

REPORT NUMBER: NCAP-CAL-15-004

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

**Nissan Motor Co., LTD
2015 Nissan Sentra
Four Door Sedan**

NHTSA No: M20155205

**PREPARED BY:
CALSPAN CORPORATION
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April 9, 2015

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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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 2015 Nissan Sentra four door sedan in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301, and foot well intrusion performance. The test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 2, 2015. The impact velocity of the vehicle was 56.69 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 510 mm at C4 to right of the vehicles centerline. The test vehicle's occupant performance data is as follows:																																																									
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SECTION 1

PURPOSE AND SUMMARY OF TEST

PURPOSE

This 56.3 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-12-D-00260. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

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

SUMMARY

A ridged fixed barrier was impacted by a 2015 Nissan Sentra four door sedan at a velocity of 56.69 km/h. The test was performed at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 2, 2015. 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. The driver (position 1) ATD (Serial No. 1046) and the right-front passenger (position 2) ATD (Serial No. 139) 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 97.8 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 510 mm at C4 to the right of the vehicles centerline. During and after the impact event, the driver's and passenger's side doors were closed and operational.

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

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

The occupant data is summarized below.

ATD Position	HIC ₁₅	Nij	Neck Tension (N)	Neck Comp. (N)	3ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50 th)	293.257	0.356	1354.710	-309.289	52.906	-27.230	-868.482	-1291.262
Passenger (5 th)	353.343	0.454	967.900	-607.290	55.635	-19.893	-2325.453	-972.105

GENERAL COMMENTS:

1. P1 (Driver) serial number - 1046
2. P2 (Passenger) serial number - 139

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: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20155205	Traction Control System (TCS)	Yes
Model Year	2015	Power Steering	Yes
Make	Nissan	Power Window Auto-Reverse	No
Model	Sentra	Driver Frontal Airbag	Yes
Body Style	Four Door Sedan	Driver Curtain Airbag	Yes
VIN	3N1AB7APXFY216362	Driver Head/Torso Airbag	No
Body Color	Charcoal Gray	Driver Torso Airbag	No
Odometer Reading (km /mi)	196.34 km / 122 mi	Driver Torso/Pelvis Airbag	Yes
Engine Displacement (L)	1.8	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	Front Wheel Drive	Front Pass. Torso/Pelvis Airbag	Yes
Roof Rack	No	Front Pass. Pelvis Airbag	No
Sunroof / T-Top	No	Front Pass. Knee Airbag	No
Running Boards	No	Driver Pretensioner	Yes
Tilt Steering Wheel	Yes	Driver Load Limiter	Yes
Power Seats	No	Front Pass. Pretensioner	Yes
Anti-Lock Brakes (ABS)	Yes	Front Pass. Load Limiter	Yes
Automatic Door Locks (ADLs)	Yes	Other	-

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Nissan Motor Co., LTD	GVWR (kg)	1734
Date of Manufacture	12/14	GAWR Front (kg)	905
		GAWR Rear (kg)	835

VEHICLE SEATING AND WEIGHT CAPACITY DATA

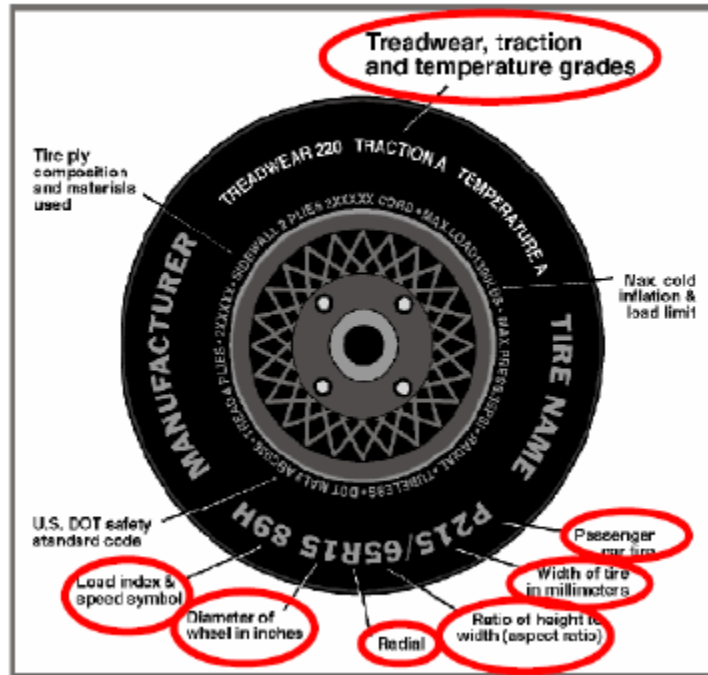
Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	-	
Number of Occupants	2	3	-	5
Capacity Wt. (VCW) (kg)				390
Cargo Wt. (RCLW) (kg)				49.8

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

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

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



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	230	230
Recommended Tire Size	P205/55R16	P205/55R16
Tire Size on Vehicle	P205/55R16	P205/55R16
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Turanza EL400	Turanza EL400
Treadwear	300	300
Traction	B	B
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Nylon	1 Polyester, 2 Steel, 1 Nylon
Load Index / Speed Symbol	89H	89H
Tire Material	Rubber	Rubber
DOT Safety Code Left	V6T2PM74814	V6T2PM74814
DOT Safety Code Right	V6T2PM74814	V6T2PM74814

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

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	408	248		465	295	
Right	kg	384	264		397	338	
Ratio	%	61%	39%		58%	42%	
Totals	kg	792	512	1304	862	633	1495

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total Delivered Weight (UVW)	kg	1304	(A)
Weight of 1 P572E ATD & 1 P572O ATD	kg	147	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	49.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1500.8	(A+B+C)

TEST VEHICLE ATTITUDES AND CG

Condition	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	710	712	710	716	1060
As Tested	mm	707	712	677	681	1143
Post-Test	mm	633	738	644	730	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Total Vehicle Wheel Base	mm	2699
Total Vehicle Length at Left Side	mm	4518
Total Vehicle Length at Centerline	mm	4623
Total Vehicle Length at Right Side	mm	4518
Weight of Ballast in Cargo Area	kg	0
Weight of Vehicle Components Removed	kg	28
Amount of Stoddard Solvent in Fuel Tank	L	46.5

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT:

Trunk carpeting, spare tire, jack, tail light, rear speaker, and side mirrors.

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

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

TARGET VEHICLE STRUCTURAL MEASUREMENT

No.	Description	Pre-Test
1	Total Length	4623
2	Total Width	1753
3*	Bumper Top Height	503
4*	Bumper Bottom Height	412
5*	Longitudinal Member Top Height	556
6	Distance Between Longitudinal Members	1017
7	Longitudinal Member Width	53
8*	Engine Top Height	874
9*	Engine Bottom Height	207
10	Engine and Gearbox Width	452
11	Front Bumper-Engine Distance	615
12*	Front Shock Absorber Fixing Height	856
13*	Bonnet Leading Edge Height	748
14	Front Shock Absorber Fixing Width	1164
15	Front Bumper – Front Axle Distance	904
16	Front Axle – A Pillar Distance	390
17	A-Pillar – B-Pillar Distance	1198
18	B-Pillar – Rear Axle Distance	1114
19	B-Pillar – C-Pillar Distance	932
20*	Roof Sill Bottom Height	1381
21*	Roof Sill Top Height	1427
22*	Floor Sill Bottom Height	324
23*	Floor Sill Top Height	364

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

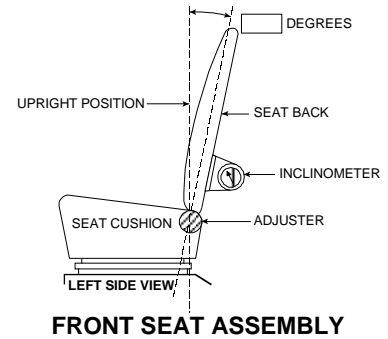
DATA SHEET NO. 2
SEAT ADJUSTMENT, FUEL SYSTEM, AND STEERING WHEEL DATA

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

NOMINAL DESIGN RIDING POSITION

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



Seating Position	Degrees
Driver Seat Back Angle	-12.0
Passenger Seat Back Angle	-11.7

SEAT FORE / AFT POSITIONS

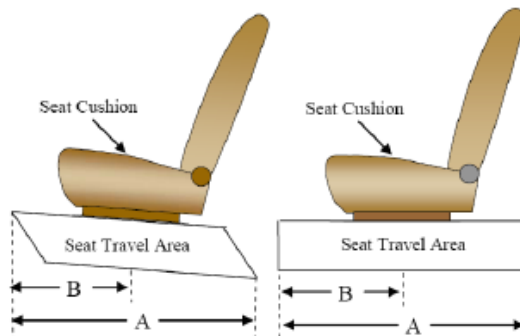
The driver's seat was positioned at the mid-point of fore/aft travel at its lowest position. The passenger's seat was positioned at the most forward position of fore/aft travel. Zero is defined as the forward most position.

Seating Position	Total Fore / Aft Travel	Placed in Position #
Driver Seat	25 (0 – 24)	10
Passenger Seat	25 (0 – 24)	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 – Uppermost
Passenger Seat	4	0 – Uppermost



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

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

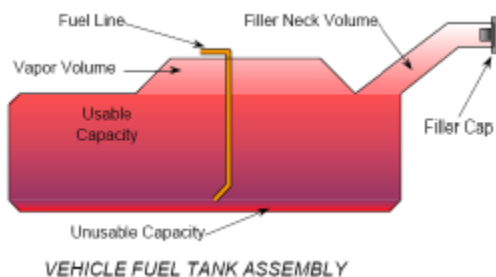
NHTSA No.: M20155205
 Test Date: 2/2/2015

FUEL TANK CAPACITY

Description	Liters
Usable Capacity of "Standard Tank"	50
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	46 – 47
Actual Amount of Solvent Used	46.5
1/3 of Usable Capacity	16.7

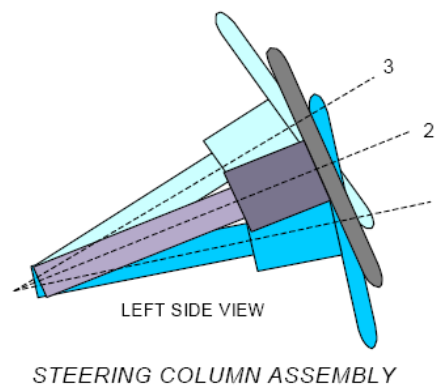
FUEL PUMP

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



STEERING COLUMN ADJUSTMENT

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



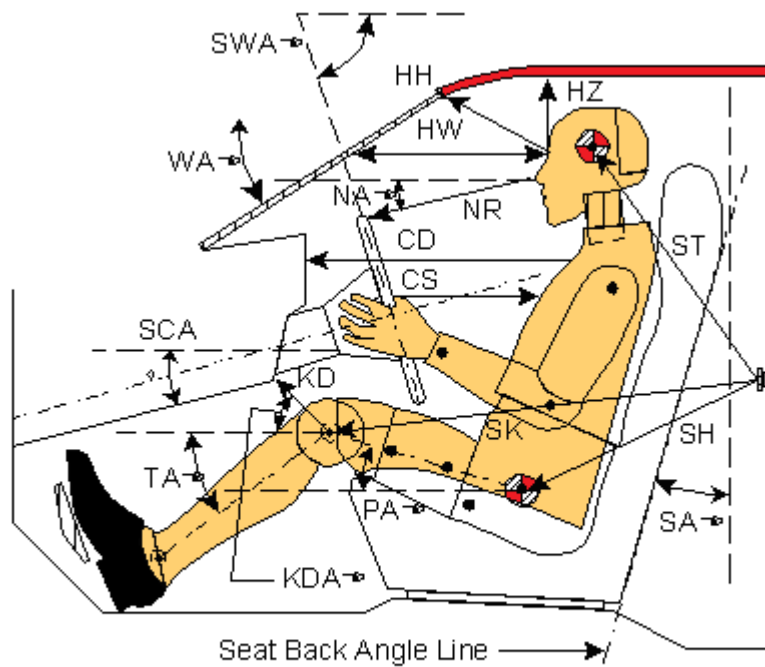
STEERING COLUMN POSITIONS

Description	Degrees	Fore / Aft Position (mm)
Lowermost position No. 1	23.0	
Geometric center position No. 2	25.4	
Uppermost position No. 3	27.8	
Telescoping Steering Wheel Travel		30
Test Position	25.4	15

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Nissan Sentra four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
Test Date: 2/2/2015



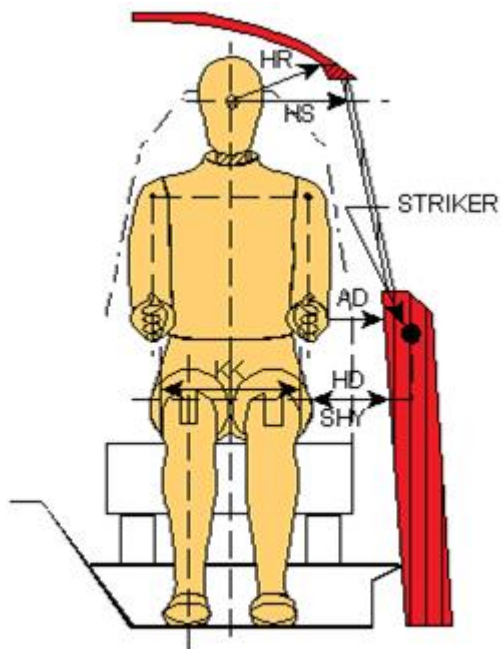
Left Side View

Code	Measurement Description	Driver (SN: 1046)		Passenger (SN: 139)	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WA°	Windshield Angle		-25.7		
SWA°	Steering Wheel Angle		25.4		
SCA°	Steering Column Angle		64.6		
SA°	Seat Back Angle (on headrest post)		-12.0		-11.7
HZ	Head to Roof (Z)	189	90	182	90
HH	Head to Header	360	27.1	277	50.1
HW	Head to Windshield	684	0	595	0
NR	Nose to Rim	403	-8.9	447	-31.7
CD	Chest to Dash	533		395	
CS	Chest to Steering Hub	305	-1.6		
RA	Rim to Abdomen	186	5.9		
KDL	Left Knee to Dash	148	12.8	91	40.4
KDR	Right Knee to Dash	145	30.3	90	39.6
PA°	Pelvic Angle		23.1		20.7
TA°	Tibia Angle		-36.2		-39.1
SK	Striker to Knee	638	1.0	750	-2.5
ST	Striker to Head	552	-79.6	565	56.4
SH	Striker to H-Point	299	-29.9	444	-12.1

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2015 Nissan Sentra four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
Test Date: 2/2/2015



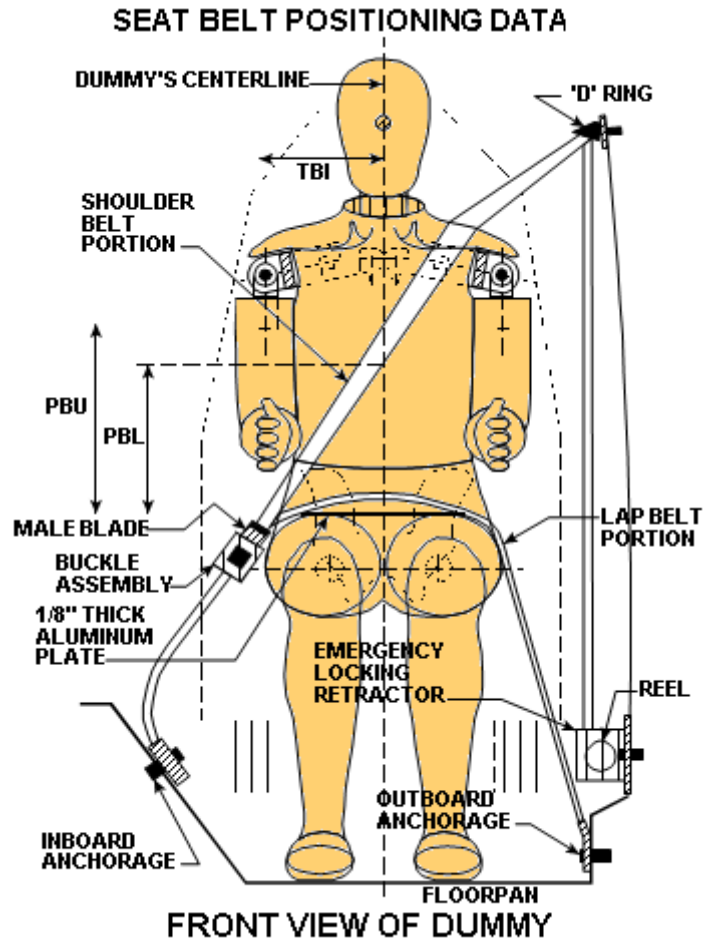
Front View

Code	Description	Driver (mm)	Passenger (mm)
AD	Arm to Door	130	55
HD	H-Point to Door	130	182
HR	Head to Side Header	212	239
HS	Head to Side Window	325	353
KK	Knee to Knee	340	165
SHY	Striker to H-Point (Y Direction)	250	250
AA	Ankle to Ankle	335	165

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

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015



SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU — Top surface of reference to belt upper edge	mm	330	210
PBL — Top surface of reference to belt lower edge	mm	245	230

BELT LENGTH DATA

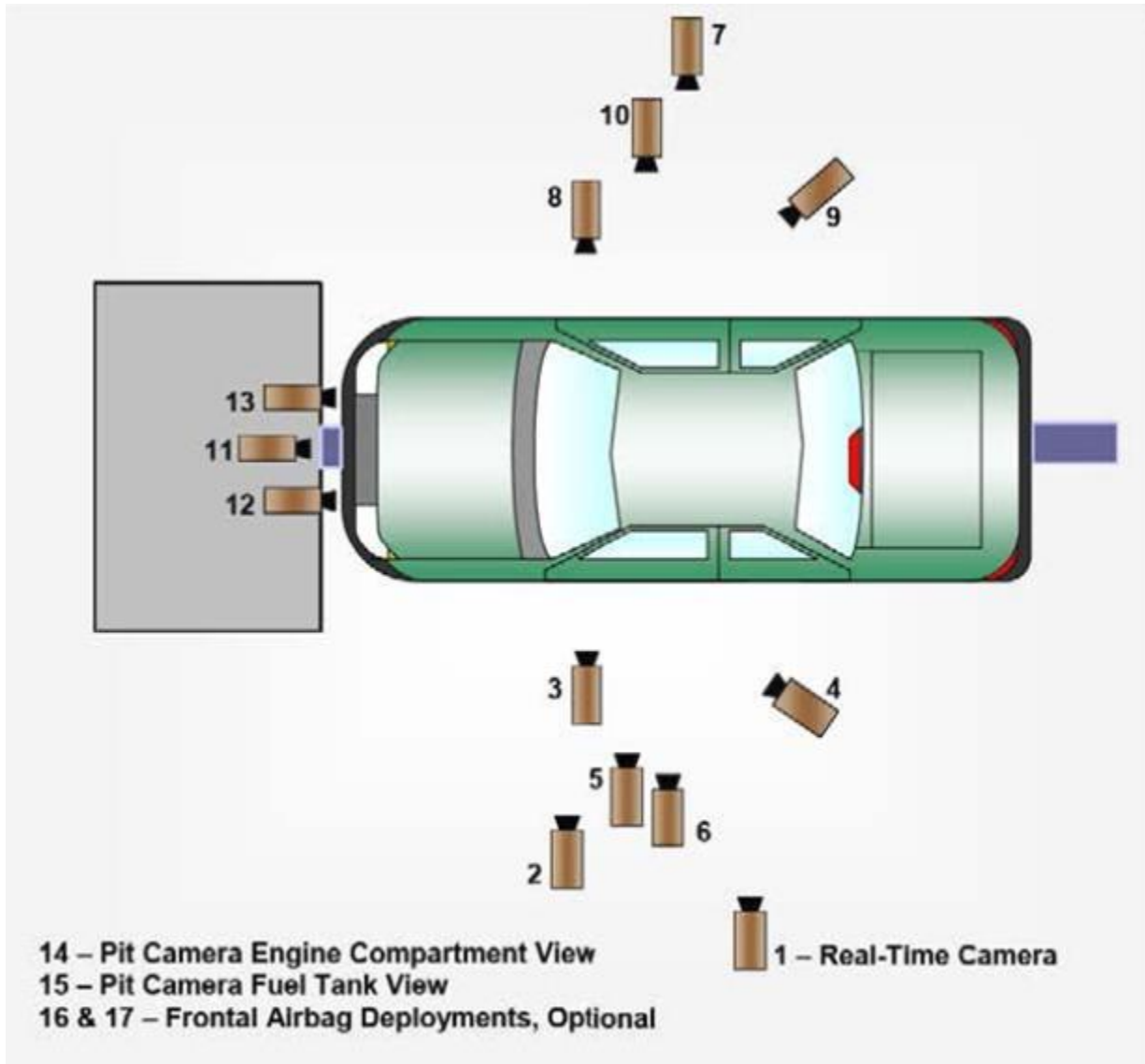
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	880	900
Lap Belt Length as measured on ATD	mm	725	810
Remainder of belt on reel	mm	895	790
Total belt length for continuous webbing systems	mm	2500	2500

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

Test Vehicle: 2015 Nissan Sentra four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
Test Date: 2/2/2015

CAMERA POSITIONS FOR FRONTAL IMPACTS



Top View

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

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

CAMERA LOCATIONS

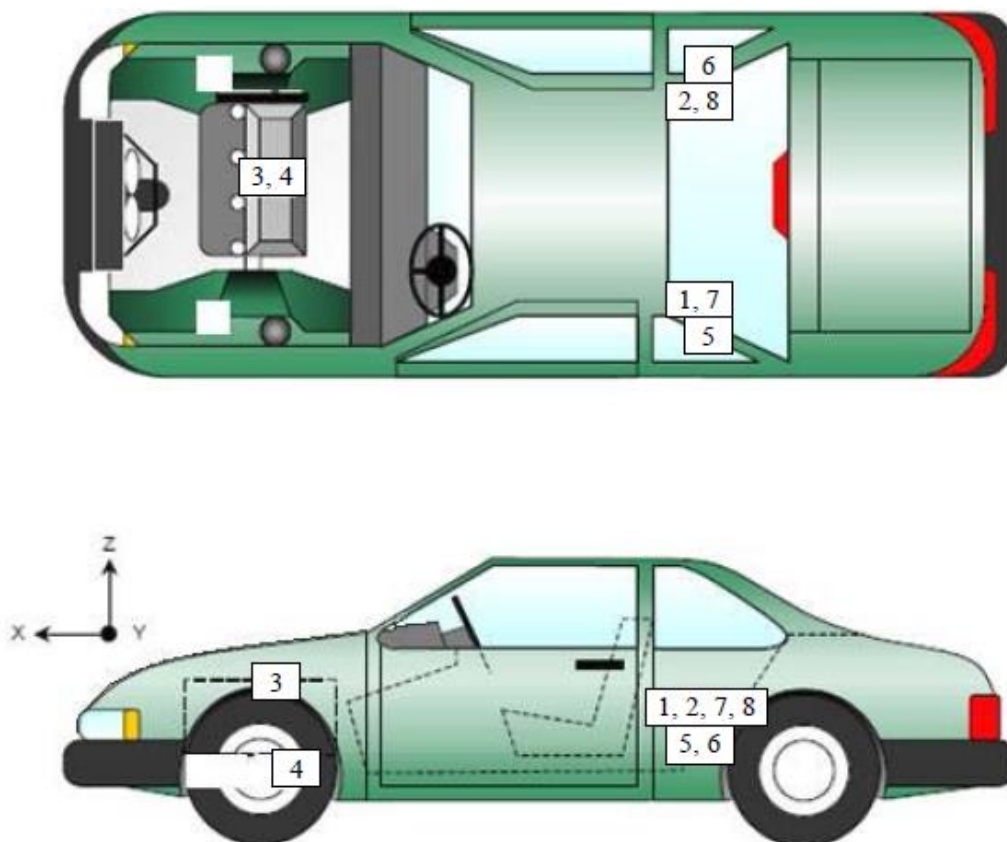
No.	Camera View	Location (mm)			Lens (mm)	Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	-	-	-	Zoom	60
2	Driver Close-Up	-1976	-8295	-1574	50	1000
3	Left Front Half	-982	-9542	-1603	50	1000
4	Left Angle	-2834	-3107	-2278	24	1000
5	Steering Column - Top					
6	Steering Column - Bottom					
7	Right Overall	-2313	8291	-1186	24	1000
8	Passenger Close-Up	-1471	7156	-1368	50	1000
9	Right Front Half	-982	7015	-1127	28	1000
10	Right Angle	-2809	3126	-2290	24	1000
11	Windshield	954	0	-3505	20	1000
12	Driver Windshield	395	-600	-2051	25	1000
13	Passenger Windshield	395	600	-2051	25	1000
14	Pit Front	-967	0	2041	12.5	1000
15	Pit Rear	-2047	0	2050	12.5	1000
16	Onboard Driver Airbag (Optional)				12.5	1000
17	Onboard Passenger Airbag (Optional)				12.5	1000

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

DATA SHEET NO. 7
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2015 Nissan Sentra four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
Test Date: 2/2/2015



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1806	-586	285
2	Right Rear Accelerometer – X Direction	1788	582	282
3	Engine Top X	3997	76	-363
4	Engine Bottom X	3942	-121	272
5	Left Rear Accelerometer – Z Direction	1788	-606	282
6	Right Rear Accelerometer – Z Direction	1810	611	285
7	Left Rear Accelerometer – X Direction Redundant	1806	-586	285
8	Right Rear Accelerometer – X Direction Redundant	1788	582	282

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

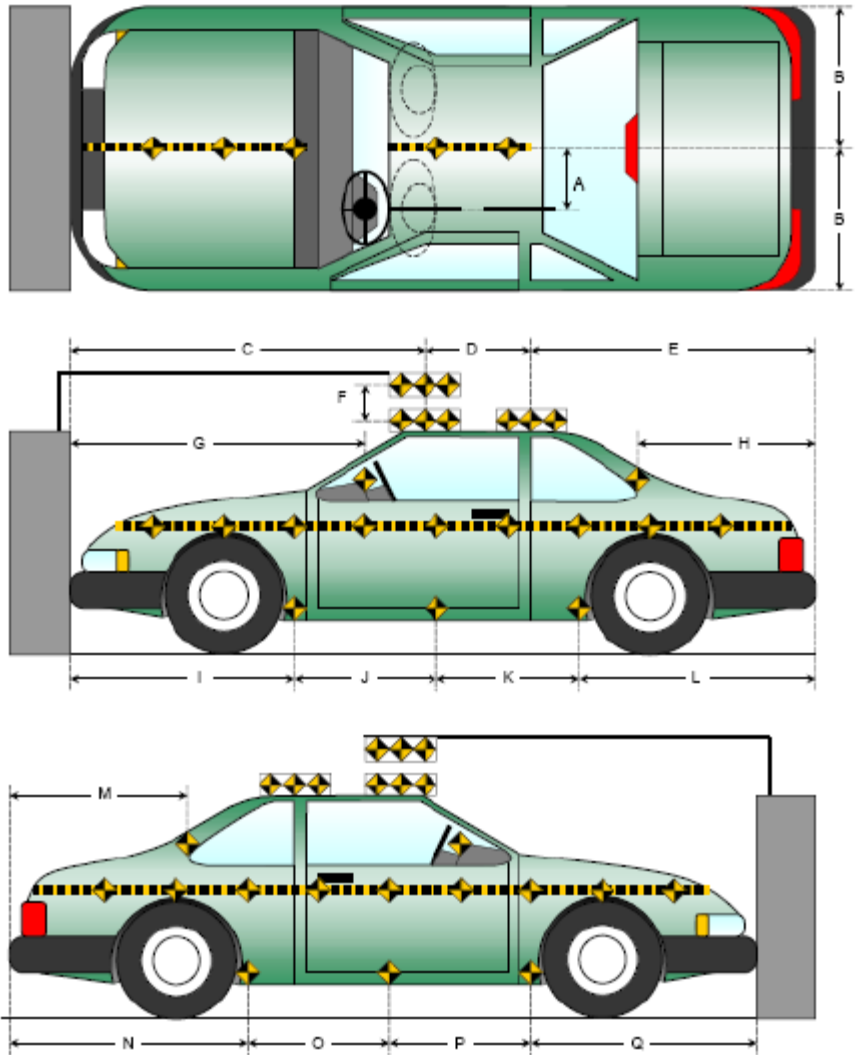
DATA SHEET NO. 8
PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

Item	Value
A	340
B	876
C	2193
D	608
E	1822
F	118
G	1662
H	1199
I	1340
J	918
K	917
L	1448
M	1198
N	1447
O	922
P	916
Q	1338

All units in millimeters



DATA SHEET NO. 9
LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

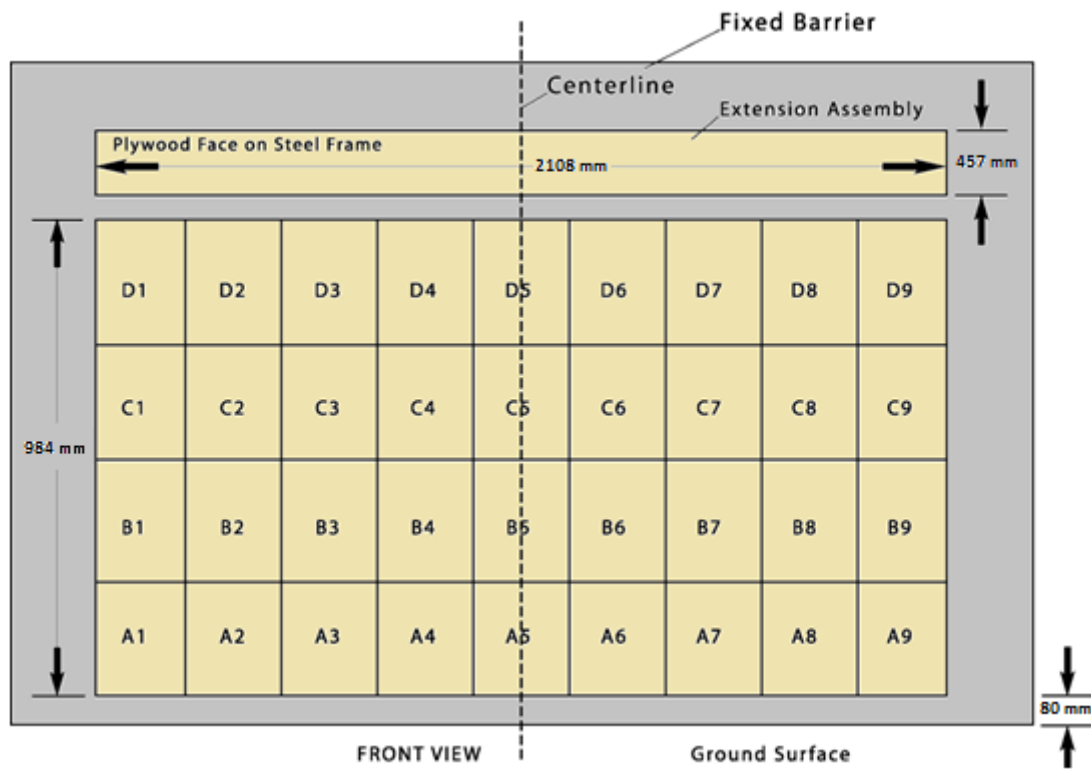


Figure 1 - Load Cell Locations on a 36-Load Cell Barrier with Plywood Height Extension*

DATA SHEET NO. 10
TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

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	2
High-Speed Offboard	12
Real-Time Panning	1
Total	15

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

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	P572E 50 th Male / 1046	P5720 5 th Female / 139
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)	0	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	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	813
Center	mm	797
Right Side	mm	848
Average	mm	819

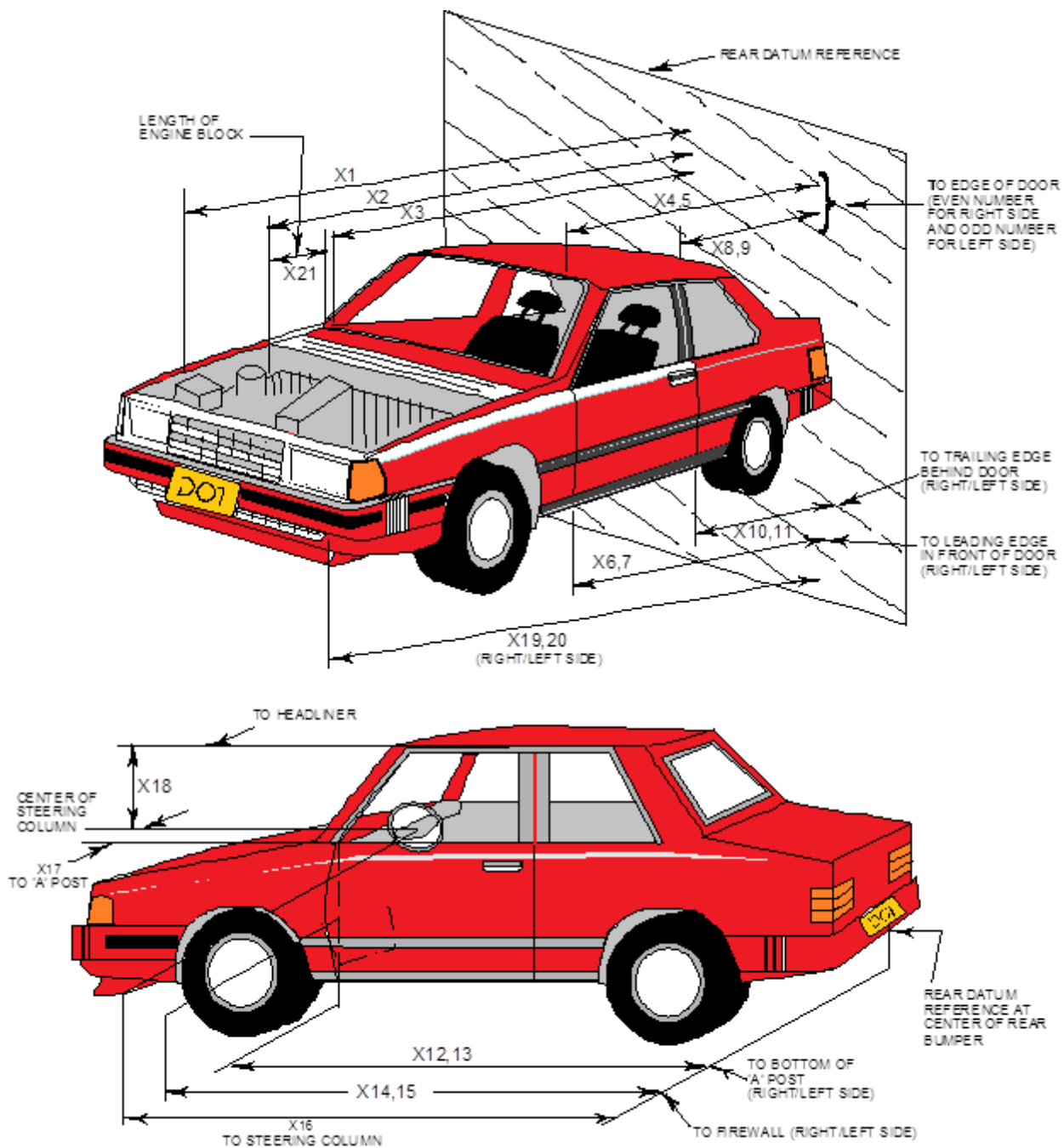
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12 VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015



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

Test Vehicle: 2015 Nissan Sentra four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
Test Date: 2/2/2015

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4623	4119	-504
2	Rear Surface of Vehicle (RSOV) to Front of Engine	4008	3737	-271
3	RSOV to Firewall	3692	3600	-92
4	RSOV to Upper Leading Edge of Right Door	3249	3245	-5
5	RSOV to Upper Leading Edge of Left Door	3248	3240	-8
6	RSOV to Lower Leading Edge of Right Door	3229	3225	-4
7	RSOV to Lower Leading Edge of Left Door	3224	3213	-10
8	RSOV to Upper Trailing Edge of Right Door	2139	2134	-5
9	RSOV to Upper Trailing Edge of Left Door	2138	2129	-9
10	RSOV to Lower Trailing Edge of Right Door	2130	2126	-4
11	RSOV to Lower Trailing Edge of Left Door	2130	2119	-10
12	RSOV to Bottom of "A" Post of Right Side	3393	3336	-57
13	RSOV to Bottom of "A" Post of Left Side	3392	3332	-59
14	RSOV to Firewall, Right Side	3628	3562	-66
15	RSOV to Firewall, Left Side	3630	3569	-61
16	RSOV to Steering Column	2800	2820	19
17	Center of Steering Column to "A" Post	268	265	-3
18	Center of Steering Column to Headliner	420	449	29
19	RSOV to Right Side of Front Bumper	4547	4010	-537
20	RSOV to Left Side of Front Bumper	4548	4090	-458
21	Length of Engine Block	216	216	0
RD	RSOV to Right Side of Dash Panel	2956	2951	-5
CD	RSOV to Center of Dash Panel	2949	2944	-6
LD	RSOV to Left Side of Dash Panel	2955	2949	-7

*UR= Unrecoverable data point
All Dimensions in mm

DATA SHEET NO. 13
ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2015 Nissan Sentra four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
Test Date: 2/2/2015

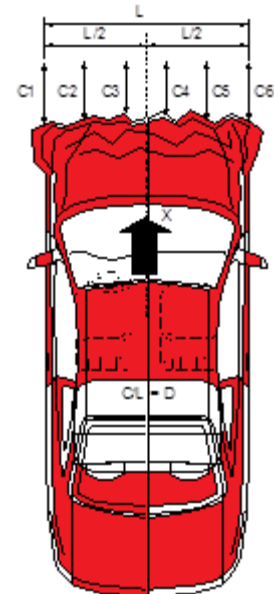
VEHICLE INFORMATION

VIN: 3N1AB7APXFY216362
Vehicle Size Category: Passenger

Wheelbase (mm): 2,699
Test Weight (kg): 1,495

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): 56.69
Velocity Change (km/h): 56.69
Time of Separation (ms): 130



CRUSH PROFILE

Collision Deformation Classification: 12FDEW03
Midpoint of Damage: Vehicle Centerline
Damage Region Length (mm): 1471
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush Zone 1 at Left Side	mm	4383	4131	252
C2	Crush Zone 2 at Left Side	mm	4548	4120	428
C3	Crush Zone 3 at Left Side	mm	4611	4111	500
C4	Crush Zone 4 at Right Side	mm	4612	4102	510
C5	Crush Zone 5 at Right Side	mm	4553	4065	488
C6	Crush Zone 6 at Right Side	mm	4390	4062	328
L	C1 to C6	mm	1471	1574	-103

DATA SHEET NO. 14
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2015 Nissan Sentra four door sedan
Test Program: NCAP Frontal Barrier Impact Test

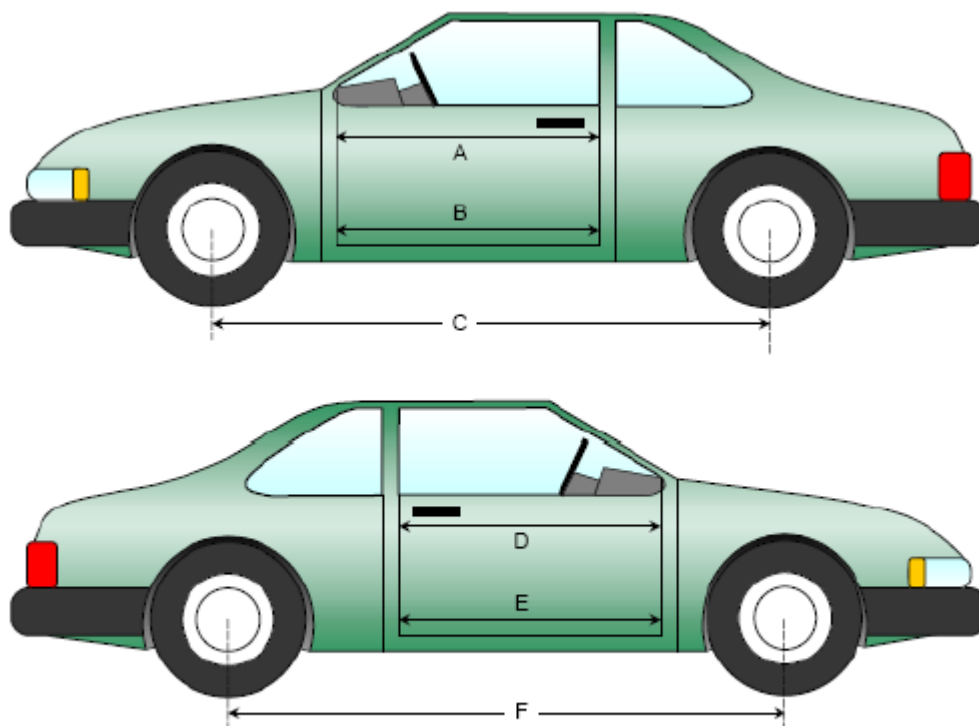
NHTSA No.: M20155205
Test Date: 2/2/2015

DOOR OPENING WIDTH

Item	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1025	1021	-4
B	Left Side Lower	mm	913	911	-2
D	Right Side Upper	mm	1023	1018	-5
E	Right Side Lower	mm	945	943	-2

WHEELBASE MEASUREMENTS

Item	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2699	2605	-94
F	Right Side Wheelbase	mm	2699	2626	-73



Left & Right Side Views

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

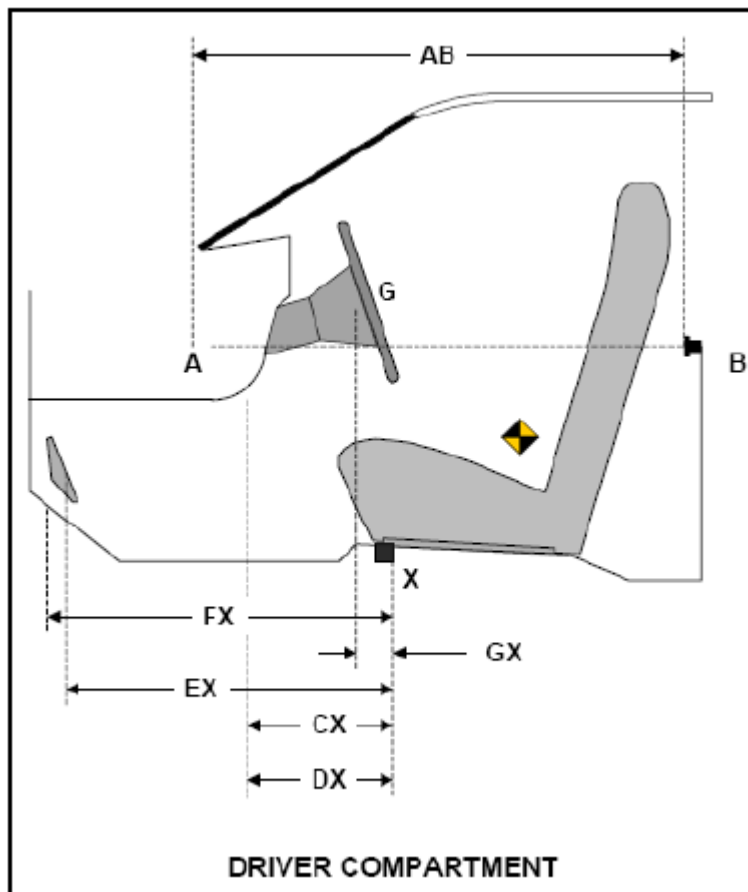
Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	829	830	1
CX	Left Knee Bolster to X	mm	320	319	-1
DX	Right Knee Bolster to X	mm	314	325	11
EX	Brake Pedal to X	mm	588	529	-59
FX	Foot Rest to X	mm	649	629	-20
GX	Center of Steering Column Wheel Hub to X	mm	94	117	23

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015

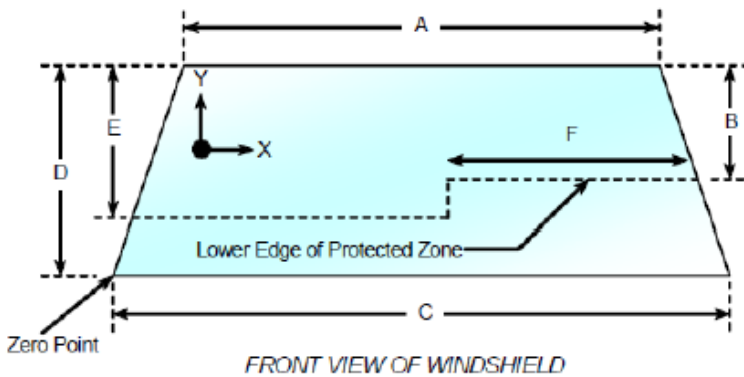
Windshield Mounting Details: A 0.8 mm trim surrounds the top and side of windshield while a plastic shroud is on the bottom.

