

REPORT NUMBER: NCAP-CAL-14-004

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

**Honda MFG. of Alabama, LLC
2014 Honda Odyssey
Mini Van**

NHTSA No: M20145300

**PREPARED BY:
CALSPAN CORPORATION
P.O. BOX 400
BUFFALO, NEW YORK 14225**



February 3, 2014

FINAL REPORT

**PREPARED FOR:
U. S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
1200 NEW JERSEY AVE SE, ROOM W43-410
WASHINGTON, D.C. 20590**

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Transportation Test Operations

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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15. Supplementary Notes																																																									
16. Abstract A 56.30 km/h (35 mph), NCAP Frontal Impact Test was conducted on a 2014 Honda Odyssey Mini Van 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 Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 3, 2014. The impact velocity of the vehicle was 56.61 km/h, and the ambient temperature at the barrier face at the time of impact was 21°C. The target vehicle's maximum post-test static crush was 561 mm at the centerline. The test vehicle's occupant performance data is as follows:																																																									
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h 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. DTNH22-12-D-00260. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

The 56.3 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Frontal NCAP Laboratory Test procedure, dated August 2013.

SUMMARY

A load cell barrier consisting of 36 load cells was impacted by a 2014 Honda Odyssey Mini Van at a velocity of 56.61 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on January 3, 2014. Pre- and post-test photographs of the vehicle and dummies to document the test 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 Data Sheet 6 of this report.

One Part 572E, 50th percentile male anthropomorphic test device (ATD), was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger seating position according to dummy placement instructions specified in the Frontal NCAP Laboratory Test Procedure. Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, right / left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's and passenger's lap and shoulder belts to measure dummy torso and pelvic section loading. The driver (position 1) ATD (Serial No. 064) and the right-front passenger (position 2) ATD (Serial No. 288) were calibrated previous to this test. Certification details, along with instrumentation calibration data, can be found in Appendix C of this report.

The 136 channels of data were recorded on an on-board data acquisition system. Please refer to Appendix B for 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 a total of 0.0 grams of stoddard solvent leakage after the event and including all phases of the static rollover. The maximum static crush of the test vehicle was 561 mm at the centerline. During and after the impact event, the driver's and passenger's side door were closed and operational.

The driver's visible contact points were as follows: The driver's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee bolster.

The passenger's visible contact points were as follows: The passenger's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the glove box.

The occupant data is summarized below.

ATD Position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th)	107.43	0.38	896.66	-144.66	35.82	-21.96	-190.49	-1002.45
Passenger (5 th)	245.16	0.29	479.95	-188.86	35.59	-15.32	-1751.18	-2439.56

GENERAL COMMENTS:

1. P1 (Driver) serial number - 064
2. P2 (Passenger) serial number - 288

Data Anomalies:

- None

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

This section contains information reporting for the following Data Sheets:

Data Sheet No. 1 – General Test and Vehicle Parameter Data

Data Sheet No. 2 – Seat Adjustment, Fuel System, and Steering Wheel Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Seat Belt Positioning Data

Data Sheet No. 6 – High-Speed Camera Locations and Data

Data Sheet No. 7 – Vehicle Accelerometer Locations

Data Sheet No. 8 – Photographic Reference Target Locations

Data Sheet No. 9 – Load Cell Locations on Fixed Barrier

Data Sheet No. 10 – Test Vehicle Summary of Results

Data Sheet No. 11 – Post-Test Observations

Data Sheet No. 12 – Vehicle Profile Measurements

Data Sheet No. 13 – Accident Investigation Division Data

Data Sheet No. 14 – Vehicle Intrusion Measurements

Data Sheet No. 15 – Summary of FMVSS 212, 219 (Partial), and 301 Data

Data Sheet No. 16 – FMVSS 301 Static Rollover Results

Data Sheet No. 17 – Dummy/Vehicle Temperature Stabilization Chart

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20145300
Model Year	2014
Make	Honda
Model	Odyssey
Body Style	Mini Van
VIN	5FNRL5H2XEB043058
Body Color	Dark Blue
Odometer Reading (km /mi)	12.9 km / 8 mi
Engine Displacement (L)	3.5
Type / No. Cylinders	V6
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

Traction Control System (TCS)	Yes
Power Steering	Yes
Power Window Auto-Reverse	No
Driver Frontal 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
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
Driver Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Pretensioner	Yes
Front Pass. Load Limiter	Yes
Other	-

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

N/A

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda MFG. of Alabama, LLC
Date of Manufacture	10/13

GVWR (kg)	2730
GAWR Front (kg)	1320
GAWR Rear (kg)	1450

VEHICLE SEATING AND WEIGHT CAPACITY DATA

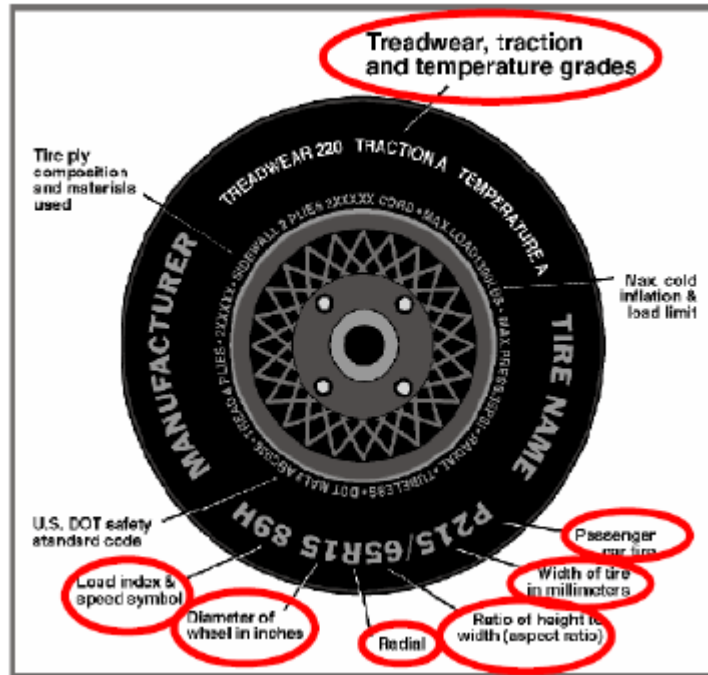
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bucket	Bench	
Number of Occupants	2	2	3	7
Capacity Wt. (VCW) (kg)				608
Cargo Wt. (RCLW) (kg)				131.7

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

Collect items circled in red, tire manufacturer, and tire name.



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	275	275
Cold Pressure (kPa)	230	230
Recommended Tire Size	P235/65R17	P235/65R17
Tire Size on Vehicle	P235/65R17	P235/65R17
Tire Manufacturer	Continental	Continental
Tire Model	ContiProContact	ContiProContact
Treadwear	500	500
Traction	AA	AA
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index / Speed Symbol	103T	103T
Tire Material	Rubber	Rubber
DOT Safety Code Left	A3873UM4013	A3873UM4013
DOT Safety Code Right	A3873UM4013	A3873UM4013

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	569	442		606	542	
Right	kg	579	410		588	528	
Ratio	%	57%	43%		52.7%	47.3%	
Totals	kg	1148	852	2000	1194	1070	2264

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	2000	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.7	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	131.7	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2272.4	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	787	790	799	798	1278
As Tested	mm	786	790	757	759	1417
Post-Test	mm	883	836	802	729	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2999
Total Vehicle Length at Left Side	mm	5037
Total Vehicle Length at Centerline	mm	5152
Total Vehicle Length at Right Side	mm	5041
Weight of Ballast in Cargo Area	kg	136.6
Weight of Vehicle Components Removed	kg	3
Amount of Stoddard Solvent in Fuel Tank	L	73.9

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Rear taillight and trunk carpeting.

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	5152
2	Total Width	1987
3*	Bumper Top Height	549
4*	Bumper Bottom Height	416
5*	Longitudinal Member Top Height	549
6	Distance Between Longitudinal Members	1182
7	Longitudinal Member Width	99
8*	Engine Top Height	935
9*	Engine Bottom Height	200
10	Engine and Gearbox Width	564
11	Front Bumper-Engine Distance	427
12*	Front Shock Absorber Fixing Height	1023
13*	Bonnet Leading Edge Height	829
14	Front Shock Absorber Fixing Width	1305
15	Front Bumper – Front Axle Distance	940
16	Front Axle – A Pillar Distance	490
17	A-Pillar – B-Pillar Distance	1058
18	B-Pillar – Rear Axle Distance	1454
19	B-Pillar – C-Pillar Distance	1136
20*	Roof Sill Bottom Height	1528
21*	Roof Sill Top Height	1651
22*	Floor Sill Bottom Height	370
23*	Floor Sill Top Height	382

*Height Measurements are taken from the ground
 Note: All measurements are in millimeters

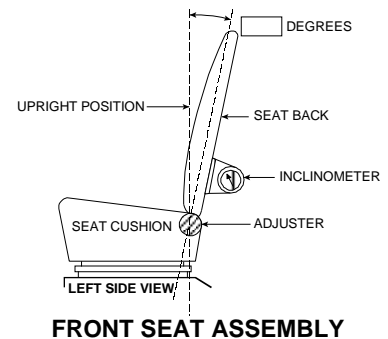
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

NOMINAL DESIGN RIDING POSITION

The driver's seat back was set to the manufacturer's designated angle. The passenger's seat back was positioned in a similar manner as the driver's seat back. Seat back angles are measured at the headrest post bezel using a digital inclinometer.



Seating Position	Degrees
Driver Seat Back Angle	12.4
Passenger Seat Back Angle	7.3

SEAT FORE / AFT POSITIONS

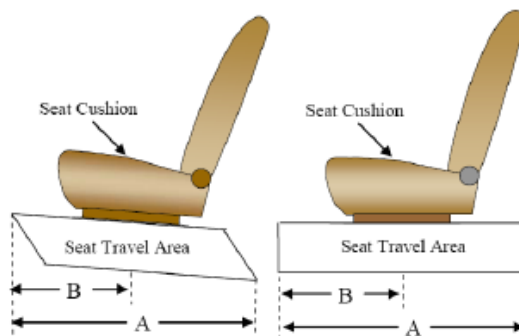
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	270	135
Passenger Seat	200	0

SEAT BELT UPPER ANCHORAGE

The driver's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 50th percentile adult male ATD. The passenger's seat belt anchorage was positioned according to the manufacturer's designated positioning for a 5th percentile adult female ATD. For this test zero is defined as the uppermost position.

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



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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

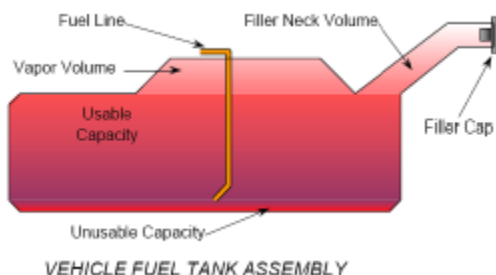
NHTSA No.: M20145300
 Test Date: 1/3/2014

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	79.5
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	73.1 – 74.7
Actual Amount of Solvent Used	73.9
1/3 of Usable Capacity	26.5

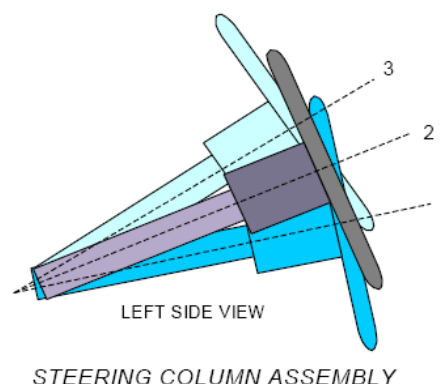
FUEL PUMP

The vehicle is equipped with an electric fuel pump. The fuel filler neck is on the left side of the vehicle. The pump creates positive pressure in the fuel lines, pushing the gasoline to the engine. See form 1 for more information.



STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. For angular measurements, a digital inclinometer was used to measure a plate which was placed across the steering wheel rim. A tape measure was used to measure the telescoping steering wheel travel.



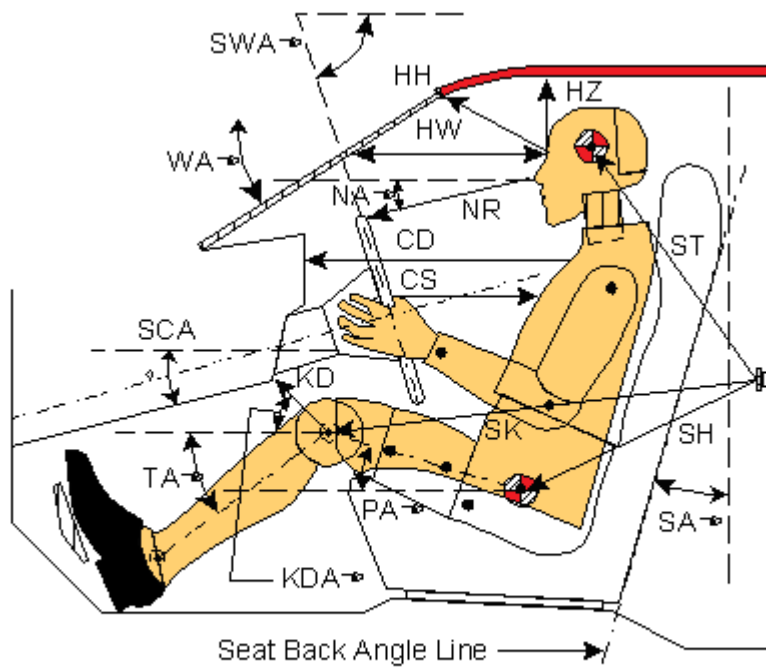
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	29.1	
Geometric center position No. 2	25.8	
Uppermost position No. 3	22.5	
Telescoping Steering Wheel Travel		40
Test Position	25.8	20

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Honda Odyssey Mini Van
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
Test Date: 1/3/2014



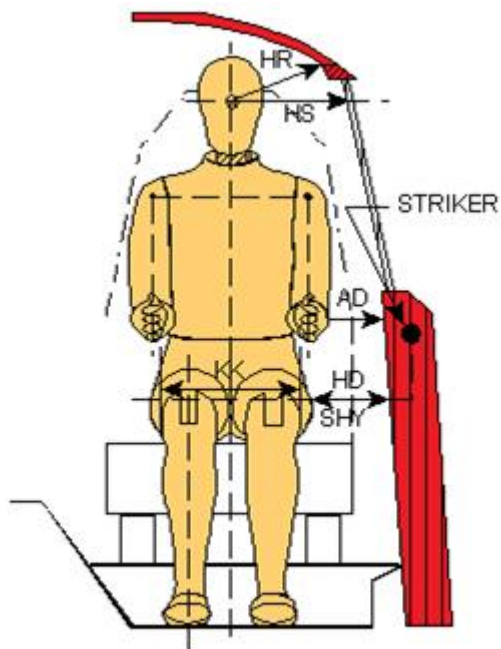
Left Side View

Code	Measurement Description	Driver (SN: 064)		Passenger (SN: 288)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		-28.5		
SWA°	Steering Wheel Angle		25.8		
SCA°	Steering Column Angle		64.2		
SA°	Seat Back Angle (on headrest post)		12.0		7.3
HZ	Head to Roof (Z)	211	90	232	90
HH	Head to Header	398	23.2	350	44.4
HW	Head to Windshield	746	0	715	0
NR	Nose to Rim	416	-6.6	515	-37.2
CD	Chest to Dash	543		424	
CS	Chest to Steering Hub	323	0		
RA	Rim to Abdomen	191	0		
KDL	Left Knee to Dash	147	20.2	75	35.4
KDR	Right Knee to Dash	132	23.2	80	30.9
PA°	Pelvic Angle		23.2		20.0
TA°	Tibia Angle		-44.9		-49.7
SK	Striker to Knee	606	5.7	695	2.9
ST	Striker to Head	611	78.7	621	62.4
SH	Striker to H-Point	240	19.4	362	-6.0

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Honda Odyssey Mini Van
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
Test Date: 1/3/2014



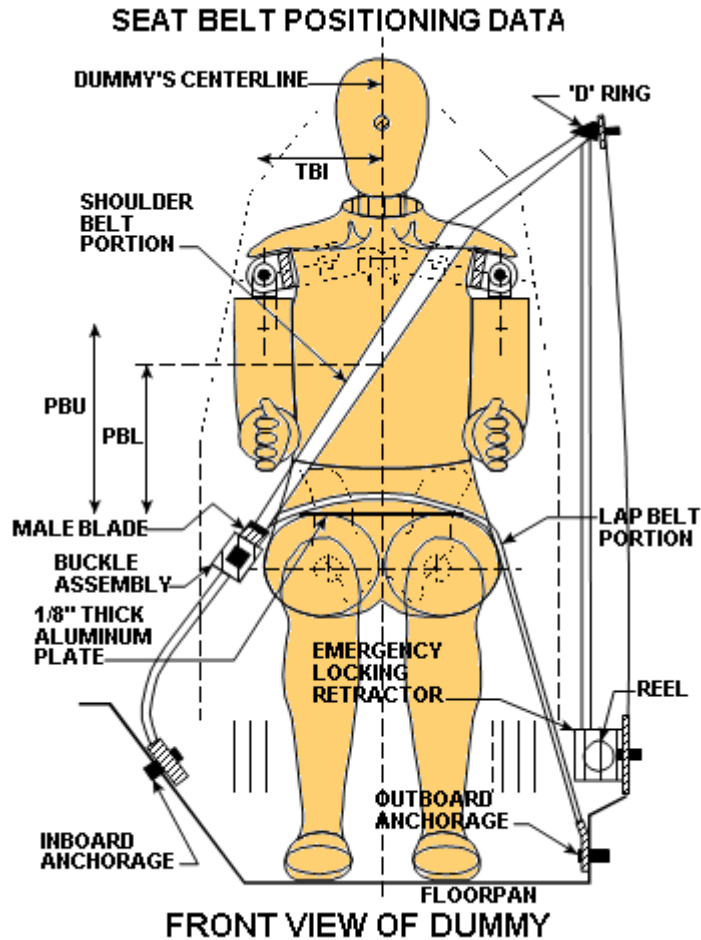
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	142	75
HD	H-Point to Door	136	157
HR	Head to Side Header	254	284
HS	Head to Side Window	385	400
KK	Knee to Knee	355	166
SHY	Striker to H-Point (Y Direction)	280	300
AA	Ankle to Ankle	360	162

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	365	310
PBL — Top surface of reference to belt lower edge	mm	285	230

BELT LENGTH DATA

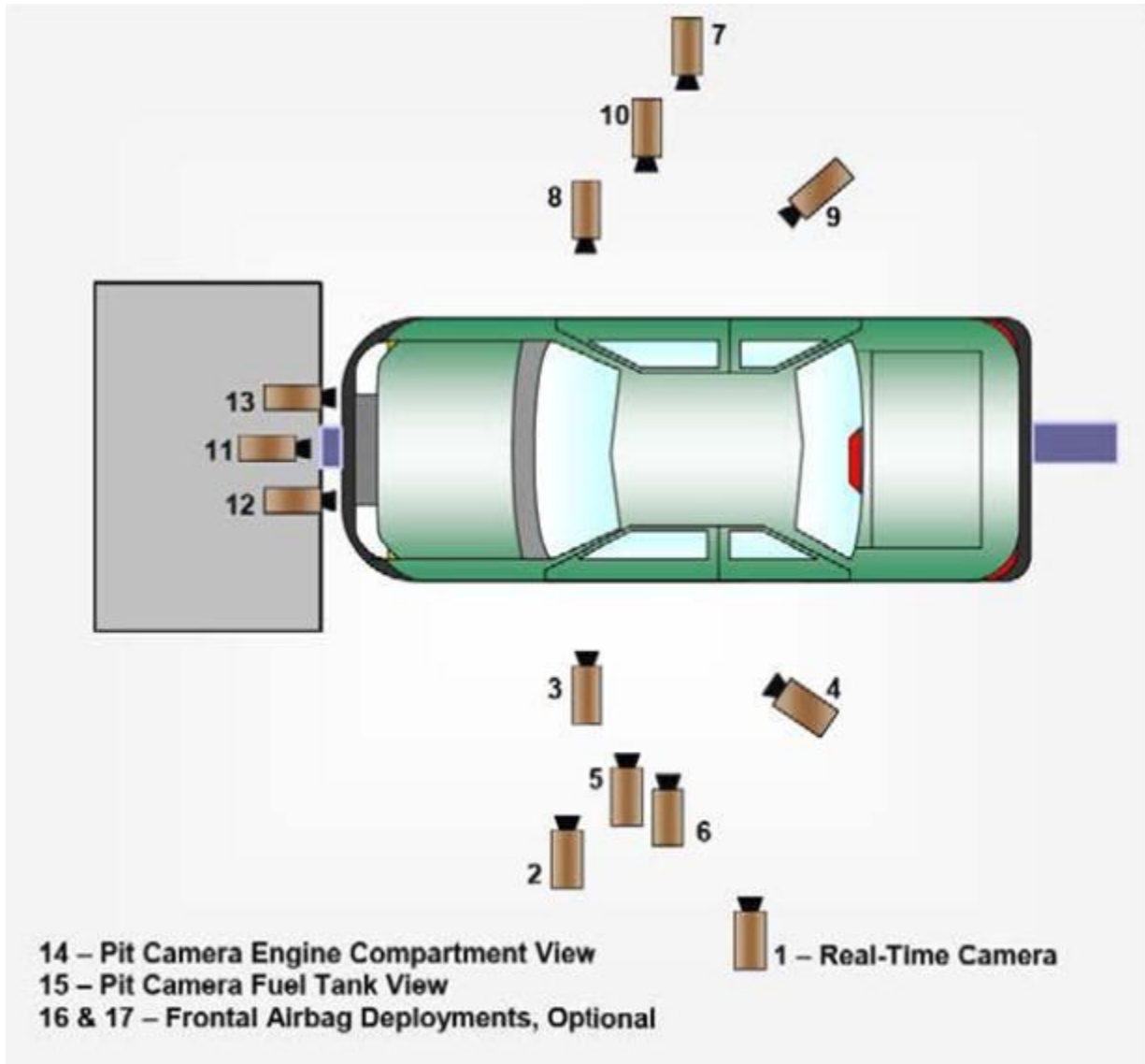
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	925	945
Lap Belt Length as measured on ATD	mm	725	540
Remainder of belt on reel	mm	950	1065
Total belt length for continuous webbing systems	mm	2600	2550

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

Test Vehicle: 2014 Honda Odyssey Mini Van
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
Test Date: 1/3/2014

CAMERA POSITIONS FOR FRONTAL IMPACTS



Top View

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

CAMERA LOCATIONS

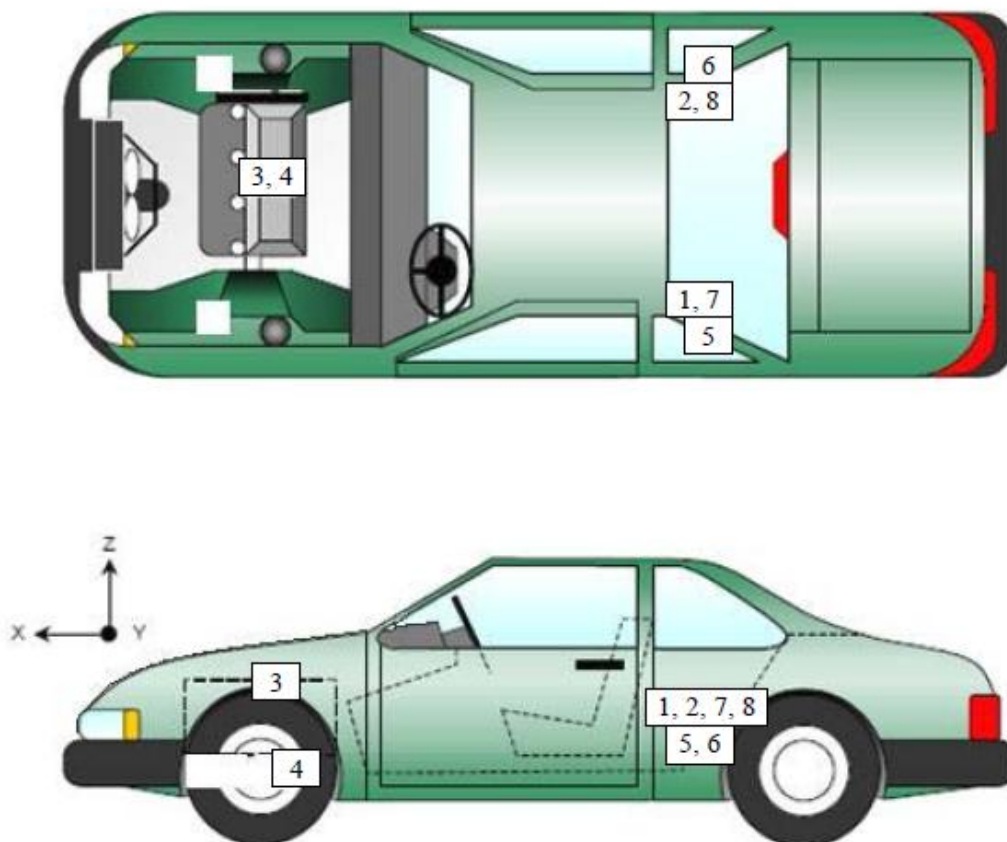
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-		60
2	Driver Close-Up	1460	-8366	1243	50	1000
3	Left Front Half	836	-9095	1508	50	1000
4	Left Angle	2892	-3117	2284	28	1000
5	Steering Column - Top	2040	-8388	1850	24-70	1000
6	Steering Column - Bottom	2040	-8388	1255	24-70	1000
7	Right Overall	2109	9637	1119	24	1000
8	Passenger Close-Up	1544	7863	1247	50	1000
9	Right Front Half	1156	8495	1096	50	1000
10	Right Angle	3013	3049	2186	28	1000
11	Windshield	-533	0	3476	24	1000
12	Driver Windshield	-191	-638	2026	25	1000
13	Passenger Windshield	-191	621	2026	25	1000
14	Pit Front	976	0	2052	12.5	1000
15	Pit Rear	2310	0	2052	12.5	1000
16	Onboard Driver Airbag (Optional)					
17	Onboard Passenger Airbag (Optional)					

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

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2699	-690	157
2	Right Rear Accelerometer – X Direction	2699	689	161
3	Engine Top X	4489	-140	-240
4	Engine Bottom X	4380	-30	363
5	Left Rear Accelerometer – Z Direction	2699	-690	157
6	Right Rear Accelerometer – Z Direction	2699	689	161
7	Left Rear Accelerometer – X Direction Redundant	2699	-690	157
8	Right Rear Accelerometer – X Direction Redundant	2699	689	161

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

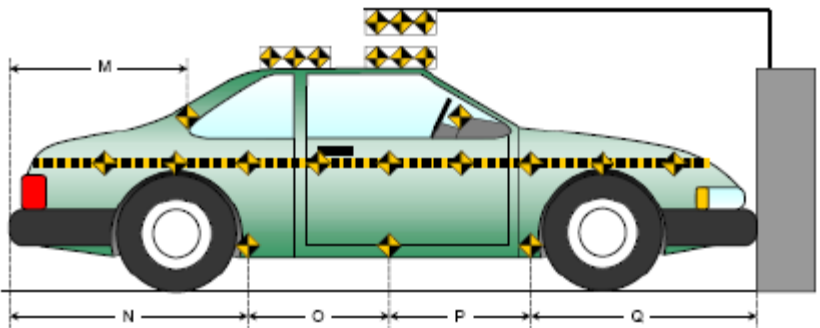
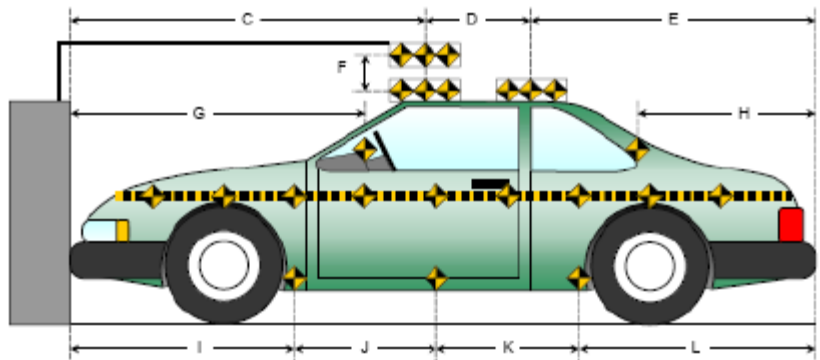
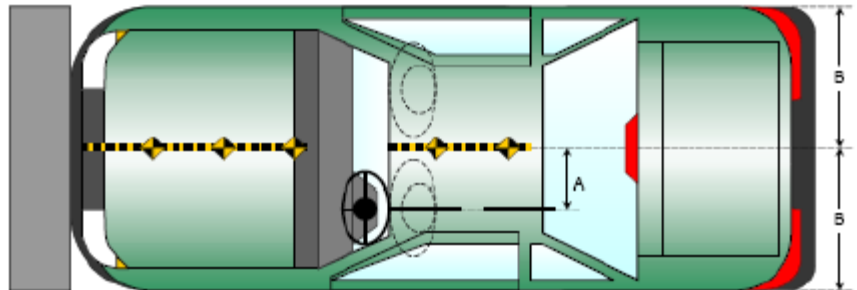
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

Item	Value
A	426
B	993
C	2342
D	909
E	1900
F	124
G	1675
H	1656
I	1434
J	1016
K	997
L	1705
M	1660
N	1707
O	1007
P	1006
Q	1432

All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

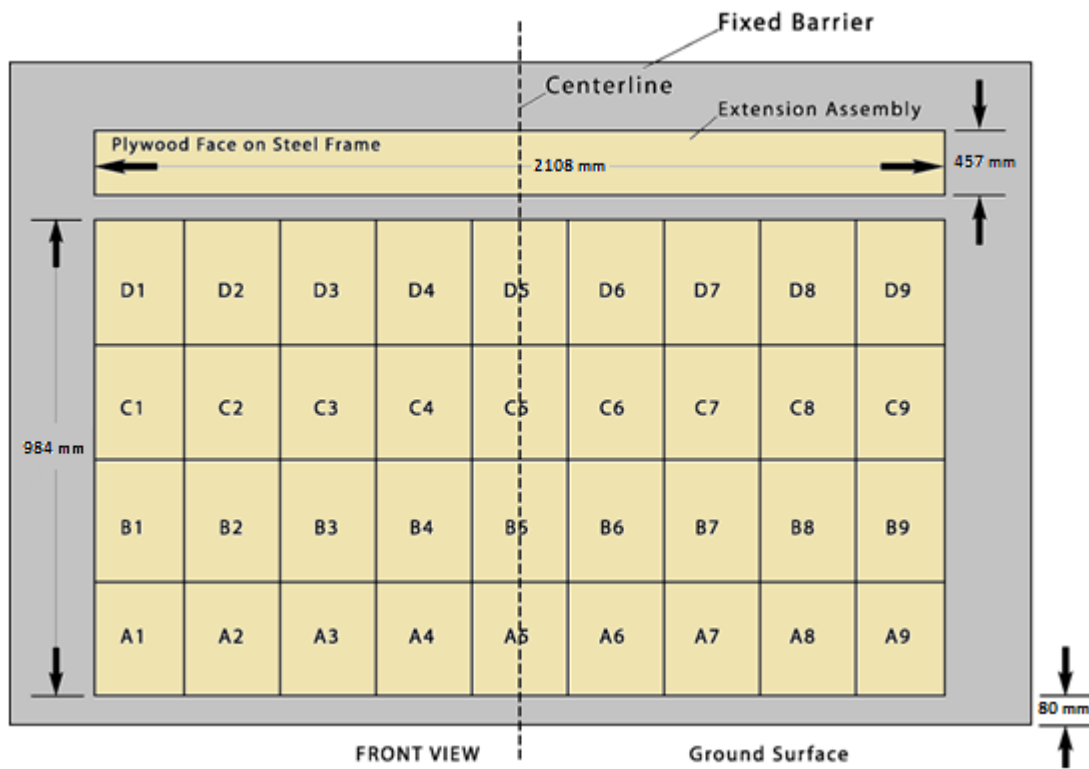


Figure 1 - Load Cell Locations on a 36-Load Cell Barrier with Plywood Height Extension

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	46
Passenger Dummy Accelerometers	46
Vehicle Structure Accelerometers	8
Load Cell Barrier	36
Total	136

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	0
High-Speed Offboard	14
Real-Time Panning	1
Total	15

**DATA SHEET NO. 11
POST-TEST OBSERVATIONS**

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	P572E 50 th Male / 064	P5720 5 th Female / 288
Head Contact	Front Airbag & Headrest	Front Airbag & Headrest
Upper Torso Contact	Front Airbag	Front Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Bolster	Glove Box
Right Knee Contact	Knee Bolster	Glove Box

DOOR OPENING AND SEAT TRACK INFORMATION

Description	Driver	Passenger
Locked / Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	0	0
Seat Back Failure	No	No
Glazing Damage	None	None

POST-TEST STRUCTURAL OBSERVATIONS

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

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	480
Center	mm	457
Right Side	mm	467
Average	mm	468

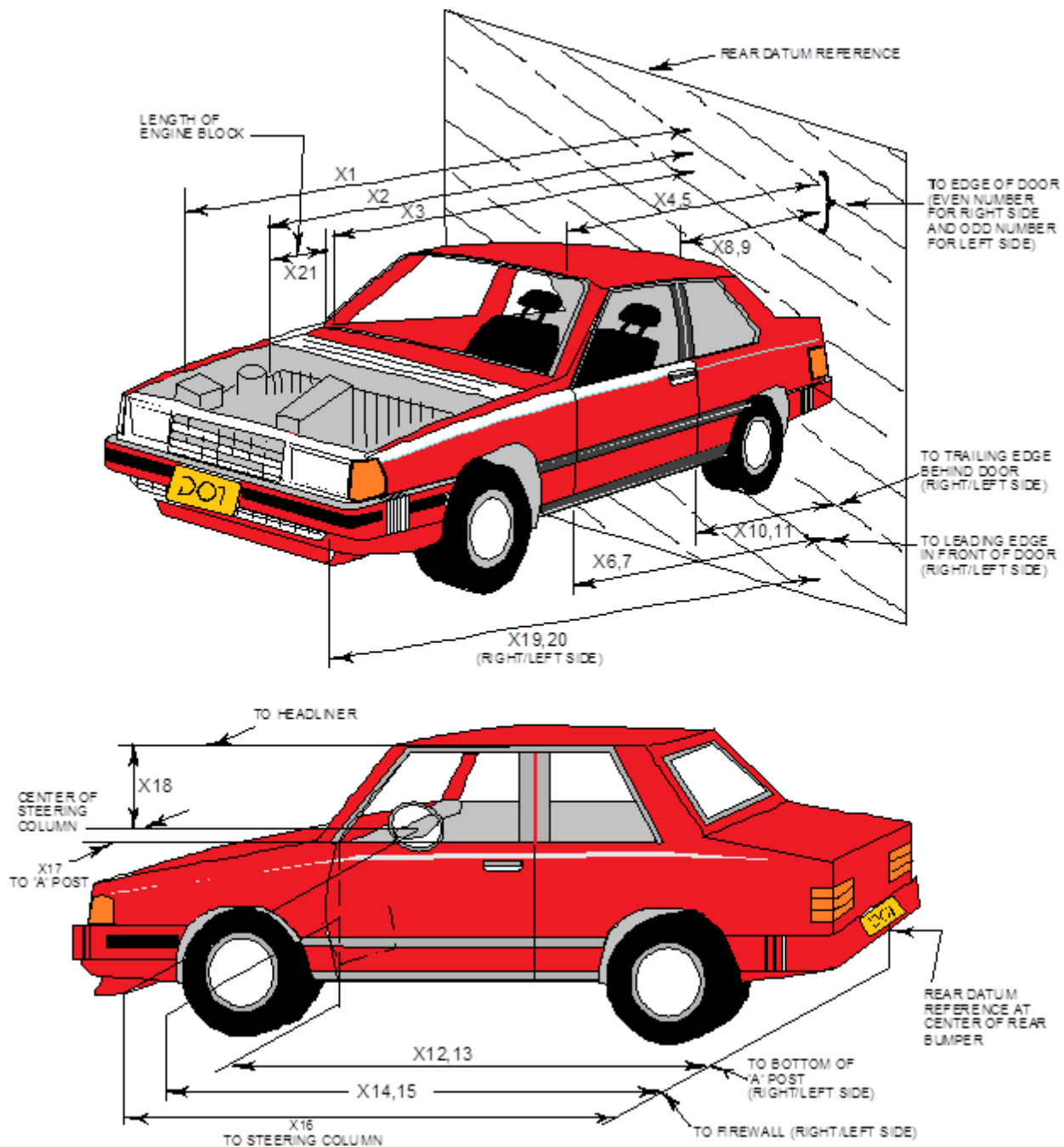
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver		Passenger	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes
Side Airbag 1 - Curtain	Yes	No	Yes	No
Side Airbag 2 - Torso/Pelvis Airbag	Yes	No	Yes	No
Knee Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Other				

DATA SHEET NO. 12
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014



**DATA SHEET NO. 12 ... (CONTINUED)
VEHICLE PROFILE MEASUREMENTS**

Test Vehicle: 2014 Honda Odyssey Mini Van
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
Test Date: 1/3/2014

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	5152	4591	-561
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4725	4449	-277
3	RSOV to Firewall	4335	4325	-10
4	RSOV to Upper Leading Edge of Right Door	3721	3719	-2
5	RSOV to Upper Leading Edge of Left Door	3718	3719	1
6	RSOV to Lower Leading Edge of Right Door	3695	3687	-7
7	RSOV to Lower Leading Edge of Left Door	3691	3689	-2
8	RSOV to Upper Trailing Edge of Right Door	2673	2670	-3
9	RSOV to Upper Trailing Edge of Left Door	2671	2670	-1
10	RSOV to Lower Trailing Edge of Right Door	2679	2674	-5
11	RSOV to Lower Trailing Edge of Left Door	2674	2671	-2
12	RSOV to Bottom of "A" Post of Right Side	3973	3970	-2
13	RSOV to Bottom of "A" Post of Left Side	3971	3968	-3
14	RSOV to Firewall, Right Side	4295	4283	-12
15	RSOV to Firewall, Left Side	4291	4284	-8
16	RSOV to Steering Column	3314	3314	1
17	Center of Steering Column to "A" Post	308	289	-19
18	Center of Steering Column to Headliner	413	418	6
19	RSOV to Right Side of Front Bumper	5088	4583	-505
20	RSOV to Left Side of Front Bumper	5086	4570	-516
21	Length of Engine Block	457	457	0
RD	RSOV to Right Side of Dash Panel	3489	3486	-2
CD	RSOV to Center of Dash Panel	3462	3456	-5
LD	RSOV to Left Side of Dash Panel	3484	3485	1

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2014 Honda Odyssey Mini Van
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
Test Date: 1/3/2014

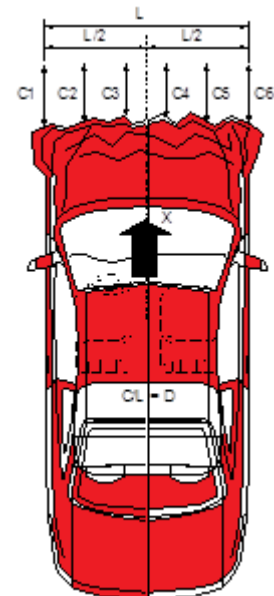
VEHICLE INFORMATION

VIN: 5FNRL5H2XEB043058
Vehicle Size Category: Passenger

Wheelbase (mm): 2,999
Test Weight (kg): 2,264

ACCELEROMETER DATA

Accelerometer Locations: Please See Data Sheet No. 7
Cal. Procedure / Interval: Calspan Procedure / 6 month
Integration Algorithm: Trapezoidal
Linearity: > 99%
Impact Velocity (km/h): 56.61
Velocity Change (km/h): 56.61
Time of Separation (ms): 120



CRUSH PROFILE

Collision Deformation Classification: 12FDEW4
Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1227
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	5030	4579	451
C2	Crush Zone 2 at Left Side	mm	5121	4593	528
C3	Crush Zone 3 at Left Side	mm	5148	4602	546
C4	Crush Zone 4 at Right Side	mm	5149	4604	545
C5	Crush Zone 5 at Right Side	mm	5123	4602	521
C6	Crush Zone 6 at Right Side	mm	5034	4558	476
L	C1 to C6	mm	1227	1249	-21

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

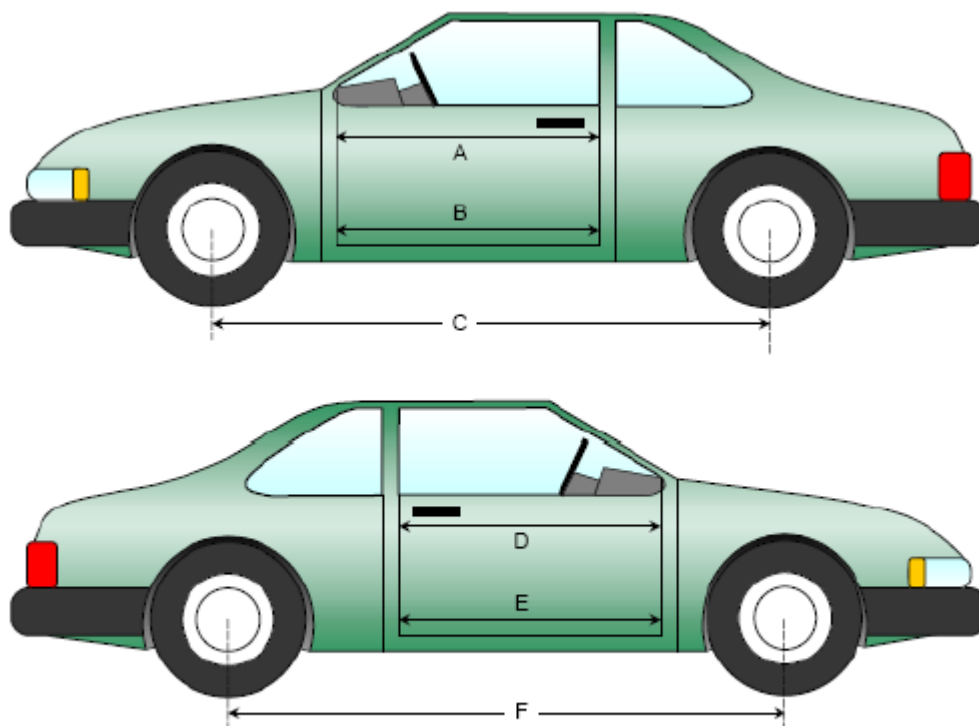
NHTSA No.: M20145300
 Test Date: 1/3/2014

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	948	948	0
B	Left Side Lower	mm	909	909	0
D	Right Side Upper	mm	956	956	0
E	Right Side Lower	mm	852	851	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2999	2922	-77
F	Right Side Wheelbase	mm	2999	2861	-138



Left & Right Side Views

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

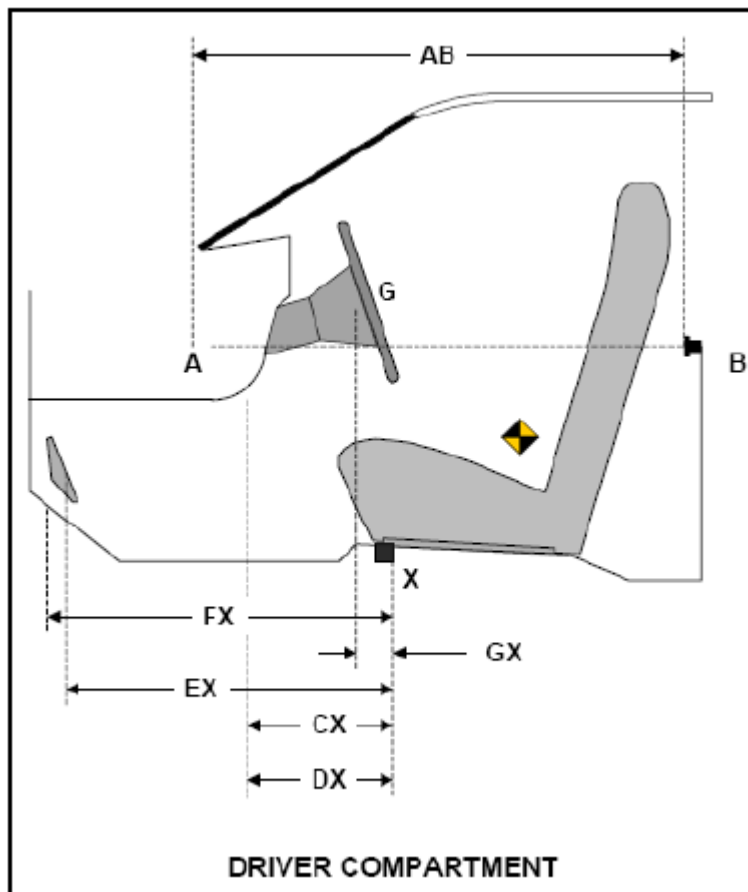
Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	752	751	-1
CX	Left Knee Bolster to X	mm	295	294	-1
DX	Right Knee Bolster to X	mm	289	286	-3
EX	Brake Pedal to X	mm	554	488	-66
FX	Foot Rest to X	mm	572	557	-15
GX	Center of Steering Column Wheel Hub to X	mm	84	90	6

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014

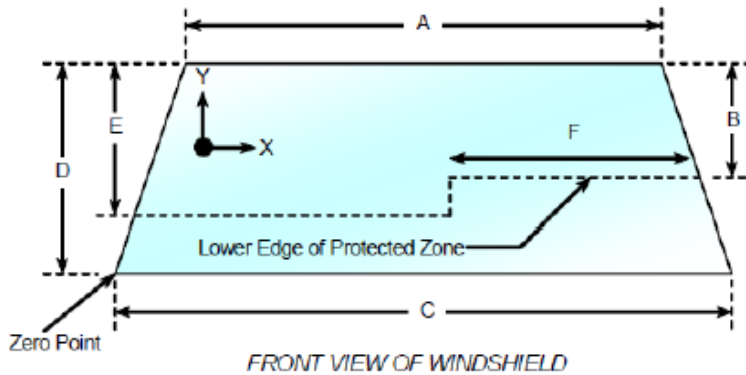
Windshield Mounting Details: A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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 °C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2485	2485	100%
Right Side	2485	2485	100%
Total	4970	4970	100%



Item	Units	Value
A	mm	1430
B	mm	625
C	mm	1680
D	mm	930
E	mm	610
F	mm	480

AREAS OF PROTECTED ZONE FAILURES

- A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.
- No Penetration

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.
- No Penetration

X	Y

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

Test Vehicle: 2014 Honda Odyssey Mini Van
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
Test Date: 1/3/2014

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21 ° C

Test Time: 3:00 PM

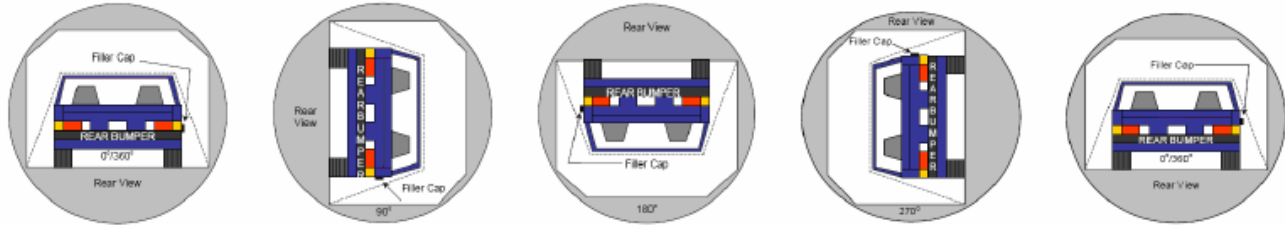
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 oz.)
- B. For the 5-minute period after motion ceases: 0 oz.
(Maximum allowable is 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable is 1 oz./minute)
- D. Spillage: No Spillage Occurred

**DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER RESULTS**

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014



0° TO 90° 90° TO 180° 180° TO 270° 270° TO 360°

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).
3. Details of Stoddard Solvent Spillage: No Spillage Occurred

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	67	300	367
90° to 180°	67	300	367
180° to 270°	63	300	363
270° to 360°	67	300	367

FMVSS 301 SPILLAGE TABLE

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

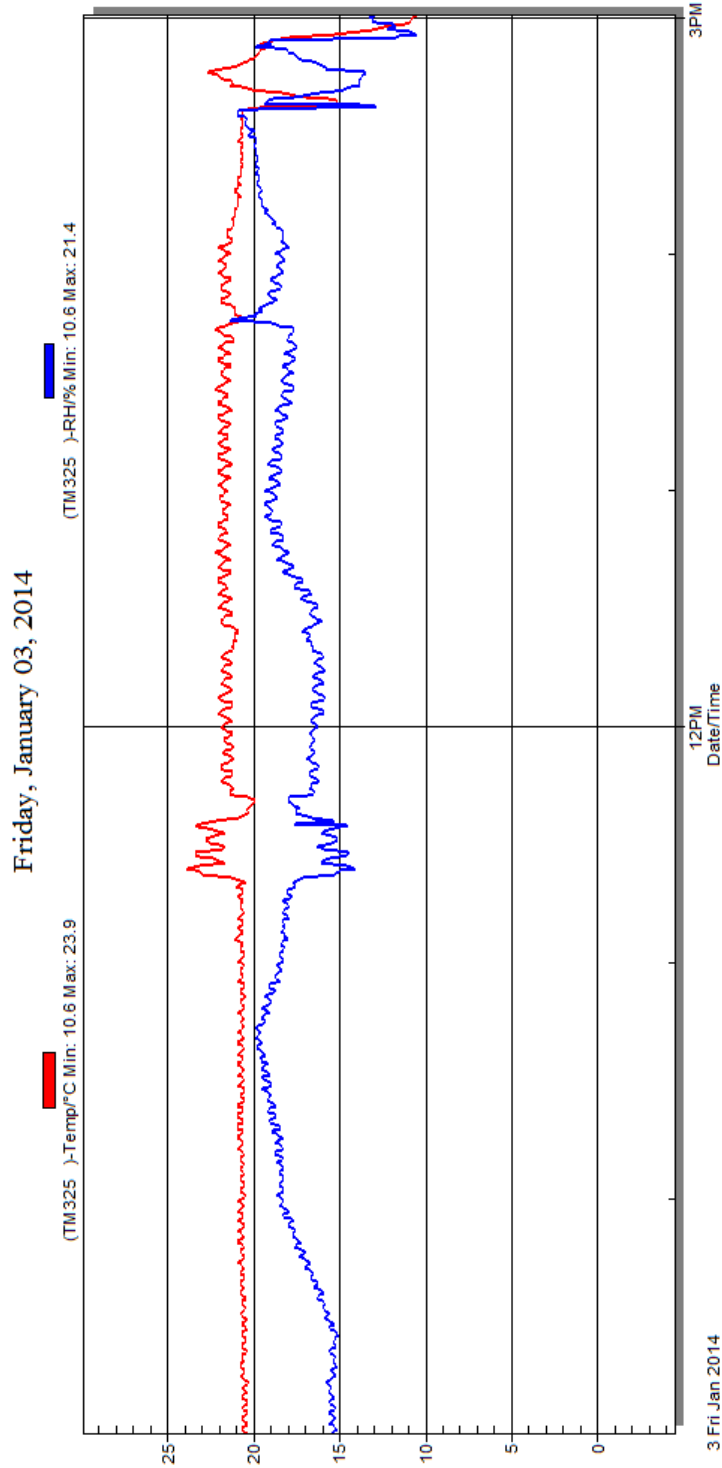
SOLVENT SPILLAGE LOCATION TABLE

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

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

Test Vehicle: 2014 Honda Odyssey Mini Van
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145300
 Test Date: 1/3/2014



