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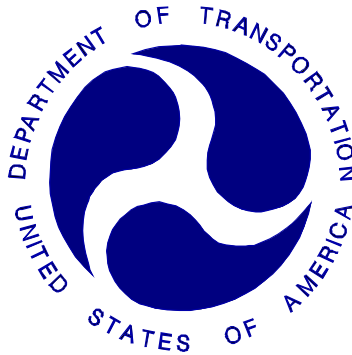
**NEW CAR ASSESSMENT PROGRAM (NCAP)
FRONTAL BARRIER IMPACT TEST**

**General Motors Corporation
2011 Chevrolet Silverado 1500
Crew Cab 4WD Pickup**

NHTSA NUMBER: MB0114

CALSPAN TEST NUMBER: tr2493

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



November 18, 2010

FINAL REPORT

PREPARED FOR:

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

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FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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				6. Performing Organization Code CAL			
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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 Test Report 10/4/2010			
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15. Supplementary Notes							
16. Abstract A 56.3 km/h NCAP Frontal Impact Test was conducted on a 2011 Chevrolet Silverado 1500 Crew Cab 4WD 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 10/4/2010. The impact velocity of the vehicle was 55.9 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 644 mm of Vehicle. The test vehicle's performance is as follows:							
		Driver ATD			Pass. ATD		
	Measurement Description	Units	Threshold	Result	Units	Threshold	Result
	Head Injury Criteria (HIC ₁₅)	N/A	700	197.7	N/A	700	216.1
	Maximum Chest Compression	mm	63	25.0	mm	52	21.5
	Nij	n/a	1	0.21	n/a	1	0.35
	Neck Tension	Newtons	4170	1151.6	Newtons	2620	880.2
	Neck Compression	Newtons	4000	-172.7	Newtons	2520	-124.2
	Left Femur Force	Newtons	10008	-3085.9	Newtons	6805	-2320
	Right Femur Force	Newtons	10008	-4225.4	Newtons	6805	-1231.4
17. Key Words 35 mph Frontal Barrier Impact test New Car Assessment Program (NCAP)					18. Distribution Statement Copies of this report are available from: NHTSA Technical Reference Division National Highway Traffic Safety Admin. 1200 New Jersey Ave SE Washington, DC 20590		
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Form DOT F1700.7 (8-69)

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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 Chevrolet Silverado 1500 Crew Cab 4WD Pickup at a velocity of 55.9 kph. The test was performed at Calspan on 10/4/2010. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 14 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

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

Both ATDs were fully instrumented with head, chest and pelvis triaxial accelerometers, chest displacement potentiometers, upper neck transducers, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's lap and shoulder belts and on the passenger's lap belt to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 61) and the right-front passenger (position 2) ATD (Serial No. 273) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C.

The 132 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 644 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 and 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 and the back of head with the head restraint; both knees contacted the glove box door panel.

The occupant data is summarized below.

ATD Position	HIC ₁₅	T ¹	T ²	Chest Disp. (mm)	Nij	Neck Tension (N)	Neck Comp (N)	Left Femur (N)	Right Femur (N)
Driver (50th)	197.7	79.2	94.2	-25.0	0.21	1151.6	-172.6	-3085.9	-4225.4
Passenger (5 th)	216.1	76.5	91.5	-21.5	0.35	880.2	-124.2	-2320	-1231.4

SECTION 2
DATA SHEETS

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle:	2011 Chevrolet Silverado 1500	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

TEST VEHICLE INFORMATION

NHTSA No.	MB0114
Make	Chevrolet
Model	Silverado 1500
Body Style	Crew Cab 4WD Pickup
VIN	3GCCKPEA1BG103767
Color	Gray
Delivery Date	8/19/2010
Odometer Reading (mi)	39
Odometer Reading (km)	63
Dealer	Outten Chevrolet
Transmission	4 Speed Automatic
Final Drive	4 x 4
Type/No. Cyl	V8
Engine Disp. (L)	4.8
Engine Placement	Lateral
Roof Rack	No
Sunroof/T-Top	No
Tinted Glass	No
Traction Control	No
Power Brakes	Yes
Front Disc	Yes
Rear Disc	Yes

TEST VEHICLE OPTIONS

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

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

NA

DATA FROM CERTIFICATION LABEL

Manufactured By	General Motors Corp.	GVWR (kg)	3175
Date of Manufacture	July 2010	GAWR Front (kg)	1792
		GAWR Rear (kg)	1792

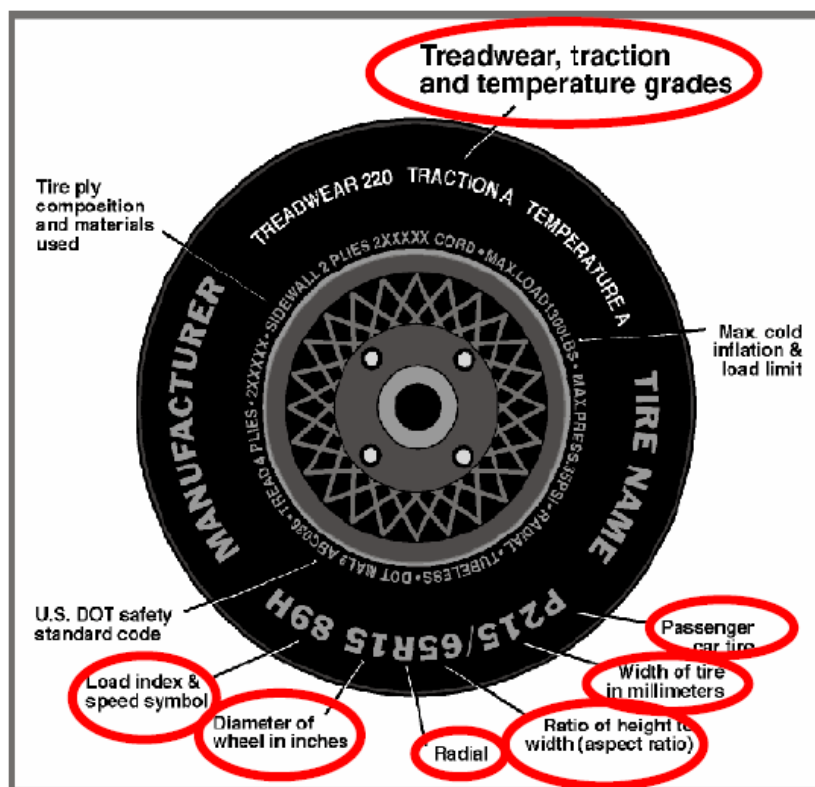
VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Split Bench	Split Bench		
Number of Occupants	3	3		6
Capacity Wt. (VCW) (kg)				746.5
Cargo Wt. (RCLW) (kg)				336.5*

* Maximum allowable Cargo Wt. is 136kg

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

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010



Measured Parameter	Front	Rear
Maximum Tire Pressure	300	300
Cold Pressure (kPa)	240	24
Recommended Tire Size	P265/70R17	P265/70R17
Tire Size on Vehicle	P265/70R17	P265/70R17
Tire Manufacturer	Goodyear	Goodyear
Tire Model	Wrangler ST	Wrangler ST
Treadwear	340	340
Traction	B	B
Temperature Grades	B	B
Tire Plies Sidewall	2 Plies Polyester	2 Plies Polyester
Tire Plies Body	2 Polyester + 2 Steel	2 Polyester + 2 Steel
Load Index/Speed Symbol	113S	113S
Tire Material	-	-
DOT Safety Code Right	4BT6 DADR 2510	4BT6 DADR 2510
DOT Safety Code Left	4BT6 DADR 2510	4BT6 DADR 2510

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

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	730.5	493.5		730.5	609.5	
Right	kg	706.5	498		732.5	624	
Ratio	%	59.2%	40.8%		54.3%	45.7%	
Totals	kg	1437.0	991.5	2428.5	1463.0	1233.5	2696.5

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2428.5
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	2705.1

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	947	954	1014	1013	1492
As Tested	mm	942	942	980	974	1672
Post Test	mm					

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	3655
Total Vehicle Length at Left Side	mm	5777
Total Vehicle Length at Centerline	mm	5844
Total Vehicle Length at Right Side	mm	5776
Weight of Ballast in Cargo Area	kg	47.5
Weight of Vehicle Components Removed	kg	0
Amount of Stoddard Solvent in Fuel Tank	L	90.7

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

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

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	5844
2	Total Width	1986
3	Bumper Top Height	708
4	Bumper Bottom Height	326
5	Longitudinal Member Top Height	629
6	Distance Between Longitudinal Members	908
7	Longitudinal Member Width	84
8	Engine Top Height	1207
9	Engine Bottom Height	325
10	Engine and Gearbox Width	621
11	Front Bumper-Engine Distance	723
12	Front Shock Absorber Fixing Height	719
13	Bonnet Leading Edge Height	1069
14	Front Shock Absorber Fixing Width	854
15	Front Bumper – Front Axle Distance	1008
16	Front Axle – A Pillar Distance	533
17	A- Pillar – B-Pillar Distance	1218
18	B-Pillar – Rear Axle Distance	1906
19	B-Pillar – C-Pillar Distance	942
20	Roof Sill Bottom Height	1724
21	Roof Sill Top Height	1848
22	Floor Sill Bottom Height	561
23	Floor Sill Top Height	565

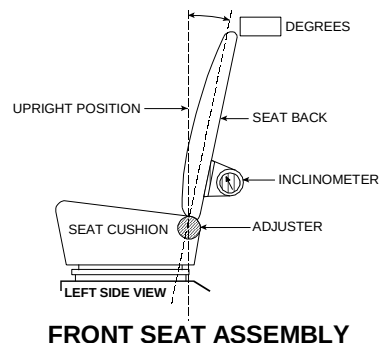
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL

Test Vehicle: 2011 Chevrolet Silverado Crew Cab NHTSA No: MB0114
 Test Program: Frontal NCAP Test Date: 10/4/2010

NORMAL DESIGN RIDING POSITION

Driver seat: Driver seat back adjusted to Nominal Design Riding Position as stated in Form 1

Passenger Seat: Passenger Seat back adjusted to SID IIs Dummy head level

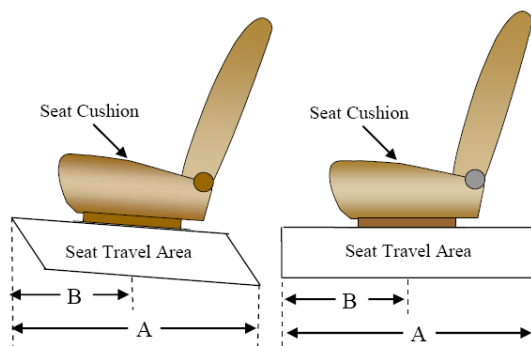


	Deg
Driver Seat Back Angle	7.8
Passenger Seat Back Angle	7.5

SEAT FORE/AFT POSITIONS

Driver seat adjusted to mid-travel. Passenger seat adjusted to full forward

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	25	12
Passenger Seat	22	0



SEAT BELT UPPER ANCHORAGES

Driver and passenger seat belt upper anchorages are adjusted to Nominal Design Position as specified in Form 1. Upper anchorage for Driver is topmost. Upper anchorage for Passenger is topmost.

	Total # of Positions	Placed in Position #
Driver Seat	5	0 (top)
Passenger Seat	5	0 (top)

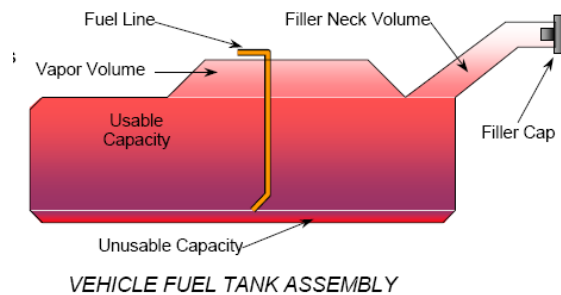
DATA SHEET NO. 2 (CONTINUED)
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

FUEL TANK CAPACITY

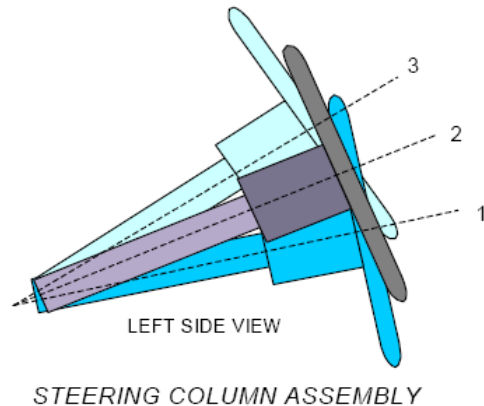
	Liters
Usable Capacity of "Standard Tank"	97.5
Usable Capacity of "Optional Tank"	NA
92%-94% of Usable Capacity	89.6 -91.6
Actual Amount of Solvent Used	90.7
1/3 of Usable Capacity	32.5

Fuel tank emptied according for specifications listed in Form 1



STEERING COLUMN ADJUSTMENT

Steering column adjusted as specified in Form 1. Steering wheel position set at mid angle. Telescope option not applicable

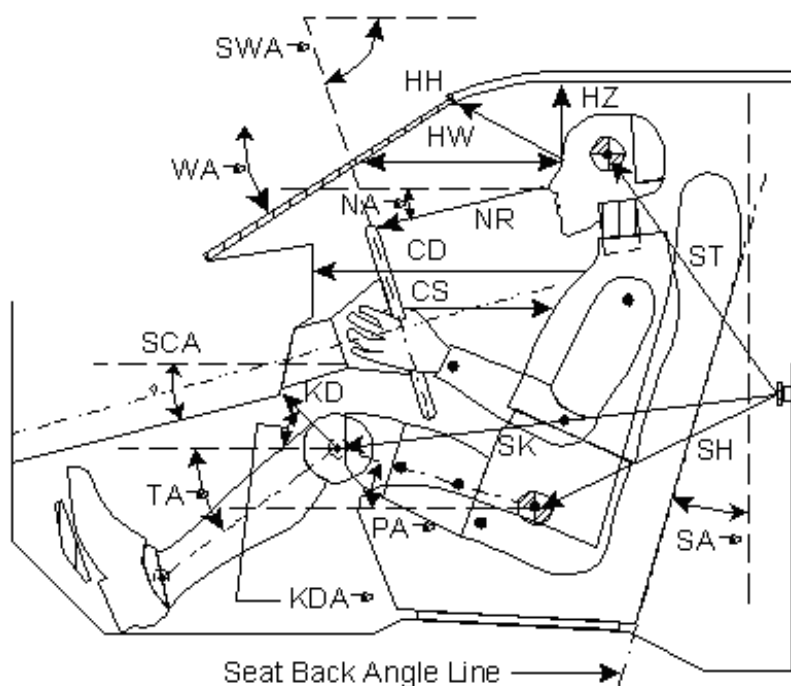


STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost position No. 1	78.5	
Geometric center position No. 2	68.5	
Uppermost position No. 3	58.4	
Telescoping Steering Wheel Travel		NA
Test Position	68.5	NA

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

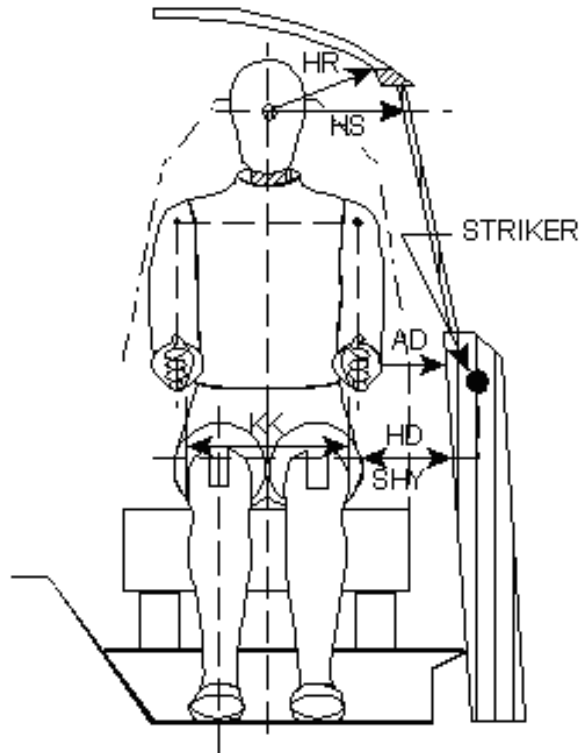
Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle(°)	Length (mm)	Angle (°)
WA°	Windshield Angle		35.5		
SWA°	Steering Wheel Angle		65.0		
SCA°	Steering Column Angle		22.0		
SA°	Seat Back Angle (on headrest post)		7.5		5.3
HZ	Head to Roof (Z)	249	90.0	304	90.0
HH	Head to Header	427	20.0	443	34.0
HW	Head to Windshield	679	0.0	755	0.0
NR	Nose to Rim	374	-10.0	NA	NA
CD	Chest to Dash	509		425	
CS	Chest to Steering Hub	324	-9.0		
RA	Rim to Abdomen	185	11.0		
KDL	Left Knee to Dash	150	21.0	103	18.5
KDR	Right Knee to Dash	135		103	20.0
PA°	Pelvic Angle		22.0		18.5
TA°	Tibia Angle		57.2		59.4
SK	Striker to Knee	784	7.6	857	2.2
ST	Striker to Head	770	56.6	745	54
SH	Striker to H-Point	316	-1.1	528	0.0

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

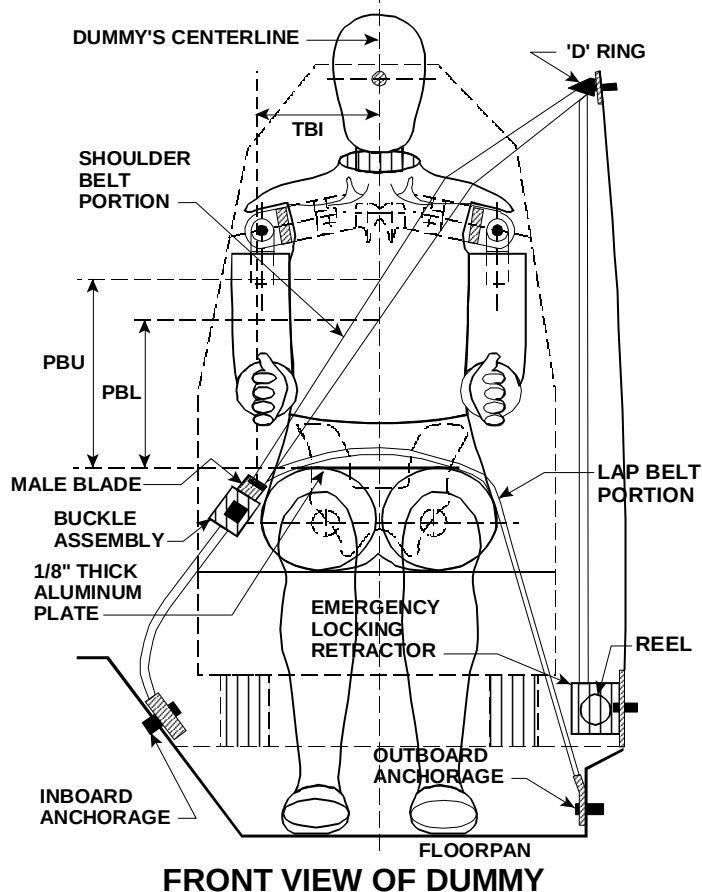


Code	Description	Driver	Passenger
AD	Arm to Door	65	99
HD	H-Point to Door	137	171
HR	Head to Side Header	223	294
HS	Head to Side Window	280	362
KK	Knee to Knee	334	224
SHY	Striker to H-Point (Y Direction)	275	312
AA	Ankle to Ankle	291	188

DATA SHEET NO. 5
SEAT BELT POSITIONING DATA

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

SEAT BELT POSITIONING DATA



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of aluminum plate to belt upper edge	mm	364	309
PBL — Top surface of aluminum plate to belt lower edge	mm	292	226

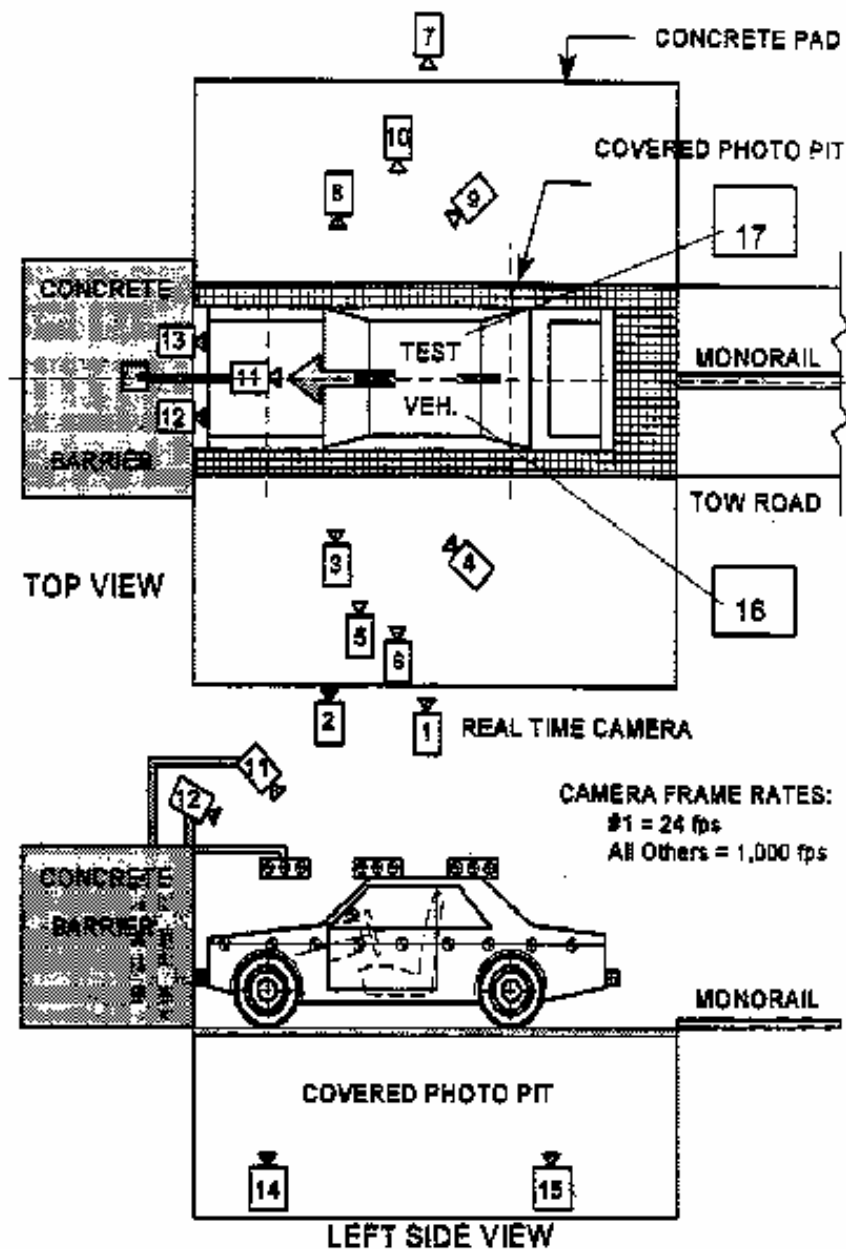
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	880	885
Lap Belt Length as measured on ATD	mm	660	587
Remainder of belt on reel	mm	255	230
Total belt length for continuous webbing systems	mm	1795	1702

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

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

CAMERA LOCATIONS

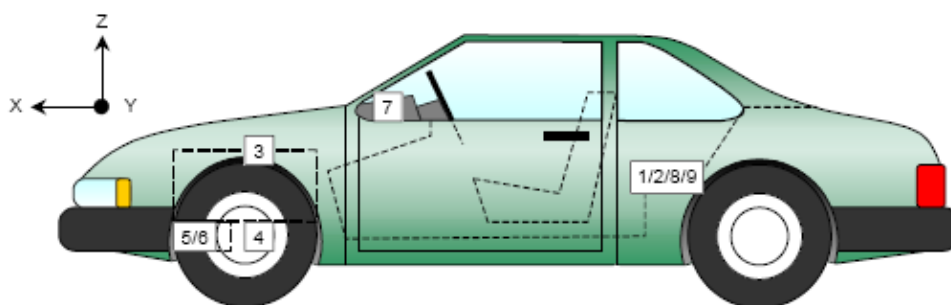
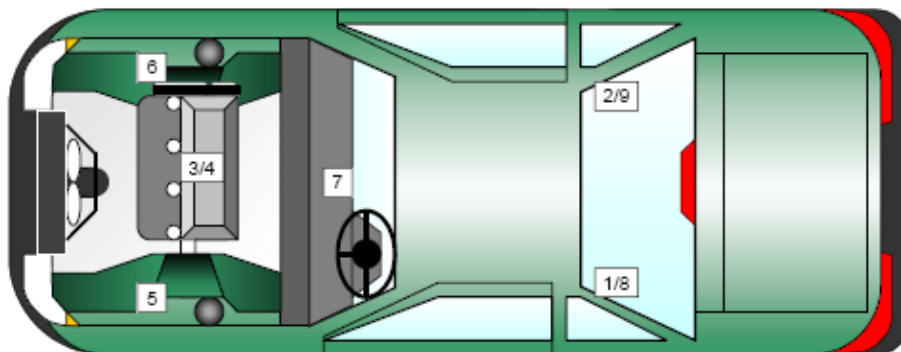
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Side View				-	24
2	Left Front View	1110	1180	930	50	1000
3	Steering Column Top	1980	630	1800	28-70	1000
4	Steering Column Bottom	1980	630	1210	24-70	1000
5	Driver Close-Up	1640	1730	1230	50	1000
6	Driver Angle	2920	3340	2380	25	1000
7	Right Overall	2280	1710	940	24	1000
8	Right Passenger Half	1920	640	1050	50	1000
9	Right Close-Up	1460	970	1170	50	1000
10	Right Angle	2920	3230	2150	24	1000
11	Windshield	0	-530	3374	25	500
12	Top Driver	620	-92	1987	25	500
13	Top Passenger	620	-92	1987	25	500
14	Pit Front	0	615	-3048	12.5	1000
15	Pit Rear	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 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear X-Member X	2814	-653	602
2	Right Rear X-Member X	2821	660	610
3	Engine Top X	5071	-237	978
4	Engine Bottom X	NA	NA	NA
5	Left Brake Caliper X	4869	561	651
6	Right Brake Caliper X	4860	-566	653
7	Instrument Panel X	4861	-547	562
8	Left Rear X-Member Z	2814	-653	602
9	Right Rear X-Member Z	2821	660	610

Reference Points:

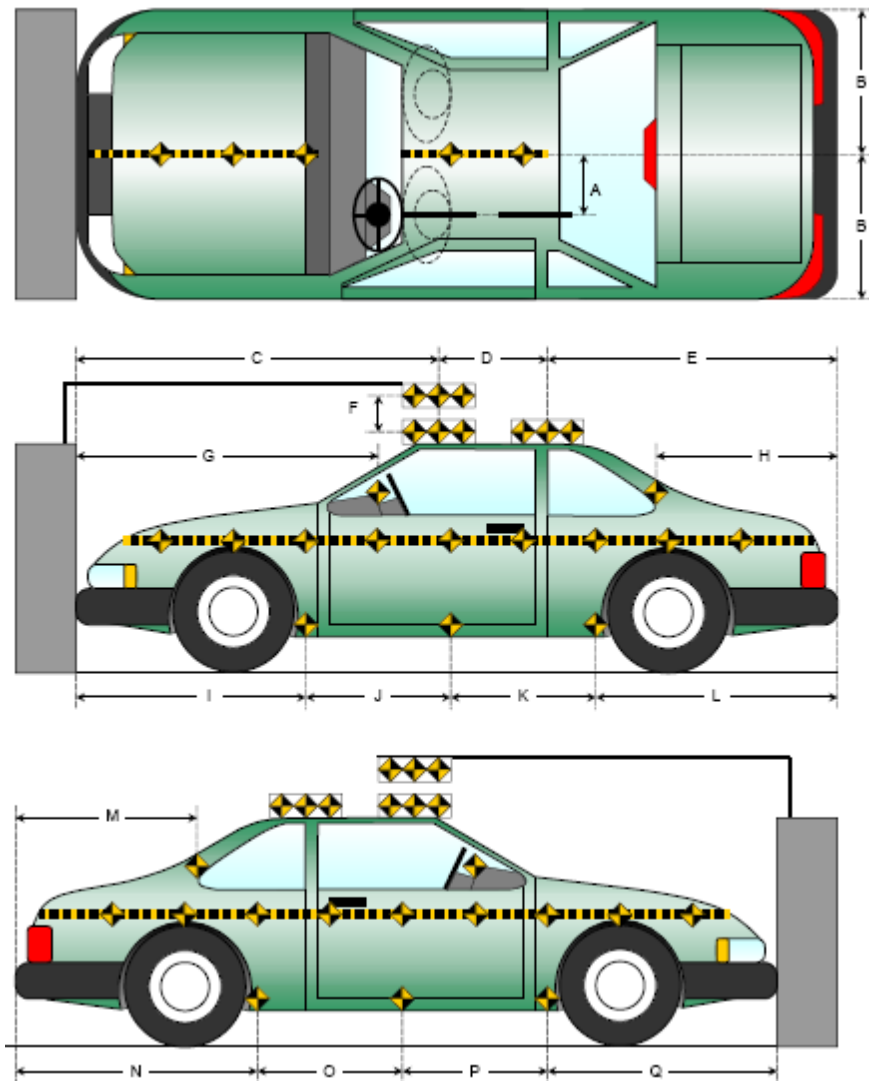
- X – Rear Surface of Vehicle (+ forward)
- Y – Vehicle Centerline (+ to right)
- Z – Ground Plane (+ down)

DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

Item	Value
A	485
B	785
C	2457
D	1217
E	2169
F	NA
G	1910
H	2133
I	1523
J	1303
K	1309
L	1709
M	2135
N	1701
O	1304
P	1310
Q	1528

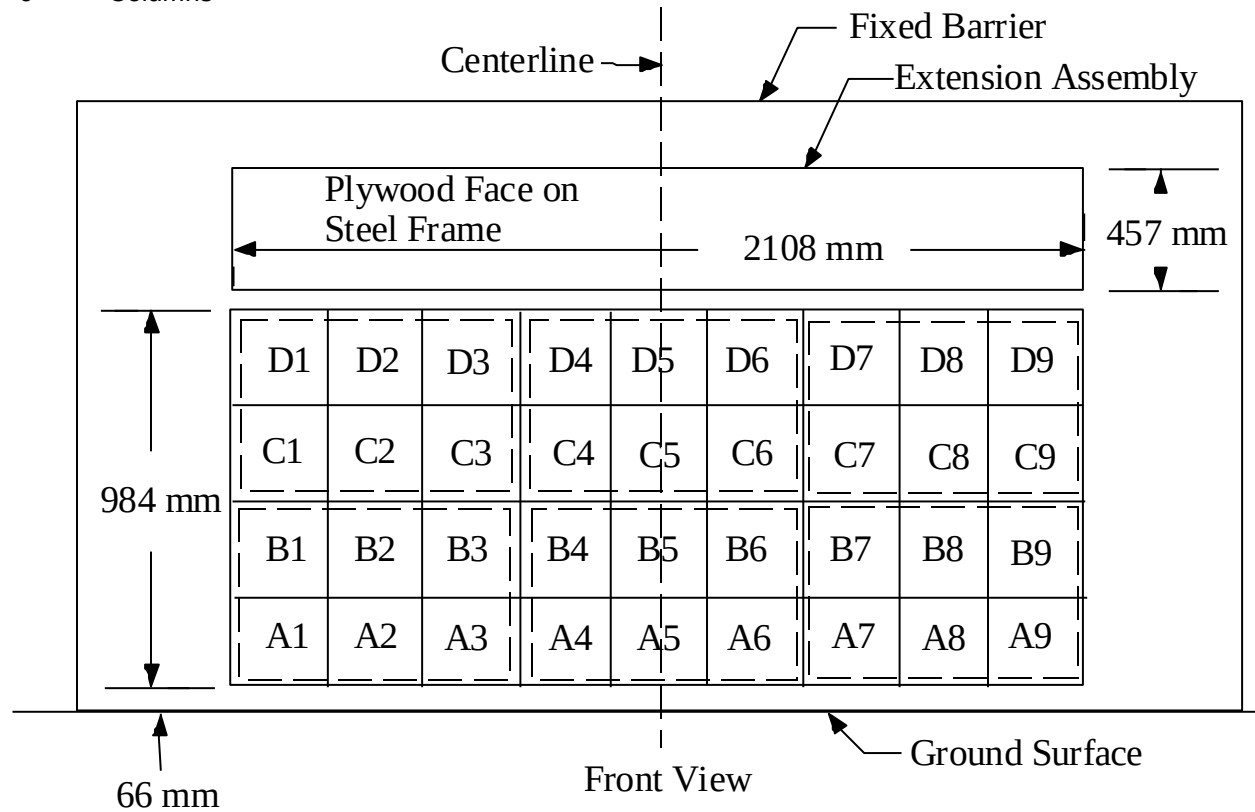
All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

36 Load Cells
4 Rows
9 Columns



DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

INSTRUMENTATION

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

CAMERA COVERAGE

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

DATA SHEET NO. 11
POST TEST OBSERVATIONS

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

TEST DUMMY INFORMATION AND CONTACT

Description	Driver	Passenger
Dummy Type/Serial No.	061	273
Head Contact	Face to airbag, rear of head to head restraint	Face to airbag, rear of head to head restraint
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	Airbag	Airbag
Left Knee Contact	Lower Instrument Panel	Glove Box Door
Right Knee Contact	Lower Instrument Panel	Glove Box Door

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Closed, operable	Closed, operable
Rear Door Opening	Closed, operable	Closed, operable
Seat Track Shift (mm)	-4	4
Seat Back Failure	None	None
Glazing Damage	None	

POST TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Passenger Side Glazing Cracked
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

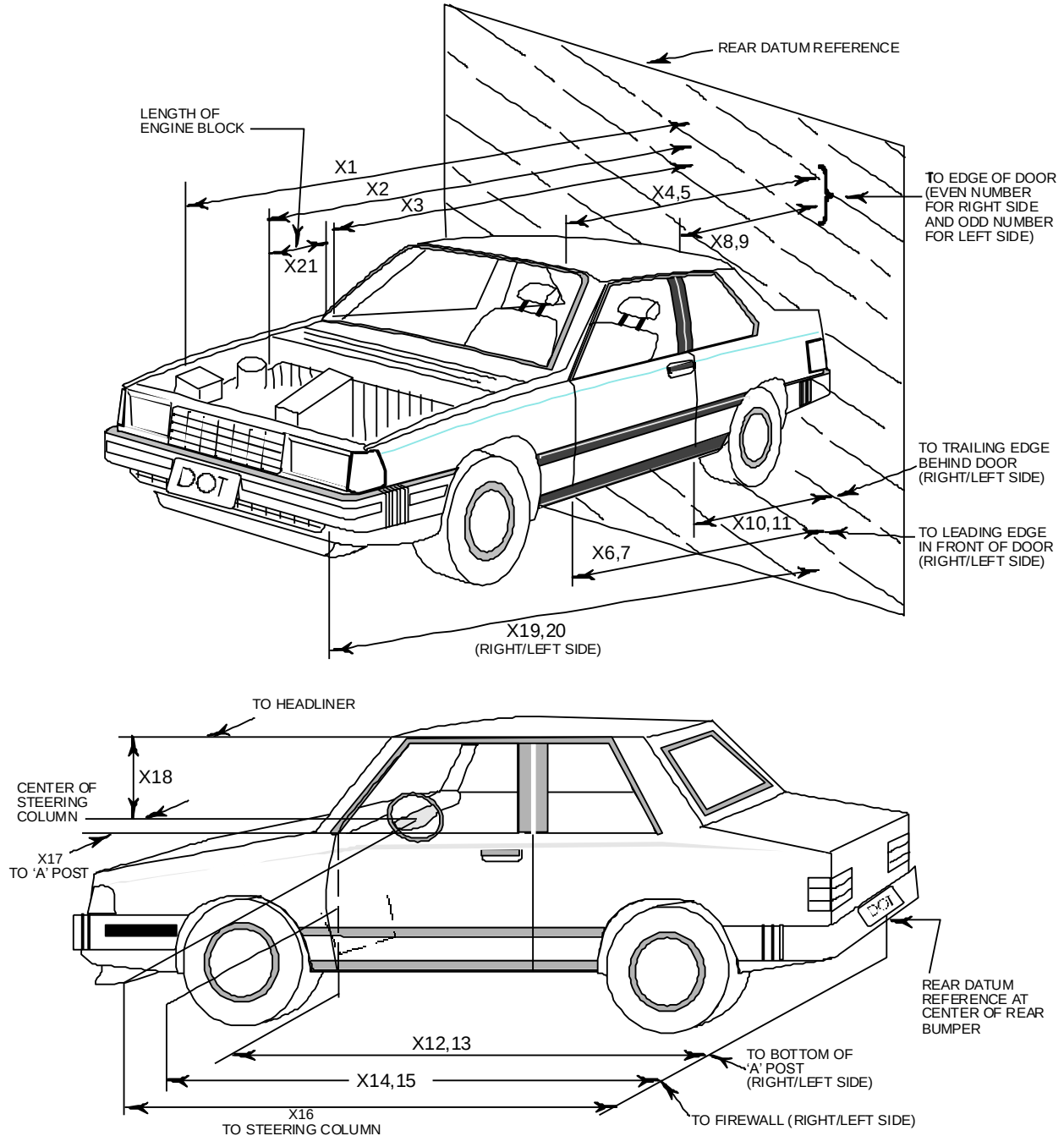
Measured Parameter	Units	Value
Left Side	mm	626
Center	mm	687
Right Side	mm	708
Average	mm	674

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010



DATA SHEET NO. 12 (CONTINUED)
VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5844	5179	-664
2	Rear Surface of Vehicle (RSOV) to Front of Engine	5120	4947	-173
3	RSOV to Firewall	4644	4650	6
4	RSOV to Upper Leading Edge of Right Door	4266	4250	-16
5	RSOV to Upper Leading Edge of Left Door	4260	4257	-3
6	RSOV to Lower Leading Edge of Right Door	4237	4249	12
7	RSOV to Lower Leading Edge of Left Door	4242	4237	-5
8	RSOV to Upper Trailing Edge of Right Door	3093	3081	-12
9	RSOV to Upper Trailing Edge of Left Door	3093	3088	-5
10	RSOV to Lower Trailing Edge of Right Door	3079	3087	8
11	RSOV to Lower Trailing Edge of Left Door	3081	3073	-8
12	RSOV to Bottom of "A" Post of Right Side	4247	4233	-15
13	RSOV to Bottom of "A" Post of Left Side	4247	4244	-3
14	RSOV to Firewall, Right Side	NA	4580	NA
15	RSOV to Firewall, Left Side	4607	4585	-22
16	RSOV to Steering Column	3781	3790	10
17	Center of Steering Column to "A" Post	302	291	-11
18	Center of Steering Column to Headliner	8	0	-8
19	RSOV to Right Side of Front Bumper	5776	5166	-610
20	RSOV to Left Side of Front Bumper	5777	5178	-599
21	Length of Engine Block	4687	4673	-14
RD	RSOV to Right Side of Dash Panel	3981	3970	-11
CD	RSOV to Center of Dash Panel	3997	3971	-26
LD	RSOV to Left Side of Dash Panel	3983	3981	-3

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: <u>2011 Chevrolet Silverado Crew Cab</u>	NHTSA No: <u>MB0114</u>
Test Program: <u>Frontal NCAP</u>	Test Date: <u>10/4/2010</u>

VEHICLE INFORMATION

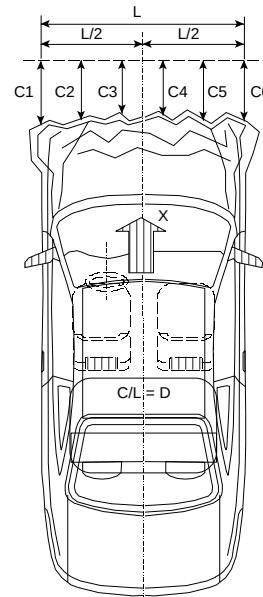
VIN	<u>3GCPKPEA1BG103767</u>	Wheelbase (mm)	<u>3655</u>
Vehicle Size Category	<u>4 Door Pickup</u>	Test Weight (kg)	<u>2696.5</u>

ACCELEROMETER DATA

Accelerometer Locations: As described in Data Sheet No. 7
 Cal. Procedure/Interval: Calspan Procedure / 6 month
 Integration Algorithm: Trapezoidal Linearity: > 99.0%
 Impact Velocity (km/h): 55.9 km/h
 Velocity Change (km/h): 63.41
 Time of Separation (msec): 206

CRUSH PROFILE

Collision Deformation Classification: 12FDEW4
 Midpoint of Damage: Vehicle Centerline
 Damage Region Length (mm): 1436
 Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	8511	7977	534
C2	Crush zone 2 at left side	mm	8575	7957	619
C3	Crush zone 3 at left side	mm	8606	7928	678
C4	Crush zone 4 at right side	mm	8607	7945	662
C5	Crush zone 5 at right side	mm	8575	7950	625
C6	Crush zone 6 at right side	mm	8508	7963	544
L	C1 to C6	mm	1481	1436	45

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

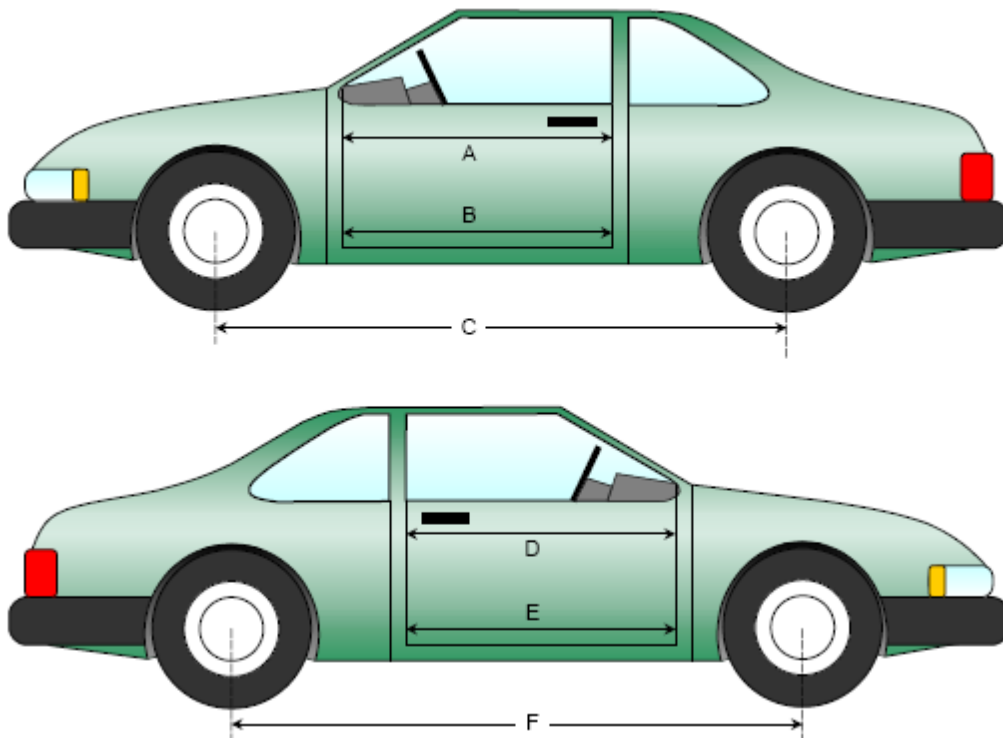
Test Vehicle: 2011 Chevrolet Silverado Crew Cab NHTSA No: MB0114
Test Program: Frontal NCAP Test Date: 10/4/2010

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1112	1108	-4
B	Left Side Lower	mm	1095	1094	-1
D	Right Side Upper	mm	1113	1109	-4
E	Right Side Lower	mm	1096	1094	-2

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3658	3629	-29
F	Right Side Wheelbase	mm	3652	3616	-37



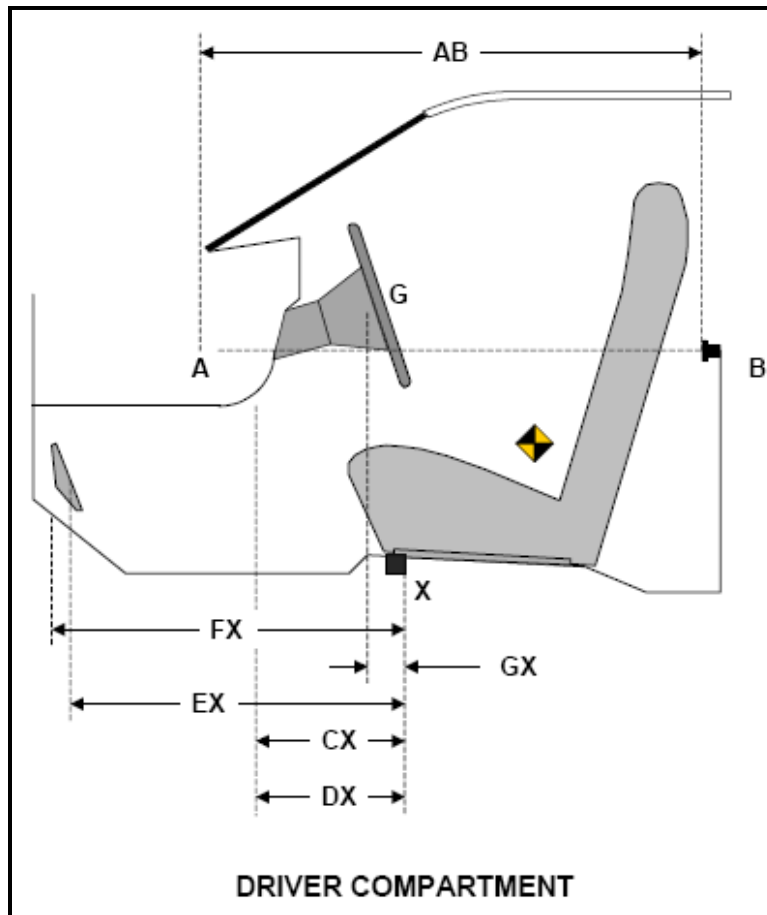
DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010

DRIVER COMPARTMENT INTRUSION

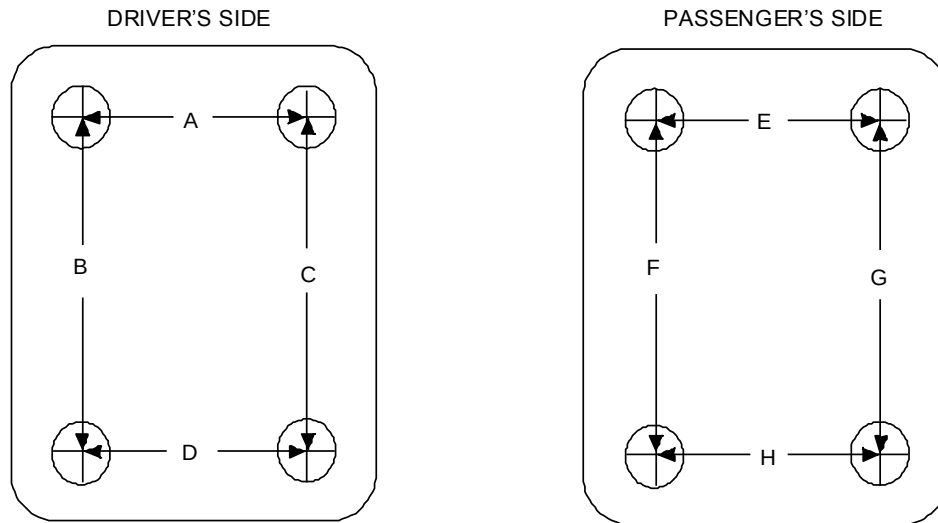
Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	876	875	-1
CX	Left Knee Bolster to X	mm	310	326	16
DX	Right Knee Bolster to X	mm	302	307	5
EX	Brake Pedal to X	mm	519	491	-28
FX	Foot Rest to X	mm	NA	NA	NA
GX	Center of Steering Column Wheel Hub to X	mm	79	93	14

X = Front of Seat Track (Stationary)



DATA SHEET NO.14 (CONTINUED)
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: <u>2011 Chevrolet Silverado Crew Cab</u>	NHTSA No: <u>MB0114</u>
Test Program: <u>Frontal NCAP</u>	Test Date: <u>10/4/2010</u>



TOP VIEW THROUGH FLOOR PAN

UNDERBODY FLOORBOARD DEFORMATION

Measurement	Pre-Test	Post-Test	Difference
A	492	493	1
B	385	397	12
C	367	364	-3
D	484	476	-8
E	412	426	15
F	345	327	-18
G	318	320	2
H	421	419	-2

All units in millimeters

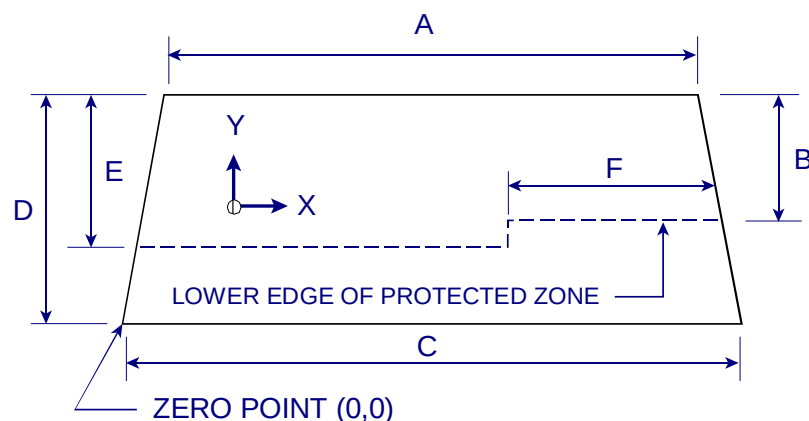
DATA SHEET NO. 15
SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: <u>2011 Chevrolet Silverado Crew Cab</u>	NHTSA No: <u>MB0114</u>
Test Program: <u>Frontal NCAP</u>	Test Date: <u>10/4/2010</u>

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	2325	2325	100
Right Side	2325	2325	100
Total	4650	4650	100



Item	Units	Value
A	mm	1390
B	mm	425
C	mm	1780
D	mm	740
E	mm	480
F	mm	770

AREAS OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.

X	Y
-	-
-	-
-	-
-	-

B. Provide coordinates of the area beneath the protected zone that the inner surface of the windshield was penetrated by a vehicle component.

