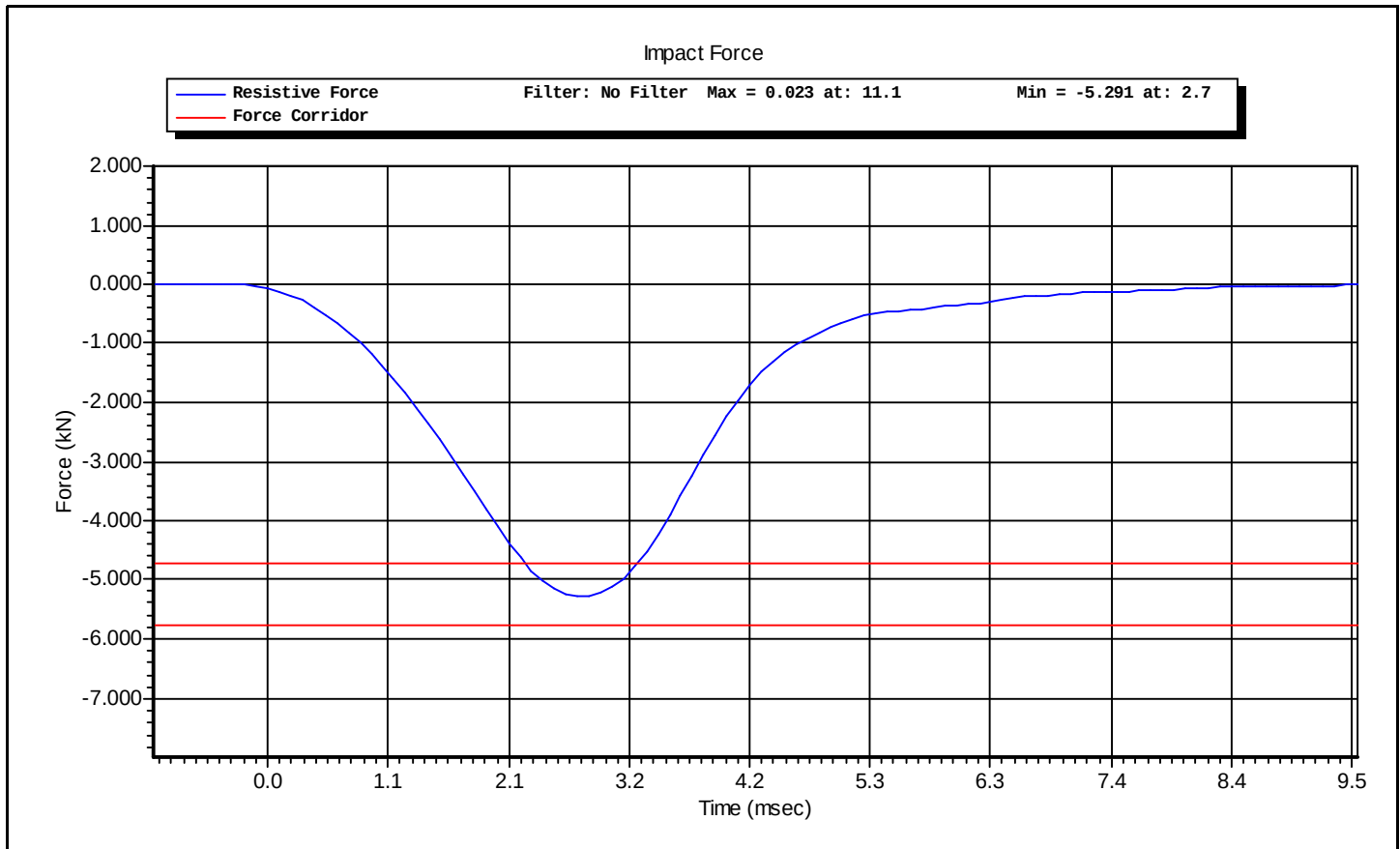


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	11/5/2010
Test Number:	1	Test Time:	2:07:11 PM



Test ID: **Right Knee**

Test Time: **2:07:11 PM**

Test Date: **11/5/2010**

CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 143

ES-2re External Measurements

5th Female SN 143

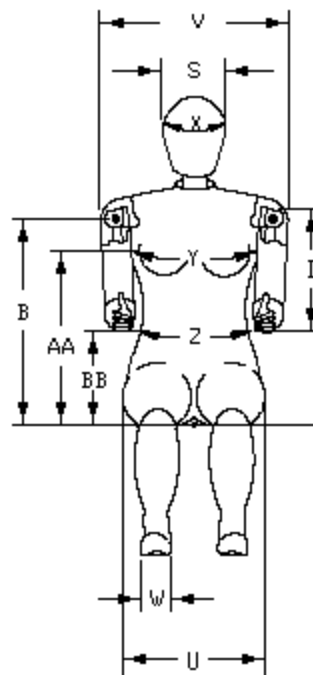
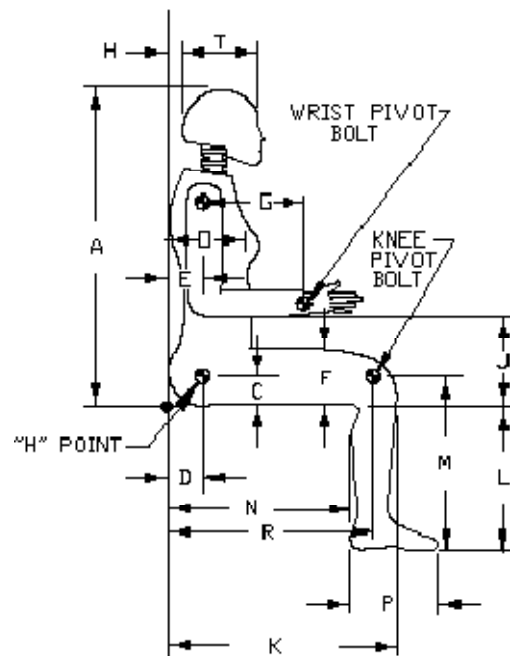
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	786	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	86	Yes
D	H-Point from Backline	144.8 – 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6-83.8	75	Yes
F	Thigh Clearance	119.4 – 134.6	127	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	250	Yes
H	Head Back to Backline	43.2 – 48.2	47.5	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	277	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	400	Yes
N	Buttock Popliteal Length	414 – 439.4	435	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	219	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	480	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	184	Yes
U	Hip Breadth	299.7 – 314.9	305	Yes
V	Shoulder Breadth	350.5 – 365.7	362	Yes
W	Foot Breadth	78.8 - 94	86	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	879	Yes
Z	Waist Circumference	759.5 – 789.9	785	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	338	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: A. Rudniski

Date: 07/09/2010

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:	143		
Test ID:	Head Drop	Test Date:	7/8/2010
Test Number:	1	Test Time:	10:08:30 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	05733
Skull - 78051-77X	
Skull Cap - 78051-220	
Cap Skin - 78051-229	

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	60 %RH P
Resultant Acceleration	250 -- 300	272 g P
Oscillation	0.0 -- 10.0	2.5 % P
Lateral Acceleration	-15.00 -- 15.00	7.78 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **10:08:30 AM**

Test Date: **7/8/2010**



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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	P58709	5/24/2010
Endevco	7264-2000	P51723	5/21/2010
Endevco	7264-2000	05G20-L01	5/21/2010

Test ID: **Head Drop**

Test Time: **10:08:30 AM**

Test Date: **7/8/2010**



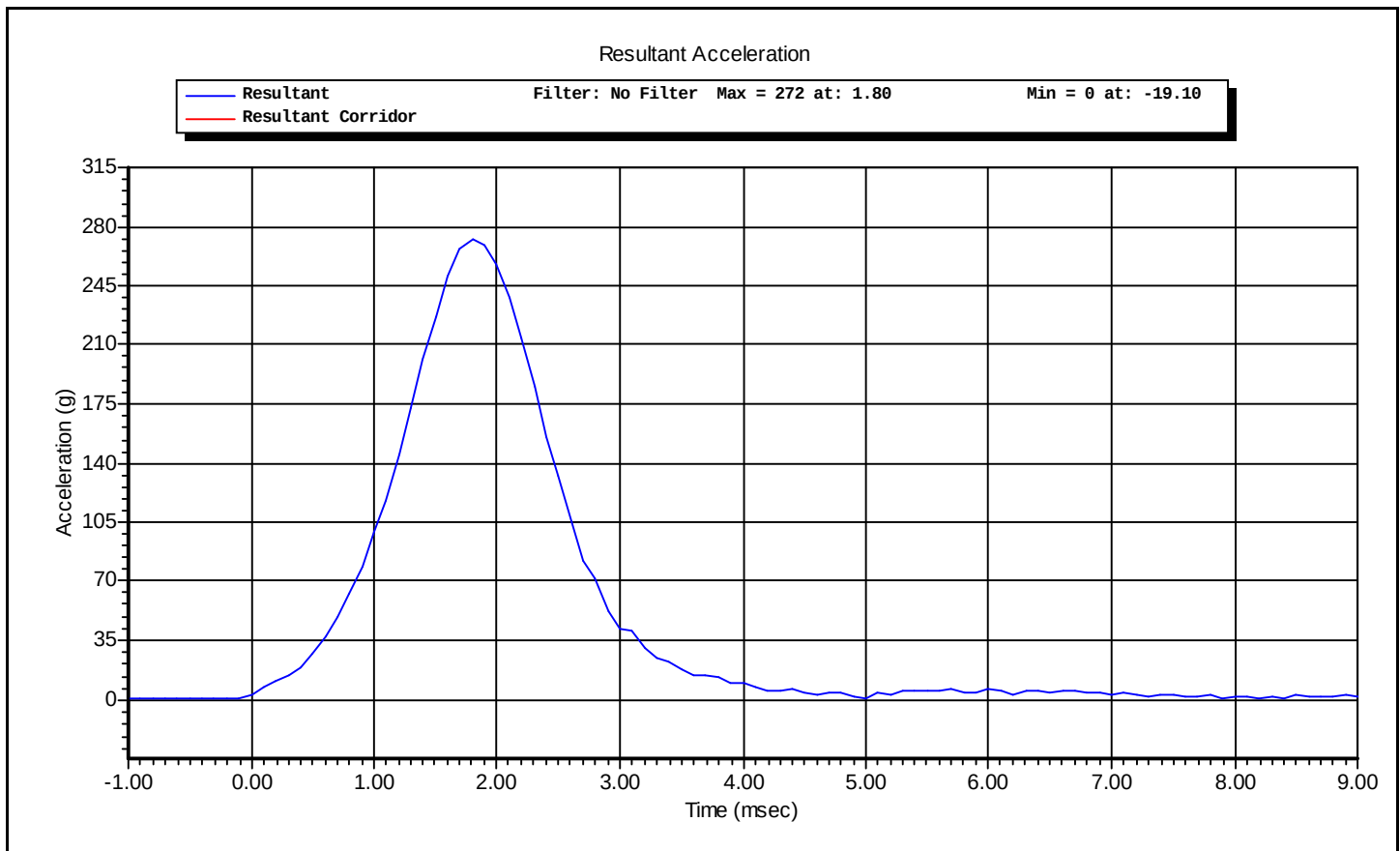
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Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Head Drop	Test Date:	7/8/2010
Test Number:	1	Test Time:	10:08:30 AM

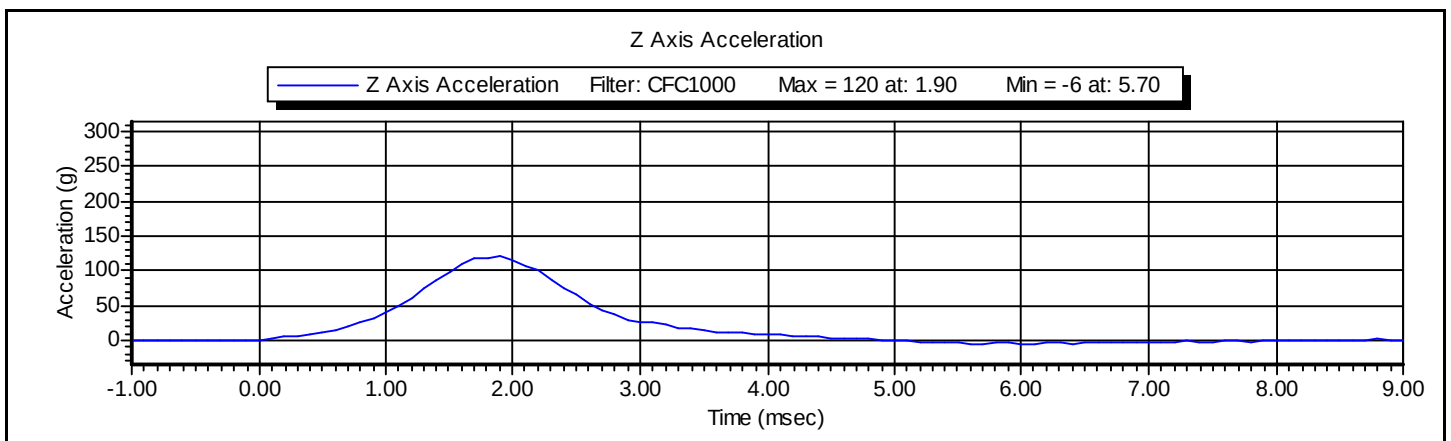
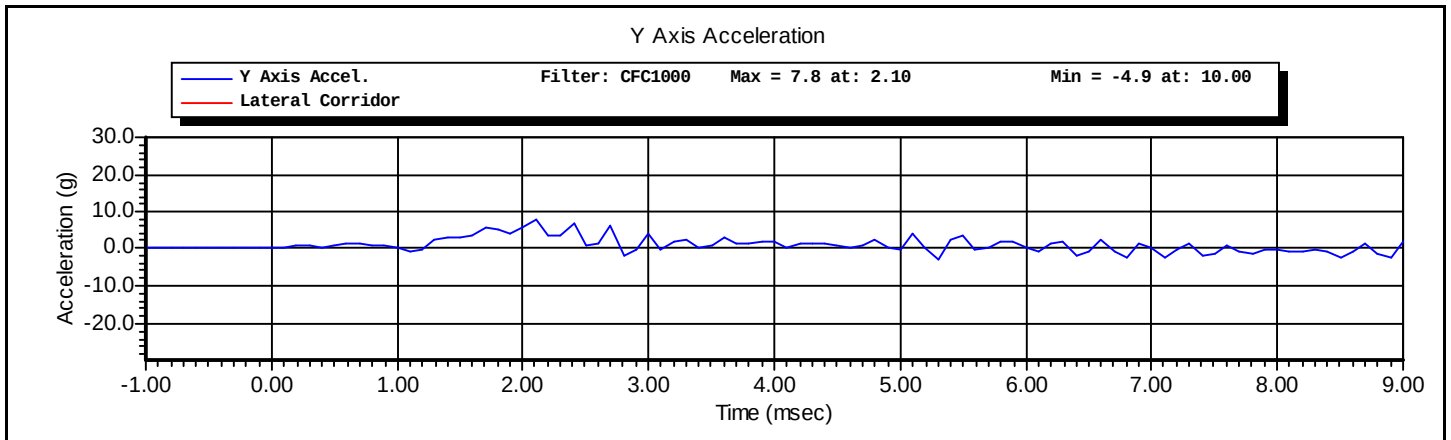
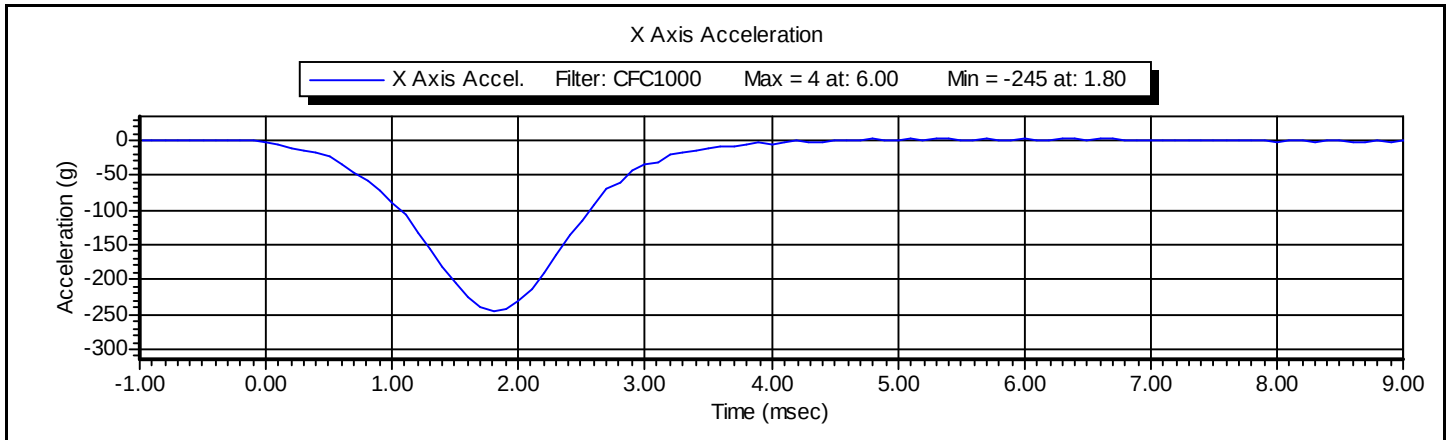
Component Part Number	Component Serial Number
Head Skin - 78051-228	05733



Test ID: Head Drop

Test Time: 10:08:30 AM

Test Date: 7/8/2010





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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:	143		
Test ID:	Neck Extension	Test Date:	7/8/2010
Test Number:	1	Test Time:	11:31:55 AM

Component Part Number	Component Serial Number
Neck - 880105-255	05-0512
Front Nodding Block - 78051-351	
Rear Nodding Block - 78051-351	
Head Skin - 880105-109	
Skull - 880105-1002	

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	5.17 m/s P
D Plane Rotation	99.0 -- 114.0	107.1 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-54.8 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	107.6 ms P

All test parameters are within specifications

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

Test ID: **Neck Extension**

Test Time: **11:31:55 AM**

Test Date: **7/8/2010**



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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	PEND ARM POT	2/11/2010
DentonATD	78051-342	PEND HEAD POT	2/11/2010
Denton	1716A	LC-443 My	5/18/2010
Denton	1716A	LC-443 Fx	5/18/2010