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	2175	2080	95.6%
Right Side	2175	2175	100%
Total	4350	4255	97.8%



Item	Units	Value
A	mm	1210
B	mm	486
C	mm	1410
D	mm	865
E	mm	520
F	mm	485

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: 2015 Nissan Sentra four door sedan
Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
Test Date: 2/2/2015

FMVSS 301 FUEL SYSTEM INTEGRITY POST IMPACT DATA

Temperature at Time of Impact: 21 ° C

Test Time: 12:55 PM

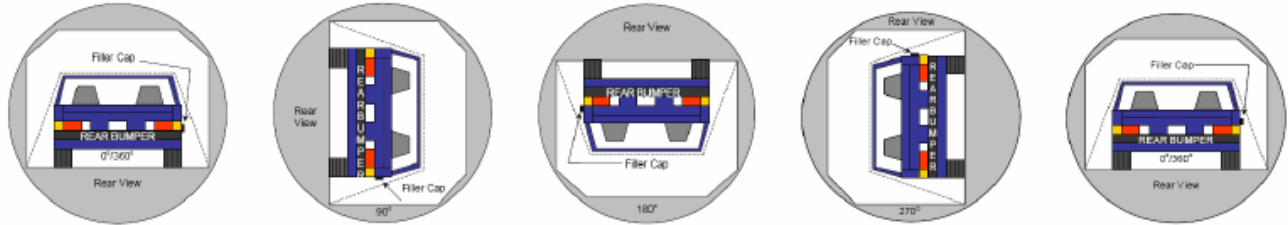
STODDARD SOLVENT SPILLAGE MEASUREMENTS

- 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: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015



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

1. The specified fixture rollover rate for each 90° of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent Spillage: No Spillage Occurred

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	73	300	373
90° to 180°	68	300	368
180° to 270°	61	300	361
270° to 360°	71	300	371

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	

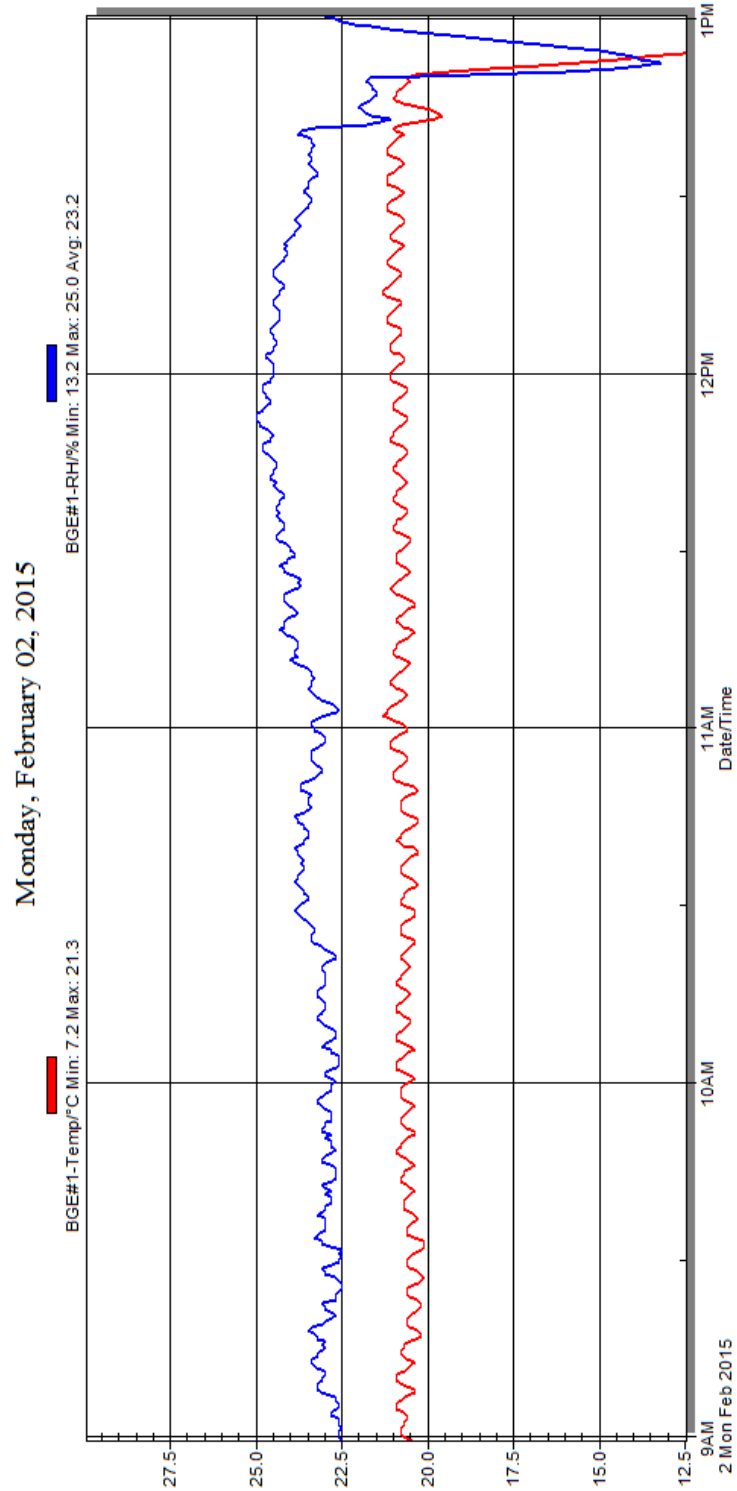
SOLVENT SPILLAGE LOCATION TABLE

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: 2015 Nissan Sentra four door sedan
 Test Program: NCAP Frontal Barrier Impact Test

NHTSA No.: M20155205
 Test Date: 2/2/2015



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

APPENDIX A
PHOTOGRAPHS

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Fig.	Description	Page
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43	Pre-Test Driver's Side Floorpan	A-26
44	Post-Test Driver's Side Floorpan	A-26
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46	Post-Test Driver Dummy Contact With Airbag	A-27
47	Post-Test Driver Dummy Contact With Headrest	A-28
48	Pre-Test View of the Steering Wheel	A-28
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50	Pre-Test Passenger Dummy Front View	A-29
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60	Pre-Test Passenger Dummy Feet	A-34
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Fig.	Description	Page
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74	Vehicle at 180° on Static Rollover Device	A-41
75	Vehicle at 270° on Static Rollover Device	A-42
76	Vehicle at 360° on Static Rollover Device	A-42
77	2015 Nissan Sentra Frontal Impact Event	A-43
78	Monroney Label Photograph	A-43

¹NOTE: *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.*

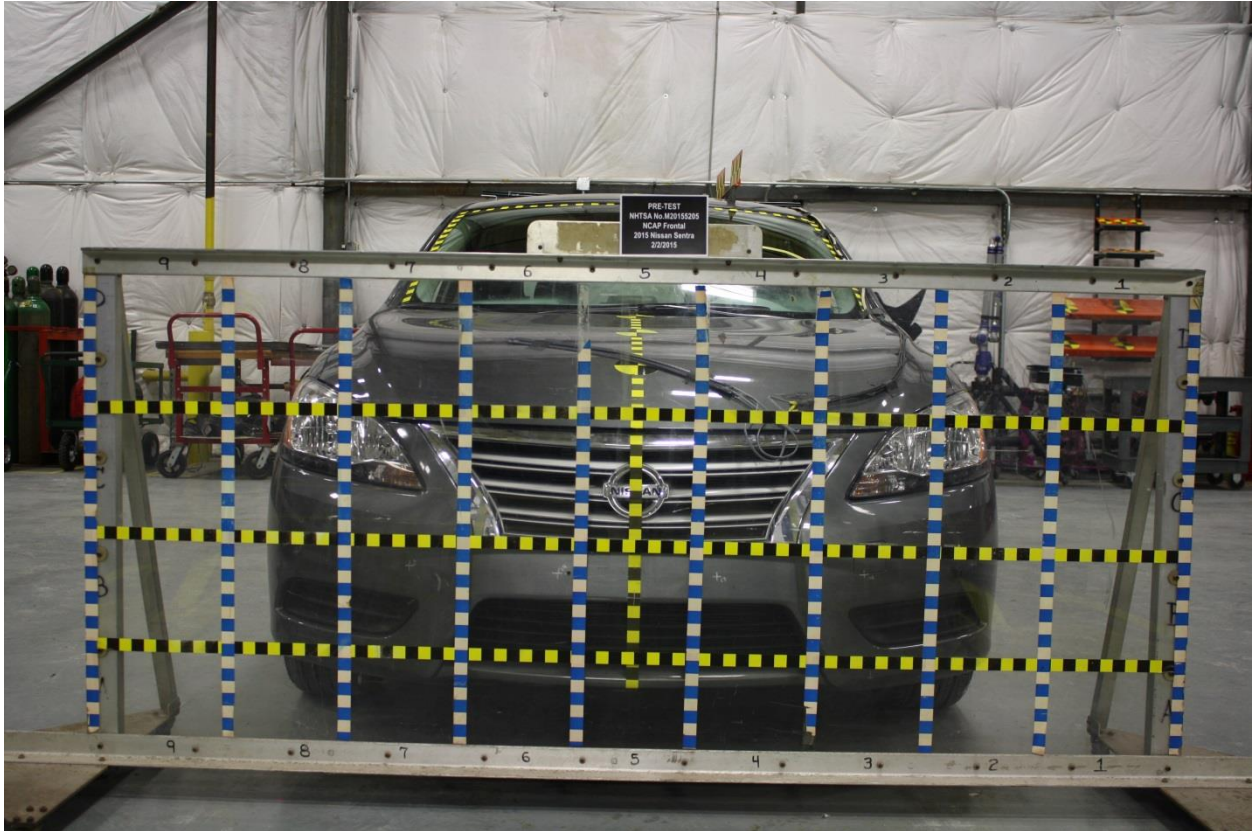


Figure A-1: Load Cell Location



Figure A-2: Load Cell Wall

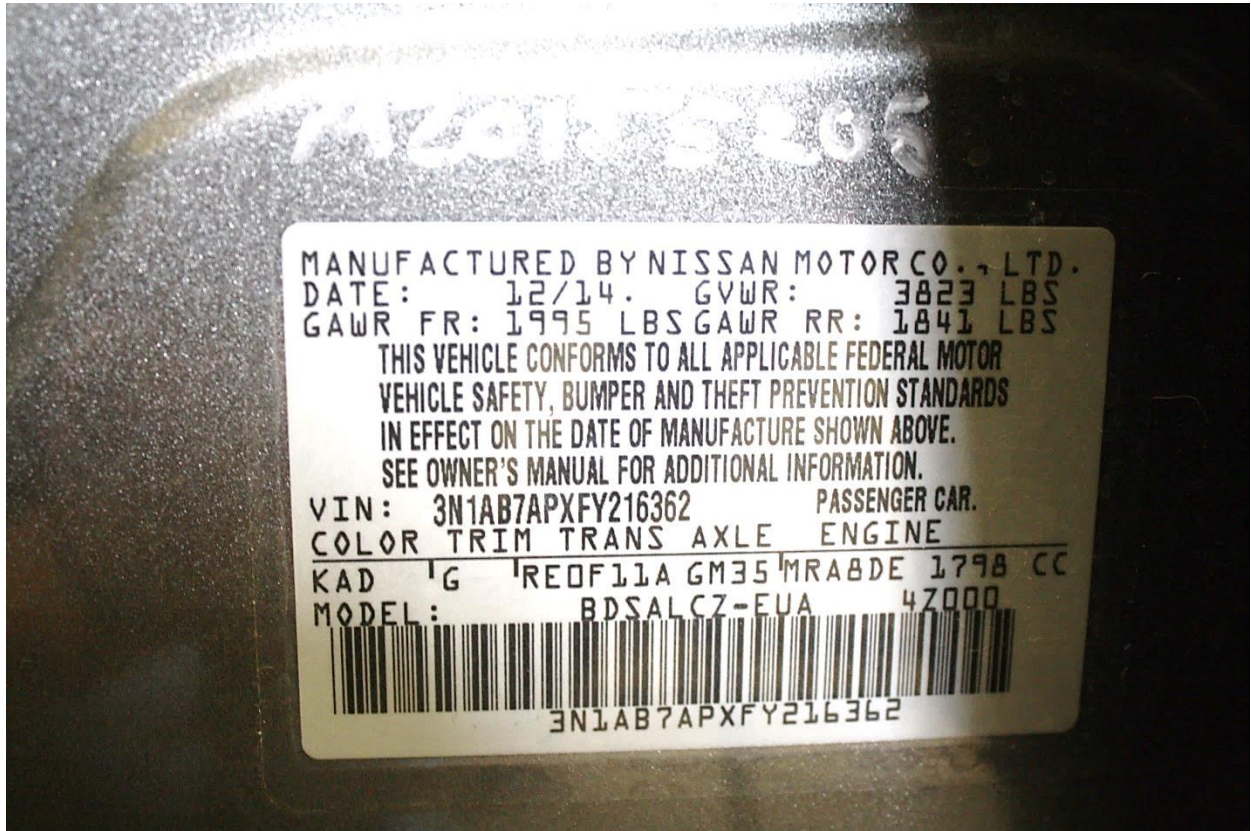


Figure A-3: Manufacturer's Label



Figure A-4: Tire Placard



Figure A-5: 2015 Nissan Sentra Frontal As Delivered



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



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

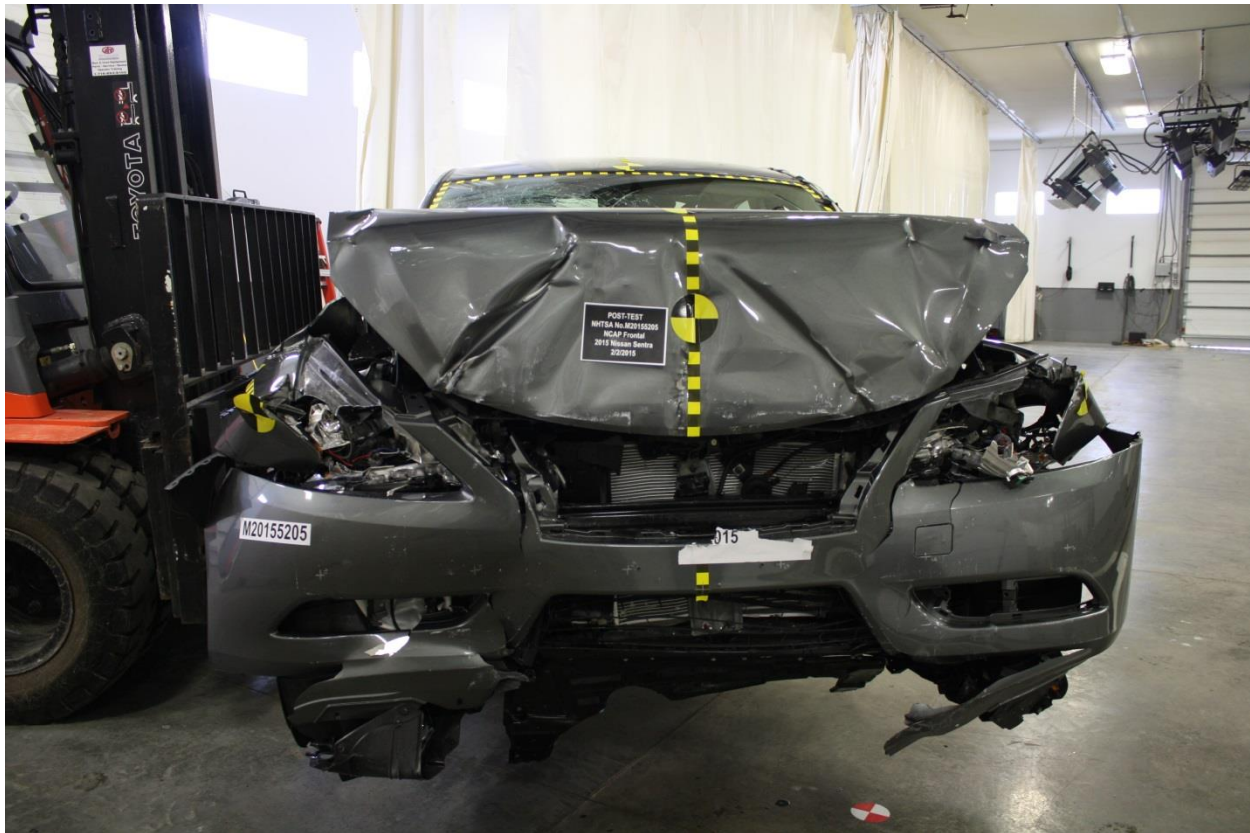


Figure A-8: Post-Test Front View of Test Vehicle



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

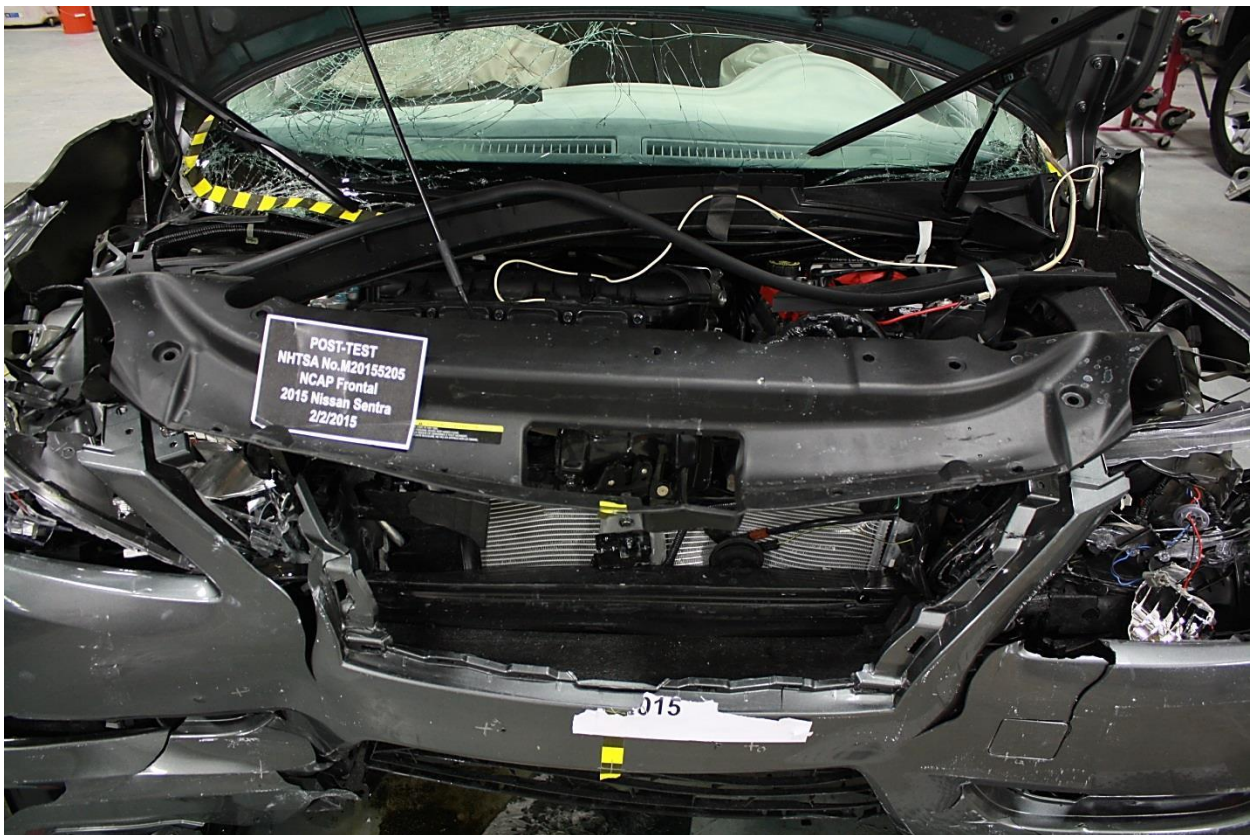


Figure A-20: Post-Test Engine Compartment View



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



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

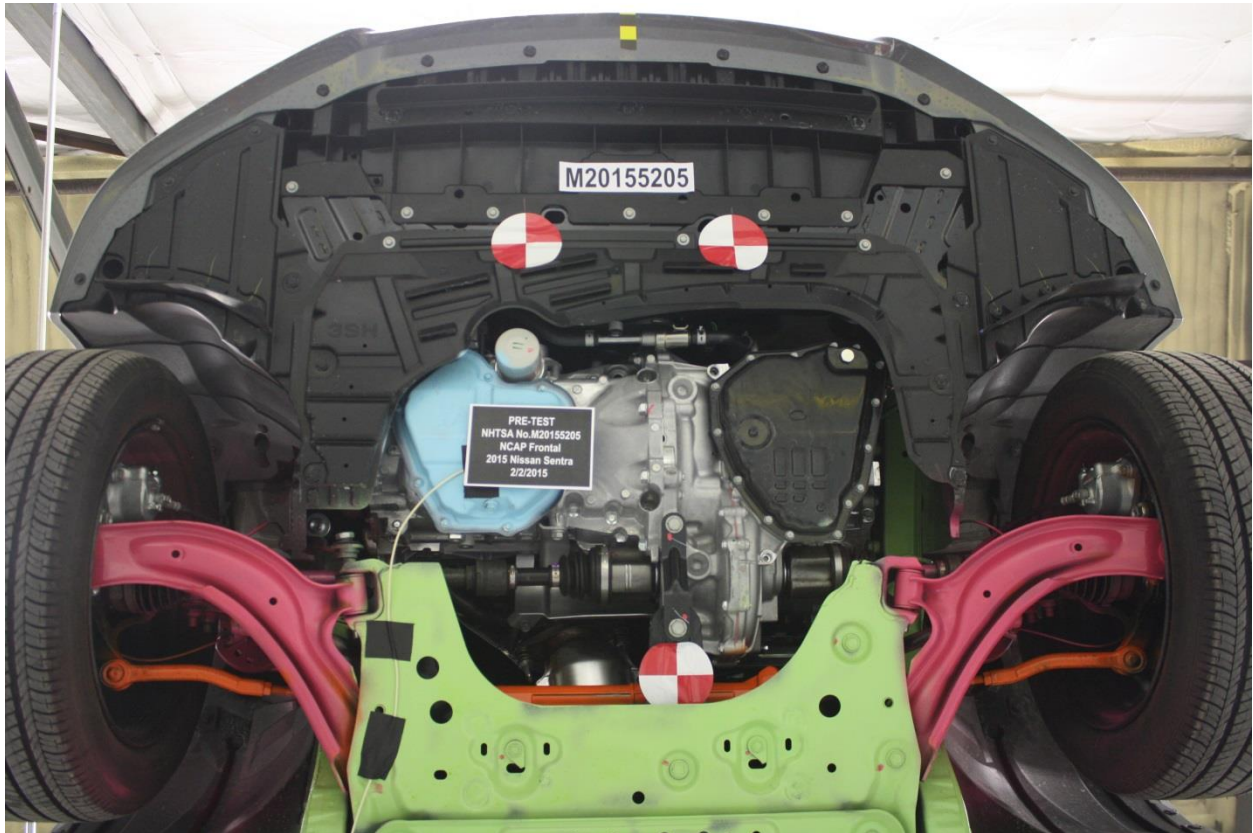


Figure A-23: Pre-Test Front Underbody View

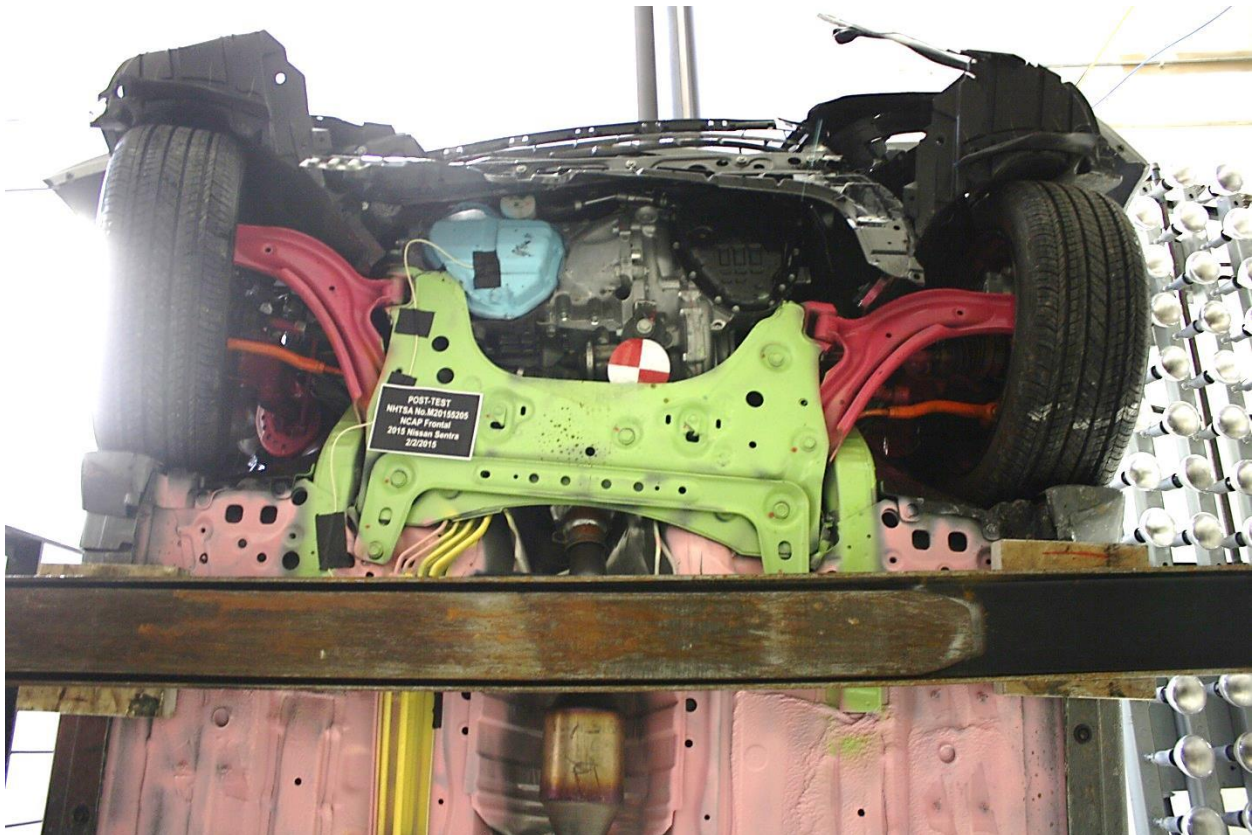


Figure A-24: Post-Test Front Underbody View



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

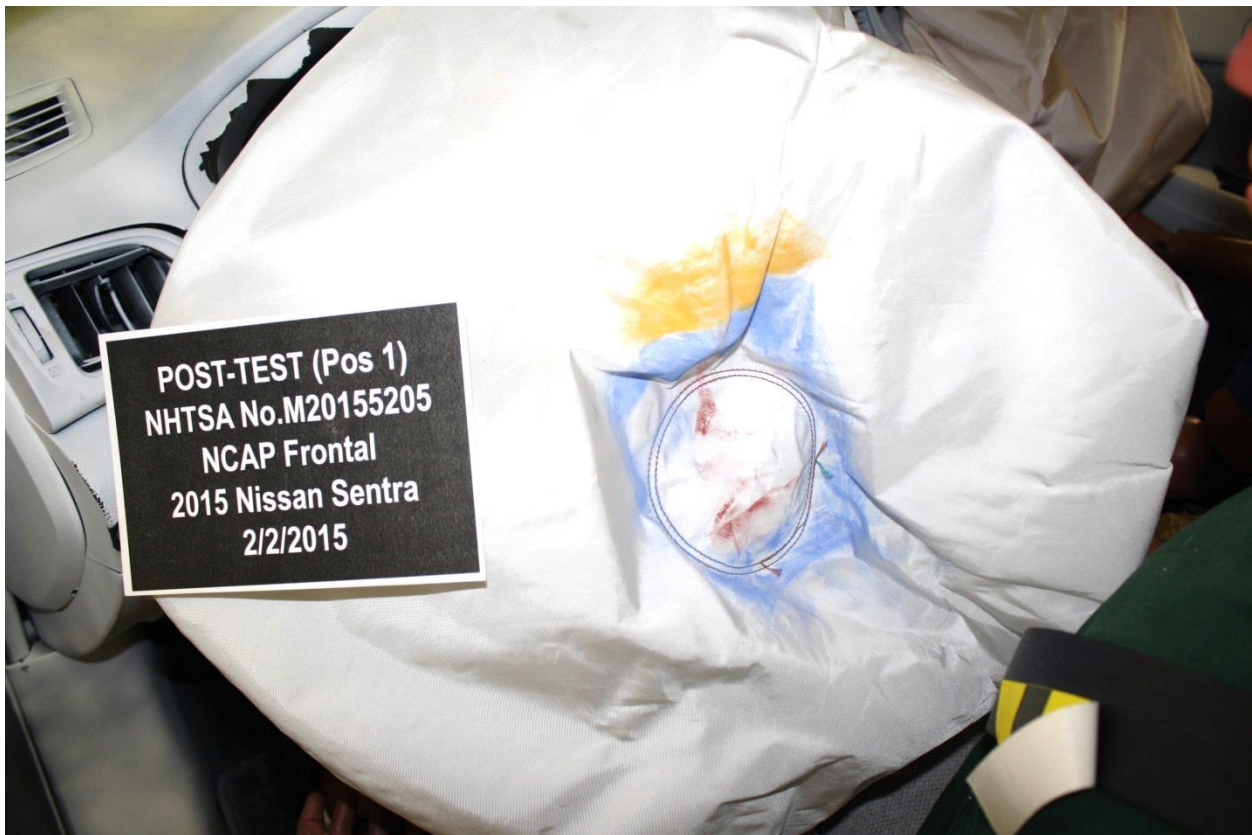


Figure A-46: Post-Test Driver Dummy Contact With Airbag



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

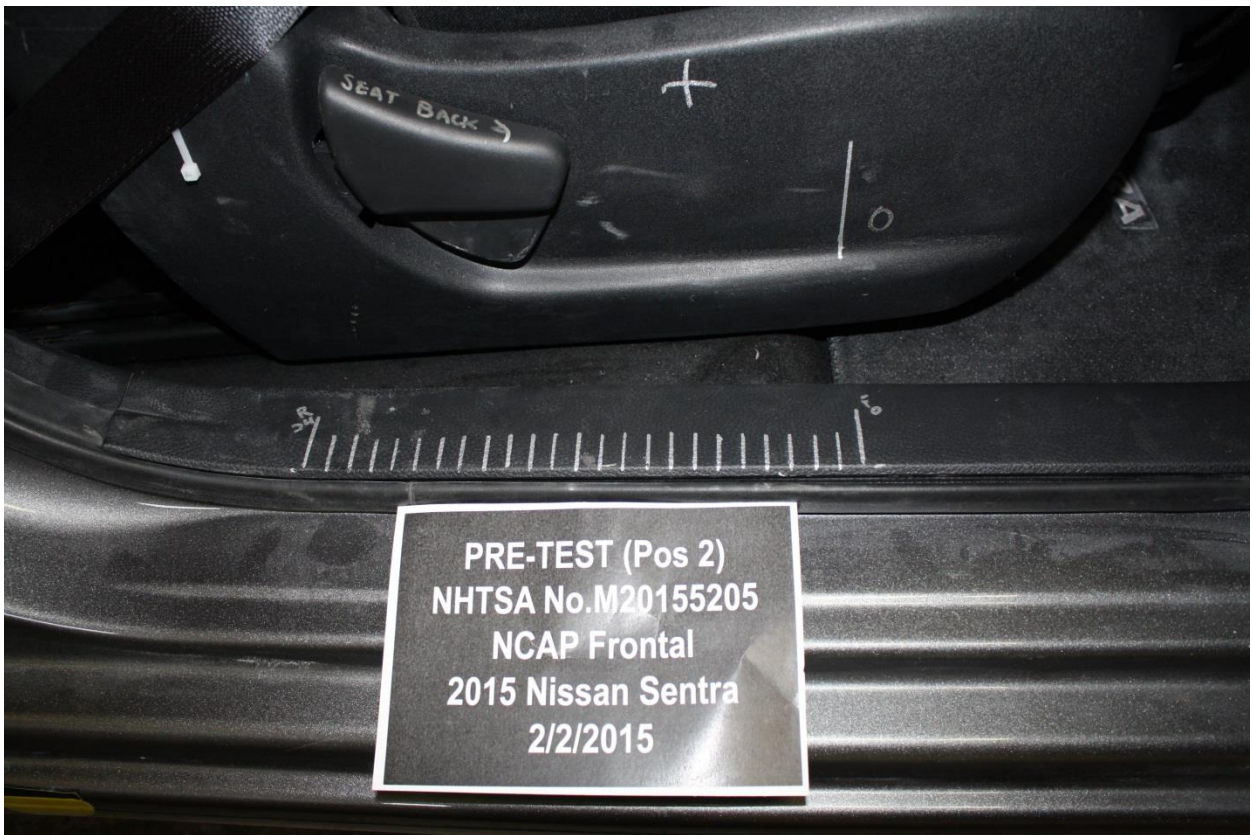


Figure A-56: Pre-Test Passenger's Seat Fore-Aft Markings



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

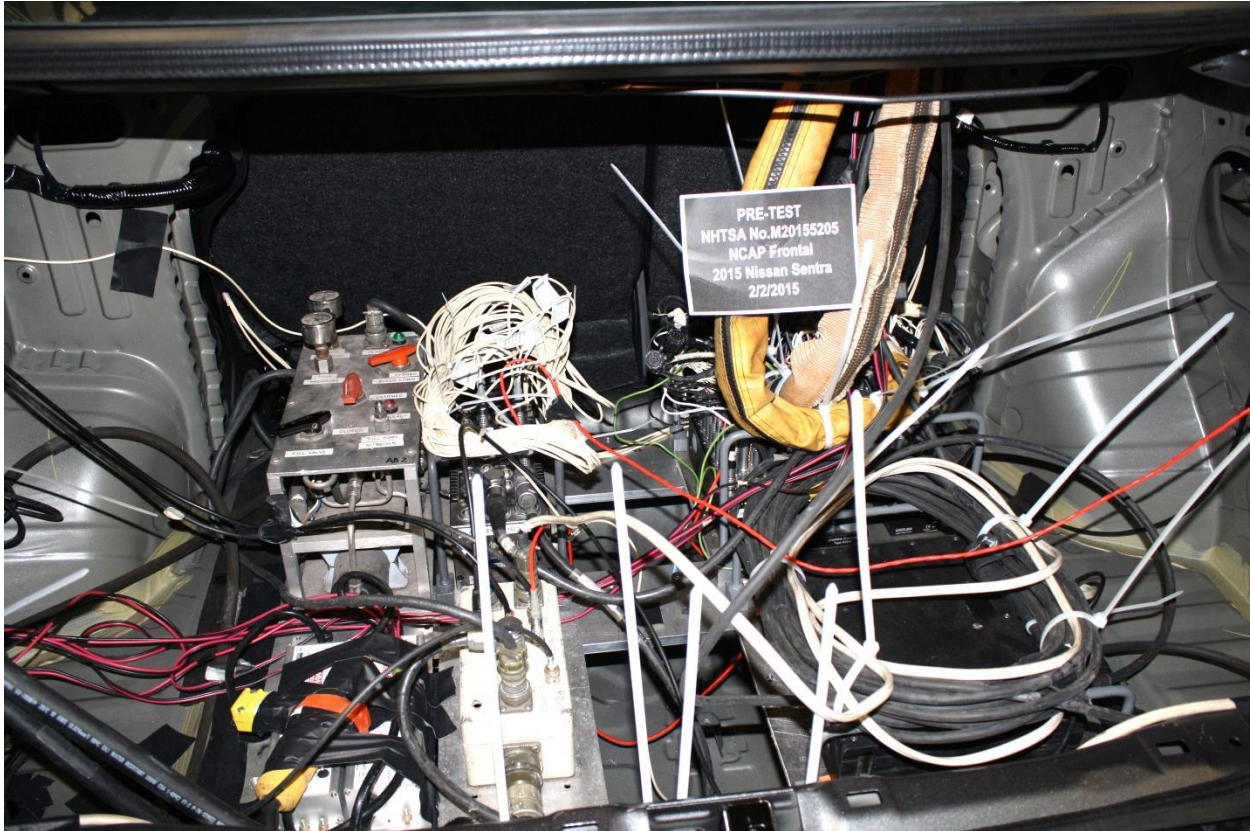


Figure A-69: Photograph of Ballast Installed in Vehicle

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

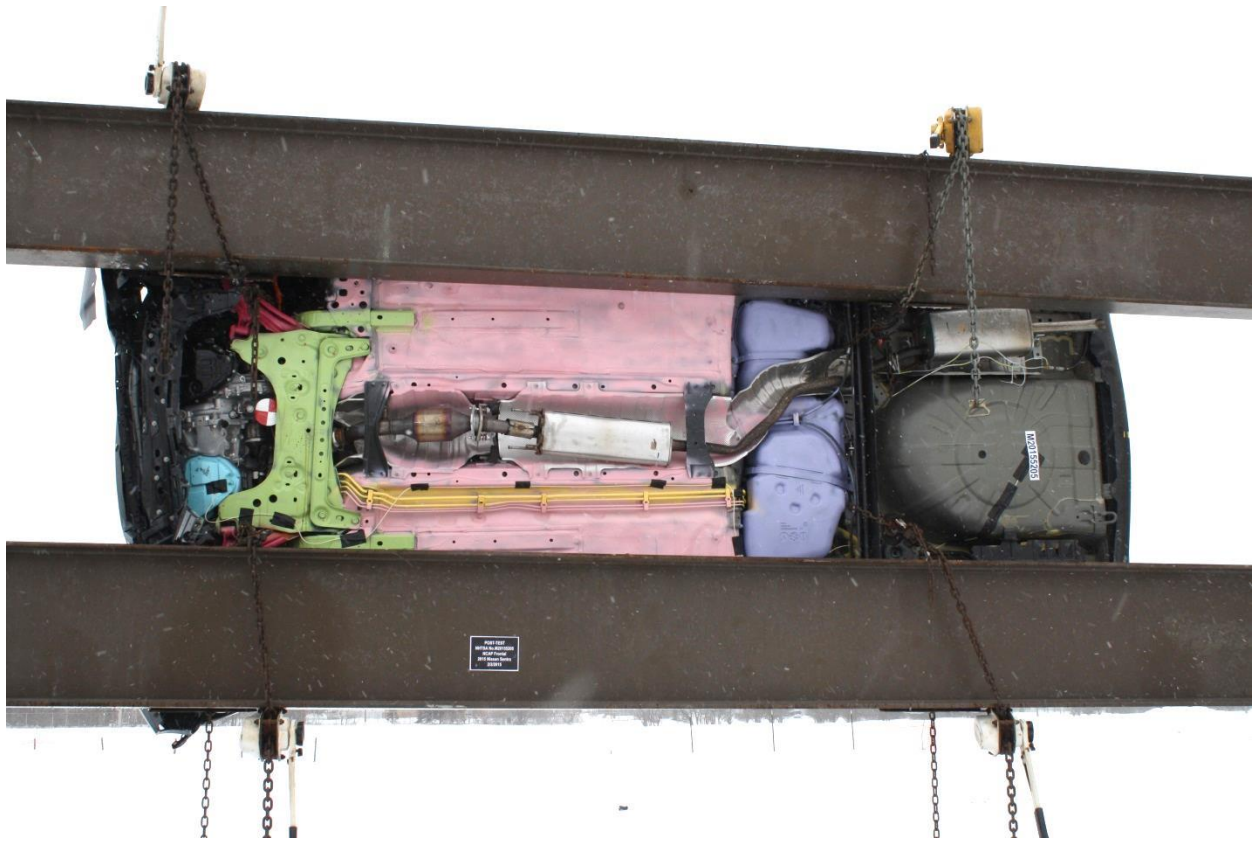


Figure A-73: Vehicle at 90° on Static Rollover Device



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: 2015 Nissan Sentra Frontal Impact Event



2015 SENTRA S

50

12/14



EPA DOT Fuel Economy and Environment Gasoline Vehicle

Fuel Economy MID-SIZE CARS range from 13 to 114 MPG. The best vehicle rates 119 MPG.

33 MPG combined city/hwy

29 city 39 highway

3.0 gallons per 100 miles

You save \$3,000 in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,600

Fuel Economy & Greenhouse Gas Rating (EPA only) Smog Rating (EPA only)

1 8 10 1 5 10

Best Best

This vehicle emits 270 grams CO₂ per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fuelconomy.gov.

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 24 MPG and costs \$13,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.50 per gallon. EPA's 16 miles per gallon is a national average. Vehicle emissions are a significant cause of climate change and smog.

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score Not Rated
Based on the combined ratings of front, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash	Driver Not Rated	Passenger Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.		
Side Crash	Front seat Not Rated	Rear seat Not Rated
Based on the risk of injury in a side impact.		
Rollover	Not Rated	
Based on the risk of rollover in a single-vehicle crash.		

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

This Vehicle qualifies for Nissan's **Security+Plus Vehicle Protection Plan**
The only service agreement backed by Nissan!
Ask your dealer for details, or call 1-800-NISSAN-1 for more information.

DELIVERY

VEHICLE COLORS:
EXT: GUN METALLIC
INT: CHARCOAL

FINAL ASSEMBLY POINT:
AGUAS(BAV)MEX

TRANSPORT METHOD:
TRUCK

DEALER:
ARLINGTON NISSAN(ARL)NTH
1100 W DUNDEE RD
ARLINGTON HEIGHTS, IL
60004

VIN: 3N1AB7APXFY216362
EMS: 50 STATE EMISSIONS
MDL: 12015-216362 KAD-G
OPT: 0-892C20L92

20141218231532AS3116

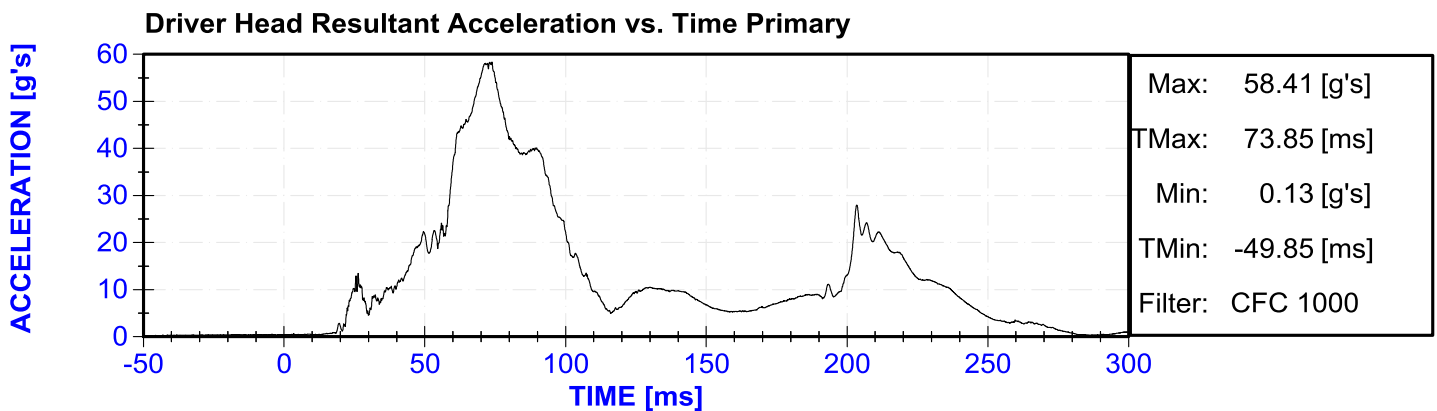
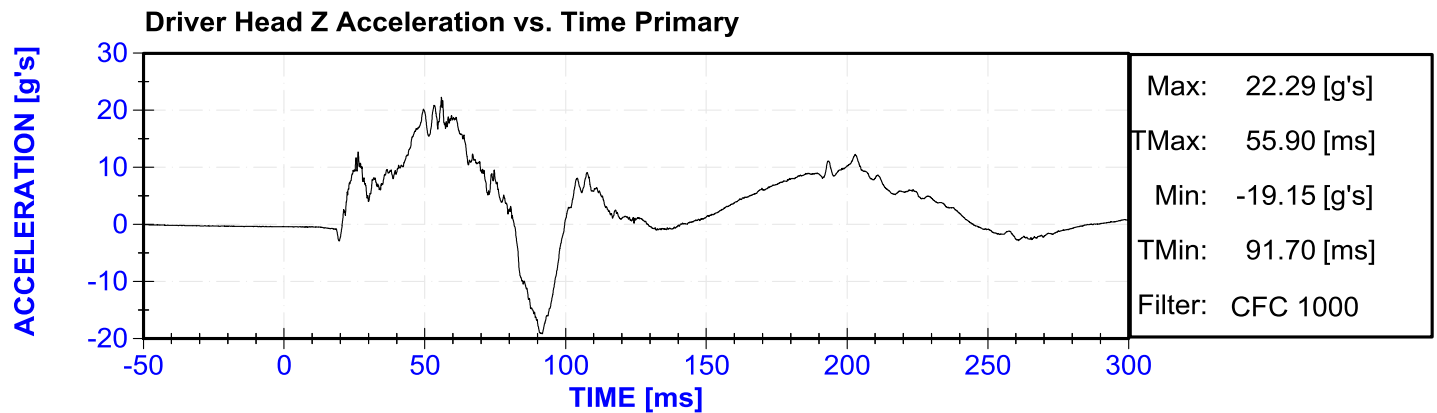
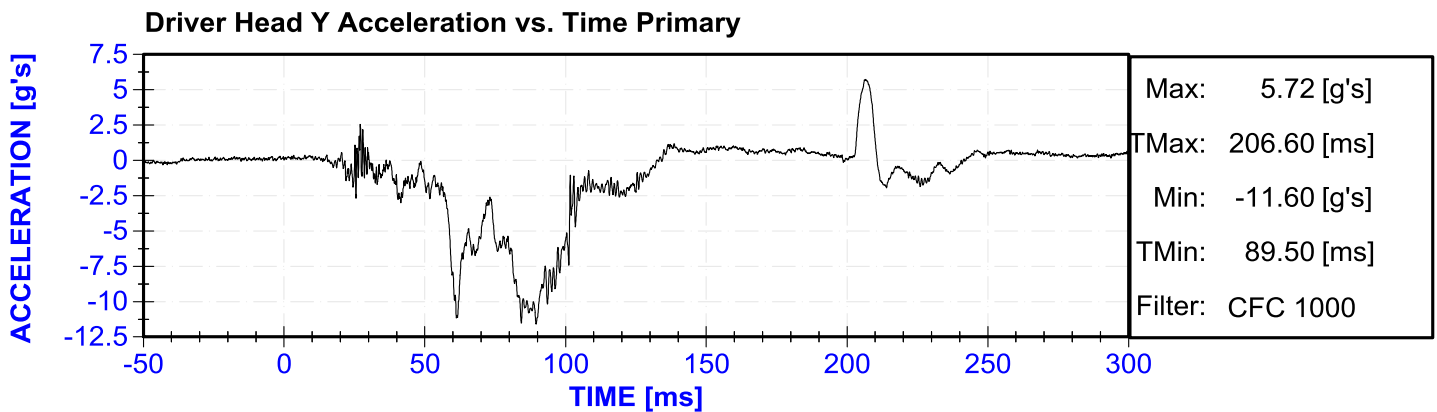
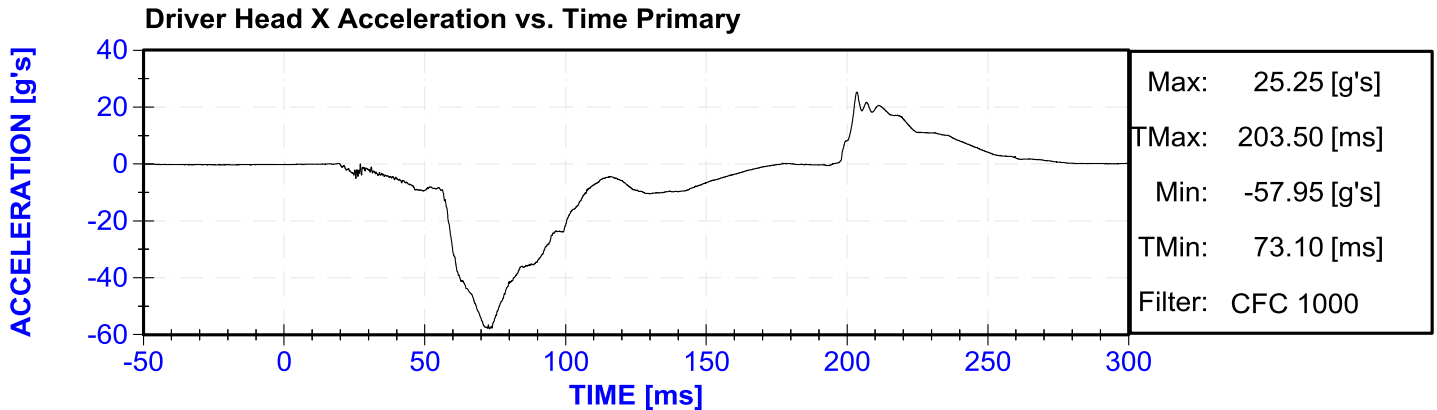
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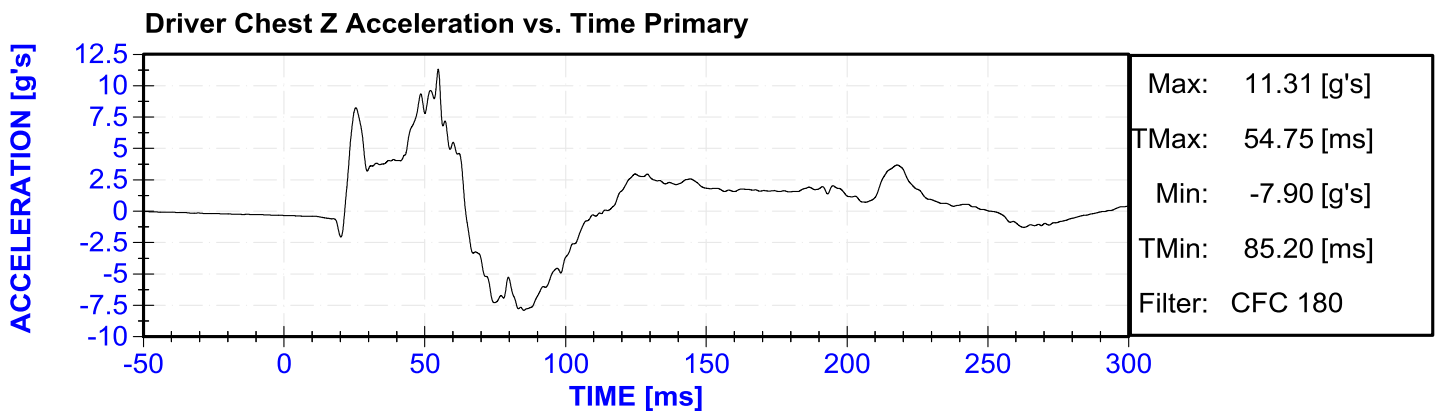
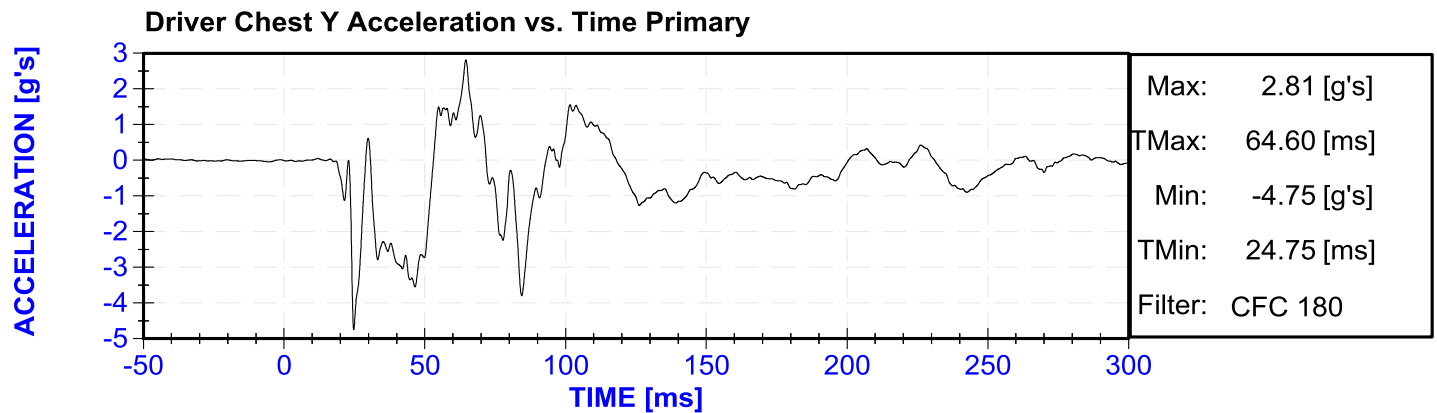
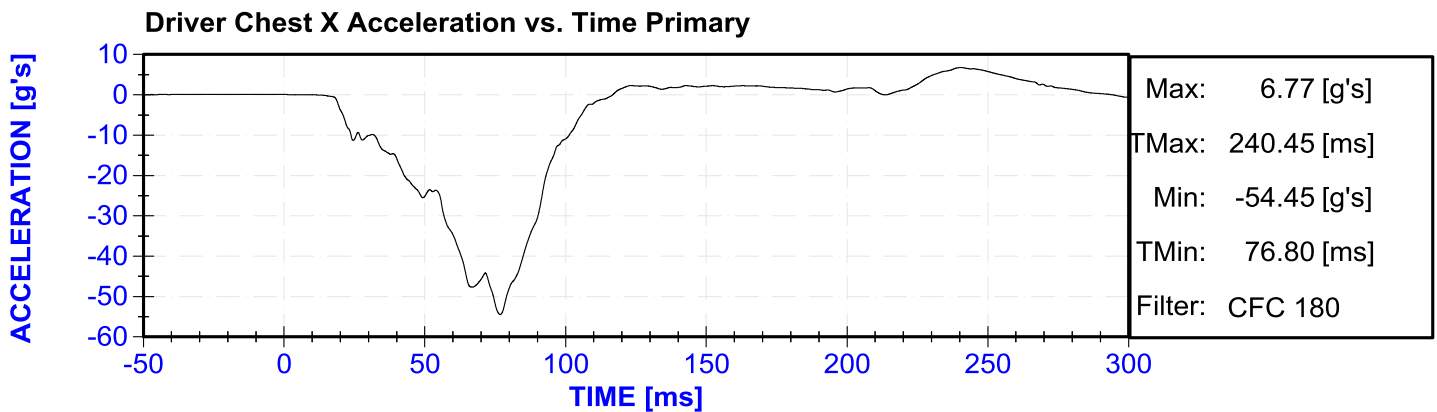
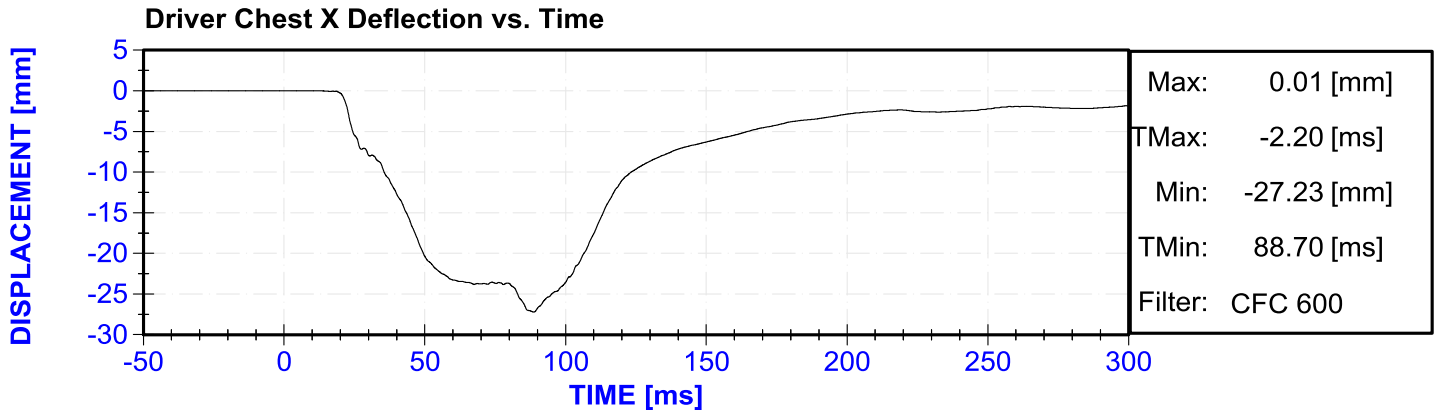
Figure A-78: Monroney Label Photograph