Temperature and Humidity Stabilization Chart/Data for Dummies and Test Vehicle

APPENDIX A
PHOTOGRAPHS

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39	Pre-Test Driver Dummy Feet	A-24
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41	Pre-Test Driver's Side Knee Bolster	A-25
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44	Post-Test Driver's Side Floorpan	A-26
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46	Post-Test Driver Dummy Contact With Airbag	A-27
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48	Pre-Test View of the Steering Wheel	A-28
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60	Pre-Test Passenger Dummy Feet	A-34
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Fig.	Description	Page
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75	Vehicle at 270° on Static Rollover Device	A-42
76	Vehicle at 360° on Static Rollover Device	A-42
77	2014 Honda Odyssey Frontal Impact Event	A-43
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¹**NOTE:** *The underbody views should include the following vehicle components: fuel pump, fuel lines, sender unit, fuel tank filler pipe and any other visible system components.*

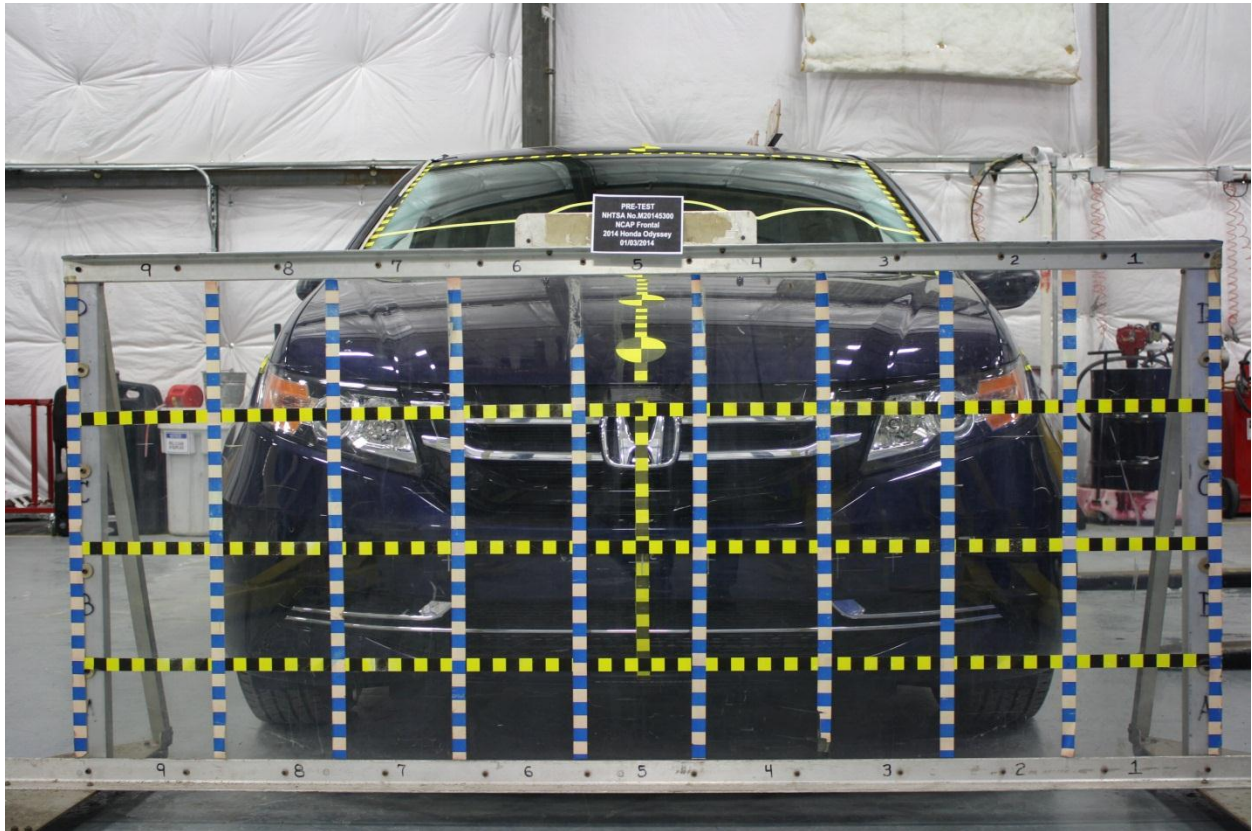


Figure A-1: Load Cell Location



Figure A-2: Load Cell Wall

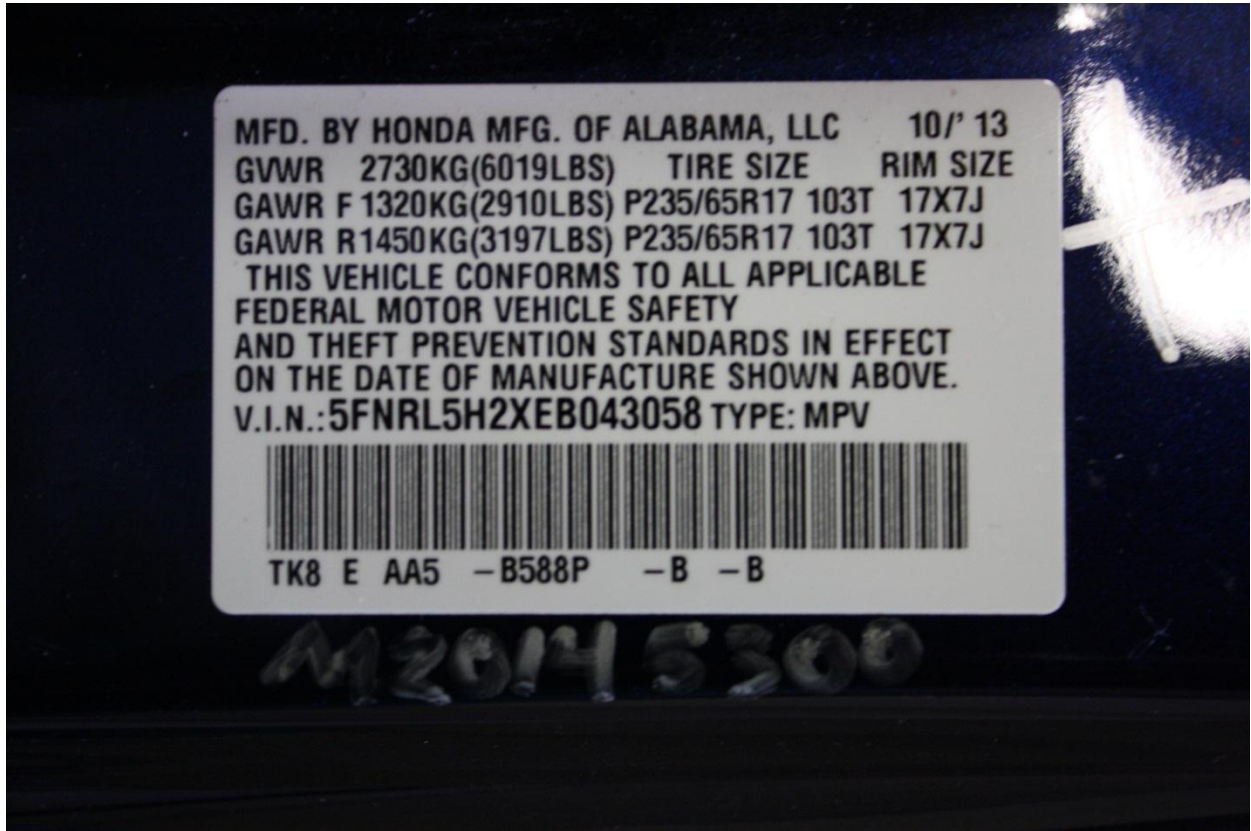


Figure A-3: Manufacturer's Label



Figure A-4: Tire Placard



Figure A-5: 2014 Honda Odyssey Frontal As Delivered



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 Test 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 Front 3-4 View



Figure A-14: Post-Test Right Front 3-4 View



Figure A-15: Pre-Test Left Rear 3-4 View



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



Figure A-17: Pre-Test Windshield View

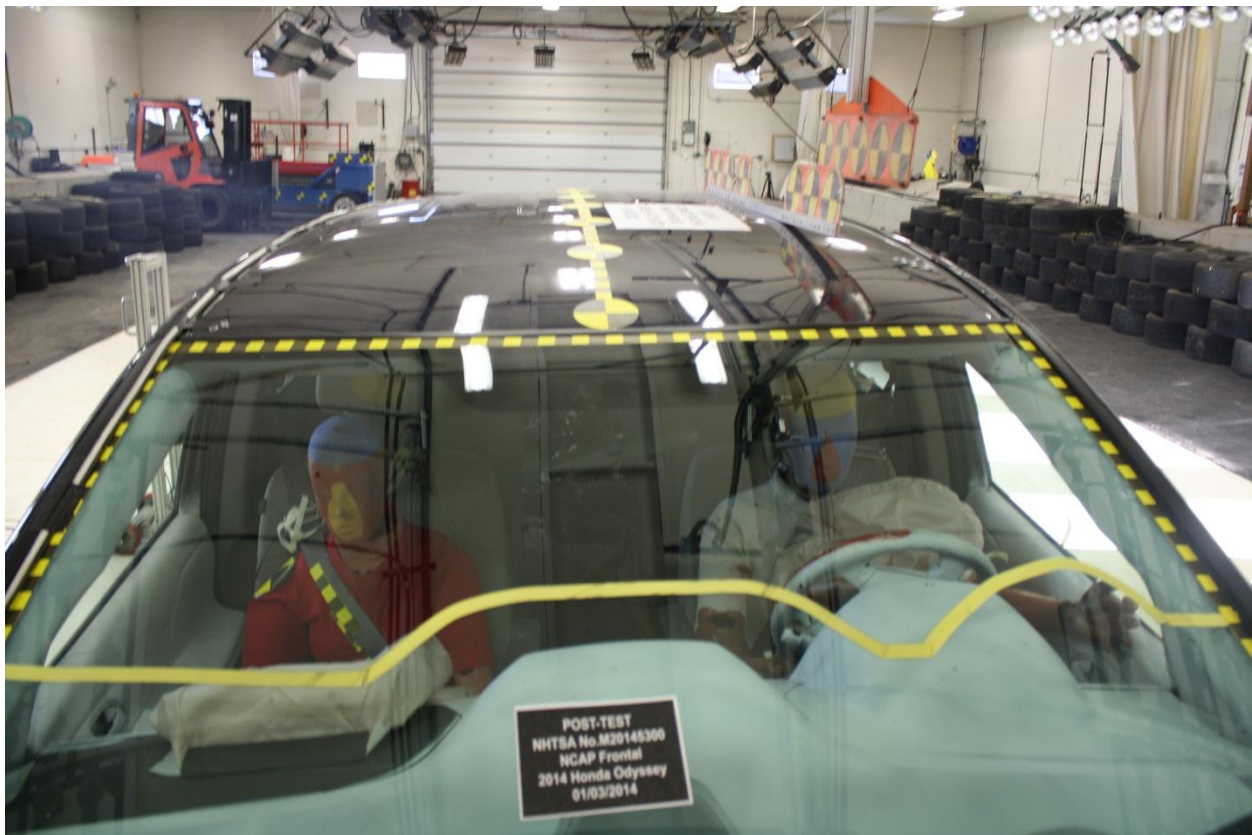


Figure A-18: Post-Test Windshield View



Figure A-19: Pre-Test Engine Compartment View

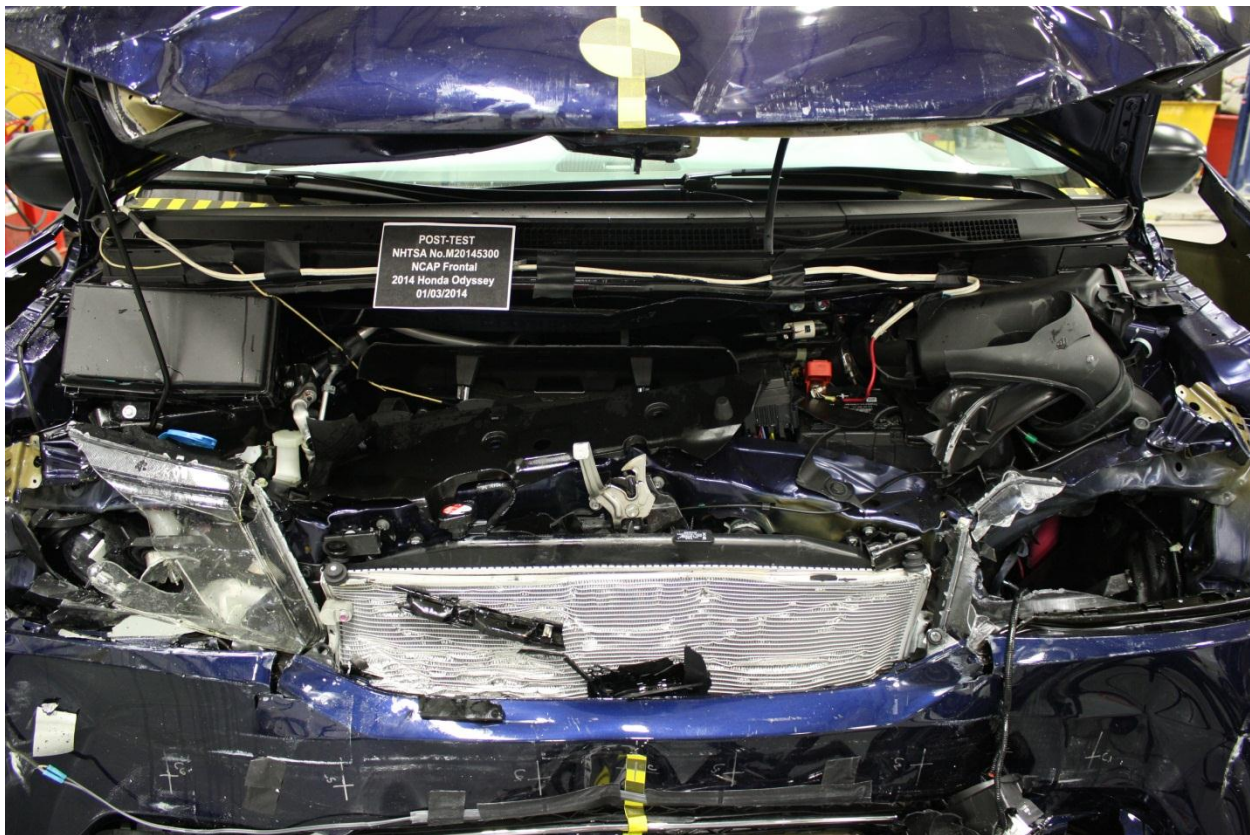


Figure A-20: Post-Test Engine Compartment View



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



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



Figure A-23: Pre-Test Front Underbody View

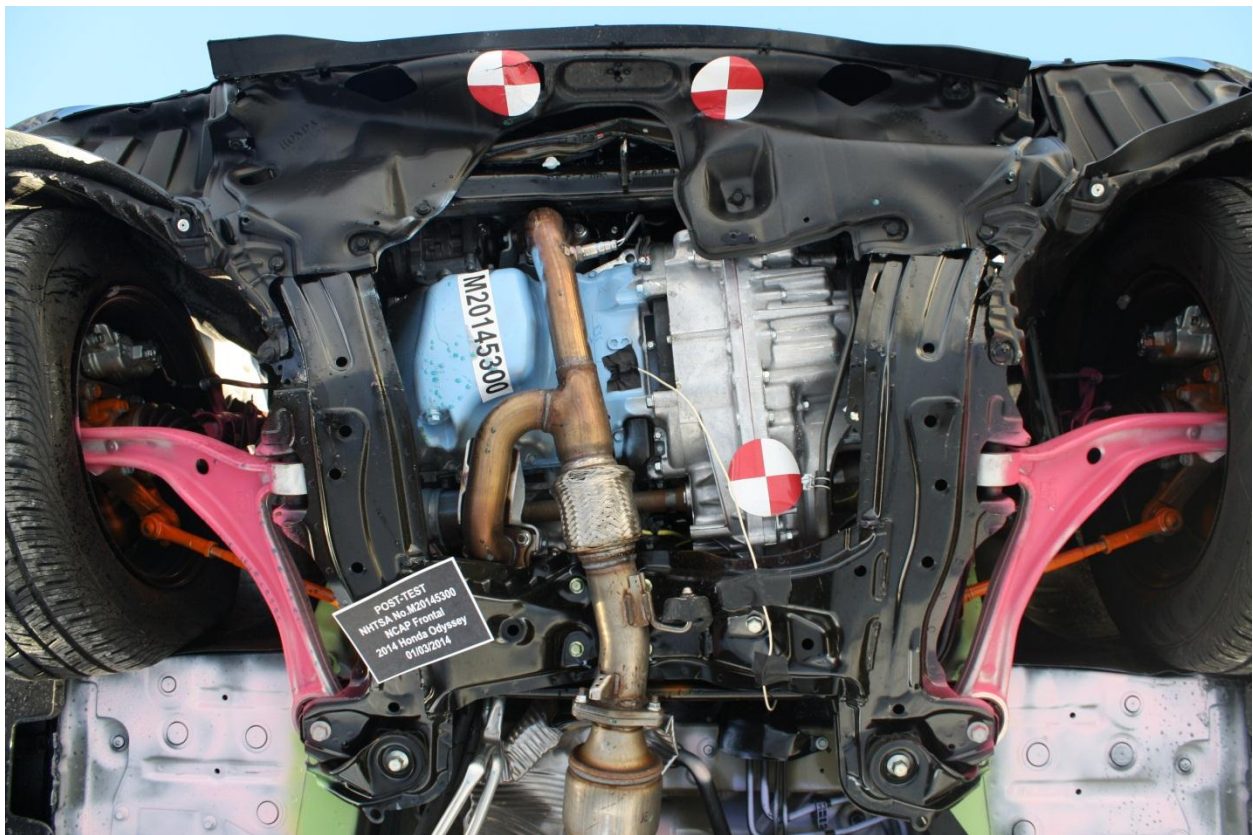


Figure A-24: Post-Test Front Underbody View



Figure A-25: Pre-Test Rear Underbody View



Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing



Figure A-28: Post-Test Dummy Cable Routing



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



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



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



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



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



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

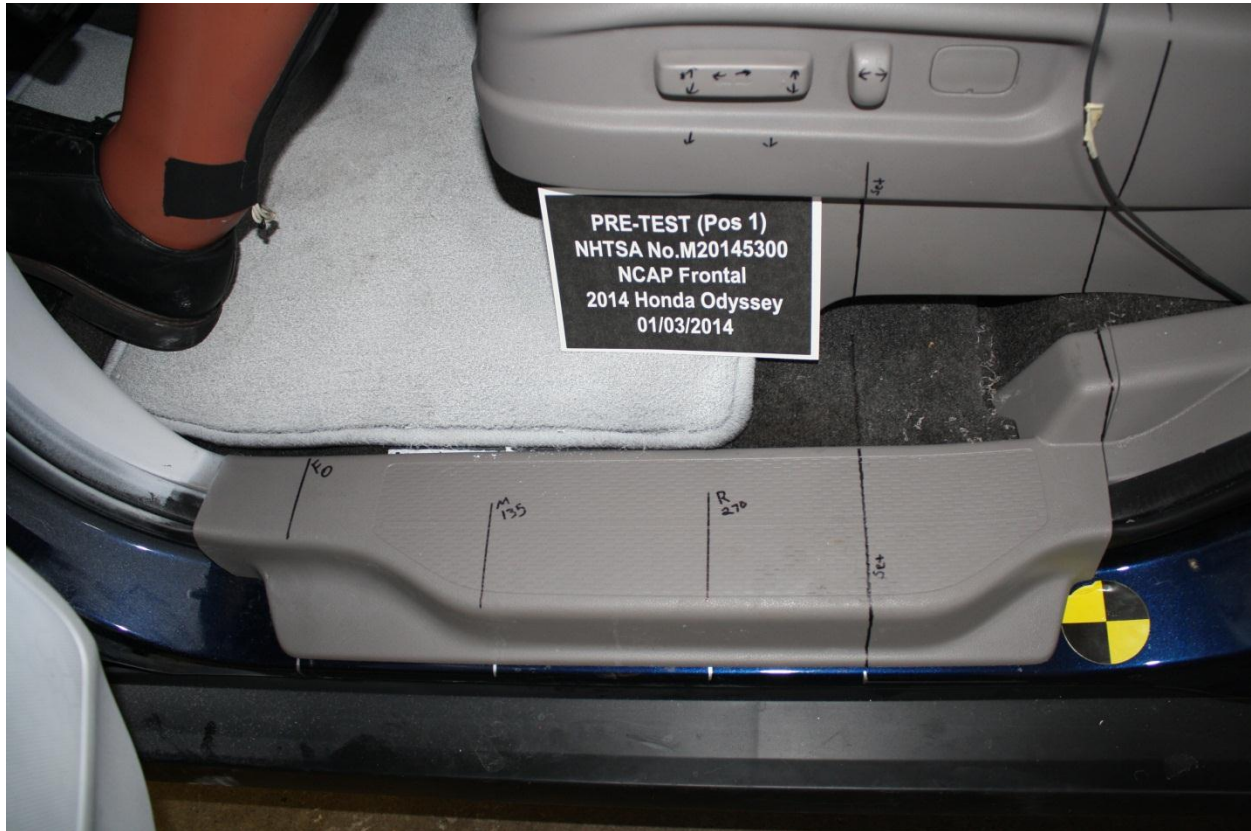


Figure A-35: Pre-Test Driver's Seat Fore-Aft Markings



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



Figure A-37: Pre-Test View of Belt Anchorage for Driver Dummy



Figure A-38: Post-Test View of Belt Anchorage for Driver Dummy



Figure A-39: Pre-Test Driver Dummy Feet



Figure A-40: Post-Test Driver Dummy Feet



Figure A-41: Pre-Test Driver's Side Knee Bolster

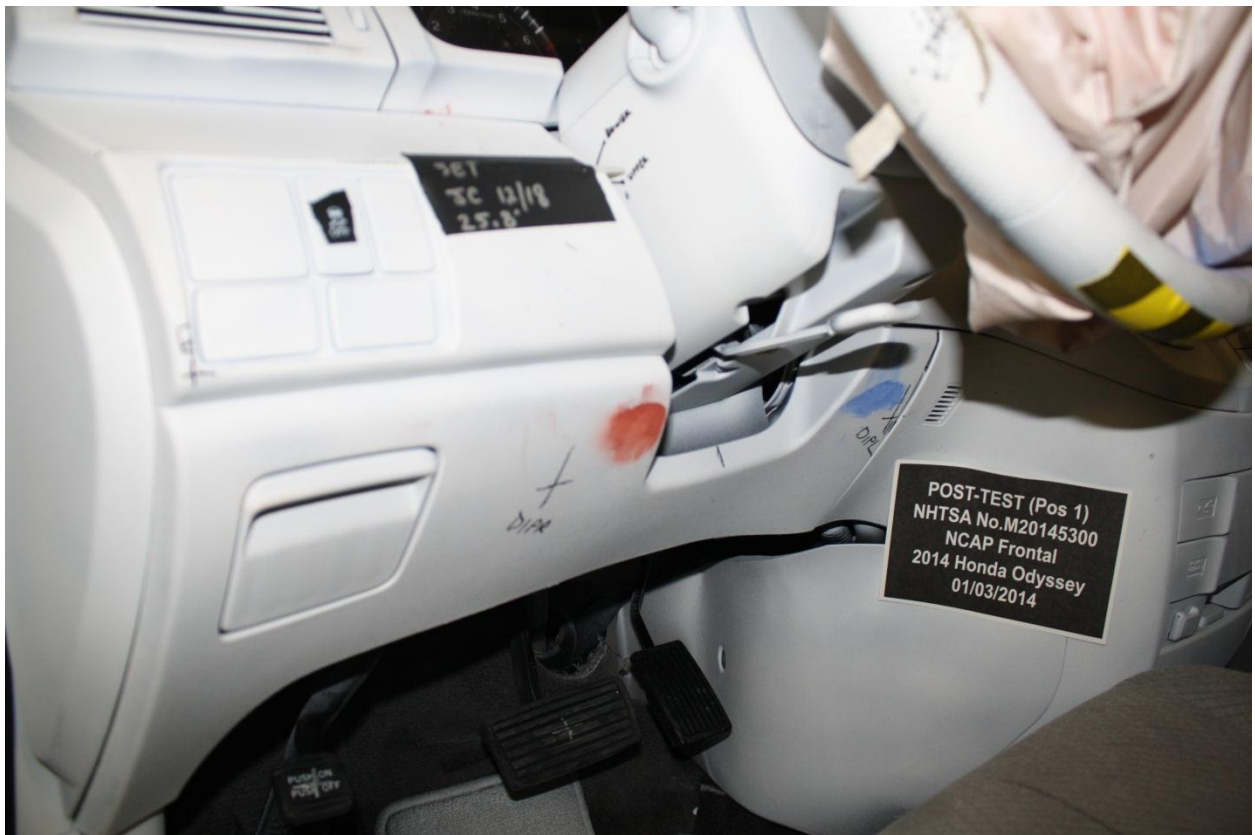


Figure A-42: Post-Test Driver's Side Knee Bolster



Figure A-43: Pre-Test Driver's Side Floorpan



Figure A-44: Post-Test Driver's Side Floorpan

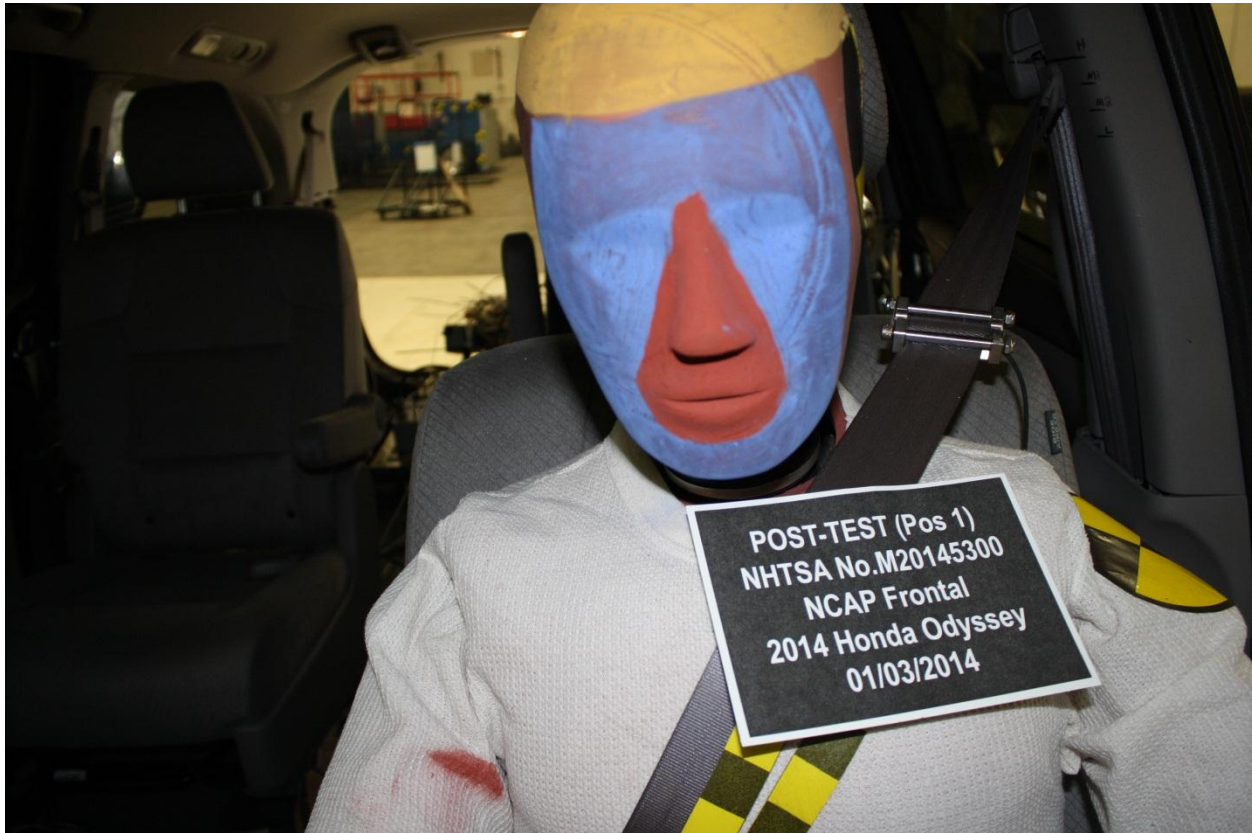


Figure A-45: Post-Test Driver Dummy Face

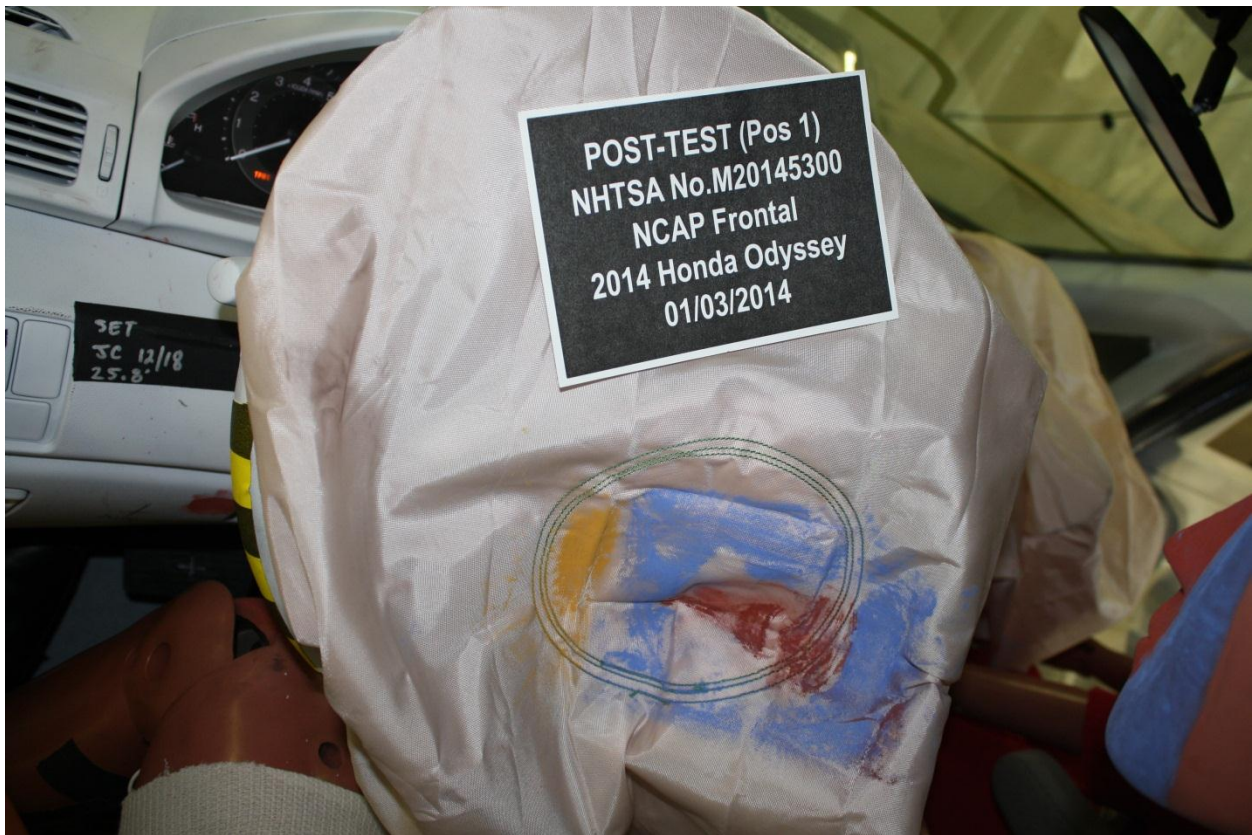


Figure A-46: Post-Test Driver Dummy Contact With Airbag



Figure A-47: Post-Test Driver Dummy Contact With Headrest

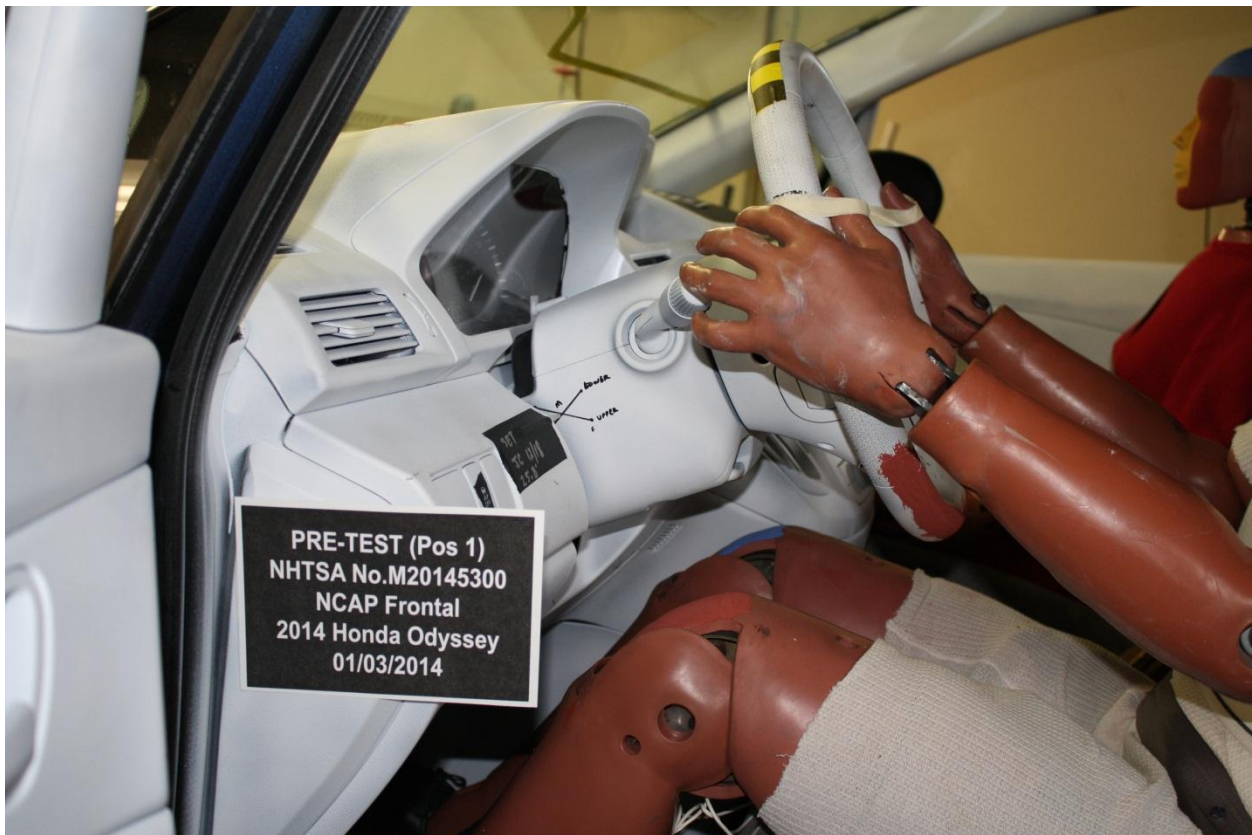


Figure A-48: Pre-Test View of the Steering Wheel



Figure A-49: Post-Test View of the Steering Wheel



Figure A-50: Pre-Test Passenger Dummy Front View

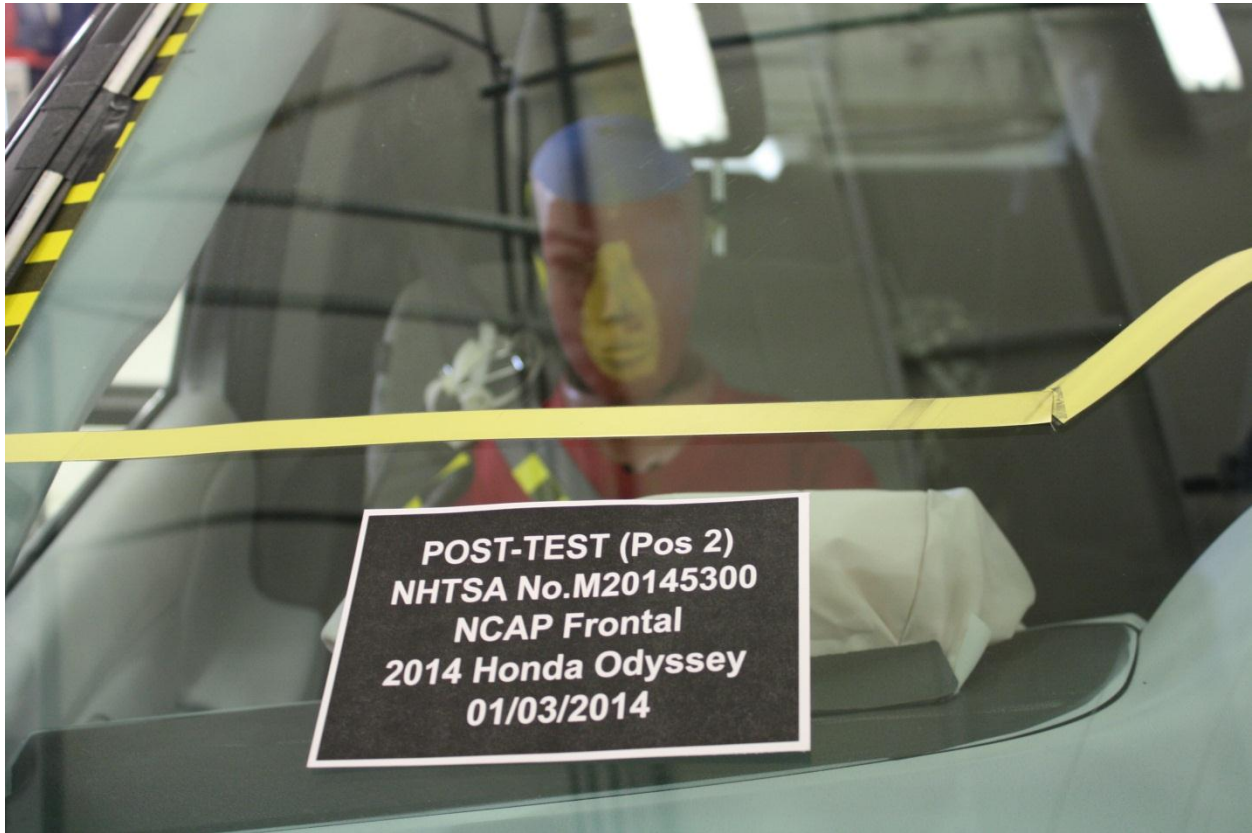


Figure A-51: Post-Test Passenger Dummy Front View



Figure A-52: Pre-Test Passenger Dummy Window View



Figure A-53: Post-Test Passenger Dummy Window View



Figure A-54: Pre-Test Passenger Dummy and Vehicle Interior View



Figure A-55: Post-Test Passenger Dummy and Vehicle Interior View



Figure A-56: Pre-Test Passenger's Seat Fore-Aft Markings

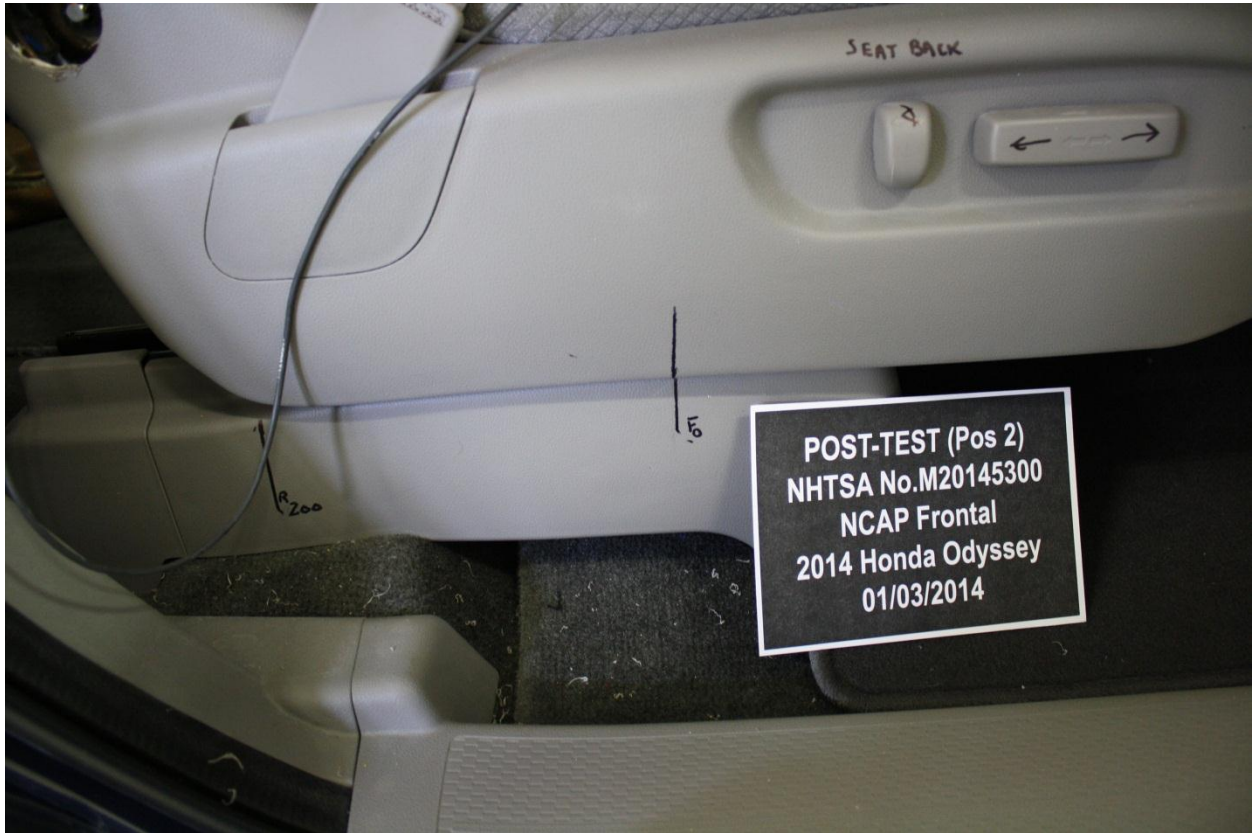


Figure A-57: Post-Test Passenger's Seat Fore-Aft Markings



Figure A-58: Pre-Test View of Belt Anchorage for Passenger Dummy



Figure A-59: Post-Test View of Belt Anchorage for Passenger Dummy



Figure A-60: Pre-Test Passenger Dummy Feet



Figure A-61: Post-Test Passenger Dummy Feet



Figure A-62: Pre-Test Passenger's Side Knee Bolster



Figure A-63: Post-Test Passenger's Side Knee Bolster



Figure A-64: Pre-Test Passenger's Side Floorpan



Figure A-65: Post-Test Passenger's Side Floorpan



Figure A-66: Post-Test Passenger Dummy Face

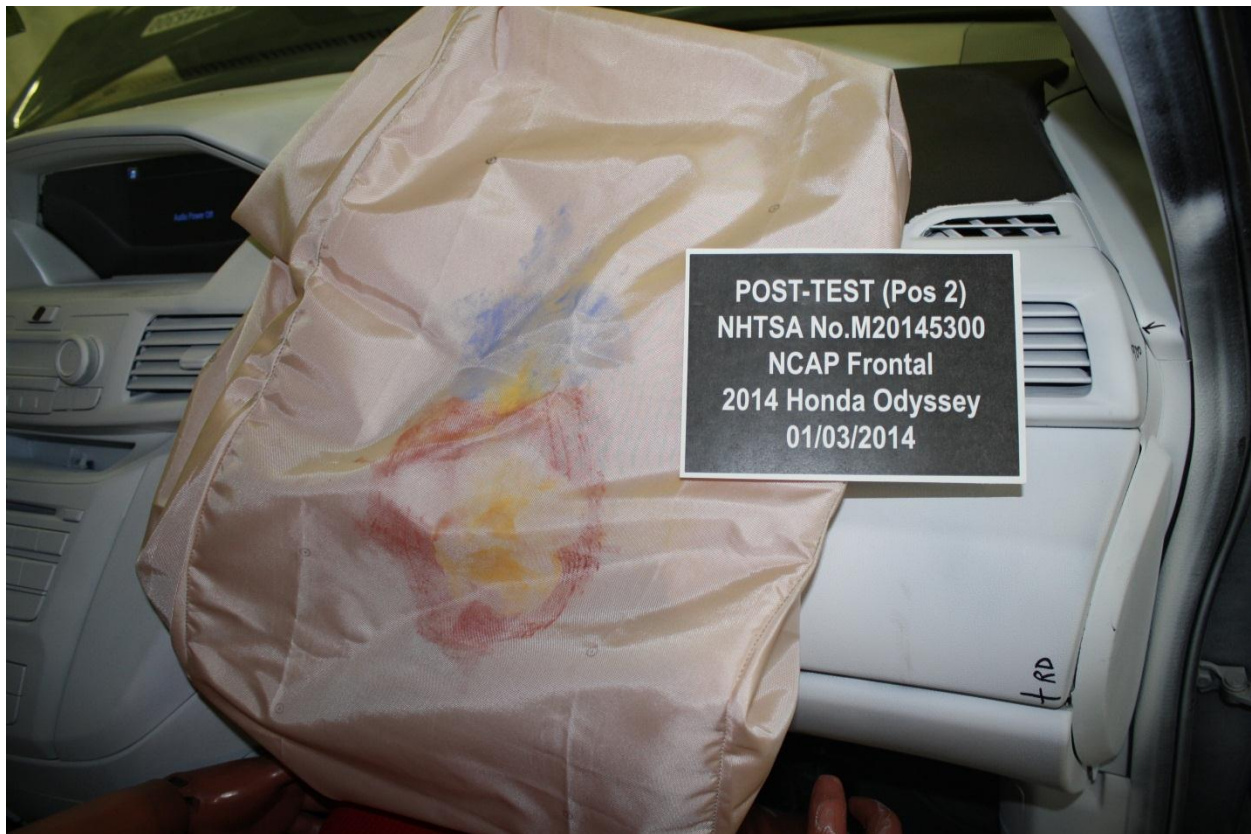


Figure A-67: Post-Test Passenger Dummy Contact With Airbag



Figure A-68: Post-Test Passenger Dummy Contact With Headrest



Figure A-69: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

Figure A-70: Post-Test Stoddard Solvent Spillage Location View, If Required



Figure A-71: Post-Test Speed Trap Read-Out



Figure A-72: Vehicle at 0° on Static Rollover Device



Figure A-73: Vehicle at 90° on Static Rollover Device



Figure A-74: Vehicle at 180° on Static Rollover Device

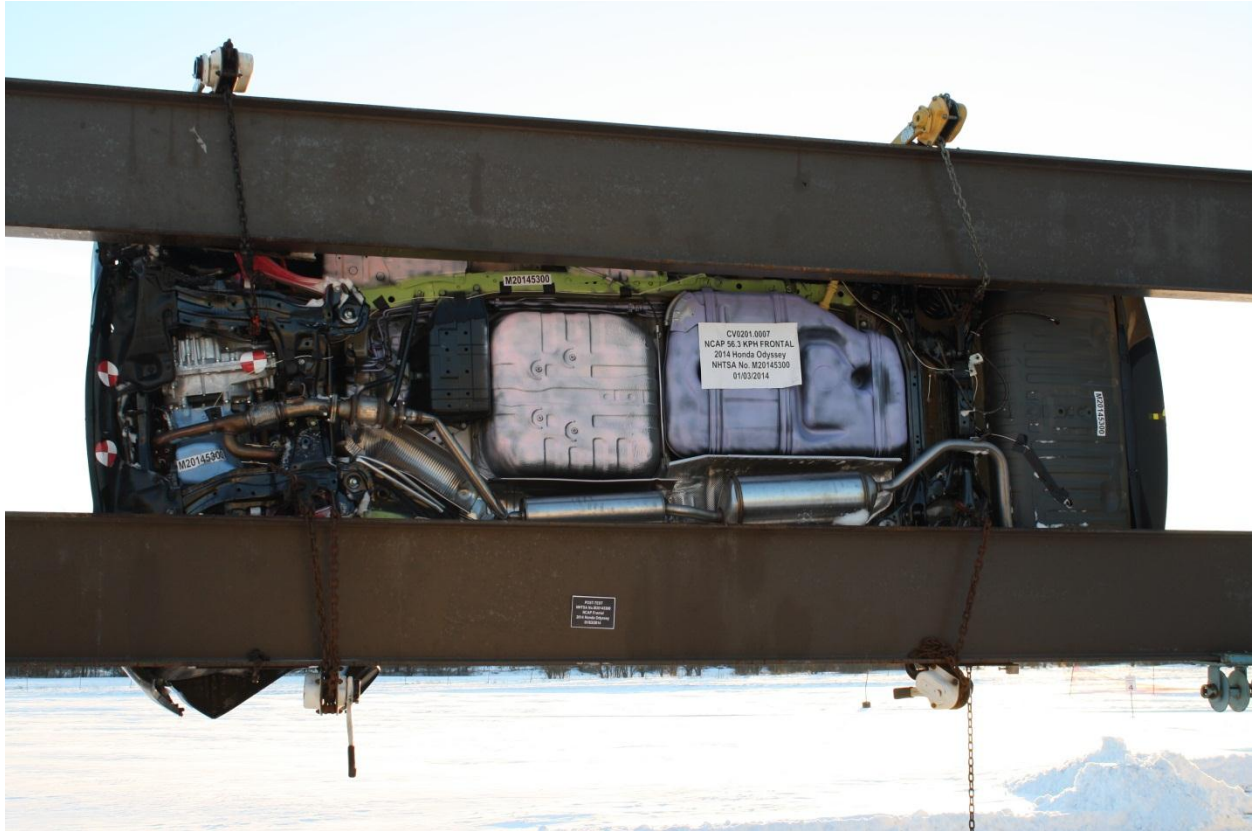


Figure A-75: Vehicle at 270° on Static Rollover Device



Figure A-76: Vehicle at 360° on Static Rollover Device



Figure A-77: 2014 Honda Odyssey Frontal Impact Event

HONDA		2014 ODYSSEY 5DR LX EXT: OBSIDIAN BLUE P. ENGINE NUMBER: J3528-4051482 INT: GRAY		EPA DOT Fuel Economy and Environment Gasoline Vehicle	
STANDARD EQUIPMENT AT NO EXTRA COST TECHNICAL FEATURES* • 248hp 3.5-Liter SOHC 24-Valve i-VTEC V6 Engine with Variable Cylinder Management (VCM) • 6-Speed Automatic Transmission with Grade Logic Control • 4-Wheel Disc Brakes • Front MacPherson Strut Suspension • Rear Double-Wishbone Suspension • Variable-Assist Rack-and-Pinion Power Steering SAFETY FEATURES* • Driver's and Front Passenger's Dual-Stage Airbags (SRS) • Driver's and Front Passenger's Side Airbags w/ SmartVent • Side Curtain Airbags with Rollover Sensor • Active Front Head Restraints • Vehicle Stability Assist (VSA) • Anti-Lock Braking System (ABS) • Brake Assist • Electronic Brake Distribution (EBD) • Tire Pressure Monitoring System • ACE Body Structure • Daytime Running Lights (DRL) • LATCH System for Child Seats		MANUFACTURER'S SUGGESTED RETAIL PRICE \$28,825.00 Full Tank of Fuel No Charge		Fuel Economy 22 MPG combined city/hwy 19 city 28 highway 4.5 gallons per 100 miles Minivans range from 19 to 24 MPG. The best vehicle rates 121 MPG.	
INTERIOR FEATURES* • AM/FM/CD Audio System w/ 7 Speakers incl. MP3/WMA Playback • Bluetooth HandsFreeLink • Bluetooth Audio • USB Audio Interface • Pandora Internet Radio Interface • SMS Text Messaging Functionality • MP3/Auxiliary Input Jack • Display (i-MID) w/ Rearview Camera • Steering Wheel-Mounted Controls • Tilt & Telescopic Steering Column • Front and Rear Air Conditioning • Driver's 8-Way Power Seat • Front Passenger's 4-Way Power Seat • One-Motion 60/40 Split Folding 3rd-Row Magic Seat • Two-Row Power Windows • Front Auto Up/Down Windows • Power Door and Tailgate Locks • Sunrings Holder • 12-Volt Power Outlets • Floor Mats • Maintenance Minder System		KEY STANDARD FEATURES • Rearview Camera • Bluetooth HandsFreeLink • USB Audio Interface • Side Curtain Airbags with Rollover Sensor		You spend \$500 in fuel costs over 5 years compared to the average new vehicle.	
EXTERIOR FEATURES* • 17" x 7.0" Steel Wheels with Full Wheel Covers • 235/65 R17 All-Season Tires • Dual Sliding Doors • Power Door Mirrors • Expanded View Driver's Mirror • Remote Entry System		Destination and Handling 830.00 TOTAL VEHICLE PRICE (includes Pre-Delivery Service) \$29,655.00 License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.		Annual fuel cost \$2,400 Fuel Economy & Greenhouse Gas Rating (tailpipe only) Smog Rating (tailpipe only) 1 5 10 Best This vehicle emits 402 grams CO ₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions; learn more at fueleconomy.gov.	
LIAM HONDA 4891 TRANSIT ROAD WILLIAMSVILLE, NY 14221 PORT OF ENTRY: ALABAMA DELIVERY POINT: WINDSOR LOCK SHIP#: ROW/SPACE: 736-014 TRANS.METHOD: M02 MARYSVILLE I/B VIN: 5FNRL5H2XEB043058		ORIG. DLR: 207494 REF. NO.: 40484 HN CODE: HN-4940 EMISSION: 50 STATE CONTROL. NO: 963554 DEALER: 207494		fueleconomy.gov Calculate personalized estimates and compare vehicles	
PARTS CONTENT INFORMATION FOR VEHICLES IN THIS CARLINE U.S./Canadian Parts Content: 75 % NOTE: Parts content does not include final assembly, distribution or other non-parts costs.		GOVERNMENT 5-STAR SAFETY RATING Overall Vehicle Score Not Rated Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.		Star Ratings range from 1 to 5 stars (****) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA) www.safercar.gov or 1-888-327-4236	
FOR THIS VEHICLE Final Assembly Point: LINCOLN, ALABAMA USA Country of Origin: Engine: U.S.A. Transmission: U.S.A.					

