

REPORT NUMBER: NCAP-CAL-14-011

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

**Nissan Motor Co., LTD.
2014 Nissan Rogue
SUV**

NHTSA No: M20145206

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



April 4, 2014

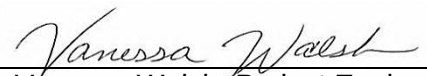
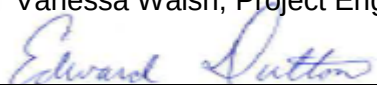
FINAL REPORT

**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:	_____ April 4, 2014
Approved by:	 _____ Edward J. Dutton, Test Engineer Director Transportation Test Operations	Date:	_____ April 4, 2014

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 Nissan Rogue SUV 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 March 6, 2014. The impact velocity of the vehicle was 56.59 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 462 mm at 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. 064)</th> <th colspan="2">Passenger ATD (Serial No. 288)</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>375.97</td> <td>700</td> <td>358.31</td> </tr> <tr> <td>Maximum Chest Compression</td> <td>mm</td> <td>63</td> <td>-28.32</td> <td>52</td> <td>-30.82</td> </tr> <tr> <td>Nij</td> <td></td> <td>1</td> <td>0.38</td> <td>1</td> <td>0.64</td> </tr> <tr> <td>Neck Tension</td> <td>N</td> <td>4,170</td> <td>988.48</td> <td>2,620</td> <td>1188.75</td> </tr> <tr> <td>Neck Compression</td> <td>N</td> <td>4,000</td> <td>-86.28</td> <td>2,520</td> <td>-378.64</td> </tr> <tr> <td>Left Femur Force</td> <td>N</td> <td>10,008</td> <td>-4627.41</td> <td>6,805</td> <td>-1730.92</td> </tr> <tr> <td>Right Femur Force</td> <td>N</td> <td>10,008</td> <td>-1201.44</td> <td>6,805</td> <td>-1512.56</td> </tr> </tbody> </table>						Measurement Description	Units	Driver ATD (Serial No. 064)		Passenger ATD (Serial No. 288)		Threshold	Result	Threshold	Result	Head Injury Criteria (HIC ₁₅)		700	375.97	700	358.31	Maximum Chest Compression	mm	63	-28.32	52	-30.82	Nij		1	0.38	1	0.64	Neck Tension	N	4,170	988.48	2,620	1188.75	Neck Compression	N	4,000	-86.28	2,520	-378.64	Left Femur Force	N	10,008	-4627.41	6,805	-1730.92	Right Femur Force	N	10,008	-1201.44	6,805	-1512.56
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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 Nissan Rogue SUV at a velocity of 56.59 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on March 6, 2014. Pre- and post-test photographs of the vehicle and dummies to document the test can be found in Appendix A. One real-time camera and 14 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in Data Sheet 6 of this report.

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

The 136 channels of data were recorded on an on-board data acquisition system. Please refer to Appendix B for the dummy response data traces.

There was 94.8 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 462 mm at the centerline. During and after the impact event, the driver's and passenger's side door were closed and operational.

The driver's visible contact points were as follows: The driver's head contacted the frontal airbag and then the head restraint. The upper torso contacted the frontal airbag. Both knees contacted the knee bolster. The torso/pelvis airbag did fire, however there was no contact.

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 torso/pelvis airbag did fire, however there was no contact.

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)	375.97	0.38	988.48	-86.28	38.73	-28.32	-4627.41	-1201.44
Passenger (5 th)	358.31	0.64	1188.75	-378.64	50.98	-30.82	-1730.92	-1512.56

GENERAL COMMENTS:

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

Data Anomalies:

- None

SECTION 2

OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

This section contains information reporting for the following Data Sheets:

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

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

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Seat Belt Positioning Data

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

Data Sheet No. 7 – Vehicle Accelerometer Locations

Data Sheet No. 8 – Photographic Reference Target Locations

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

Data Sheet No. 10 – Test Vehicle Summary of Results

Data Sheet No. 11 – Post-Test Observations

Data Sheet No. 12 – Vehicle Profile Measurements

Data Sheet No. 13 – Accident Investigation Division Data

Data Sheet No. 14 – Vehicle Intrusion Measurements

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

Data Sheet No. 16 – FMVSS 301 Static Rollover Results

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

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20145206	Traction Control System (TCS)	Yes
Model Year	2014	Power Steering	Yes
Make	Nissan	Power Window Auto-Reverse	No
Model	Rogue	Driver Frontal Airbag	Yes
Body Style	SUV	Driver Curtain Airbag	Yes
VIN	5N1AT2MV5EC754526	Driver Head/Torso Airbag	No
Body Color	Red	Driver Torso Airbag	No
Odometer Reading (km /mi)	61.2 km / 38 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	2.5	Driver Pelvis Airbag	No
Type / No. Cylinders	I4	Driver Knee Airbag	No
Engine Placement	Transverse	Front Pass. Frontal Airbag	Yes
Transmission Type	Automatic	Front Pass. Curtain Airbag	Yes
Transmission Speeds	CVT	Front Pass. Head/Torso Airbag	No
Overdrive	Yes	Front Pass. Torso Airbag	No
Final Drive	All-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?

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Company	GVWR (kg)	2122
Date of Manufacture	11/13	GAWR Front (kg)	1072
		GAWR Rear (kg)	1089

VEHICLE SEATING AND WEIGHT CAPACITY DATA

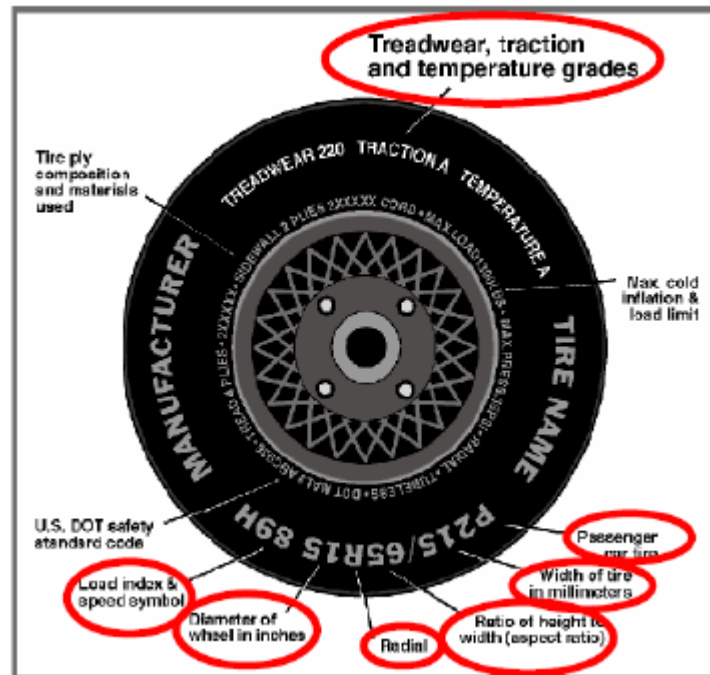
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	-	
Number of Occupants	2	3	-	5
Capacity Wt. (VCW) (kg)				408
Cargo Wt. (RCLW) (kg)				67.8

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

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	230	230
Recommended Tire Size	P225/65R17	P225/65R17
Tire Size on Vehicle	P225/65R17	P225/65R17
Tire Manufacturer	Hankook	Hankook
Tire Model	DynaPro HT	DynaPro HT
Treadwear	380	380
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	102H	102H
Tire Material	Rubber	Rubber
DOT Safety Code Left	T7H1HUH2613	T7H1HUH2613
DOT Safety Code Right	T7H1HUH2613	T7H1HUH2613

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

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	474	343		507	419	
Right	kg	458	339		481	408	
Ratio	%	57.7%	42.3%		54.4%	45.6%	
Totals	kg	932	682	1614	988	827	1815

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1614	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	140.6	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	67.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1822.4	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	848	848	864	859	1144
As Tested	mm	840	842	840	840	1234
Post-Test	mm	874	860	871	808	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2708
Total Vehicle Length at Left Side	mm	4534
Total Vehicle Length at Centerline	mm	4644
Total Vehicle Length at Right Side	mm	4533
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	27
Amount of Stoddard Solvent in Fuel Tank	L	51.1

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

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

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

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	4644
2	Total Width	1825
3*	Bumper Top Height	583
4*	Bumper Bottom Height	486
5*	Longitudinal Member Top Height	629
6	Distance Between Longitudinal Members	1041
7	Longitudinal Member Width	54
8*	Engine Top Height	975
9*	Engine Bottom Height	229
10	Engine and Gearbox Width	564
11	Front Bumper-Engine Distance	652
12*	Front Shock Absorber Fixing Height	958
13*	Bonnet Leading Edge Height	902
14	Front Shock Absorber Fixing Width	1192
15	Front Bumper – Front Axle Distance	938
16	Front Axle – A Pillar Distance	477
17	A-Pillar – B-Pillar Distance	1135
18	B-Pillar – Rear Axle Distance	1095
19	B-Pillar – C-Pillar Distance	992
20*	Roof Sill Bottom Height	1480
21*	Roof Sill Top Height	1590
22*	Floor Sill Bottom Height	370
23*	Floor Sill Top Height	444

*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

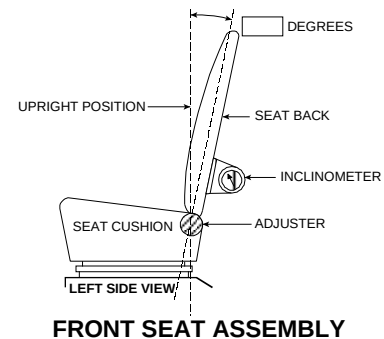
Test Vehicle: 2014 Nissan Rogue SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
Test Date: 3/6/2014

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	6.2
Passenger Seat Back Angle	1.8



SEAT FORE / AFT POSITIONS

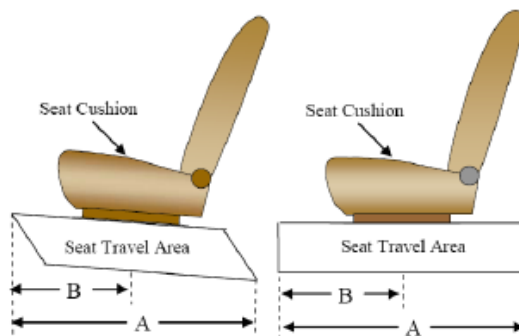
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	25	10
Passenger Seat	25	0

SEAT BELT UPPER ANCHORAGE

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

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



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

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

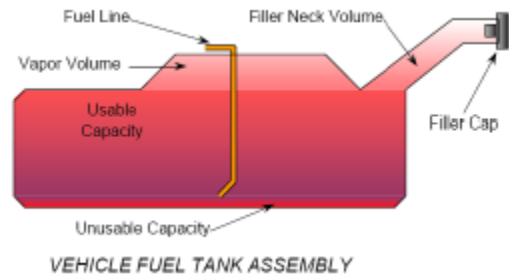
NHTSA No.: M20145206
 Test Date: 3/6/2014

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	54.9
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	50.5 – 51.6
Actual Amount of Solvent Used	51.1
1/3 of Usable Capacity	18.3

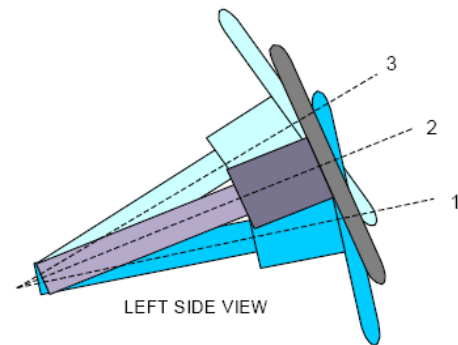
FUEL PUMP

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

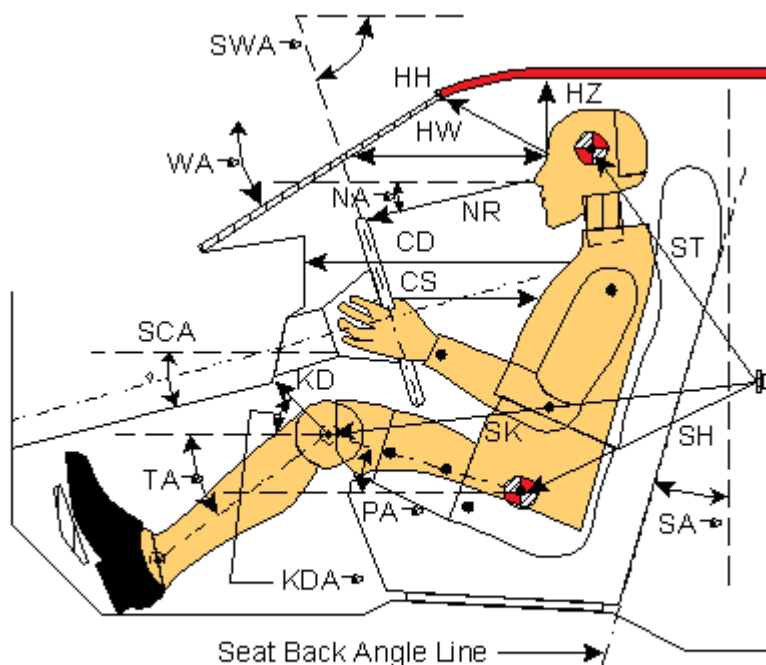
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	25.2	
Geometric center position No. 2	27.2	
Uppermost position No. 3	29.2	
Telescoping Steering Wheel Travel		50
Test Position	27.2	25

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014



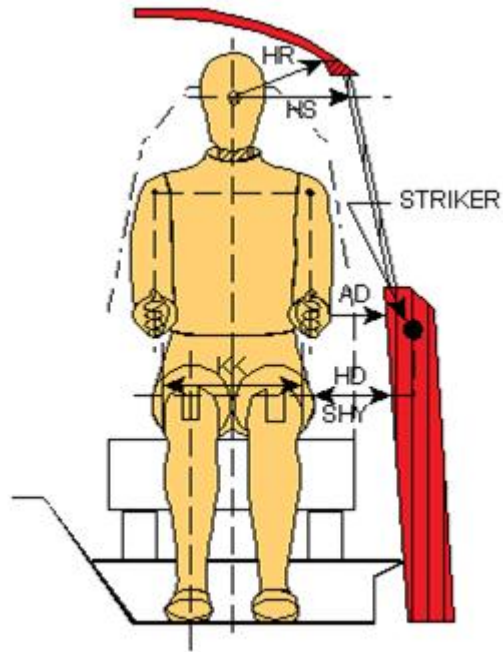
Left Side View

Code	Measurement Description	Driver (SN: 064)		Passenger (SN: 288)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		-27.0		
SWA°	Steering Wheel Angle		26.7		
SCA°	Steering Column Angle		63.3		
SA°	Seat Back Angle (on headrest post)		6.2		1.8
HZ	Head to Roof (Z)	236	90	229	90
HH	Head to Header	375	28.5	310	51.5
HW	Head to Windshield	715	0	643	0
NR	Nose to Rim	410	-10.5	466	32.6
CD	Chest to Dash	528		387	
CS	Chest to Steering Hub	291	0		
RA	Rim to Abdomen	175	0		
KDL	Left Knee to Dash	150	23.5	88	37.4
KDR	Right Knee to Dash	108	22.2	88	34.8
PA°	Pelvic Angle		22.8		20.1
TA°	Tibia Angle		-38.7		-45.7
SK	Striker to Knee	683	0	737	-3.3
ST	Striker to Head	562	-76.5	575	-56.0
SH	Striker to H-Point	308	-28.2	421	-13.8

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014



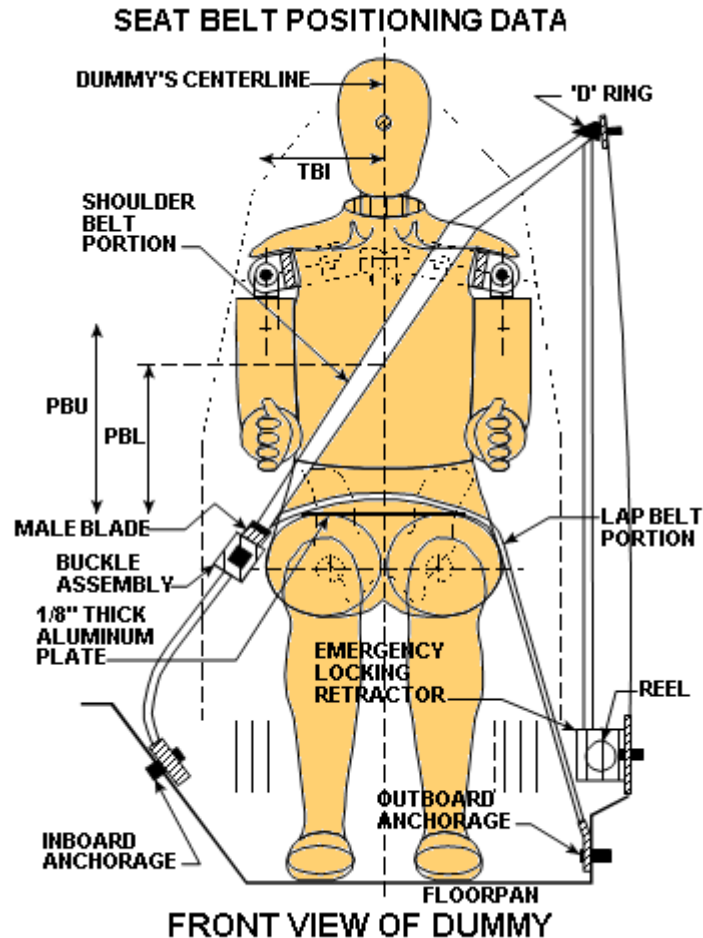
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	108	71
HD	H-Point to Door	158	209
HR	Head to Side Header	249	262
HS	Head to Side Window	350	360
KK	Knee to Knee	355	165
SHY	Striker to H-Point (Y Direction)	260	275
AA	Ankle to Ankle	355	165

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

Test Vehicle: 2014 Nissan Rogue SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
Test Date: 3/6/2014



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	370	315
PBL — Top surface of reference to belt lower edge	mm	290	235

BELT LENGTH DATA

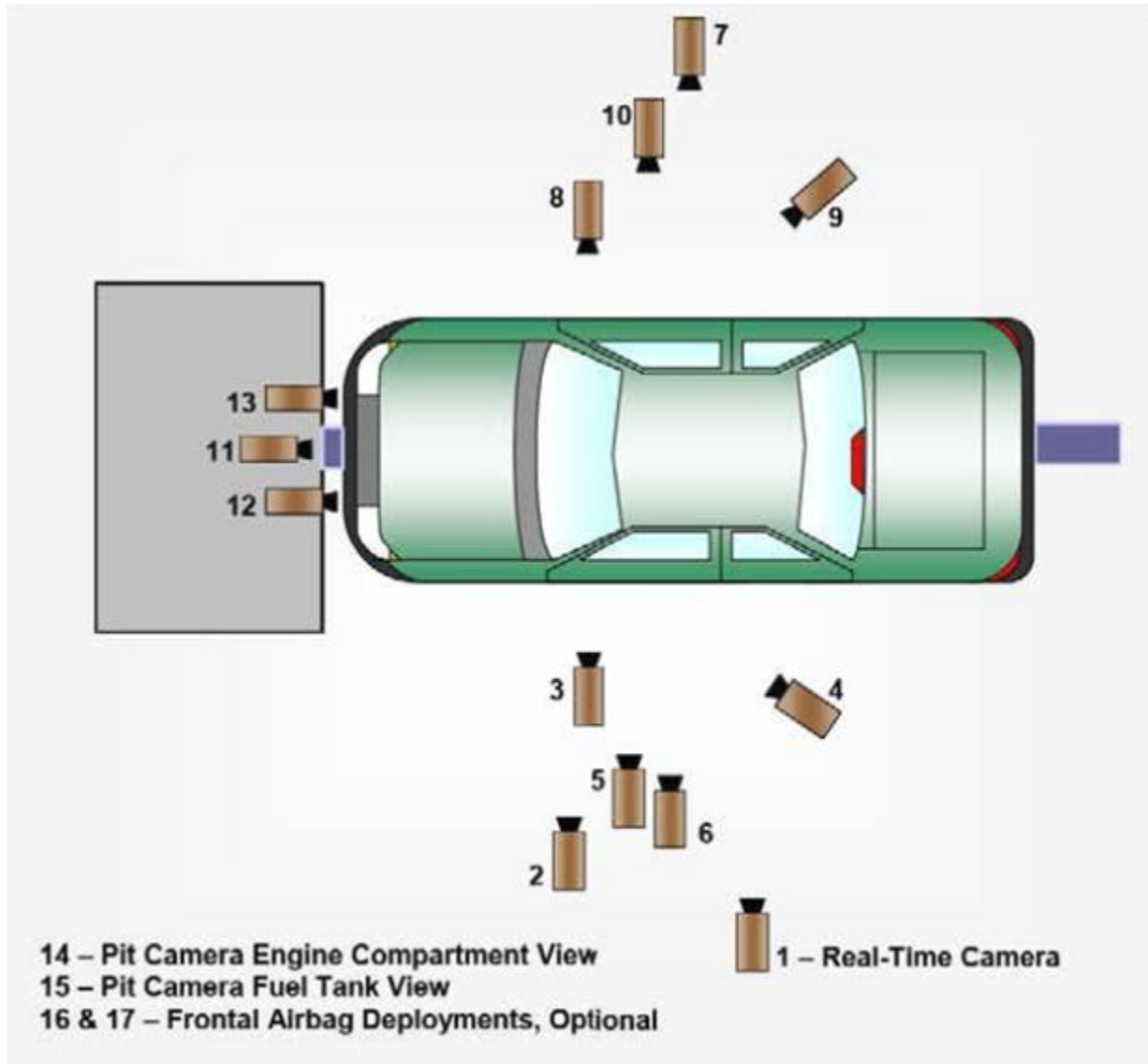
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	890	980
Lap Belt Length as measured on ATD	mm	705	810
Remainder of belt on reel	mm	805	450
Total belt length for continuous webbing systems	mm	2400	2240

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

Test Vehicle: 2014 Nissan Rogue SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
Test Date: 3/6/2014

CAMERA POSITIONS FOR FRONTAL IMPACTS



Top View

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

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

CAMERA LOCATIONS

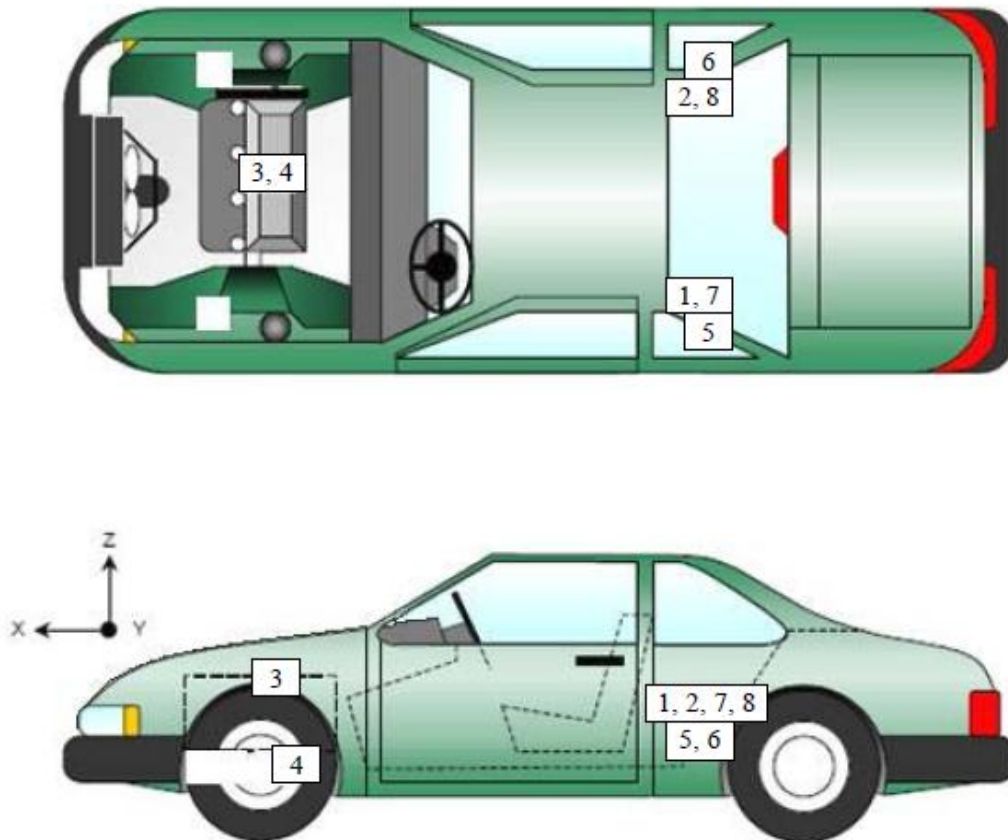
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-		60
2	Driver Close-Up	1540	-8482	1509	50	1000
3	Left Front Half	1046	-11039	1586	50	1000
4	Left Angle	3088	-2977	2212	24	1000
5	Steering Column - Top	1735	-8234	1964	24-70	1000
6	Steering Column - Bottom	1735	-8234	1371	24-70	1000
7	Right Overall	1912	8731	1267	24	1000
8	Passenger Close-Up	1651	8008	1382	50	1000
9	Right Front Half	660	10065	1119	50	1000
10	Right Angle	3128	3226	2286	28	1000
11	Windshield	-557	0	3494	20	1000
12	Driver Windshield	-191	-638	2026	25	1000
13	Passenger Windshield	-191	621	2026	25	1000
14	Pit Front	749	0	1428	12.5	1000
15	Pit Rear	2547	0	1412	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 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1830	-593	166
2	Right Rear Accelerometer – X Direction	1827	585	155
3	Engine Top X	3849	209	-303
4	Engine Bottom X	3725	137	323
5	Left Rear Accelerometer – Z Direction	1828	-600	157
6	Right Rear Accelerometer – Z Direction	1830	605	165
7	Left Rear Accelerometer – X Direction Redundant	1830	-593	166
8	Right Rear Accelerometer – X Direction Redundant	1827	585	155

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

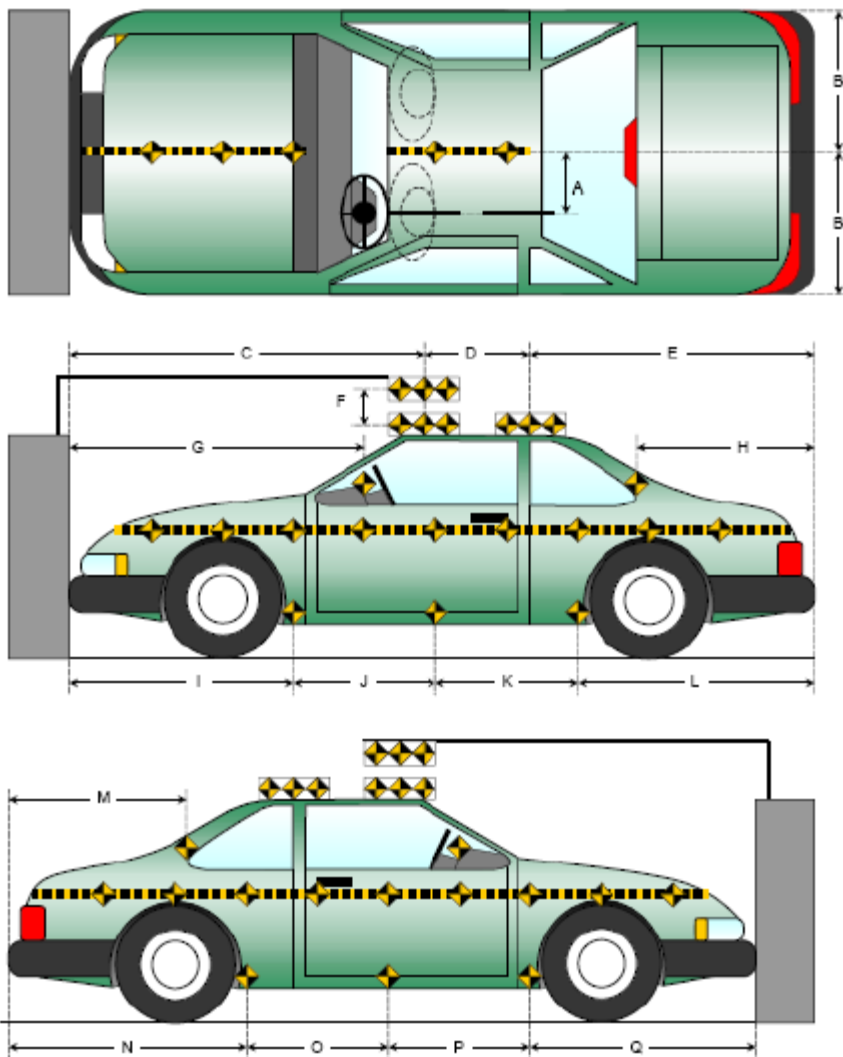
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

Item	Value
A	349
B	912
C	2235
D	1221
E	1189
F	137
G	1725
H	1011
I	1419
J	880
K	874
L	1470
M	1011
N	1474
O	869
P	880
Q	1421

All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

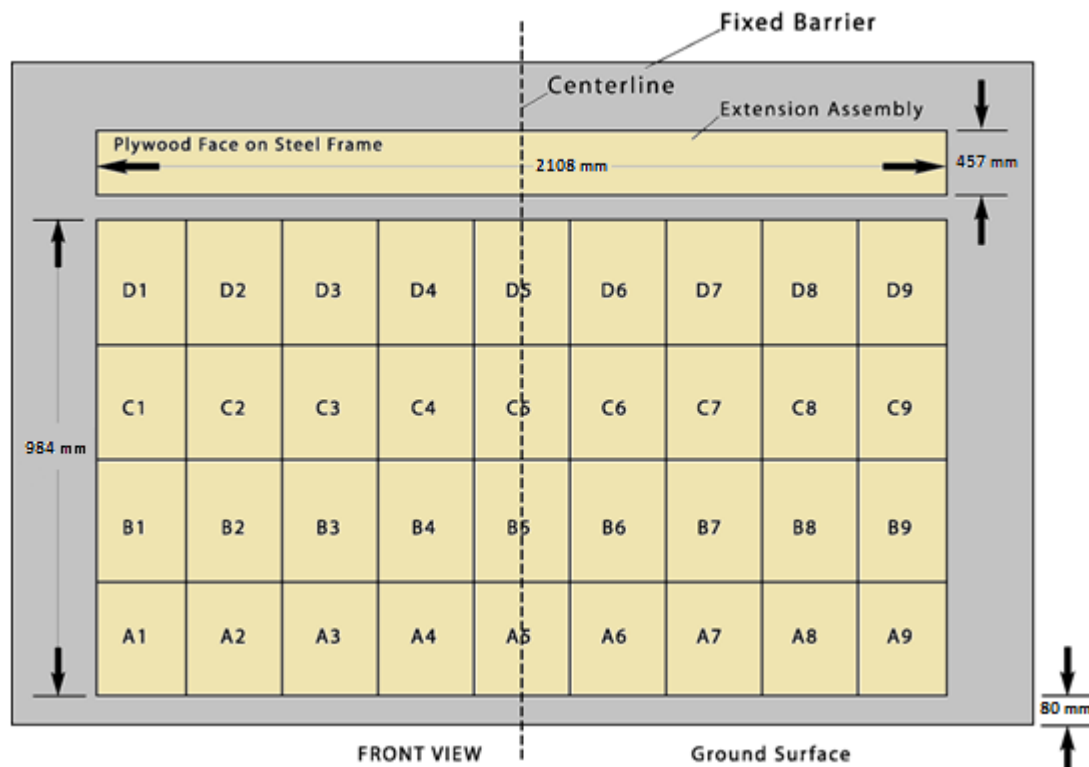


Figure 1 - Load Cell Locations on a 36-Load Cell Barrier with Plywood Height Extension

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

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 Nissan Rogue SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
Test Date: 3/6/2014

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	Locked	Locked
Front Door Opening	Closed & Operational	Closed & Operational
Rear Door Opening	Closed & Operational	Closed & Operational
Seat Track Shift (mm)	8	0
Seat Back Failure	No	No
Glazing Damage	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	Cracks throughout with minor separation
Window Damage	Front windows shifted up during impact event
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	1658
Center	mm	1626
Right Side	mm	1596
Average	mm	1627

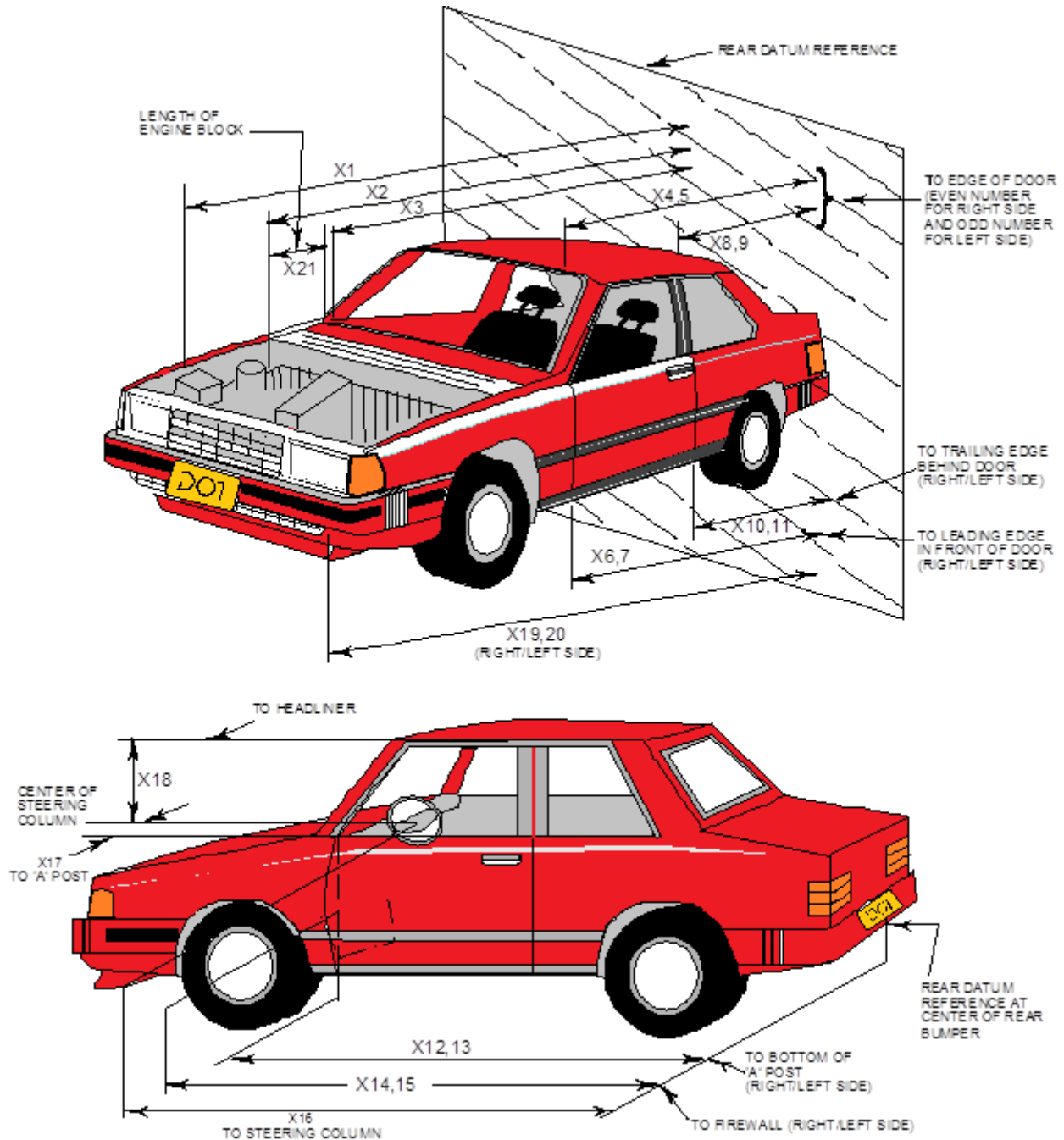
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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	Yes	Yes	Yes
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 Nissan Rogue SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
Test Date: 3/6/2014



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

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4644	4182	-462
2	Rear Surface of Vehicle (RSOV) to Front of Engine	3992	3826	-167
3	RSOV to Firewall	3648	3525	-123
4	RSOV to Upper Leading Edge of Right Door	3227	3221	-6
5	RSOV to Upper Leading Edge of Left Door	3224	3220	-4
6	RSOV to Lower Leading Edge of Right Door	3197	3191	-5
7	RSOV to Lower Leading Edge of Left Door	3194	3189	-5
8	RSOV to Upper Trailing Edge of Right Door	2107	2103	-5
9	RSOV to Upper Trailing Edge of Left Door	2103	2100	-3
10	RSOV to Lower Trailing Edge of Right Door	2114	2110	-4
11	RSOV to Lower Trailing Edge of Left Door	2110	2106	-4
12	RSOV to Bottom of "A" Post of Right Side	3260	3170	-90
13	RSOV to Bottom of "A" Post of Left Side	3256	3267	12
14	RSOV to Firewall, Right Side	3609	3523	-87
15	RSOV to Firewall, Left Side	3607	3572	-34
16	RSOV to Steering Column	2757	2799	43
17	Center of Steering Column to "A" Post	271	272	1
18	Center of Steering Column to Headliner	441	424	-17
19	RSOV to Right Side of Front Bumper	4581	4170	-412
20	RSOV to Left Side of Front Bumper	4581	4210	-371
21	Length of Engine Block	255	255	0
RD	RSOV to Right Side of Dash Panel	2916	2912	-5
CD	RSOV to Center of Dash Panel	2919	2914	-6
LD	RSOV to Left Side of Dash Panel	2915	2908	-7

*UR= Unrecoverable Data Point
 All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2014 Nissan Rogue SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
Test Date: 3/6/2014

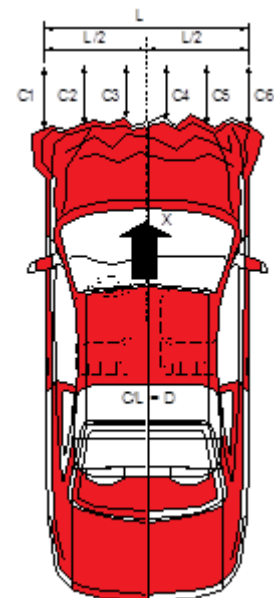
VEHICLE INFORMATION

VIN: 5N1AT2MV5EC754526
Vehicle Size Category: Passenger

Wheelbase (mm): 2708
Test Weight (kg): 1,815

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): 56.59
Velocity Change (km/h): 56.59
Time of Separation (ms): 127



CRUSH PROFILE

Collision Deformation Classification: 12FDEW3
Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1041
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	4560	4190	370
C2	Crush Zone 2 at Left Side	mm	4624	4194	430
C3	Crush Zone 3 at Left Side	mm	4637	4191	446
C4	Crush Zone 4 at Right Side	mm	4637	4184	453
C5	Crush Zone 5 at Right Side	mm	4625	4181	444
C6	Crush Zone 6 at Right Side	mm	4559	4165	394
L	C1 to C6	mm	1041	1045	-5

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

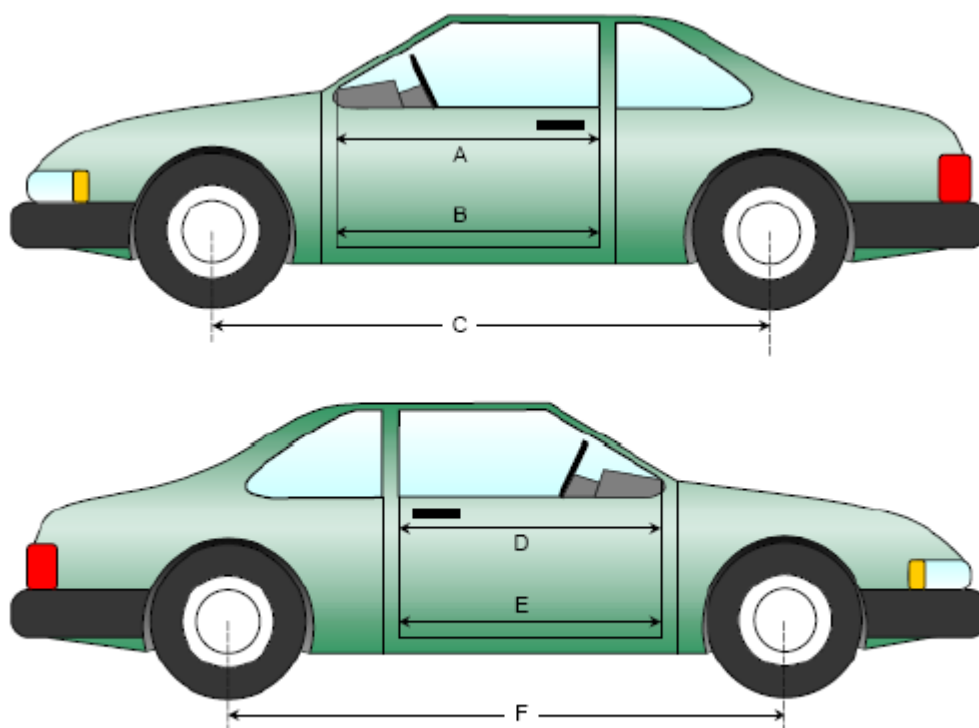
NHTSA No.: M20145206
 Test Date: 3/6/2014

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1019	1012	-7
B	Left Side Lower	mm	916	910	-6
D	Right Side Upper	mm	1018	1006	-12
E	Right Side Lower	mm	918	912	-6

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2708	2638	-70
F	Right Side Wheelbase	mm	2708	2674	-34



Left & Right Side Views

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

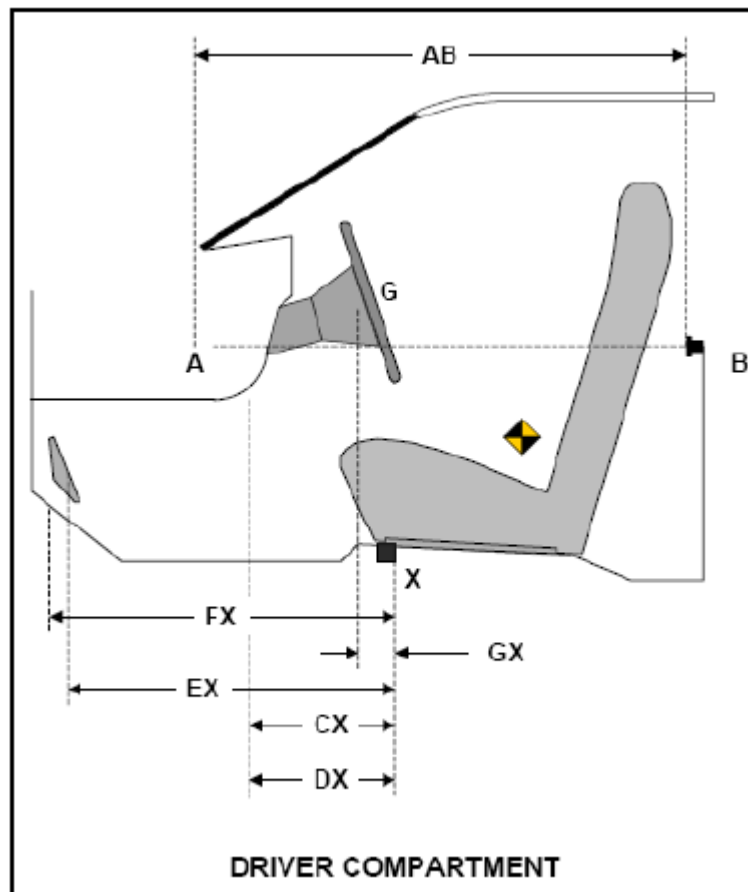
Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	808	805	-3
CX	Left Knee Bolster to X	mm	346	335	-11
DX	Right Knee Bolster to X	mm	325	322	-3
EX	Brake Pedal to X	mm	589	613	24
FX	Foot Rest to X	mm	660	649	-11
GX	Center of Steering Column Wheel Hub to X	mm	109	155	46

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014

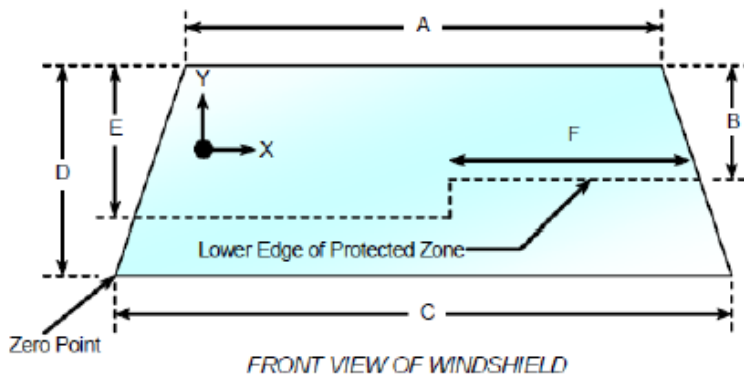
Windshield Mounting Details: A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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	2210	2105	95.2%
Right Side	2210	2085	94.3%
Total	4420	4190	94.8%



Item	Units	Value
A	mm	1220
B	mm	540
C	mm	1420
D	mm	890
E	mm	555
F	mm	335

AREAS OF PROTECTED ZONE FAILURES

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

- No Penetration

X	Y

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

- No Penetration

X	Y

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

Test Vehicle: 2014 Nissan Rogue SUV
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
Test Date: 3/6/2014

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21 ° C

Test Time: 12:35 PM

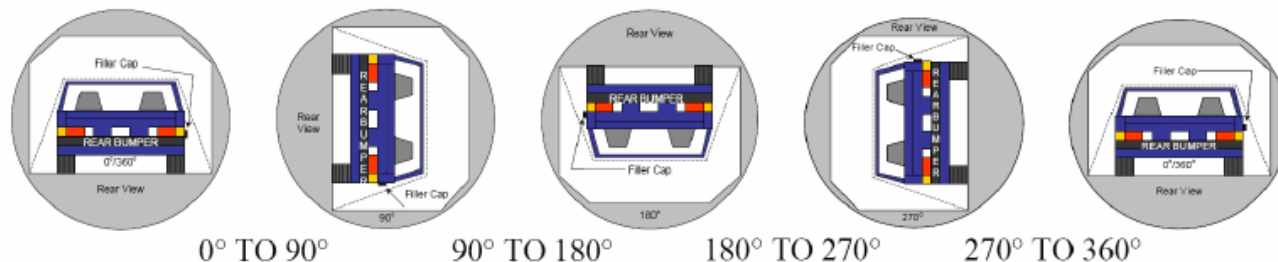
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- 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 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014



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°	69	300	369
90° to 180°	68	300	368
180° to 270°	63	300	363
270° to 360°	67	300	367

FMVSS 301 SPILLAGE TABLE

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

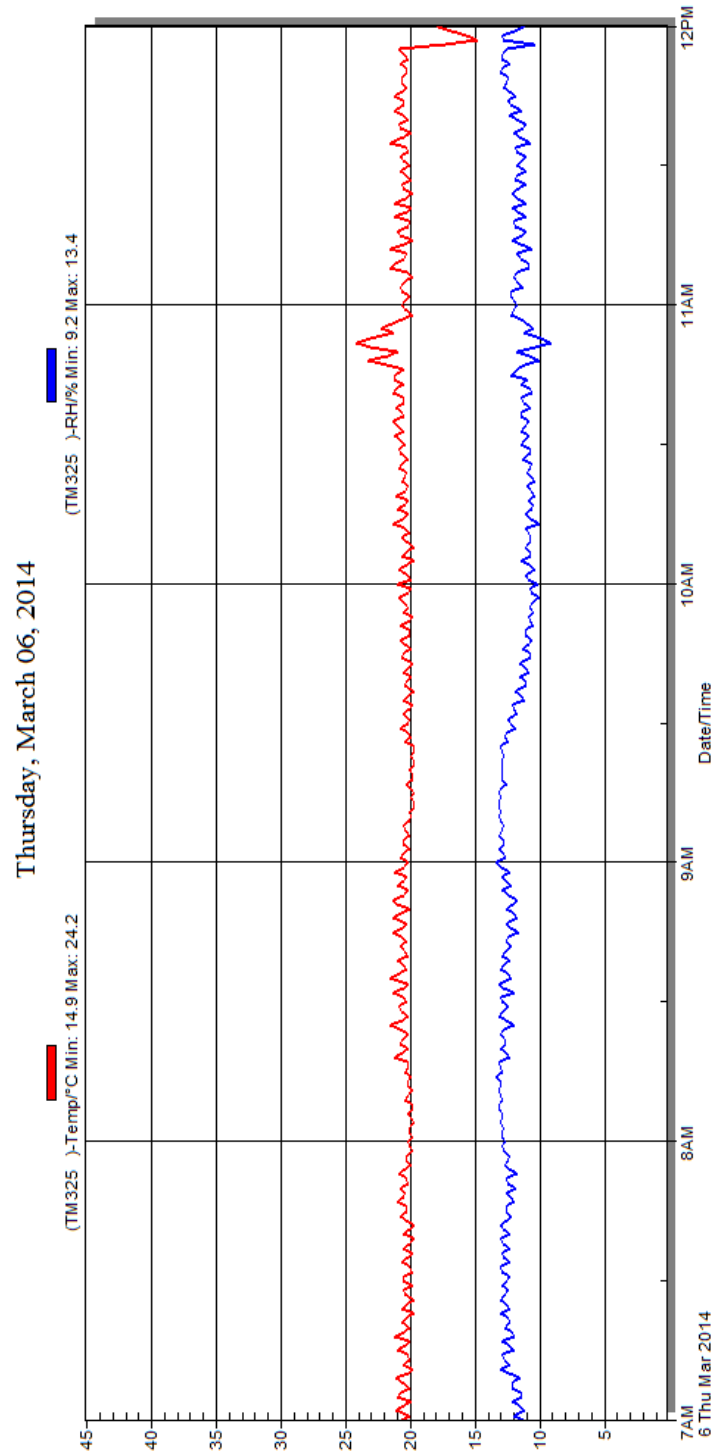
SOLVENT SPILLAGE LOCATION TABLE

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

DATA SHEET NO. 17
DUMMY / VEHICLE TEMPERATURE STABILIZATION CHART

Test Vehicle: 2014 Nissan Rogue SUV
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20145206
 Test Date: 3/6/2014



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

APPENDIX A
PHOTOGRAPHS

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45	Post-Test Driver Dummy Face	A-27
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77	2014 Nissan Rogue 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.*