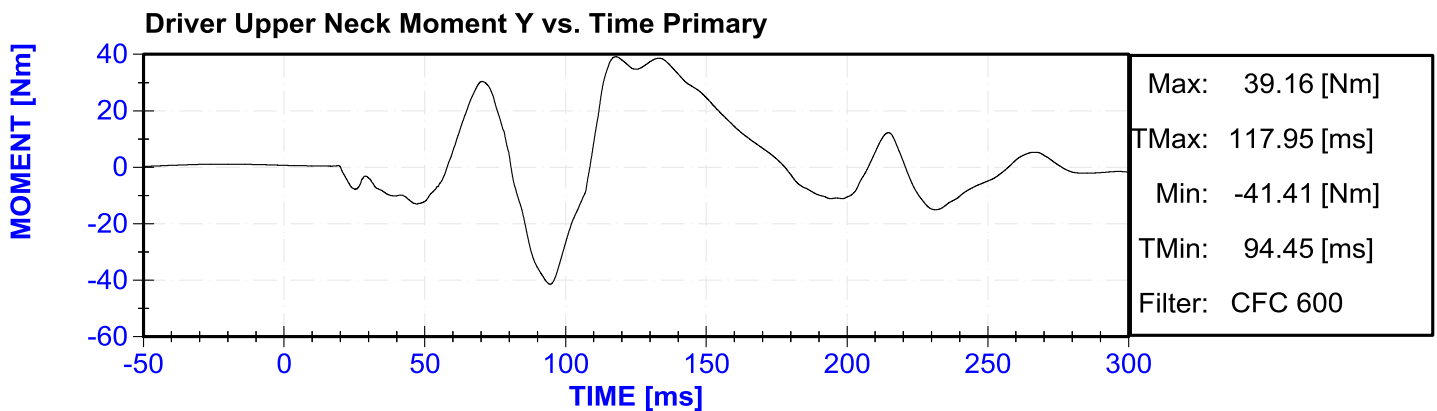
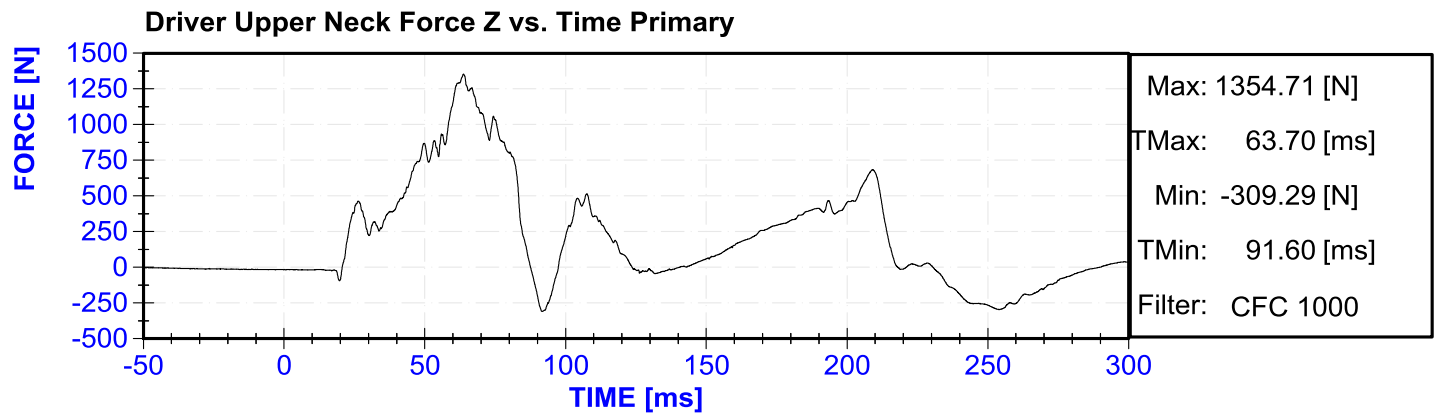
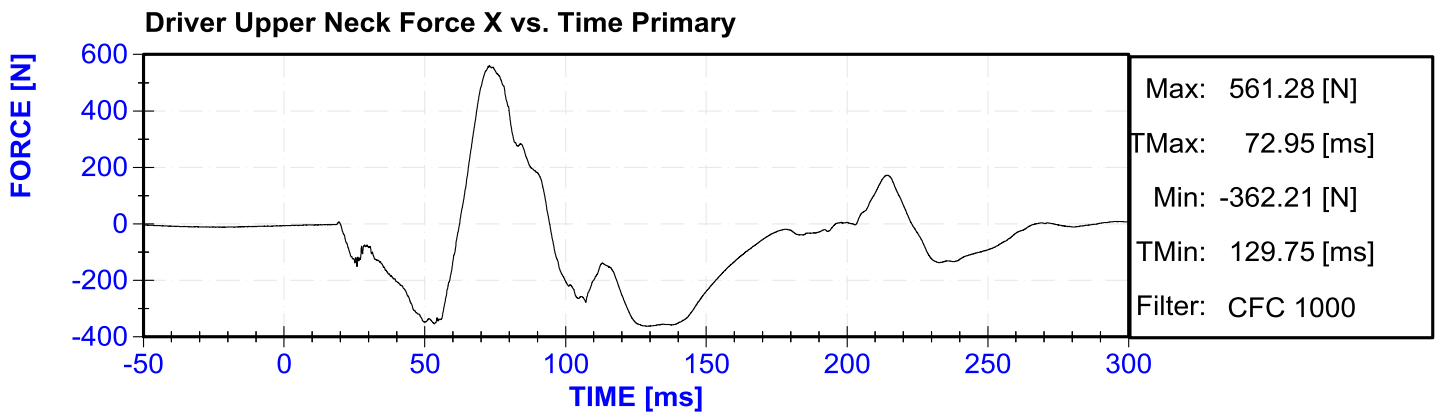
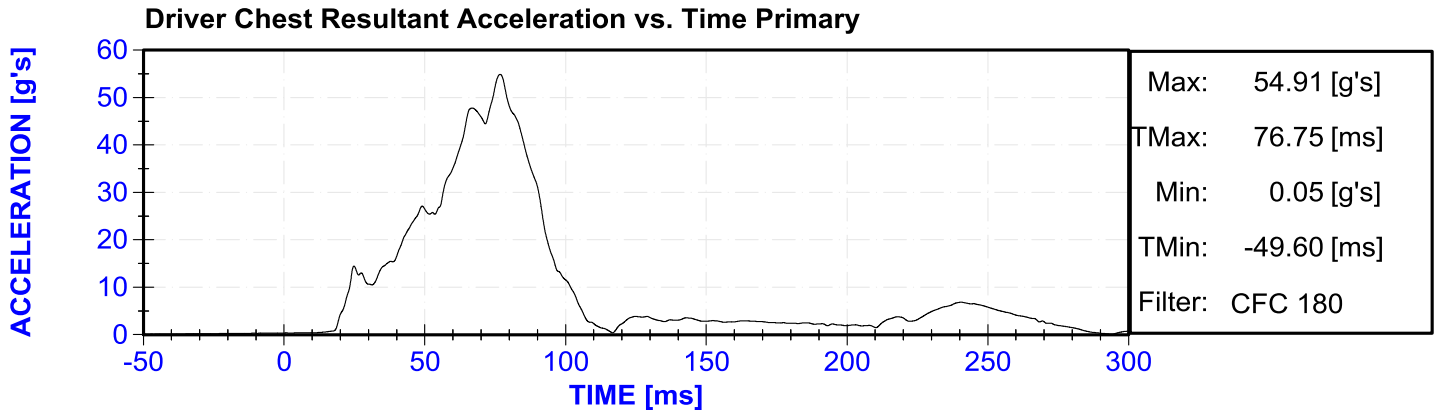
**APPENDIX B
VEHICLE & DUMMY RESPONSE DATA TRACES**

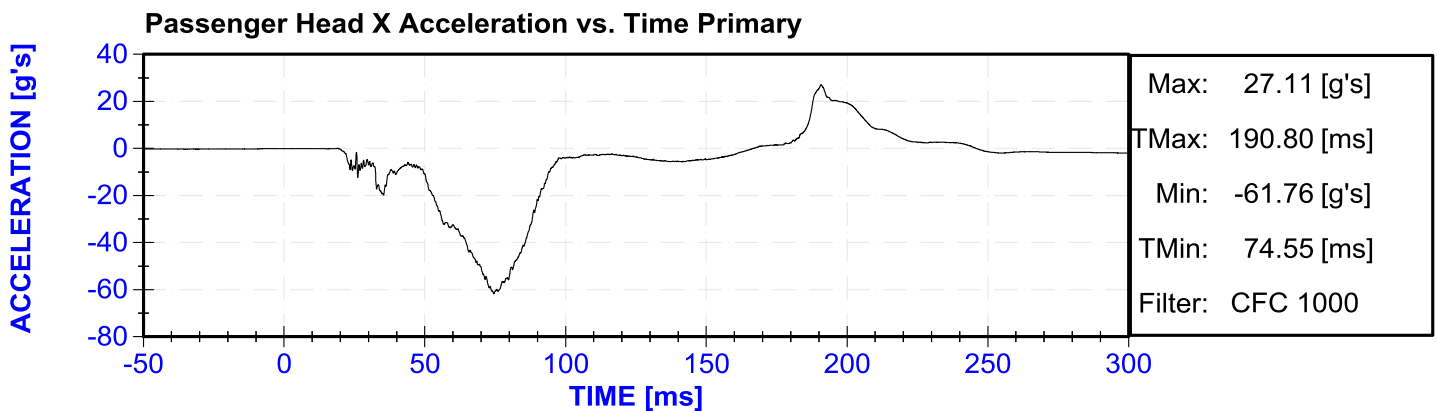
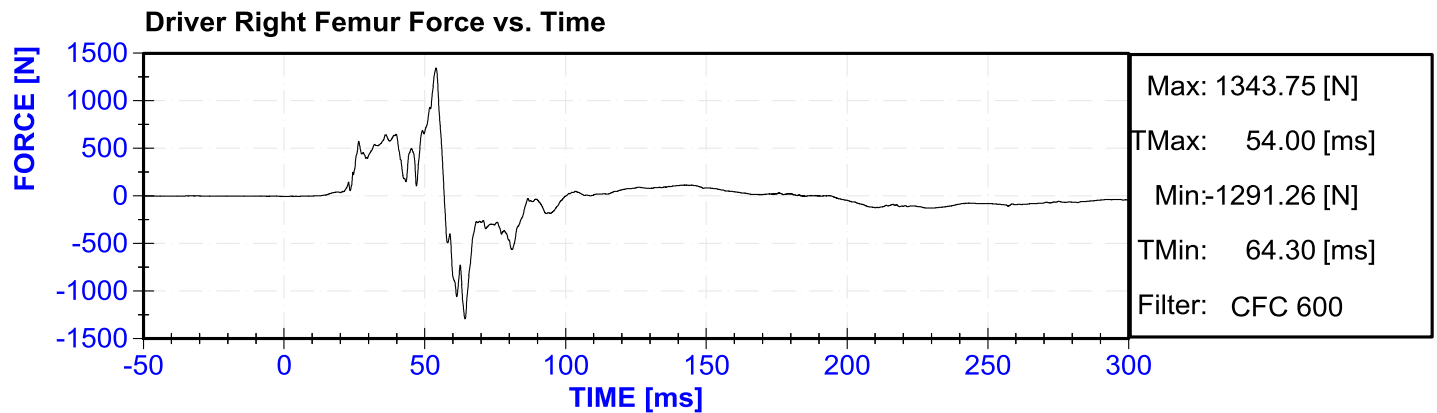
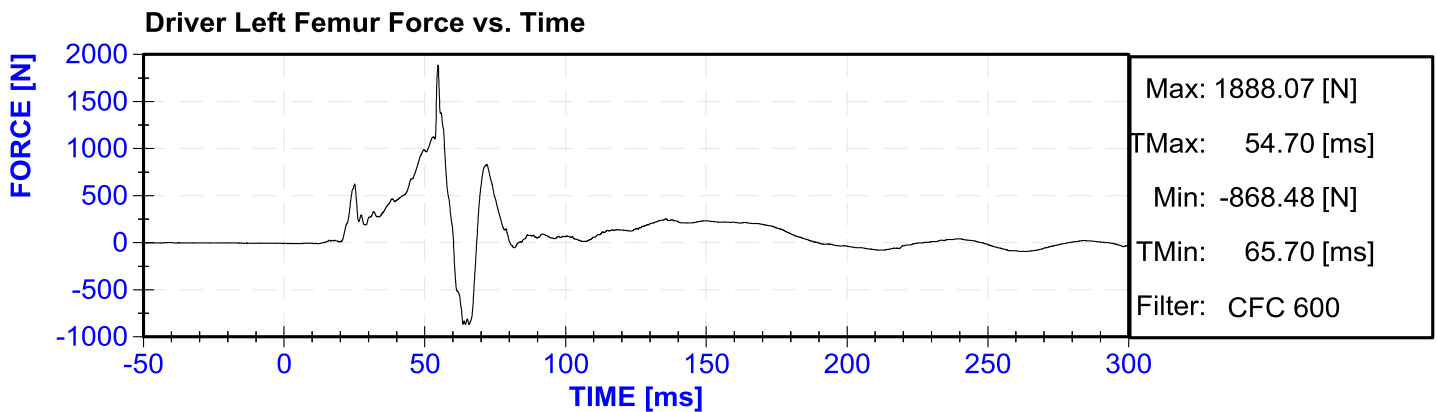
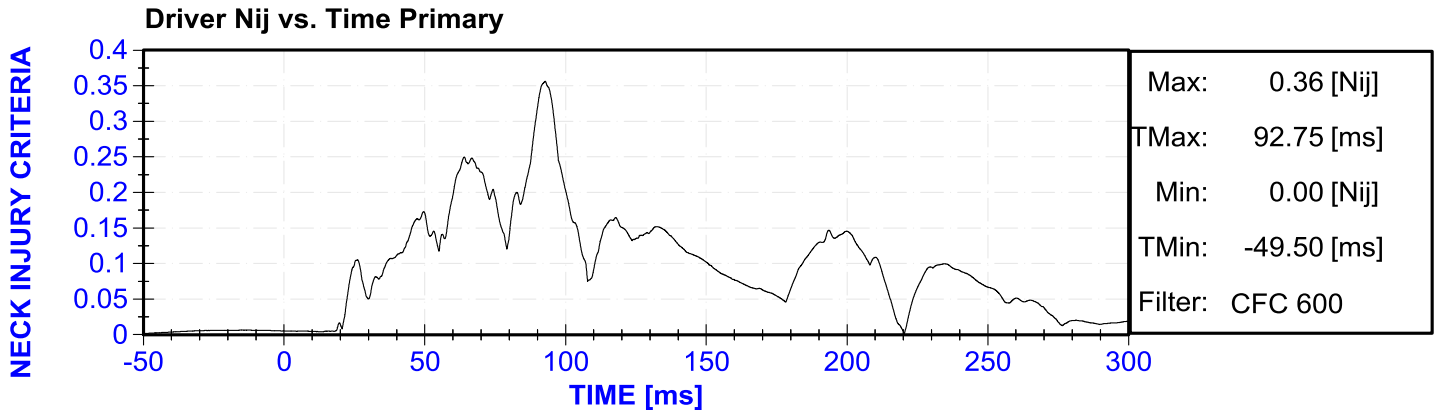
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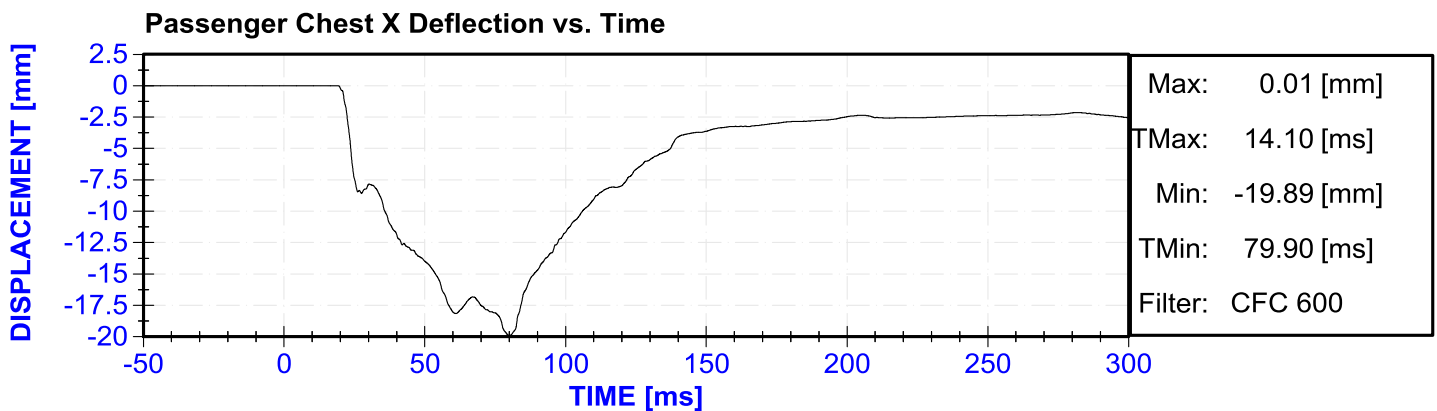
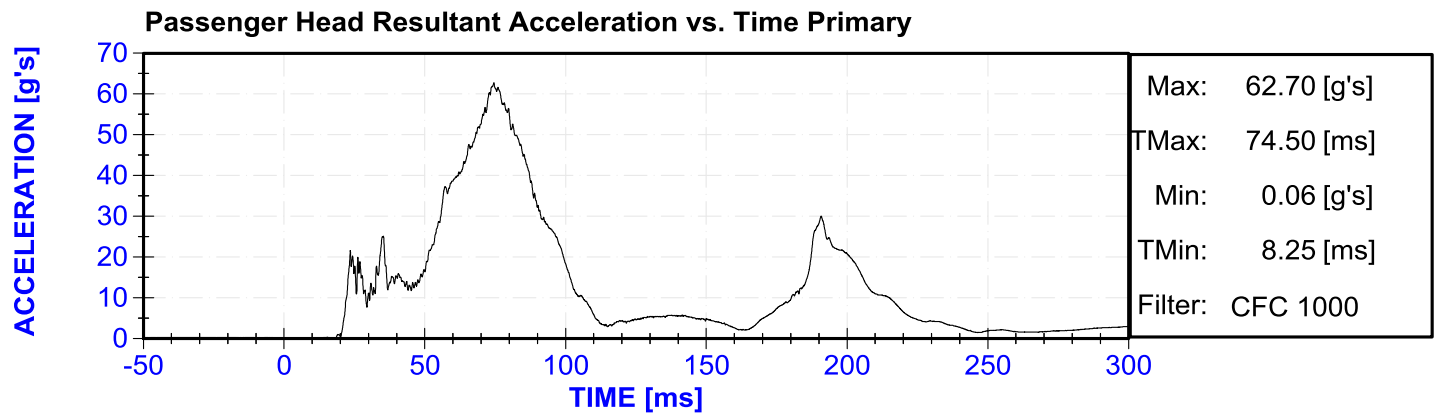
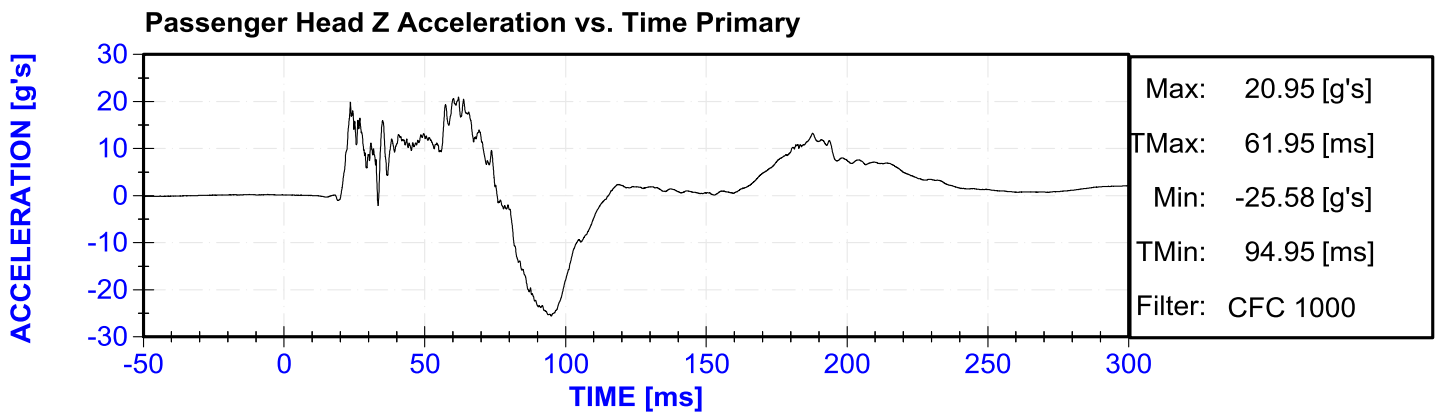
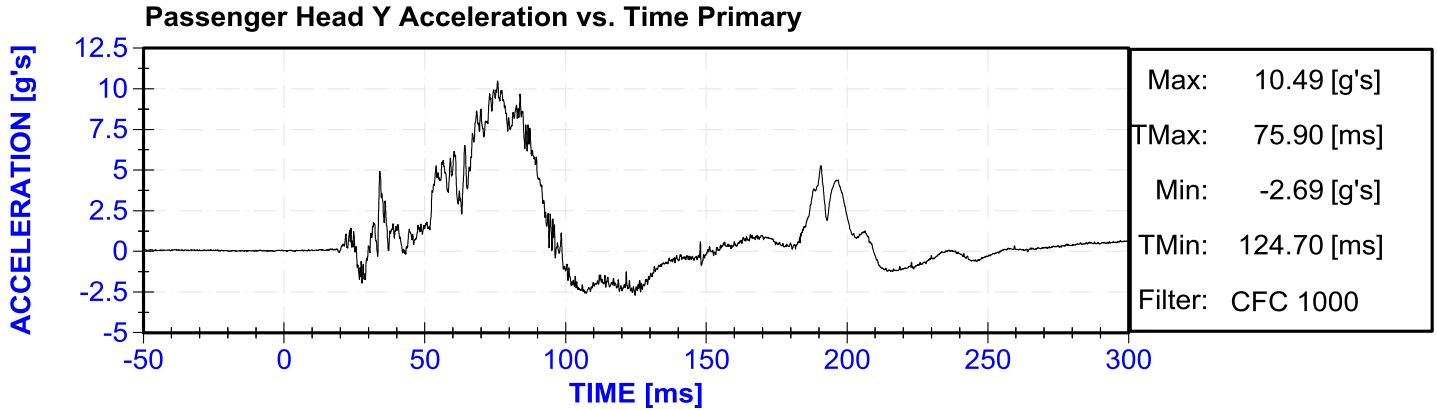
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Plot 2	Driver Head Y Acceleration vs. Time Primary	B-3
Plot 3	Driver Head Z Acceleration vs. Time Primary	B-3
Plot 4	Driver Head Resultant Acceleration vs. Time Primary	B-3
Plot 5	Driver Chest X Deflection vs. Time	B-4
Plot 6	Driver Chest X Acceleration 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
Plot 14	Driver Left Femur Force vs. Time	B-6
Plot 15	Driver Right Femur Force vs. Time	B-6
Plot 16	Passenger Head X Acceleration vs. Time Primary	B-6
Plot 17	Passenger Head Y Acceleration vs. Time Primary	B-7
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
Plot 23	Passenger Chest Z Acceleration vs. Time Primary	B-8
Plot 24	Passenger Chest Resultant Acceleration vs. Time Primary	B-8
Plot 25	Passenger Upper Neck Force X vs. Time Primary	B-9
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

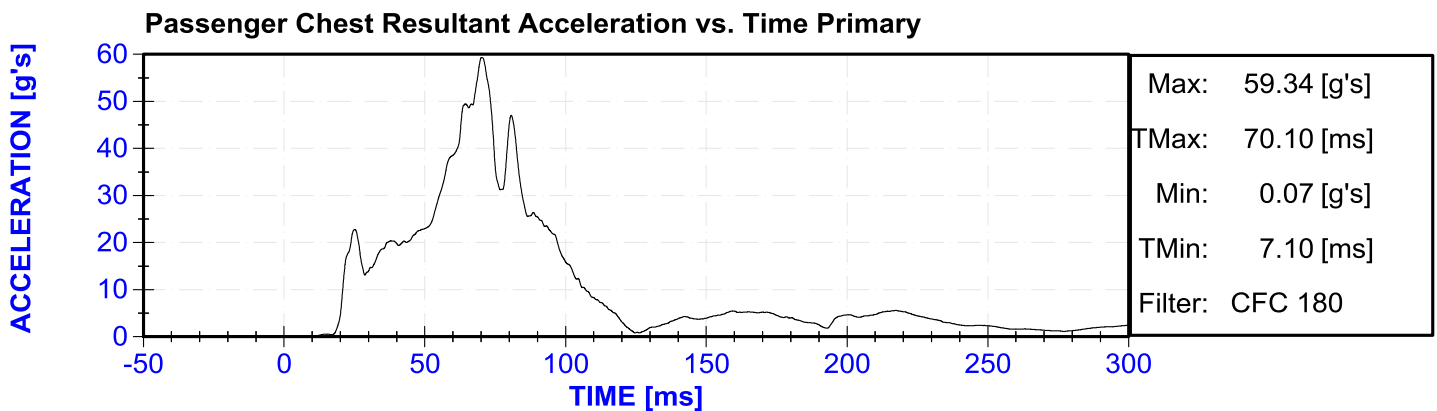
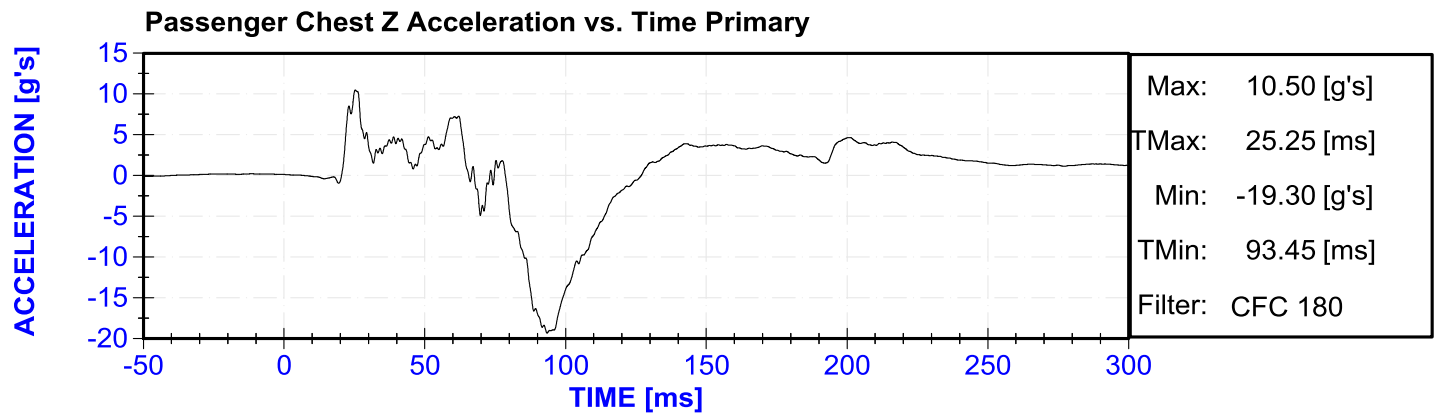
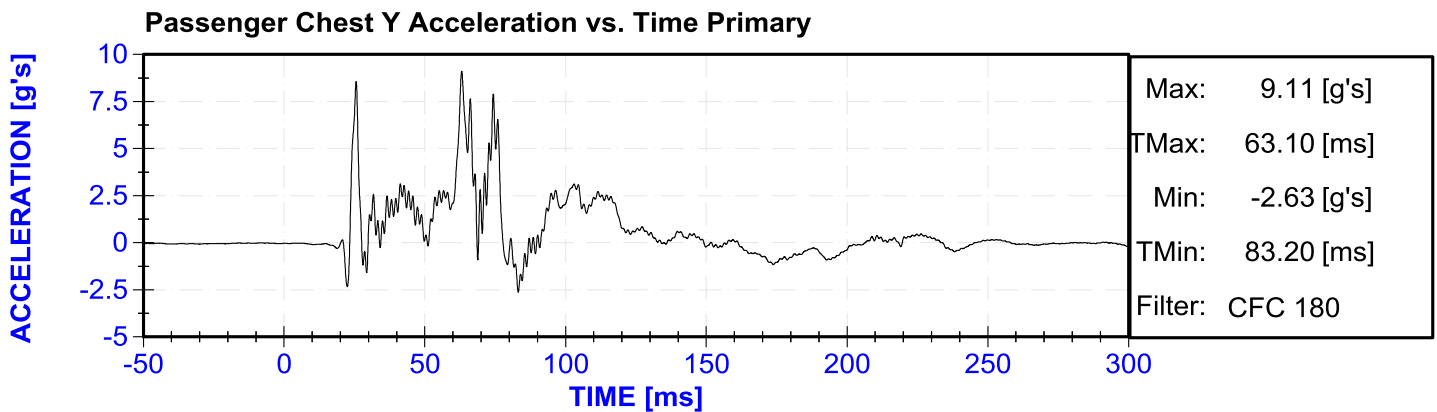
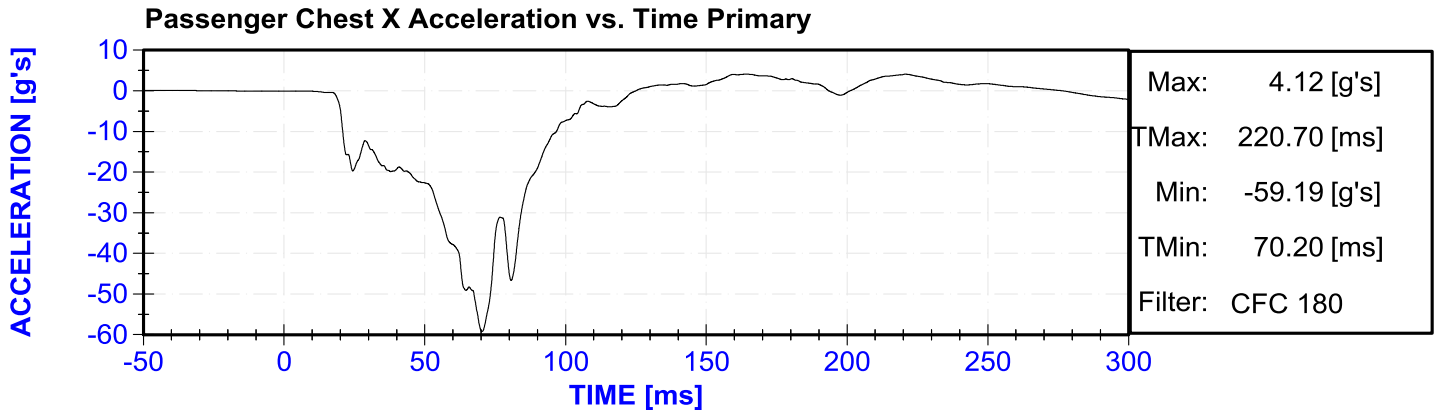


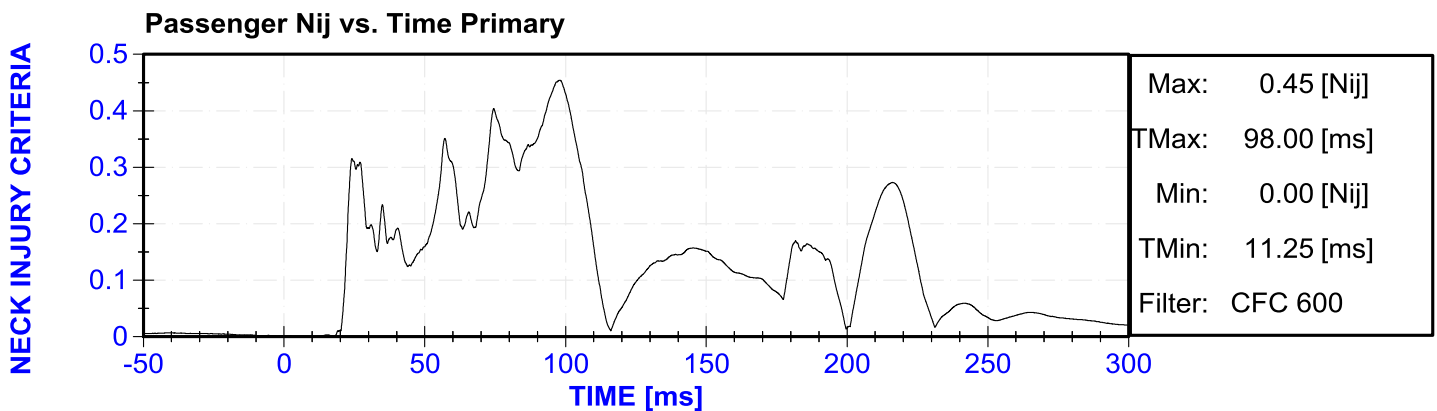
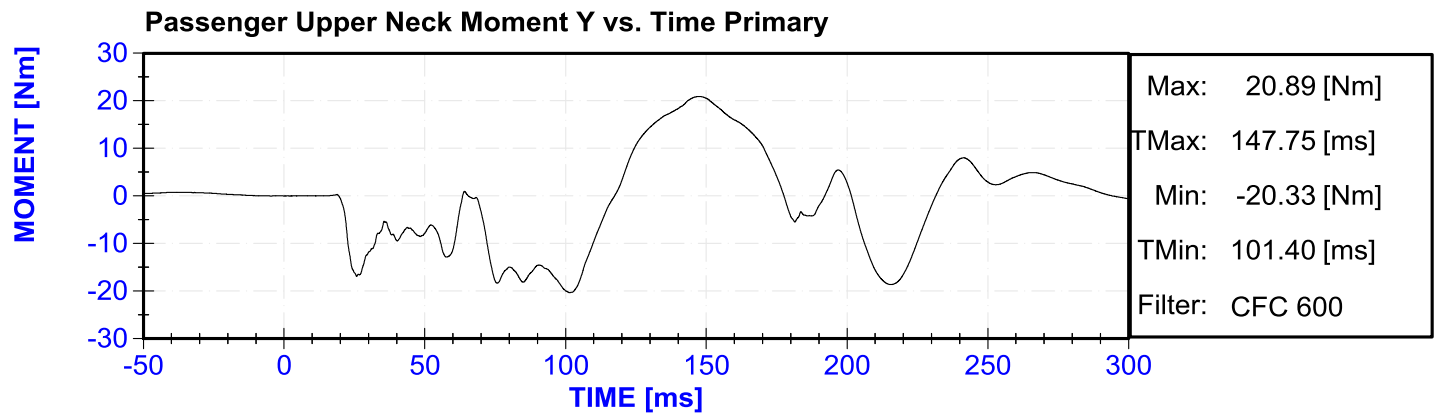
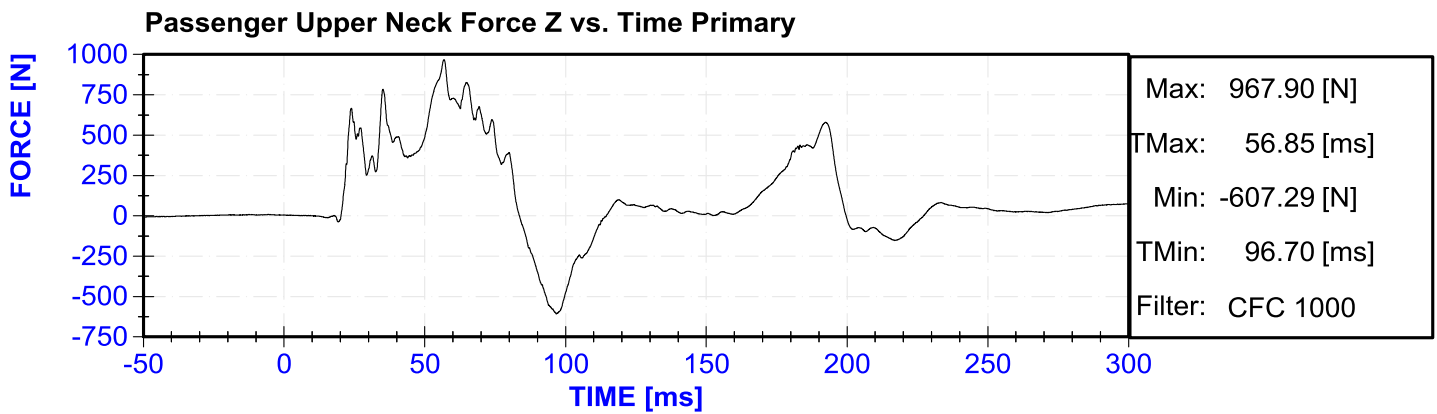
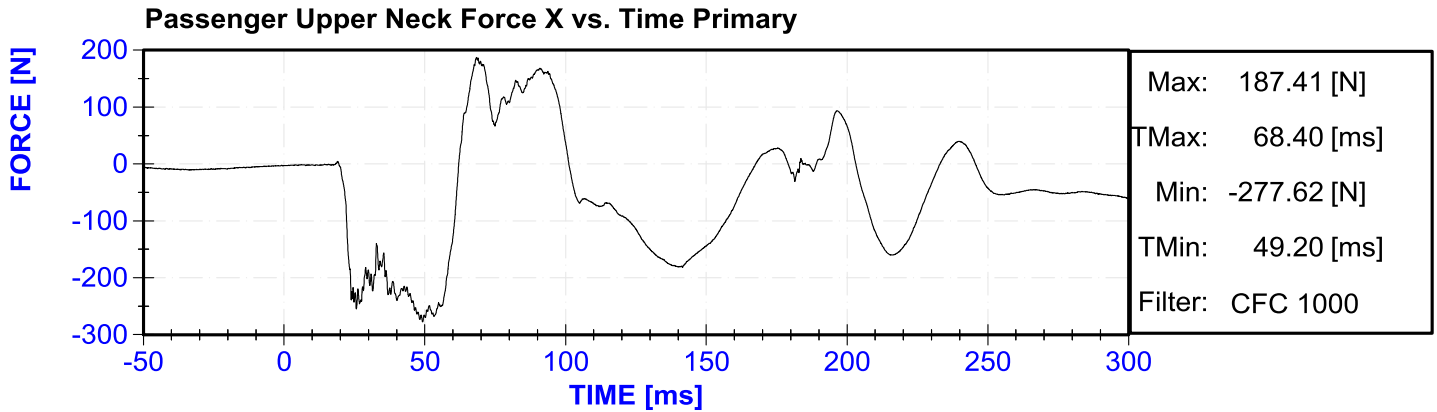




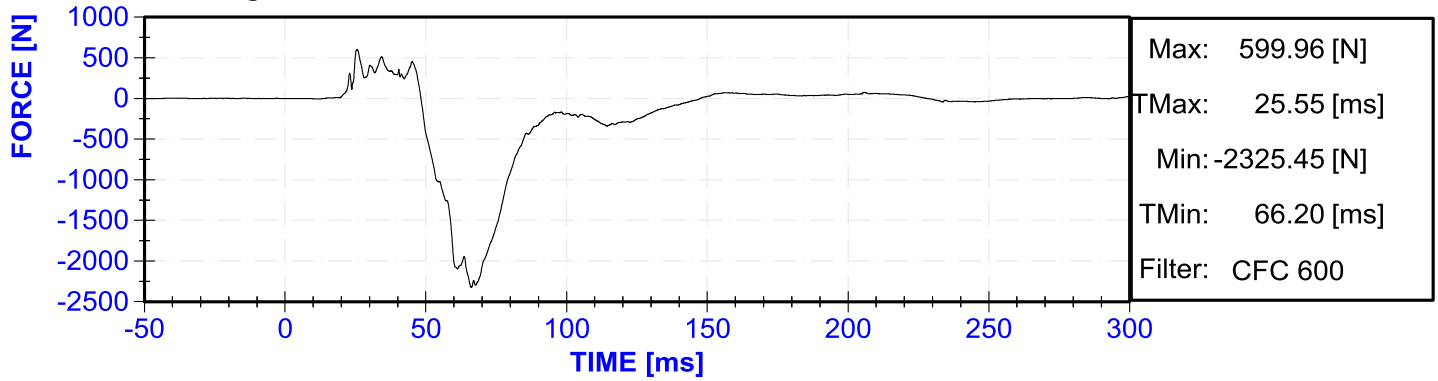




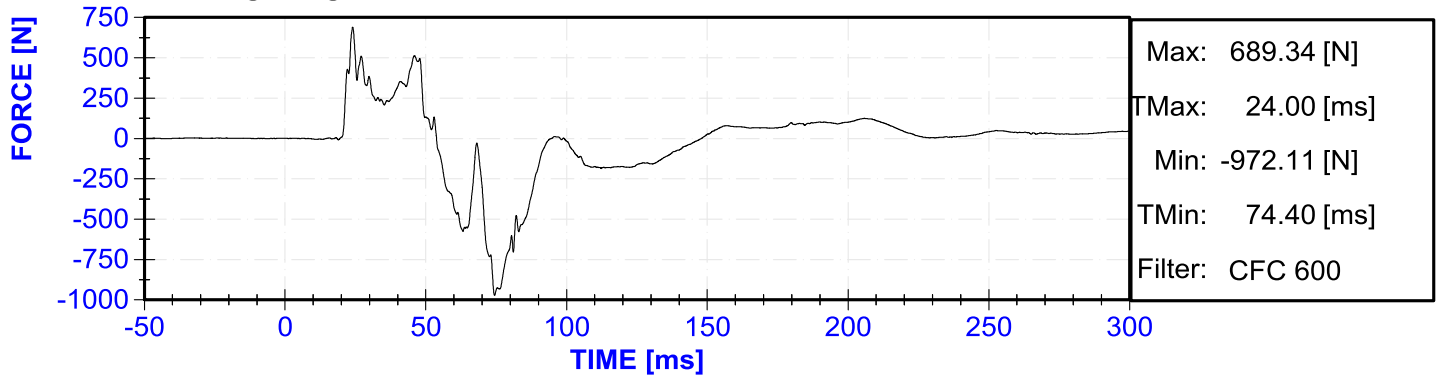




Passenger Left Femur Force vs. Time



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: 1046

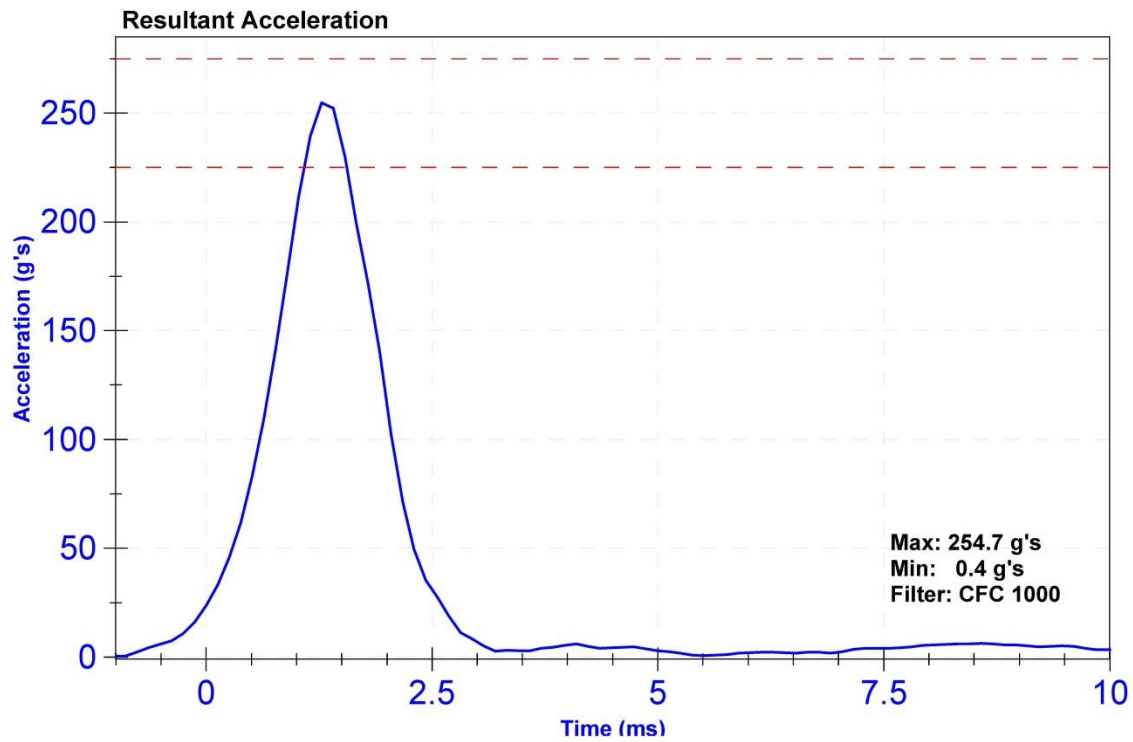
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

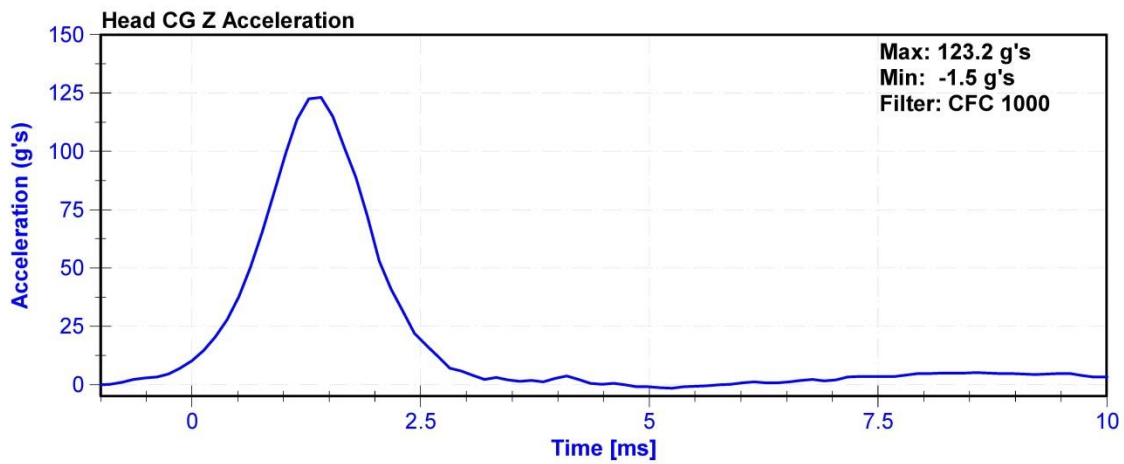
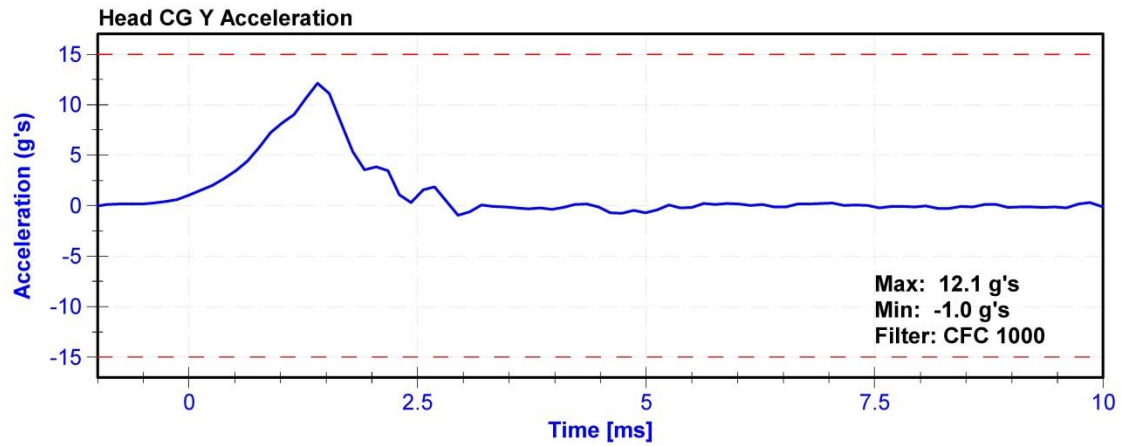
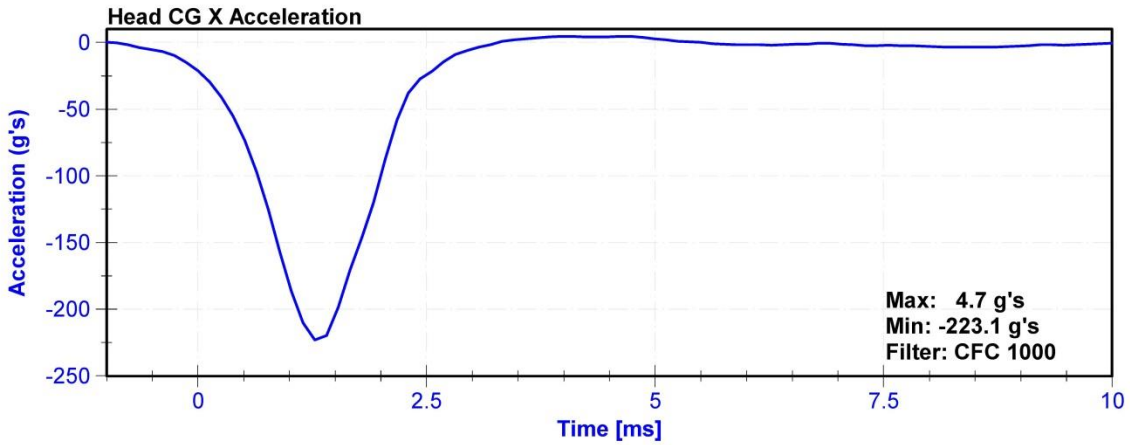
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.8	Pass
Humidity	10	70	%	21.4	Pass
Resultant Acceleration	225	275	g's	254.7	Pass
Oscillation	0	10	%	2.4	Pass
Lateral Acceleration	-15	15	g's	12.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58871	12/19/2014	6/19/2015
Y Accelerometer	ENDEVCO 7264	AC-P12359	12/19/2014	6/19/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P52133	12/19/2014	6/19/2015





