

REPORT NUMBER: NCAP-CAL-14-006

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

**Mazda Motor Co
2014 Mazda Mazda3
Four Door Sedan**

NHTSA No: M20145403

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



March 20, 2014

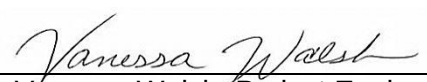
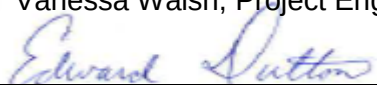
FINAL REPORT

**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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Prepared by:	 _____ Vanessa Walsh, Project Engineer	Date:	_____ March 20, 2014
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FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

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16. Abstract A 56.30 km/h (35 mph), NCAP Frontal Impact Test was conducted on a 2014 Mazda Mazda3 four door sedan in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 12, 2014. The impact velocity of the vehicle was 56.39 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 532 mm to the left of the centerline. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th rowspan="2">Units</th> <th colspan="2">Driver ATD (Serial No. 061)</th> <th colspan="2">Passenger ATD (Serial No. 273)</th> </tr> <tr> <th>Threshold</th> <th>Result</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₁₅)</td> <td></td> <td>700</td> <td>191.71</td> <td>700</td> <td>218.40</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-24.66</td> <td>52</td> <td>-12.18</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.20</td> <td>1</td> <td>0.48</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4,170</td> <td>1031.88</td> <td>2,620</td> <td>947.00</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4,000</td> <td>-312.26</td> <td>2,520</td> <td>-348.44</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10,008</td> <td>-473.77</td> <td>6,805</td> <td>-1582.26</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10,008</td> <td>-1114.69</td> <td>6,805</td> <td>-1137.46</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD (Serial No. 061)		Passenger ATD (Serial No. 273)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)		700	191.71	700	218.40	Maximum Chest Compression	mm	63	-24.66	52	-12.18	Nij		1	0.20	1	0.48	Neck Tension	N	4,170	1031.88	2,620	947.00	Neck Compression	N	4,000	-312.26	2,520	-348.44	Left Femur Force	N	10,008	-473.77	6,805	-1582.26	Right Femur Force	N	10,008	-1114.69	6,805	-1137.46
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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 Mazda Mazda3 four door sedan at a velocity of 56.39 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 12, 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 shoulder belts to measure dummy torso loading. The driver (position 1) ATD (Serial No. 061) and the right-front passenger (position 2) ATD (Serial No. 273) were calibrated previous to this test. Certification details, along with instrumentation calibration data, 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 532 mm to the left of 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)	191.71	0.20	1031.88	-312.26	39.37	-24.66	-473.77	-1114.69
Passenger (5 th)	218.40	0.48	947.00	-348.44	44.96	-12.18	-1582.26	-1137.46

GENERAL COMMENTS:

1. P1 (Driver) serial number - 061
2. P2 (Passenger) serial number - 273

Data Anomalies:

- Left Lower Tibia Y Moment, Questionable data from 45 to 107 ms
- Engine Top X Acceleration, Questionable data after 50 ms

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 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20145403	Traction Control System (TCS)	Yes
Model Year	2014	Power Steering	Yes
Make	Mazda	Power Window Auto-Reverse	No
Model	Mazda3	Driver Frontal Airbag	Yes
Body Style	Four door sedan	Driver Curtain Airbag	Yes
VIN	JM1BM1T71E1124775	Driver Head/Torso Airbag	No
Body Color	Gray	Driver Torso Airbag	No
Odometer Reading (km /mi)	286.5 km / 178 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	2.0	Driver Pelvis Airbag	No
Type / No. Cylinders	I4	Driver Knee Airbag	No
Engine Placement	Transverse	Front Pass. Frontal Airbag	Yes
Transmission Type	Manual	Front Pass. Curtain Airbag	Yes
Transmission Speeds	6-Speed	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	Front Wheel Drive	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof / T-Top	No	Front Pass. Knee Airbag	No
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	No	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	-

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	Mazda Motor Co.	GVWR (kg)	1772
Date of Manufacture	10/13	GAWR Front (kg)	925
		GAWR Rear (kg)	855

VEHICLE SEATING AND WEIGHT CAPACITY DATA

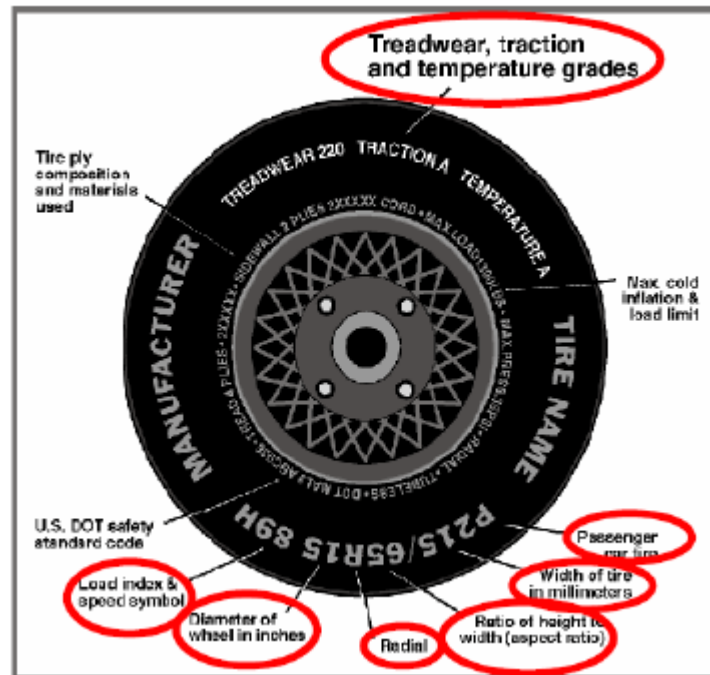
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	-	
Number of Occupants	2	3	-	5
Capacity Wt. (VCW) (kg)				385
Cargo Wt. (RCLW) (kg)				44.8

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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

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)	250	250
Recommended Tire Size	P205/60R16	P205/60R16
Tire Size on Vehicle	P205/60R16	P205/60R16
Tire Manufacturer	Yokohama	Yokohama
Tire Model	Avid S34	Avid S34
Treadwear	320	320
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel	1 Polyester, 2 Steel
Load Index / Speed Symbol	91H	91H
Tire Material	Rubber	Rubber
DOT Safety Code Left	FD20PHY3813	FD20PHY3813
DOT Safety Code Right	FD20PHY3813	FD20PHY3813

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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	397	256		416	336	
Right	kg	371	266		411	307	
Ratio	%	60%	40%		56%	44%	
Totals	kg	768	522	1290	827	643	1470

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1290	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.7	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	44.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1475.5	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	700	701	722	725	1092
As Tested	mm	702	702	701	700	1181
Post-Test	mm	752	706	704	686	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2700
Total Vehicle Length at Left Side	mm	4452
Total Vehicle Length at Centerline	mm	4575
Total Vehicle Length at Right Side	mm	4444
Weight of Ballast in Cargo Area	kg	20
Weight of Vehicle Components Removed	kg	15
Amount of Stoddard Solvent in Fuel Tank	L	46.5

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk carpeting, spare tire, jack, and tail light.

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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	4575
2	Total Width	1802
3*	Bumper Top Height	529
4*	Bumper Bottom Height	426
5*	Longitudinal Member Top Height	559
6	Distance Between Longitudinal Members	1014
7	Longitudinal Member Width	49
8*	Engine Top Height	891
9*	Engine Bottom Height	182
10	Engine and Gearbox Width	540
11	Front Bumper-Engine Distance	494
12*	Front Shock Absorber Fixing Height	890
13*	Bonnet Leading Edge Height	781
14	Front Shock Absorber Fixing Width	1134
15	Front Bumper – Front Axle Distance	924
16	Front Axle – A Pillar Distance	533
17	A-Pillar – B-Pillar Distance	1118
18	B-Pillar – Rear Axle Distance	1048
19	B-Pillar – C-Pillar Distance	1004
20*	Roof Sill Bottom Height	1301
21*	Roof Sill Top Height	1413
22*	Floor Sill Bottom Height	330
23*	Floor Sill Top Height	372

*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

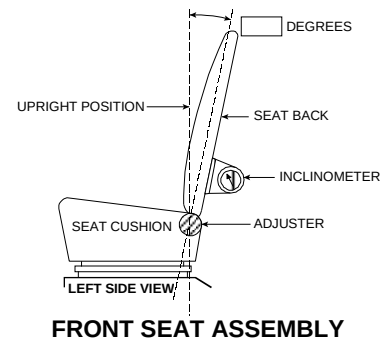
Test Vehicle: 2014 Mazda Mazda3 four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
Test Date: 2/12/2014

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	5.0
Passenger Seat Back Angle	5.0



SEAT FORE / AFT POSITIONS

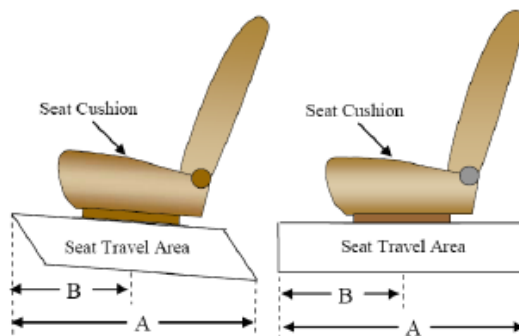
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	26	11
Passenger Seat	26	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	3	0
Passenger Seat	3	0



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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

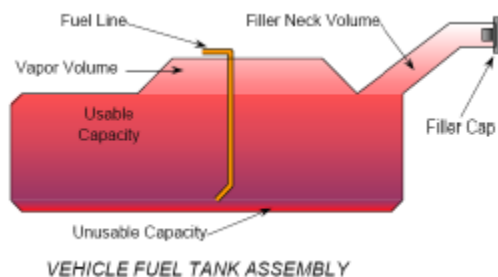
NHTSA No.: M20145403
 Test Date: 2/12/2014

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	50.0
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	46 - 47
Actual Amount of Solvent Used	46.5
1/3 of Usable Capacity	16.7

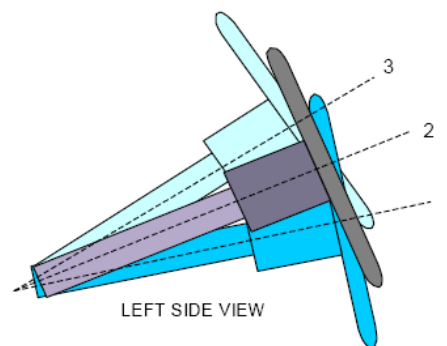
FUEL PUMP

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 ASSEMBLY

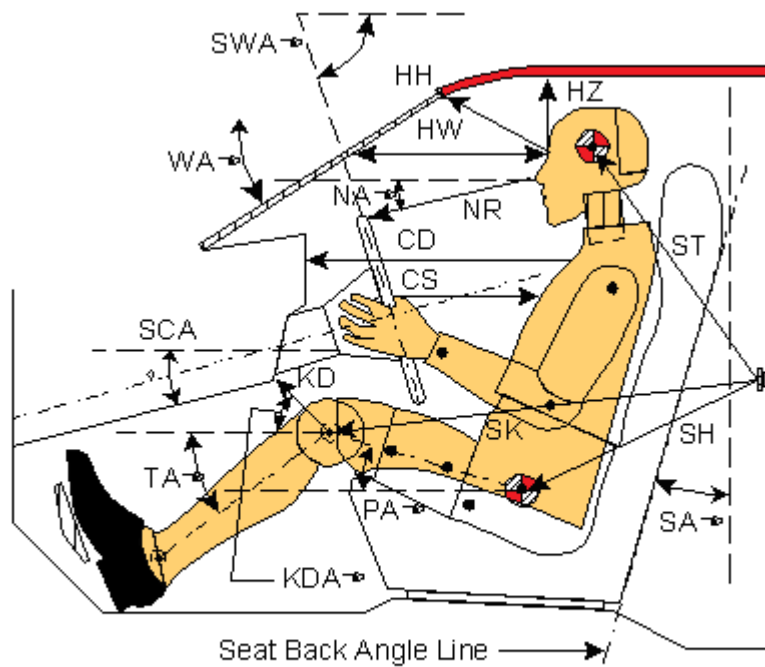
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	20.5	
Geometric center position No. 2	22.9	
Uppermost position No. 3	25.2	
Telescoping Steering Wheel Travel		50
Test Position	22.9	25

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014



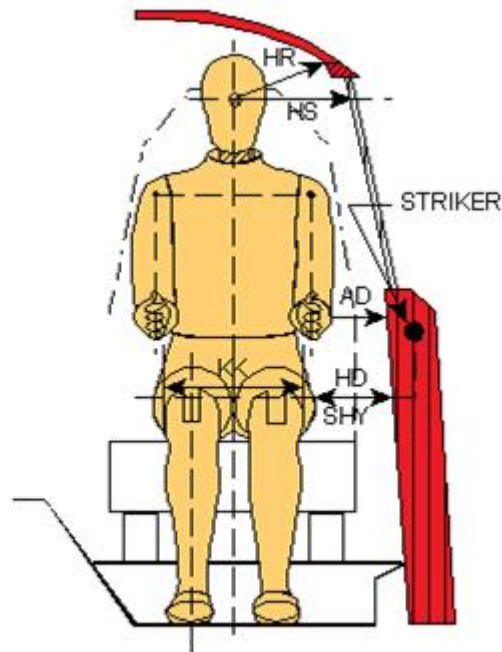
Left Side View

Code	Measurement Description	Driver (SN: 061)		Passenger (SN: 273)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		-26.2		
SWA°	Steering Wheel Angle		22.5		
SCA°	Steering Column Angle		67.5		
SA°	Seat Back Angle (on headrest post)		5.5		4.1
HZ	Head to Roof (Z)	200	90	211	90
HH	Head to Header	347	28.3	280	59.2
HW	Head to Windshield	678	0	638	0
NR	Nose to Rim	412	6.2	418	24.4
CD	Chest to Dash	539		368	
CS	Chest to Steering Hub	315	0		
RA	Rim to Abdomen	215	0		
KDL	Left Knee to Dash	180	30.3	106	39.6
KDR	Right Knee to Dash	168	35.8	106	39.1
PA°	Pelvic Angle		23.5		20.3
TA°	Tibia Angle		23.7		38.7
SK	Striker to Knee	562	-9.9	662	-7.1
ST	Striker to Head	448	87.2	472	55.7
SH	Striker to H-Point	272	-49.9	403	-26.0

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014



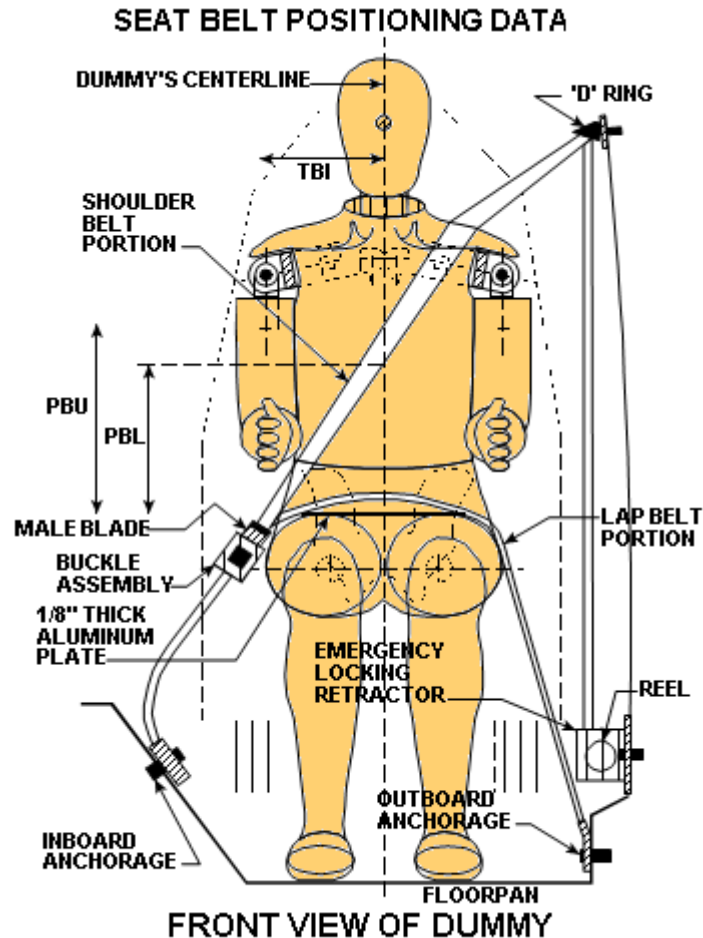
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	116	71
HD	H-Point to Door	159	173
HR	Head to Side Header	222	265
HS	Head to Side Window	340	380
KK	Knee to Knee	328	165
SHY	Striker to H-Point (Y Direction)	250	270
AA	Ankle to Ankle	330	160

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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	375	335
PBL — Top surface of reference to belt lower edge	mm	305	260

BELT LENGTH DATA

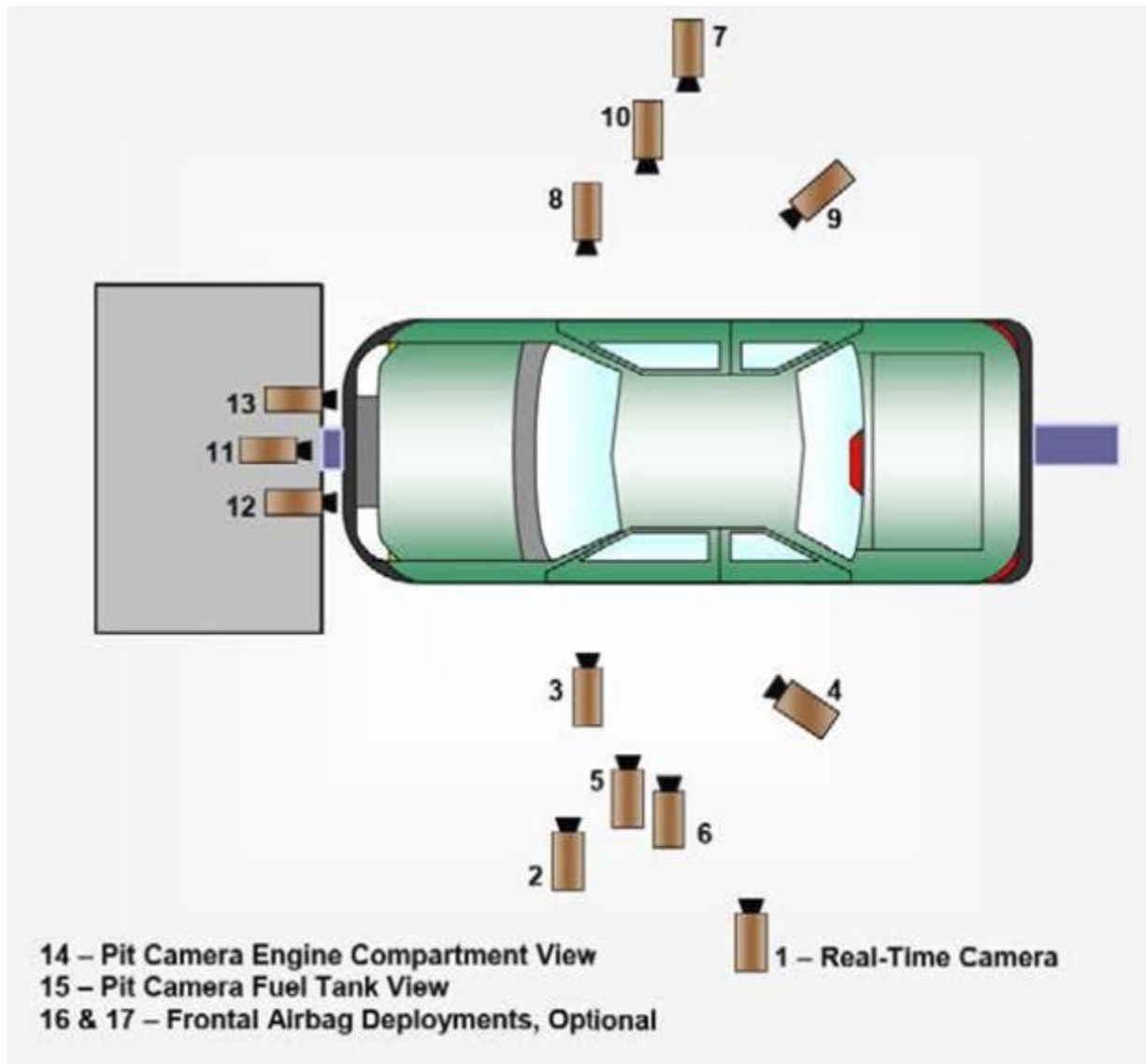
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	850	940
Lap Belt Length as measured on ATD	mm	680	780
Remainder of belt on reel	mm	920	730
Total belt length for continuous webbing systems	mm	2450	2450

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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
Test Date: 2/12/2014

CAMERA POSITIONS FOR FRONTAL IMPACTS



Top View

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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

CAMERA LOCATIONS

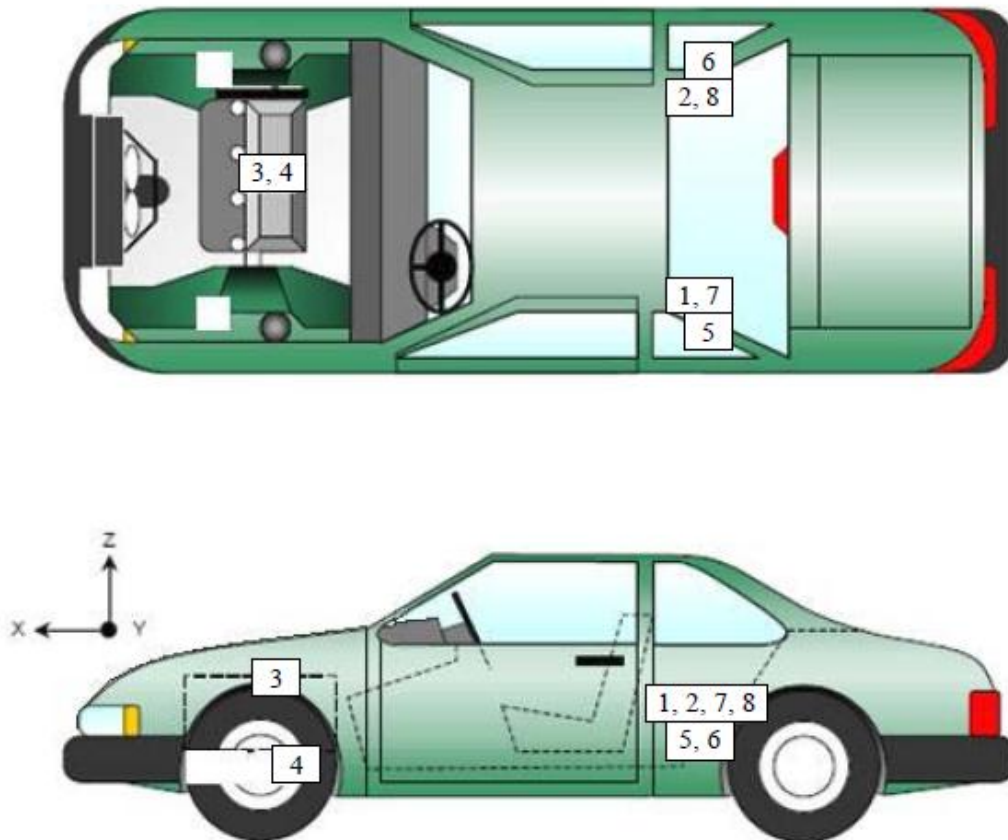
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-		60
2	Driver Close-Up	1284	-8287	1512	50	1000
3	Left Front Half	784	-9809	1618	50	1000
4	Left Angle	3147	-2884	2109	28	1000
5	Steering Column - Top	1741	-8257	1961	24-70	1000
6	Steering Column - Bottom	1741	-8257	1370	24-70	1000
7	Right Overall	1848	8752	1036	24	1000
8	Passenger Close-Up	1517	8113	1215	50	1000
9	Right Front Half	1098	9979	1000	50	1000
10	Right Angle	3141	2995	2147	28	1000
11	Windshield	-533	0	3265	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 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1779	-598	300
2	Right Rear Accelerometer – X Direction	1780	604	299
3	Engine Top X	3786	129	-194
4	Engine Bottom X	4178	160	411
5	Left Rear Accelerometer – Z Direction	1779	588	289
6	Right Rear Accelerometer – Z Direction	1779	-587	295
7	Left Rear Accelerometer – X Direction Redundant	1779	-598	300
8	Right Rear Accelerometer – X Direction Redundant	1780	604	299

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

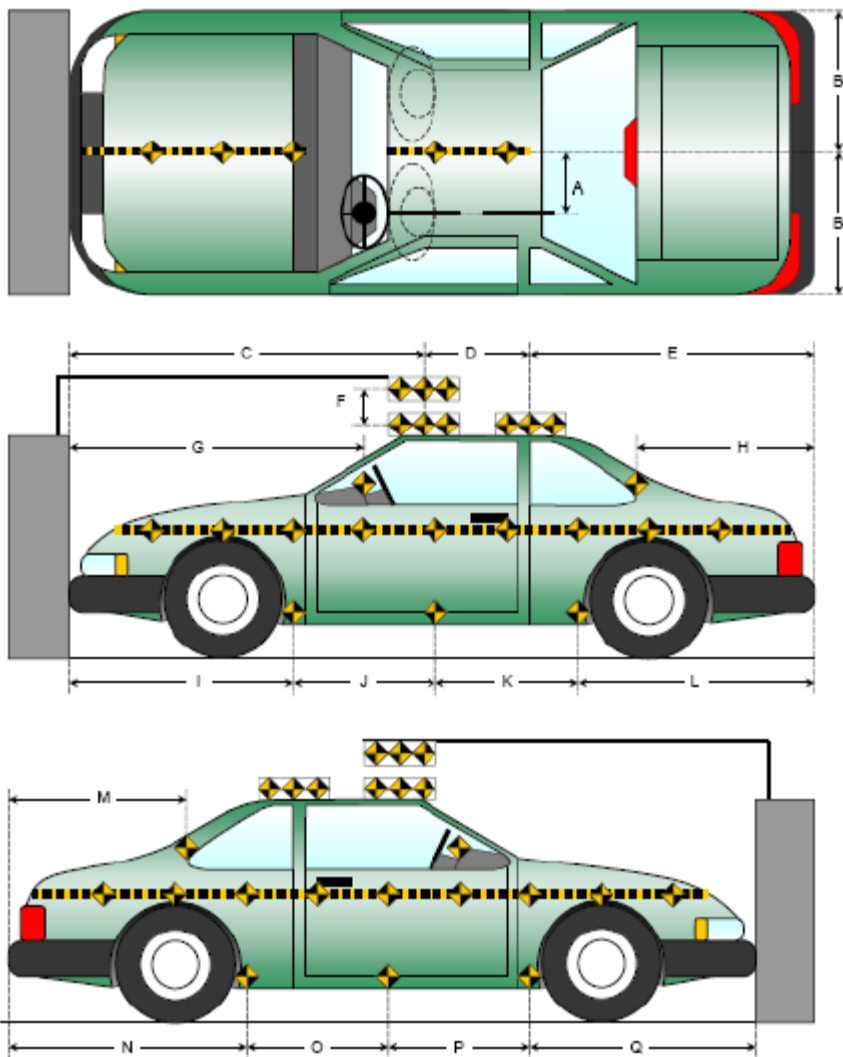
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

Item	Value
A	361
B	901
C	2322
D	911
E	1342
F	185
G	1823
H	936
I	1358
J	919
K	913
L	1385
M	943
N	1395
O	920
P	912
Q	1349

All units in millimeters



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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

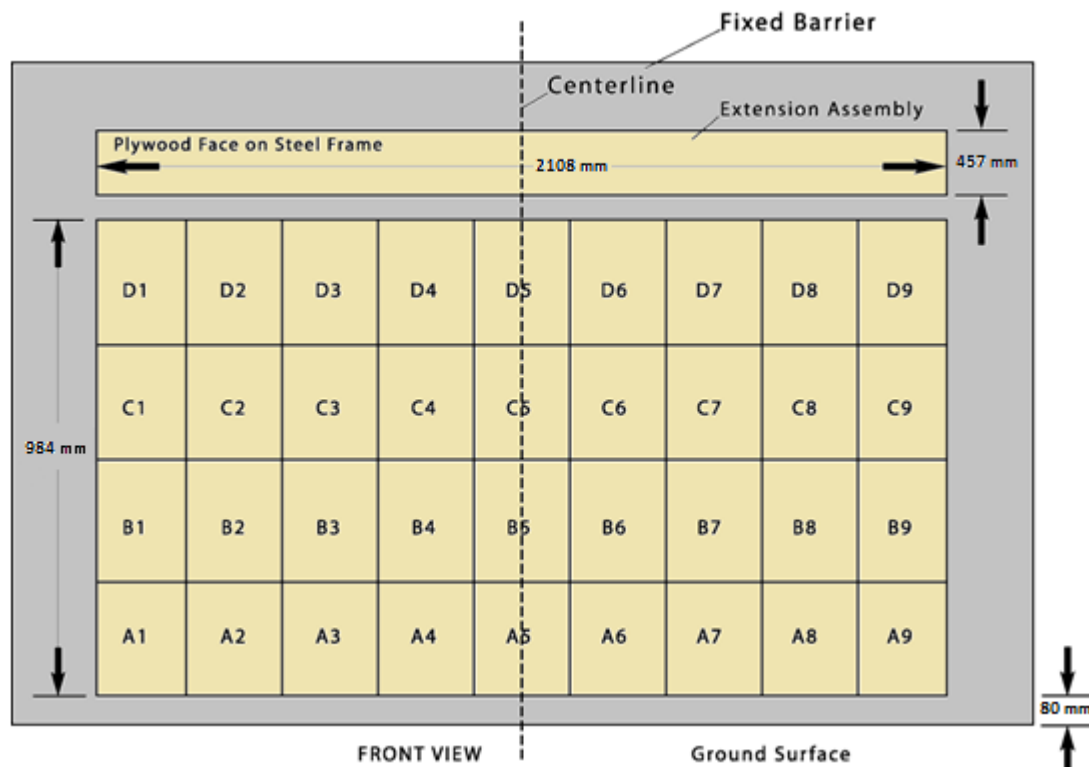


Figure 1 - Load Cell Locations on a 36-Load Cell Barrier with Plywood Height Extension

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

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 Mazda Mazda3 four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
Test Date: 2/12/2014

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	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Minor cracks on the bottom driver's side
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	716
Center	mm	703
Right Side	mm	784
Average	mm	734

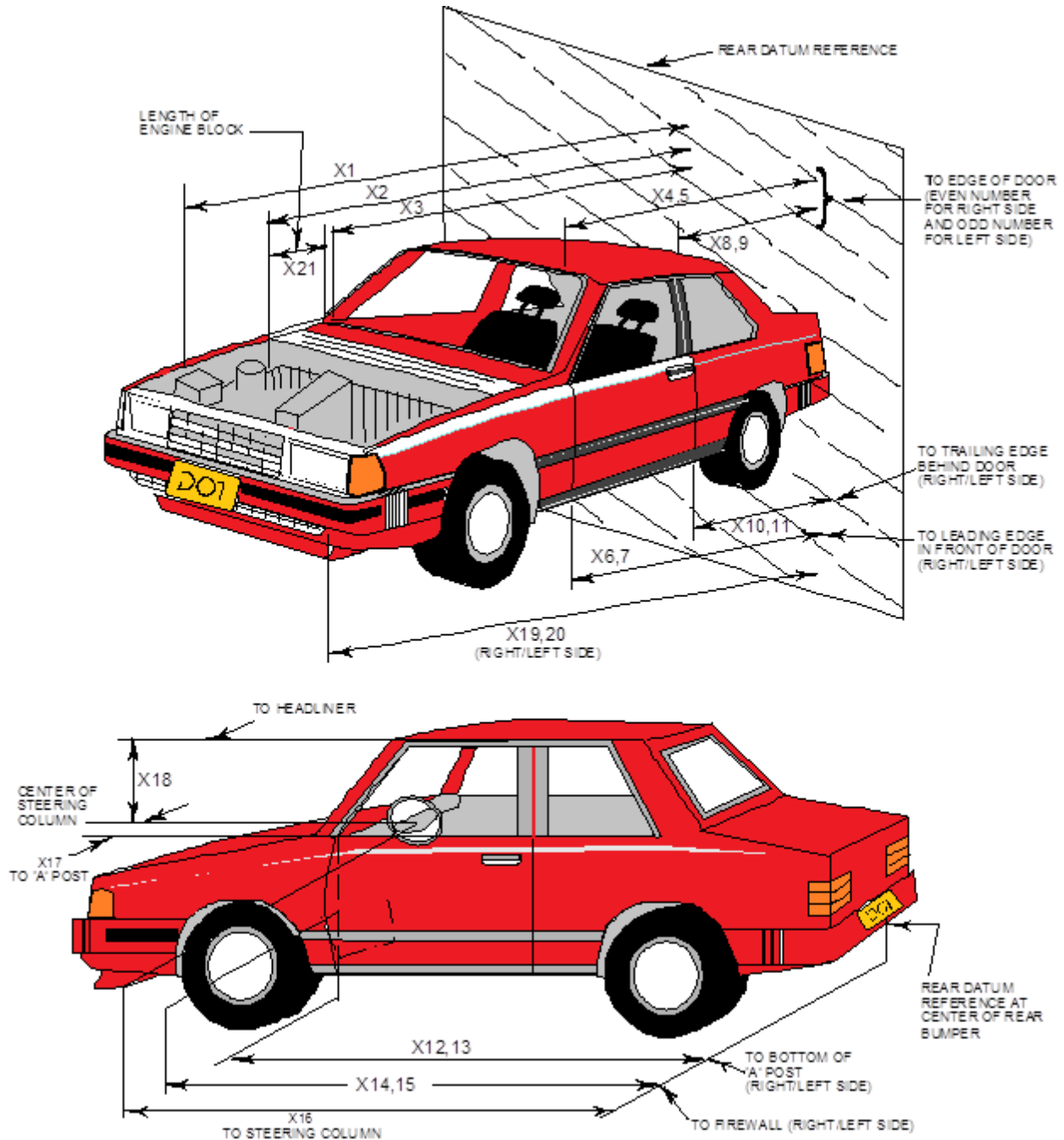
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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 Mazda Mazda3 four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
Test Date: 2/12/2014



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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4575	4182	-393
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4081	3806	-275
3	RSOV to Firewall	3508	3475	-33
4	RSOV to Upper Leading Edge of Right Door	3081	3076	-5
5	RSOV to Upper Leading Edge of Left Door	3074	3074	0
6	RSOV to Lower Leading Edge of Right Door	3116	3109	-7
7	RSOV to Lower Leading Edge of Left Door	3110	3109	-1
8	RSOV to Upper Trailing Edge of Right Door	2009	2004	-5
9	RSOV to Upper Trailing Edge of Left Door	2004	2004	-1
10	RSOV to Lower Trailing Edge of Right Door	2065	2058	-7
11	RSOV to Lower Trailing Edge of Left Door	2059	2058	-1
12	RSOV to Bottom of "A" Post of Right Side	3111	3107	-4
13	RSOV to Bottom of "A" Post of Left Side	3107	3106	-1
14	RSOV to Firewall, Right Side	3407	3382	-25
15	RSOV to Firewall, Left Side	3405	3389	-15
16	RSOV to Steering Column	2597	2660	63
17	Center of Steering Column to "A" Post	284	282	-2
18	Center of Steering Column to Headliner	420	450	31
19	RSOV to Right Side of Front Bumper	4497	4200	-297
20	RSOV to Left Side of Front Bumper	4506	4061	-445
21	Length of Engine Block	393	393	0
RD	RSOV to Right Side of Dash Panel	2808	2809	1
CD	RSOV to Center of Dash Panel	2766	2762	-3
LD	RSOV to Left Side of Dash Panel	2809	2808	-1

All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2014 Mazda Mazda3 four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
Test Date: 2/12/2014

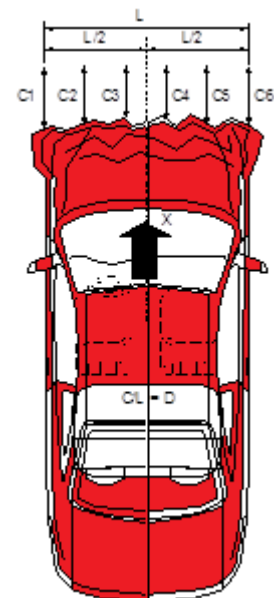
VEHICLE INFORMATION

VIN: JM1BM1T71E1124775
Vehicle Size Category: Passenger

Wheelbase (mm): 2,700
Test Weight (kg): 1,470

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): 56.39
Velocity Change (km/h): 56.39
Time of Separation (ms): 118



CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1021
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	4494	4056	438
C2	Crush Zone 2 at Left Side	mm	4539	4008	531
C3	Crush Zone 3 at Left Side	mm	4530	3998	532
C4	Crush Zone 4 at Right Side	mm	4530	4001	529
C5	Crush Zone 5 at Right Side	mm	4550	4027	523
C6	Crush Zone 6 at Right Side	mm	4492	4121	371
L	C1 to C6	mm	1021	1027	-6

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

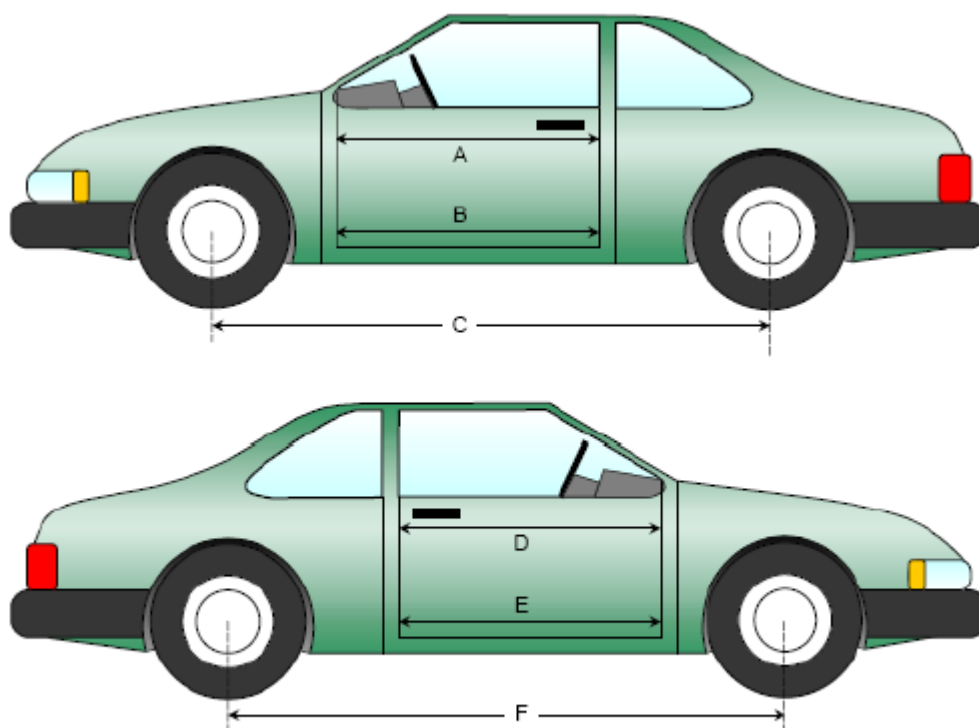
NHTSA No.: M20145403
 Test Date: 2/12/2014

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	982	981	-1
B	Left Side Lower	mm	816	816	0
D	Right Side Upper	mm	982	981	-1
E	Right Side Lower	mm	818	817	-1

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2700	2605	-95
F	Right Side Wheelbase	mm	2700	2606	-94



Left & Right Side Views

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

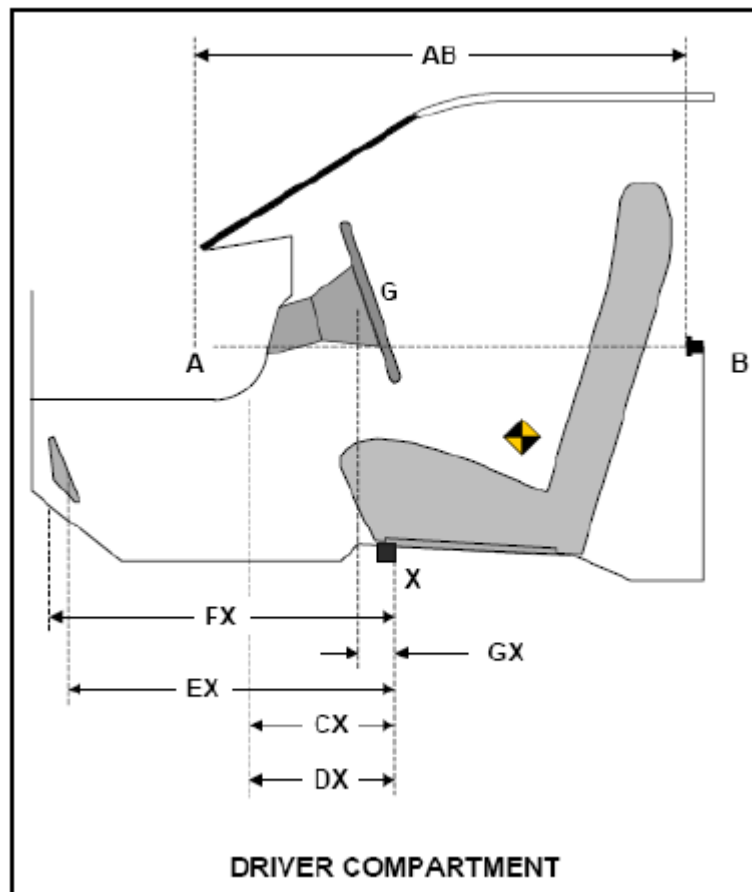
Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	721	721	0
CX	Left Knee Bolster to X	mm	254	252	-2
DX	Right Knee Bolster to X	mm	250	248	-2
EX	Brake Pedal to X	mm	559	547	-11
FX	Foot Rest to X	mm	611	598	-12
GX	Center of Steering Column Wheel Hub to X	mm	20	86	65

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014

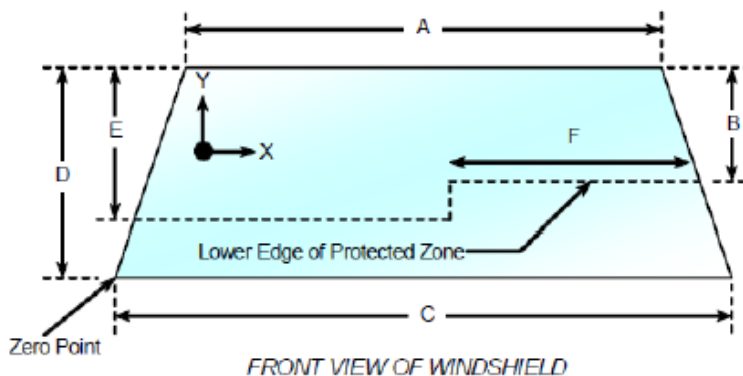
Windshield Mounting Details: A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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	2158	2158	100%
Right Side	2158	2158	100%
Total	4316	4316	100%



Item	Units	Value
A	mm	1225
B	mm	470
C	mm	1440
D	mm	825
E	mm	500
F	mm	310

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
- 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

X	Y

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

Test Vehicle: 2014 Mazda Mazda3 four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
Test Date: 2/12/2014

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21 ° C

Test Time: 12:24 PM

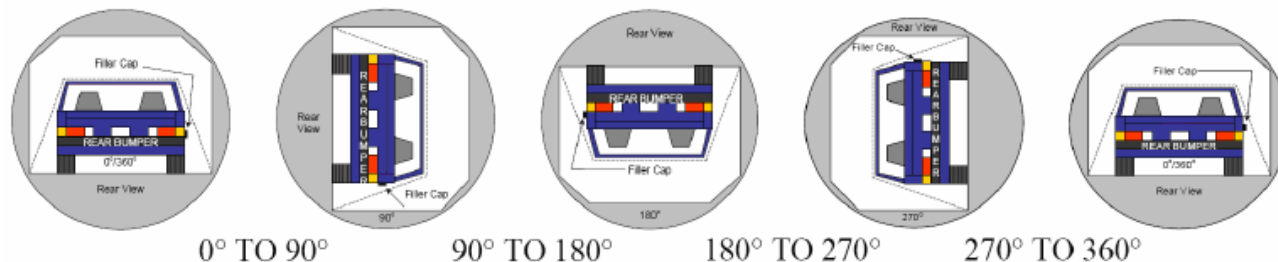
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- 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 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014



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°	72	300	372
90° to 180°	64	300	364
180° to 270°	61	300	361
270° to 360°	72	300	372

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	

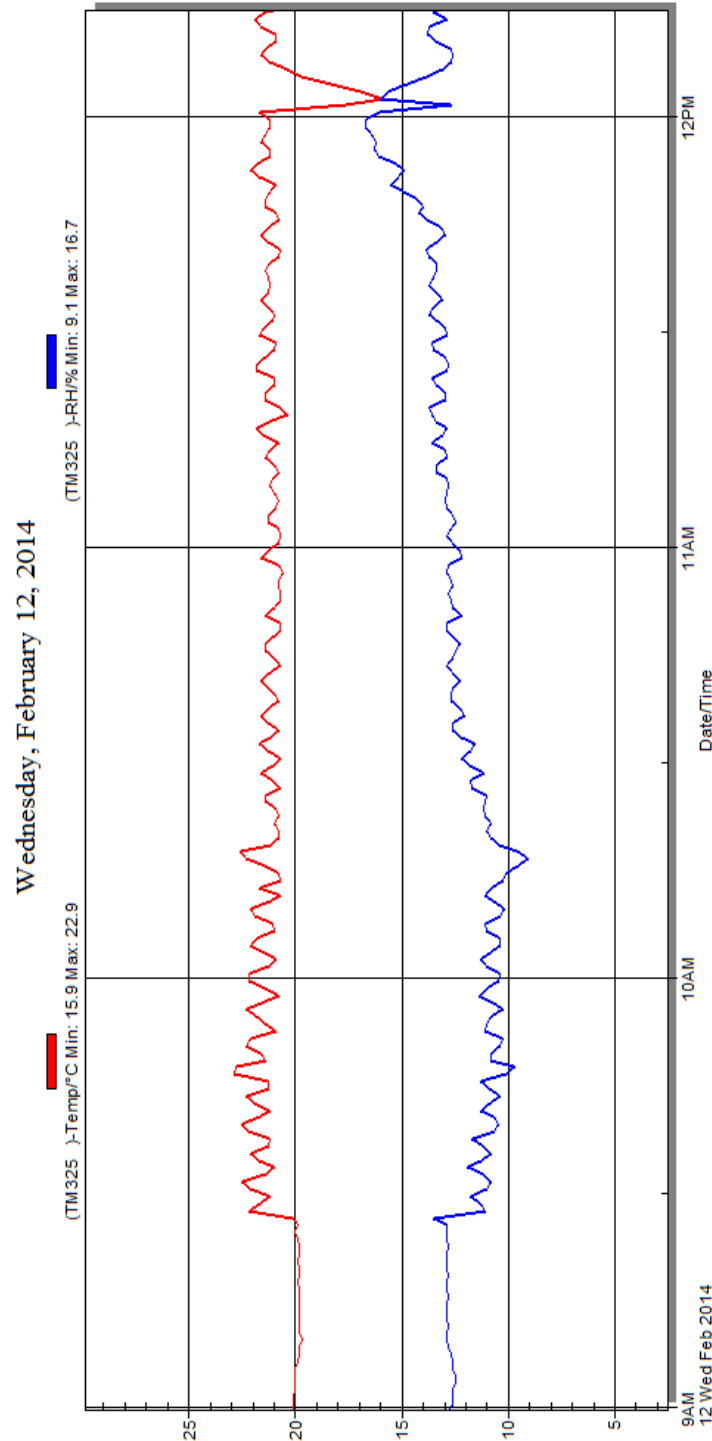
SOLVENT SPILLAGE LOCATION TABLE

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 Mazda Mazda3 four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145403
 Test Date: 2/12/2014



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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44	Post-Test Driver's Side Floorpan	A-26
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48	Pre-Test View of the Steering Wheel	A-28
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63	Post-Test Passenger's Side Knee Bolster	A-36
64	Pre-Test Passenger's Side Floorpan	A-36
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76	Vehicle at 360° on Static Rollover Device	A-42
77	2014 Mazda Mazda3 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.*