X	Y
-	-
-	-
-	-
-	-

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

Test Vehicle:	<u>2011 Chevrolet Silverado Crew Cab</u>	NHTSA No:	<u>MB0114</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>10/4/2010</u>

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

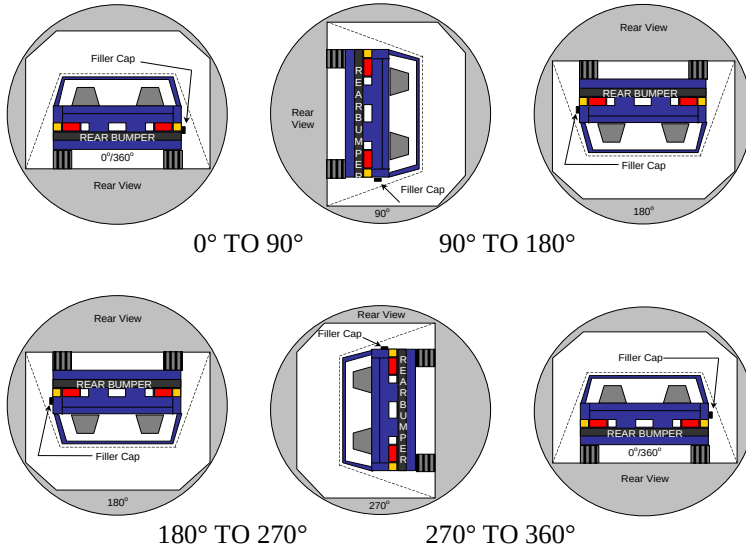
Temperature at Time of Impact: 22 °C Test Time: 3:00pm

Stoddard Solvent Spillage Measurements

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

DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle:	2011 Chevrolet Silverado Crew Cab	NHTSA No:	MB0114
Test Program:	Frontal NCAP	Test Date	10/4/2010



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

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	1:06	5:00	6:06
90° to 180°	1:07	5:00	6:07
180° to 270°	1:06	5:00	6:06
270° to 360°	1:03	5:00	6:03

FMVSS 301 SPILLAGE TABLE

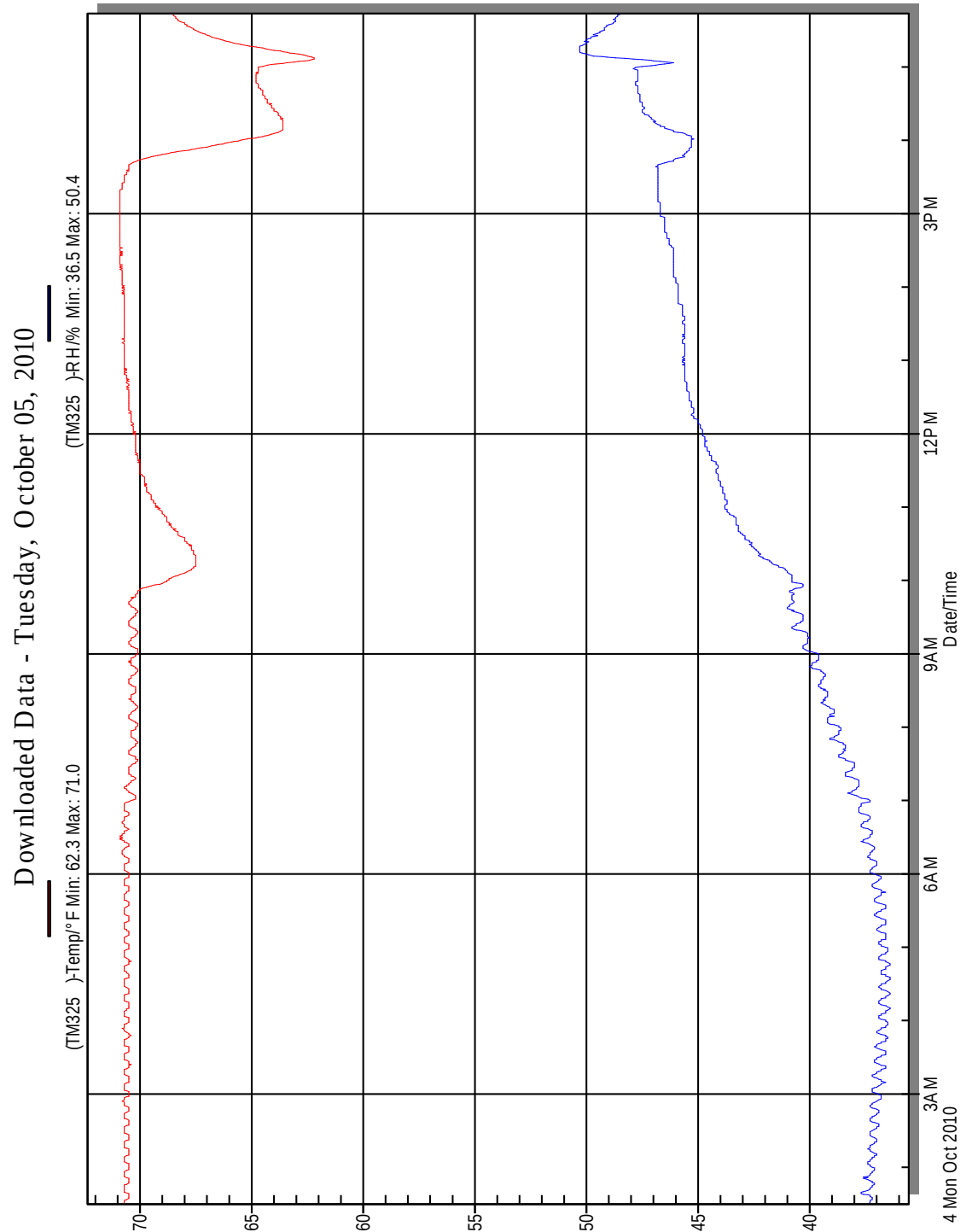
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	NA		
90° to 180°	0	NA		
180° to 270°	0	NA		
270° to 360°	0	NA		

SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle:	<u>2011 Chevrolet Silverado Crew Cab</u>	NHTSA No:	<u>MB0114</u>
Test Program:	<u>Frontal NCAP</u>	Test Date	<u>10/4/2010</u>



APPENDIX A
PHOTOGRAPHS

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15	Pre-test Left Rear $\frac{3}{4}$ View	A-12
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41	Pre-test Driver's Side Floorpan	A-25
42	Post-test Driver's Side Floorpan	A-25
43a	Post-test Driver Dummy Contact With Airbag	A-26
43b	Post-Test Driver Dummy Contact With Head Restraint	A-26
44	Pre-test View of the Steering Column Shear Capsule	A-27
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60a	Post-test Passenger Dummy Contact With Airbag	A-35
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66	Vehicle at 180° on Static Rollover Device	A-38
67	Vehicle at 270° on Static Rollover Device	A-39
68	Vehicle at 360° on Static Rollover Device	A-39
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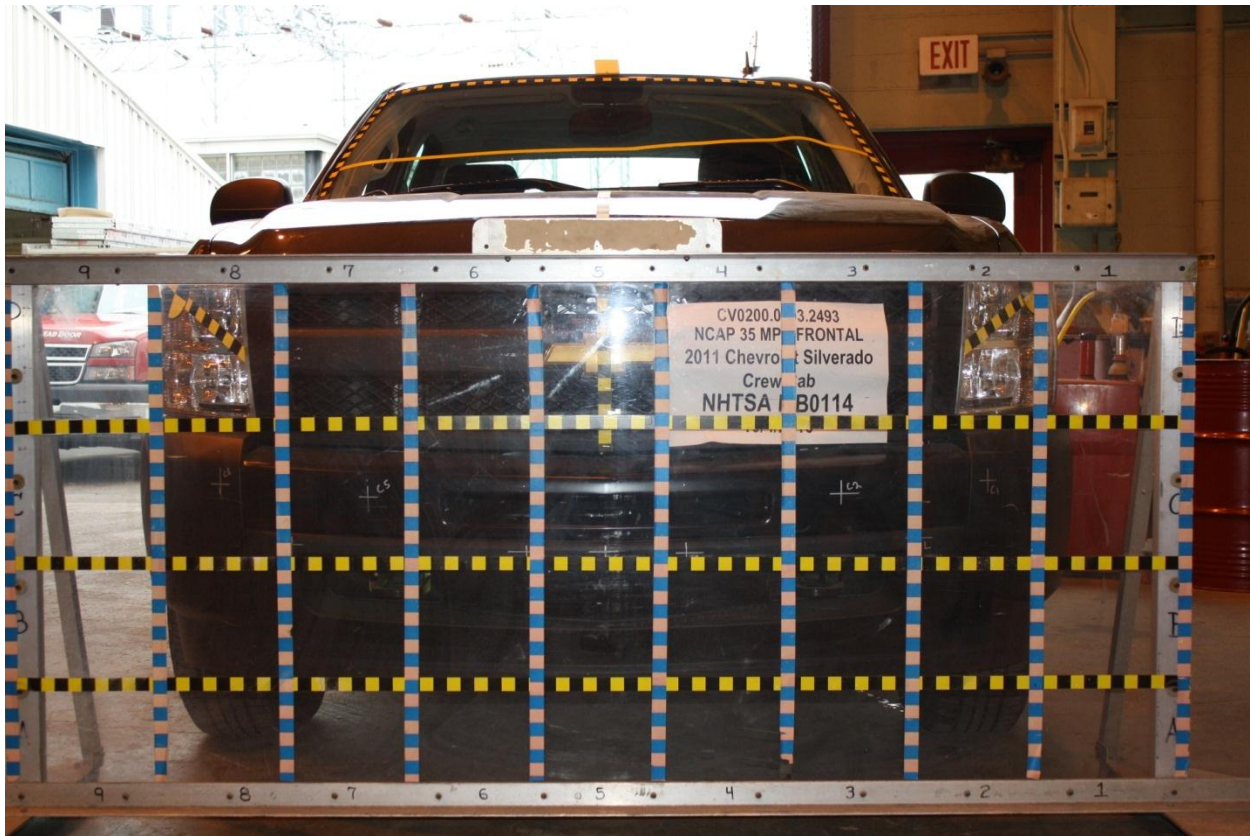


Figure A-1: Load Cell Location



Figure A-2: Load Cell Wall



Figure A-3: Manufacturer's 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 $\frac{3}{4}$ View



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



Figure A-17: Pre-Test Windshield View



Figure A-18: Post-Test Windshield View



Figure A-19: Pre-Test Engine Compartment View

Photo Not Available

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

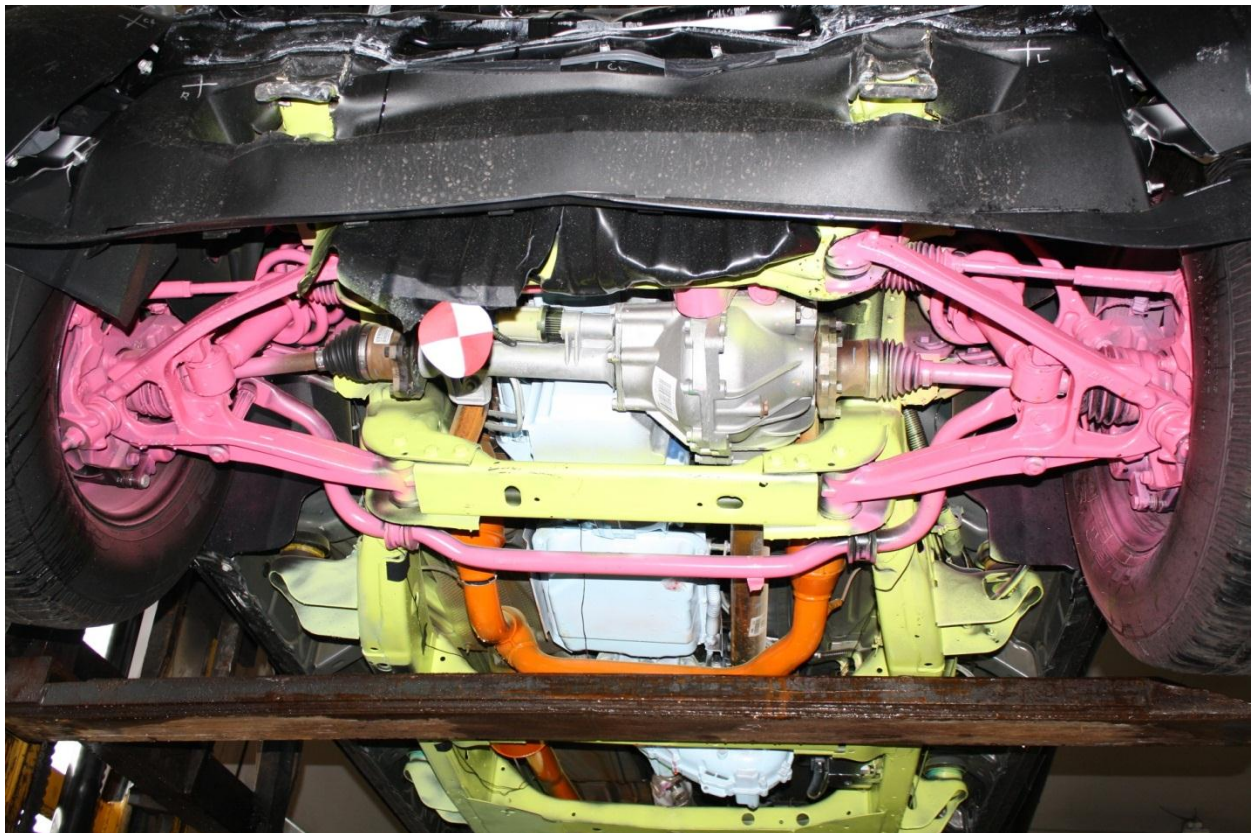


Figure A-24: Post-Test Front Underbody View

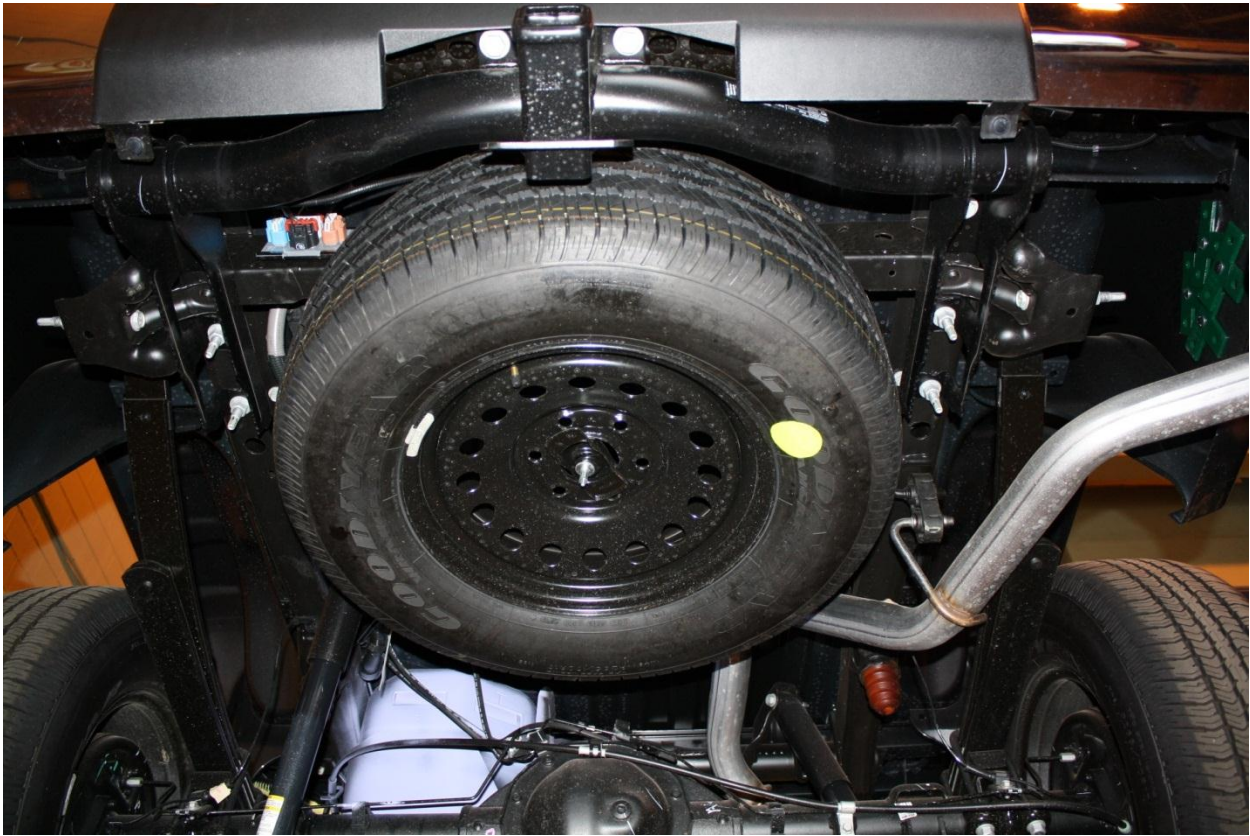


Figure A-25: Pre-Test Rear Underbody View

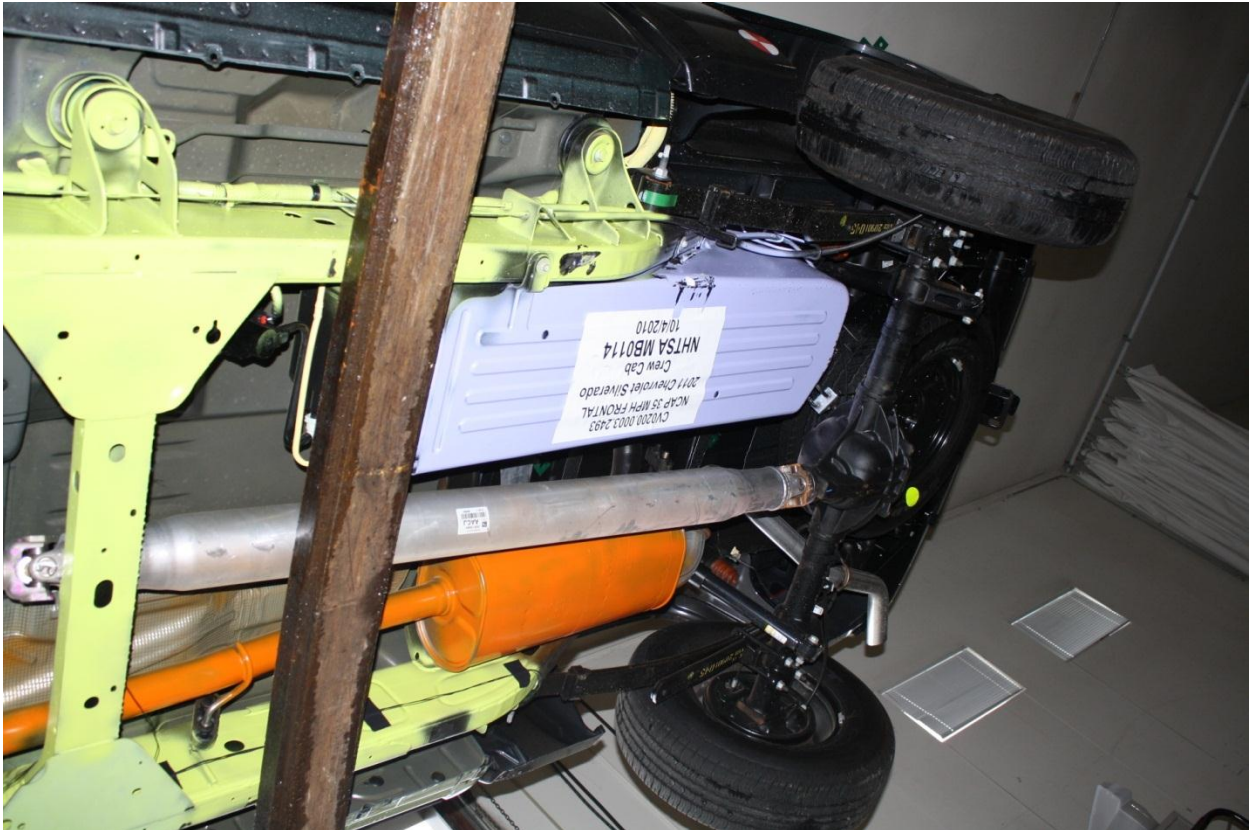


Figure A-26: Post-Test Rear Underbody View



PRE-TEST
NCAP 35 MPH FRONTAL
2011 Chevrolet Silverado Crew Cab
NHTSA No. MB0114

Figure A-27: Pre-Test Dummy Cable Routing

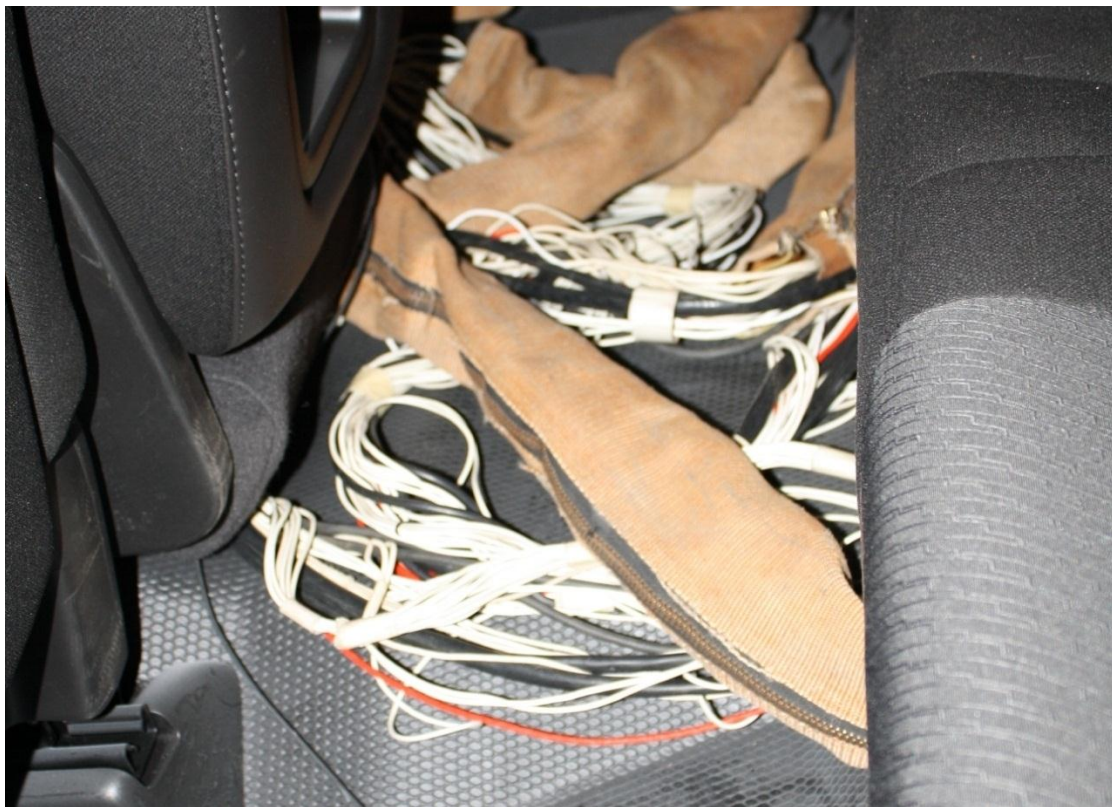


Figure A-28: Post-Test Dummy Cable Routing



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

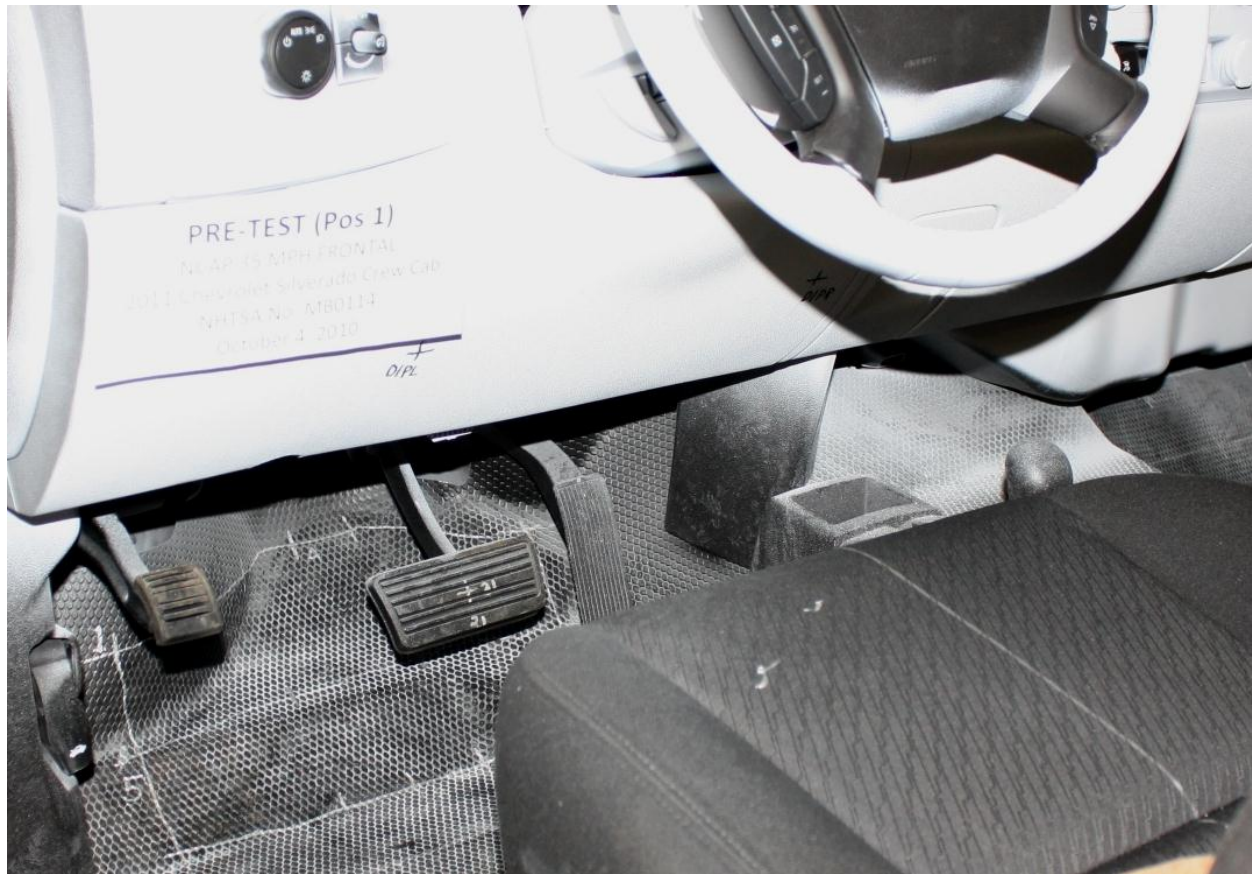


Figure A-39: Pre-Test Driver's Side Knee Bolster



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



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

Photo Not Available

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

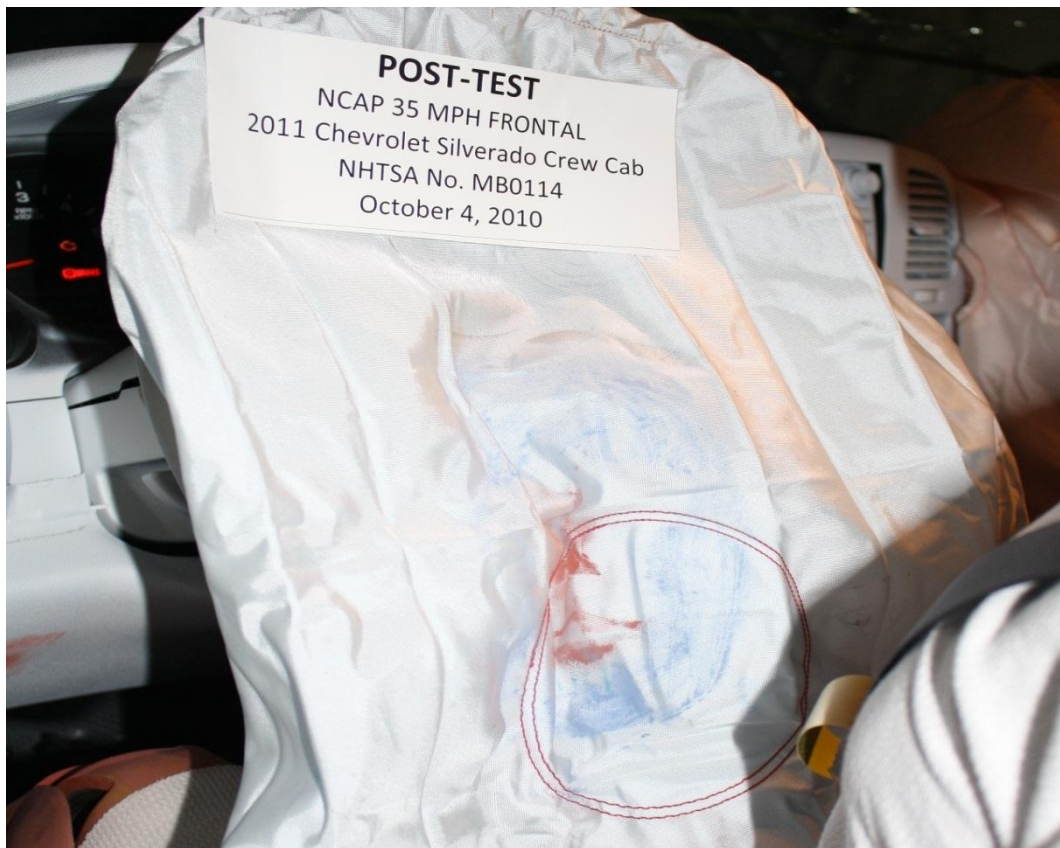


Figure A-43a: Post-Test Diver Dummy Contact with Airbag

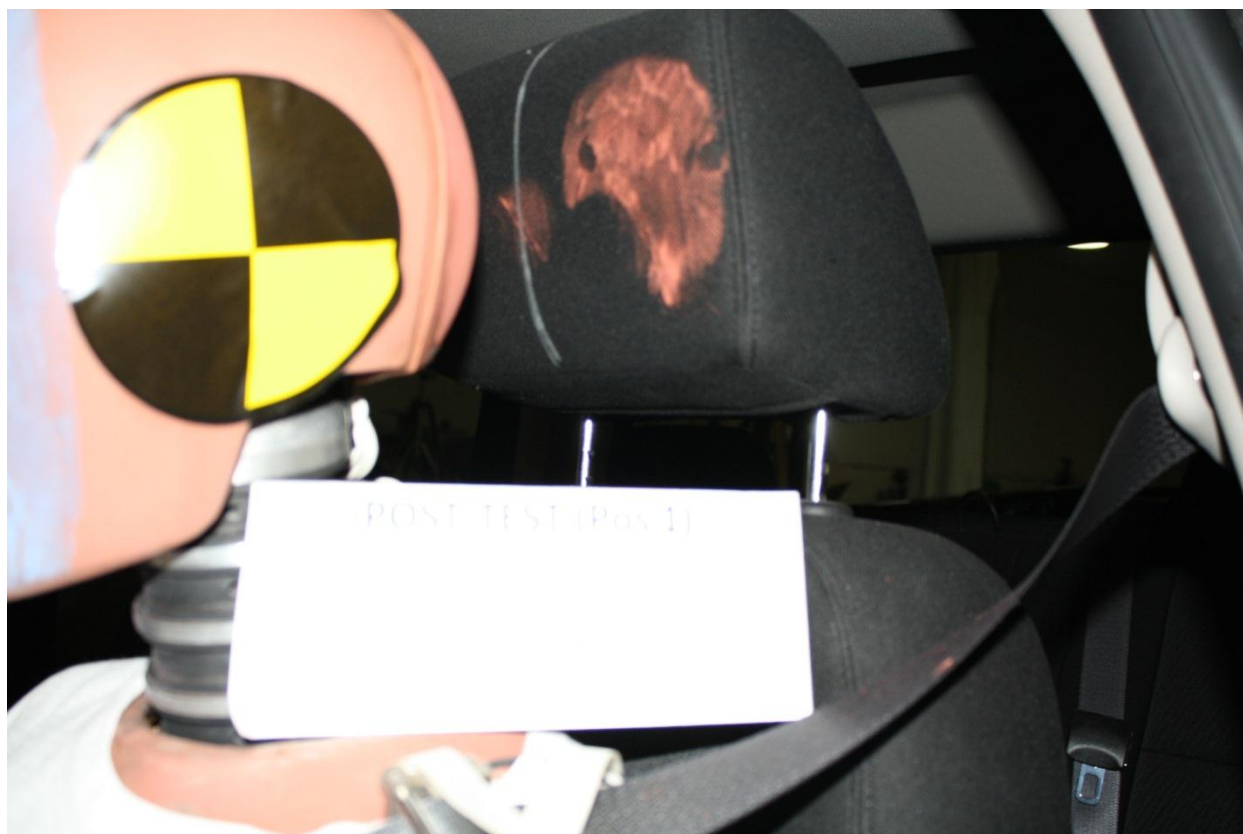


Figure A-43b: Post-Test Driver Dummy Contact with Head Restraint



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



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



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



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



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



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



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



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



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



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



Figure A-54: Pre-Test Passenger Dummy Feet



Figure A-55: Post-Test Passenger Dummy Feet

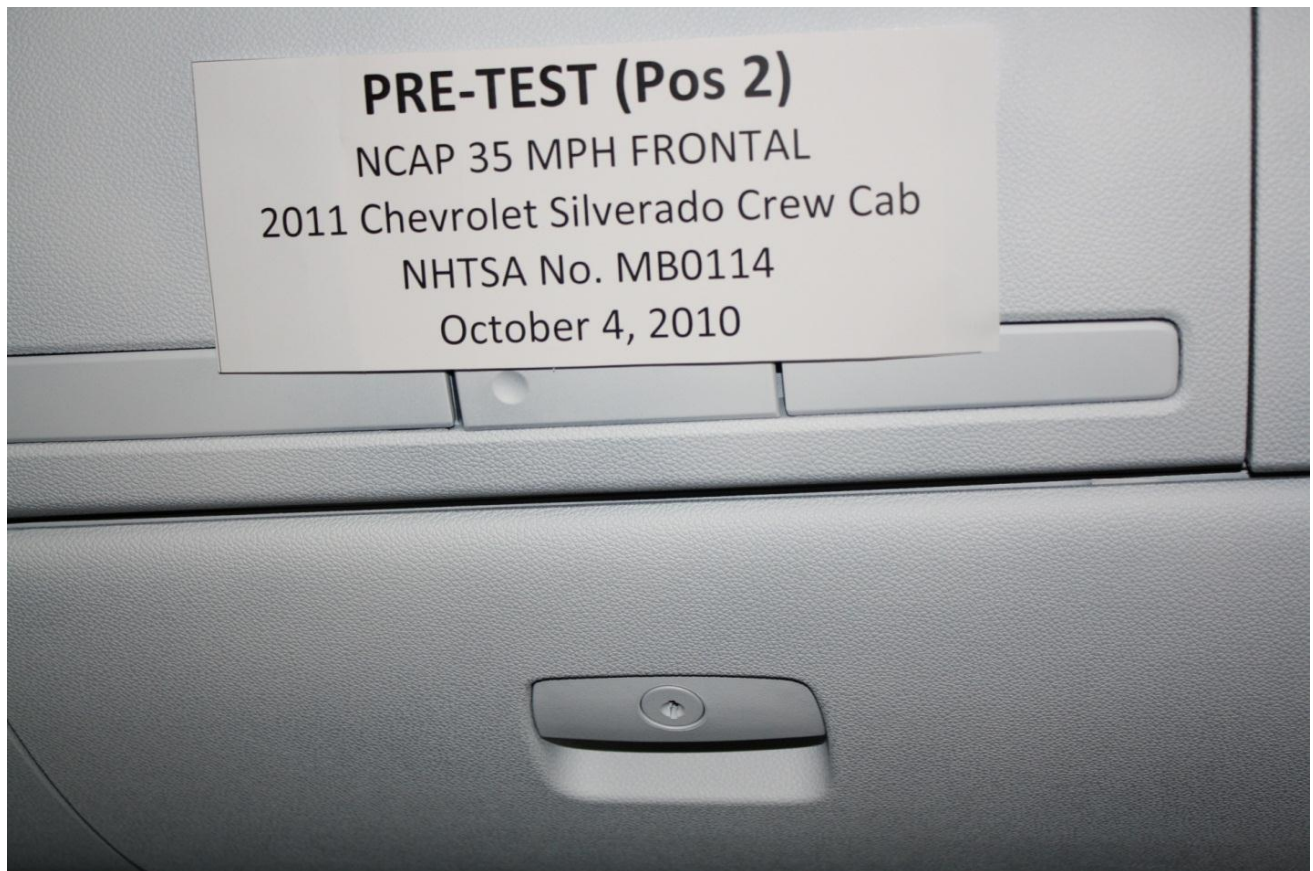


Figure A-56: Pre-Test Passenger's Side Knee Bolster

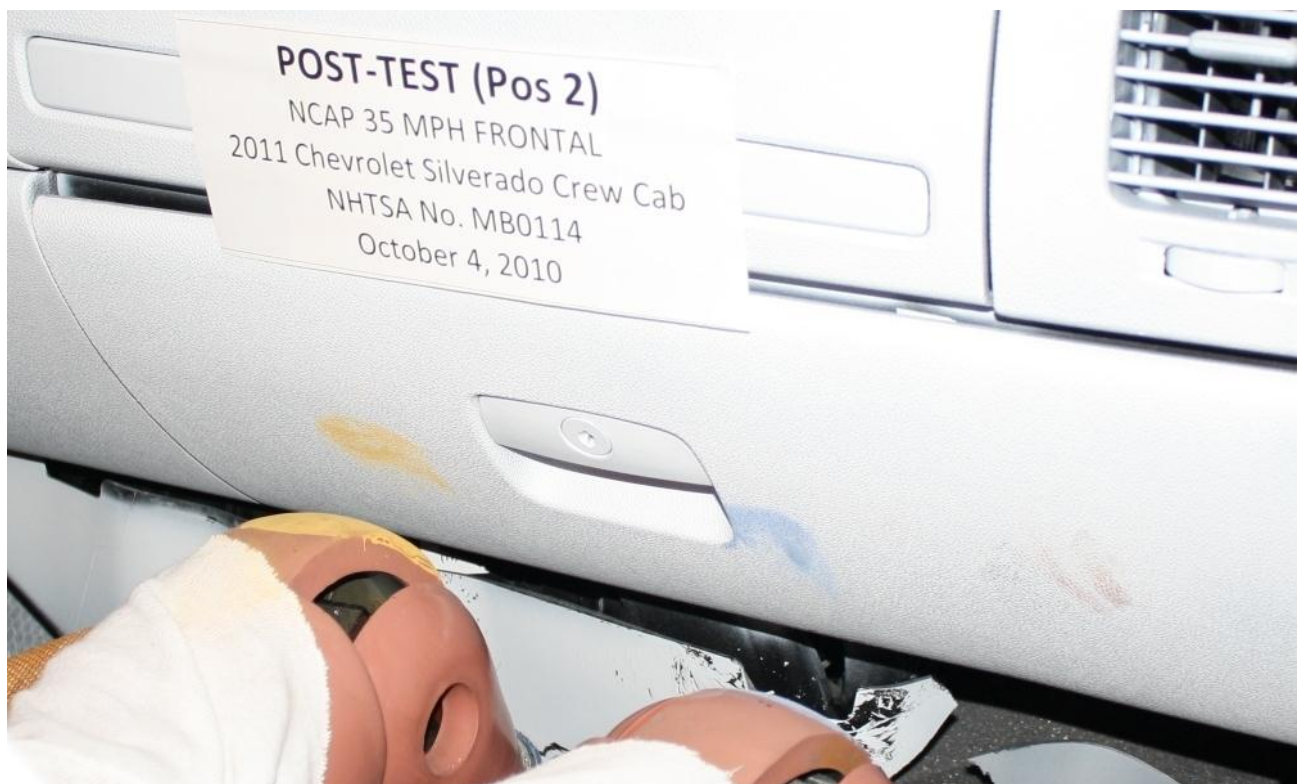


Figure A-57: Post-Test Passenger's Side Knee Bolster



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



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



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



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

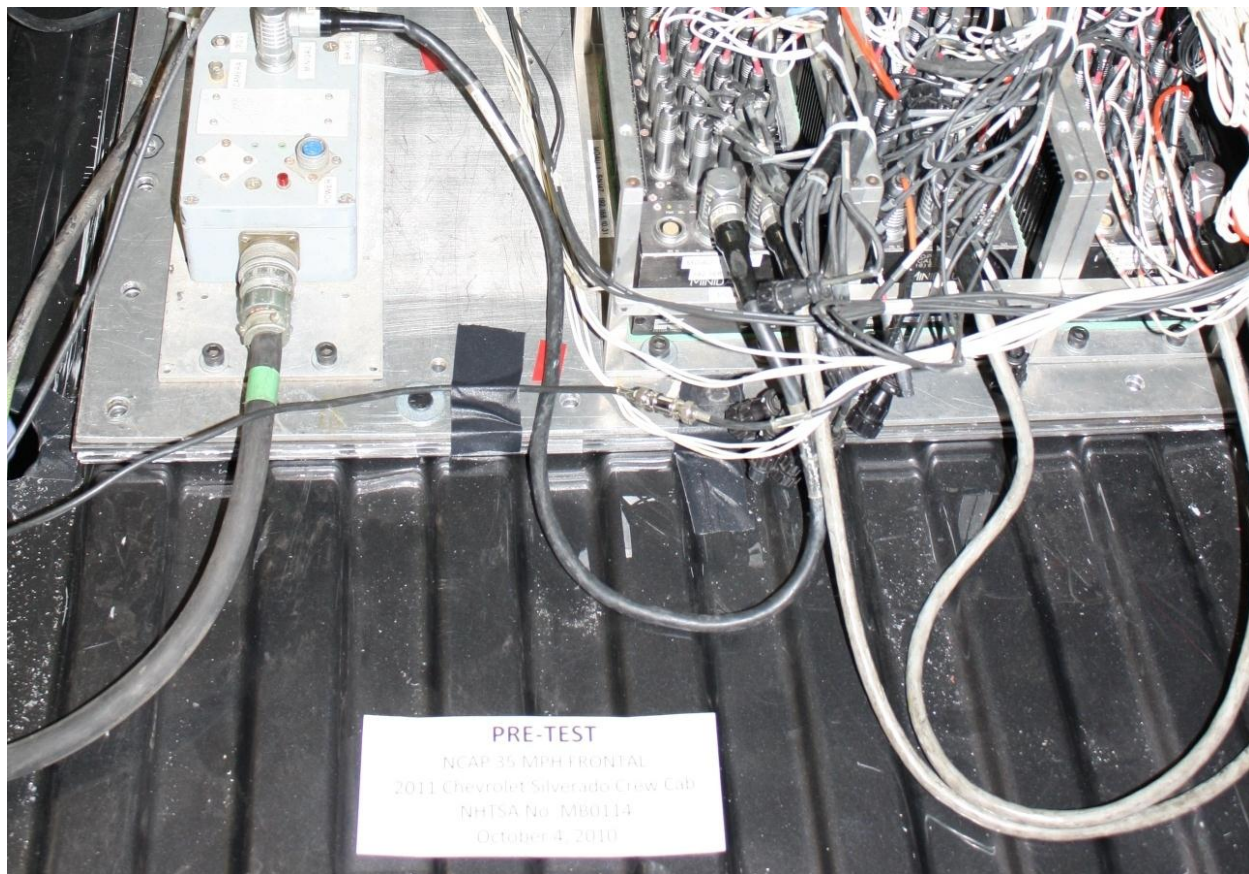


Figure A-61: Photograph of Ballast Installed Vehicle

Photo Not Applicable

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

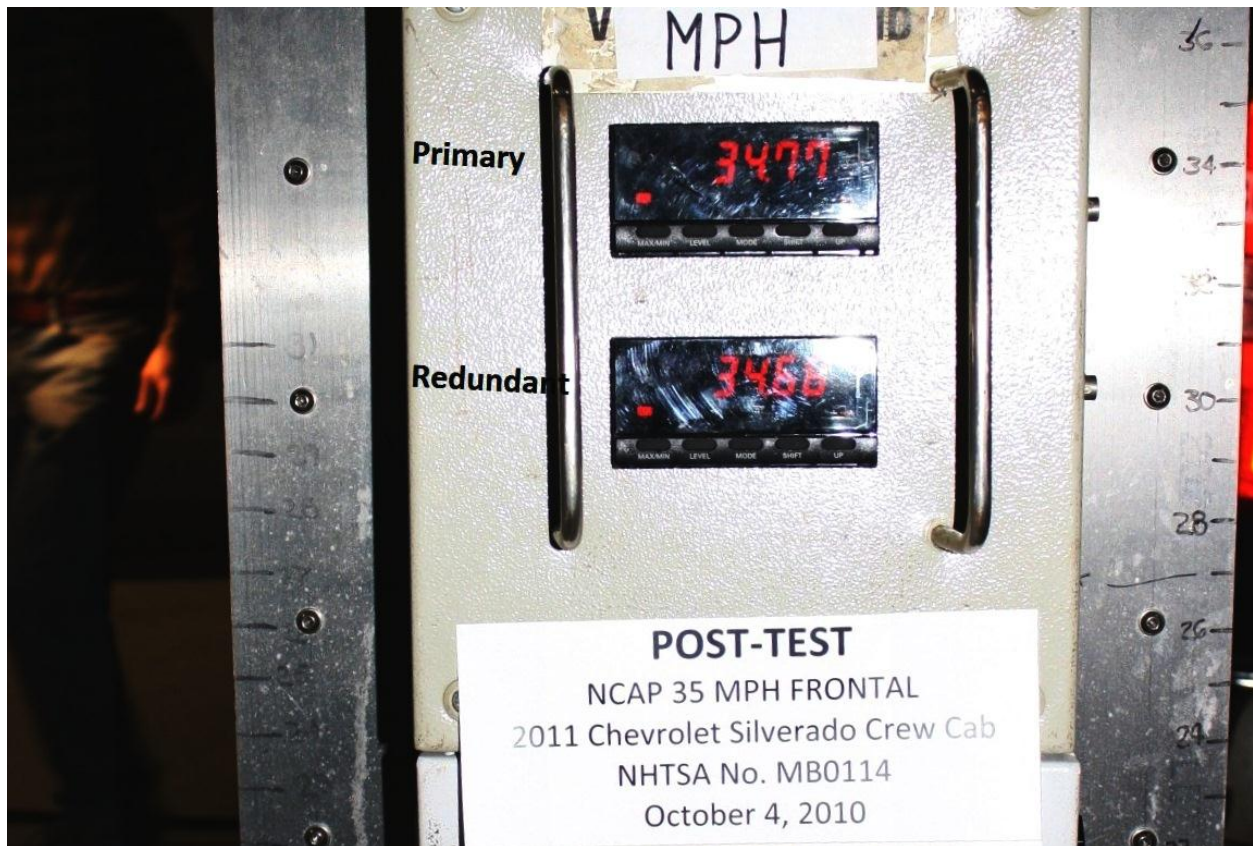


Figure A-63: Post-Test Speed Trap Read Out



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



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



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



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



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



Figure A-69: Impact Photograph

[illegible]

Figure A-70: Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

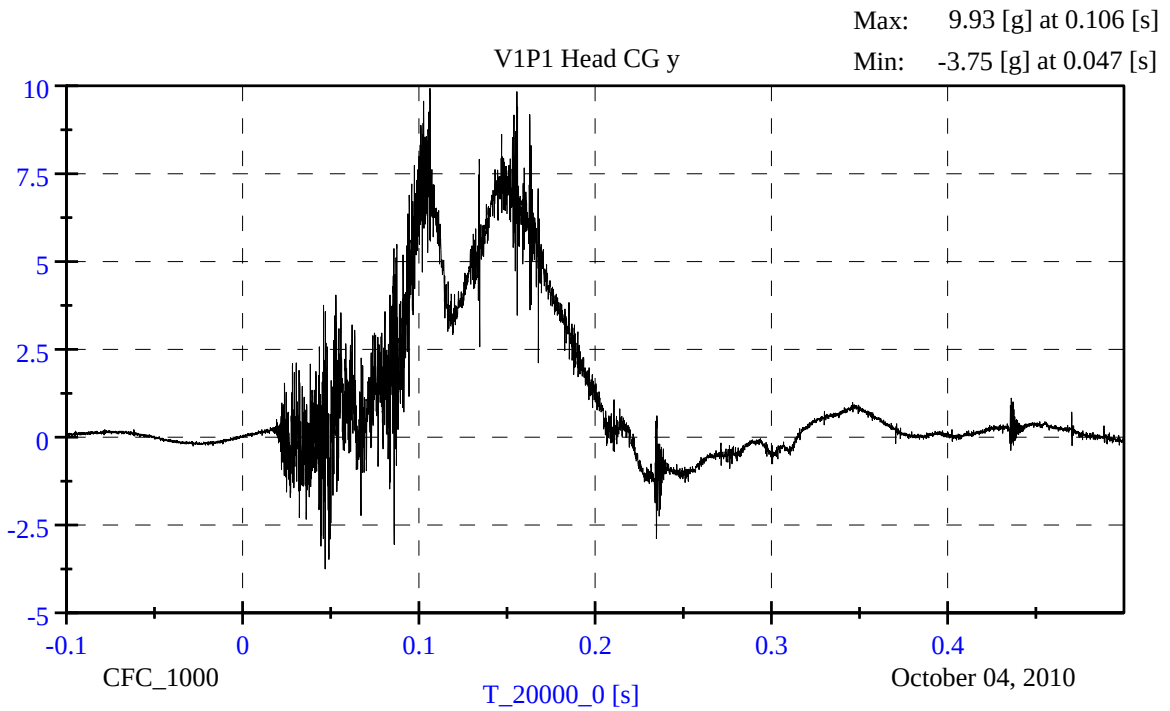
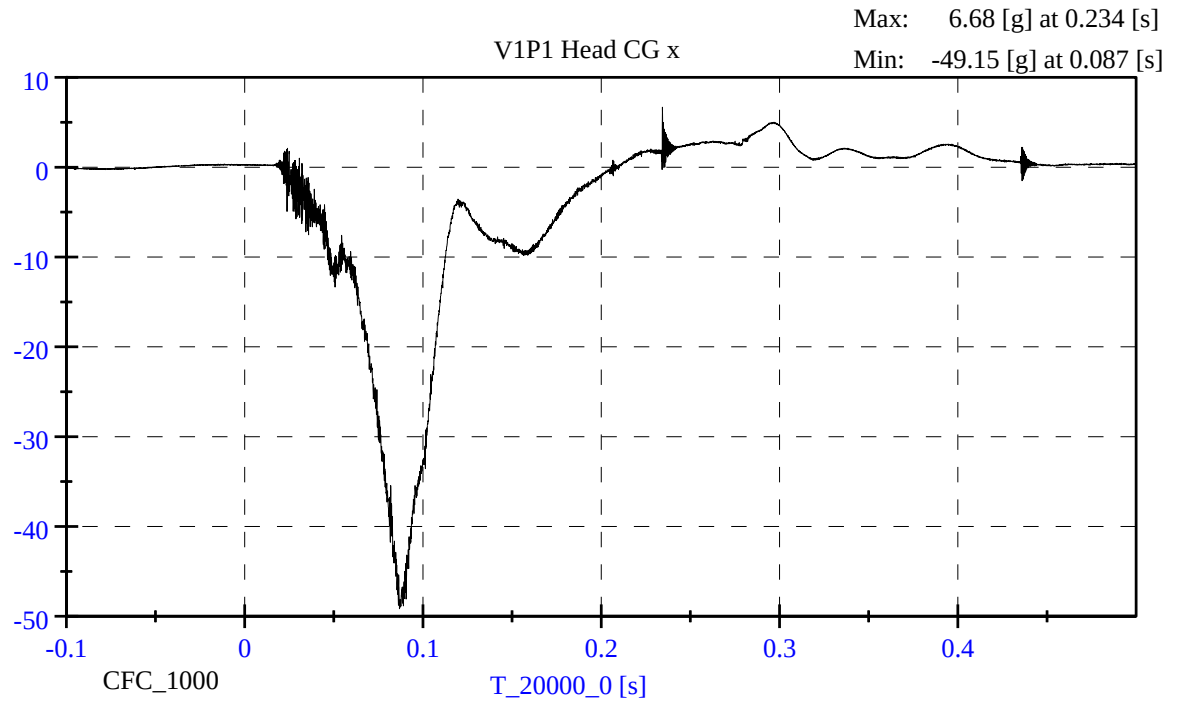
Fig. No.	List of Data Plots Provided In The Test Report	Page No.
1	Driver Head X Acceleration vs. Time Primary	B-5
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5	Driver Chest X Deflection vs. Time	B-7
6	Driver Chest X Acceleration vs. Time Primary	B-7
7	Driver Chest Y Acceleration vs. Time Primary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

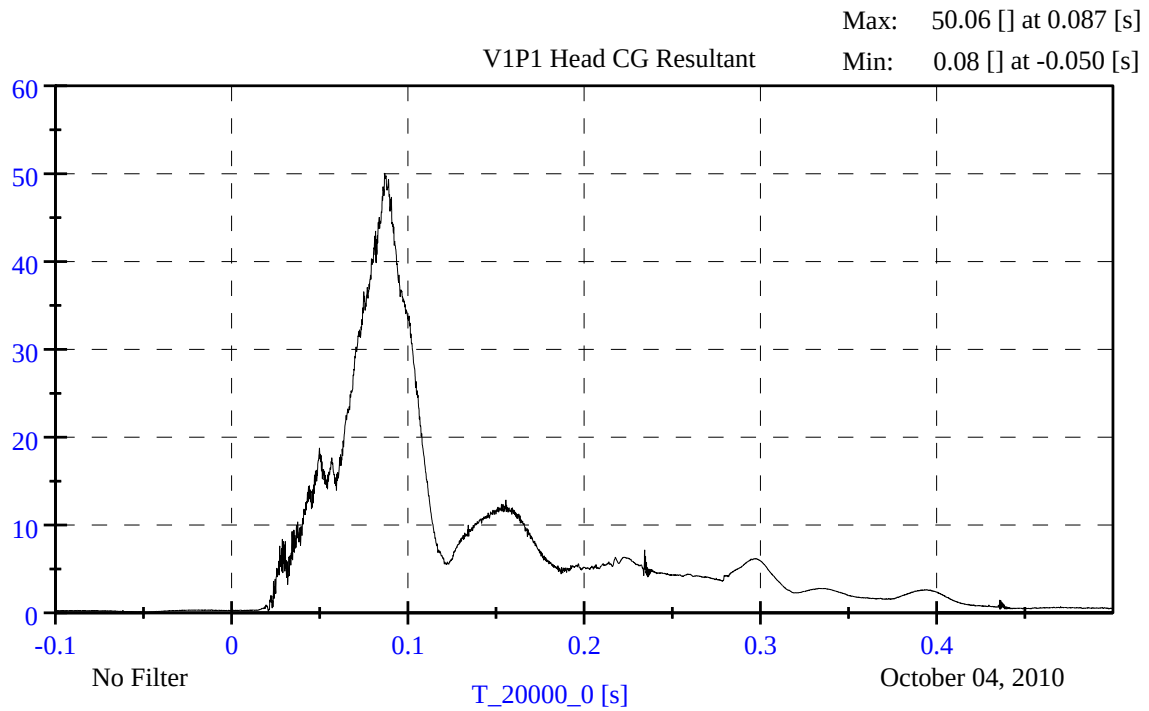
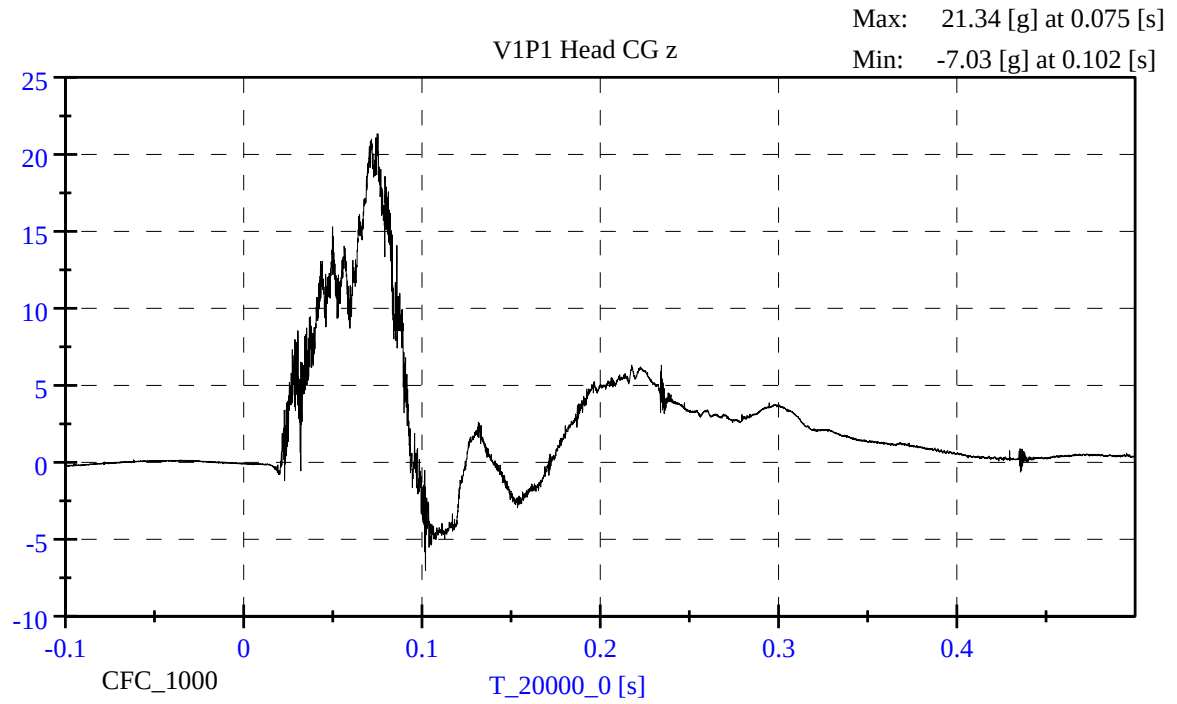
29	Passenger Left Femur Force vs. Time	B-19
30	Passenger Right Femur Force vs. Time	B-19

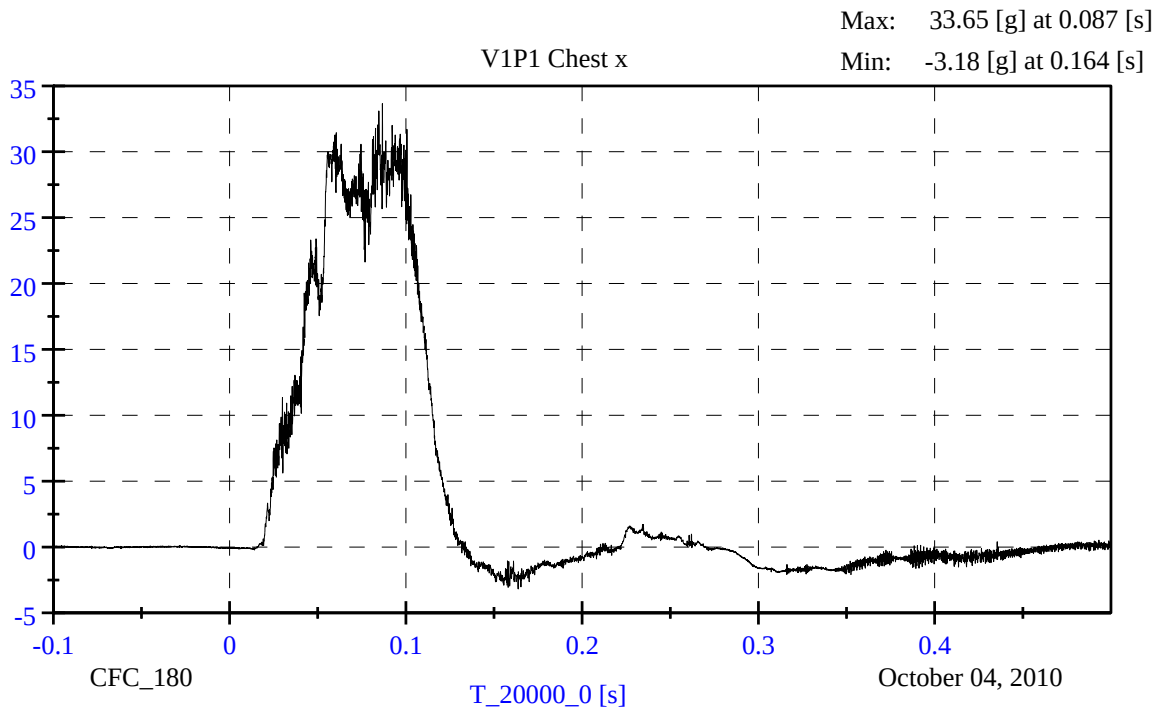
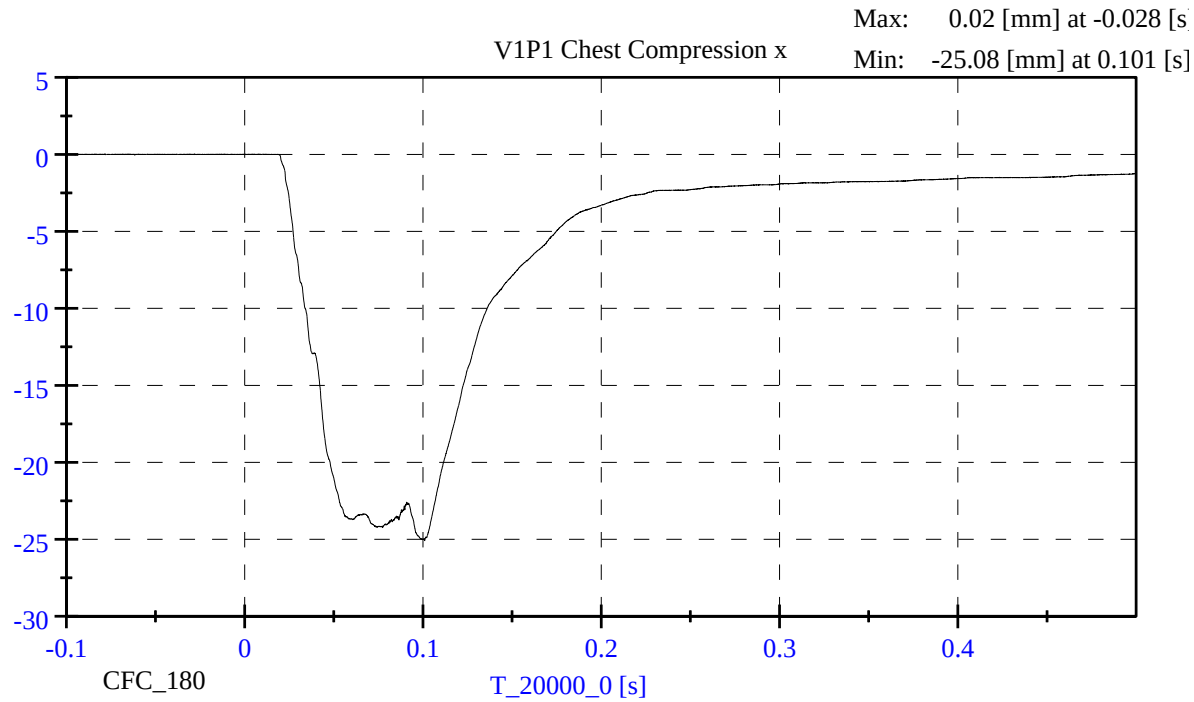
The following additional dummy and vehicle response data can be found in the R&D section of the NHTSA website at www.nhtsa.dot.gov

