REPORT NUMBER: SPNCAP-CAL-16-001

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

Ford Motor Co.
2016 Ford Explorer
SUV

NHTSA No: M20160206

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

December 16, 2015

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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Edward Dutton, Test Engineer
Transportation Test Operations

FINAL REPORT ACCEPTANCE BY OCWS:

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

Date: _____

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

Date: _____

TECHNICAL REPORT DOCUMENTATION PAGE

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7. *Author(s)* Vanessa Hansen, Test Engineer Edward Dutton, Senior Test Engineer		**8. *Performing Organization Report No.*** CAL-DOT-2016-001
9. *Performing Organization Name and Address* Calspan Corporation Transportation Test Operation P.O. Box 400 Buffalo, New York 14225		**10. *Work Unit No.*** **11. *Contract or Grant No.*** DTNH22-14-D-00352
12. *Sponsoring Agency Name and Address* U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590		**13. *Type of Report and Period Covered:*** Final Test Report, November 5, 2015 - December 16, 2015 **14. *Sponsoring Agency Code*** NRM-110

15. *Supplementary Notes*

16. *Abstract*

A 32.20 km/h (20 mph), 75˚ oblique impact Side NCAP Test was conducted on the subject 2016 Ford Explorer 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 November 5, 2015.

The impact velocity of the vehicle was 32.75 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 428 mm located at level 2. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver ATD (SID-IIs) (Serial No. 300)		
	Units	Threshold	Result
Head Injury Criteria (HIC_{36})		1000	406.578
Resultant Lower Spine Acceleration	G	82	56.492
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4041.518
Maximum Thoracic Rib Deflection	mm	38	23.123
Maximum Abdomen Rib Deflection	mm	45	26.514

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.

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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Form DOT F1700.7 (8-72)

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SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2016 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 2016 Ford Explorer 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 2016 Ford Explorer SUV. The subject vehicle was towed into the rigid pole at an angle of 75^{o} and a velocity of 32.75 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on November 5, 2015. 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	406.578
Resultant Lower Spine Acceleration	g	82	56.492
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	4041.518
Maximum Thoracic Rib Deflection	mm	38*	23.123
Maximum Abdominal Rib Deflection	mm	45*	26.514

*****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	No	N/A		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

GENERAL COMMENTS:

1. P1 serial number – DG8012

Data Anomalies:

- Left Front Sill Y Acceleration, Questionable magnitude 29.3ms to 31.7ms

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: 2016 Ford Explorer SUV NHTSA No.: M20160206
Test Program: NCAP Side Pole Impact Test Test Date: 11/5/2016

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20160206
Model Year	2016
Make	Ford
Model	Explorer
Body Style	SUV
VIN	1FM5K7B88GGA75084
Body Color	Blue
Odometer Reading (km/mi)	346 km / 215 mi
Engine Displacement (L)	3.5
Type / No. Cylinders	V6
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	6-Speed
Overdrive	Yes
Final Drive	Front Wheel Drive
Roof Rack	No
Sunroof / T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	Yes
Anti-Lock Brakes (ABS)	Yes

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	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head / Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso / Pelvis Airbag	No
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	-

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

DATA FROM CERTIFICATION LABEL

Manufactured By	Ford Motor Co.
Date of Manufacture	08/15
Vehicle Type	Passenger

GVWR (kg)	2776
GAWR Front (kg)	1397
GAWR Rear (kg)	1497

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total	
Designated Seating Capacity (DSC)	2	3	2	7	
Capacity Weight (VCW) (kg)				734	(A)
DSC X 68.04 kg				476.28	(B)
Cargo Weight (RCLW) (kg)				257.7	(A-B)

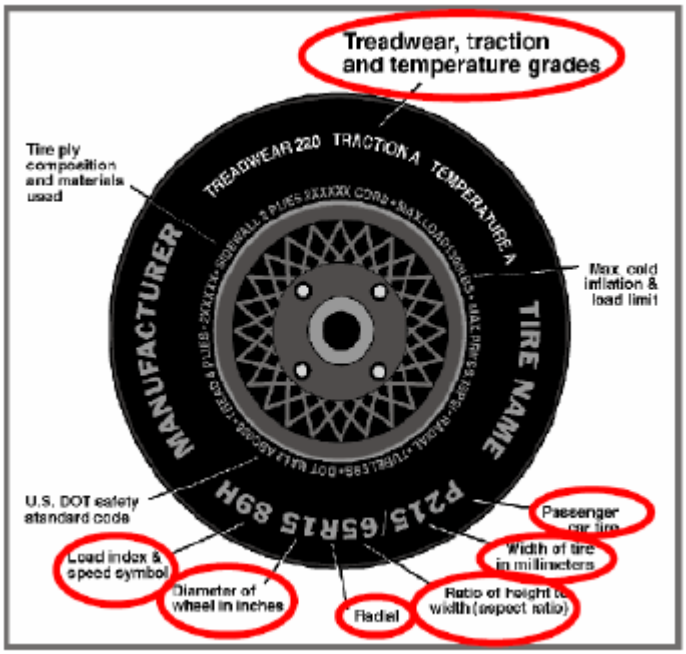
VEHICLE SEAT TYPE

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			X		X		

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

Test Vehicle:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016

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	P245/60R18	P245/60R18
Tire Size on Vehicle	P245/60R18	P245/60R18
Tire Manufacturer	Michelin	Michelin
Tire Model	Latitude Tour HP	Latitude Tour HP
Treadwear	440	440
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 1 Polyamide, 2 Steel	2 Polyester, 1 Polyamide, 2 Steel
Load Index/Speed Symbol	104H	104H
Tire Material	Rubber	Rubber
DOT Safety Code Left	AP4AKAMX3315	AP4AKAMX3315
DOT Safety Code Right	AP4AKAMX3315	AP4AKAMX3315

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

Test Vehicle: 2016 Ford Explorer SUV NHTSA No.: M20160206
Test Program: NCAP Side Pole Impact Test Test Date: 11/5/2016

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	244	230	244	242
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	567	431		569	563		555	524	
Right	kg	558	459		541	514		565	554	
Ratio	%	56%	44%		51%	49%		51%	49%	
Totals	kg	1125	890	2015	1110	1077	2187	1120	1078	2198

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2015	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	44.12	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2195.12	(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)? [X] **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	-0.5	-0.5	-0.1	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.8	-0.5	-0.4	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	0.0	0.0	0.0	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	0.1	0.1	0.1	Yes
Vehicle CG (Aft of Front Axle)	mm	1265	1411	1405	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	-8	30	-15	

* 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:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Tail light	2
Trunk Carpeting	9
Passenger Side Windows	10
Ballast / Equipment Added	79

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:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016

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 (º)		
	Max	Min	Mid
Driver Seat	16.8	7.5	12.1
Front Passenger Seat	-	Not Adjustable	-
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) (º)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	12.1	32	Max	59	52	56
			Mid	24	28	32
			Min	0	5	9
Front Passenger Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			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

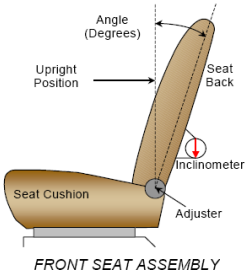
Test Vehicle: 2016 Ford Explorer SUV NHTSA No.: M20160206
Test Program: NCAP Side Pole Impact Test Test Date: 11/5/2016

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detents*
Driver Seat	255	N/A	0	N/A
Front Passenger Seat	180	N/A	0	N/A
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	100	25 (0 – 24)	0	0
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.



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	-10.5 to 42.1	N/A	-4.2	N/A
Front Passenger Seat	-14.4 to 36.3	N/A	-8.9	N/A
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	15.6 to 33.6	N/A	15.6	N/A
Non-Struck Side Rear Seat	14.9 to 33.1	N/A	14.9	N/A
Rear Center Seat	15.6 to 33.6	N/A	15.6	N/A

SEAT BELT ANCHORAGE ADJUSTMENT

Seat belt anchorages are adjusted in accordance with the information provided by the manufacturer on Form No. 1.