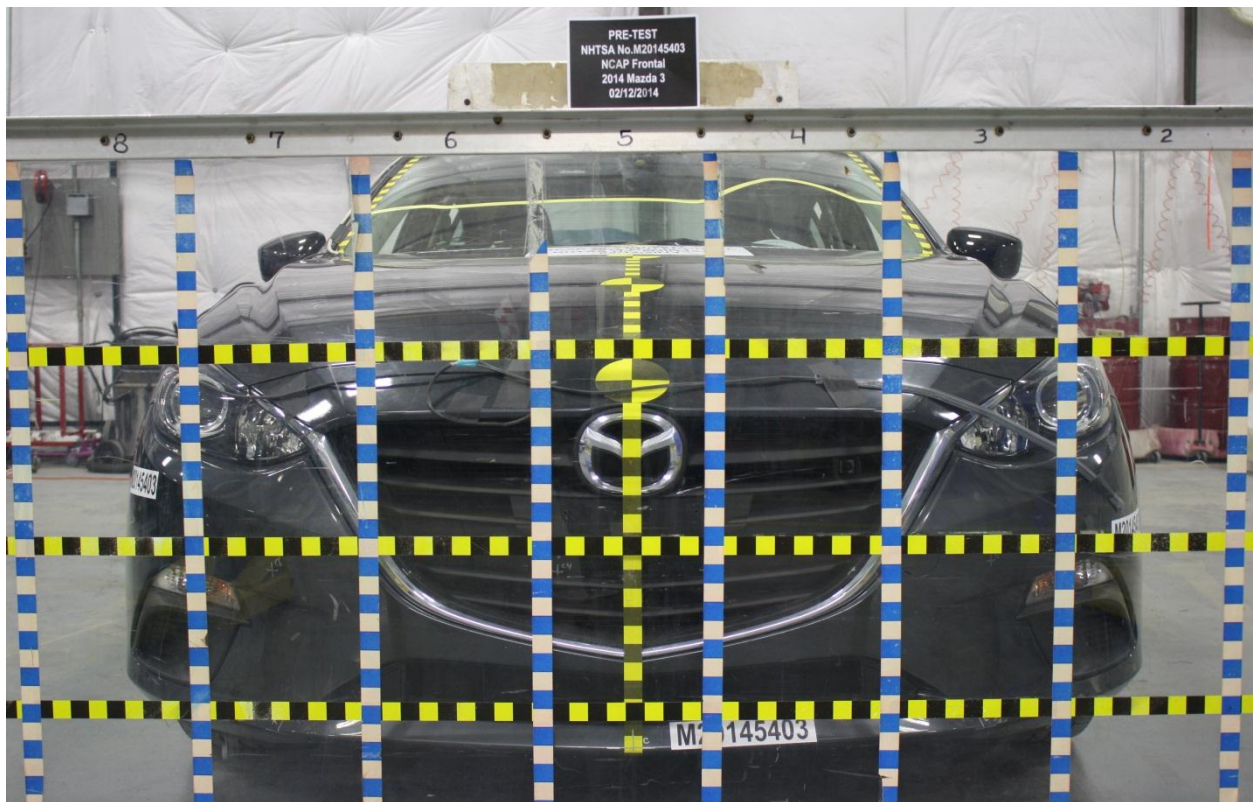


Figure A-1: Load Cell Location

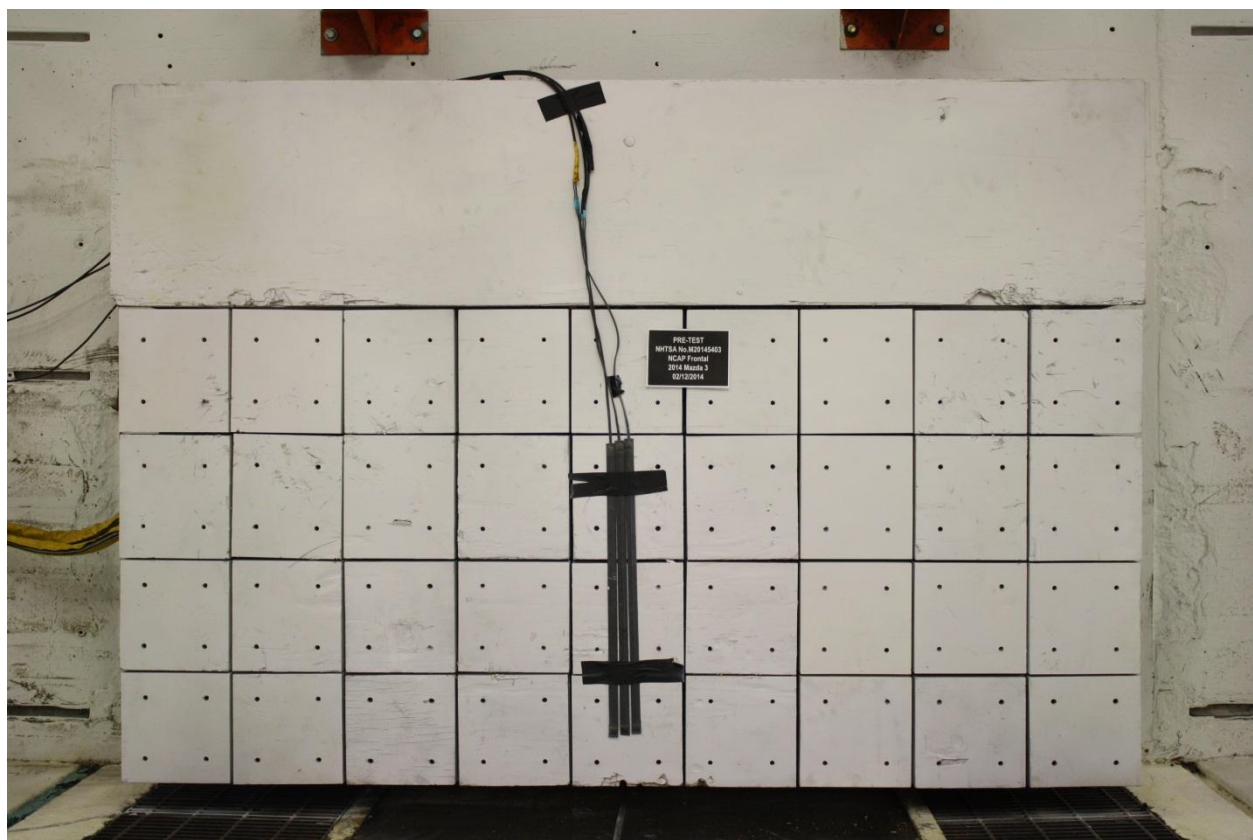


Figure A-2: Load Cell Wall



Figure A-3: Manufacturer's Label

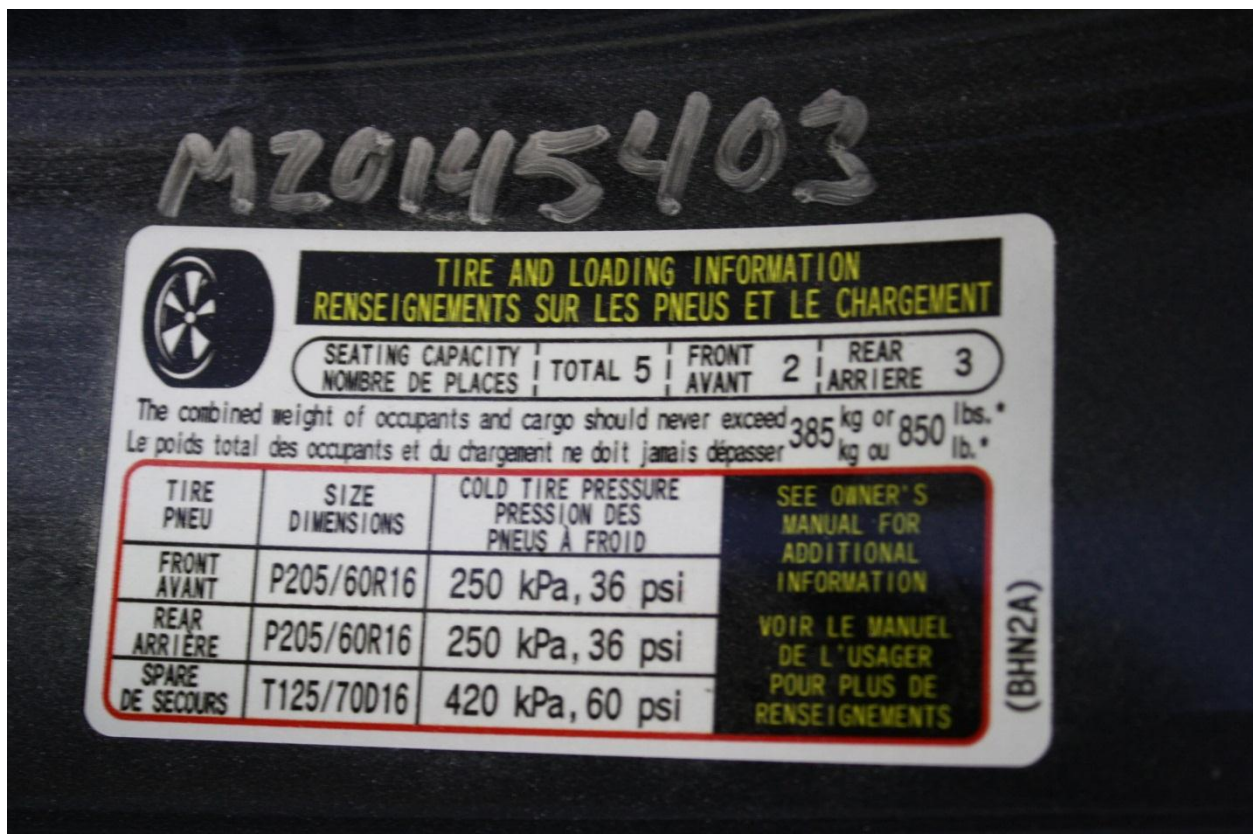


Figure A-4: Tire Placard



Figure A-5: 2014 Mazda Mazda3 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

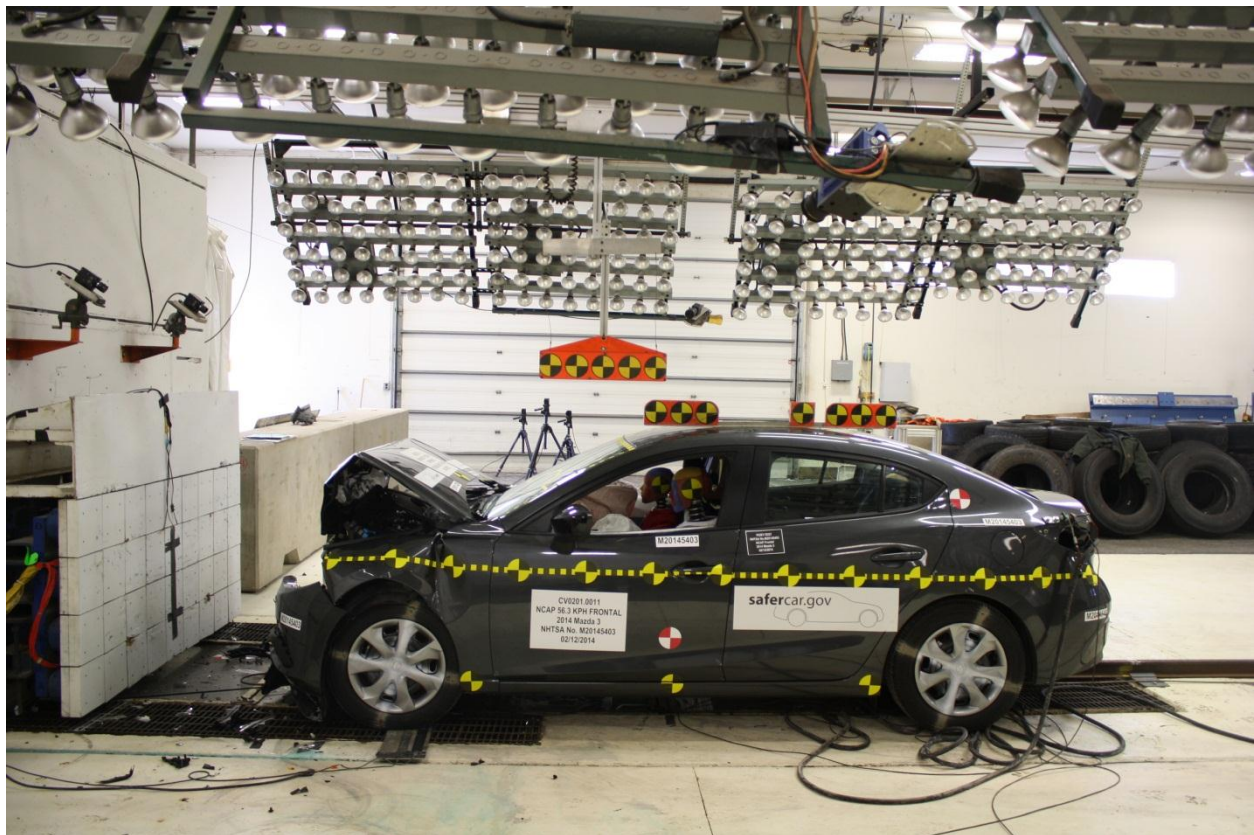


Figure A-10: Post-Test Left View of Test Vehicle



Figure A-11: Pre-Test Right View of Test Vehicle



Figure A-12: Post-Test Right View of Test Vehicle

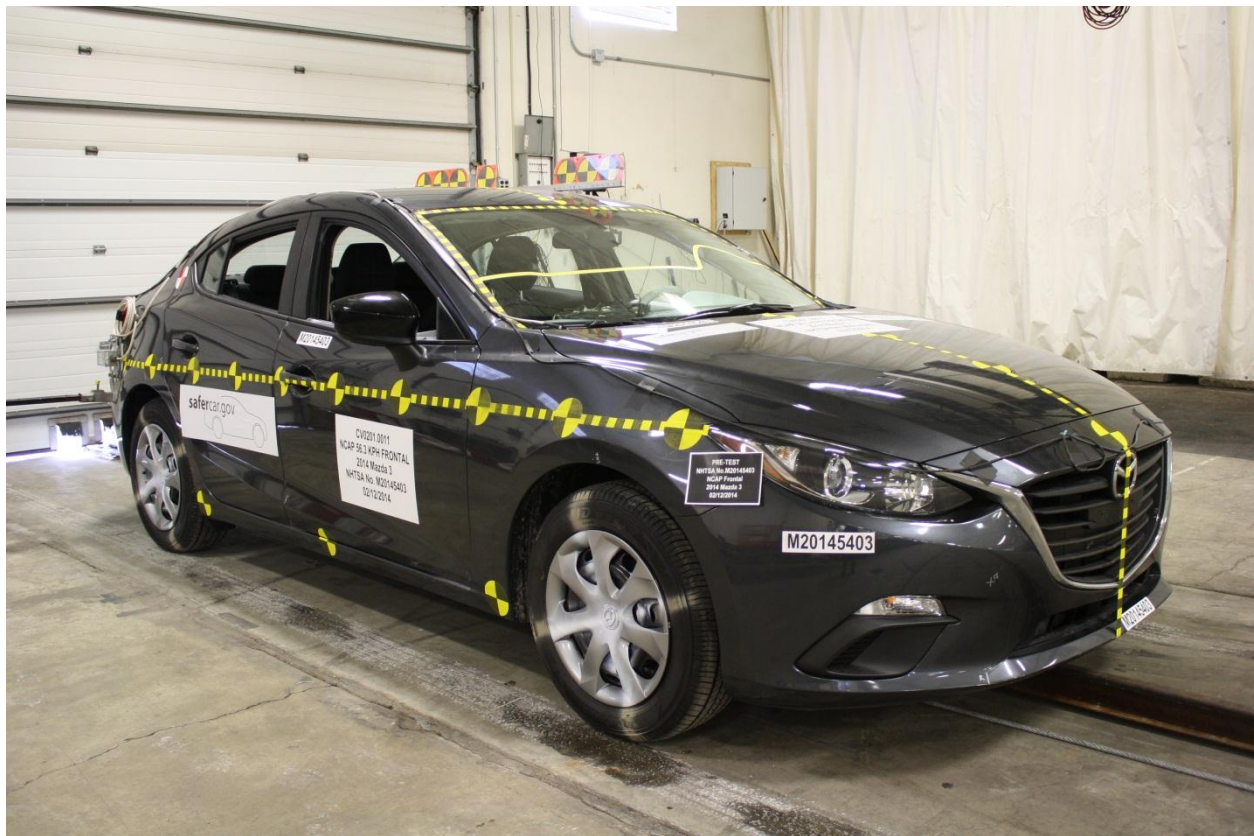


Figure A-13: Pre-Test Right Front 3-4 View



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

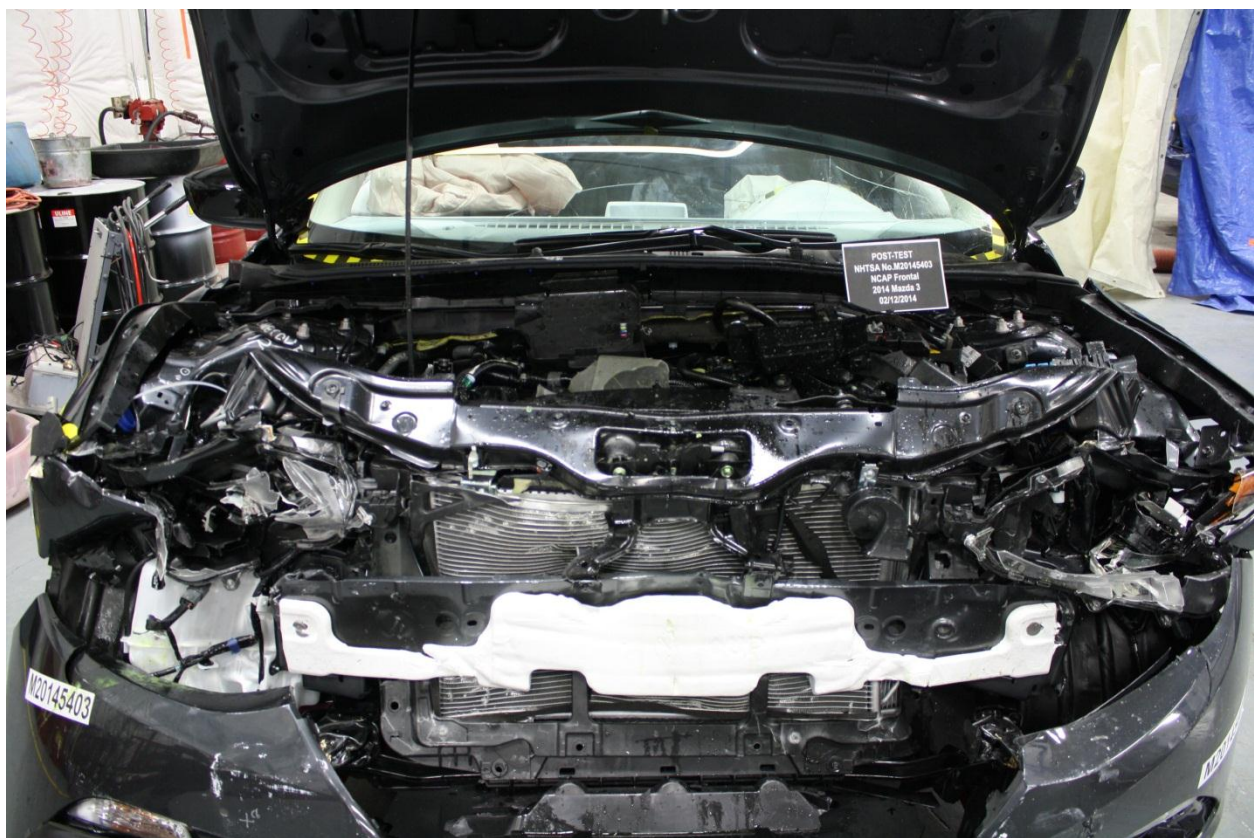


Figure A-20: Post-Test Engine Compartment View



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

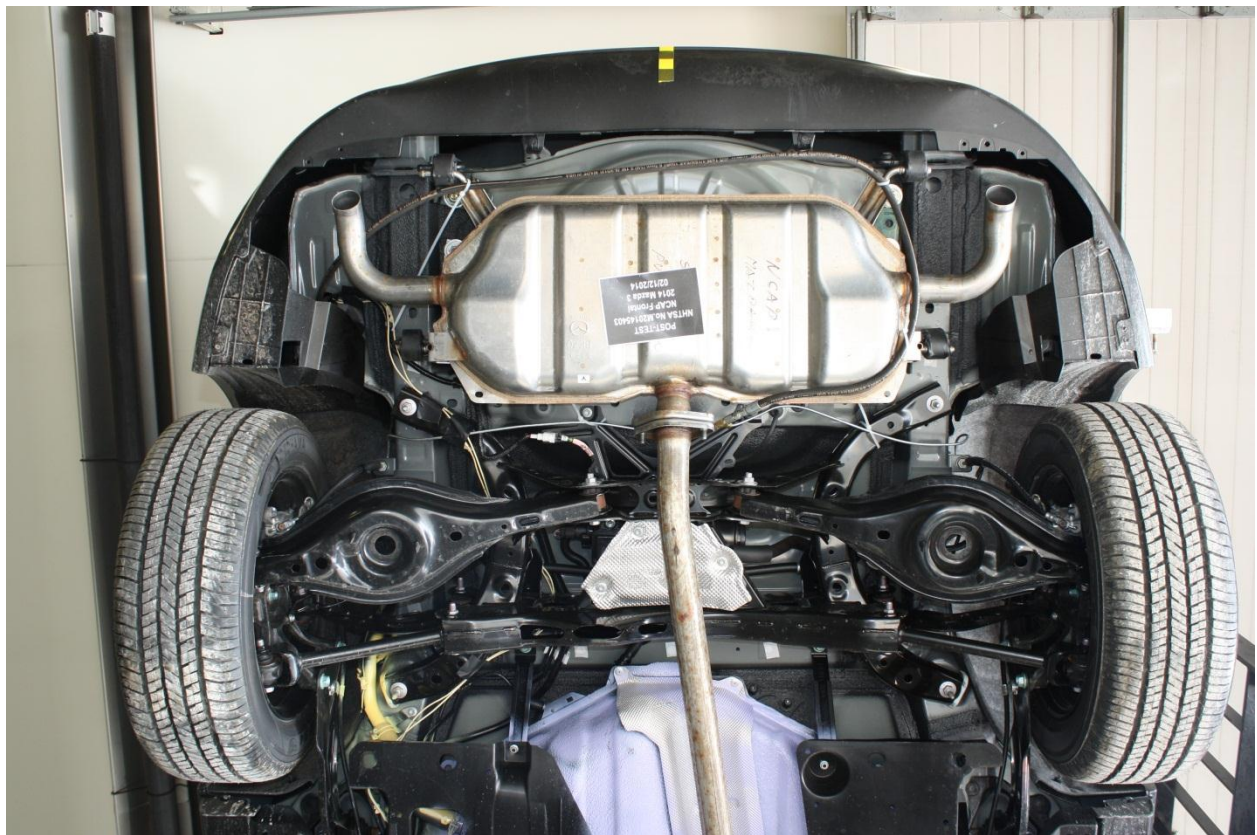


Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing



Figure A-28: Post-Test Dummy Cable Routing

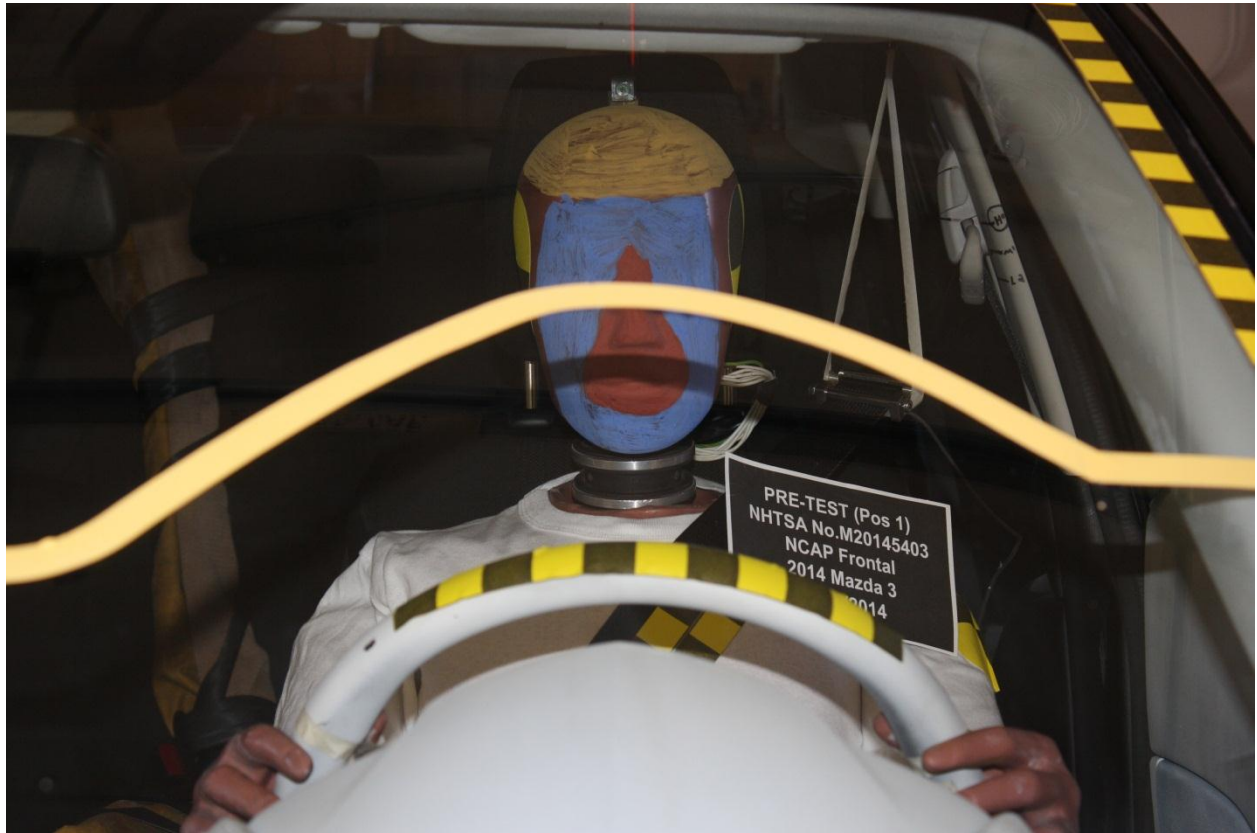


Figure A-29: Pre-Test Driver Dummy Front View



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

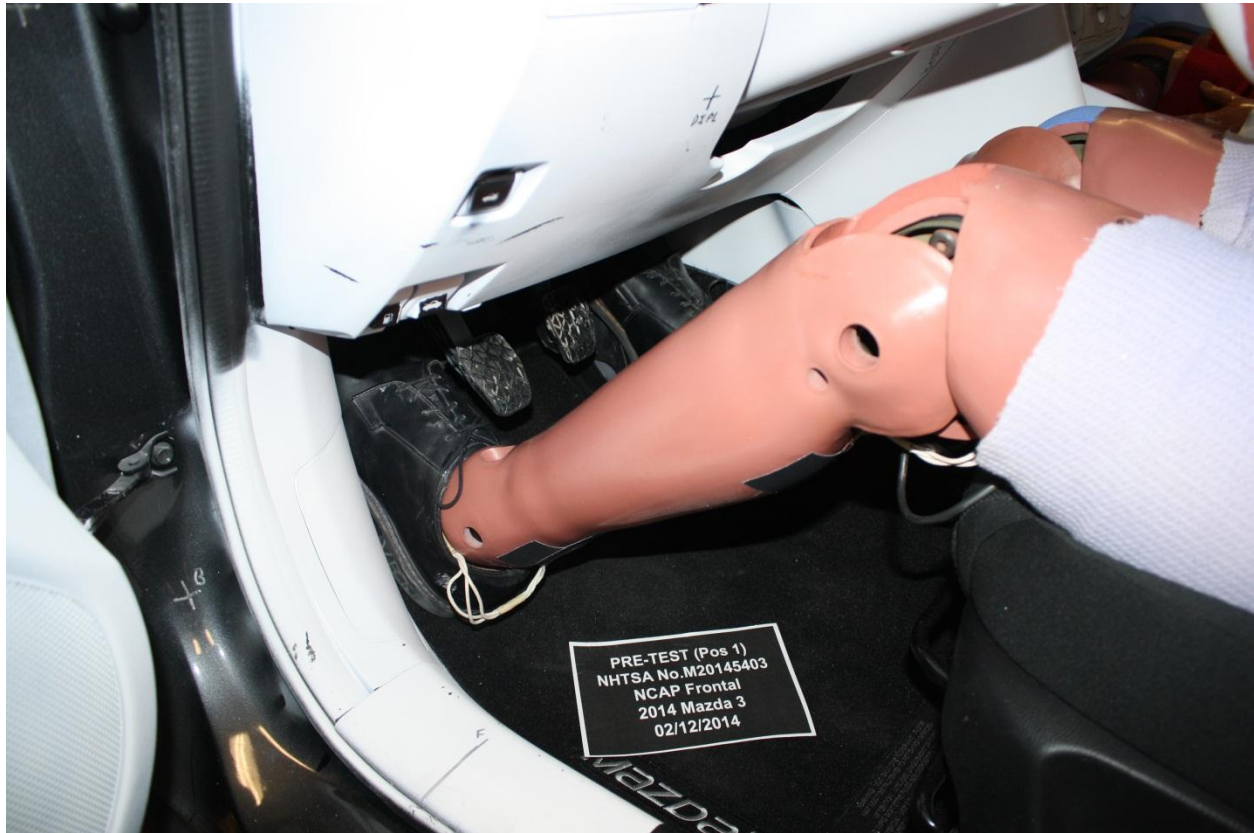


Figure A-39: Pre-Test Driver Dummy Feet

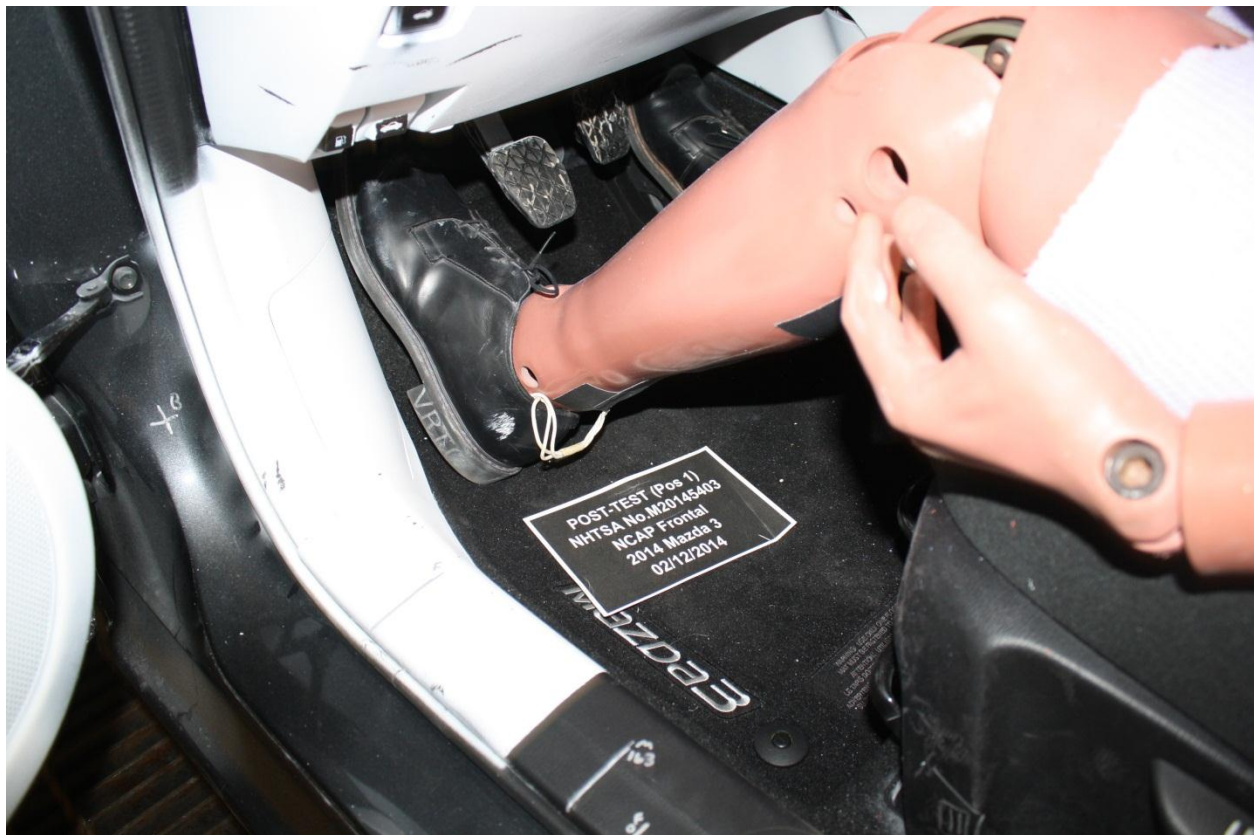


Figure A-40: Post-Test Driver Dummy Feet



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

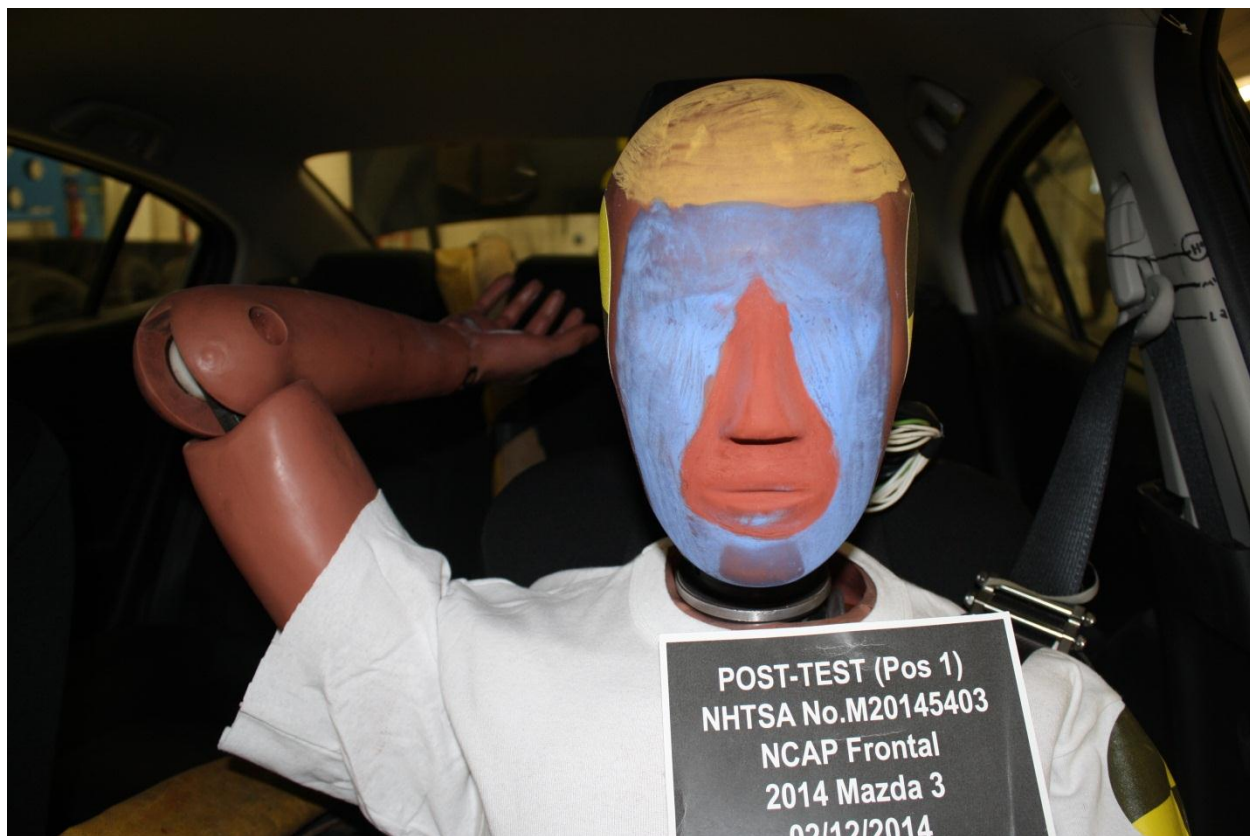


Figure A-45: Post-Test Driver Dummy Face



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



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

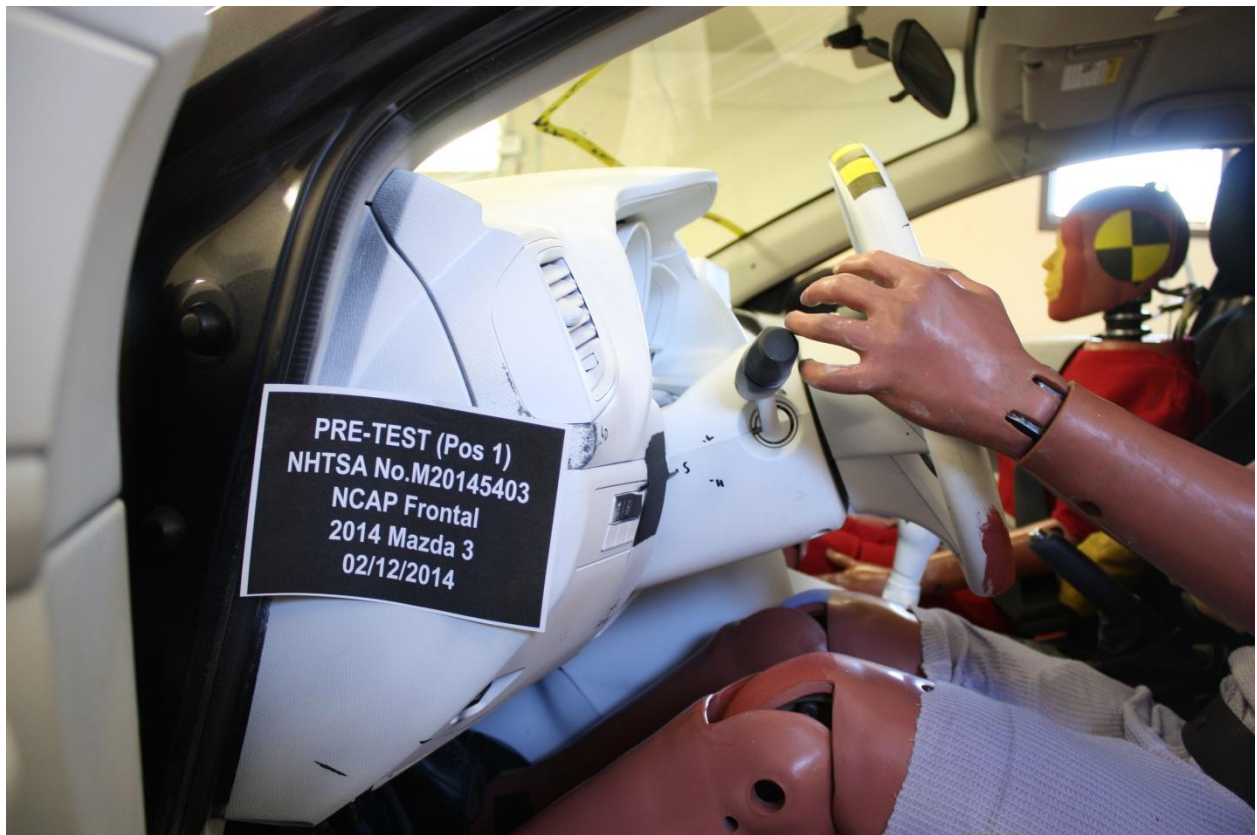


Figure A-48: Pre-Test View of the Steering Wheel

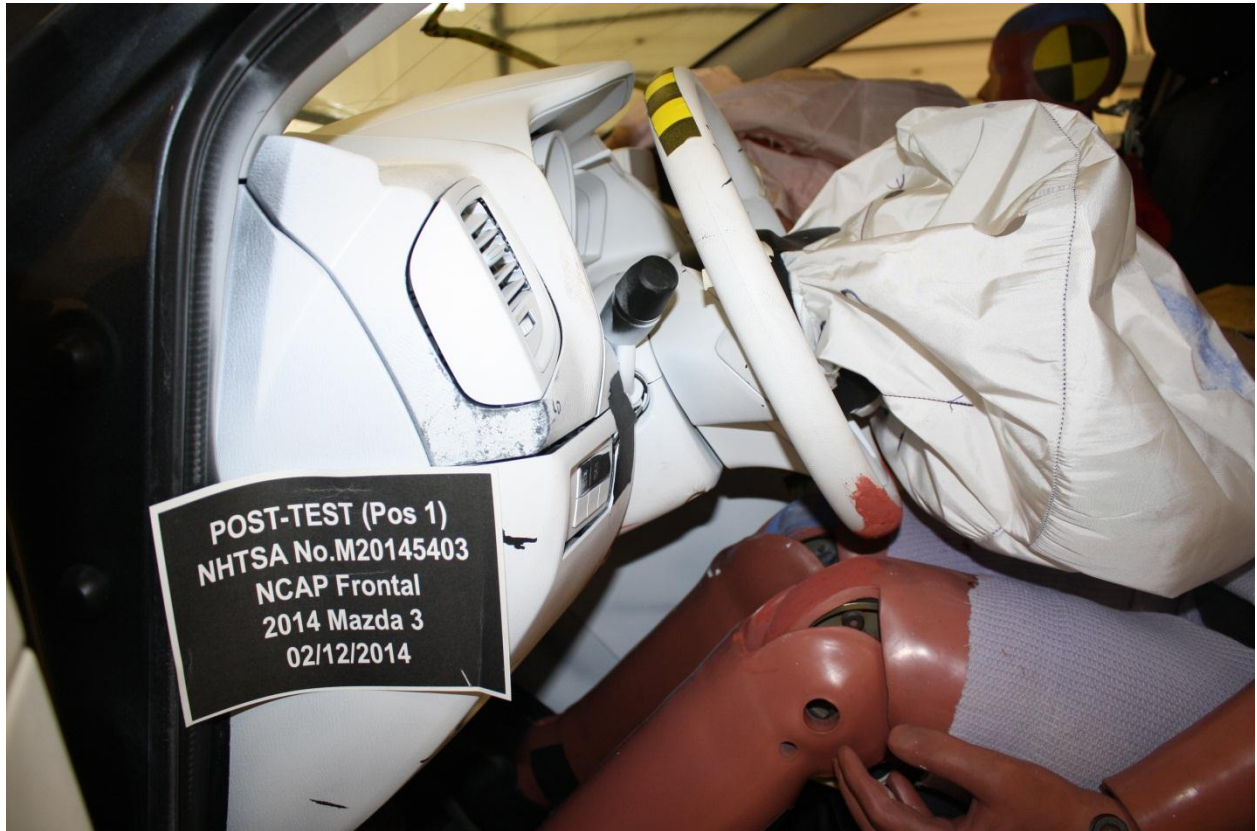


Figure A-49: Post-Test View of the Steering Wheel



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

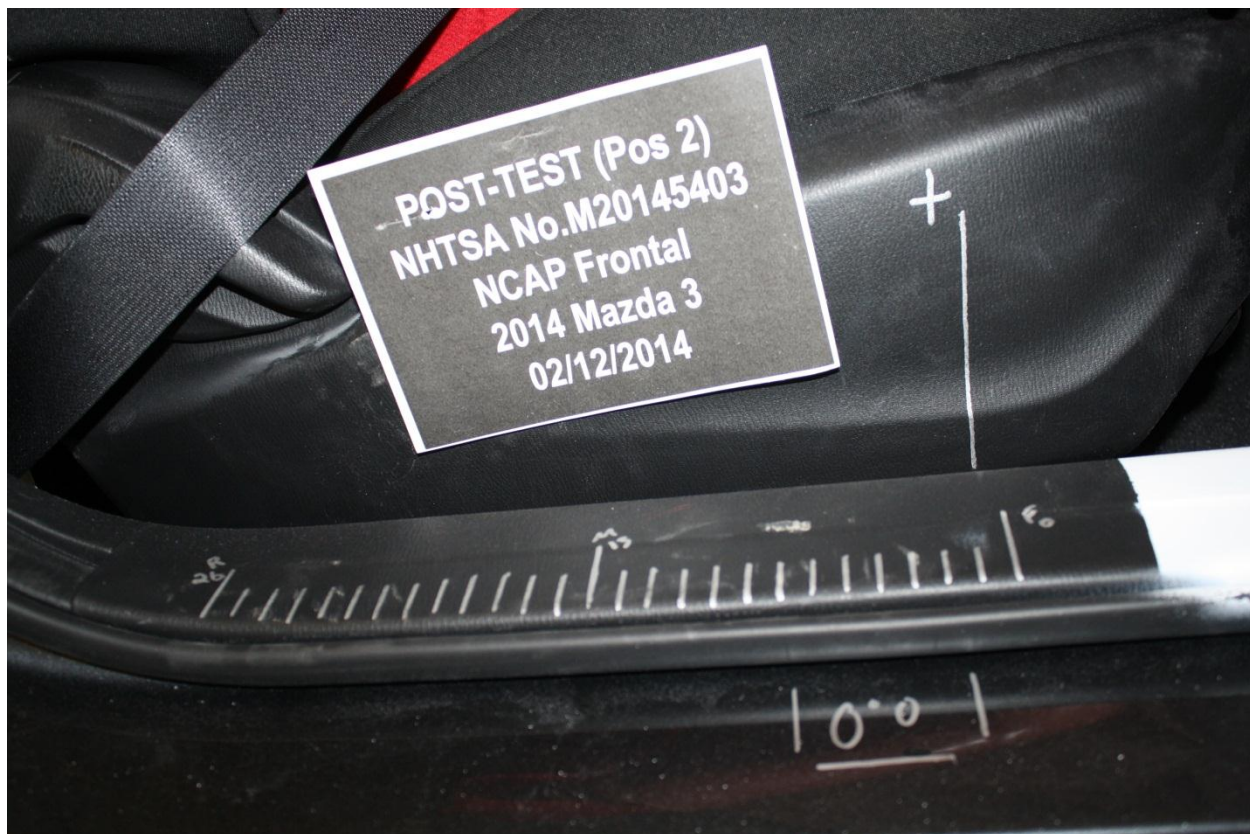


Figure A-57: Post-Test Passenger's Seat Fore-Aft Markings



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

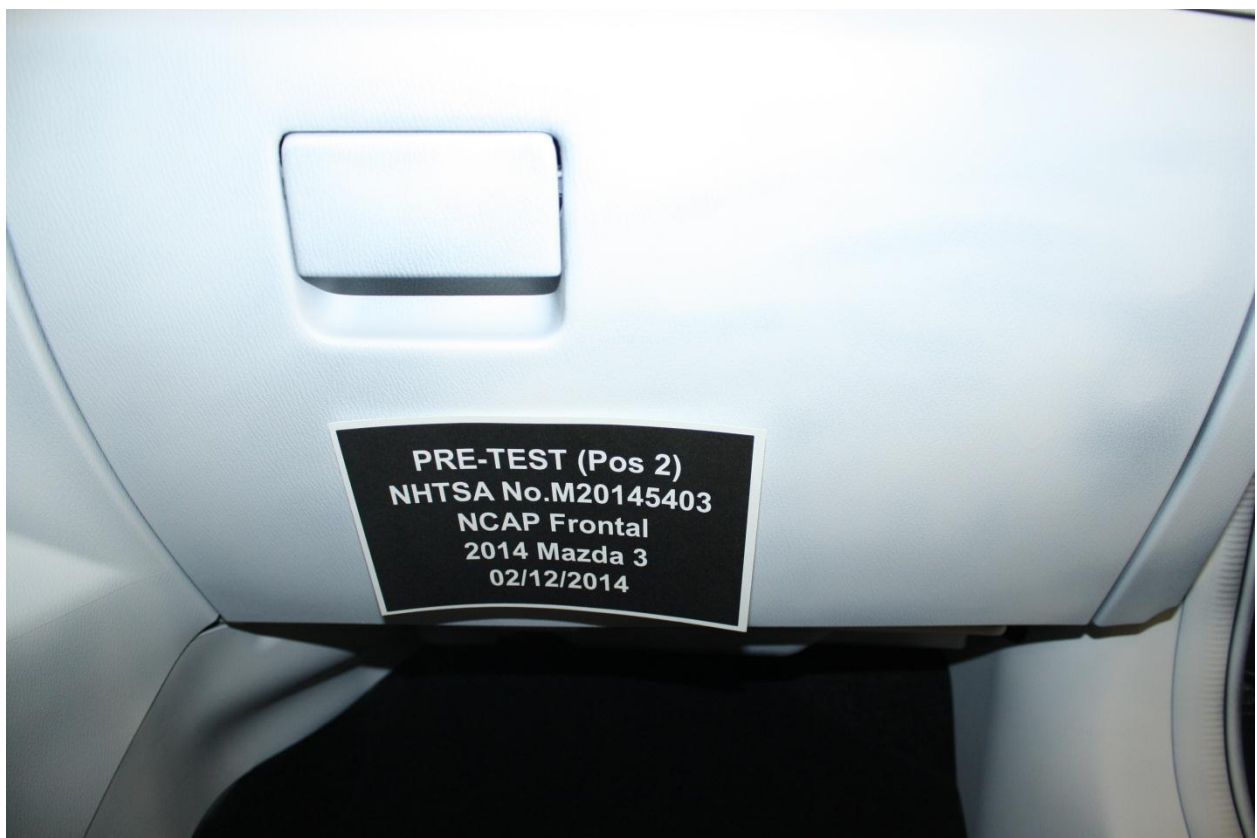


Figure A-62: Pre-Test Passenger's Side Knee Bolster



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

Photo Not Available

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

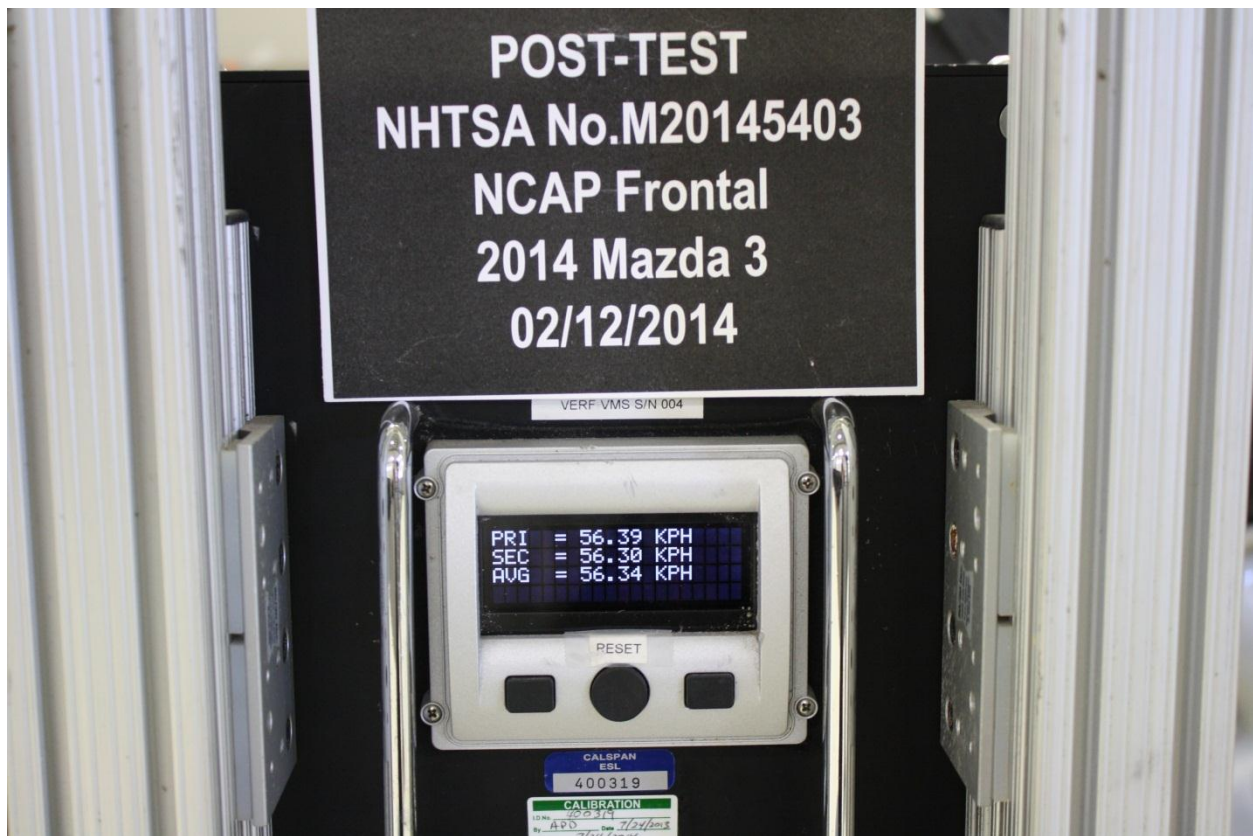


Figure A-71: Post-Test Speed Trap Read-Out



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 Mazda Mazda3 Frontal Impact Event

2014 MAZDA3 SA

Model: 2014 MAZDA3 I 4-DOOR SV
Exterior Color: METEOR GRAY MICA
Interior Color: BLACK

EPA DOT Fuel Economy and Environment

Fuel Economy

33 MPG combined city/hwy
29 city
41 highway
3.0 gallons per 100 miles

You Save \$3,500 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel Cost \$1,600

Fuel Economy & Greenhouse Gas Rating (tailpipe only) **Smog Rating** (tailpipe only)

1 8 10 1 5 10

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 23 MPG and costs \$11,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.50 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change.

fuel economy.gov
Calculate personalized estimates and compare vehicles

PART'S CONTENT INFORMATION:

FOR VEHICLES IN THIS CARLINE: U.S./CANADIAN PARTS CONTENT: 0%
MAJOR SOURCES OF FOREIGN PARTS CONTENT: JAPAN 85%

NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
FINAL ASSEMBLY POINT: HOFU, JAPAN
COUNTRY OF ORIGIN: JAPAN
TRANSMISSION: JAPAN

This label is affixed pursuant to the Federal Automobile Disclosure Act. Gasoline, License and Title fees, State and Local taxes, and Dealer installed options are not included.

