

REPORT NUMBER: SPNCAP-CAL-18-007

**NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST**

**Ford Motor Co.
2018 Ford EcoSport
SUV**

NHTSA No: M20180201

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



July 9, 2018

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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Date: July 9, 2018

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Date: July 9, 2018

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 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2018 Ford EcoSport SUV in accordance with the specifications of the Office of Crashworthiness Standards Side NCAP Pole Laboratory Test Procedure for the generation of consumer information on vehicle side pole crash protection. This test was conducted at Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on June 5, 2018. The impact velocity of the vehicle was 32.62 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle was 21°C. The target vehicle's maximum post-test static crush was 312 mm located at level 3. The test vehicle's occupant performance data is as follows: <table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs) (Serial No. 300)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>214.944</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>37.443</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>2442.083</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>14.848</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45</td> <td>12.505</td> </tr> </tbody> </table> The two doors on the struck side of the vehicle did not separate from the body at the hinges or latches and the opposite doors did not open during the side impact event.				Measurement Description	Driver ATD (SID-IIs) (Serial No. 300)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	214.944	Resultant Lower Spine Acceleration	G	82	37.443	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2442.083	Maximum Thoracic Rib Deflection	mm	38	14.848	Maximum Abdomen Rib Deflection	mm	45	12.505
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17. Key Words New Car Assessment Program (NCAP) Side Impact Pole Part 572V SID-IIs		18. Distribution Statement Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave. SE Washington, D.C. 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833																												
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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2018 New Car Assessment Program Side Impact Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under Contract No. DTNH22-14-D-00352. The purpose of this test is to generate comparative side impact performance in a 2018 Ford EcoSport SUV. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2018 Ford EcoSport SUV. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.62 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on June 5, 2018. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

One Part 572V (SID-IIs) dummy was placed in the driver designated seating position according to instructions specified in the OCWS Side NCAP Pole Laboratory Test Procedure, dated October 2015. Camera locations and other pertinent camera information are included on page 3-11 in this report.

The Part 572V (SID-IIs) dummy was instrumented accordingly:

Head CG tri-axial accelerometers

Thorax upper, middle, and lower rib displacement potentiometers

Abdomen upper and lower rib displacement potentiometers

Lower spine tri-axial accelerometers

Iliac load cell

Acetabulum load cell

Appendix B contains the dummy response data. Dummy configuration and performance verification data can be found in Appendix C of this report. Appendix D identifies all serial numbers, manufacturers, and calibration dates for test equipment, dummy sensors, potentiometers, and load cells used to collect data during the test.

Injury readings for the SID-IIs dummy were recorded as follows:

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	214.944
Resultant Lower Spine Acceleration	g	82	37.443
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2442.083
Maximum Thoracic Rib Deflection	mm	38*	14.848
Maximum Abdominal Rib Deflection	mm	45*	12.505

*Proposed IARV

Supplemental restraint information was recorded as follows:

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 1		Left Rear (Passenger) Occupant Location 4	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

GENERAL COMMENTS:

1. P1 serial number – 300

Data Anomalies:

- Left Lower B-Pillar Y Acceleration, Exceeded calibration range at 16.6ms
- Left Middle B-Pillar Y Acceleration, Exceeded calibration range at 17.1ms

SECTION 3

OCCUPANT AND VEHICLE INFORMATION

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, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data

Data Sheet No. 3 – Dummy Longitudinal Clearance Dimensions

Data Sheet No. 4 – Dummy Lateral Clearance Dimensions

Data Sheet No. 5 – Camera and instrumentation Data

Data Sheet No. 6 – Vehicle Accelerometer Data

Data Sheet No. 7 – Rigid Pole Load Cell Data

Data Sheet No. 8 – Post-Test Observations

Data Sheet No. 9 – Test Vehicle Profile Measurements

Data Sheet No. 10 – Test Vehicle Exterior Crush Measurements

Data Sheet No. 11 – Vehicle Damage Profile Distances

Data Sheet No. 12 – FMVSS No. 301 Static Rollover Results

Data Sheet No. 13 – Dummy / Vehicle Temperature and Humidity Stabilization Data

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford EcoSport SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
Test Date: 6/5/2018

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20180201
Model Year	2018
Make	Ford
Model	EcoSport
Body Style	SUV
VIN	MAJ3P1RE7JC184114
Body Color	Silver
Odometer Reading (km/mi)	135 miles
Engine Displacement (L)	1.0
Type / No. Cylinders	I4
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes

Traction Control System (TCS)	Yes
Auto-Leveling System	No
Automatic Door Locks (ADL)	Yes
Power Window Auto-Reverse	No
Other Optional Feature	--
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso / Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head / Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso / Pelvis Airbag	Yes
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	No

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	12/17
Vehicle Type	MPV

GVWR (kg)	1810
GAWR Front (kg)	955
GAWR Rear (kg)	865

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	-	5
Capacity Weight (VCW) (kg)				375
DSC X 68.04 kg				340.2
Cargo Weight (RCLW) (kg)				34.8

(A)

(B)

(A-B)

VEHICLE SEAT TYPE

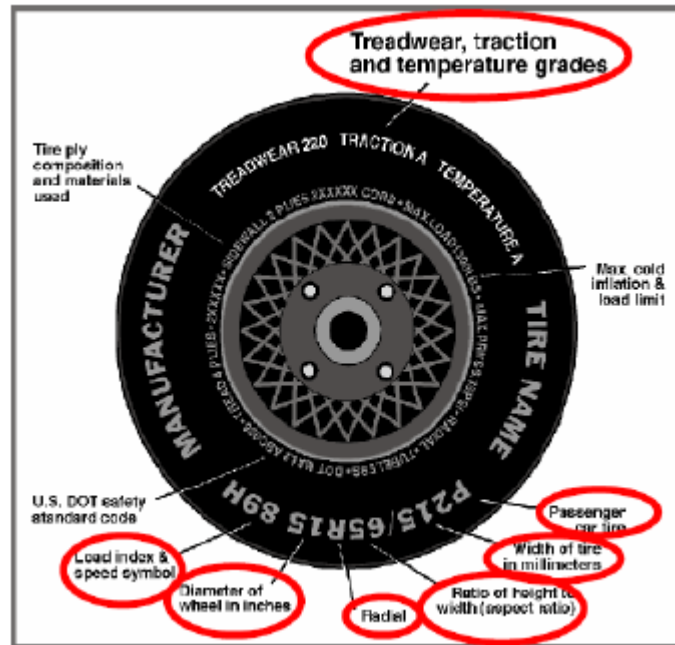
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat			X		X		
Third Row seat							

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

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018

Collected for year, make, model, & VIN, all 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)	240	240
Recommended Tire Size	205/60R16	205/60R16
Tire Size on Vehicle	205/60R16	205/60R16
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Ecopia EP422	Ecopia EP422
Treadwear	600	600
Traction	A	A
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	92H	92H
Tire Material	Rubber	Rubber
DOT Safety Code Left	1V20	1V20
DOT Safety Code Right	1V20	1V20

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

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	255	252	260	250
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	427	286		445	314		446	325	
Right	kg	413	256		423	279		416	284	
Ratio	%	61	39		59	41		59	41	
Totals	kg	840	542	1382	868	593	1461	862	609	1471

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1382	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	49.9	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	34.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1466.7	(A+B+C)

Does the measured As Test Vehicle Weight lie within the required weight range
 (i.e. Calculated Test Vehicle Target Weight – 4.5 kg to – 9 kg)? ☒ Yes ☐ No

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-0.75	-0.50	-0.40	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.80	-0.50	-0.50	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	-0.45	-0.20	-0.20	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	+0.25	+0.25	+0.25	Yes
Vehicle CG (Aft of Front Axle)	mm	988	1022	1043	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	24	30	37	

* ND = Nose Down (-), NU = Nose Up (+)

** LD = Left Down (-), LU = Left Up (+)

*** The "As Tested" vehicle attitude measurements must be equal to or between the "As Delivered" and "Fully Loaded" vehicle attitude measurements. Indicate "Yes" or "No" for Meets Requirement

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

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Trunk Carpeting	11
Road Side Kit	2
Tail Light	2
Passenger Windows and door parts	9
Right Side Mirror	1
Wiper Motor Rear	1
Lisence Plate Light Assembly	1
Non-Struck Side Headrests	2
Ballast / Equipment Added	0

Test Height – Adjustable Suspension Setting, if Applicable	N/A
--	-----

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

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the forward-most, mid-height, mid-angle position. The struck-side rear passenger's seat, rear center seat, and non-struck side rear passenger's seats should be set to the rear-most, lowest, mid-angle position.

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	15.6	10.4	13
Front Passenger Seat	14.7	9.6	12.15
Front Center Seat	N/A	N/A	N/A
Struck Side Rear Seat	Fixed	Fixed	Fixed
Non-Struck Side Rear Seat	Fixed	Fixed	Fixed
Rear Center Seat	Fixed	Fixed	Fixed

SEAT HEIGHT AND ANGLE

Seat	As Tested SCRL Angle (Mid) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	13	15	Max	-	-	-
			Mid	0	7.5	15
			Min	-	-	-
Front Passenger Seat	12.15	15	Max	-	-	-
			Mid	0	7.5	15
			Min	-	-	-
Front Center Seat	N/A	N/A	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Non-Struck Side Rear Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
Rear Center Seat	Fixed	Fixed	Max	-	-	-
			Mid	-	-	-
			Min	-	-	-

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

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

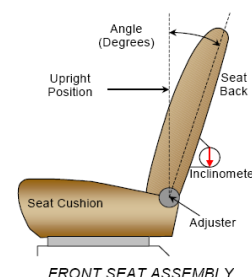
NHTSA No.: M20180201
 Test Date: 6/5/2018

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	225	35 (0-34)	0	0
Front Passenger Seat	225	35 (0-34)	0	0
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat	FIXED	FIXED	FIXED	FIXED

SEAT BACK ANGLE ADJUSTMENT

The driver's seat back is positioned such that the dummy's head is level. The front center and front passenger's seat backs are positioned in a similar manner as the driver's seat back. The struck-side rear passenger seat back is positioned in accordance with the information provided by the manufacturer on Form No. 1 for the 5th percentile female dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back are set to match the struck-side rear seat back.



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	50	-	-2.2	-
Front Passenger Seat	50.3	-	-1.8	-
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat	FIXED	FIXED	FIXED	FIXED

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1. Zero is defined as the uppermost detent

Seat	Total # of Positions	Placed in Position #
Driver Seat	4	0 – Uppermost

HEAD RESTRAINT ADJUSTMENT

The driver's head restraint is adjusted to the lowest and most full forward in-use position.

Seat	Total # of Positions	Placed in Position #
Driver Seat	3	Lowest

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

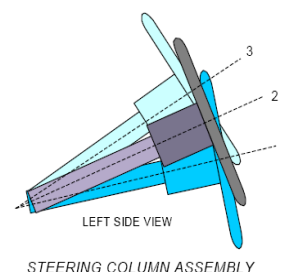
Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the center of its geometric locus it describes when it moves through its full range of motion.

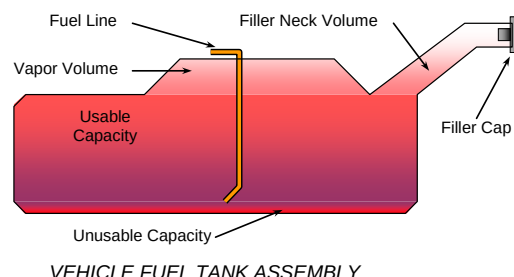
		Degrees	Fore / Aft Position (mm)
Lowermost	– Position 1	24.2	
Geometric Center	– Position 2	26.35	
Uppermost	– Position 3	28.5	
Telescoping Steering Wheel Travel			42
Test Position		26.4	21



FUEL PUMP

Describe the fuel pump type, details about how it operates, and the location of the fuel filler neck.

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.



FUEL TANK CAPACITY DATA

Description	Liters
Usable Capacity of "Standard Tank" - see Form No. 1	51.4
Usable Capacity of "Optional Tank" - see Form No. 1	N/A
Usable Capacity of "Standard Tank" - see Owner's Manual	51.4
Usable Capacity of "Optional Tank" - see Owner's Manual	N/A
93% of Usable Capacity	47.8
Actual Amount of Solvent Used in Test	47.8
1/3 of Usable Capacity	17.1

Is the Actual Amount of Solvent Used in the test equal to 93% $\pm$ 1% of the Usable Capacity stated in Form No. 1?



Yes

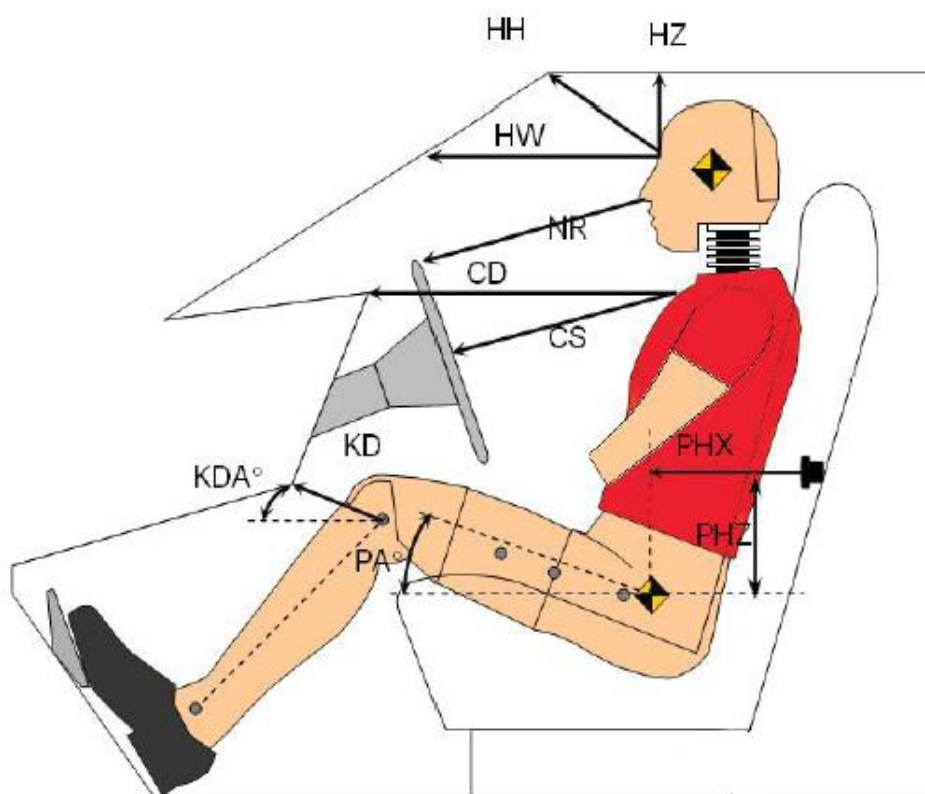


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DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018



Left Side View

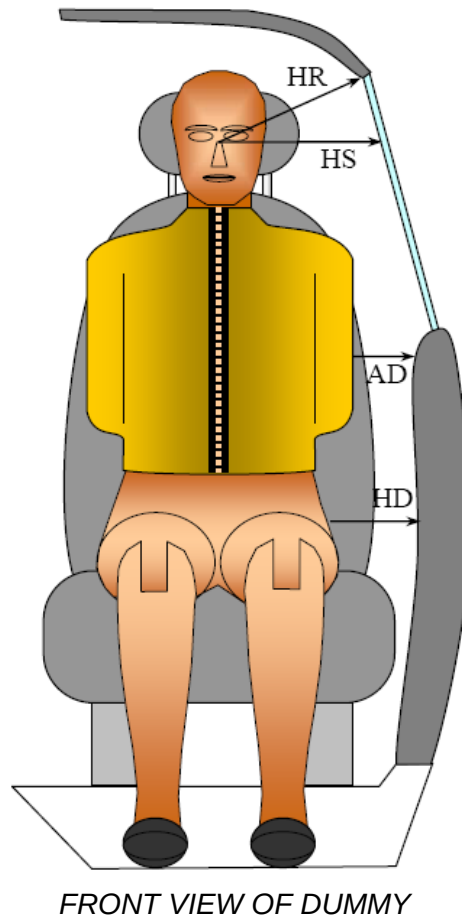
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (°)
HH	Head to Header	355	
HW	Head to Windshield	718	
HZ	Head to Roof Liner	211	
NR	Nose to Rim	264	
CD	Chest to Dash	442	
CS	Chest to Steering Wheel	213	
KD(L) / KDA(L)°	Left Knee to Dash	163	19.2
KD(R) / KDA(R)°	Right Knee to Dash	152	21.6
PAX°	Pelvic Tilt Angle (X-Axis)		20.1
PAY°	Pelvic Tilt Angle (Y-Axis)		0.3
PHX	Hip Point to Striker (X-Axis)	288	
PHZ	Hip Point to Striker (Z-Axis)	53	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Ford EcoSport SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
Test Date: 6/5/2018



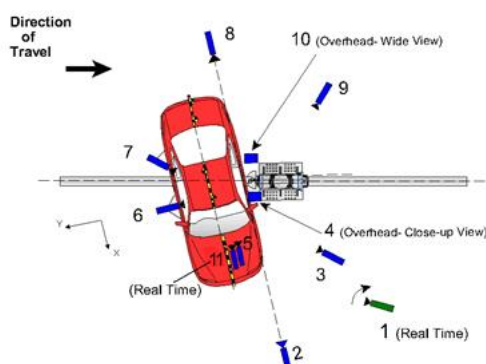
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver – Length (Serial No. 300)
HR	Head To Side Header	mm	265
HS	Head to Side Window	mm	382
AD	Arm to Door	mm	157
HD	Hip Point to Door	mm	164

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2018 Ford EcoSport SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
Test Date: 6/5/2018



CAMERA LOCATIONS AND DATA

No.	Camera View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real-time (24 - 30 fps) pan view of impact				Zoom	60
2	Front ground level - impact view	8058	0	-1329	24	1000
3	Impact side 45° - forward pole view	4850	-1404	-1833	24	1000
4	Overhead Close-up view of impact	0	0	-9375	35	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				12.5	1000
8	Rear ground level - impact view	-8933	0	-1356	24	1000
9	Impact side 45° - rearward pole view	-3426	-3547	-1729	24	1000
10	Overhead wide - view of impact	0	0	-9375	12.5	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

Notes: Reference - From Point of Impact for X and Y; from Ground for Z
+X = Forward of vehicle, +Y = Right of vehicle, +Z = Down
* All measurements accurate to ± 6 mm. Vehicle is at a 75° angle to the rigid pole.

Comments: All cameras operated as intended.

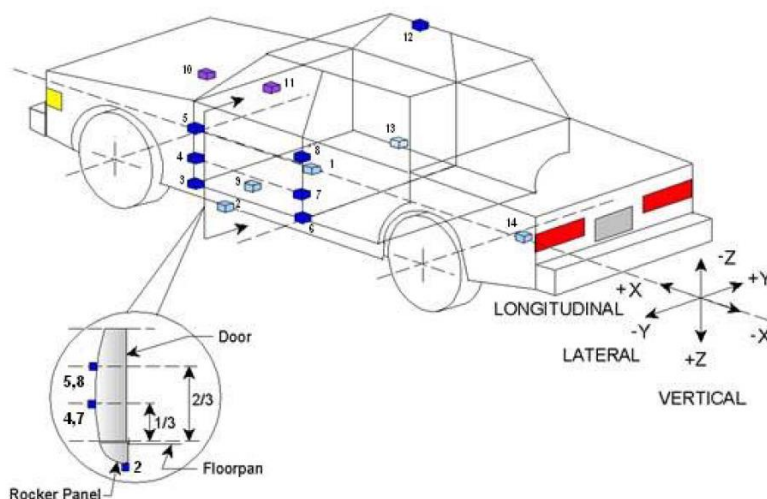
INSTRUMENTATION

Description	Number of Channels
Driver Dummy Channels	16
Vehicle Structure Accelerometers	18
Pole Load Cells	8
Total	42

DATA SHEET NO. 6 VEHICLE ACCELEROMETER DATA

Test Vehicle: 2018 Ford EcoSport SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
Test Date: 6/5/2018



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2053	26	20
2	Left Floor Sill	2363	-612	148
3	A-Pillar Sill	2735	-595	176
4	A-Pillar Low	2816	-563	-52
5	A-Pillar Mid	2761	-622	-575
6	B-Pillar Sill	1758	-620	145
7	B-Pillar Low	1778	-642	-7
8	B-Pillar Mid	1761	-654	-253
9	Driver Seat Track	1931	-526	153
10	Engine Top	3357	127	-282
11	Firewall	3257	53	-435
12	Right Roof	1751	534	-1073
13	Right Floor Sill	2359	622	146
14	Rear Floorpan	885	-27	-2

Reference: X – Rear surface of vehicle (+ forward)
Y – Vehicle centerline (+ to right)
Z – Ground plane (+ down)

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2018 Ford EcoSport SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
Test Date: 6/5/2018

POLE BARRIER



RIGID POLE LOAD CELL LOCATIONS

ID	Units	Height From Ground
1	mm	200
2	mm	590
3	mm	750
4	mm	1075
5	mm	1260
6	mm	1740
7	mm	1920
8	mm	2300

**DATA SHEET NO. 8
POST-TEST OBSERVATIONS**

Test Vehicle: 2018 Ford EcoSport SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
Test Date: 6/5/2018

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	None
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Headrest & Curtain Airbag
Left Shoulder	Seatback & Torso/Pelvis Airbag
Upper Torso	Seatback
Lower Torso	Seatback
Left Hip	Seatpan & Torso/Pelvis Airbag
Left Knee	Driver's Door

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	Yes	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	No	No	No	No	No
Latch or Hinge Systems Pulled Out of Their Anchorages	No	No	No	No	No
Disengaged from Latched Position	No	No	No	No	No
Latch Separated from Striker	No	No	No	No	No
Jammed Shut	Yes	Yes	No	No	No
If Door Opened at Striker, Width of Opening at Striker (mm)	0	0	0	0	0

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	No	No	No
Seat Disengagement from Floor Pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

DATA SHEET NO. 8 ... (CONTINUED)
POST-TEST OBSERVATIONS

Test Vehicle: 2018 Ford EcoSport SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
Test Date: 6/5/2018

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar Buckled
Sill Separation	None
Windshield Damage	Cracks throughout, separated along driver A-pillar
Side Window Damage	Driver Window Shattered
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side Driver		Struck Side Rear Passenger	
	Mounted	Deployed	Mounted	Deployed
Frontal Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

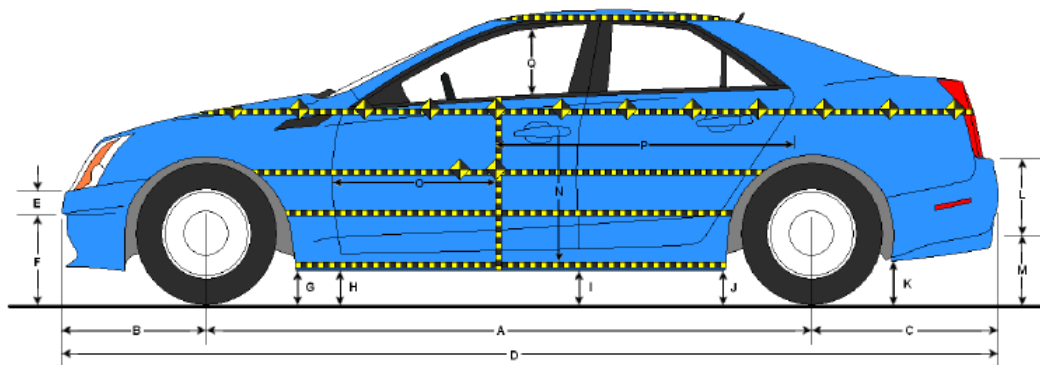
Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1108
Actual Impact Point - Aft of Front Axle	mm		1096
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 *	12
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75.0
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.62
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	32.61

* Of Intended Impact Point

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

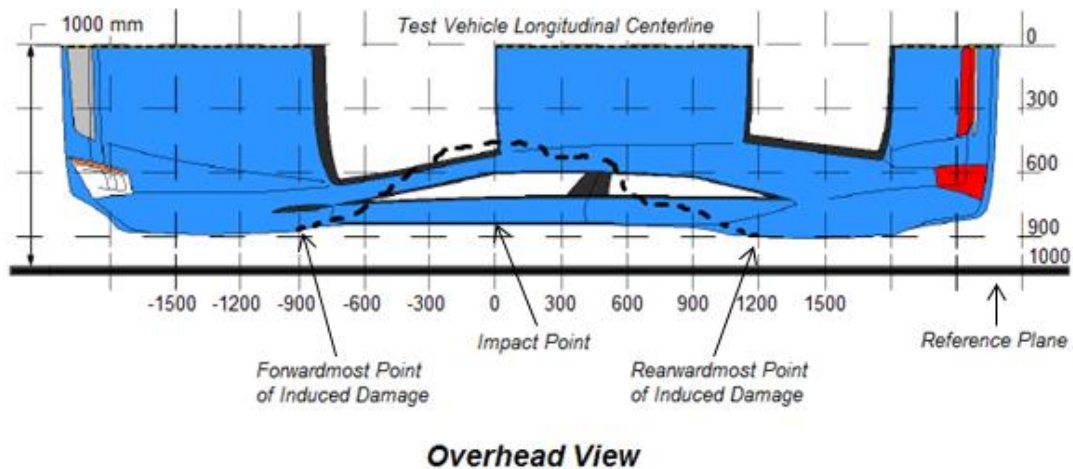
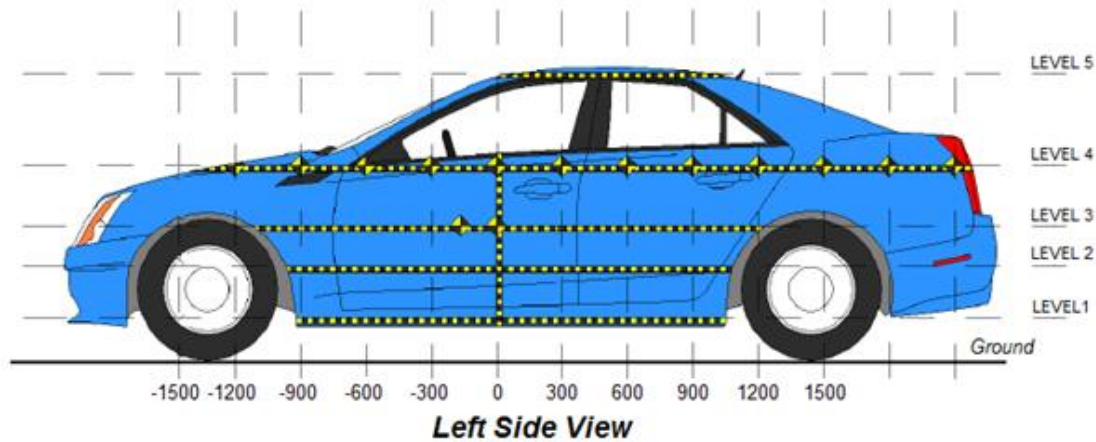
Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2519	2498	21
B	Front Axle to FSOV	838	854	-16
C	Rear Axle to RSOV	741	730	11
D	Total Length at Centerline	4098	4082	16
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	475	486	-11
G	Sill Height at Front Wheel Well	275	199	76
H	Sill Height at Front Door Leading Edge	264	247	17
I	Sill Height at B-Pillar	265	286	-21
J1	Sill Height at Rear Wheel Well	278	286	-8
J2	Pinch Weld Height at Rear Wheel Well	264	284	-20
K	Sill Height Aft of Rear Wheel Well	291	323	-32
L	Rear Bumper Thickness	220	225	-5
M	Rear Bumper Bottom to Ground	323	328	-5
N	Sill Height to Bottom of Front Window Sill	822	829	-7
O	Front Door Leading Edge to Impact CL	645	575	70
P	Rear Door Trailing Edge to Impact CL	1355	1299	56
Q	Front Window Opening	430	416	14
R	Right Side Length	3990	3989	1
S	Left Side Length	3992	3966	26
T	Vehicle Width at B-Pillars	1722	1648	74

* All measurements in mm with tolerance of $\pm 3\text{mm}$

DATA SHEET NO. 10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	342	179	0
2	Occupant Hip Point	mm	694	308	0
3	Mid - Door	mm	768	312	0
4	Window Sill	mm	1002	300	0
5	Window Top	mm	1576	112	0

NOTE: The above measurements should be taken along the vertical impact reference line. Vehicle measurements forward of the vertical impact reference line are negative.

DATA SHEET NO. 10 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

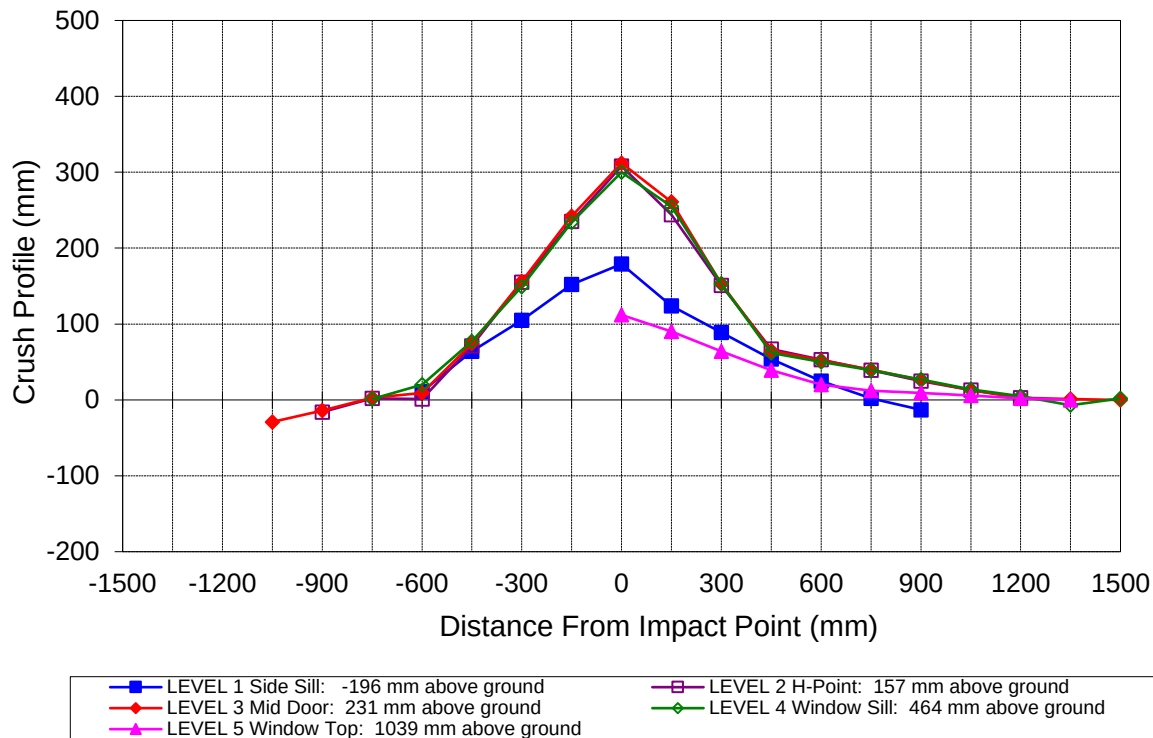
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050			883					912					-29		
-900		885	875				901	889				-16	-14		
-750		863	850	786			861	847	785			2	3	1	
-600	825	841	843	800		814	840	834	780		11	1	9	20	
-450	814	842	845	853		750	771	771	776		64	71	74	77	
-300	808	843	847	819		703	688	691	670		105	155	156	149	
-150	805	845	848	828		653	610	606	594		152	235	242	234	
0	803	845	849	836	554	624	537	537	536	442	179	308	312	300	112
150	801	845	850	841	594	677	601	589	586	504	124	244	261	255	90
300	799	844	849	846	598	710	693	696	693	534	89	151	153	153	64
450	795	841	847	848	599	741	774	782	786	560	54	67	65	62	39
600	793	839	844	850	599	768	786	792	800	579	25	53	52	50	20
750	797	835	841	849	597	795	796	801	810	585	2	39	40	39	12
900	810	830	837	843	593	823	805	811	816	584	-13	25	26	27	9
1050		846	839	832	586		833	826	818	580		13	13	14	6
1200		871	864	829	573		868	861	824	571		3	3	5	2
1350			878	821	555			877	828	555			1	-7	0
1500			876	812				876	810				0	2	

NOTE: Pre-test measurements are taken when the vehicle is in the “As Tested” weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The final distance from impact is determined after the final dummy positioning and the pole is aligned with the center of gravity of the dummy’s head.

DATA SHEET NO. 10 ... (CONTINUED)
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018



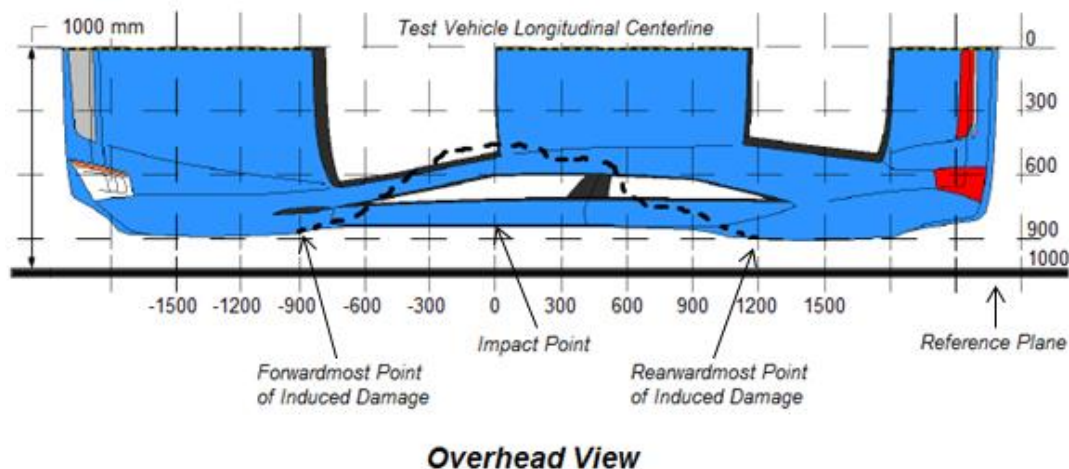
Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 11 **VEHICLE DAMAGE PROFILE DISTANCES**

Test Vehicle: 2018 Ford EcoSport SUV
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
Test Date: 6/5/2018

For guidance regarding damage profile distance measurements, please refer to the latest version of the *NHTSA Test Reference Guide, Volume 1: Vehicle Tests*.