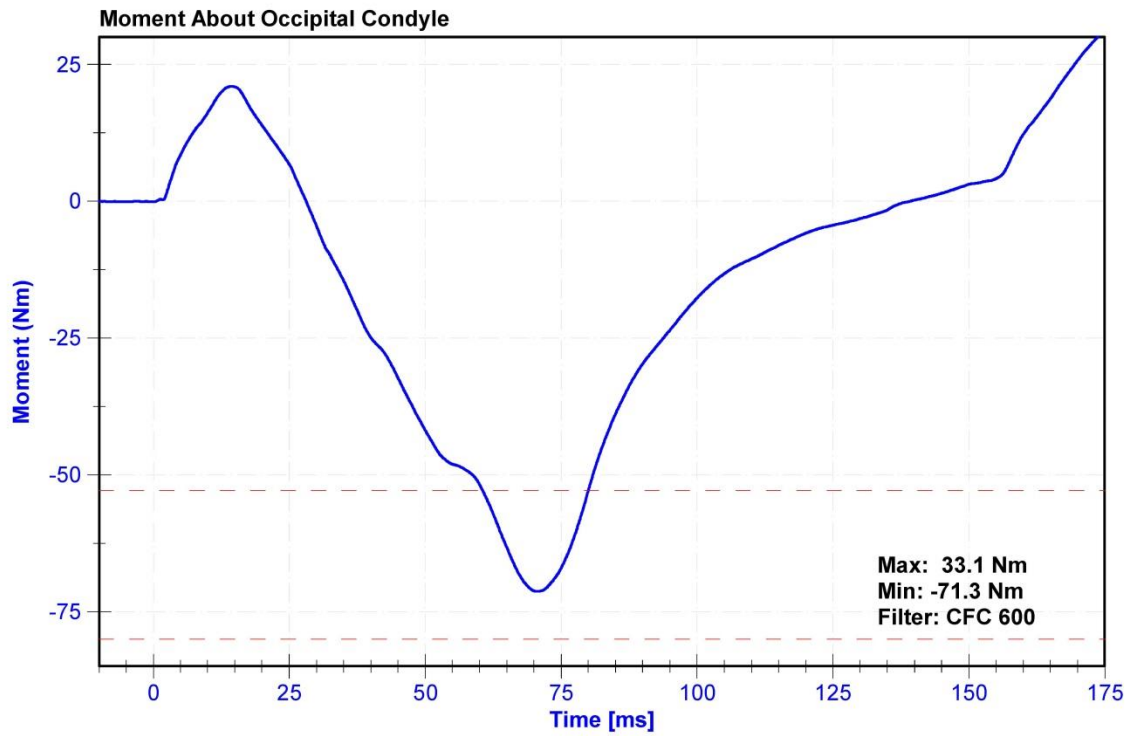
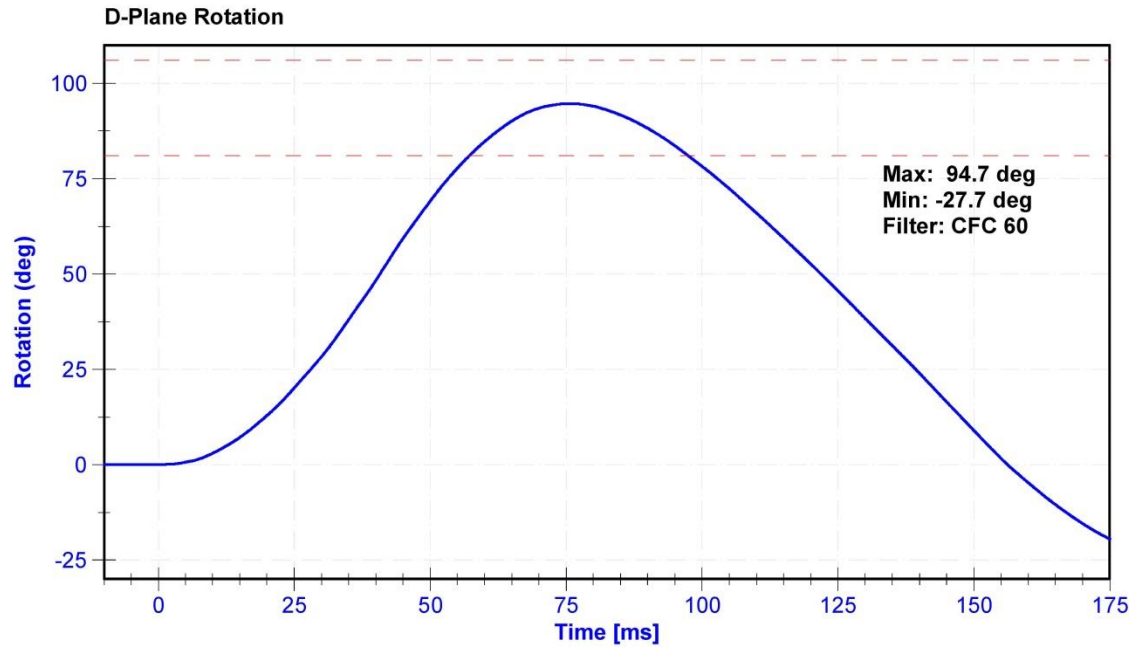
ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

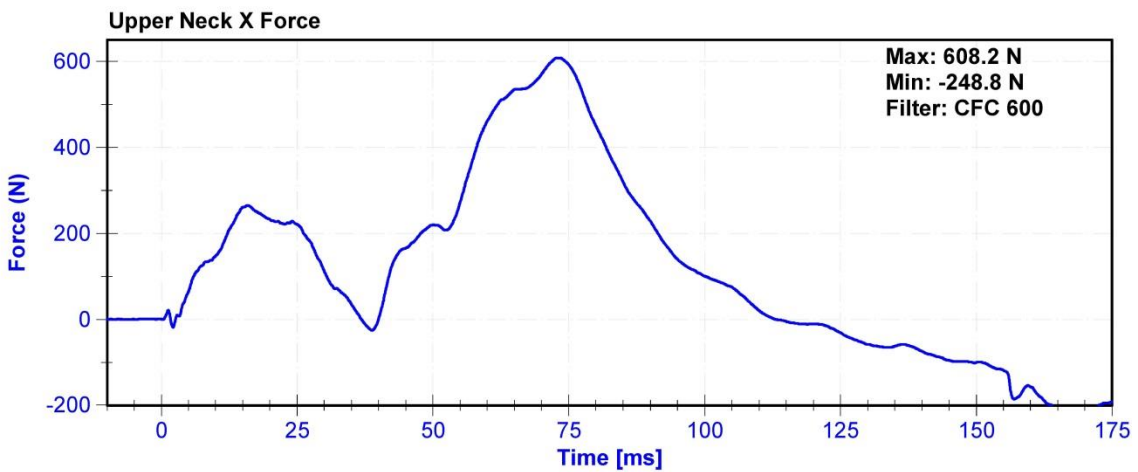
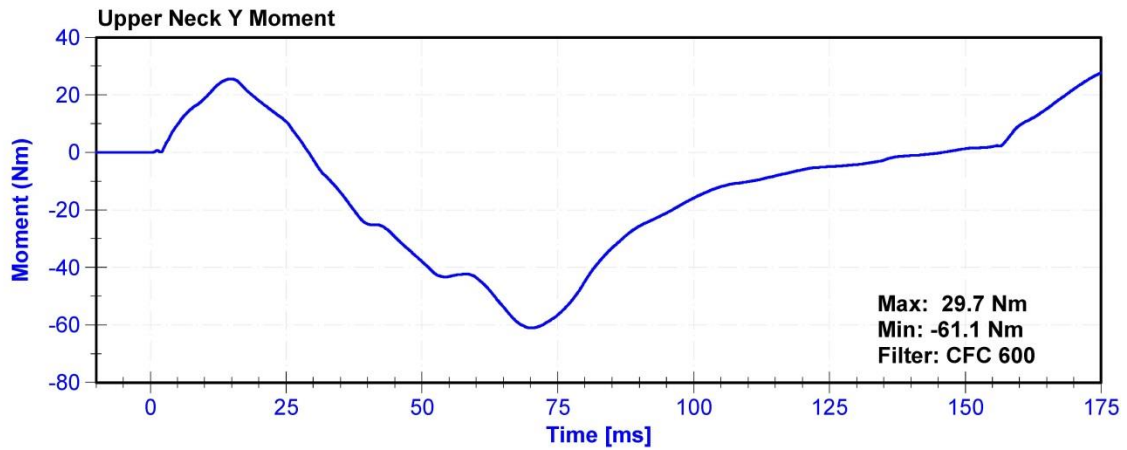
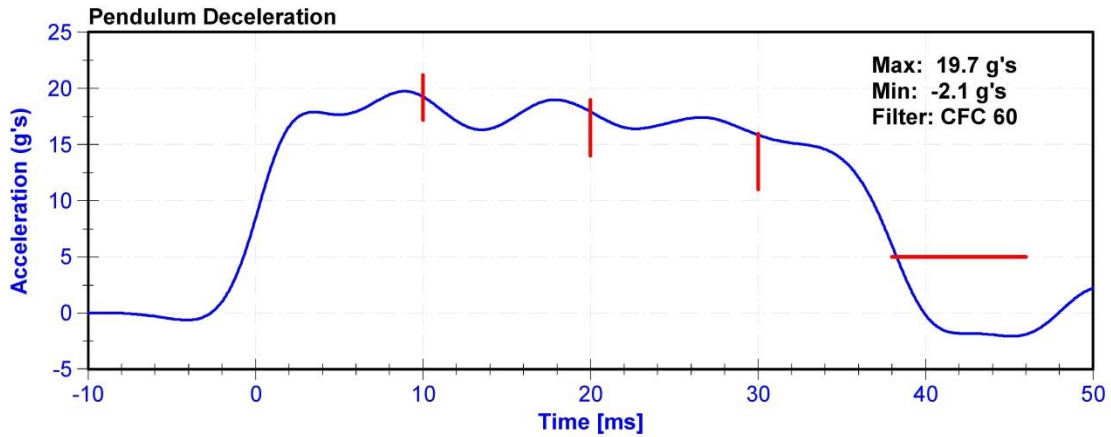
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	14.8	Pass
Velocity	5.94	6.19	m/s	6.025	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	19.26	Pass
Pendulum Deceleration at 20ms	14	19	g's	17.9	Pass
Pendulum Deceleration at 30ms	11	16	g's	15.9	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	19.7	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	38.3	Pass
D Plane Rotation	81	106	deg	94.7	Pass
Time at Maximum Rotation	72	82	ms	75.8	Pass
Rotation Decay to Zero	147	174	ms	156.3	Pass
Moment About Occipital Condyle	-80	-52.9	Nm	-71.33	Pass
Time at Minimum Moment	65	79	ms	70.7	Pass
Moment Decay to Zero	120	148	ms	139.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	SP22G	DS-PendPot	9/16/2014	9/16/2015
Condyle Potentiometer	SP22G	DS-CondPot	2/21/2014	2/21/2015
Upper Neck Load Cell	DENTON 1716A	LC-2186Fx	8/7/2014	8/7/2015





ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

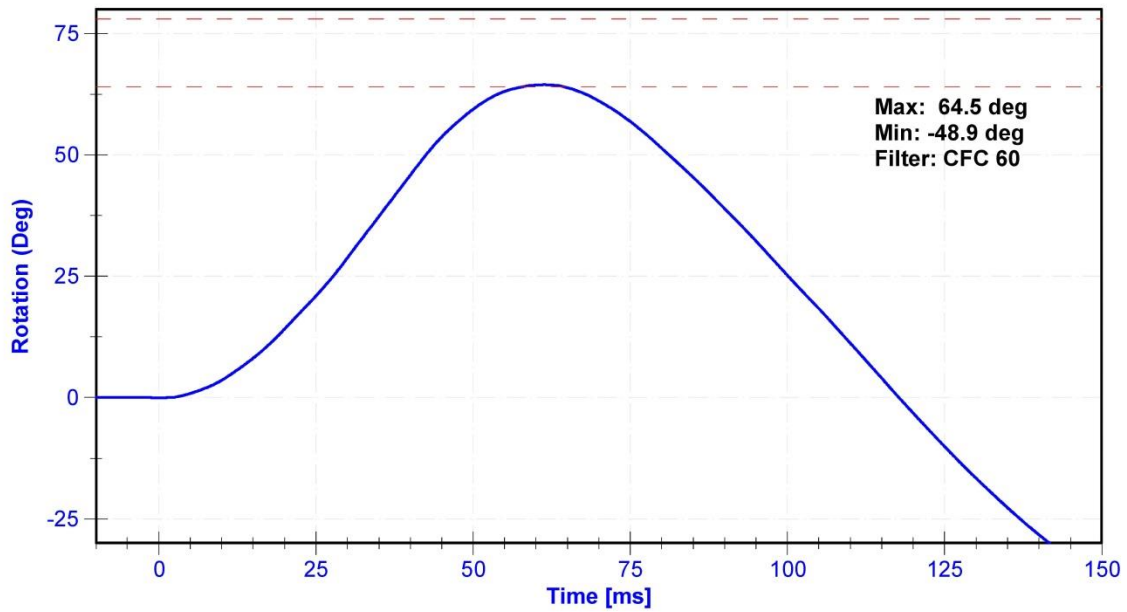
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	13.6	Pass
Velocity	6.89	7.13	m/s	6.979	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	22.68	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	19.44	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	17.82	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	23.5	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	39.0	Pass
D Plane Rotation	64	78	deg	64.5	Pass
Time at Maximum Rotation	57	64	ms	61.3	Pass
Rotation Decay to Zero	113	127	ms	117.7	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	94.60	Pass
Time at Maximum Moment	47	58	ms	52.3	Pass
Moment Decay to Zero	97	107	ms	100.5	Pass

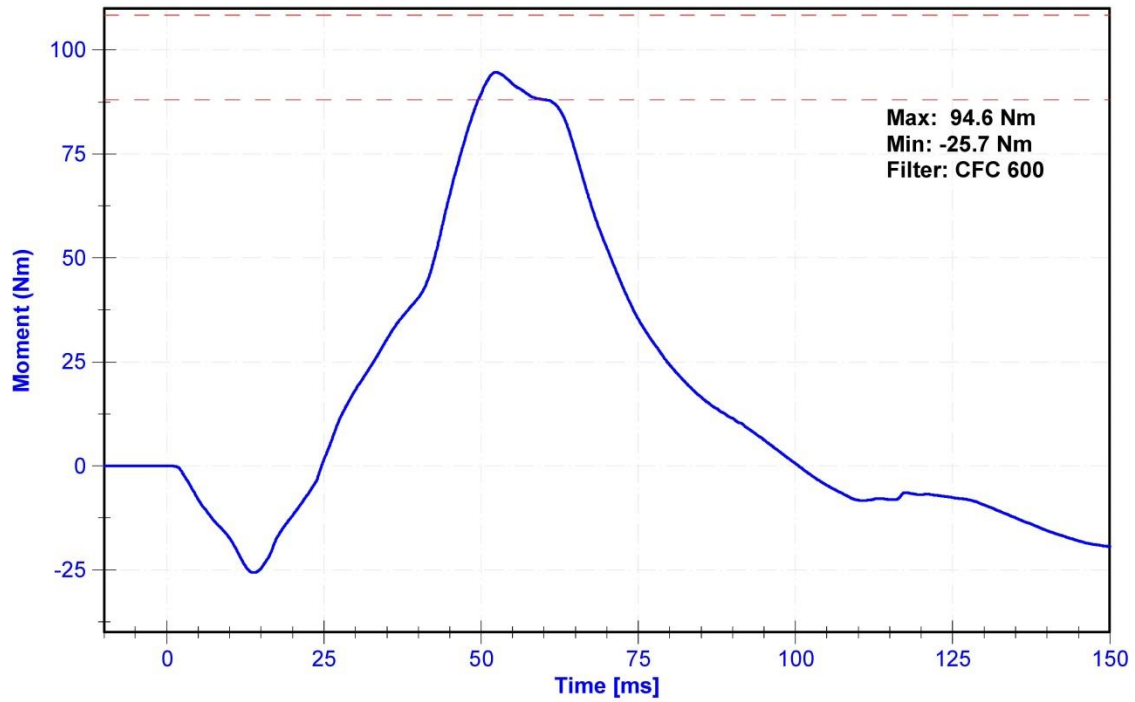
Transducer Calibrations

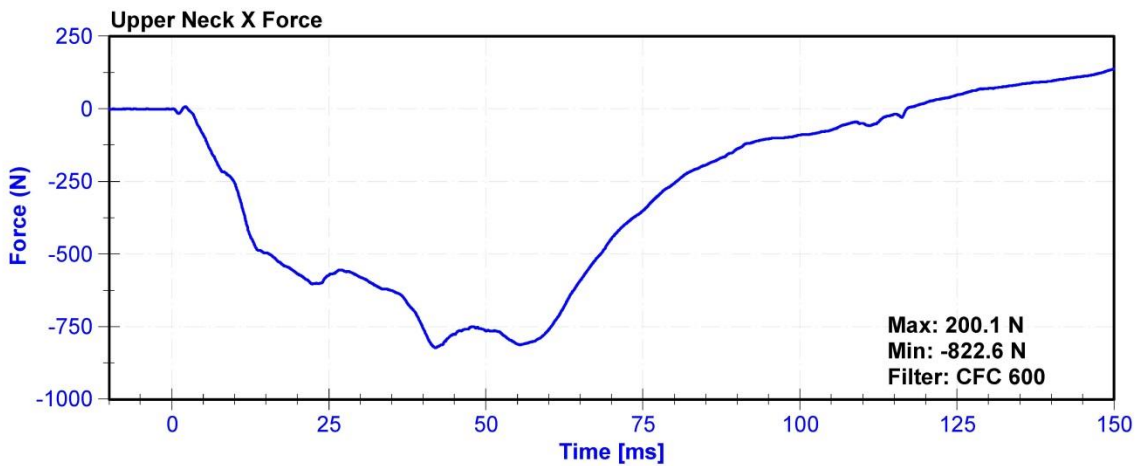
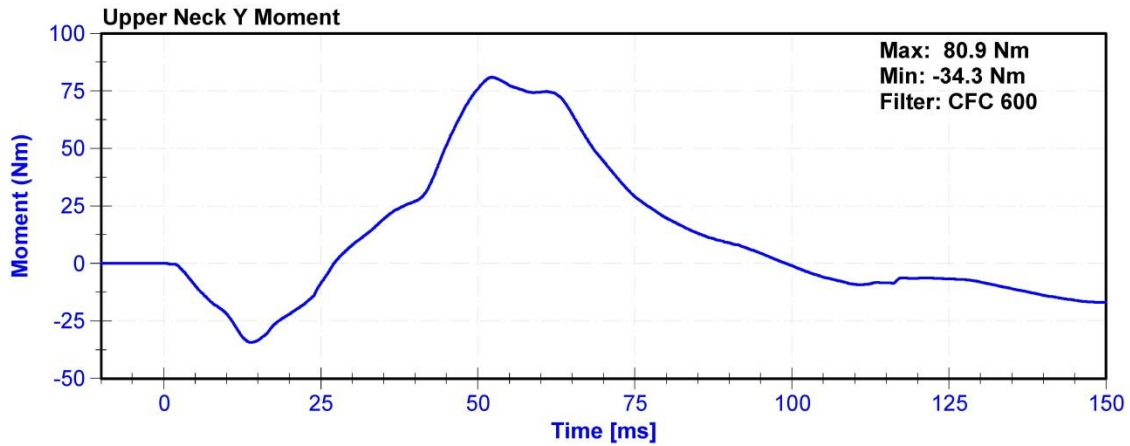
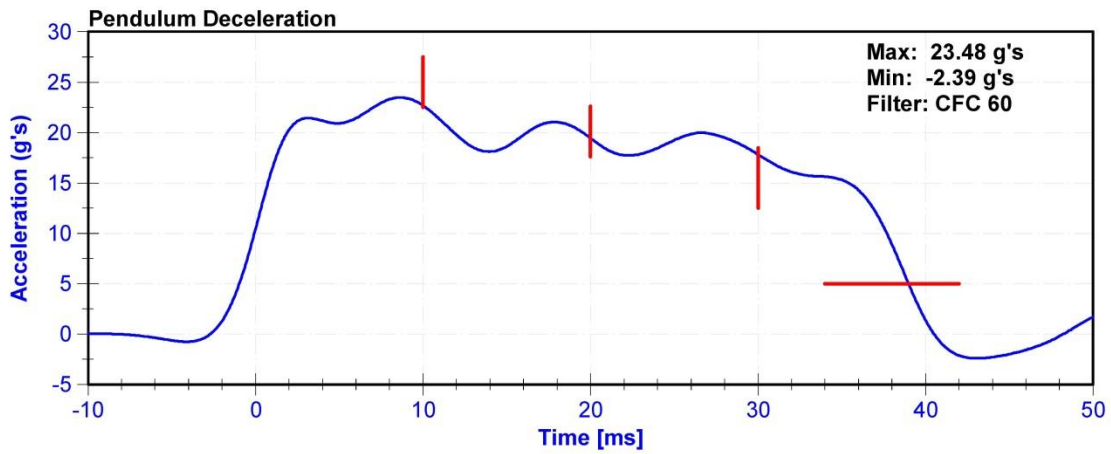
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	SP22G	DS-PendPot	9/16/2014	9/16/2015
Condyle Potentiometer	SP22G	DS-CondPot	2/21/2014	2/21/2015
Upper Neck Load Cell	DENTON 1716A	LC-2186Fx	8/7/2014	8/7/2015

D-Plane Rotation



Moment About Occipital Condyle





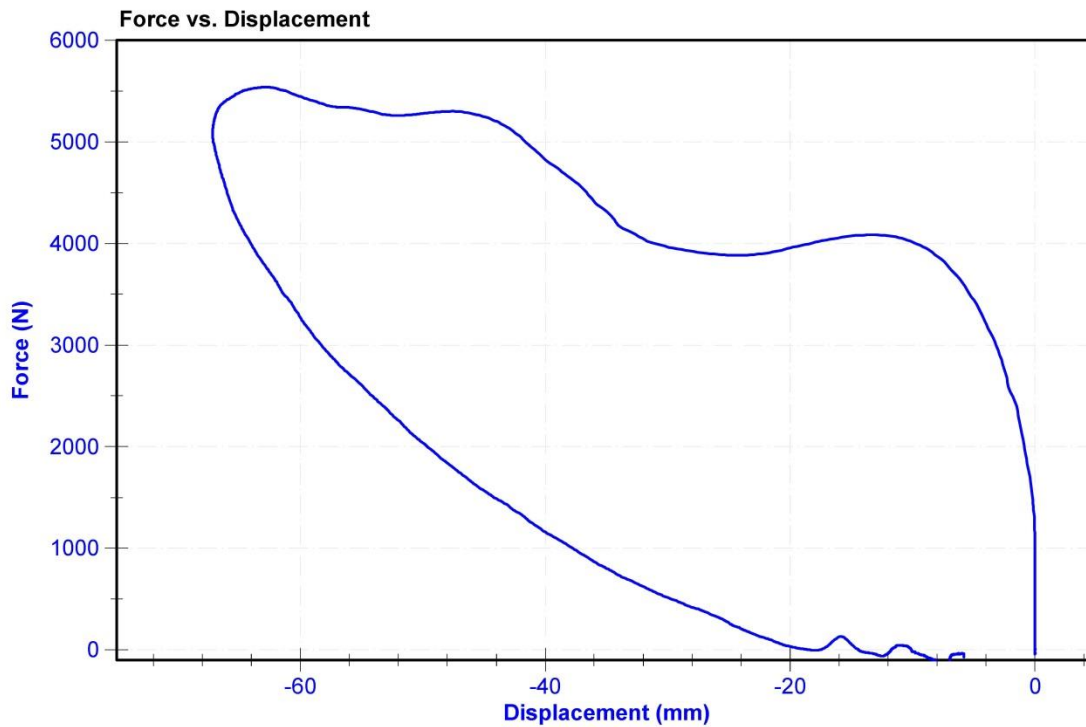
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

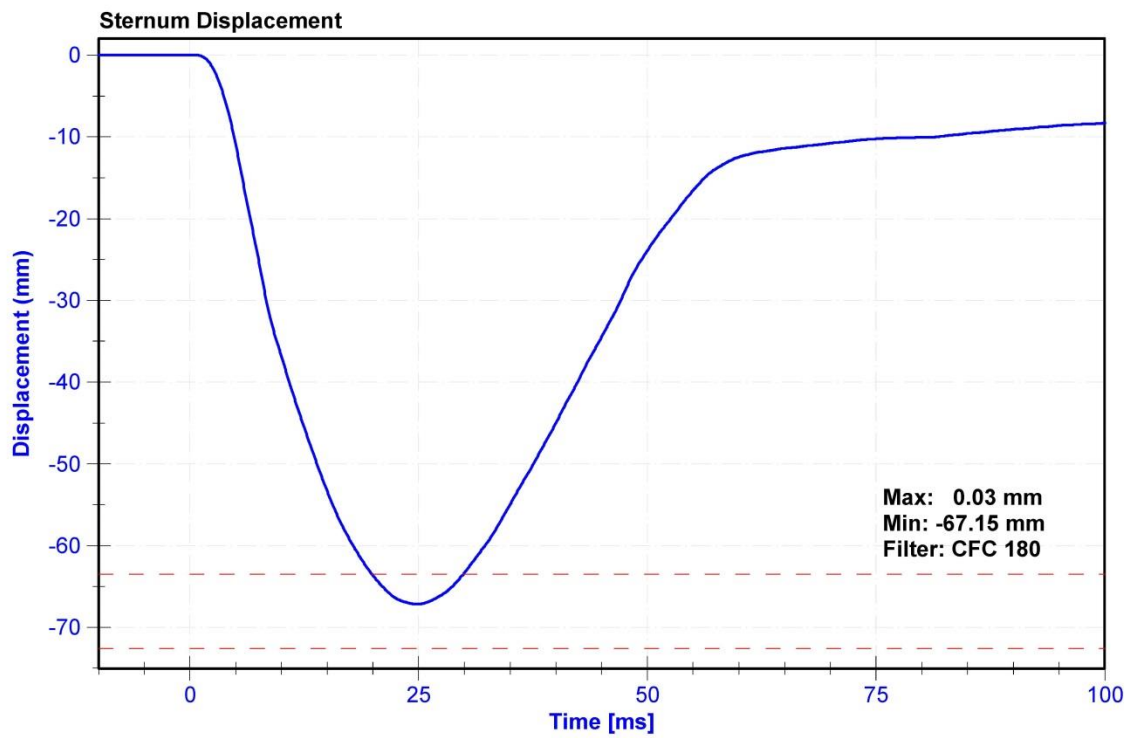
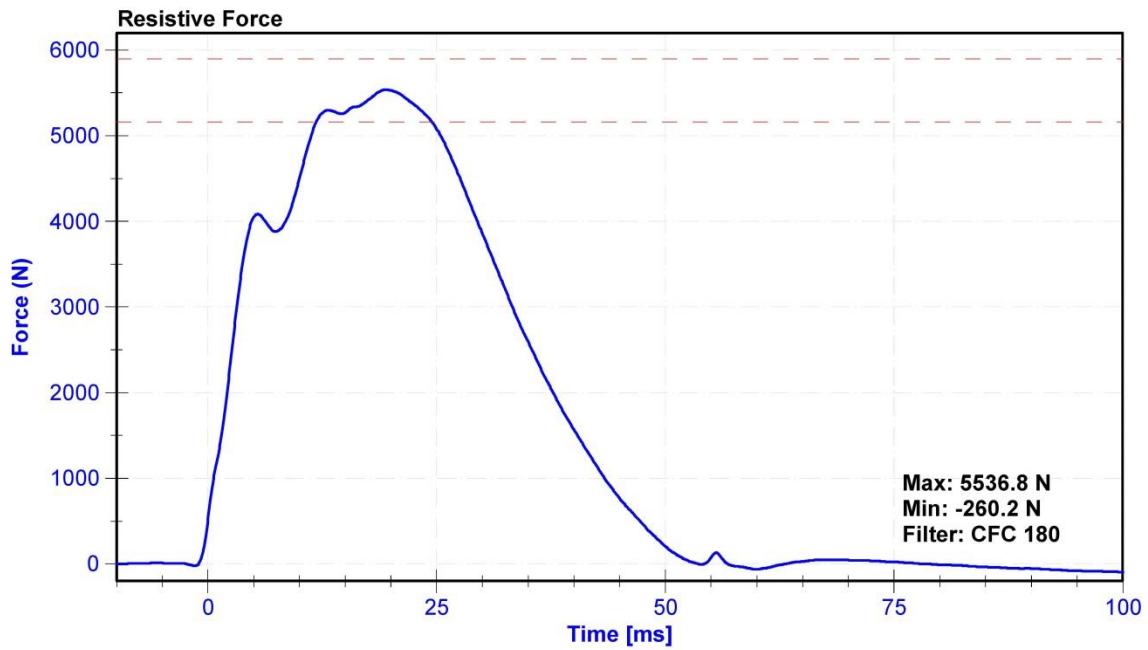
Results

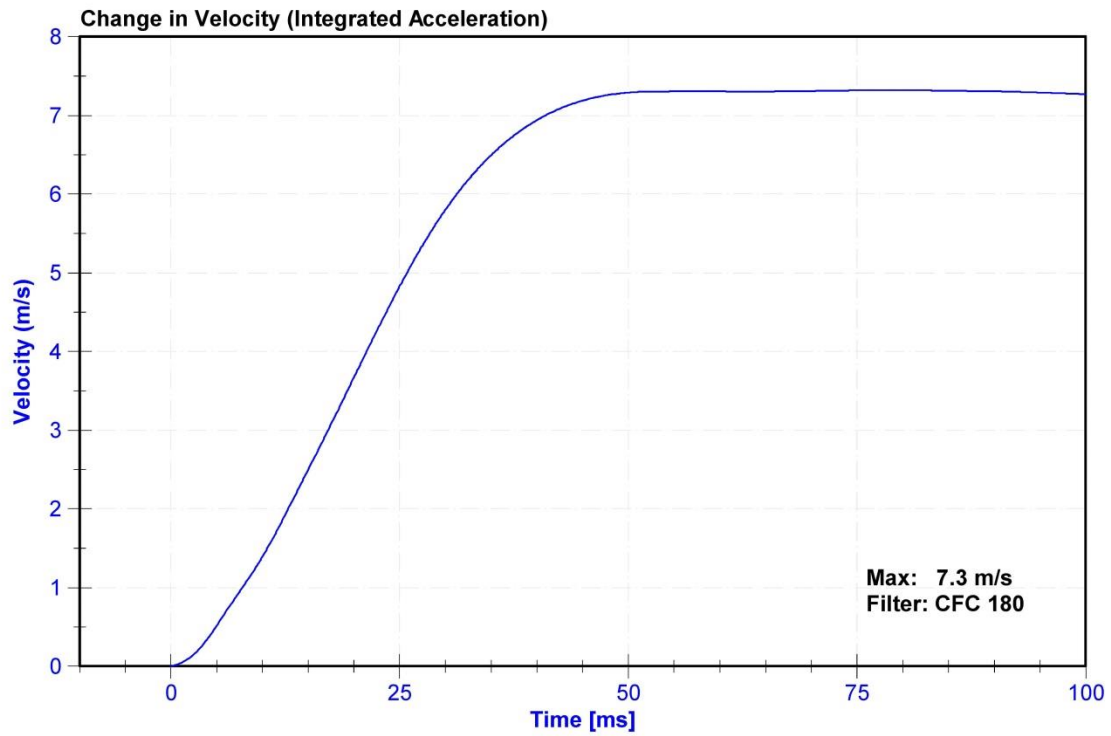
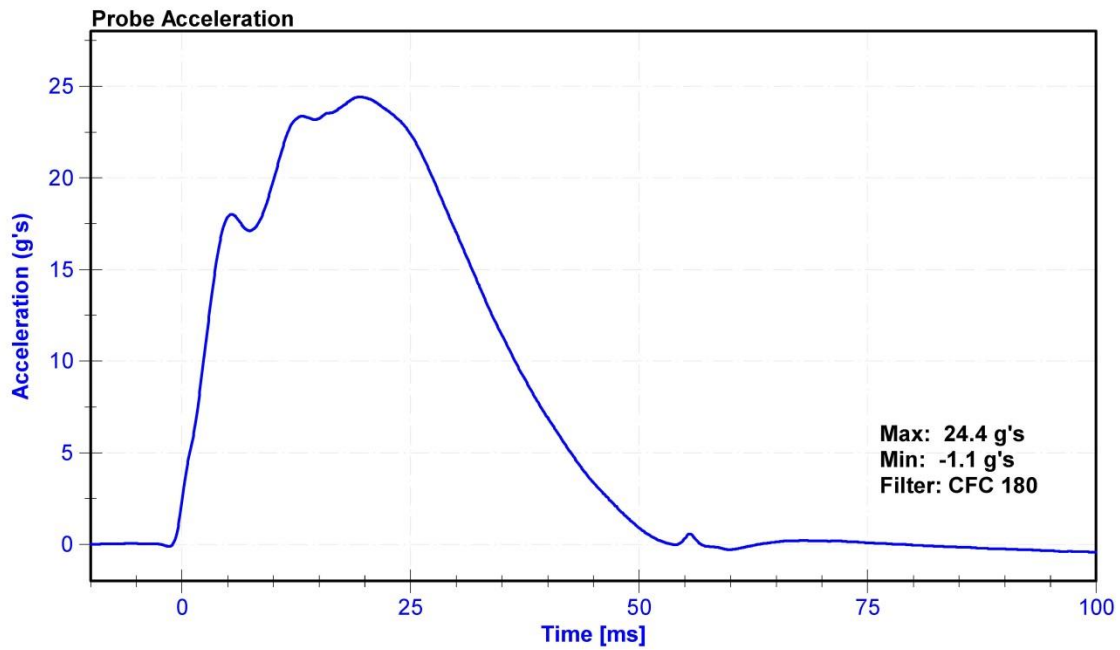
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	16.6	Pass
Velocity	6.59	6.83	m/s	6.773	Pass
Chest Displacement	-72.6	-63.5	mm	-67.15	Pass
Resistive Force	5,160	5,894	N	5536.8	Pass
Hysteresis	69	85	%	72.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
Chest Potentiometer	Servo 14CB1-2897	DS-1046	7/31/2014	7/31/2015







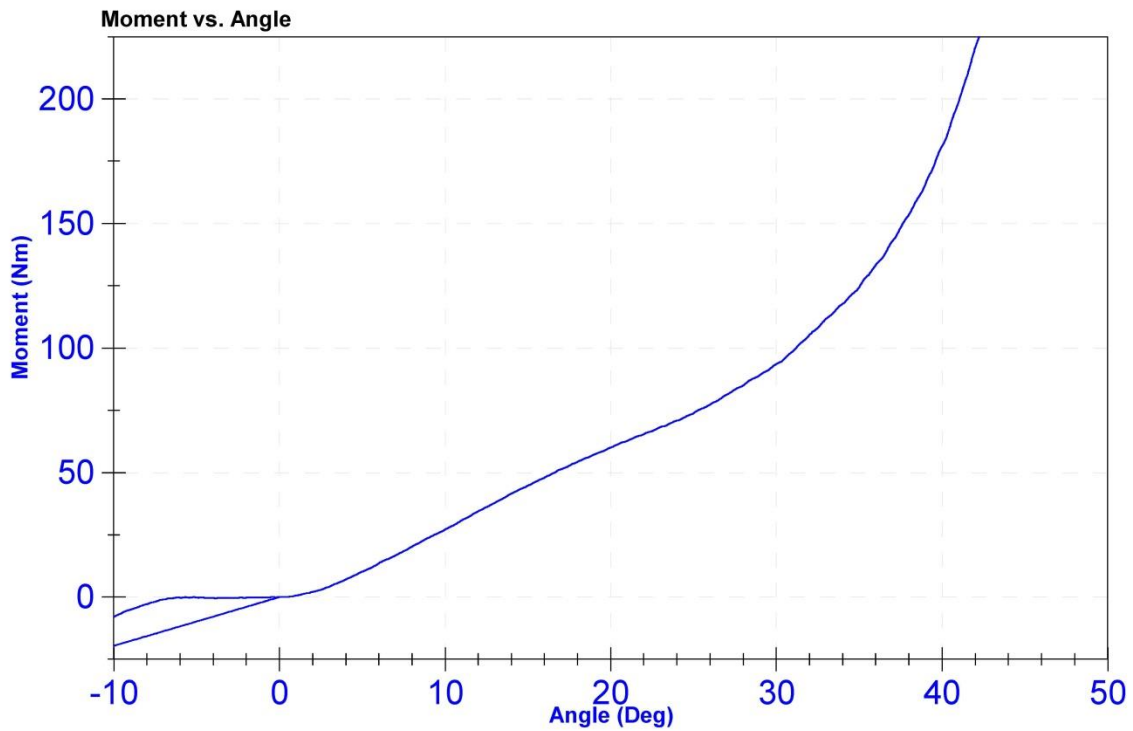
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	13.5	Pass
Average Velocity	5	10	deg/s	5.1	Pass
Angle at 203Nm	40	50	deg	41.2	Pass
Moment at 30 degrees	0	94.9	Nm	93.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Servo 14CB1-3615	DS-0008	2/20/2014	2/20/2015
Load Cell	Key Trans 2301-02	LC-115 My	3/25/2014	3/25/2015



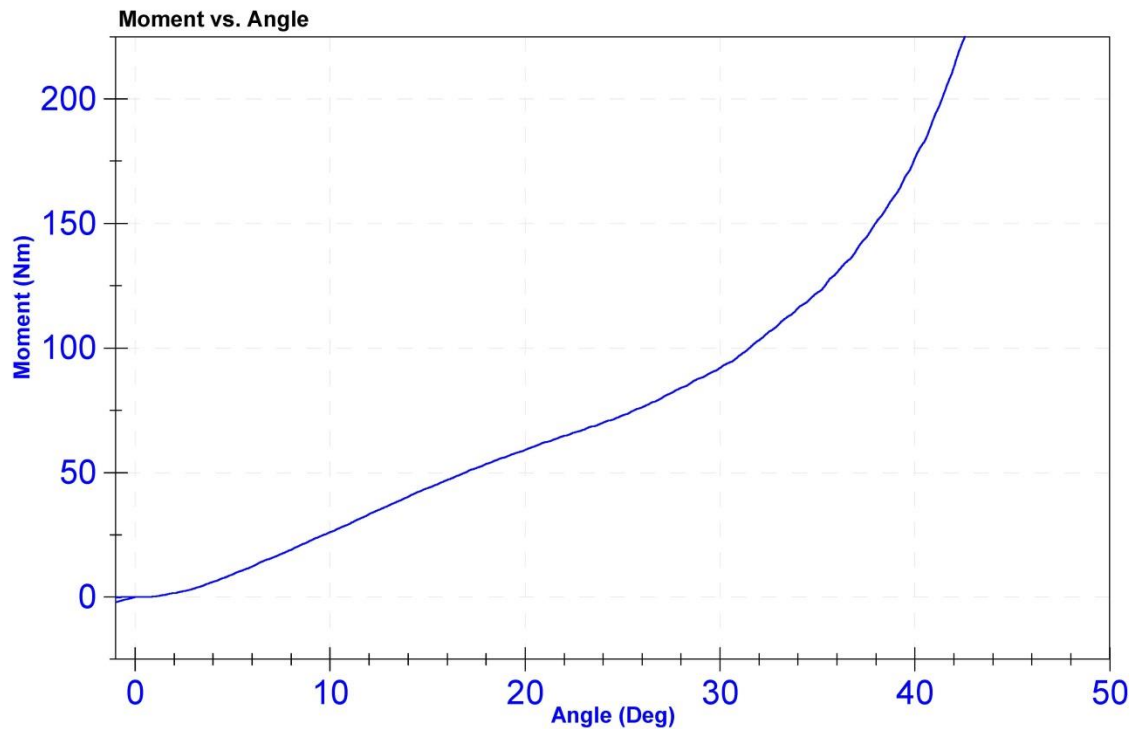
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.0	Pass
Humidity	10	70	%	13.5	Pass
Average Velocity	5	10	deg/s	5.4	Pass
Angle at 203Nm	40	50	deg	41.5	Pass
Moment at 30 degrees	0	94.9	Nm	92.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Servo 14CB1-3615	DS-0008	2/20/2014	2/20/2015
Load Cell	Key Trans 2301-02	LC-115 My	3/25/2014	3/25/2015



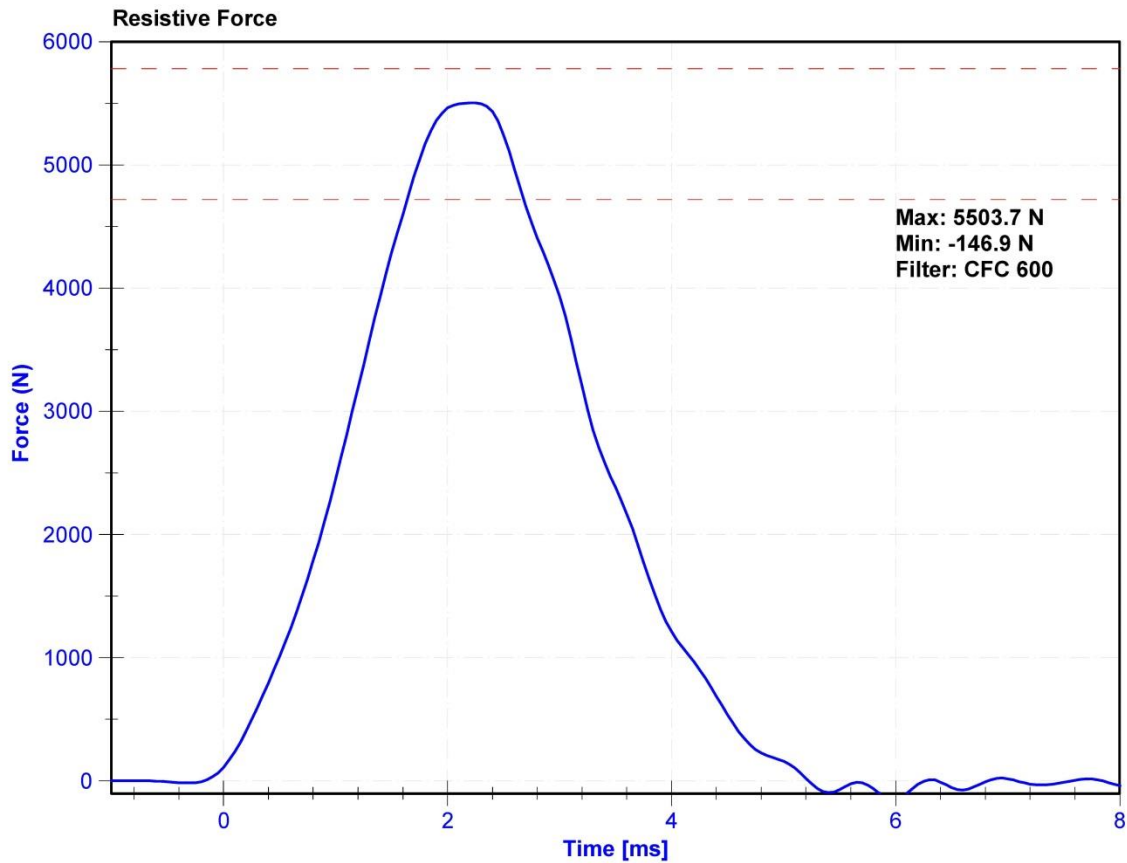
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

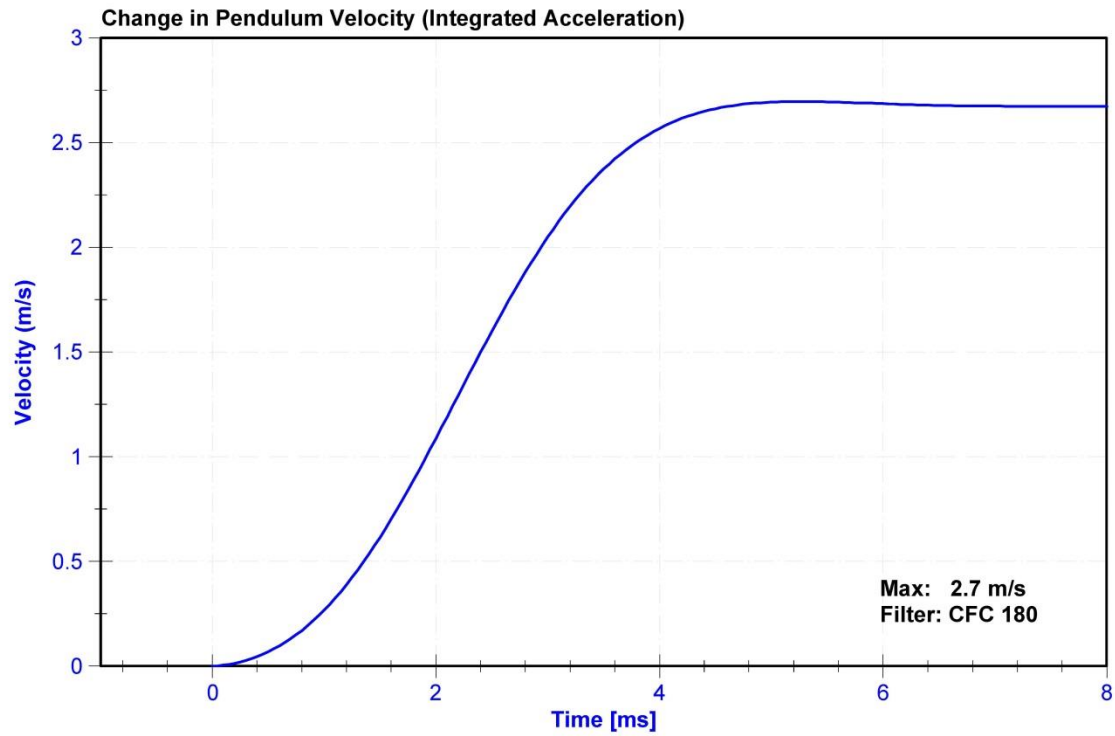
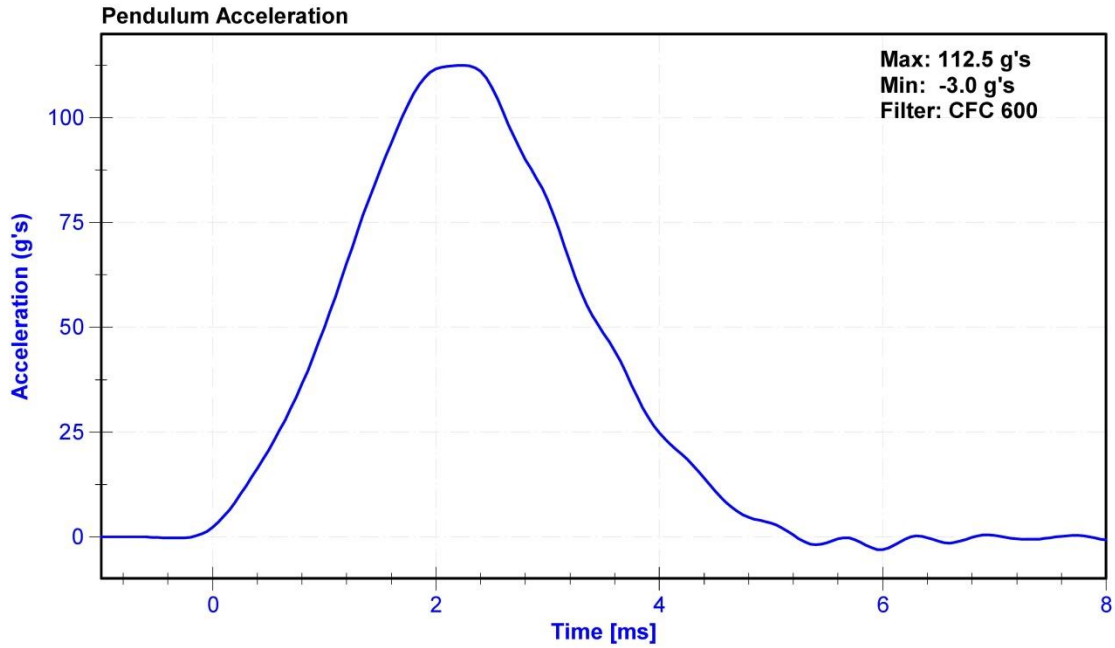
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	16.7	Pass
Velocity	2.07	2.13	m/s	2.128	Pass
Resistive Force	4,720	5,780	N	5503.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015





