

REPORT NUMBER: NCAP-CAL-11-034

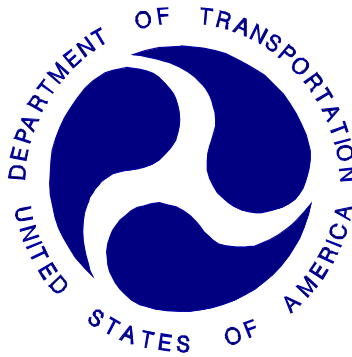
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**Ford Motor Company
2011 Ford Ranger SuperCab
Extended Cab Pickup**

NHTSA NUMBER: MB0220

CALSPAN TEST NUMBER: TR2517

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



March 17, 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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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-11-034	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 Ranger SuperCab Extended Cab Pickup NHTSA No. MB0220			5. Report Date 3/17/2011																																																																
			6. Performing Organization Code CAL																																																																
7. Author(s) Bethany Koetje, Project Engineer			8. Performing Organization Report No. TR2517																																																																
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, 3/17/2011																																																																
			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 Ranger SuperCab Extended Cab Pickup 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 2/16/2011. The impact velocity of the vehicle was 56.46 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 496 mm of vehicle. The test vehicle's performance is as follows:																																																																			
<table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD</th> <th colspan="3">Pass. ATD</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td>N/A</td> <td>700</td> <td>470.59</td> <td>N/A</td> <td>700</td> <td>509.81</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-38.50</td> <td>mm</td> <td>52</td> <td>-24.14</td> </tr> <tr> <td>Nij</td> <td>n/a</td> <td>1</td> <td>0.44</td> <td>n/a</td> <td>1</td> <td>1.08</td> </tr> <tr> <td>Neck Tension</td> <td>Newtons</td> <td>4,170</td> <td>1,896.48</td> <td>Newtons</td> <td>2,620</td> <td>2,056.21</td> </tr> <tr> <td>Neck Compression</td> <td>Newtons</td> <td>4,000</td> <td>-362.91</td> <td>Newtons</td> <td>2,520</td> <td>-356.14</td> </tr> <tr> <td>Left Femur Force</td> <td>Newtons</td> <td>10,008</td> <td>-2,860.69</td> <td>Newtons</td> <td>6,805</td> <td>-2,608.71</td> </tr> <tr> <td>Right Femur Force</td> <td>Newtons</td> <td>10,008</td> <td>-5,865.57</td> <td>Newtons</td> <td>6,805</td> <td>-1,244.90</td> </tr> </tbody> </table>						Measurement Description	Driver ATD			Pass. ATD			Units	Threshold	Result	Units	Threshold	Result	Head Injury Criteria (HIC ₁₅)	N/A	700	470.59	N/A	700	509.81	Maximum Chest Compression	mm	63	-38.50	mm	52	-24.14	Nij	n/a	1	0.44	n/a	1	1.08	Neck Tension	Newtons	4,170	1,896.48	Newtons	2,620	2,056.21	Neck Compression	Newtons	4,000	-362.91	Newtons	2,520	-356.14	Left Femur Force	Newtons	10,008	-2,860.69	Newtons	6,805	-2,608.71	Right Femur Force	Newtons	10,008	-5,865.57	Newtons	6,805	-1,244.90
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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 Ranger SuperCab Extended Cab Pickup at a velocity of 56.46 kph. The test was performed at Calspan on 2/16/2011. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 13 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap belts and driver shoulder belt to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No. 143) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 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 496 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.

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)	470.59	66.60	81.60	-38.50	0.44	1,896.48	-362.91	-2,860.69	-5,865.57
Passenger (5 th)	509.81	61.85	76.85	-24.14	1.08	2,056.21	-356.14	-2,608.71	-1,244.90

**SECTION 2
DATA SHEETS**

**DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA**

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

TEST VEHICLE INFORMATION

NHTSA No.	MB0220
Make	Ford
Model	Ranger SuperCab
Body Style	Extended Cab Pickup
VIN	1FTLR4FE2BPA27692
Color	Red
Delivery Date	2/10/2011
Odometer Reading (mi)	26
Odometer Reading (km)	41.8
Dealer	West Herr Ford
Transmission	5-Speed Automatic
Final Drive	All Wheel Drive
Type/No. Cyl	V6
Engine Disp. (L)	4.0
Engine Placement	Longitudinal
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	No
Driver Head/Torso Airbag	Yes
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	No
Driver Pelvis Airbag	No
Driver Knee Airbag	No
Pass. Front Airbag	Yes
Pass. Curtain Airbag	No
Pass. Head/Torso Airbag	Yes
Pass. Torso Airbag	No
Pass. Torso/Pelvis Airbag	No
Pass. Pelvis Airbag	No
Pass. Knee Airbag	No
Pretensioners	Yes
Load Limiters	Yes
Automatic Door Locks	No
Tilt Steering	Yes
Other	--

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

NA

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Company
Date of Manufacture	1/11

GVWR (kg)	2,336
GAWR Front (kg)	1,293
GAWR Rear (kg)	1,179

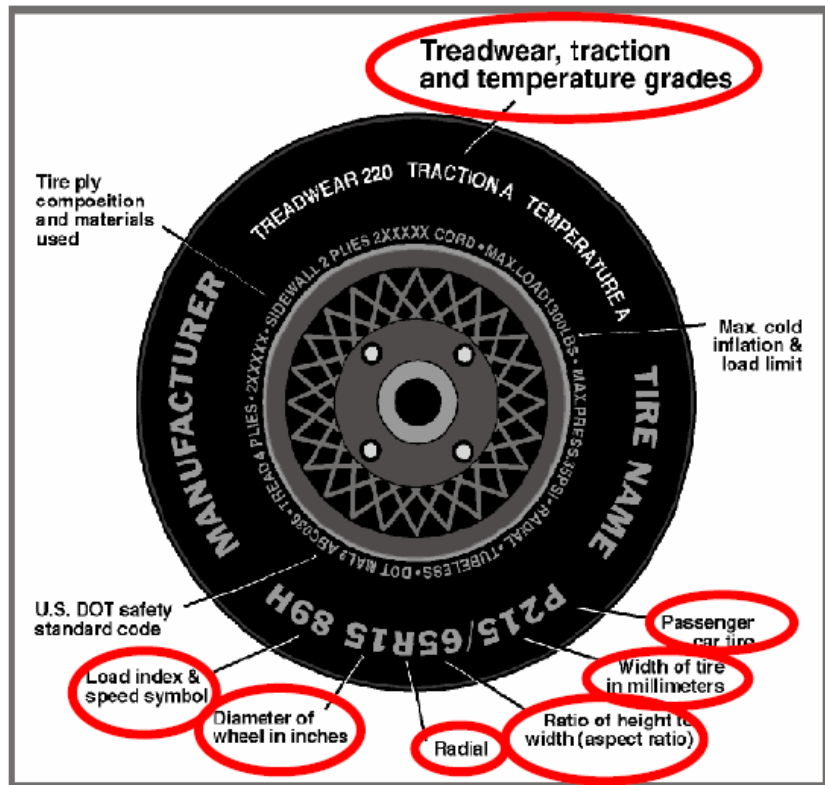
VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Split Bench	Fold Down	NA	
Number of Occupants	3	2		5
Capacity Wt. (VCW) (kg)				531.0
Cargo Wt. (RCLW) (kg)				190.8*

* Maximum allowable added cargo weight is 136 kg

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

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011



Measured Parameter	Front	Rear
Maximum Tire Pressure	300	300
Cold Pressure (kPa)	240	240
Recommended Tire Size	P235/75R15	P235/75R15
Tire Size on Vehicle	P235/75R15	P235/75R15
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler SR-A	Wrangler SR-A
Treadwear	500	500
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester + 2 Steel	2 Polyester + 2 Steel
Load Index/Speed Symbol	105S	105S
Tire Material	Rubber	Rubber
DOT Safety Code Right	MDHLDYER4910	MDHLDYER4910
DOT Safety Code Left	MDHLDYER4910	MDHLDYER4910

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

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	559.0	371.0		591.0	464.0	
Right	kg	510.0	362.0		554.0	461.5	
Ratio	%	59	41		55	45	
Totals	kg	1,069.0	733.0	1,802.0	1,145.0	925.5	2,070.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1,802.0
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6
Rated Cargo/Luggage Weight (RCLW)	kg	136.0
Calculated Vehicle Target Weight (TVTW)	kg	2,078.6

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	847	846	896	901	1,302
As Tested	mm	841	837	864	857	1,429
Post Test	mm	855	978	820	865	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3,196
Total Vehicle Length at Left Side	mm	5,098
Total Vehicle Length at Centerline	mm	5,175
Total Vehicle Length at Right Side	mm	5,098
Weight of Ballast in Cargo Area	kg	104.0
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	L	68.1

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

None

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

Test Vehicle:	2011 Ford Ranger SuperCab	NHTSA No:	MB0220
Test Program:	Frontal NCAP	Test Date	2/16/2011

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5,175
2	Total Width	1,747
3	Bumper Top Height	684
4	Bumper Bottom Height	595
5	Longitudinal Member Top Height	614
6	Distance Between Longitudinal Members	792
7	Longitudinal Member Width	61
8	Engine Top Height	1,114
9	Engine Bottom Height	357
10	Engine and Gearbox Width	514
11	Front Bumper-Engine Distance	634
12	Front Shock Absorber Fixing Height	789
13	Bonnet Leading Edge Height	1,036
14	Front Shock Absorber Fixing Width	798
15	Front Bumper – Front Axle Distance	854
16	Front Axle – A Pillar Distance	683
17	A- Pillar – B-Pillar Distance	1,026
18	B-Pillar – Rear Axle Distance	1,481
19	B-Pillar – C-Pillar Distance	495
20	Roof Sill Bottom Height	1,596
21	Roof Sill Top Height	1,697
22	Floor Sill Bottom Height	553
23	Floor Sill Top Height	574

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

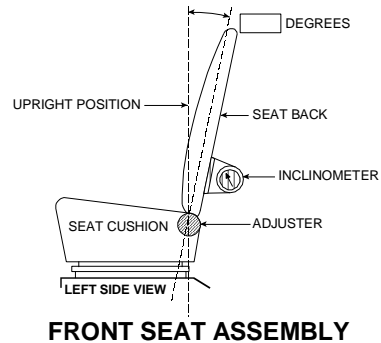
Test Vehicle: 2011 Ford Ranger SuperCab
 Test Program: Frontal NCAP

NHTSA No: MB0220
 Test Date: 2/16/2011

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 5th percentile female dummy



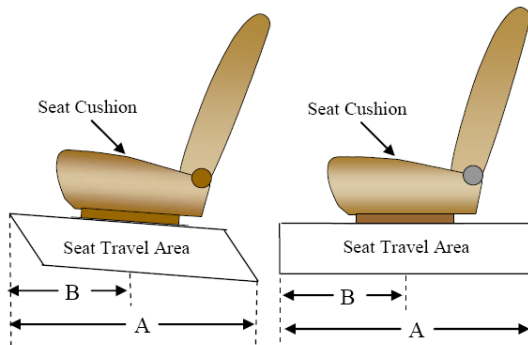
	Deg
Driver Seat Back Angle	7.7
Passenger Seat Back Angle	4.0

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 (detents)	Placed in Position #
Driver Seat	26	13
Passenger Seat	26	0



SEAT BELT UPPER ANCHORAGES

The driver's upper seat belt anchorage was placed in the middle of 5 possible positions (position 2).

The right front passenger's upper seat belt anchorage was placed in the uppermost of 5 possible positions (position 0).

	Total # of Positions	Placed in Position #
Driver Seat	5	2
Passenger Seat	5	0

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

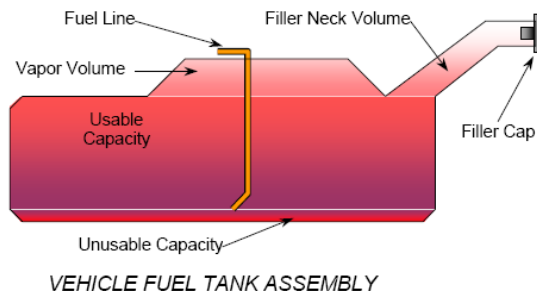
Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	73.8
Usable Capacity of "Optional Tank"	-
92%-94% of Usable Capacity	67.9 - 69.4
Actual Amount of Solvent Used	68.1
1/3 of Usable Capacity	24.6

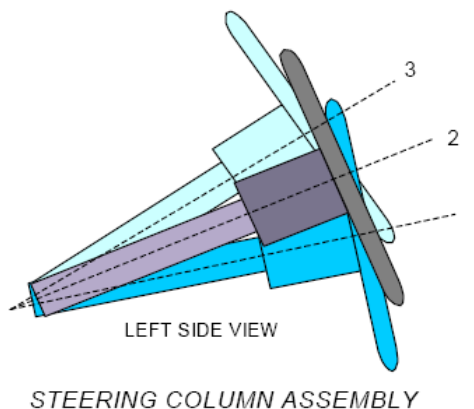
FUEL PUMP

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



STEERING COLUMN ADJUSTMENT

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

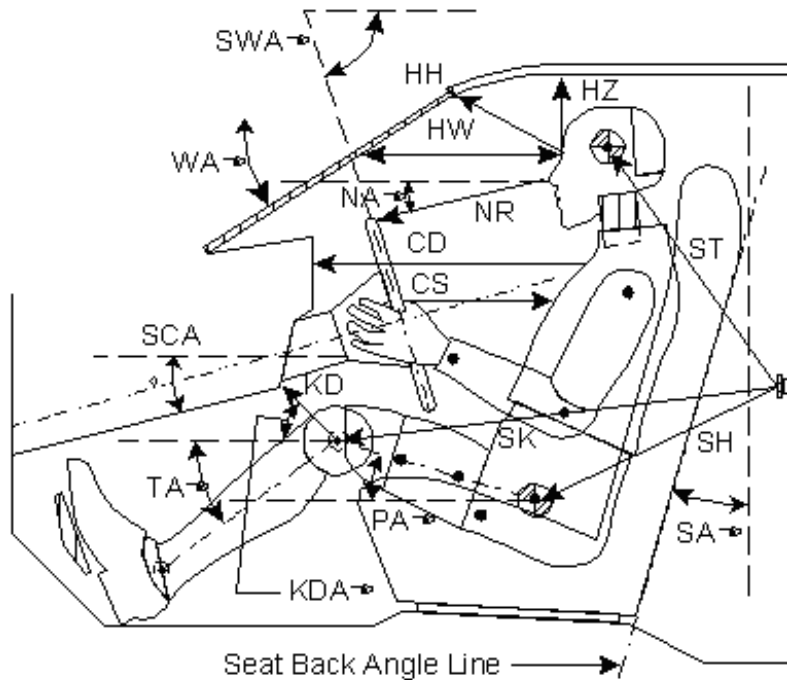


STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1	59.0	
Geometric center position No. 2	69.0	
Uppermost position No. 3	80.0	
Telescoping Steering Wheel Travel		NA
Test Position	69.0	NA

**DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

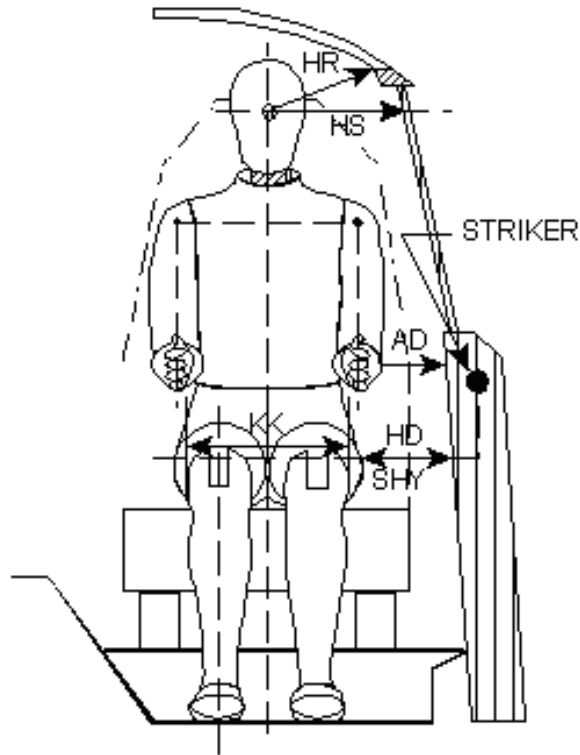
Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		41.8		
SWA°	Steering Wheel Angle		69.0		
SCA°	Steering Column Angle		21.5		
SA°	Seat Back Angle (on headrest post)		7.7		4.0
HZ	Head to Roof (Z)	203	90.0	265	90.0
HH	Head to Header	459	12.9	349	38.2
HW	Head to Windshield	585	0.0	553	0.0
NR	Nose to Rim	360	-11.9	455	-17.8
CD	Chest to Dash	512		438	
CS	Chest to Steering Hub	260	0.0		
RA	Rim to Abdomen	170	0.0		
KDL	Left Knee to Dash	136	24.2	66	30.5
KDR	Right Knee to Dash	115	34.8	72	31.0
PA°	Pelvic Angle		23.3		20.7
TA°	Tibia Angle		45.0		50.1
SK	Striker to Knee	720	1.2	813	-2.4
ST	Striker to Head	331	-24.6	571	50.0
SH	Striker to H-Point	593	63.9	515	-9.6

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Ford Ranger SuperCab	NHTSA No:	MB0220
Test Program:	Frontal NCAP	Test Date	2/16/2011

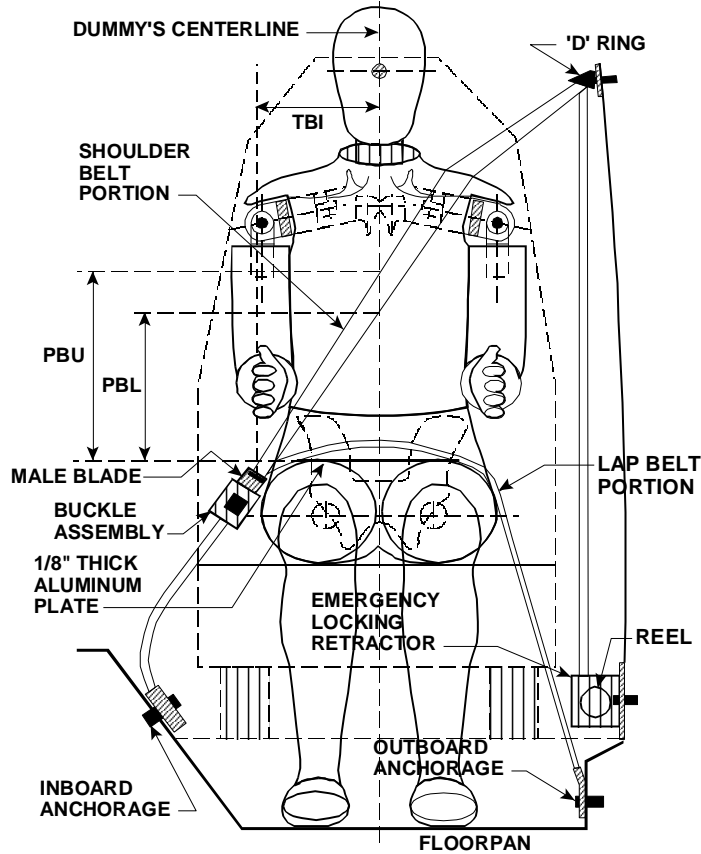


Code	Description	Driver	Passenger
AD	Arm to Door	74	45
HD	H-Point to Door	128	170
HR	Head to Side Header	220	265
HS	Head to Side Window	322	365
KK	Knee to Knee	300	236
SHY	Striker to H-Point (Y Direction)	190	245
AA	Ankle to Ankle	272	170

**DATA SHEET NO. 5
SEAT BELT POSITIONING DATA**

Test Vehicle:	2011 Ford Ranger SuperCab	NHTSA No:	MB0220
Test Program:	Frontal NCAP	Test Date	2/16/2011

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	355	325
PBL — Top surface of aluminum plate to belt lower edge	mm	275	220

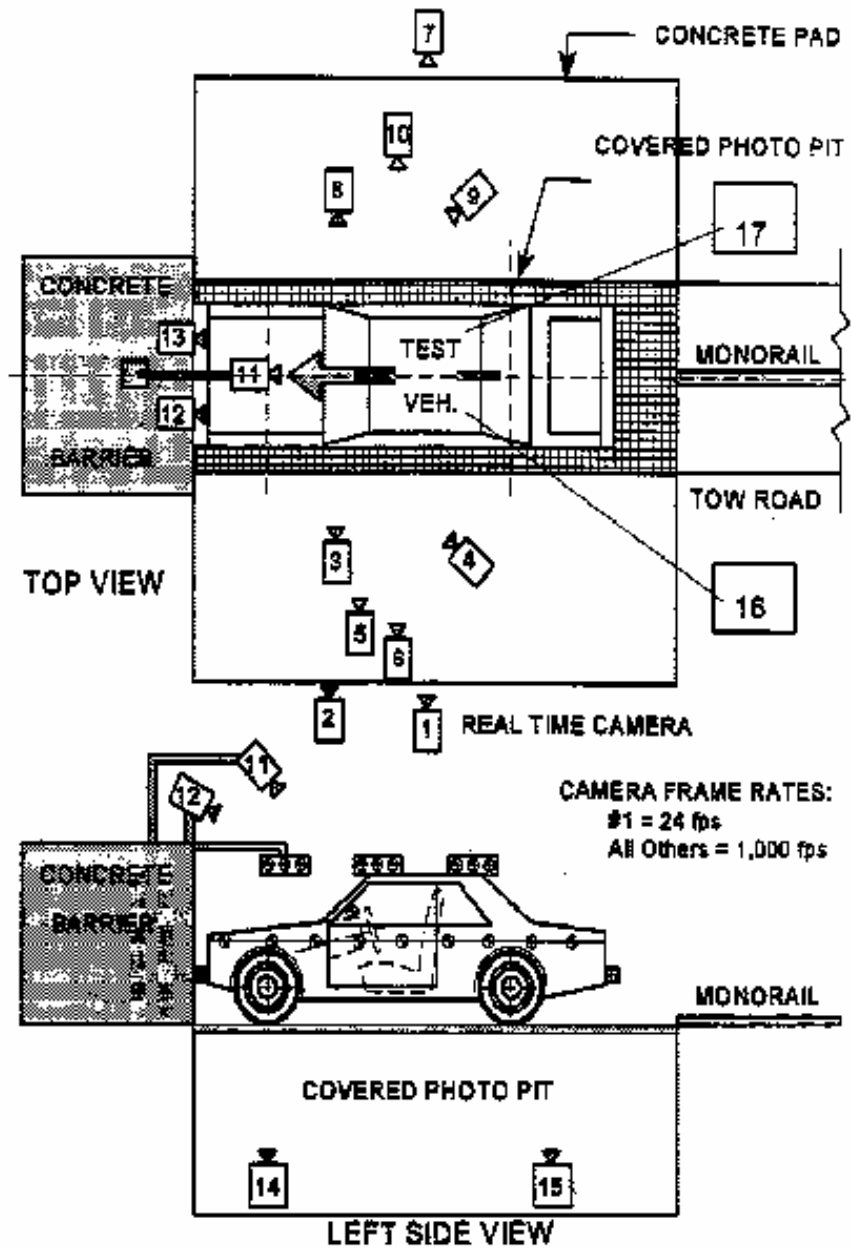
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	820	900
Lap Belt Length as measured on ATD	mm	770	810
Remainder of belt on reel	mm	260	310
Total belt length for continuous webbing systems	mm	1,850	2,020

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

Test Vehicle:	2011 Ford Ranger SuperCab	NHTSA No:	MB0220
Test Program:	Frontal NCAP	Test Date:	2/16/2011

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

CAMERA LOCATIONS

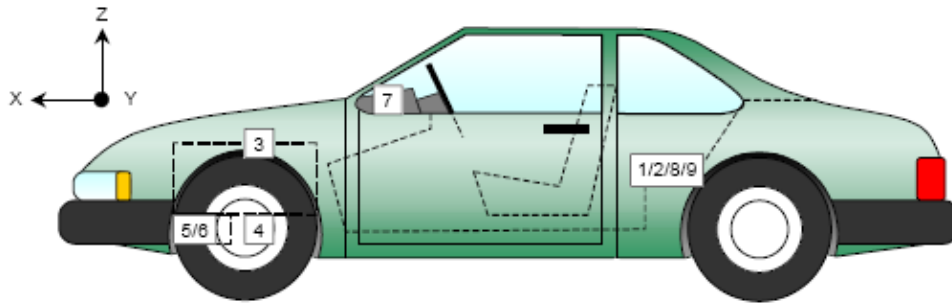
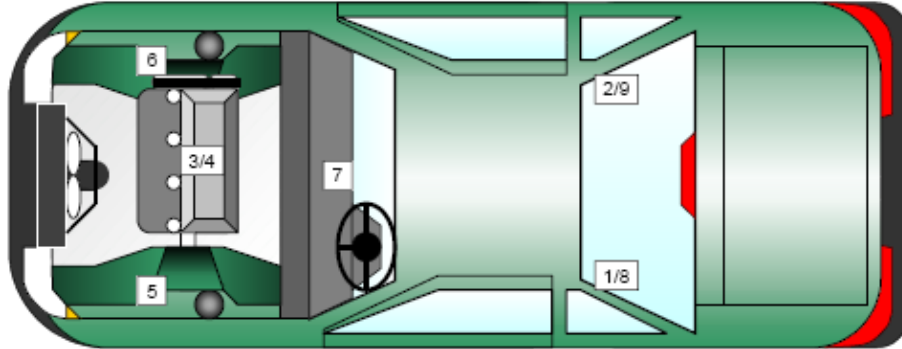
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Camera				-	24
2	Driver Left Side View	-850	-9514	-1030	50	1000
3	Left Side View	-1520	-7016	-1080	50	1000
4	Overall Right Side	-2010	7800	-970	50	1000
5	Steering Column (Bottom)	-1720	-7476	-1220	28 - 70	1000
6	Steering Column (Top)	-1720	-7476	-1810	24 - 70	1000
7	Driver and Interior View	-2910	-3050	-2330	50	1000
8	Right Side View	-1340	-9390	-1010	50	1000
9	Right Passenger View	-1760	8230	-1160	50	1000
10	Pass. And Interior View	-2940	3050	-2270	50	1000
11	Passenger Front View	-92	620	-1987	25	500
12	Driver Front View	-92	-620	-1987	25	500
13	Windshield View	0	0	-3374	25	500
14	Pit View of Engine	-615	0	3048	12.5	1000
15	Pit View of Fuel Tank	-2215	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 Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	2,467	-627	550
2	Right Rear X-Member X	2,490	621	550
3	Engine Top X	4,428	13	1122
4	Engine Bottom X	4,814	-239	356
5	Left Brake Caliper X	4,241	732	466
6	Right Brake Caliper X	4,272	-719	480
7	Instrument Panel X	-	-	-
8	Left Rear X-Member Z	2,467	-627	550
9	Right Rear X-Member Z	2,490	621	550

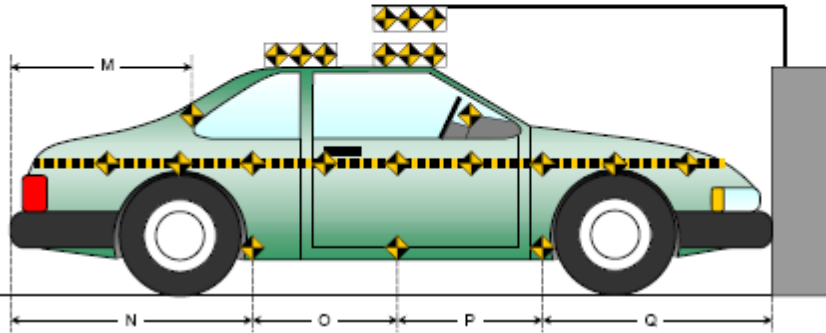
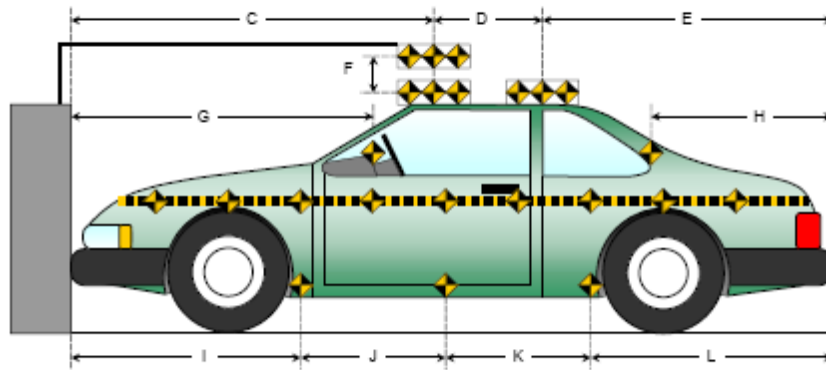
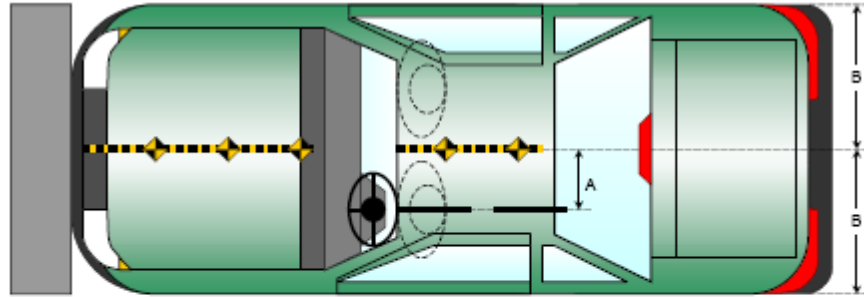
Reference Points: X – Rear Surface of Vehicle (+ forward)
 Y – Vehicle Centerline (+ to right)
 Z – Ground Plane (+ down)

**DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS**

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

Item	Value
A	378
B	874
C	2,109
D	910
E	2,155
F	-
G	1,702
H	2,188
I	1,352
J	1,092
K	1,091
L	1,640
M	2,193
N	1,631
O	1,100
P	1,096
Q	1,348

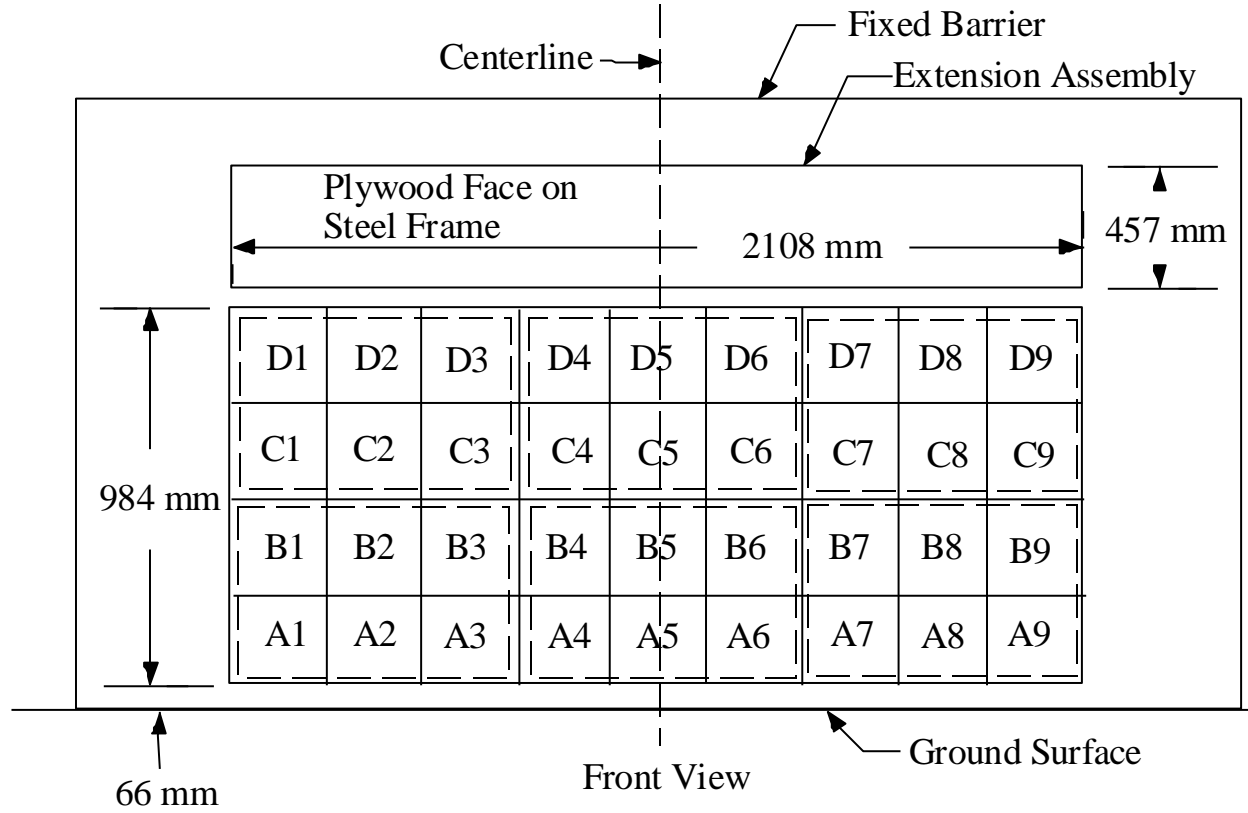
All units in millimeters



**DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER**

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

36 Load Cells
 4 Rows
 9 Columns



DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
Test Program: Frontal NCAP Test Date 2/16/2011

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 Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	061	143
Head Contact	Airbag	Airbag
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	Airbag	Airbag
Left Knee Contact	Lower Dash Panel	Glove Box Door Panel
Right Knee Contact	Lower Dash Panel	Glove Box Door Panel

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	5	3
Seat Back Failure	None	None
Glazing Damage	None	

POST TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

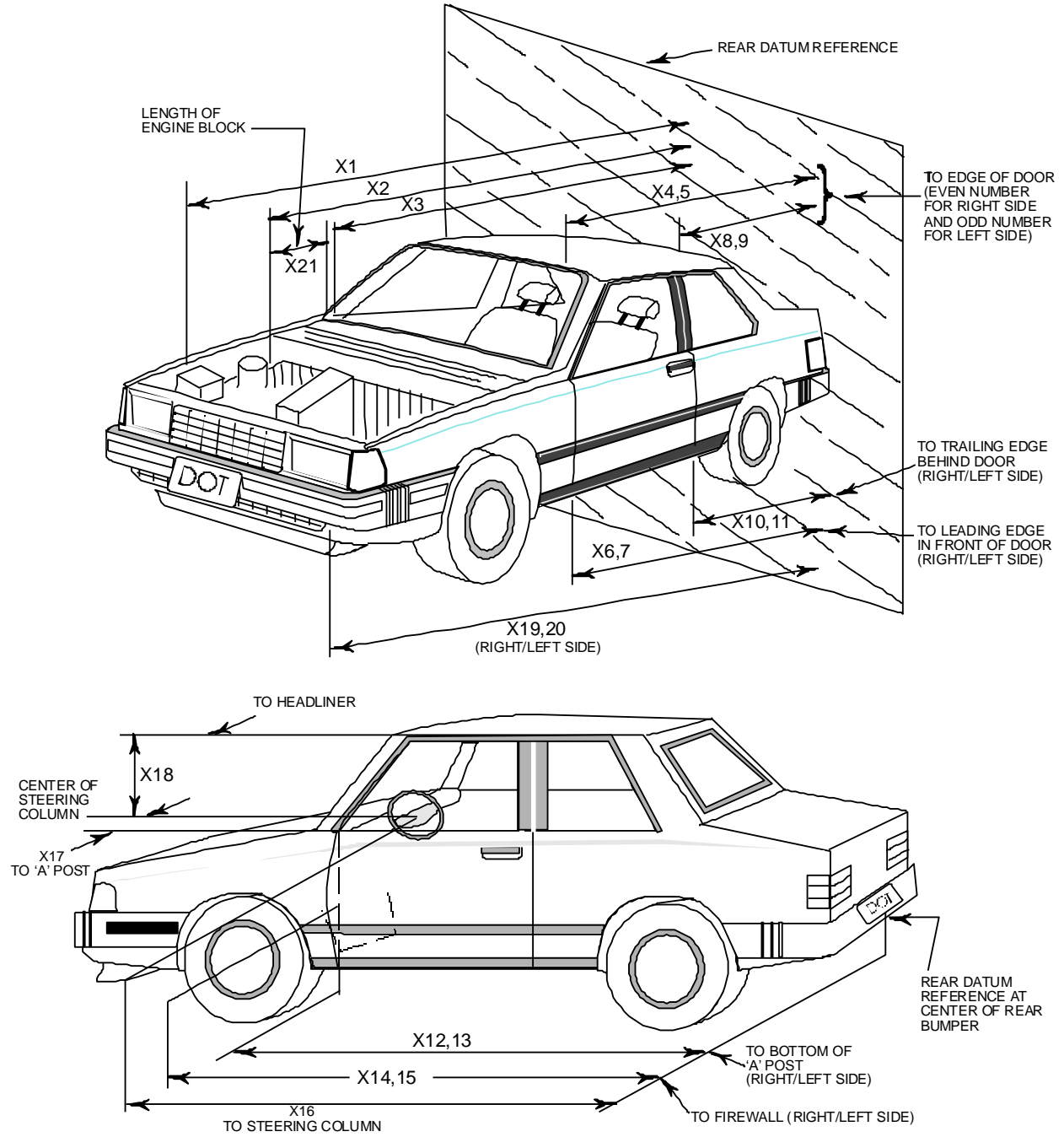
Measured Parameter	Units	Value
Left Side	mm	1,278
Center	mm	1,245
Right Side	mm	1,270
Average	mm	1,264

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

Test Vehicle:	<u>2011 Ford Ranger SuperCab</u>	NHTSA No:	<u>MB0220</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>2/16/2011</u>



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5,175	4,680	-496
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4,541	4,341	-200
3	RSOV to Firewall	4,022	3,953	-69
4	RSOV to Upper Leading Edge of Right Door	3,735	3,718	-18
5	RSOV to Upper Leading Edge of Left Door	3,733	3,714	-20
6	RSOV to Lower Leading Edge of Right Door	3,670	3,659	-11
7	RSOV to Lower Leading Edge of Left Door	3,673	3,652	-21
8	RSOV to Upper Trailing Edge of Right Door	2,621	2,611	-10
9	RSOV to Upper Trailing Edge of Left Door	2,625	2,613	-12
10	RSOV to Lower Trailing Edge of Right Door	2,608	2,597	-11
11	RSOV to Lower Trailing Edge of Left Door	2,609	2,592	-18
12	RSOV to Bottom of "A" Post of Right Side	3,722	3,680	-42
13	RSOV to Bottom of "A" Post of Left Side	3,721	3,685	-36
14	RSOV to Firewall, Right Side	3,972	3,952	-20
15	RSOV to Firewall, Left Side	3,972	3,926	-46
16	RSOV to Steering Column	3,264	3,256	-8
17	Center of Steering Column to "A" Post	279	276	-3
18	Center of Steering Column to Headliner	416	393	-23
19	RSOV to Right Side of Front Bumper	5,098	4,641	-457
20	RSOV to Left Side of Front Bumper	5,098	4,653	-445
21	Length of Engine Block	451	386	-66
RD	RSOV to Right Side of Dash Panel	3,474	3,462	-12
CD	RSOV to Center of Dash Panel	3,505	3,466	-39
LD	RSOV to Left Side of Dash Panel	3,474	3,463	-10

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

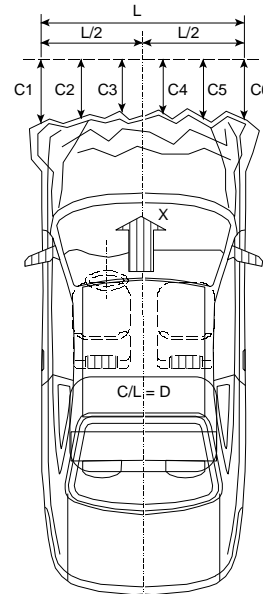
Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

VEHICLE INFORMATION

VIN 1FTLR4FE2BPA27692 Wheelbase (mm) 3,196
 Vehicle Size Category Extended Cab Pickup Test Weight (kg) 2070.5

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): 56.46
 Velocity Change (km/h): 66.36
 Time of Separation (msec): 137 ms



CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1,470
 Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	5,051	4,637	-414
C2	Crush zone 2 at left side	mm	5,132	4,666	-466
C3	Crush zone 3 at left side	mm	5,170	4,677	-493
C4	Crush zone 4 at right side	mm	5,170	4,666	-504
C5	Crush zone 5 at right side	mm	5,133	4,654	-478
C6	Crush zone 6 at right side	mm	5,052	4,616	-436
L	C1 to C6	mm	1,470	1,489	18

**DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS**

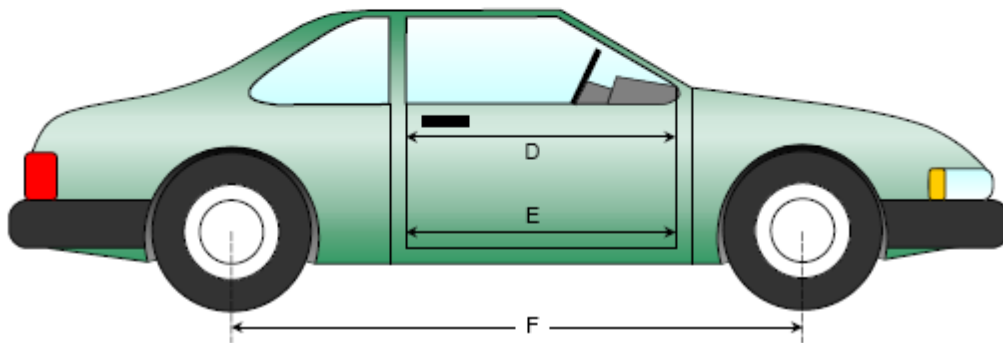
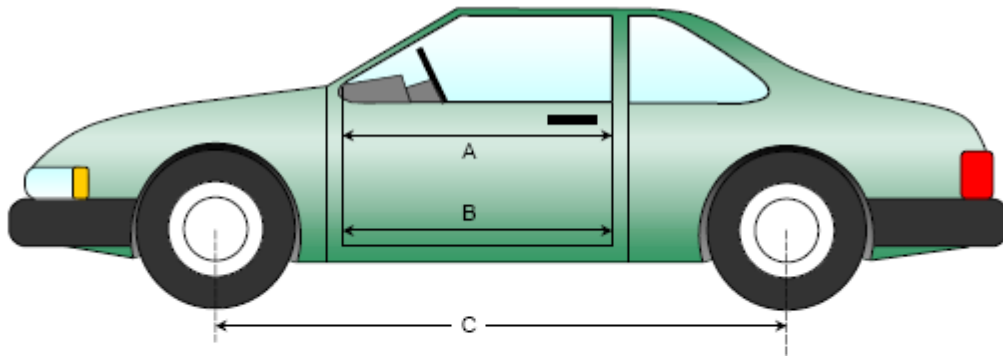
Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1,027	1,009	-19
B	Left Side Lower	mm	1,012	1,001	-12
D	Right Side Upper	mm	1,026	1,005	-20
E	Right Side Lower	mm	1,013	1,002	-11

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3,191	3,156	-34
F	Right Side Wheelbase	mm	3,202	3,117	-85



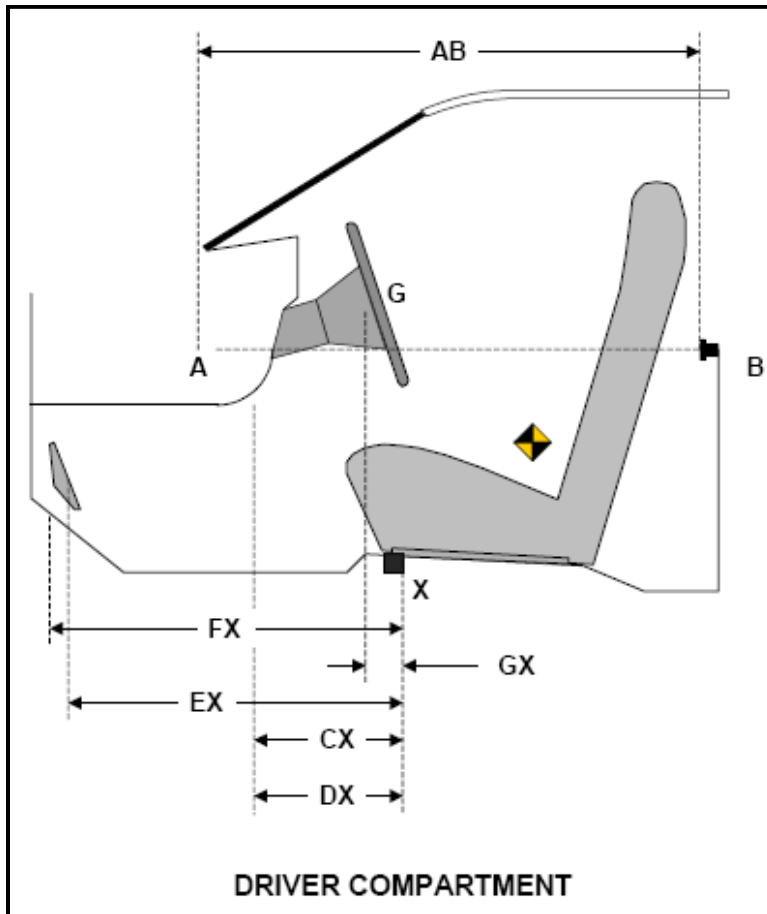
DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

DRIVER COMPARTMENT INTRUSION

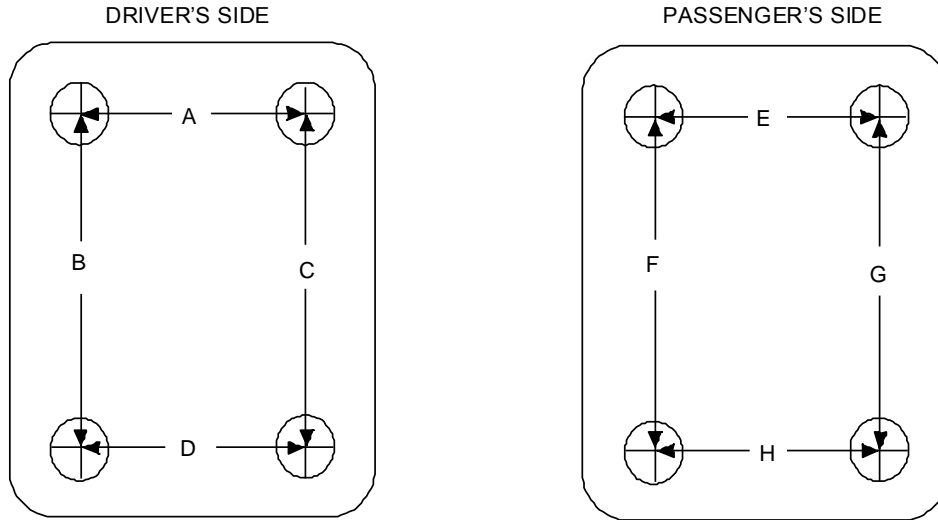
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	737	736	-1
CX	Left Knee Bolster to X	mm	248	209	-39
DX	Right Knee Bolster to X	mm	234	189	-44
EX	Brake Pedal to X	mm	519	426	-93
FX	Foot Rest to X	mm	NA	NA	NA
GX	Center of Steering Column Wheel Hub to X	mm	0	-50	-50

X = Front of Seat Track (Stationary)



**DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS**

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011



TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	436	437	1
B	345	339	-6
C	336	335	-1
D	395	393	-2
E	321	315	-6
F	381	379	-2
G	386	377	-9
H	419	421	3

All units in millimeters

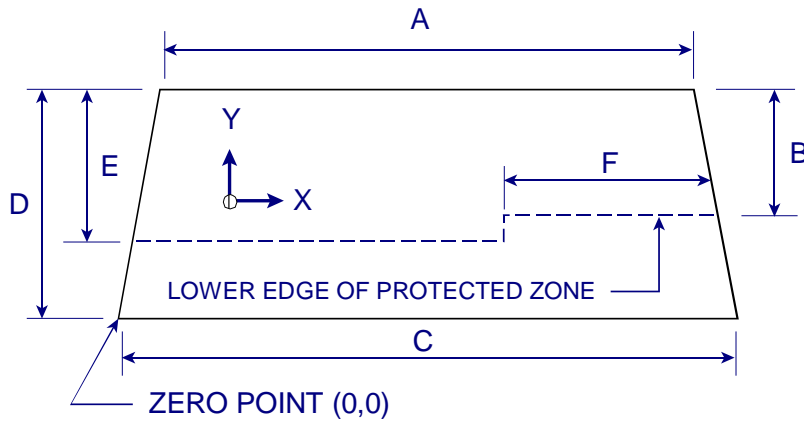
DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2011 Ford Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011

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	1,913	1,913	100%
Right Side	1,913	1,913	100%
Total	3,825	3,825	100%



Item	Units	Value
A	mm	1,240
B	mm	320
C	mm	1,485
D	mm	550
E	mm	365
F	mm	720

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: 2011 Ford Ranger SuperCab NHTSA No: MB0220
Test Program: Frontal NCAP Test Date: 2/16/2011

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

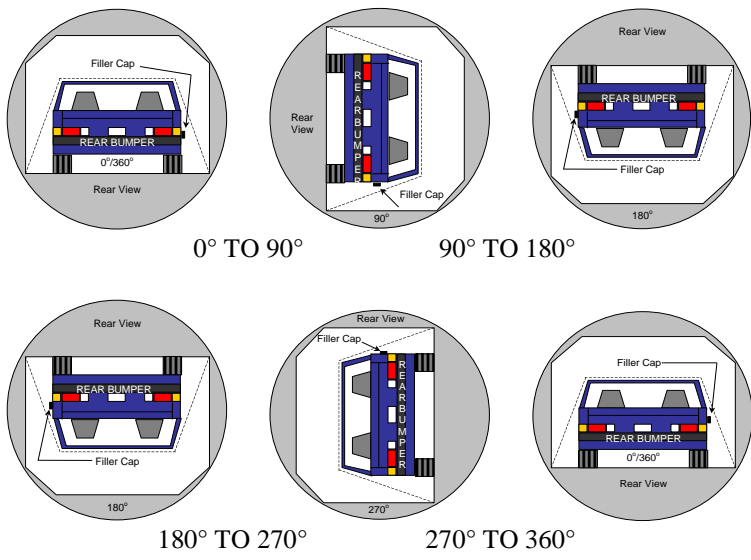
Temperature at Time of Impact: 22° C Test Time: 11:30

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 Ranger SuperCab NHTSA No: MB0220
 Test Program: Frontal NCAP Test Date: 2/16/2011



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°	1:05	5:00	6:05
90° to 180°	1:10	5:00	6:10
180° to 270°	1:02	5:00	6:02
270° to 360°	1:09	5:00	6:09

FMVSS 301 SPILLAGE TABLE

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

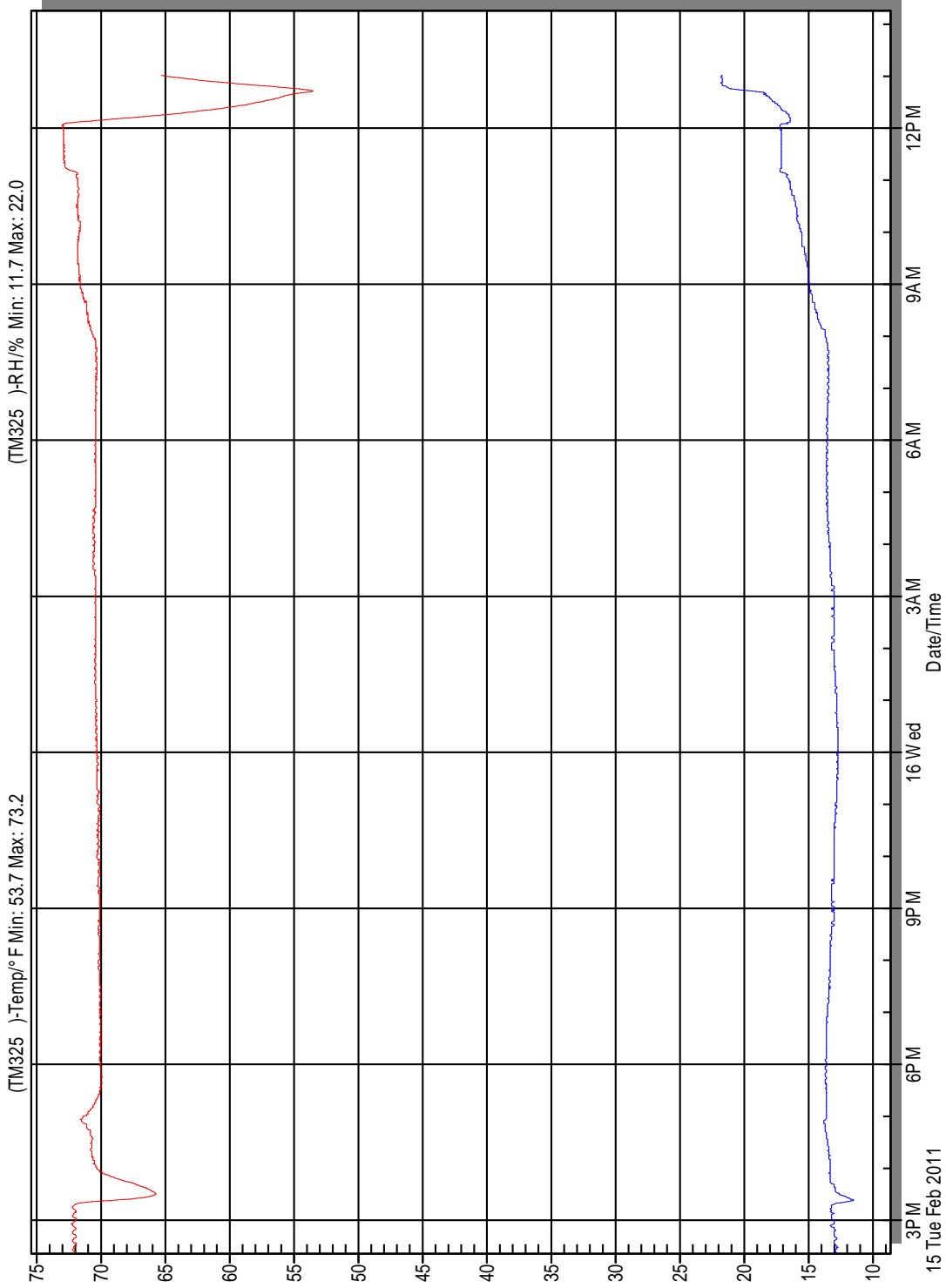
SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	No Spillage
90° to 180°	No Spillage
180° to 270°	No Spillage
270° to 360°	No Spillage