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-1050	3	88	117	-29
2	-570	3	179	157	22
3	-90	3	422	152	270
4	390	3	252	152	100
5	870	3	191	162	29
6	1350	3	123	122	1

DATA SHEET NO. 12
FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle:	<u>2018 Ford EcoSport SUV</u>	NHTSA No.:	<u>M20180201</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>6/5/2018</u>
Test Time:	<u>9:43 AM</u>	Temperature:	<u>21° C</u>

- 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 Details: No Spillage Occurred

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	71	300	371
90° to 180°	68	300	368
180° to 270°	64	300	364
270° to 360°	71	300	371

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

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

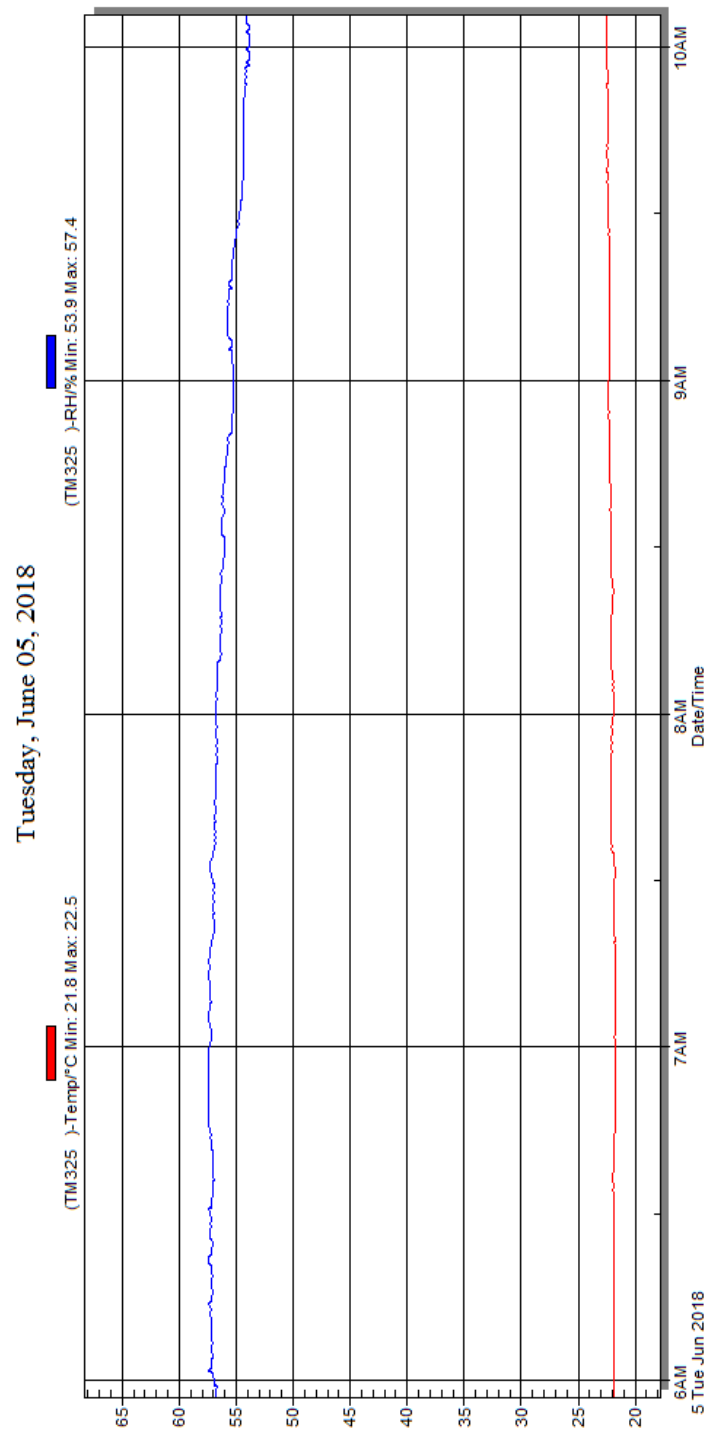
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	No Spillage Occurred
90° to 180°	No Spillage Occurred
180° to 270°	No Spillage Occurred
270° to 360°	No Spillage Occurred

DATA SHEET NO. 13
DUMMY / VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2018 Ford EcoSport SUV
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20180201
 Test Date: 6/5/2018



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

APPENDIX A
PHOTOGRAPHS

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50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-28
51	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-29
52	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	A-29
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Figure A-1: As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



Figure A-2: As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-3: Pre-Test Frontal View of Test Vehicle



Figure A-4: Post-Test Frontal View of Test Vehicle



Figure A-5: Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-6: Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



Figure A-7: Pre-Test Left Side View of Test Vehicle



Figure A-8: Post-Test Left Side View of Test Vehicle



Figure A-9: Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



Figure A-10: Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



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



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



Figure A-13: Pre-Test Right Side View of Test Vehicle



Figure A-14: Post-Test Right Side View of Test Vehicle

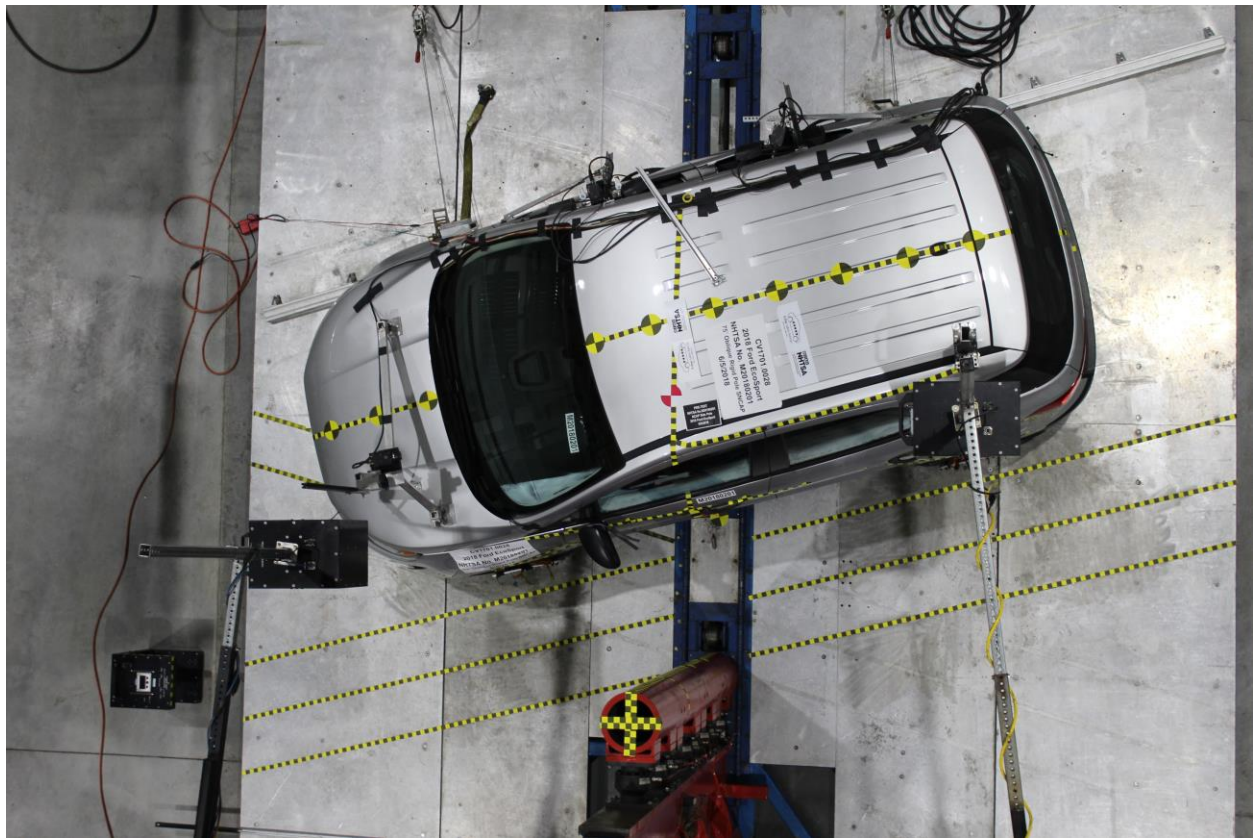


Figure A-15: Pre-Test Overhead View of Test Area

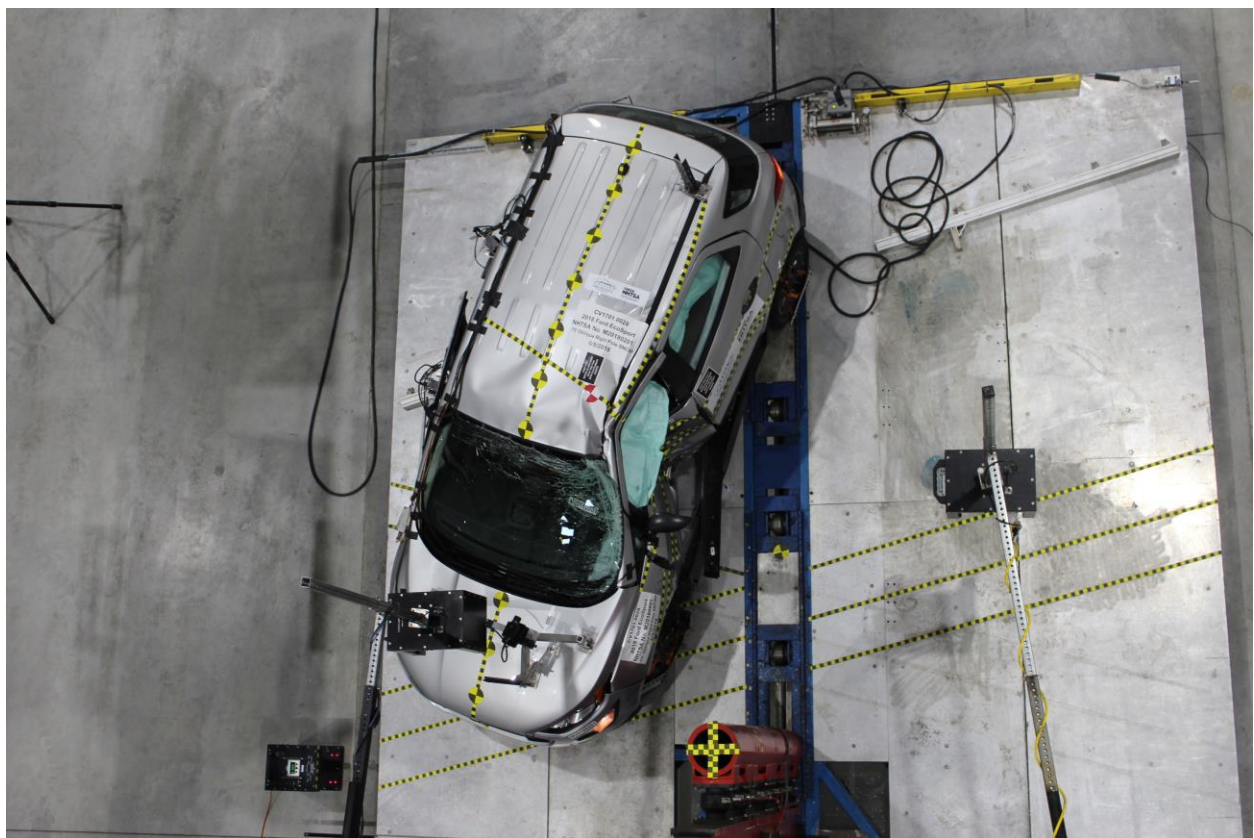


Figure A-16: Post-Test Overhead View of Test Area



Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



Figure A-18: Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



Figure A-19: Pre-Test Close-Up View of Impact Point Target



Figure A-20: Post-Test Close-Up View of Impact Point Target Showing Impact Location



Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest



Figure A-22: Post-Test Front Close-Up View of Dummy



Figure A-23: Pre-Test Left Side View of Dummy Showing Belt and Chalking



Figure A-24: Pre-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-25: Post-Test Left Side View of Dummy Shoulder and Door Top View



Figure A-26: Pre-Test Frontal View of Seat Back Prior to Dummy Positioning

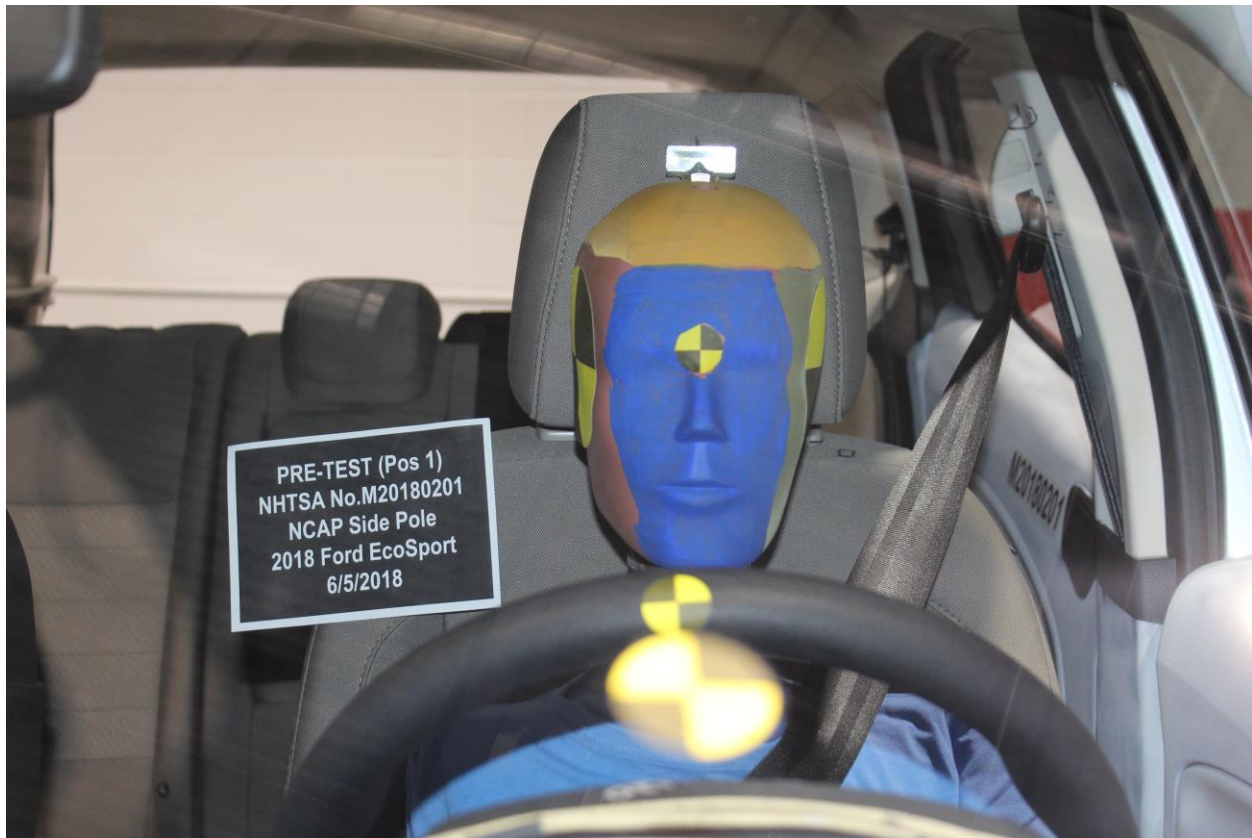


Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



Figure A-28: Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning



Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan



Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket

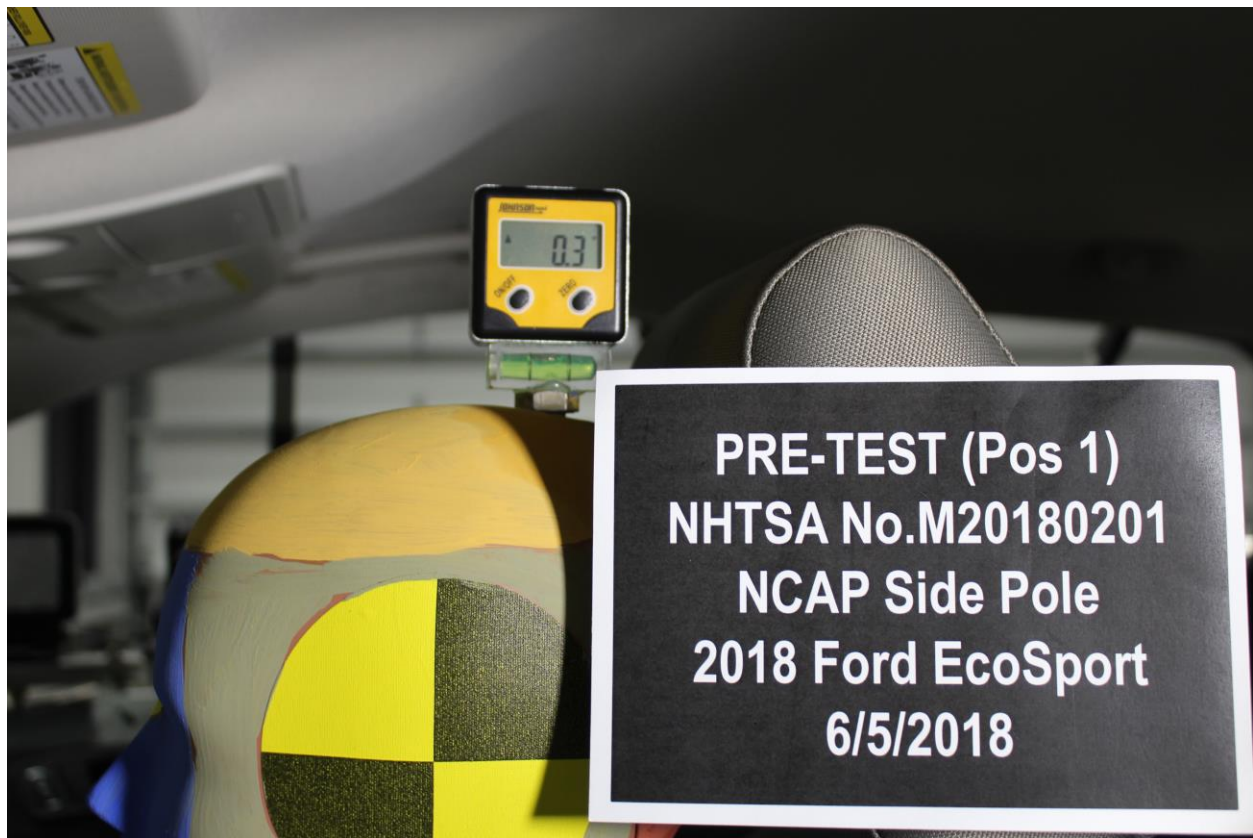


Figure A-31: Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level



Figure A-32: Pre-Test Placement of Dummy's Feet



Figure A-33: Pre-Test View of Belt Anchorage for Dummy



Figure A-34: Pre-Test Left Side View of Steering Wheel



Figure A-35: Pre-Test View of Disengaged Parking Brake



Figure A-36: Pre-Test View of Parking Brake



Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track



Figure A-38: Pre-Test Close-Up Left Side View of Driver Seat Back



Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



Figure A-40: Pre-Test Dummy and Door Clearance View



Figure A-41: Post-Test Dummy and Door Clearance View

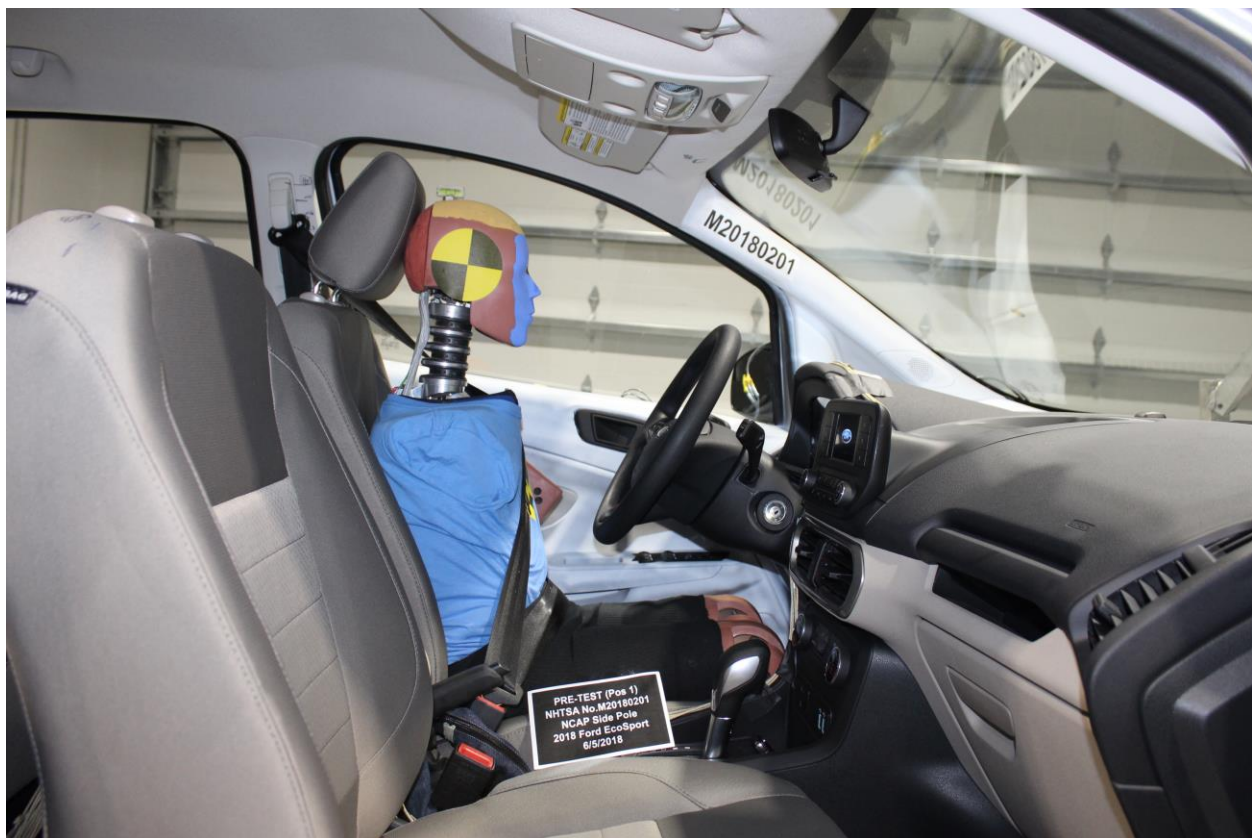


Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-43: Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



