

REPORT NUMBER: NCAP-CAL-11-023

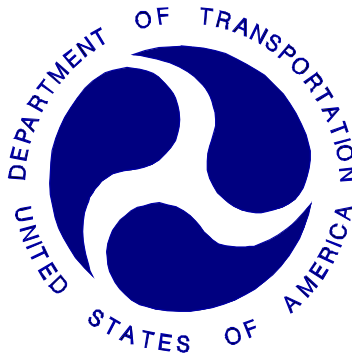
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**Ford Motor Company
2011 Ford Fusion
Four Door Sedan**

NHTSA NUMBER: MB0217

CALSPAN TEST NUMBER: TR2502

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



January 11, 2011

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: _____

TECHNICAL REPORT STANDARD TITLE PAGE

1. Report No. NCAP-CAL-11-023		2. Government Accession No.		3. Recipient's Catalog No.																																																																	
4. Title and Subtitle Final Report of NEW CAR ASSESSMENT PROGRAM Testing of a 2011 Ford Fusion Four Door Sedan NHTSA No. MB0217				5. Report Date 1/11/2011																																																																	
				6. Performing Organization Code CAL																																																																	
7. Author(s) Bethany Koetje, Project Engineer				8. Performing Organization Report No. tr2502																																																																	
9. Performing Organization Name and Address Calspan Corporation 4455 Genesee Street Buffalo, New York 14225				10. Work Unit No.																																																																	
				11. Contract or Grant No. DTNH22-06-D-00024																																																																	
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards 1200 New Jersey Ave SE, Room W43-410 Washington, DC 20590				13. Type of Report and Period Covered Final Report, 1/11/2011																																																																	
				14. Sponsoring Agency Code NVS-111																																																																	
15. Supplementary Notes																																																																					
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2011 Ford Fusion Four Door Sedan in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at the Calspan Corporation's crash test facility in Buffalo, New York on 11/3/2010. The impact velocity of the vehicle was 56.3 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 512mm 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>196.42</td> <td>N/A</td> <td>700</td> <td>319.75</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-28.98</td> <td>mm</td> <td>52</td> <td>-24.11</td> </tr> <tr> <td>Nij</td> <td>n/a</td> <td>1</td> <td>0.39</td> <td>n/a</td> <td>1</td> <td>0.37</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4170</td> <td>1,736.43</td> <td>Newtons</td> <td>2620</td> <td>1,034.76</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4000</td> <td>273.72</td> <td>Newtons</td> <td>2520</td> <td>335.27</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-1341.48</td> <td>Newtons</td> <td>6805</td> <td>-3667.95</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10008</td> <td>-3929.24</td> <td>Newtons</td> <td>6805</td> <td>-2909.84</td> </tr> </tbody> </table>								Driver ATD			Pass. ATD			Measurement Description	Units	Threshold	Result	Units	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	196.42	N/A	700	319.75	Maximum Chest Compression	mm	63	-28.98	mm	52	-24.11	Nij	n/a	1	0.39	n/a	1	0.37	Neck Tension	Newtons	4170	1,736.43	Newtons	2620	1,034.76	Neck Compression	Newtons	4000	273.72	Newtons	2520	335.27	Left Femur Force	Newtons	10008	-1341.48	Newtons	6805	-3667.95	Right Femur Force	Newtons	10008	-3929.24	Newtons	6805	-2909.84
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17. Key Words 35 mph Frontal Barrier Impact test New Car Assessment Program (NCAP)				18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave SE Washington, DC 20590																																																																	
19. Security Classif. (of this report) UNCLASSIFIED		20. Security Classif. (of this page) UNCLASSIFIED		21. No. of Pages 222		22. Price																																																															

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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 Ford Fusion Four Door Sedan at a velocity of 56.7kph. The test was performed at Calspan on 11/3/2010. 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. 273) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 133 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 512 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 glovebox door panel.

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)	196.42	57.70	72.70	-28.98	0.39	1,736.43	-273.72	-1341.48	-3929.24
Passenger (5 th)	319.75	66.50	81.50	-24.11	0.37	1,034.76	-335.27	-3667.95	-2909.84

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

TEST VEHICLE INFORMATION

NHTSA No.	MB0217
Make	Ford
Model	Fusion
Body Style	Four Door Sedan
VIN	3FAHP0DC5BR132649
Color	Silver Metallic
Delivery Date	9/22/2010
Odometer Reading (mi)	45
Odometer Reading (km)	72.4
Dealer	Towne Ford
Transmission	6-Speed Automatic
Final Drive	All Wheel Drive
Type/No. Cyl	V6
Engine Disp. (L)	3.5
Engine Placement	Transverse
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	Yes
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

TEST VEHICLE OPTIONS

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

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

Yes

DATA FROM CERTIFICATION LABEL

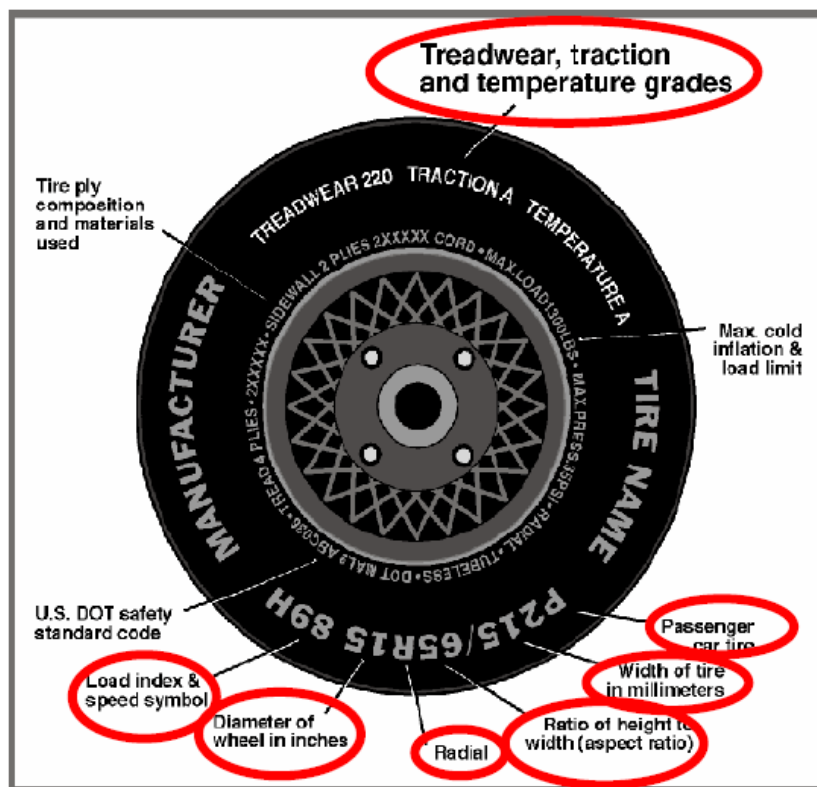
Manufactured By	Ford Motor Company	GVWR (kg)	2,210
Date of Manufacture	8/10	GAWR Front (kg)	1,186
		GAWR Rear (kg)	1,024

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)				396
Cargo Wt. (RCLW) (kg)				55.8

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

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010



Measured Parameter	Front	Rear
Maximum Tire Pressure	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	P225/45R18	P225/45R18
Tire Size on Vehicle	P225/45R18	P225/45R18
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Eagle RA-S	Eagle RS-A
Treadwear	260	260
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	91V	91V
Tire Material		
DOT Safety Code Right	M6RR3210	M6RR3210
DOT Safety Code Left	M6RR3210	M6RR3210

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

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	514.5	346		548	409	
Right	kg	522.5	329		540	402	
Ratio	%	61	39		57	43	
Totals	kg	1,037	675	1,712	1,088	811	1,899

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1,712
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	54.0
Calculated Vehicle Target Weight (TVTW)	kg	1,907

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	739	740	739	736	1077
As Tested	mm	738	738	719	718	1166
Post Test	mm	718	739	708	703	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2,730
Total Vehicle Length at Left Side	mm	4,231
Total Vehicle Length at Centerline	mm	4,841
Total Vehicle Length at Right Side	mm	4,233
Weight of Ballast in Cargo Area	kg	26
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	58.0

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

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

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	4841
2	Total Width	1814
3	Bumper Top Height	528
4	Bumper Bottom Height	241
5	Longitudinal Member Top Height	582
6	Distance Between Longitudinal Members	1098
7	Longitudinal Member Width	82
8	Engine Top Height	918
9	Engine Bottom Height	225
10	Engine and Gearbox Width	492
11	Front Bumper-Engine Distance	492
12	Front Shock Absorber Fixing Height	896
13	Bonnet Leading Edge Height	770
14	Front Shock Absorber Fixing Width	1015
15	Front Bumper – Front Axle Distance	1006
16	Front Axle – A Pillar Distance	522
17	A- Pillar – B-Pillar Distance	1082
18	B-Pillar – Rear Axle Distance	1126
19	B-Pillar – C-Pillar Distance	1044
20	Roof Sill Bottom Height	1310
21	Roof Sill Top Height	1379
22	Floor Sill Bottom Height	273
23	Floor Sill Top Height	394

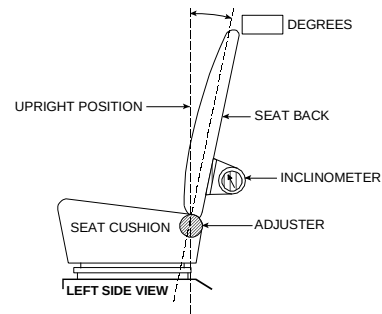
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

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

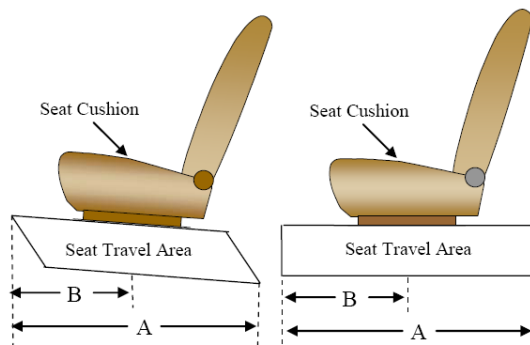
	Deg
Driver Seat Back Angle	11
Passenger Seat Back Angle	14

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	293	147
Passenger Seat	239	0



SEAT BELT UPPER ANCHORAGES

The driver and right front passenger seatbelt upper anchorages were positioned in the uppermost position of 4 positions

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

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

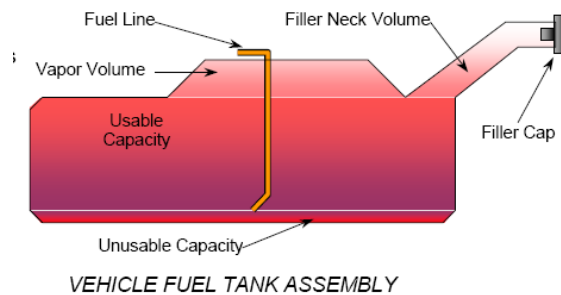
Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	62.5
Usable Capacity of "Optional Tank"	NA
92%-94% of Usable Capacity	57.5 - 58.7
Actual Amount of Solvent Used	58.0
1/3 of Usable Capacity	20.8

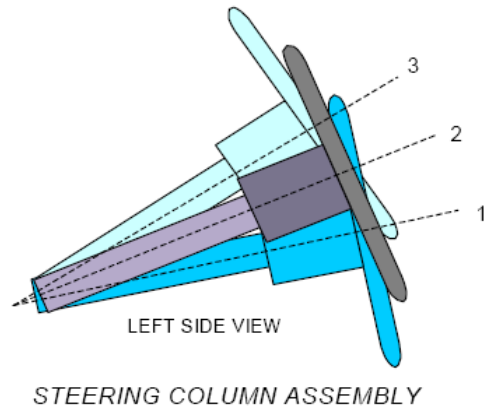
FUEL PUMP

Fuel evacuated according to specifications provided
 In Form 1 by the vehicle manufacturer



STEERING COLUMN ADJUSTMENT

Steering column adjusted to the midpoint of tilt.
 range and midpoint of telescoping travel range

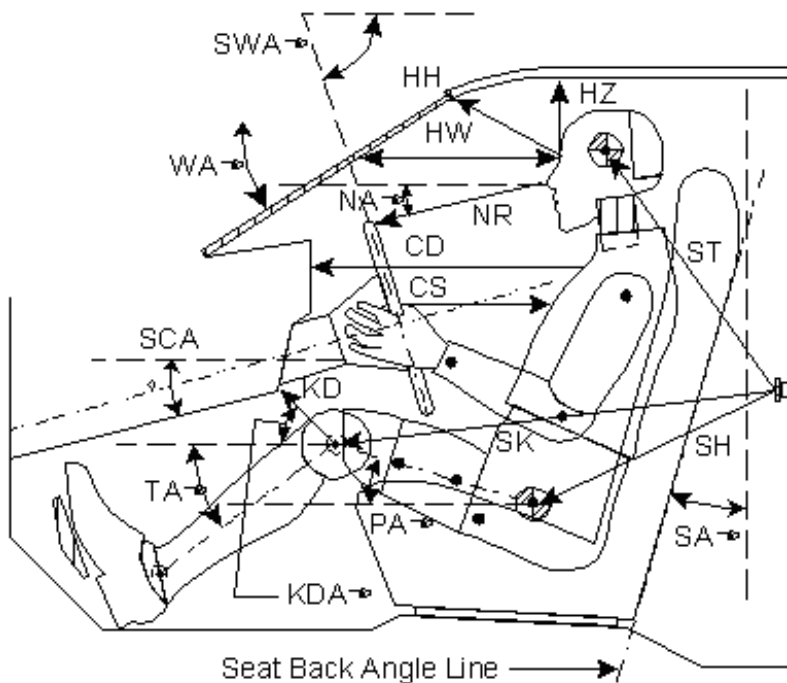


STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1	-	
Geometric center position No. 2	67	
Uppermost position No. 3	-	
Telescoping Steering Wheel Travel		30
Test Position	67	15

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

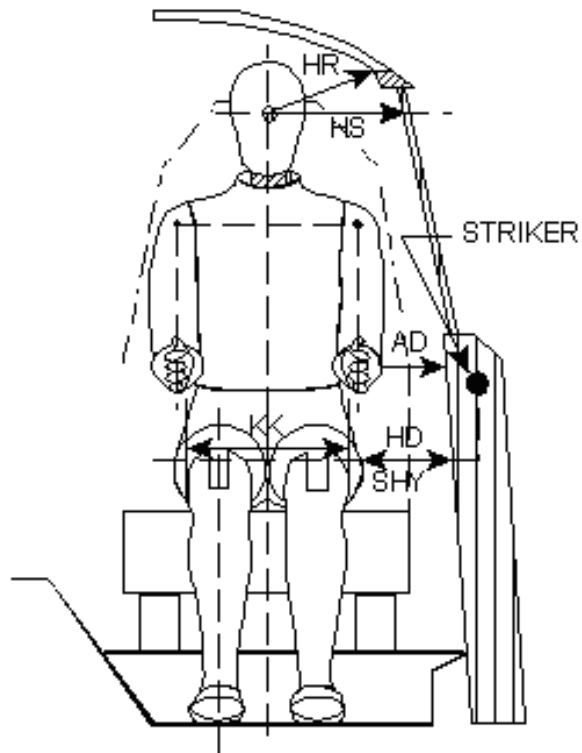
Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		27		
SWA°	Steering Wheel Angle		67		
SCA°	Steering Column Angle		16		
SA°	Seat Back Angle (on headrest post)		11		14
HZ	Head to Roof (Z)	187	90	240	90
HH	Head to Header	300	26	290	40
HW	Head to Windshield	590	0	676	0
NR	Nose to Rim	349	-7	483	-23
CD	Chest to Dash	535		461	
CS	Chest to Steering Hub	289	0		
RA	Rim to Abdomen	174	0		
KDL	Left Knee to Dash	170	18	107	26
KDR	Right Knee to Dash	148	20	103	27
PA°	Pelvic Angle		25		21
TA°	Tibia Angle		50		49
SK	Striker to Knee	546	1	643	-6
ST	Striker to Head	510	81	458	62
SH	Striker to H-Point	197	157	348	-20

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

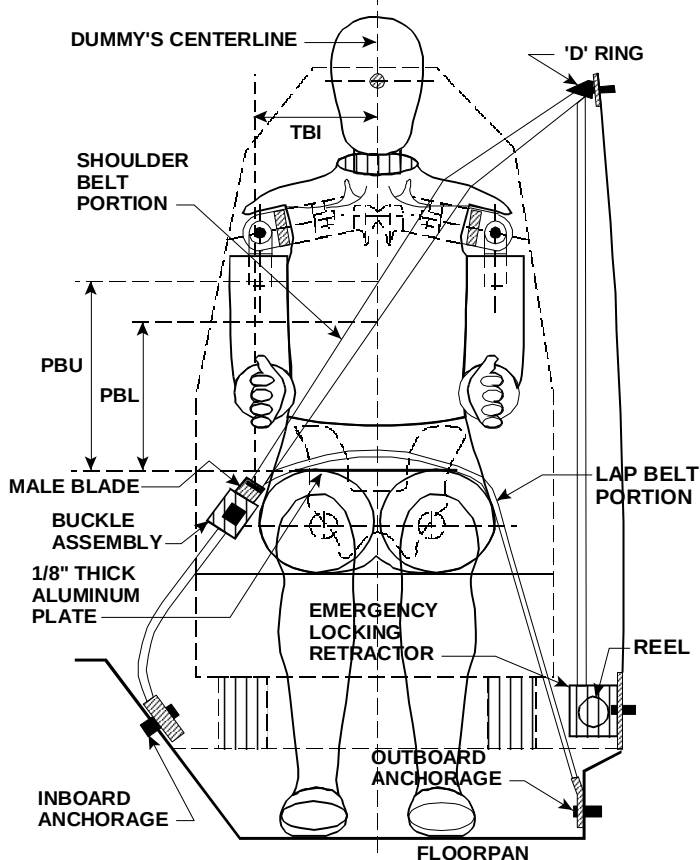


Code	Description	Driver	Passenger
AD	Arm to Door	32	96
HD	H-Point to Door	146	167
HR	Head to Side Header	204	261
HS	Head to Side Window	272	370
KK	Knee to Knee	302	162
SHY	Striker to H-Point (Y Direction)	255	295
AA	Ankle to Ankle	295	175

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

SEAT BELT POSITIONING DATA



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of aluminum plate to belt upper edge	mm	335	310
PBL — Top surface of aluminum plate to belt lower edge	mm	260	243

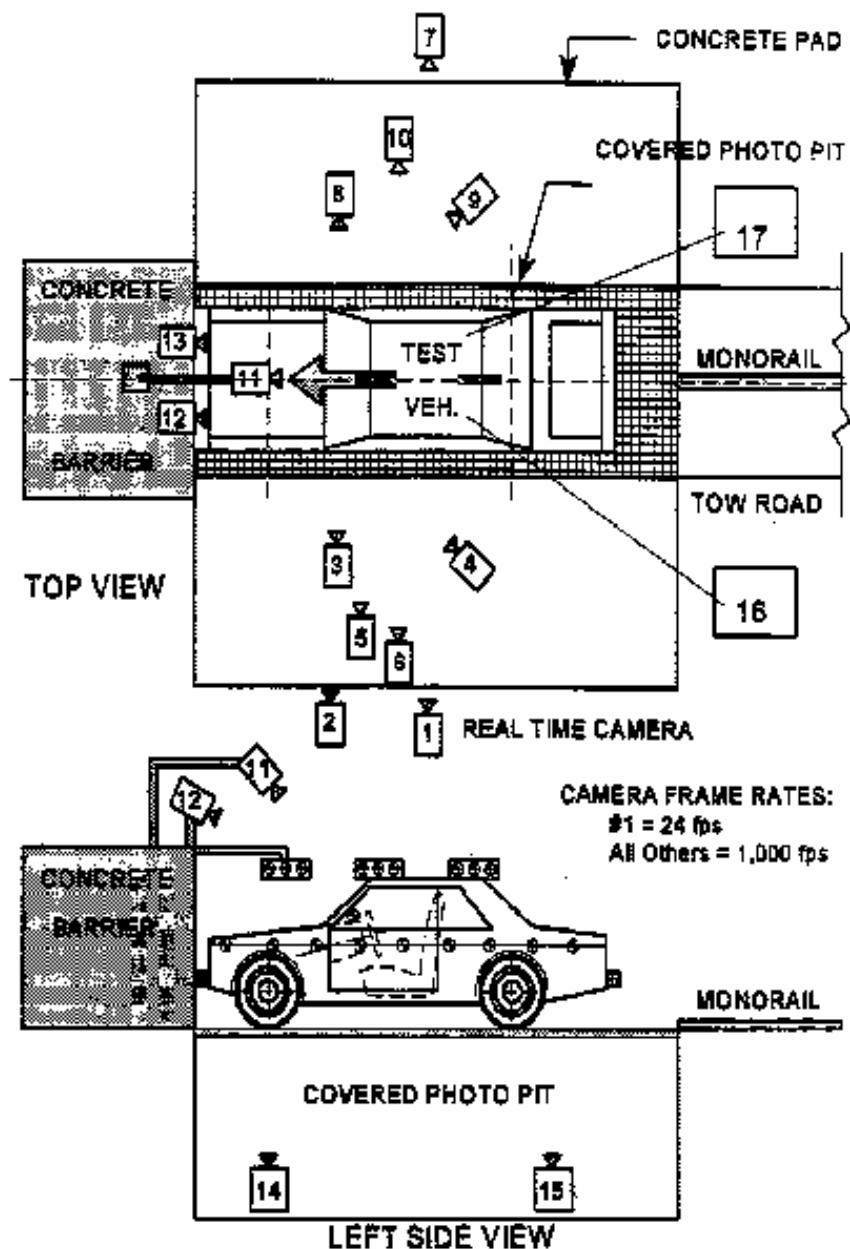
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	865	950
Lap Belt Length as measured on ATD	mm	770	630
Remainder of belt on reel	mm	160	160
Total belt length for continuous webbing systems	mm	1795	1740

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

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

CAMERA LOCATIONS

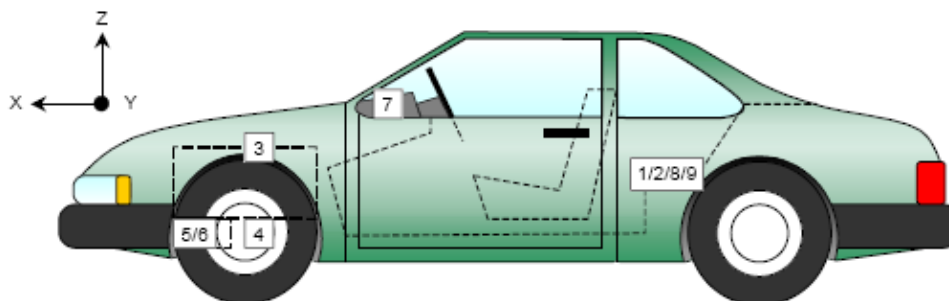
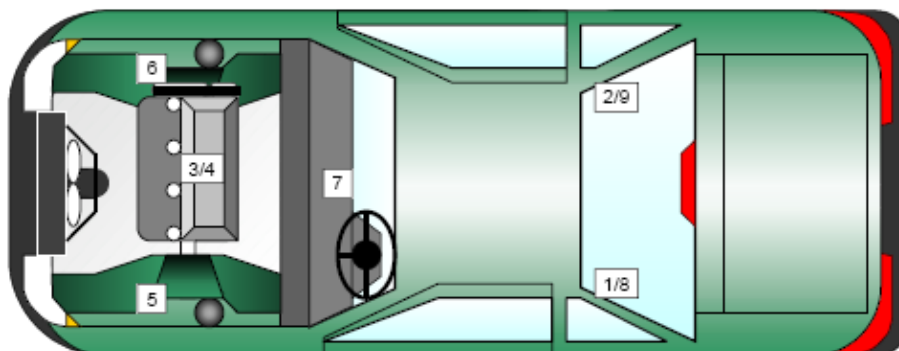
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Camera	-	-	-	-	24
2	Driver Left Side View	1680	1760	1120	50	1000
3	Left Side View	850	790	940	50	1000
4	Overall Right Side	750	3730	1890	50	1000
5	Steering Column (Bottom)	710	1955	1205	28 - 70	1000
6	Steering Column (Top)	710	1955	1825	24 - 70	1000
7	Driver and Interior View	550	3730	1890	50	1000
8	Right Side View	1200	1270	940	50	1000
9	Right Passenger View	370	1910	1170	50	1000
10	Pass. And Interior View	240	3870	1790	50	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	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

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

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	1835	-638	380
2	Right Rear X-Member X	1842	641	379
3	Engine Top X	3948	338	810
4	Engine Bottom X	4406	317	225
5	Left Brake Caliper X	4001	-806	349
6	Right Brake Caliper X	4001	802	346
7	Instrument Panel X	-	-	-
8	Left Rear X-Member Z	1835	-638	380
9	Right Rear X-Member Z	1842	641	379

Reference Points:

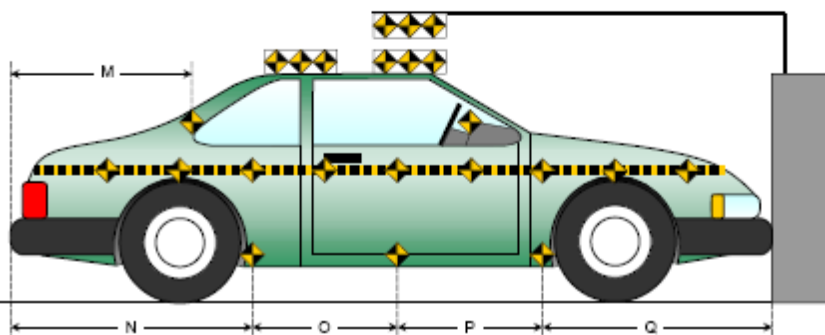
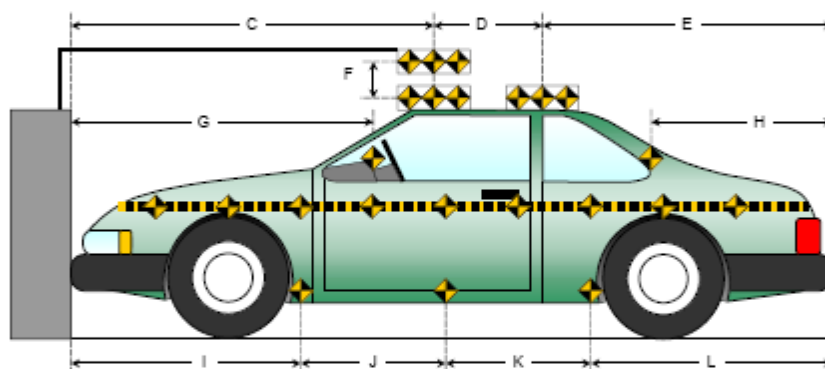
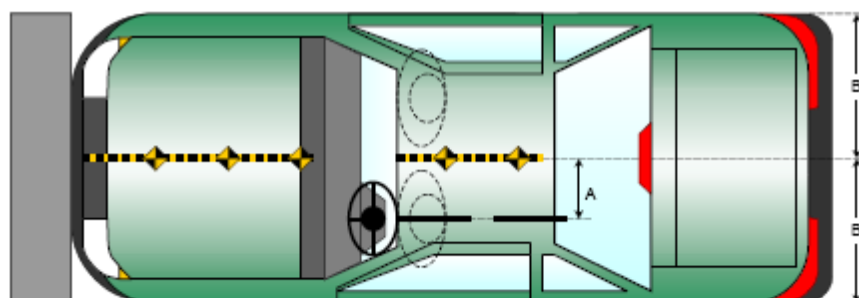
- X – Rear Surface of Vehicle (+ forward)
- Y – Vehicle Centerline (+ to right)
- Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

Item	Value
A	384
B	907
C	2139
D	1219
E	1483
F	NA
G	1842
H	1177
I	1460
J	908
K	908
L	1565
M	1183
N	1568
O	909
P	907
Q	1456

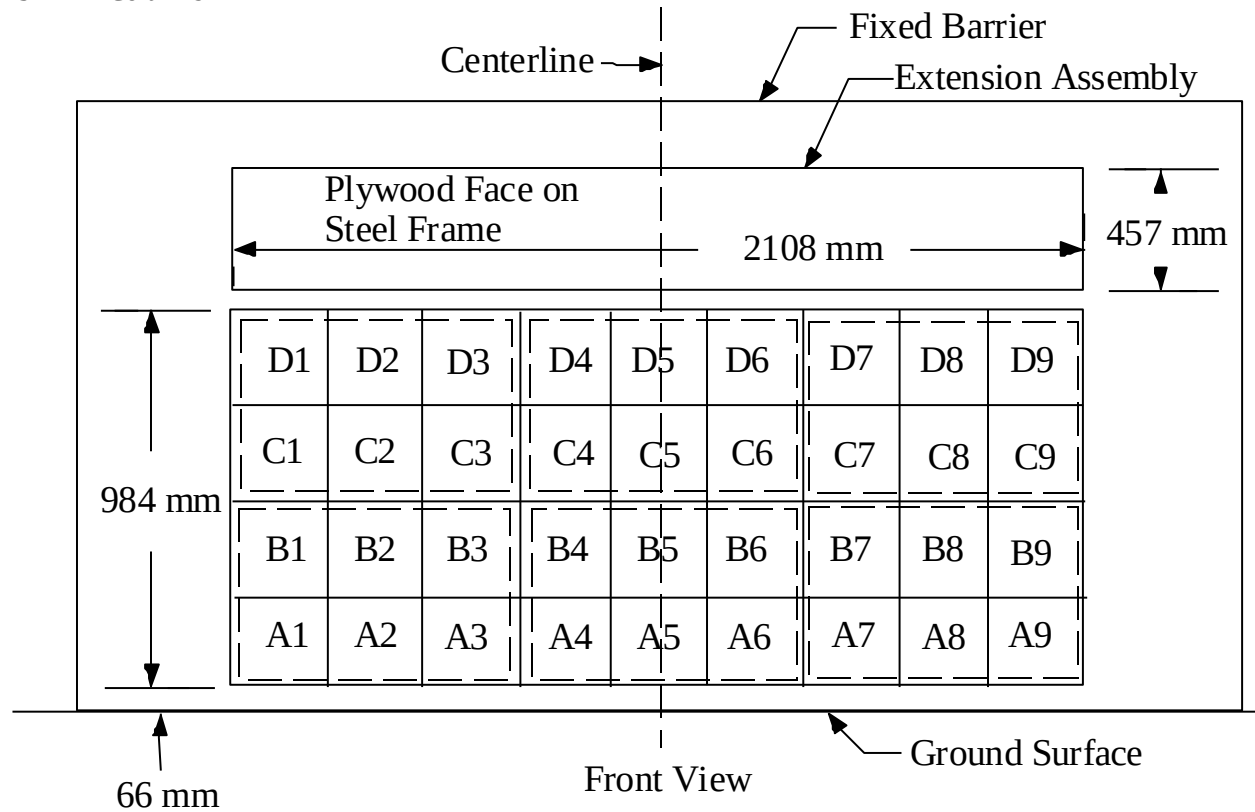
All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

36 Load Cells
 4 Rows
 9 Columns



DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

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 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	061	273
Head Contact	Frontal Airbag	Frontal Airbag
Upper Torso Contact	Frontal Airbag	Frontal Airbag
Lower Torso Contact	Frontal Airbag	Frontal Airbag
Left Knee Contact	Lower Dash Panel	Glove Box Door
Right Knee Contact	Lower Dash Panel	Glove Box Door

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	48	52
Seat Back Failure	None	None
Glazing Damage	Glazing Cracked from Passenger Airbag Deployment	

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Glazing cracked from passenger airbag deployment
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

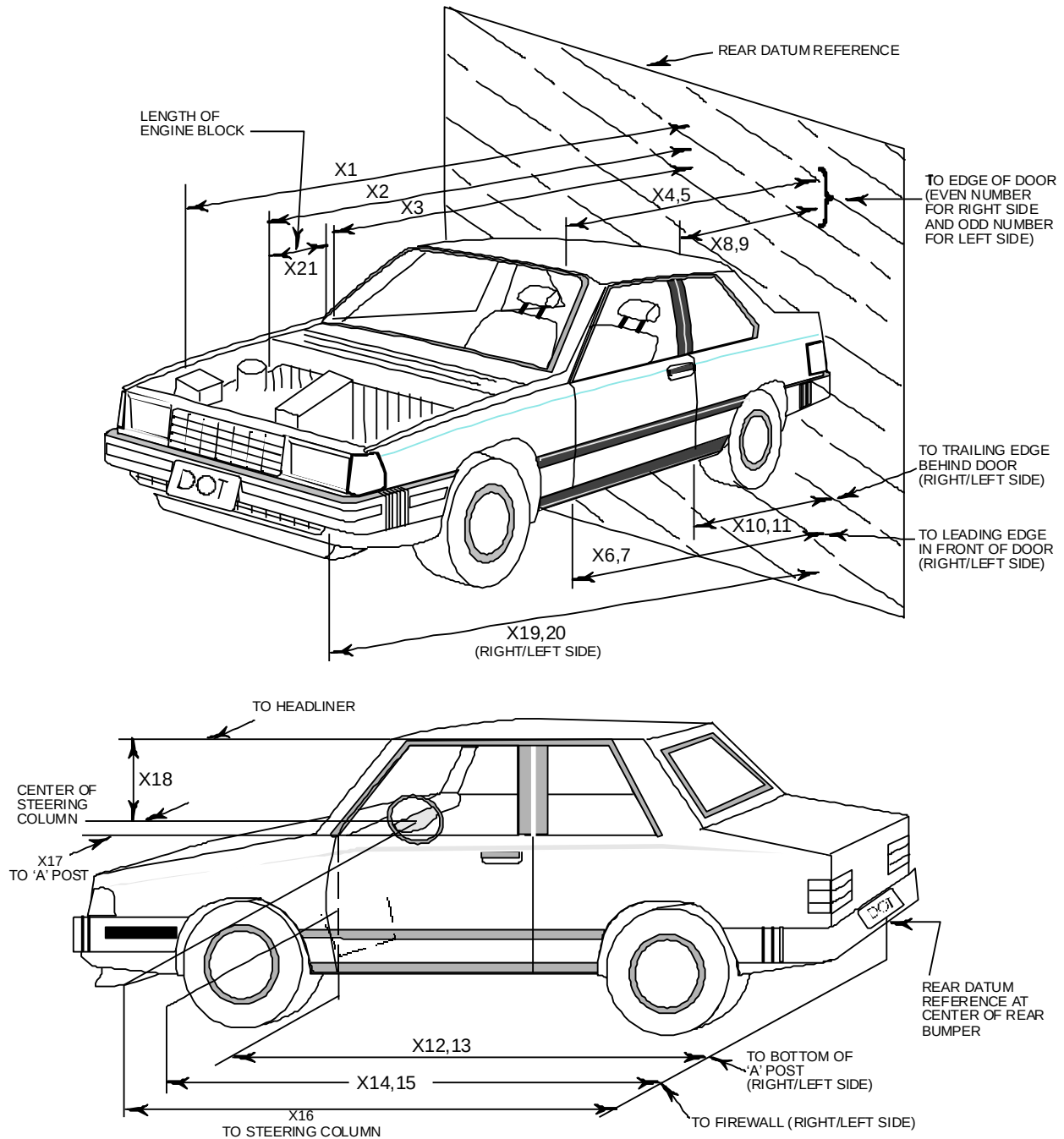
Measured Parameter	Units	Value
Left Side	mm	375
Center	mm	330
Right Side	mm	376
Average	mm	360

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/Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	No	NA	No	NA
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other	NA	NA	NA	NA

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4841	4328	-512
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4349	4042	-307
3	RSOV to Firewall	3715	3513	-202
4	RSOV to Upper Leading Edge of Right Door	3357	3346	-12
5	RSOV to Upper Leading Edge of Left Door	3357	3346	-11
6	RSOV to Lower Leading Edge of Right Door	3367	3364	-3
7	RSOV to Lower Leading Edge of Left Door	3365	3359	-6
8	RSOV to Upper Trailing Edge of Right Door	2237	2239	3
9	RSOV to Upper Trailing Edge of Left Door	2238	2230	-8
10	RSOV to Lower Trailing Edge of Right Door	2287	2287	0
11	RSOV to Lower Trailing Edge of Left Door	2286	2285	-2
12	RSOV to Bottom of "A" Post of Right Side	3335	3331	-4
13	RSOV to Bottom of "A" Post of Left Side	3336	3322	-14
14	RSOV to Firewall, Right Side	3744	3547	-197
15	RSOV to Firewall, Left Side	3730	3564	-165
16	RSOV to Steering Column	2840	2864	24
17	Center of Steering Column to "A" Post	285	247	-38
18	Center of Steering Column to Headliner	417	435	18
19	RSOV to Right Side of Front Bumper	4233	4139	-94
20	RSOV to Left Side of Front Bumper	4231	4157	-74
21	Length of Engine Block	574	513	-61
RD	RSOV to Right Side of Dash Panel	3064	3057	-7
CD	RSOV to Center of Dash Panel	3032	2974	-58
LD	RSOV to Left Side of Dash Panel	3064	3050	-14

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

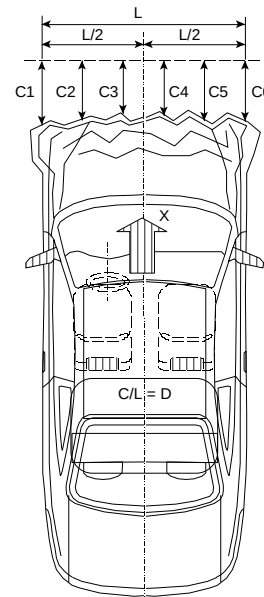
Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

VEHICLE INFORMATION

VIN	3FAHP0DC5BR132649	Wheelbase (mm)	2730
Vehicle Size Category	4 Door Sedan	Test Weight (kg)	1899

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): 56.33
 Velocity Change (km/h): 67.2
 Time of Separation (msec): 320



CRUSH PROFILE

Collision Deformation Classification: 12FDEW4
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1381
 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4603	4236	-367
C2	Crush zone 2 at left side	mm	4774	4324	-450
C3	Crush zone 3 at left side	mm	4834	4363	-471
C4	Crush zone 4 at right side	mm	4833	4346	-487
C5	Crush zone 5 at right side	mm	4771	4298	-473
C6	Crush zone 6 at right side	mm	4604	4235	-369
L	C1 to C6	mm	1381	1498	117

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

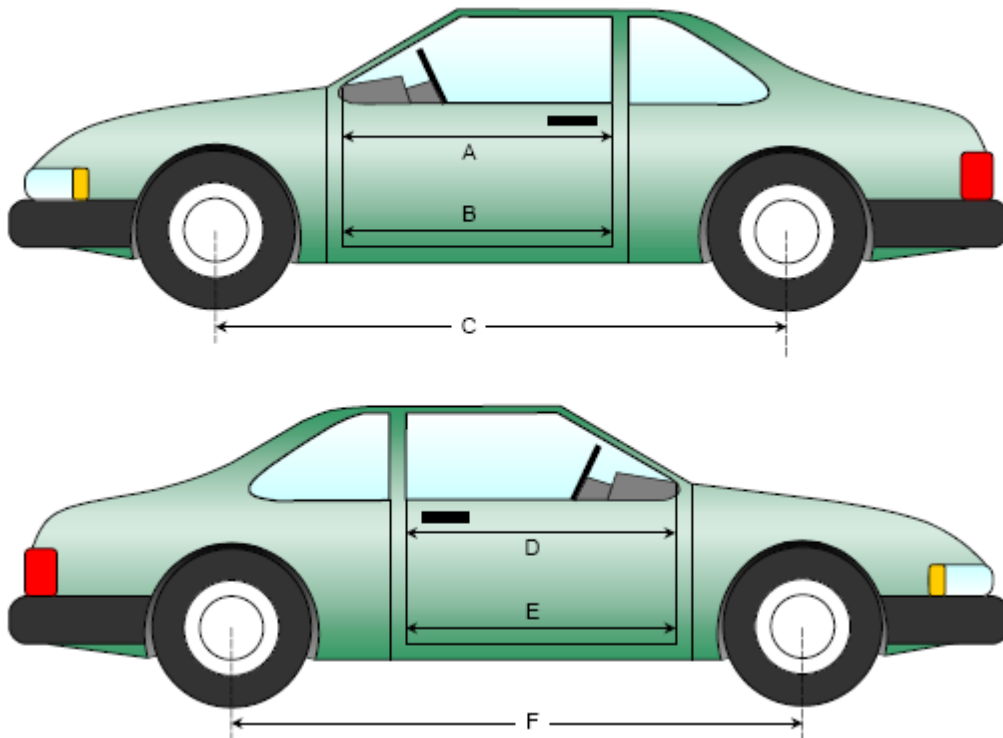
Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	984	981	-3
B	Left Side Lower	mm	931	932	1
D	Right Side Upper	mm	985	982	-3
E	Right Side Lower	mm	926	923	-3

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2730	2665	-66
F	Right Side Wheelbase	mm	2730	2658	-73



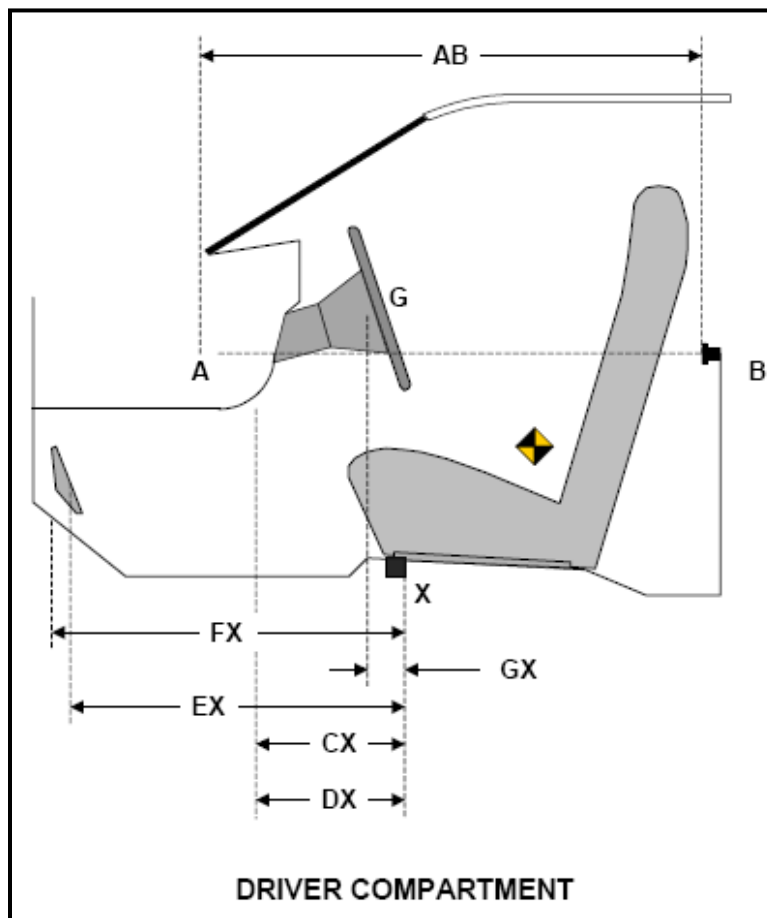
DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

DRIVER COMPARTMENT INTRUSION

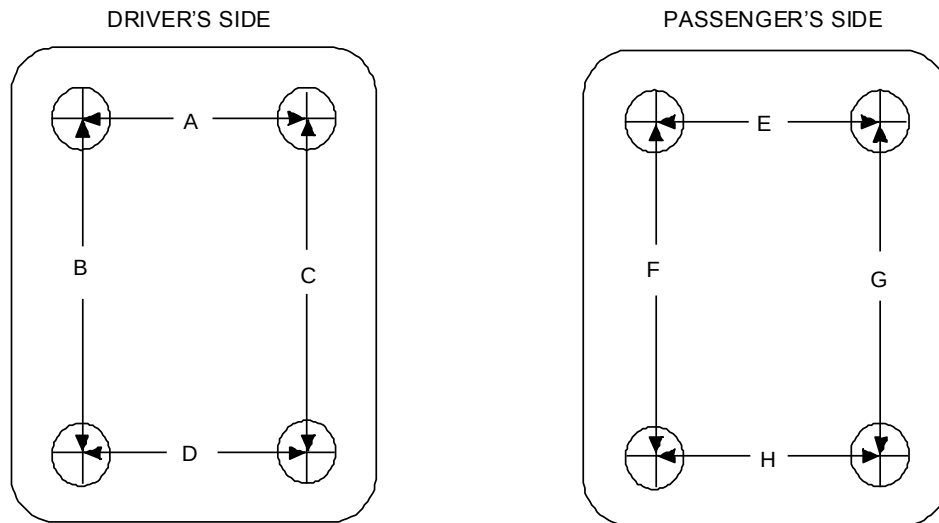
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	755	753	-2
CX	Left Knee Bolster to X	mm	301	237	-64
DX	Right Knee Bolster to X	mm	285	210	-75
EX	Brake Pedal to X	mm	586	529	-57
FX	Foot Rest to X	mm	606	542	-64
GX	Center of Steering Column Wheel Hub to X	mm	63	49	-14

X = Front of Seat Track (Stationary)



DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010



TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	458	436	-22
B	328	332	3
C	320	294	-26
D	449	425	-24
E	445	422	-23
F	240	240	0
G	237	206	-31
H	443	428	-15

All units in millimeters

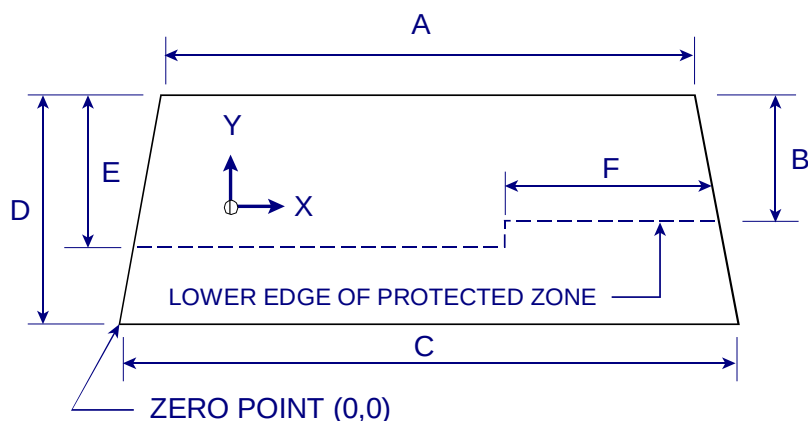
DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle:	2011 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010

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	2095	2095	100%
Right Side	2095	2095	100%
Total	4190	4190	100%



Item	Units	Value
A	mm	1150
B	mm	452
C	mm	1490
D	mm	775
E	mm	524
F	mm	480

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 Ford Fusion</u>	NHTSA No:	<u>MB0217</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>11/3/2010</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

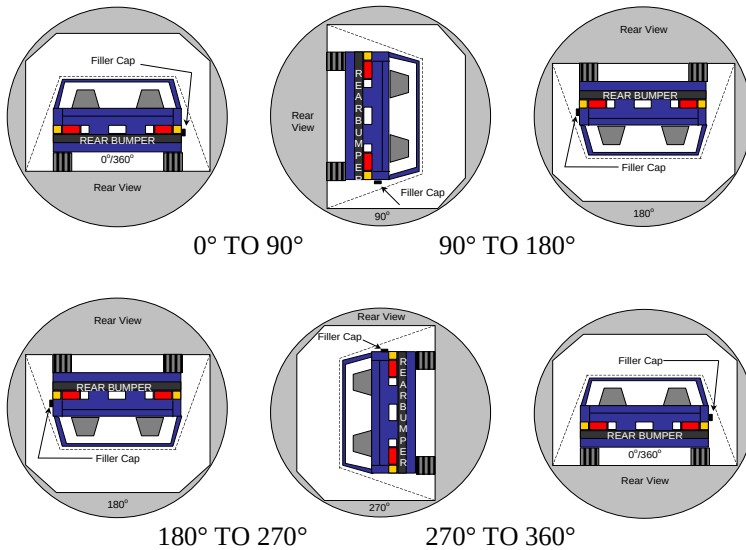
Temperature at Time of Impact: 22° C Test Time: 2:00 pm

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 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010



1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
2. Details of Stoddard Solvent spillage:
None

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	1:11	5:00	6:11
90° to 180°	1:04	5:00	6:04
180° to 270°	1:01	5:00	6:01
270° to 360°	1:08	5:00	6:08

FMVSS 301 SPILLAGE TABLE

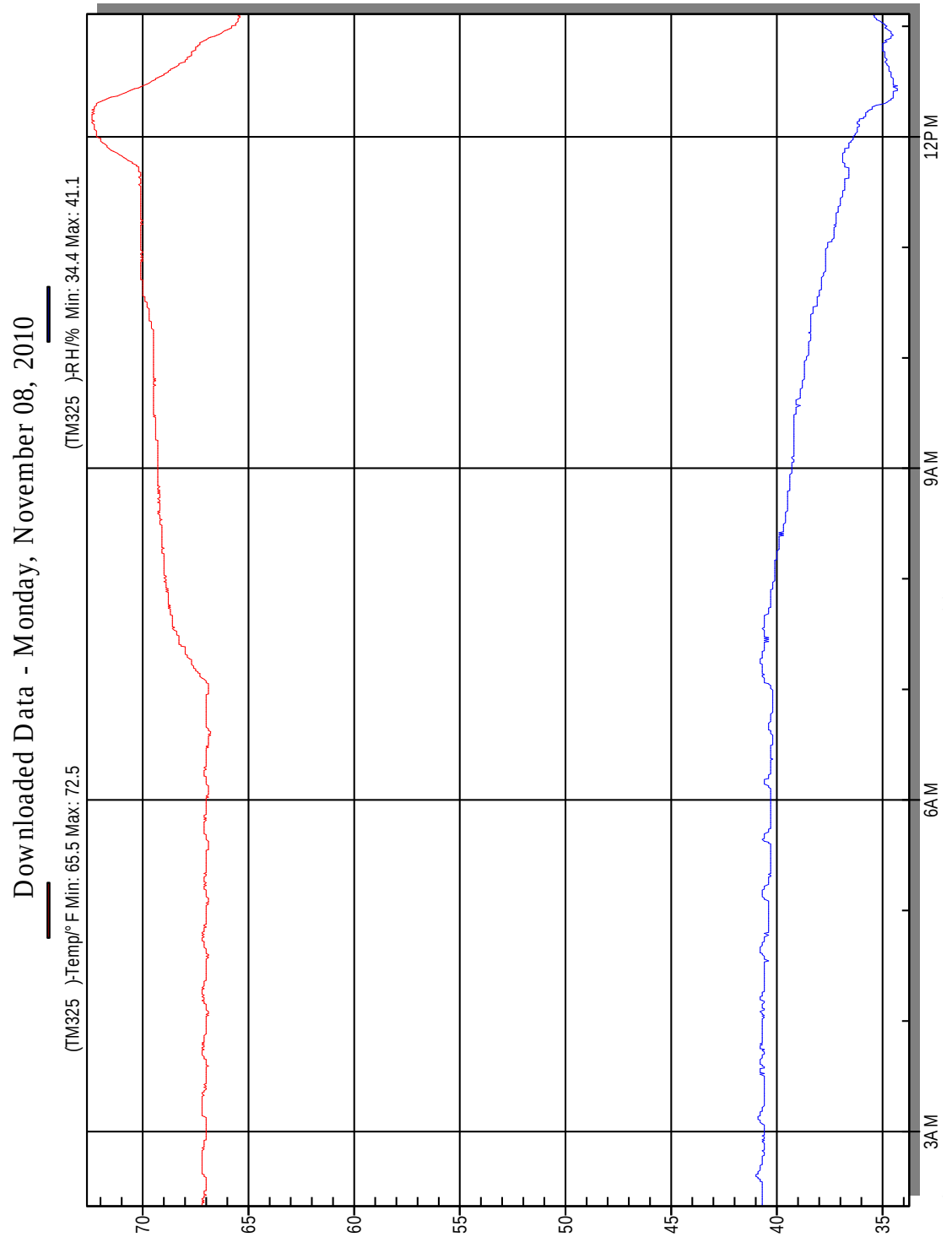
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	NA	
90° to 180°	0	0	NA	
180° to 270°	0	0	NA	
270° to 360°	0	0	NA	

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 Ford Fusion	NHTSA No:	MB0217
Test Program:	Frontal NCAP	Test Date	11/3/2010