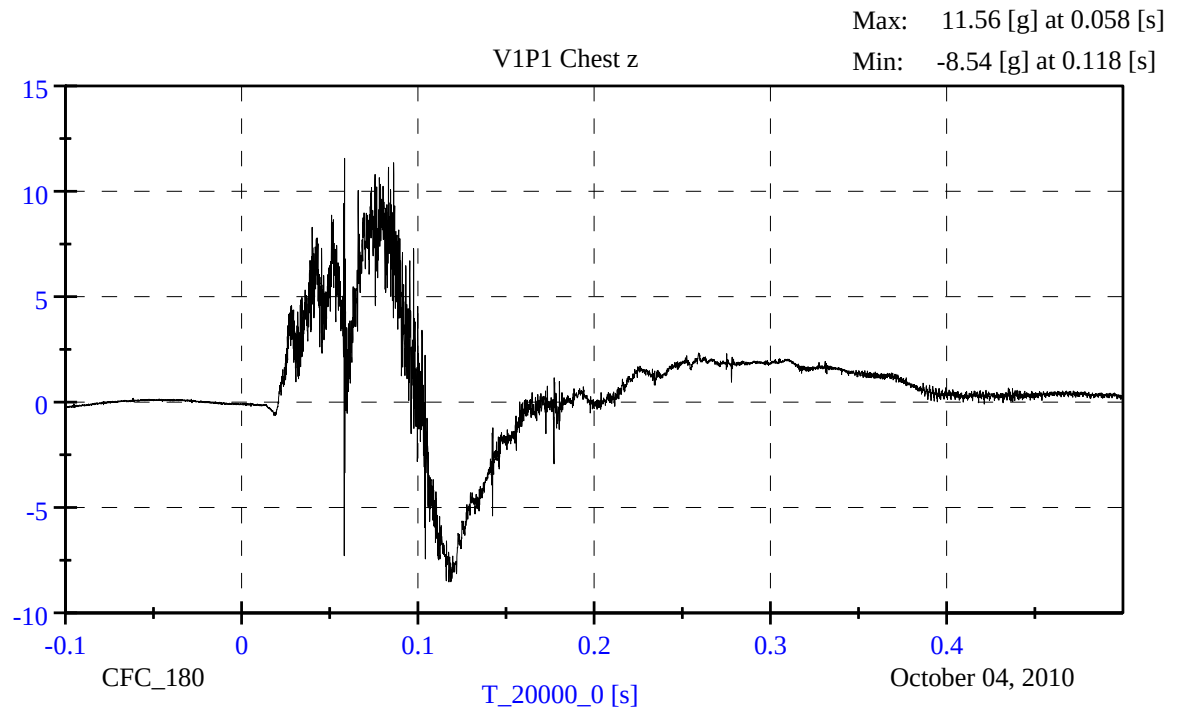
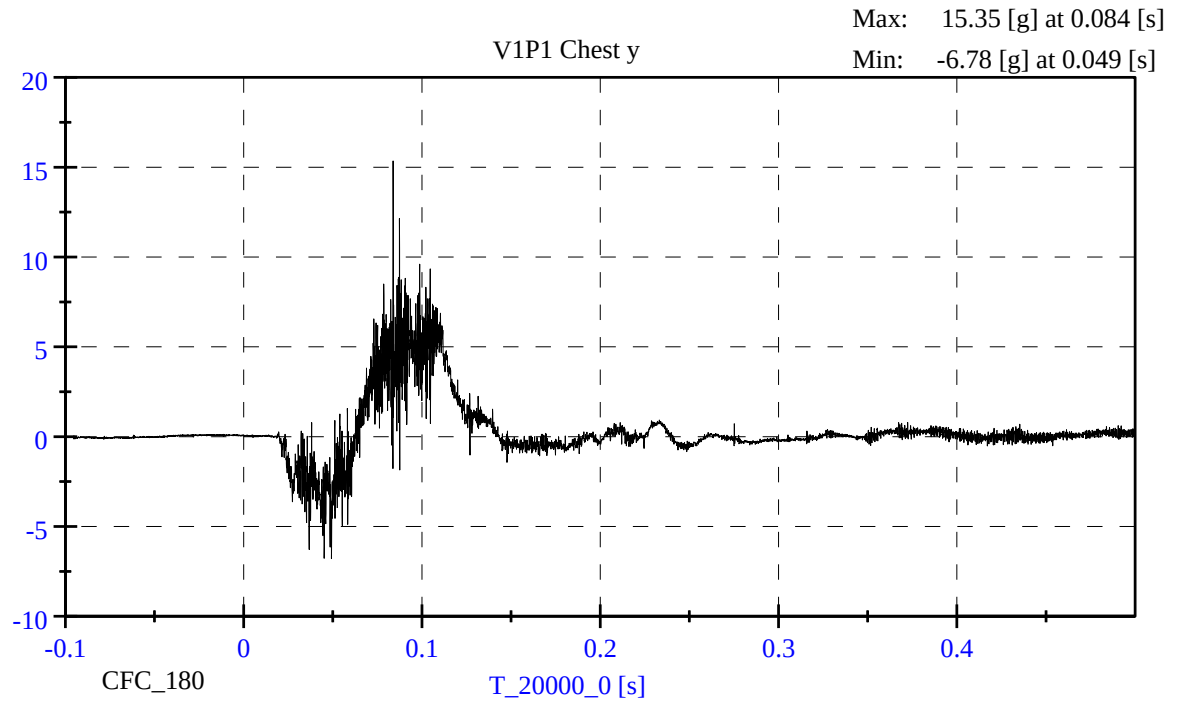
Driver Head X Acceleration Redundant
 Driver Head Y Acceleration Redundant
 Driver Head Z Acceleration Redundant
 Driver Upper Neck Force Y
 Driver Upper Neck Moment X
 Driver Upper Neck Moment Z
 Driver Chest X Acceleration Redundant
 Driver Chest Y Acceleration Redundant
 Driver Chest Z Acceleration Redundant
 Driver Pelvis X
 Driver Pelvis Y
 Driver Pelvis Z
 Driver Shoulder Belt Force
 Driver Lap Belt Force
 Driver Left Upper Tibia Moment X
 Driver Left Upper Tibia Moment Y
 Driver Left Upper Tibia Force Z
 Driver Left Lower Tibia Moment X
 Driver Left Lower Tibia Moment Y
 Driver Left Lower Tibia Force Z
 Driver Right Upper Tibia Moment X
 Driver Right Upper Tibia Moment Y
 Driver Right Upper Tibia Force Z
 Driver Right Lower Tibia Moment X
 Driver Right Lower Tibia Moment Y
 Driver Right Lower Tibia Force Z
 Driver Left Foot Fore Z
 Driver Left Foot Aft X
 Driver Left Foot Aft Z
 Driver Right Foot Fore Z
 Driver Right Foot Aft X
 Driver Right Foot Aft Z
 Passenger Head X Acceleration Redundant
 Passenger Head Y Acceleration Redundant
 Passenger Head Z Acceleration Redundant
 Passenger Upper Neck Force X
 Passenger Upper Neck Force Z
 Passenger Upper Neck Moment Y
 Passenger Chest X Acceleration Redundant
 Passenger Chest Y Acceleration Redundant
 Passenger Chest Z Acceleration Redundant
 Passenger Pelvis X
 Passenger Pelvis Y
 Passenger Pelvis Z
 Passenger Shoulder Belt Force
 Passenger Lap Belt Force
 Passenger Left Upper Tibia Moment X
 Passenger Left Upper Tibia Moment Y
 Passenger Left Upper Tibia Force Z
 Passenger Left Lower Tibia Moment X
 Passenger Left Lower Tibia Moment Y

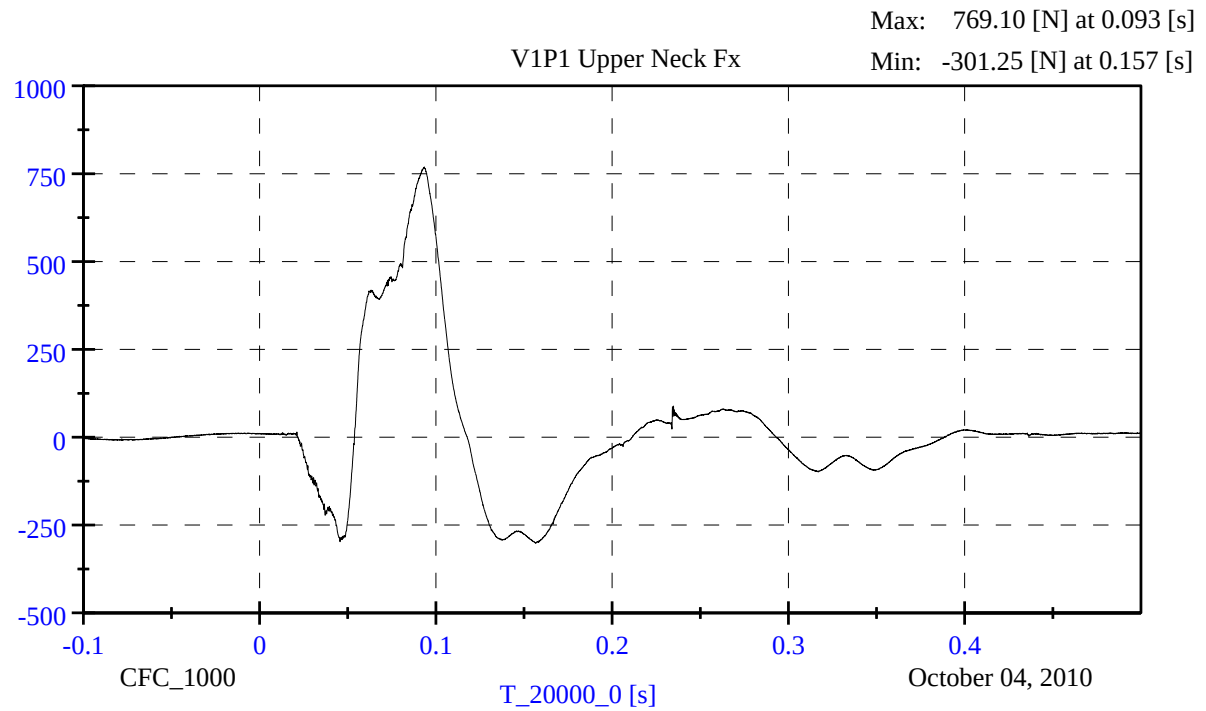
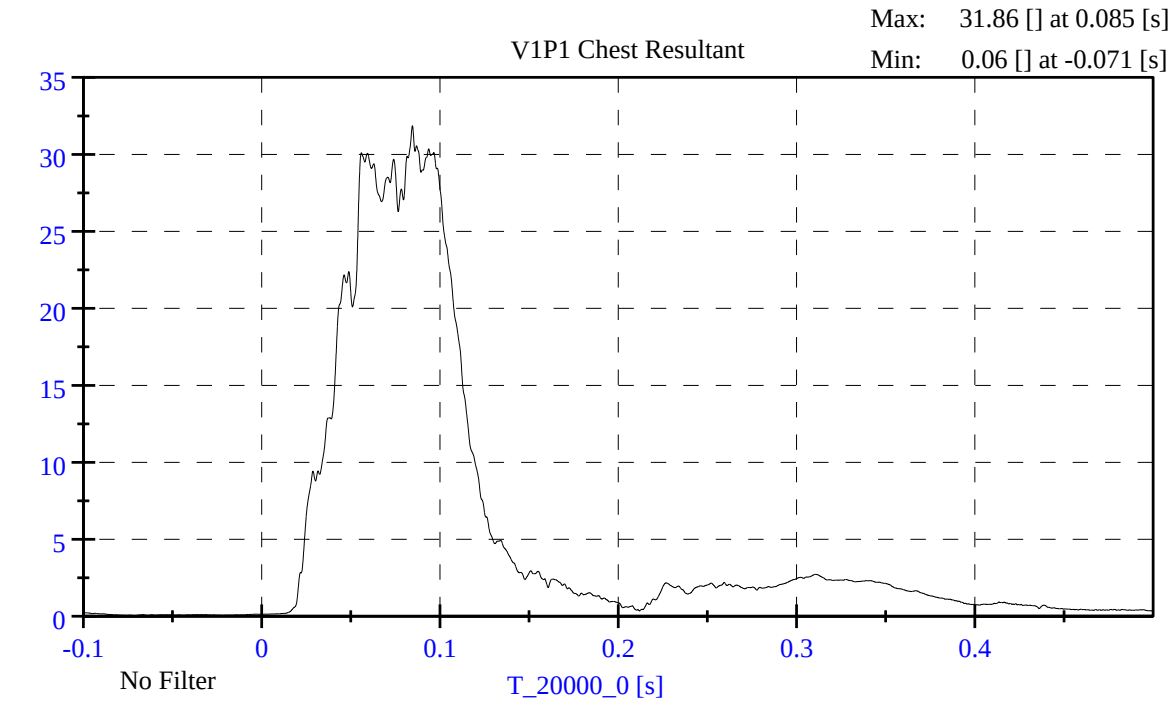
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Vehicle Engine Top X
Vehicle Engine Bottom X
Vehicle Left Brake Caliper X
Vehicle Right Brake Caliper X
Load Cell Barrier A1-A9
Load Cell Barrier B1-A9
Load Cell Barrier C1-A9
Load Cell Barrier D1-A9

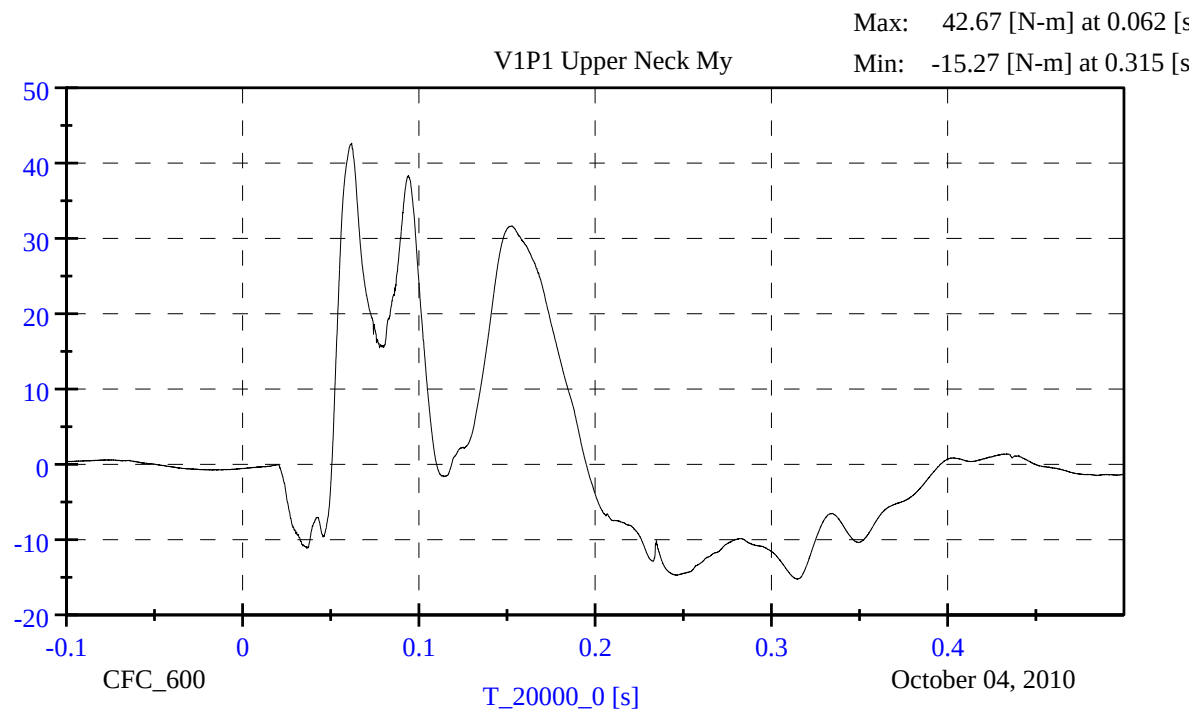
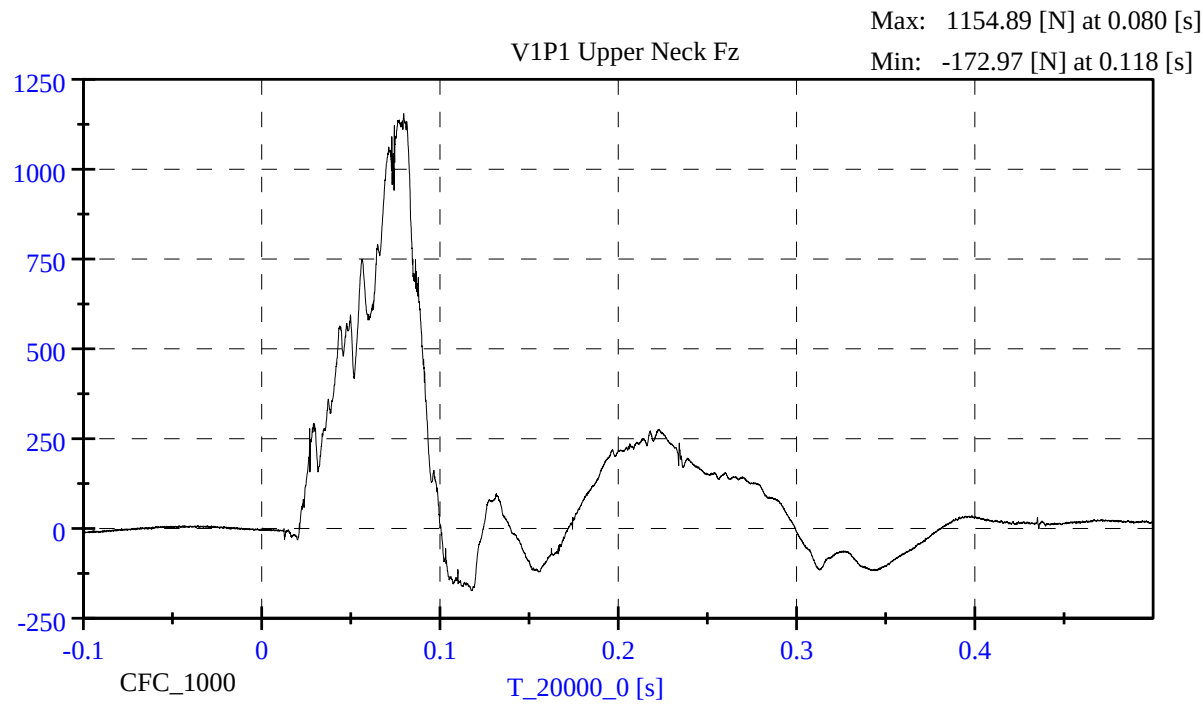


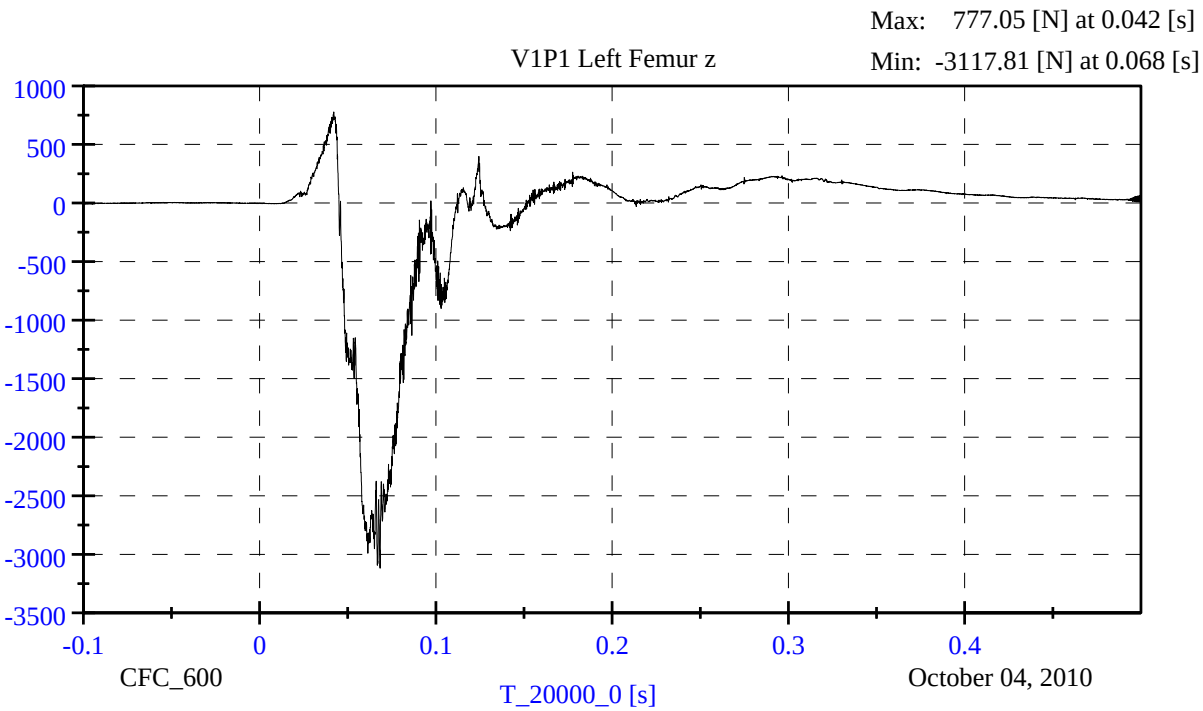
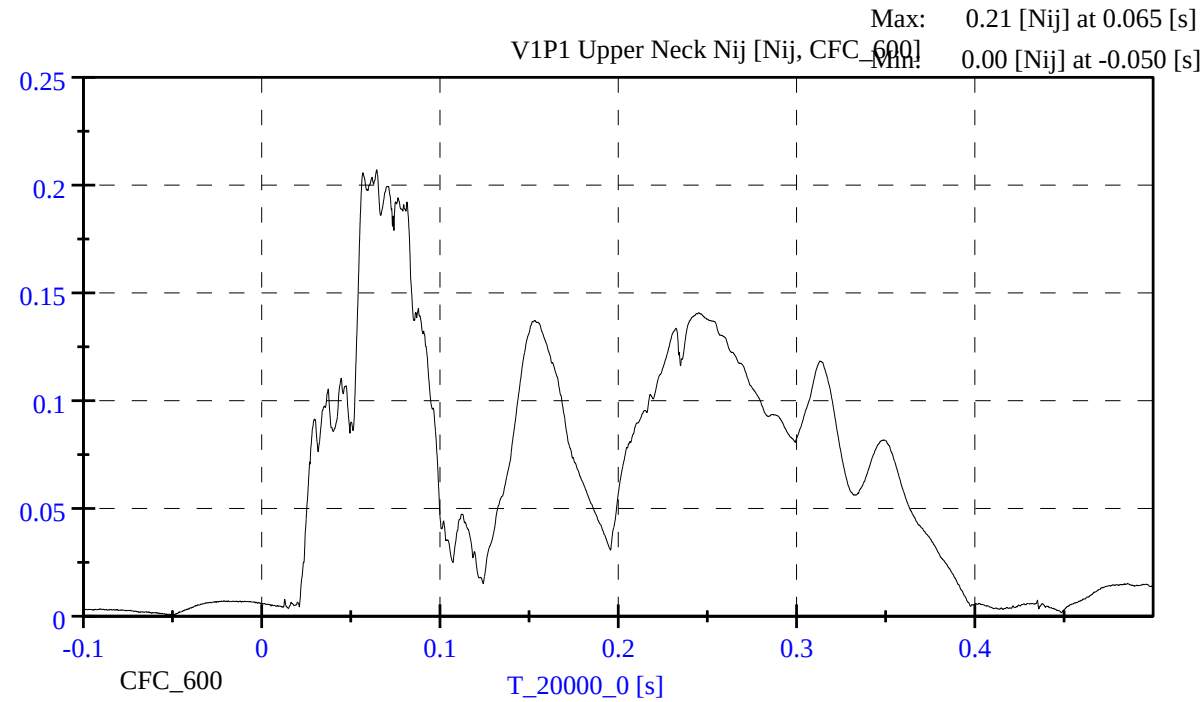


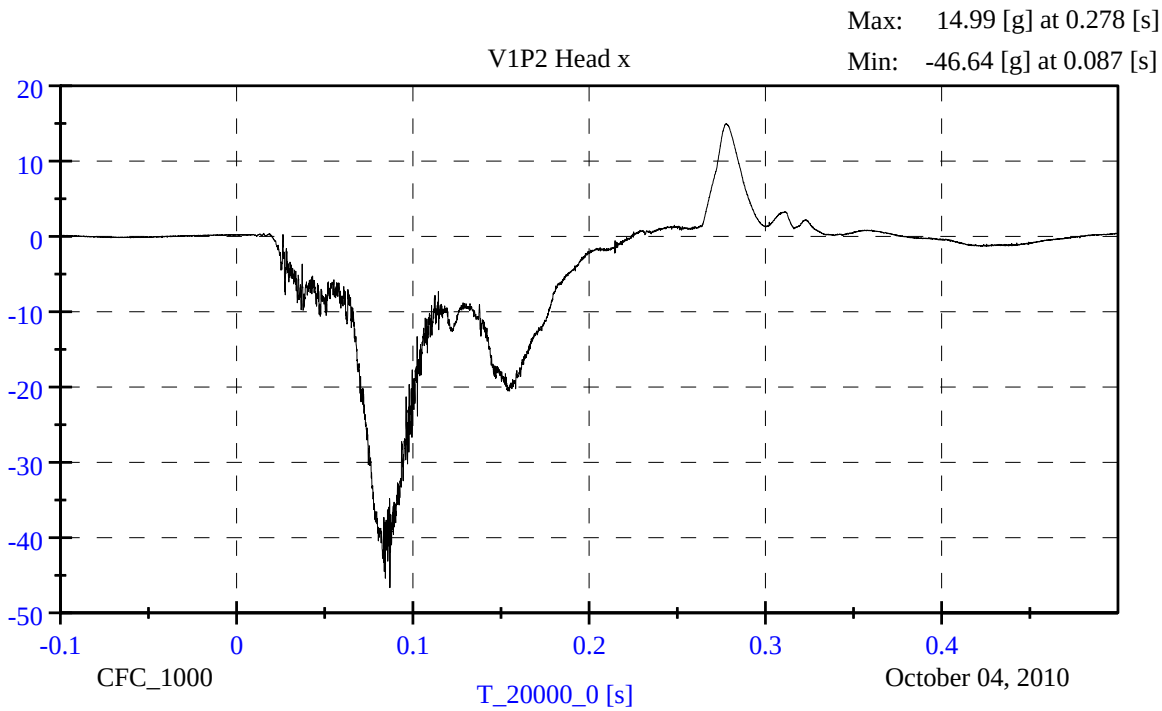
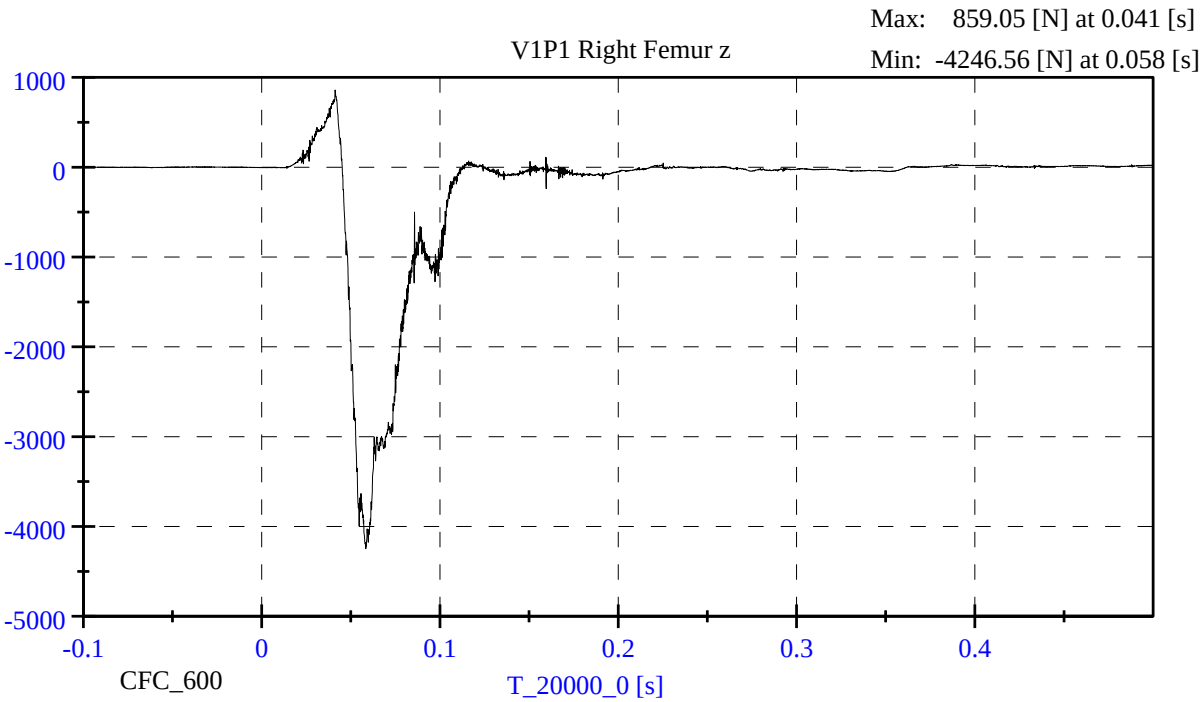


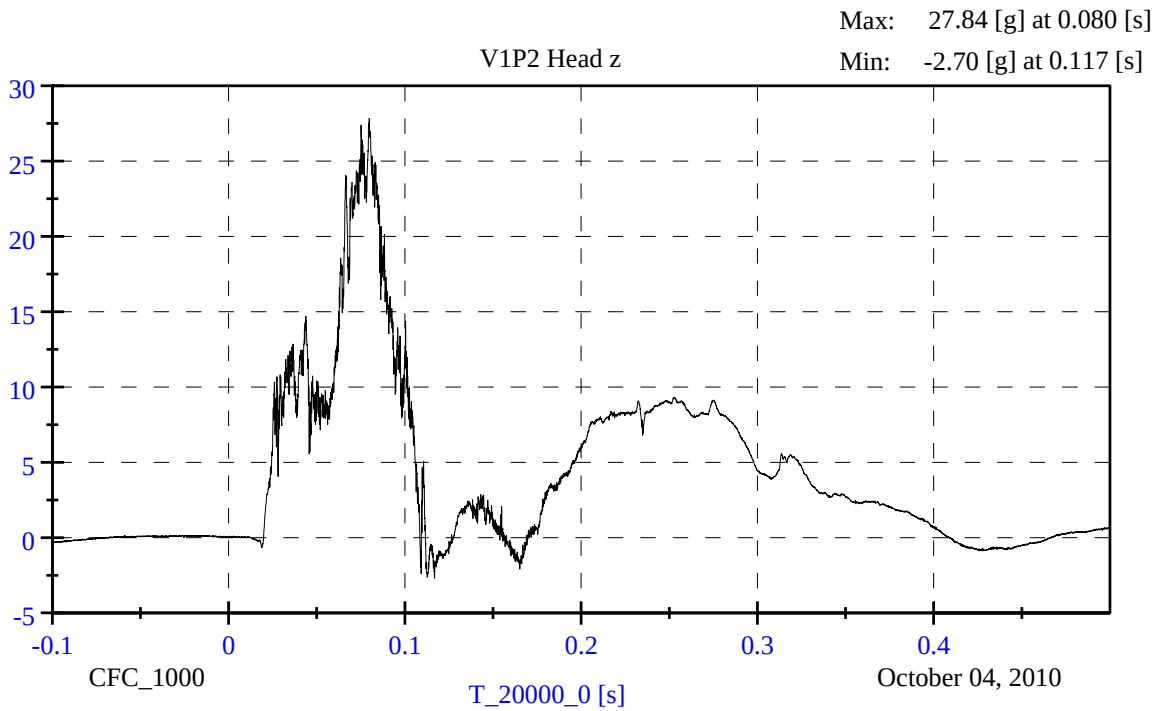
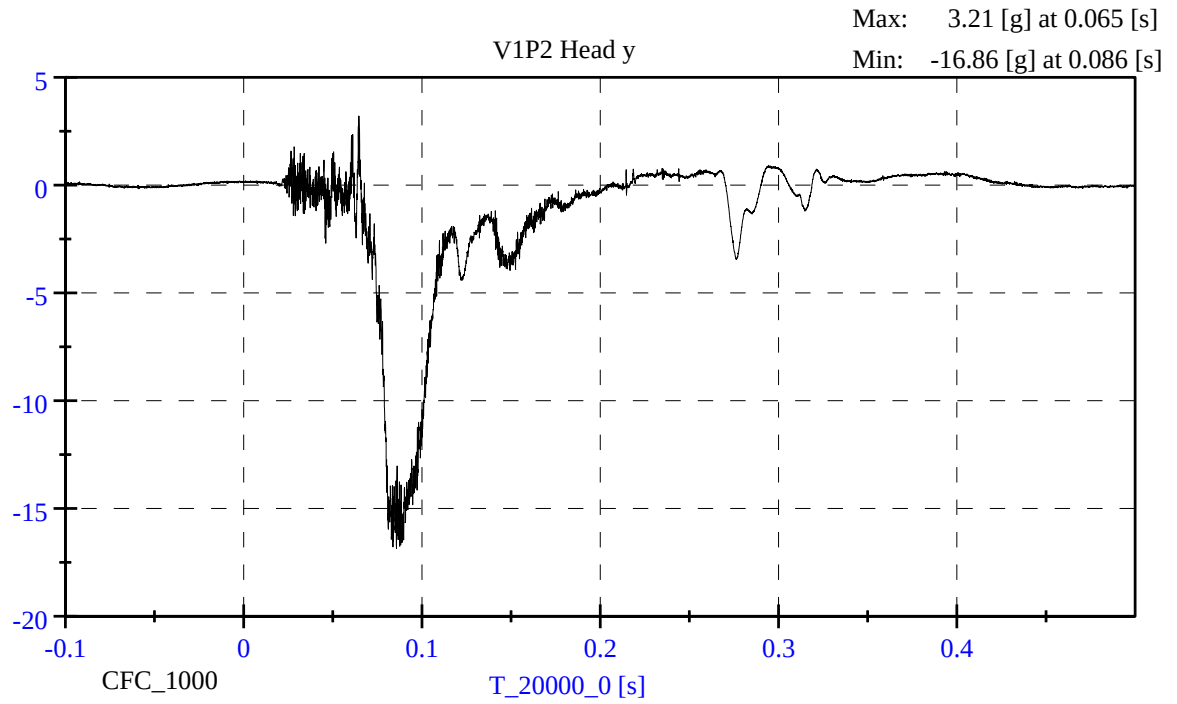


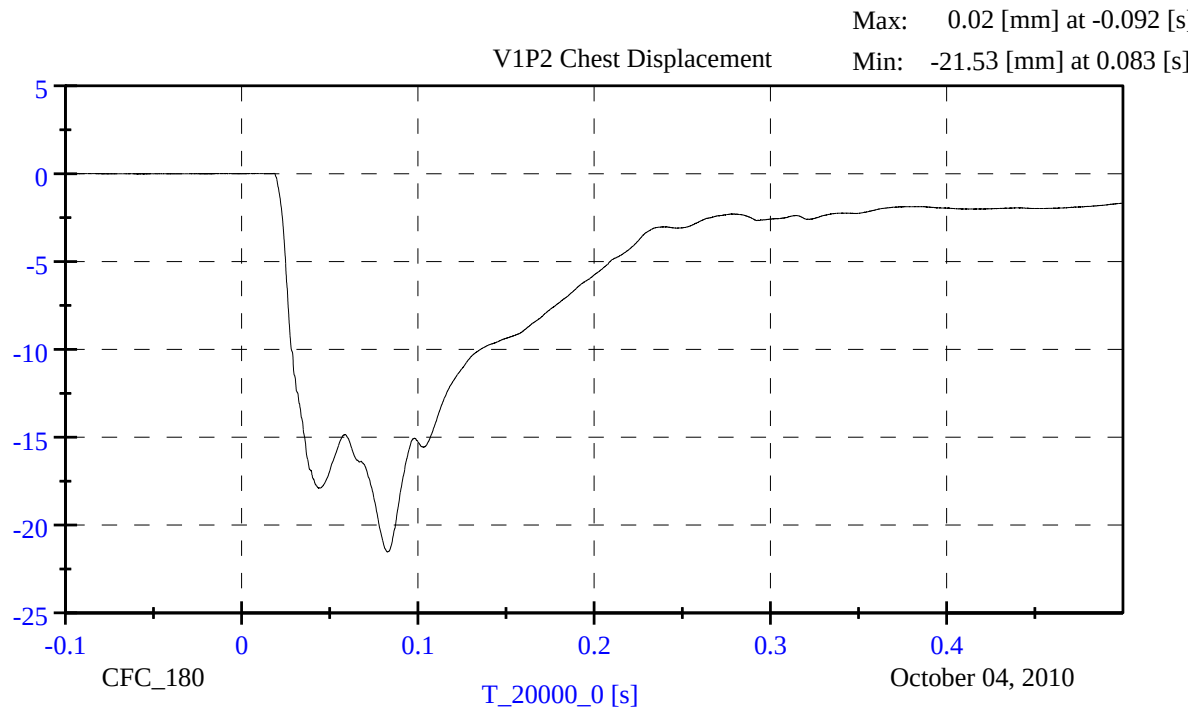
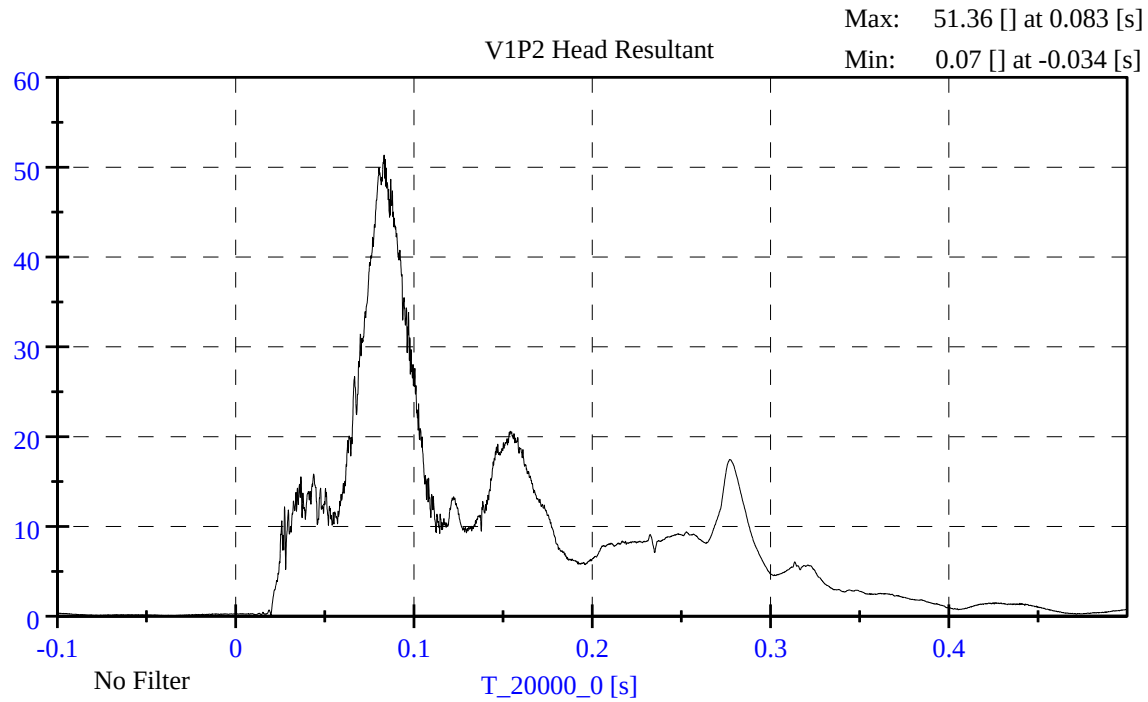


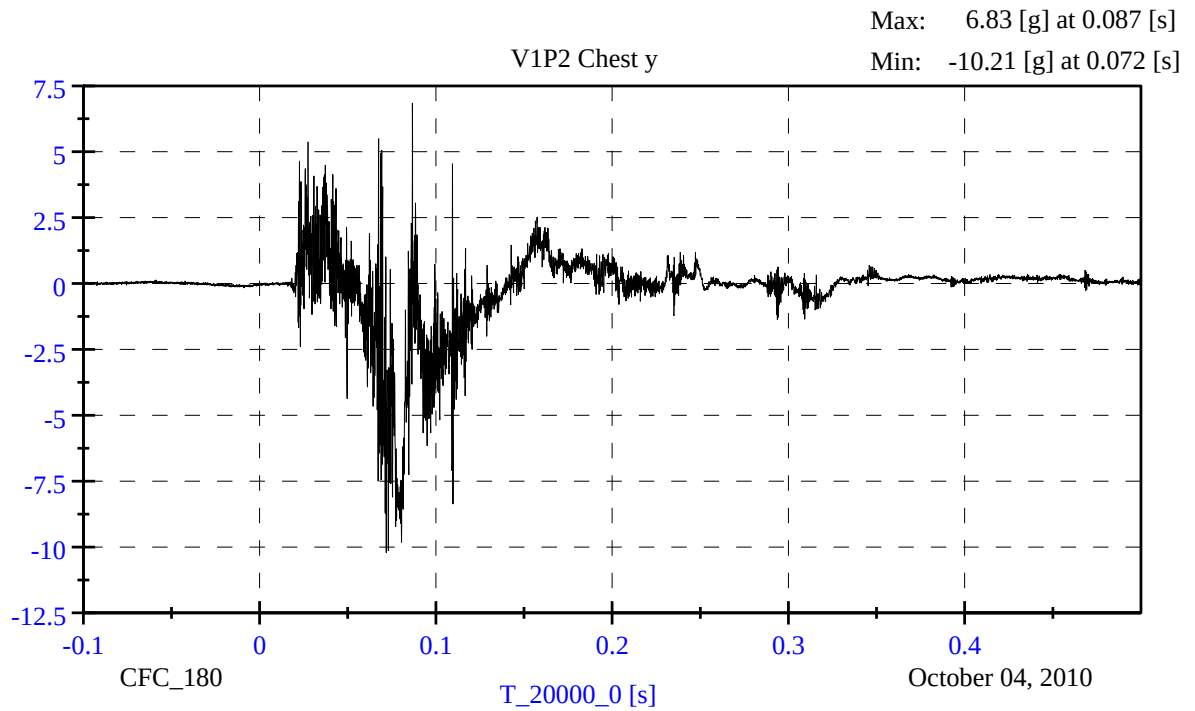
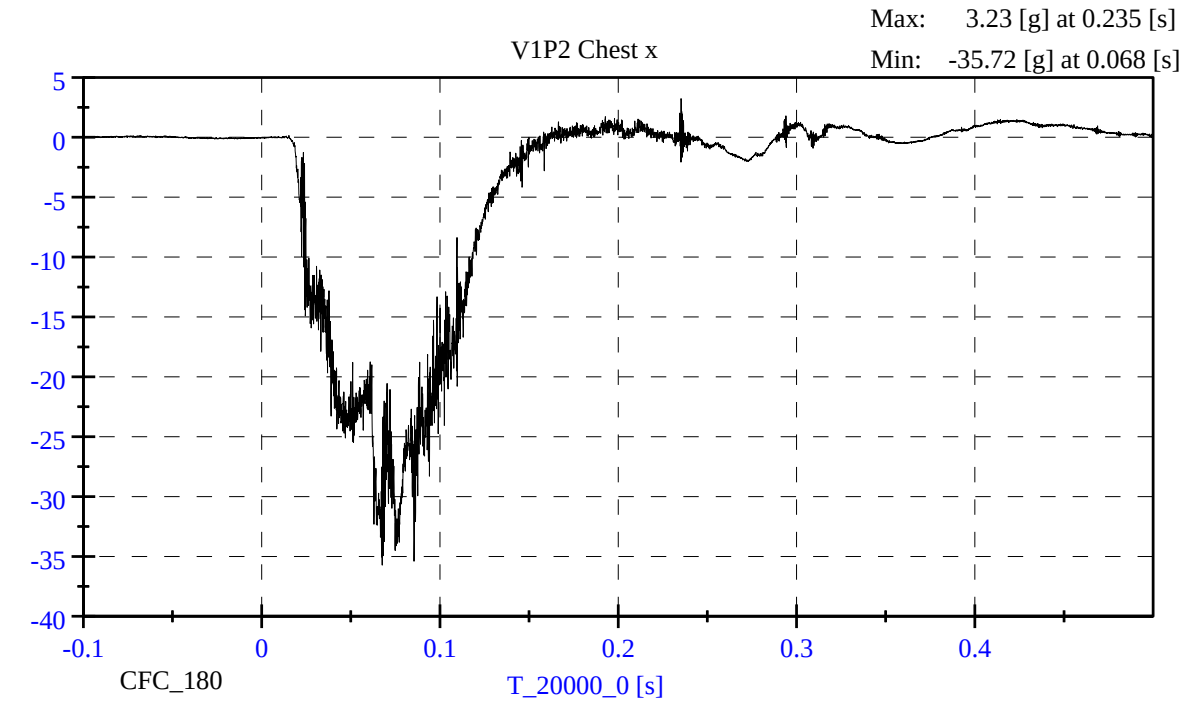


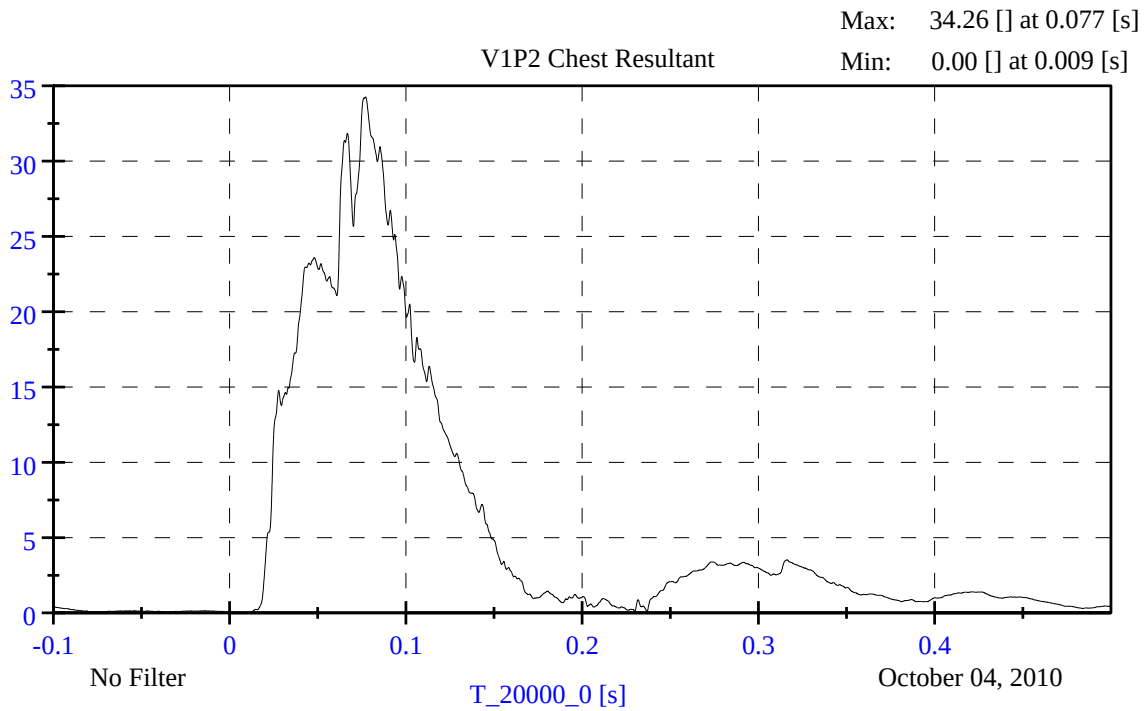
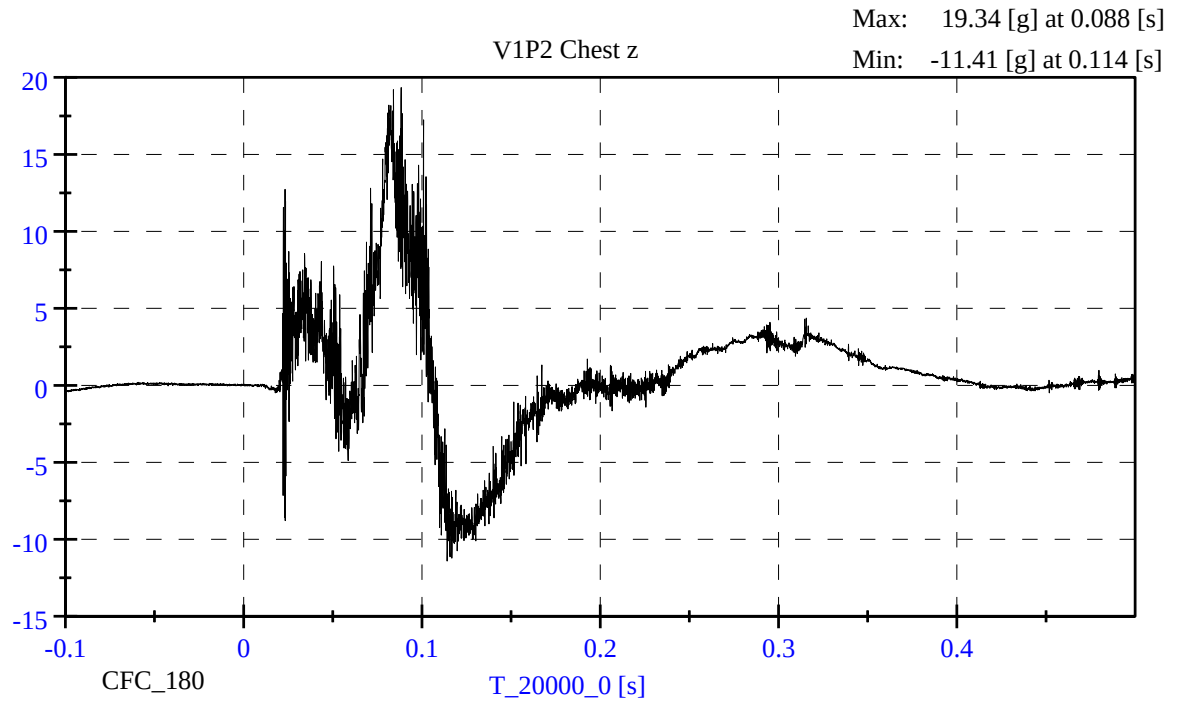


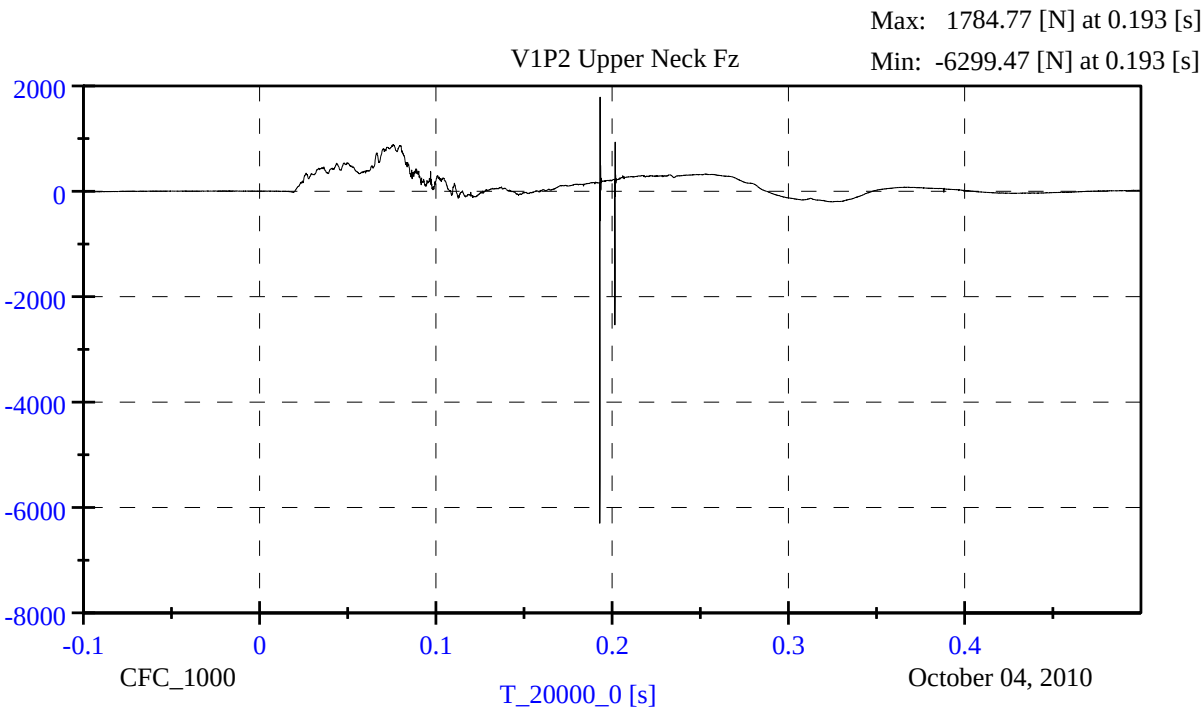
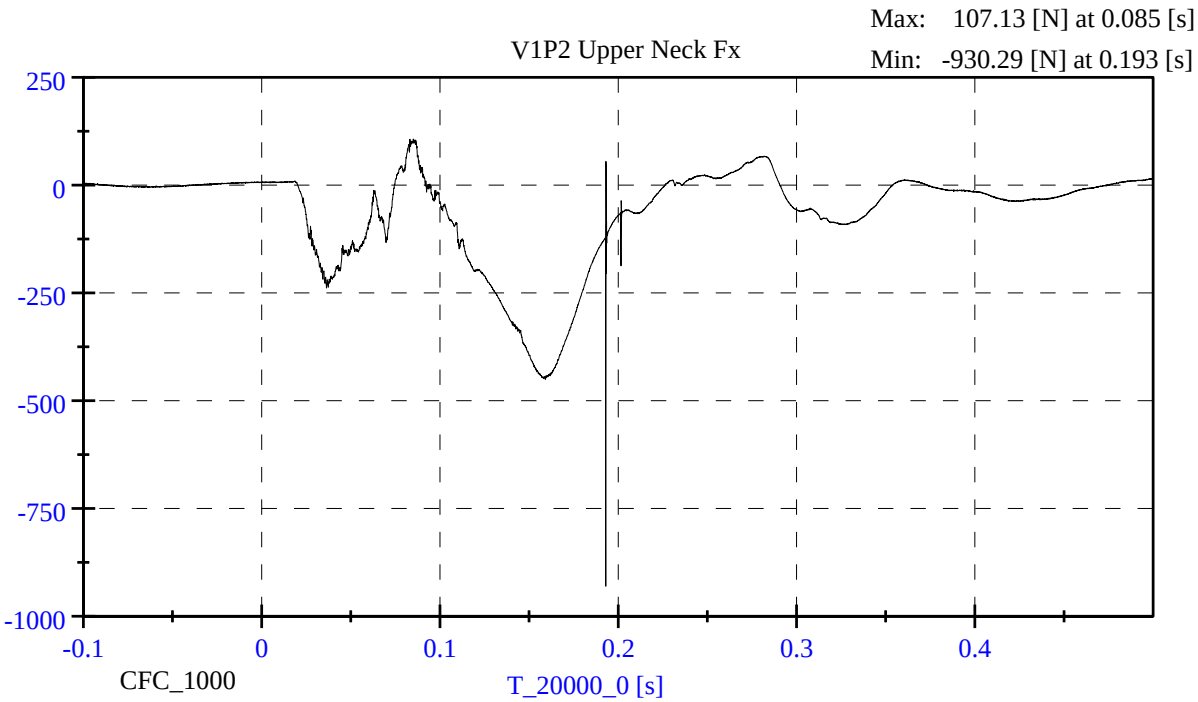