Figure A-44: Pre-Test Inner Door Panel View



Figure A-45: Post-Test Inner Door Panel View Showing Dummy Contact Location



Figure A-46: Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



Figure A-47: Post-Test Dummy Close-Up Head Contact with Side Airbag View



Figure A-48: Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



Figure A-49: Post-Test Dummy Close-Up Torso Contact with Side Airbag View



Figure A-50: Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



Figure A-51: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



Figure A-52: Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



Figure A-53: Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



Figure A-54: Post-Test View of Fuel Filler Cap or Fuel Filler Neck

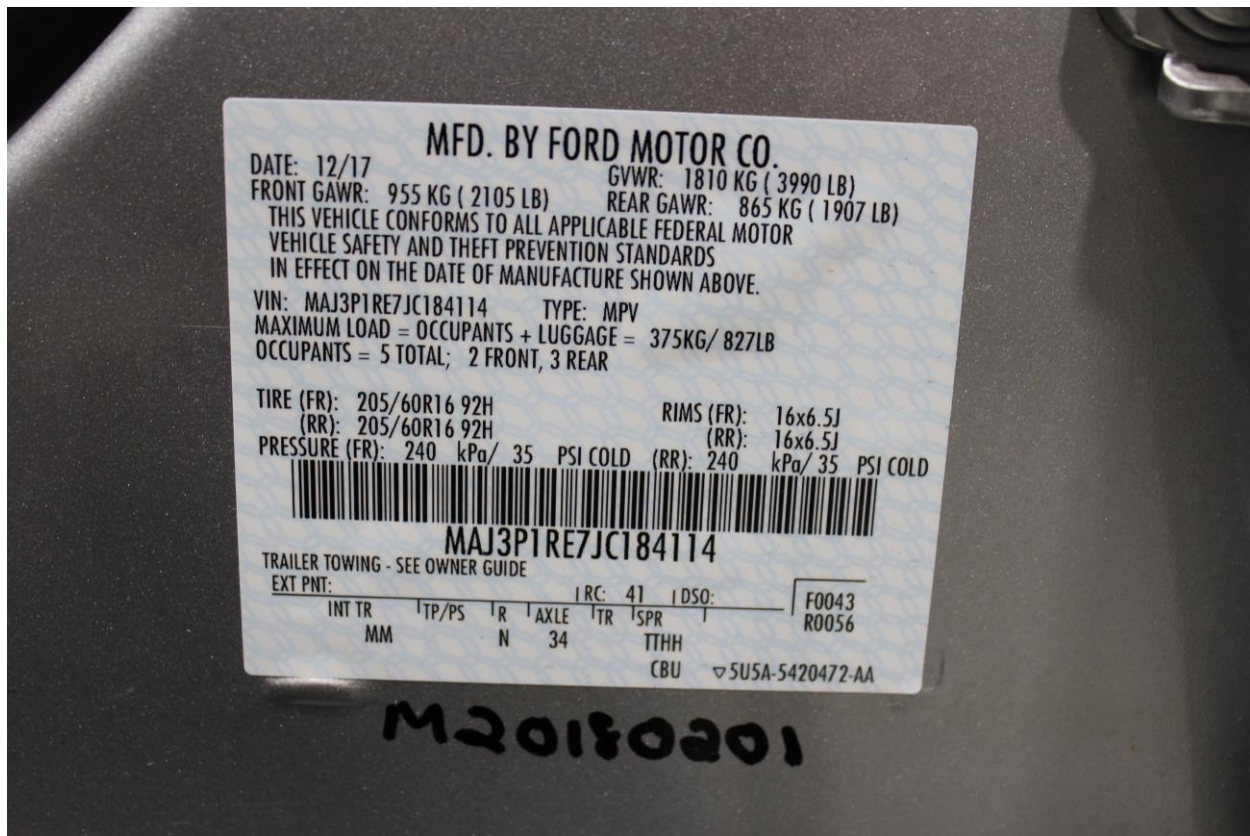


Figure A-55: Close-Up View of Vehicle's Certification Label

Photo Not Applicable

Figure A-55a: Close-Up View of Reduced Load Capacity Label



Figure A-56: Close-Up View of Vehicle's Tire Information Placard or Label

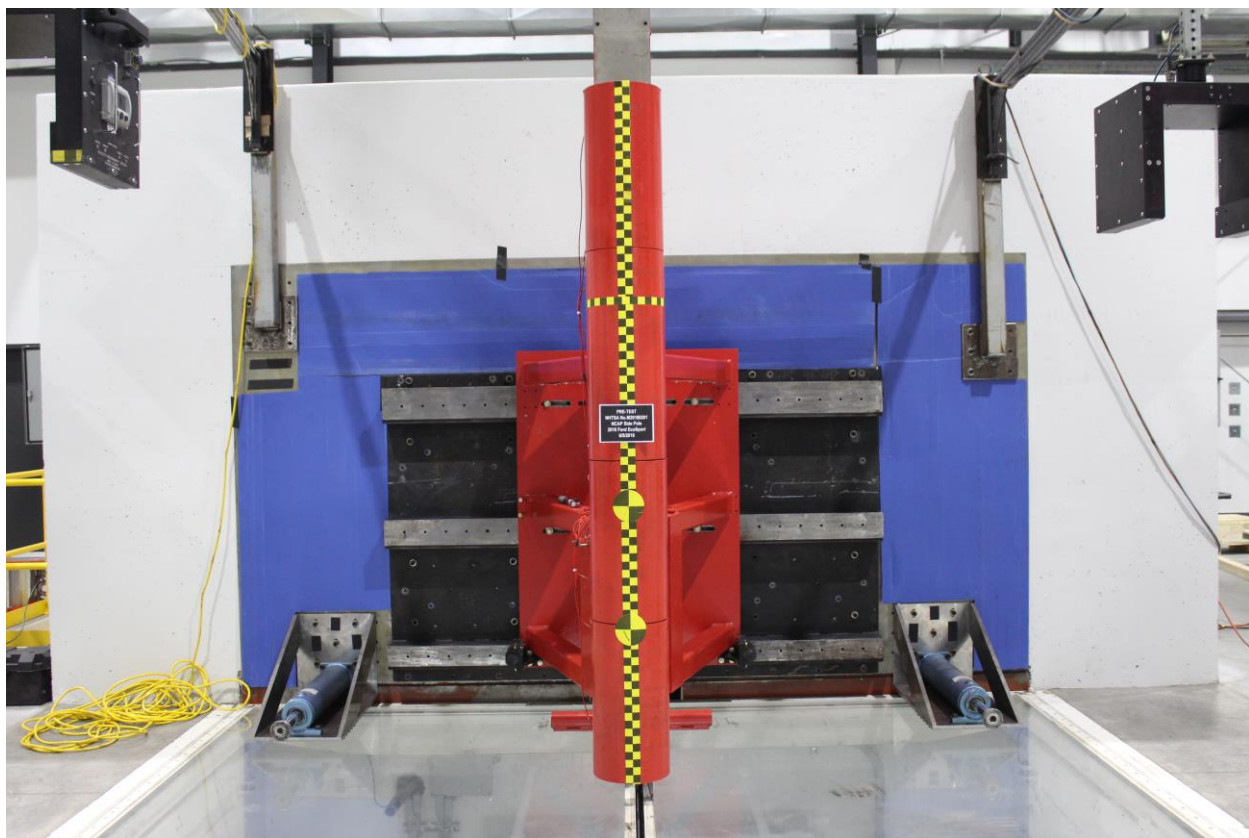


Figure A-57: Pre-Test Pole Barrier Front View

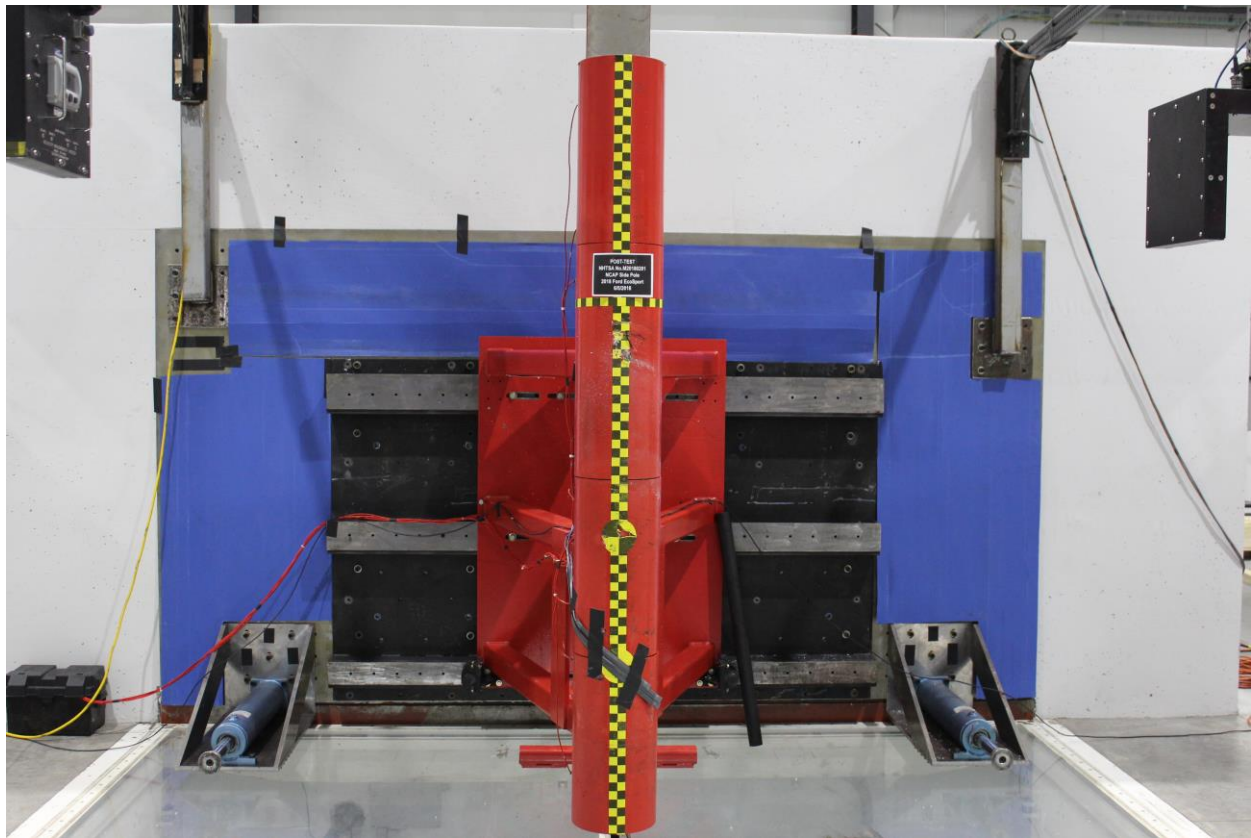


Figure A-58: Post-Test Pole Barrier Front View

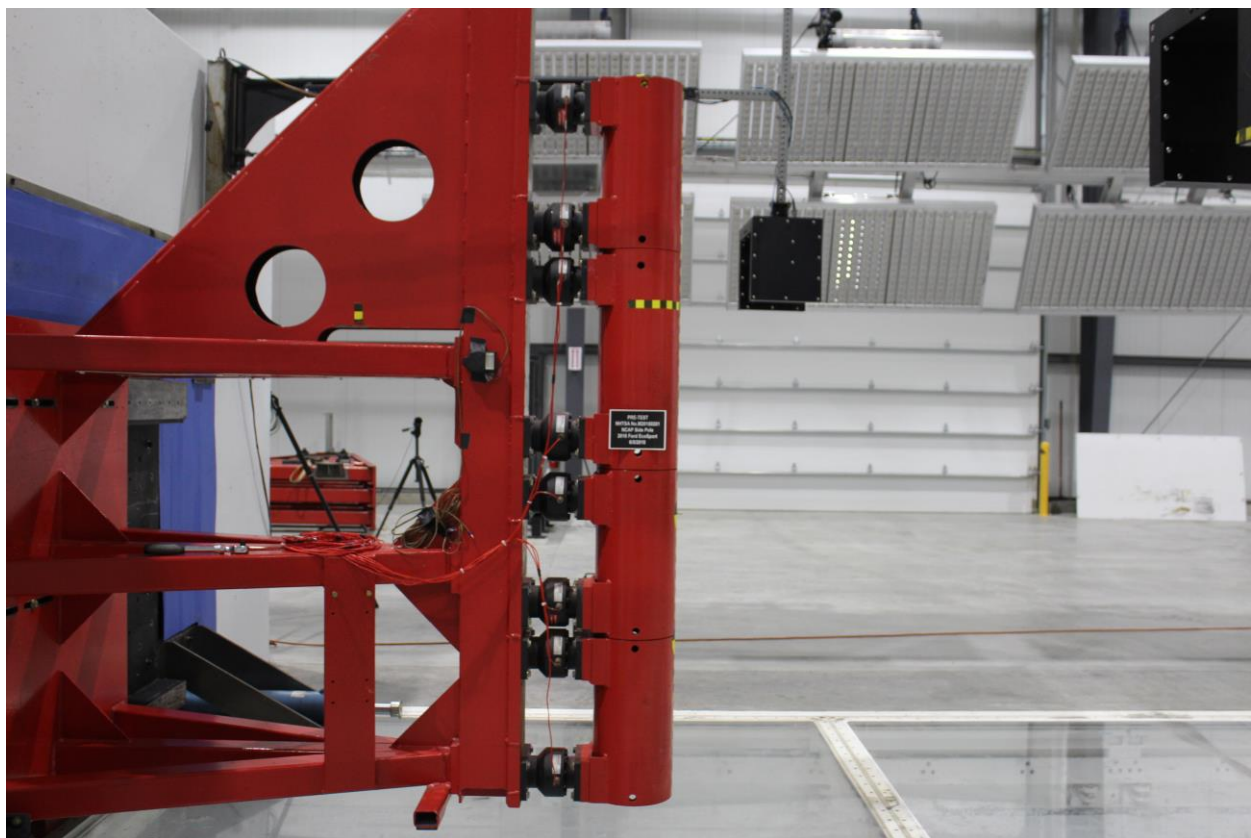


Figure A-59: Pre-Test Pole Barrier Side View

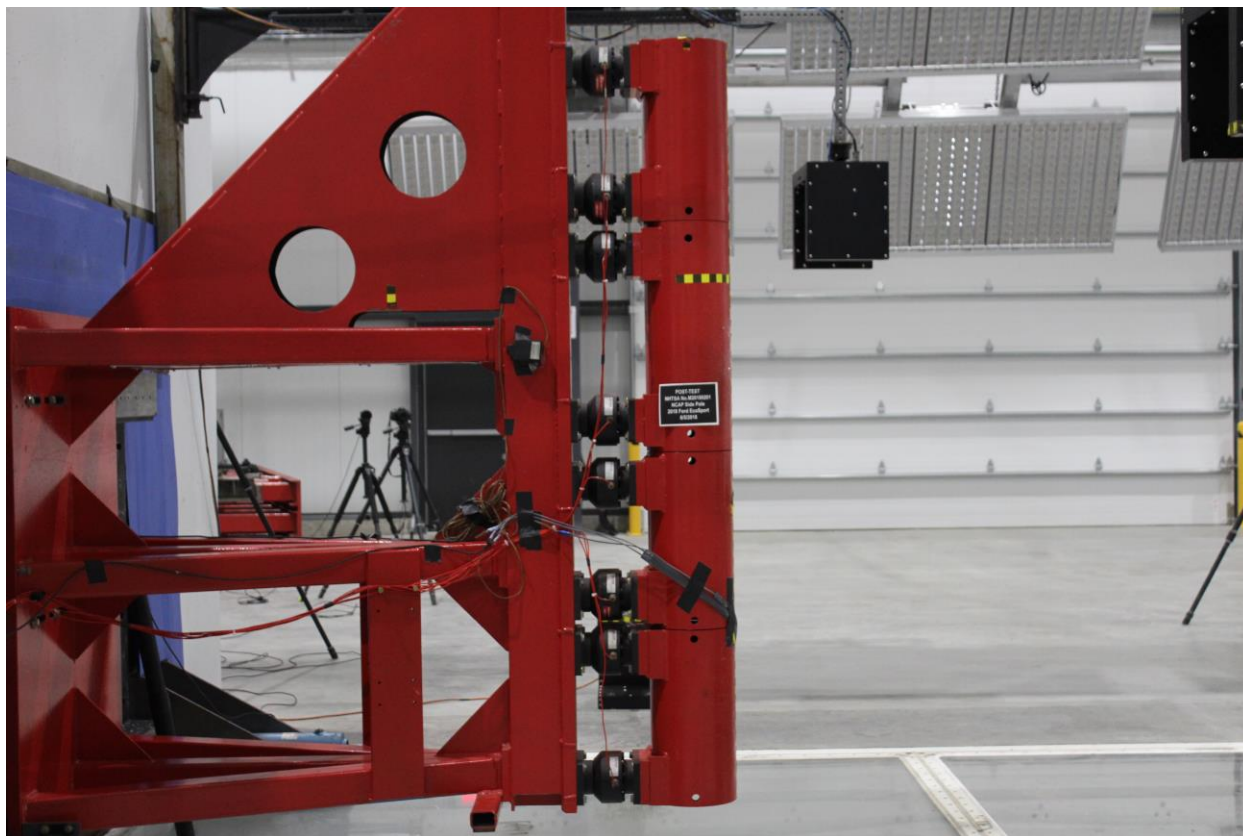


Figure A-60: Post-Test Pole Barrier Side View

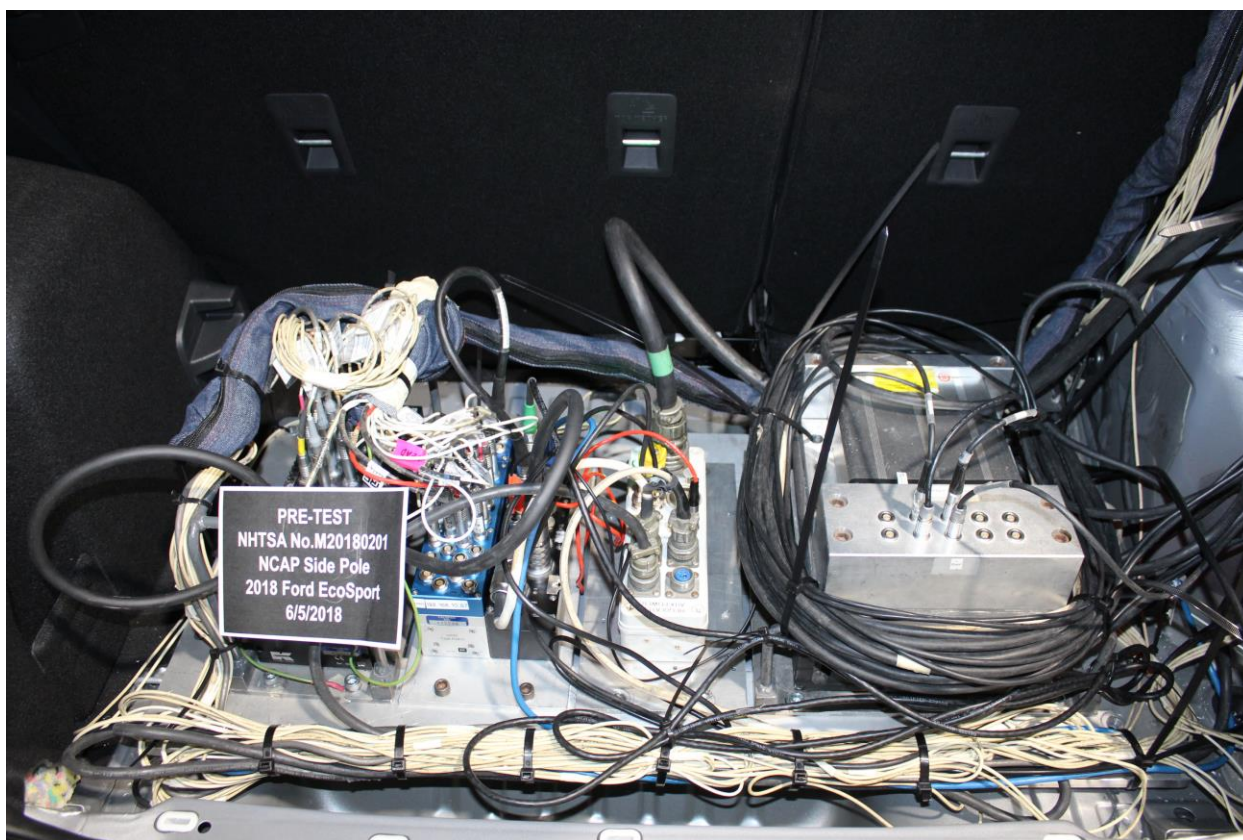


Figure A-61: Pre-Test Ballast View



Figure A-62: Post-Test Primary and Redundant Speed Trap Read-Out

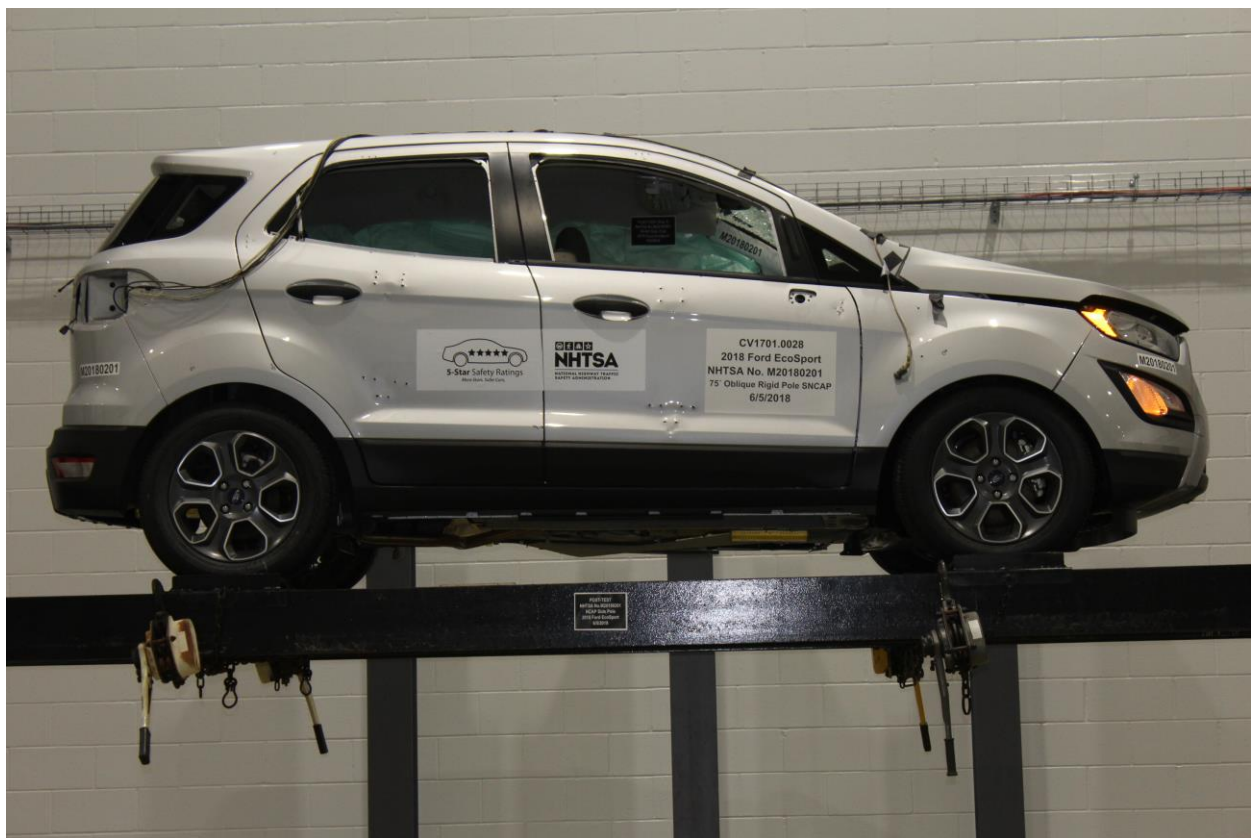


Figure A-63: FMVSS No. 301 Static Rollover 0 Degrees

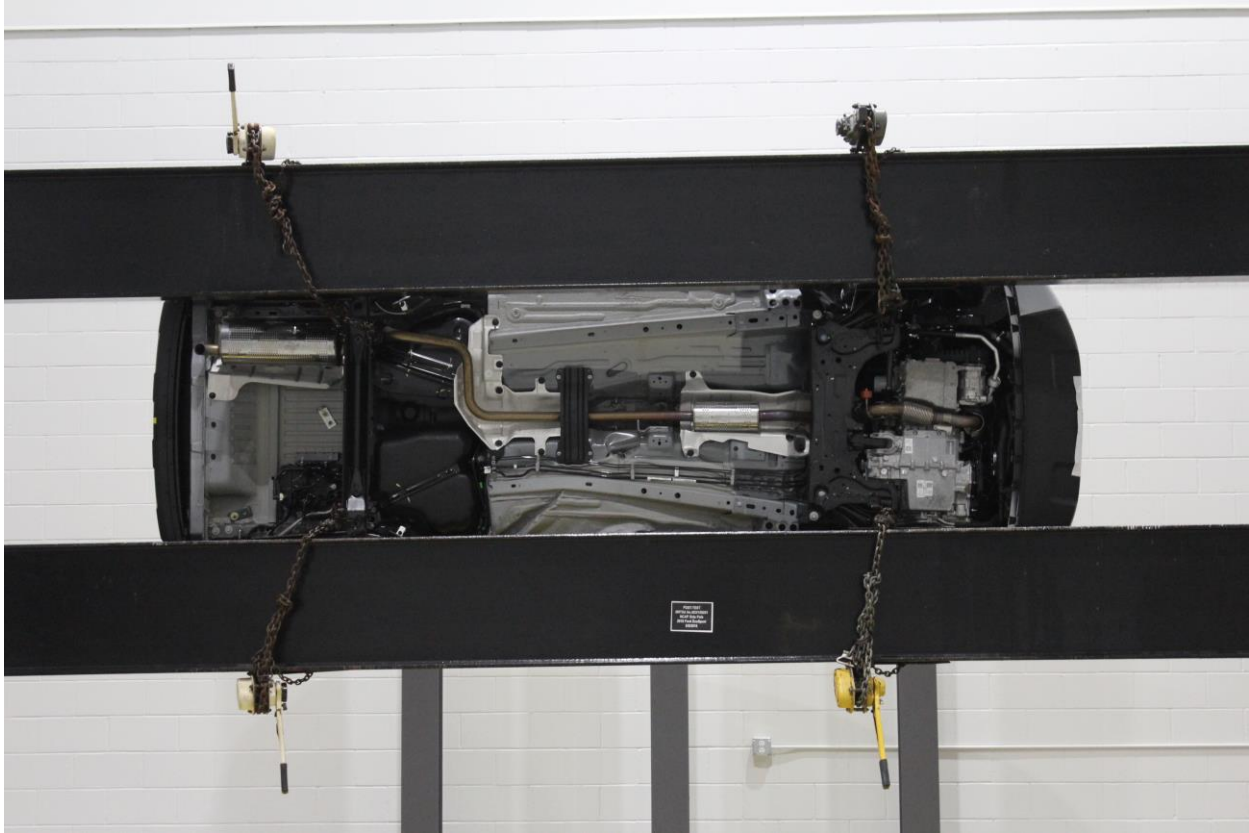


Figure A-64: FMVSS No. 301 Static Rollover 90 Degrees

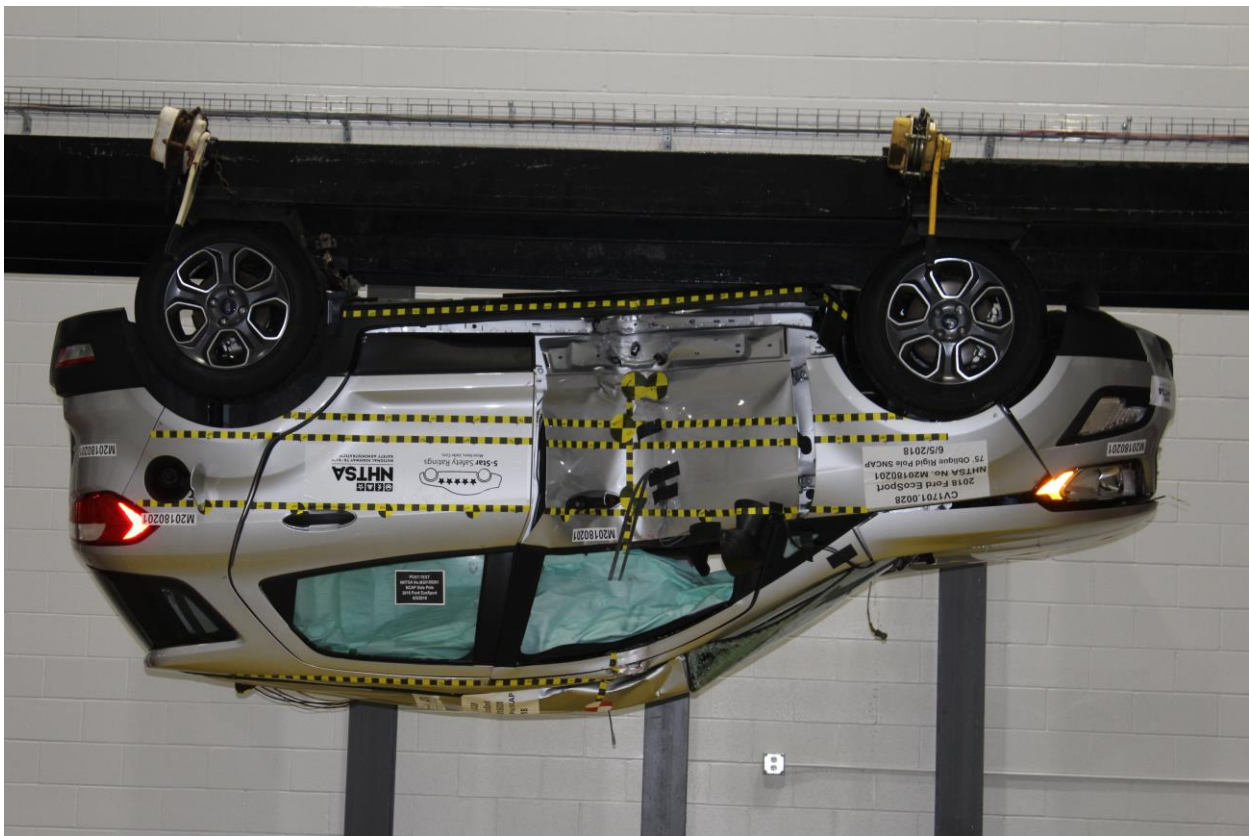


Figure A-65: FMVSS No. 301 Static Rollover 180 Degrees



Figure A-66: FMVSS No. 301 Static Rollover 270 Degrees



Figure A-67: FMVSS No. 301 Static Rollover 360 Degrees



Figure A-68: Impact Event

Go Further ford.com		VEHICLE DESCRIPTION ECOSPORT 2018 ECOSPORT S FWD 5-PASSENGER 1.6L ECOBOOST ENGINE 6-SPD AUTO TRANS W/S/LCTSHFT		JC 184114 EXTERIOR MOONDUST SILVER METALLIC INTERIOR MEDIUM STONE CLOTH SEATS		EPA DOT Fuel Economy and Environment Gasoline Vehicle Fuel Economy 28 MPG combined city/hwy 27 city 29 highway 3.6 gallons per 100 miles Small SUVs range from 18 to 37 MPG. The best vehicle rates 136 MPG.		You Save \$250 in fuel costs over 5 years compared to the average new vehicle.	
STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE									
EXTERIOR • ACQUETIC LAMINATE WINDSHLD • ACTIVE GRILLE SHUTTERS • EASY FUEL CAPLESS FILLER • HEADLAMP - AUTO HALOGEN • INTEGRATED BLIND SPOT MIRR • MIRRORS - POWER GLASS/ MANUAL FOLD • REAR INT WIPER/WASH/FRST • SWING GATE REAR DOOR • TOW HOOKS • TRAILER TOW PREP WIRING		INTERIOR • 1 TOUCH UP/DOWN DRIVER WIN • 2ND ROW 60/40 FLIP-UP • SPLIT FOLD-FLAT SEATS • BEVERAGE HOLDERS (8) • CLOTH BUCKET FRONT SEATS • FLOOR MATS - FRONT • ILLUMINATED ENTRY SYSTEM • MANUAL A/C, SINGLE ZONE • MANUAL DRIVER SEAT - 4-WAY • MANUAL PASS SEAT - 4-WAY • POWERPOINTS - 12V • SLIDING VISOIR/S/LUM MIRROR • SMART CHARGING USB PORT(2) • STEERING TILT/TELESCOPE CRUISE & AUDIO CONTROLS		FUNCTIONAL • 4.2" LCD CTR STACK SCREEN • AM/FM, MP3, 6-SPEAKERS • AUTO START STOP TECH • BRAKES, 4-WHEEL DISC/ABS • HILL START ASSIST • MKX100 • POWER STEERING W/EPAS • REAR VIEW CAMERA • REMOTE KEYLESS ENTRY • SYNC® WITH APPLE®		SAFETY/SECURITY • ADVANCETRAC WITH RSC • AIRBAG-DRIVER/PASS KNEE • AIRBAGS - DUAL STAGE FRONT • AIRBAGS - FRONT SEAT • MOUNTED SIDE IMPACT • AIRBAGS - SAFETY CANOPY • FRT-PASS SENSING SYSTEM • NOW TIRE PRESS MONIT SYS • LATCH CHILD SAFETY SYSTEM • SECURILOCK® ANTI-THIEF SYS • SOS POST CRASH ALERT SYS		WARRANTY • 5YR/60,000 BUMPER / BUMPER • 5YR/60,000 POWERTRAIN • 5YR/60,000 ROADSIDE ASSIST	
INCLUDED ON THIS VEHICLE (MSRP) OPTIONAL EQUIPMENT/OTHER EQUIPMENT GROUP 100A 16" MAGNETIC PNTD ALUM WHEELS 225/65R16 A/S BSW TIRES 90 STATE EMISSIONS FRONT LICENSE PLATE BRACKET		PRICE INFORMATION (MSRP) BASE PRICE \$19,995.00 TOTAL OPTIONS/OTHER \$65.00 TOTAL VEHICLE & OPTIONS/OTHER DESTINATION & DELIVERY 19,995.00 \$65.00		GOVERNMENT 5-STAR SAFETY RATINGS Overall Vehicle Score Not Rated Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight. Frontal Crash Driver 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.safercar.gov or 1-888-327-4236		fuel economy.gov Calculate personalized estimates and compare vehicles		GO FURTHER Go Further	
SOLD TO Roush Ford 333 West Grand Avenue Bensenville, IL 60106		41C 061 CAK6		DEALER NO. 41C 061		TOTAL MSRP \$20,990.00		SHIP TO (IF OTHER THAN SOLD TO) CHENNAI	
SHIP TO (IF OTHER THAN SOLD TO) CHENNAI		ITEM # 41-P101 O/T 2		HM283 N RA82X 815 001904 12 28 17.		MAJSP1RE7JC184114		Scan this code to experience this vehicle or test MAJJC184114 to 48028 or Visit ford.com/windowsticker	
SHIP THROUGH CONVOY		METHOD OF TRANSFER CONVOY		INSIST ON FORD PROTECT! The only extended service plan fully backed by Ford and honored at every Ford dealership in the U.S., Canada and Mexico. See your Ford dealer for additional details, or visit www.FordOwner.com for more information.		CHOOSE THE VEHICLE YOU WANT. Whether you decide to lease or finance, you'll find the choice that's right for you. See your Ford Dealer for details or visit www.FordCredit.com.		Standard messaging & data plan rates may apply.	

Figure A-69: Monroney Label

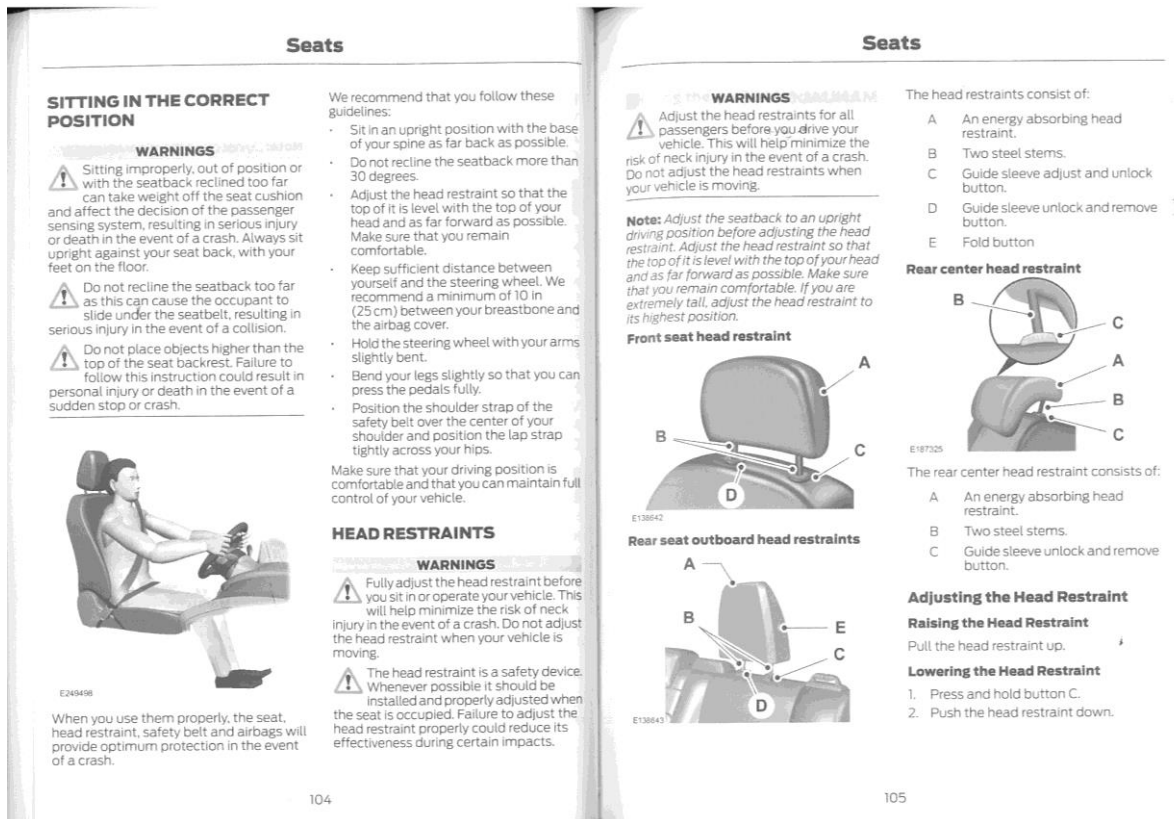


Figure A-70: Head Restraint Use and Adjustment Information from Vehicle Owner's Manual



Figure A-71: Post-Test View of Shattered Vehicle Inner Door Panel (if applicable)

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

Driver Dummy Instrumentation Plots

Fig.	Description	Page
1	Driver Head Acceleration (X) Primary vs. Time	B-4
2	Driver Head Acceleration (Y) Primary vs. Time	B-4
3	Driver Head Acceleration (Z) Primary vs. Time	B-4
4	Driver Head Resultant Acceleration Primary vs. Time	B-4
5	Driver Lower Spine T12 Acceleration (X) vs. Time	B-5
6	Driver Lower Spine T12 Acceleration (Y) vs. Time	B-5
7	Driver Lower Spine T12 Acceleration (Z) vs. Time	B-5
8	Driver Lower Spine T12 Resultant Acceleration vs. Time	B-5
9	Driver Iliac Wing Force on Impact Side (Y) vs. Time	B-6
10	Driver Acetabulum Force on Impact Side (Y) vs. Time	B-6
11	Driver Total Pelvis Force on Impact Side (Y) vs. Time	B-6

The following additional data for this test can be obtained from the Research and Development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov.

Additional Driver Dummy Instrumentation Data

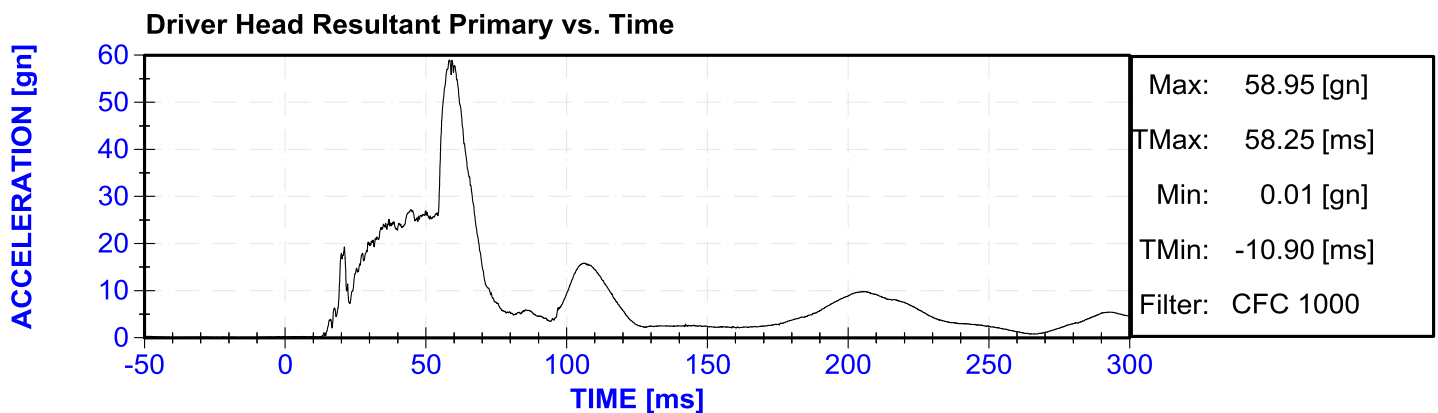
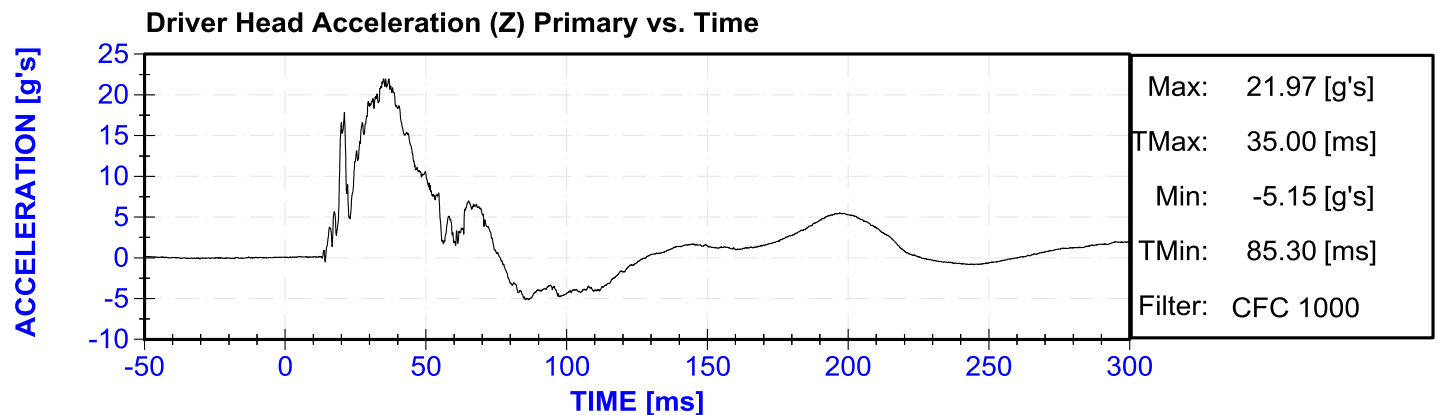
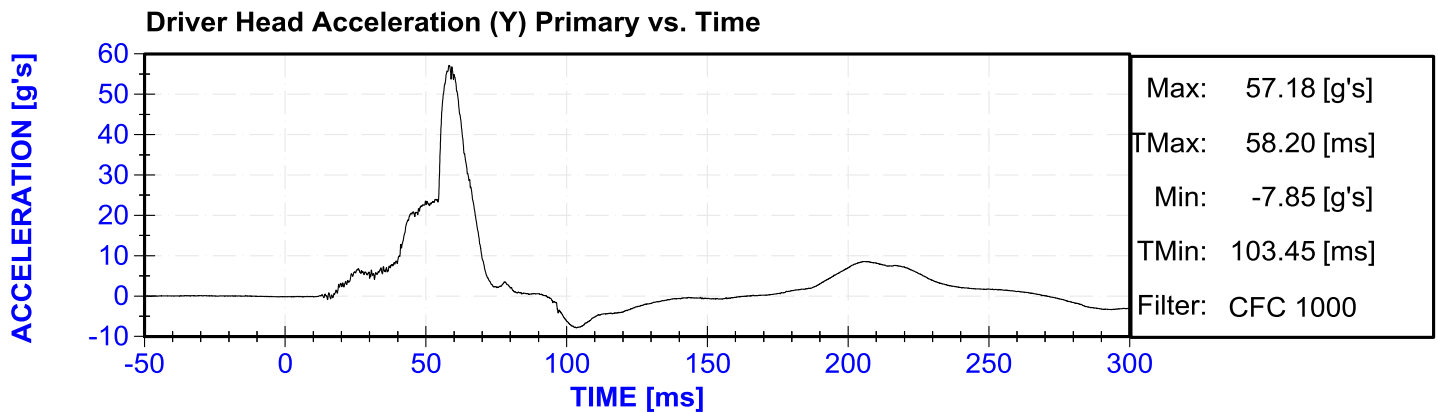
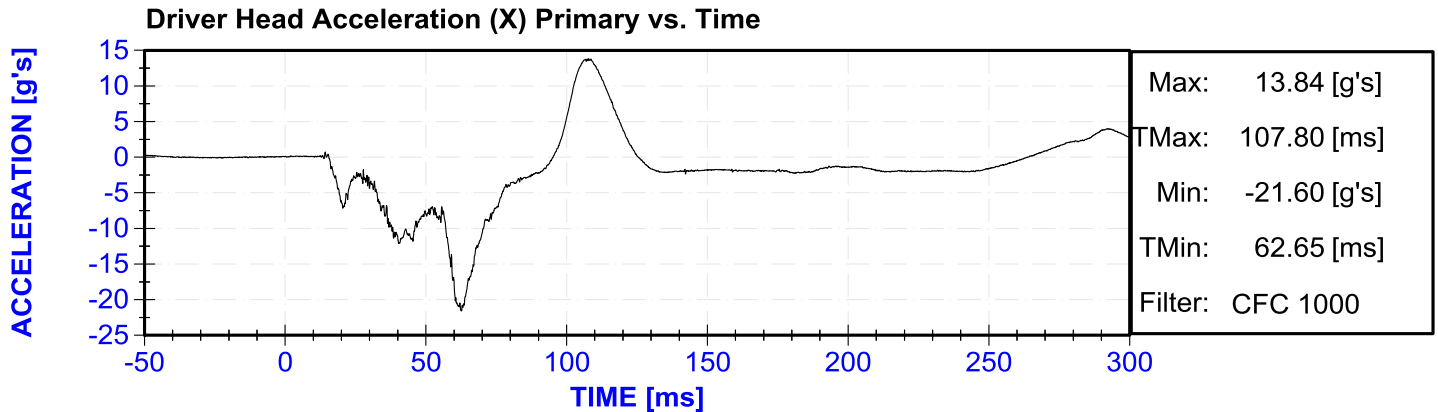
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection (Y)