Seat	Total # of Positions	Placed in Position #
Driver Seat	4 (0 – 3)	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 (0 – 2)	2 - Lowest

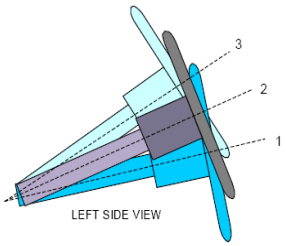
DATA SHEET NO. 2 … (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016

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	26.1	
Geometric Center – Position 2	29	
Uppermost – Position 3	31.9	
Telescoping Steering Wheel Travel		50
Test Position	29	25

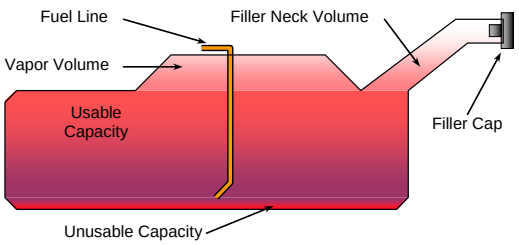


STEERING COLUMN ASSEMBLY

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 right 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.



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY DATA

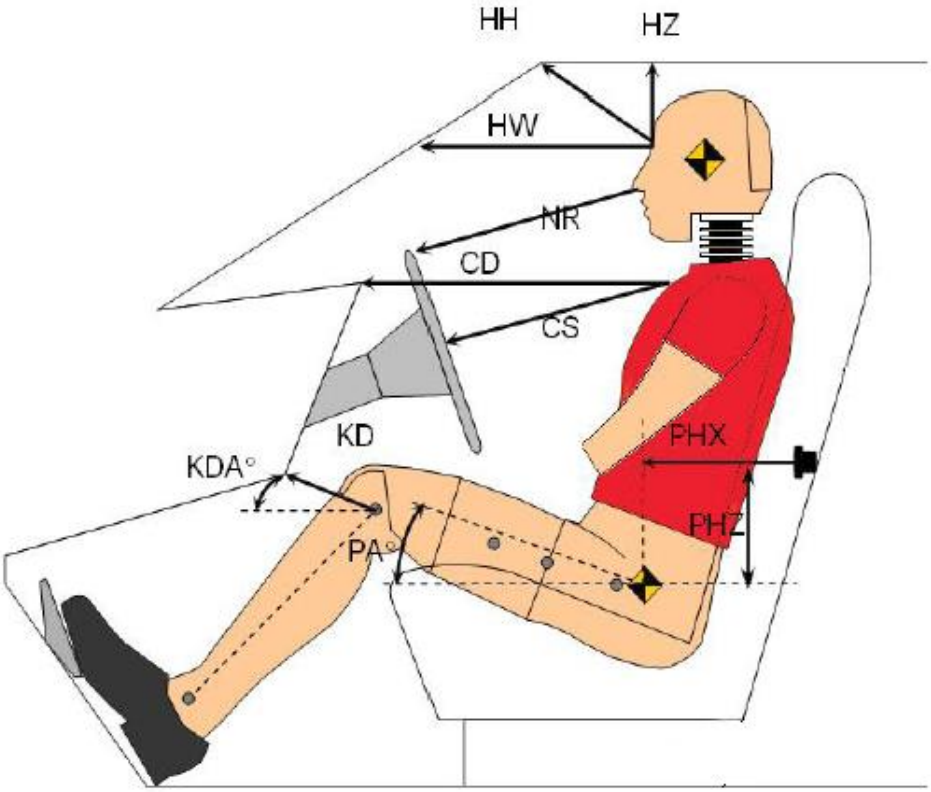
Description			Liters
Usable Capacity of "Standard Tank"	-	see Form No. 1	70.4
Usable Capacity of "Optional Tank"	-	see Form No. 1	
Usable Capacity of "Standard Tank"	-	see Owner's Manual	70.4
Usable Capacity of "Optional Tank"	-	see Owner's Manual	
93% of Usable Capacity			65.47
Actual Amount of Solvent Used in Test			65.47
1/3 of Usable Capacity			23.47

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

[X] Yes [ ] No

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016



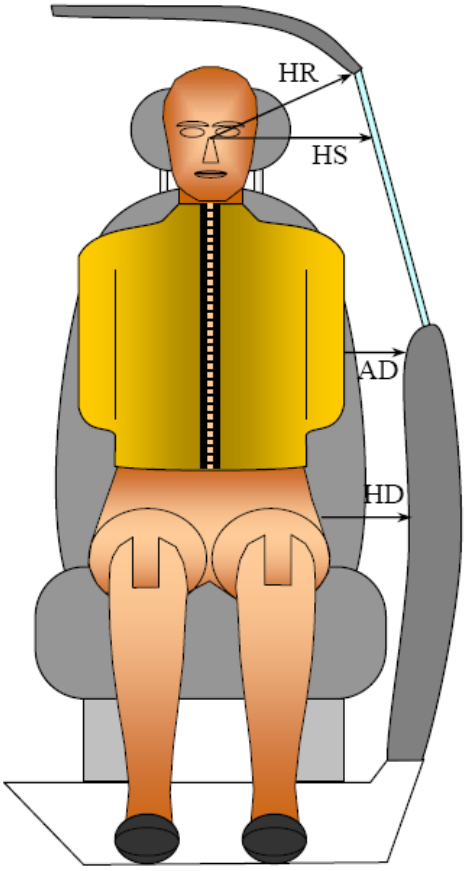
Left Side View

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. DG8012)	
		Length (mm)	Angle (◦)
HH	Head to Header	364	
HW	Head to Windshield	731	
HZ	Head to Roof Liner	238	
NR	Nose to Rim	244	
CD	Chest to Dash	432	
CS	Chest to Steering Wheel	186	
KD(L) / KDA(L)◦	Left Knee to Dash	94	27.5
KD(R) / KDA(R)◦	Right Knee to Dash	95	24.5
PAX◦	Pelvic Tilt Angle (X-Axis)		0.2
PAY◦	Pelvic Tilt Angle (Y-Axis)		19.7
PHX	Hip Point to Striker (X-Axis)	350	
PHZ	Hip Point to Striker (Z-Axis)	82	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016



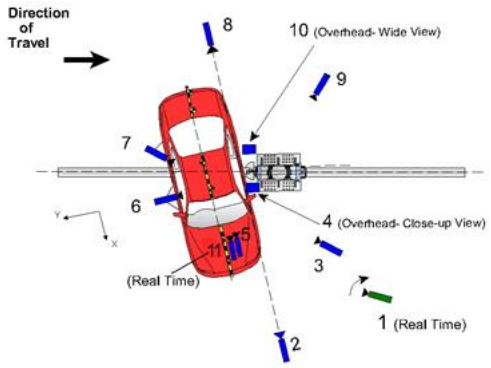
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver - Length (Serial No. DG8012)
HR	Head To Side Header	mm	320
HS	Head to Side Window	mm	459
AD	Arm to Door	mm	201
HD	Hip Point to Door	mm	190

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2016 Ford Explorer SUV NHTSA No.: M20160206
Test Program: NCAP Side Pole Impact Test Test Date: 11/5/2016



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	0	5993	-1362	24	1000
3	Impact side 45º - forward pole view	3940	-2235	-1669	24	1000
4	Overhead Close-up view of impact	0	0	-5203	20	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	0	-7112	-1401	24	1000
9	Impact side 45º - rearward pole view	-1870	-3729	-1694	24	1000
10	Overhead wide - view of impact	-75	305	-5203	14	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 75º angle to the rigid pole.*

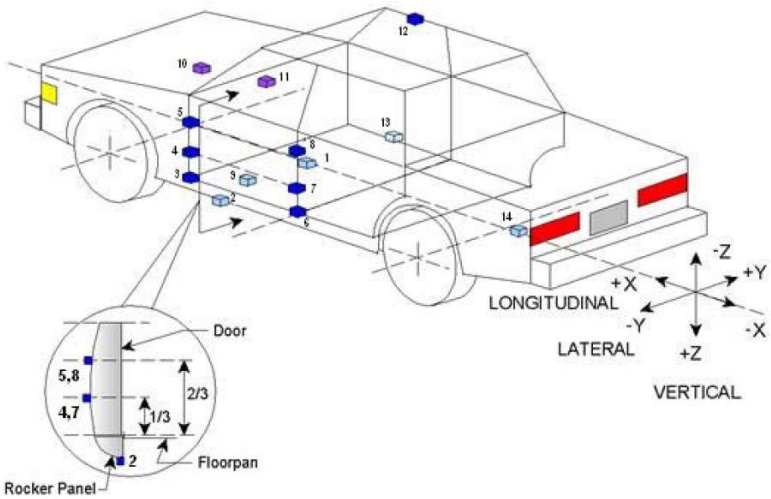
Comments: All cameras operated as intended.