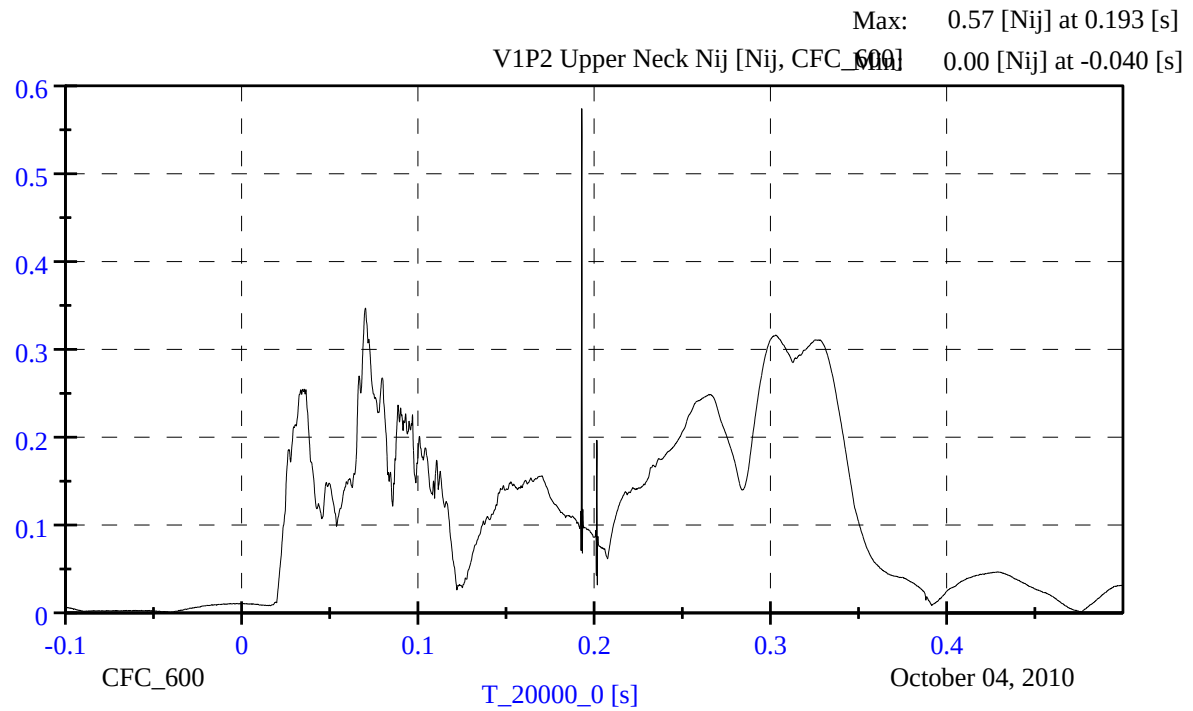
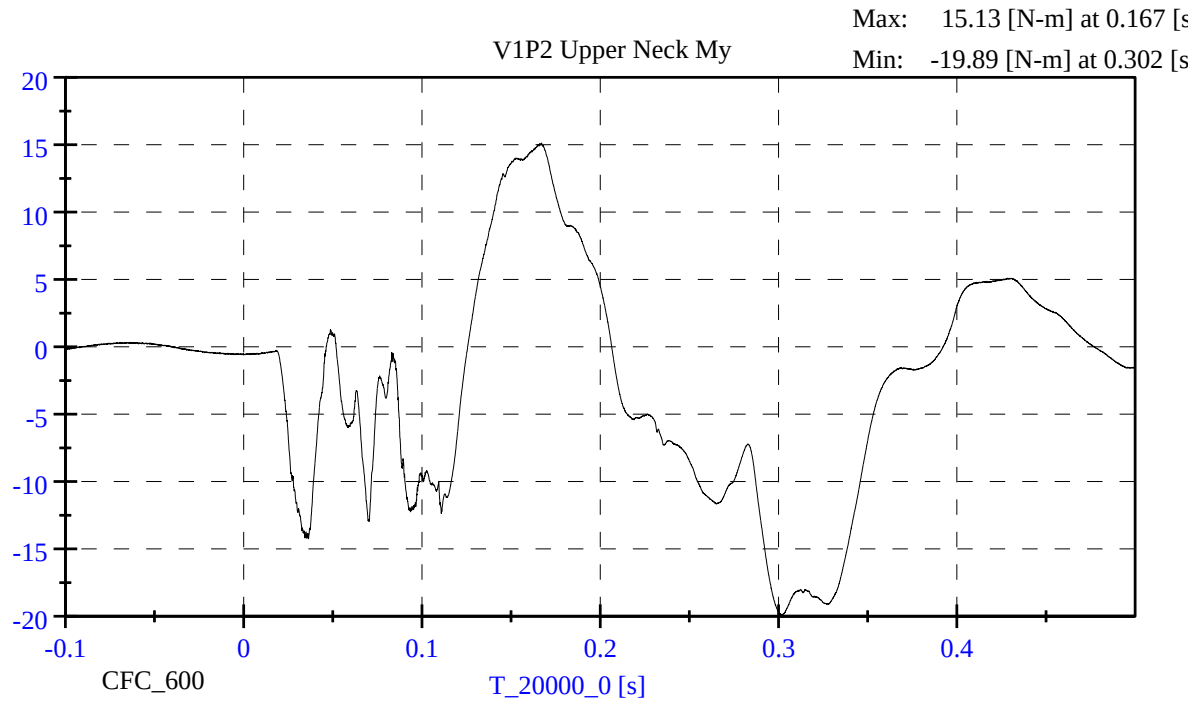




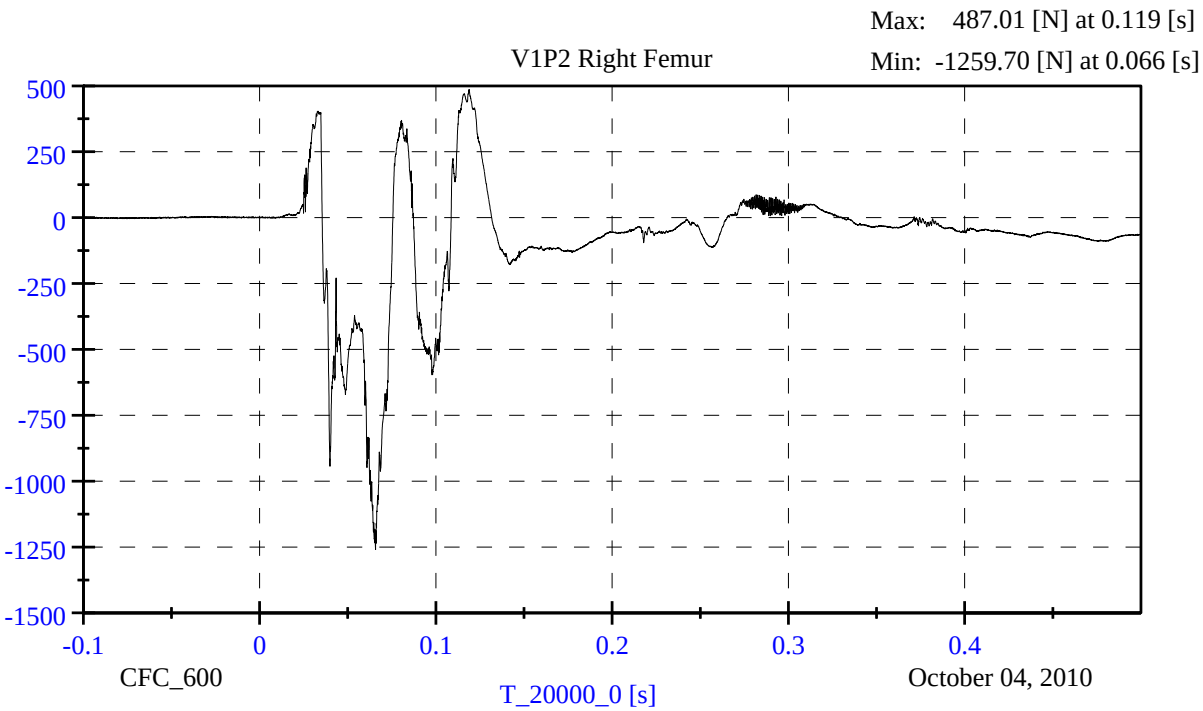
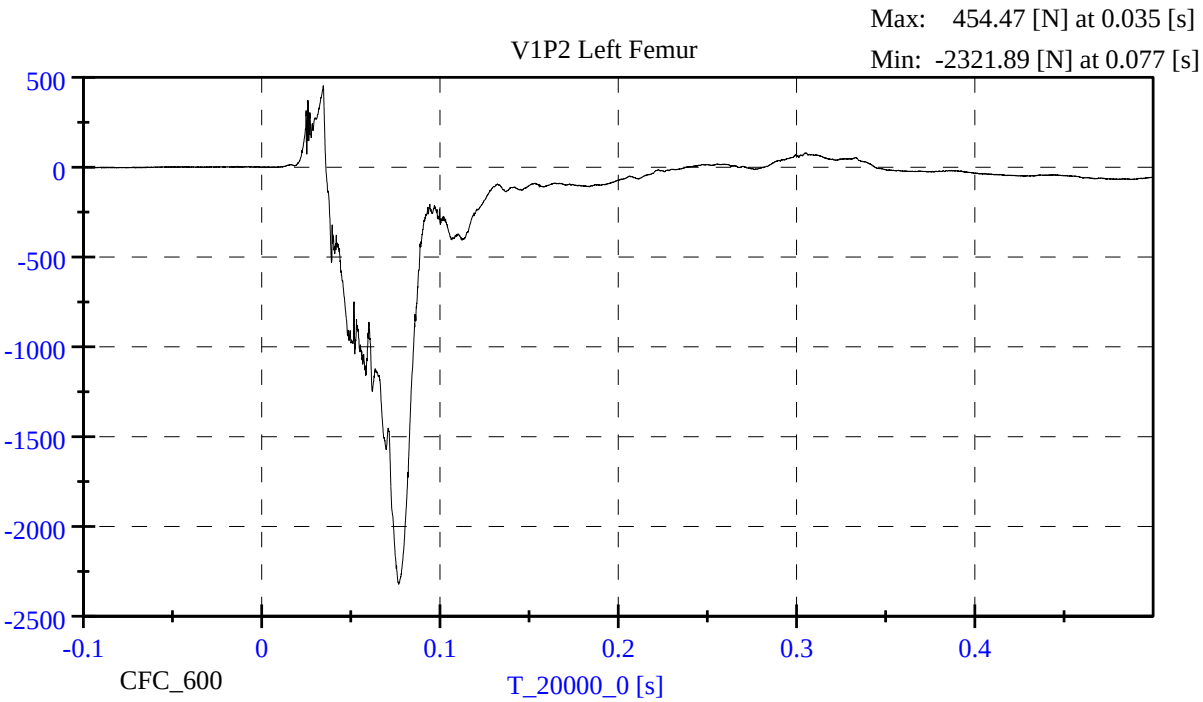








* Neck bracket noise spike was removed before Neck Nij calculation was performed



APPENDIX C

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

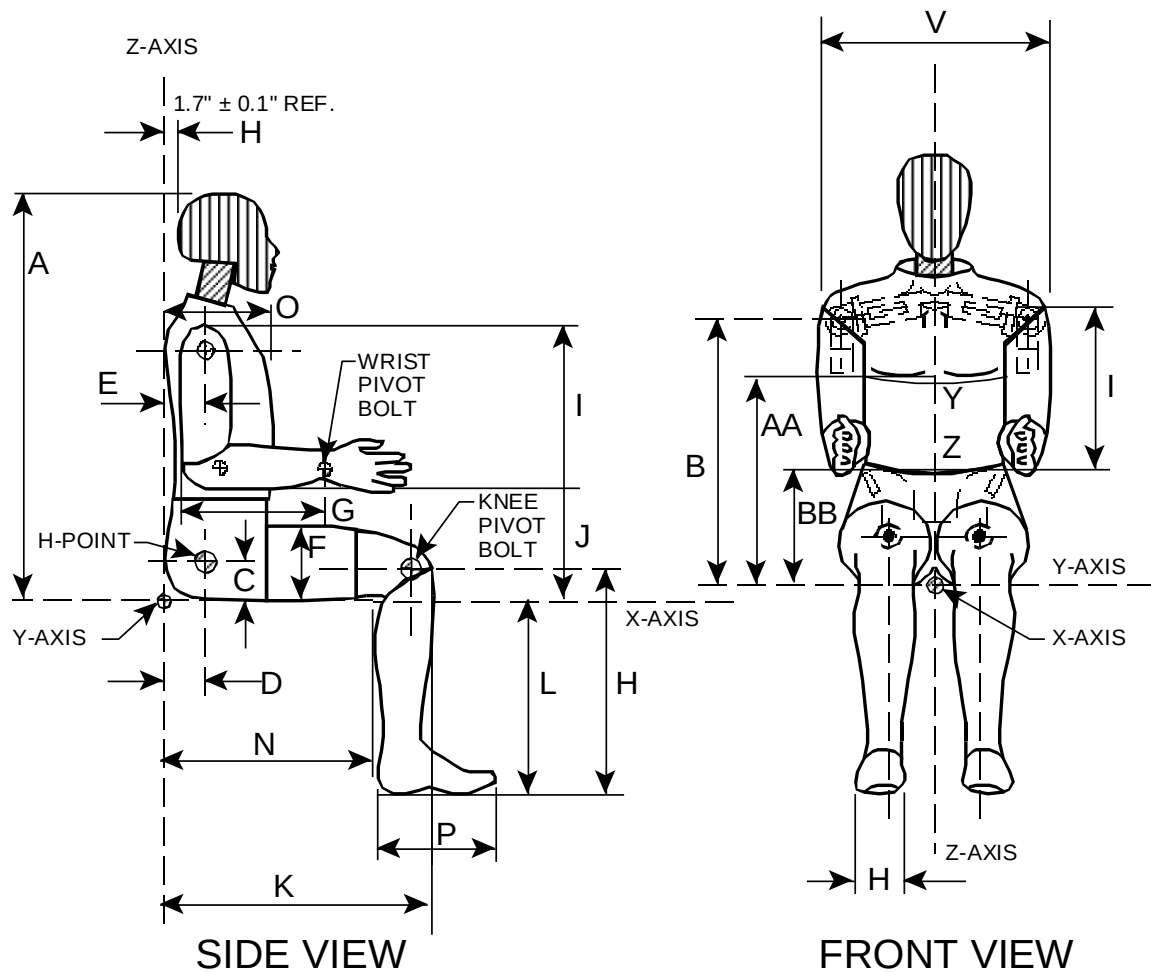
The tests were conducted at the Dummy Certification Test Facility of Calspan. A summary of the test results, and Part 572 specifications are included in this Appendix.

Dummy serial numbers and certification dates are:

<u>Position No./Location</u>	<u>Serial No.</u>	<u>Completion Date</u>
#1/Driver	61	
#2/Right Front Passenger	273	

DUMMY CONFIGURATION DIMENSIONS

EXTERNAL DIMENSIONS SPECIFICATIONS



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

CALIBRATION TEST RESULTS

PRE-TEST

DRIVER DUMMY

S/N: 61

50th Male External Measurements

SN 061

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

Technician: AR

Date: 10/1/2010



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	9/30/2010
Test Number:	2	Test Time:	5:35:15 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	55 %RH P
Resultant Acceleration	225 -- 275	244 g P
Oscillation	0.0 -- 10.0	5.2 % P
Lateral Acceleration	-15.00 -- 15.00	5.49 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **5:35:15 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Head Drop**

Test Time: **5:35:15 PM**

Test Date: **9/30/2010**

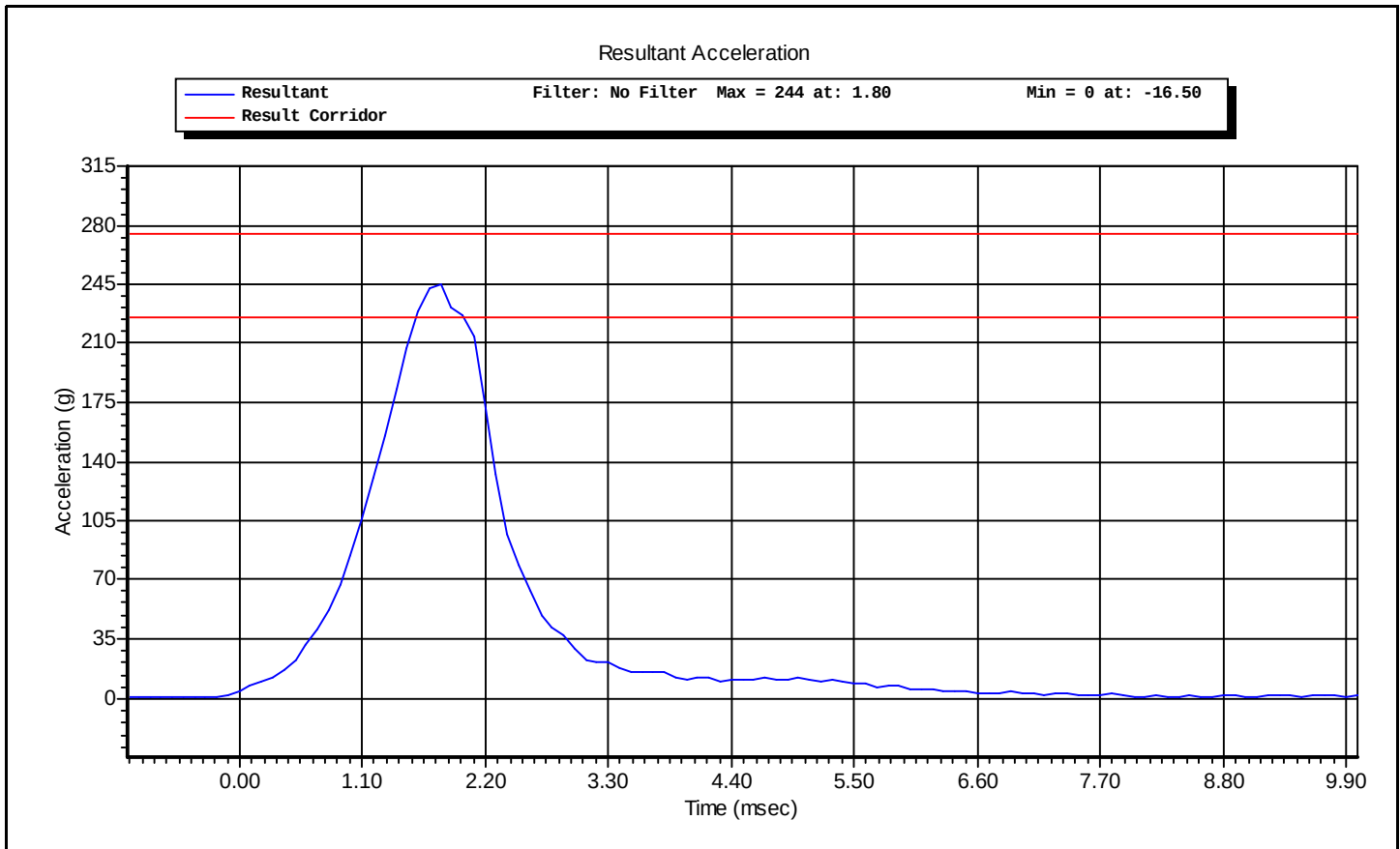


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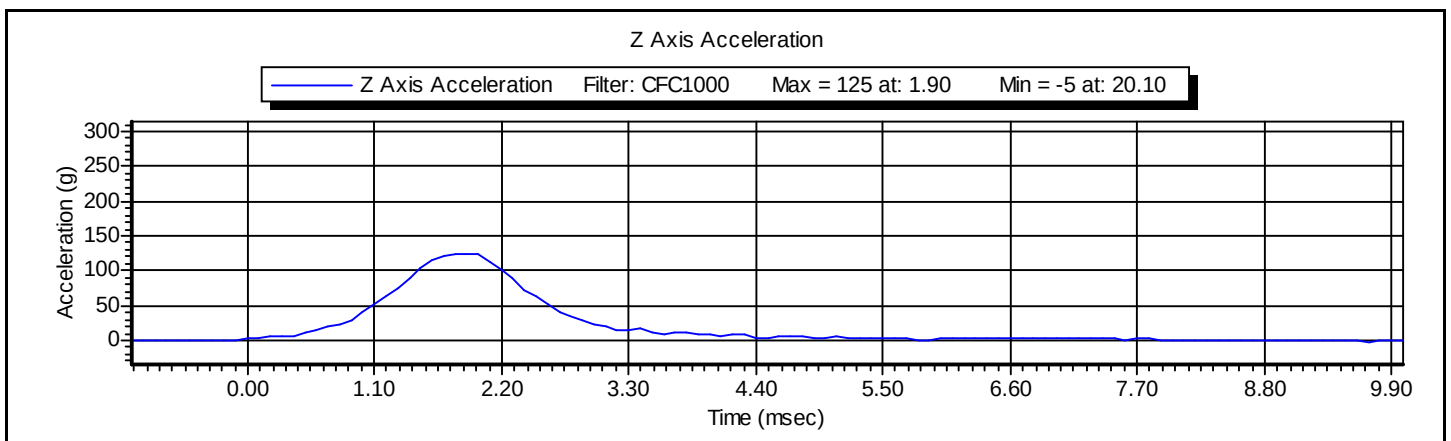
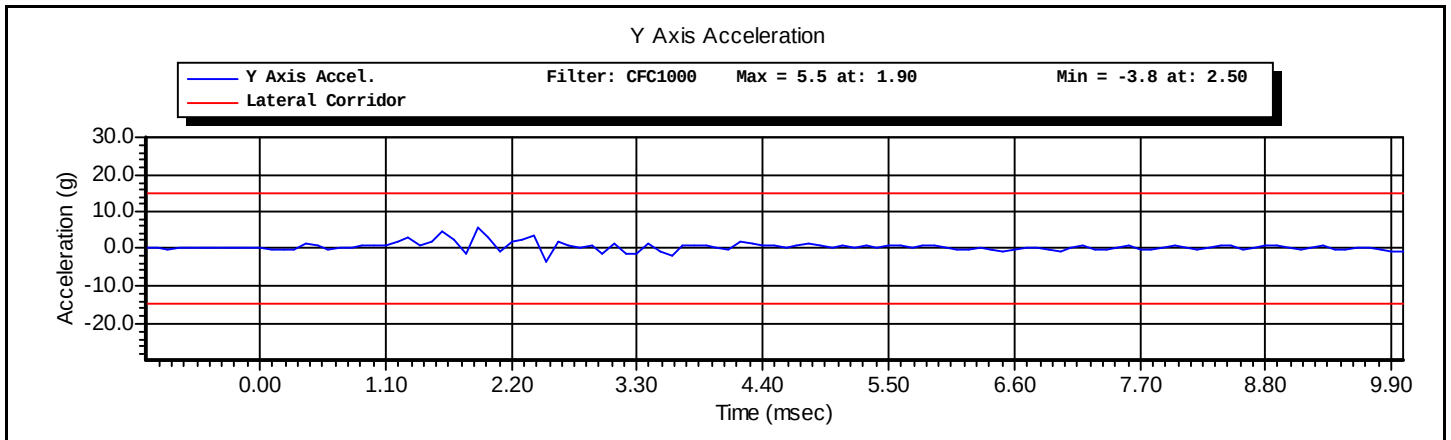
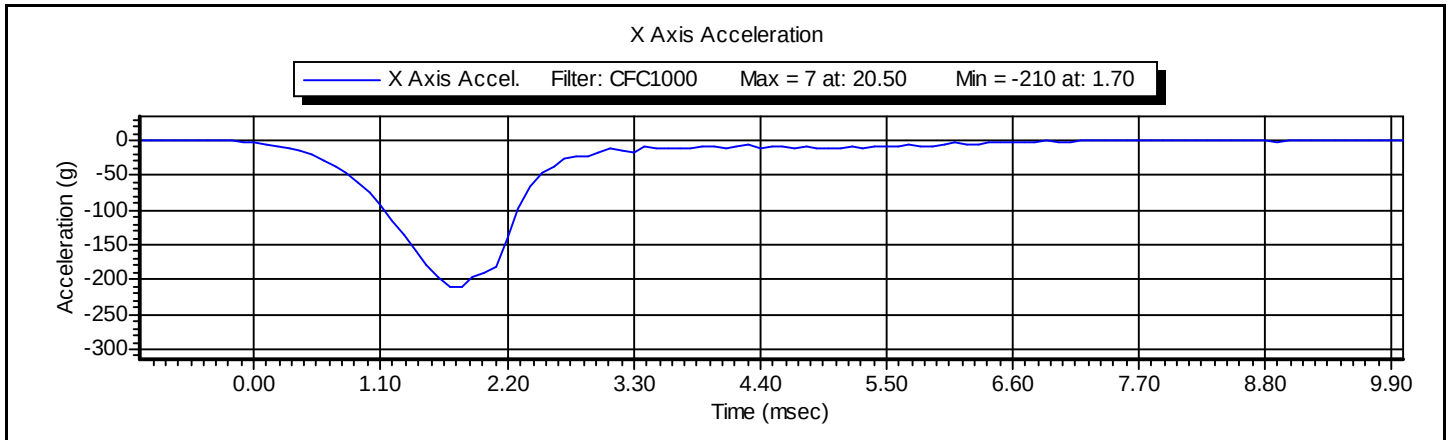
Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	9/30/2010
Test Number:	2	Test Time:	5:35:15 PM



Test ID: **Head Drop**

Test Time: **5:35:15 PM**

Test Date: **9/30/2010**





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Extension	Test Date:	9/30/2010
Test Number:	1	Test Time:	2:16:56 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	55 %RH P
Velocity	5.94 -- 6.19	6.13 m/s P
Pendulum Deceleration at 10 ms	17.2 -- 21.2	18.7 g P
Pendulum Deceleration at 20 ms	14.0 -- 19.0	18.3 g P
Pendulum Deceleration at 30 ms	11.0 -- 16.0	14.3 g P
Max Pendulum Deceleration after 30 ms	0.0 -- 22.0	14.3 g P
Decel Time to 5 g	38.0 -- 46.0	40.5 ms P
D Plane Rotation	81.0 -- 106.0	95.5 degrees P
Time at Max Rotation	72.0 -- 82.0	75.4 ms P
Rotation Decay to Zero	147.0 -- 174.0	154.8 ms P
Moment About Occipital Condyle	-80.0 -- -52.9	-70.9 Nm P
Time at Max Moment	65.0 -- 79.0	71.1 ms P
Moment Decay to Zero	120.0 -- 148.0	140.5 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **2:16:56 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Extension**

Test Time: **2:16:56 PM**

Test Date: **9/30/2010**

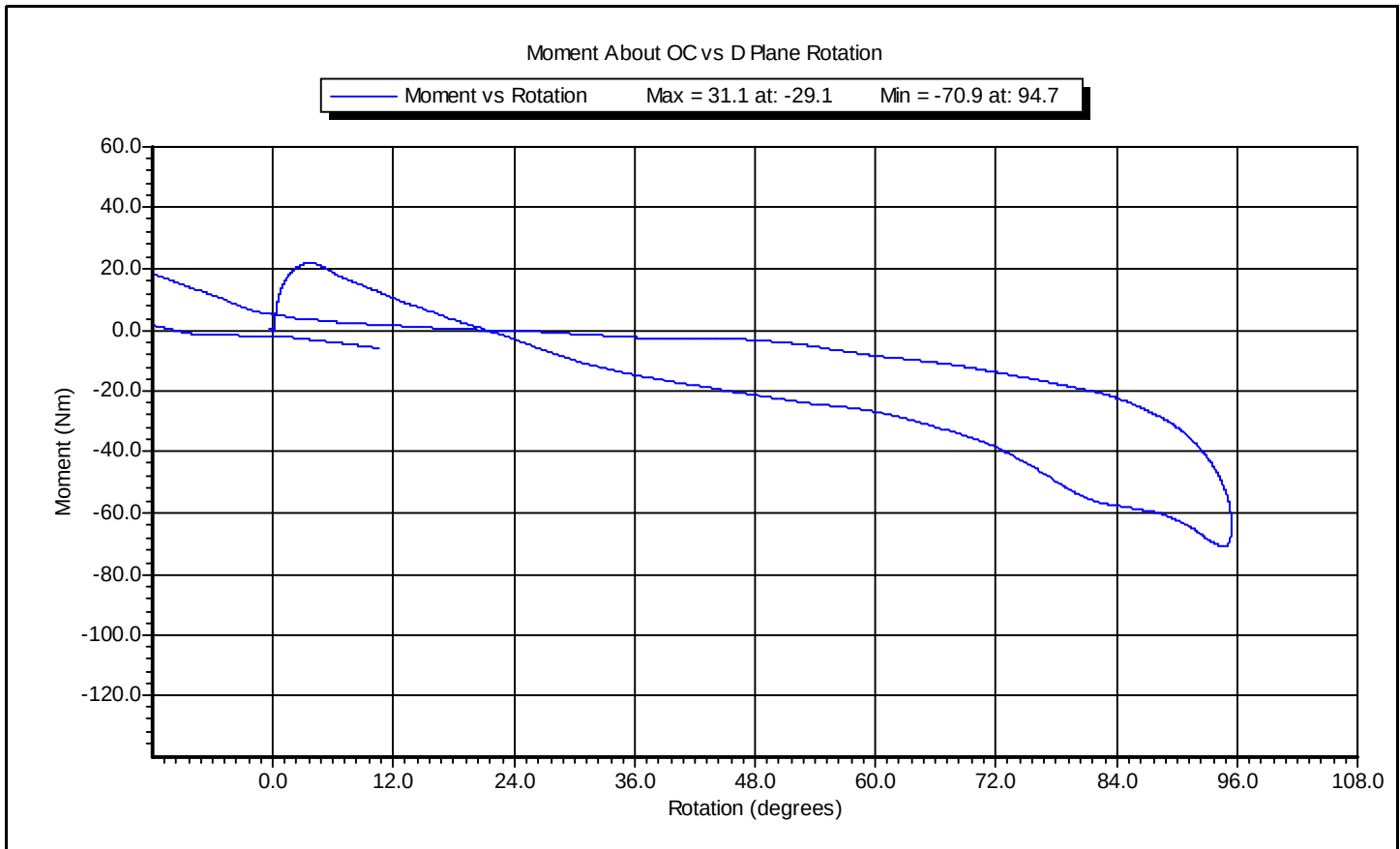


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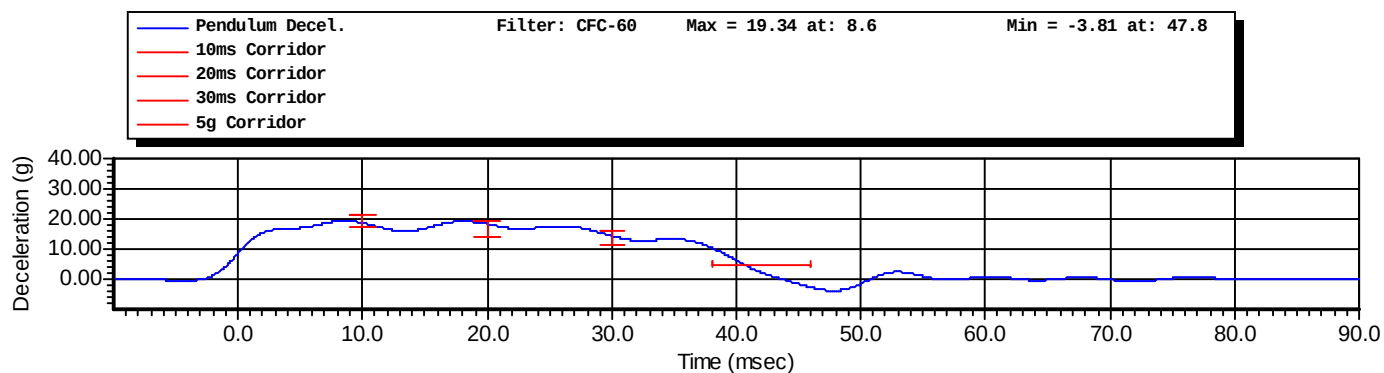
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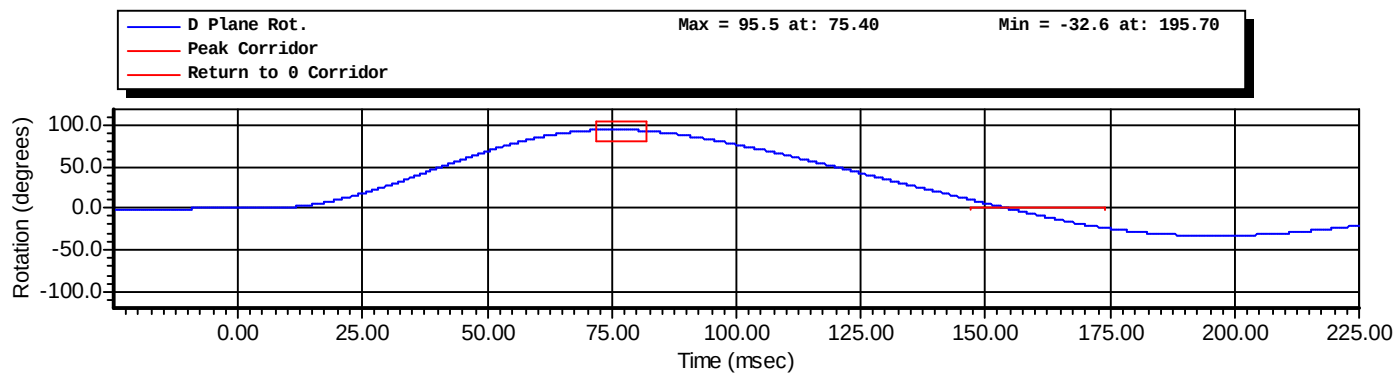
Name of Test:	Neck Extension	REVISION:	10/1/2001
Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	9/30/2010
Number of Test:	1	Time of Test:	2:16:56 PM



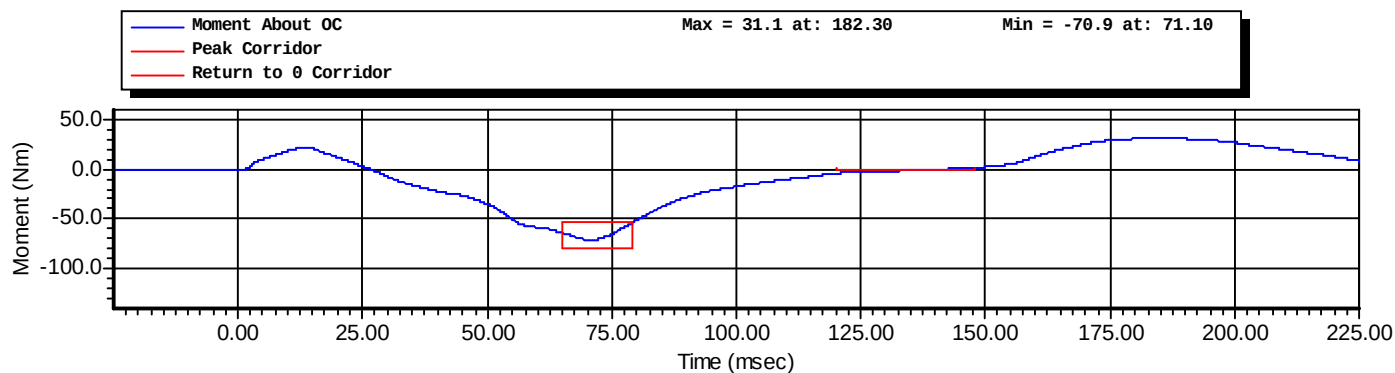
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Flexion	Test Date:	9/30/2010
Test Number:	1	Test Time:	1:07:58 PM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	55 %RH	P
Velocity		6.89	-- 7.13	7.09 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	23.9 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.6 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	16.3 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	16.3 g	P
Deceleration time to	5 g	34.0	-- 42.0	39.4 ms	P
D Plane Rotation		-78.0	-- -64.0	-70.4 degrees	P
Time at max rotation		57.0	-- 64.0	58.2 ms	P
Rotation Decay to Zero		113.0	-- 128.0	117.0 ms	P
Moment about OC		88.1	-- 108.4	104.5 Nm	P
Time at Max Moment		47.0	-- 58.0	52.9 ms	P
Moment Decay to Zero		97.0	-- 107.0	97.2 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **1:07:58 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

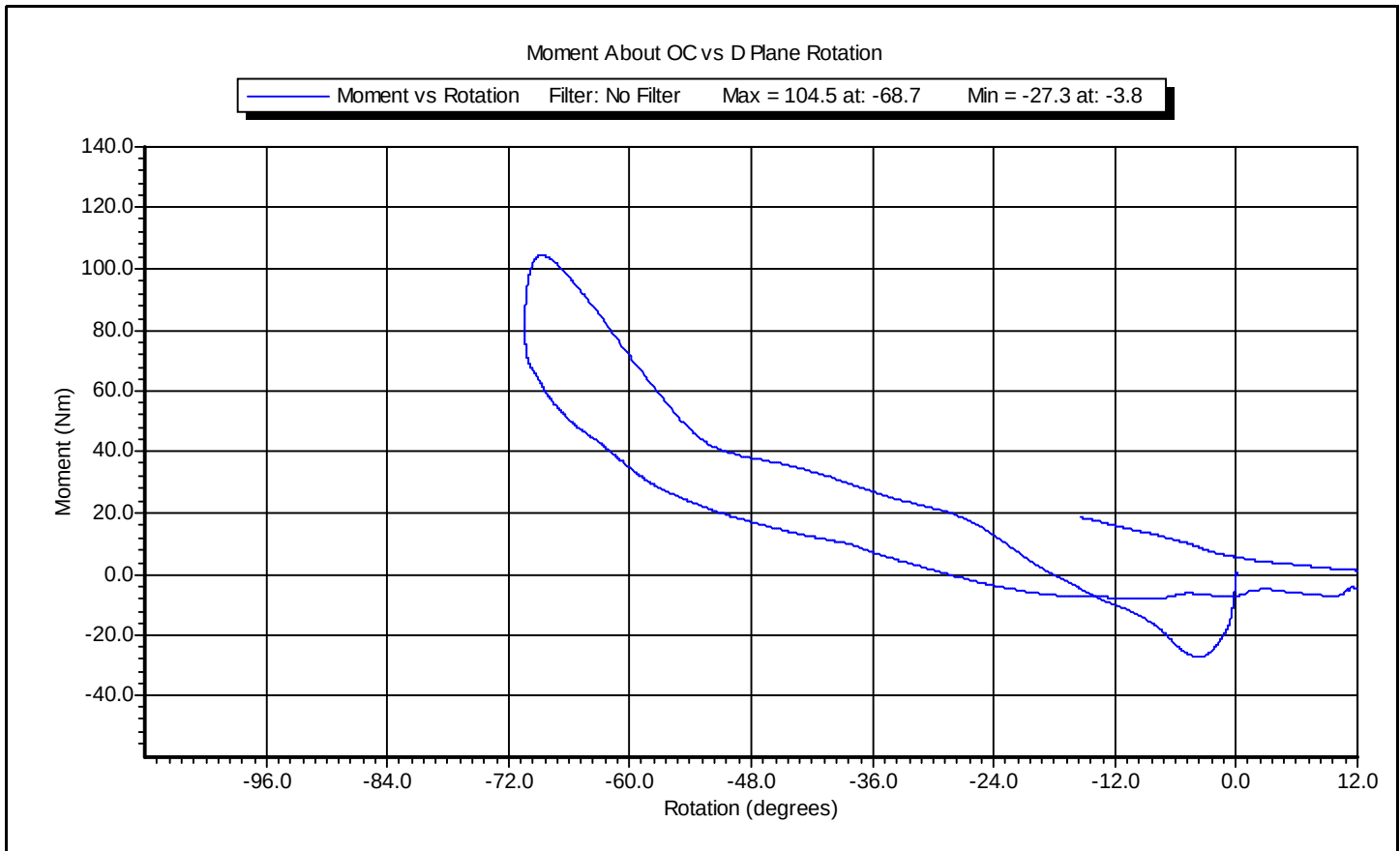
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7231CT	C16510	5/10/2010
DentonATD	78051-342	PENDULUM POT	8/14/2010
DentonATD	78051-342	CONDYLE POT	8/14/2010
Denton	1716A	LC-1916 My	5/18/2010
Denton	1716A	LC-1916 Fx	5/18/2010

Test ID: **Neck Flexion**

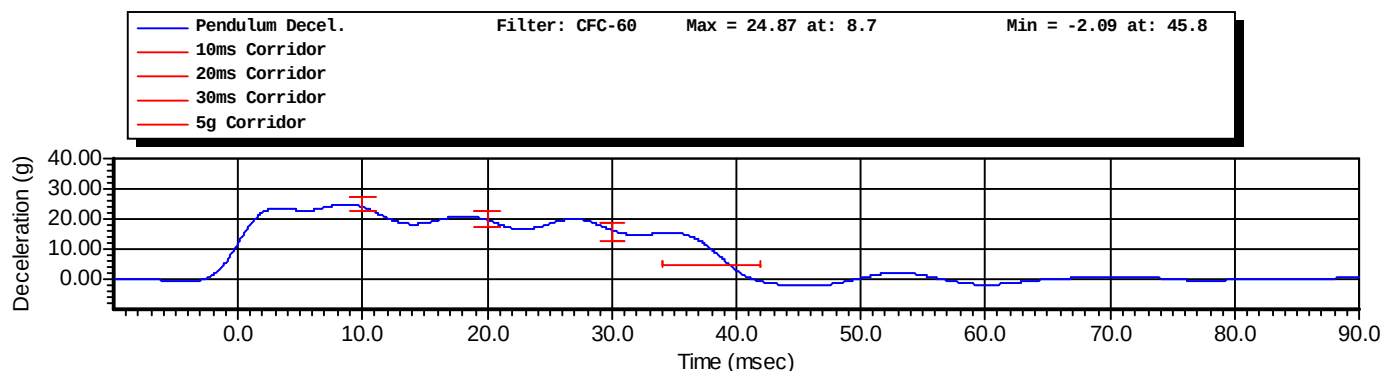
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Test Date: **9/30/2010**

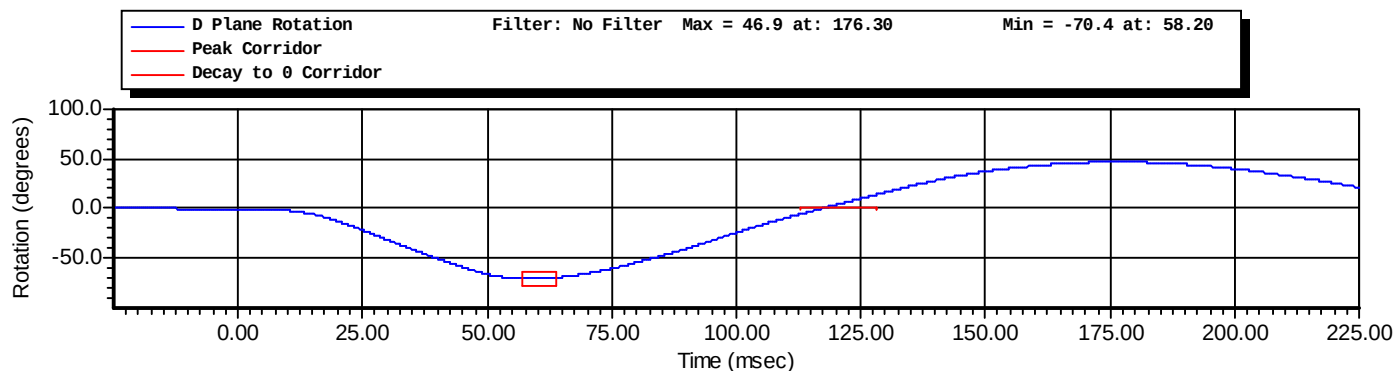
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Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	9/30/2010
Number of Test:	1	Time of Test:	1:07:58 PM



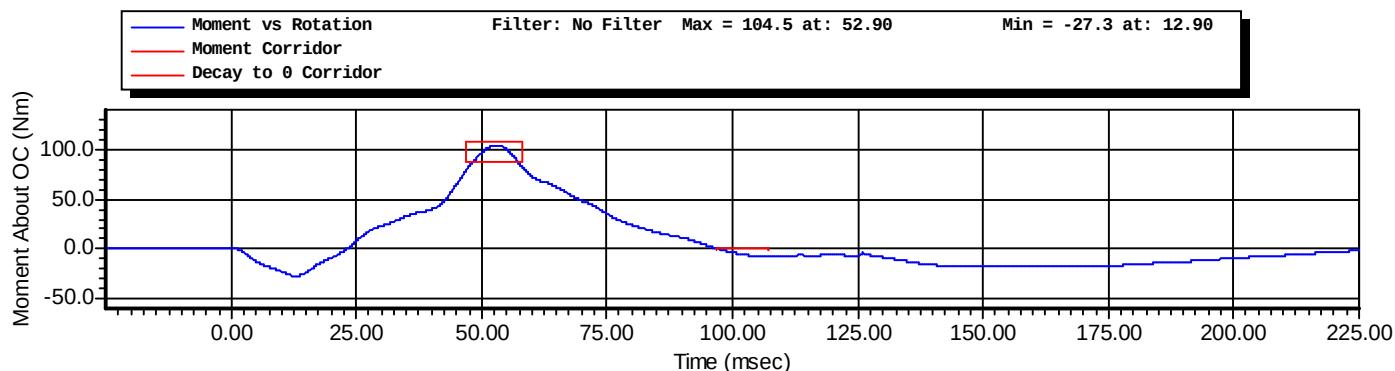
Pendulum Deceleration



D Plane Rotation



Moment About Occipital Condyle





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	9/30/2010
Test Number:	1	Test Time:	9:38:05 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	54.0 %RH P
Velocity	6.59 -- 6.83	6.71 m/s P
Resistive Force	-5.894 -- -5.160	-5.726 kN P
Sternum Displacement	-72.6 -- -63.5	-67.3 mm P
Hysteresis	69 -- 85	74 % P

All test parameters are within specifications

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

Test ID: **Thorax**

Test Time: **9:38:05 AM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Thorax**

Test Time: **9:38:05 AM**

Test Date: **9/30/2010**



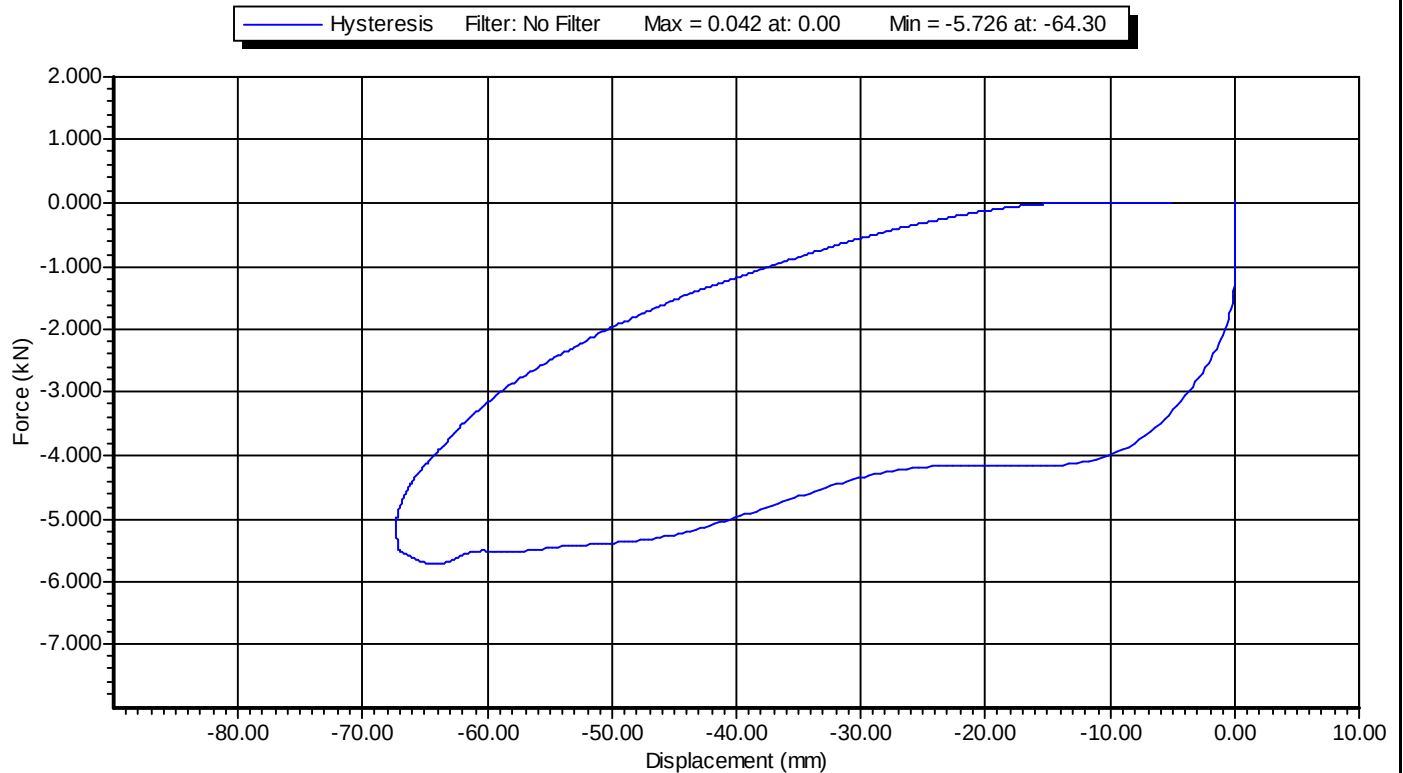
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Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	9/30/2010
Test Number:	1	Test Time:	9:38:05 AM

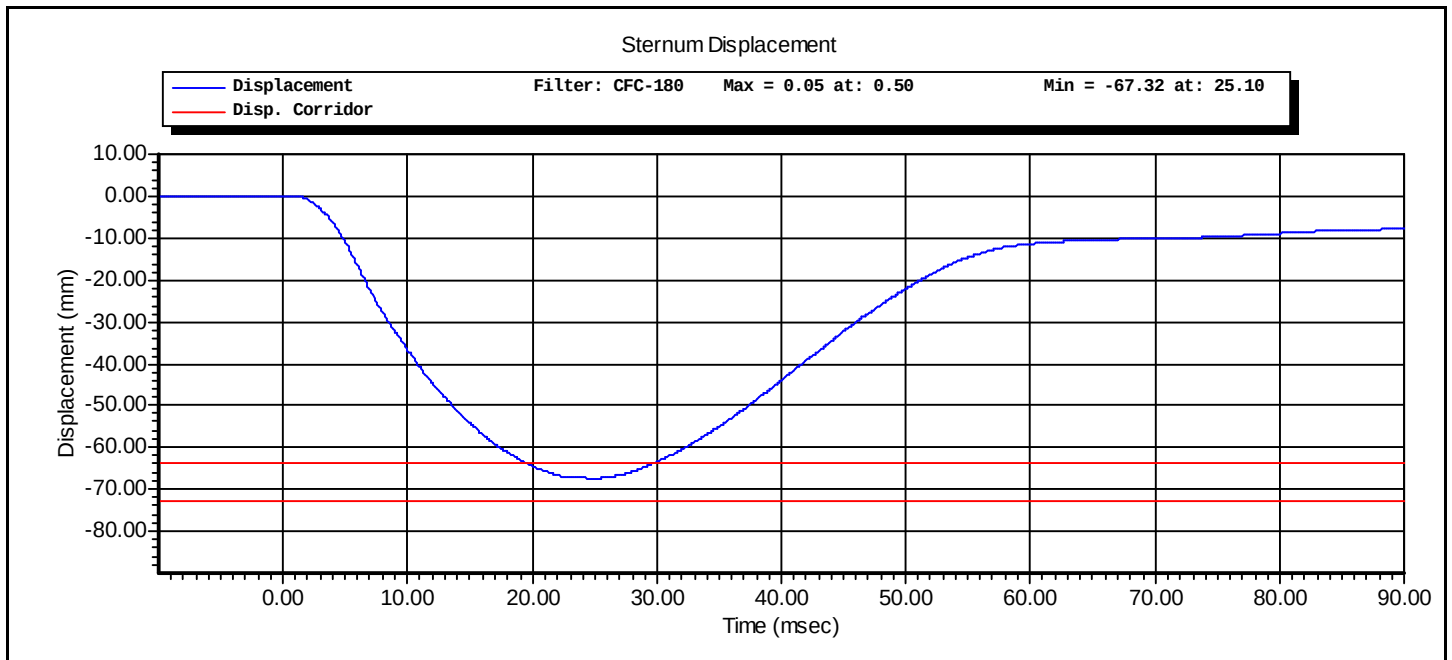
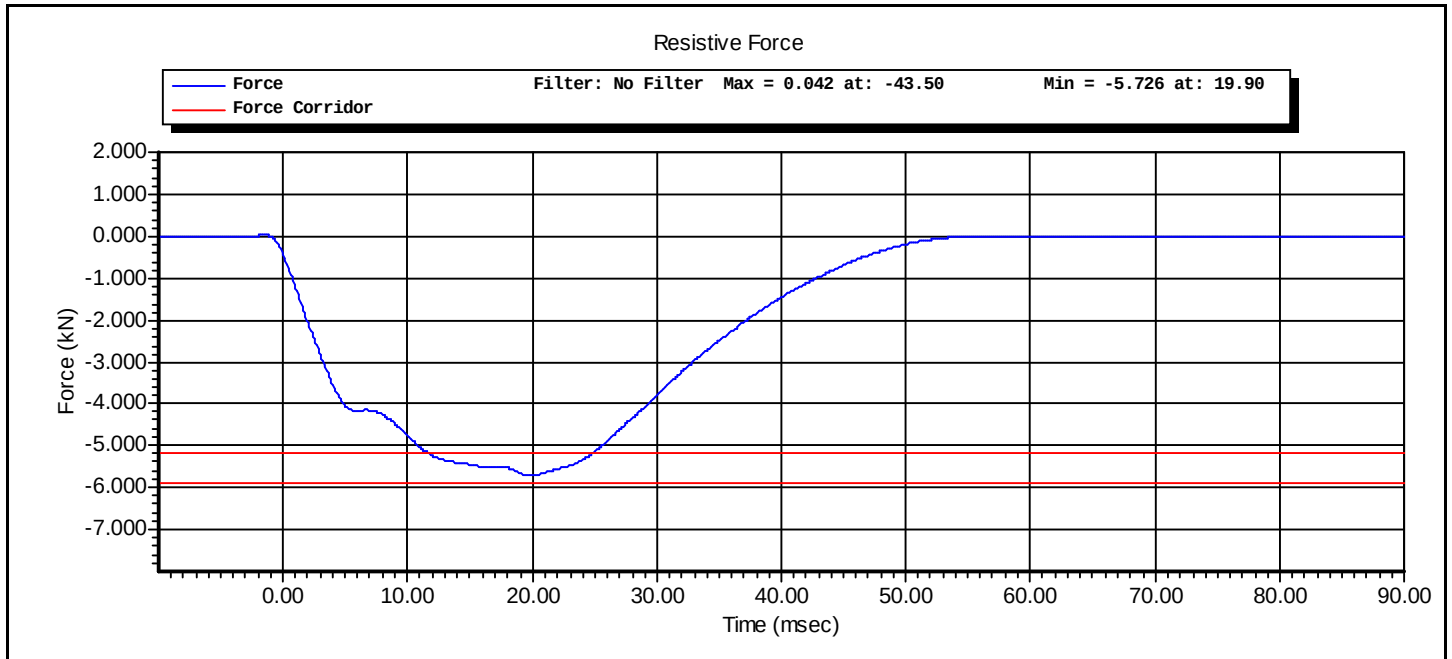
Resistive Force vs Sternum Displacement