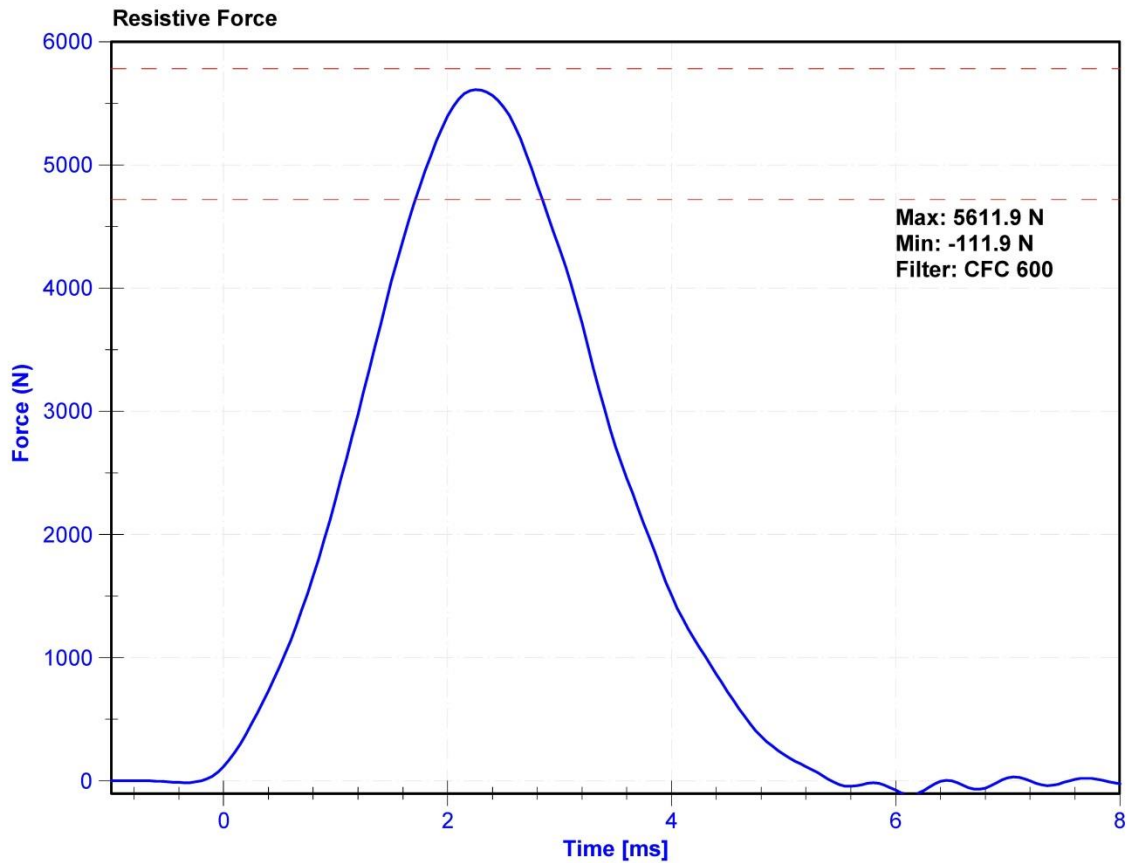
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

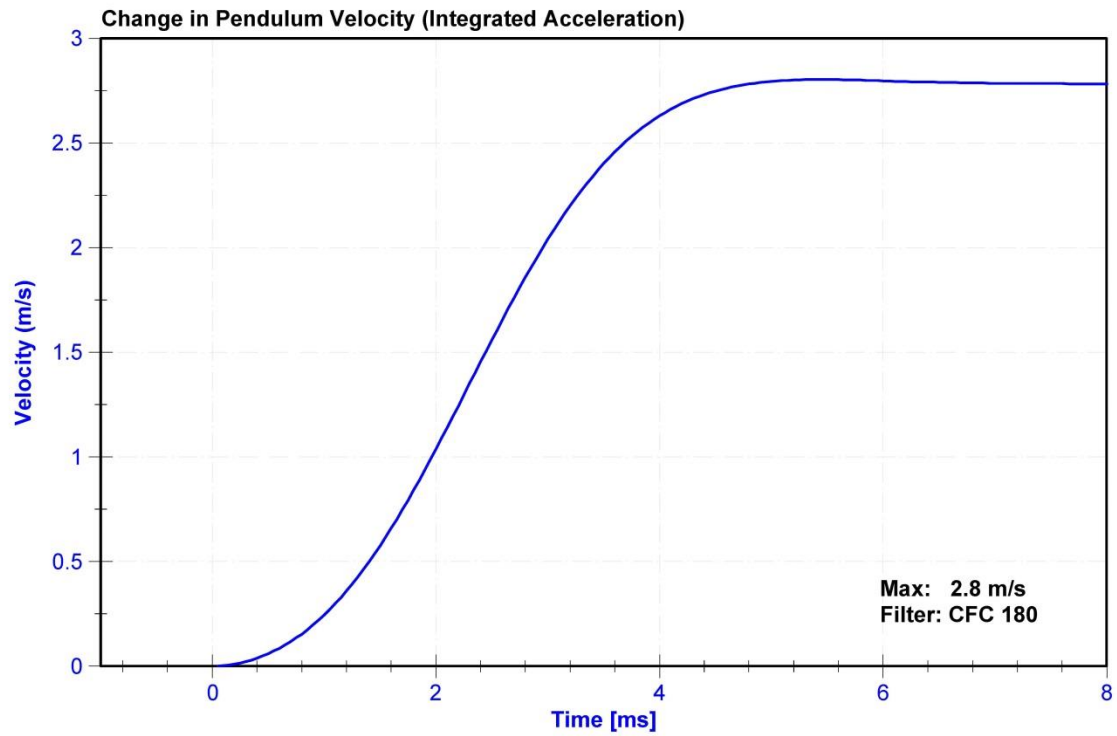
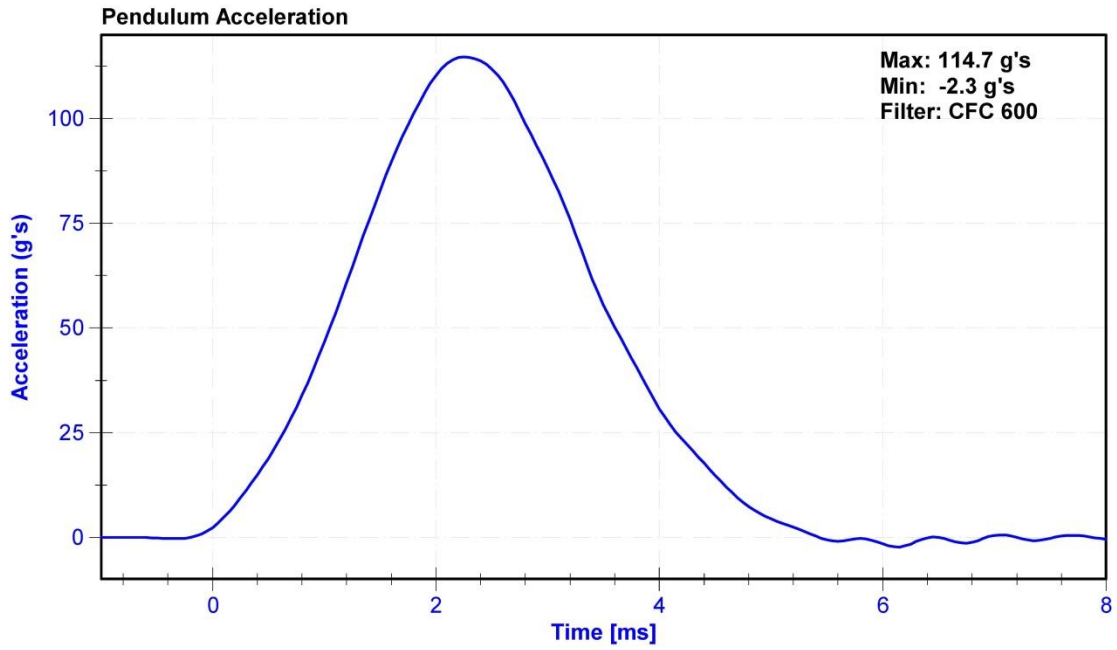
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	16.7	Pass
Velocity	2.07	2.13	m/s	2.096	Pass
Resistive Force	4,720	5,780	N	5611.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015





CALIBRATION TEST RESULTS

PRE-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 139

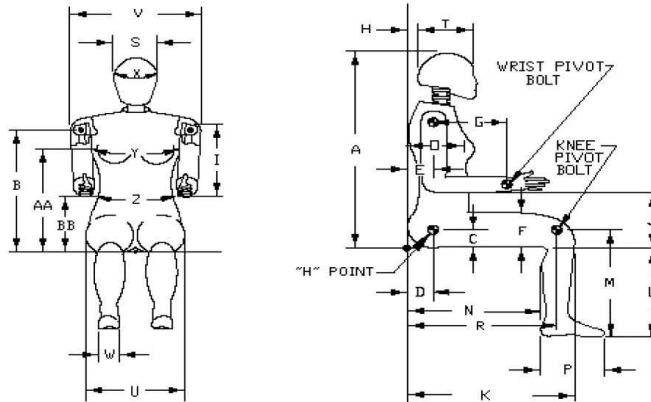


External Measurements - Hybrid 3 - 5th Female

Technician: M. Geesey

Date: 1/30/2015

Dummy Serial Number: 139



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	790	Pass
B	Shoulder Pivot Height	432	457	447	Pass
C	H-Point Height	81	86	85	Pass
D	H-Point from Backline	145	150	147	Pass
E	Shoulder Pivot from Backline	69	84	74	Pass
F	Thigh Clearance	119	135	125	Pass
G	Back of Elbow to Wrist Pivot	244	259	248	Pass
H	Head Back to Backline	43	48	44	Pass
I	Shoulder to Elbow Length	277	297	291	Pass
J	Elbow Rest Height	183	203	186	Pass
K	Buttock to Knee Length	521	546	542	Pass
L	Popliteal Height	356	376	360	Pass
M	Knee Pivot Height	394	419	397	Pass
N	Buttock Popliteal Length	414	439	422	Pass
O	Chest Depth without Jacket	175	191	183	Pass
P	Foot Length (right)	219	234	219	Pass
R	Buttock To Knee Pivot Length	457	483	471	Pass
S	Head Breadth	137	147	140	Pass
T	Head Depth	178	188	181	Pass
U	Hip Breadth	300	315	301	Pass
V	Shoulder Breadth	351	366	361	Pass
W	Foot Breadth	79	94	82	Pass
X	Head Circumference	528	549	536	Pass
Y	Chest Circumference with Jacket	851	881	851	Pass
Z	Waist Circumference	460	490	471	Pass
AA	Reference Location (Chest Circumference)	333	358	356	Pass
BB	Reference Location (Waist Circumference)	160	170	170	Pass

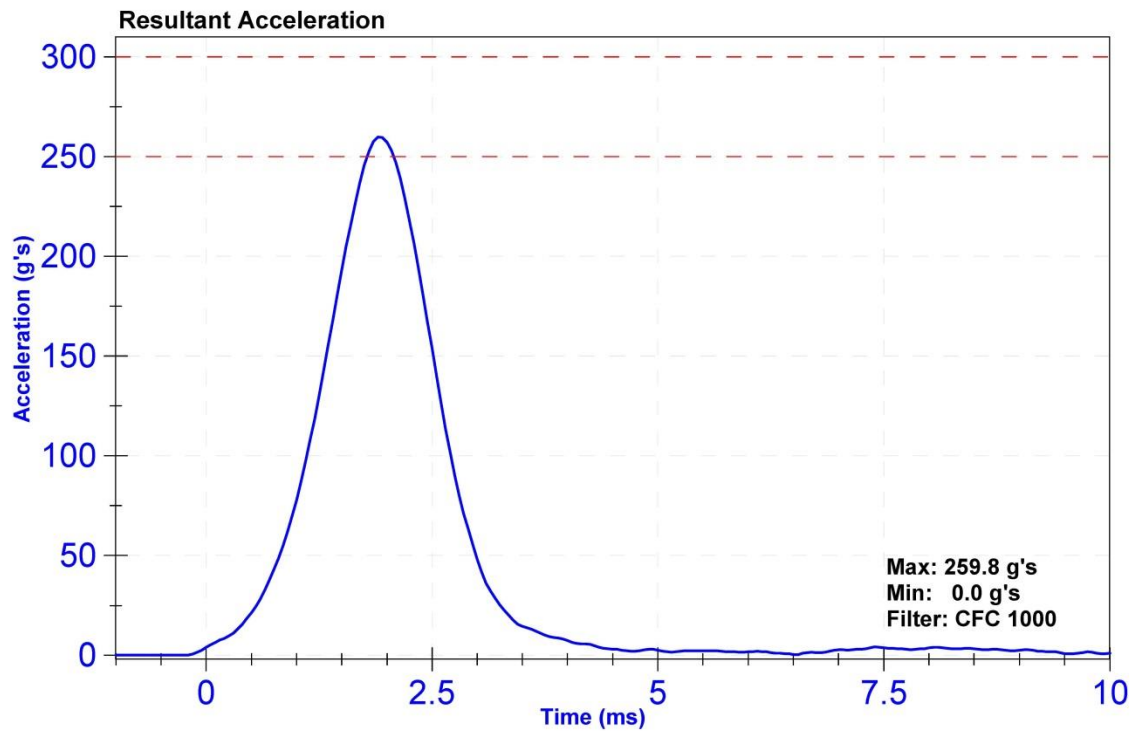
ATD Manufacturer	Denton	Test Technician	M. Goehle
ATD Serial Number	139	Laboratory Supervisor	M. Goehle

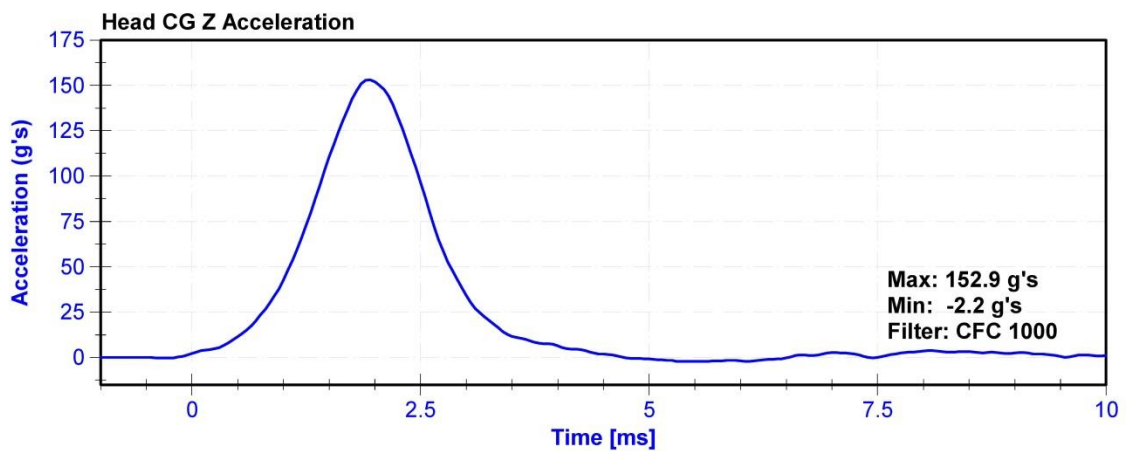
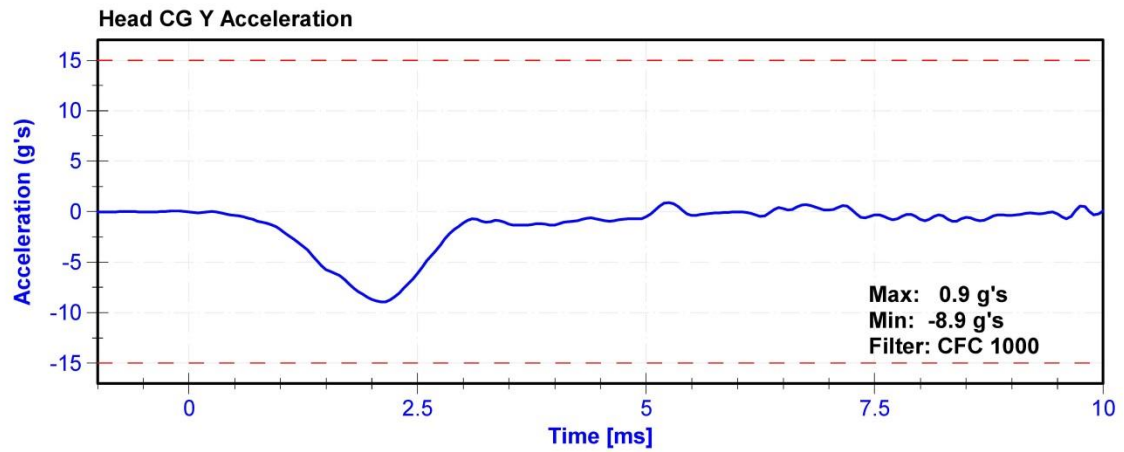
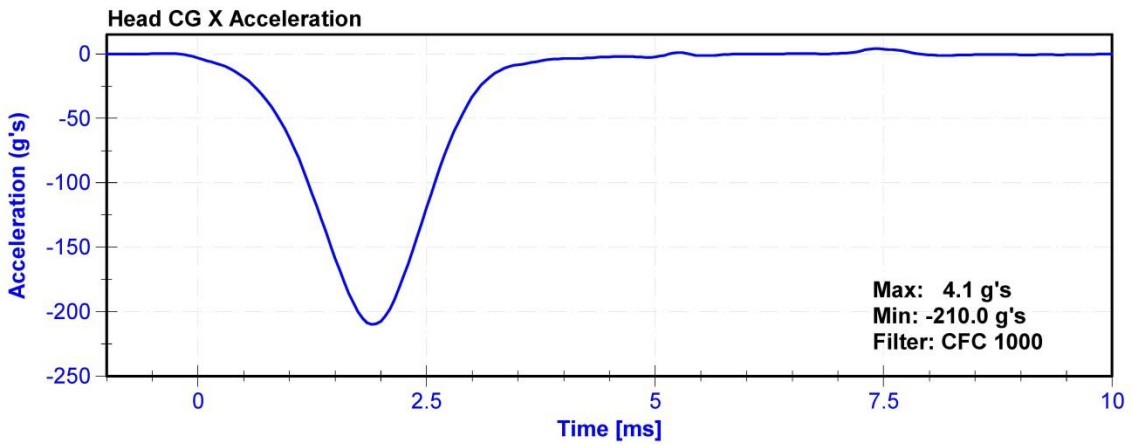
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.9	Pass
Humidity	10	70	%	16.8	Pass
Resultant Acceleration	250	300	g's	259.8	Pass
Oscillation	0	10	%	1.5	Pass
Lateral Acceleration	-15	15	g's	-8.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P52054	8/26/2014	2/24/2015
Y Accelerometer	ENDEVCO 7264	AC-P52007	8/26/2014	2/24/2015
Z Accelerometer	ENDEVCO 7264	AC-P51298	8/26/2014	2/24/2015





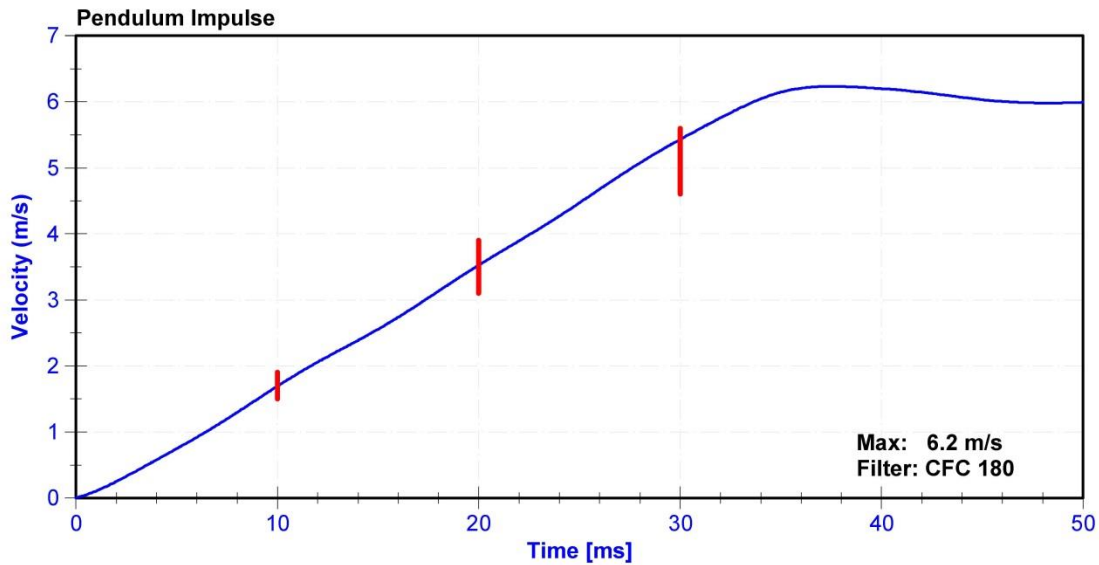
ATD Manufacturer	Denton	Test Technician	M. Geesey
ATD Serial Number	139	Laboratory Supervisor	M. Goehle

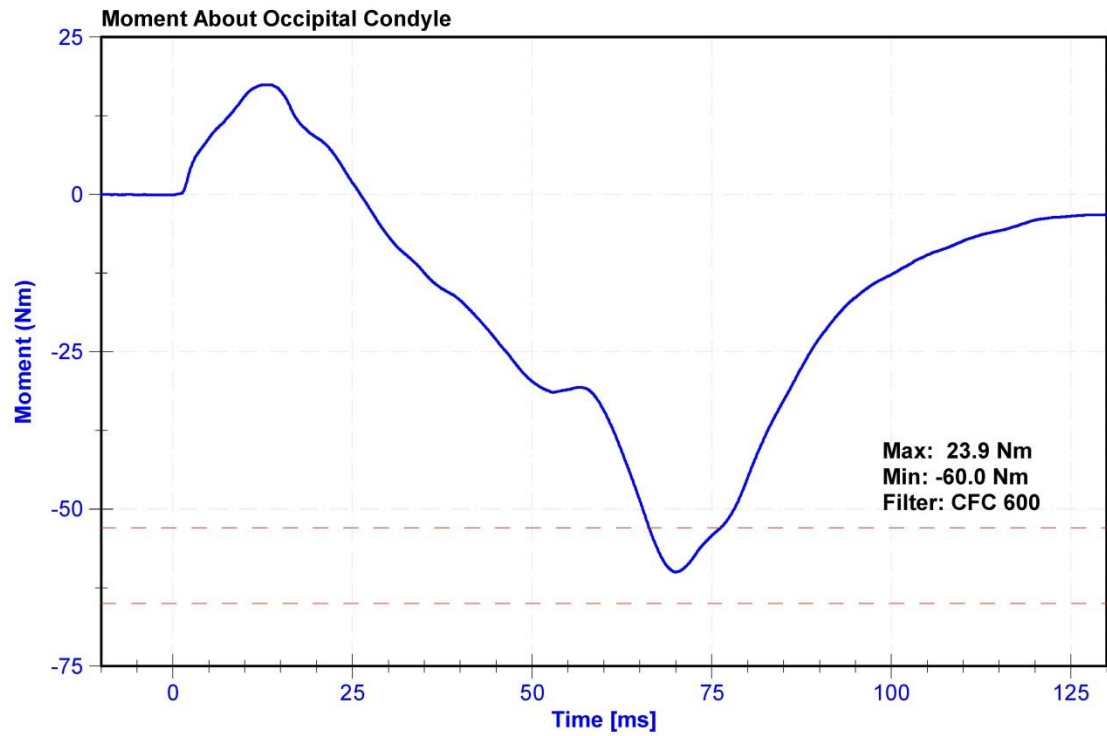
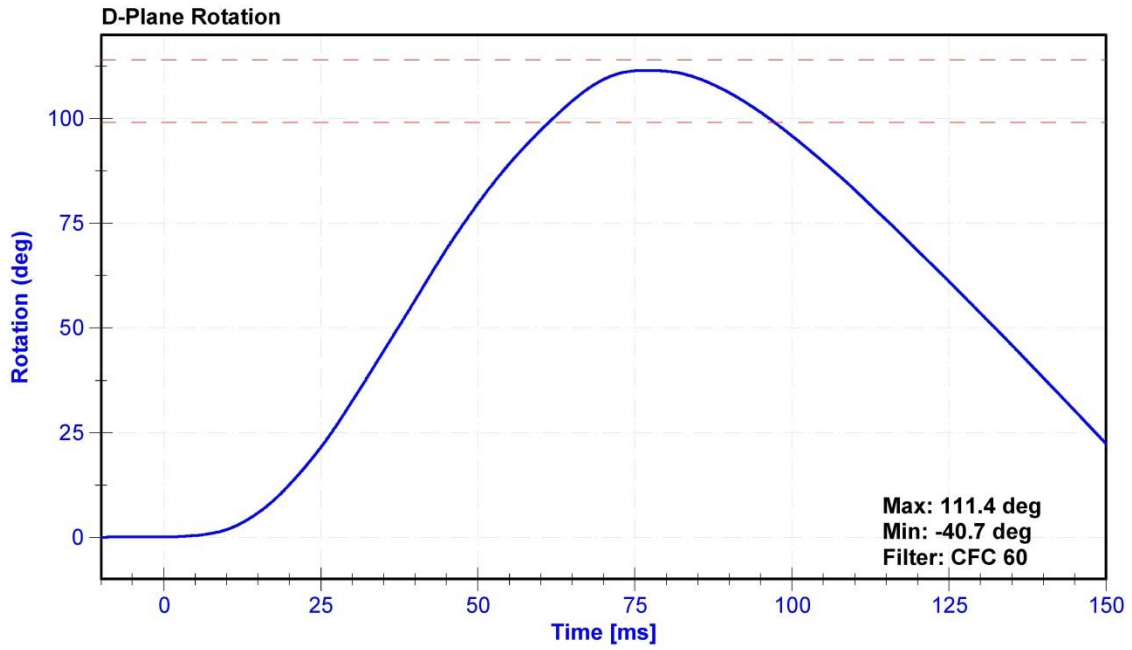
Results

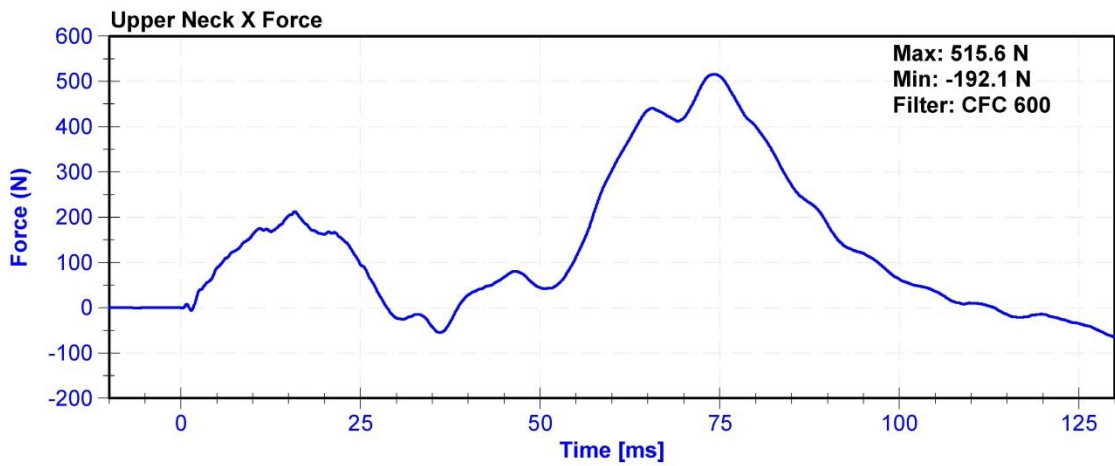
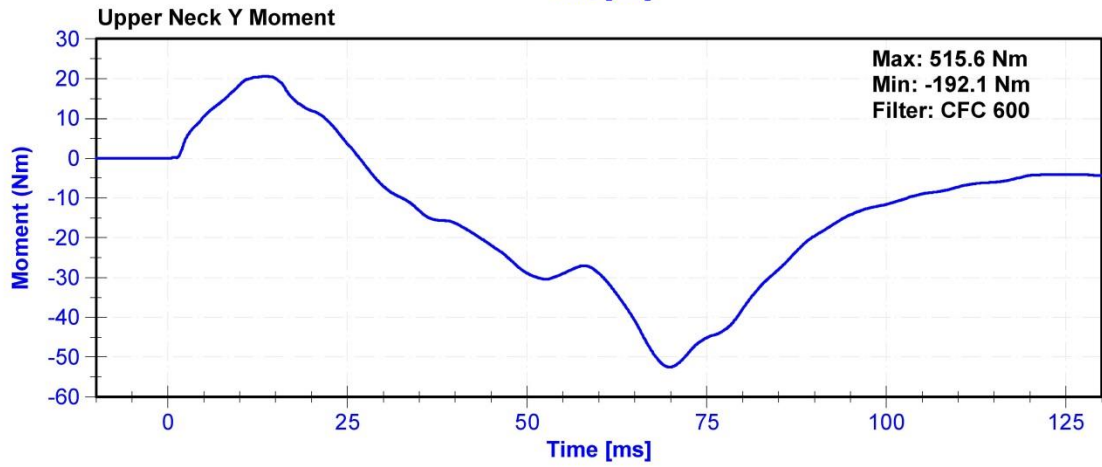
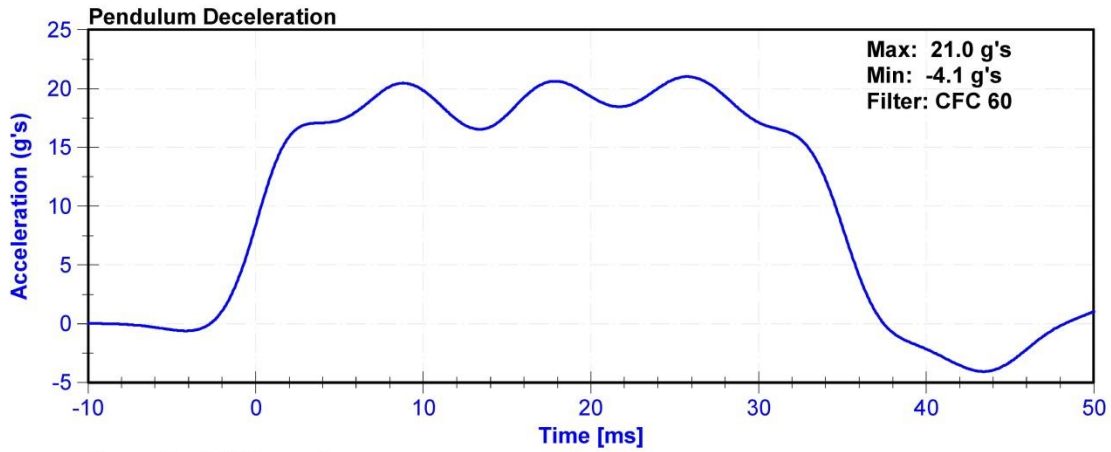
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	13.1	Pass
Velocity	5.96	6.19	m/s	6.025	Pass
Pendulum Impulse at 10ms	1.5	1.9	m/s	1.69	Pass
Pendulum Impulse at 20ms	3.1	3.9	m/s	3.53	Pass
Pendulum Impulse at 30ms	4.6	5.6	m/s	5.43	Pass
D Plane Rotation	99	114	deg	111.4	Pass
Moment During Rotation Interval	-65	-53	Nm	-60.0	Pass
Moment Decay to -10Nm	94	114	ms	104.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	SP22G	DS-PendPot	9/16/2014	9/16/2015
Condyle Potentiometer	SP22G	DS-CondPot	2/21/2014	2/21/2015
Upper Neck Load Cell	Denton 1716A	LC-2019Fx	5/19/2014	5/19/2015







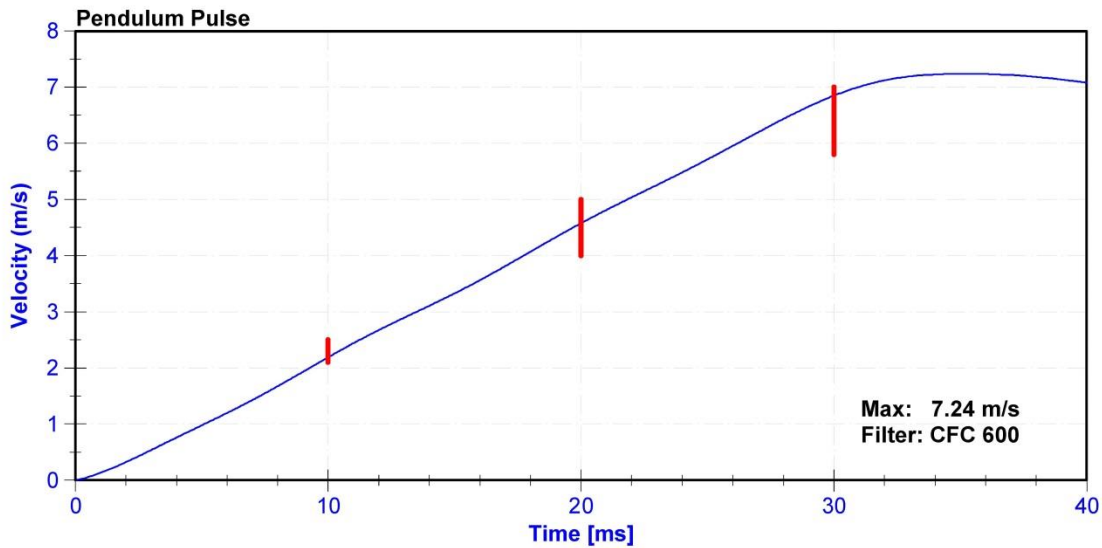
ATD Manufacturer	Denton	Test Technician	M. Geesey
ATD Serial Number	139	Laboratory Supervisor	M. Goehle

Results

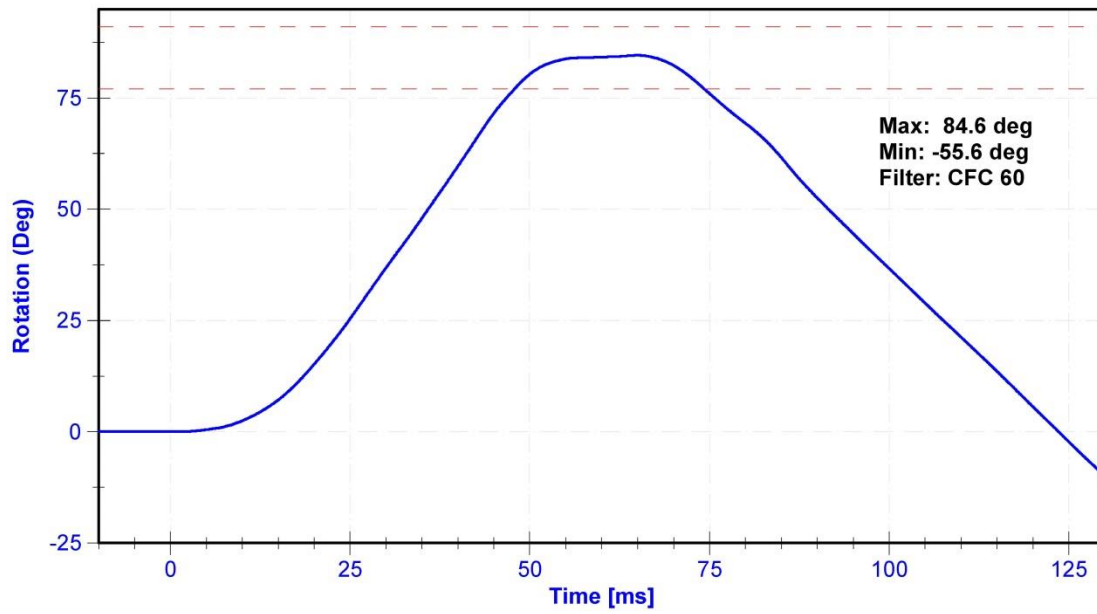
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	14.0	Pass
Velocity	6.89	7.13	m/s	6.979	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.19	Pass
Pendulum Impulse at 20ms	4	5	m/s	4.58	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.85	Pass
D Plane Rotation	77	91	deg	84.6	Pass
Moment During Rotation Interval	69	83	Nm	78.2	Pass
Moment Decay to 10.0 Nm	80	100	ms	86.3	Pass

Transducer Calibrations

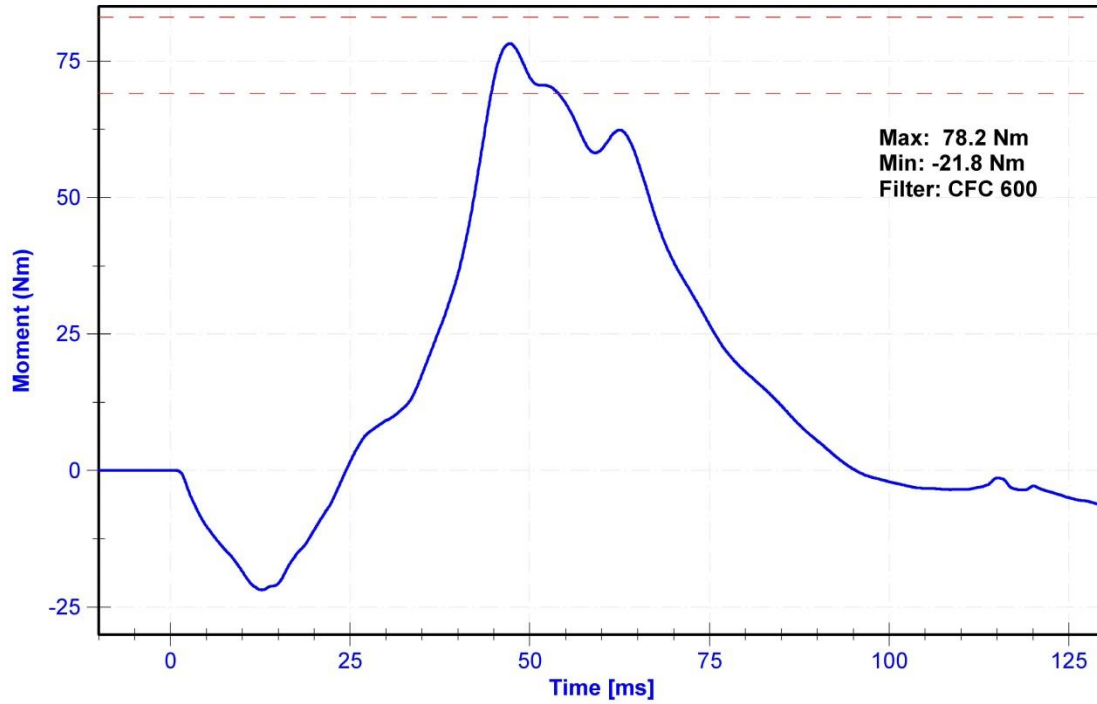
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	SP22G	DS-PendPot	9/16/2014	9/16/2015
Condyle Potentiometer	SP22G	DS-CondPot	2/21/2014	2/21/2015
Upper Neck Load Cell	Denton 1716A	LC-2018Fx	5/1/2014	5/1/2015

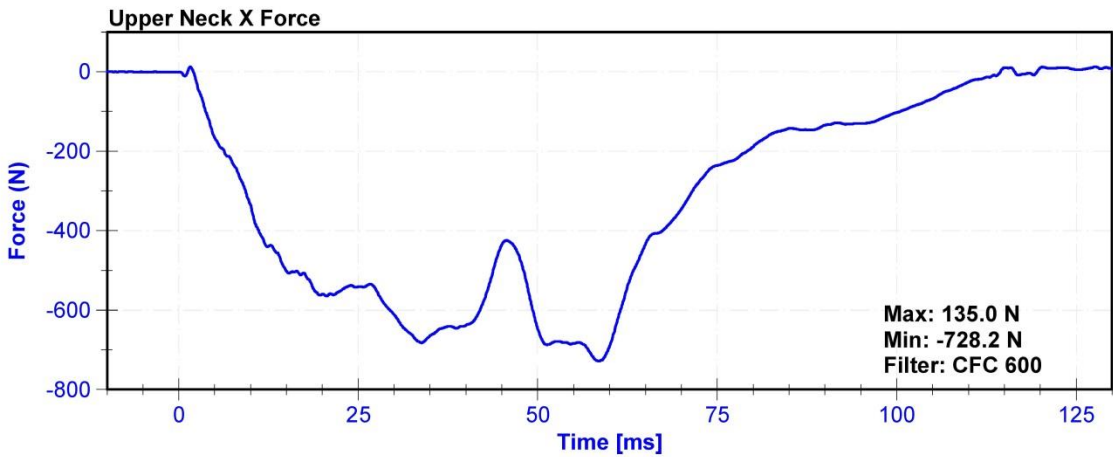
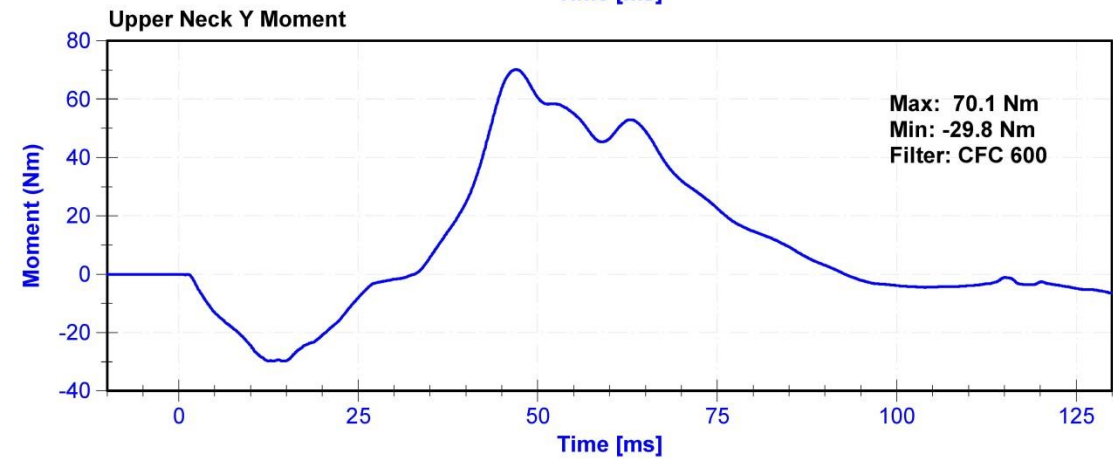
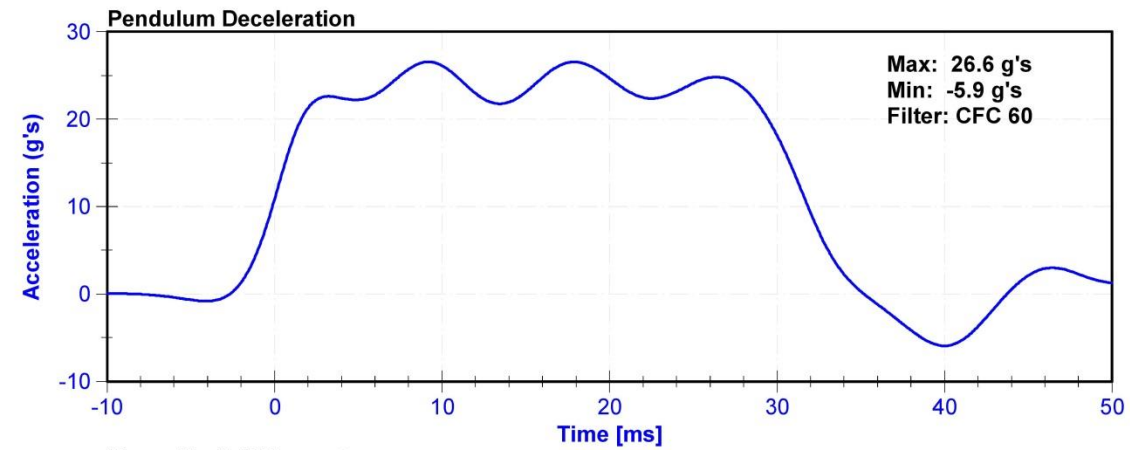


D-Plane Rotation



Moment About Occipital Condyle





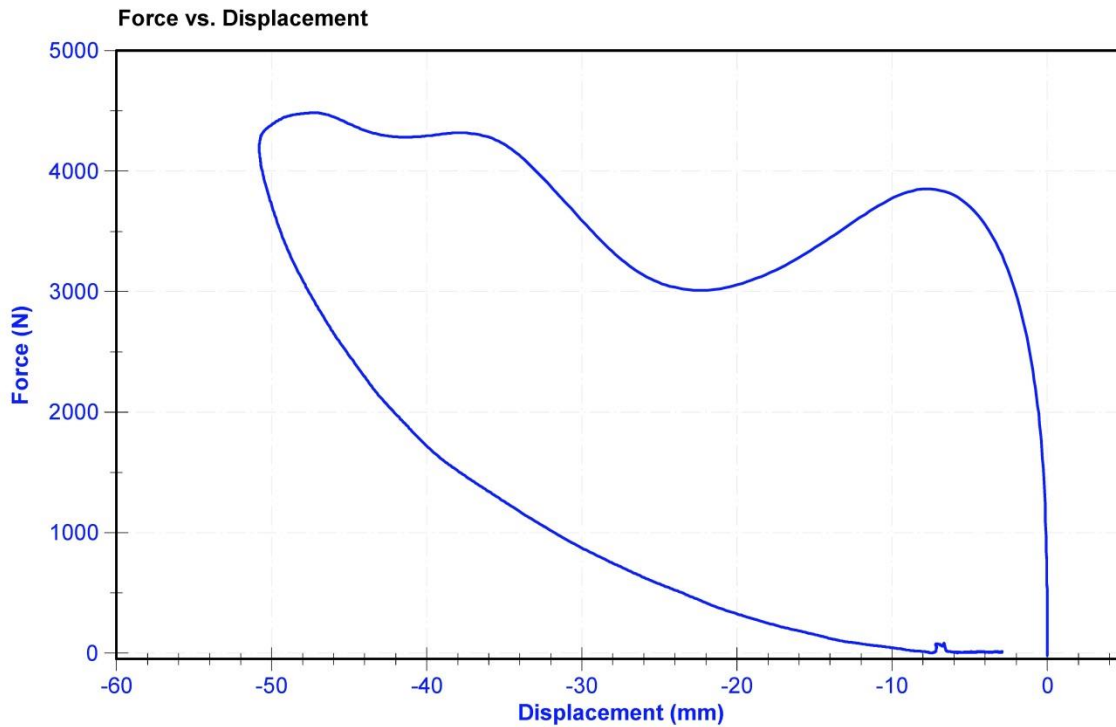
ATD Manufacturer	Denton	Test Technician	M. Geesey
ATD Serial Number	139	Laboratory Supervisor	M. Goehle

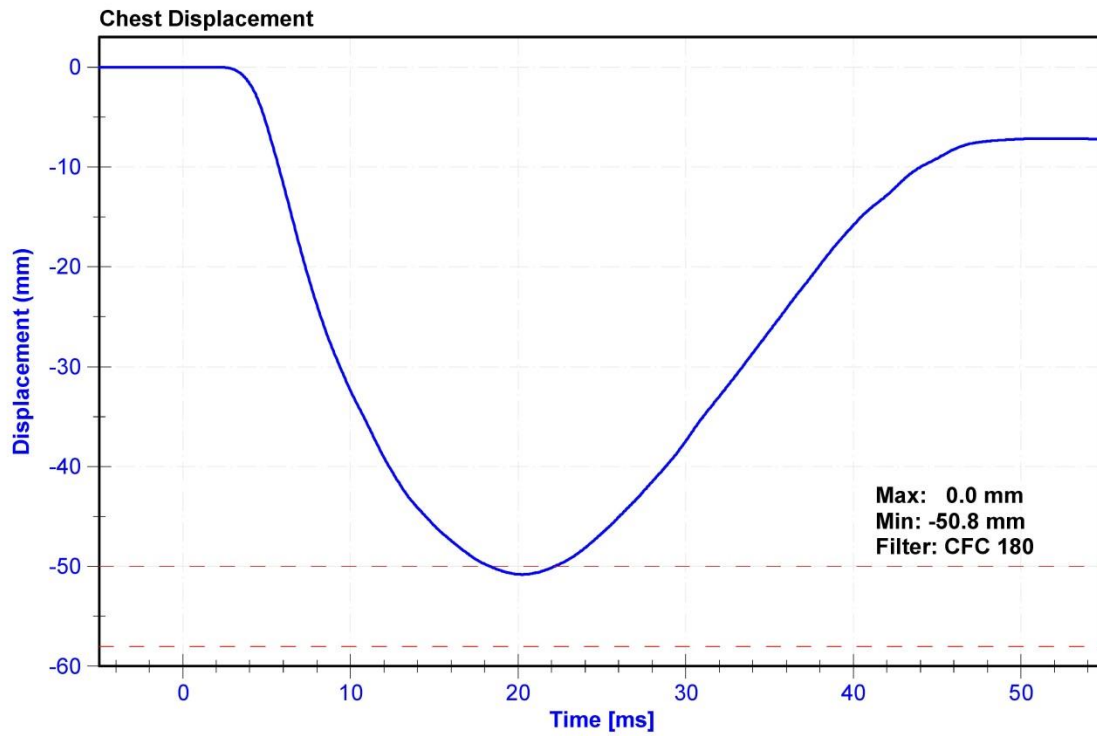
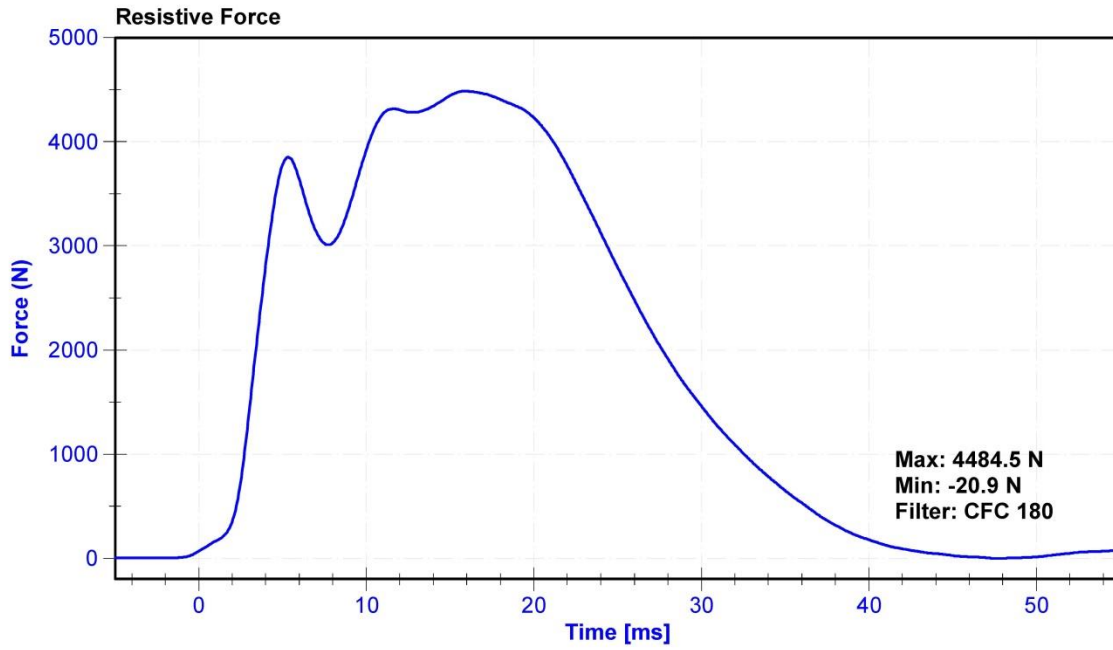
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	15.4	Pass
Velocity	6.59	6.83	m/s	6.76	Pass
Chest Displacement	-58	-50	mm	-50.8	Pass
Force During Displacement Interval	3,900	4,400	N	4374.9	Pass
Force During -18 to 50mm Displacement	0	4,600	N	4484.5	Pass
Hysteresis	69	85	%	74.0	Pass