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:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2905	51	179
2	Left Floor Sill	3035	-696	-100
3	A-Pillar Sill	3382	-659	-161
4	A-Pillar Low	3450	-688	122
5	A-Pillar Mid	3474	-678	635
6	B-Pillar Sill	2479	-672	-118
7	B-Pillar Low	2484	-726	124
8	B-Pillar Mid	2452	-724	388
9	Driver Seat Track	2681	-581	-55
10	Engine Top	4305	-15	335
11	Firewall	3938	10	432
12	Right Roof	2482	686	1155
13	Right Floor Sill	3037	698	-101
14	Rear Floorpan	986	9	-62

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:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016

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: 2016 Ford Explorer SUV NHTSA No.: M20160206
Test Program: NCAP Side Pole Impact Test Test Date: 11/5/2016

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	Visor
Top of Head	Curtain Airbag
Left Side of Head	Curtain Airbag
Back of Head	Headrest & Seatback
Left Shoulder	Torso/Pelvis Airbag
Upper Torso	Seatback
Lower Torso	Seatback
Left Hip	Seat pan & Driver Door
Left Knee	Driver Door

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other
	Front	Rear	Front	Rear	
Remained Closed and Operational	No	No	No	Yes	Yes
Total Separation from Vehicle at Hinges or Latches	0	0	0	0	0
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: 2016 Ford Explorer SUV NHTSA No.: M20160206
Test Program: NCAP Side Pole Impact Test Test Date: 11/5/2016

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar and B-Pillar buckled inward.
Sill Separation	Bent inwards where pole impacted
Windshield Damage	Shattered throughout with separation along Driver A-Pillar
Side Window Damage	Driver window shattered during impact event
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	No	N/A		
Side Airbag 1 - Curtain	Yes	Yes	Yes	Yes
Side Airbag 2 – Torso/Pelvis	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

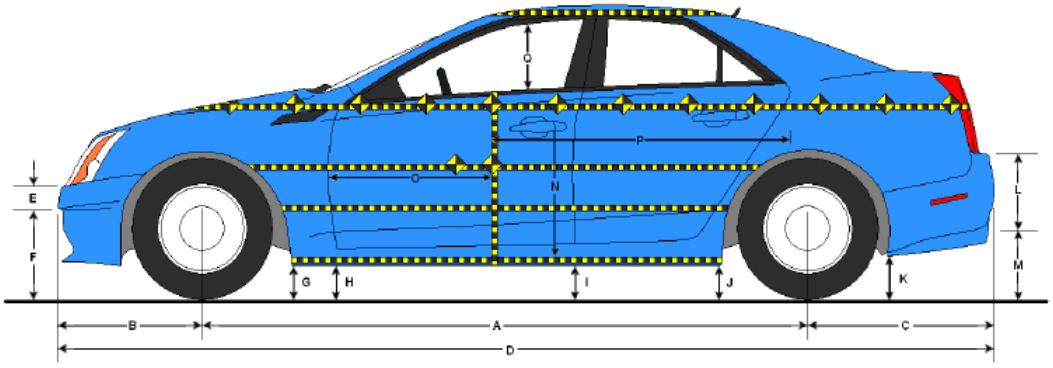
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter		Units	Tolerance	Value
Vertical Impact Ref Line	- Aft of Front Axle, Intended Impact Pt	mm		1099
Actual Impact Point	- Aft of Front Axle	mm		1096
Horizontal Offset (+ forward / - rearward)		mm	+/- 38 *	+3
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	32.75**
Trap No. 2 Velocity	- Redundant	kph	31.4 to 33.0	32.75**

* Of Intended Impact Point
** Speed Determined from video analysis

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2016 Ford Explorer SUV
Test Program: NCAP Side Pole Impact Test
NHTSA No.: M20160206
Test Date: 11/5/2016



LEFT SIDE VIEW

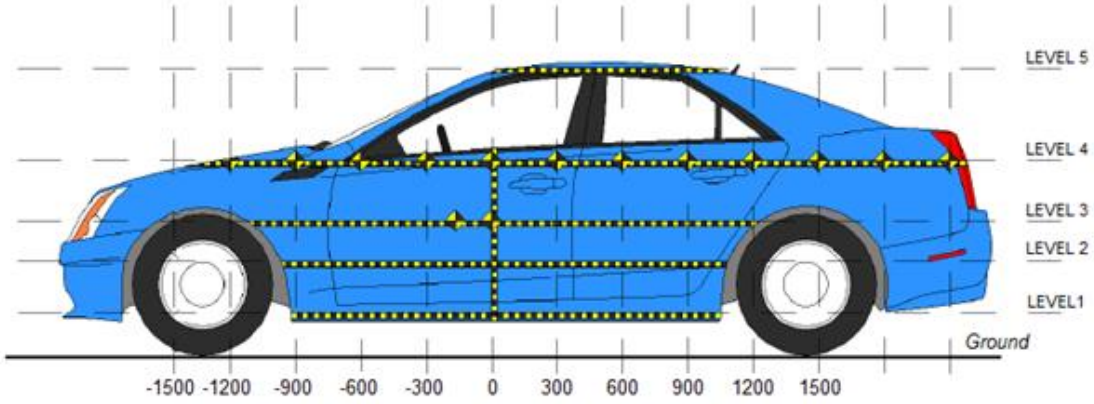
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2865	2745	120
B	Front Axle to FSOV	989	1053	-64
C	Rear Axle to RSOV	1189	1179	10
D	Total Length at Centerline	5043	4977	67
E	Front Bumper Thickness	80	80	0
F	Front Bumper Bottom to Ground	579	608	-29
G	Sill Height at Front Wheel Well	232	213	19
H	Sill Height at Front Door Leading Edge	257	232	25
I	Sill Height at B-Pillar	260	257	3
J1	Sill Height at Rear Wheel Well	260	273	-13
J2	Pinch Weld Height at Rear Wheel Well	261	273	-12
K	Sill Height Aft of Rear Wheel Well	332	333	-1
L	Rear Bumper Thickness	255	255	0
M	Rear Bumper Bottom to Ground	433	426	7
N	Sill Height to Bottom of Front Window Sill	906	908	-2
O	Front Door Leading Edge to Impact CL	560	430	130
P	Rear Door Trailing Edge to Impact CL	1658	1540	118
Q	Front Window Opening	414	404	11
R	Right Side Length	4936	4919	16
S	Left Side Length	4933	4827	106
T	Vehicle Width at B-Pillars	1970	1891	80