**DATA SHEET NO. 17
DUMMY/VEHICLE TEMPERATURE STABILIZATION**

Test Vehicle:	2011 Ford Ranger SuperCab	NHTSA No:	MB0220
Test Program:	Frontal NCAP	Test Date:	2/16/2011

Downloaded Data - Wednesday, February 16, 2011



**APPENDIX A
PHOTOGRAPHS**

TABLE OF PHOTOGRAPHS		
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2	Load Cell Wall	A-5
3	Manufacturer's Label	A-6
4	Tire Placard	A-6
5	Right Front $\frac{3}{4}$ View, as Received	A-7
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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11	Pre-test Right View of Test Vehicle	A-10
12	Post-test Right View of Test Vehicle	A-10
13	Pre-test Right Front $\frac{3}{4}$ View	A-11
14	Post-test Right Front $\frac{3}{4}$ View	A-11
15	Pre-test Left Rear $\frac{3}{4}$ View	A-12
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29	Pre-test Driver Dummy Front View	A-19
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33	Pre-test Driver Dummy and Vehicle Interior View	A-21
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35	Pre-test Driver's Seat Fore-Aft Markings	A-22
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37	Pre-test Driver Dummy Feet	A-23
38	Post-test Driver Dummy Feet	A-23
39	Pre-test Driver's Side Knee Bolster	A-24
40	Post-test Driver's Side Knee Bolster	A-24
41	Pre-test Driver's Side Floorpan	A-25
42	Post-test Driver's Side Floorpan	A-25
43	Post-test Driver Dummy Contact With Airbag	A-26
43a	Post-Test Driver Dummy Contact With Head Restraint	A-26
44	Pre-test View of the Steering Column Shear Capsule	A-27
45	Post-test View of the Steering Column Shear Capsule	A-27
46	Pre-test Passenger Dummy Front View	A-28
47	Post-test Passenger Dummy Front View	A-28
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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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61	Photograph of ballast installed in vehicle	A-36

62	Post-test Stoddard solvent spillage location view, if required	A-36
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64	Vehicle at 0° on Static Rollover Device	A-37
65	Vehicle at 90° on Static Rollover Device	A-38
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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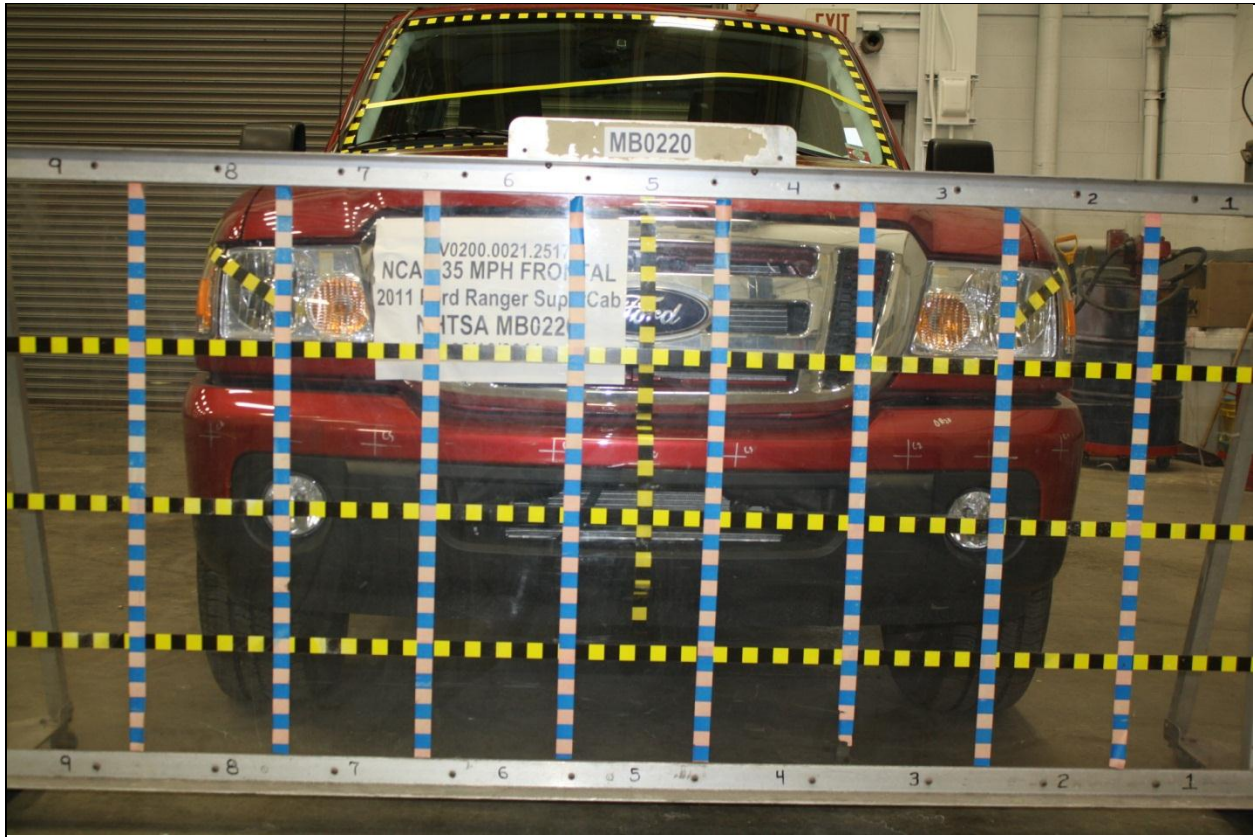


Figure A-1: Load Cell Location



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 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 3/4 View



Figure A-16: Post-Test Left Rear 3/4 View



Figure A-17: Pre-Test Windshield View



Figure A-18: Post-Test Windshield View



Figure A-19: Pre-Test Engine Compartment View



Figure A-20: Post-Test Engine Compartment View

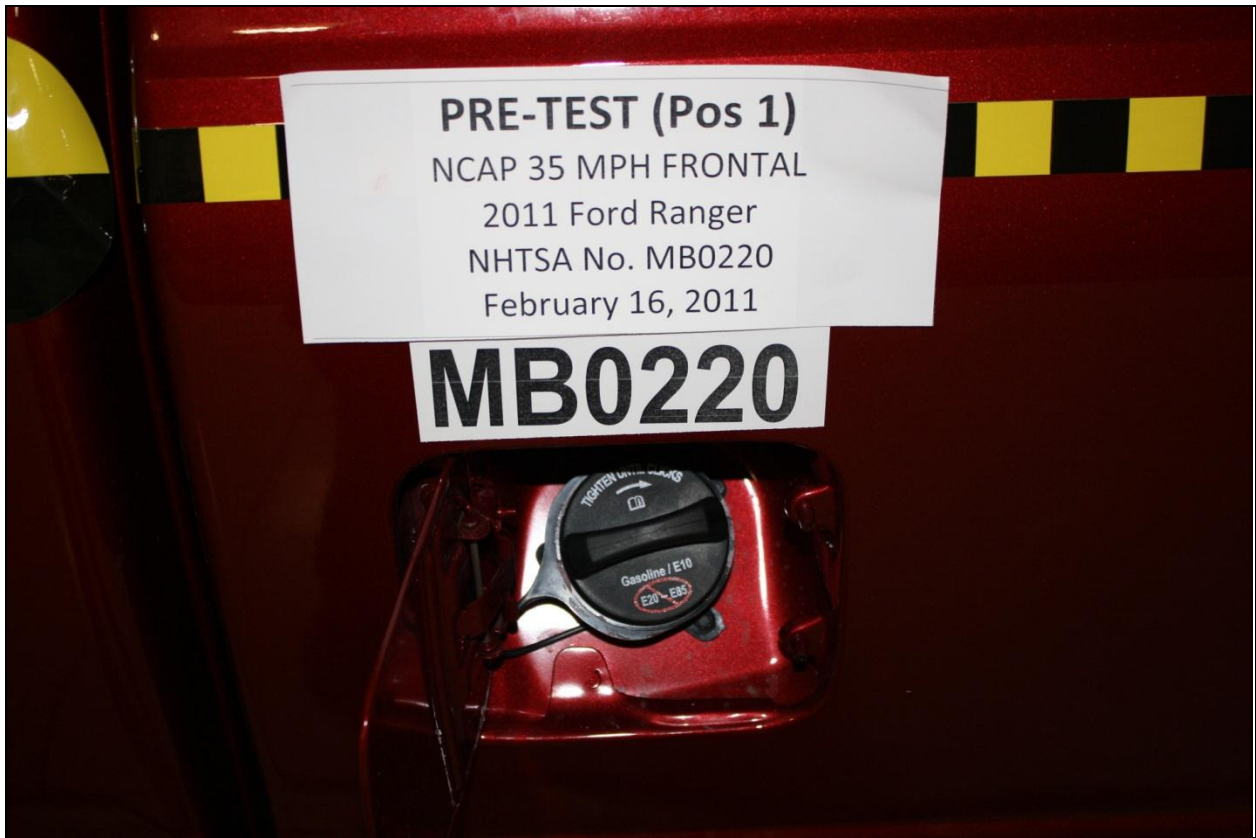


Figure A-21: Pre-Test Fuel Filler Cap View



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

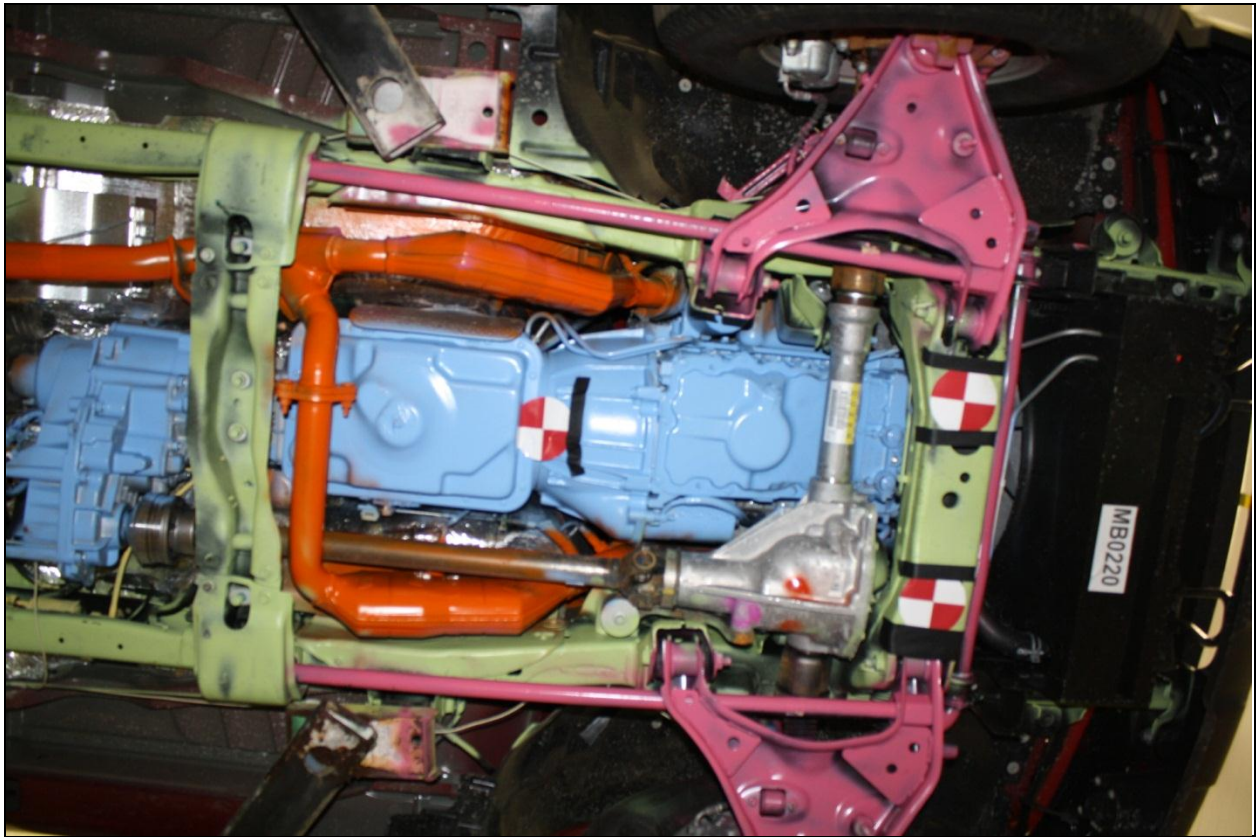


Figure A-23: Pre-Test Front Underbody View

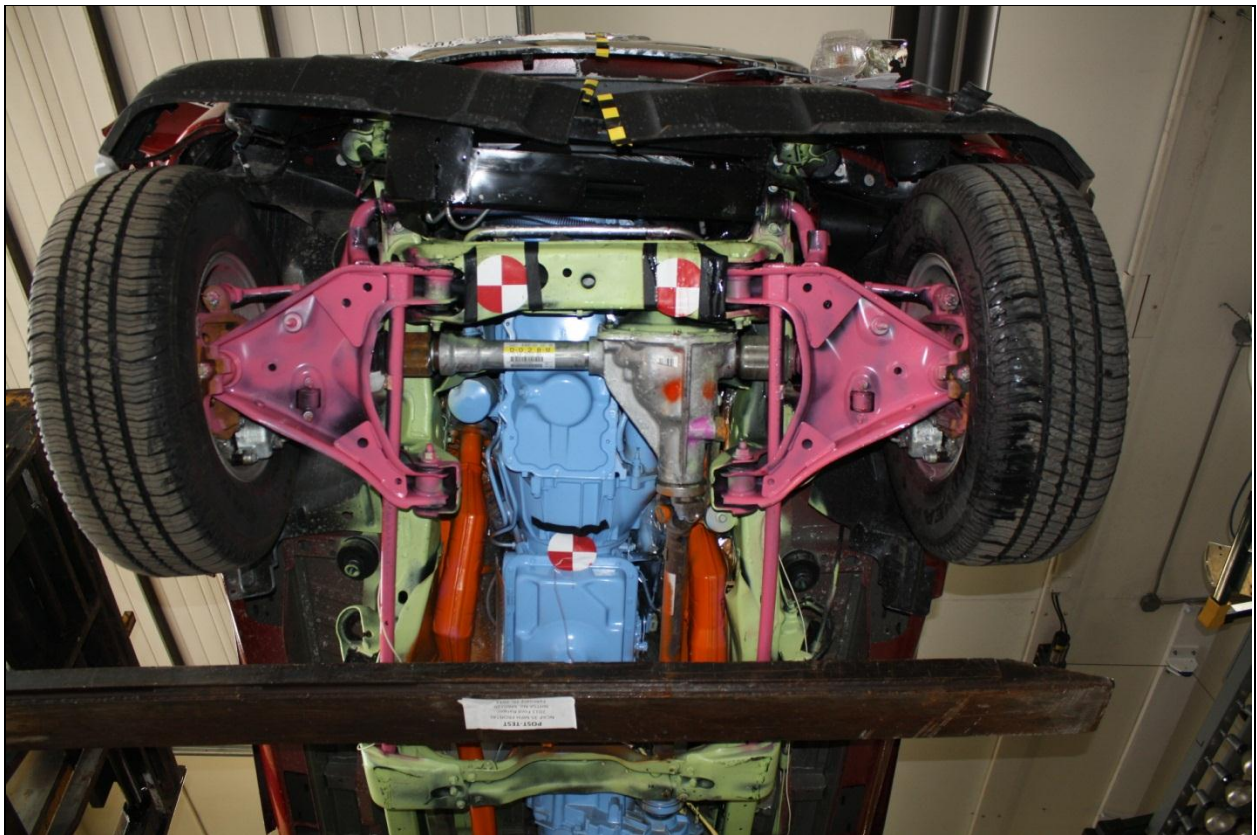


Figure A-24: Post-Test Front Underbody View



Figure A-25: Pre-Test Rear Underbody View



Figure A-26: Post-Test Rear Underbody View

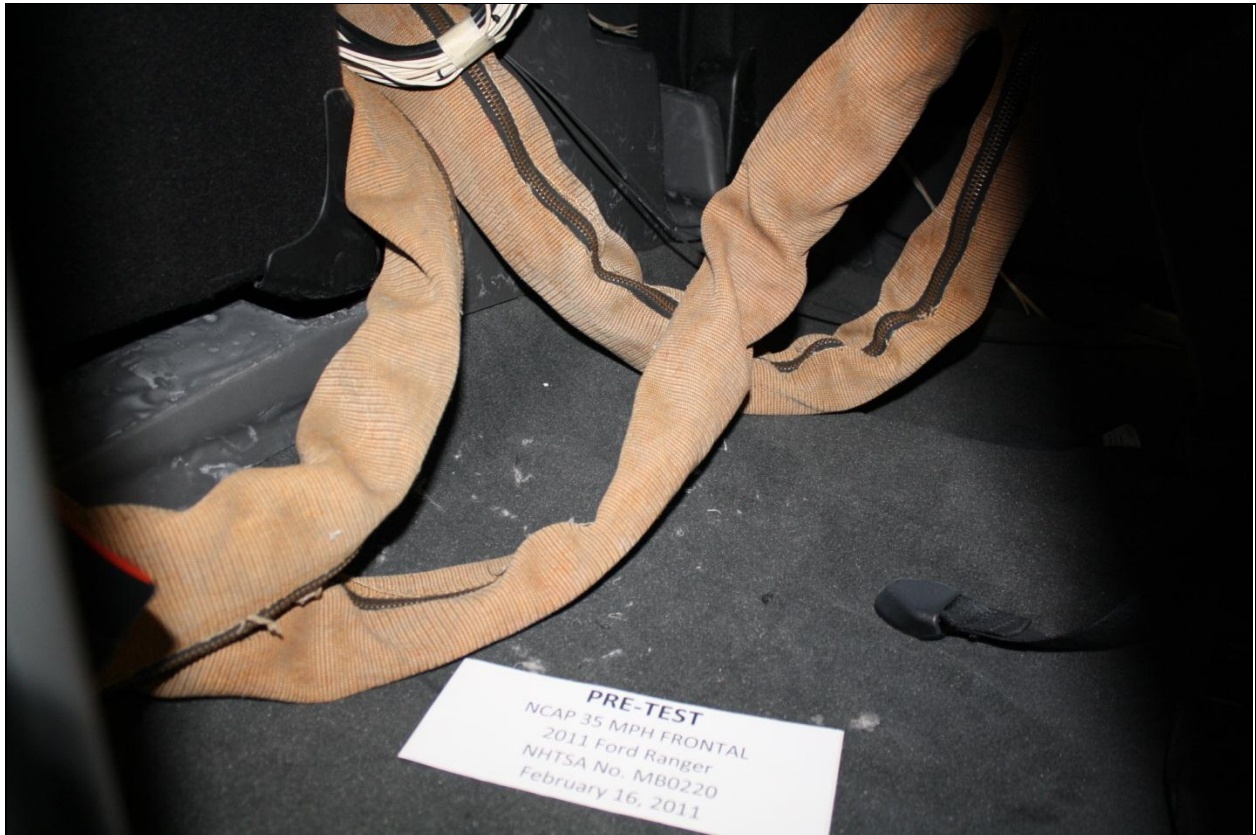


Figure A-27: Pre-Test Dummy Cable Routing



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

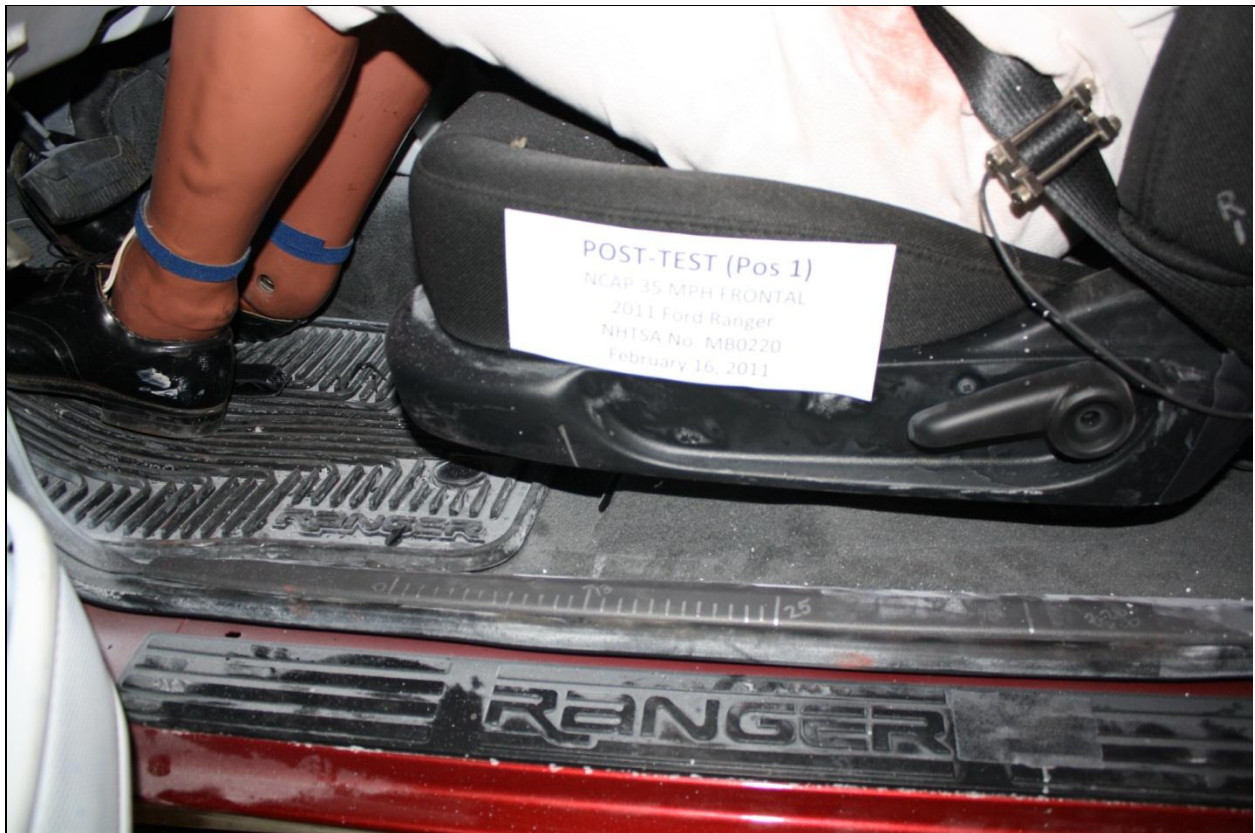


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



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

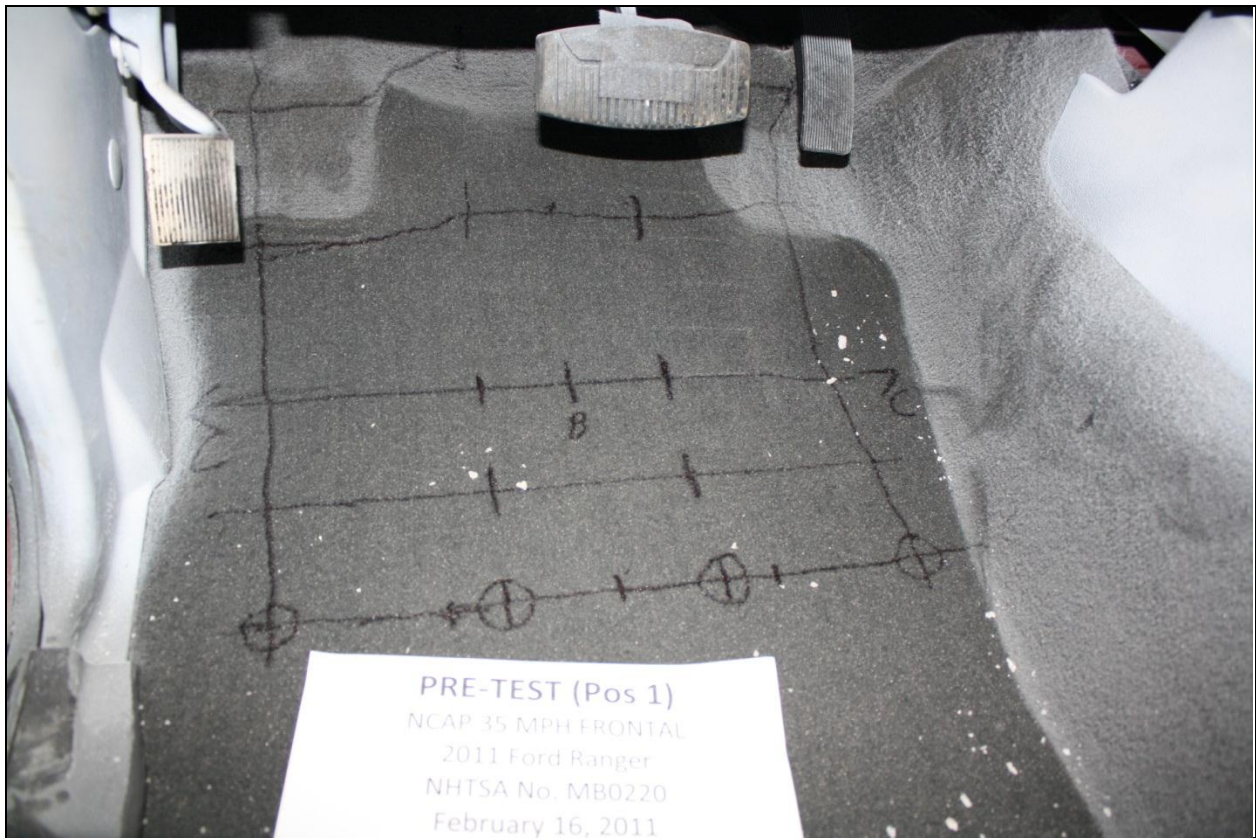


Figure A-41: Pre-Test Driver's Side Floorpan



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



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



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

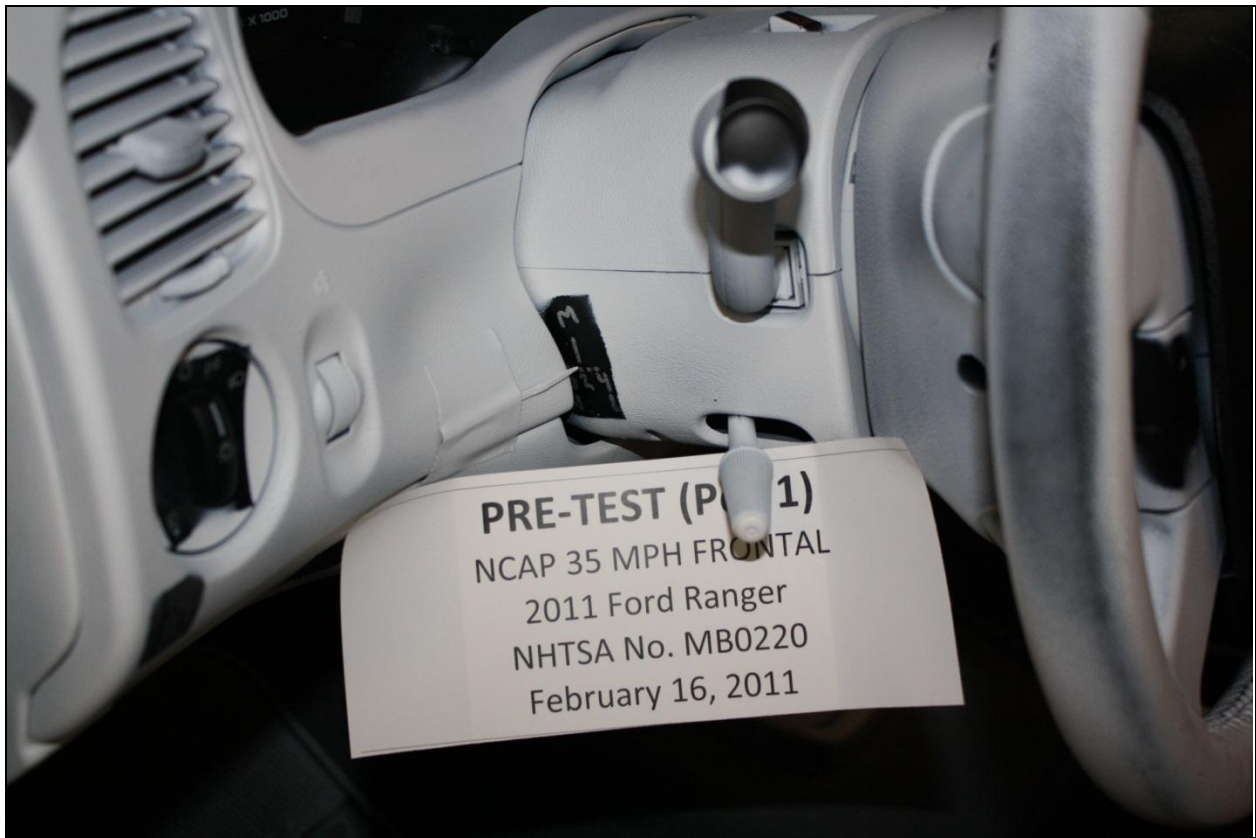


Figure A-44: Pre-Test View of the Steering Column Shear Capsule



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



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



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



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



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



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



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



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

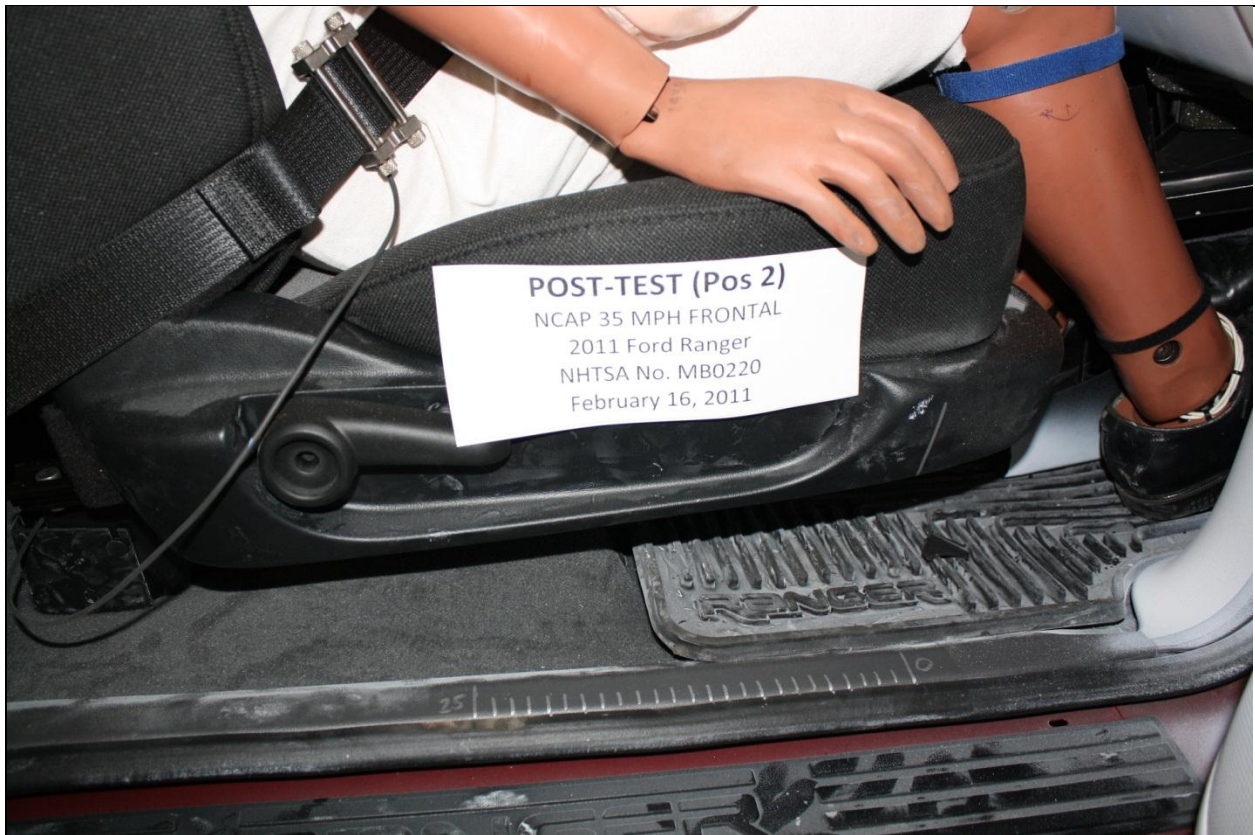


Figure A-53: Post-Test Passenger's Seat Fore-Aft Markings



Figure A-54: Pre-Test Passenger Dummy Feet



Figure A-55: Post-Test Passenger Dummy Feet

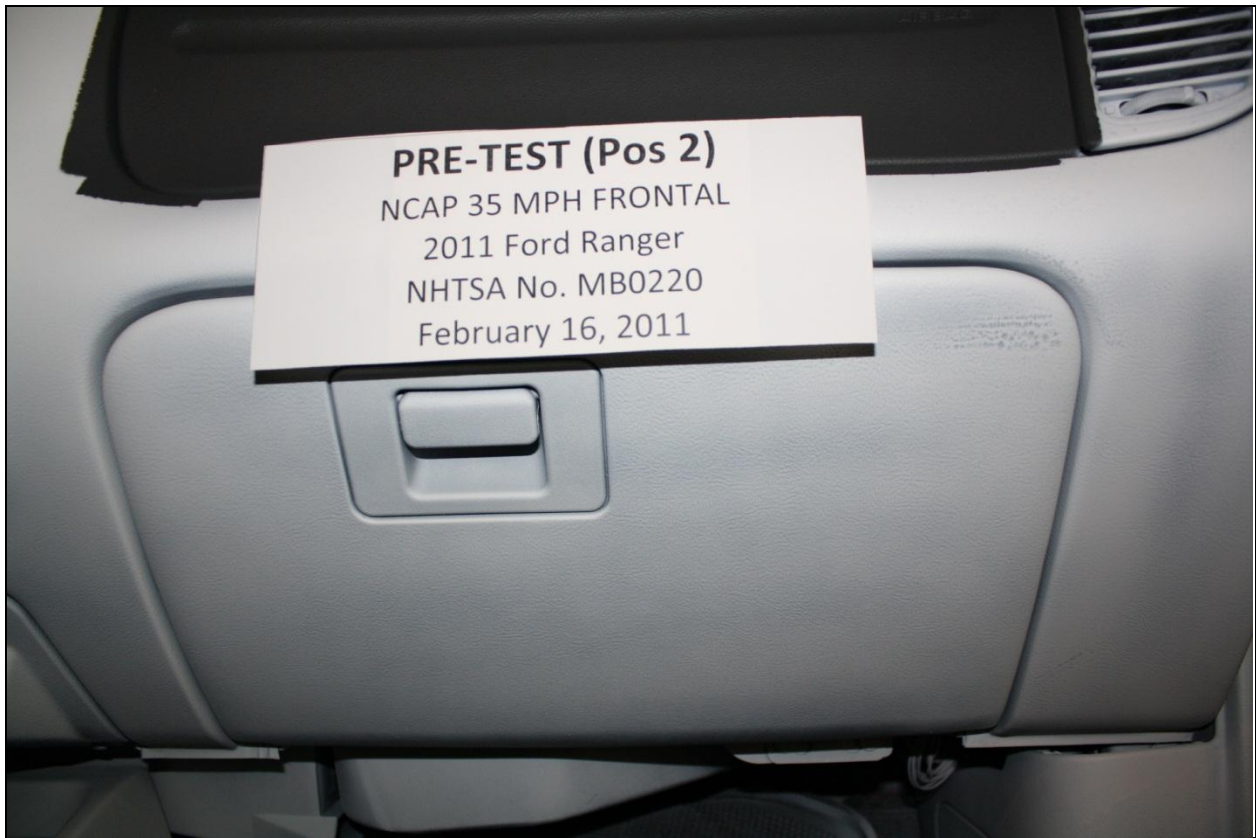


Figure A-56: Pre-Test Passenger's Side Knee Bolster



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

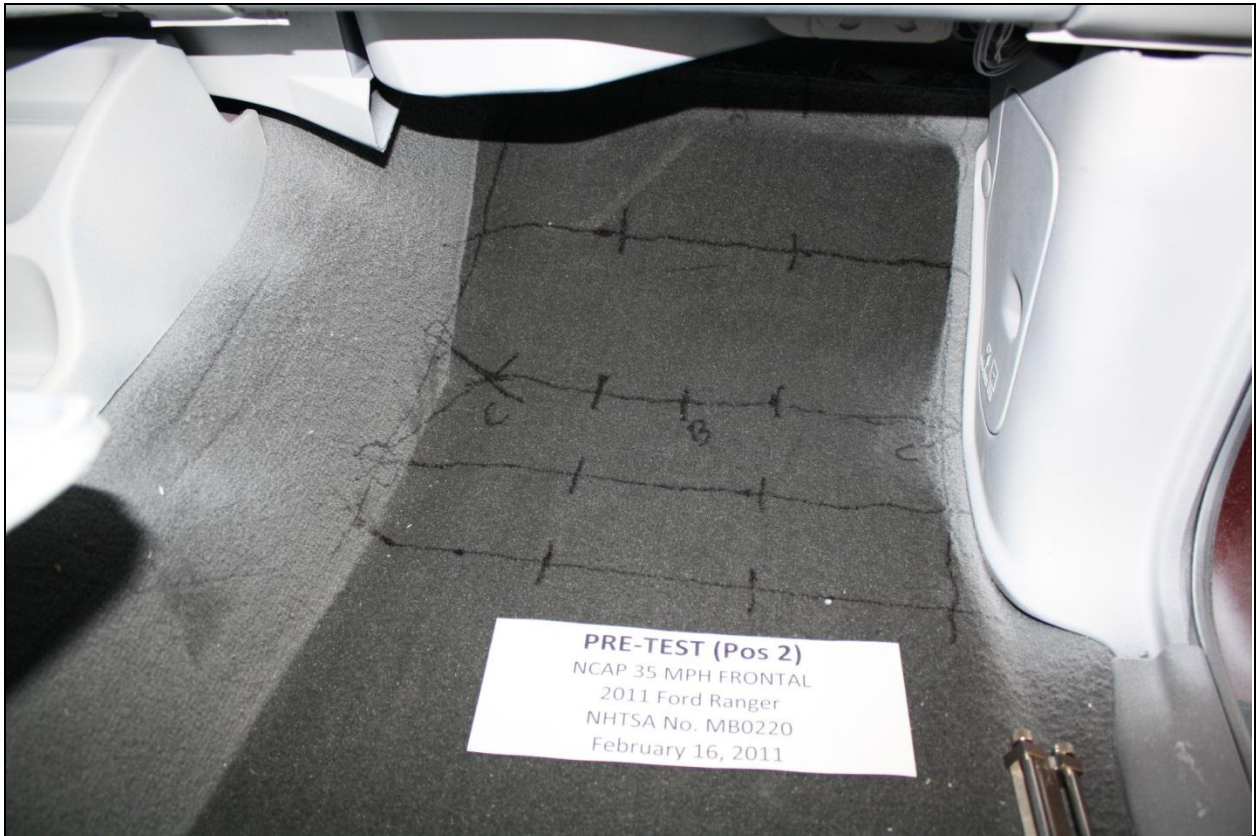


Figure A-58: Pre-Test Passenger's Side Floorpan



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



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



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



Figure A-61: Photograph of Ballast Installed Vehicle

Photo Not Applicable

No Spillage of Stoddard

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

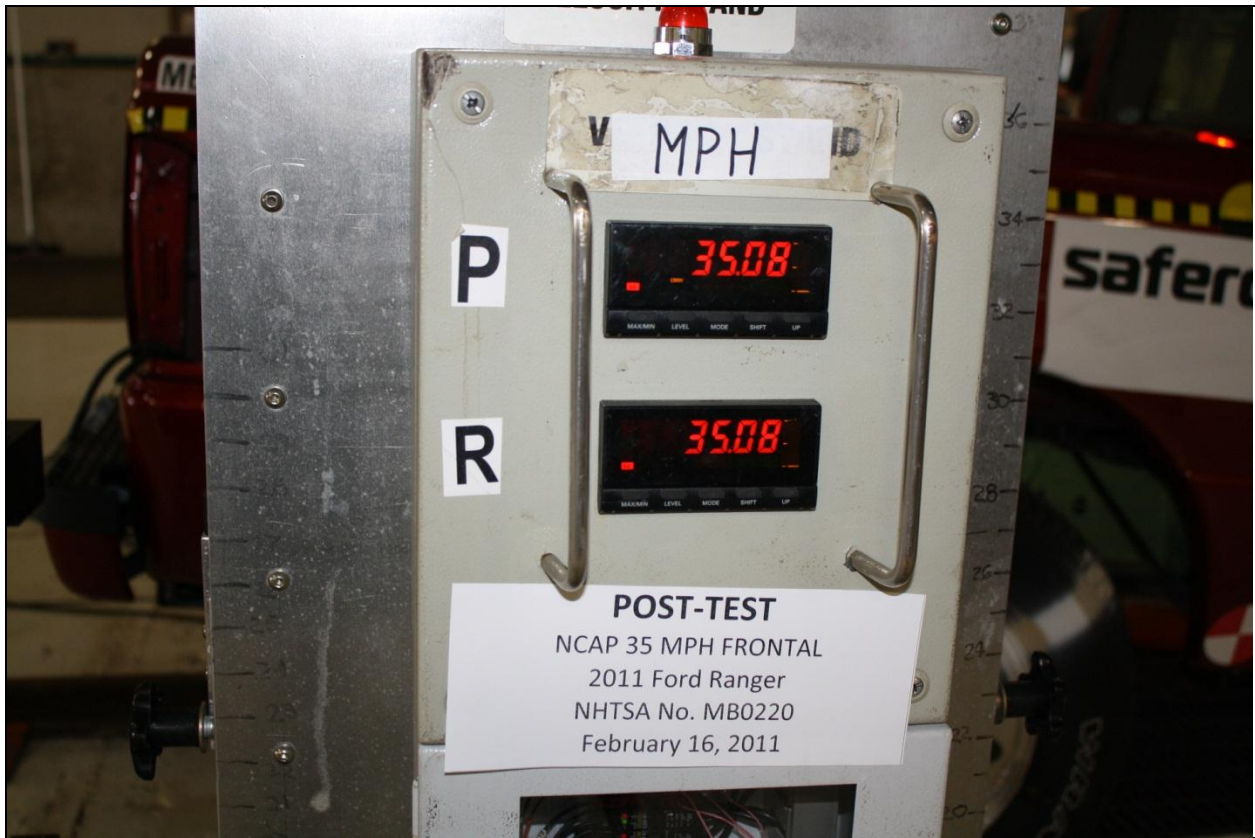


Figure A-63: Post-Test Speed Trap Read Out



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

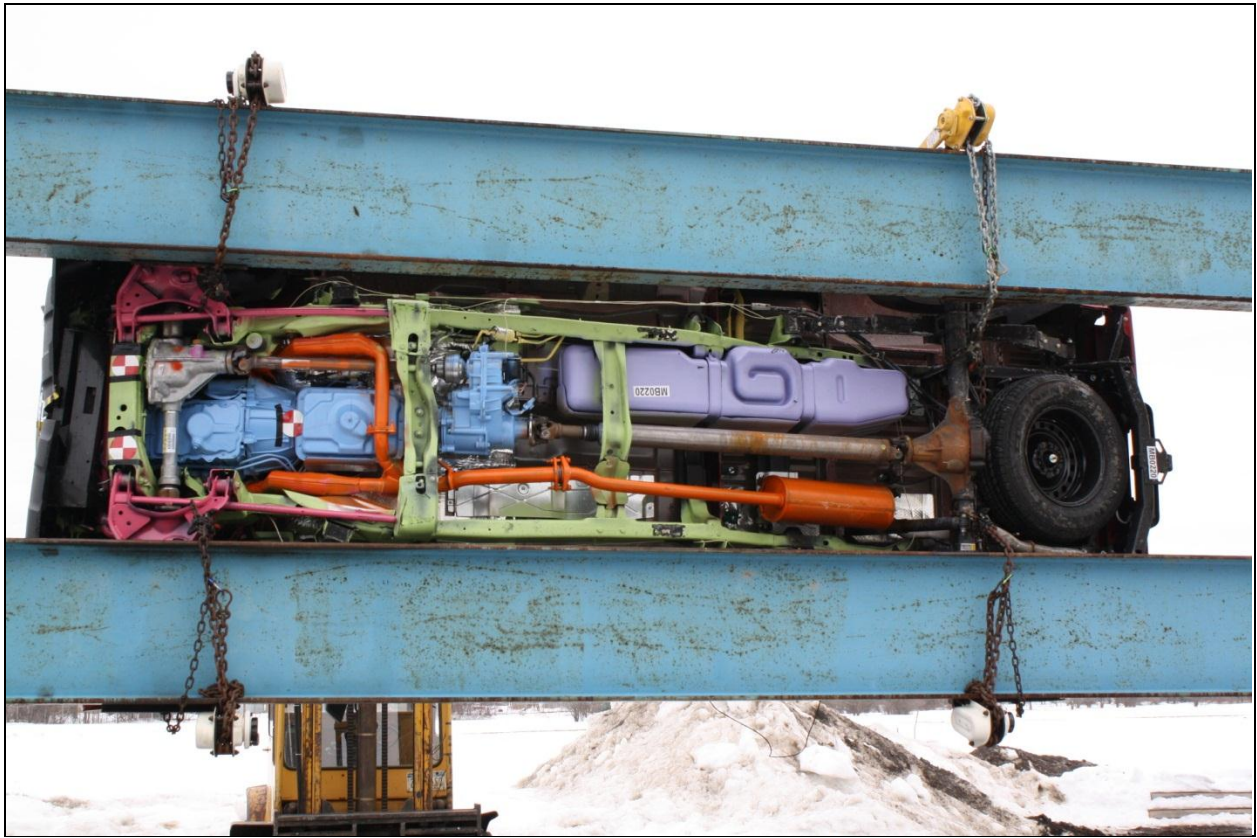


Figure A-67: Vehicle at 270° on Static Rollover Device



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



Figure A-69: Impact Photograph

		VEHICLE DESCRIPTION RANGER		BUILT Ford TOUGH	2011 XLT 4DR SUPERCAB 4X4 XLT 126" WHEELBASE 4.0L SOHC V6 ENGINE 5-SPD AUTOMATIC O/D TRANS	EXTERIOR REDFIRE METALLIC INTERIOR MEDIUM DARK FLINT CLOTH	RP A27692
www.fordvehicles.com							
STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE							
EXTERIOR • TIE DOWN CARGO BOX HOOKS • H-BAR GRILLE, CHROME • BUMPERS, BODY COLOR • BLACK DOOR HANDLES • SOLAR TINTED GLASS • FR TOW HOOKS/FOG LAMPS		FUNCTIONAL • ELECT. SHIFT-ON-FLY 4X4 SYS • TRAILER TOW CLASS III • POWER RACK, PULVON STEERING • INDEPENDENT SLA FRT SUSPEN • HD GAS-FILLED SHOCKS		SAFETY/SECURITY • ADVANCETRAC W/ESC • PERSONAL SAFETY SYSTEM • DRIVER/PASSENGER AIR BAGS • SIDE AIRBAGS • ADJUSTABLE SAFETY BELTS • ANTI-LOCK BRAKING SYSTEM • REAR HIGH MOUNT STOP LAMP • SECURILOCK PASS ANTI THEFT • TIRE PRESSURE MONITOR SYS		WARRANTY • 3YR/36,000 BUMPER / BUMPER • 3YR/60,000 POWERTRAIN • 3YR/60,000 ROADSIDE ASSIST	
INTERIOR • AIR CONDITIONING • AM/FM CD/MP3/SAT CAPABL • W/ AID TRIPET DACE • SIRIUS SAT SVC - N/A AK&HI • POWER EQUIP GROUP • COLOR COORD. CARPET & MATS • LH/RH A-PILLAR GRAB HANDLE							
EPA Fuel Economy Estimates							
CITY MPG 14 Expected range for most drivers 11 to 17 MPG		Estimated Annual Fuel Cost \$2,812 based on 15,000 miles at \$3.00 per gallon		HIGHWAY MPG 18 Expected range for most drivers 14 to 22 MPG		Combined Fuel Economy This Vehicle 16 15 to 24 All Small Pickups	
See the FREE Fuel Economy Guide at dealers or www.fueleconomy.gov							
SOLD TO 44G 120 West-Herr Ford Inc 5025 Camp Road Hamburg NY 14075		ONE RA43	DEALER NO. 44G 120	METHOD OF TRANSP. RAIL ITEM #: 44-1915 O/T 2			
SHIP TO (Print or type name and address)		TWO	1FTLR4FE28PA27692				
SHIP THROUGH		FINAL ASSEMBLY POINT TWIN CITIES		This label is affixed pursuant to the Federal Automobile Information Disclosure Act, California, Louisiana, and Utah laws. Items and codes listed here are the vehicle. Dealer installed options or accessories are not included unless listed below. BA062 N RB 2X 120 000127 01 06 11			
		Ford Extended Service Plan is the only service contract backed by Ford and honored at all Ford and Lincoln Mercury Dealers. Ask your dealer for price and additional details or see our website at www.ford-esp.com.					
				PRICE INFORMATION		Manufacturer's Suggested Retail Price	
				STANDARD VEHICLE PRICE		\$25,015.00	
				OPTIONAL EQUIPMENT		PREFERRED EQUIPMENT PKG. 867A	
				5-SPD AUTOMATIC O/D TRANS		1,000.00	
				FRONT LICENSE PLATE BRACKET		NO CHARGE	
				5150 GVWR		NO CHARGE	
				VINYL SLUSH FLOOR MATS		NO CHARGE	
				CALIFORNIA EMISSIONS SYSTEM		NO CHARGE	
				P235 ALL-SEASON SPARE		NO CHARGE	
				SIRIUS SAT RADIO W/5 MOS SVC		1,000.00	
				TOTAL OPTIONS		1,000.00	
				TOTAL VEHICLE & OPTIONS		26,015.00	
				DESTINATION & DELIVERY		820.00	
				TOTAL MSRP		\$26,835.00	
GOVERNMENT SAFETY RATINGS							
Frontal Crash		Driver Passenger		To Be Rated To Be Rated		To Be Rated To Be Rated	
Star ratings based on the risk of injury in a frontal impact. Frontal ratings should ONLY be compared to other vehicles of similar size and weight.							
Side Crash		Front seat Rear seat		To Be Rated Not Rated		To Be Rated Not Rated	
Star ratings based on the risk of injury in a side impact.							
Rollover				***		***	
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							