Test ID: **Neck Extension**

Test Time: **11:31:55 AM**

Test Date: **7/8/2010**



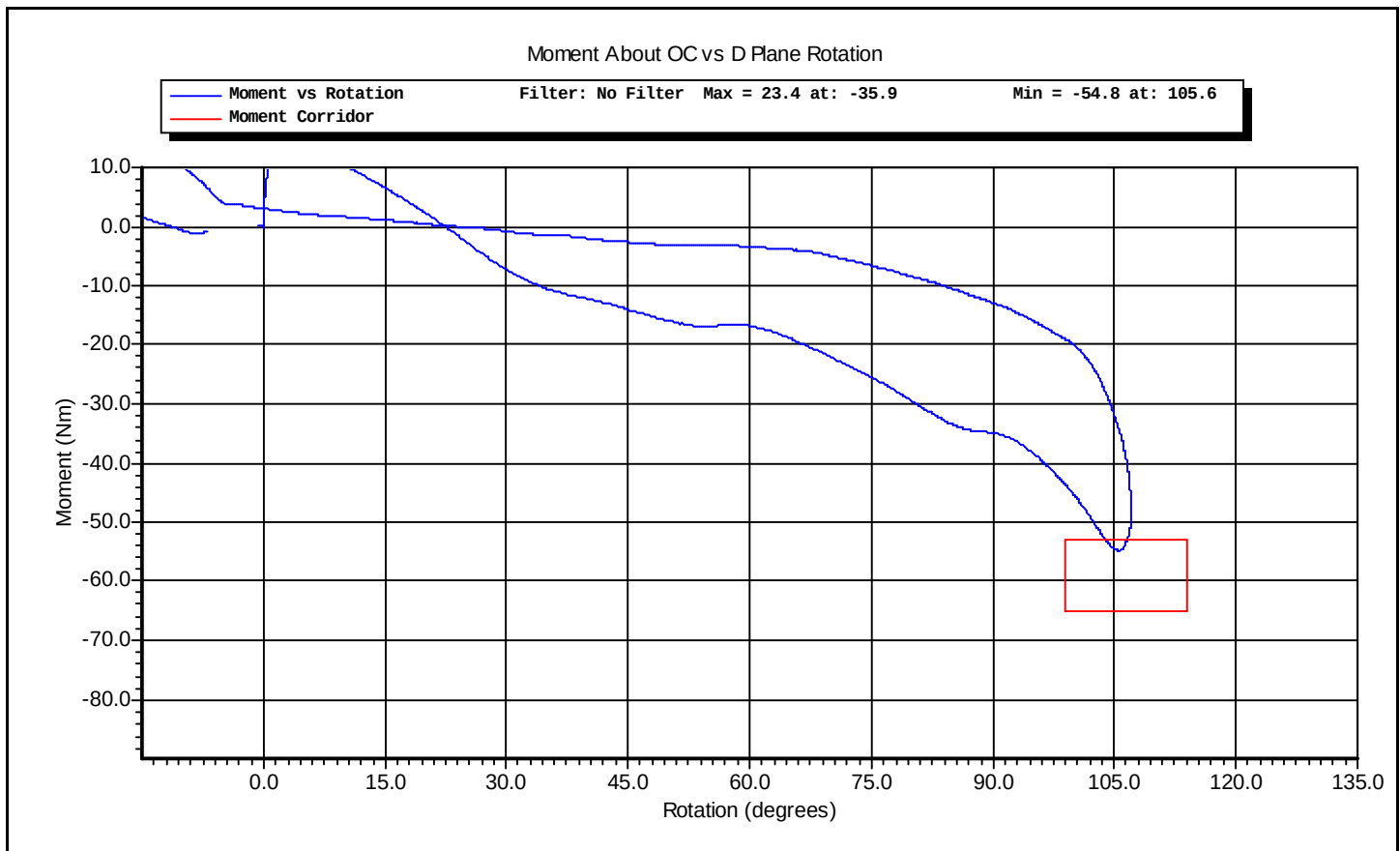
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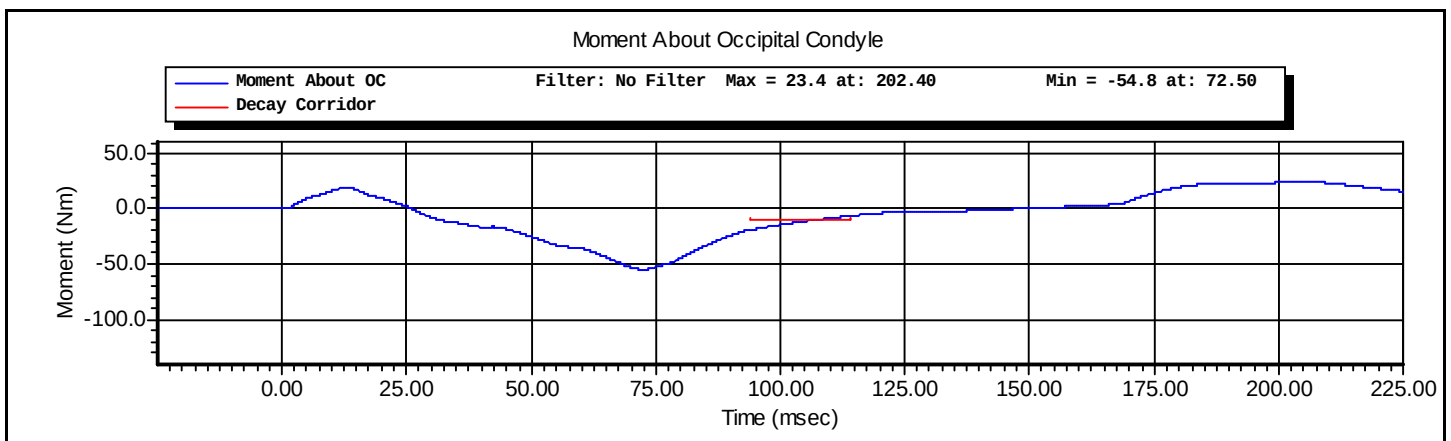
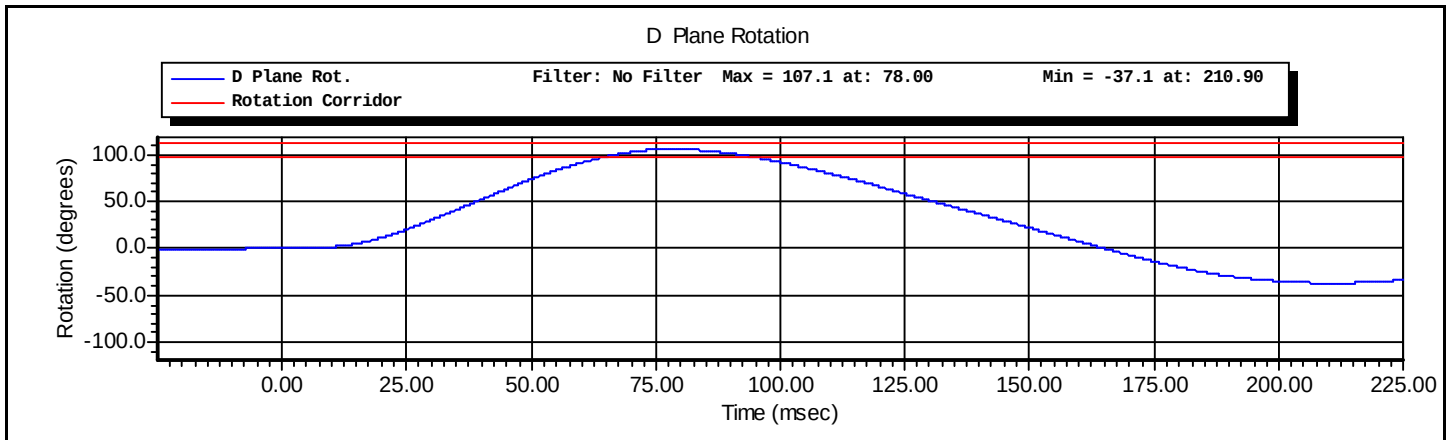
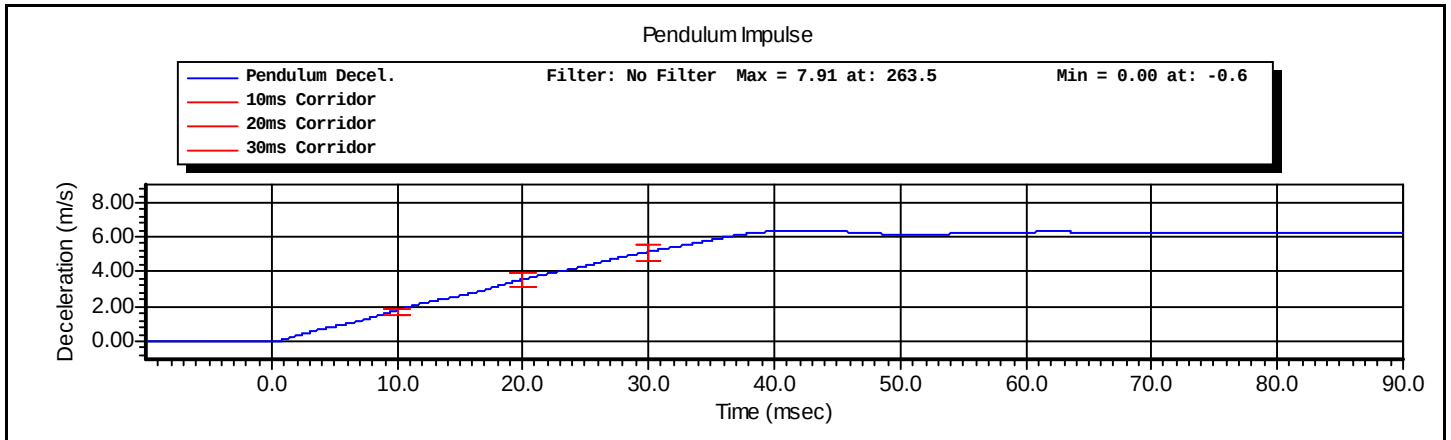
Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Extension	Test Date:	7/8/2010
Test Number:	1	Test Time:	11:31:55 AM

Component Part Number	Component Serial Number
Neck - 880105-255	05-0512



Test ID: Neck Extension Test Time: 11:31:55 AM

Test Date: 7/8/2010





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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:	143		
Test ID:	Neck Flexion	Test Date:	7/8/2010
Test Number:	2	Test Time:	11:04:35 AM

Component Part Number	Component Serial Number
Neck - 880105-255	05-0512
Front Nodding Block - 78051-351	
Rear Nodding Block - 78051-351	
Head Skin - 880105-109	
Skull - 880105-1002	

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 Impulse at 10 ms	2.10 -- 2.50	2.45 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.80 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.85 m/s P
D Plane Rotation	-91.0 -- -77.0	-81.6 degrees P
Moment During Rotation Interval	69.0 -- 83.0	82.7 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	86.2 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **11:04:35 AM**

Test Date: **7/8/2010**



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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	PEND ARM POT	2/11/2010
DentonATD	78051-342	PEND HEAD POT	2/11/2010
Denton	1716A	LC-443 My	5/18/2010
Denton	1716A	LC-443 Fx	5/18/2010

Test ID: **Neck Flexion**

Test Time: **11:04:35 AM**

Test Date: **7/8/2010**



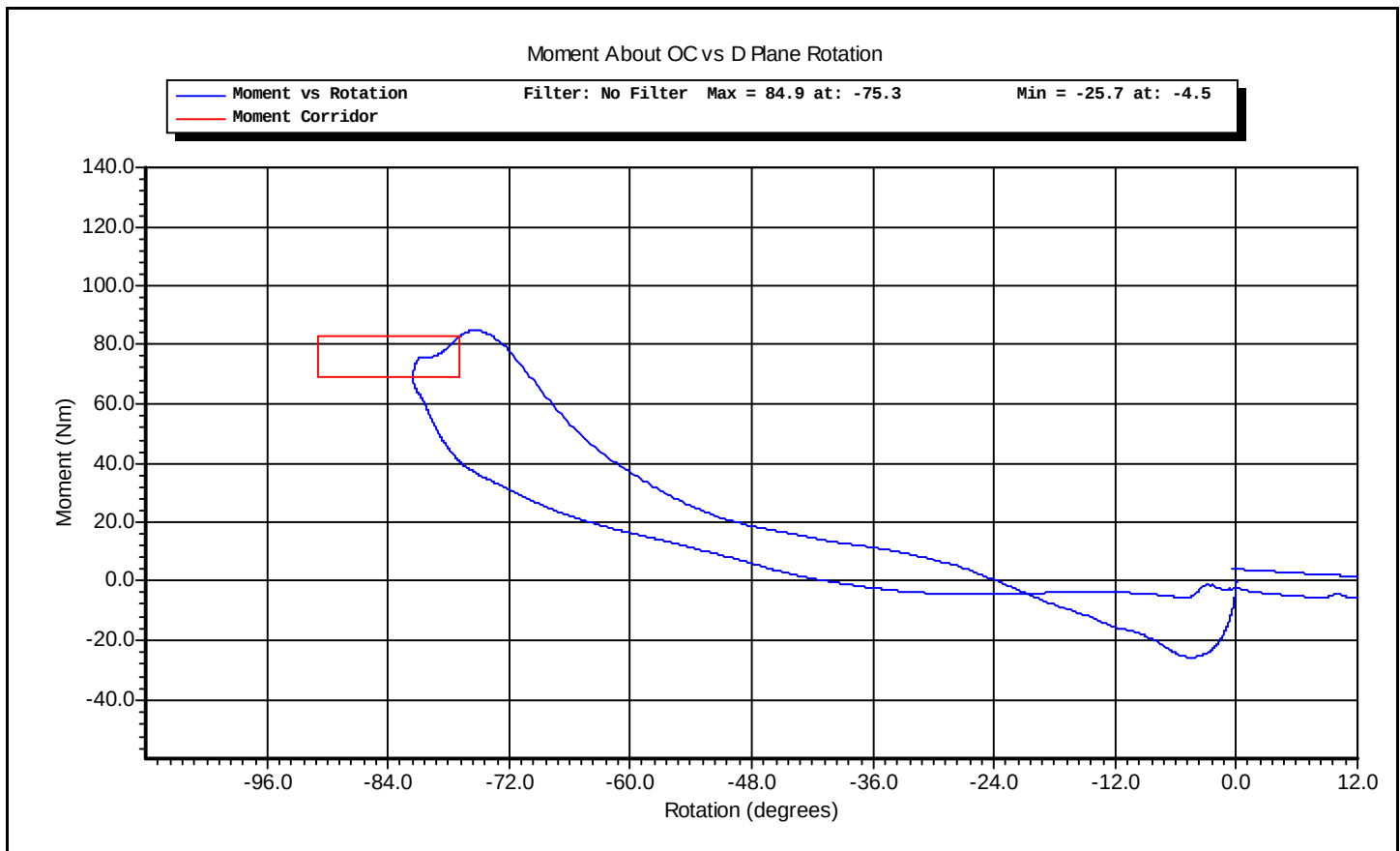
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Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Flexion	Test Date:	7/8/2010
Test Number:	2	Test Time:	11:04:35 AM

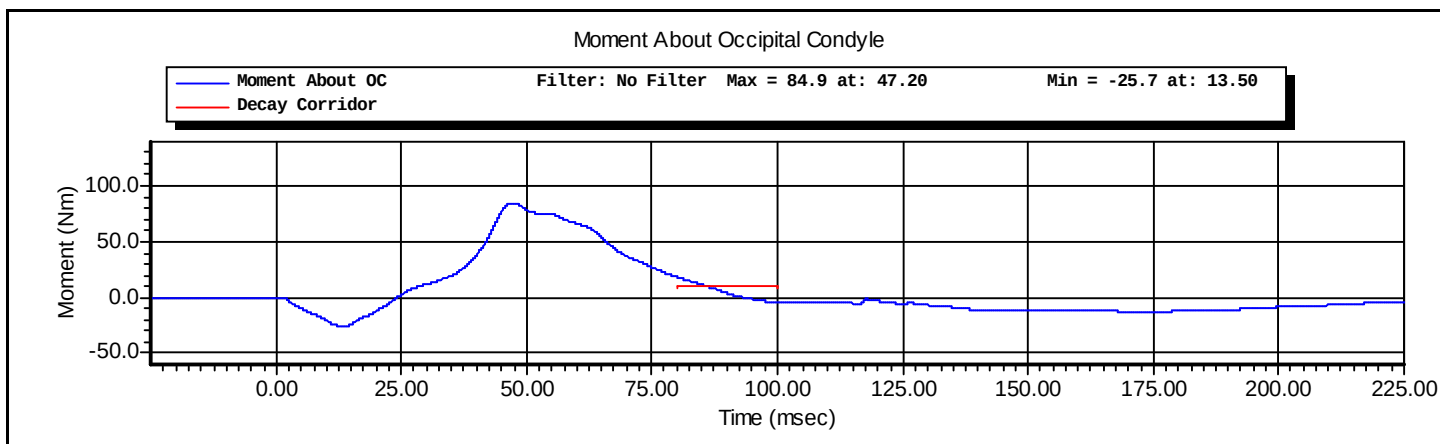
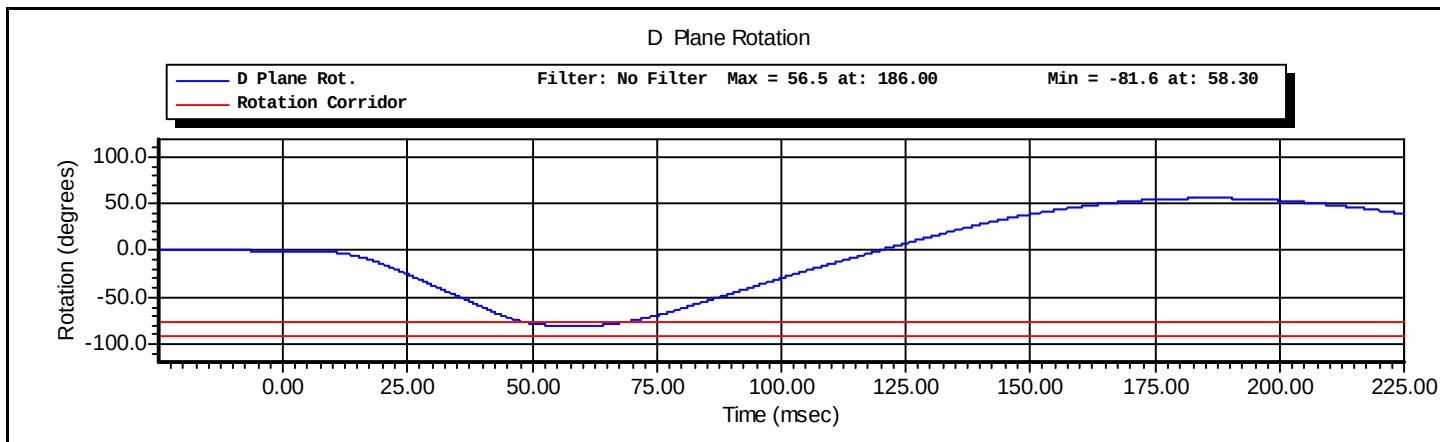
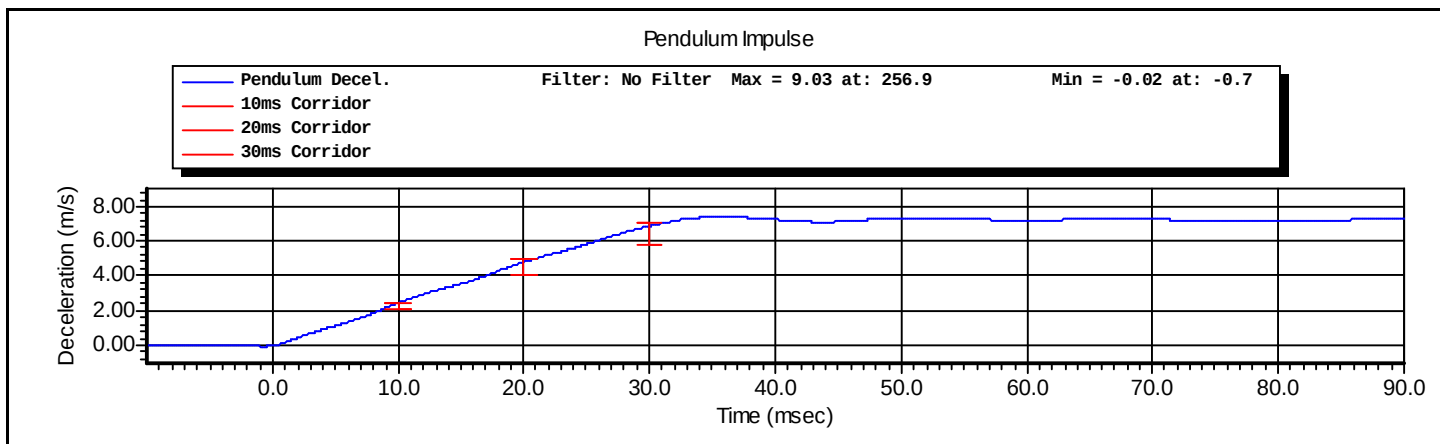
Component Part Number	Component Serial Number
Neck - 880105-255	05-0512



Test ID: Neck Flexion

Test Time: 11:04:35 AM

Test Date: 7/8/2010



Thorax Impact

Part 5720 Thorax Impact

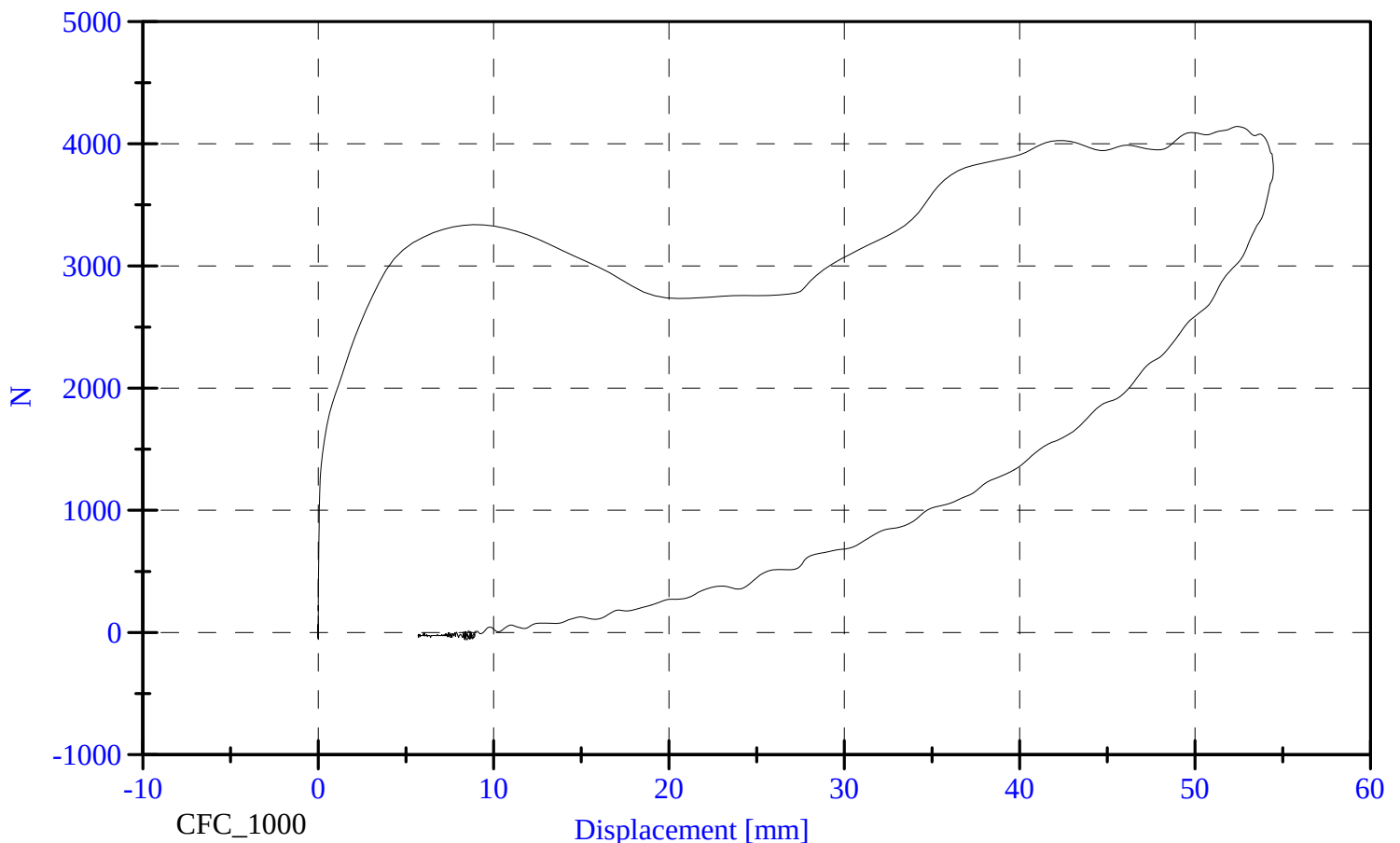
Calibration Date: 07-08-2010

Serial No: 143

Work File: 143 Thorax 2 07-08-2010

-----TEST RESULTS-----

<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	20.6-22.2 C	21.1 C	Passed
Lab Humidity:	10-70 %	49.00 %	Passed
Pendulum Velocity:	6.59- 6.83 m/s	6.67 m/s	Passed
Maximum Deflection:	50.00-58.00 mm	54.47 mm	Passed
Maximum Res. Force:	3900.00-4400.00 N	4141.86 N	Passed
Internal Hysteresis:	69-85 %	73.11 %	Passed
Pass Sternum Force Criteria?:	105 %	100.00 %	Passed
Pass Sternum Displacement Criteria?:	4600.00 N	4141.86	Passed
Thorax Impact	Probe Force vs. Displacement	Max: 4141.9 [N] at 52.431 [mm] Min: -60.9 [N] at 8.484 [mm]	