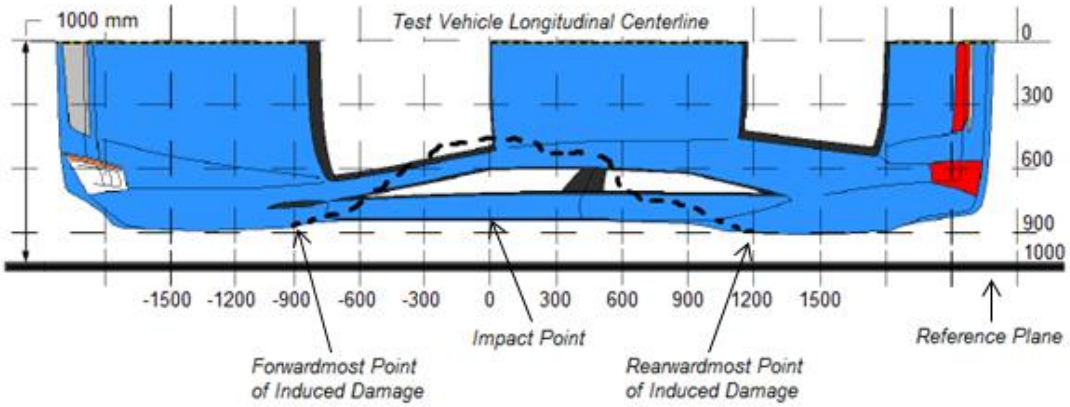
* All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016



Left Side View



Overhead View

MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	313	367	0
2	Occupant Hip Point	mm	747	428	0
3	Mid - Door	mm	823	424	0
4	Window Sill	mm	1154	371	0
5	Window Top	mm	1684	119	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: 2016 Ford Explorer SUV NHTSA No.: M20160206
Test Program: NCAP Side Pole Impact Test Test Date: 11/5/2016

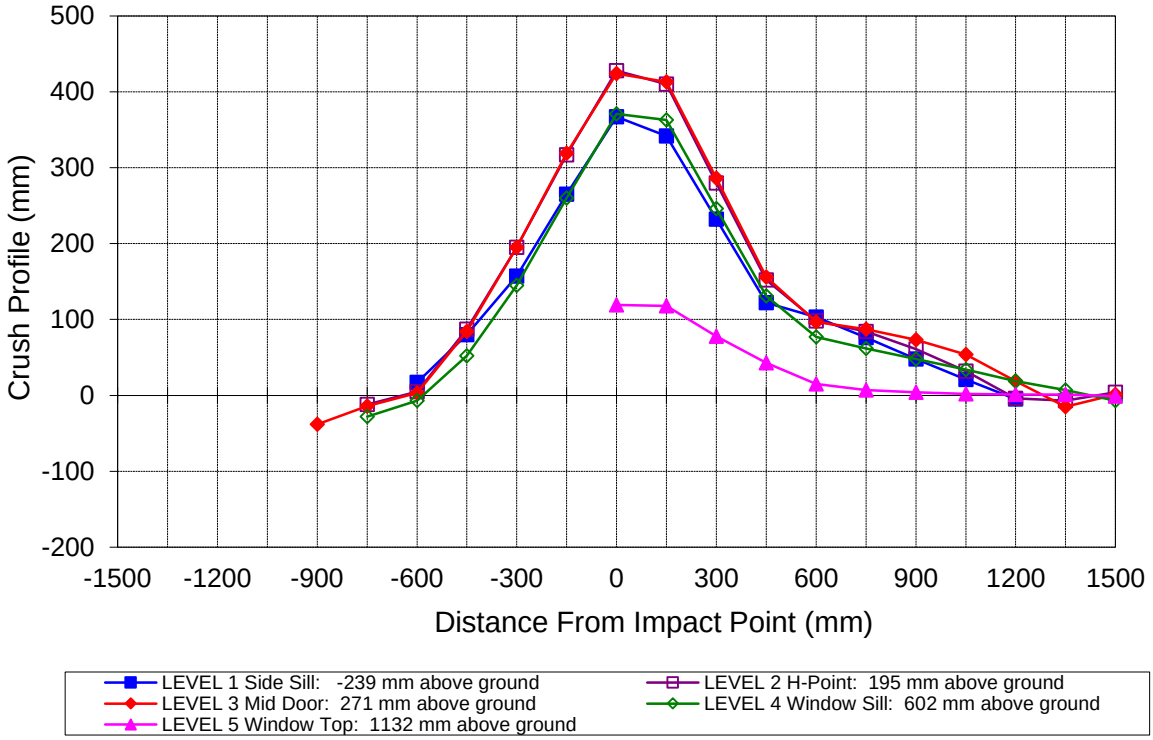
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050															
-900			1001					1039					-38		
-750		1000	994	866			1012	1008	894			-12	-14	-28	
-600	917	988	979	892		900	983	976	899		17	5	3	-7	
-450	913	975	974	906		833	888	890	854		80	87	84	52	
-300	910	975	977	920		753	780	782	775		157	195	195	145	
-150	909	977	979	929		644	660	660	669		265	317	319	260	
0	909	978	980	938	621	542	550	556	567	502	367	428	424	371	119
150	908	978	981	944	679	566	568	568	581	561	342	410	413	363	118
300	907	978	981	949	688	675	698	695	703	610	232	280	286	246	78
450	907	976	981	951	692	785	824	825	820	649	122	152	156	131	43
600	900	976	981	953	694	797	878	884	876	679	103	98	97	77	15
750	899	975	979	953	695	823	891	892	891	688	76	84	87	62	7
900	898	973	978	952	695	850	912	905	904	691	48	61	73	48	4
1050	897	971	976	950	694	876	939	922	916	692	21	32	54	34	2
1200	896	982	980	946	691	901	986	961	927	690	-5	-4	19	19	1
1350		1000	995	943	689		1007	1010	936	688		-7	-15	7	1
1500		1004	1002	939	684		1000	1001	946	685		4	1	-7	-1

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:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016

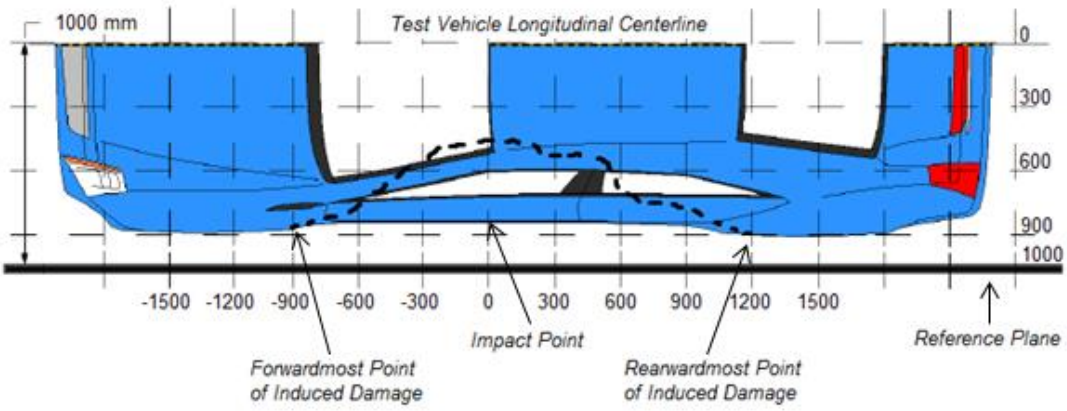


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016

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



Overhead View

VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-900	3	-39	-1	-38
2	-420	3	132	25	107
3	60	3	439	20	419
4	540	3	140	19	121
5	1020	3	81	24	57
6	1500	3	-1	-2	1

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

Test Vehicle:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side MDB Impact Test	Test Date:	11/5/2016
Test Time:	11:40 AM	Temperature:	21° C

A. From impact until vehicle motion ceases: (Maximum allowable is 1 oz.) — 0 oz.

B. For the 5-minute period after motion ceases: (Maximum allowable is 5 oz.) — 0 oz.

C. For the following 25 minutes: (Maximum allowable is 1 oz./minute) — 0 oz.

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°	66	300	366
90° to 180°	65	300	365
180° to 270°	64	300	364
270° to 360°	67	300	367