Figure A-78: Monroney Label Photograph

APPENDIX B
DUMMY RESPONSE DATA TRACES

TABLE OF DATA PLOTS

Driver & Passenger Dummy Instrumentation Plots

Fig.	Description	Page
1	Driver Head X Acceleration vs. Time Primary	B-5
2	Driver Head Y Acceleration vs. Time Primary	B-5
3	Driver Head Z Acceleration vs. Time Primary	B-5
4	Driver Head Resultant Acceleration vs. Time Primary	B-5
5	Driver Chest X Deflection vs. Time	B-6
6	Driver Chest X Acceleration vs. Time Primary	B-6
7	Driver Chest Y Acceleration vs. Time Primary	B-6
8	Driver Chest Z Acceleration vs. Time Primary	B-6
9	Driver Chest Resultant Acceleration vs. Time Primary	B-7
10	Driver Upper Neck Force X vs. Time Primary	B-7
11	Driver Upper Neck Force Z vs. Time Primary	B-7
12	Driver Upper Neck Moment Y vs. Time Primary	B-7
13	Driver Nij vs. Time Primary	B-8
14	Driver Left Femur Force vs. Time	B-8
15	Driver Right Femur Force vs. Time	B-8
16	Passenger Head X Acceleration vs. Time Primary	B-8
17	Passenger Head Y Acceleration vs. Time Primary	B-9
18	Passenger Head Z Acceleration vs. Time Primary	B-9
19	Passenger Head Resultant Acceleration vs. Time Primary	B-9
20	Passenger Chest X Deflection vs. Time	B-9
21	Passenger Chest X Acceleration vs. Time Primary	B-10
22	Passenger Chest Y Acceleration vs. Time Primary	B-10
23	Passenger Chest Z Acceleration vs. Time Primary	B-10
24	Passenger Chest Resultant Acceleration vs. Time Primary	B-10
25	Passenger Upper Neck Force X vs. Time Primary	B-11
26	Passenger Upper Neck Force Z vs. Time Primary	B-11
27	Passenger Upper Neck Moment Y vs. Time Primary	B-11
28	Passenger Nij vs. Time Primary	B-11
29	Passenger Left Femur Force vs. Time	B-12
30	Passenger Right Femur Force vs. Time	B-12

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

Additional Driver Dummy Instrumentation Data

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 Left Femur Redundant
Driver Right Femur Redundant
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
Driver Shoulder Belt Force
Driver Lap Belt Force

Additional Passenger Dummy Instrumentation Data

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

Additional Passenger Dummy Instrumentation Data ... (continued)

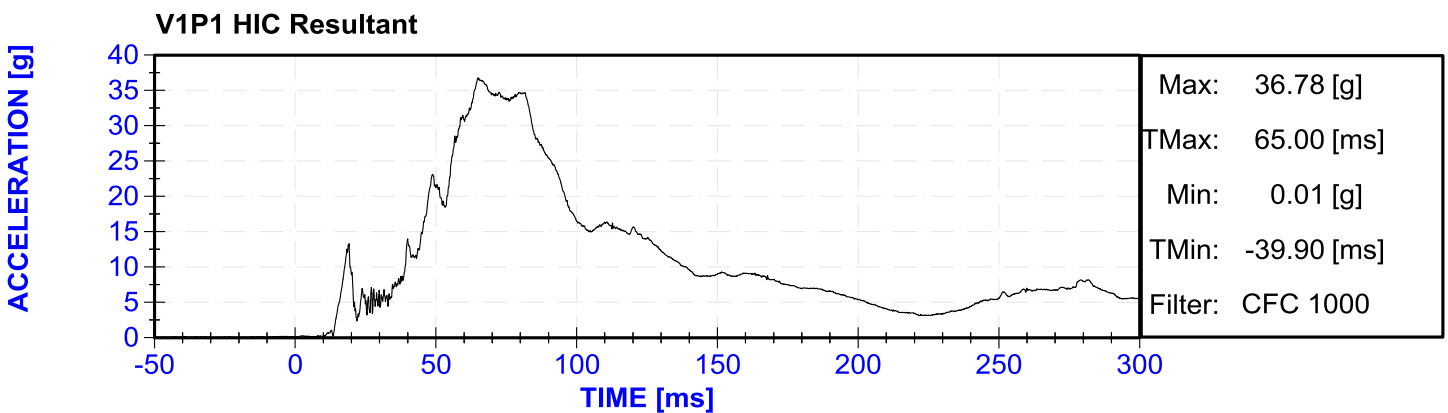
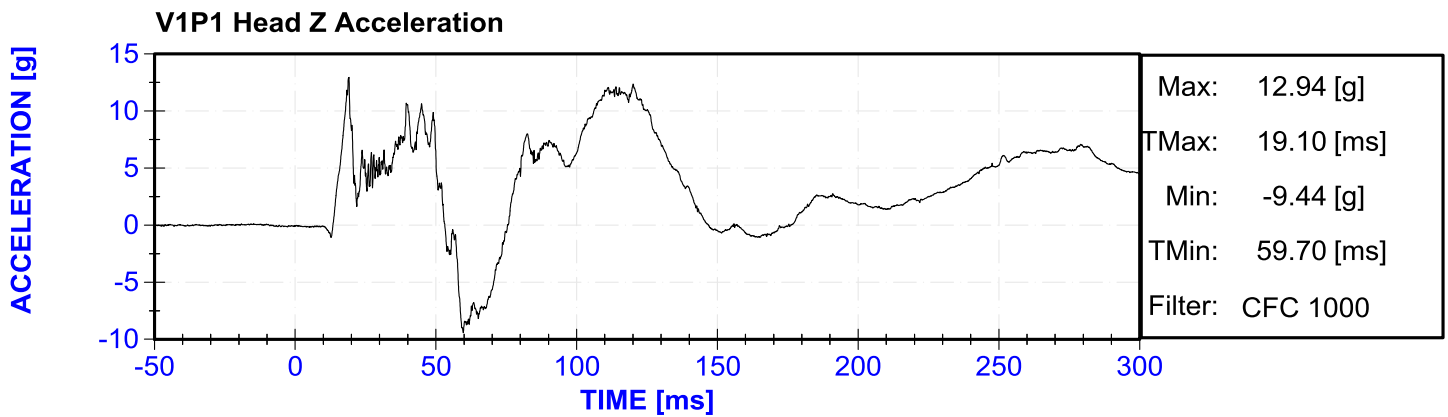
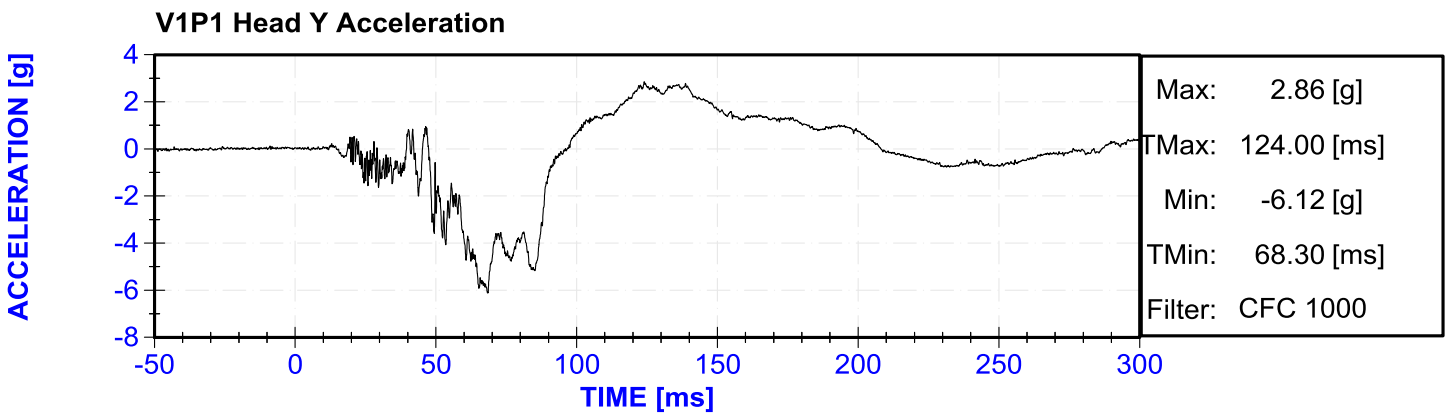
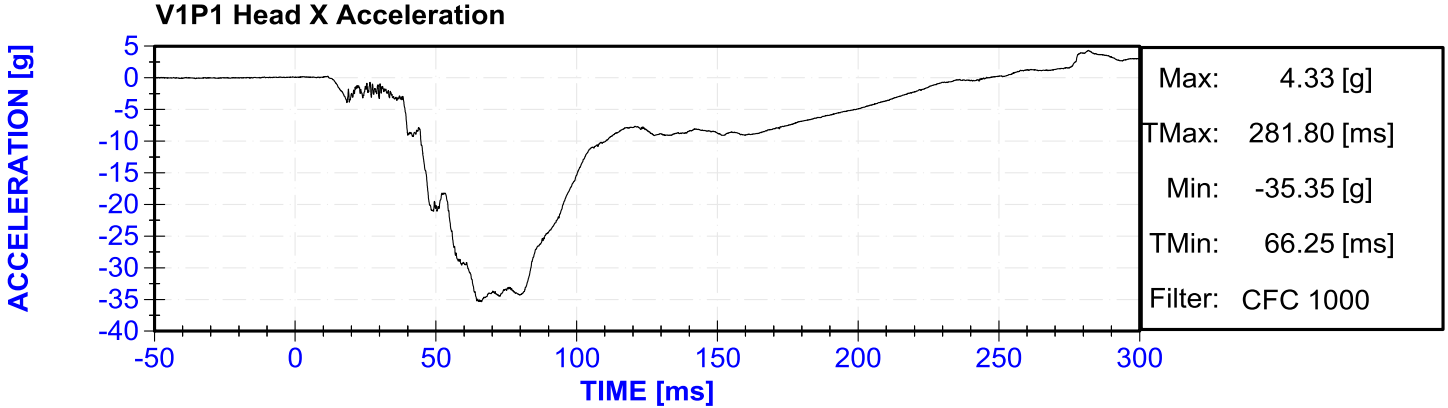
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Passenger Pelvis Z
Passenger Left Femur Redundant
Passenger Right Femur Redundant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia 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
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Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z
Passenger Shoulder Belt Force
Passenger Lap Belt Force

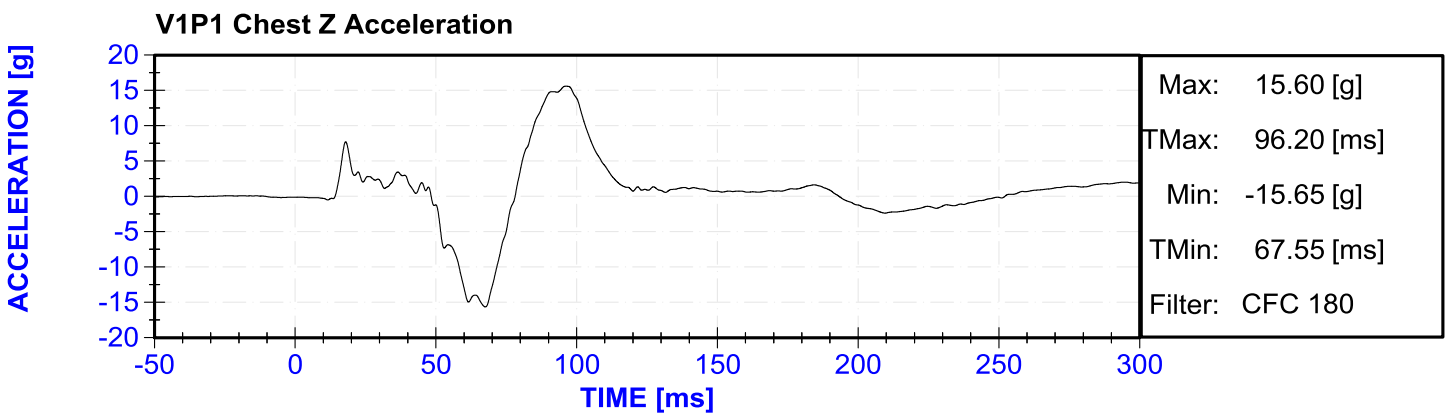
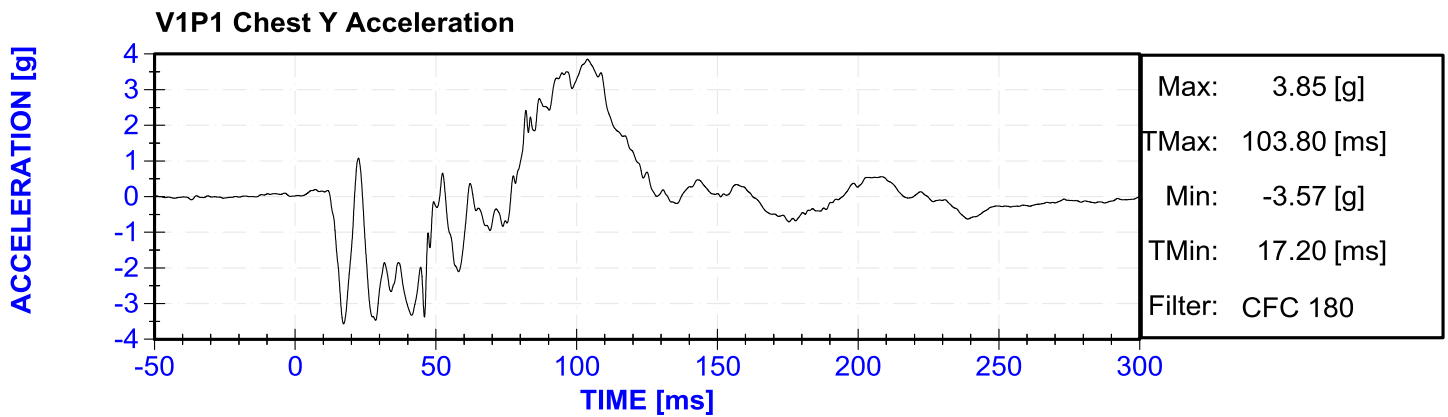
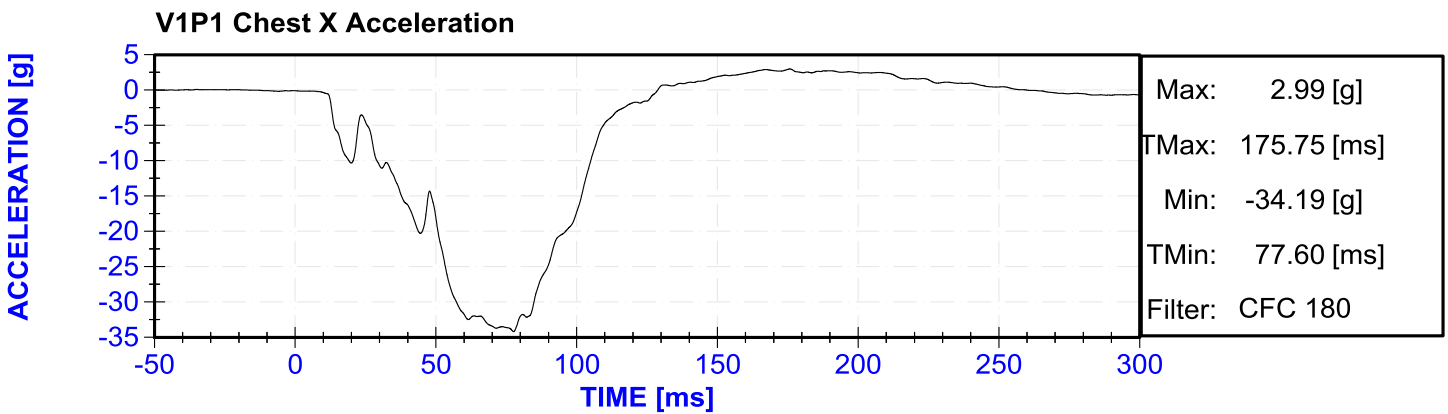
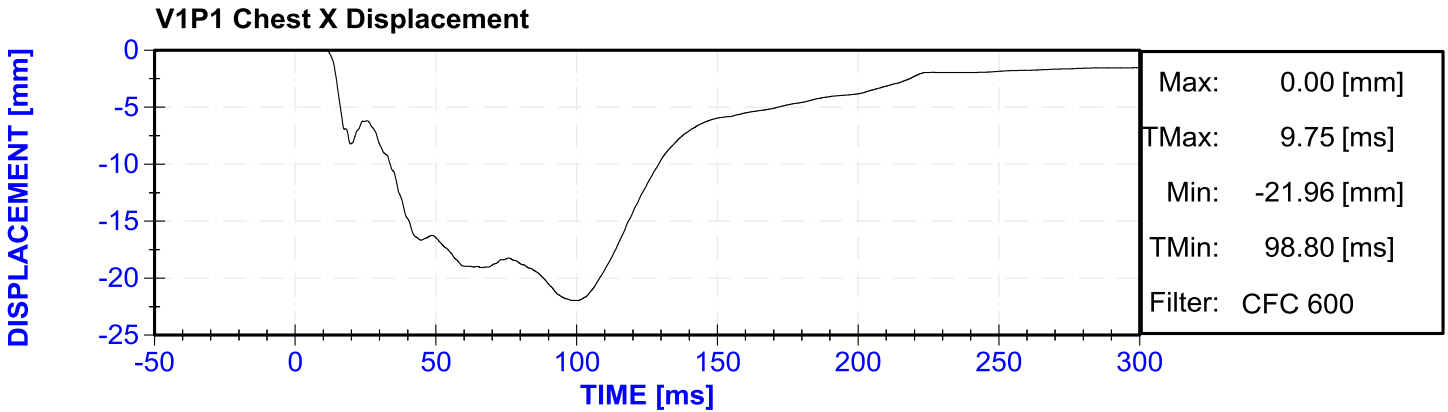
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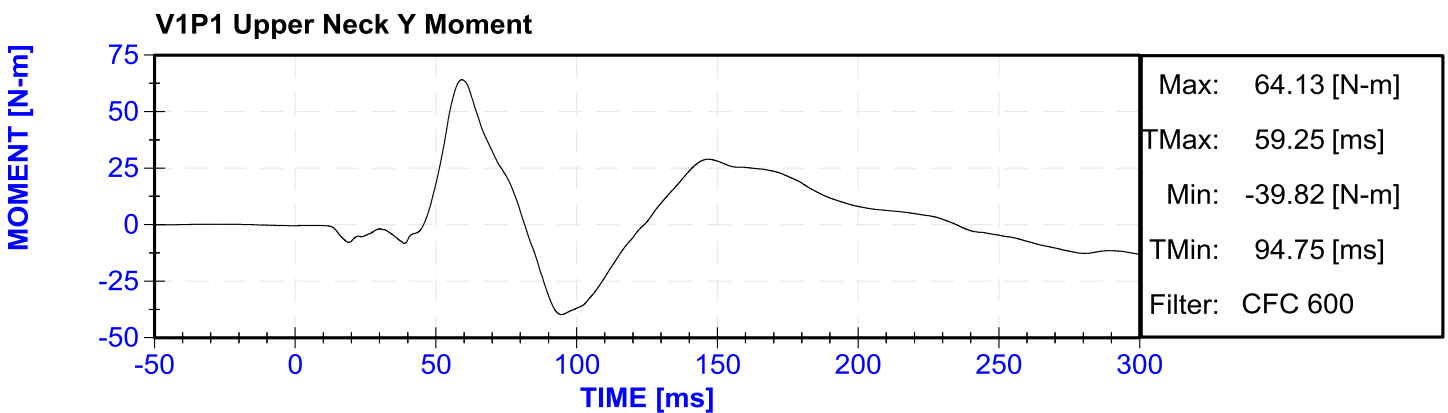
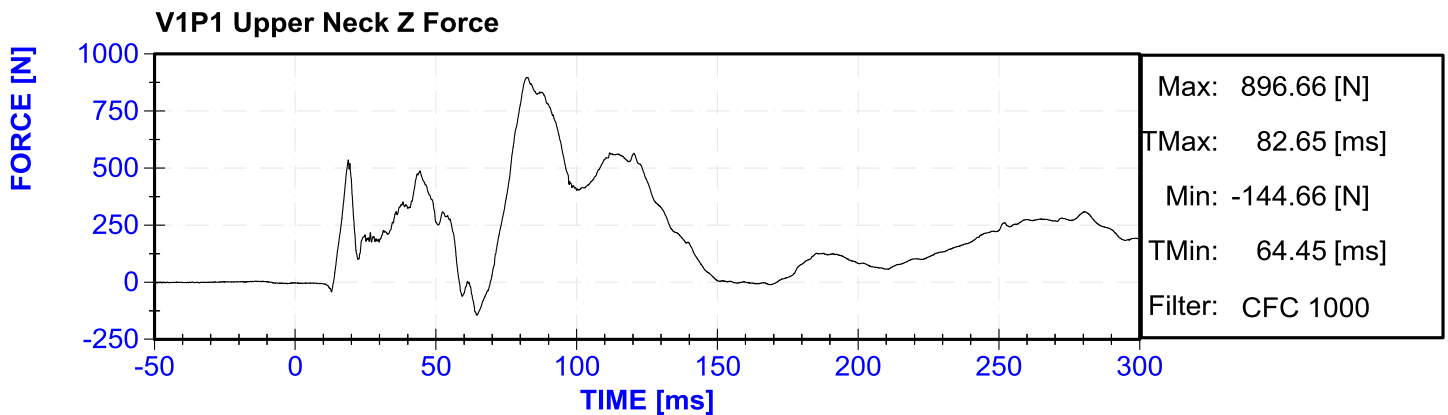
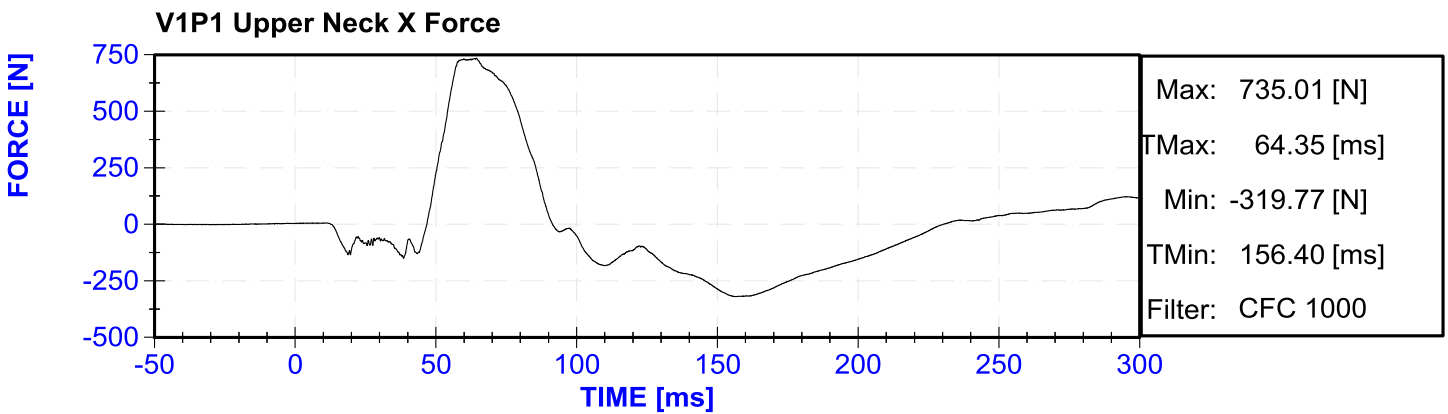
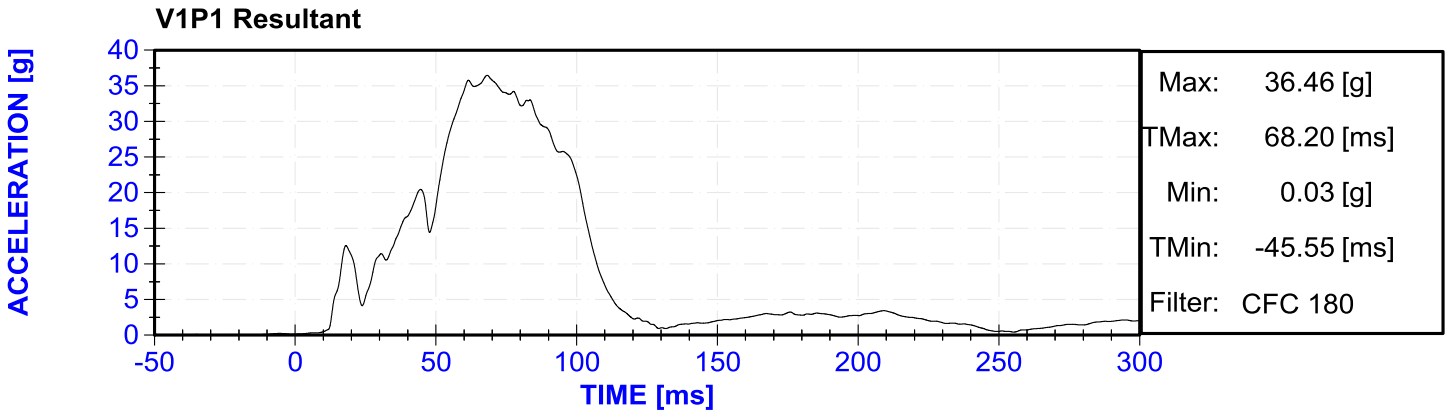
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Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
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Left Rear Seat Crossmember X Redundant
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Vehicle Engine Top X
Vehicle Engine Bottom X

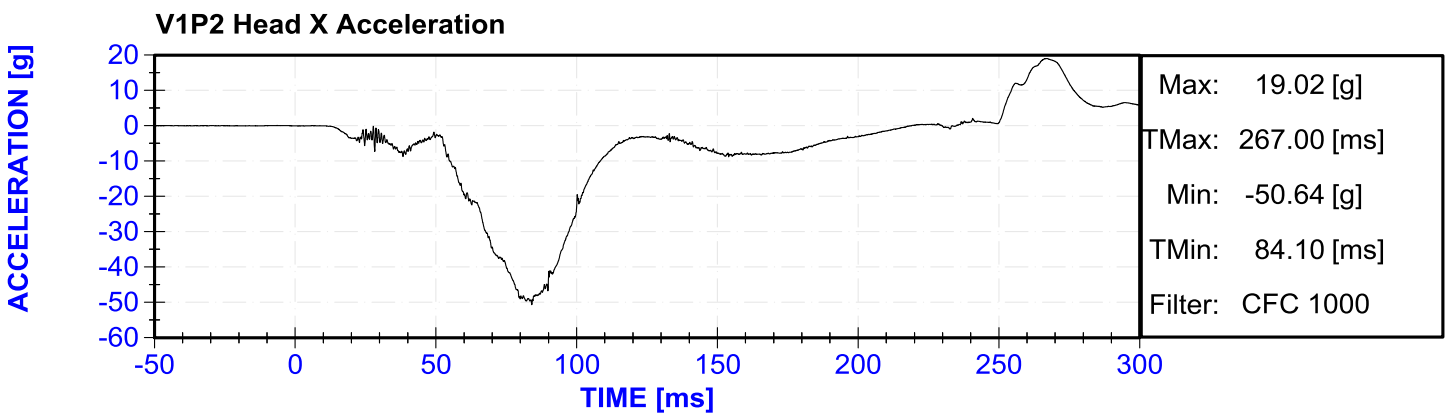
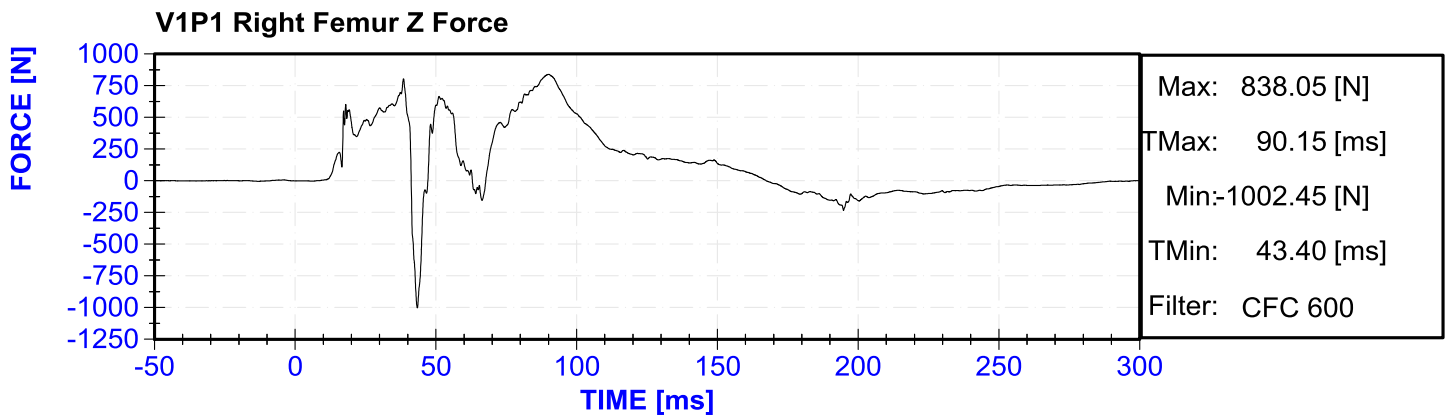
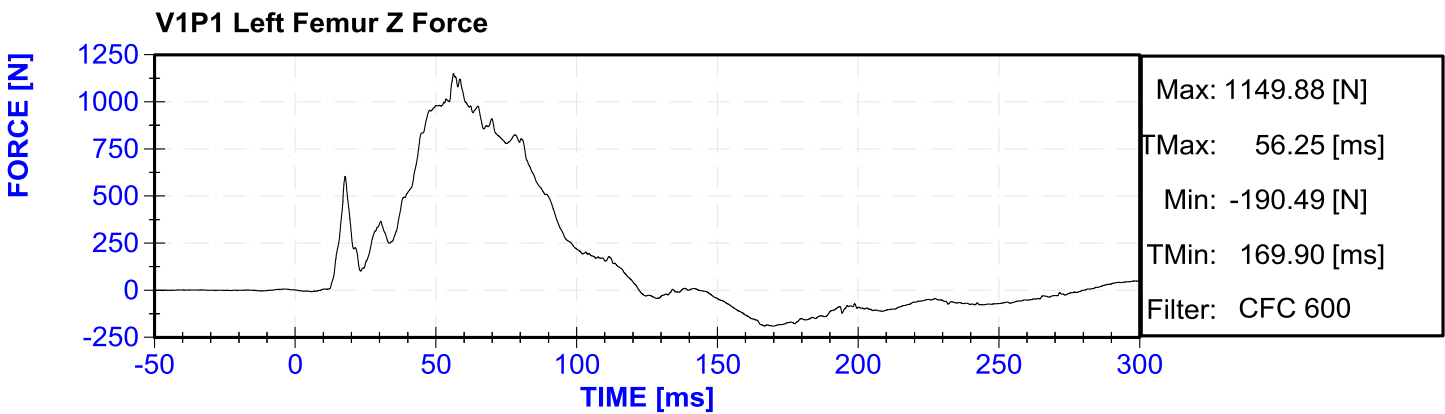
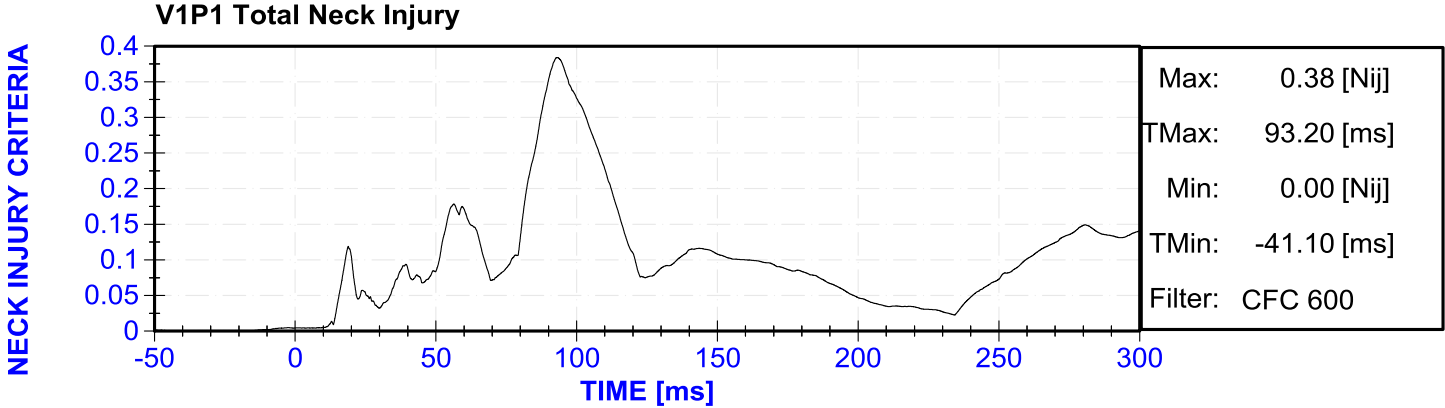
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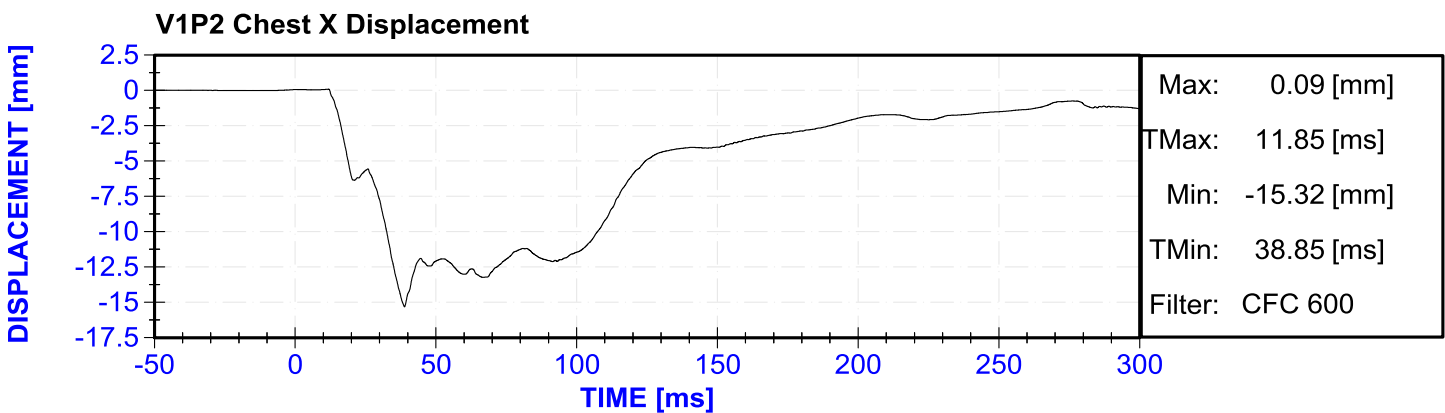
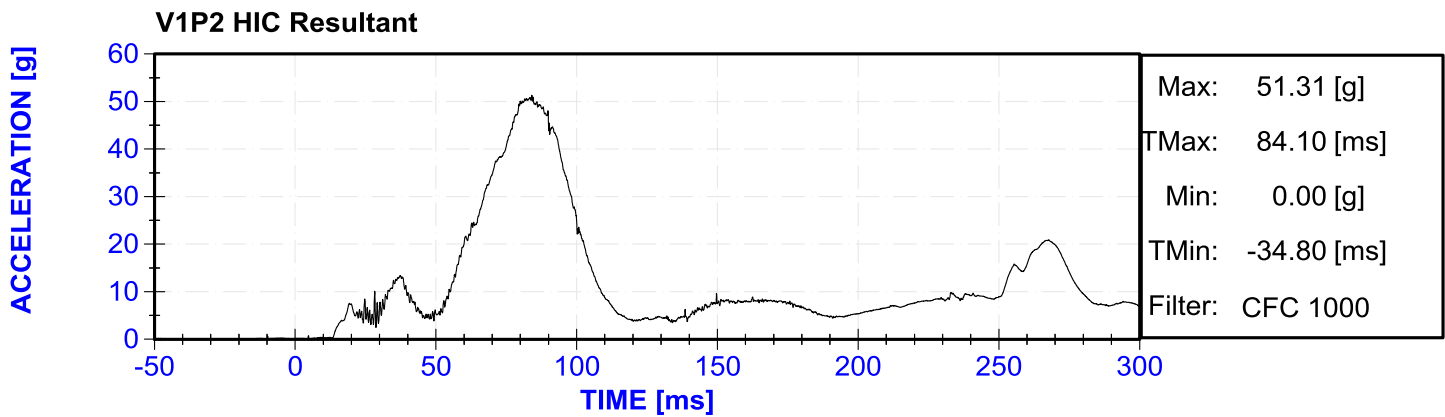
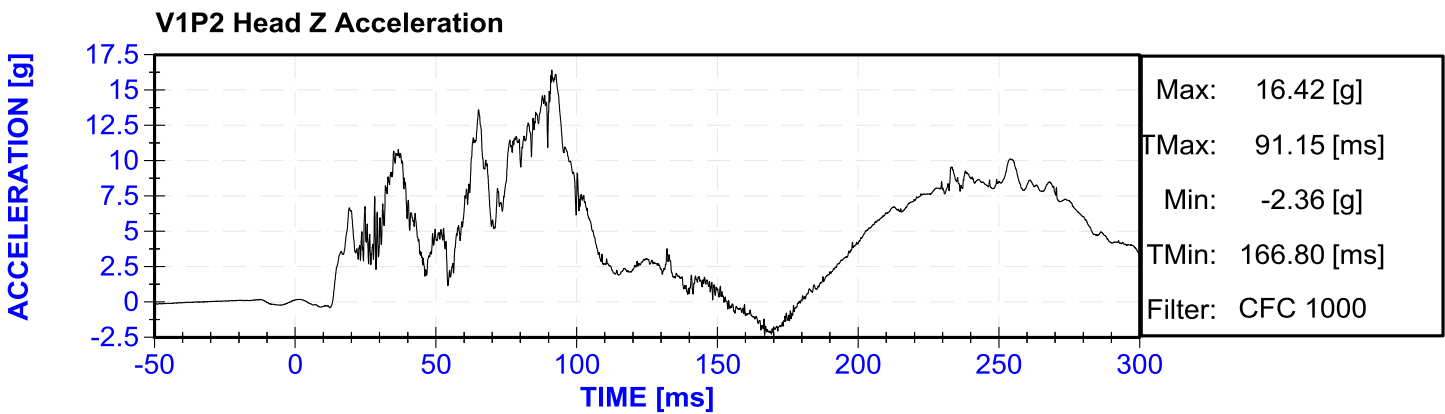
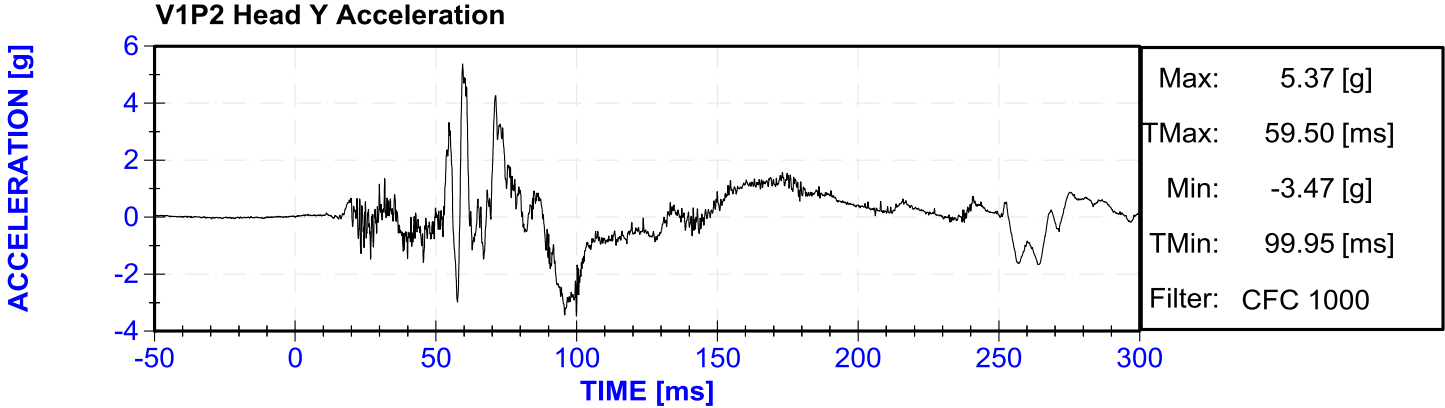
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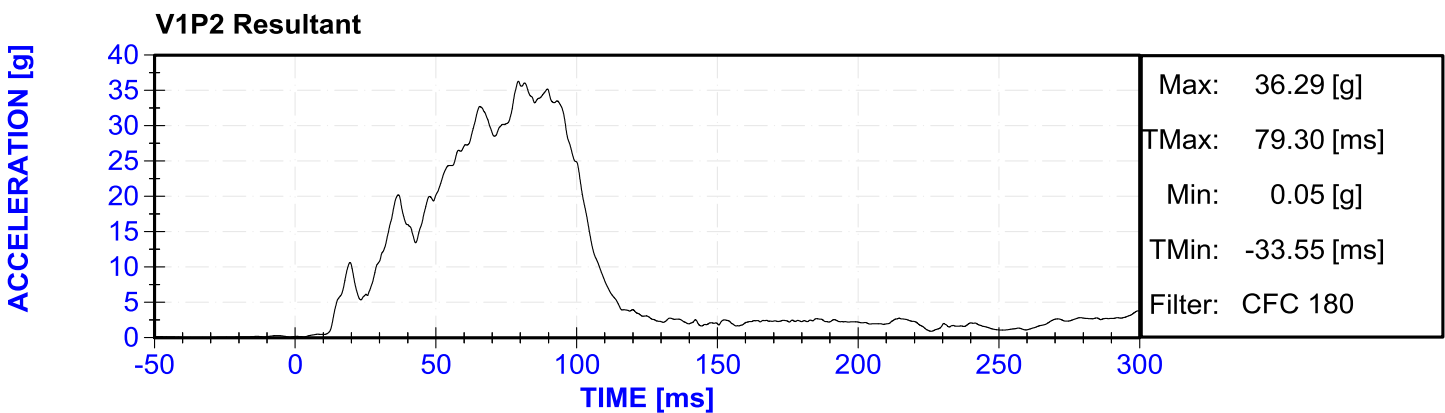
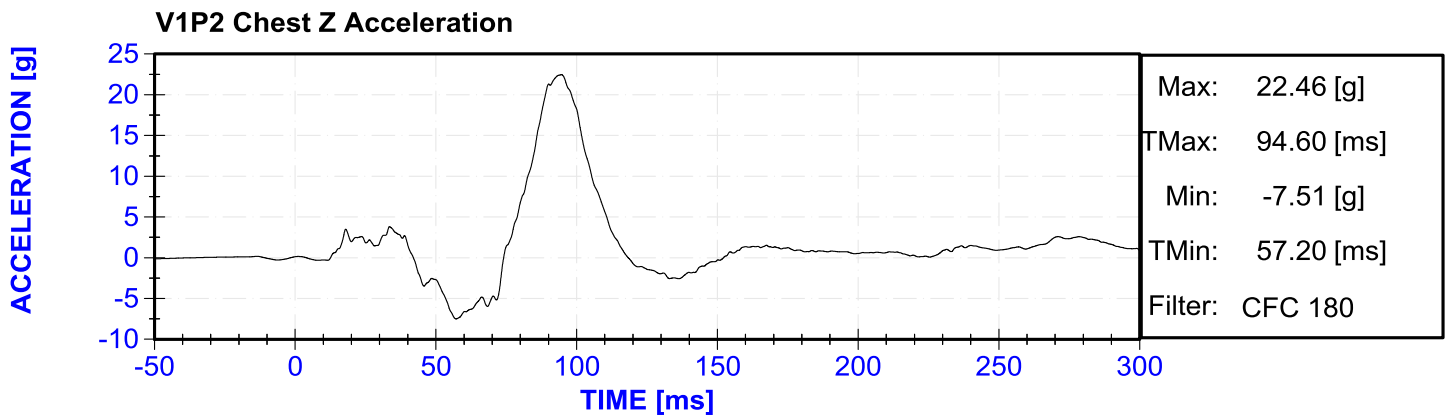
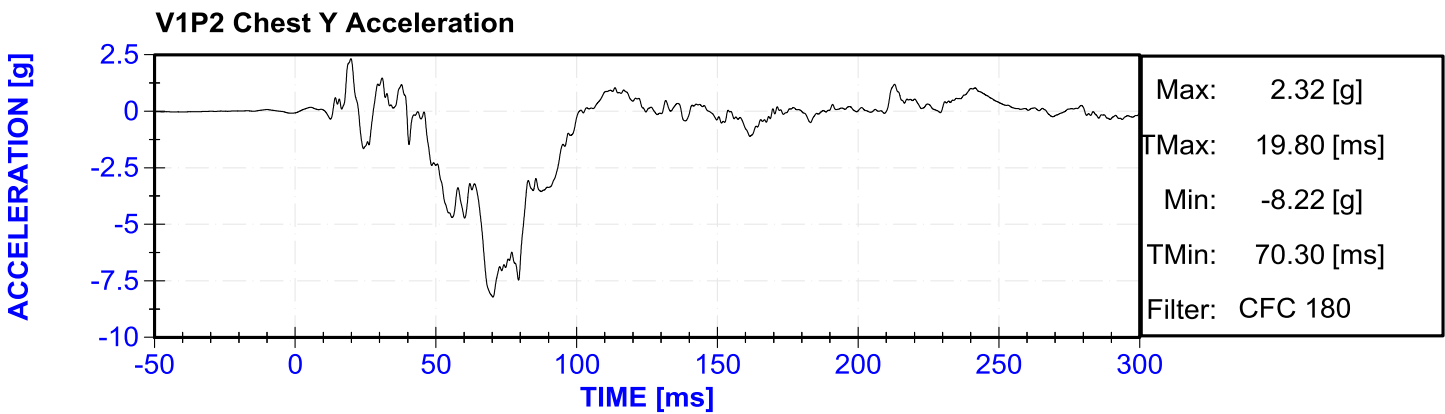
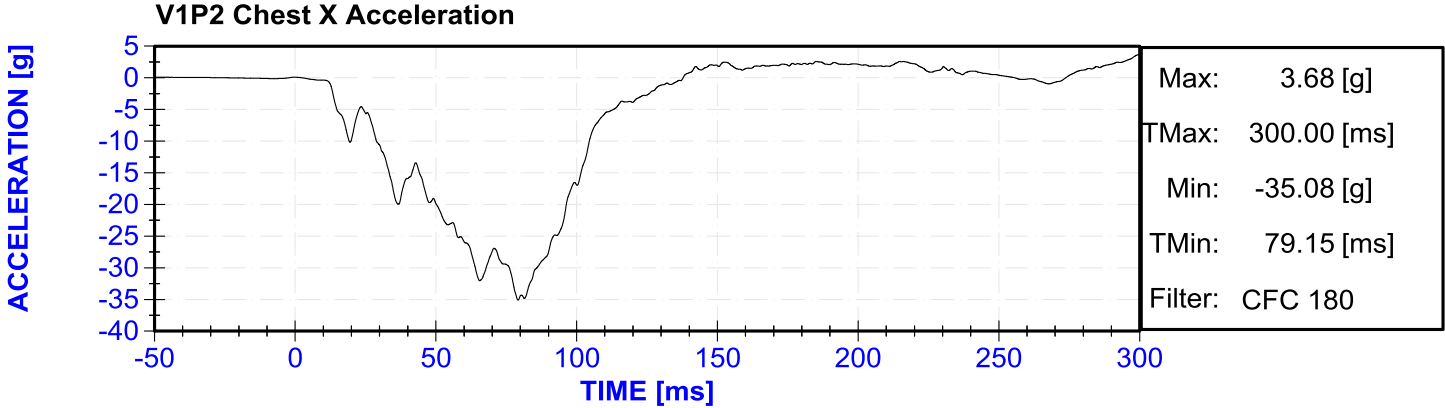