Torso Flexion Test

Technician: AR

Calibration Date: 7/12/2010

ATD Serial Number: 5th Female 143

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	22.2° C	P
Lab Humidity: 38%	10-70%	48%	P
Max Force @ 45 deg	320 – 390N	352N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	12°	P
Final ref plan angle	Initial ref plane ± 8 deg	17°	P

P = Pass

F= Fail

Left Femur

Part 572O Femur Impact

Calibration Date: 07-08-2010

Serial No: 143

Work File: 143 Left Femur 07-08-2010

-----TEST RESULTS-----

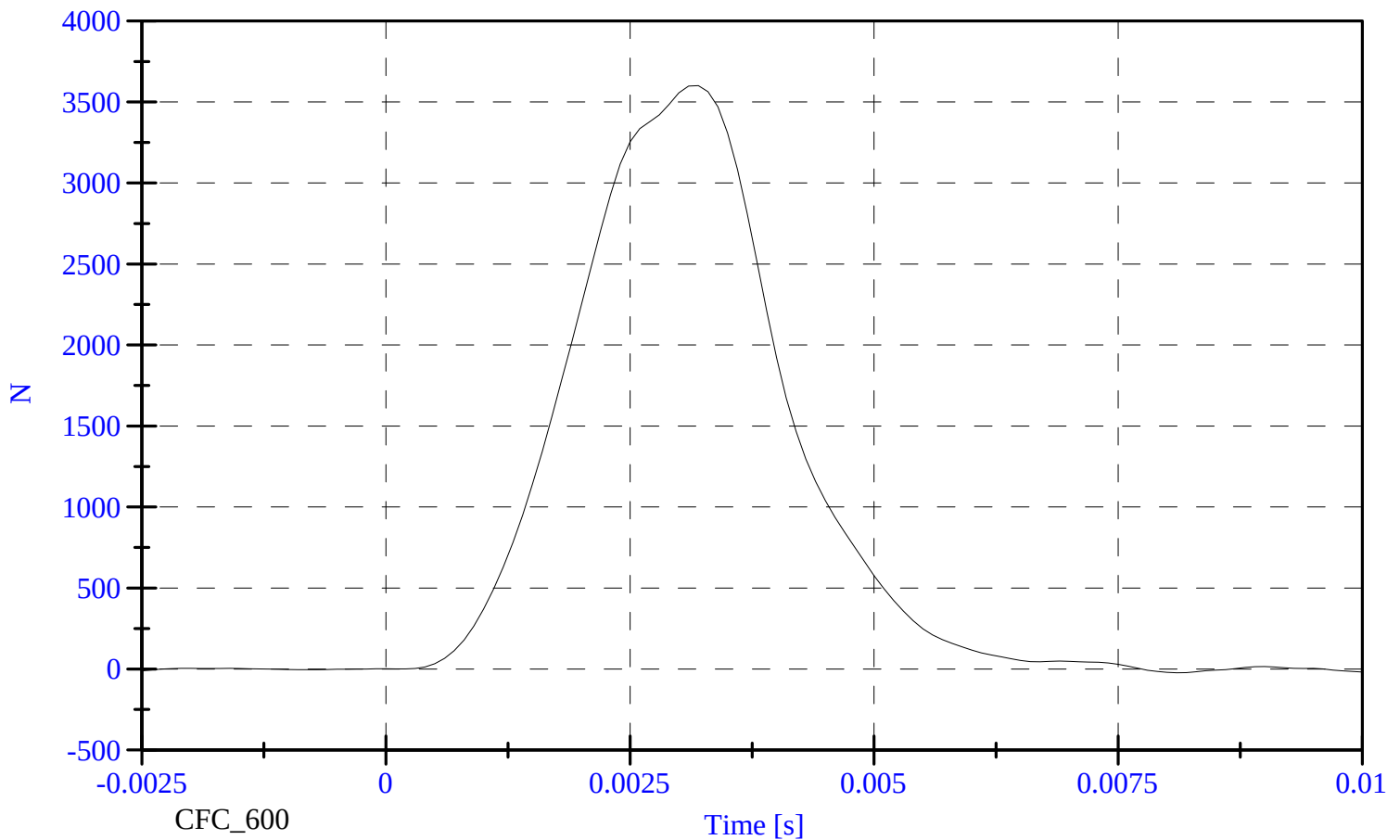
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	18.9-25.6 C	22.2 C	Passed
Lab Humidity:	10-70 %	51.00 %	Passed
Probe Velocity:	2.07- 2.13 m/s	2.12 m/s	Passed
Maximum Force:	3450.00-4060.00 N	3601.49 N	Passed

Left Femur

Left Femur Force vs. Time

Max: 3601.5 [N] at 0.003 [s]

Min: -29.6 [N] at 0.012 [s]



Right Femur

Part 572O Femur Impact

Calibration Date: 07-08-2010

Serial No: 143

Work File143 Right Femur 1 07-08-2010

-----TEST RESULTS-----

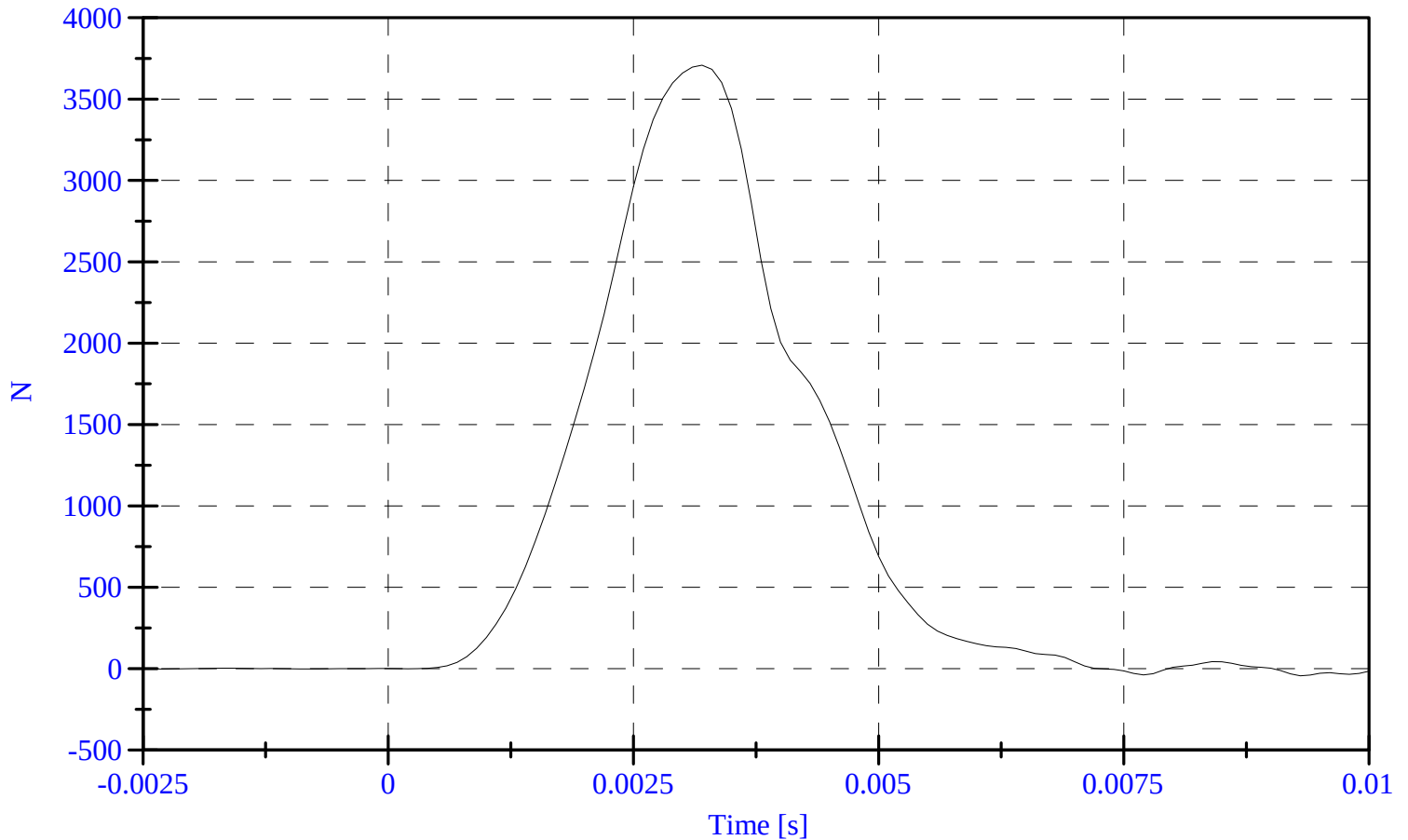
<u>TEST CONDITION</u>	<u>PARAMETERS</u>	<u>RESULTS</u>	<u>STATUS</u>
Lab Temperature:	18.9-25.6 C	22.2 C	Passed
Lab Humidity:	10-70 %	51.00 %	Passed
Probe Velocity:	2.07- 2.13 m/s	2.12 m/s	Passed
Maximum Force:	3450.00-4060.00 N	3707.68 N	Passed

Right Femur

Right Femur Force vs. Time

Max: 3707.7 [N] at 0.003 [s]

Min: -52.1 [N] at 0.014 [s]



CFC_600

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	20.2	Yes
C	H-Point Height	3.3 - 3.5	3.5	Yes
D	H-Point from Backline	5.3 - 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.6	Yes
F	Thigh Clearance	5.5 - 6.1	6.1	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.6	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.3	Yes
J	Elbow Rest Height	7.5 - 8.3	8.1	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.6	Yes
L	Popliteal Height	16.9 - 17.9	17.1	Yes
M	Knee Pivot Height	19.1 - 19.7	19.4	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	10.0	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	33.6	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: SZ

Date: 11/18/2010



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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		
Test ID:	Head Drop	Test Date:	11/18/2010
Test Number:	1	Test Time:	4:26:02 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.7 deg C P
Humidity	10 -- 70	35 %RH P
Resultant Acceleration	225 -- 275	238 g P
Oscillation	0.0 -- 10.0	1.1 % P
Lateral Acceleration	-15.00 -- 15.00	4.25 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **4:26:02 PM**

Test Date: **11/18/2010**



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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	P66931	10/25/2010
Endevco	7264-2000	P66926	10/25/2010
Endevco	7264-2000	P66943	10/25/2010

Test ID: **Head Drop**

Test Time: **4:26:02 PM**

Test Date: **11/18/2010**

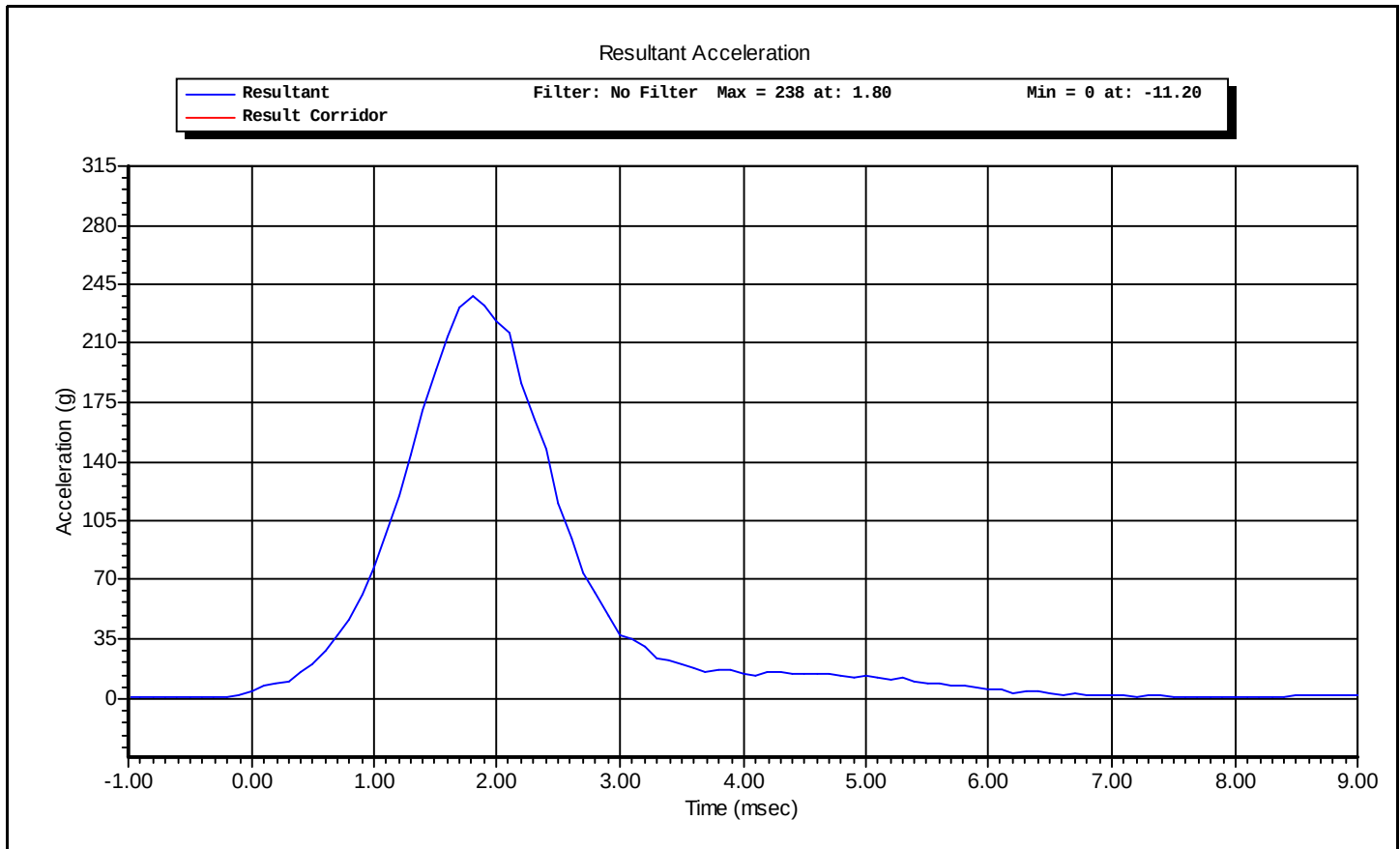


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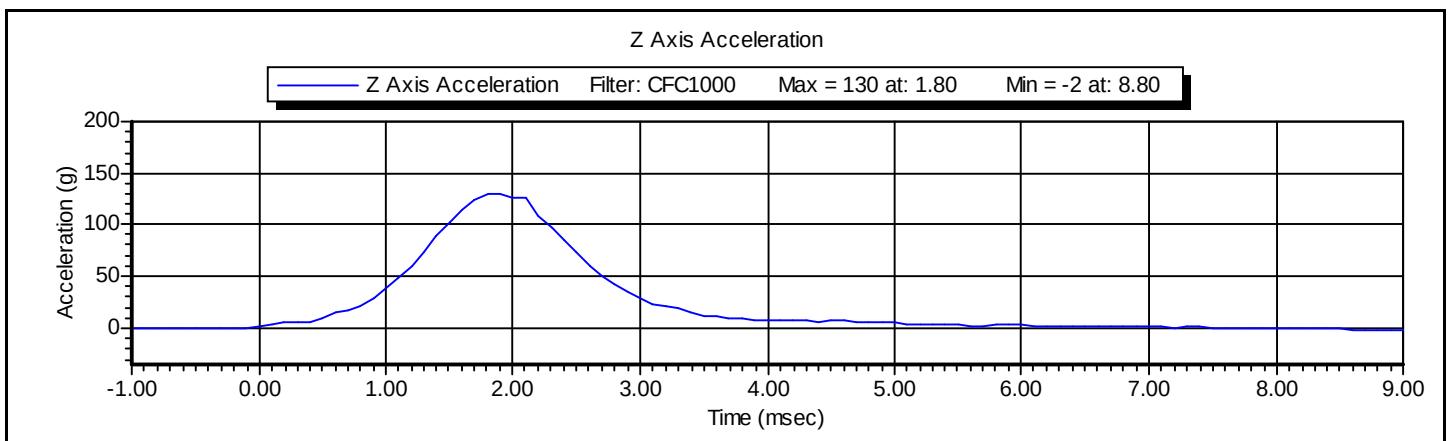
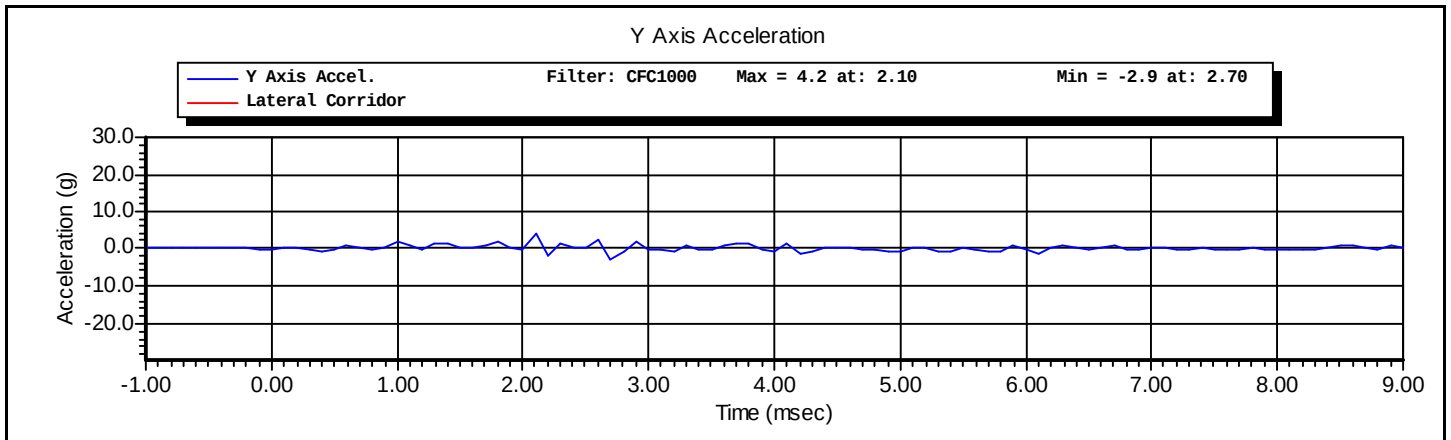
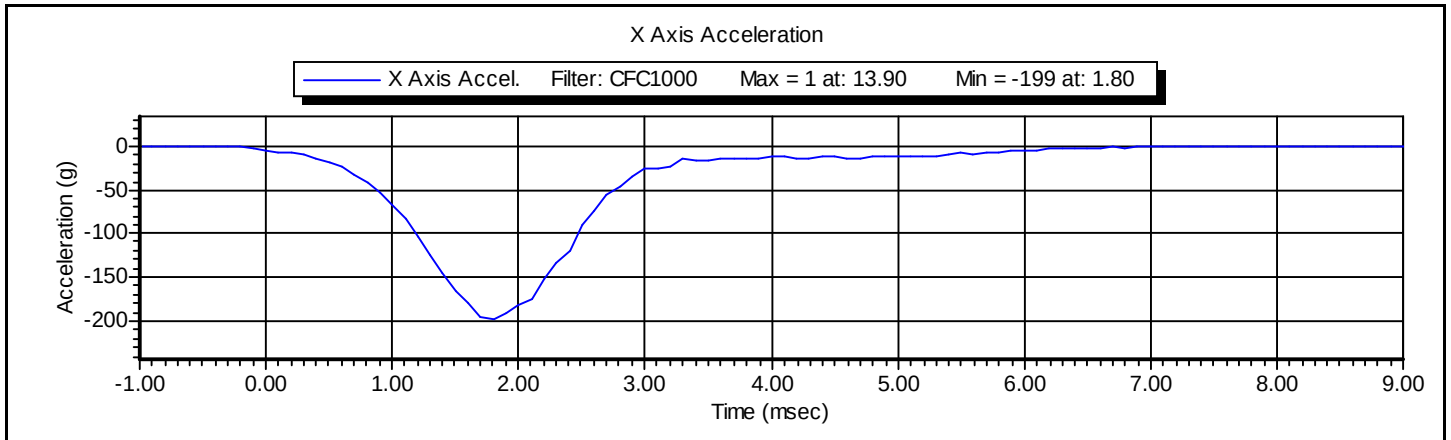
Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	11/18/2010
Test Number:	1	Test Time:	4:26:02 PM



Test ID: **Head Drop**

Test Time: **4:26:02 PM**

Test Date: **11/18/2010**





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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		
Test ID:	Neck Extension	Test Date:	11/19/2010
Test Number:	1	Test Time:	2:09:41 PM

Component Part Number	Component Serial Number
Neck - 78051-336	4194
Front Nodding Block - 78051-351	1797
Rear Nodding Block - 78051-351	1799
Head Skin - 78051-220	243