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

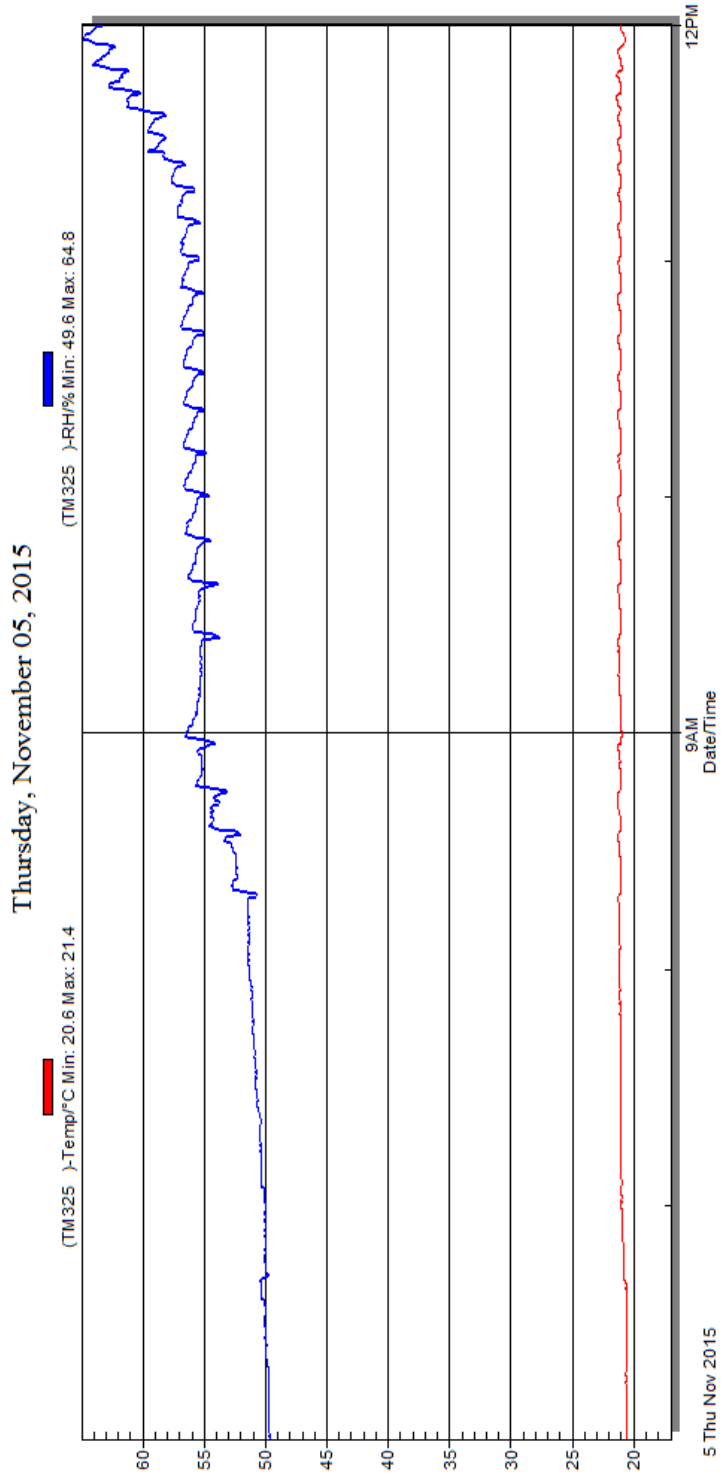
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

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:	2016 Ford Explorer SUV	NHTSA No.:	M20160206
Test Program:	NCAP Side Pole Impact Test	Test Date:	11/5/2016



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

APPENDIX A

PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Figure A-1: As Delivered Right Front ¾ View of Test Vehicle

Figure A-2: As Delivered Left Rear ¾ 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 ¾ View of Test Vehicle

Figure A-6: Post-Test Left Front ¾ 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 ¾ View of Test Vehicle

Figure A-10: Post-Test Left Rear ¾ 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