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS		
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4	Tire Placard	A-6
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6	Left Rear $\frac{3}{4}$ View, as Received	A-7
7	Pre-test Front View of Test Vehicle	A-8
8	Post-test Front View of Test Vehicle	A-8
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25	Pre-test Rear Underbody View	A-17
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42	Post-test Driver's Side Floorpan	A-25
43	Post-test Driver Dummy Contact With Airbag	A-26
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44	Pre-test View of the Steering Column Shear Capsule	A-27
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53	Post-test Passenger's Seat Fore-Aft Markings	A-31
54	Pre-test Passenger Dummy Feet	A-32
55	Post-test Passenger Dummy Feet	A-32
56	Pre-test Passenger's Side Knee Bolster	A-33
57	Post-test Passenger's Side Knee Bolster	A-33
58	Pre-test Passenger's Side Floorpan	A-34
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60	Post-test Passenger Dummy Contact With Airbag	A-35
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63	Post-test Speed Trap Read-out	A-37
64	Vehicle at 0° on Static Rollover Device	A-37
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66	Vehicle at 180° on Static Rollover Device	A-38
67	Vehicle at 270° on Static Rollover Device	A-39
68	Vehicle at 360° on Static Rollover Device	A-39
69	Impact Photograph (video still)	A-40
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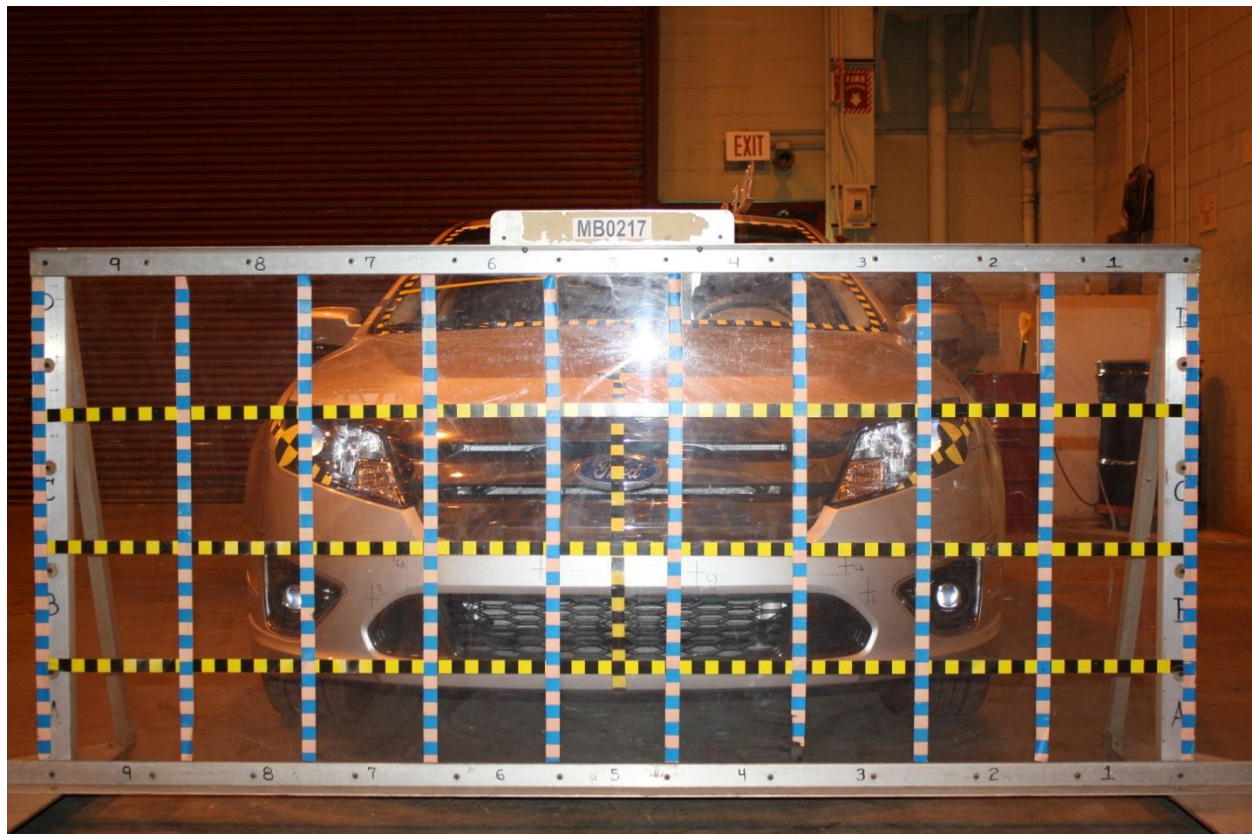


Figure A-1: Load Cell Location



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

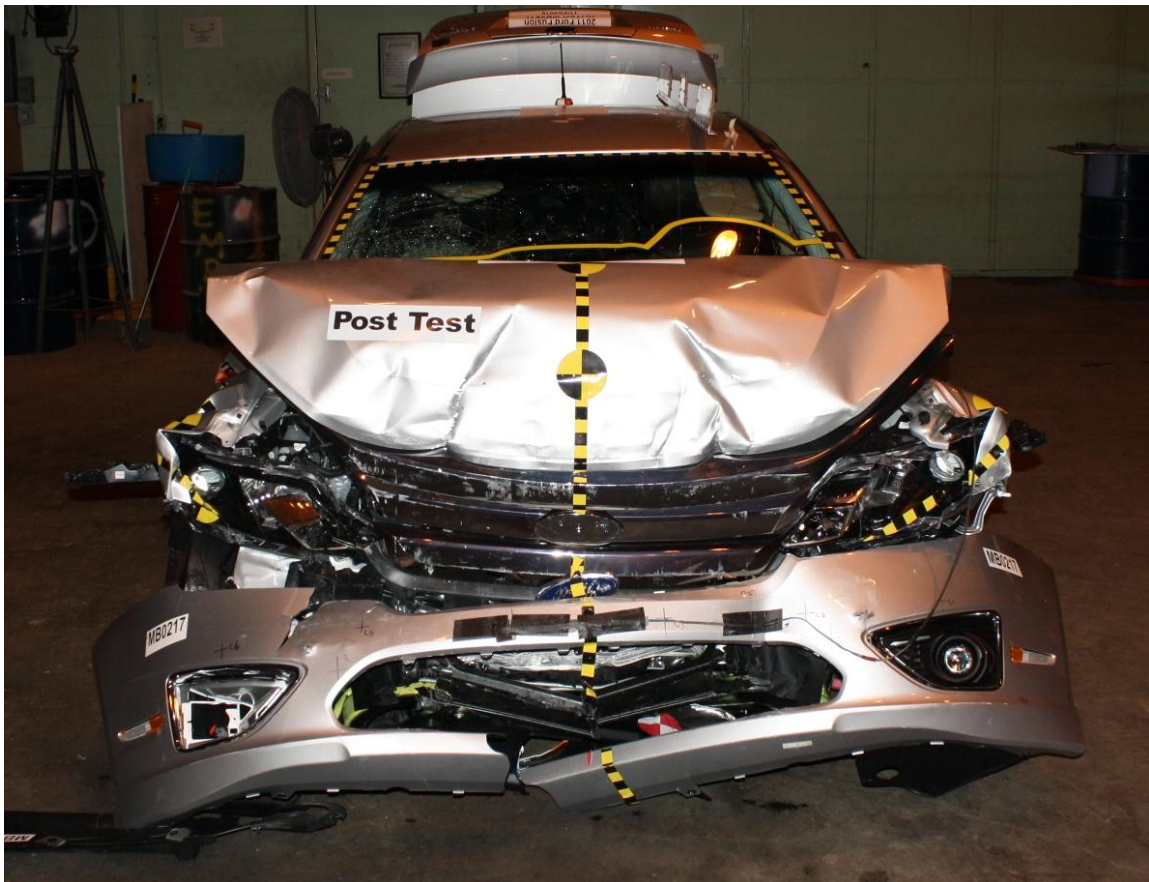


Figure A-8: Post-Test Front View of Test Vehicle



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

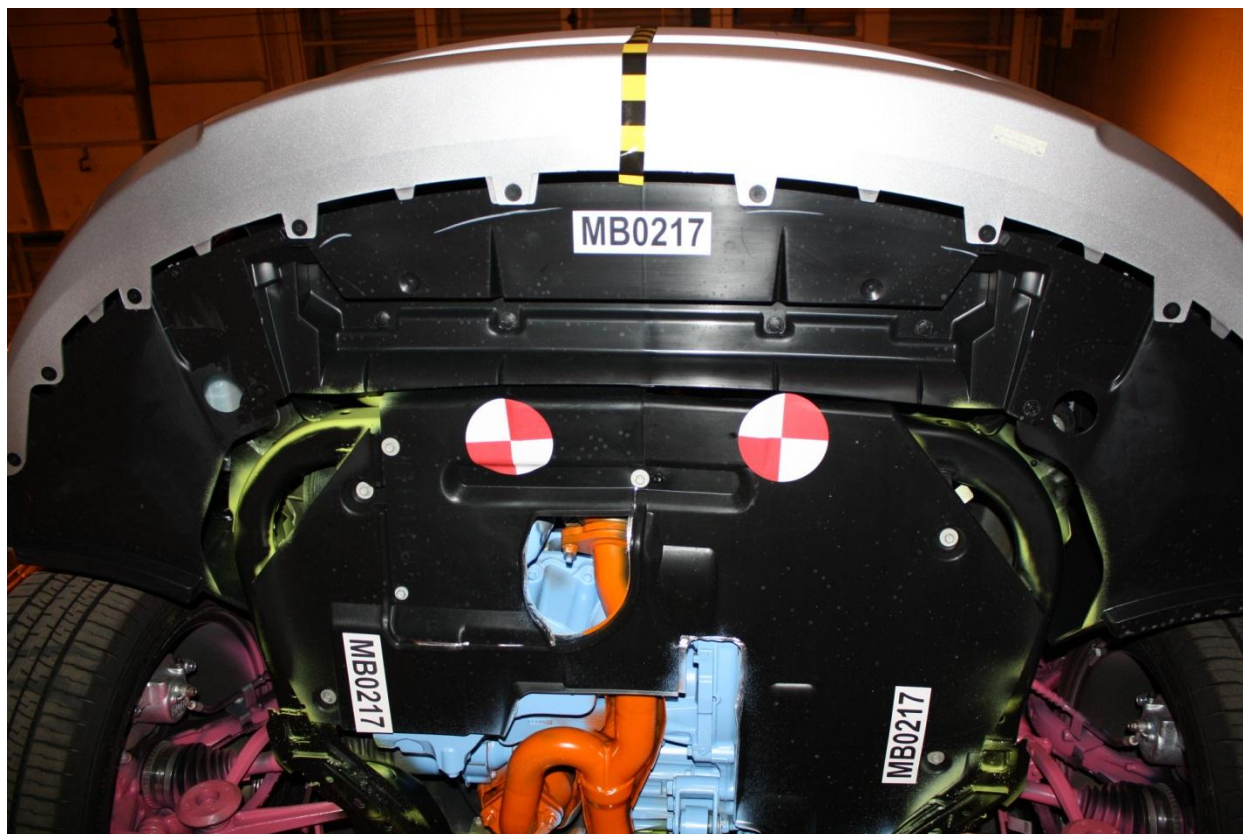


Figure A-23: Pre-Test Front Underbody View



Figure A-24: Post-Test Front Underbody View

Photo Not Available

Figure A-25: Pre-Test Rear Underbody View



Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing



Figure A-28: Post-Test Dummy Cable Routing



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



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

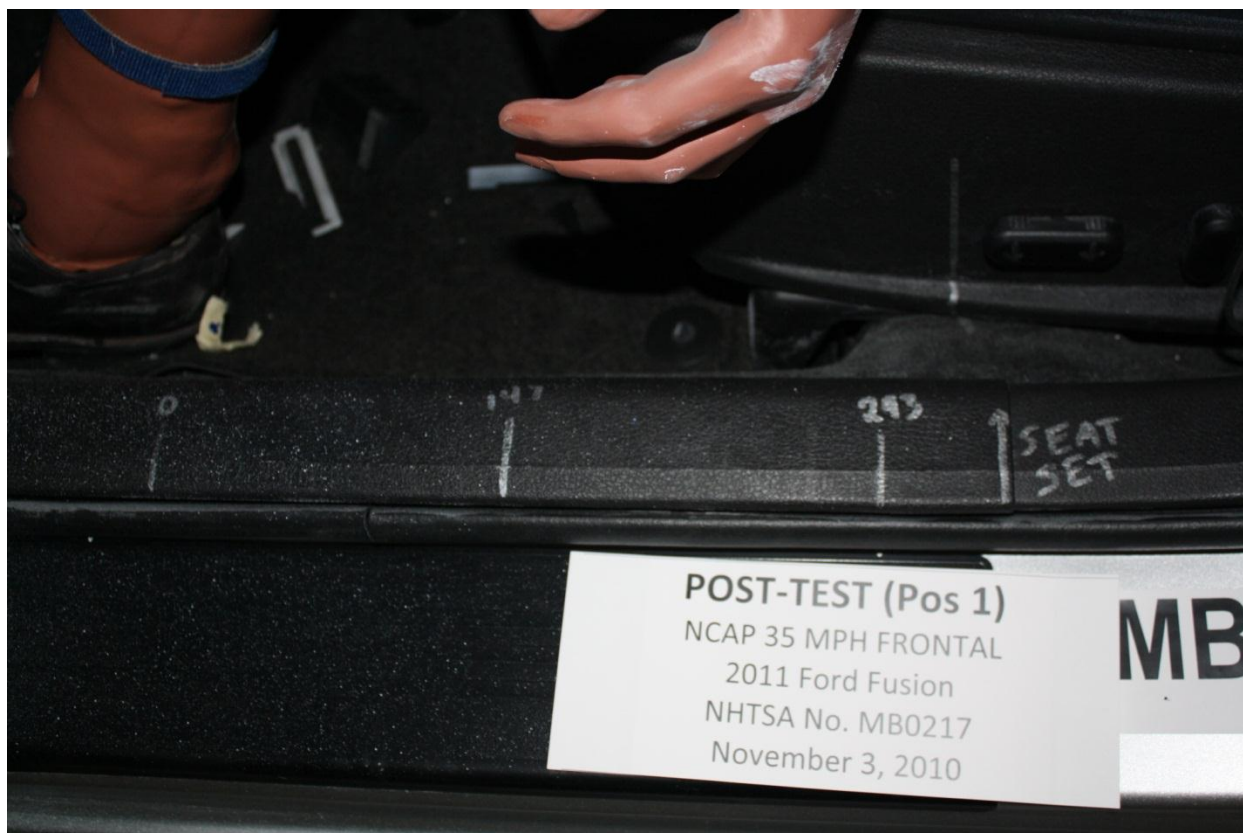


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



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

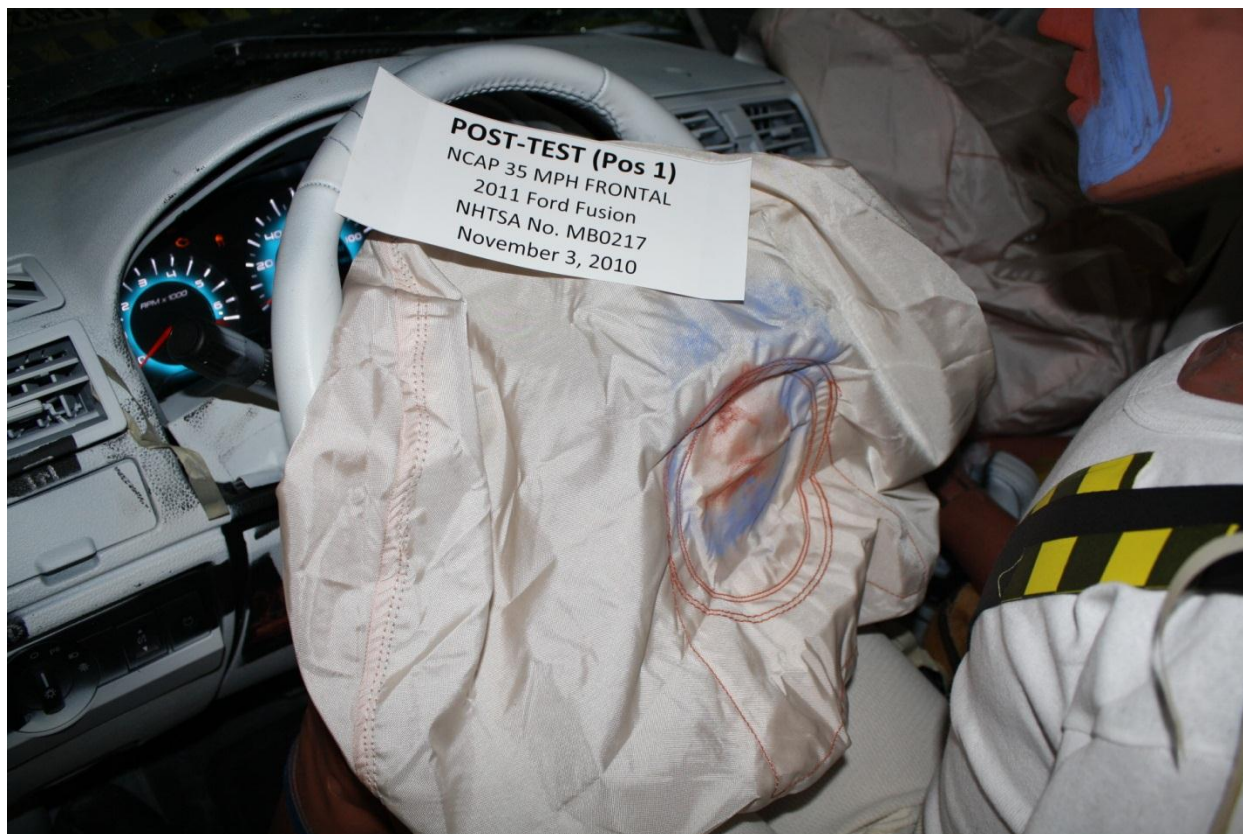


Figure A-43a: Post-Test Driver Dummy Contact with Airbag



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

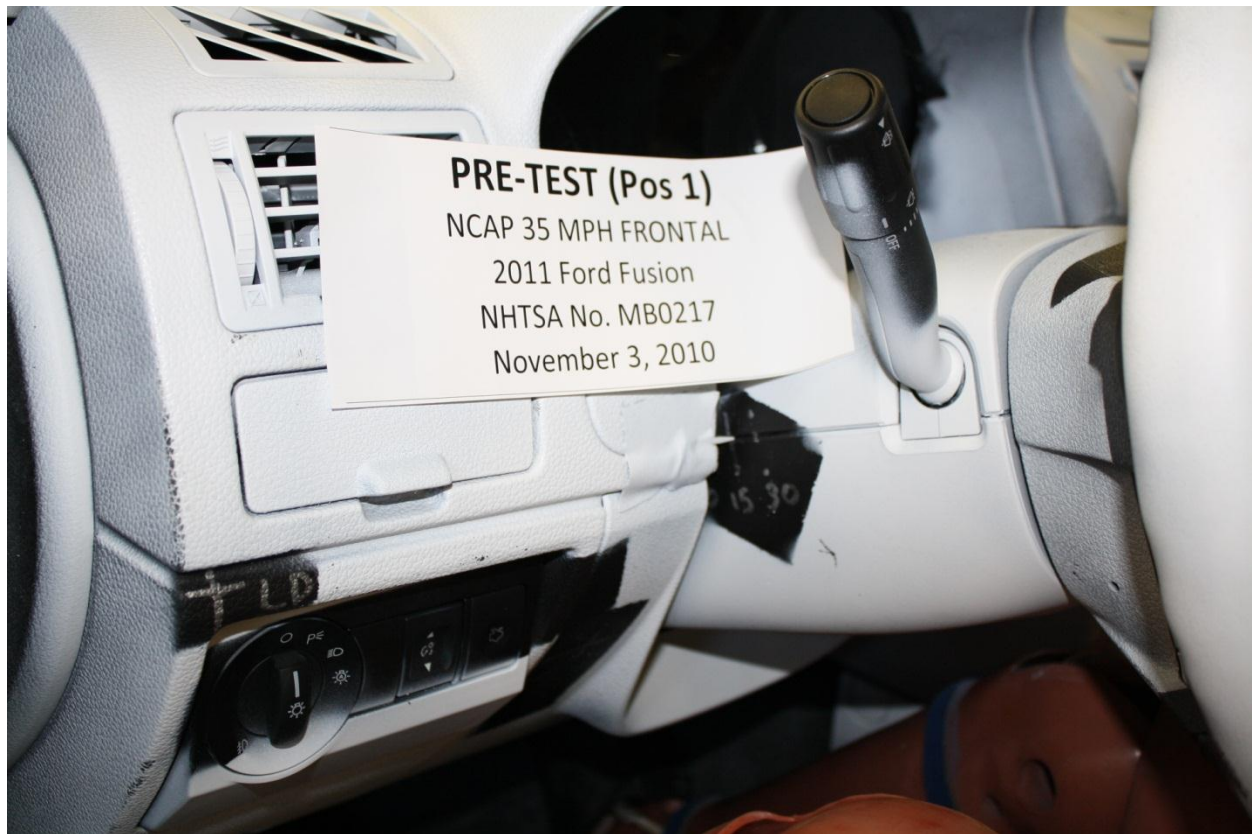


Figure A-44: Pre-Test View of the Steering Column Shear Capsule

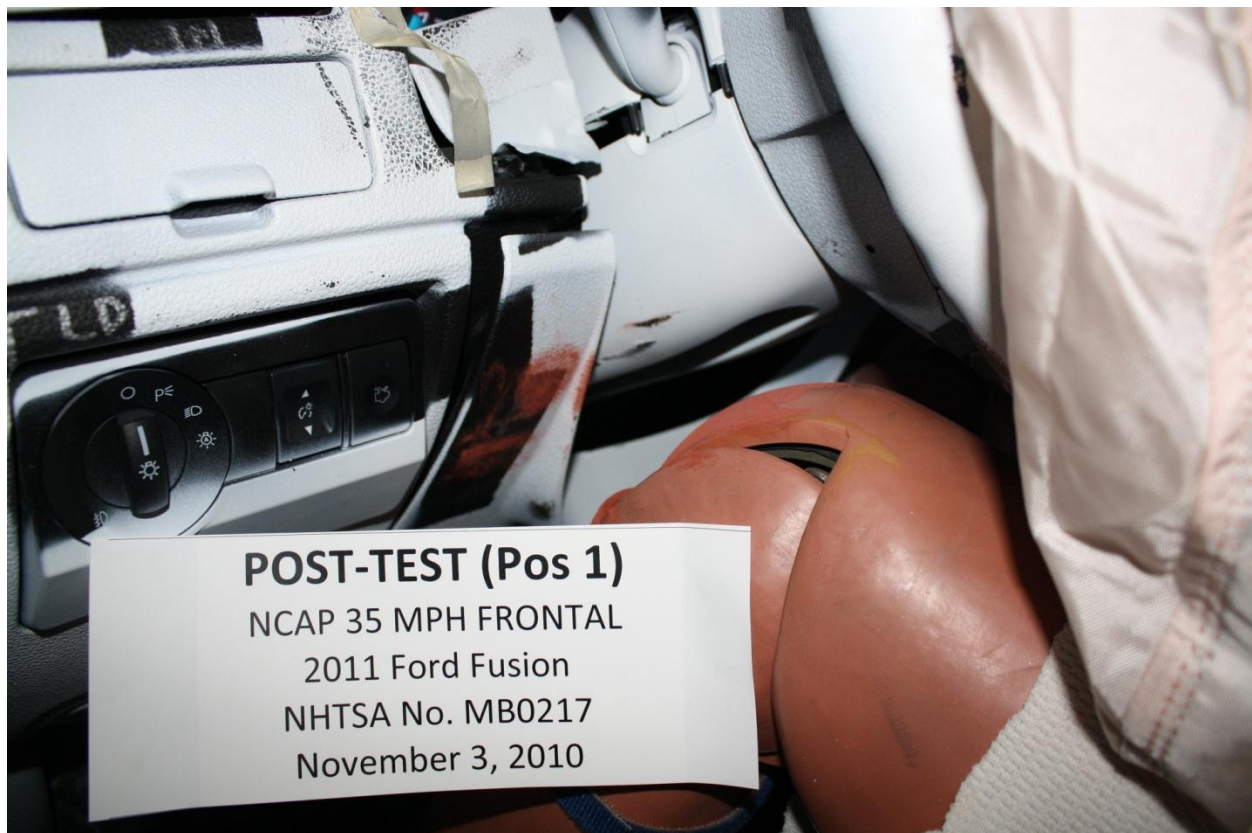


Figure A-45: Post-Test View of the Steering Column Shear Capsule



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

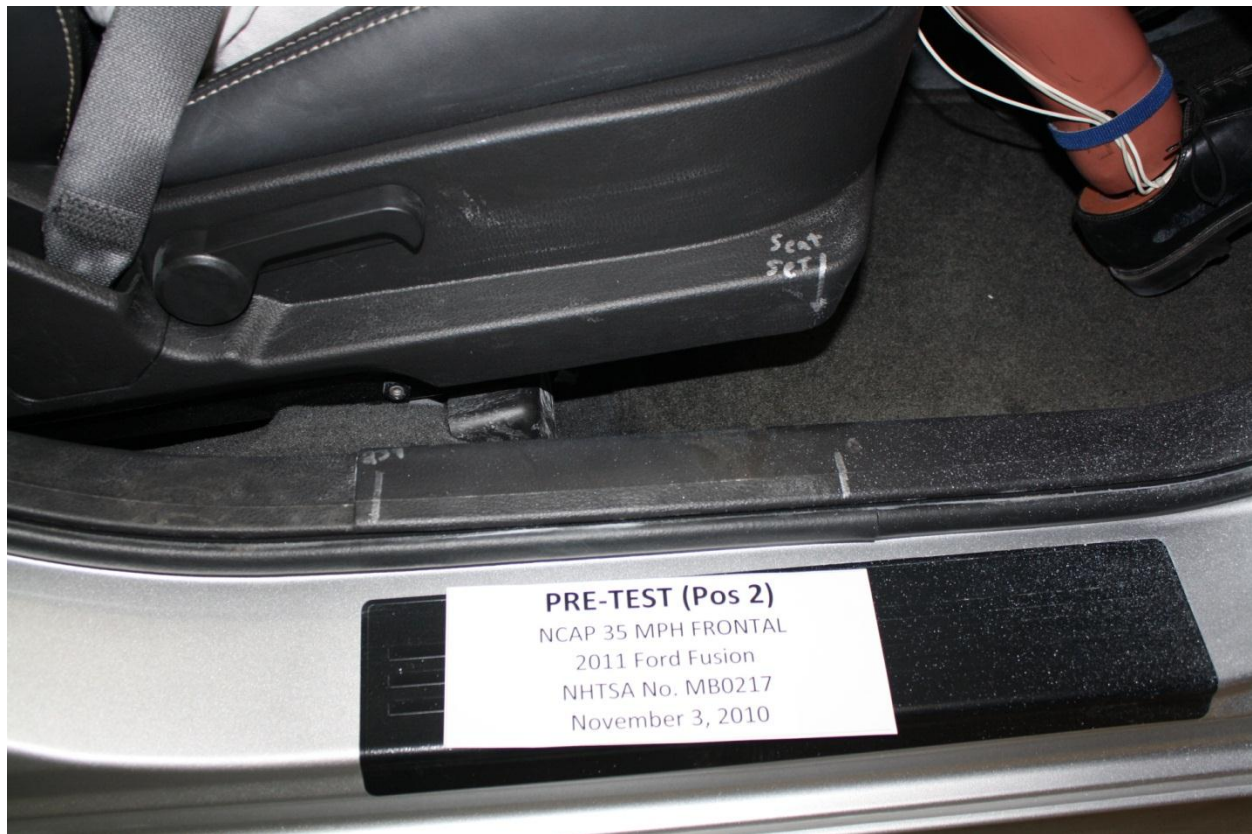


Figure A-52: Pre-Test Passenger's Seat Fore-Aft Markings

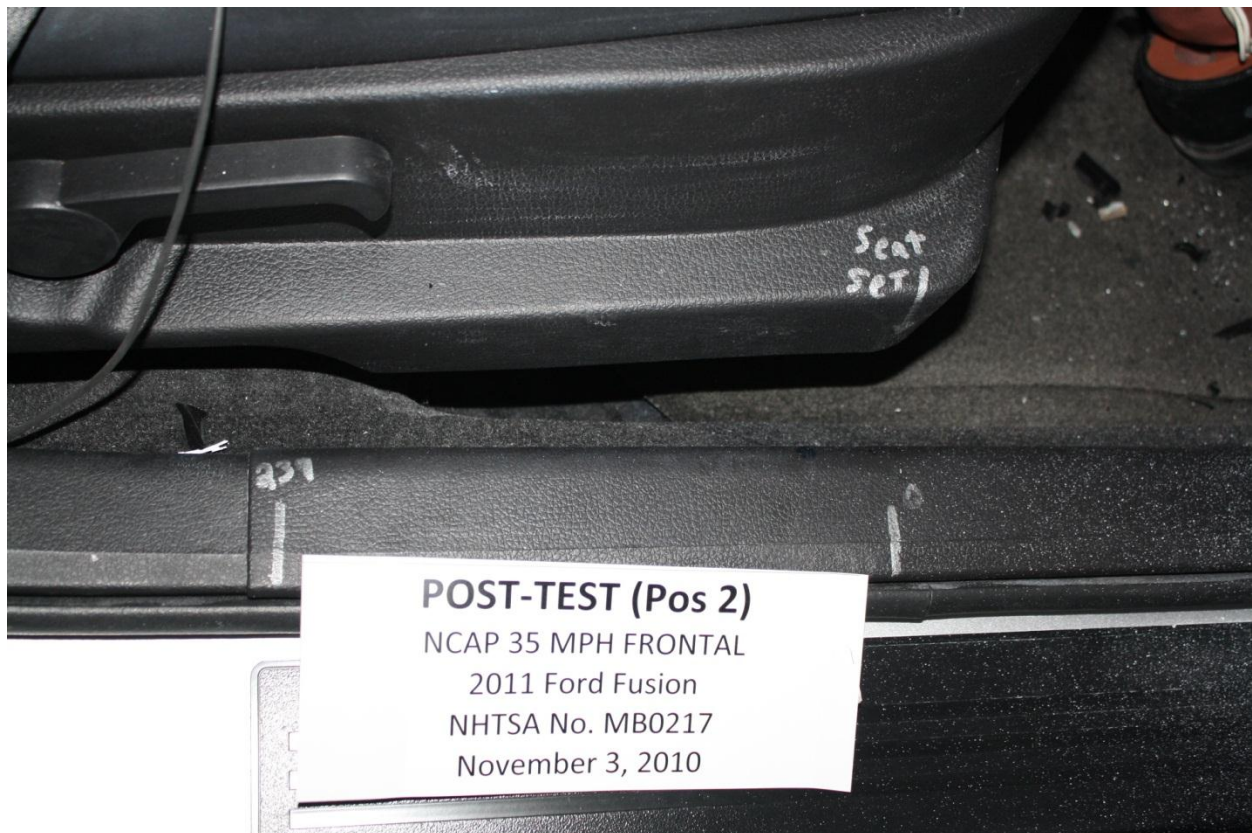


Figure A-53: Post-Test Passenger's Seat Fore-Aft Markings



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

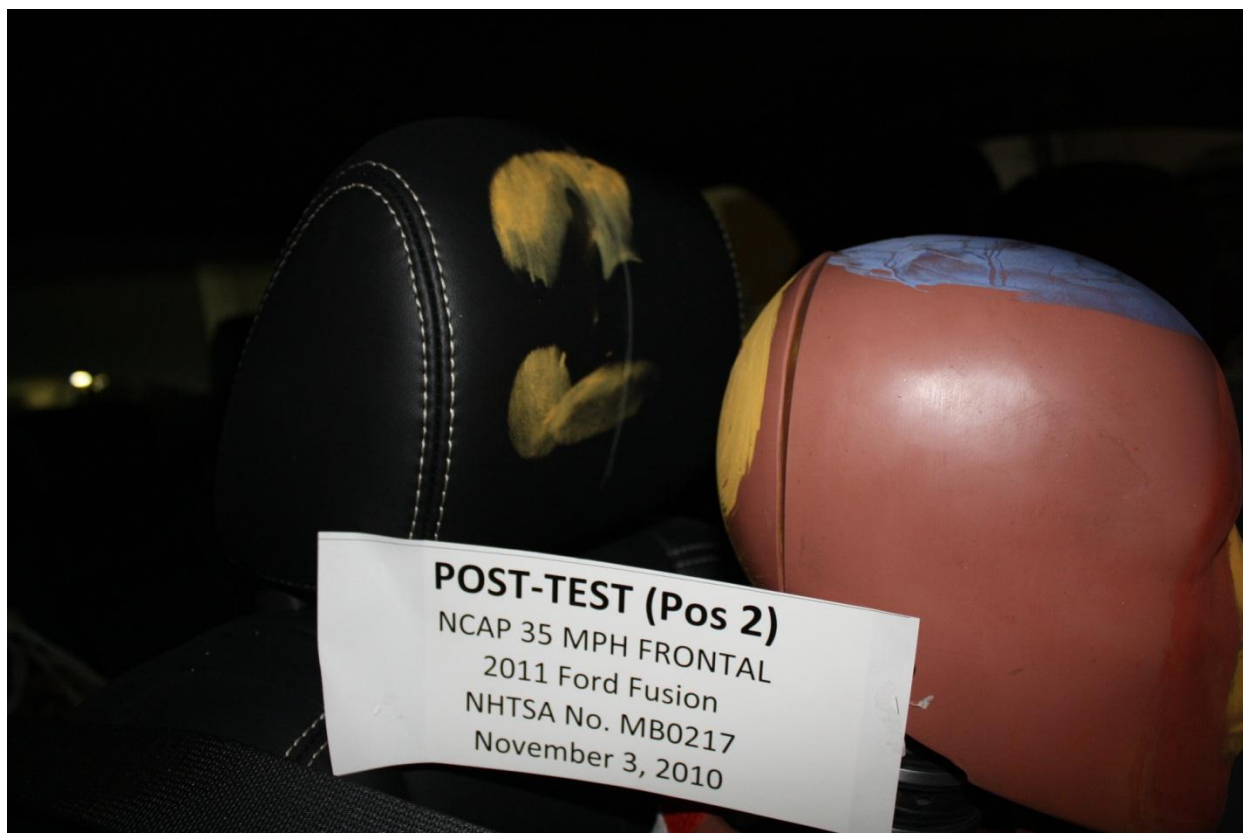


Figure A-60b: Post-Test Passenger Dummy Contact with Head Restraint



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

FORD		FUSION		2011 FUSION SPORT AWD 4 PASSENGER 2.0L 24V V6 DURATEC ENGINE 8-SPEAKER PREMIUM AUDIO SYSTEM		EXTERIOR INDIGO SILVER METALLIC INTERIOR SPORT BLACK LEATHER TRIMME		132049
www.fordvehicles.com STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE EXTERIOR 18" ALUMINUM WHEELS - BLIND SPOT MIRRORS - CHROME GRILLE - LOCKED SPEEDLEK - FOG LAMPS IN CHOCOL 30-WAY POWER DR. SEAT W/LUMBAR 60/40 REAR SEAT W. - SPRING ASSISTED DOOR - TOUCH UP/DOOR DYPASS WIN - AM/FM SINGLE CD/MP3/SSPM - FMG 21100 VARIETY PACK - ILLUMINOMINOMAL MIRROR - TECHNICAL ASSISTANT STR. ADJUST - W/CRUISE & AUDIO CONTROLS - LEATHER TRIMMED SEATS - POWER MIRRORS & LULLS - SERVO-STEER. LOCKING LUGS - SWC VOICE ACT. MIRROR SYS FUNCTIONAL 2-DR. DSC BRAKES W/ABS - DRIVER FRONT PASSENGER - GLOBAL OPEN CONTROLS - NAVIG - POWER STEERING - TELE/TELECOM. MICEL - TRANSM. TITANI SAFETY/SECURITY - ADVANCETRAC ESC - LATCH CHILD SAFETY SYSTEM - PERIMETER ALARM - REAR AIR BAGS/OUTSTANDING - SECURELOCK PWS ANTI THEFT - SECURELOCK PWS ANTI THEFT - TIME PRESSURE MONITOR SYS WARRANTY 3YR/50,000 MILE bumper to bumper 5YR/60,000 MILE POWERTRAIN 3YR/50,000 MILE SCARSIDE ASSIST								
EPA Fuel Economy Estimates CITY MPG 17 HIGHWAY MPG 24 Expected range for total drive: 14 to 20 MPG Expected range for total drive: 19 to 29 MPG Estimated Annual Fuel Cost: \$2,367 (based on 15,000 miles at \$3.00 per gallon) Combined Fuel Economy: 19 mpg (all vehicles) Your actual mileage will vary depending on how you drive and maintain your vehicle.								
PRICE INFORMATION STANDARD VEHICLE PRICE: \$28,505.00 INCLUDED ON THIS VEHICLE: \$28,505.00 OPTIONAL EQUIPMENT: NO CHARGE FRONT LICENSE PLATE BRACKET: NO CHARGE CALIFORNIA EMISSIONS: NO CHARGE TOTAL OPTIONS: 00 TOTAL VEHICLE & OPTIONS: \$28,505.00 DESTINATION & DELIVERY: 725.00 <i>Handwritten: 9-22, 45 miles</i>								
TOTAL MSRP \$29,230.00 GOVERNMENT SAFETY RATINGS Frontal Crash Driver Passenger To Be Rated To Be Rated Side Crash Front seat Rear seat To Be Rated To Be Rated Ro tover ★★★★★ Star ratings based on the risk of injury in a frontal impact. Star ratings based on the risk of injury in a side impact. Star ratings based on the risk of rollover in a single vehicle crash. Star ratings range from 1 to 5 stars (★★★★★), with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA) www.safercar.gov or call 1-888-327-4236								
See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov SOLD TO 446 119 ONE DEALER NO. RA43 446 119 WITH CERTIFICATE OF TRANSFER DATE: 44-2001 C/12 SHP TO 000000000000 TWO 3FAMFDCSBR132049 SHIP THROUGH TRIAL ASSEMBLY POINT HERMOSILLO AN230 N RA2X 1'5 000540 08 23 10 EXTENDED SERVICE PLAN Ever Estimated Service Plan is Policy service plan not backed by Ford and General Motors and is not a warranty. Dealers: ask your dealer for price and additional details or visit www.ford.com.								

Figure A-70: Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

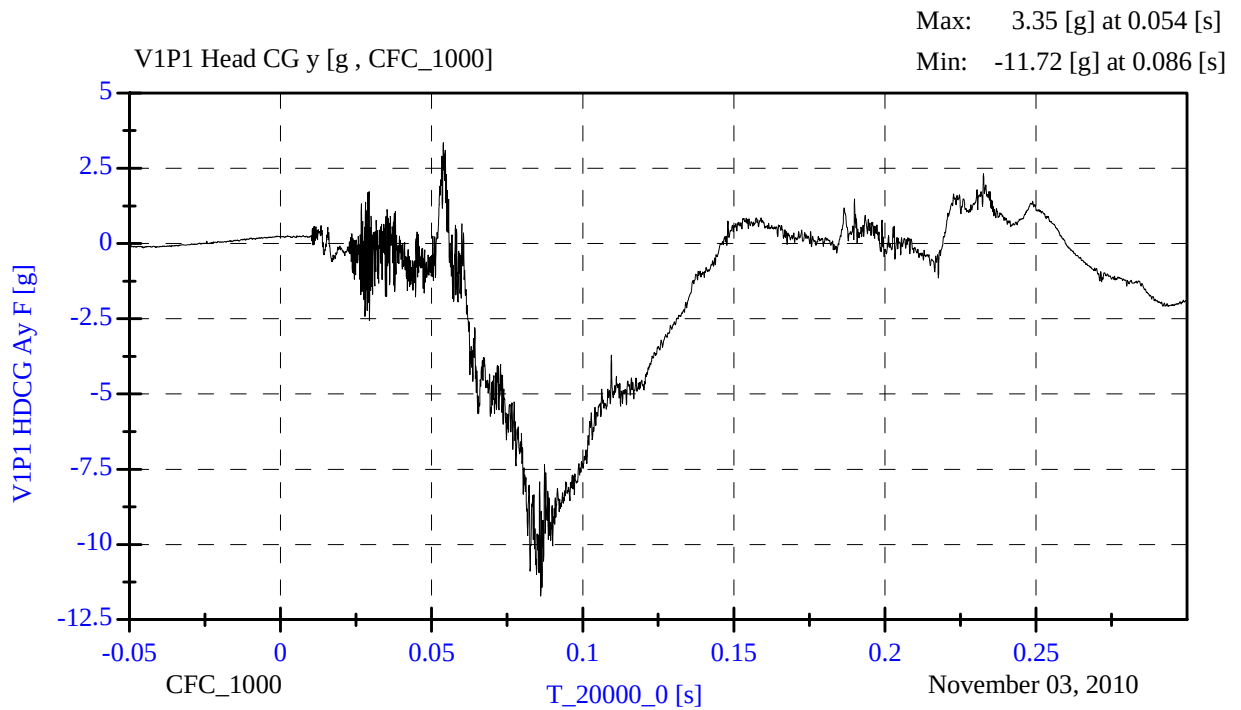
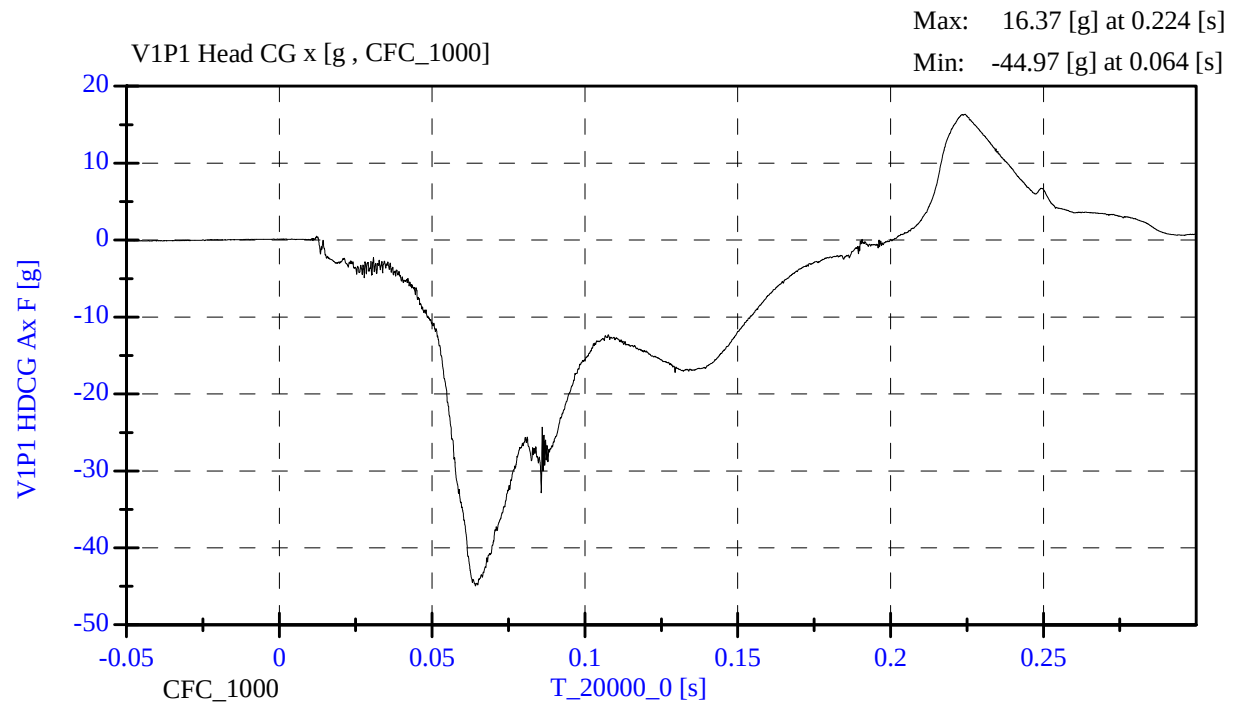
Fig. No.	List of Data Plots Provided In The Test Report	Page No.
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection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

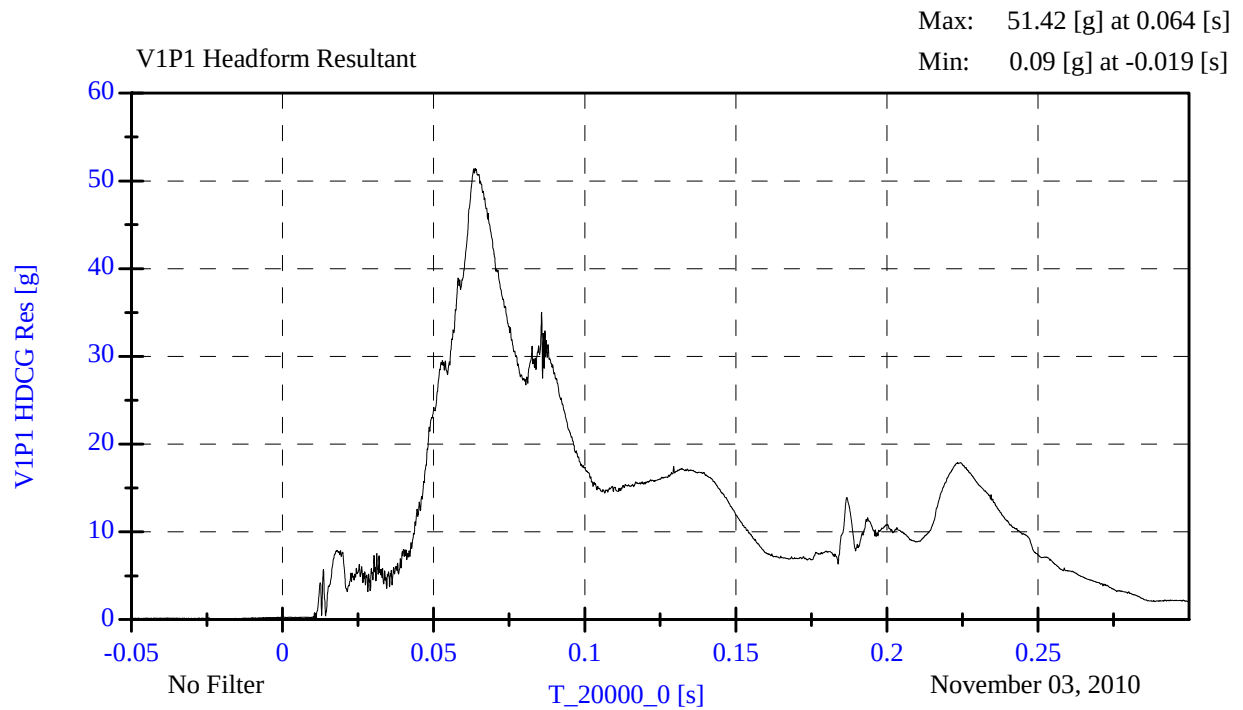
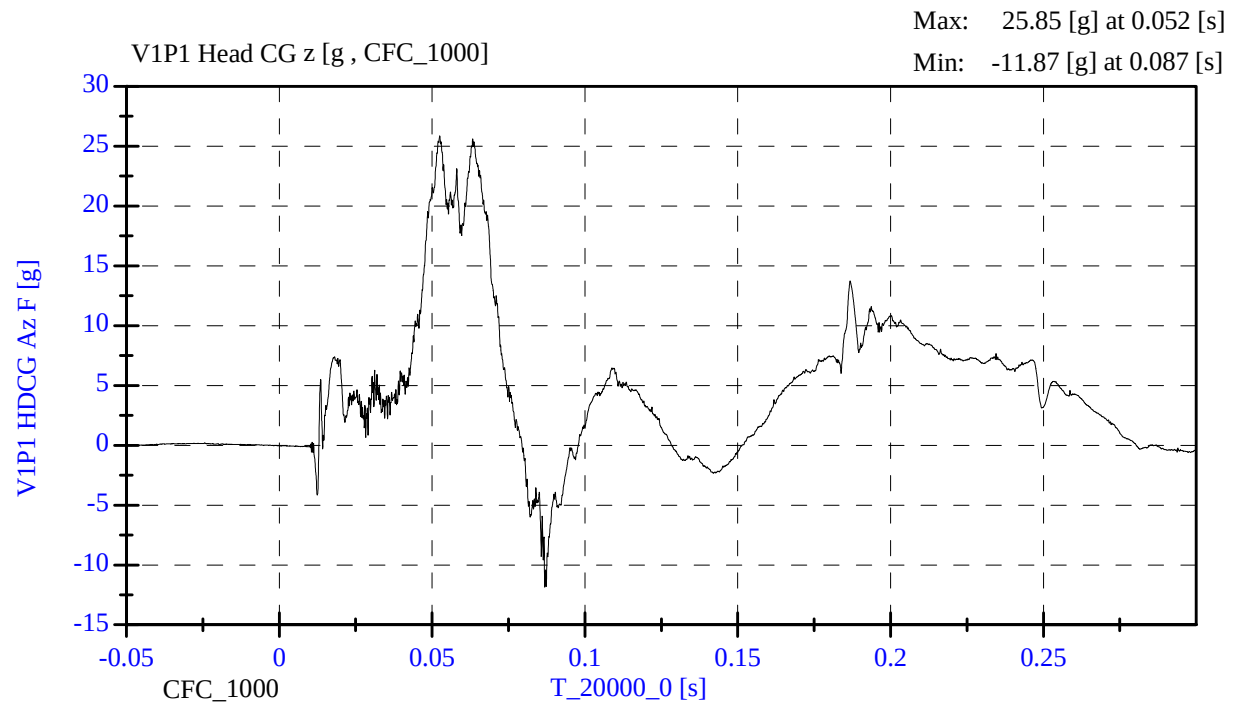
30	Passenger Right Femur Force vs. Time	B-19
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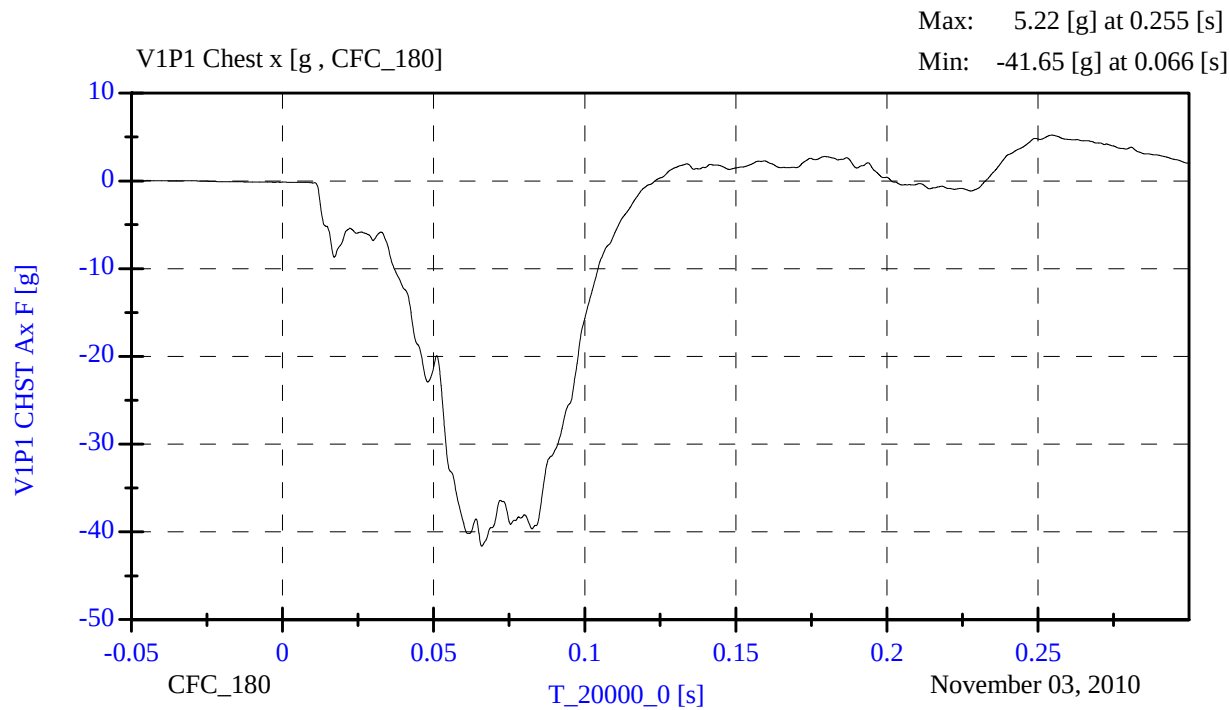
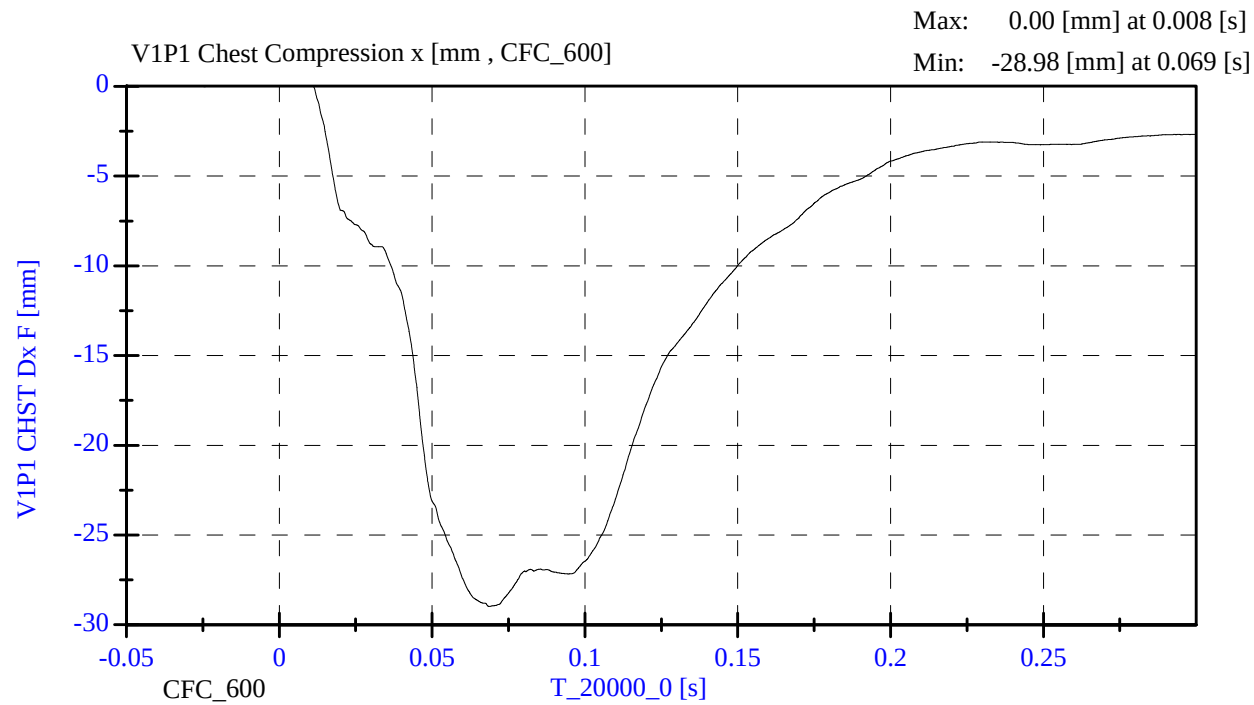
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