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.1 deg C	P
Humidity		10	-- 70	27 %RH	P
Velocity		5.94	-- 6.19	6.12 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	21.2 g	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	17.3 g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	13.8 g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	14.1 g	P
Decel Time to	5 g	38.0	-- 46.0	38.0 ms	P
D Plane Rotation		81.0	-- 106.0	98.3 degrees	P
Time at Max Rotation		72.0	-- 82.0	75.3 ms	P
Rotation Decay to Zero		147.0	-- 174.0	157.0 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-69.4 Nm	P
Time at Max Moment		65.0	-- 79.0	70.4 ms	P
Moment Decay to Zero		120.0	-- 148.0	136.9 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **2:09:41 PM**

Test Date: **11/19/2010**



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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	10/21/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	11/18/2010
Denton	1716A	LC-1916 Fx	11/18/2010

Test ID: **Neck Extension**

Test Time: **2:09:41 PM**

Test Date: **11/19/2010**

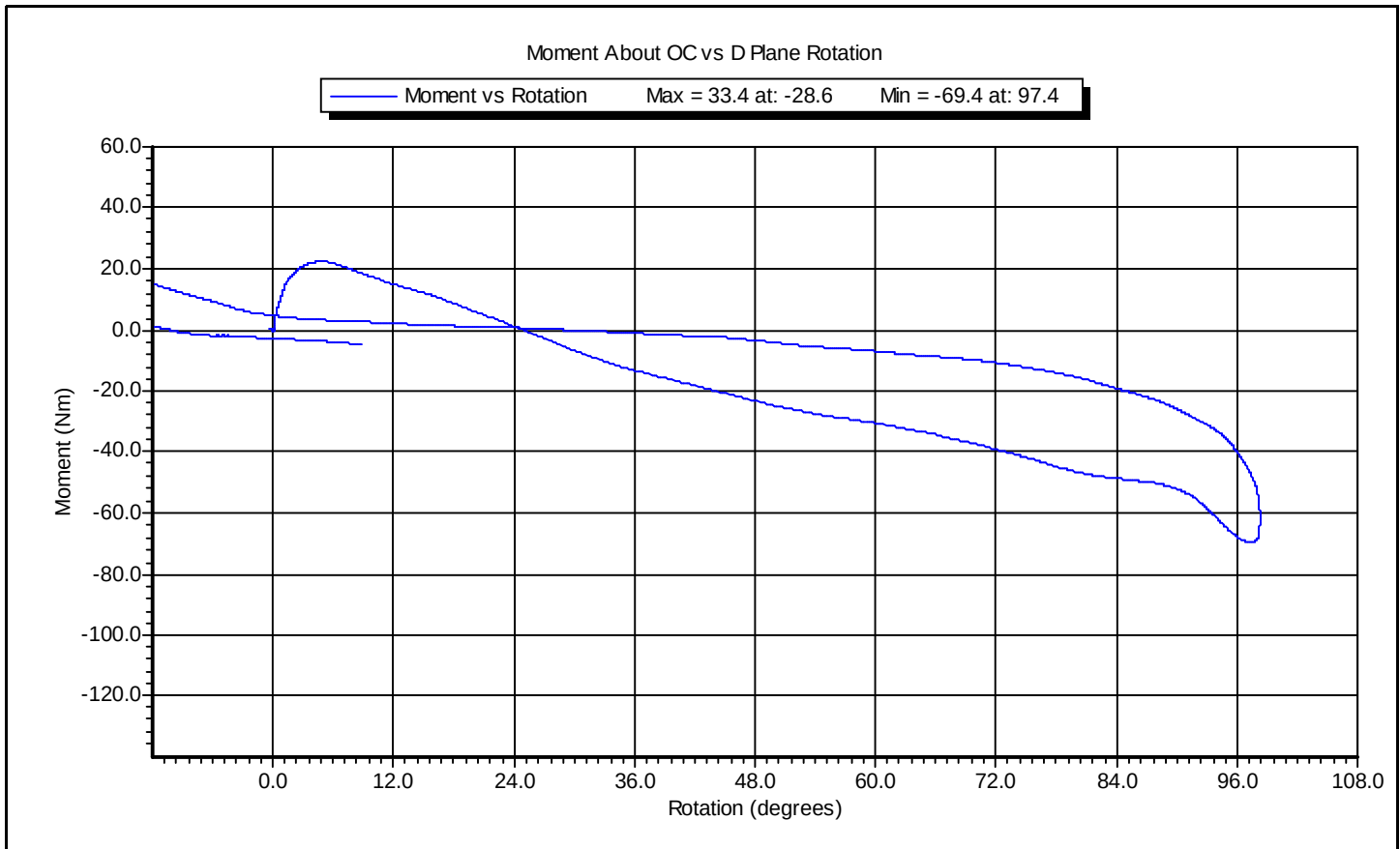


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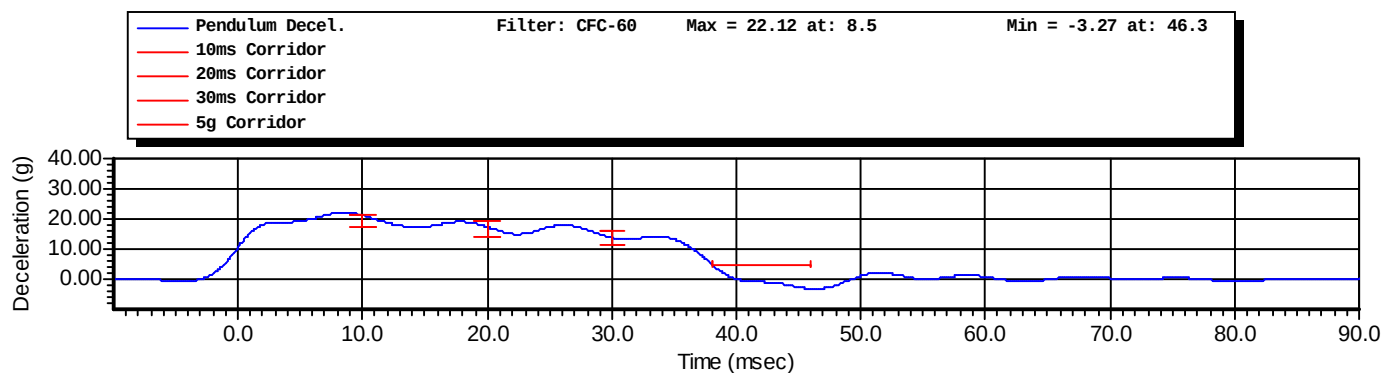
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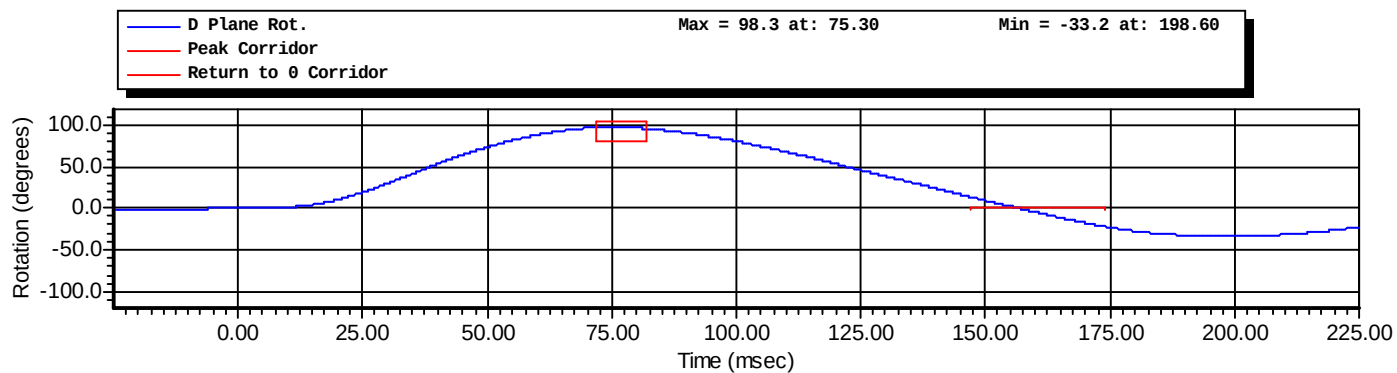
Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	11/19/2010
Number of Test:	1	Time of Test:	2:09:41 PM



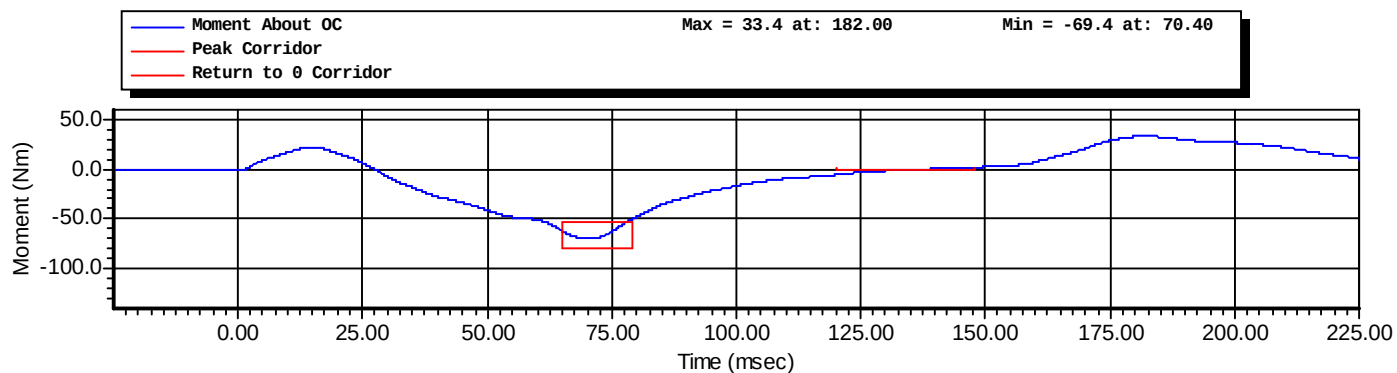
Pendulum Deceleration



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		
Test ID:	Neck Flexion	Test Date:	11/19/2010
Test Number:	2	Test Time:	8:43:58 AM

Component Part Number	Component Serial Number
Neck - 78051-336	4194
Front Nodding Block - 78051-351	1797
Rear Nodding Block - 78051-351	1799
Head Skin - 78051-220	243

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.1 deg C	P
Humidity		10	-- 70	27 %RH	P
Velocity		6.89	-- 7.13	7.10 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	25.3 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	18.4 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	13.3 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	13.7 g	P
Deceleration time to	5 g	34.0	-- 42.0	41.5 ms	P
D Plane Rotation		-78.0	-- -64.0	-72.5 degrees	P
Time at max rotation		57.0	-- 64.0	58.3 ms	P
Rotation Decay to Zero		113.0	-- 128.0	118.1 ms	P
Moment about OC		88.1	-- 108.4	94.7 Nm	P
Time at Max Moment		47.0	-- 58.0	54.8 ms	P
Moment Decay to Zero		97.0	-- 107.0	98.4 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **8:43:58 AM**

Test Date: **11/19/2010**



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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	10/21/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	11/18/2010
Denton	1716A	LC-1916 Fx	11/18/2010
Endevco	7231CT	P35758	10/5/2010

Test ID: **Neck Flexion**

Test Time: **8:43:58 AM**

Test Date: **11/19/2010**

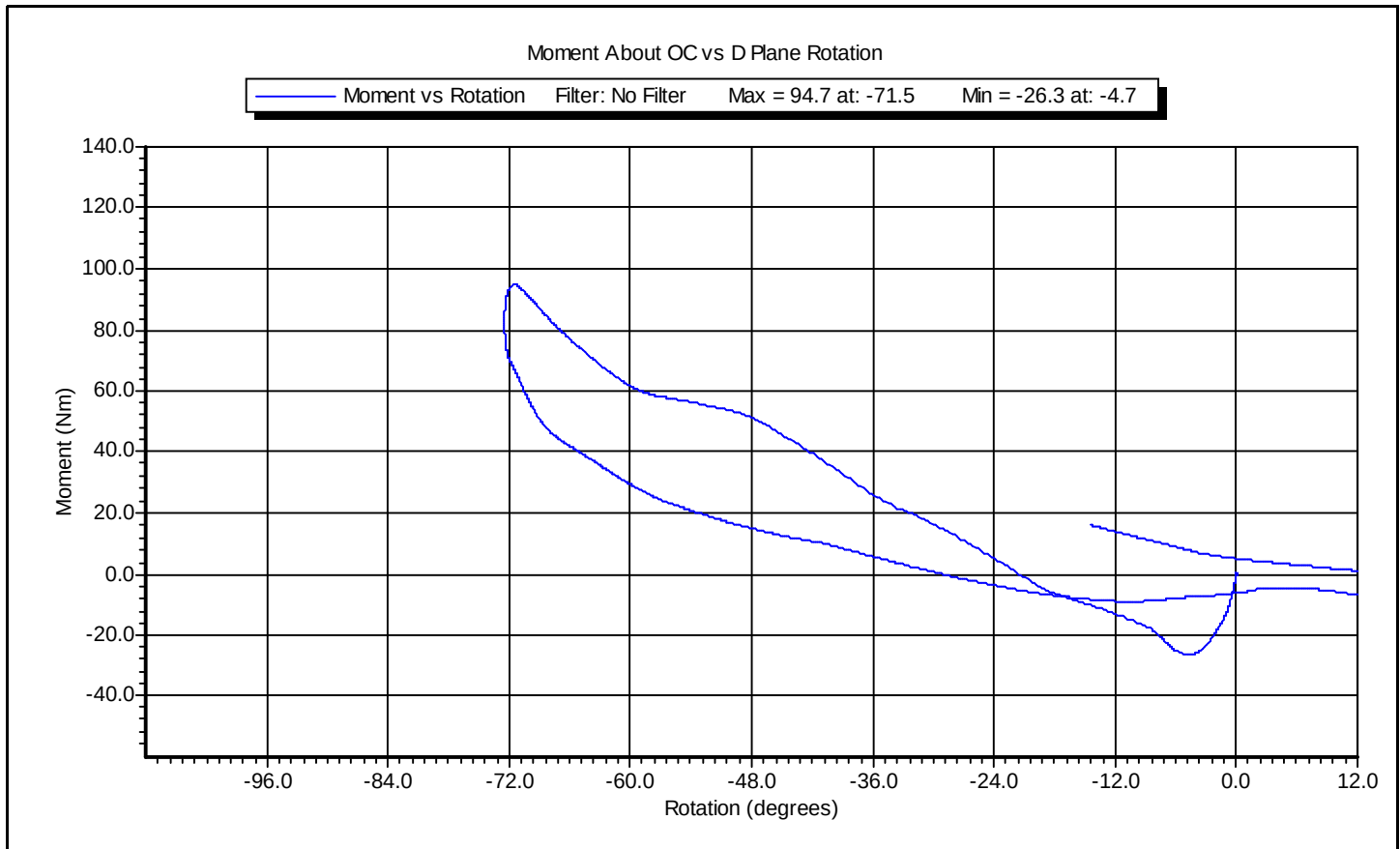


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Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	11/19/2010
Number of Test:	2	Time of Test:	8:43:58 AM

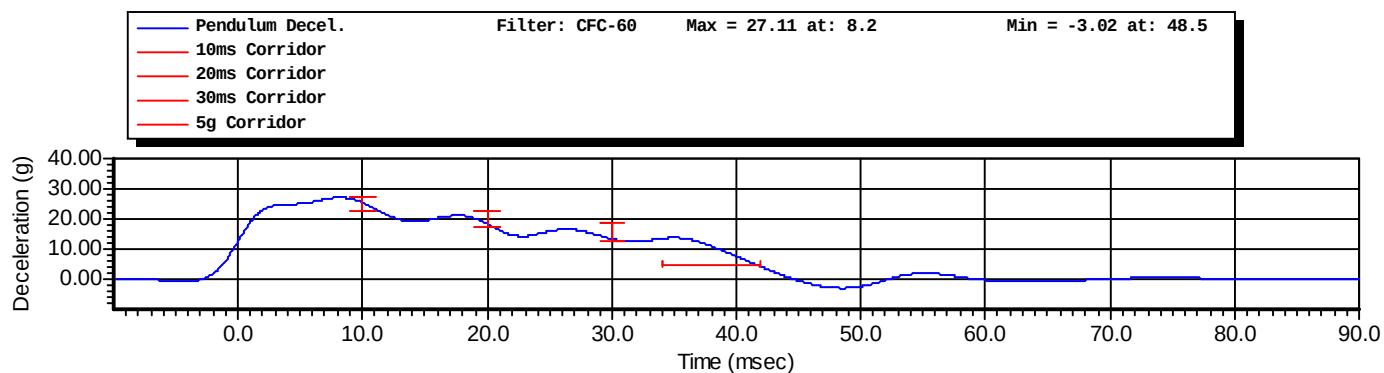


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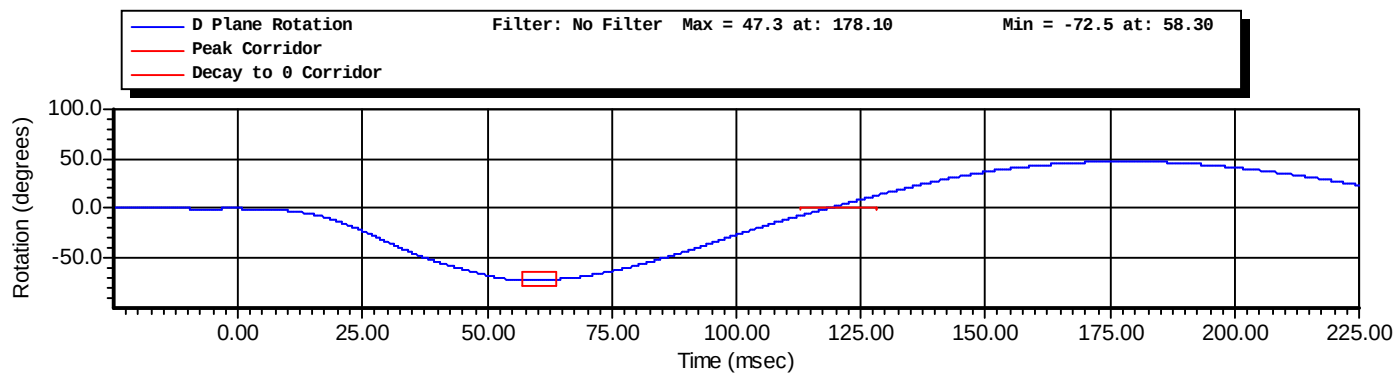
Time of Test: **8:43:58 AM**

Date of Test: **11/19/2010**

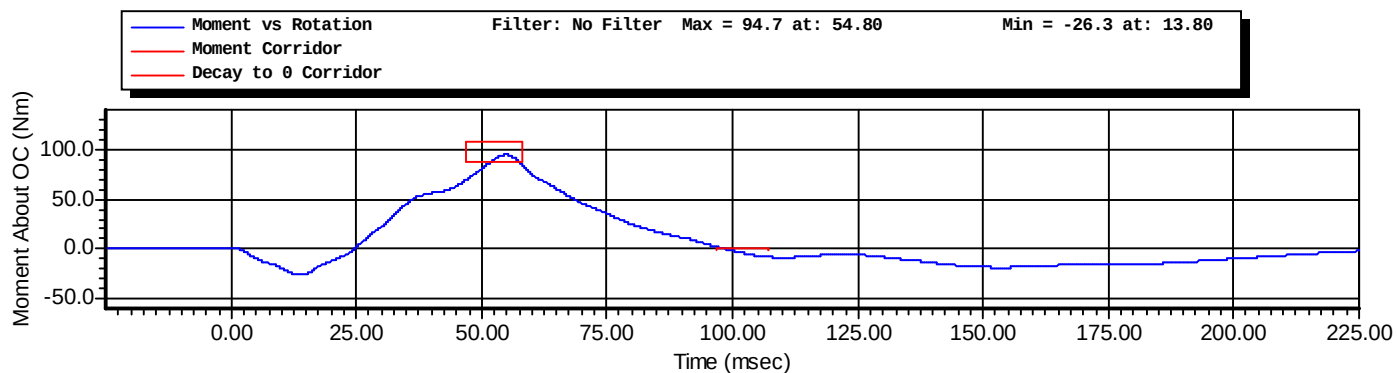
Pendulum Deceleration



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		
Test ID:	Thorax	Test Date:	11/23/2010
Test Number:	1	Test Time:	9:55:55 AM

Component Part Number	Component Serial Number
Ribs 78051-RS	4273
Chest Jacket - 78051-169	2437
Lumbar Spine - 78051-66	555

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10.0 -- 70.0	54.0 %RH P
Velocity	6.59 -- 6.83	6.71 m/s P
Resistive Force	-5.894 -- -5.160	-5.736 kN P
Sternum Displacement	-72.6 -- -63.5	-70.3 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: **9:55:55 AM**