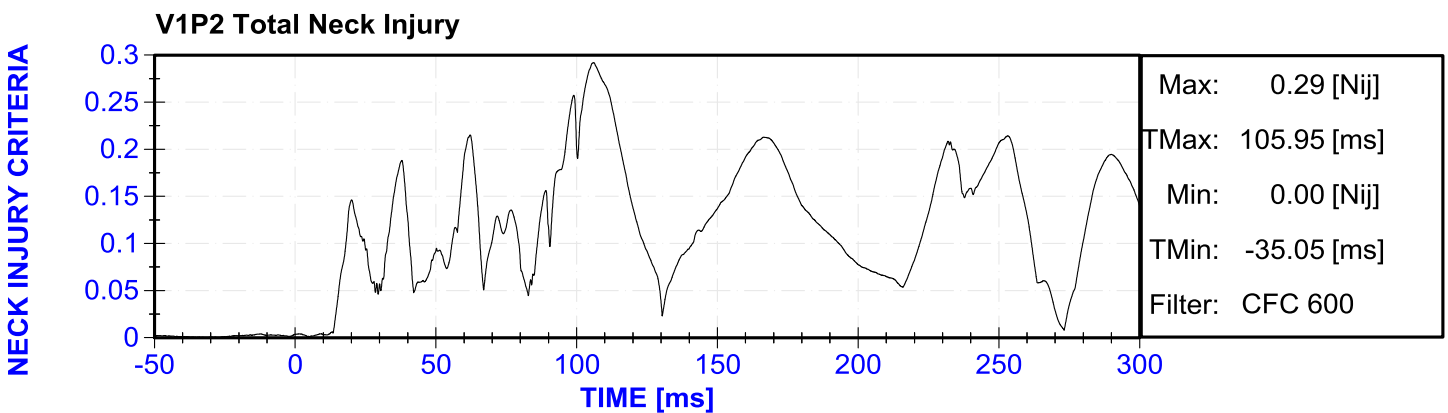
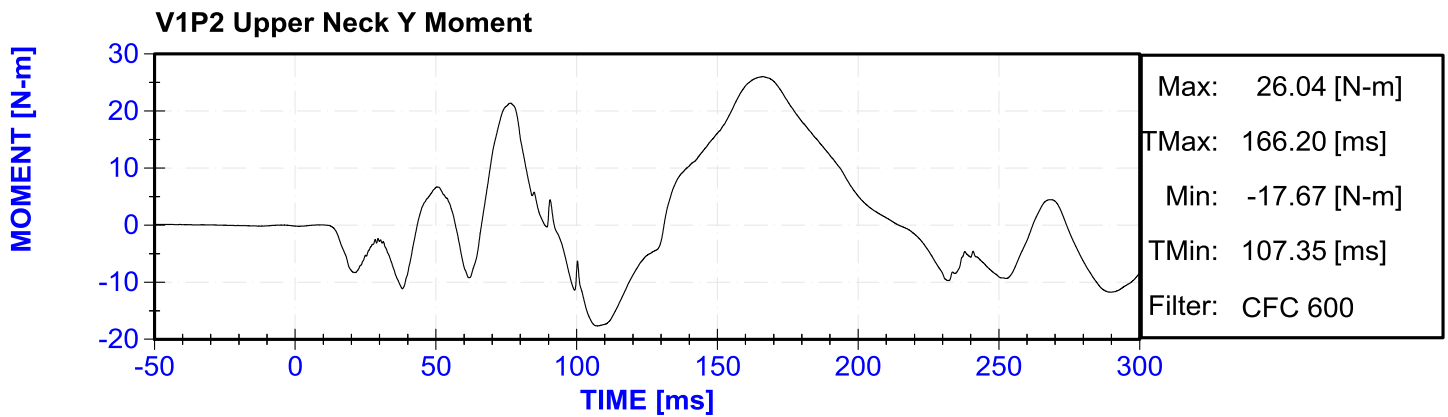
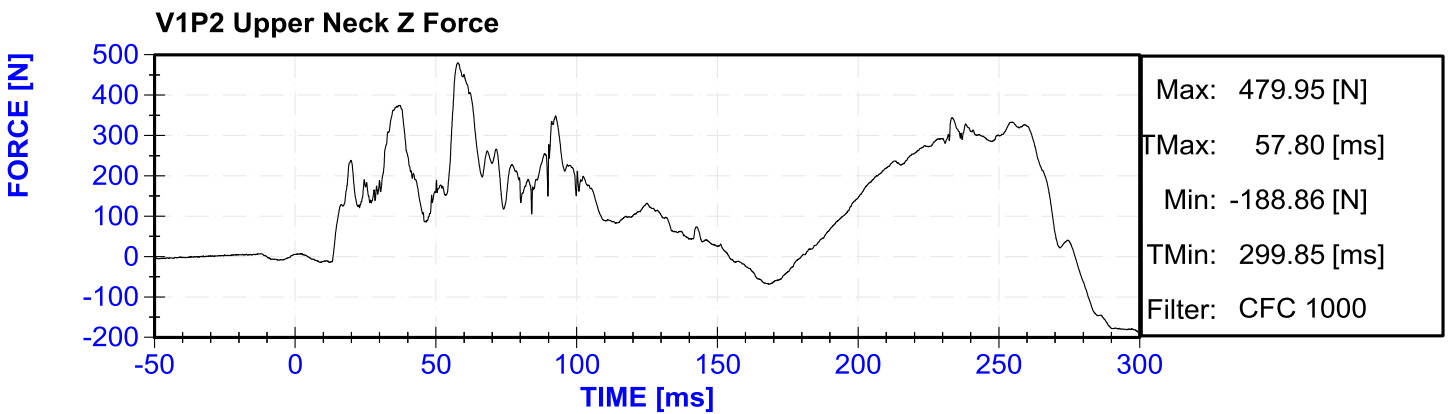
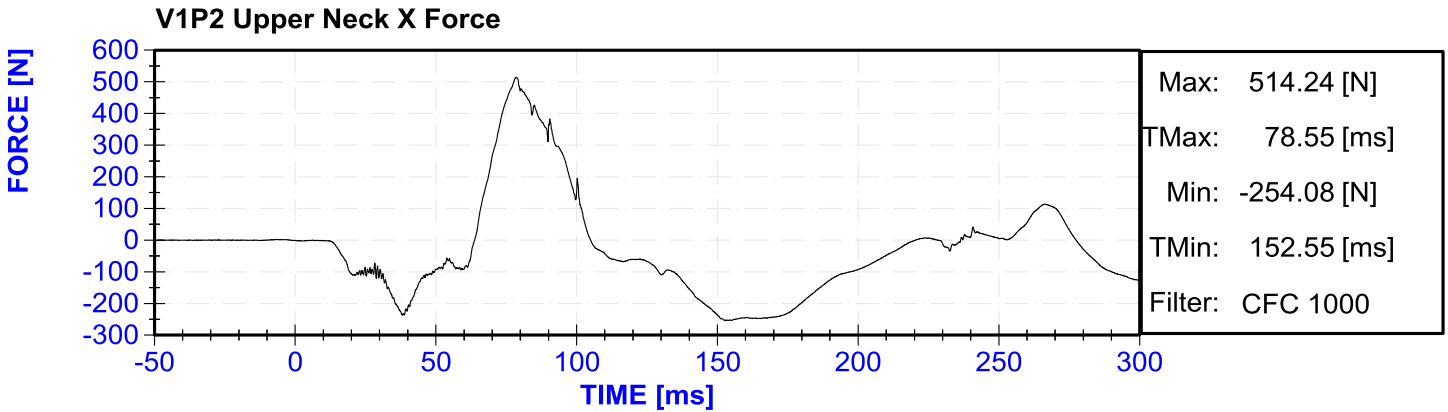


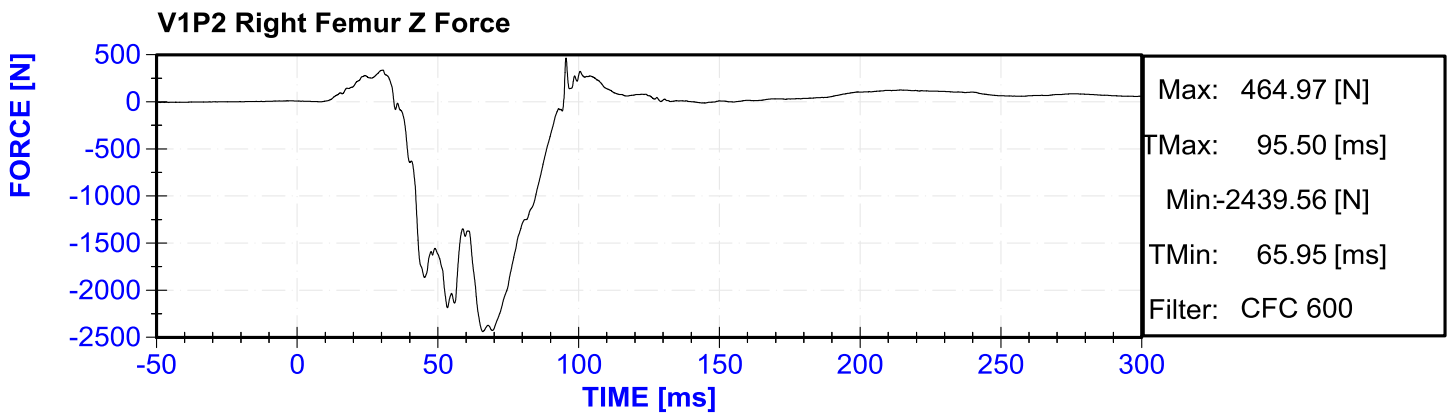
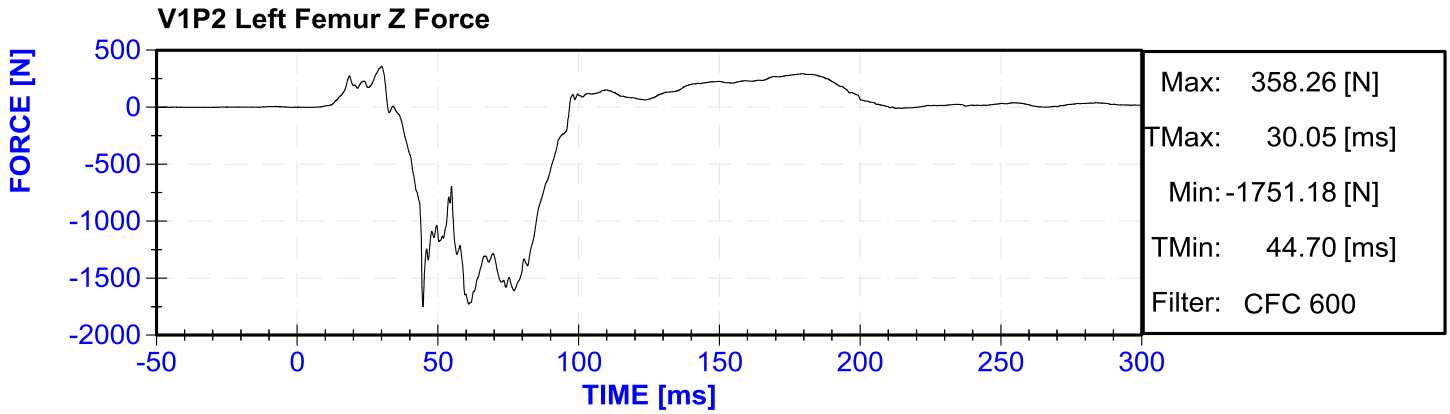












APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 064



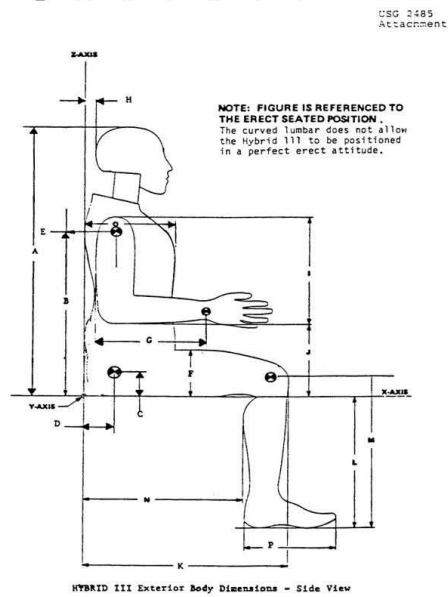
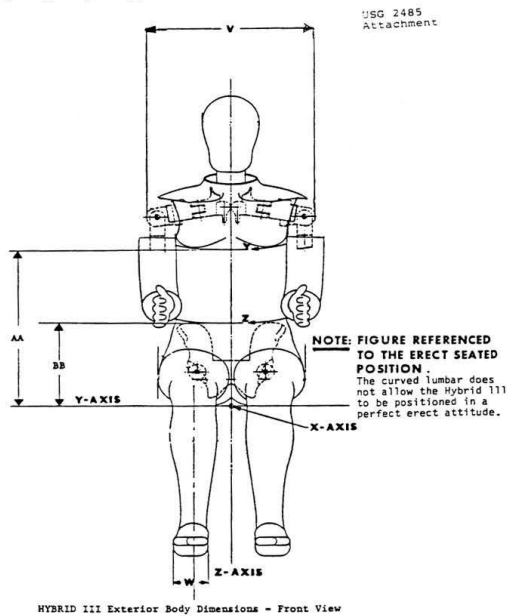
50th Male External Measurements

S/N 064

Symbol	Description	Specification	Results	Pass
		in	In	
A	Sitting Height	34.6 – 35.0	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.0	Yes
C	H-Point Height	3.3 – 3.5	3.3	Yes
D	H-Point from Backline	5.3 – 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.4	Yes
F	Thigh Clearance	5.5 – 6.1	6.0	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	13.0	Yes
J	Elbow Rest Height	7.5 – 8.3	8.1	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.0	Yes
L	Popliteal Height	16.9 – 17.9	17.1	Yes
M	Knee Pivot Height	19.1 – 19.7	19.3	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.5	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.5	Yes
P	Foot Length (right)	9.9 – 10.5	10.3	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	39.0	Yes
Z	Waist Circumference	32.9 – 34.1	33.6	Yes
AA	Reference Location (Chest Circumference)	16.9 – 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 – 9.1	9.0	Yes

Technician: R. Weil

12/05/2013





VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male -NEW		
ATD Serial Number:	064		
Test ID:	Head Drop	Test Date:	12.5/2013
		Test Time:	8:35:17 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	7997
Cap Skin - 78051-229	2494

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.3 deg C P
Humidity	10 -- 70	48.2 %RH P
Resultant Acceleration	225 -- 275	245.1 g P
Oscillation	0 -- 10	2.1 % P
Lateral Acceleration	-15 -- 15	-6.2 g P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



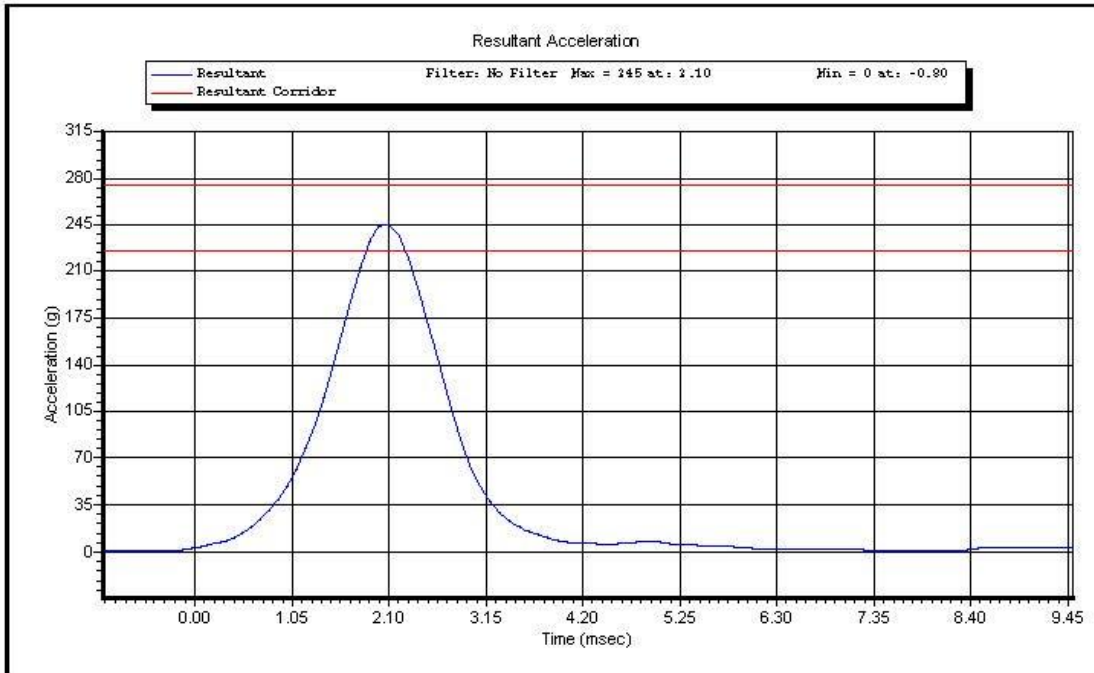
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58904	6/13/2013
Endevco	7264-2000	P58911	6/13/2013
Endevco	7264-2000	P58776	6/11/2013



Test Name: **Head Drop**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male -NEW**
ATD Serial Number: **064**

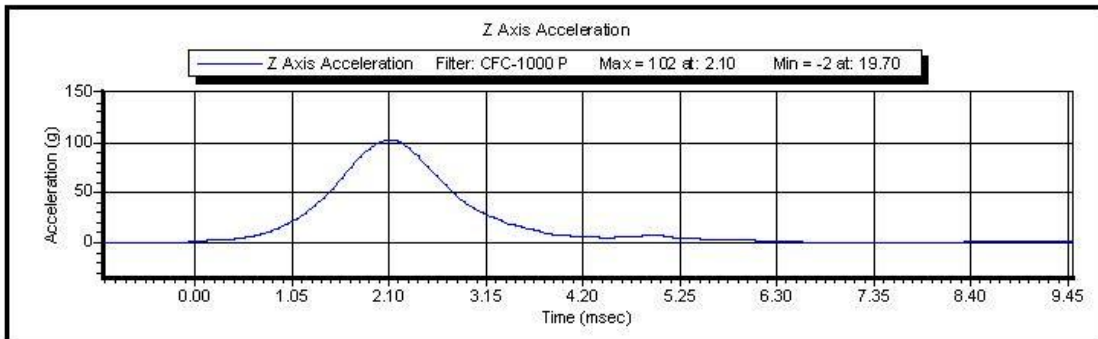
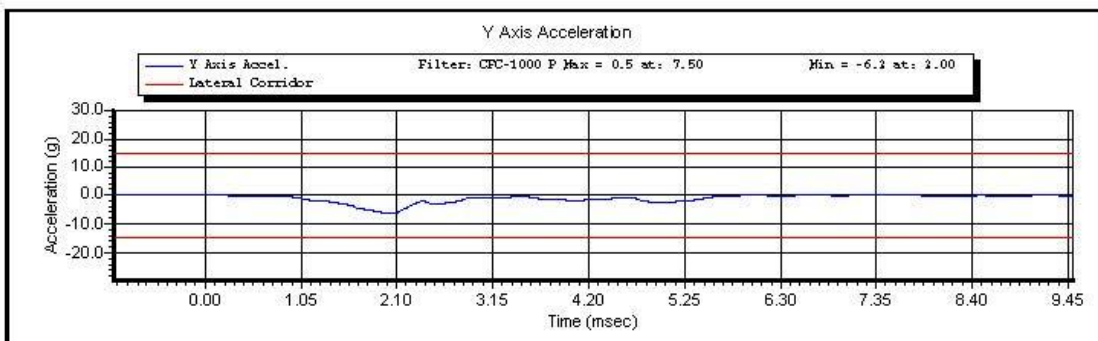
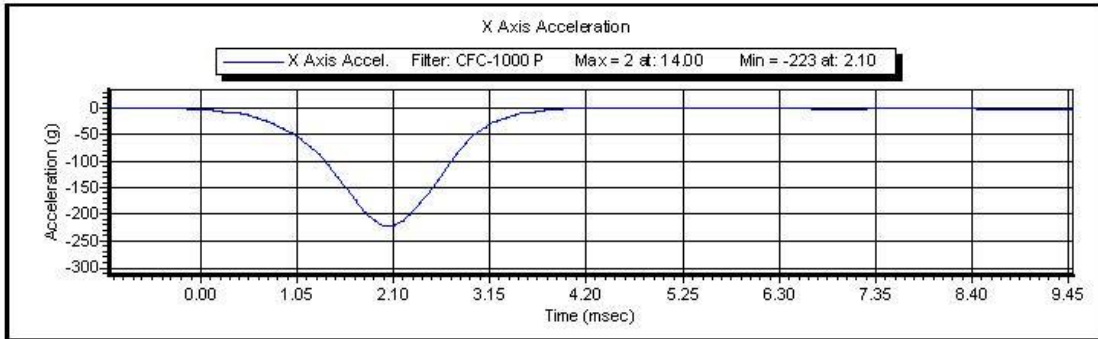


Test ID: **Head Drop**

Test Time: **8:35:17 AM**

Test Date: **12/5/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Head Drop**

Test Time: **8:35:17 AM**

Test Date: **12/5/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Neck Extention	Test Date:	12/4/2013
		Test Time:	4:15:56 PM

Component Part Number	Component Serial Number
Neck - 78051-336	021692

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.7 deg C	P
Humidity		10	-- 70	35.5 %RH	P
Velocity		5.94	-- 6.19	6.114 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	19.35 g	P
Pendulum Deceleration at	20 ms	14	-- 19	16.2 g	P
Pendulum Deceleration at	30 ms	11	-- 16	13.6 g	P
Max Pendulum Deceleration after	30 ms	0	-- 22	13.6 g	P
Decel Time to	5 g	38	-- 46	40.0 ms	P
D Plane Rotation		81	-- 106	101.1 degrees	P
Time at Max Rotation		72	-- 82	78.3 ms	P
Rotation Decay to Zero		147	-- 174	157.9 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-69.46 Nm	P
Time at Max Moment		65	-- 79	74.5 ms	P
Moment Decay to Zero		120	-- 148	146.9 ms	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



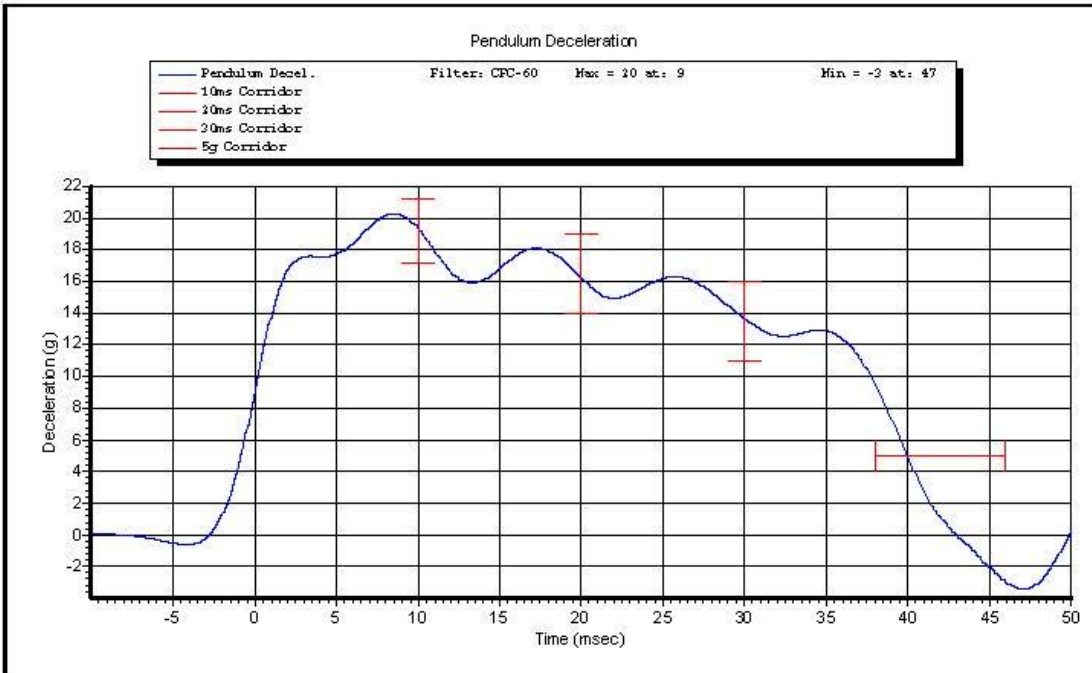
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	4/19/2013
Denton	1716A	LC-2186 My	5/23/2013
Denton	1716A	LC-2186 Fx	5/23/2013



Name of Test:	Neck Extension
Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	064

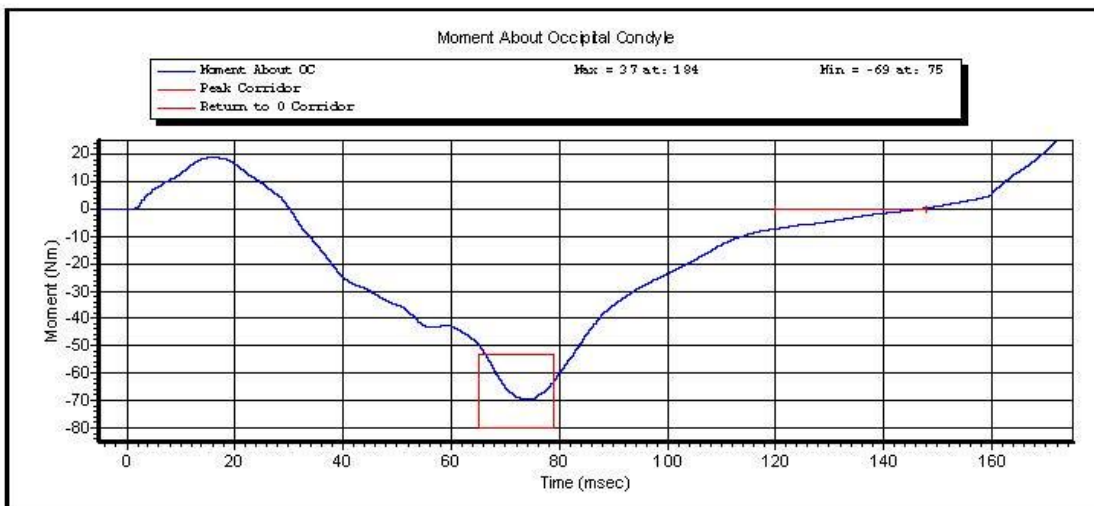
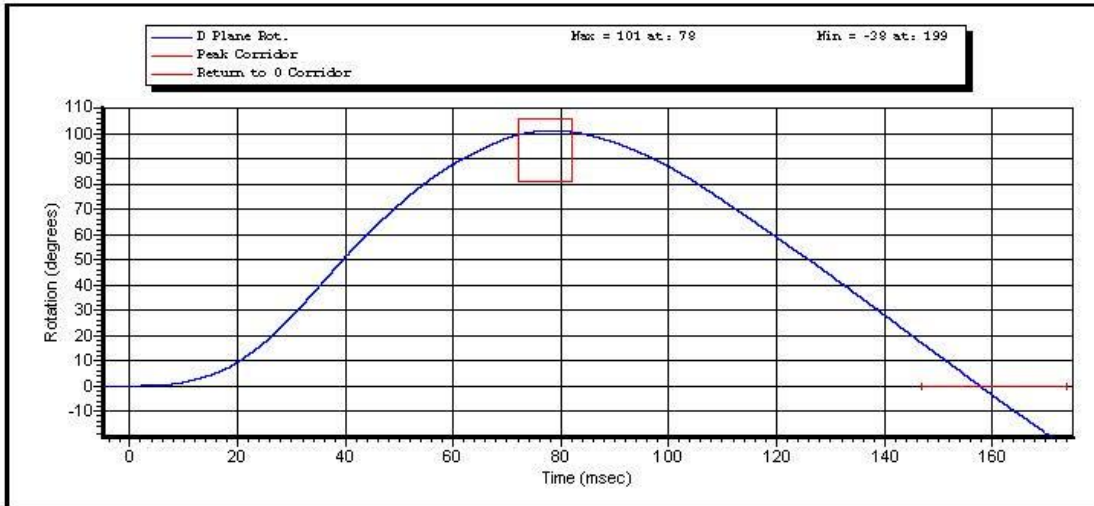


ID of Test: **Neck Extension**

Time of Test: **4:15:56 PM**

Date of Test: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

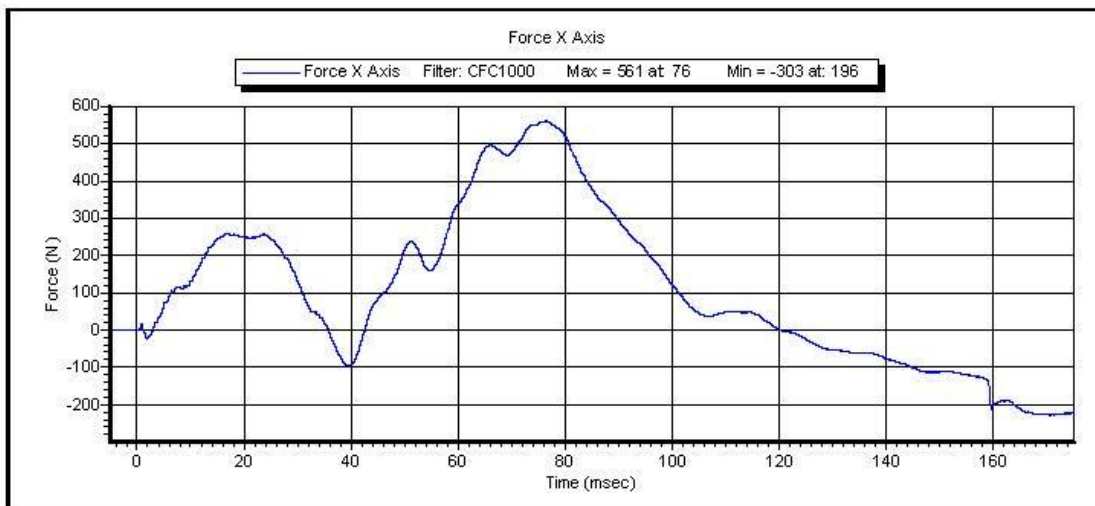
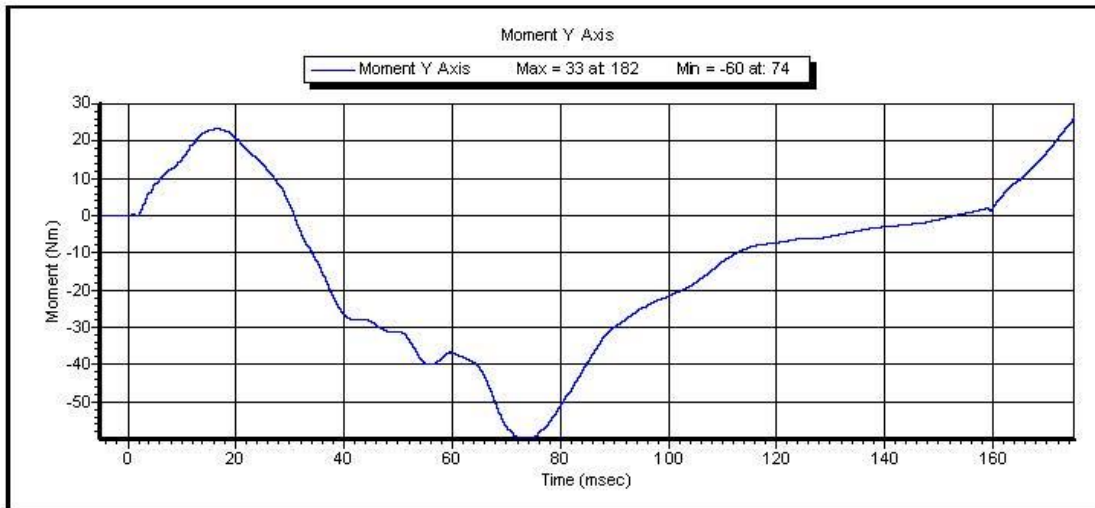


ID of Test: **Neck Extension**

Time of Test: **4:15:56 PM**

Date of Test: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



ID of Test: **Neck Extention**

Time of Test: **4:15:56 PM**

Date of Test: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Neck Flexion	Test Date:	12/4/2013
		Test Time:	11:53:33 AM

Component Part Number	Component Serial Number
Neck - 78051-336	021692

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.5 deg C	P
Humidity		10	-- 70	34.0 %RH	P
Velocity		6.89	-- 7.13	7.084 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	24.14 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	20.03 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	14.89 g	P
Max Pendulum Deceleration After	30 ms	0	-- 29	14.9 g	P
Deceleration time to	5 g	34	-- 42	38.1 ms	P
D Plane Rotation		-78	-- -64	-71.2 degrees	P
Time at max rotation		57	-- 64	59.3 ms	P
Rotation Decay to Zero		113	-- 128	114.5 ms	P
Moment about OC		88.1	-- 108.4	92.47 Nm	P
Time at Max Moment		47	-- 58	52.4 ms	P
Moment Decay to Zero		97	-- 107	99.0 ms	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



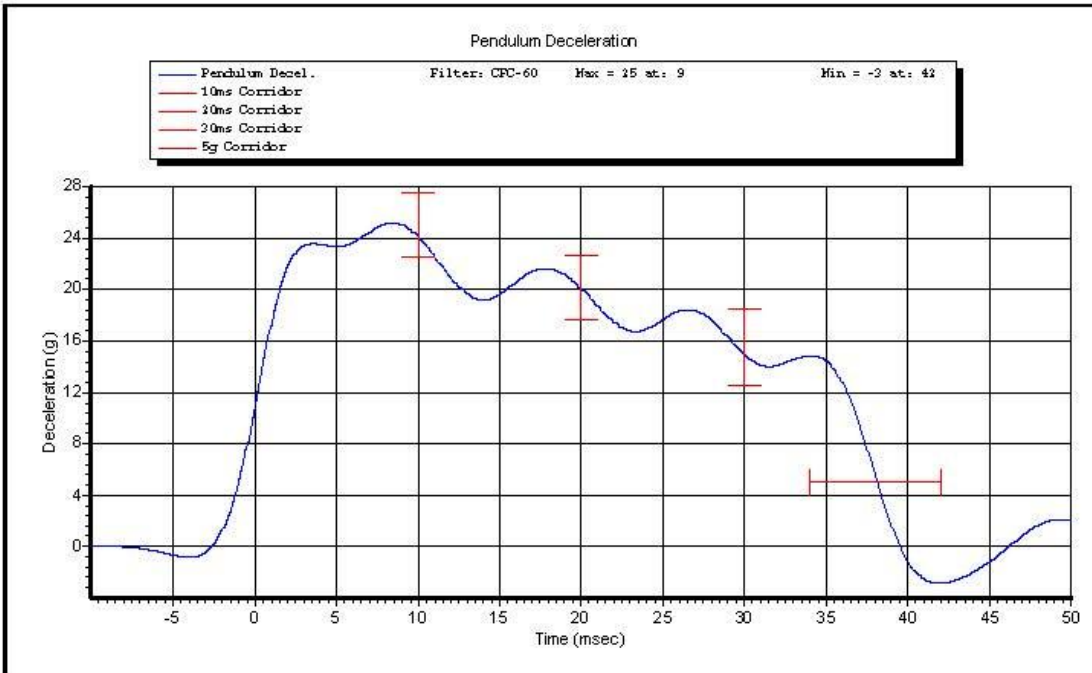
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	4/19/2013
Denton	1716A	LC-2186 My	5/23/2013
Denton	1716A	LC-2186 Fx	5/23/2013



Name of Test: **Neck Flexion**
Name of Sub Test:
Type of ATD: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**

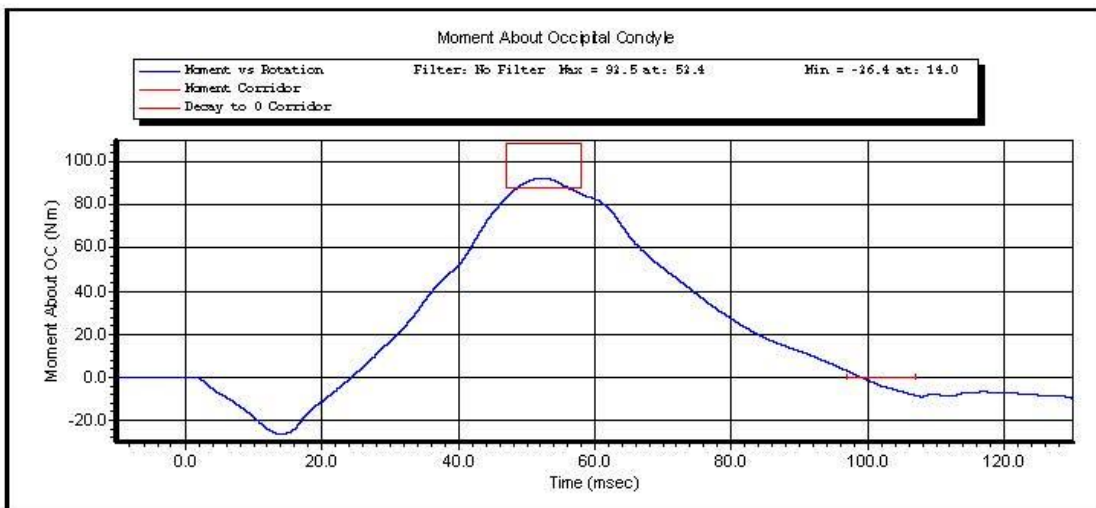
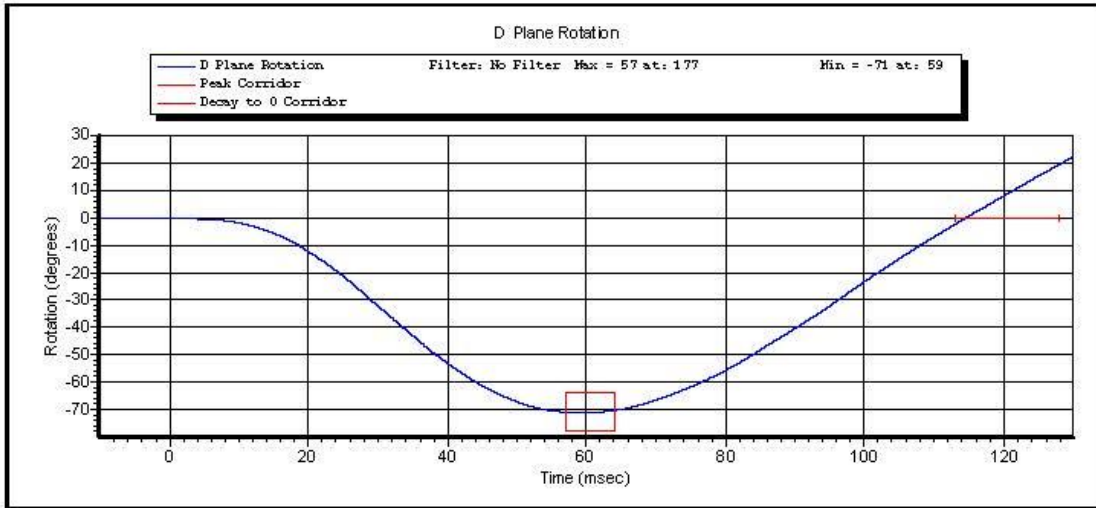


ID of Test: **Neck Flexion**

Time of Test: **11:53:33 AM**

Date of Test: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

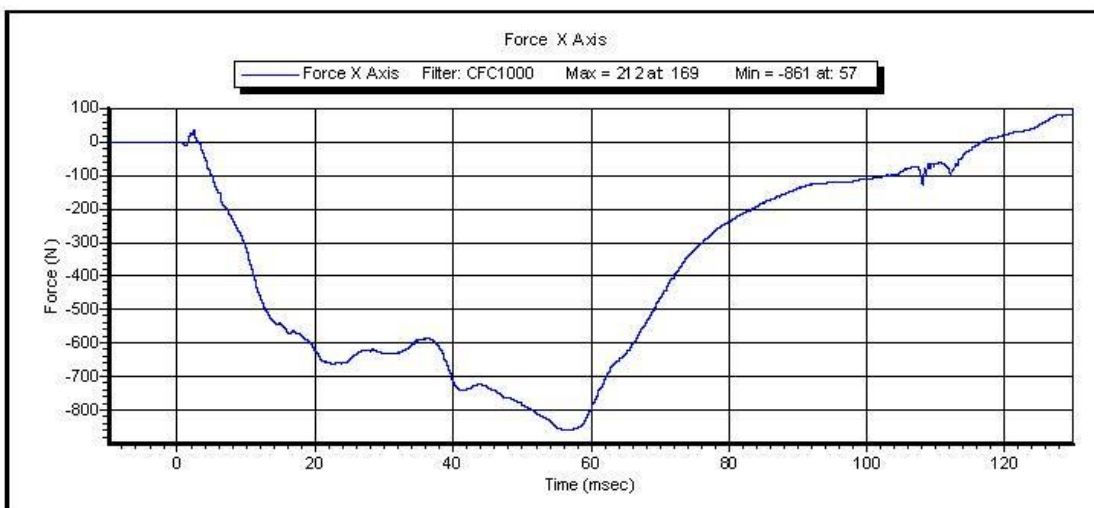
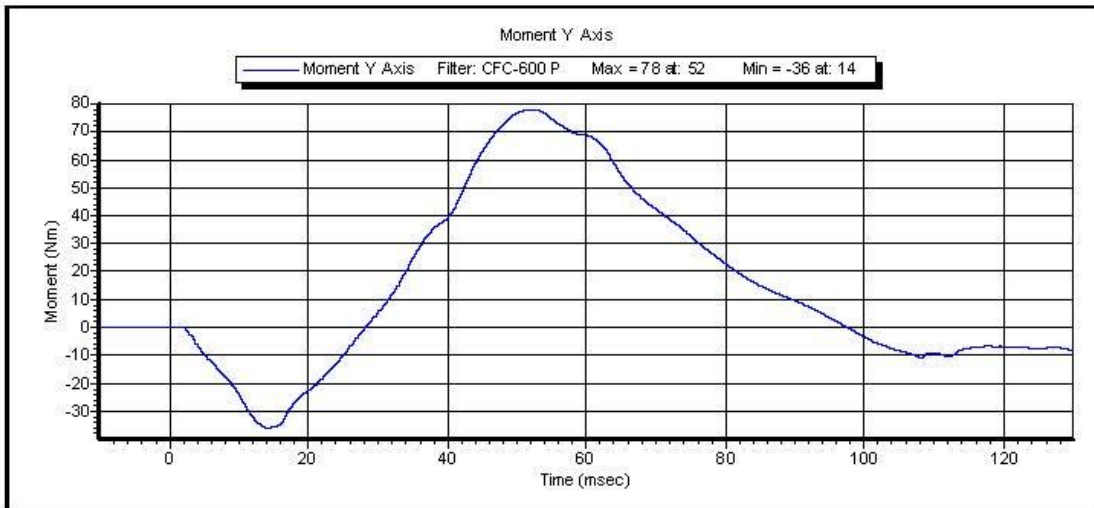


ID of Test: **Neck Flexion**

Time of Test: **11:53:33 AM**

Date of Test: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



ID of Test: **Neck Flexion**

Time of Test: **11:53:33 AM**

Date of Test: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Thorax Impact	Test Date:	12/4/2013
		Test Time:	7:46:34 AM

Component Part Number	Component Serial Number
Chest Jacket - 78051-169	DL 7598

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.0 deg C P
Humidity	10 -- 70	26.7 %RH P
Velocity	6.59 -- 6.83	6.741 m/s P
Resistive Force	-5.894 -- -5.160	-5.5599 kN P
Sternum Displacement	-72.6 -- -63.5	-72.33 mm P
Hysteresis	69 -- 85	69.5 % P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



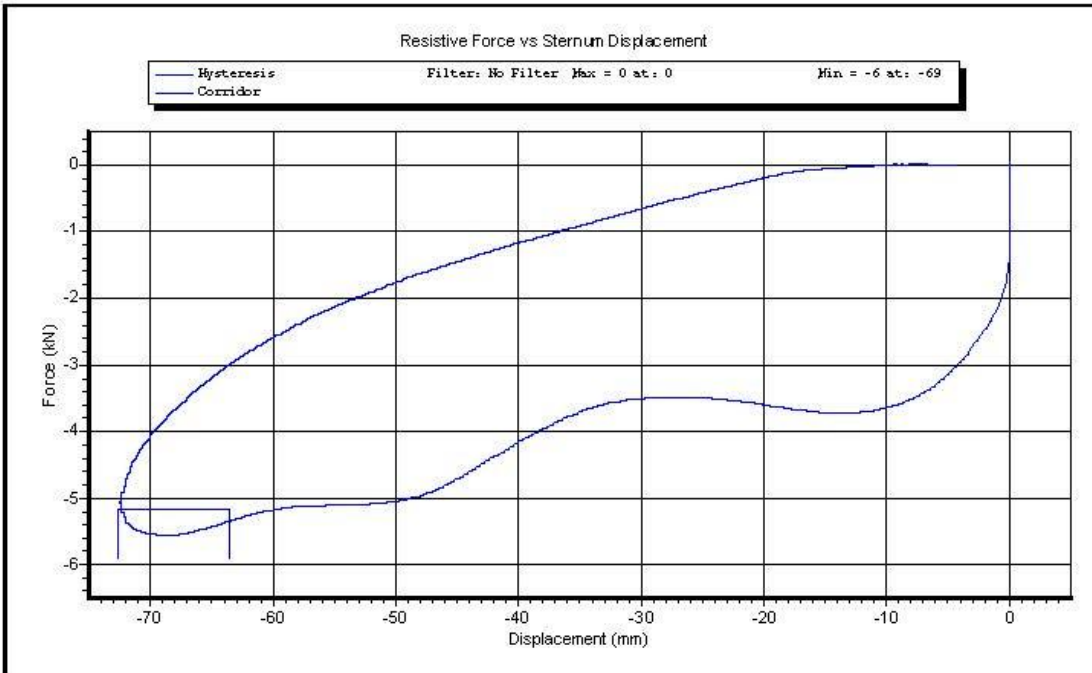
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	12/4/2013
DentonATD	78051-342	DS-064	6/18/2013



Test Name: **Thorax Impact**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**