Figure A-70: Monroney Label Photograph

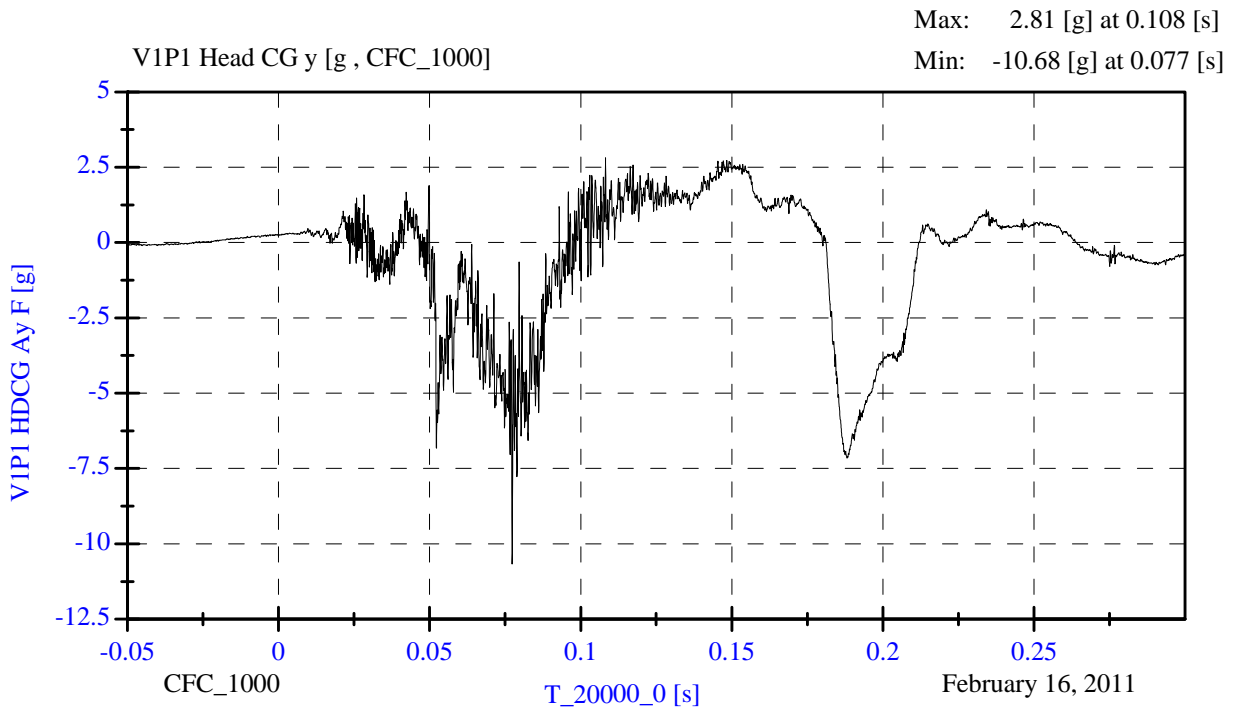
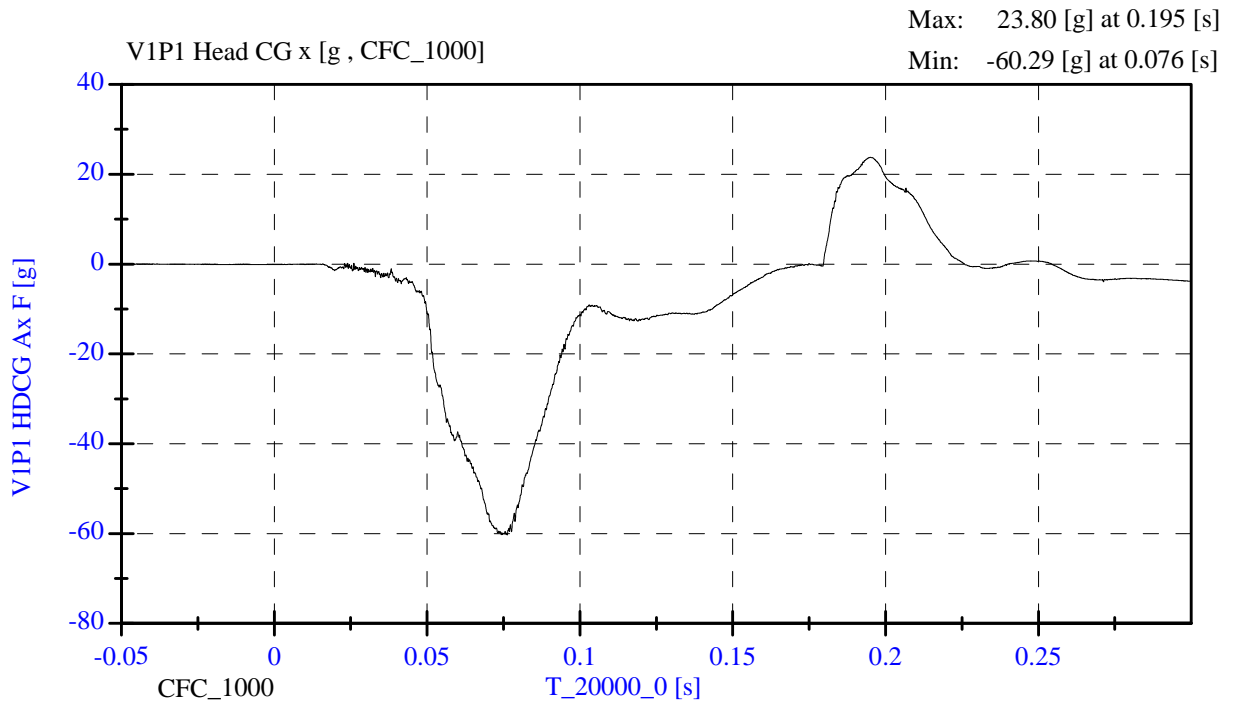
APPENDIX B
DUMMY RESPONSE DATA TRACES

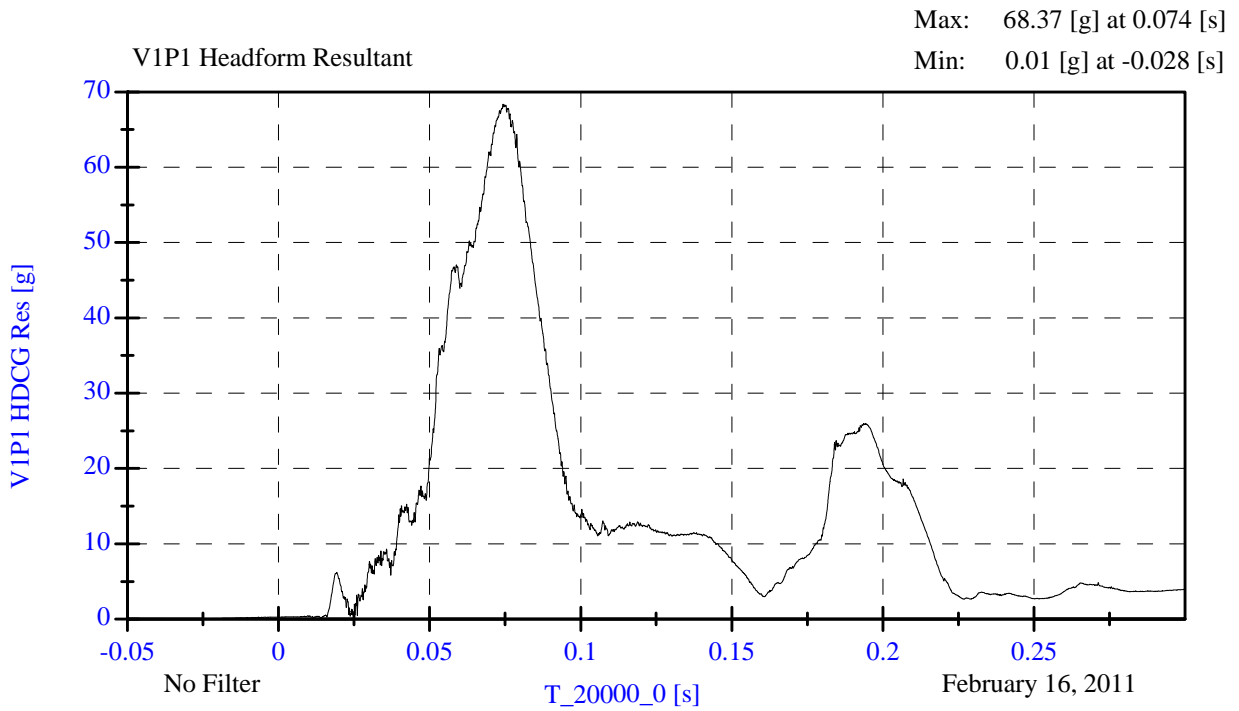
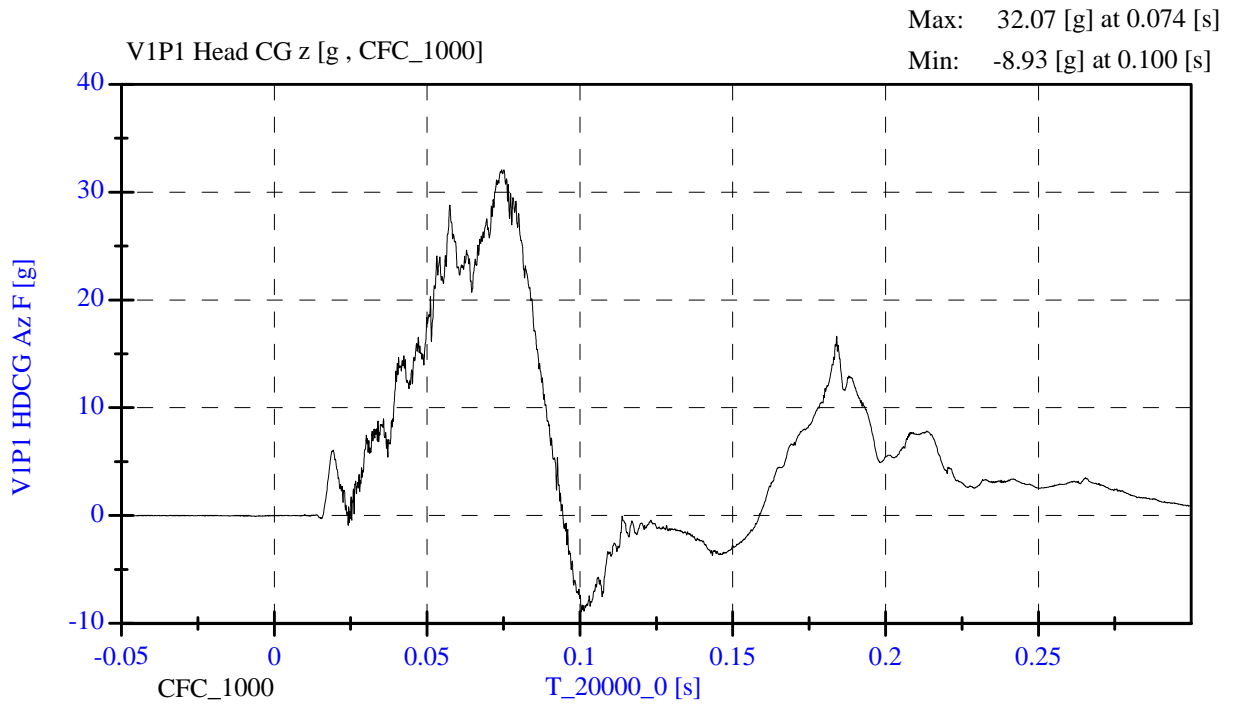
Fig. No.	List of Data Plots Provided In The Test Report	Page No.
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-6
4	Driver Head Resultant Acceleration vs. Time Primary	B-6
5	Driver Chest X Deflection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

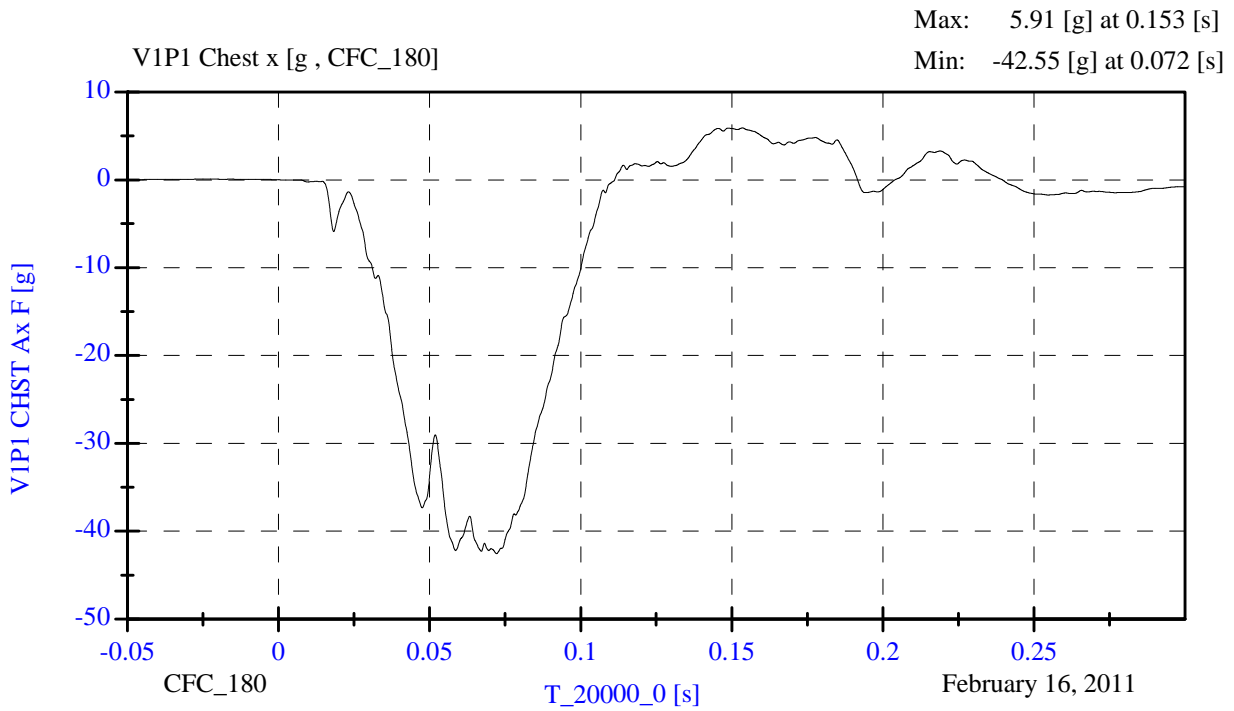
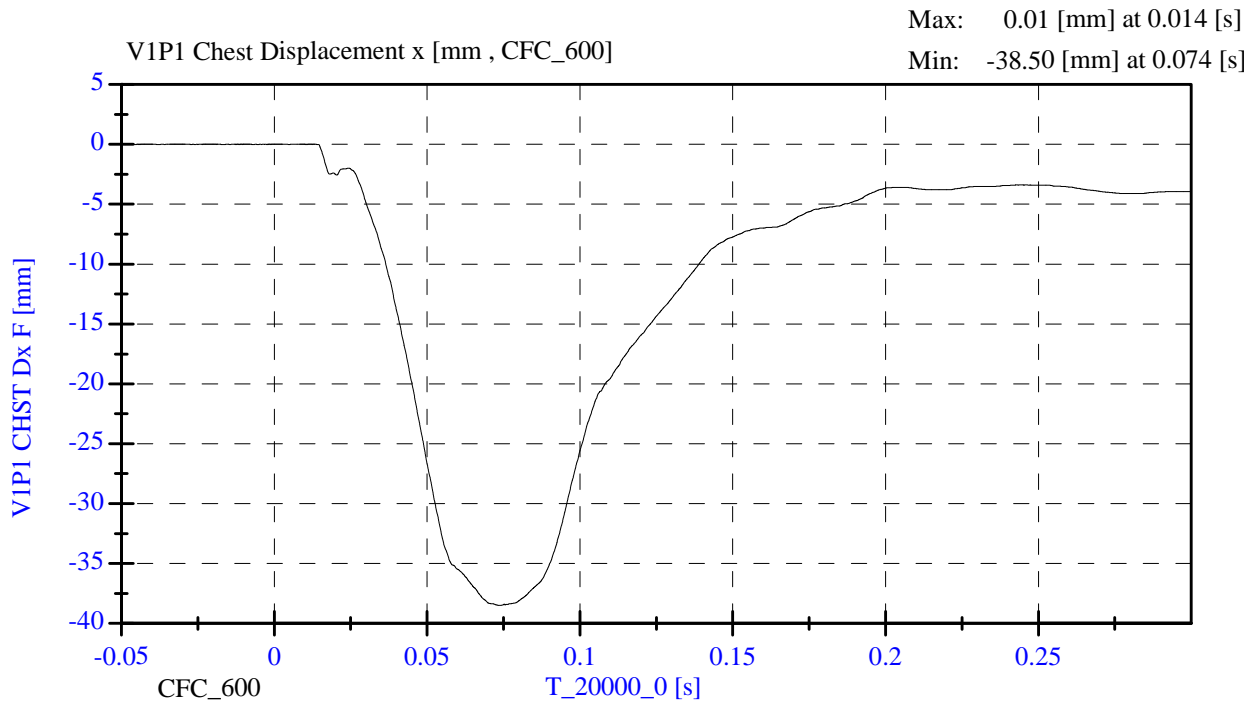
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

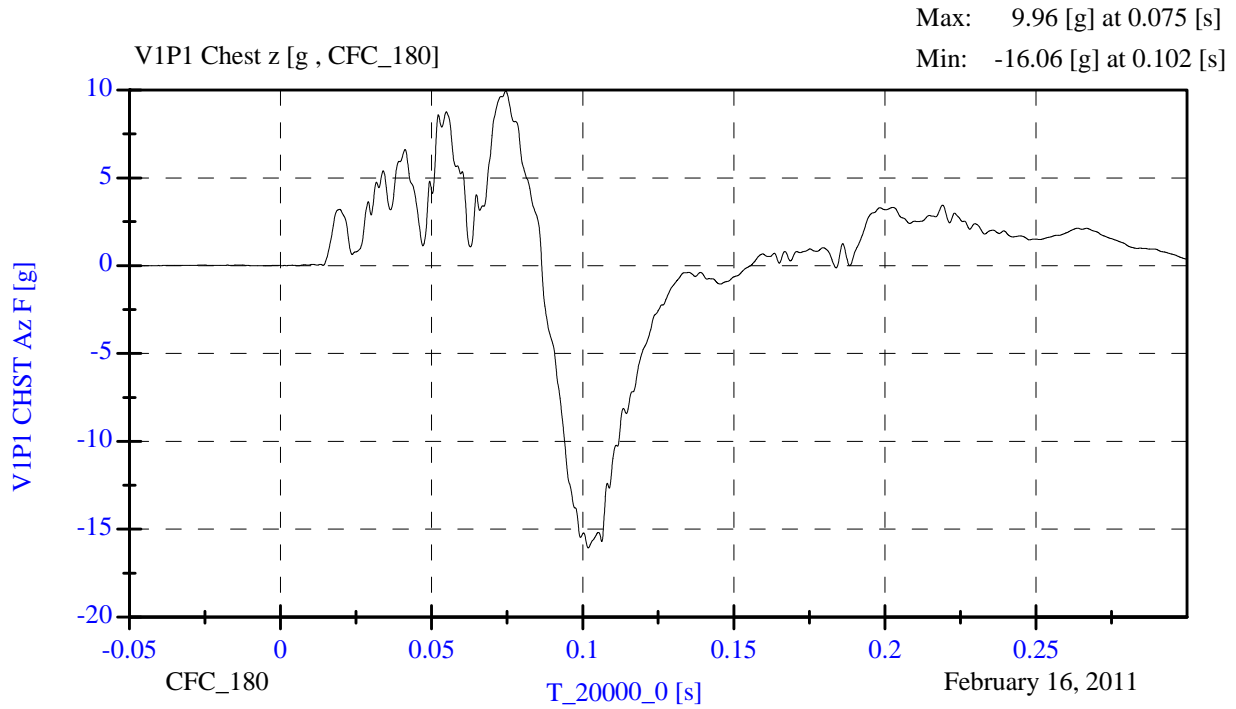
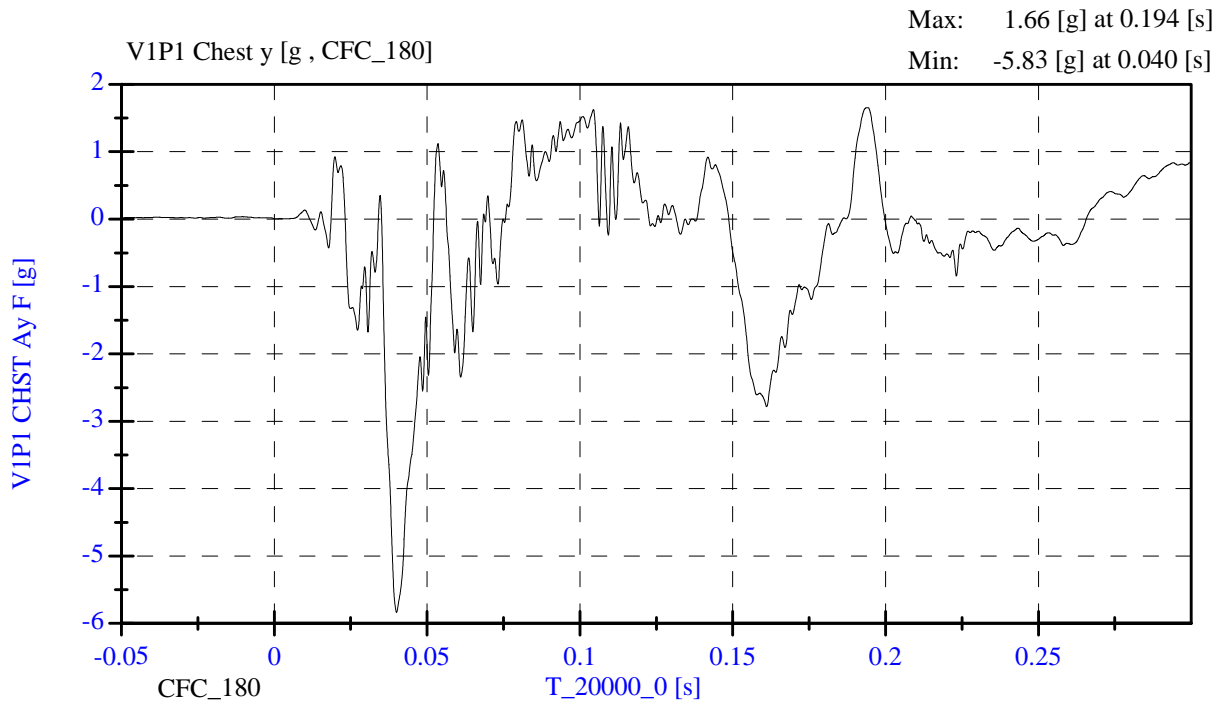
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 Driver Head Z Acceleration Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Acceleration Redundant
 Driver Chest Y Acceleration Redundant
 Driver Chest Z Acceleration Redundant
 Driver Pelvis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

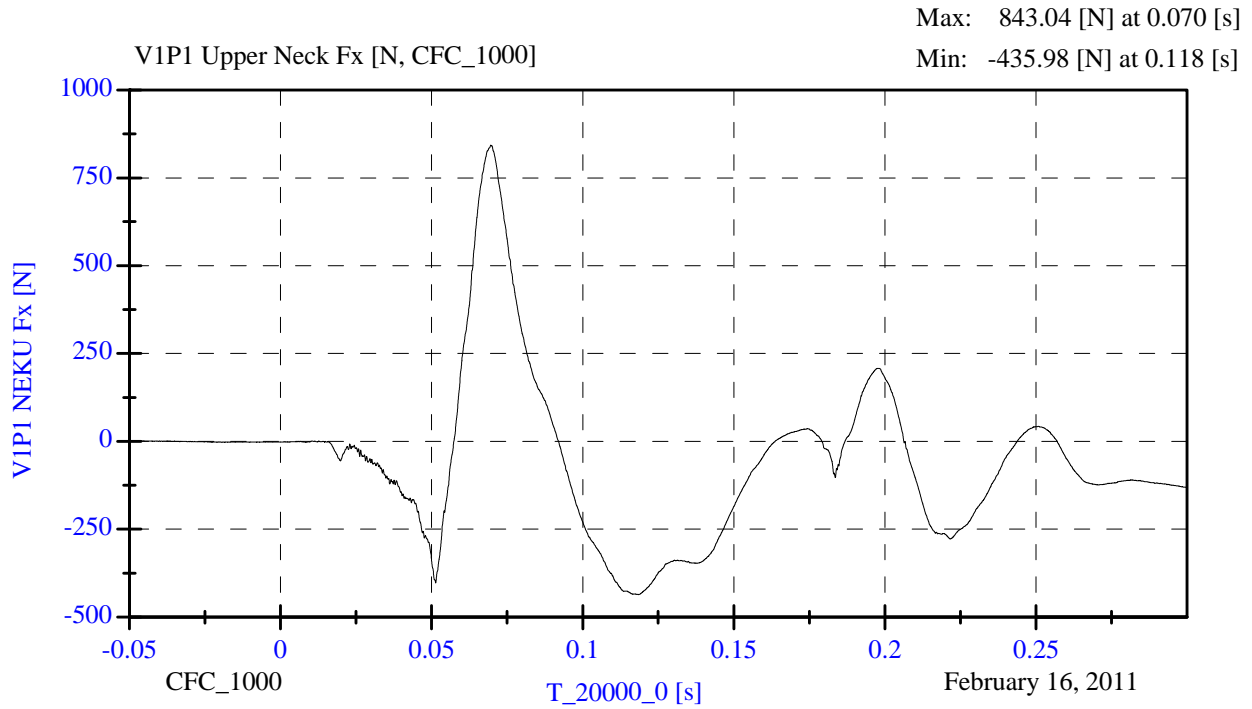
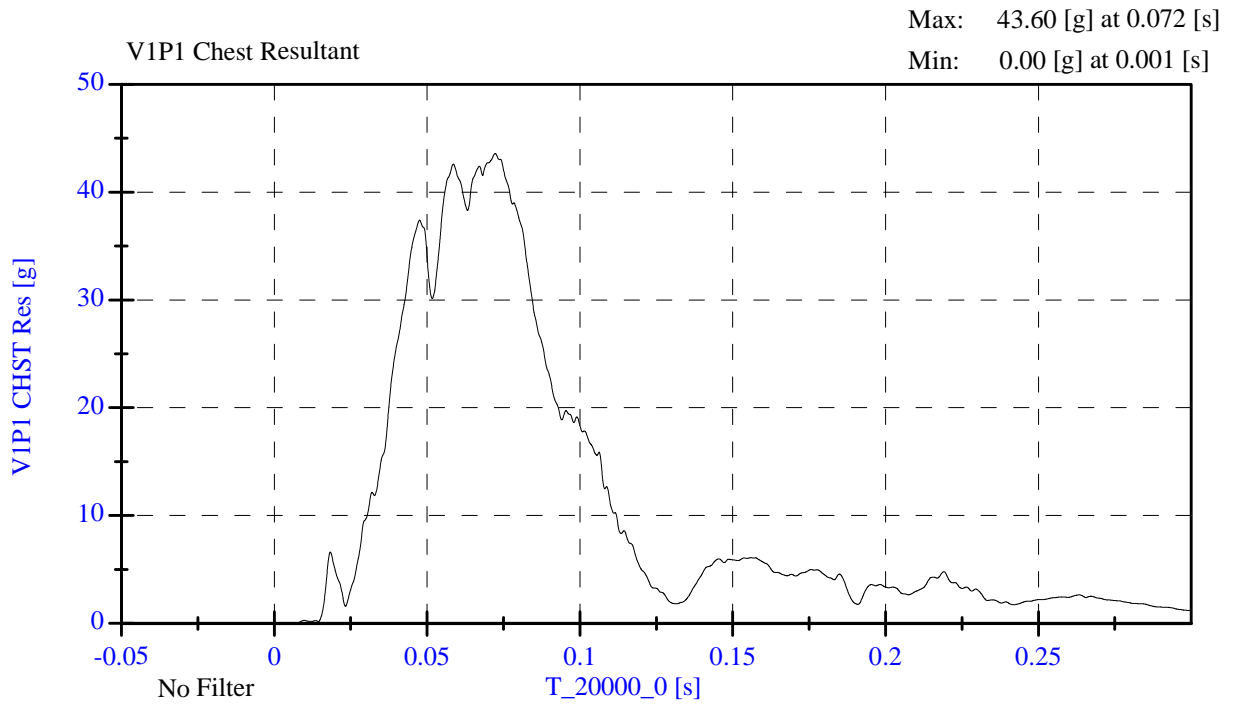
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Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Left Rear Seat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

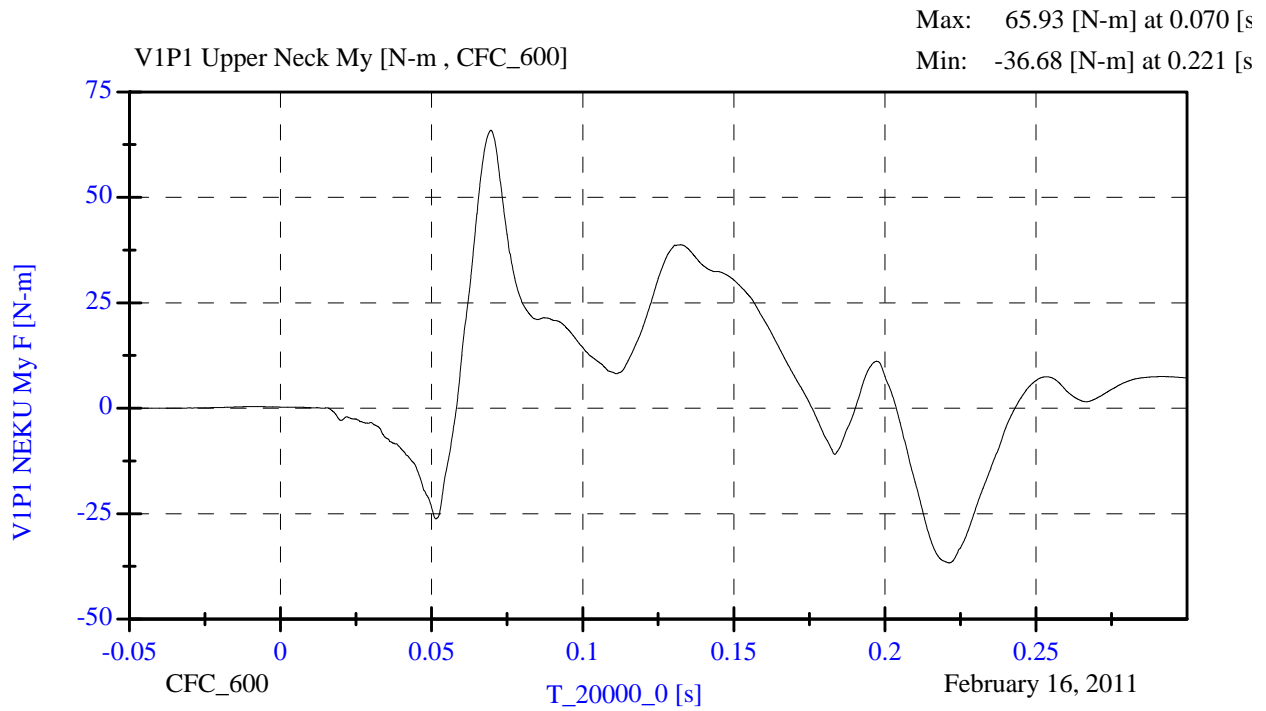
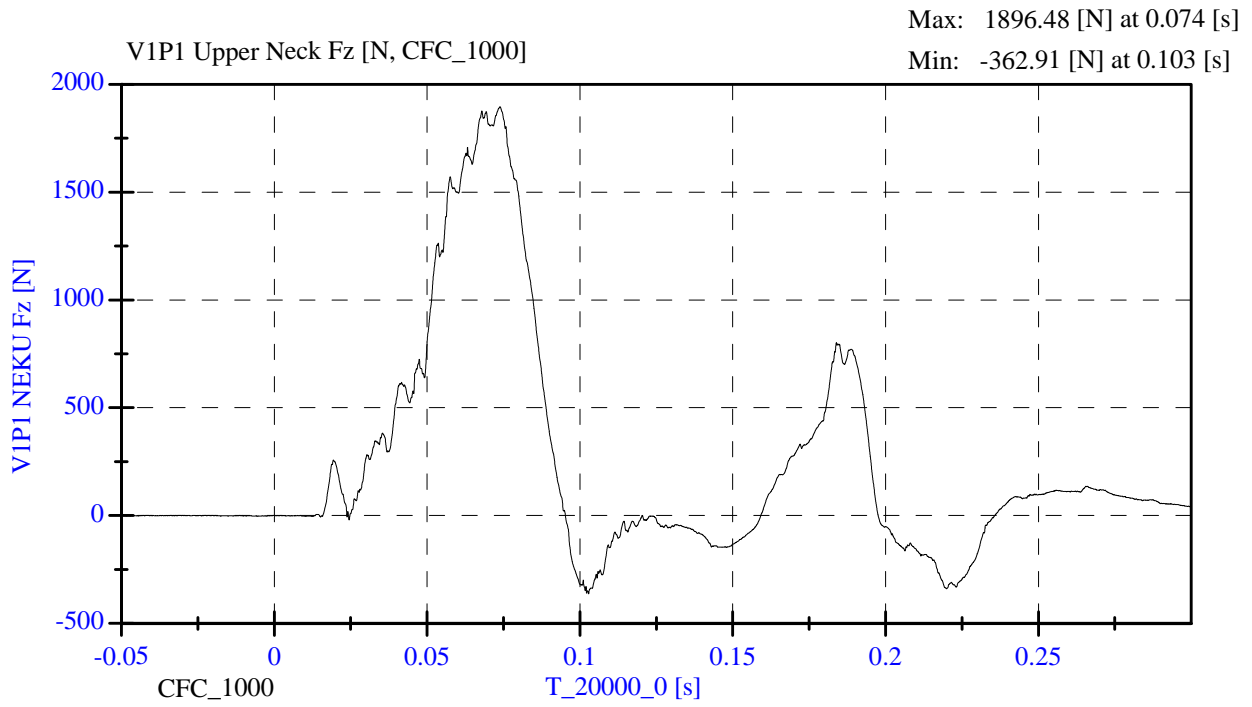


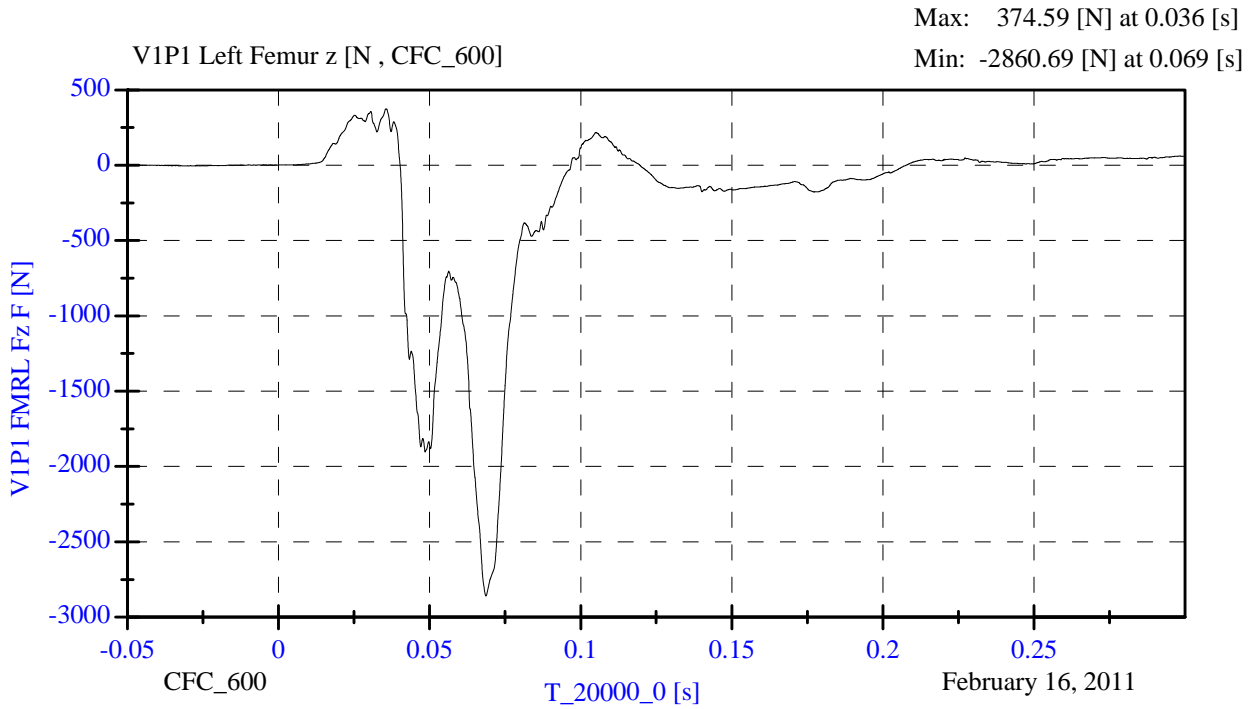
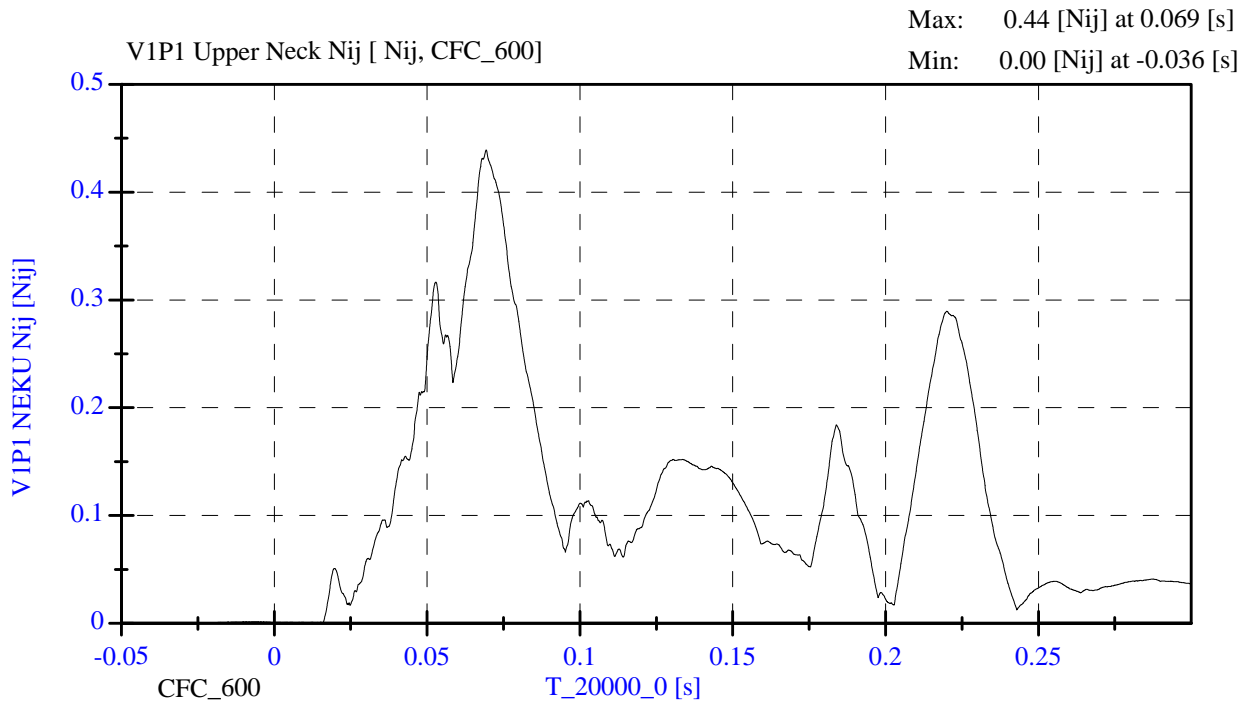


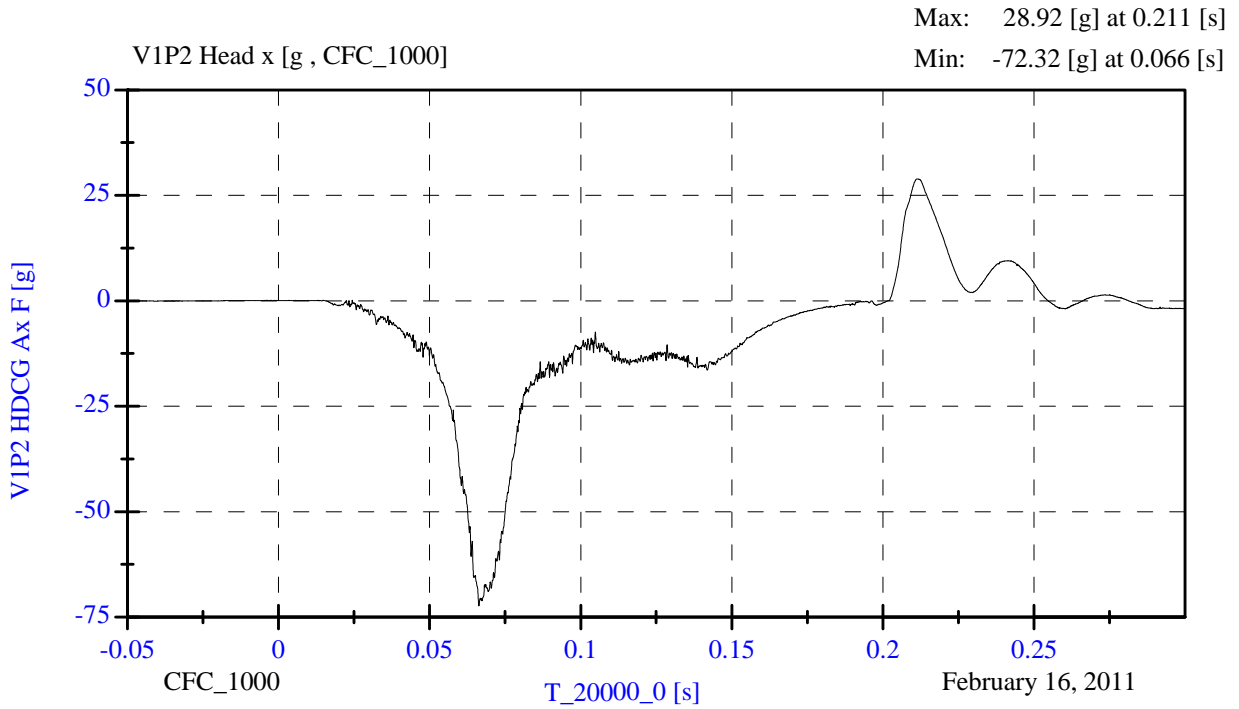
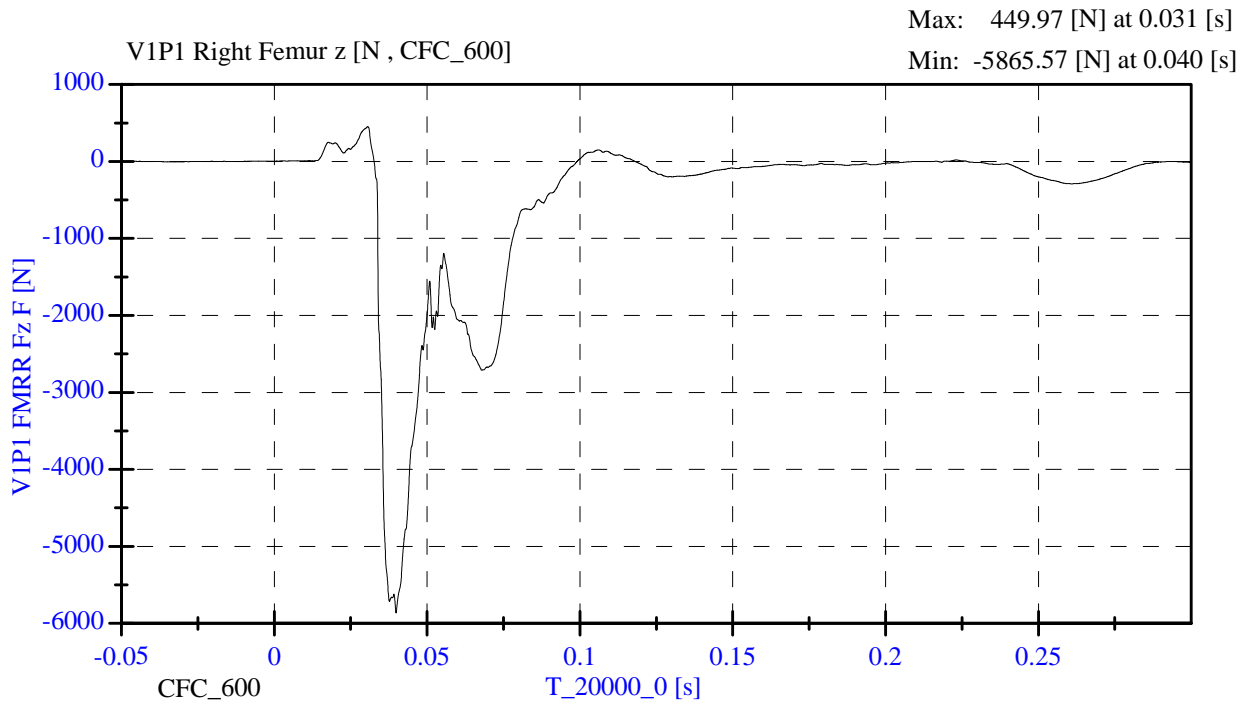


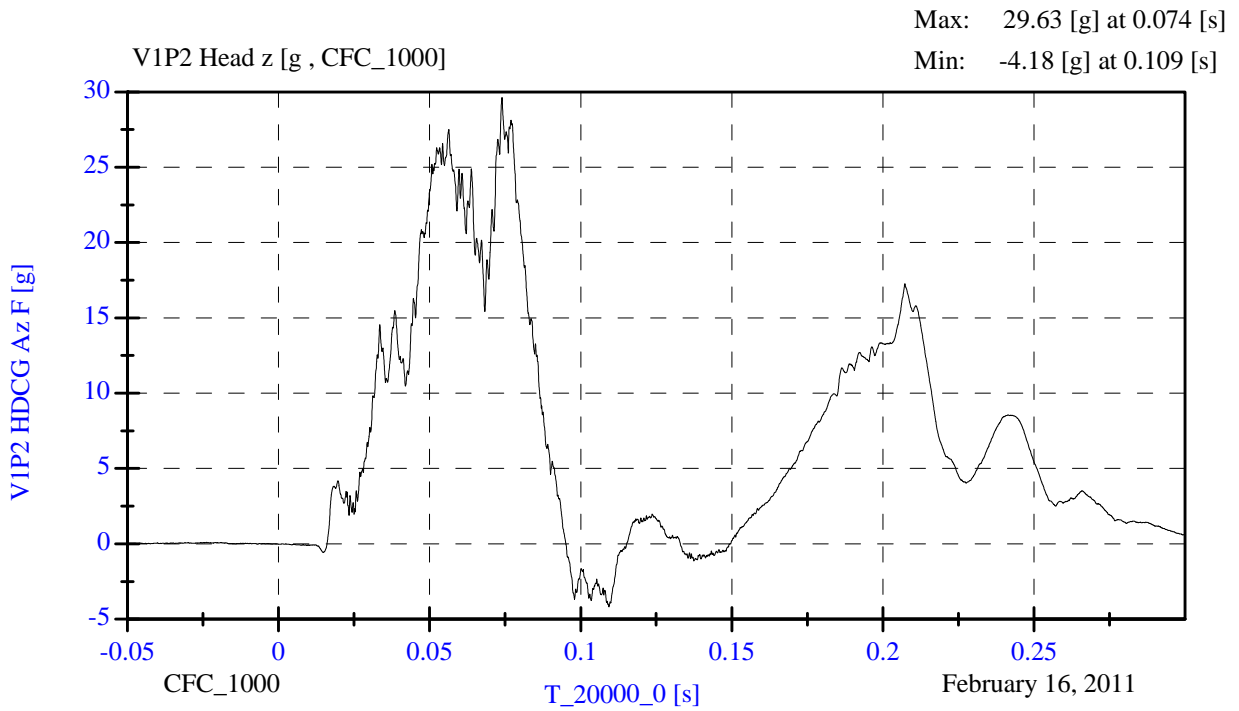
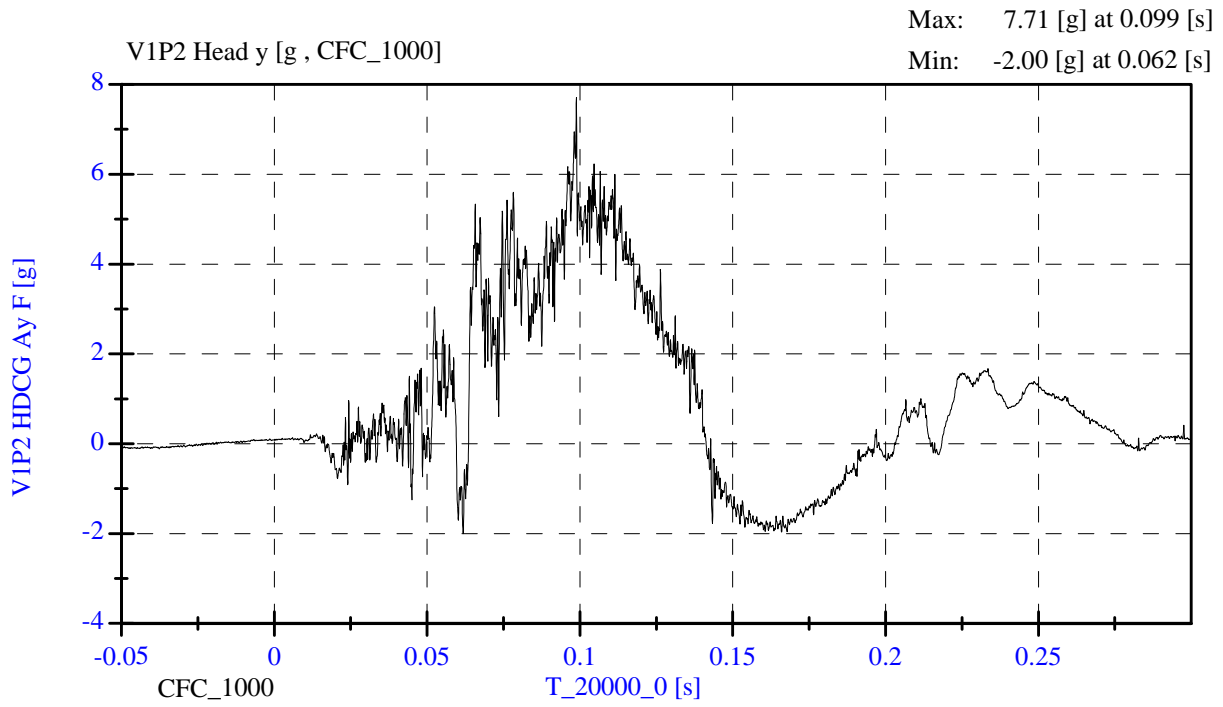


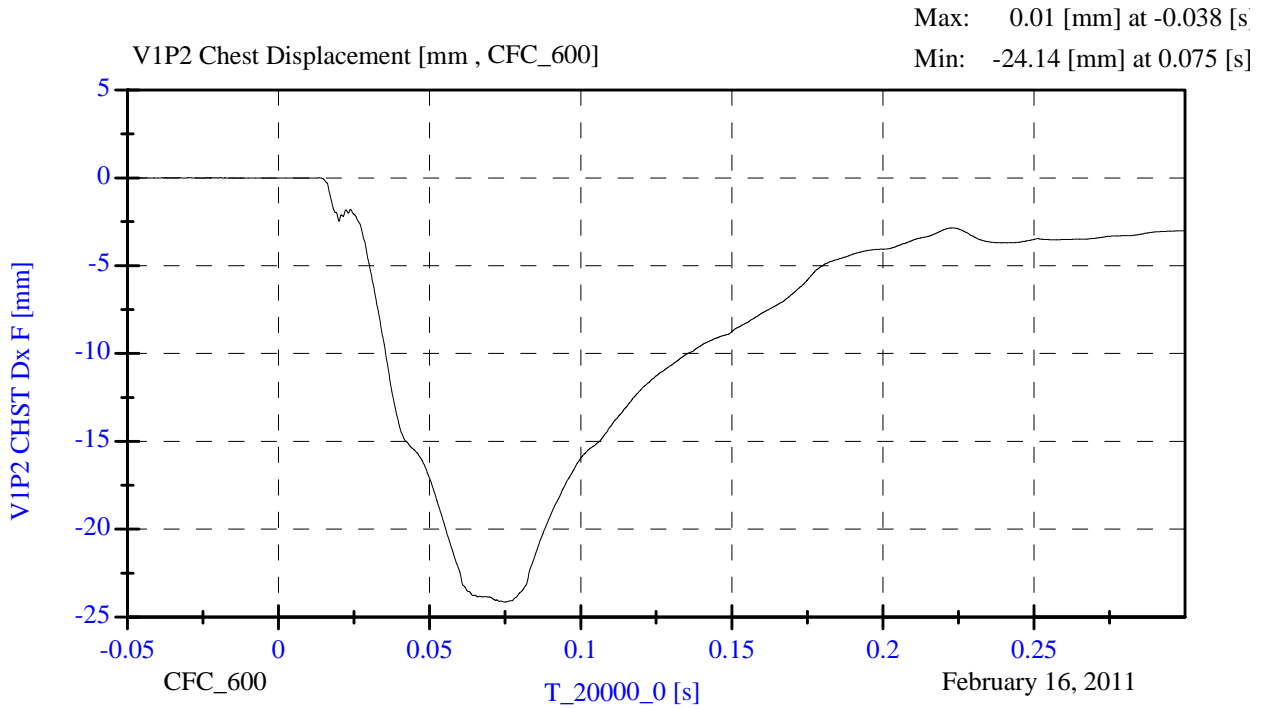
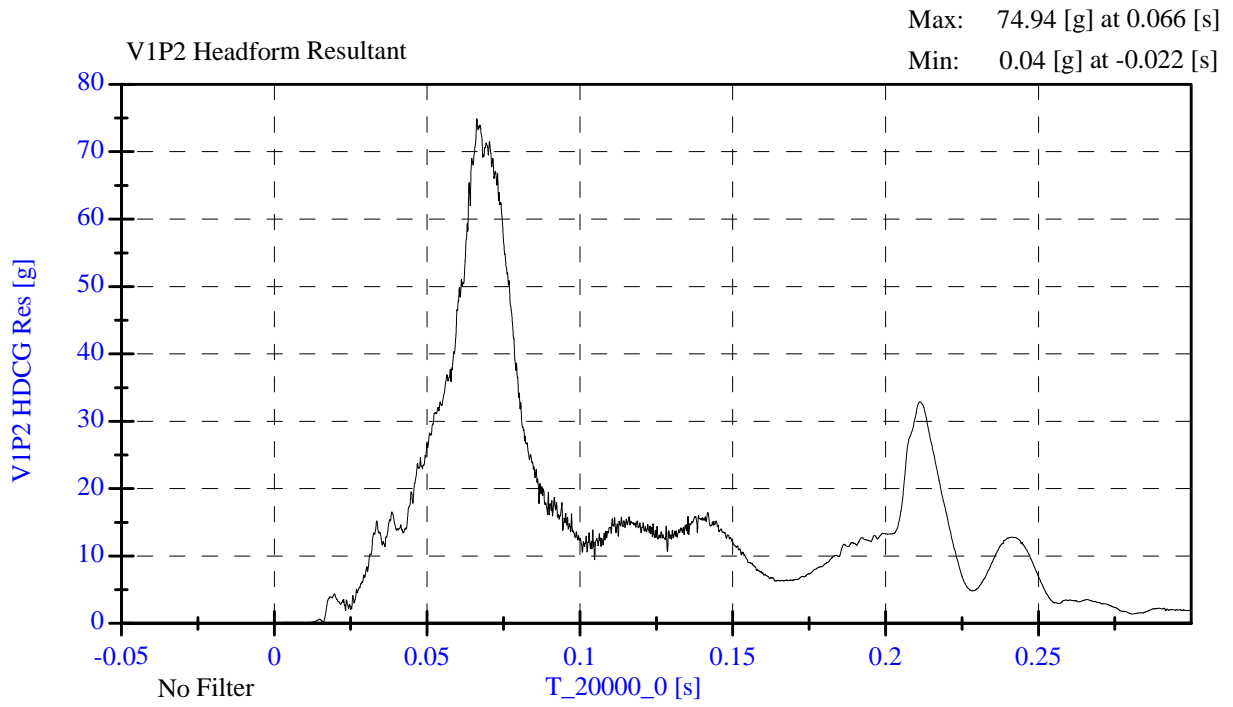