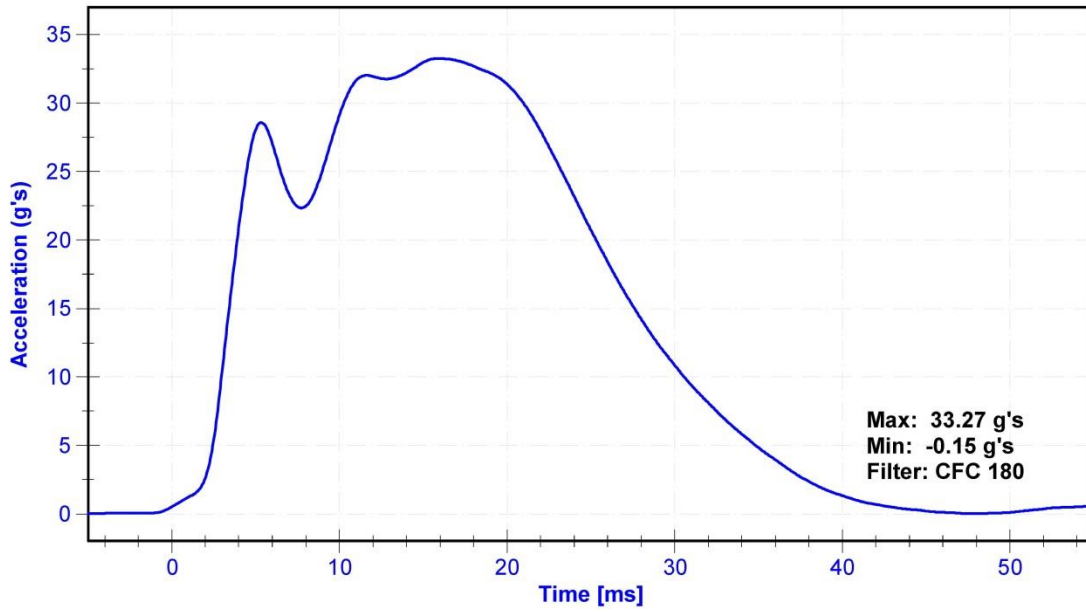
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
Chest Potentiometer	Servo 14CBI-3615	DS-139	7/31/2014	7/31/2015

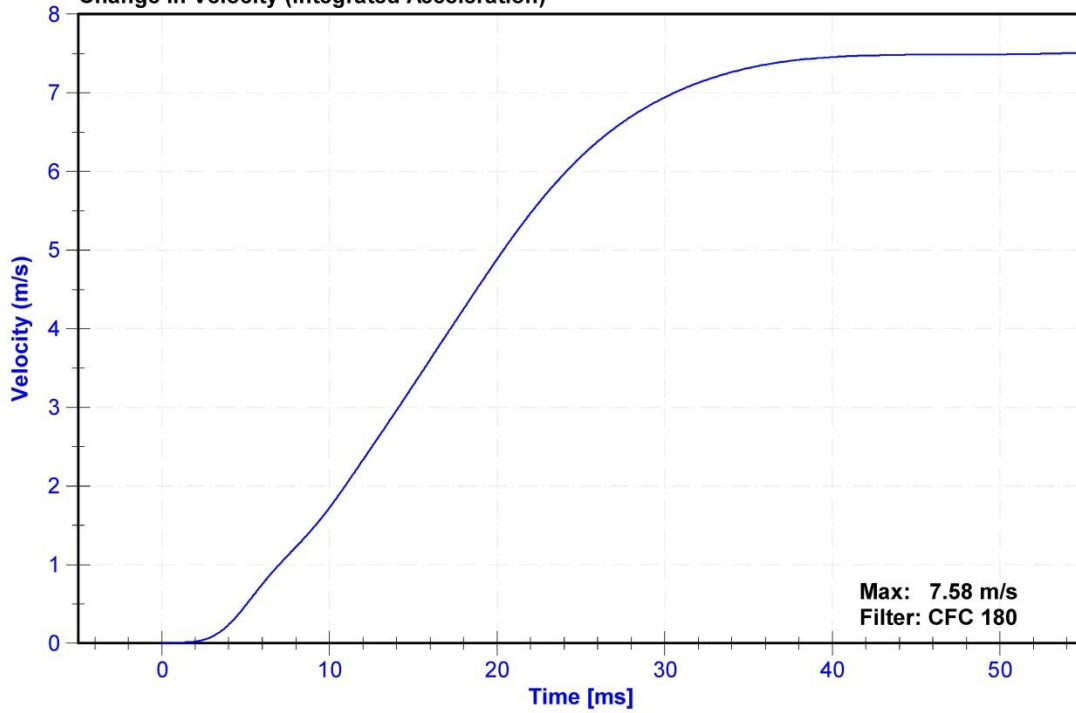




Probe Acceleration



Change in Velocity (Integrated Acceleration)



ATD Manufacturer	Denton	Test Technician	M. Goehle
ATD Serial Number	139	Laboratory Supervisor	M. Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.9	Pass
Humidity	10	70	%	16.0	Pass
Initial Angle	0	20	deg	13.4	Pass
Force at 45 Degrees	320	390	N	381.4	Pass
Return Angle	0	8	deg	7.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker N4C-1	DS-13051548	8/1/2014	8/1/2015
Load Cell	Interface SML-200	LC-493319	8/13/2014	8/13/2015



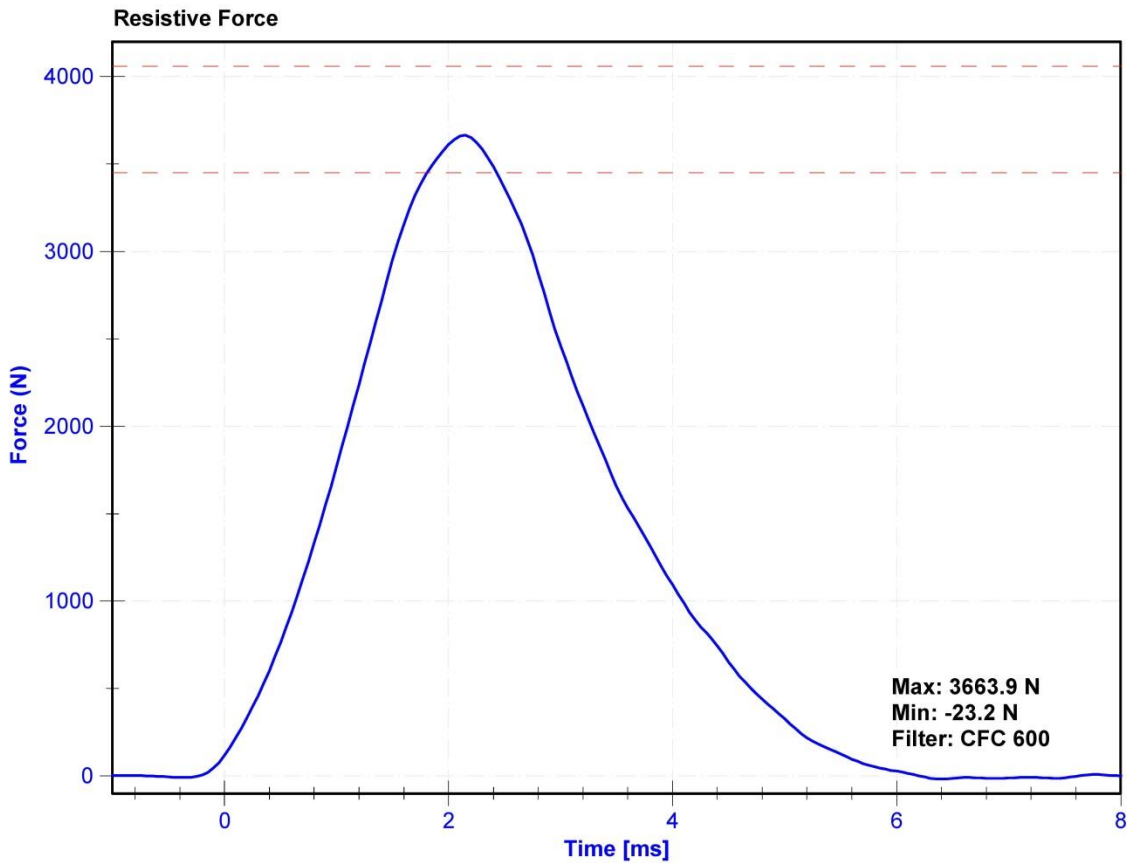
ATD Manufacturer	Denton	Test Technician	M.Hartung
ATD Serial Number	139	Laboratory Supervisor	M.Goehle

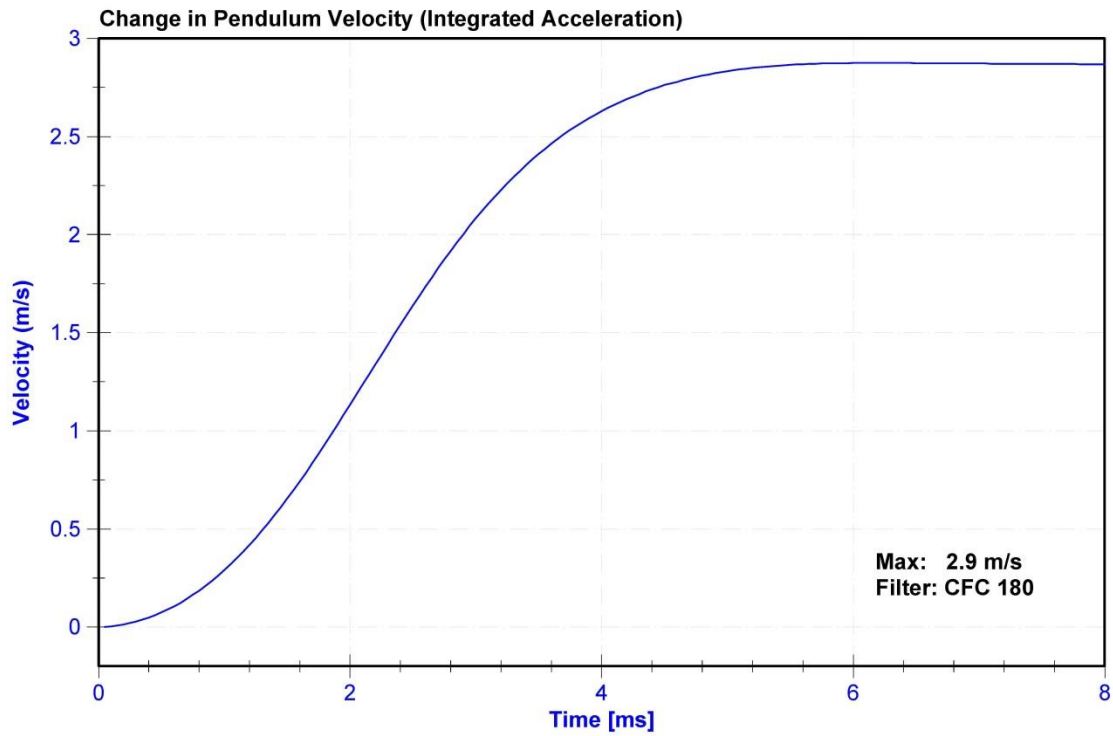
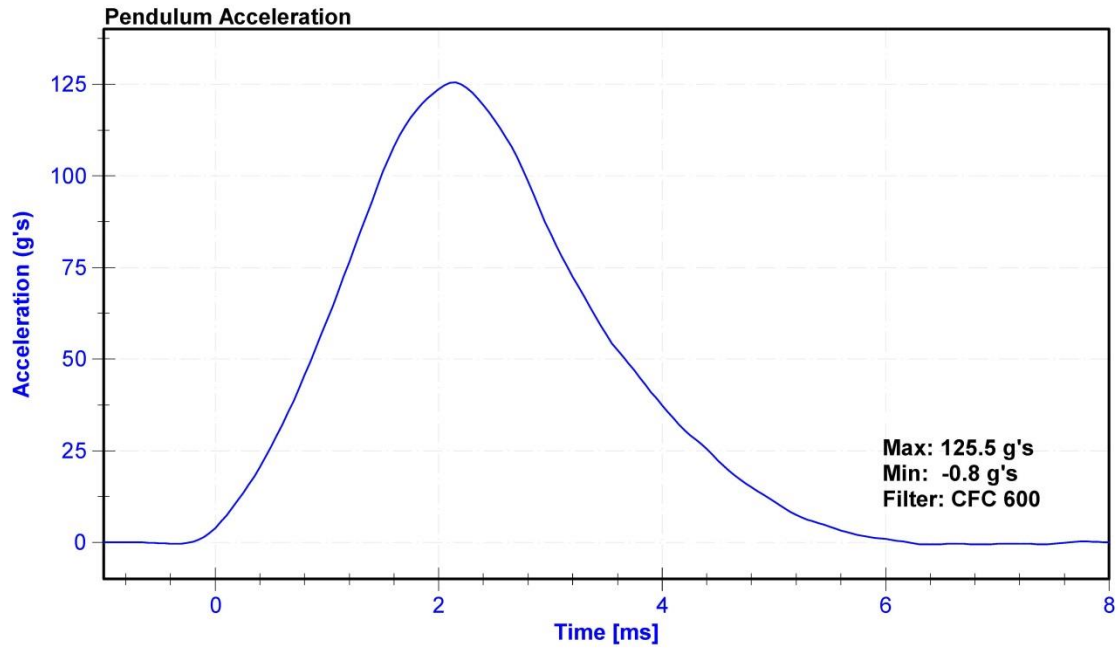
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.0	Pass
Humidity	10	70	%	15.5	Pass
Velocity	2.07	2.13	m/s	2.085	Pass
Resistive Force	3,450	4,060	N	3663.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015





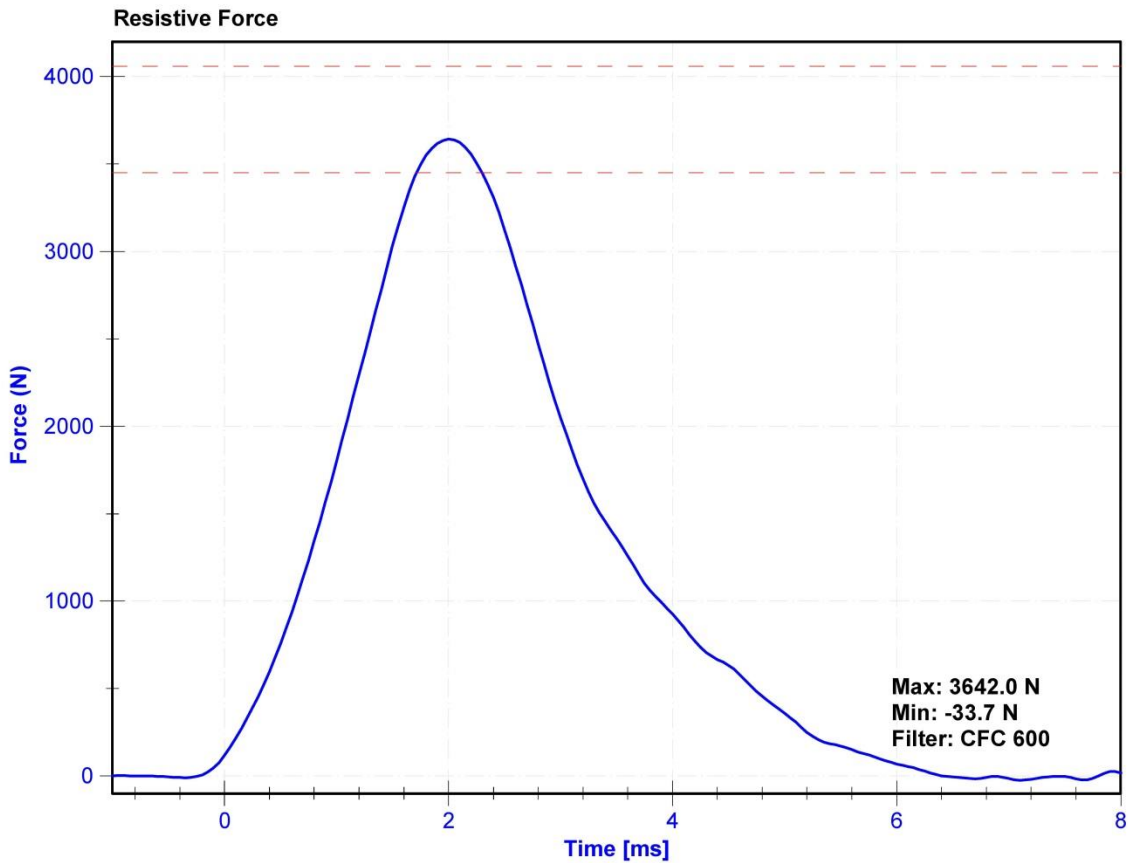
ATD Manufacturer	Denton	Test Technician	M.Hartung
ATD Serial Number	139	Laboratory Supervisor	M.Goehle

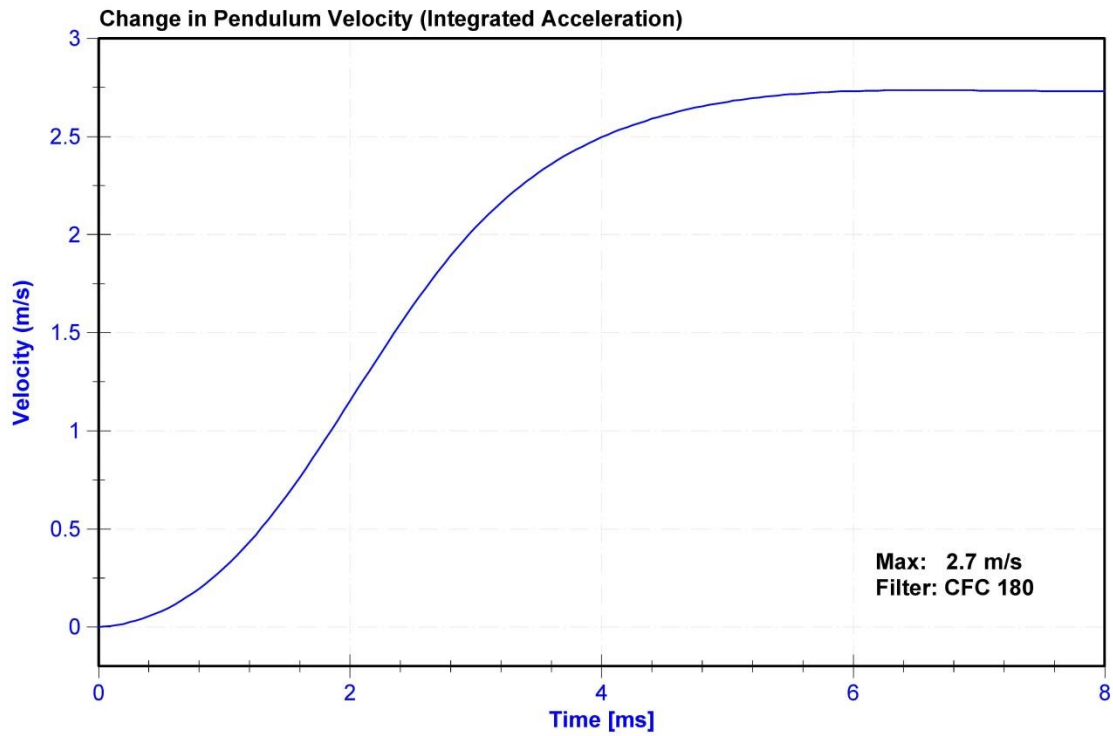
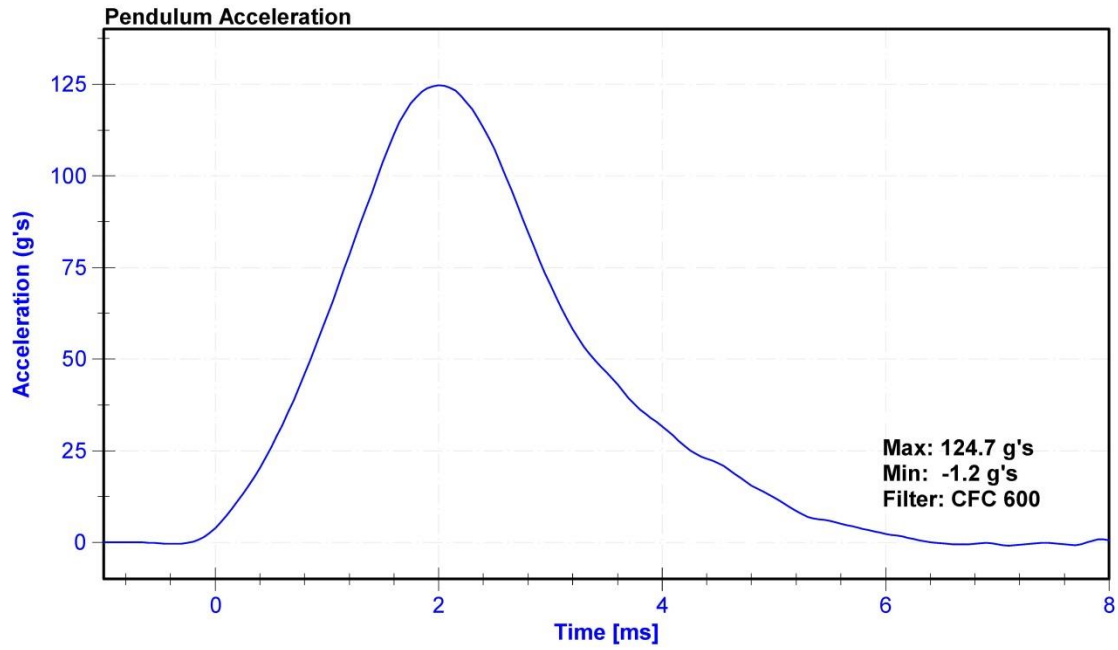
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	14.8	Pass
Velocity	2.07	2.13	m/s	2.086	Pass
Resistive Force	3,450	4,060	N	3642.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 50TH PERCENTILE MALE - DRIVER ATD

SERIAL NO: 1046

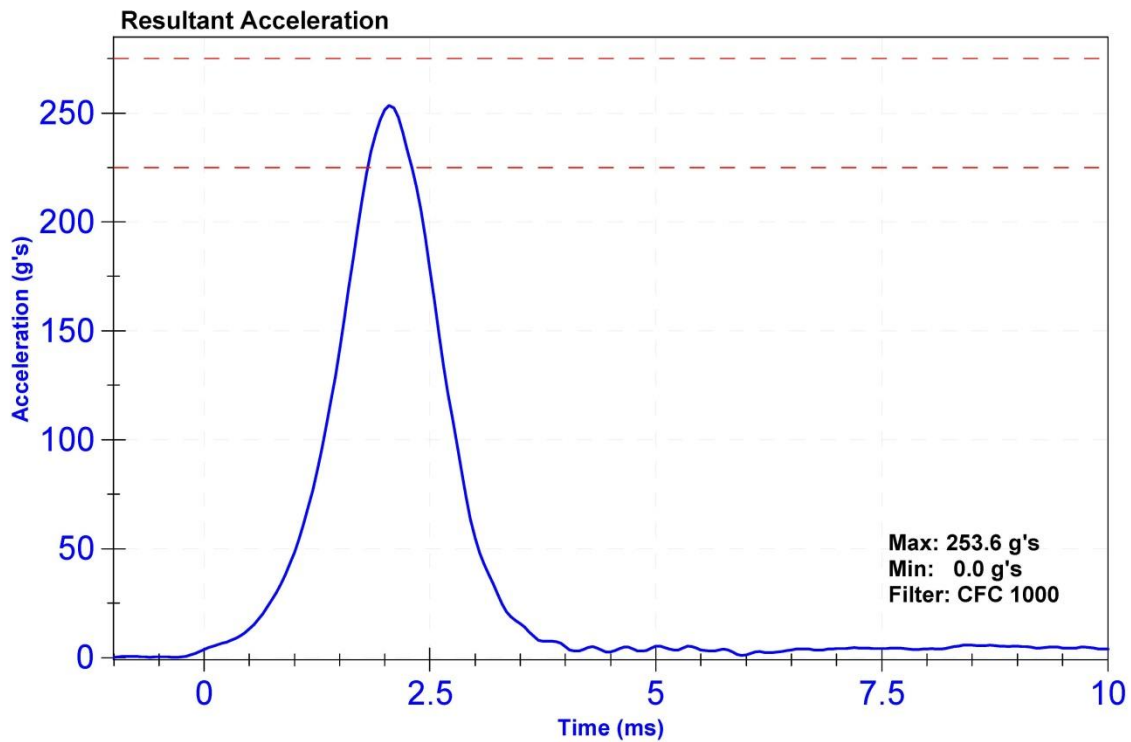
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

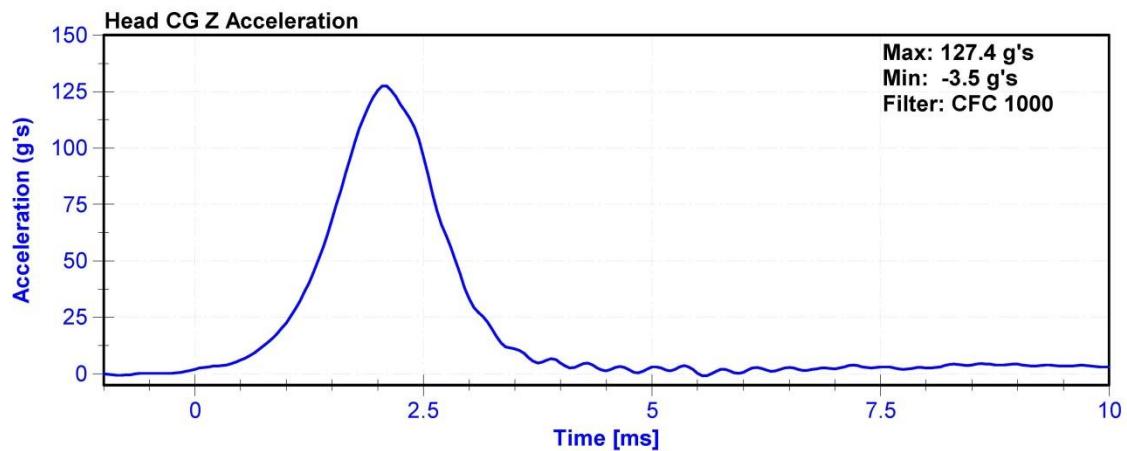
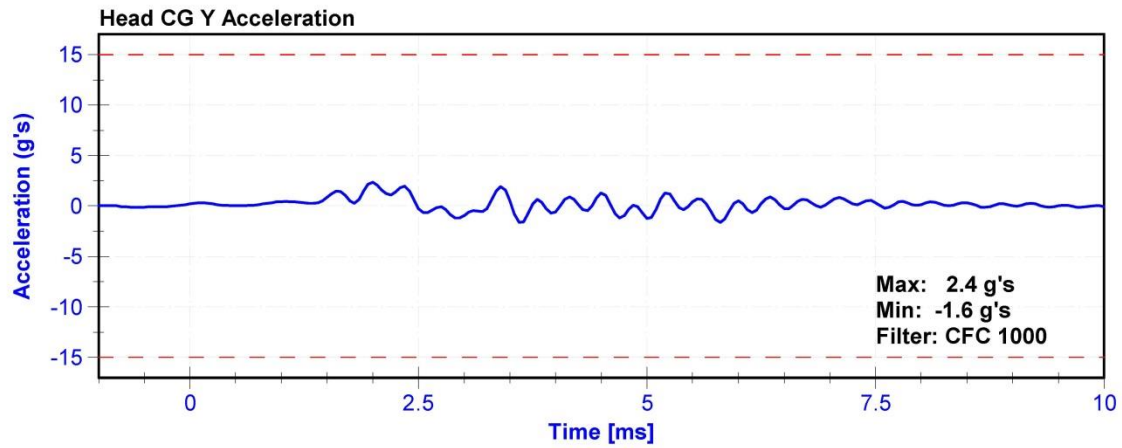
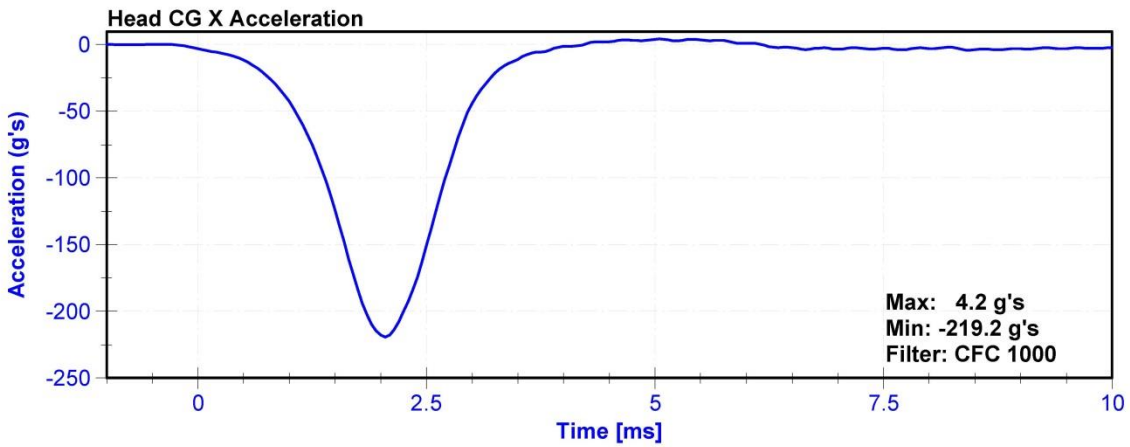
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.6	Pass
Humidity	10	70	%	16.2	Pass
Resultant Acceleration	225	275	g's	253.6	Pass
Oscillation	0	10	%	2.9	Pass
Lateral Acceleration	-15	15	g's	2.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58871	12/19/2014	6/19/2015
Y Accelerometer	ENDEVCO 7264	AC-P12359	12/19/2014	6/19/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P52133	12/19/2014	6/19/2015





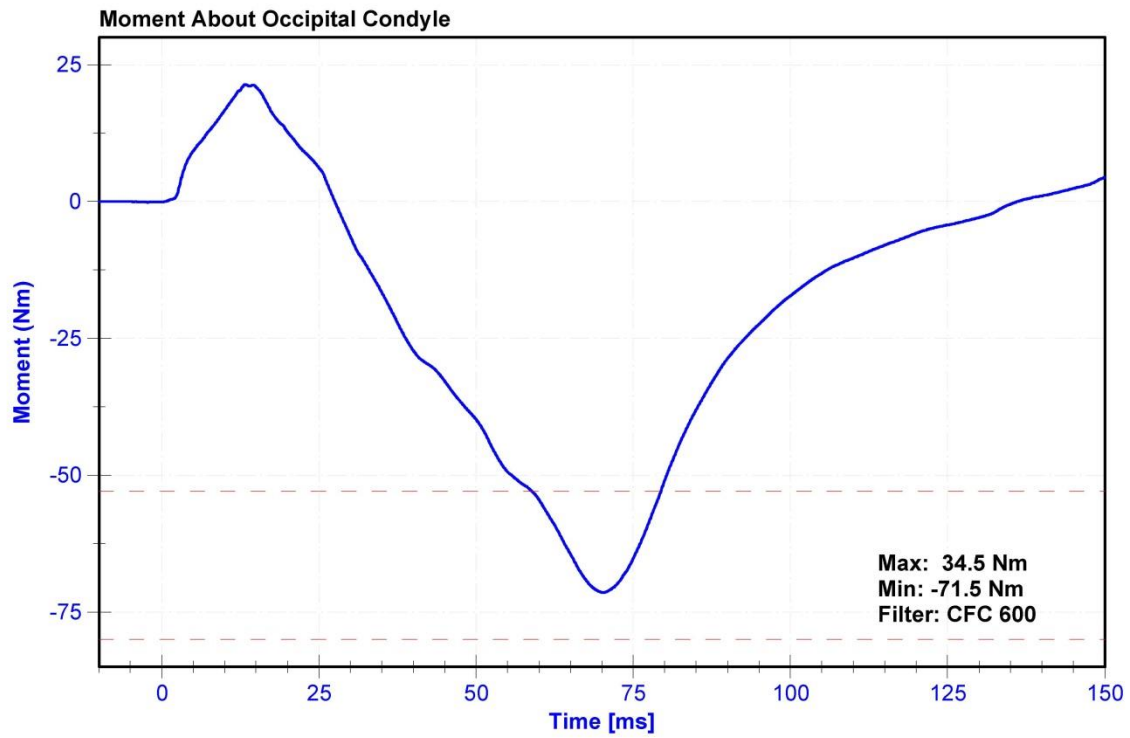
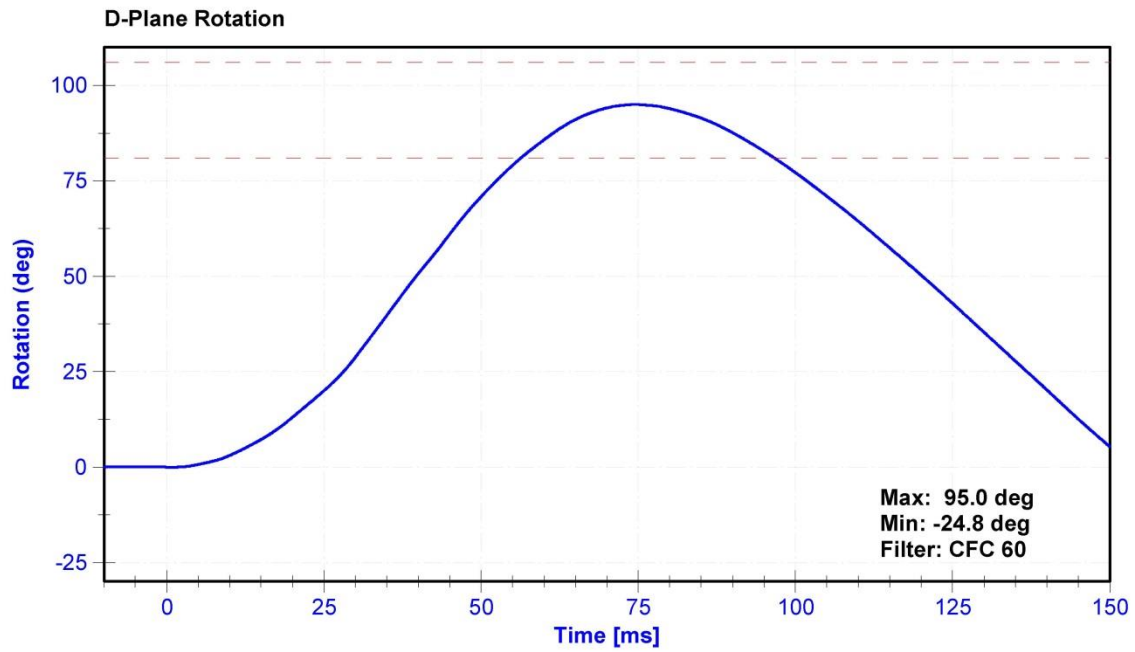
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

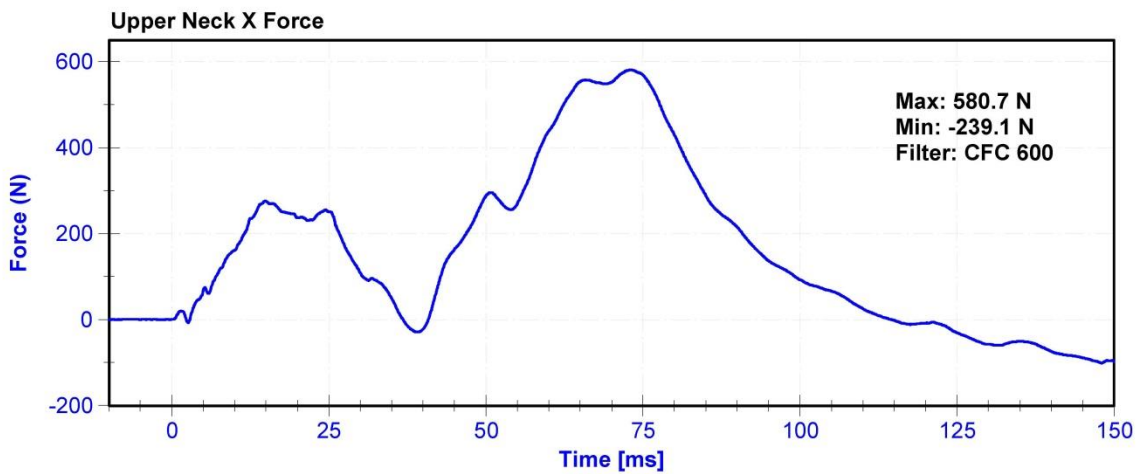
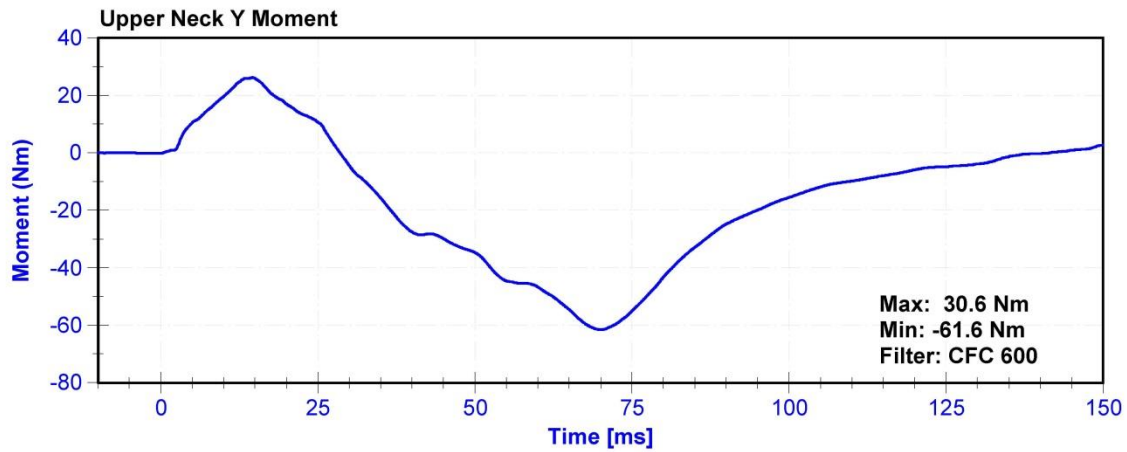
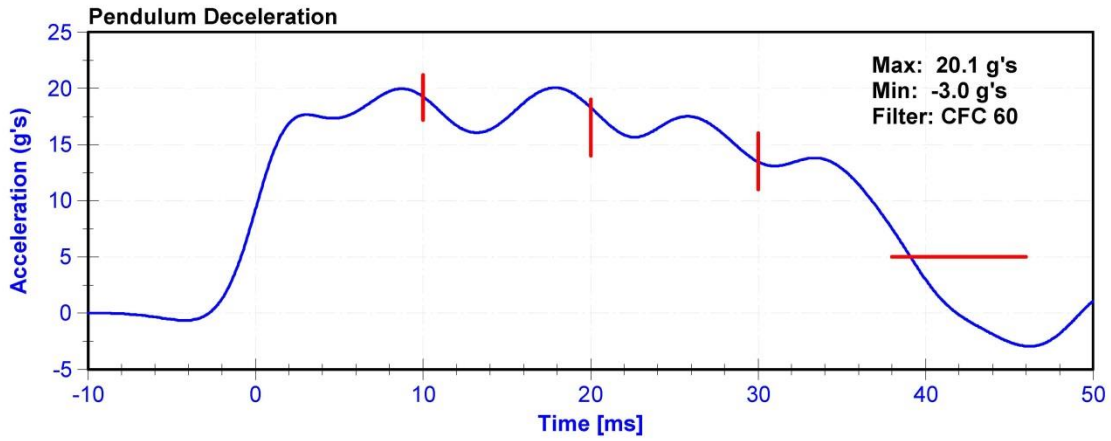
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	14.6	Pass
Velocity	5.94	6.19	m/s	6.025	Pass
Pendulum Deceleration at 10ms	17.2	21.2	g's	19.27	Pass
Pendulum Deceleration at 20ms	14	19	g's	18.32	Pass
Pendulum Deceleration at 30ms	11	16	g's	13.47	Pass
Max. Pendulum Deceleration After 30ms	0	22	g's	20.06	Pass
Pendulum Deceleration Time to 5 g's	38	46	ms	39.1	Pass
D Plane Rotation	81	106	deg	95.0	Pass
Time at Maximum Rotation	72	82	ms	74.4	Pass
Rotation Decay to Zero	147	174	ms	154.3	Pass
Moment About Occipital Condyle	-80	-52.9	Nm	-71.5	Pass
Time at Minimum Moment	65	79	ms	70.2	Pass
Moment Decay to Zero	120	148	ms	136.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	SP22G	DS-PendPot	9/16/2014	9/16/2015
Condyle Potentiometer	SP22G	DS-CondPot	2/21/2014	2/21/2015
Upper Neck Load Cell	DENTON 1716A	LC-2186Fx	8/7/2014	8/7/2015





ATD Manufacturer	FTSS	Test Technician	M. Goehle
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

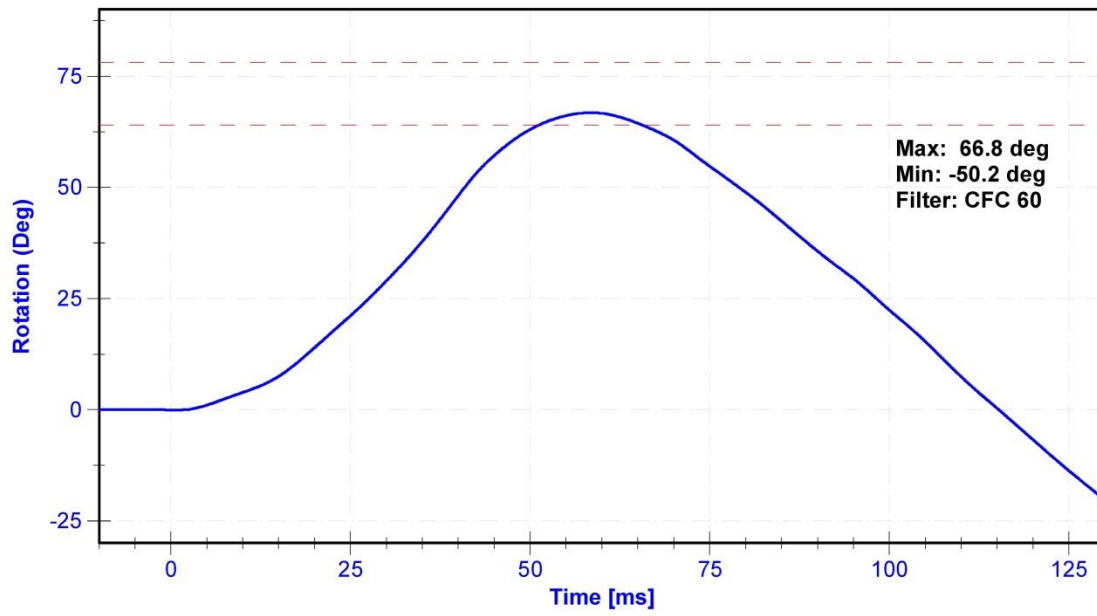
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	14.7	Pass
Velocity	6.89	7.13	m/s	6.921	Pass
Pendulum Deceleration at 10ms	22.5	27.5	g's	23.72	Pass
Pendulum Deceleration at 20ms	17.6	22.6	g's	21.62	Pass
Pendulum Deceleration at 30ms	12.5	18.5	g's	16.64	Pass
Max. Pendulum Deceleration After 30ms	0	29	g's	25.0	Pass
Pendulum Deceleration Time to 5 g's	34	42	ms	37.3	Pass
D Plane Rotation	64	78	deg	66.8	Pass
Time at Maximum Rotation	57	64	ms	58.4	Pass
Rotation Decay to Zero	113	127	ms	115.2	Pass
Moment About Occipital Condyle	88.1	108.4	Nm	95.30	Pass
Time at Maximum Moment	47	58	ms	52.1	Pass
Moment Decay to Zero	97	107	ms	98.4	Pass