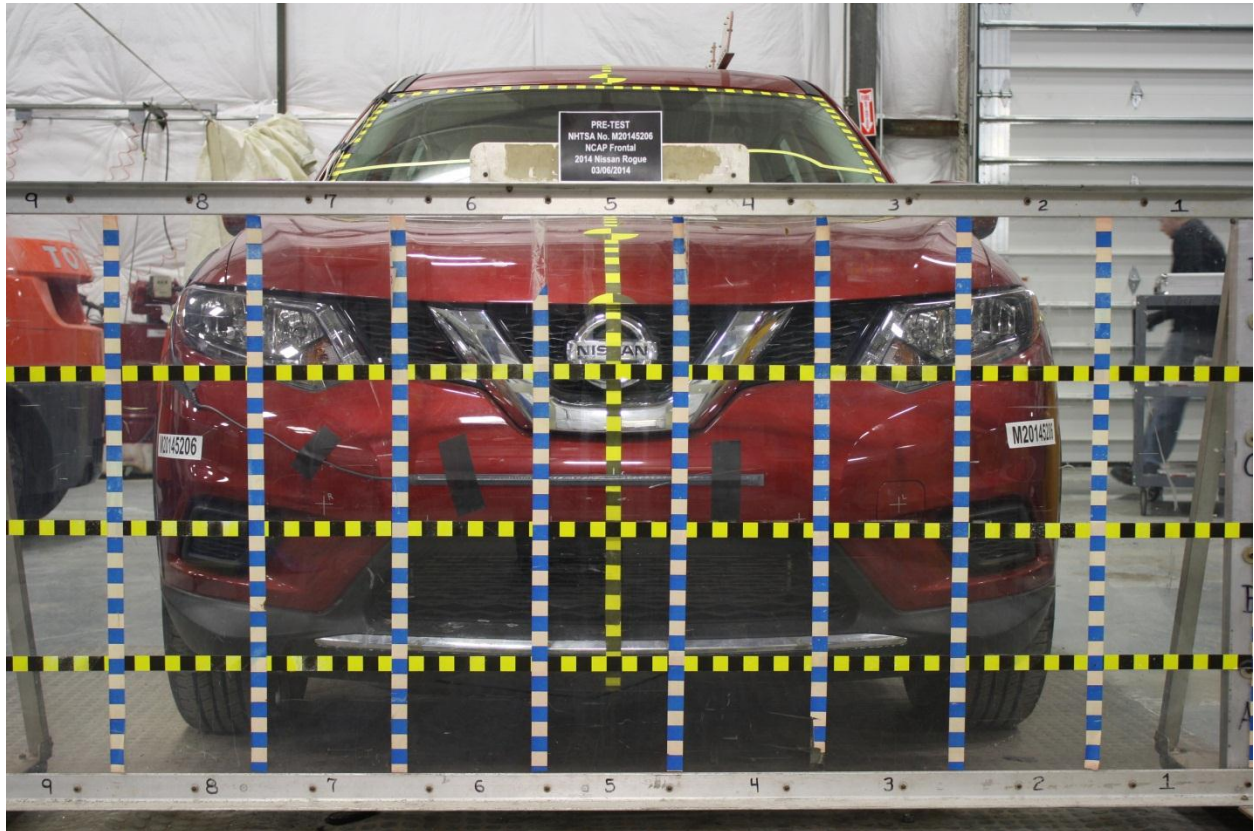


Figure A-1: Load Cell Location



Figure A-2: Load Cell Wall



Figure A-3: Manufacturer's Label

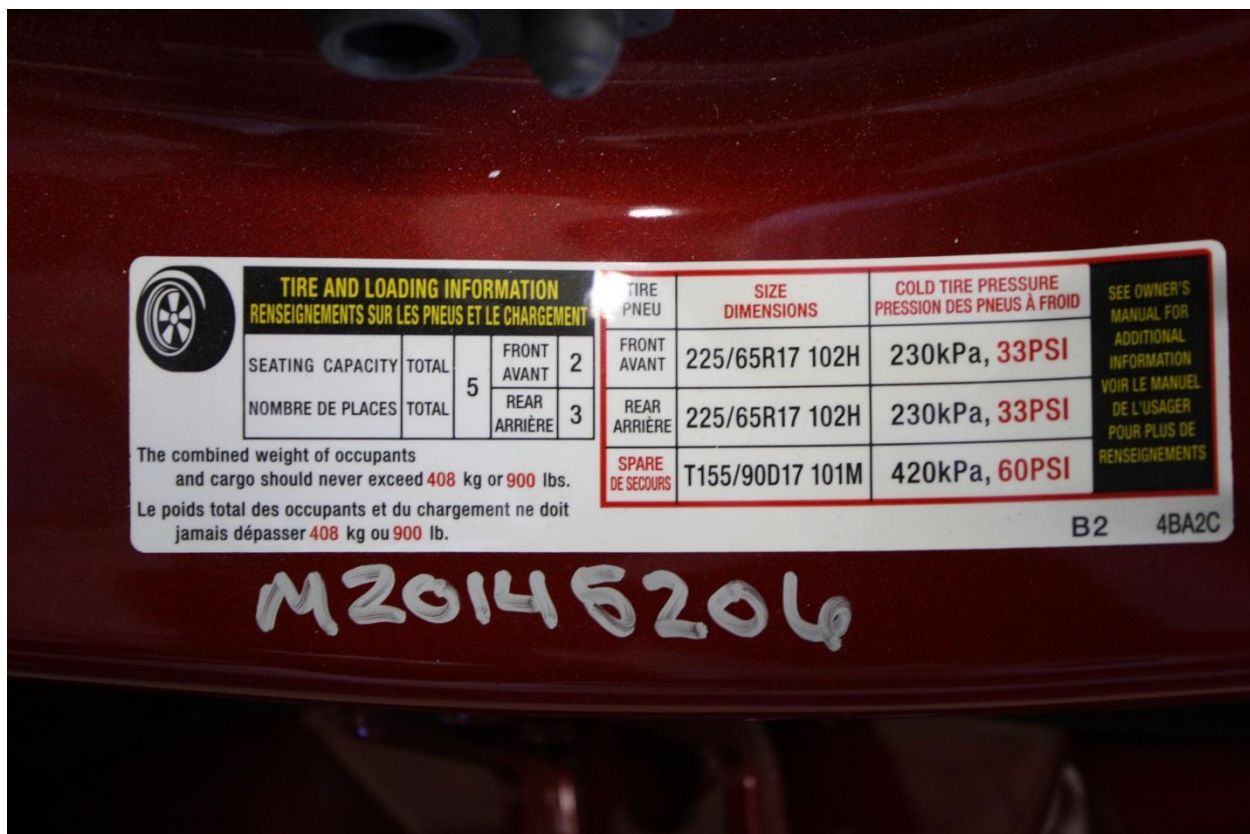


Figure A-4: Tire Placard



Figure A-5: 2014 Nissan Rogue Frontal As Delivered



Figure A-6: Left Rear 3-4 View, As Received

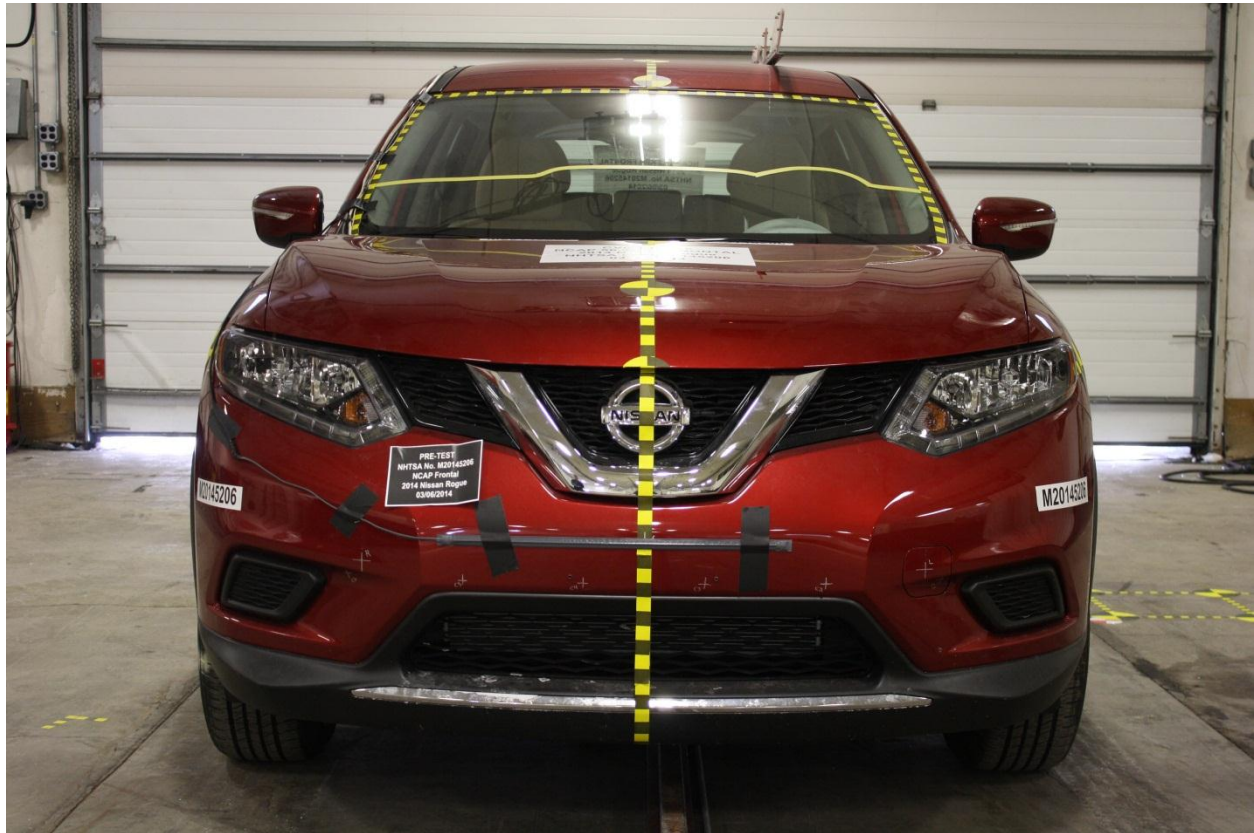


Figure A-7: Pre-Test Front View of Test Vehicle

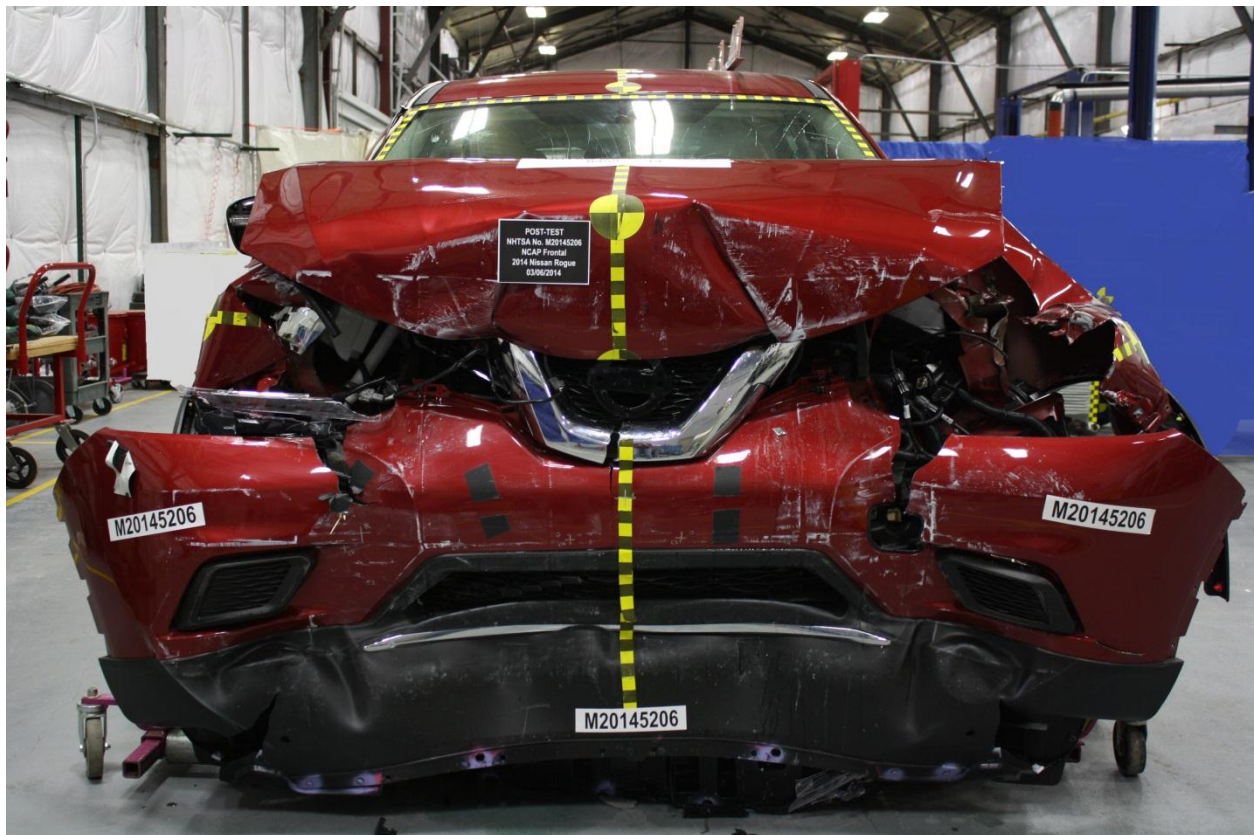


Figure A-8: Post-Test Front View of Test Vehicle



Figure A-9: Pre-Test Left View of Test Vehicle

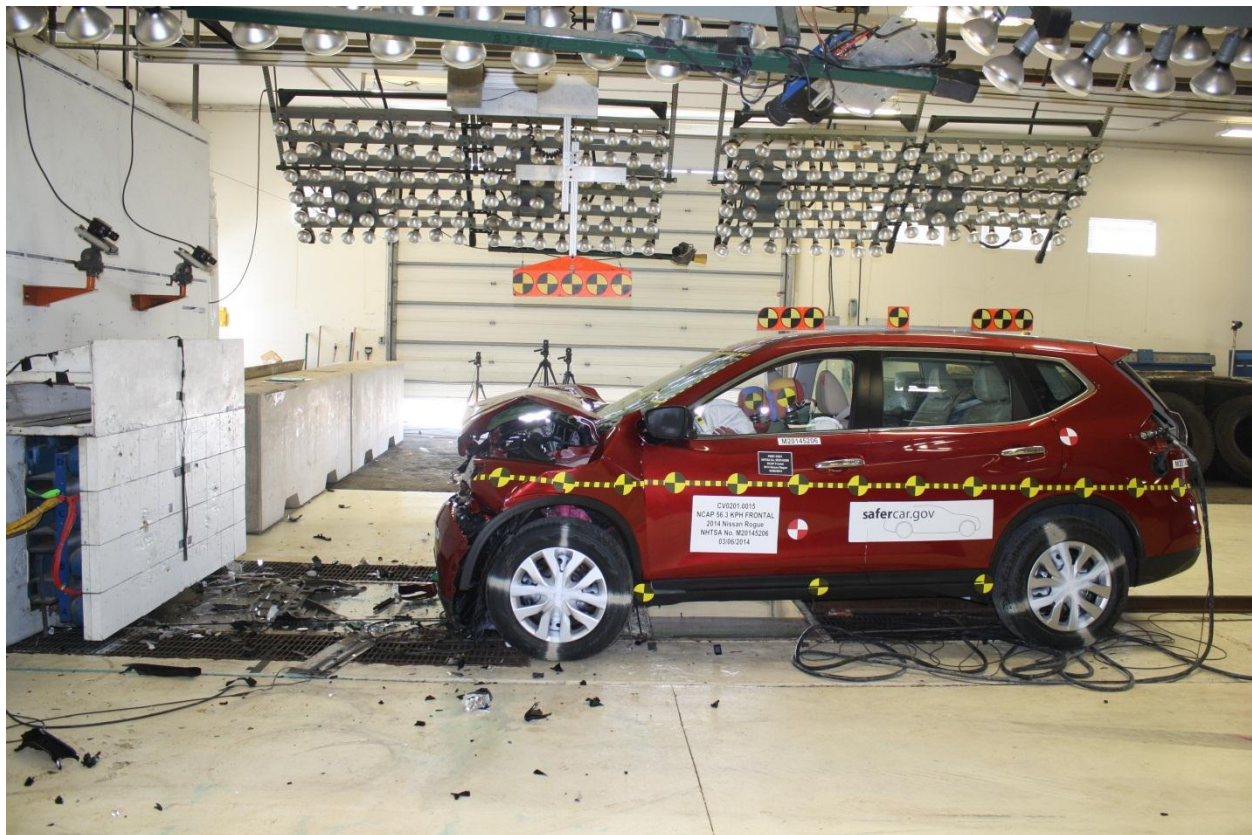


Figure A-10: Post-Test Left View of Test Vehicle



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

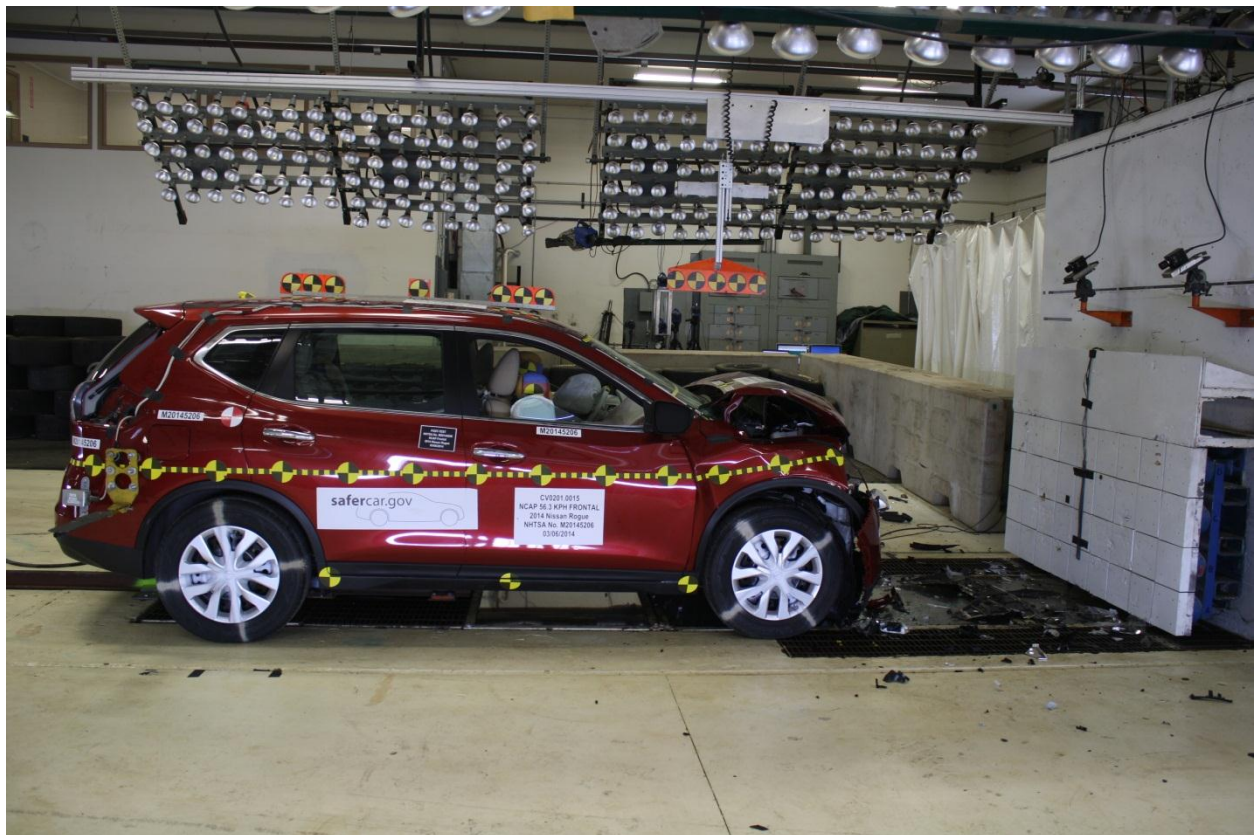


Figure A-12: Post-Test Right View of Test Vehicle



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

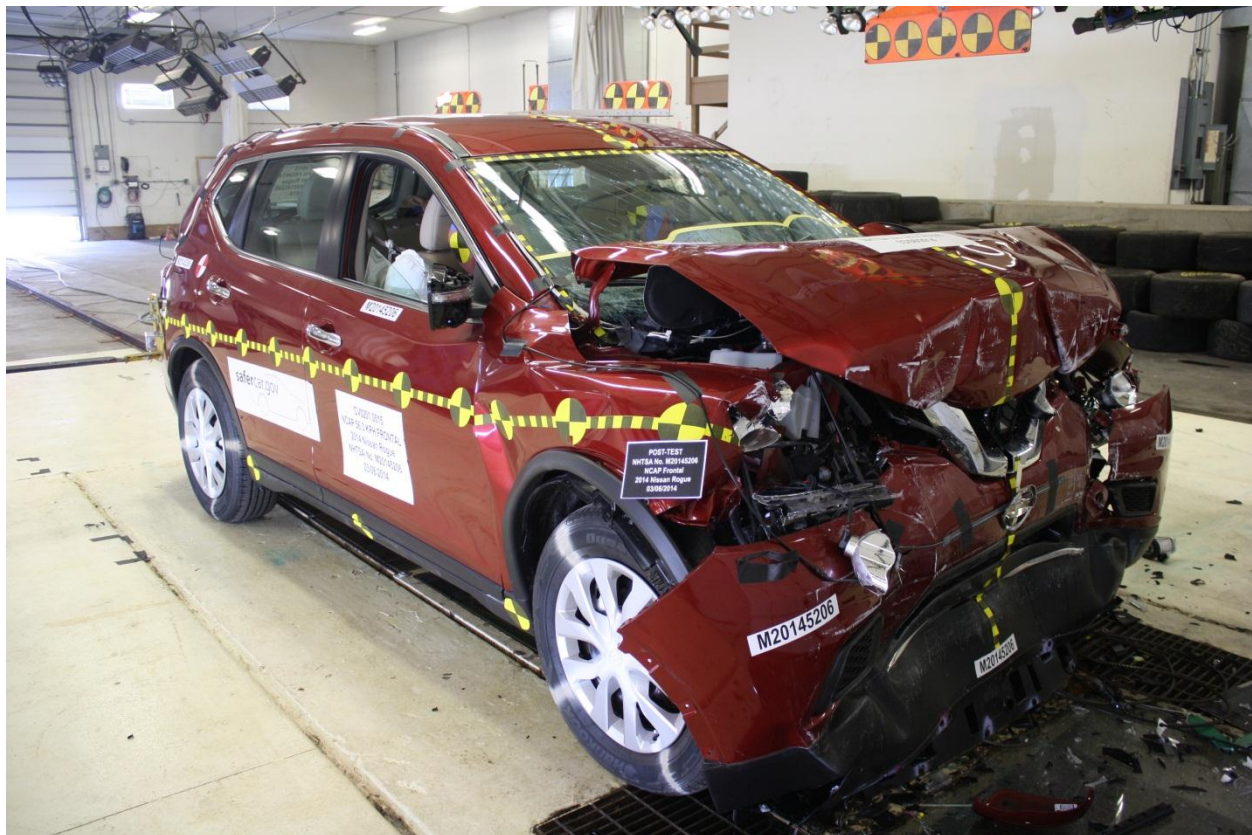


Figure A-14: Post-Test Right Front 3-4 View



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



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



Figure A-17: Pre-Test Windshield View



Figure A-18: Post-Test Windshield View



Figure A-19: Pre-Test Engine Compartment View



Figure A-20: Post-Test Engine Compartment View



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



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

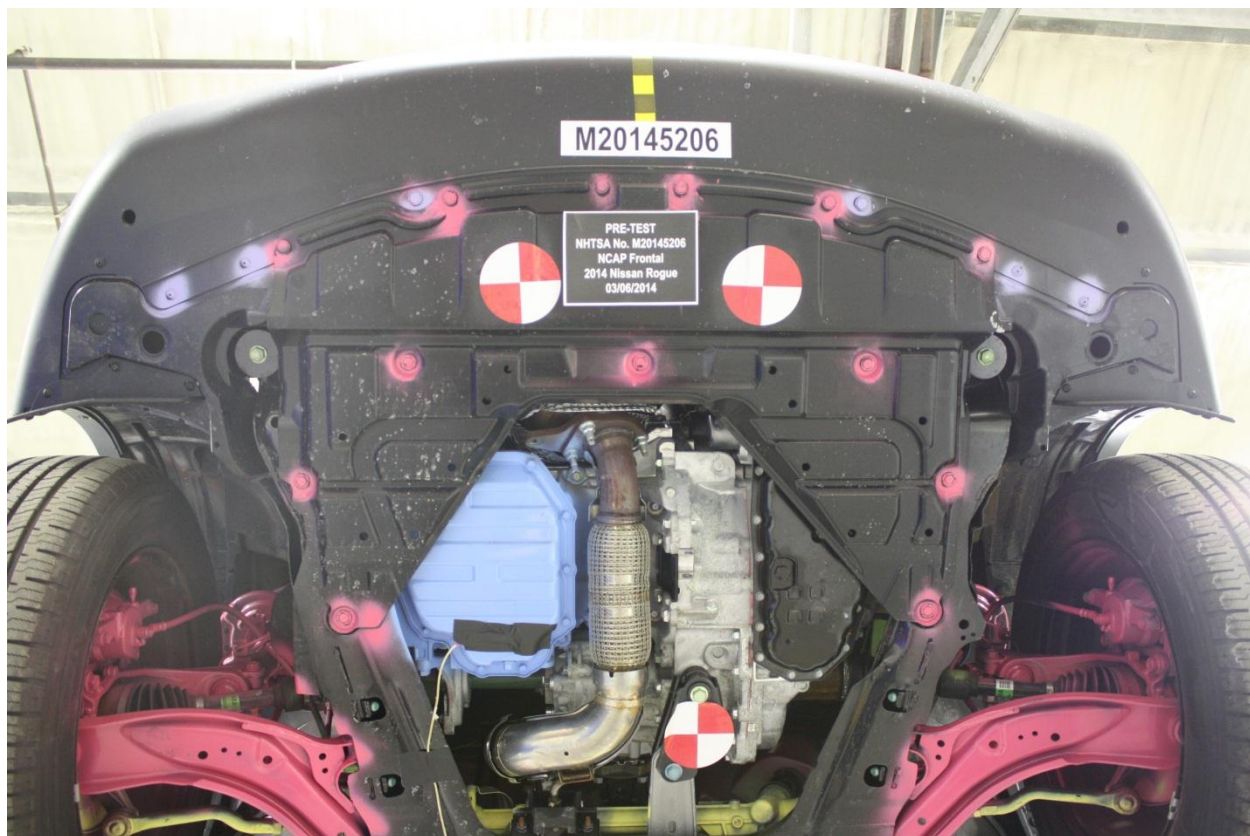


Figure A-23: Pre-Test Front Underbody View

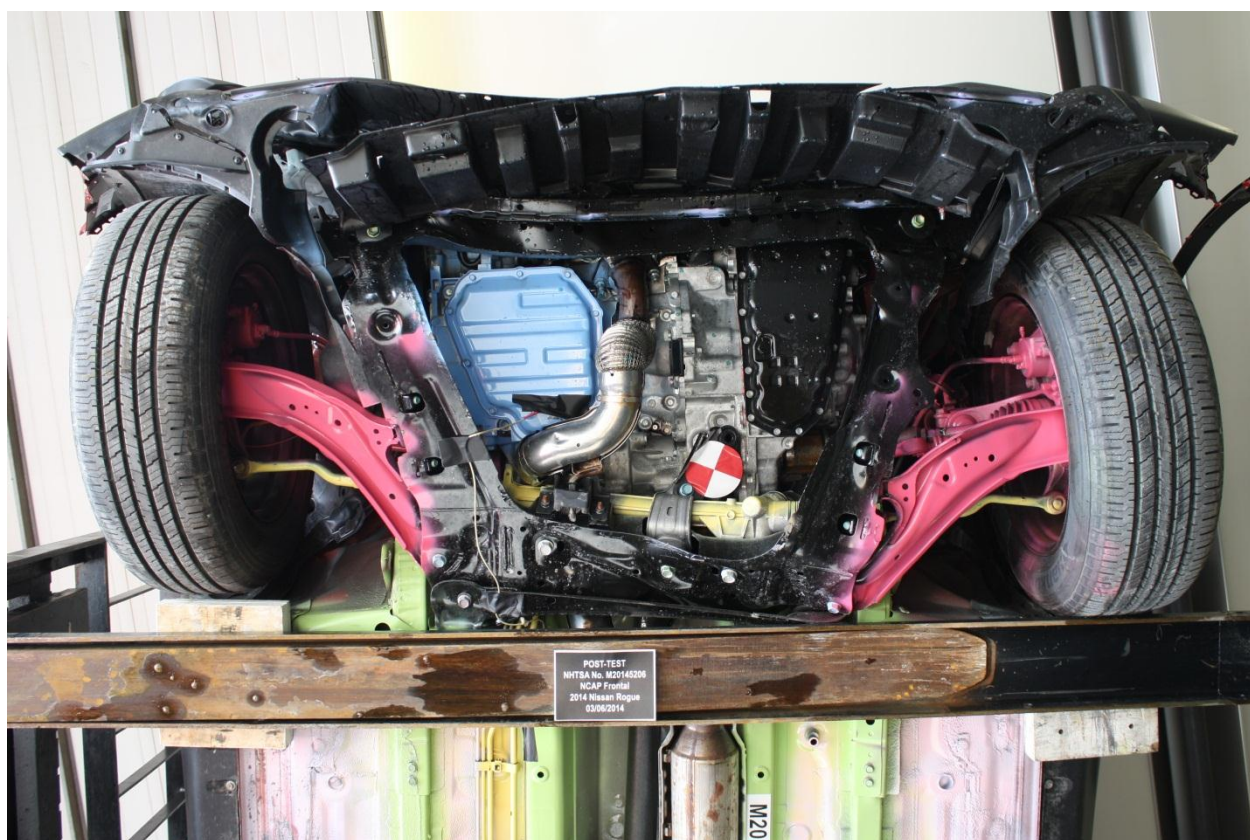


Figure A-24: Post-Test Front Underbody View



Figure A-25: Pre-Test Rear Underbody View

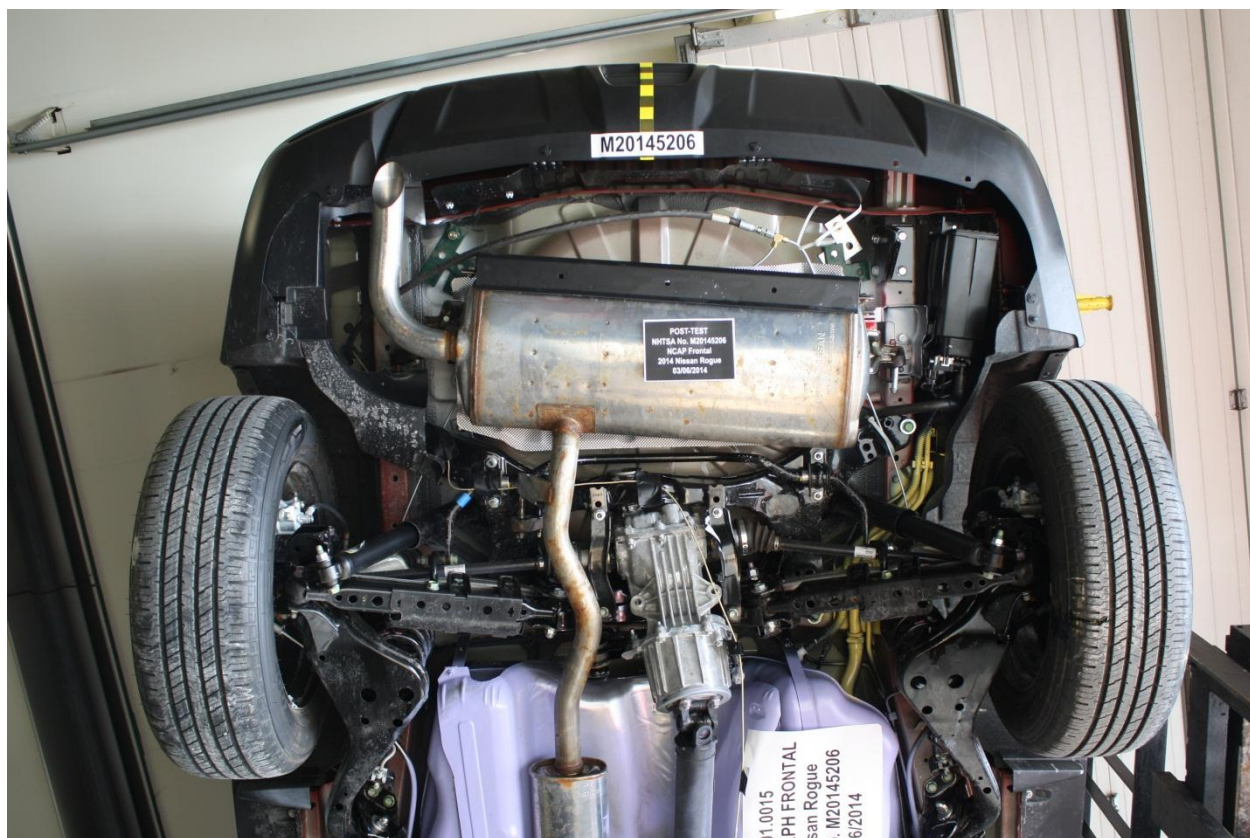


Figure A-26: Post-Test Rear Underbody View



Figure A-27: Pre-Test Dummy Cable Routing



Figure A-28: Post-Test Dummy Cable Routing

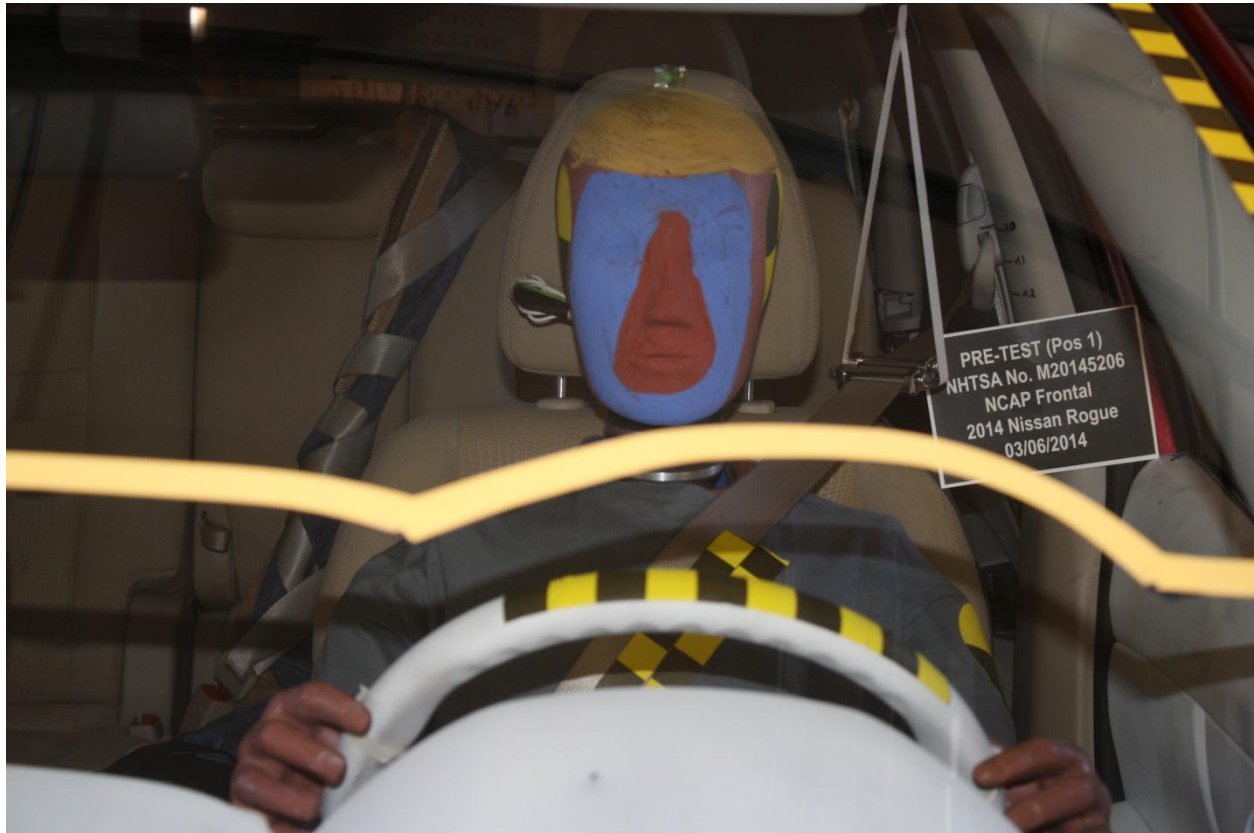


Figure A-29: Pre-Test Driver Dummy Front View



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



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



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



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



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

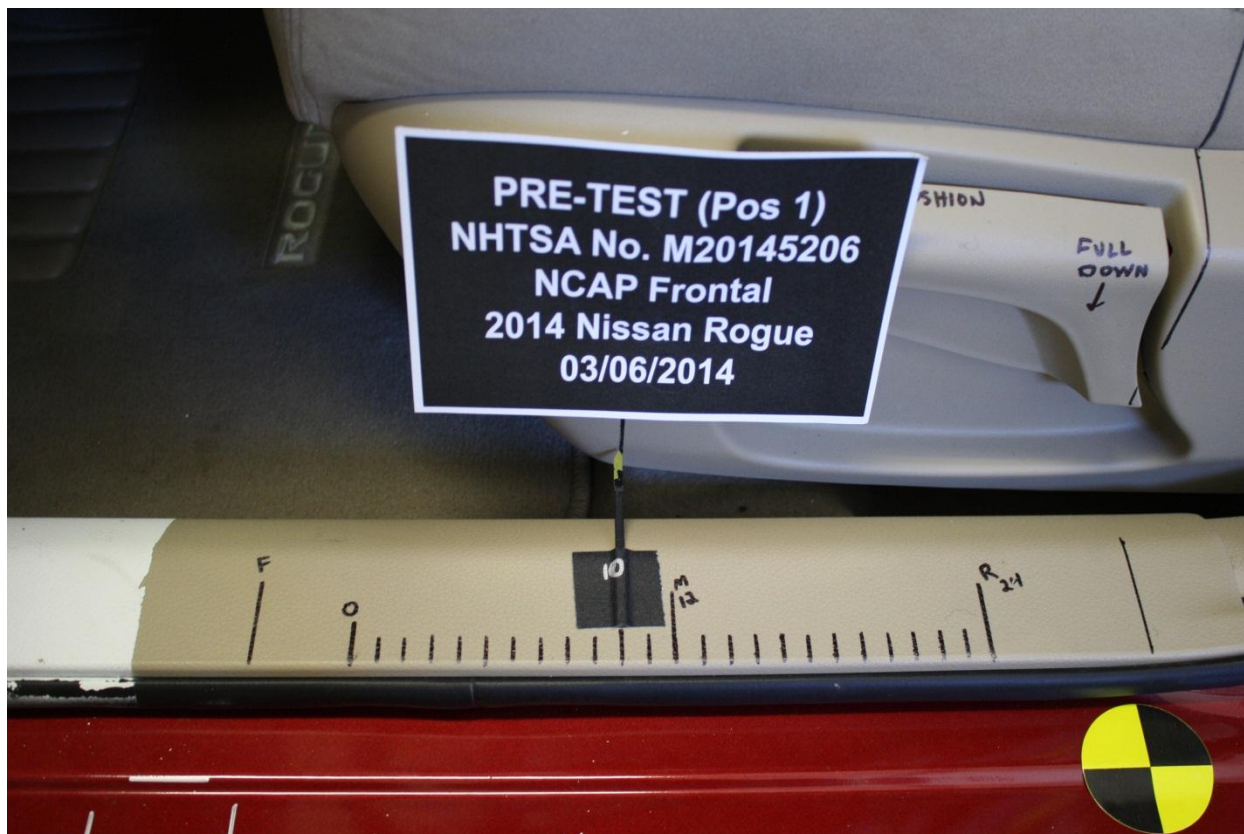


Figure A-35: Pre-Test Driver's Seat Fore-Aft Markings

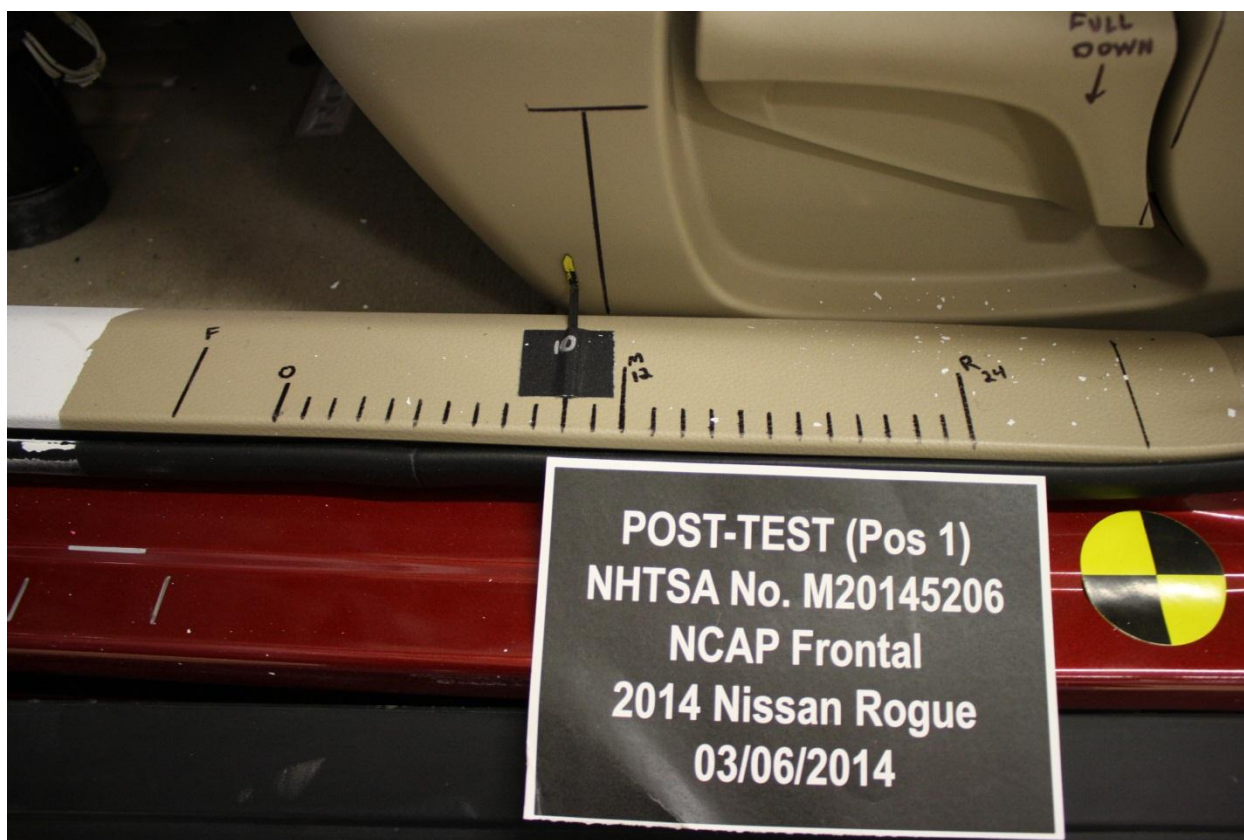


Figure A-36: Post-Test Driver's Seat Fore-Aft Markings



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



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

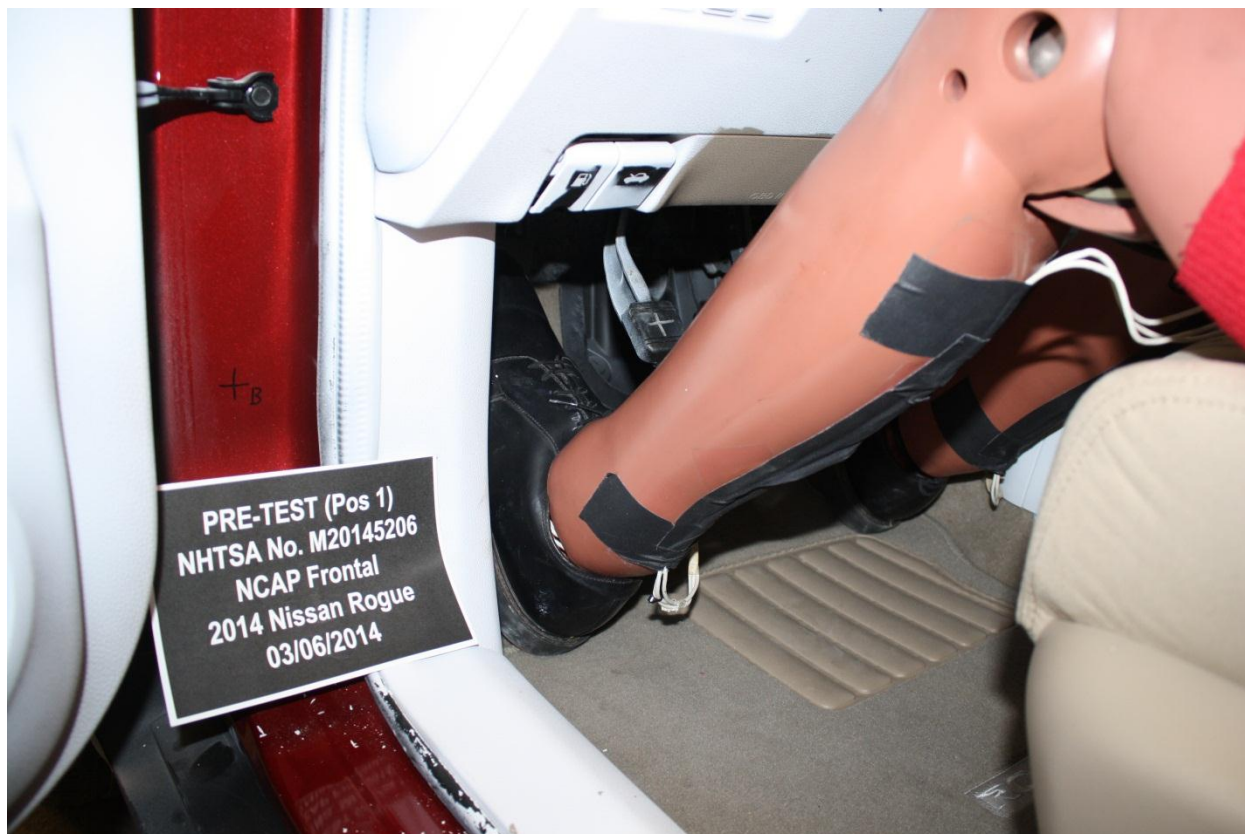


Figure A-39: Pre-Test Driver Dummy Feet



Figure A-40: Post-Test Driver Dummy Feet



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



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



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



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



Figure A-45: Post-Test Driver Dummy Face



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



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



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

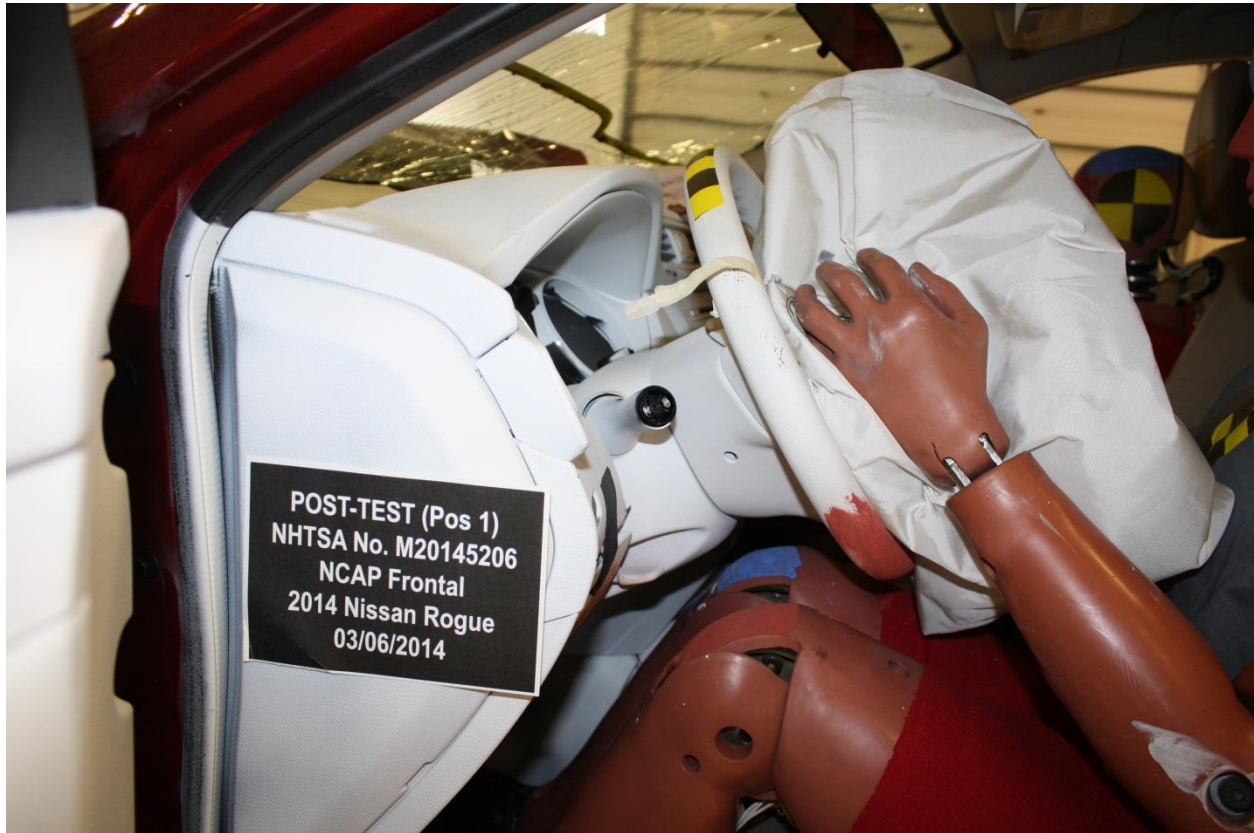


Figure A-49: Post-Test View of the Steering Wheel



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



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



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



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



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



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

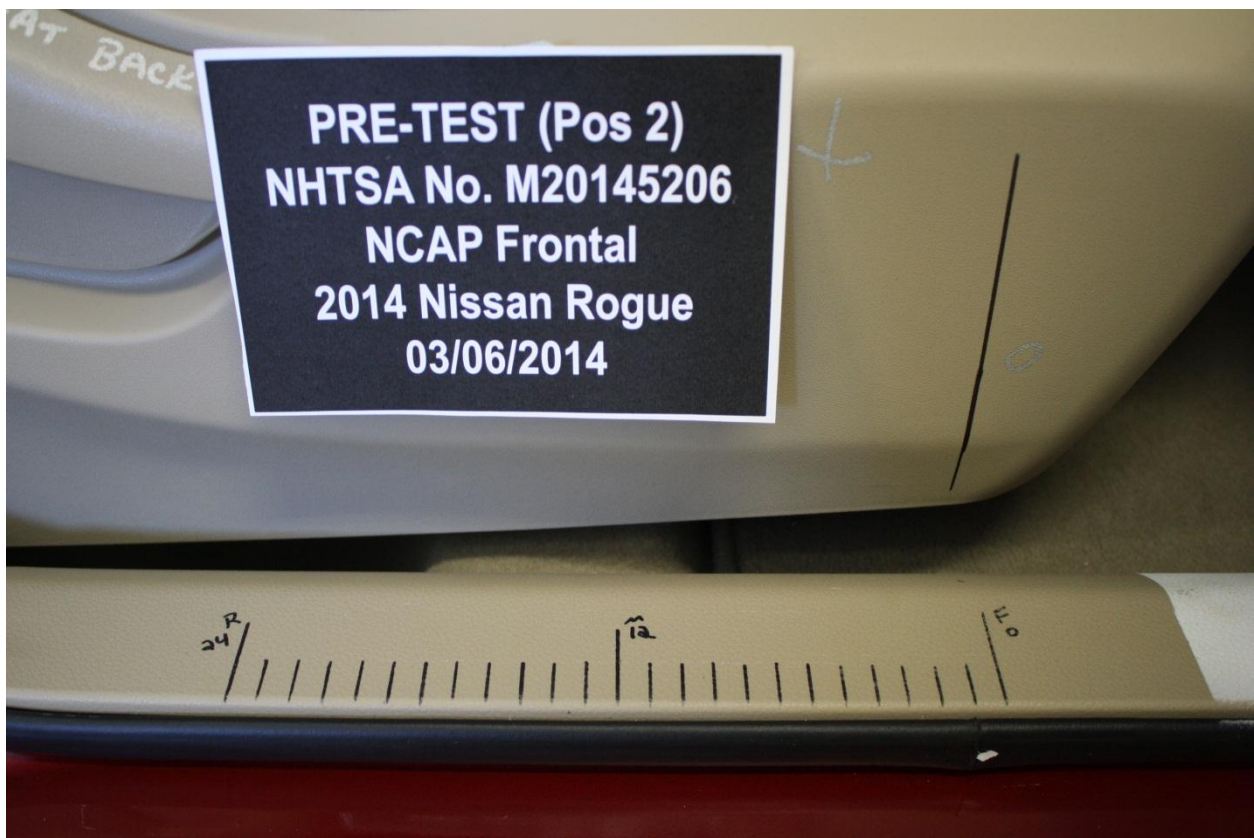


Figure A-56: Pre-Test Passenger's Seat Fore-Aft Markings

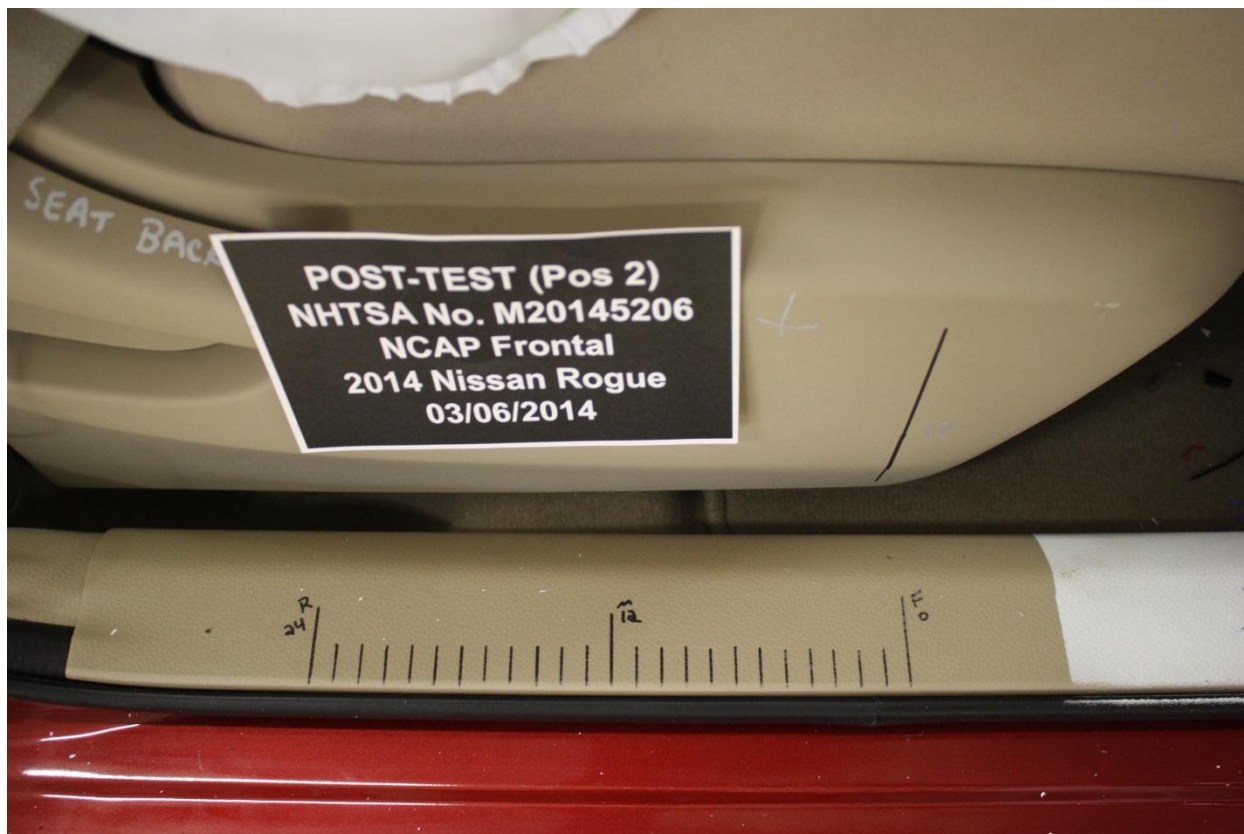


Figure A-57: Post-Test Passenger's Seat Fore-Aft Markings



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

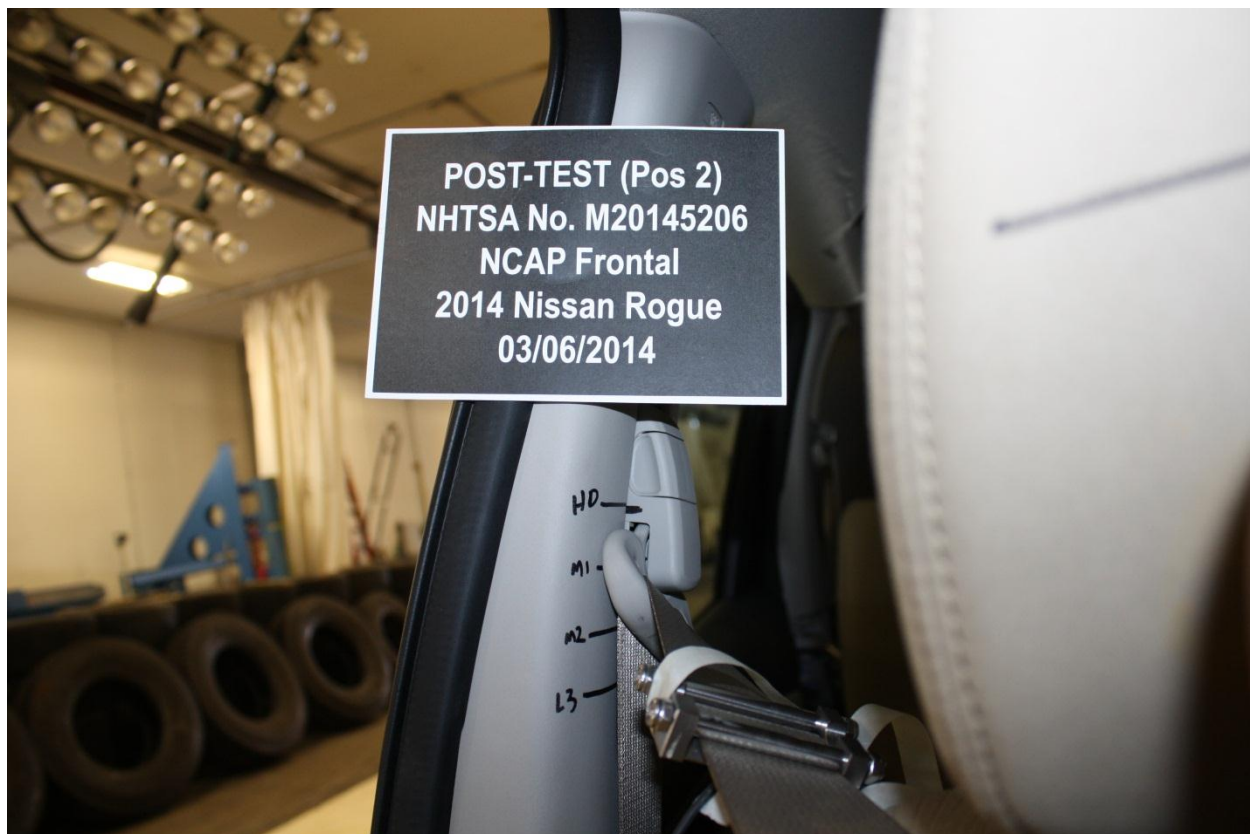


Figure A-59: Post-Test View of Belt Anchorage for Passenger Dummy



Figure A-60: Pre-Test Passenger Dummy Feet



Figure A-61: Post-Test Passenger Dummy Feet



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

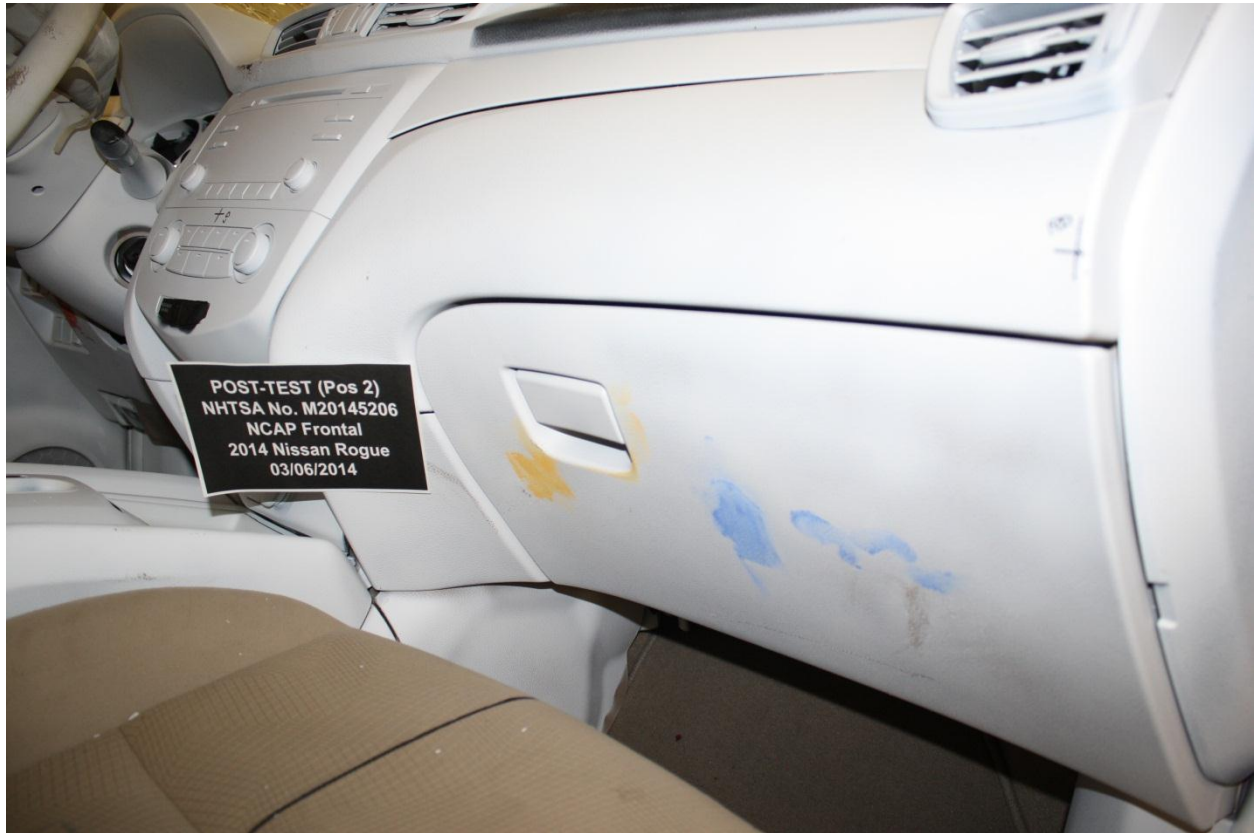


Figure A-63: Post-Test Passenger's Side Knee Bolster



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



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



Figure A-66: Post-Test Passenger Dummy Face



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



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

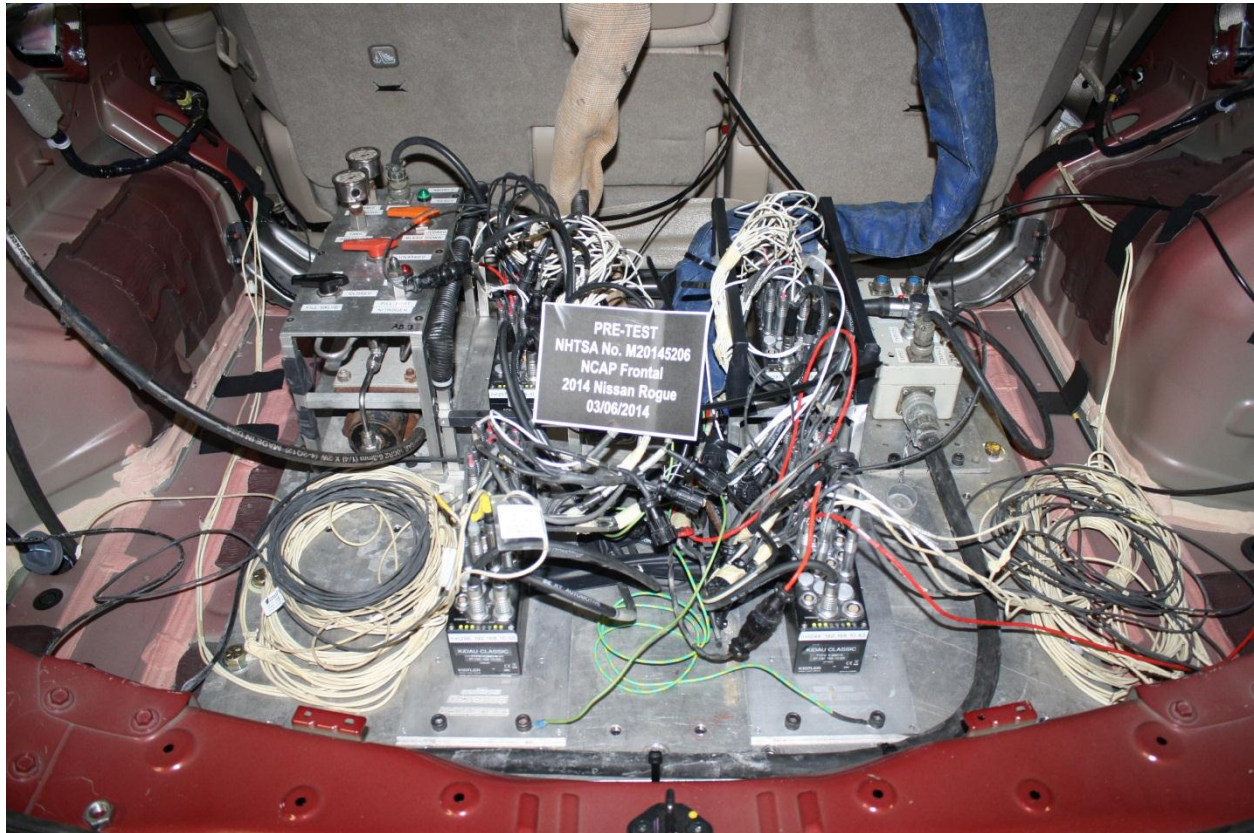


Figure A-69: Photograph of Ballast Installed in Vehicle

Photo Not Applicable

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



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



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



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



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



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



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



Figure A-77: 2014 Nissan Rogue Frontal Impact Event

2014 ROGUE S AWD

THE ALL-NEW ROGUE

MECHANICAL & PERFORMANCE

- 2.5-liter DOHC I-4 Engine