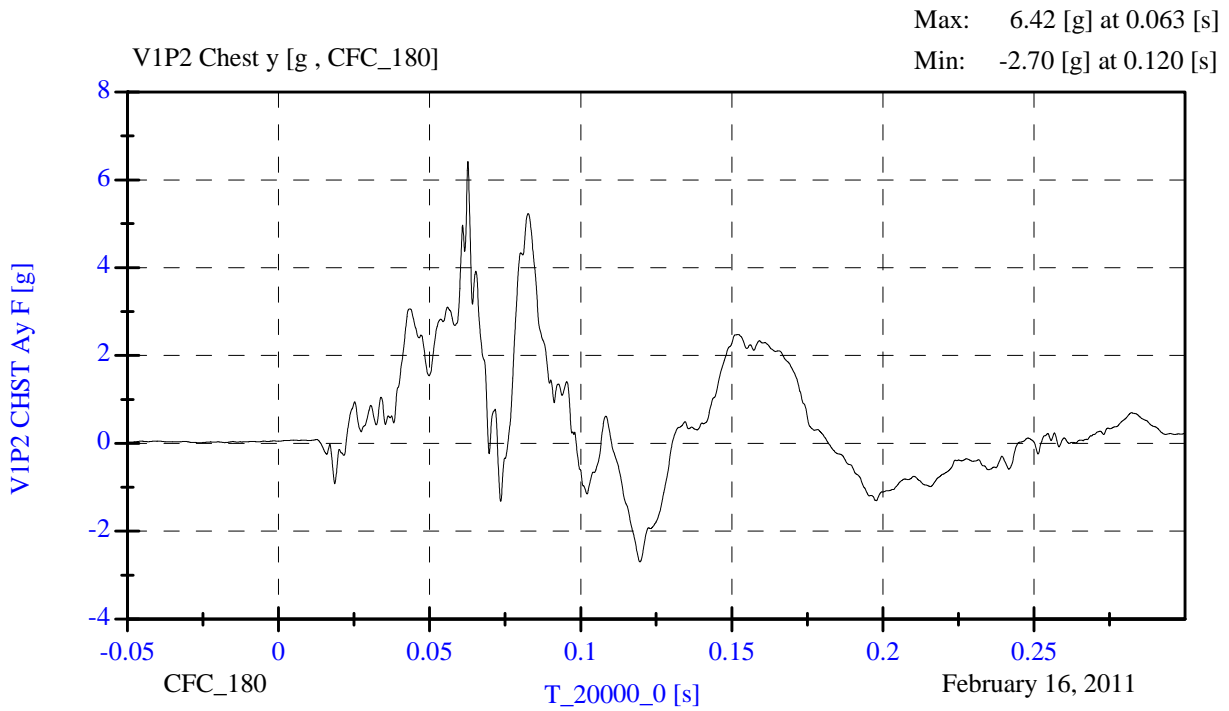
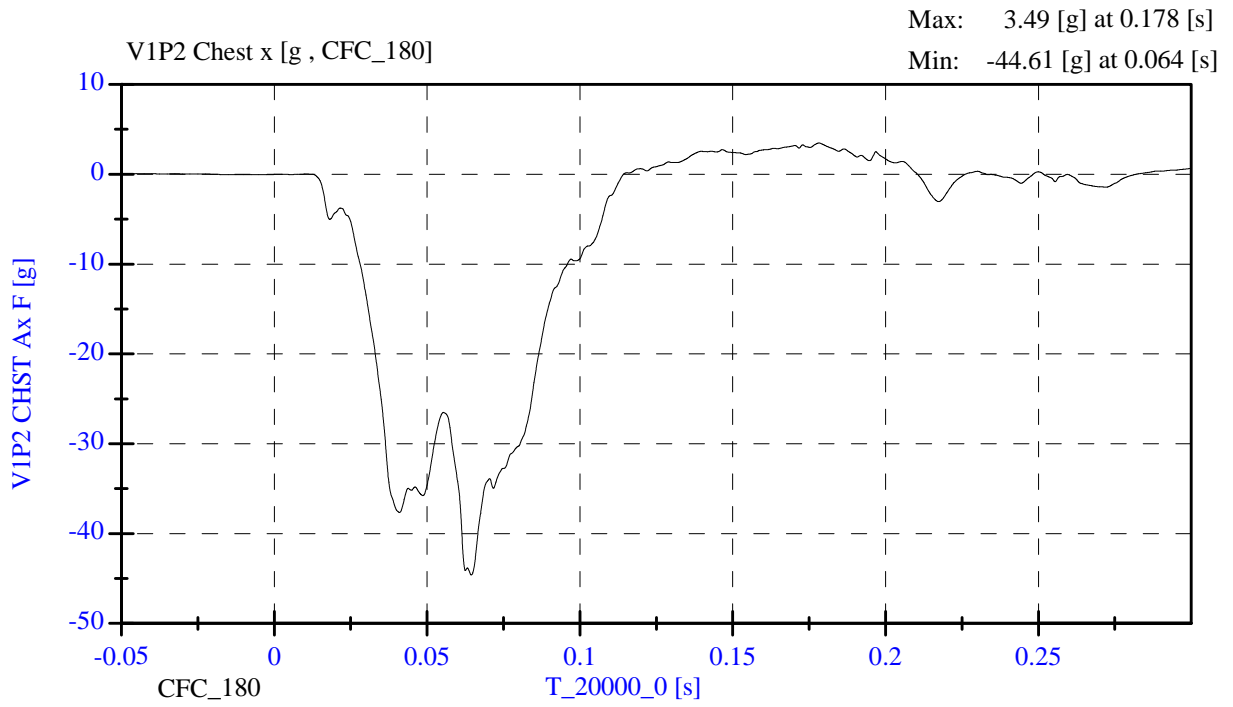


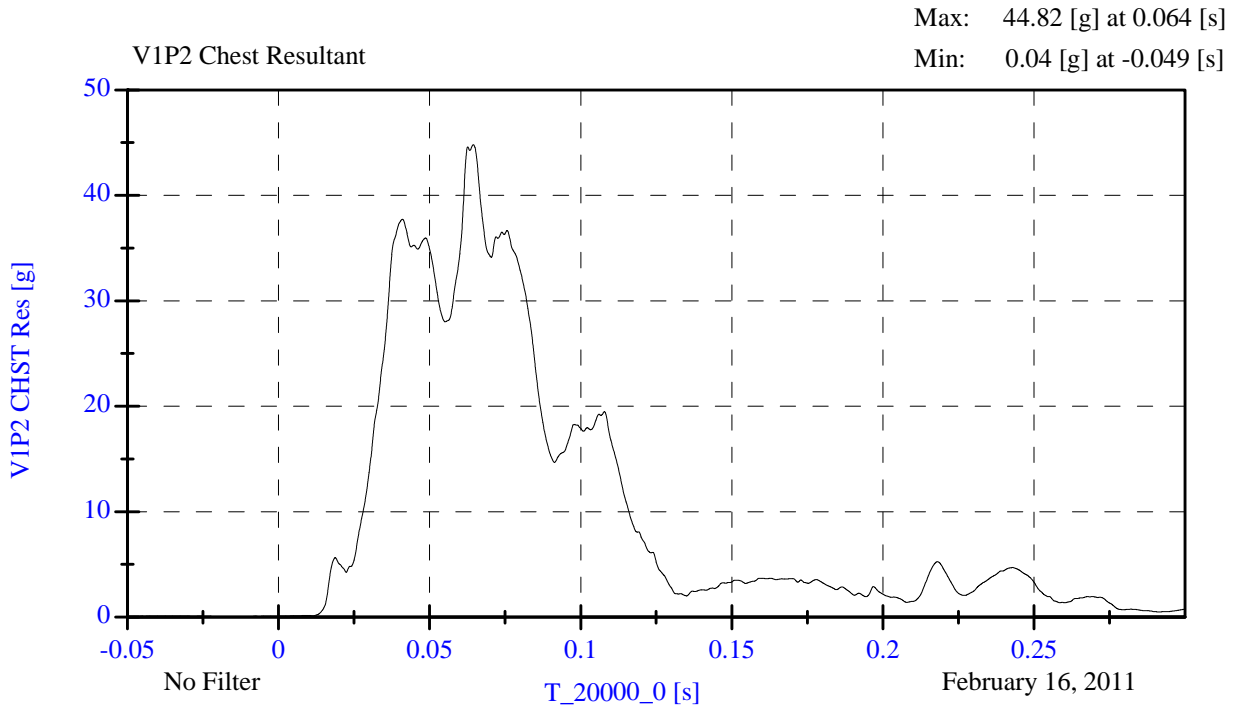
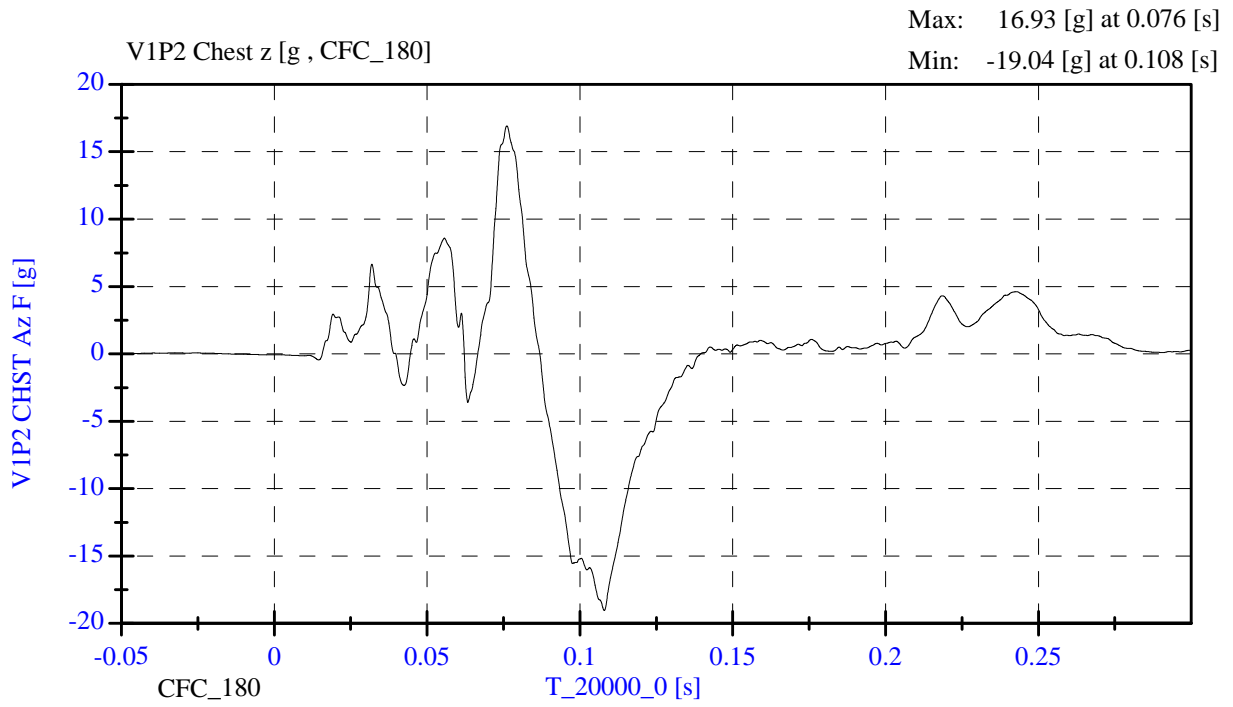


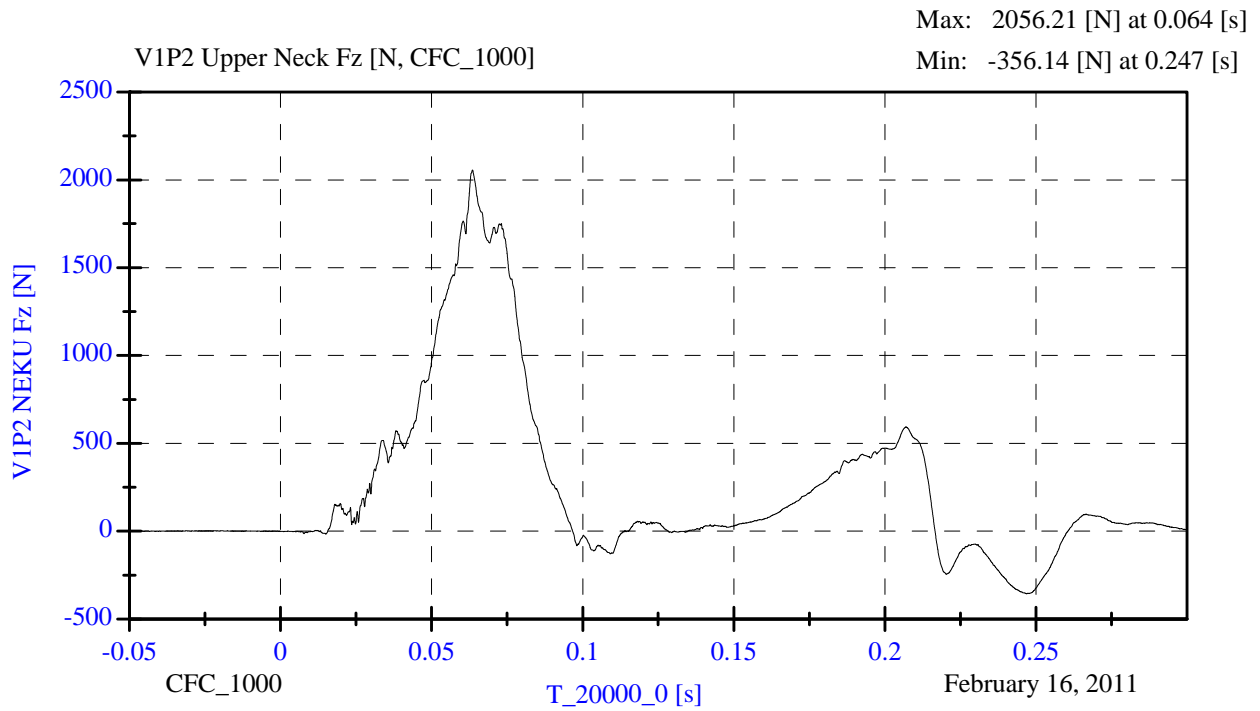
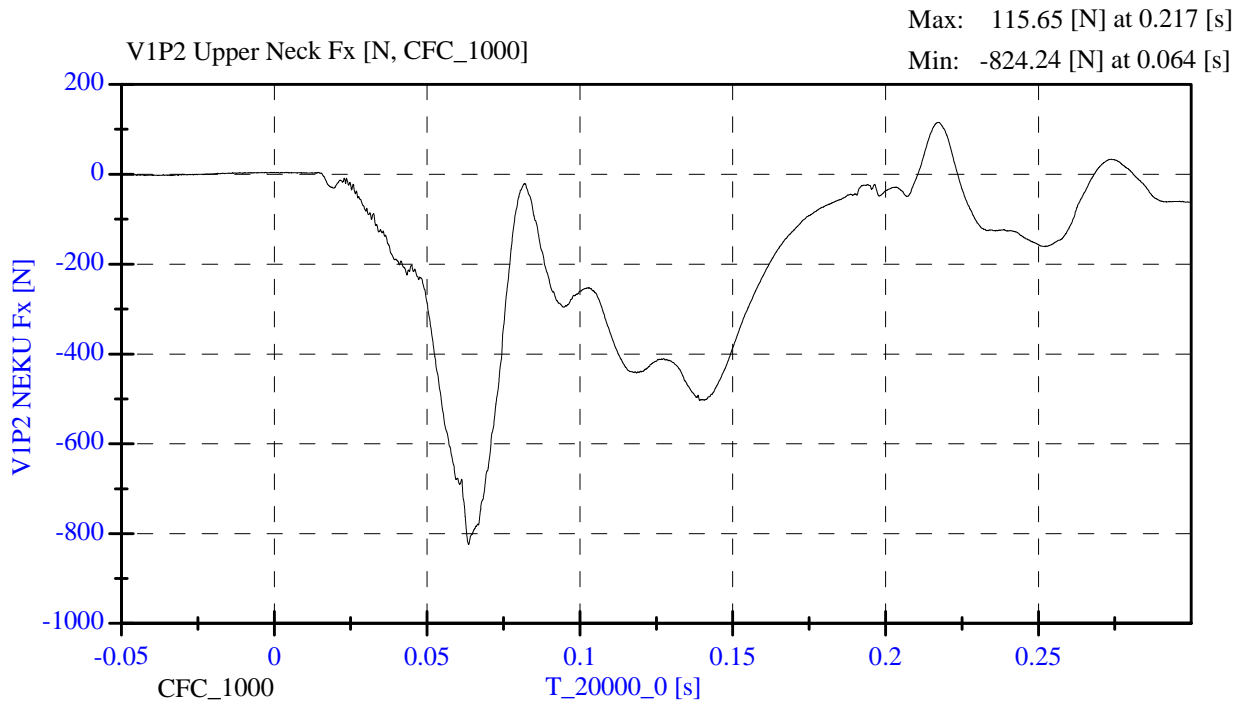


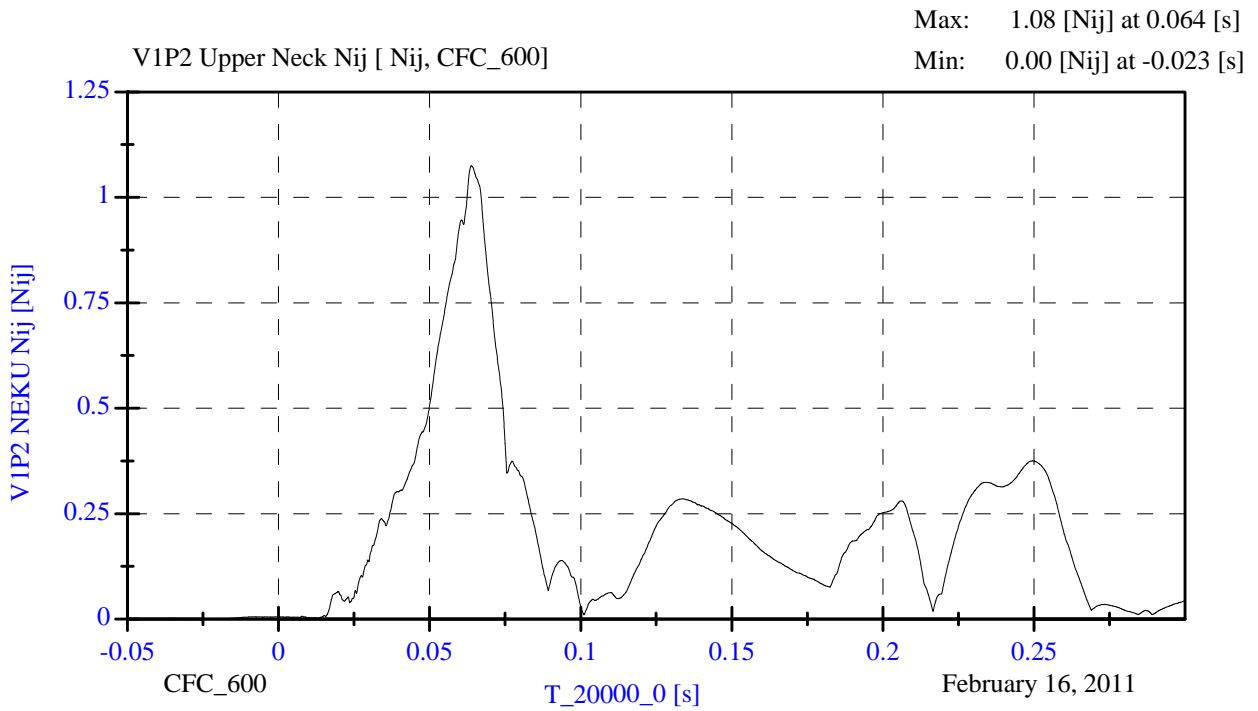
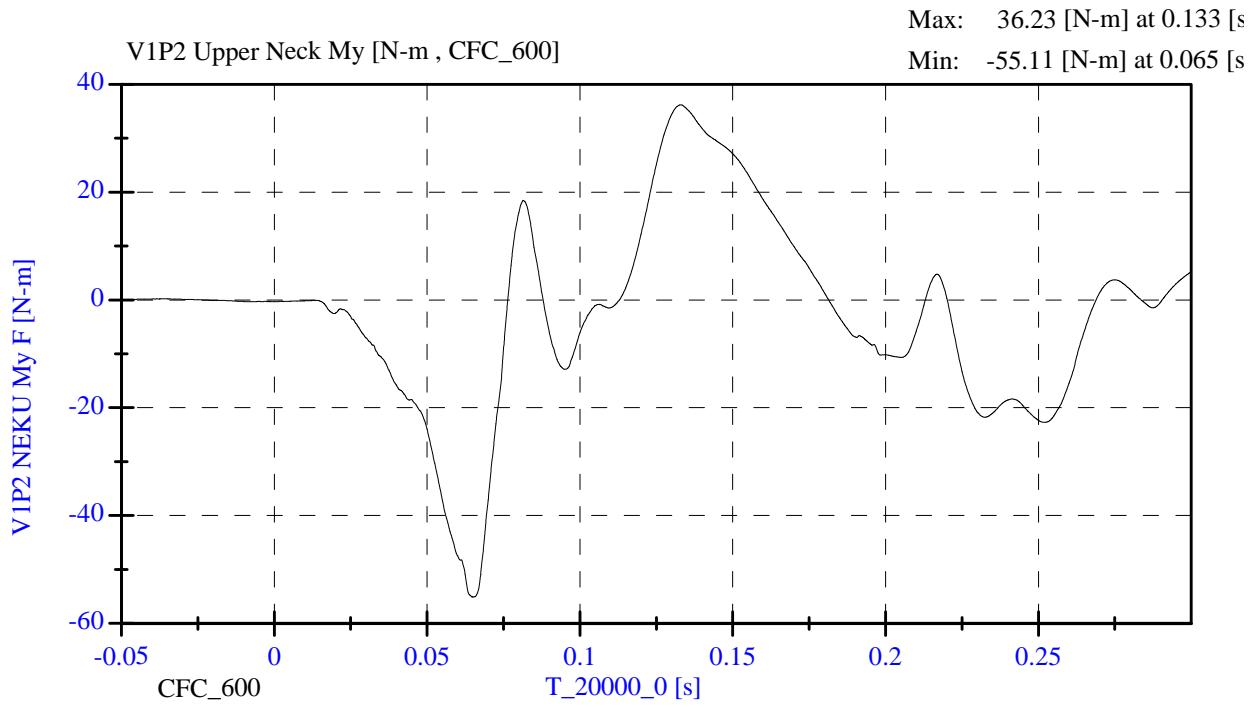


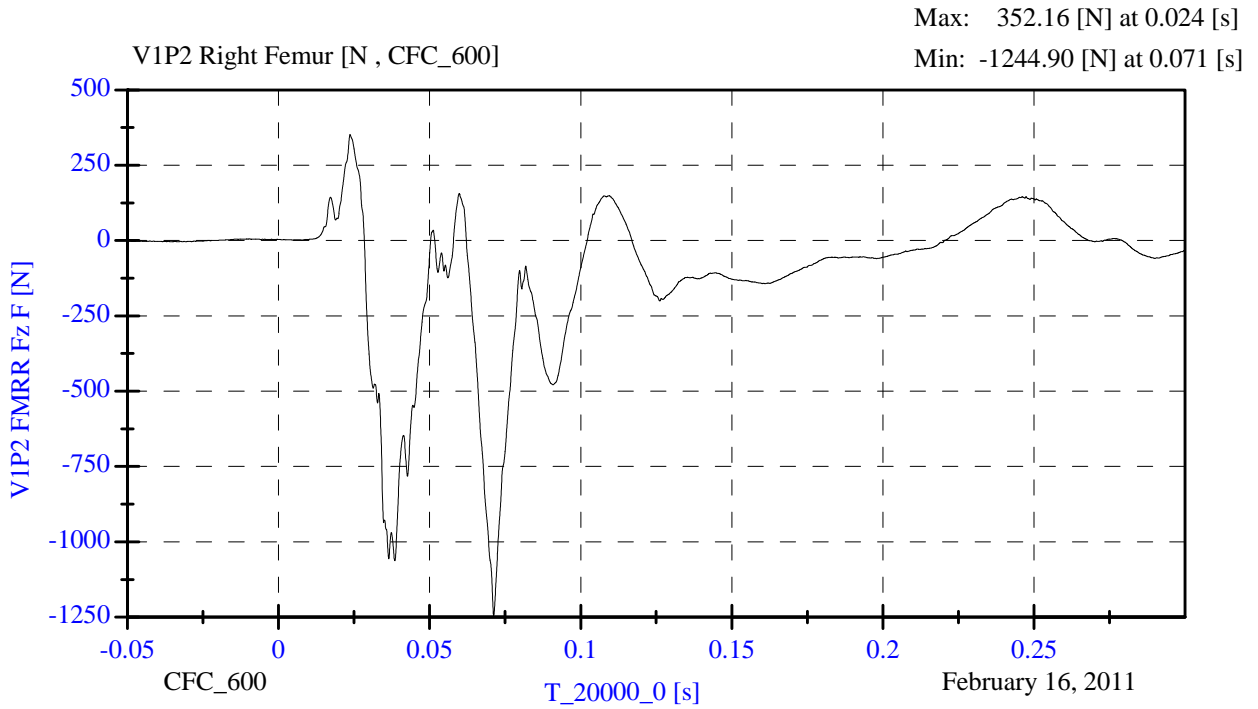
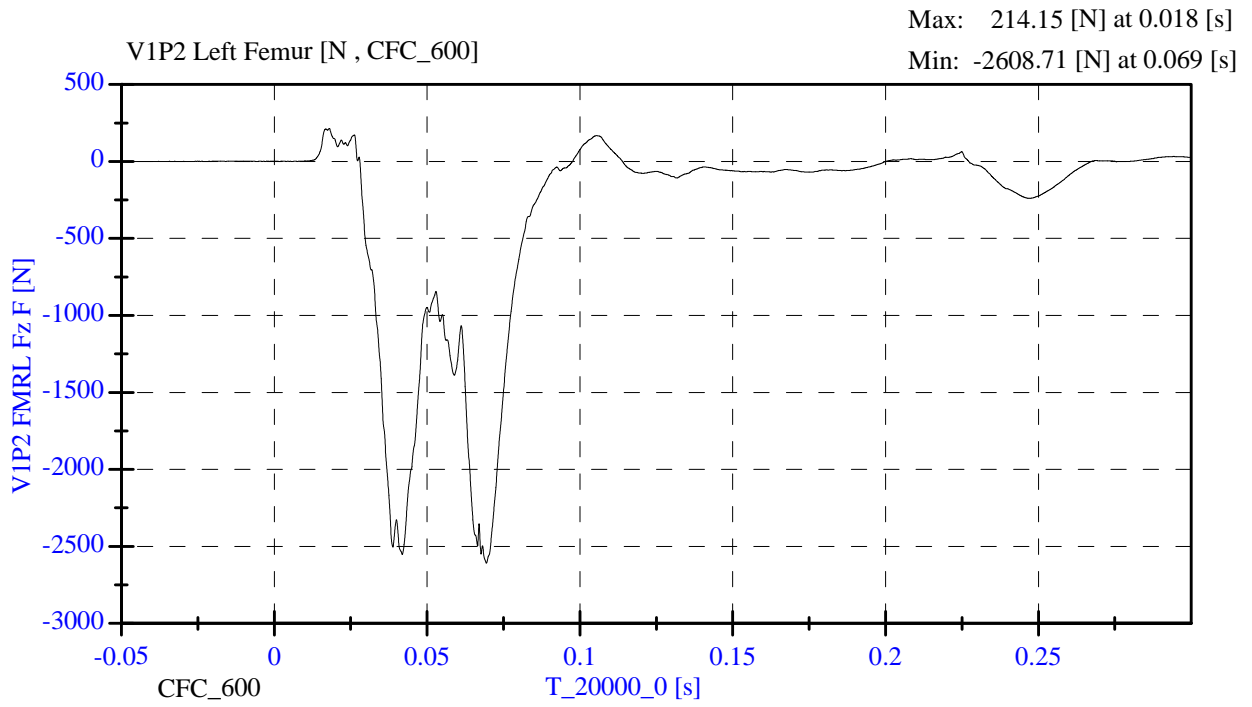












APPENDIX C

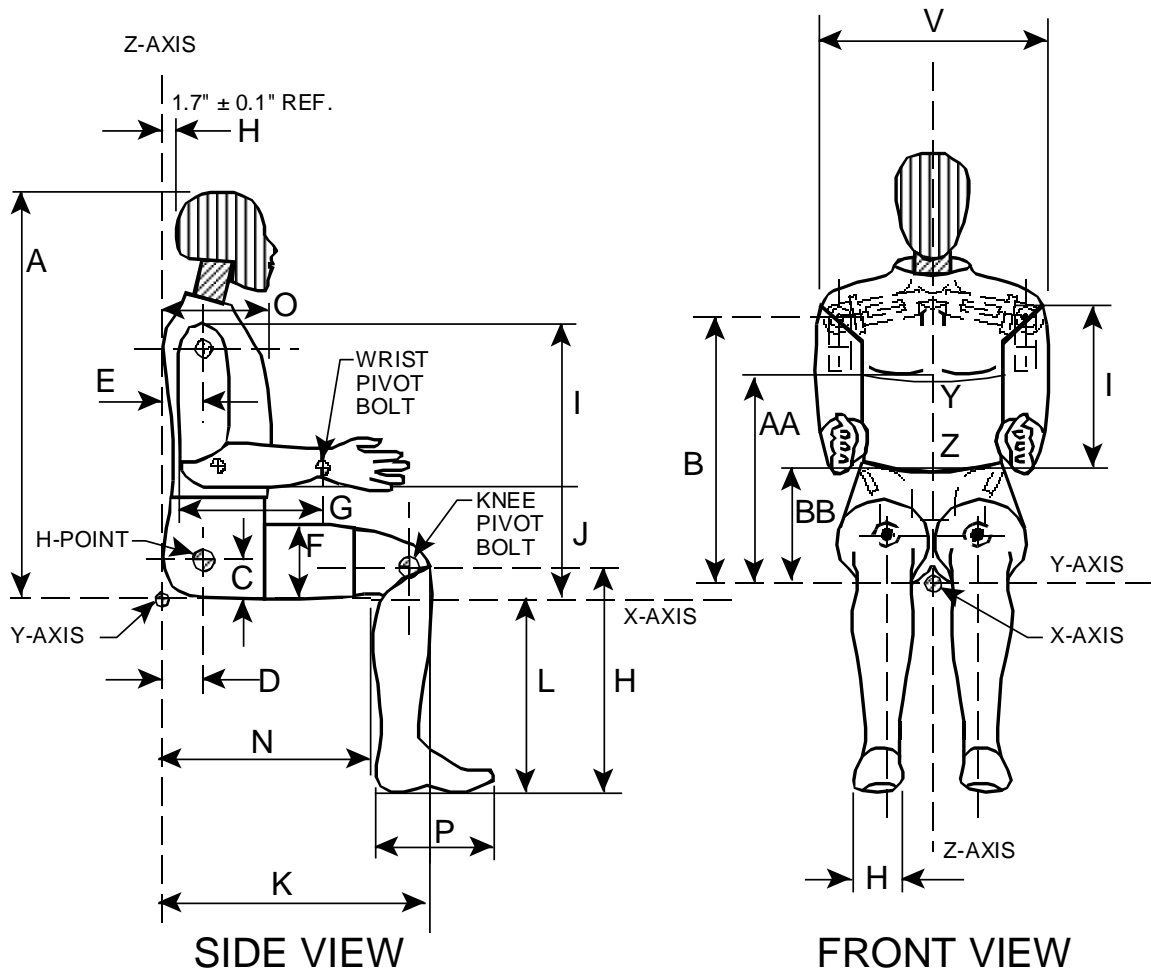
**PART 572 E/O DUMMY CONFIGURATION
AND PERFORMANCE VERIFICATION DATA SHEETS**

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	02/09/2011
#2/Right Front Passenger	143	02/09/2011

EXTERNAL DIMENSIONS SPECIFICATIONS



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

CALIBRATION TEST RESULTS

PRE-TEST

DRIVER DUMMY

S/N: 061

50th Male External Measurements

SN 061

Symbol	Description	Specification	Results	Pass
		in	in	
A	Sitting Height	34.6 - 35	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.1	Yes
C	H-Point Height	3.3 - 3.5	3.4	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	6.0	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	13.2	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	16.9	Yes
W	Foot Breadth	3.6 - 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.5	Yes
Z	Waist Circumference	32.9 - 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician: AR

Date: 2/9/2011



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:	1/21/2011
Test Number:	1	Test Time:	10:48:51 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.8 deg C P
Humidity	10 -- 70	19 %RH P
Resultant Acceleration	225 -- 275	260 g P
Oscillation	0.0 -- 10.0	7.6 % P
Lateral Acceleration	-15.00 -- 15.00	6.35 g P

All test parameters are within specifications

Technician: Don Schenk Signature: _____

Supervisor: D.Travale Signature: _____

Test ID: **Head Drop**

Test Time: **10:48:51 AM**

Test Date: **1/21/2011**



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

Test ID: **Head Drop**

Test Time: **10:48:51 AM**

Test Date: **1/21/2011**

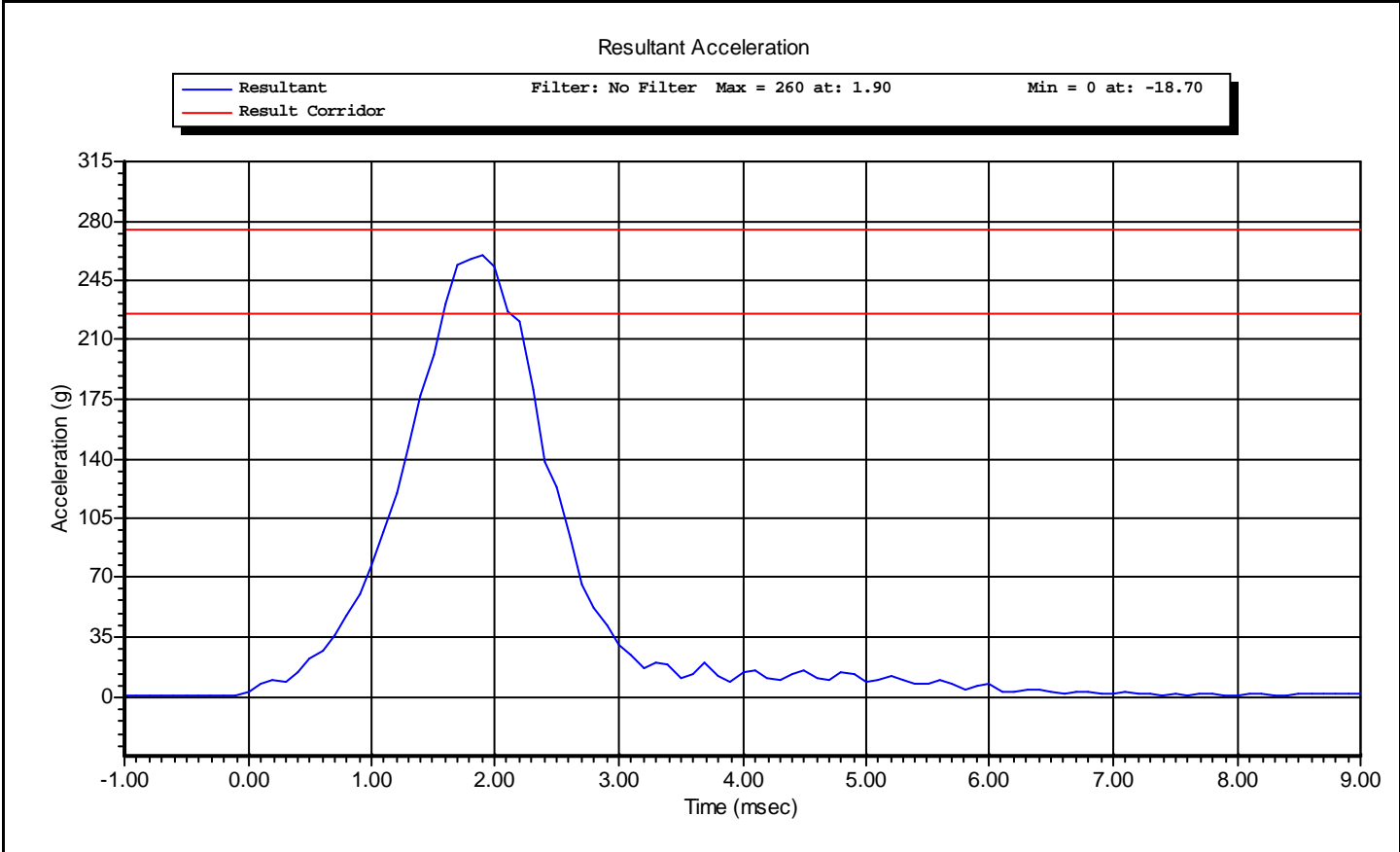


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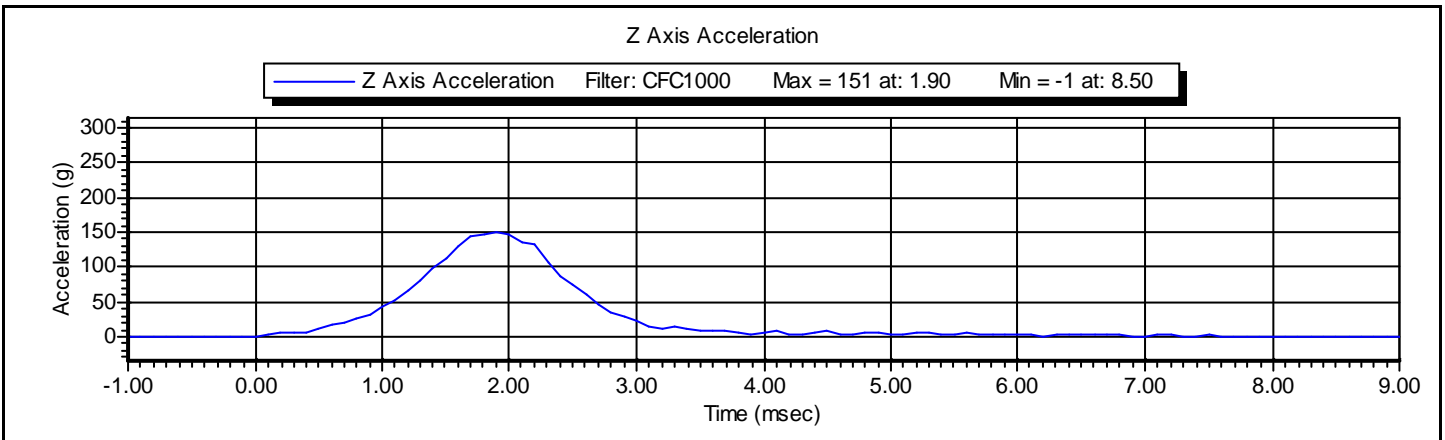
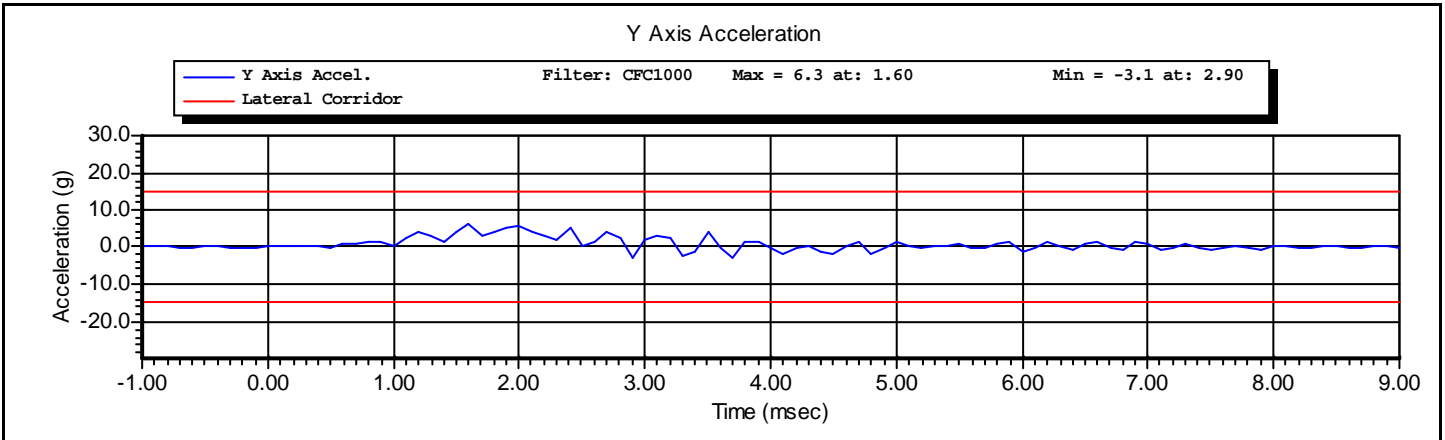
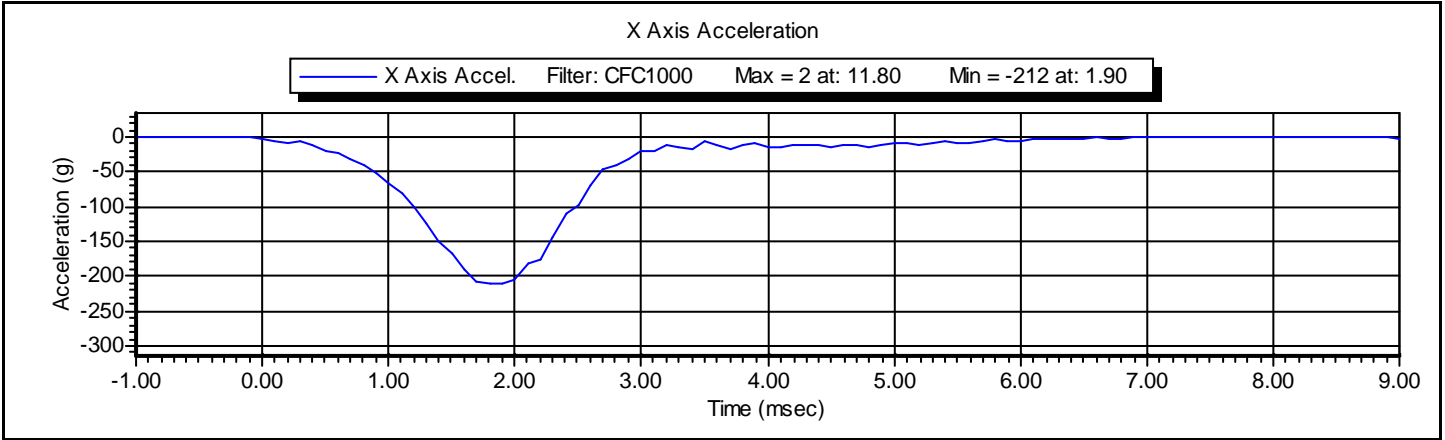
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	1/21/2011
Test Number:	1	Test Time:	10:48:51 AM



Test ID: **Head Drop**

Test Time: **10:48:51 AM**

Test Date: **1/21/2011**





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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:	2/8/2011
Test Number:	1	Test Time:	3:10:34 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	22.2 deg C P
Humidity	10 -- 70	20 %RH P
Velocity	5.94 -- 6.19	6.12 m/s P
Pendulum Deceleration at 10 ms	17.2 -- 21.2	19.6 g P
Pendulum Deceleration at 20 ms	14.0 -- 19.0	17.6 g P
Pendulum Deceleration at 30 ms	11.0 -- 16.0	14.6 g P
Max Pendulum Deceleration after 30 ms	0.0 -- 22.0	14.7 g P
Decel Time to 5 g	38.0 -- 46.0	39.9 ms P
D Plane Rotation	81.0 -- 106.0	90.9 degrees P
Time at Max Rotation	72.0 -- 82.0	76.5 ms P
Rotation Decay to Zero	147.0 -- 174.0	157.0 ms P
Moment About Occipital Condyle	-80.0 -- -52.9	-71.9 Nm P
Time at Max Moment	65.0 -- 79.0	72.7 ms P
Moment Decay to Zero	120.0 -- 148.0	139.9 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **3:10:34 PM**

Test Date: **2/8/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

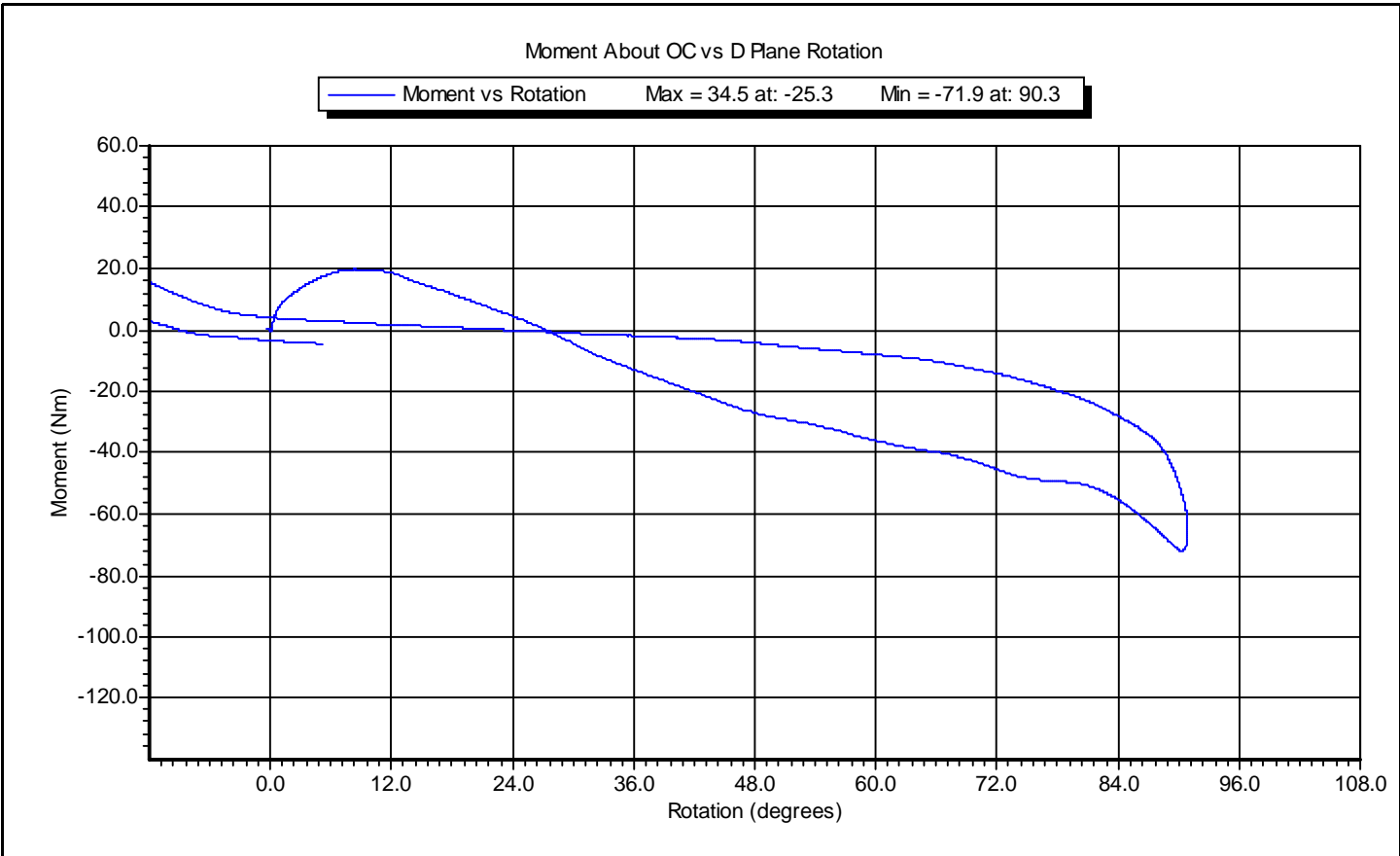
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DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/21/2010
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1916 My	11/18/2010
Denton	1716A	LC-1916 Fx	11/18/2010

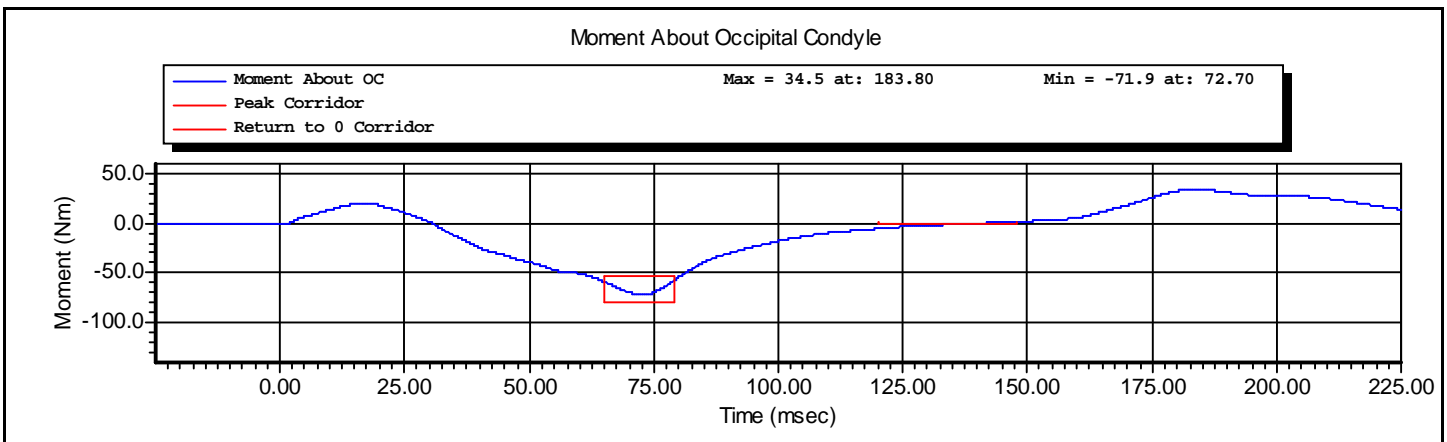
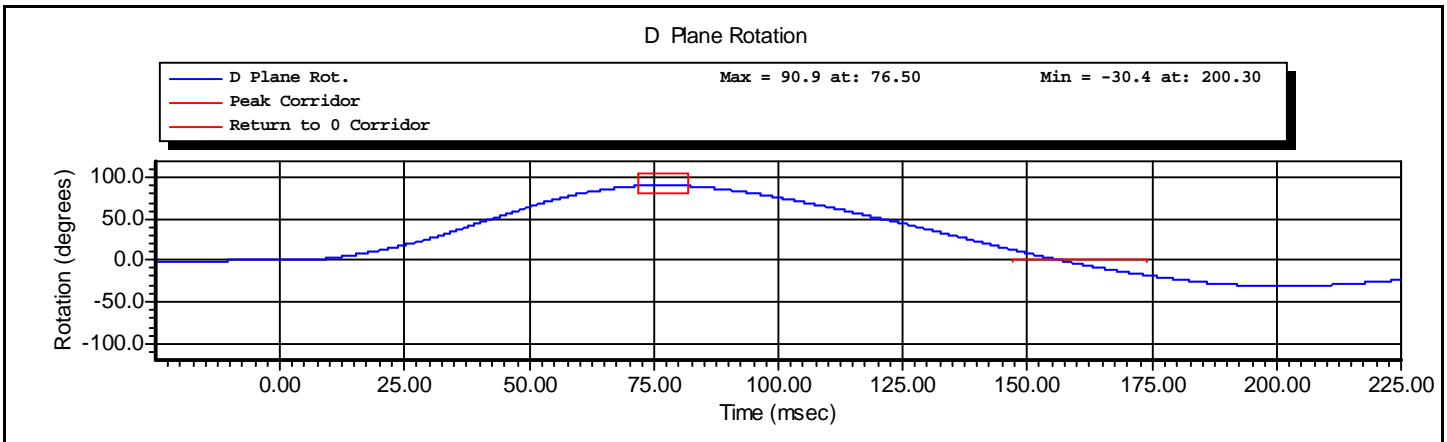
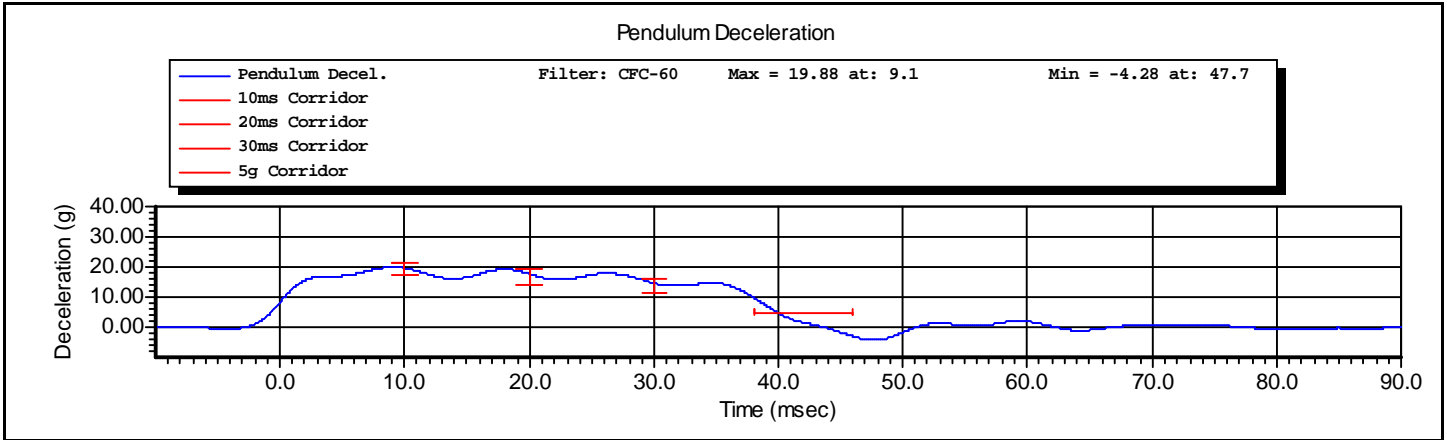
Test ID: **Neck Extension**