Test ID: **Thorax**

Test Time: **9:38:05 AM**

Test Date: **9/30/2010**



CALSPAN

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

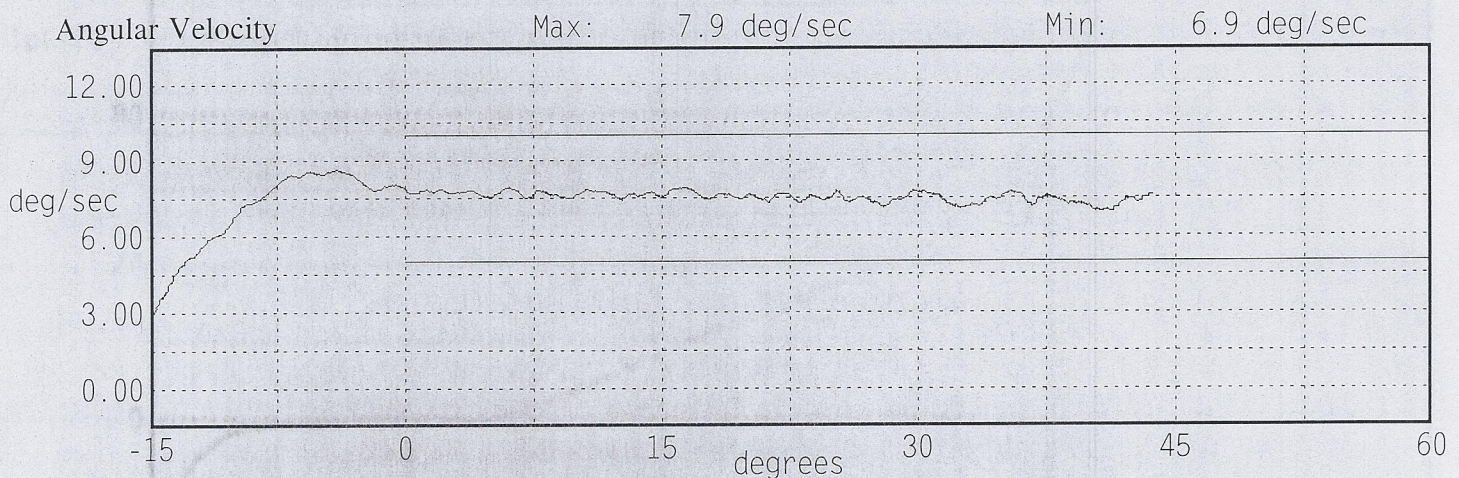
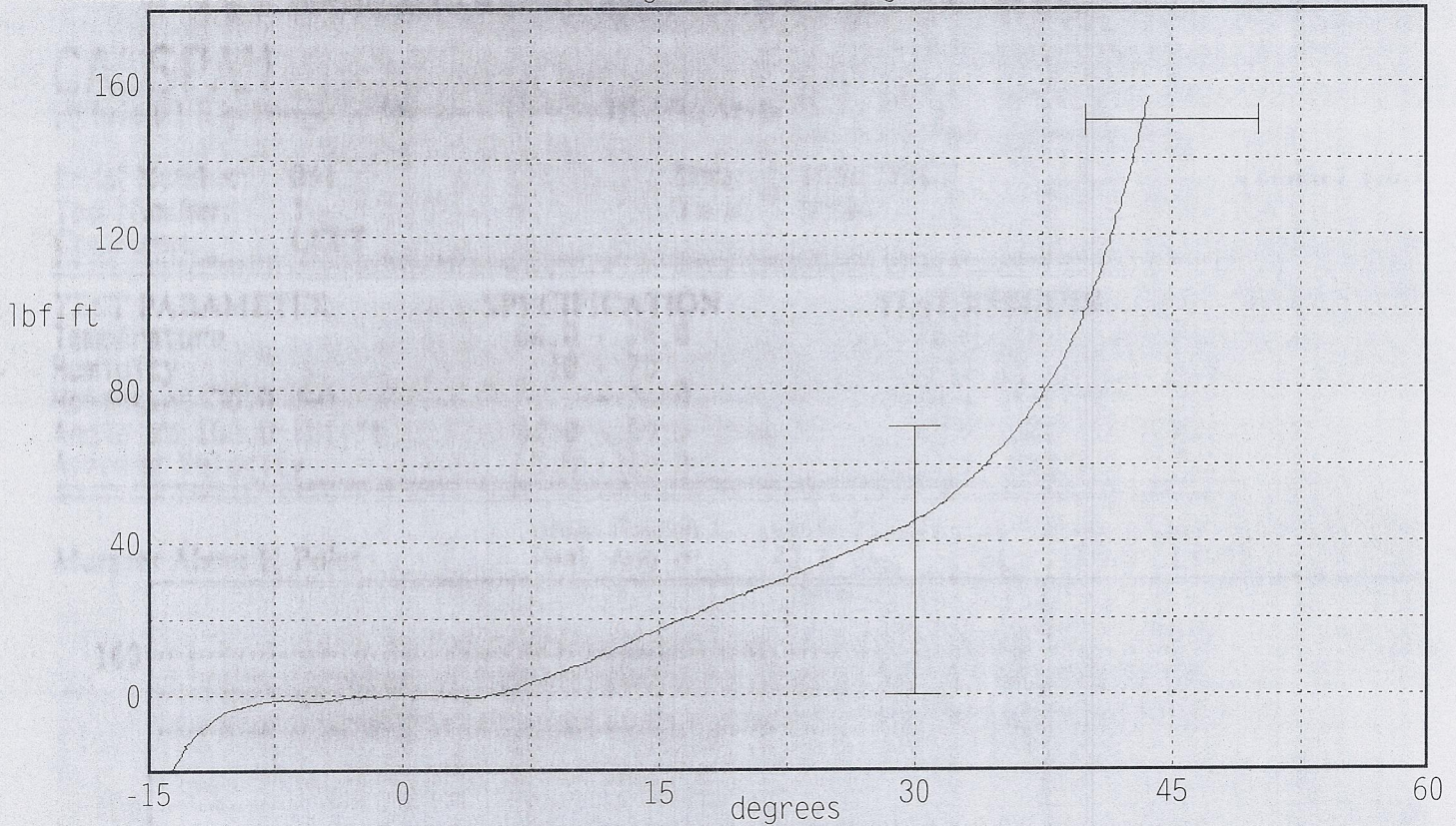
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 10/01/2010
Time: 09:40

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	54 % Pass
Moment at 30.0 deg	<= 70.0	45.6 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.4 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.9 lbf-ft at 43.6 deg
Peak Angle: 43.6 deg at 155.9 lbf-ft



CALSPAN

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

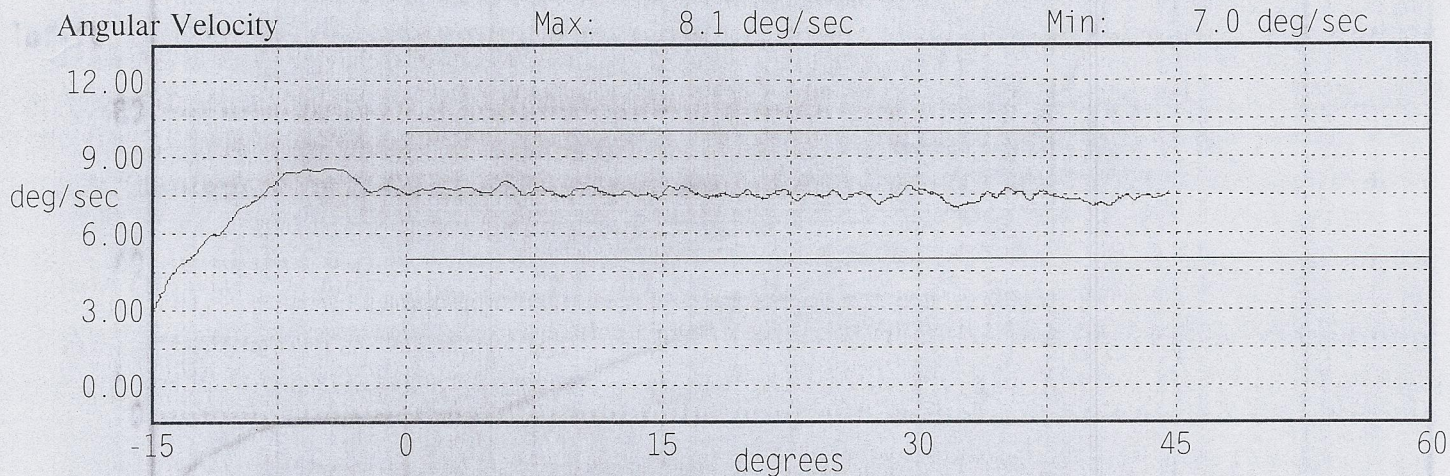
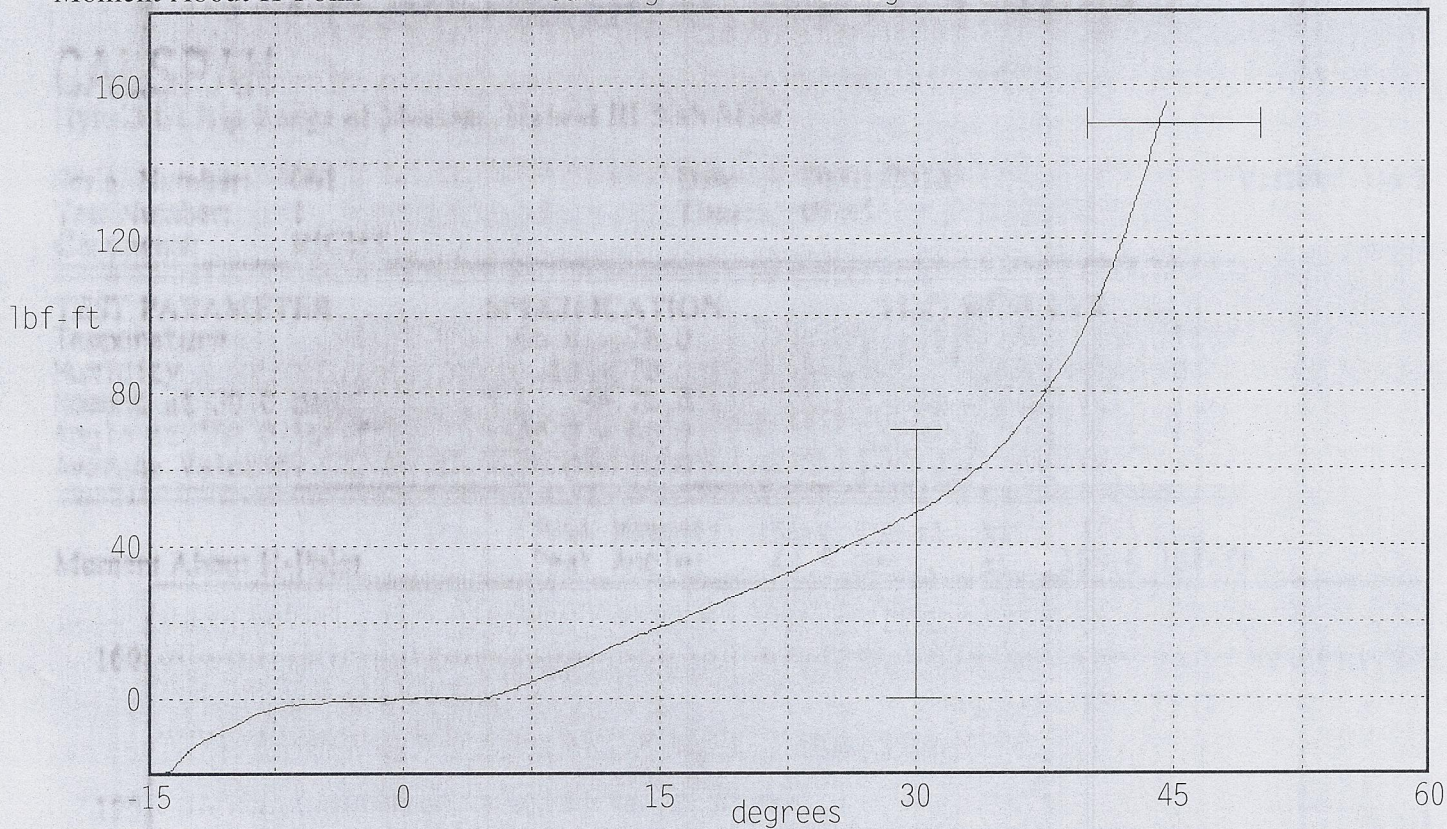
Serial Number: 061
Test Number: 1
Comments: RIGHT

Date: 10/01/2010
Time: 09:45

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	54 % Pass
Moment at 30.0 deg	<= 70.0	48.6 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	44.2 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.6 lbf-ft at 44.5 deg
Peak Angle: 44.5 deg at 155.6 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:	9/30/2010
Test Number:	1	Test Time:	5:55:21 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	55.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-5.78 -- -4.72	-4.93 kN P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **5:55:21 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Left Knee**

Test Time: **5:55:21 PM**

Test Date: **9/30/2010**

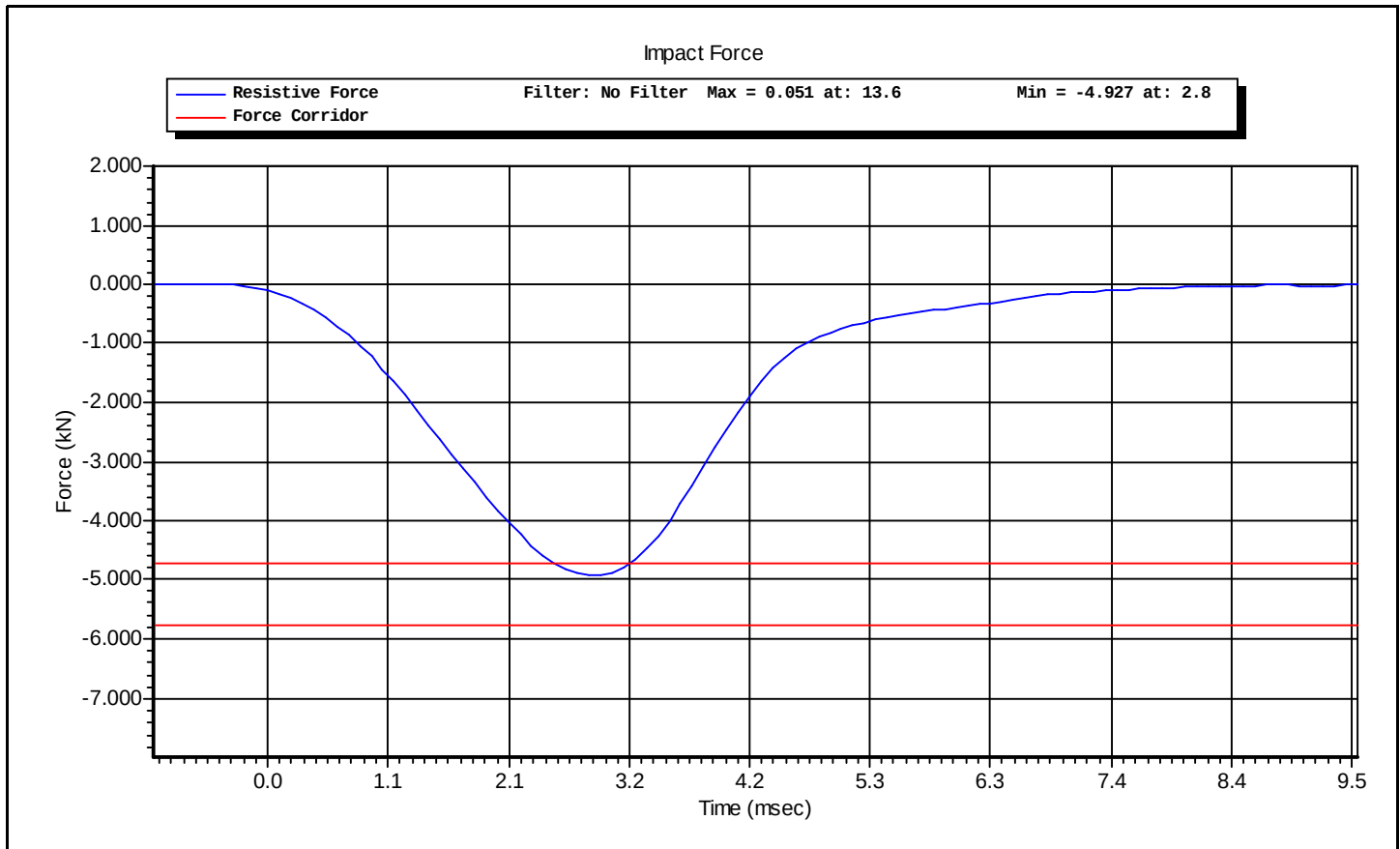


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	9/30/2010
Test Number:	1	Test Time:	5:55:21 PM



Test ID: **Left Knee**

Test Time: **5:55:21 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	8:28:06 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.1 deg C P
Humidity	10.0 -- 70.0	54.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-5.78 -- -4.72	-5.17 kN P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **8:28:06 AM**

Test Date: **10/1/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Right Knee**

Test Time: **8:28:06 AM**

Test Date: **10/1/2010**

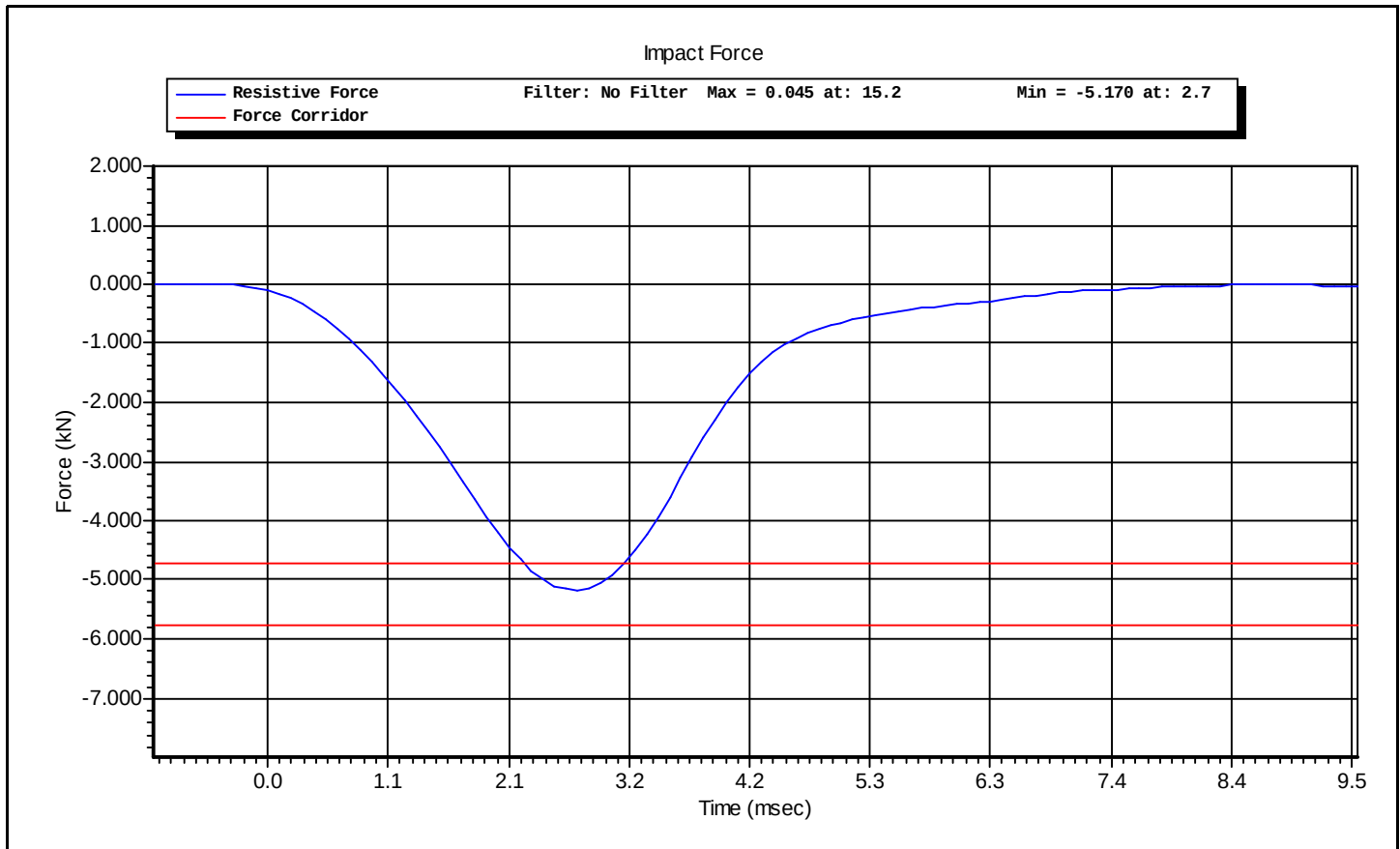


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	8:28:06 AM



Test ID: **Right Knee**

Test Time: **8:28:06 AM**

Test Date: **10/1/2010**

CALIBRATION TEST RESULTS

PRE-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

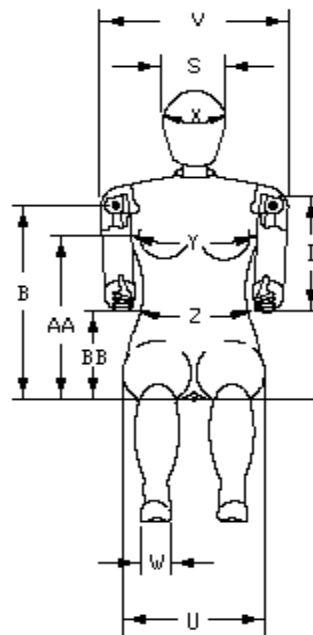
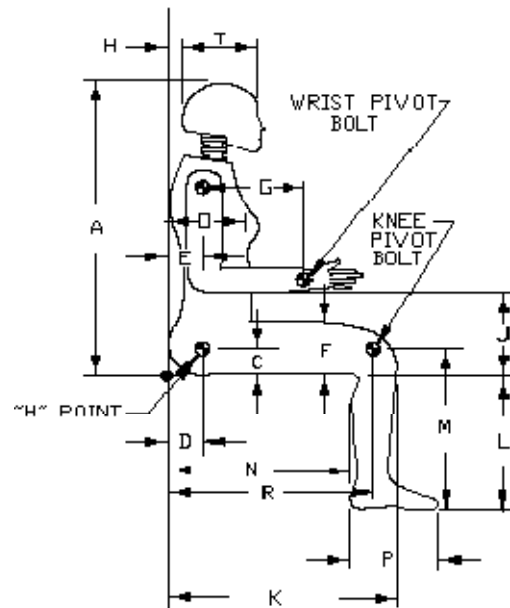
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	78	Yes
F	Thigh Clearance	119.4 – 134.6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

Technician: AR

Date: 10/1/2010

Hybrid 3 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	9/30/2010
Test Number:	1	Test Time:	2:38:04 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	55 %RH P
Resultant Acceleration	250 -- 300	285 g P
Oscillation	0.0 -- 10.0	1.5 % P
Lateral Acceleration	-15.00 -- 15.00	-4.06 g P

All test parameters are within specifications

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

Test ID: **Head Drop**

Test Time: **2:38:04 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Head Drop**

Test Time: **2:38:04 PM**

Test Date: **9/30/2010**

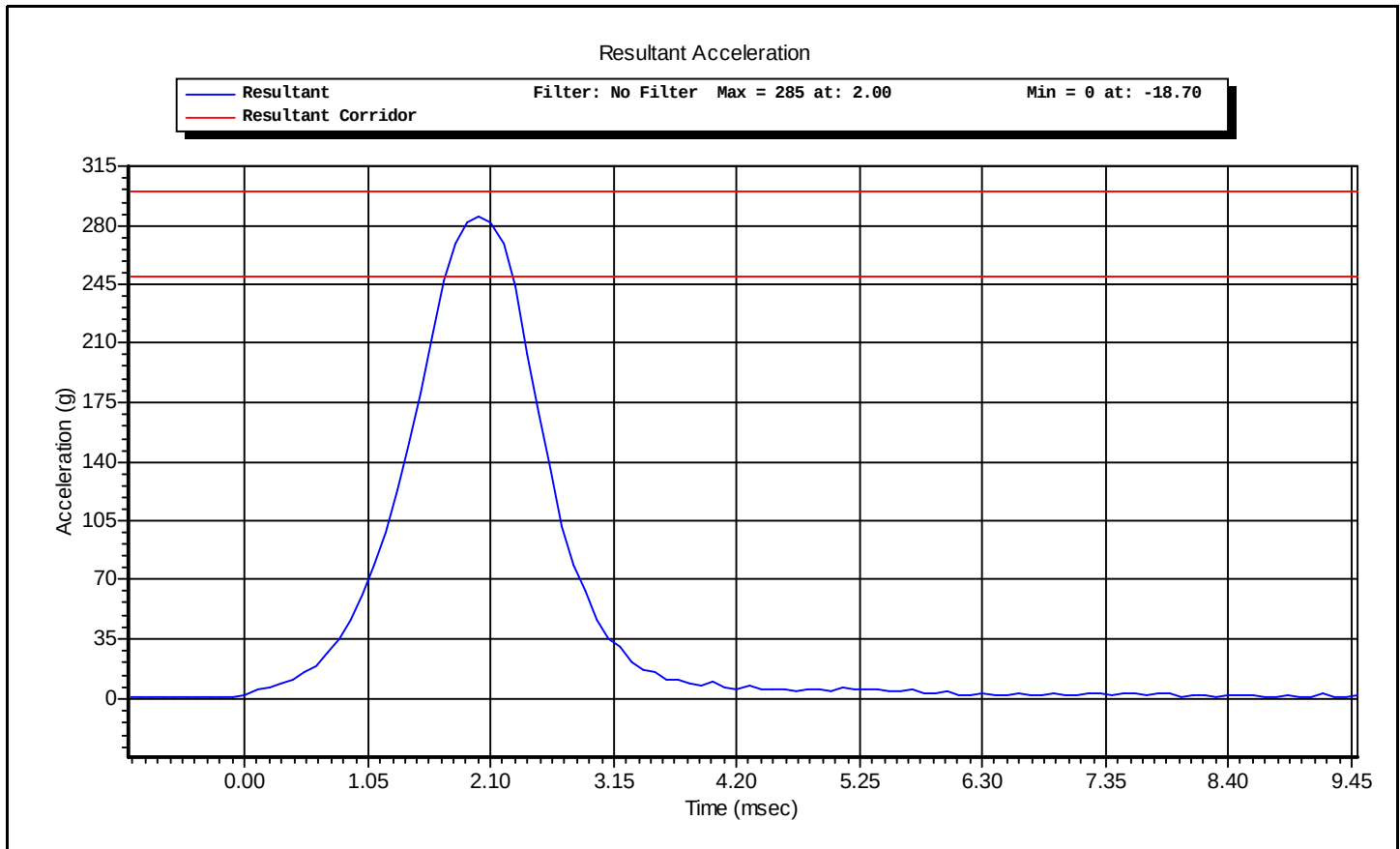


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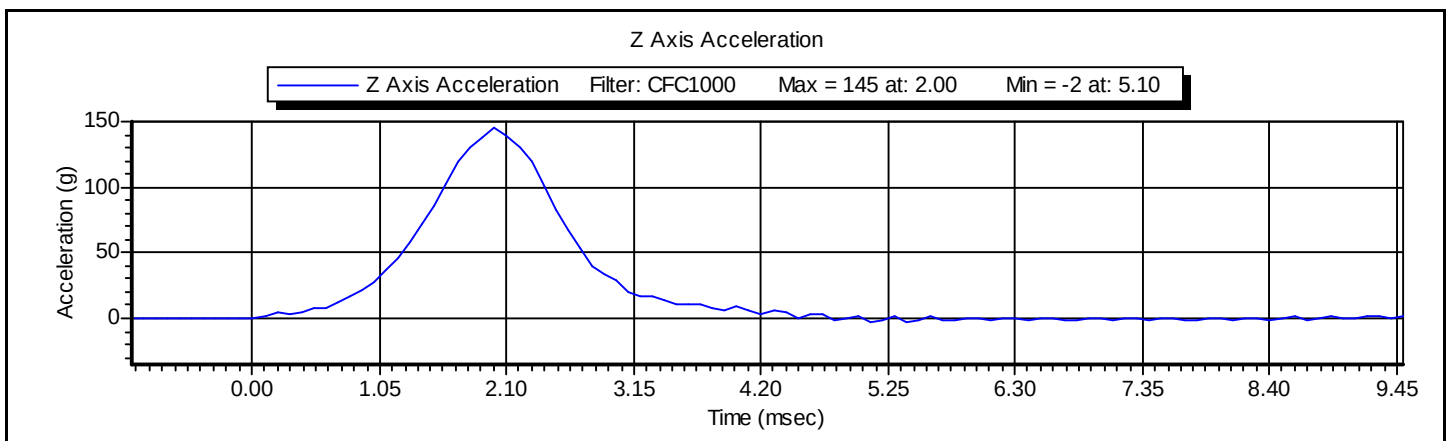
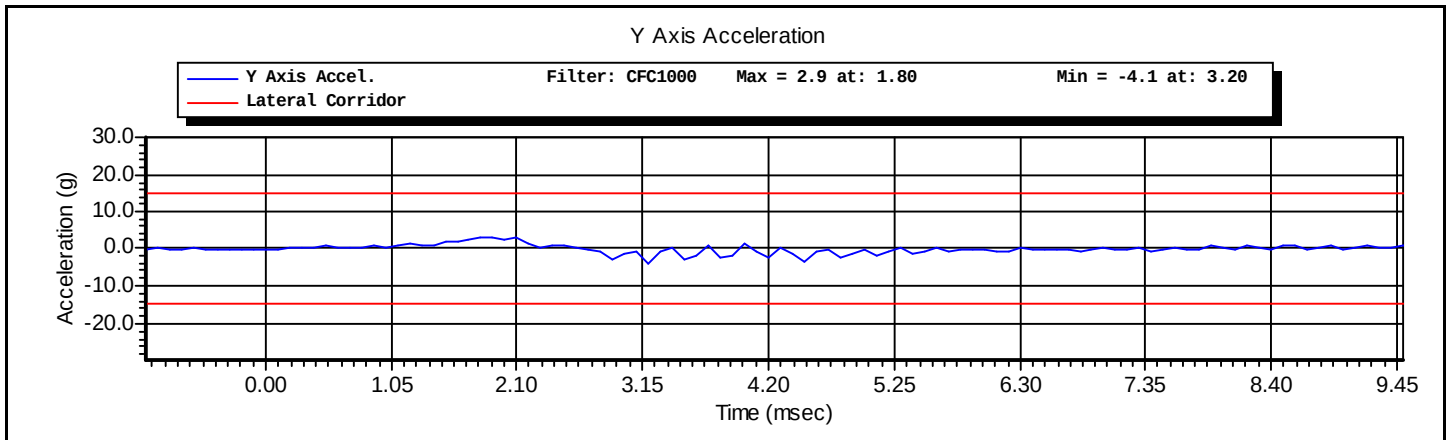
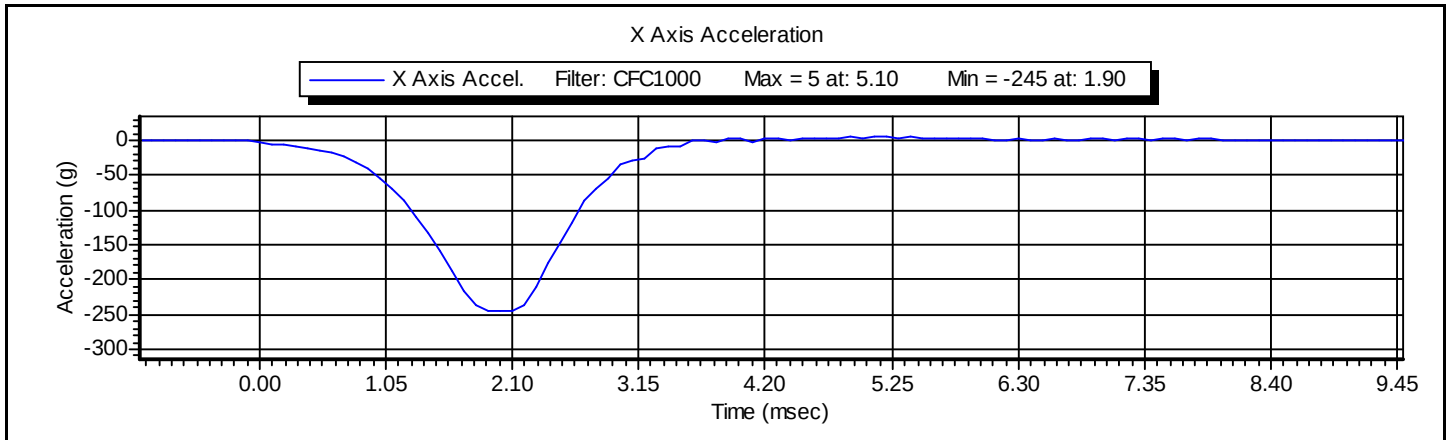
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	9/30/2010
Test Number:	1	Test Time:	2:38:04 PM



Test ID: **Head Drop**

Test Time: **2:38:04 PM**

Test Date: **9/30/2010**





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	9/30/2010
Test Number:	2	Test Time:	4:59:14 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	55 %RH P
Velocity	5.95 -- 6.19	6.19 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.83 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.62 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.24 m/s P
D Plane Rotation	99.0 -- 114.0	110.6 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-59.0 Nm P
Moment Decay to -10.0 Nm	94.0 -- 114.0	104.2 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **4:59:14 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Extension**

Test Time: **4:59:14 PM**

Test Date: **9/30/2010**

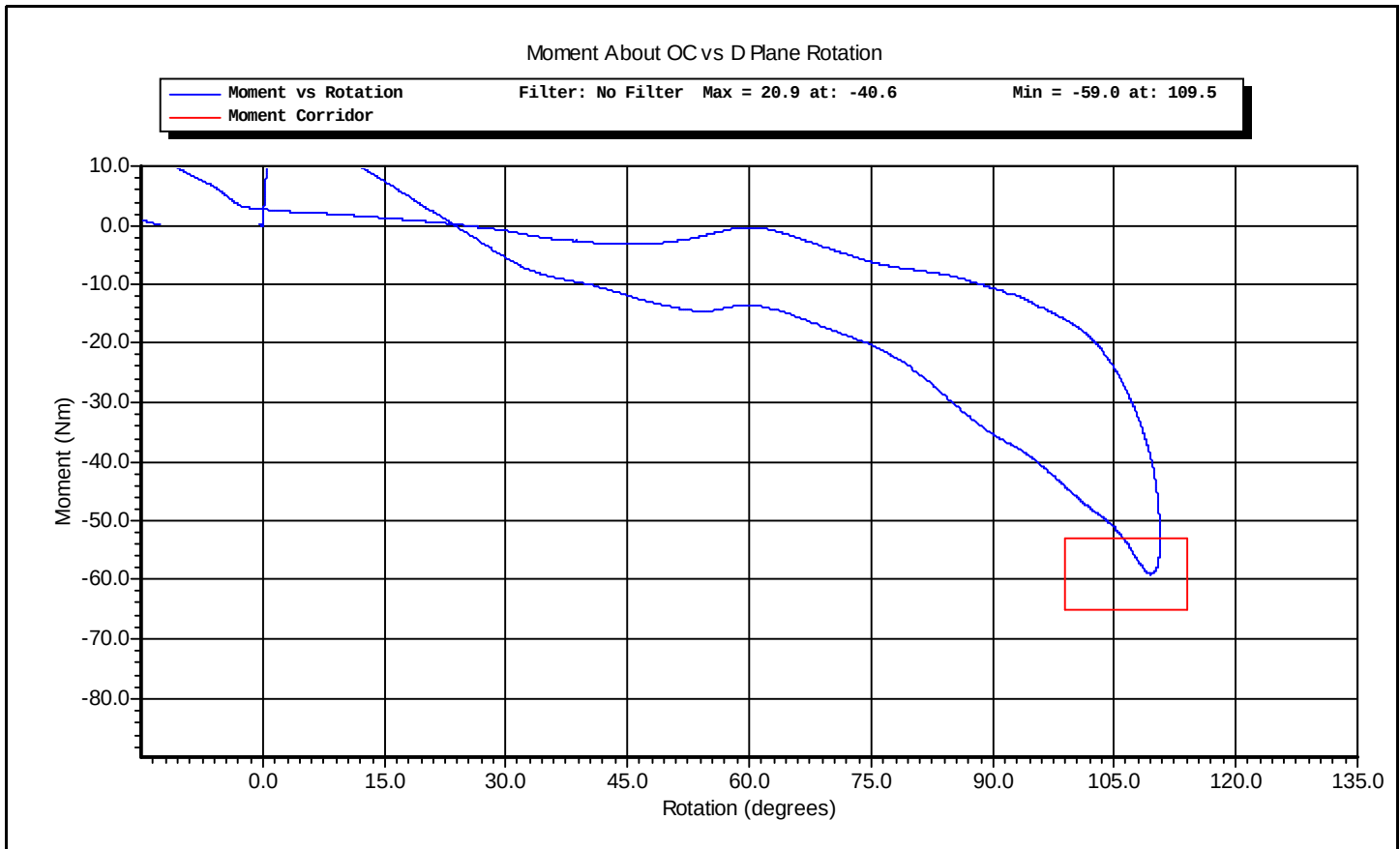


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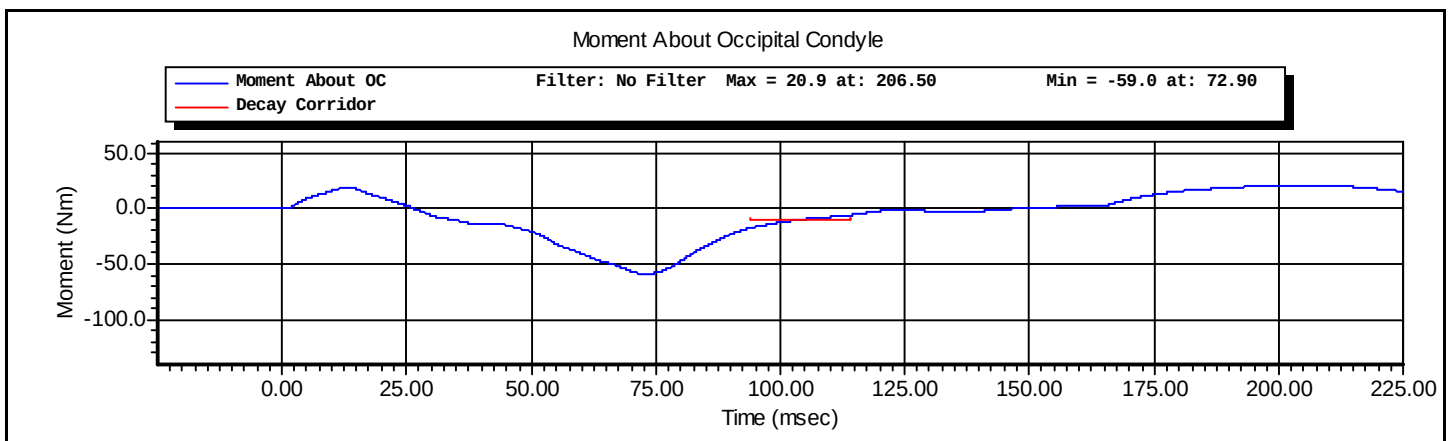
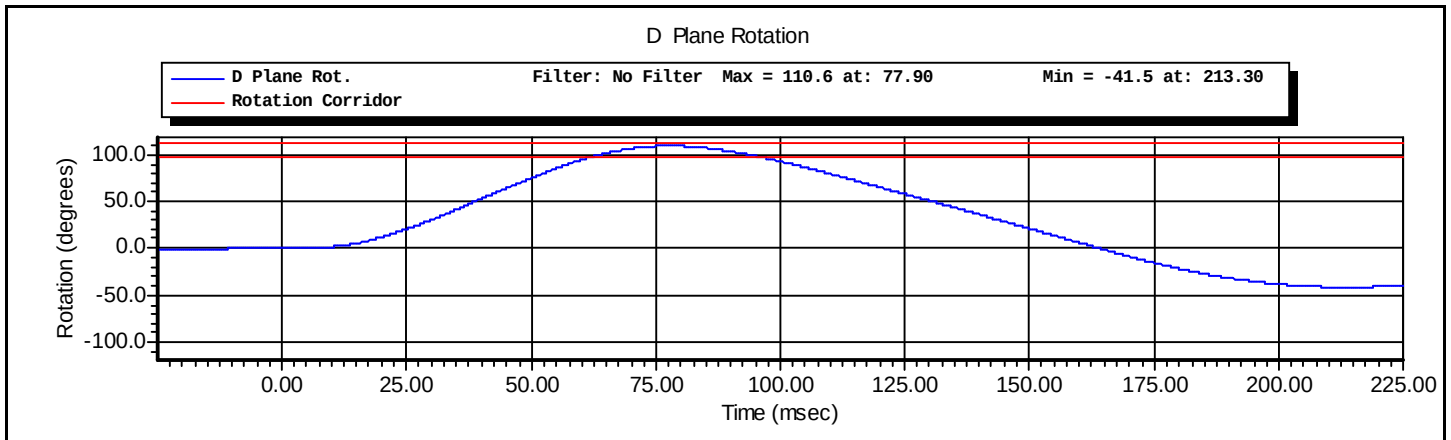
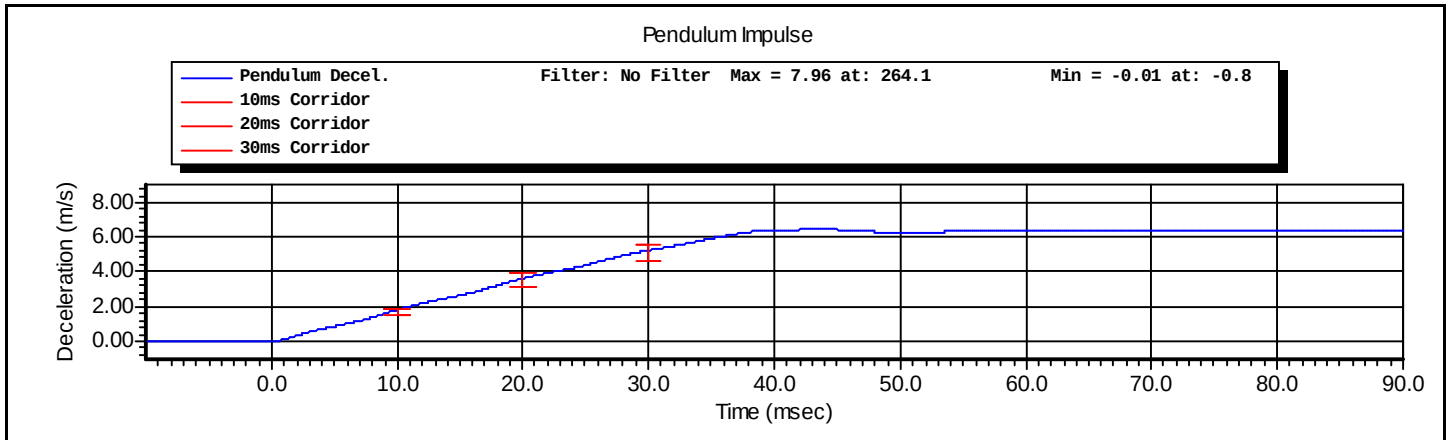
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Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	9/30/2010
Test Number:	2	Test Time:	4:59:14 PM



Test ID: Neck Extension Test Time: 4:59:14 PM

Test Date: 9/30/2010





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	9/30/2010
Test Number:	1	Test Time:	3:43:31 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	56 %RH P
Velocity	6.89 -- 7.13	7.05 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.15 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.30 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.25 m/s P
D Plane Rotation	-91.0 -- -77.0	-82.0 degrees P
Moment During Rotation Interval	69.0 -- 83.0	69.6 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	89.8 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **3:43:31 PM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Flexion**

Test Time: **3:43:31 PM**

Test Date: **9/30/2010**

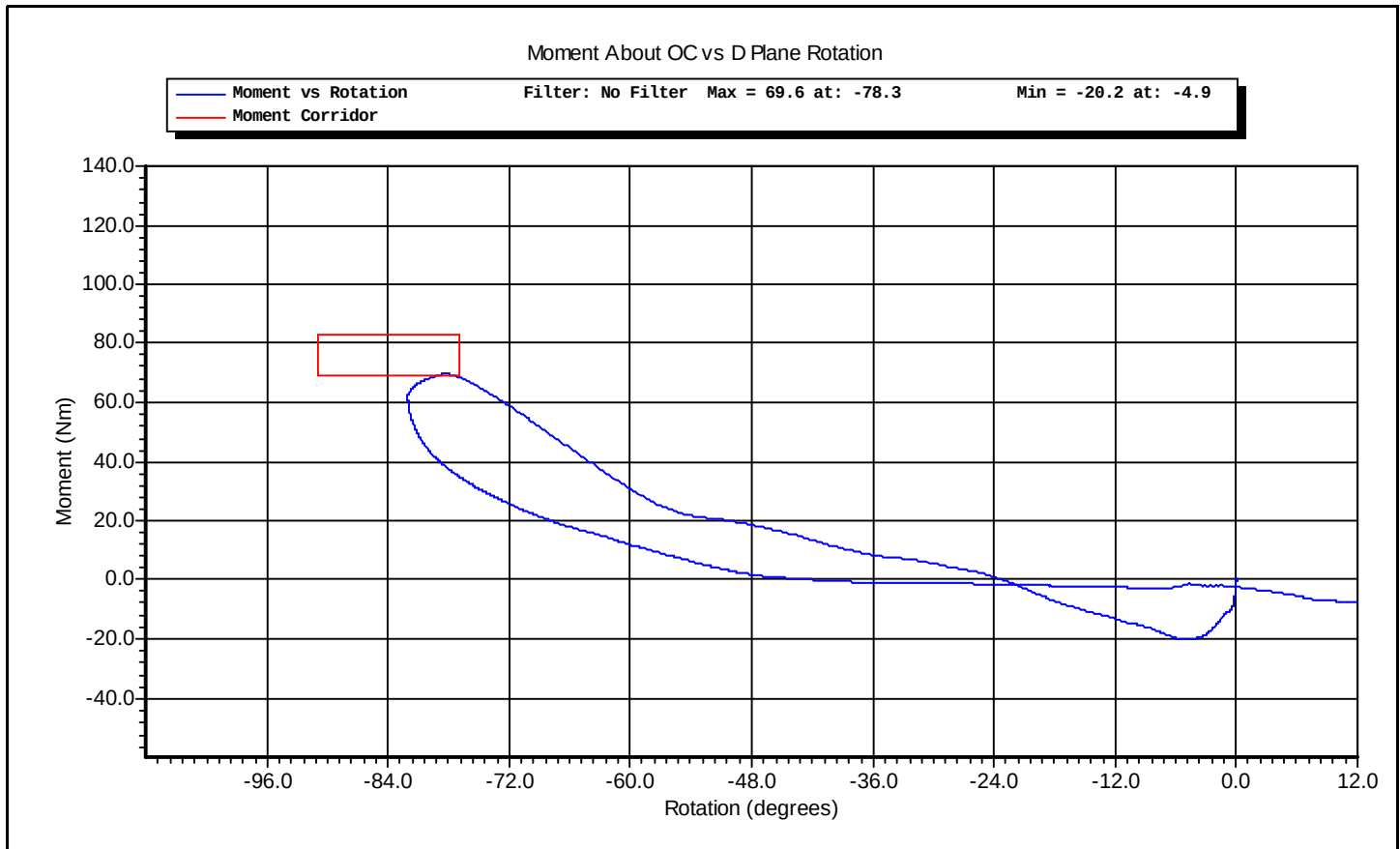


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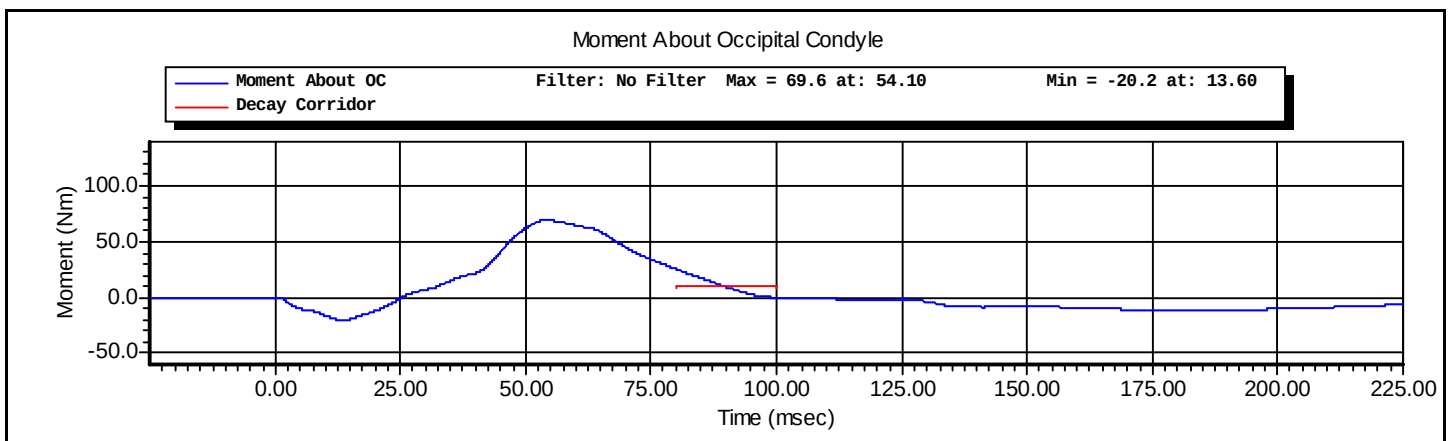
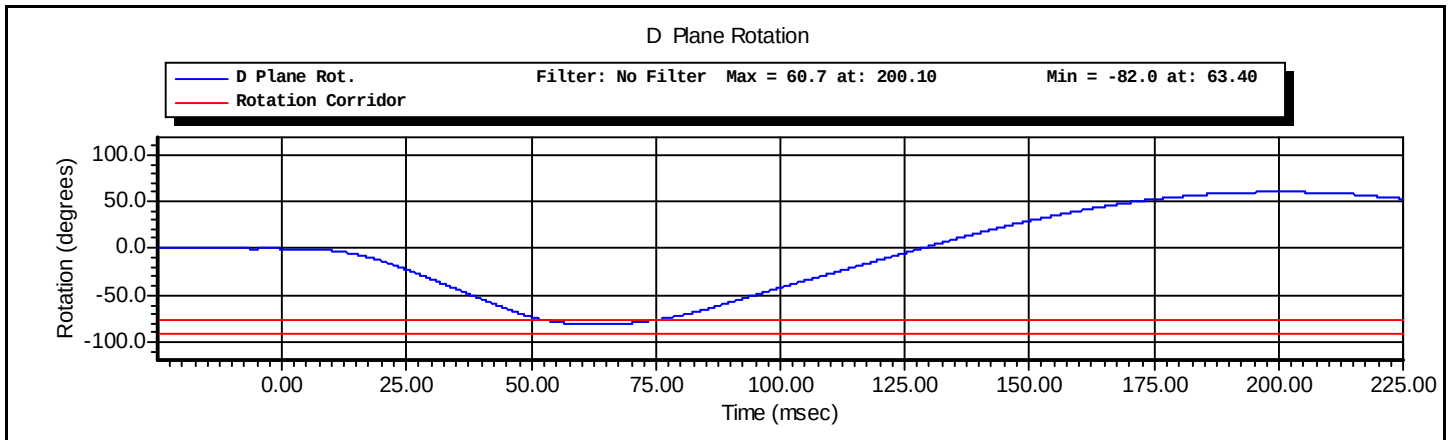
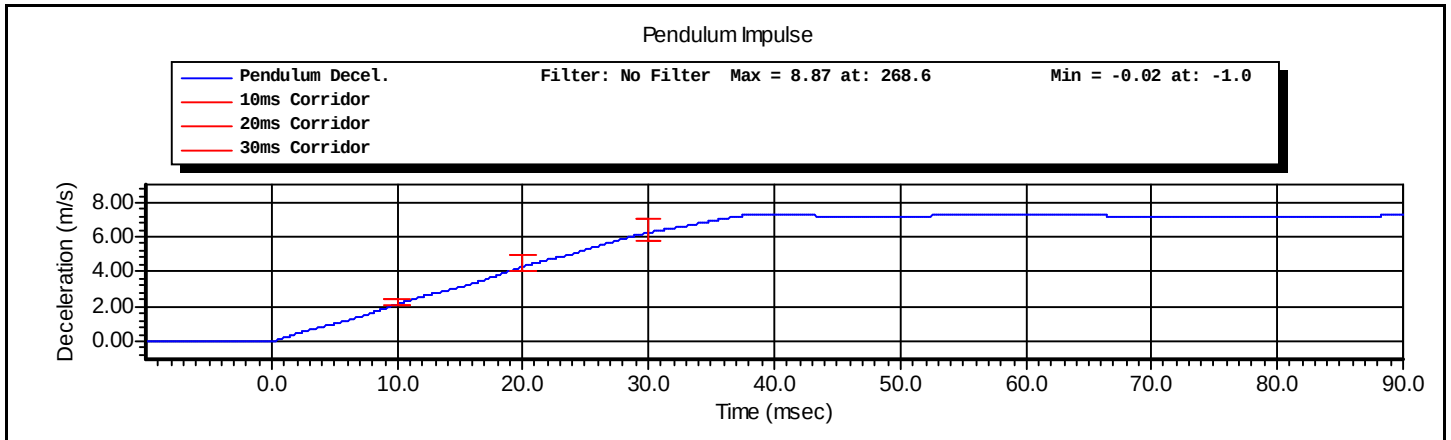
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	9/30/2010
Test Number:	1	Test Time:	3:43:31 PM



Test ID: Neck Flexion

Test Time: 3:43:31 PM

Test Date: 9/30/2010





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	9/30/2010
Test Number:	2	Test Time:	11:10:13 AM

Component Part Number	Component Serial Number
Chest Jacket - 880105-355-E	DG0304

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	56.0 %RH P
Velocity	6.59 -- 6.83	6.69 m/s P
Sternum Displacement	-58.0 -- -50.0	-51.7 mm P
Force During Displacement Interval	-4400 -- -3900	-4142 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-4167 N P
Hysteresis	69 -- 85	71 % P

All test parameters are within specifications

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

Test ID: **Thorax Impact**

Test Time: **11:10:13 AM**

Test Date: **9/30/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Thorax Impact**

Test Time: **11:10:13 AM**

Test Date: **9/30/2010**



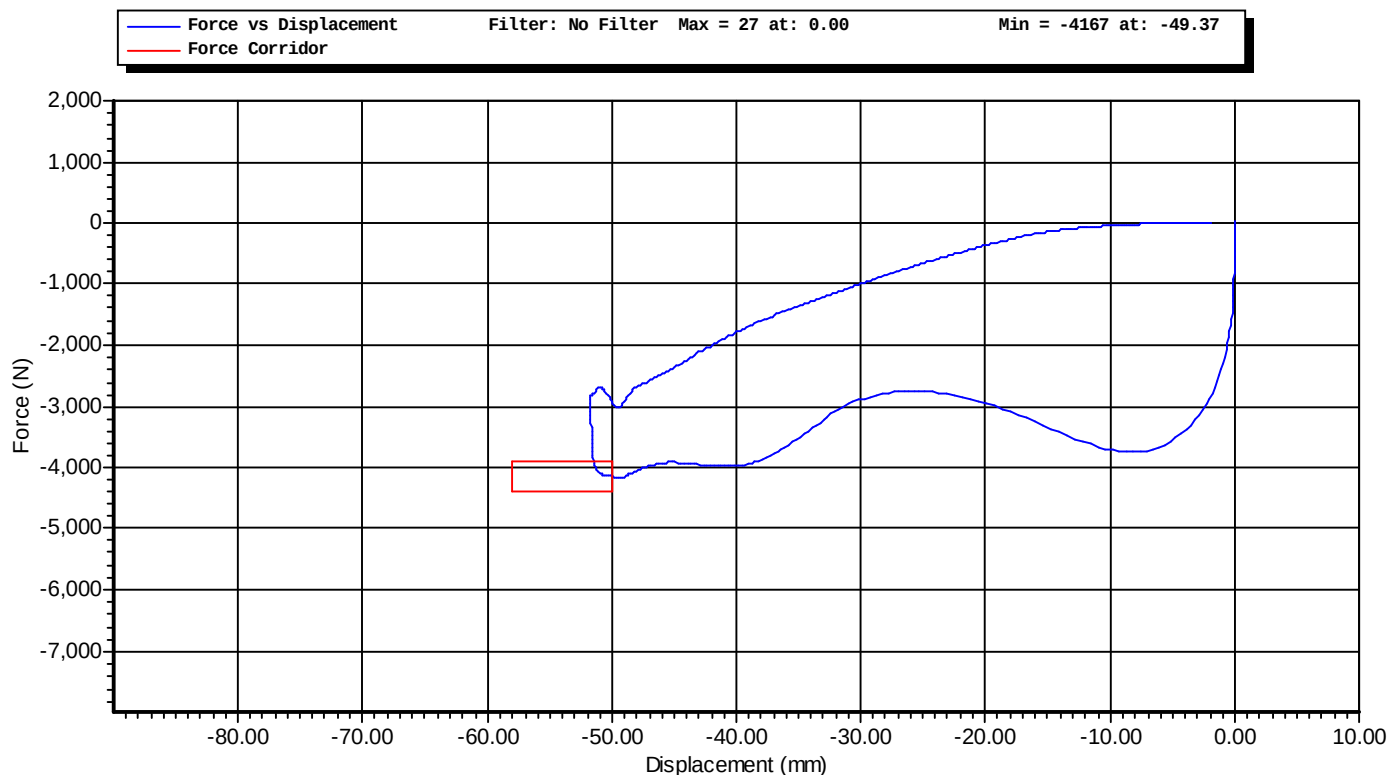
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	9/30/2010
Test Number:	2	Test Time:	11:10:13 AM