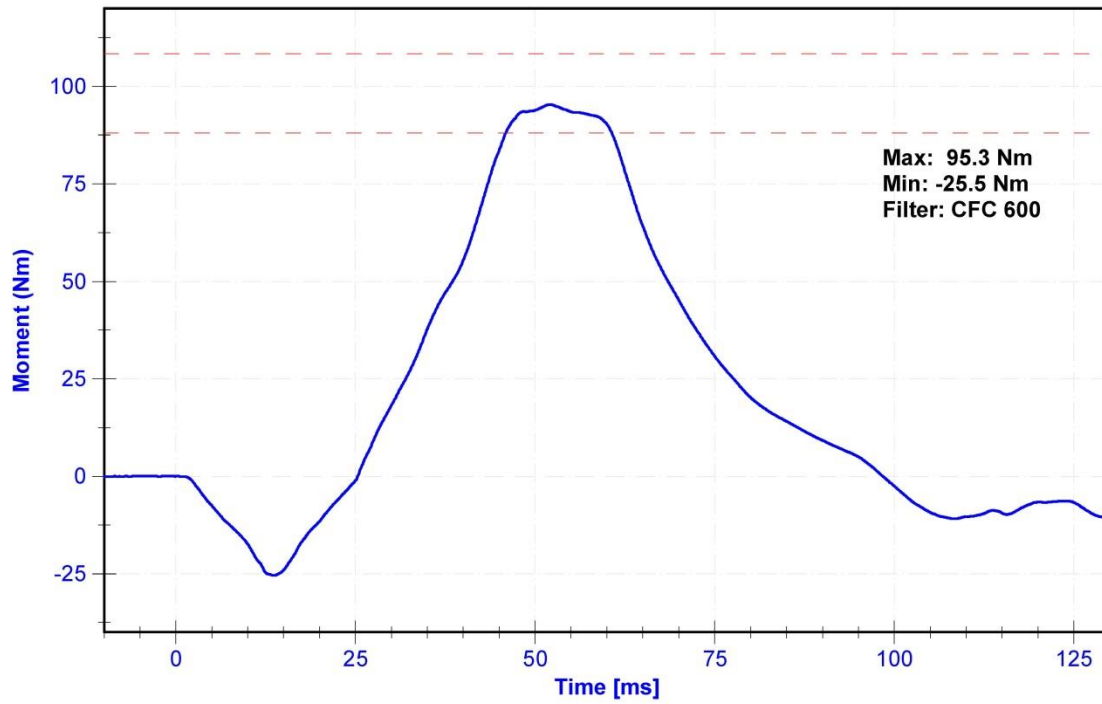
Transducer Calibrations

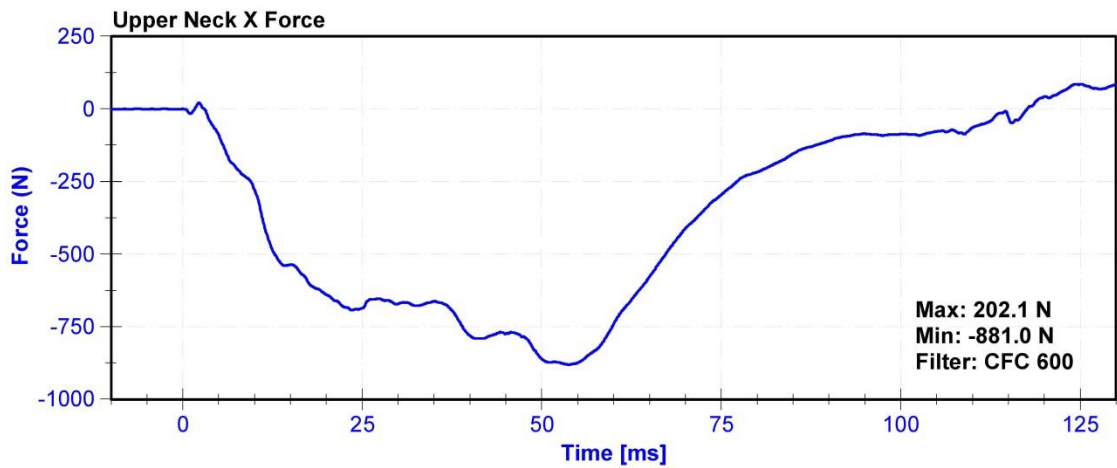
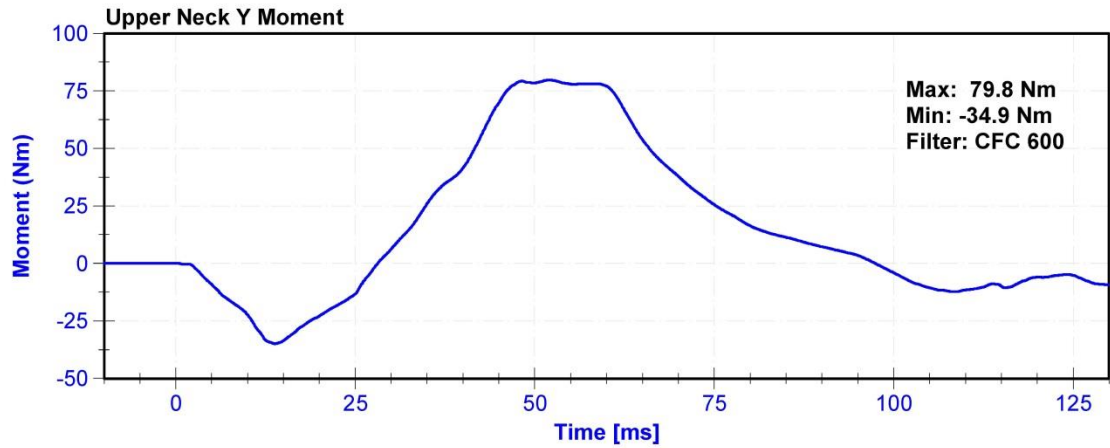
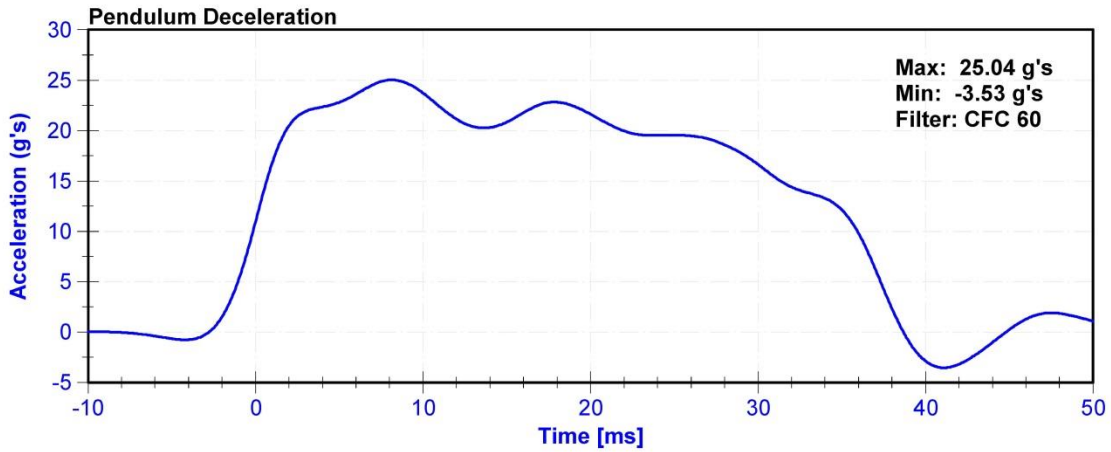
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	SP22G	DS-PendPot	9/16/2014	9/16/2015
Condyle Potentiometer	SP22G	DS-CondPot	2/21/2014	2/21/2015
Upper Neck Load Cell	DENTON 1716A	LC-2186Fx	8/7/2014	8/7/2015

D-Plane Rotation



Moment About Occipital Condyle





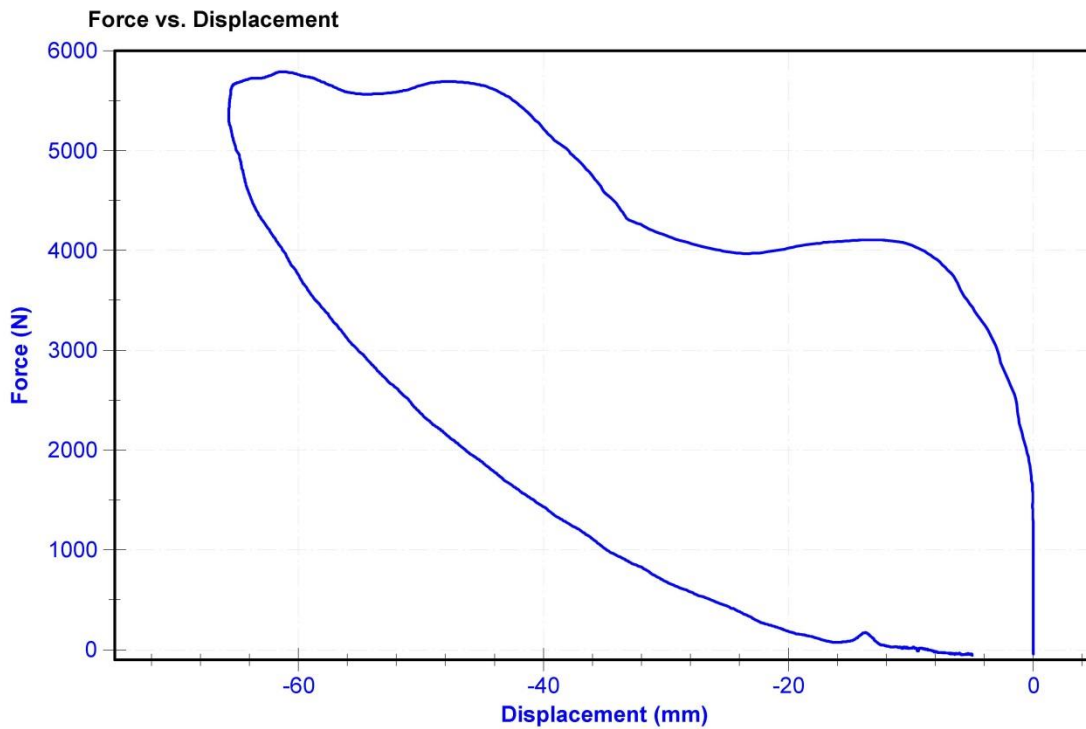
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

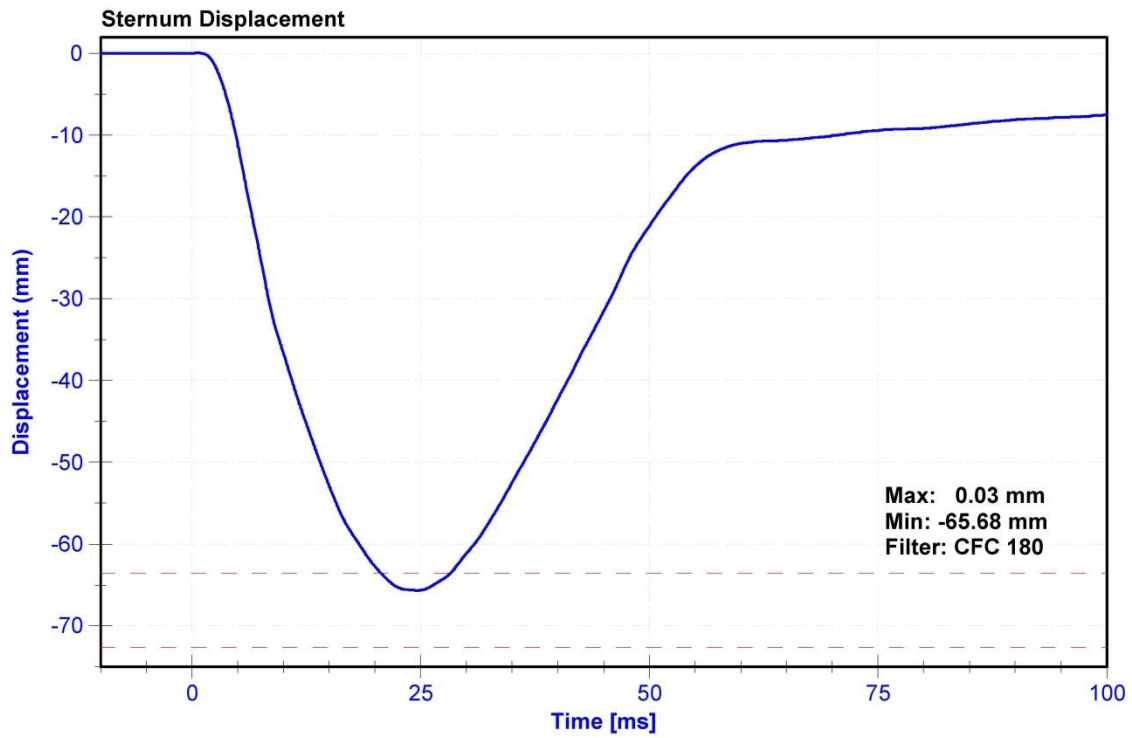
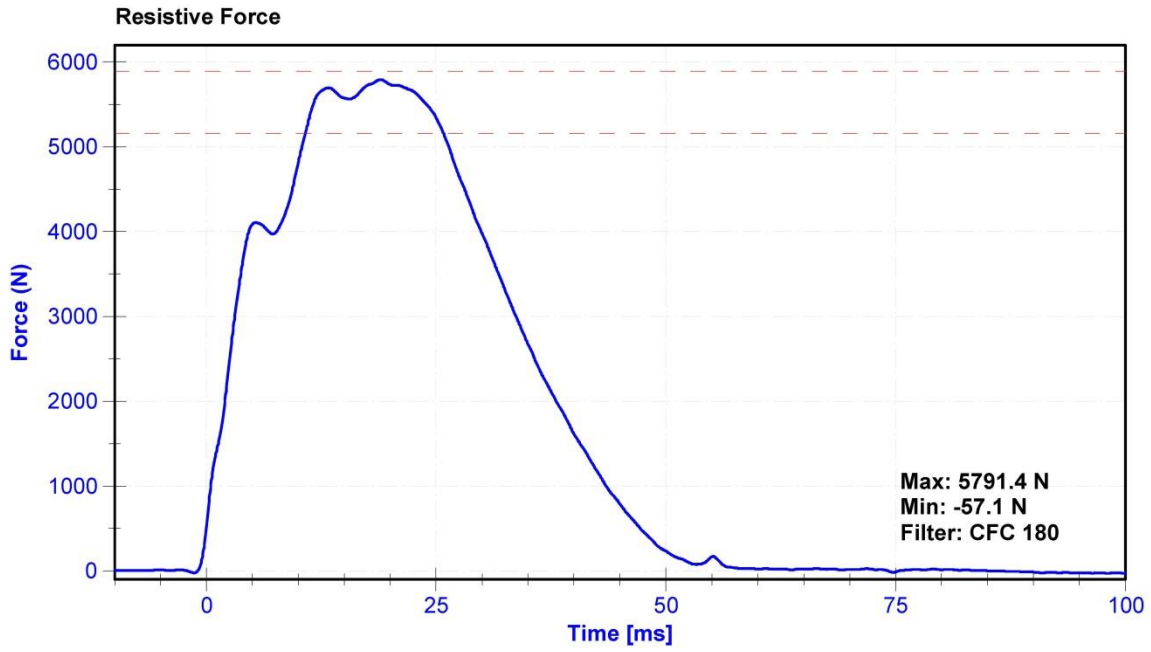
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	15.7	Pass
Velocity	6.59	6.83	m/s	6.79	Pass
Chest Displacement	-72.6	-63.5	mm	-65.68	Pass
Resistive Force	5,160	5,894	N	5791.4	Pass
Hysteresis	69	85	%	70.7	Pass

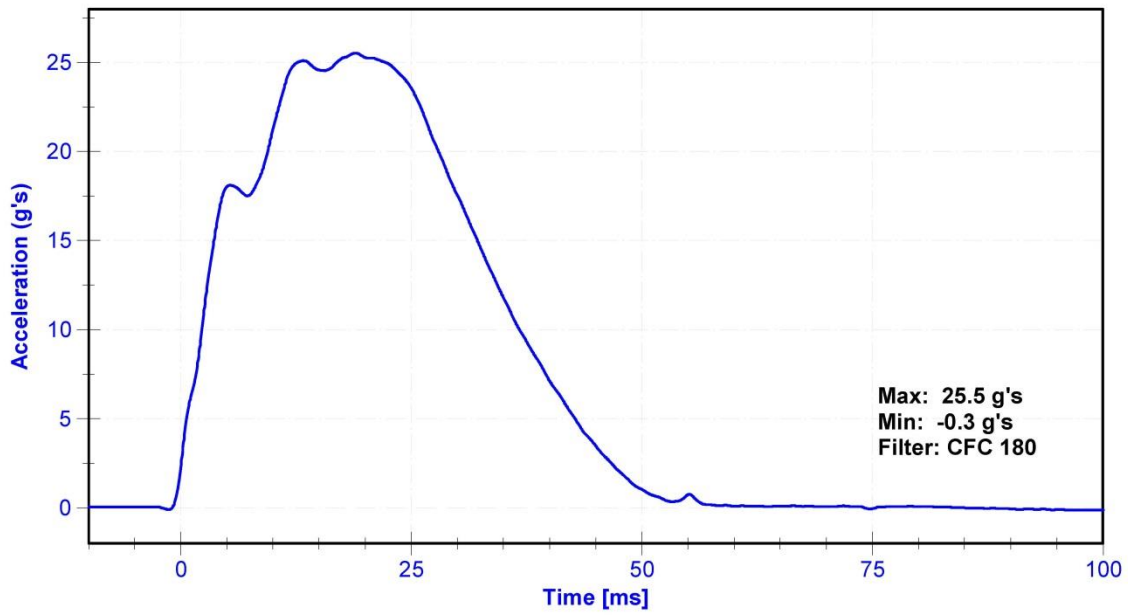
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
Chest Potentiometer	Servo 14CB1-2897	DS-1046	7/31/2014	7/31/2015

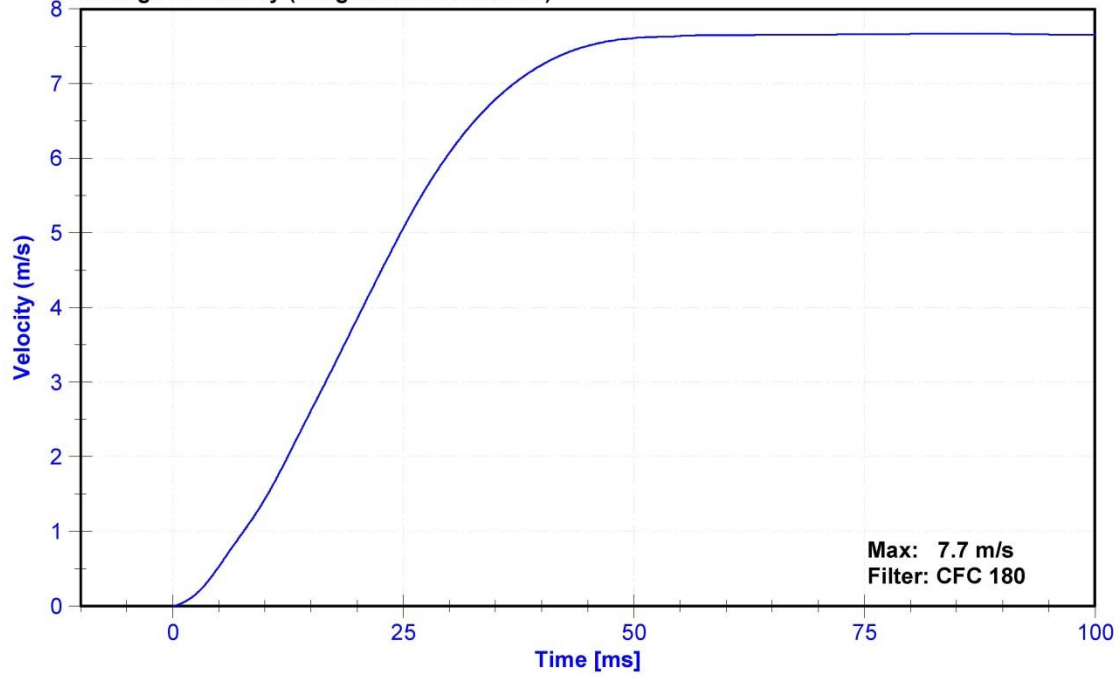




Probe Acceleration



Change in Velocity (Integrated Acceleration)



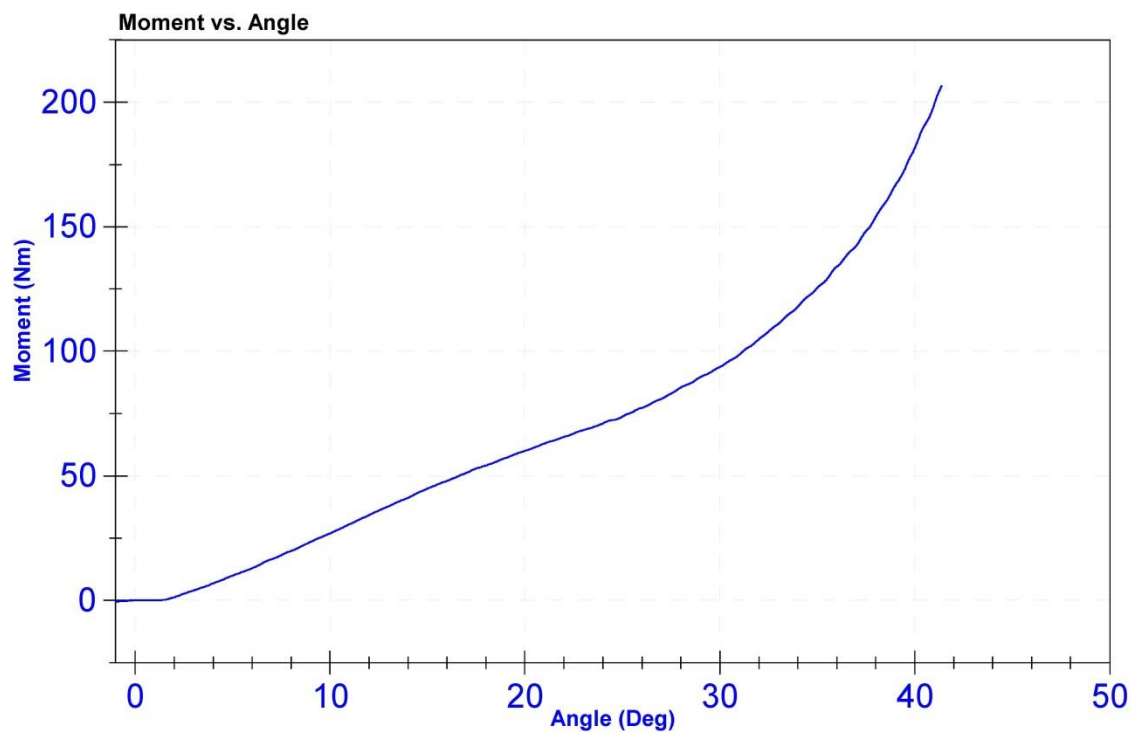
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.6	Pass
Humidity	10	70	%	16.4	Pass
Average Velocity	5	10	deg/s	5.8	Pass
Angle at 203Nm	40	50	deg	41.2	Pass
Moment at 30 degrees	0	94.9	Nm	93.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Servo 14CB1-3615	DS-0008	2/20/2014	2/20/2015
Load Cell	Key Trans 2301-02	LC-115 My	3/25/2014	3/25/2015



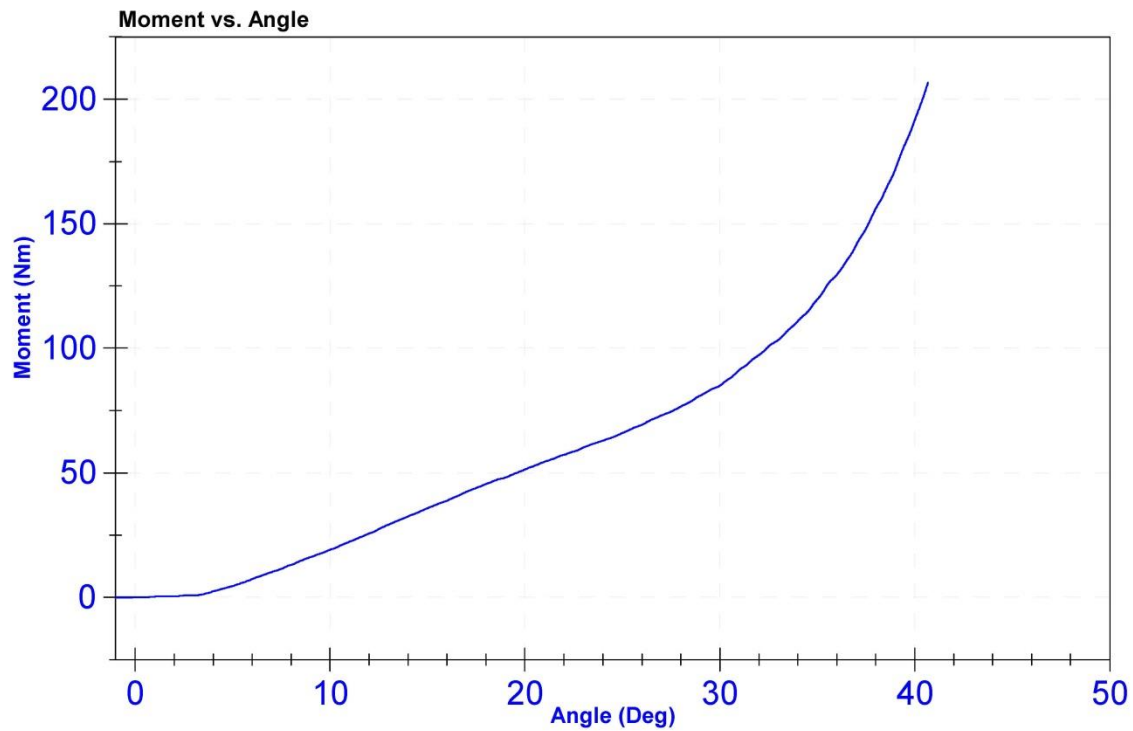
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	21.6	Pass
Humidity	10	70	%	16.4	Pass
Average Velocity	5	10	deg/s	6.0	Pass
Angle at 203Nm	40	50	deg	40.5	Pass
Moment at 30 degrees	0	94.9	Nm	85.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Servo 14CB1-3615	DS-0008	2/20/2014	2/20/2015
Load Cell	Key Trans 2301-02	LC-115 My	3/25/2014	3/25/2015



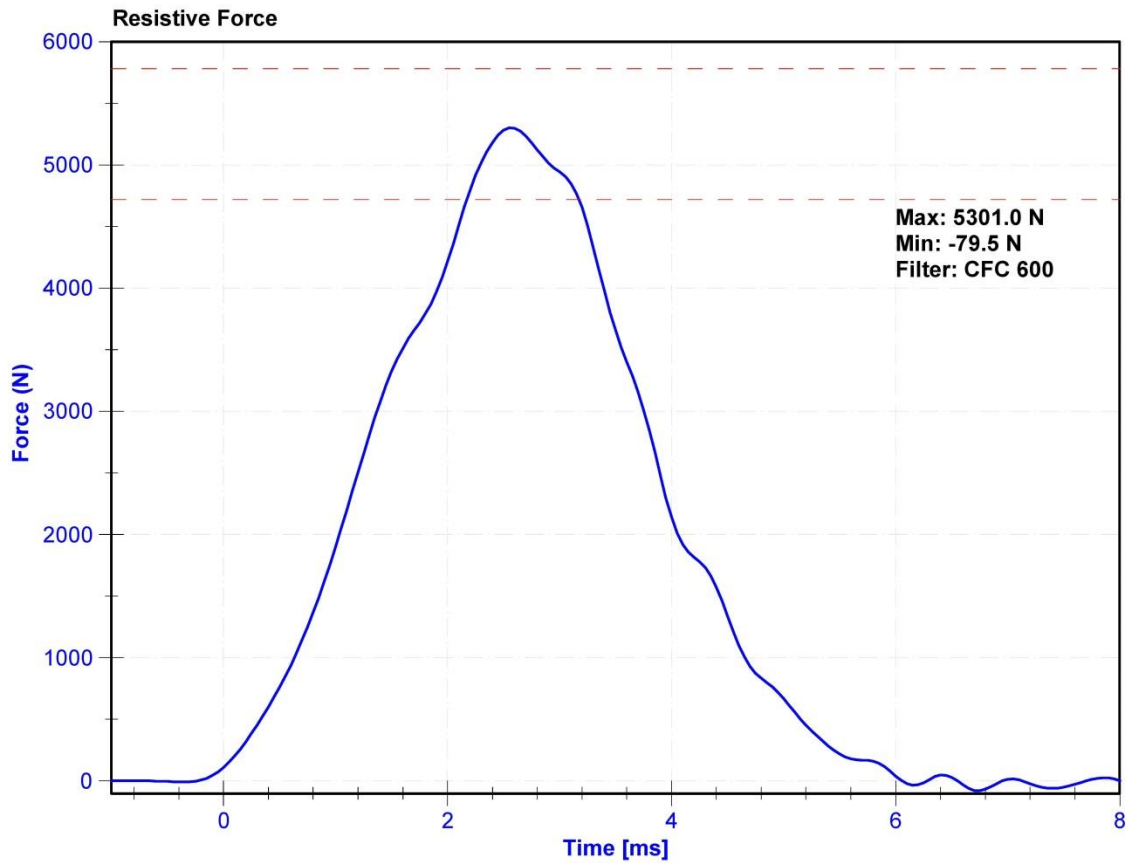
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

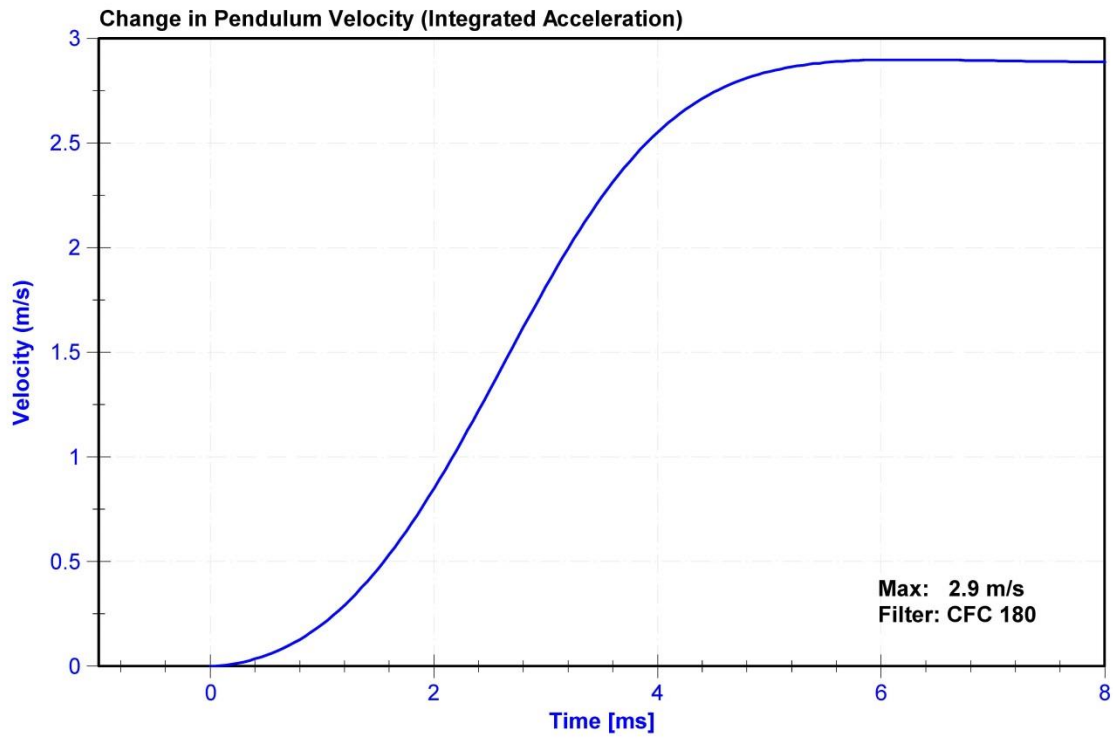
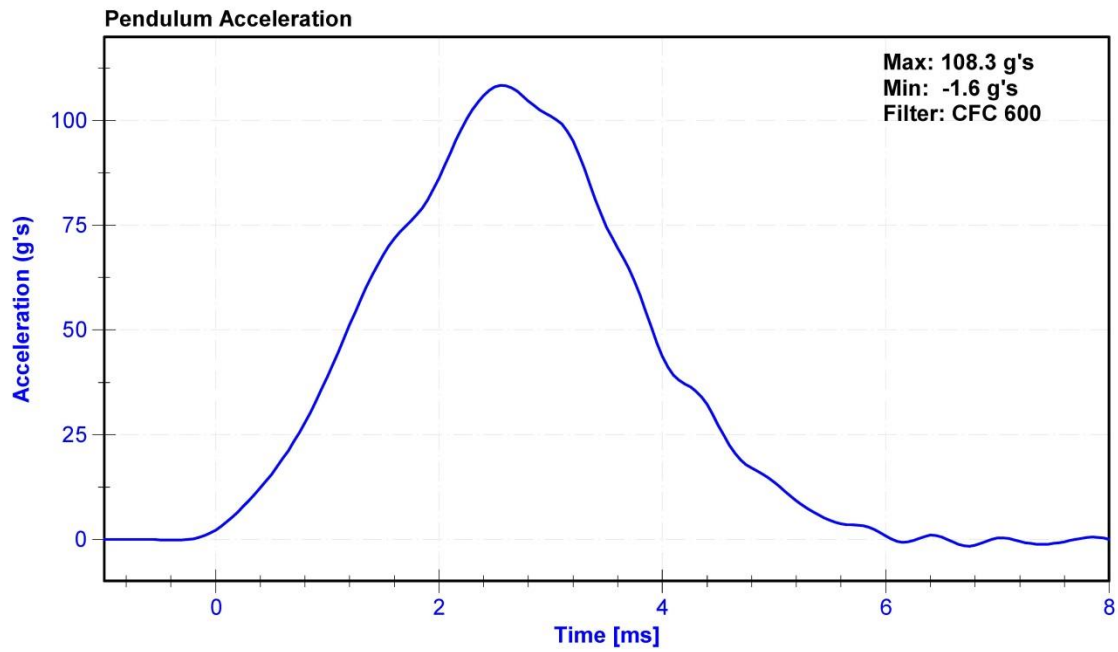
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	16.7	Pass
Velocity	2.07	2.13	m/s	2.098	Pass
Resistive Force	4,720	5,780	N	5301.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015





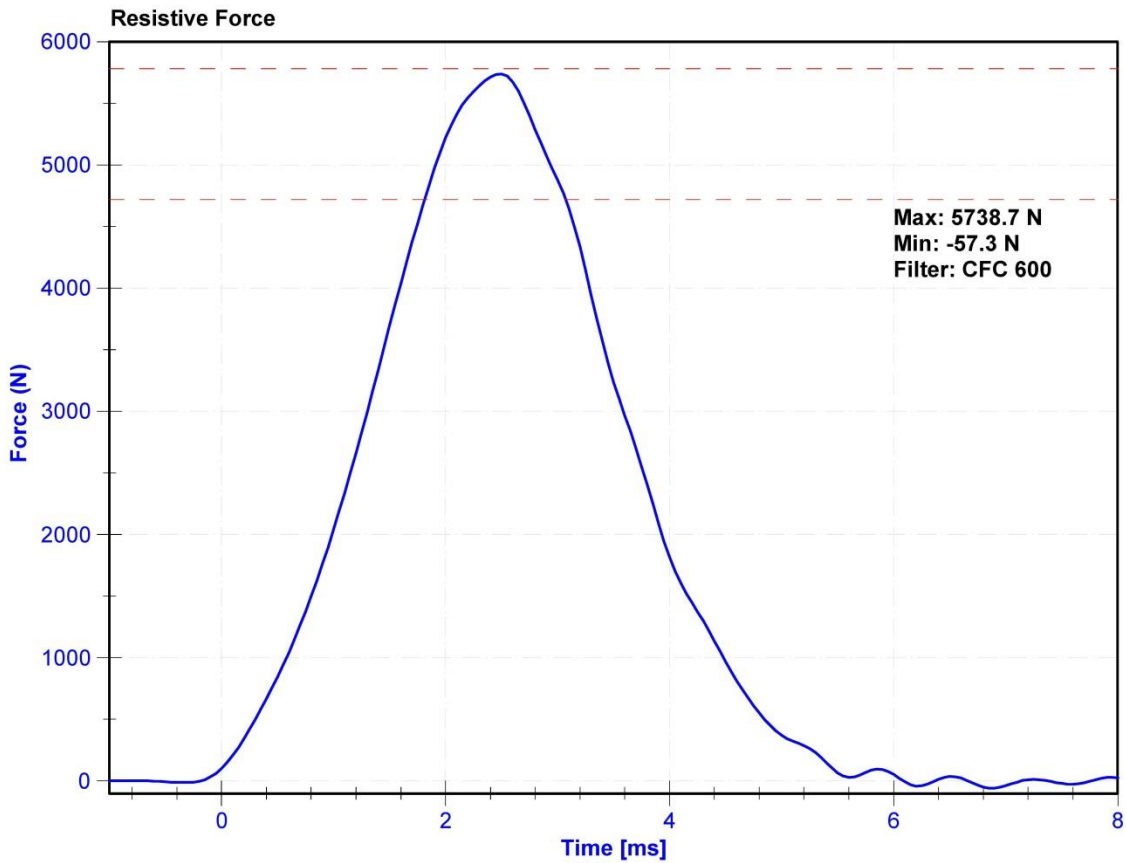
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	1046	Laboratory Supervisor	M. Goehle

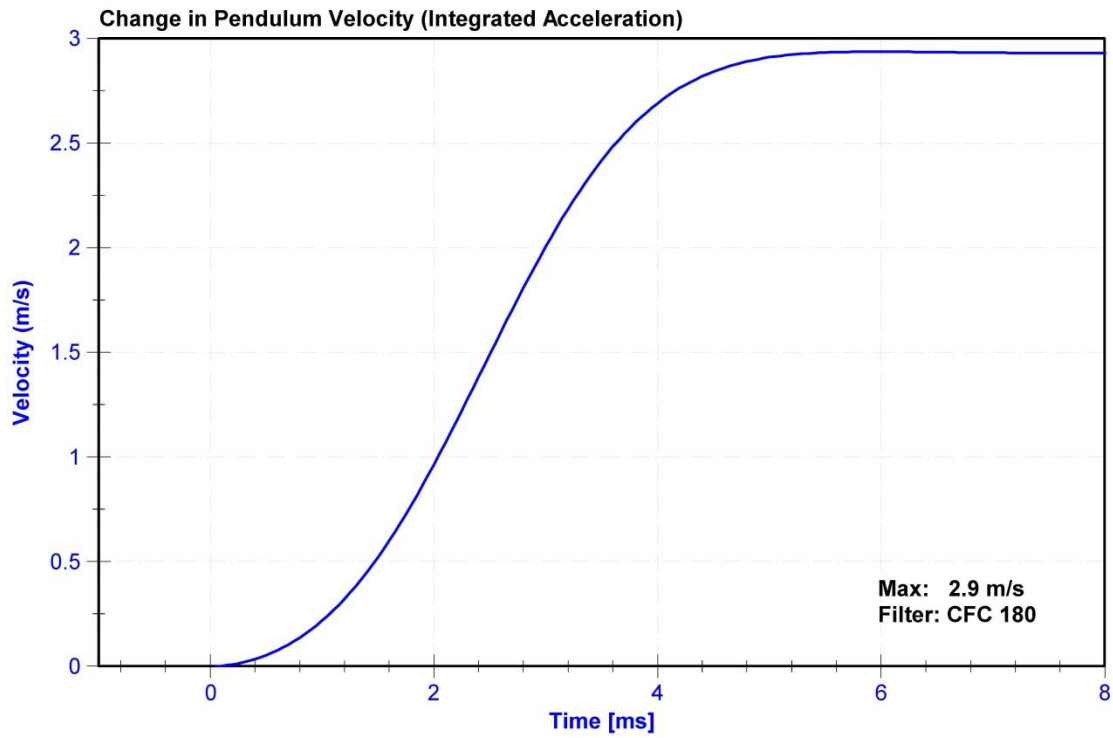
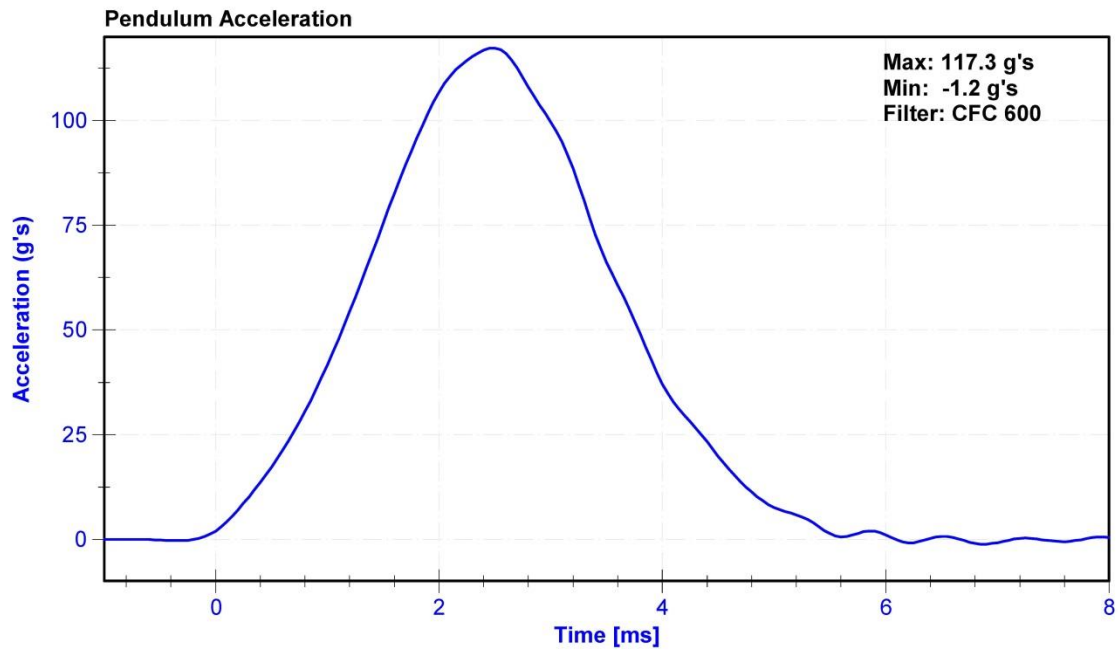
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.6	Pass
Humidity	10	70	%	16.7	Pass
Velocity	2.07	2.13	m/s	2.098	Pass
Resistive Force	4,720	5,780	N	5738.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015





CALIBRATION TEST RESULTS

POST-TEST

HYBRID III 5TH PERCENTILE FEMALE - PASSENGER ATD

SERIAL NO: 139

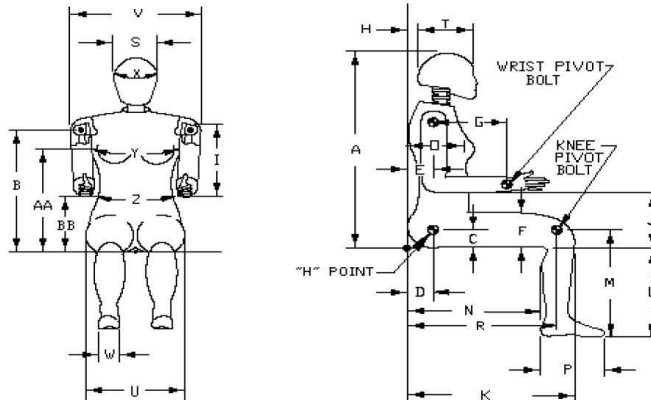


External Measurements - Hybrid 3 - 5th Female

Technician: M. Geesey

Date: 2/3/2015

Dummy Serial Number: 139



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	775	800	788	Pass
B	Shoulder Pivot Height	432	457	446	Pass
C	H-Point Height	81	86	84	Pass
D	H-Point from Backline	145	150	146	Pass
E	Shoulder Pivot from Backline	69	84	75	Pass
F	Thigh Clearance	119	135	124	Pass
G	Back of Elbow to Wrist Pivot	244	259	248	Pass
H	Head Back to Backline	43	48	44	Pass
I	Shoulder to Elbow Length	277	297	293	Pass
J	Elbow Rest Height	183	203	187	Pass
K	Buttock to Knee Length	521	546	541	Pass
L	Popliteal Height	356	376	362	Pass
M	Knee Pivot Height	394	419	398	Pass
N	Buttock Popliteal Length	414	439	423	Pass
O	Chest Depth without Jacket	175	191	183	Pass
P	Foot Length (right)	219	234	220	Pass
R	Buttock To Knee Pivot Length	457	483	472	Pass
S	Head Breadth	137	147	140	Pass
T	Head Depth	178	188	181	Pass
U	Hip Breadth	300	315	303	Pass
V	Shoulder Breadth	351	366	361	Pass
W	Foot Breadth	79	94	82	Pass
X	Head Circumference	528	549	536	Pass
Y	Chest Circumference with Jacket	851	881	852	Pass
Z	Waist Circumference	460	490	471	Pass
AA	Reference Location (Chest Circumference)	333	358	357	Pass
BB	Reference Location (Waist Circumference)	160	170	170	Pass

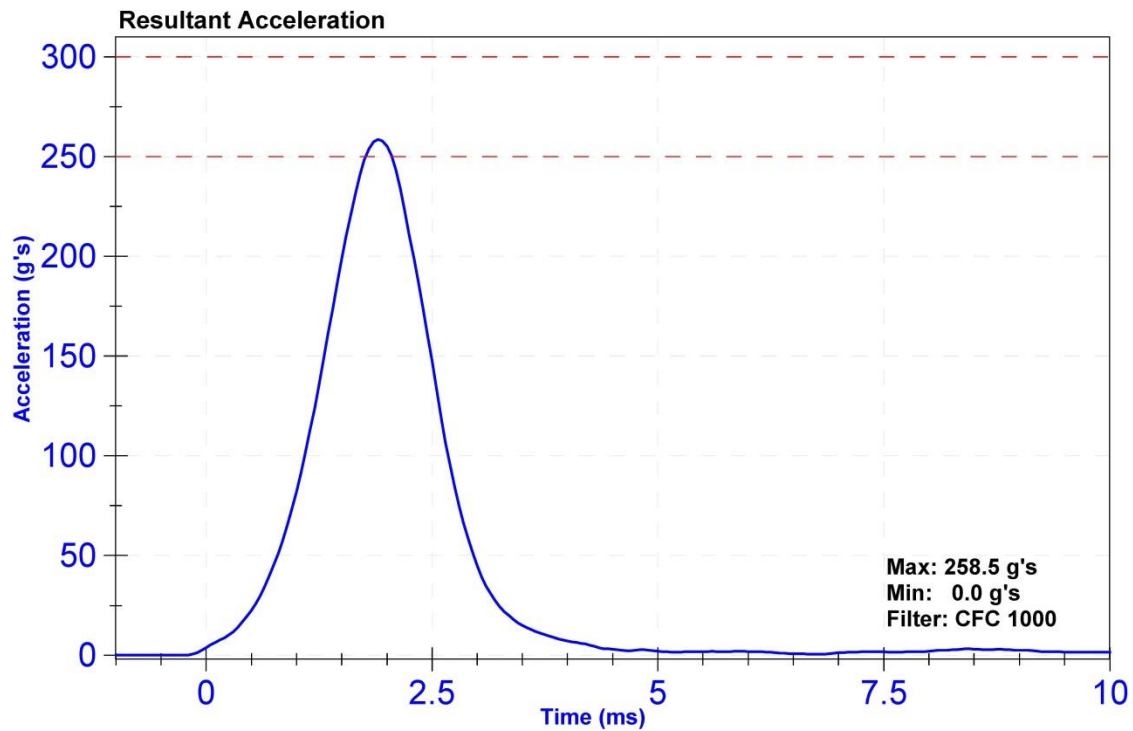
ATD Manufacturer	Denton	Test Technician	M. Geesey
ATD Serial Number	139	Laboratory Supervisor	M. Goehle

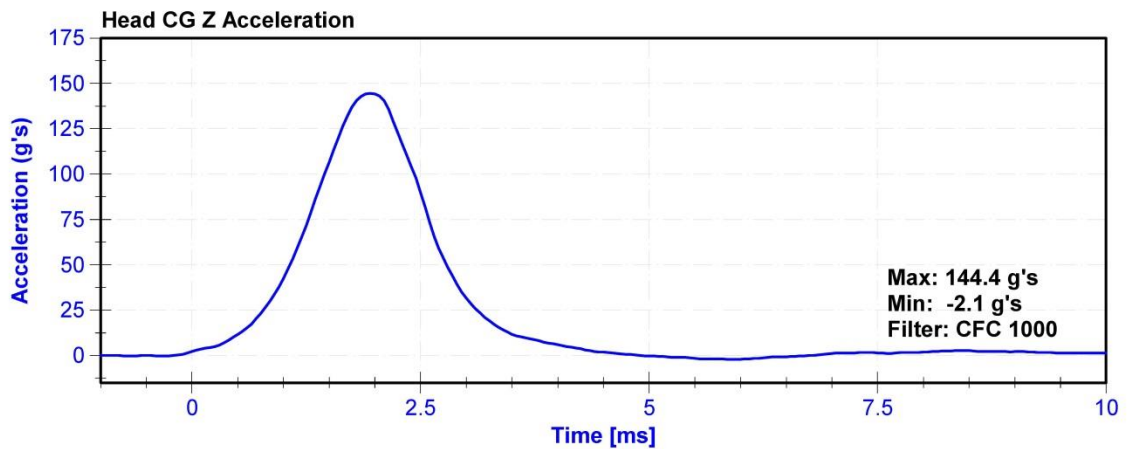
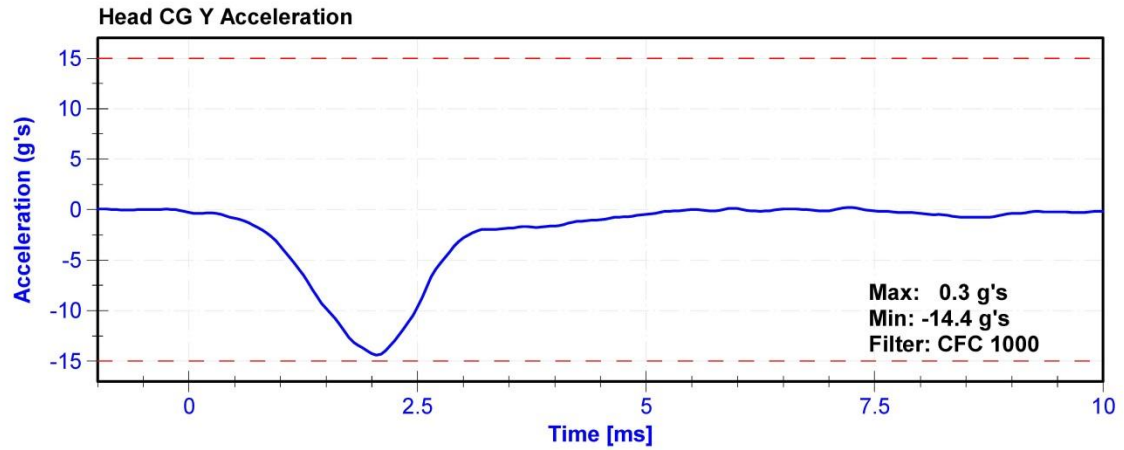
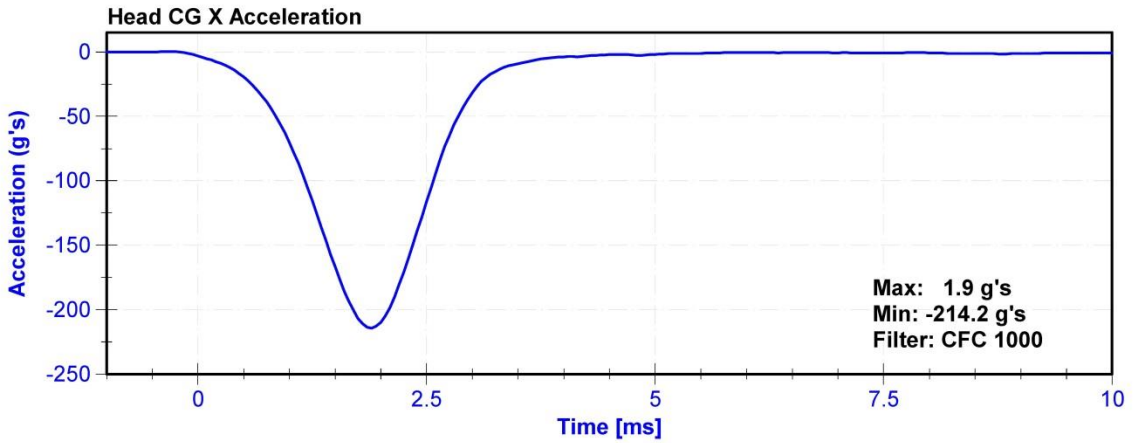
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	22.2	Pass
Humidity	10	70	%	14.5	Pass
Resultant Acceleration	250	300	g's	258.5	Pass
Oscillation	0	10	%	1.2	Pass
Lateral Acceleration	-15	15	g's	-14.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264	AC-P52054	8/26/2014	2/24/2015
Y Accelerometer	ENDEVCO 7264	AC-P52007	8/26/2014	2/24/2015
Z Accelerometer	ENDEVCO 7264	AC-P51298	8/26/2014	2/24/2015