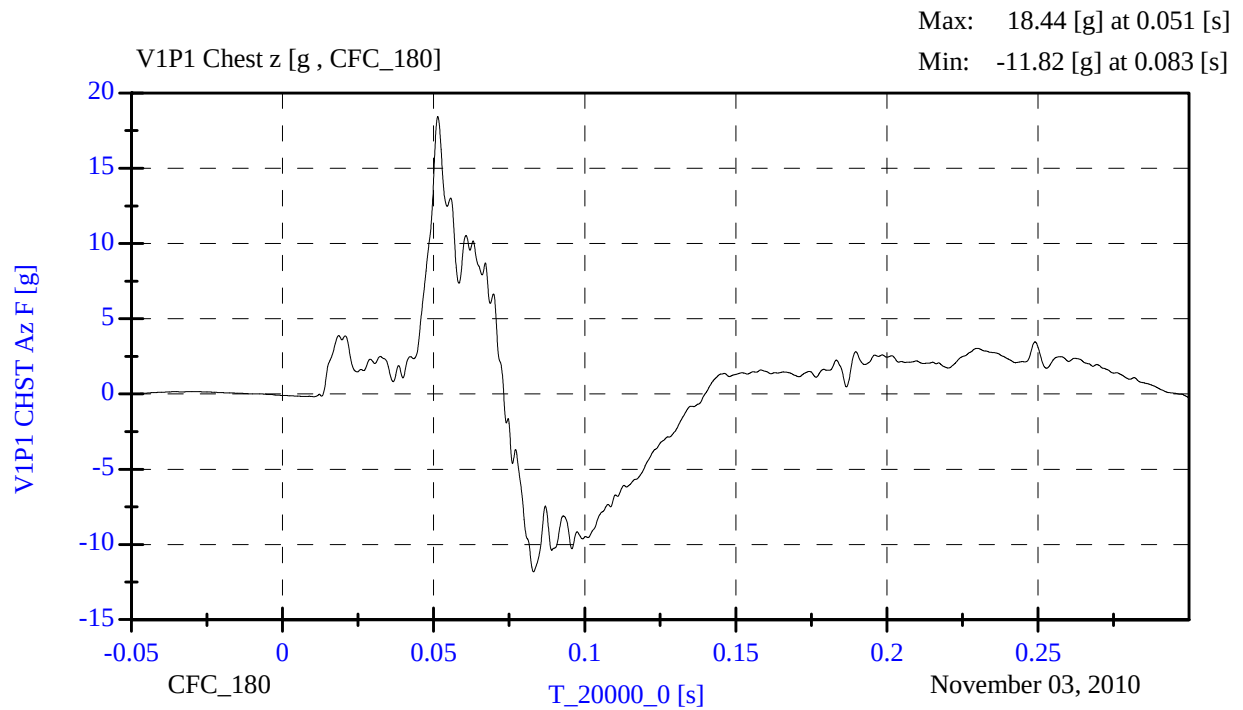
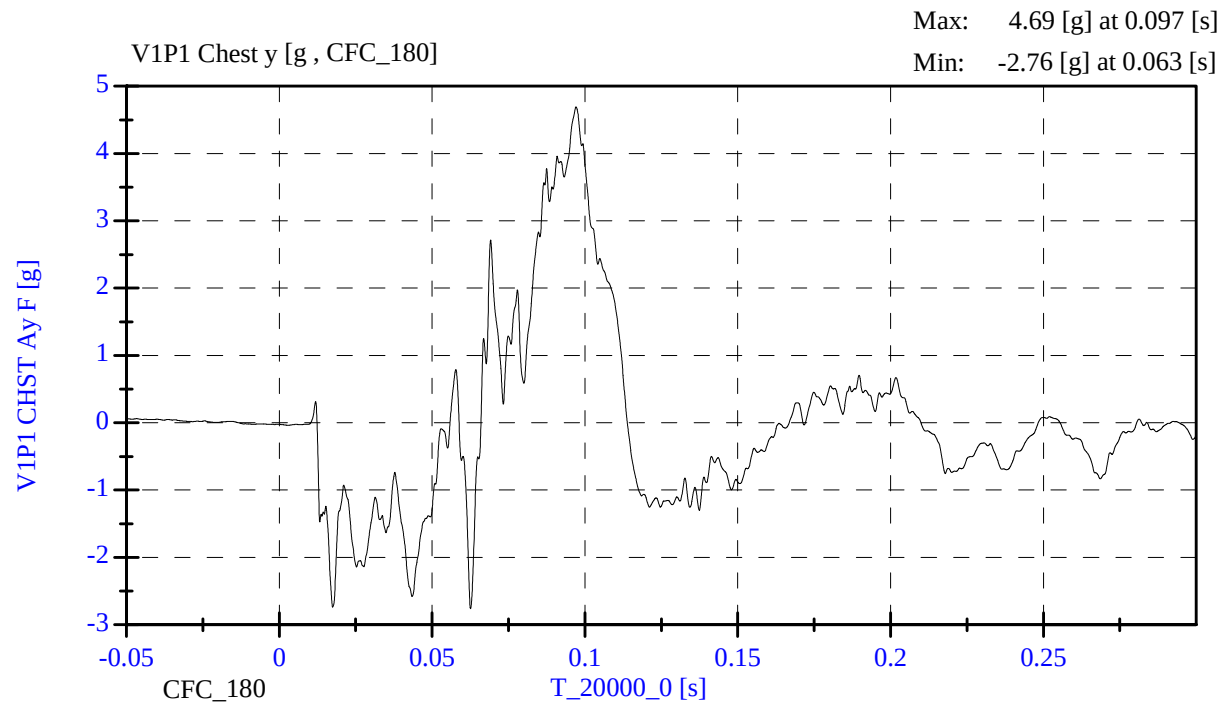
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 Driver Head Y Acceleration Redundant
 Driver Head Z Acceleration Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Acceleration Redundant
 Driver Chest Y Acceleration Redundant
 Driver Chest 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
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 Passenger Left Lower Tibia Force Z
 Passenger Right Upper Tibia Moment X
 Passenger Right Upper Tibia Moment Y

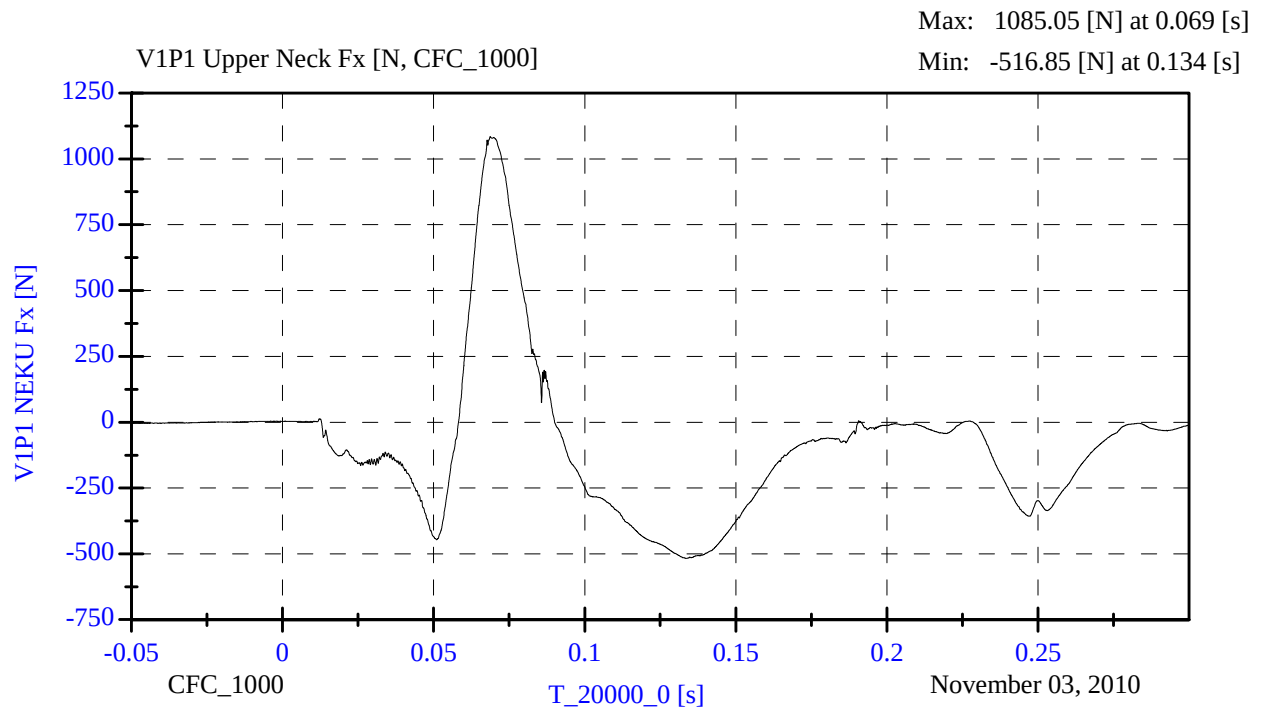
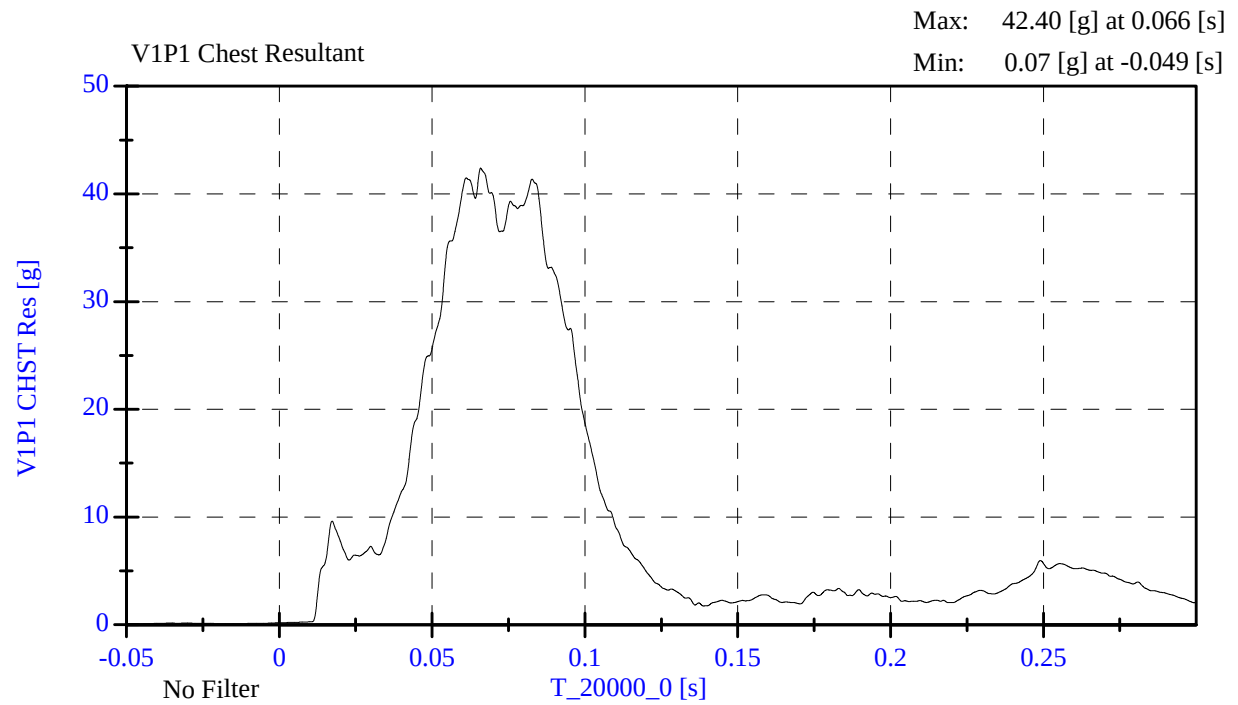
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot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

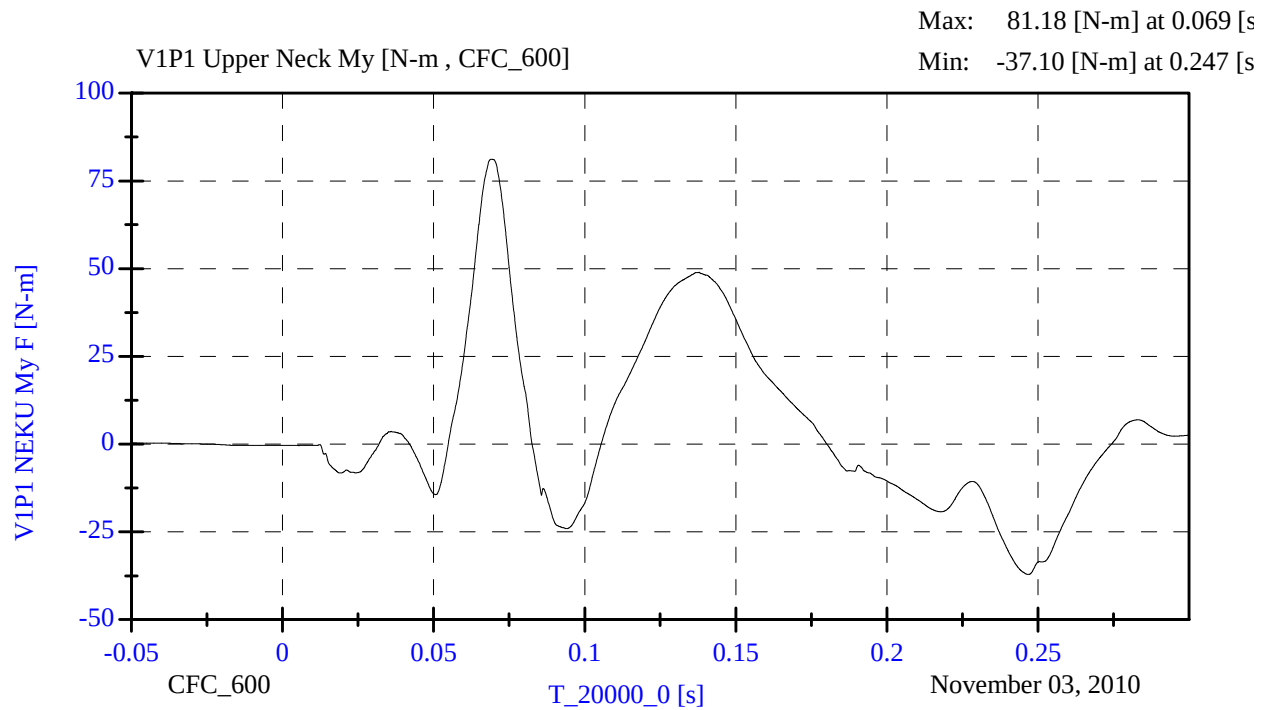
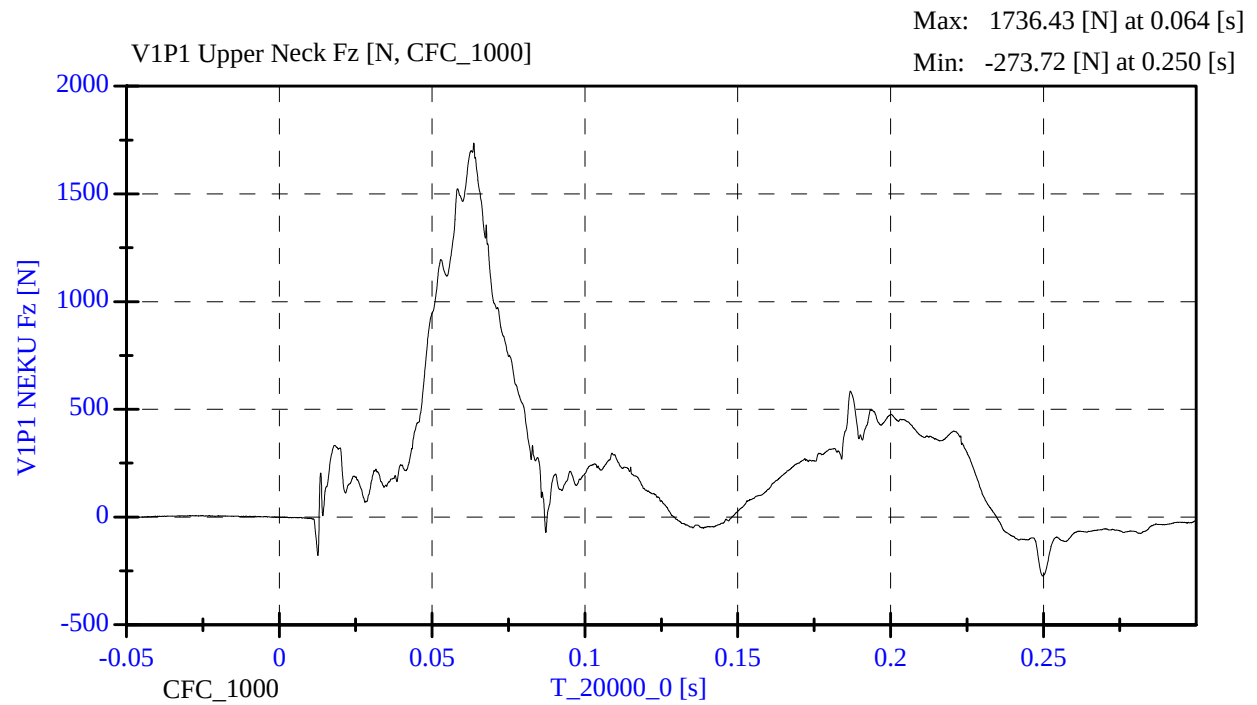


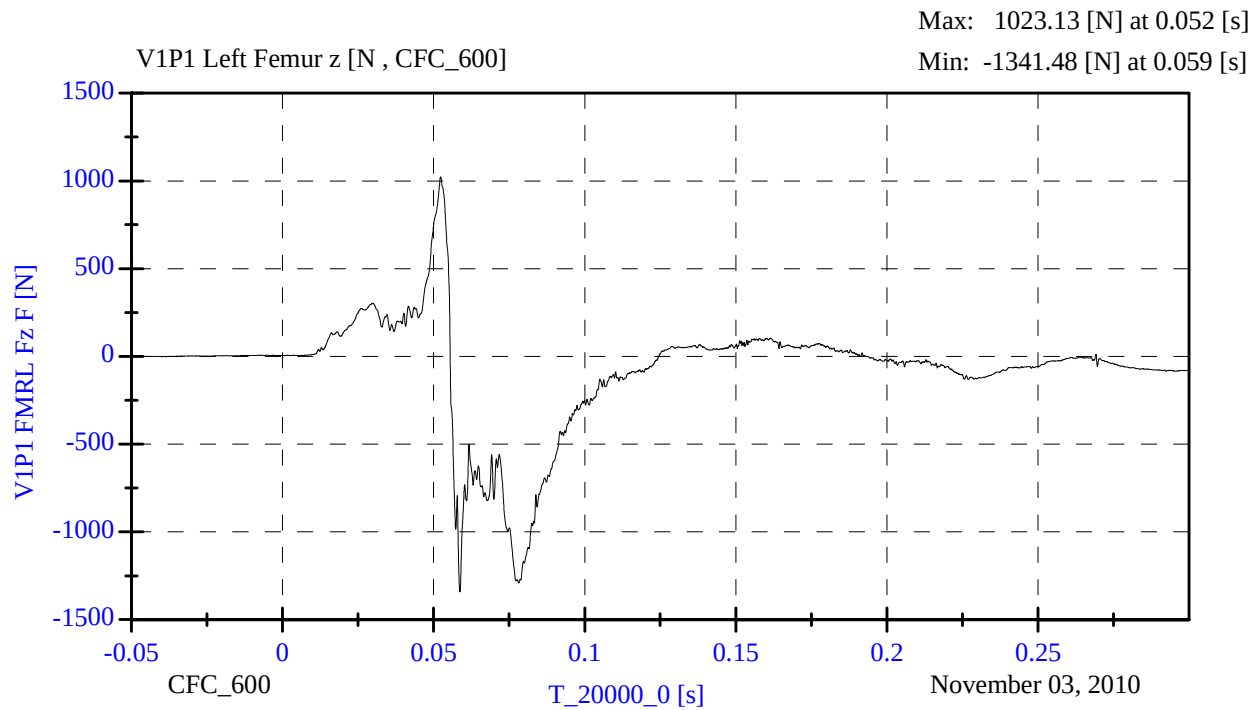
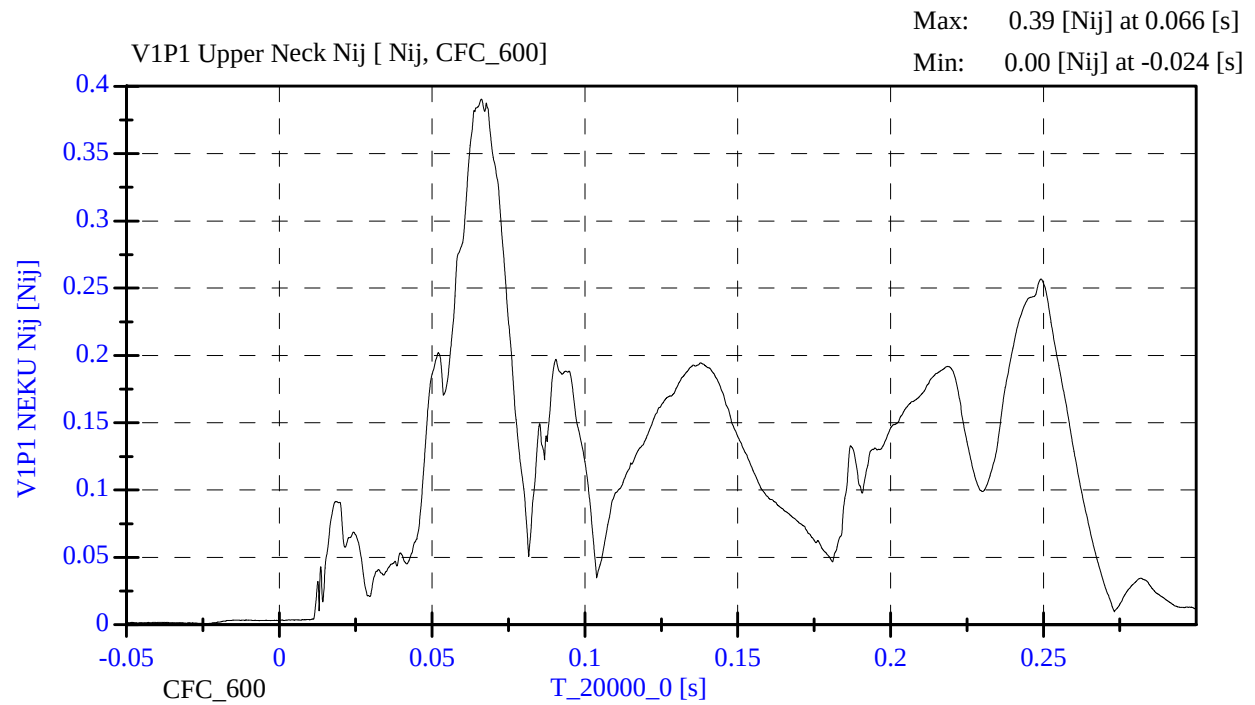


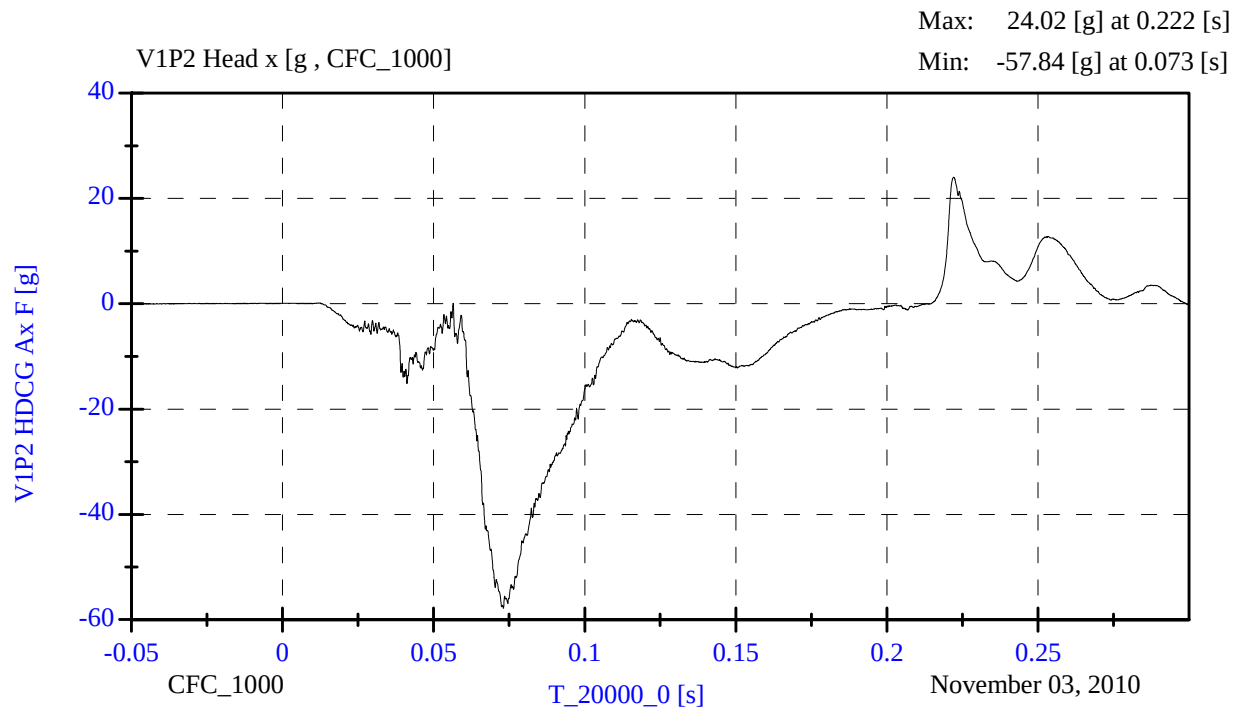
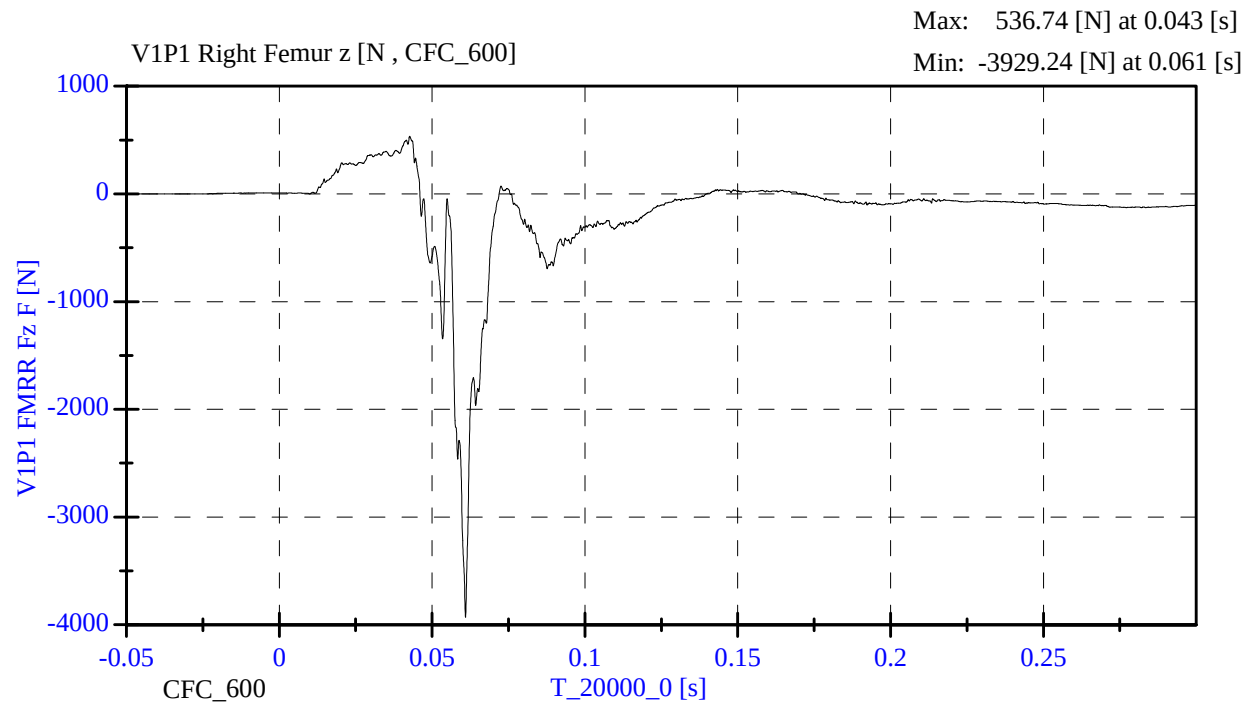


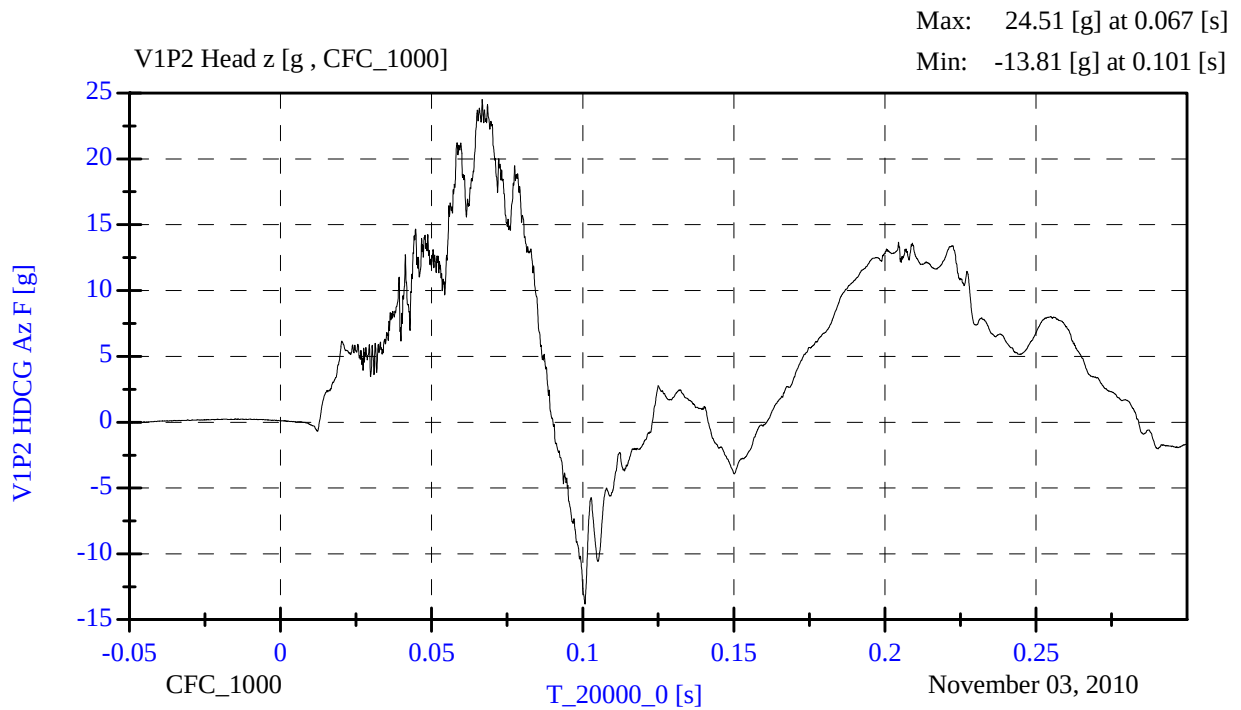
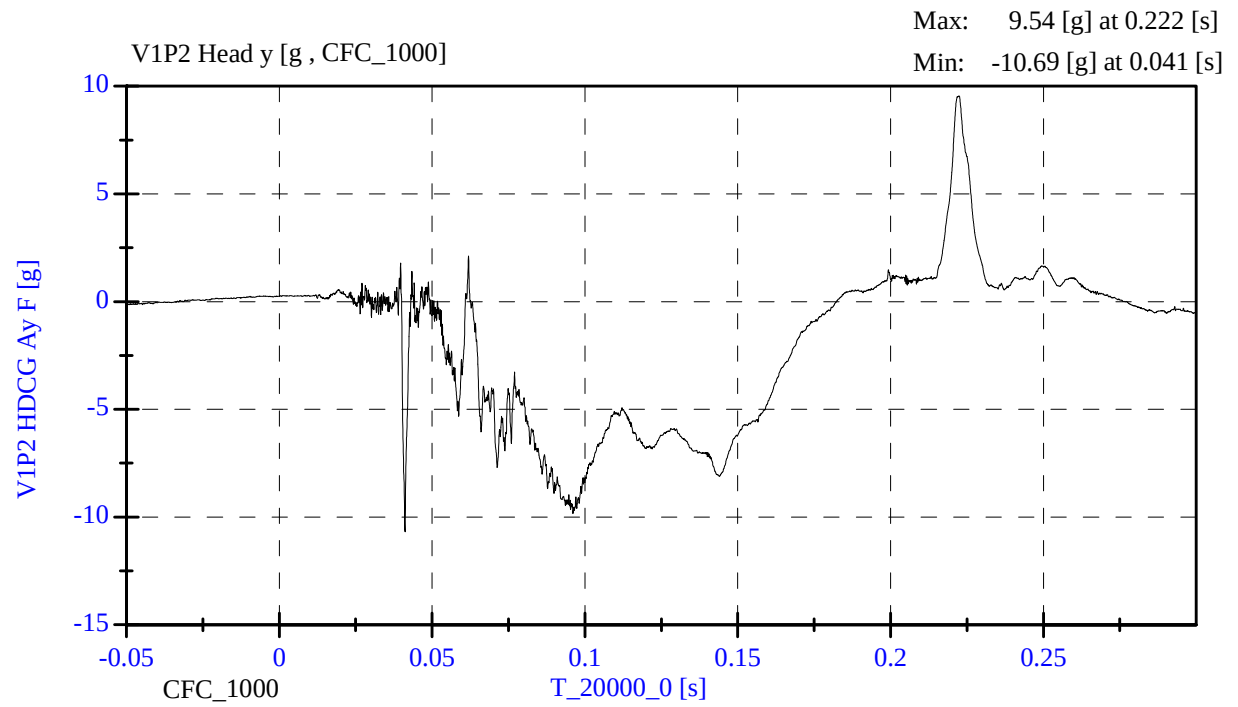


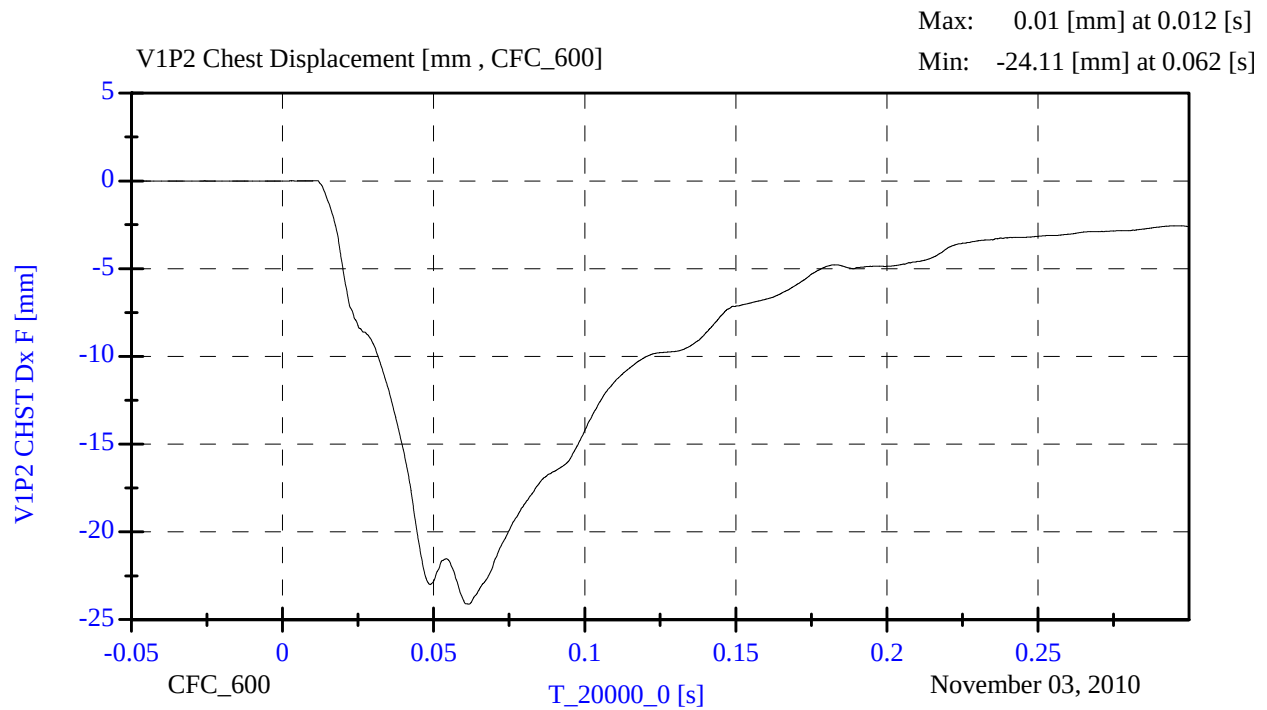
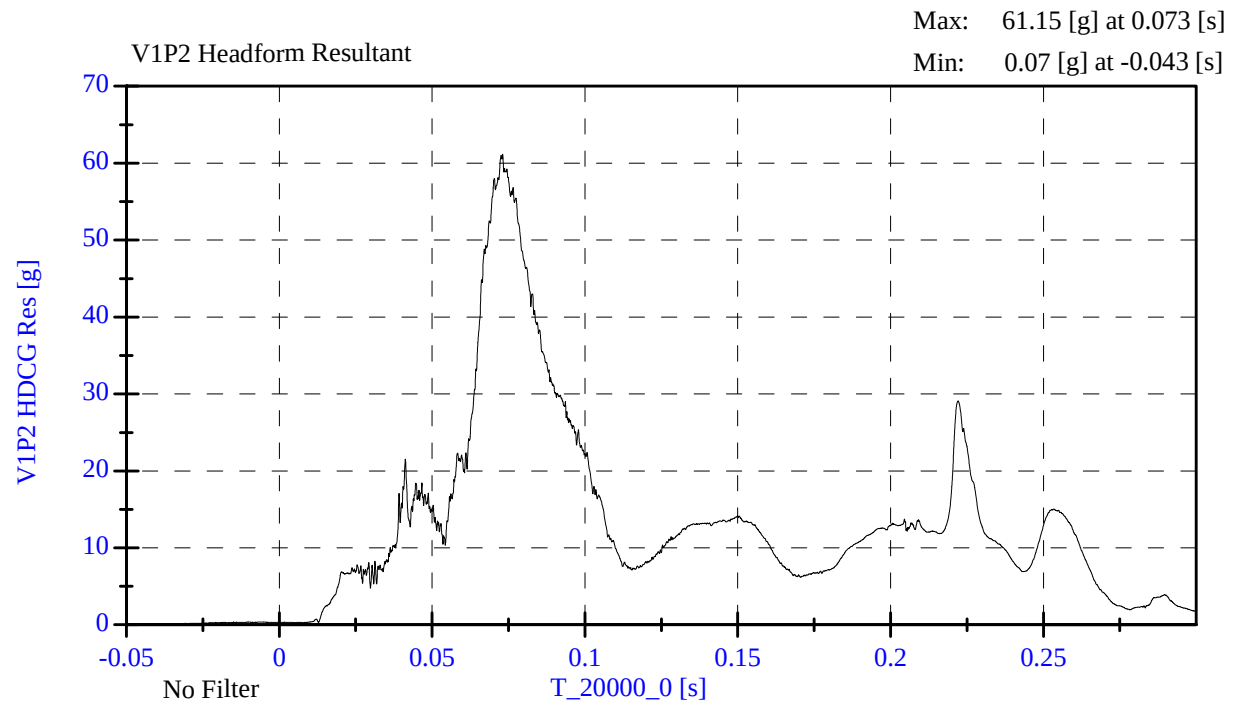


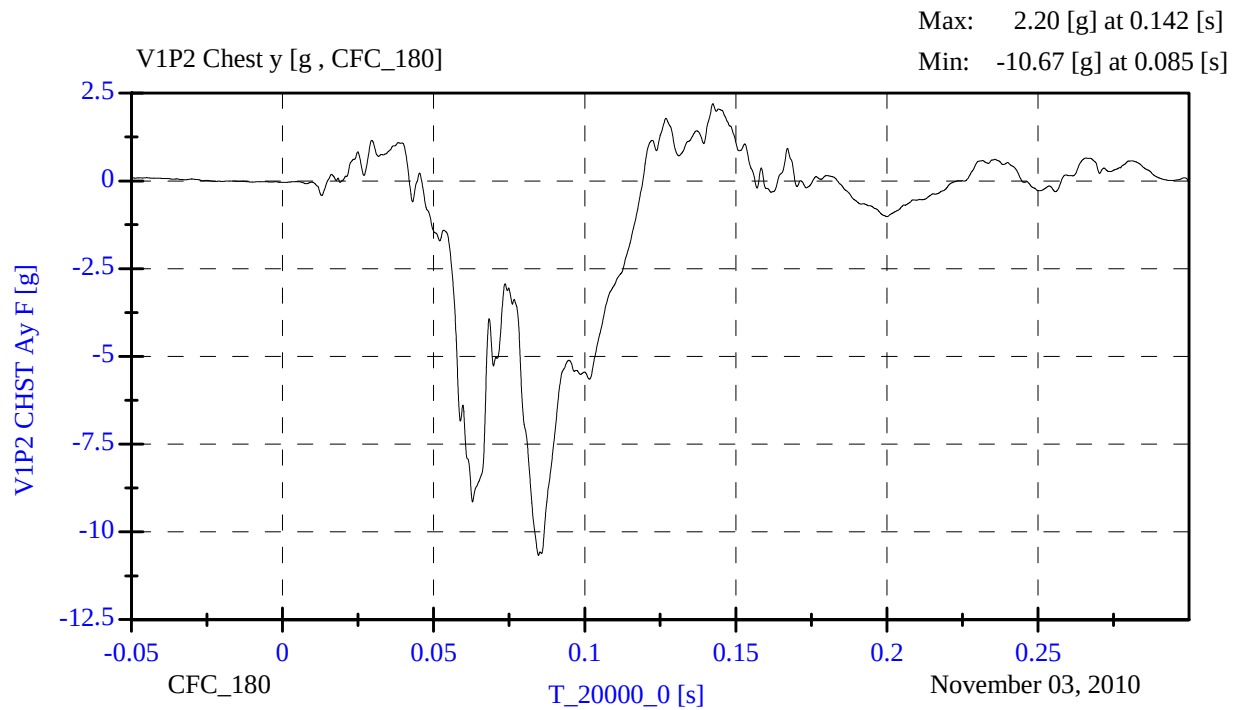
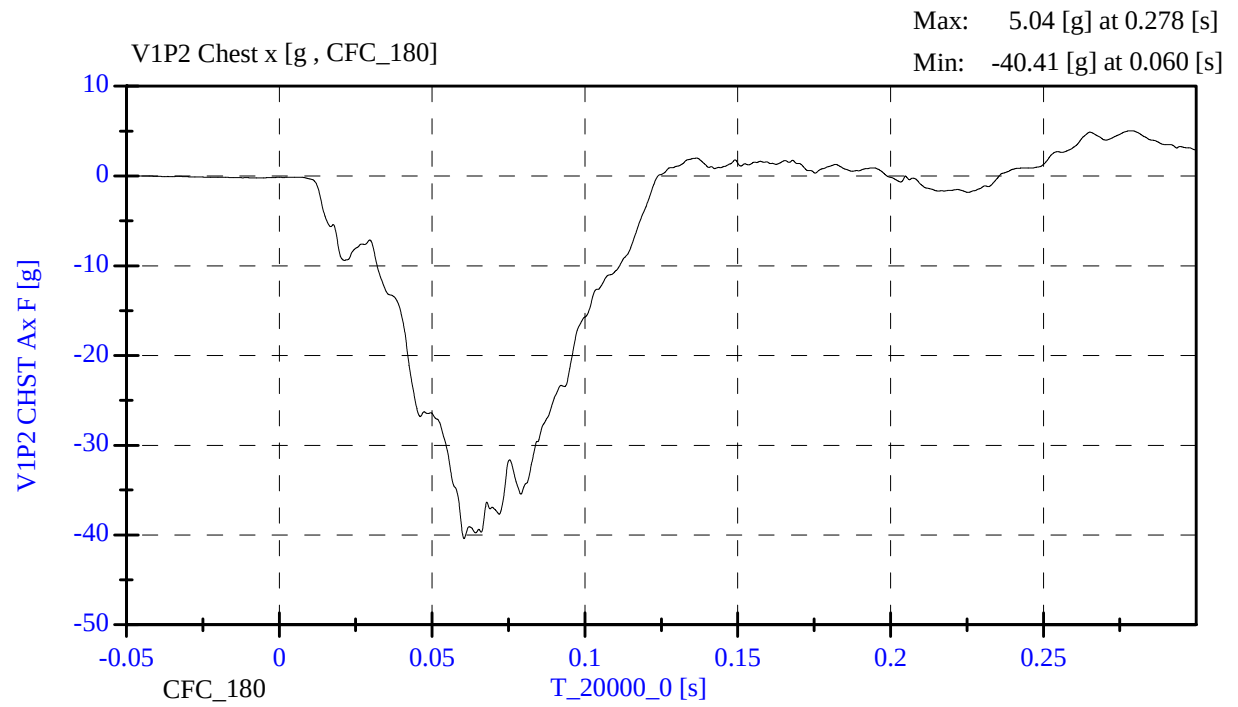


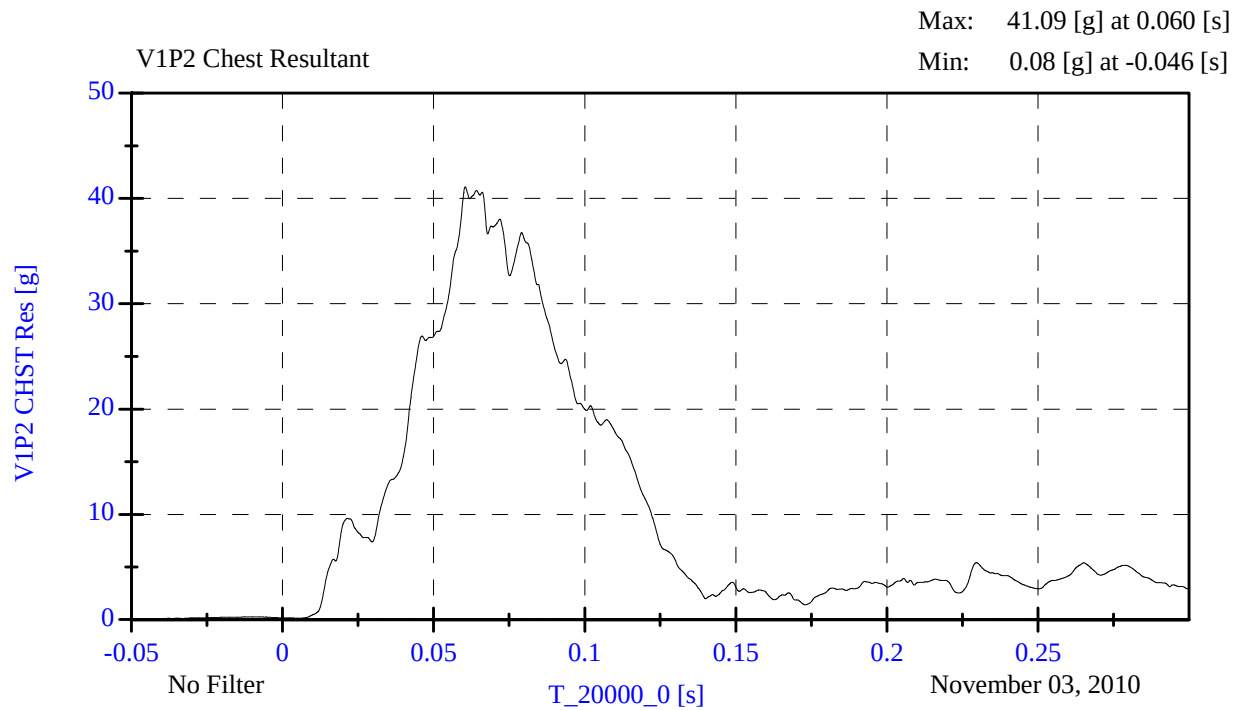
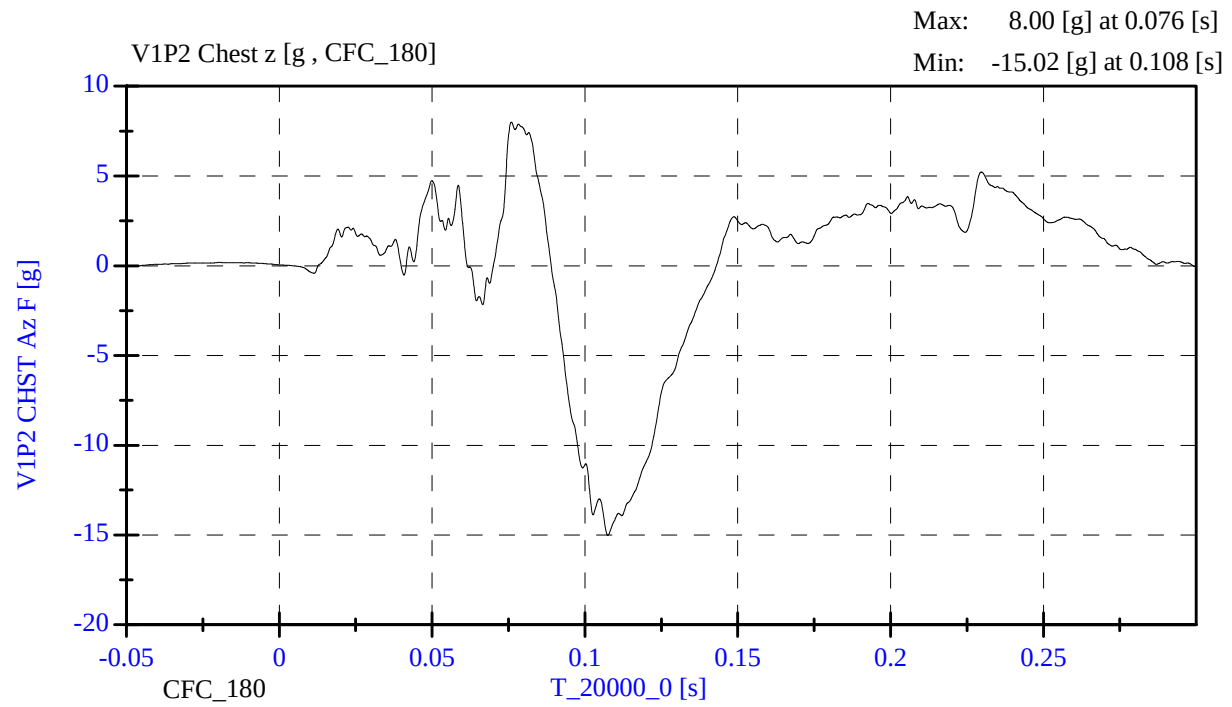