- 170 Horsepower and 175 lb-ft of Torque
- Xtronic CVT (Continuously Variable Transmission) with Sport Mode Switch
- All-Wheel Drive
- 4-Wheel Front and Rear Disc Brakes
- 17" Steel Wheels with Full Wheel Covers
- All-Season Tires/Temporary Spare Tire
- Hill Start Assist & Descent Control

SAFETY & SECURITY

- Driver & Front Passenger, Side-Impact, Curtain Air Bags
- Lower Anchors and Tethers for Children (LATCH)
- 4-Wheel Anti-Lock Braking System
- Vehicle Dynamic Control (VDC) with Traction Control System (TCS)
- Electronic Brake Force Distribution (EBD) and Brake Assist (BA)
- Nissan Vehicle Immobilizer System
- Vehicle Security System
- The Pressure Monitoring System (TPMS) with position monitoring
- TPMS with Easy Fill Tire Alert

COMFORT & CONVENIENCE

- 6-Way Manual Driver Seat
- 4-Way Manual Front Passenger Seat
- EZ Flex® Seating System
- 40/20/40 Folding and Reclining
- 60/40 Sliding 2nd Row
- 4-Speaker AM/FM/CD Audio System
- Auxiliary Audio Input Jack
- NissanConnect™
- 5" Color Audio Display
- USB connection port for iPod®
- Interface and other compatible devices
- Bluetooth® Hands-free Phone System
- Streaming Audio via Bluetooth®
- Hands-free text messaging assistant
- Advanced Drive-Assist® Display
- 3 12-volt power points
- RearView Monitor

COMFORT & CONVENIENCE CONT.

- 2nd row seat A/C vents
- Illuminated Visor Vanity Mirrors with visor extenders
- Divide-N-Hide® Cargo System
- Power Door Locks w/ Auto Locking Feature
- Power Windows w/ DR Auto Up/Down
- Active Trace Control
- Active Engine Braking
- Active Ride Control

EXTERIOR

- LED Daytime Running Lights
- Halogen Headlights w/ Auto Off Function
- Body Color Outside Mirrors w/ Integrated LED Turn Signals
- Rear Window Wiper w/ Reverse Wiper Link

NissanConnect™

Certain remote functions require compatible phone, not included with vehicle. Cellular network and vehicle services provided by independent companies not within Nissan's control. Cellular network not available in all areas. Certain connected vehicle services, including but not limited to Points of Interest and Send-to-Car, may require subscription and owner consent to activate. Should service provider terminate/restrict service, service may be suspended or terminated without notice or liability to Nissan and/or its agents. Nissan not responsible for any equipment replacement or upgrades, or associated costs, that may be required for continued operation due to service changes. Standard text rates, voice minutes, roaming charges and/or data usage may apply.

Manufacturer's Suggested Retail Base Price: \$23,840.00

Options Included by Manufacturer

FLOOR MATS (2-PC FRONT & 2-PC 2ND ROW) 125.00

DESTINATION CHARGES 860.00

Total \$24,825.00

Fuel Economy and Environment

Fuel Economy

28 MPG

combined city highway

25 32

3.6 gallons per 100 miles

Annual fuel cost

\$1,900

Fuel Economy & Greenhouse Gas Rating

1 7 10

Best

You save \$2,000

in fuel costs over 5 years

compared to the average new vehicle.

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 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 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

DELIVERY

VEHICLE COLORS:

EXT: CAYENNE RED

INT: ALMOND

FINAL ASSEMBLY POINT:

SMYRNA

TRANSPORT METHOD:

TRUCK

DEALER:

AUTOPLACE NISSAN

8137 MAIN STREET

WILLIAMSVILLE NY 14221

VIN: 5N1AT2M/5EC754508

EMS: 50 STATE EMISSIONS

MDL: 22214-754508 NAH-C

OPT: E-C03.92

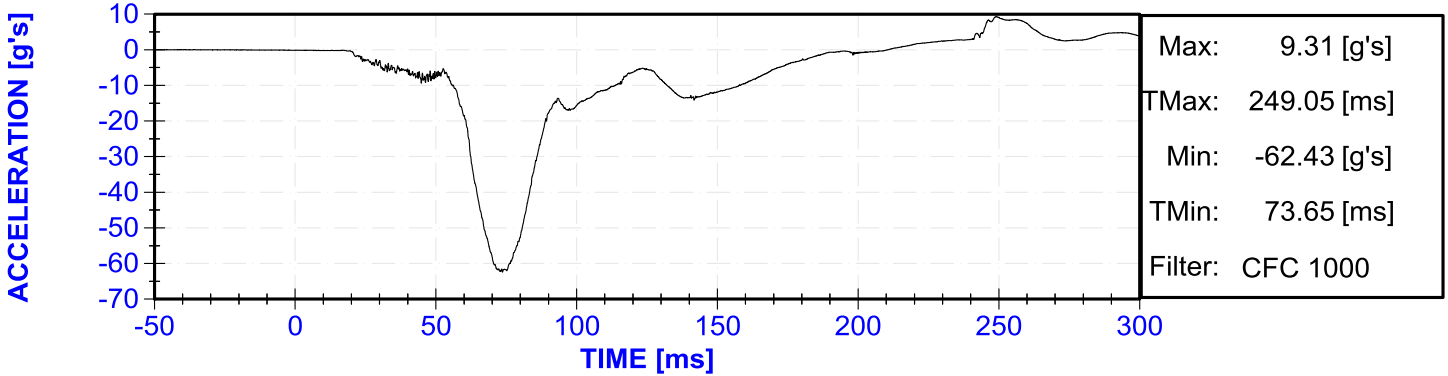
Figure A-78: Monroney Label Photograph

APPENDIX B
VEHICLE & DUMMY RESPONSE DATA TRACES

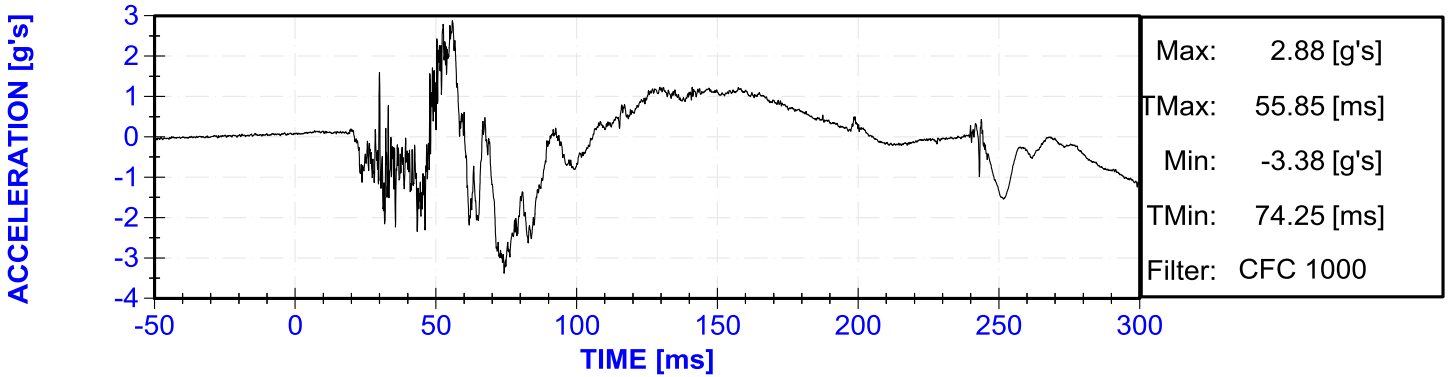
Table of Data Plots

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

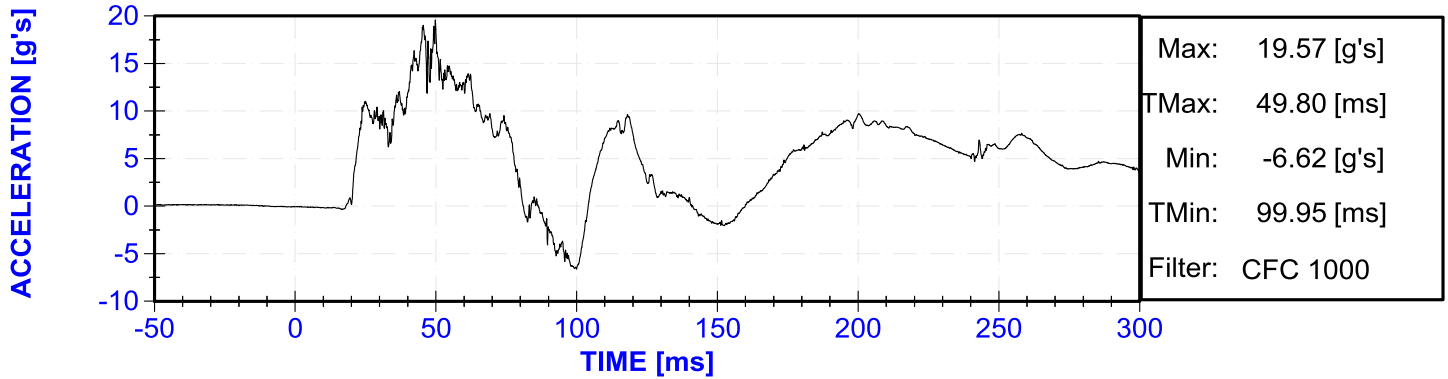
Driver Head X Acceleration vs. Time Primary



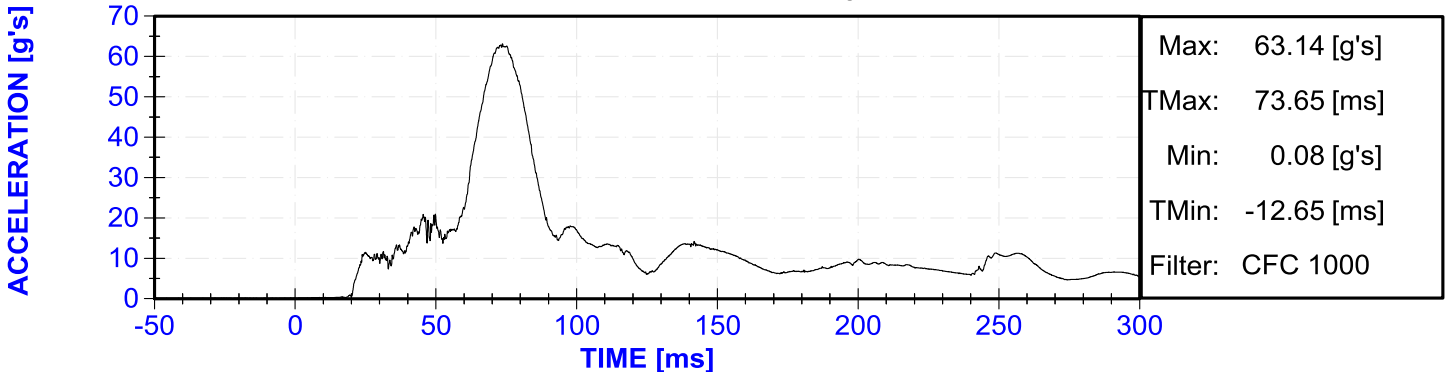
Driver Head Y Acceleration vs. Time Primary



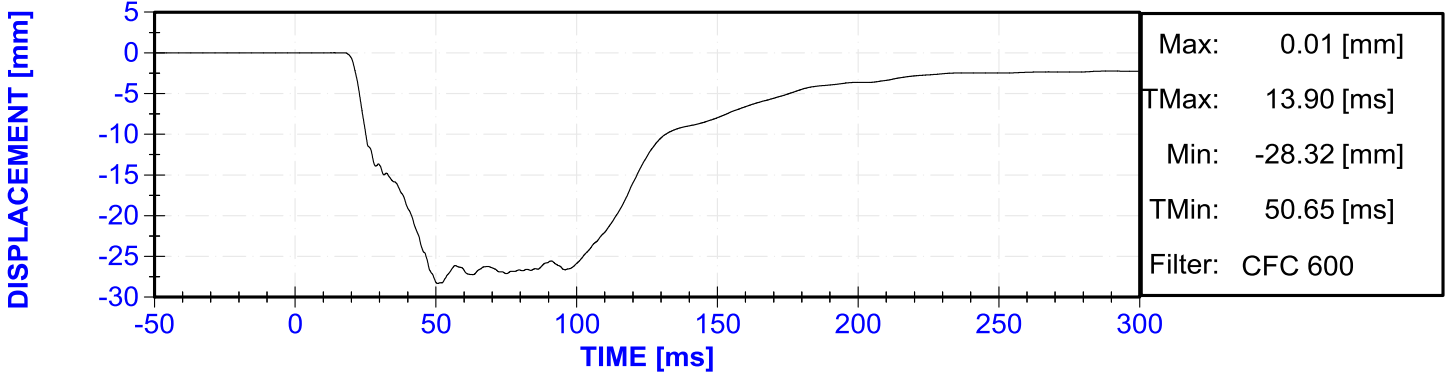
Driver Head Z Acceleration vs. Time Primary



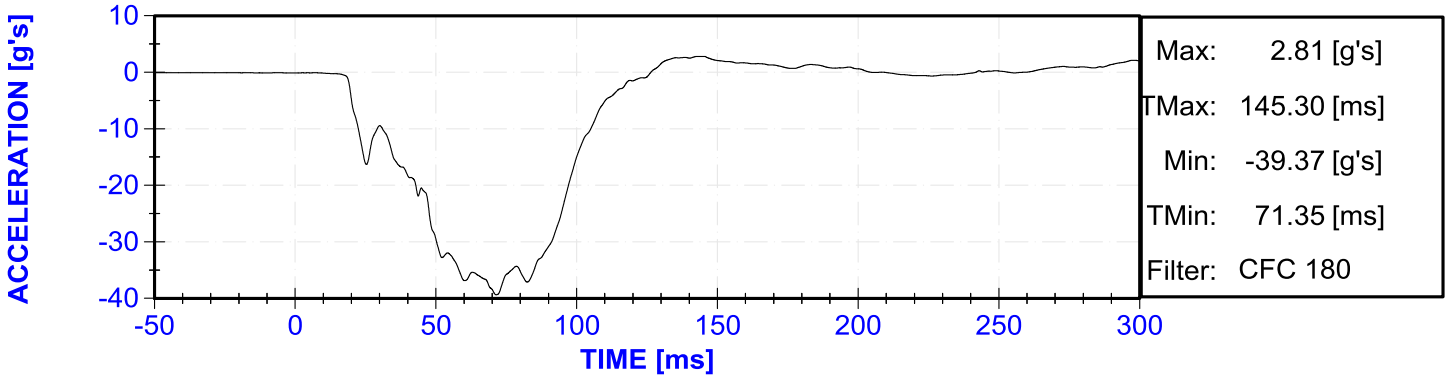
Driver Head Resultant Acceleration vs. Time Primary



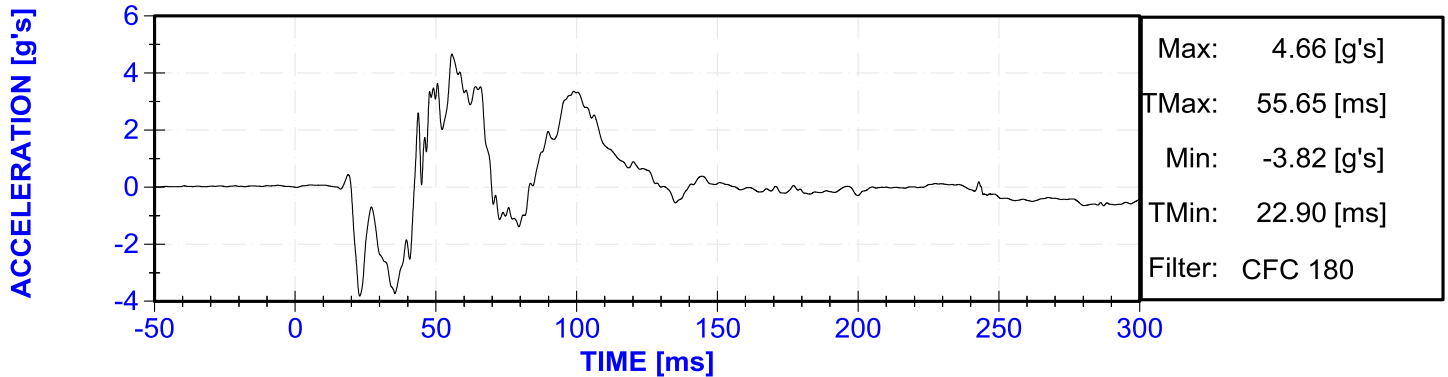
Driver Chest X Deflection vs. Time



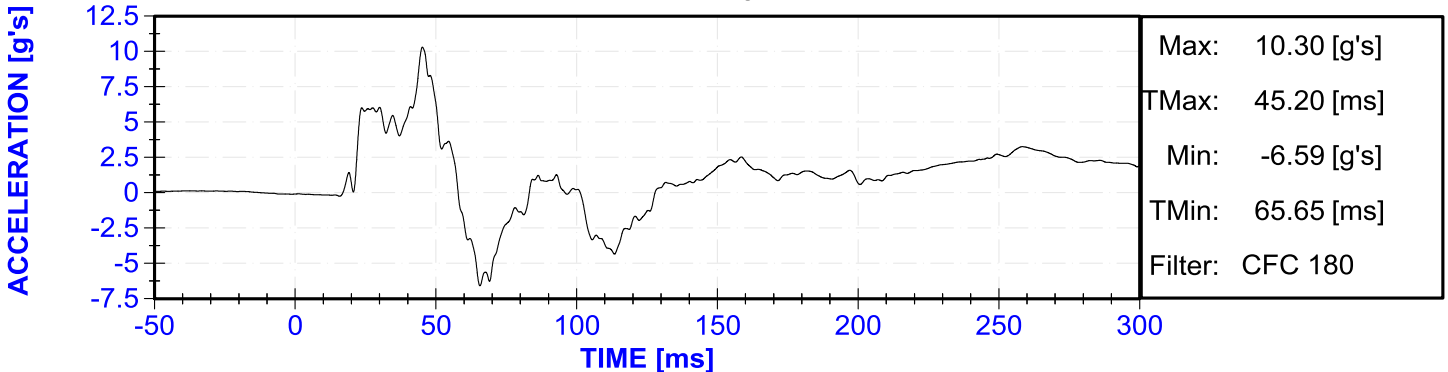
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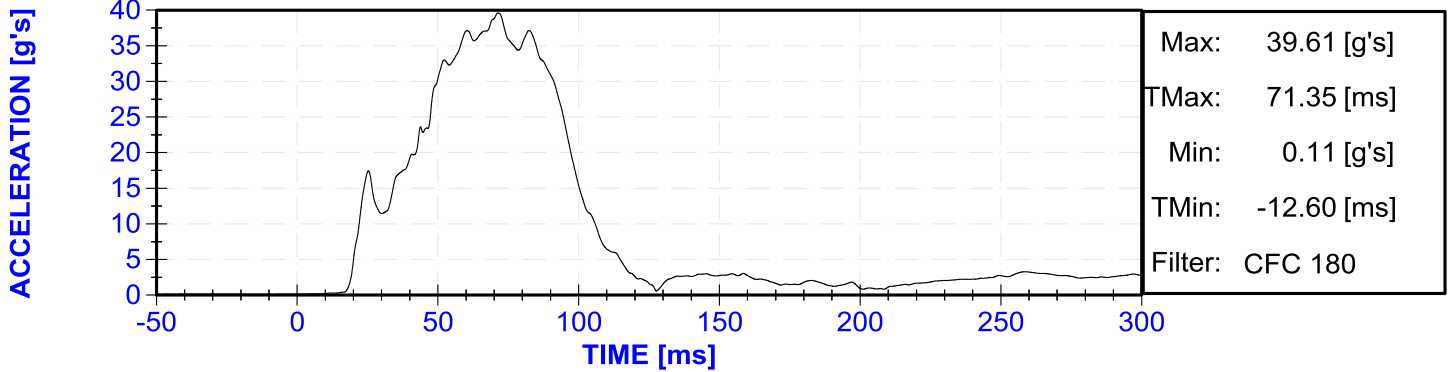
Driver Chest Y Acceleration vs. Time Primary



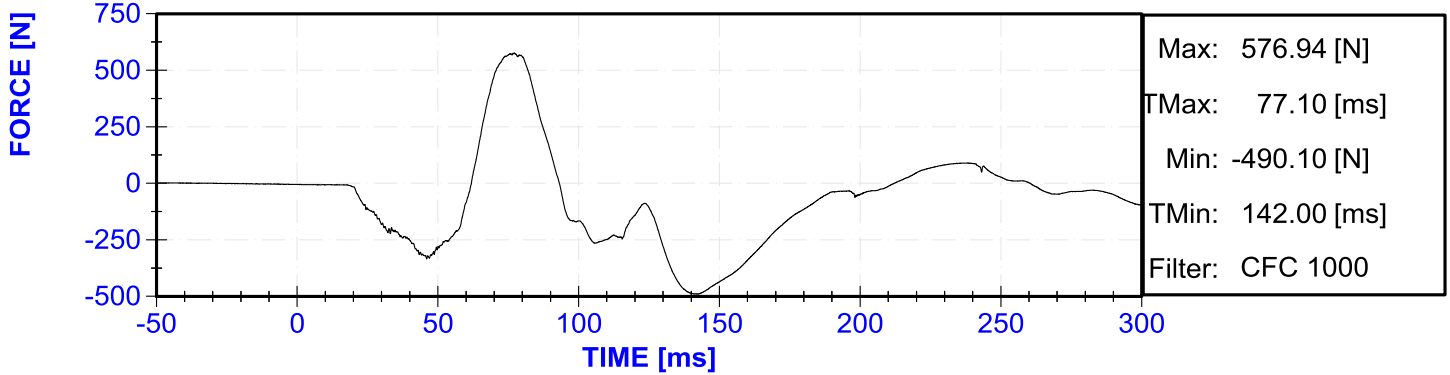
Driver Chest Z Acceleration vs. Time Primary



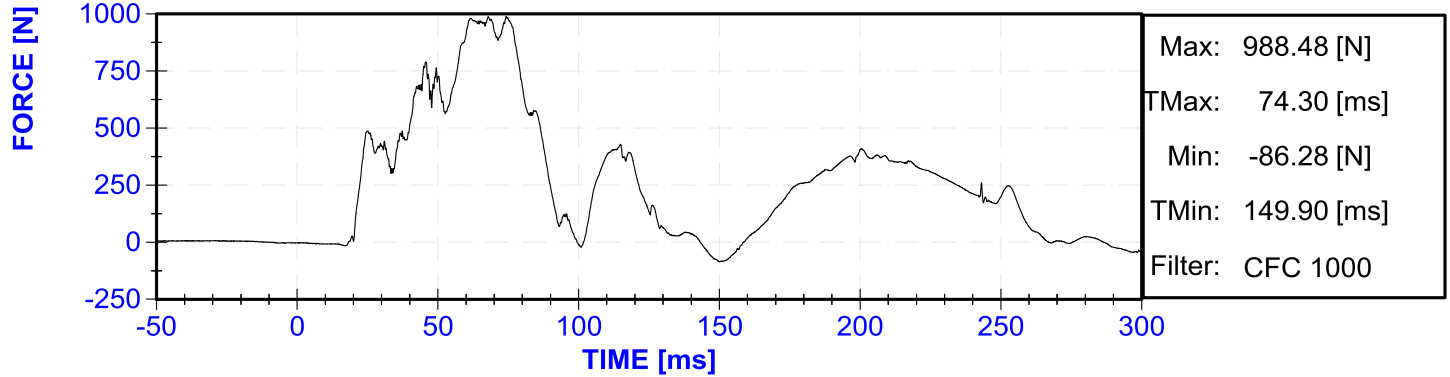
Driver Chest Resultant Acceleration vs. Time Primary



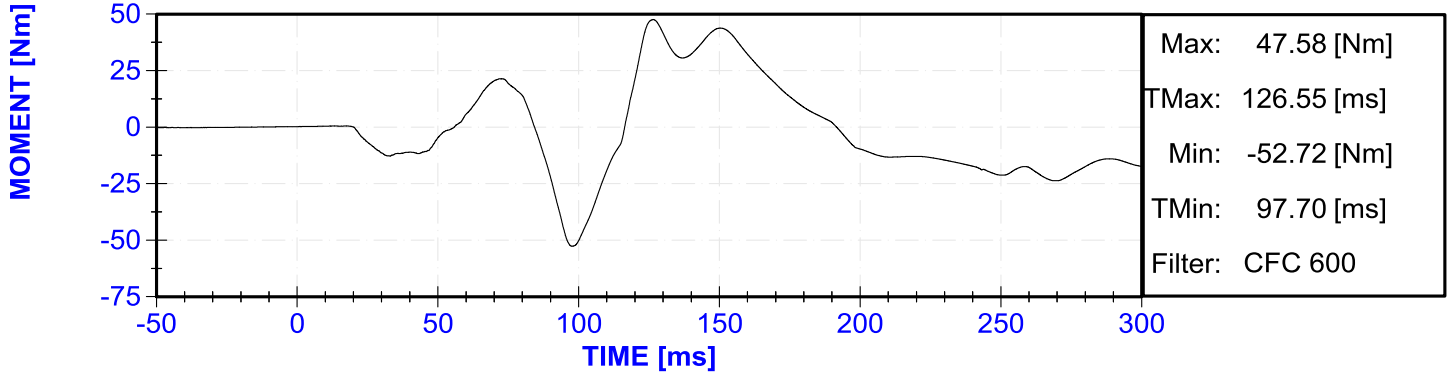
Driver Upper Neck Force X vs. Time Primary

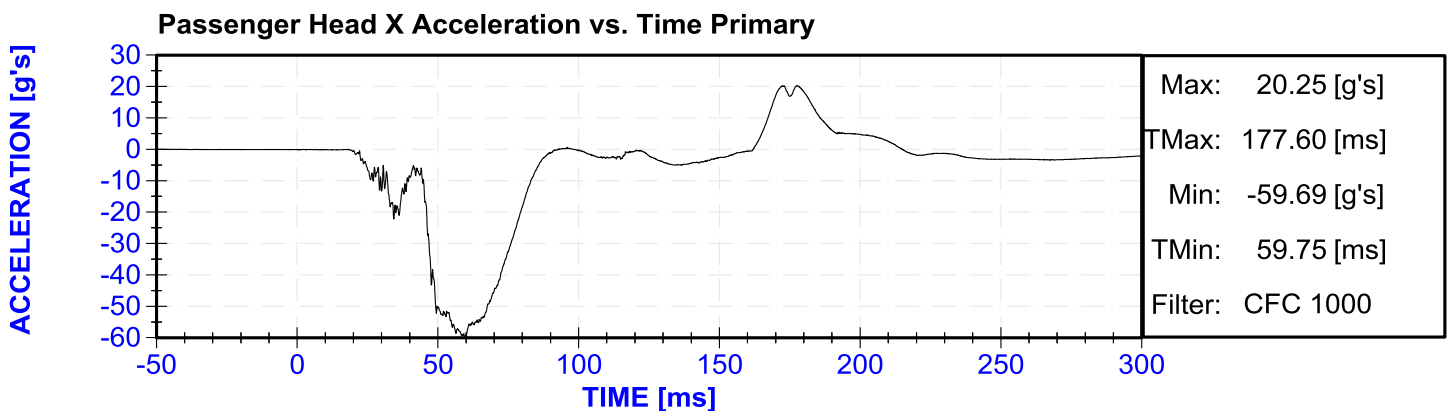
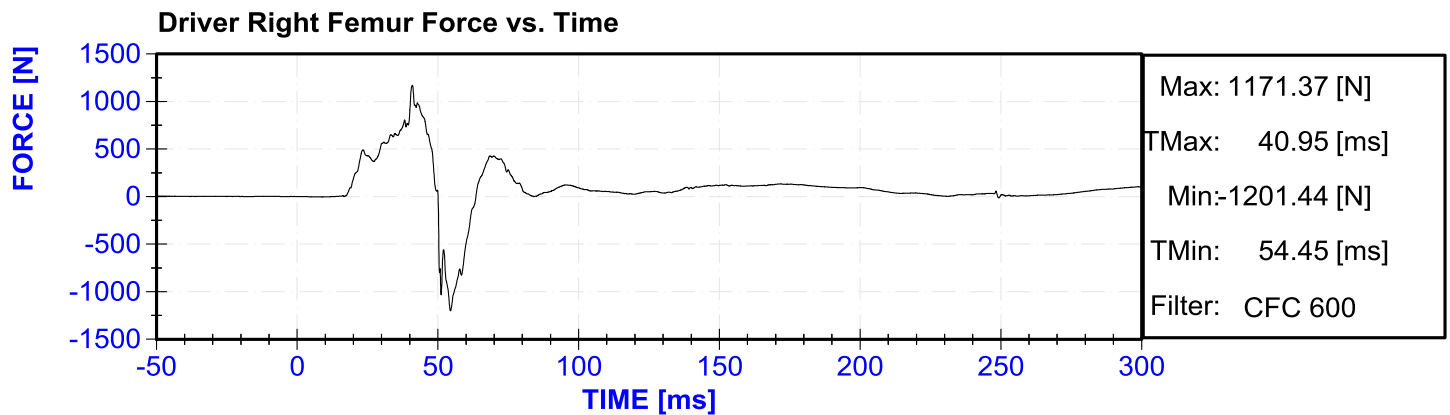
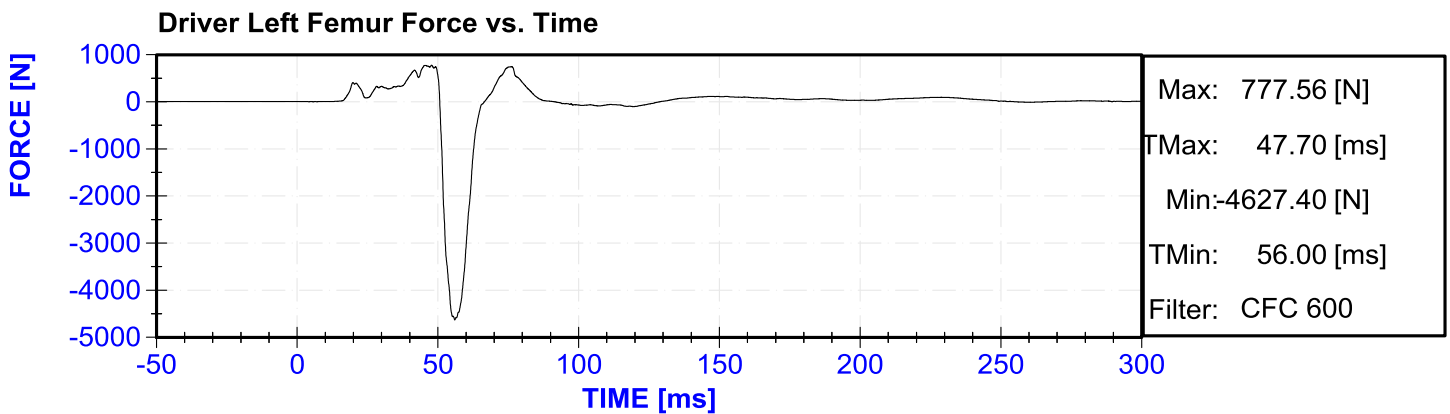
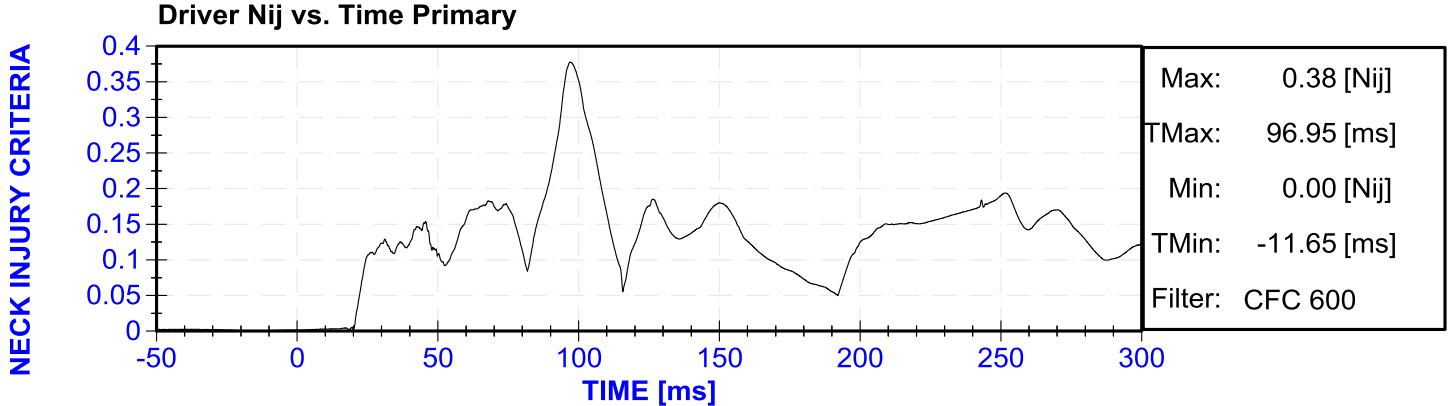


Driver Upper Neck Force Z vs. Time Primary

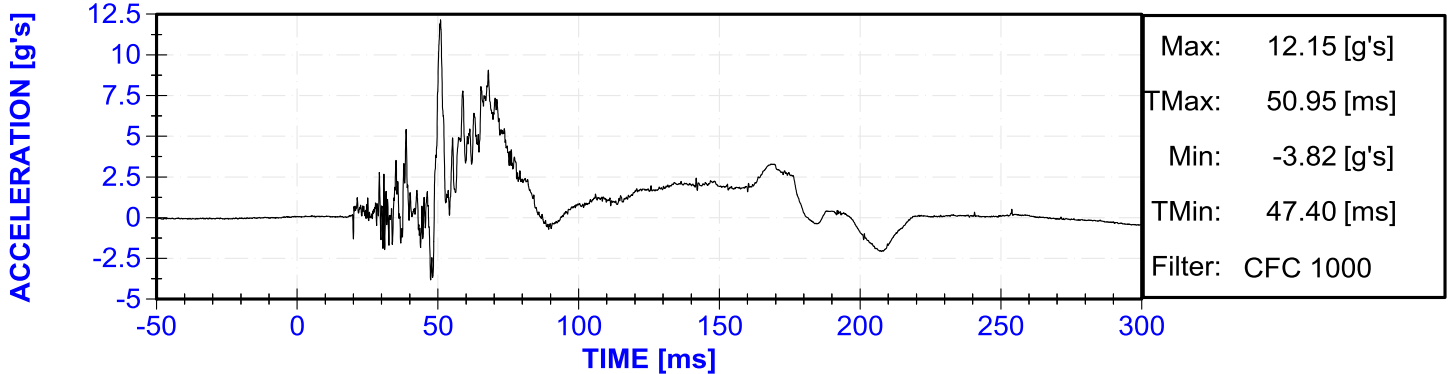


Driver Upper Neck Moment Y vs. Time Primary

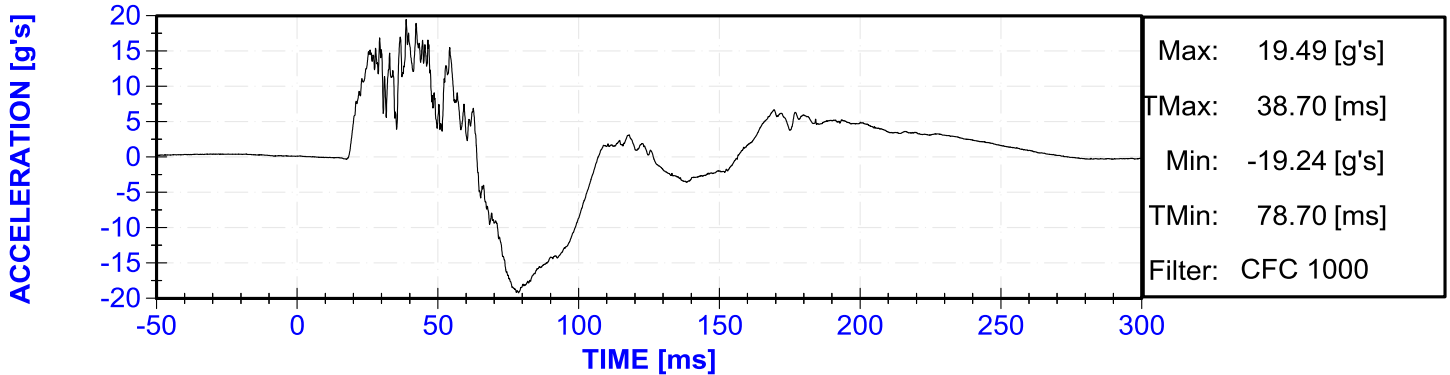




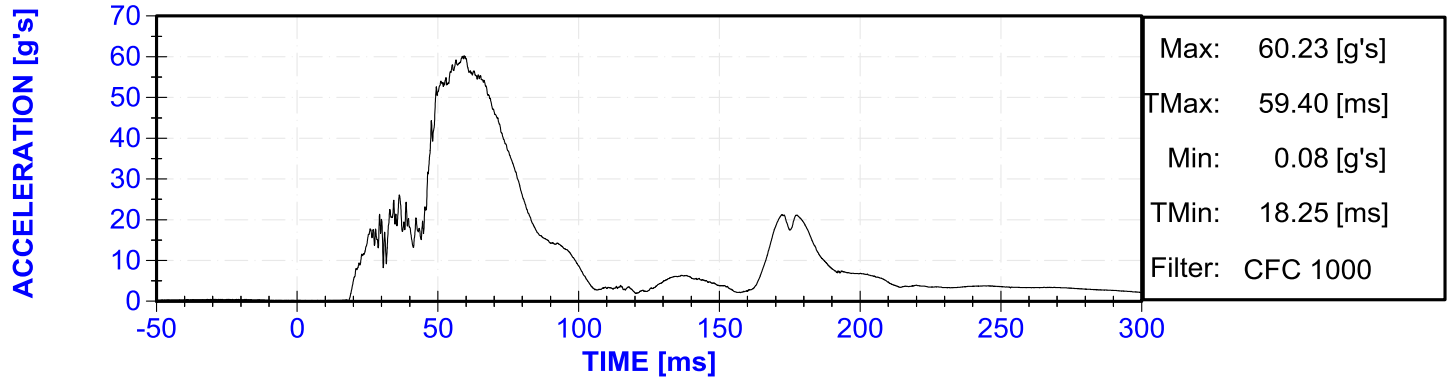
Passenger Head Y Acceleration vs. Time Primary