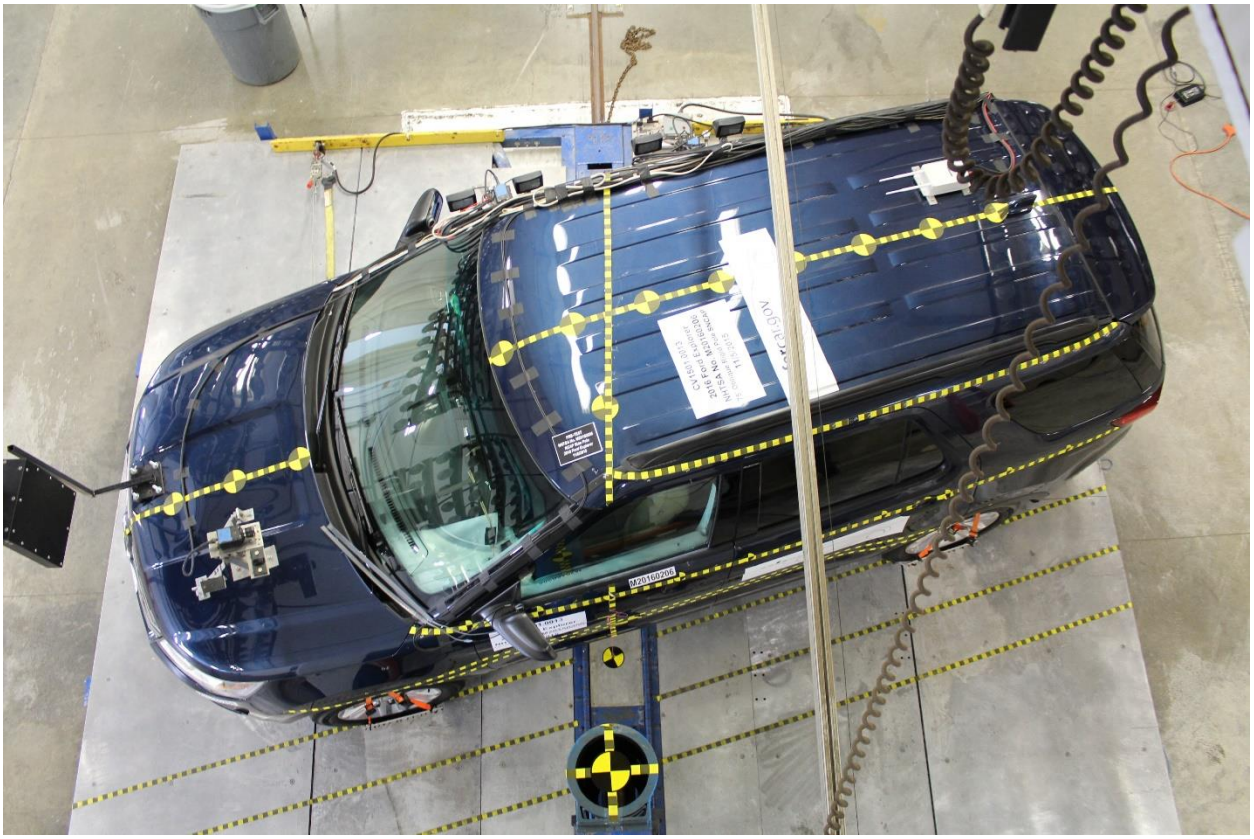


Figure A-15: Pre-Test Overhead View of Test Area

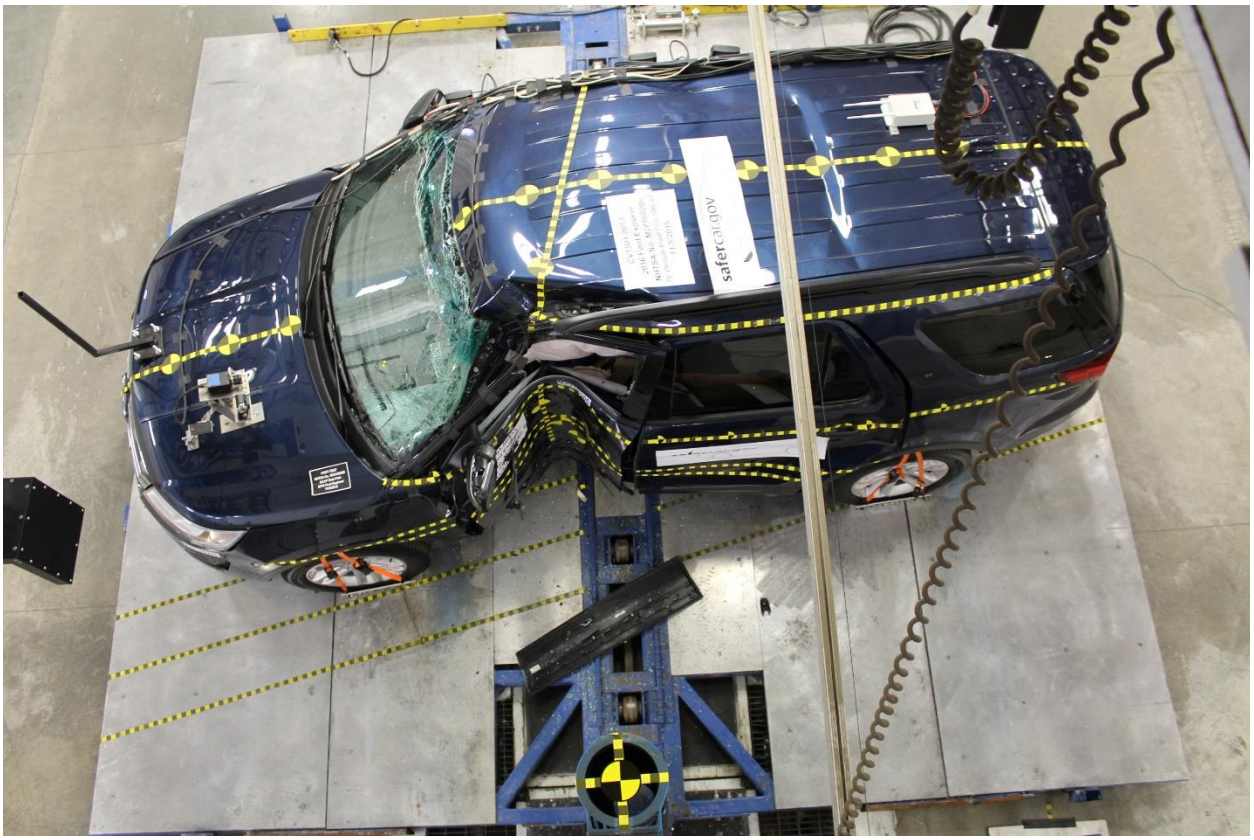


Figure A-16: Post-Test Overhead View of Test Area

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

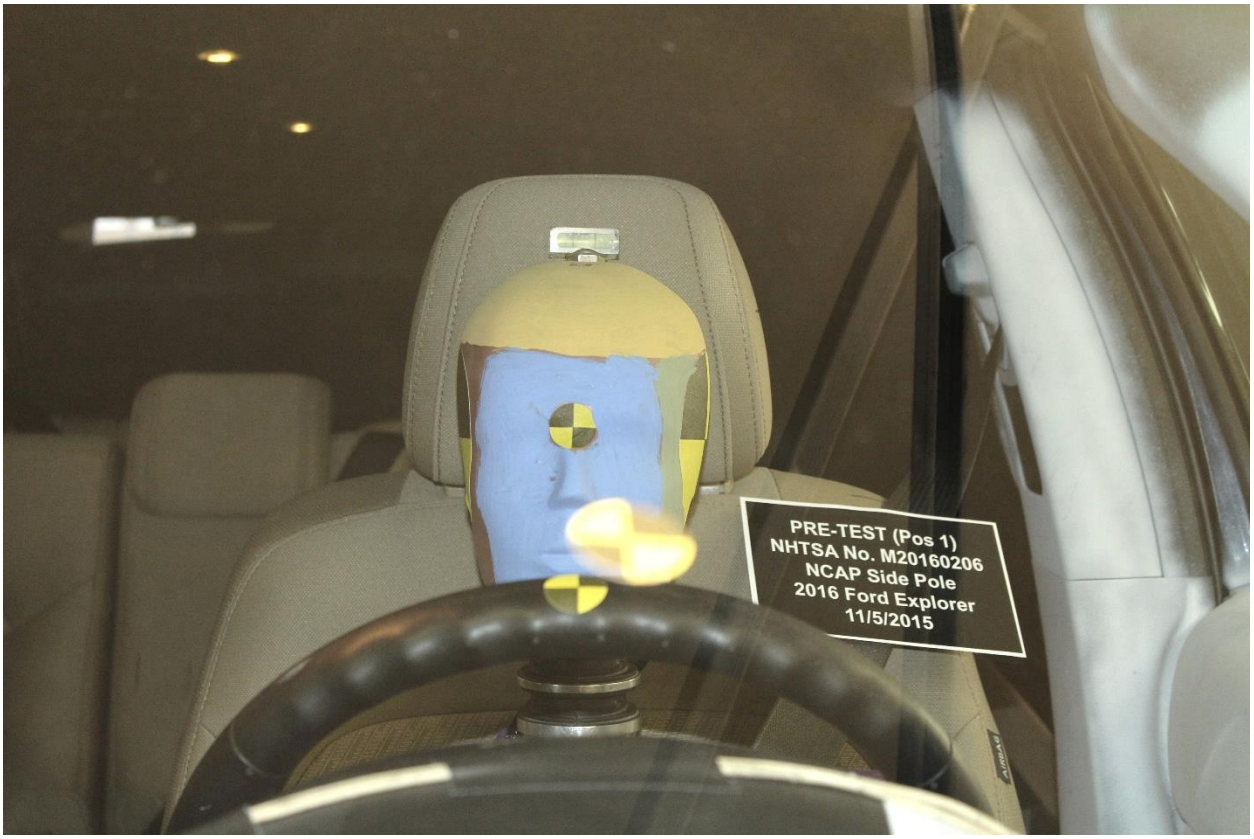


Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint

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