STANDARD EQUIPMENT

ENGINE/MECHANICAL FEATURES

- SKYACTIV-G 2.0L DOHC 4-CYL ENGINE
- SKYACTIV-MT 6-SPEED MANUAL TRANS
- 155 HORSEPOWER, 150 LB-FT TORQUE
- INDEPENDENT FRONT/REAR SUSPENSION

EXTERIOR FEATURES

- 16-INCH STEEL WHEELS
- P225/60 R16 ALL-SEASON TIRES
- VARIABLE INTERMITTENT WIPERS
- GLOSS BLACK DUAL POWER MIRRORS

INTERIOR FEATURES

- CLOTH-TRIMMED SPORT SEATS
- 6-WAY MANUAL DRIVER'S SEAT
- AIR CONDITIONING W/POLEN FILTER
- POWER AUTOMATIC DOOR LOCKS
- POWER WINDOWS W/DRIVER ONE-TOUCH
- REMOTE KEYLESS ENTRY
- PUSH BUTTON ENGINE START
- FOLD-DOWN REAR SEAT
- CENTER ARMREST W/COVERED STORAGE
- DRIVER/PASSENGER VANITY MIRRORS

SAFETY AND SECURITY FEATURES

- 36-MONTH/50,000 MILE "BUMPER-TO-BUMPER" WARRANTY
- 60-MONTH/60,000 MILE POWERTRAIN WARRANTY
- 24-HOUR ROADSIDE ASSISTANCE
- 5-PASSENGER 3-POINT SAFETY BELTS
- LATCH CHILD SAFETY SEAT ANCHORS
- ANTI-THIEF ENGINE IMMOBILIZER
- SKYACTIV BODY RING STRUCTURE

4-WHEEL DISC BRAKES

- ELECTRIC POWER ASSISTED RACK AND PINION STEERING (EPAS)
- HALOGEN HEADLIGHTS
- HALOGEN DAYTIME RUNNING LIGHTS
- BLACK GRILLE
- IN-GLASS ANTENNA
- AM/FM 4-SPEAKER AUDIO
- AUXILIARY AUDIO JACK & USB INPUT
- TRIP COMPUTER
- STEERING WHEEL MOUNTED CONTROLS
- TACHOMETER
- TWO 12V POWER OUTLETS
- DUAL FRONT CUP HOLDERS & DOOR POCKETS W/BOTTLE HOLDERS
- FRONT SEATBACK MAP POCKET
- CARPETED FLOOR MATS
- DYNAMIC STABILITY CONTROL
- TRACTION CONTROL SYSTEM
- HILL LAUNCH ASSIST
- ANTI-LOCK BRAKE SYSTEM WITH EBD & BRAKE ASSIST
- ADVANCED DUAL FRONT AIR BAGS WITH EBD & BRAKE ASSIST
- FRONT SIDE-IMPACT AIR 2+2
- FRONT & REAR SIDE AIR CURTAINS
- TIRE PRESSURE MONITORING SYSTEM

MSRP \$16,945

Total Vehicle and Options \$16,945
Delivery, Processing and Handling Fee \$795
Total MSRP \$17,740

GOVERNMENT 5-STAR SAFETY RATINGS

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.

Frontal Crash Driver Passenger Not Rated
Based on the risk of injury in a frontal impact.
Should ONLY be compared to other vehicles of similar size and weight.

Side Crash Front seat Not Rated
Rear seat Not Rated
Based on the risk of injury in a side impact.

Rollover Not Rated
Based on the risk of rollover in a single vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★) with 5 being the highest.
Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

SOLD TO: 61590
BERGSTROM MAZDA
3023 VICTORY LANE
APPLETON, WI 54913

SHIP TO: 61590 DY
BERGSTROM MAZDA
3023 VICTORY LANE
APPLETON, WI 54913

JM1BM1T71E1124775

MAZDAUSA.COM

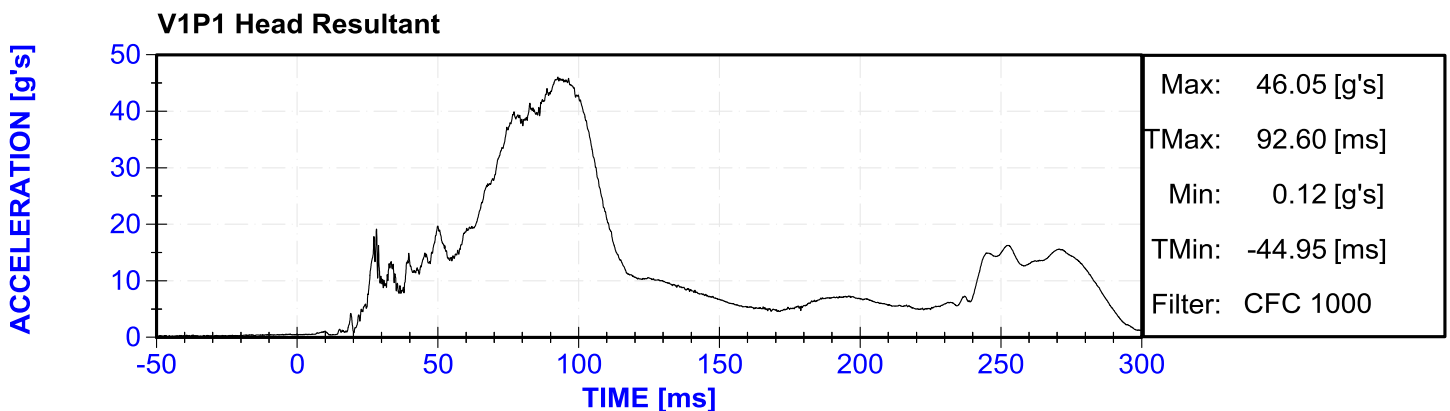
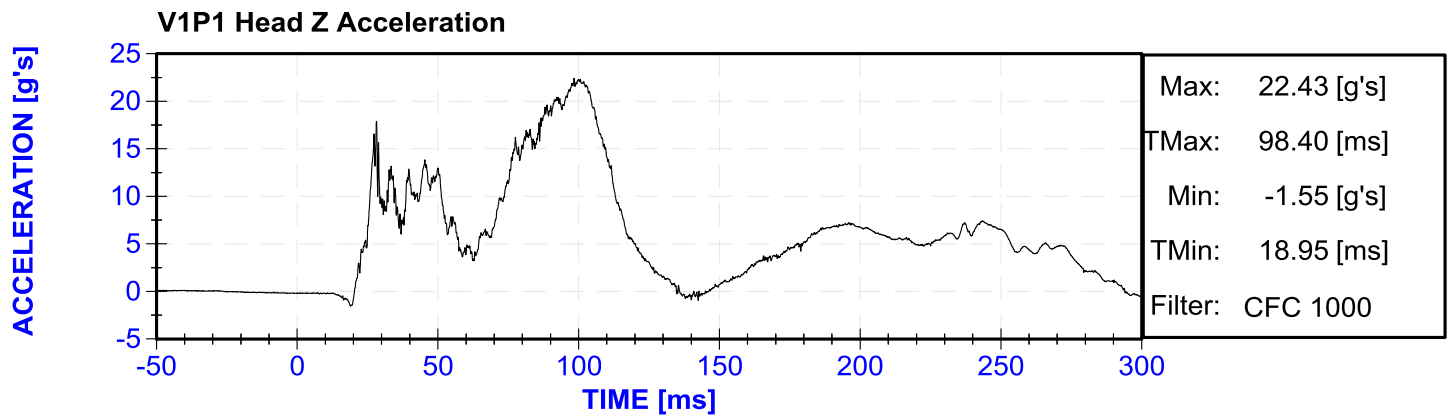
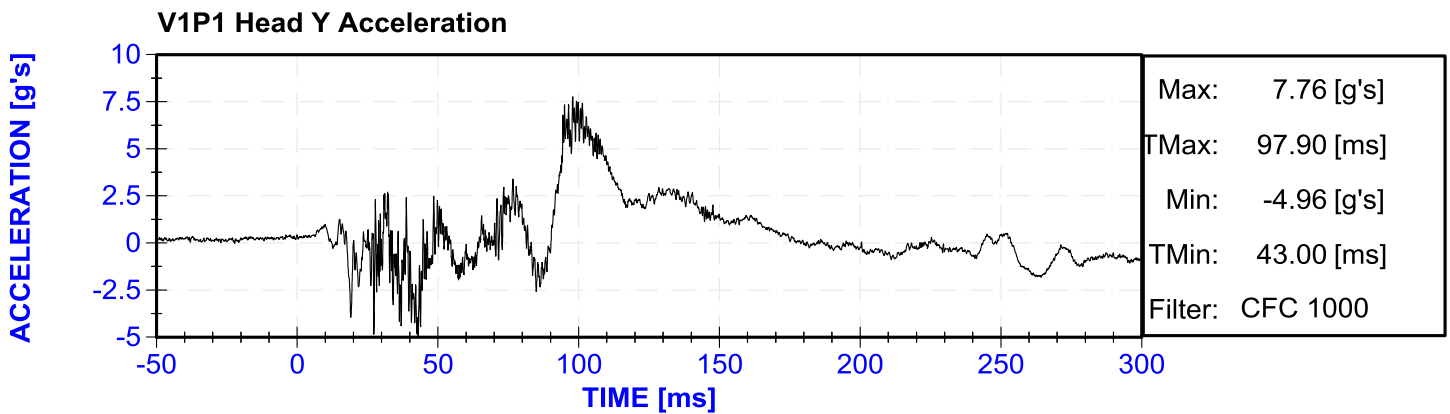
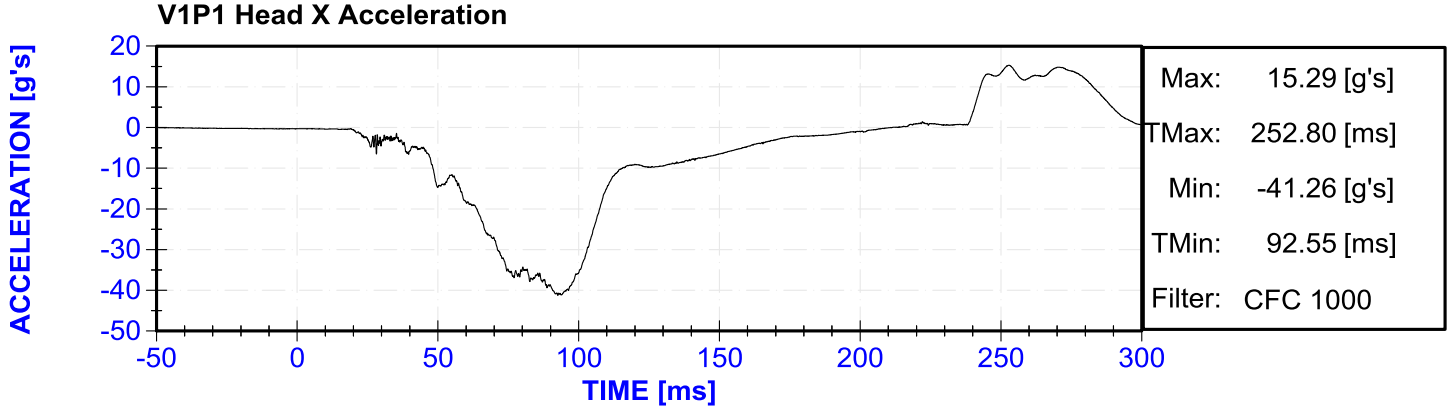
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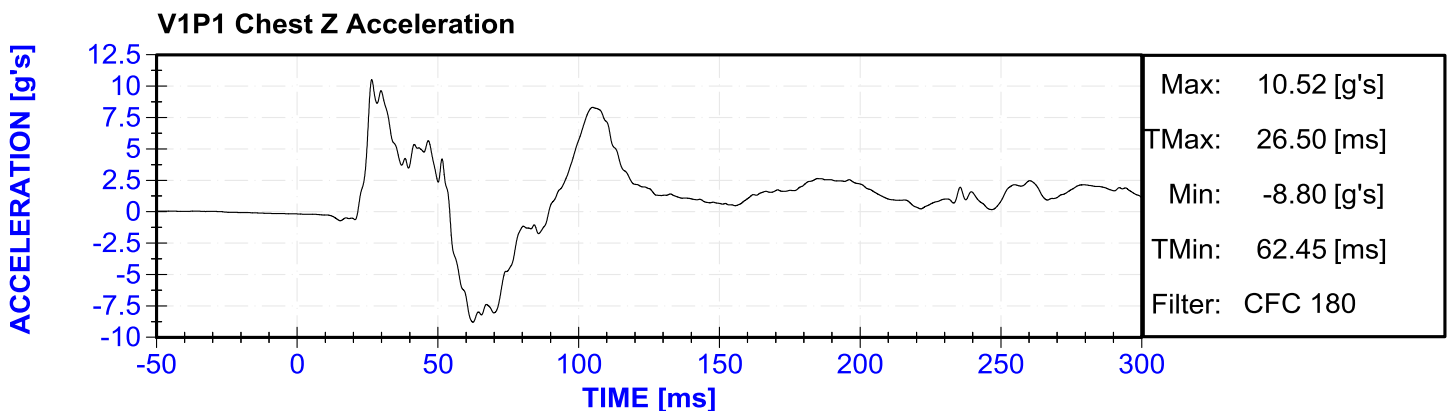
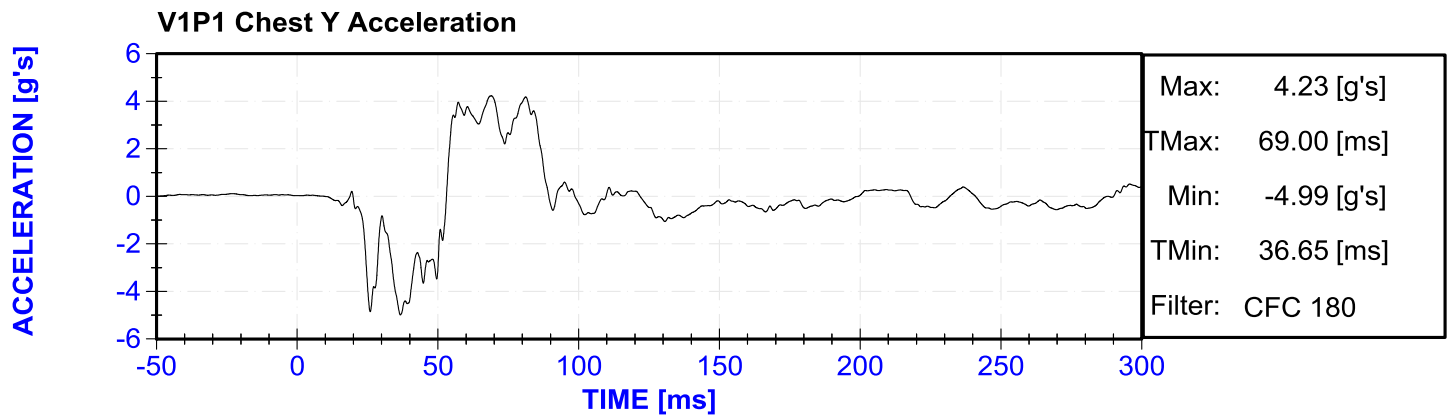
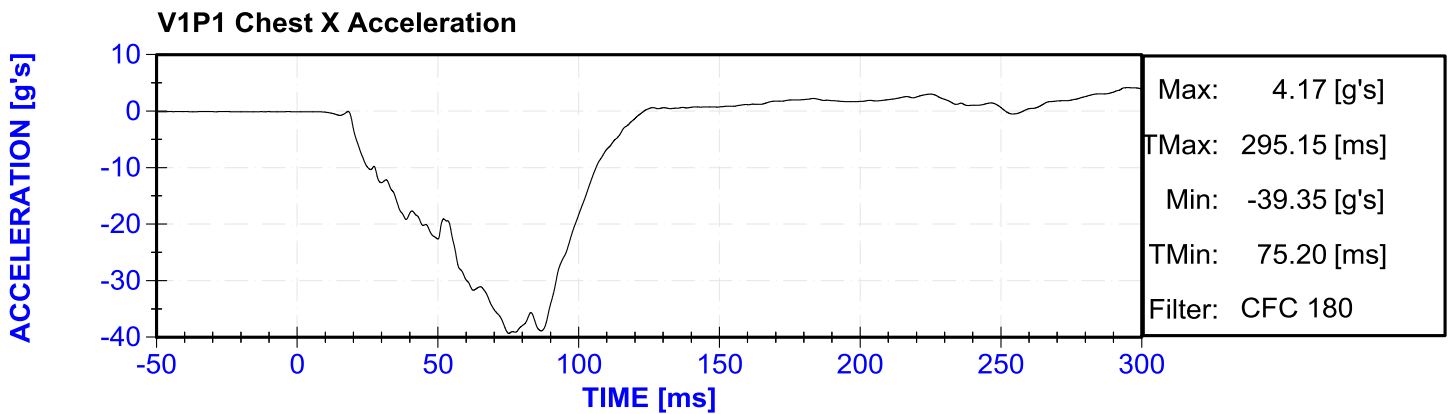
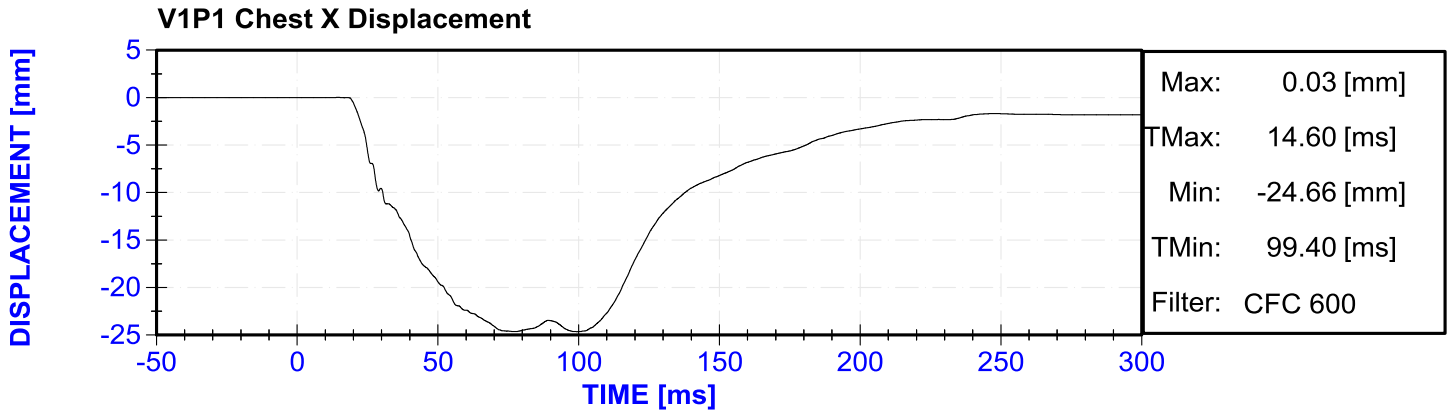
Figure A-78: Monroney Label Photograph

APPENDIX B
VEHICLE & DUMMY RESPONSE DATA TRACES

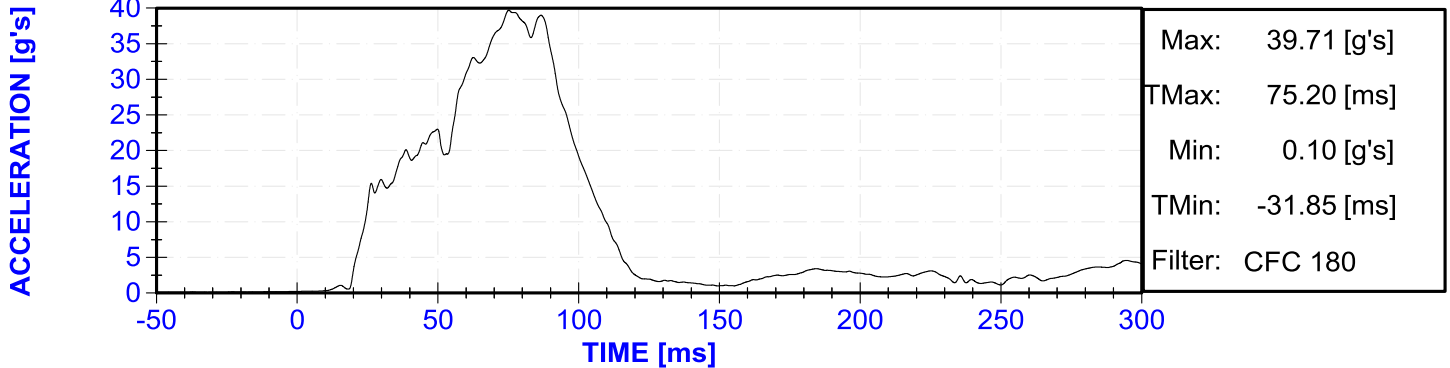
Table of Data Plots

No.	Description	Page
Plot 1	V1P1 Head X Acceleration	B-3
Plot 2	V1P1 Head Y Acceleration	B-3
Plot 3	V1P1 Head Z Acceleration	B-3
Plot 4	V1P1 Head Resultant	B-3
Plot 5	V1P1 Chest X Displacement	B-4
Plot 6	V1P1 Chest X Acceleration	B-4
Plot 7	V1P1 Chest Y Acceleration	B-4
Plot 8	V1P1 Chest Z Acceleration	B-4
Plot 9	V1P1 Chest Resultant	B-5
Plot 10	V1P1 Upper Neck X Force	B-5
Plot 11	V1P1 Upper Neck Z Force	B-5
Plot 12	V1P1 Upper Neck Y Moment	B-5
Plot 13	V1P1 Total Neck Injury	B-6
Plot 14	V1P1 Left Femur Z Force	B-6
Plot 15	V1P1 Right Femur Z Force	B-6
Plot 16	V1P2 Head X Acceleration	B-6
Plot 17	V1P2 Head Y Acceleration	B-7
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Plot 20	V1P2 Chest X Displacement	B-7
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Plot 25	V1P2 Upper Neck X Force	B-9
Plot 26	V1P2 Upper Neck Z Force	B-9
Plot 27	V1P2 Upper Neck Y Moment	B-9
Plot 28	V1P2 Total Neck Injury	B-9
Plot 29	V1P2 Left Femur Z Force	B-10
Plot 30	V1P2 Right Femur Z Force	B-10

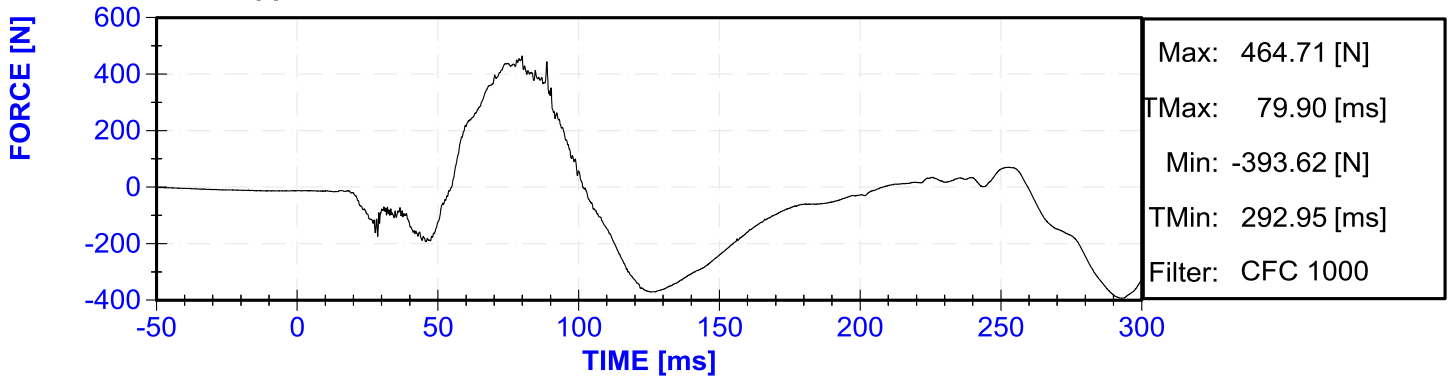




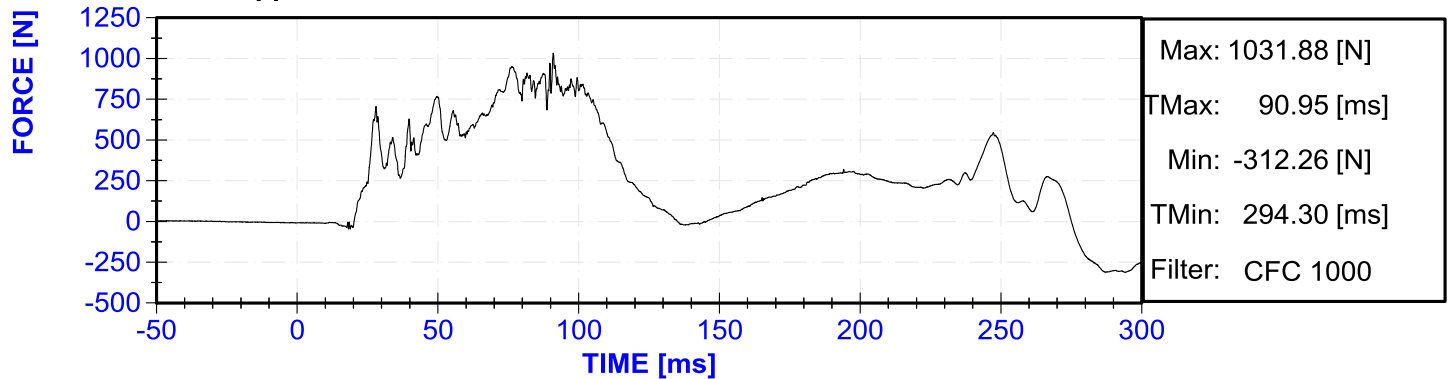
V1P1 Chest Resultant



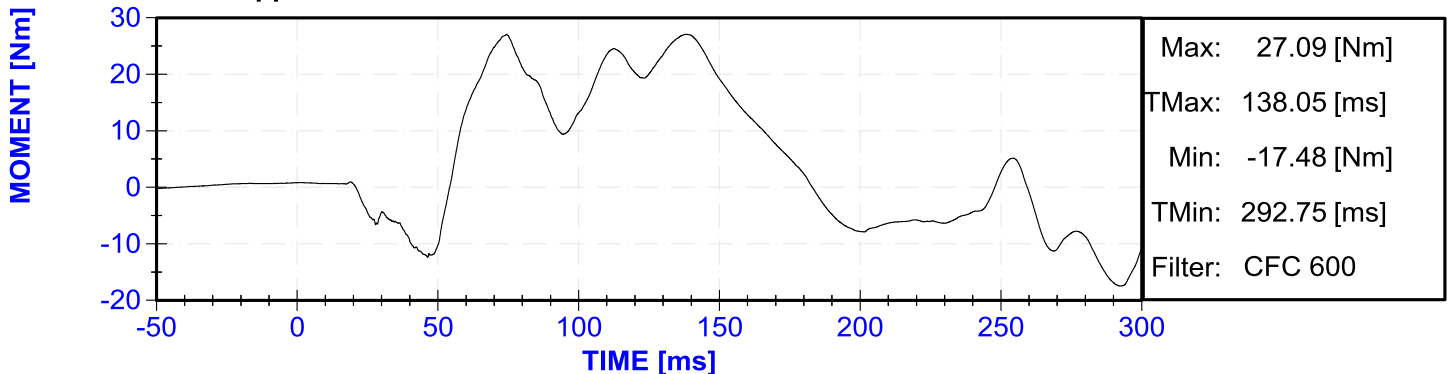
V1P1 Upper Neck X Force

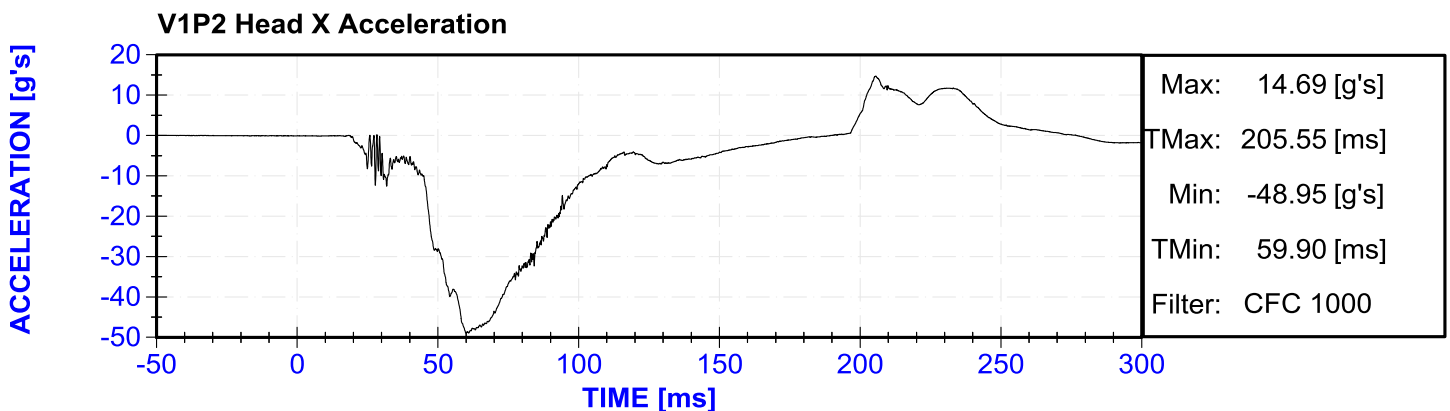
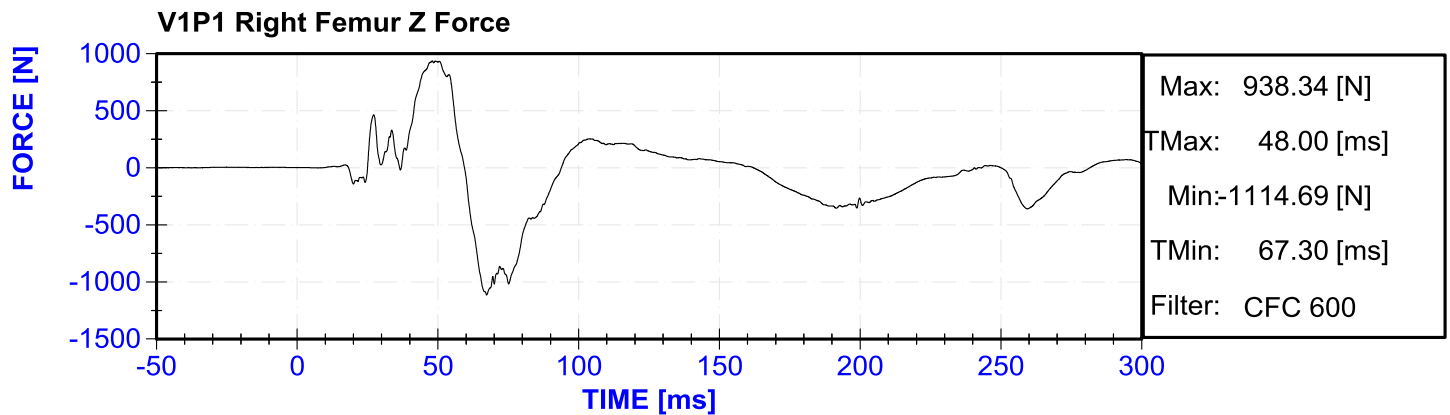
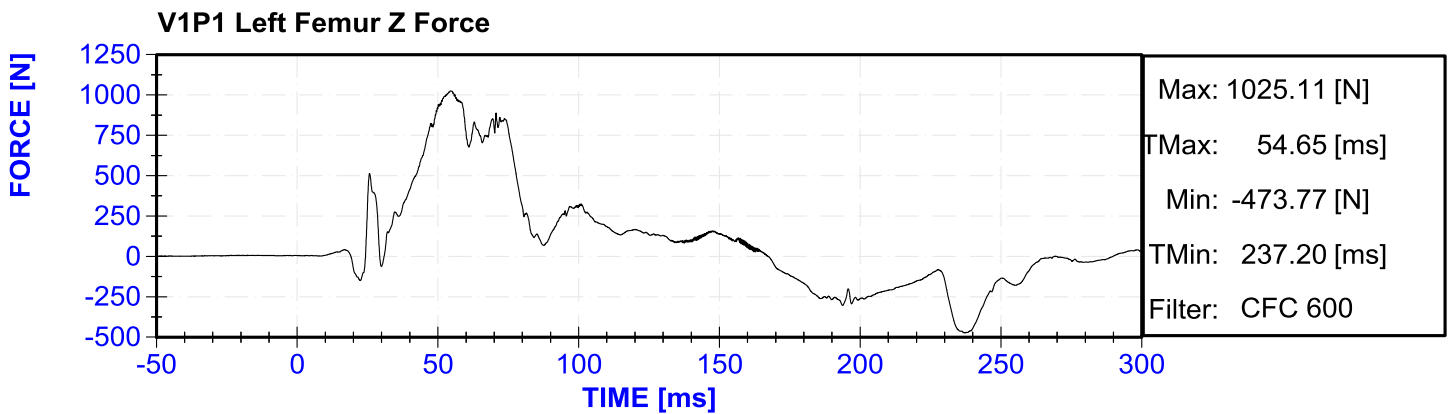
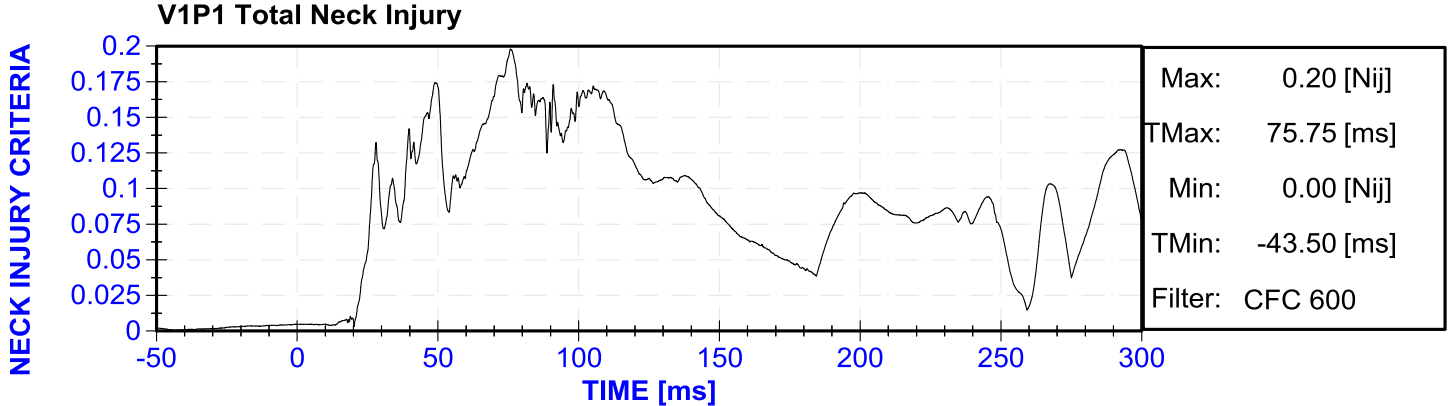


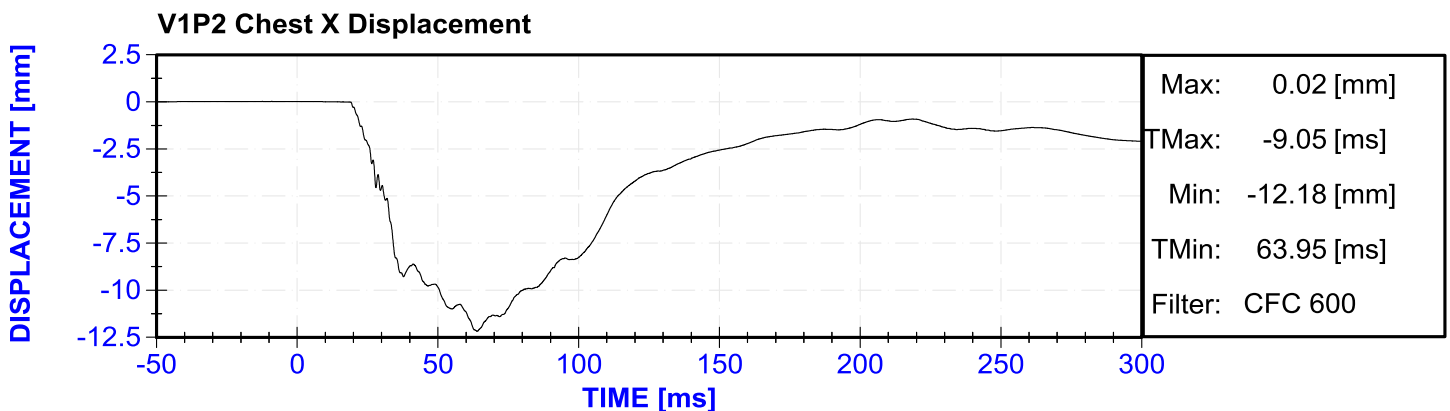
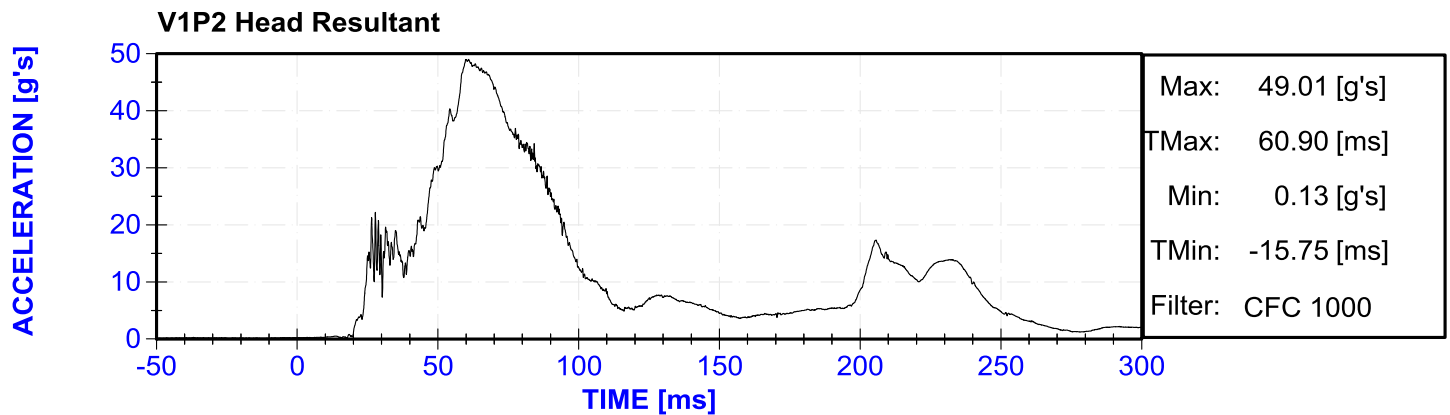
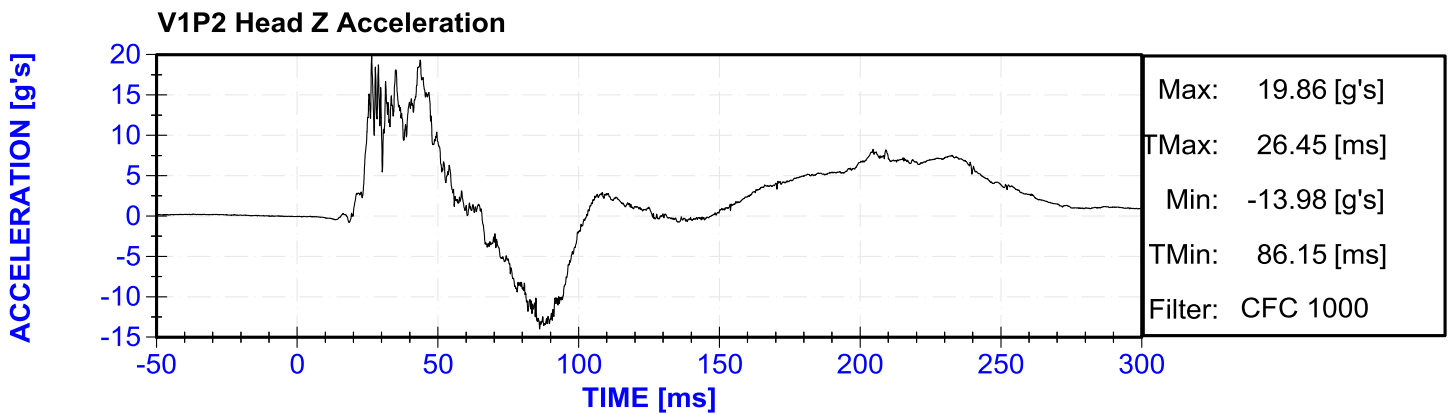
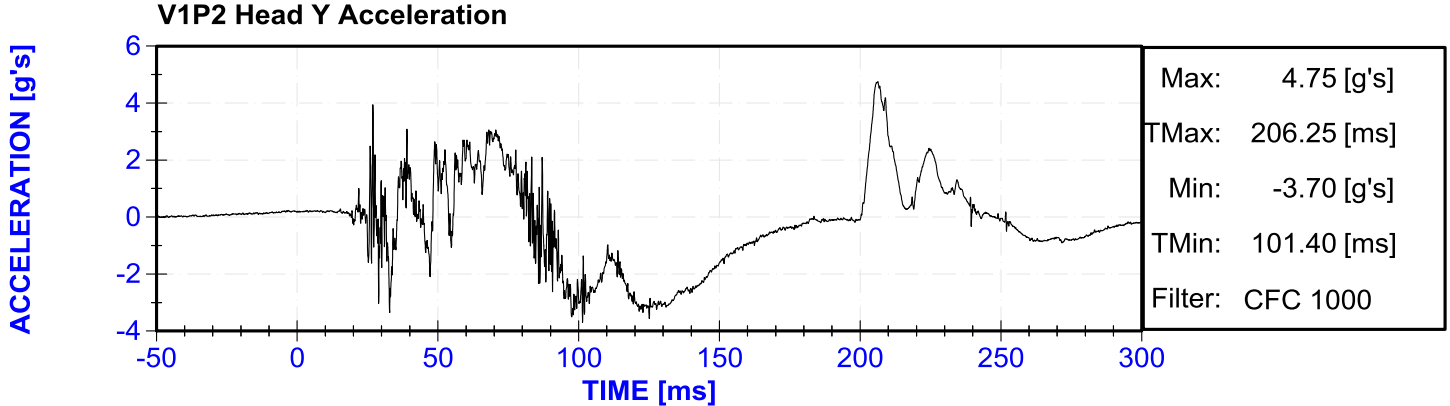
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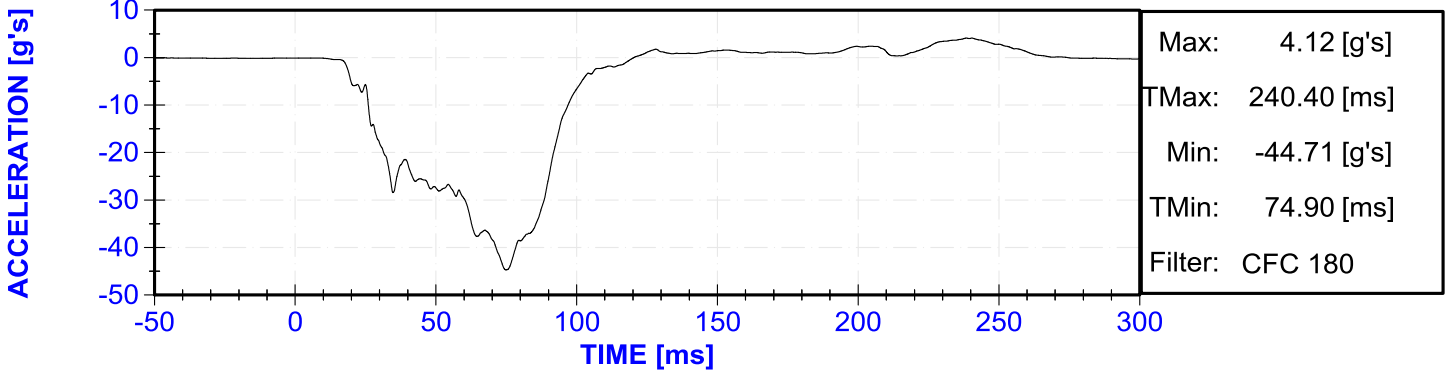
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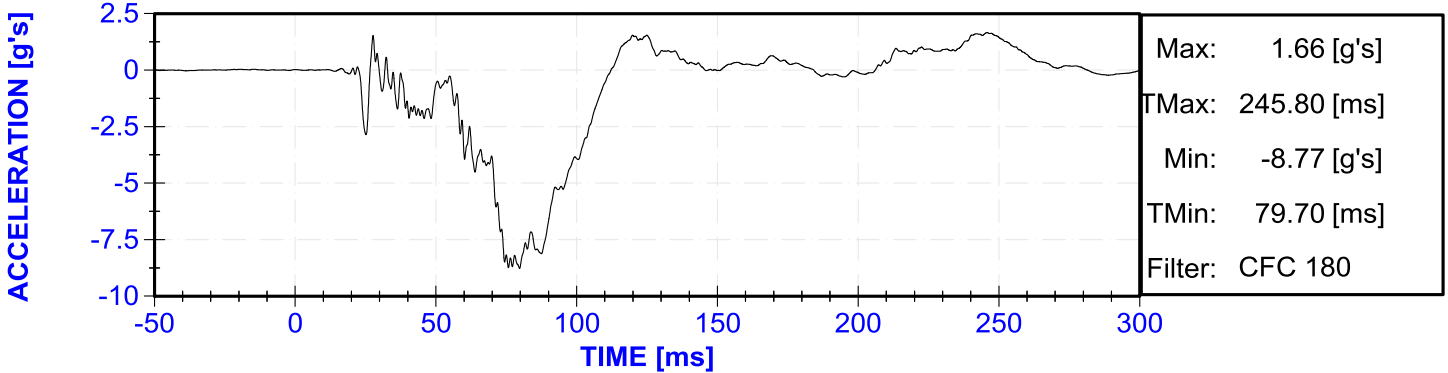