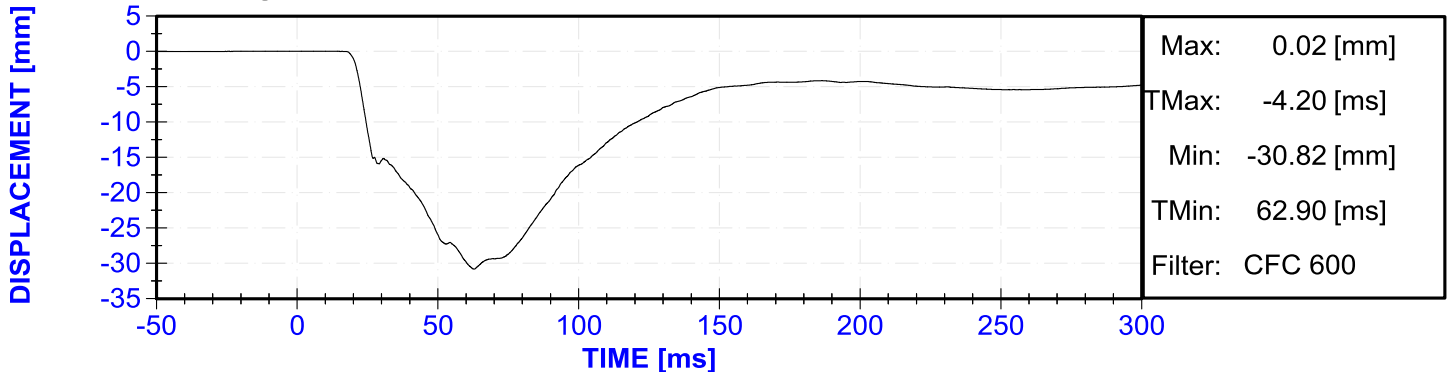
Passenger Head Z Acceleration vs. Time Primary



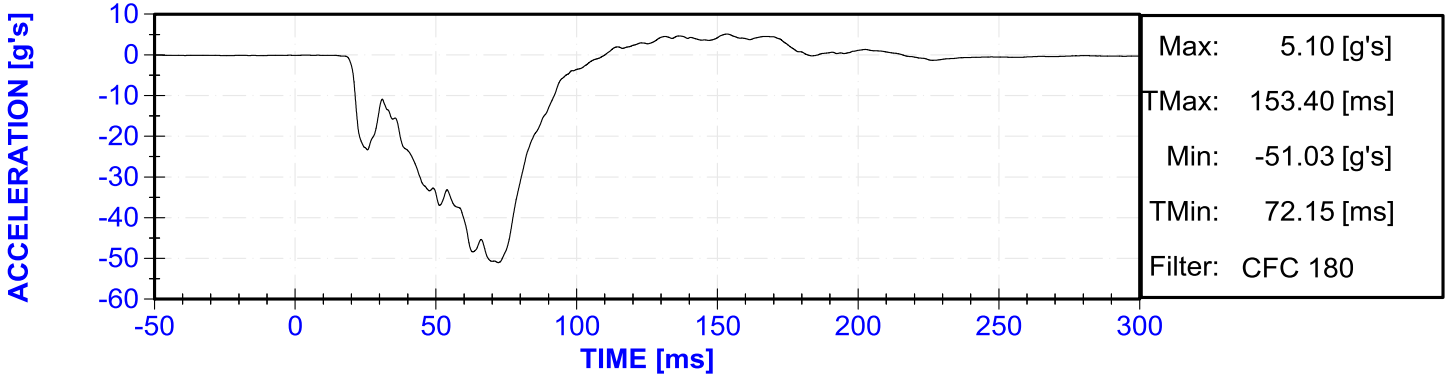
Passenger Head Resultant Acceleration vs. Time Primary



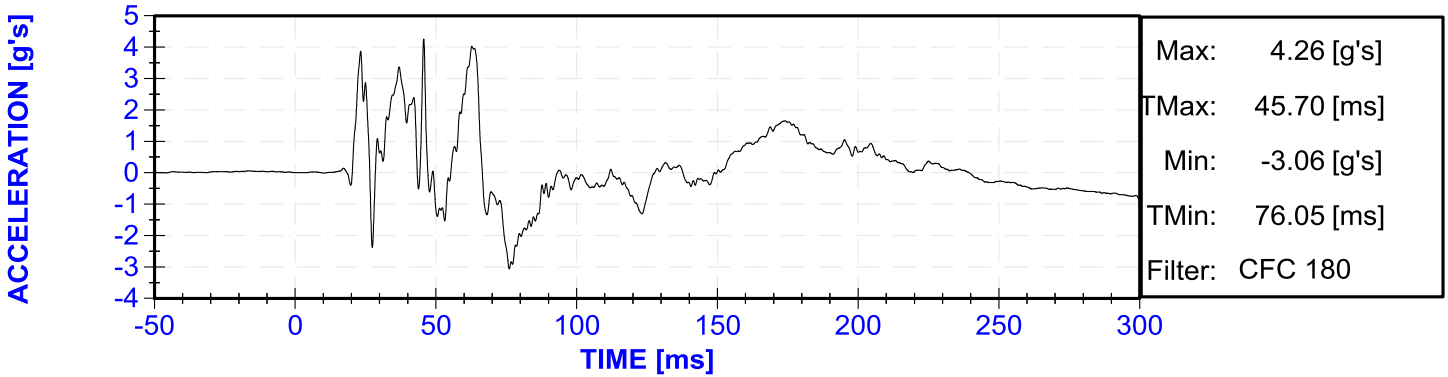
Passenger Chest X Deflection vs. Time



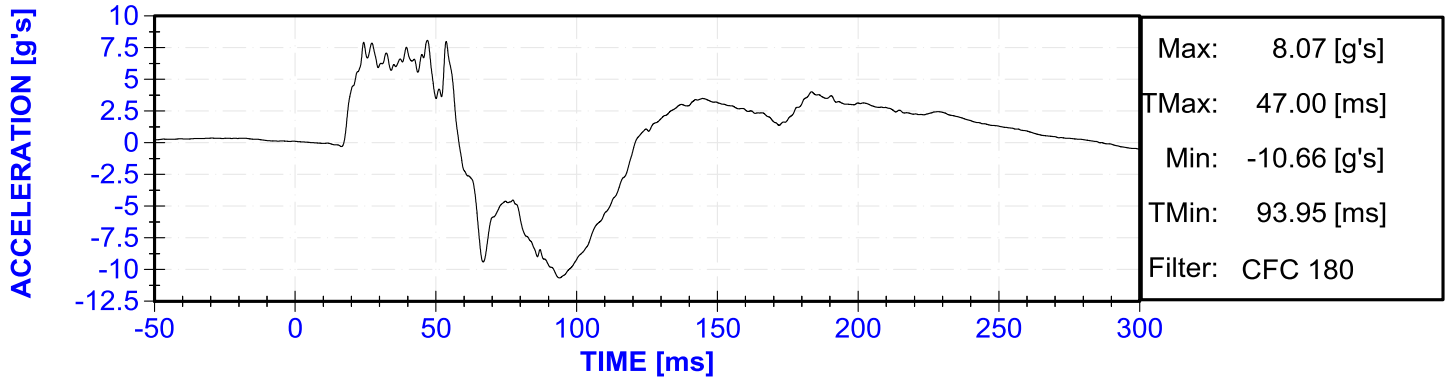
Passenger Chest X Acceleration vs. Time Primary



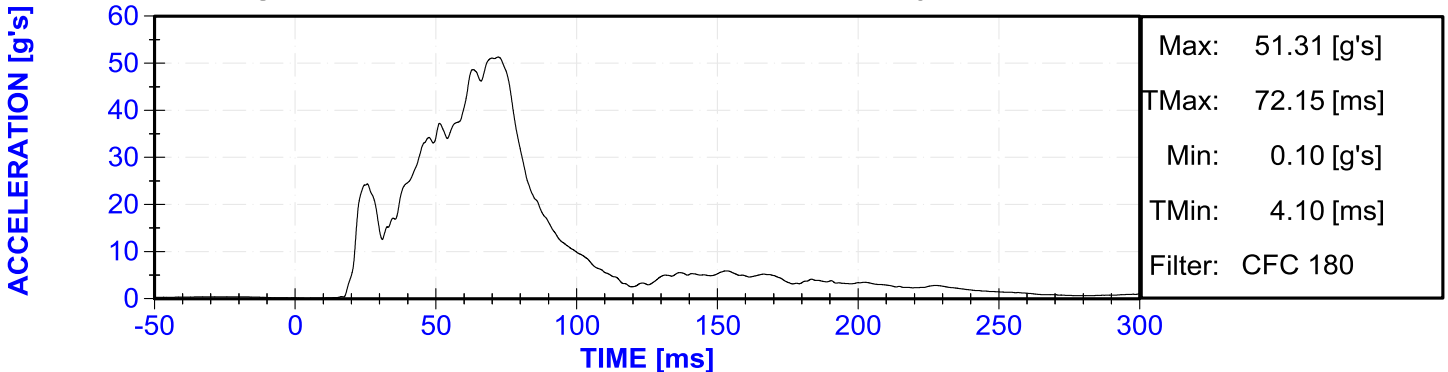
Passenger Chest Y Acceleration vs. Time Primary



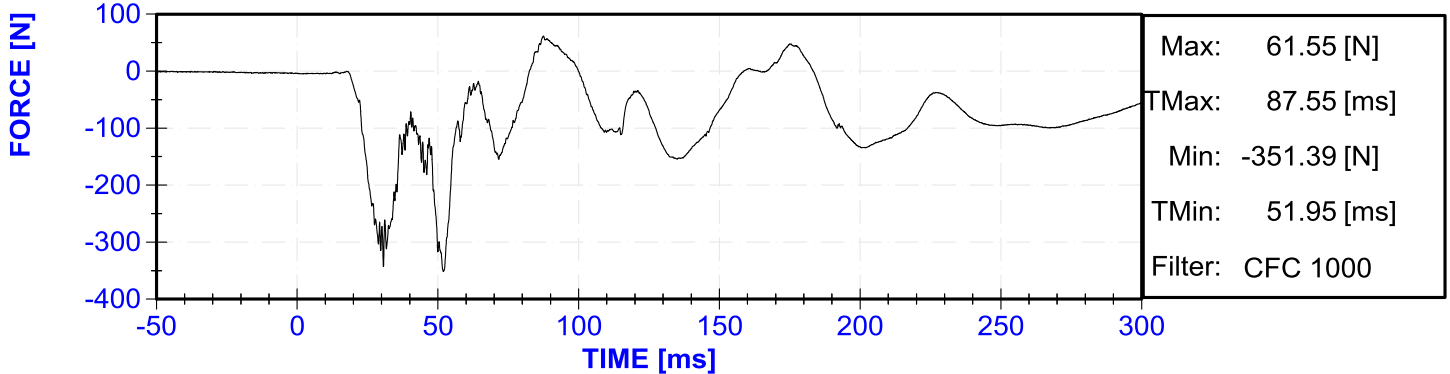
Passenger Chest Z Acceleration vs. Time Primary



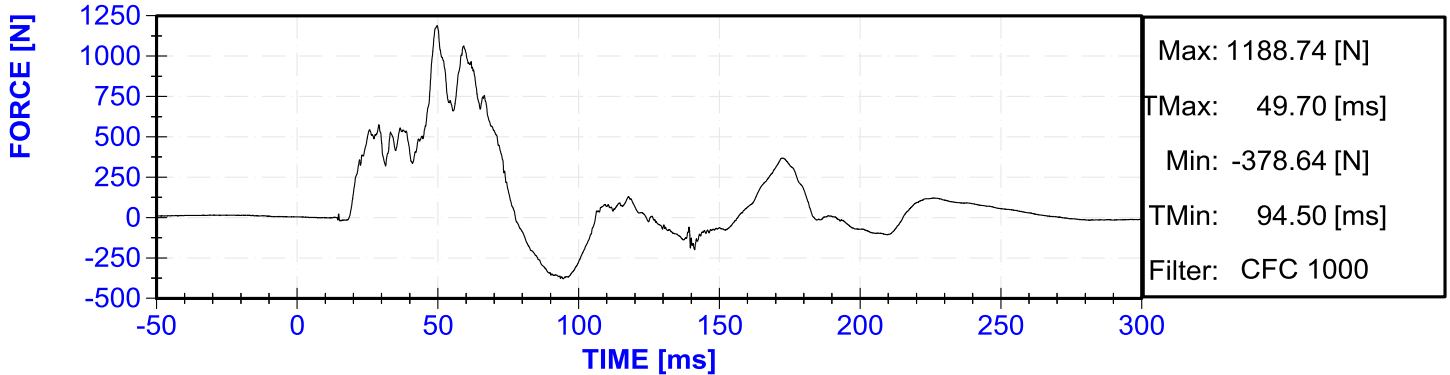
Passenger Chest Resultant Acceleration vs. Time Primary



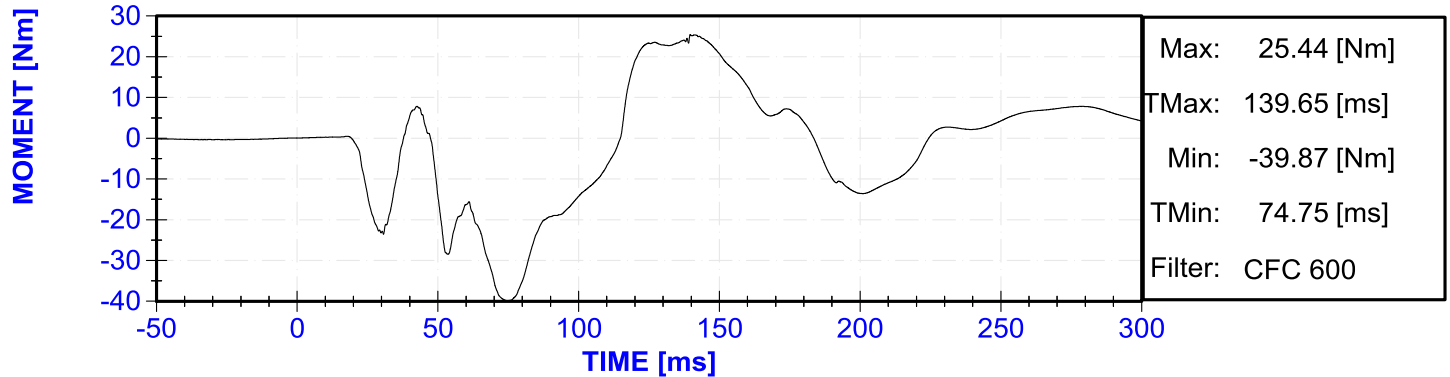
Passenger Upper Neck Force X vs. Time Primary



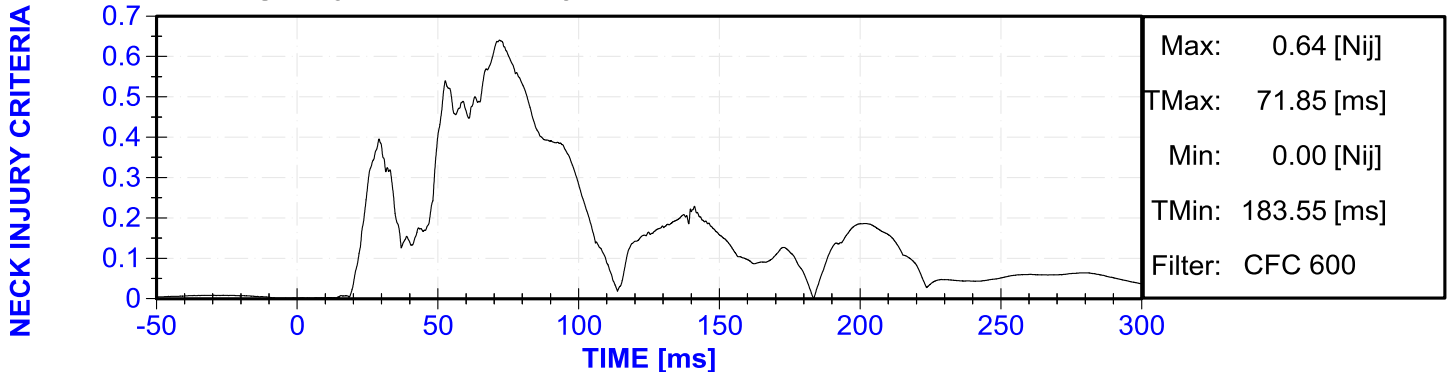
Passenger Upper Neck Force Z vs. Time Primary



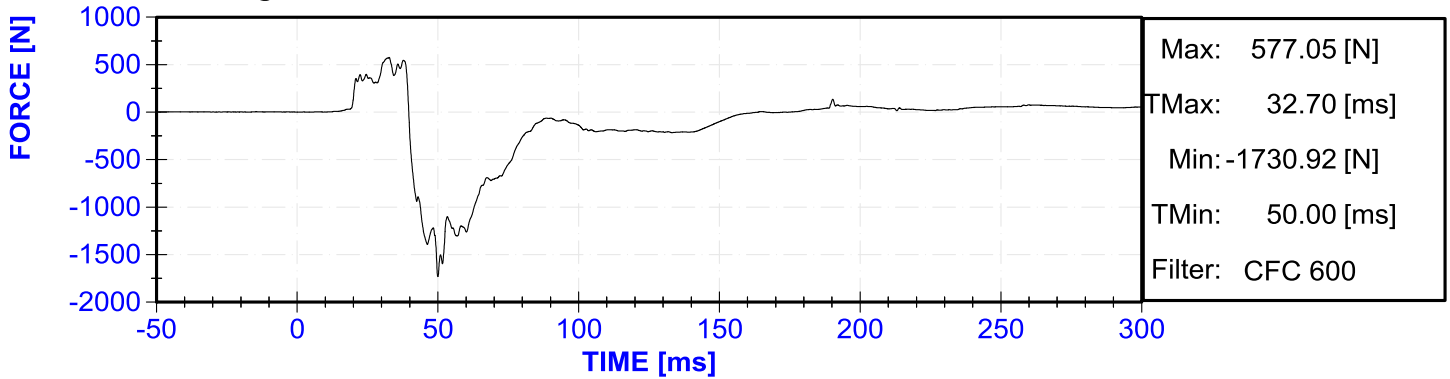
Passenger Upper Neck Moment Y vs. Time Primary



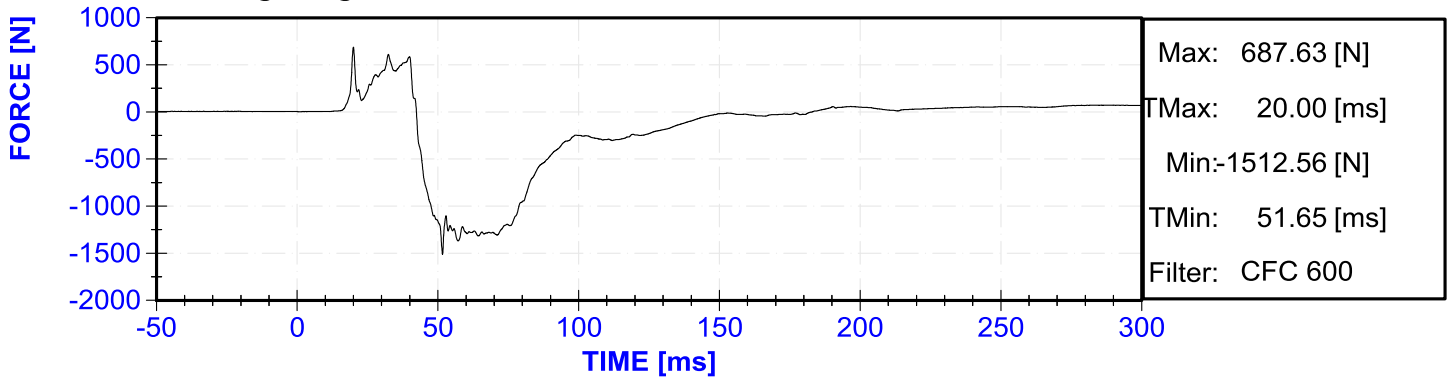
Passenger Nij vs. Time Primary



Passenger Left Femur Force vs. Time



Passenger Right Femur Force vs. Time



APPENDIX C

DUMMY CALIBRATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 064



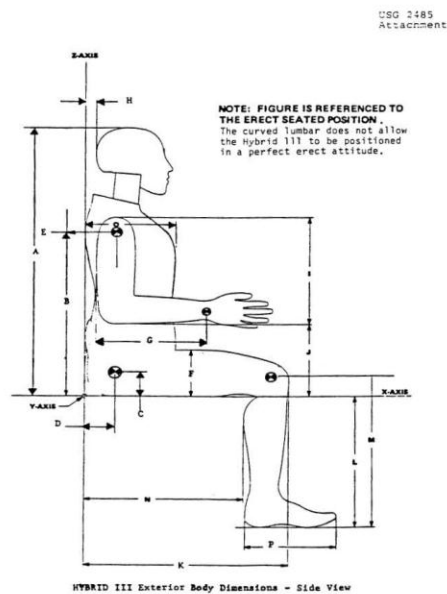
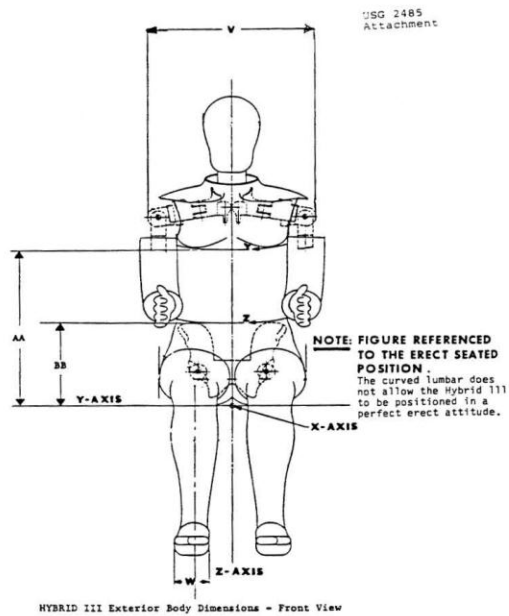
50th Male External Measurements

S/N 064

Symbol	Description	Specification	Results	Pass
		in	In	
A	Sitting Height	34.6 – 35.0	34.8	Yes
B	Shoulder Pivot Height	19.9 – 20.5	20.0	Yes
C	H-Point Height	3.3 – 3.5	3.3	Yes
D	H-Point from Backline	5.3 – 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.5	Yes
F	Thigh Clearance	5.5 – 6.1	6.0	Yes
G	Back of Elbow to Wrist Pivot	11.4 – 12.0	11.5	Yes
H	Head Back to Backline	1.6 – 1.8	1.7	Yes
I	Shoulder to Elbow Length	13.0 – 13.6	13.1	Yes
J	Elbow Rest Height	7.5 – 8.3	8.1	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.1	Yes
L	Popliteal Height	16.9 – 17.9	17.2	Yes
M	Knee Pivot Height	19.1 – 19.7	19.3	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.5	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.6	Yes
P	Foot Length (right)	9.9 – 10.5	10.3	Yes
V	Shoulder Breadth	16.3 – 17.2	16.8	Yes
W	Foot Breadth	3.6 – 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	39.0	Yes
Z	Waist Circumference	32.9 – 34.1	33.6	Yes
AA	Reference Location (Chest Circumference)	16.9 – 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 – 9.1	9.0	Yes

Technician: M. Geesey

02/24/2014





VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Head Drop	Test Date:	2/21/2014
		Test Time:	4:38:41 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	7997

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.70 deg C P
Humidity	10 -- 70	28.40 %RH P
Resultant Acceleration	225 -- 275	244.4 G's P
Oscillation	0 -- 10	2.2 % P
Lateral Acceleration	-15 -- 15	1.8 G's P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**



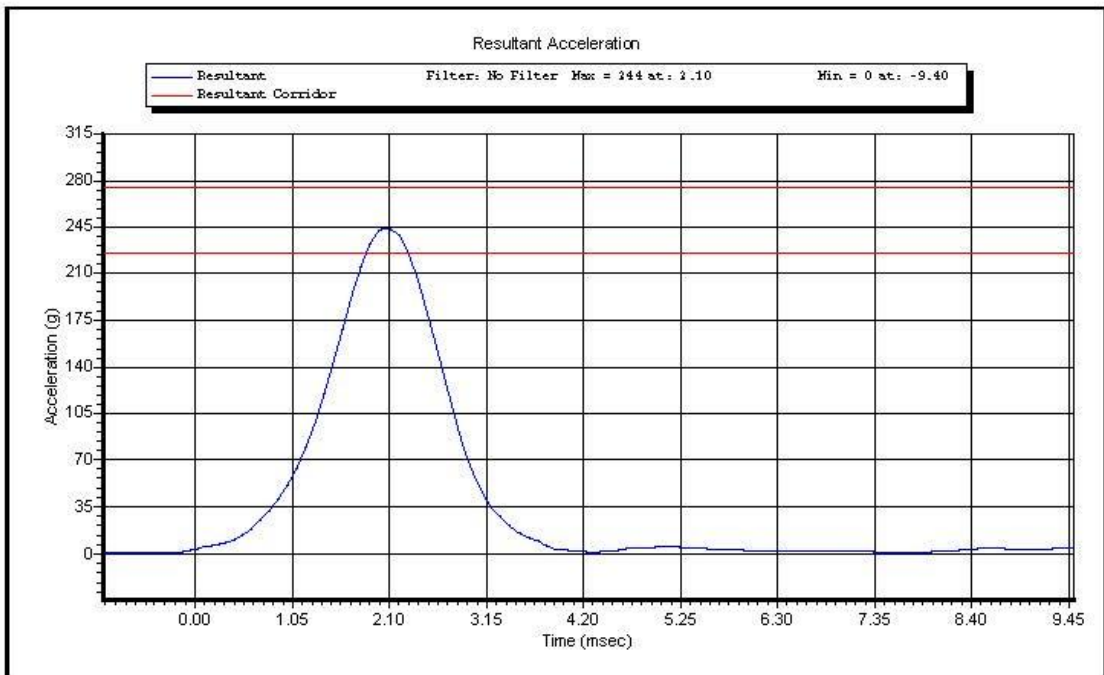
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58904	12/5/2013
Endevco	7264-2000	P58911	12/5/2013
Endevco	7264-2000	P58776	12/5/2013



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

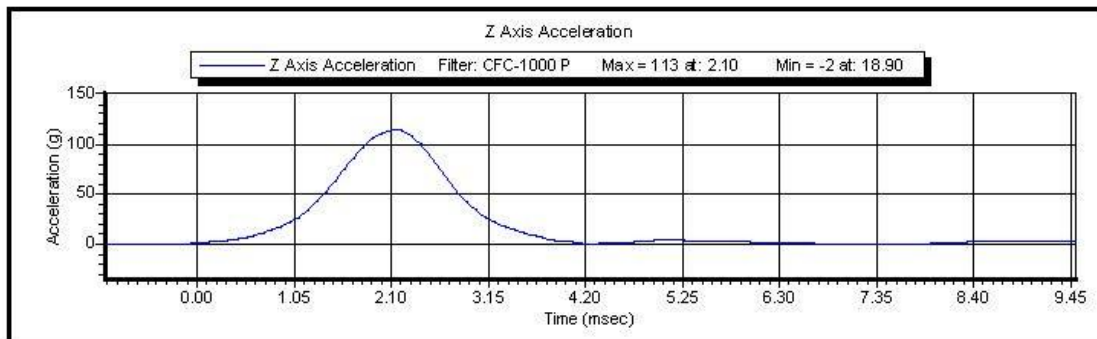
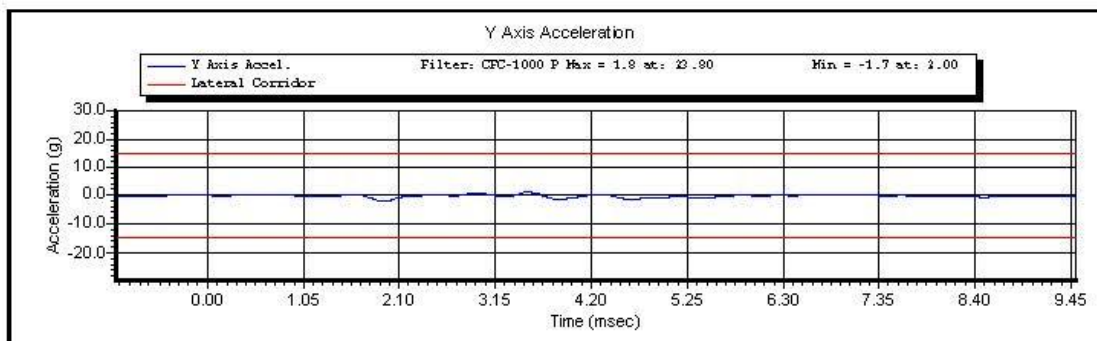
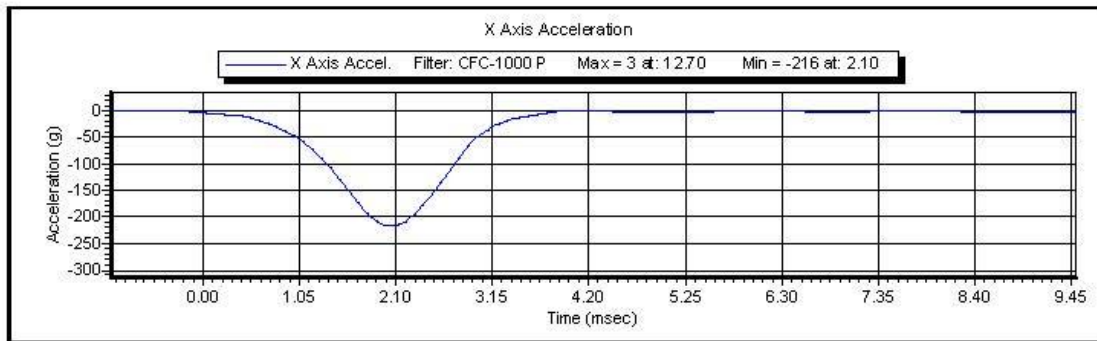


Test ID: **Head Drop**

Test Time: **4:38:41 PM**

Test Date: **2/21/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Head Drop**

Test Time: **4:38:41 PM**

Test Date: **2/21/2014**

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:	064		
Test ID:	Neck Extension	Test Date:	2/24/2014
		Test Time:	9:11:39 AM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.20 deg C	P
Humidity		10	-- 70	16.50 %RH	P
Velocity		5.94	-- 6.19	6.041 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	18.31 G's	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	16.40 G's	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	11.57 G's	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	12.51 G's	P
Deceleration Time to	5 G's	38	-- 46	44.0 ms	P
D Plane Rotation		81	-- 106	98.2 degrees	P
Time at Max Rotation		72	-- 82	78.2 ms	P
Rotation Decay to Zero		147	-- 174	155.7 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-67.45 Nm	P
Time at Maximum Moment		65	-- 79	73.0 ms	P
Moment Decay to Zero		120	-- 148	141.1 ms	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



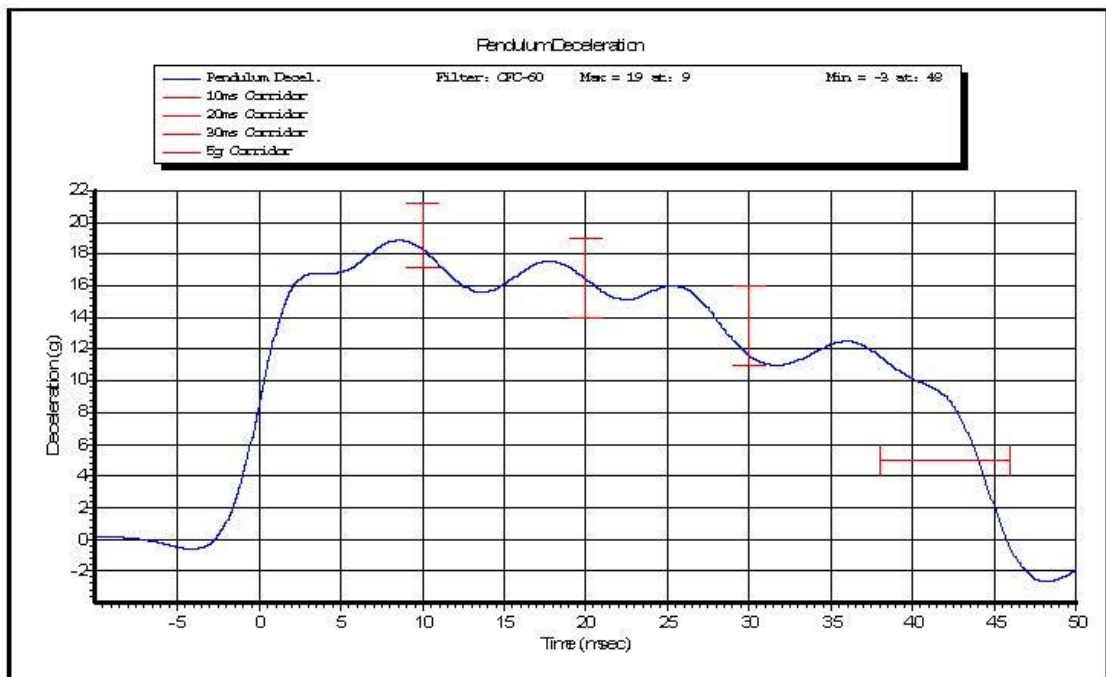
VERIFICATION REPORT

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-2186 My	5/23/2013
Denton	1716A	LC-2186 Fx	5/23/2013



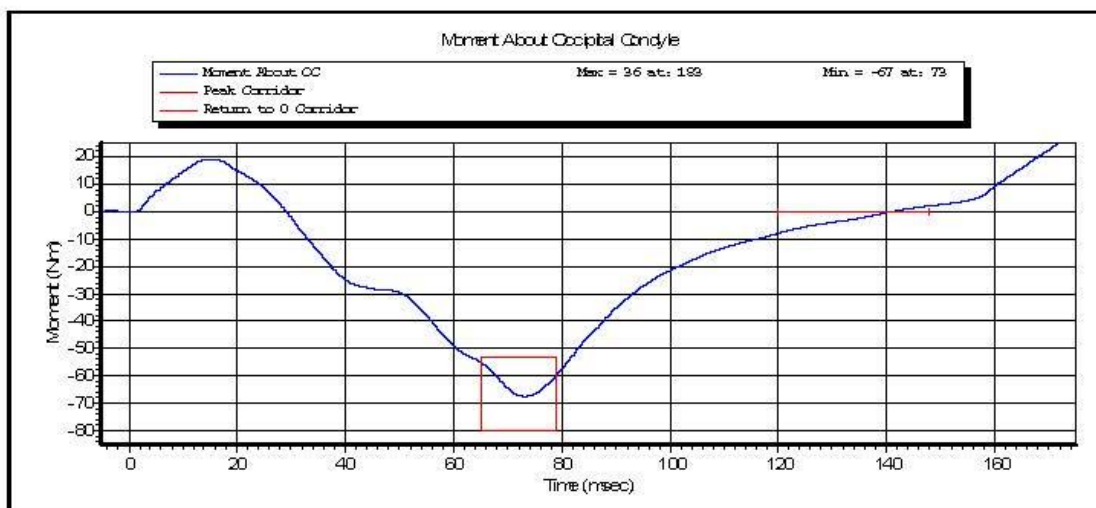
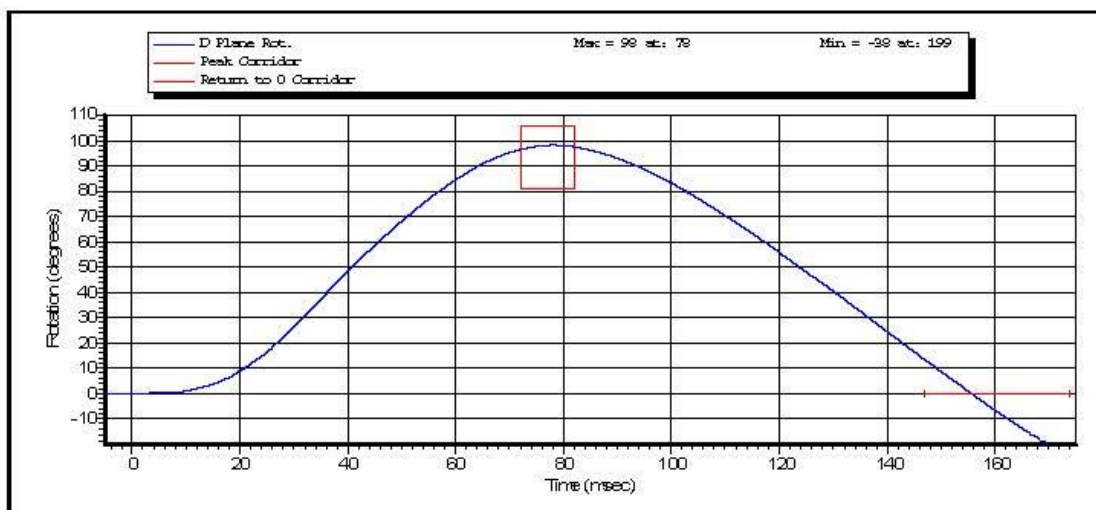
Name of Test:	Neck Extension
Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	064



ID of Test: **Neck Extension** Time of Test: **9:11:39 AM**

Date of Test: **2/24/2014**

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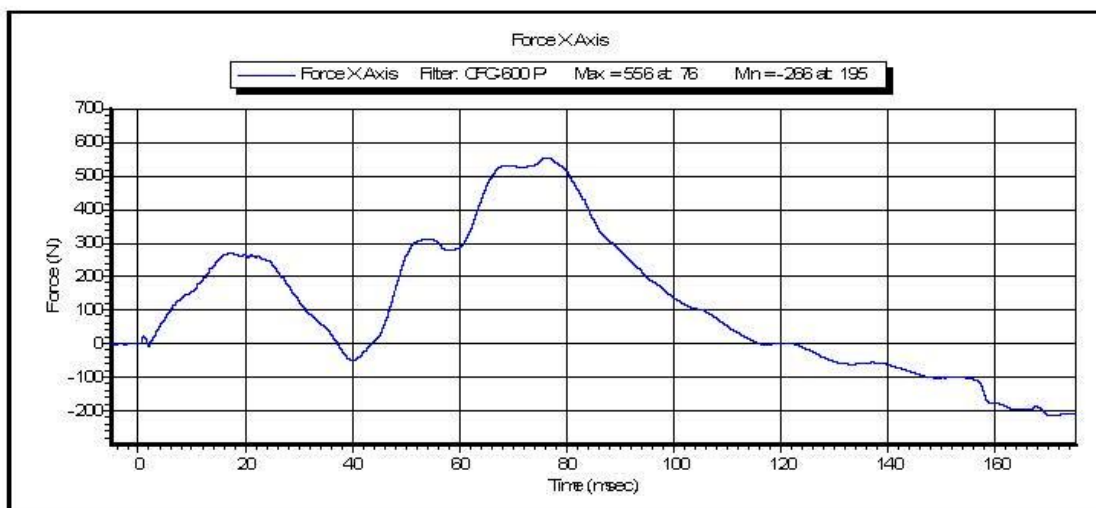
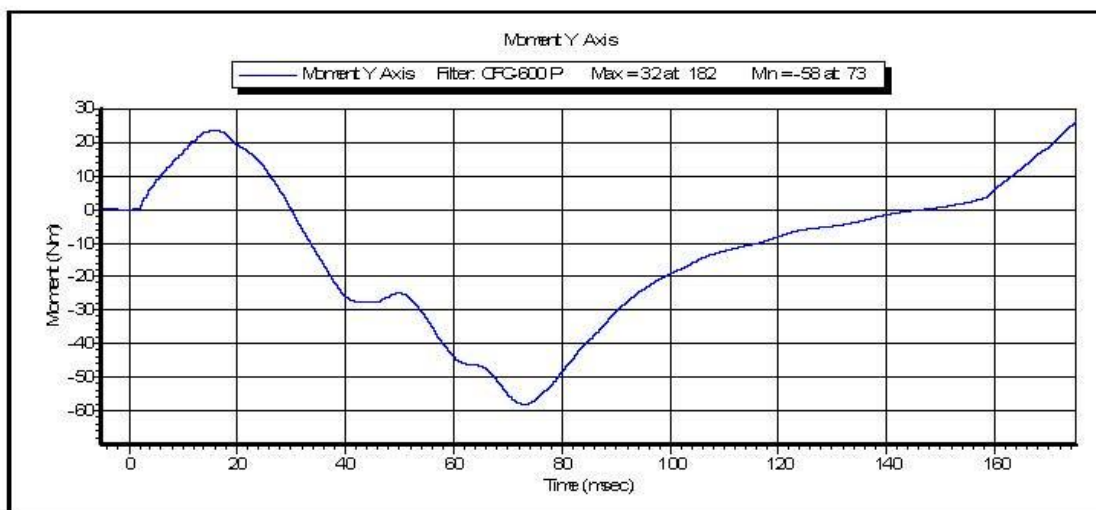


ID of Test: **Neck Extension**

Time of Test: **9:11:39 AM**

Date of Test: **2/24/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



ID of Test: **Neck Extension**

Time of Test: **9:11:39 AM**

Date of Test: **2/24/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Neck Flexion	Test Date:	2/24/2014
		Test Time:	8:29:39 AM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	22.20 deg C	P
Humidity		10	-- 70	15.70 %RH	P
Velocity		6.89	-- 7.13	6.891 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	23.75 G's	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	20.51 G's	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	15.02 G's	P
Maximum Pendulum Deceleration After	30 ms	0	-- 29	15.0 G's	P
Deceleration Time to	5 ms	34	-- 42	38.8 ms	P
D Plane Rotation		-78	-- -64	-72.9 degrees	P
Time at Maximum Rotation		57	-- 64	59.4 ms	P
Rotation Decay to Zero		113	-- 128	122.0 ms	P
Moment About Occipital Condyle		88.1	-- 108.4	97.43 Nm	P
Time at Maximum Moment		47	-- 58	52.9 ms	P
Moment Decay to Zero		97.0	-- 107.0	100.5 ms	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



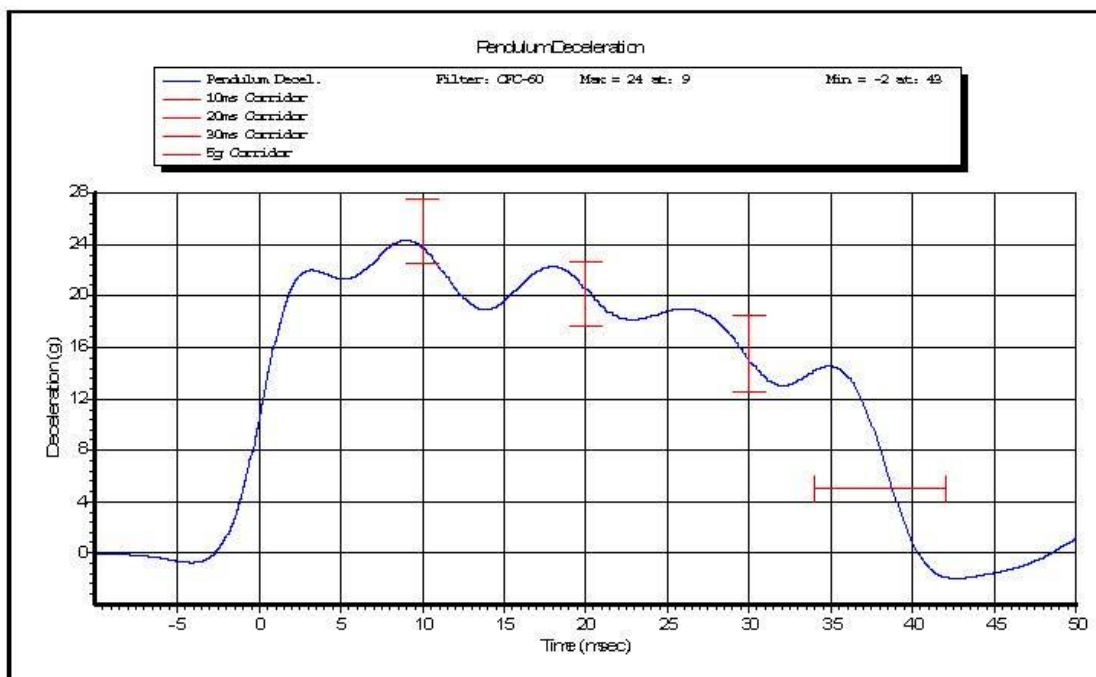
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
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-2186 My	5/23/2013
Denton	1716A	LC-2186 Fx	5/23/2013



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

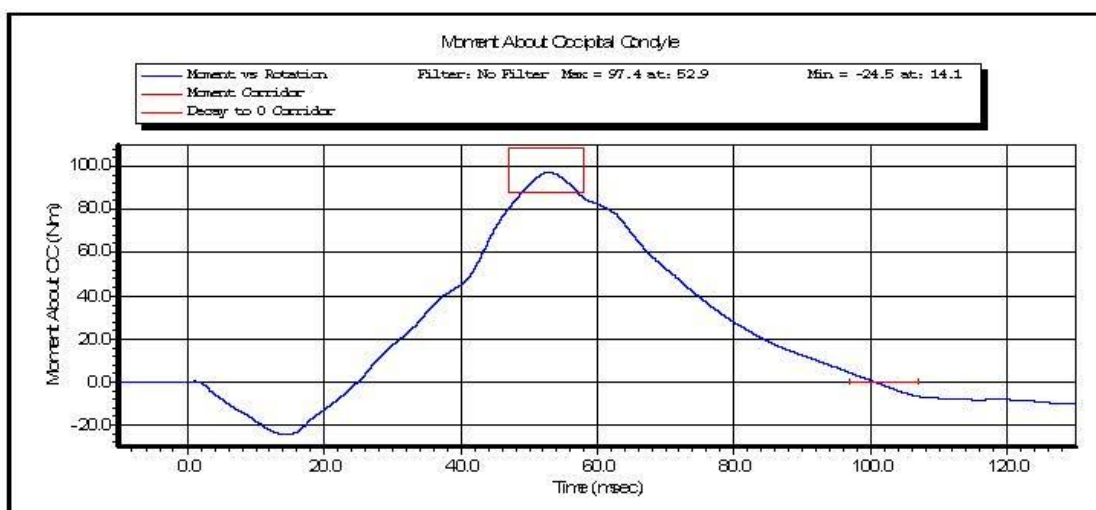
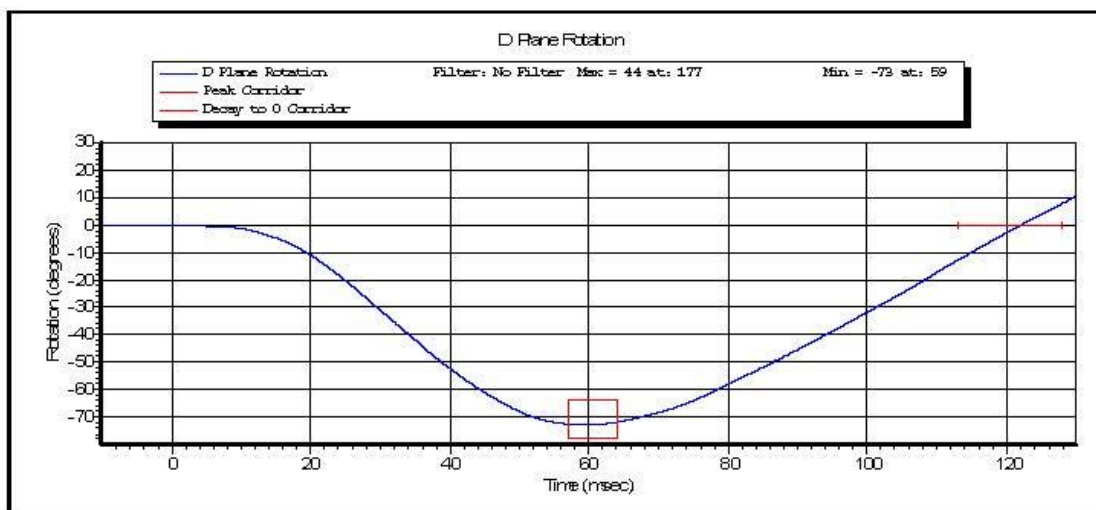