Test Time: **3:10:34 PM**

Test Date: **2/8/2011**

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:	2/8/2011
Number of Test:	1	Time of Test:	3:10:34 PM







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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:	2/8/2011
Test Number:	1	Test Time:	1:25:24 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	22.2 deg C P
Humidity	10 -- 70	20 %RH P
Velocity	6.89 -- 7.13	7.09 m/s P
Pendulum Deceleration at 10 ms	22.5 -- 27.5	23.3 g P
Pendulum Deceleration at 20 ms	17.6 -- 22.6	19.2 g P
Pendulum Deceleration at 30 ms	12.5 -- 18.5	14.2 g P
Max Pendulum Deceleration After 30 ms	0.0 -- 29.0	16.5 g P
Deceleration time to 5 g	34.0 -- 42.0	41.0 ms P
D Plane Rotation	-78.0 -- -64.0	-73.0 degrees P
Time at max rotation	57.0 -- 64.0	60.8 ms P
Rotation Decay to Zero	113.0 -- 128.0	122.9 ms P
Moment about OC	88.1 -- 108.4	90.7 Nm P
Time at Max Moment	47.0 -- 58.0	55.0 ms P
Moment Decay to Zero	97.0 -- 107.0	103.7 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **1:25:24 PM**

Test Date: **2/8/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

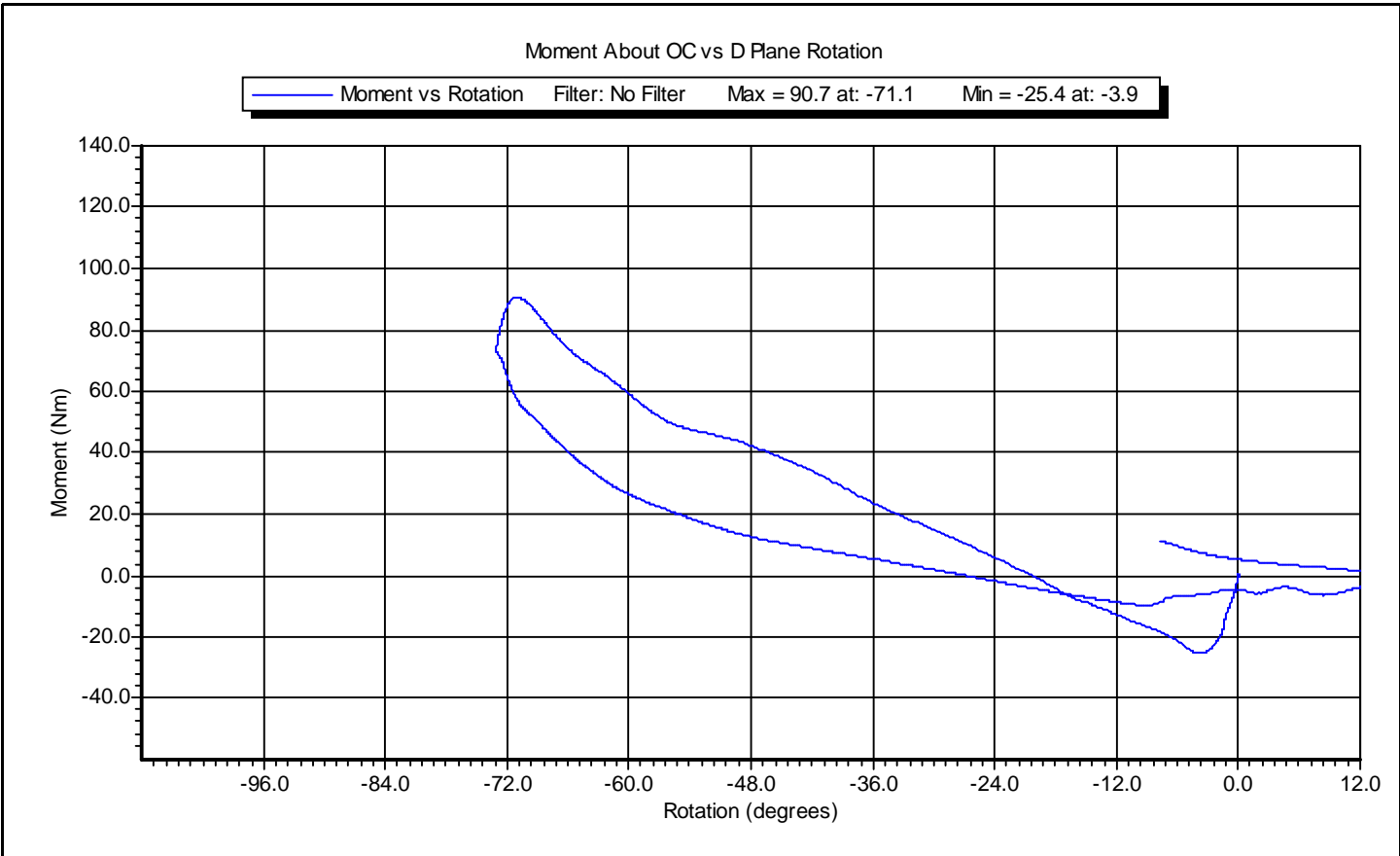
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DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/21/2010
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1916 My	11/18/2010
Denton	1716A	LC-1916 Fx	11/18/2010
Endevco	7231CT	P35758	10/5/2010

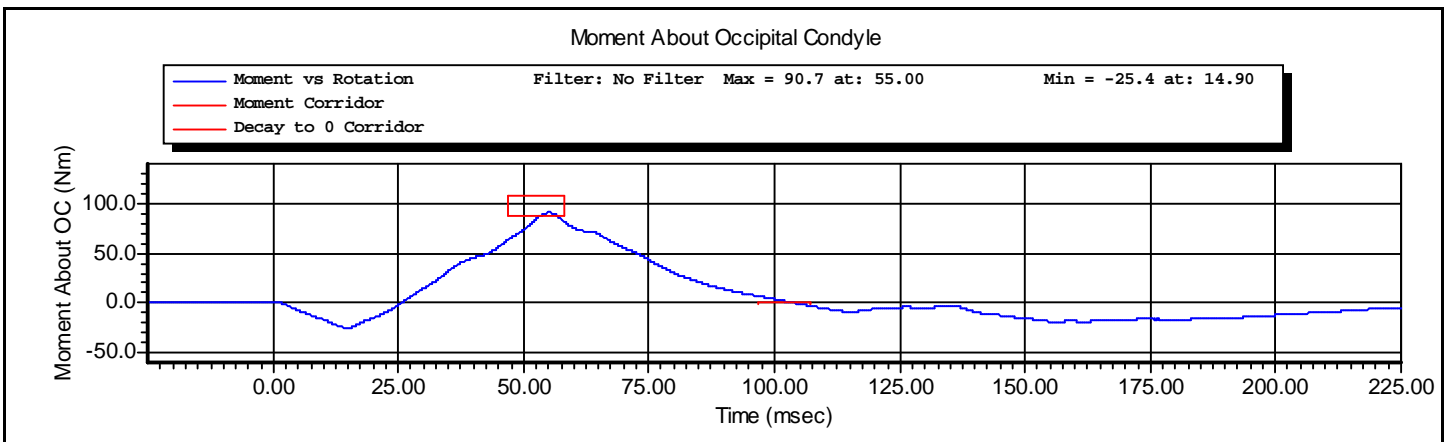
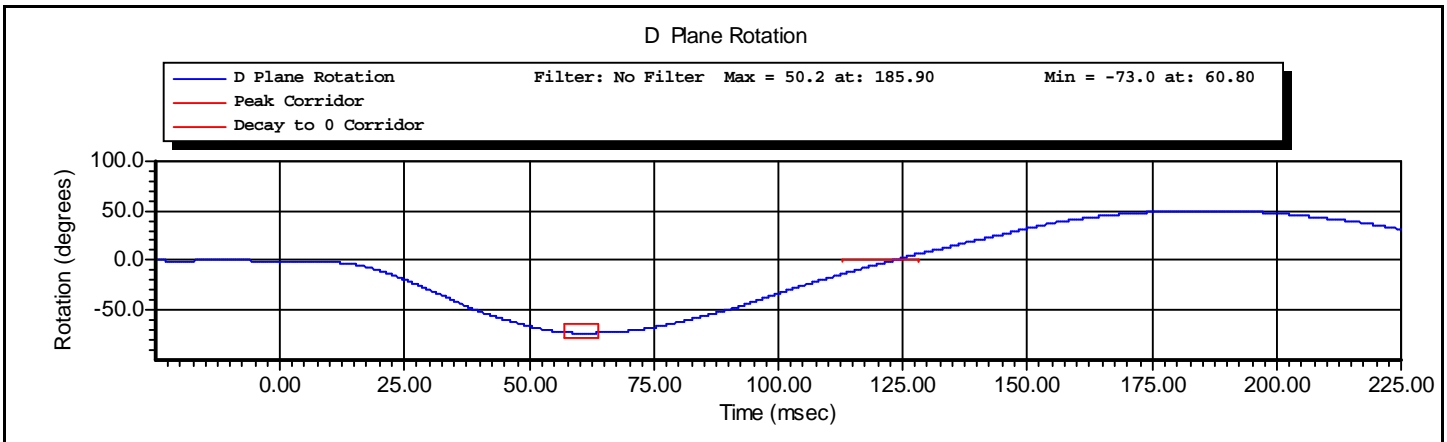
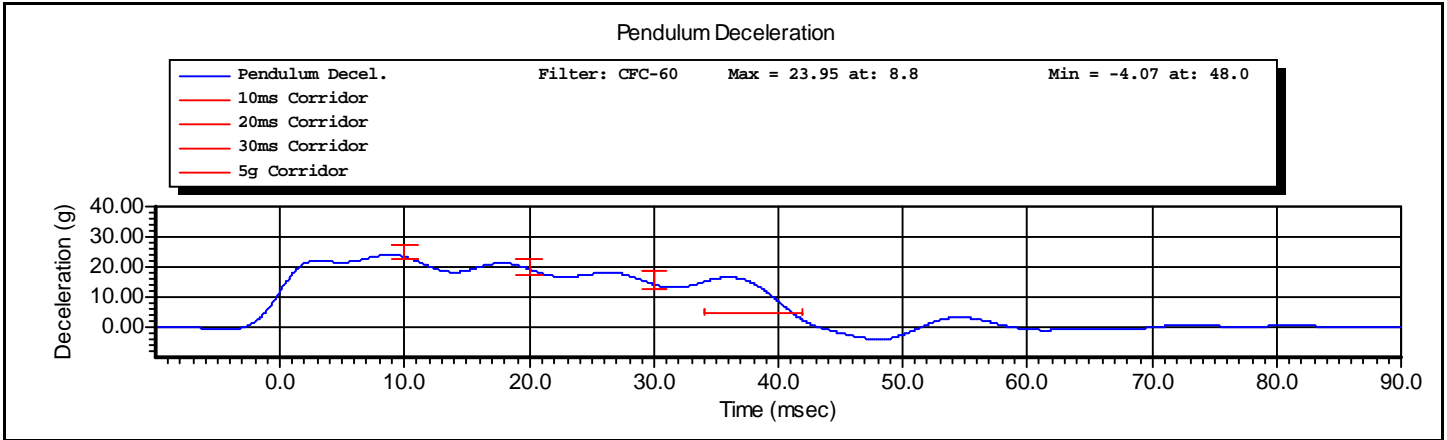
Test ID: **Neck Flexion**

Test Time: **1:25:24 PM**

Test Date: **2/8/2011**

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:	2/8/2011
Number of Test:	1	Time of Test:	1:25:24 PM







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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:	1/20/2011
Test Number:	1	Test Time:	3:05:11 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10.0 -- 70.0	20.0 %RH P
Velocity	6.59 -- 6.83	6.71 m/s P
Resistive Force	-5.894 -- -5.160	-5.600 kN P
Sternum Displacement	-72.6 -- -63.5	-68.2 mm P
Hysteresis	69 -- 85	73 % P

All test parameters are within specifications

Technician: Don Schenk Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: **Thorax**

Test Time: **3:05:11 PM**

Test Date: **1/20/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

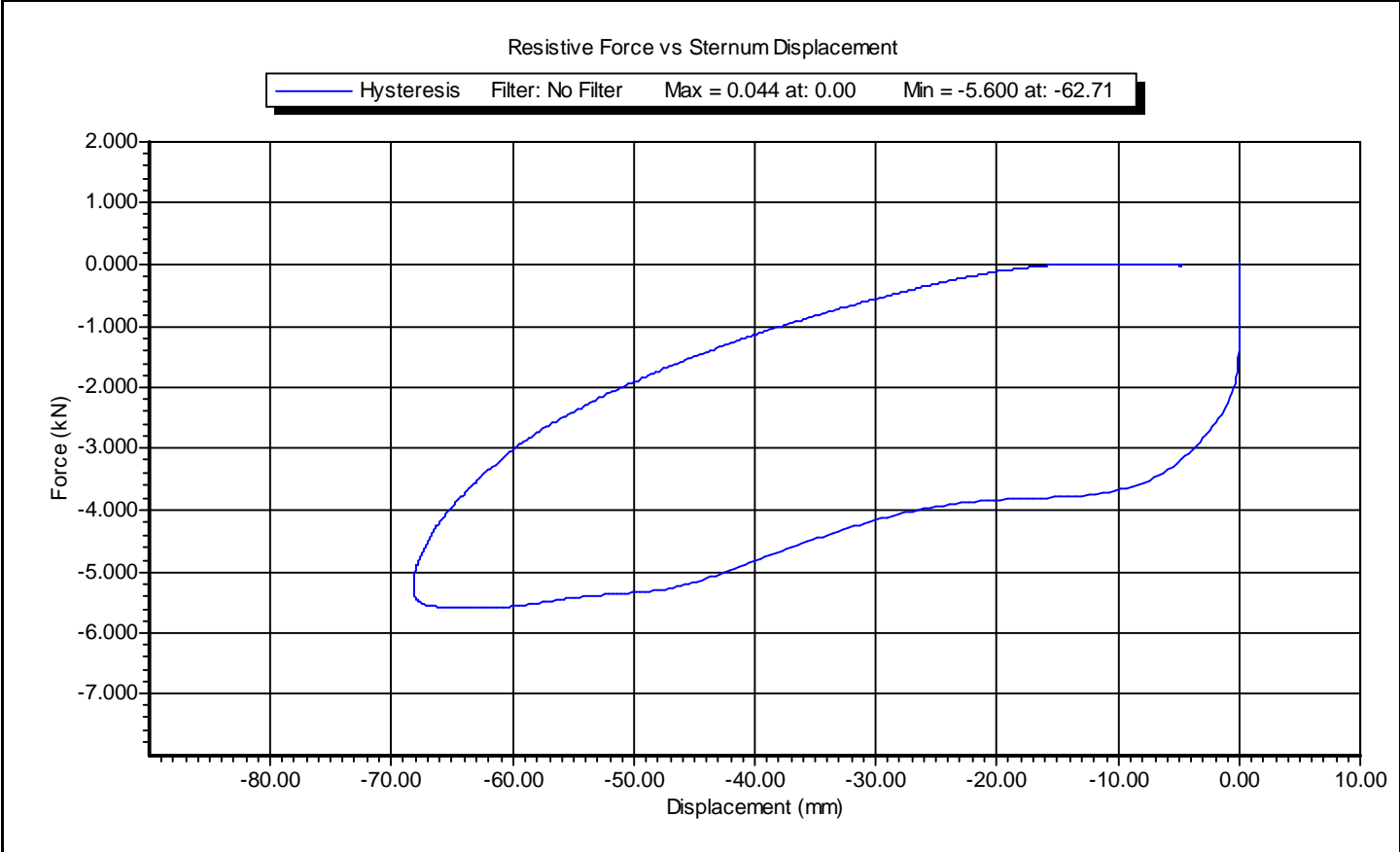
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DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P66930	10/5/2010
DentonATD	78051-342	DS-061	6/1/2010

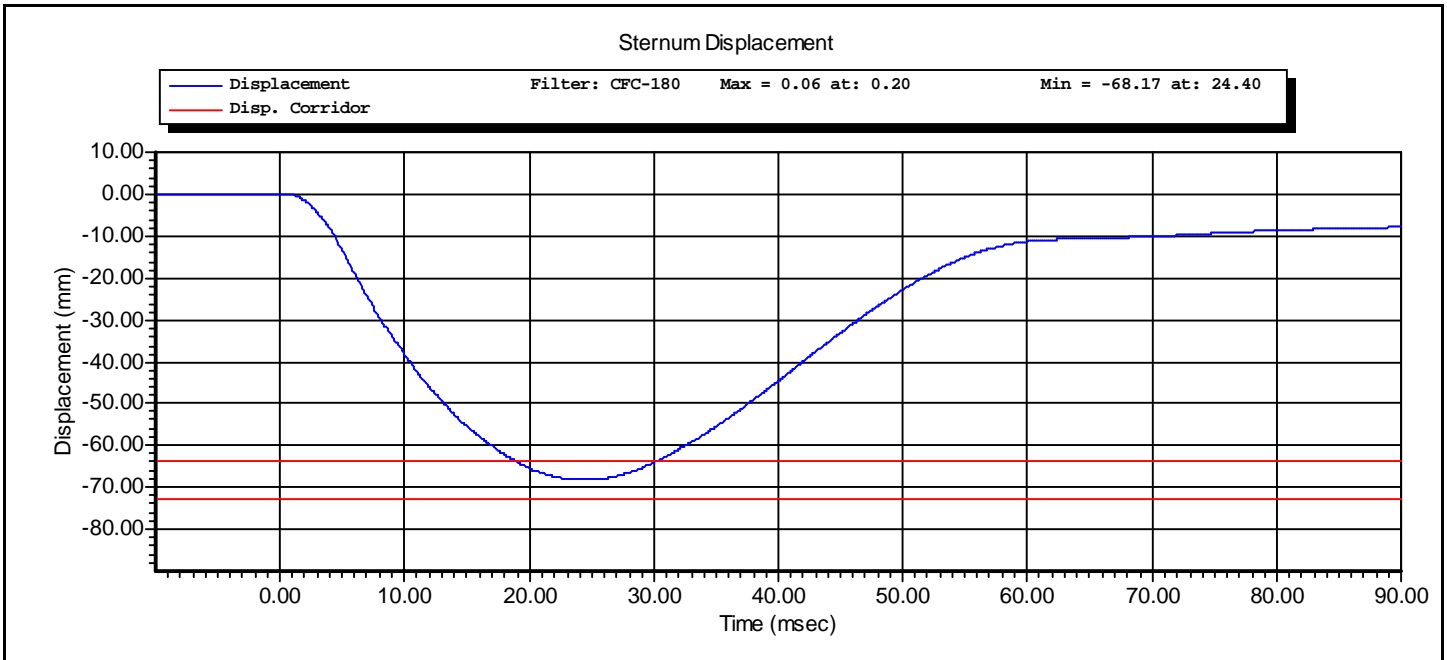
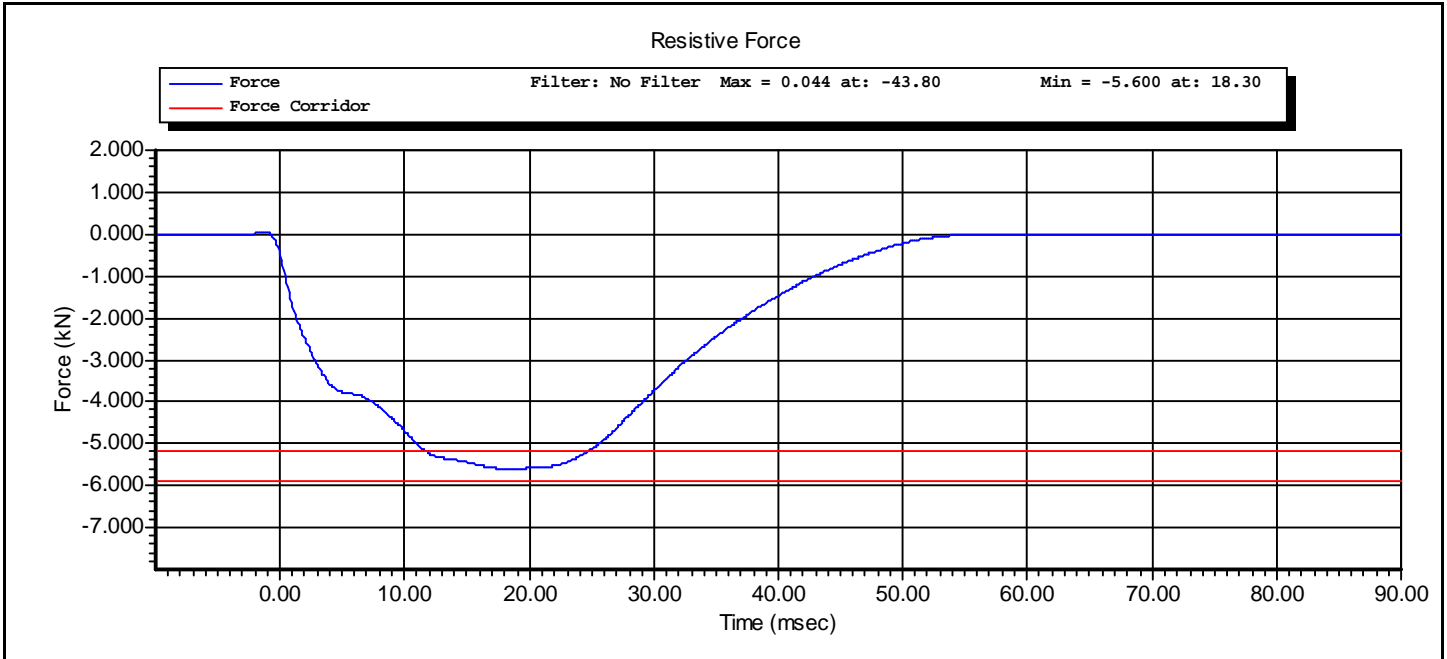
Test ID: **Thorax**

Test Time: **3:05:11 PM**

Test Date: **1/20/2011**

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:	1/20/2011
Test Number:	1	Test Time:	3:05:11 PM





CALSPAN

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

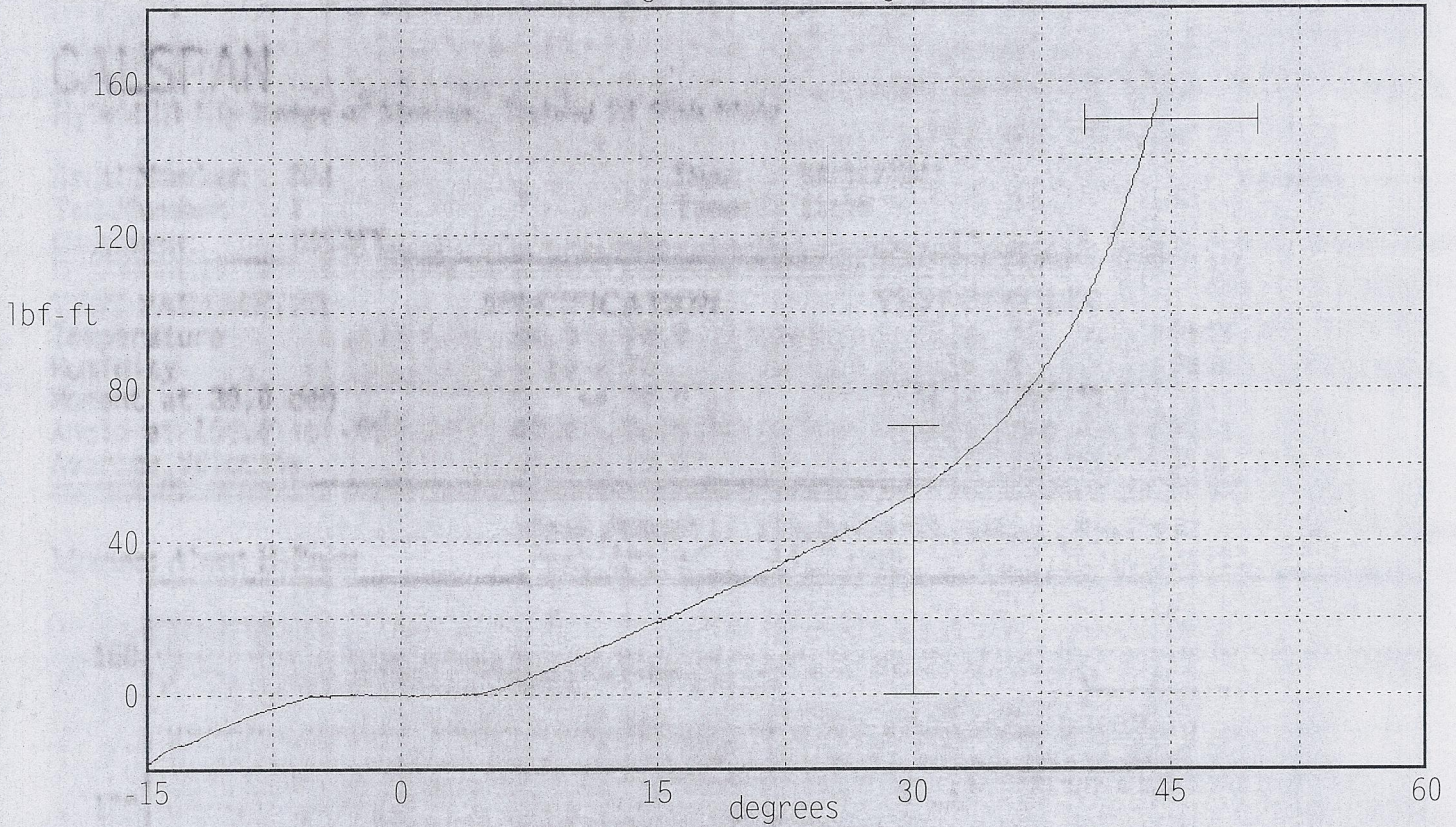
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Test Number: 1
Comments: RIGHT

Date: 01/21/2011
Time: 11:39

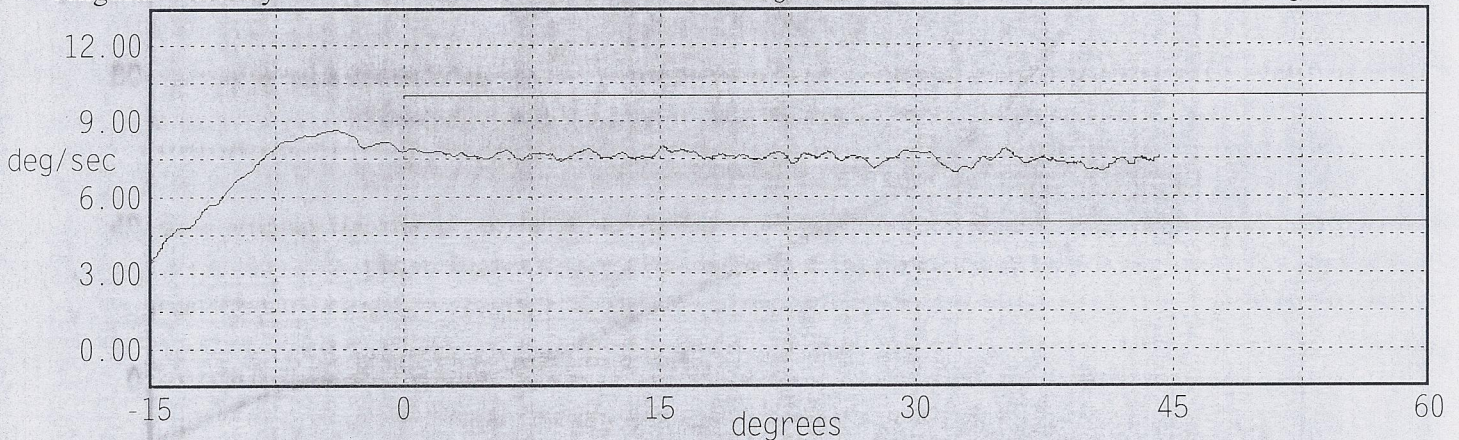
Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	19 % Pass
Moment at 30.0 deg	<= 70.0	51.4 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.0 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.3 lbf-ft at 44.2 deg
Peak Angle: 44.2 deg at 153.4 lbf-ft



Angular Velocity Max: 8.0 deg/sec Min: 6.9 deg/sec



CALSPAN

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

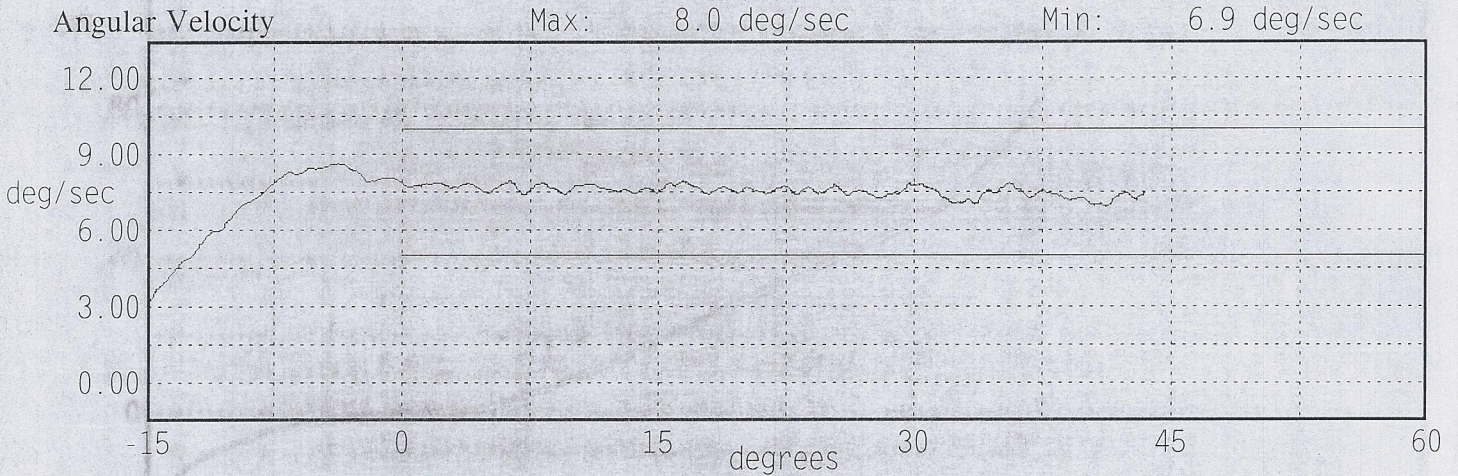
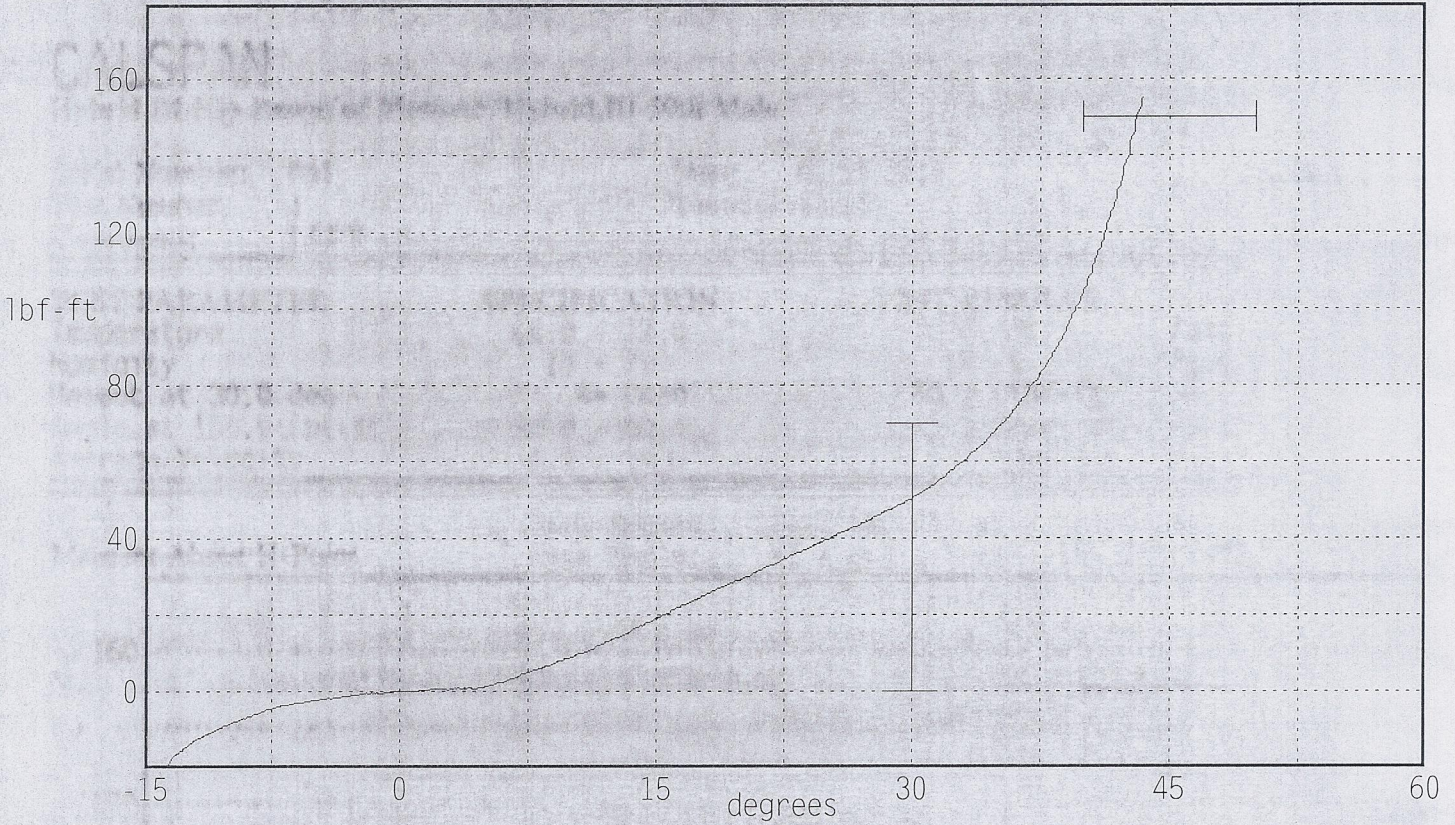
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 01/21/2011
Time: 11:42

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	19 % Pass
Moment at 30.0 deg	<= 70.0	50.3 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.2 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.2 lbf-ft at 43.4 deg
Peak Angle: 43.4 deg at 155.2 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:	1/21/2011
Test Number:	1	Test Time:	10:17:36 AM

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	21.5 deg C P
Humidity	10.0 -- 70.0	19.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-5.78 -- -4.72	-5.29 kN P

All test parameters are within specifications

Technician: Don Schenk Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: **Left Knee**

Test Time: **10:17:36 AM**

Test Date: **1/21/2011**



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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	1/11/2011
CEC	4-202	AC-A44	8/26/2010

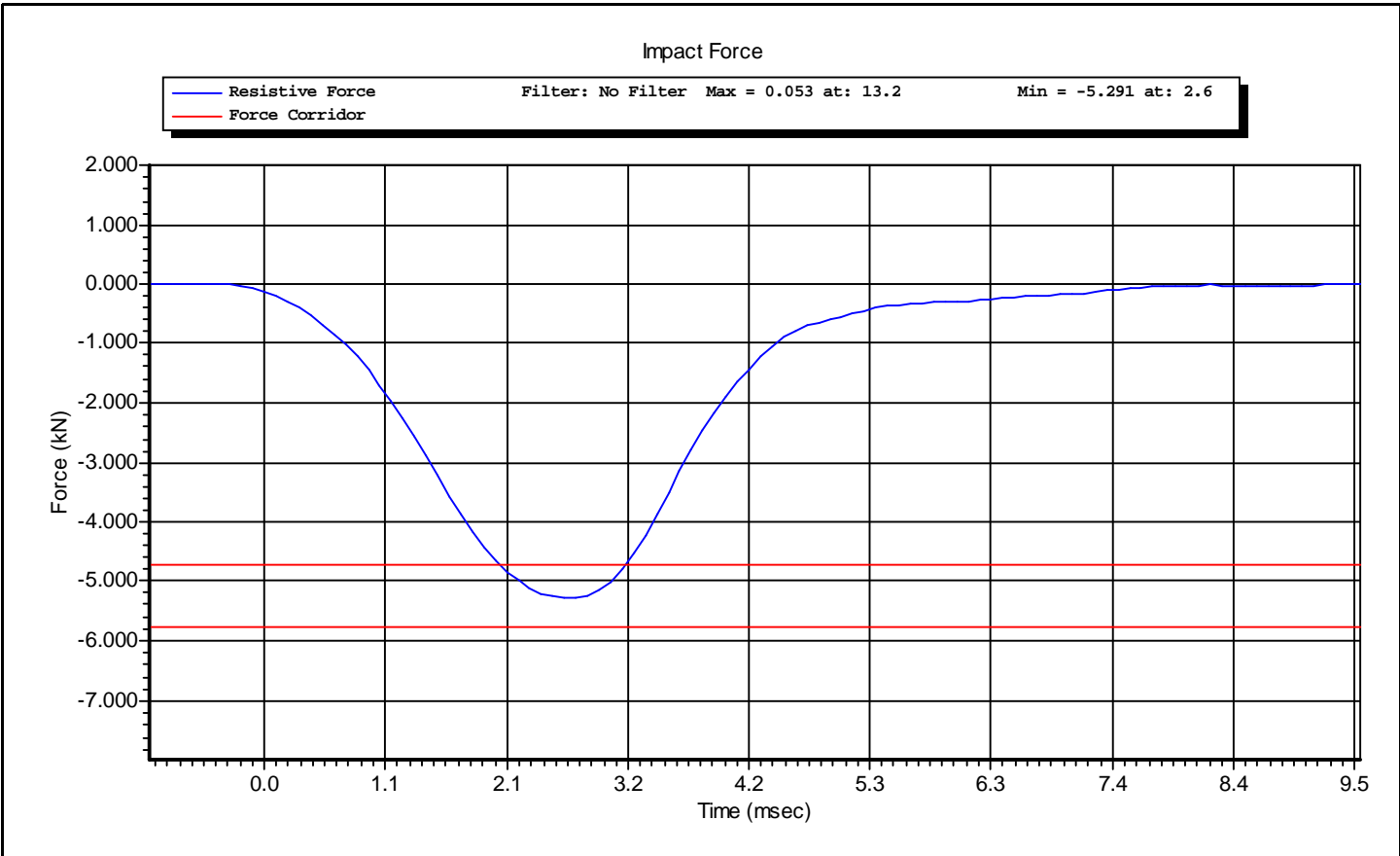
Test ID: **Left Knee**

Test Time: **10:17:36 AM**

Test Date: **1/21/2011**



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:	1/21/2011
Test Number:	1	Test Time:	10:17:36 AM





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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:	1/21/2011
Test Number:	1	Test Time:	9:52:55 AM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	3260

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.0 deg C P
Humidity	10.0 -- 70.0	19.0 %RH P
Velocity	2.07 -- 2.13	2.08 m/s P
Resistive Force	-5.78 -- -4.72	-5.53 kN P

All test parameters are within specifications

Technician: Don Schenk Signature: _____

Supervisor: D. Travale Signature: _____

Test ID: **Right Knee**

Test Time: **9:52:55 AM**

Test Date: **1/21/2011**



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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	1/11/2011
CEC	4-202	AC-A44	8/26/2010

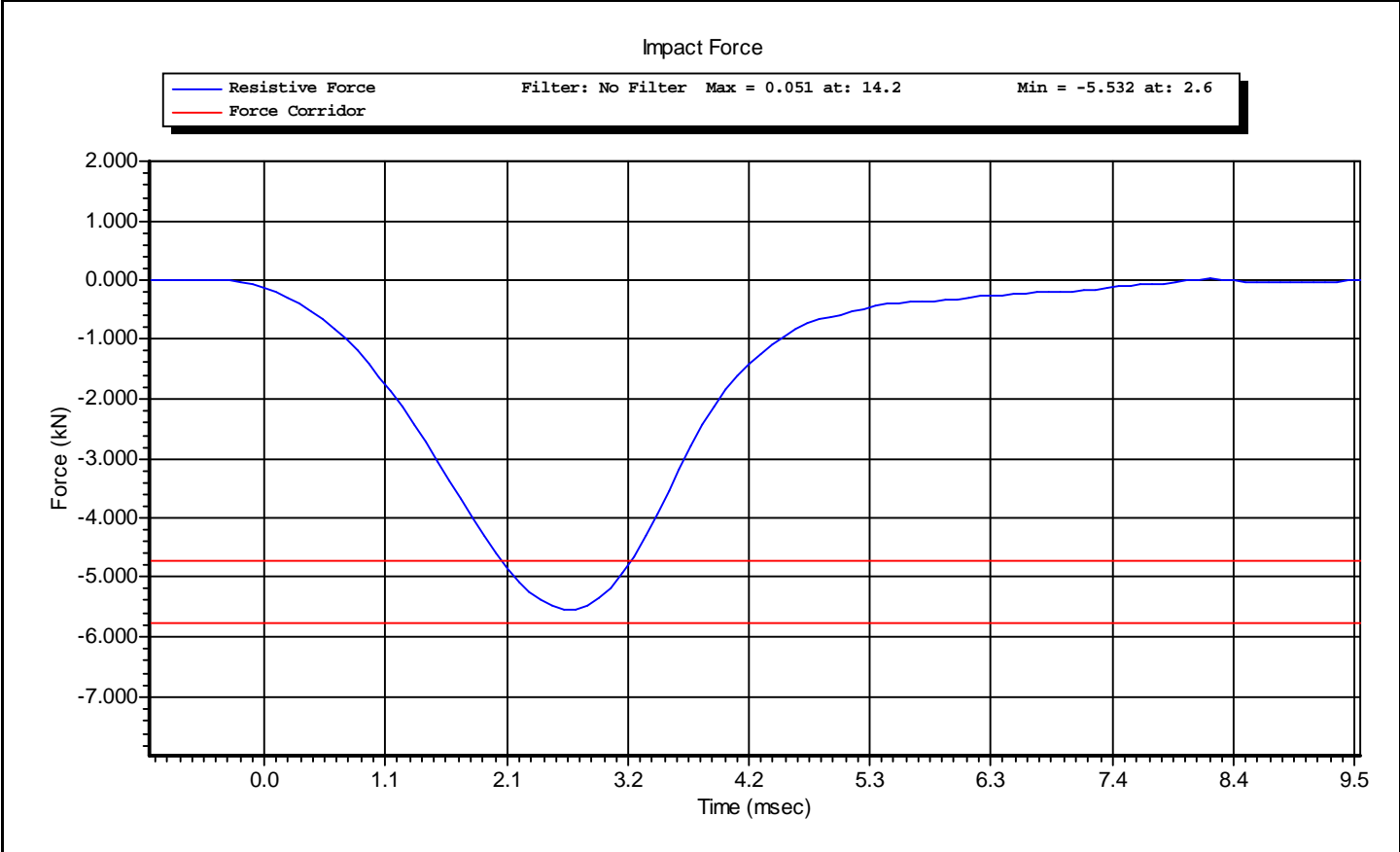
Test ID: **Right Knee**

Test Time: **9:52:55 AM**

Test Date: **1/21/2011**



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:	1/21/2011
Test Number:	1	Test Time:	9:52:55 AM



CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 143

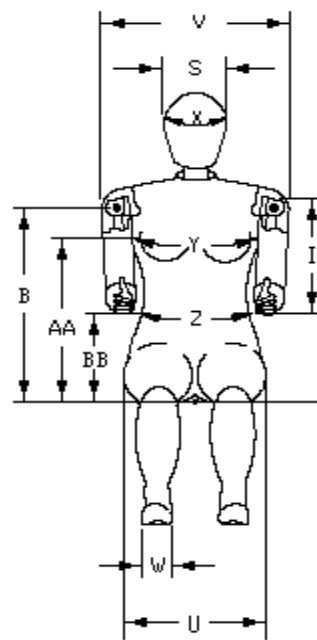
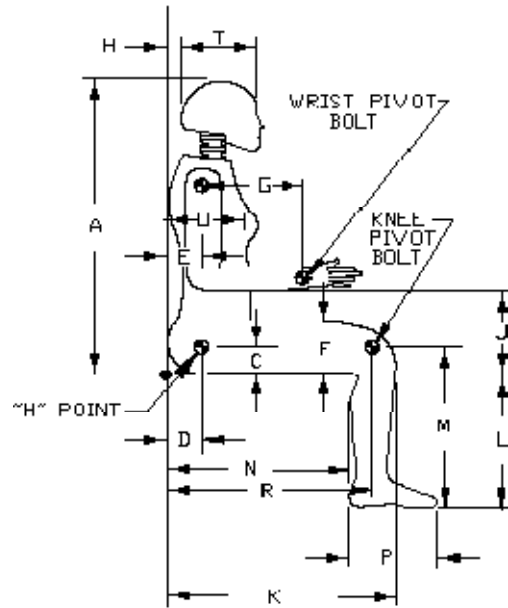
External Measurements - 5th Female

SN 143

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	786	Yes
B	Shoulder Pivot Height	431.8 – 457.2	447	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	128	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	248	Yes
H	Head Back to Backline	43.2 – 48.2	47	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	288	Yes
J	Elbow Rest Height	182.8 – 203.2	195	Yes
K	Buttock to Knee Length	520.7 – 546.1	543	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	402	Yes
N	Buttock Popliteal Length	414 – 439.4	431	Yes
O	Chest Depth without Jacket	175.3 – 190.5	183	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	474	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	184	Yes
U	Hip Breadth	299.7 – 314.9	305	Yes
V	Shoulder Breadth	350.5 – 365.7	361	Yes
W	Foot Breadth	78.8 - 94	86	Yes
X	Head Circumference	528.3 – 548.7	544	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	869	Yes
Z	Waist Circumference	759.5 – 789.9	775	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	338	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Hybrid 3 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Head Drop	Test Date:	1/20/2011
Test Number:	1	Test Time:	2:05:00 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	16 %RH P
Resultant Acceleration	250 -- 300	265 g P
Oscillation	0.0 -- 10.0	1.8 % P
Lateral Acceleration	-15.00 -- 15.00	3.27 g P

All test parameters are within specifications

Technician: Don Schenk Signature: _____

Supervisor: D.Travale Signature: _____

Test ID: **Head Drop**

Test Time: **2:05:00 PM**

Test Date: **1/20/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Head Drop**

Test Time: **2:05:00 PM**

Test Date: **1/20/2011**

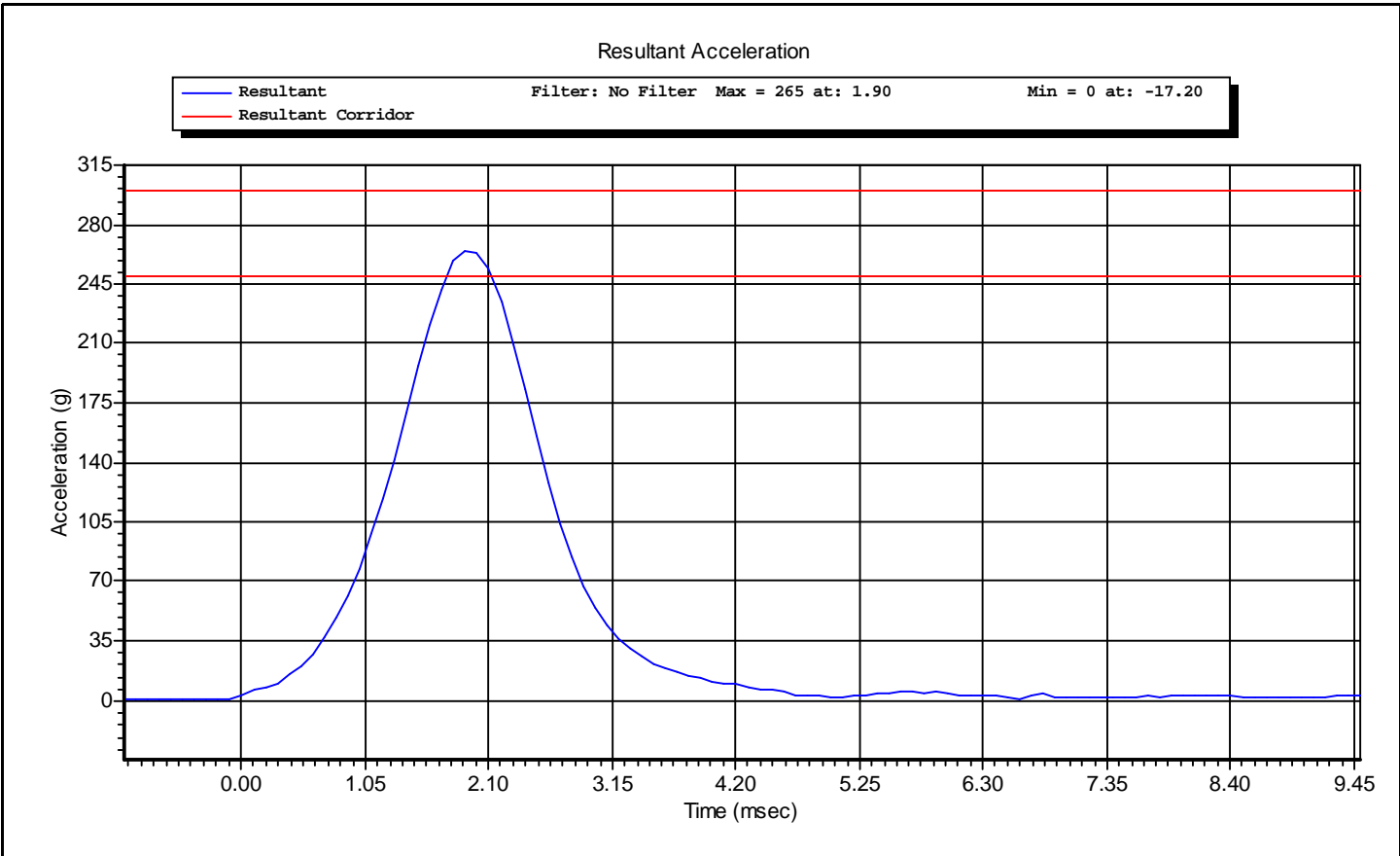


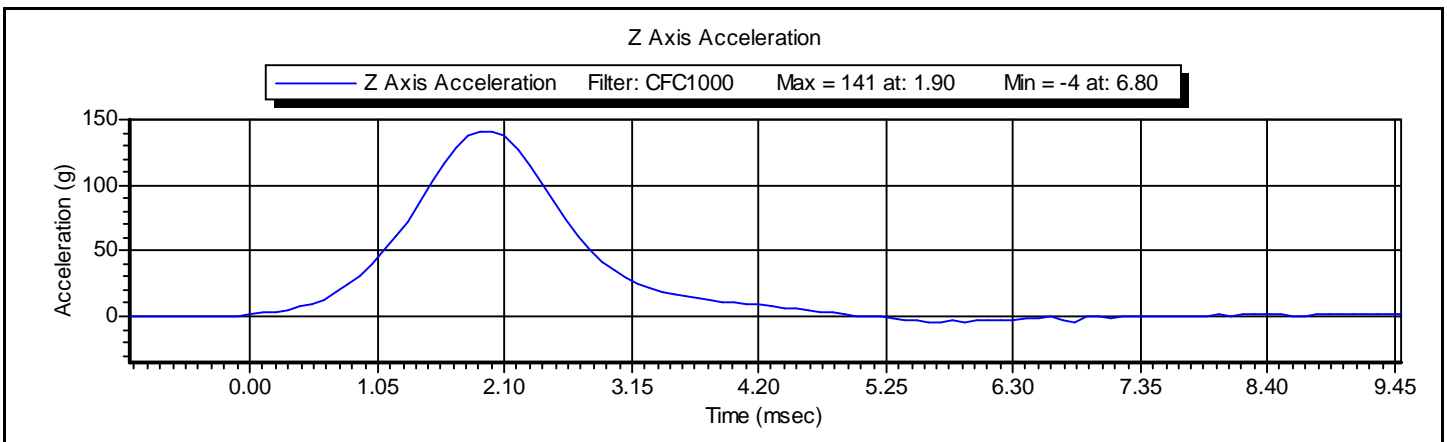
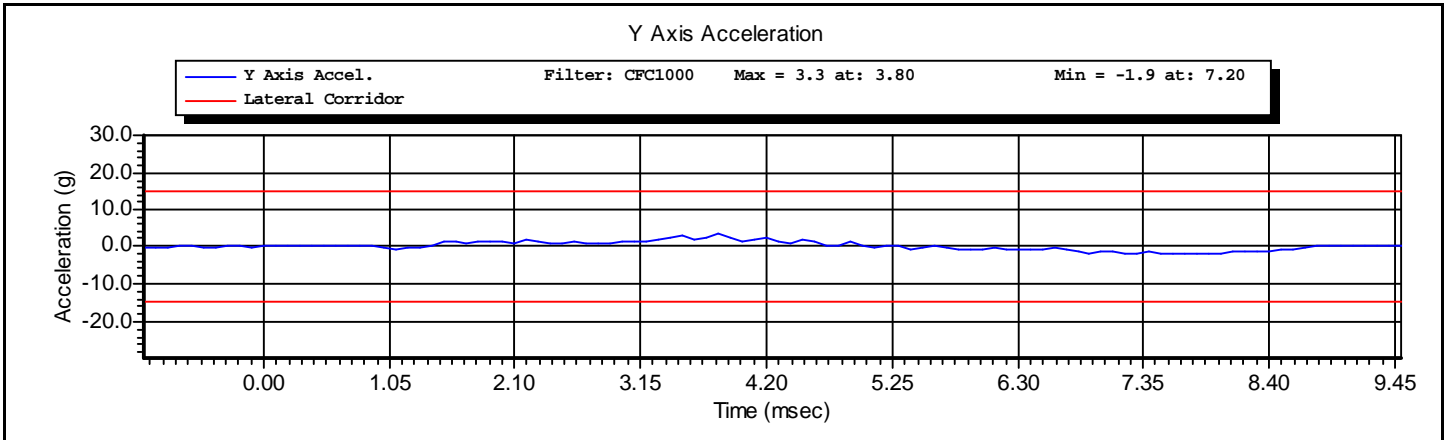
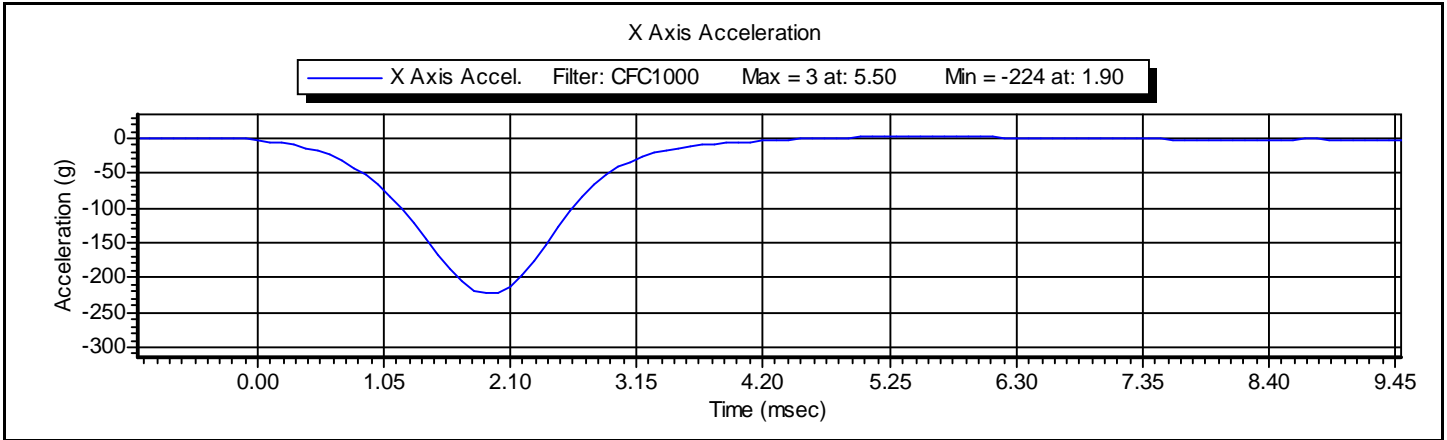
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Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Head Drop	Test Date:	1/20/2011
Test Number:	1	Test Time:	2:05:00 PM