Test Date: **11/23/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

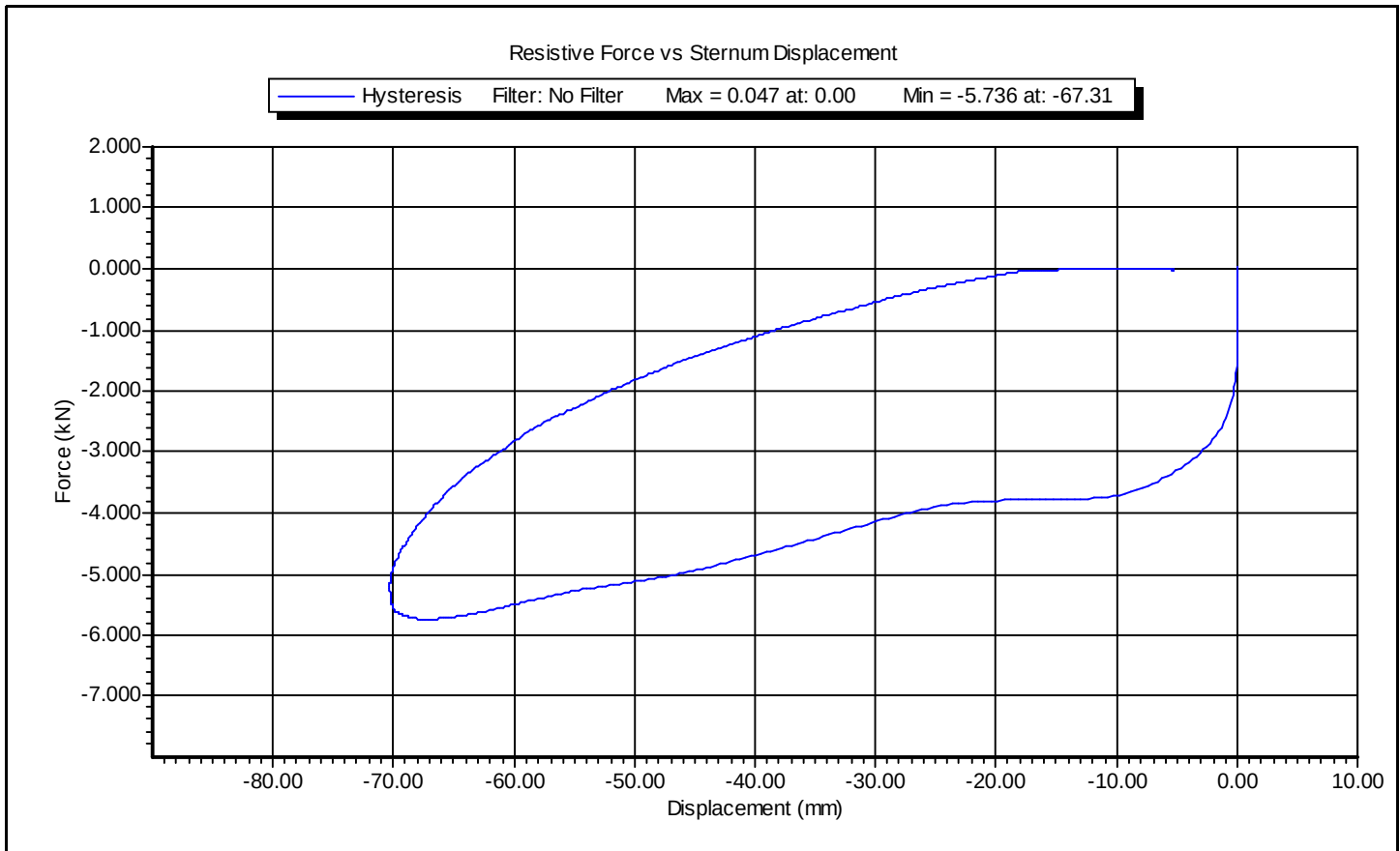
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66930	10/5/2010
DentonATD	78051-342	DS-061	6/1/2010

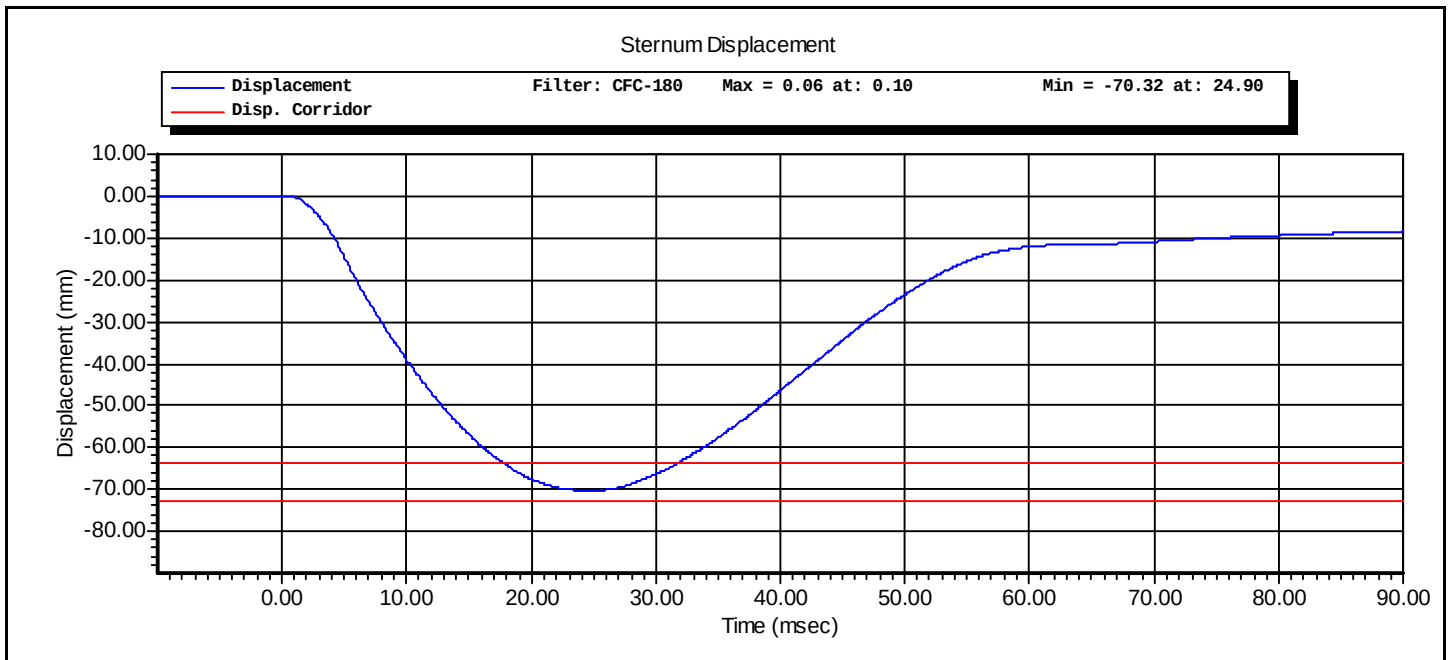
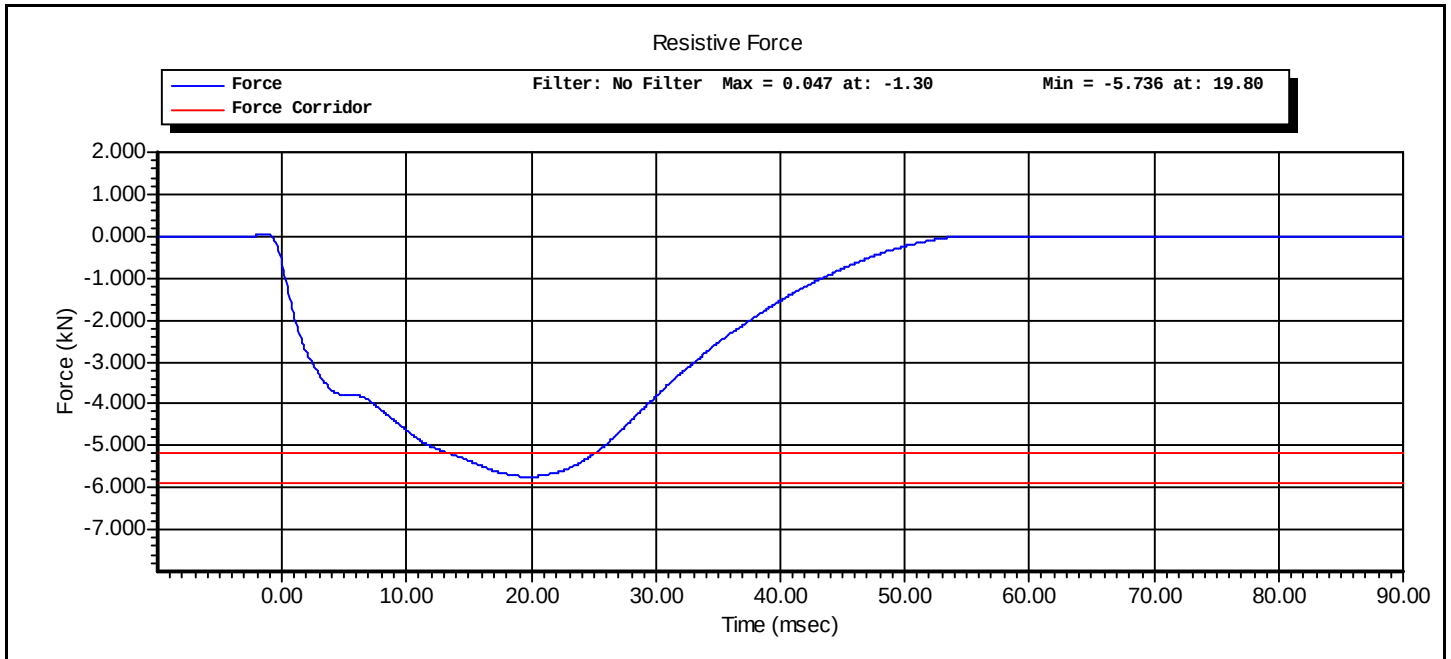
Test ID: **Thorax**

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

Test Date: **11/23/2010**

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:	11/23/2010
Test Number:	1	Test Time:	9:55:55 AM





CALSPAN

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

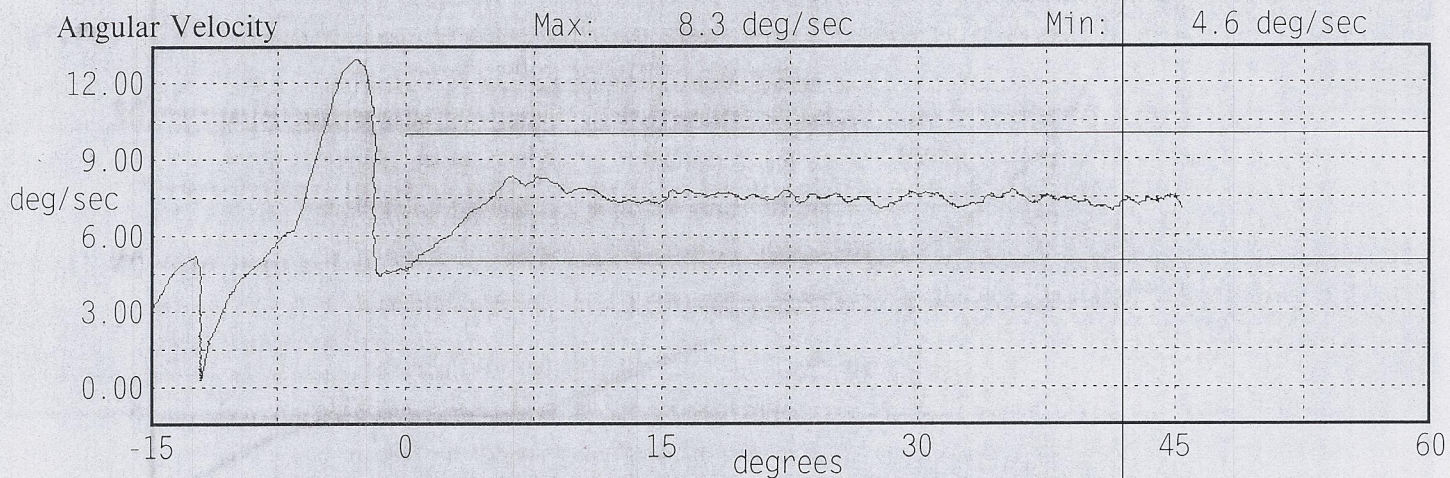
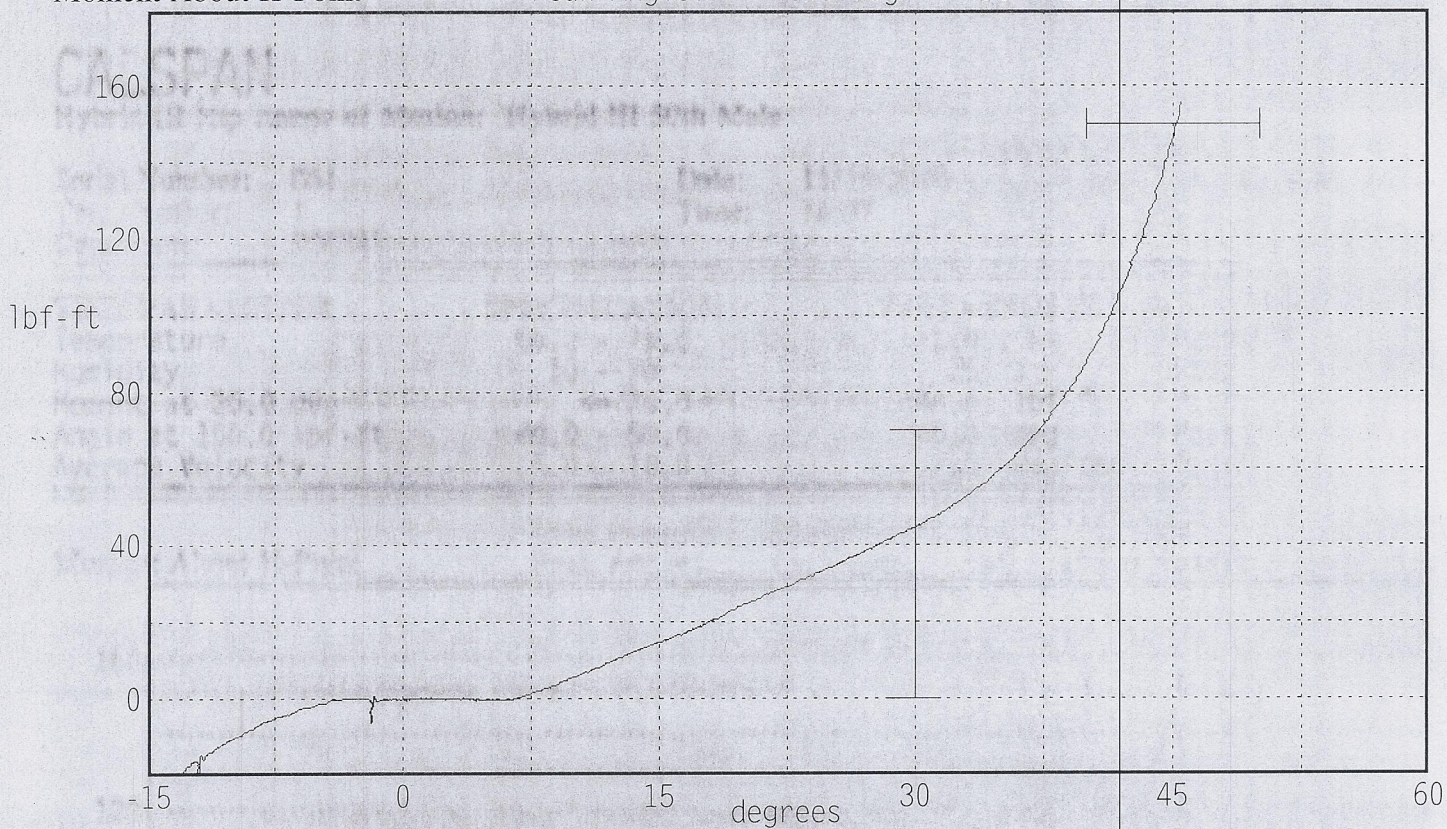
Serial Number: 061
Test Number: 1
Comments: RIGHT

Date: 11/19/2010
Time: 16:07

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	66.0 - 78.0	71.0 °F	Pass
Humidity	10 - 70	25 %	Pass
Moment at 30.0 deg	<= 70.0	44.6 lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	45.3 deg	Pass
Average Velocity	5.0 - 10.0	7.3 deg/sec	Pass

Moment About H-Point
Peak Moment: 155.5 lbf-ft at 45.5 deg
Peak Angle: 45.5 deg at 155.5 lbf-ft



CALSPAN

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

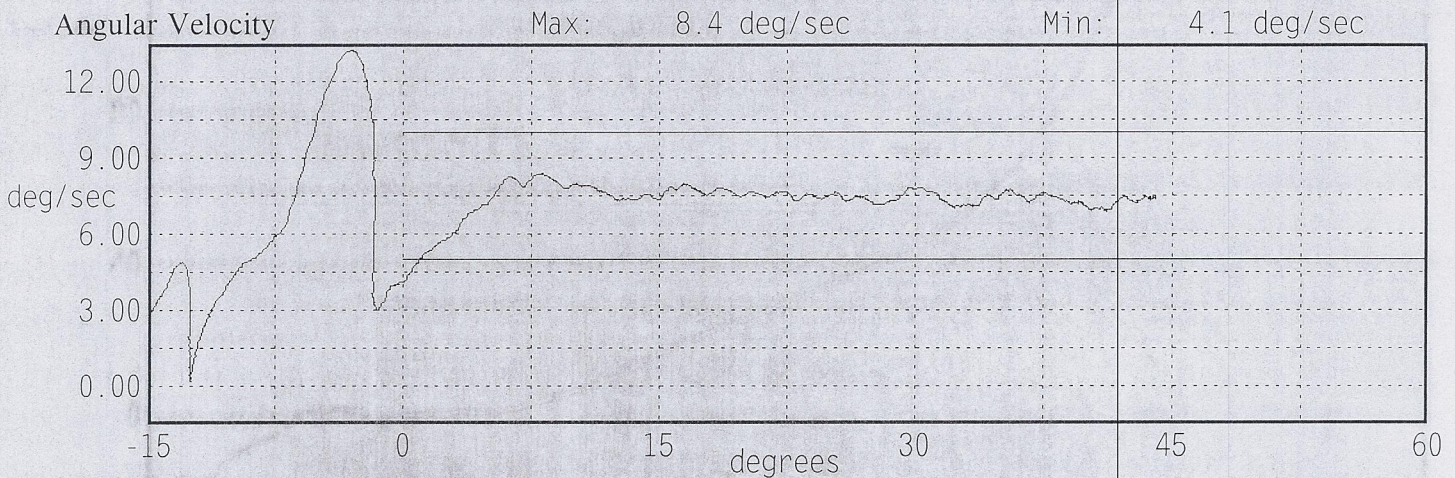
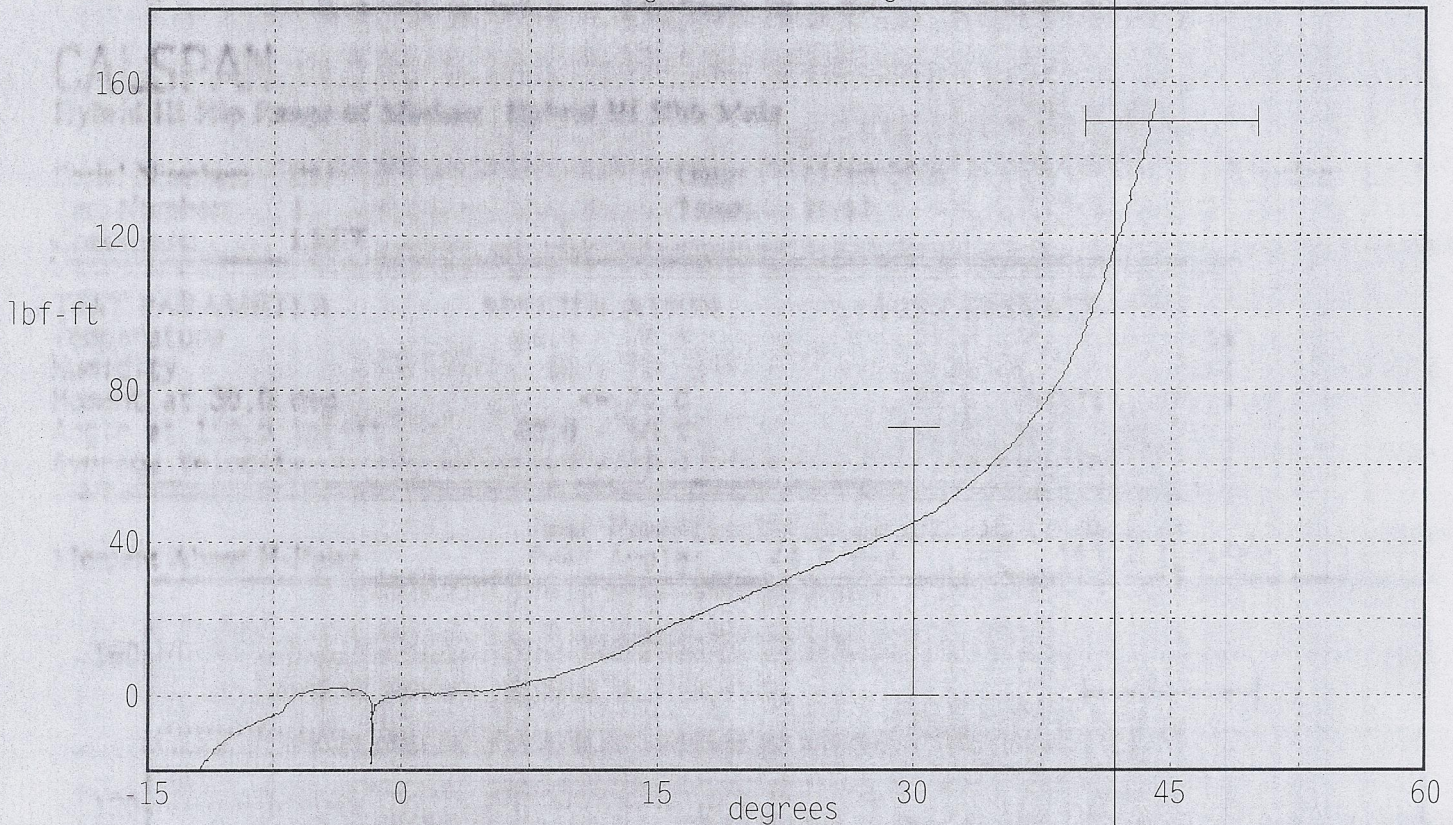
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 11/19/2010
Time: 16:13