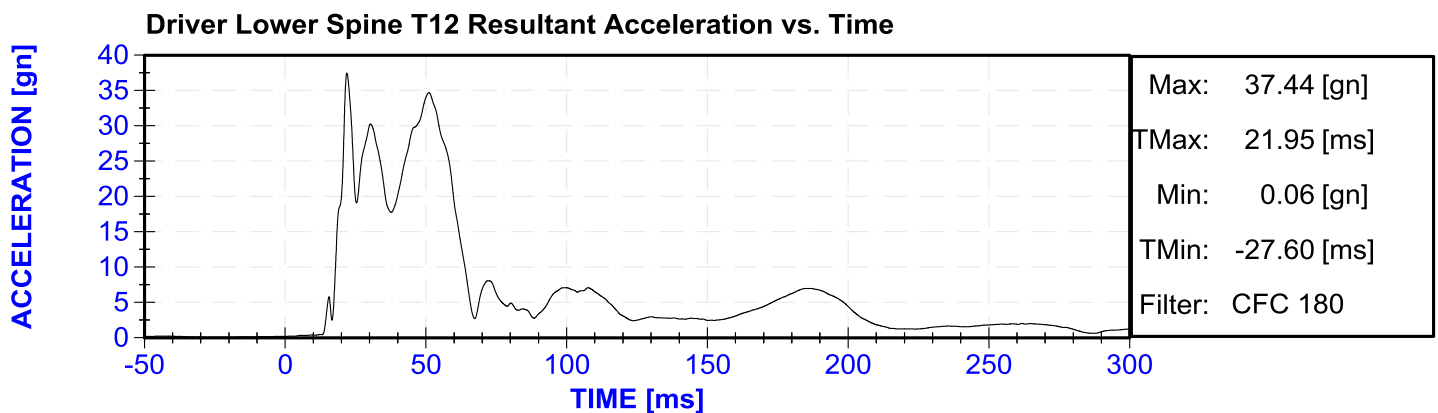
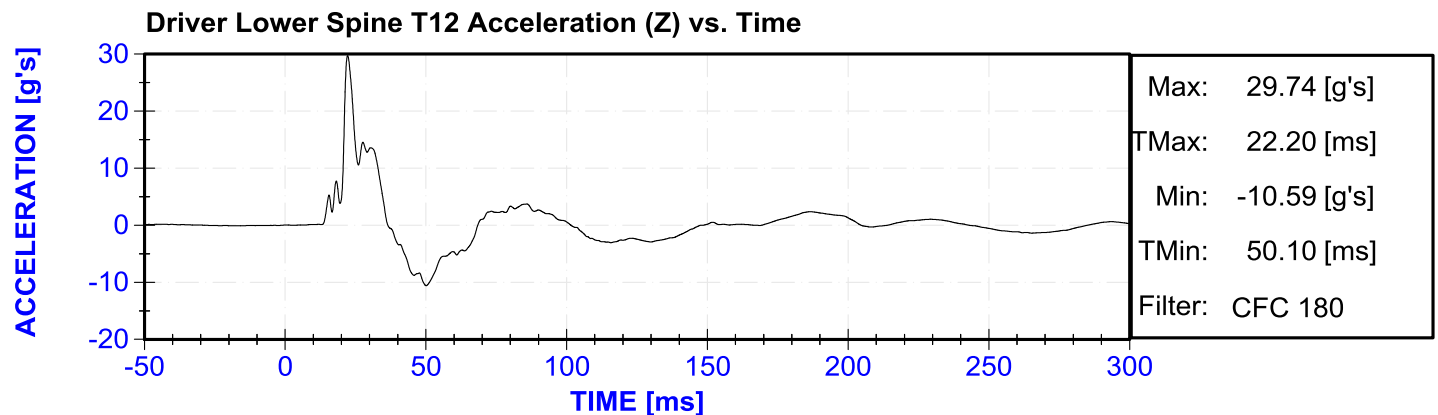
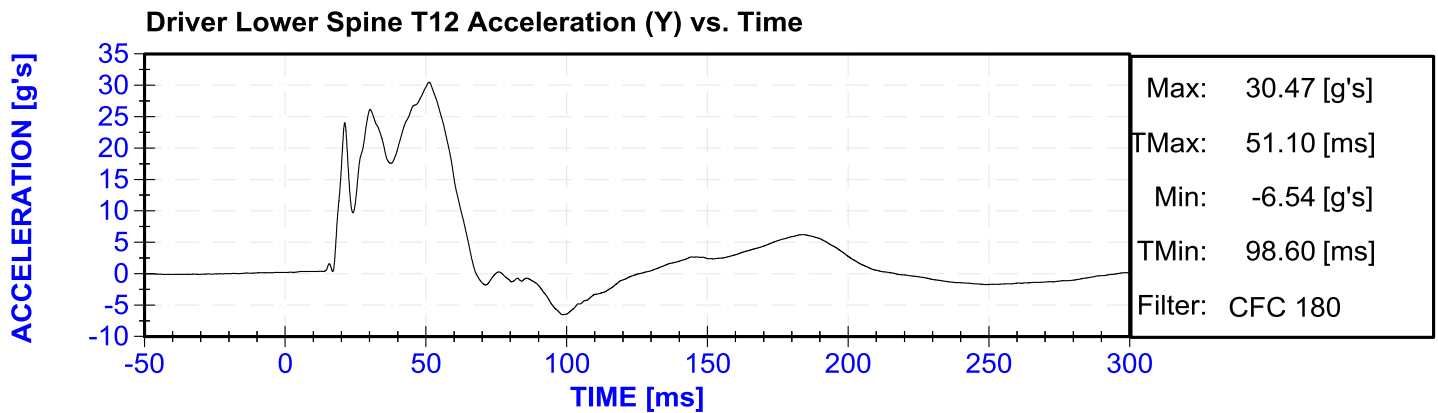
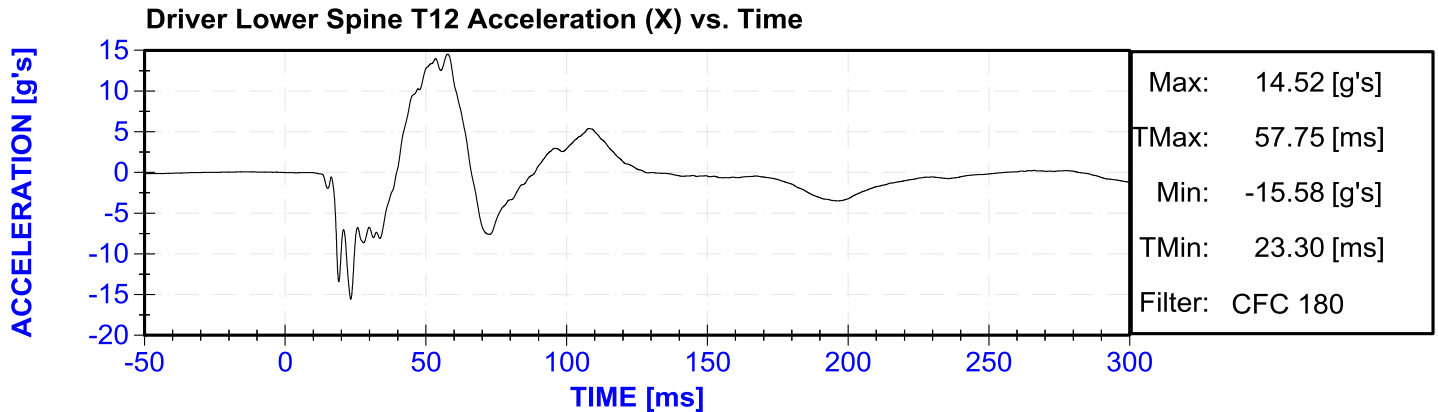
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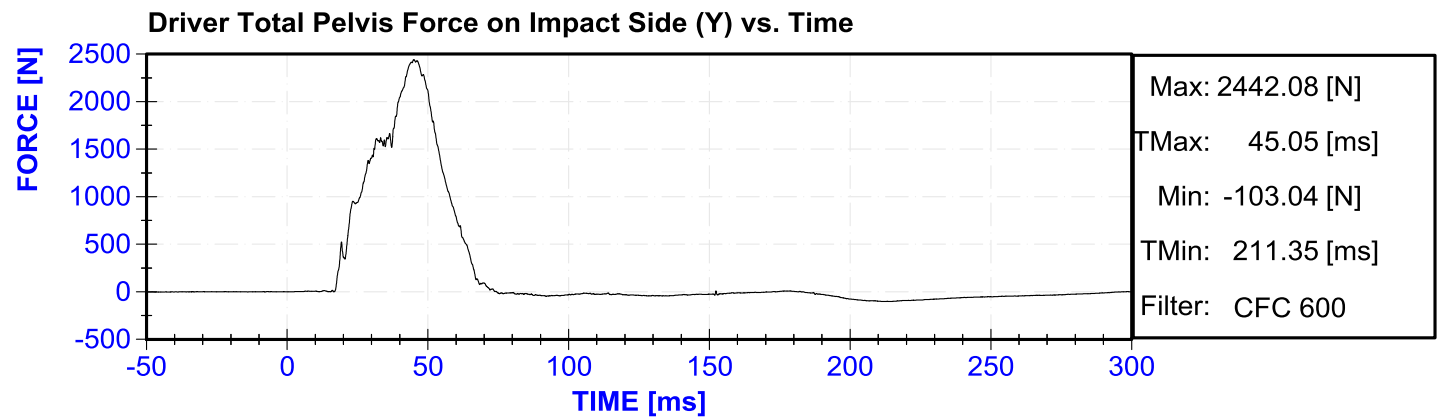
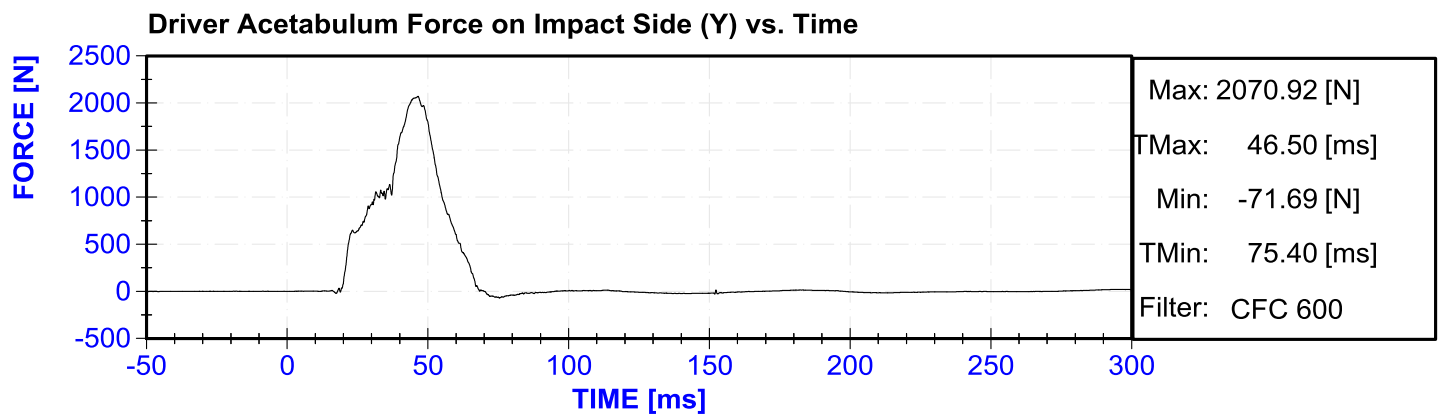
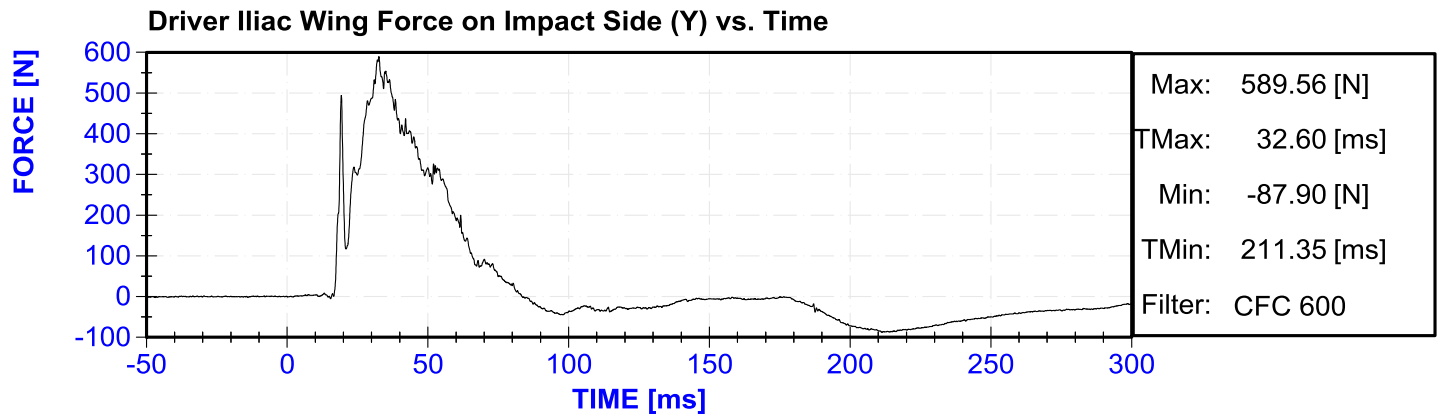
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (Y)
Left Lower B-Pillar Acceleration (Y)
Left Mid B-Pillar Acceleration (Y)
Driver Seat Track at Dummy Hip Point Acceleration (Y)
Engine Top Acceleration (X)
Engine Top Acceleration (Y)
Firewall Center Acceleration (Y)
Right Roof at Vertical Impact Reference Line Acceleration (Y)
Right Sill at Vertical Impact Reference Line Acceleration (Y)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)
Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)

Pole Instrumentation Data

Load Cell Pole Barrier #1 Force (Y)
Load Cell Pole Barrier #2 Force (Y)
Load Cell Pole Barrier #3 Force (Y)
Load Cell Pole Barrier #4 Force (Y)
Load Cell Pole Barrier #5 Force (Y)
Load Cell Pole Barrier #6 Force (Y)
Load Cell Pole Barrier #7 Force (Y)
Load Cell Pole Barrier #8 Force (Y)







APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: 300

(CONFIGURED FOR LEFT SIDE IMPACT)

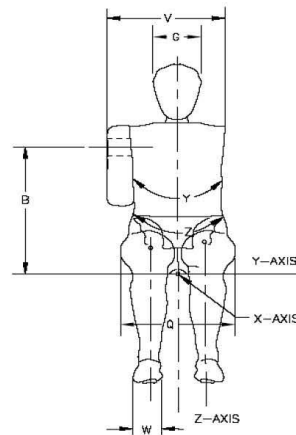
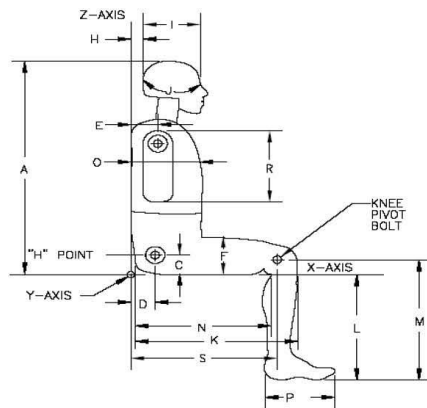


External Measurements - SID-IIs

Technician: K. Brogan

Date: 5/21/2018

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	447	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	123	Pass
G	Head Breadth	140	148	143	Pass
H	Head Back from Backline	40	46	44	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	547	Pass
K	Buttock to Knee Length	514	540	529	Pass
L	Popliteal Height	343	369	359	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	433	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	224	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	252	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	869	Pass
Z	Waist Circumference	761	791	771	Pass

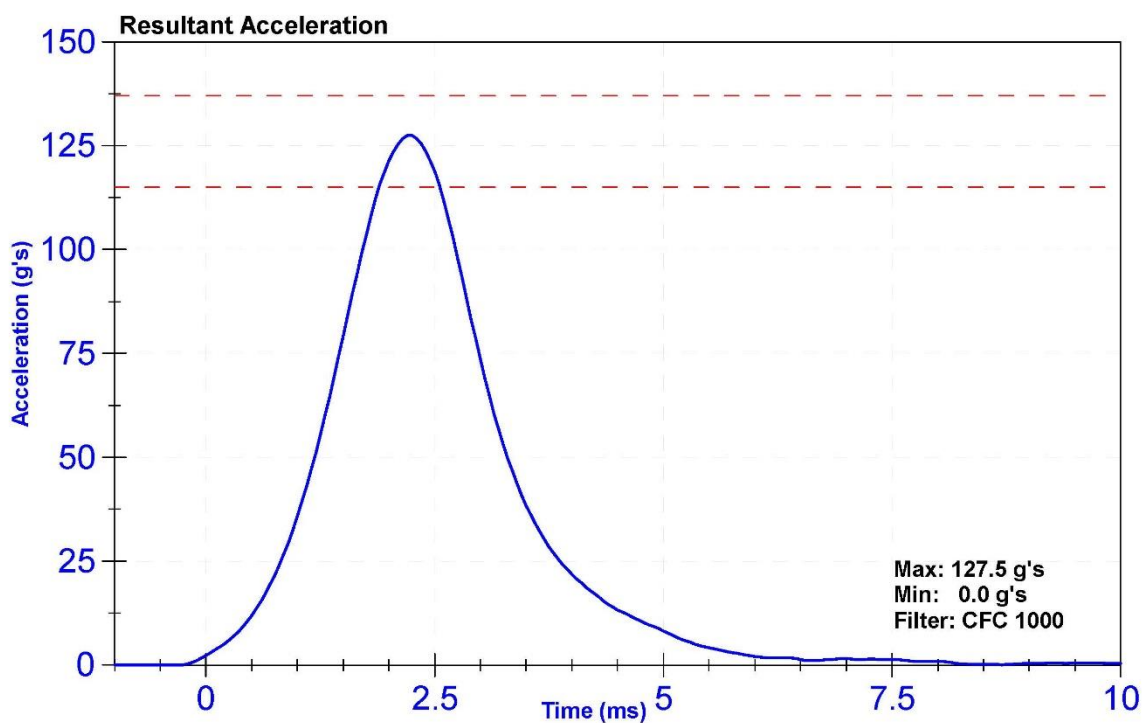
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ATD Serial Number	300	Laboratory Supervisor	K. Brogan

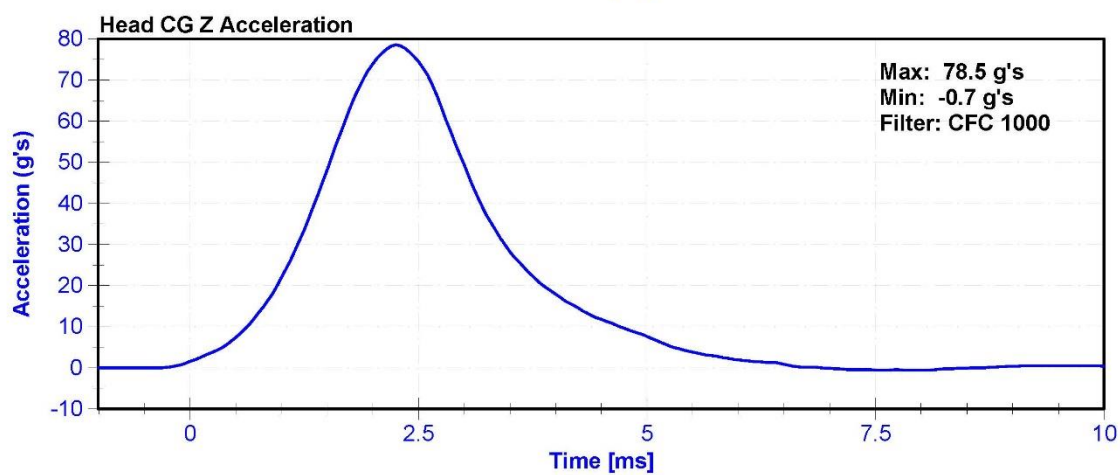
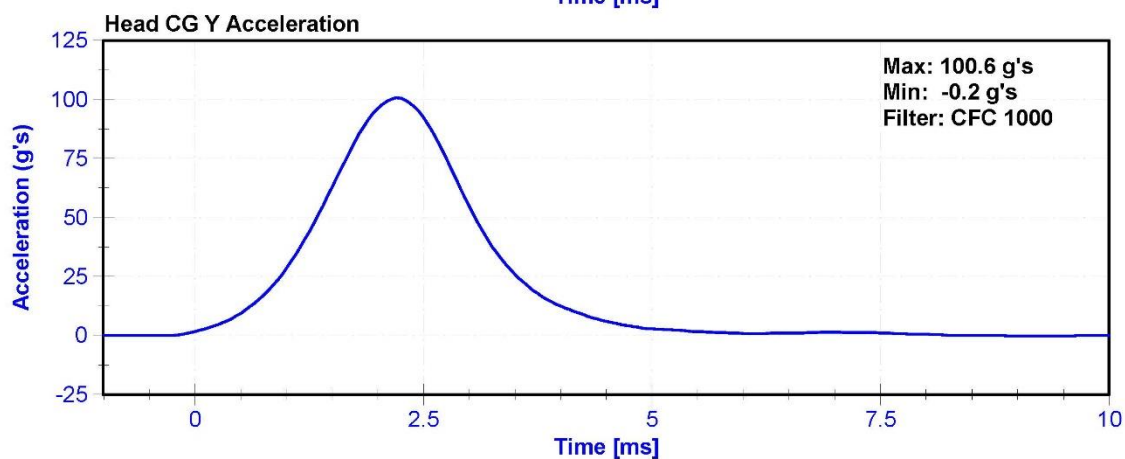
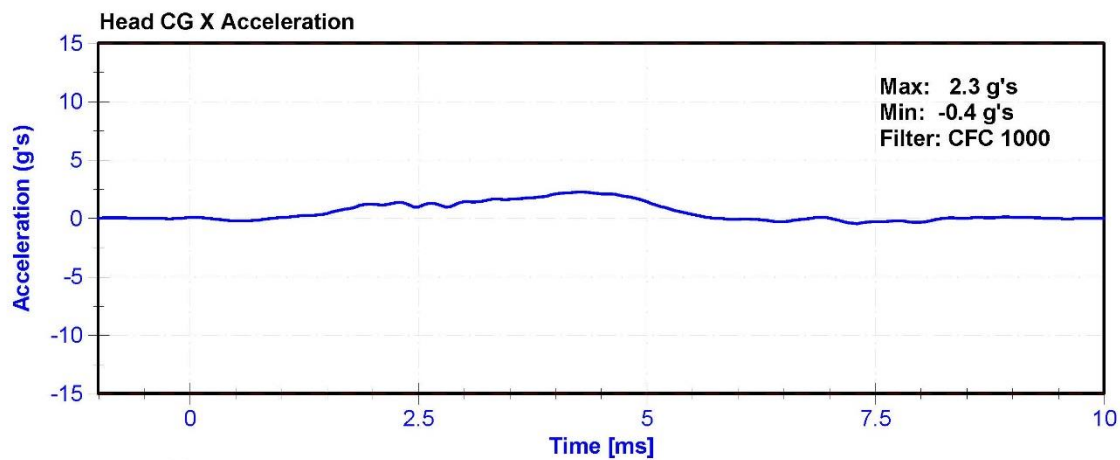
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	38.7	Pass
Resultant Acceleration	115	137	g's	127.5	Pass
Oscillation	0	15	%	1.3	Pass
Fore-Aft Acceleration	-15	15	g's	2.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	5/7/2018	11/5/2018
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	5/7/2018	11/5/2018
Z Accelerometer	ENDEVCO 7264	AC-P79189	5/7/2018	11/5/2018





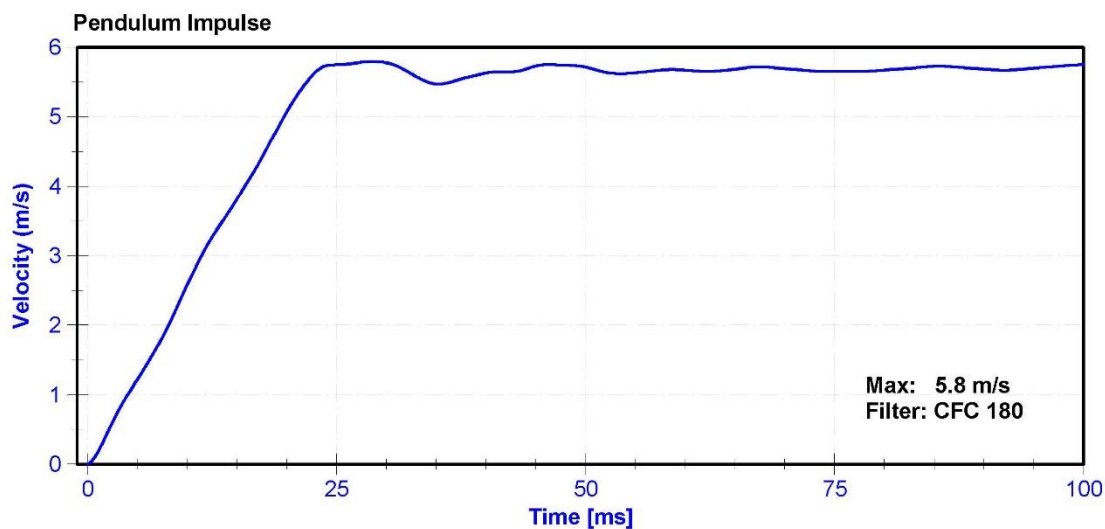
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ATD Serial Number	300	Laboratory Supervisor	K. Brogan

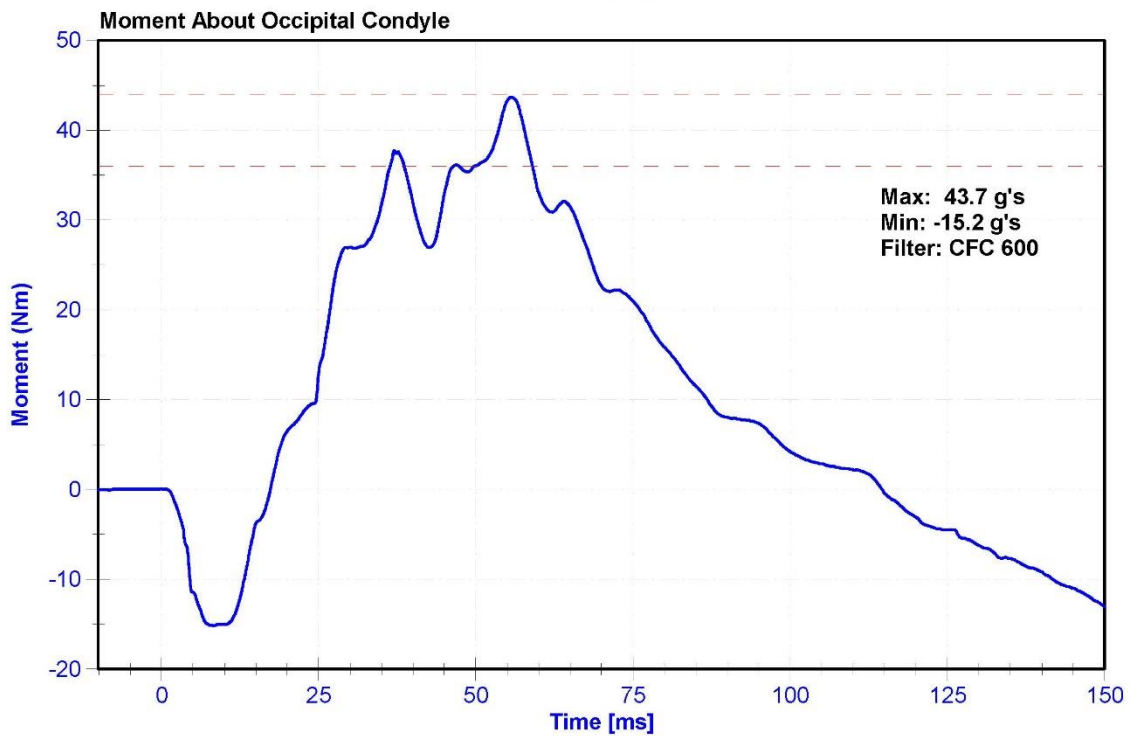
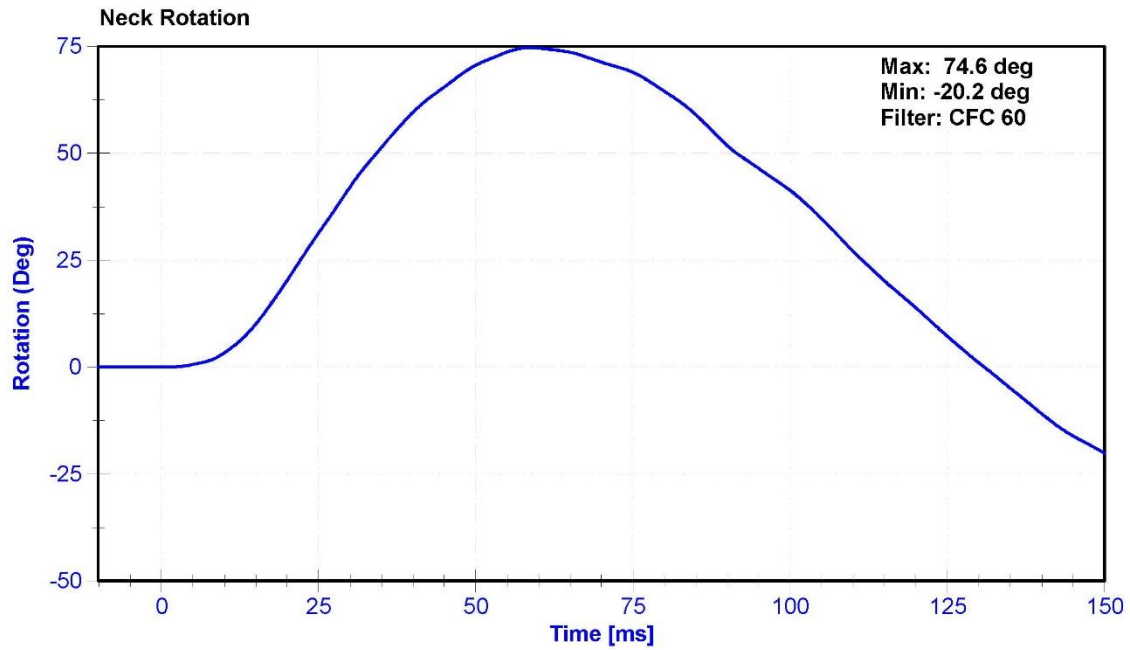
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	40.3	Pass
Velocity	5.51	5.63	m/s	5.546	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.58	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.82	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	5.07	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.75	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.80	Pass
Neck Rotation	71	81	deg	74.6	Pass
Time at Maximum Rotation	50	70	ms	58.4	Pass
Moment about the OC	36	44	Nm	43.7	Pass
Moment Decay to 0 Nm	102	126	ms	114.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2018	5/11/2019
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/27/2017	10/27/2018
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/27/2017	10/27/2018
Upper Neck Load Cell	Denton 1716	LC-1872 FY	7/26/2017	7/26/2018





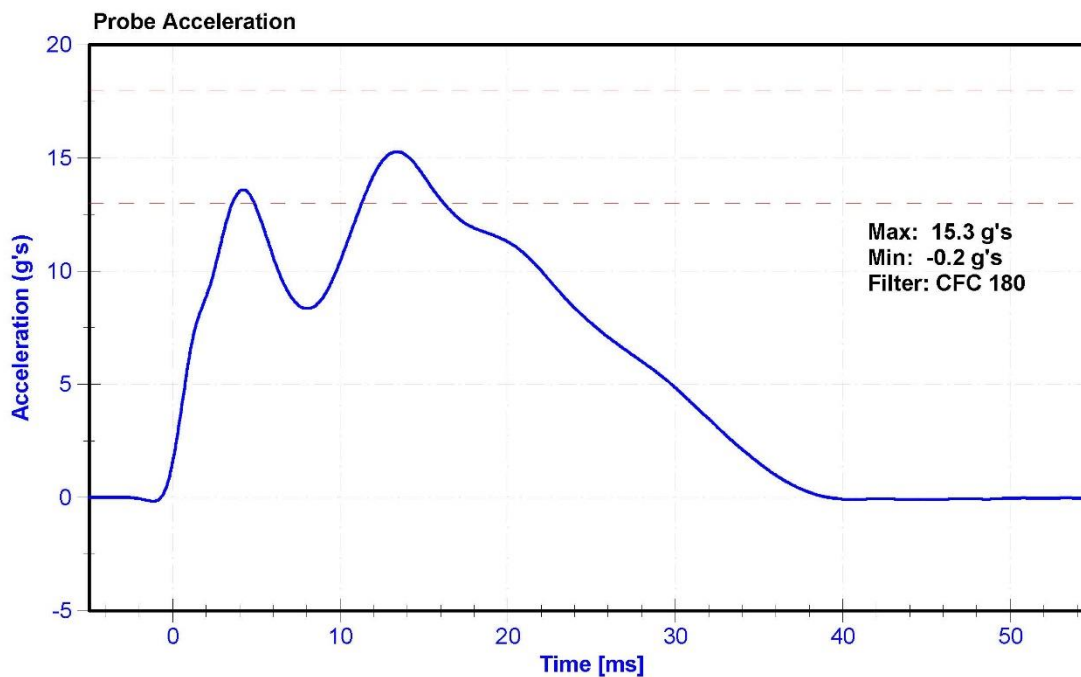
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