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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Extension	Test Date:	2/7/2011
Test Number:	1	Test Time:	4:07:17 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	5.95 -- 6.19	6.08 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.82 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.55 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.14 m/s P
D Plane Rotation	99.0 -- 114.0	109.2 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-55.0 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	105.6 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **4:07:17 PM**

Test Date: **2/7/2011**



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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	1/11/2011
Endevco	7231CT	C16510	10/21/2010
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	PENDULUM POT	2/7/2011
Denton	1716A	LC-443 My	5/25/2010
Denton	1716A	LC-443 Fx	5/25/2010

Test ID: **Neck Extension**

Test Time: **4:07:17 PM**

Test Date: **2/7/2011**

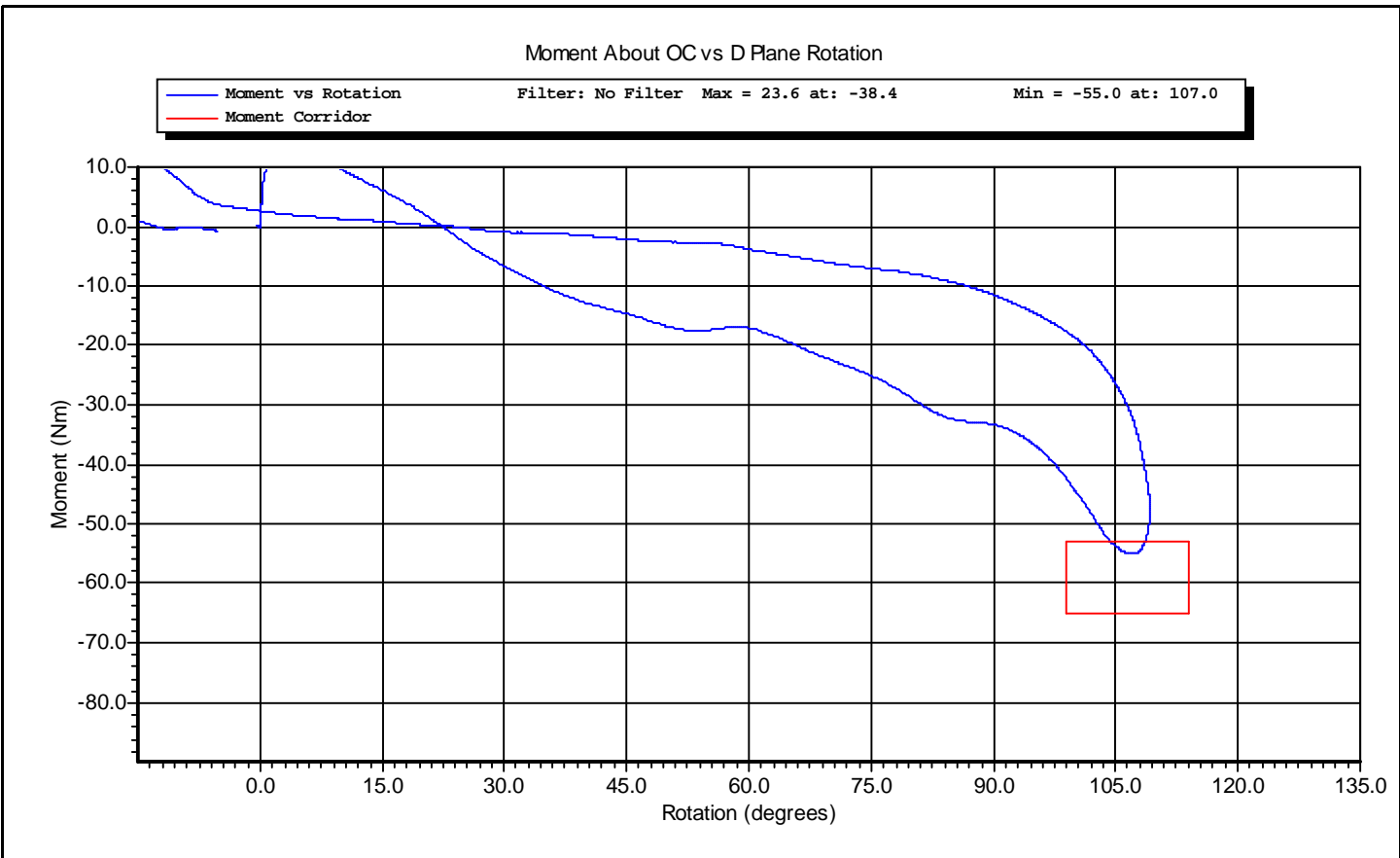


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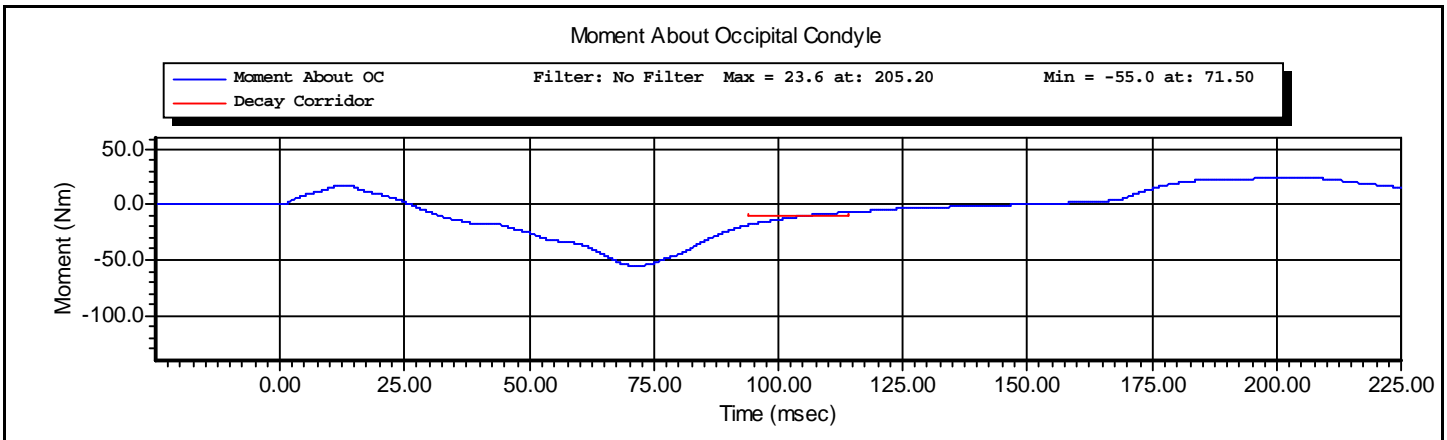
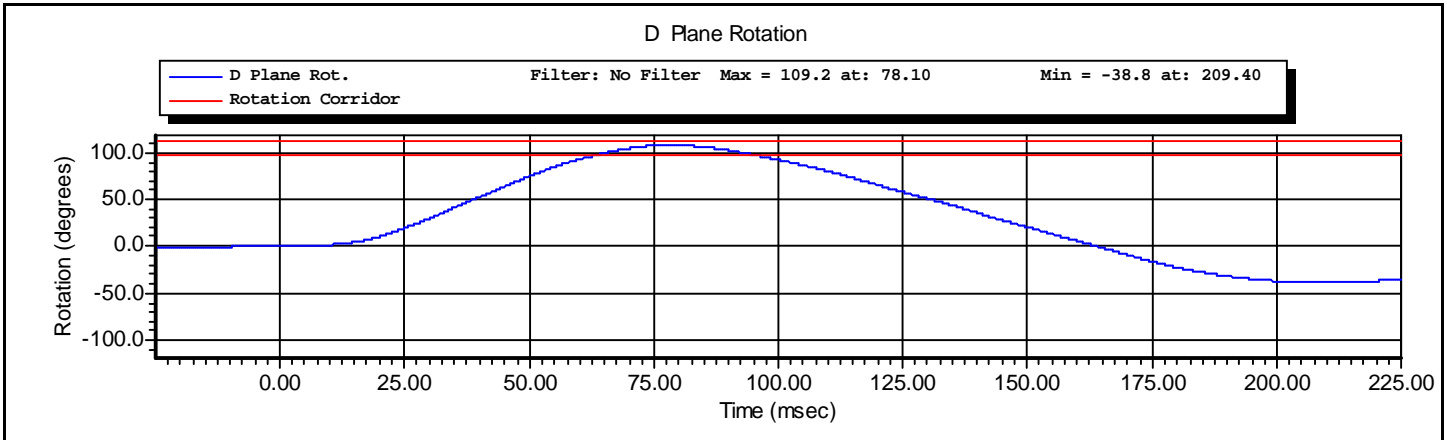
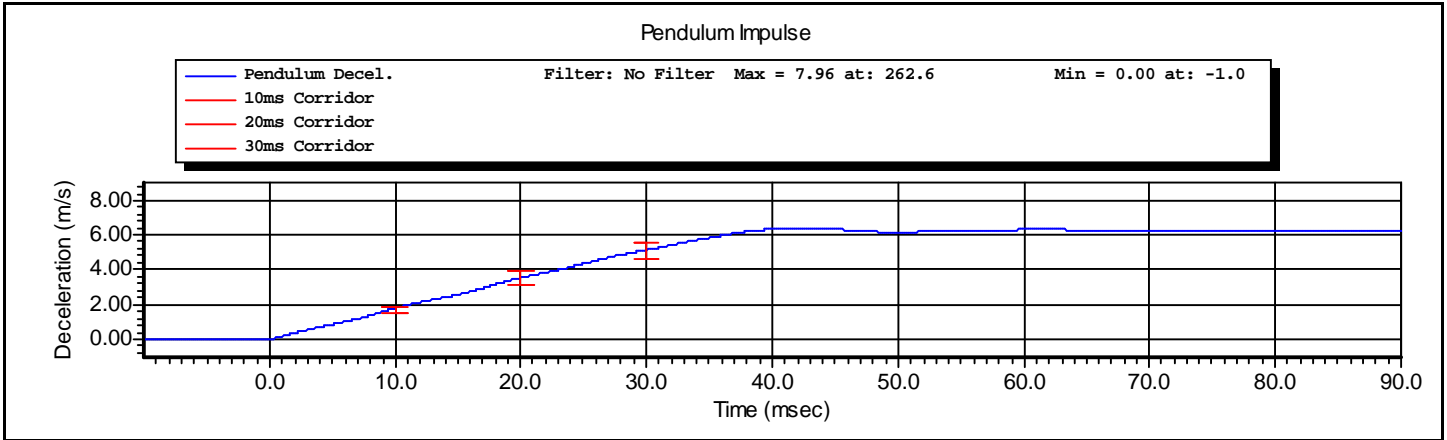
Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Extension	Test Date:	2/7/2011
Test Number:	1	Test Time:	4:07:17 PM



Test ID: **Neck Extension**

Test Time: **4:07:17 PM**

Test Date: **2/7/2011**





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Flexion	Test Date:	2/7/2011
Test Number:	1	Test Time:	3:14:47 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	6.89 -- 7.13	7.09 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.29 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	6.61 m/s P
D Plane Rotation	-91.0 -- -77.0	-79.0 degrees P
Moment During Rotation Interval	69.0 -- 83.0	74.0 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	87.4 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **3:14:47 PM**

Test Date: **2/7/2011**



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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	1/11/2011
Endevco	7231CT	C16510	10/21/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	(NEW CALSPAN S/N C1)	5/25/2010
Denton	1716A	LC-443 My LC-443 Fx	5/25/2010

Test ID: **Neck Flexion**

Test Time: **3:14:47 PM**

Test Date: **2/7/2011**

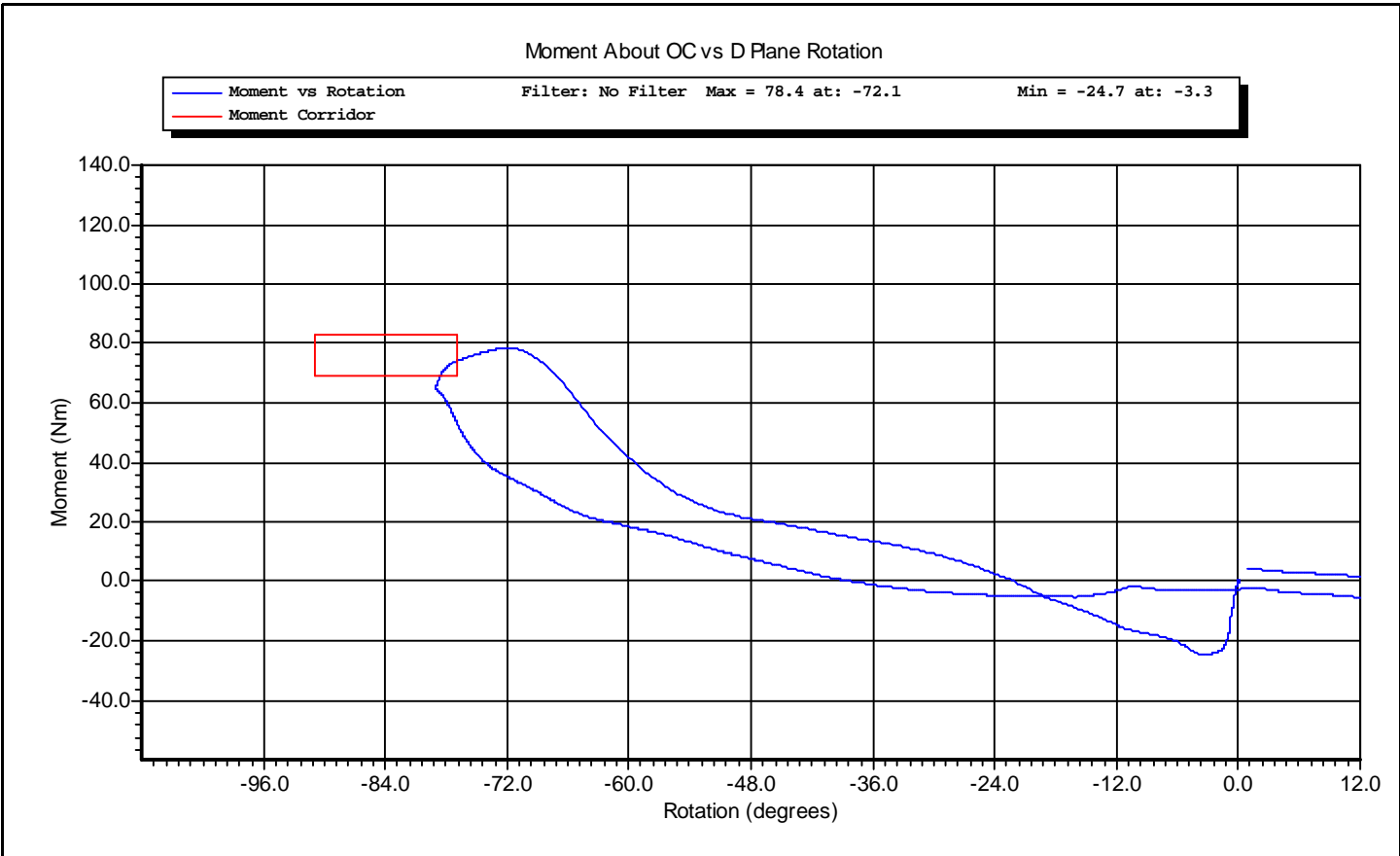


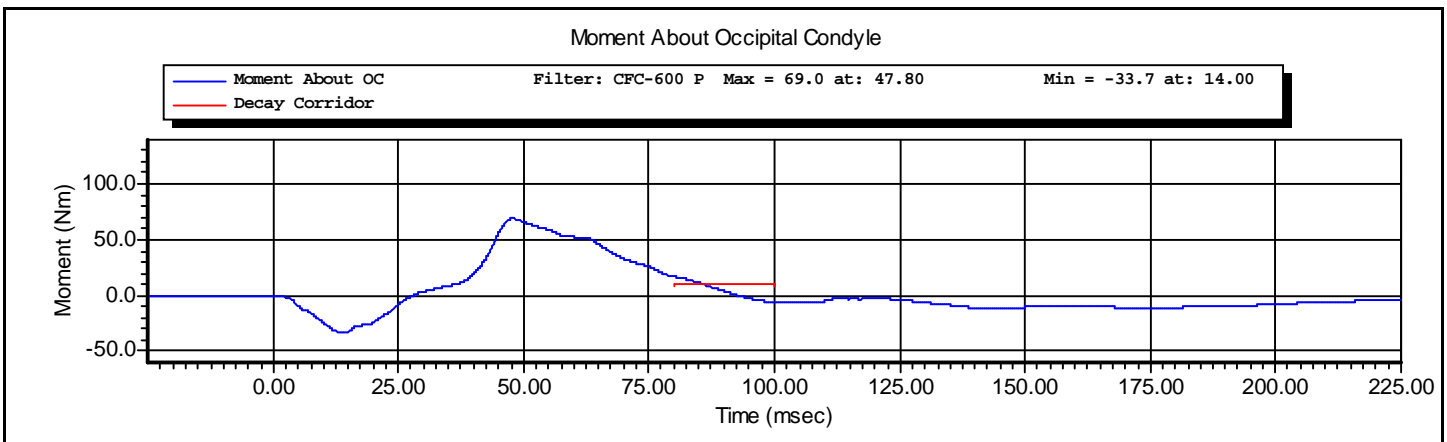
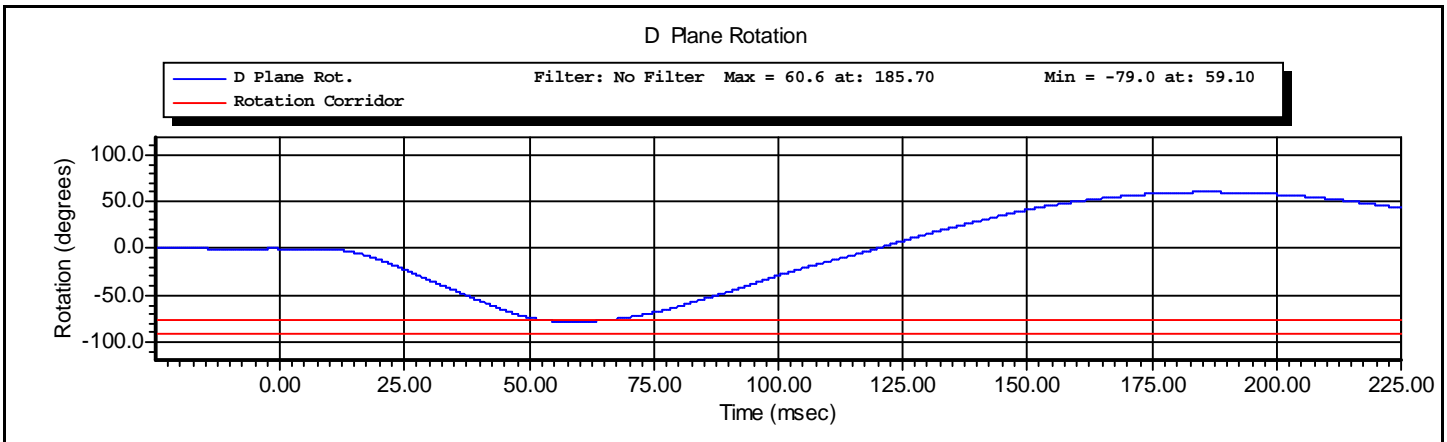
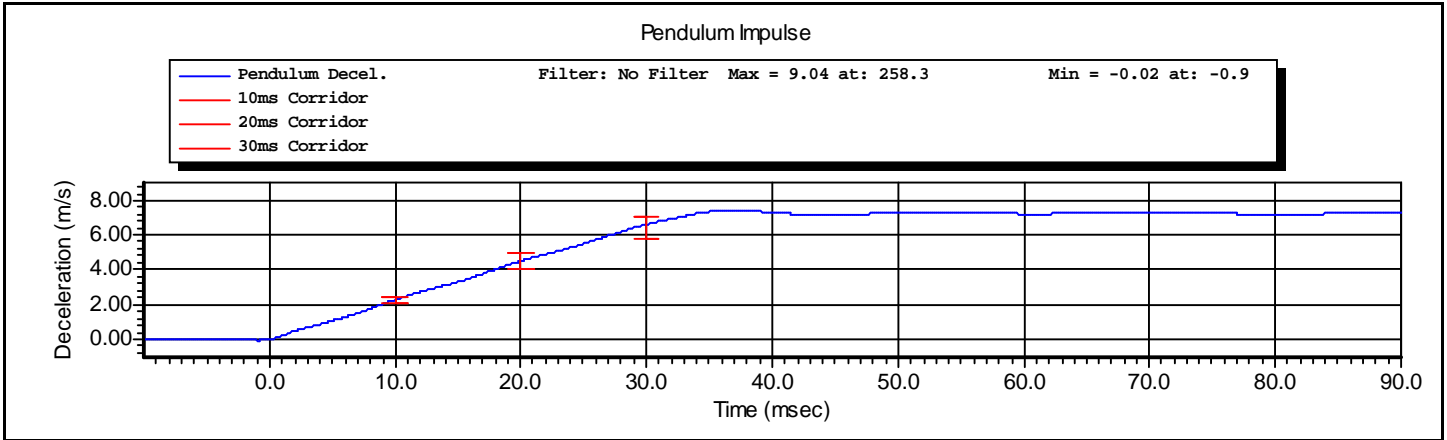
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Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Flexion	Test Date:	2/7/2011
Test Number:	1	Test Time:	3:14:47 PM







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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:	143		
Test ID:	Thorax	Test Date:	1/28/2011
Test Number:	2	Test Time:	10:41:49 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	33.0 %RH P
Velocity	6.59 -- 6.83	6.68 m/s P
Sternum Displacement	-58.0 -- -50.0	-53.6 mm P
Force During Displacement Interval	-4400 -- -3900	-4339 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-4304 N P
Hysteresis	69 -- 85	72 % P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **10:41:49 AM**

Test Date: **1/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

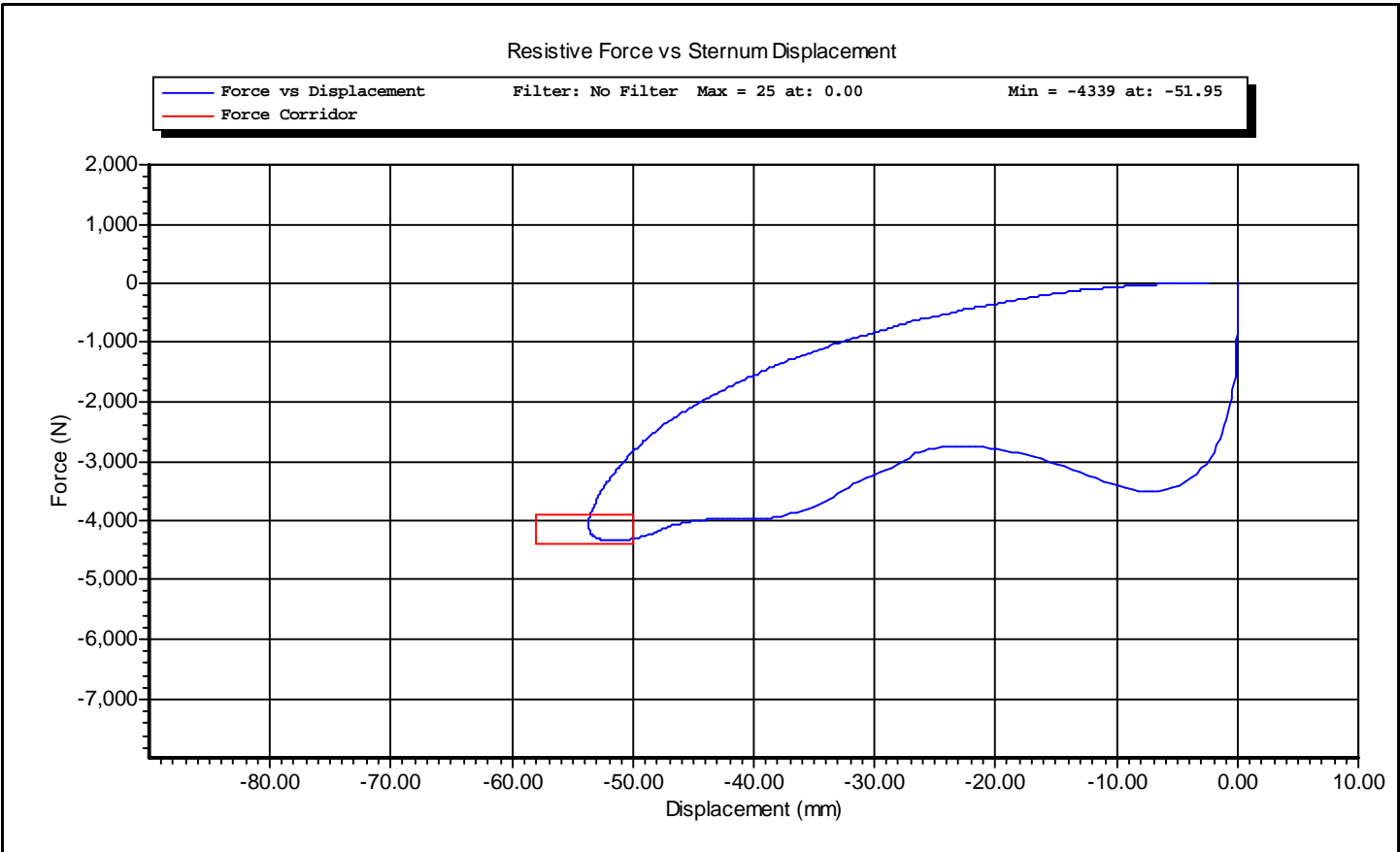
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P66930	10/5/2010
DentonATD	78051-342	DS-143G	6/2/2010

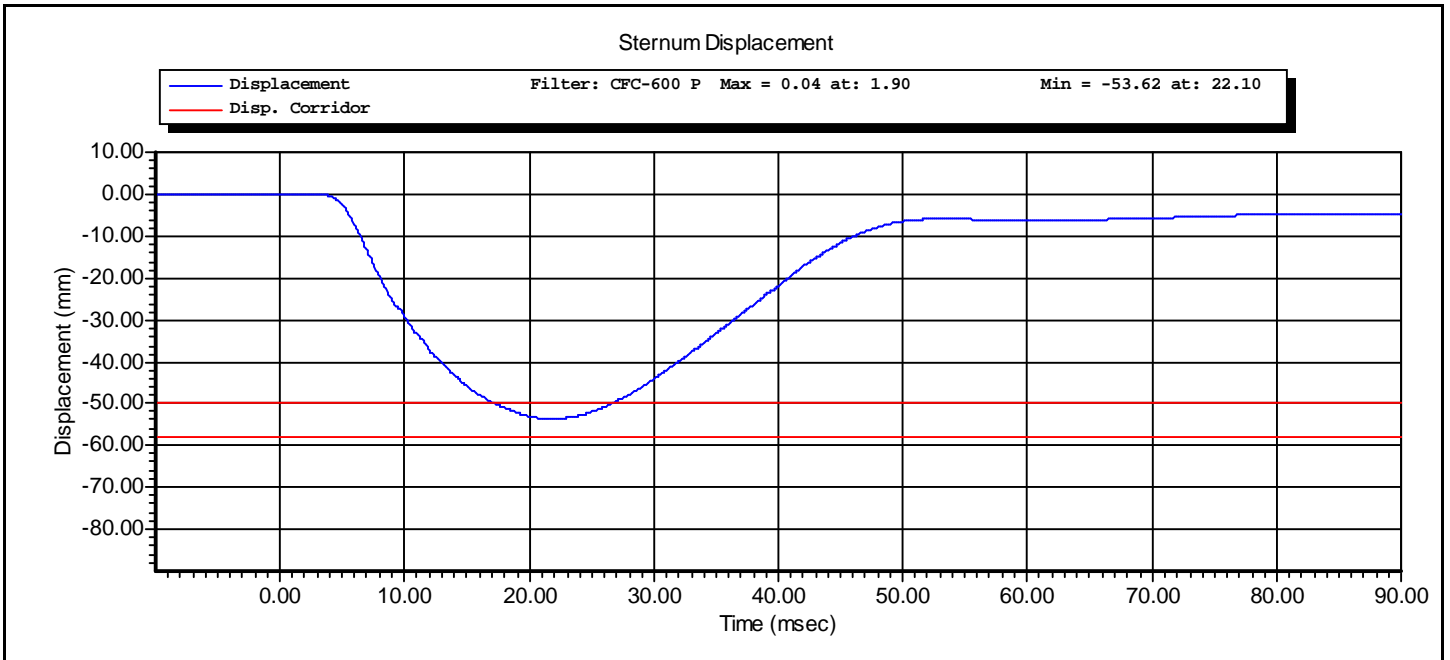
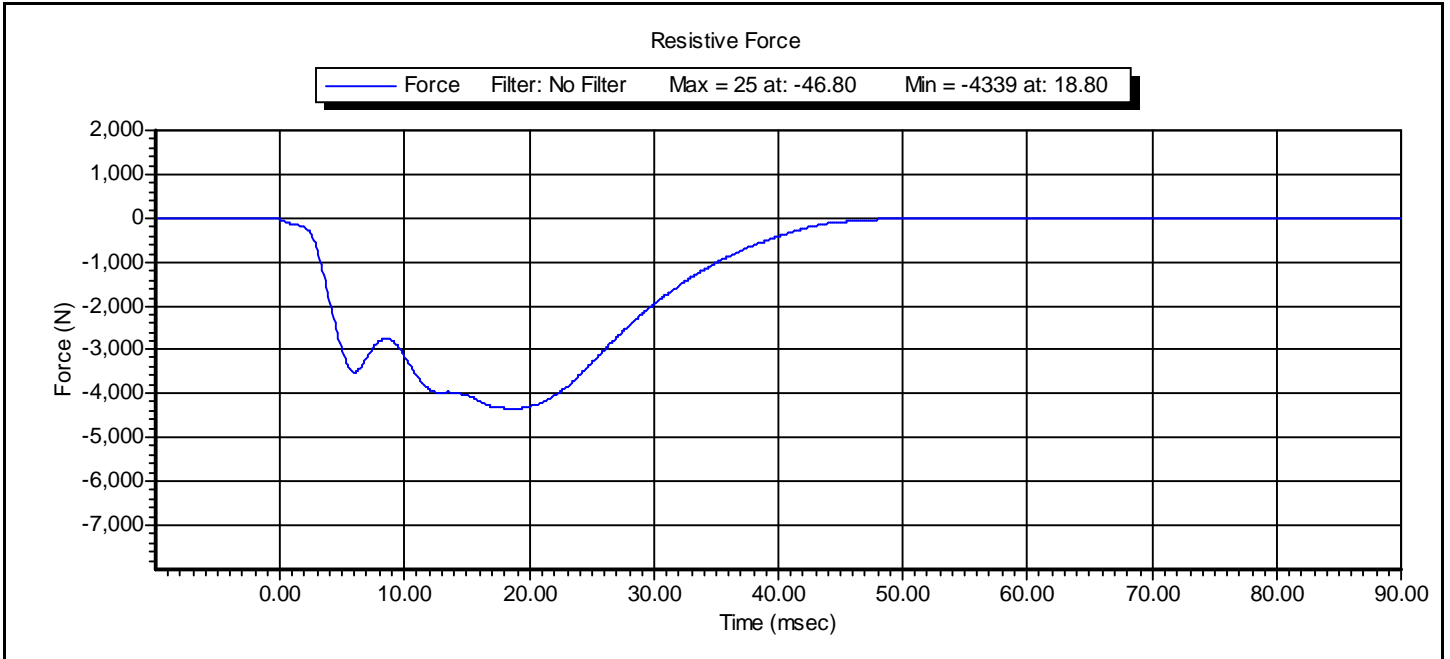
Test ID: **Thorax**

Test Time: **10:41:49 AM**

Test Date: **1/28/2011**

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Thorax	Test Date:	1/28/2011
Test Number:	2	Test Time:	10:41:49 AM







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Torso Flexion Test

Technician: AR

Calibration Date: 1/28/2011

ATD Serial Number: 5th Female 143

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	21.7° C	P
Lab Humidity: 38%	10-70%	28%	P
Max Force @ 45 deg	320 – 390N	365N	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	19°	P

P = Pass

F = Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Left Knee	Test Date:	1/20/2011
Test Number:	1	Test Time:	11:09:59 AM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	18.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-4060 -- -3450	-3613 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **11:09:59 AM**

Test Date: **1/20/2011**



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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	1/11/2011
CEC	4-202	AC-A44	8/26/2010

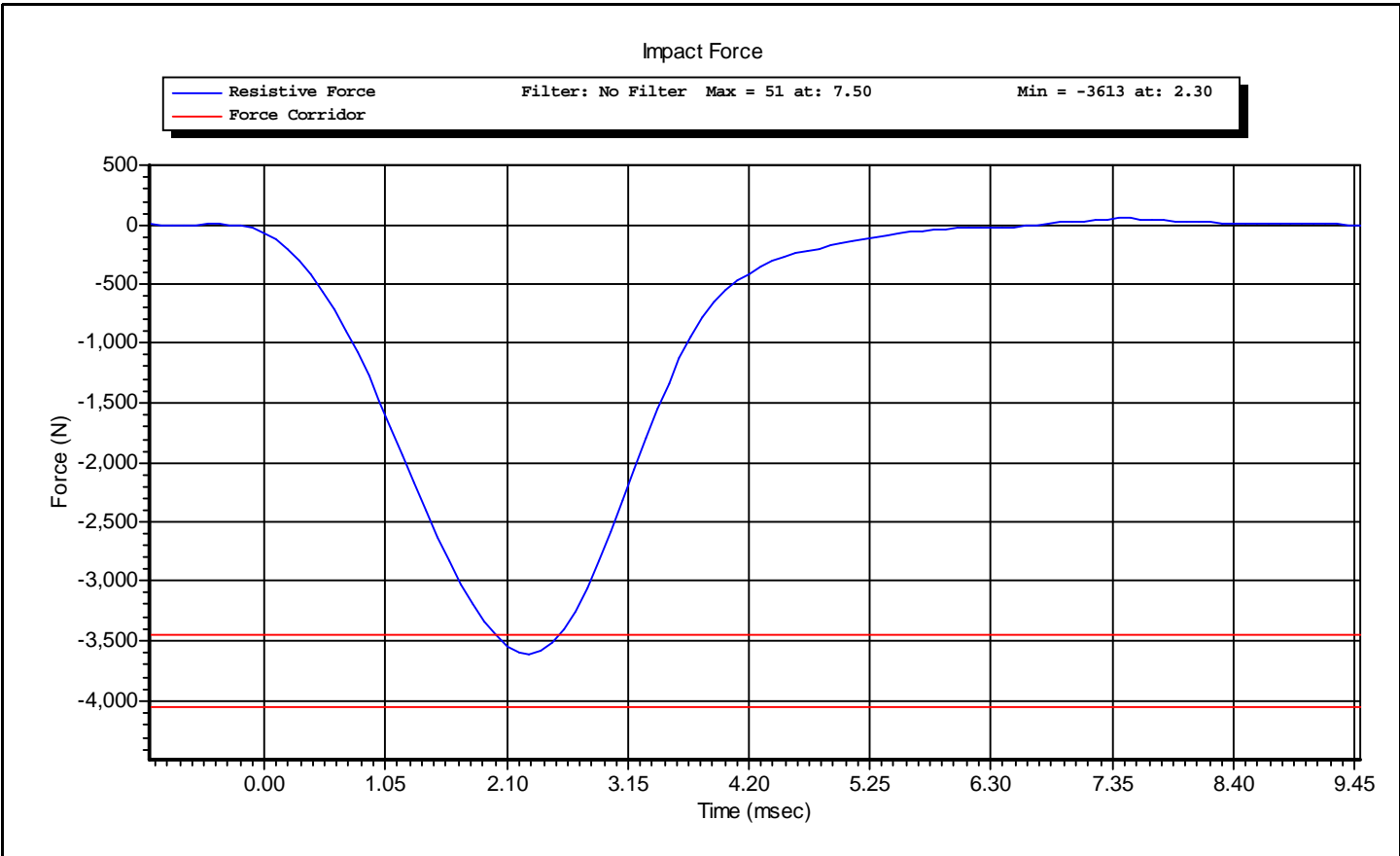
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Test Time: **11:09:59 AM**

Test Date: **1/20/2011**



Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Left Knee	Test Date:	1/20/2011
Test Number:	1	Test Time:	11:09:59 AM





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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:	143		
Test ID:	Right Knee	Test Date:	1/20/2011
Test Number:	1	Test Time:	11:25:20 AM

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	18.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-4060 -- -3450	-3724 N P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **11:25:20 AM**

Test Date: **1/20/2011**



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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	1/11/2011
CEC	4-202	AC-A44	8/26/2010

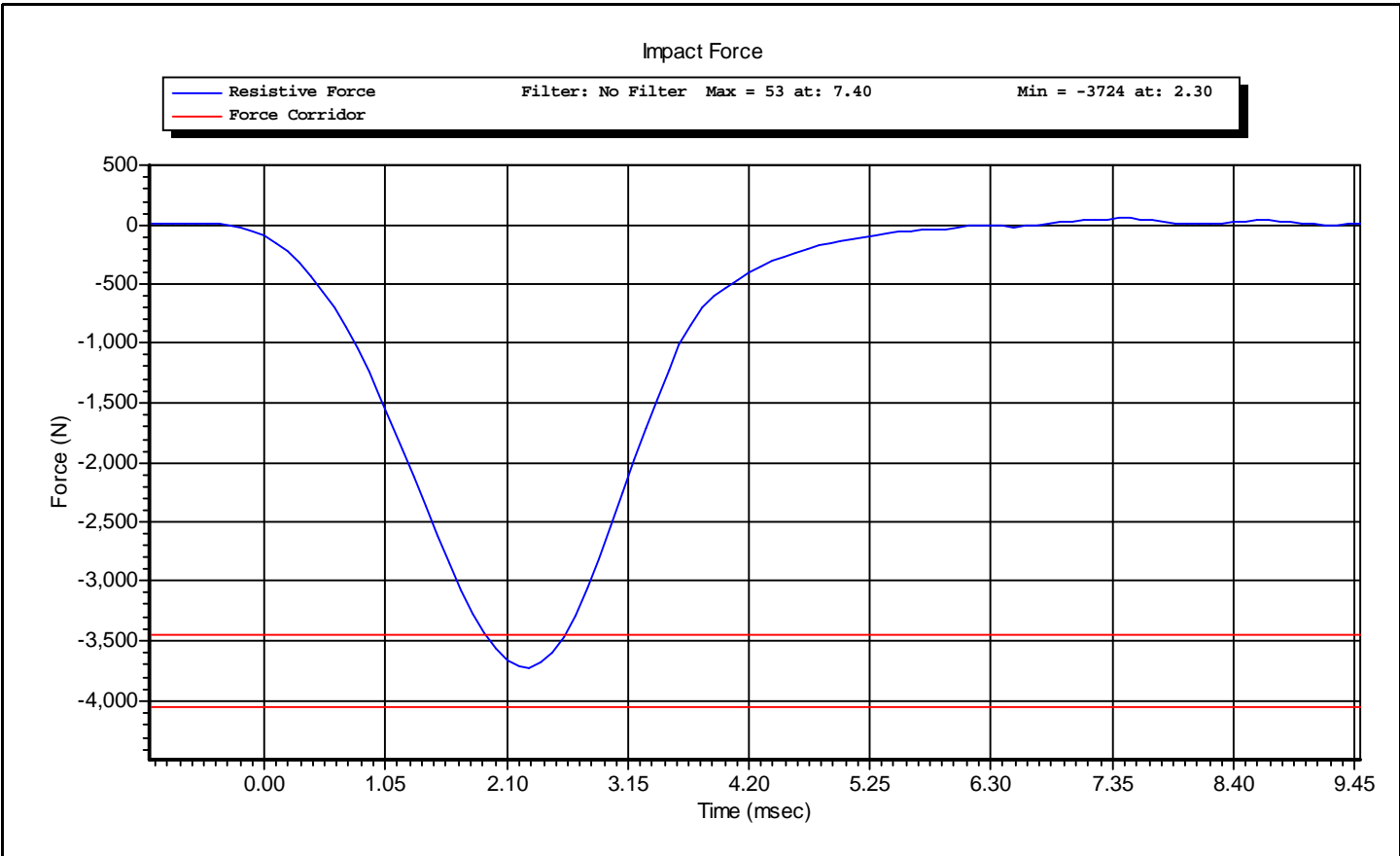
Test ID: **Right Knee**

Test Time: **11:25:20 AM**

Test Date: **1/20/2011**



Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Right Knee	Test Date:	1/20/2011
Test Number:	1	Test Time:	11:25:20 AM



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	20.1	Yes
C	H-Point Height	3.3 - 3.5	3.4	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	5.9	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	13.2	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	16.9	Yes
W	Foot Breadth	3.6 - 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 - 39.4	38.6	Yes
Z	Waist Circumference	32.9 - 34.1	33.4	Yes
AA	Reference Location (Chest Circumference)	16.9 - 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 - 9.1	9.0	Yes

Technician: AR

Date: 03/02/2011



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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:	3/21/2011
Test Number:	2	Test Time:	1:45:41 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	02-20544
Skull - 78051-77X	0201
Skull Cap - 78051-220	1981
Cap Skin - 78051-229	20496

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.7 deg C P
Humidity	10 -- 70	34 %RH P
Resultant Acceleration	225 -- 275	256 g P
Oscillation	0.0 -- 10.0	0.0 % P
Lateral Acceleration	-15.00 -- 15.00	-2.42 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **1:45:41 PM**

Test Date: **3/21/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P66931	3/21/2011
Endevco	7264-2000	P66926	3/21/2011
Endevco	7264-2000	P66943	3/21/2011

Test ID: **Head Drop**

Test Time: **1:45:41 PM**

Test Date: **3/21/2011**

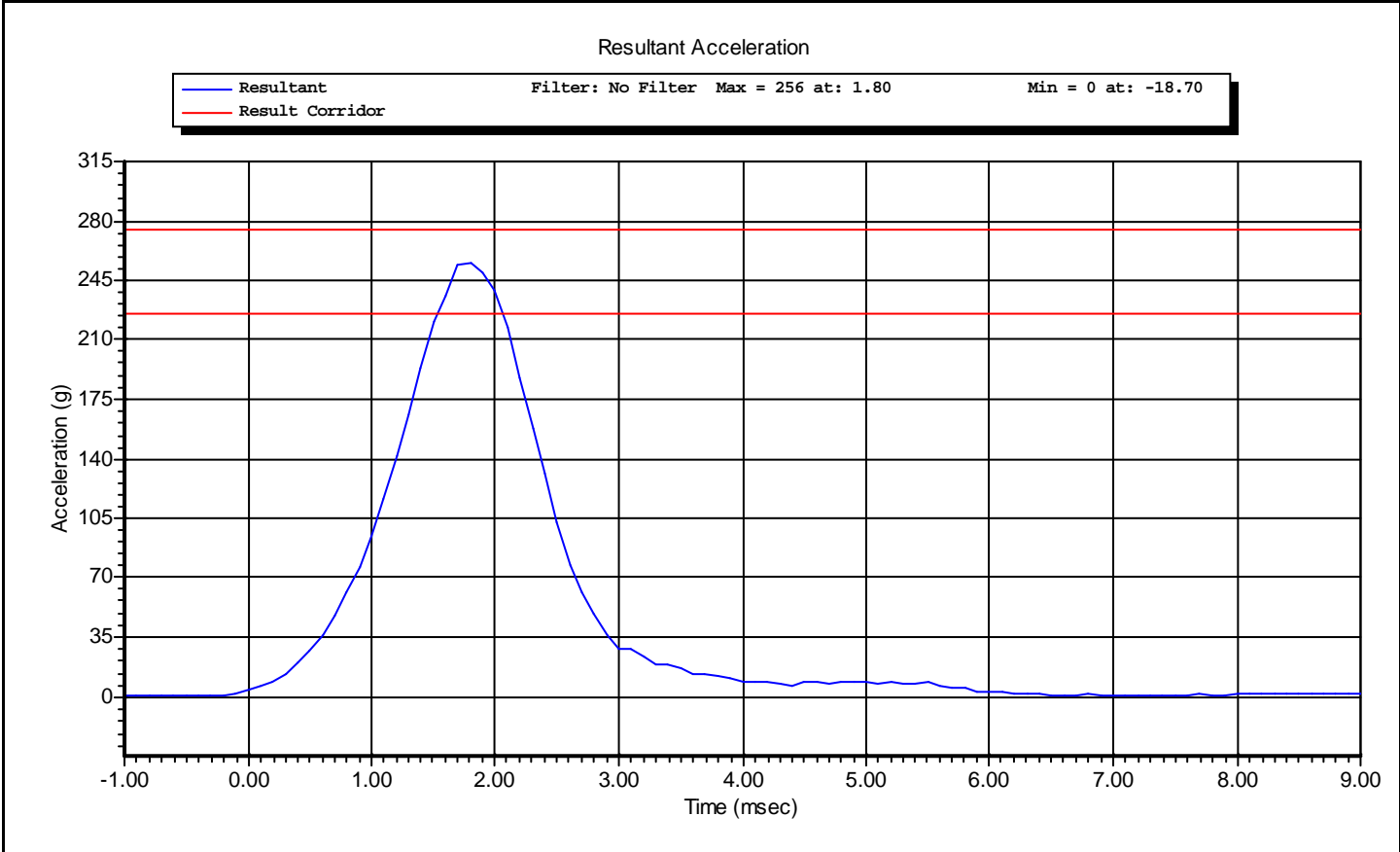


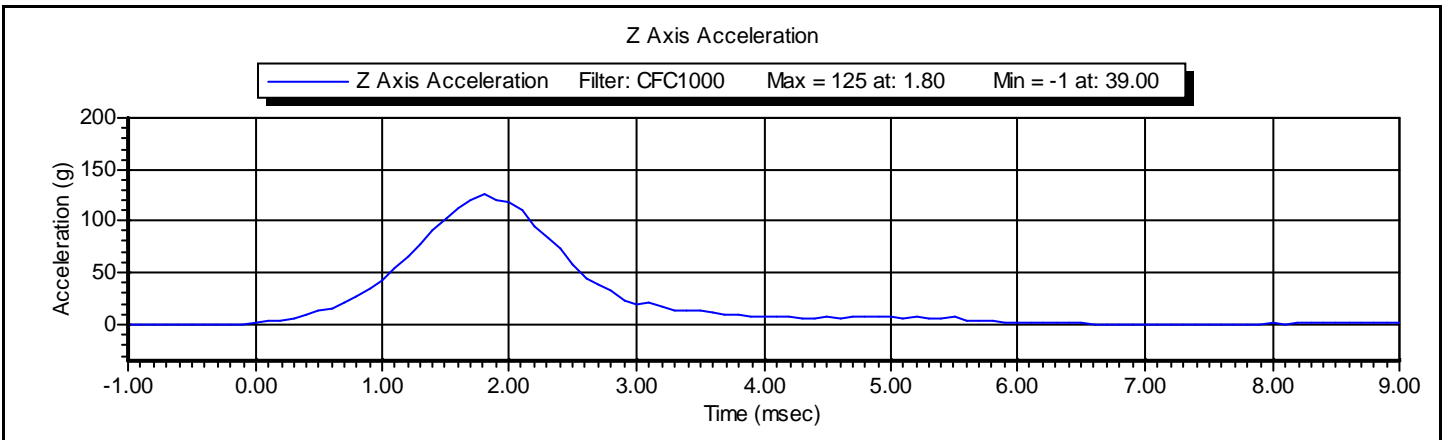
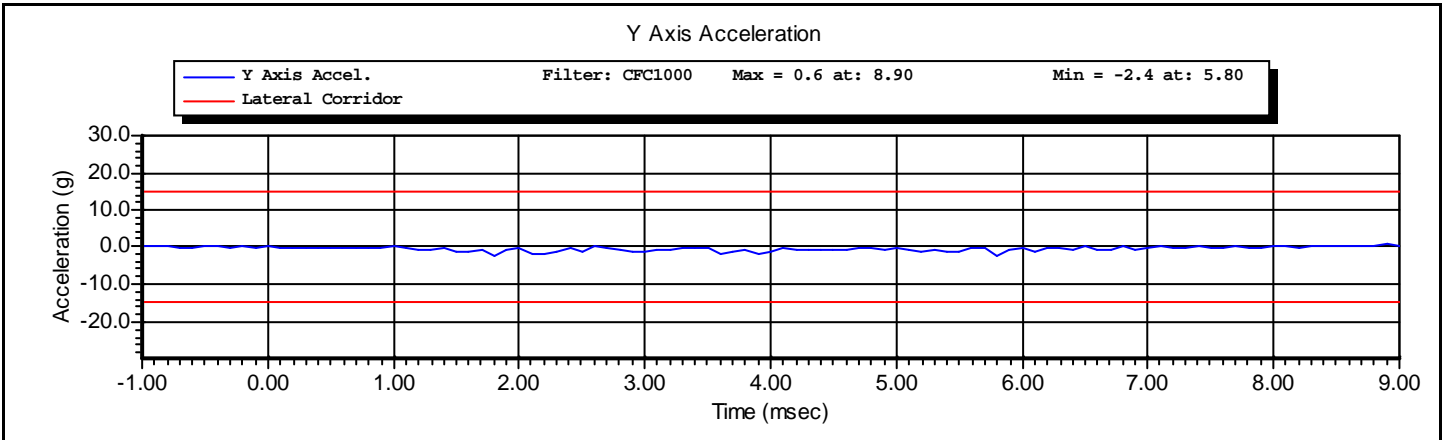
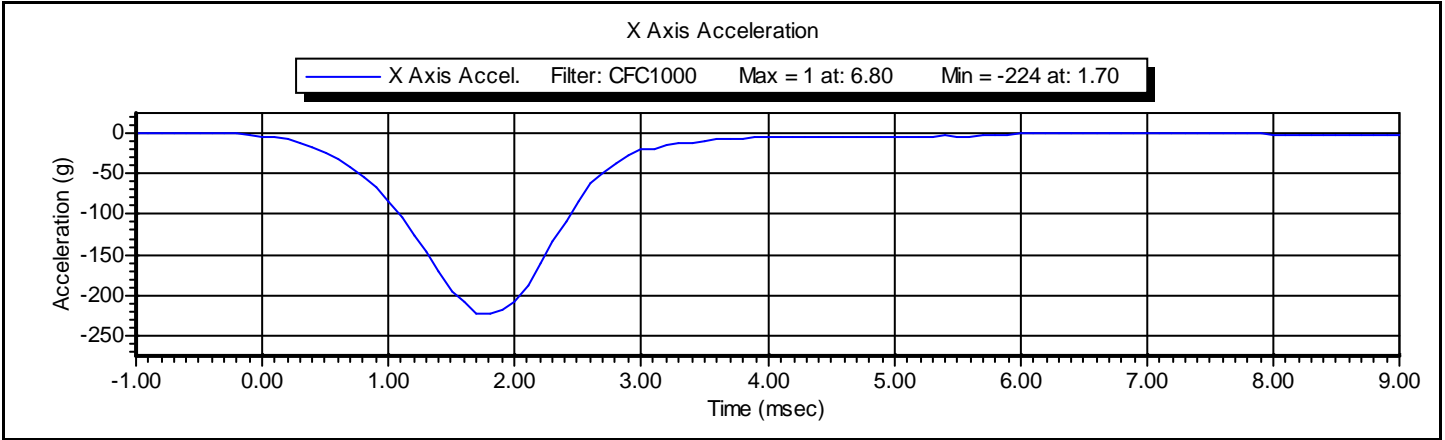
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Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	3/21/2011
Test Number:	2	Test Time:	1:45:41 PM