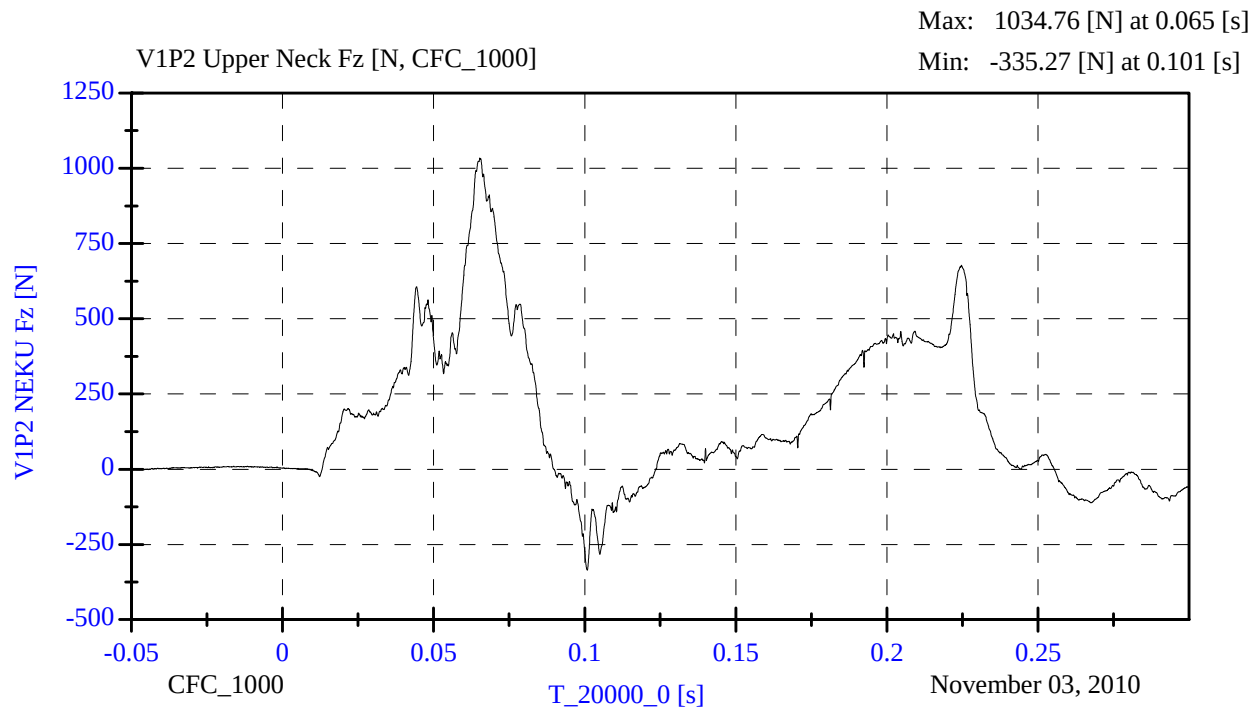
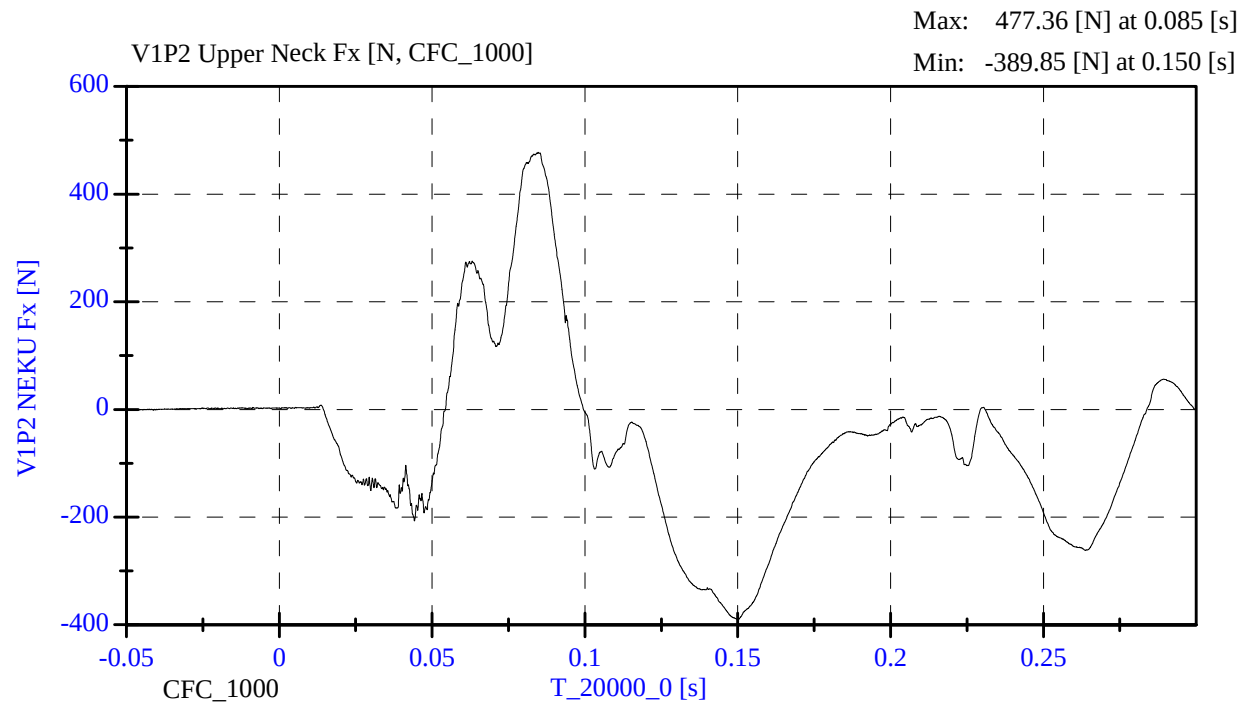


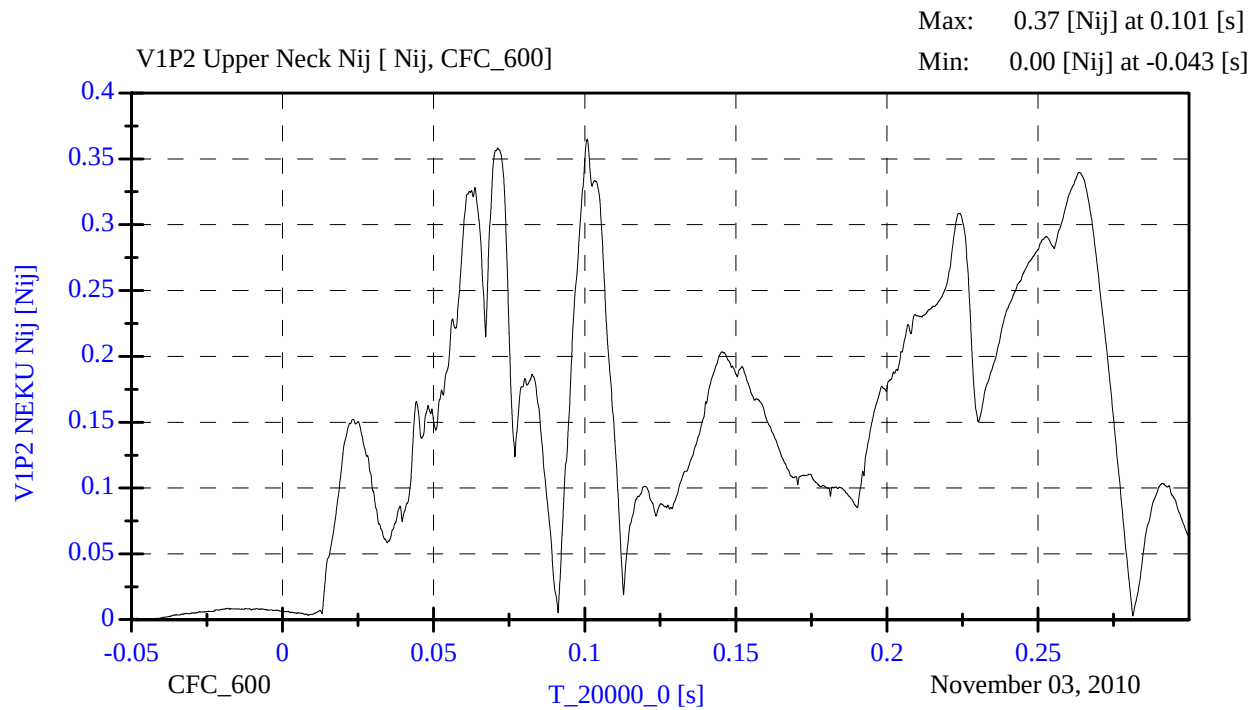
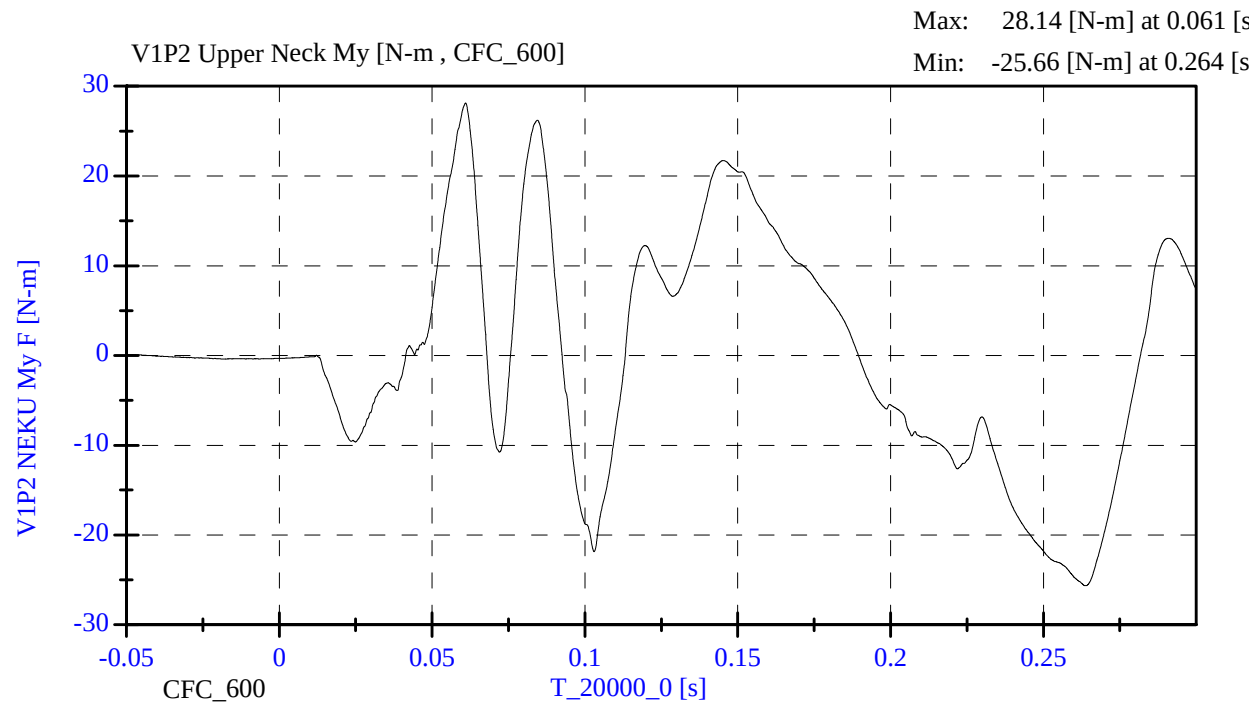


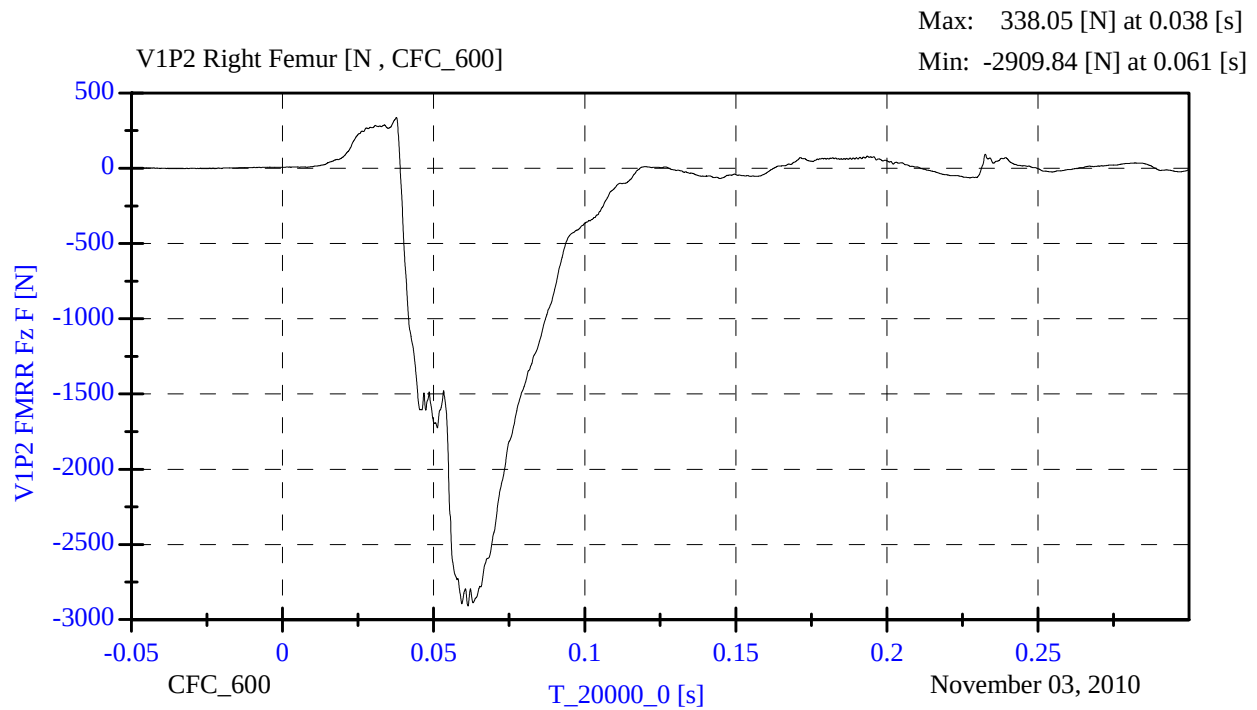
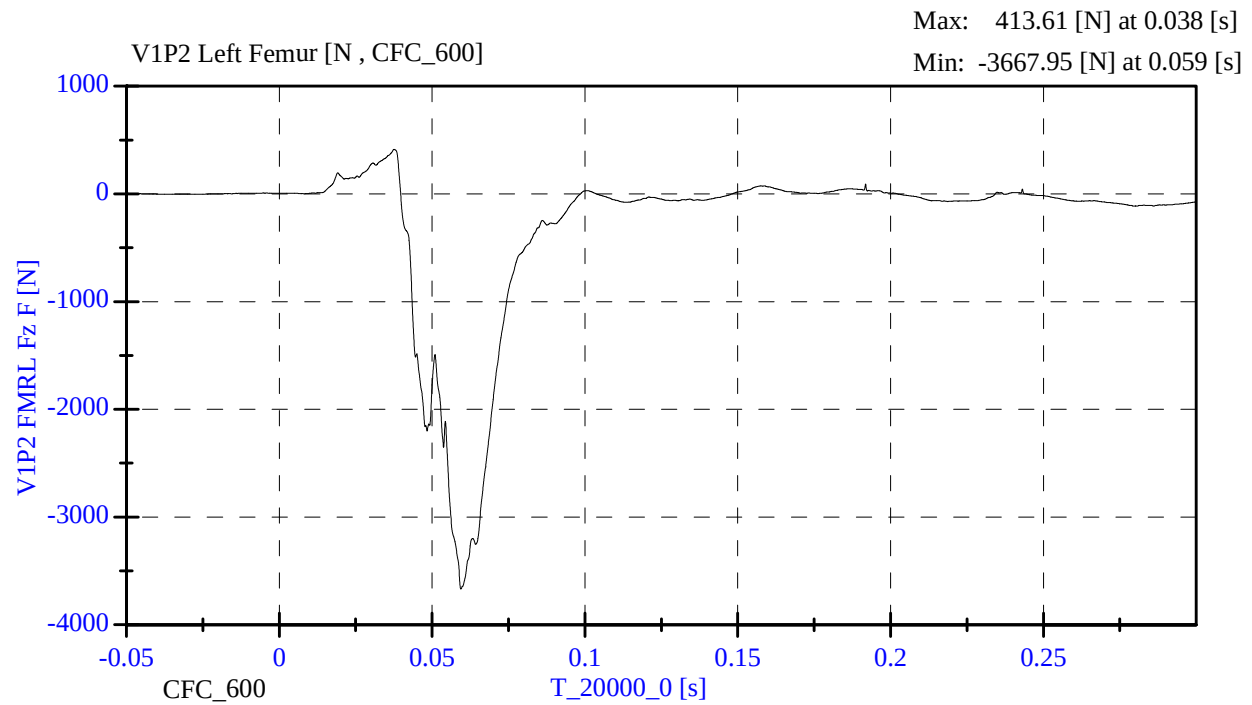












APPENDIX C

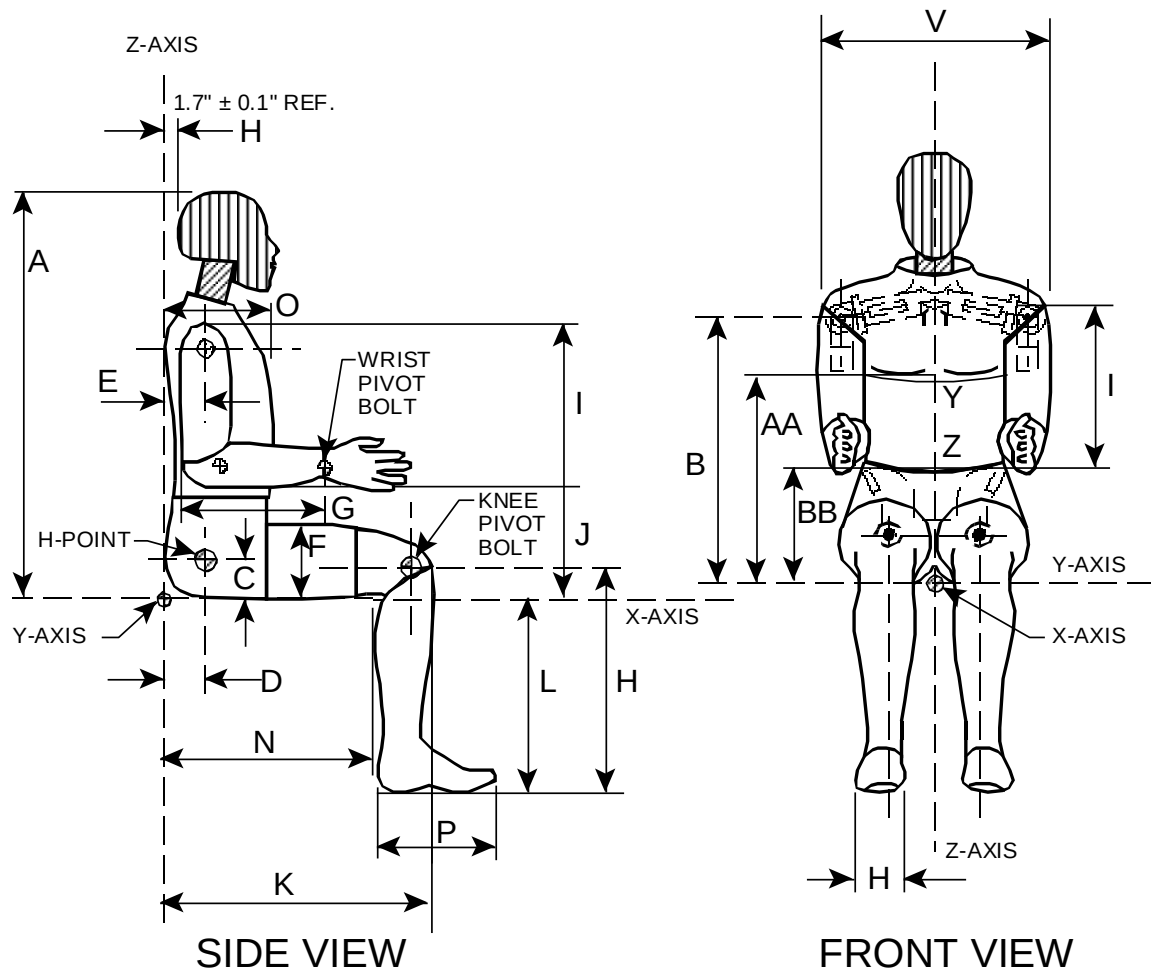
PART 572 E/O DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA SHEETS

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	10/28/2010
#2/Right Front Passenger	273	11/01/2010

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	2.04	Yes
C	H-Point Height	3.3 - 3.5	3.5	Yes
D	H-Point from Backline	5.3 - 5.5	5.3	Yes
E	Shoulder Pivot from Backline	3.3 - 3.7	3.7	Yes
F	Thigh Clearance	5.5 - 6.1	6.1	Yes
G	Back of Elbow to Wrist Pivot	11.4 - 12.0	11.5	Yes
H	Head Back to Backline	1.6 - 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 - 13.6	13.2	Yes
J	Elbow Rest Height	7.5 - 8.3	8.0	Yes
K	Buttock to Knee Length	22.8 - 23.8	23.4	Yes
L	Popliteal Height	16.9 - 17.9	17.5	Yes
M	Knee Pivot Height	19.1 - 19.7	19.2	Yes
N	Buttock Popliteal Length	17.8 - 18.8	18.7	Yes
O	Chest Depth without Jacket	8.4 - 9.0	8.6	Yes
P	Foot Length (right)	9.9 - 10.5	10.1	Yes
V	Shoulder Breadth	16.3 - 17.2	16.8	Yes
W	Foot Breadth	3.6 - 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.5	Yes
Z	Waist Circumference	32.9 - 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician: SZ

Date: 10/26/2010



www.calspan.com

Calspan - Transportation Research Group

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

VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	10/27/2010
Test Number:	1	Test Time:	3:14:34 PM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	37 %RH P
Resultant Acceleration	225 -- 275	272 g P
Oscillation	0.0 -- 10.0	9.0 % P
Lateral Acceleration	-15.00 -- 15.00	-5.34 g P

All test parameters are within specifications

Technician: S. Zito Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: **Head Drop**

Test Time: **3:14:34 PM**

Test Date: **10/27/2010**



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

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	10/25/2010
Endevco	7264-2000	P66931	10/25/2010
Endevco	7264-2000	P66926	10/25/2011

Test ID: **Head Drop**

Test Time: **3:14:34 PM**

Test Date: **10/27/2010**

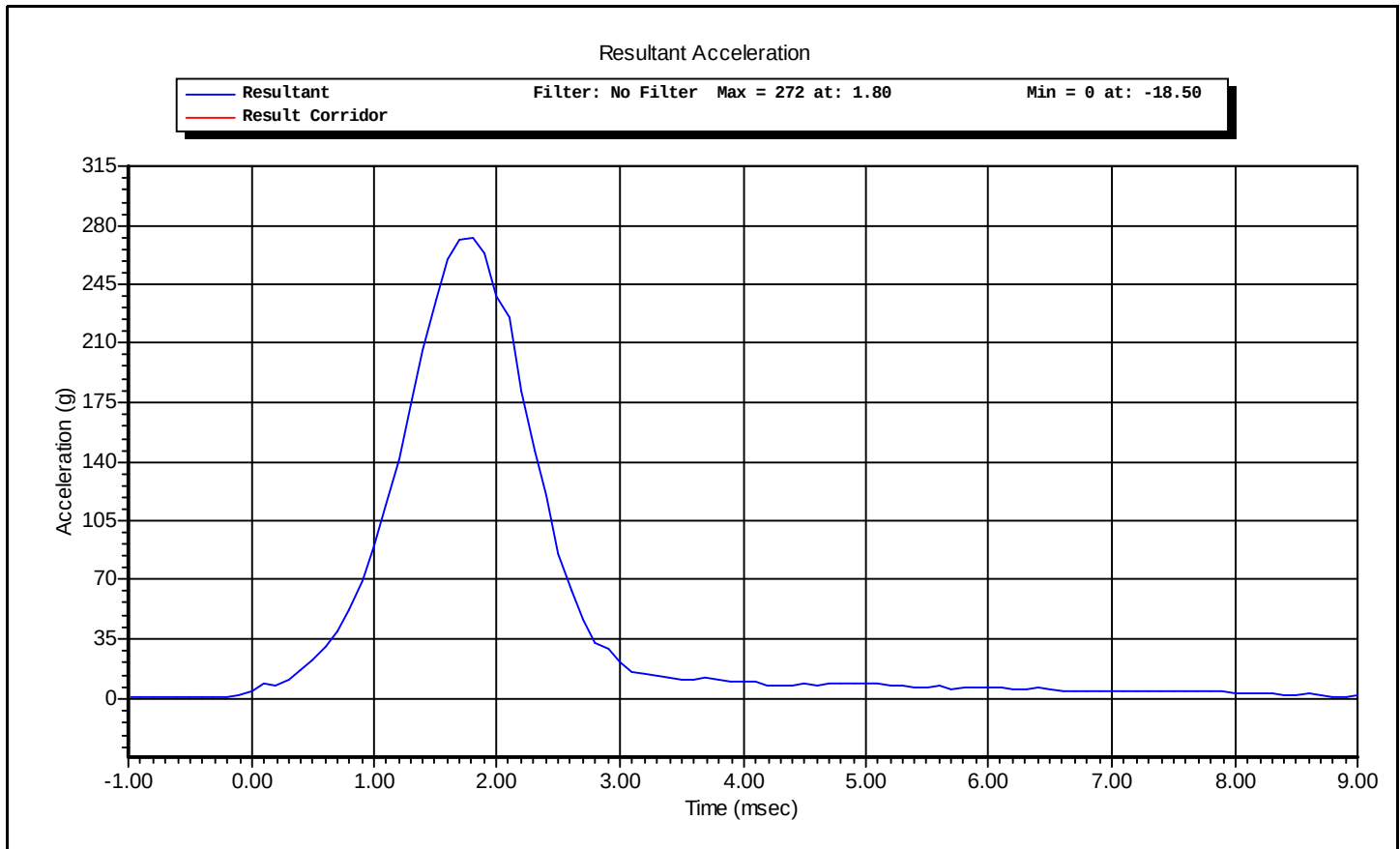


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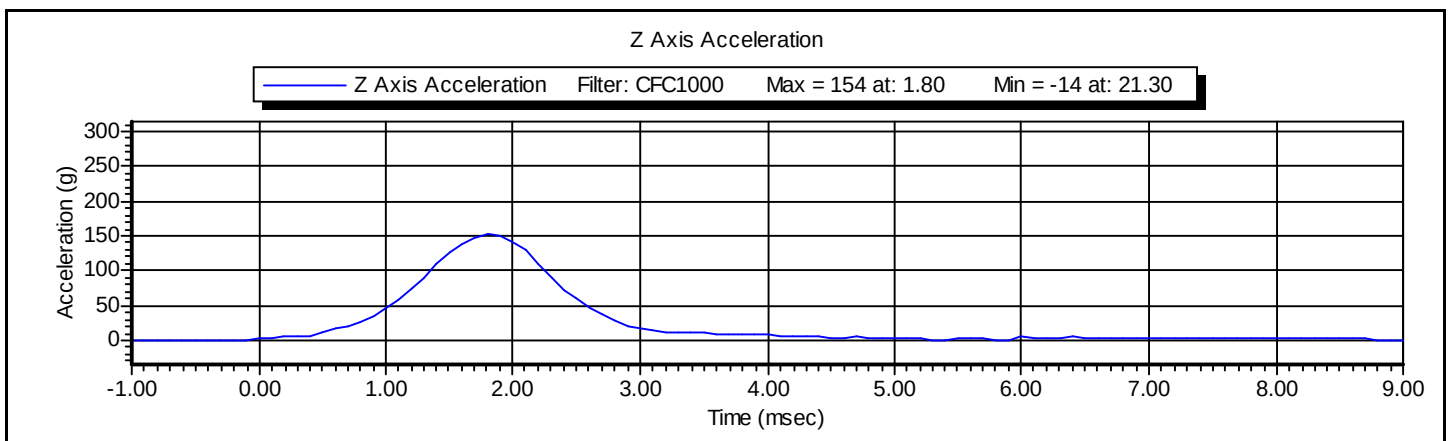
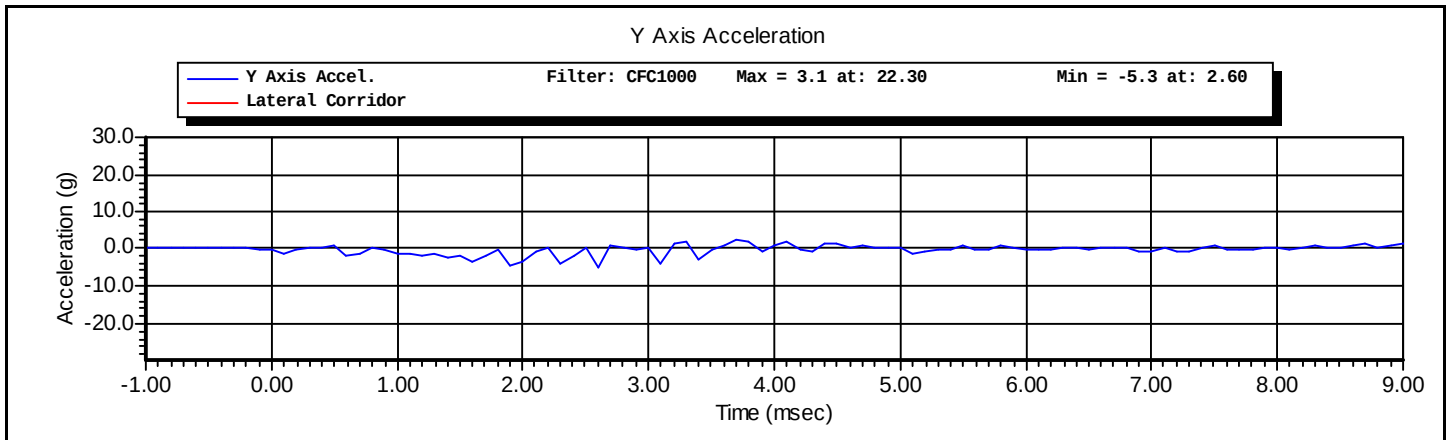
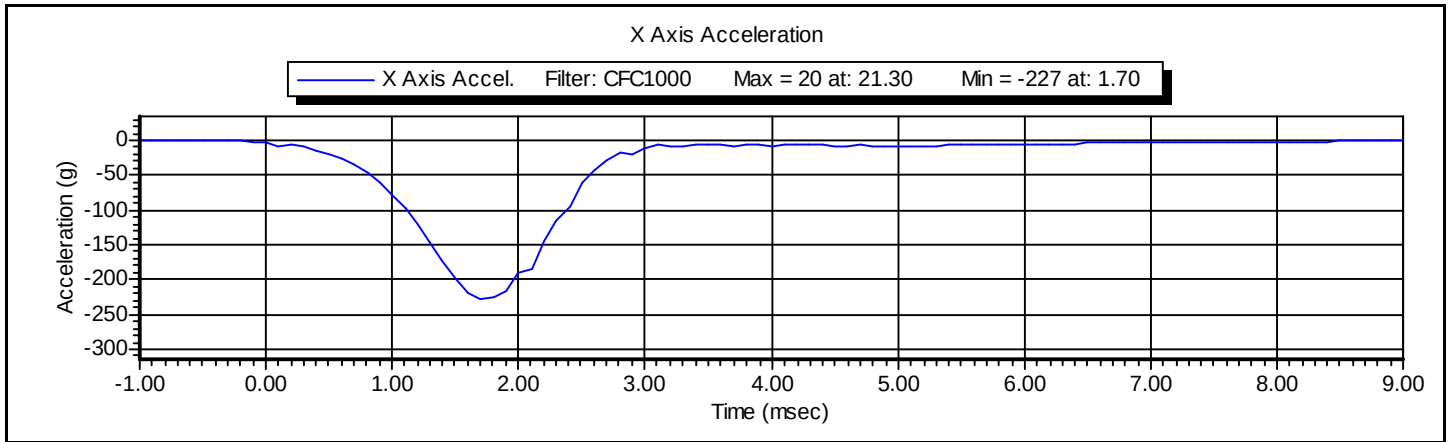
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	10/27/2010
Test Number:	1	Test Time:	3:14:34 PM



Test ID: **Head Drop**

Test Time: **3:14:34 PM**

Test Date: **10/27/2010**





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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:	10/28/2010
Test Number:	3	Test Time:	11:35:34 AM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.7 deg C	P
Humidity		10	-- 70	37 %RH	P
Velocity		5.94	-- 6.19	6.13 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	18.2 g	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	16.2 g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	12.4 g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	12.4 g	P
Decel Time to	5 g	38.0	-- 46.0	44.3 ms	P
D Plane Rotation		81.0	-- 106.0	92.7 degrees	P
Time at Max Rotation		72.0	-- 82.0	77.1 ms	P
Rotation Decay to Zero		147.0	-- 174.0	158.9 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-67.1 Nm	P
Time at Max Moment		65.0	-- 79.0	72.3 ms	P
Moment Decay to Zero		120.0	-- 148.0	142.8 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **11:35:34 AM**

Test Date: **10/28/2010**



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

VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
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: **11:35:34 AM**

Test Date: **10/28/2010**

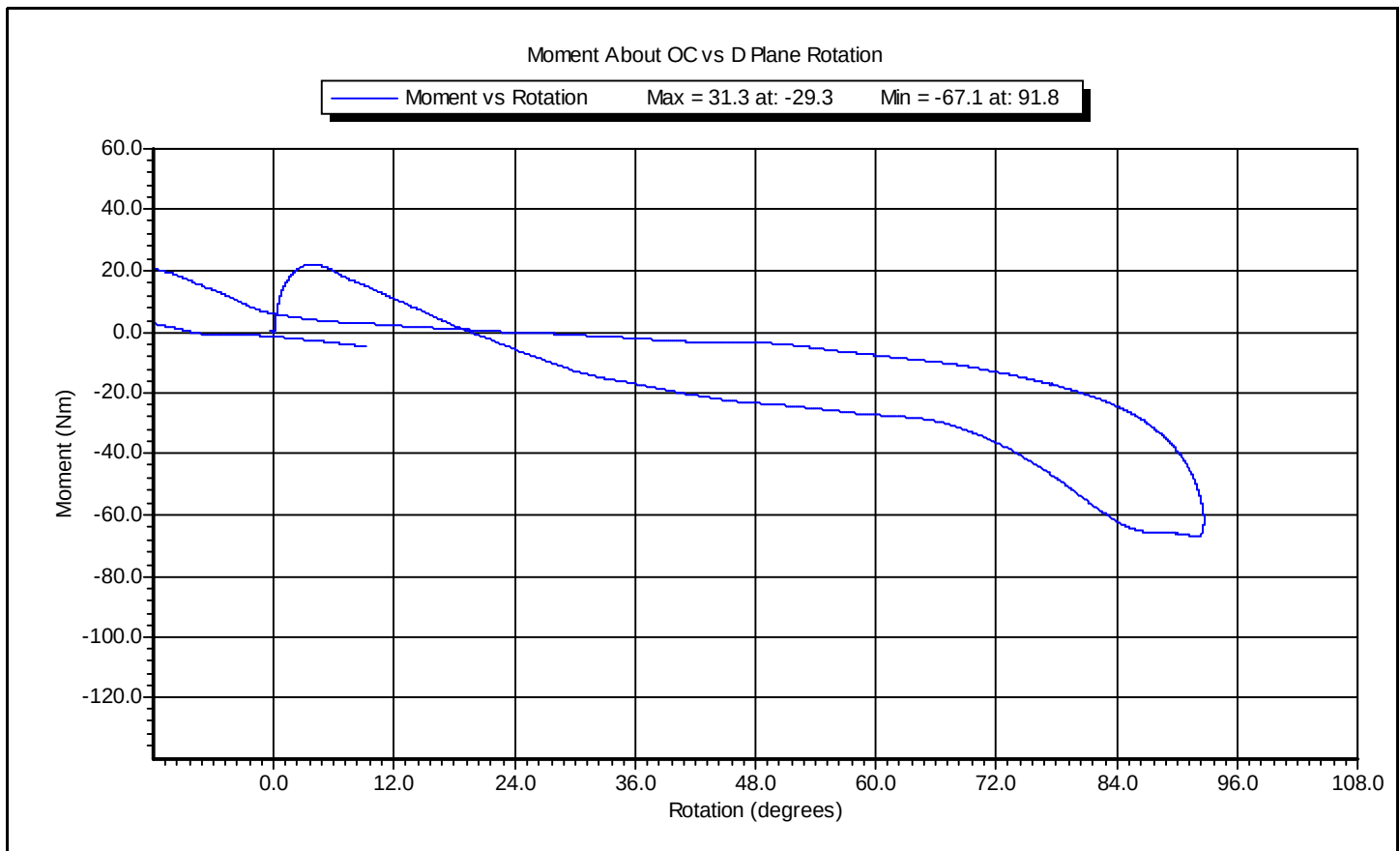


www.calspan.com

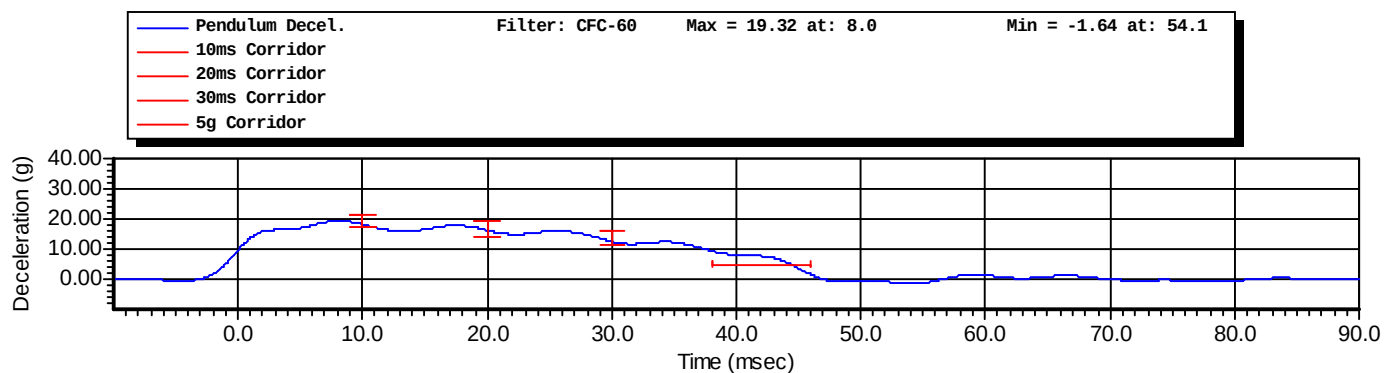
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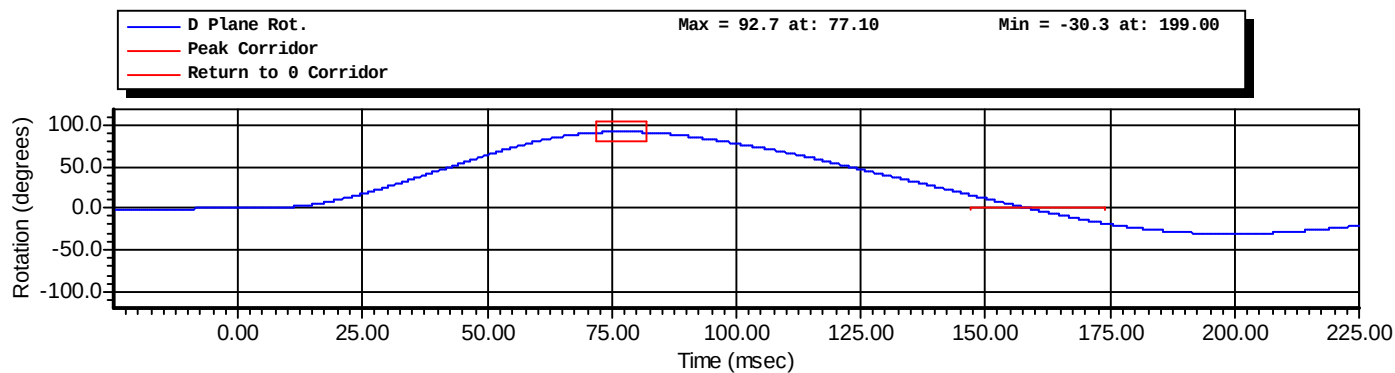
Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	10/28/2010
Number of Test:	3	Time of Test:	11:35:34 AM



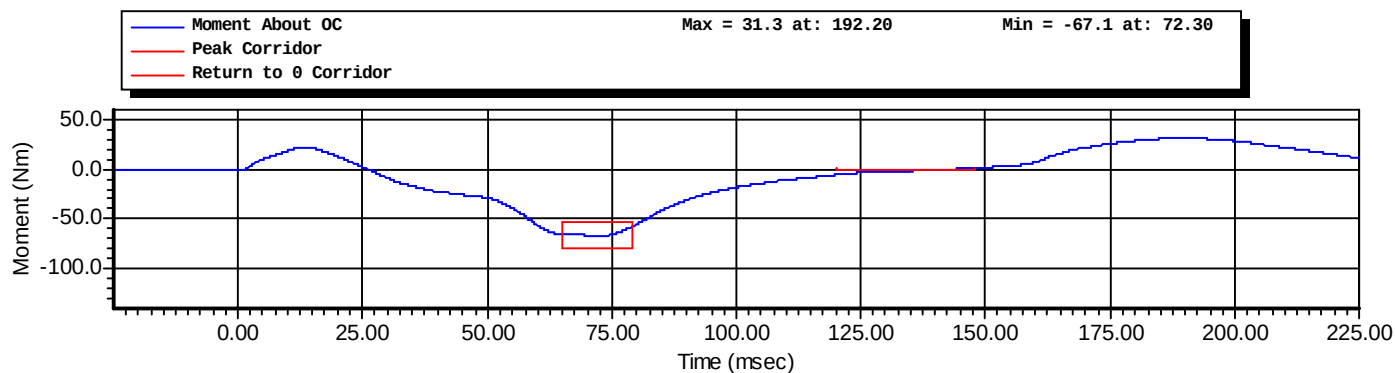
Pendulum Deceleration



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:	10/27/2010
Test Number:	1	Test Time:	4:04:48 PM

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	36 %RH	P
Velocity		6.89	-- 7.13	7.10 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	23.9 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.5 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	13.3 g	P
Deceleration time to	5 g	34.0	-- 42.0	39.3 ms	P
D Plane Rotation		-78.0	-- -64.0	-65.5 degrees	P
Time at max rotation		57.0	-- 64.0	60.9 ms	P
Rotation Decay to Zero		113.0	-- 128.0	119.2 ms	P
Moment about OC		88.1	-- 108.4	88.6 Nm	P
Time at Max Moment		47.0	-- 58.0	57.5 ms	P
Moment Decay to Zero		97.0	-- 107.0	99.9 ms	P

All test parameters are within specifications

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

Test ID: **Neck Flexion**

Test Time: **4:04:48 PM**

Test Date: **10/27/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Flexion**

Test Time: **4:04:48 PM**

Test Date: **10/27/2010**

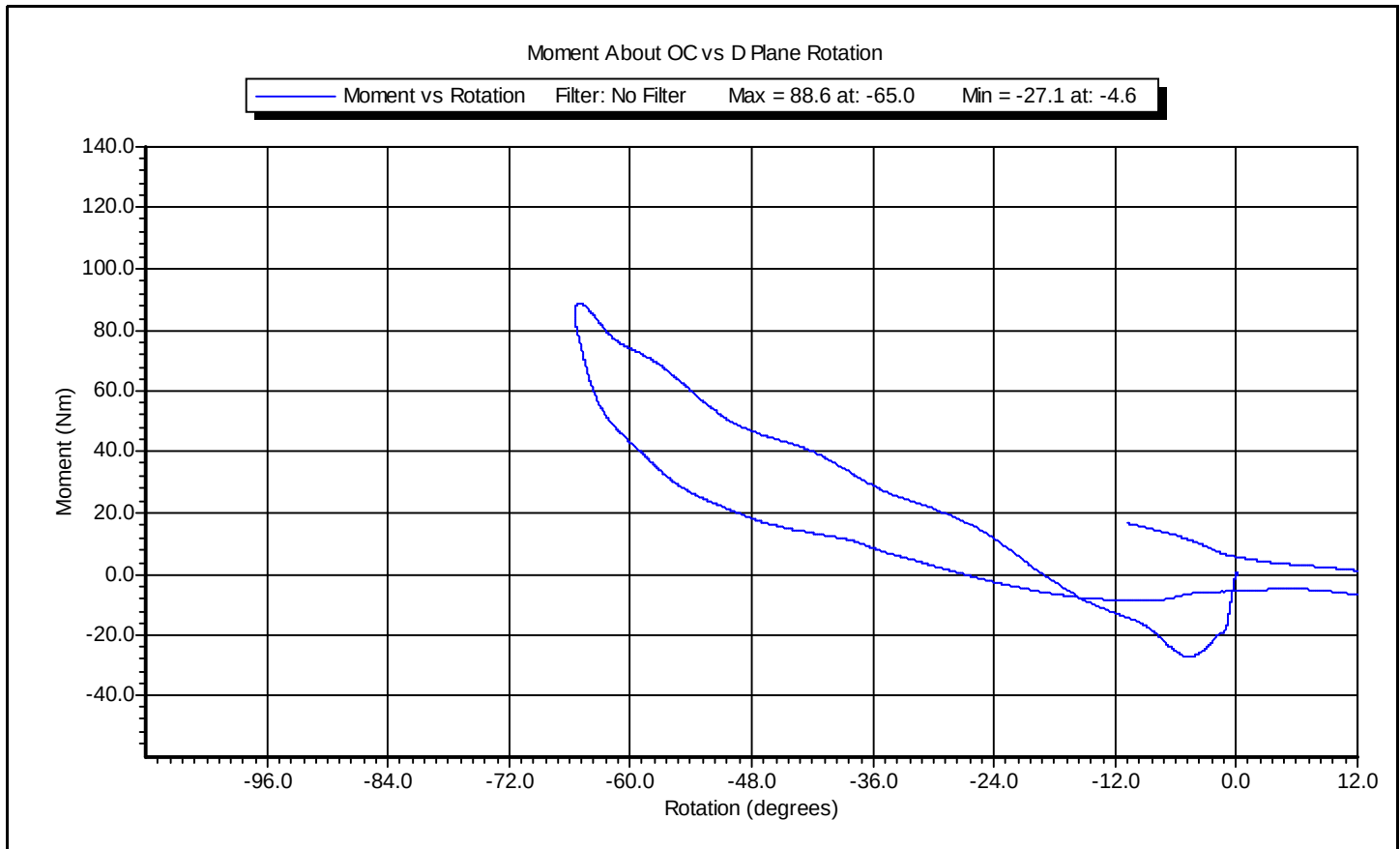


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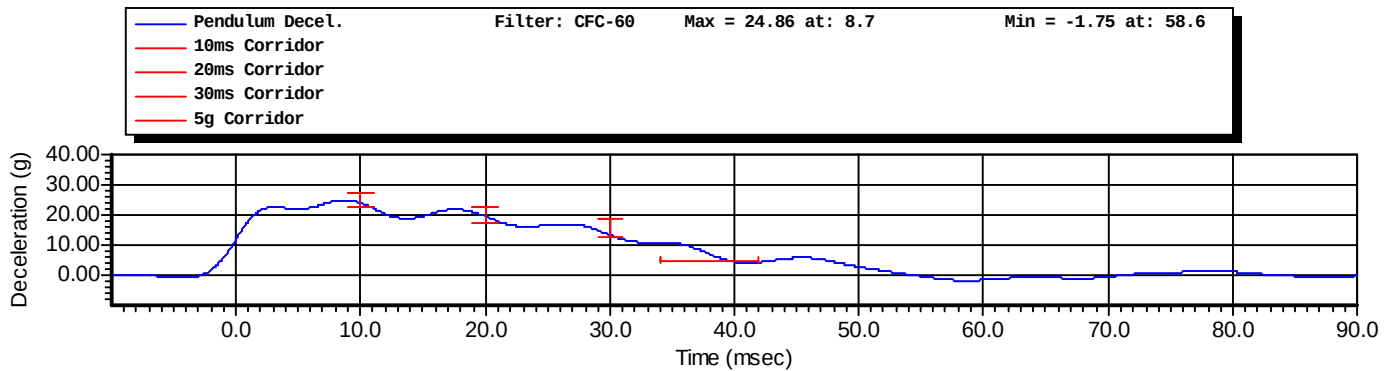
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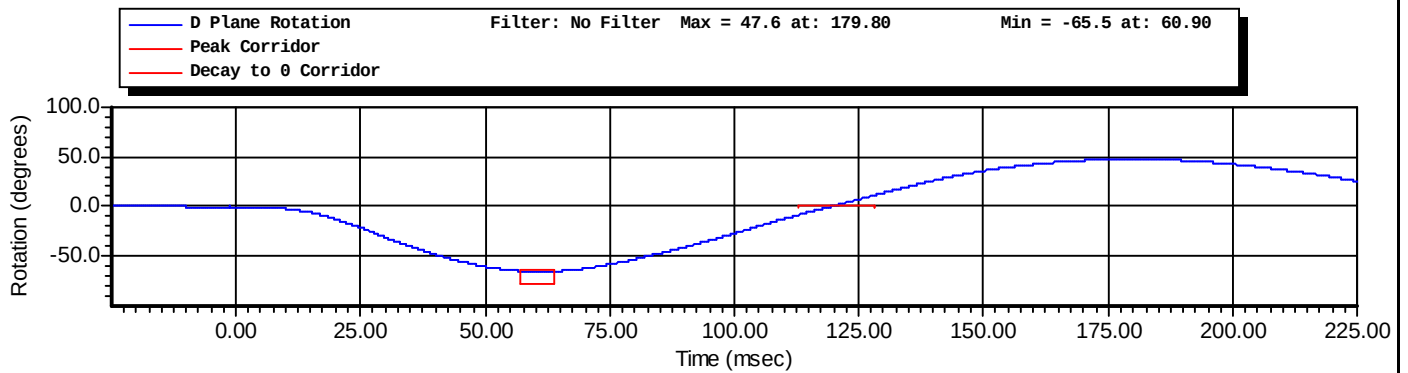
Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	10/27/2010
Number of Test:	1	Time of Test:	4:04:48 PM



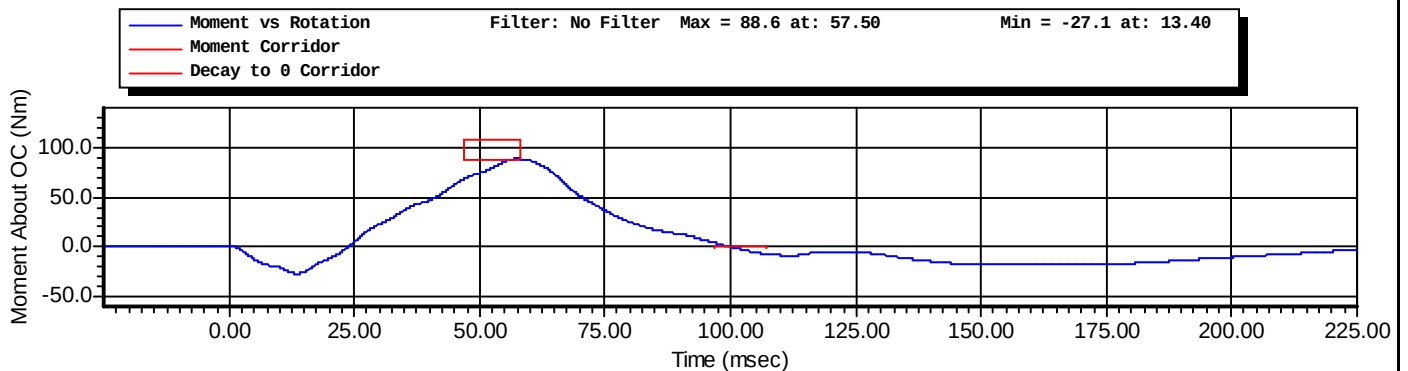
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	10/26/2010
Test Number:	1	Test Time:	10:55:56 AM

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

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10.0	--	70.0	57.0 %RH	P
Velocity	6.59	--	6.83	6.72 m/s	P
Resistive Force	-5.894	--	-5.160	-5.586 kN	P
Sternum Displacement	-72.6	--	-63.5	-72.4 mm	P
Hysteresis	69	--	85	72 %	P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

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

Test ID: **Thorax**

Test Time: **10:55:56 AM**

Test Date: **10/26/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

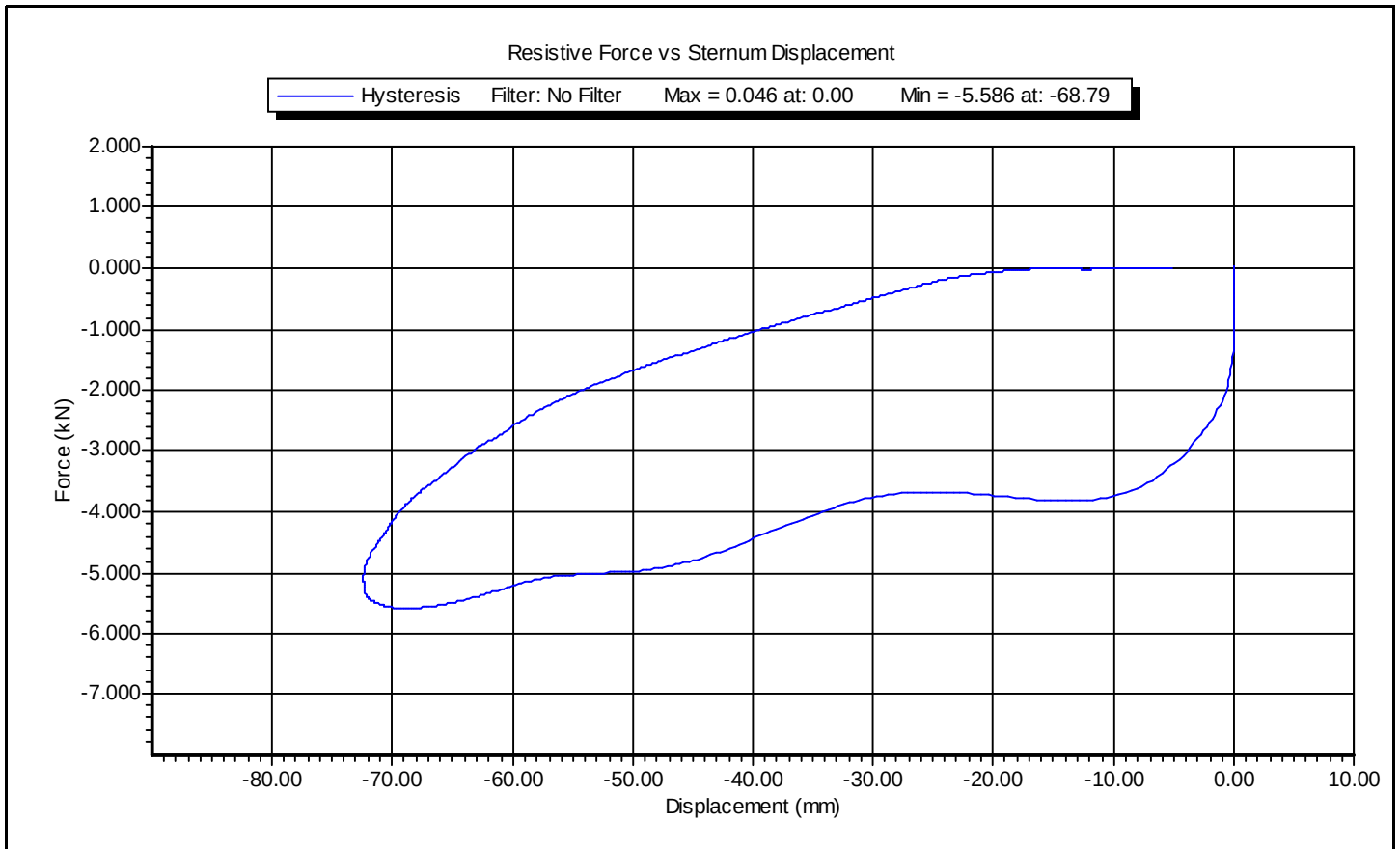
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66930	10/5/2010
DentonATD	78051-342	DS-061	6/1/2010