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS	
Temperature	66.0 - 78.0	71.0 °F	Pass
Humidity	10 - 70	25 %	Pass
Moment at 30.0 deg	<= 70.0	44.9 lbf-ft	Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.8 deg	Pass
Average Velocity	5.0 - 10.0	7.3 deg/sec	Pass

Moment About H-Point
Peak Moment: 155.5 lbf-ft at 44.0 deg
Peak Angle: 44.0 deg at 153.4 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		
Test ID:	Left Knee	Test Date:	11/19/2010
Test Number:	1	Test Time:	4:35:59 PM

Component Part Number	Component Serial Number
Knee Skin - 78051	077

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.0 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-5.78 -- -4.72	-5.37 kN P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **4:35:59 PM**

Test Date: **11/19/2010**



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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
CEC	4-202	AC-A44	8/26/2010

Test ID: **Left Knee**

Test Time: **4:35:59 PM**

Test Date: **11/19/2010**

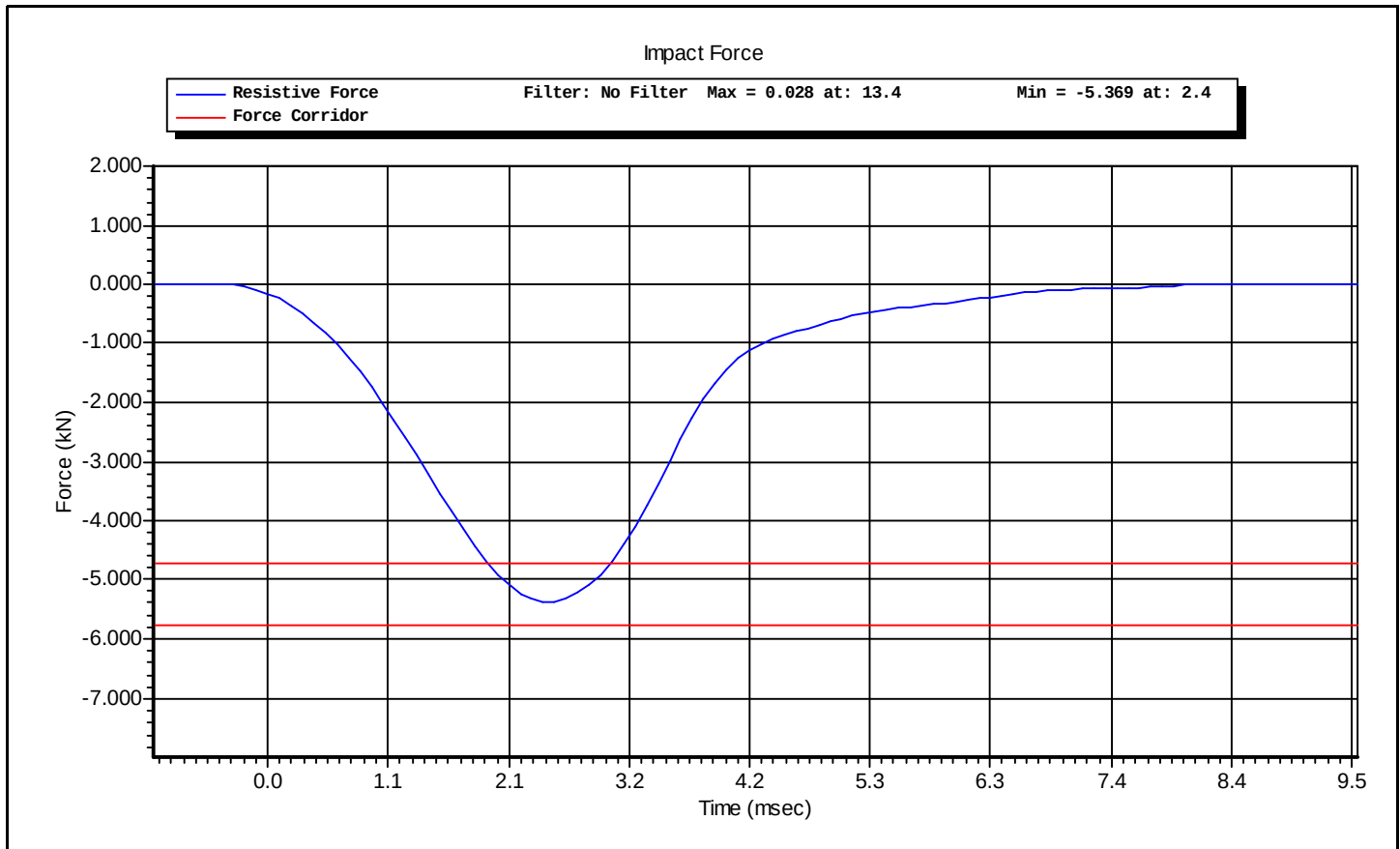


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	11/19/2010
Test Number:	1	Test Time:	4:35:59 PM



Test ID: **Left Knee**

Test Time: **4:35:59 PM**

Test Date: **11/19/2010**



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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		
Test ID:	Right Knee	Test Date:	11/19/2010
Test Number:	1	Test Time:	4:44:34 PM

Component Part Number	Component Serial Number
Knee Skin - 78056	3266

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.0 deg C P
Humidity	10.0 -- 70.0	29.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-5.27 kN P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **4:44:34 PM**

Test Date: **11/19/2010**



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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
CEC	4-202	AC-A44	8/26/2010

Test ID: **Right Knee**

Test Time: **4:44:34 PM**

Test Date: **11/19/2010**

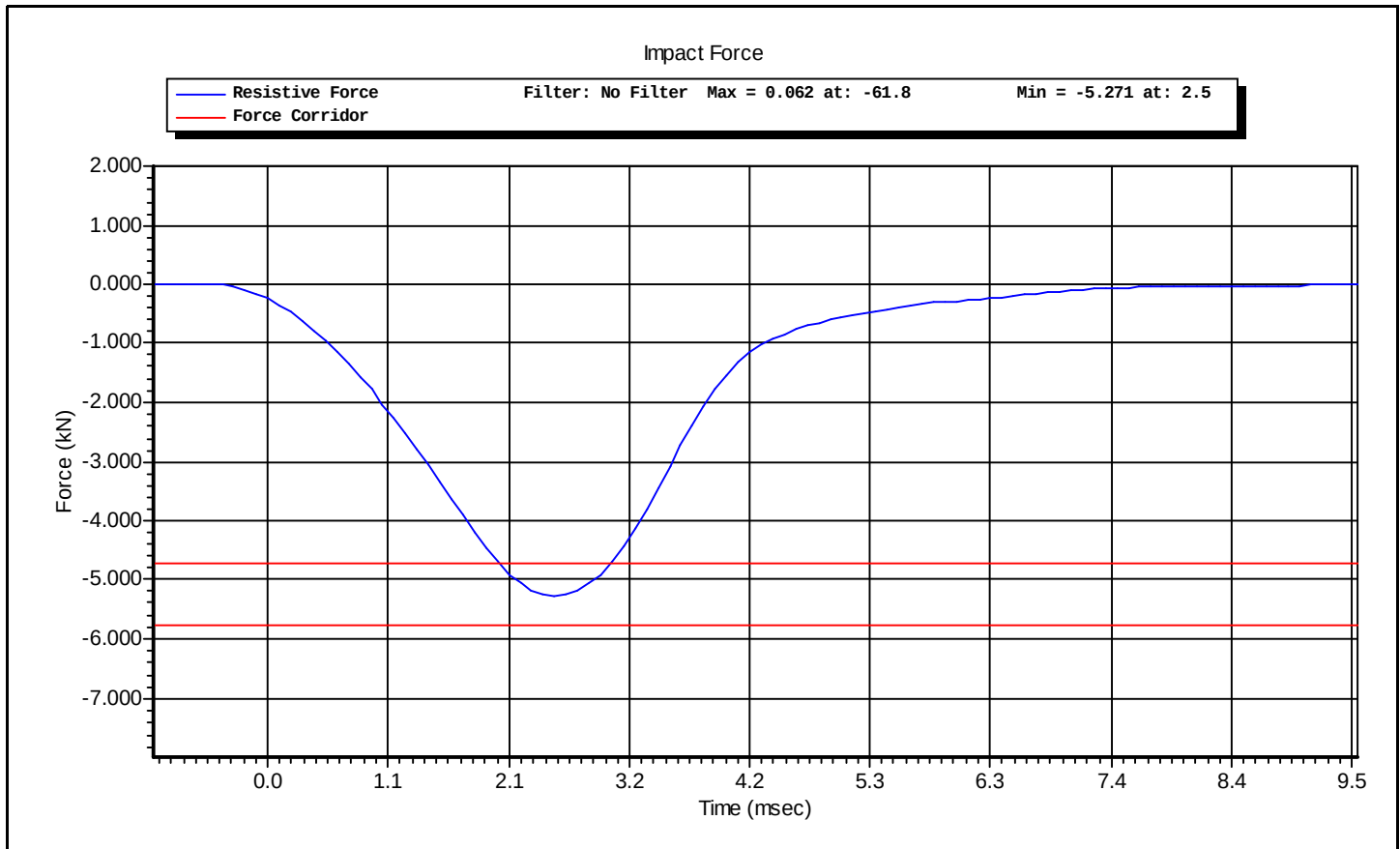


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	11/19/2010
Test Number:	1	Test Time:	4:44:34 PM



Test ID: **Right Knee**

Test Time: **4:44:34 PM**

Test Date: **11/19/2010**

CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 143

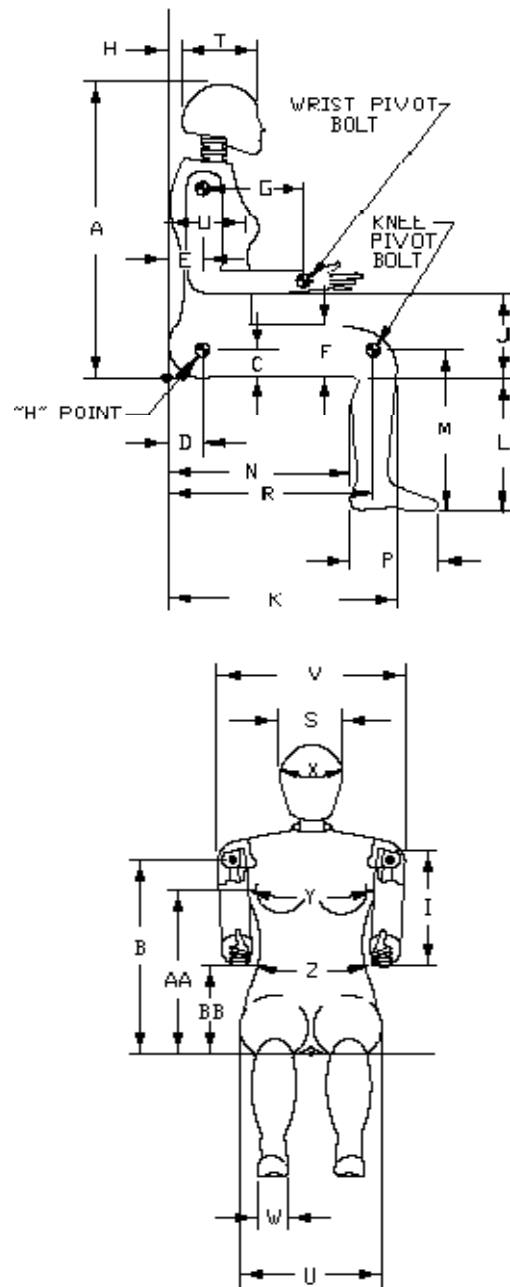
External Measurements - 5th Female

SN 143

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	786	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	86	Yes
D	H-Point from Backline	144.8 – 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6-83.8	75	Yes
F	Thigh Clearance	119.4 – 134.6	127	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	250	Yes
H	Head Back to Backline	43.2 – 48.2	47	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	277	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	435	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	219	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	480	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	184	Yes
U	Hip Breadth	299.7 – 314.9	305	Yes
V	Shoulder Breadth	350.5 – 365.7	362	Yes
W	Foot Breadth	78.8 - 94	86	Yes
X	Head Circumference	528.3 – 548.7	537	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	879	Yes
Z	Waist Circumference	759.5 – 789.9	785	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	338	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		
Test ID:	Head Drop	Test Date:	11/22/2010
Test Number:	1	Test Time:	11:36:23 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	05733

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.3 deg C P
Humidity	10 -- 70	49 %RH P
Resultant Acceleration	250 -- 300	256 g P
Oscillation	0.0 -- 10.0	1.5 % P
Lateral Acceleration	-15.00 -- 15.00	3.08 g P

All test parameters are within specifications

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

Test ID: **Head Drop**

Test Time: **11:36:23 AM**

Test Date: **11/22/2010**



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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	P66931	10/25/2010
Endevco	7264-2000	P66926	10/25/2010
Endevco	7264-2000	P66943	10/25/2010

Test ID: **Head Drop**

Test Time: **11:36:23 AM**

Test Date: **11/22/2010**

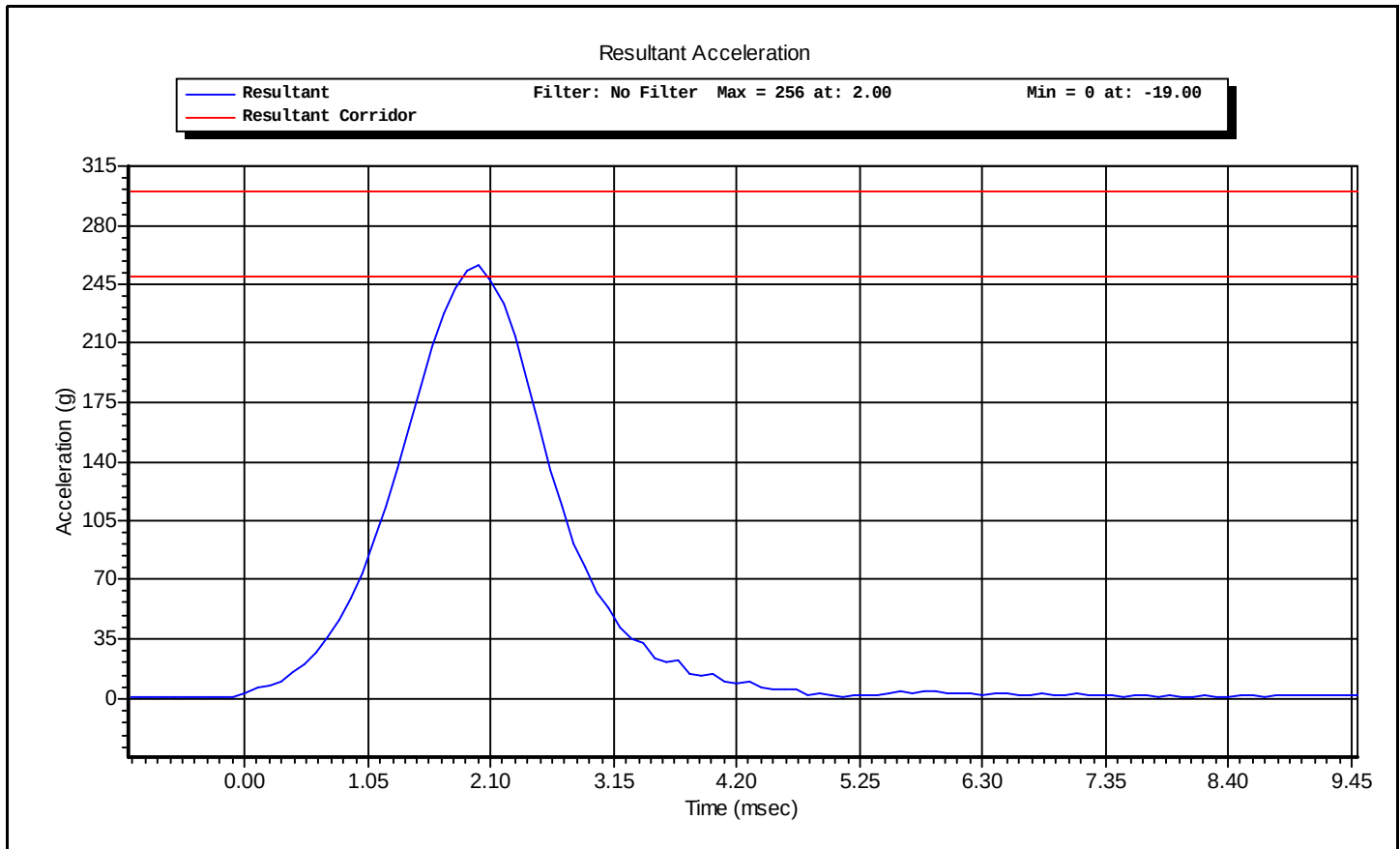


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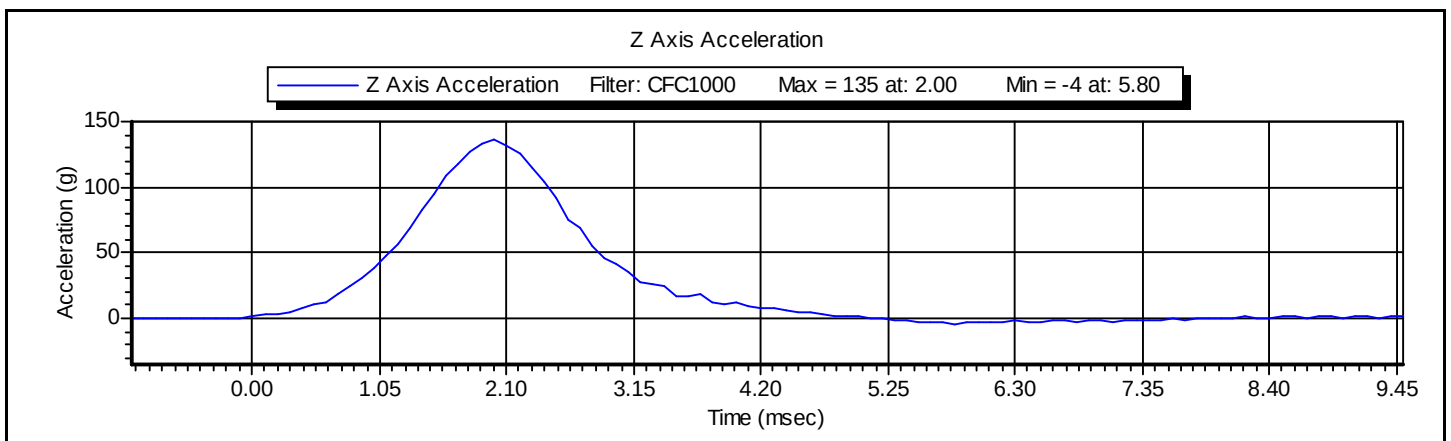
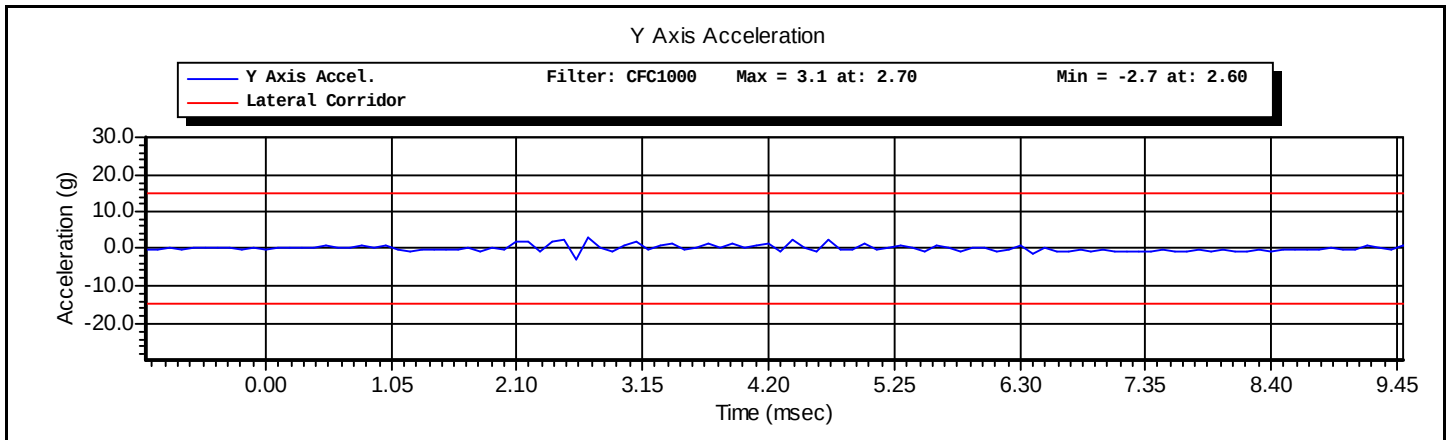
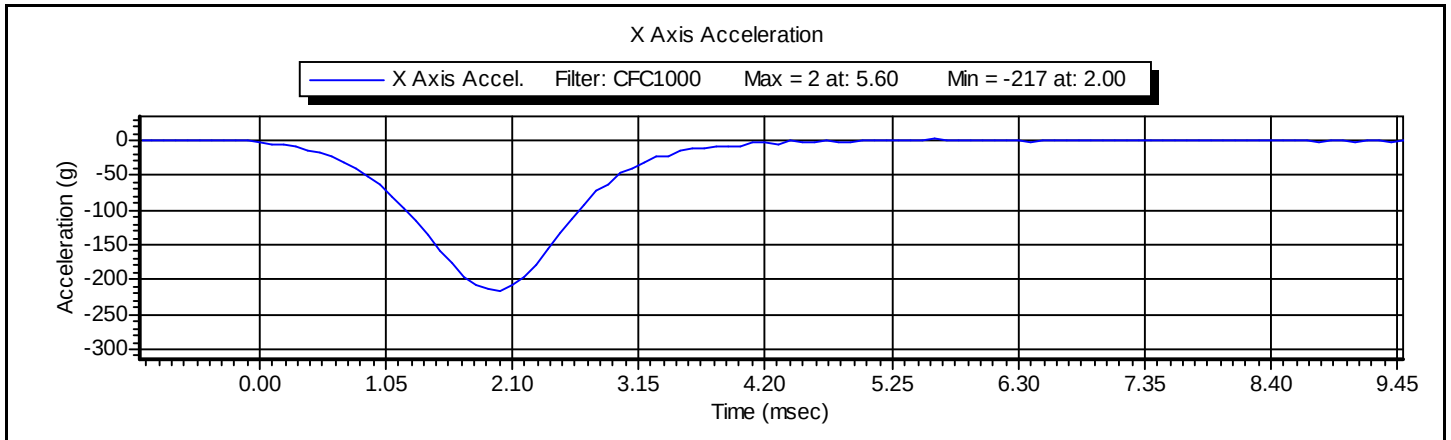
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Head Drop	Test Date:	11/22/2010
Test Number:	1	Test Time:	11:36:23 AM