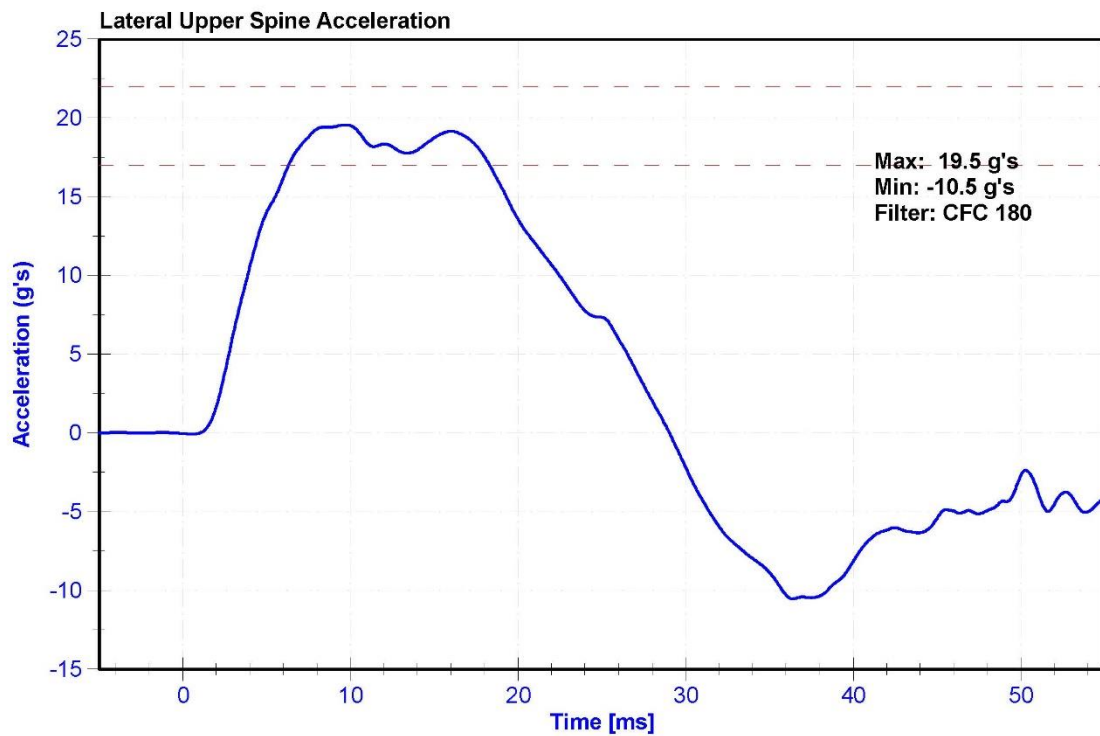
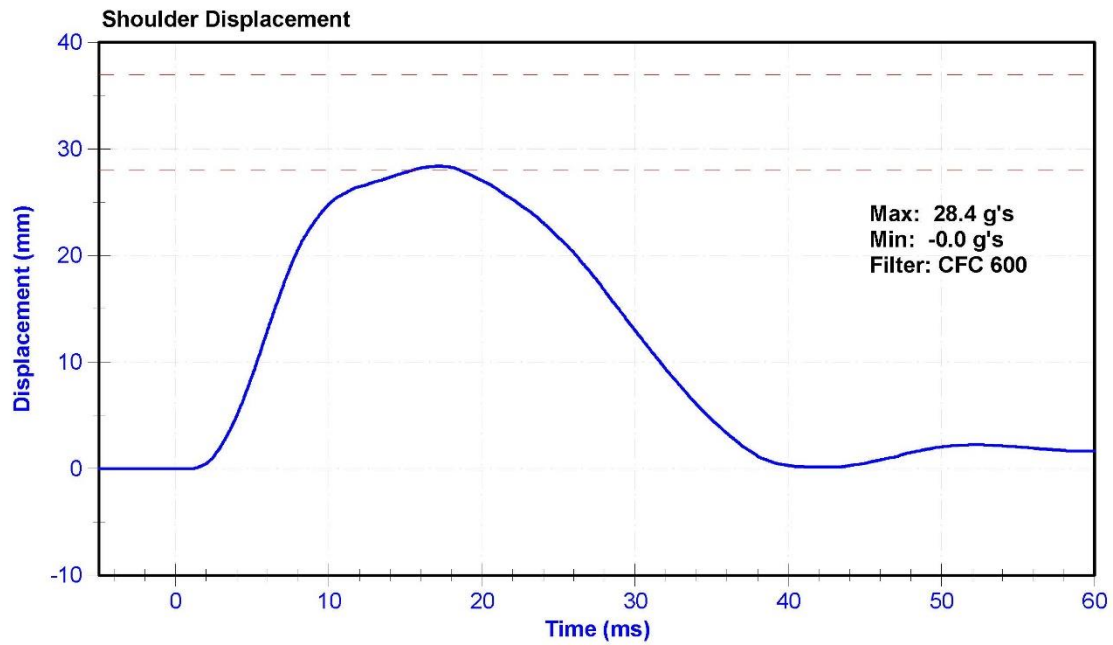
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	37.8	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	13	18	g's	15.3	Pass
Shoulder Deflection	28	37	mm	28.4	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	9/27/2017	9/27/2018
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P83320	5/7/2018	11/5/2018





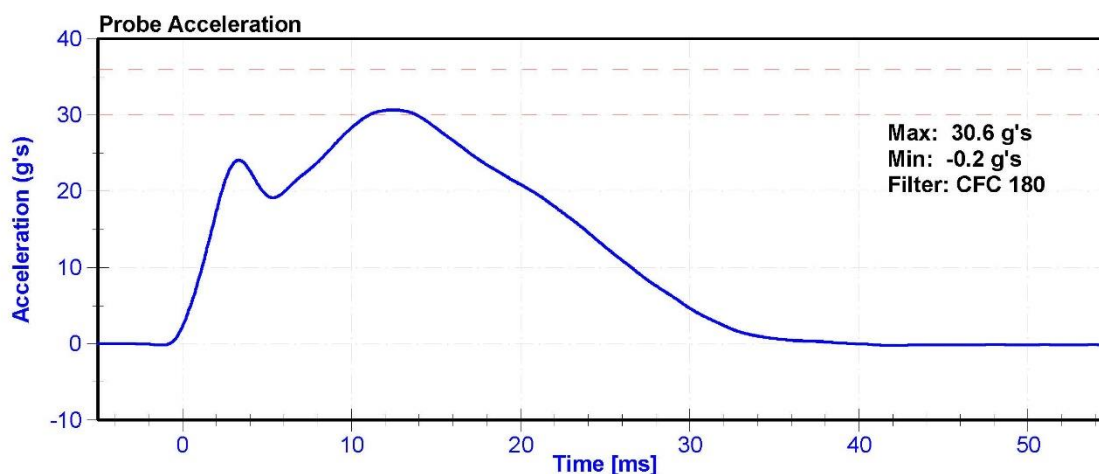
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

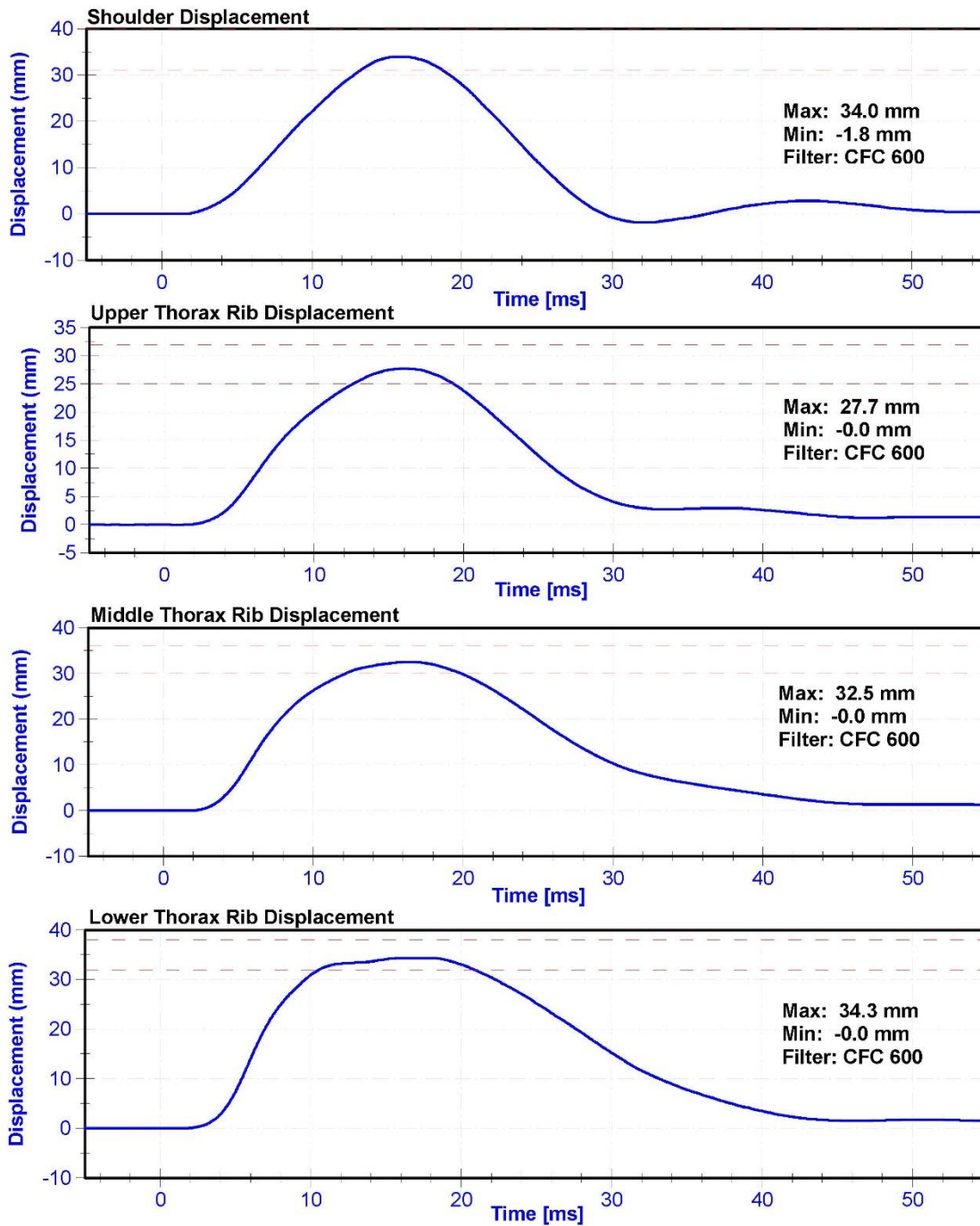
Results

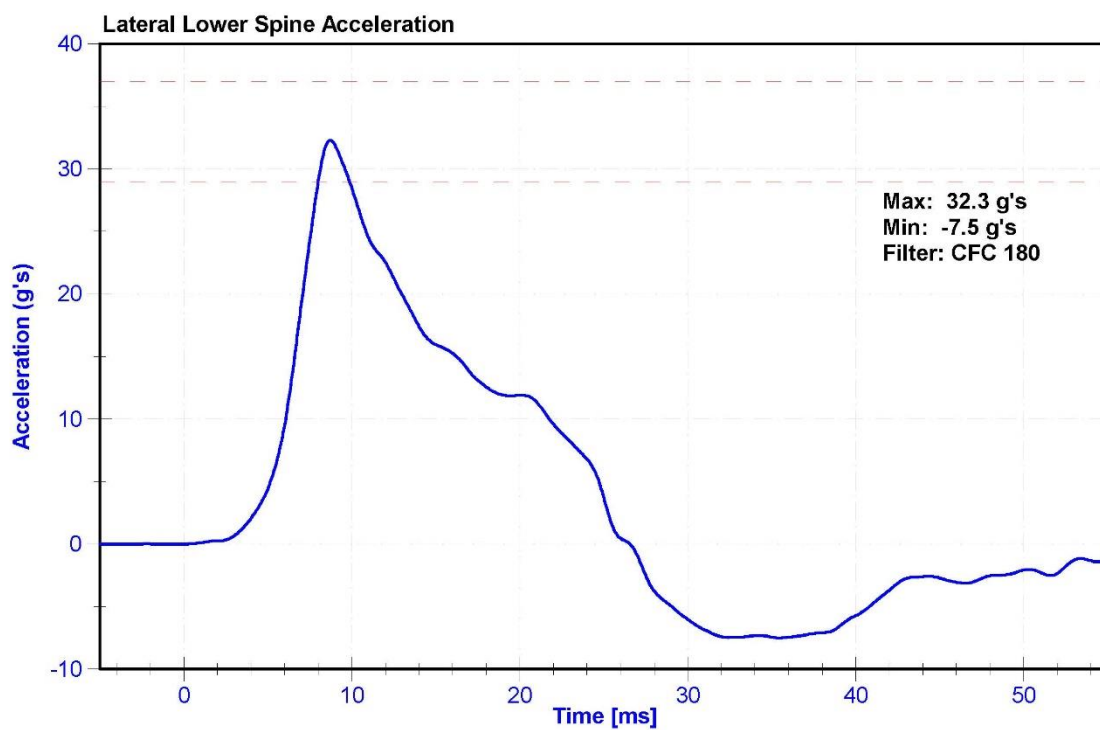
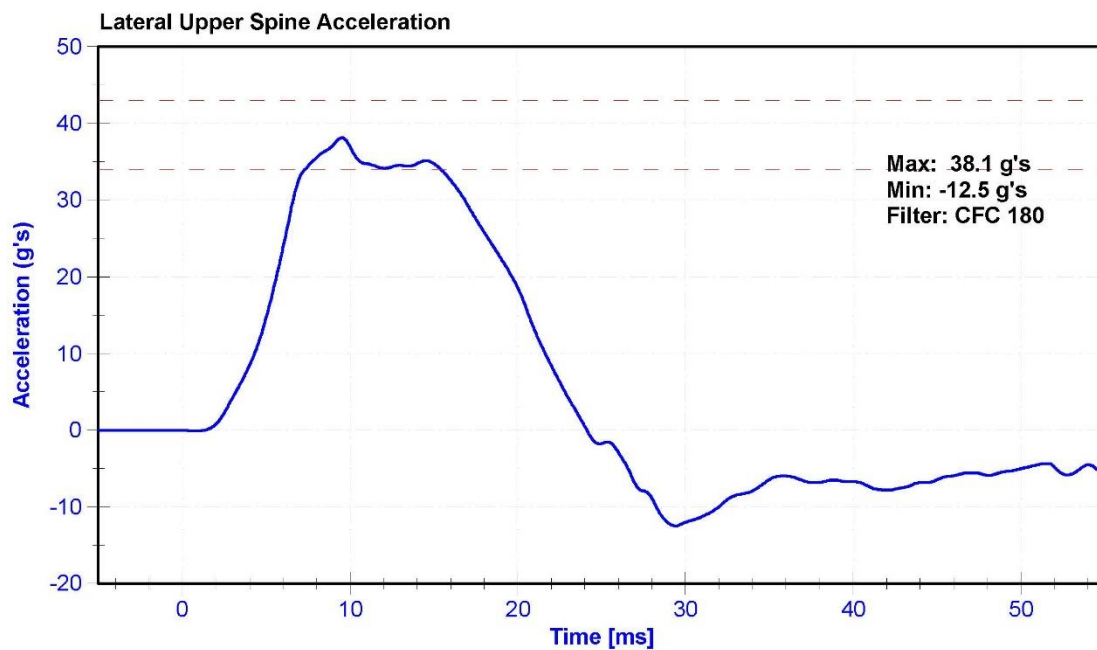
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	37.5	Pass
Velocity	6.6	6.8	m/s	6.77	Pass
Probe Acceleration after 5 ms	30	36	g's	30.6	Pass
Lateral Upper Spine Acceleration	34	43	g's	38.1	Pass
Lateral Lower Spine Acceleration	29	37	g's	32.3	Pass
Shoulder Deflection	31	40	mm	34.0	Pass
Upper Thorax Rib Deflection	25	32	mm	27.7	Pass
Mid Thorax Rib Deflection	30	36	mm	32.5	Pass
Lower Thorax Rib Deflection	32	38	mm	34.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Upper Spine T1 Y Accelerometer	ENDEVCO 7264	AC-P83320	5/7/2018	11/5/2018
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	5/7/2018	11/5/2018
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	9/27/2017	9/27/2018
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Servo 1246	DS-040GFE	5/17/2018	5/17/2019
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	9/27/2017	9/27/2018







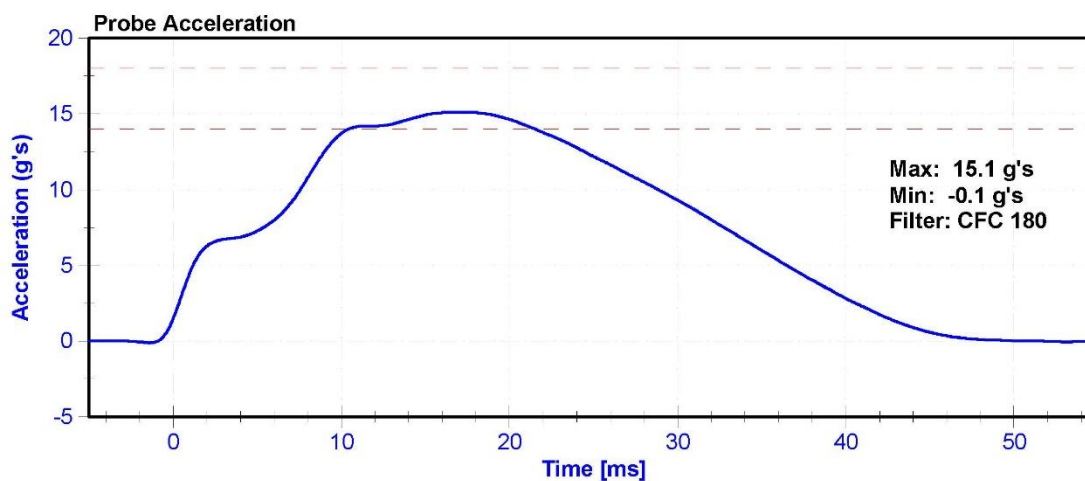
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

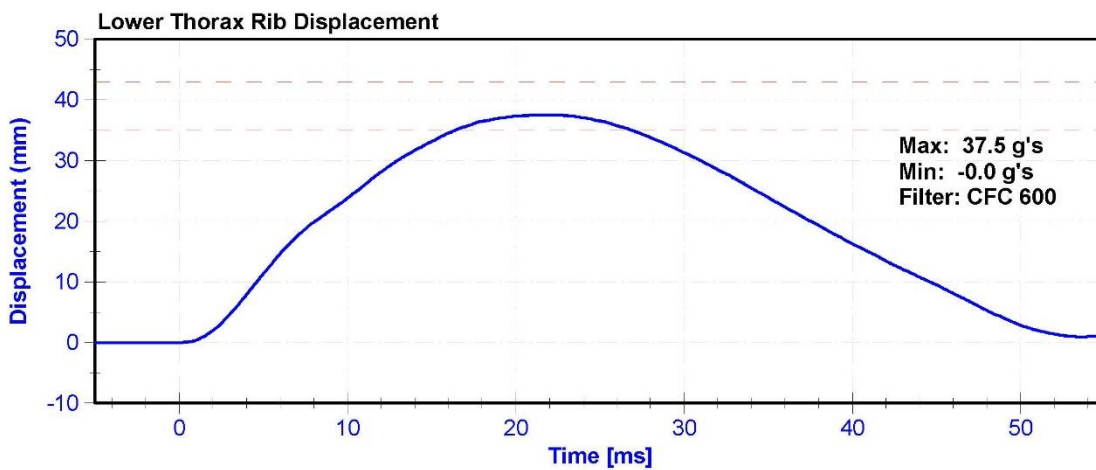
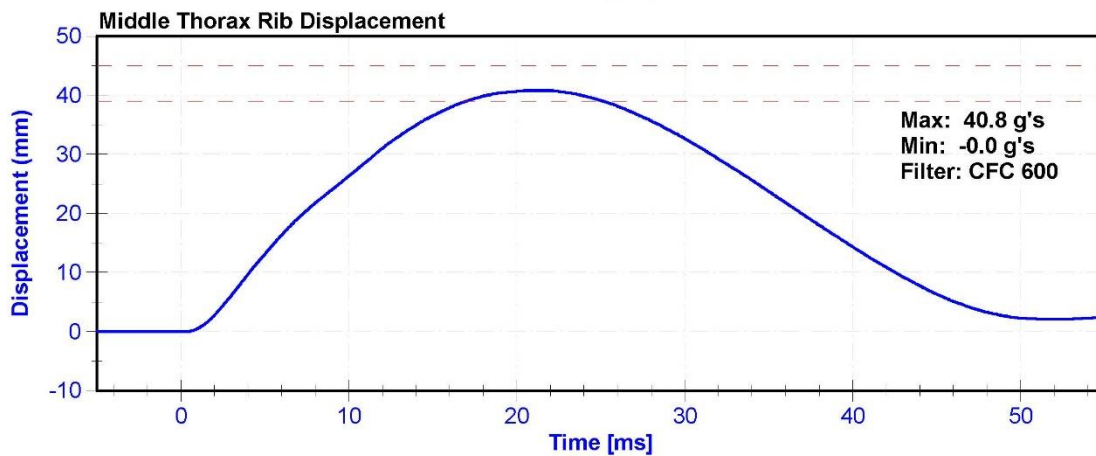
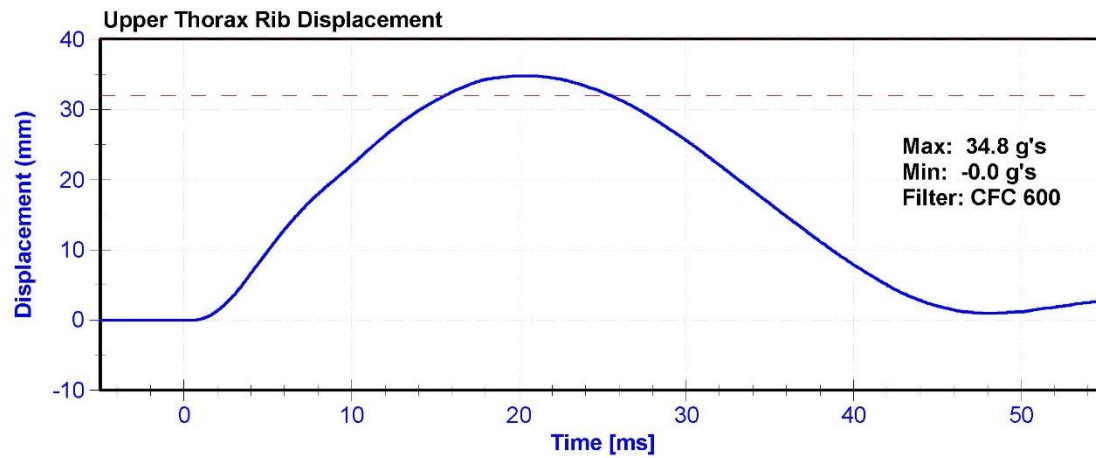
Results

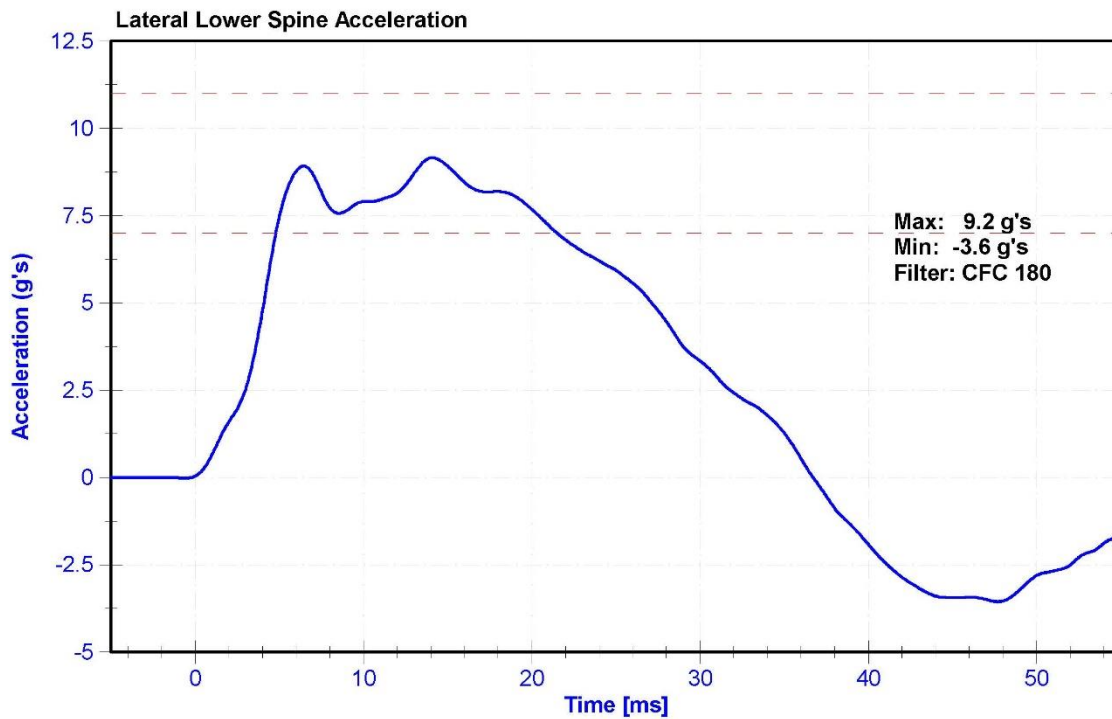
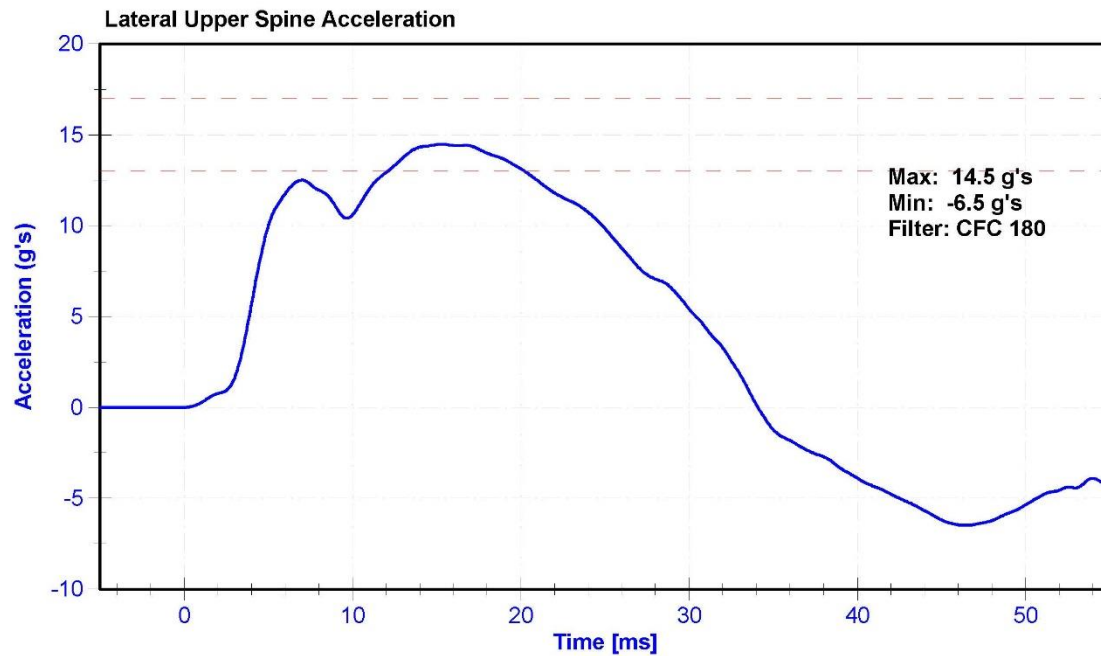
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	36	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	14	18	g's	15.1	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.5	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.2	Pass
Upper Thorax Rib Deflection	32	40	mm	34.8	Pass
Middle Thorax Rib Deflection	39	45	mm	40.8	Pass
Lower Thorax Rib Deflection	35	43	mm	37.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P83320	5/7/2018	11/5/2018
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	5/7/2018	11/5/2018
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Servo 1246	DS-040GFE	5/17/2018	5/17/2019
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	9/27/2017	9/27/2018







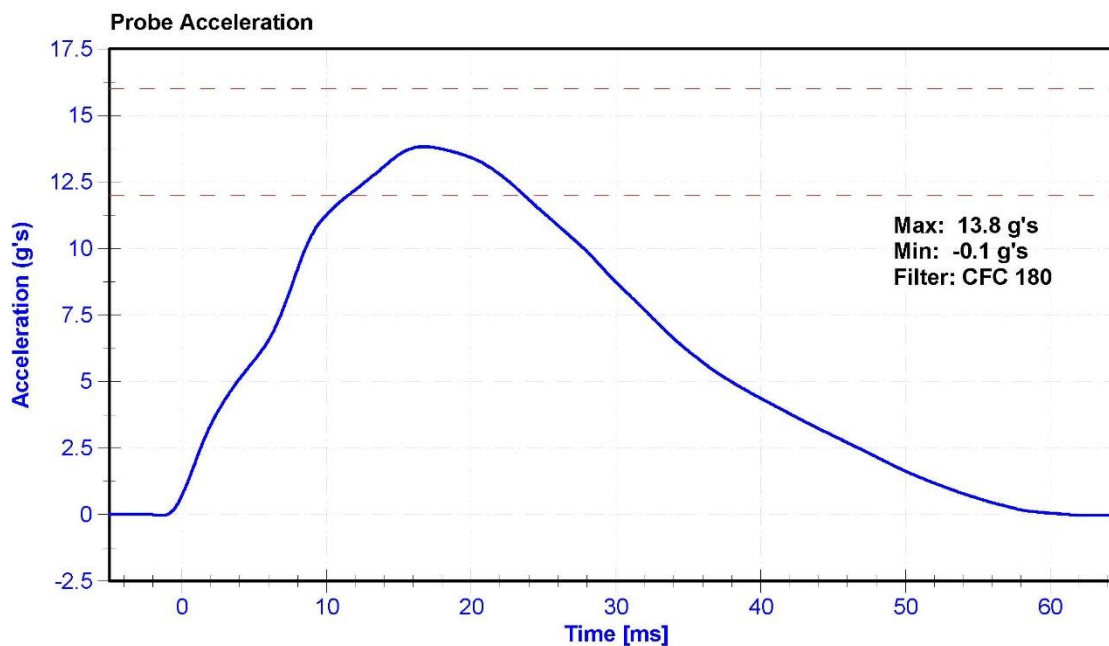
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