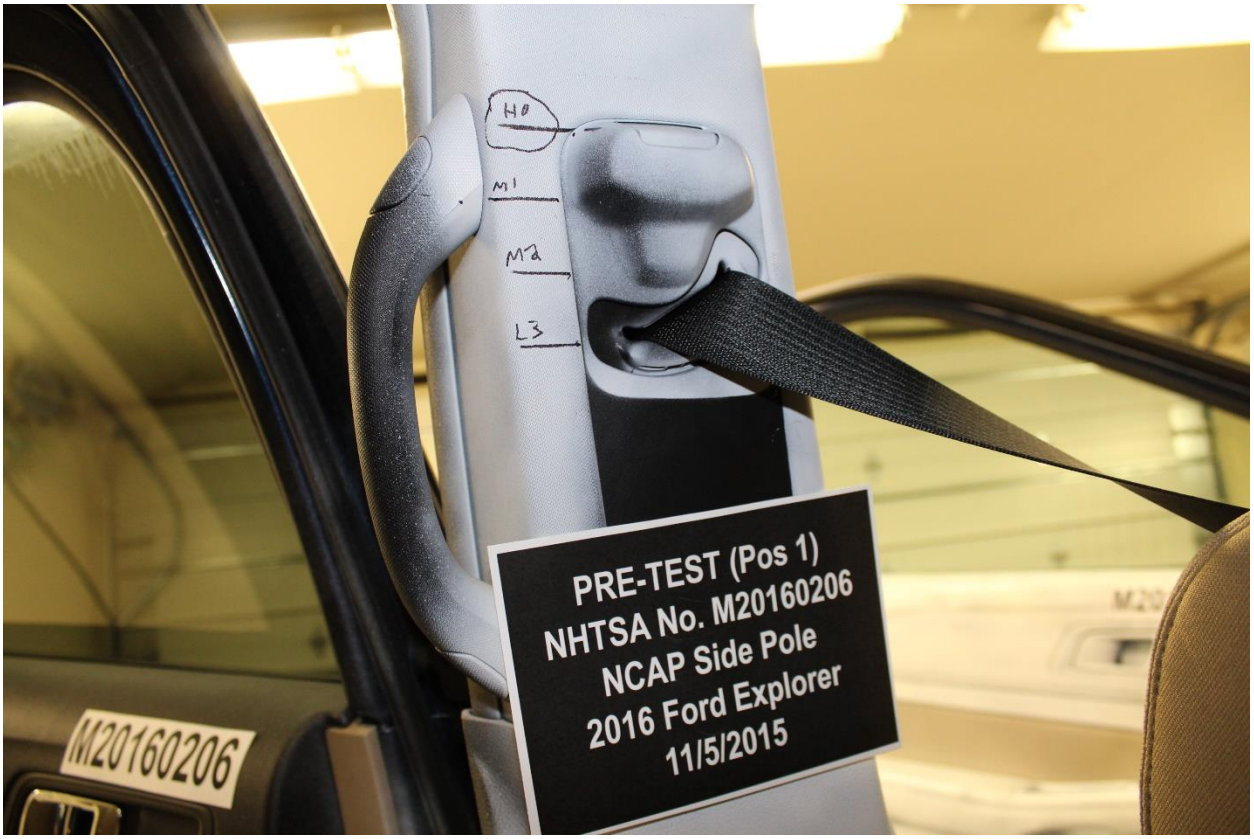


Figure A-33: Pre-Test View of Belt Anchorage for Dummy

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

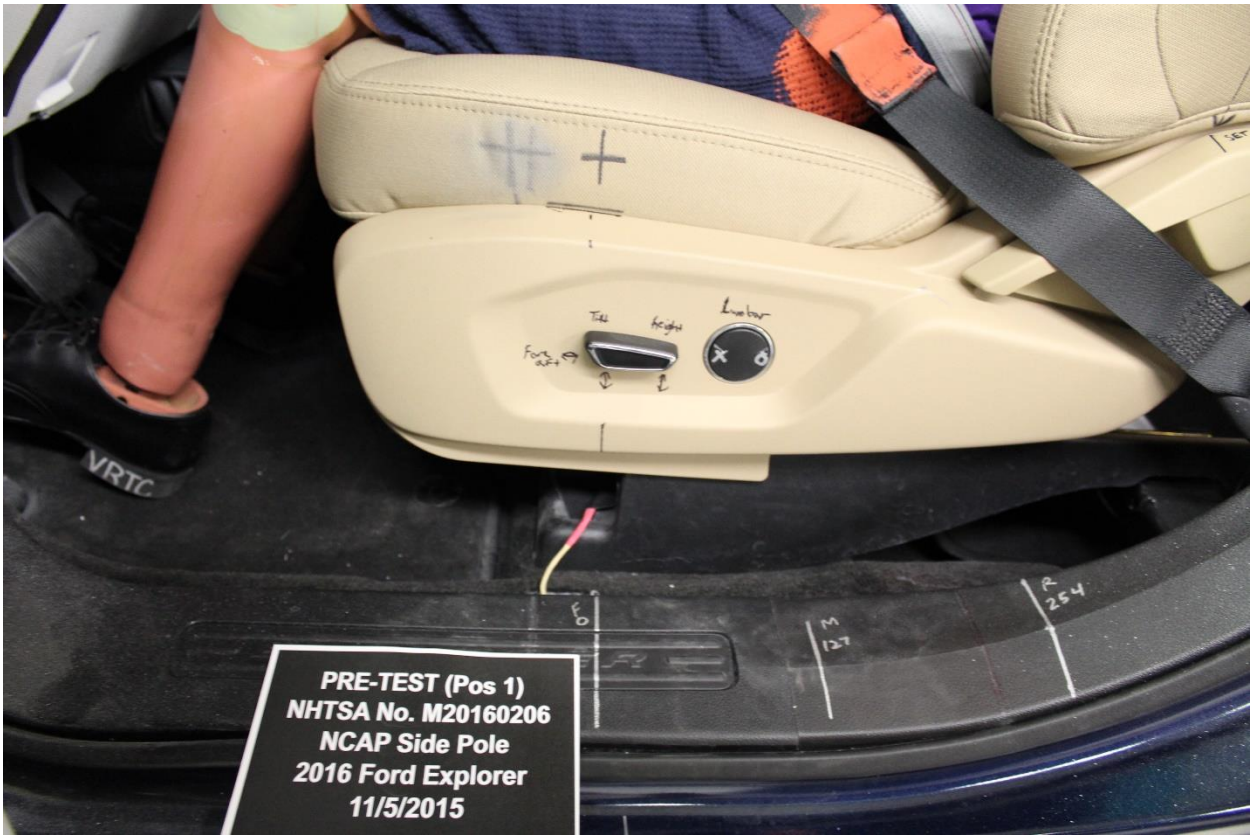


Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track

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

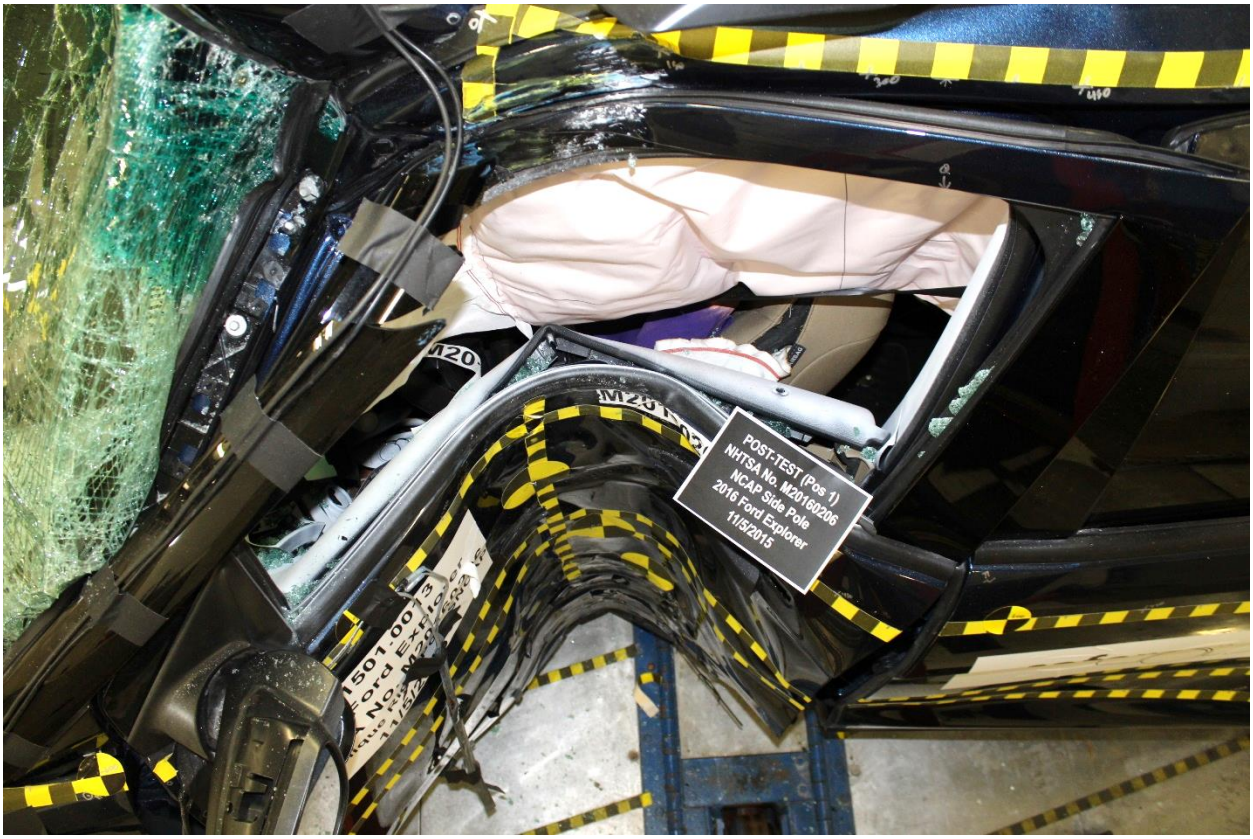


Figure A-41: Post-Test Dummy and Door Clearance View