Test ID: **Head Drop**

Test Time: **11:36:23 AM**

Test Date: **11/22/2010**





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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		
Test ID:	Neck Extension	Test Date:	11/22/2010
Test Number:	2	Test Time:	2:44:09 PM

Component Part Number	Component Serial Number
Neck - 880105-255	05-0512

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.7 deg C P
Humidity	10 -- 70	51 %RH P
Velocity	5.95 -- 6.19	6.07 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.86 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.73 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.38 m/s P
D Plane Rotation	99.0 -- 114.0	107.0 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-58.0 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	104.1 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **2:44:09 PM**

Test Date: **11/22/2010**



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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	10/21/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-443 My	5/25/2010
Denton	1716A	LC-443 Fx	5/25/2010
FTSS	1716A	LC-296 Fy	2/1/2010
FTSS	1716A	LC-296 Fz	2/1/2010

Test ID: **Neck Extension**

Test Time: **2:44:09 PM**

Test Date: **11/22/2010**

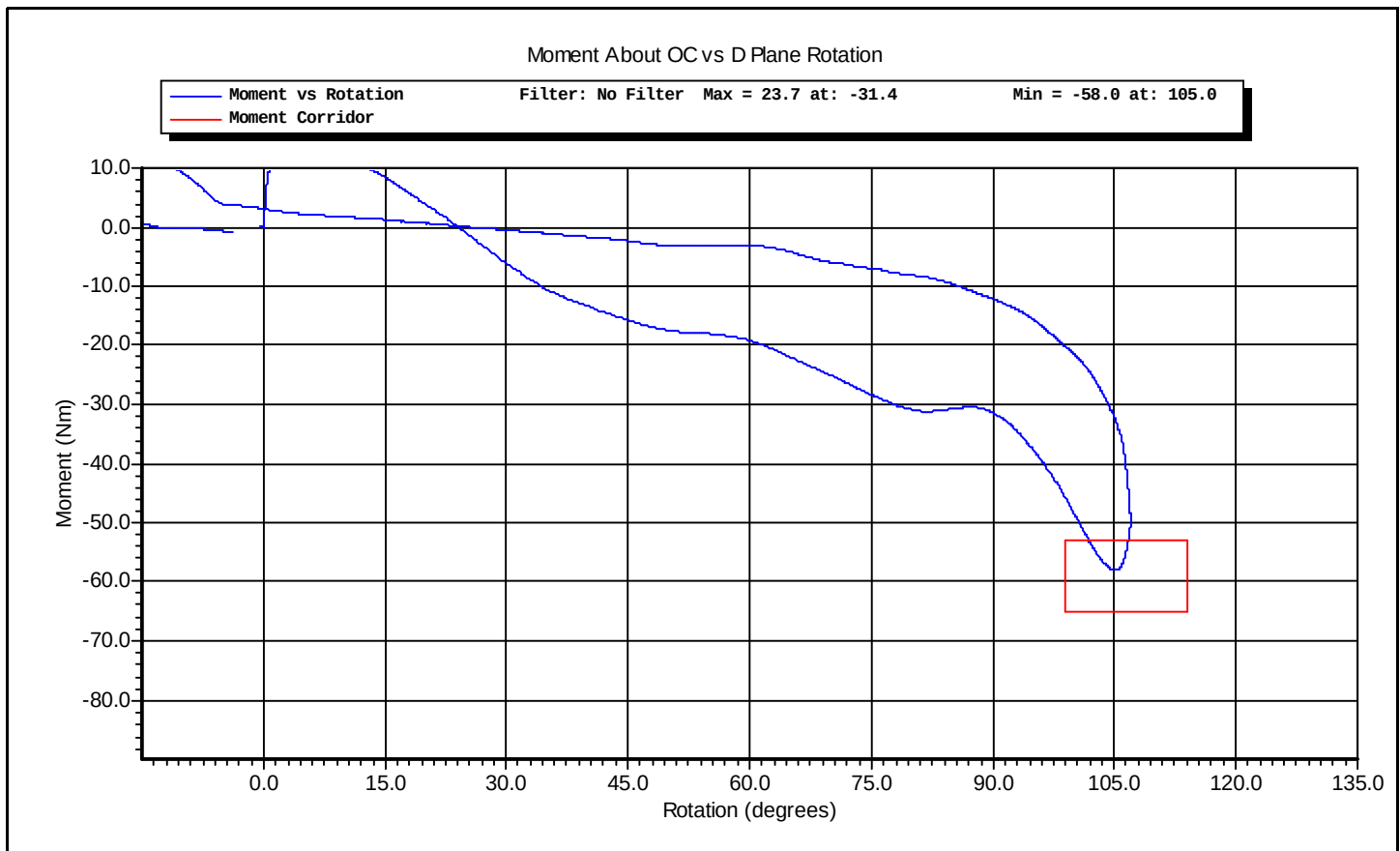


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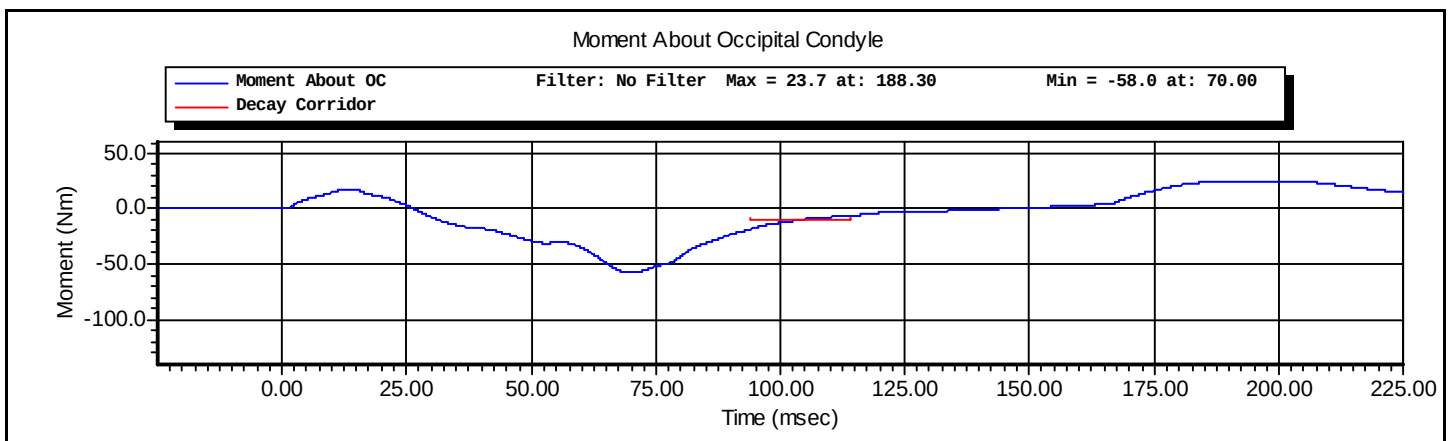
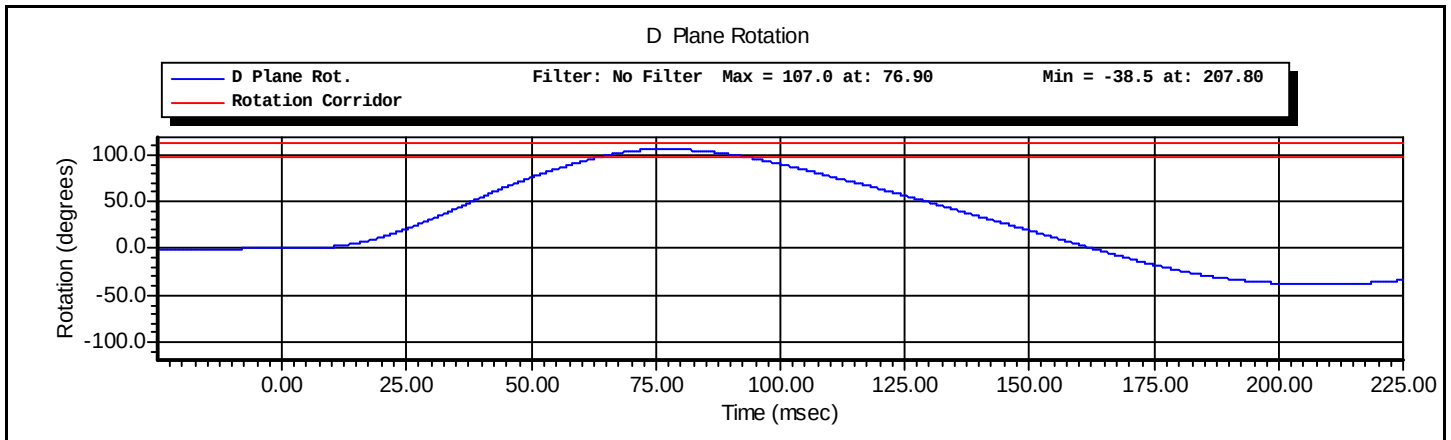
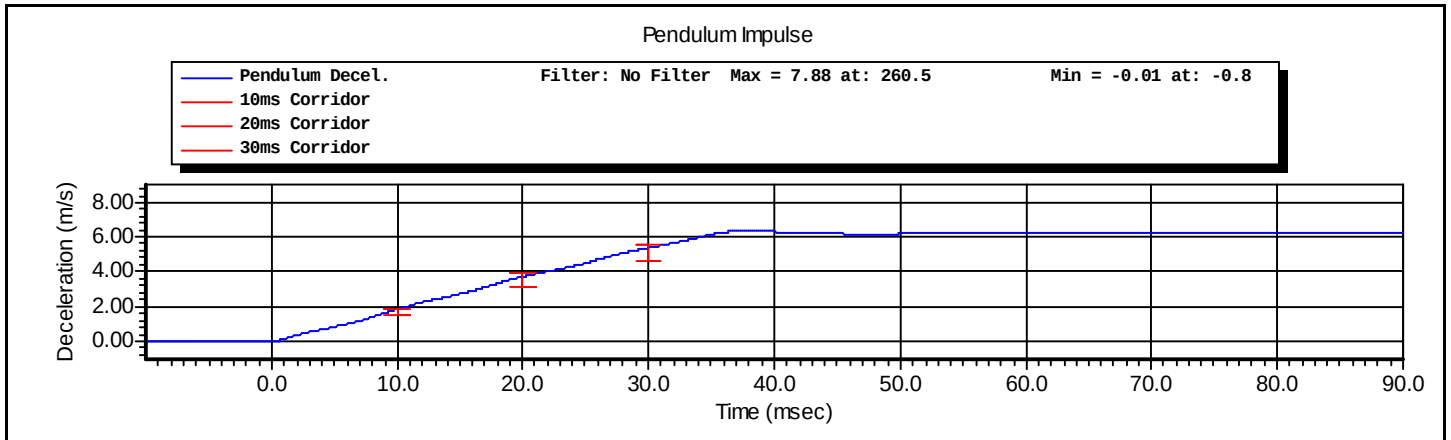
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Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Extension	Test Date:	11/22/2010
Test Number:	2	Test Time:	2:44:09 PM



Test ID: Neck Extension Test Time: 2:44:09 PM

Test Date: 11/22/2010





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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		
Test ID:	Neck Flexion	Test Date:	11/22/2010
Test Number:	1	Test Time:	1:38:45 PM

Component Part Number	Component Serial Number
Neck - 880105-255	05-0512

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	51 %RH P
Velocity	6.89 -- 7.13	7.09 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.33 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.67 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.58 m/s P
D Plane Rotation	-91.0 -- -77.0	-78.7 degrees P
Moment During Rotation Interval	69.0 -- 83.0	74.9 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	86.9 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **1:38:45 PM**

Test Date: **11/22/2010**



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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	10/21/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-443 My	5/25/2010
Denton	1716A	LC-443 Fx	5/25/2010
FTSS	1716A	LC-296 Fy	2/1/2010
FTSS	1716A	LC-296 Fz	2/1/2010

Test ID: **Neck Flexion**

Test Time: **1:38:45 PM**

Test Date: **11/22/2010**

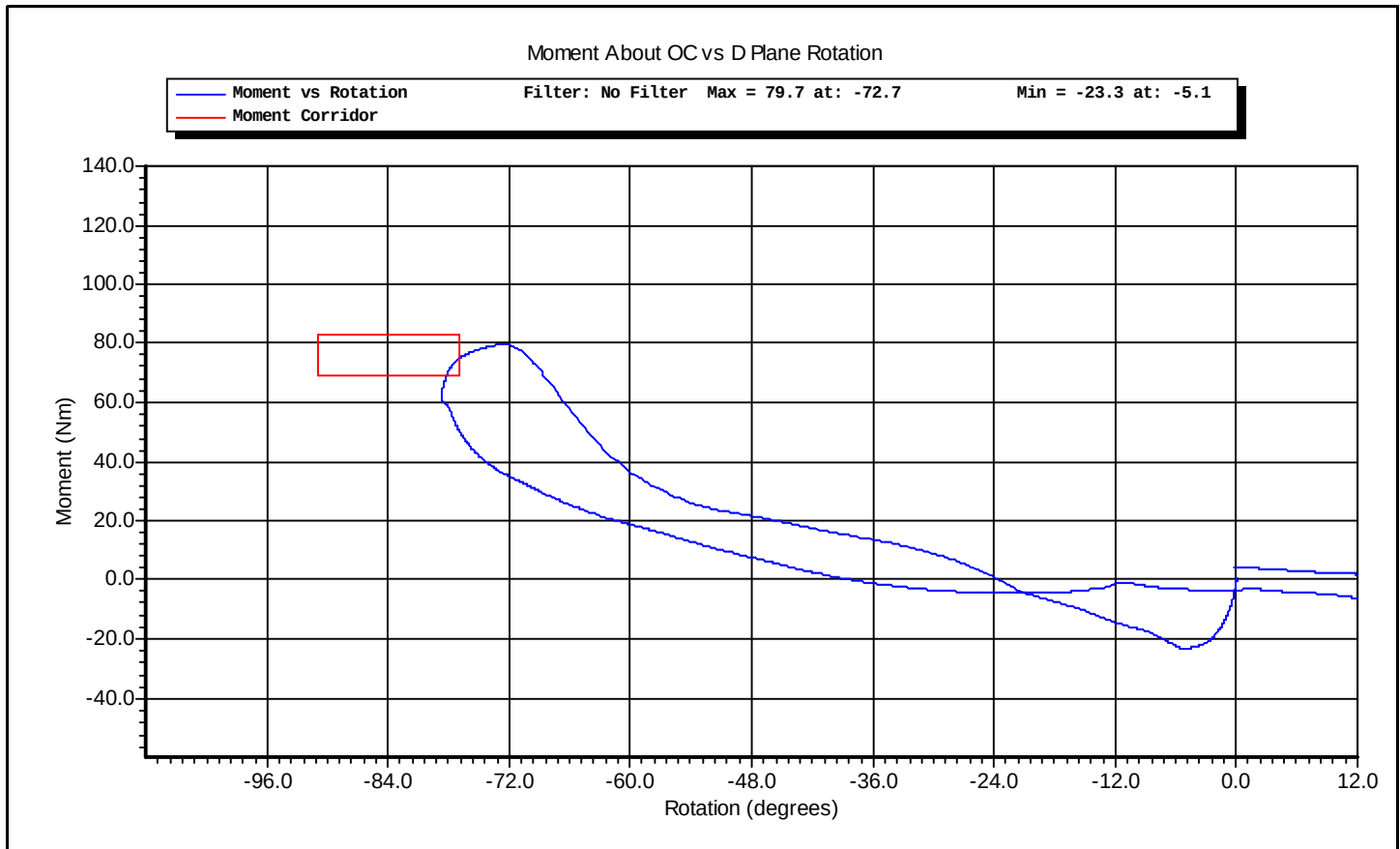


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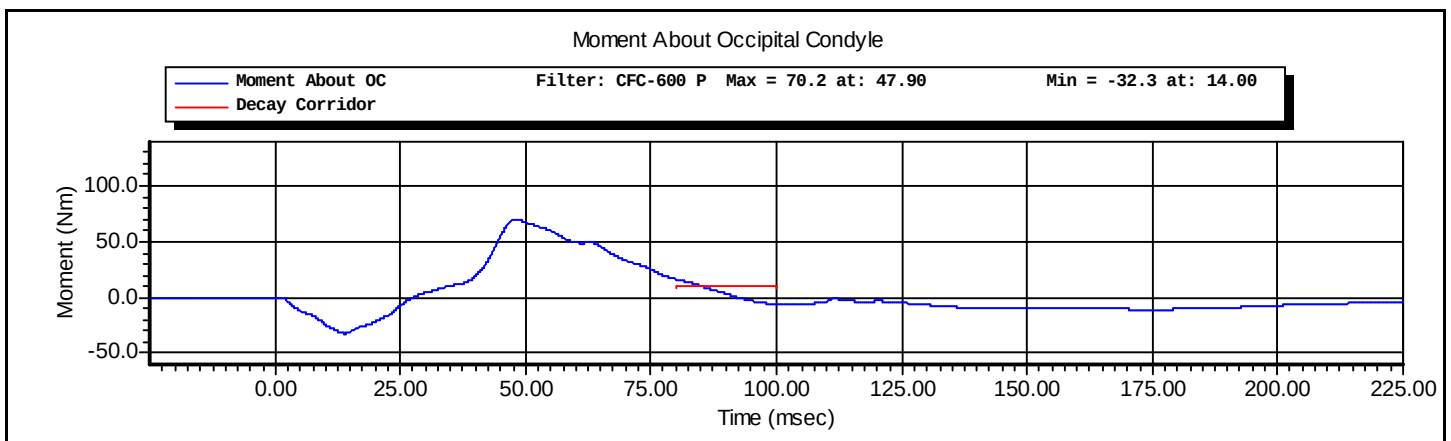
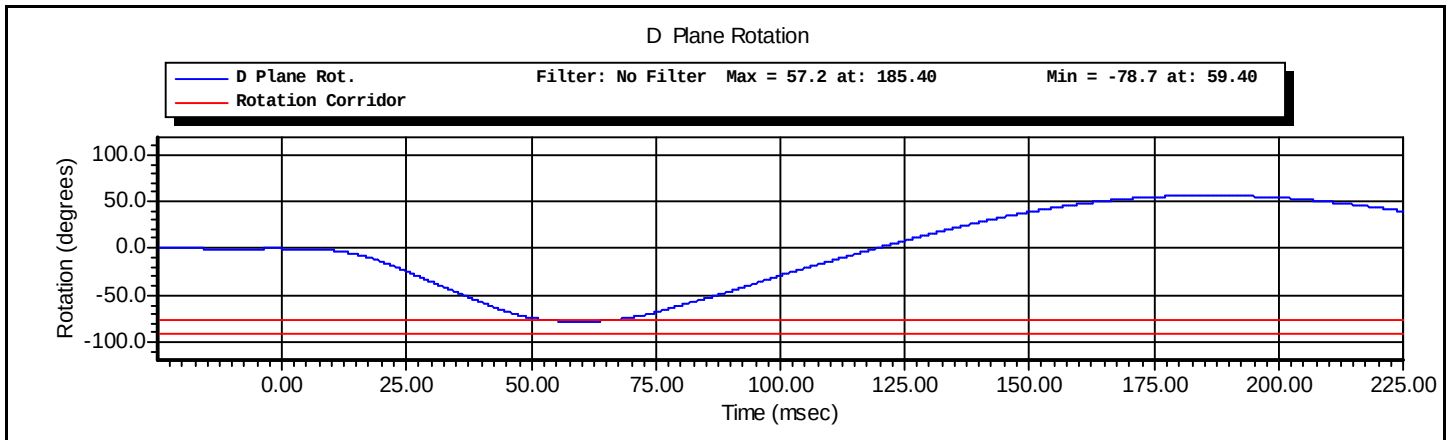
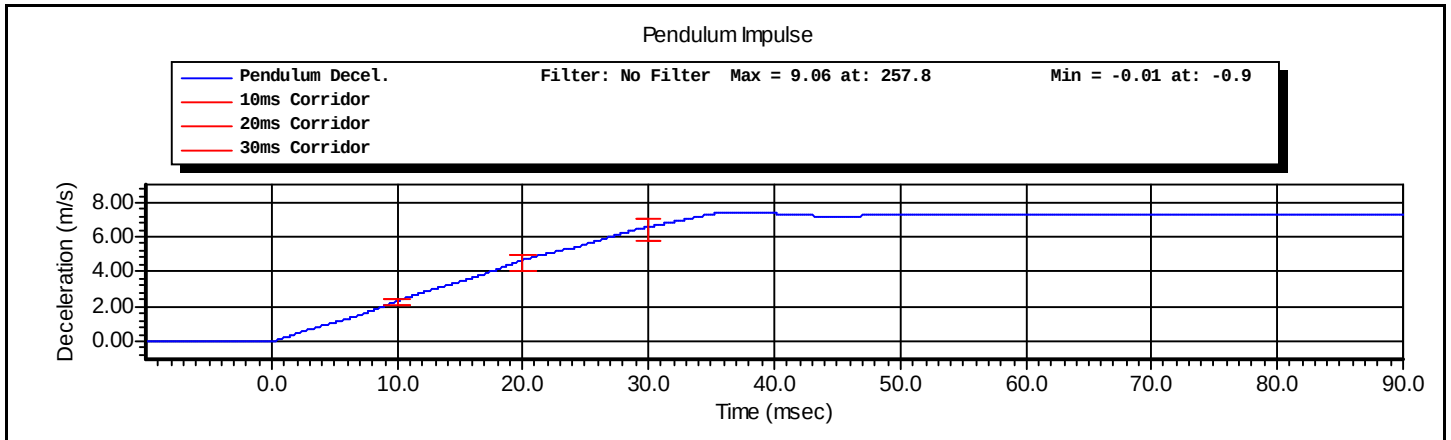
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Flexion	Test Date:	11/22/2010
Test Number:	1	Test Time:	1:38:45 PM