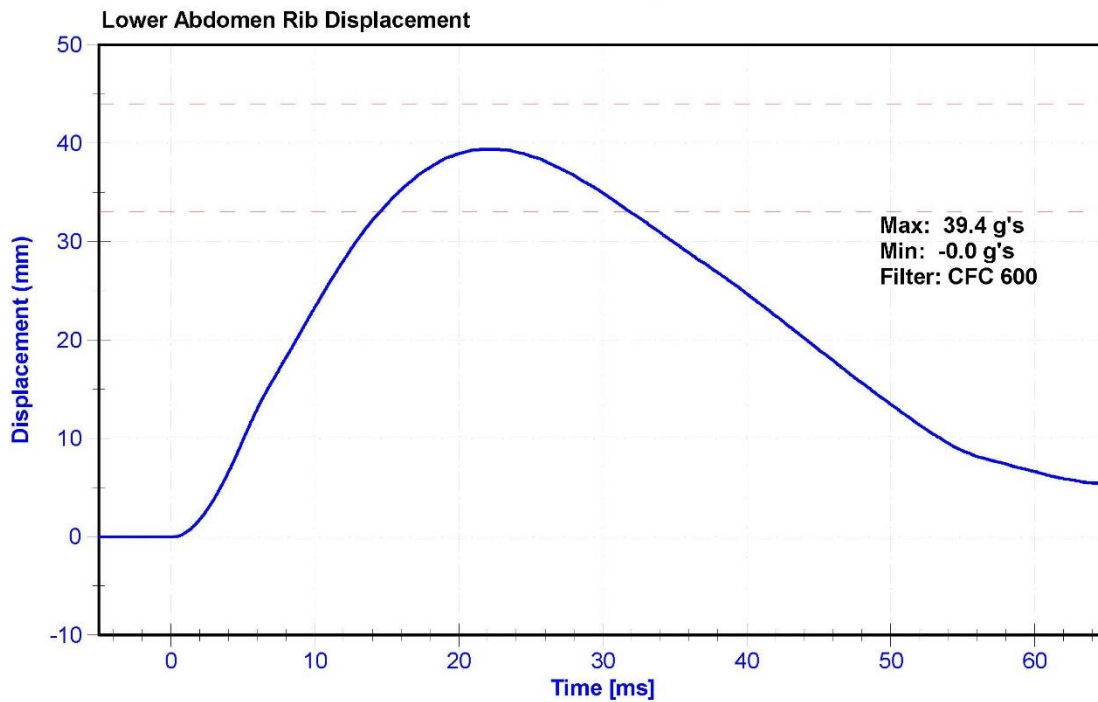
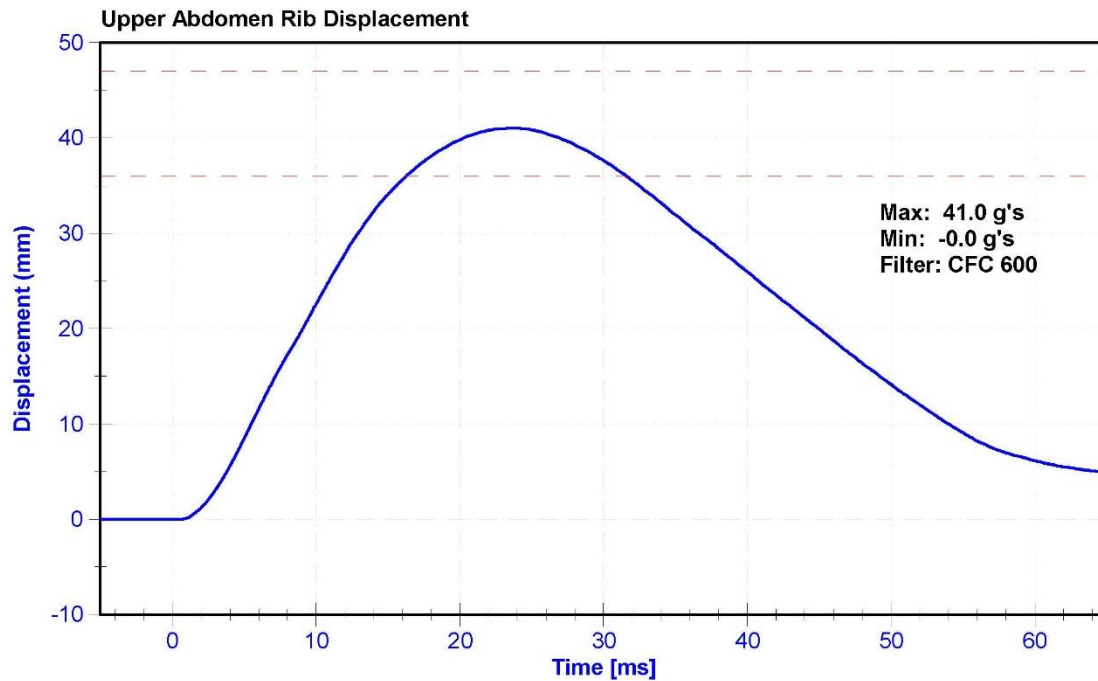
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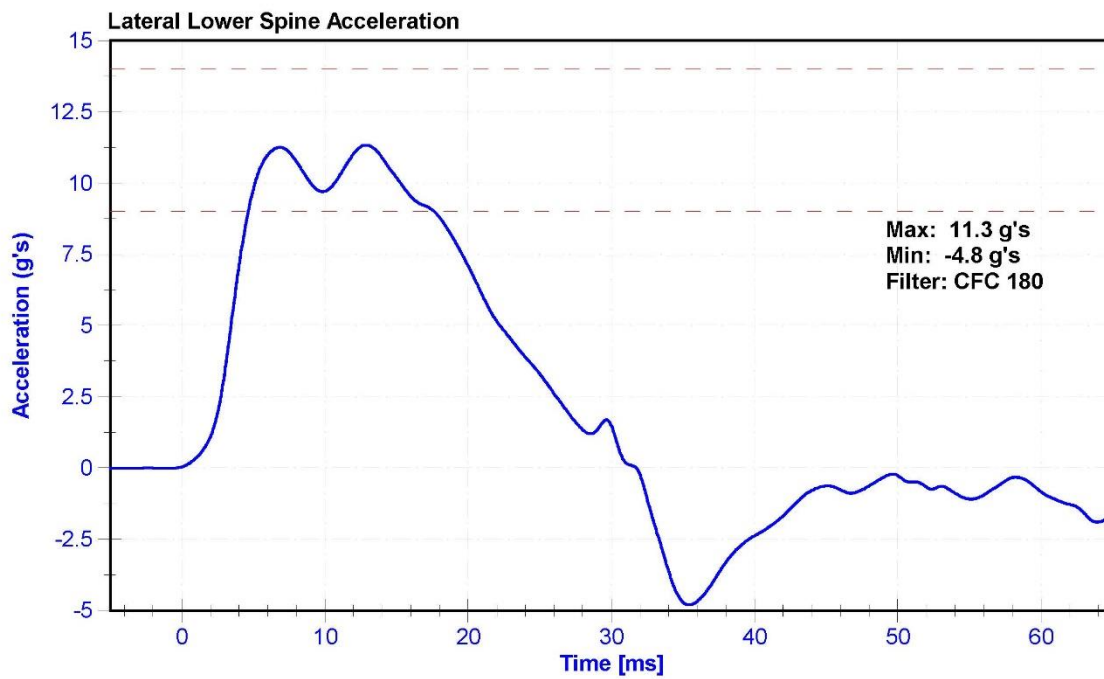
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	34.7	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	12	16	g's	13.8	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.3	Pass
Upper Abdomen Rib Deflection	36	47	mm	41.0	Pass
Lower Abdomen Rib Deflection	33	44	mm	39.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	5/7/2018	11/5/2018
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	9/27/2017	9/27/2018
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	9/27/2017	9/27/2018







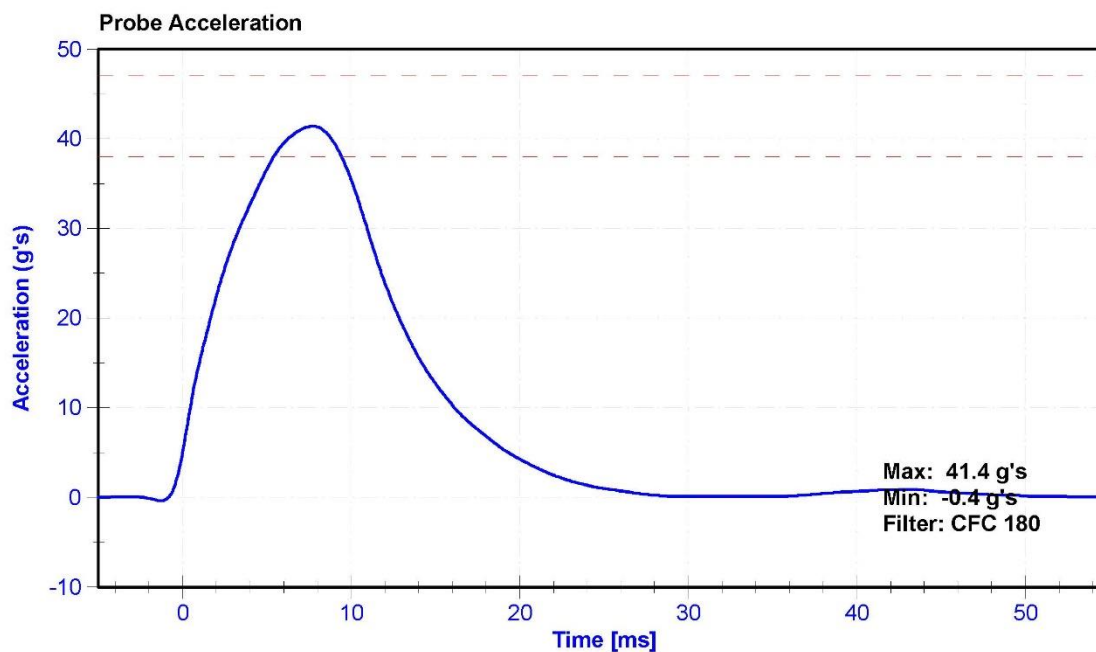
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

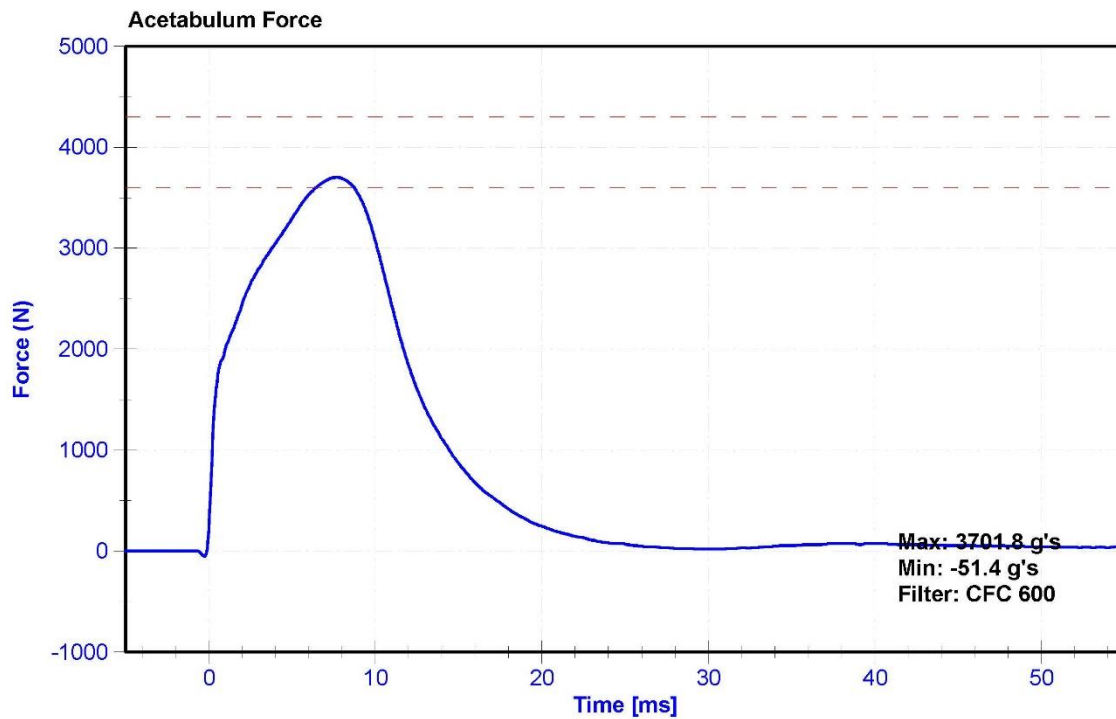
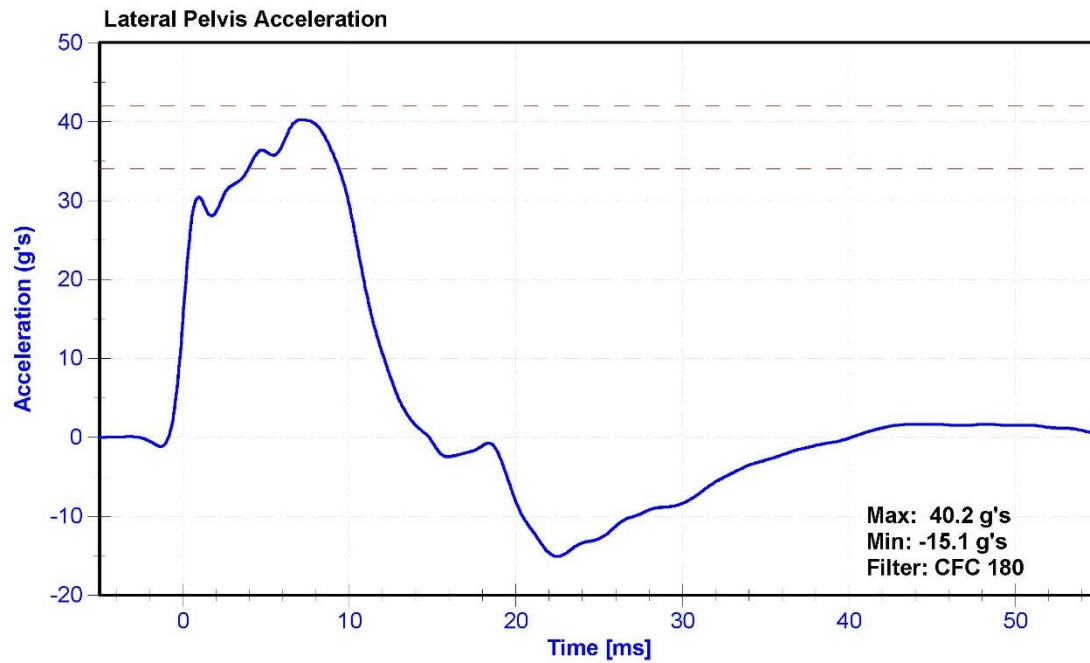
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	37.5	Pass
Velocity	6.6	6.8	m/s	6.60	Pass
Probe Acceleration	38	47	g's	41.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	40.2	Pass
Acetabulum Force	3600	4300	N	3701.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P79602	5/7/2018	11/5/2018
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	6/20/2017	6/20/2018
Certification Plug	SACO	12207	3/1/2018	N/A
Crash Test Plug	SACO	12150	2/28/2018	N/A







SID-Ils Pelvis Plug Certification Test

Plug S/N 11947

Test Number 6135

Report Number 6152

Test Date 2/1/2018 10:00:10 AM

Crash

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	259.14	50.00 600.00
Force @ 1.5 mm (N)	1,178.55	850.00 1,400.00
Force @ 2.5 mm (N)	1,471.02	1,306.00 1,618.00
Force @ 3.0 mm (N)	1,529.35	1,361.00 1,673.00

Testing Machine STM-20 5965542

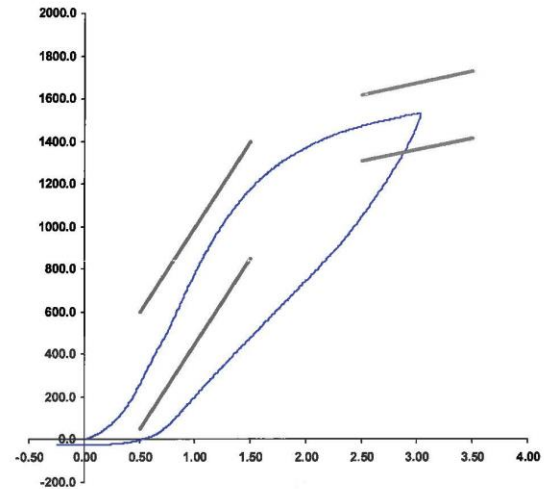
Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107

01-Feb-18

SACO Research

By : DC

Date : 2/1/18

SACO Research 41735 Elm St, #401 Murrieta, CA 92582 Tel 310-694-2062 FAX



SID-Is Pelvis Plug Certification Test

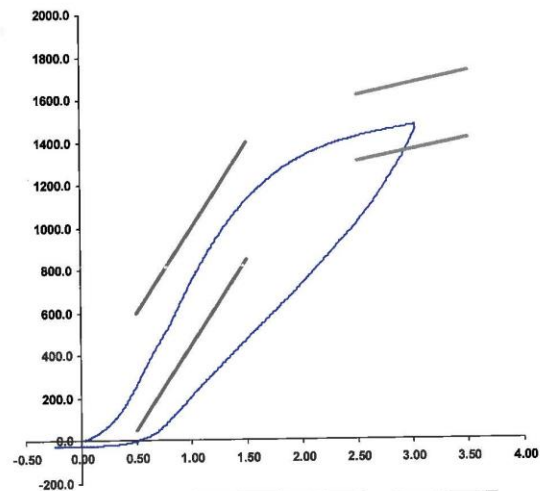
Plug S/N 12267
 Test Number 6652
 Report Number 6667
 Test Date 3/15/2018 10:58:11 AM

Cert

	Test Results	Spec. Min	Spec. Max
Force @ 0.5 mm (N)	256.81	50.00	600.00
Force @ 1.5 mm (N)	1,133.30	850.00	1,400.00
Force @ 2.5 mm (N)	1,423.44	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,474.03	1,361.00	1,673.00

Testing Machine STM-20 5965542
 Load Cell S/N (FI360947), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)
 Notes:

Force (-N) vs Extension (-mm)



Operator _____
 Part Number 180-4450

Template No 107 15-Mar-18
 SACO Research

By : DC Date : 3/15/18
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

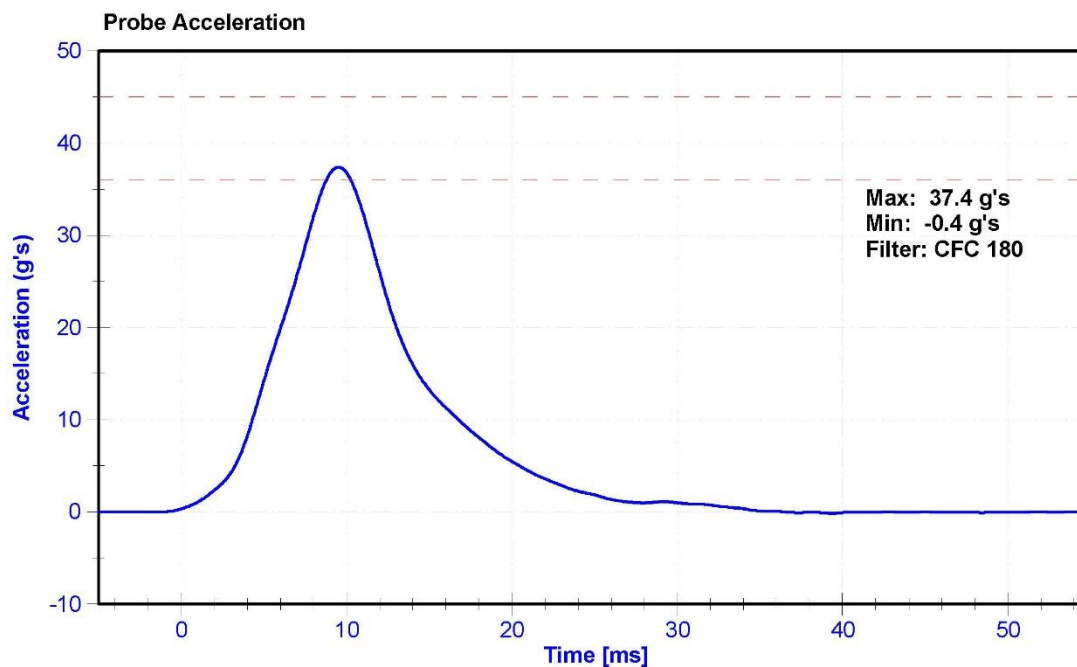
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D. Reinhard

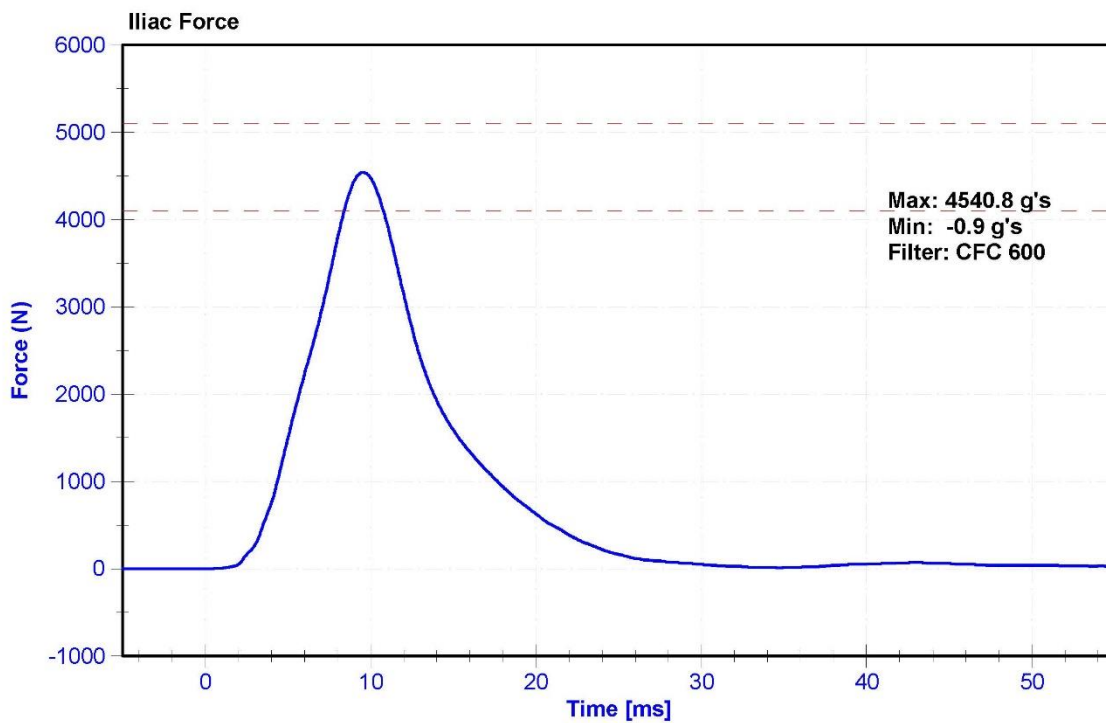
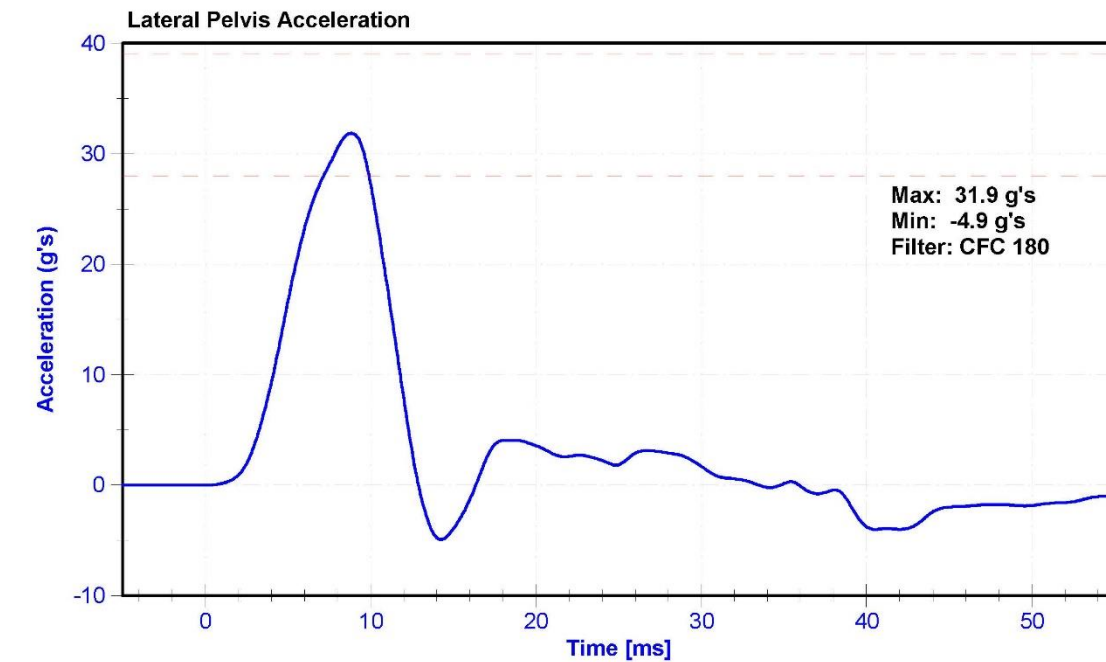
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	38.9	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	36	45	g's	37.4	Pass
Lateral Pelvis Acceleration	28	39	g's	31.9	Pass
Iliac Force	4100	5100	N	4540.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P79602	5/7/2018	11/5/2018
Iliac Load Cell	DENTON 3228J	LC-279Fy	6/21/2017	6/21/2018





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: 300

(CONFIGURED FOR LEFT SIDE IMPACT)

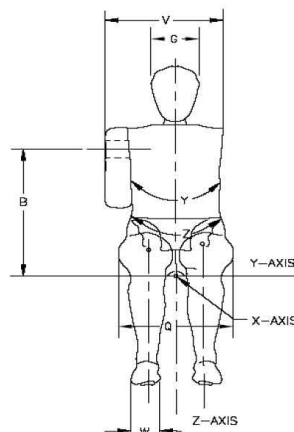
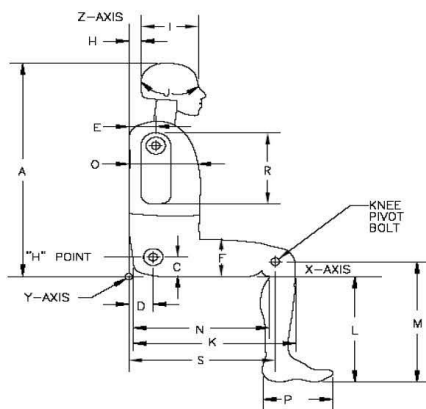


External Measurements - SID-IIs

Technician: K. Brogan

Date: 6/5/2018

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	780	Pass
B	Shoulder Pivot Height	437	453	445	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	120	Pass
G	Head Breadth	140	148	143	Pass
H	Head Back from Backline	40	46	44	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	548	Pass
K	Buttock to Knee Length	514	540	529	Pass
L	Popliteal Height	343	369	360	Pass
M	Knee Pivot to floor height	392	409	400	Pass
N	Buttock Popliteal Length	416	442	433	Pass
O	Chest Depth w/o jacket	195	211	203	Pass
P	Foot Length	216	232	221	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	85	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	770	Pass

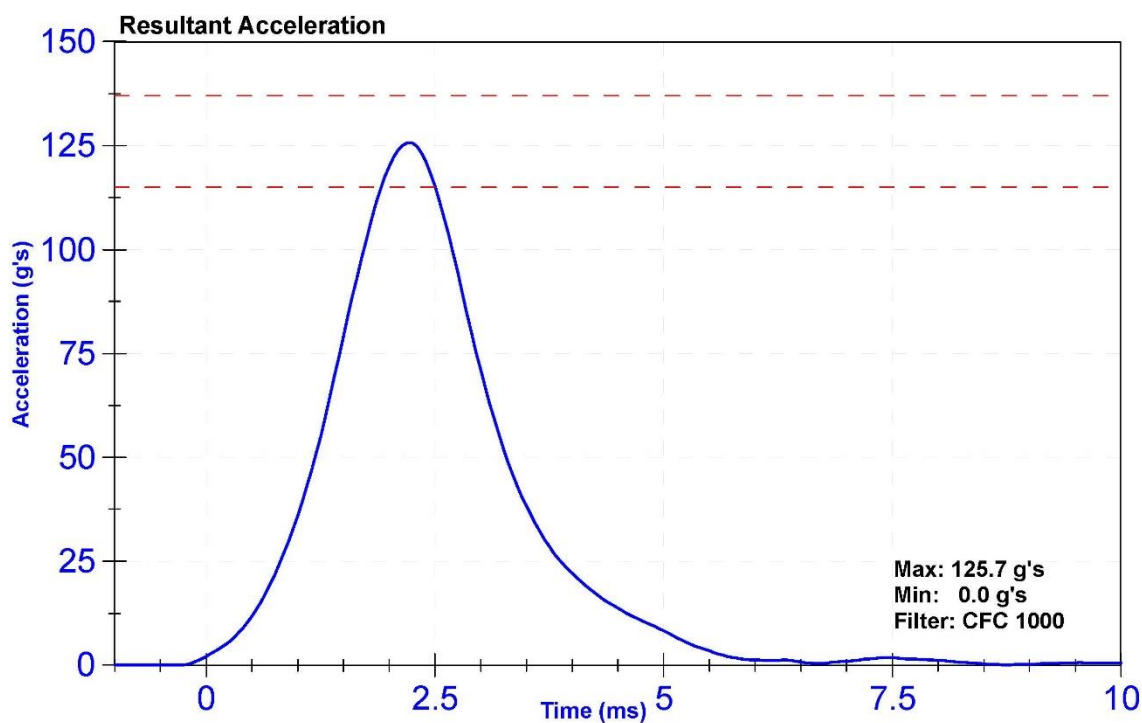
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

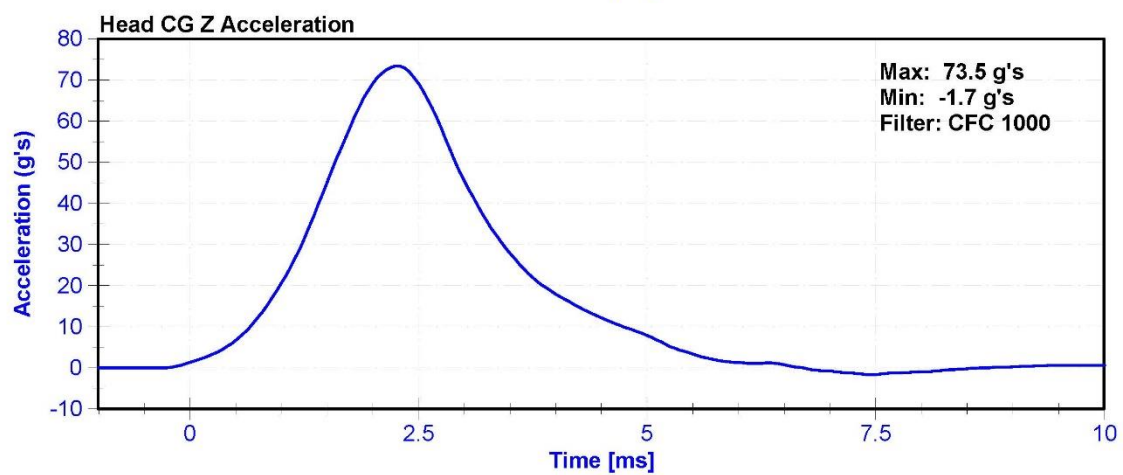
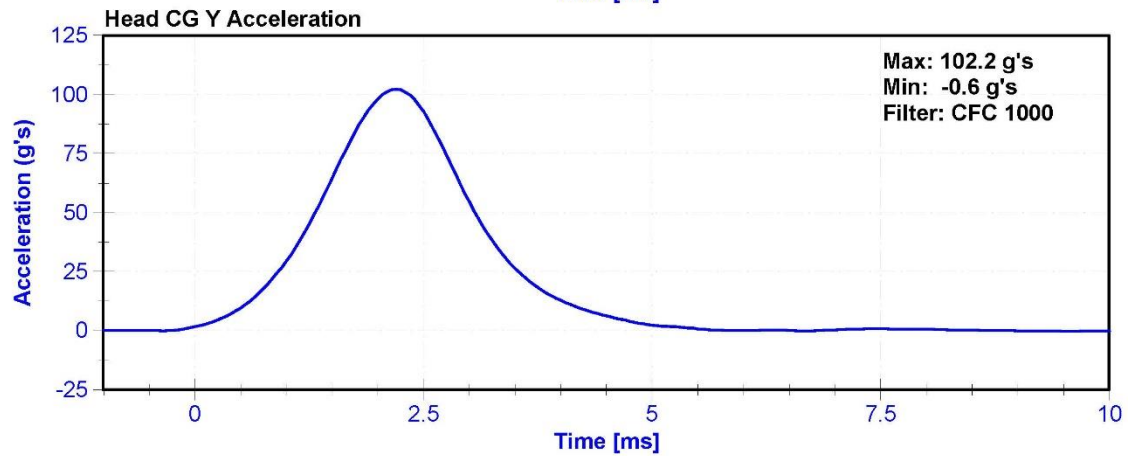
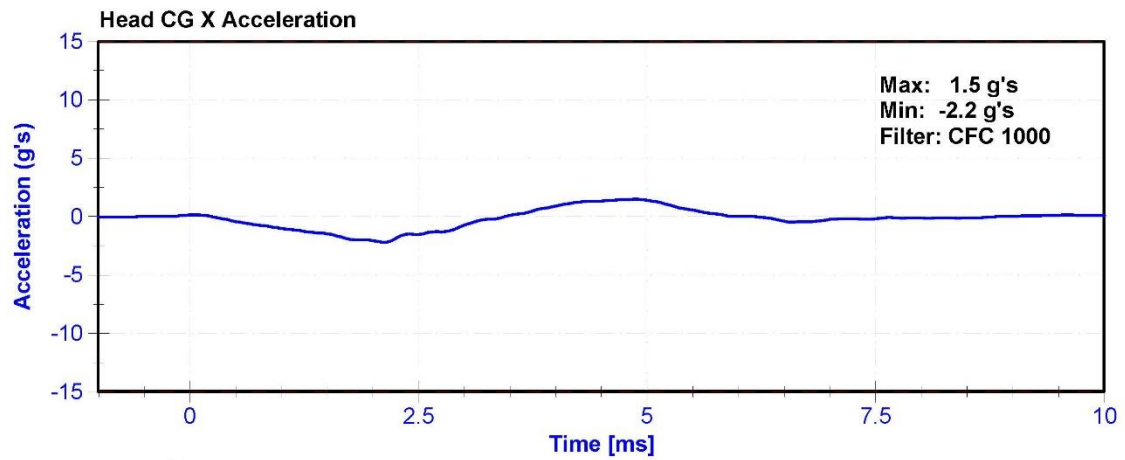
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	45.6	Pass
Resultant Acceleration	115	137	g's	125.7	Pass
Oscillation	0	15	%	1.5	Pass
Fore-Aft Acceleration	-15	15	g's	-2.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	5/7/2018	11/5/2018
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	5/7/2018	11/5/2018
Z Accelerometer	ENDEVCO 7264	AC-P79189	5/7/2018	11/5/2018





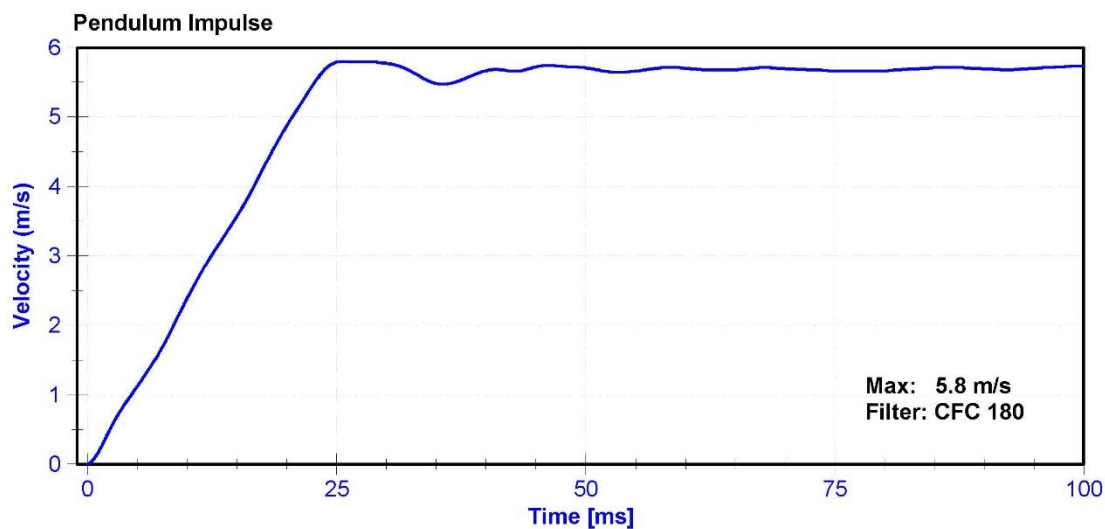
ATD Manufacturer	FTSS	Test Technician	S. Keller
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