ID of Test: **Neck Flexion**

Time of Test: **8:29:39 AM**

Date of Test: **2/24/2014**

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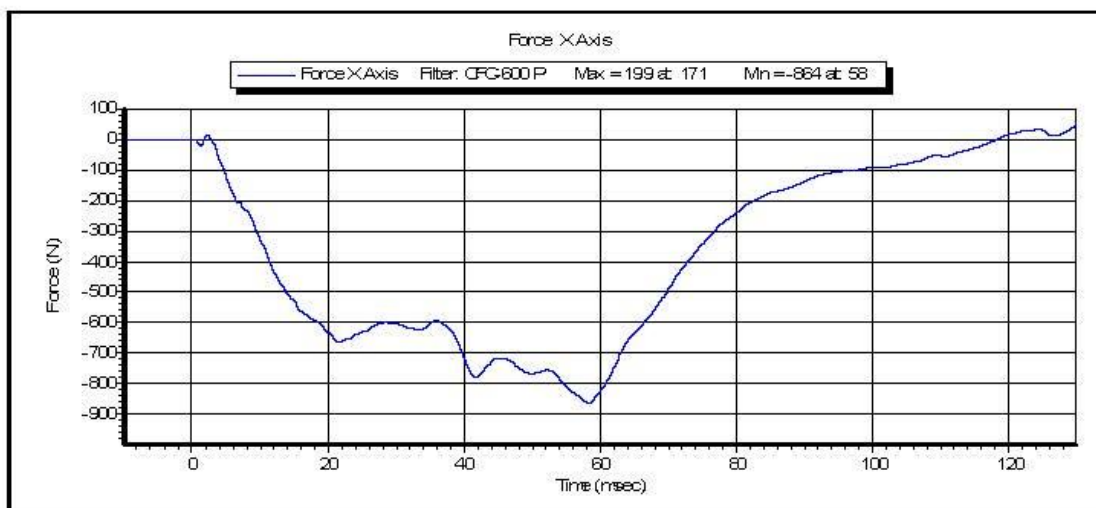
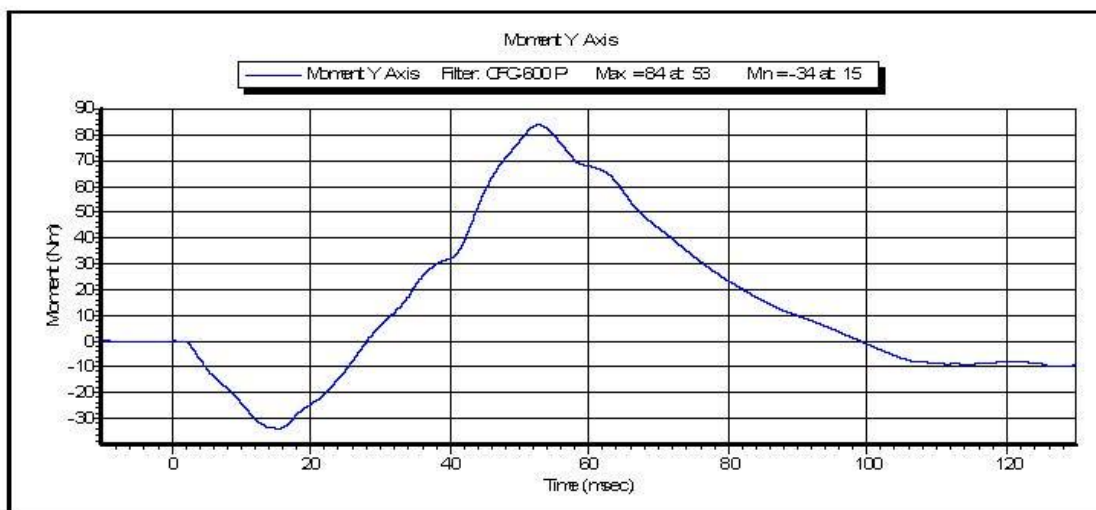


ID of Test: **Neck Flexion**

Time of Test: **8:29:39 AM**

Date of Test: **2/24/2014**

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ID of Test: **Neck Flexion**

Time of Test: **8:29:39 AM**

Date of Test: **2/24/2014**

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Thorax Impact	Test Date:	2/24/2014
		Test Time:	4:16:38 PM

Component Part Number	Component Serial Number
-----------------------	-------------------------

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.20 deg C	P
Humidity	10	--	70	17.40 %RH	P
Velocity	6.59	--	6.83	6.721 m/s	P
Chest Deflection	-72.6	--	-63.5	-72.39 mm	P
Resistive Force	-5.894	--	-5.160	-5.5209 kN	P
Hysteresis	69	--	85	70.0 %	P

All test parameters are within specifications

Technician: **M. Goehle/M. Geesey**

Supervisor: **E. Dutton**



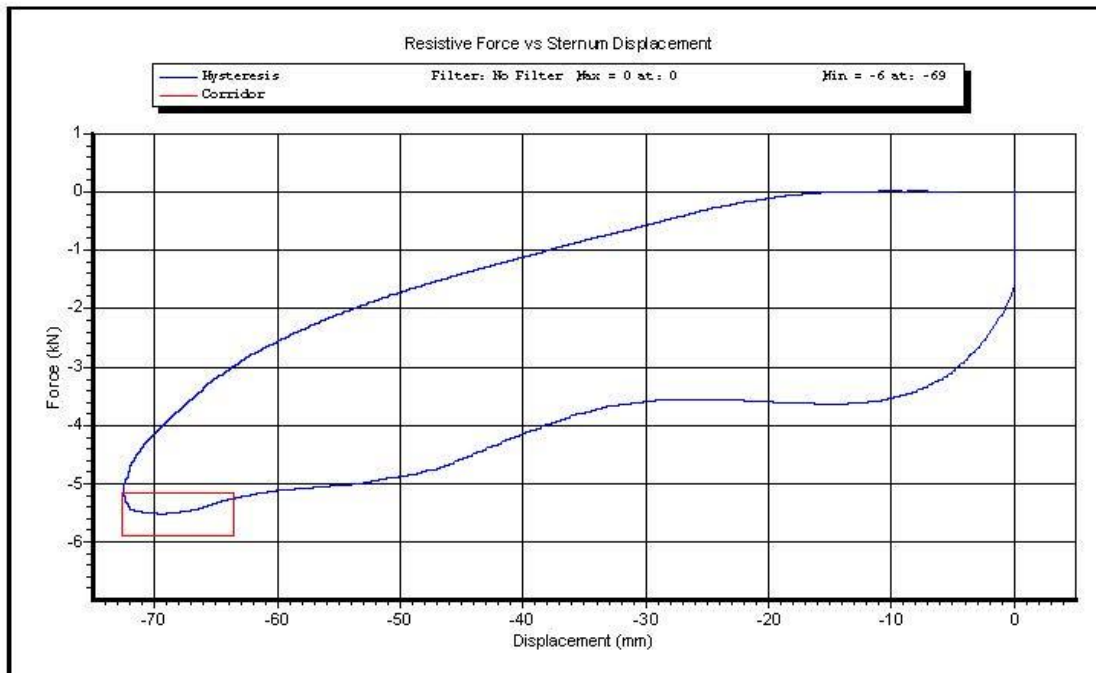
VERIFICATION REPORT

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-064	6/18/2013

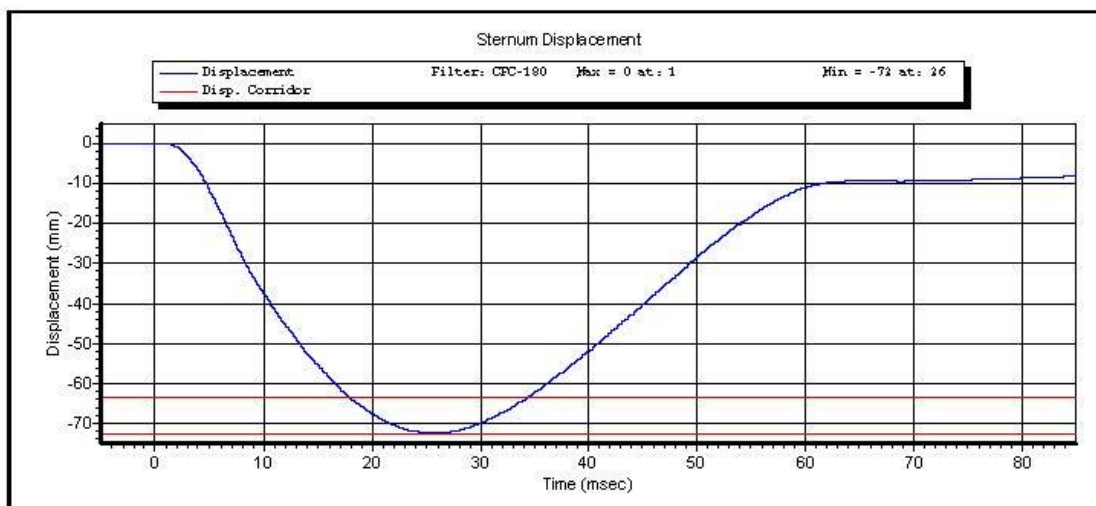
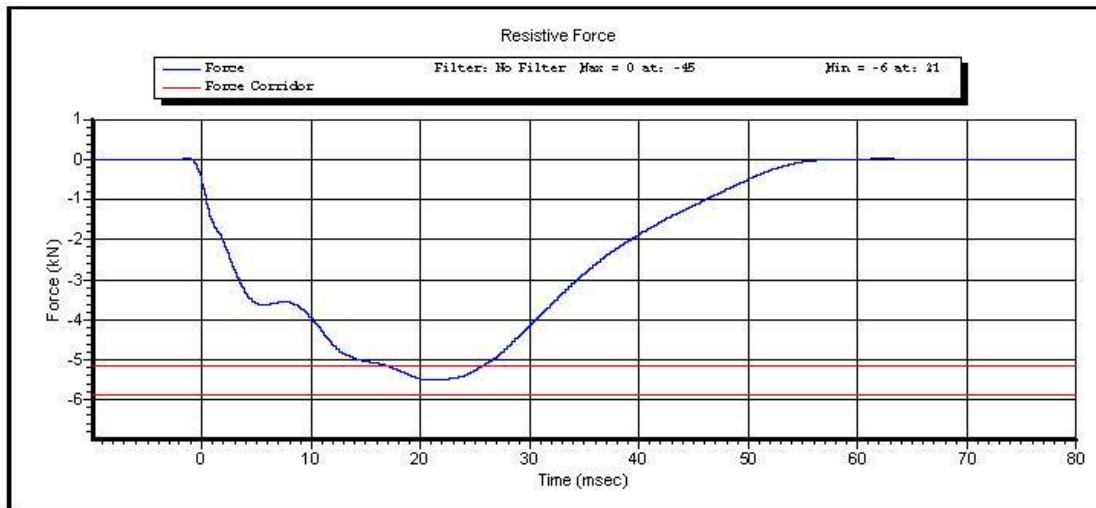


Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	064



Test ID: Thorax Impact Test Time: 4:16:38 PM
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: 2/24/2014

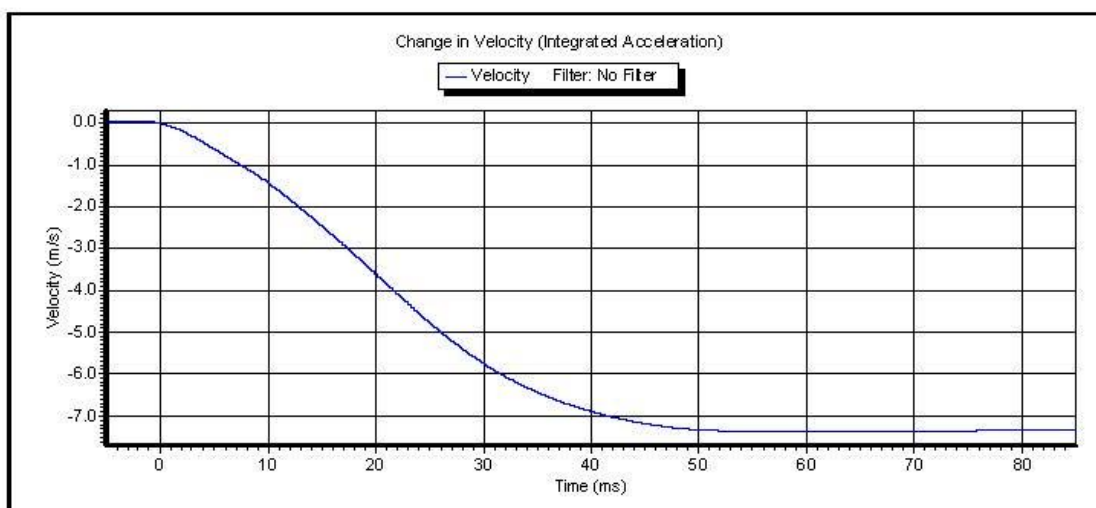
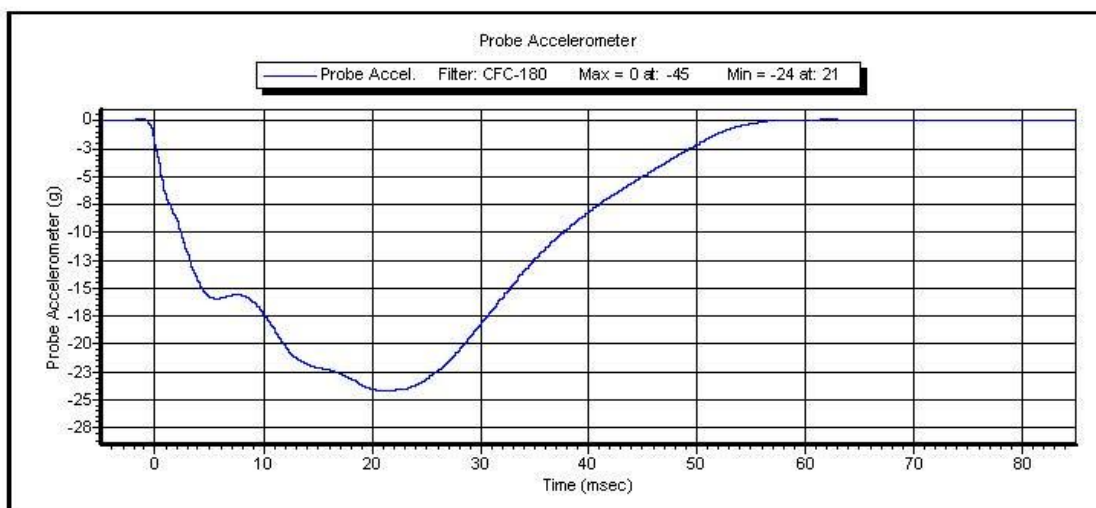


Test ID: **Thorax Impact**

Test Time: **4:16:38 PM**

Test Date: **2/24/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Thorax Impact**

Test Time: **4:16:38 PM**

Test Date: **2/24/2014**

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VERIFICATION REPORT

Test Name:	Hip ROM	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Hip ROM Left	Test Date:	2/21/2014
		Test Time:	8:50:21 AM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.20 deg C	P
Humidity	10	--	70	36.00 %RH	P
Average Velocity	5	--	10	6.2 deg/s	P
Angle at 203 Nm	40	--	50	43.5 degrees	P
Moment at 30 degrees	0.0	--	94.9	65.90 Nm	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



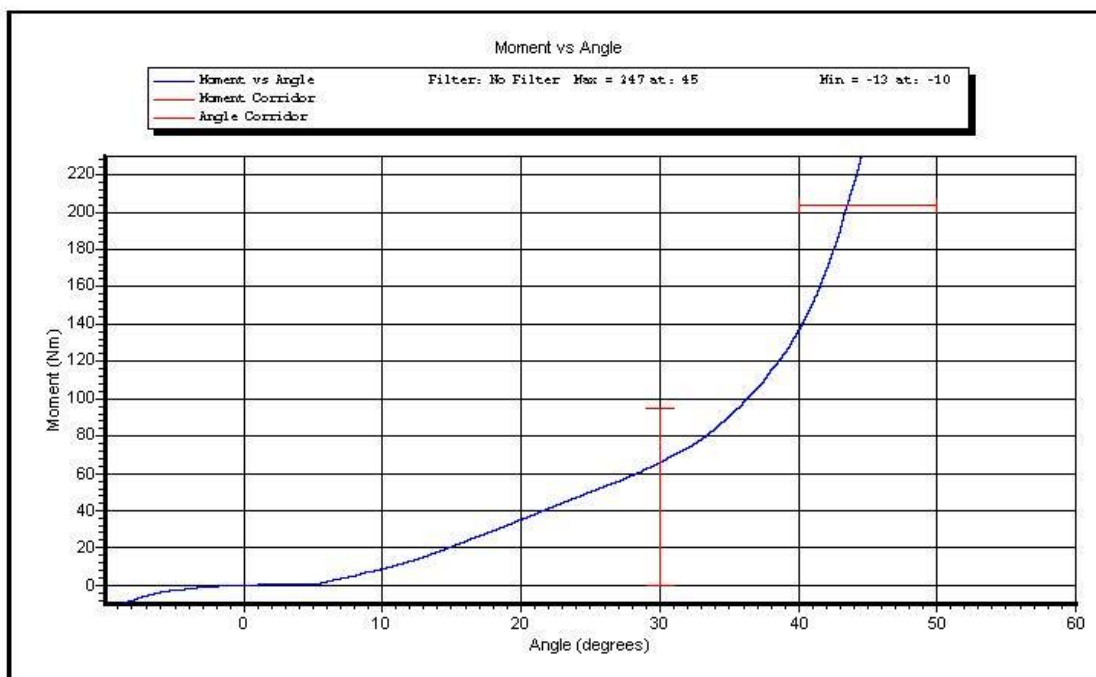
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key Trans/PCB	2301-02	115	3/19/2013
DentonATD	14 CB1-3615	0008	2/20/2014
DentonATD	A0 Output	1	1/11/2014



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



Test ID: **Hip ROM Left** Test Time: **8:50:21 AM**

Test Date: **2/21/2014**

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VERIFICATION REPORT

Test Name:	Hip ROM	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Hip ROM Right	Test Date:	2/21/2014
		Test Time:	7:35:41 AM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.20 deg C	P
Humidity	10	--	70	39.20 %RH	P
Average Velocity	5	--	10	5.8 deg/s	P
Angle at 203 Nm	40	--	50	42.2 degrees	P
Moment at 30 degrees	0.0	--	94.9	80.63 Nm	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



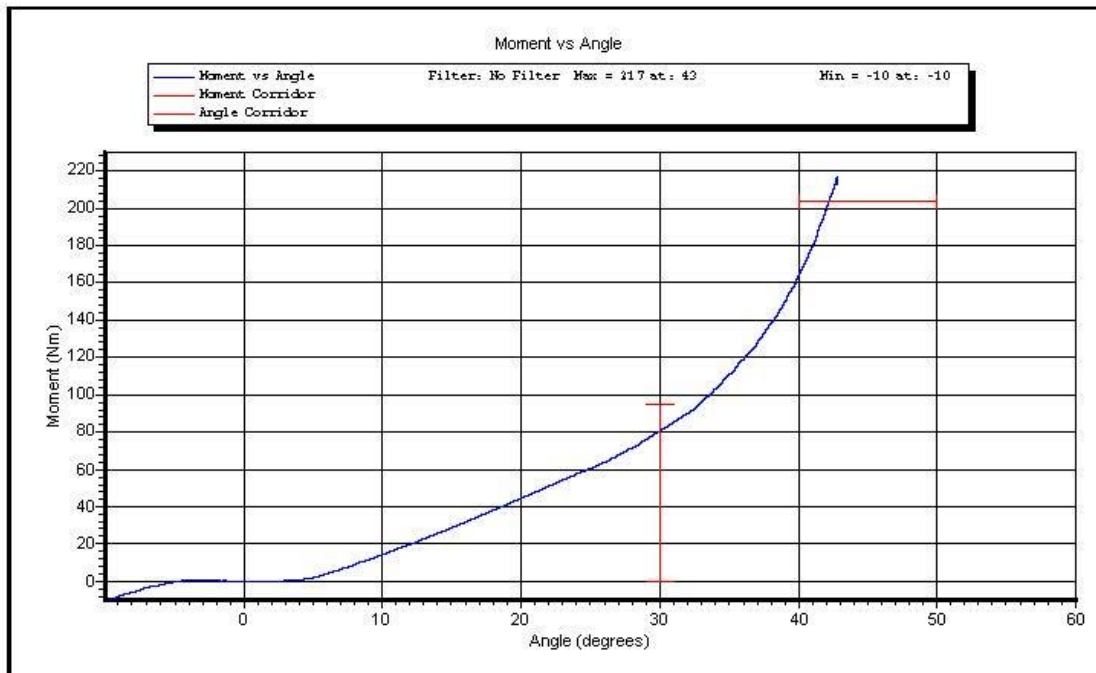
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Key Trans/PCB	2301-02	115	3/19/2013
DentonATD	14 CB1-3615	0008	2/20/2014
DentonATD	A0 Output	1	1/11/2014



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



Test ID: **Hip ROM Right** Test Time: **7:35:41 AM**

Test Date: **2/21/2014**

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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Knee Impact Left	Test Date:	2/20/2014
		Test Time:	1:27:49 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.30 deg C P
Humidity	10 -- 70	21.00 %RH P
Velocity	2.07 -- 2.13	2.116 m/s P
Resistive Force	-5.780 -- -4.720	-4.739 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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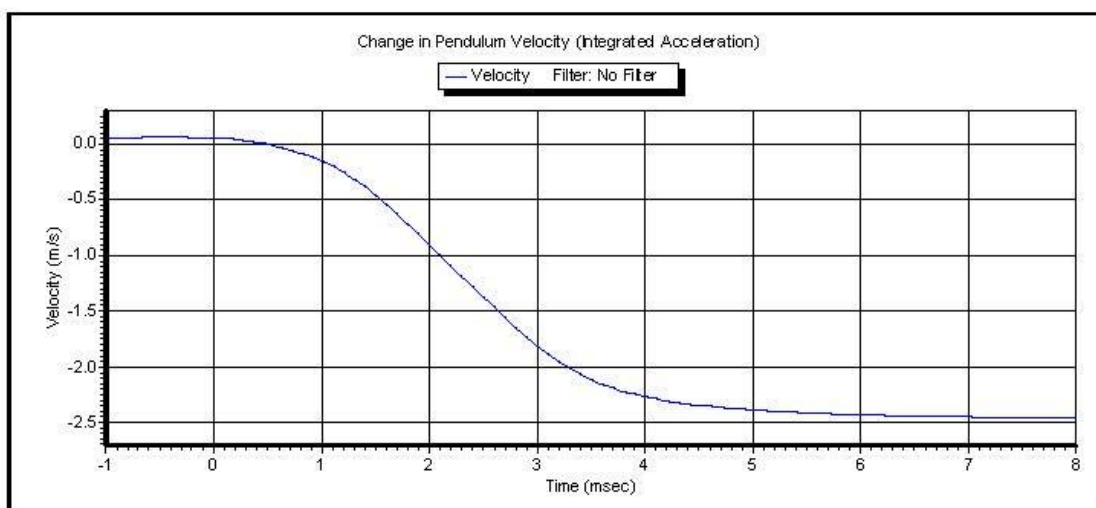
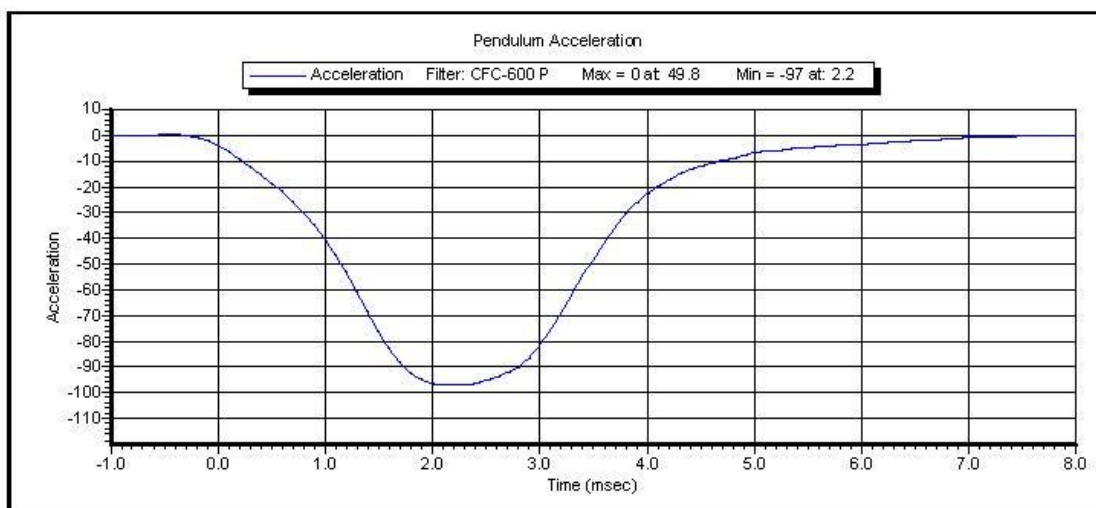


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	064



Test ID: **Knee Impact Left** Test Time: **1:27:49 PM**
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Test Date: **2/20/2014**



Test ID: **Knee Impact Left** Test Time: **1:27:49 PM**

Test Date: **2/20/2014**

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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Knee Impact Right	Test Date:	2/20/2014
		Test Time:	1:14:10 PM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.10 deg C	P
Humidity	10	--	70	21.30 %RH	P
Velocity	2.07	--	2.13	2.112 m/s	P
Resistive Force	-5.780	--	-4.720	-5.130 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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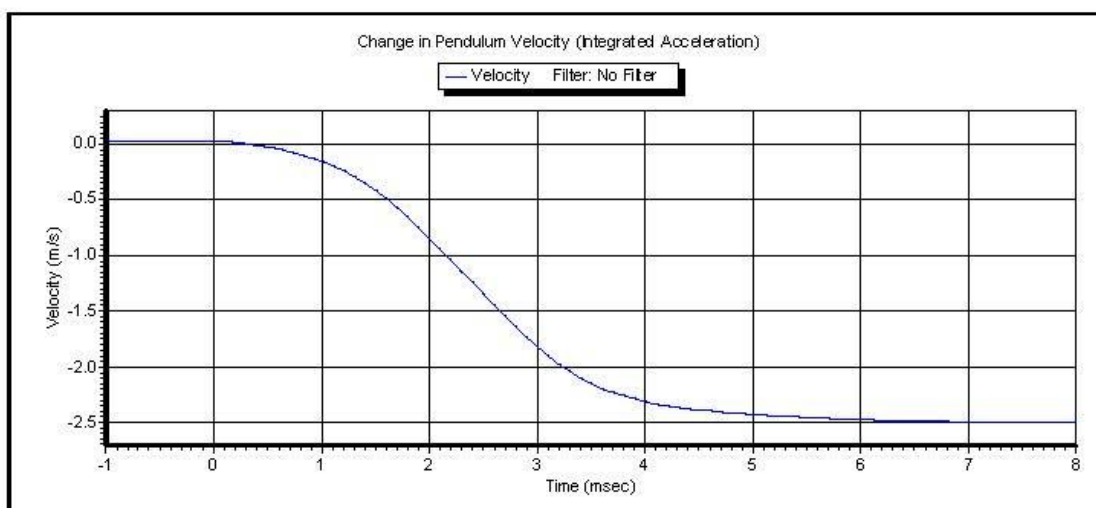
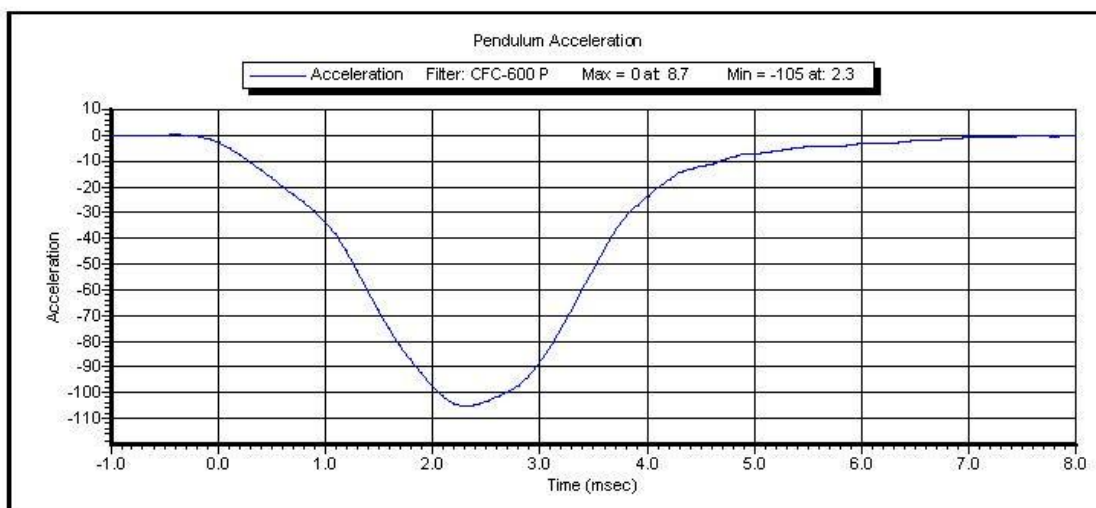
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Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	064



Test ID: **Knee Impact Right** Test Time: **1:14:10 PM**

Test Date: **2/20/2014**

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Test ID: **Knee Impact Right** Test Time: **1:14:10 PM**
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Test Date: **2/20/2014**

CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 288



External Measurements

5th Female SN 288

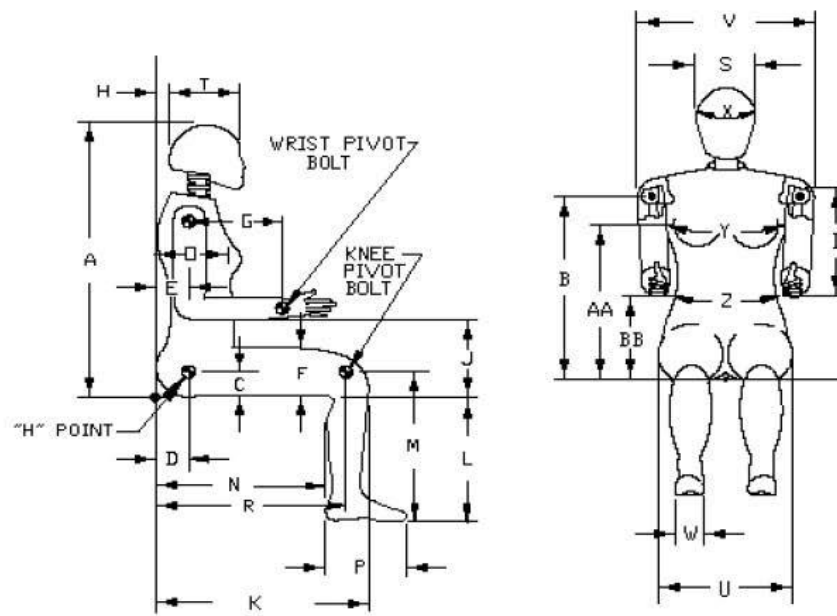
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	780	Yes
B	Shoulder Pivot Height	431.8 – 457.2	439	Yes
C	H-Point Height	81.3 – 86.3	83	Yes
D	H-Point from Backline	144.8 – 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6 – 83.8	74	Yes
F	Thigh Clearance	119.4 – 134.6	123	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	247	Yes
H	Head Back to Backline	43.2 – 48.2	44	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	280	Yes
J	Elbow Rest Height	182.8 – 203.2	188	Yes
K	Buttock to Knee Length	520.7 – 546.1	540	Yes
L	Popliteal Height	355.6 – 376	368	Yes
M	Knee Pivot Height	393.7 – 419.1	398	Yes
N	Buttock Popliteal Length	414 – 439.4	430	Yes
O	Chest Depth without Jacket	175.3 – 190.5	179	Yes
P	Foot Length (right)	218.5 – 233.7	223	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	181	Yes
U	Hip Breadth	299.7 – 314.9	302	Yes
V	Shoulder Breadth	350.5 – 365.7	358	Yes
W	Foot Breadth	78.8 – 94	82	Yes
X	Head Circumference	528.3 – 548.7	540	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	855	Yes
Z	Waist Circumference	759.5 – 789.9	781	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	343	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	164	Yes

Technician: M. Geesey

Date: 02/11/2014

Hybrid III 5th Female External Measurements

Reference Diagram





VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Head Drop	Test Date:	2/13/2014
		Test Time:	3:46:25 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.30 deg C P
Humidity	10 -- 70	18.60 %RH P
Resultant Acceleration	250 -- 300	270.3 G's P
Oscillation	0 -- 10	0.0 % P
Lateral Acceleration	-15 -- 15	-9.6 G's P

All test parameters are within specifications

Technician: **M. Goehle**

Supervisor: **E. Dutton**



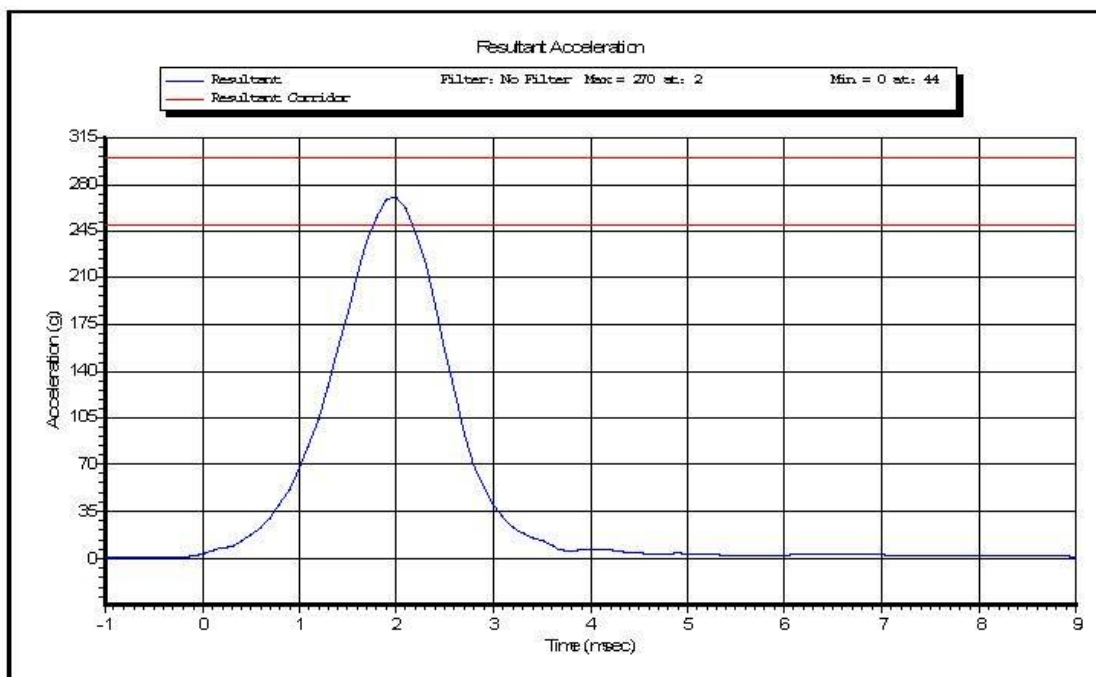
VERIFICATION REPORT

REFERENCE EQUIPMENT

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



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

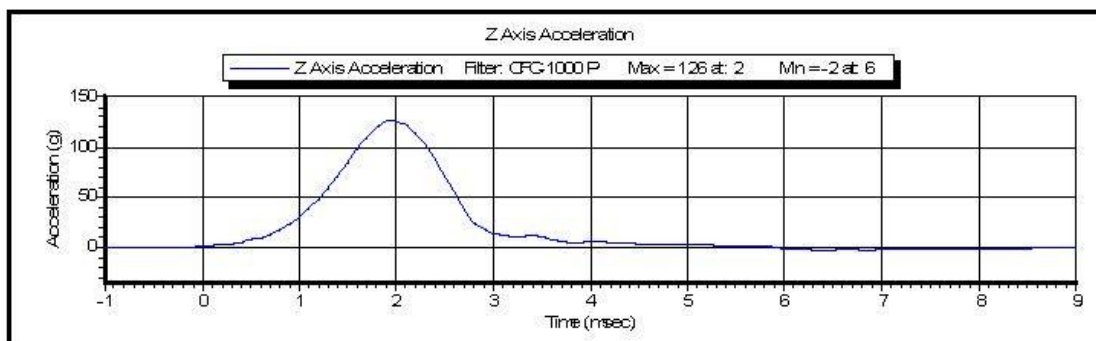
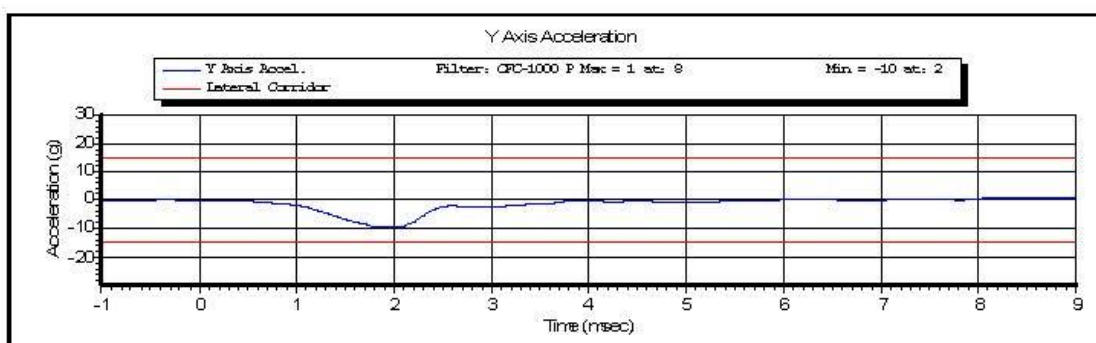
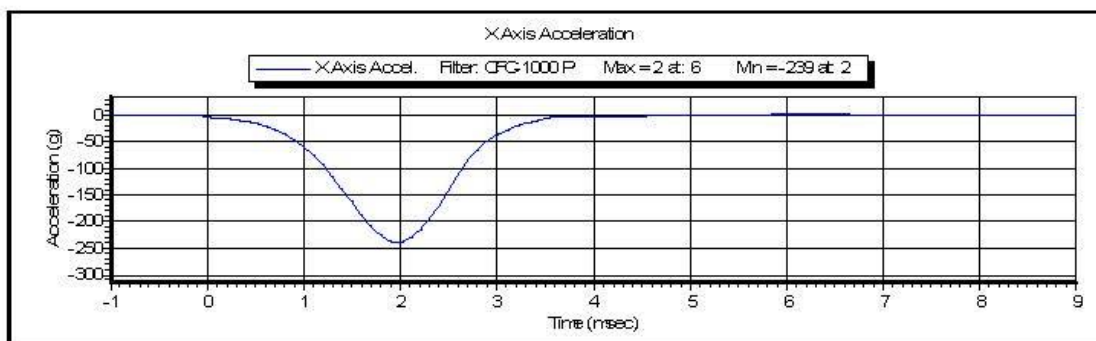


Test ID: **Head Drop**

Test Time: **3:46:25 PM**

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

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Test ID: **Head Drop**

Test Time: **3:46:25 PM**

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

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Neck Extension	Test Date:	2/13/2014
		Test Time:	3:01:27 PM

Component Part Number	Component Serial Number
Neck - 880105-255	7121

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	21.40 deg C P
Humidity	10 -- 70	18.30 %RH P
Velocity	5.95 -- 6.19	6.033 m/s P
Pendulum Impulse at 10 ms	1.5 -- 1.9	1.83 m/s P
Pendulum Impulse at 20 ms	3.1 -- 3.9	3.61 m/s P
Pendulum Impulse at 30 ms	4.6 -- 5.6	5.14 m/s P
D Plane Rotation	99 -- 114	104.5 degrees P
Moment During Rotation Interval	-65 -- -53	-60.5 Nm P
Moment Decay to -10.0 Nm	94 -- 114	98.3 ms P

All test parameters are within specifications

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



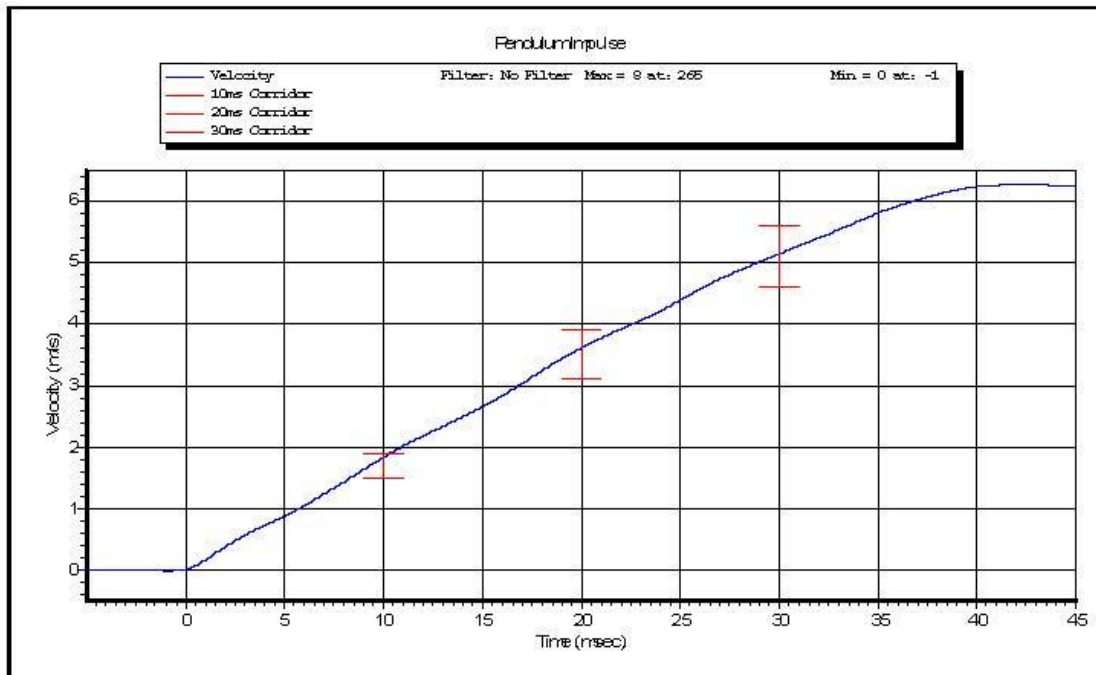
VERIFICATION REPORT

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	1716A	LC-2206My	5/23/2013
Denton	1716A	LC-2206Fx	5/23/2013



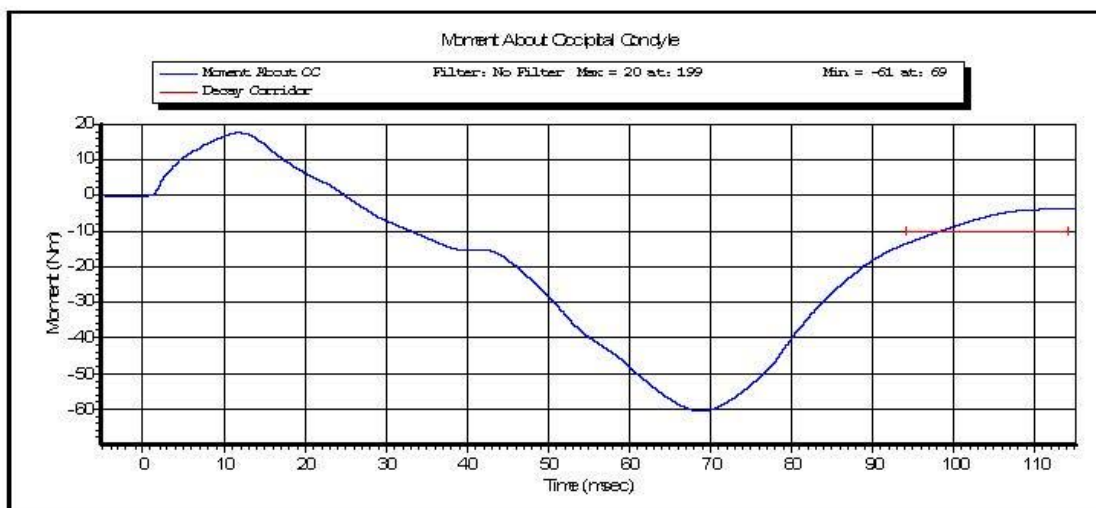
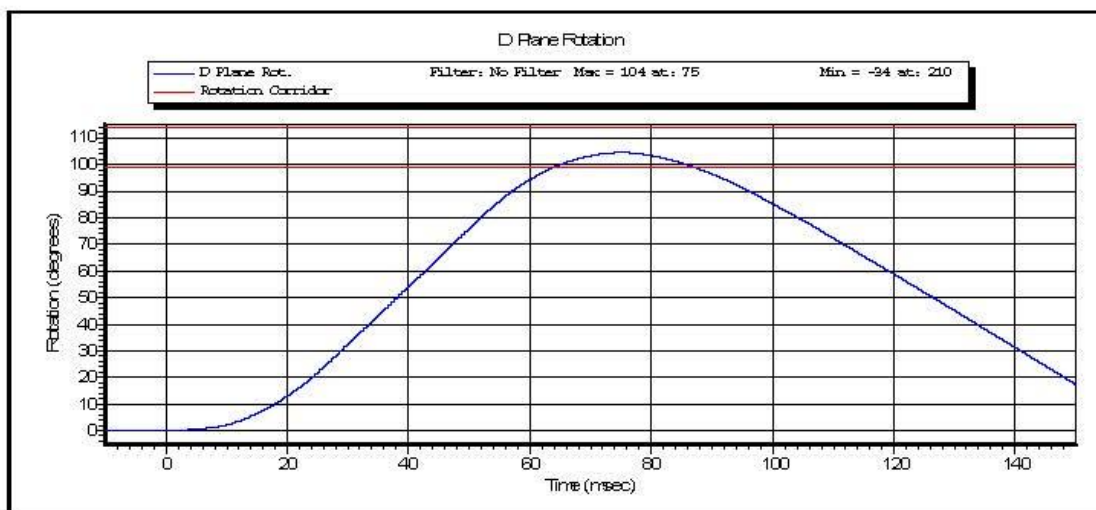
Test Name:	Neck Extension
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: Neck Extension Test Time: 3:01:27 PM

Test Date: 2/13/2014

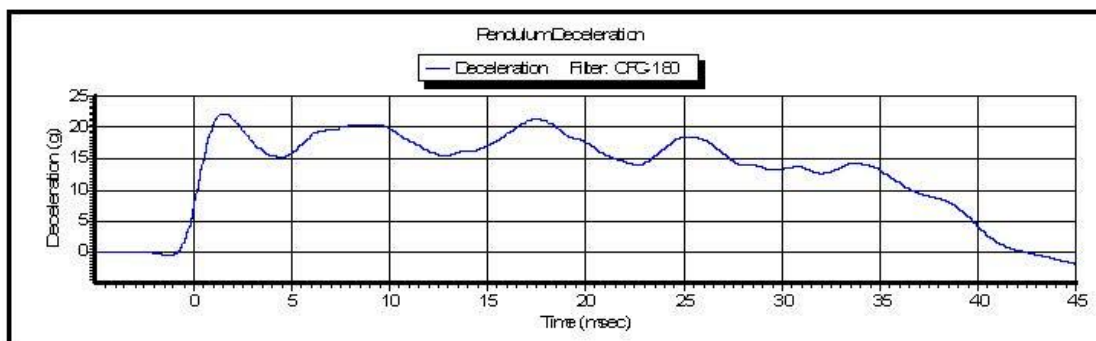
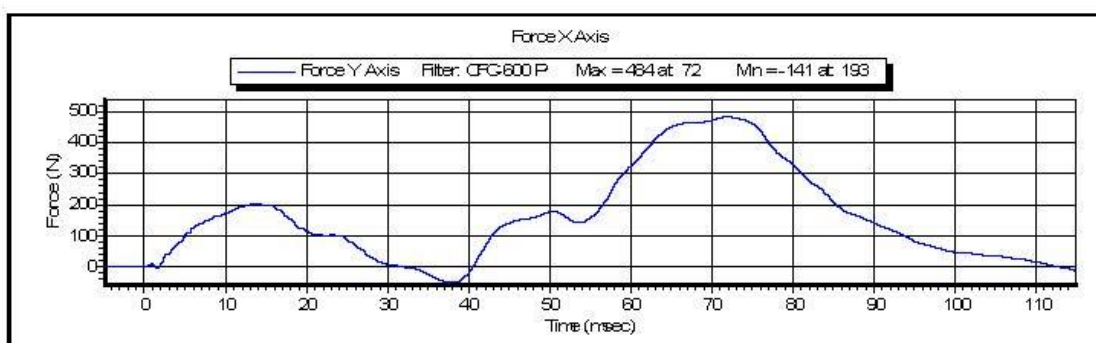
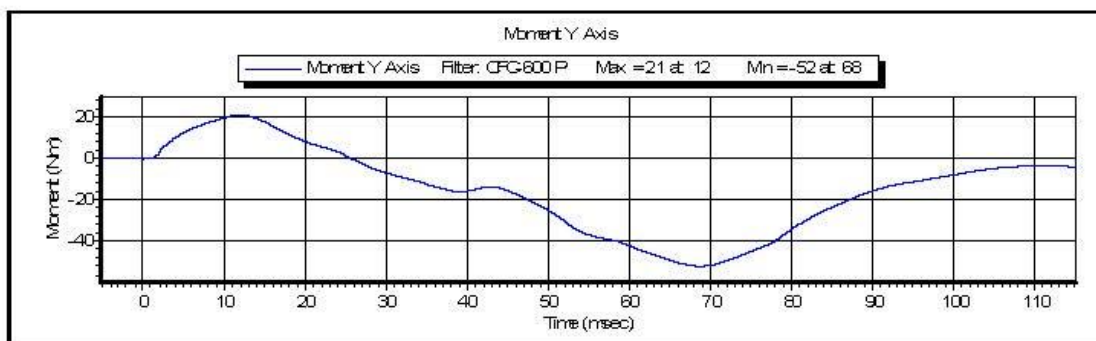
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: Neck Extension Test Time: 3:01:27 PM

Test Date: 2/13/2014

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Test ID: **Neck Extension** Test Time: **3:01:27 PM**

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

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Neck Flexion	Test Date:	2/13/2014
		Test Time:	2:30:19 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	21 -- 22	21.60 deg C P
Humidity	10 -- 70	17.90 %RH P
Velocity	6.89 -- 7.13	6.987 m/s P
Pendulum Impulse at 10 ms	2.1 -- 2.5	2.15 m/s P
Pendulum Impulse at 20 ms	4 -- 5	4.3 m/s P
Pendulum Impulse at 30 ms	5.8 -- 7.0	6.08 m/s P
D Plane Rotation	-91 -- -77	-81.1 degrees P
Moment During Rotation Interval	69 -- 83	76.1 Nm P
Moment Decay to 10.0 Nm	80 -- 100	89.6 ms P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



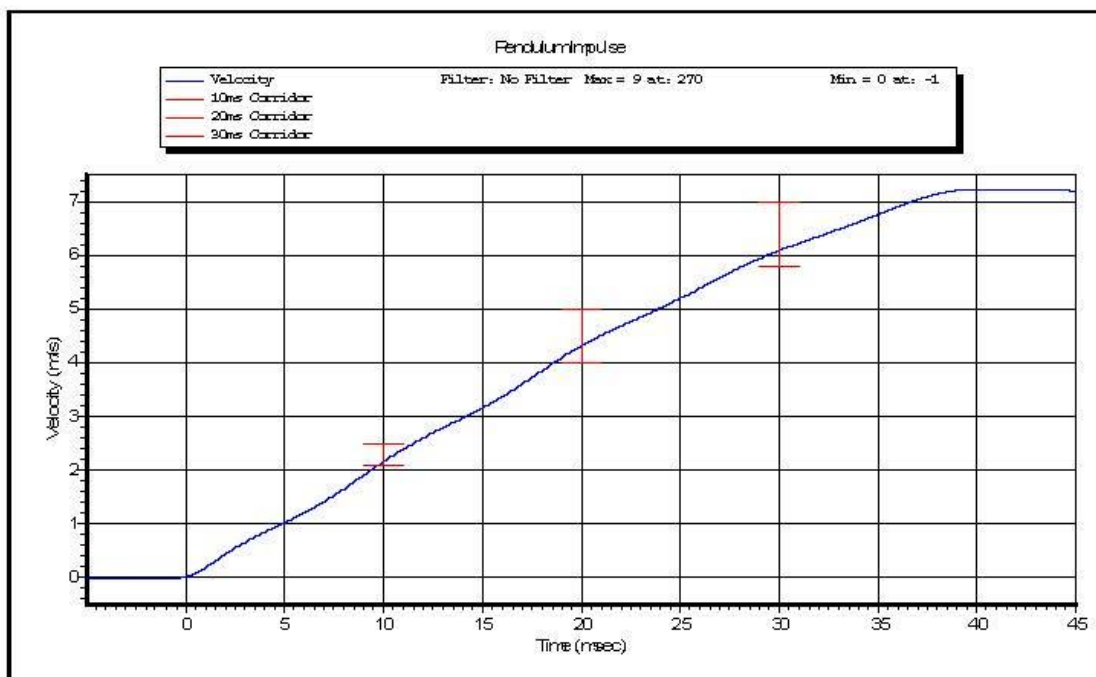
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
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-2206My	5/23/2013
Denton	1716A	LC-2206Fx	5/23/2013