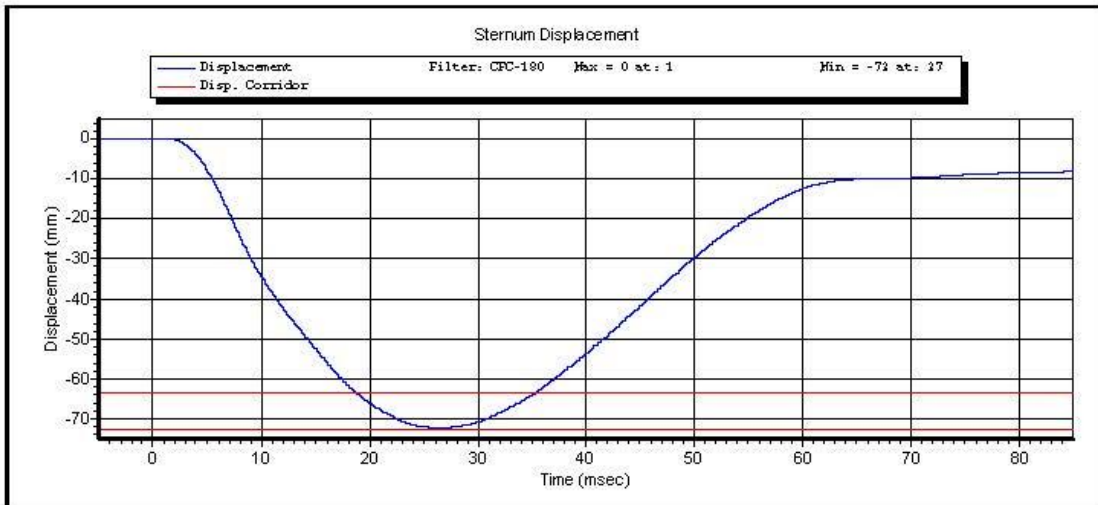
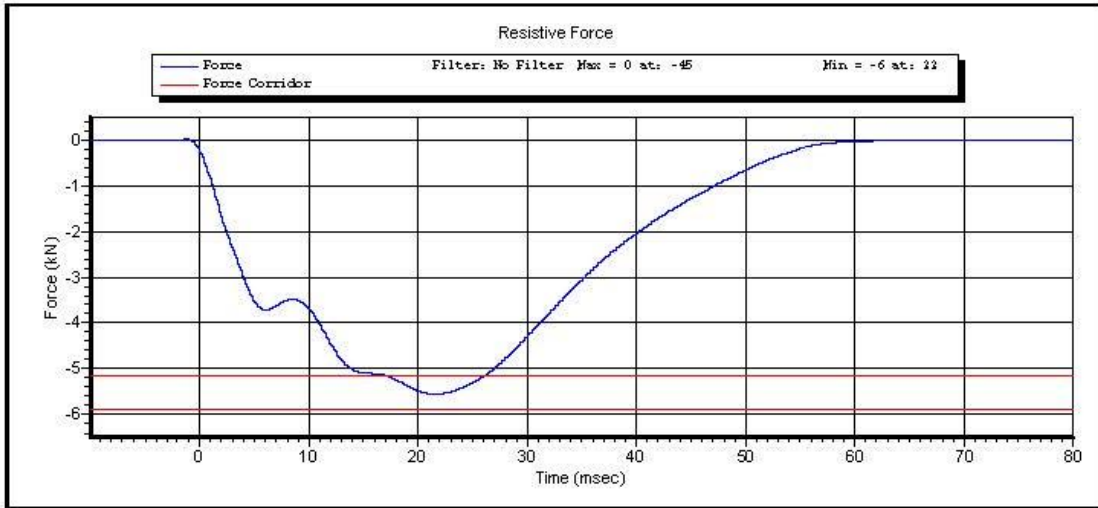


Test ID: **Thorax Impact**

Test Time: **7:46:34 AM**

Test Date: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

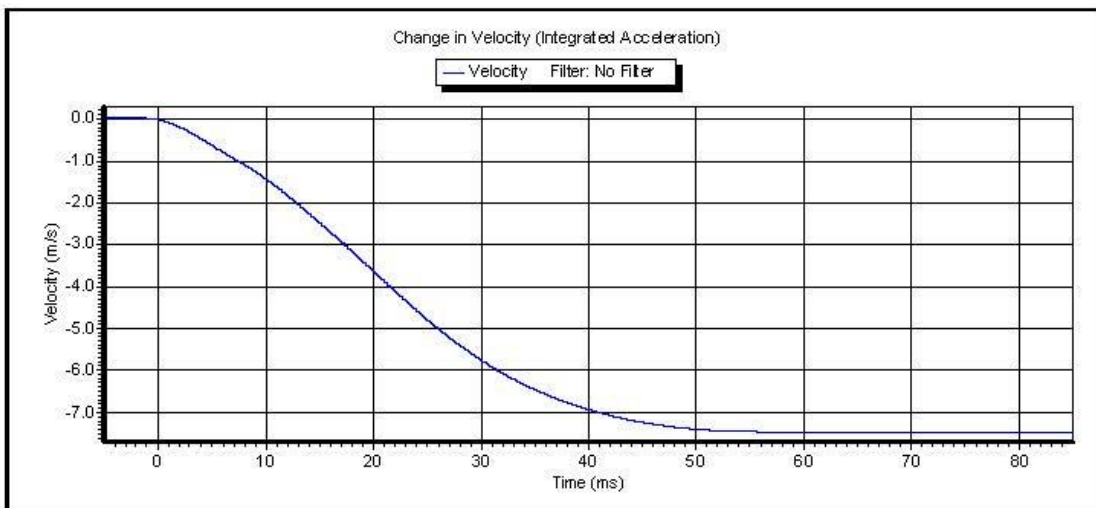
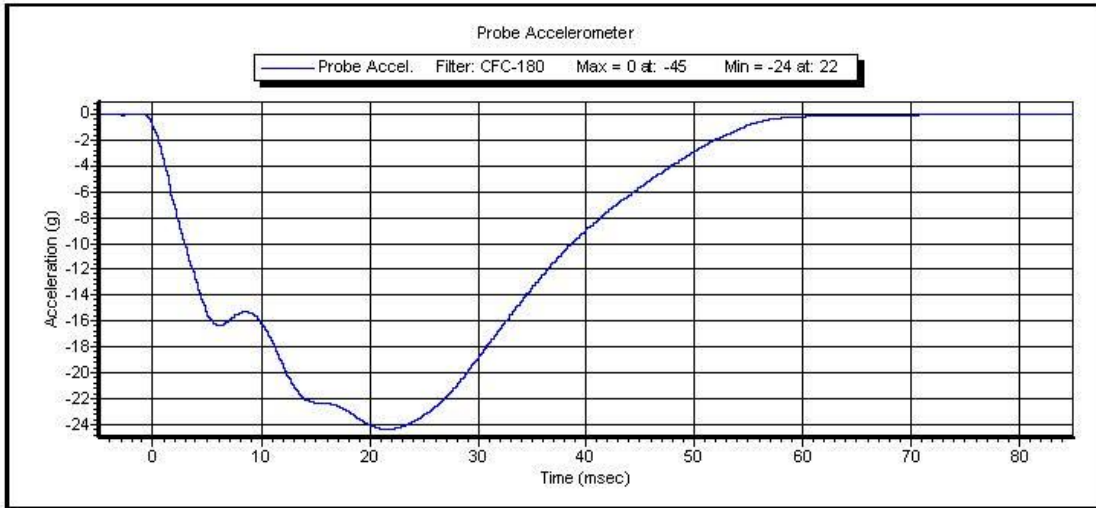


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Test Time: **7:46:34 AM**

Test Date: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Thorax Impact**

Test Time: **7:46:34 AM**

Test Date: **12/4/2013**

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VERIFICATION REPORT

Test Name:	Hip ROM	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Hip ROM Left	Test Date:	12/4/2013
		Test Time:	9:49:05 AM

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	1445

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.1 deg C P
Humidity	10 -- 70	32.2 %RH P
Average Velocity	5 -- 10	5.2 deg/s P
Angle at 203 Nm	40 -- 50	42.4 degrees P
Moment at 30 degrees	0.0 -- 94.9	73.33 Nm P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



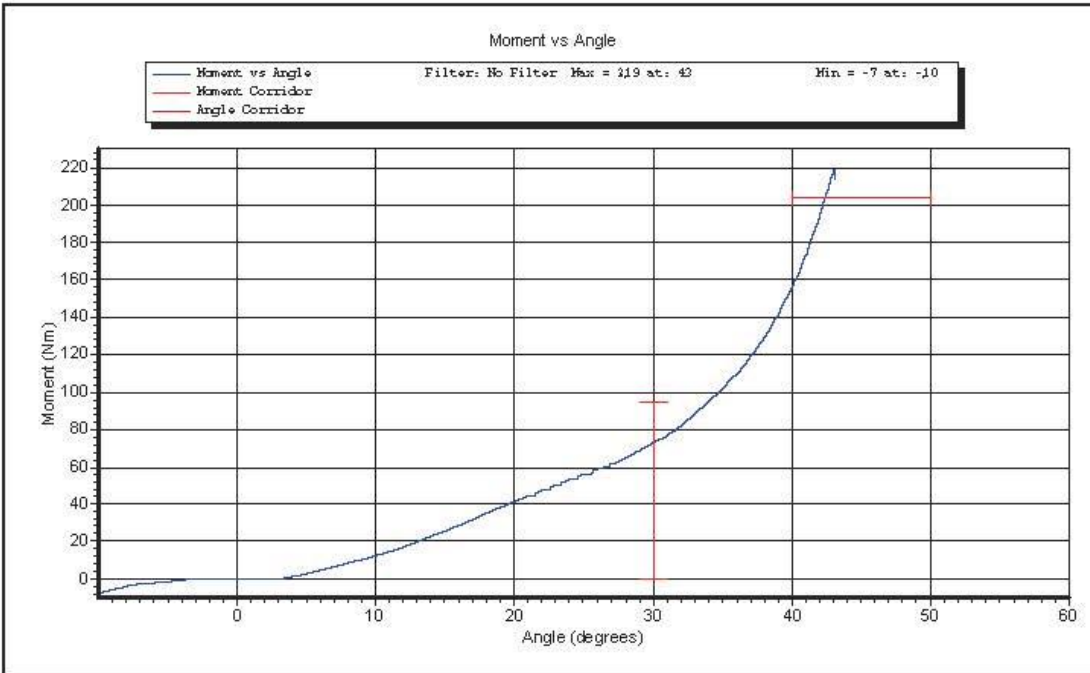
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key Trans/PCB	2301-02	115	3/19/2013
DentonATD	14 CB1-3615	0008	2/21/2013
DentonATD	Velocity Trap	1	1/11/2013



Test Name: **Hip ROM**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Hip ROM Left**

Test Time: **9:49:05 AM**

Test Date: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Hip ROM	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Hip Rom Right	Test Date:	12/4/2013
		Test Time:	9:31:12 AM

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	1445

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.2 deg C P
Humidity	10 -- 70	31.8 %RH P
Average Velocity	5 -- 10	5.7 deg/s P
Angle at 203 Nm	40 -- 50	41.0 degrees P
Moment at 30 degrees	0.0 -- 94.9	86.14 Nm P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



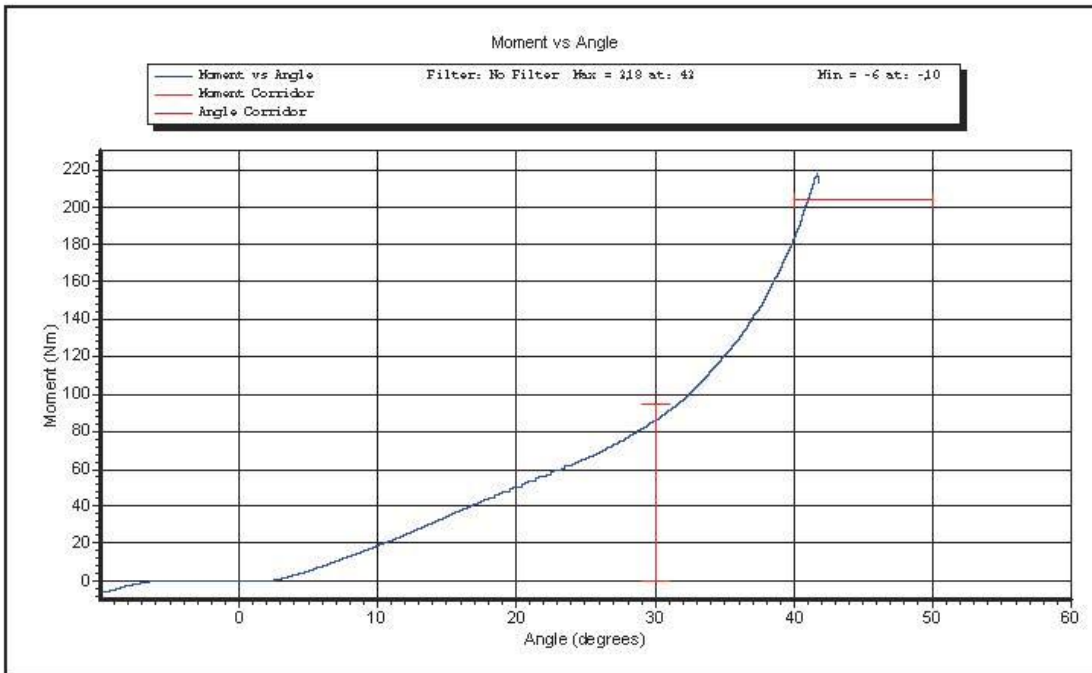
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key Trans/PCB	2301-02	115	3/19/2013
DentonATD	14 CB1-3615	0008	2/21/2013
DentonATD	Velocity Trap	1	1/11/2013



Test Name: **Hip ROM**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Hip Rom Right**

Test Time: **9:31:12 AM**

Test Date: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Knee Impact Left	Test Date:	12/2/2013
		Test Time:	4:18:25 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	2882 (L)

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	20.6 deg C P
Humidity	10 -- 70	25.5 %RH P
Velocity	2.07 -- 2.13	2.094 m/s P
Resistive Force	-5.78 -- -4.72	-4.942 kN P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



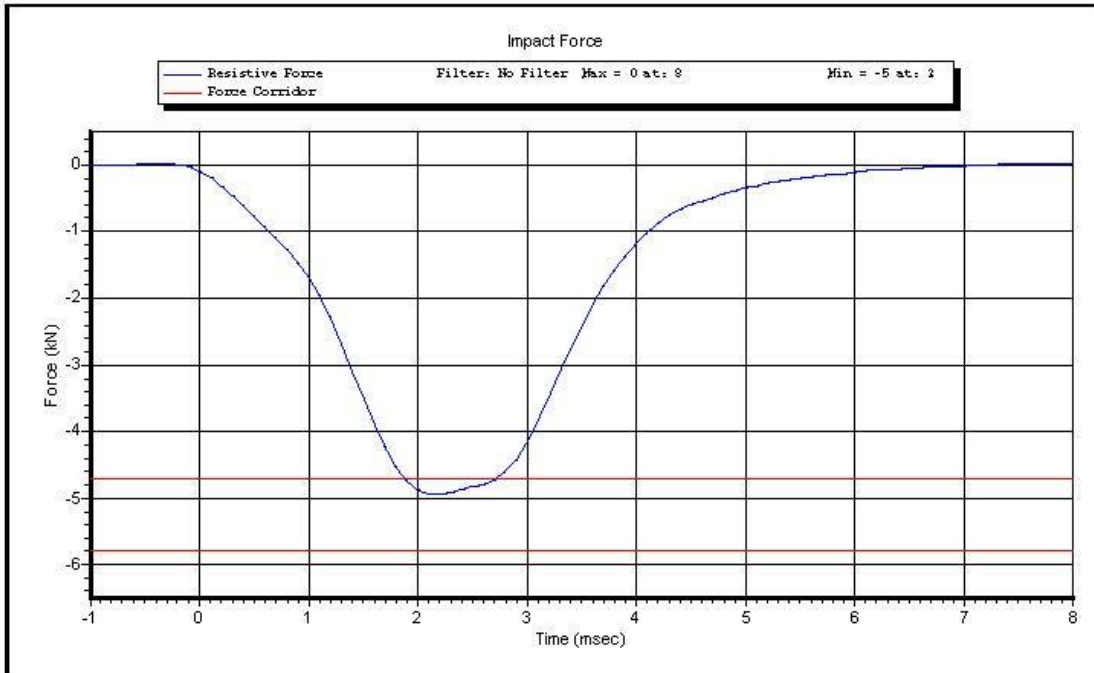
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	6/3/2013



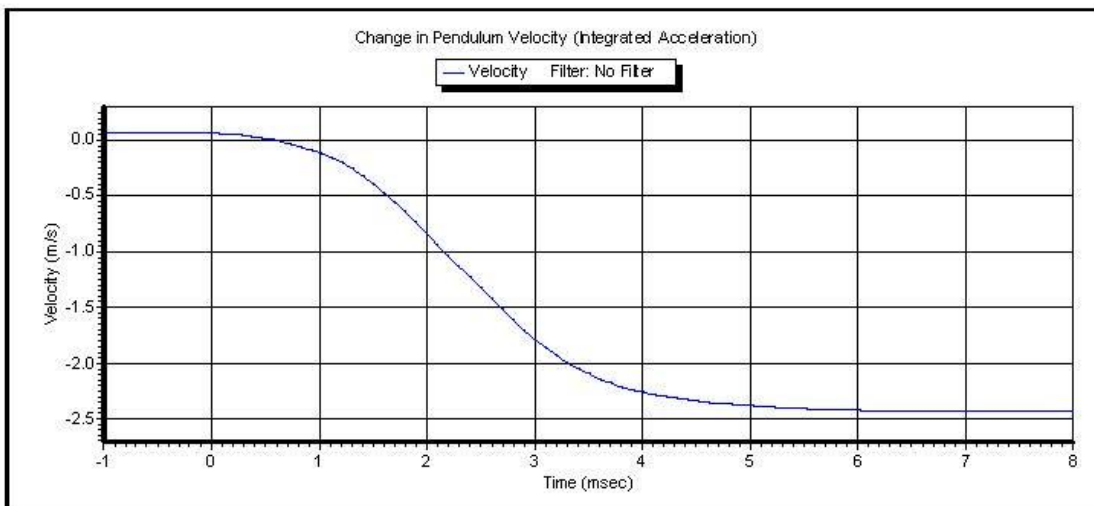
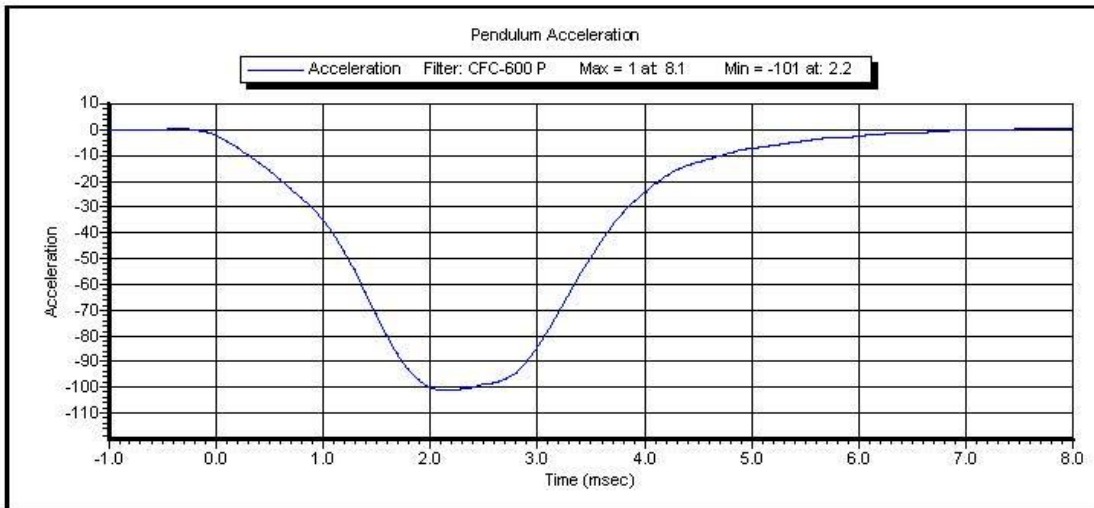
Test Name: **Knee Impact**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Knee Impact Left** Test Time: **4:18:25 PM**

Test Date: **12/2/2013**

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Test ID: **Knee Impact Left** Test Time: **4:18:25 PM**

Test Date: **12/2/2013**

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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Knee Impact Right	Test Date:	12/2/2013
		Test Time:	4:12:24 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	2531 (R)

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	20.6 deg C P
Humidity	10 -- 70	25.5 %RH P
Velocity	2.07 -- 2.13	2.095 m/s P
Resistive Force	-5.78 -- -4.72	-5.335 kN P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



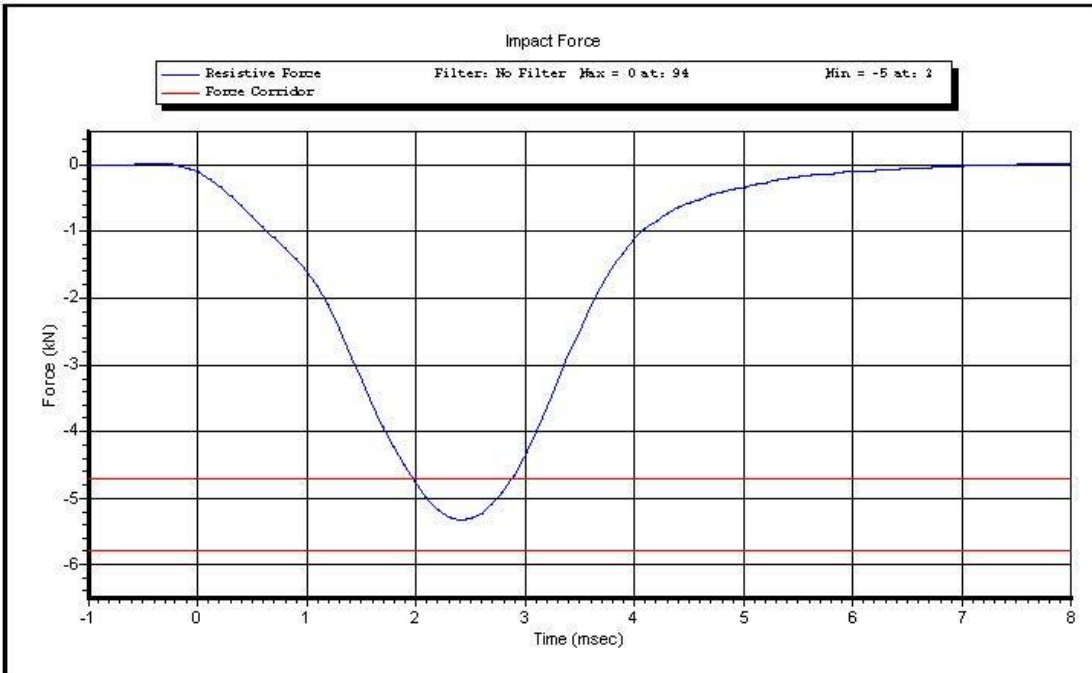
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	6/3/2013



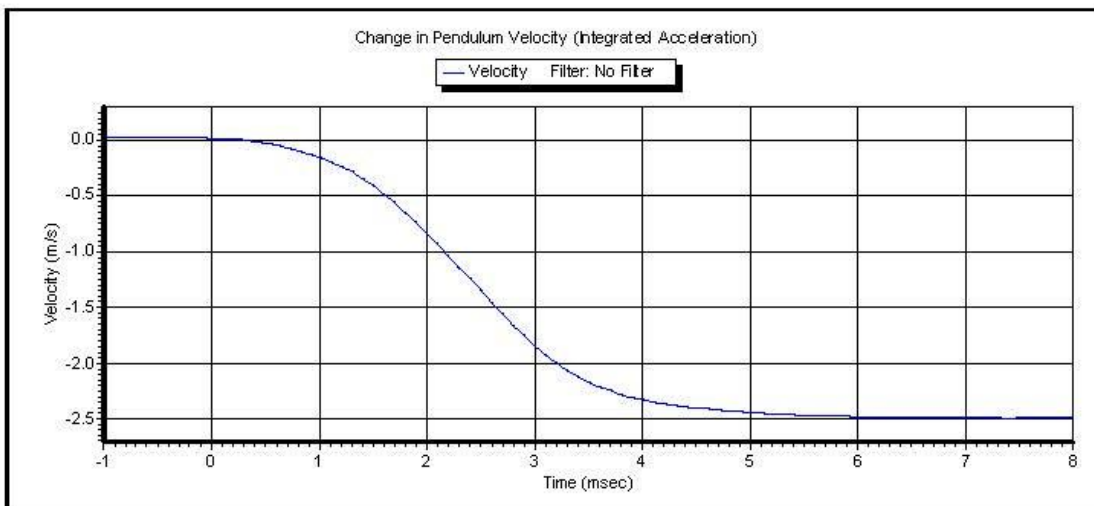
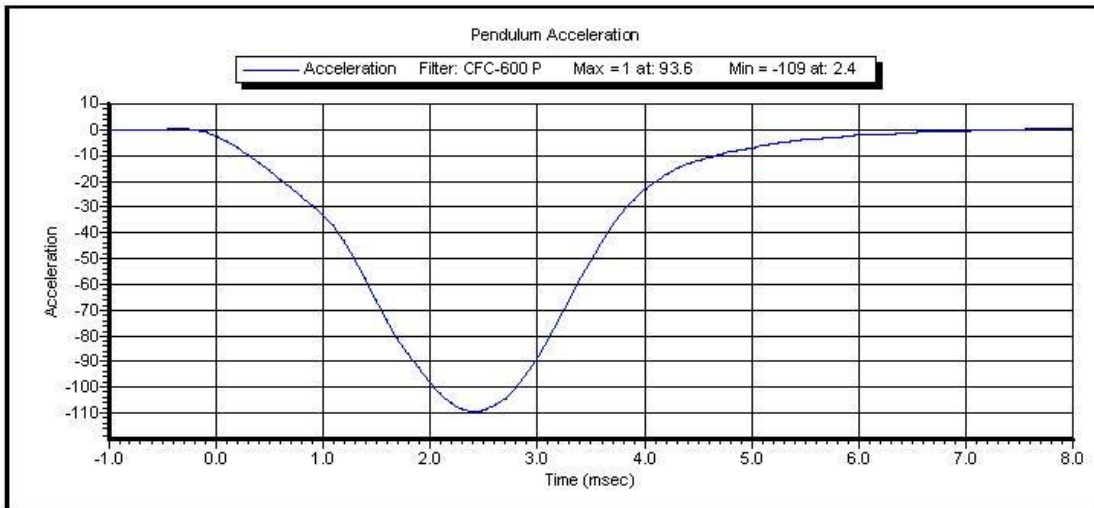
Test Name: **Knee Impact**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Knee Impact Right** Test Time: **4:12:24 PM**

Test Date: **12/2/2013**

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Test ID: **Knee Impact Right** Test Time: **4:12:24 PM**

Test Date: **12/2/2013**

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CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 288



External Measurements

5th Female SN 288

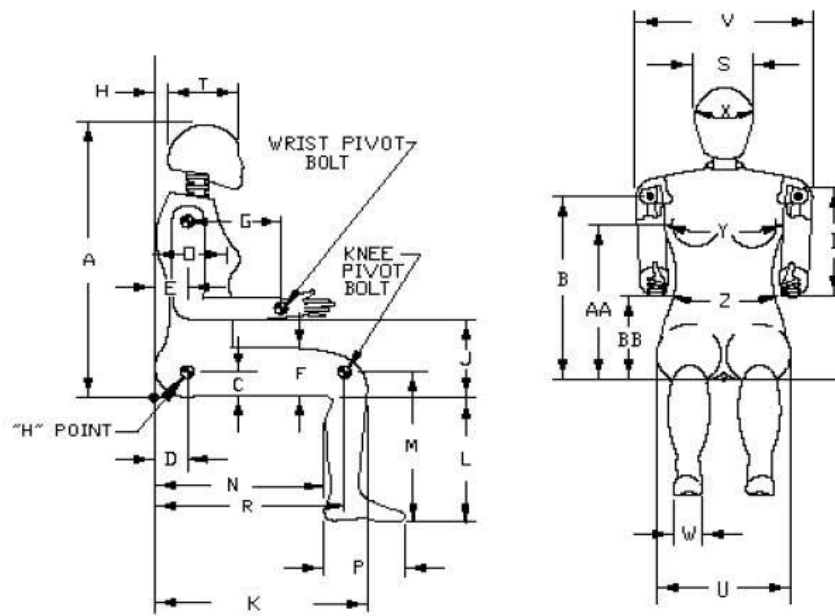
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	786	Yes
B	Shoulder Pivot Height	431.8 – 457.2	453	Yes
C	H-Point Height	81.3 – 86.3	82	Yes
D	H-Point from Backline	144.8 – 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6 – 83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	131	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	248	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	285	Yes
J	Elbow Rest Height	182.8 – 203.2	194	Yes
K	Buttock to Knee Length	520.7 – 546.1	533	Yes
L	Popliteal Height	355.6 – 376	361	Yes
M	Knee Pivot Height	393.7 – 419.1	397	Yes
N	Buttock Popliteal Length	414 – 439.4	421	Yes
O	Chest Depth without Jacket	175.3 – 190.5	184	Yes
P	Foot Length (right)	218.5 – 233.7	221	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	469	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 – 188	183	Yes
U	Hip Breadth	299.7 – 314.9	308	Yes
V	Shoulder Breadth	350.5 – 365.7	356	Yes
W	Foot Breadth	78.8 – 94	82	Yes
X	Head Circumference	528.3 – 548.7	534	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	863	Yes
Z	Waist Circumference	759.5 – 789.9	770	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	346	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	164	Yes

Technician: M. Geesey

Date: 12/04/2013

Hybrid III 5th Female External Measurements

Reference Diagram





VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Head Drop	Test Date:	12/4/2013
		Test Time:	9:54:26 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	912

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.1 deg C P
Humidity	10 -- 70	32.4 %RH P
Resultant Acceleration	250 -- 300	277.6 g P
Oscillation	0 -- 10	0.0 % P
Lateral Acceleration	-15 -- 15	-2.0 g P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**



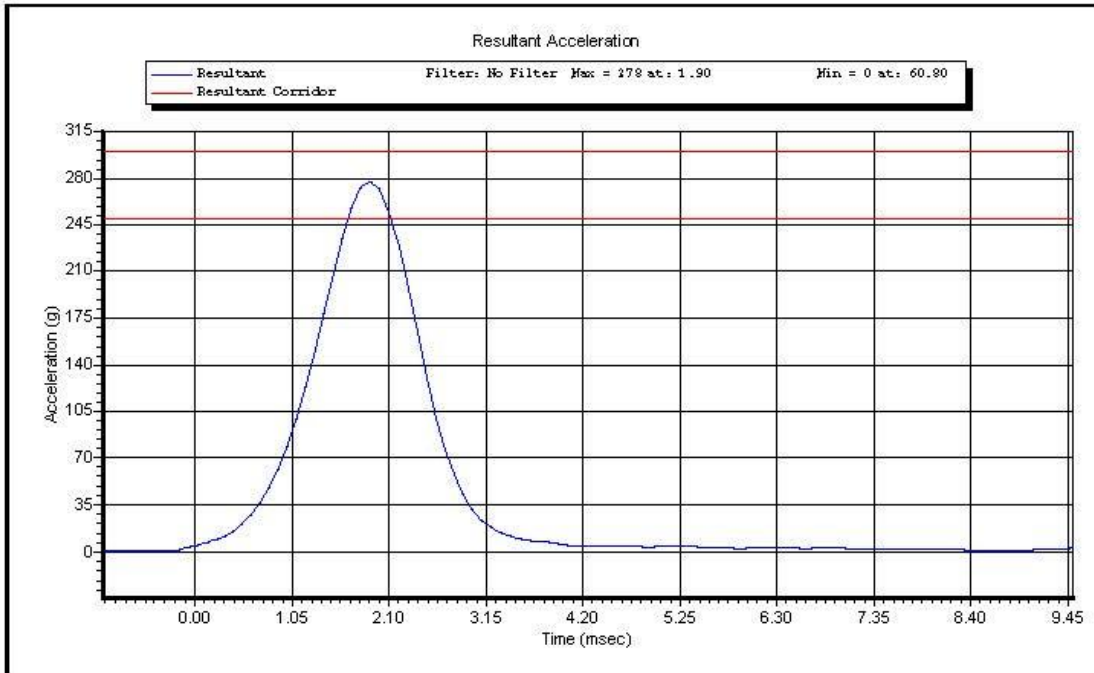
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P51682	11/21/2013
Endevco	7264-2000	P51685	11/21/2013
Endevco	7264-2000	P51699	11/21/2013



Test Name: **Head Drop**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**

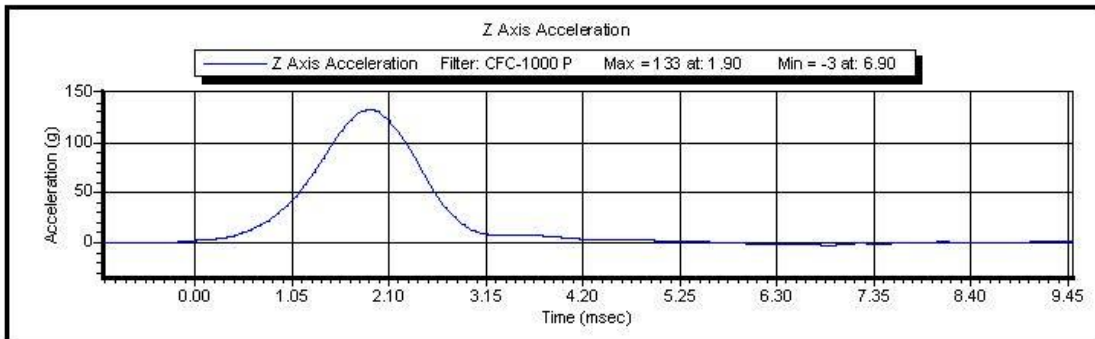
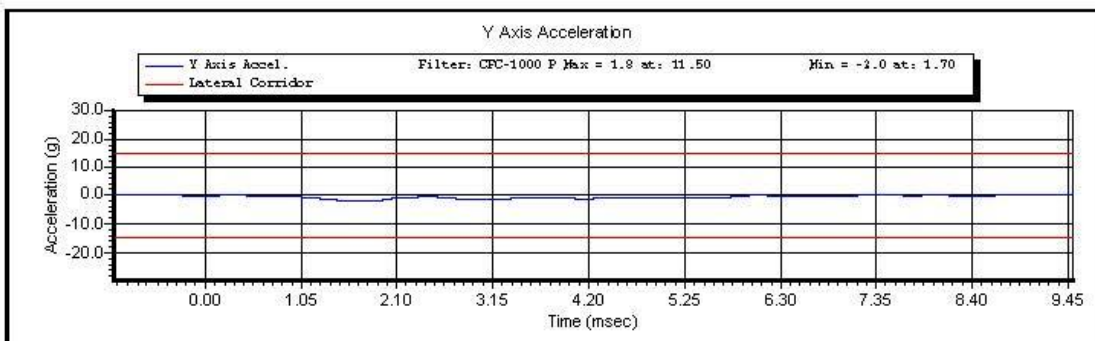
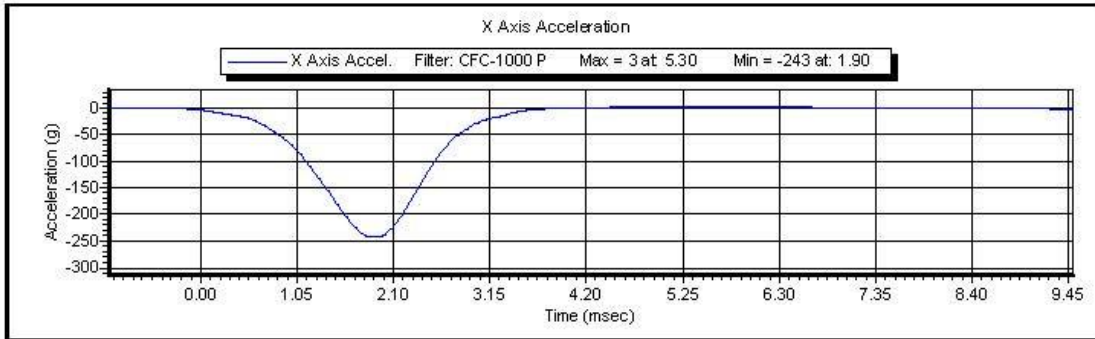


Test ID: **Head Drop**

Test Time: **9:54:26 AM**

Test Date: **12/4/2013**

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Test ID: **Head Drop**

Test Time: **9:54:26 AM**

Test Date: **12/4/2013**

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Neck Extension	Test Date:	12/5/2013
		Test Time:	1:20:08 PM

Component Part Number	Component Serial Number
Neck - 880105-255	7121
Head Skin - 880105-109	912

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	46.9 %RH P
Velocity	5.95 -- 6.19	6.146 m/s P
Pendulum Impulse at 10 ms	1.5 -- 1.9	1.60 m/s P
Pendulum Impulse at 20 ms	3.1 -- 3.9	3.29 m/s P
Pendulum Impulse at 30 ms	4.6 -- 5.6	4.87 m/s P
D Plane Rotation	99 -- 114	105.1 degrees P
Moment During Rotation Interval	-65 -- -53	-60.9 Nm P
Moment Decay to -10.0 Nm	94 -- 114	103.6 ms P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



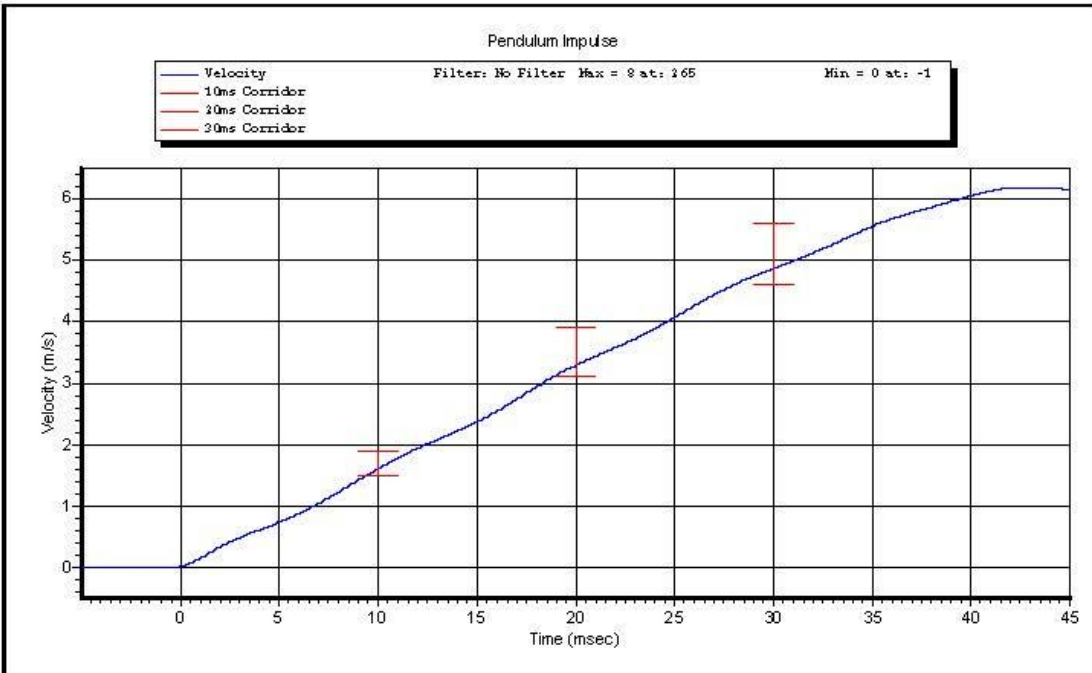
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	4/19/2013
Denton	1716A	LC-2206My	5/23/2013
Denton	1716A	LC-2206Fx	5/23/2013



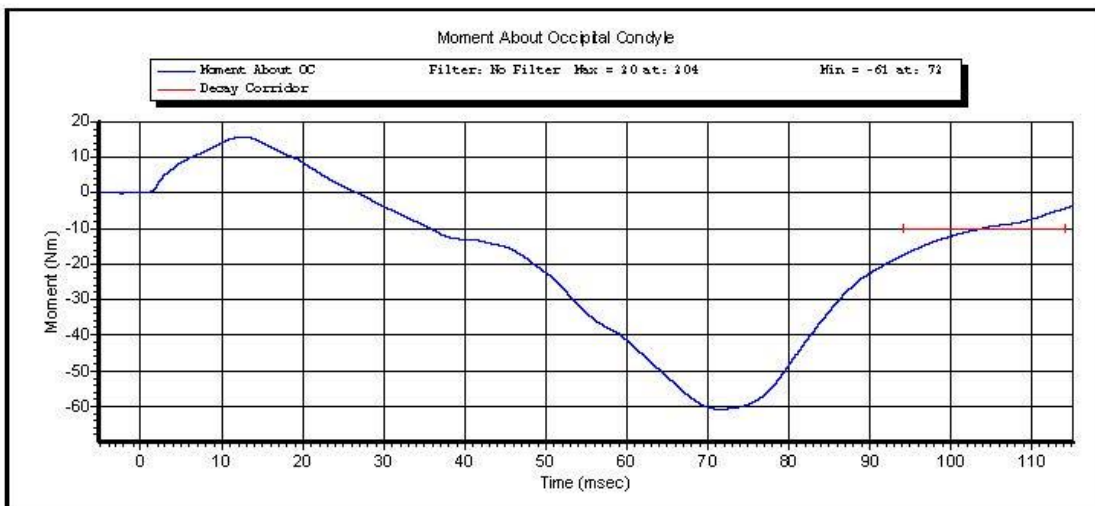
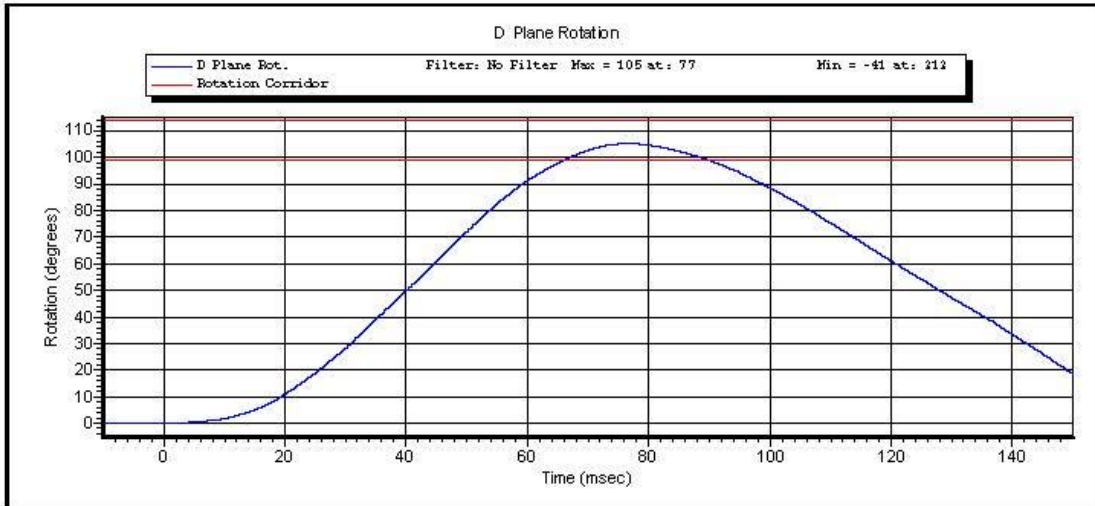
Test Name: **Neck Extension**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**



Test ID: **Neck Extension** Test Time: **1:20:08 PM**

Test Date: **12/5/2013**

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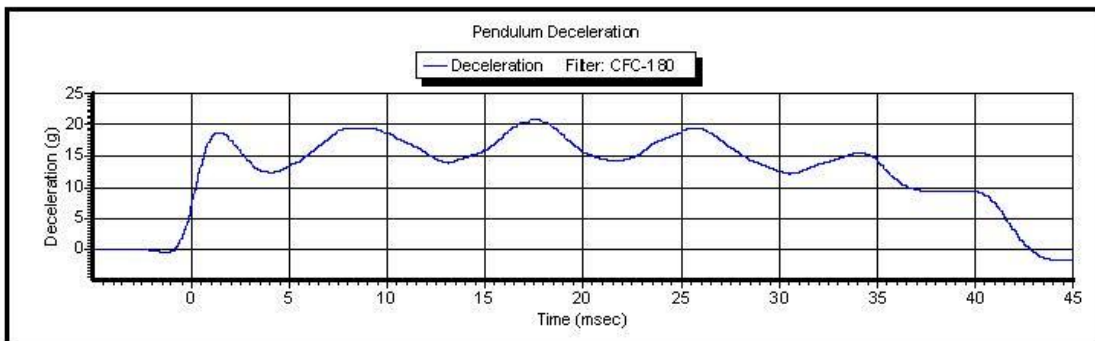
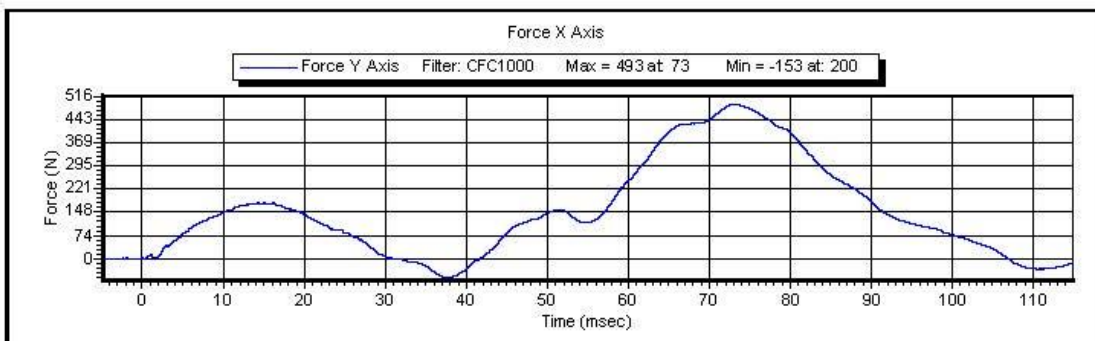
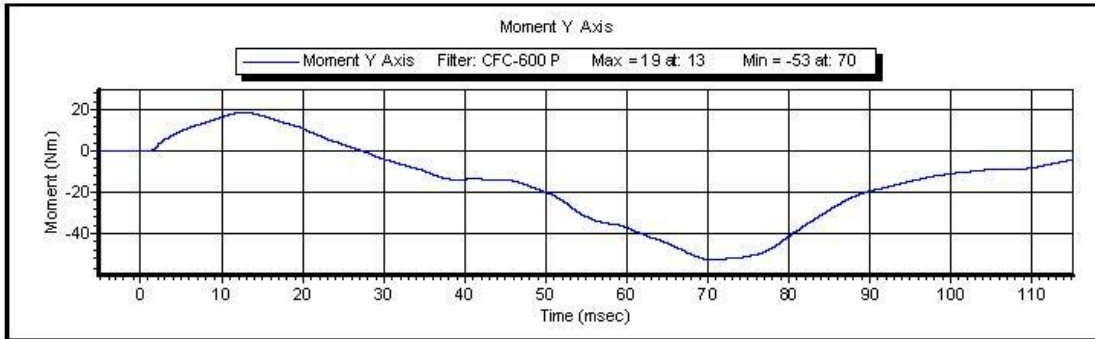


Test ID: Neck Extension

Test Time: 1:20:08 PM

Test Date: 12/5/2013

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Test ID: **Neck Extension** Test Time: **1:20:08 PM**

Test Date: **12/5/2013**

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Neck Flexion	Test Date:	12/5/2013
		Test Time:	12:59:40 PM

Component Part Number	Component Serial Number
Neck - 880105-255	7121
Head Skin - 880105-109	912

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.8 deg C P
Humidity	10 -- 70	46.9 %RH P
Velocity	6.89 -- 7.13	7.100 m/s P
Pendulum Impulse at 10 ms	2.1 -- 2.5	2.15 m/s P
Pendulum Impulse at 20 ms	4 -- 5	4.4 m/s P
Pendulum Impulse at 30 ms	5.8 -- 7.0	6.28 m/s P
D Plane Rotation	-91 -- -77	-80.6 degrees P
Moment During Rotation Interval	69 -- 83	73.0 Nm P
Moment Decay to 10.0 Nm	80 -- 100	88.5 ms P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



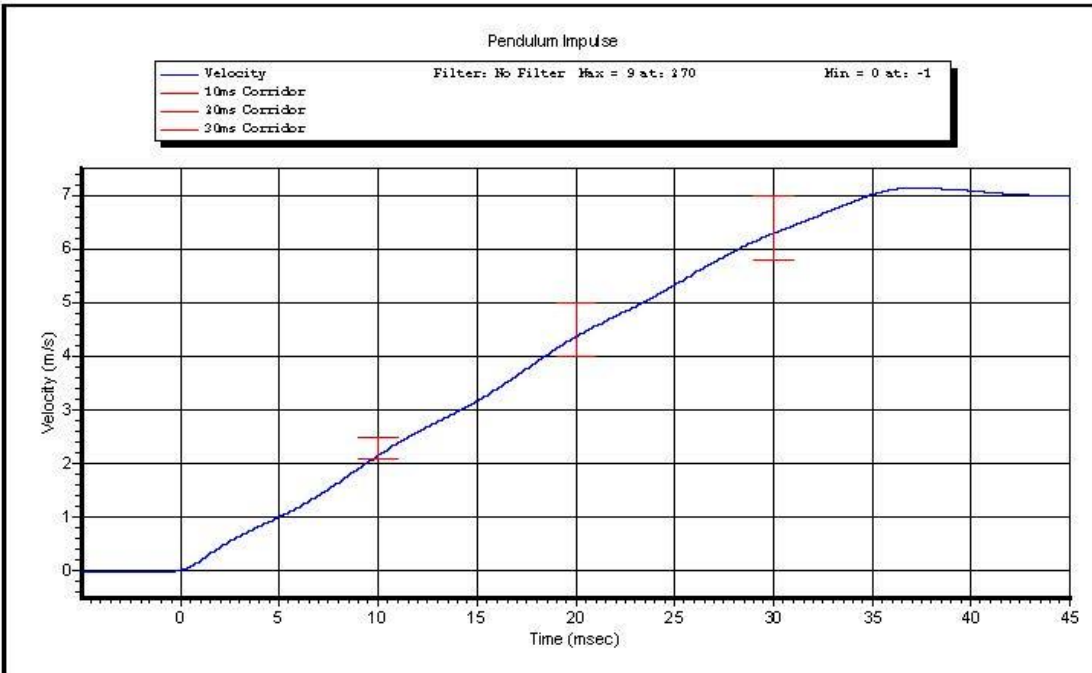
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	4/19/2013
Denton	1716A	LC-2206My	5/23/2013
Denton	1716A	LC-2206Fx	5/23/2013