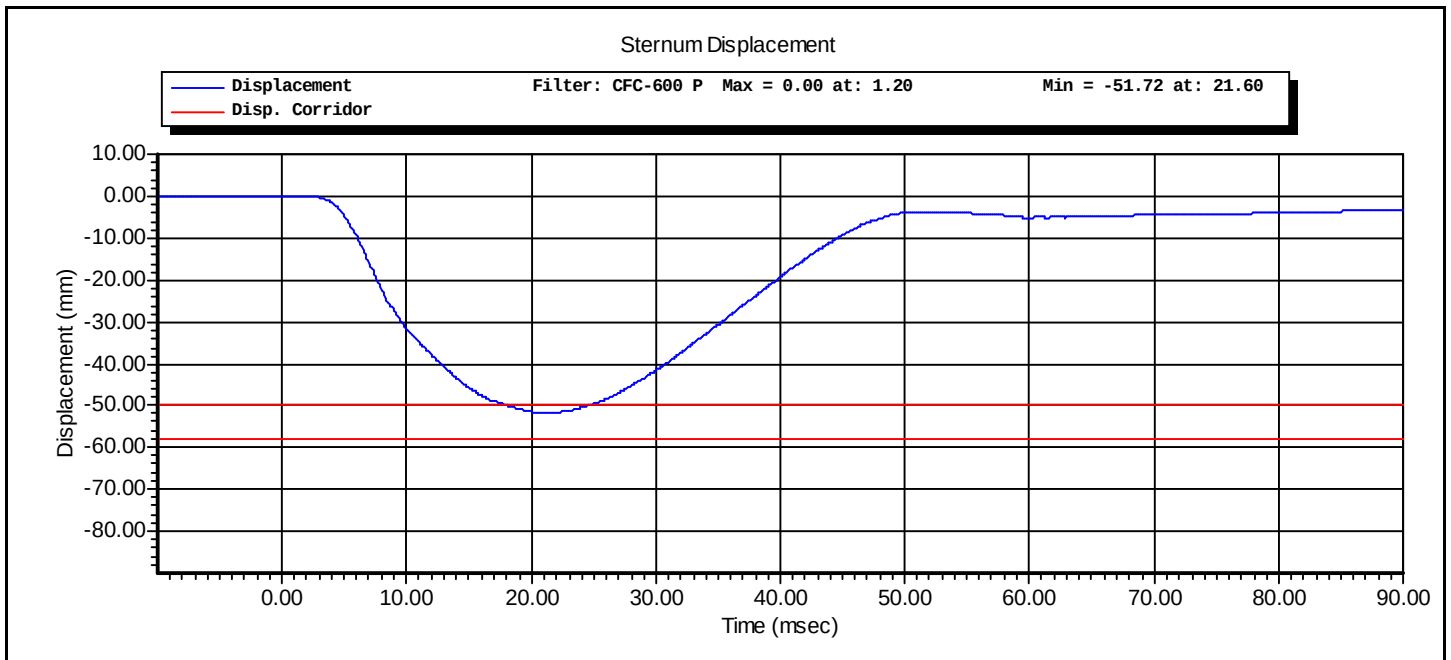
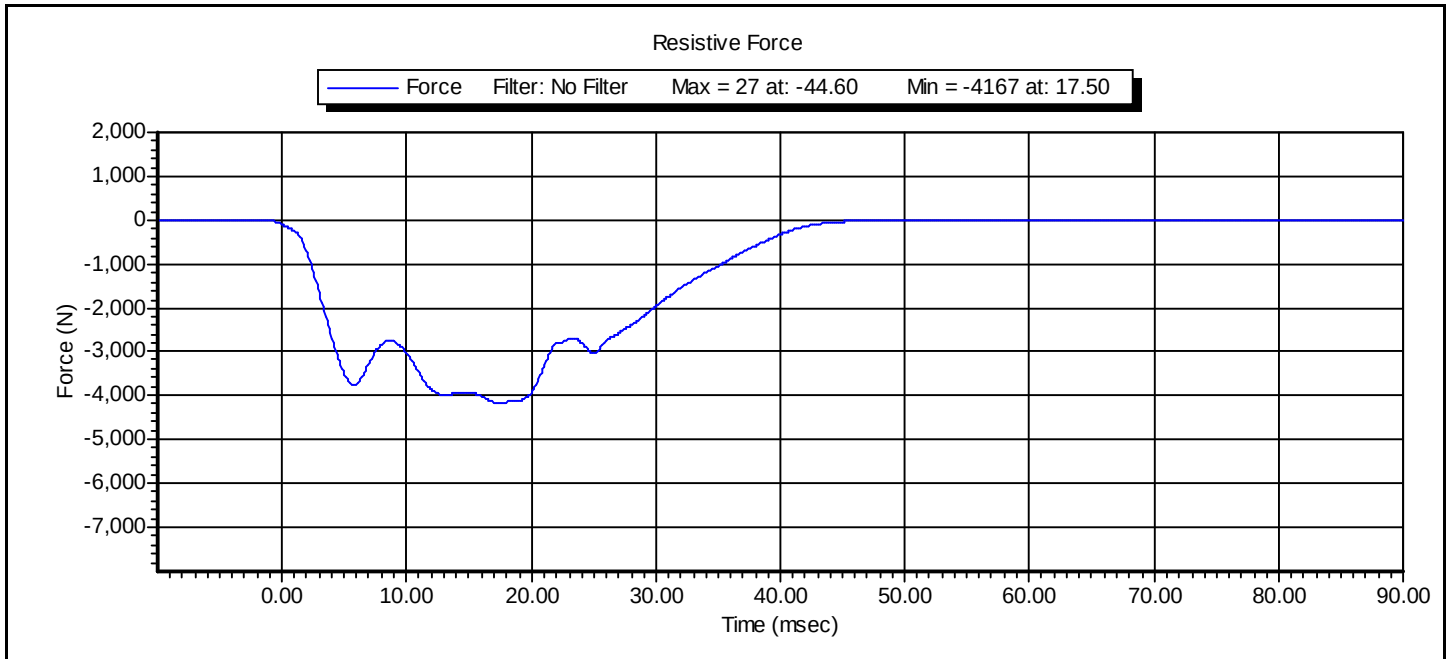
Resistive Force vs Sternum Displacement



Test ID: Thorax Impact

Test Time: 11:10:13 AM

Test Date: 9/30/2010



Torso Flexion Test

Technician: AR

Calibration Date: 10/1/2010

ATD Serial Number: 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	22.2° C	P
Lab Humidity: 38%	10-70%	41%	P
Max Force @ 45 deg	320 – 390N	353N	P
Torso Rotation Rate	0.5 °/s ≤ rate ≤ 1.5 °/s	1.0 °/s	P
Initial reference angle	≤20 deg	15°	P
Final ref plan angle	Initial ref plane ± 8 deg	22°	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	1:10:48 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	46.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-4060 -- -3450	-3639 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **1:10:48 PM**

Test Date: **10/1/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Left Knee**

Test Time: **1:10:48 PM**

Test Date: **10/1/2010**

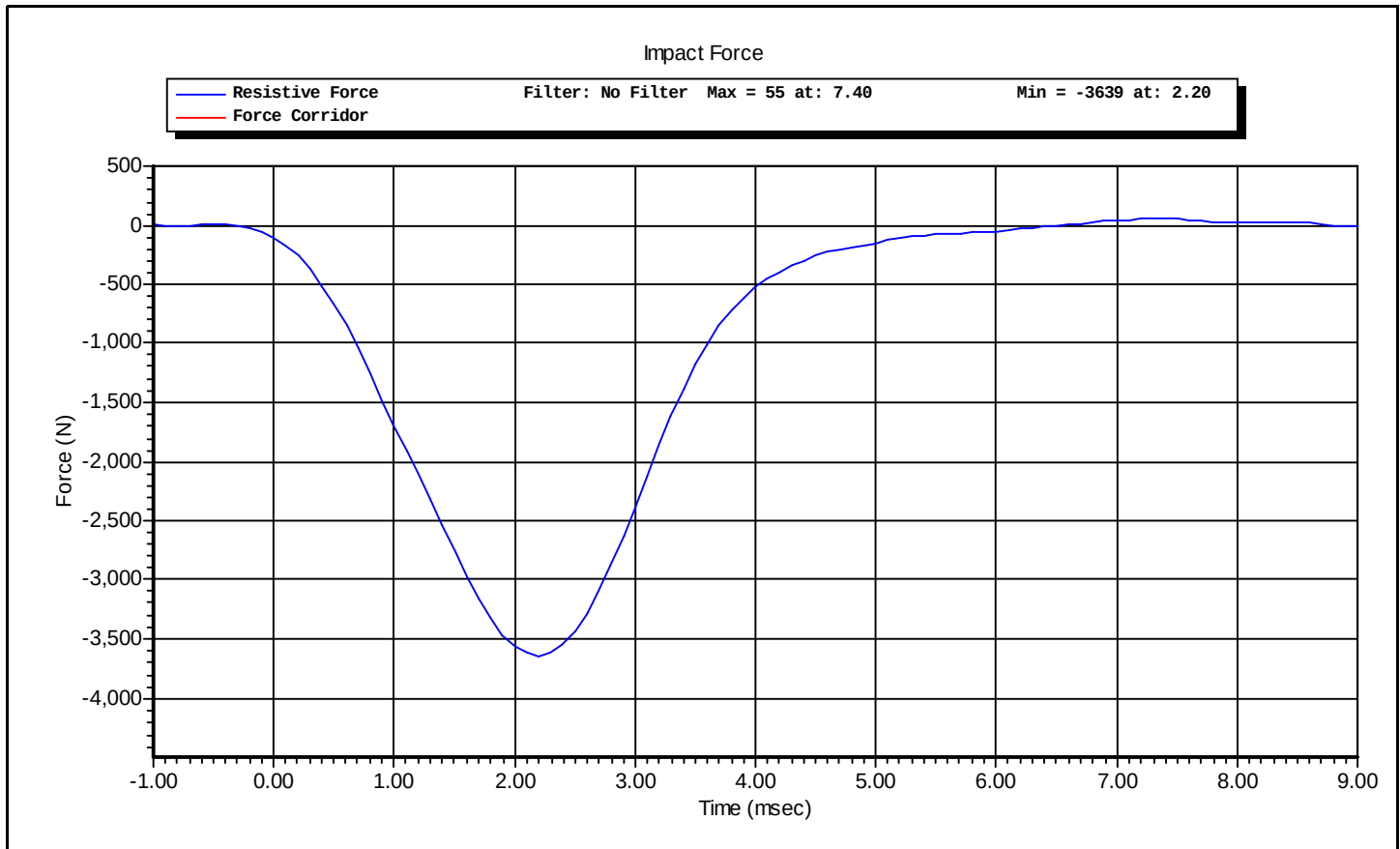


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	1:10:48 PM



Test ID: **Left Knee**

Test Time: **1:10:48 PM**

Test Date: **10/1/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	1:54:25 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	45.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-4060 -- -3450	-3638 N P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **1:54:25 PM**

Test Date: **10/1/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Right Knee**

Test Time: **1:54:25 PM**

Test Date: **10/1/2010**

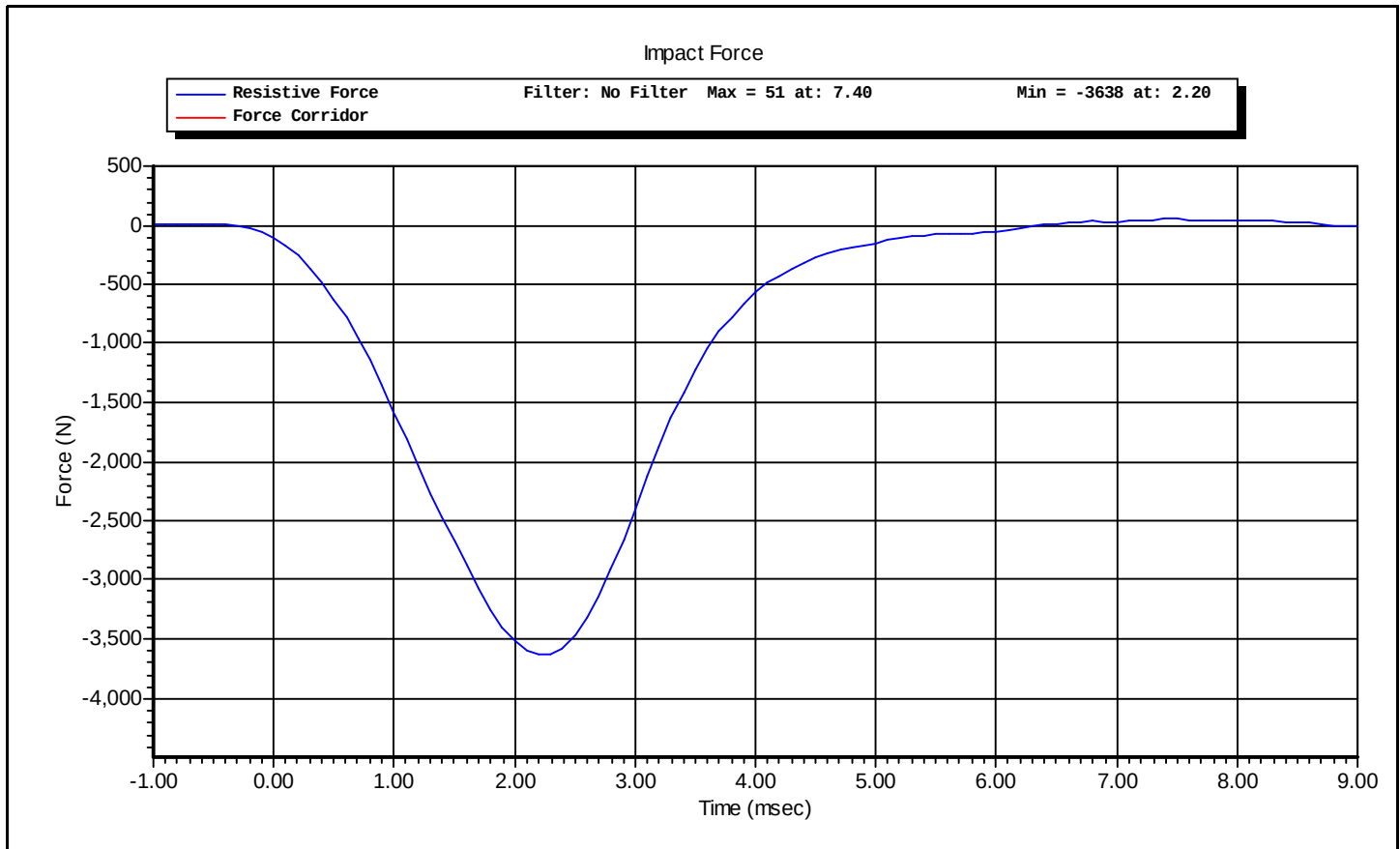


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/1/2010
Test Number:	1	Test Time:	1:54:25 PM



Test ID: **Right Knee**

Test Time: **1:54:25 PM**

Test Date: **10/1/2010**

CALIBRATION TEST RESULTS

POST-TEST

DRIVER DUMMY

S/N: 61

50th Male External Measurements

SN 061

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

Technician: AR

Date: 10/7/2010



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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	10/6/2010
Test Number:	1	Test Time:	10:30:21 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	50 %RH P
Resultant Acceleration	225 -- 275	265 g P
Oscillation	0.0 -- 10.0	8.3 % P
Lateral Acceleration	-15.00 -- 15.00	10.64 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **10:30:21 AM**

Test Date: **10/6/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Head Drop**

Test Time: **10:30:21 AM**

Test Date: **10/6/2010**



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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Extension	Test Date:	10/6/2010
Test Number:	1	Test Time:	12:45:14 PM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	48 %RH	P
Velocity		5.94	-- 6.19	6.14 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	19.0 g	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	16.8 g	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	13.6 g	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	13.6 g	P
Decel Time to	5 g	38.0	-- 46.0	43.8 ms	P
D Plane Rotation		81.0	-- 106.0	93.1 degrees	P
Time at Max Rotation		72.0	-- 82.0	79.8 ms	P
Rotation Decay to Zero		147.0	-- 174.0	160.7 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-65.3 Nm	P
Time at Max Moment		65.0	-- 79.0	70.5 ms	P
Moment Decay to Zero		120.0	-- 148.0	140.3 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Extension**

Test Time: **12:45:14 PM**

Test Date: **10/6/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Extension**

Test Time: **12:45:14 PM**

Test Date: **10/6/2010**

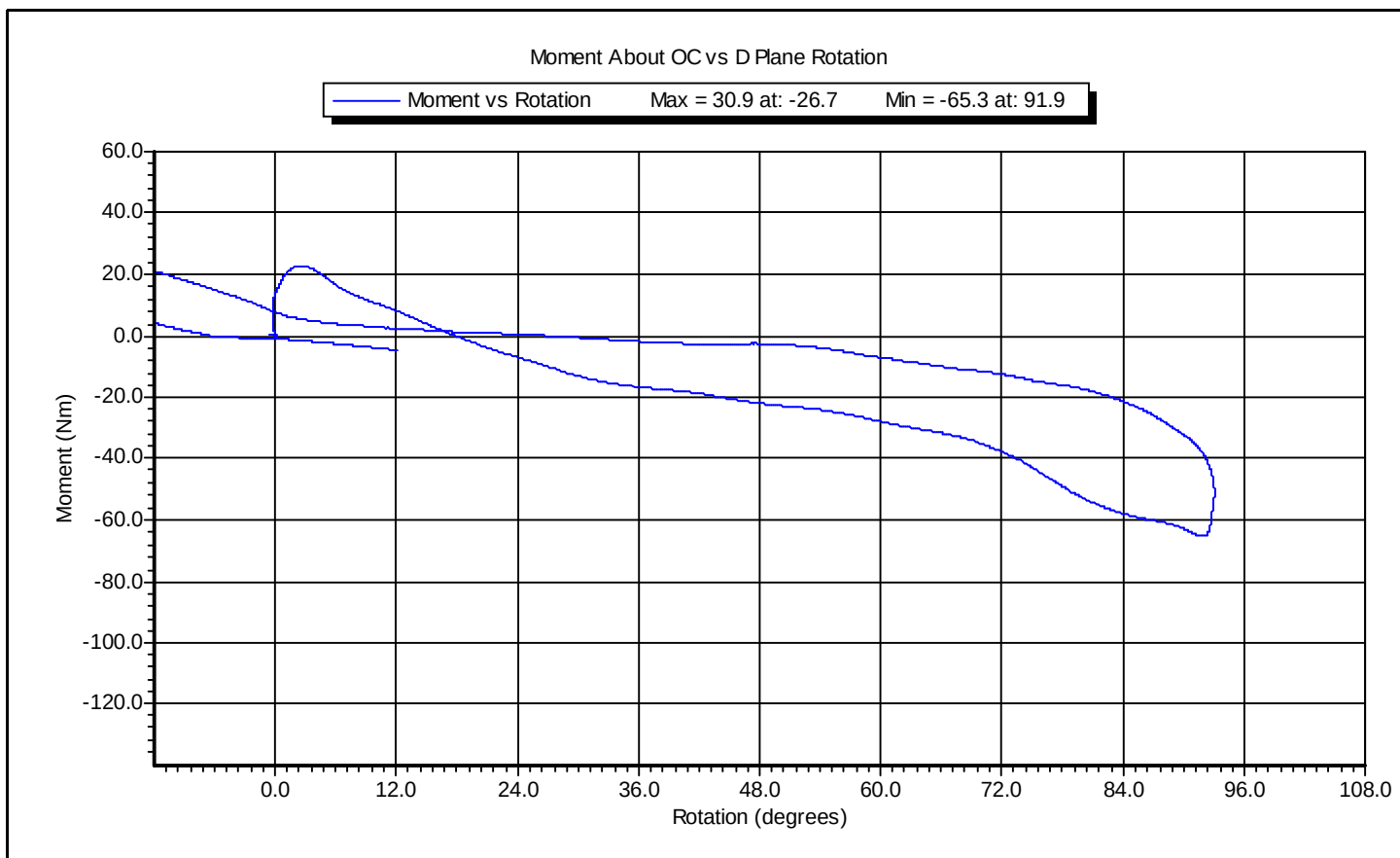


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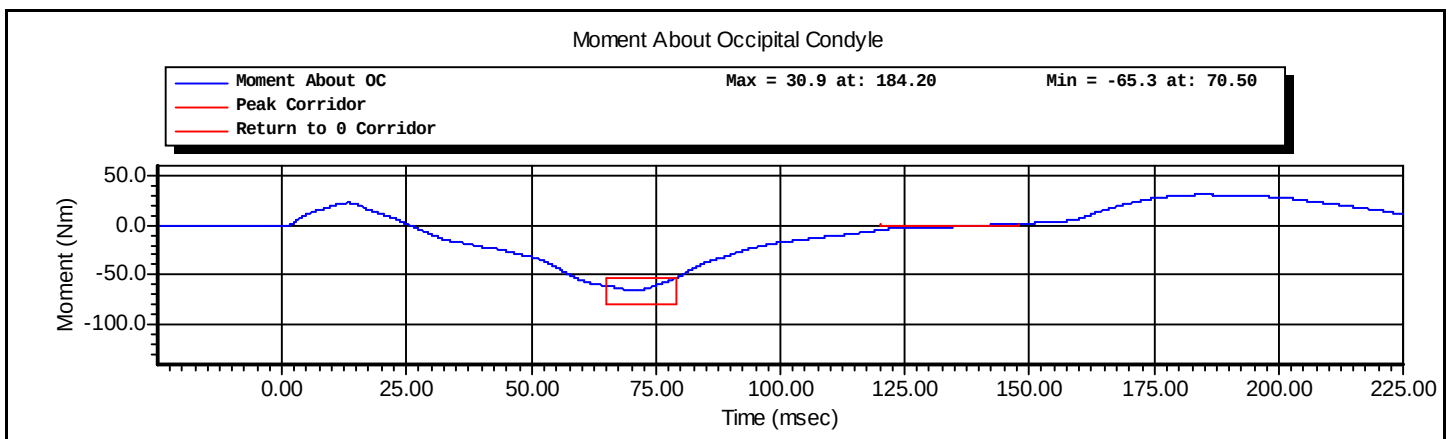
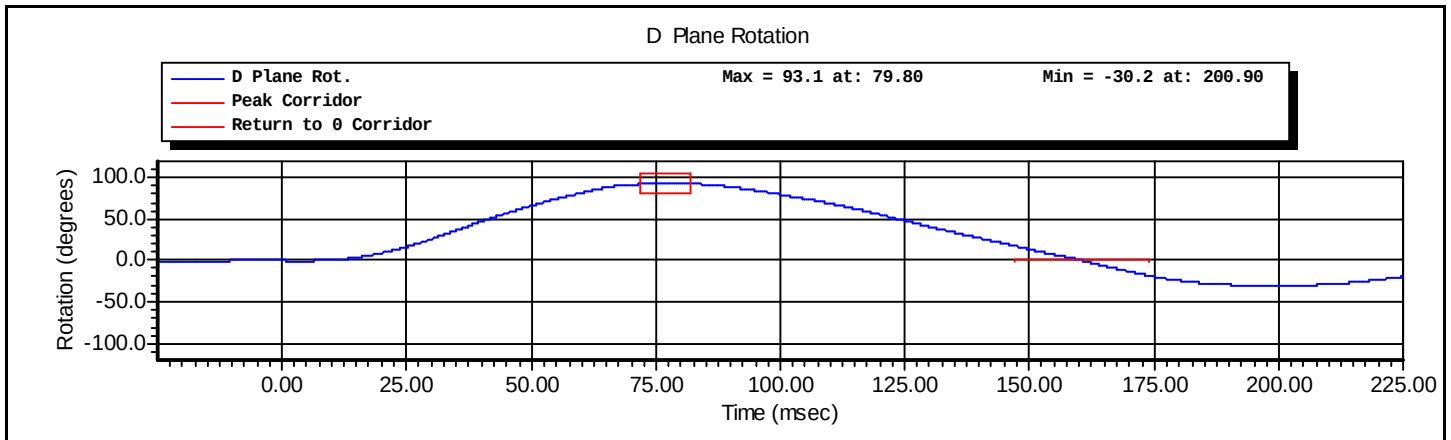
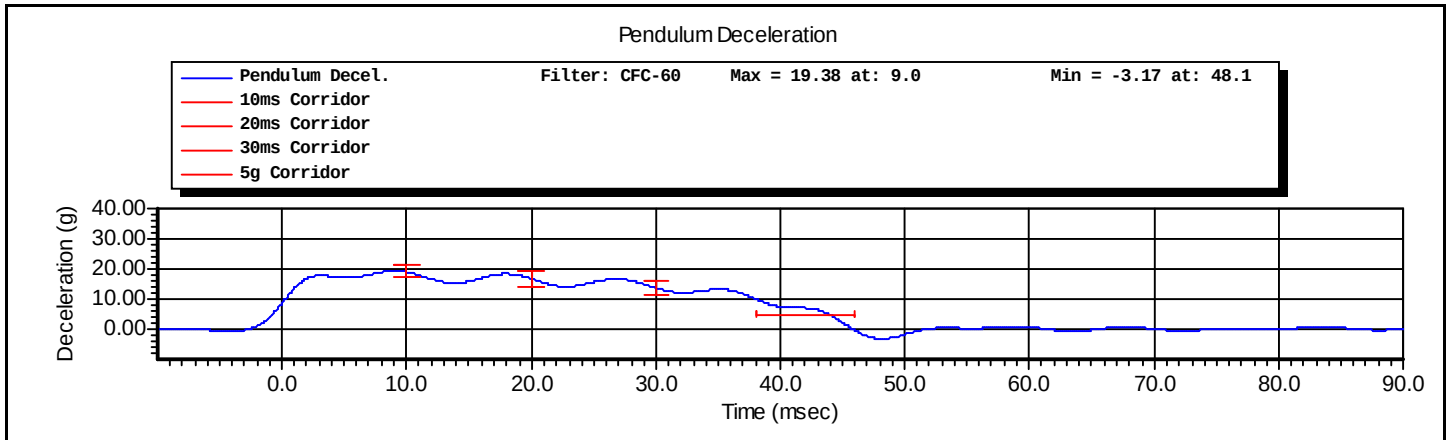
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Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Extension	Date:	10/6/2010
Number of Test:	1	Time of Test:	12:45:14 PM



ID of Test: Neck Extension

Time of Test: 12:45:14 PM

Date of Test: 10/6/2010





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Neck Flexion	Test Date:	10/6/2010
Test Number:	1	Test Time:	11:41:33 AM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.2 deg C	P
Humidity		10	-- 70	48 %RH	P
Velocity		6.89	-- 7.13	7.10 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	25.5 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.4 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	14.0 g	P
Max Pendulum Deceleration After	30 ms	0.0	-- 29.0	14.5 g	P
Deceleration time to	5 g	34.0	-- 42.0	40.0 ms	P
D Plane Rotation		-78.0	-- -64.0	-72.1 degrees	P
Time at max rotation		57.0	-- 64.0	58.9 ms	P
Rotation Decay to Zero		113.0	-- 128.0	118.9 ms	P
Moment about OC		88.1	-- 108.4	102.0 Nm	P
Time at Max Moment		47.0	-- 58.0	53.5 ms	P
Moment Decay to Zero		97.0	-- 107.0	97.5 ms	P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **11:41:33 AM**

Test Date: **10/6/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Flexion**

Test Time: **11:41:33 AM**

Test Date: **10/6/2010**

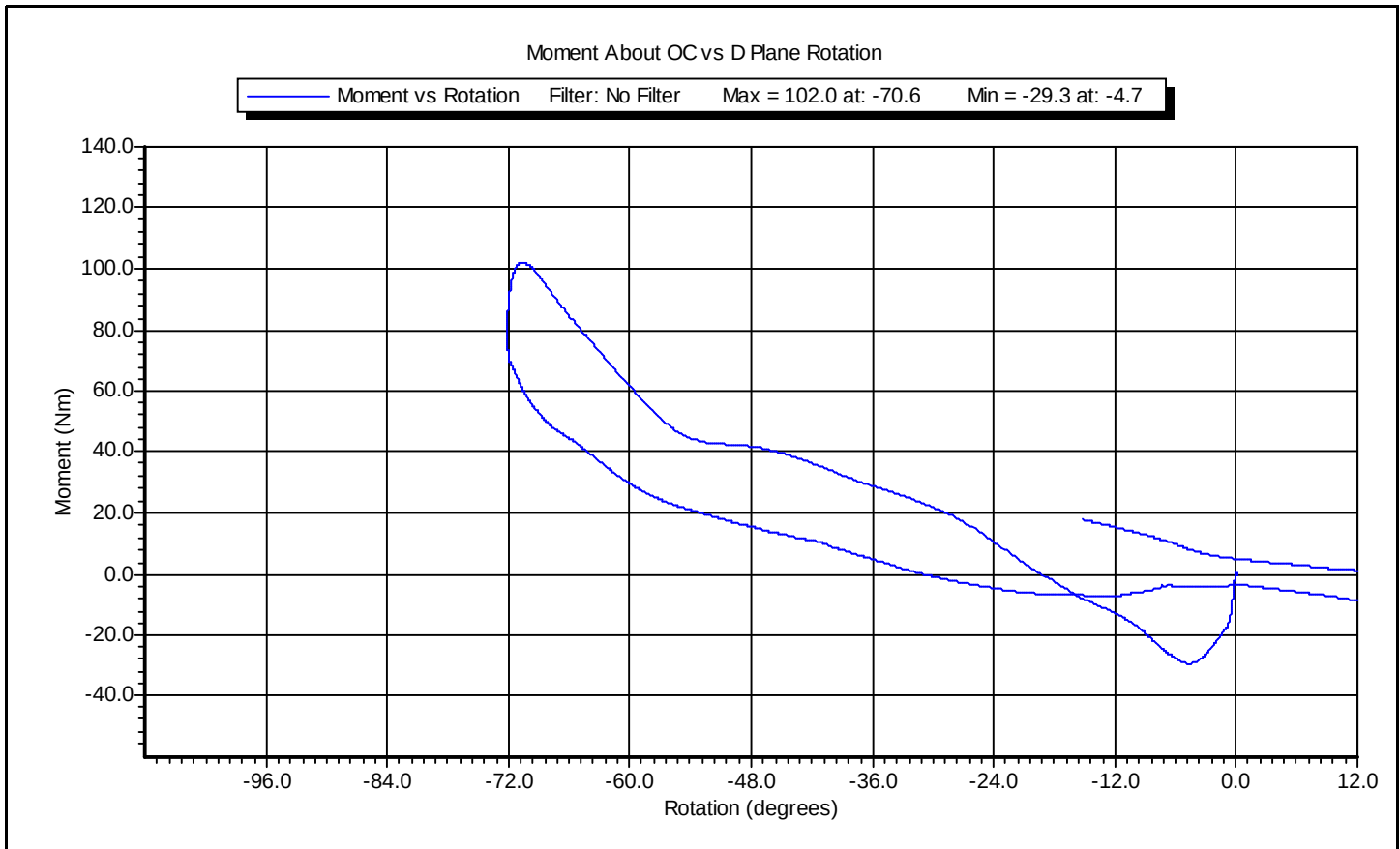


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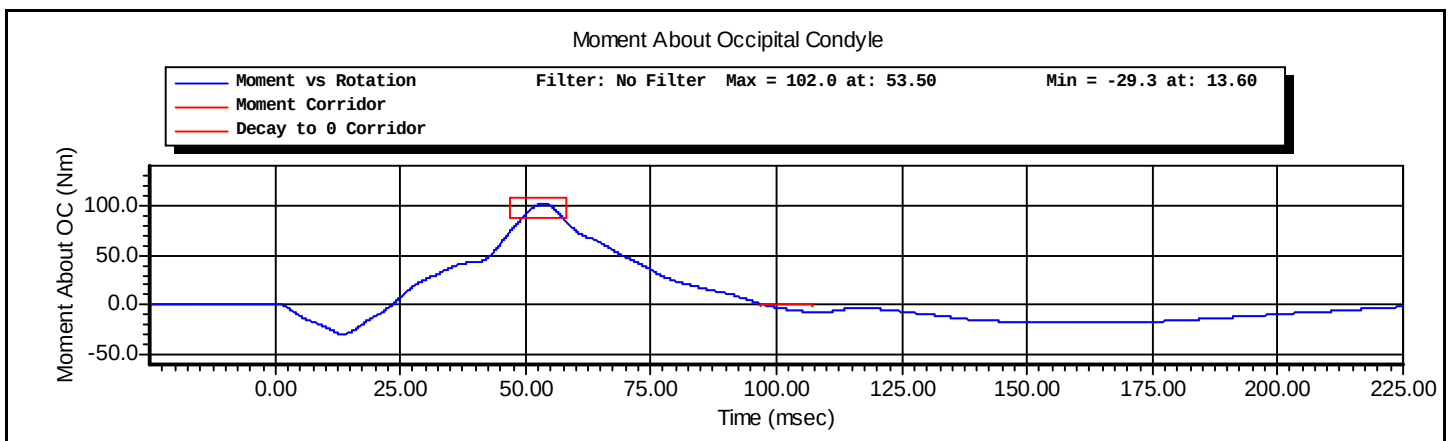
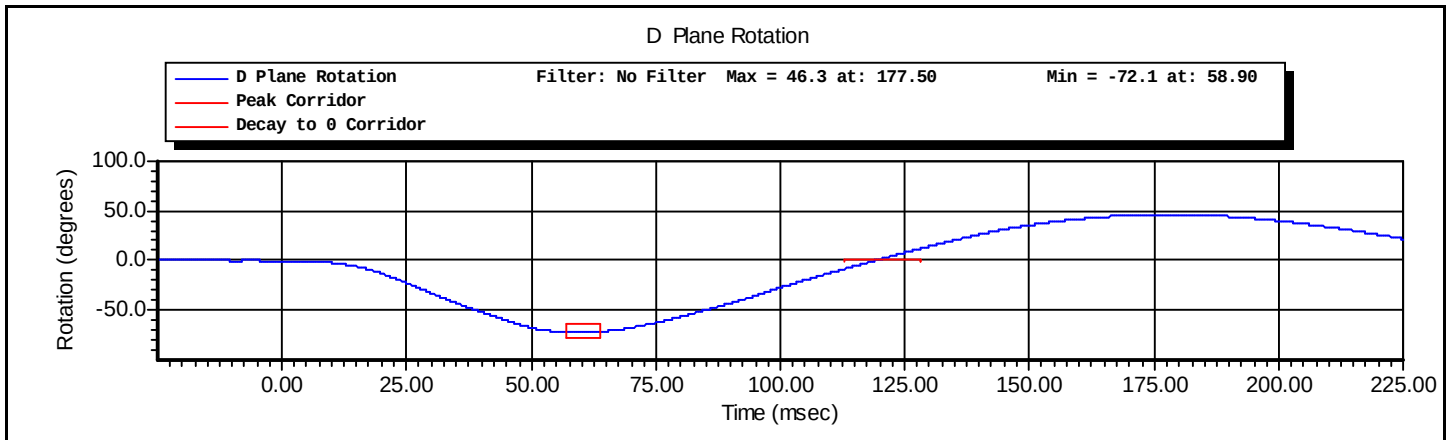
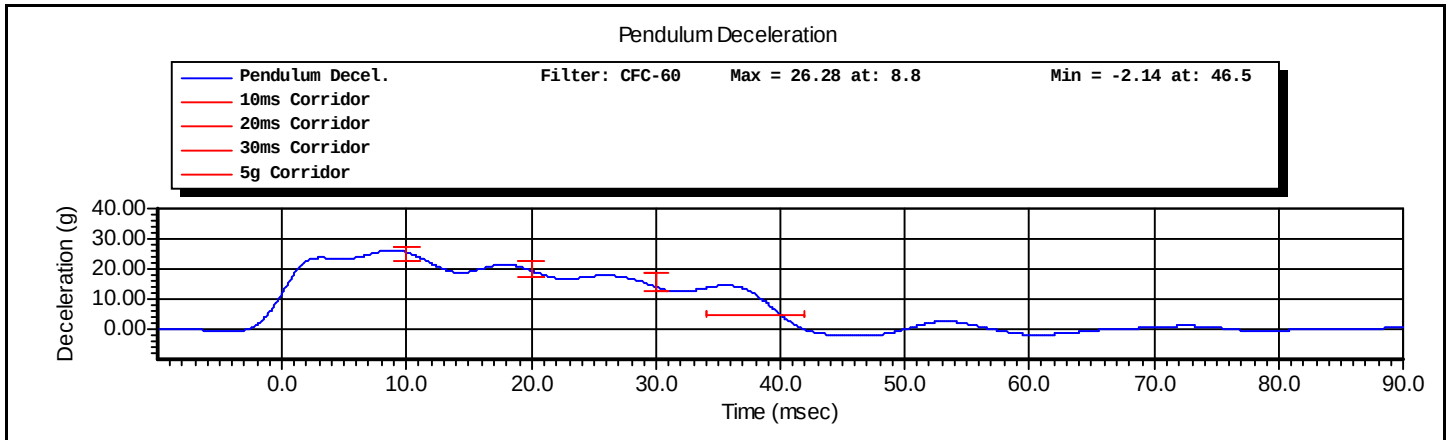
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Name of Sub Test:		Type of Spec:	NHTSA
Type of ATD:	Hybrid III 50'th		
ATD Serial Number:	061		
ID of Test:	Neck Flexion	Date:	10/6/2010
Number of Test:	1	Time of Test:	11:41:33 AM



ID of Test: **Neck Flexion**

Time of Test: **11:41:33 AM**

Date of Test: **10/6/2010**





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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	10/5/2010
Test Number:	1	Test Time:	1:27:02 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	42.0 %RH P
Velocity	6.59 -- 6.83	6.73 m/s P
Resistive Force	-5.894 -- -5.160	-5.539 kN P
Sternum Displacement	-72.6 -- -63.5	-68.8 mm P
Hysteresis	69 -- 85	73 % P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **1:27:02 PM**

Test Date: **10/5/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

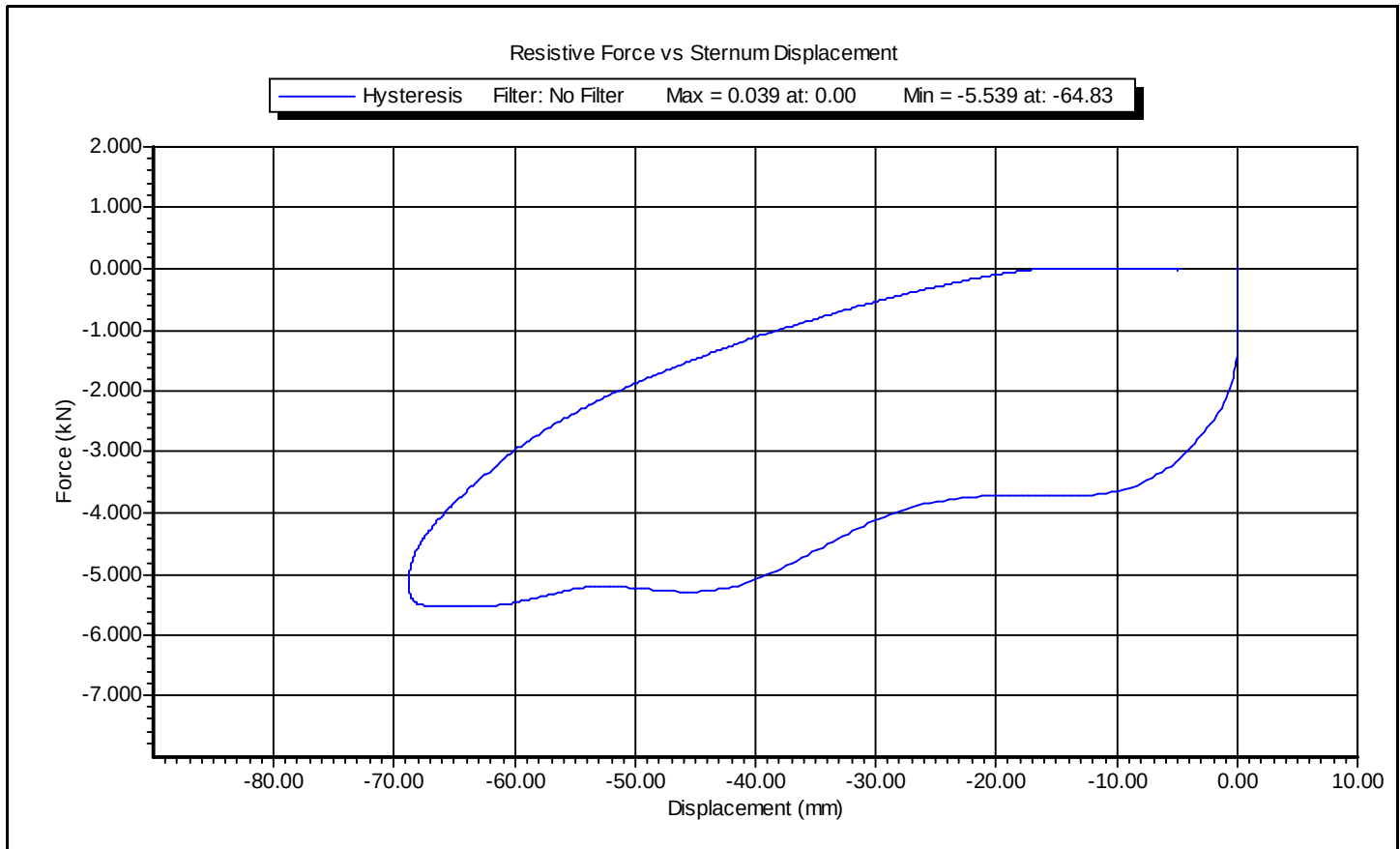
<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66927	4/20/2010
DentonATD	78051-342	DS-061	6/1/2010

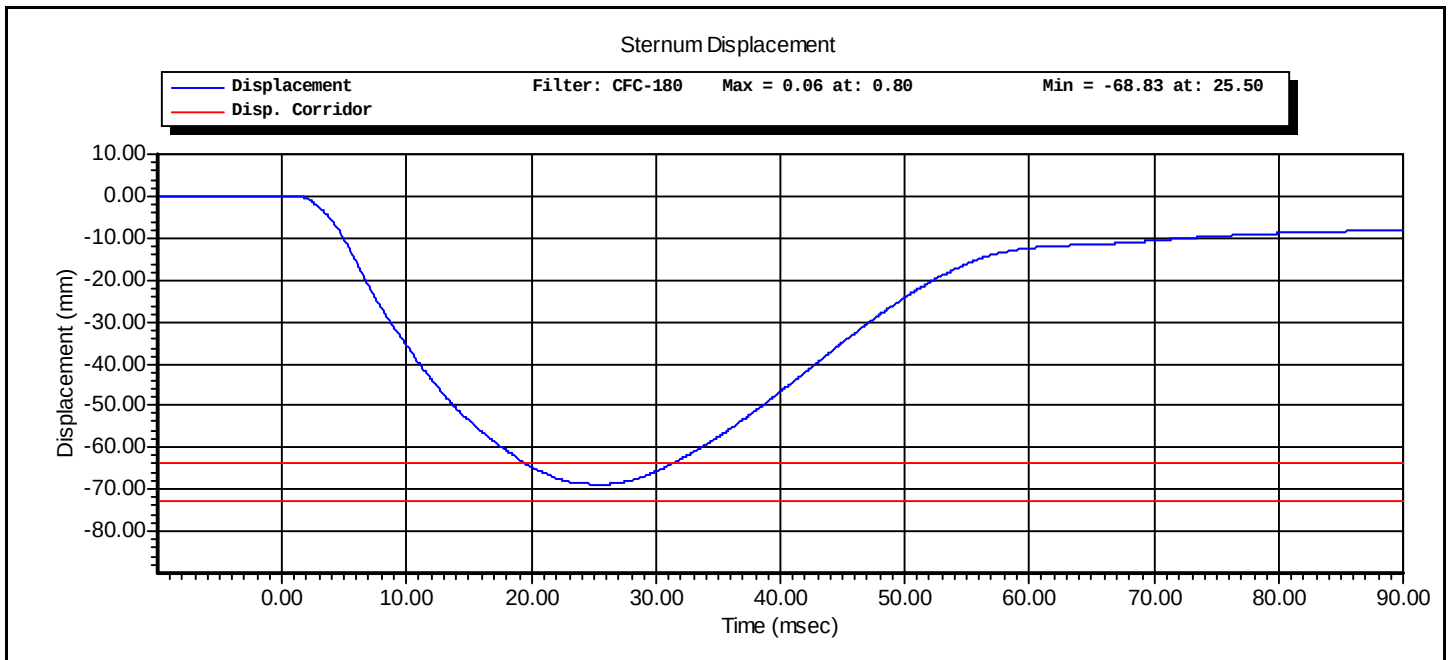
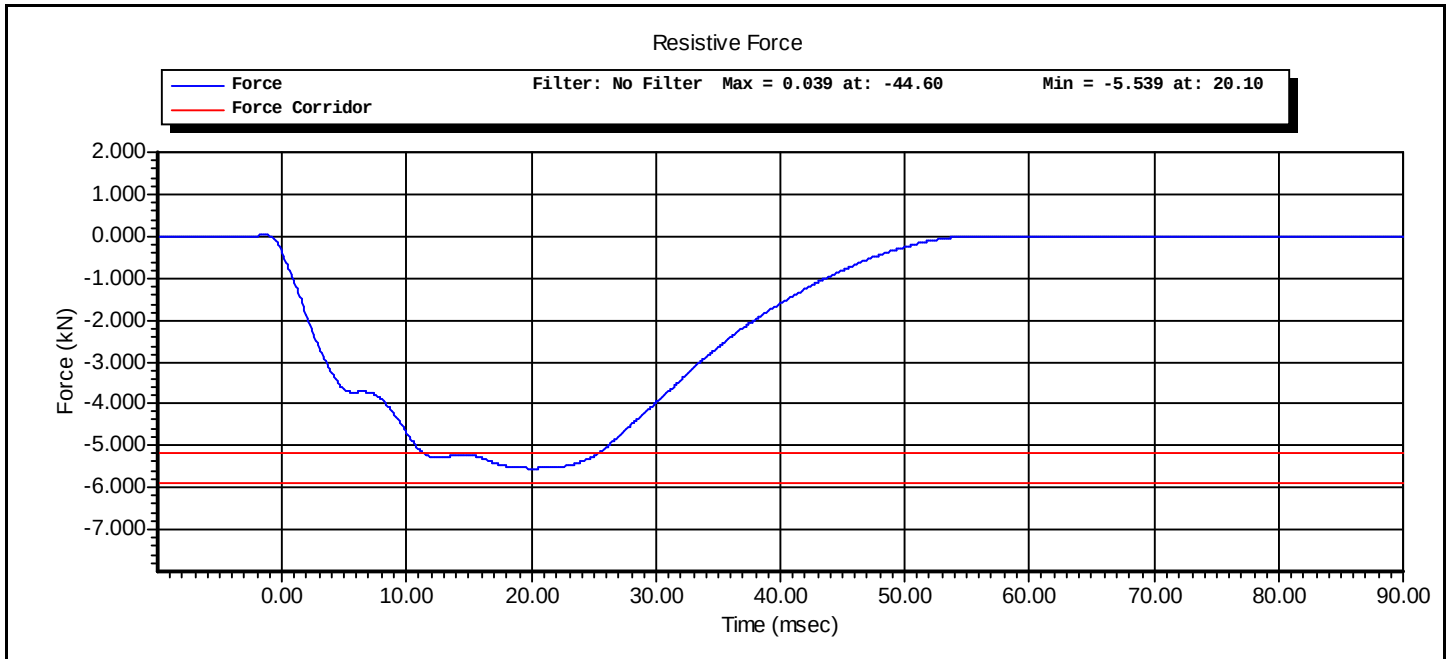
Test ID: **Thorax**

Test Time: **1:27:02 PM**

Test Date: **10/5/2010**

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Thorax	Test Date:	10/5/2010
Test Number:	1	Test Time:	1:27:02 PM





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

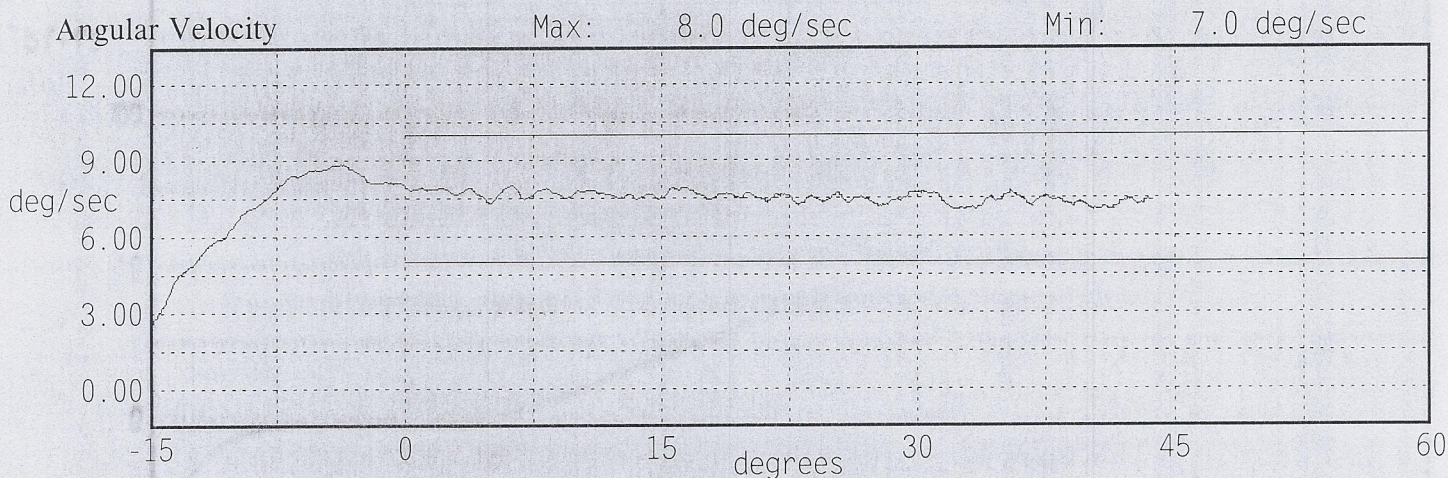
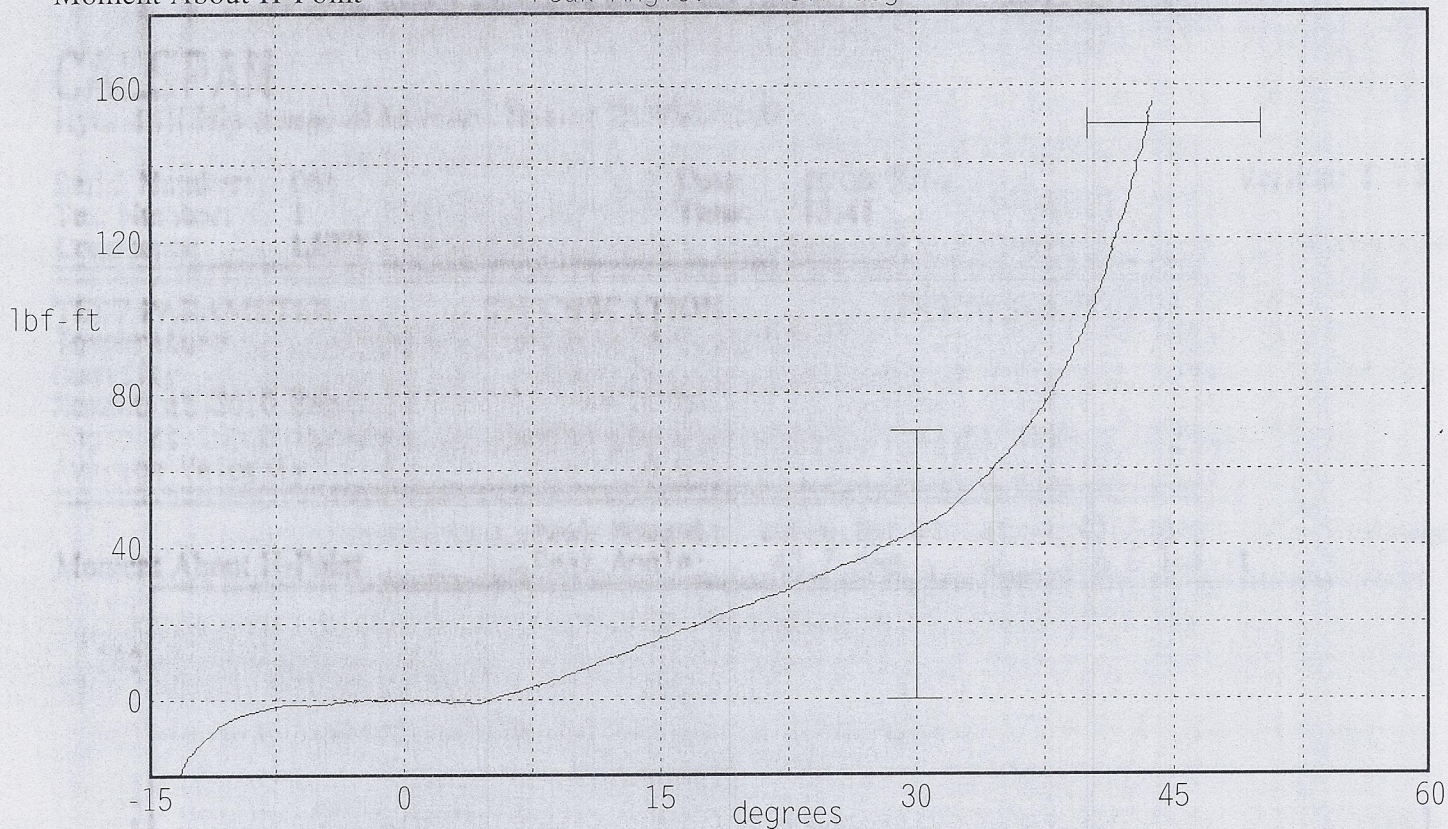
Serial Number: 061
Test Number: 1
Comments: LEFT

Date: 10/06/2010
Time: 15:41

Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	49 % Pass
Moment at 30.0 deg	<= 70.0	44.3 lbf-ft Pass
Angle at 150.0 lbf-ft	40.0 - 50.0	43.5 deg Pass
Average Velocity	5.0 - 10.0	7.5 deg/sec Pass

Moment About H-Point
Peak Moment: 155.6 lbf-ft at 43.7 deg
Peak Angle: 43.7 deg at 155.6 lbf-ft



CALSPAN

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

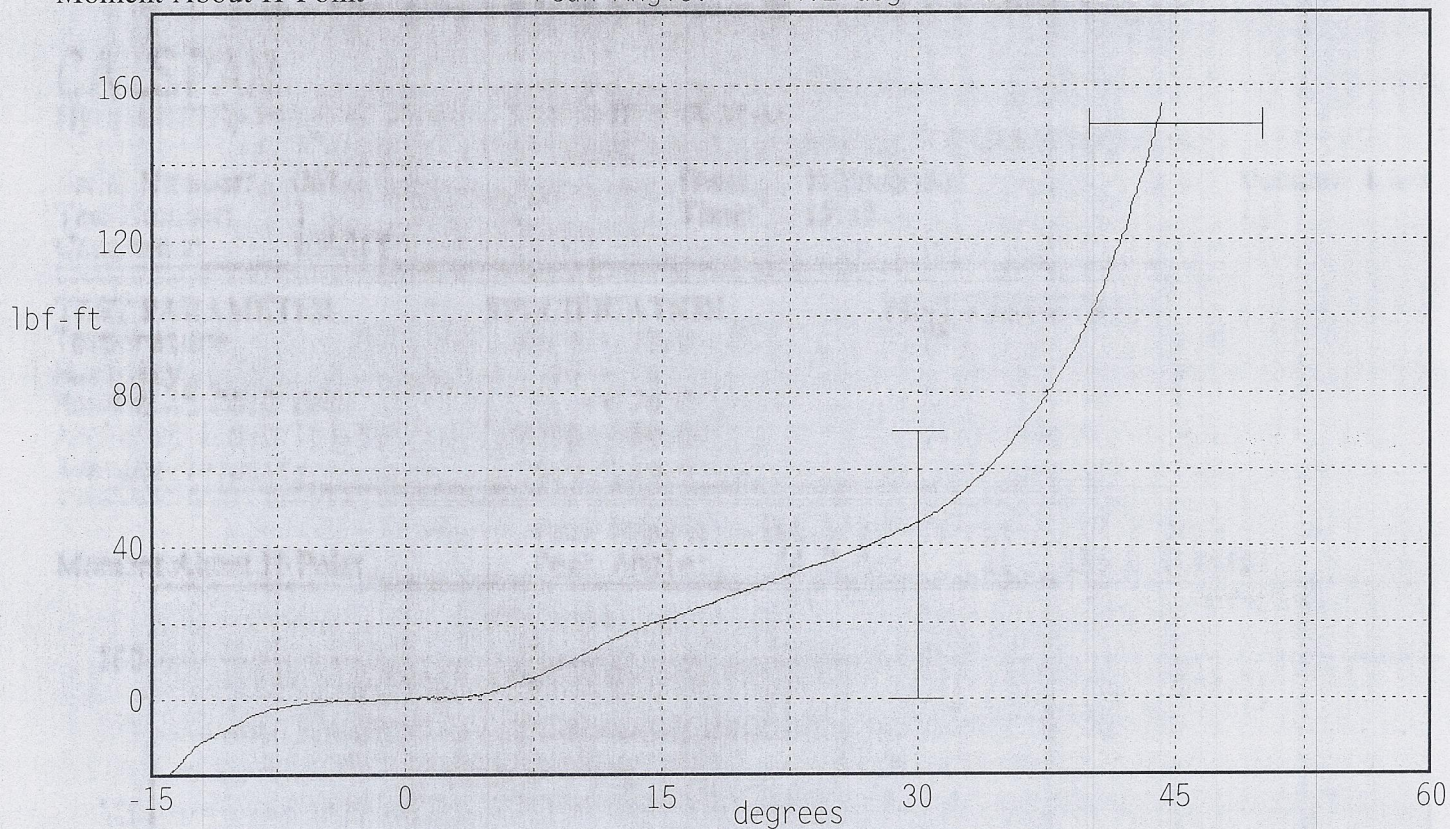
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Test Number: 1
Comments: RIGHT