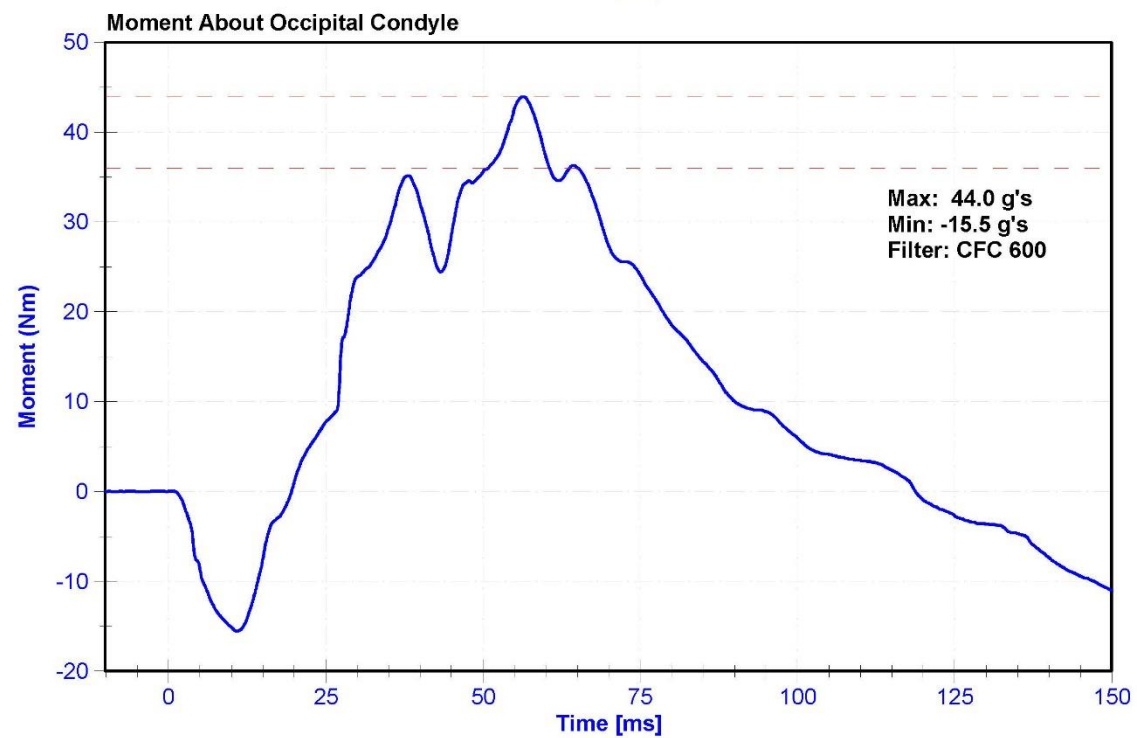
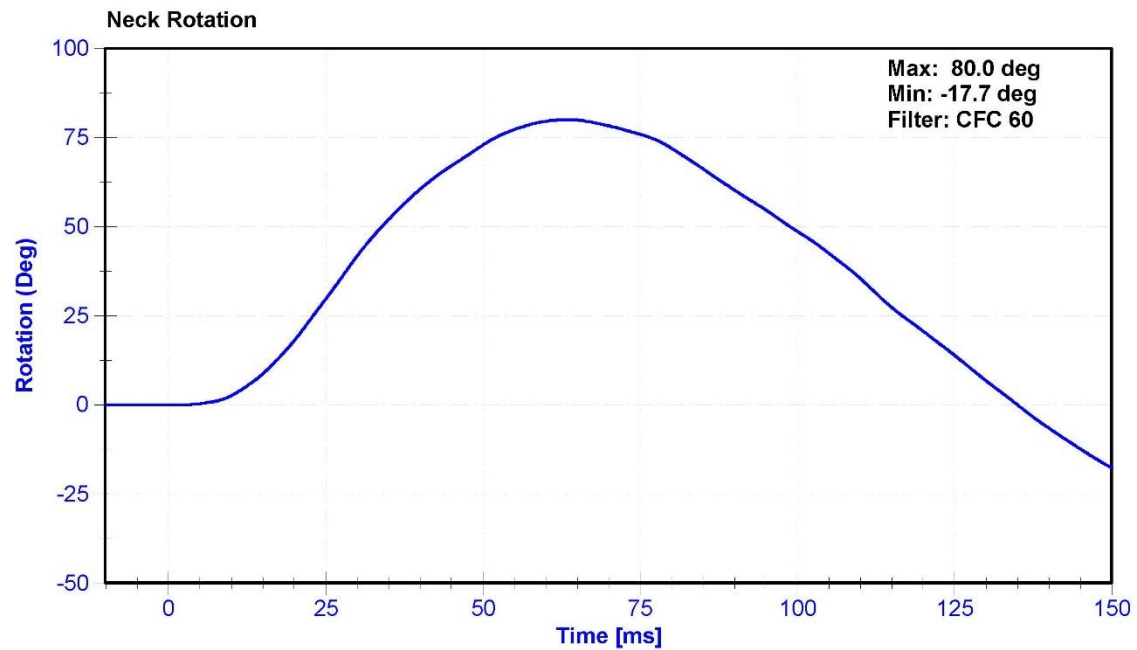
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	44.5	Pass
Velocity	5.51	5.63	m/s	5.546	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.39	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.57	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.87	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.79	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.80	Pass
Neck Rotation	71	81	deg	80.0	Pass
Time at Maximum Rotation	50	70	ms	63.5	Pass
Moment about the OC	36	44	Nm	44.0	Pass
Moment Decay to 0 Nm	102	126	ms	118.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/11/2018	5/11/2019
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	10/27/2017	10/27/2018
Condyle Potentiometer	Denton 78051-342	DS-185Pend	10/27/2017	10/27/2018
Upper Neck Load Cell	Denton 1716	LC-1872 FY	7/26/2017	7/26/2018





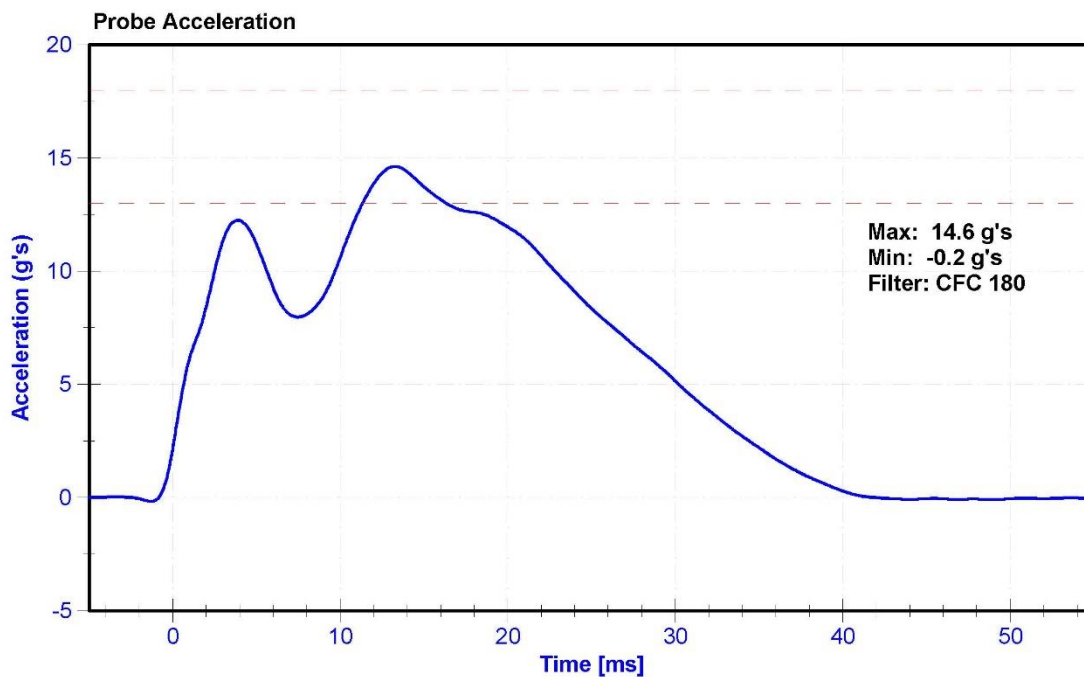
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

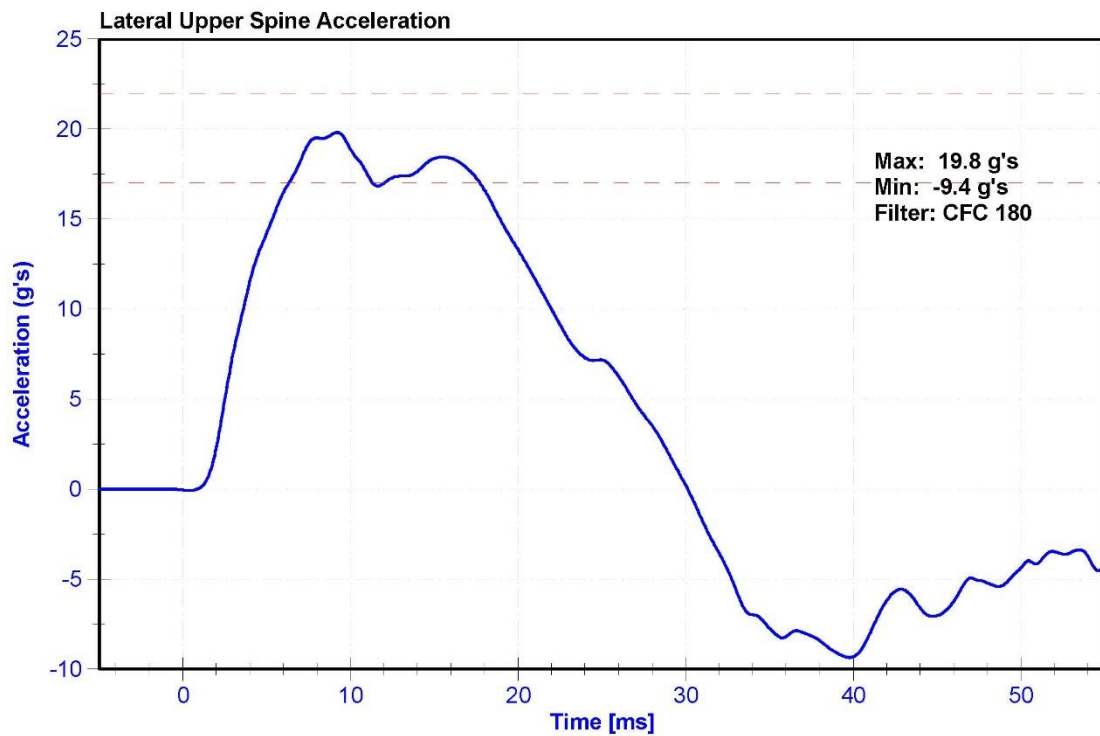
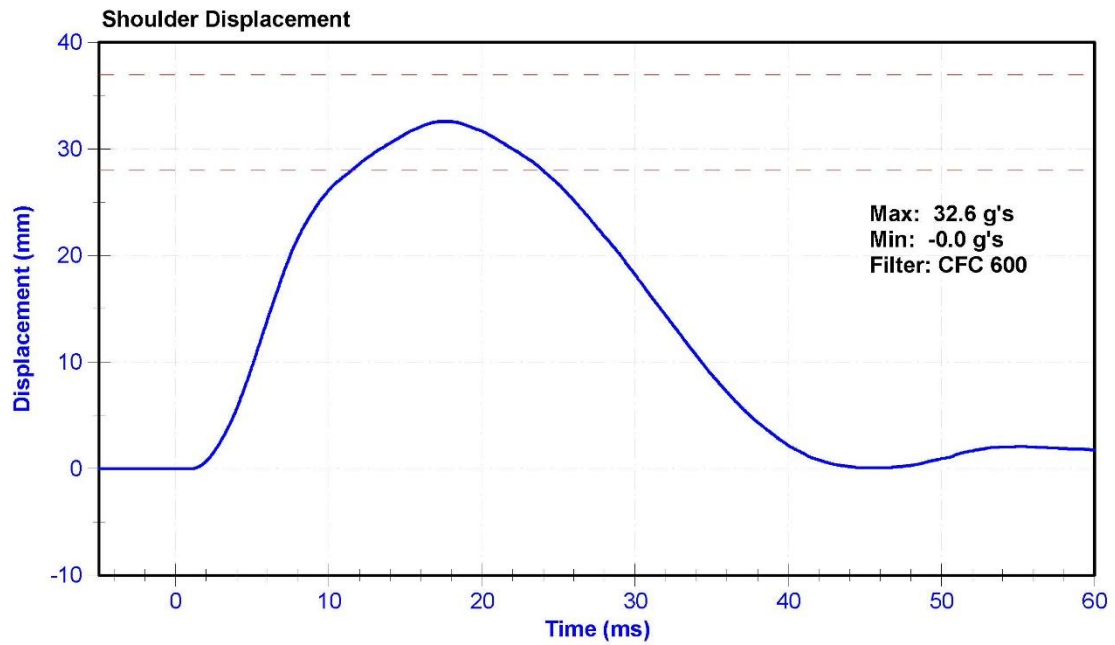
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	42.6	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Probe Acceleration	13	18	g's	14.6	Pass
Shoulder Deflection	28	37	mm	32.6	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	9/27/2017	9/27/2018
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P83320	5/7/2018	11/5/2018





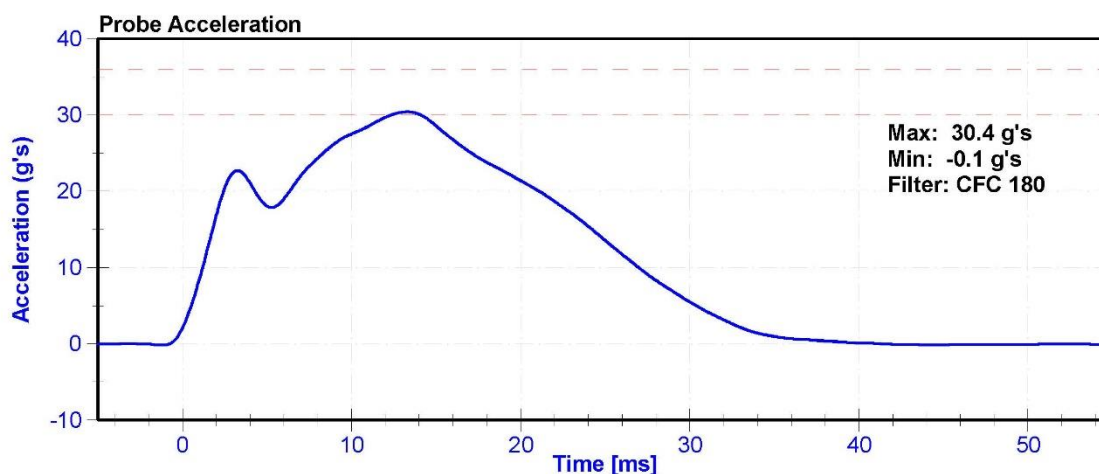
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

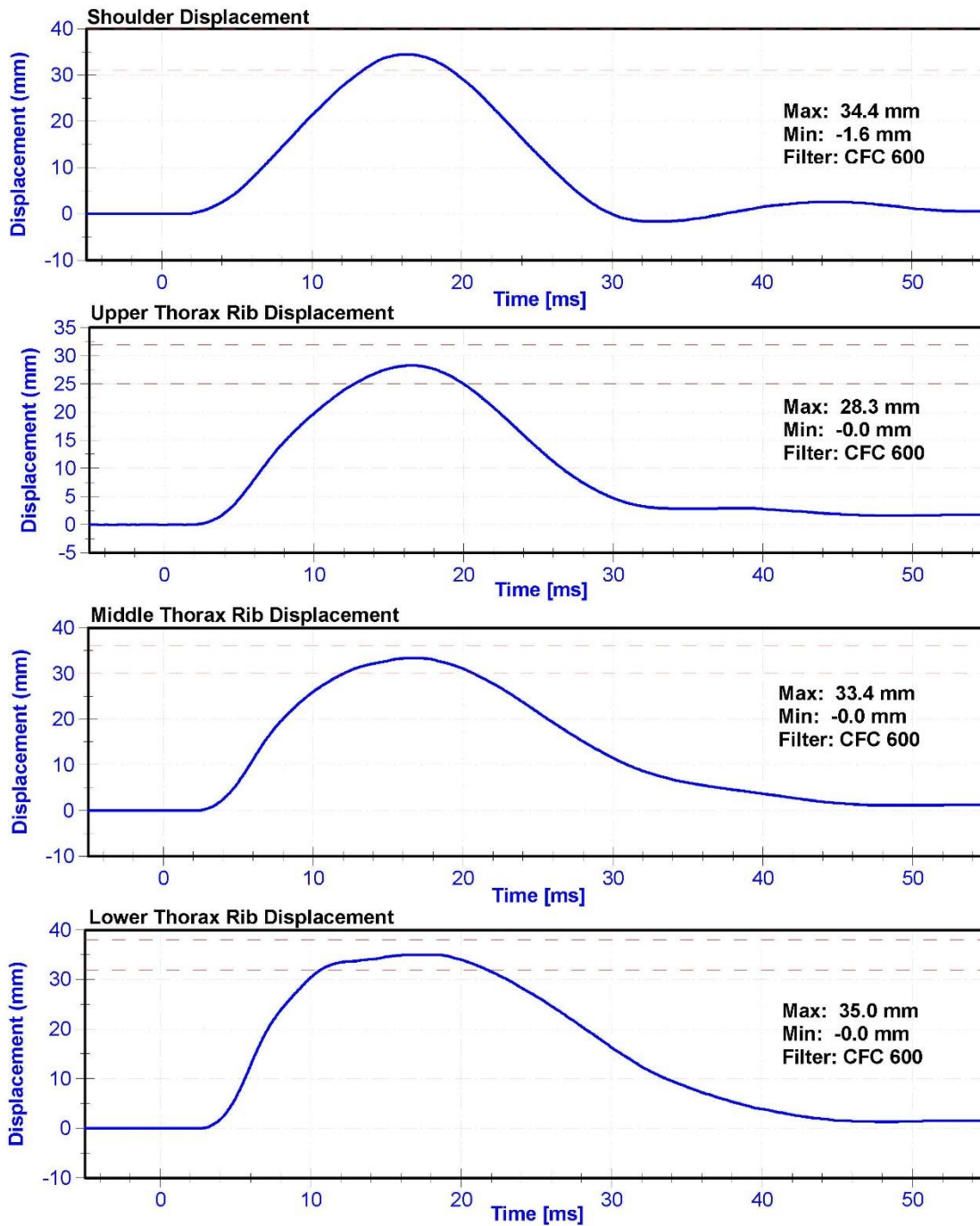
Results

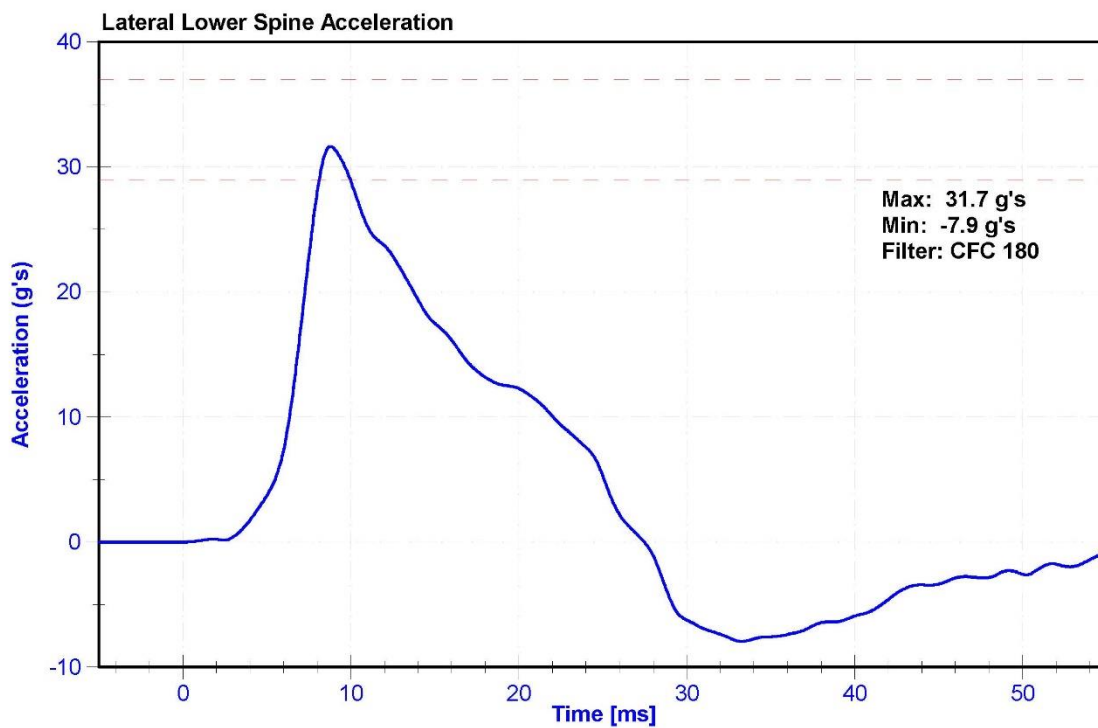
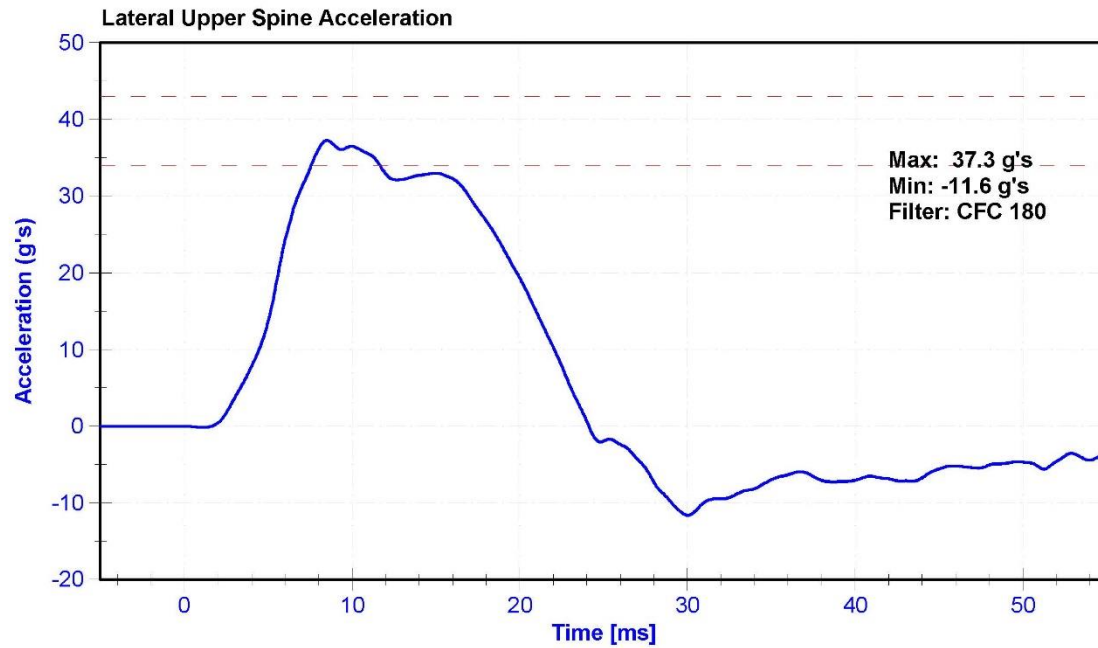
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	37.5	Pass
Velocity	6.6	6.8	m/s	6.77	Pass
Probe Acceleration after 5 ms	30	36	g's	30.4	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.3	Pass
Lateral Lower Spine Acceleration	29	37	g's	31.7	Pass
Shoulder Deflection	31	40	mm	34.4	Pass
Upper Thorax Rib Deflection	25	32	mm	28.3	Pass
Mid Thorax Rib Deflection	30	36	mm	33.4	Pass
Lower Thorax Rib Deflection	32	38	mm	35.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Upper Spine T1 Y Accelerometer	ENDEVCO 7264	AC-P83320	5/7/2018	11/5/2018
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	5/7/2018	11/5/2018
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	9/27/2017	9/27/2018
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	5/17/2018	5/17/2019
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	9/27/2017	9/27/2018







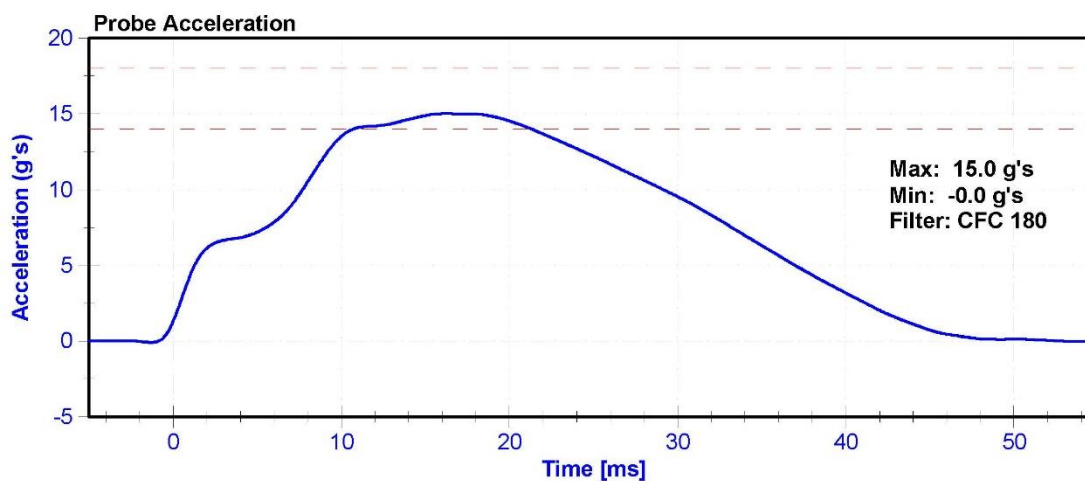
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

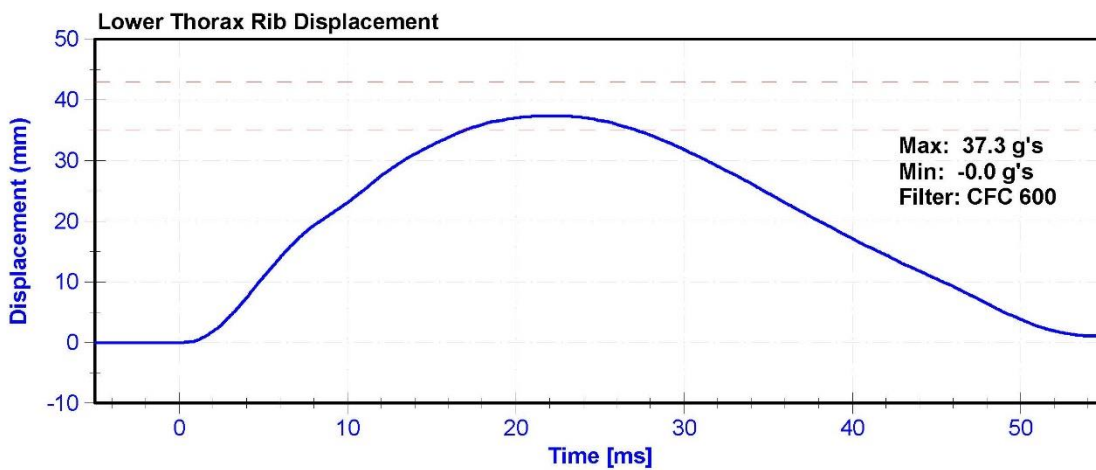
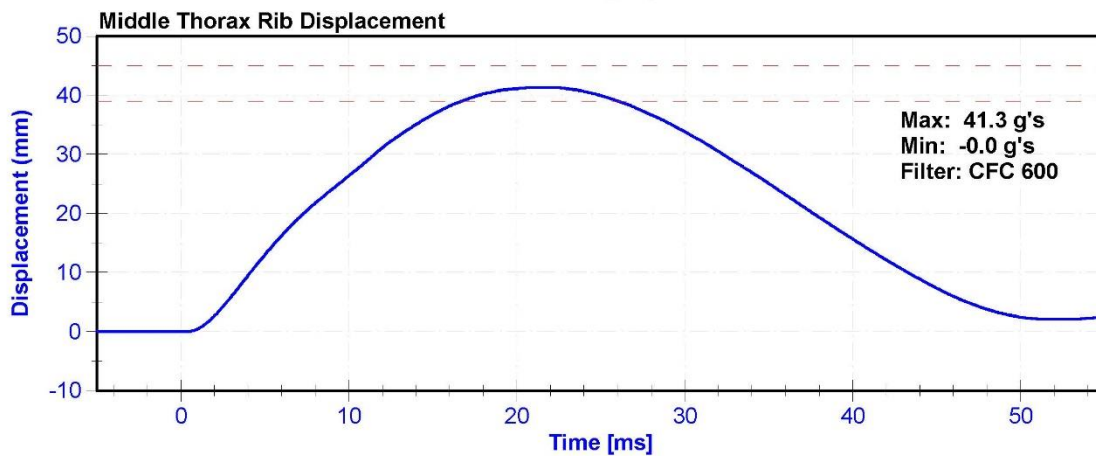
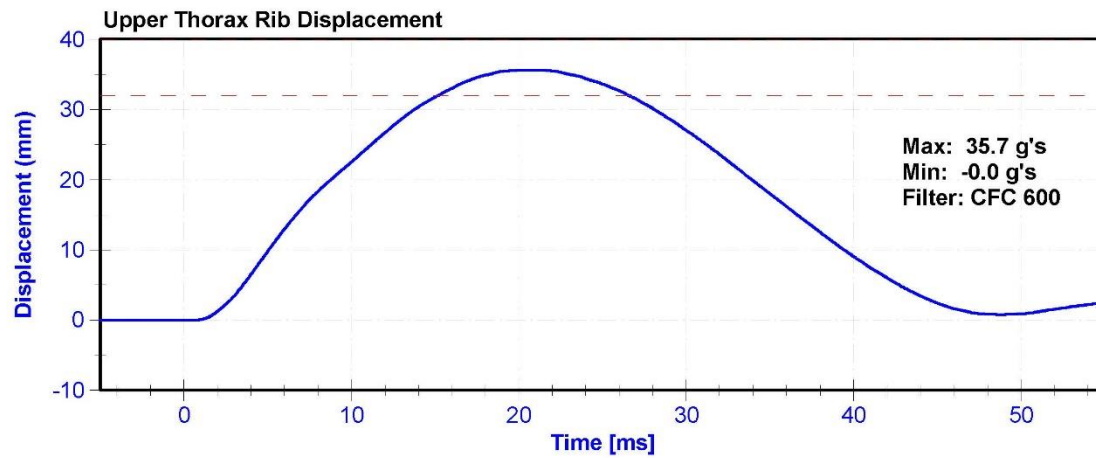
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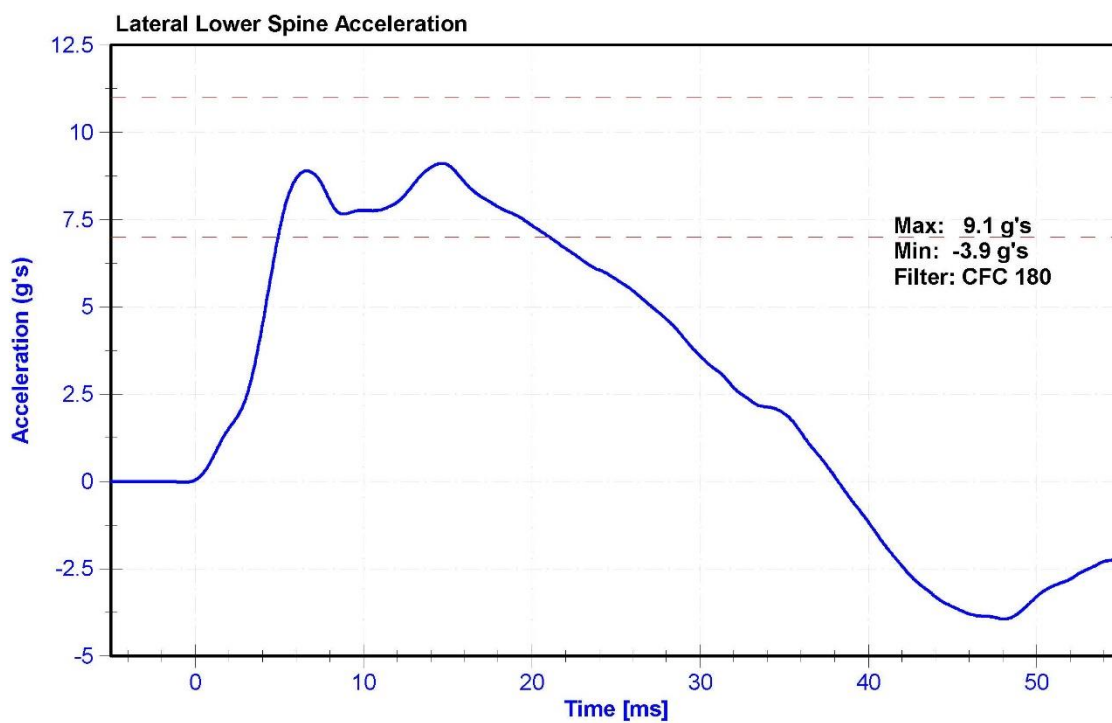
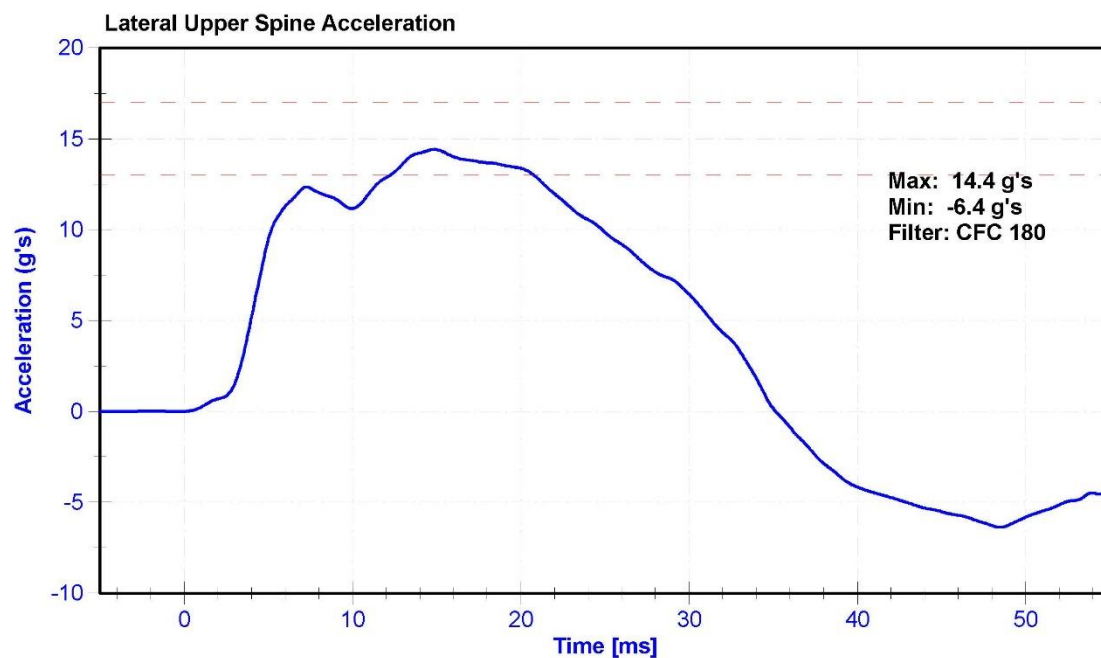
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	42.6	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Probe Acceleration	14	18	g's	15.0	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.4	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.1	Pass
Upper Thorax Rib Deflection	32	40	mm	35.7	Pass
Middle Thorax Rib Deflection	39	45	mm	41.3	Pass
Lower Thorax Rib Deflection	35	43	mm	37.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P83320	5/7/2018	11/5/2018
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	5/7/2018	11/5/2018
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	9/27/2017	9/27/2018
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	5/17/2018	5/17/2019
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	9/27/2017	9/27/2018