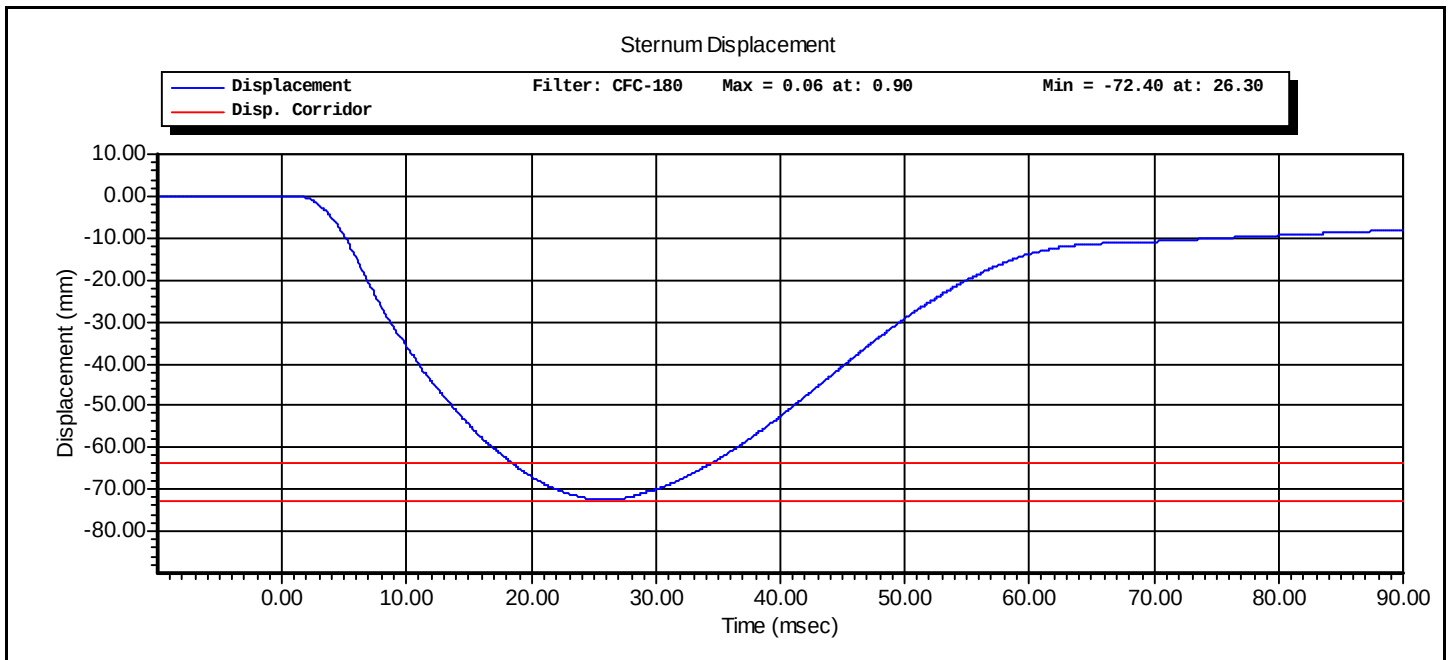
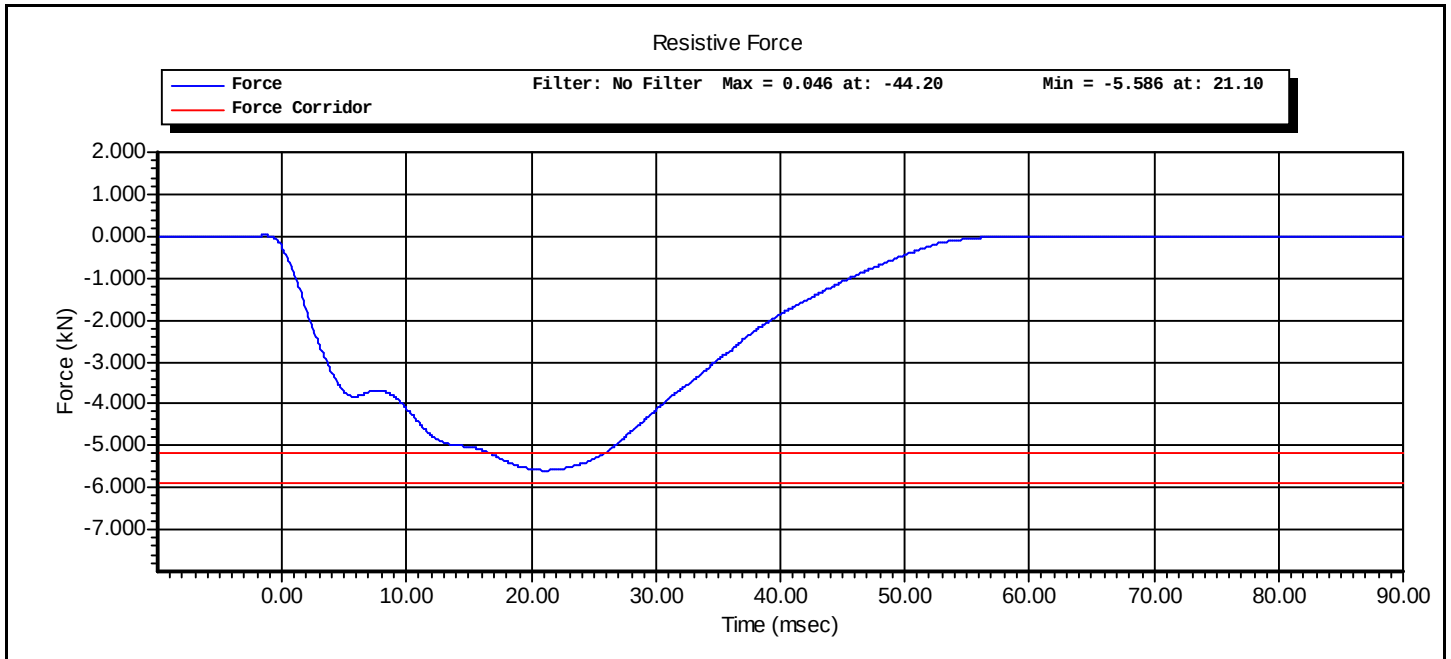
Test ID: **Thorax**

Test Time: **10:55:56 AM**

Test Date: **10/26/2010**

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:	10/26/2010
Test Number:	1	Test Time:	10:55:56 AM





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

Serial Number: 061
Test Number: 1
Comments: RIGHT

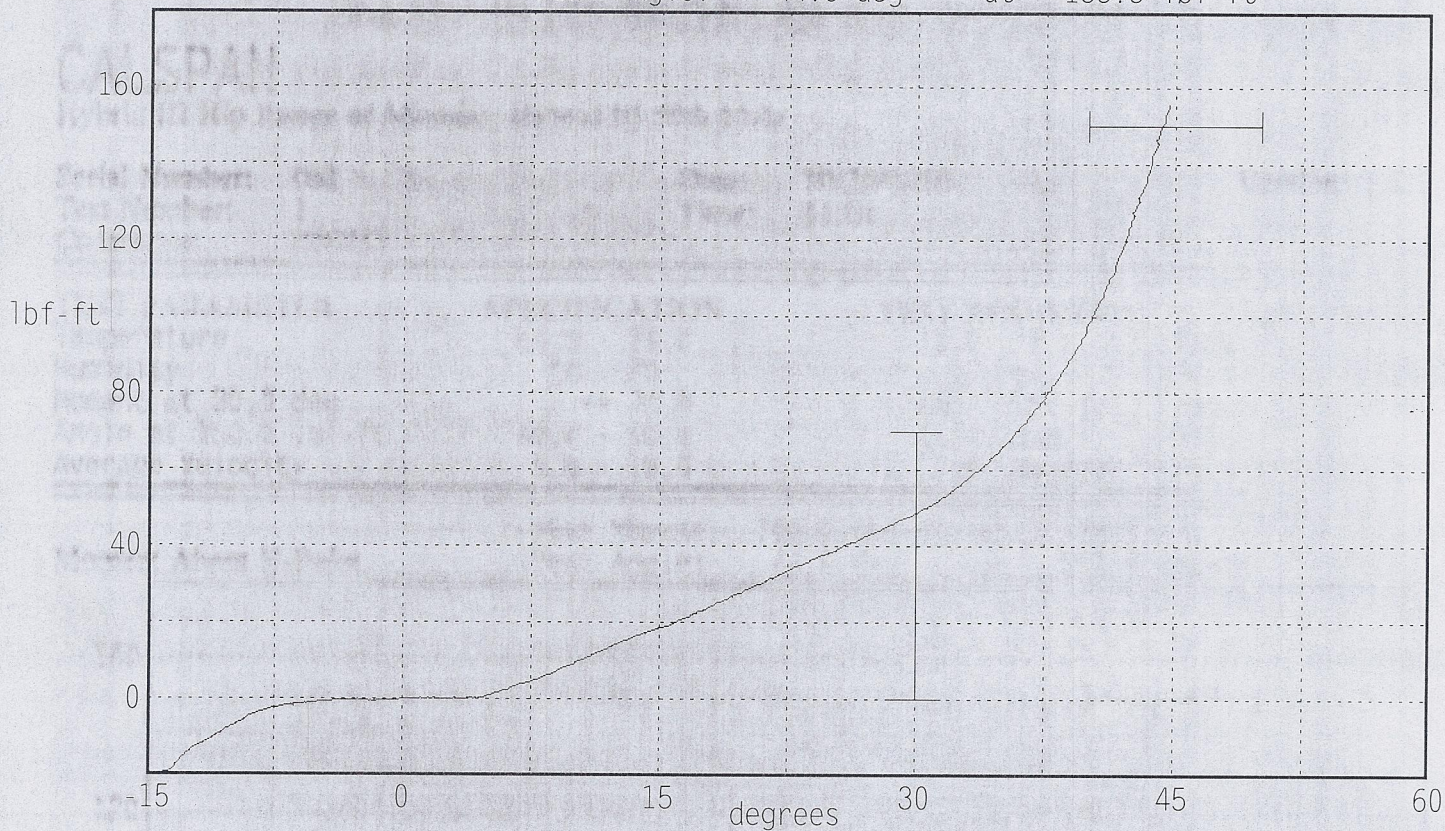
Date: 10/28/2010
Time: 11:04

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	71.0 °F Pass
Humidity	10 - 70	37 % Pass
Moment at 30.0 deg	<= 70.0	48.7 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.4 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point

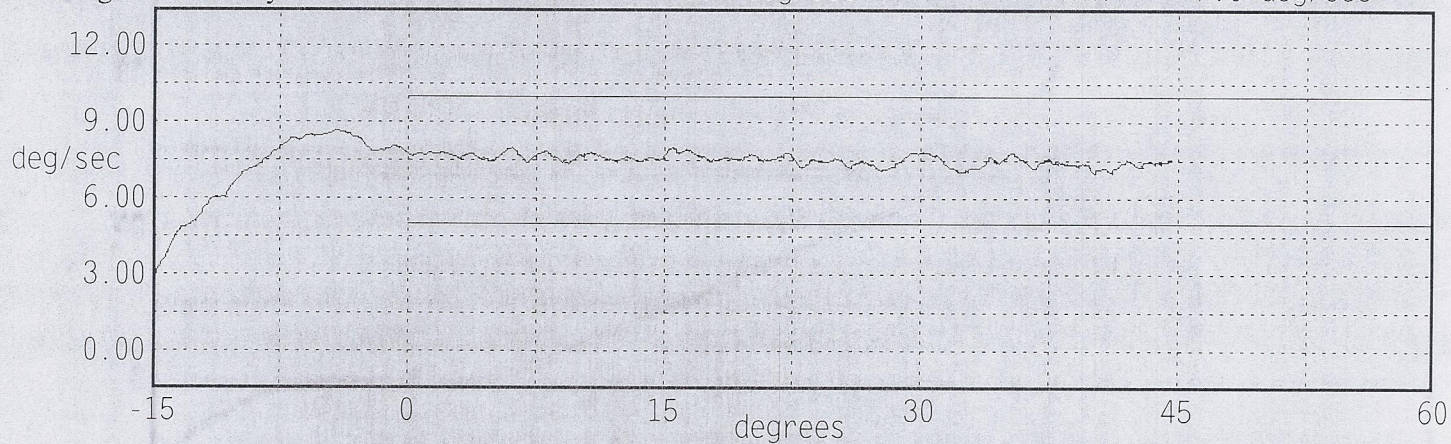
Peak Moment: 155.5 lbf-ft at 44.6 deg
Peak Angle: 44.6 deg at 155.5 lbf-ft



Angular Velocity

Max: 8.0 deg/sec

Min: 7.0 deg/sec



CALSPAN

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

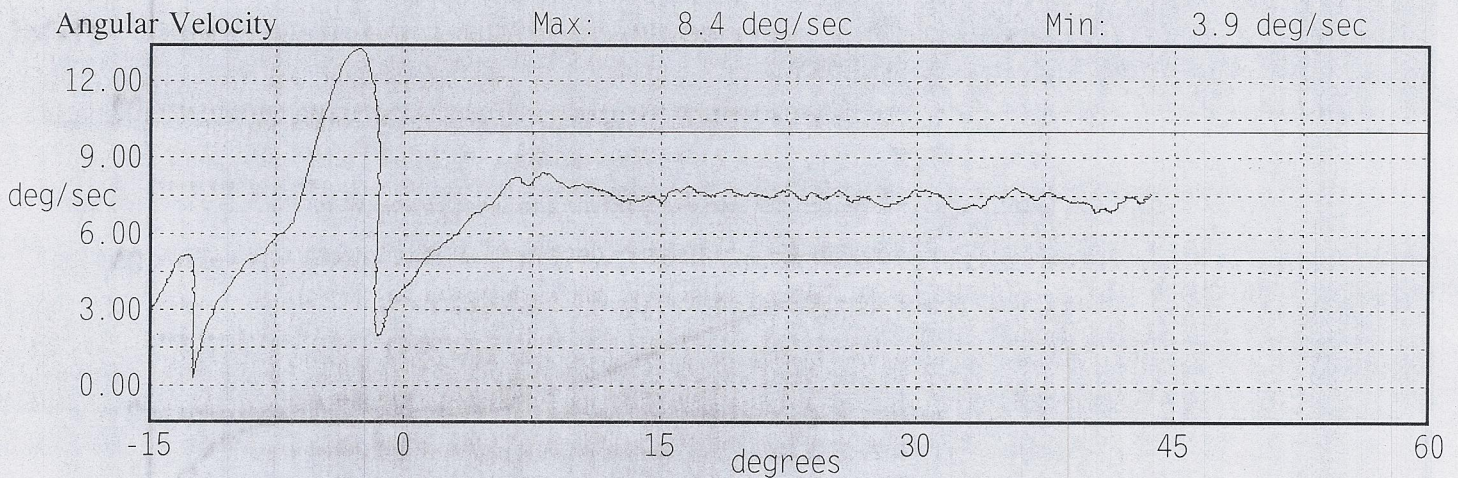
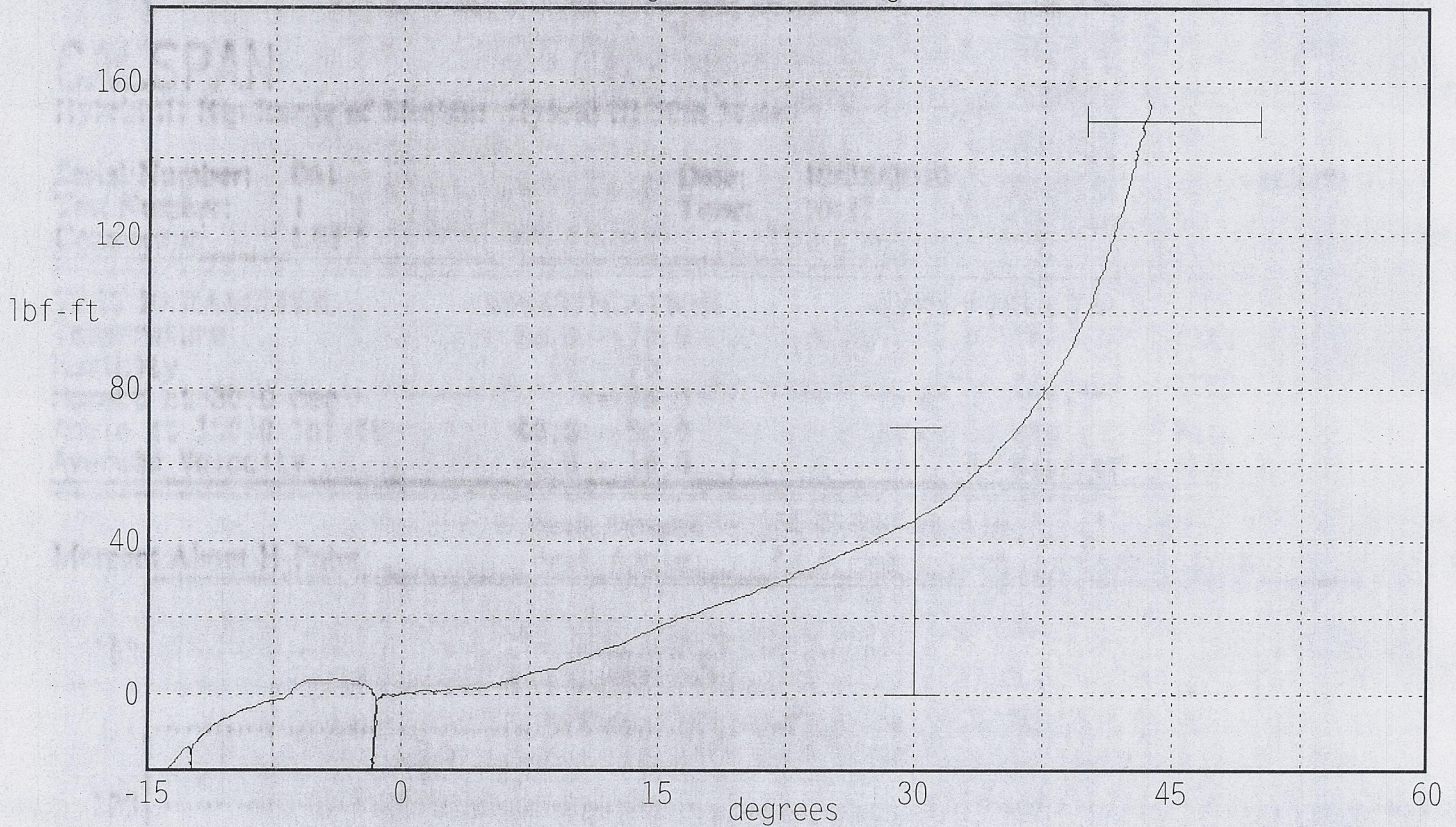
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 10/28/2010
Time: 10:57

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	71.0 °F Pass
Humidity	10 - 70	37 % Pass
Moment at 30.0 deg	<= 70.0	46.0 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.5 deg Pass
Average Velocity	5.0 - 10.0	7.3 deg/sec Pass

Moment About H-Point
Peak Moment: 155.7 lbf-ft at 43.6 deg
Peak Angle: 43.6 deg at 154.5 lbf-ft





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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	10/28/2010
Test Number:	1	Test Time:	2:31:25 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	34.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-5.24 kN P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

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

Test ID: **Left Knee**

Test Time: **2:31:25 PM**

Test Date: **10/28/2010**



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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: **2:31:25 PM**

Test Date: **10/28/2010**

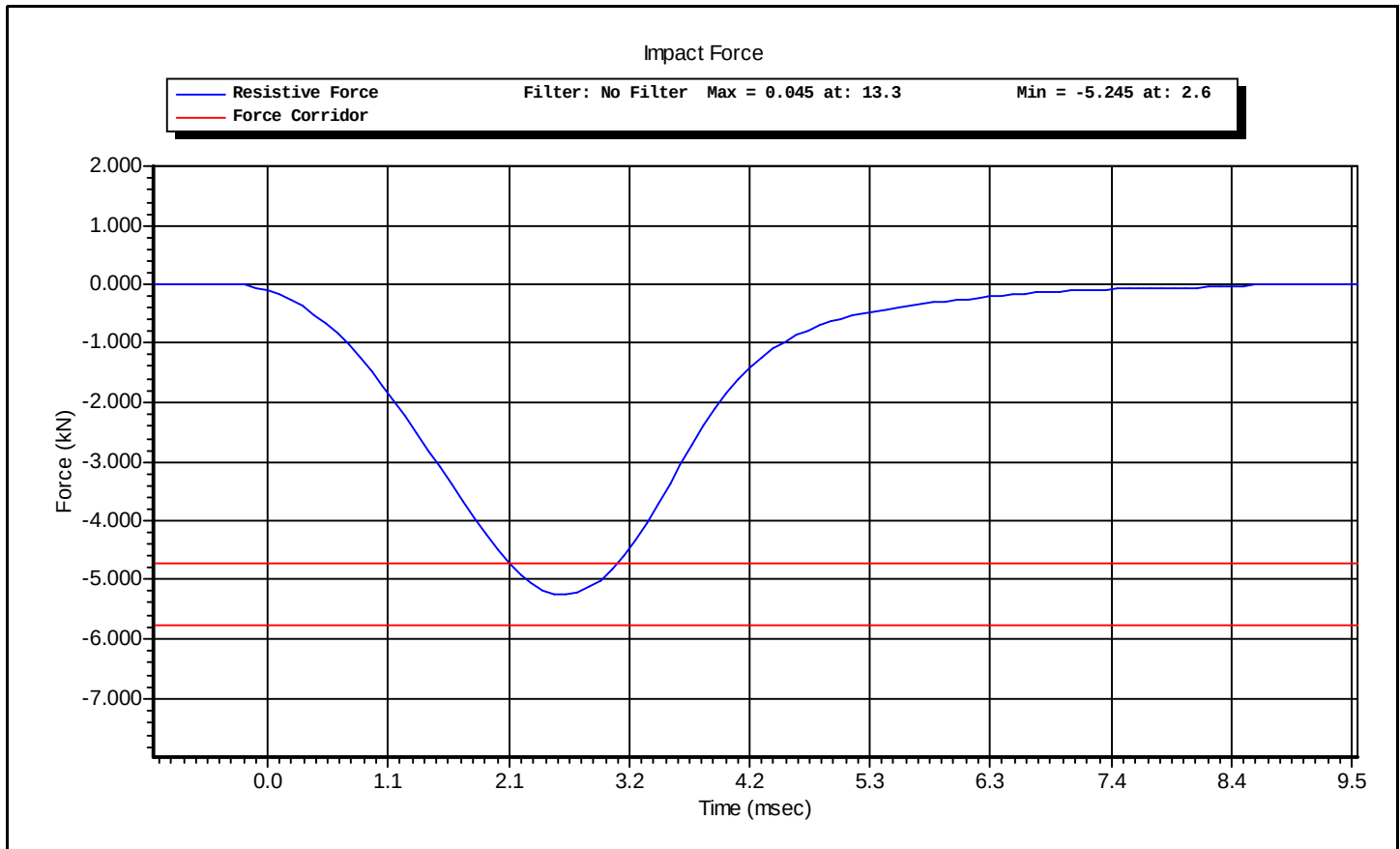


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	10/28/2010
Test Number:	1	Test Time:	2:31:25 PM



Test ID: **Left Knee**

Test Time: **2:31:25 PM**

Test Date: **10/28/2010**



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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:	10/28/2010
Test Number:	1	Test Time:	2:25:48 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	35.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-5.33 kN P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

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

Test ID: **Right Knee**

Test Time: **2:25:48 PM**

Test Date: **10/28/2010**



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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: **2:25:48 PM**

Test Date: **10/28/2010**

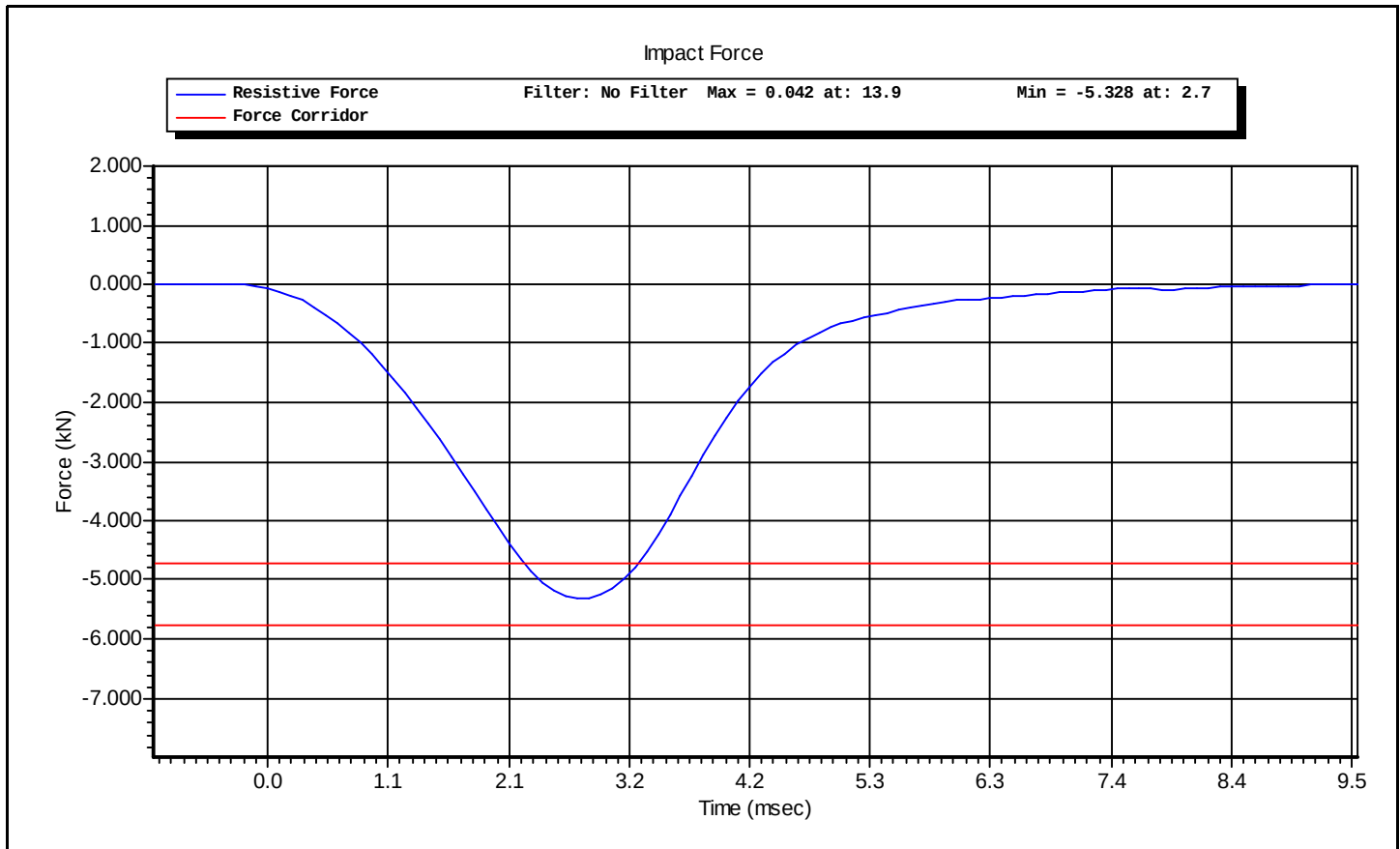


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	10/28/2010
Test Number:	1	Test Time:	2:25:48 PM



Test ID: Right Knee

Test Time: 2:25:48 PM

Test Date: 10/28/2010

CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

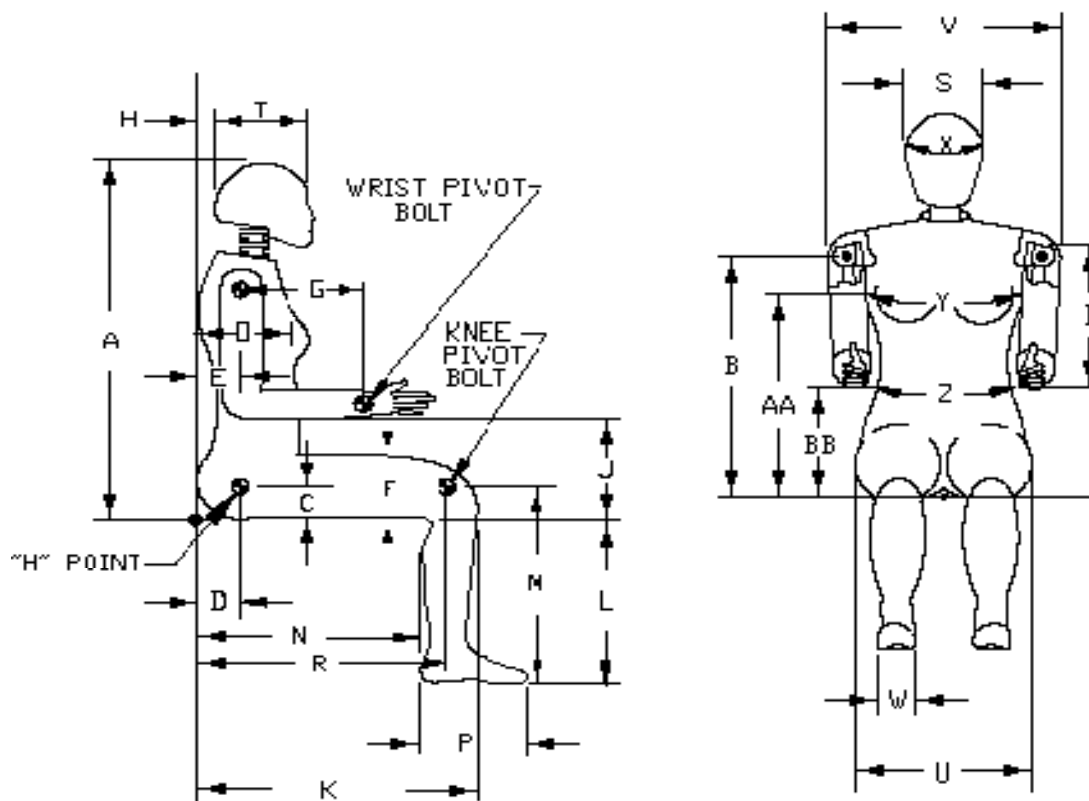
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	784	Yes
B	Shoulder Pivot Height	431.8 – 457.2	450	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	130	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	250	Yes
H	Head Back to Backline	43.2 – 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	282	Yes
J	Elbow Rest Height	182.8 – 203.2	195	Yes
K	Buttock to Knee Length	520.7 – 546.1	529	Yes
L	Popliteal Height	355.6 - 376	361	Yes
M	Knee Pivot Height	393.7 – 419.1	399	Yes
N	Buttock Popliteal Length	414 – 439.4	421	Yes
O	Chest Depth without Jacket	175.3 – 190.5	185	Yes
P	Foot Length (right)	218.5 – 233.7	221	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	465	Yes
S	Head Breadth	137.1 – 147.3	144	Yes
T	Head Depth	177.8 - 188	180	Yes
U	Hip Breadth	299.7 – 314.9	311	Yes
V	Shoulder Breadth	350.5 – 365.7	358	Yes
W	Foot Breadth	78.8 - 94	85	Yes
X	Head Circumference	528.3 – 548.7	540	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	859	Yes
Z	Waist Circumference	759.5 – 789.9	775	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: SZ

Date: 11/1/2010

Hybrid III 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/29/2010
Test Number:	1	Test Time:	12:58:21 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	780

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	30 %RH P
Resultant Acceleration	250 -- 300	284 g P
Oscillation	0.0 -- 10.0	5.3 % P
Lateral Acceleration	-15.00 -- 15.00	14.35 g P

All test parameters are within specifications

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

Test ID: **Head Drop**

Test Time: **12:58:21 PM**

Test Date: **10/29/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	10/25/2010
Endevco	7264-2000	P66931	10/25/2010
Endevco	7264-2000	P66926	10/25/2011

Test ID: **Head Drop**

Test Time: **12:58:21 PM**

Test Date: **10/29/2010**

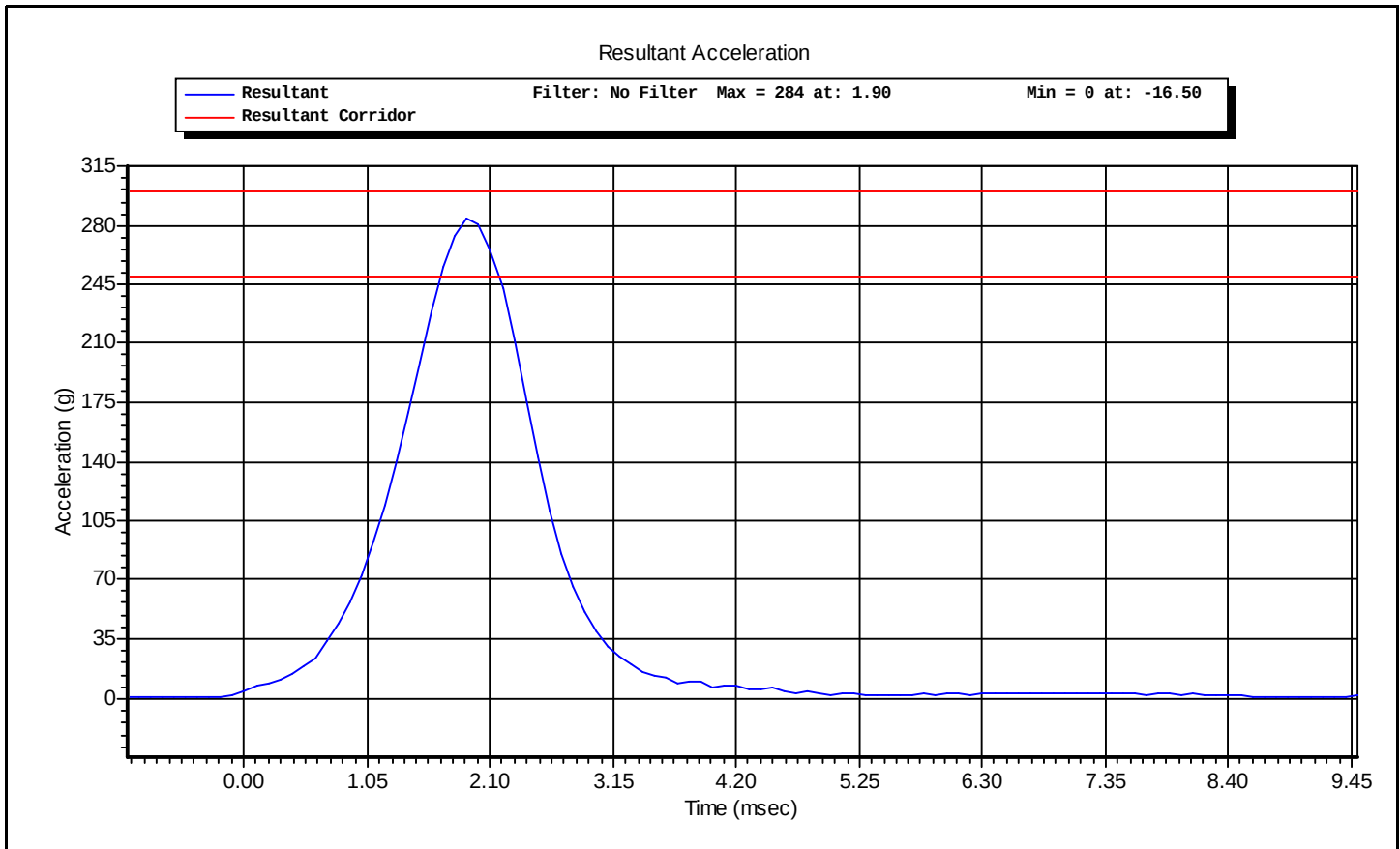


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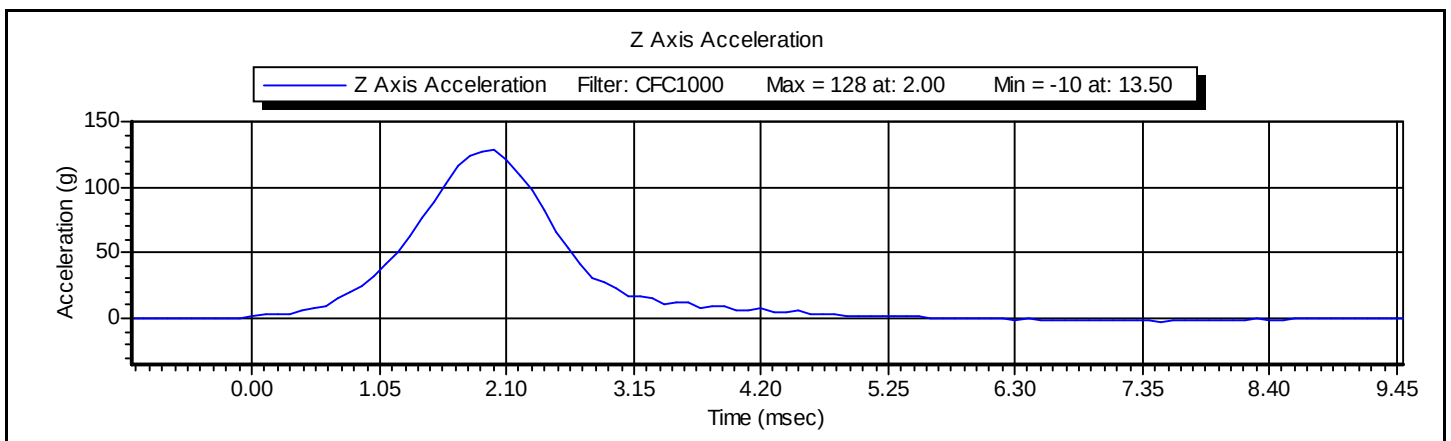
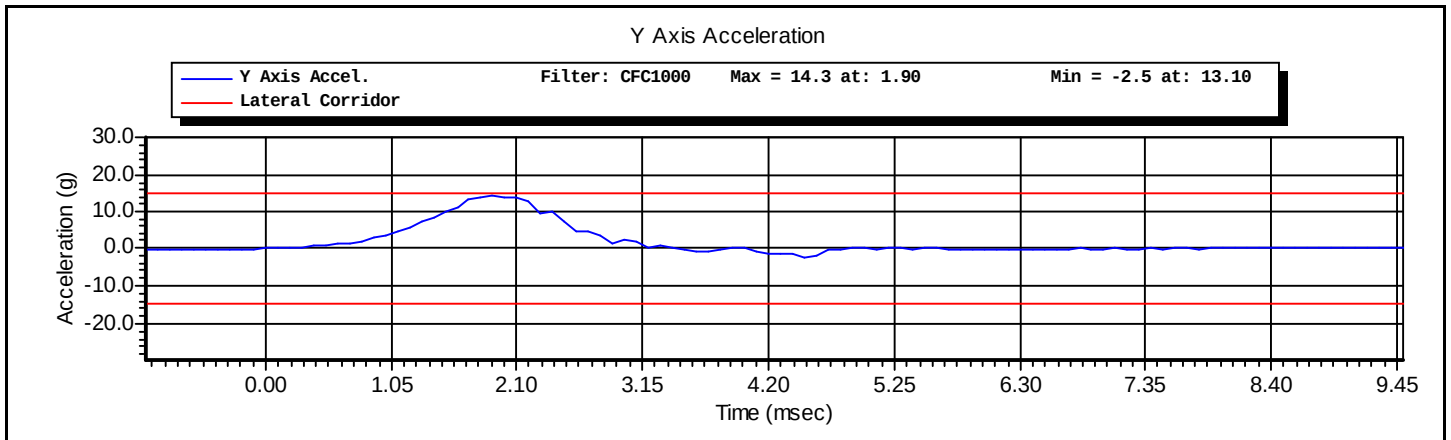
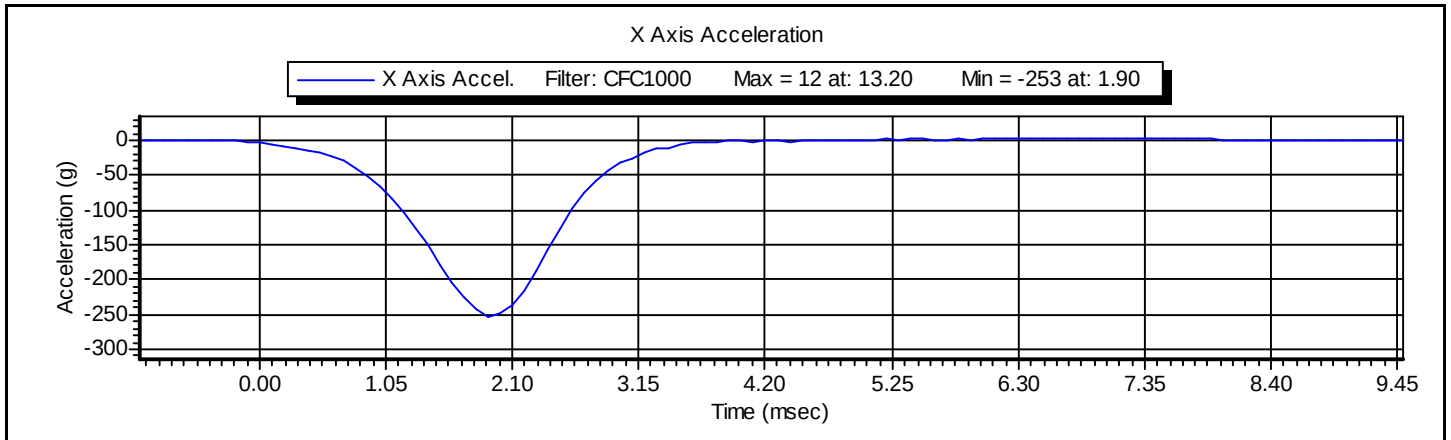
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/29/2010
Test Number:	1	Test Time:	12:58:21 PM



Test ID: **Head Drop**

Test Time: **12:58:21 PM**

Test Date: **10/29/2010**





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/29/2010
Test Number:	2	Test Time:	11:41:29 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	31 %RH P
Velocity	5.95 -- 6.19	6.13 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.63 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.22 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	4.70 m/s P
D Plane Rotation	99.0 -- 114.0	103.6 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-53.1 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	105.9 ms P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

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

Test ID: **Neck Extension**

Test Time: **11:41:29 AM**

Test Date: **10/29/2010**



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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
FTSS	1716A	LC-296 My	2/1/2010
FTSS	1716A	LC-296 Fx	2/1/2010
FTSS	1716A	LC-296 Fy	2/1/2010
FTSS	1716A	LC-296 Fz	2/1/2010

Test ID: **Neck Extension**

Test Time: **11:41:29 AM**

Test Date: **10/29/2010**

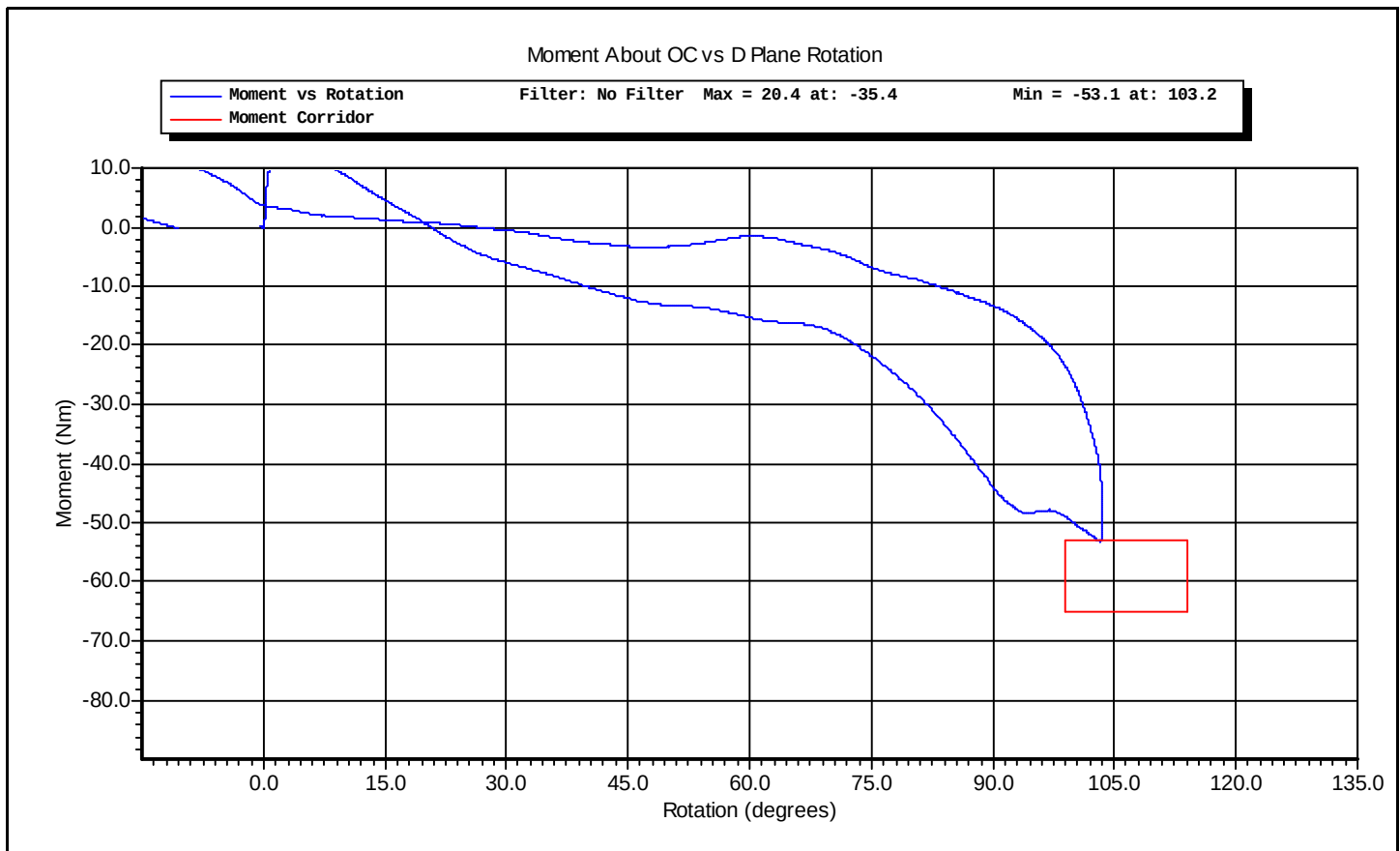


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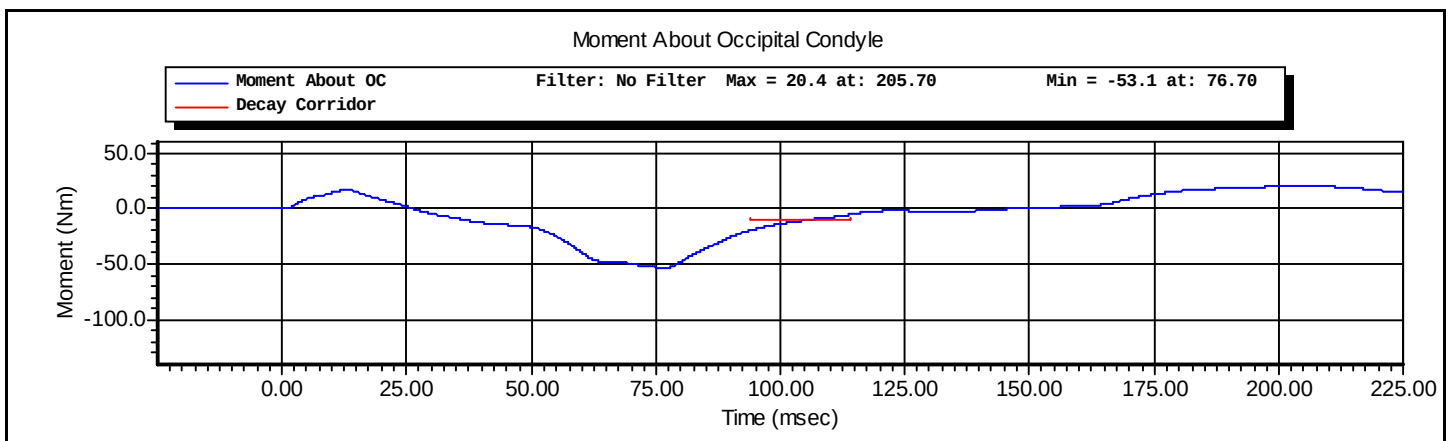
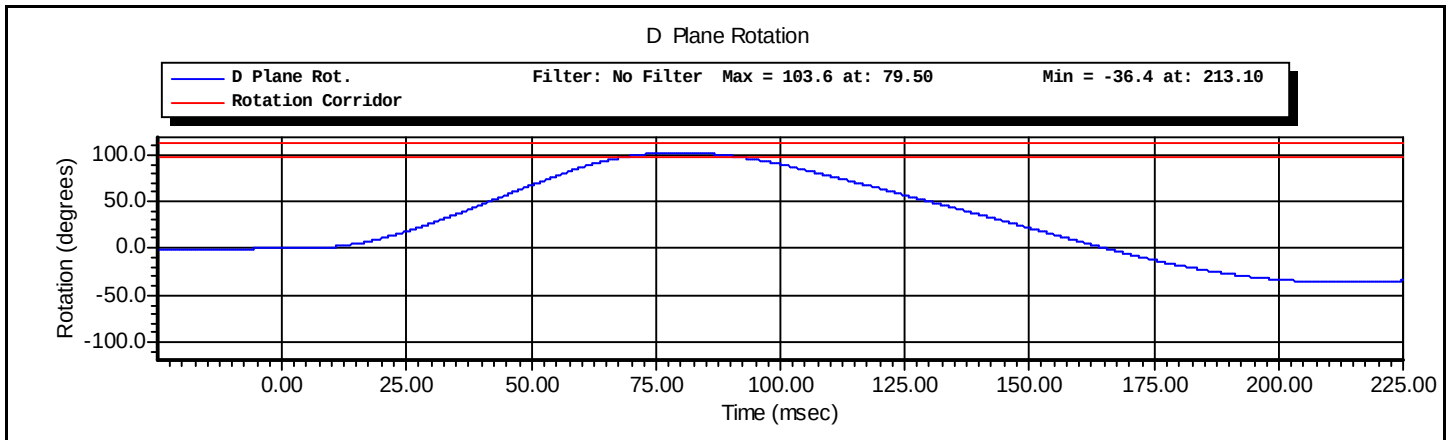
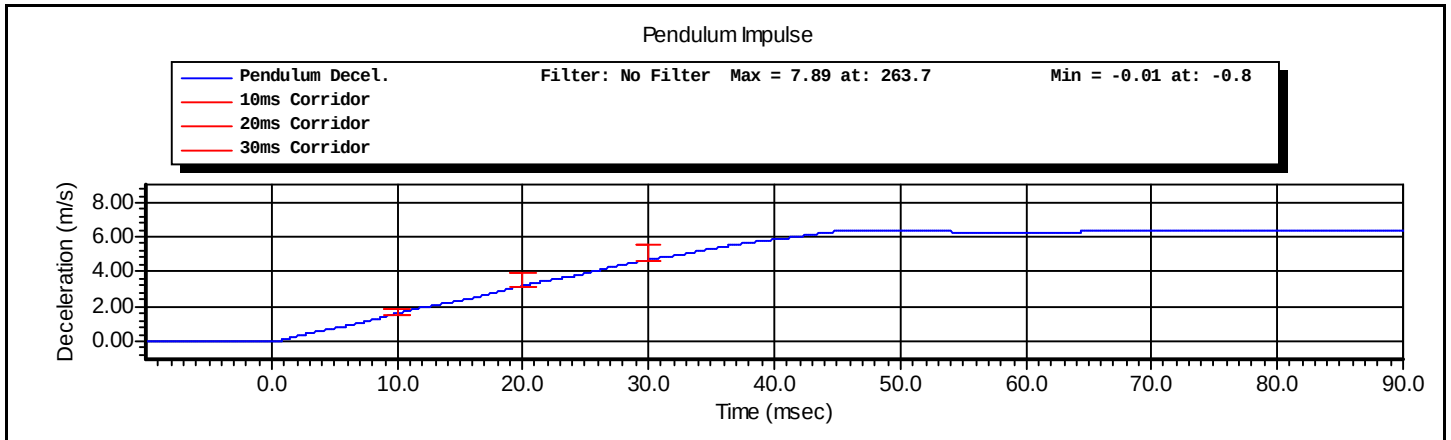
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/29/2010
Test Number:	2	Test Time:	11:41:29 AM



Test ID: Neck Extension Test Time: 11:41:29 AM

Test Date: 10/29/2010





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/29/2010
Test Number:	1	Test Time:	10:07:57 AM

Component Part Number	Component Serial Number
Neck - 880105-255	713
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	22.0 deg C P
Humidity	10 -- 70	32 %RH P
Velocity	6.89 -- 7.13	7.10 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.19 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.51 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.45 m/s P
D Plane Rotation	-91.0 -- -77.0	-78.9 degrees P
Moment During Rotation Interval	69.0 -- 83.0	71.4 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	88.0 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **10:07:57 AM**