Test Name: **Neck Flexion**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**

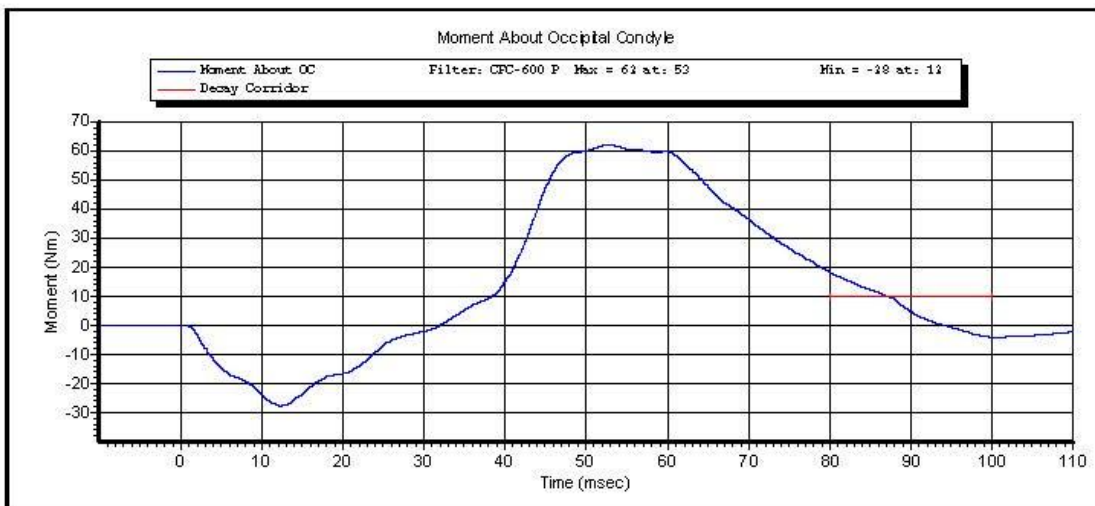
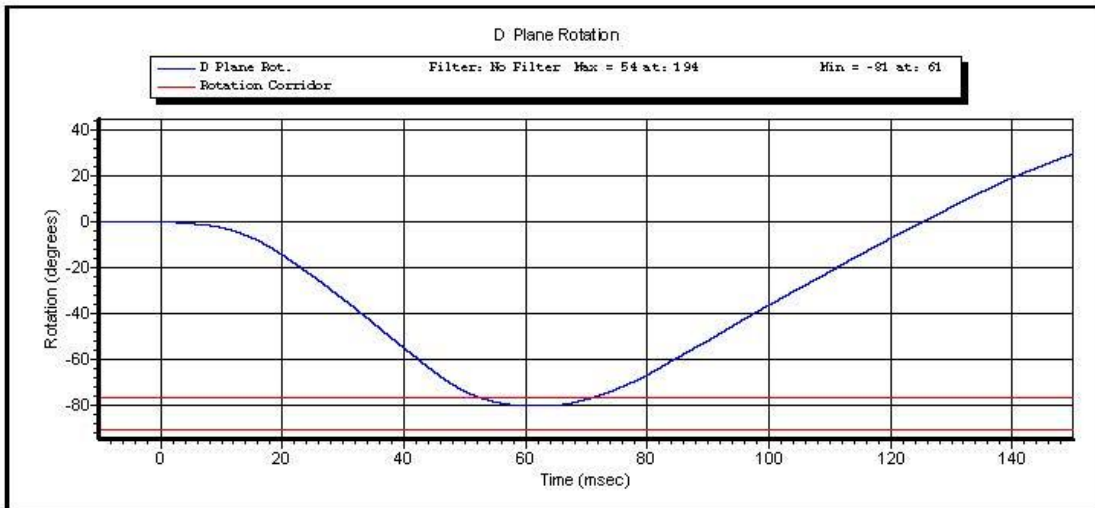


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Test Time: **12:59:40 PM**

Test Date: **12/5/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

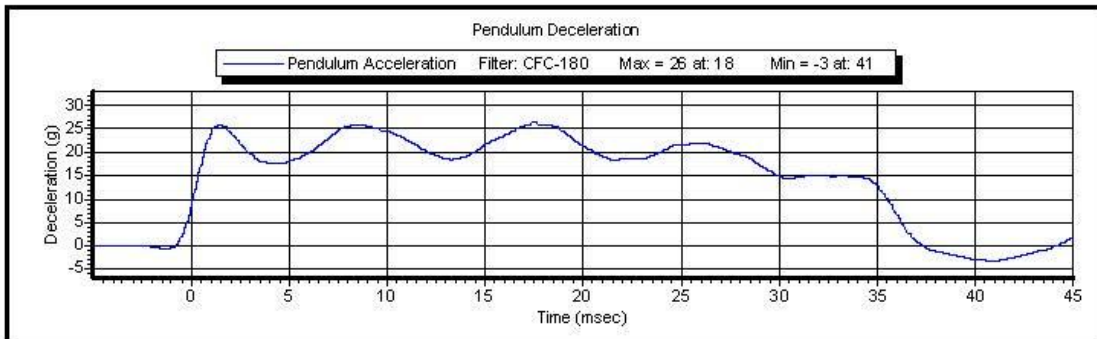
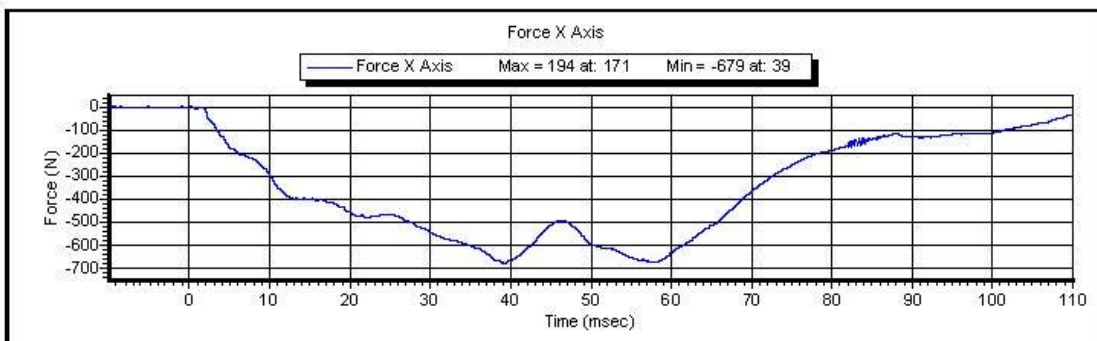
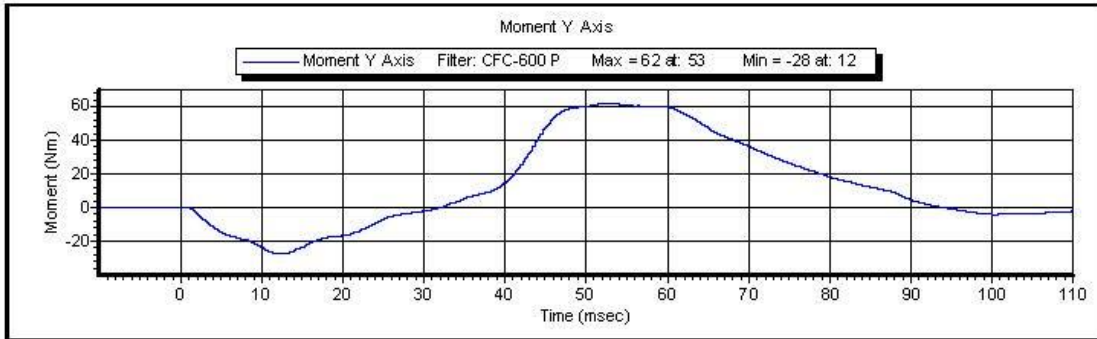


Test ID: Neck Flexion

Test Time: 12:59:40 PM

Test Date: 12/5/2013

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Neck Flexion**

Test Time: **12:59:40 PM**

Test Date: **12/5/2013**

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Thorax Impact	Test Date:	12/4/2013
		Test Time:	12:18:35 PM

Component Part Number	Component Serial Number
Chest Jacket - 880105-355-E	DG 8843
Lumbar Spine - 880105-1095	288

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.0 deg C P
Humidity	10 -- 70	29.5 %RH P
Velocity	6.59 -- 6.83	6.716 m/s P
Sternum Displacement	-58 -- -50	-50.8 mm P
Force During Displacement Interval	-4400 -- -3900	-4094.5 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-4103.7 N P
Hysteresis	69 -- 85	75.0 % P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



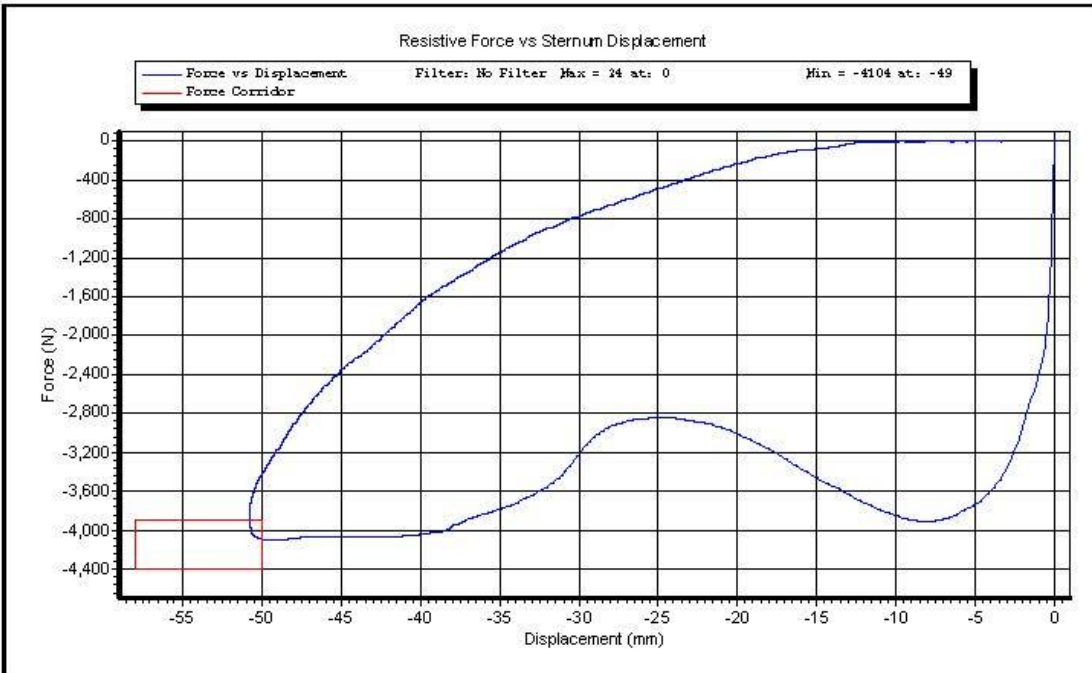
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	12/4/2013
SERVO	14 CB1-2897	DS-288	11/21/2013



Test Name: **Thorax Impact**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**

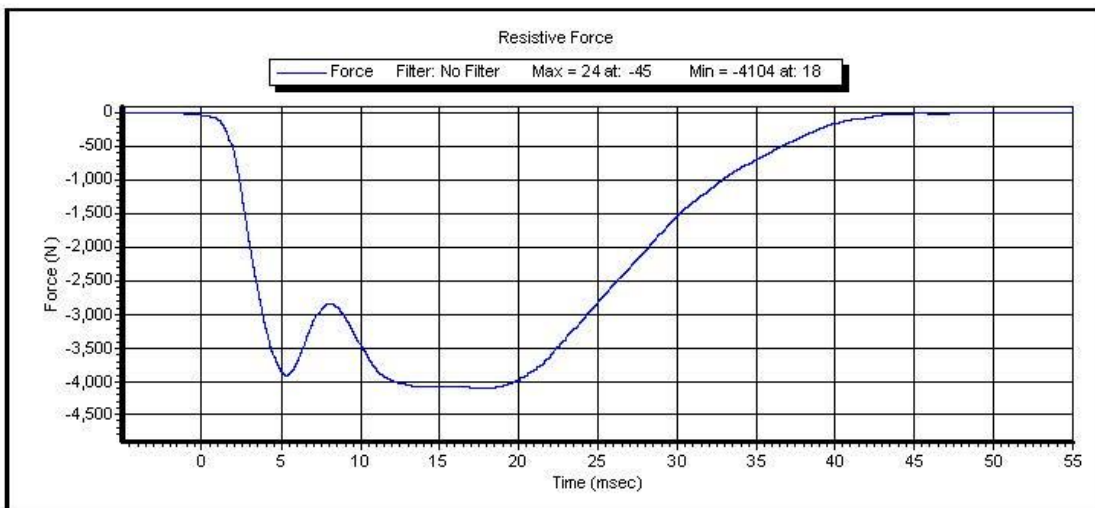
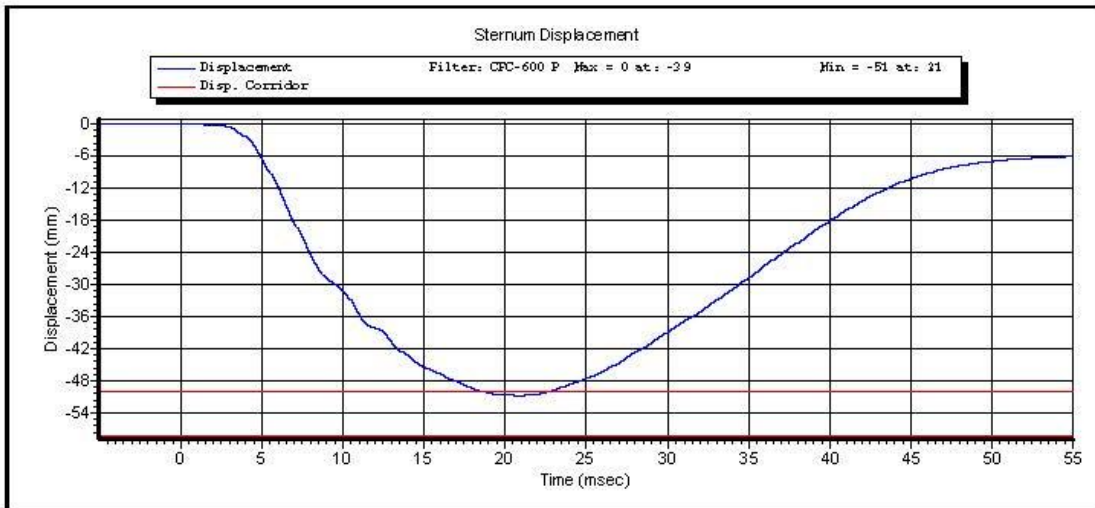


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Test Date: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

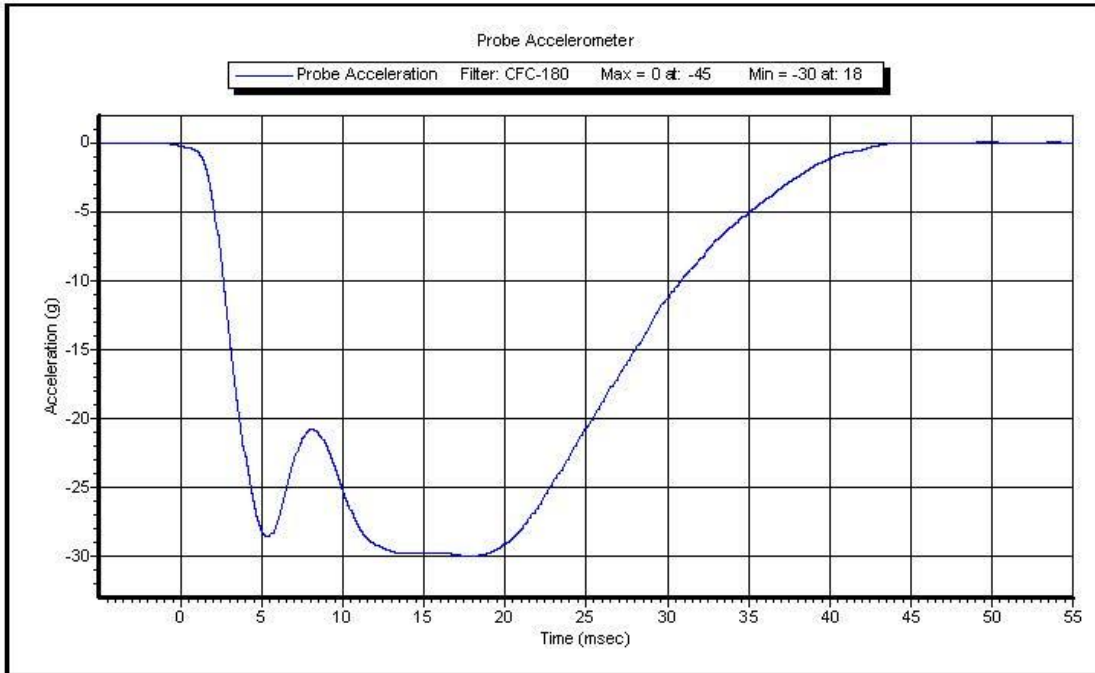


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Test Time: **12:18:35 PM**

Test Date: **12/4/2013**

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Test ID: **Thorax Impact**

Test Time: **12:18:35 PM**

Test Date: **12/4/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Torso Flexion

Post-Test

Part 5720 HIII 5% Female

ATD Serial No: 288

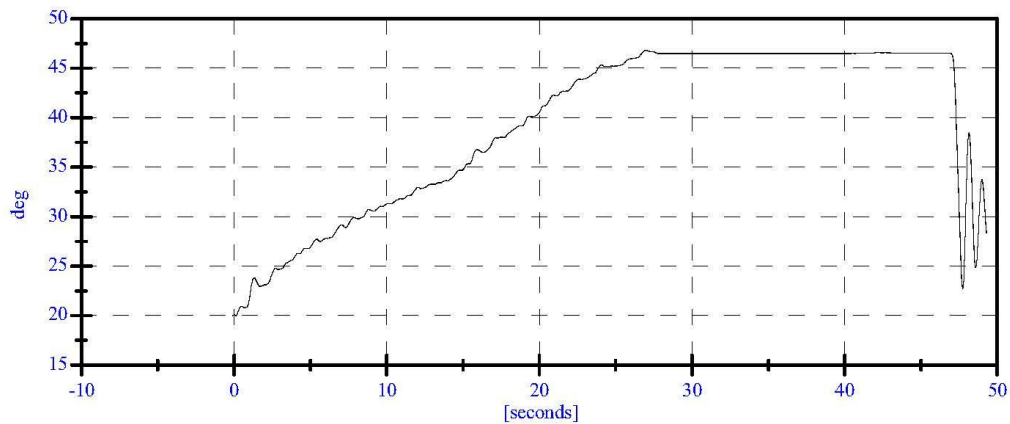
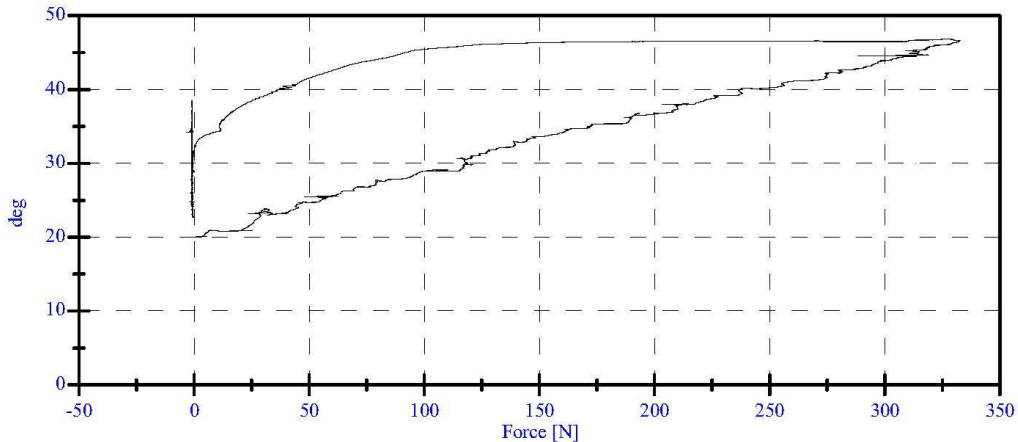
Laboratory Supervisor: E. Dutton

Date: 12/5/2013

Laboratory Technician: M. Geesey

<u>TEST PARAMETER</u>	<u>SPECIFICATION</u>	<u>TEST RESULTS</u>	<u>STATUS</u>
Lab Temperature:	18.9-25.6 C	21.8 C	Passed
Lab Humidity:	10-70 %	48.00 %	Passed
Initial Angle:	0.00-20.00 Deg	20.00 Deg	Passed
Force at 45 Deg	320.00-390.00 N	332.80 N	Passed
Return Angle	8 Deg Max from Initial	25.70 deg	Passed

LUMBAR SPINE FLEXION TEST





VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Knee Impact Left	Test Date:	12/3/2013
		Test Time:	2:24:43 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1729 (L)

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.1 deg C P
Humidity	10 -- 70	21.0 %RH P
Velocity	2.07 -- 2.13	2.102 m/s P
Resistive Force	-4060 -- -3450	-3590.2 N P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	6/3/2013



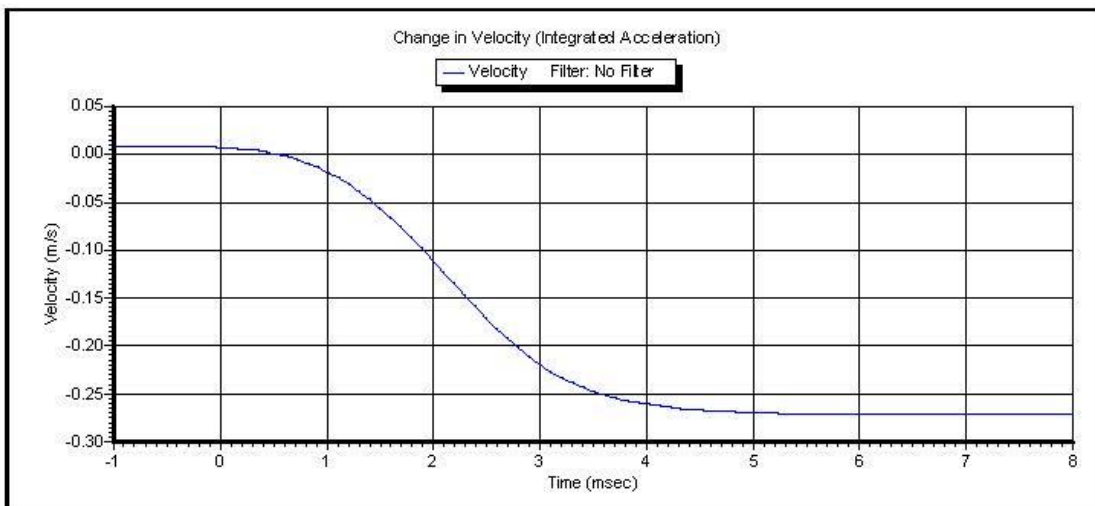
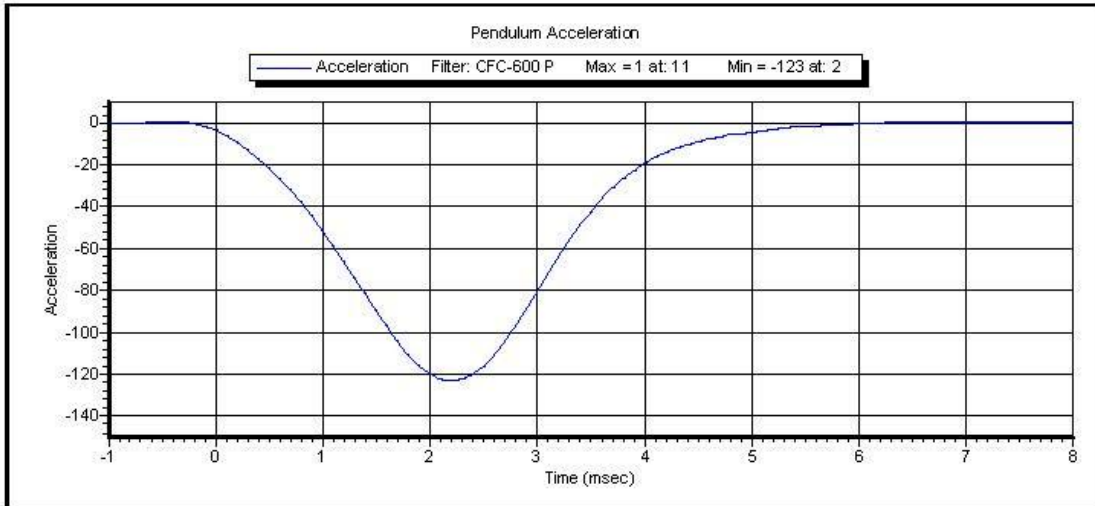
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Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**



Test ID: **Knee Impact Left** Test Time: **2:24:43 PM**

Test Date: **12/3/2013**

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Test ID: **Knee Impact Left** Test Time: **2:24:43 PM**

Test Date: **12/3/2013**

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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Knee Impact Right	Test Date:	12/3/2013
		Test Time:	2:29:59 PM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1728 (R)

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.2 deg C P
Humidity	10 -- 70	20.9 %RH P
Velocity	2.07 -- 2.13	2.100 m/s P
Resistive Force	-4060 -- -3450	-3577.4 N P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



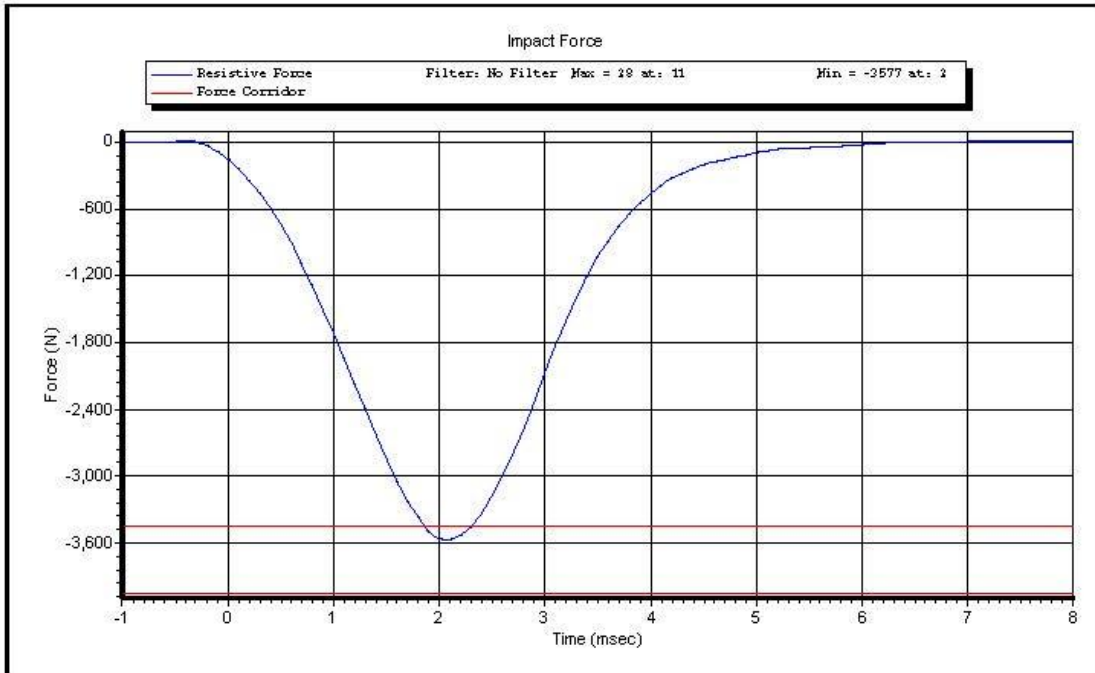
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	6/3/2013



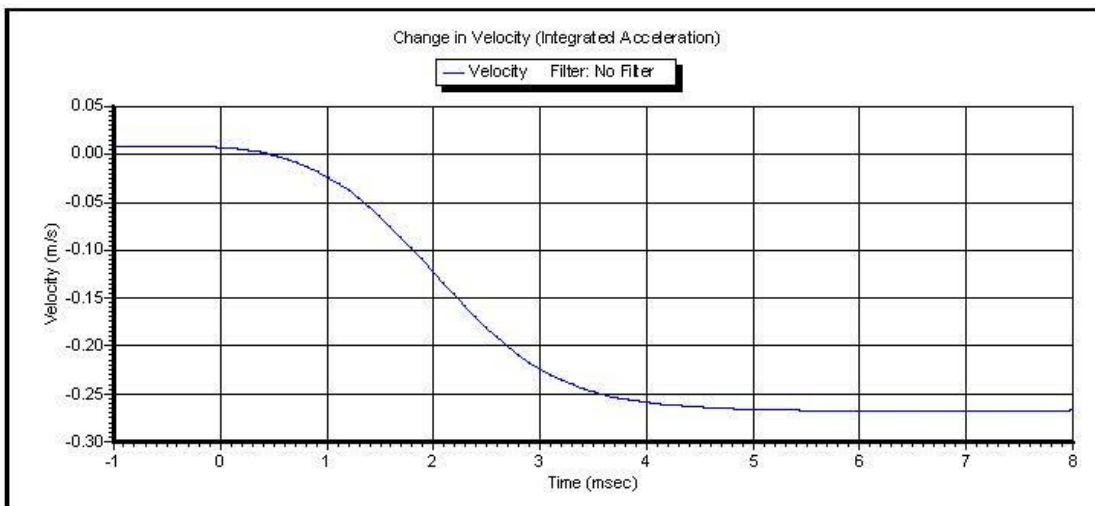
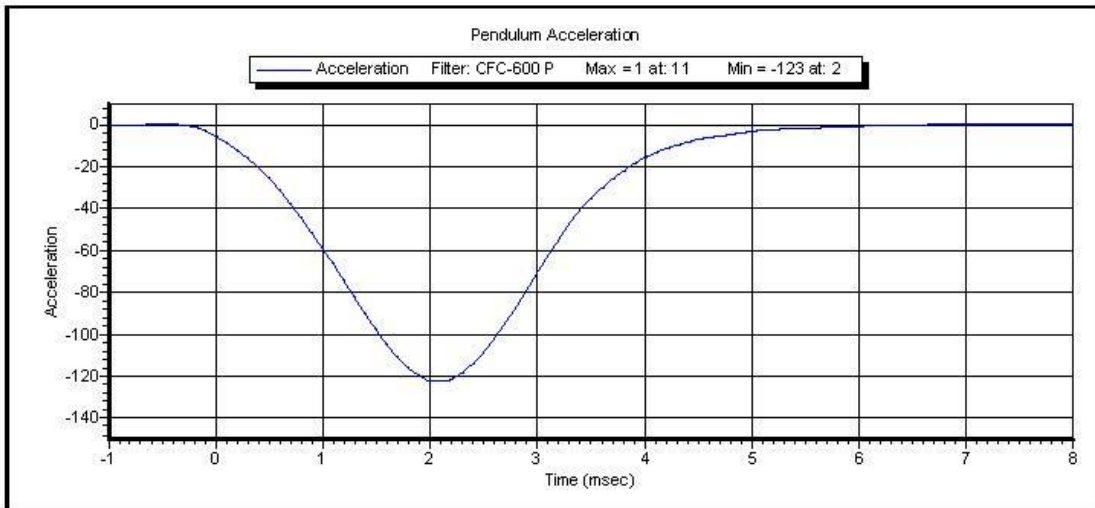
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Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**



Test ID: **Knee Impact Right** Test Time: **2:29:59 PM**

Test Date: **12/3/2013**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Knee Impact Right** Test Time: **2:29:59 PM**

Test Date: **12/3/2013**

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CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 064



50th Male External Measurements

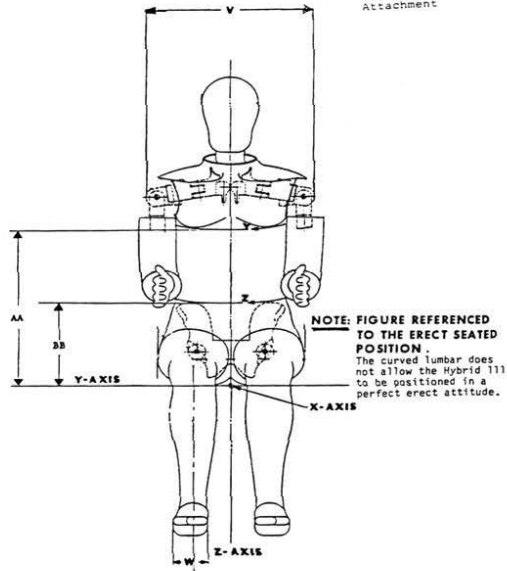
S/N 064

Symbol	Description	Specification	Results	Pass
		in	In	
A	Sitting Height	34.6 – 35.0	34.7	Yes
B	Shoulder Pivot Height	19.9 - 20.5	20.0	Yes
C	H-Point Height	3.3 – 3.5	3.3	Yes
D	H-Point from Backline	5.3 – 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.4	Yes
F	Thigh Clearance	5.5 – 6.1	6.0	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	13.0	Yes
J	Elbow Rest Height	7.5 – 8.3	8.1	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.0	Yes
L	Popliteal Height	16.9 – 17.9	17.1	Yes
M	Knee Pivot Height	19.1 – 19.7	19.3	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.5	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.5	Yes
P	Foot Length (right)	9.9 – 10.5	10.3	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	39.0	Yes
Z	Waist Circumference	32.9 – 34.1	33.6	Yes
AA	Reference Location (Chest Circumference)	16.9 – 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 – 9.1	9.0	Yes

Technician: R. Weil

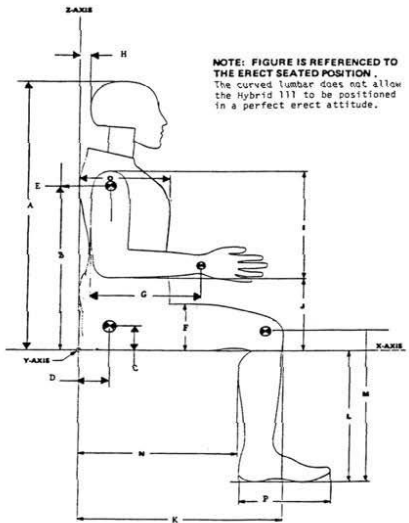
01/06/2014

USG 2485
Attachment



HYBRID III Exterior Body Dimensions - Front View

USG 2485
Attachment



HYBRID III Exterior Body Dimensions - Side View



VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male -NEW		
ATD Serial Number:	064		
Test ID:	Head Drop	Test Date:	1/6/2014
		Test Time:	3:52:48 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	7997
Cap Skin - 78051-229	2494

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.6 deg C P
Humidity	10 -- 70	19.0 %RH P
Resultant Acceleration	225 -- 275	256.0 g P
Oscillation	0 -- 10	1.9 % P
Lateral Acceleration	-15 -- 15	-2.4 g P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



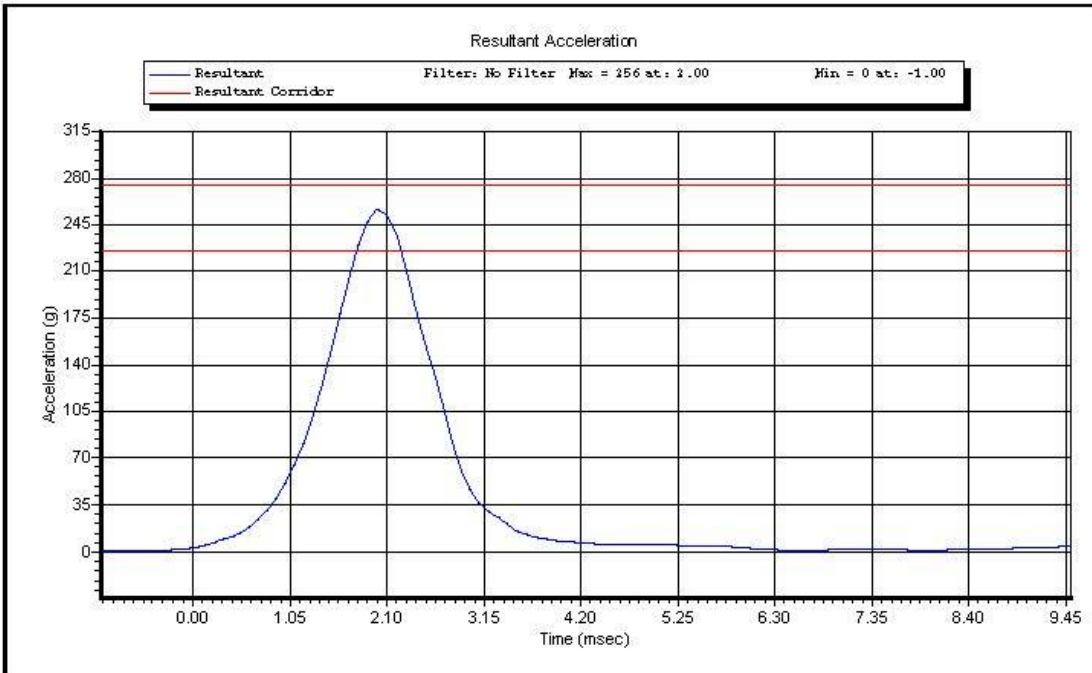
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58904	12.5/2013
Endevco	7264-2000	P58911	12.5/2013
Endevco	7264-2000	P58776	12.5/2013



Test Name: **Head Drop**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male -NEW**
ATD Serial Number: **064**

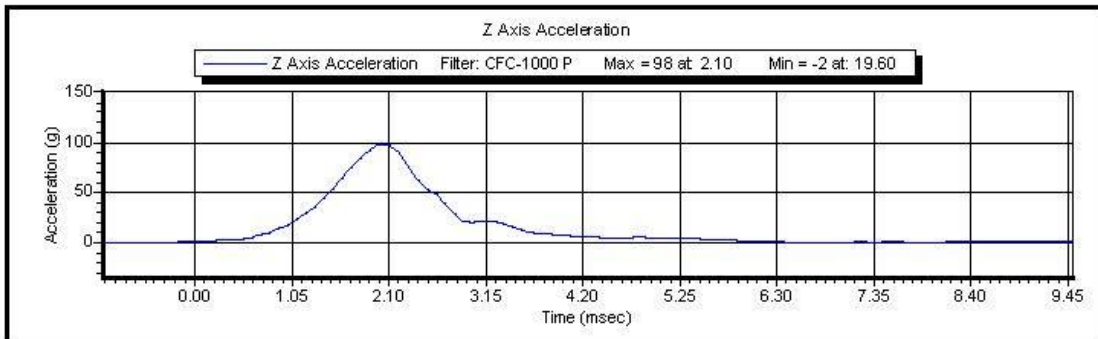
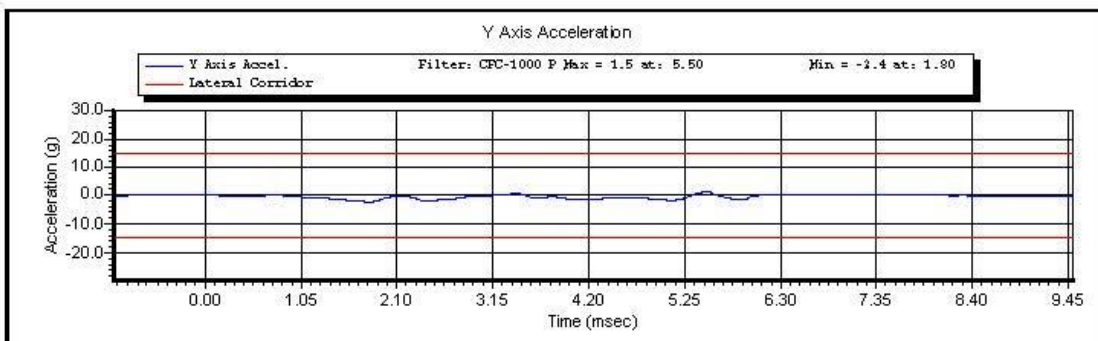
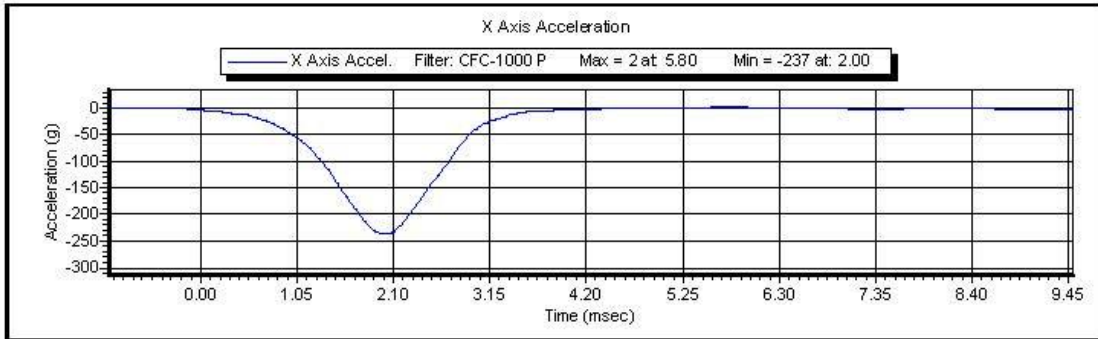


Test ID: **Head Drop**

Test Time: **3:52:48 PM**

Test Date: **1/6/2014**

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Test ID: **Head Drop**

Test Time: **3:52:48 PM**

Test Date: **1/6/2014**

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Neck Extension	Test Date:	1/8/2014
		Test Time:	2:28:23 PM

Component Part Number	Component Serial Number
Neck - 78051-336	021692

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.1 deg C P
Humidity	10 -- 70	16.9 %RH P
Velocity	5.94 -- 6.19	6.117 m/s P
Pendulum Deceleration at 10 ms	17.2 -- 21.2	19.18 g P
Pendulum Deceleration at 20 ms	14 -- 19	16.4 g P
Pendulum Deceleration at 30 ms	11 -- 16	13.0 g P
Max Pendulum Deceleration after 30 ms	0 -- 22	13.7 g P
Decel Time to 5 g	38 -- 46	42.7 ms P
D Plane Rotation	81 -- 106	98.6 degrees P
Time at Max Rotation	72 -- 82	80.1 ms P
Rotation Decay to Zero	147 -- 174	159.6 ms P
Moment About Occipital Condyle	-80.0 -- -52.9	-64.90 Nm P
Time at Max Moment	65 -- 79	75.9 ms P
Moment Decay to Zero	120 -- 148	147.3 ms P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



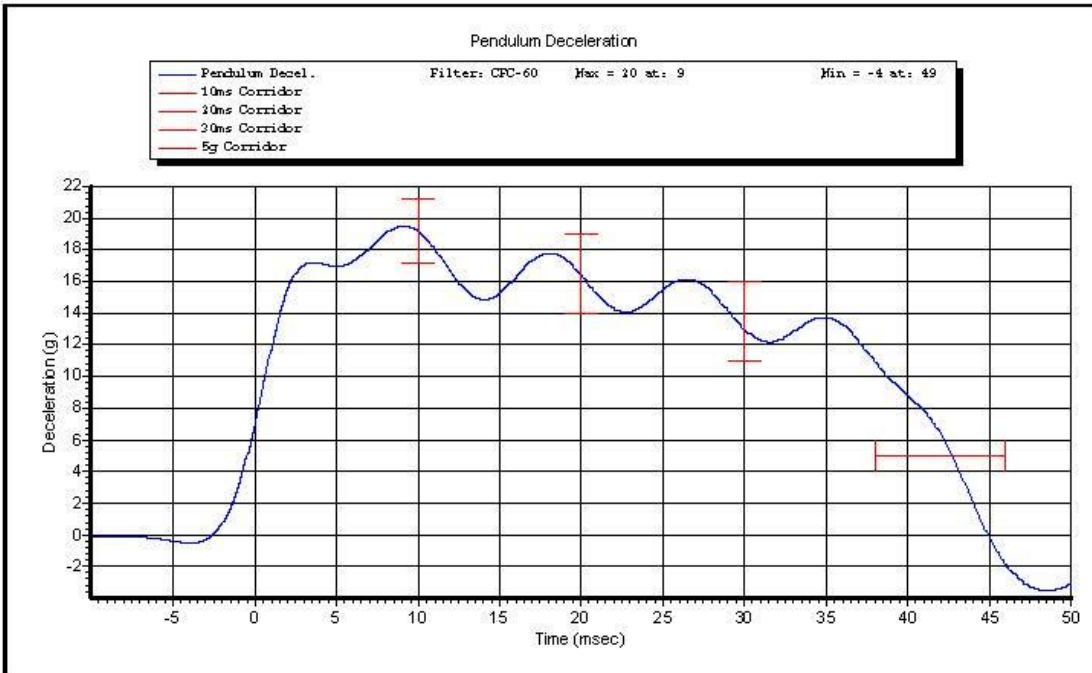
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	4/19/2013
Denton	1716A	LC-2186 My	5/23/2013
Denton	1716A	LC-2186 Fx	5/23/2013



Name of Test:	Neck Extension
Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	064

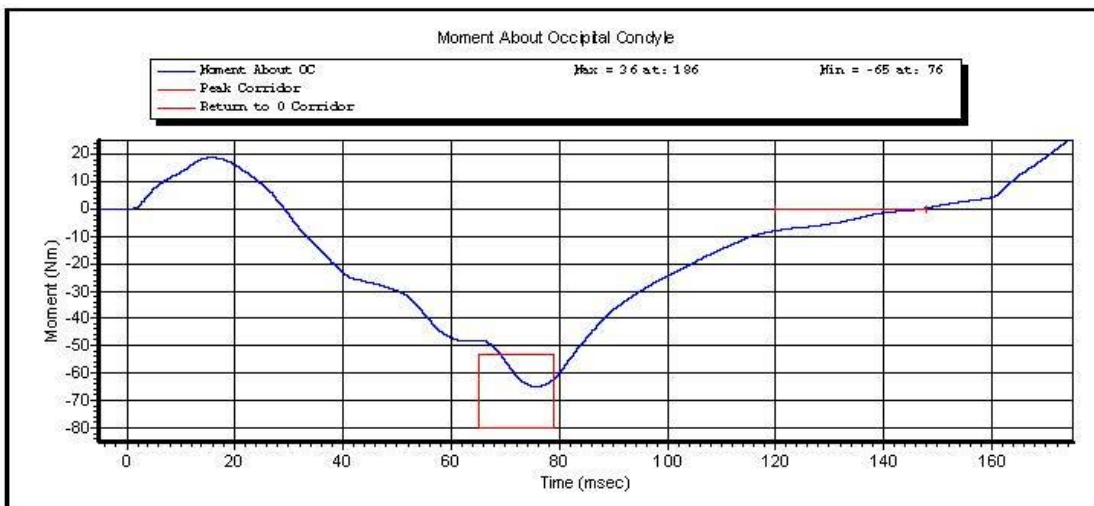
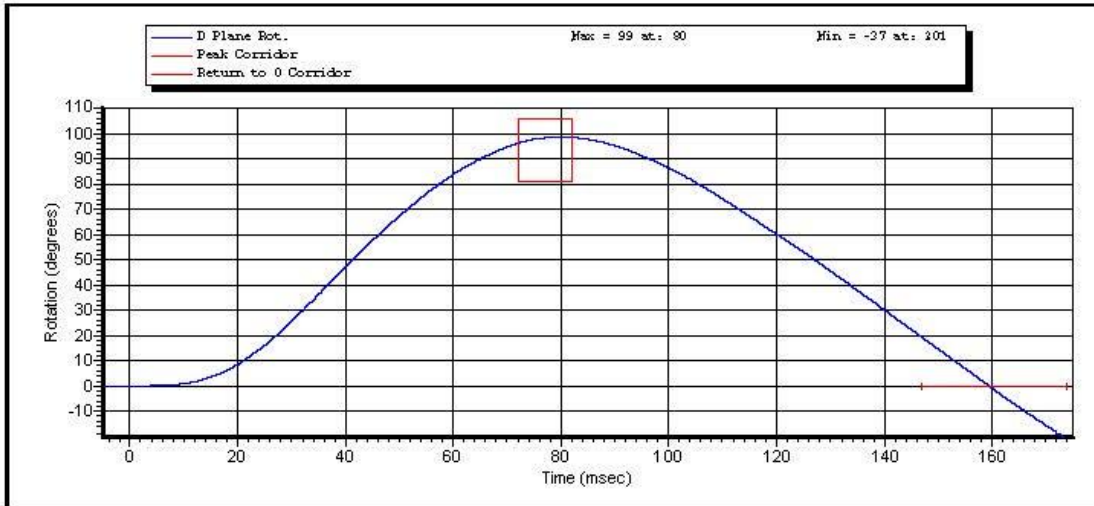