Date: 10/06/2010
Time: 15:32

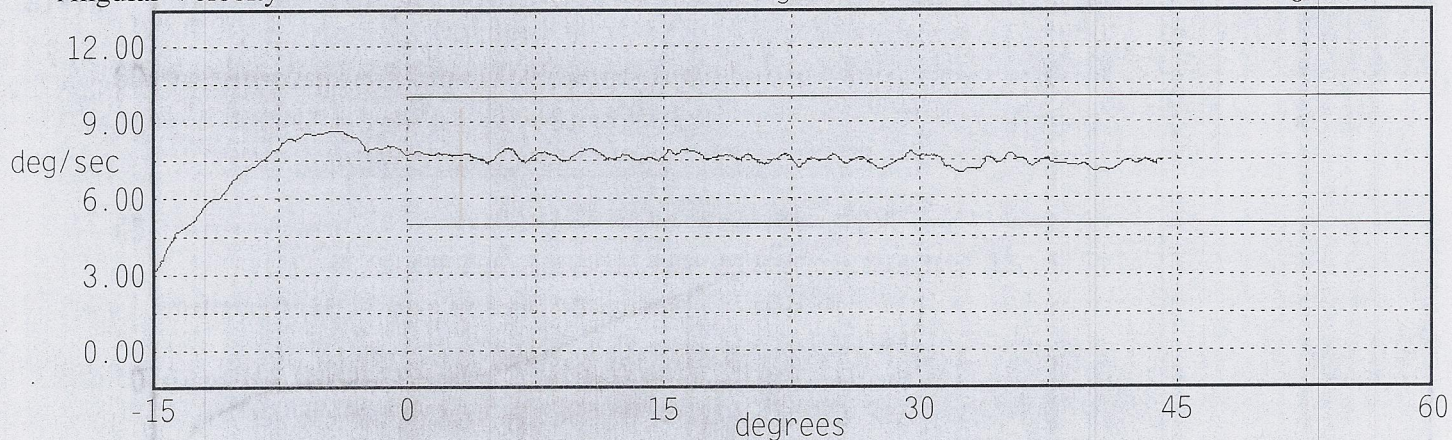
Version: 1.6.3

TEST PARAMETER	SPECIFICATION	TEST RESULTS
Temperature	66.0 - 78.0	72.0 °F Pass
Humidity	10 - 70	49 % Pass
Moment at 30.0 deg	<= 70.0	46.2 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 155.3 lbf-ft



Angular Velocity Max: 8.0 deg/sec Min: 7.0 deg/sec





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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	10/6/2010
Test Number:	1	Test Time:	3:54:08 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	49.0 %RH P
Velocity	2.07 -- 2.13	2.08 m/s P
Resistive Force	-5.78 -- -4.72	-5.00 kN P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **3:54:08 PM**

Test Date: **10/6/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Left Knee**

Test Time: **3:54:08 PM**

Test Date: **10/6/2010**

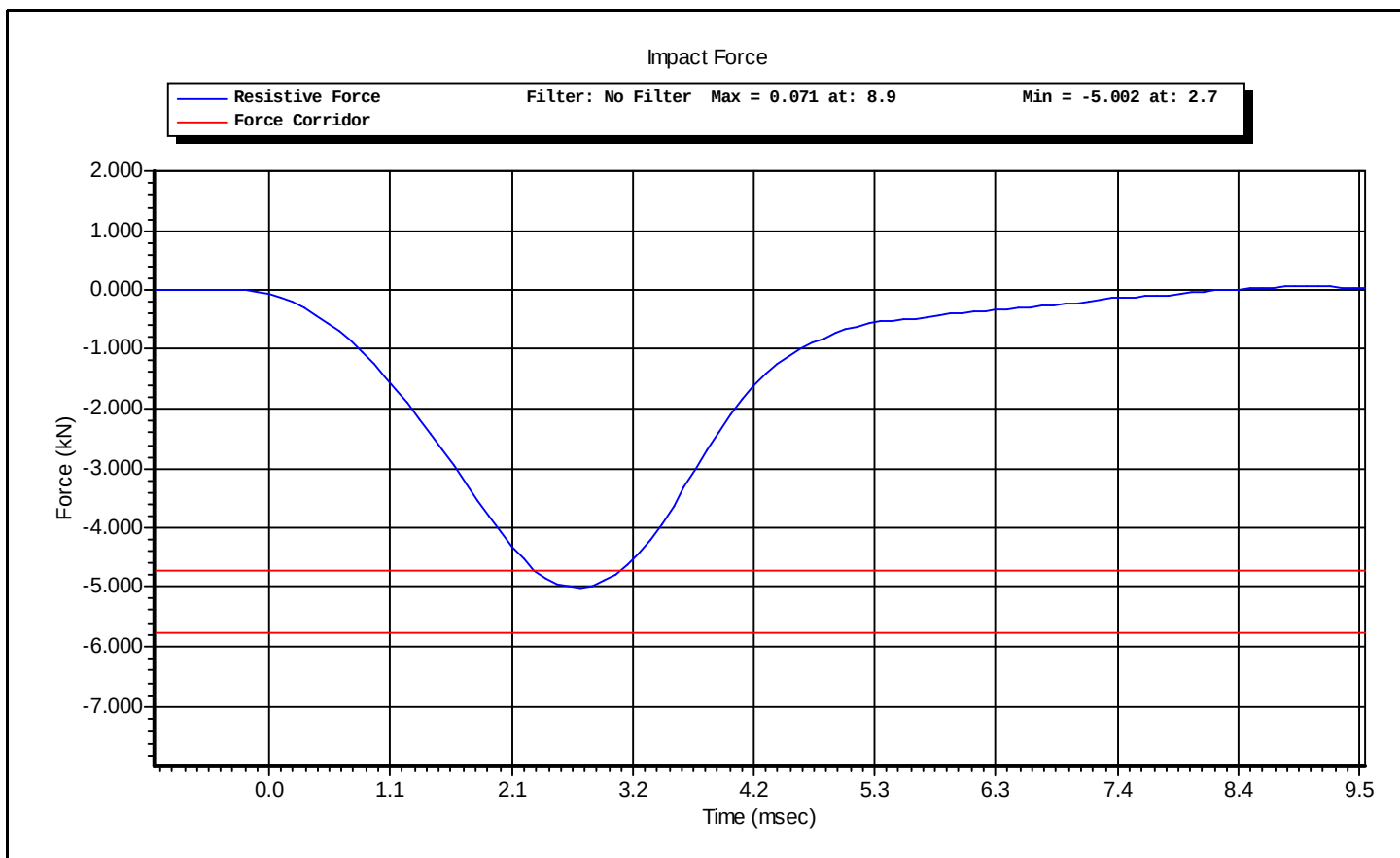


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Left Knee	Test Date:	10/6/2010
Test Number:	1	Test Time:	3:54:08 PM



Test ID: Left Knee

Test Time: 3:54:08 PM

Test Date: 10/6/2010



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	10/6/2010
Test Number:	1	Test Time:	4:48:27 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	49.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-5.78 -- -4.72	-5.36 kN P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **4:48:27 PM**

Test Date: **10/6/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Right Knee**

Test Time: **4:48:27 PM**

Test Date: **10/6/2010**

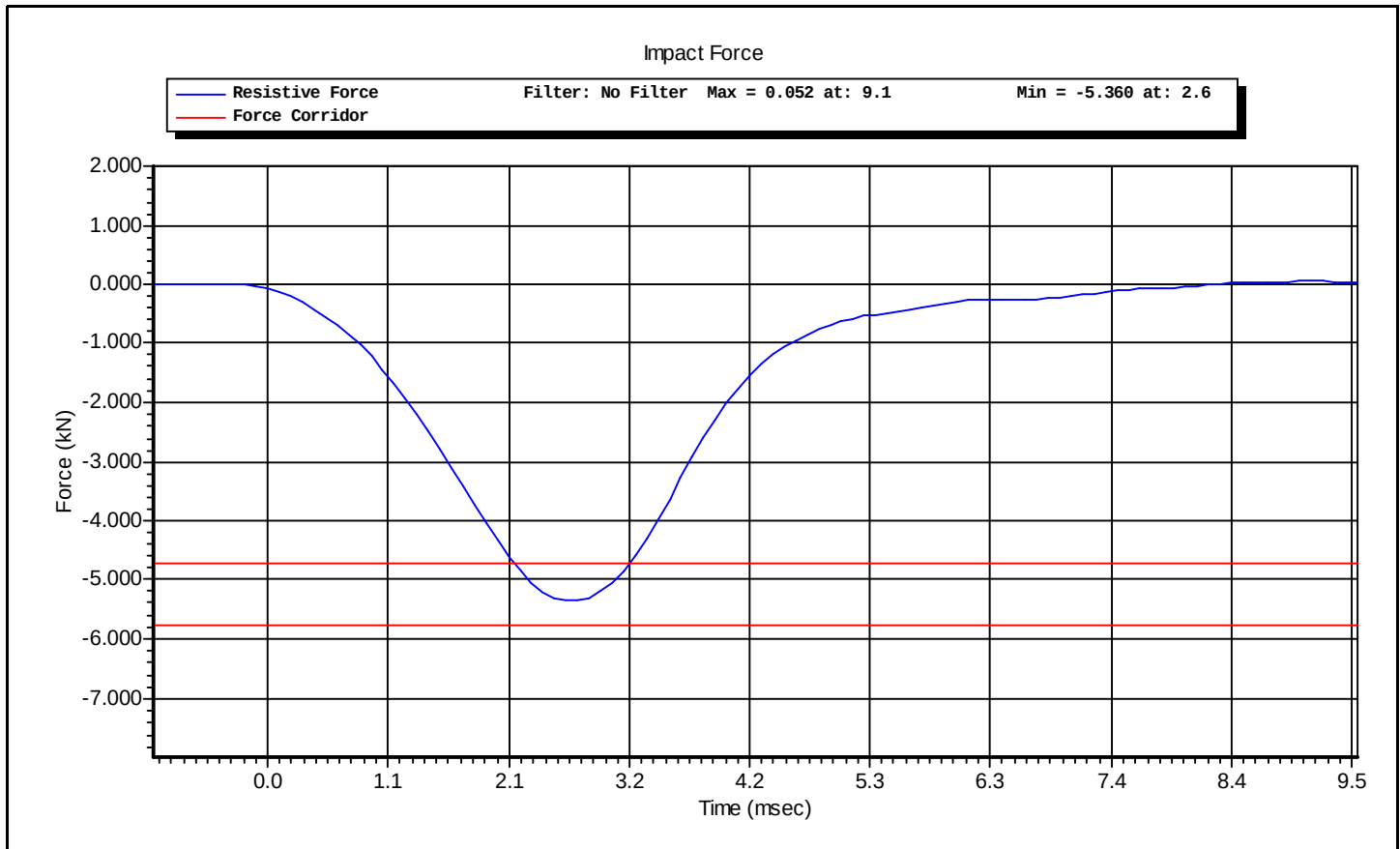


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Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 50'th		
ATD Serial Number:	061		
Test ID:	Right Knee	Test Date:	10/6/2010
Test Number:	1	Test Time:	4:48:27 PM



Test ID: **Right Knee**

Test Time: **4:48:27 PM**

Test Date: **10/6/2010**

CALIBRATION TEST RESULTS

POST-TEST

RIGHT-FRONT PASSENGER DUMMY

S/N: 273

External Measurements

5th Female SN 273

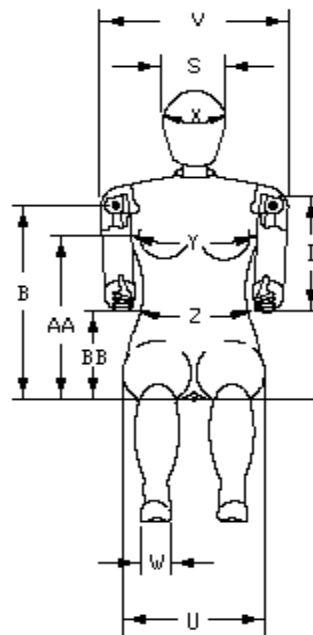
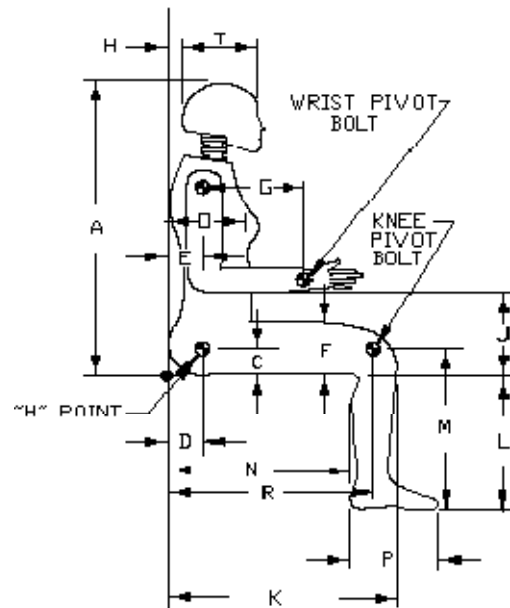
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	449	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6-83.8	78	Yes
F	Thigh Clearance	119.4 – 134.6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

Technician: AR

Date: 10/7/2010

Hybrid 3 5th Female External Measurements

Reference Diagram





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VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/7/2010
Test Number:	1	Test Time:	10:34:29 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10 -- 70	46 %RH P
Resultant Acceleration	250 -- 300	282 g P
Oscillation	0.0 -- 10.0	9.2 % P
Lateral Acceleration	-15.00 -- 15.00	2.79 g P

All test parameters are within specifications

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

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

Test ID: **Head Drop**

Test Time: **10:34:29 AM**

Test Date: **10/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Head Drop**

Test Time: **10:34:29 AM**

Test Date: **10/7/2010**

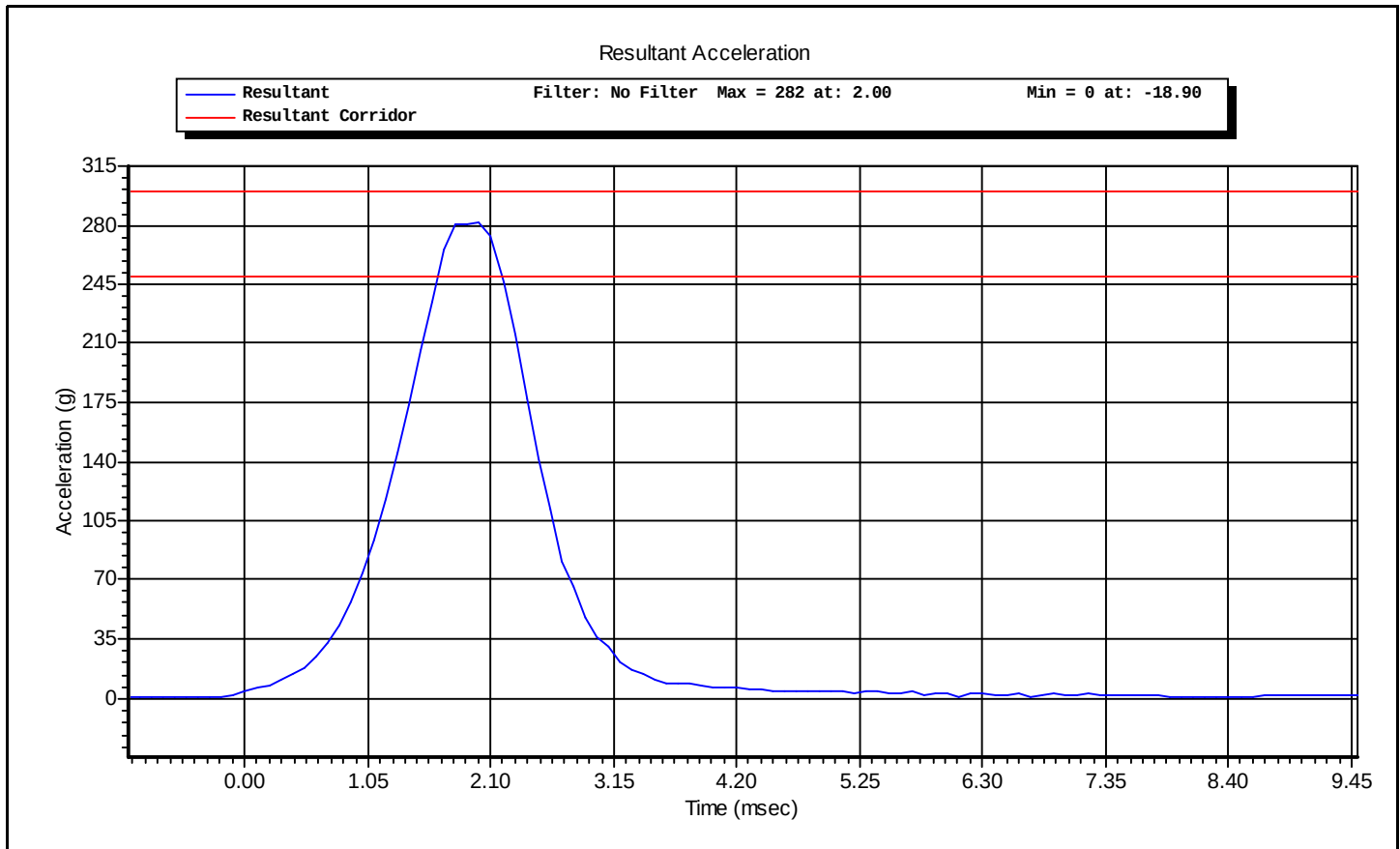


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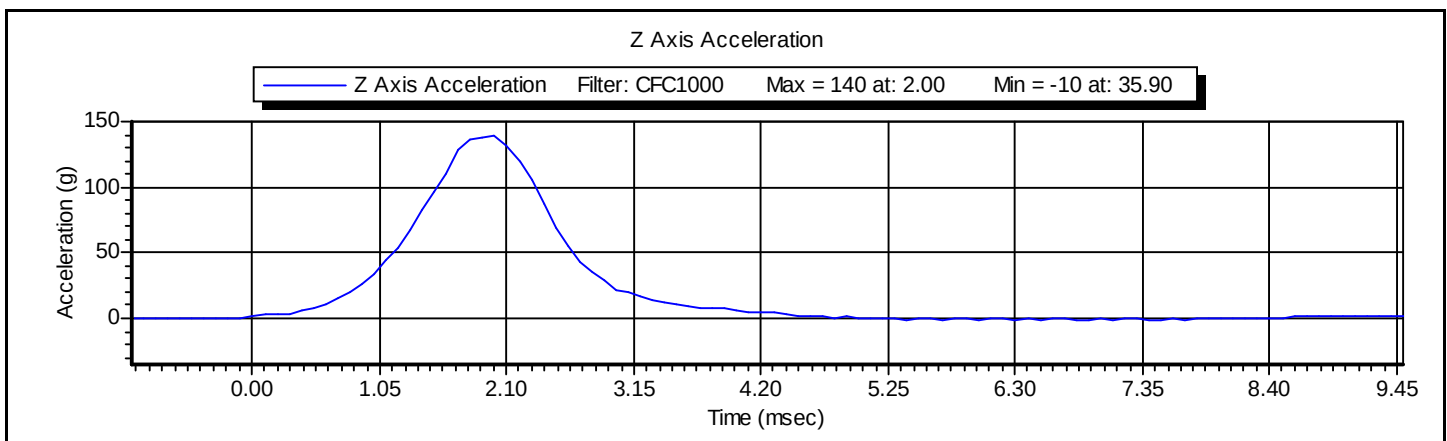
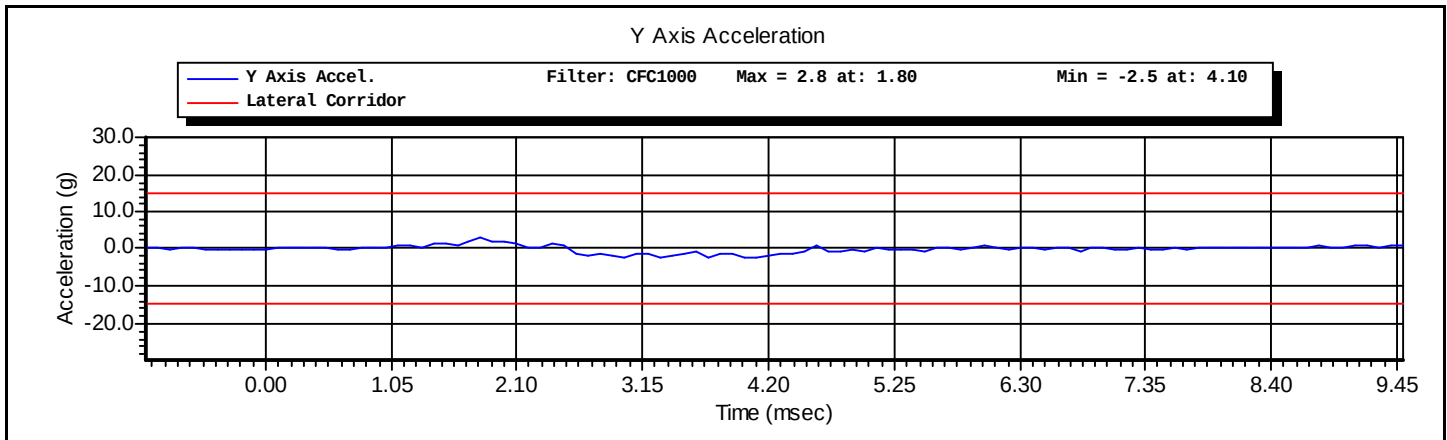
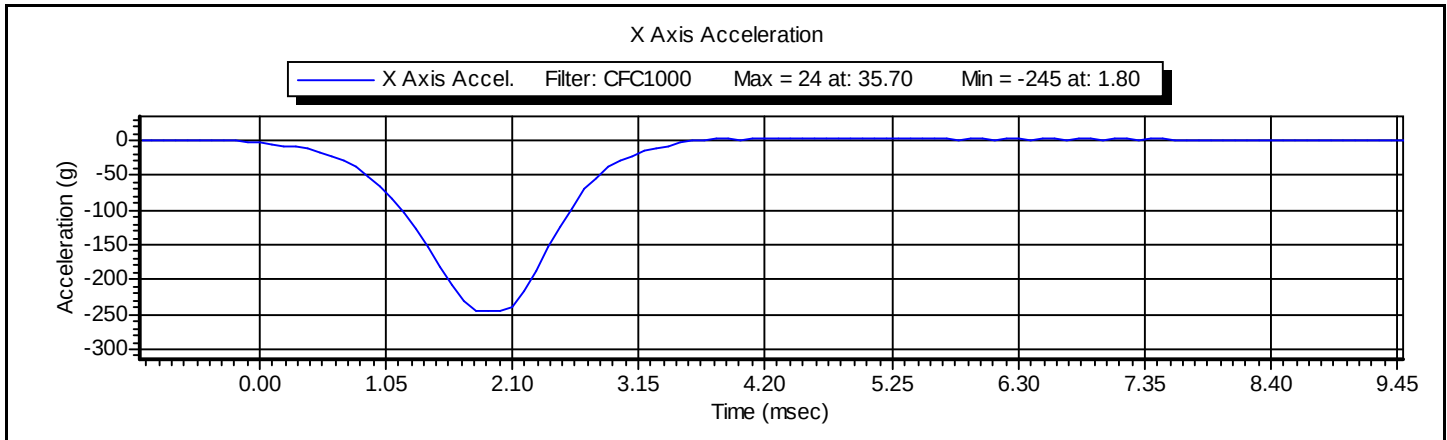
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Head Drop	Test Date:	10/7/2010
Test Number:	1	Test Time:	10:34:29 AM



Test ID: Head Drop

Test Time: 10:34:29 AM

Test Date: 10/7/2010





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/7/2010
Test Number:	1	Test Time:	1:20:30 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	43 %RH P
Velocity	5.95 -- 6.19	6.08 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.88 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.67 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.28 m/s P
D Plane Rotation	99.0 -- 114.0	108.1 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-56.2 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: **1:20:30 PM**

Test Date: **10/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Extension**

Test Time: **1:20:30 PM**

Test Date: **10/7/2010**

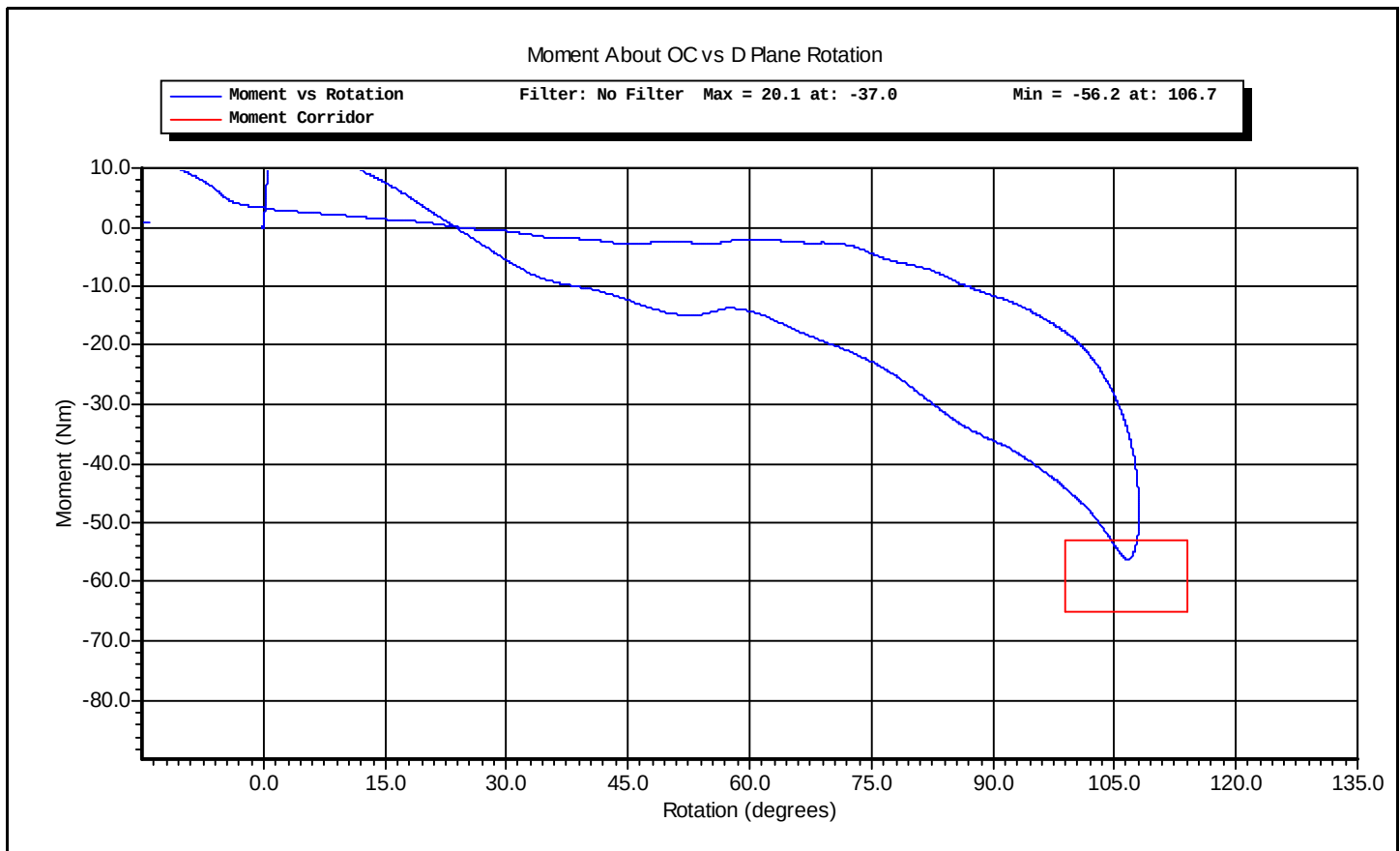


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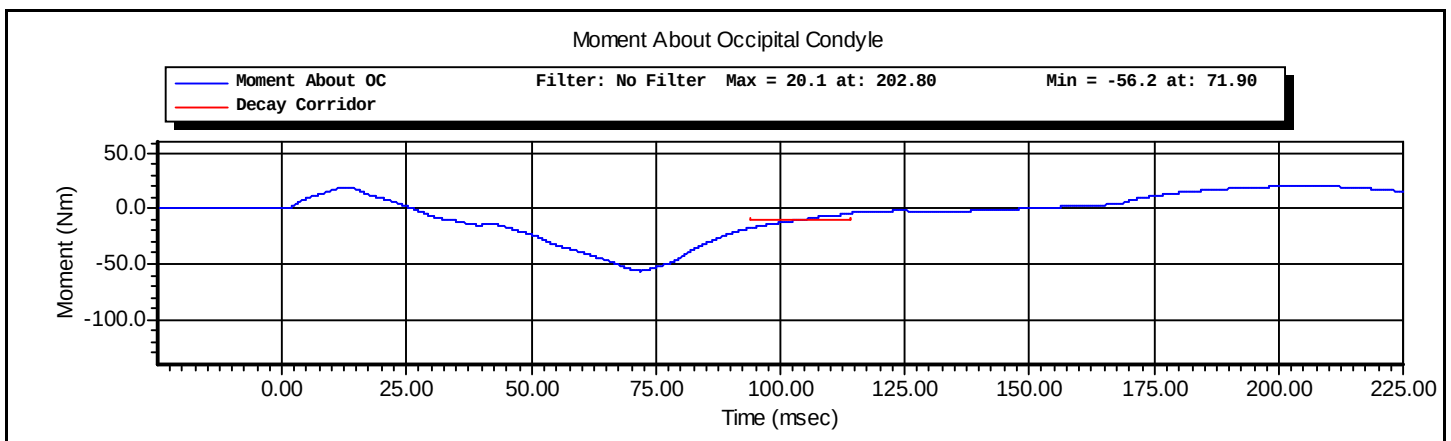
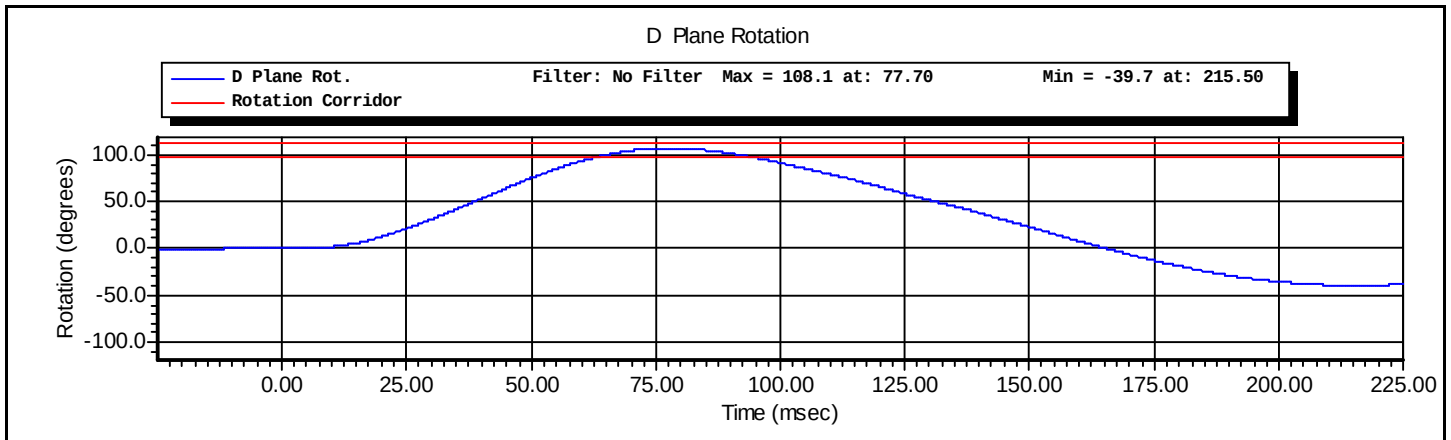
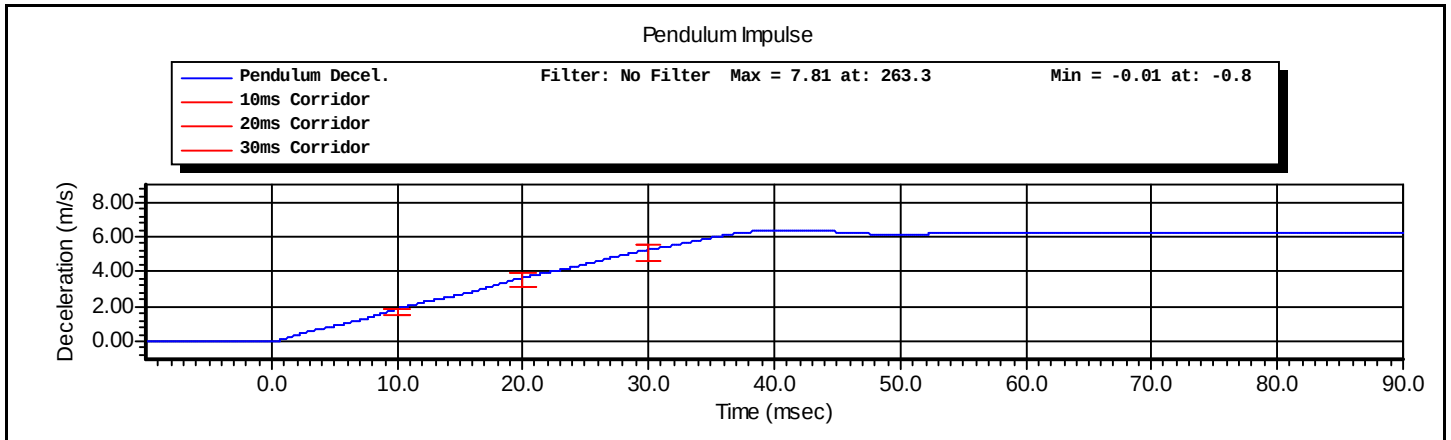
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Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/7/2010
Test Number:	1	Test Time:	1:20:30 PM



Test ID: Neck Extension Test Time: 1:20:30 PM

Test Date: 10/7/2010





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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/7/2010
Test Number:	1	Test Time:	1:20:30 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	43 %RH P
Velocity	5.95 -- 6.19	6.08 m/s P
Pendulum Impulse at 10 ms	1.50 -- 1.90	1.88 m/s P
Pendulum Impulse at 20 ms	3.10 -- 3.90	3.67 m/s P
Pendulum Impulse at 30 ms	4.60 -- 5.60	5.28 m/s P
D Plane Rotation	99.0 -- 114.0	108.1 degrees P
Moment During Rotation Interval	-65.0 -- -53.0	-56.2 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: **1:20:30 PM**

Test Date: **10/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Extension**

Test Time: **1:20:30 PM**

Test Date: **10/7/2010**

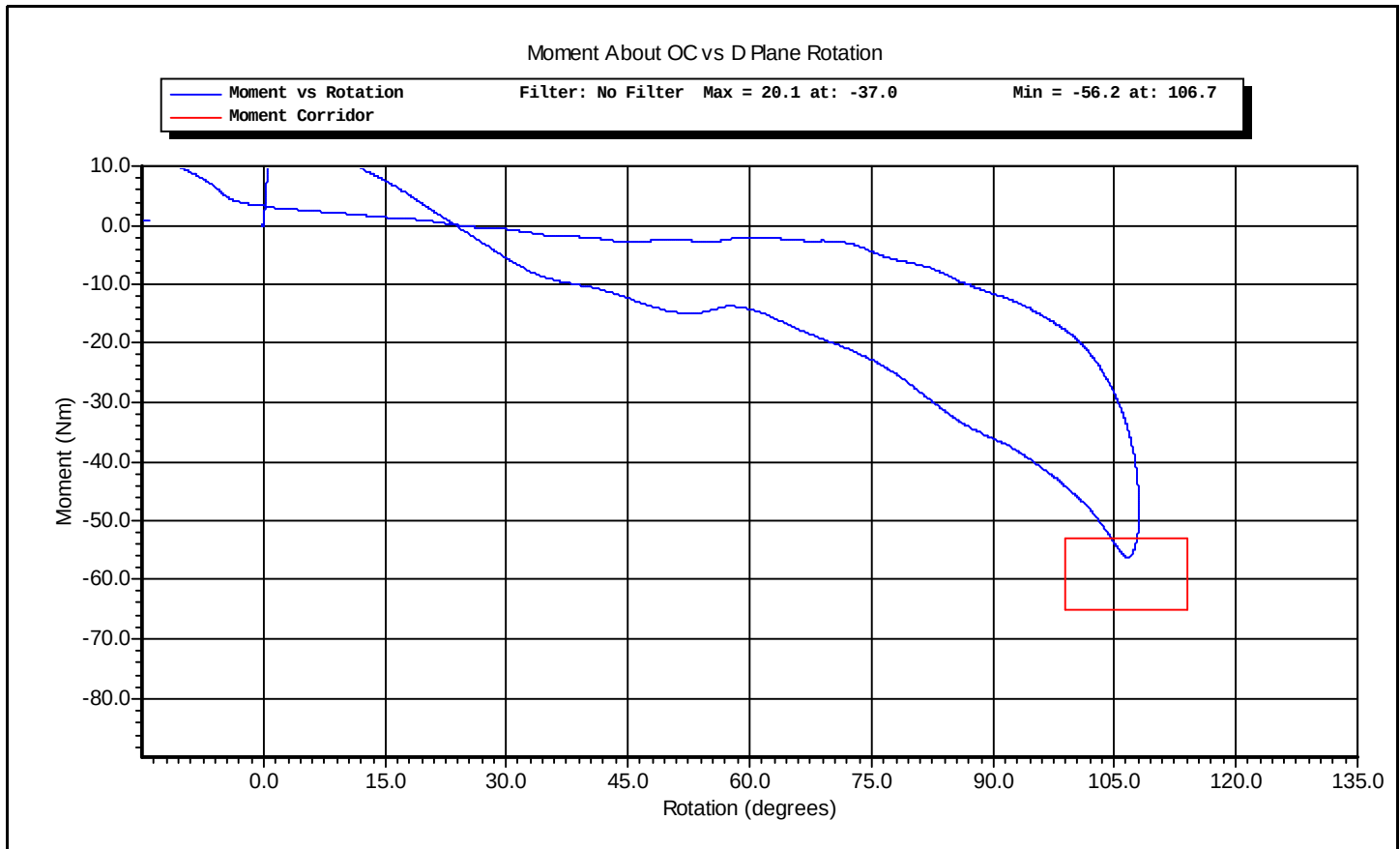


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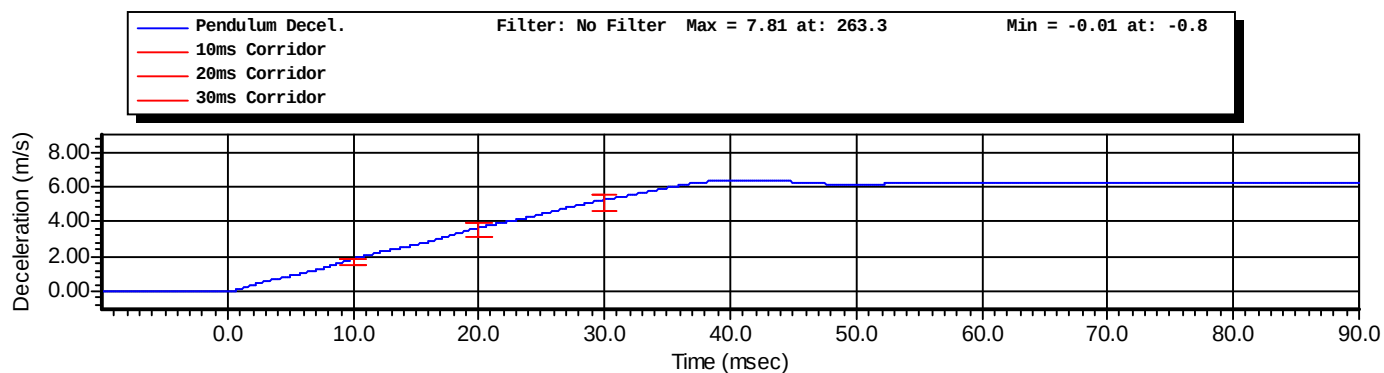
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Extension	Test Date:	10/7/2010
Test Number:	1	Test Time:	1:20:30 PM



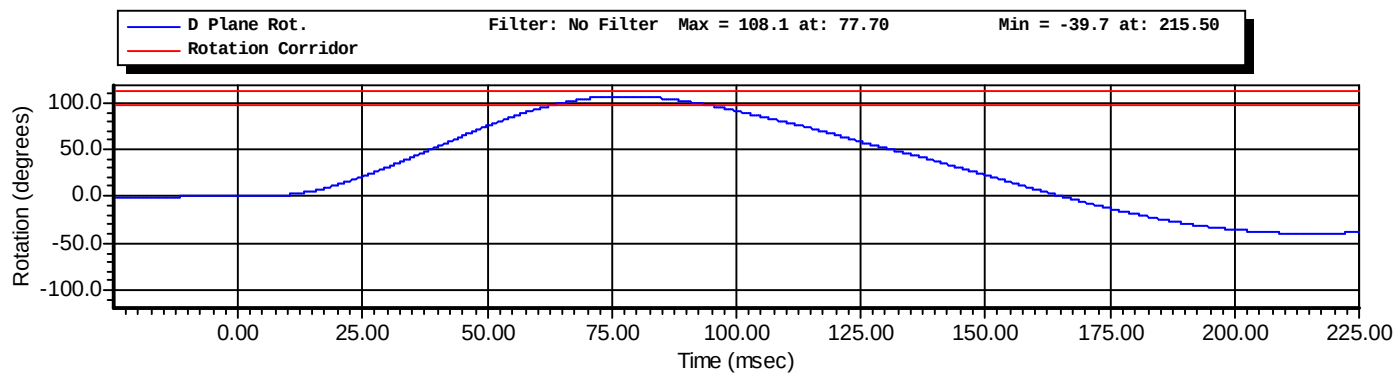
Test ID: Neck Extension Test Time: 1:20:30 PM

Test Date: 10/7/2010

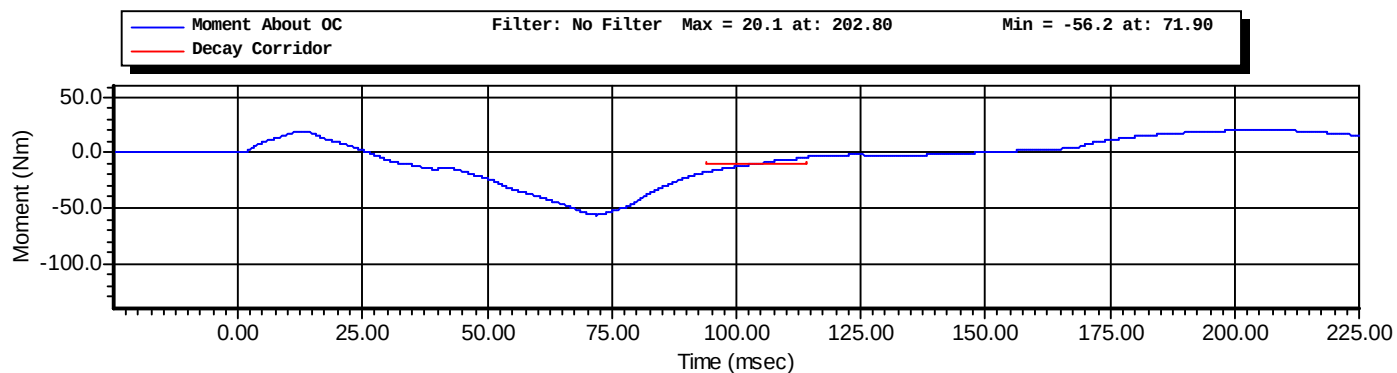
Pendulum Impulse



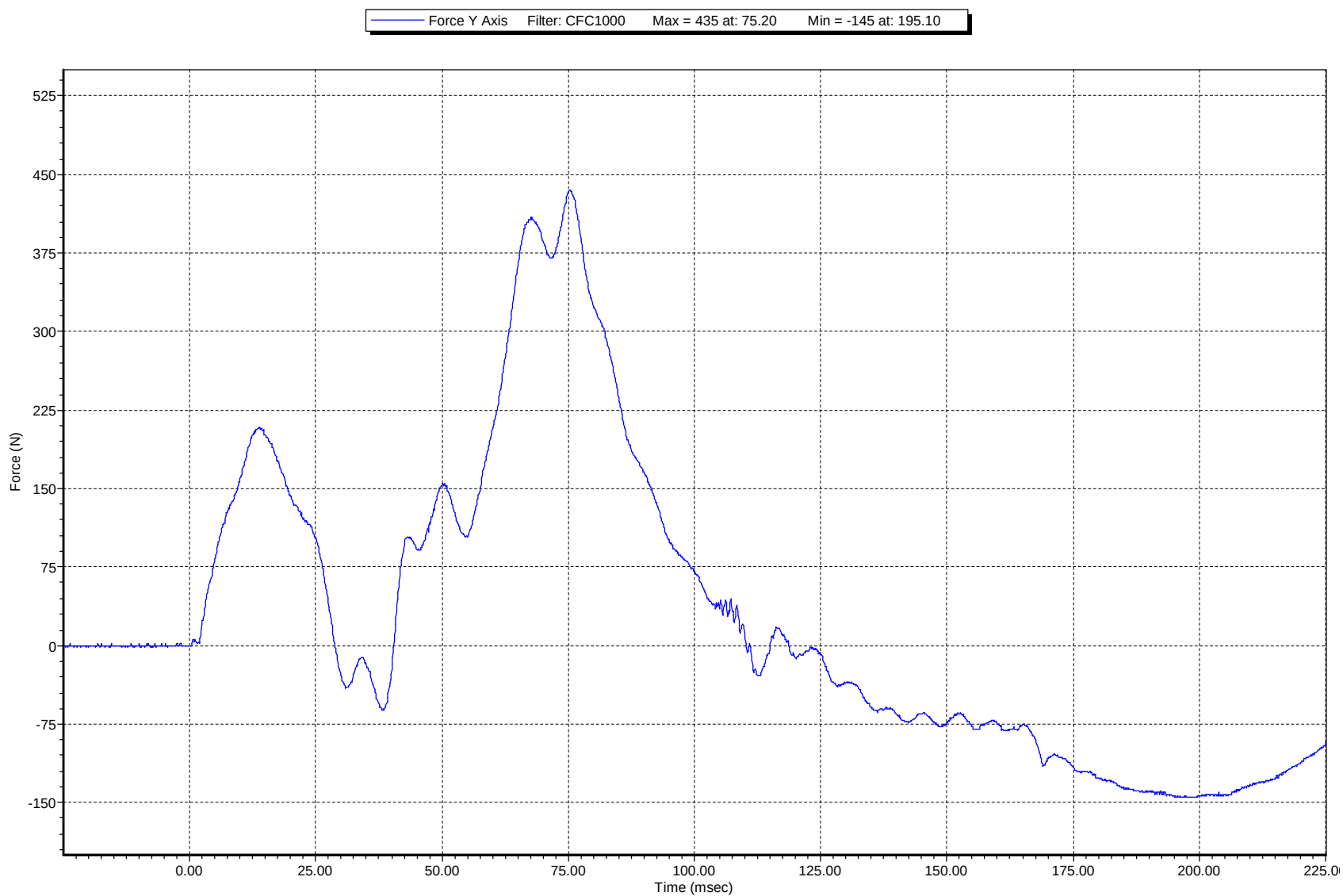
D Plane Rotation



Moment About Occipital Condyle



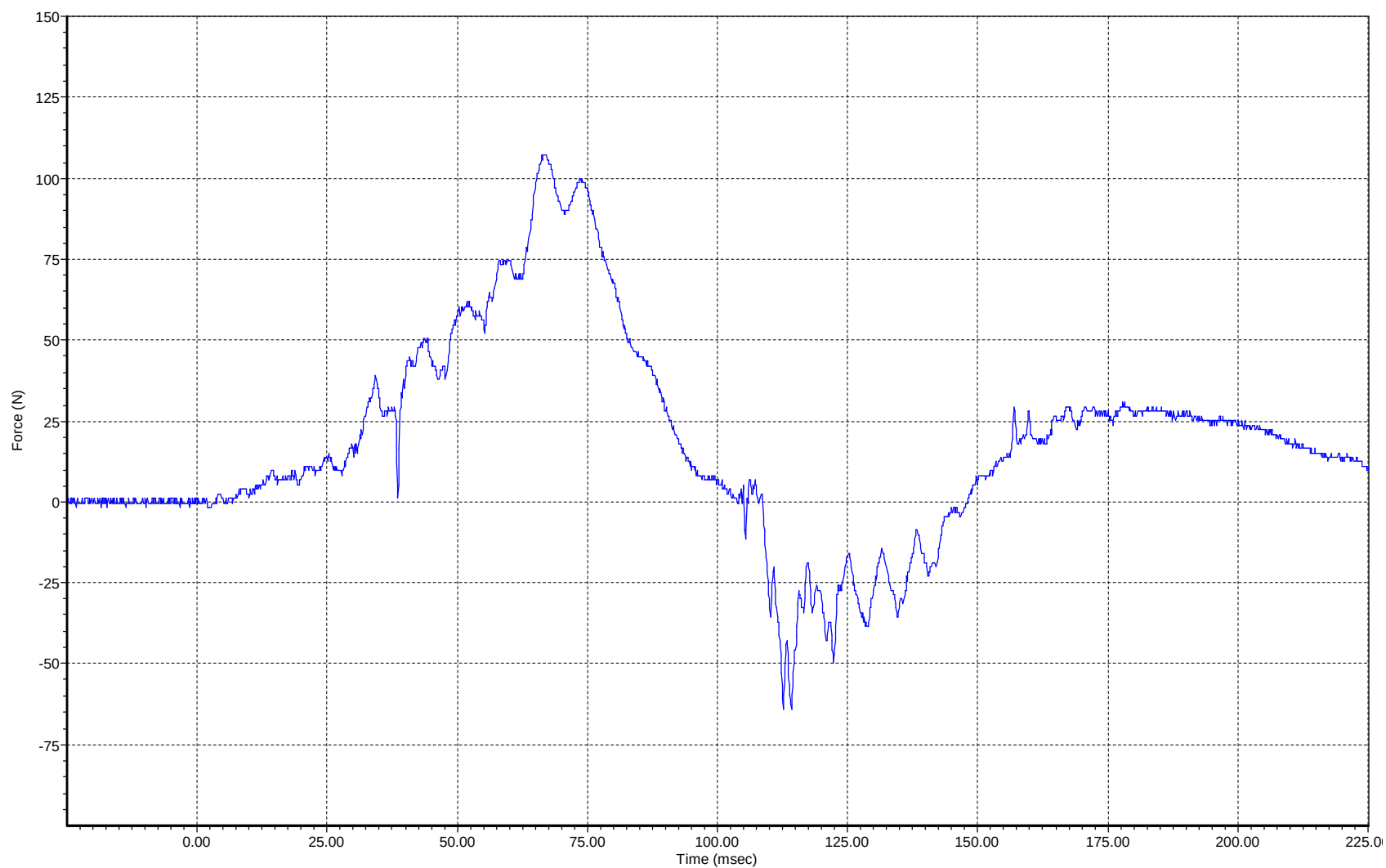
Force X Axis



Hybrid III 5'th, Neck Extension, 10/7/2010, 1:20:30 PM

Force Y Axis

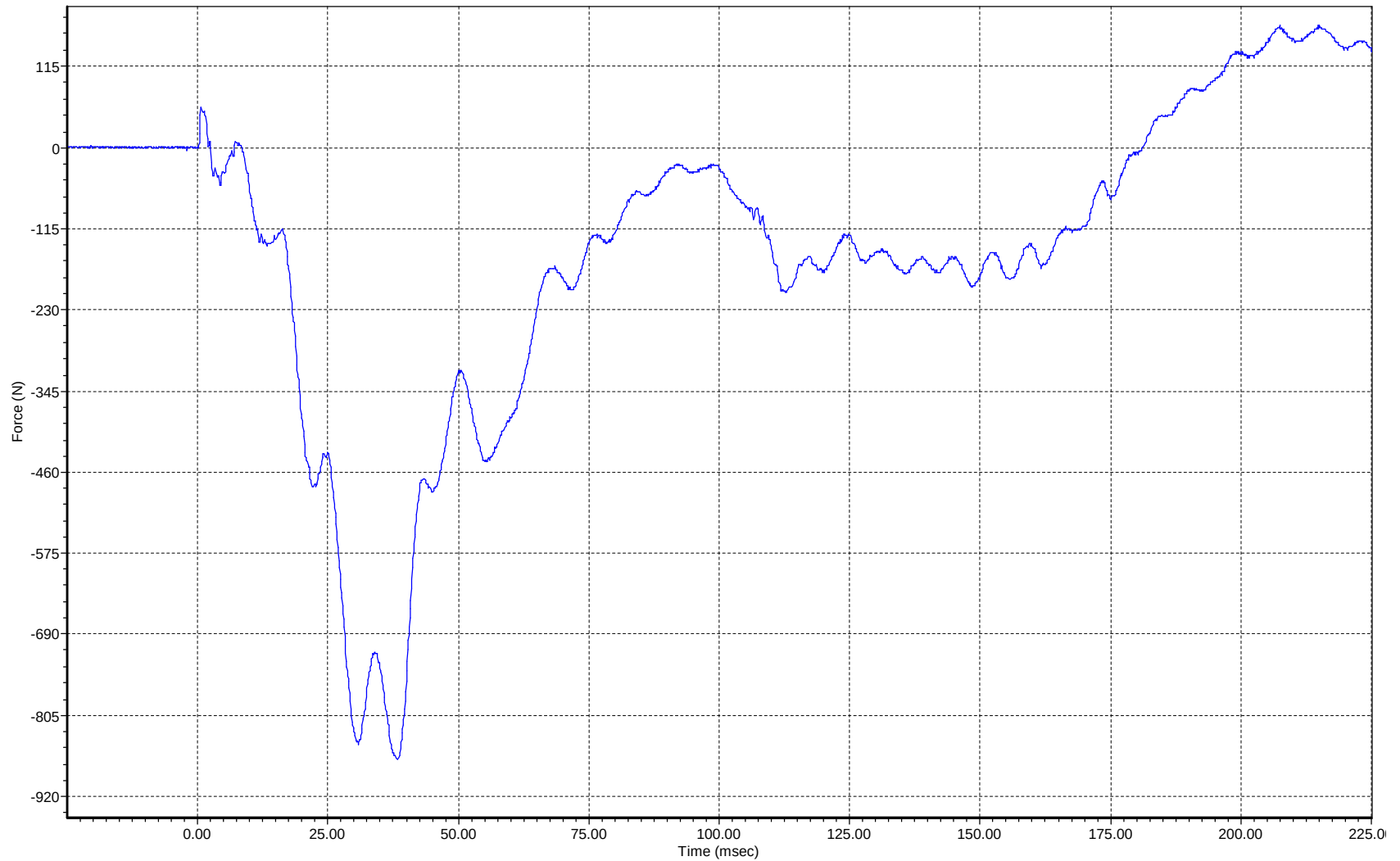
Force Y Axis Filter: CFC1000 Max = 107 at: 66.20 Min = -64 at: 112.60