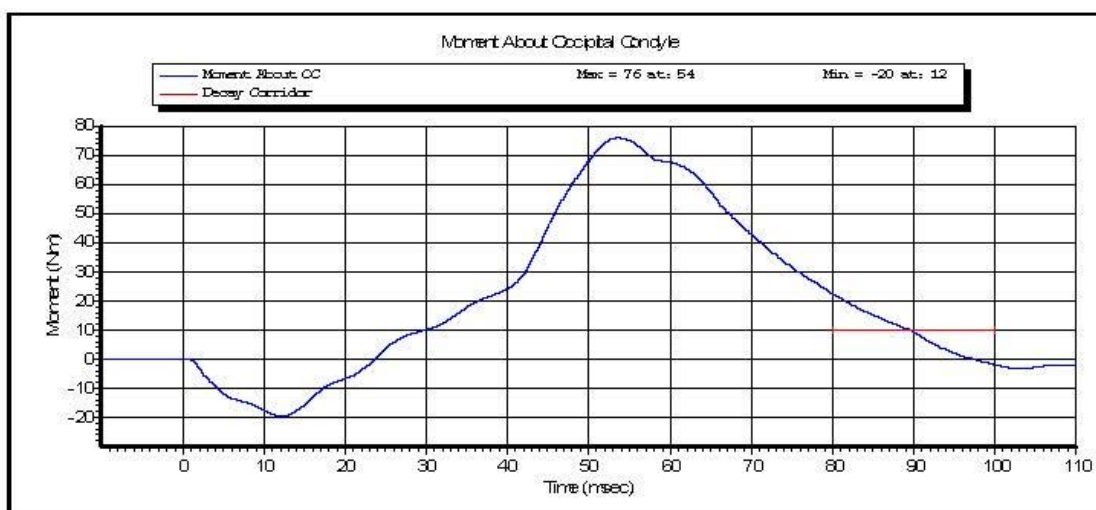
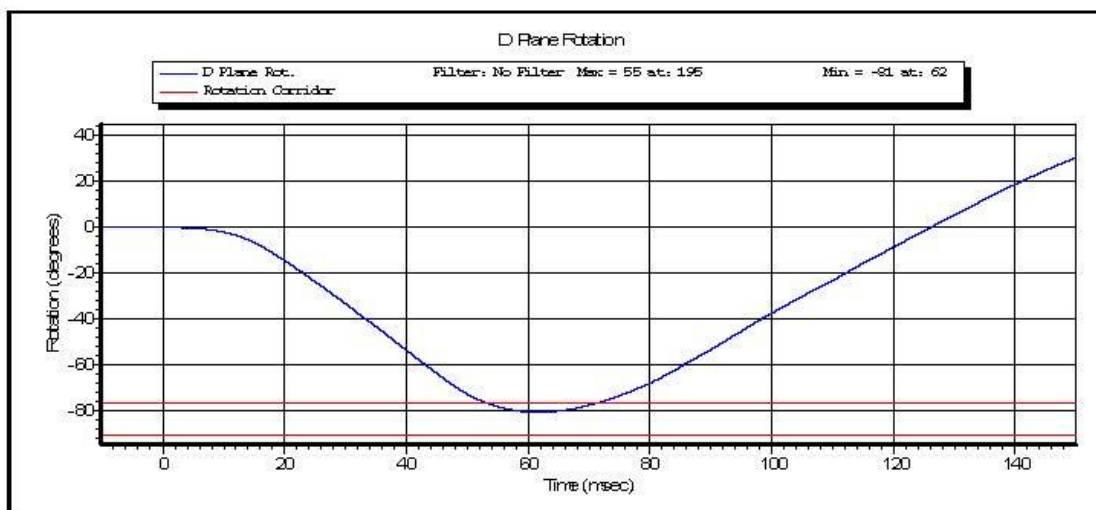


Test Name:	Neck Flexion
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: **Neck Flexion** Test Time: **2:30:19 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

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

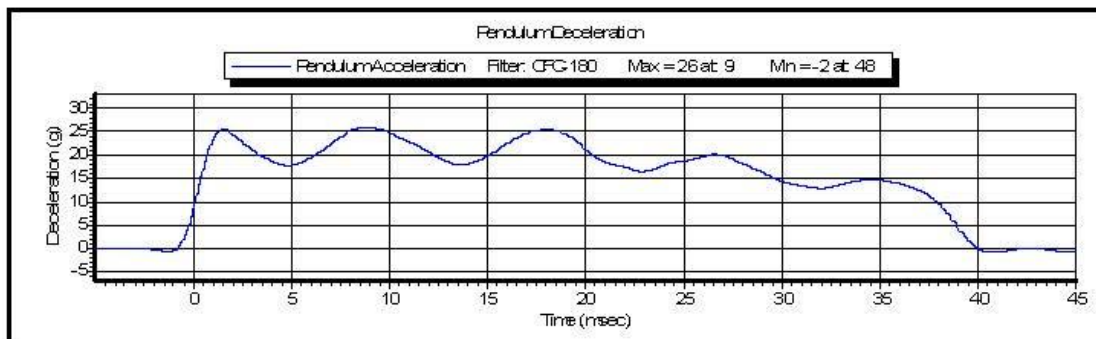
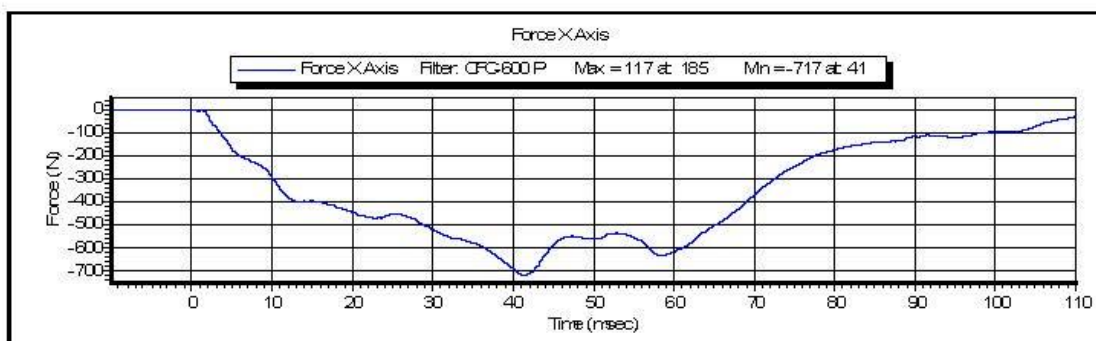
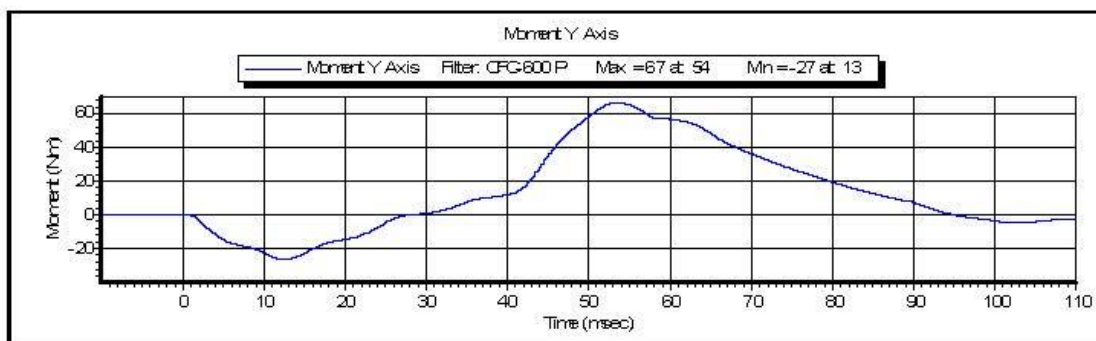


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Test Time: **2:30:19 PM**

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

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Test ID: **Neck Flexion**

Test Time: **2:30:19 PM**

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

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Thorax Impact	Test Date:	2/11/2014
		Test Time:	12:11:19 PM

Component Part Number	Component Serial Number
Chest Jacket - 880105-355-E	DG8843

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.40 deg C	P
Humidity	10	--	70	15.80 %RH	P
Velocity	6.59	--	6.83	6.815 m/s	P
Sternum Displacement	-58	--	-50	-52.4 mm	P
Force During Displacement Interval	-4400	--	-3900	-4173.7 N	P
Force During -18mm to -50mm Displacem	-4600	--	0	-4170.7 N	P
Hysteresis	69	--	85	72.4 %	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



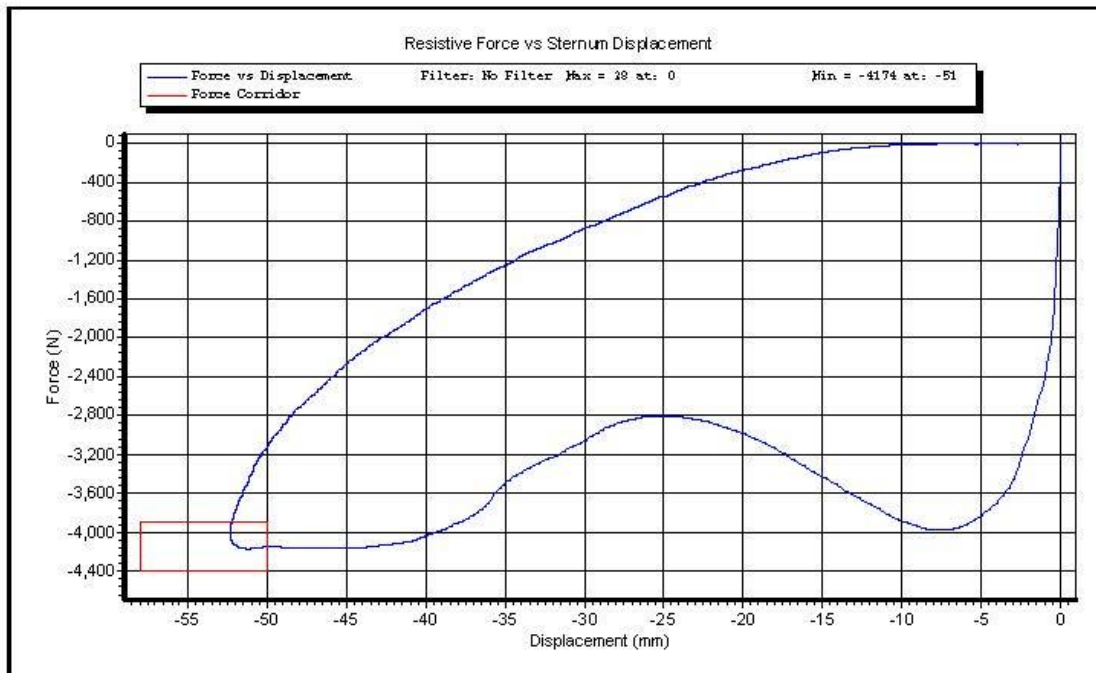
VERIFICATION REPORT

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
SERVO	14 CB1-2897	DS-288	11/21/2013



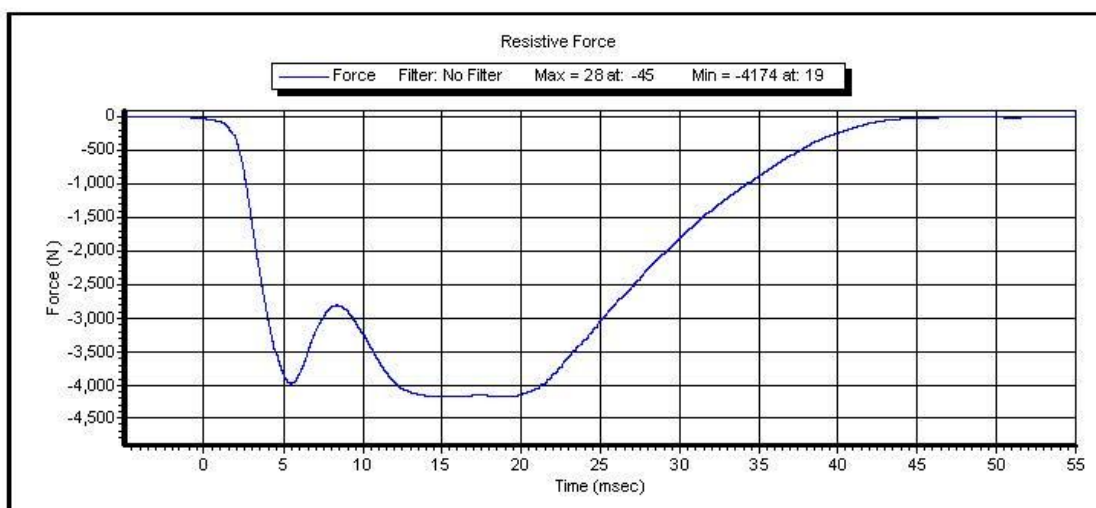
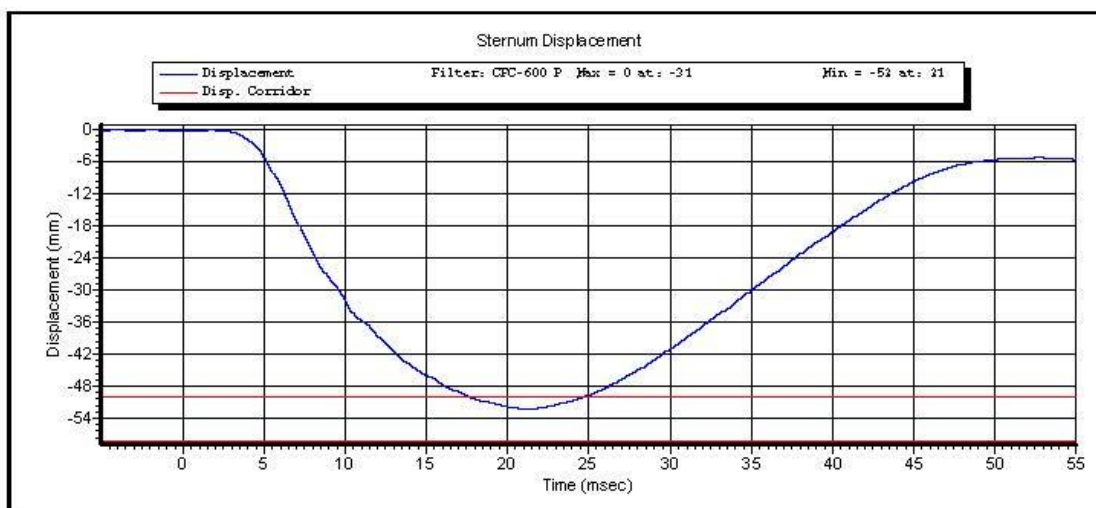
Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: Thorax Impact Test Time: 12:11:19 PM

Test Date: 2/11/2014

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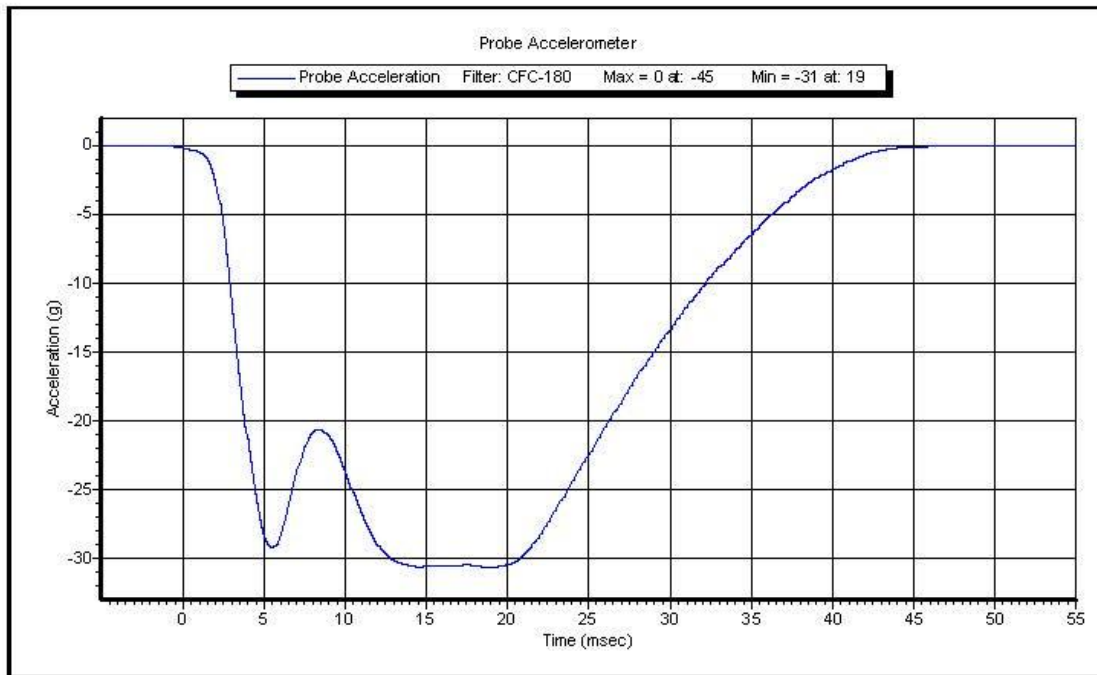


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Test Time: **12:11:19 PM**

Test Date: **2/11/2014**

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Test ID: **Thorax Impact**

Test Time: **12:11:19 PM**

Test Date: **2/11/2014**

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Torso Flexion

Part 5720 HIII 5% Female

ATD Serial No: 288

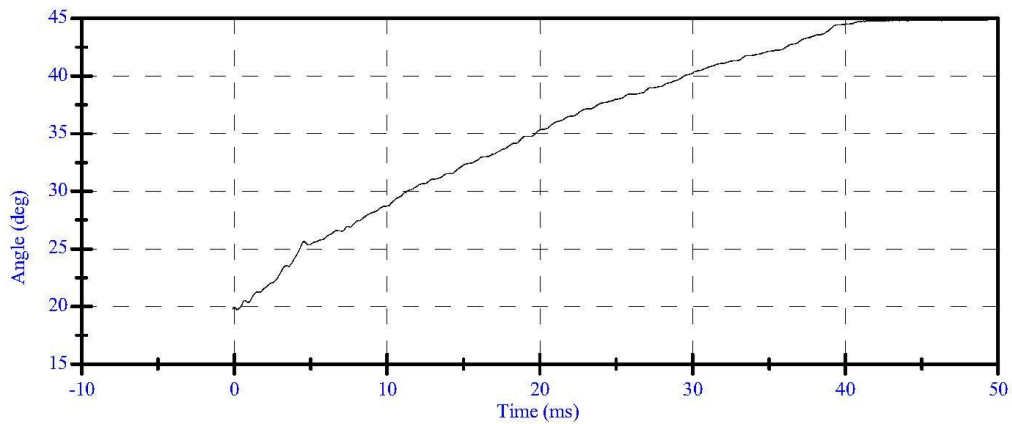
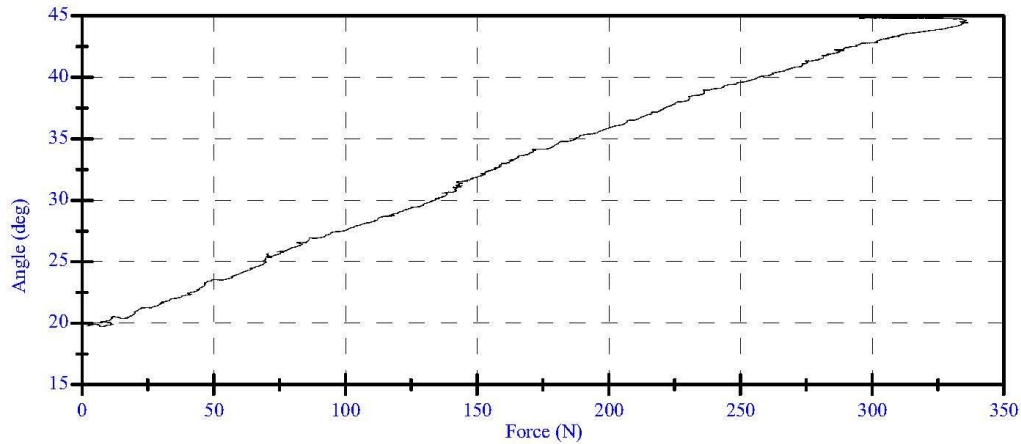
Laboratory Supervisor: E. Dutton

Date: 2/13/2014

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	19.7 Deg	Passed
Force at 45 Deg	320.00-390.00 N	334.46 N	Passed
Return Angle	8 Deg Max from Initial	22.9 deg	Passed

LUMBAR SPINE FLEXION TEST





VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Knee Impact Left	Test Date:	2/11/2014
		Test Time:	2:41:54 PM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.40 deg C	P
Humidity	10	--	70	15.50 %RH	P
Velocity	2.07	--	2.13	2.110 m/s	P
Resistive Force	-4060	--	-3450	-3533.1 N	P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

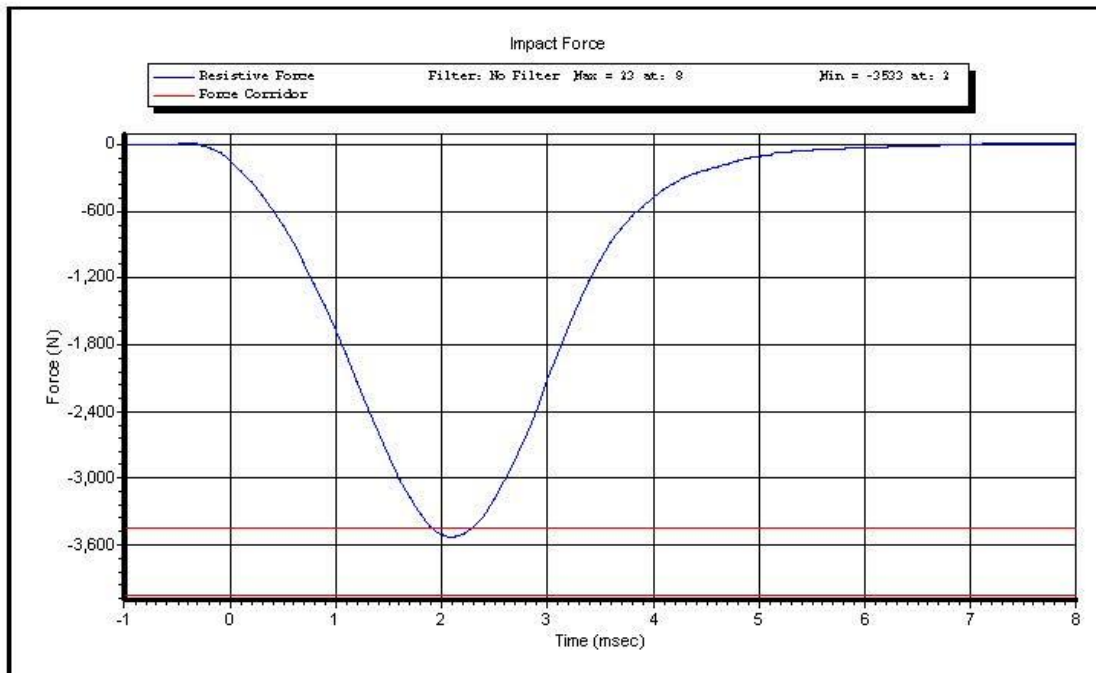
REFERENCE EQUIPMENT

<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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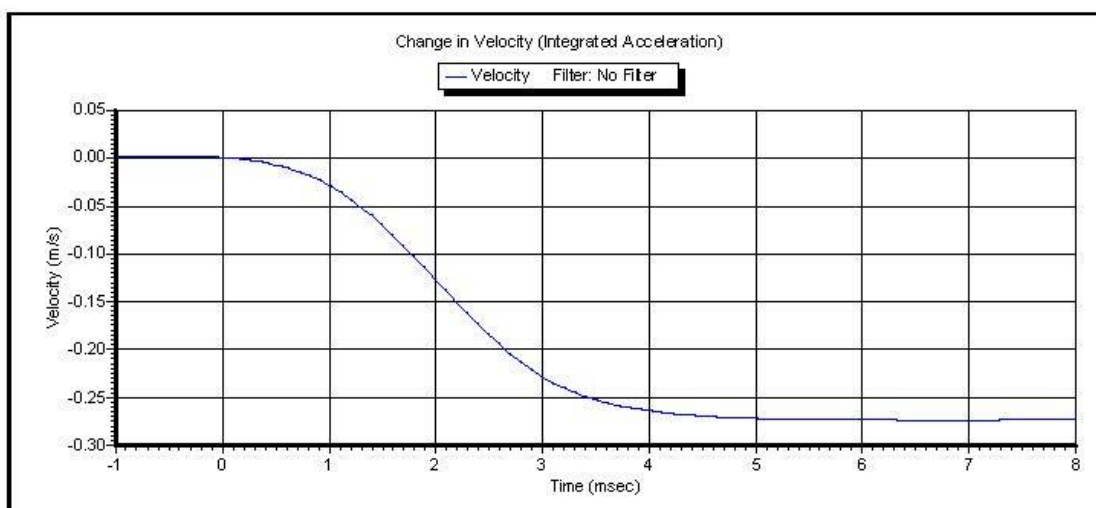
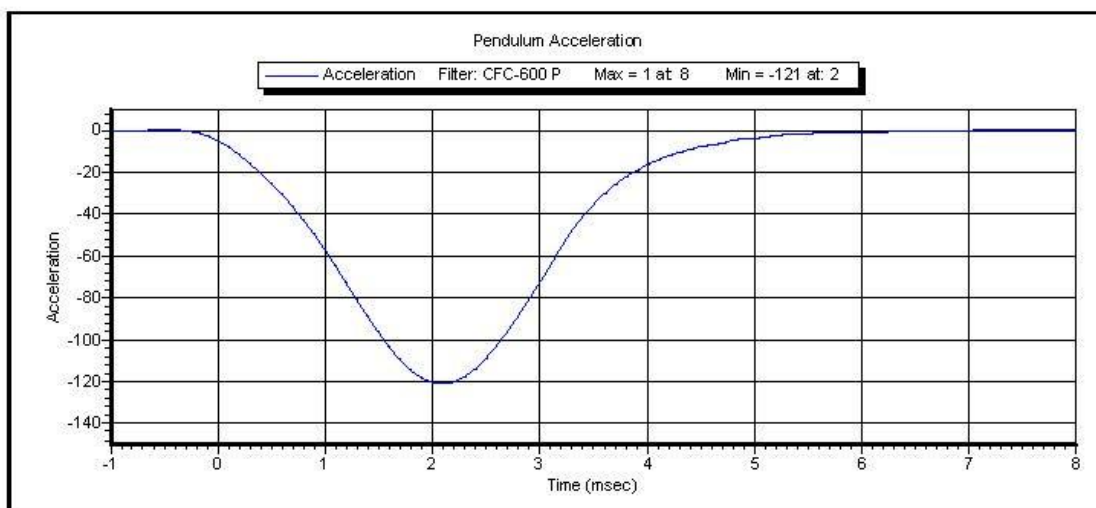


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: **Knee Impact Left** Test Time: **2:41:54 PM**
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Test Date: **2/11/2014**



Test ID: **Knee Impact Left** Test Time: **2:41:54 PM**

Test Date: **2/11/2014**

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VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Knee Impact Right	Test Date:	2/11/2014
		Test Time:	2:31:41 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	21.20 deg C P
Humidity	10 -- 70	15.40 %RH P
Velocity	2.07 -- 2.13	2.103 m/s P
Resistive Force	-4060 -- -3450	-3453.1 N P

All test parameters are within specifications

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



VERIFICATION REPORT

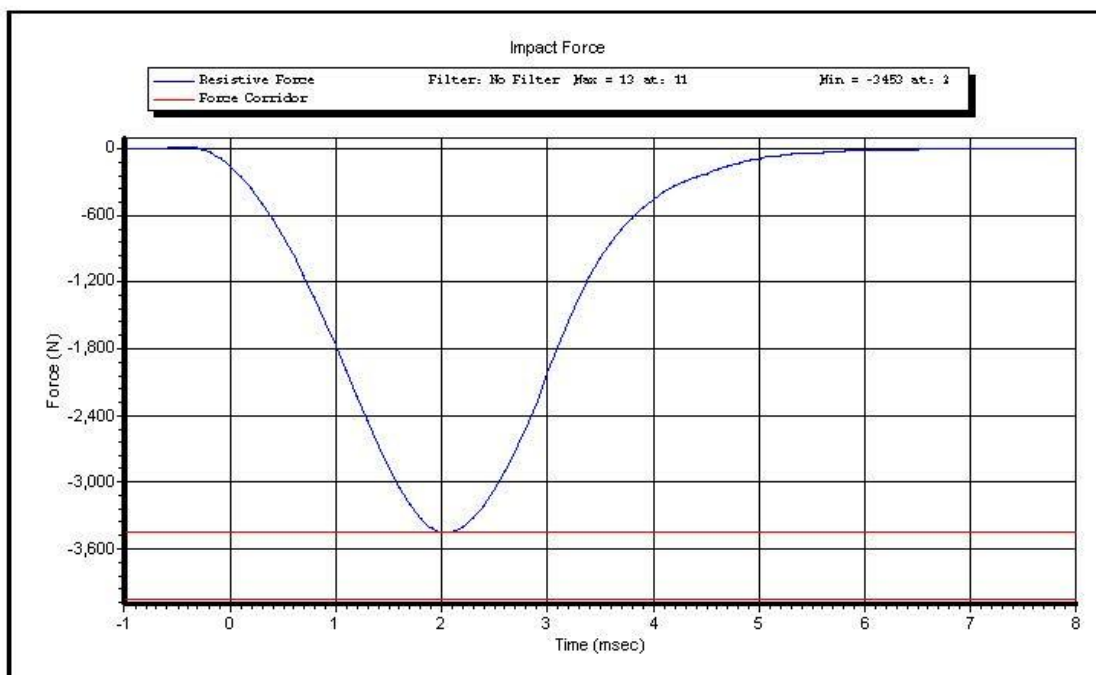
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DentonATD Endevco	Velocity Trap 7231CT	1 C14953	1/11/2014 12/4/2013

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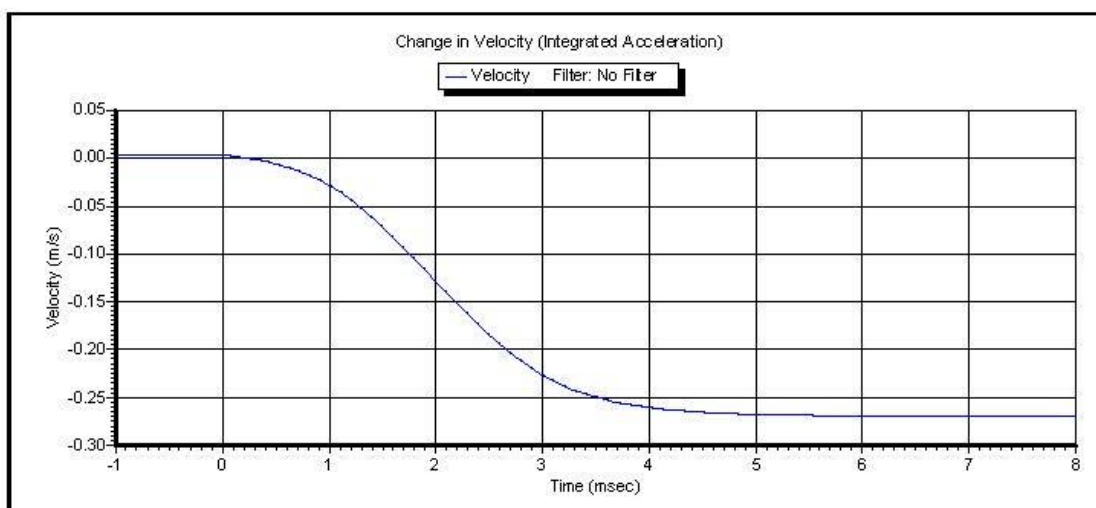
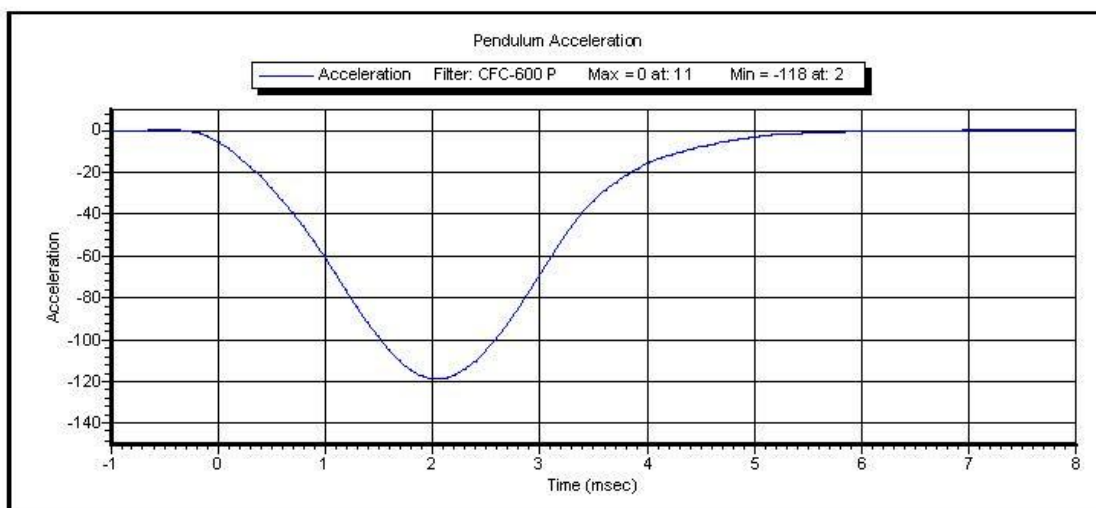
Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: **Knee Impact Right** Test Time: **2:31:41 PM**

Test Date: **2/11/2014**

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Test ID: **Knee Impact Right** Test Time: **2:31:41 PM**

Test Date: **2/11/2014**

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CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 064



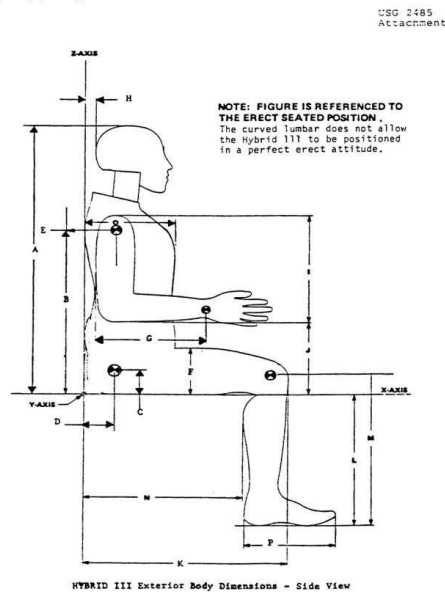
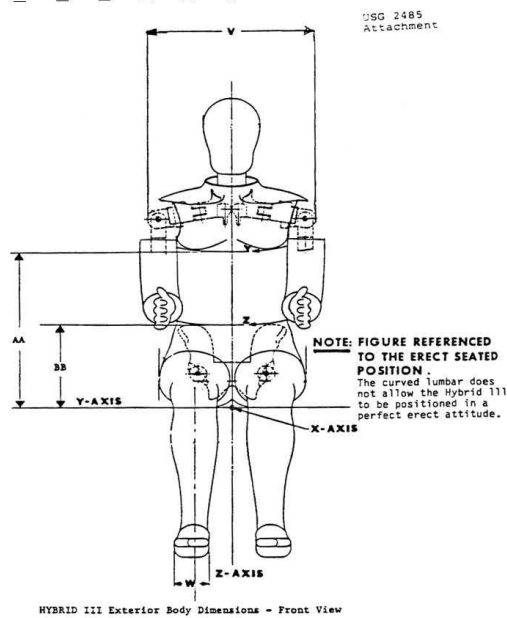
50th Male External Measurements

S/N 064

Symbol	Description	Specification	Results	Pass
		in	In	
A	Sitting Height	34.6 – 35.0	34.5	Yes
B	Shoulder Pivot Height	19.9 – 20.5	20.0	Yes
C	H-Point Height	3.3 – 3.5	3.4	Yes
D	H-Point from Backline	5.3 – 5.5	5.4	Yes
E	Shoulder Pivot from Backline	3.3 – 3.7	3.5	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	13.0	Yes
J	Elbow Rest Height	7.5 – 8.3	8.1	Yes
K	Buttock to Knee Length	22.8 – 23.8	23.1	Yes
L	Popliteal Height	16.9 – 17.9	17.1	Yes
M	Knee Pivot Height	19.1 – 19.7	19.3	Yes
N	Buttock Popliteal Length	17.8 – 18.8	18.5	Yes
O	Chest Depth without Jacket	8.4 – 9.0	8.6	Yes
P	Foot Length (right)	9.9 – 10.5	10.1	Yes
V	Shoulder Breadth	16.3 – 17.2	16.8	Yes
W	Foot Breadth	3.6 – 4.2	3.9	Yes
Y	Chest Circumference with Jacket	38.2 – 39.4	38.9	Yes
Z	Waist Circumference	32.9 – 34.1	33.9	Yes
AA	Reference Location (Chest Circumference)	16.9 – 17.1	17.0	Yes
BB	Reference Location (Waist Circumference)	8.9 – 9.1	9.0	Yes

Technician: R. Weil

03/06/2014





VERIFICATION REPORT

Test Name:	Head Drop	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Head Drop	Test Date:	3/7/2014
		Test Time:	2:49:29 PM

Component Part Number	Component Serial Number
Head Skin - 78051-228	7997

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.00 deg C P
Humidity	10 -- 70	19.80 %RH P
Resultant Acceleration	225 -- 275	259.6 G's P
Oscillation	0 -- 10	2.3 % P
Lateral Acceleration	-15 -- 15	-8.3 G's P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



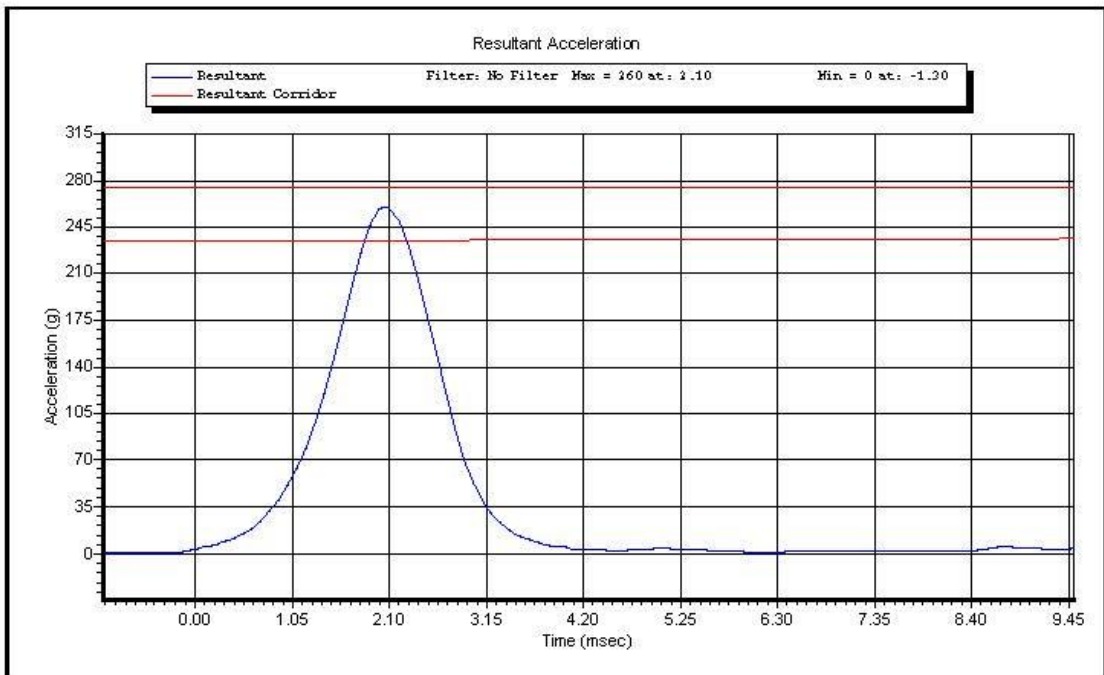
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
Endevco	7264-2000	P58904	12/5/2013
Endevco	7264-2000	P58911	12/5/2013
Endevco	7264-2000	P58776	12/5/2013



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

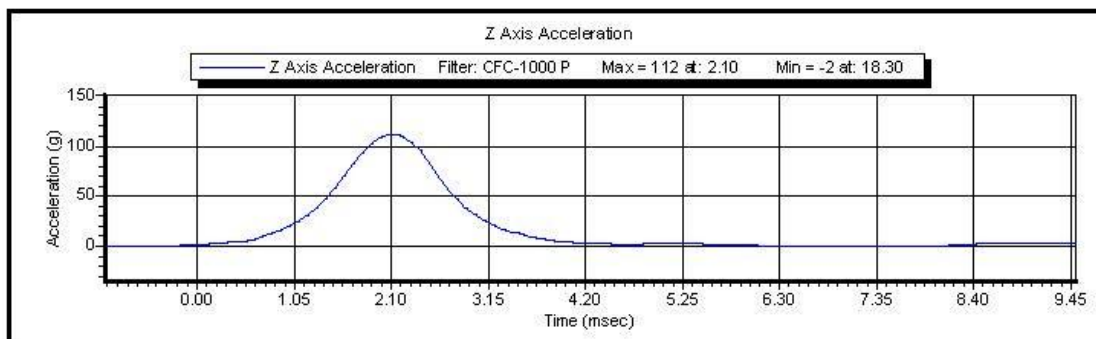
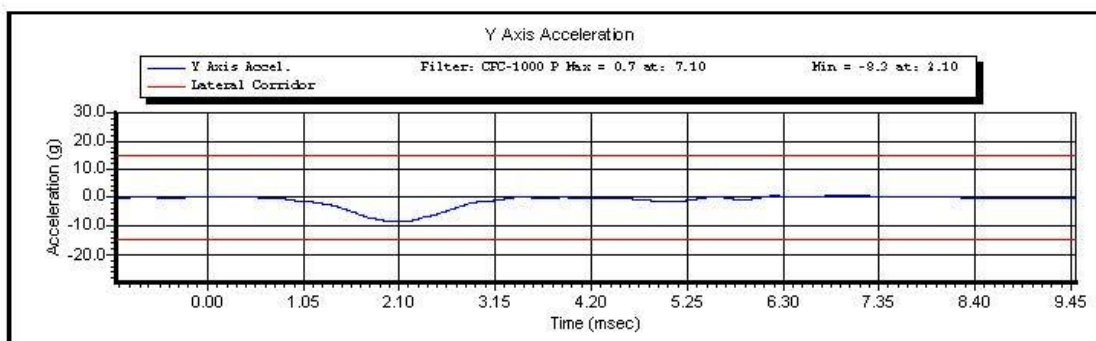
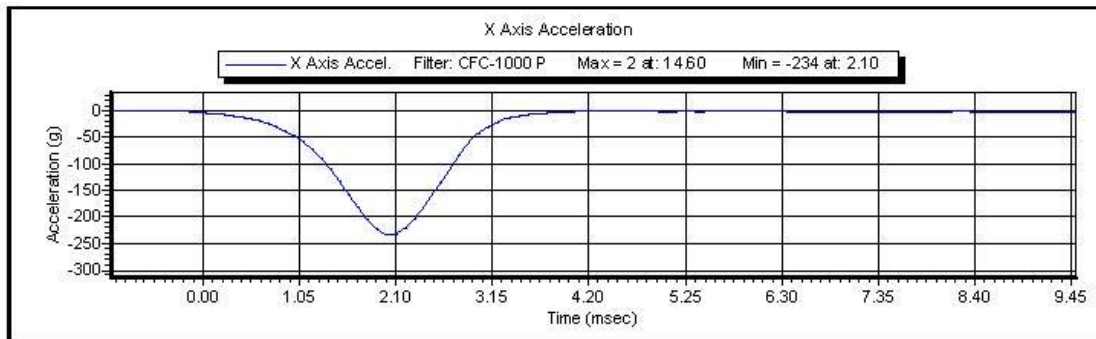


Test ID: **Head Drop**

Test Time: **2:49:29 PM**

Test Date: **3/7/2014**

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Test ID: **Head Drop**

Test Time: **2:49:29 PM**

Test Date: **3/7/2014**

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Neck Extension	Test Date:	3/7/2014
		Test Time:	10:57:21 AM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.90 deg C	P
Humidity		10	-- 70	16.90 %RH	P
Velocity		5.94	-- 6.19	6.038 m/s	P
Pendulum Deceleration at	10 ms	17.2	-- 21.2	18.90 G's	P
Pendulum Deceleration at	20 ms	14.0	-- 19.0	16.20 G's	P
Pendulum Deceleration at	30 ms	11.0	-- 16.0	12.12 G's	P
Max Pendulum Deceleration after	30 ms	0.0	-- 22.0	13.26 G's	P
Deceleration Time to	5 G's	38	-- 46	43.3 ms	P
D Plane Rotation		81	-- 106	98.8 degrees	P
Time at Max Rotation		72	-- 82	78.0 ms	P
Rotation Decay to Zero		147	-- 174	157.6 ms	P
Moment About Occipital Condyle		-80.0	-- -52.9	-66.68 Nm	P
Time at Maximum Moment		65	-- 79	73.9 ms	P
Moment Decay to Zero		120	-- 148	145.1 ms	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



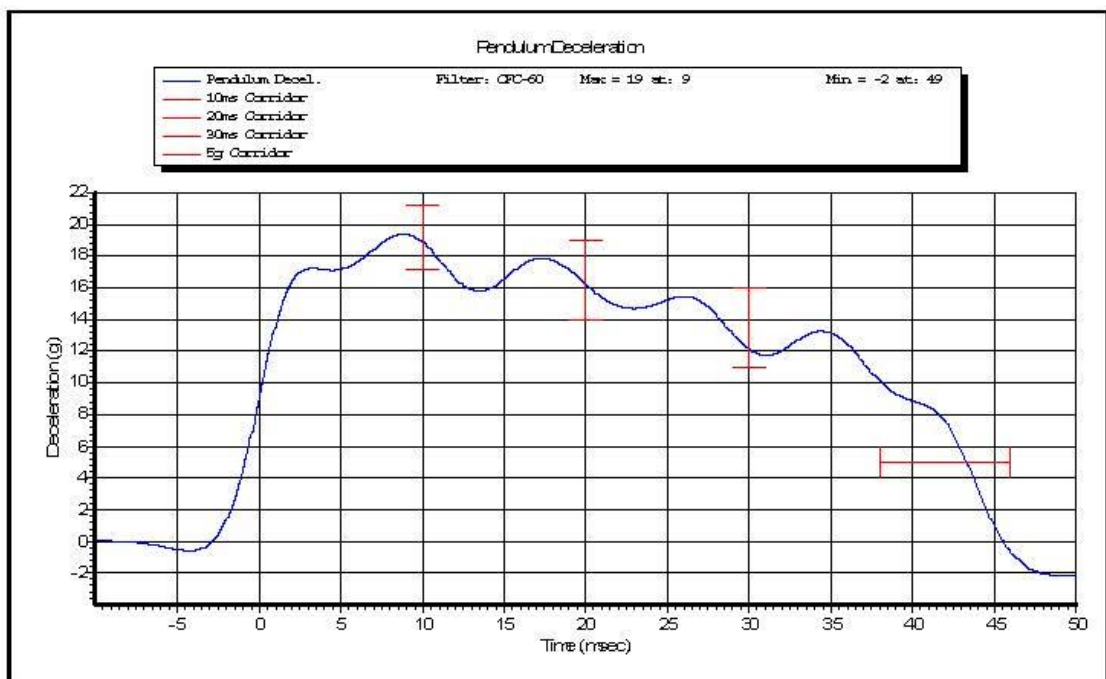
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
ETI	SP22D	SP22 PENDULUM	2/21/2014
ETI	SP22D	SP22 CONDYLE	2/21/2014
Denton	1716A	LC-2186 My	5/23/2013
Denton	1716A	LC-2186 Fx	5/23/2013



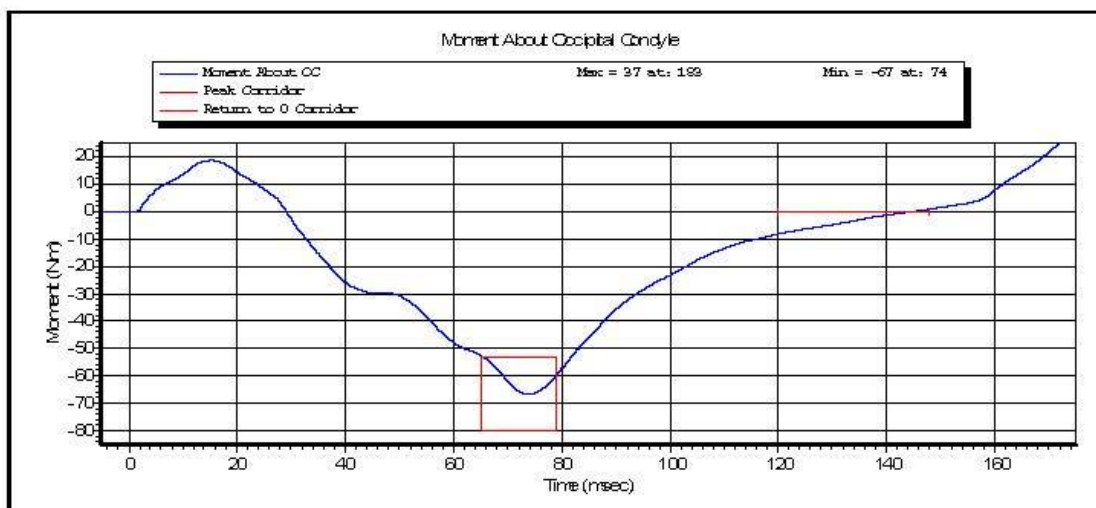
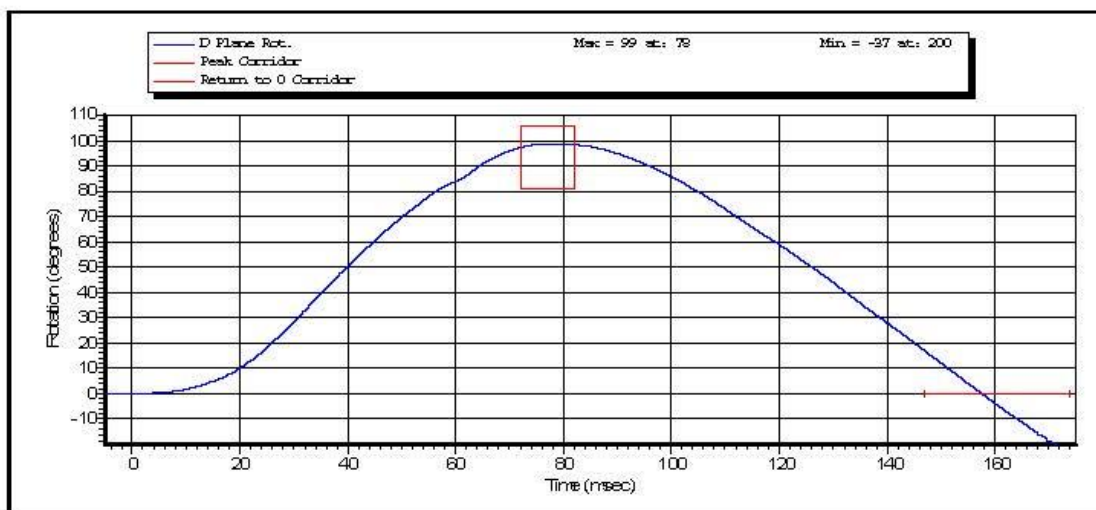
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Name of Sub Test:	
Type of ATD:	Hybrid 3 - 50th Male
ATD Serial Number:	064