Test Date: **10/29/2010**



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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
FTSS	1716A	LC-296 My	2/1/2010
FTSS	1716A	LC-296 Fx	2/1/2010
FTSS	1716A	LC-296 Fy	2/1/2010
FTSS	1716A	LC-296 Fz	2/1/2010

Test ID: **Neck Flexion**

Test Time: **10:07:57 AM**

Test Date: **10/29/2010**

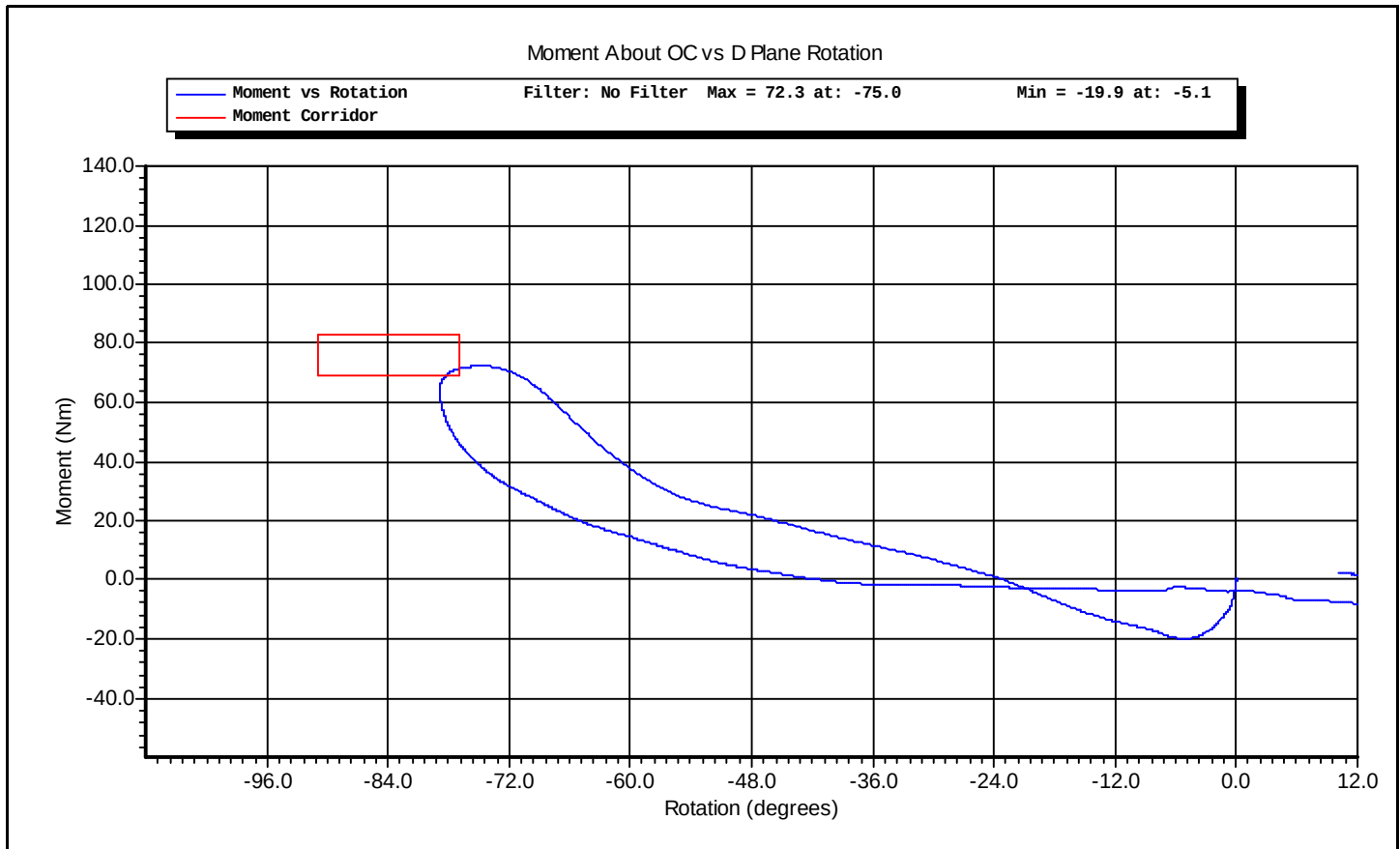


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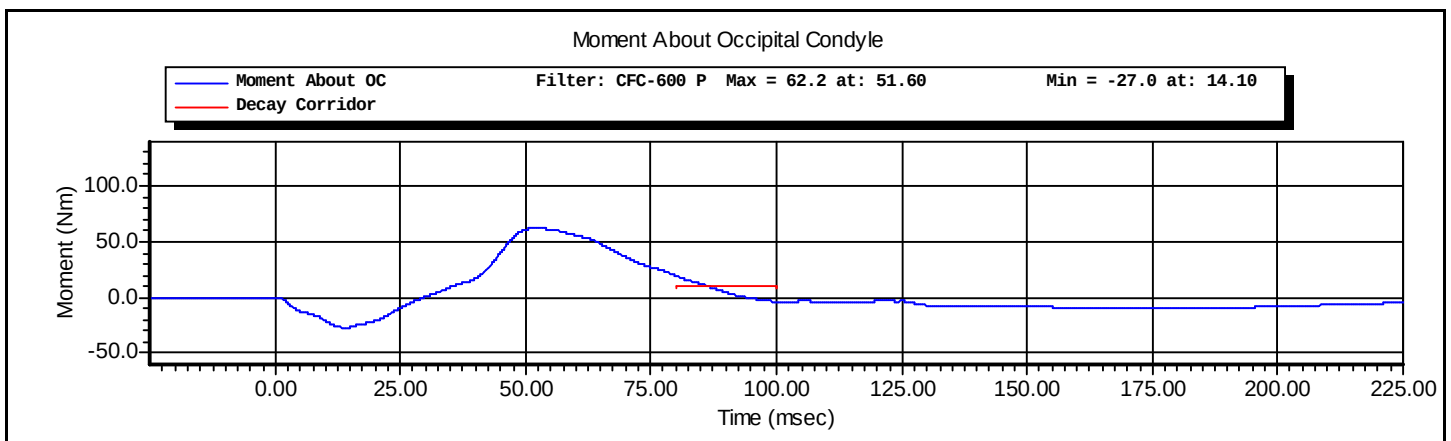
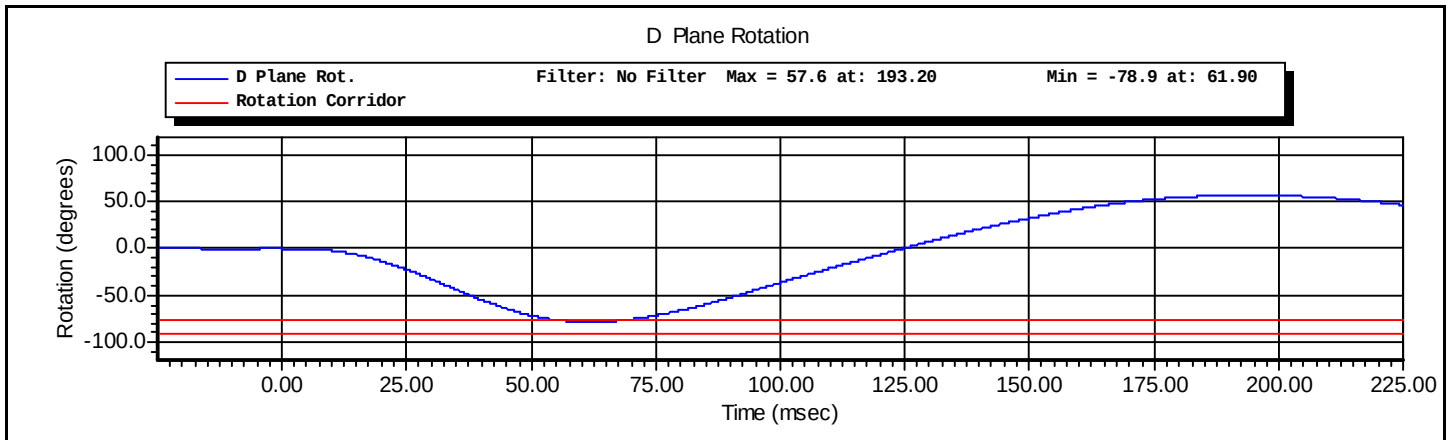
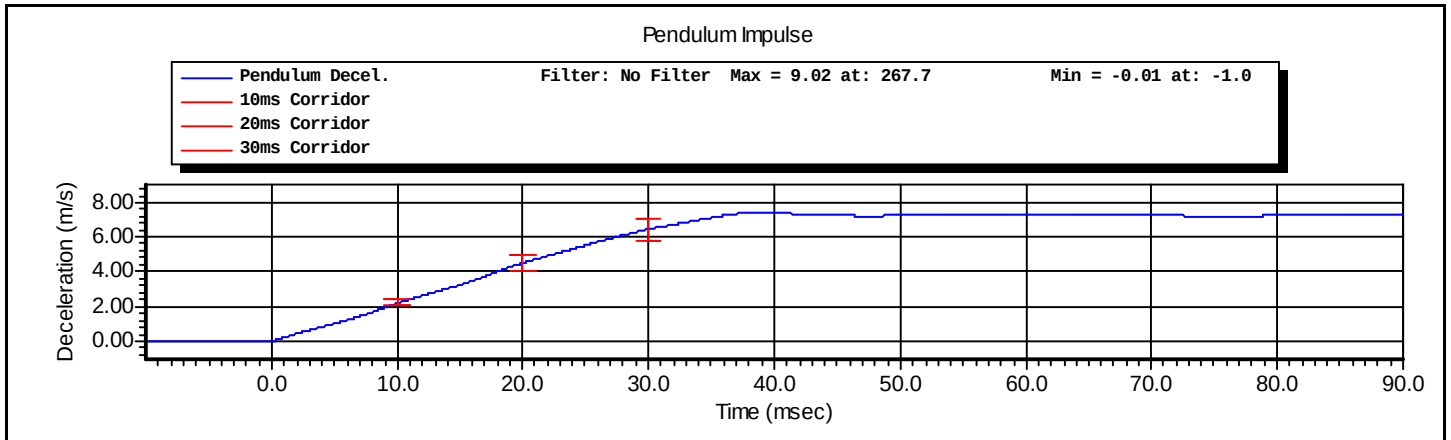
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/29/2010
Test Number:	1	Test Time:	10:07:57 AM



Test ID: Neck Flexion

Test Time: 10:07:57 AM

Test Date: 10/29/2010





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/27/2010
Test Number:	1	Test Time:	2:12:12 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10.0	--	70.0	41.0 %RH	P
Velocity	6.59	--	6.83	6.69 m/s	P
Sternum Displacement	-58.0	--	-50.0	-51.1 mm	P
Force During Displacement Interval	-4400	--	-3900	-4353 N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	-4266 N	P
Hysteresis	69	--	85	71 %	P

All test parameters are within specifications

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

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

Test ID: **Thorax Impact**

Test Time: **2:12:12 PM**

Test Date: **10/27/2010**



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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-273	4/13/2010

Test ID: **Thorax Impact**

Test Time: **2:12:12 PM**

Test Date: **10/27/2010**



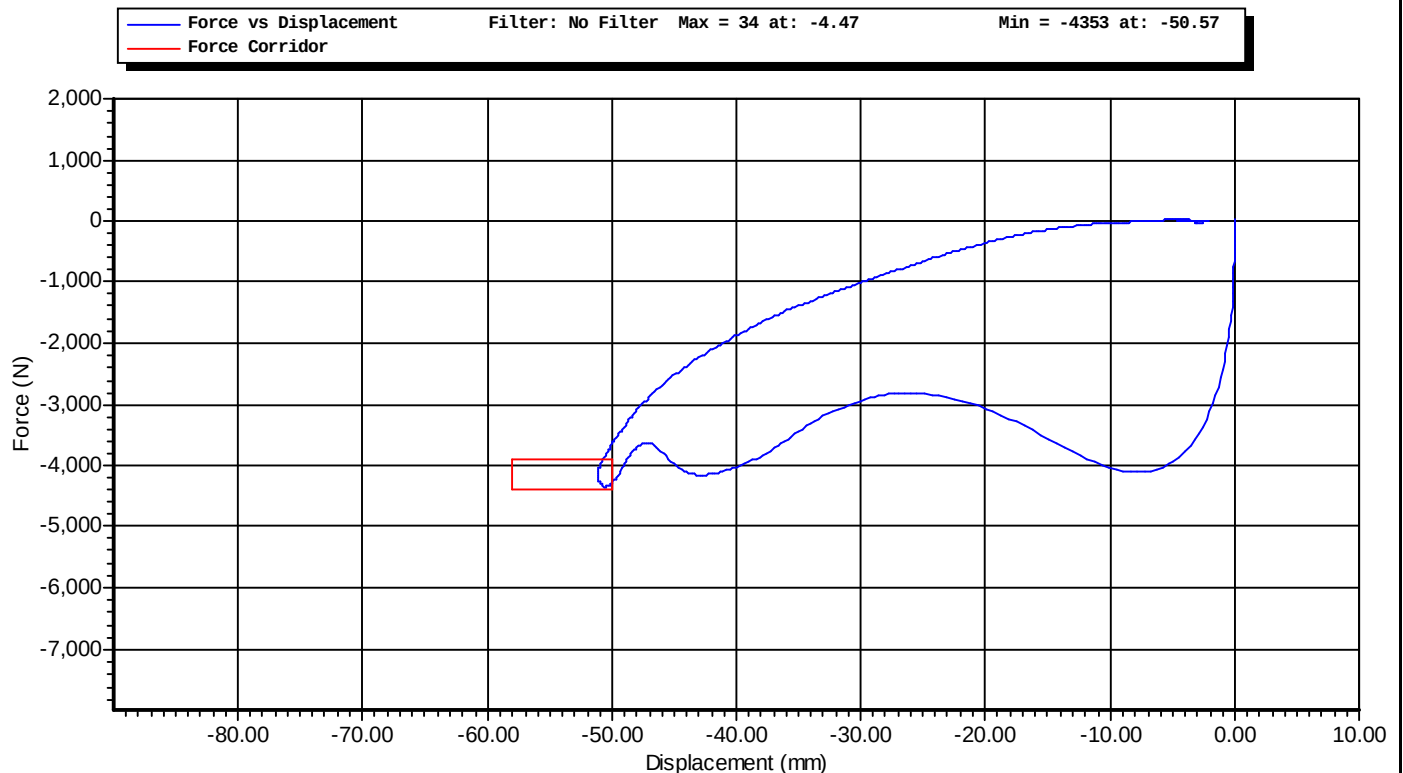
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/27/2010
Test Number:	1	Test Time:	2:12:12 PM

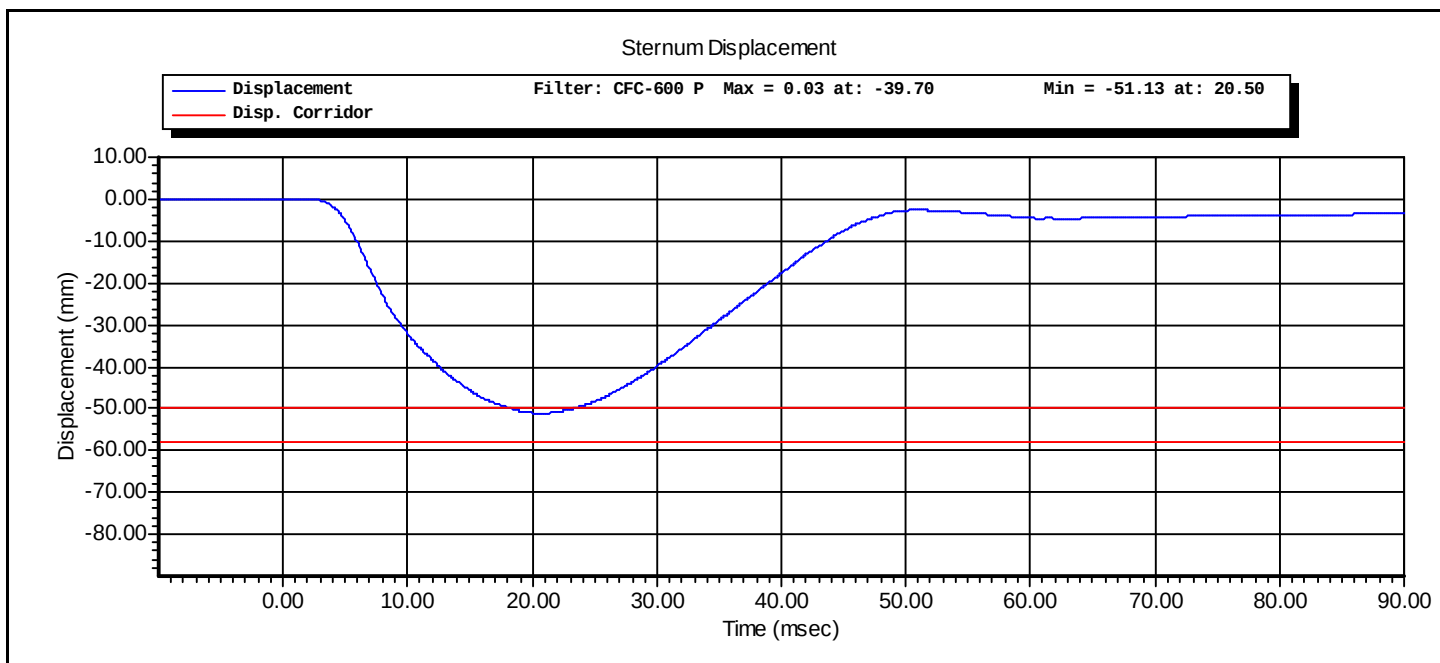
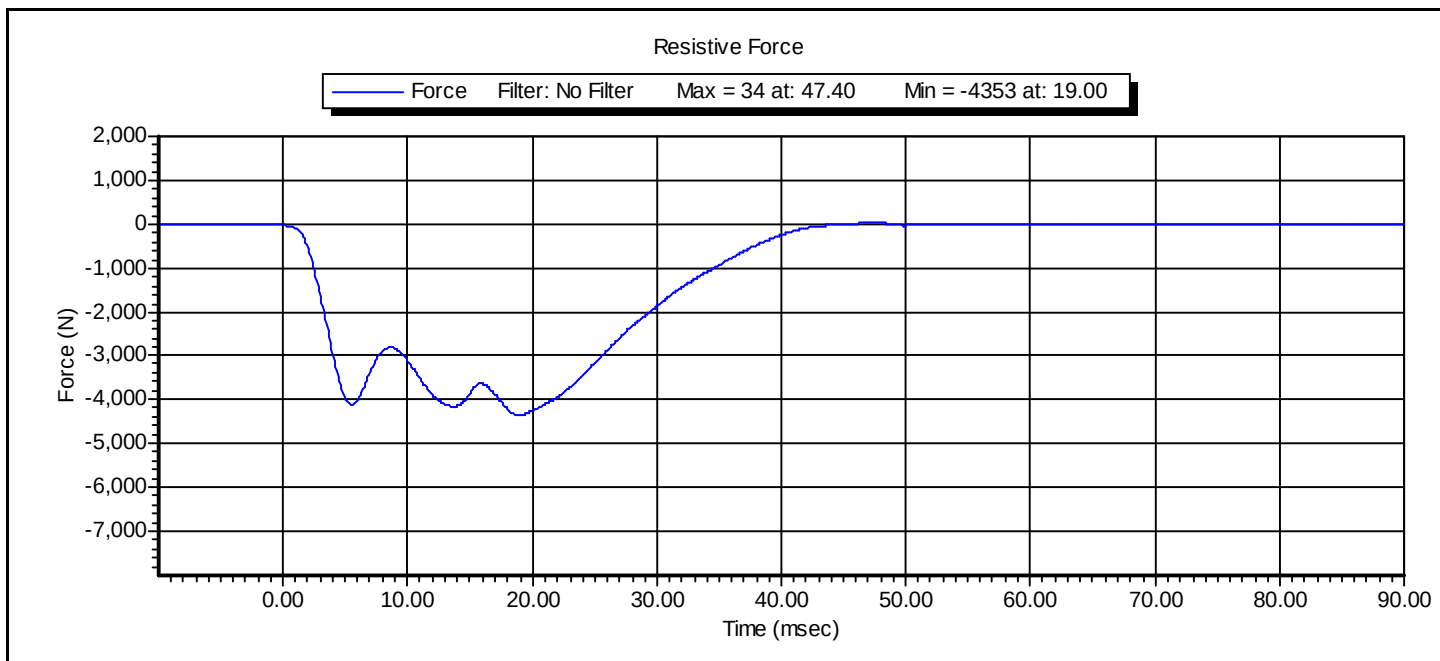
Resistive Force vs Sternum Displacement



Test ID: Thorax Impact

Test Time: 2:12:12 PM

Test Date: 10/27/2010





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/27/2010
Test Number:	1	Test Time:	2:12:12 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10.0	--	70.0	41.0 %RH	P
Velocity	6.59	--	6.83	6.69 m/s	P
Sternum Displacement	-58.0	--	-50.0	-51.1 mm	P
Force During Displacement Interval	-4400	--	-3900	-4353 N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	-4266 N	P
Hysteresis	69	--	85	71 %	P

All test parameters are within specifications

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

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

Test ID: **Thorax Impact**

Test Time: **2:12:12 PM**

Test Date: **10/27/2010**



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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-273	4/13/2010

Test ID: **Thorax Impact**

Test Time: **2:12:12 PM**

Test Date: **10/27/2010**



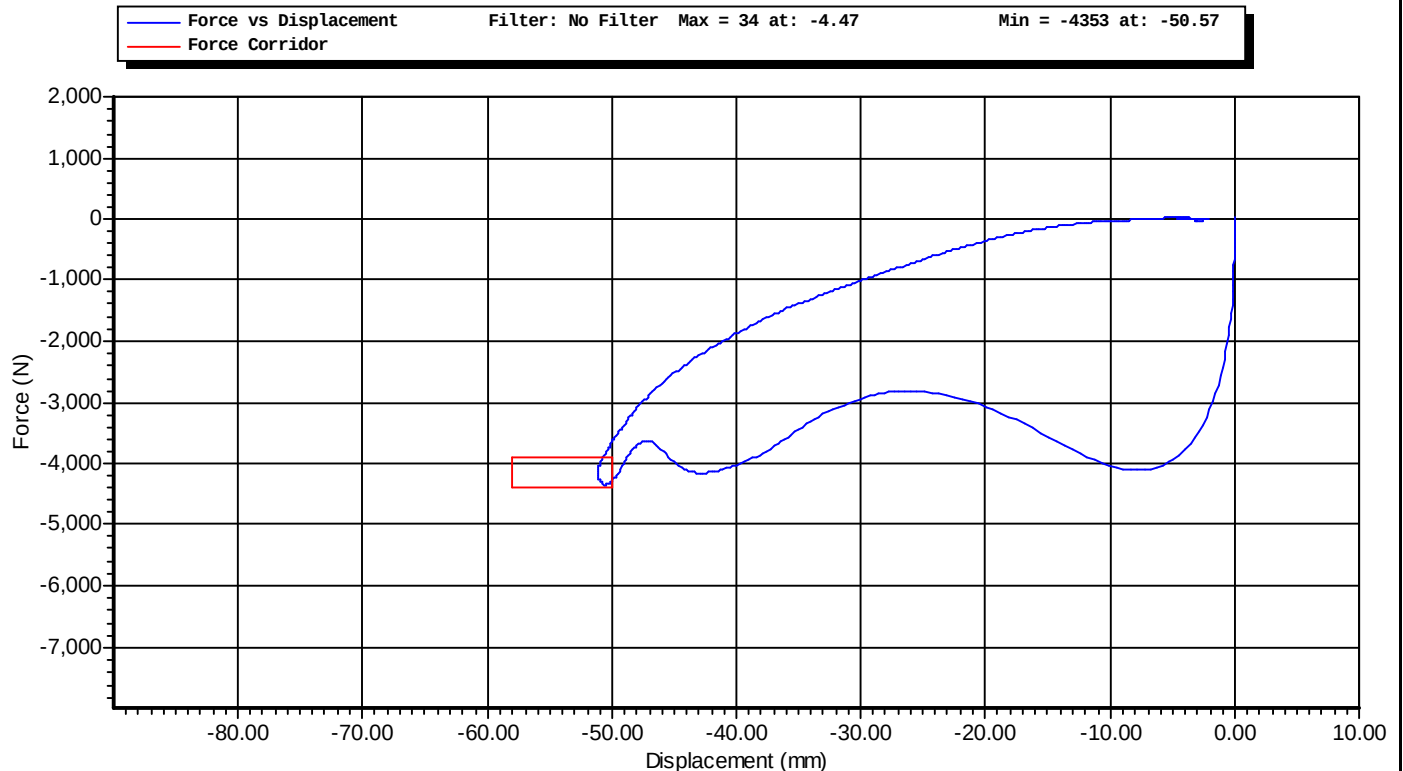
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/27/2010
Test Number:	1	Test Time:	2:12:12 PM

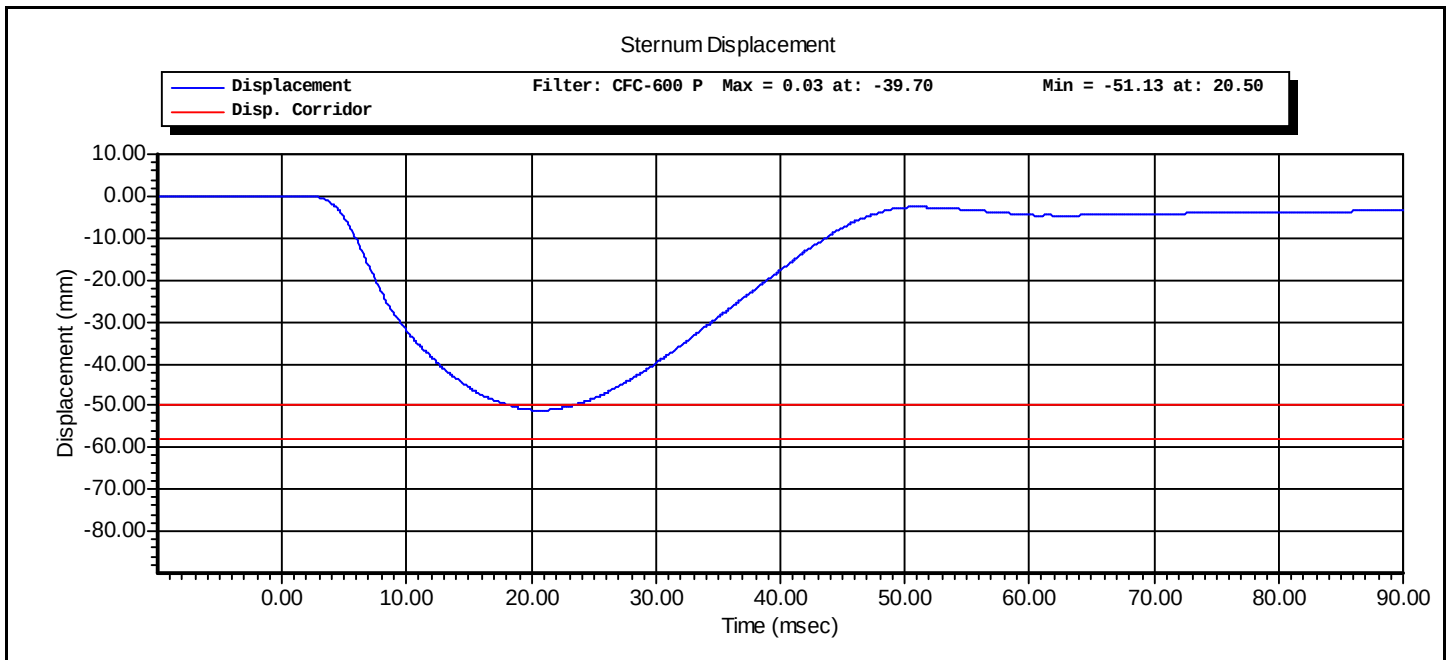
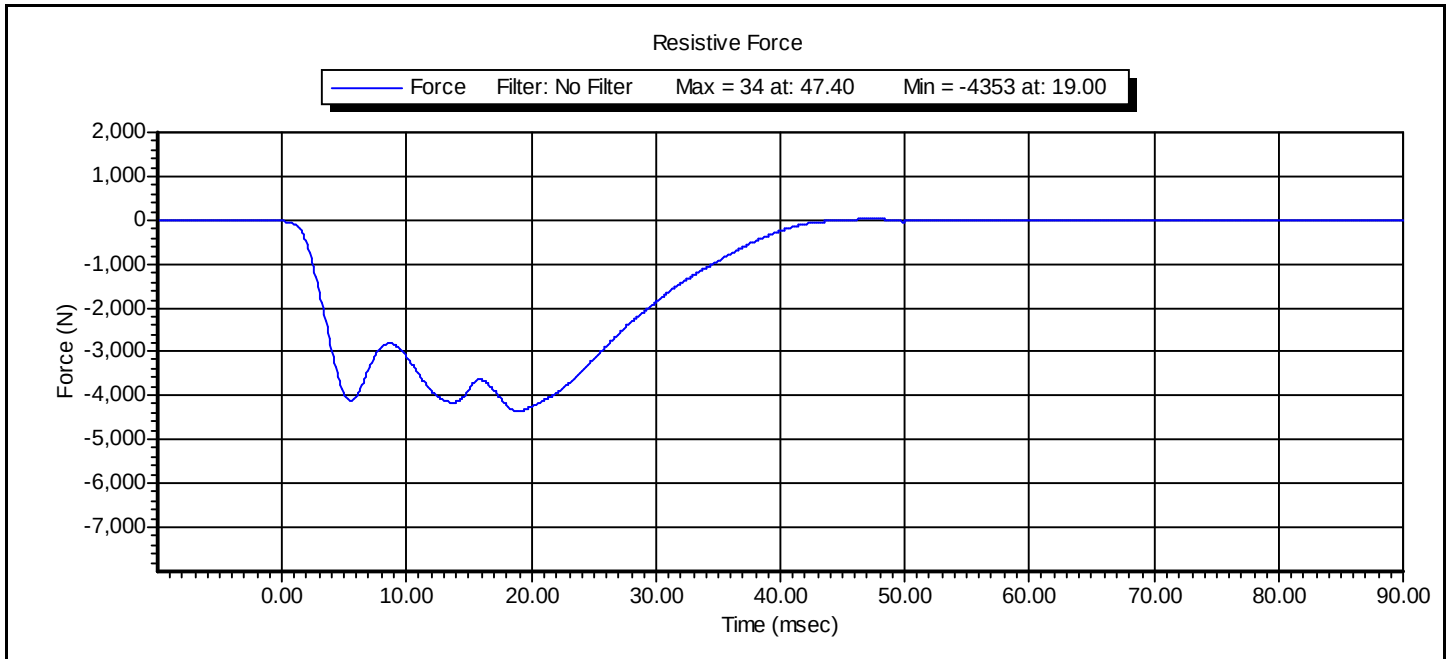
Resistive Force vs Sternum Displacement



Test ID: Thorax Impact

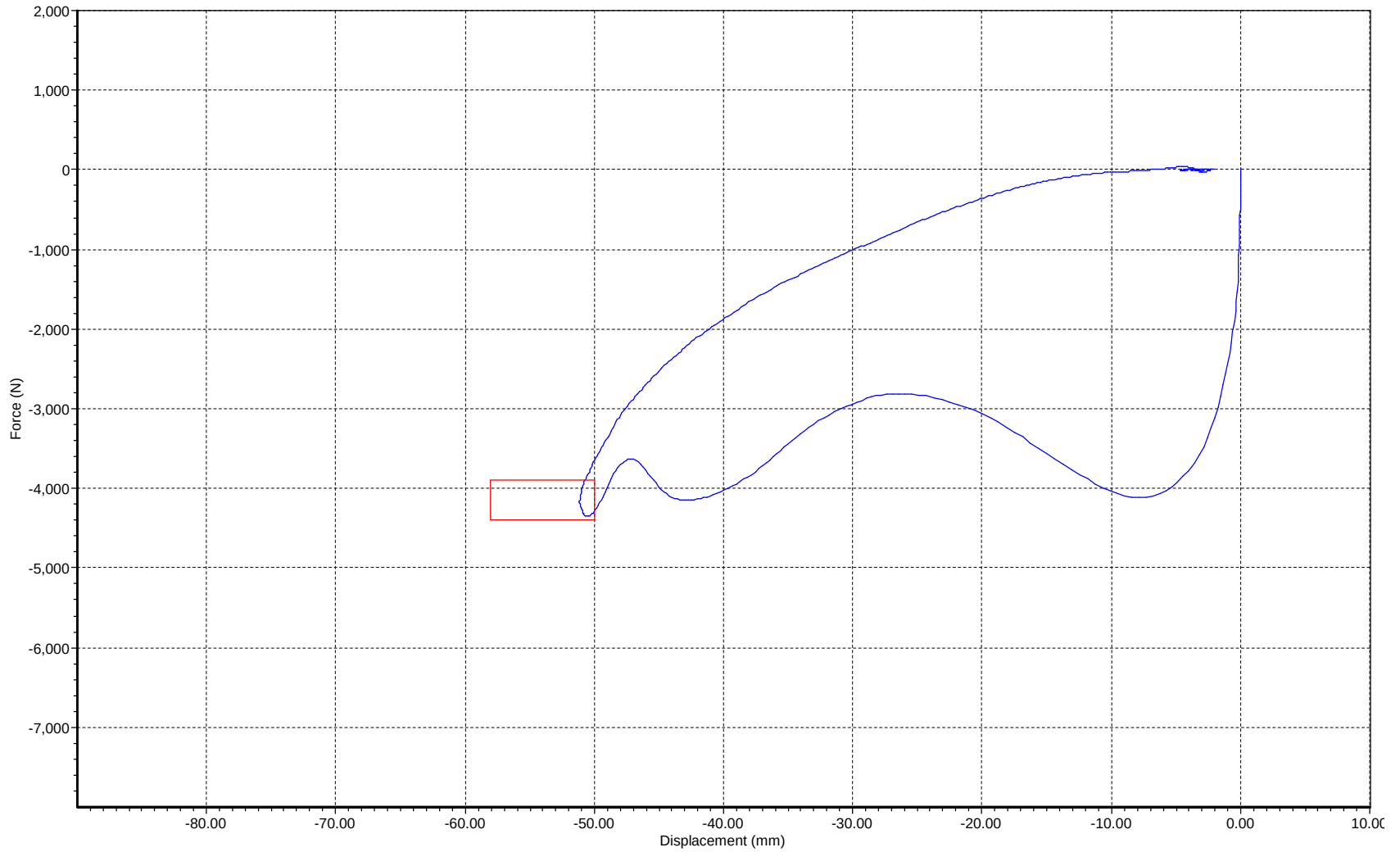
Test Time: 2:12:12 PM

Test Date: 10/27/2010



Resistive Force vs Sternum Displacement

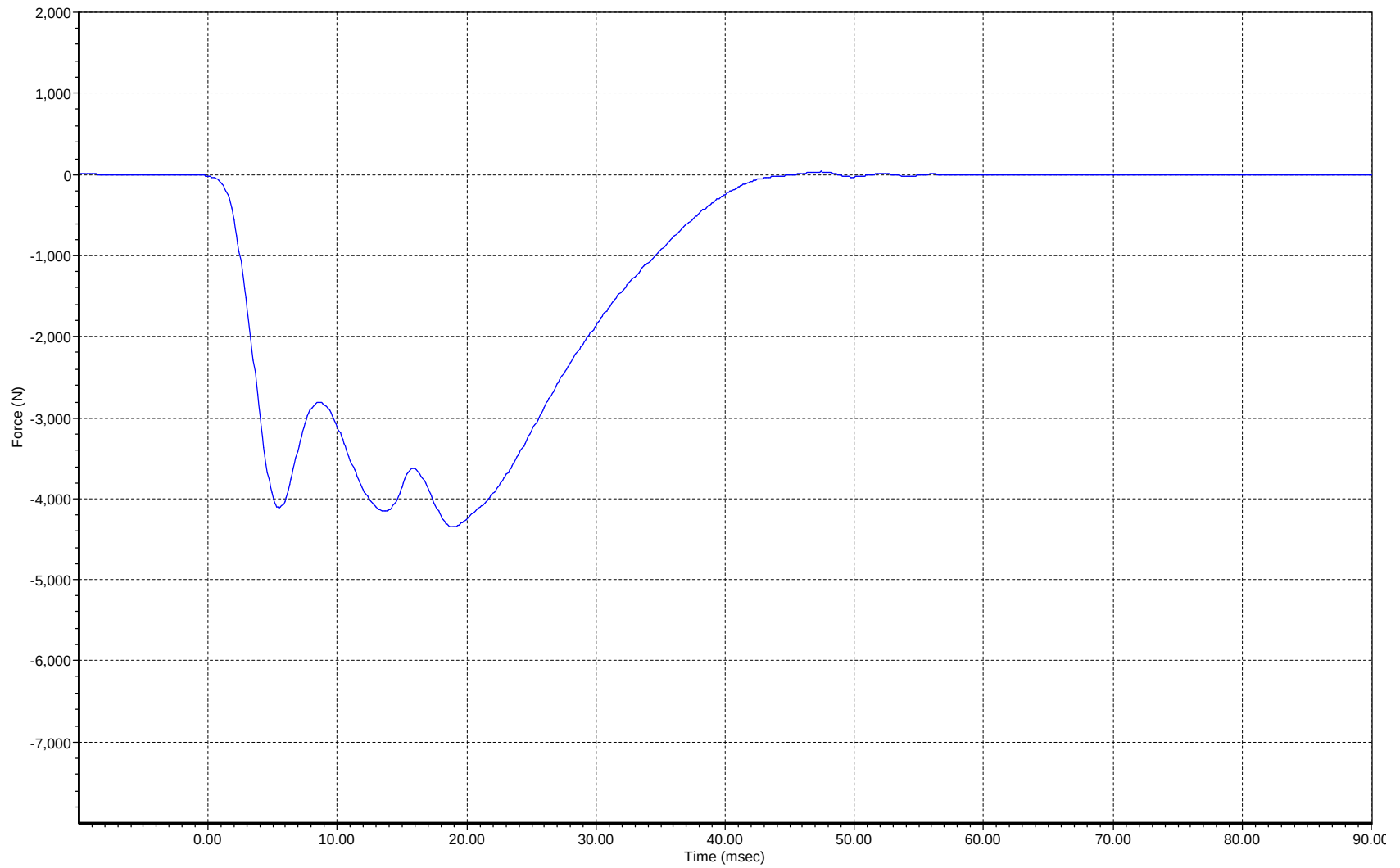
Force vs Displacement Filter: No Filter Max = 34 at: -4.47 Min = -4353 at: -50.57
Force Corridor



Hybrid III 5'th, Thorax Impact, 10/27/2010, 2:12:12 PM

Resistive Force

Force Filter: No Filter Max = 34 at: 47.40 Min = -4353 at: 19.00



Hybrid III 5'th, Thorax Impact, 10/27/2010, 2:12:12 PM

Torso Flexion Test

Technician: AR

Calibration Date: 10/29/2010

ATD Serial Number: 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	22.2° C	P
Lab Humidity: 38%	10-70%	29%	P
Max Force @ 45 deg	320 – 390N	362N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	14 °	P
Final ref plan angle	Initial ref plane ± 8 deg	20 °	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left	Test Date:	10/29/2010
Test Number:	1	Test Time:	2:12:42 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	222.0 deg C F
Humidity	10.0 -- 70.0	30.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-4060 -- -3450	-3552 N P

All test parameters are NOT within specifications

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

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

Test ID: **Left**

Test Time: **2:12:42 PM**

Test Date: **10/29/2010**



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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**

Test Time: **2:12:42 PM**

Test Date: **10/29/2010**

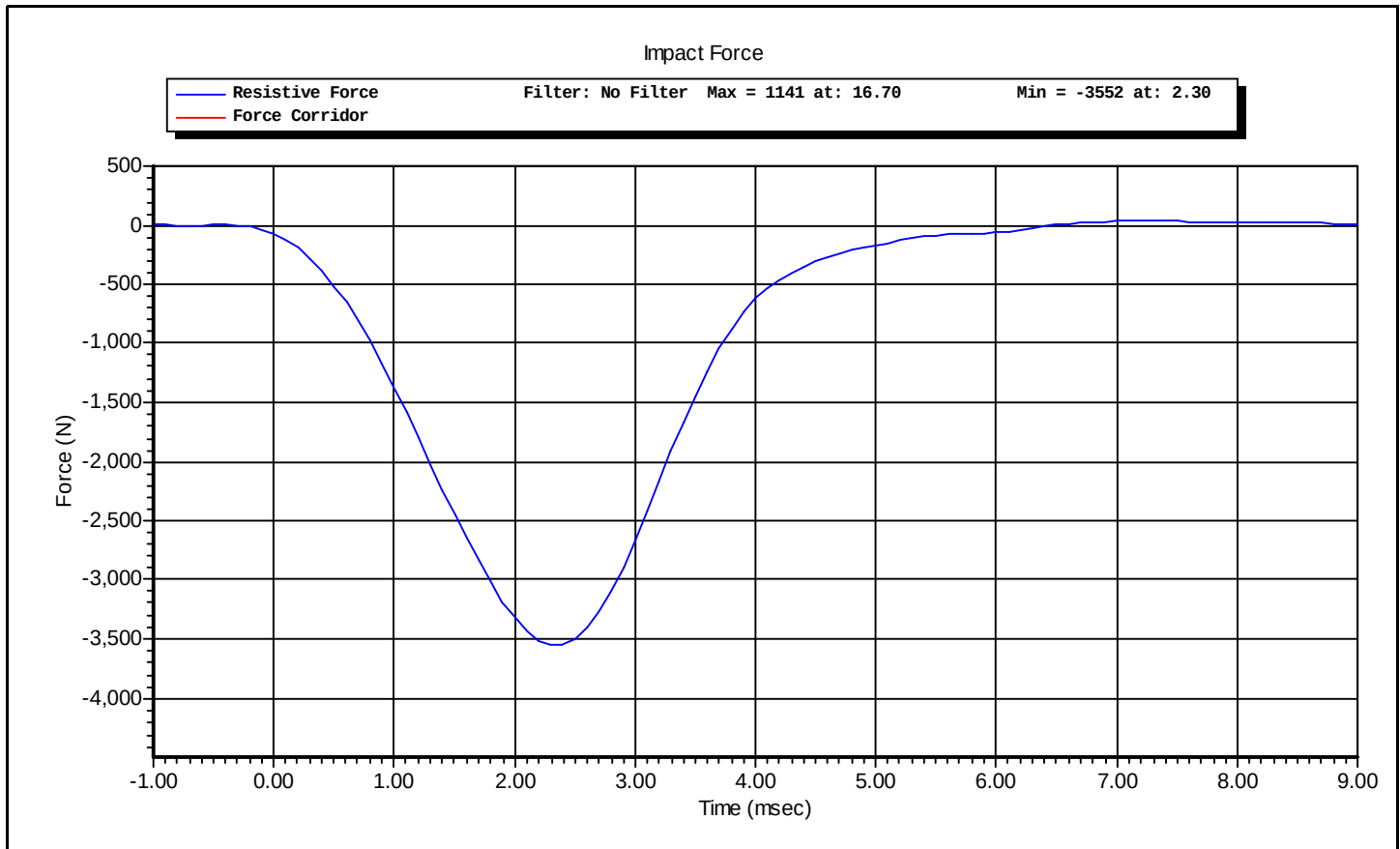


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left	Test Date:	10/29/2010
Test Number:	1	Test Time:	2:12:42 PM



Test ID: **Left**

Test Time: **2:12:42 PM**

Test Date: **10/29/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/29/2010
Test Number:	1	Test Time:	2:00:39 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	30.0 %RH P
Velocity	2.07 -- 2.13	2.12 m/s P
Resistive Force	-4060 -- -3450	-3727 N P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **2:00:39 PM**

Test Date: **10/29/2010**



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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: **2:00:39 PM**

Test Date: **10/29/2010**

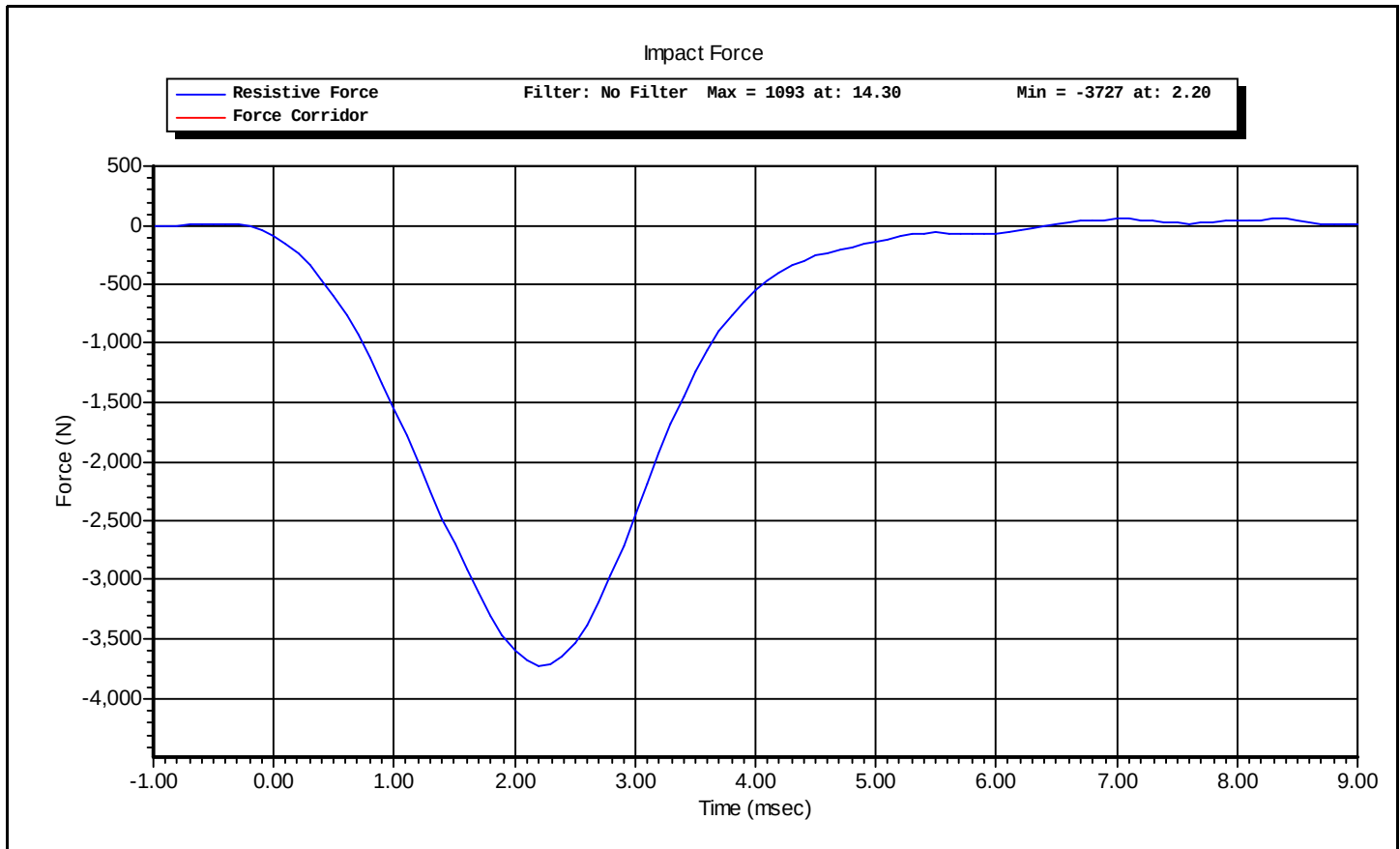


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/29/2010
Test Number:	1	Test Time:	2:00:39 PM



Test ID: Right Knee

Test Time: 2:00:39 PM

Test Date: 10/29/2010

CALIBRATION TEST RESULTS

POST-TEST

DRIVER DUMMY

S/N: 061

50th Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	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**

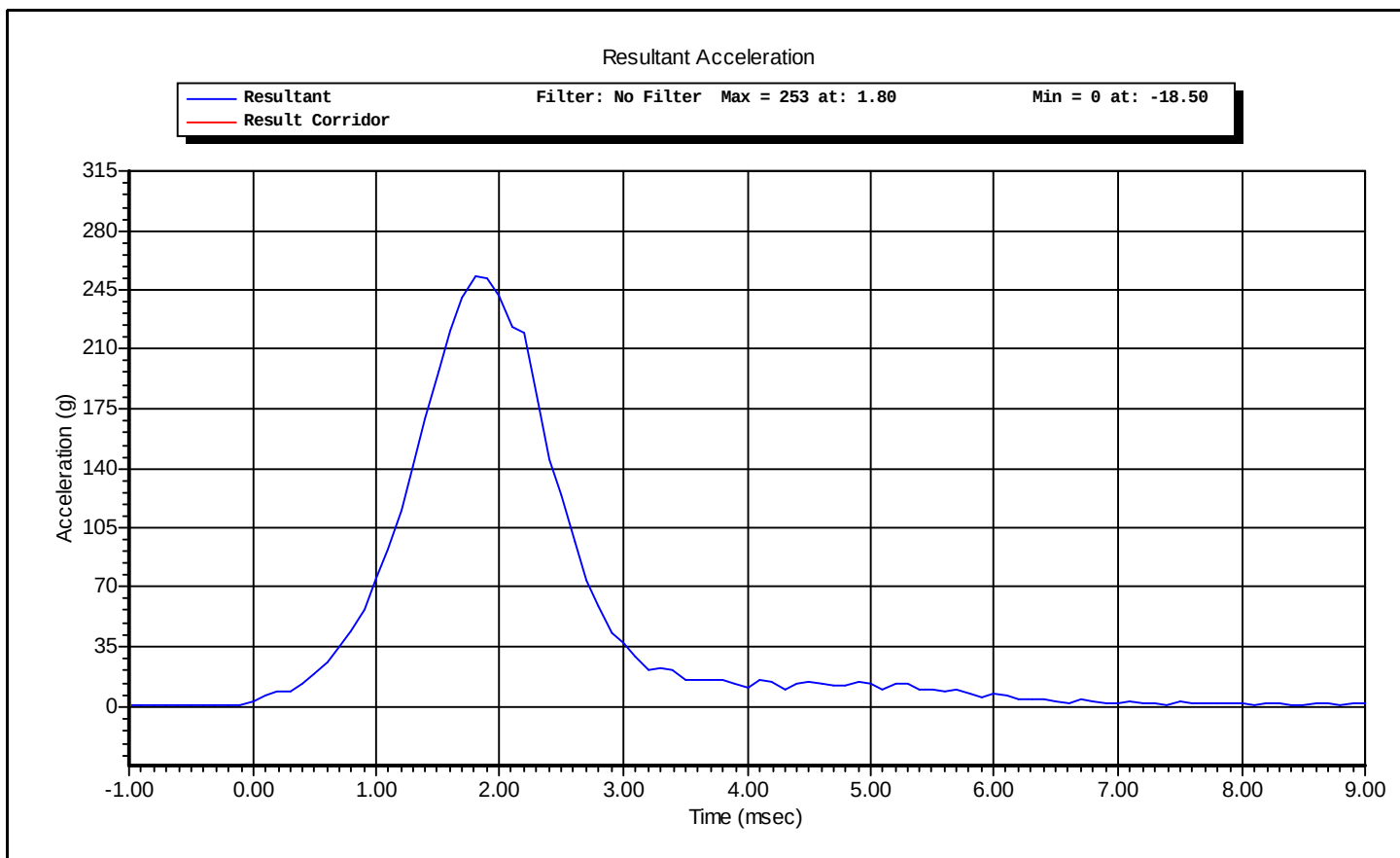


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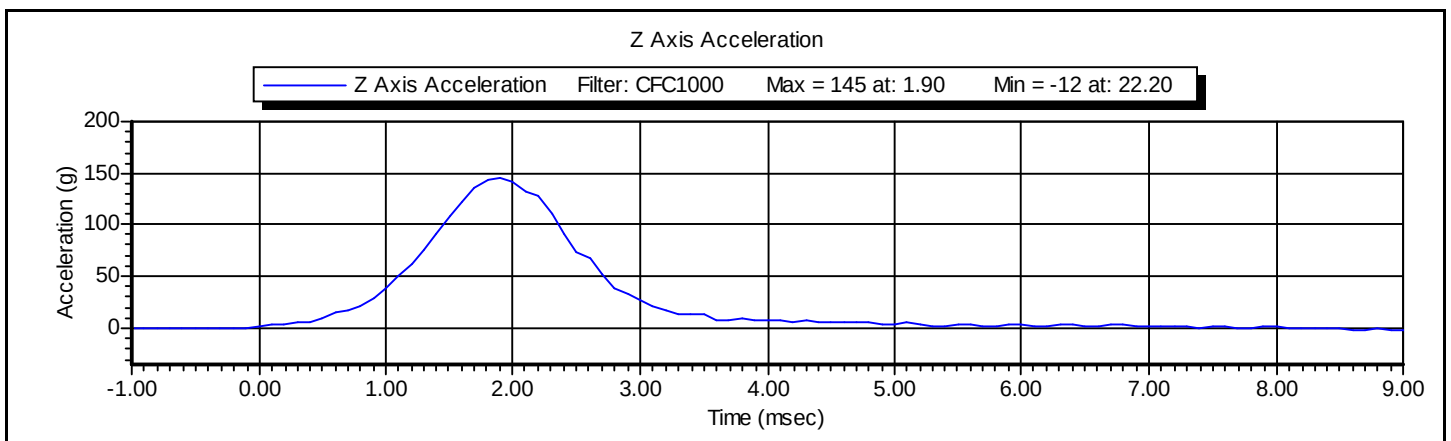
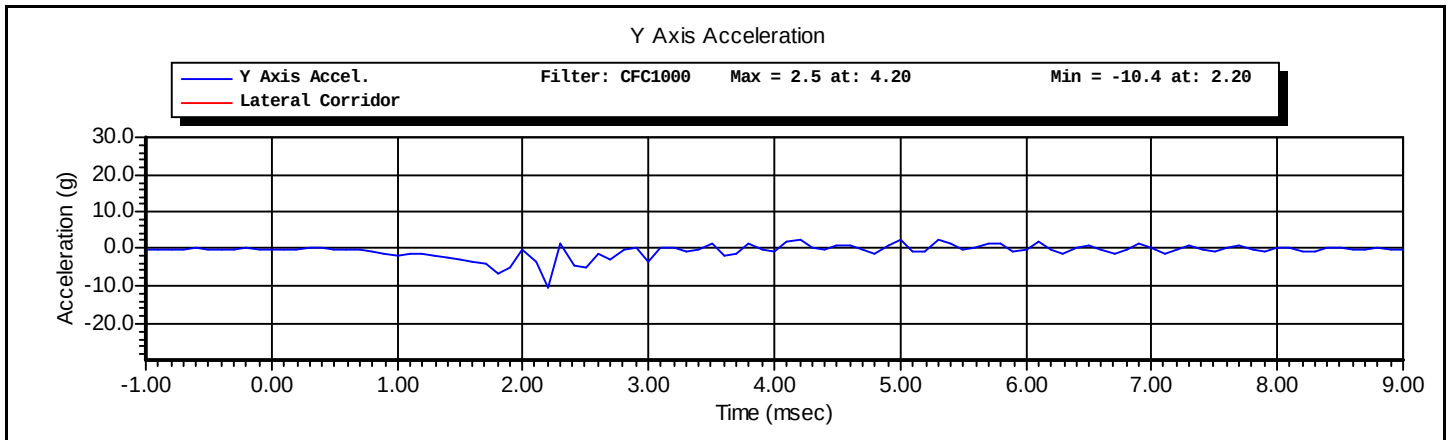
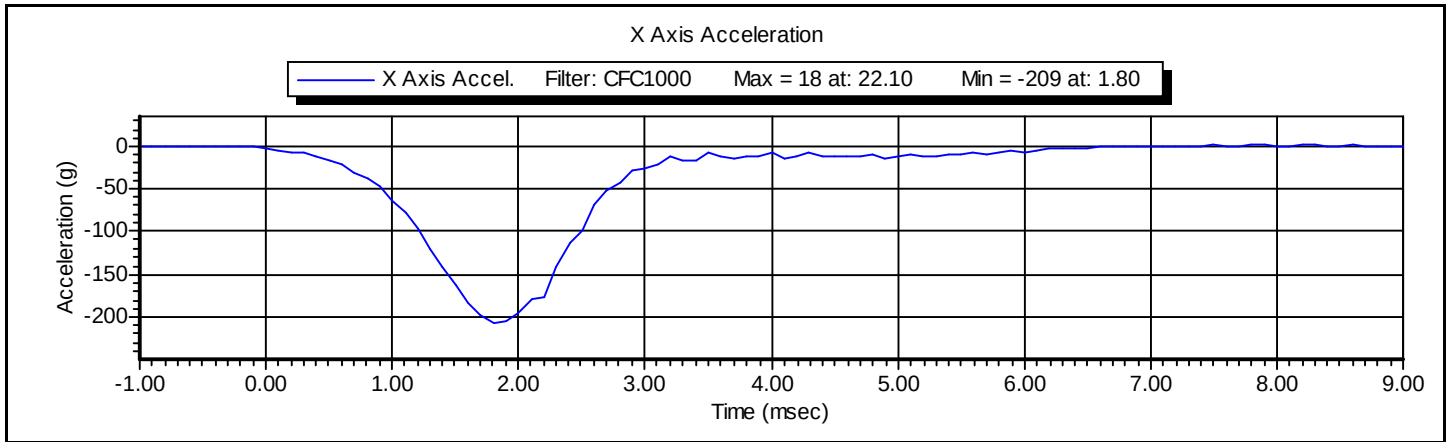
Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	11/8/2010
Test Number:	1	Test Time:	10:48:36 AM