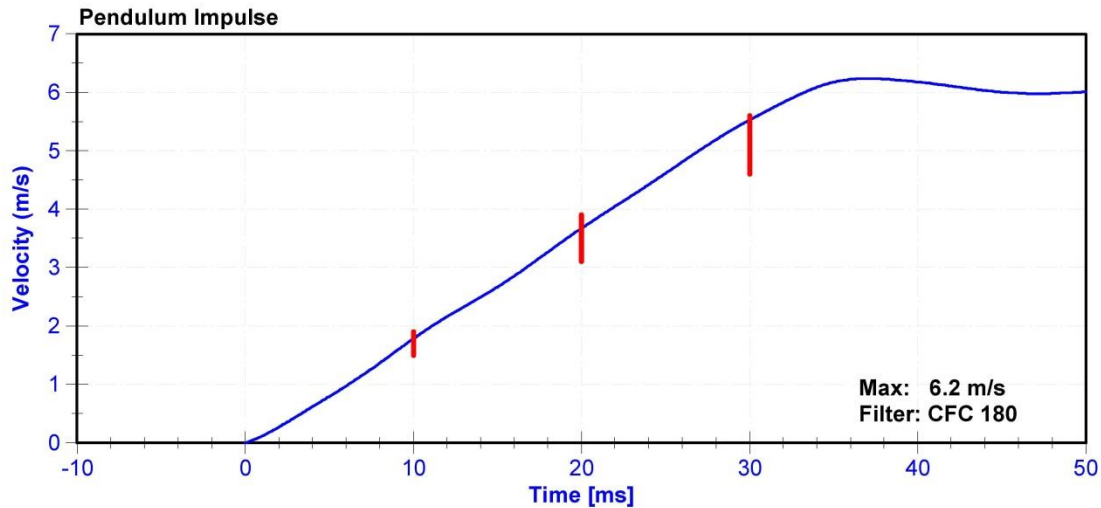
ATD Manufacturer	Denton	Test Technician	M. Geesey
ATD Serial Number	139	Laboratory Supervisor	M. Goehle

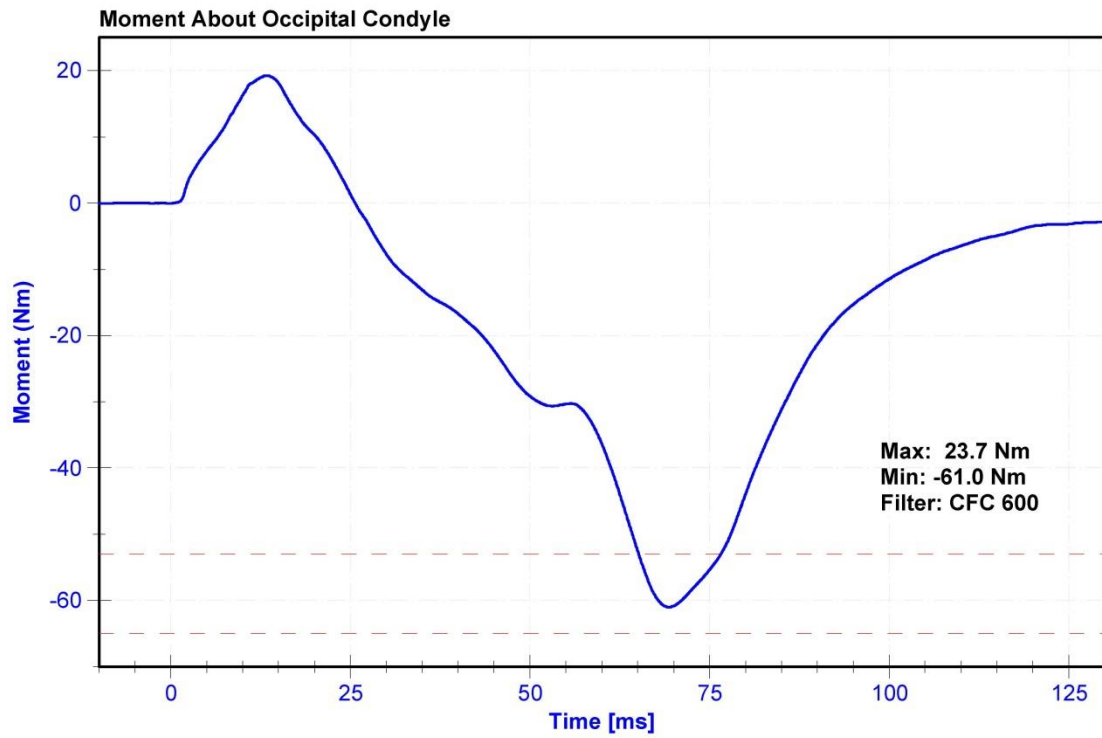
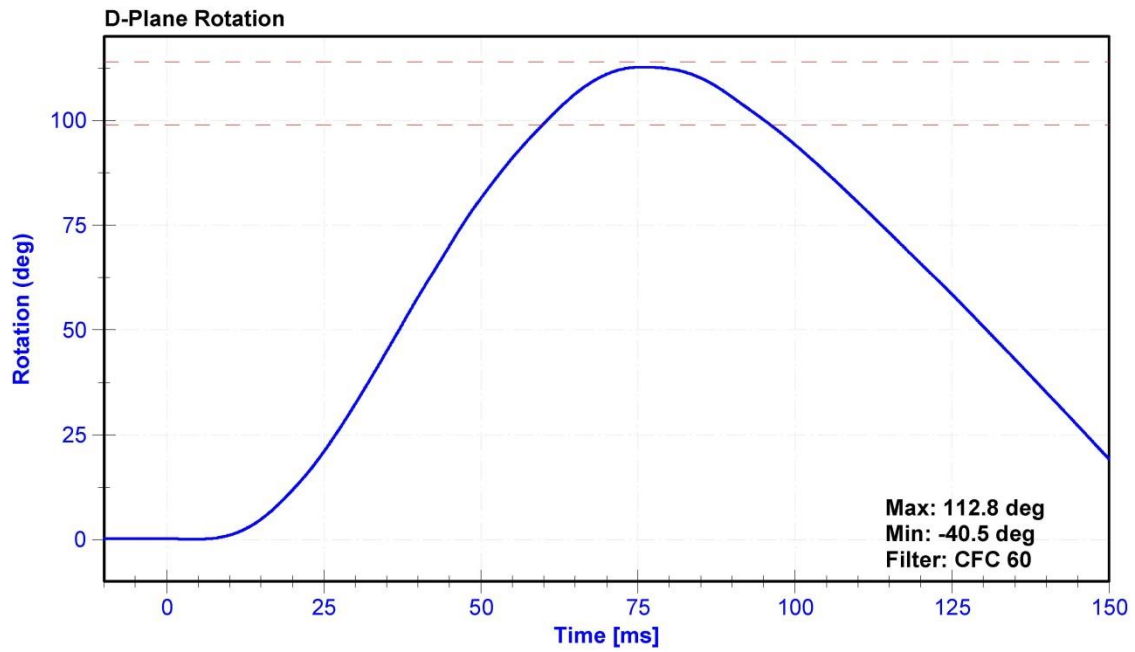
Results

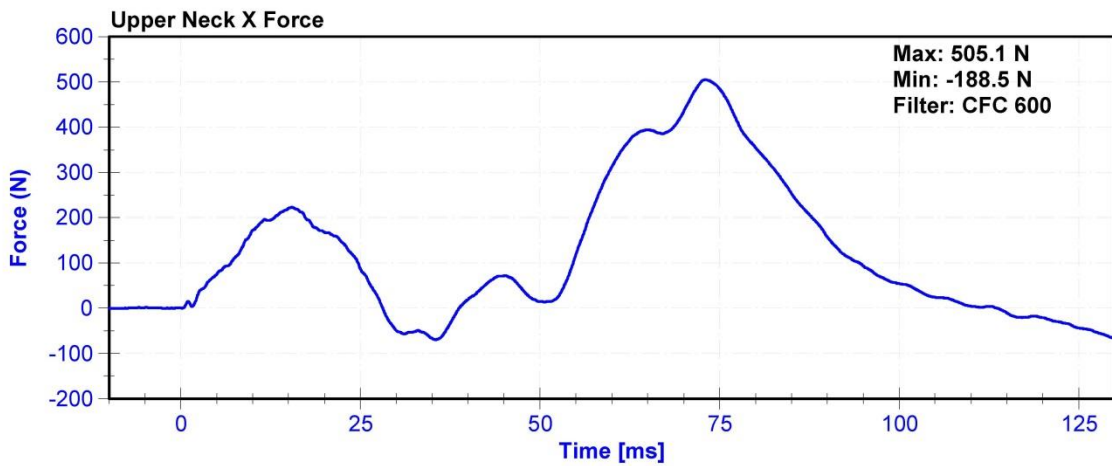
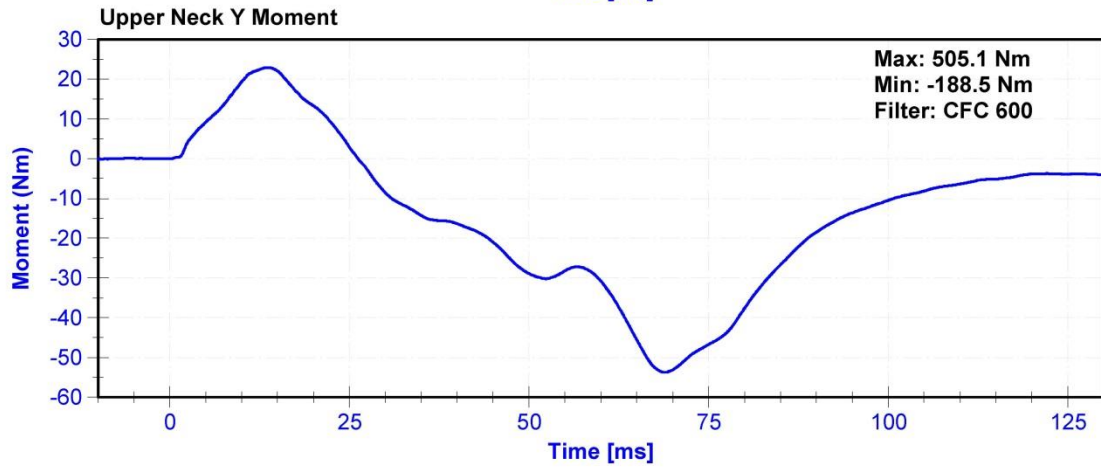
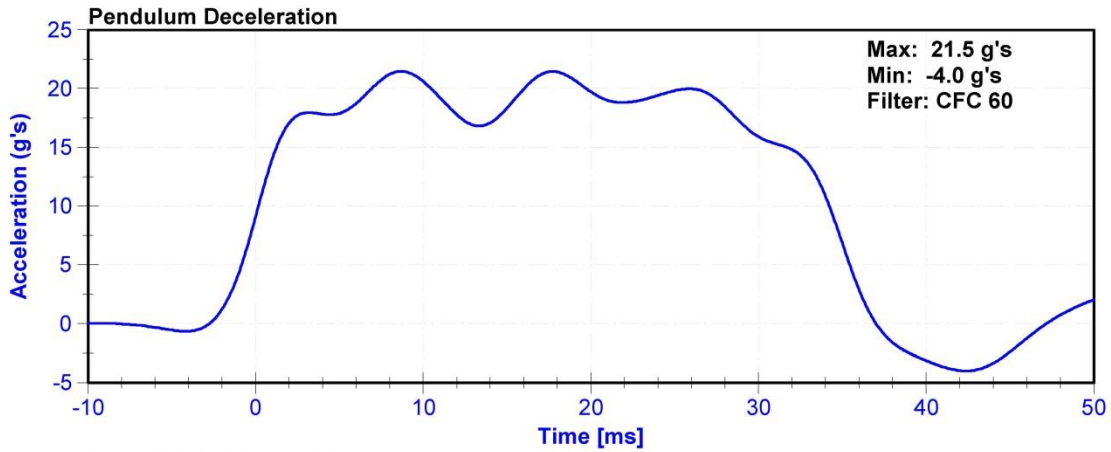
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	16.4	Pass
Velocity	5.96	6.19	m/s	5.98	Pass
Pendulum Impulse at 10ms	1.5	1.9	G's	1.78	Pass
Pendulum Impulse at 20ms	3.1	3.9	G's	3.67	Pass
Pendulum Impulse at 30ms	4.6	5.6	G's	5.52	Pass
D Plane Rotation	99	114	deg	112.8	Pass
Moment During Rotation Interval	-65	-53	Nm	-61.0	Pass
Moment Decay to -10Nm	94	114	Nm	102.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	SP22G	DS-PendPot	9/16/2014	9/16/2015
Condyle Potentiometer	SP22G	DS-CondPot	2/21/2014	2/21/2015
Upper Neck Load Cell	Denton 1716A	LC-2018Fx	5/1/2014	5/1/2015







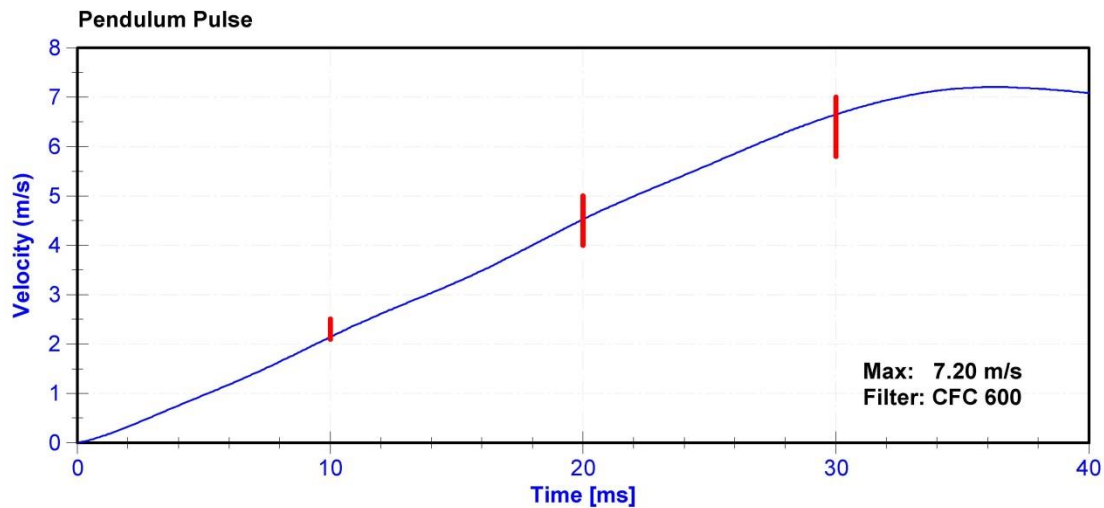
ATD Manufacturer	Denton	Test Technician	M. Geesey
ATD Serial Number	139	Laboratory Supervisor	M. Goehle

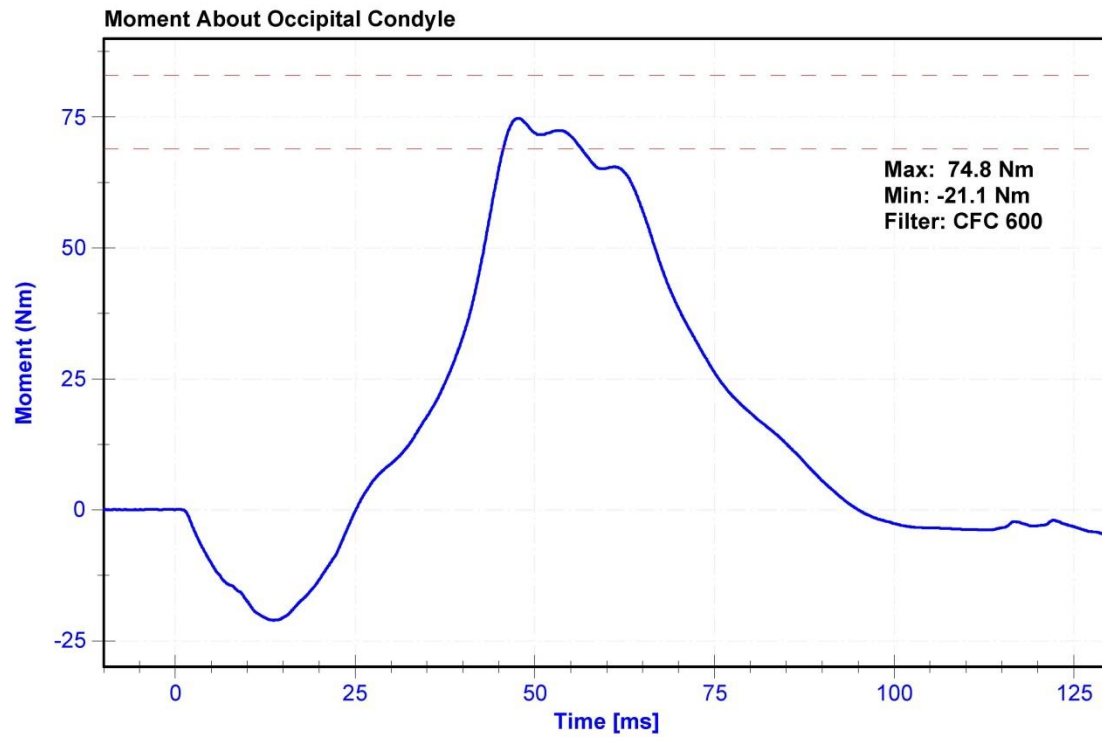
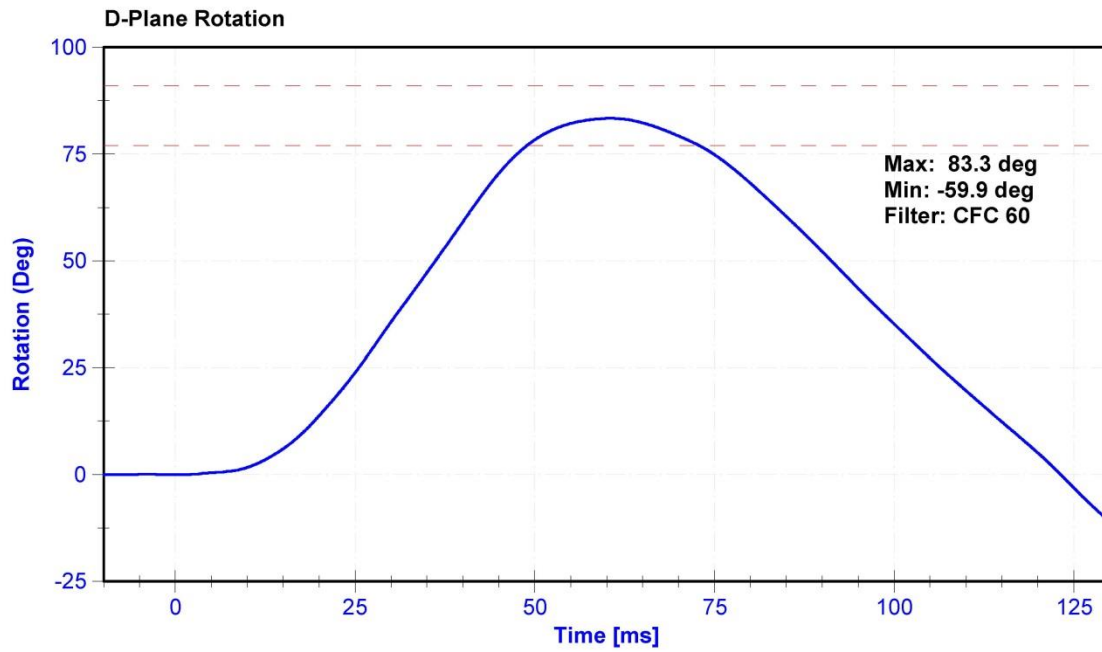
Results

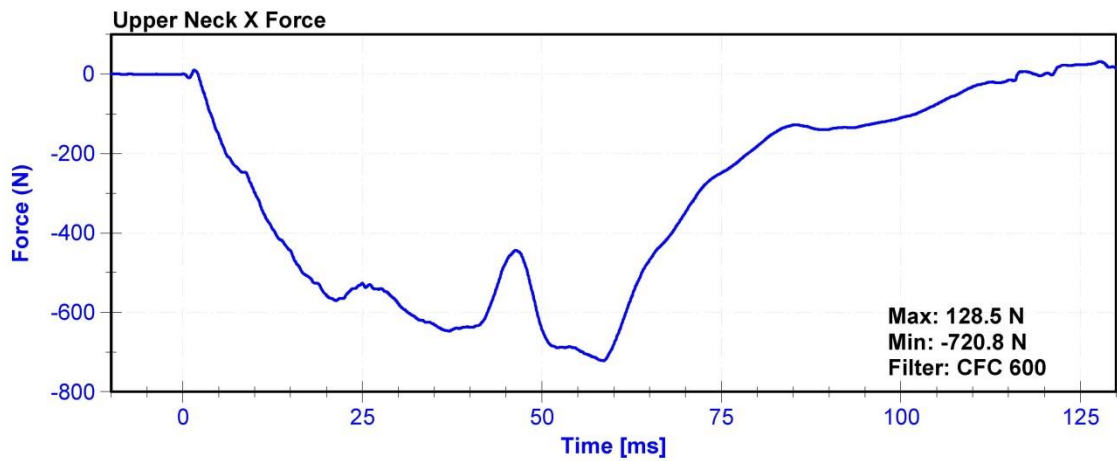
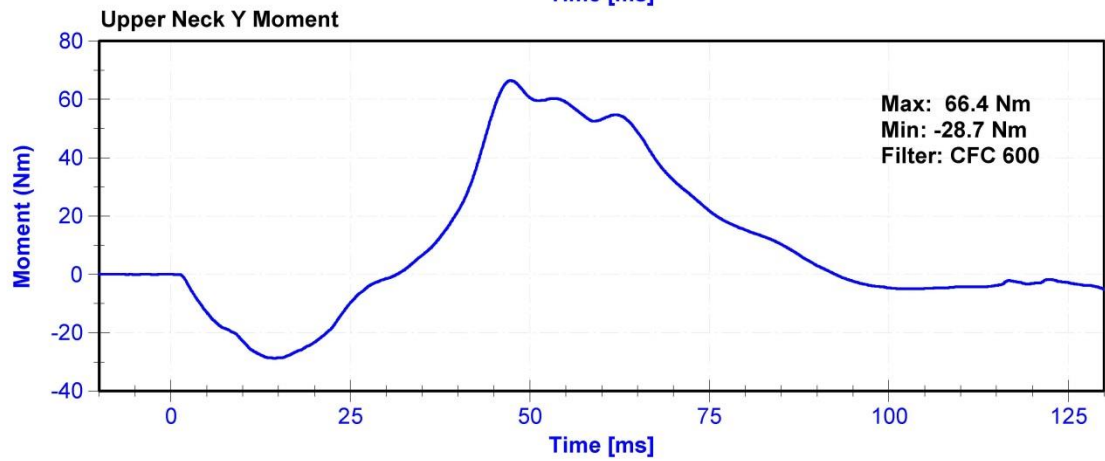
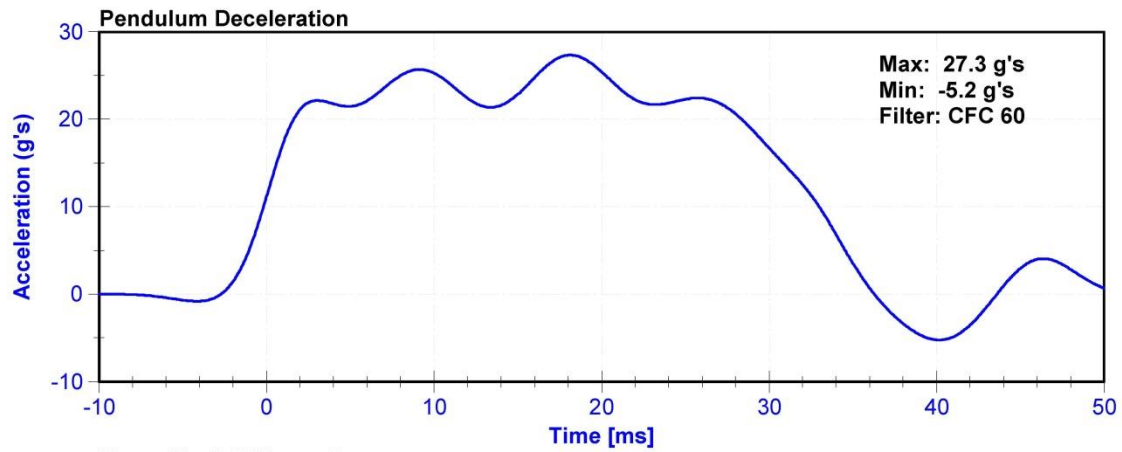
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	15.1	Pass
Velocity	6.89	7.13	m/s	6.979	Pass
Pendulum Impulse at 10ms	2.1	2.5	m/s	2.14	Pass
Pendulum Impulse at 20ms	4	5	m/s	4.53	Pass
Pendulum Impulse at 30ms	5.8	7.0	m/s	6.65	Pass
D Plane Rotation	77	91	deg	83.3	Pass
Moment During Rotation Interval	69	83	Nm	74.8	Pass
Moment Decay to 10.0 Nm	80	100	ms	86.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	SP22G	DS-PendPot	9/16/2014	9/16/2015
Condyle Potentiometer	SP22G	DS-CondPot	2/21/2014	2/21/2015
Upper Neck Load Cell	Denton 1716A	LC-2018Fx	5/1/2014	5/1/2015







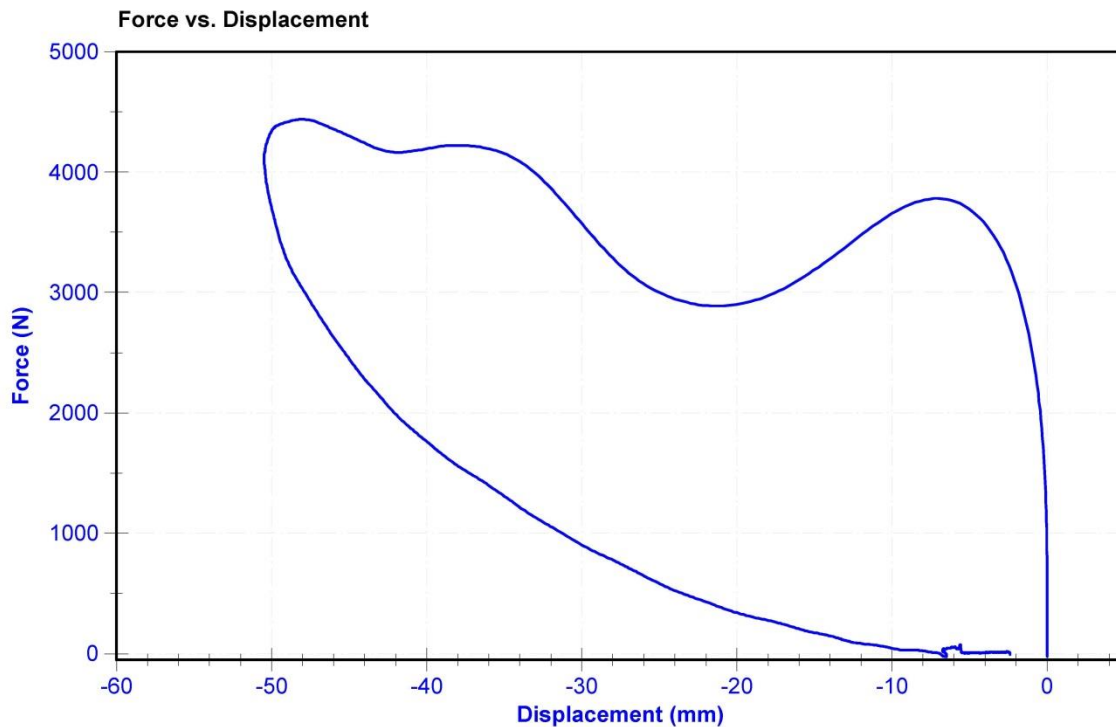
ATD Manufacturer	Denton	Test Technician	M.Hartung
ATD Serial Number	139	Laboratory Supervisor	M.Goehle

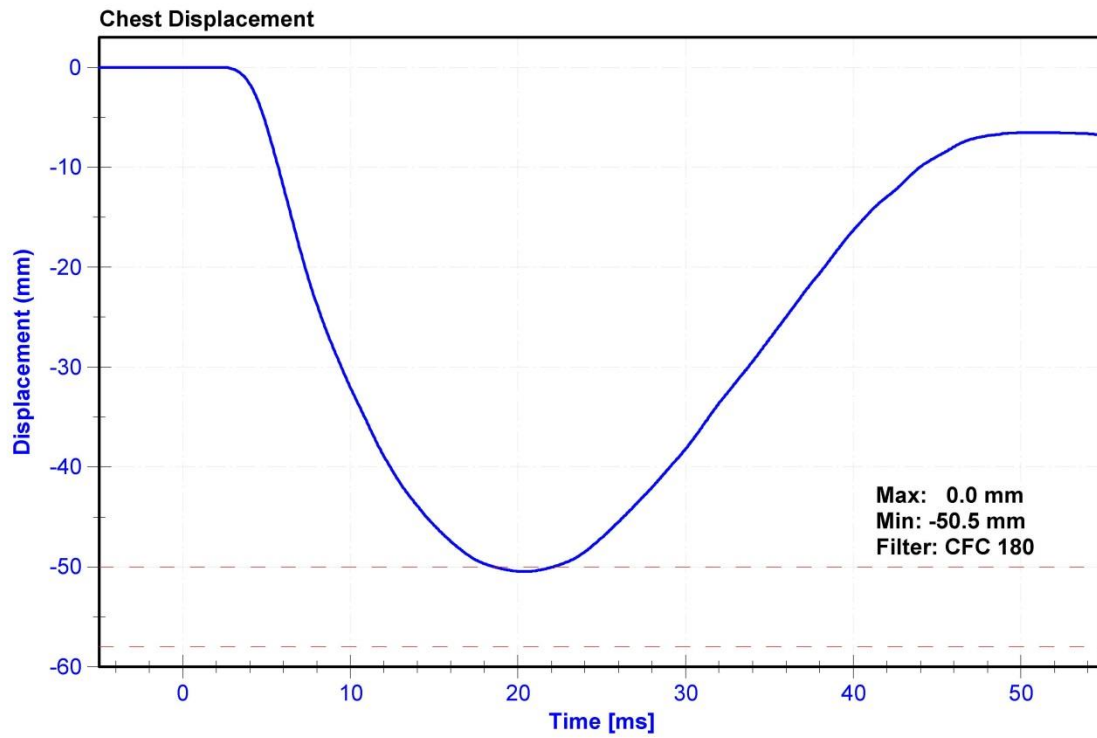
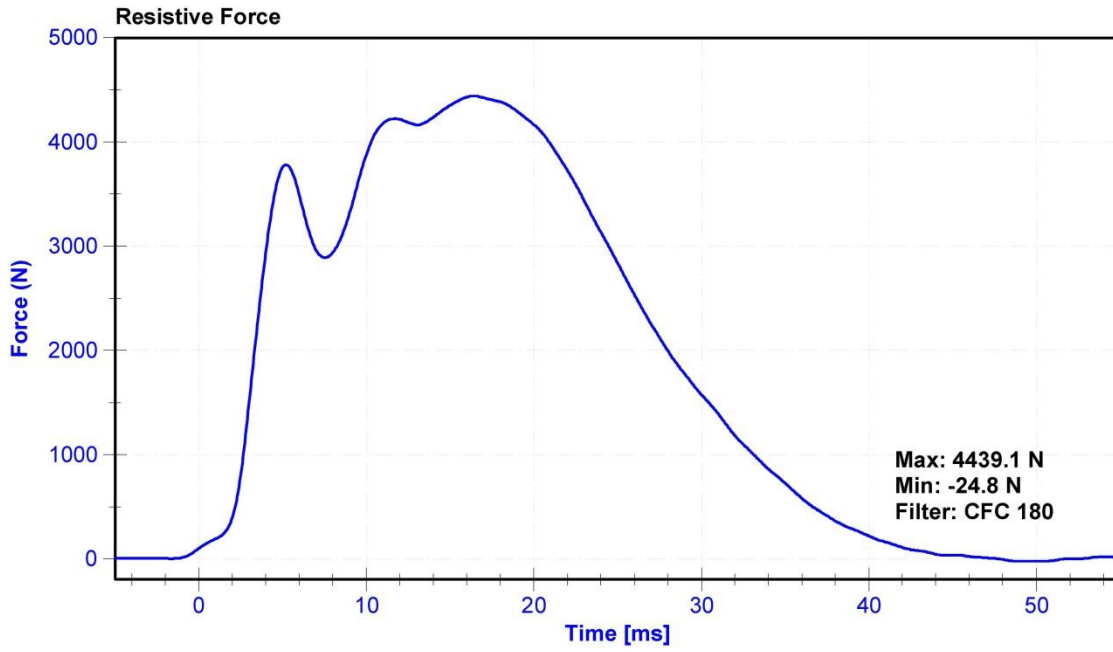
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	13.6	Pass
Velocity	6.59	6.83	m/s	6.76	Pass
Chest Displacement	-58	-50	mm	-50.5	Pass
Force During Displacement Interval	3,900	4,400	N	4338.1	Pass
Force During -18 to 50mm Displacement	0	4,600	N	4439.1	Pass
Hysteresis	69	85	%	73.7	Pass

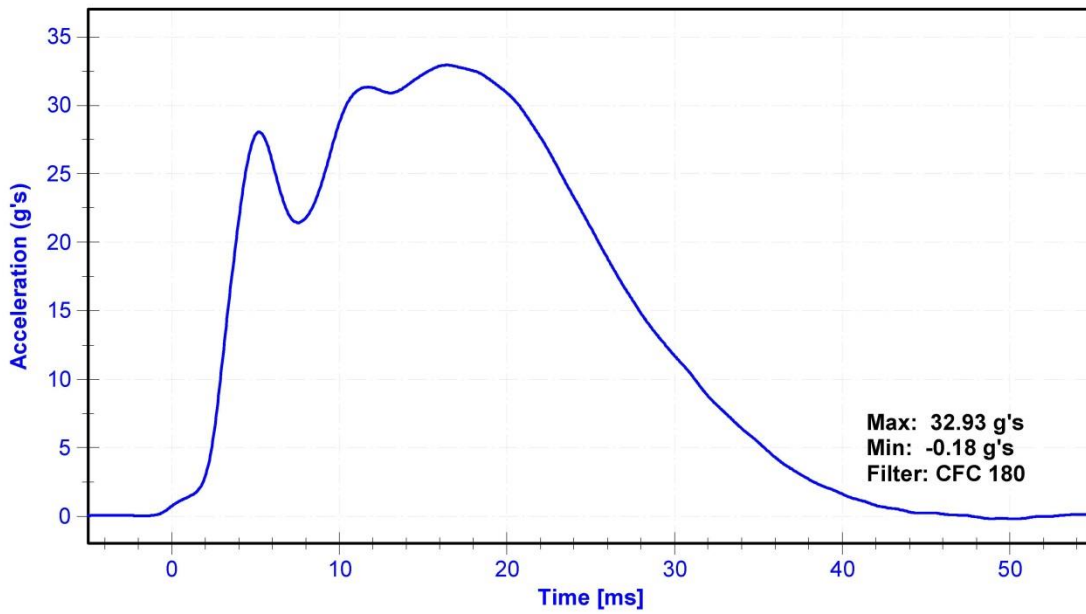
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015
Chest Potentiometer	Servo 14CBI-3615	DS-139	7/31/2014	7/31/2015

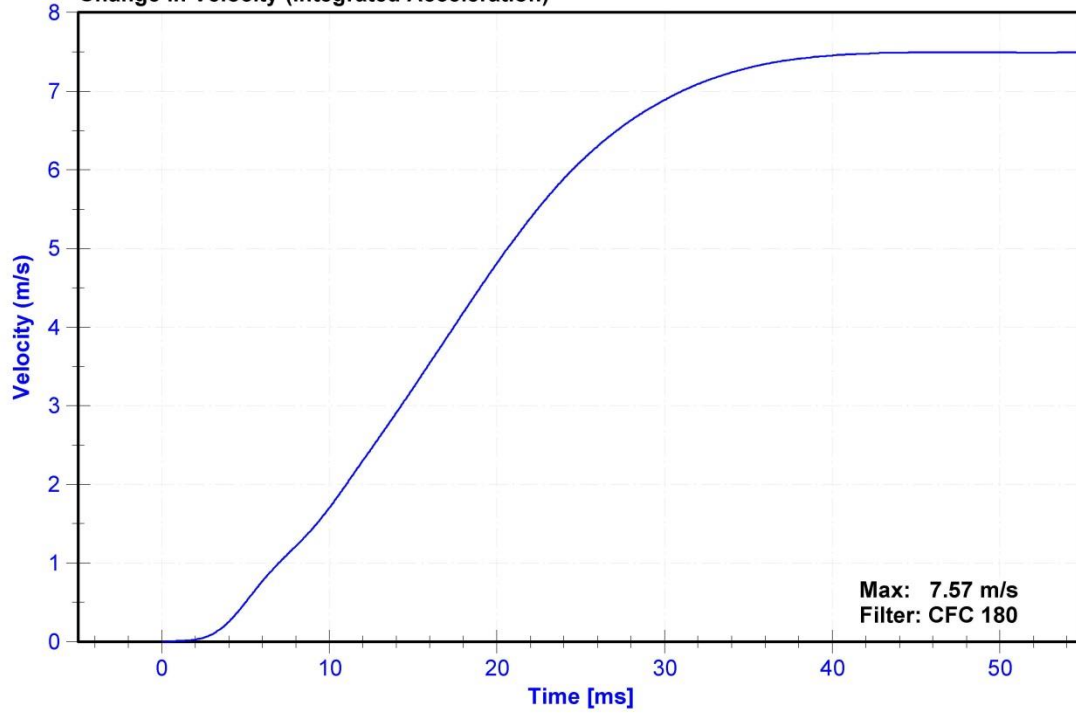




Probe Acceleration



Change in Velocity (Integrated Acceleration)



ATD Manufacturer	Denton	Test Technician	M.Hartung
ATD Serial Number	139	Laboratory Supervisor	M.Goehle

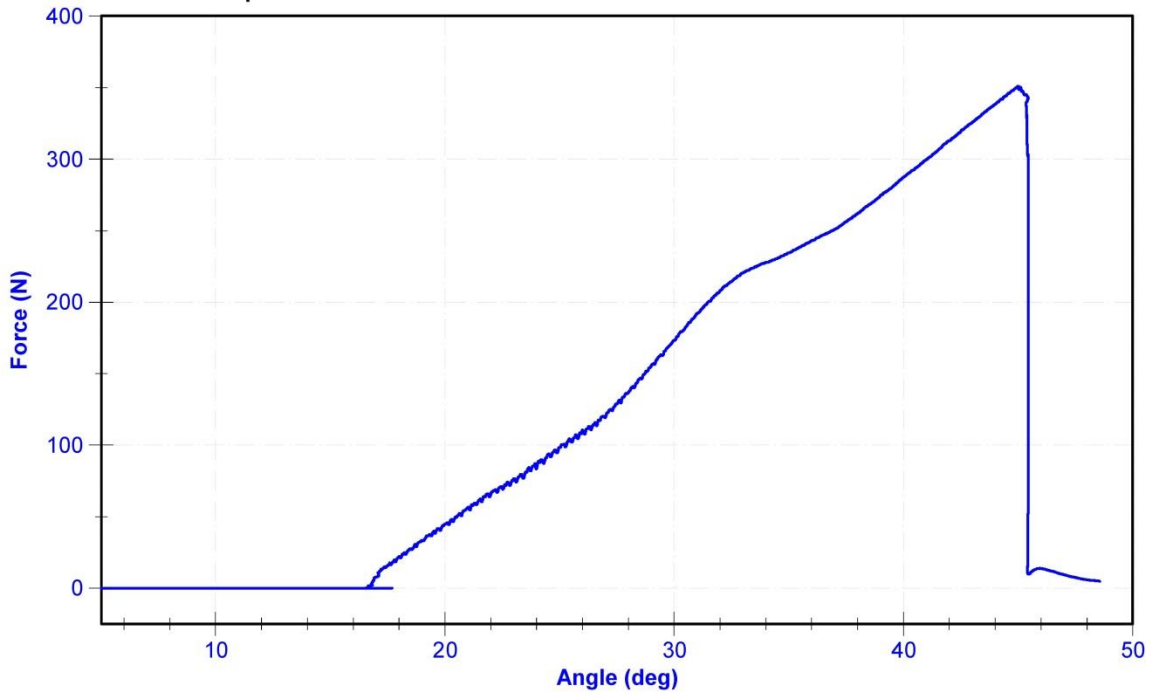
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.6	25.6	°C	21.7	Pass
Humidity	10	70	%	14.6	Pass
Initial Angle	0	20	deg	16.4	Pass
Force at 45 Degrees	320	390	N	349.6	Pass
Return Angle	0	8	deg	7.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Potentiometer	Rieker N4C-1	DS-13051548	8/1/2014	8/1/2015
Load Cell	Interface SML-200	LC-493319	8/13/2014	8/13/2015

Force vs. Displacement



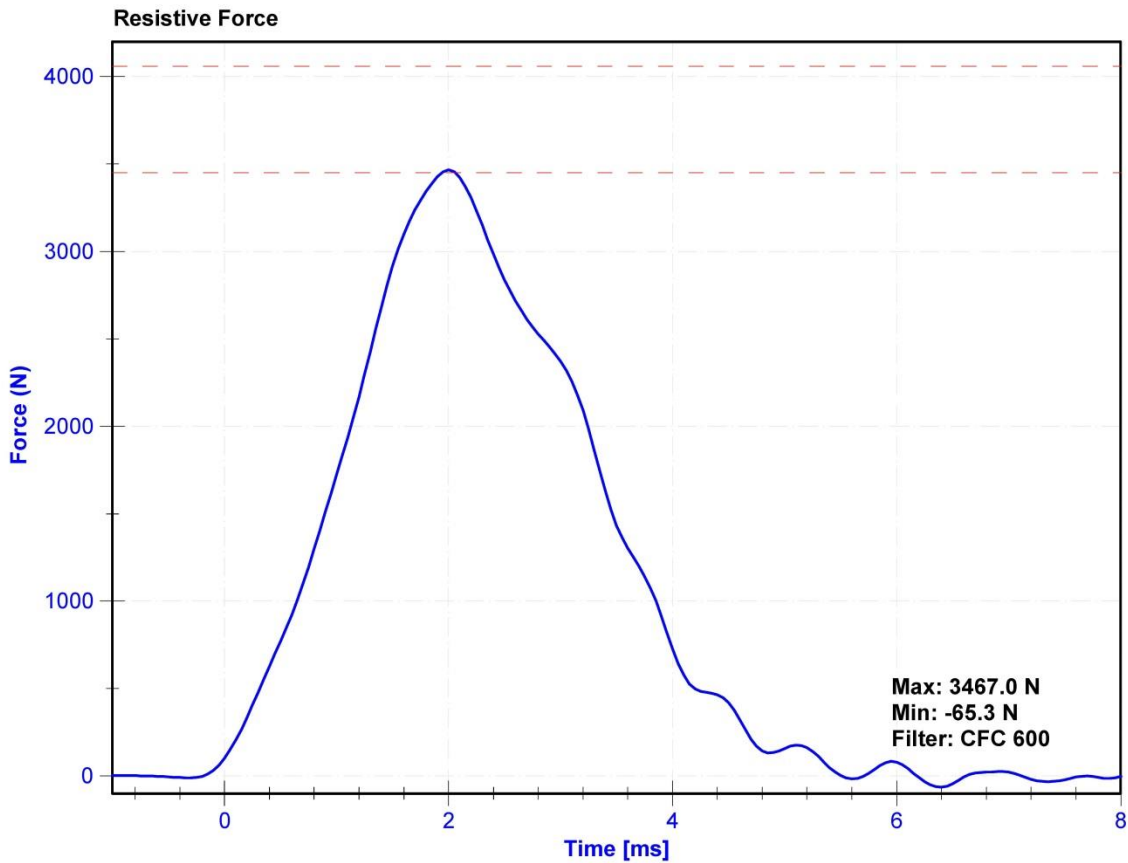
ATD Manufacturer	Denton	Test Technician	M.Hartung
ATD Serial Number	139	Laboratory Supervisor	M.Goehle

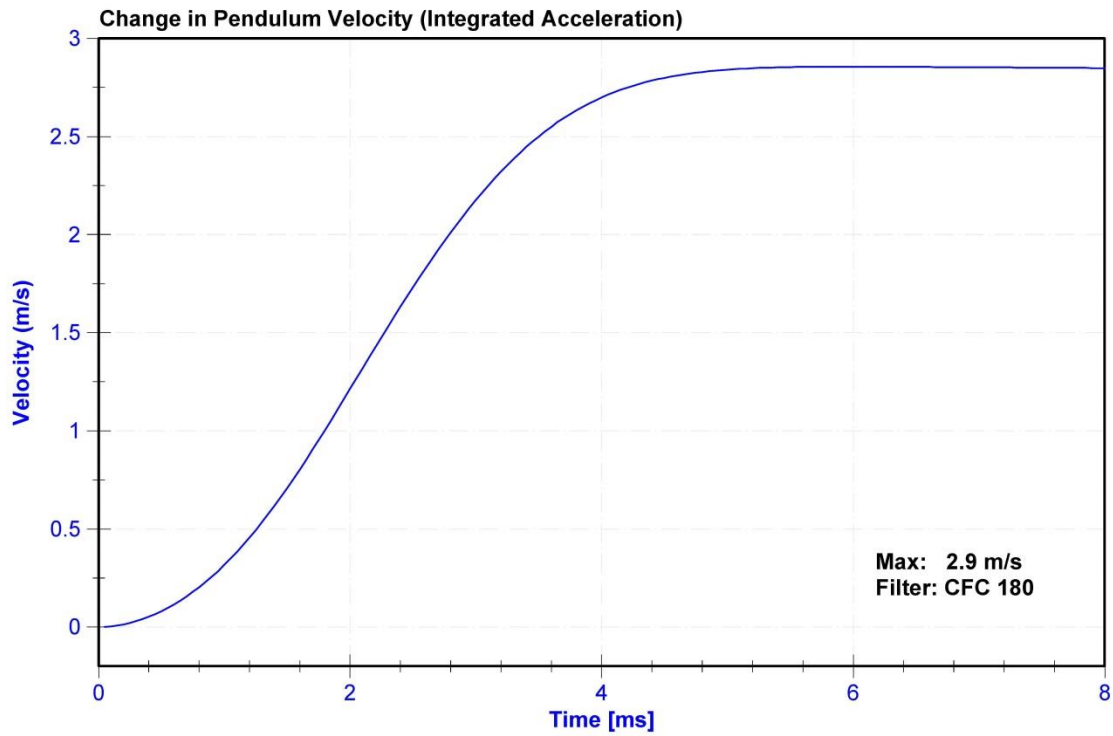
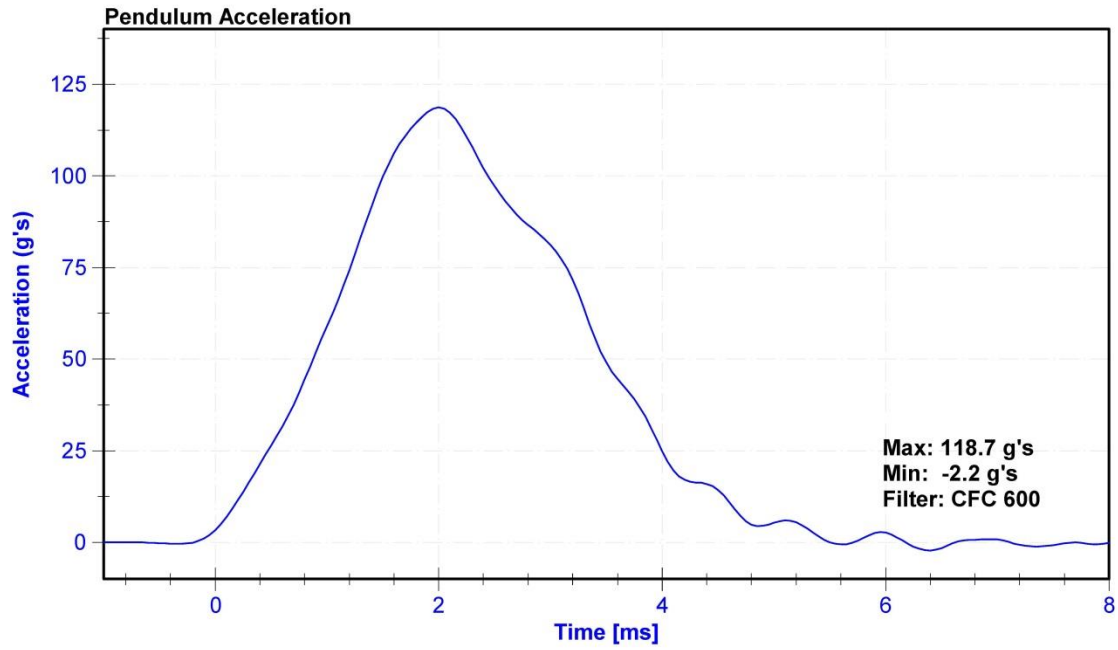
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	16.6	Pass
Velocity	2.07	2.13	m/s	2.106	Pass
Resistive Force	3,450	4,060	N	3467.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015





ATD Manufacturer	Denton	Test Technician	M.Hartung
ATD Serial Number	139	Laboratory Supervisor	M.Goehle

Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	18.9	25.6	°C	20.9	Pass
Humidity	10	70	%	16.6	Pass
Velocity	2.07	2.13	m/s	2.105	Pass
Resistive Force	3,450	4,060	N	3777.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14953	1/29/2015	7/30/2015