ID of Test: **Neck Extension** Time of Test: **10:57:21 AM**

Date of Test: **3/7/2014**

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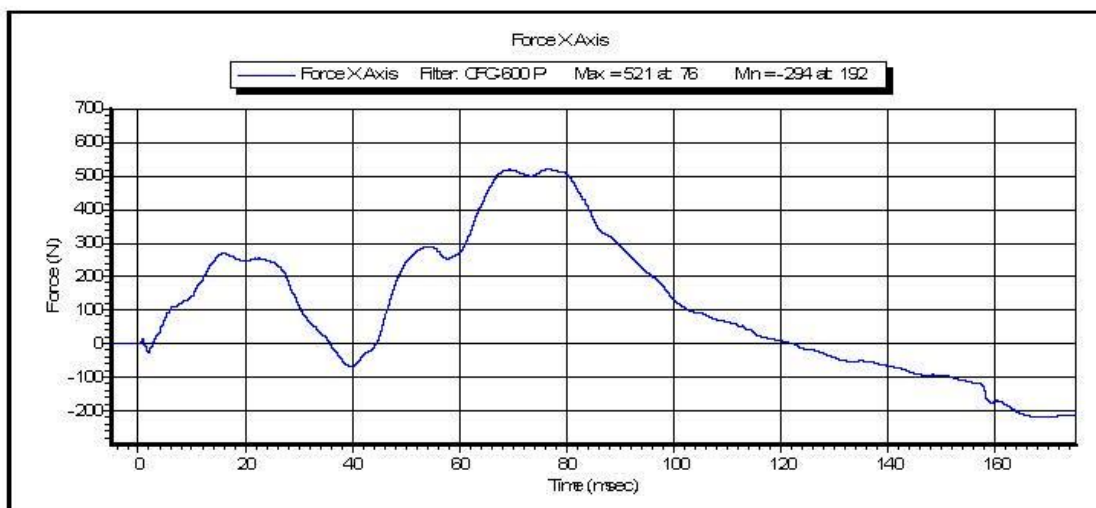
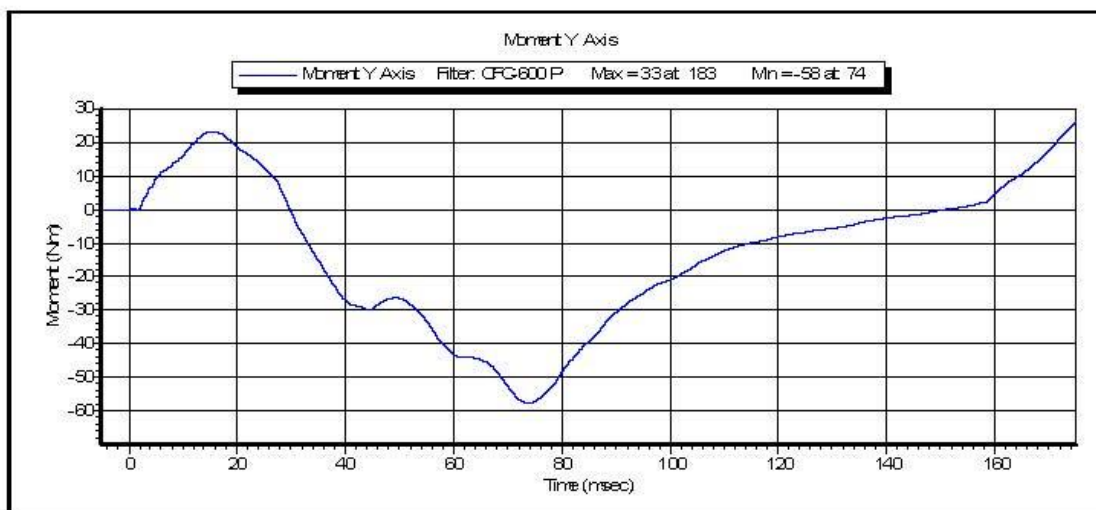


ID of Test: **Neck Extension**

Time of Test: **10:57:21 AM**

Date of Test: **3/7/2014**

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ID of Test: **Neck Extension**

Time of Test: **10:57:21 AM**

Date of Test: **3/7/2014**

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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:	064		
Test ID:	Neck Flexion	Test Date:	3/7/2014
		Test Time:	9:11:48 AM

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

Test Parameters		Test Specifications		Test Results	
Temperature		20.6	-- 22.2	21.90 deg C	P
Humidity		10	-- 70	16.00 %RH	P
Velocity		6.89	-- 7.13	6.985 m/s	P
Pendulum Deceleration at	10 ms	22.5	-- 27.5	23.53 G's	P
Pendulum Deceleration at	20 ms	17.6	-- 22.6	20.62 G's	P
Pendulum Deceleration at	30 ms	12.5	-- 18.5	14.49 G's	P
Maximum Pendulum Deceleration After	30 ms	0	-- 29	14.5 G's	P
Deceleration Time to	5 ms	34	-- 42	40.4 ms	P
D Plane Rotation		-78	-- -64	-72.7 degrees	P
Time at Maximum Rotation		57	-- 64	60.0 ms	P
Rotation Decay to Zero		113	-- 128	113.4 ms	P
Moment About Occipital Condyle		88.1	-- 108.4	101.08 Nm	P
Time at Maximum Moment		47	-- 58	53.6 ms	P
Moment Decay to Zero		97.0	-- 107.0	98.9 ms	P

All test parameters are within specifications

Technician: R. Weil

Supervisor: E. Dutton



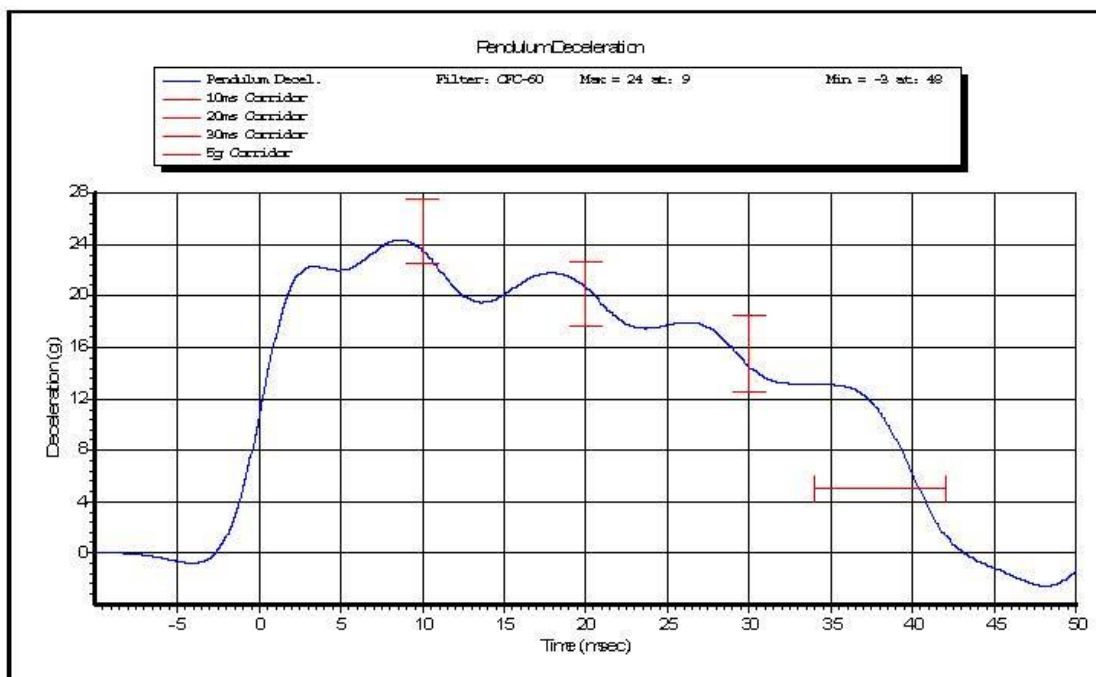
VERIFICATION REPORT

REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD	Velocity Trap	1	1/11/2014
Endevco	7231CT	AH5F3	10/16/2013
ETI	SP22D	SP22 PENDULUM	2/21/2014
ETI	SP22D	SP22 CONDYLE	2/21/2014
Denton	1716A	LC-2186 My	5/23/2013
Denton	1716A	LC-2186 Fx	5/23/2013



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

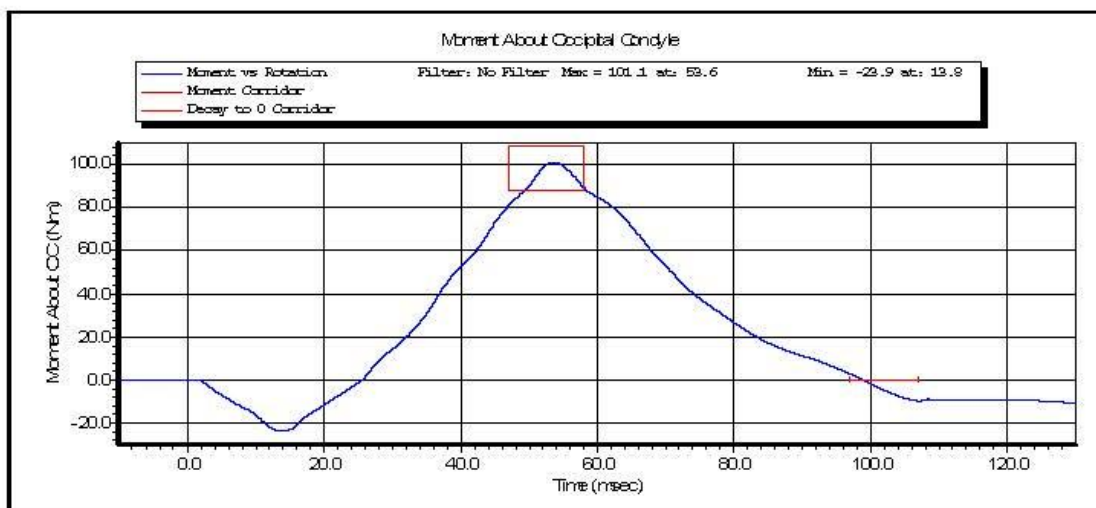
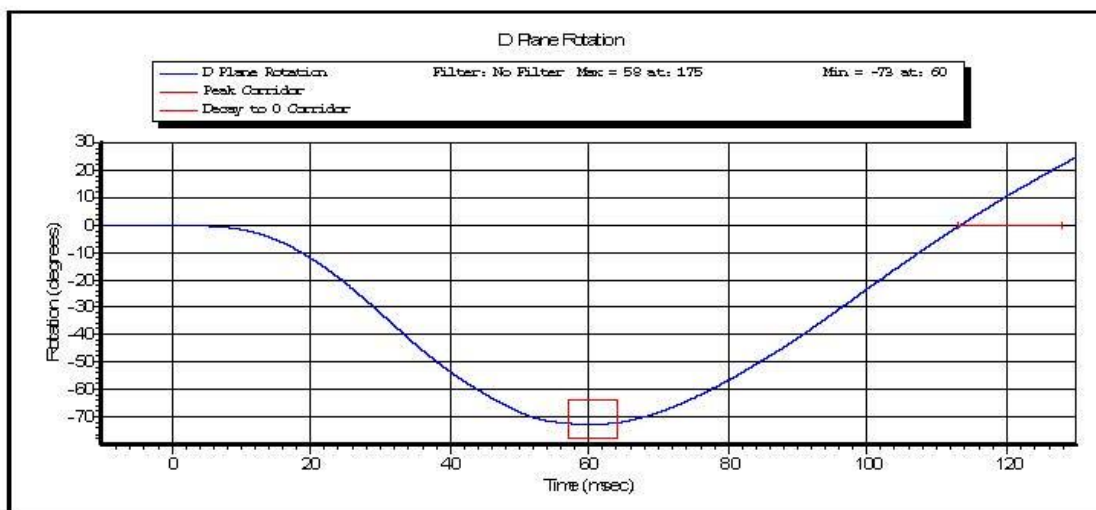


ID of Test: **Neck Flexion**

Time of Test: **9:11:48 AM**

Date of Test: **3/7/2014**

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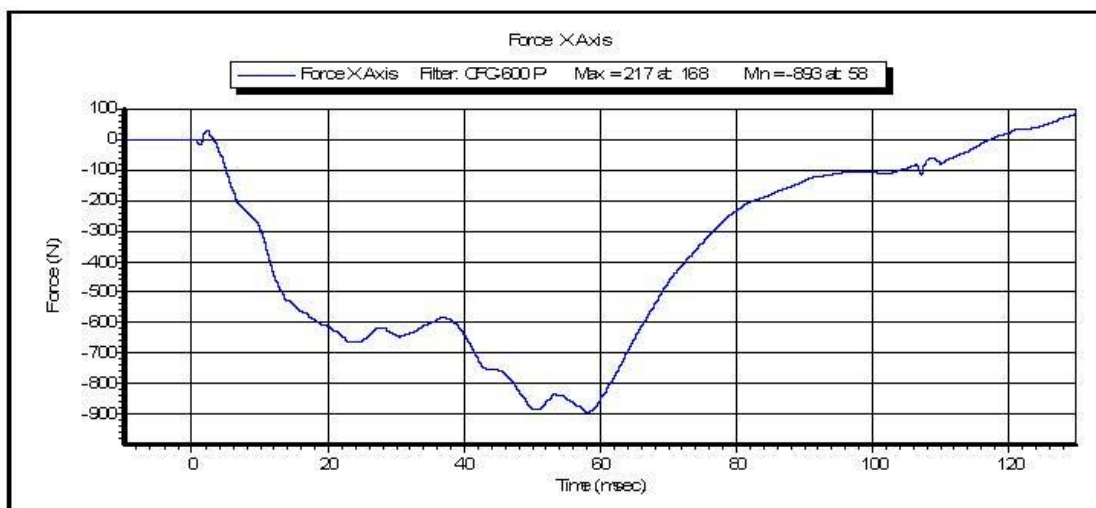
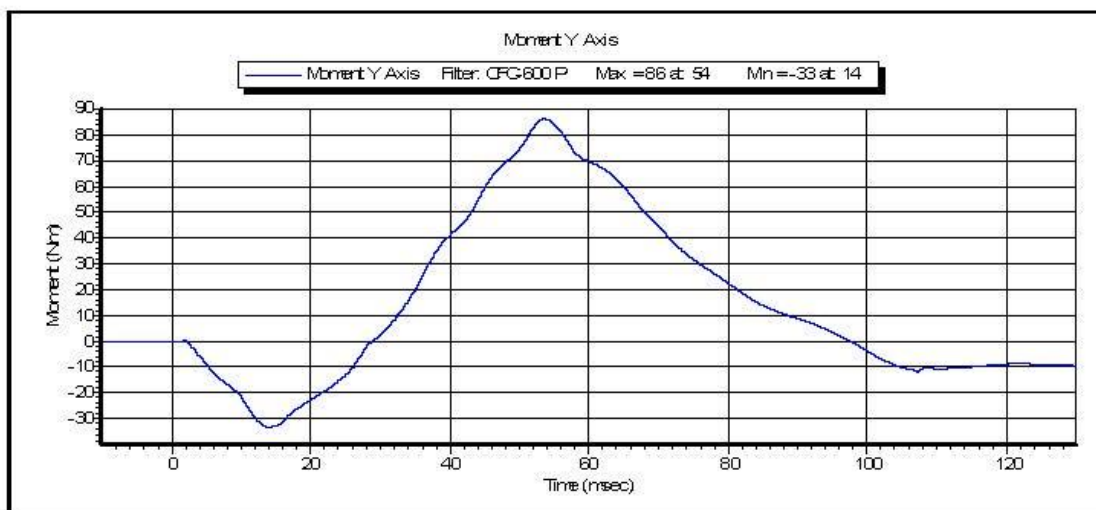


ID of Test: **Neck Flexion**

Time of Test: **9:11:48 AM**

Date of Test: **3/7/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



ID of Test: **Neck Flexion**

Time of Test: **9:11:48 AM**

Date of Test: **3/7/2014**

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:	064		
Test ID:	Thorax Impact	Test Date:	3/10/2014
		Test Time:	10:40:24 AM

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

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.40 deg C	P
Humidity	10	--	70	25.50 %RH	P
Velocity	6.59	--	6.83	6.663 m/s	P
Chest Deflection	-72.6	--	-63.5	-71.18 mm	P
Resistive Force	-5.894	--	-5.160	-5.5068 kN	P
Hysteresis	69	--	85	69.8 %	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



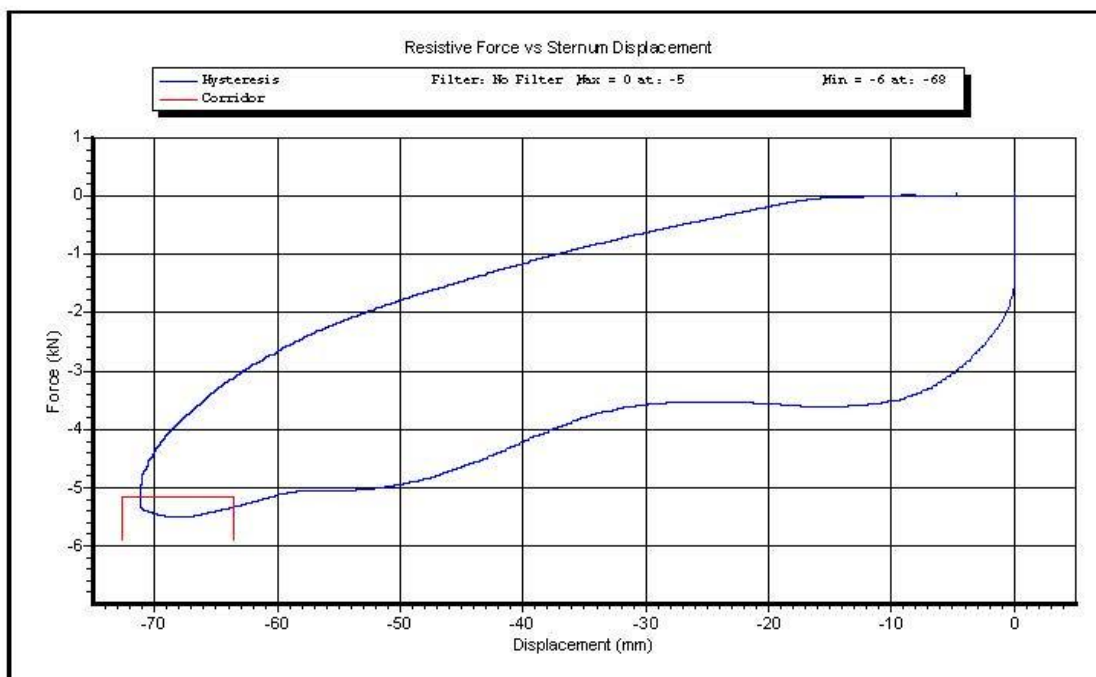
VERIFICATION REPORT

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	C14953	12/4/2013
DentonATD	78051-342	DS-064	6/18/2013

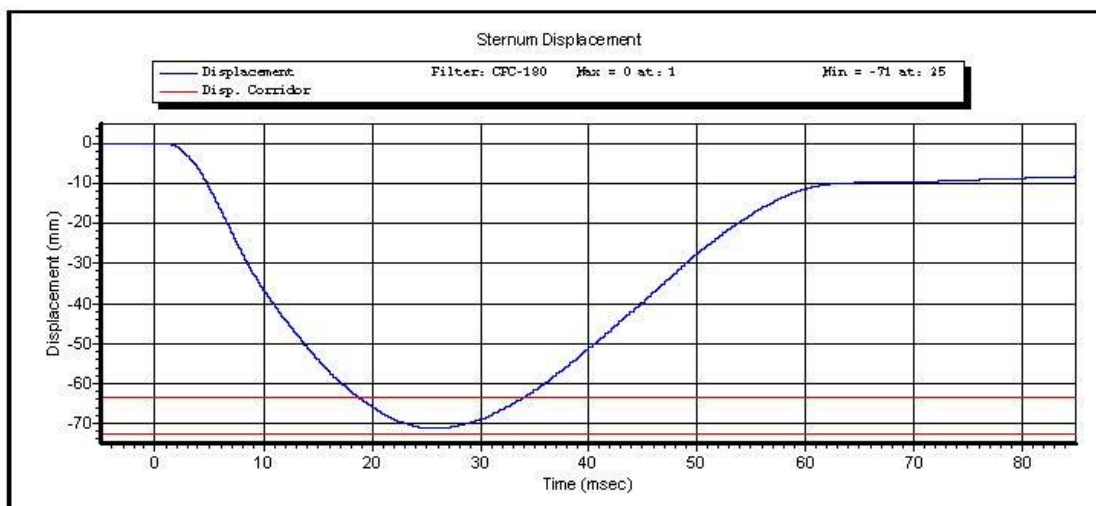
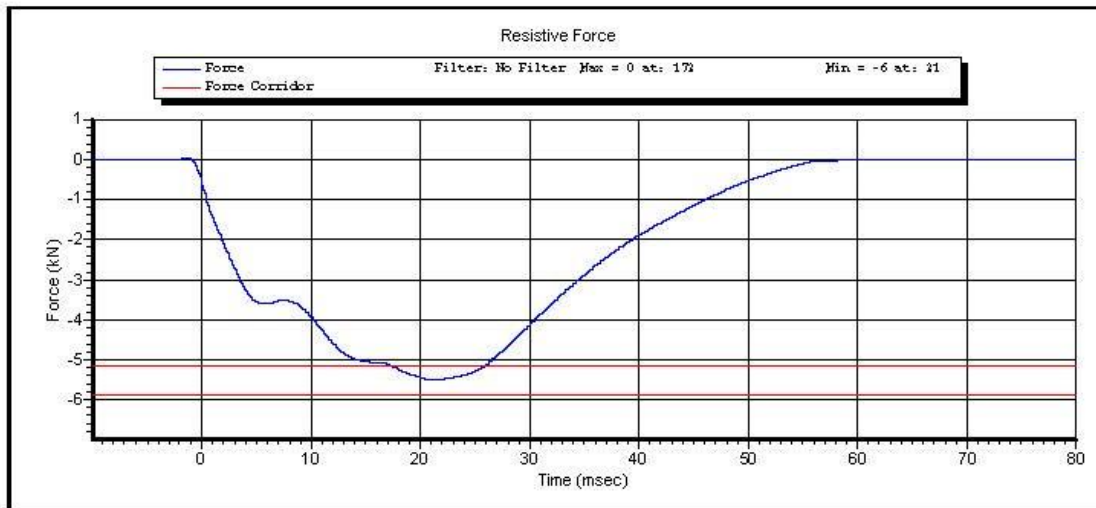


Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	064



Test ID: **Thorax Impact** Test Time: **10:40:24 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **3/10/2014**

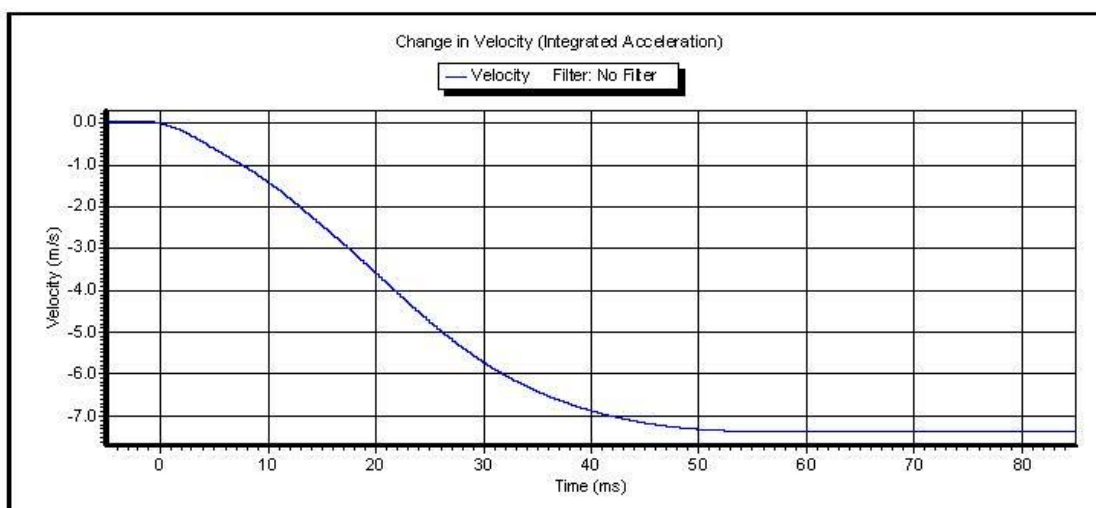
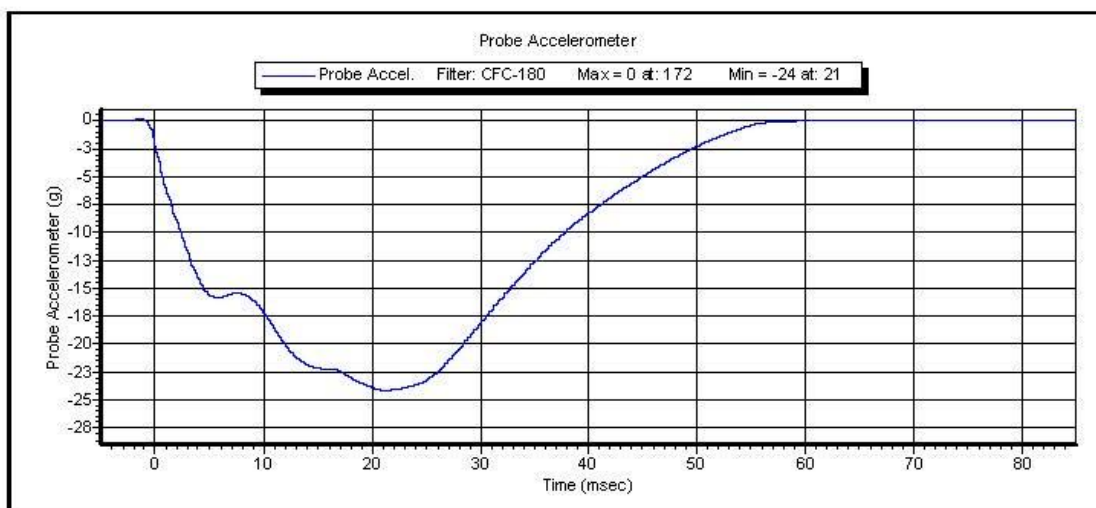


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Test Time: **10:40:24 AM**

Test Date: **3/10/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Thorax Impact** Test Time: **10:40:24 AM**

Test Date: **3/10/2014**

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VERIFICATION REPORT

Test Name:	Hip ROM	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Hip ROM Left	Test Date:	3/6/2014
		Test Time:	2:25:32 PM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.60 deg C	P
Humidity	10	--	70	15.00 %RH	P
Average Velocity	5	--	10	5.9 deg/s	P
Angle at 203 Nm	40	--	50	43.6 degrees	P
Moment at 30 degrees	0.0	--	94.9	66.58 Nm	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



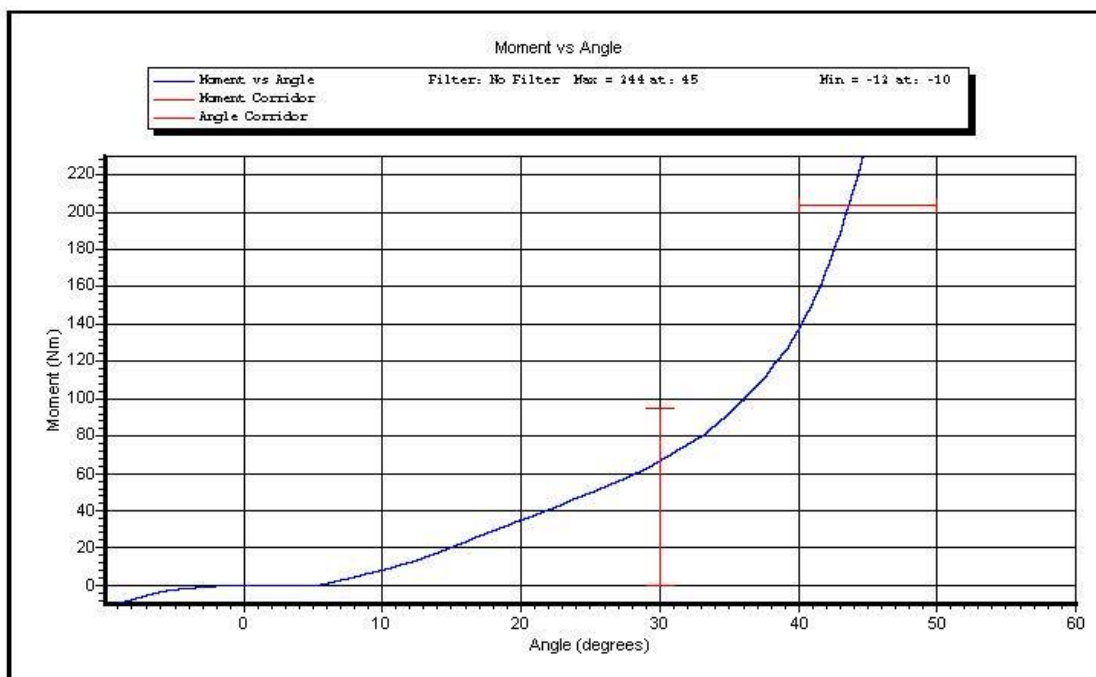
VERIFICATION REPORT

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	2/20/2014
DentonATD	A0 Output	1	1/11/2014



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



Test ID: **Hip ROM Left** Test Time: **2:25:32 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **3/6/2014**



VERIFICATION REPORT

Test Name:	Hip ROM	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Hip ROM Right	Test Date:	3/6/2014
		Test Time:	2:13:13 PM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.60 deg C	P
Humidity	10	--	70	15.20 %RH	P
Average Velocity	5	--	10	6.1 deg/s	P
Angle at 203 Nm	40	--	50	42.4 degrees	P
Moment at 30 degrees	0.0	--	94.9	78.34 Nm	P

All test parameters are within specifications

Technician: **R. Weil**

Supervisor: **E. Dutton**



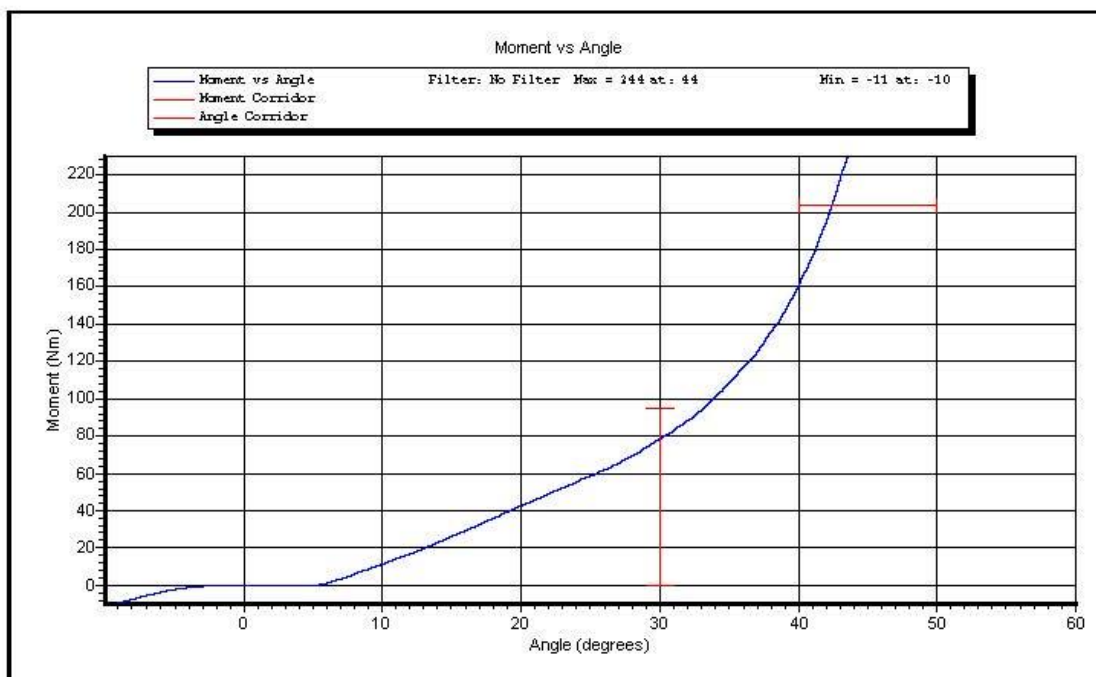
VERIFICATION REPORT

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	2/20/2014
DentonATD	A0 Output	1	1/11/2014



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



Test ID: **Hip ROM Right** Test Time: **2:13:13 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **3/6/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:	Knee Impact Left	Test Date:	3/7/2014
		Test Time:	9:27:51 AM

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

Test Parameters	Test Specifications			Test Results	
Temperature	18.9	--	25.6	21.90 deg C	P
Humidity	10	--	70	16.00 %RH	P
Velocity	2.07	--	2.13	2.104 m/s	P
Resistive Force	-5.780	--	-4.720	-5.268 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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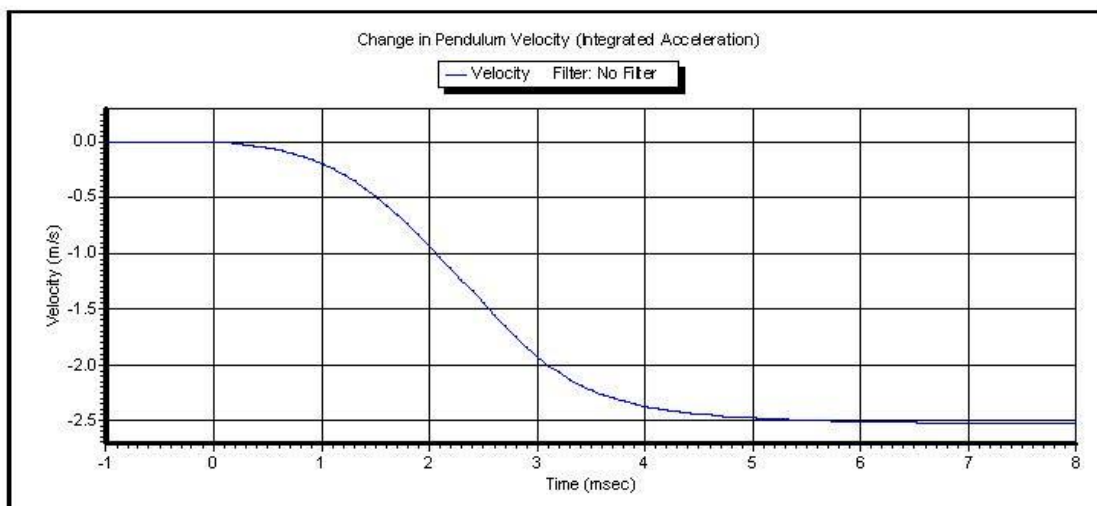
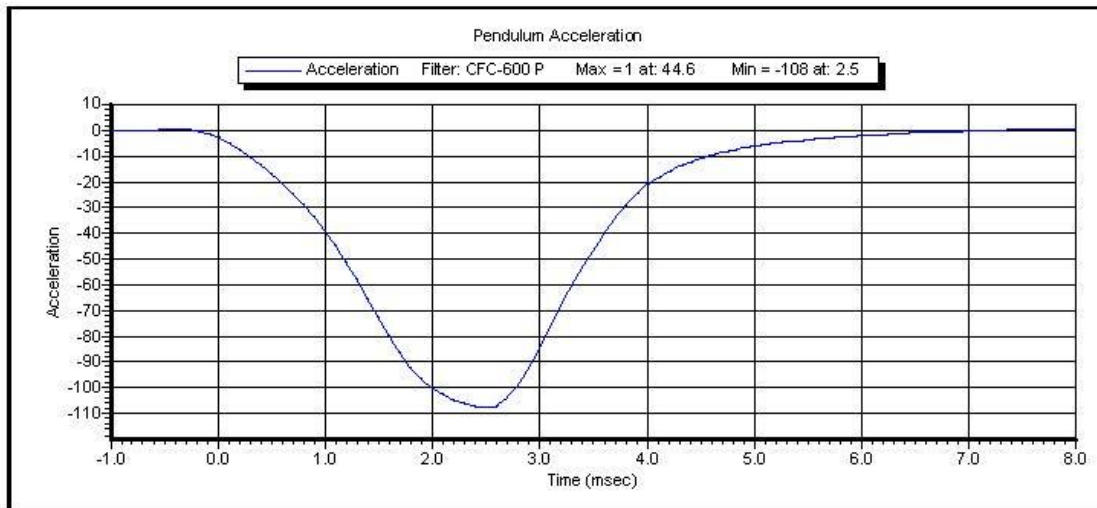


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 50th Male
ATD Serial Number:	064



Test ID: **Knee Impact Left** Test Time: **9:27:51 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **3/7/2014**



Test ID: **Knee Impact Left** Test Time: **9:27:51 AM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **3/7/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	10/1/2001
Sub Test Name:			
ATD Type:	Hybrid 3 - 50th Male		
ATD Serial Number:	064		
Test ID:		Test Date:	3/7/2014
		Test Time:	11:57:29 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.20 deg C P
Humidity	10 -- 70	17.90 %RH P
Velocity	2.07 -- 2.13	2.083 m/s P
Resistive Force	-5.780 -- -4.720	-5.211 kN P

All test parameters are within specifications

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



VERIFICATION REPORT

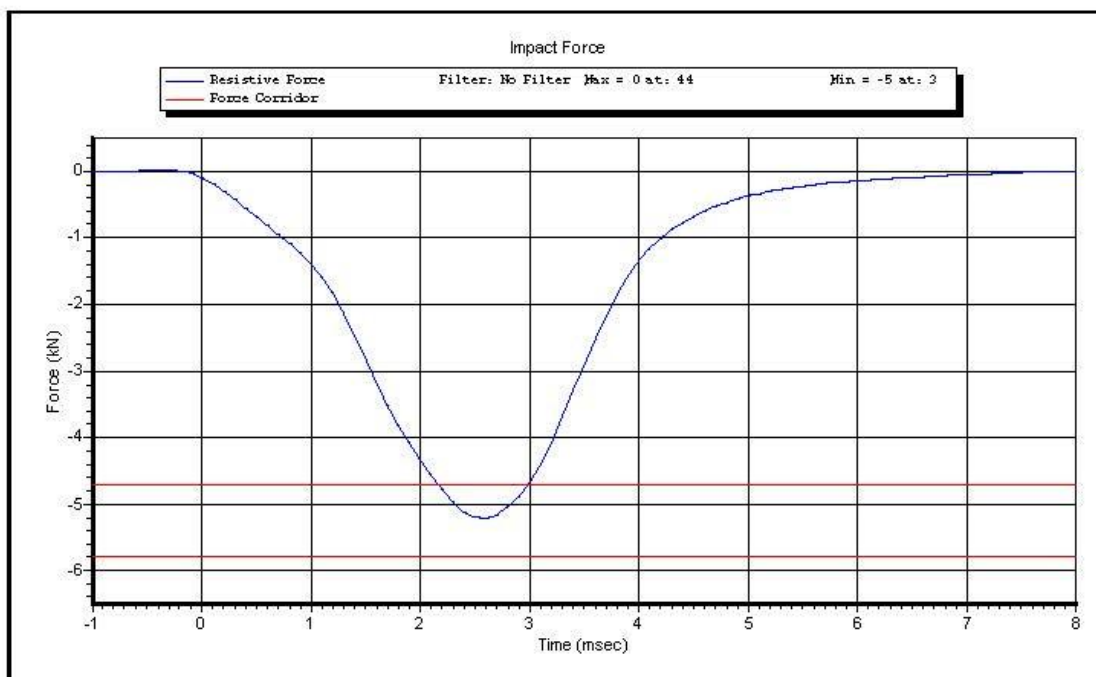
REFERENCE EQUIPMENT

<u>Manufacturer</u>	<u>Model</u>	<u>Serial Number</u>	<u>Calibration Date</u>
DentonATD 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:	064

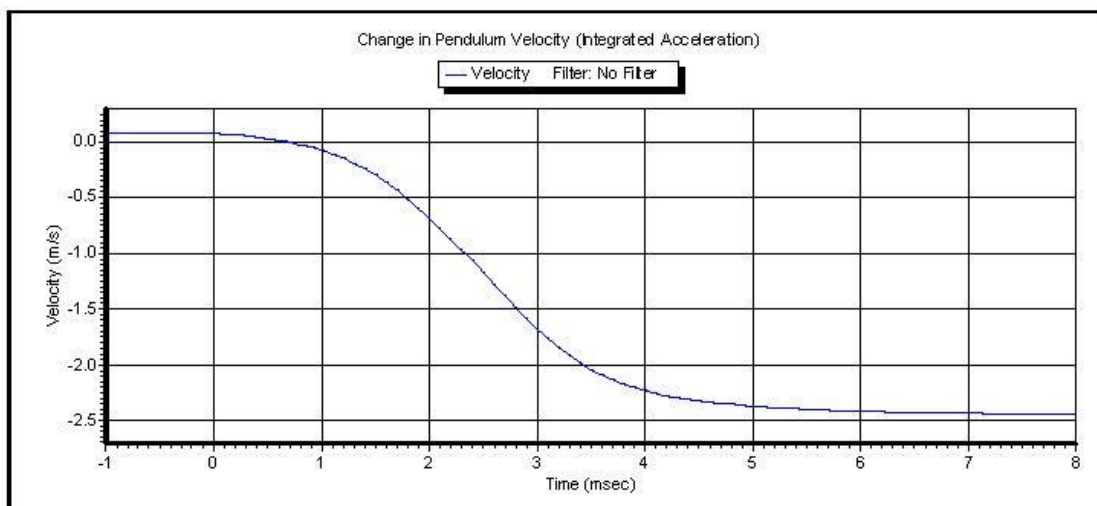
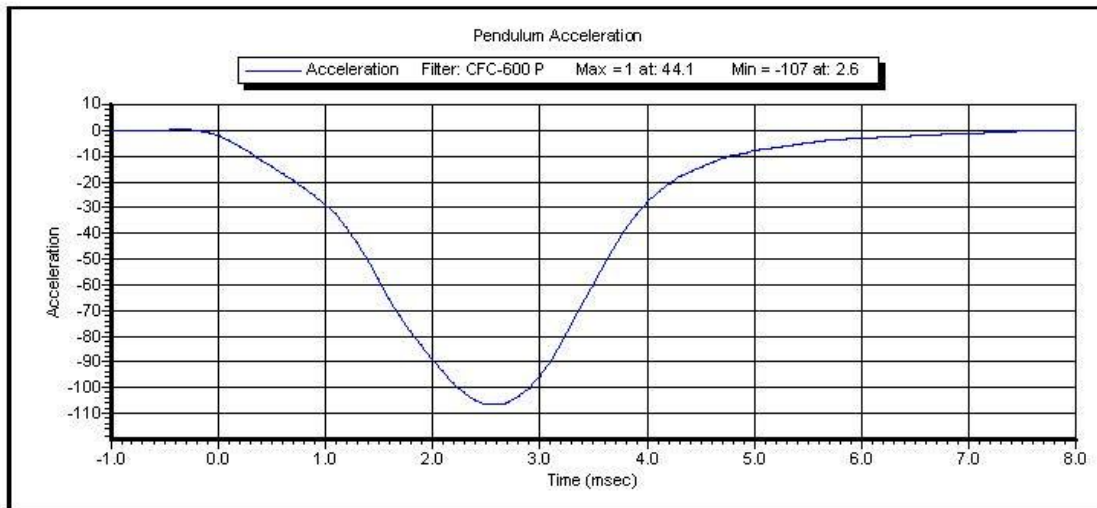


Test ID:

Test Time: 11:57:29 AM

Test Date: 3/7/2014

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID:

Test Time: 11:57:29 AM

Test Date: 3/7/2014

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CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 288



External Measurements

5th Female SN 288

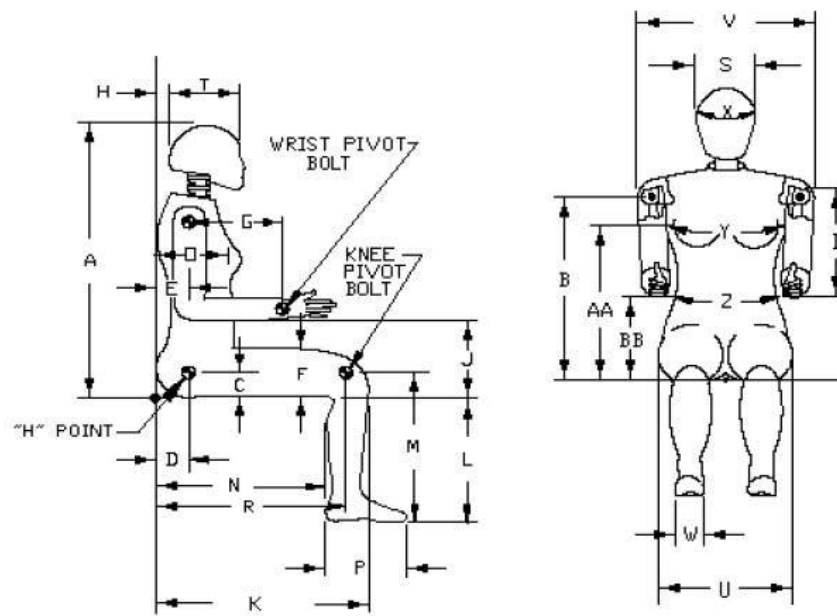
Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Sitting Height	774.7 – 800.1	780	Yes
B	Shoulder Pivot Height	431.8 – 457.2	439	Yes
C	H-Point Height	81.3 – 86.3	83	Yes
D	H-Point from Backline	144.8 – 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6 – 83.8	74	Yes
F	Thigh Clearance	119.4 – 134.6	124	Yes
G	Back of Elbow to Wrist Pivot	243.9 – 259.1	247	Yes
H	Head Back to Backline	43.2 – 48.2	44	Yes
I	Shoulder to Elbow Length	276.8 – 297.2	280	Yes
J	Elbow Rest Height	182.8 – 203.2	188	Yes
K	Buttock to Knee Length	520.7 – 546.1	541	Yes
L	Popliteal Height	355.6 – 376	368	Yes
M	Knee Pivot Height	393.7 – 419.1	398	Yes
N	Buttock Popliteal Length	414 – 439.4	430	Yes
O	Chest Depth without Jacket	175.3 – 190.5	179	Yes
P	Foot Length (right)	218.5 – 233.7	223	Yes
R	Buttock To Knee Pivot Length	457.2 – 482.6	462	Yes
S	Head Breadth	137.1 – 147.3	142	Yes
T	Head Depth	177.8 – 188	181	Yes
U	Hip Breadth	299.7 – 314.9	302	Yes
V	Shoulder Breadth	350.5 – 365.7	358	Yes
W	Foot Breadth	78.8 – 94	82	Yes
X	Head Circumference	528.3 – 548.7	540	Yes
Y	Chest Circumference with Jacket	850.9 – 881.3	856	Yes
Z	Waist Circumference	759.5 – 789.9	781	Yes
AA	Reference Location (Chest Circumference)	332.7 – 358.1	343	Yes
BB	Reference Location (Waist Circumference)	160.1 – 170.2	164	Yes

Technician: M. Geesey

Date: 03/06/2014

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:	288		
Test ID:	Head Drop	Test Date:	3/7/2014
		Test Time:	7:41:23 AM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	22.20 deg C P
Humidity	10 -- 70	14.70 %RH P
Resultant Acceleration	250 -- 300	265.4 G's P
Oscillation	0 -- 10	0.0 % P
Lateral Acceleration	-15 -- 15	-13.6 G's P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