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**

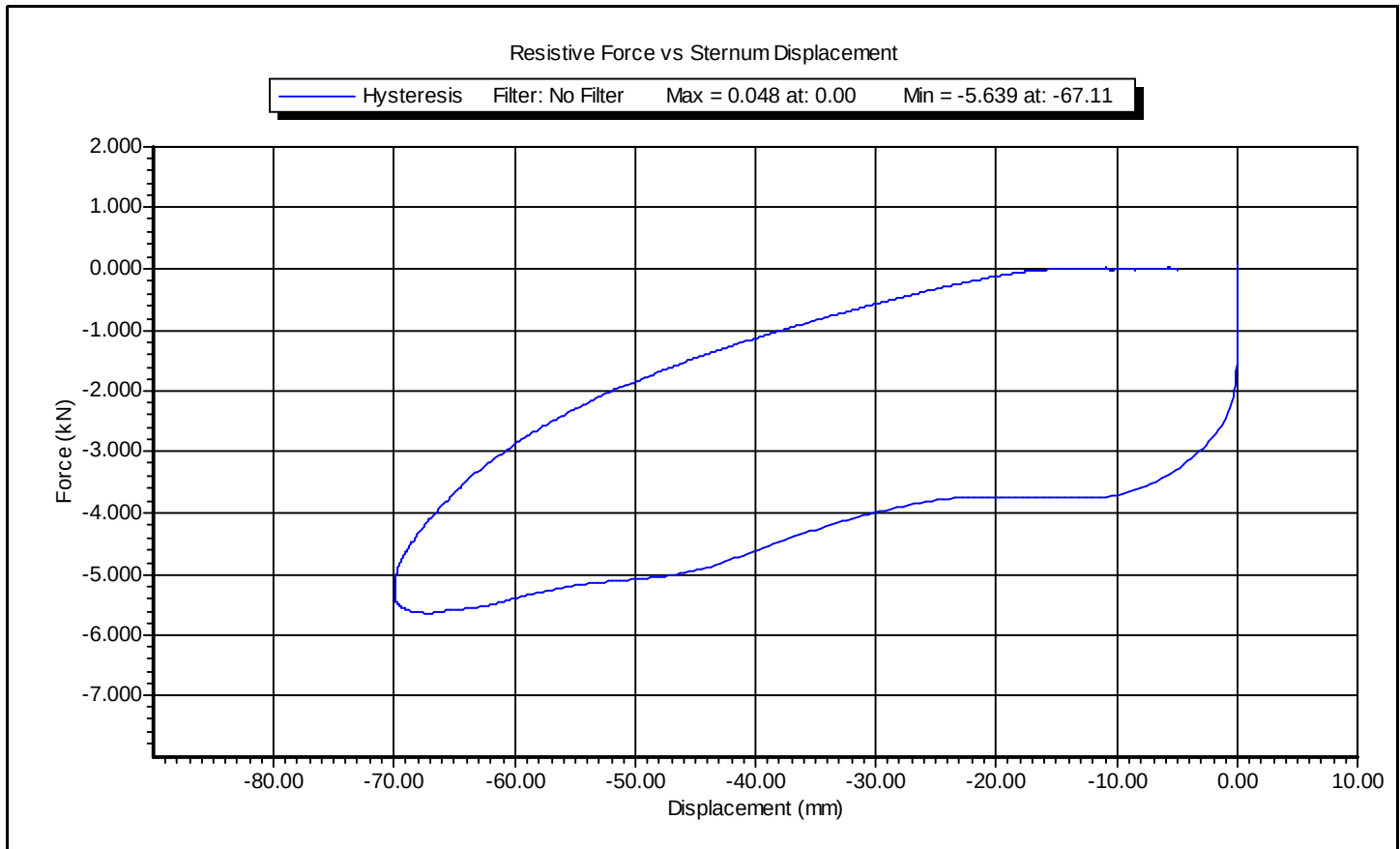


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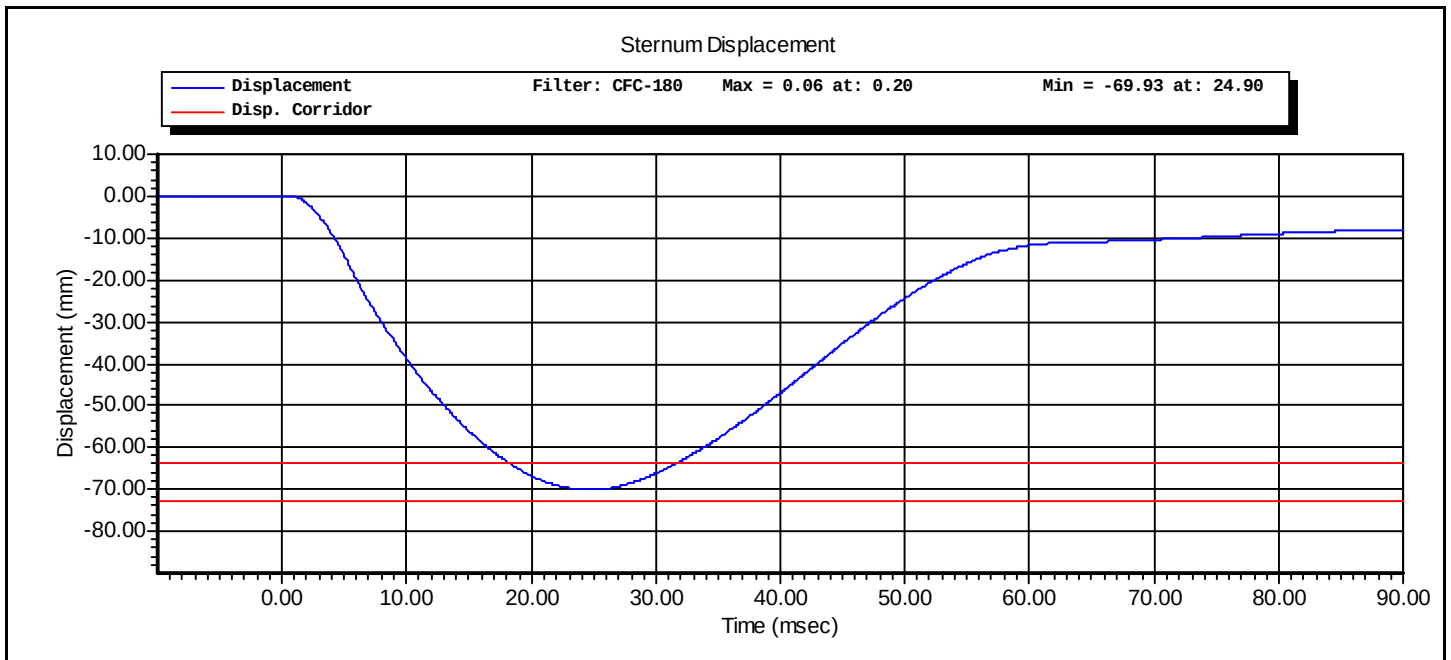
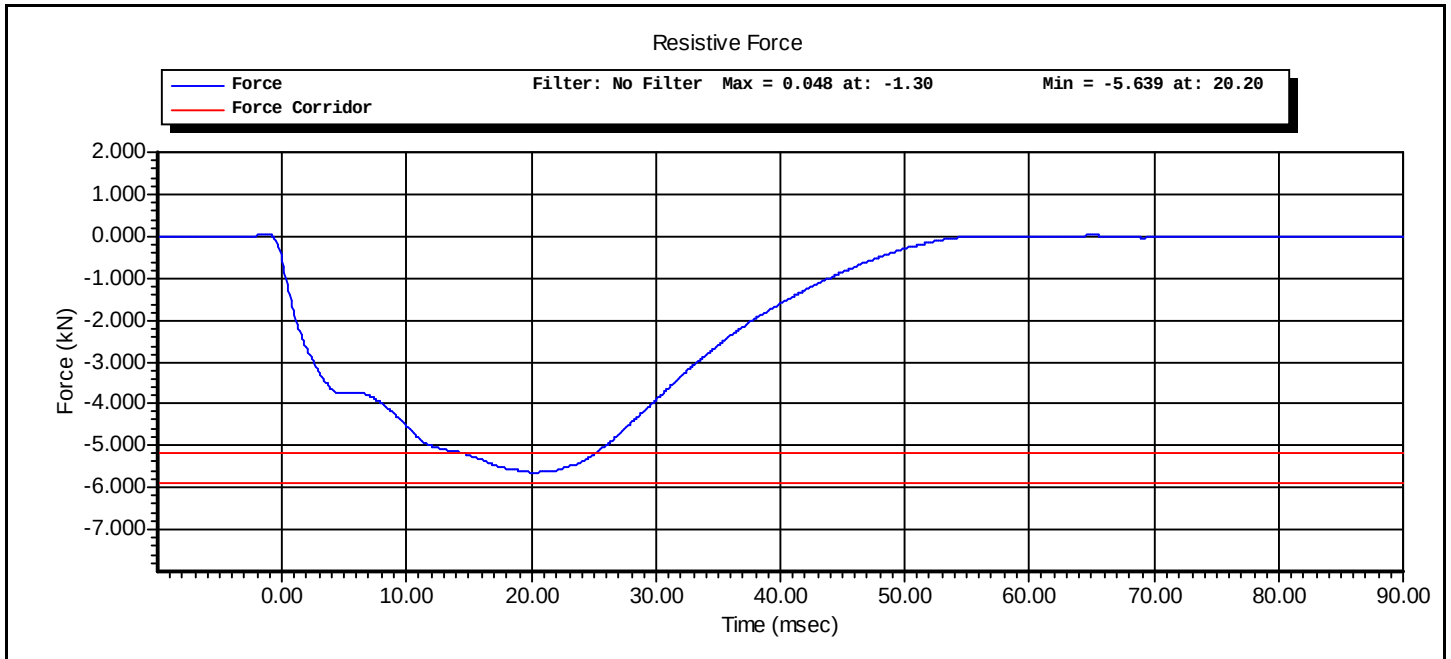
Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:			
Test ID:		Test Date:	11/5/2010
Test Number:	1	Test Time:	1:19:40 PM



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**

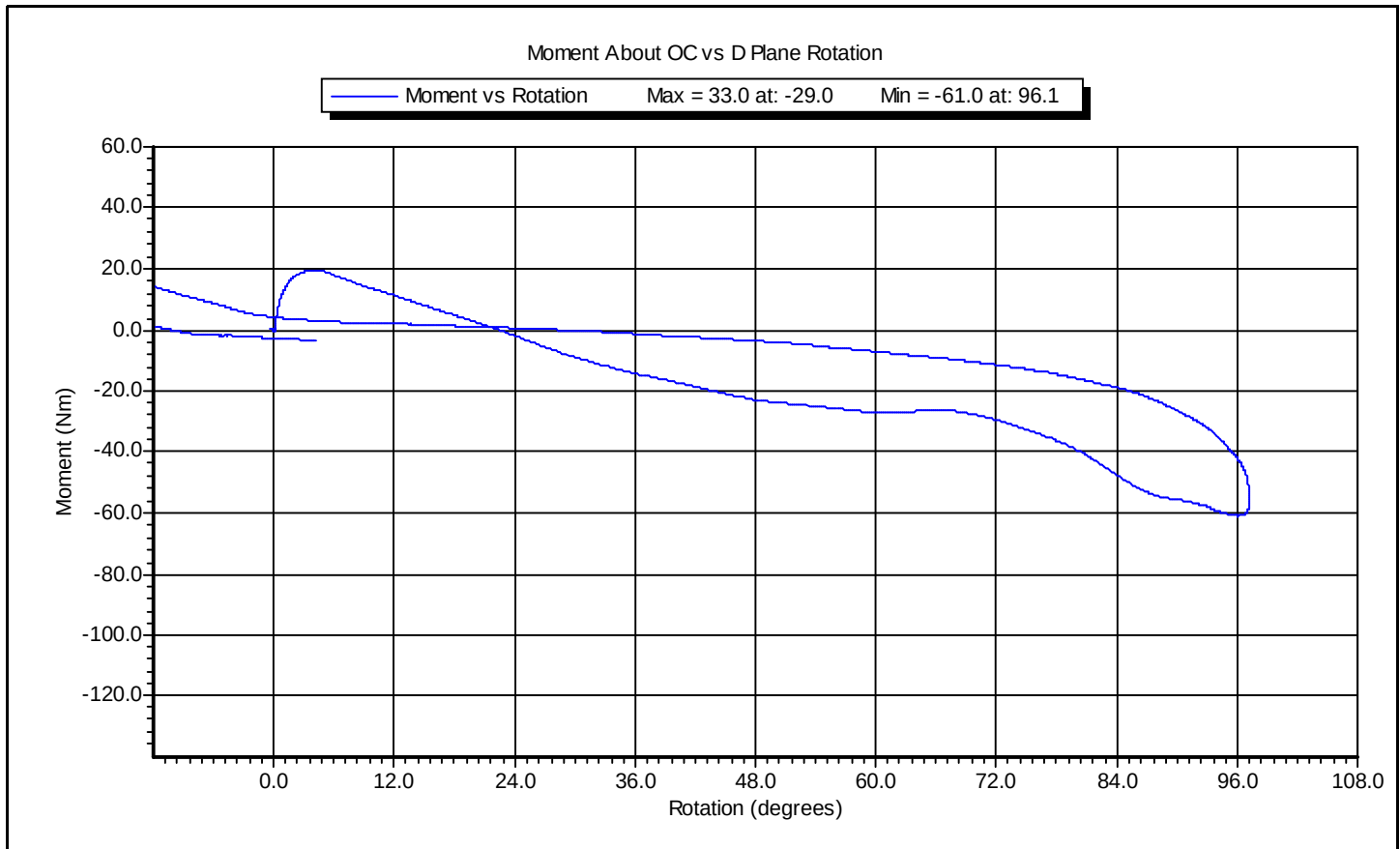


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4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

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

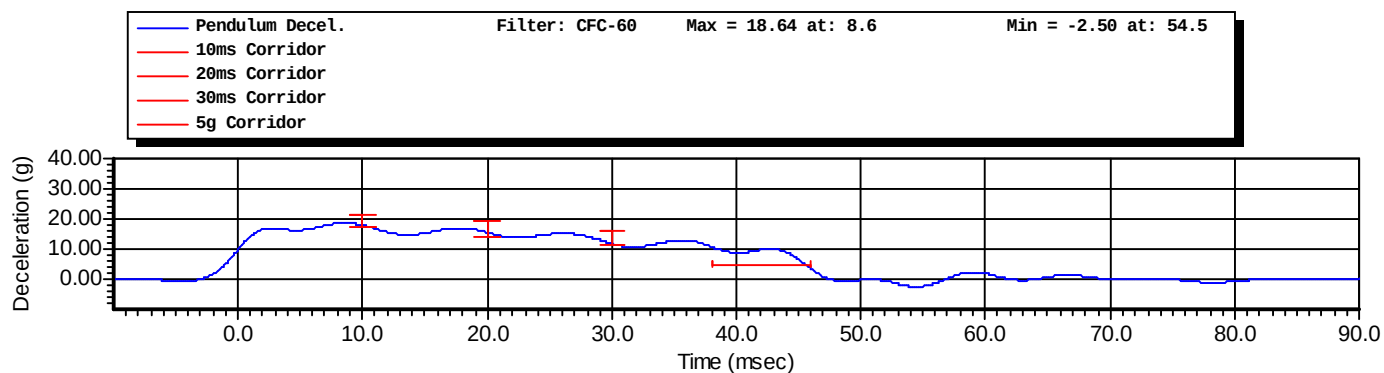


ID of Test: **Neck Extension**

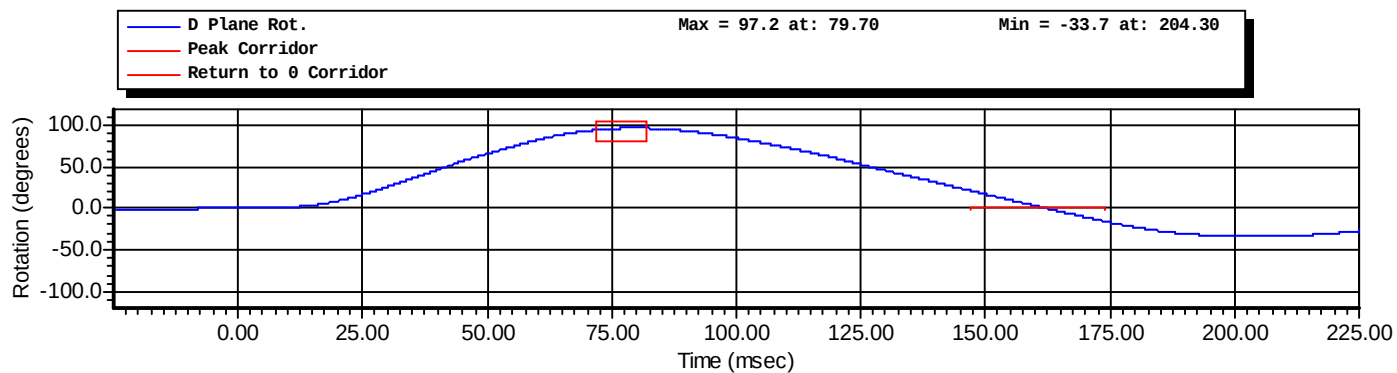
Time of Test: **1:06:27 PM**

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

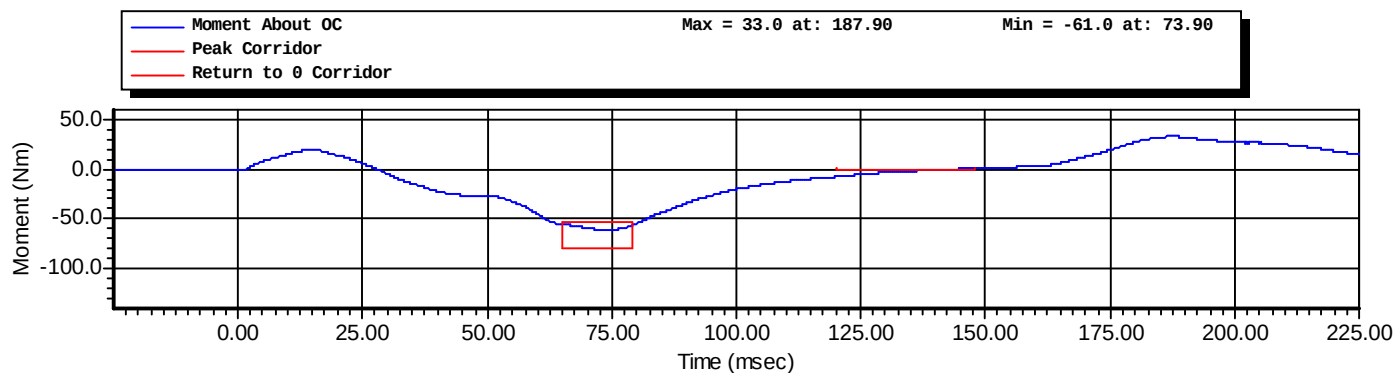
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Flexion	Test Date:	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**

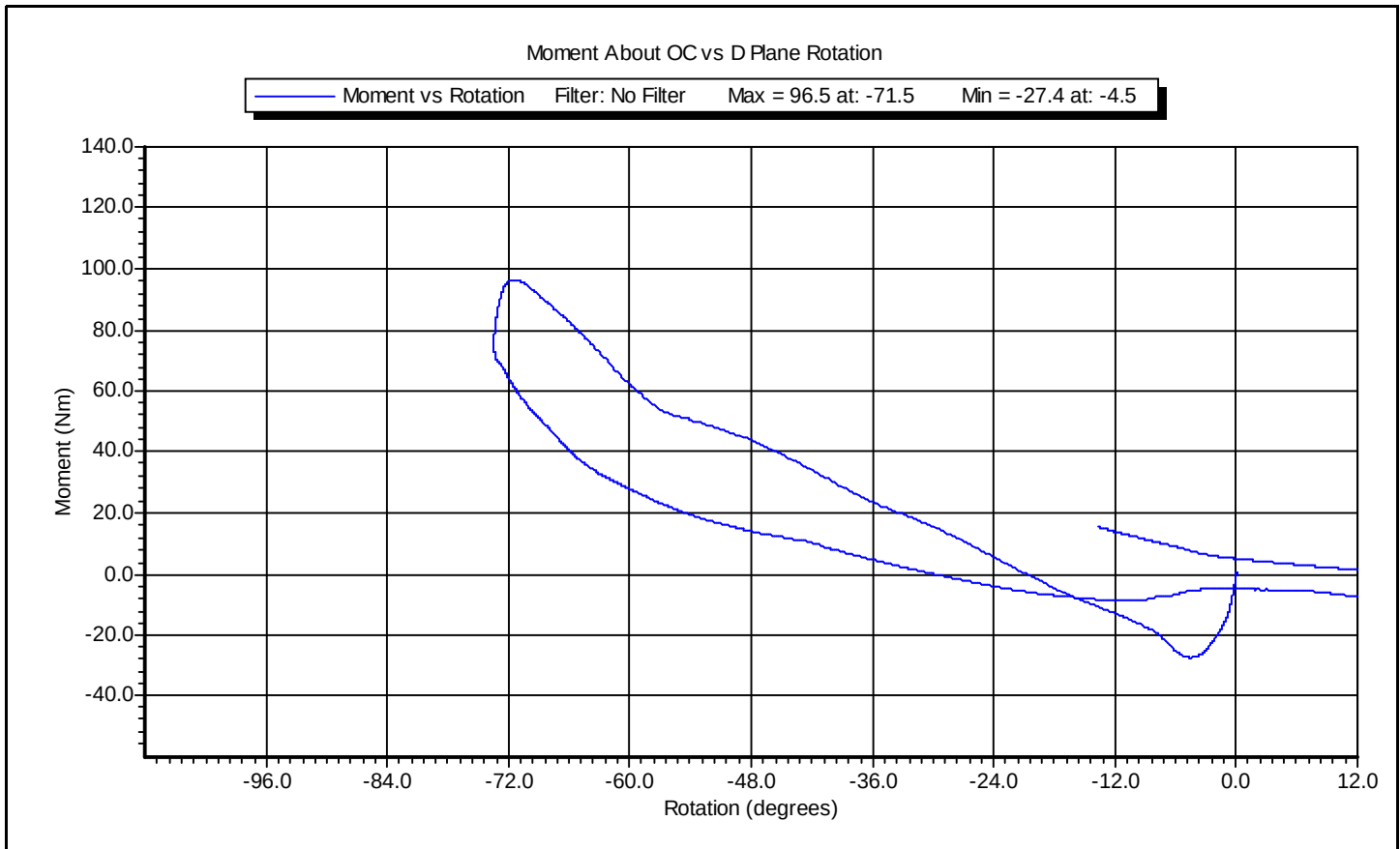


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Name of Test:	Neck Flexion	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	11/9/2010
Number of Test:	3	Time of Test:	11:02:44 AM

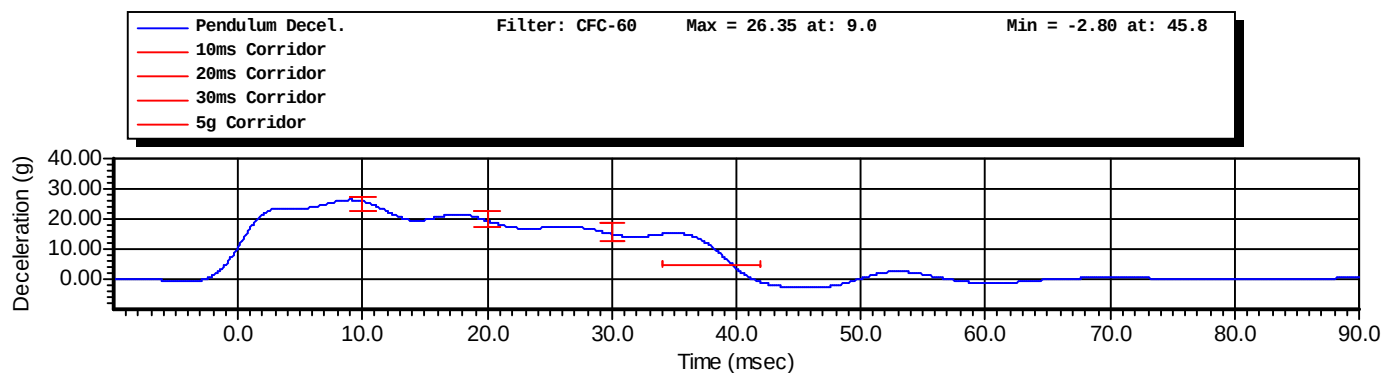


ID of Test: **Neck Flexion**

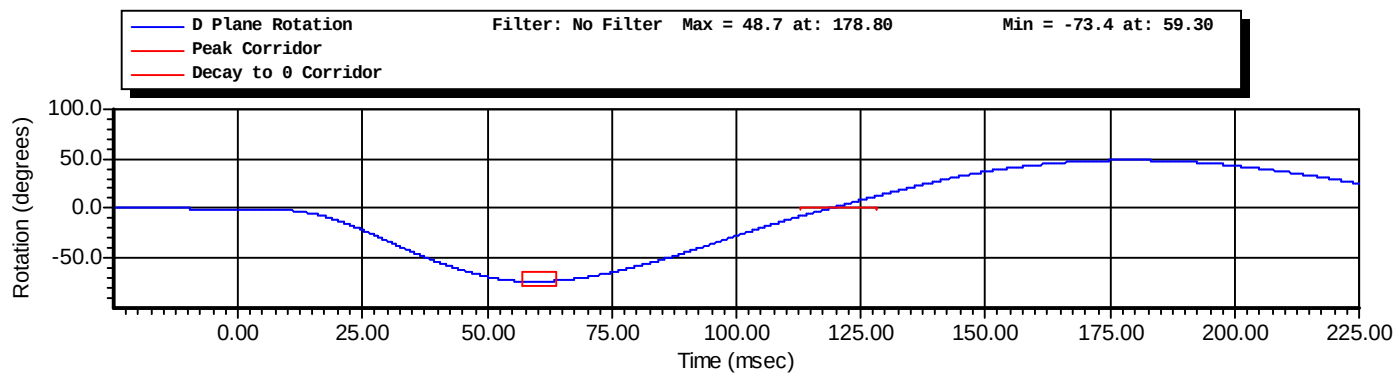
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Date of Test: **11/9/2010**

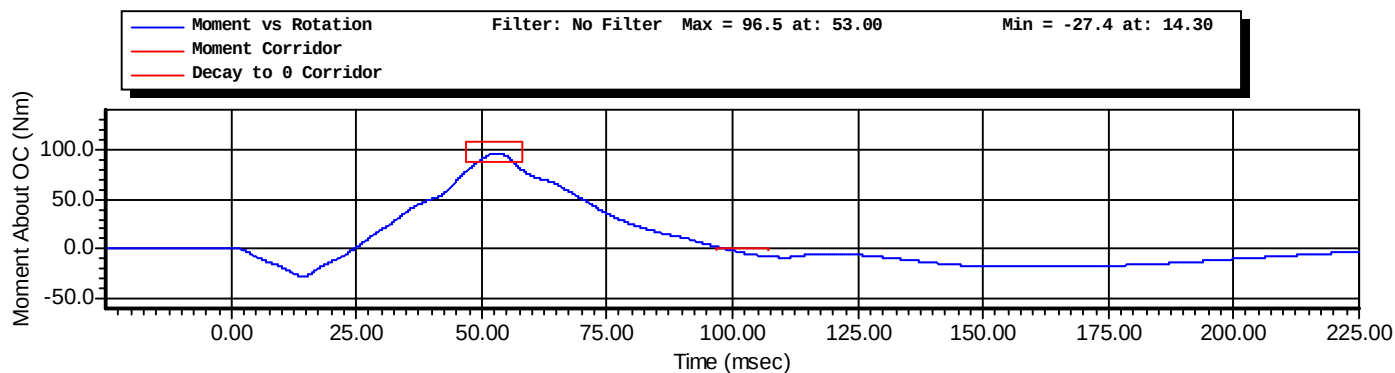
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle



CALSPAN

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

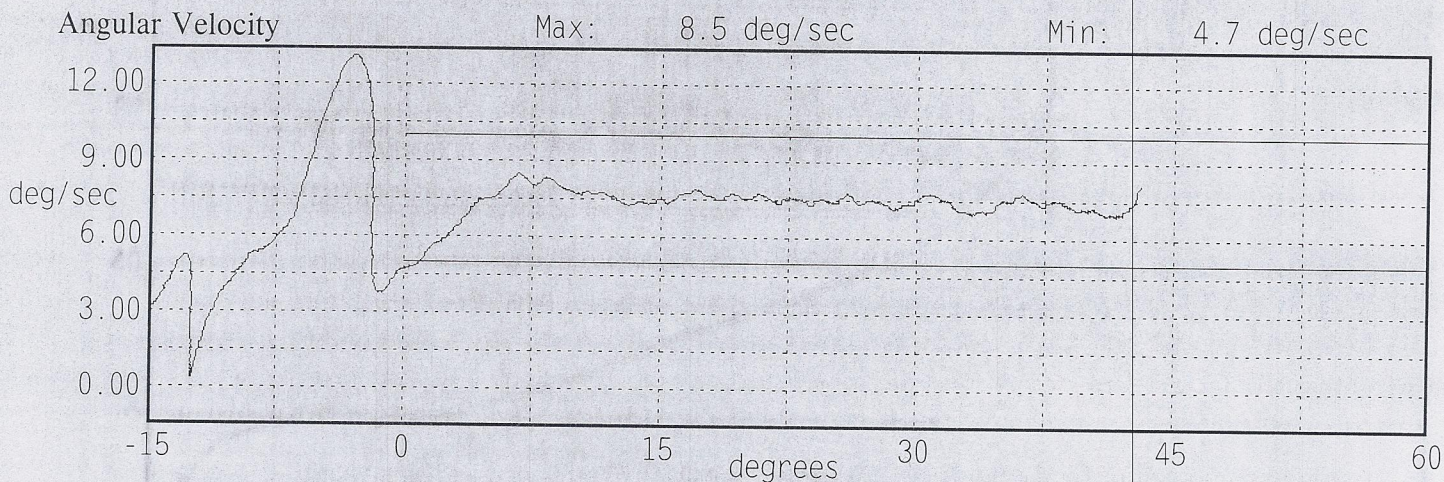
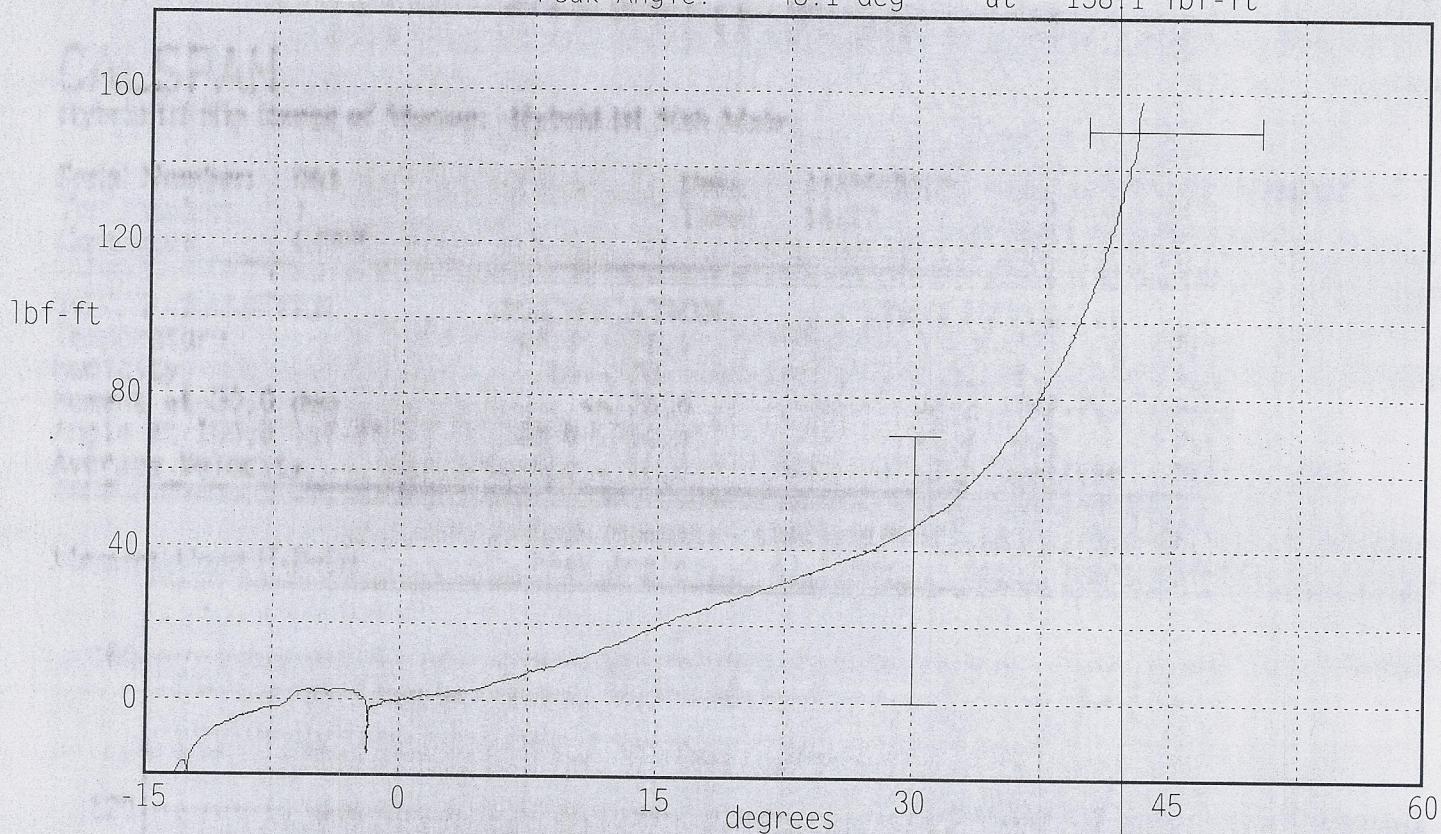
Serial Number: 061
Test Number: 1
Comments: LEFT

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



CALSPAN

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

Serial Number: 061
Test Number: 1
Comments: RIGHT

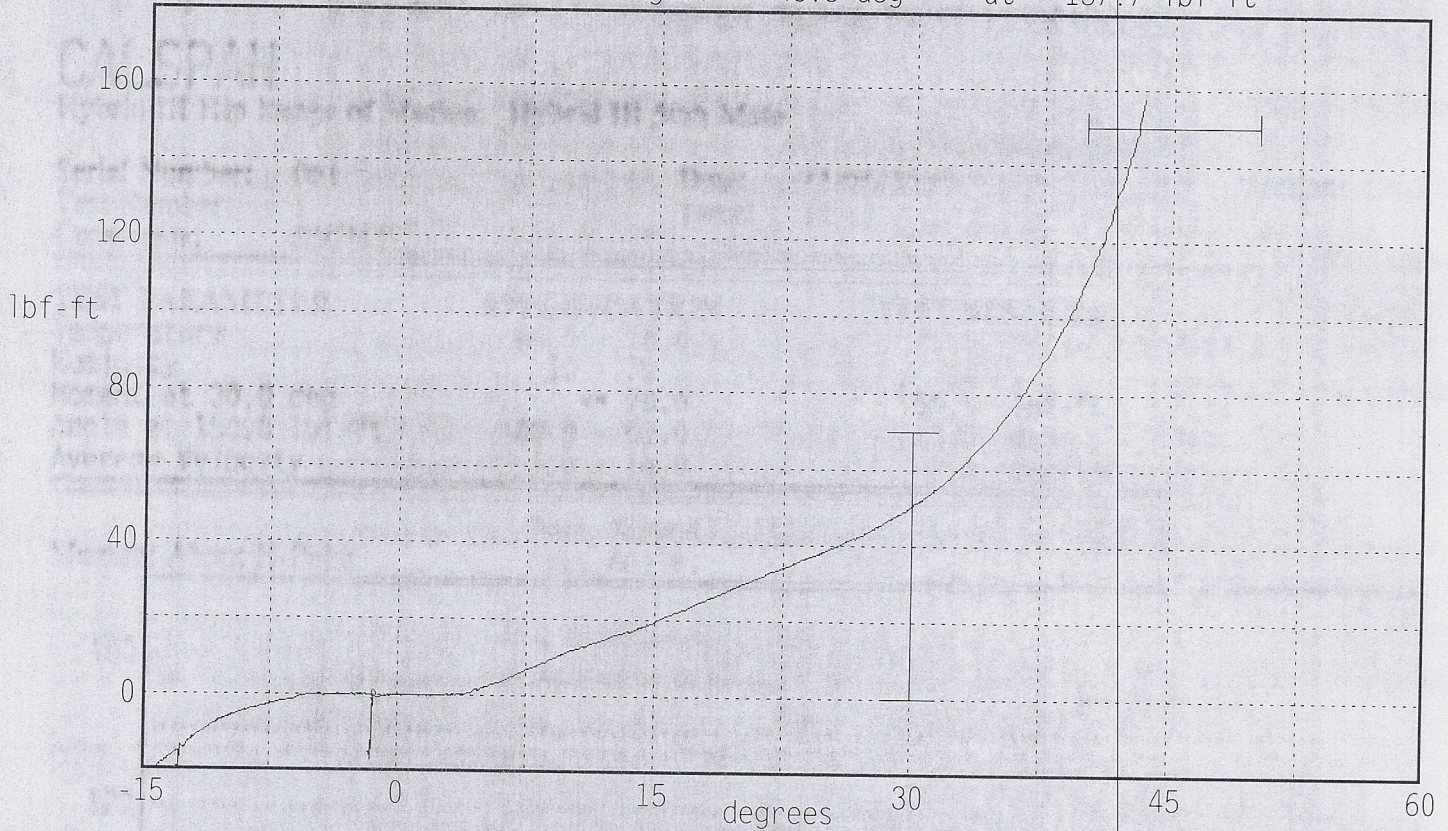
Date: 11/05/2010
Time: 14:41

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

Moment About H-Point

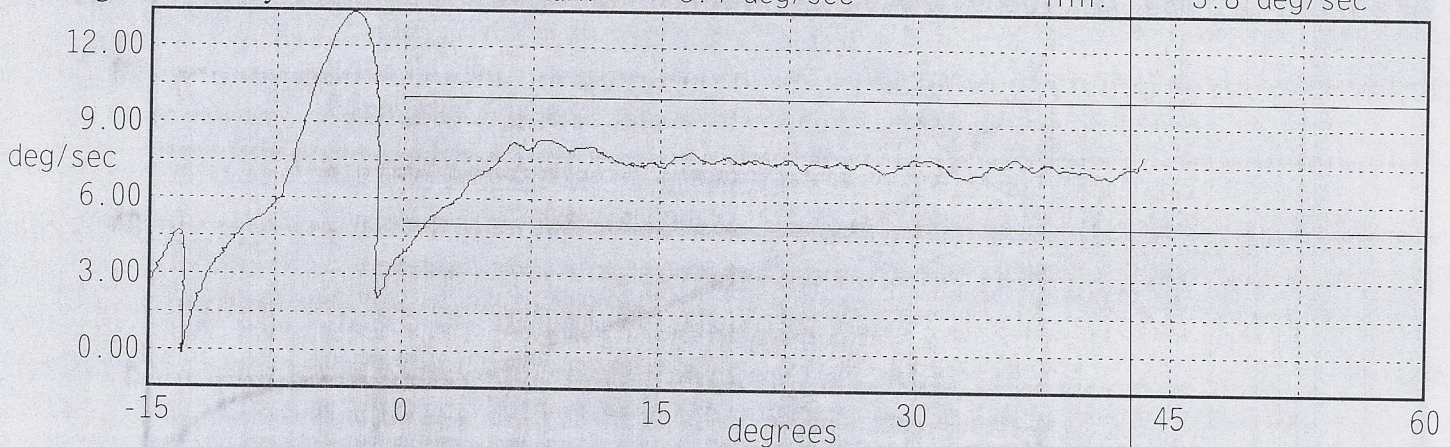
Peak Moment: 157.7 lbf-ft at 43.3 deg
Peak Angle: 43.3 deg at 157.7 lbf-ft



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**

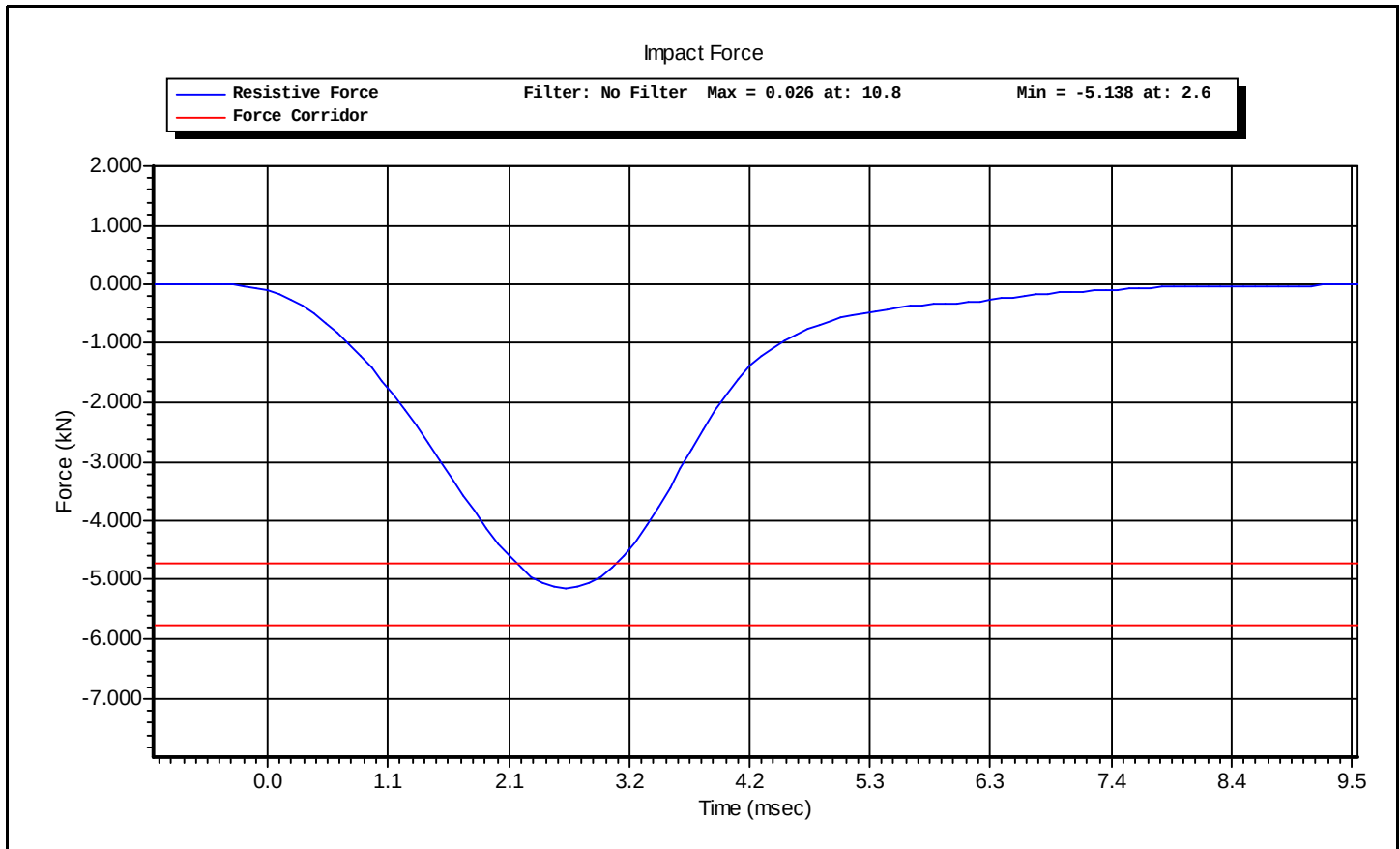


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	11/5/2010
Test Number:	1	Test Time:	2:00:24 PM



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**

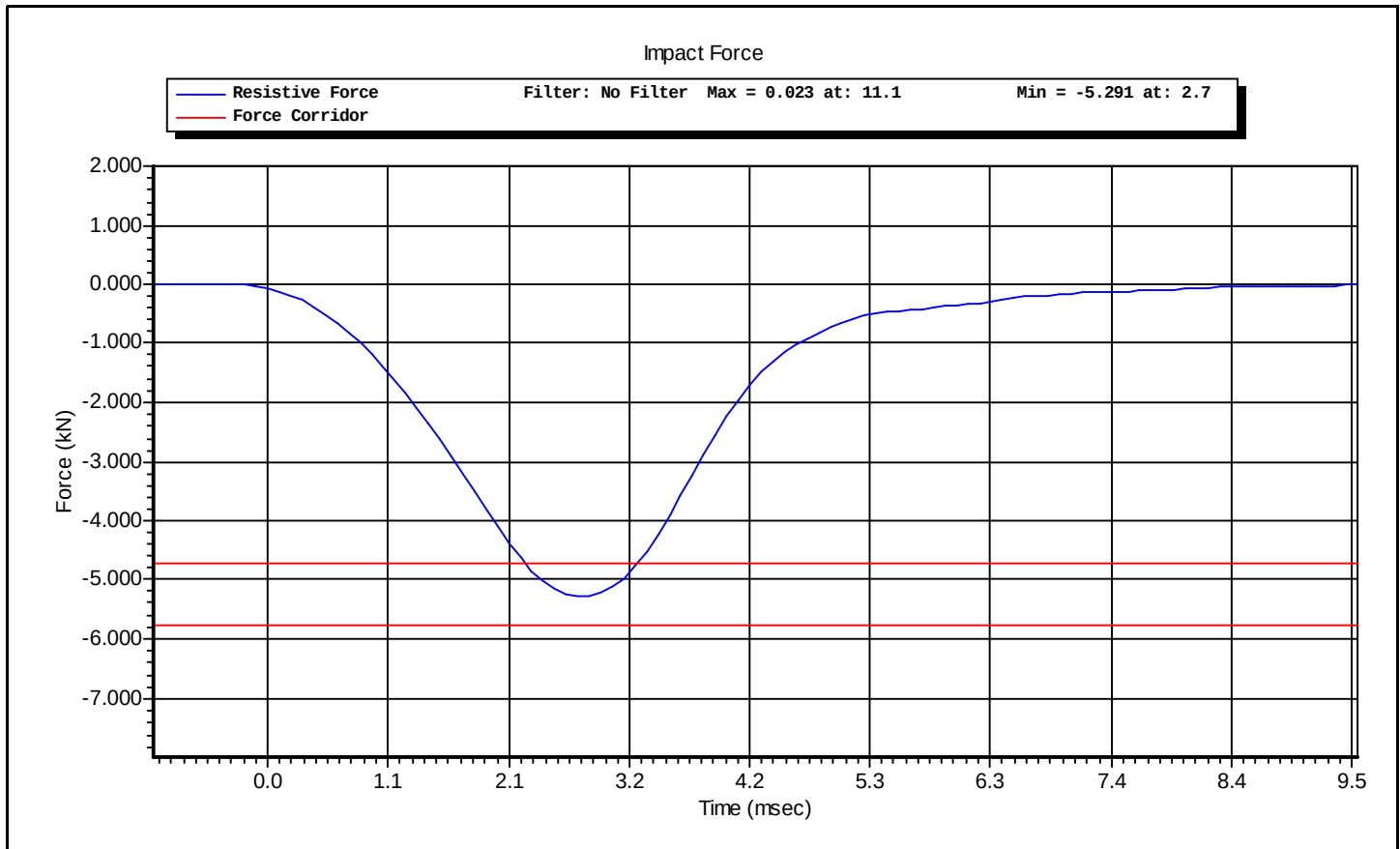


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	11/5/2010
Test Number:	1	Test Time:	2:07:11 PM