Hybrid III 5'th, Neck Extension, 10/7/2010, 1:20:30 PM

Force Z Axis

Force Y Axis Filter: CFC1000 Max = 173 at: 207.50 Min = -868 at: 38.20



Hybrid III 5'th, Neck Extension, 10/7/2010, 1:20:30 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:	273		
Test ID:	Neck Flexion	Test Date:	10/7/2010
Test Number:	2	Test Time:	11:34:16 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	44 %RH P
Velocity	6.89 -- 7.13	7.03 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.25 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.59 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.74 m/s P
D Plane Rotation	-91.0 -- -77.0	-85.2 degrees P
Moment During Rotation Interval	69.0 -- 83.0	69.1 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	88.5 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **11:34:16 AM**

Test Date: **10/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Flexion**

Test Time: **11:34:16 AM**

Test Date: **10/7/2010**

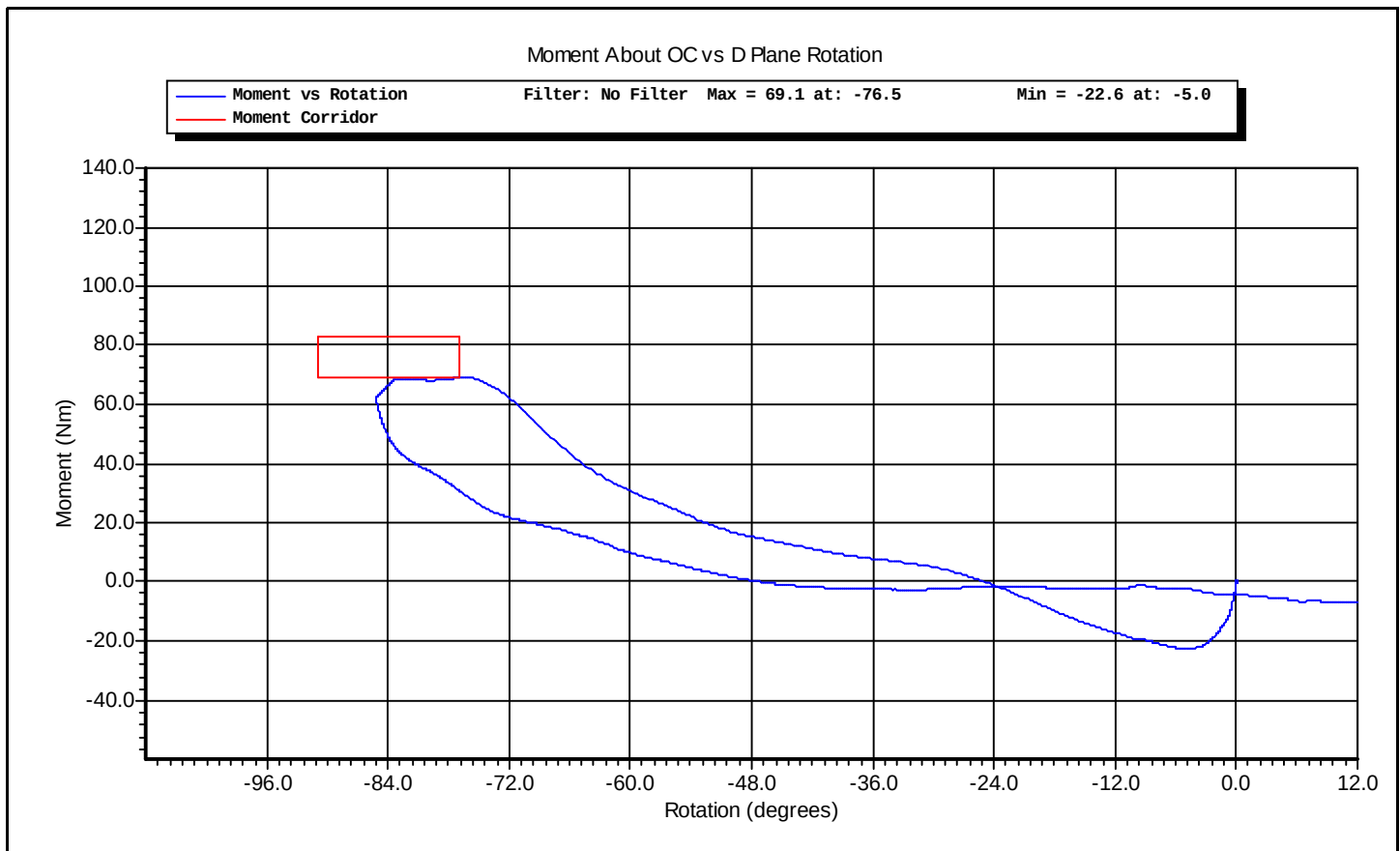


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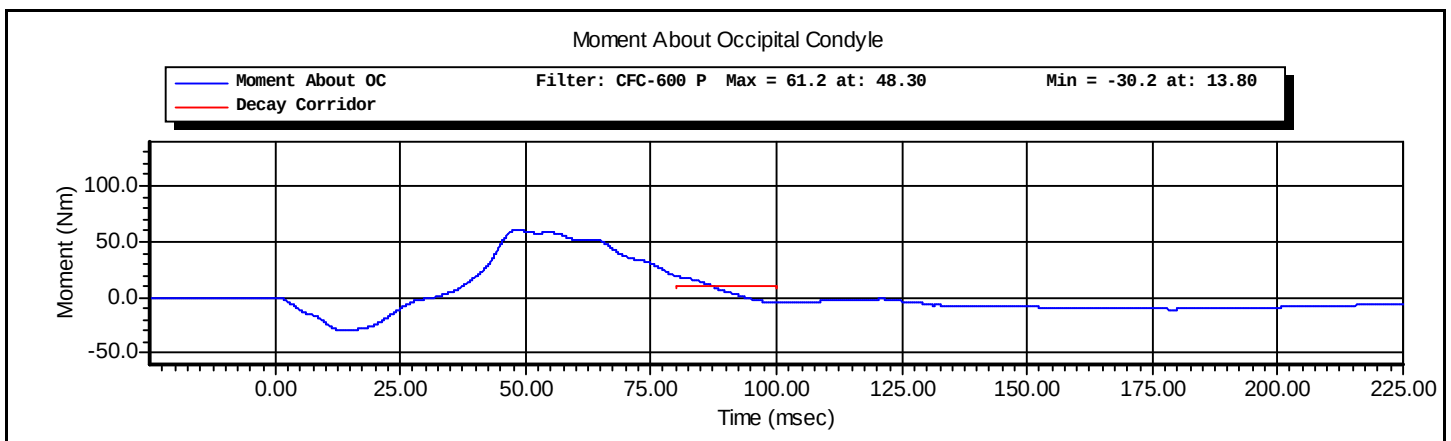
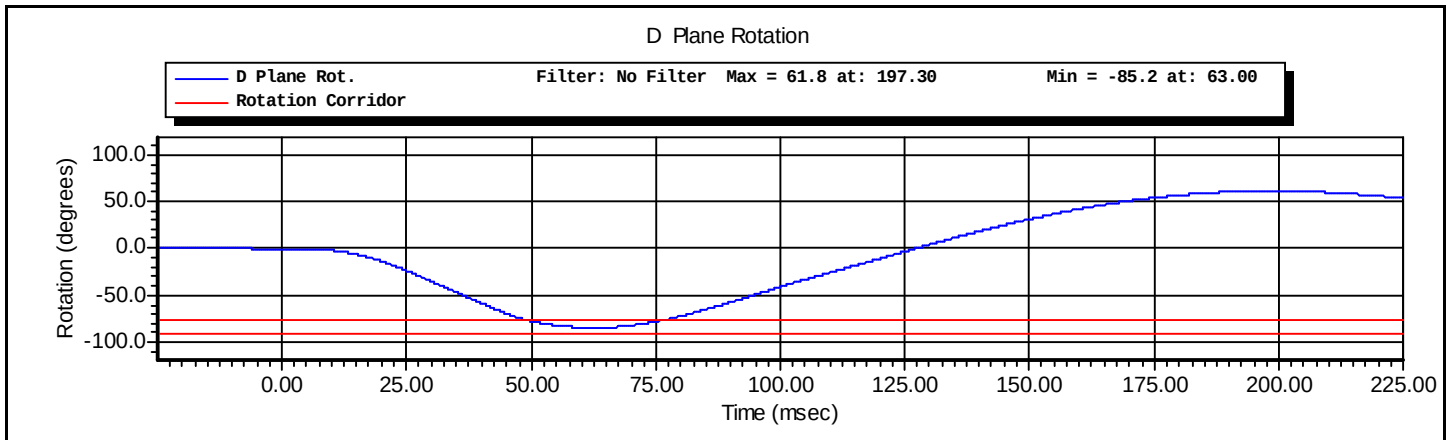
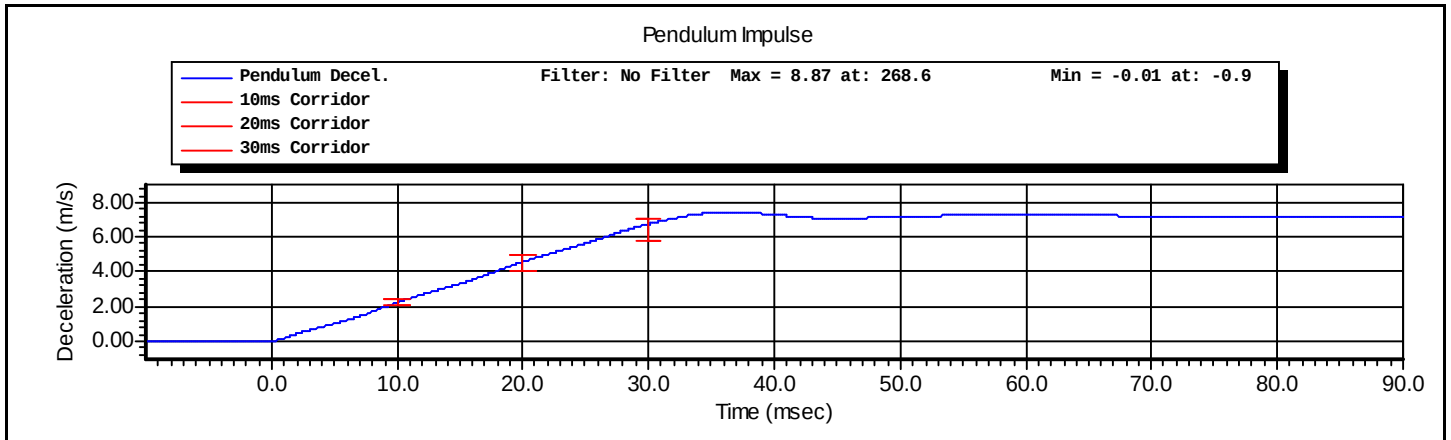
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/7/2010
Test Number:	2	Test Time:	11:34:16 AM



Test ID: Neck Flexion

Test Time: 11:34:16 AM

Test Date: 10/7/2010





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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/7/2010
Test Number:	2	Test Time:	11:34:16 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10 -- 70	44 %RH P
Velocity	6.89 -- 7.13	7.03 m/s P
Pendulum Impulse at 10 ms	2.10 -- 2.50	2.25 m/s P
Pendulum Impulse at 20 ms	4.00 -- 5.00	4.59 m/s P
Pendulum Impulse at 30 ms	5.80 -- 7.00	6.74 m/s P
D Plane Rotation	-91.0 -- -77.0	-85.2 degrees P
Moment During Rotation Interval	69.0 -- 83.0	69.1 Nm P
Moment Decay to 10.0 Nm	80.0 -- 100.0	88.5 ms P

All test parameters are within specifications

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

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

Test ID: **Neck Flexion**

Test Time: **11:34:16 AM**

Test Date: **10/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Neck Flexion**

Test Time: **11:34:16 AM**

Test Date: **10/7/2010**

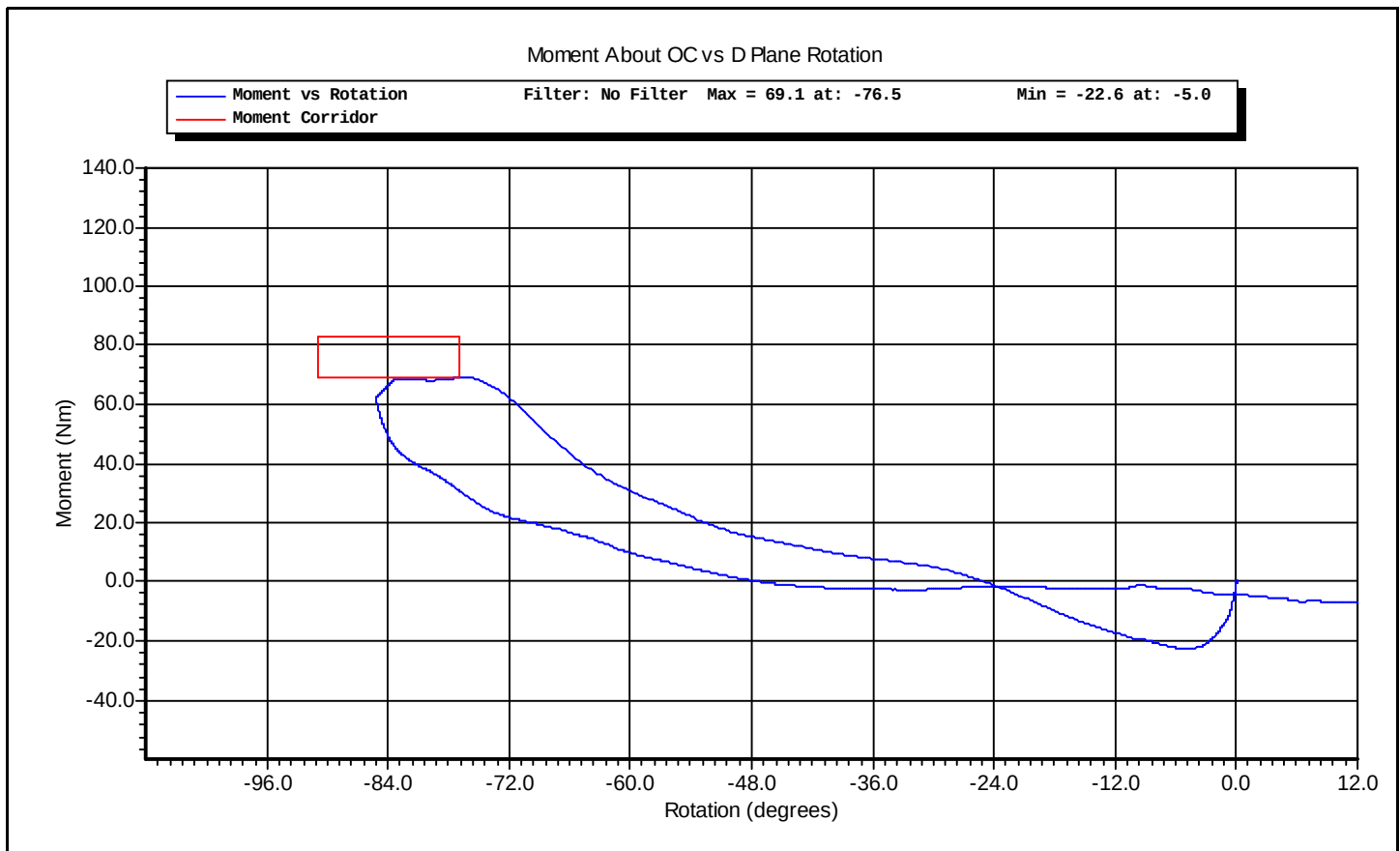


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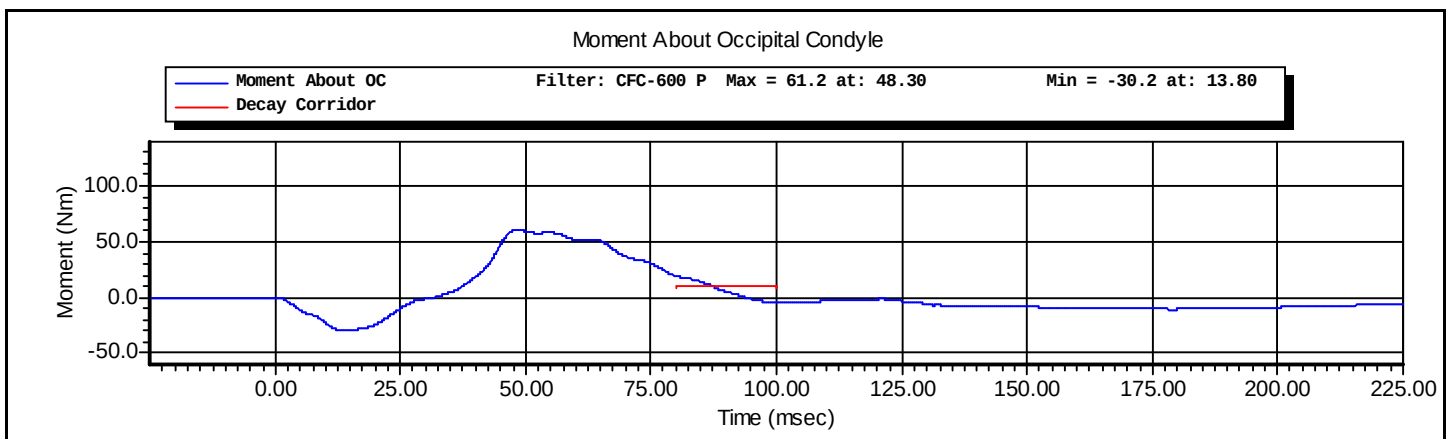
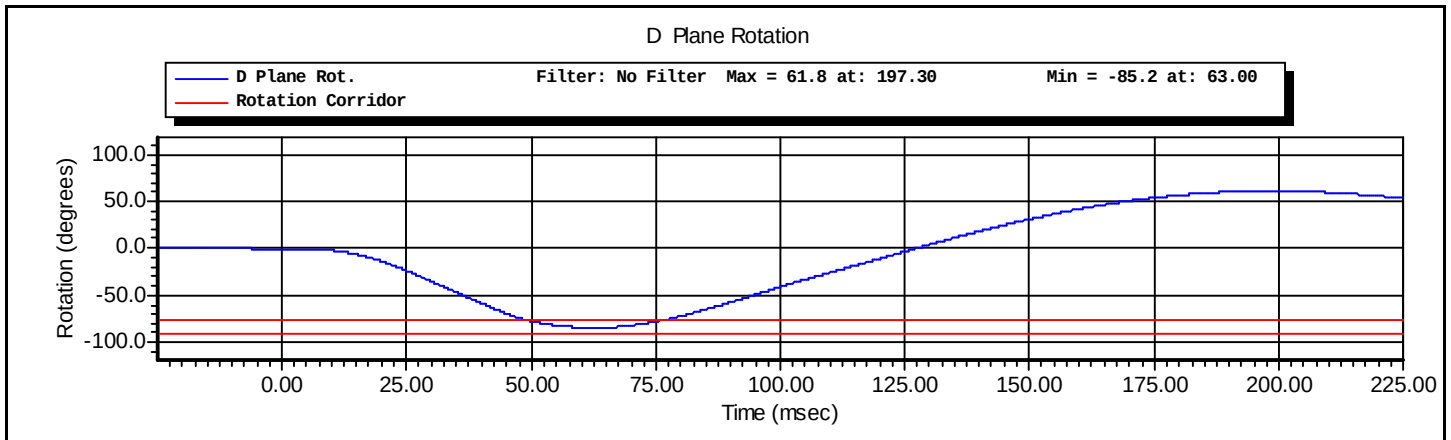
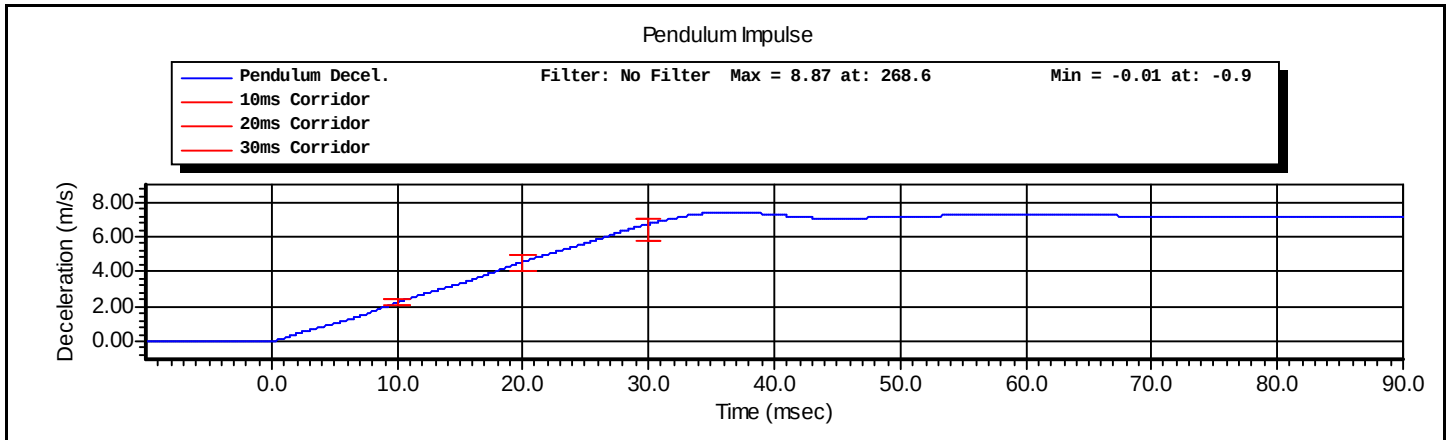
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Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	10/7/2010
Test Number:	2	Test Time:	11:34:16 AM



Test ID: Neck Flexion

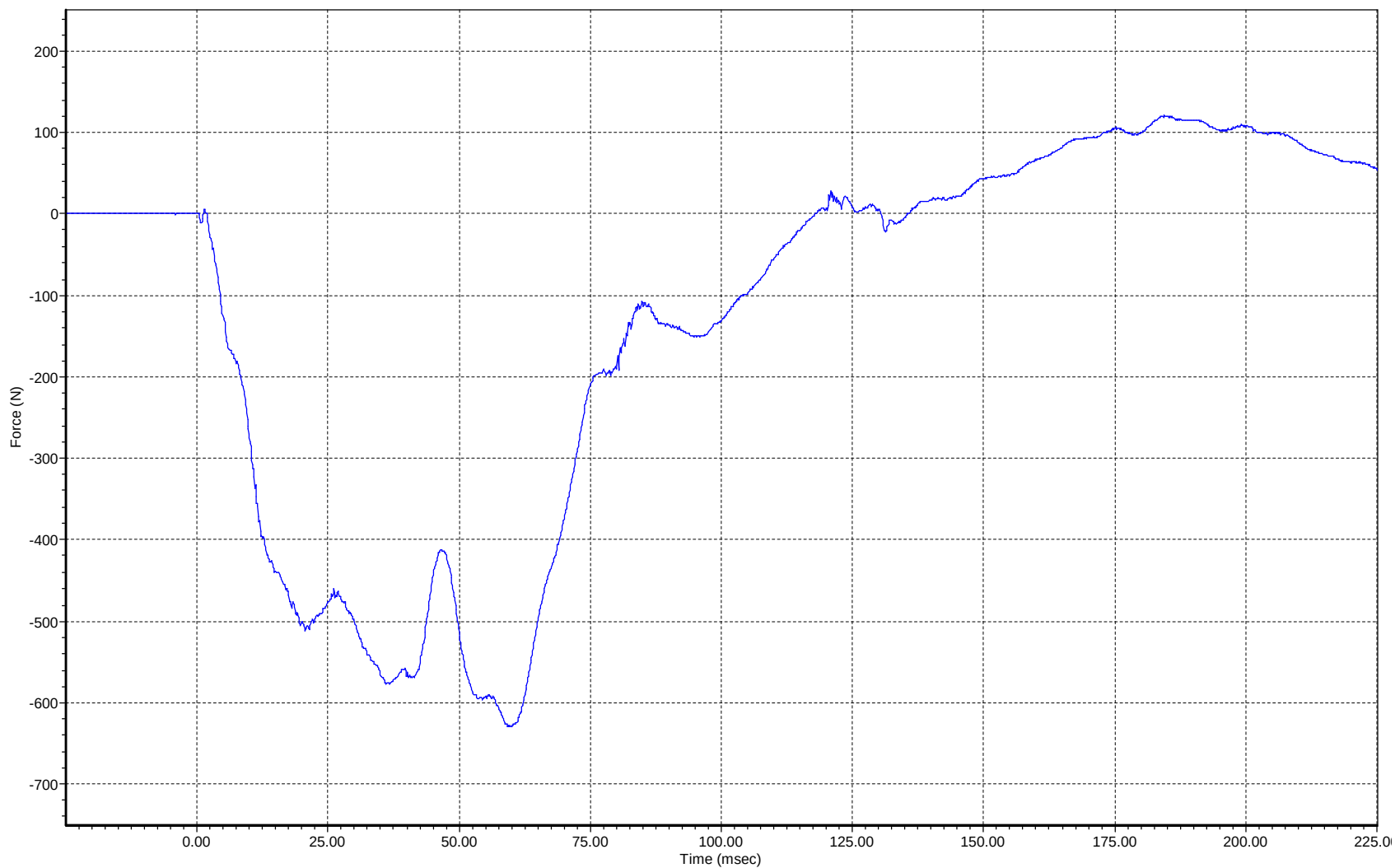
Test Time: 11:34:16 AM

Test Date: 10/7/2010

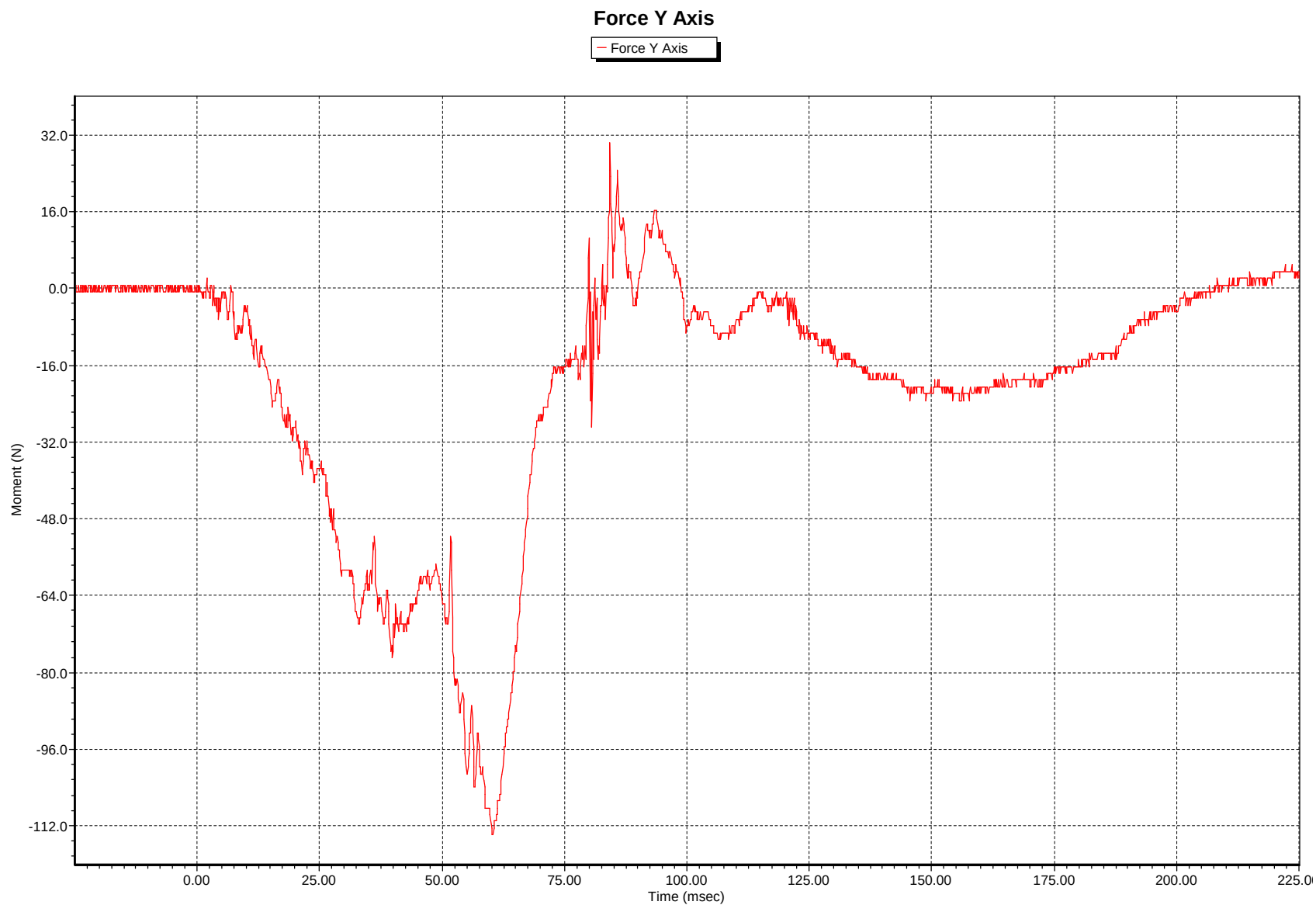


Force X Axis

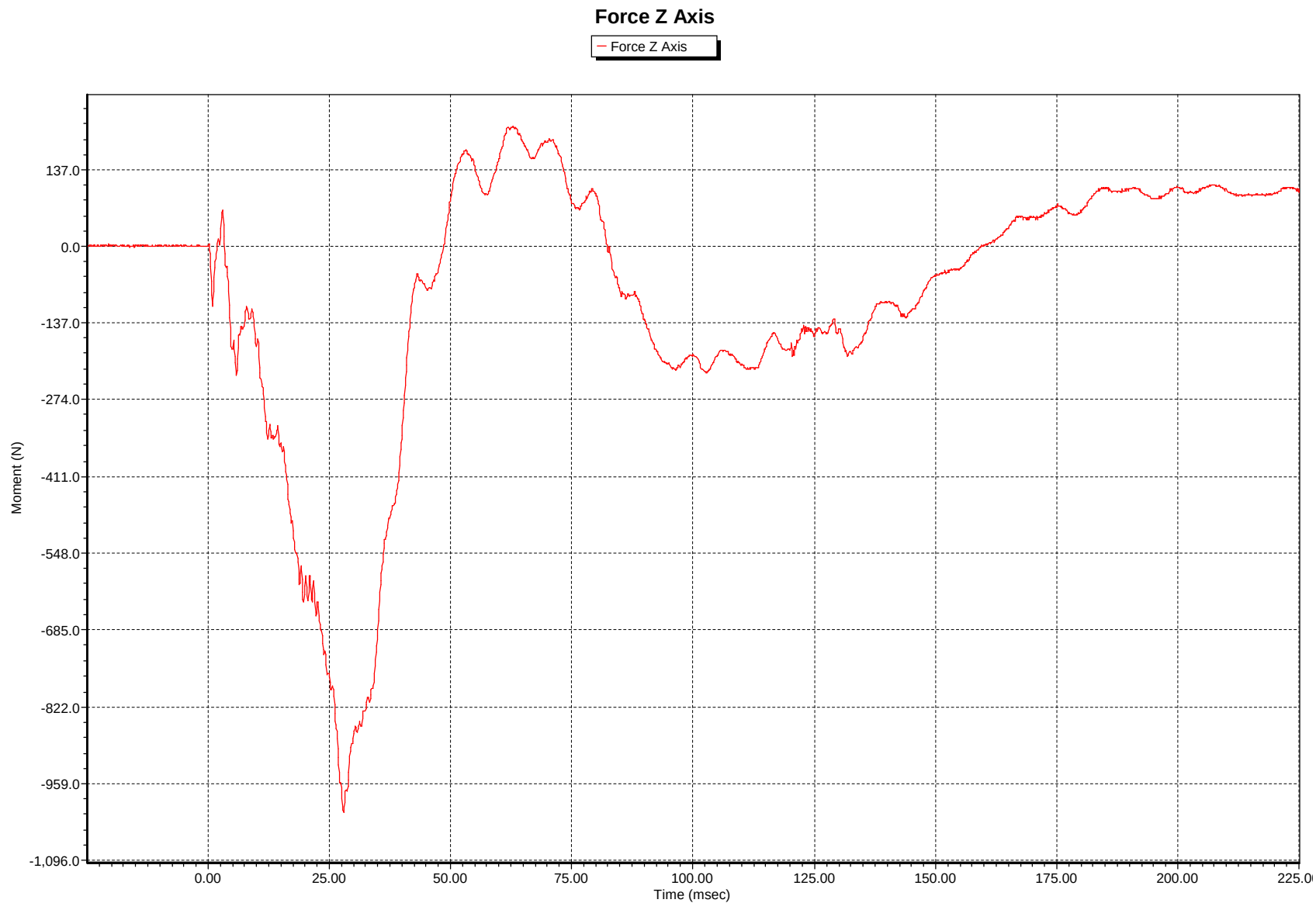
Force X Axis Max = 120 at: 184.50 Min = -629 at: 59.20



Hybrid III 5'th, Neck Flexion, 10/7/2010, 11:34:16 AM



Hybrid III 5'th, Neck Flexion, 10/7/2010, 11:34:16 AM



Hybrid III 5'th, Neck Flexion, 10/7/2010, 11:34:16 AM



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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	10/6/2010
Test Number:	1	Test Time:	9:40:51 AM

Component Part Number	Component Serial Number
Chest Jacket - 880105-355-E	DG0304

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.2 deg C P
Humidity	10.0 -- 70.0	49.0 %RH P
Velocity	6.59 -- 6.83	6.75 m/s P
Sternum Displacement	-58.0 -- -50.0	-50.5 mm P
Force During Displacement Interval	-4400 -- -3900	-4216 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-4216 N P
Hysteresis	69 -- 85	73 % P

All test parameters are within specifications

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

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

Test ID: **Thorax**

Test Time: **9:40:51 AM**

Test Date: **10/6/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2010
Endevco	7264-2000	P66930	10/5/2010
DentonATD	78051-342	DS-273	4/13/2010

Test ID: **Thorax**

Test Time: **9:40:51 AM**

Test Date: **10/6/2010**



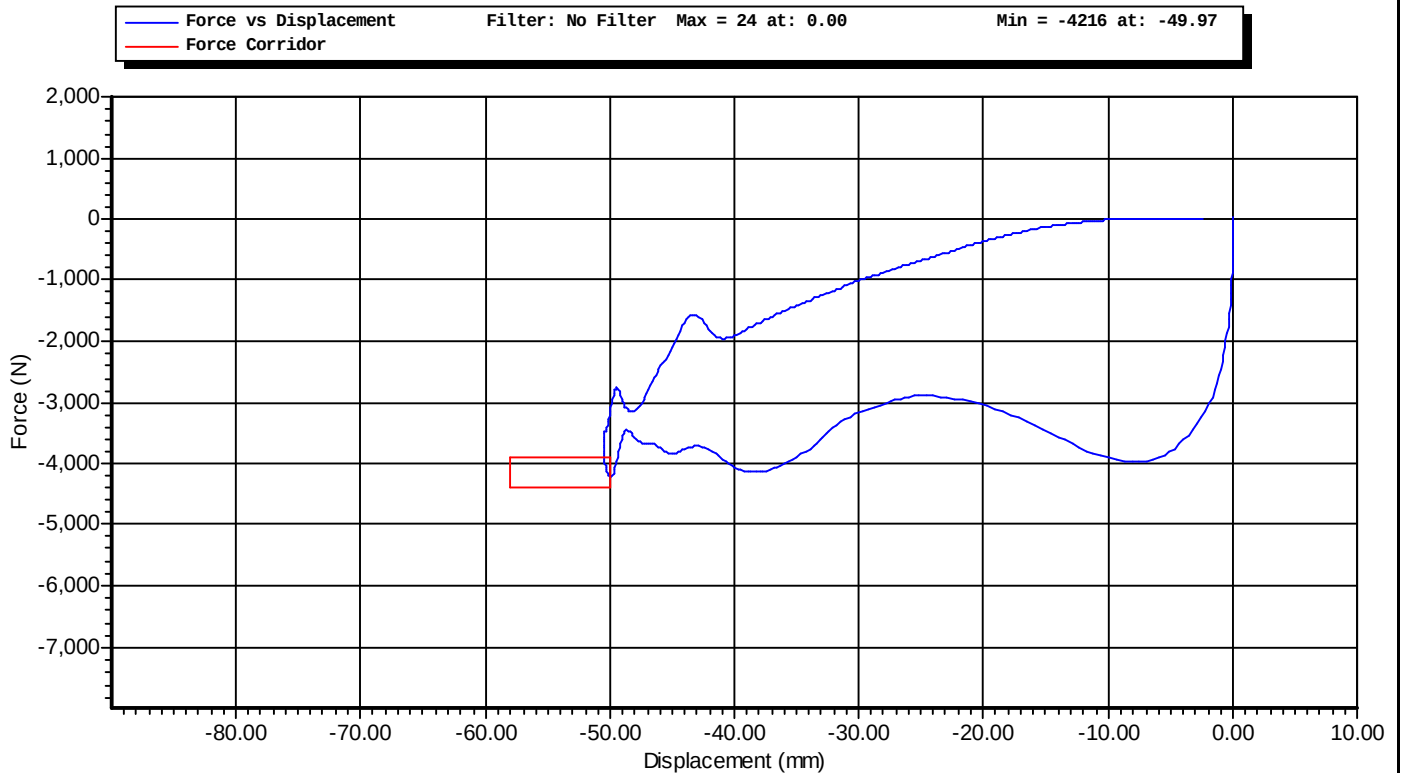
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Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Thorax	Test Date:	10/6/2010
Test Number:	1	Test Time:	9:40:51 AM

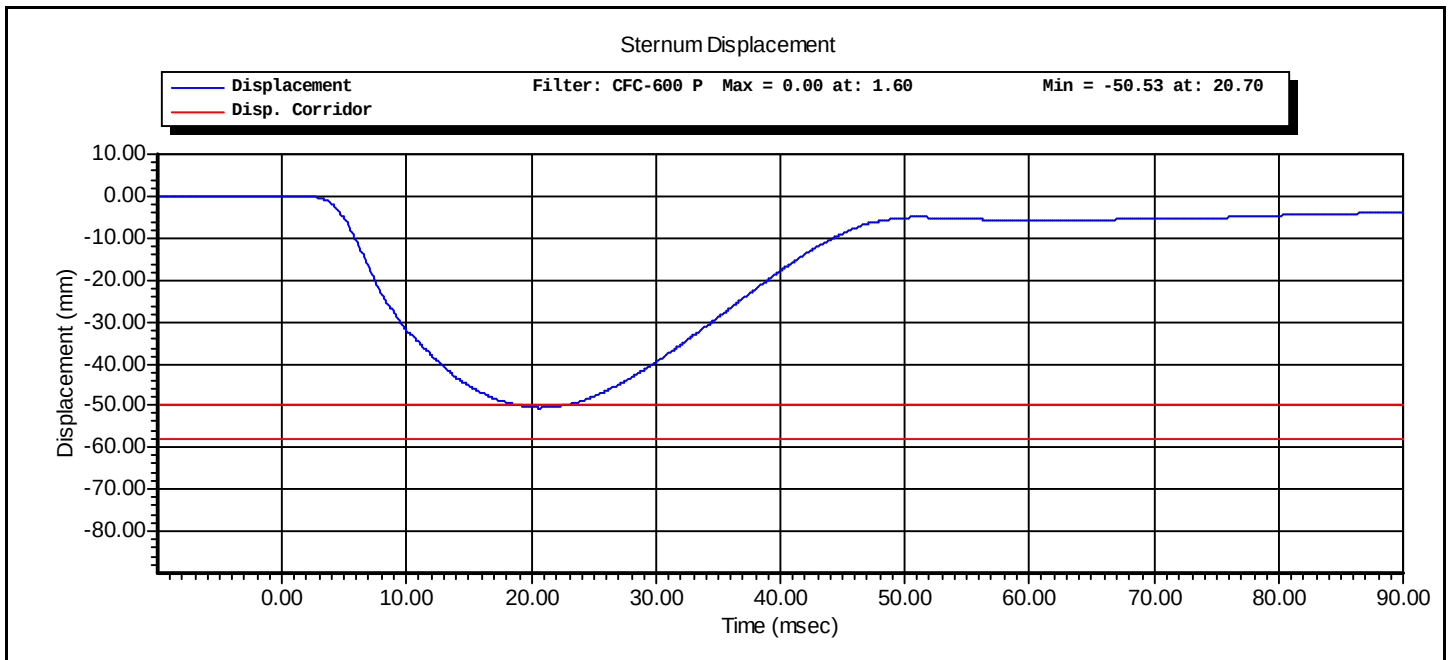
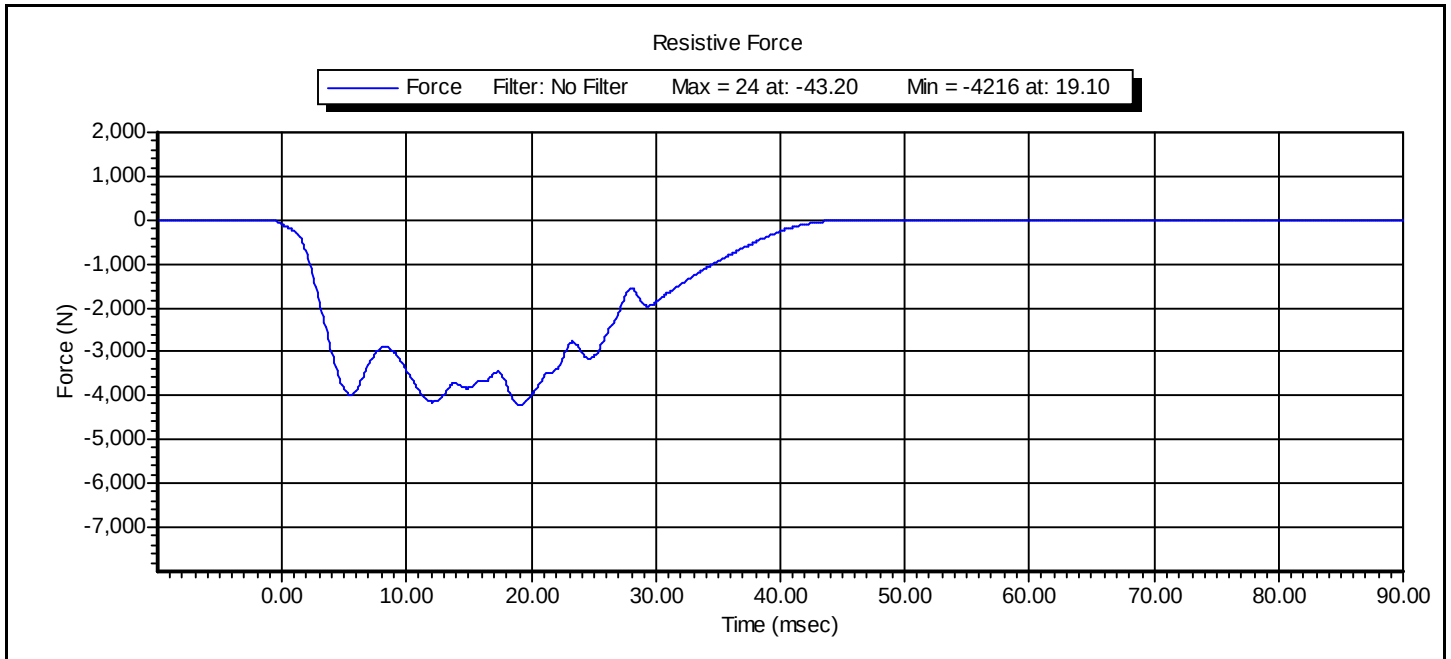
Resistive Force vs Sternum Displacement



Test ID: **Thorax**

Test Time: **9:40:51 AM**

Test Date: **10/6/2010**



Torso Flexion Test

Technician: AR

Calibration Date: 10/7/2010

ATD Serial Number: 5th Female 273

Test Results			
Test Condition	Parameters	Results	Status
Temperature	18.9-25.6° C	22.2° C	P
Lab Humidity: 38%	10-70%	40%	P
Max Force @ 45 deg	320 – 390N	360N	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	21°	P

P = Pass

F= Fail



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/7/2010
Test Number:	1	Test Time:	3:30:53 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	40.0 %RH P
Velocity	2.07 -- 2.13	2.09 m/s P
Resistive Force	-4060 -- -3450	-3666 N P

All test parameters are within specifications

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

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

Test ID: **Left Knee**

Test Time: **3:30:53 PM**

Test Date: **10/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Left Knee**

Test Time: **3:30:53 PM**

Test Date: **10/7/2010**

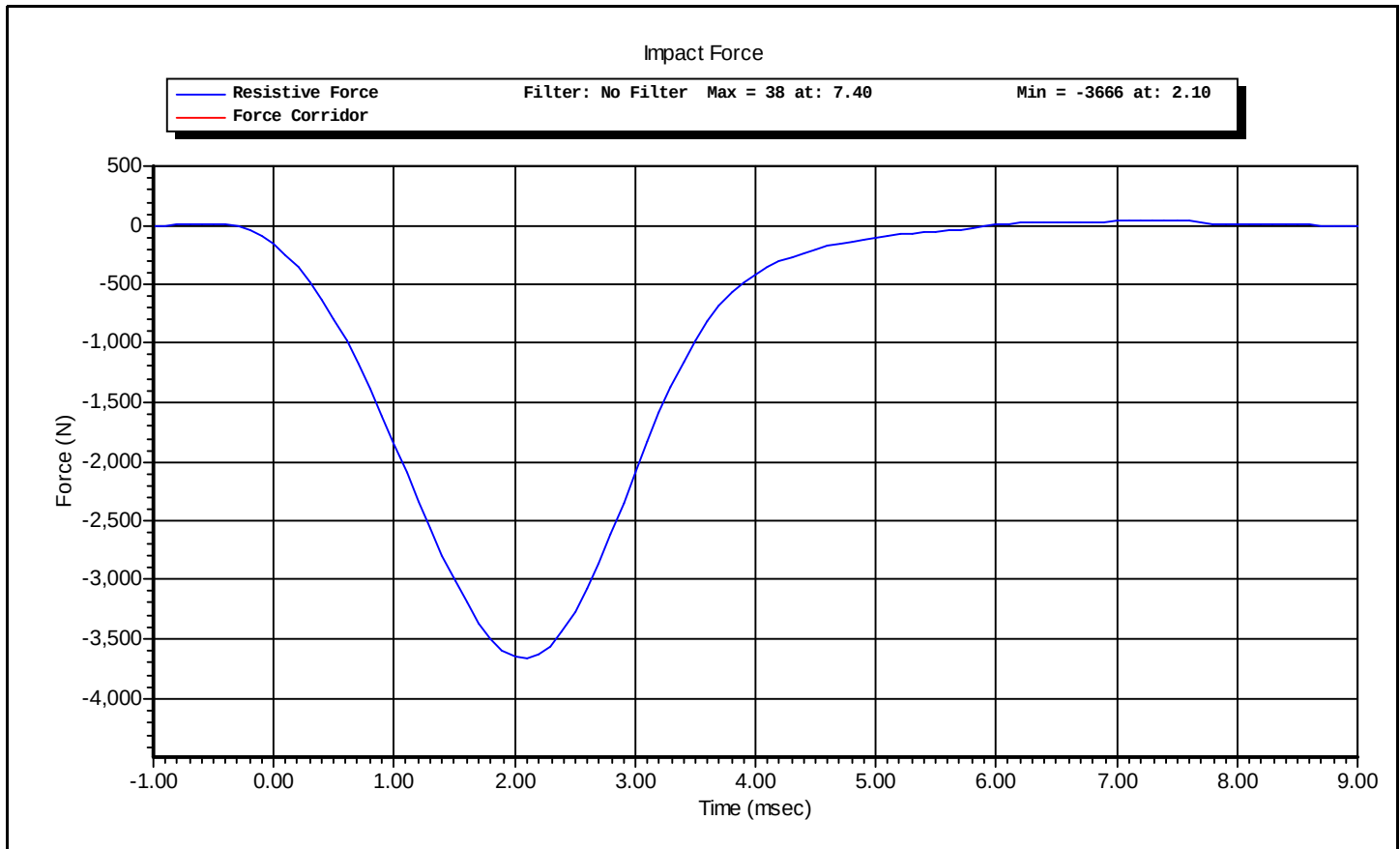


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/7/2010
Test Number:	1	Test Time:	3:30:53 PM



Test ID: **Left Knee**

Test Time: **3:30:53 PM**

Test Date: **10/7/2010**

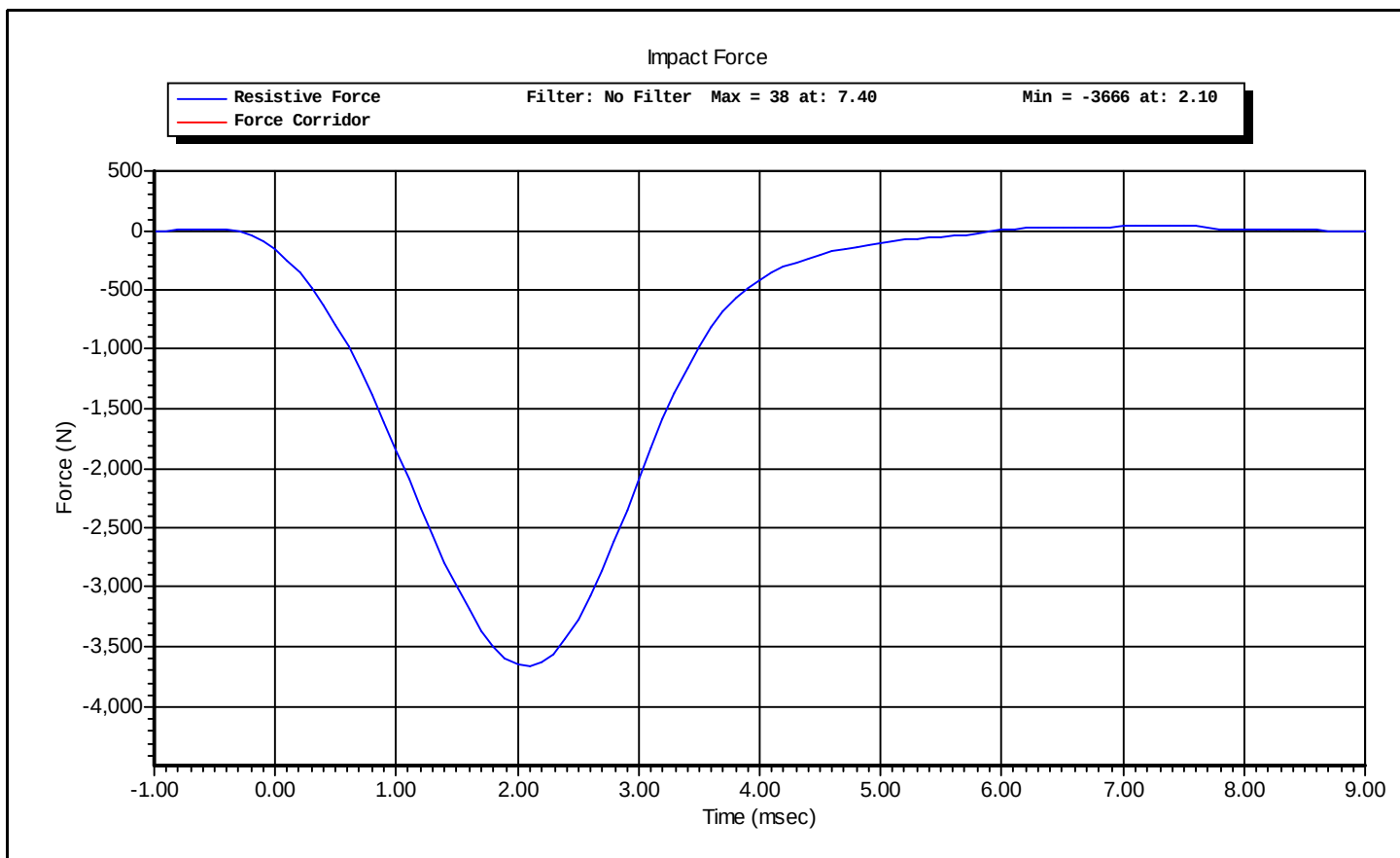


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Left Knee	Test Date:	10/7/2010
Test Number:	1	Test Time:	3:30:53 PM



Test ID: **Left Knee**

Test Time: **3:30:53 PM**

Test Date: **10/7/2010**



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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/7/2010
Test Number:	1	Test Time:	3:15:29 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.2 deg C P
Humidity	10.0 -- 70.0	40.0 %RH P
Velocity	2.07 -- 2.13	2.10 m/s P
Resistive Force	-4060 -- -3450	-3538 N P

All test parameters are within specifications

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

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

Test ID: **Right Knee**

Test Time: **3:15:29 PM**

Test Date: **10/7/2010**



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VERIFICATION REPORT

REFERENCE EQUIPMENT

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

Test ID: **Right Knee**

Test Time: **3:15:29 PM**

Test Date: **10/7/2010**

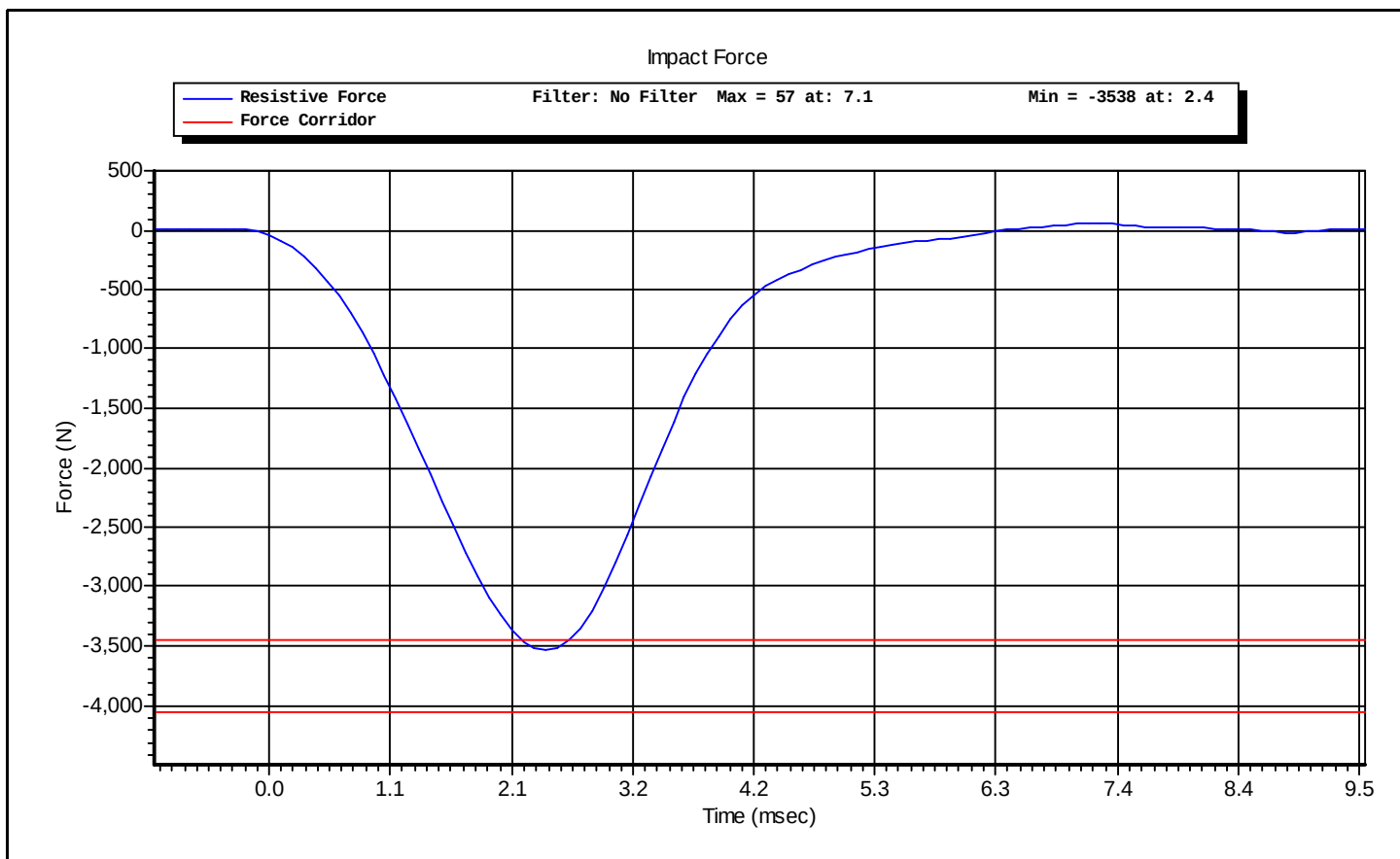


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Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:		Spec Type:	NHTSA
ATD Type:	Hybrid III 5'th		
ATD Serial Number:	273		
Test ID:	Right Knee	Test Date:	10/7/2010
Test Number:	1	Test Time:	3:15:29 PM



Test ID: **Right Knee**

Test Time: **3:15:29 PM**

Test Date: **10/7/2010**