Test ID: Neck Flexion

Test Time: 1:38:45 PM

Test Date: 11/22/2010





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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		
Test ID:	Thorax Impact	Test Date:	11/22/2010
Test Number:	1	Test Time:	3:14:11 PM

Component Part Number	Component Serial Number
Ribs 880105-RS	05032021A
Chest Jacket - 880105-355-E	05855
Lumbar Spine - 880105-1095	050330

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	0.0 deg C F
Humidity	10.0 -- 70.0	0.0 %RH F
Velocity	6.59 -- 6.83	6.71 m/s P
Sternum Displacement	-58.0 -- -50.0	-57.9 mm P
Force During Displacement Interval	-4400 -- -3900	-4304 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-4026 N P
Hysteresis	69 -- 85	69 % P

All test parameters are NOT within specifications

Technician: **S. Zito III** Signature: _____
Supervisor: **D. Travale** Signature: _____

Test ID: **Thorax Impact**

Test Time: **3:14:11 PM**

Test Date: **11/22/2010**



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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	P66930	10/5/2010
DentonATD	78051-342	DS-143G	6/2/2010

Test ID: **Thorax Impact**

Test Time: **3:14:11 PM**

Test Date: **11/22/2010**



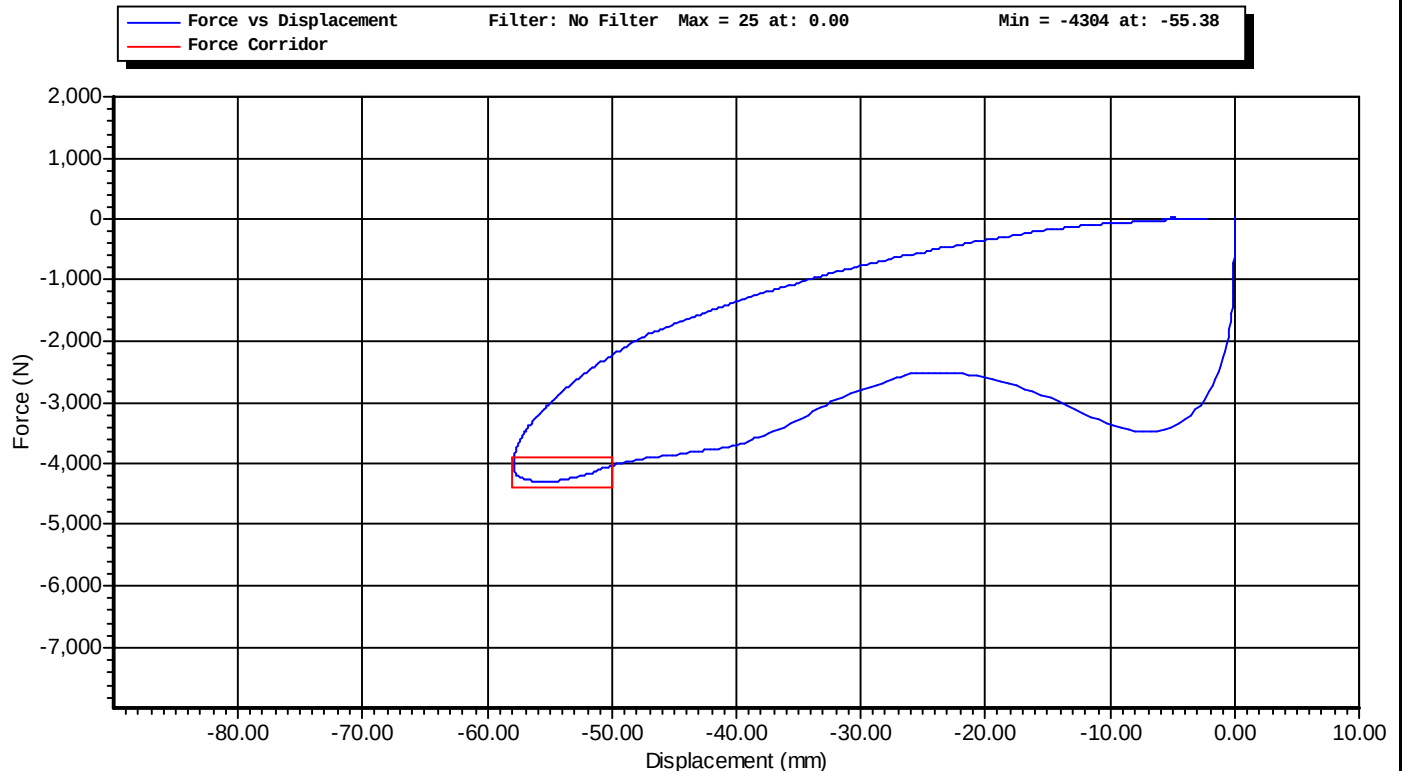
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Thorax Impact	Test Date:	11/22/2010
Test Number:	1	Test Time:	3:14:11 PM

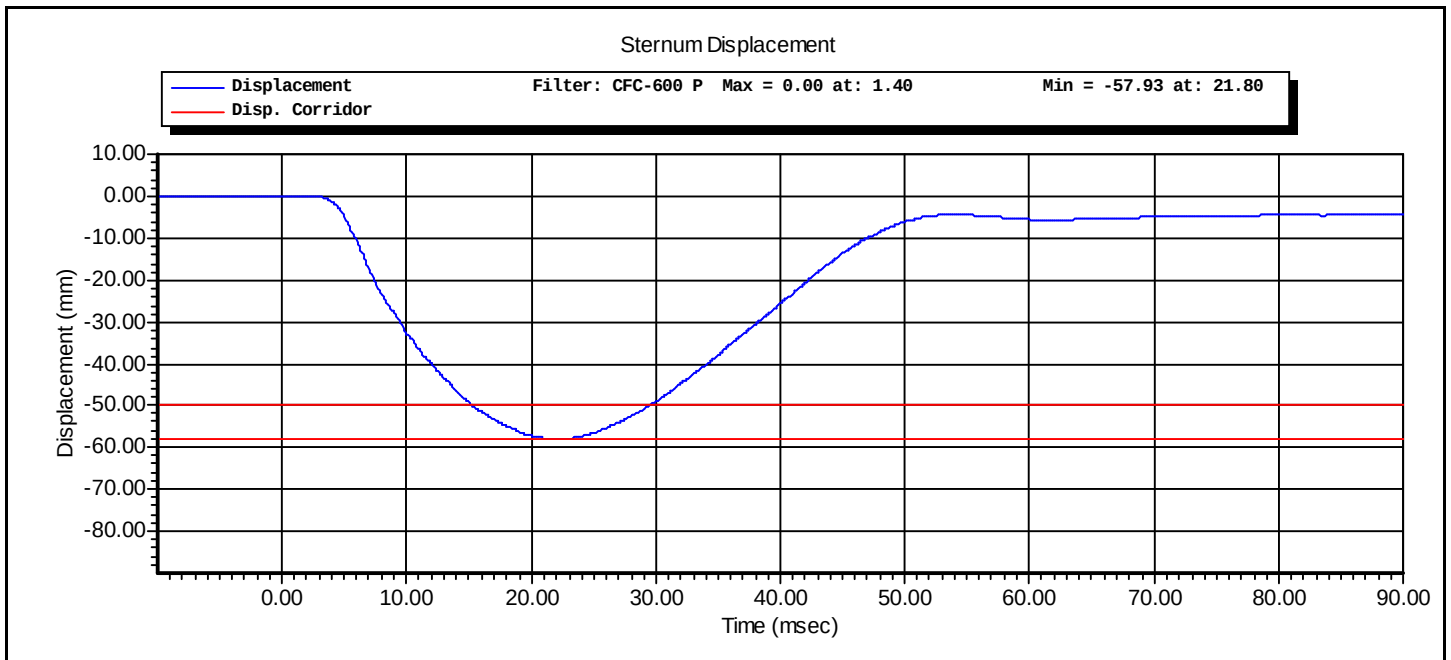
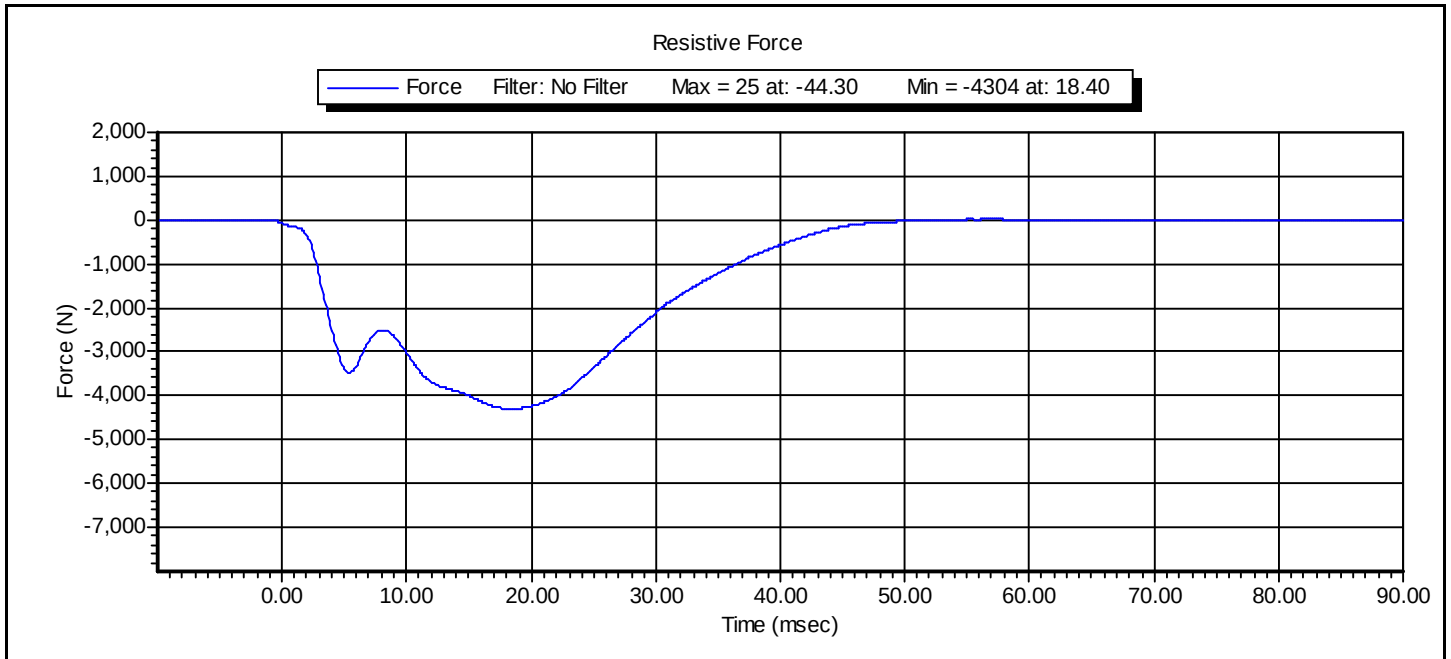
Resistive Force vs Sternum Displacement



Test ID: Thorax Impact

Test Time: 3:14:11 PM

Test Date: 11/22/2010



Torso Flexion Test

Technician: AR

Calibration Date: 11/23/2010

ATD Serial Number: 5th Female 143

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	21.7° C	P
Lab Humidity: 38%	10-70%	53%	P
Max Force @ 45 deg	320 – 390N	368N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	12°	P
Final ref plan angle	Initial ref plane ± 8 deg	18°	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		
Test ID:	Left Knee	Test Date:	11/22/2010
Test Number:	1	Test Time:	4:15:27 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	5955

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	52.0 %RH P
Velocity	2.07 -- 2.13	2.11 m/s P
Resistive Force	-4060 -- -3450	-3515 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **4:15:27 PM**

Test Date: **11/22/2010**



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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: **4:15:27 PM**

Test Date: **11/22/2010**

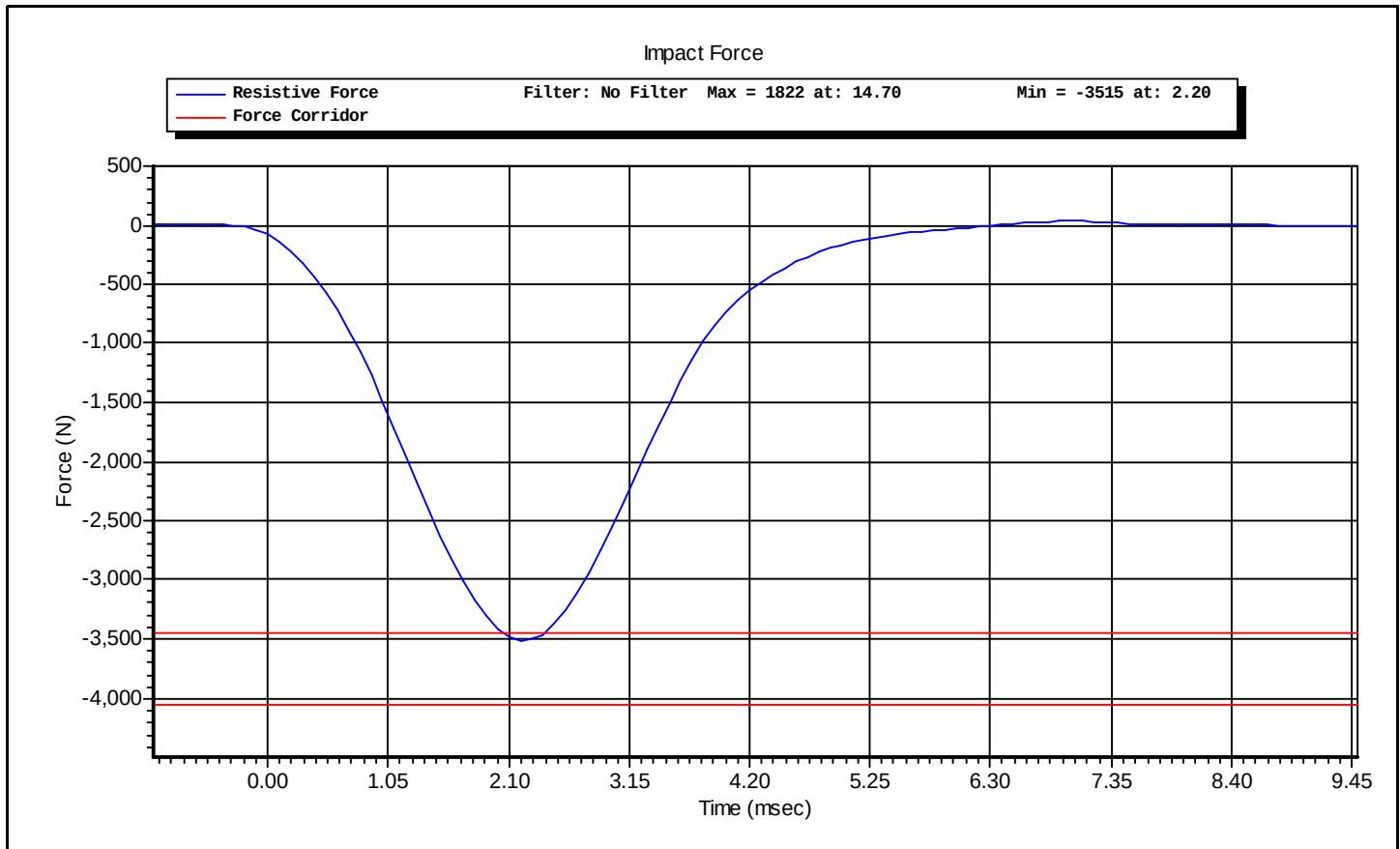


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Left Knee	Test Date:	11/22/2010
Test Number:	1	Test Time:	4:15:27 PM



Test ID: Left Knee

Test Time: 4:15:27 PM

Test Date: 11/22/2010



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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		
Test ID:	Right Knee	Test Date:	11/22/2010
Test Number:	1	Test Time:	4:34:32 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	06052

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	2.10 m/s P
Resistive Force	-4060 -- -3450	-3545 N P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **4:34:32 PM**

Test Date: **11/22/2010**



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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: **4:34:32 PM**

Test Date: **11/22/2010**

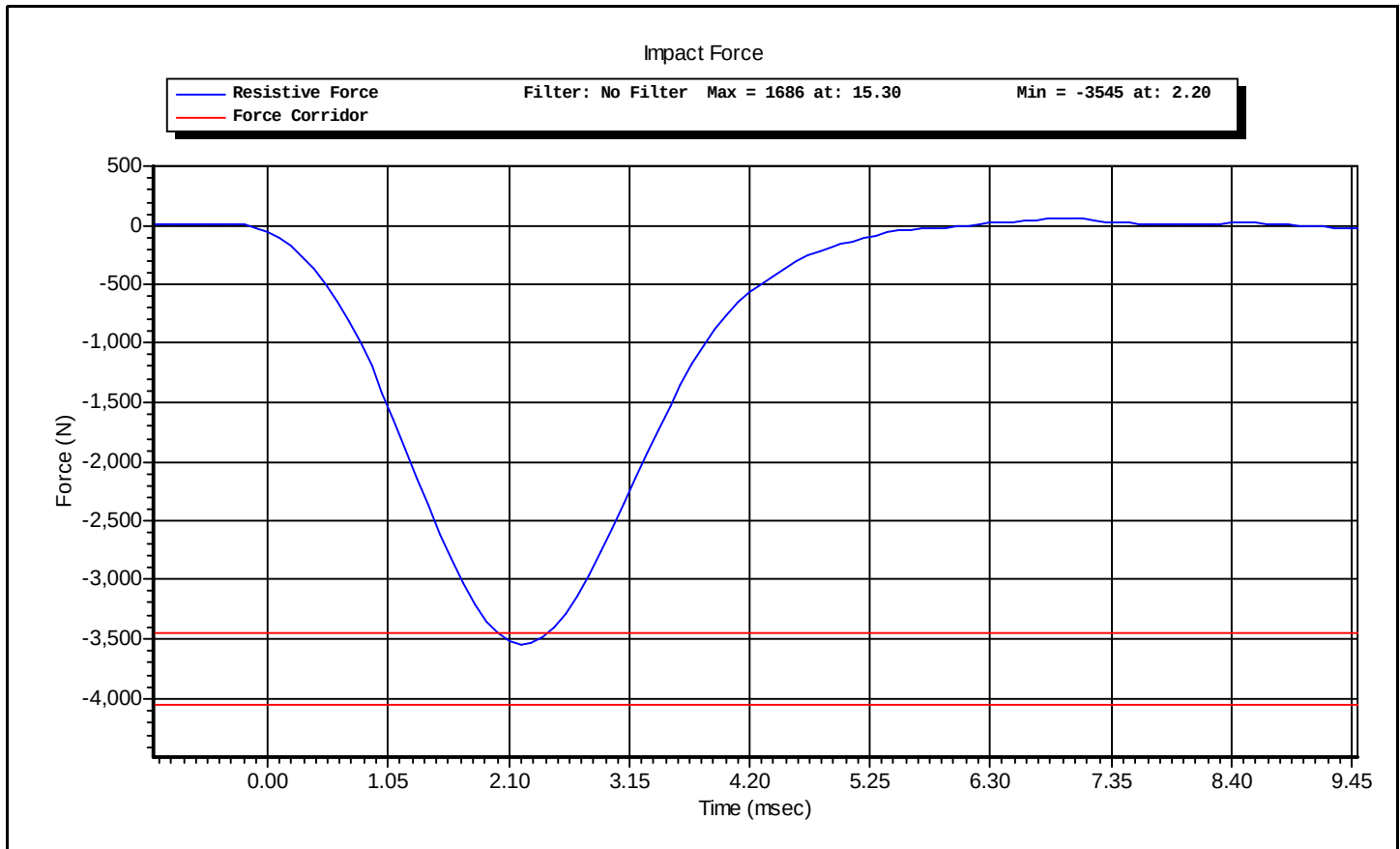


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Right Knee	Test Date:	11/22/2010
Test Number:	1	Test Time:	4:34:32 PM



Test ID: **Right Knee**

Test Time: **4:34:32 PM**

Test Date: **11/22/2010**