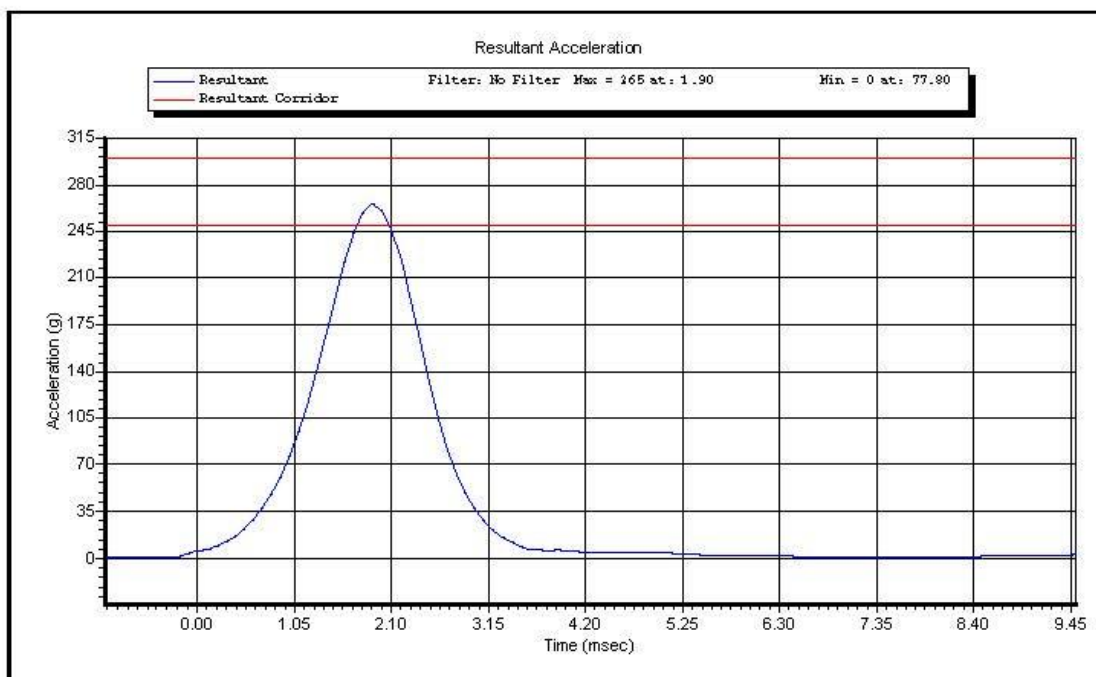
VERIFICATION REPORT

REFERENCE EQUIPMENT

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



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

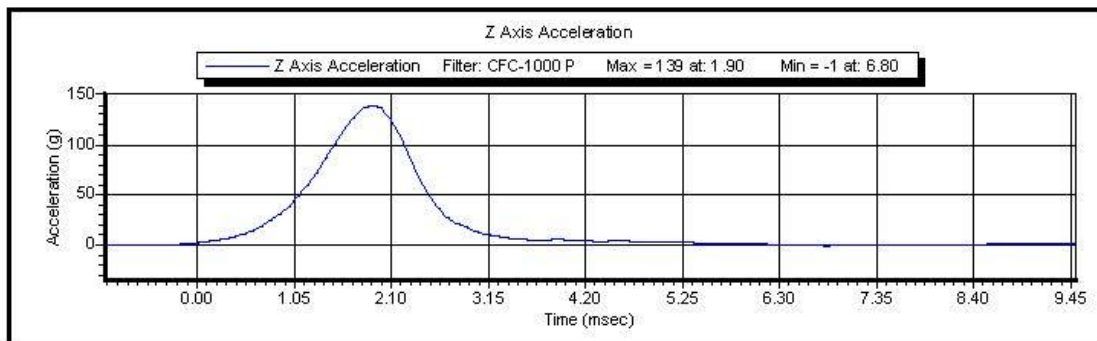
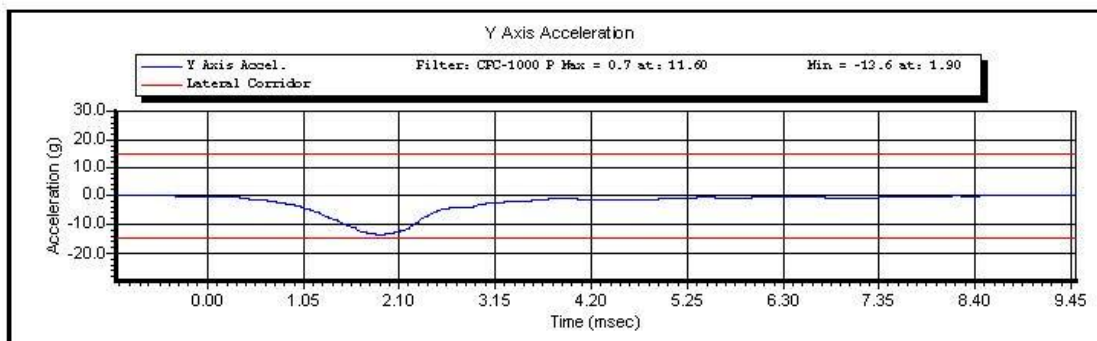
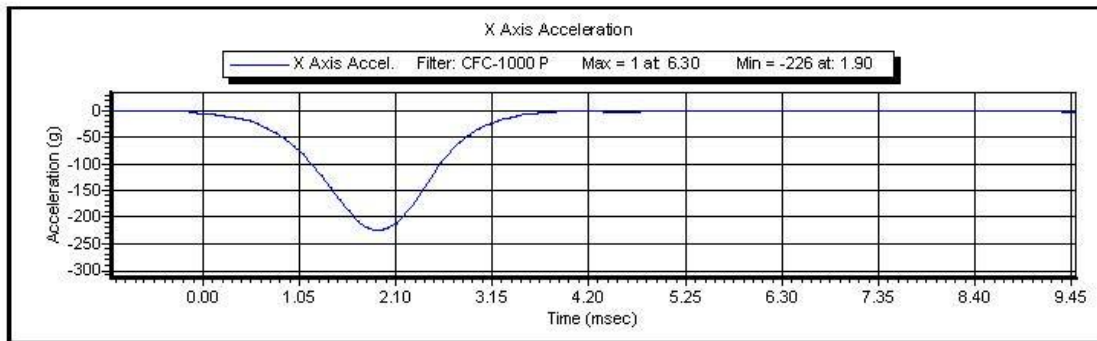


Test ID: **Head Drop**

Test Time: **7:41:23 AM**

Test Date: **3/7/2014**

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Test ID: **Head Drop**

Test Time: **7:41:23 AM**

Test Date: **3/7/2014**

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VERIFICATION REPORT

Test Name:	Neck Extension	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Neck Extension	Test Date:	3/7/2014
		Test Time:	12:52:27 PM

Component Part Number	Component Serial Number
Neck - 880105-255	7121

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.10 deg C P
Humidity	10 -- 70	18.30 %RH P
Velocity	5.95 -- 6.19	6.031 m/s P
Pendulum Impulse at 10 ms	1.5 -- 1.9	1.80 m/s P
Pendulum Impulse at 20 ms	3.1 -- 3.9	3.56 m/s P
Pendulum Impulse at 30 ms	4.6 -- 5.6	5.17 m/s P
D Plane Rotation	99 -- 114	103.9 degrees P
Moment During Rotation Interval	-65 -- -53	-61.2 Nm P
Moment Decay to -10.0 Nm	94 -- 114	101.7 ms P

All test parameters are within specifications

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



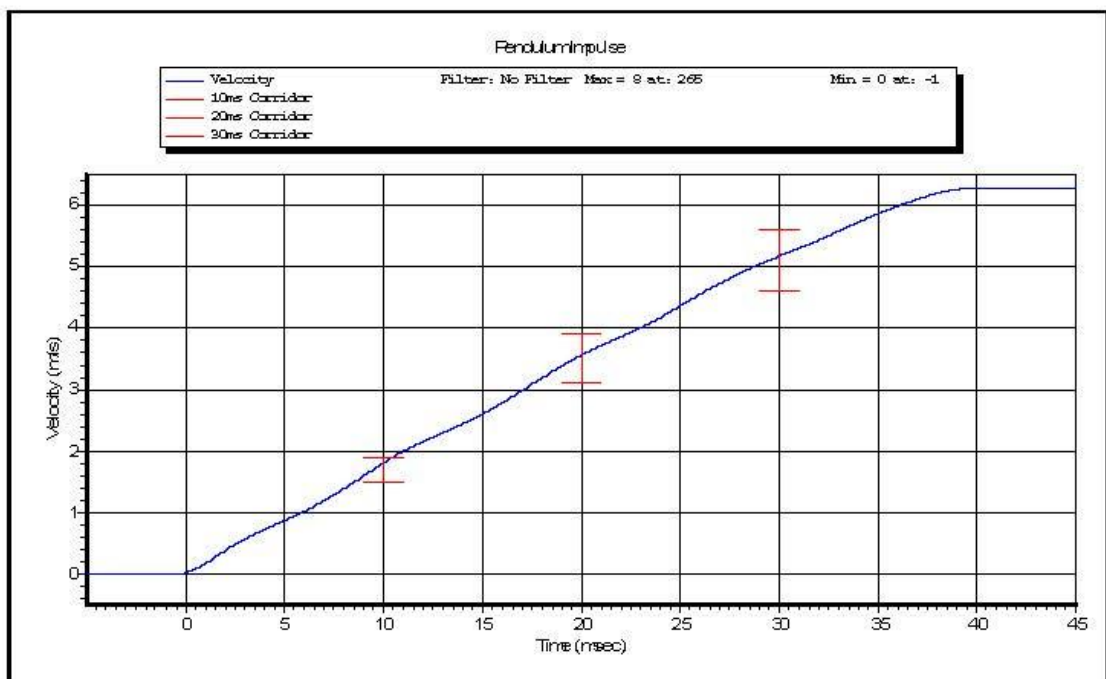
VERIFICATION REPORT

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
ETI	SP22D	SP22 PENDULUM	2/21/2014
ETI	SP22D	SP22 CONDYLE	2/21/2014
Denton	1716A	LC-2206My	5/23/2013
Denton	1716A	LC-2206Fx	5/23/2013



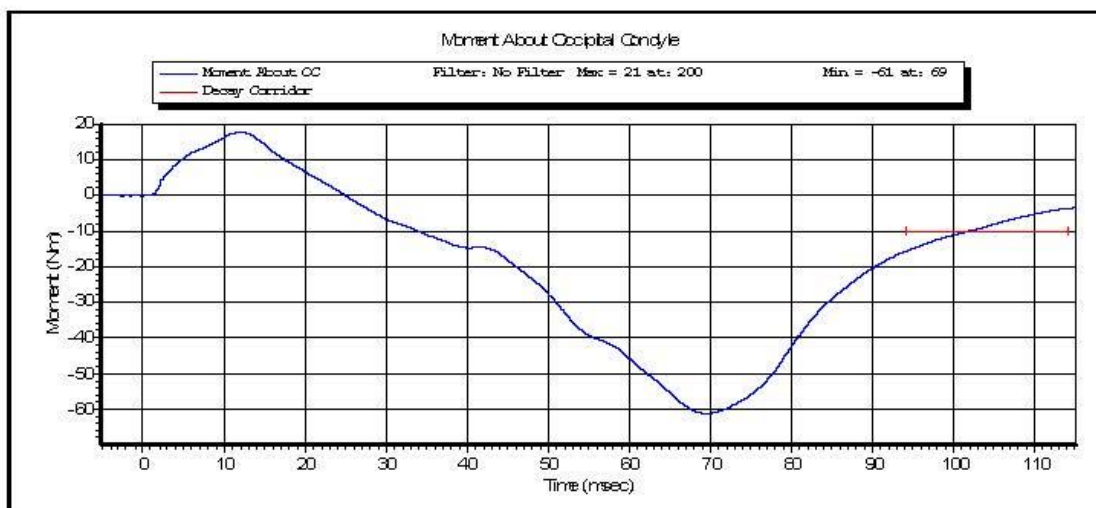
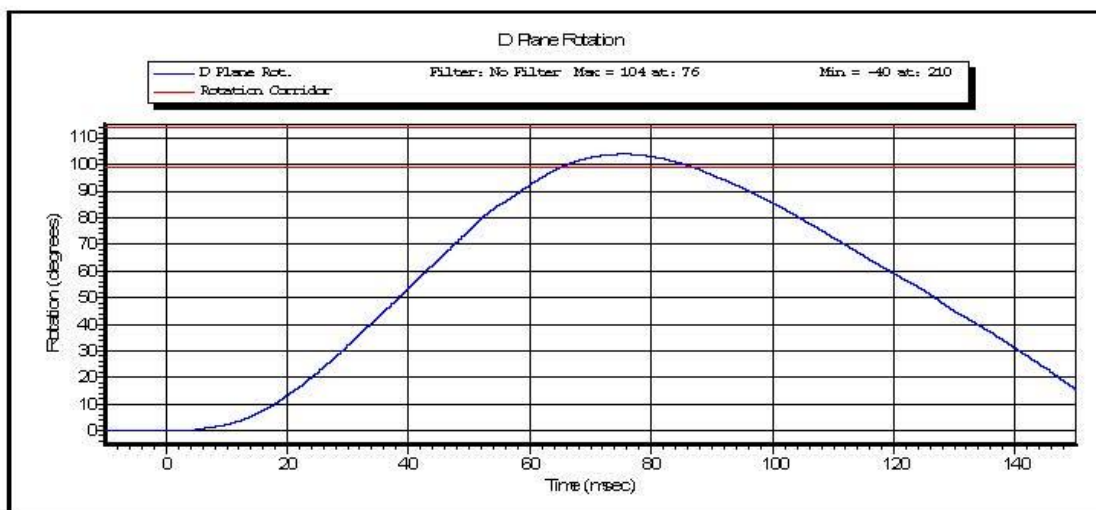
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Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: Neck Extension Test Time: 12:52:27 PM

Test Date: 3/7/2014

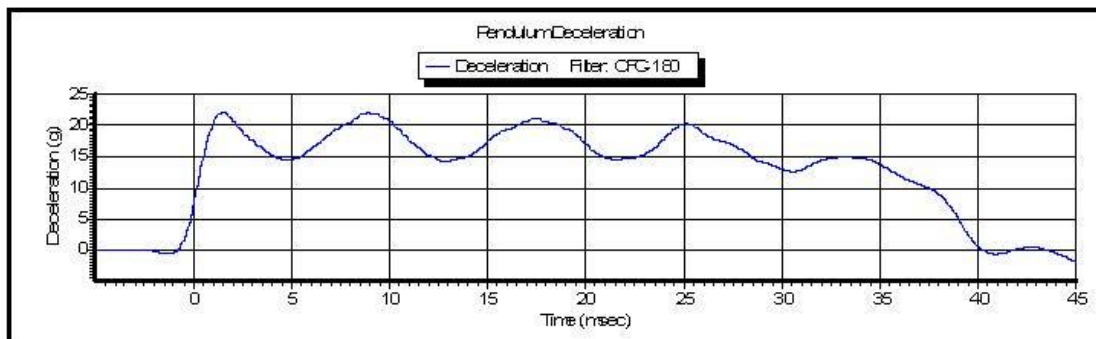
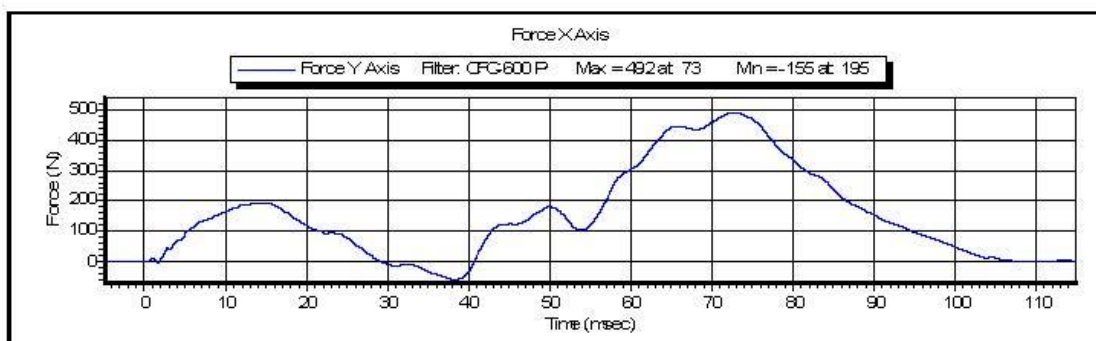
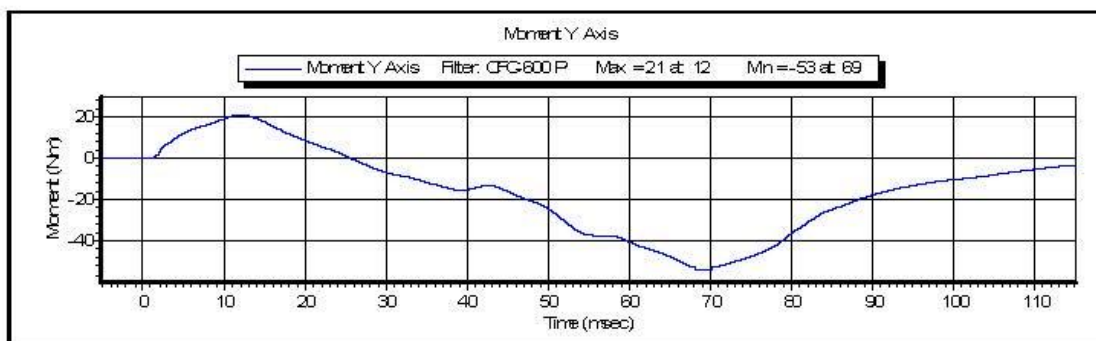
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Test ID: Neck Extension Test Time: 12:52:27 PM

Test Date: 3/7/2014

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Neck Extension** Test Time: **12:52:27 PM**

Test Date: **3/7/2014**

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VERIFICATION REPORT

Test Name:	Neck Flexion	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Neck Flexion	Test Date:	3/7/2014
		Test Time:	12:10:40 PM

Component Part Number	Component Serial Number
Neck - 880105-255	7121

Test Parameters	Test Specifications	Test Results
Temperature	20.6 -- 22.2	22.20 deg C P
Humidity	10.0 -- 70.0	17.90 %RH P
Velocity	6.89 -- 7.13	6.981 m/s P
Pendulum Impulse at 10 ms	2.1 -- 2.5	2.12 m/s P
Pendulum Impulse at 20 ms	4 -- 5	4.2 m/s P
Pendulum Impulse at 30 ms	5.8 -- 7.0	6.01 m/s P
D Plane Rotation	-91 -- -77	-78.3 degrees P
Moment During Rotation Interval	69 -- 83	72.2 Nm P
Moment Decay to 10.0 Nm	80 -- 100	89.3 ms P

All test parameters are within specifications

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



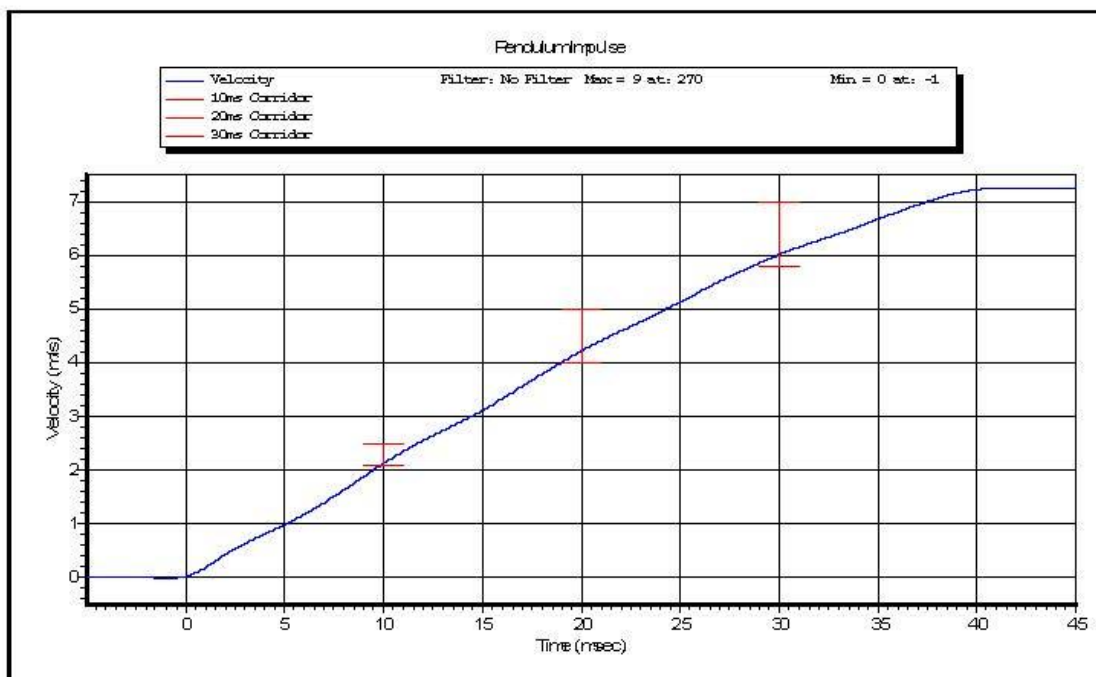
VERIFICATION REPORT

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
ETI	SP22D	SP22 PENDULUM	2/21/2014
ETI	SP22D	SP22 CONDYLE	2/21/2014
Denton	1716A	LC-2206My	5/23/2013
Denton	1716A	LC-2206Fx	5/23/2013



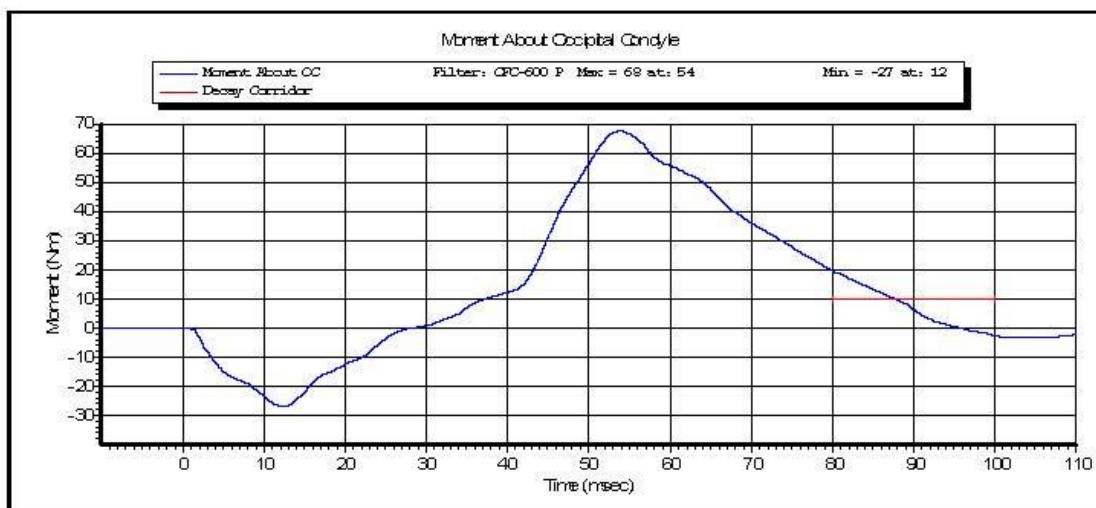
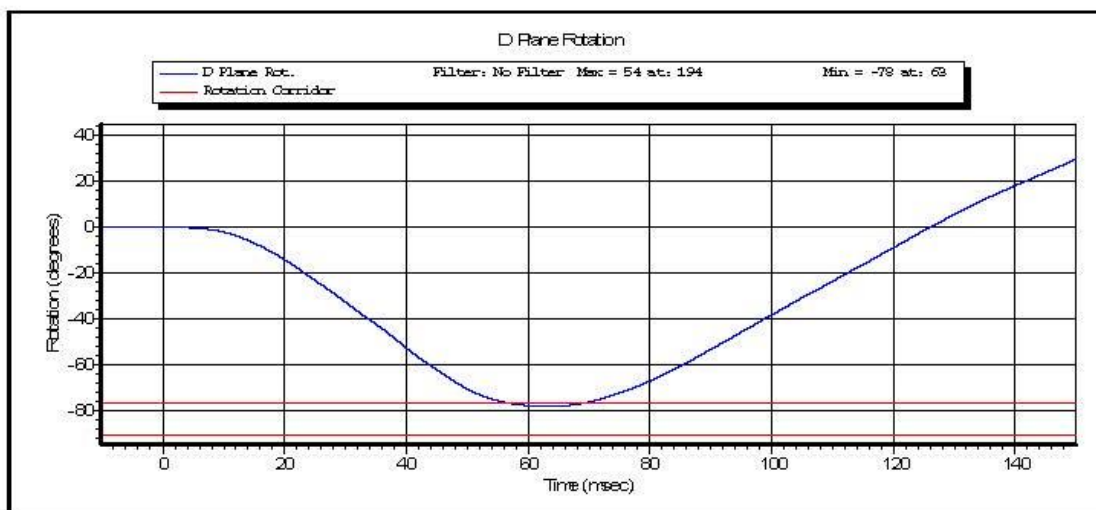
Test Name:	Neck Flexion
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: **Neck Flexion** Test Time: **12:10:40 PM**

Test Date: **3/7/2014**

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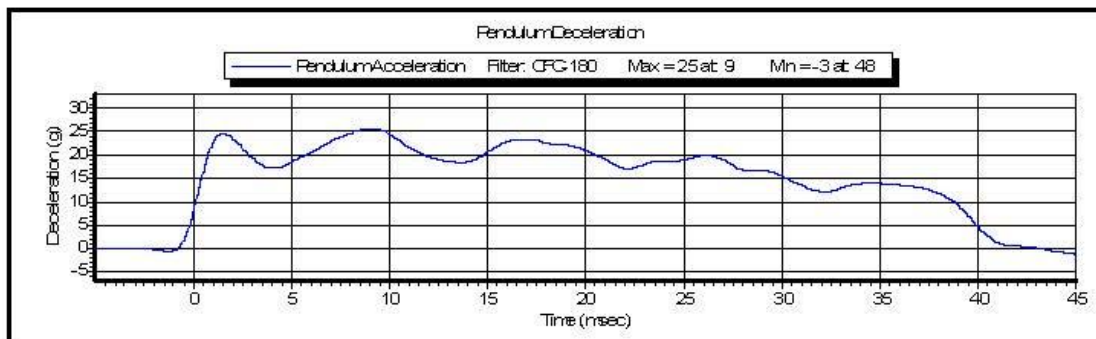
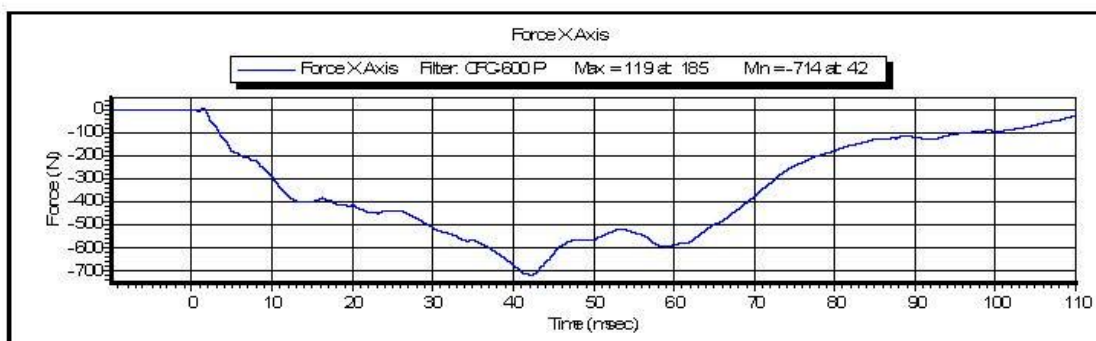
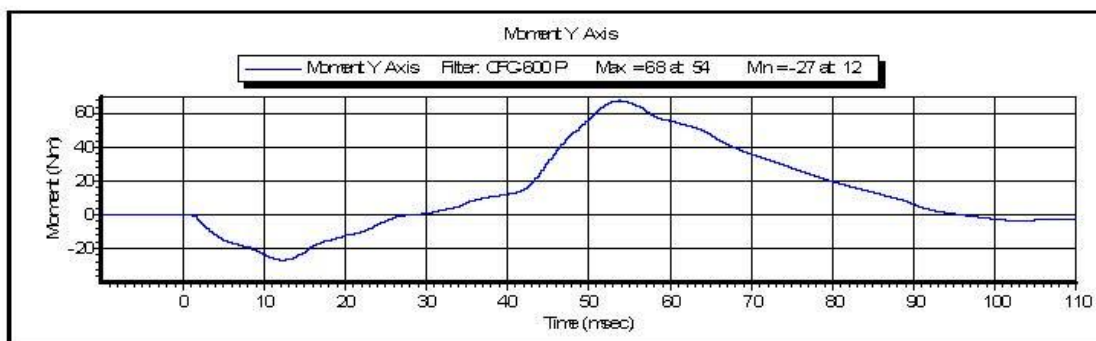


Test ID: **Neck Flexion**

Test Time: **12:10:40 PM**

Test Date: **3/7/2014**

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Test ID: **Neck Flexion**

Test Time: **12:10:40 PM**

Test Date: **3/7/2014**

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VERIFICATION REPORT

Test Name:	Thorax Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Thorax Impact	Test Date:	3/6/2014
		Test Time:	5:47:17 PM

Component Part Number	Component Serial Number
Ribs 880105-RS	DG8843

Test Parameters	Test Specifications			Test Results	
Temperature	20.6	--	22.2	21.90 deg C	P
Humidity	10	--	70	15.10 %RH	P
Velocity	6.59	--	6.83	6.805 m/s	P
Sternum Displacement	-58	--	-50	-52.0 mm	P
Force During Displacement Interval	-4400	--	-3900	-4169.1 N	P
Force During -18mm to -50mm Displacem	-4600	--	0	-4173.4 N	P
Hysteresis	69	--	85	73.9 %	P

All test parameters are within specifications

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



VERIFICATION REPORT

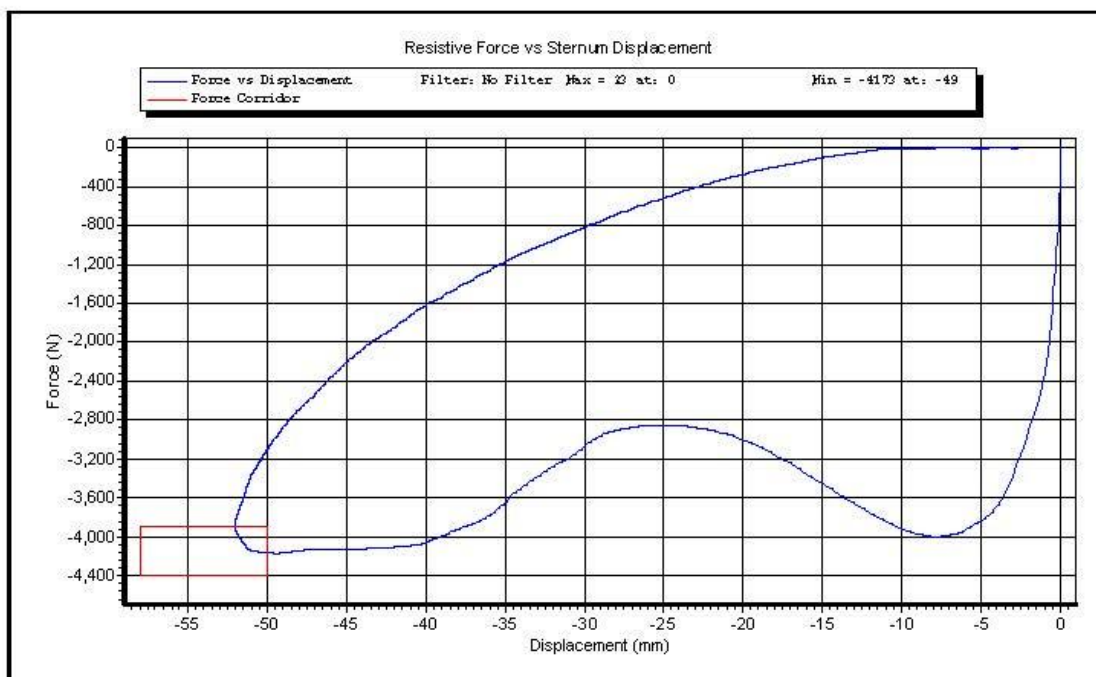
REFERENCE EQUIPMENT

<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
SERVO	14 CB1-2897	DS-288	11/21/2013

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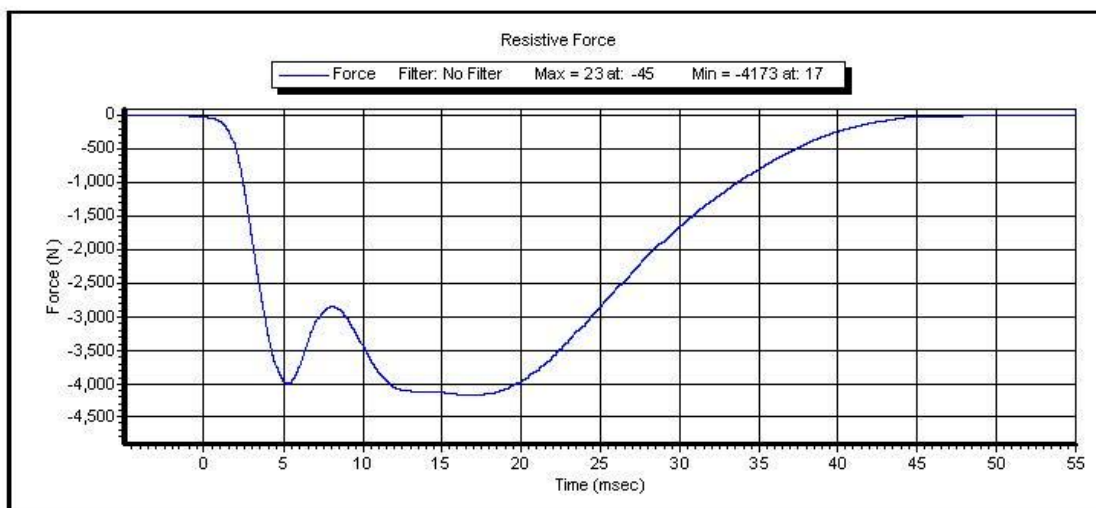
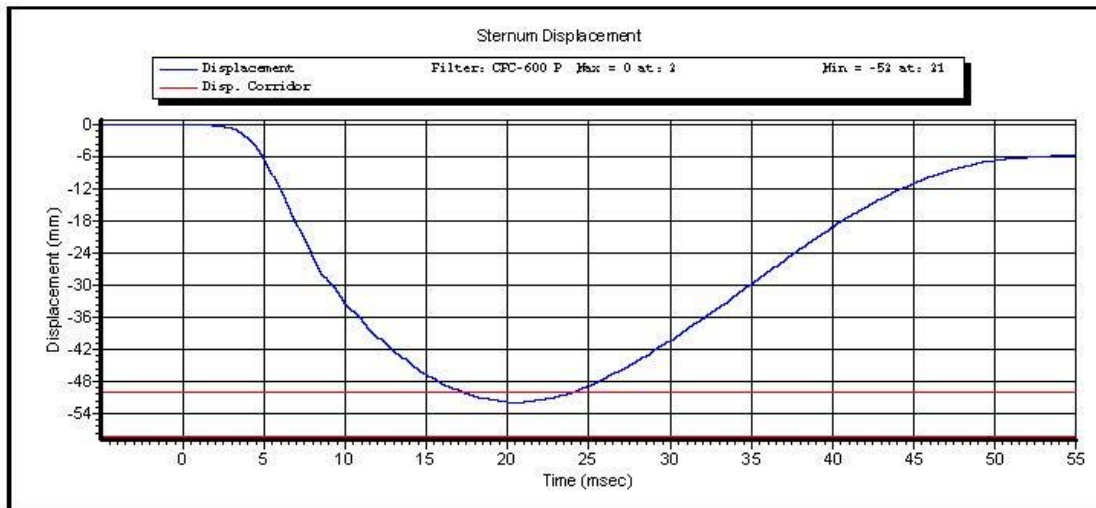


Test Name:	Thorax Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: Thorax Impact Test Time: 5:47:17 PM
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: 3/6/2014

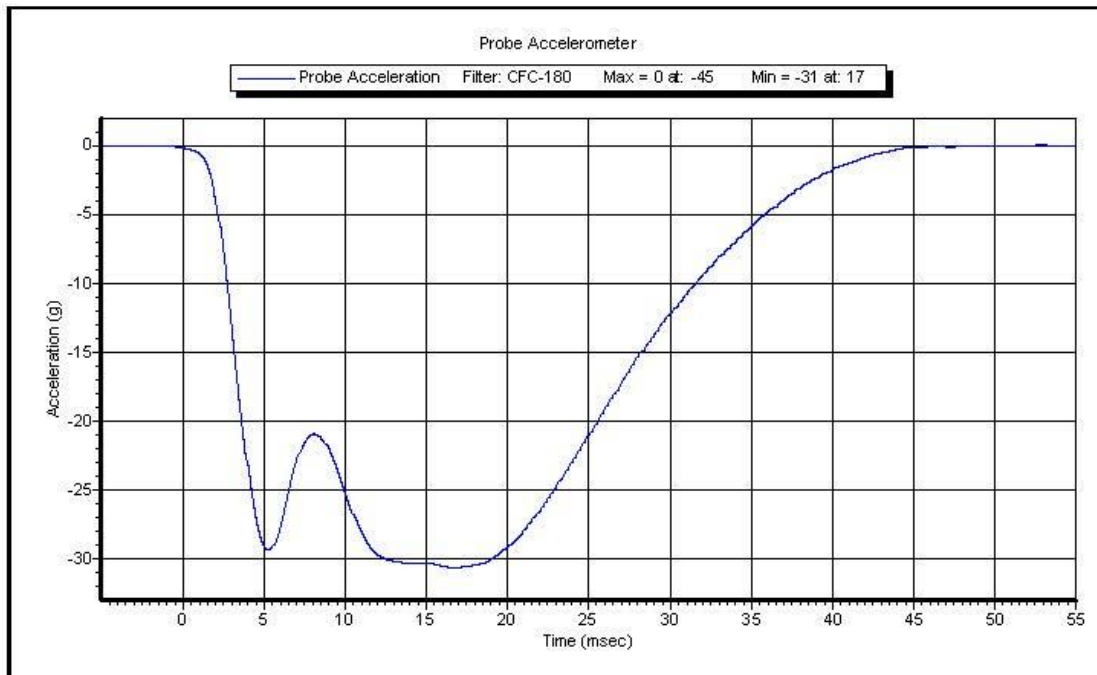


Test ID: **Thorax Impact**

Test Time: **5:47:17 PM**

Test Date: **3/6/2014**

Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0



Test ID: **Thorax Impact**

Test Time: **5:47:17 PM**

Test Date: **3/6/2014**

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Torso Flexion

Part 572O HIII 5% Female

ATD Serial No: 288

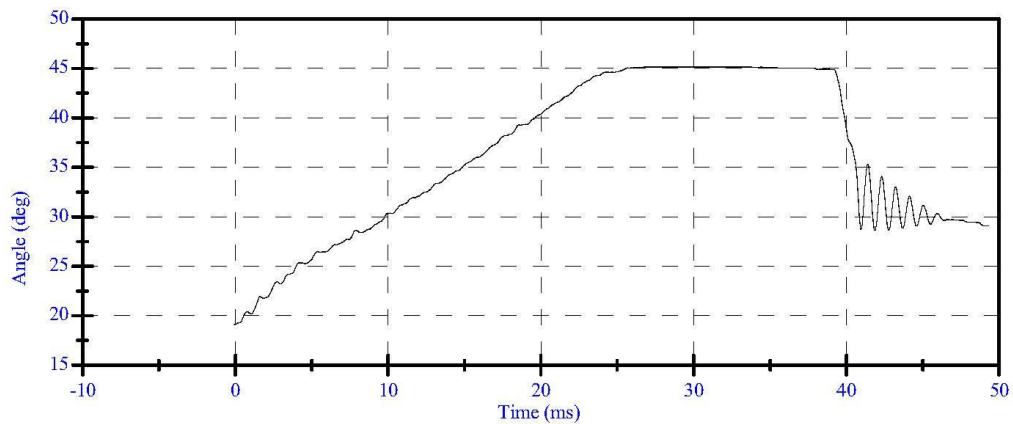
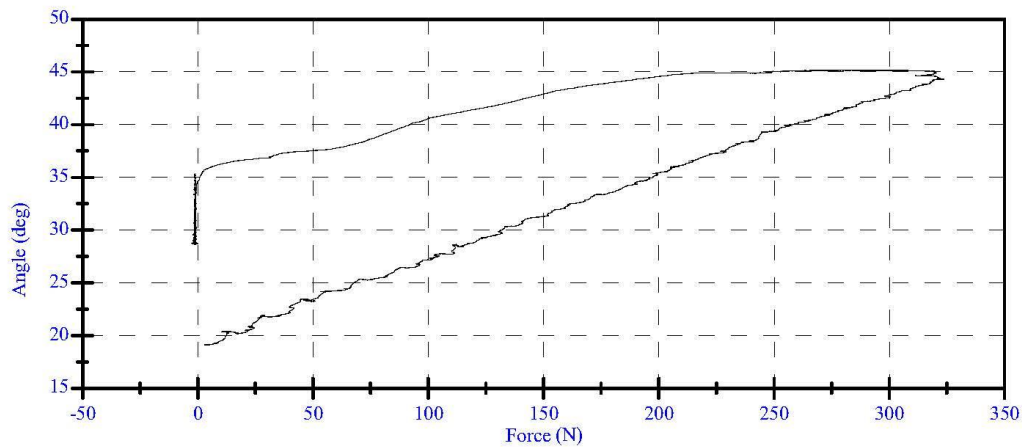
Laboratory Supervisor: E. Dutton

Date: 03/07/2014

Laboratory Technician: M. Goehle

TEST PARAMETER	SPECIFICATION	TEST RESULTS	STATUS
Lab Temperature:	18.9-25.6 C	21.4 C	Passed
Lab Humidity:	10-70 %	21.1 %	Passed
Initial Angle:	0.00-20.00 Deg	15.9 Deg	Passed
Force at 45 Deg	320.00-390.00 N	323.7 N	Passed
Return Angle	8 Deg Max from Initial	22.8 deg	Passed

TORSO FLEXION TEST





VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Knee Impact Left	Test Date:	3/6/2014
		Test Time:	6:28:25 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	20.80 deg C P
Humidity	10 -- 70	10.50 %RH P
Velocity	2.07 -- 2.13	2.124 m/s P
Resistive Force	-4060 -- -3450	-3849.4 N P

All test parameters are within specifications

Technician: **M. Geesey**

Supervisor: **E. Dutton**



VERIFICATION REPORT

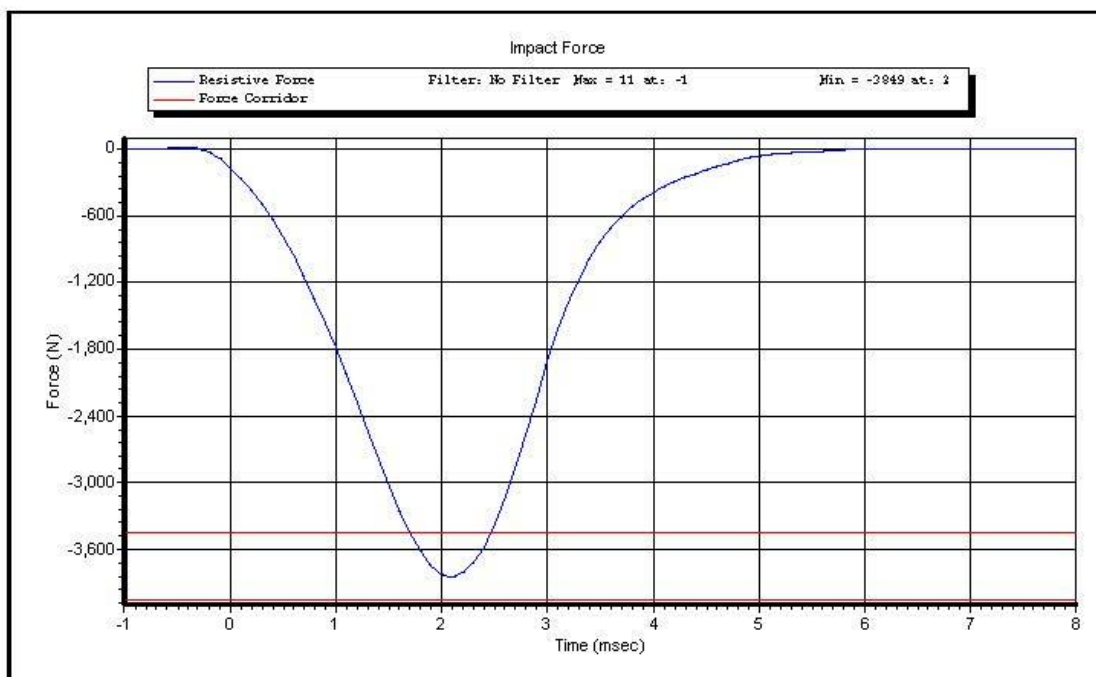
REFERENCE EQUIPMENT

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

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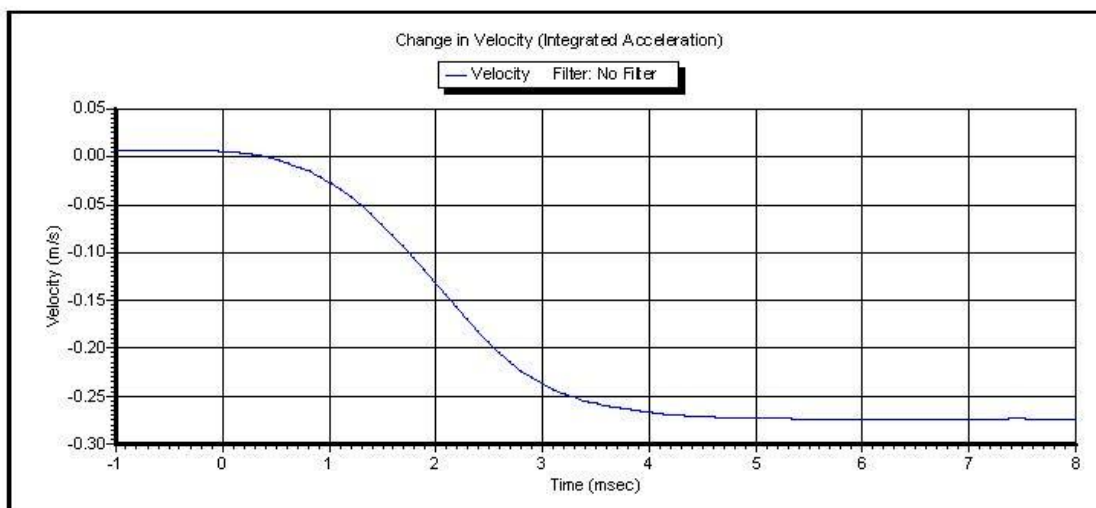
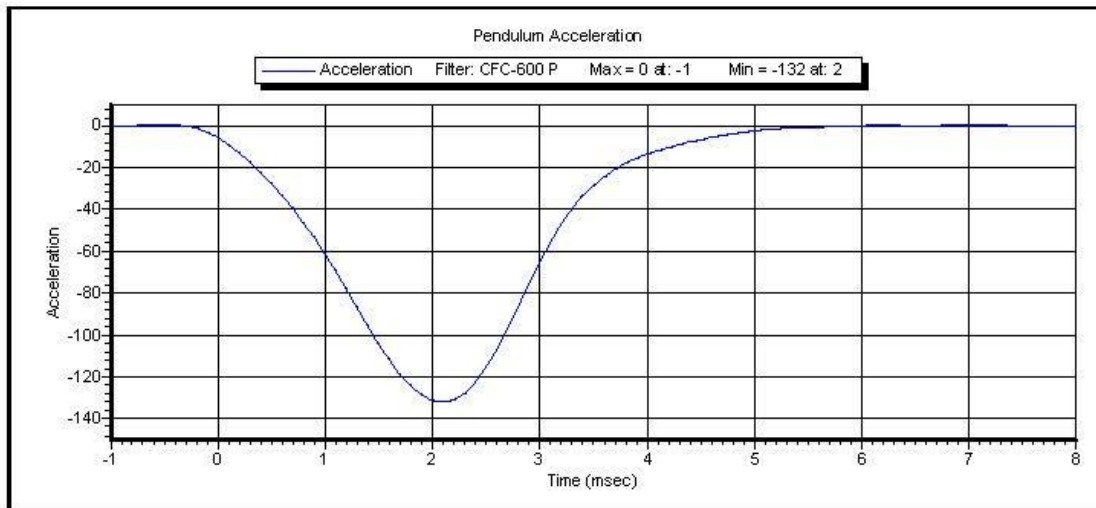


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: **Knee Impact Left** Test Time: **6:28:25 PM**
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Test Date: **3/6/2014**



Test ID: **Knee Impact Left** Test Time: **6:28:25 PM**
Copyright 2003 Denton ATD, Inc. LabPaqII Version: 1.8.5.0

Test Date: **3/6/2014**



VERIFICATION REPORT

Test Name:	Knee Impact	Revision:	7/15/2002
Sub Test Name:			
ATD Type:	Hybrid 3 - 5th Female		
ATD Serial Number:	288		
Test ID:	Knee Impact Right	Test Date:	3/6/2014
		Test Time:	6:23:46 PM

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

Test Parameters	Test Specifications	Test Results
Temperature	18.9 -- 25.6	20.80 deg C P
Humidity	10 -- 70	10.50 %RH P
Velocity	2.07 -- 2.13	2.128 m/s P
Resistive Force	-4060 -- -3450	-3640.0 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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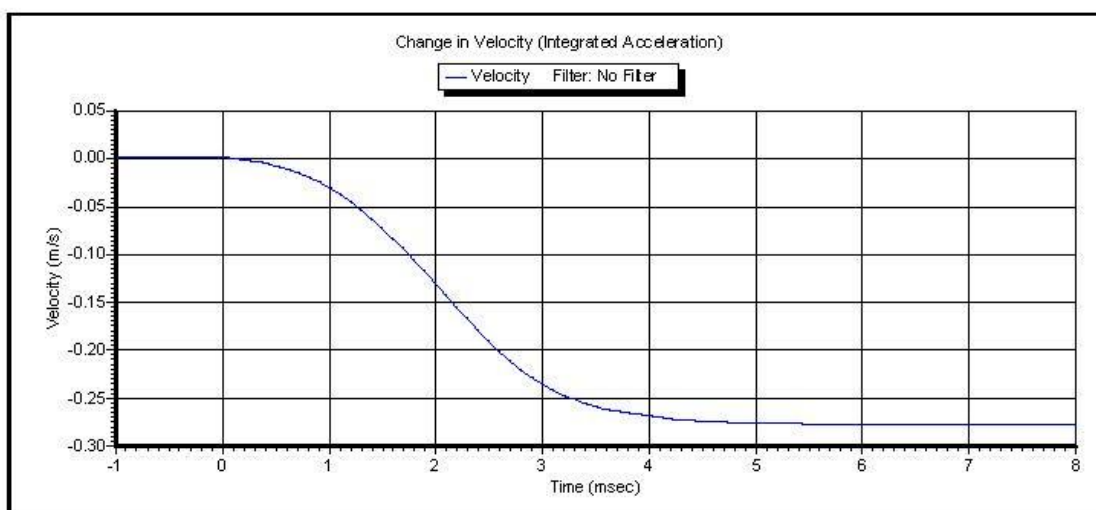
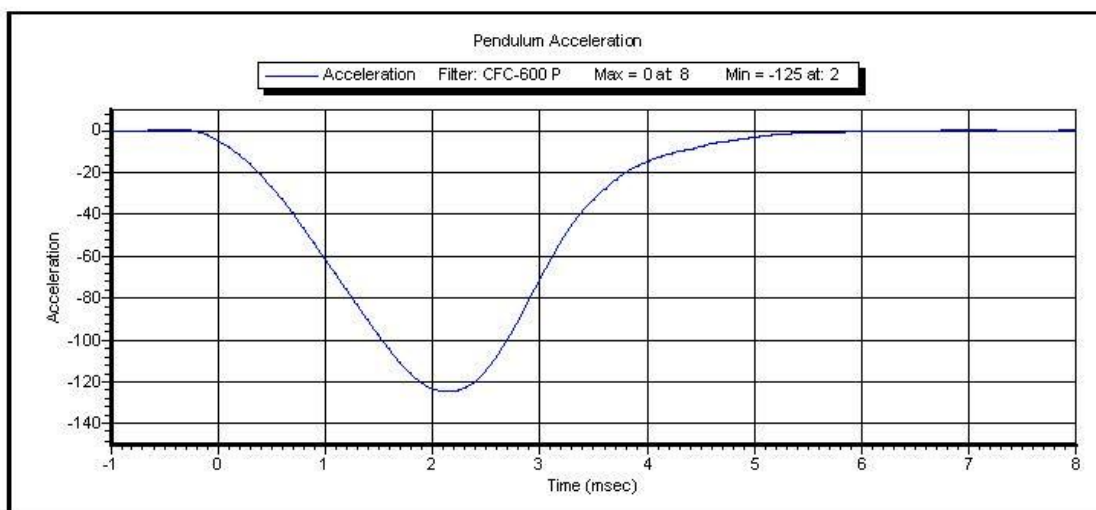


Test Name:	Knee Impact
Sub Test Name:	
ATD Type:	Hybrid 3 - 5th Female
ATD Serial Number:	288



Test ID: **Knee Impact Right** Test Time: **6:23:46 PM**
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Test Date: **3/6/2014**



Test ID: **Knee Impact Right** Test Time: **6:23:46 PM**
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Test Date: **3/6/2014**