ID of Test: **Neck Extension**

Time of Test: **2:28:23 PM**

Date of Test: **1/8/2014**

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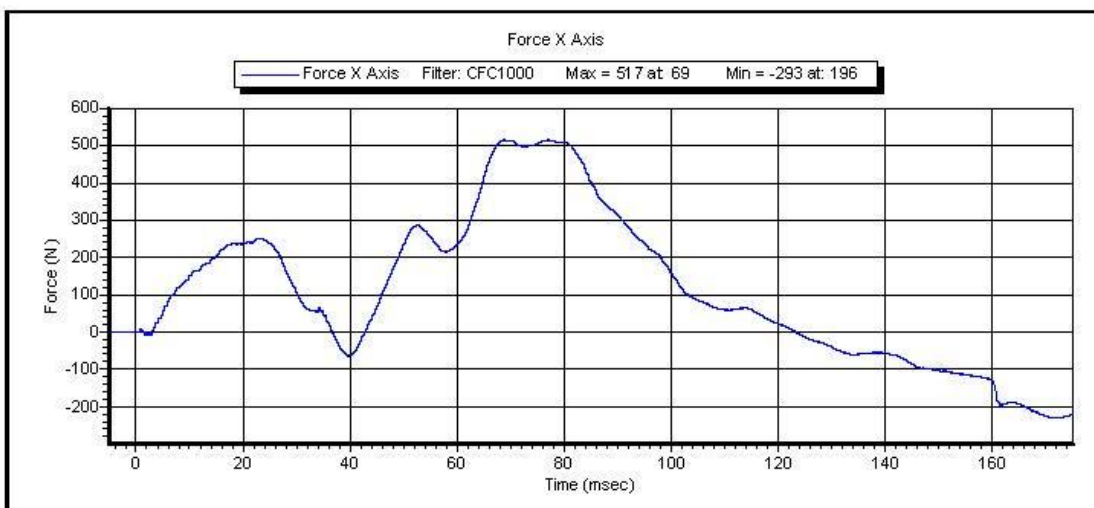
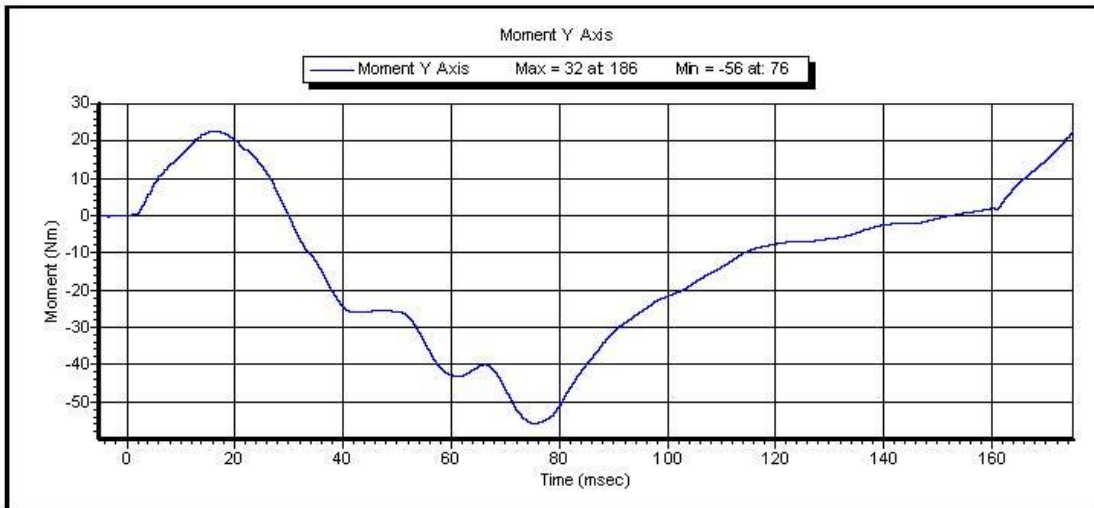


ID of Test: **Neck Extension**

Time of Test: **2:28:23 PM**

Date of Test: **1/8/2014**

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ID of Test: **Neck Extension**

Time of Test: **2:28:23 PM**

Date of Test: **1/8/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Neck Flexion	Test Date:	1/8/2014
		Test Time:	12:17:46 PM

Component Part Number	Component Serial Number
Neck - 78051-336	021692

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.2 deg C	P
Humidity		10	-- 70	17.5 %RH	P
Velocity		6.89	-- 7.13	7.063 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	25.49 g	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.84 g	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	14.38 g	P
Max Pendulum Deceleration After	30 ms	0	-- 29	14.4 g	P
Deceleration time to	5 g	34	-- 42	39.3 ms	P
D Plane Rotation		-78	-- -64	-73.0 degrees	P
Time at max rotation		57	-- 64	59.0 ms	P
Rotation Decay to Zero		113	-- 128	114.7 ms	P
Moment about OC		88.1	-- 108.4	96.16 Nm	P
Time at Max Moment		47	-- 58	53.0 ms	P
Moment Decay to Zero		97	-- 107	99.1 ms	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



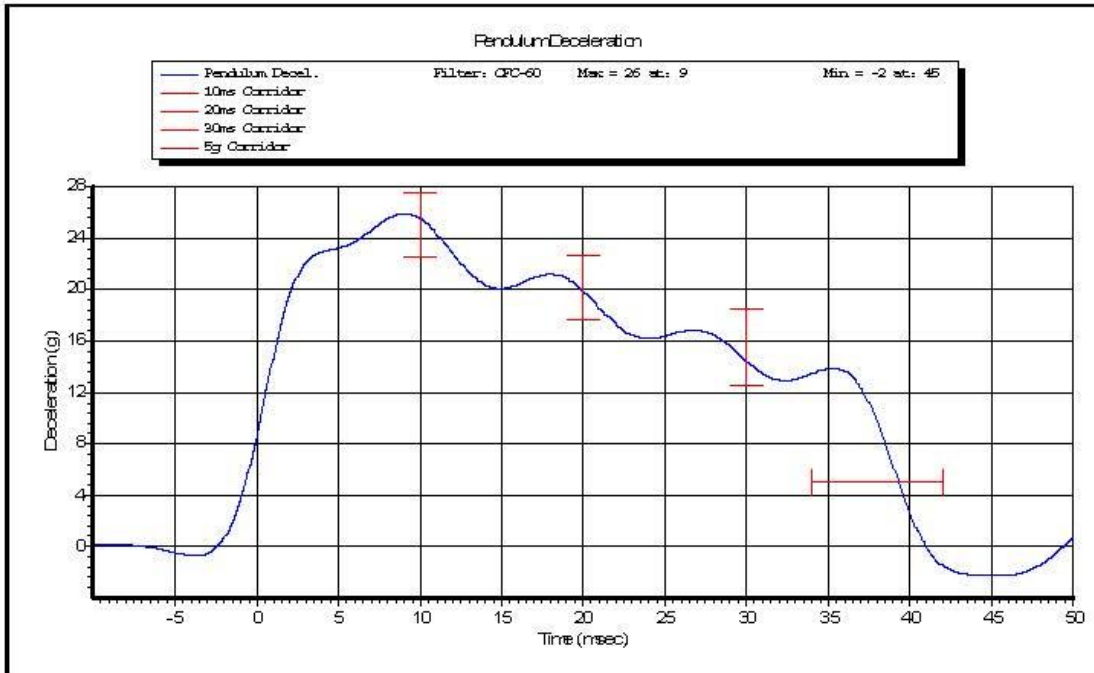
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	4/19/2013
Denton	1716A	LC-2186 My	5/23/2013
Denton	1716A	LC-2186 Fx	5/23/2013



Name of Test:	Neck Flexion
Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	064

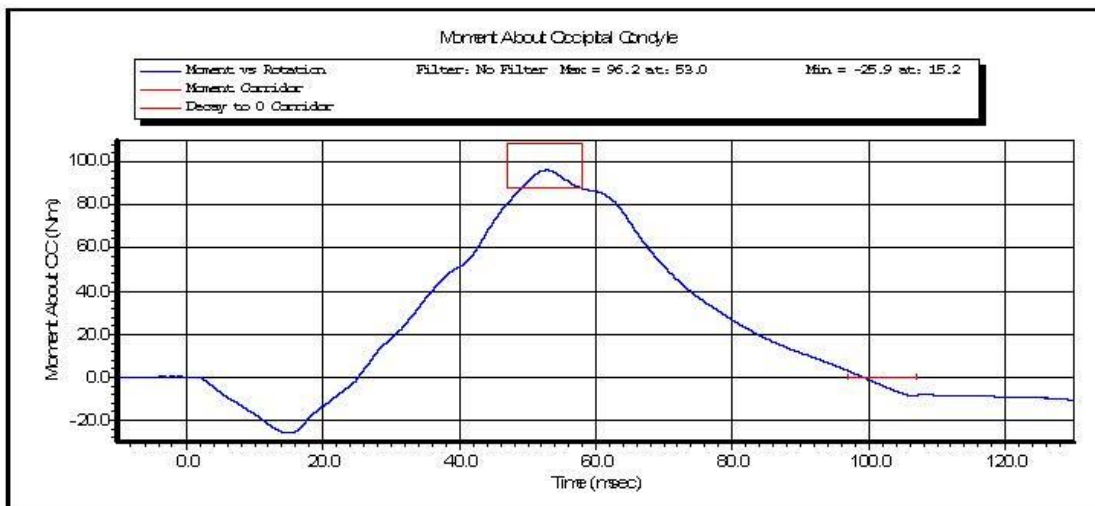
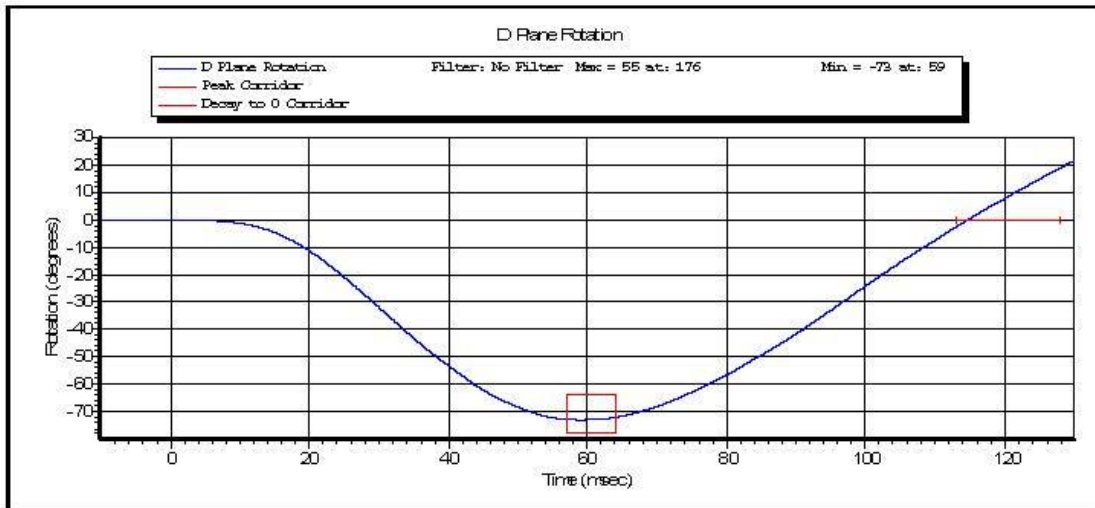


ID of Test: **Neck Flexion**

Time of Test: **12:17:46 PM**

Date of Test: **1/8/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

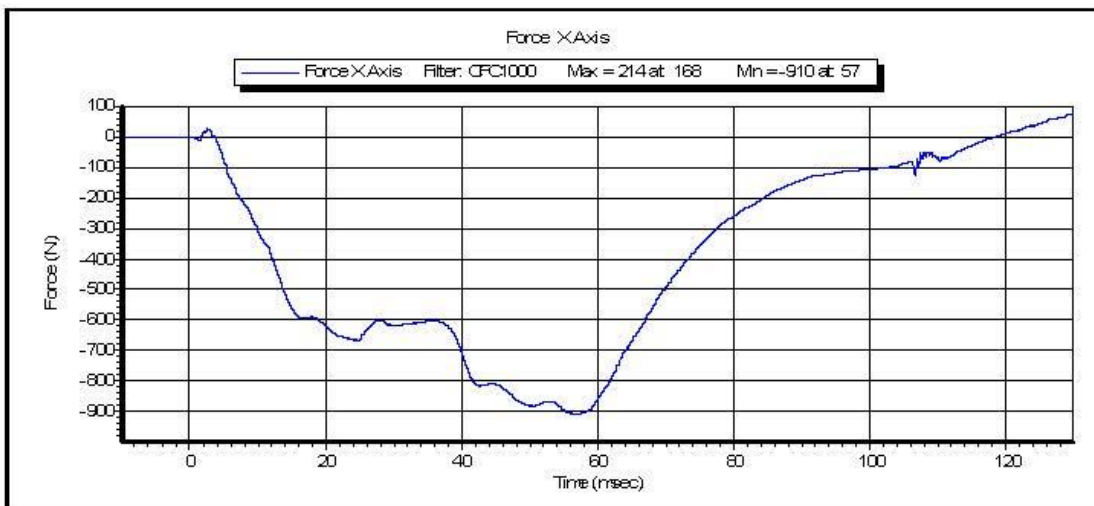
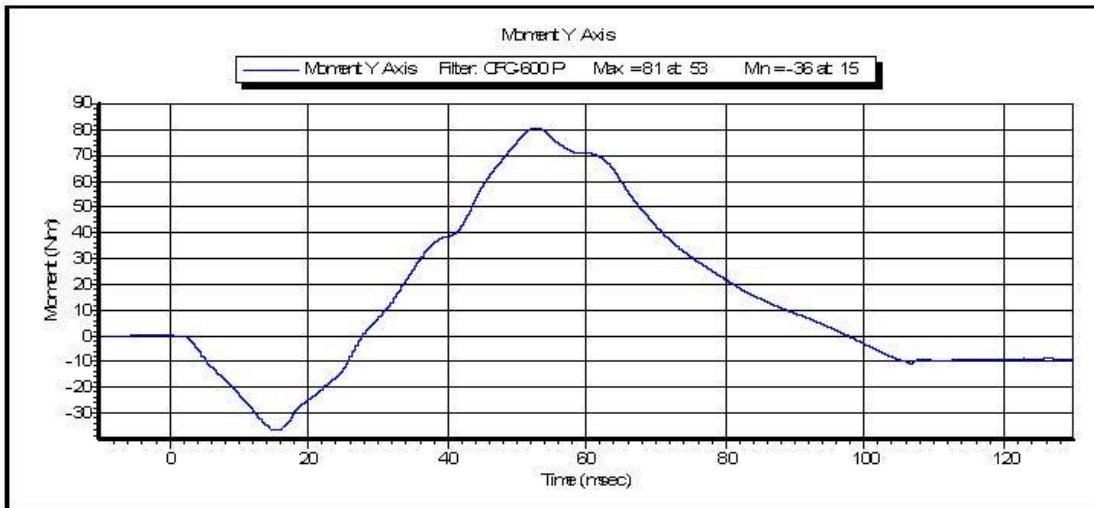


ID of Test: **Neck Flexion**

Time of Test: **12:17:46 PM**

Date of Test: **1/8/2014**

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ID of Test: **Neck Flexion**

Time of Test: **12:17:46 PM**

Date of Test: **1/8/2014**

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Thorax Impact	Test Date:	1/9/2014
		Test Time:	8:11:11 AM

Component Part Number	Component Serial Number
Chest Jacket - 78051-169	DL7598

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.6 deg C P
Humidity	10 -- 70	12.0 %RH P
Velocity	6.59 -- 6.83	6.733 m/s P
Resistive Force	-5.894 -- -5.160	-5.4402 kN P
Sternum Displacement	-72.6 -- -63.5	-72.34 mm P
Hysteresis	69 -- 85	69.5 % P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



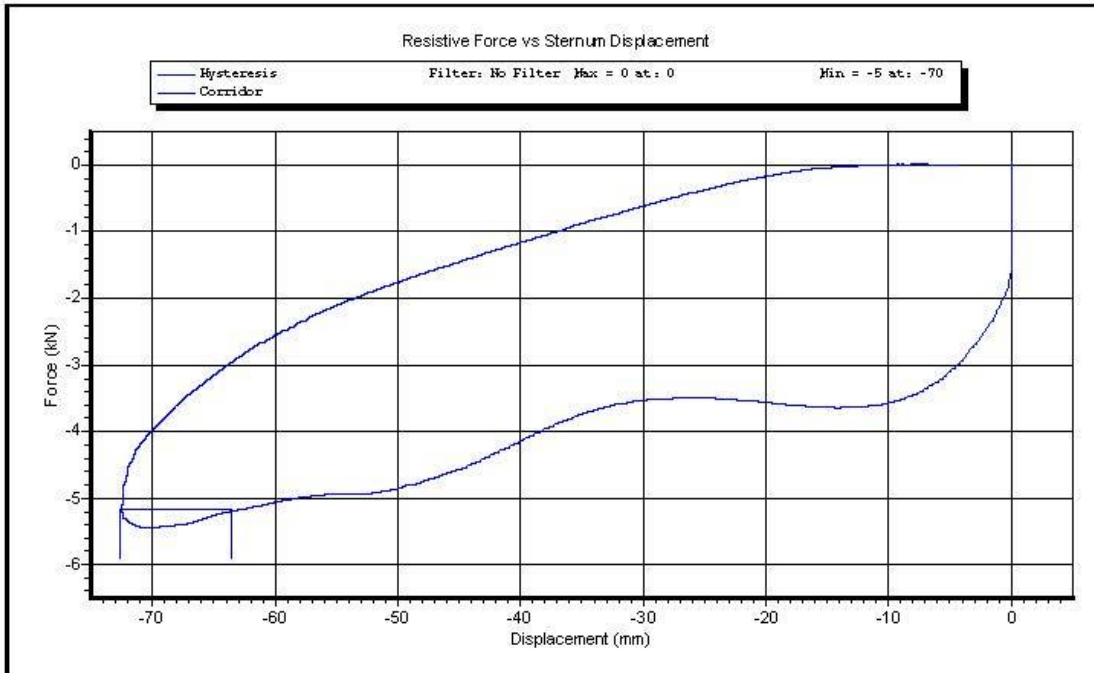
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	12/4/2013
DentonATD	78051-342	DS-064	6/18/2013

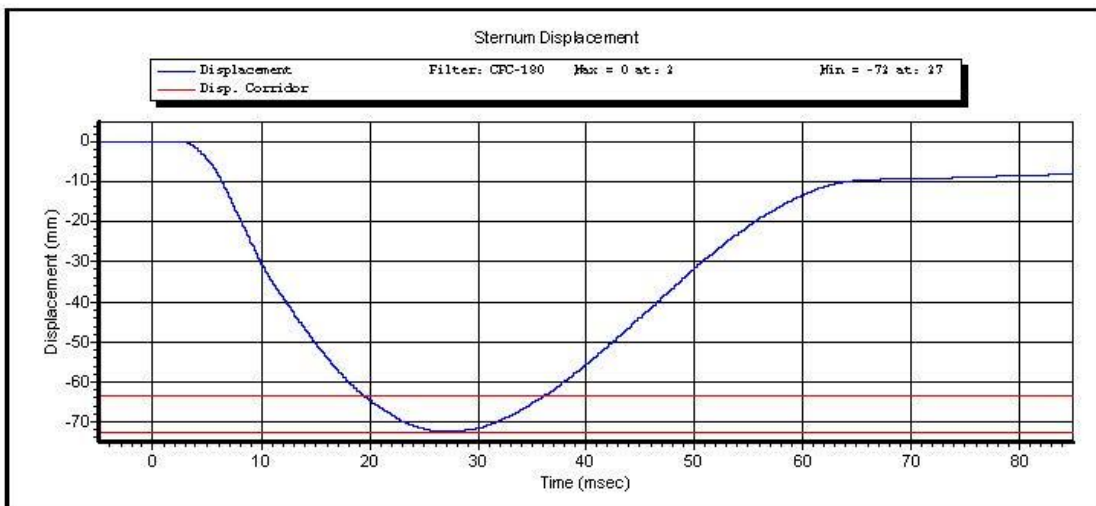
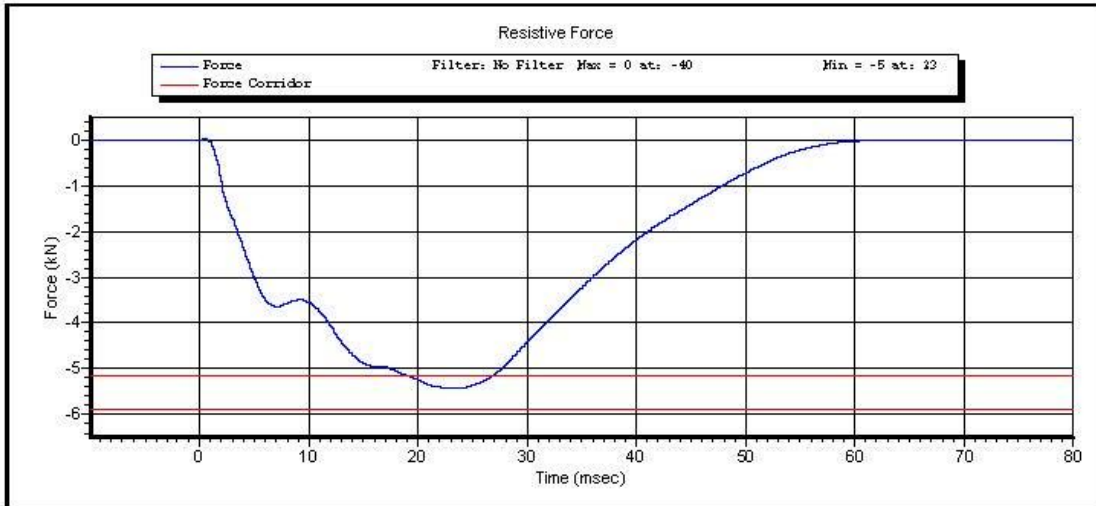


Test Name: **Thorax Impact**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Thorax Impact** Test Time: **8:11:11 AM** Test Date: **1/9/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

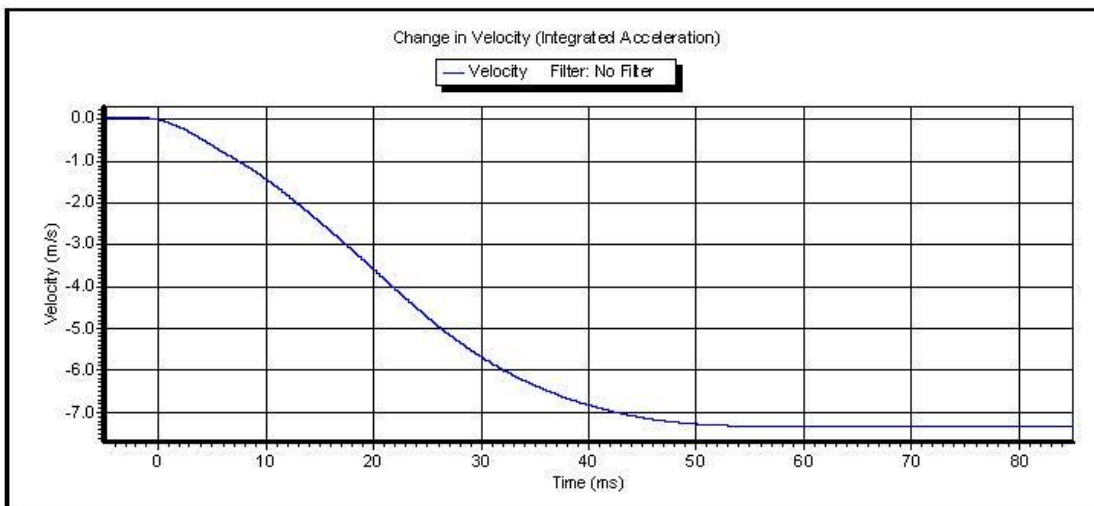
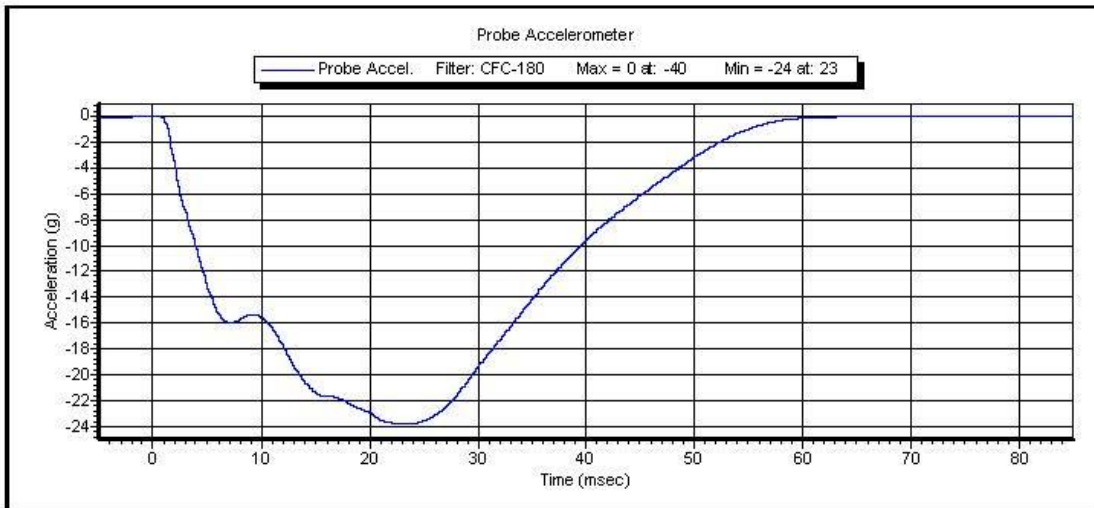


Test ID: **Thorax Impact**

Test Time: **8:11:11 AM**

Test Date: **1/9/2014**

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Test ID: **Thorax Impact**

Test Time: **8:11:11 AM**

Test Date: **1/9/2014**

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VERIFICATION REPORT

Test Name:	Hip ROM	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Hip ROM Left	Test Date:	1/6/2014
		Test Time:	10:47:36 AM

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	1445

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.7 deg C P
Humidity	10 -- 70	23.2 %RH P
Average Velocity	5 -- 10	6.0 deg/s P
Angle at 203 Nm	40 -- 50	42.7 degrees P
Moment at 30 degrees	0.0 -- 94.9	71.99 Nm P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



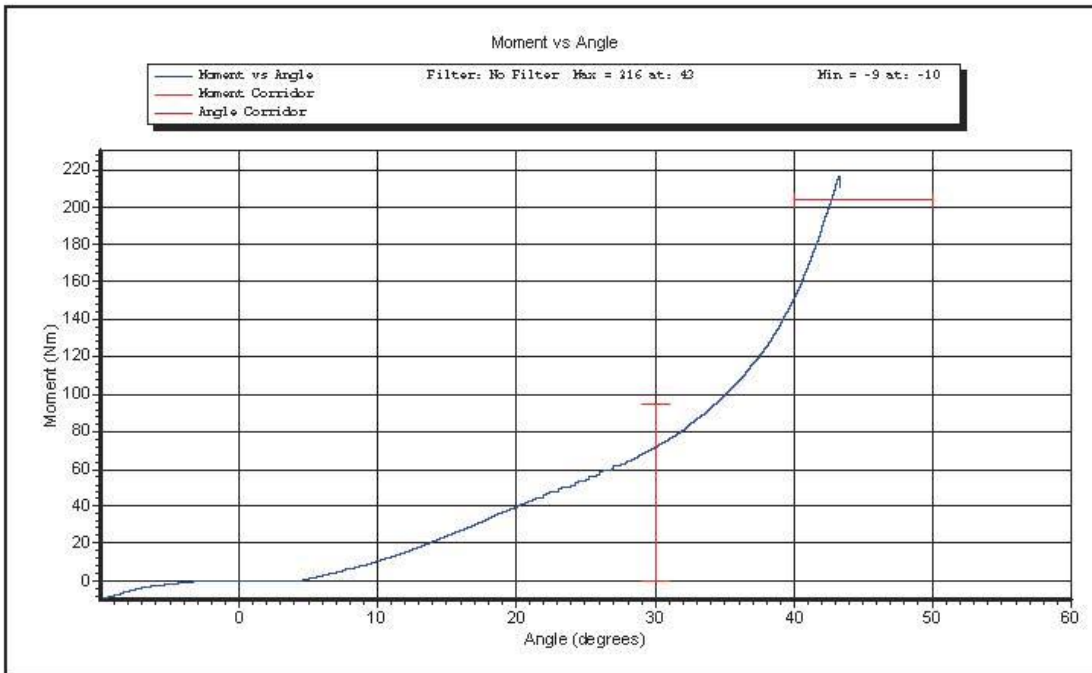
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key Trans/PCB	2301-02	115	3/19/2013
DentonATD	14 CB1-3615	0008	2/21/2013
DentonATD	Velocity Trap	1	1/11/2013



Test Name: **Hip ROM**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Hip ROM Left**

Test Time: **10:47:36 AM**

Test Date: **1/6/2014**

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VERIFICATION REPORT

Test Name:	Hip ROM	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Hip ROM Right	Test Date:	1/6/2014
		Test Time:	11:12:29 AM

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	1445

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.1 deg C P
Humidity	10 -- 70	24.3 %RH P
Average Velocity	5 -- 10	5.5 deg/s P
Angle at 203 Nm	40 -- 50	41.4 degrees P
Moment at 30 degrees	0.0 -- 94.9	81.90 Nm P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



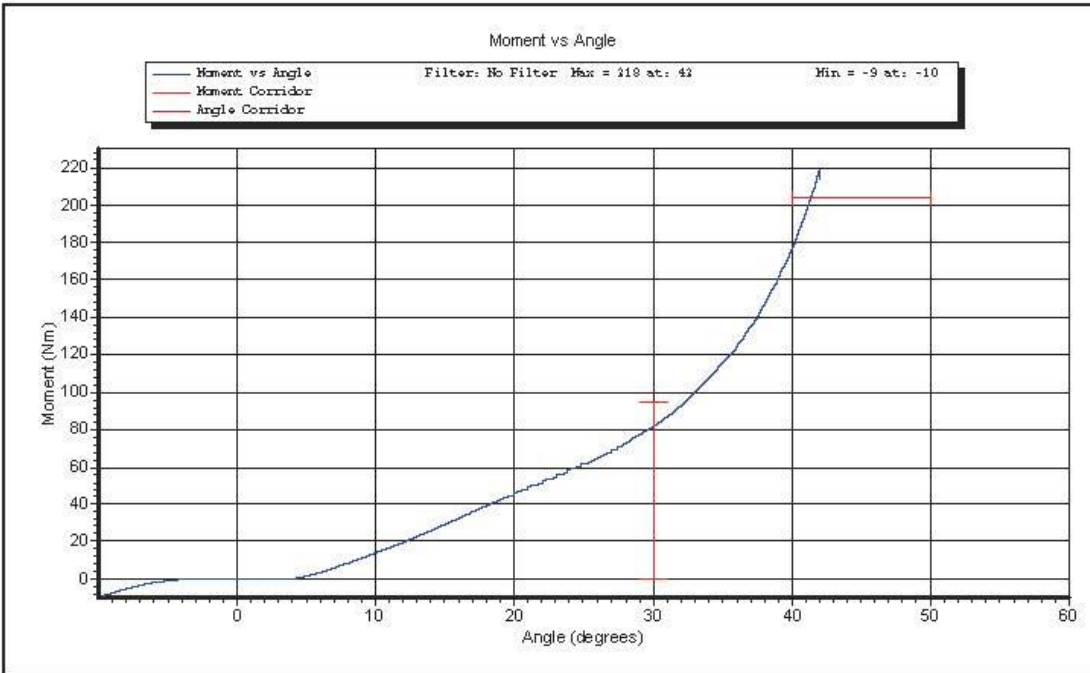
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key Trans/PCB	2301-02	115	3/19/2013
DentonATD	14 CB1-3615	0008	2/21/2013
DentonATD	Velocity Trap	1	1/11/2013



Test Name: **Hip ROM**
Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Hip ROM Right** Test Time: **11:12:29 AM** Test Date: **1/6/2014**

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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Knee Impact Left	Test Date:	1/6/2014
		Test Time:	10:00:39 AM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	2882

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.4 deg C P
Humidity	10 -- 70	22.2 %RH P
Velocity	2.07 -- 2.13	2.106 m/s P
Resistive Force	-5.78 -- -4.72	-4.875 kN P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



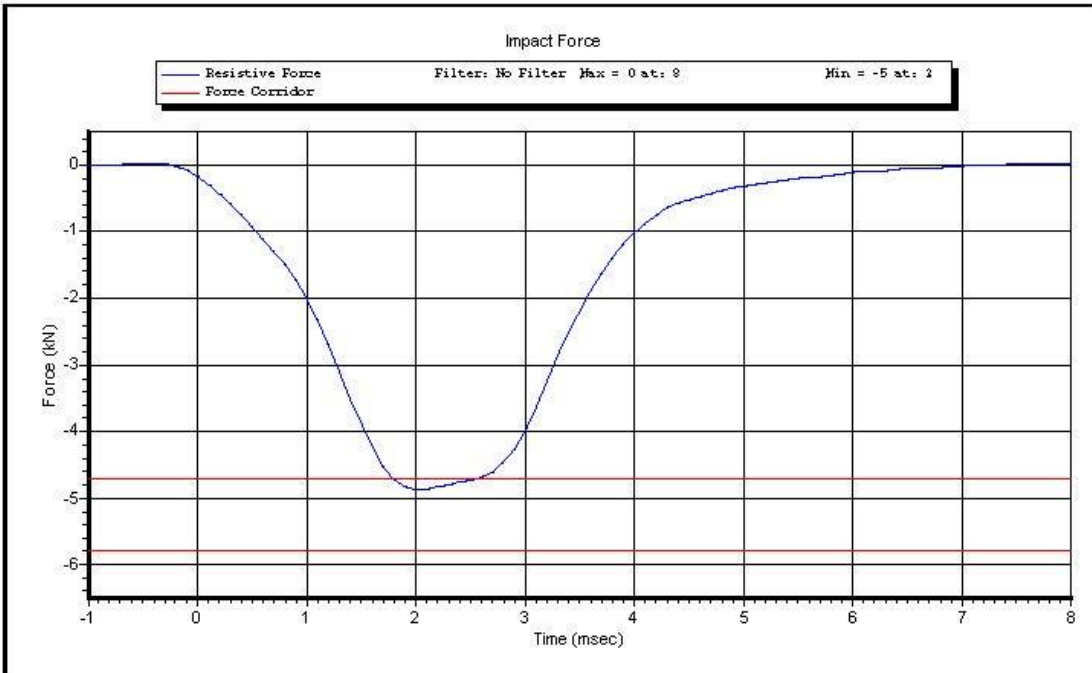
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	12/4/2013



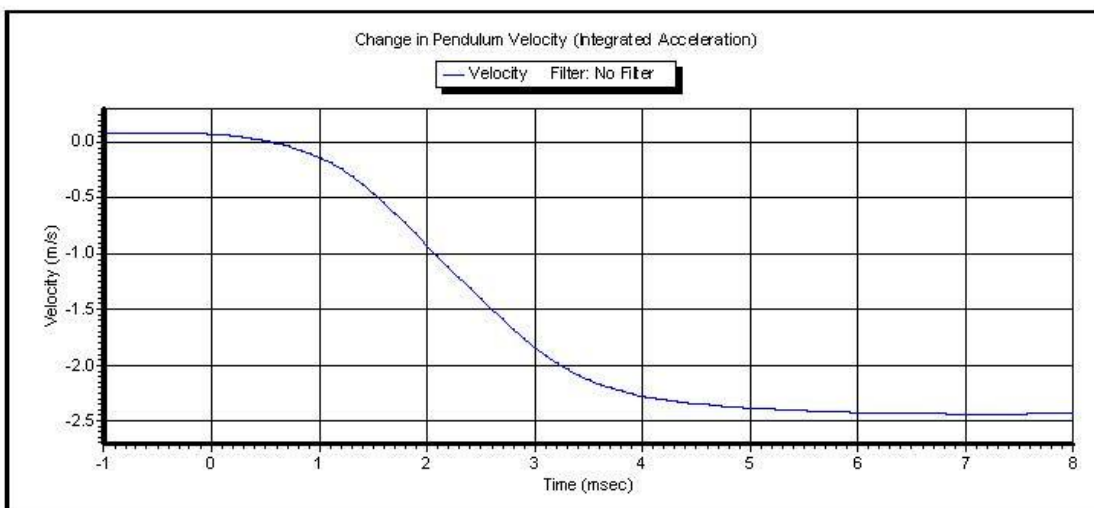
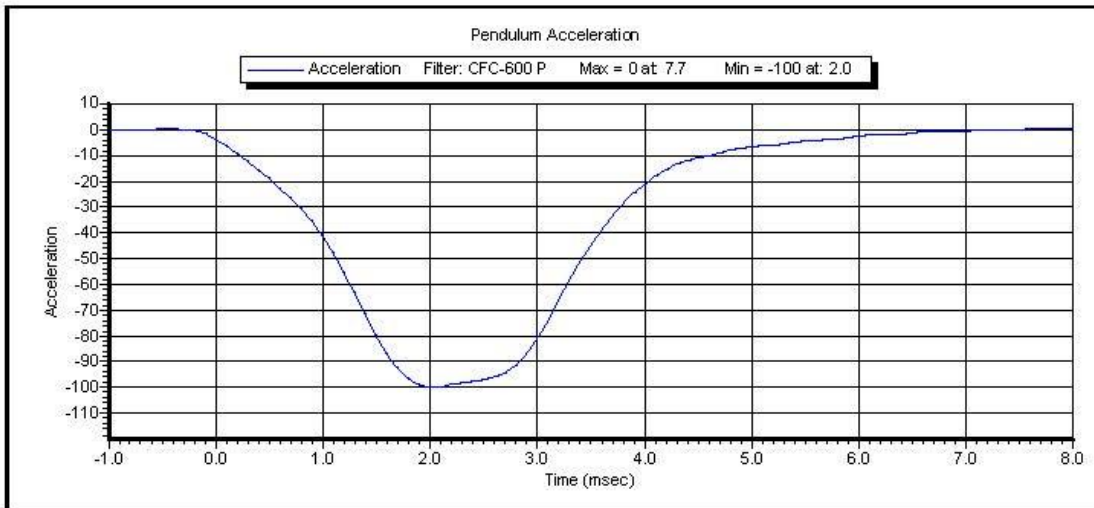
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Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Knee Impact Left** Test Time: **10:00:39 AM**

Test Date: **1/6/2014**

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Test ID: **Knee Impact Left** Test Time: **10:00:39 AM**

Test Date: **1/6/2014**

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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Knee Impact Right	Test Date:	1/6/2014
		Test Time:	9:53:48 AM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	2531

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.4 deg C P
Humidity	10 -- 70	22.2 %RH P
Velocity	2.07 -- 2.13	2.111 m/s P
Resistive Force	-5.78 -- -4.72	-5.292 kN P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



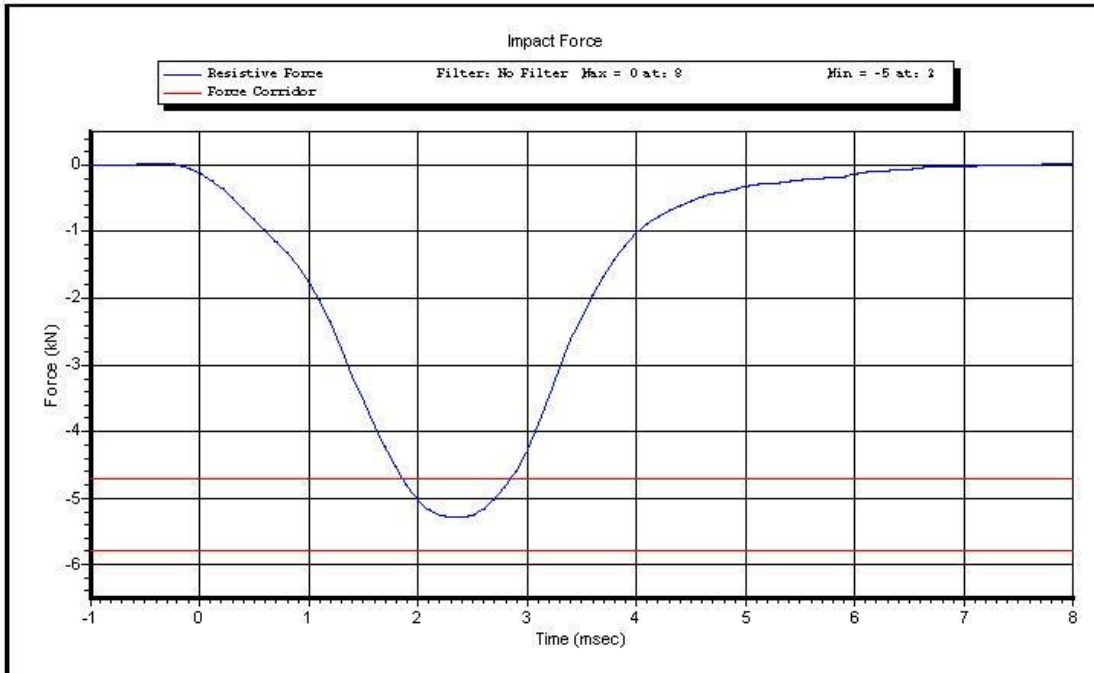
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	12/4/2013



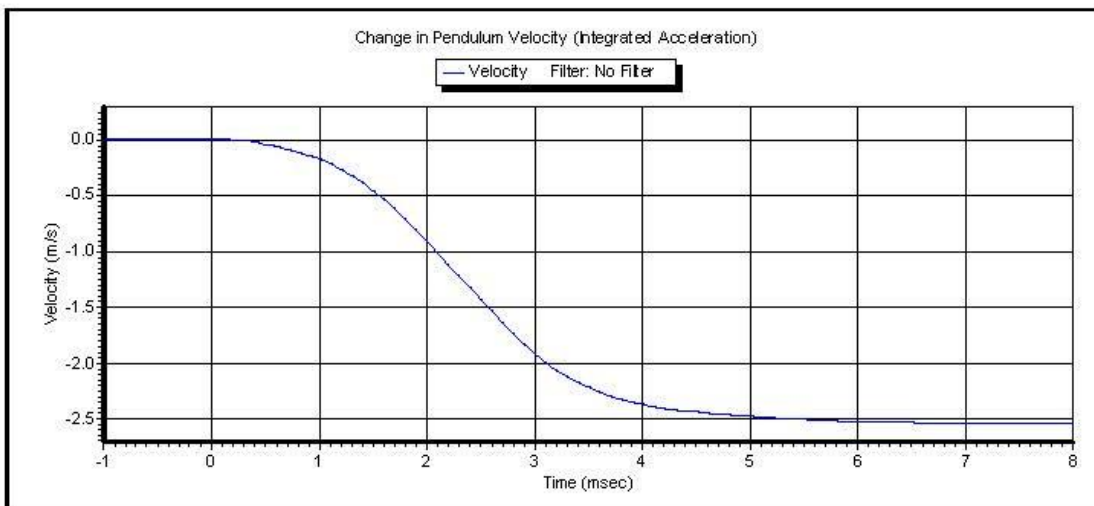
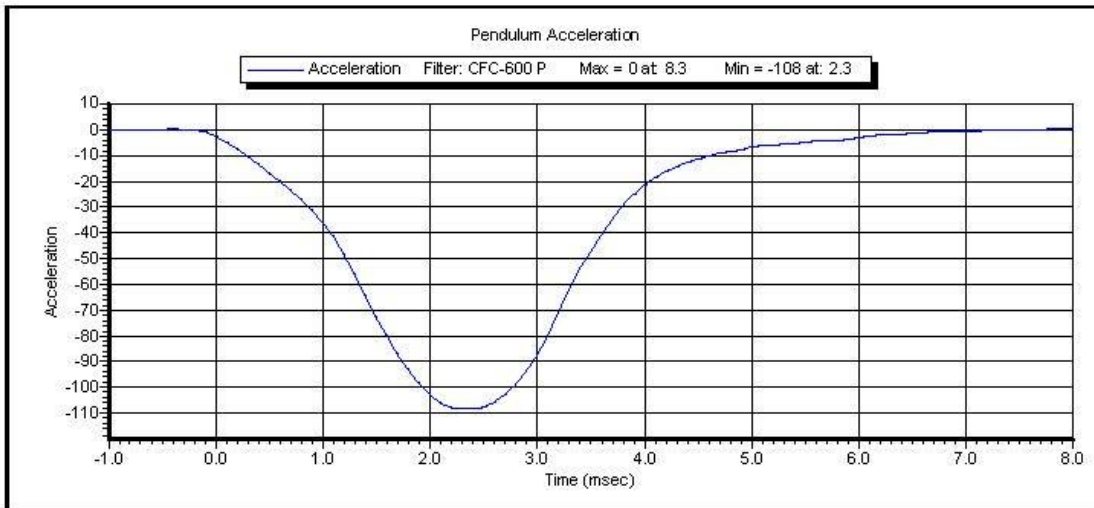
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Sub Test Name:
ATD Type: **Hybrid 3 - 50th Male**
ATD Serial Number: **064**



Test ID: **Knee Impact Right** Test Time: **9:53:48 AM**

Test Date: **1/6/2014**

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Test ID: **Knee Impact Right** Test Time: **9:53:48 AM**

Test Date: **1/6/2014**

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CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 288



External Measurements

5th Female SN 288

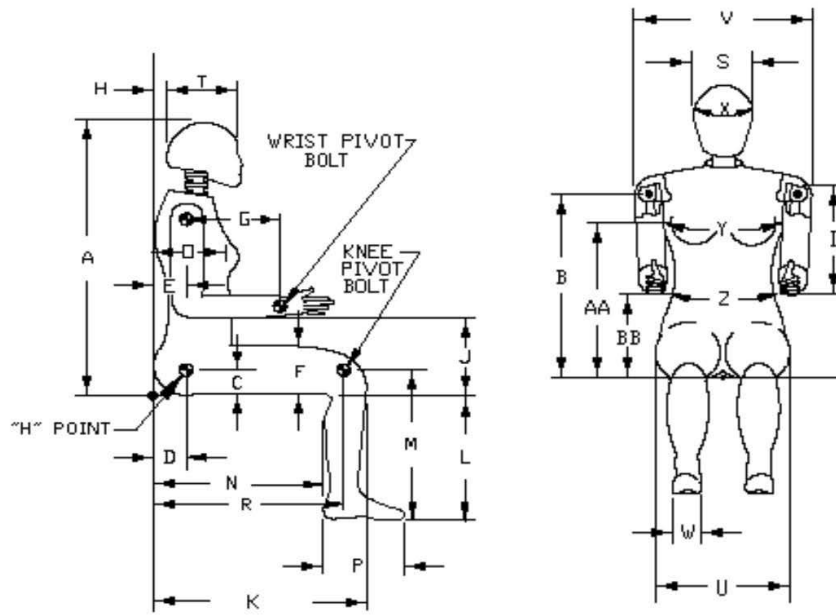
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	785	Yes
B	Shoulder Pivot Height	431.8 – 457.2	452	Yes
C	H-Point Height	81.3 – 86.3	83	Yes
D	H-Point from Backline	144.8 – 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6 – 83.8	76	Yes
F	Thigh Clearance	119.4 – 134.6	130	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	248	Yes
H	Head Back to Backline	43.2 – 48.2	46	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	285	Yes
J	Elbow Rest Height	182.8 – 203.2	193	Yes
K	Buttock to Knee Length	520.7 – 546.1	534	Yes
L	Popliteal Height	355.6 – 376	359	Yes
M	Knee Pivot Height	393.7 – 419.1	398	Yes
N	Buttock Popliteal Length	414 – 439.4	420	Yes
O	Chest Depth without Jacket	175.3 – 190.5	185	Yes
P	Foot Length (right)	218.5 – 233.7	219	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	469	Yes
S	Head Breadth	137.1 – 147.3	143	Yes
T	Head Depth	177.8 – 188	183	Yes
U	Hip Breadth	299.7 – 314.9	311	Yes
V	Shoulder Breadth	350.5 – 365.7	356	Yes
W	Foot Breadth	78.8 – 94	81	Yes
X	Head Circumference	528.3 – 548.7	536	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	861	Yes
Z	Waist Circumference	759.5 – 789.9	770	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	346	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	164	Yes

Technician: M. Goehle

Date: 1/09/2014

Hybrid III 5th Female External Measurements

Reference Diagram





VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Head Drop	Test Date:	1/6/2014
		Test Time:	11:59:39 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	912

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.0 deg C P
Humidity	10 -- 70	20.7 %RH P
Resultant Acceleration	250 -- 300	275.2 g P
Oscillation	0 -- 10	1.3 % P
Lateral Acceleration	-15 -- 15	-6.6 g P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



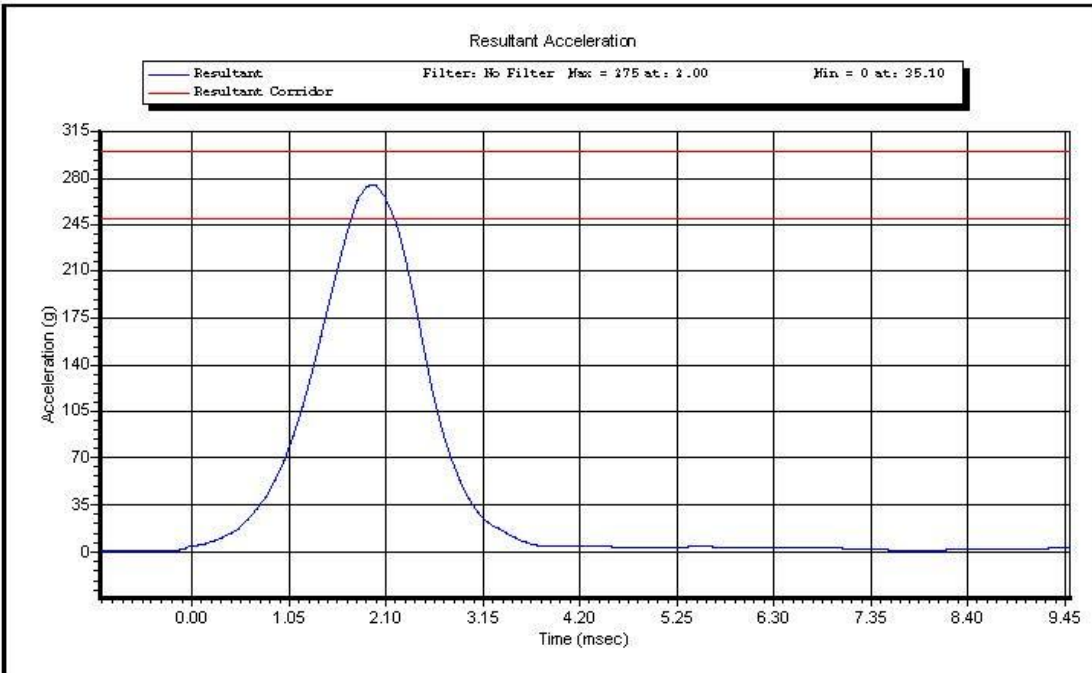
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P51682	11/21/2013
Endevco	7264-2000	P51685	11/21/2013
Endevco	7264-2000	P51699	11/21/2013