Test ID: **Right Knee**

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

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

CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

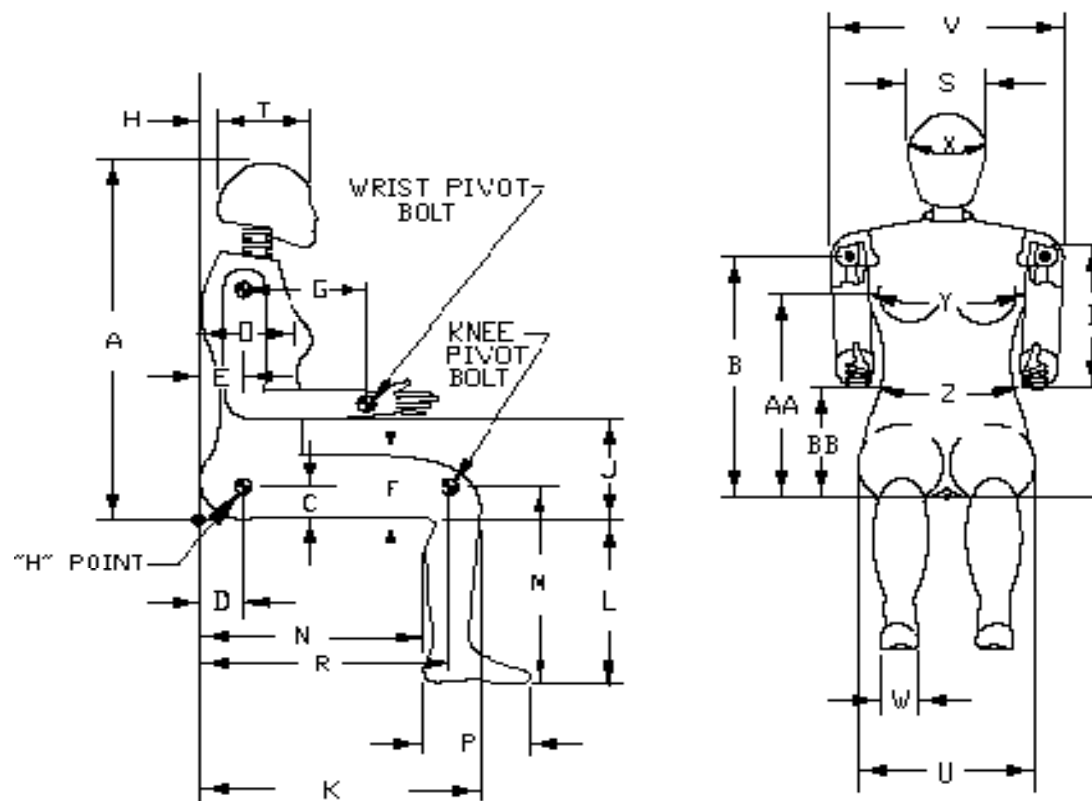
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	784	Yes
B	Shoulder Pivot Height	431.8 – 457.2	450	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	130	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	250	Yes
H	Head Back to Backline	43.2 – 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	282	Yes
J	Elbow Rest Height	182.8 – 203.2	195	Yes
K	Buttock to Knee Length	520.7 – 546.1	529	Yes
L	Popliteal Height	355.6 - 376	361	Yes
M	Knee Pivot Height	393.7 – 419.1	399	Yes
N	Buttock Popliteal Length	414 – 439.4	421	Yes
O	Chest Depth without Jacket	175.3 – 190.5	185	Yes
P	Foot Length (right)	218.5 – 233.7	221	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	465	Yes
S	Head Breadth	137.1 – 147.3	144	Yes
T	Head Depth	177.8 - 188	180	Yes
U	Hip Breadth	299.7 – 314.9	311	Yes
V	Shoulder Breadth	350.5 – 365.7	358	Yes
W	Foot Breadth	78.8 - 94	85	Yes
X	Head Circumference	528.3 – 548.7	540	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	859	Yes
Z	Waist Circumference	759.5 – 789.9	775	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	345	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Technician: SZ

Date: 11/1/2010

Hybrid III 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/29/2010
Test Number:	1	Test Time:	12:58:21 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	780

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	30 %RH P
Resultant Acceleration	250 -- 300	284 g P
Oscillation	0.0 -- 10.0	5.3 % P
Lateral Acceleration	-15.00 -- 15.00	14.35 g P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

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

Test ID: **Head Drop**

Test Time: **12:58:21 PM**

Test Date: **10/29/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66943	10/25/2010
Endevco	7264-2000	P66931	10/25/2010
Endevco	7264-2000	P66926	10/25/2011

Test ID: **Head Drop**

Test Time: **12:58:21 PM**

Test Date: **10/29/2010**

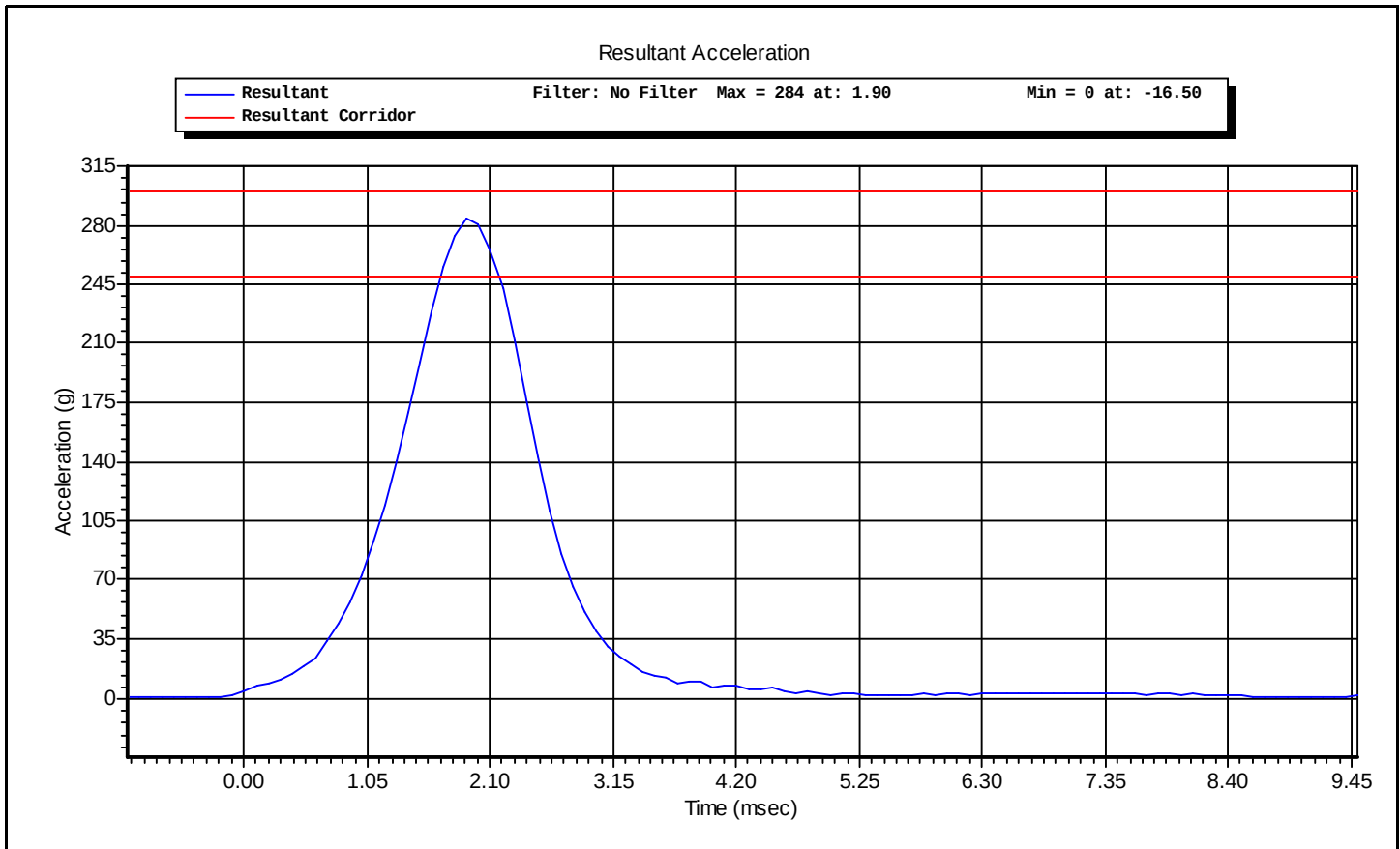


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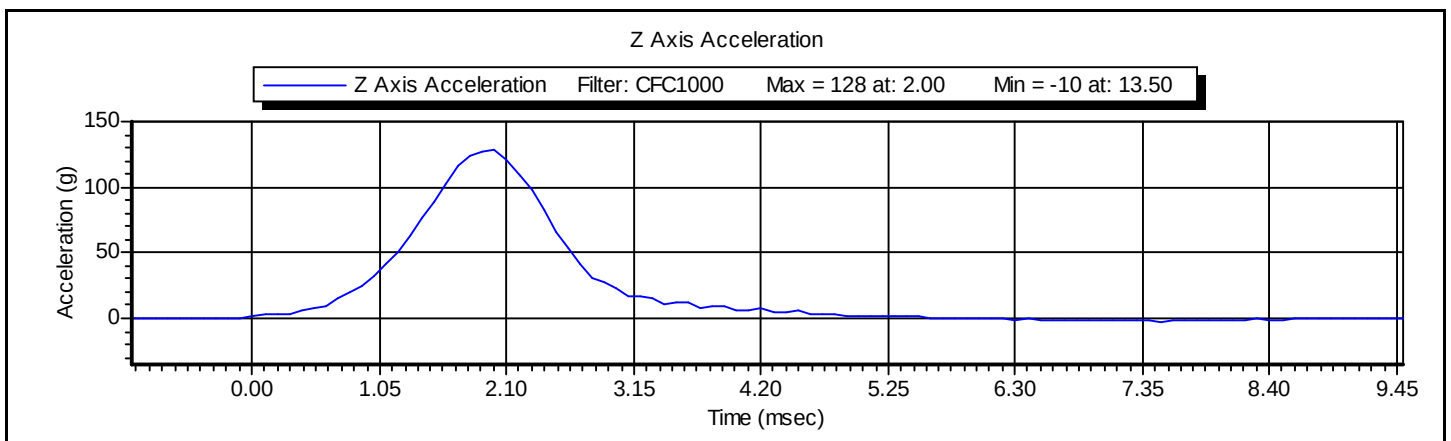
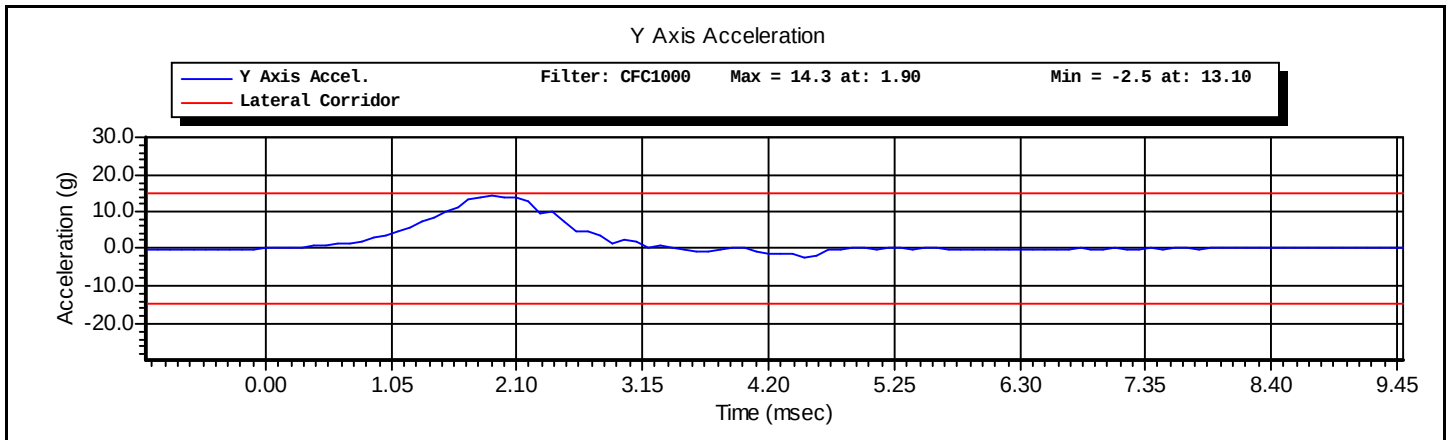
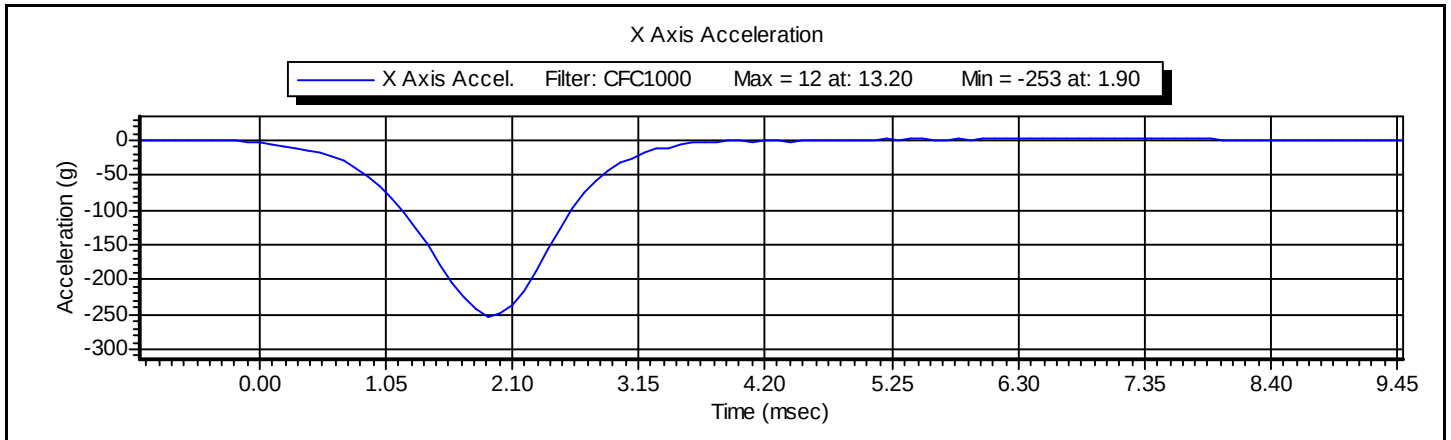
Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/29/2010
Test Number:	1	Test Time:	12:58:21 PM



Test ID: **Head Drop**

Test Time: **12:58:21 PM**

Test Date: **10/29/2010**





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/29/2010
Test Number:	2	Test Time:	11:41:29 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	31 %RH P
Velocity	5.95 -- 6.19	6.13 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.63 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.22 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	4.70 m/s P
D Plane Rotation	99.0 -- 114.0	103.6 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-53.1 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	105.9 ms P

All test parameters are within specifications

Technician: **S. Zito** Signature: _____

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

Test ID: **Neck Extension**

Test Time: **11:41:29 AM**

Test Date: **10/29/2010**



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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
FTSS	1716A	LC-296 My	2/1/2010
FTSS	1716A	LC-296 Fx	2/1/2010
FTSS	1716A	LC-296 Fy	2/1/2010
FTSS	1716A	LC-296 Fz	2/1/2010

Test ID: **Neck Extension**

Test Time: **11:41:29 AM**

Test Date: **10/29/2010**

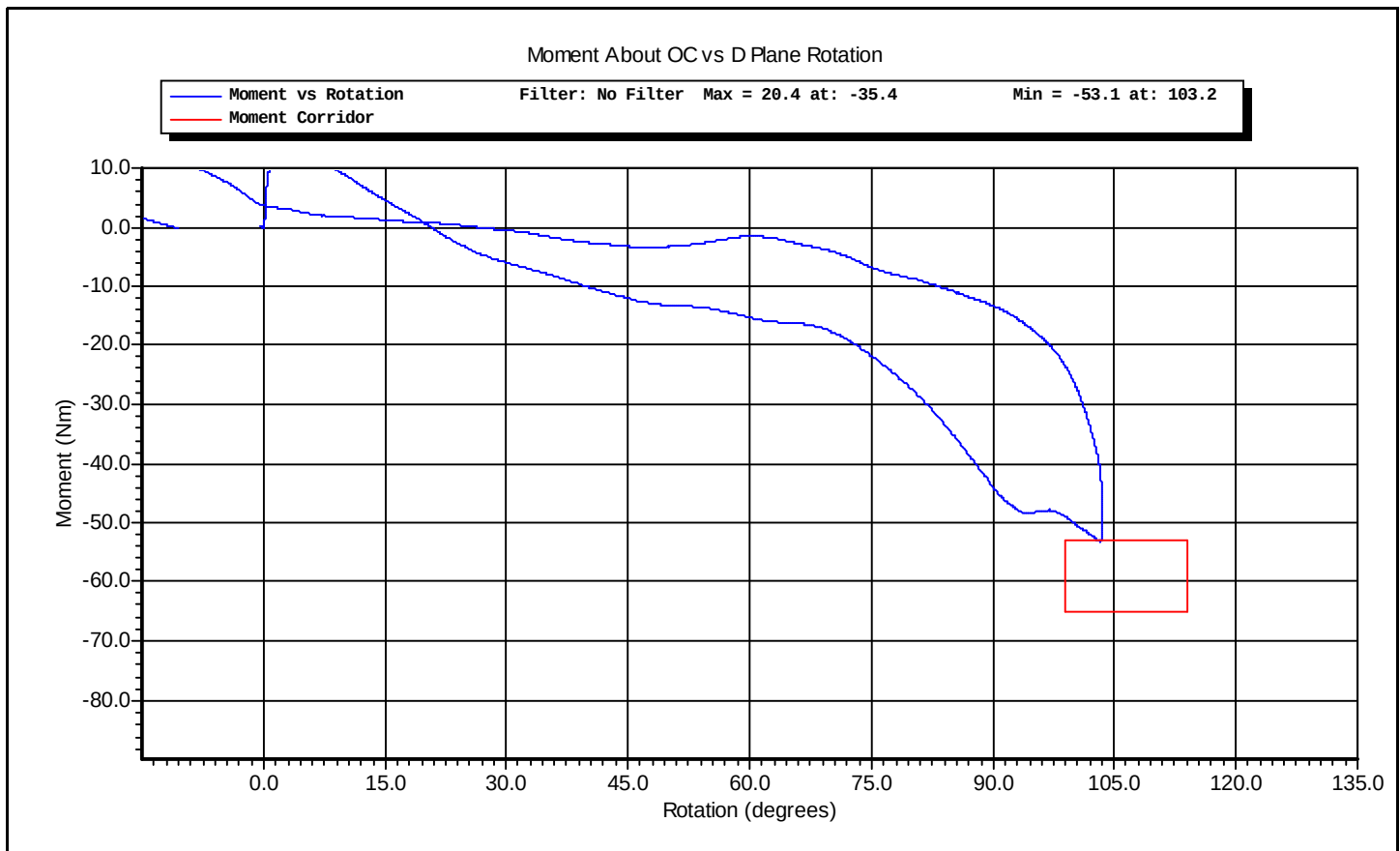


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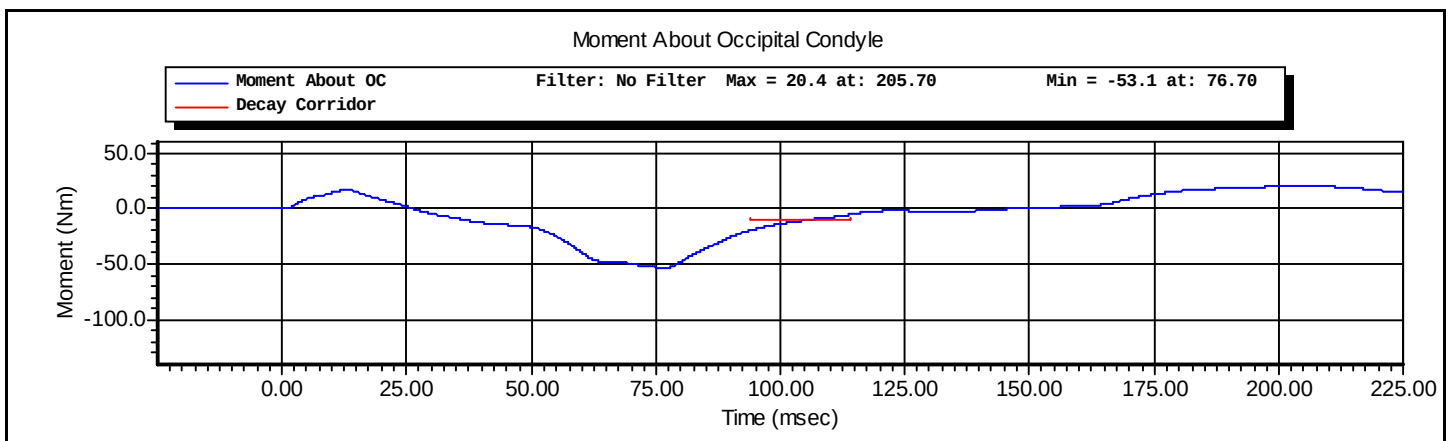
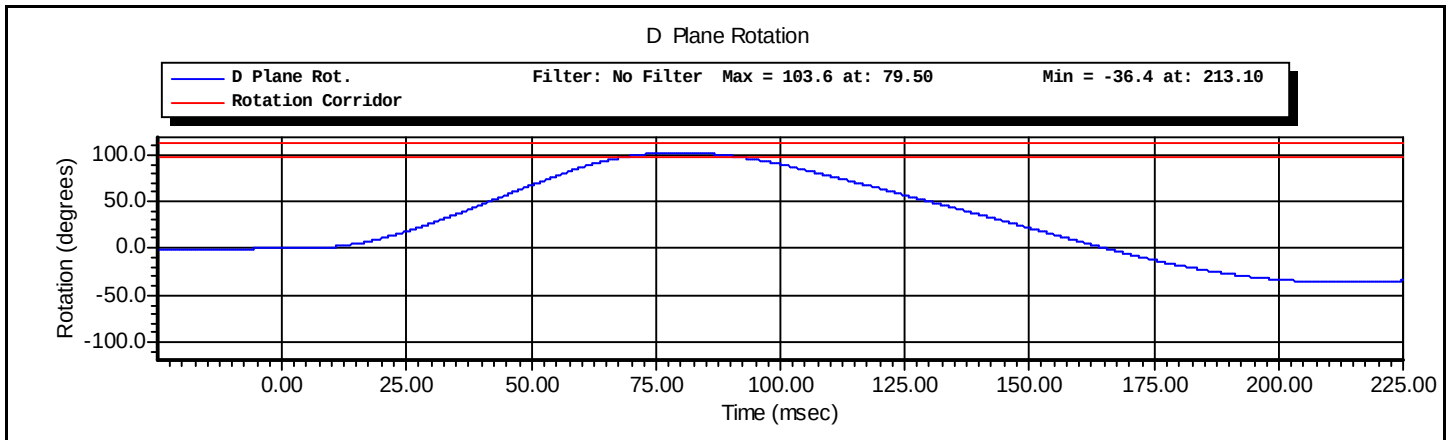
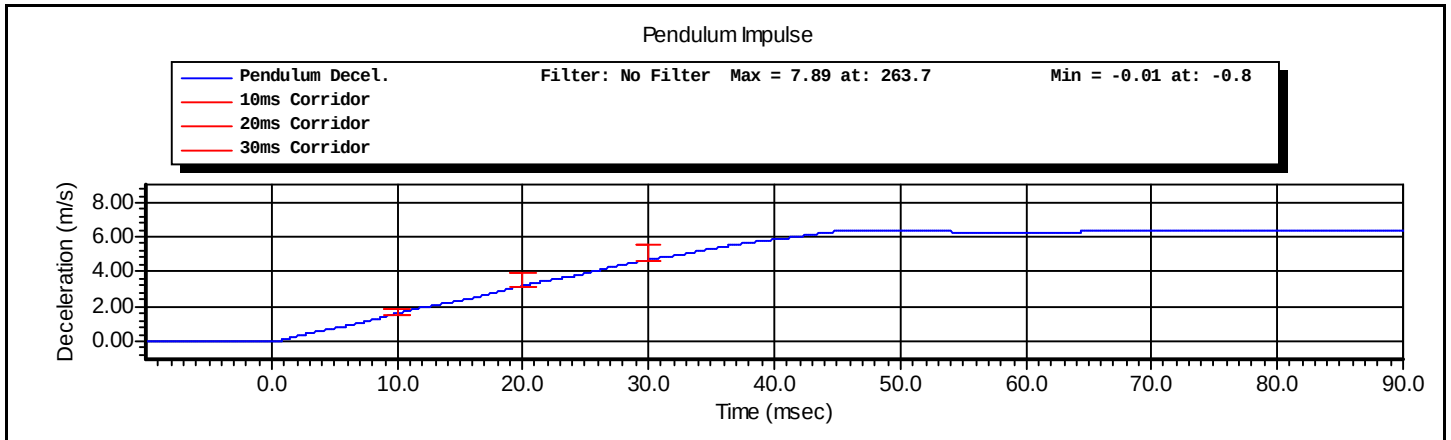
4455 Genesee Street, Buffalo, New York 14225 - Phone (716)632-7500

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/29/2010
Test Number:	2	Test Time:	11:41:29 AM



Test ID: Neck Extension Test Time: 11:41:29 AM

Test Date: 10/29/2010





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/29/2010
Test Number:	1	Test Time:	10:07:57 AM

Component Part Number	Component Serial Number
Neck - 880105-255	713
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	22.0 deg C P
Humidity	10 -- 70	32 %RH P
Velocity	6.89 -- 7.13	7.10 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.19 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.51 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.45 m/s P
D Plane Rotation	-91.0 -- -77.0	-78.9 degrees P
Moment During Rotation Interval	69.0 -- 83.0	71.4 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	88.0 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **10:07:57 AM**

Test Date: **10/29/2010**



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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
FTSS	1716A	LC-296 My	2/1/2010
FTSS	1716A	LC-296 Fx	2/1/2010
FTSS	1716A	LC-296 Fy	2/1/2010
FTSS	1716A	LC-296 Fz	2/1/2010

Test ID: **Neck Flexion**

Test Time: **10:07:57 AM**

Test Date: **10/29/2010**

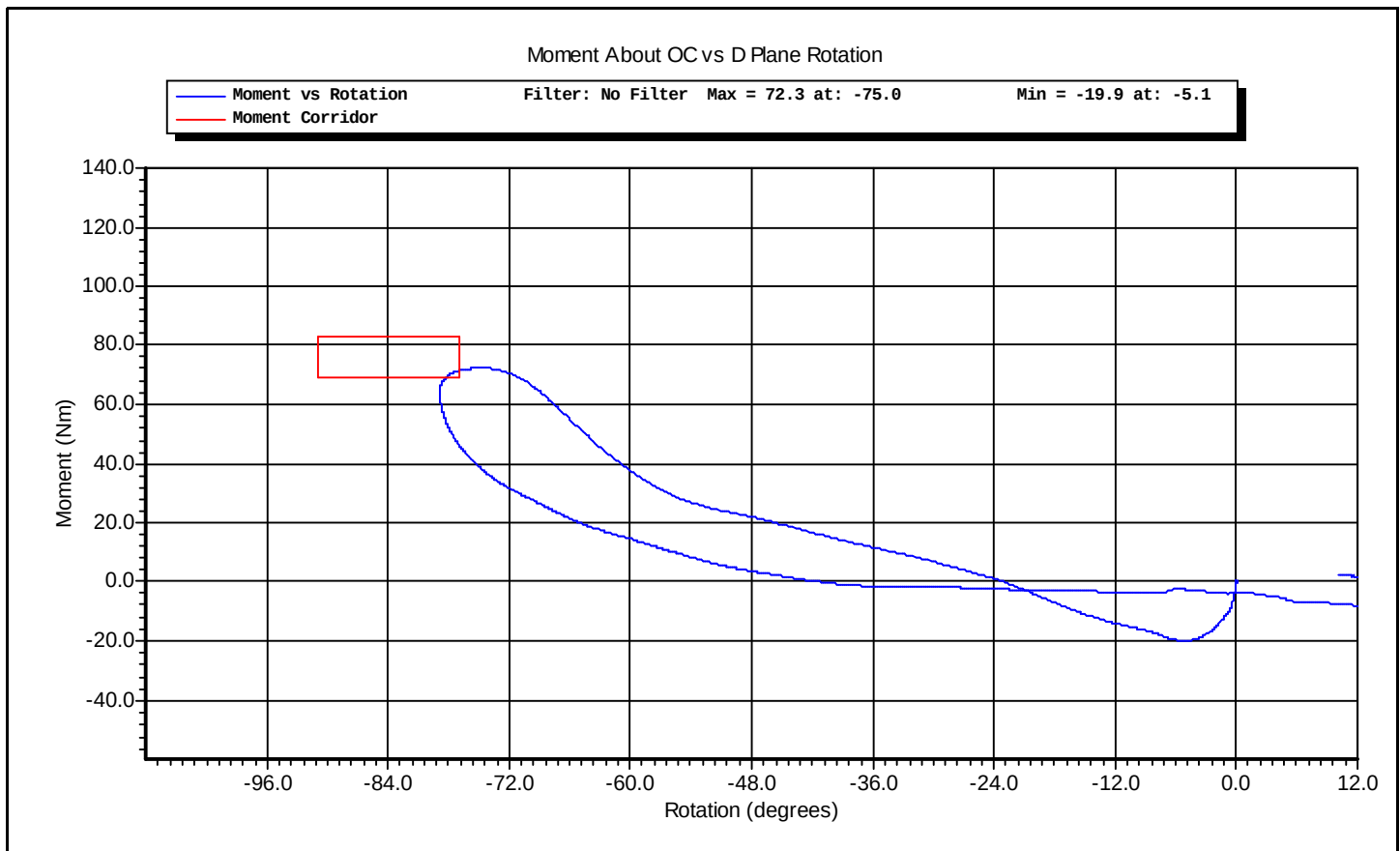


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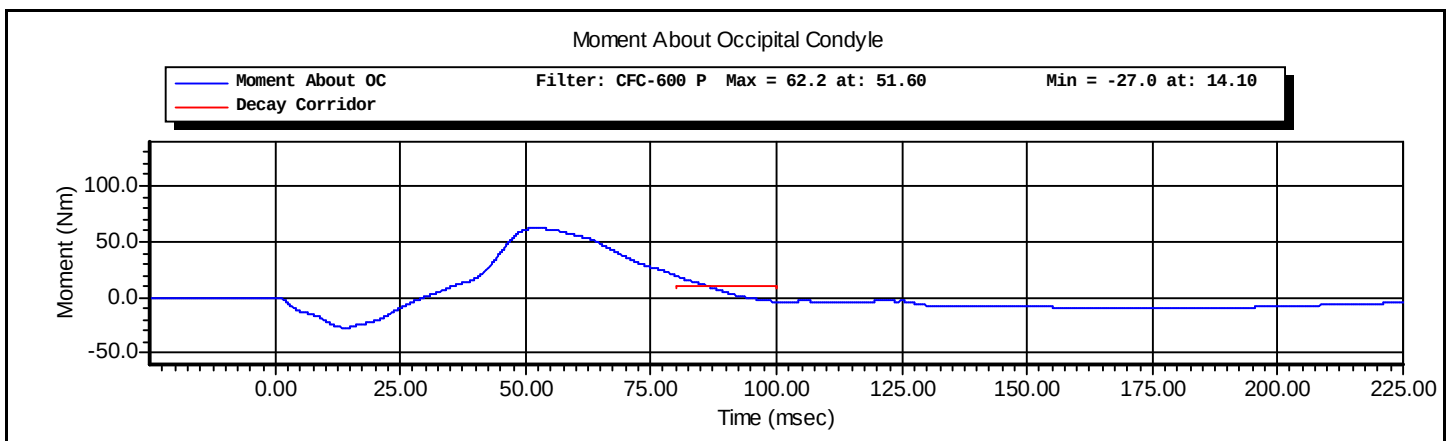
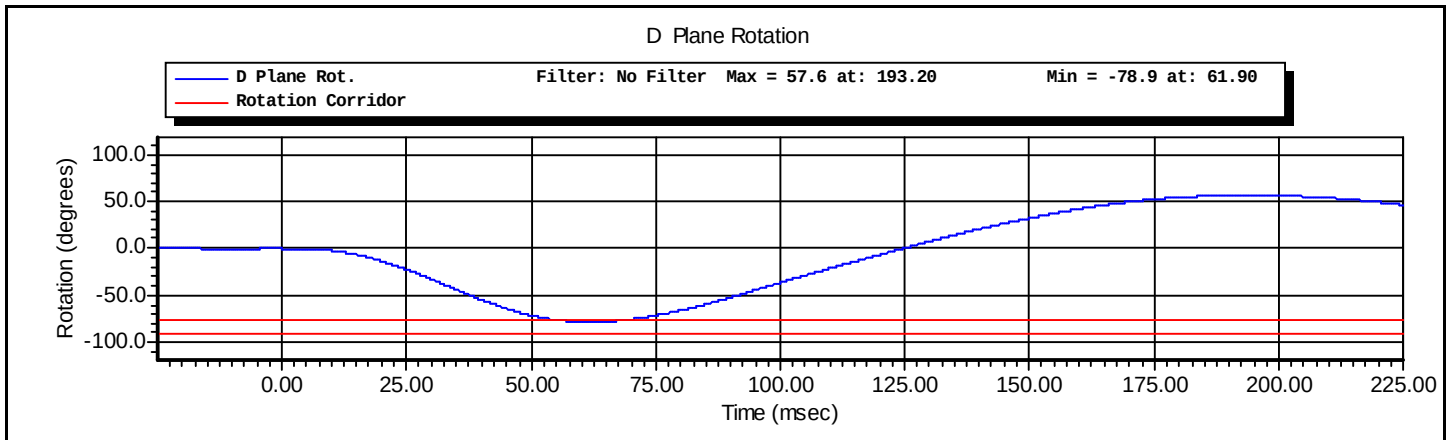
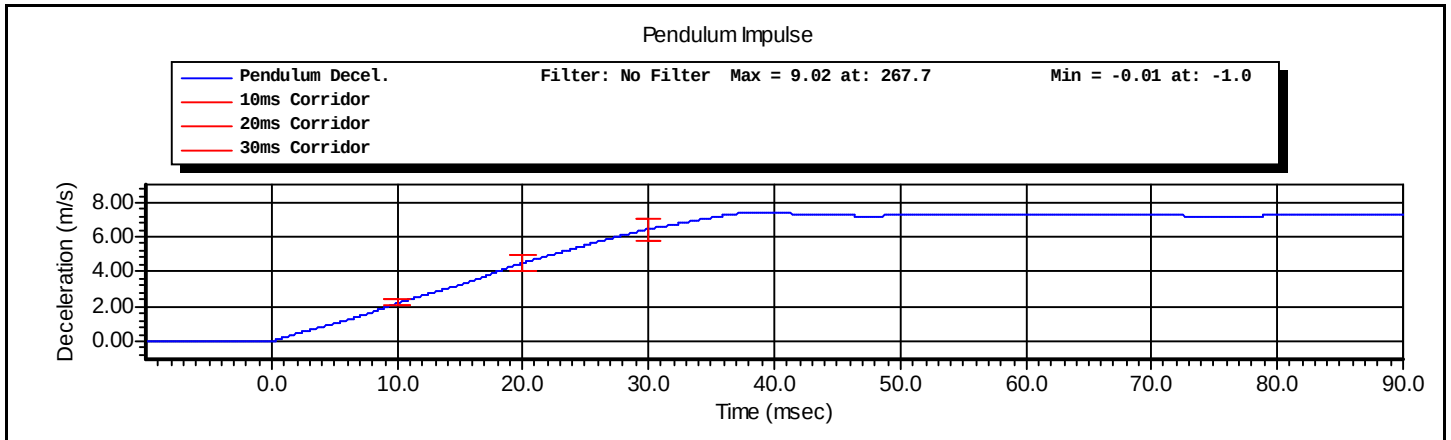
Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/29/2010
Test Number:	1	Test Time:	10:07:57 AM



Test ID: Neck Flexion

Test Time: 10:07:57 AM

Test Date: 10/29/2010





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/27/2010
Test Number:	1	Test Time:	2:12:12 PM

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	22.2 deg C	P
Humidity	10.0	--	70.0	41.0 %RH	P
Velocity	6.59	--	6.83	6.69 m/s	P
Sternum Displacement	-58.0	--	-50.0	-51.1 mm	P
Force During Displacement Interval	-4400	--	-3900	-4353 N	P
Force -18.0 to -50.0 Displacement	-4600	--	0	-4266 N	P
Hysteresis	69	--	85	71 %	P

All test parameters are within specifications

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

Test ID: **Thorax Impact**

Test Time: **2:12:12 PM**

Test Date: **10/27/2010**



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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-273	4/13/2010

Test ID: **Thorax Impact**

Test Time: **2:12:12 PM**

Test Date: **10/27/2010**



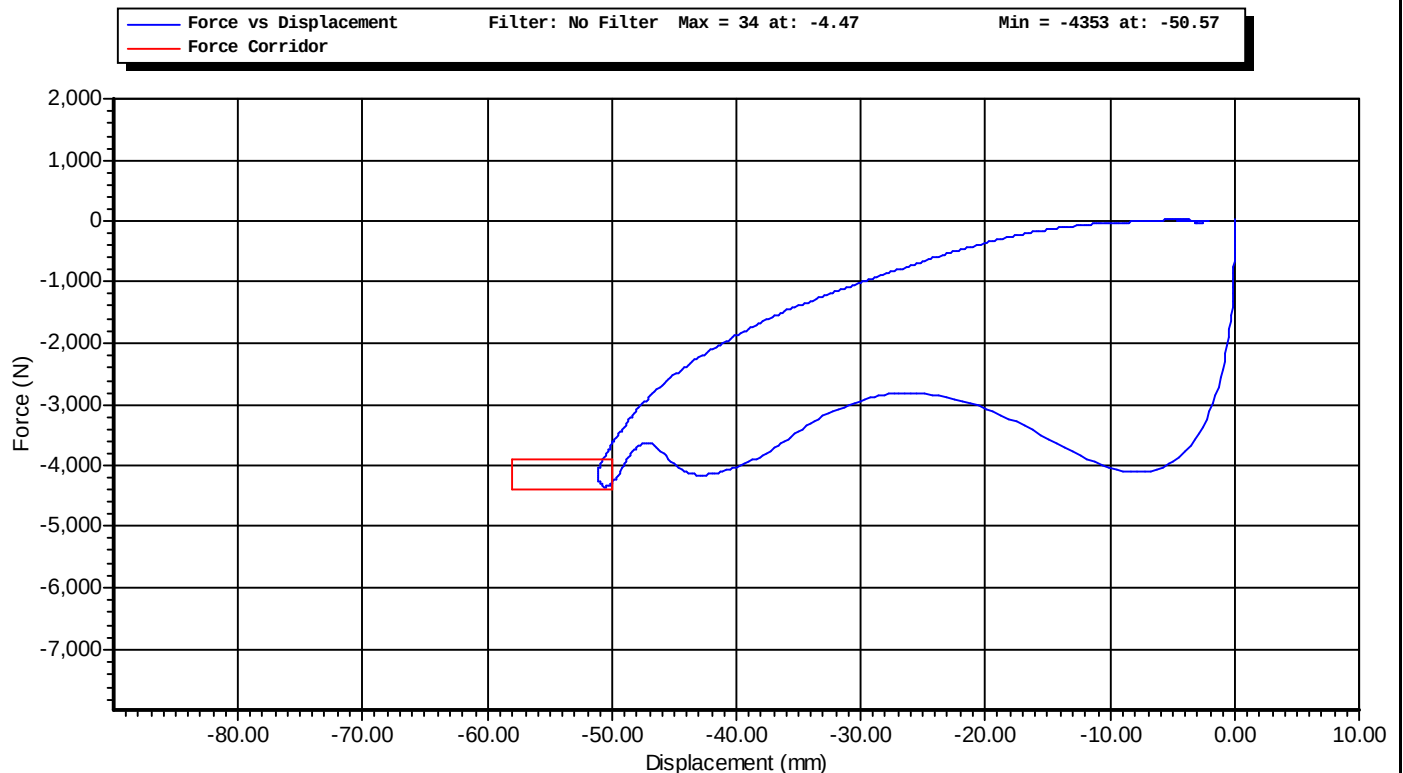
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	10/27/2010
Test Number:	1	Test Time:	2:12:12 PM

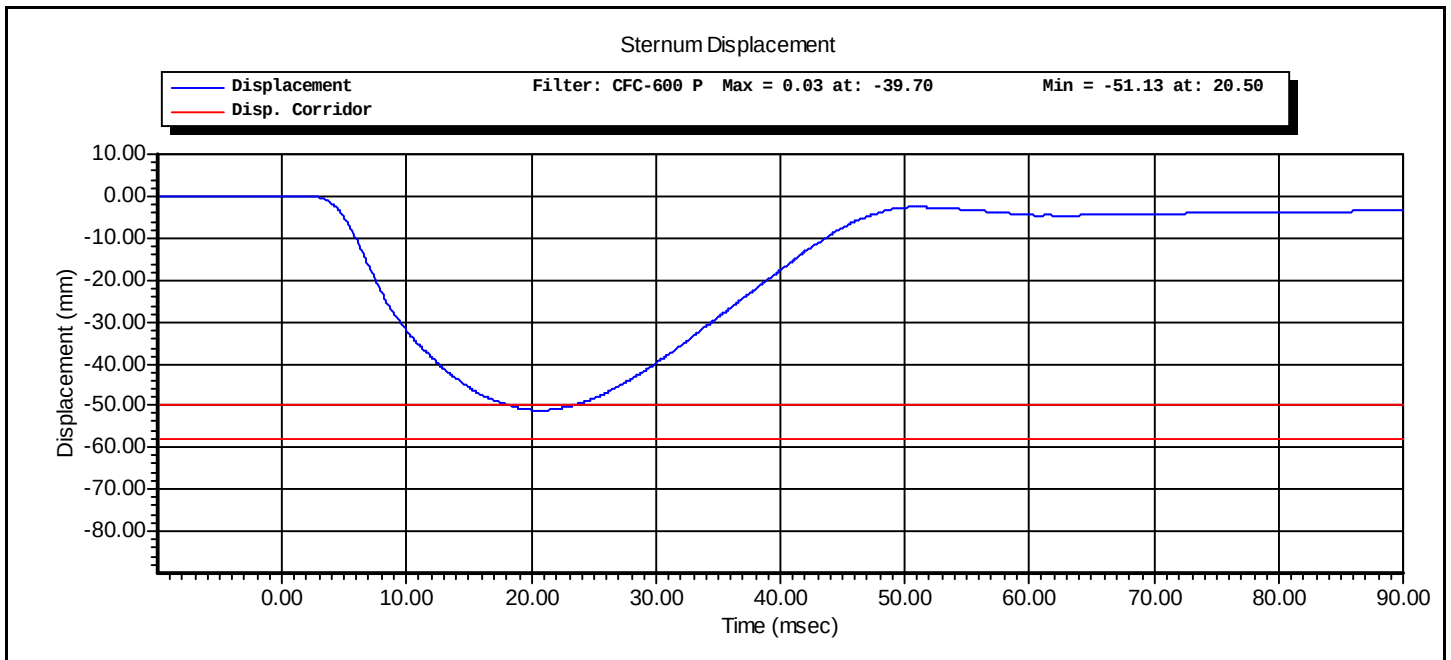
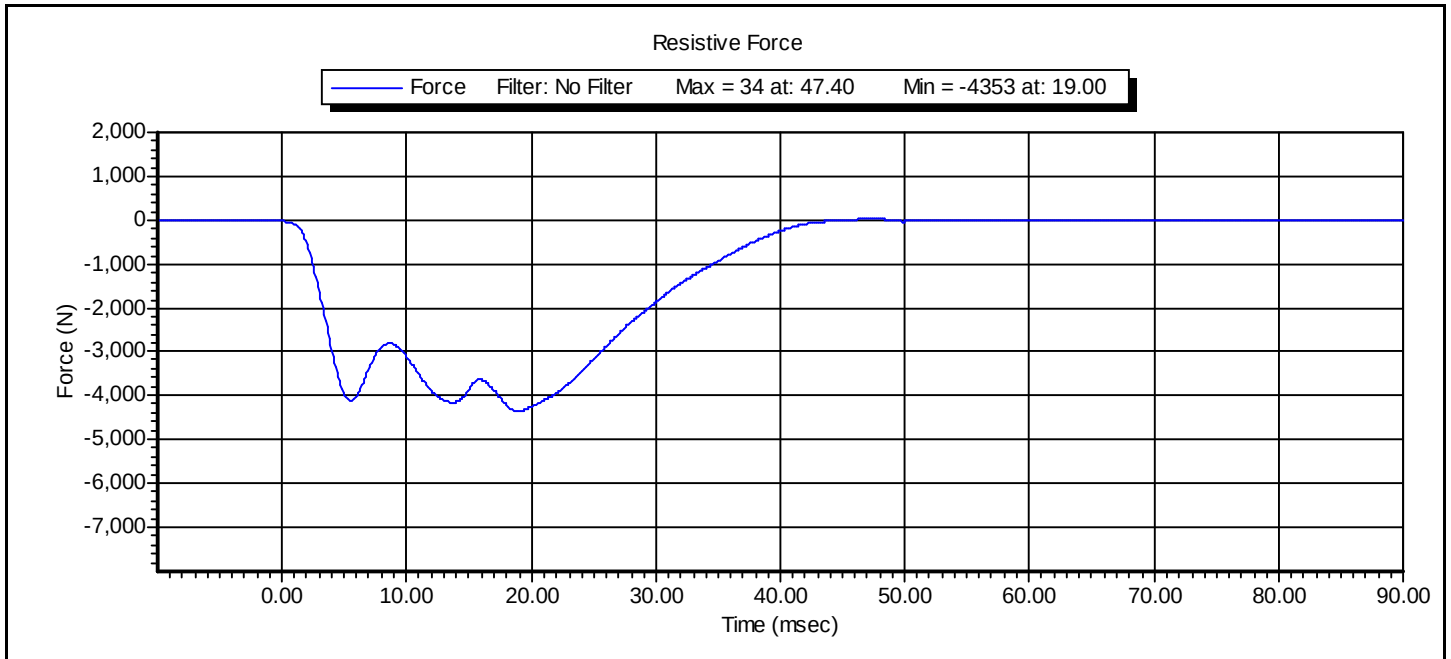
Resistive Force vs Sternum Displacement



Test ID: Thorax Impact

Test Time: 2:12:12 PM

Test Date: 10/27/2010



Torso Flexion Test

Technician: AR

Calibration Date: 10/29/2010

ATD Serial Number: 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	22.2° C	P
Lab Humidity: 38%	10-70%	29%	P
Max Force @ 45 deg	320 – 390N	362N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	14 °	P
Final ref plan angle	Initial ref plane ± 8 deg	20 °	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/29/2010
Test Number:	1	Test Time:	2:12:42 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	30.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-4060 -- -3450	-3552 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **2:12:42 PM**

Test Date: **10/29/2010**



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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**

Test Time: **2:12:42 PM**

Test Date: **10/29/2010**

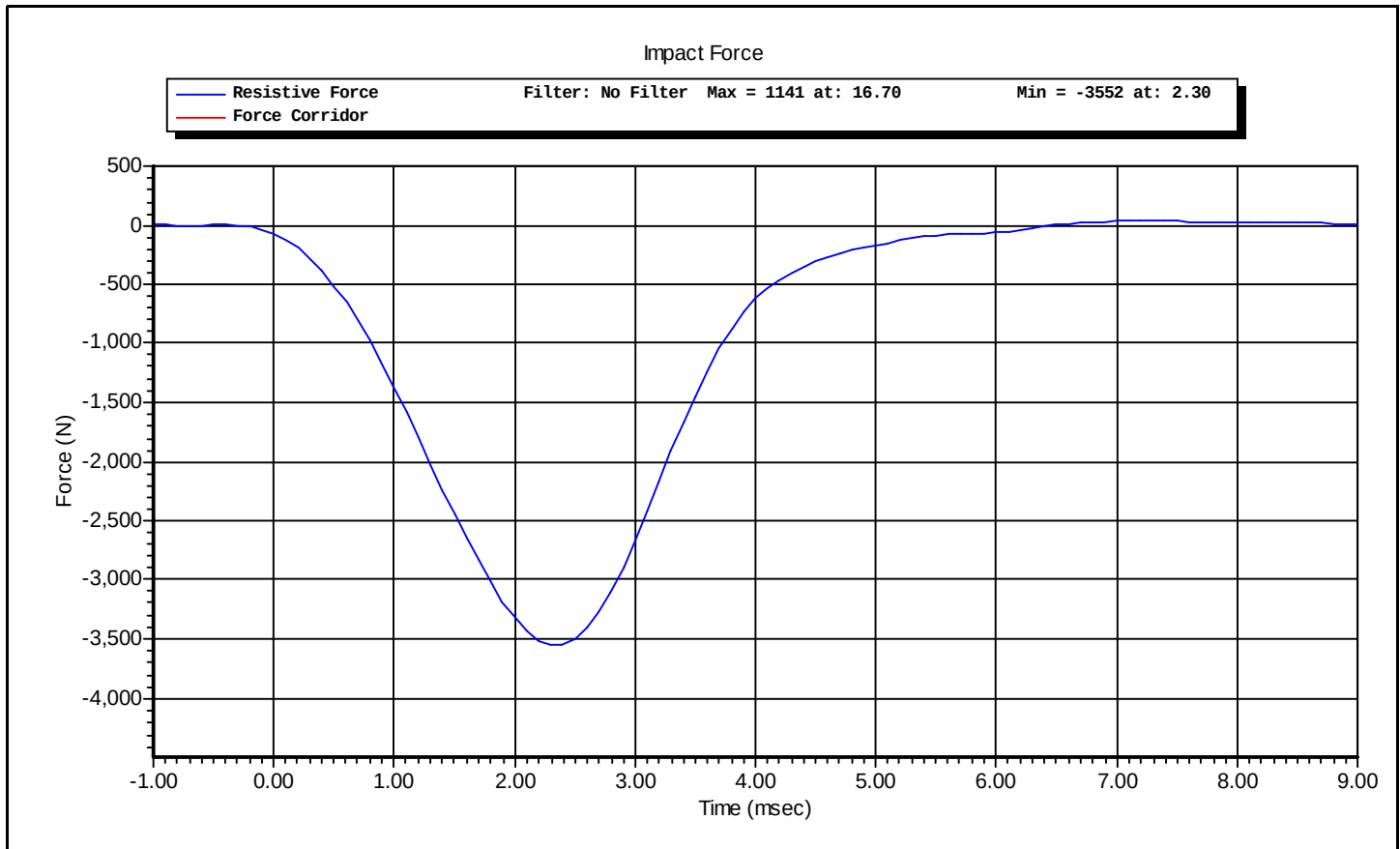


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left	Test Date:	10/29/2010
Test Number:	1	Test Time:	2:12:42 PM



Test ID: **Left**

Test Time: **2:12:42 PM**

Test Date: **10/29/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/29/2010
Test Number:	1	Test Time:	2:00:39 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	30.0 %RH P
Velocity	2.07 -- 2.13	2.12 m/s P
Resistive Force	-4060 -- -3450	-3727 N P

All test parameters are within specifications

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

Test ID: **Right Knee**

Test Time: **2:00:39 PM**

Test Date: **10/29/2010**



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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: **2:00:39 PM**

Test Date: **10/29/2010**

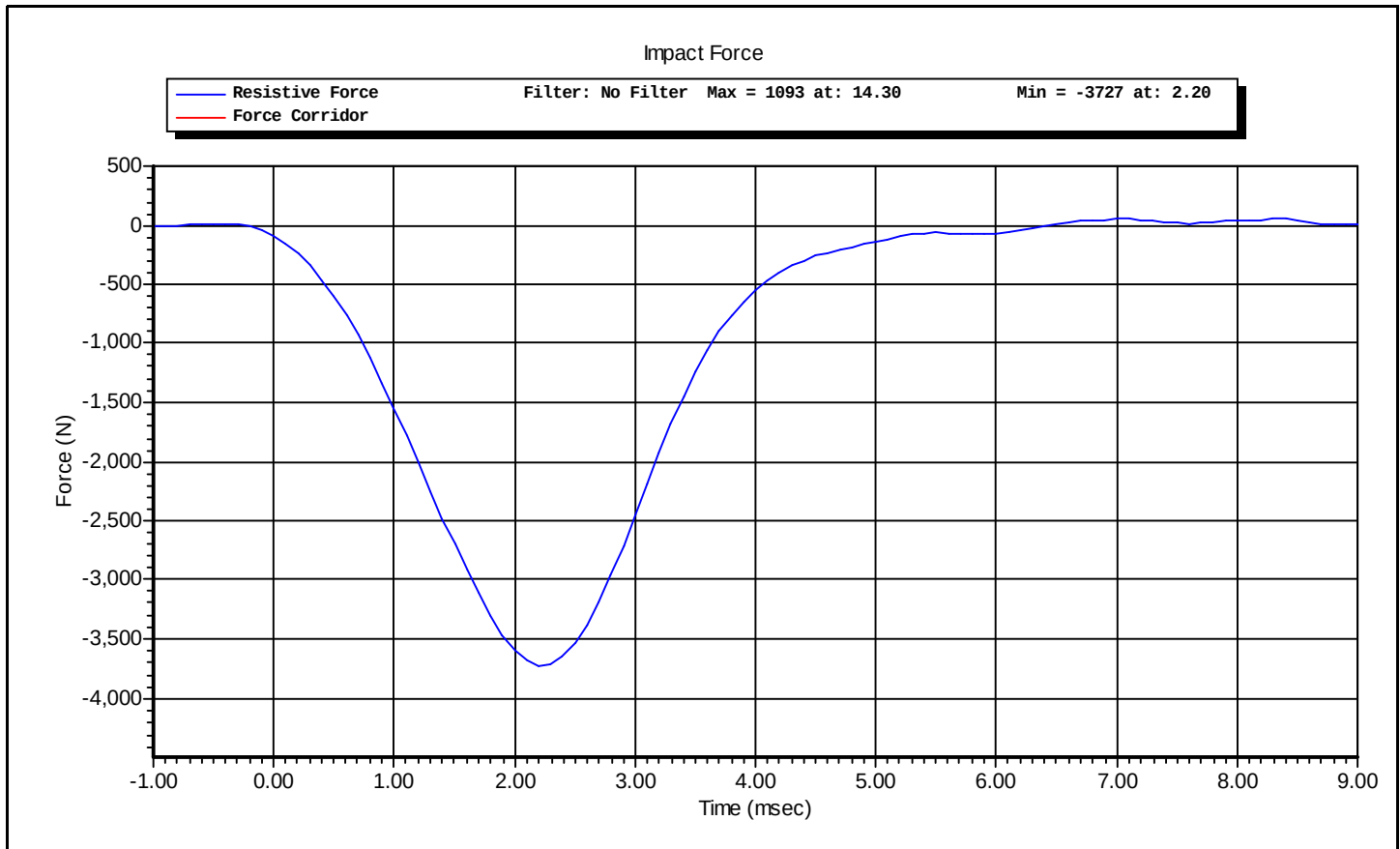


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/29/2010
Test Number:	1	Test Time:	2:00:39 PM



Test ID: Right Knee

Test Time: 2:00:39 PM

Test Date: 10/29/2010