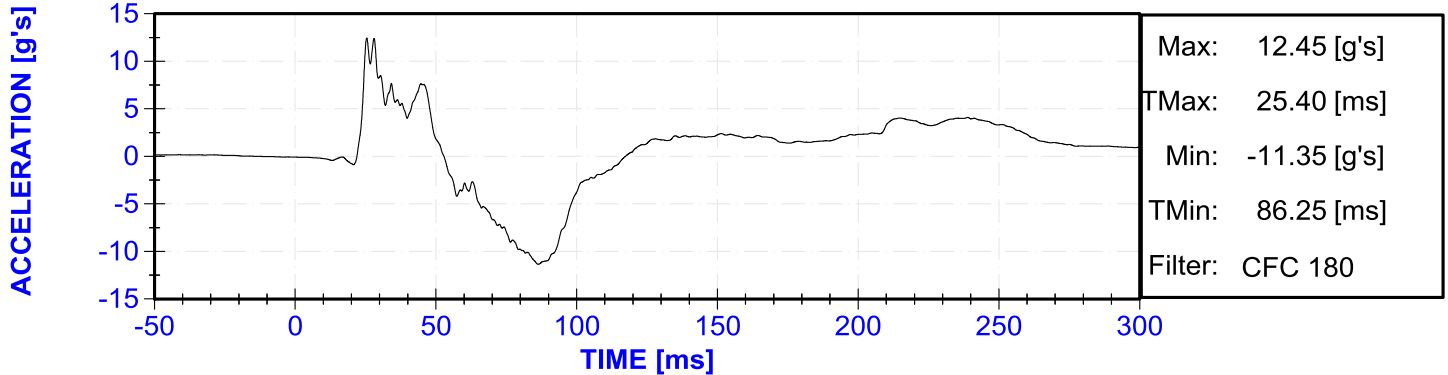
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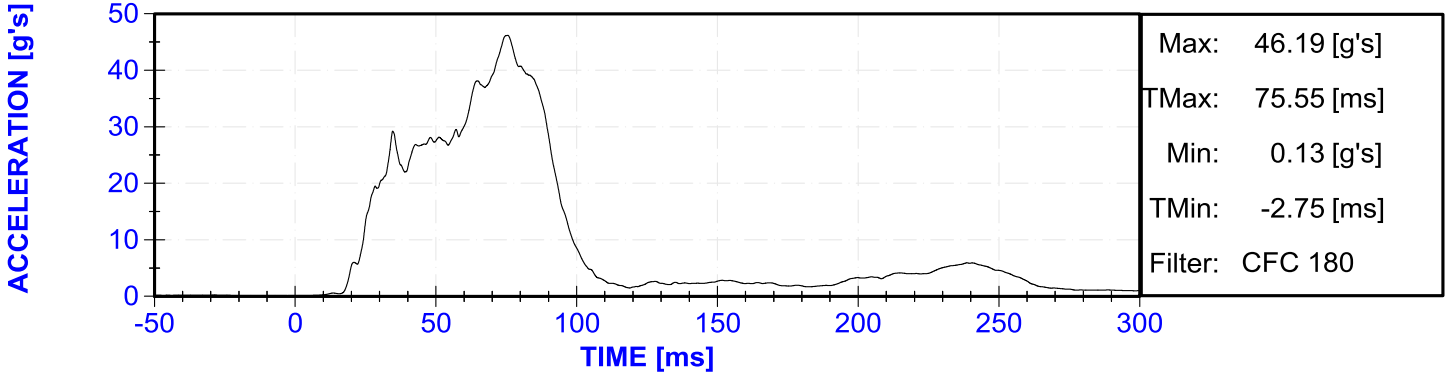
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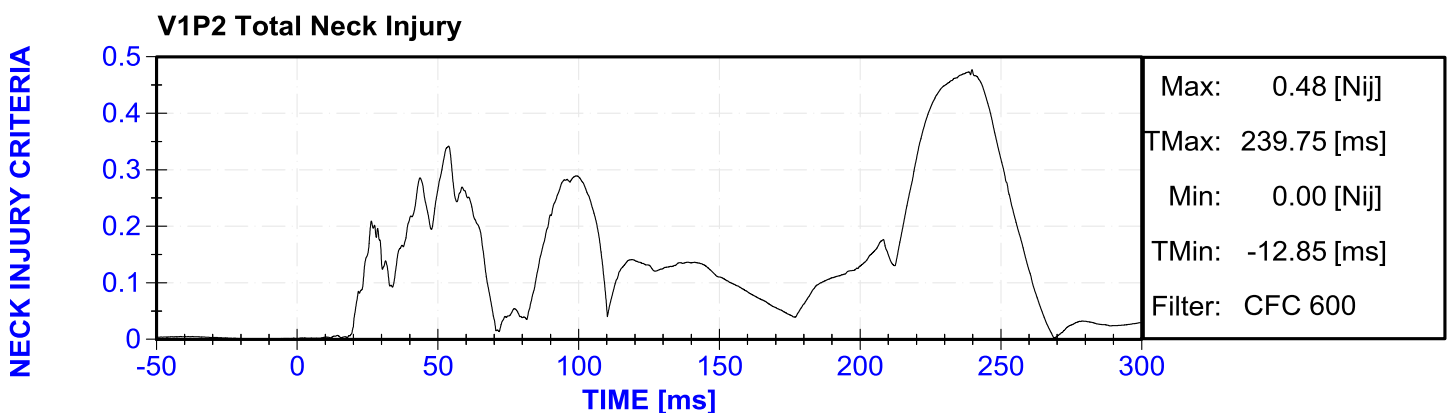
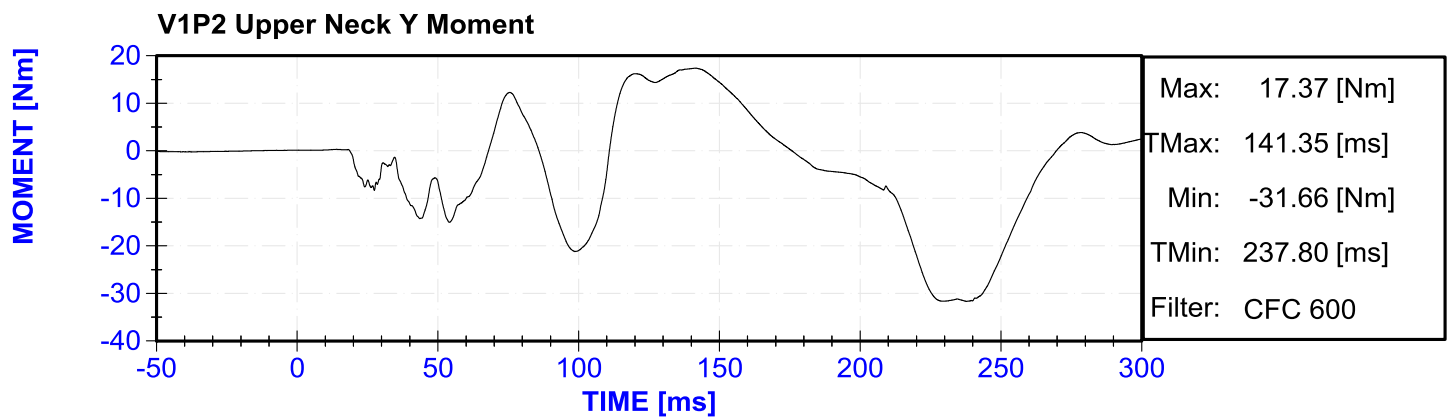
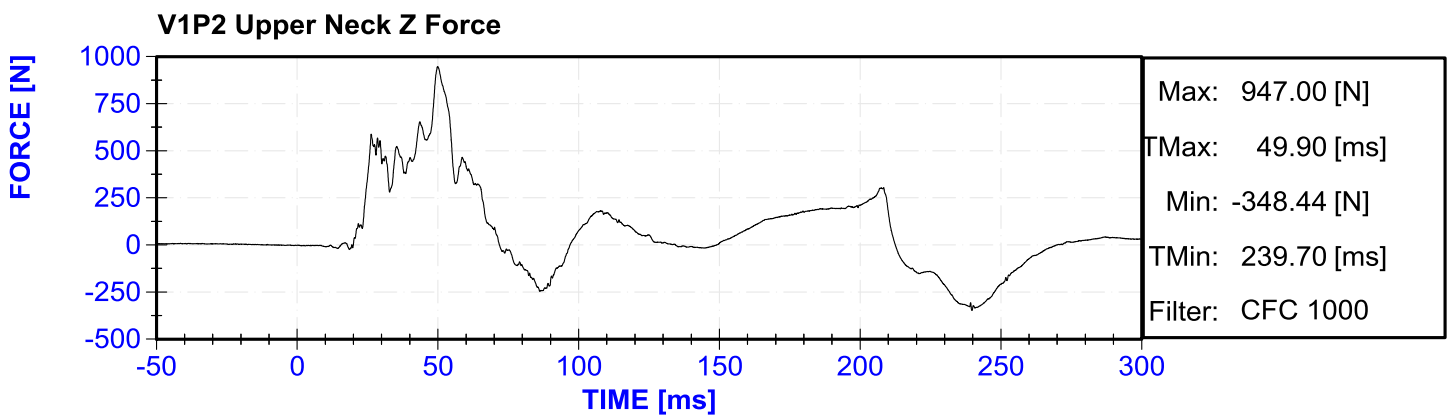
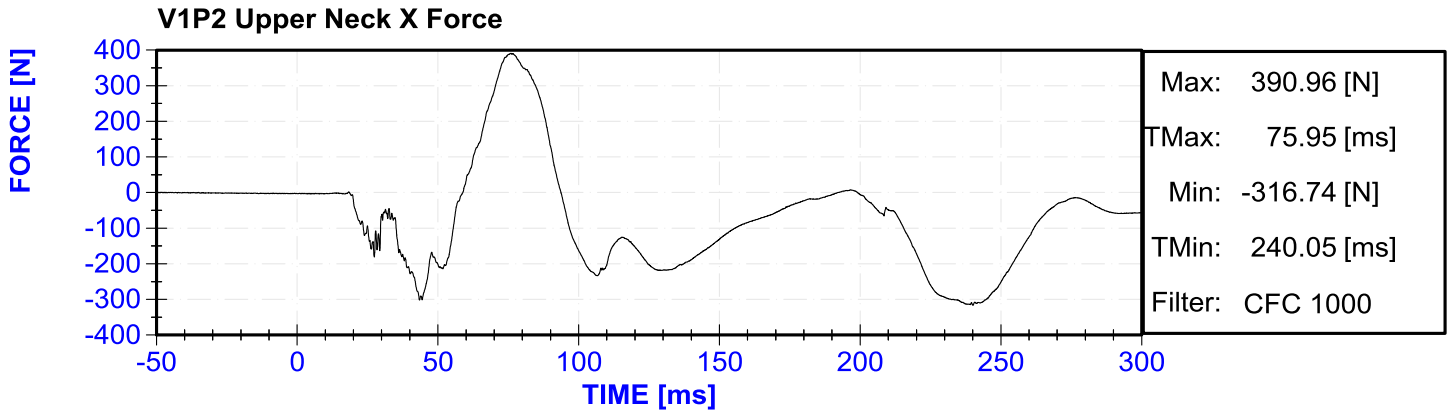


V1P2 Chest Z Acceleration

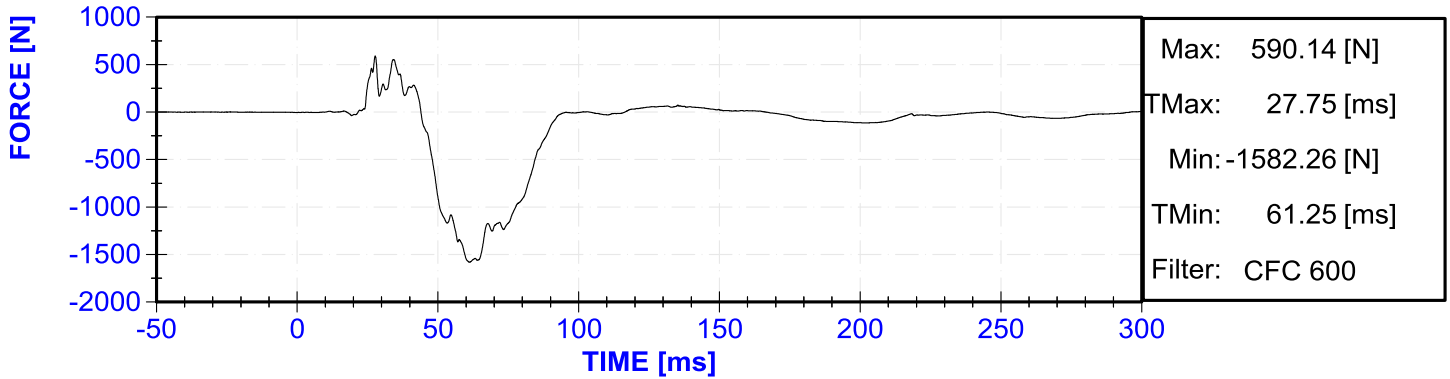


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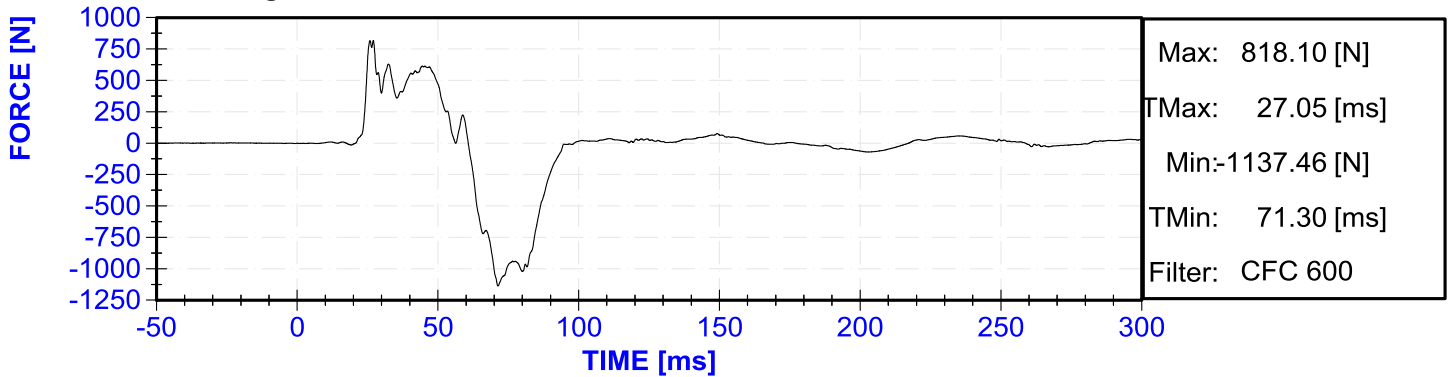




V1P2 Left Femur Z Force



V1P2 Right Femur Z Force



APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 061



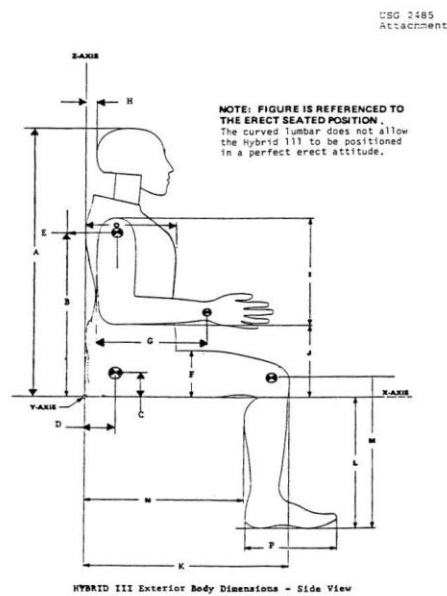
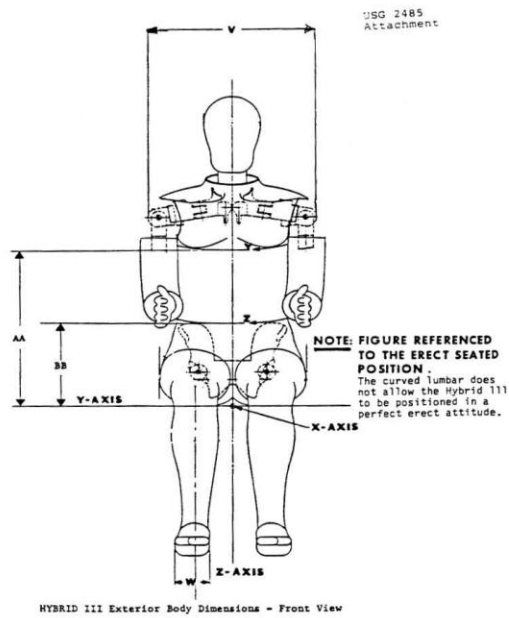
50th Male External Measurements

S/N 061

Symbol	Description	Specification	Results	Pass
		in	In	
A	Sitting Height	34.6 – 35.0	34.8	Yes
B	Shoulder Pivot Height	19.9 – 20.5	20.1	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	3.5	Yes
F	Thigh Clearance	5.5 – 6.1	5.9	Yes
G	Back of Elbow to Wrist Pivot	11.4 – 12.0	11.6	Yes
H	Head Back to Backline	1.6 – 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 – 13.6	13.5	Yes
J	Elbow Rest Height	7.5 – 8.3	7.8	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.2	Yes
L	Popliteal Height	16.9 – 17.9	17.4	Yes
M	Knee Pivot Height	19.1 – 19.7	19.3	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.4	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.7	Yes
P	Foot Length (right)	9.9 – 10.5	10.1	Yes
V	Shoulder Breadth	16.3 – 17.2	16.7	Yes
W	Foot Breadth	3.6 – 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.5	Yes
Z	Waist Circumference	32.9 – 34.1	34.0	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: M. Geesey

02/07/2014





VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	2/3/2014
		Test Time:	2:19:05 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	0220544

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.60 deg C P
Humidity	10 -- 70	14.70 %RH P
Resultant Acceleration	225 -- 275	254.7 G's P
Oscillation	0 -- 10	0.0 % P
Lateral Acceleration	-15 -- 15	2.9 G's P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



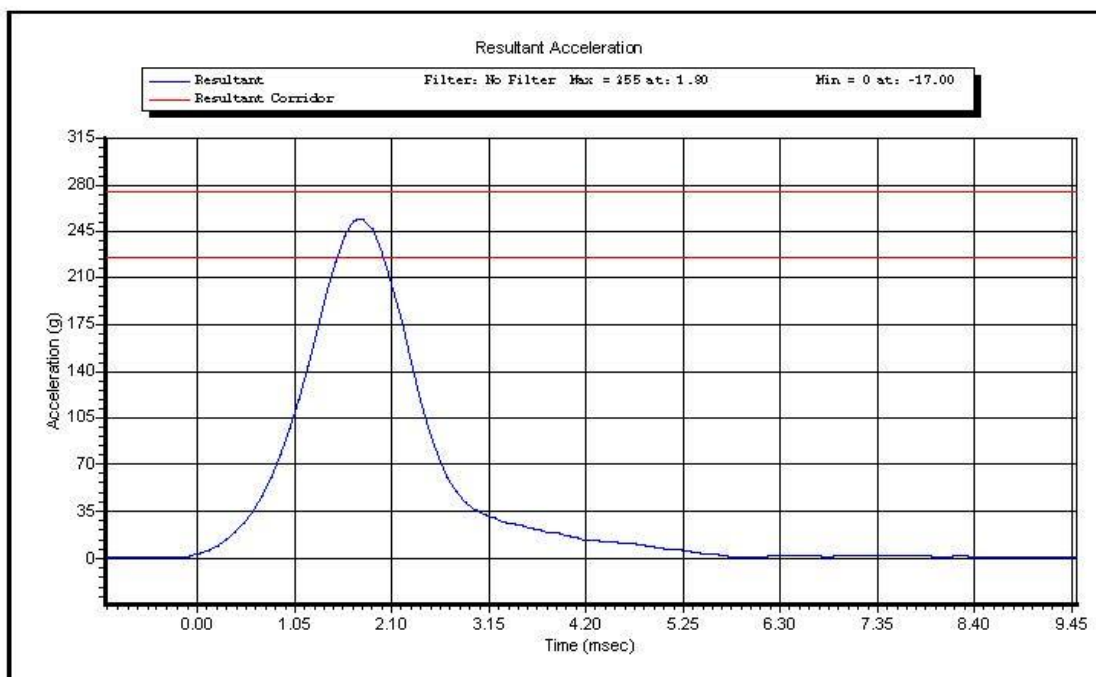
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58871	1/29/2014
Endevco	7264-2000	P12359	1/29/2014
Endevco	7264-2000	P52133	1/29/2014



Test Name:	Head Drop
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061

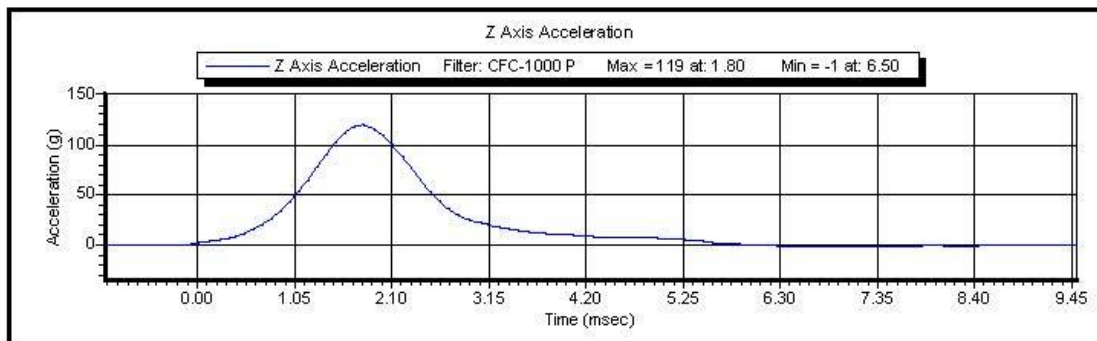
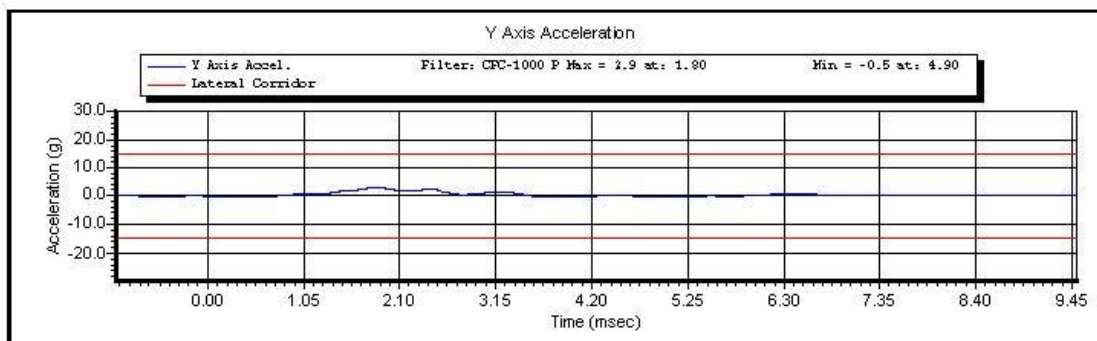
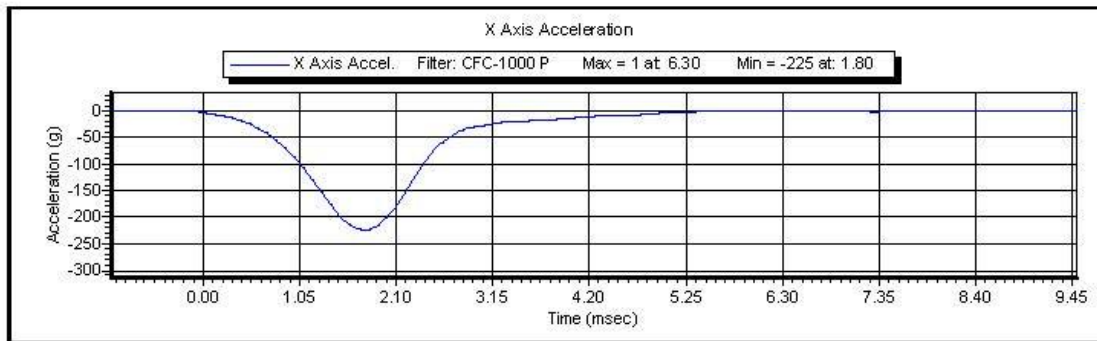


Test ID: **Head Drop**

Test Time: **2:19:05 PM**

Test Date: **2/3/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Head Drop**

Test Time: **2:19:05 PM**

Test Date: **2/3/2014**

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:	061		
Test ID:	Neck Extension	Test Date:	2/6/2014
		Test Time:	9:22:41 AM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.60	deg C P
Humidity		10	-- 70	16.70	%RH P
Velocity		5.94	-- 6.19	6.043	m/s P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	19.63	G's P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	15.61	G's P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	13.20	G's P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	13.84	G's P
Deceleration Time to	5 G's	38	-- 46	41.6	ms P
D Plane Rotation		81	-- 106	97.3	degrees P
Time at Max Rotation		72	-- 82	74.9	ms P
Rotation Decay to Zero		147	-- 174	155.9	ms P
Moment About Occipital Condyle		-80.0	-- -52.9	-72.70	Nm P
Time at Maximum Moment		65	-- 79	70.6	ms P
Moment Decay to Zero		120	-- 148	136.3	ms P

All test parameters are within specifications

Technician: **R. Weil**
 Supervisor: **E. Dutton**



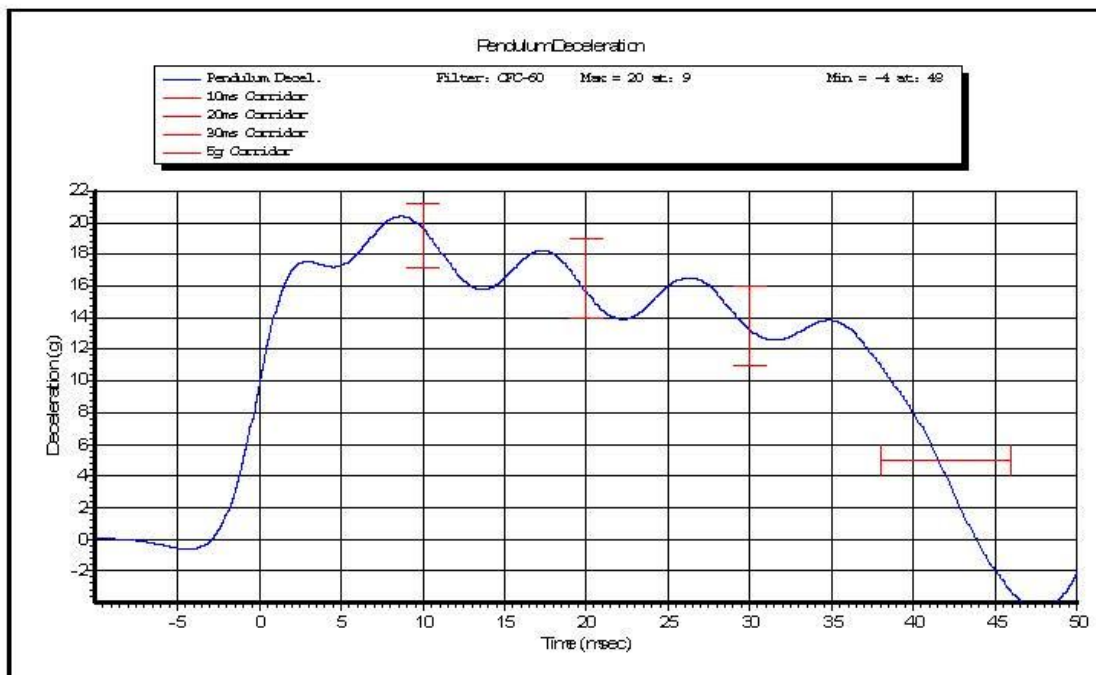
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/31/2014
DentonATD	78051-342	CONDYLE POT	1/31/2014
Denton	1716AFT	LC-2184 My	5/7/2013
Denton	1716AFT	LC-2184 Fx	5/7/2013

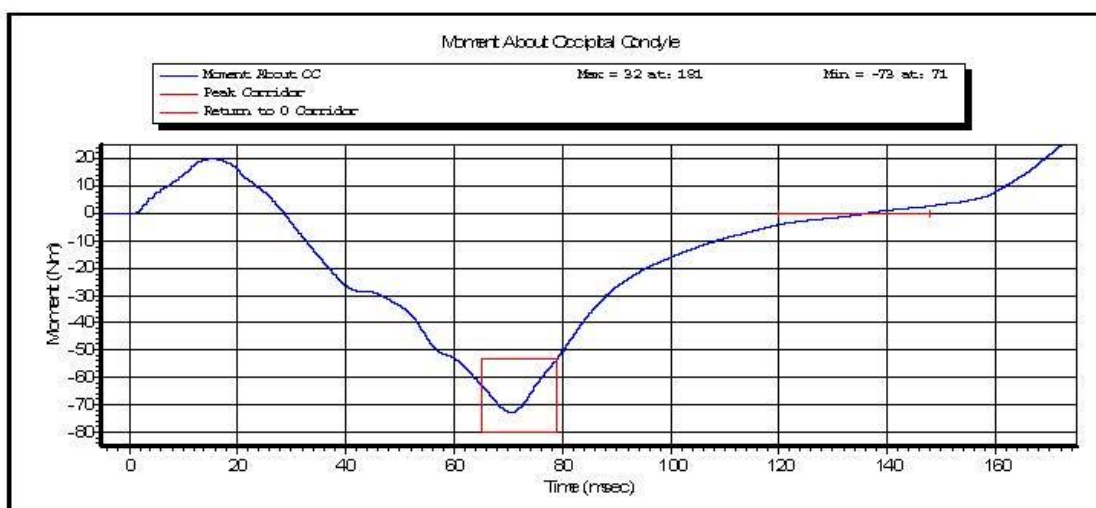
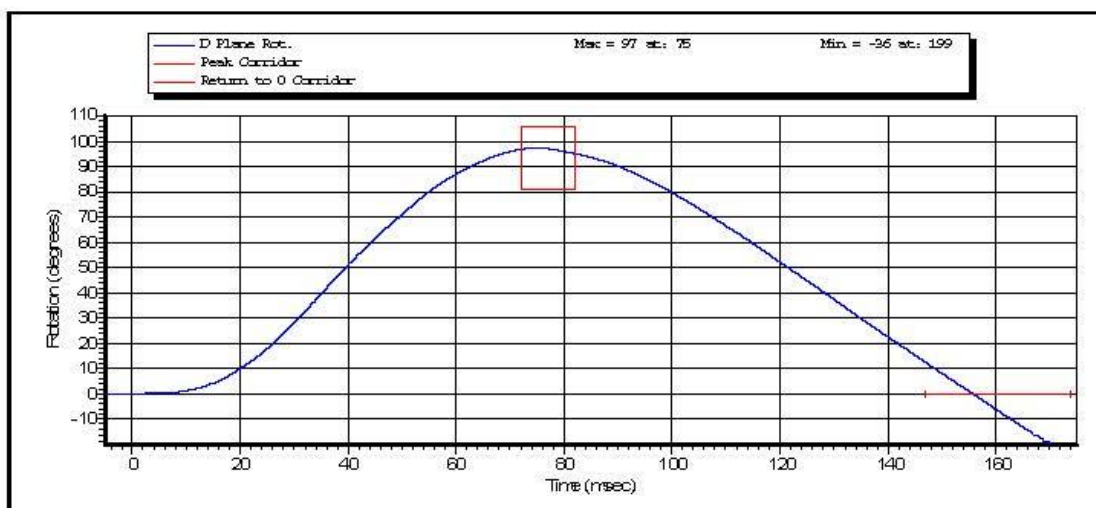


Name of Test:	Neck Extension
Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	061



ID of Test: **Neck Extension** Time of Test: **9:22:41 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Date of Test: **2/6/2014**

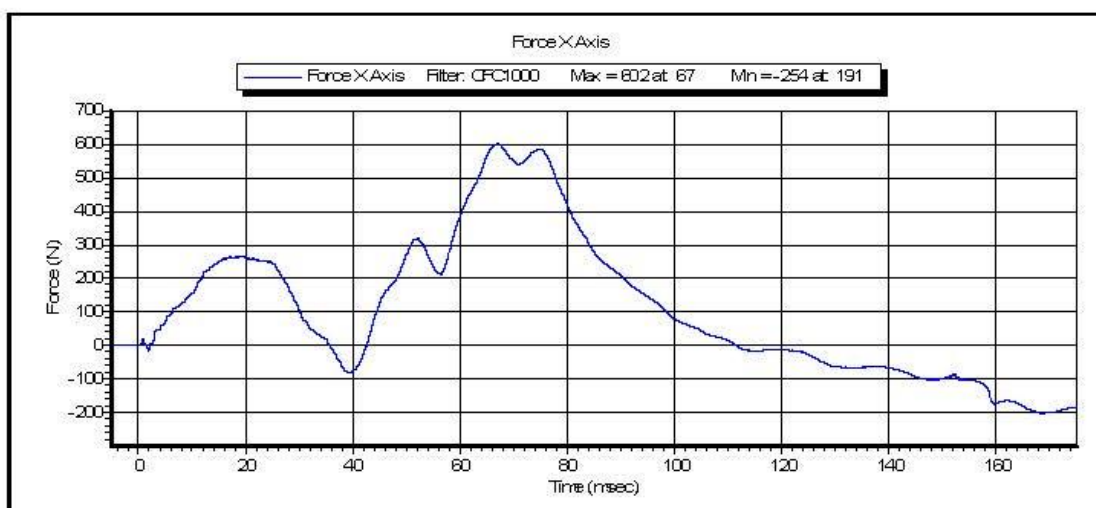
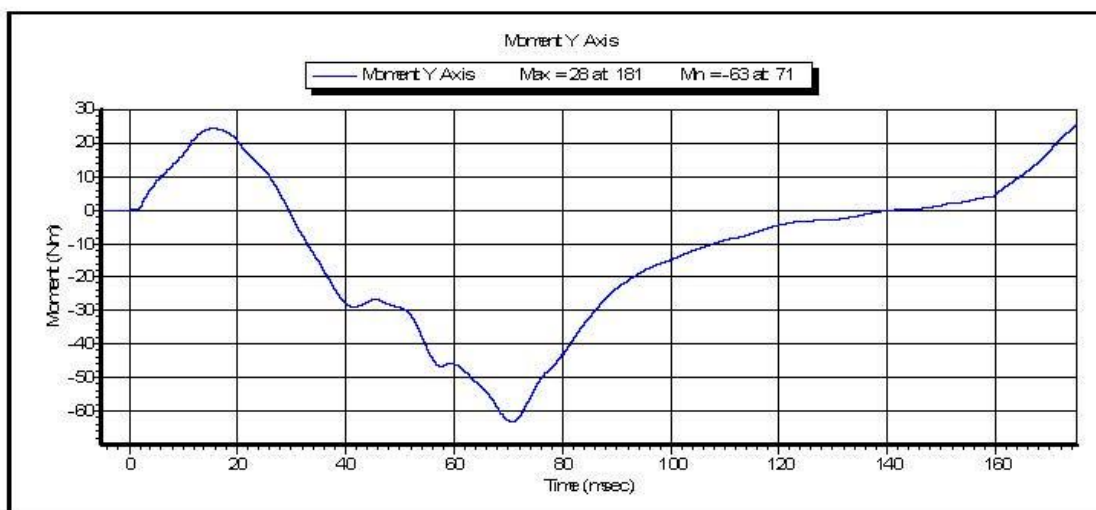


ID of Test: **Neck Extension**

Time of Test: **9:22:41 AM**

Date of Test: **2/6/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



ID of Test: **Neck Extension** Time of Test: **9:22:41 AM**

Date of Test: **2/6/2014**

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:	061		
Test ID:	Neck Flexion	Test Date:	2/6/2014
		Test Time:	7:06:25 AM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.50 deg C	P
Humidity		10	-- 70	16.30 %RH	P
Velocity		6.89	-- 7.13	6.938 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	25.24 G's	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	19.12 G's	P
Pendulum Deceleration at		12.5	-- 18.5	13.12 G's	P
Maximum Pendulum Deceleration After	30 ms	0	-- 29	14.4 G's	P
Deceleration Time to	5 ms	34	-- 42	40.5 ms	P
D Plane Rotation		-78	-- -64	-73.7 degrees	P
Time at Maximum Rotation		57	-- 64	58.5 ms	P
Rotation Decay to Zero		113	-- 128	119.1 ms	P
Moment About Occipital Condyle		88.1	-- 108.4	91.82 Nm	P
Time at Maximum Moment		47	-- 58	53.7 ms	P
Moment Decay to Zero		97.0	-- 107.0	100.3 ms	P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**



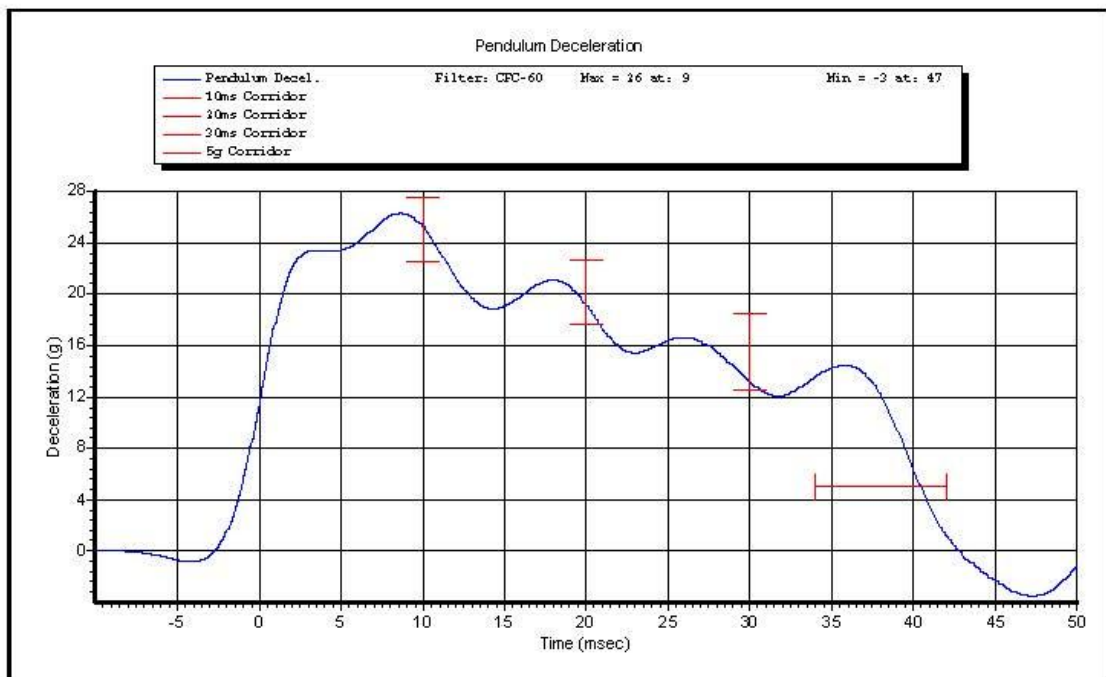
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/31/2014
DentonATD	78051-342	CONDYLE POT	1/31/2014
Denton	1716AFT	LC-2184 My	5/7/2013
Denton	1716AFT	LC-2184 Fx	5/7/2013



Name of Test:	Neck Flexion
Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	061

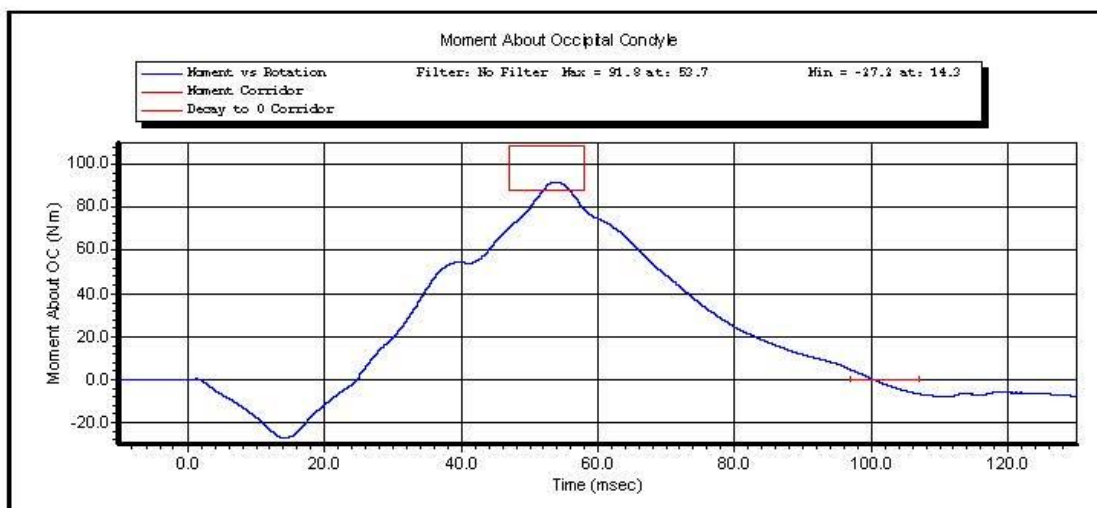
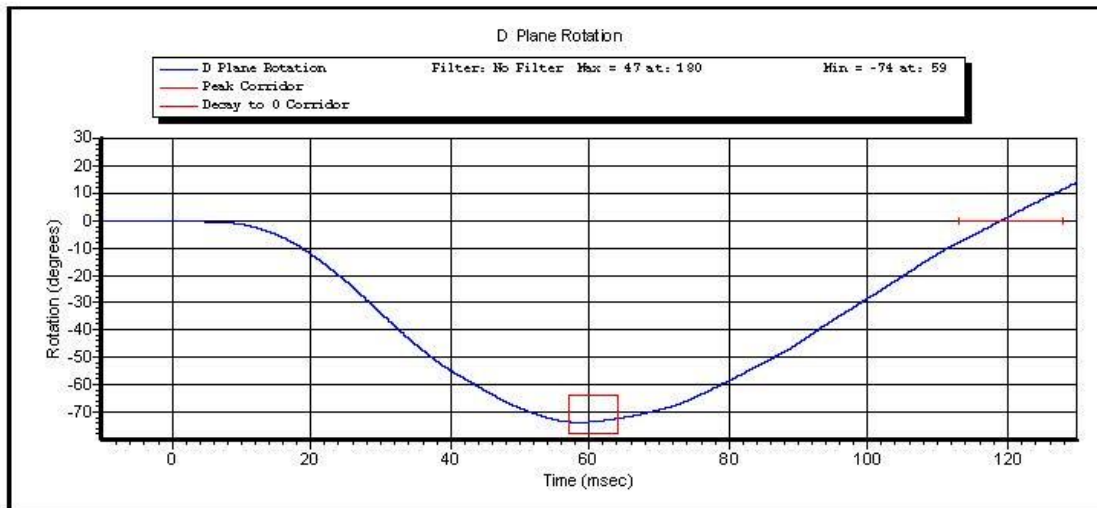


ID of Test: **Neck Flexion**

Time of Test: **7:06:25 AM**

Date of Test: **2/6/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

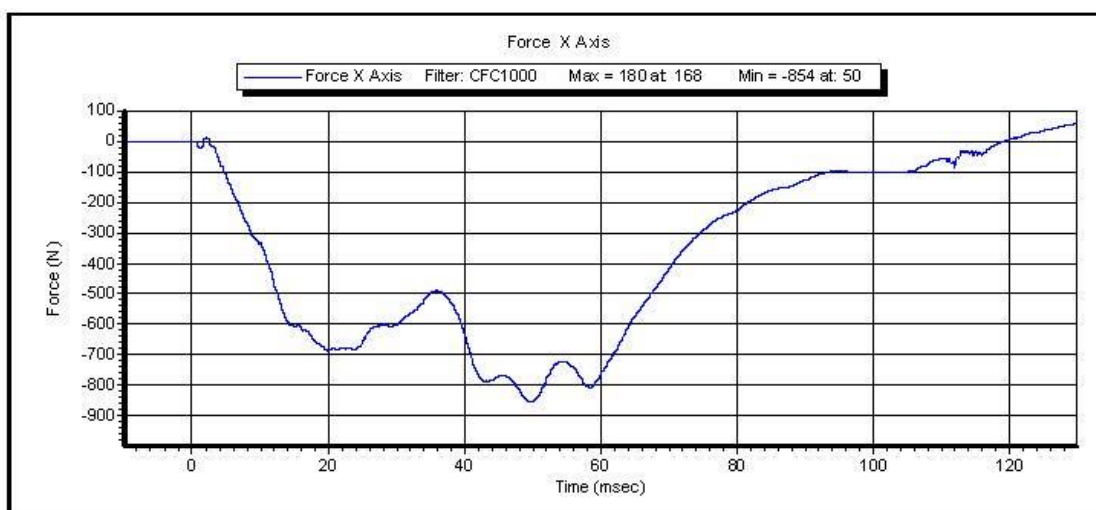
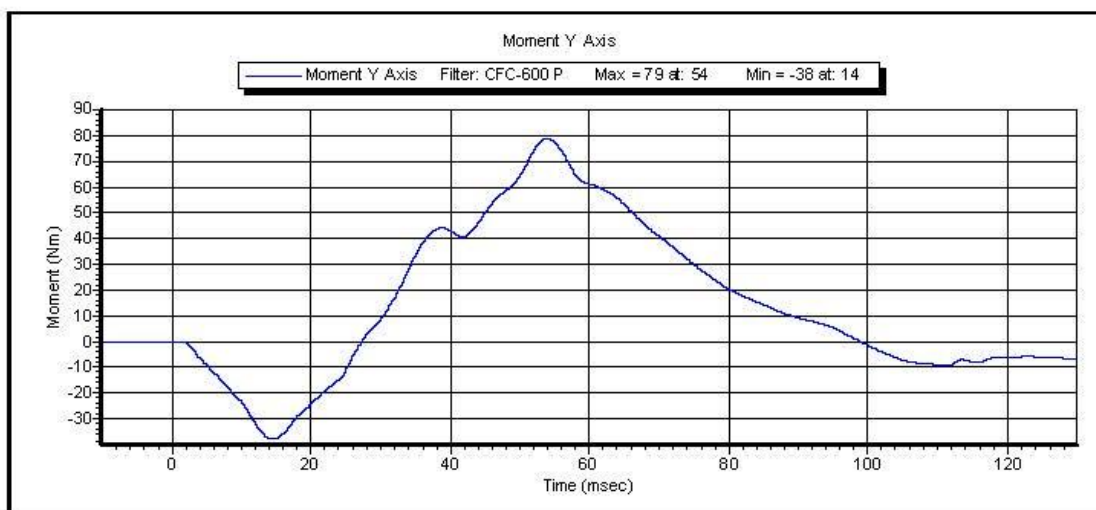


ID of Test: **Neck Flexion**

Time of Test: **7:06:25 AM**

Date of Test: **2/6/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



ID of Test: **Neck Flexion**

Time of Test: **7:06:25 AM**

Date of Test: **2/6/2014**

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:	061		
Test ID:	Thorax Impact	Test Date:	2/6/2014
		Test Time:	1:03:33 PM

Component Part Number	Component Serial Number
Chest Jacket - 78051-169	2437

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.10 deg C P
Humidity	10 -- 70	13.70 %RH P
Velocity	6.59 -- 6.83	6.739 m/s P
Resistive Force	-5.894 -- -5.160	-5.4122 kN P
Sternum Displacement	-72.6 -- -63.5	-69.35 mm P
Hysteresis	69 -- 85	71.7 % P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



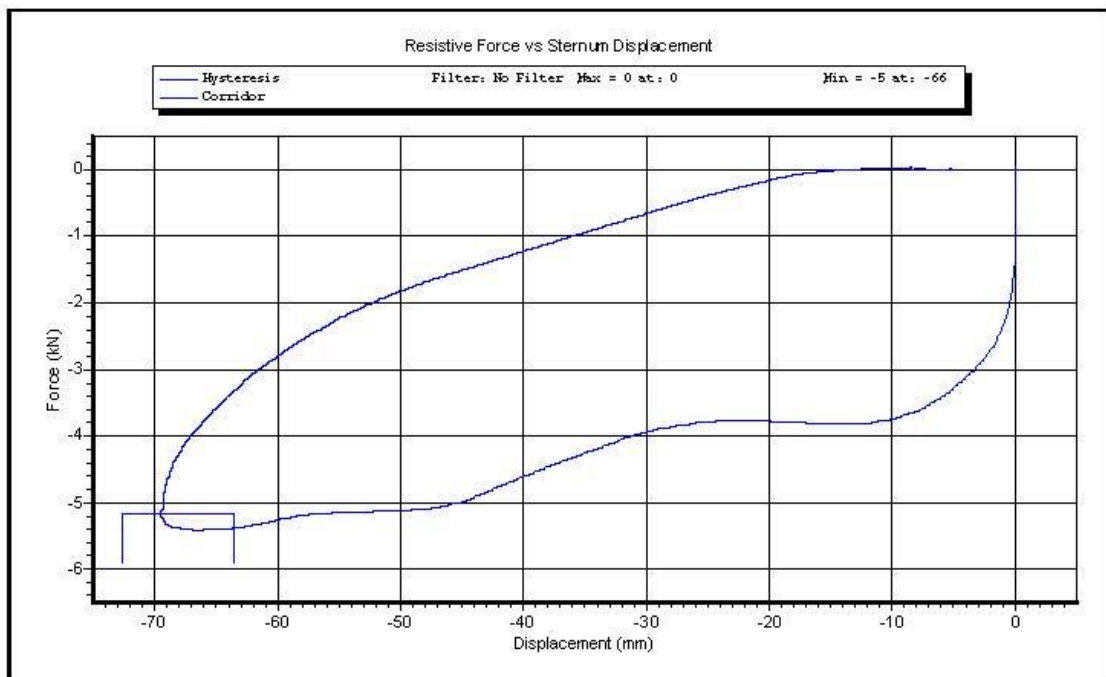
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	12/4/2013
DentonATD	78051-342	DS-061	5/14/2013

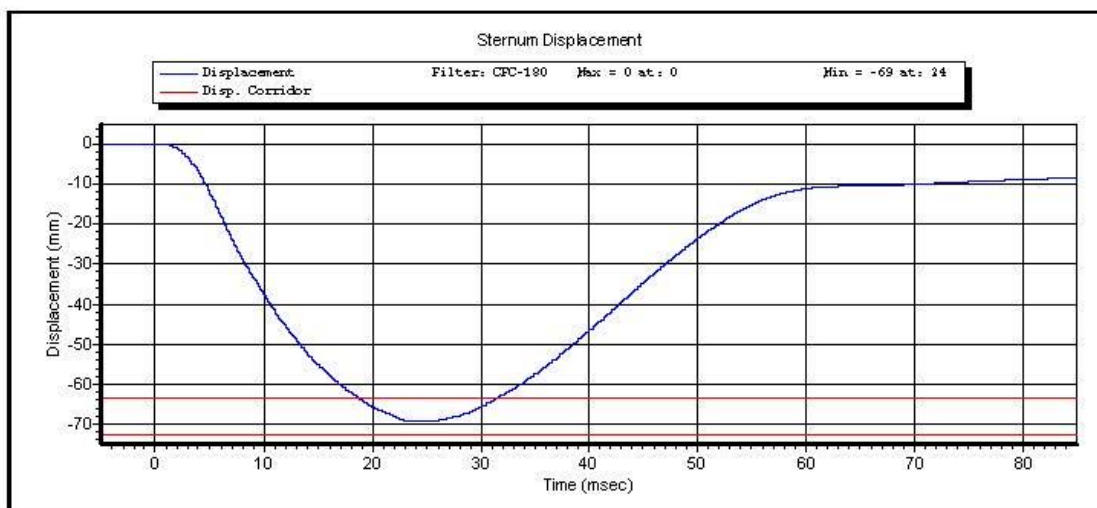
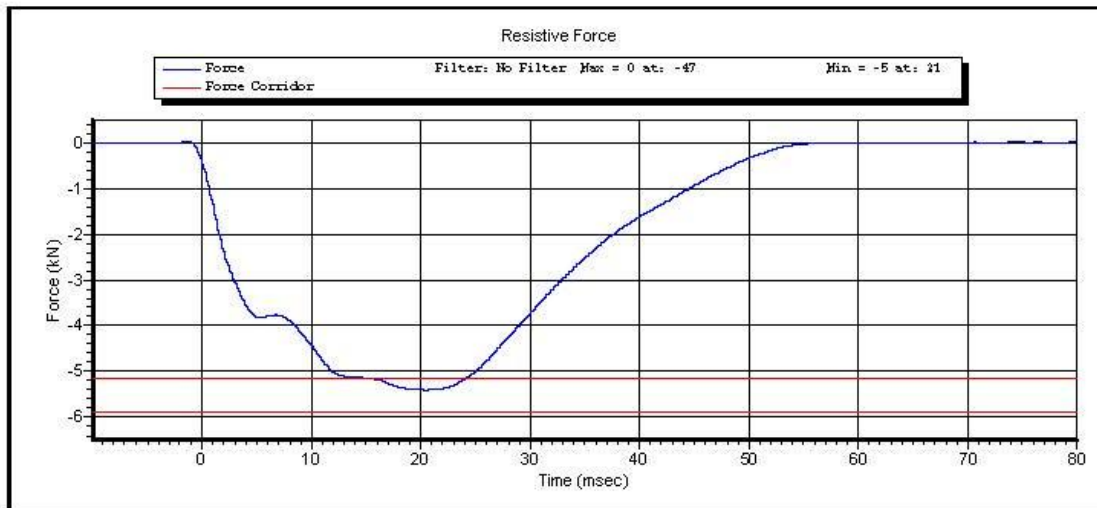


Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Thorax Impact** Test Time: **1:03:33 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/6/2014**

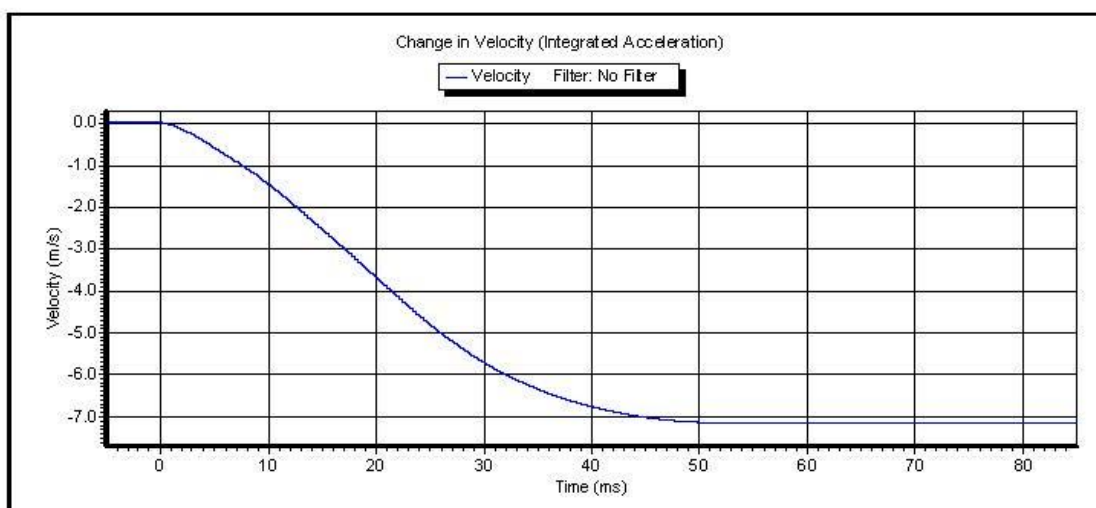
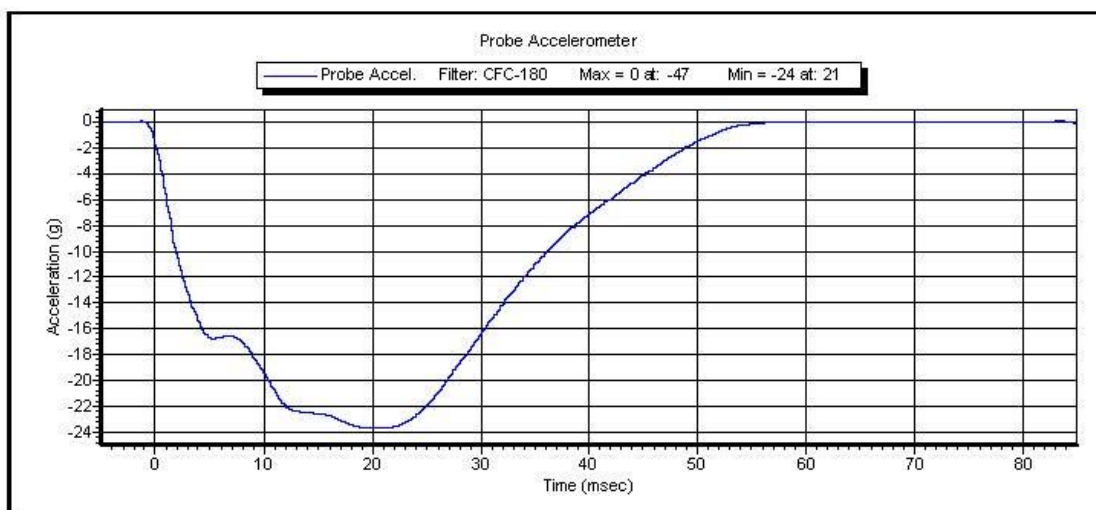


Test ID: **Thorax Impact**

Test Time: **1:03:33 PM**

Test Date: **2/6/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Thorax Impact**

Test Time: **1:03:33 PM**

Test Date: **2/6/2014**

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:	061		
Test ID:	HipROM Left	Test Date:	2/4/2014
		Test Time:	9:56:02 AM

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	DB459

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	22.00 deg C	P
Humidity	10	--	70	18.30 %RH	P
Average Velocity	5	--	10	6.0 deg/s	P
Angle at 203 Nm	40	--	50	40.1 degrees	P
Moment at 30 degrees	0.0	--	94.9	82.52 Nm	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



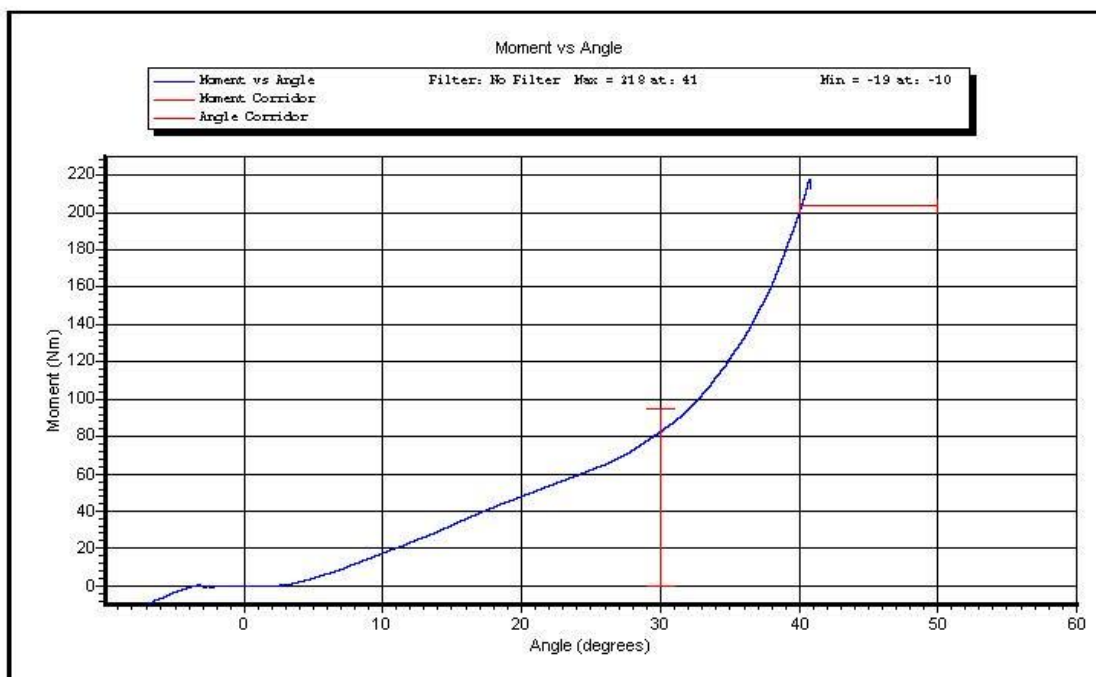
VERIFICATION REPORT

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	A0 Output	1	1/11/2014



Test Name:	Hip ROM
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: HipROM Left

Test Time: 9:56:02 AM

Test Date: 2/4/2014

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:	061		
Test ID:	Hip ROM Right	Test Date:	2/3/2014
		Test Time:	3:17:30 PM

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	DB459

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.80 deg C	P
Humidity	10	--	70	14.80 %RH	P
Average Velocity	5	--	10	5.4 deg/s	P
Angle at 203 Nm	40	--	50	41.3 degrees	P
Moment at 30 degrees	0.0	--	94.9	92.05 Nm	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



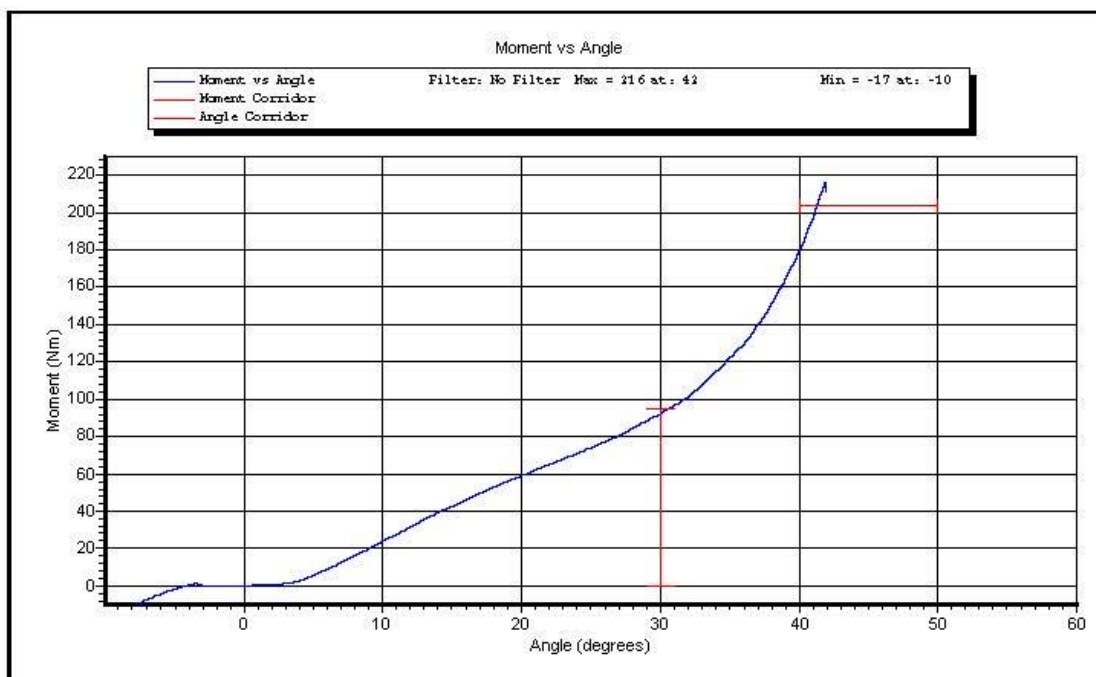
VERIFICATION REPORT

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	A0 Output	1	1/11/2014



Test Name:	Hip ROM
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Hip ROM Right** Test Time: **3:17:30 PM**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/3/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	061		
Test ID:	Knee Impact Left	Test Date:	2/4/2014
		Test Time:	10:05:55 AM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	3268

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	22.00 deg C	P
Humidity	10	--	70	18.40 %RH	P
Velocity	2.07	--	2.13	2.121 m/s	P
Resistive Force	-5.780	--	-4.720	-4.932 kN	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



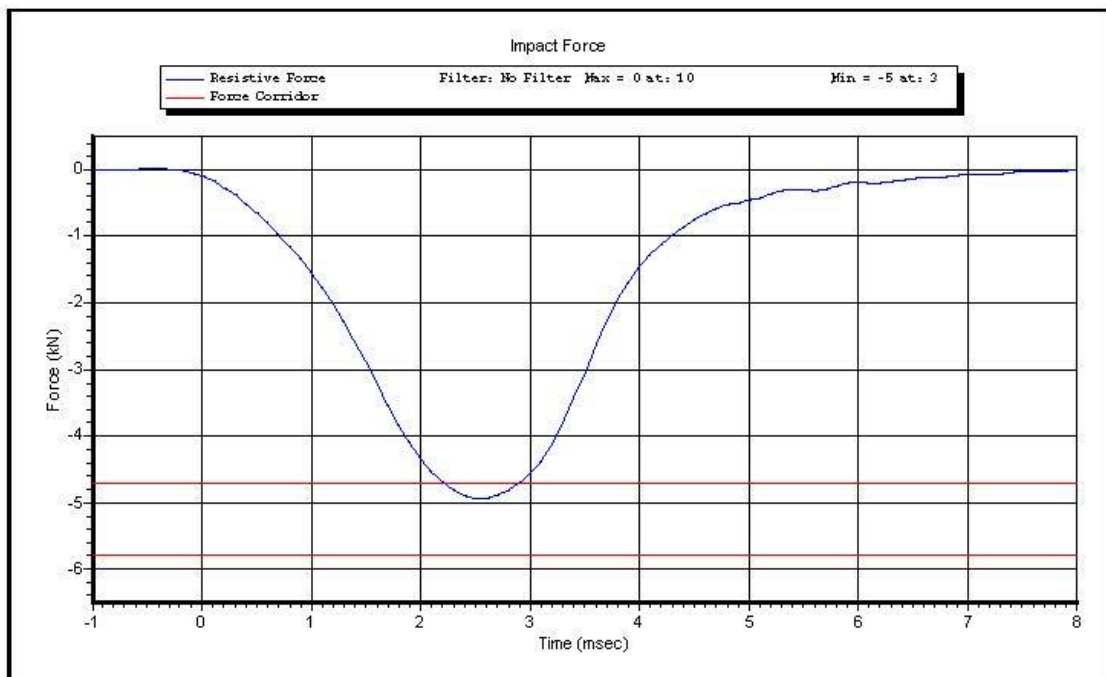
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2014 12/4/2013

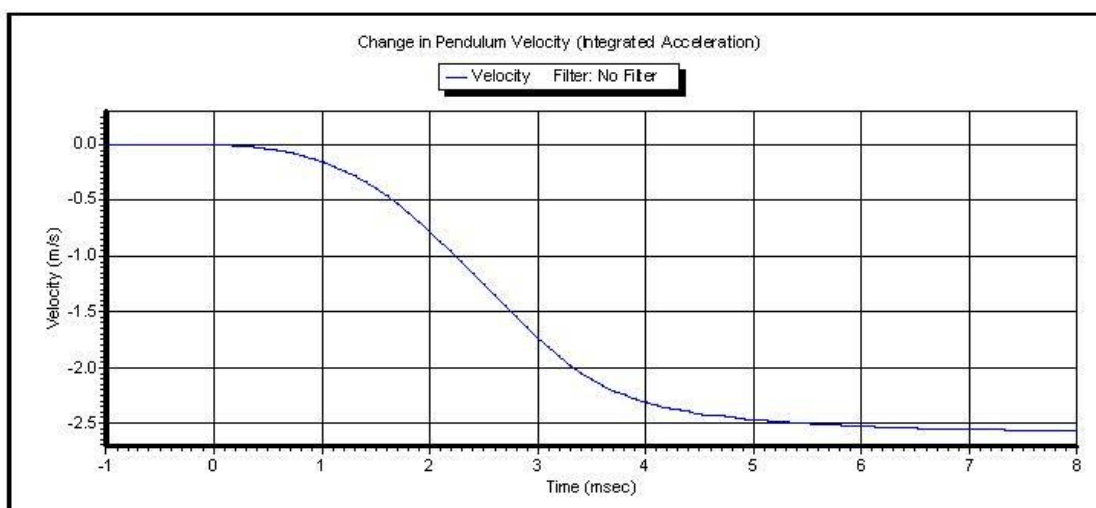
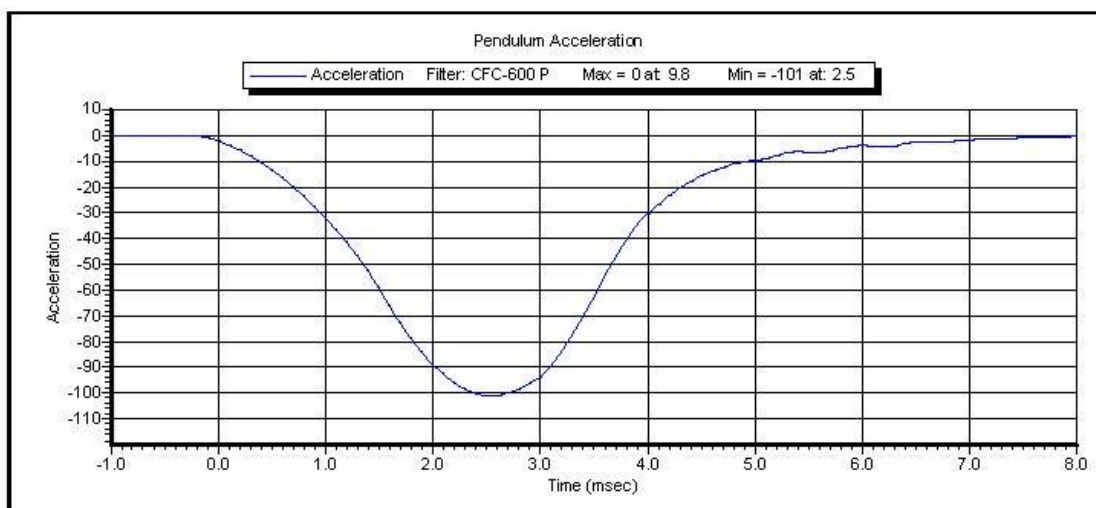


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Knee Impact Left** Test Time: **10:05:55 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/4/2014**



Test ID: **Knee Impact Left** Test Time: **10:05:55 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/4/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	061		
Test ID:	Knee Impact Right	Test Date:	2/4/2014
		Test Time:	9:59:08 AM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	3158

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.70 deg C	P
Humidity	10	--	70	18.40 %RH	P
Velocity	2.07	--	2.13	2.123 m/s	P
Resistive Force	-5.780	--	-4.720	-4.743 kN	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

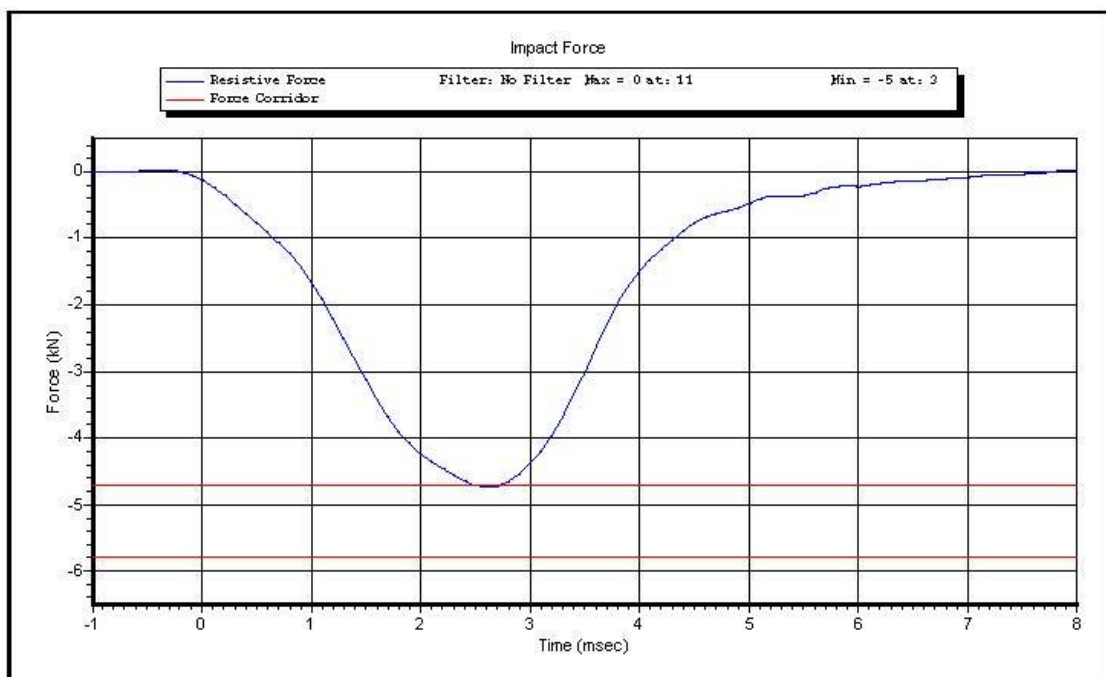
REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2014 12/4/2013

Copyright 2006 Denton ATD, Inc. LabPac II Version: 1.8.5.0

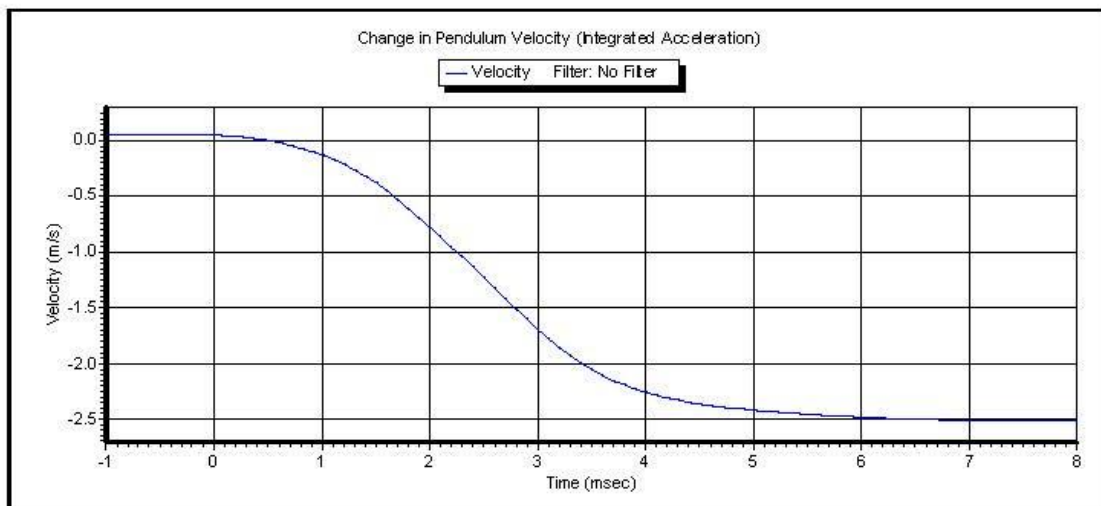
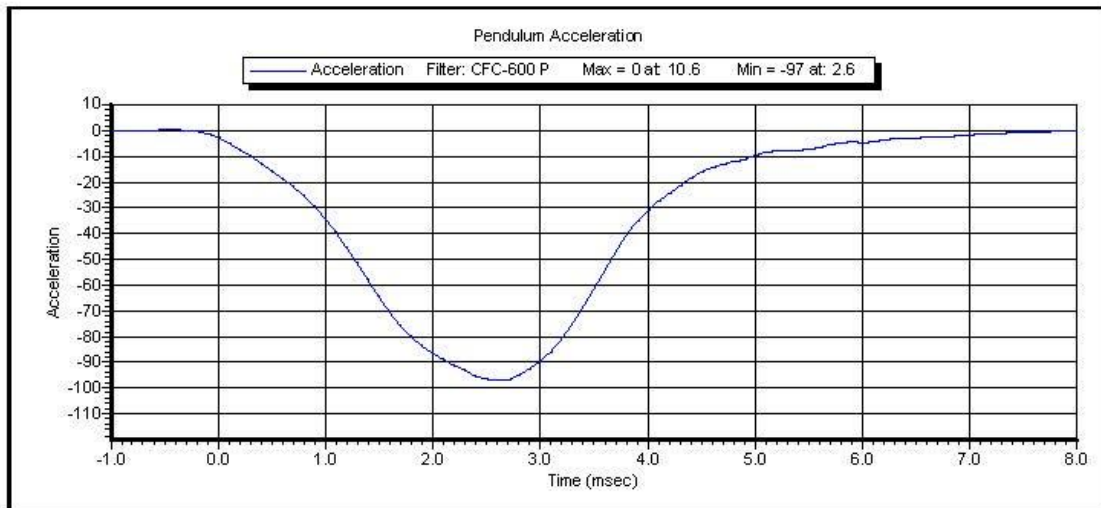


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Knee Impact Right** Test Time: **9:59:08 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/4/2014**



Test ID: **Knee Impact Right** Test Time: **9:59:08 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/4/2014**

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 273



External Measurements

5th Female SN 273

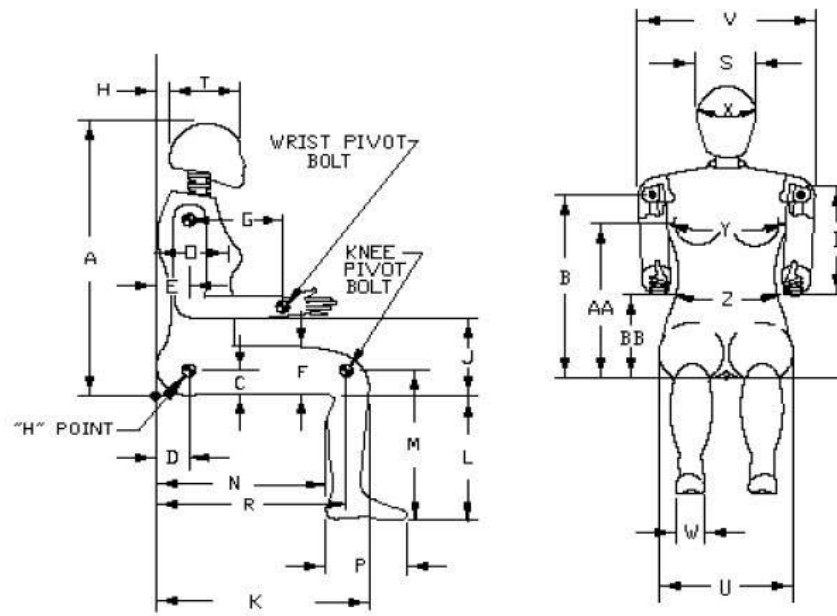
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	780	Yes
B	Shoulder Pivot Height	431.8 – 457.2	452	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 – 83.8	71	Yes
F	Thigh Clearance	119.4 – 134.6	124	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	245	Yes
H	Head Back to Backline	43.2 – 48.2	44	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	294	Yes
J	Elbow Rest Height	182.8 – 203.2	200	Yes
K	Buttock to Knee Length	520.7 – 546.1	531	Yes
L	Popliteal Height	355.6 – 376	373	Yes
M	Knee Pivot Height	393.7 – 419.1	395	Yes
N	Buttock Popliteal Length	414 – 439.4	434	Yes
O	Chest Depth without Jacket	175.3 – 190.5	182	Yes
P	Foot Length (right)	218.5 – 233.7	221	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	461	Yes
S	Head Breadth	137.1 – 147.3	142	Yes
T	Head Depth	177.8 – 188	179	Yes
U	Hip Breadth	299.7 – 314.9	312	Yes
V	Shoulder Breadth	350.5 – 365.7	358	Yes
W	Foot Breadth	78.8 – 94	81	Yes
X	Head Circumference	528.3 – 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	852	Yes
Z	Waist Circumference	759.5 – 789.9	776	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	355	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	168	Yes

Technician: M. Geesey

Date: 02/06/2014

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:	273		
Test ID:	Head Drop	Test Date:	1/31/2014
		Test Time:	11:33:28 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	780
Cap Skin - 78051-229	866

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.10 deg C P
Humidity	10 -- 70	15.70 %RH P
Resultant Acceleration	250 -- 300	287.3 G's P
Oscillation	0 -- 10	1.6 % P
Lateral Acceleration	-15 -- 15	6.4 G's P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



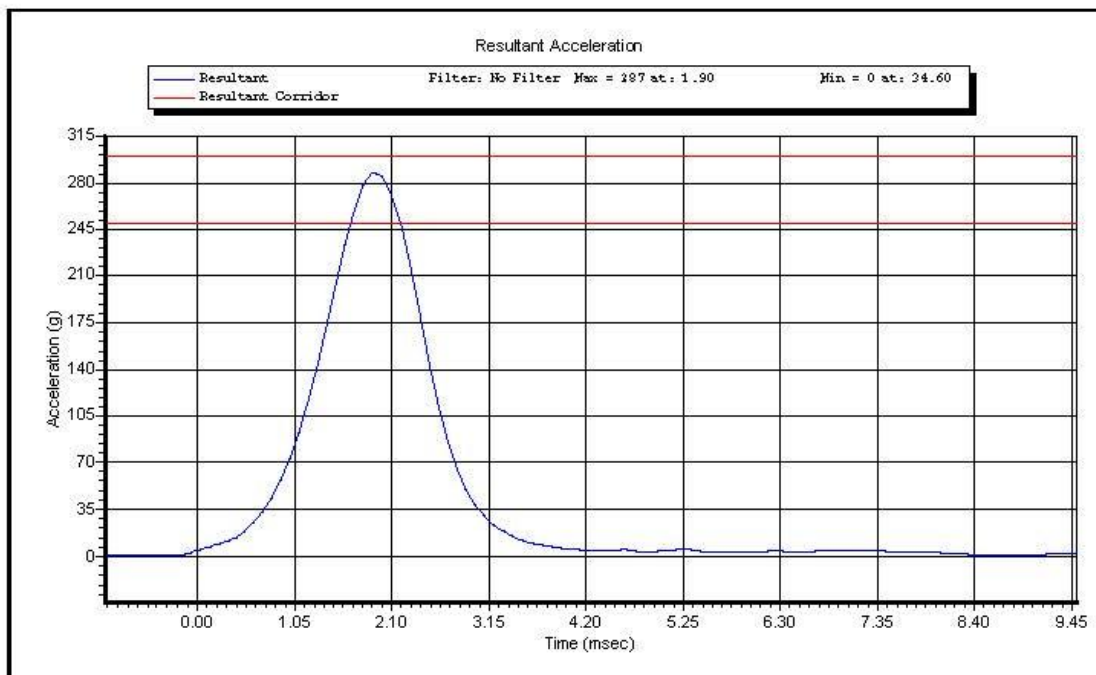
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58833	1/24/2014
Endevco	7264-2000	P58905	1/24/2014
Endevco	7264-2000	P52114	1/24/2014



Test Name:	Head Drop
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273

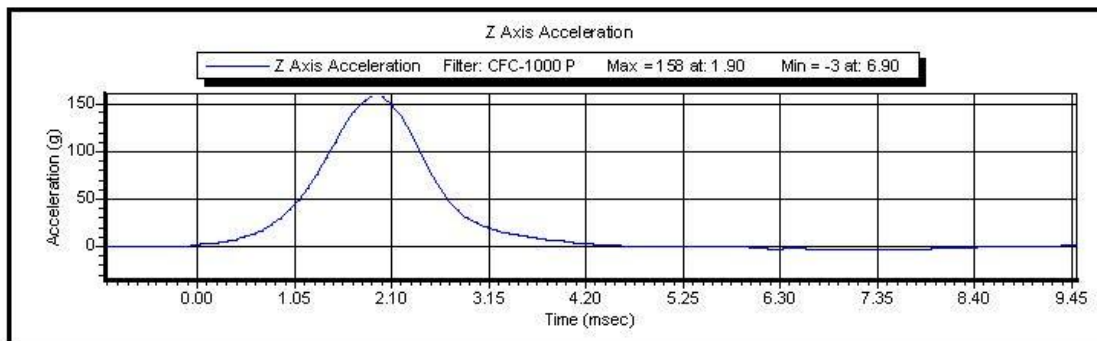
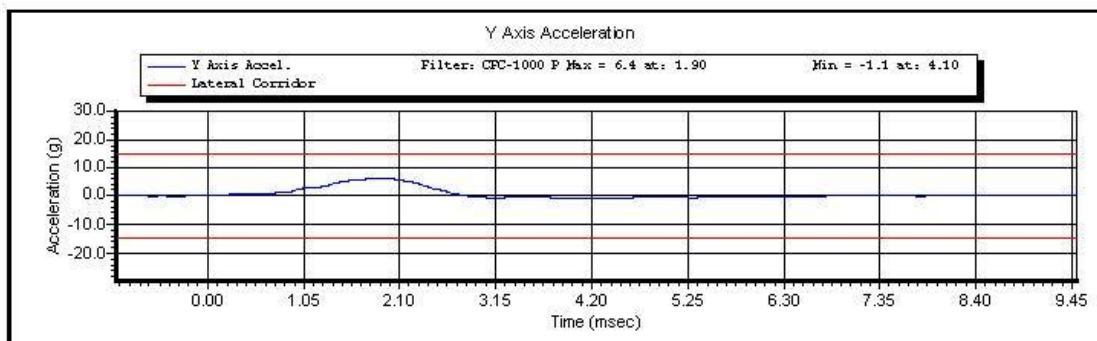
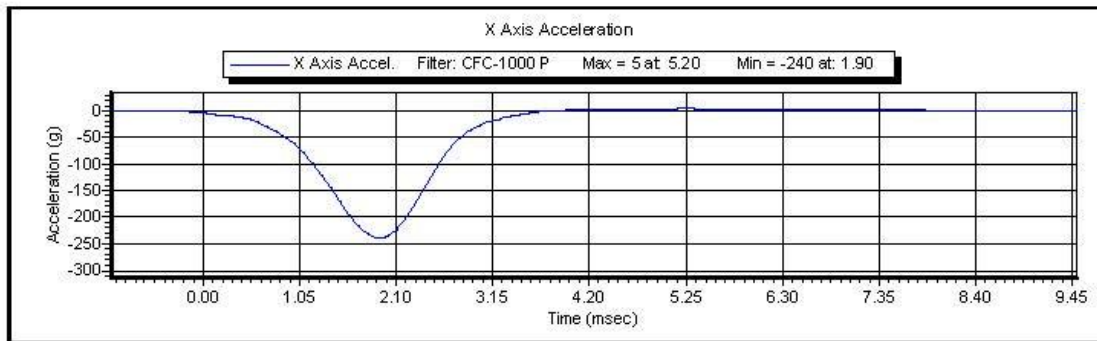


Test ID: **Head Drop**

Test Time: **11:33:28 AM**

Test Date: **1/31/2014**

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Test ID: **Head Drop**

Test Time: **11:33:28 AM**

Test Date: **1/31/2014**

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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:	273		
Test ID:	Neck Extension	Test Date:	2/4/2014
		Test Time:	2:55:48 PM

Component Part Number	Component Serial Number
Neck - 880105-255	660

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.20 deg C P
Humidity	10 -- 70	18.00 %RH P
Velocity	5.95 -- 6.19	6.043 m/s P
Pendulum Impulse at 10 ms	1.5 -- 1.9	1.77 m/s P
Pendulum Impulse at 20 ms	3.1 -- 3.9	3.56 m/s P
Pendulum Impulse at	4.6 -- 5.6	5.18 m/s P
D Plane Rotation	99 -- 114	105.9 degrees P
Moment During Rotation Interval	-65 -- -53	-55.0 Nm P
Moment Decay to -10.0 Nm	94 -- 114	100.8 ms P

All test parameters are within specifications

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



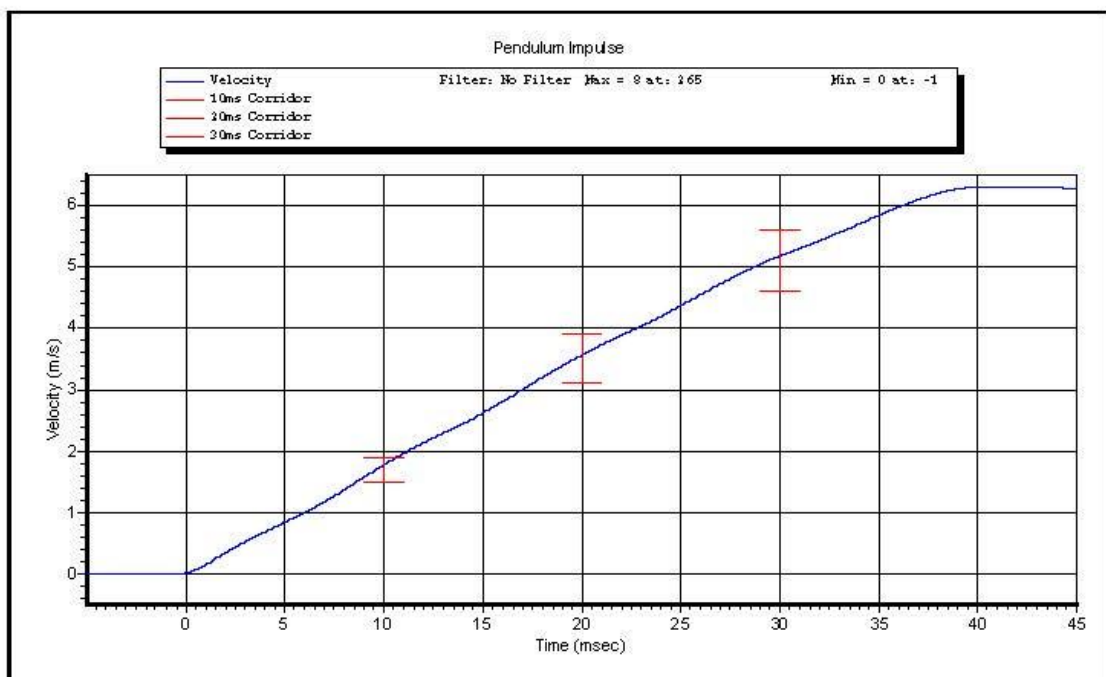
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/31/2014
DentonATD	78051-342	CONDYLE POT	1/31/2014
Denton	1716A	LC-1629 My	4/30/2013
Denton	1716A	LC-1629 Fx	4/30/2013

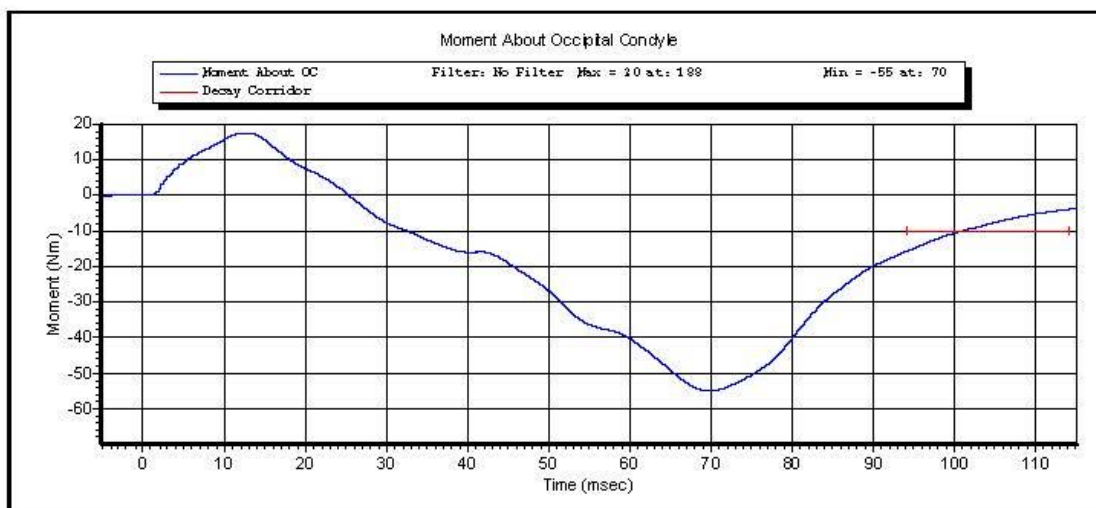
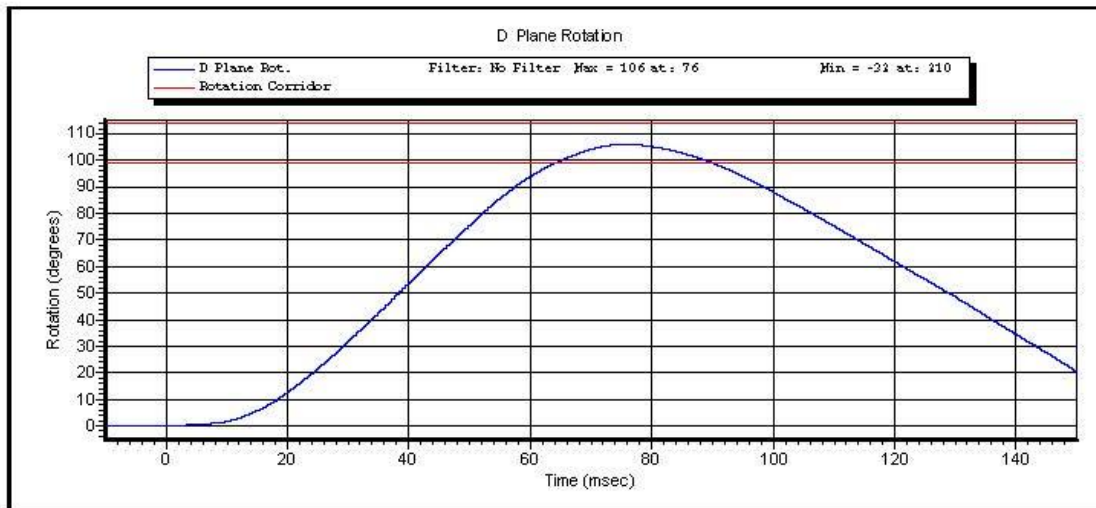


Test Name:	Neck Extension
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



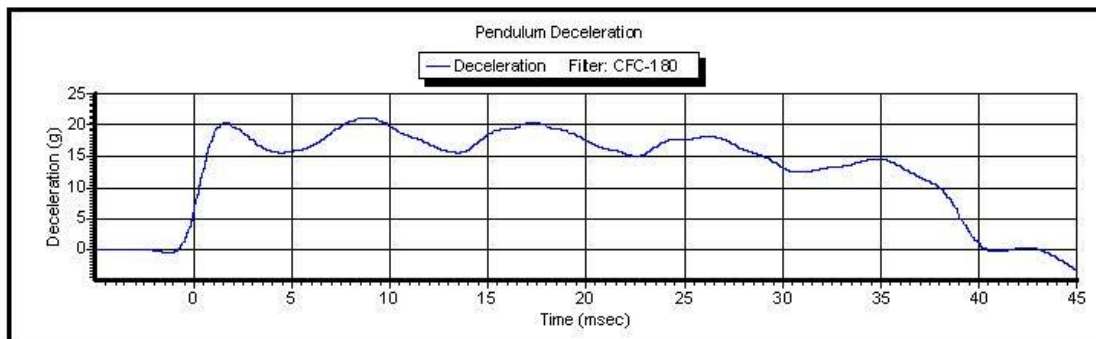
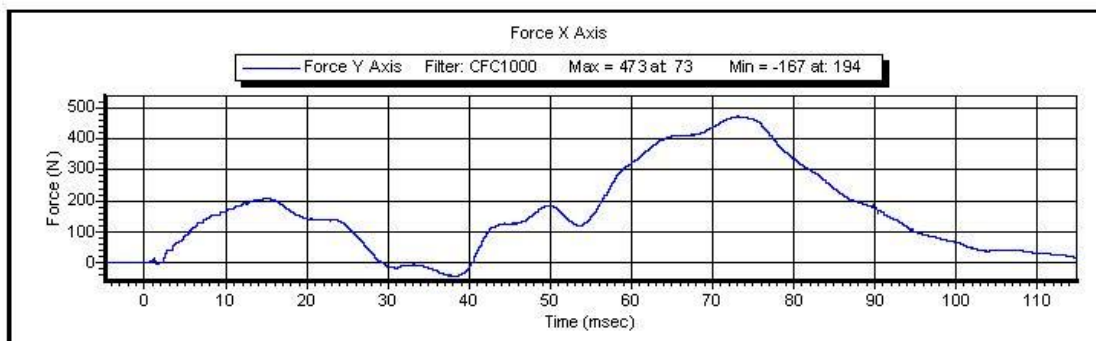
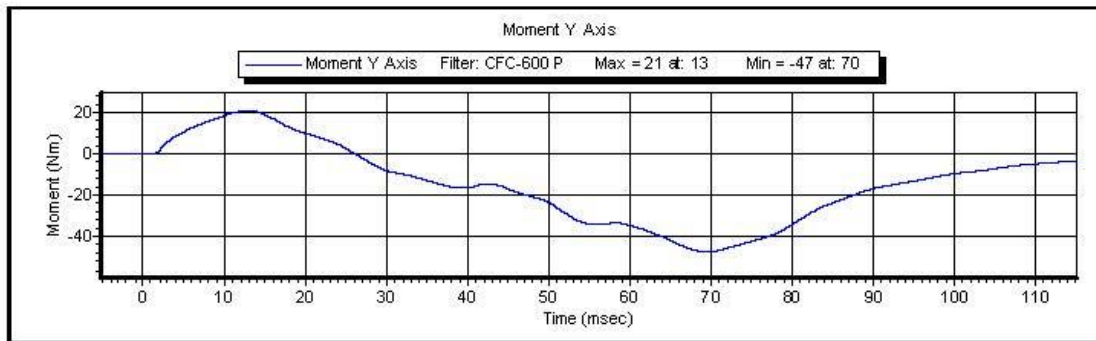
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Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: 2/4/2014



Test ID: **Neck Extension** Test Time: **2:55:48 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/4/2014**



Test ID: **Neck Extension** Test Time: **2:55:48 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/4/2014**



VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	273		
Test ID:	Neck Flexion	Test Date:	2/4/2014
		Test Time:	2:36:22 PM

Component Part Number	Component Serial Number
Neck - 880105-255	660

Test Parameters	Test Specifications	Test Results
Temperature	21 -- 22	22.20 deg C P
Humidity	10 -- 70	17.00 %RH P
Velocity	6.89 -- 7.13	6.992 m/s P
Pendulum Impulse at 10 ms	2.1 -- 2.5	2.25 m/s P
Pendulum Impulse at 20 ms	4 -- 5	4.3 m/s P
Pendulum Impulse at 30 ms	5.8 -- 7.0	6.06 m/s P
D Plane Rotation	-91 -- -77	-78.6 degrees P
Moment During Rotation Interval	69 -- 83	72.3 Nm P
Moment Decay to 10.0 Nm	80 -- 100	88.2 ms P

All test parameters are within specifications

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



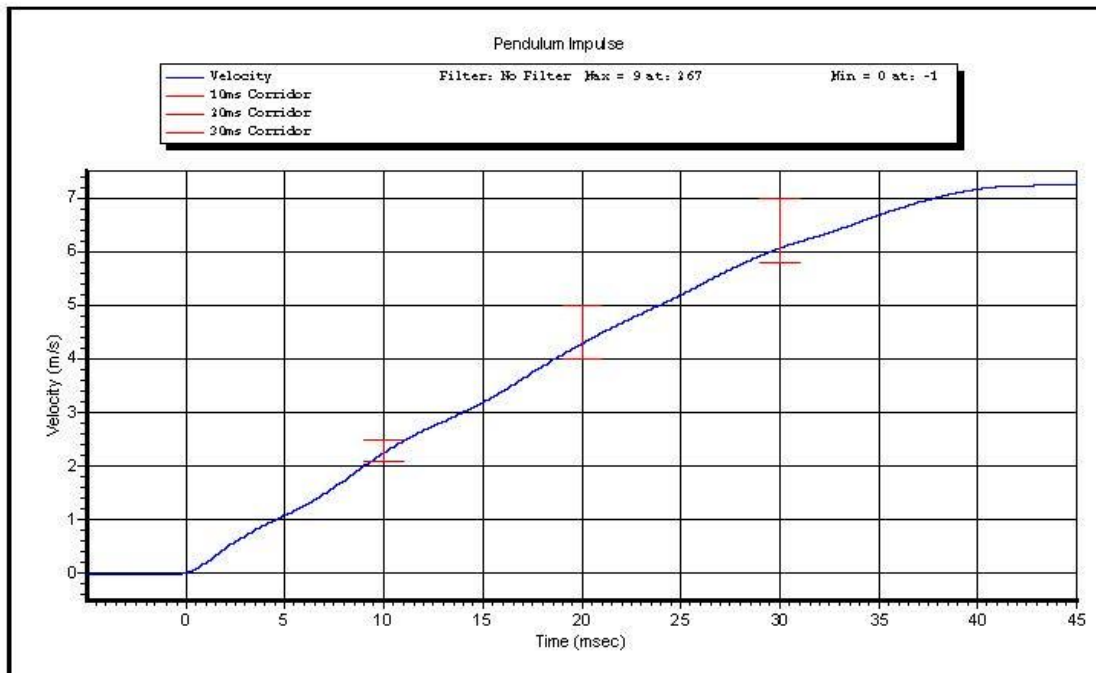
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/31/2014
DentonATD	78051-342	CONDYLE POT	1/31/2014
Denton	1716A	LC-1629 My	4/30/2013
Denton	1716A	LC-1629 Fx	4/30/2013

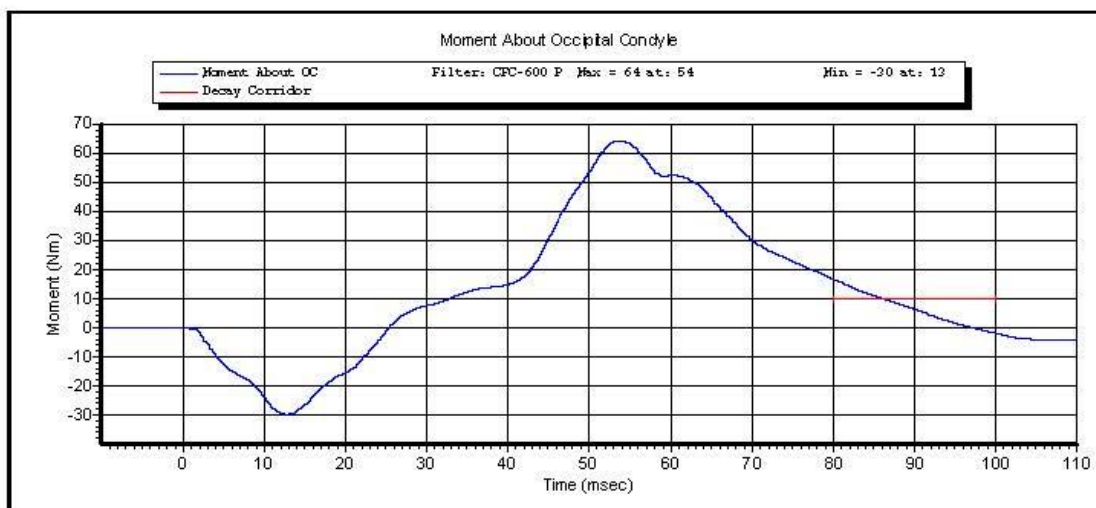
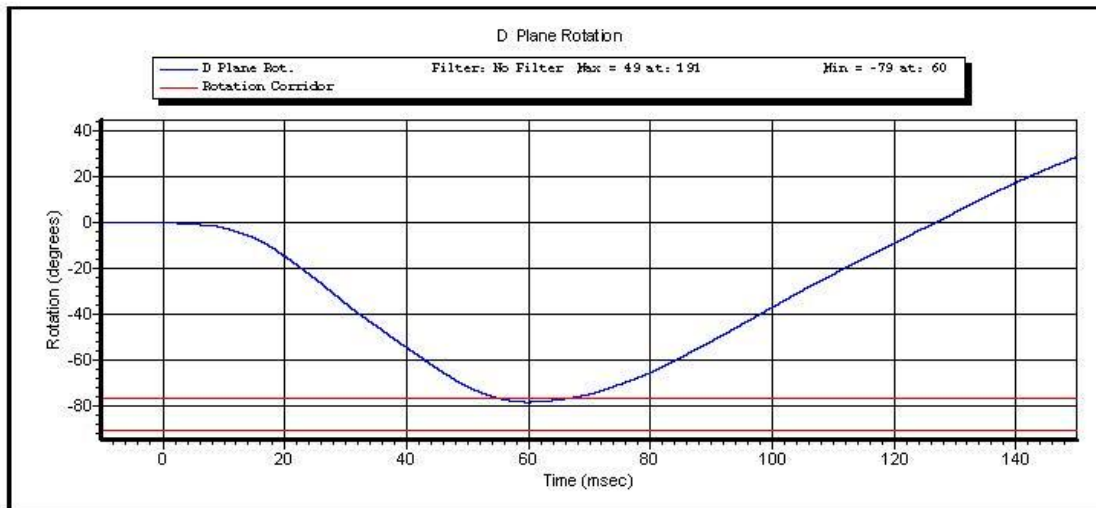