Test Name: **Head Drop**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**

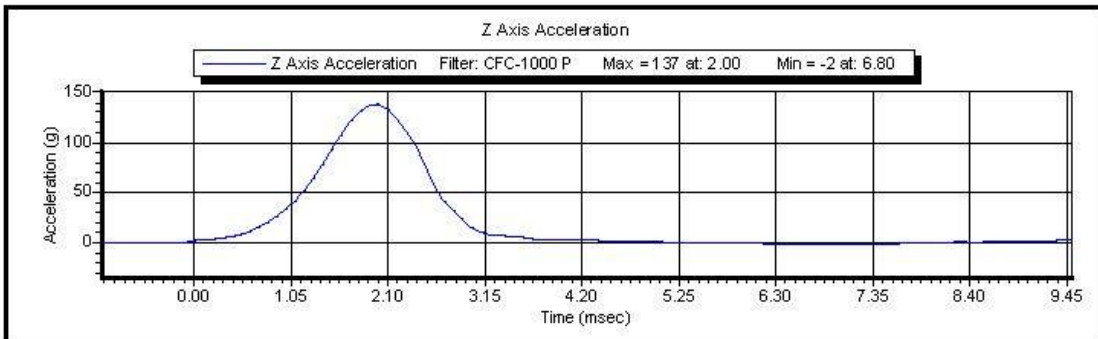
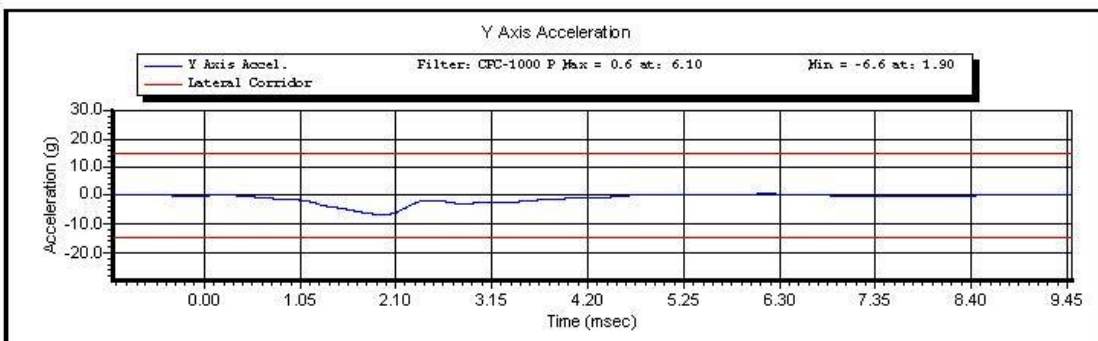
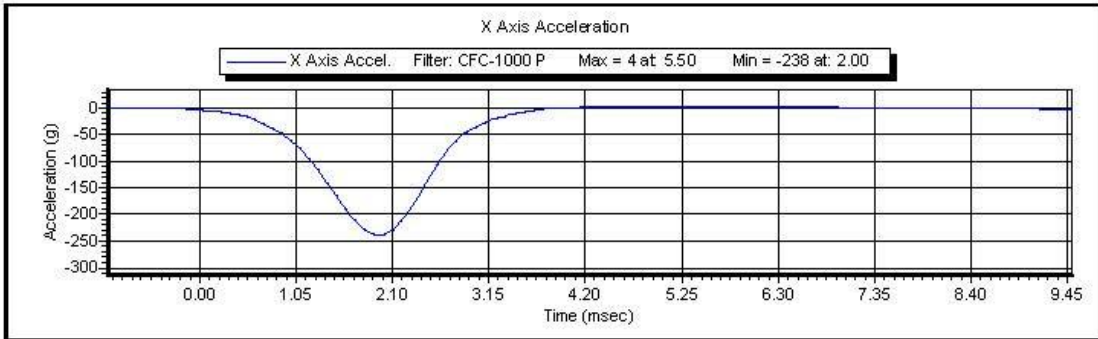


Test ID: **Head Drop**

Test Time: **11:59:39 AM**

Test Date: **1/6/2014**

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Test ID: **Head Drop**

Test Time: **11:59:39 AM**

Test Date: **1/6/2014**

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Neck Extension	Test Date:	1/6/2014
		Test Time:	2:42:48 PM

Component Part Number	Component Serial Number
Neck - 880105-255	7121
Head Skin - 880105-109	912

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.9 deg C P
Humidity	10 -- 70	20.9 %RH P
Velocity	5.95 -- 6.19	6.140 m/s P
Pendulum Impulse at 10 ms	1.5 -- 1.9	1.60 m/s P
Pendulum Impulse at 20 ms	3.1 -- 3.9	3.22 m/s P
Pendulum Impulse at 30 ms	4.6 -- 5.6	4.68 m/s P
D Plane Rotation	99 -- 114	104.3 degrees P
Moment During Rotation Interval	-65 -- -53	-54.6 Nm P
Moment Decay to -10.0 Nm	94 -- 114	103.7 ms P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



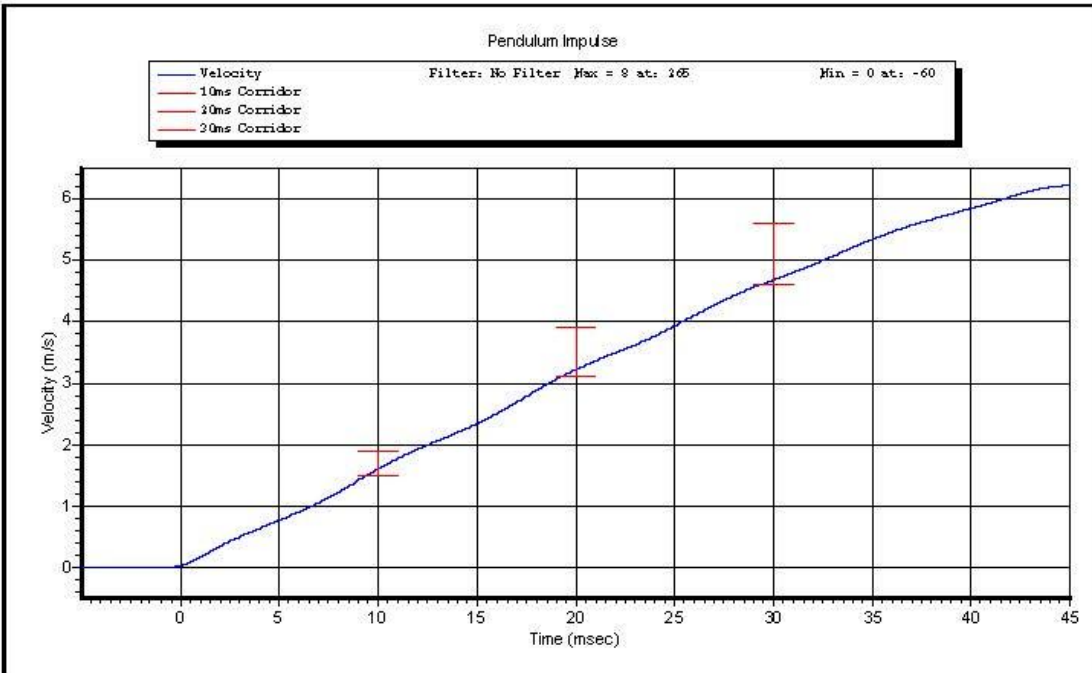
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	4/19/2013
Denton	1716A	LC-2206My	5/23/2013
Denton	1716A	LC-2206Fx	5/23/2013



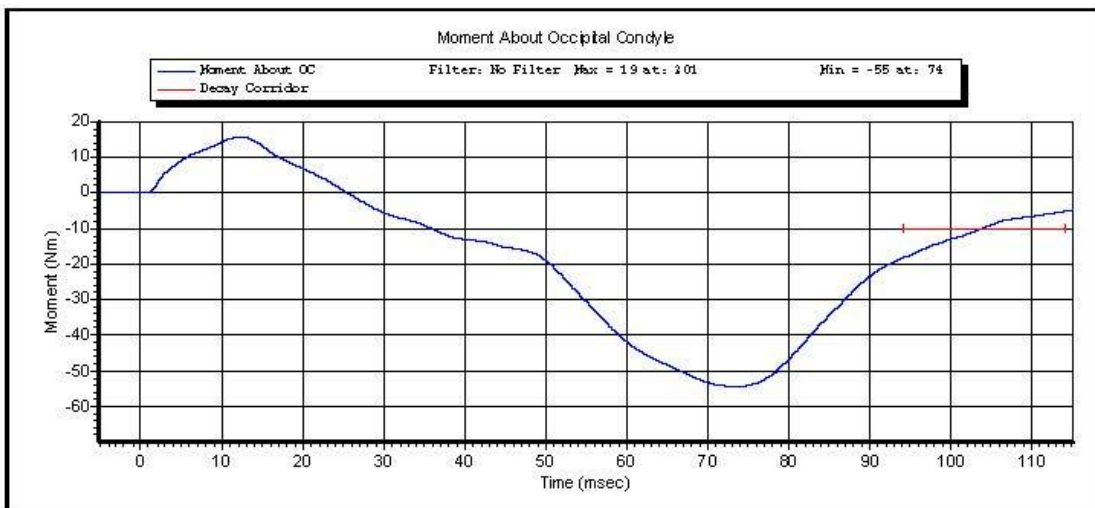
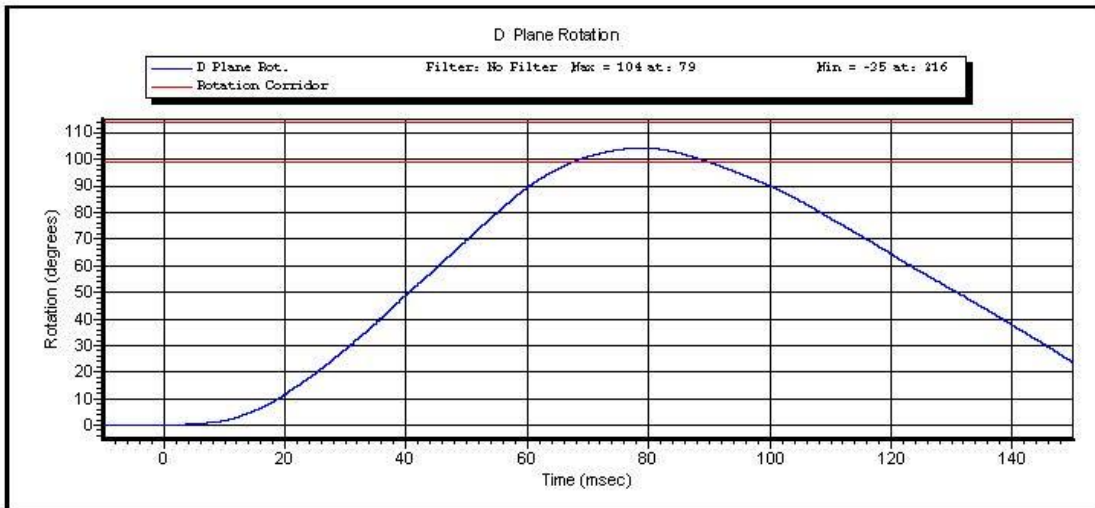
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Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**



Test ID: **Neck Extension** Test Time: **2:42:48 PM**

Test Date: **1/6/2014**

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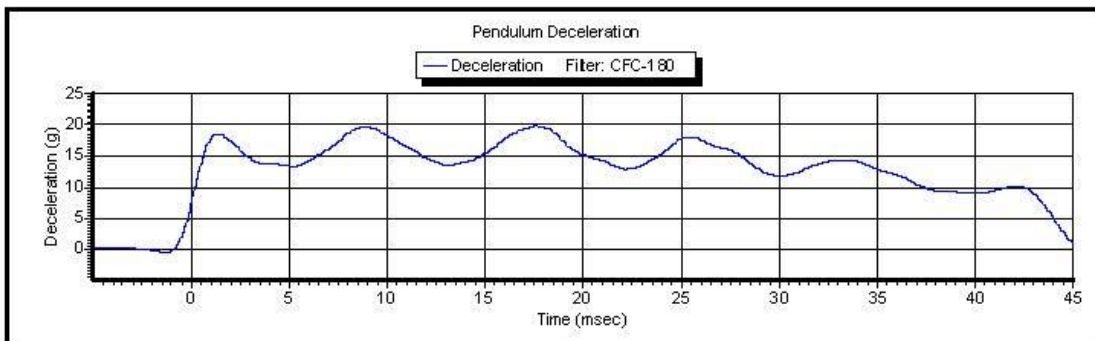
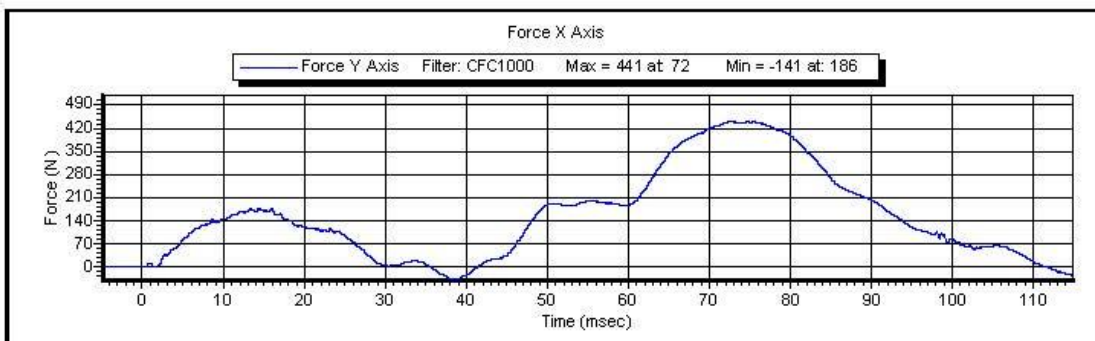
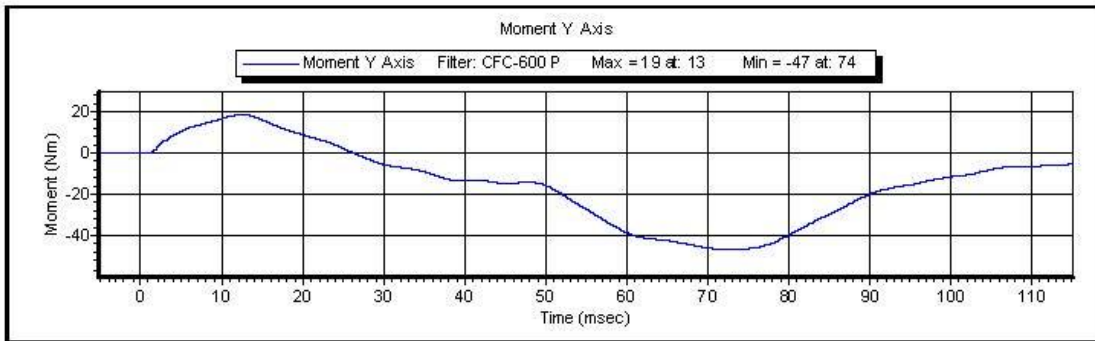


Test ID: Neck Extension

Test Time: 2:42:48 PM

Test Date: 1/6/2014

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Test ID: **Neck Extension** Test Time: **2:42:48 PM**

Test Date: **1/6/2014**

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Neck Flexion	Test Date:	1/6/2014
		Test Time:	2:11:25 PM

Component Part Number	Component Serial Number
Neck - 880105-255	7121
Head Skin - 880105-109	912

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	20.9 deg C P
Humidity	10 -- 70	20.7 %RH P
Velocity	6.89 -- 7.13	7.093 m/s P
Pendulum Impulse at 10 ms	2.1 -- 2.5	2.31 m/s P
Pendulum Impulse at 20 ms	4 -- 5	4.6 m/s P
Pendulum Impulse at 30 ms	5.8 -- 7.0	6.56 m/s P
D Plane Rotation	-91 -- -77	-81.3 degrees P
Moment During Rotation Interval	69 -- 83	72.3 Nm P
Moment Decay to 10.0 Nm	80 -- 100	88.4 ms P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



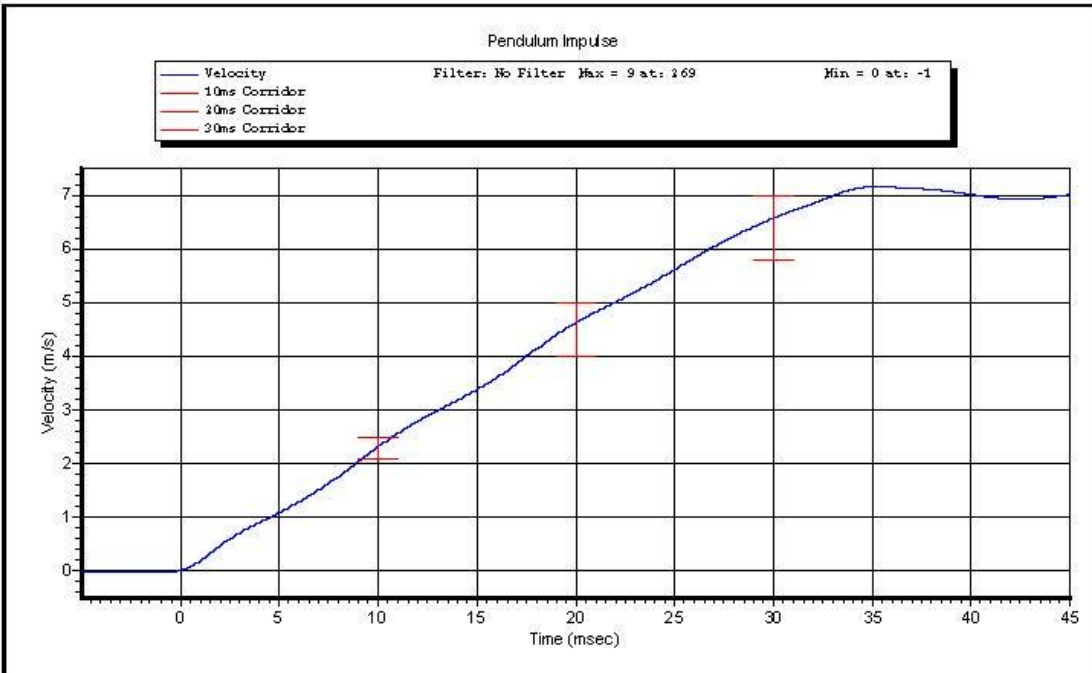
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/25/2013
DentonATD	78051-342	CONDYLE POT	4/19/2013
Denton	1716A	LC-2206My	5/23/2013
Denton	1716A	LC-2206Fx	5/23/2013



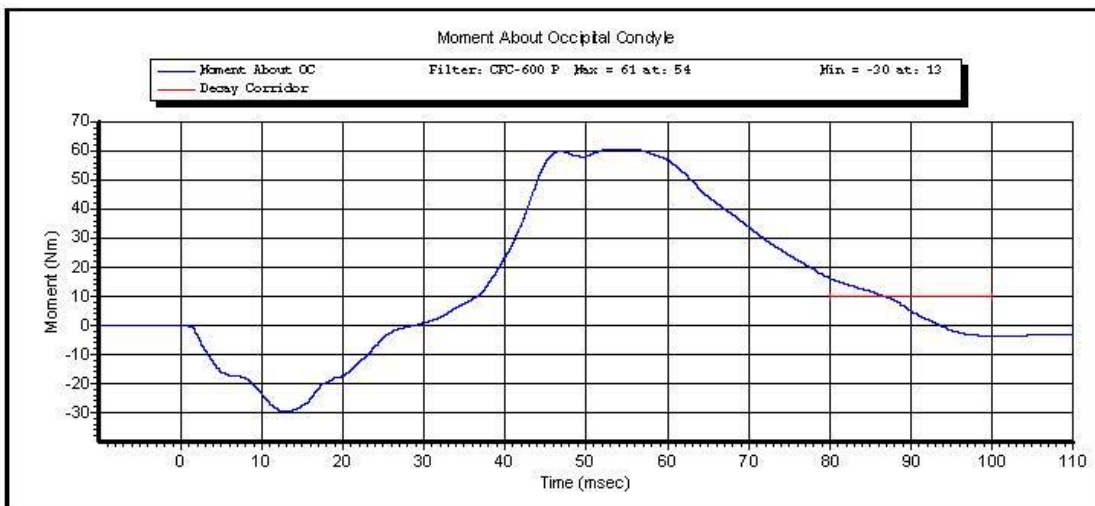
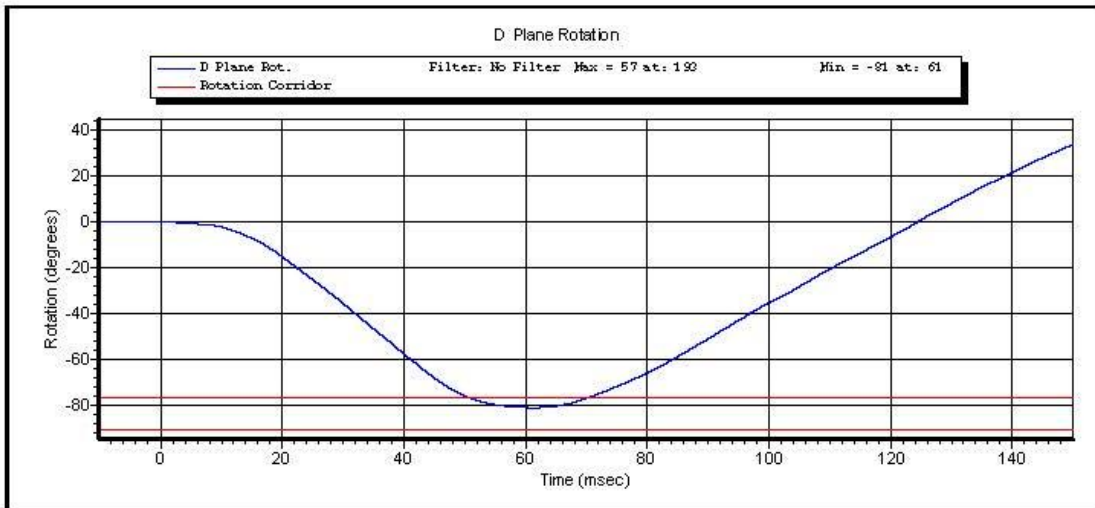
Test Name: **Neck Flexion**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**



Test ID: **Neck Flexion** Test Time: **2:11:25 PM**

Test Date: **1/6/2014**

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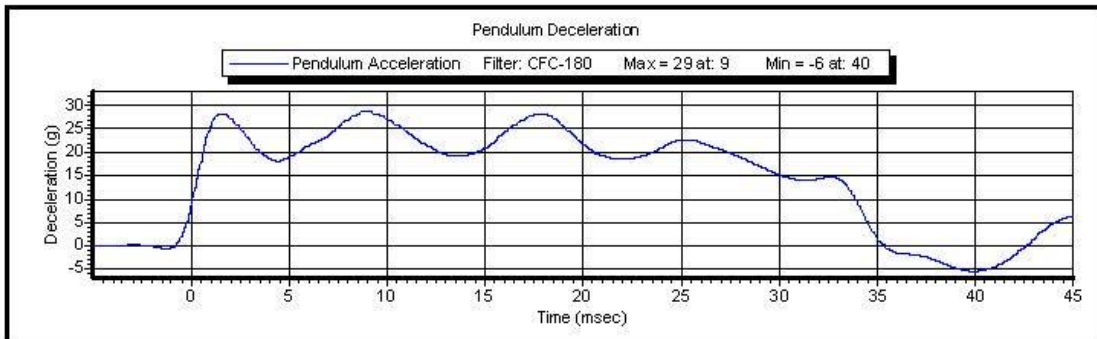
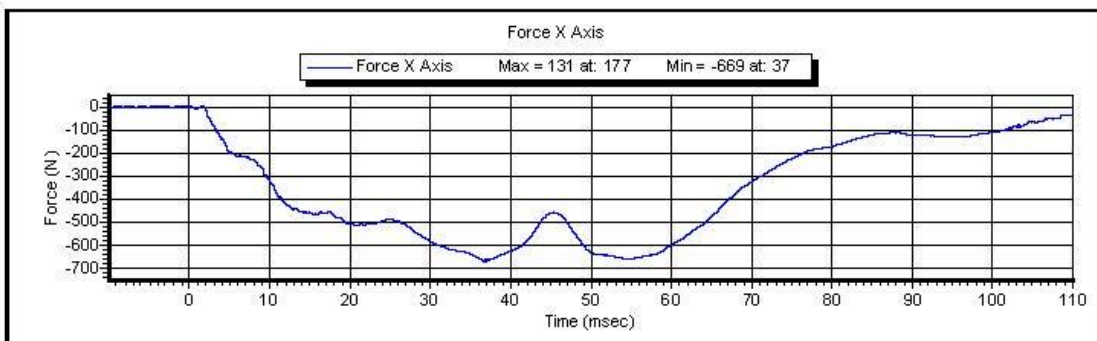
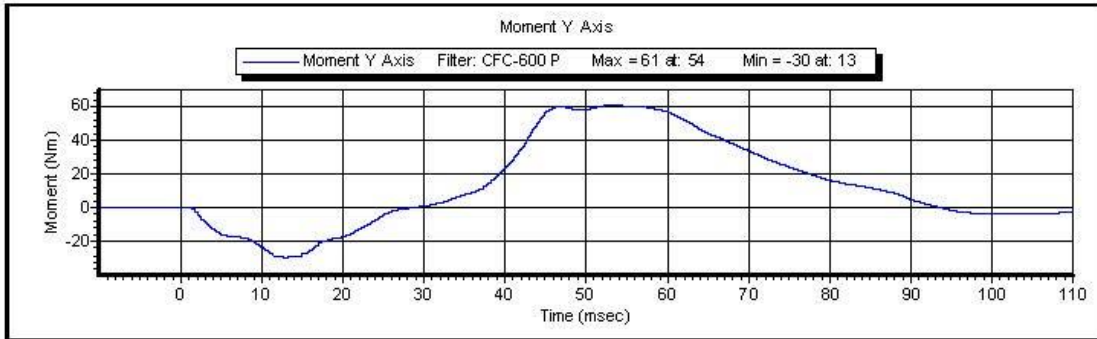


Test ID: Neck Flexion

Test Time: 2:11:25 PM

Test Date: 1/6/2014

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Test ID: **Neck Flexion**

Test Time: **2:11:25 PM**

Test Date: **1/6/2014**

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Thorax Impact	Test Date:	1/8/2014
		Test Time:	2:46:32 PM

Component Part Number	Component Serial Number
Chest Jacket - 880105-355-E	DG 8843
Lumbar Spine - 880105-1095	288

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.9 deg C P
Humidity	10 -- 70	11.8 %RH P
Velocity	6.59 -- 6.83	6.826 m/s P
Sternum Displacement	-58 -- -50	-50.9 mm P
Force During Displacement Interval	-4400 -- -3900	-4313.6 N P
Force -18.0 to -50.0 Displacement	-4600 -- 0	-4364.0 N P
Hysteresis	69 -- 85	73.6 % P

All test parameters are within specifications

Technician: **M. Geesey**
 Supervisor: **E. Dutton**



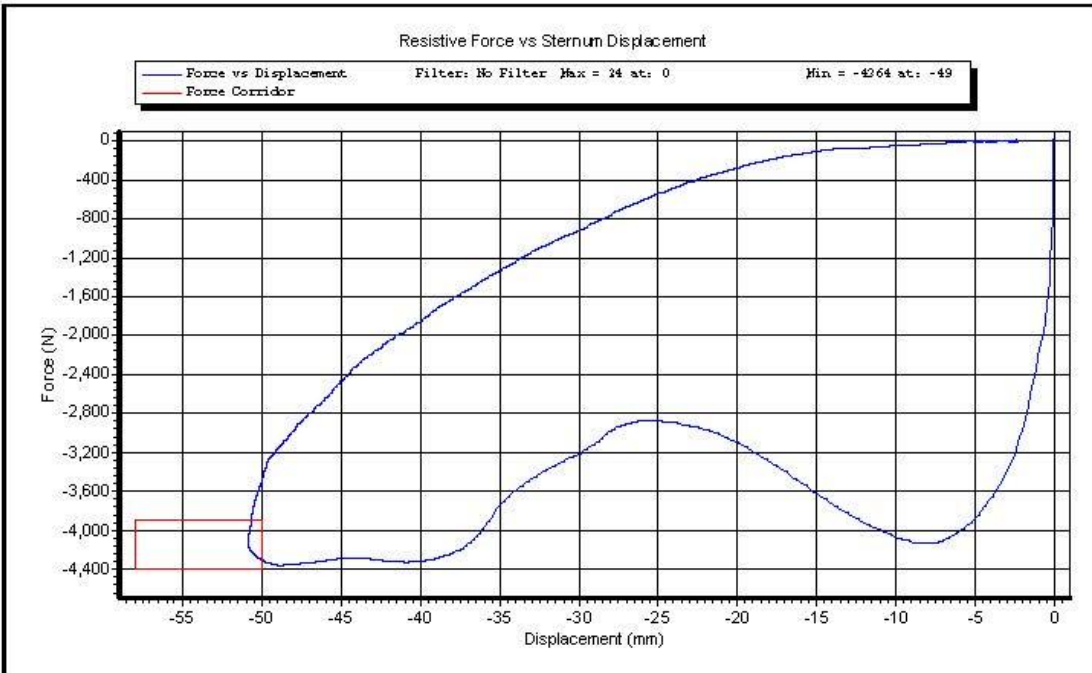
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	12/4/2013
SERVO	14 CB1-2897	DS-288	11/21/2013



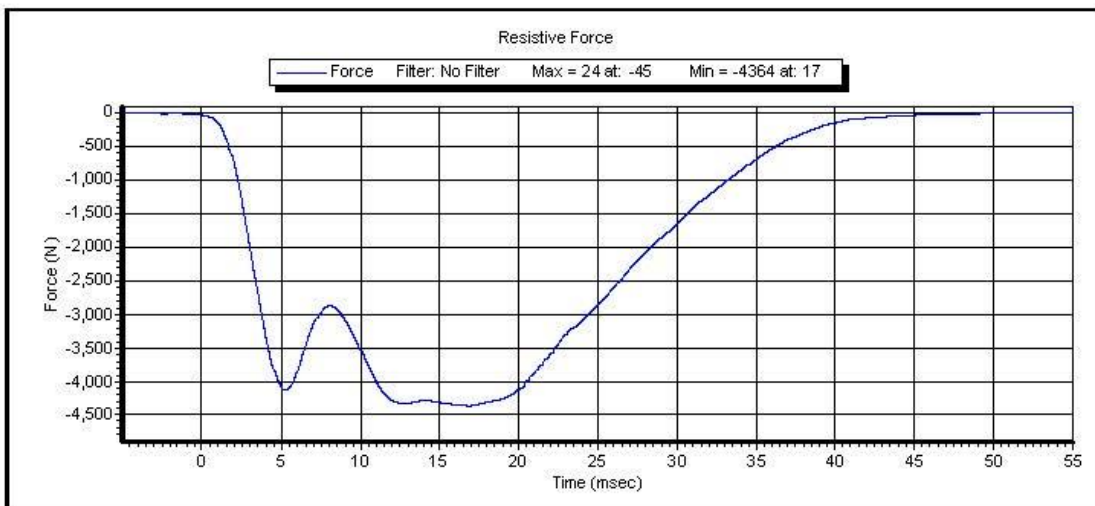
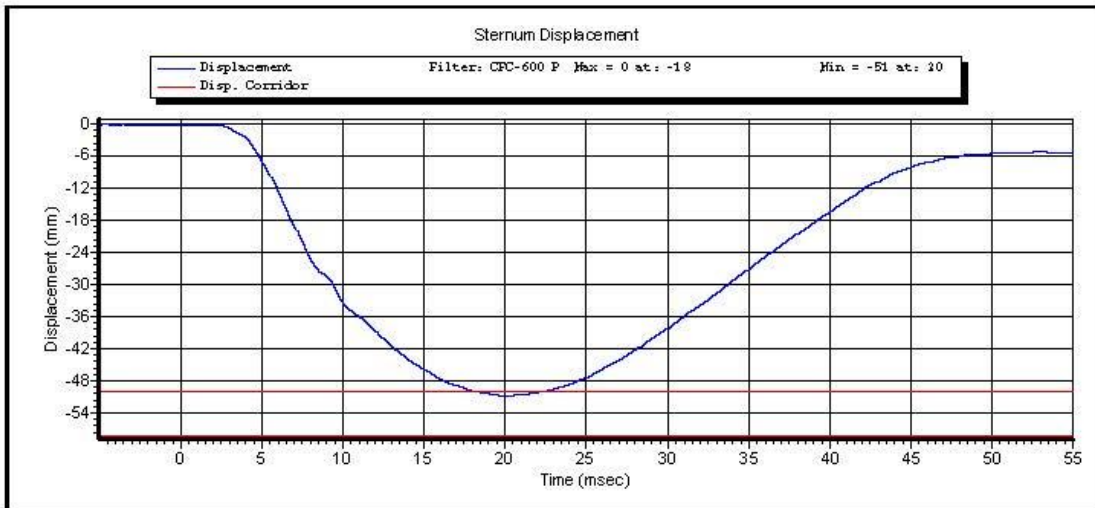
Test Name: **Thorax Impact**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**



Test ID: **Thorax Impact** Test Time: **2:46:32 PM**

Test Date: **1/8/2014**

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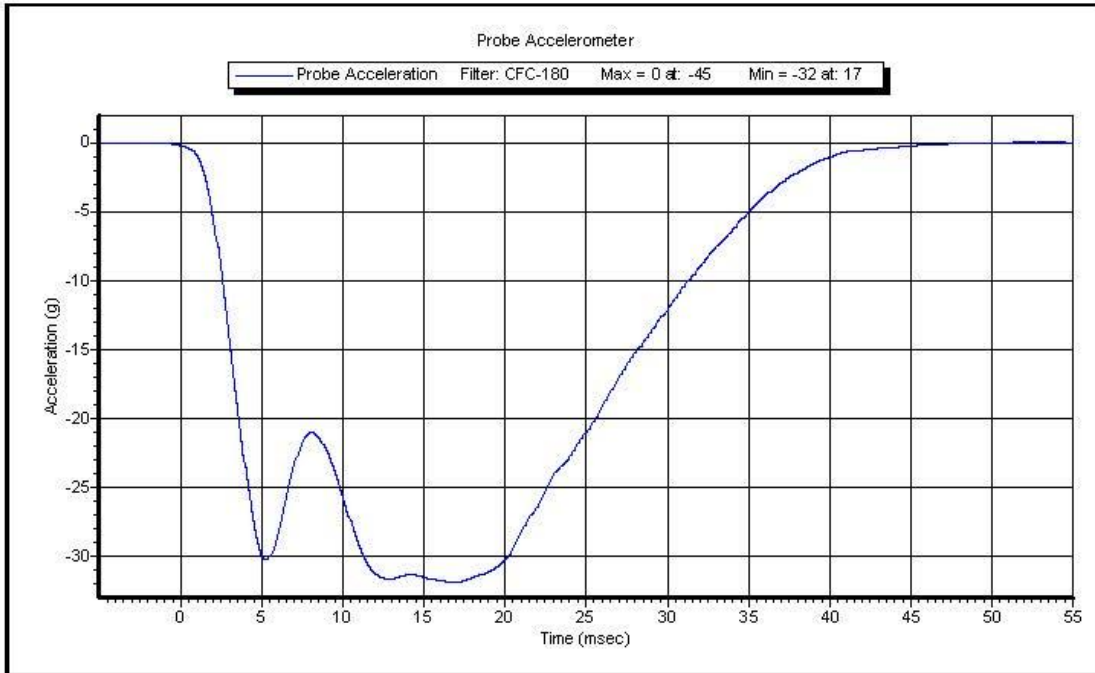


Test ID: Thorax Impact

Test Time: 2:46:32 PM

Test Date: 1/8/2014

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Thorax Impact**

Test Time: **2:46:32 PM**

Test Date: **1/8/2014**

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Torso Flexion

Part 5720 HIII 5% Female

ATD Serial No: 288

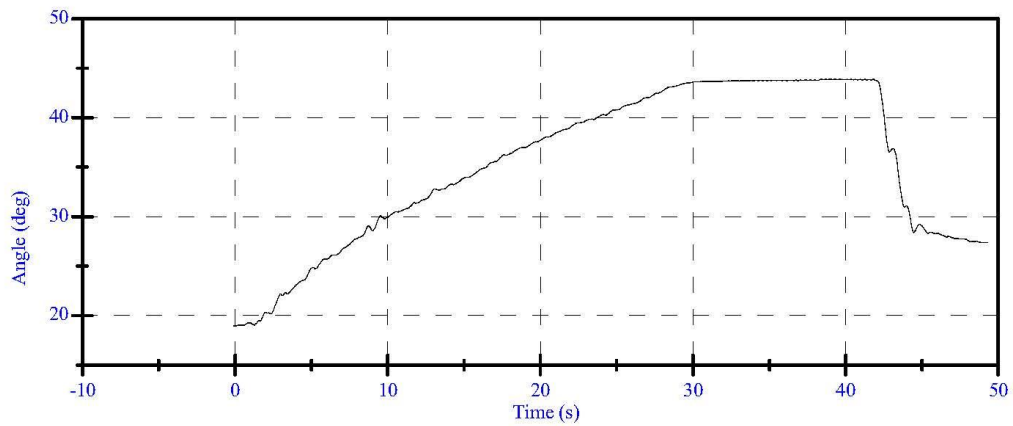
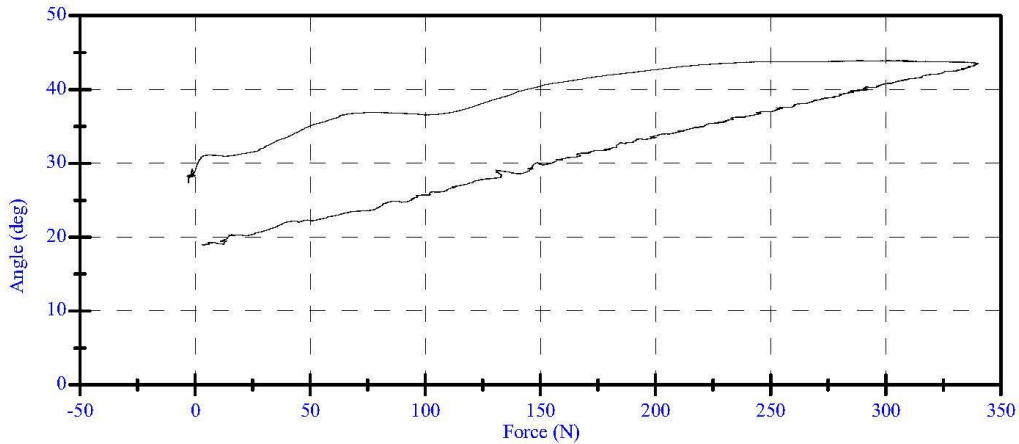
Laboratory Supervisor: E. Dutton

Date: 1/10/2014

Laboratory Technician: M. Goehle

<u>TEST PARAMETER</u>	<u>SPECIFICATION</u>	<u>TEST RESULTS</u>	<u>STATUS</u>
Lab Temperature:	18.9-25.6 C	22.1 C	Passed
Lab Humidity:	10-70 %	24.3 %	Passed
Initial Angle:	0.00-20.00 Deg	18.95 Deg	Passed
Force at 45 Deg	320.00-390.00 N	340.27 N	Passed
Return Angle	8 Deg Max from Initial	22.40 deg	Passed

LUMBAR SPINE FLEXION TEST



01.10.2014 08:41:45



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Knee Impact Left	Test Date:	1/6/2014
		Test Time:	8:54:45 AM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1729

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.6 deg C P
Humidity	10 -- 70	14.5 %RH P
Velocity	2.07 -- 2.13	2.106 m/s P
Resistive Force	-4060 -- -3450	-3588.2 N P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



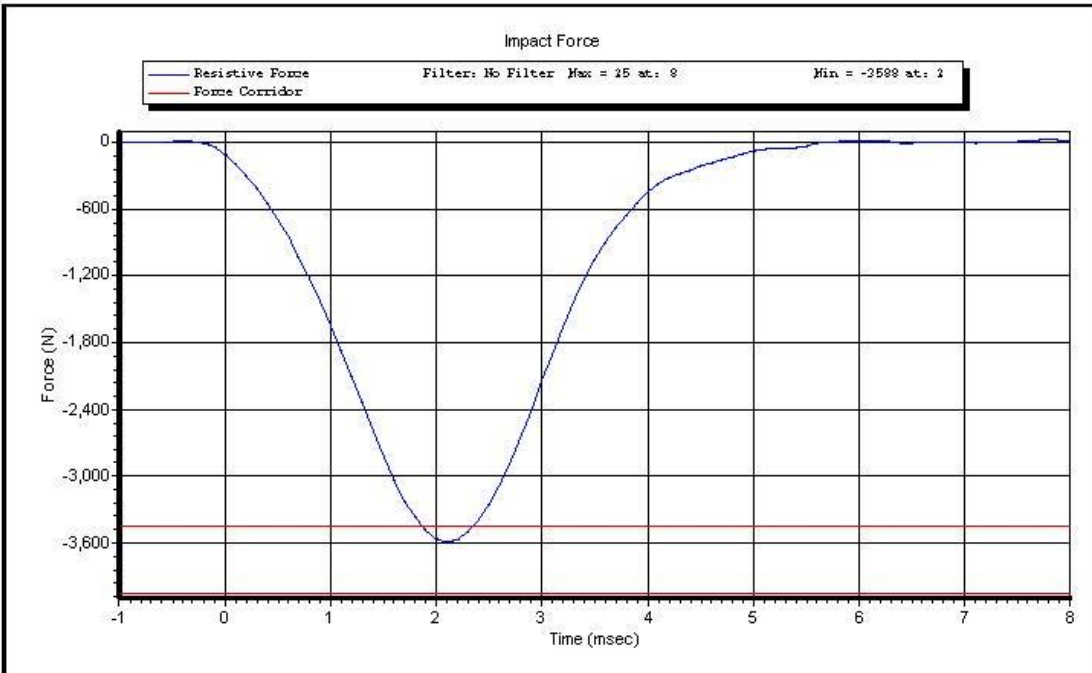
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	12/4/2013



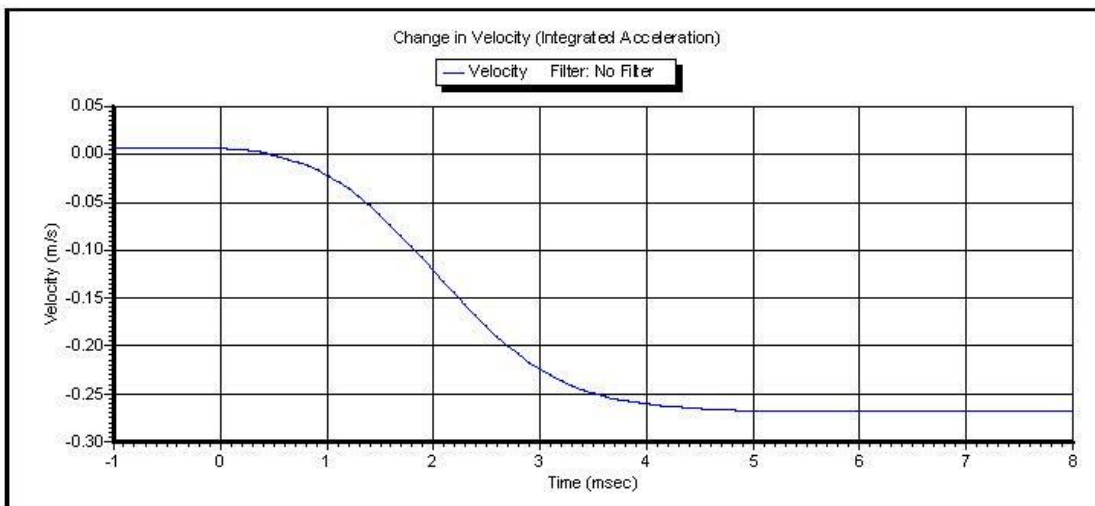
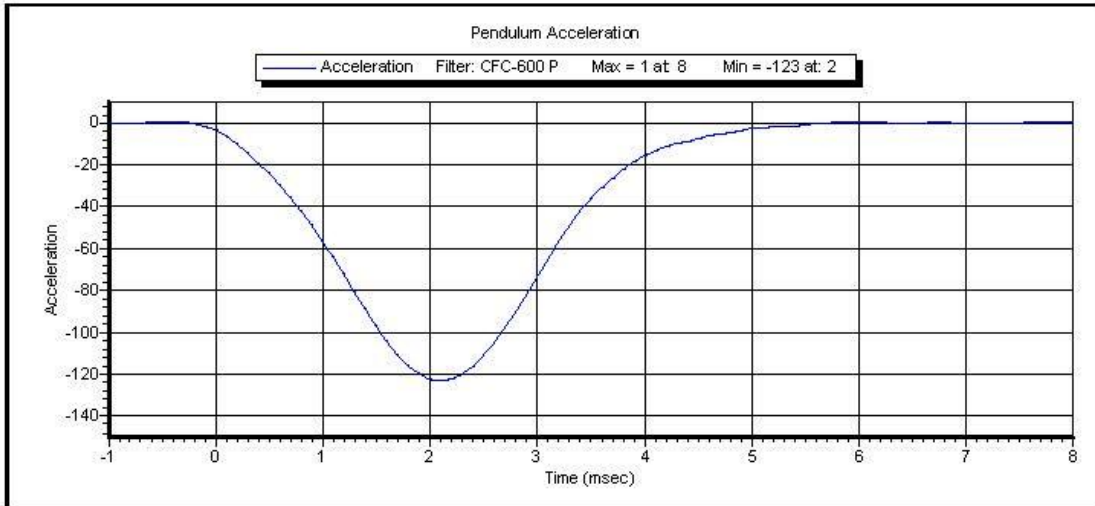
Test Name: **Knee Impact**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**



Test ID: **Knee Impact Left** Test Time: **8:54:45 AM**

Test Date: **1/6/2014**

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Test ID: **Knee Impact Left** Test Time: **8:54:45 AM**

Test Date: **1/6/2014**

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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Knee Impact Right	Test Date:	1/6/2014
		Test Time:	9:00:07 AM

Component Part Number	Component Serial Number
Knee Skin - 880105-508	1728

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.6 deg C P
Humidity	10 -- 70	14.5 %RH P
Velocity	2.07 -- 2.13	2.101 m/s P
Resistive Force	-4060 -- -3450	-3487.6 N P

All test parameters are within specifications

Technician: **M. Geesey**
Supervisor: **E. Dutton**



VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2013
Endevco	7231CT	C14953	12/4/2013



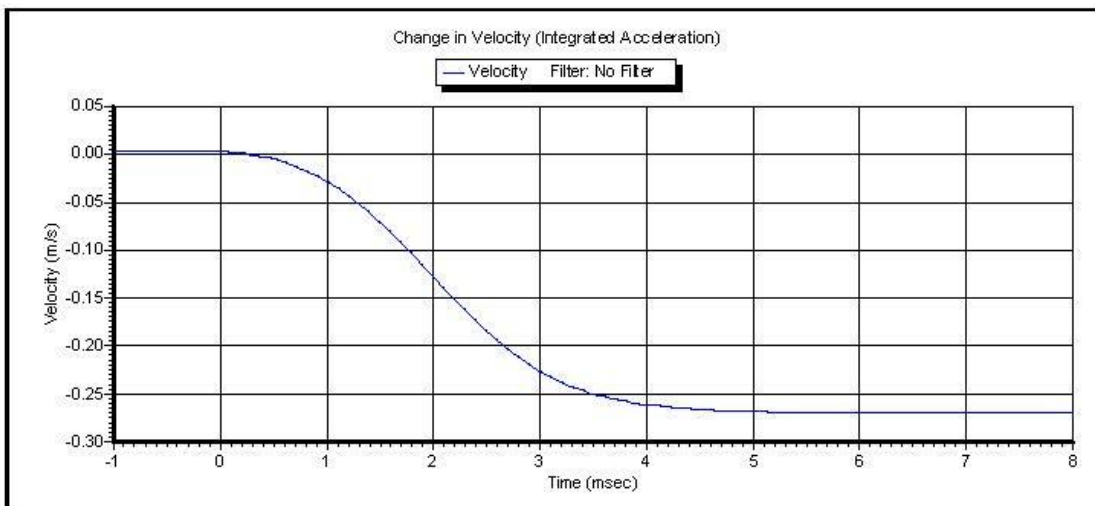
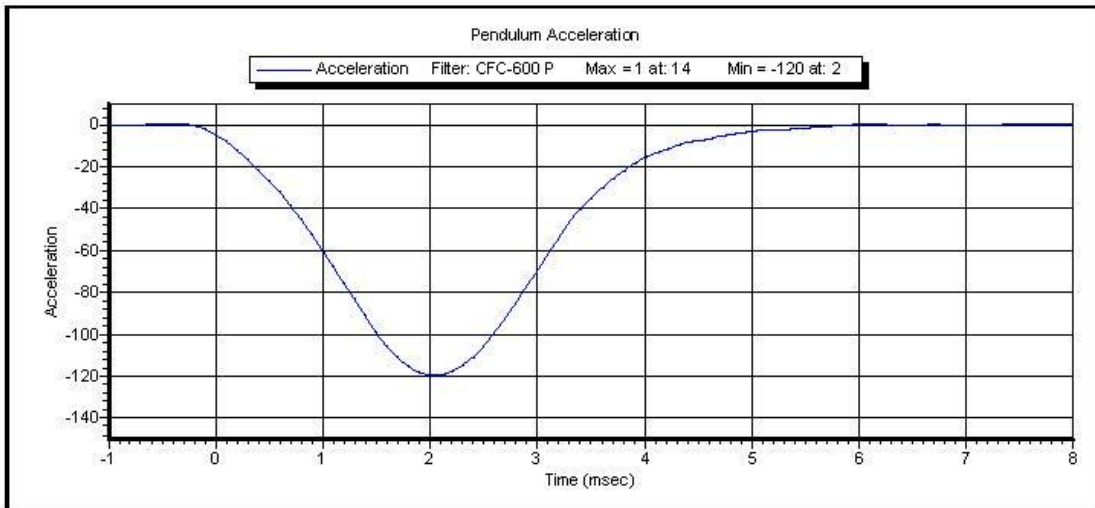
Test Name: **Knee Impact**
Sub Test Name:
ATD Type: **Hybrid 3 - 5th Female**
ATD Serial Number: **288**



Test ID: **Knee Impact Right** Test Time: **9:00:07 AM**

Test Date: **1/6/2014**

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Test ID: **Knee Impact Right** Test Time: **9:00:07 AM**

Test Date: **1/6/2014**

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