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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:	3/1/2011
Test Number:	2	Test Time:	2:31:26 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	22.0 deg C P
Humidity	10 -- 70	21 %RH P
Velocity	5.94 -- 6.19	6.11 m/s P
Pendulum Deceleration at 10 ms	17.2 -- 21.2	20.1 g P
Pendulum Deceleration at 20 ms	14.0 -- 19.0	17.6 g P
Pendulum Deceleration at 30 ms	11.0 -- 16.0	15.1 g P
Max Pendulum Deceleration after 30 ms	0.0 -- 22.0	16.4 g P
Decel Time to 5 g	38.0 -- 46.0	39.0 ms P
D Plane Rotation	81.0 -- 106.0	89.8 degrees P
Time at Max Rotation	72.0 -- 82.0	76.2 ms P
Rotation Decay to Zero	147.0 -- 174.0	155.3 ms P
Moment About Occipital Condyle	-80.0 -- -52.9	-73.4 Nm P
Time at Max Moment	65.0 -- 79.0	72.7 ms P
Moment Decay to Zero	120.0 -- 148.0	139.8 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **2:31:26 PM**

Test Date: **3/1/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

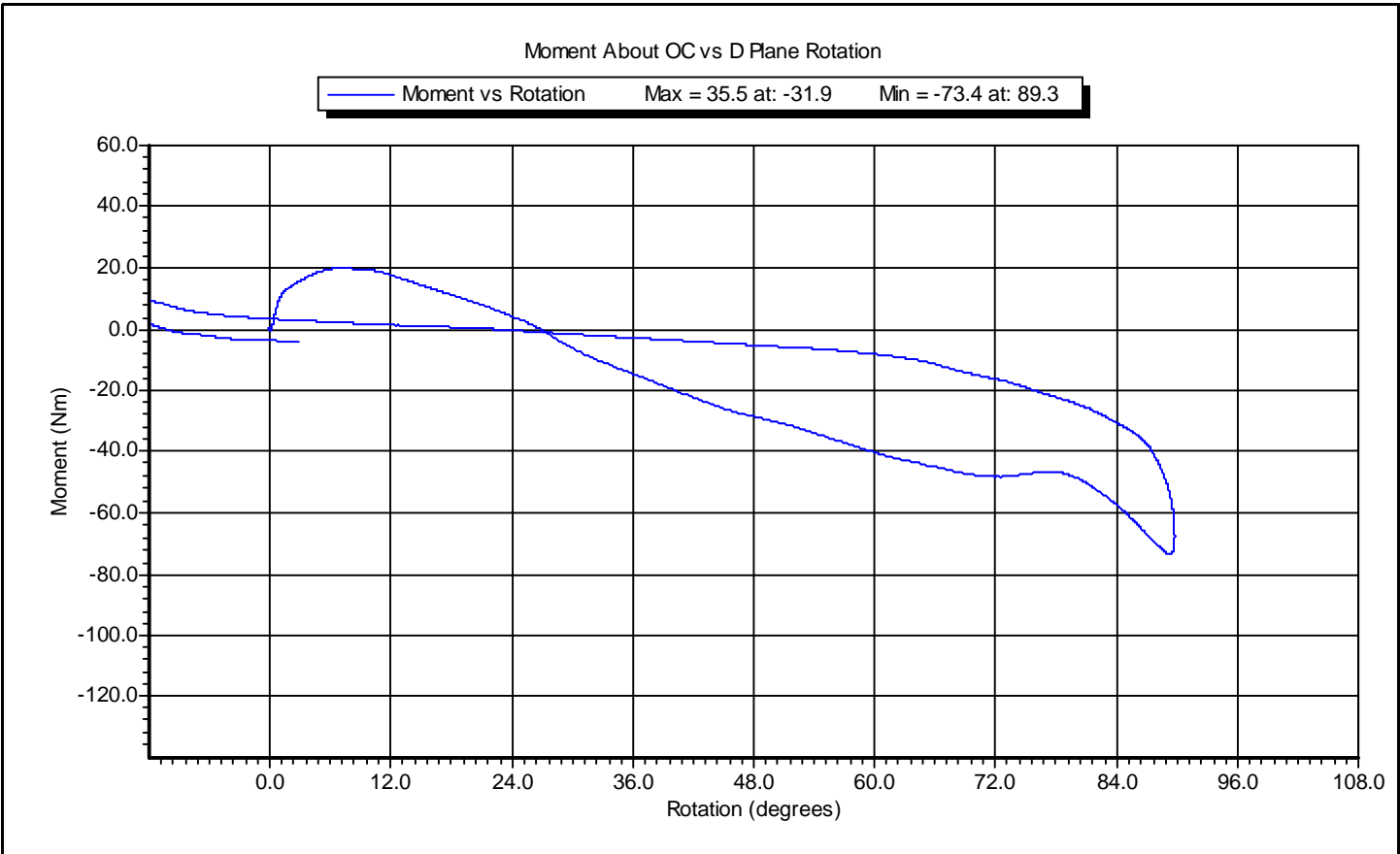
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DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/21/2010
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1916 My	11/18/2010
Denton	1716A	LC-1916 Fx	11/18/2010

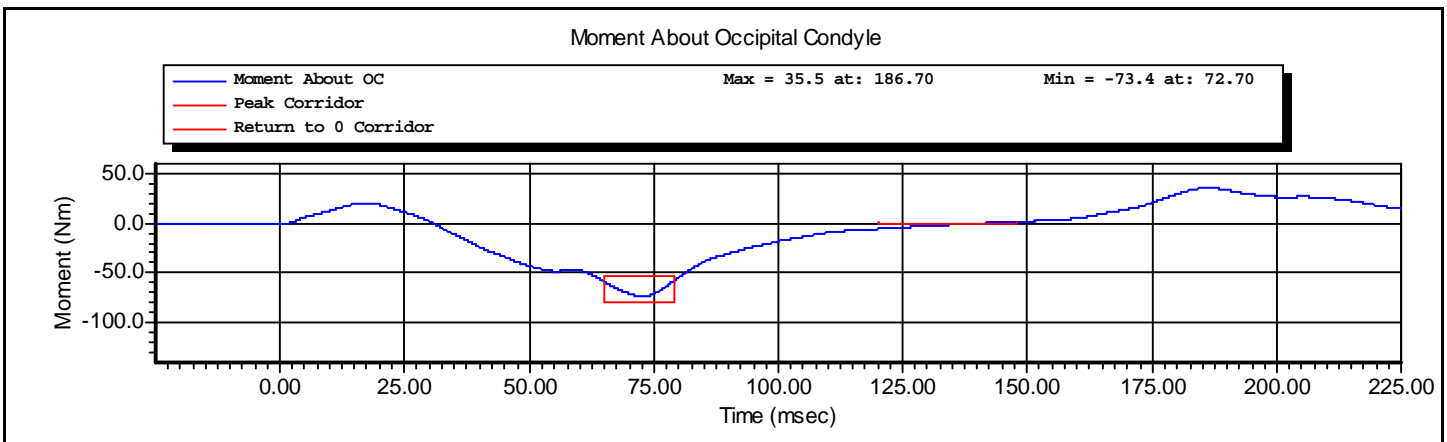
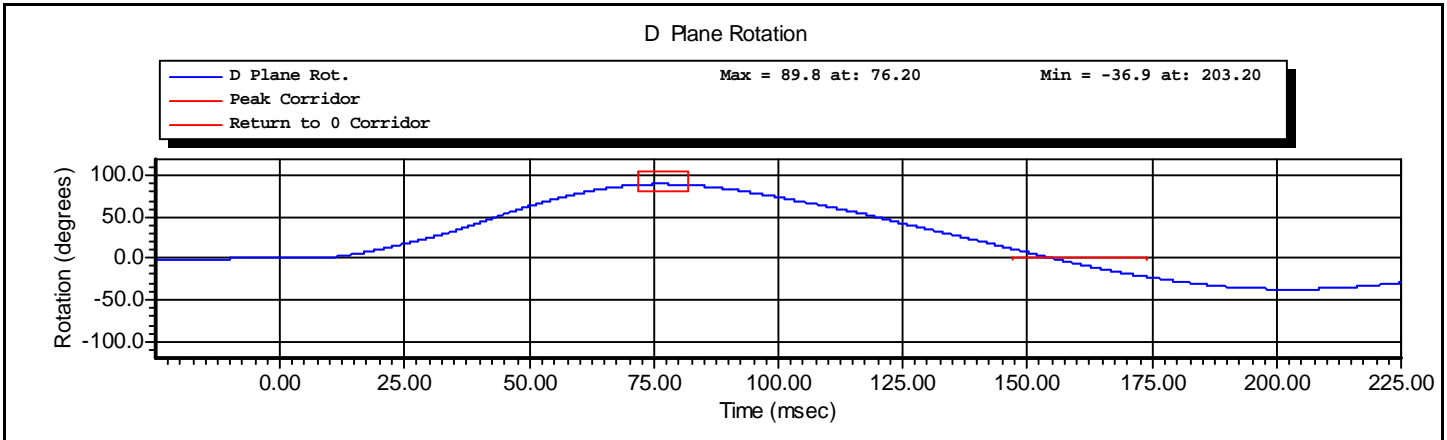
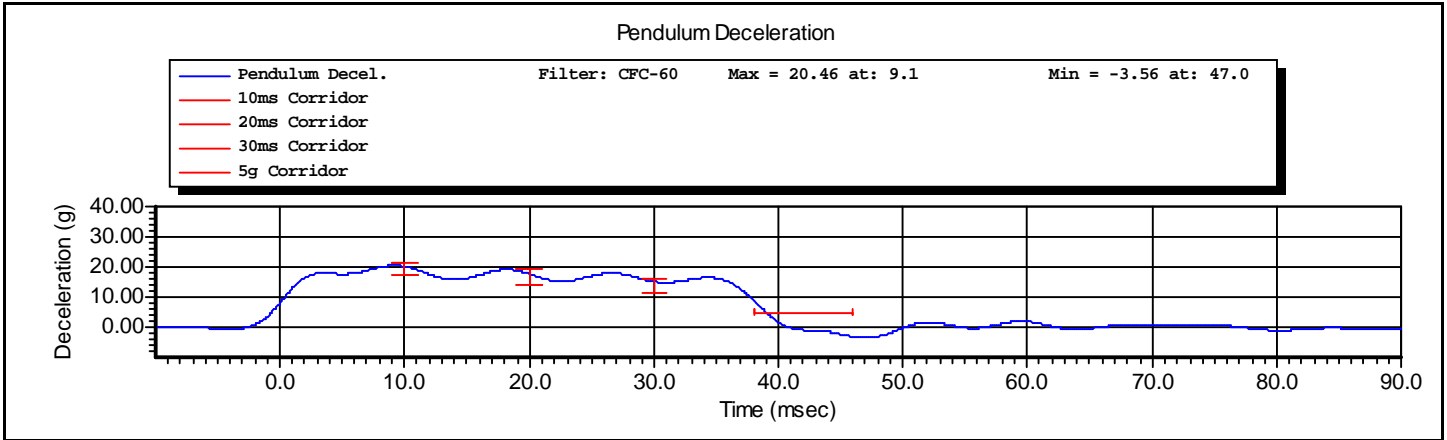
Test ID: **Neck Extension**

Test Time: **2:31:26 PM**

Test Date: **3/1/2011**

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:	3/1/2011
Number of Test:	2	Time of Test:	2:31:26 PM







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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:	3/1/2011
Test Number:	1	Test Time:	11:45:04 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	21.8 deg C	P
Humidity		10	-- 70	22 %RH	P
Velocity		6.89	-- 7.13	7.10 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	24.6 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.3 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	17.7 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	17.7 g	P
Deceleration time to	5 g	34.0	-- 42.0	38.8 ms	P
D Plane Rotation		-78.0	-- -64.0	-69.0 degrees	P
Time at max rotation		57.0	-- 64.0	61.3 ms	P
Rotation Decay to Zero		113.0	-- 128.0	121.5 ms	P
Moment about OC		88.1	-- 108.4	94.3 Nm	P
Time at Max Moment		47.0	-- 58.0	51.7 ms	P
Moment Decay to Zero		97.0	-- 107.0	100.9 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **11:45:04 AM**

Test Date: **3/1/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

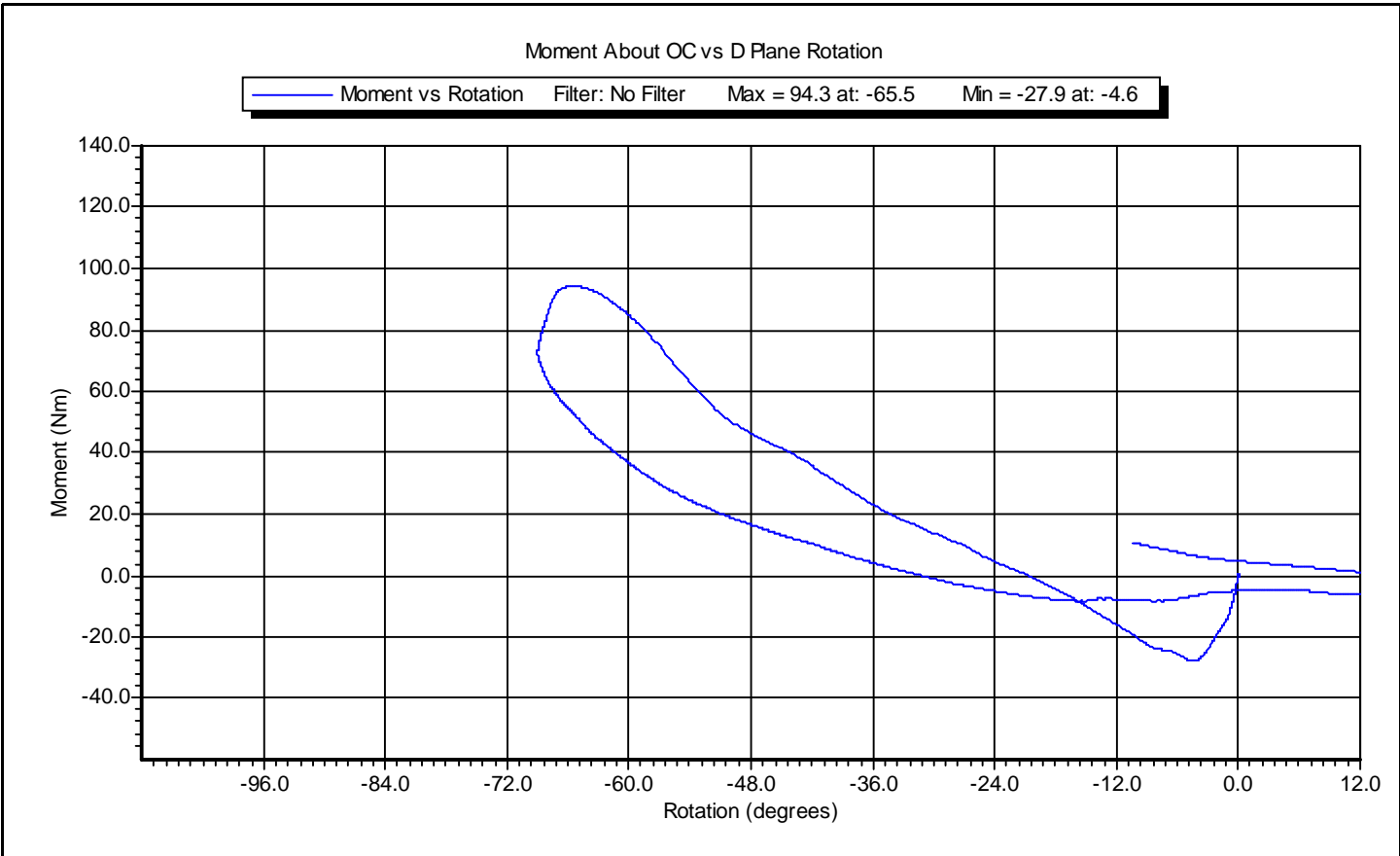
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/21/2010
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-1916 My	11/18/2010
Denton	1716A	LC-1916 Fx	11/18/2010
Endevco	7231CT	P35758	10/5/2010

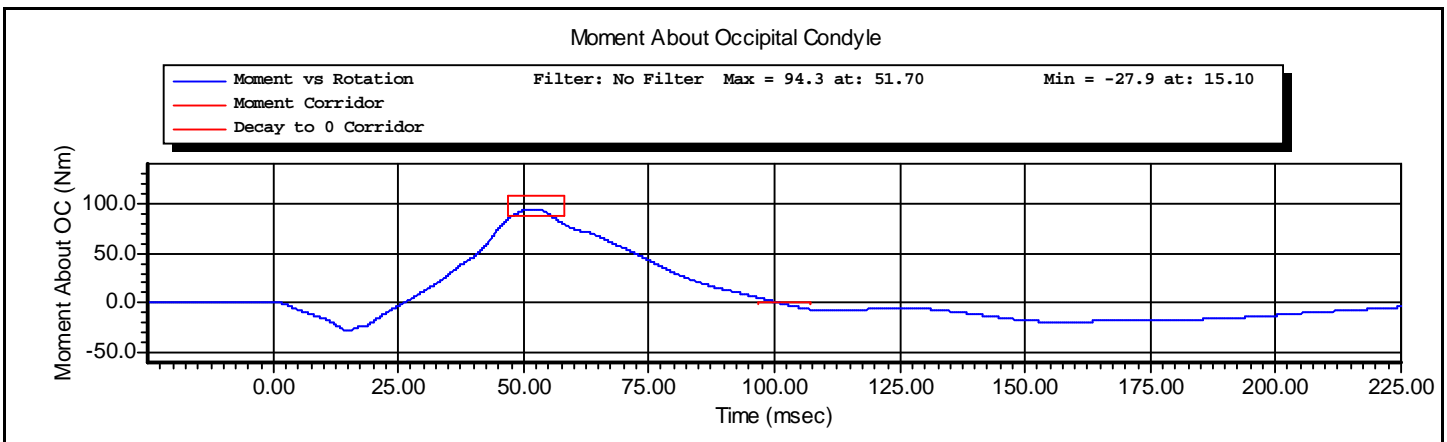
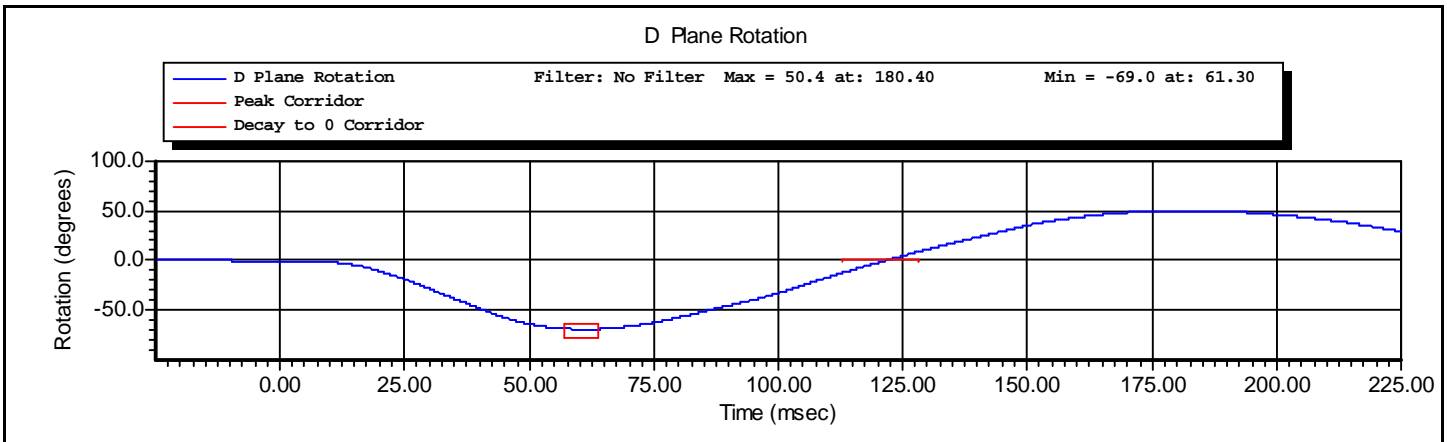
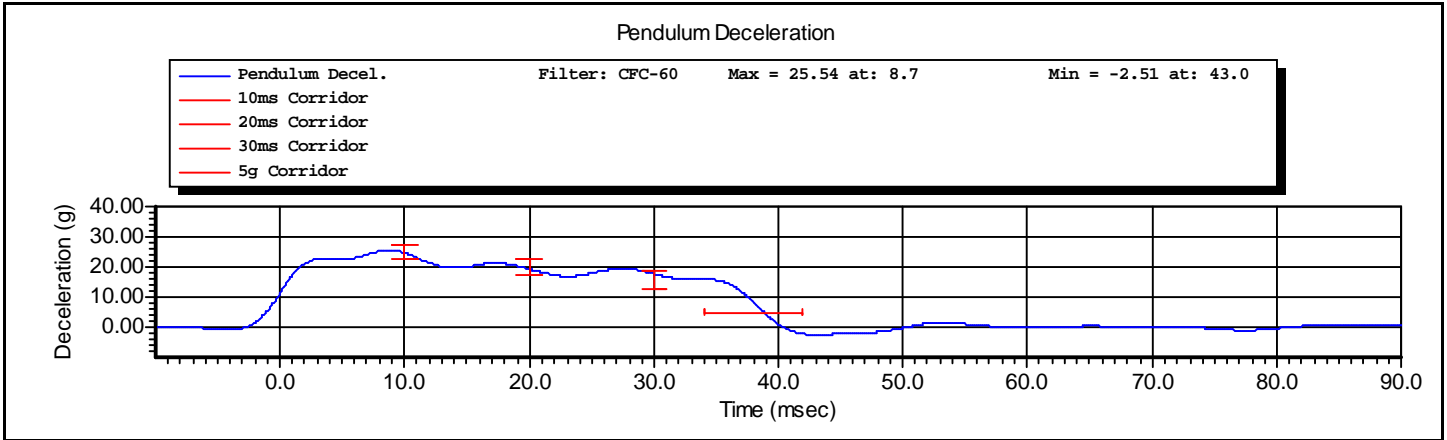
Test ID: **Neck Flexion**

Test Time: **11:45:04 AM**

Test Date: **3/1/2011**

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:	3/1/2011
Number of Test:	1	Time of Test:	11:45:04 AM







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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:	3/4/2011
Test Number:	1	Test Time:	1:04:11 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.6 deg C P
Humidity	10.0 -- 70.0	20.0 %RH P
Velocity	6.59 -- 6.83	6.69 m/s P
Resistive Force	-5.894 -- -5.160	-5.815 kN P
Sternum Displacement	-72.6 -- -63.5	-67.4 mm P
Hysteresis	69 -- 85	72 % P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **1:04:11 PM**

Test Date: **3/4/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

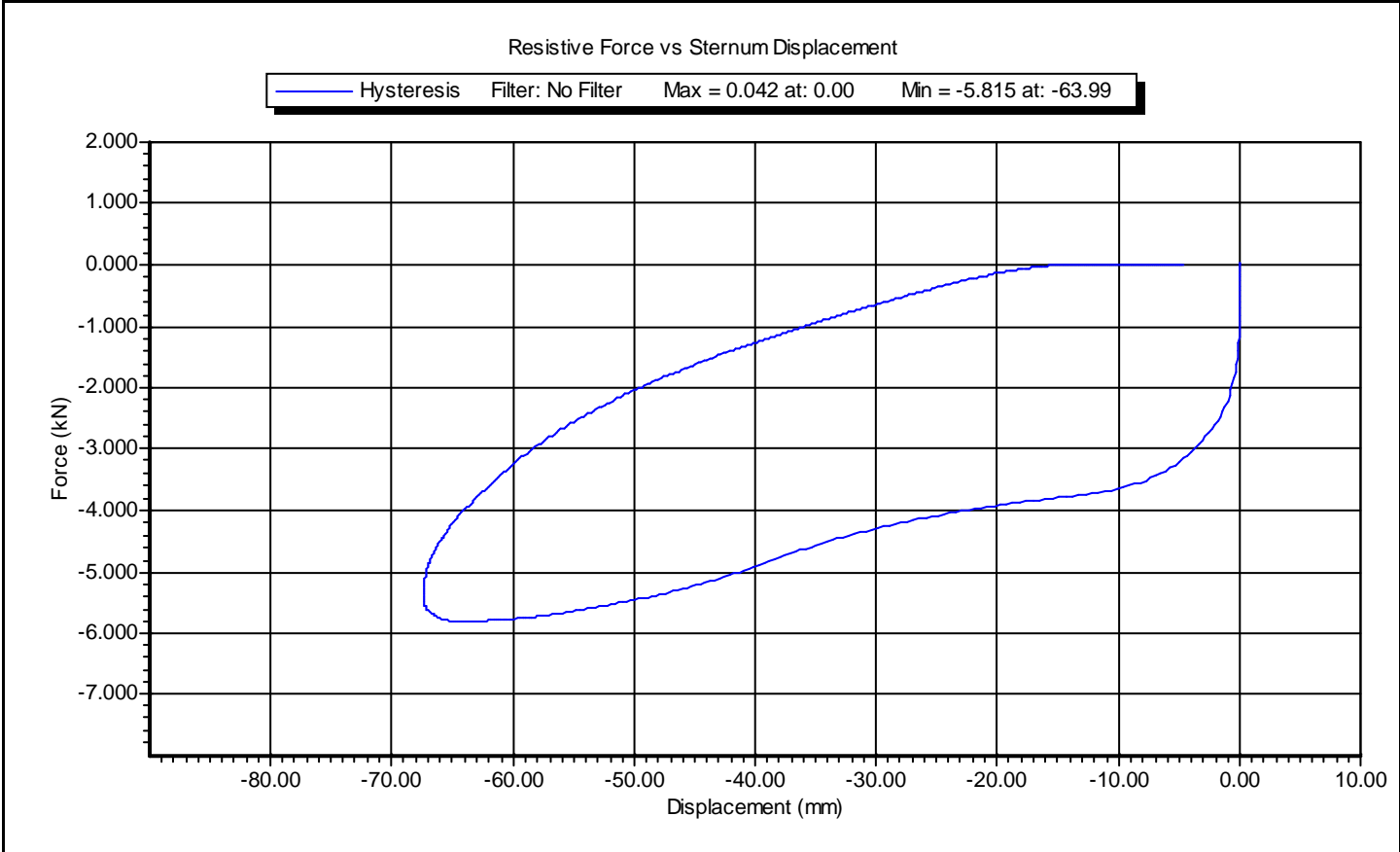
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DentonATD	Velocity Trap	1	1/11/2011
Endevco	7264-2000	P18524	2/2/2011
DentonATD	78051-342	DS-061	6/1/2010

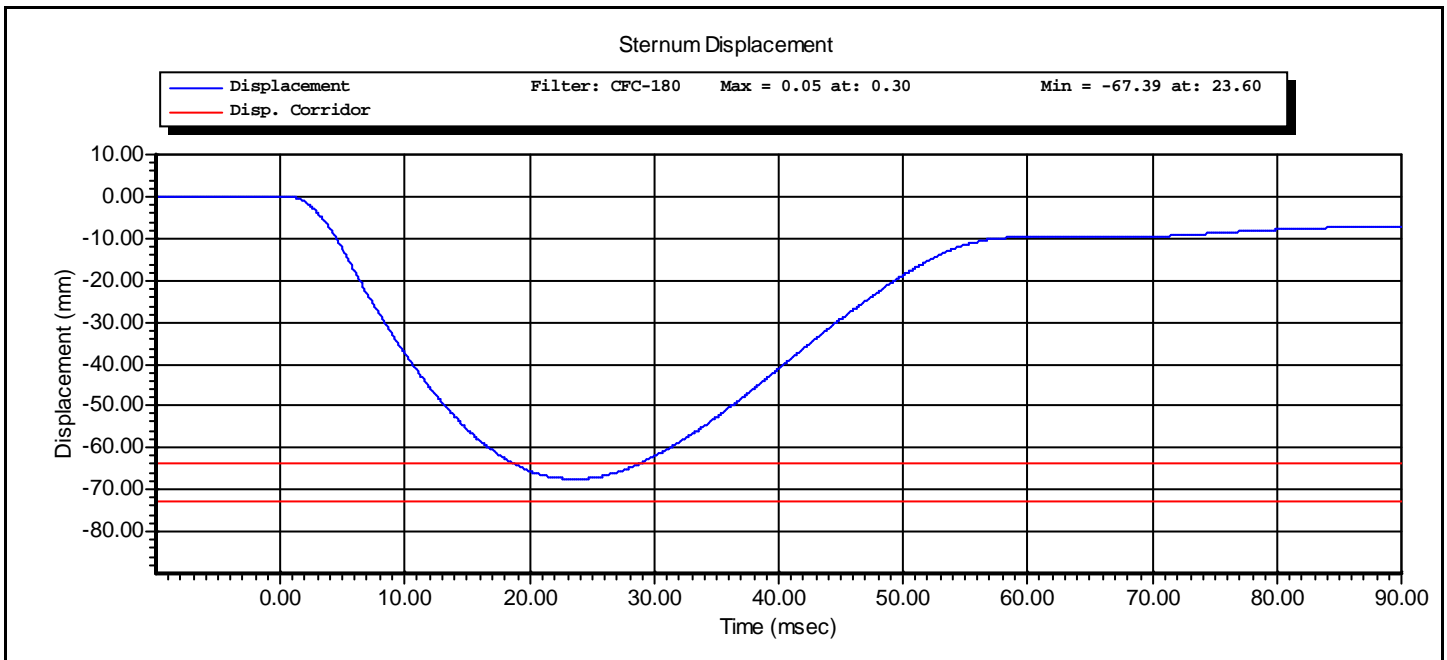
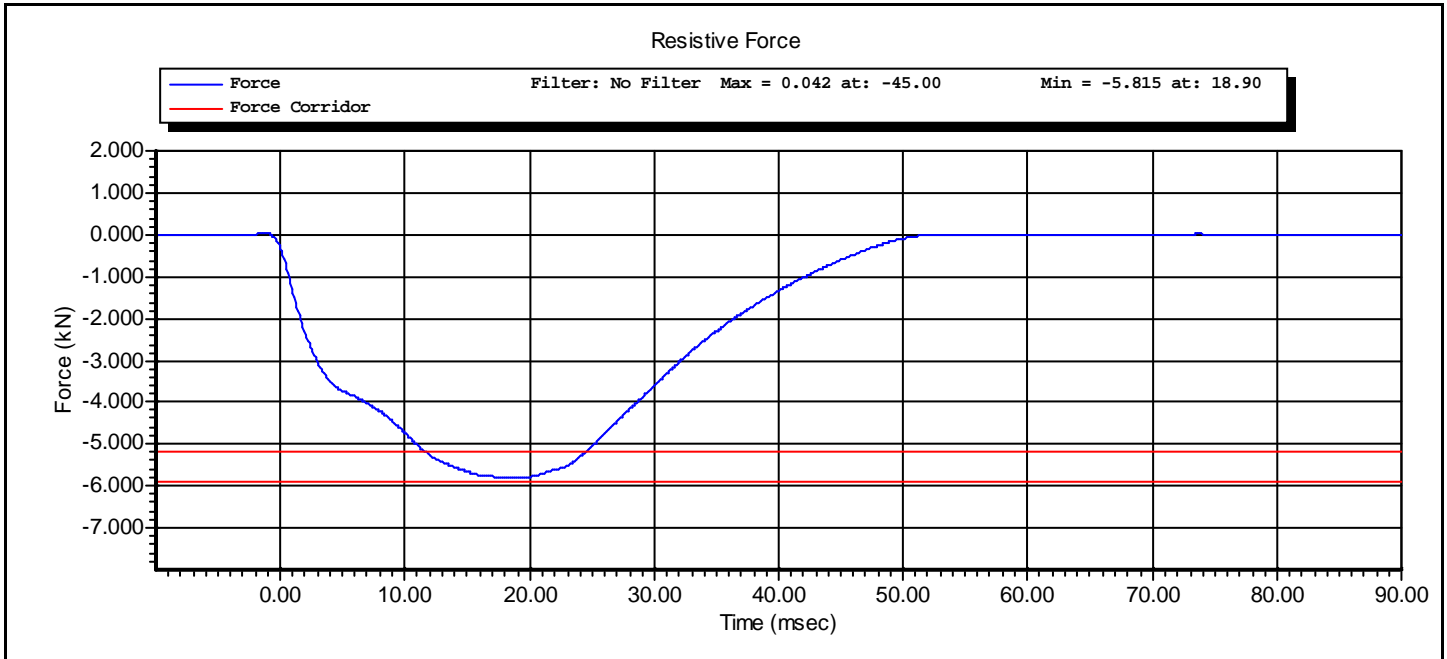
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Test Time: **1:04:11 PM**

Test Date: **3/4/2011**

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:	3/4/2011
Test Number:	1	Test Time:	1:04:11 PM





CALSPAN

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

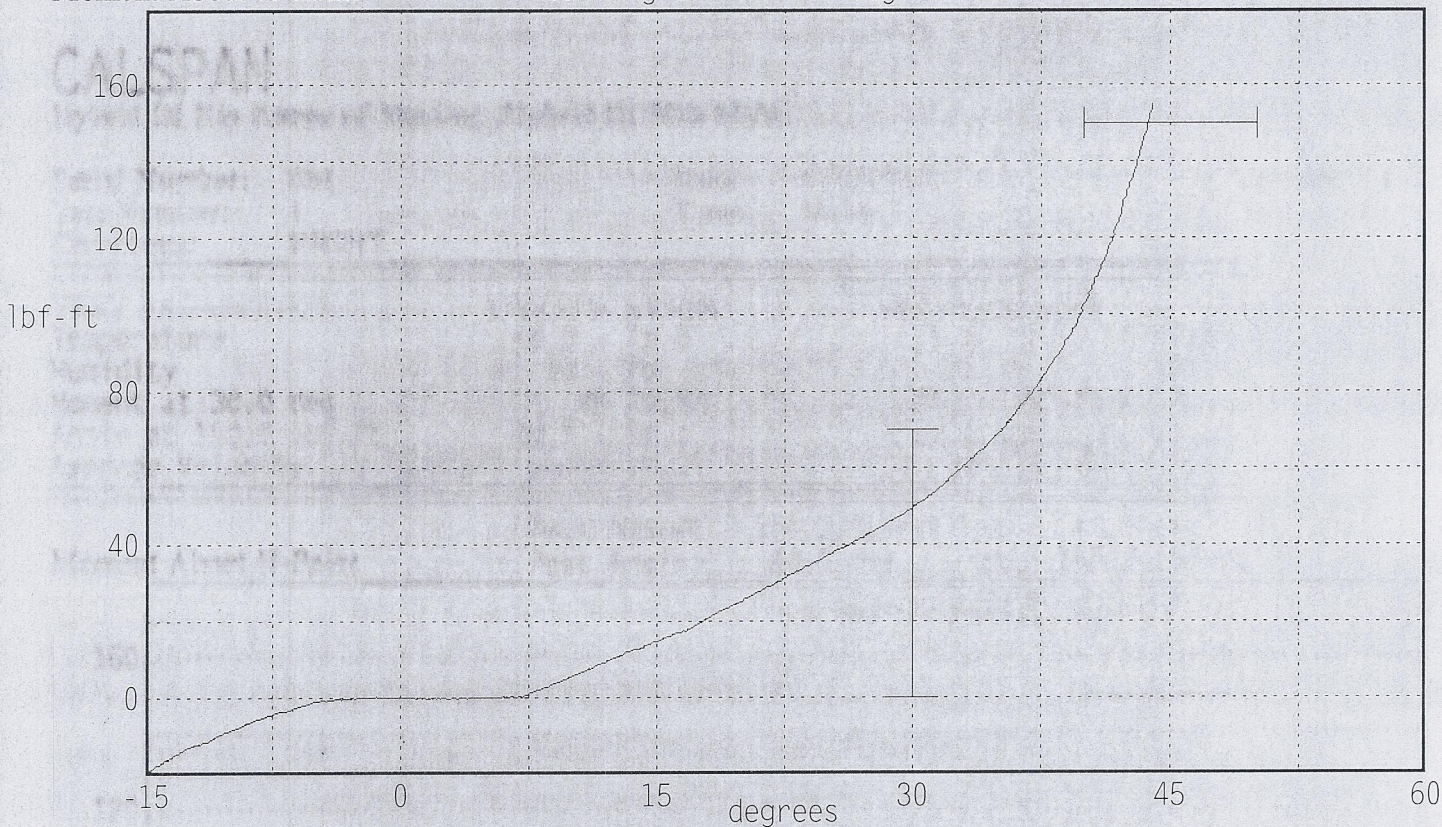
Serial Number: 061
Test Number: 1
Comments: RIGHT

Date: 03/02/2011
Time: 10:16

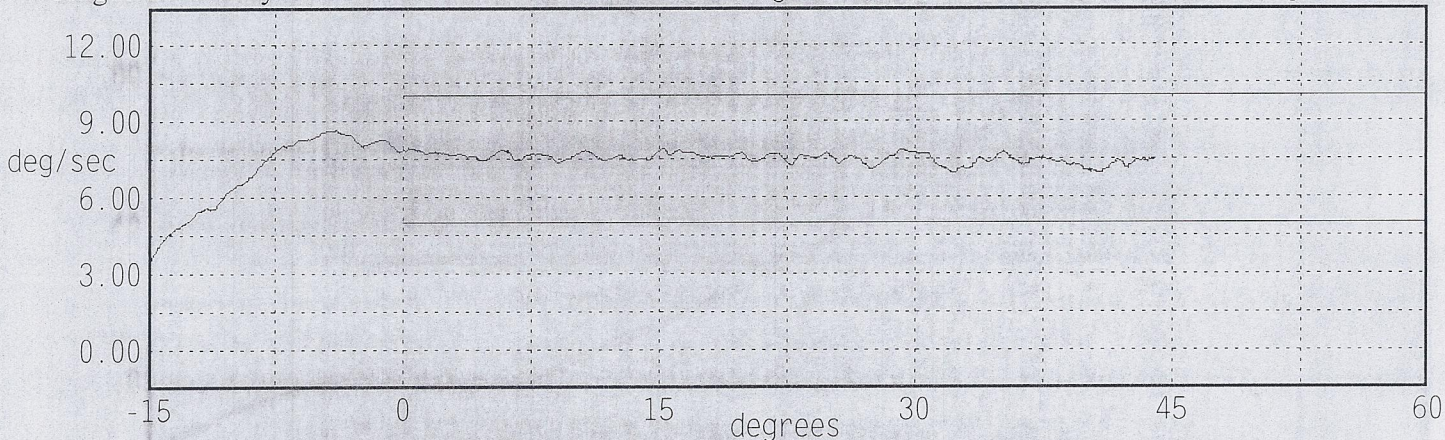
Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	71.0 °F Pass
Humidity	10 - 70	23 % Pass
Moment at 30.0 deg	<= 70.0	49.6 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.8 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.2 lbf-ft at 44.0 deg
Peak Angle: 44.0 deg at 155.2 lbf-ft



Angular Velocity Max: 7.9 deg/sec Min: 6.9 deg/sec



CALSPAN

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

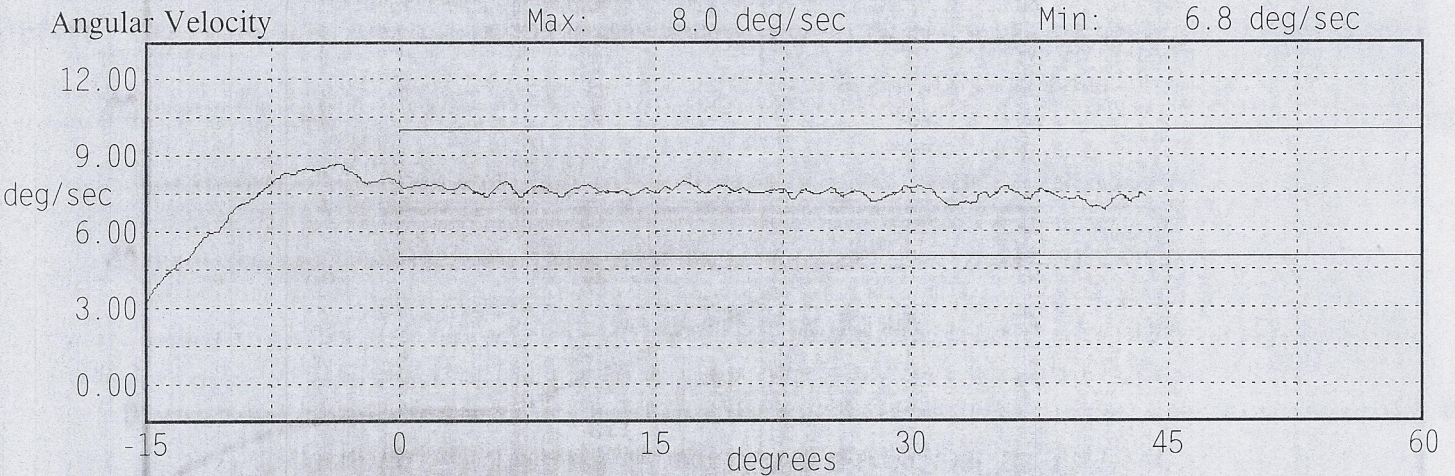
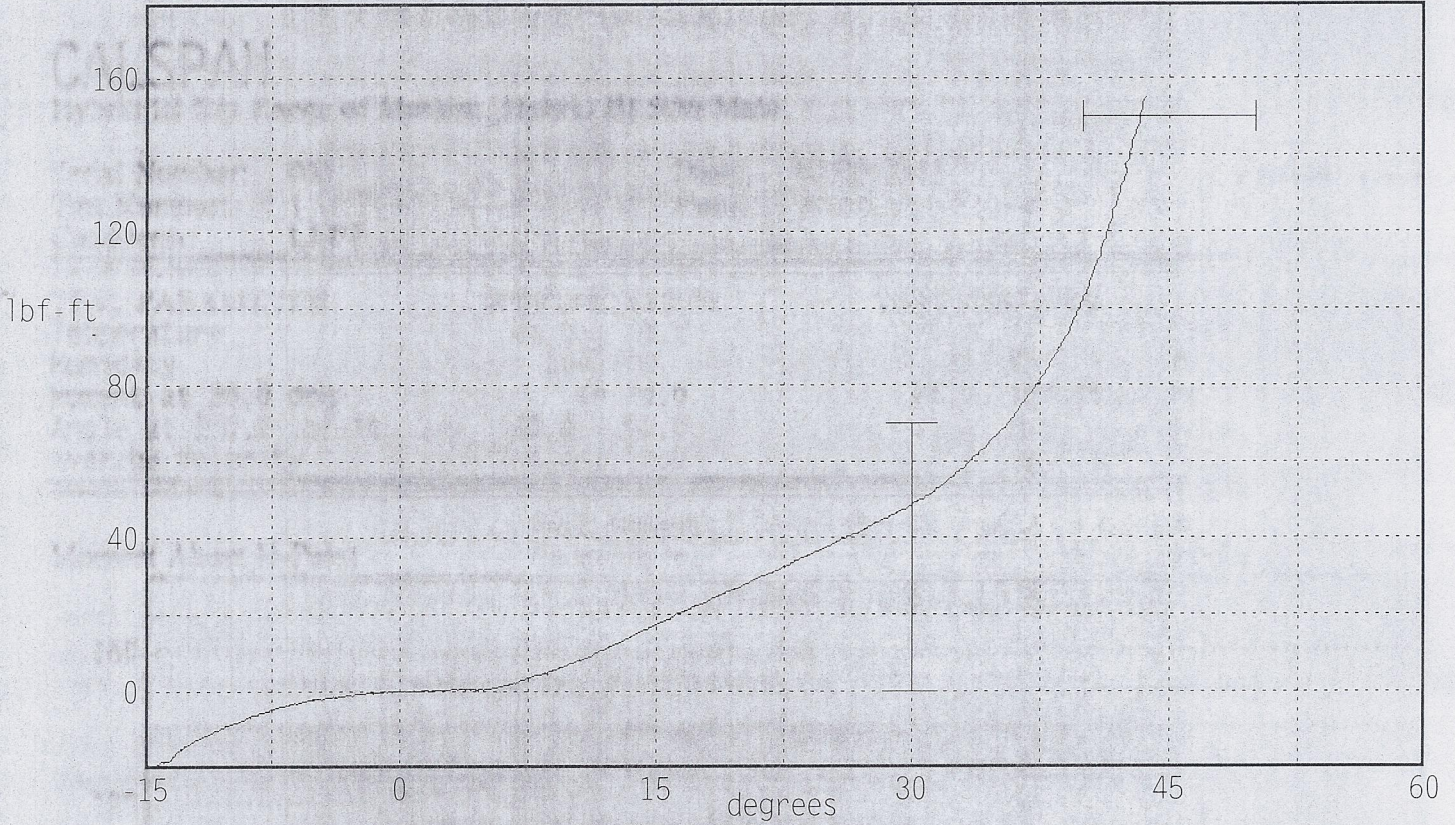
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 03/02/2011
Time: 10:19

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	71.0 °F Pass
Humidity	10 - 70	23 % Pass
Moment at 30.0 deg	<= 70.0	48.9 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.3 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.0 lbf-ft at 43.6 deg
Peak Angle: 43.6 deg at 155.0 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:	3/2/2011
Test Number:	1	Test Time:	12:58:07 PM

Component Part Number	Component Serial Number
Knee Skin - 78051	077

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.0 deg C P
Humidity	10.0 -- 70.0	19.0 %RH P
Velocity	2.07 -- 2.13	2.13 m/s P
Resistive Force	-5.78 -- -4.72	-5.49 kN P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **12:58:07 PM**

Test Date: **3/2/2011**



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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	1/11/2011
CEC	4-202	AC-A44	2/21/2011

Test ID: **Left Knee**

Test Time: **12:58:07 PM**

Test Date: **3/2/2011**

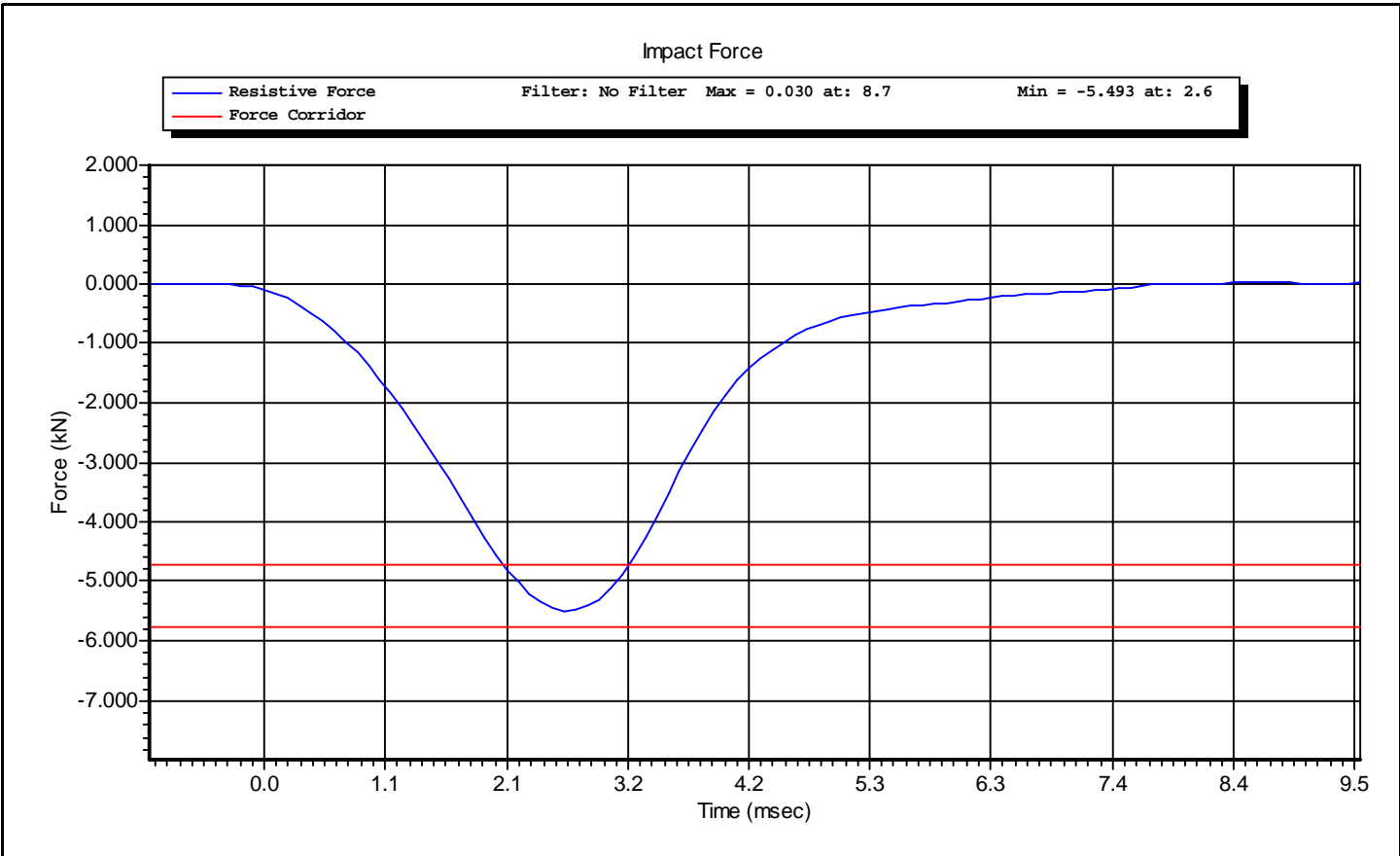


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	3/2/2011
Test Number:	1	Test Time:	12:58:07 PM





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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:	3/2/2011
Test Number:	1	Test Time:	1:09:30 PM

Component Part Number	Component Serial Number
Knee Skin - 780516	3260

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.0 deg C P
Humidity	10.0 -- 70.0	19.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-5.78 -- -4.72	-5.37 kN P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **1:09:30 PM**

Test Date: **3/2/2011**



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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	1/11/2011
CEC	4-202	AC-A44	2/21/2011