Test Name:	Neck Flexion
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



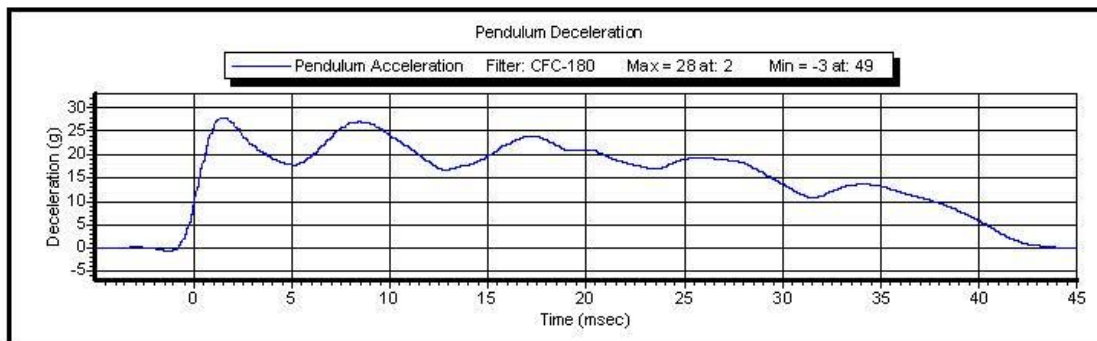
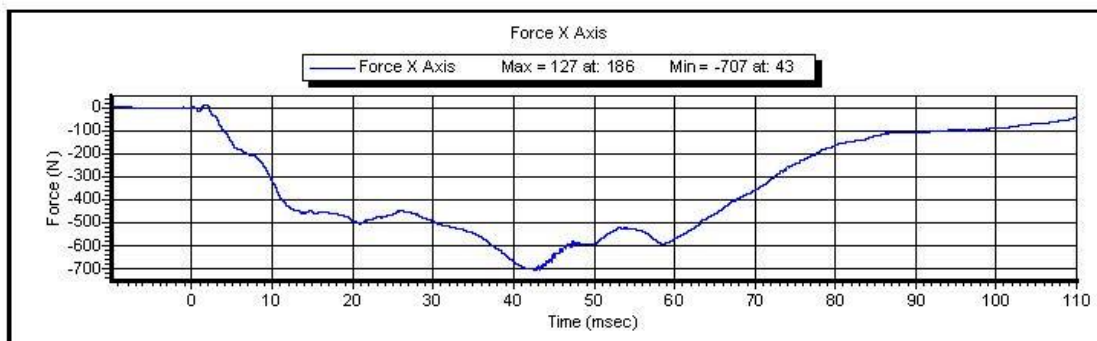
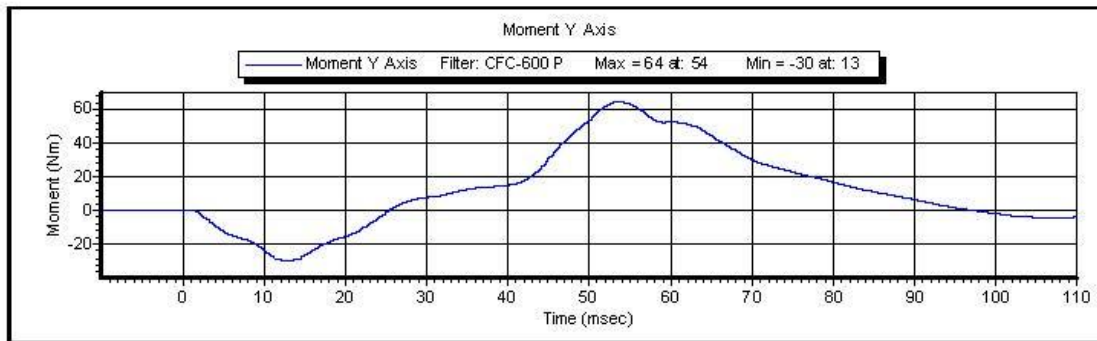
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Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: 2/4/2014



Test ID: **Neck Flexion** Test Time: **2:36:22 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/4/2014**



Test ID: **Neck Flexion**

Test Time: **2:36:22 PM**

Test Date: **2/4/2014**

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Spine Cal

Part 5720 HIII 5% Female

ATD Serial No: 273

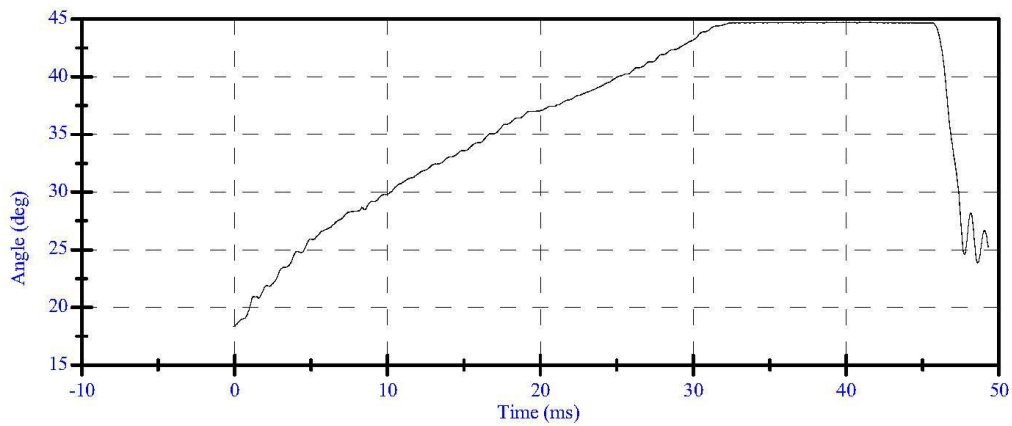
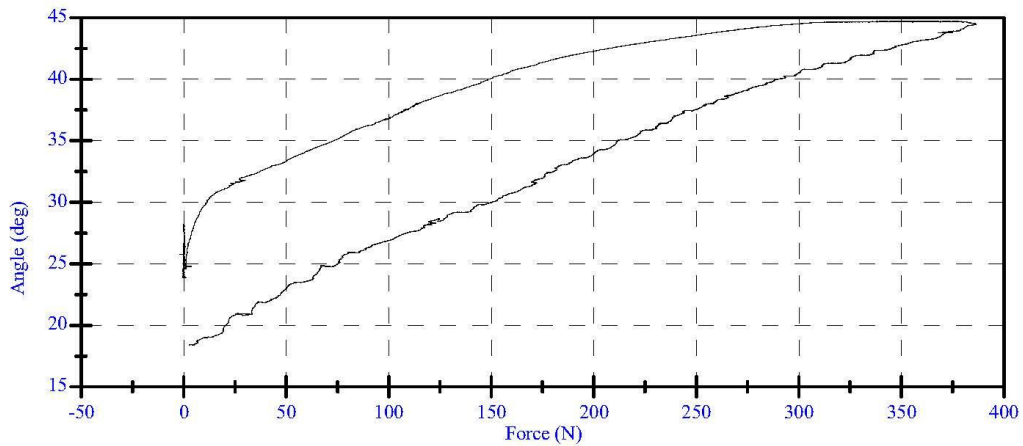
Laboratory Supervisor: E. Dutton

Date: 2/5/2014

Laboratory Technician: M. Goehle

TEST PARAMETER	SPECIFICATION	TEST RESULTS	STATUS
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	18.35 Deg	Passed
Force at 45 Deg	320.00-390.00 N	386.4 N	Passed
Return Angle	8 Deg Max from Initial	21.8 Deg	Passed

LUMBAR SPINE FLEXION TEST



01.10.2014 08:41:45



VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	2/5/2014
		Test Time:	8:50:18 AM

Component Part Number	Component Serial Number
Chest Jacket - 880105-355-E	DH0069

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.80 deg C	P
Humidity	10	--	70	17.70 %RH	P
Velocity	6.59	--	6.83	6.767 m/s	P
Sternum Displacement	-58	--	-50	-52.8 mm	P
Force During Displacement Interval	-4400	--	-3900	-4329.3 N	P
Force During -18mm to -50mm Displacement	-4600	--	0	-4324.5 N	P
Hysteresis	69	--	85	71.7 %	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



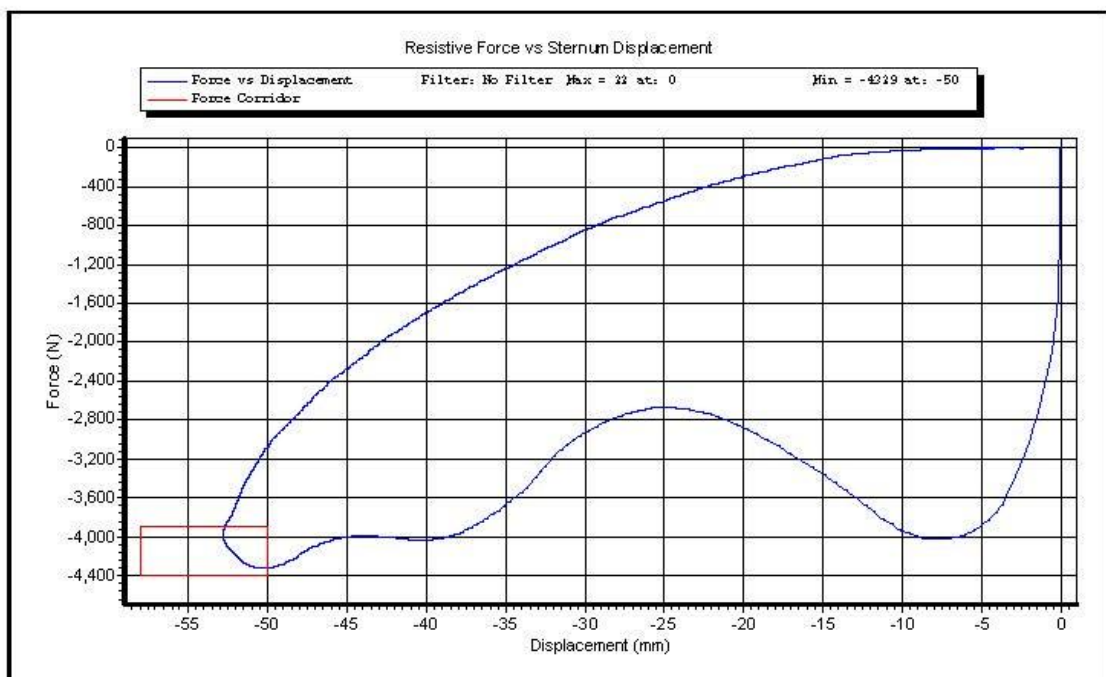
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	12/4/2013
DentonATD	78051-342	DS-273	6/17/2013

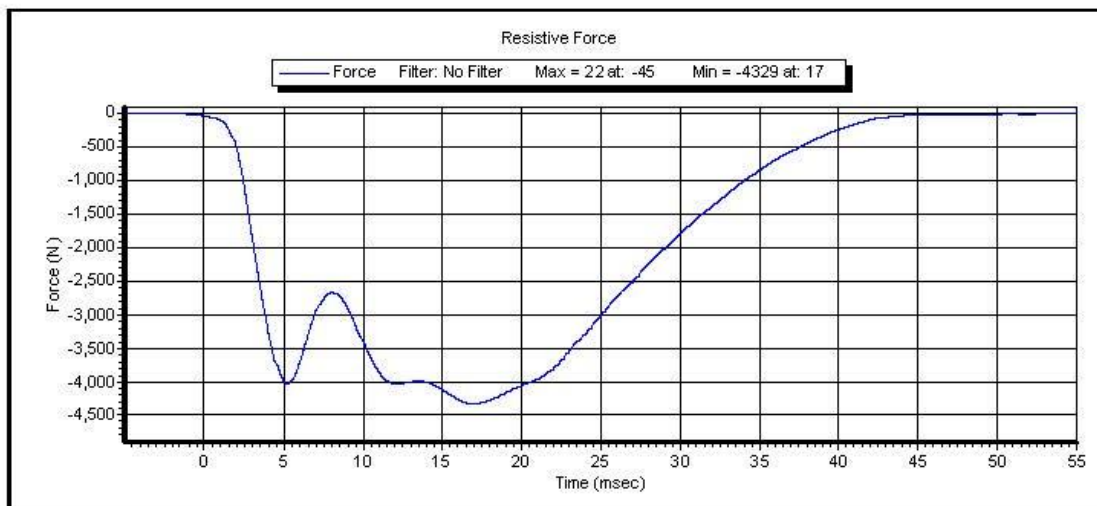
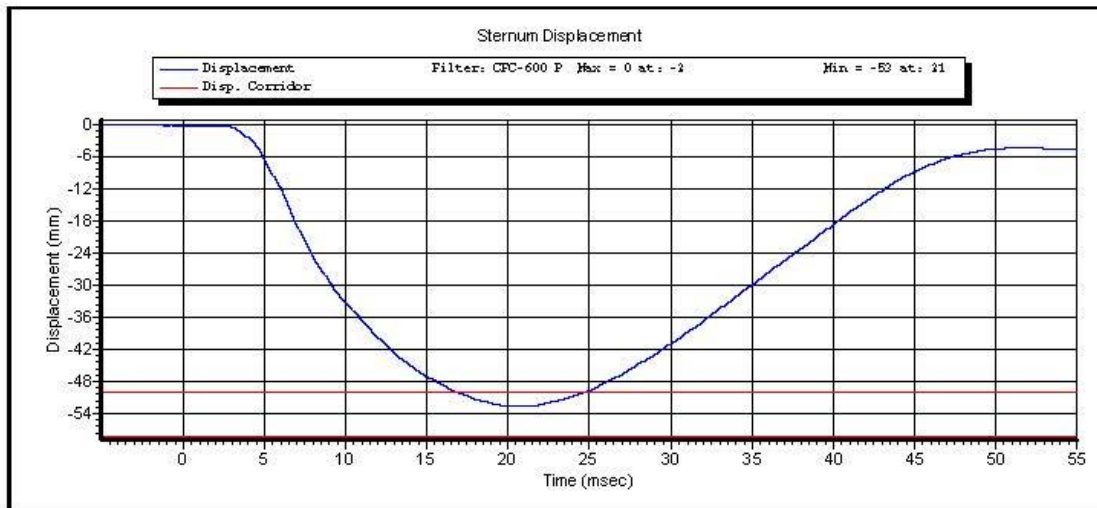


Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



Test ID: **Thorax Impact** Test Time: **8:50:18 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/5/2014**

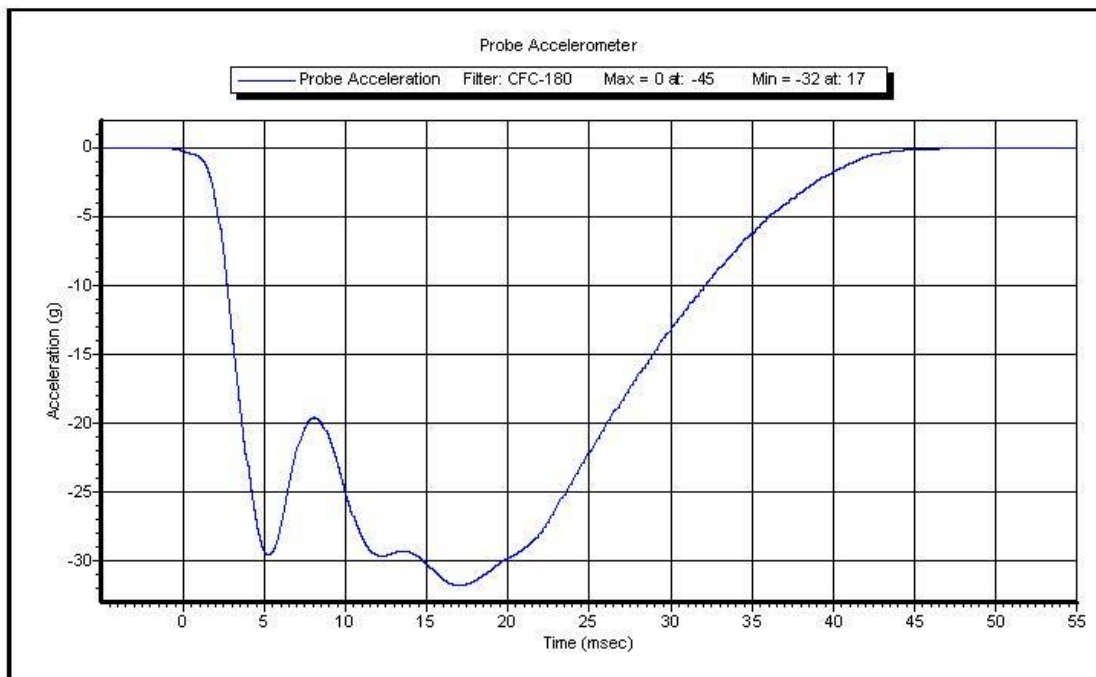


Test ID: **Thorax Impact**

Test Time: **8:50:18 AM**

Test Date: **2/5/2014**

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Test ID: **Thorax Impact**

Test Time: **8:50:18 AM**

Test Date: **2/5/2014**

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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:	273		
Test ID:	Knee Impact Left	Test Date:	2/3/2014
		Test Time:	12:43:19 PM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.30 deg C	P
Humidity	10	--	70	14.70 %RH	P
Velocity	2.07	--	2.13	2.104 m/s	P
Resistive Force	-4060	--	-3450	-3721.2 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 Endevco	Velocity Trap 7231CT	1 C14953	1/11/2013 12/4/2013

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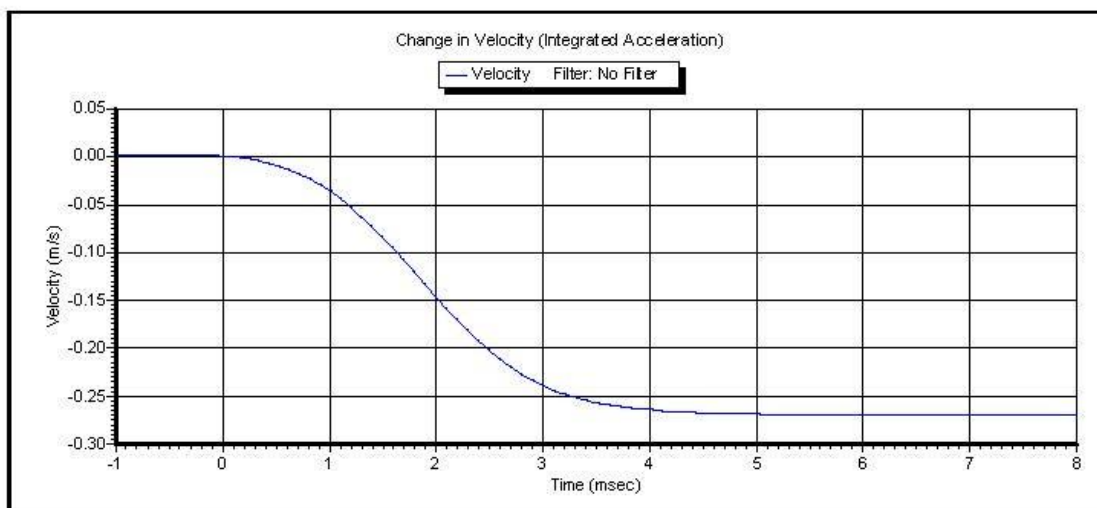
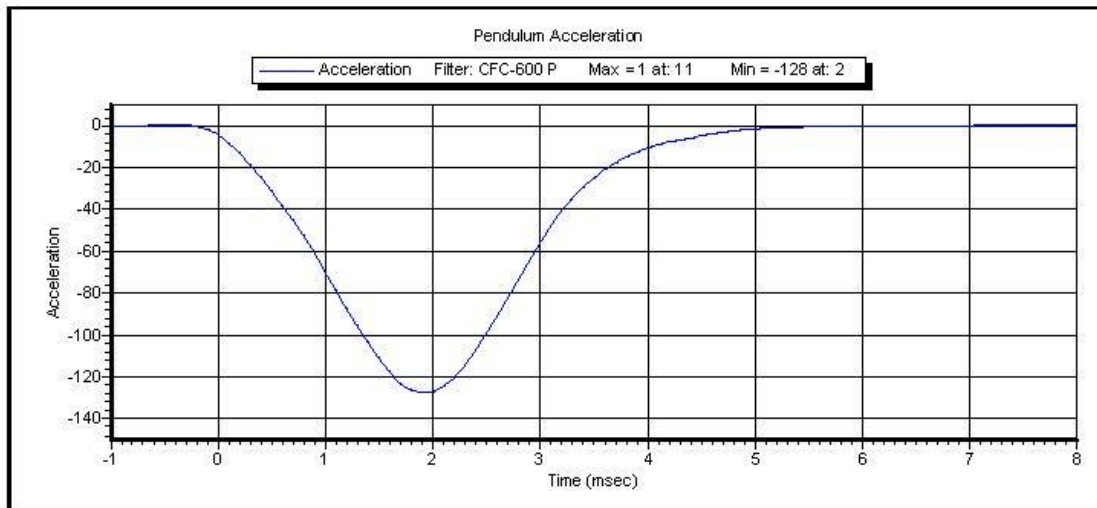


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



Test ID: **Knee Impact Left** Test Time: **12:43:19 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/3/2014**



Test ID: **Knee Impact Left** Test Time: **12:43:19 PM**
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Test Date: **2/3/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	273		
Test ID:	Knee Impact Right	Test Date:	2/3/2014
		Test Time:	12:30:37 PM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.30 deg C	P
Humidity	10	--	70	14.70 %RH	P
Velocity	2.07	--	2.13	2.105 m/s	P
Resistive Force	-4060	--	-3450	-3814.8 N	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

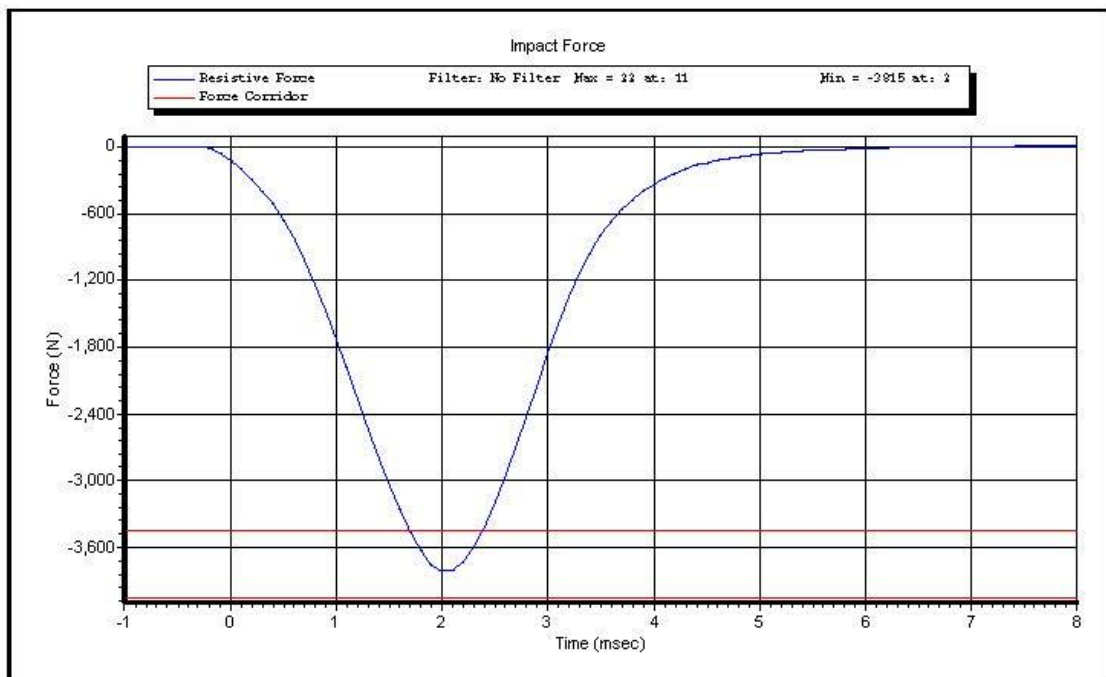
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<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2013 12/4/2013

Copyright 2006 Denton ATD, Inc. LabPac II Version: 1.8.5.0

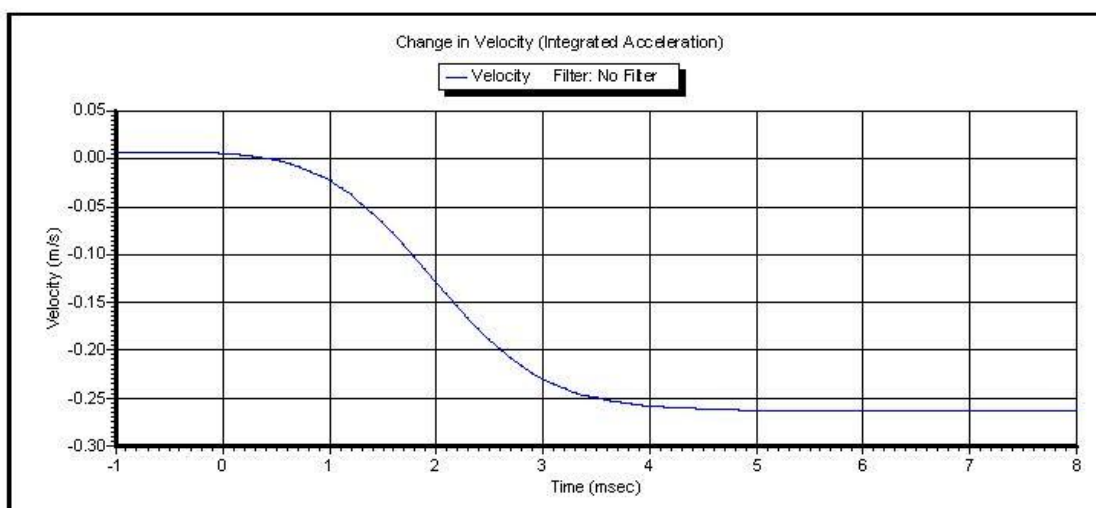
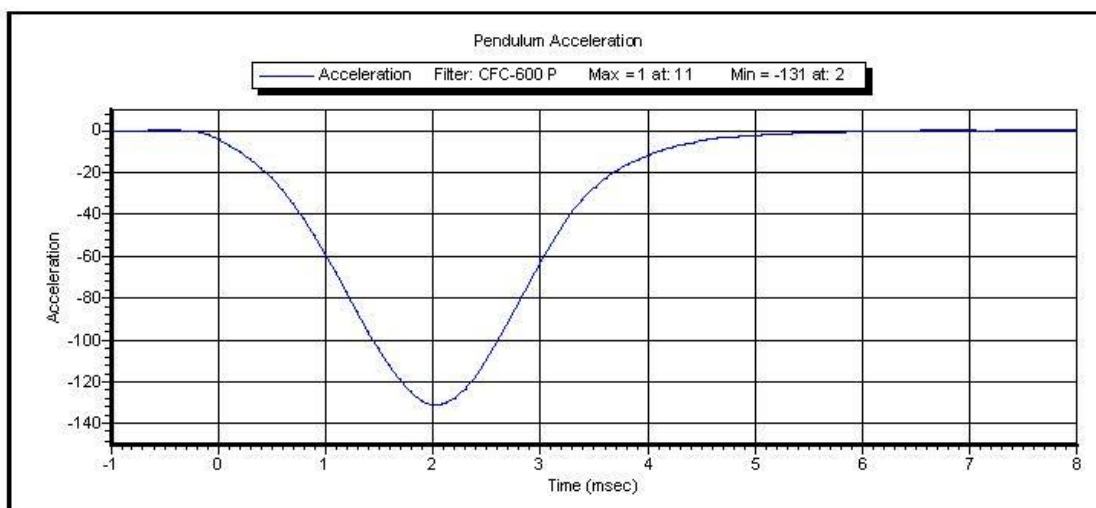


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



Test ID: **Knee Impact Right** Test Time: **12:30:37 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/3/2014**



Test ID: **Knee Impact Right** Test Time: **12:30:37 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/3/2014**

CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 061



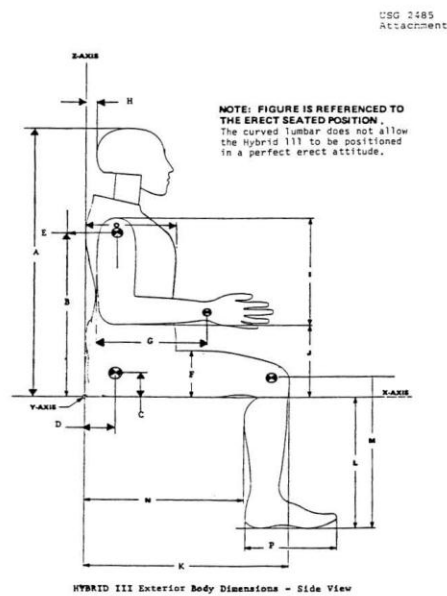
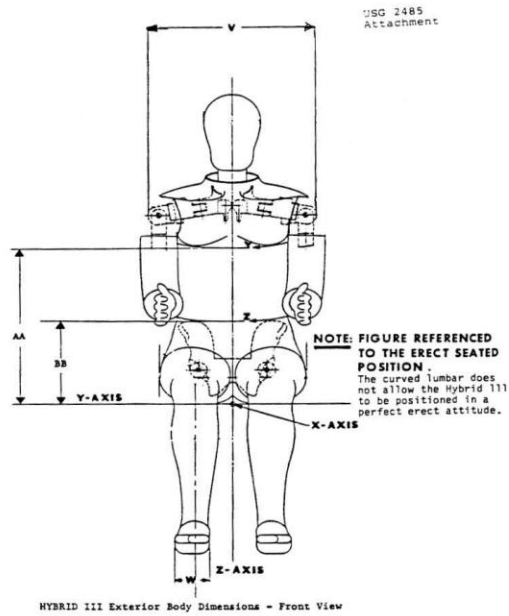
50th Male External Measurements

S/N 061

Symbol	Description	Specification	Results	Pass
		in	In	
A	Sitting Height	34.6 – 35.0	34.8	Yes
B	Shoulder Pivot Height	19.9 – 20.5	20.1	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	3.5	Yes
F	Thigh Clearance	5.5 – 6.1	5.9	Yes
G	Back of Elbow to Wrist Pivot	11.4 – 12.0	11.6	Yes
H	Head Back to Backline	1.6 – 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 – 13.6	13.4	Yes
J	Elbow Rest Height	7.5 – 8.3	7.8	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.2	Yes
L	Popliteal Height	16.9 – 17.9	17.4	Yes
M	Knee Pivot Height	19.1 – 19.7	19.4	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.4	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.7	Yes
P	Foot Length (right)	9.9 – 10.5	10.1	Yes
V	Shoulder Breadth	16.3 – 17.2	16.7	Yes
W	Foot Breadth	3.6 – 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.7	Yes
Z	Waist Circumference	32.9 – 34.1	34.0	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: M. Geesey

02/14/2014





VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	061		
Test ID:	Head Drop	Test Date:	2/14/2014
		Test Time:	9:30:47 AM

Component Part Number	Component Serial Number
Head Skin - 78051-228	0220544

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.10 deg C P
Humidity	10 -- 70	20.60 %RH P
Resultant Acceleration	225 -- 275	246.0 G's P
Oscillation	0 -- 10	1.5 % P
Lateral Acceleration	-15 -- 15	-4.5 G's P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

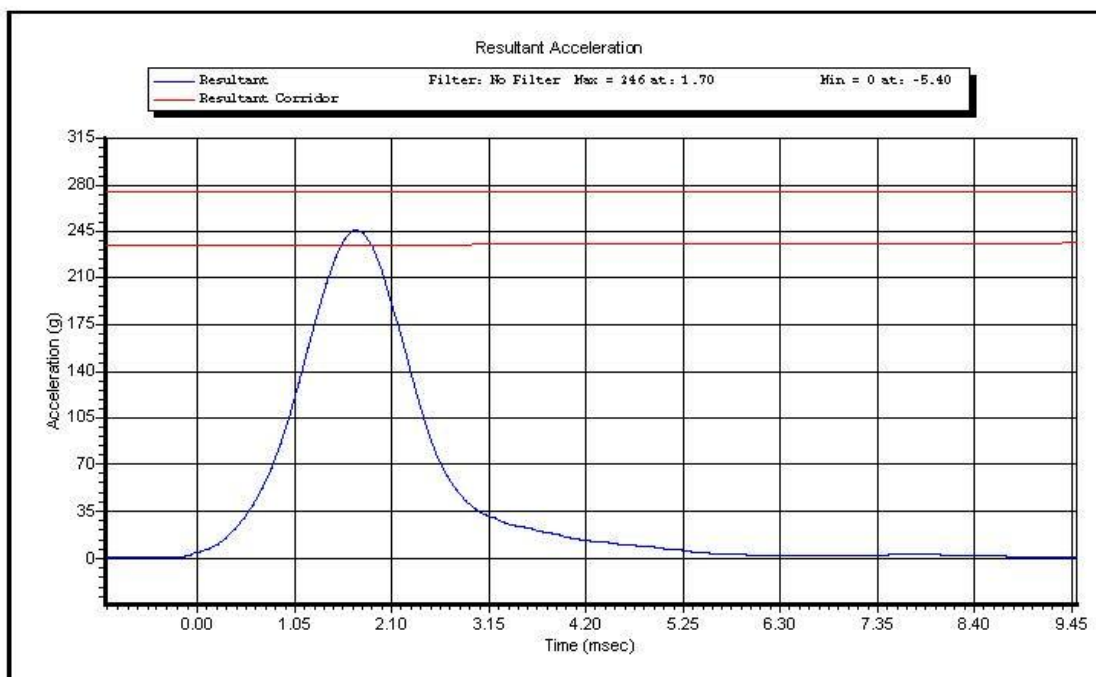
REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58871	1/29/2014
Endevco	7264-2000	P12359	1/29/2014
Endevco	7264-2000	P52133	1/29/2014

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Test Name:	Head Drop
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061

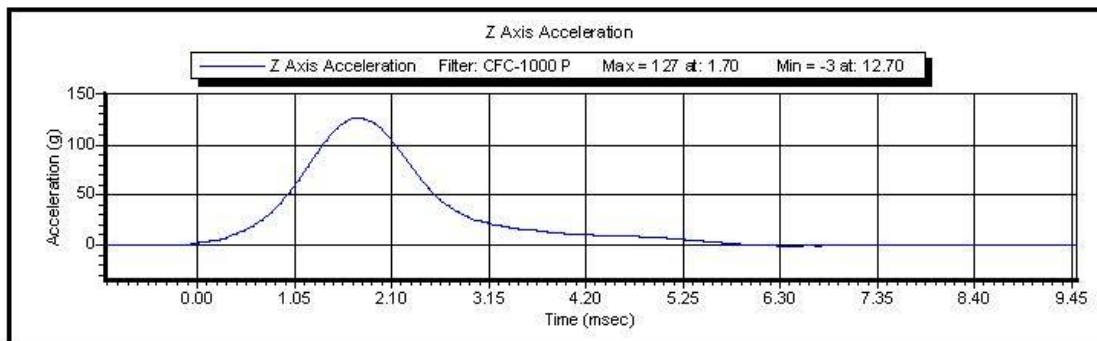
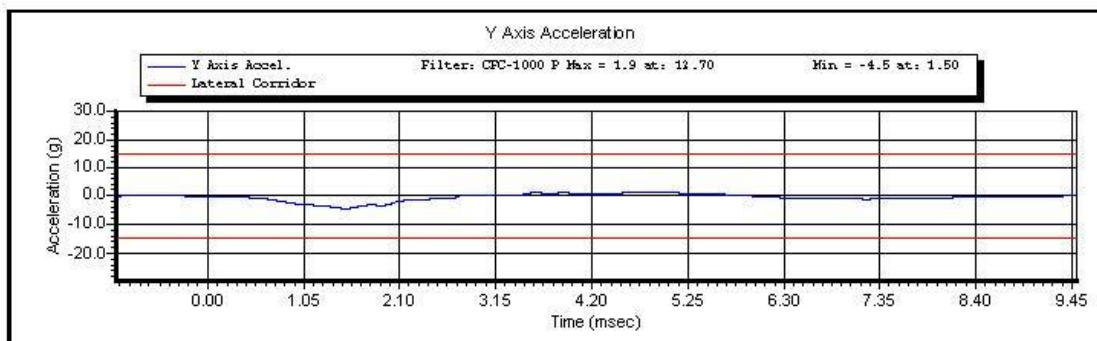
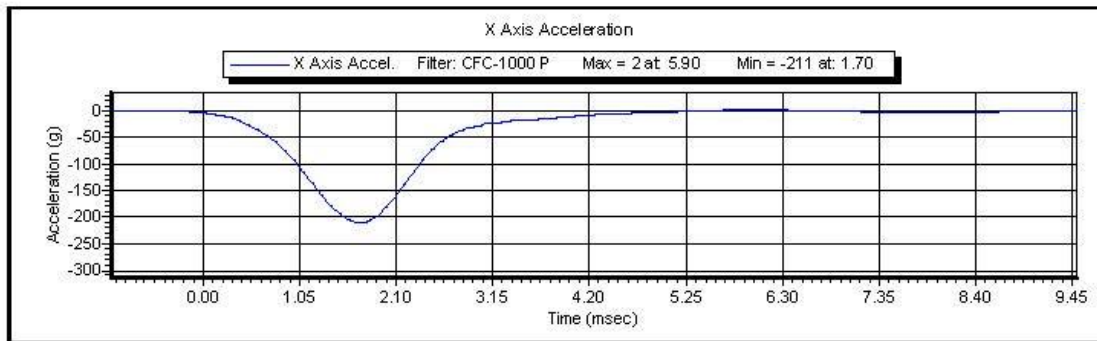


Test ID: **Head Drop**

Test Time: **9:30:47 AM**

Test Date: **2/14/2014**

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Test ID: **Head Drop**

Test Time: **9:30:47 AM**

Test Date: **2/14/2014**

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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:	061		
Test ID:	Neck Extension	Test Date:	2/14/2014
		Test Time:	3:47:59 PM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.00	deg C P
Humidity		10	-- 70	22.00	%RH P
Velocity		5.94	-- 6.19	6.037	m/s P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	17.61	G's P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	15.08	G's P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	12.16	G's P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	13.77	G's P
Deceleration Time to	5 G's	38	-- 46	45.3	ms P
D Plane Rotation		81	-- 106	97.2	degrees P
Time at Max Rotation		72	-- 82	79.0	ms P
Rotation Decay to Zero		147	-- 174	163.0	ms P
Moment About Occipital Condyle		-80.0	-- -52.9	-63.99	Nm P
Time at Maximum Moment		65	-- 79	74.3	ms P
Moment Decay to Zero		120	-- 148	144.6	ms P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



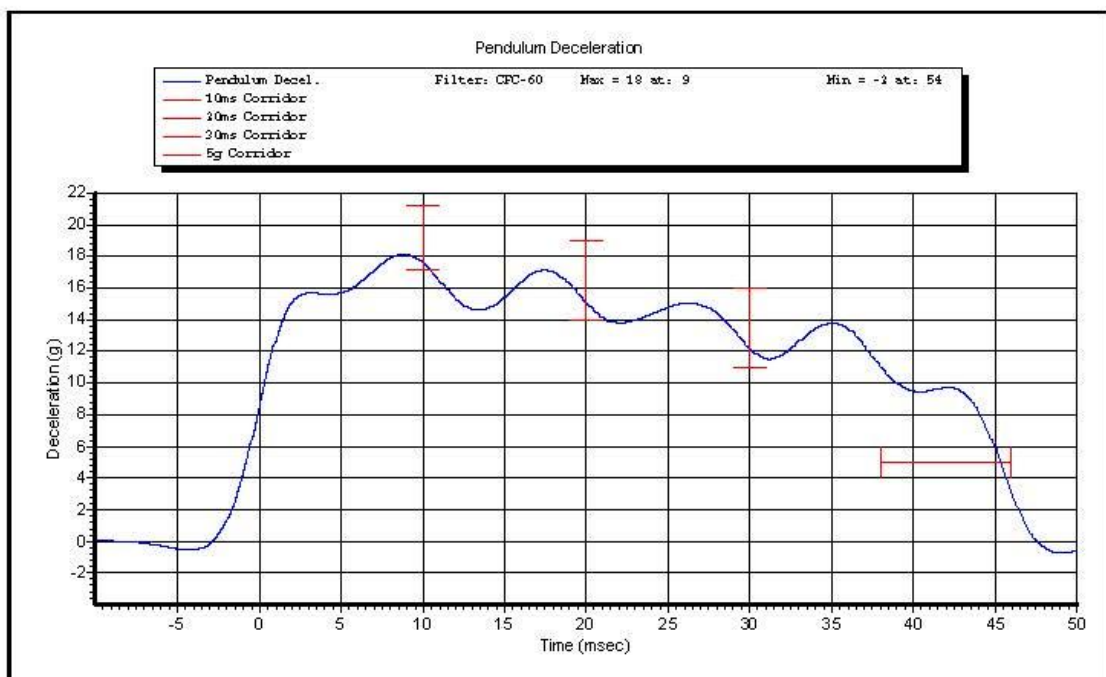
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/31/2014
DentonATD	78051-342	CONDYLE POT	1/31/2014
Denton	1716AFT	LC-2184 My	5/7/2013
Denton	1716AFT	LC-2184 Fx	5/7/2013



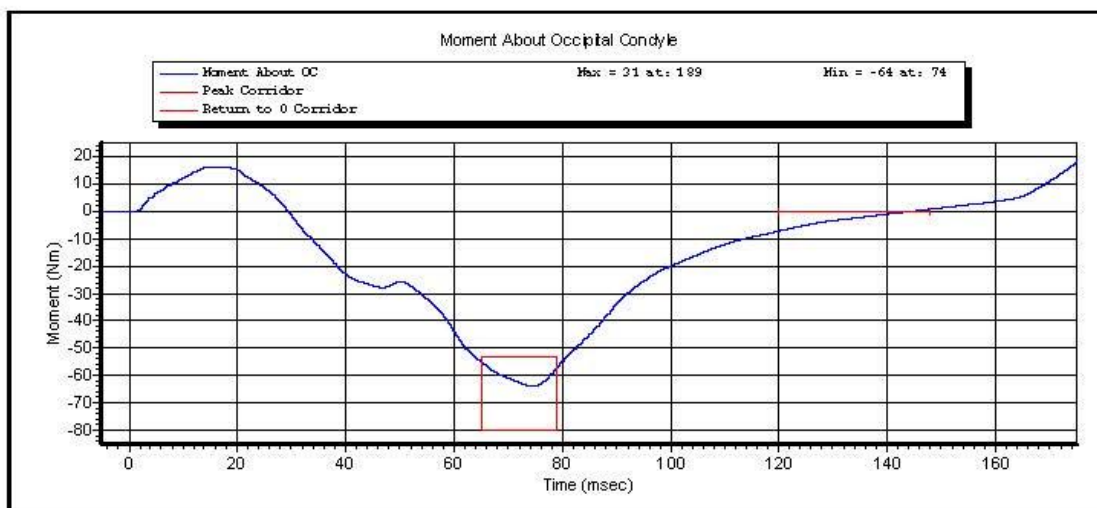
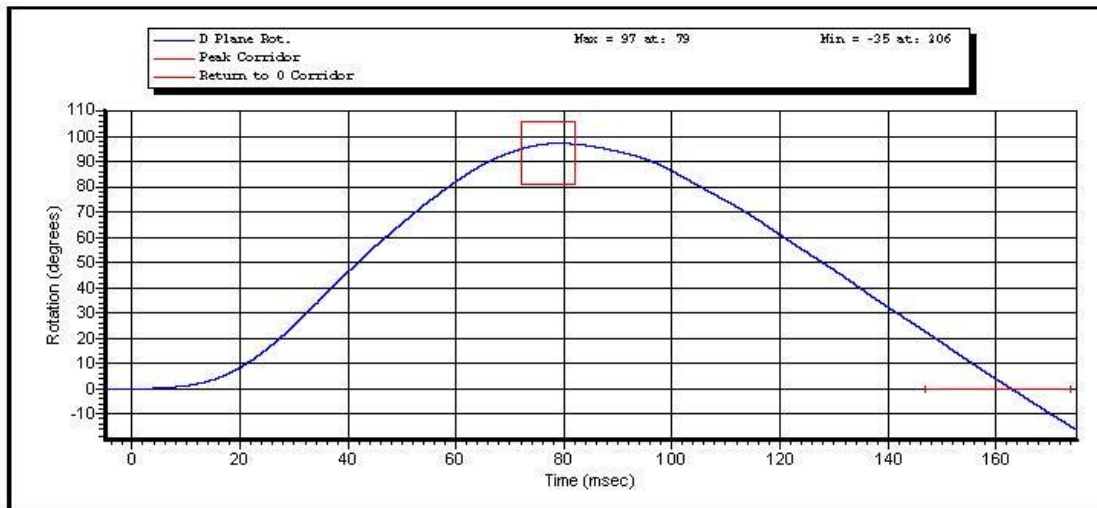
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Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	061



ID of Test: **Neck Extension** Time of Test: **3:47:59 PM**

Date of Test: **2/14/2014**

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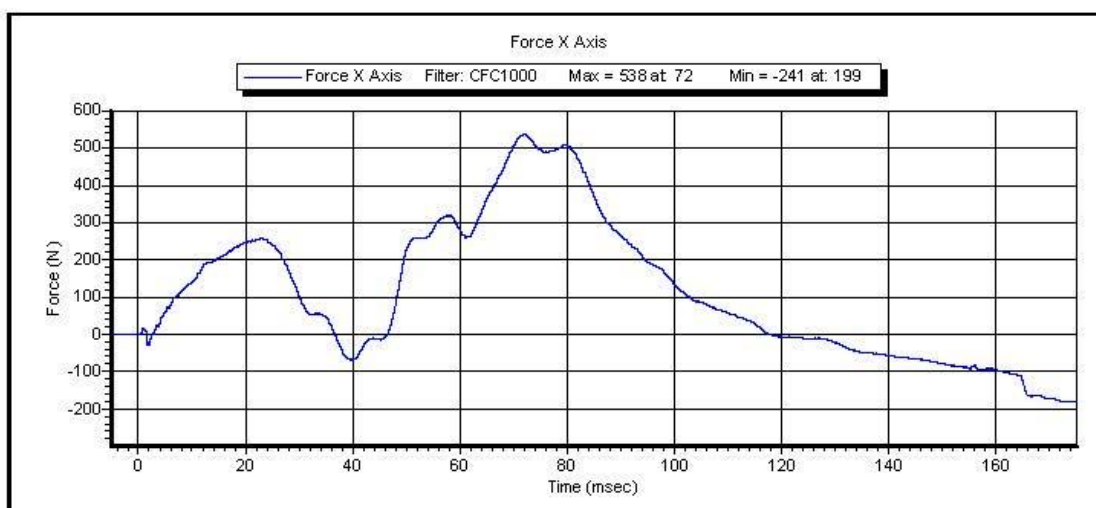
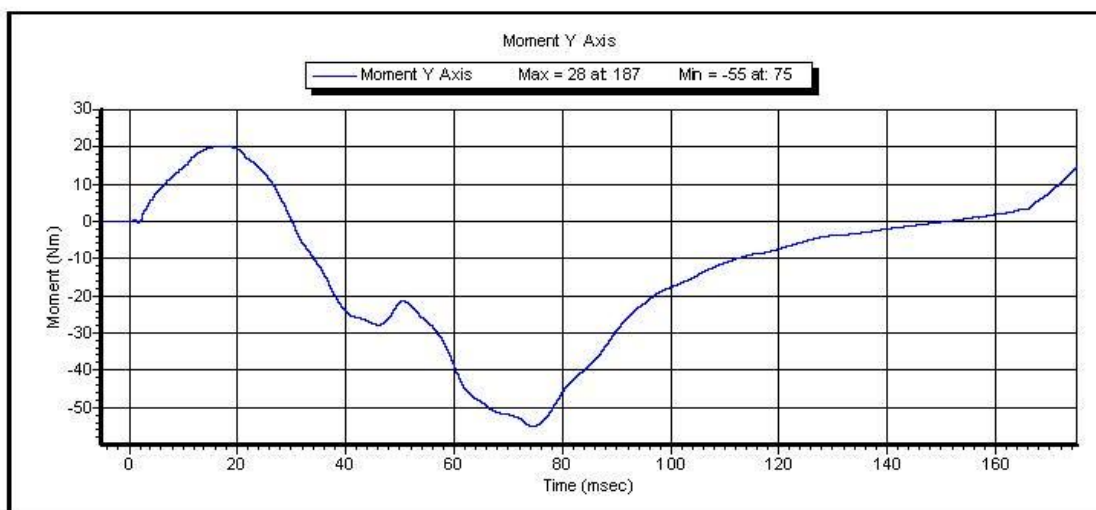


ID of Test: **Neck Extension**

Time of Test: **3:47:59 PM**

Date of Test: **2/14/2014**

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ID of Test: **Neck Extension** Time of Test: **3:47:59 PM**