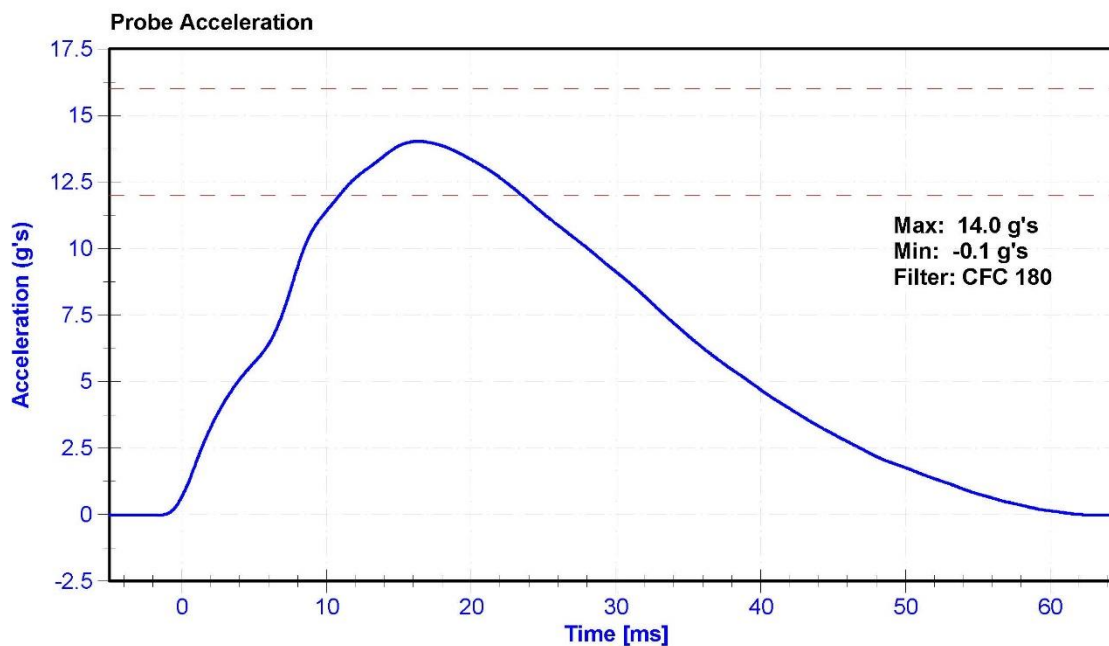
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

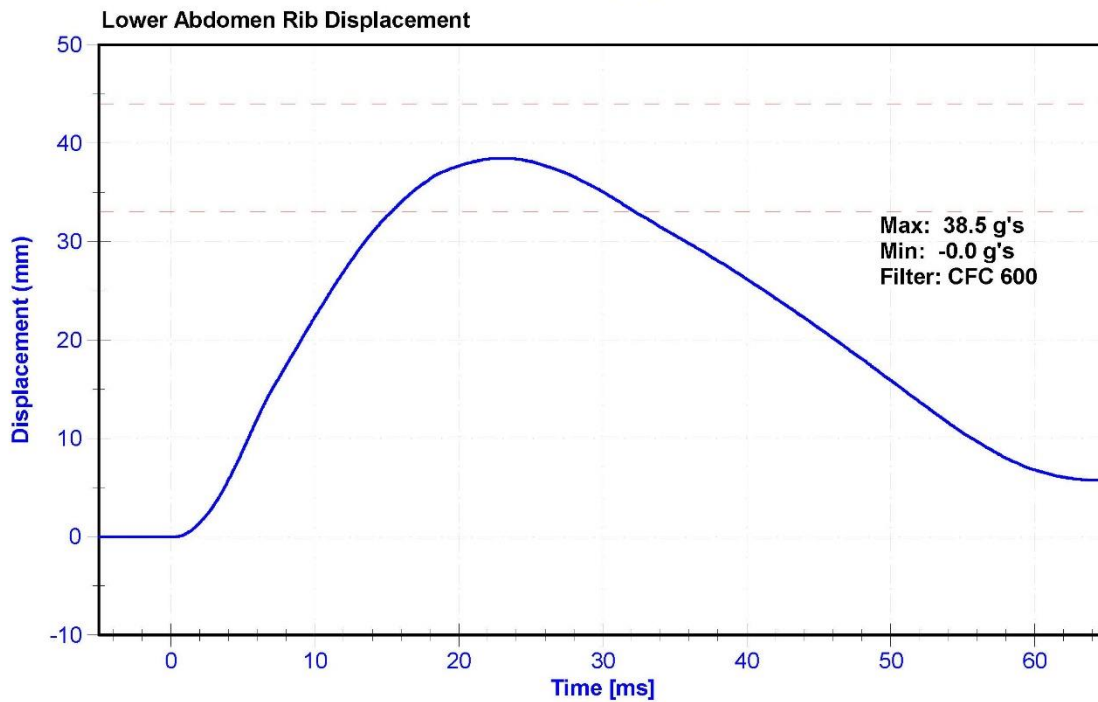
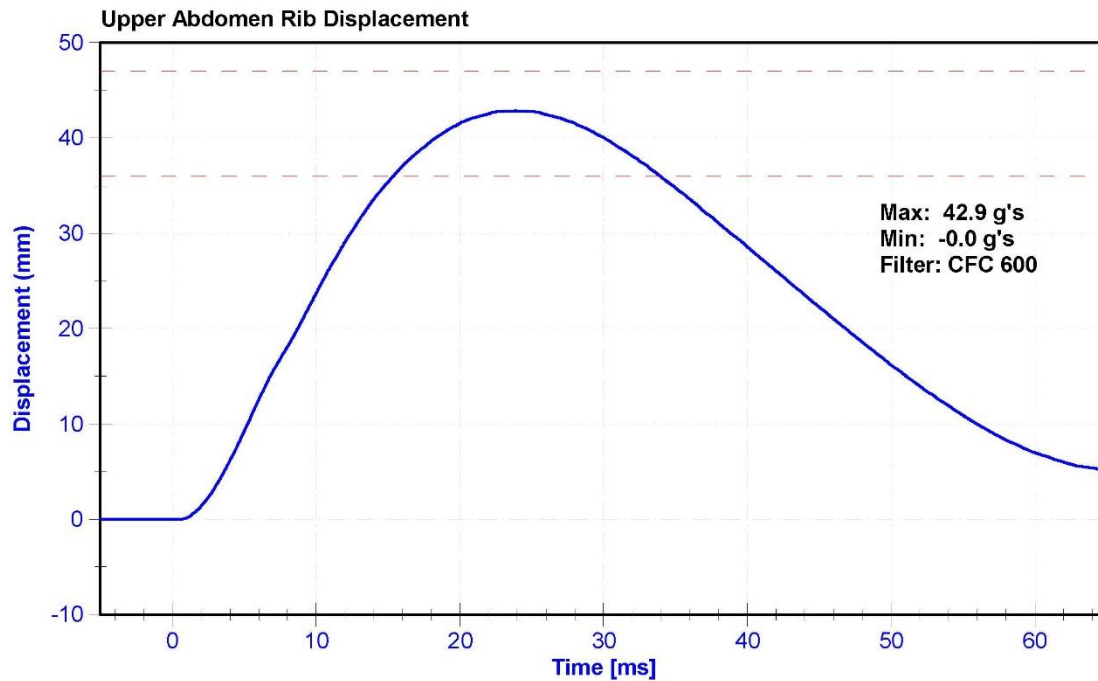
Results

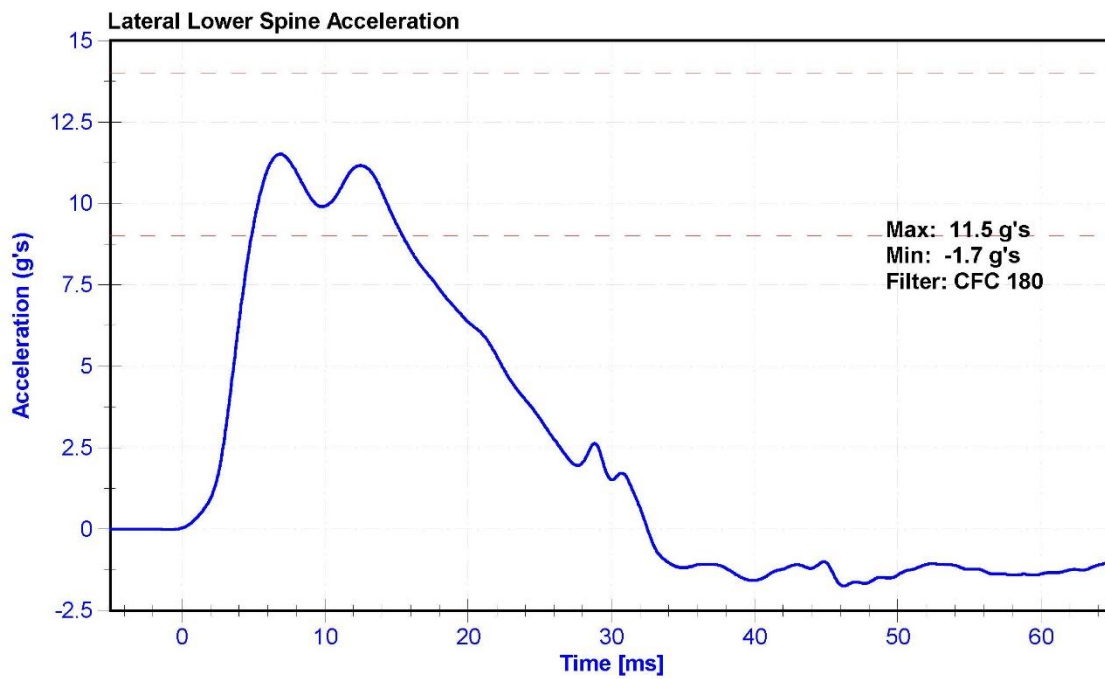
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	43.0	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	12	16	g's	14.0	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.5	Pass
Upper Abdomen Rib Deflection	36	47	mm	42.9	Pass
Lower Abdomen Rib Deflection	33	44	mm	38.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	5/7/2018	11/5/2018
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	9/27/2017	9/27/2018
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	9/27/2017	9/27/2018







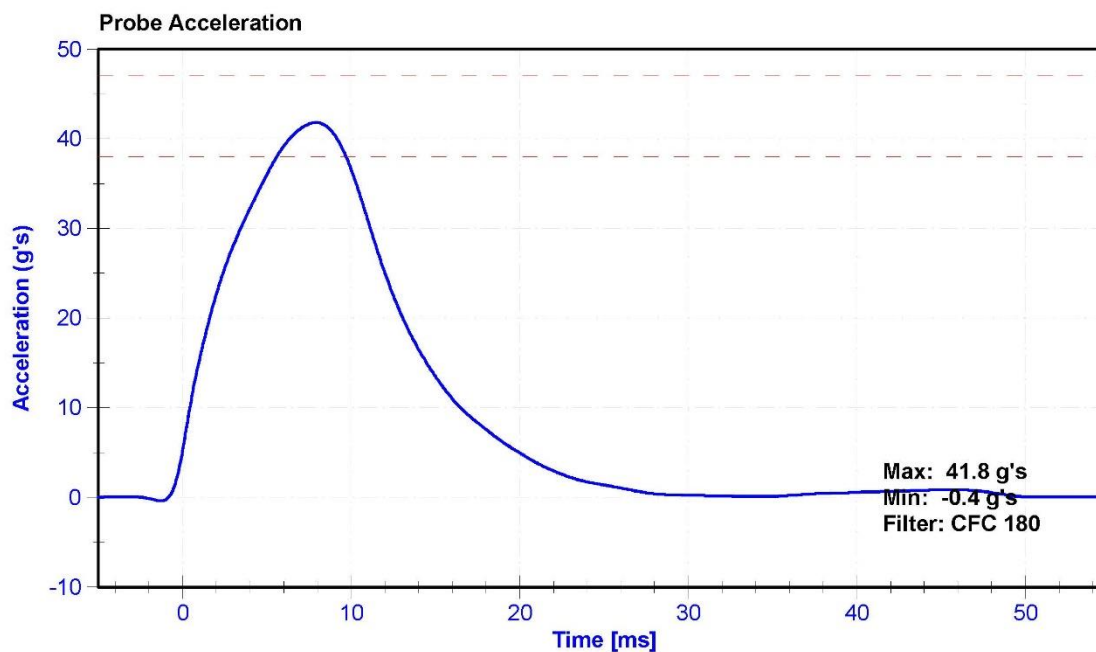
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

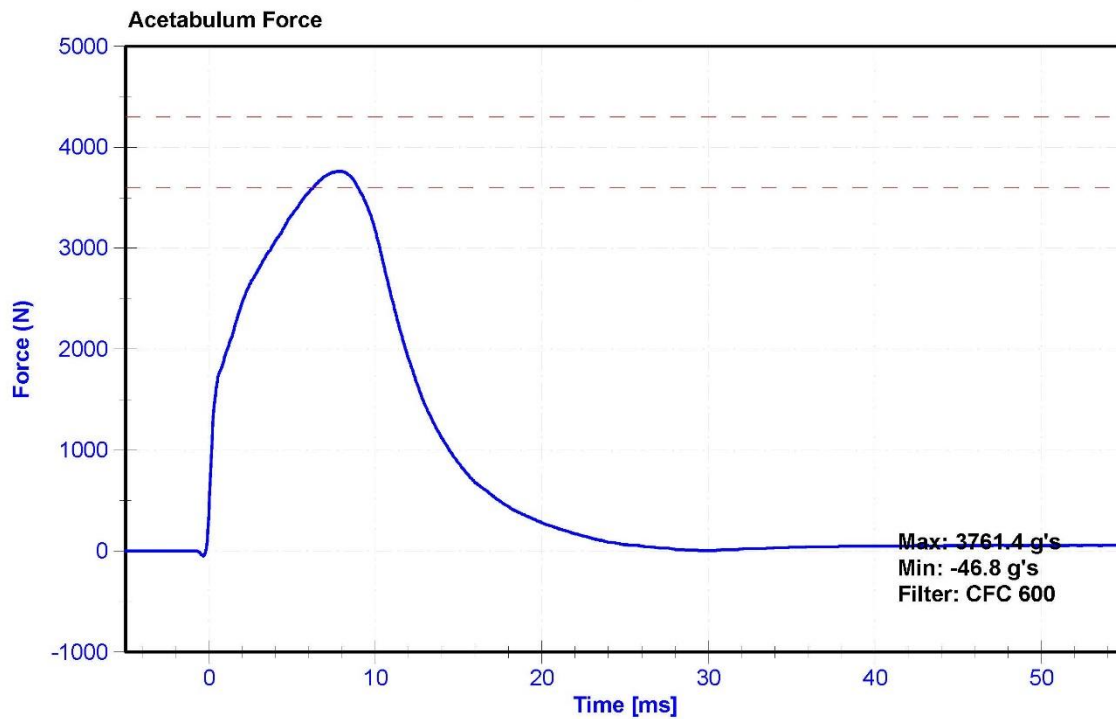
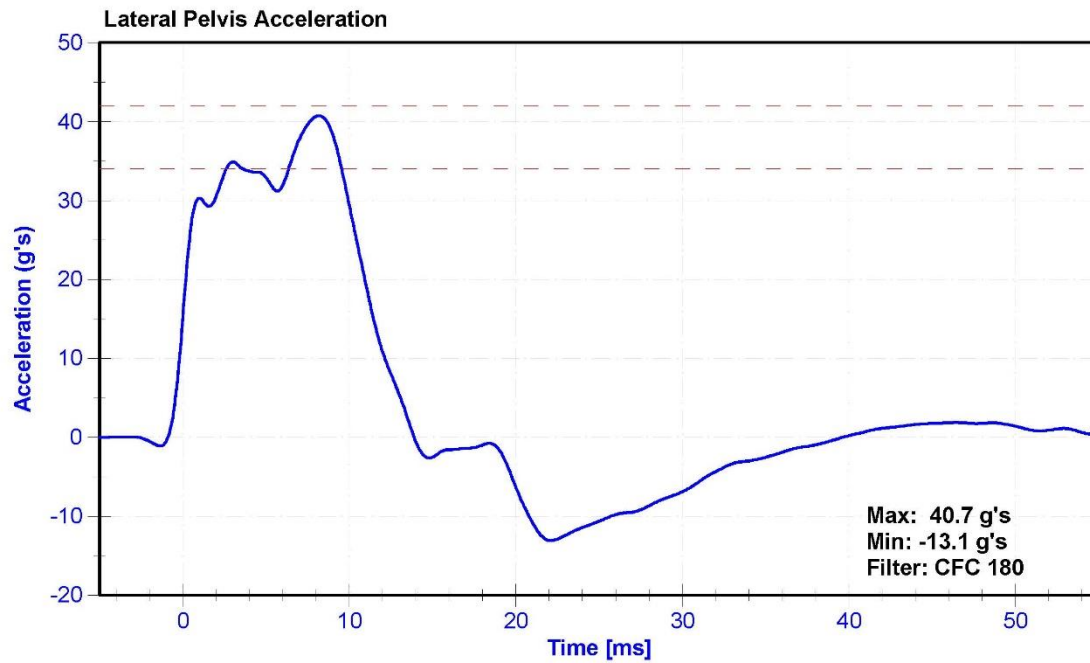
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.1	Pass
Humidity	10	70	%	37.5	Pass
Velocity	6.6	6.8	m/s	6.60	Pass
Probe Acceleration	38	47	g's	41.8	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	40.7	Pass
Acetabulum Force	3600	4300	N	3761.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P79602	5/7/2018	11/5/2018
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	6/20/2017	6/20/2018
Certification Plug	Humanetics	12283	3/15/2018	N/A
Crash Test Plug	Humanetics	12048	2/26/2018	N/A





300 6/6/2018



Cert.

SID-IIs Pelvis Plug Certification Test

Plug S/N 12283

Test Number 6668

Report Number 6683

Test Date 3/15/2018 11:25:00 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	312.82	50.00 600.00
Force @ 1.5 mm (N)	1,173.63	850.00 1,400.00
Force @ 2.5 mm (N)	1,438.18	1,306.00 1,618.00
Force @ 3.0 mm (N)	1,488.61	1,361.00 1,673.00

Testing Machine STM-20 5965542

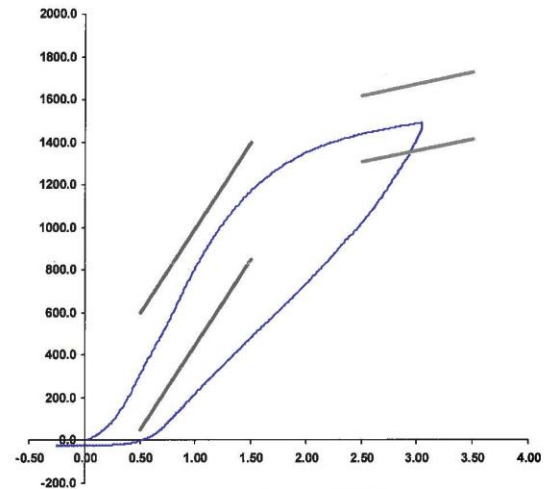
Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107

15-Mar-18

SACO Research

By: DC

Date:

3/15/18

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

300 6/6/2018



Crash

SID-Its Pelvis Plug Certification Test

Plug S/N 12048

Test Number 6401

Report Number 6416

Test Date 2/26/2018 12:40:39 PM

	Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	294.45	50.00	500.00
Force @ 1.5 mm (N)	1,167.77	850.00	1,400.00
Force @ 2.5 mm (N)	1,438.17	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,492.10	1,361.00	1,673.00

Testing Machine STM-20 5965542

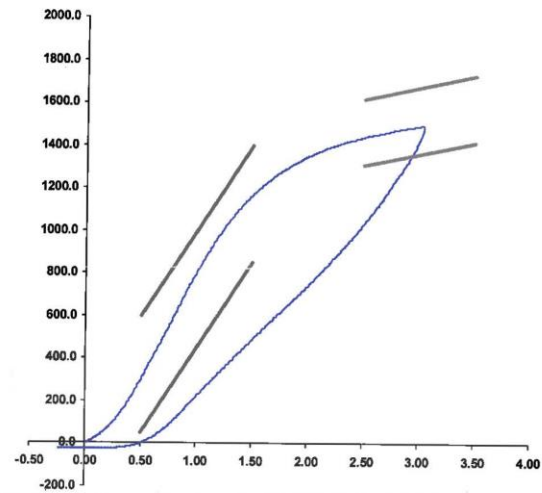
Load Cell S/N (F1360947), Units (LBS) 1000

Crosshead Speed (mm / min) or Rate 12.7

Extension or Position Measured by XHD_100 (XHD100)

Notes:

Force (-N) vs Extension (-mm)



Operator

Part Number 180-4450

Template No 107 28-Feb-18
SACO Research

By: DC Date: 2/26/2018

SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX

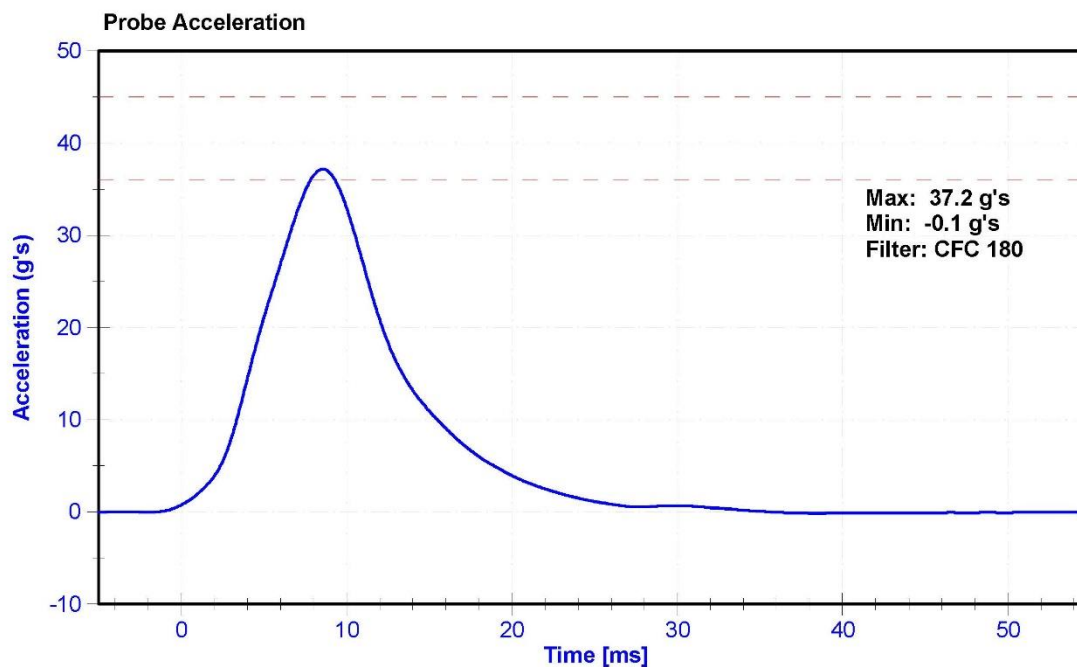
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D. Reinhard

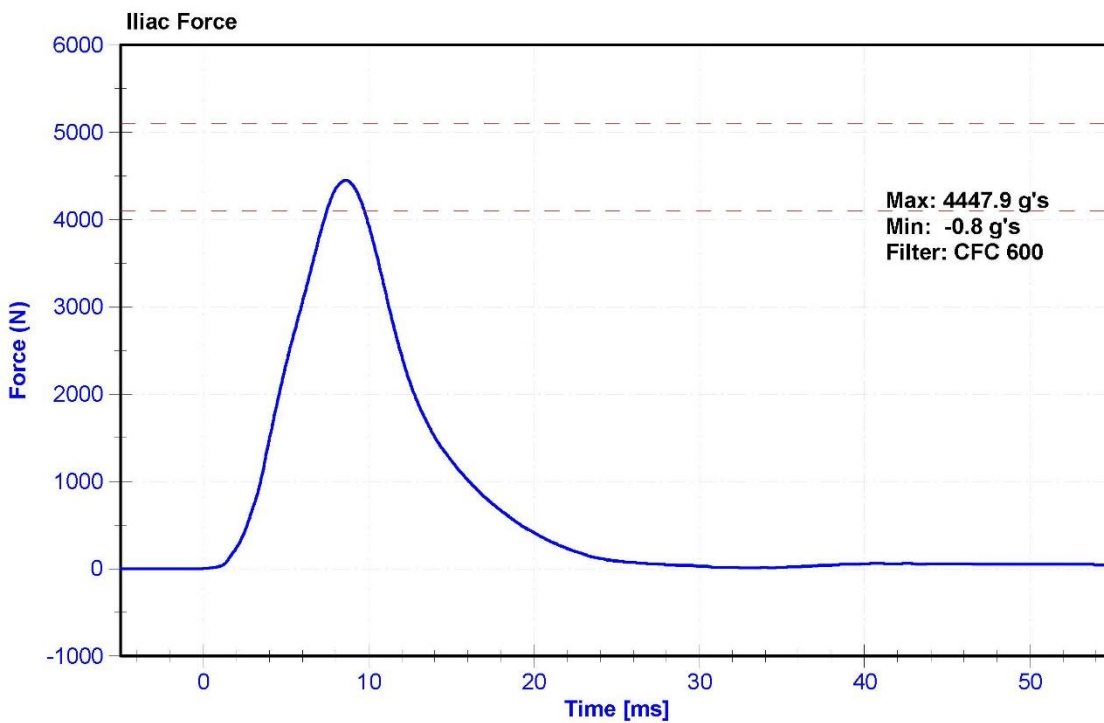
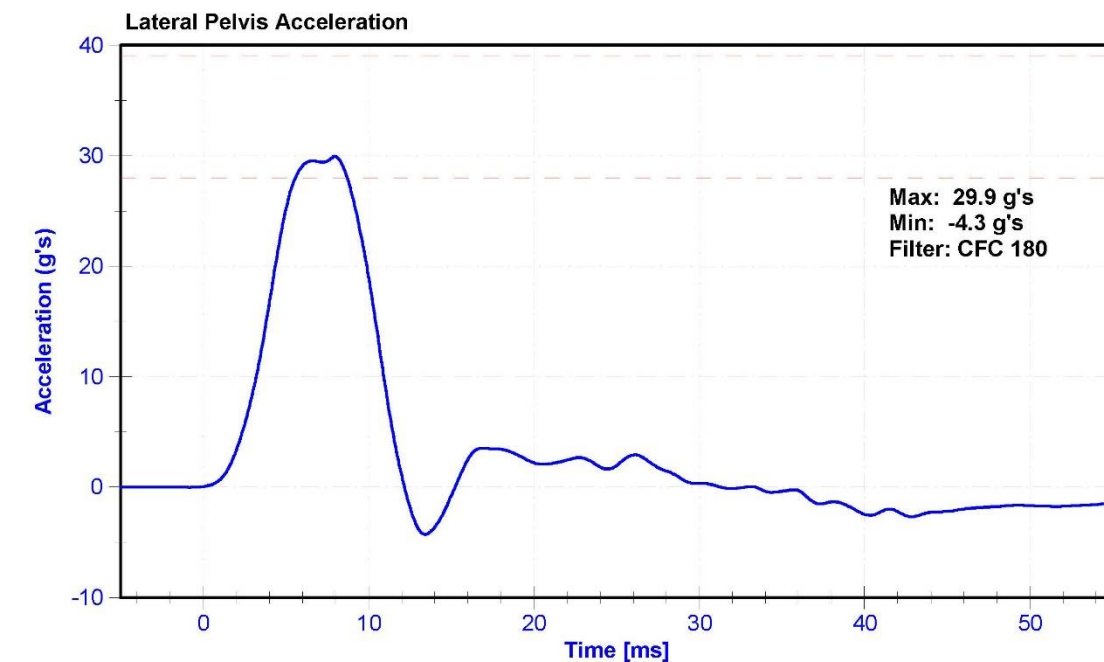
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.6	Pass
Humidity	10	70	%	39.2	Pass
Velocity	4.2	4.4	m/s	4.37	Pass
Probe Acceleration	36	45	g's	37.2	Pass
Lateral Pelvis Acceleration	28	39	g's	29.9	Pass
Iliac Force	4100	5100	N	4447.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7264CT	AC-P32453	10/17/2017	10/17/2018
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P79602	5/7/2018	11/5/2018
Iliac Load Cell	DENTON 3228J	LC-279Fy	6/21/2017	6/21/2018





APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

			SID-IIs S/N: 300			
			Serial Number	Manufacturer	Calibration Date	
Head Accelerometers			X	AC-P58777	ENDEVCO	5/7/2018
			Y	AC-P59018	ENDEVCO	5/7/2018
			Z	AC-P79189	ENDEVCO	5/7/2018
Head Accelerometers - Redundant			X	AC-P52095	ENDEVCO	5/7/2018
			Y	AC-P58986	ENDEVCO	5/7/2018
			Z	AC-P68057	ENDEVCO	5/7/2018
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	DS-451GFE	Servo	9/27/2017
		Middle	Y	DS-040GFE	Servo	5/17/2018
		Lower	Y	DS-1156GFE	Servo	9/27/2017
	Abdominal Rib	Upper	Y	DS-308GFE	Servo	9/27/2017
		Lower	Y	DS-307GFE	Servo	9/27/2017
Lower Spine Accelerometers (T12)			X	AC-P58883	ENDEVCO	5/7/2018
			Y	AC-P64147	ENDEVCO	5/7/2018
			Z	AC-P58786	ENDEVCO	5/7/2018
Acetabulum Load Cell			Y	LC-275Fy	Denton	6/20/2017
Lilac Wing Load Cell			Y	LC-279Fy	Denton	6/21/2017
Pelvis Plug (Struck Side)				11947	SACO	2/1/2018
Pelvis Plug (Non-Struck Side)						

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	AC-A250345	MSI 1201-1014	1/17/2018
Vehicle Center of Gravity	Y	AC-A250364	MSI 1201-1000	1/29/2018
Vehicle Center of Gravity	Z	AC-A250378	MSI 1201-1016	1/17/2018
Left Floor Sill	Y	AC-A250386	MSI 1201-1001	1/17/2018
A-Pillar Sill	Y	AC-A192213	MSI 1201-1001	4/3/2018
A-Pillar Low	Y	AC-A217547	MSI 1201-1000	5/24/2018
A-Pillar Mid	Y	AC-A217578	MSI 1201-1000	4/3/2018
B-Pillar Sill	Y	AC-A250380	MSI 1201-1002	1/17/2018
B-Pillar Low	Y	AC-A197007	MSI 1201-1000	4/2/2018
B-Pillar Mid	Y	AC-A192193	MSI 1201-1001	4/2/2018
Driver Seat	Y	AC-A126821	MSI 1201-1001	4/17/2018
Engine Top	X	AC-A197030	MSI 1201-1000	4/2/2018
Engine Top	Y	AC-A217558	MSI 1201-1000	3/27/2018
Firewall	Y	AC-A192214	MSI 1201-1001	3/10/2018
Right Roof	Y	AC-A196600	MSI 1201-1000	3/27/2018
Right Floor Sill	Y	AC-A192232	MSI 1201-1001	5/9/2018
Rear Floorpan	X	AC-A192194	MSI 1201-1001	2/2/2018
Rear Floorpan	Y	AC-A250370	MSI 1201-1000	1/29/2018

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	LC-18879	Interface 1220-FS	6/19/2017
Load Cell 2	LC-18852	Interface 1220-FS	6/19/2017
Load Cell 3	LC-46955	Interface 1220-FS	6/19/2017
Load Cell 4	LC-18882	Interface 1220-FS	6/19/2017
Load Cell 5	LC-18864	Interface 1220-FS	6/19/2017
Load Cell 6	LC-18847	Interface 1220-FS	6/19/2017
Load Cell 7	LC-62086	Interface 1220-FS	6/19/2017
Load Cell 8	LC-46962	Interface 1220-FS	6/19/2017