Test ID: **Right Knee**

Test Time: **1:09:30 PM**

Test Date: **3/2/2011**

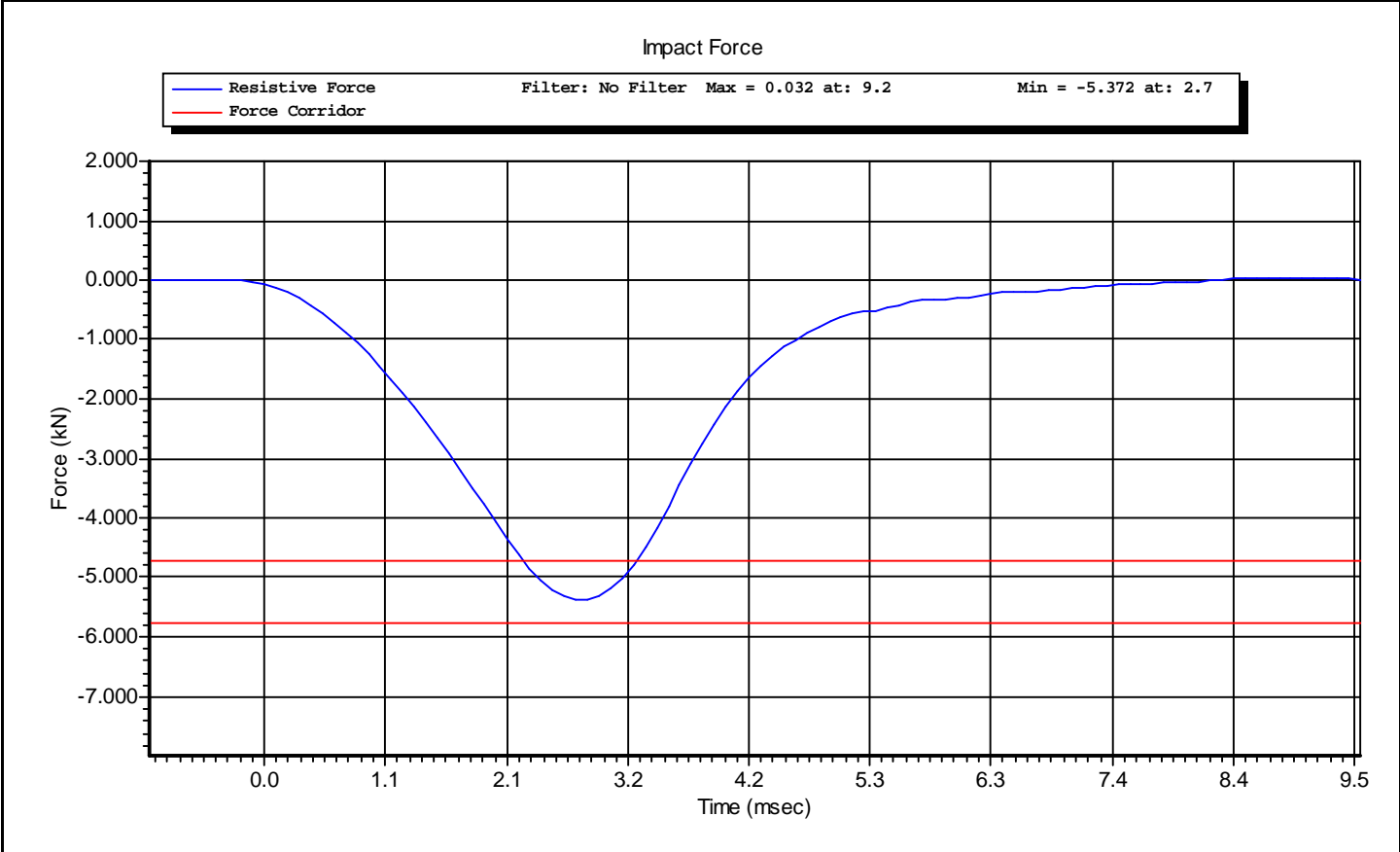


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	3/2/2011
Test Number:	1	Test Time:	1:09:30 PM



CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 143

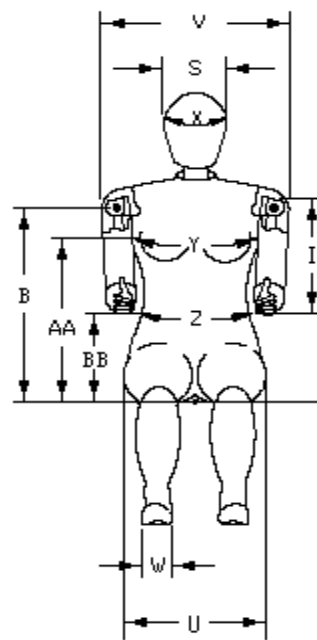
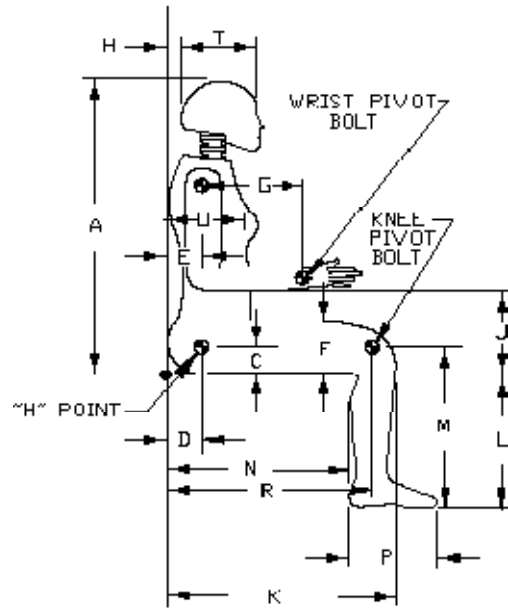
External Measurements - 5th Female

SN 143

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	447	Yes
C	H-Point Height	81.3 – 86.3	84	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	77	Yes
F	Thigh Clearance	119.4 – 134.6	128	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	248	Yes
H	Head Back to Backline	43.2 – 48.2	47	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	288	Yes
J	Elbow Rest Height	182.8 – 203.2	195	Yes
K	Buttock to Knee Length	520.7 – 546.1	543	Yes
L	Popliteal Height	355.6 - 376	360	Yes
M	Knee Pivot Height	393.7 – 419.1	402	Yes
N	Buttock Popliteal Length	414 – 439.4	431	Yes
O	Chest Depth without Jacket	175.3 – 190.5	183	Yes
P	Foot Length (right)	218.5 – 233.7	220	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	474	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 - 188	184	Yes
U	Hip Breadth	299.7 – 314.9	305	Yes
V	Shoulder Breadth	350.5 – 365.7	361	Yes
W	Foot Breadth	78.8 - 94	86	Yes
X	Head Circumference	528.3 – 548.7	544	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	869	Yes
Z	Waist Circumference	759.5 – 789.9	775	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	338	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	165	Yes

Hybrid 3 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Head Drop	Test Date:	2/28/2011
Test Number:	1	Test Time:	11:40:31 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	32 %RH P
Resultant Acceleration	250 -- 300	266 g P
Oscillation	0.0 -- 10.0	1.9 % P
Lateral Acceleration	-15.00 -- 15.00	2.83 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **11:40:31 AM**

Test Date: **2/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Head Drop**

Test Time: **11:40:31 AM**

Test Date: **2/28/2011**

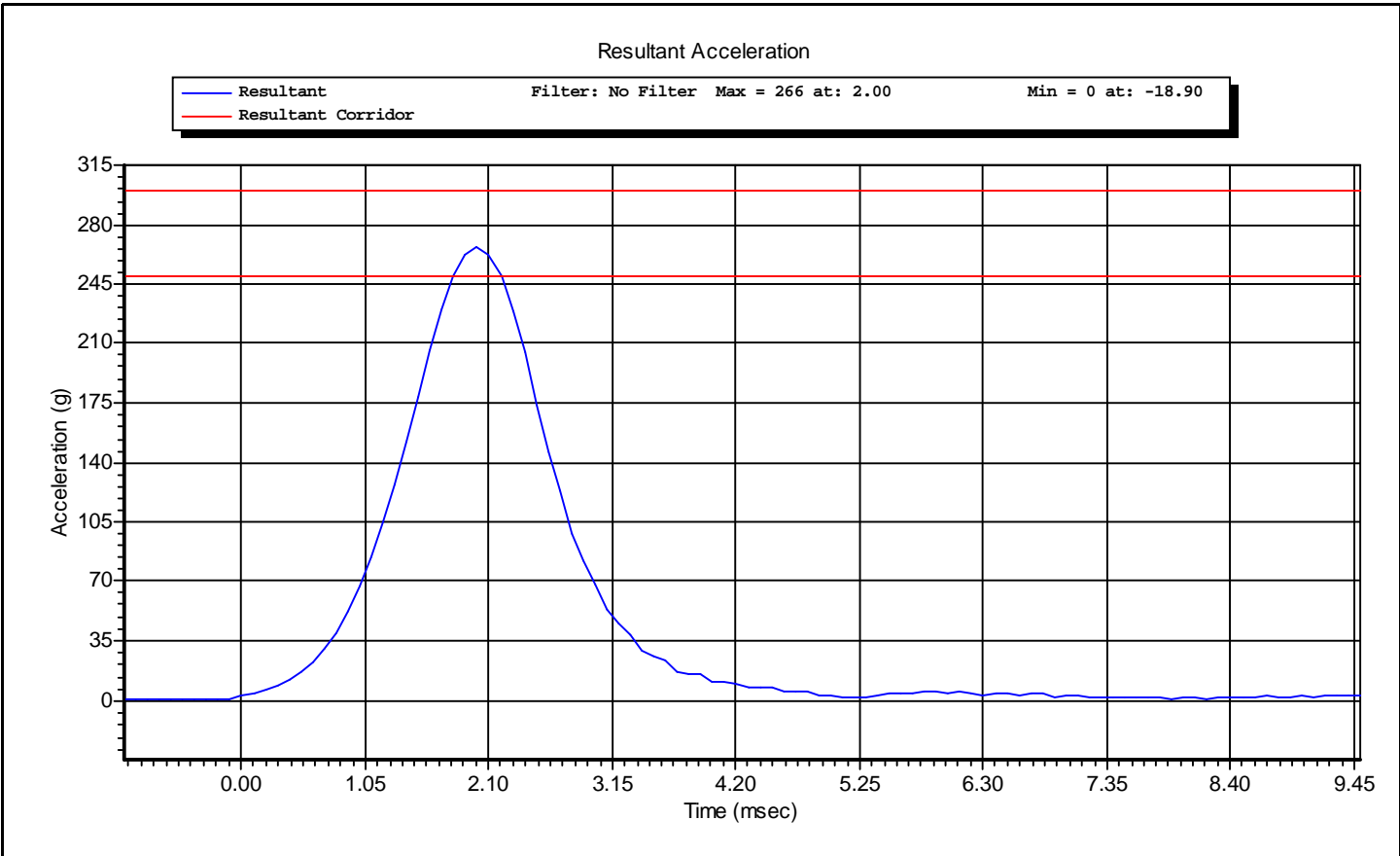


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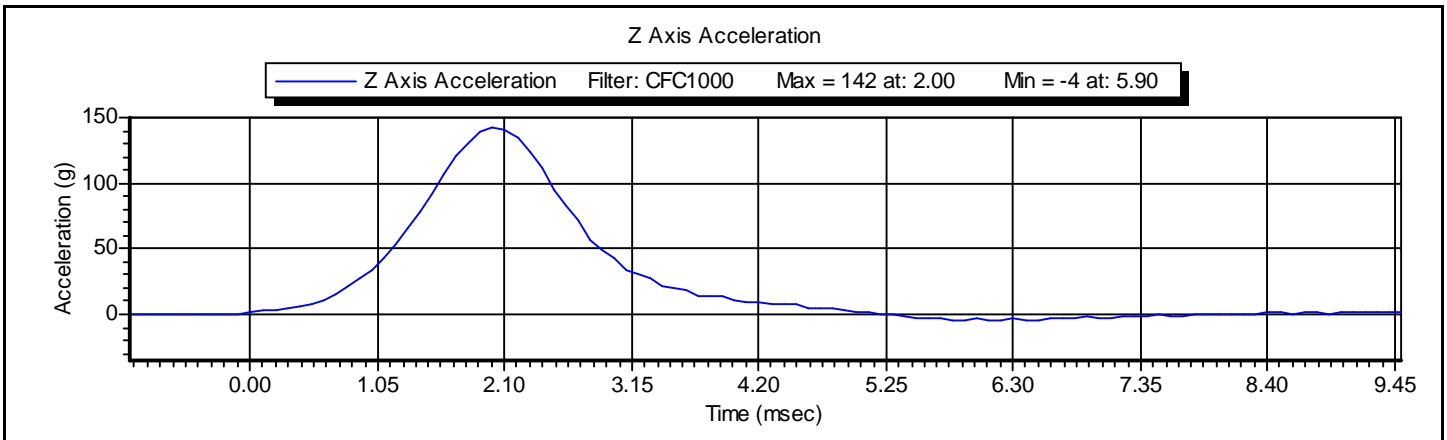
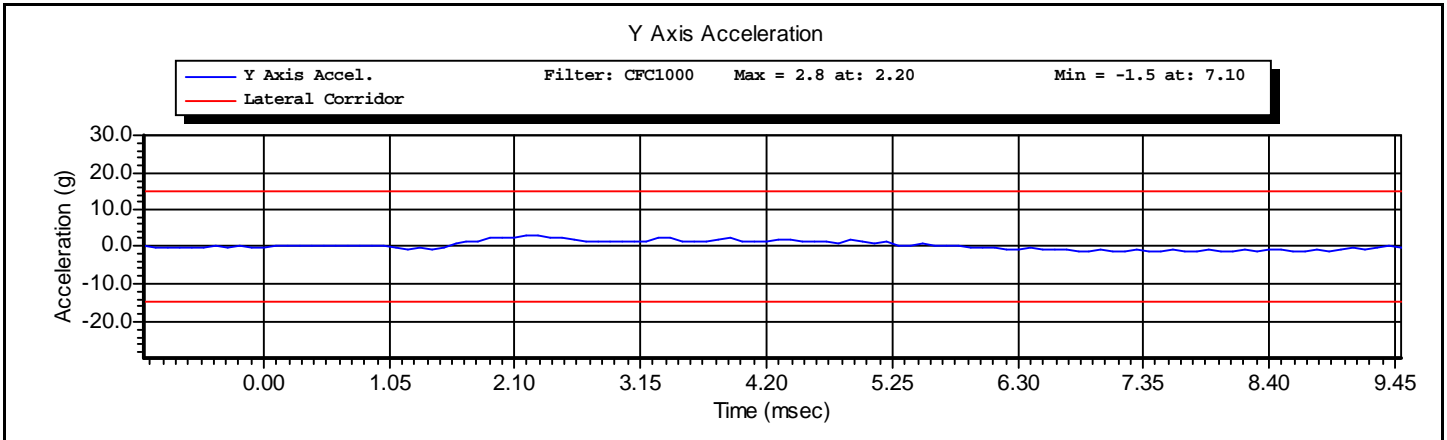
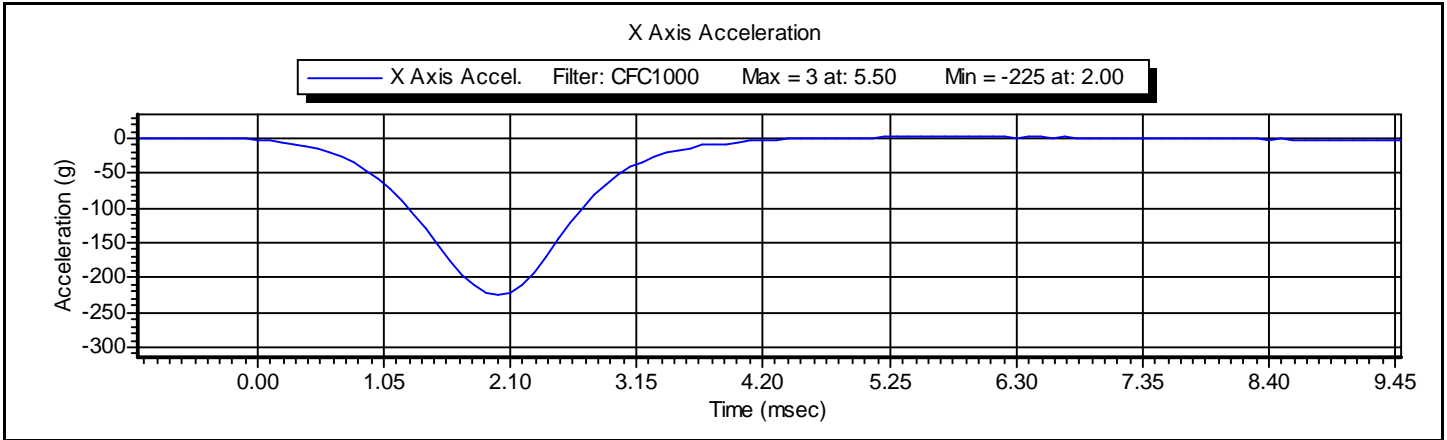
Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Head Drop	Test Date:	2/28/2011
Test Number:	1	Test Time:	11:40:31 AM



Test ID: **Head Drop**

Test Time: **11:40:31 AM**

Test Date: **2/28/2011**





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Extension	Test Date:	2/28/2011
Test Number:	1	Test Time:	2:51:10 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	5.95 -- 6.19	6.08 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.81 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.60 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.38 m/s P
D Plane Rotation	99.0 -- 114.0	107.3 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-56.8 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	104.5 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **2:51:10 PM**

Test Date: **2/28/2011**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

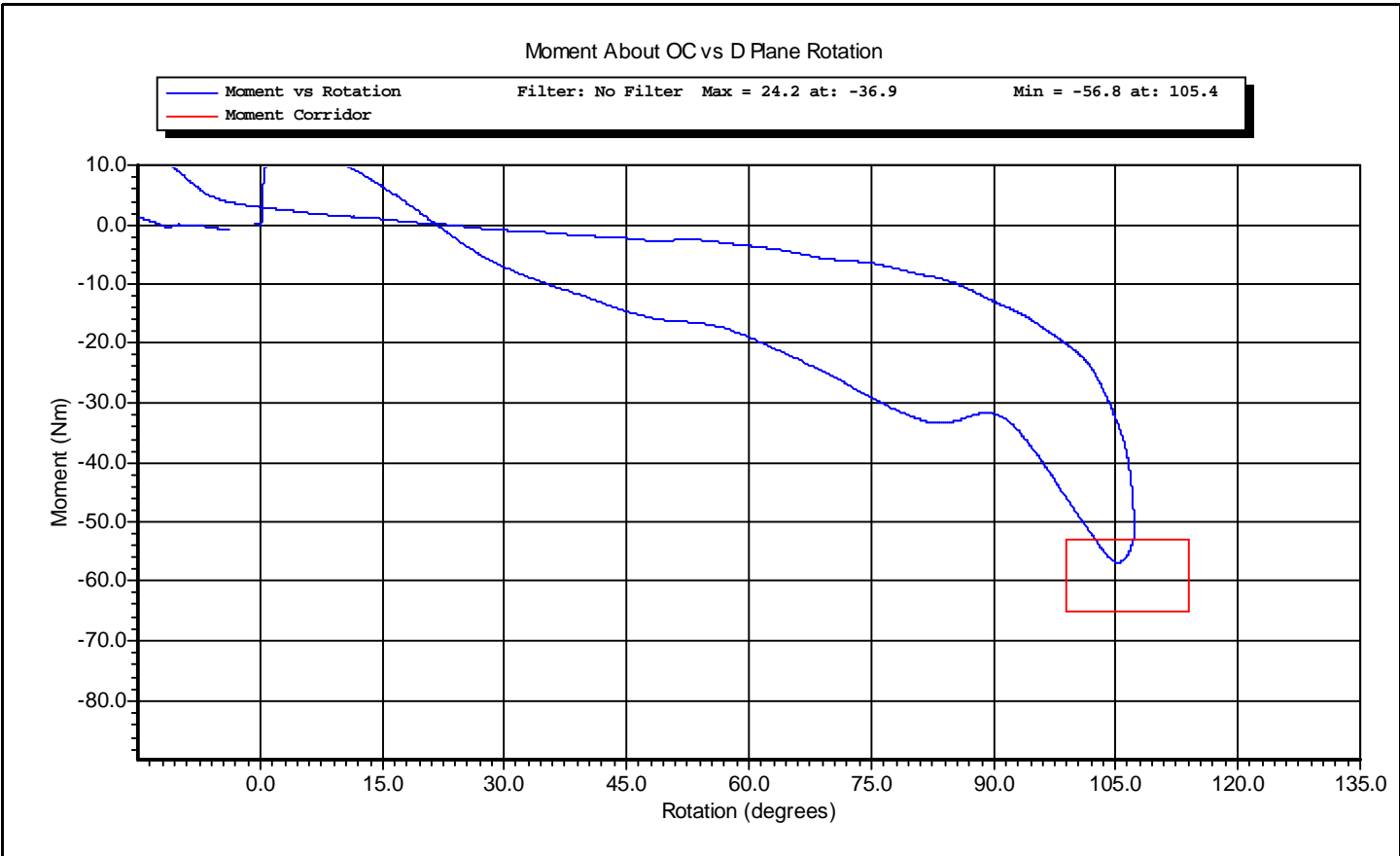
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2011
Endevco	7231CT	C16510	10/21/2010
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-443 My	5/25/2010
Denton	1716A	LC-443 Fx	5/25/2010

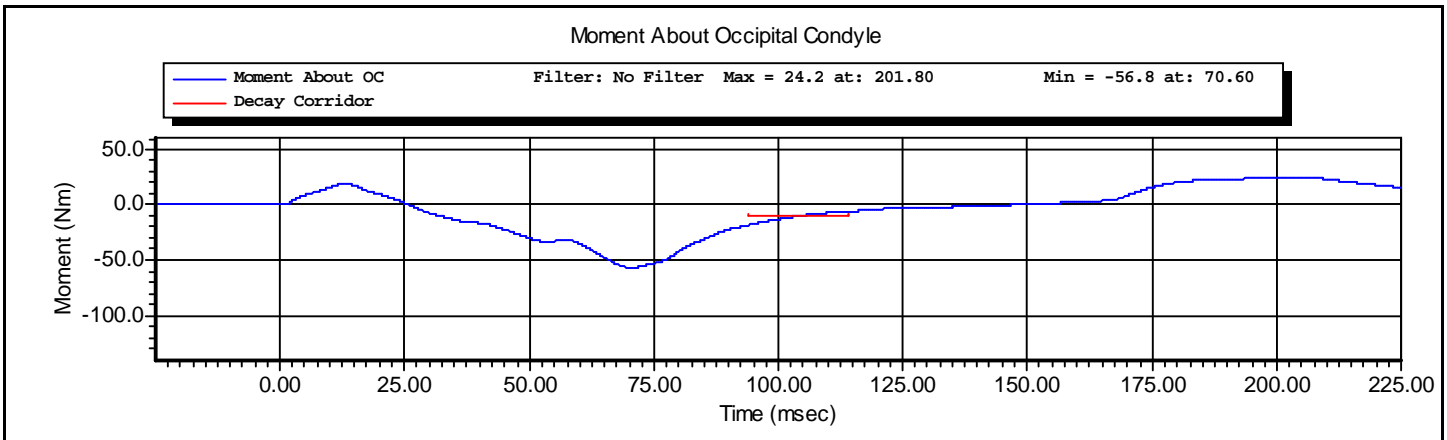
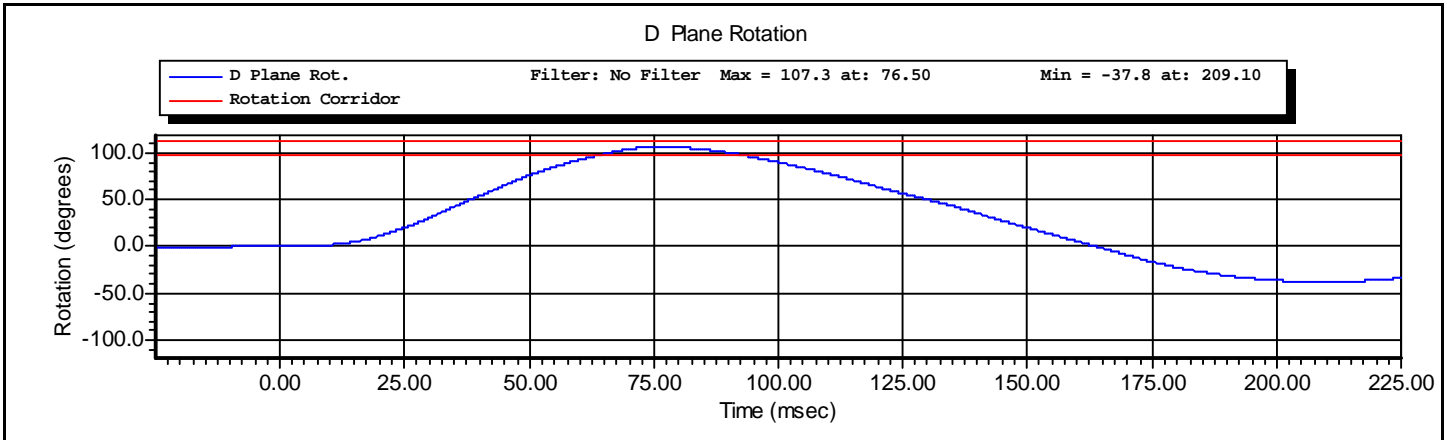
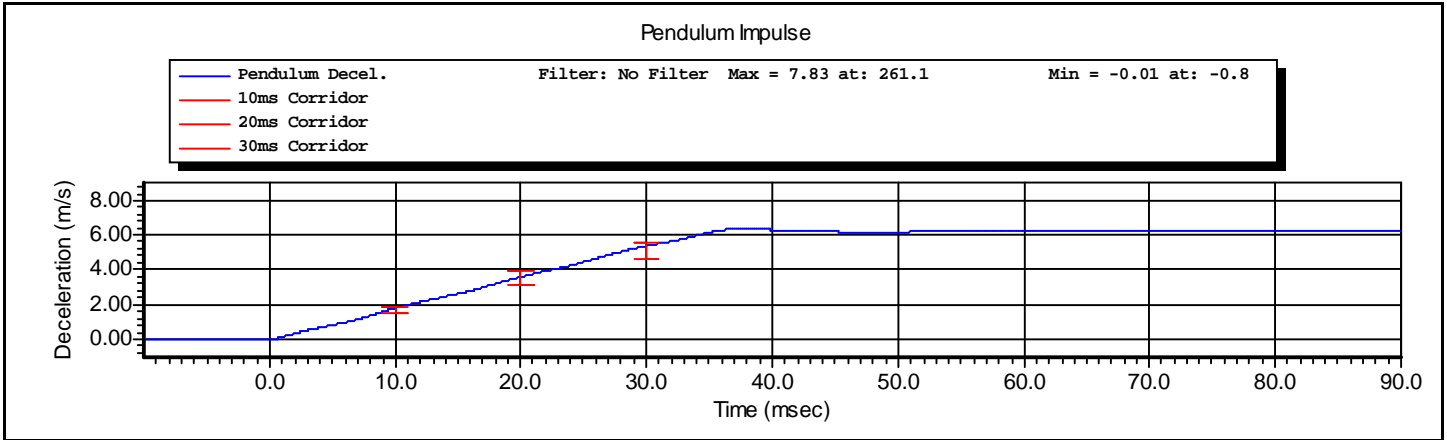
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Test Time: **2:51:10 PM**

Test Date: **2/28/2011**

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Extension	Test Date:	2/28/2011
Test Number:	1	Test Time:	2:51:10 PM







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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Flexion	Test Date:	2/28/2011
Test Number:	1	Test Time:	1:56:08 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	30 %RH P
Velocity	6.89 -- 7.13	7.09 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.26 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.44 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.32 m/s P
D Plane Rotation	-91.0 -- -77.0	-78.8 degrees P
Moment During Rotation Interval	69.0 -- 83.0	80.3 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	87.8 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **1:56:08 PM**

Test Date: **2/28/2011**



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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	1/11/2011
Endevco	7231CT	C16510	10/21/2010
DentonATD	78051-342	PENDULUM POT	2/7/2011
DentonATD	78051-342	CONDYLE POT	2/7/2011
Denton	1716A	LC-443 My	5/25/2010
Denton	1716A	LC-443 Fx	5/25/2010

Test ID: **Neck Flexion**

Test Time: **1:56:08 PM**

Test Date: **2/28/2011**

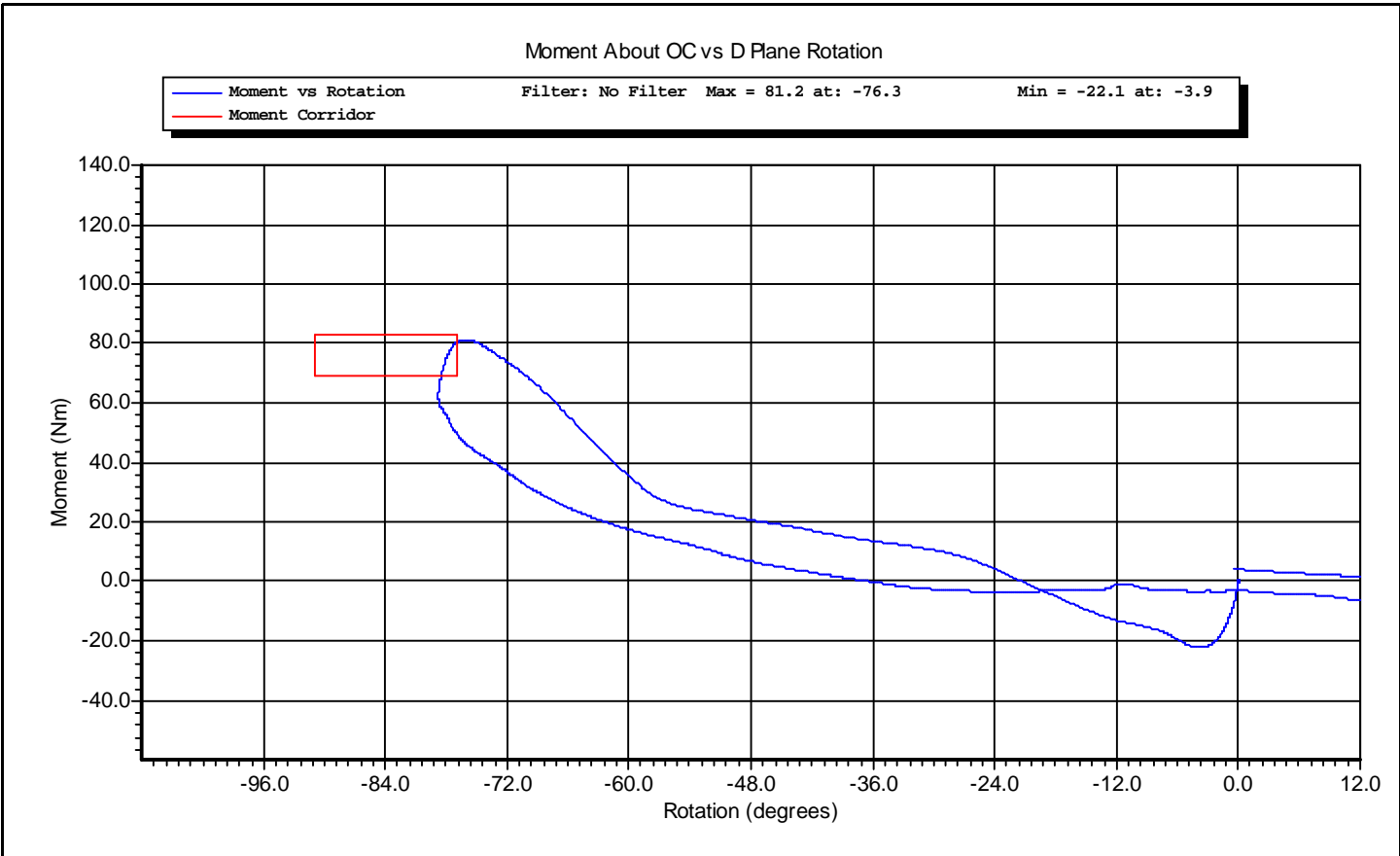


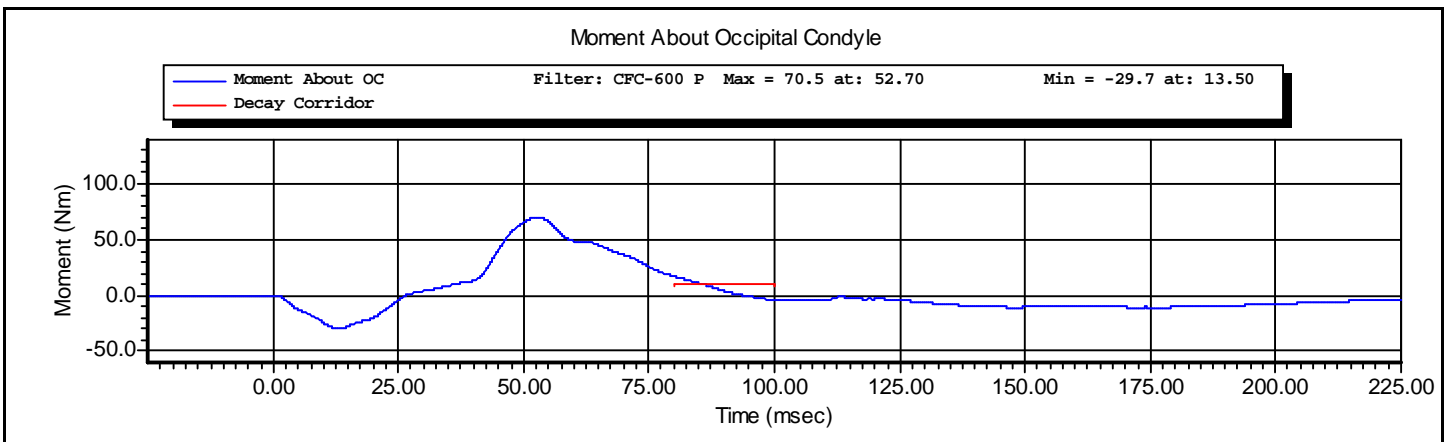
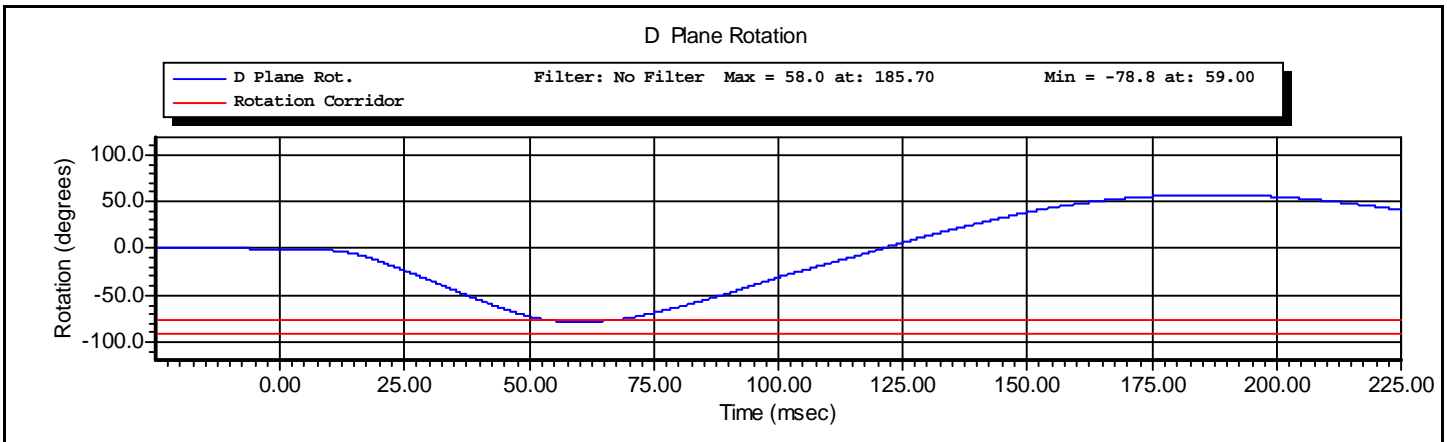
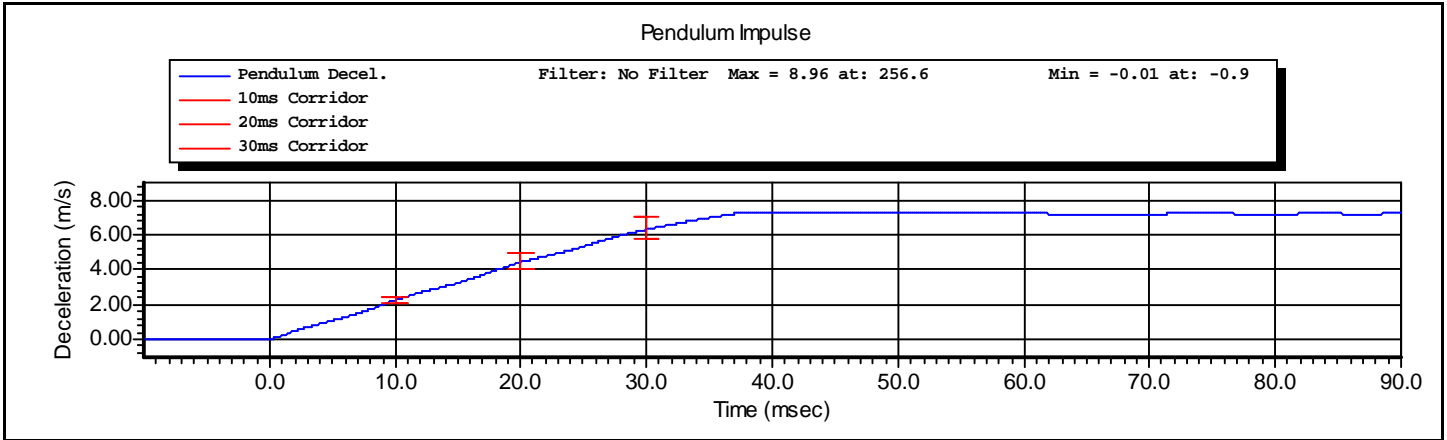
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Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Neck Flexion	Test Date:	2/28/2011
Test Number:	1	Test Time:	1:56:08 PM







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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:	143		
Test ID:	Thorax	Test Date:	3/3/2011
Test Number:	3	Test Time:	2:56:45 PM

Component Part Number	Component Serial Number
Ribs 880105-RS	0503021A
Chest Jacket - 880105-355-E	05855
Lumbar Spine - 880105-1095	050330

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	21.0 %RH P
Velocity	6.59 -- 6.83	6.69 m/s P
Sternum Displacement	-58.0 -- -50.0	-51.5 mm P
Force During Displacement Interval	-4400 -- -3900	-4278 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-4241 N P
Hysteresis	69 -- 85	71 % P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **2:56:45 PM**

Test Date: **3/3/2011**



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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	1/11/2011
Endevco	7264-2000	P18524	2/2/2011
DentonATD	78051-342	DS-143G	6/2/2010

Test ID: **Thorax**

Test Time: **2:56:45 PM**

Test Date: **3/3/2011**

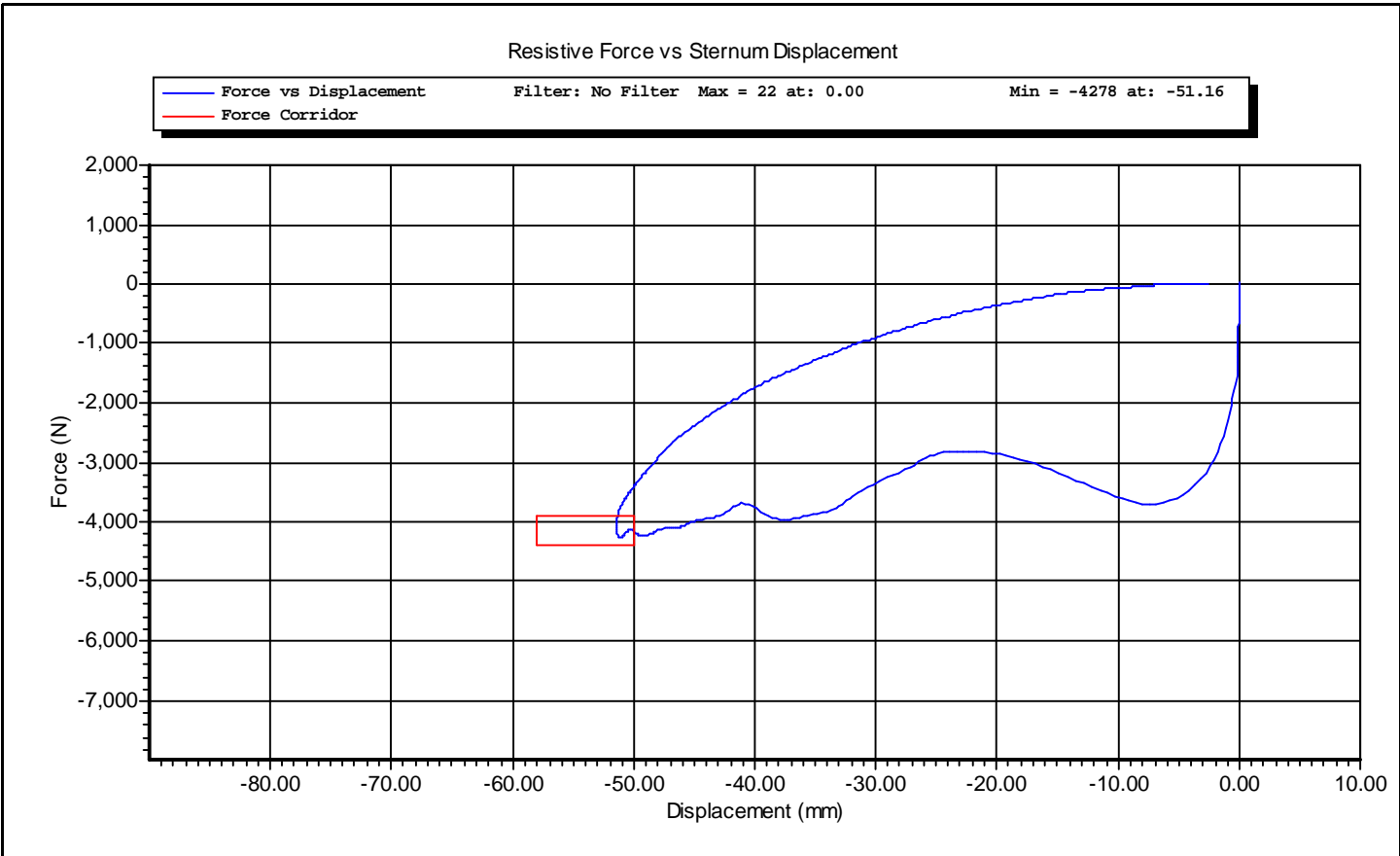


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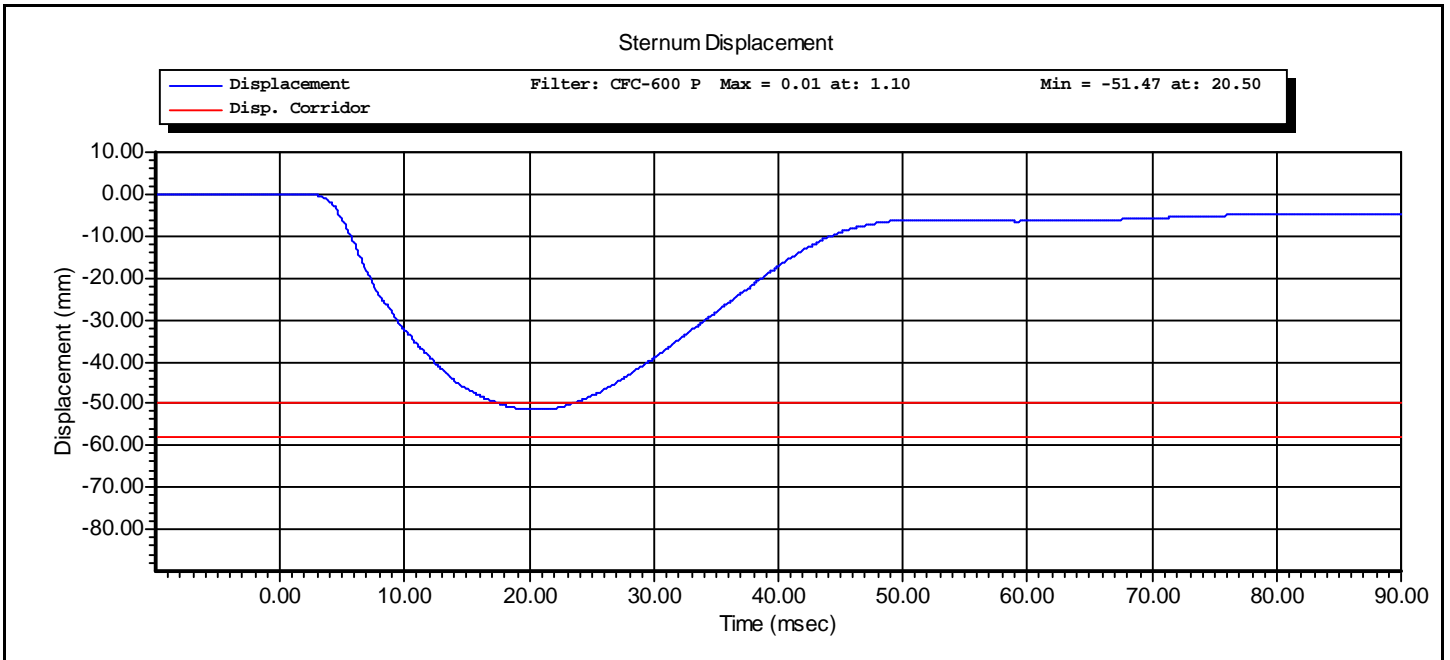
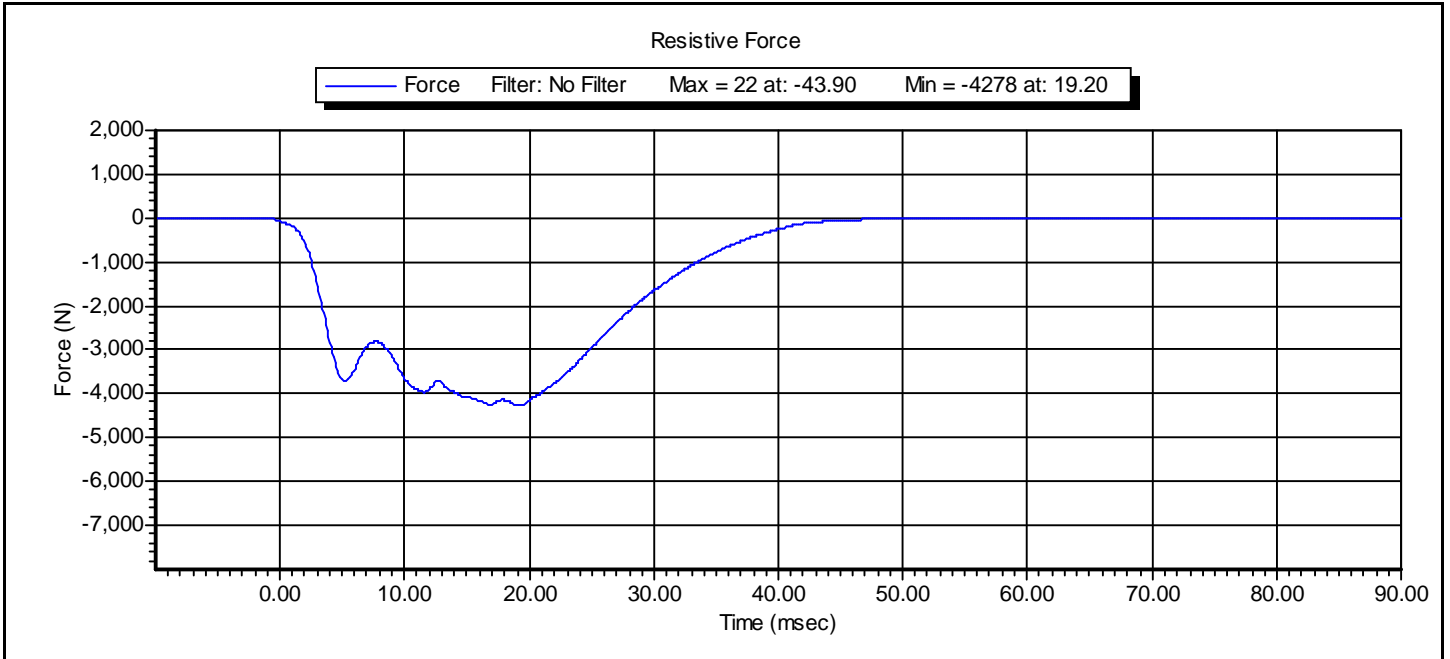
Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Thorax	Test Date:	3/3/2011
Test Number:	3	Test Time:	2:56:45 PM



Test ID: **Thorax**

Test Time: **2:56:45 PM**

Test Date: **3/3/2011**



Torso Flexion Test

Technician: AR
Calibration Date: 03/07/2011
ATD Serial Number: NHTSA 5th Female 143

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	21.9° C	P
Lab Humidity: 38%	10-70%	21%	P
Max Force @ 45 deg	320 – 390N	369N	P
Torso rotation rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	13°	P
Final ref plane angle	Initial ref plane ± 8 deg	19°	P

P = Pass
F = Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Left Knee	Test Date:	3/3/2011
Test Number:	1	Test Time:	9:40:05 AM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1687
Knee Insert - 880105-511	2189

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.1 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	2.07 -- 2.13	2.12 m/s P
Resistive Force	-4060 -- -3450	-3706 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **9:40:05 AM**

Test Date: **3/3/2011**



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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	1/11/2011
CEC	4-202	AC-A44	2/21/2011

Test ID: **Left Knee**

Test Time: **9:40:05 AM**

Test Date: **3/3/2011**

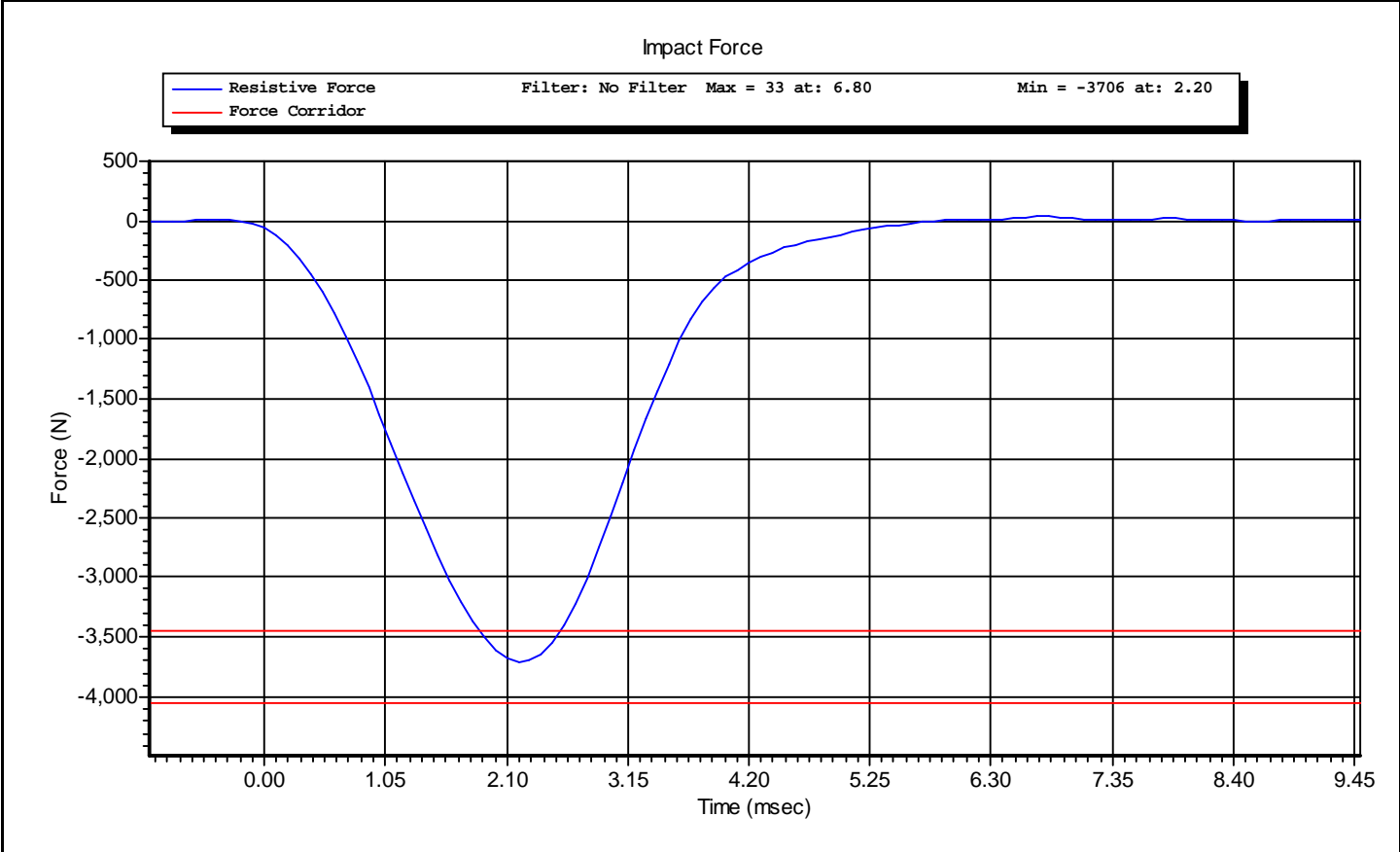


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Left Knee	Test Date:	3/3/2011
Test Number:	1	Test Time:	9:40:05 AM



Test ID: **Left Knee**

Test Time: **9:40:05 AM**

Test Date: **3/3/2011**



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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:	143		
Test ID:	Right Knee	Test Date:	3/3/2011
Test Number:	1	Test Time:	8:48:32 AM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1028
Knee Insert - 880105-511	2192

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.0 deg C P
Humidity	10.0 -- 70.0	17.0 %RH P
Velocity	2.07 -- 2.13	2.11 m/s P
Resistive Force	-4060 -- -3450	-3809 N P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **8:48:32 AM**

Test Date: **3/3/2011**



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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	1/11/2011
CEC	4-202	AC-A44	2/21/2011

Test ID: **Right Knee**

Test Time: **8:48:32 AM**

Test Date: **3/3/2011**



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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	143		
Test ID:	Right Knee	Test Date:	3/3/2011
Test Number:	1	Test Time:	8:48:32 AM