Date of Test: **2/14/2014**

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	061		
Test ID:	Neck Flexion	Test Date:	2/14/2014
		Test Time:	3:06:03 PM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.40 deg C	P
Humidity		10	-- 70	20.90 %RH	P
Velocity		6.89	-- 7.13	6.952 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	25.75 G's	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	20.86 G's	P
Pendulum Deceleration at		12.5	-- 18.5	15.26 G's	P
Maximum Pendulum Deceleration After	30 ms	0	-- 29	15.3 G's	P
Deceleration Time to	5 ms	34	-- 42	36.8 ms	P
D Plane Rotation		-78	-- -64	-73.4 degrees	P
Time at Maximum Rotation		57	-- 64	58.1 ms	P
Rotation Decay to Zero		113	-- 128	115.4 ms	P
Moment About Occipital Condyle		88.1	-- 108.4	95.89 Nm	P
Time at Maximum Moment		47	-- 58	47.0 ms	P
Moment Decay to Zero		97.0	-- 107.0	97.4 ms	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



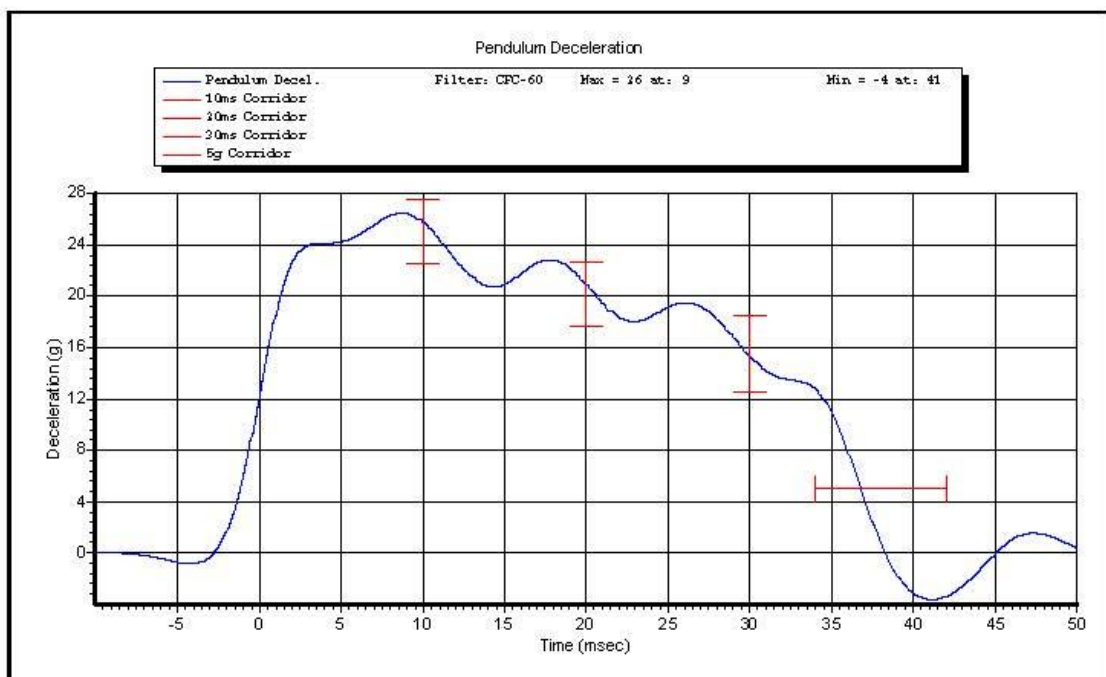
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/31/2014
DentonATD	78051-342	CONDYLE POT	1/31/2014
Denton	1716AFT	LC-2184 My	5/7/2013
Denton	1716AFT	LC-2184 Fx	5/7/2013

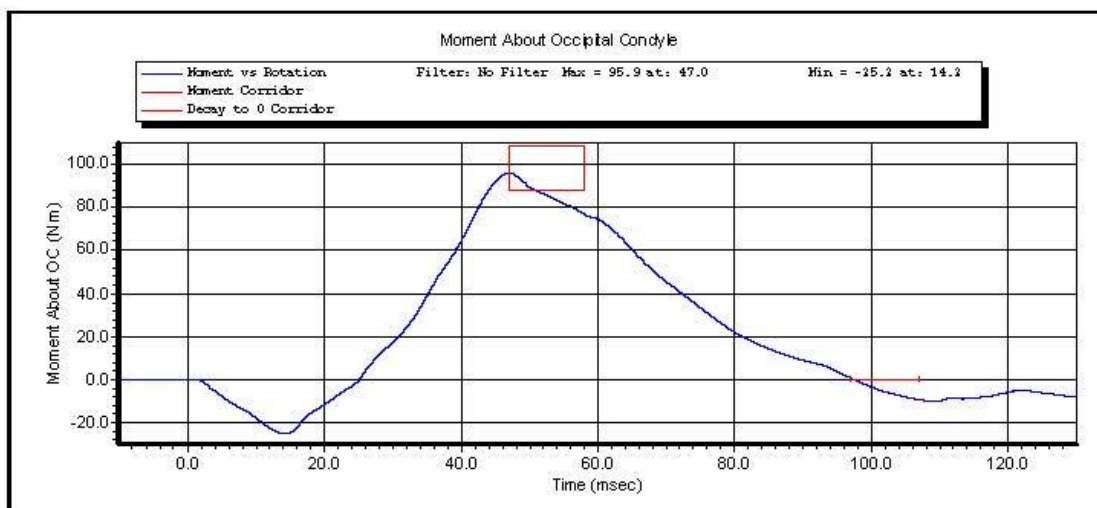
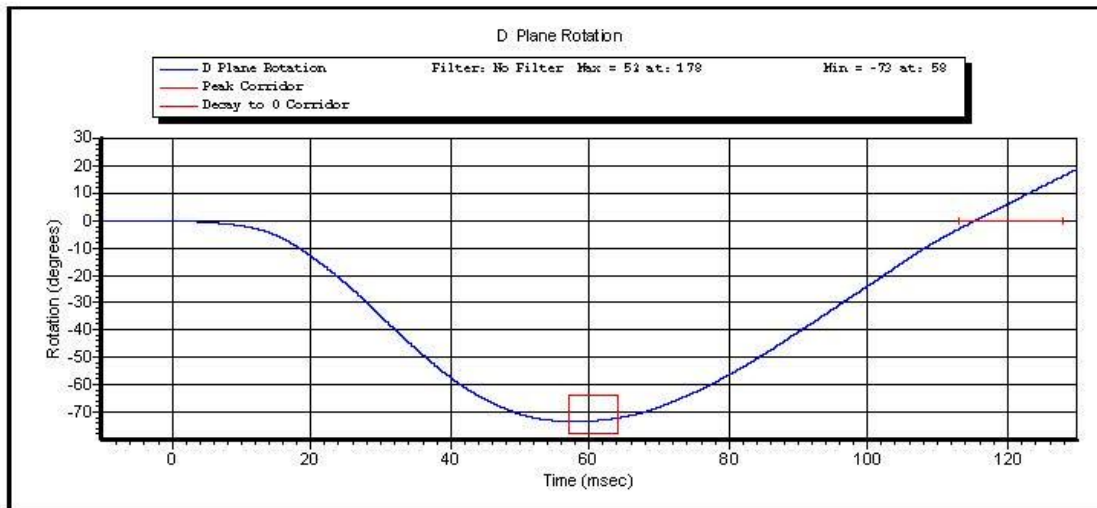


Name of Test:	Neck Flexion
Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	061



ID of Test: **Neck Flexion** Time of Test: **3:06:03 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Date of Test: **2/14/2014**

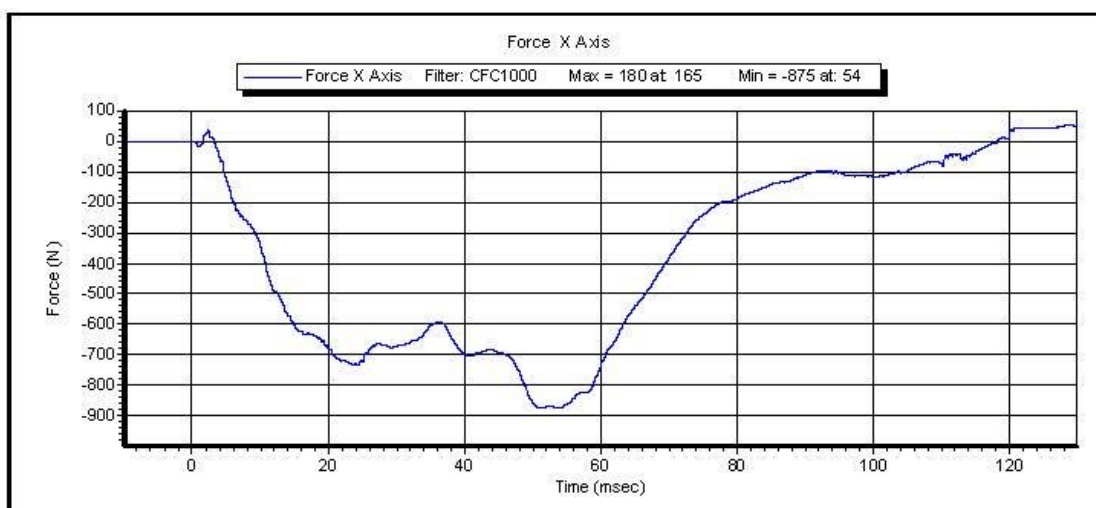
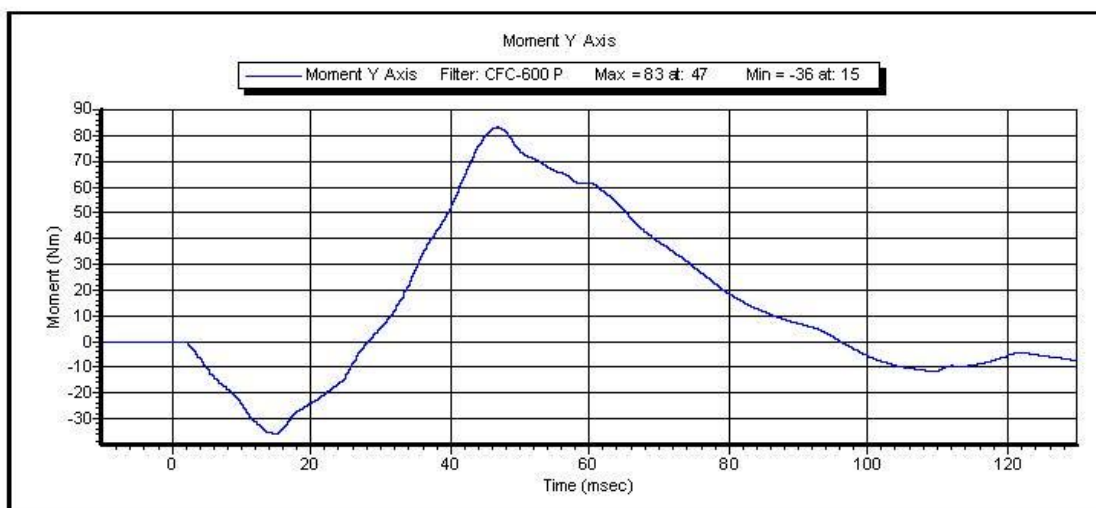


ID of Test: **Neck Flexion**

Time of Test: **3:06:03 PM**

Date of Test: **2/14/2014**

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ID of Test: **Neck Flexion**

Time of Test: **3:06:03 PM**

Date of Test: **2/14/2014**

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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:	061		
Test ID:	Thorax Impact	Test Date:	2/13/2014
		Test Time:	3:48:46 PM

Component Part Number	Component Serial Number
Chest Jacket - 78051-169	2437

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.60 deg C	P
Humidity	10	--	70	13.30 %RH	P
Velocity	6.59	--	6.83	6.785 m/s	P
Chest Deflection	-72.6	--	-63.5	-70.56 mm	P
Resistive Force	-5.894	--	-5.160	-5.5594 kN	P
Hysteresis	69	--	85	71.1 %	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



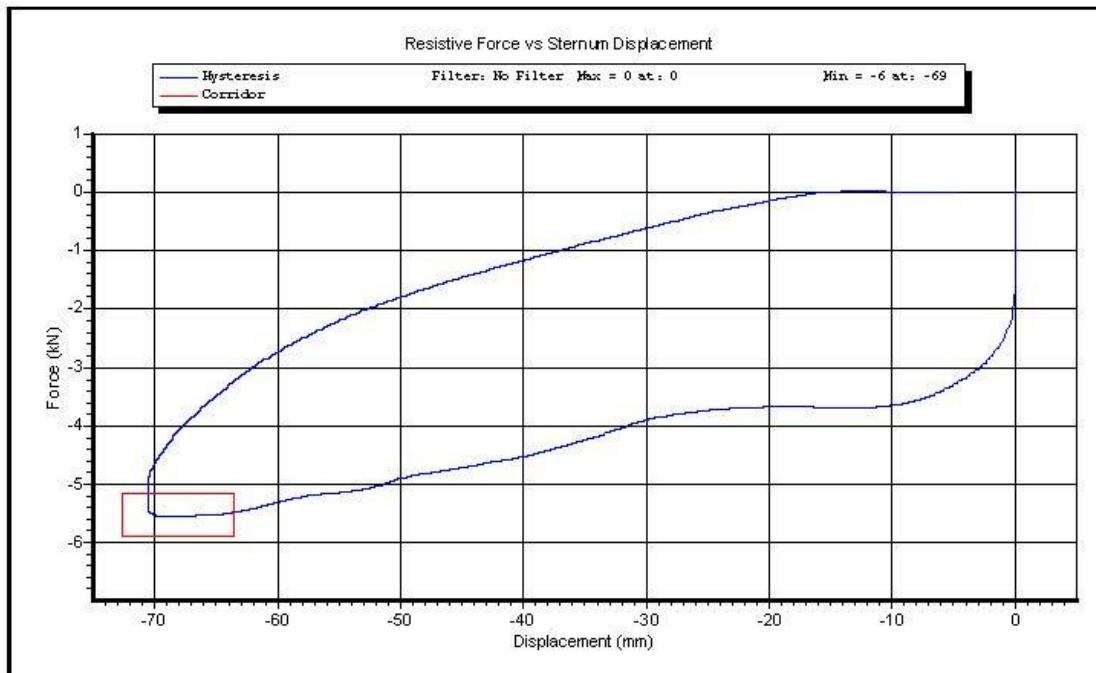
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	C14953	12/4/2013
DentonATD	78051-342	DS-061	5/14/2013

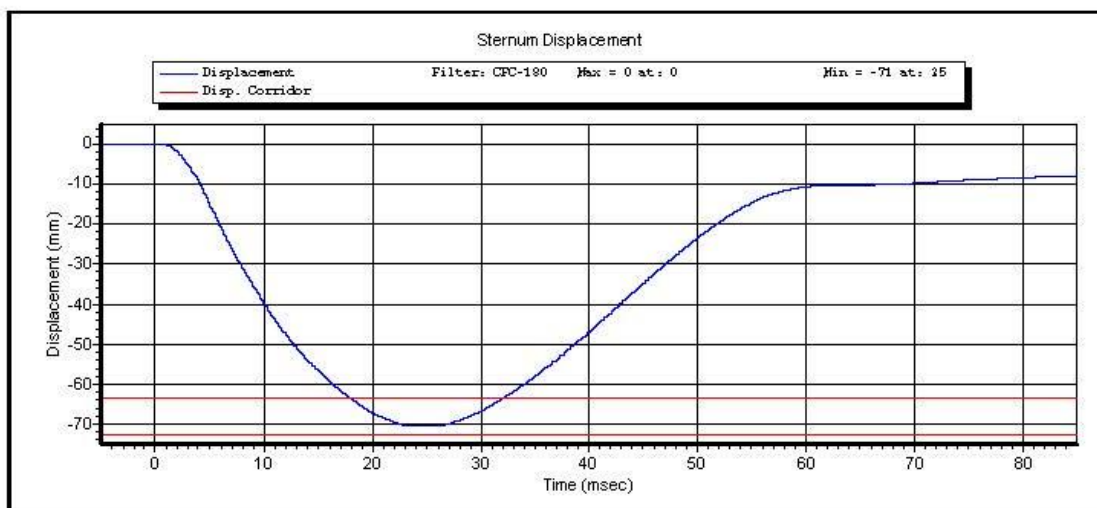
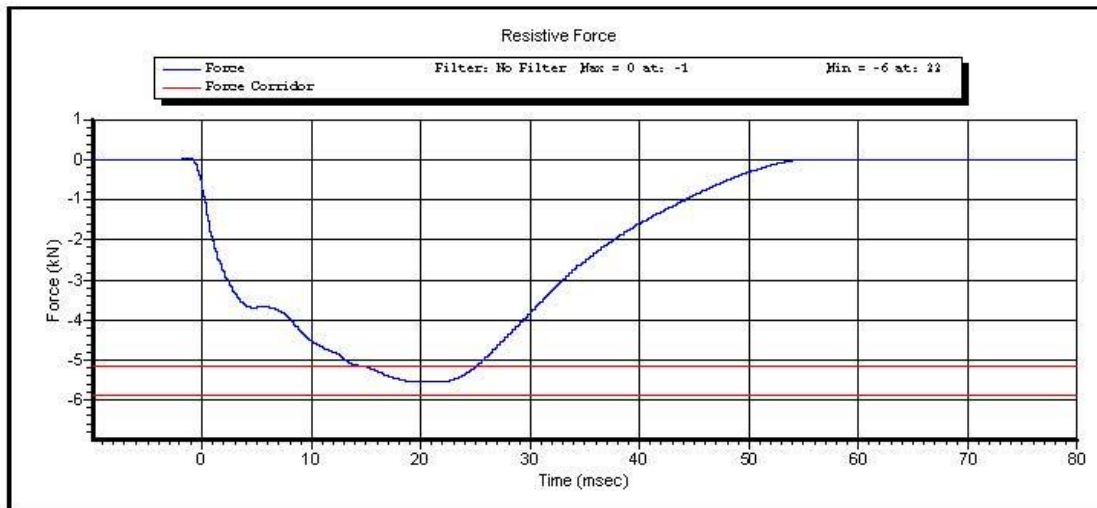


Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Thorax Impact** Test Time: **3:48:46 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/13/2014**

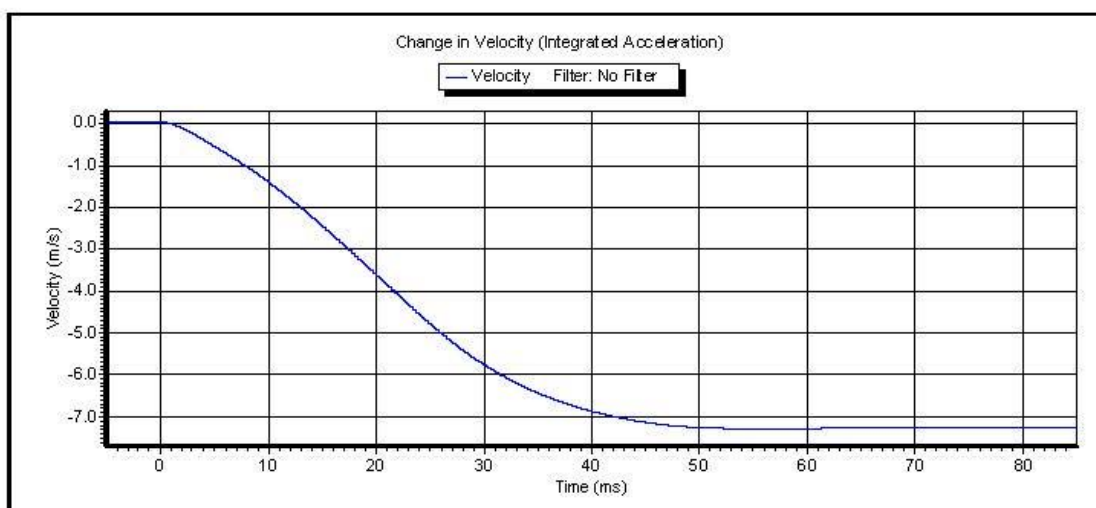
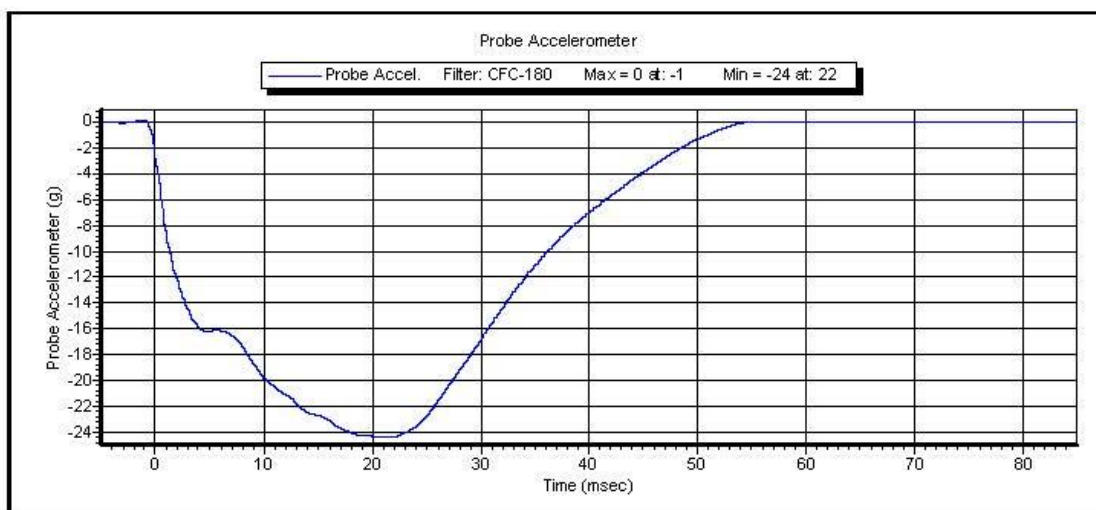


Test ID: **Thorax Impact**

Test Time: **3:48:46 PM**

Test Date: **2/13/2014**

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Test ID: **Thorax Impact**

Test Time: **3:48:46 PM**

Test Date: **2/13/2014**

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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:	061		
Test ID:	Hip ROM Left	Test Date:	2/14/2014
		Test Time:	11:57:07 AM

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	D13459

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.40 deg C	P
Humidity	10	--	70	20.80 %RH	P
Average Velocity	5	--	10	6.5 deg/s	P
Angle at 203 Nm	40	--	50	40.4 degrees	P
Moment at 30 degrees	0.0	--	94.9	88.75 Nm	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



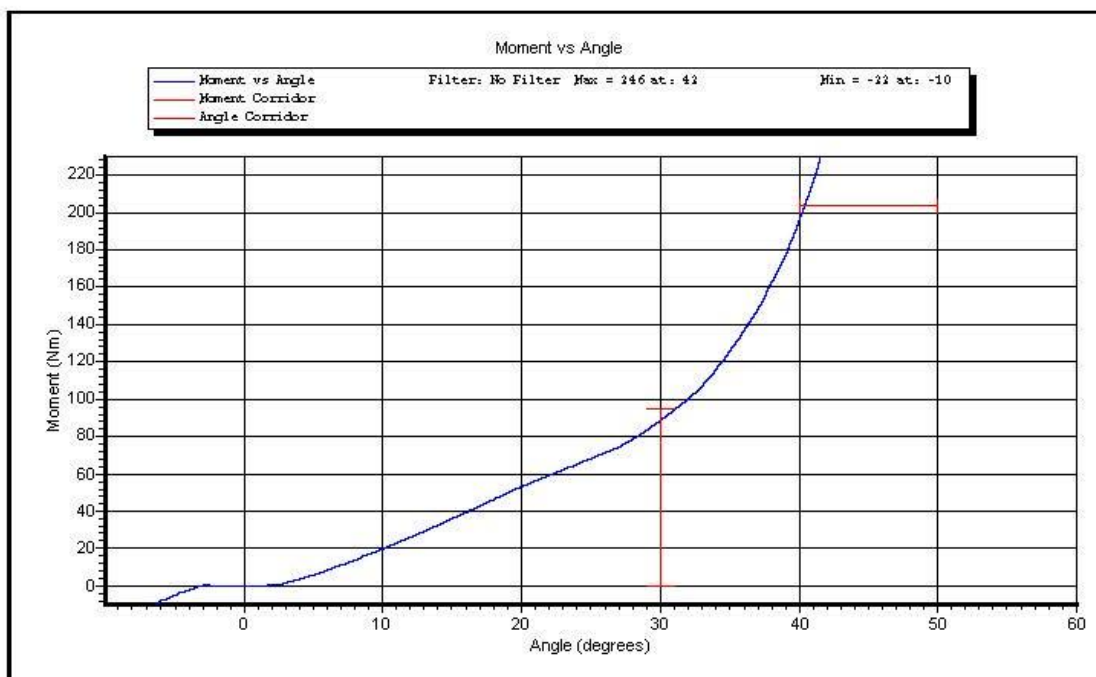
VERIFICATION REPORT

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	A0 Output	1	1/11/2014



Test Name:	Hip ROM
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Hip ROM Left** Test Time: **11:57:07 AM**

Test Date: **2/14/2014**

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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:	061		
Test ID:	Hip ROM Right	Test Date:	2/14/2014
		Test Time:	11:45:31 AM

Component Part Number	Component Serial Number
Pelvis Assembly 78051-60	D13459

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.40 deg C	P
Humidity	10	--	70	20.90 %RH	P
Average Velocity	5	--	10	5.6 deg/s	P
Angle at 203 Nm	40	--	50	42.2 degrees	P
Moment at 30 degrees	0.0	--	94.9	90.68 Nm	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



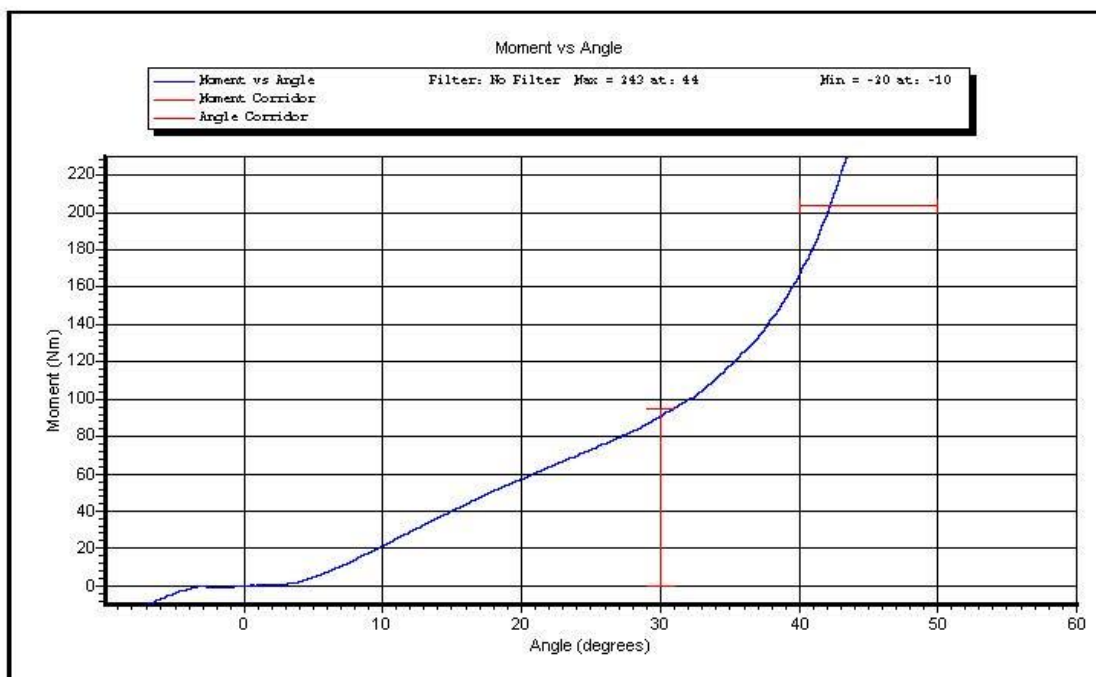
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REFERENCE EQUIPMENT

<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	A0 Output	1	1/11/2014



Test Name:	Hip ROM
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Hip ROM Right** Test Time: **11:45:31 AM**

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Test Date: **2/14/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	061		
Test ID:	Knee Impact Left	Test Date:	2/13/2014
		Test Time:	7:11:56 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	3268

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	20.60 deg C	P
Humidity	10	--	70	14.30 %RH	P
Velocity	2.07	--	2.13	2.120 m/s	P
Resistive Force	-5.780	--	-4.720	-5.190 kN	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

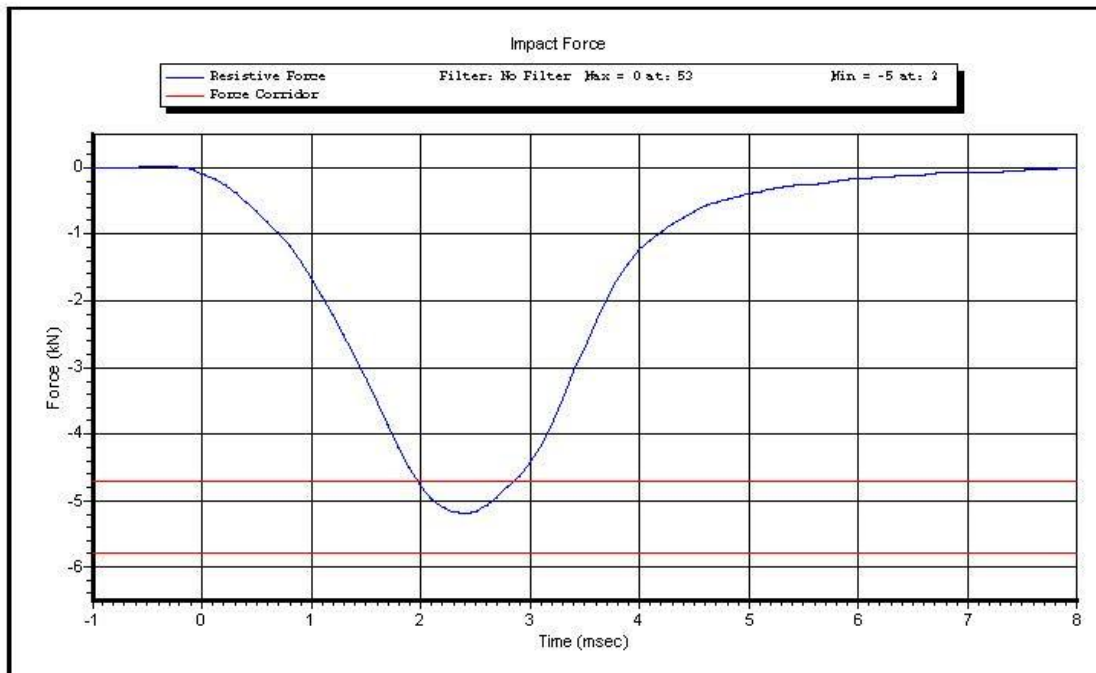
REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2014 12/4/2013

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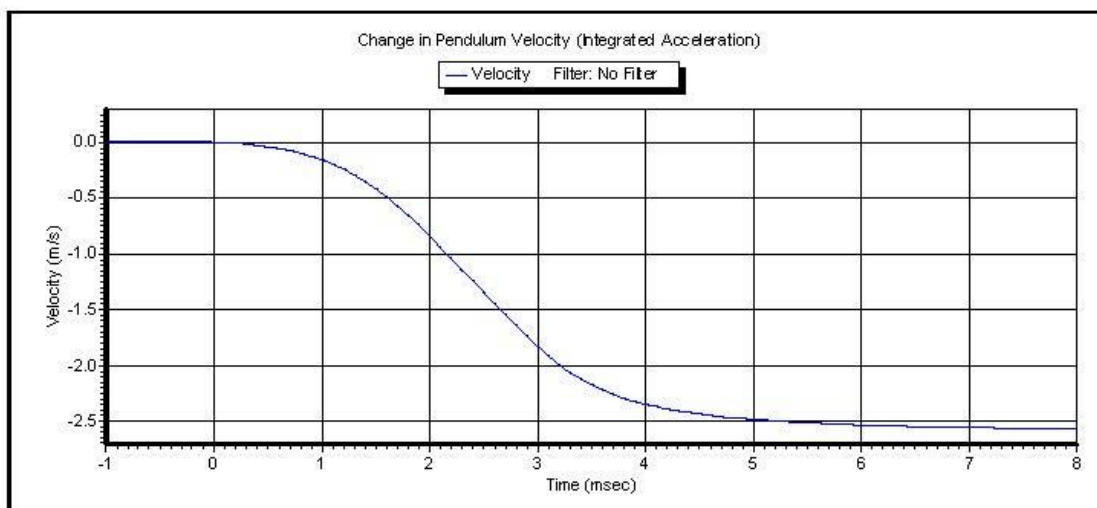
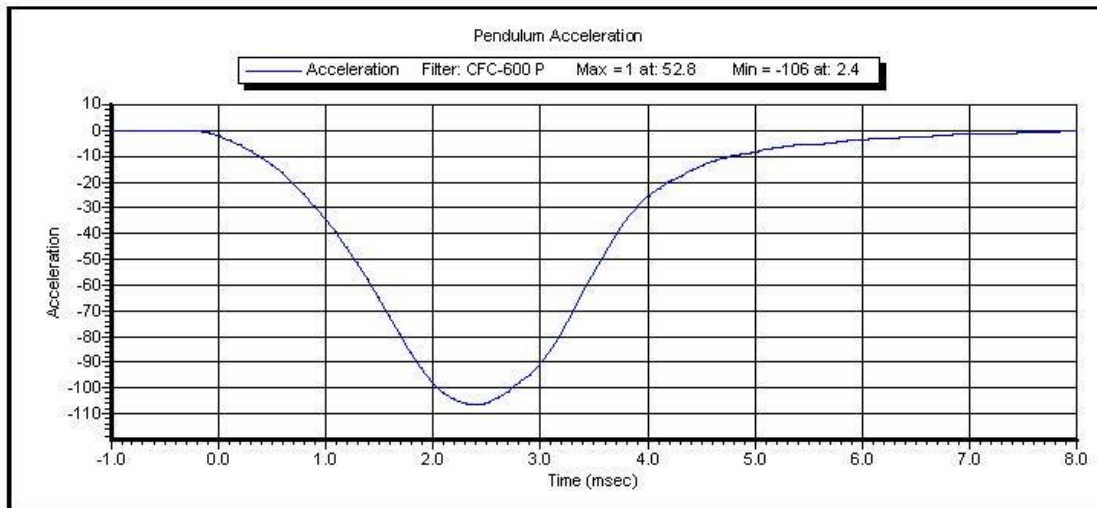


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Knee Impact Left** Test Time: **7:11:56 PM**
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Test Date: **2/13/2014**



Test ID: **Knee Impact Left** Test Time: **7:11:56 PM**
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Test Date: **2/13/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	061		
Test ID:	Knee Impact Right	Test Date:	2/13/2014
		Test Time:	7:16:02 PM

Component Part Number	Component Serial Number
Knee Skin - 78051(L) or 6(R)	3158

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	20.60 deg C	P
Humidity	10	--	70	14.30 %RH	P
Velocity	2.07	--	2.13	2.130 m/s	P
Resistive Force	-5.780	--	-4.720	-5.332 kN	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

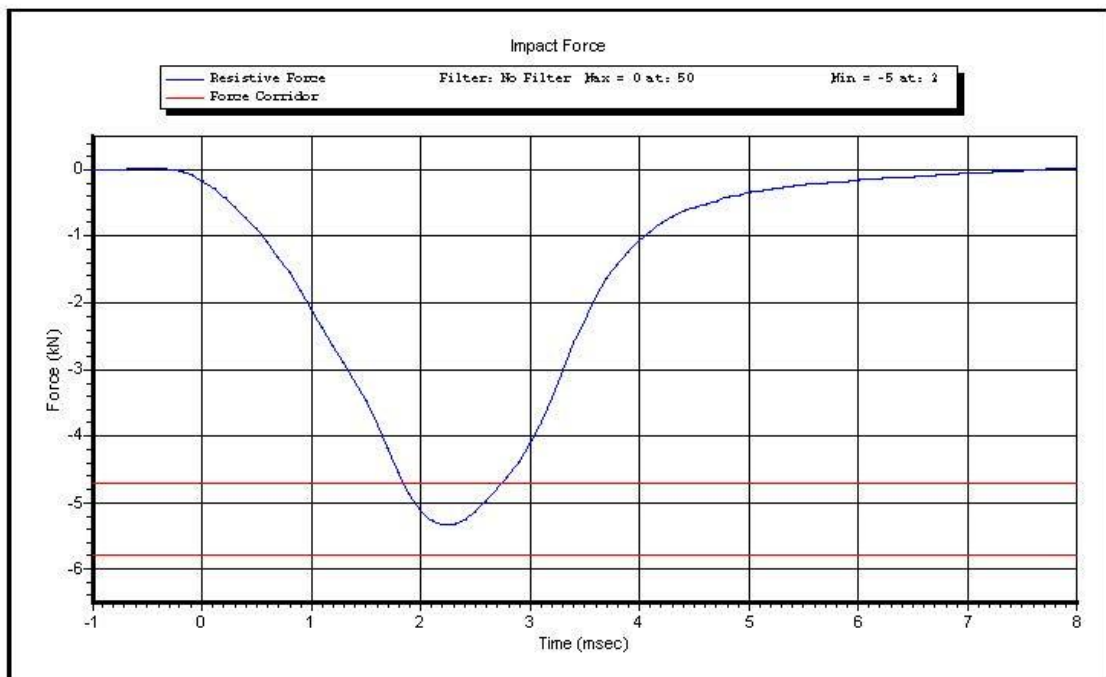
REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2014 12/4/2013

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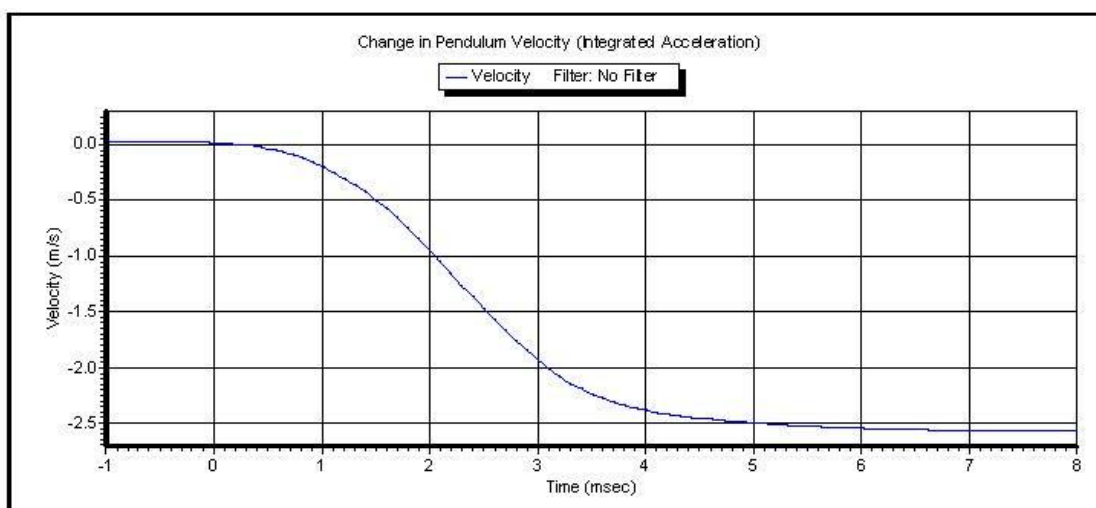
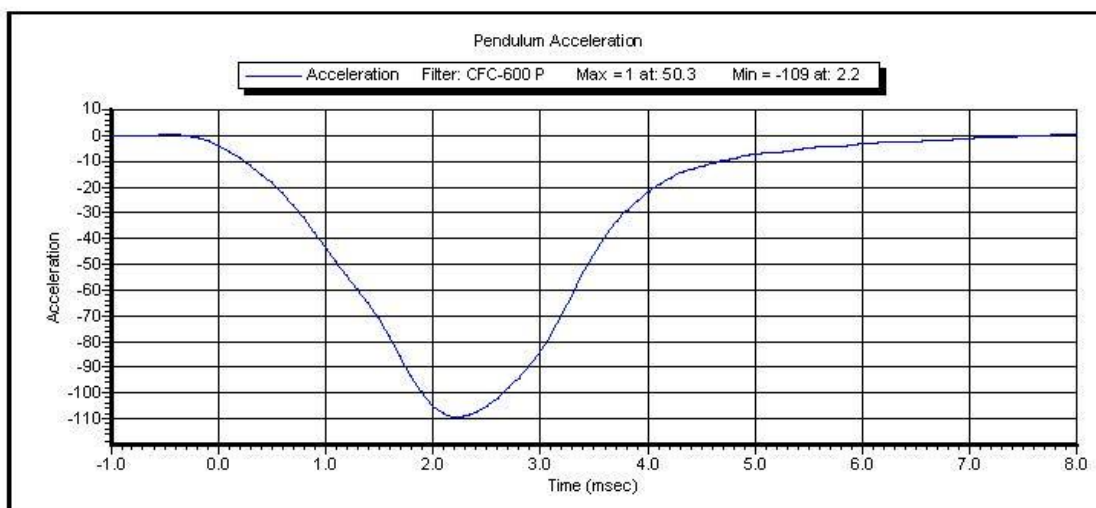


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	061



Test ID: **Knee Impact Right** Test Time: **7:16:02 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **2/13/2014**



Test ID: **Knee Impact Right** Test Time: **7:16:02 PM**

Test Date: **2/13/2014**

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CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 273



External Measurements

5th Female SN 273

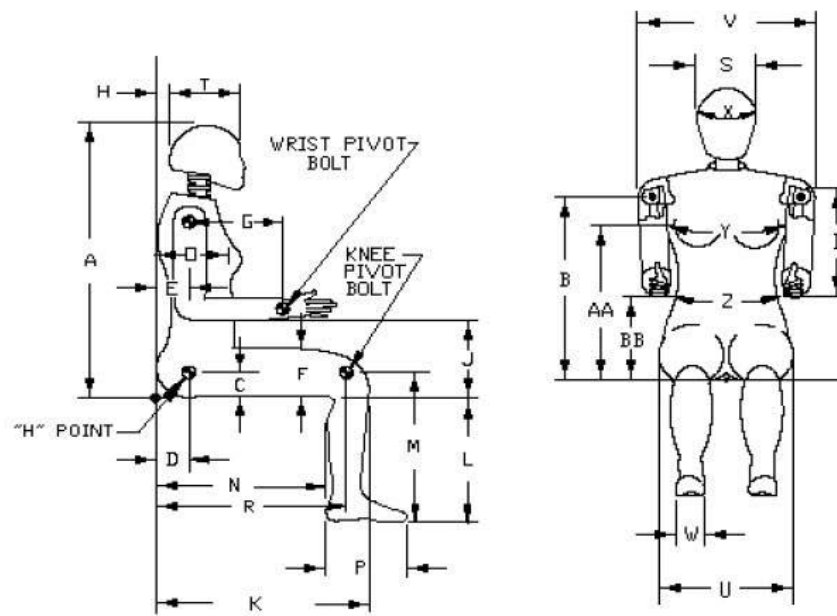
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	780	Yes
B	Shoulder Pivot Height	431.8 – 457.2	450	Yes
C	H-Point Height	81.3 – 86.3	85	Yes
D	H-Point from Backline	144.8 – 149.8	147	Yes
E	Shoulder Pivot from Backline	68.6 – 83.8	72	Yes
F	Thigh Clearance	119.4 – 134.6	124	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	245	Yes
H	Head Back to Backline	43.2 – 48.2	44	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	293	Yes
J	Elbow Rest Height	182.8 – 203.2	200	Yes
K	Buttock to Knee Length	520.7 – 546.1	531	Yes
L	Popliteal Height	355.6 – 376	373	Yes
M	Knee Pivot Height	393.7 – 419.1	395	Yes
N	Buttock Popliteal Length	414 – 439.4	434	Yes
O	Chest Depth without Jacket	175.3 – 190.5	181	Yes
P	Foot Length (right)	218.5 – 233.7	221	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	461	Yes
S	Head Breadth	137.1 – 147.3	142	Yes
T	Head Depth	177.8 – 188	179	Yes
U	Hip Breadth	299.7 – 314.9	311	Yes
V	Shoulder Breadth	350.5 – 365.7	358	Yes
W	Foot Breadth	78.8 – 94	81	Yes
X	Head Circumference	528.3 – 548.7	540	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	852	Yes
Z	Waist Circumference	759.5 – 789.9	777	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	355	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	168	Yes

Technician: M. Geesey

Date: 02/13/2014

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:	273		
Test ID:	Head Drop	Test Date:	2/14/2014
		Test Time:	12:25:16 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.30 deg C P
Humidity	10 -- 70	20.90 %RH P
Resultant Acceleration	250 -- 300	288.1 G's P
Oscillation	0 -- 10	1.5 % P
Lateral Acceleration	-15 -- 15	-3.2 G's P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

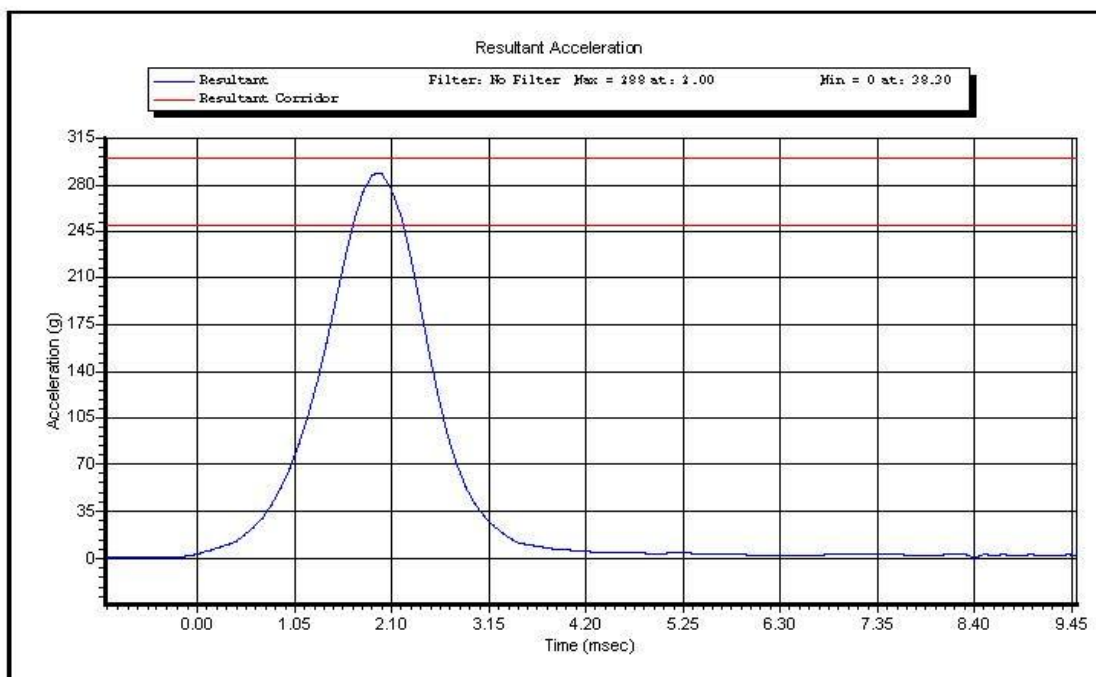
REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58833	1/24/2014
Endevco	7264-2000	P58905	1/24/2014
Endevco	7264-2000	P52114	1/24/2014

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Test Name:	Head Drop
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273

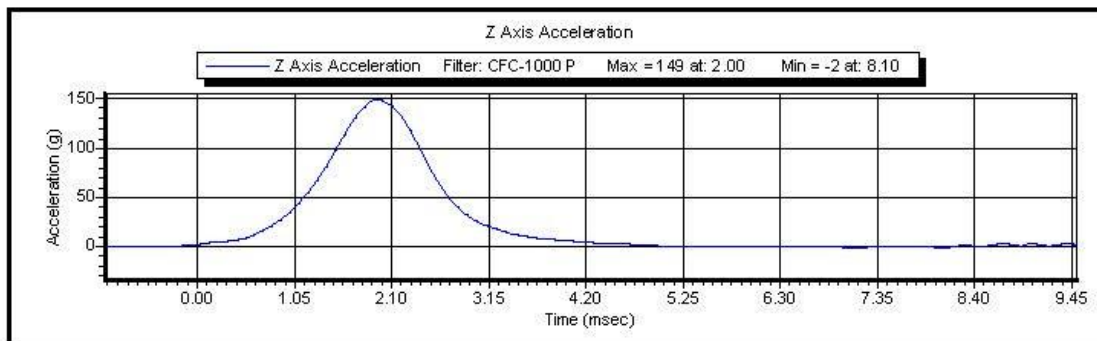
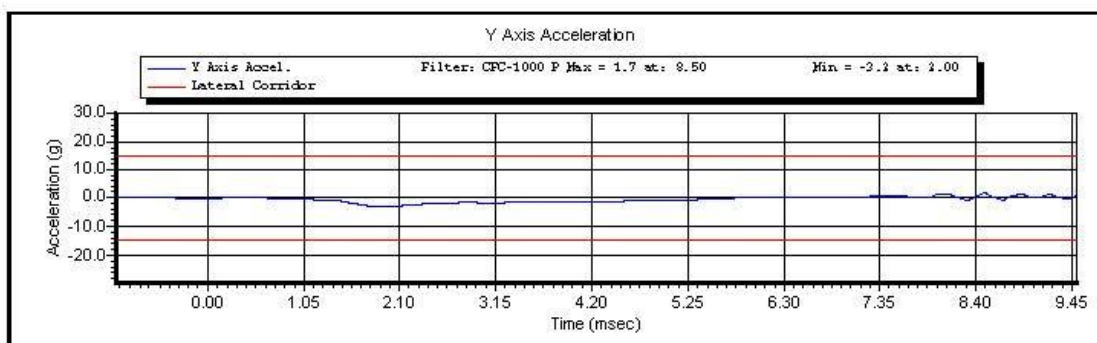
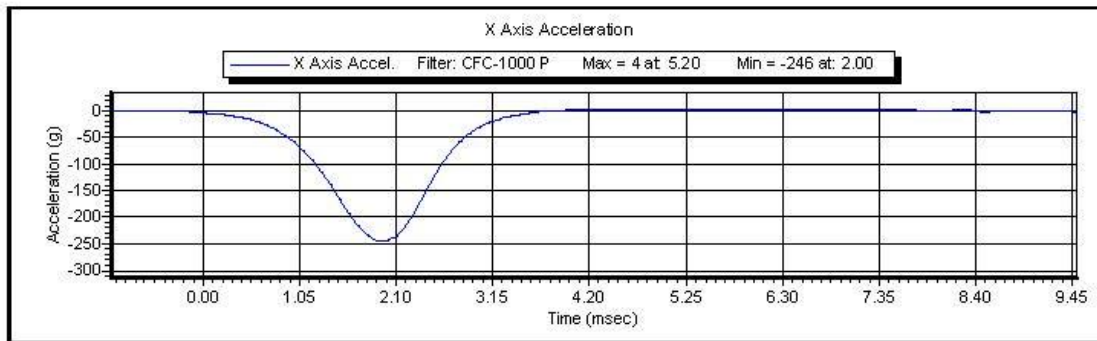


Test ID: **Head Drop**

Test Time: **12:25:16 PM**

Test Date: **2/14/2014**

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Test ID: **Head Drop**

Test Time: **12:25:16 PM**

Test Date: **2/14/2014**

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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:	273		
Test ID:	Neck Extension	Test Date:	2/14/2014
		Test Time:	7:50:14 AM

Component Part Number	Component Serial Number
Neck - 880105-255	660

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.00 deg C P
Humidity	10 -- 70	20.30 %RH P
Velocity	5.95 -- 6.19	6.045 m/s P
Pendulum Impulse at 10 ms	1.5 -- 1.9	1.68 m/s P
Pendulum Impulse at 20 ms	3.1 -- 3.9	3.33 m/s P
Pendulum Impulse at	4.6 -- 5.6	4.81 m/s P
D Plane Rotation	99 -- 114	103.9 degrees P
Moment During Rotation Interval	-65 -- -53	-53.3 Nm P
Moment Decay to -10.0 Nm	94 -- 114	102.7 ms P

All test parameters are within specifications

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



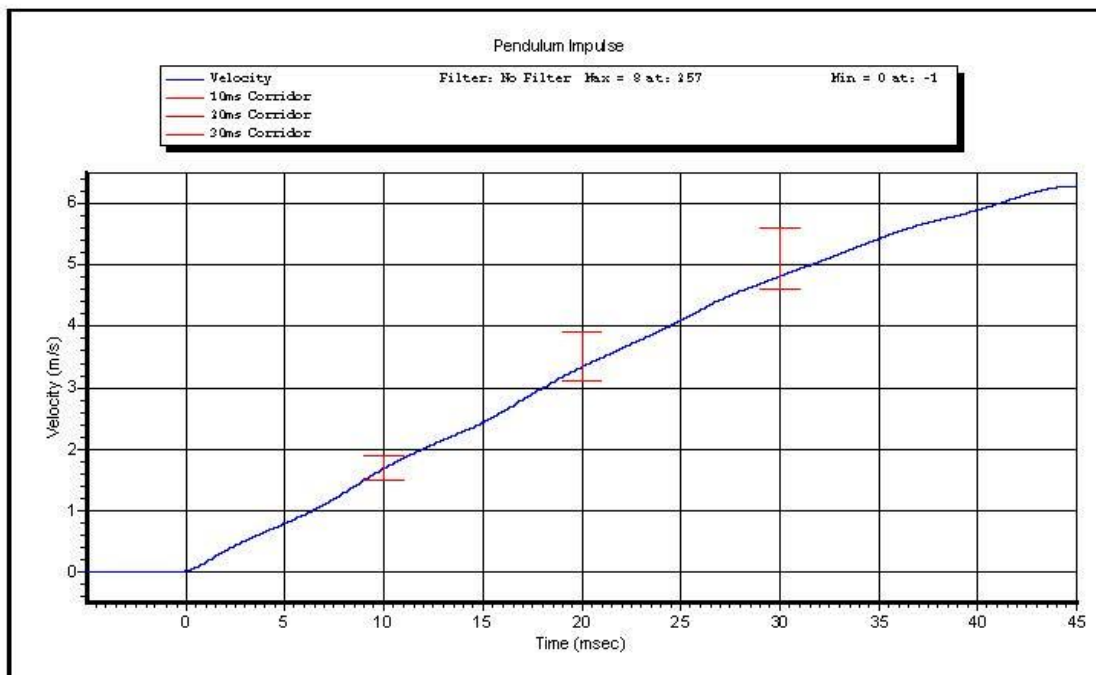
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/31/2014
DentonATD	78051-342	CONDYLE POT	1/31/2014
Denton	1716A	LC-1629 My	4/30/2013
Denton	1716A	LC-1629 Fx	4/30/2013



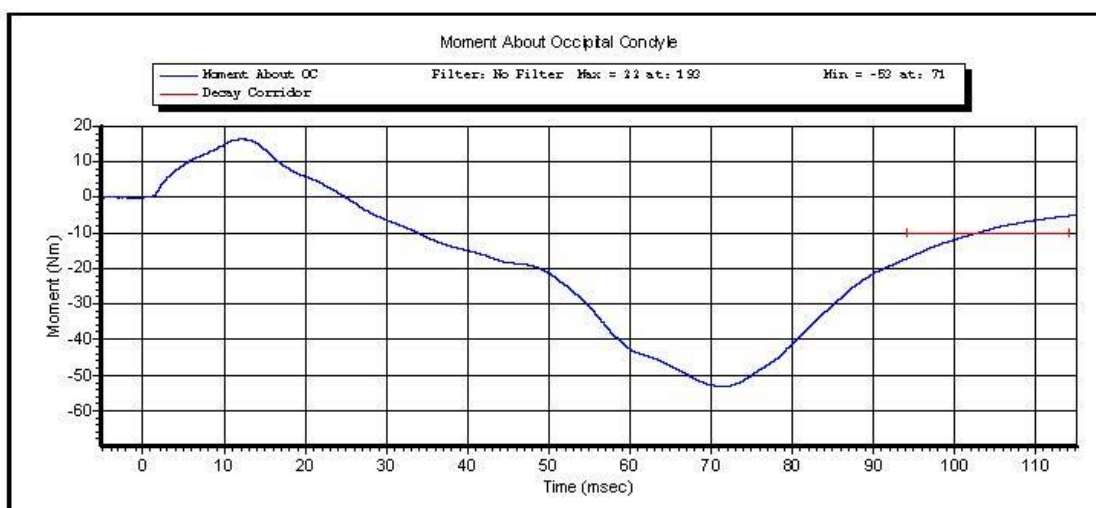
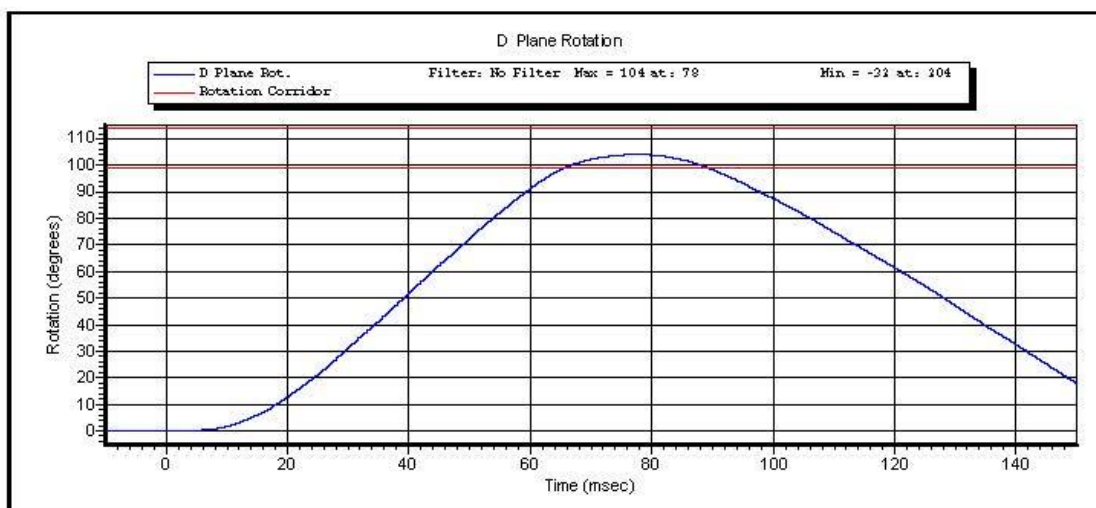
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Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



Test ID: Neck Extension Test Time: 7:50:14 AM

Test Date: 2/14/2014

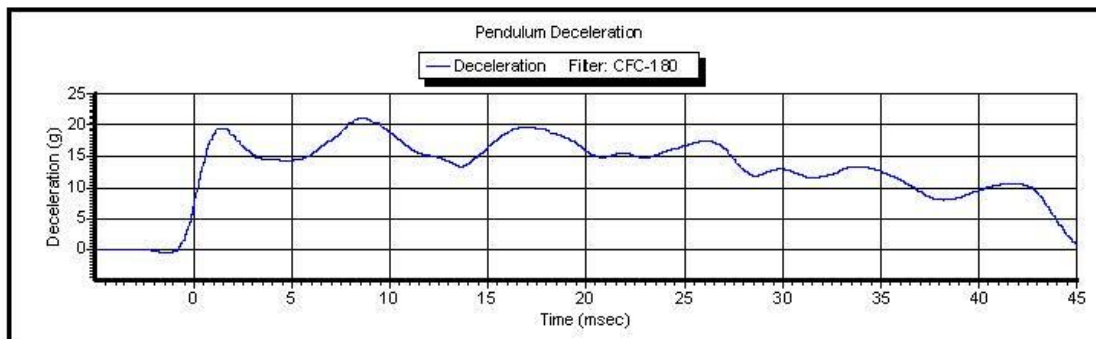
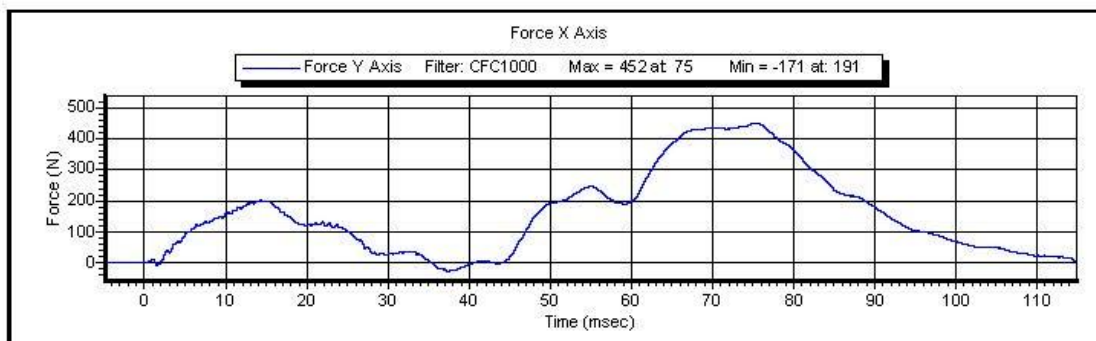
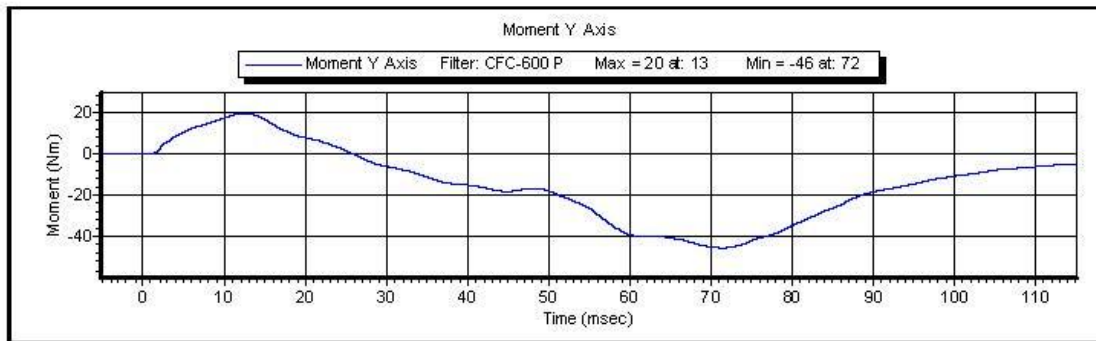
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Test ID: Neck Extension Test Time: 7:50:14 AM

Test Date: 2/14/2014

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Neck Extension** Test Time: **7:50:14 AM**

Test Date: **2/14/2014**

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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:	273		
Test ID:	Neck Flexion	Test Date:	2/14/2014
		Test Time:	11:08:49 AM

Component Part Number	Component Serial Number
Neck - 880105-255	660

Test Parameters	Test Specifications	Test Results
Temperature	21 -- 22	21.30 deg C P
Humidity	10 -- 70	20.60 %RH P
Velocity	6.89 -- 7.13	6.986 m/s P
Pendulum Impulse at 10 ms	2.1 -- 2.5	2.35 m/s P
Pendulum Impulse at 20 ms	4 -- 5	4.5 m/s P
Pendulum Impulse at 30 ms	5.8 -- 7.0	6.35 m/s P
D Plane Rotation	-91 -- -77	-77.4 degrees P
Moment During Rotation Interval	69 -- 83	69.1 Nm P
Moment Decay to 10.0 Nm	80 -- 100	85.4 ms P

All test parameters are within specifications

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



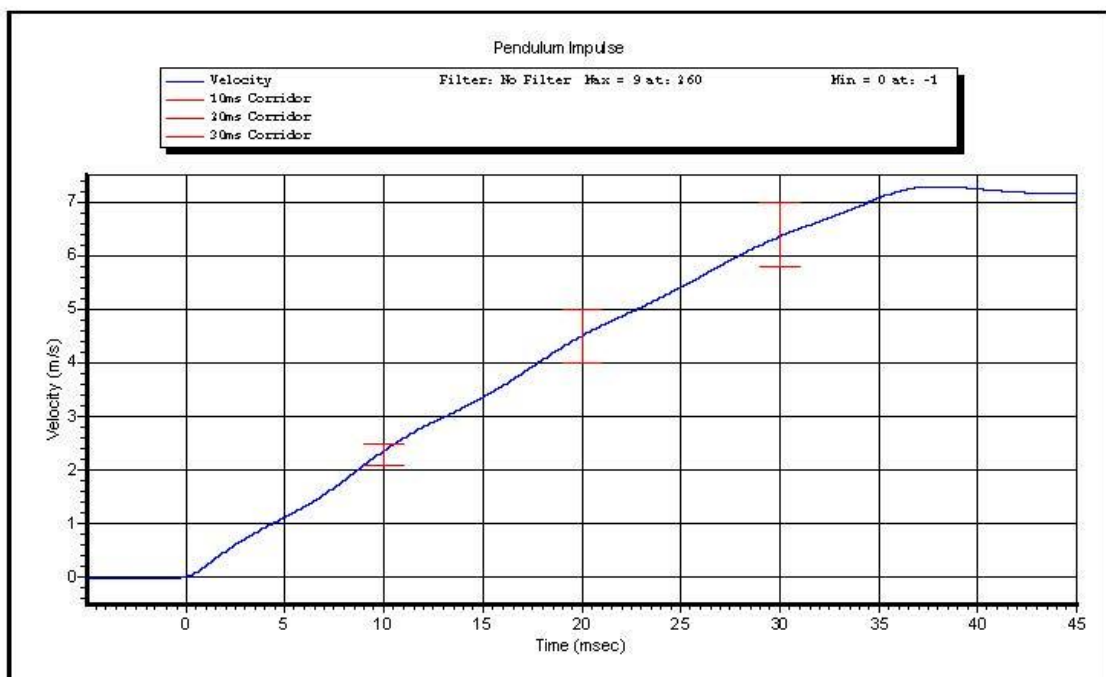
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
DentonATD	78051-342	PENDULUM POT	1/31/2014
DentonATD	78051-342	CONDYLE POT	1/31/2014
Denton	1716A	LC-1629 My	4/30/2013
Denton	1716A	LC-1629 Fx	4/30/2013



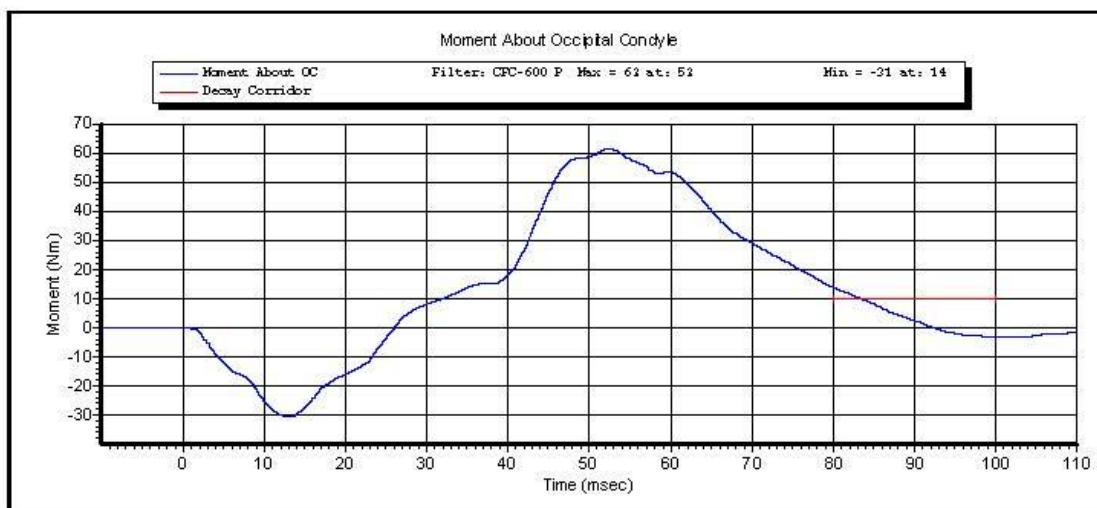
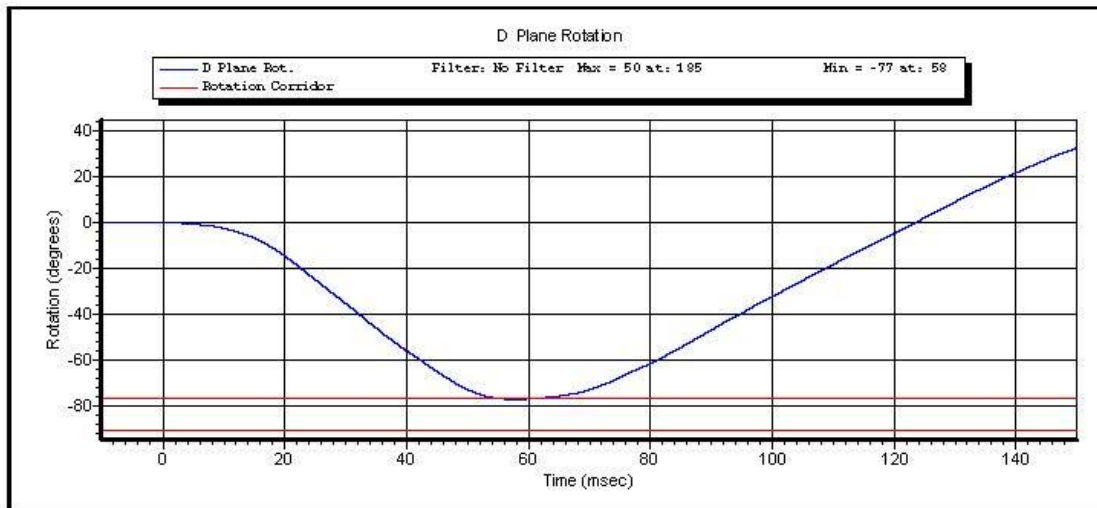
Test Name:	Neck Flexion
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



Test ID: Neck Flexion Test Time: 11:08:49 AM

Test Date: 2/14/2014

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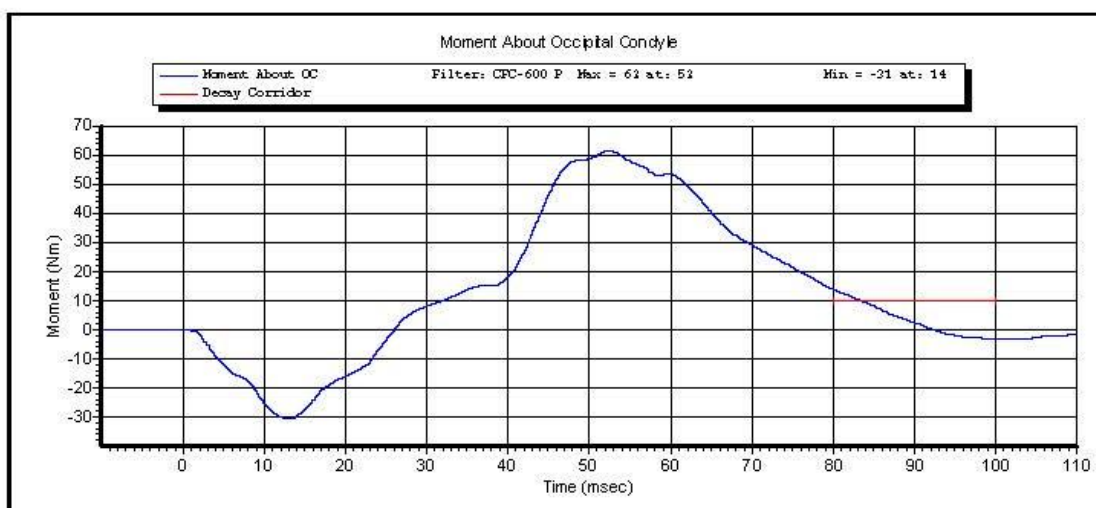
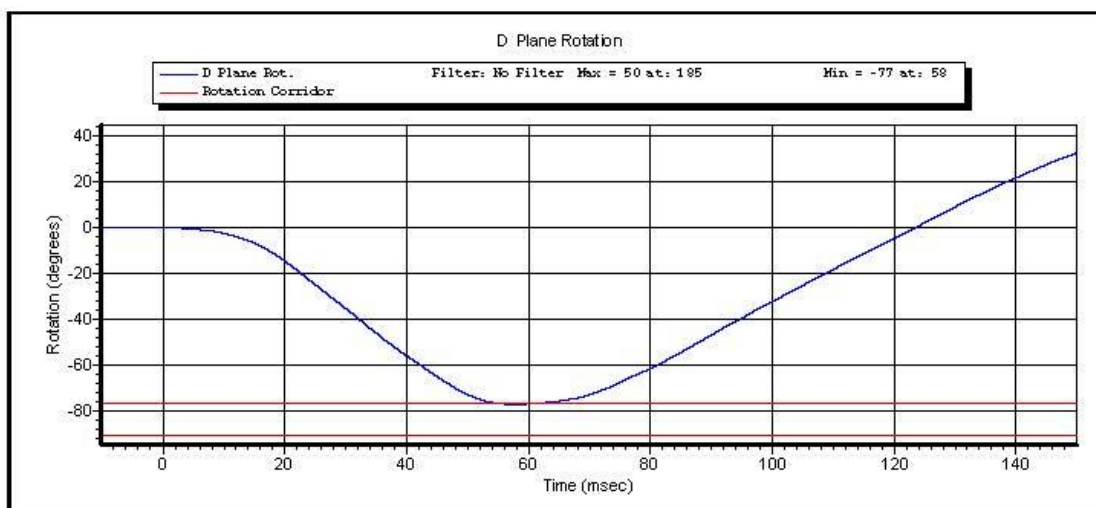


Test ID: Neck Flexion

Test Time: 11:08:49 AM

Test Date: 2/14/2014

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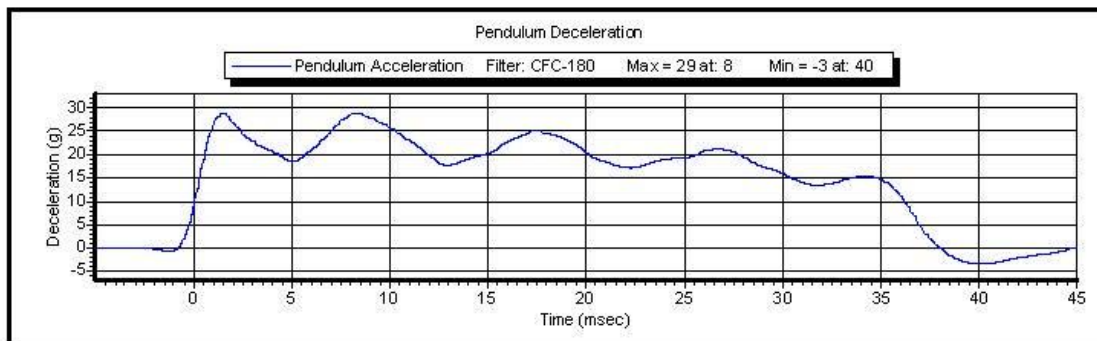
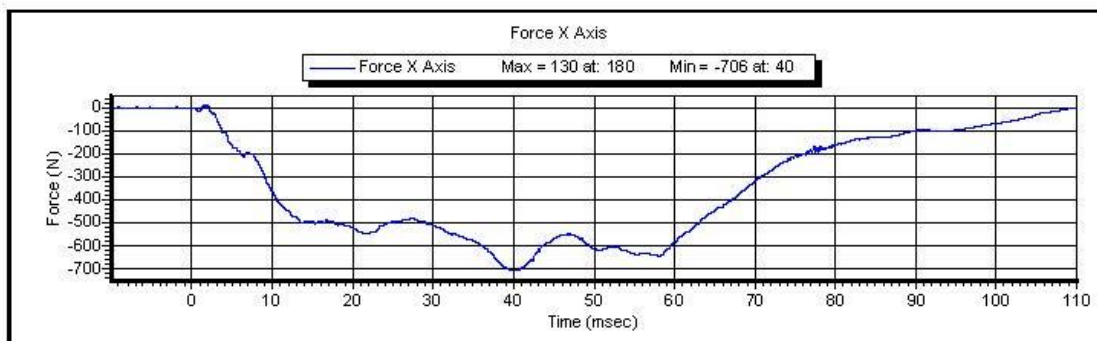
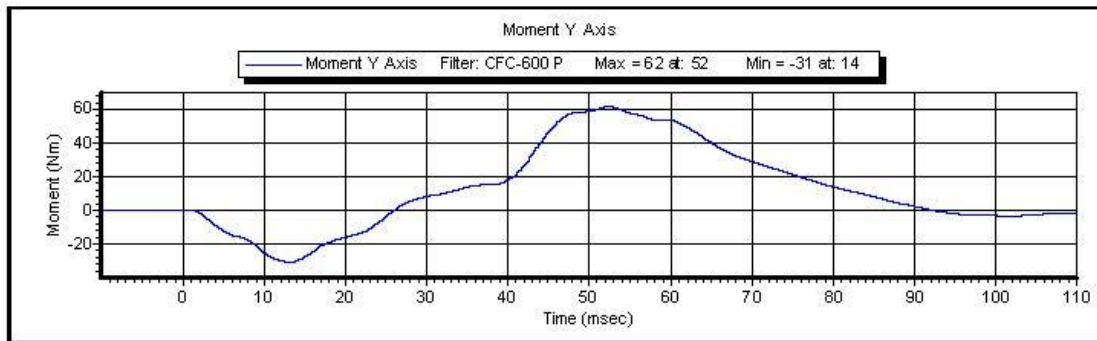


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Test Time: 11:08:49 AM

Test Date: 2/14/2014

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Test ID: **Neck Flexion**

Test Time: **11:08:49 AM**

Test Date: **2/14/2014**

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Torso Flexion

Part 5720 HIII 5% Female

ATD Serial No: 273

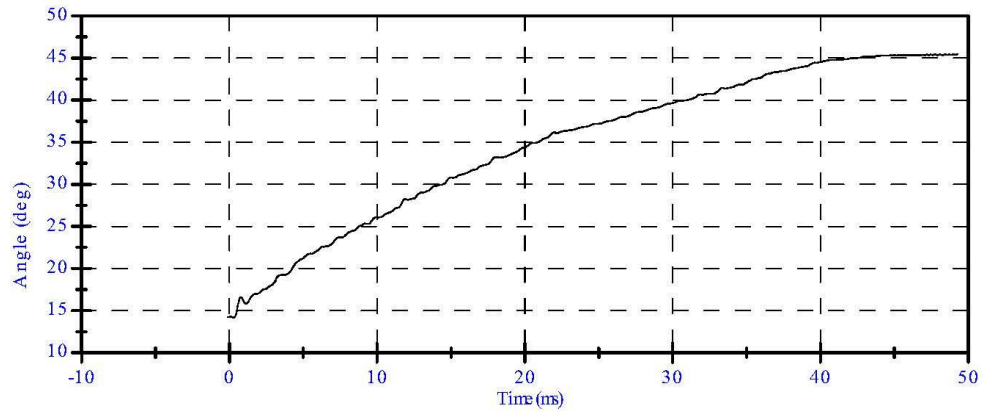
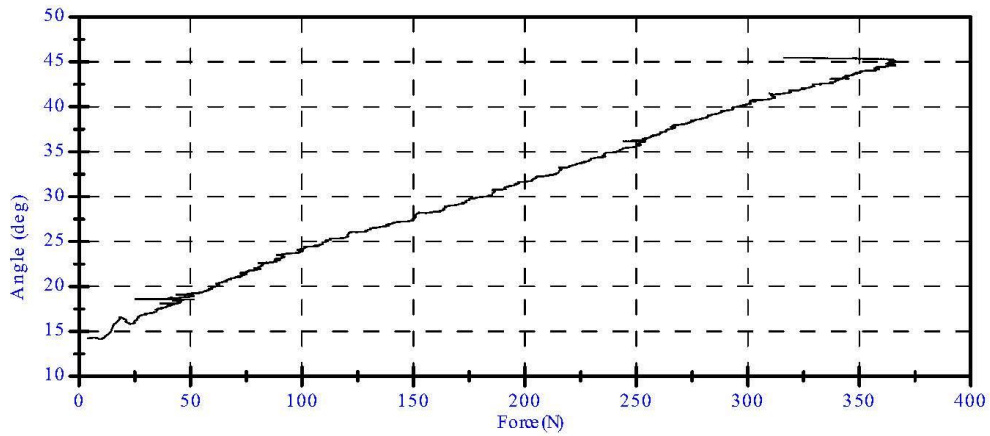
Laboratory Supervisor: E Dutton

Date: 2/14/2014

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	14.13 Deg	Passed
Force at 45 Deg	320.00-390.00 N	366.28 N	Passed
Return Angle	8 Deg Max from Initial	20.6 deg	Passed

TORSO FLEXION TEST





VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	273		
Test ID:	Thorax Impact	Test Date:	2/13/2014
		Test Time:	5:38:55 PM

Component Part Number	Component Serial Number
Chest Jacket - 880105-355-E	DH0069

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	20.60 deg C	P
Humidity	10	--	70	13.30 %RH	P
Velocity	6.59	--	6.83	6.781 m/s	P
Sternum Displacement	-58	--	-50	.51.4 mm	P
Force During Displacement Interval	-4400	--	-3900	.4298.4 N	P
Force During -18mm to -50mm Displacem	-4600	--	0	.4313.2 N	P
Hysteresis	69	--	85	73.0 %	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	1/11/2014
Endevco	7231CT	C14953	12/4/2013
DentonATD	78051-342	DS-273	6/17/2013

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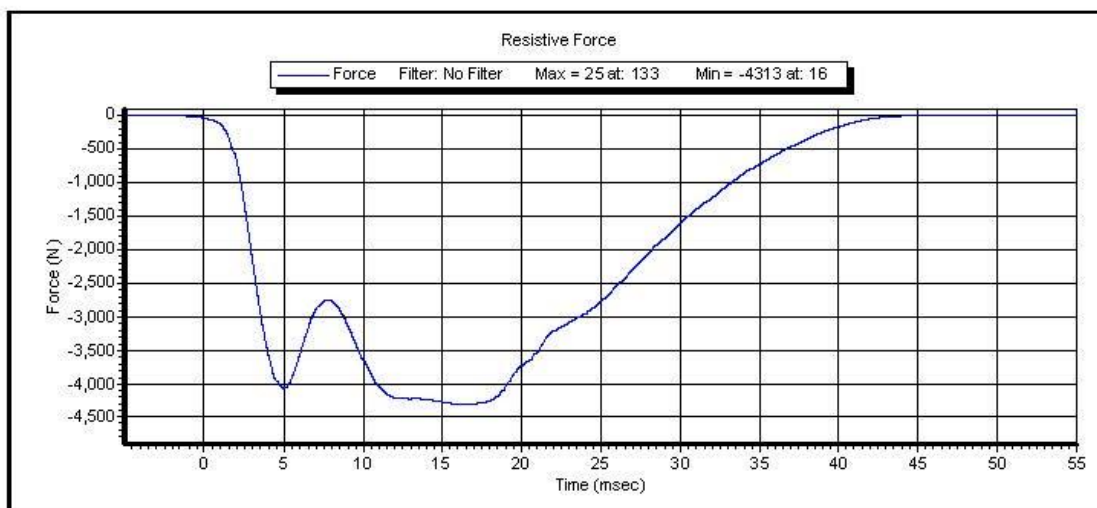
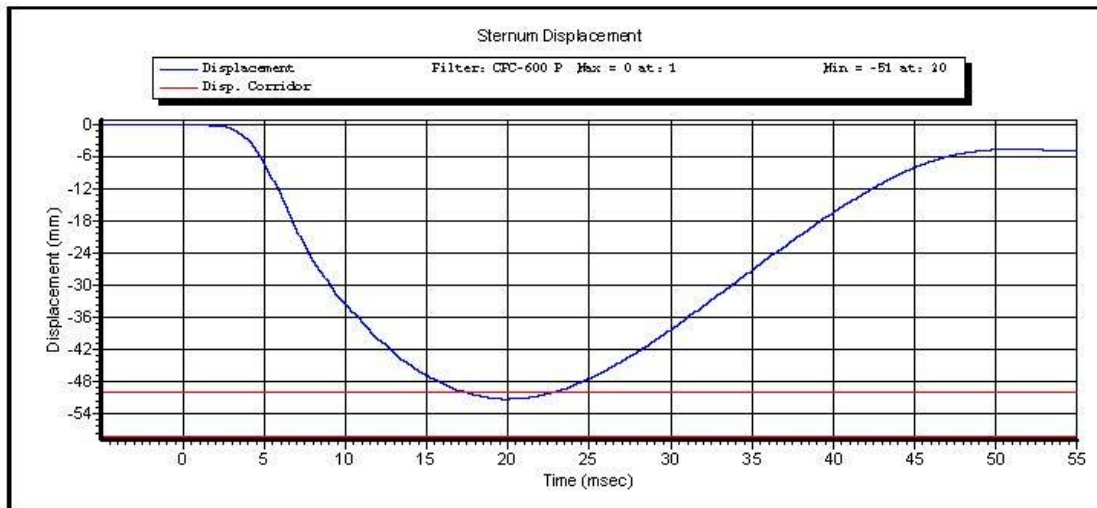
Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



Test ID: Thorax Impact Test Time: 5:38:55 PM

Test Date: 2/13/2014

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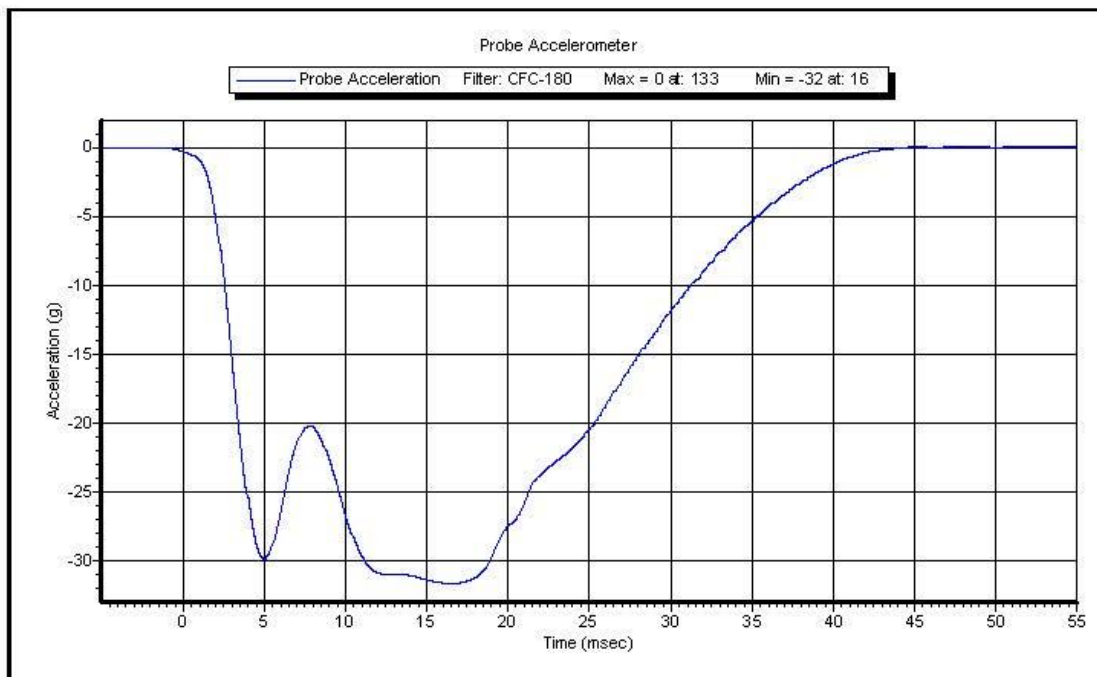


Test ID: **Thorax Impact**

Test Time: **5:38:55 PM**

Test Date: **2/13/2014**

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Test ID: **Thorax Impact**

Test Time: **5:38:55 PM**

Test Date: **2/13/2014**

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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:	273		
Test ID:	Knee Impact Left	Test Date:	2/13/2014
		Test Time:	6:34:03 PM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	20.90 deg C	P
Humidity	10	--	70	13.90 %RH	P
Velocity	2.07	--	2.13	2.106 m/s	P
Resistive Force	-4060	--	-3450	-3671.9 N	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

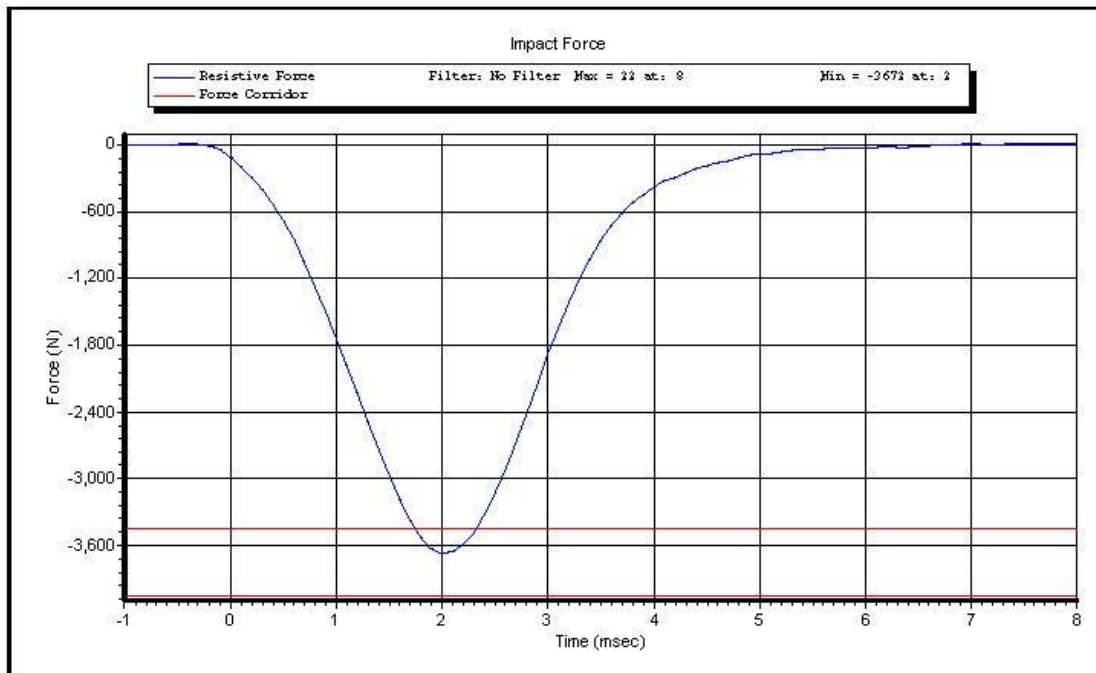
REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2014 12/4/2013

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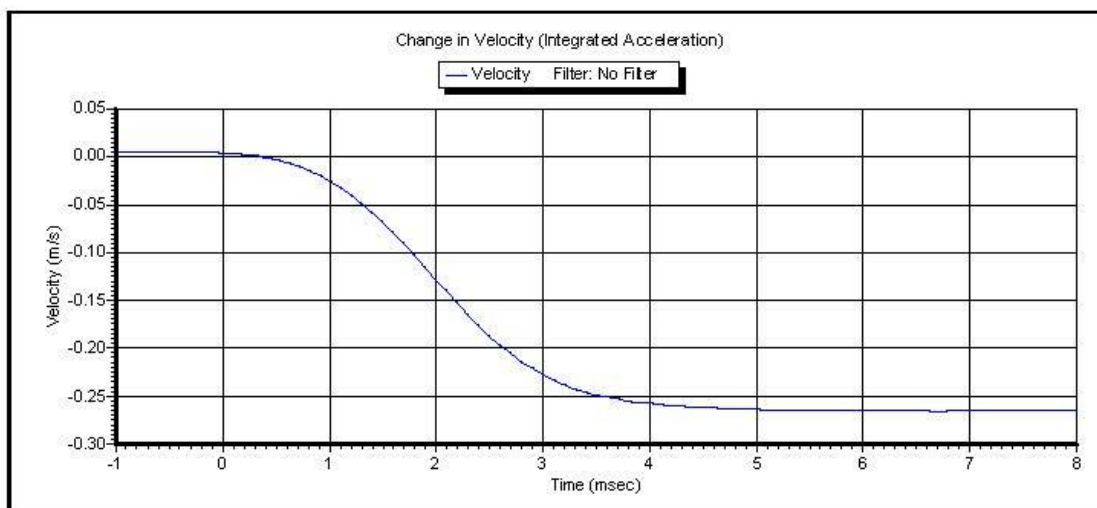
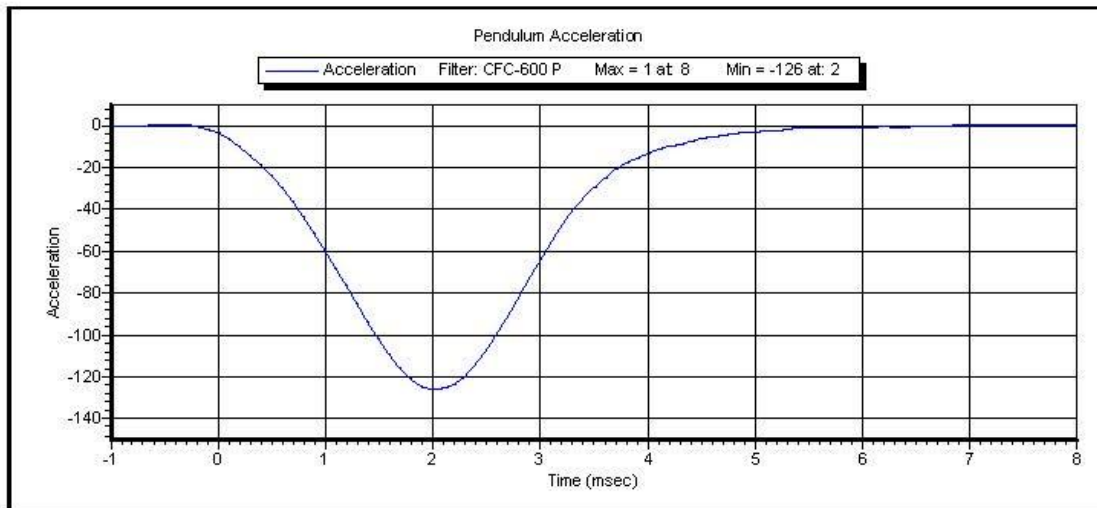


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



Test ID: **Knee Impact Left** Test Time: **6:34:03 PM**
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Test Date: **2/13/2014**



Test ID: **Knee Impact Left** Test Time: **6:34:03 PM**
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Test Date: **2/13/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	273		
Test ID:	Knee Impact Right	Test Date:	2/13/2014
		Test Time:	6:40:13 PM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	20.90 deg C	P
Humidity	10	--	70	13.90 %RH	P
Velocity	2.07	--	2.13	2.112 m/s	P
Resistive Force	-4060	--	-3450	-3829.0 N	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

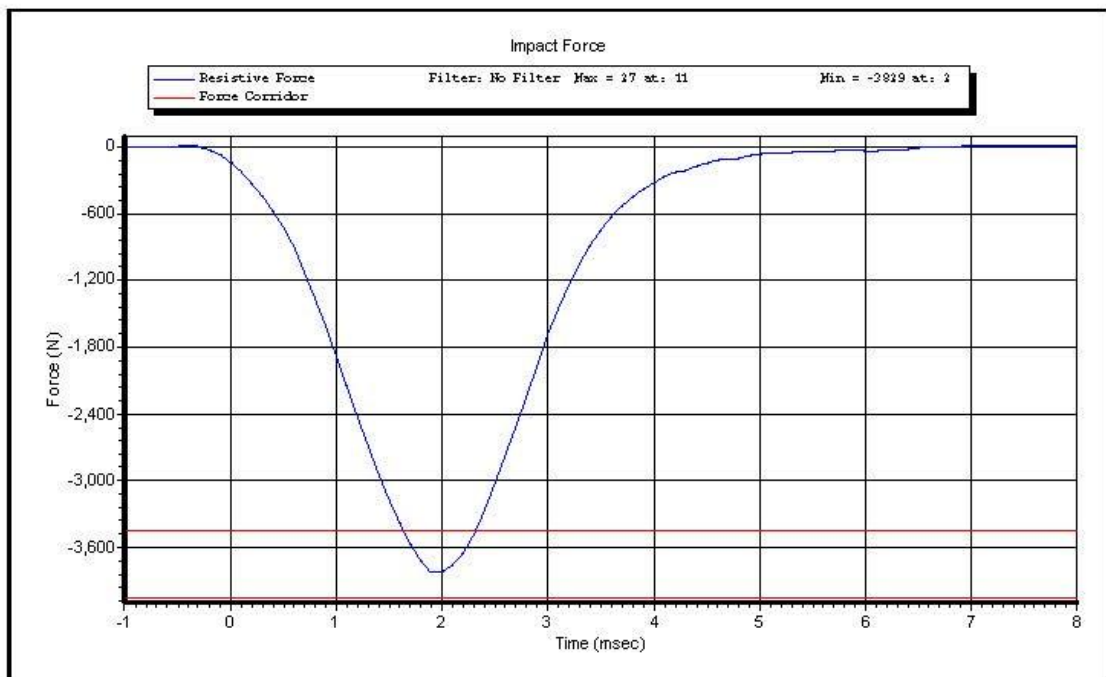
REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2014 12/4/2013

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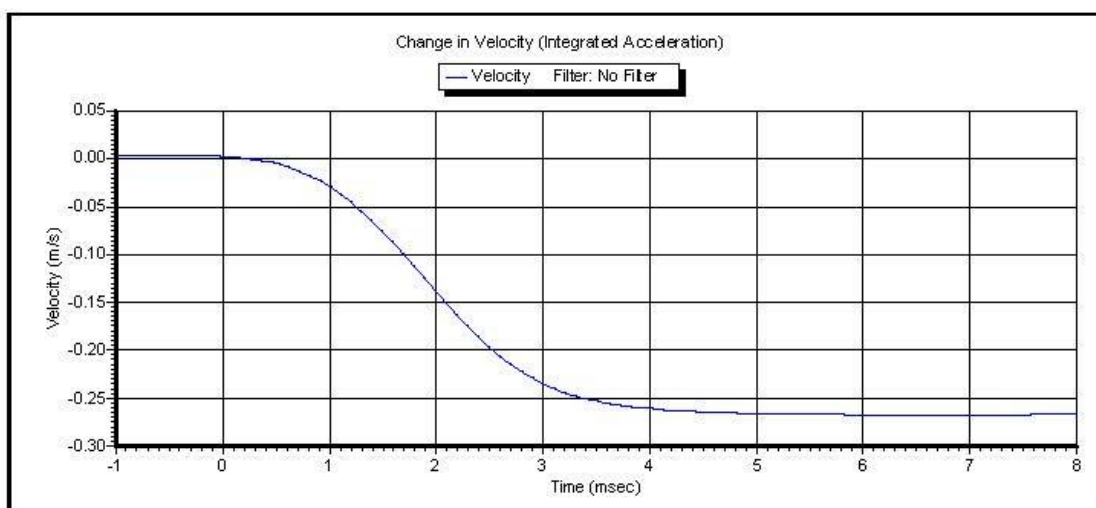
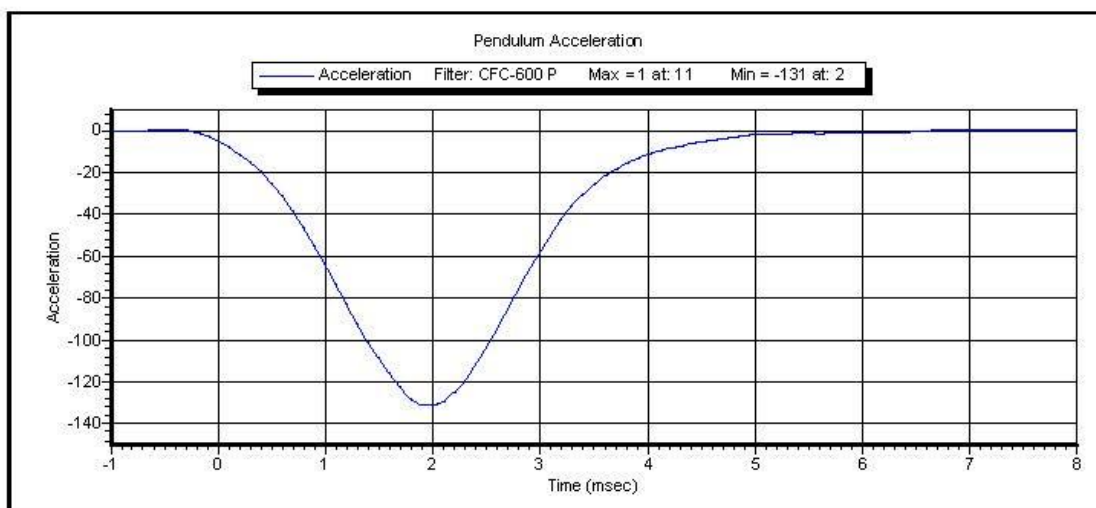


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	273



Test ID: **Knee Impact Right** Test Time: **6:40:13 PM**
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Test Date: **2/13/2014**



Test ID: **Knee Impact Right** Test Time: **6:40:13 PM**

Test Date: **2/13/2014**

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