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

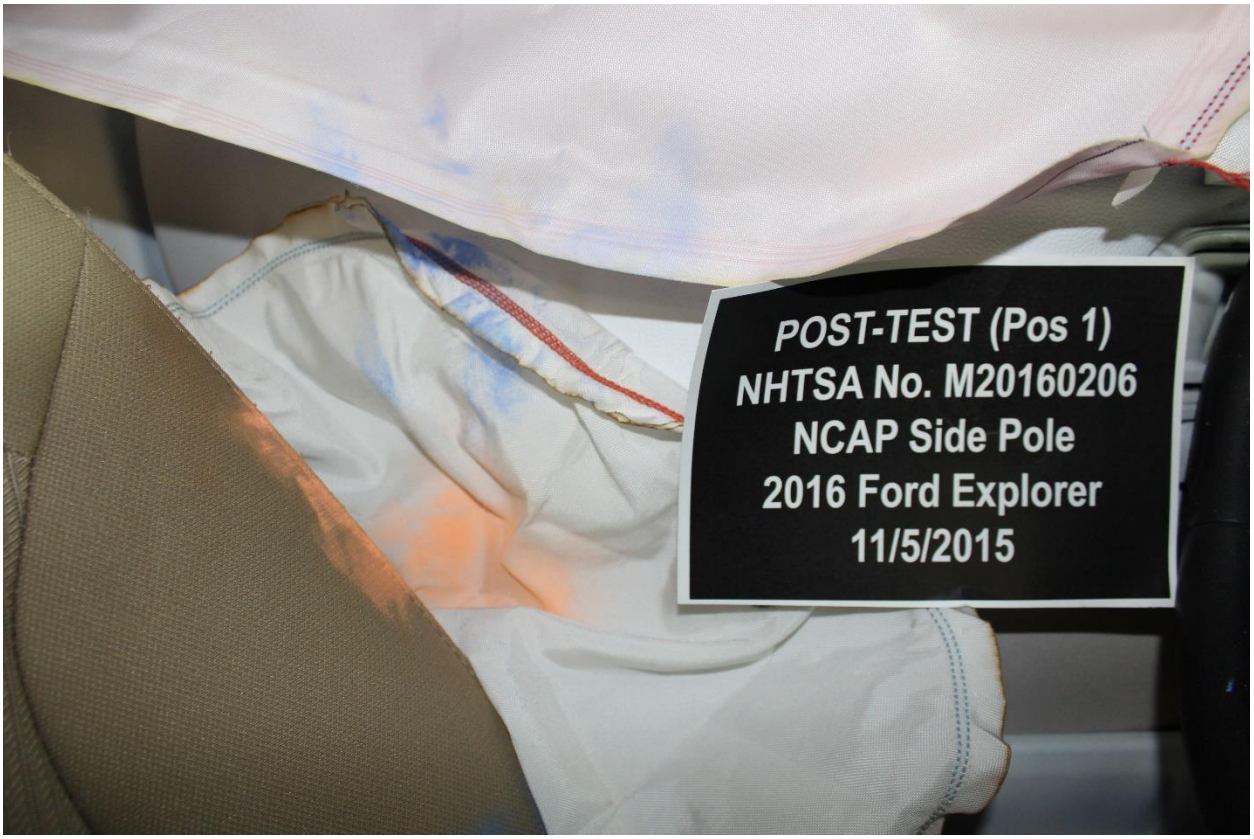


Figure A-49: Post-Test Dummy Close-Up Torso Contact with Side Airbag View

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

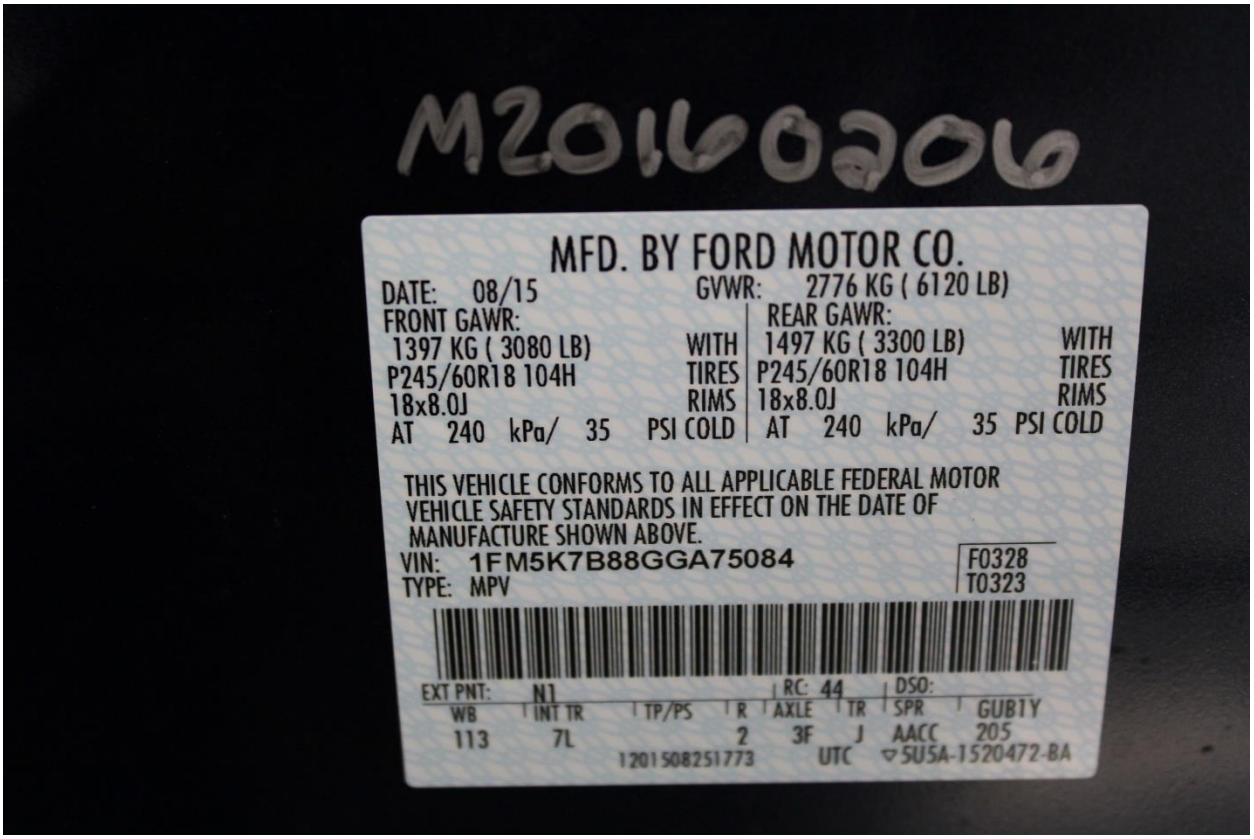


Figure A-55: Close-Up View of Vehicle's Certification Label

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

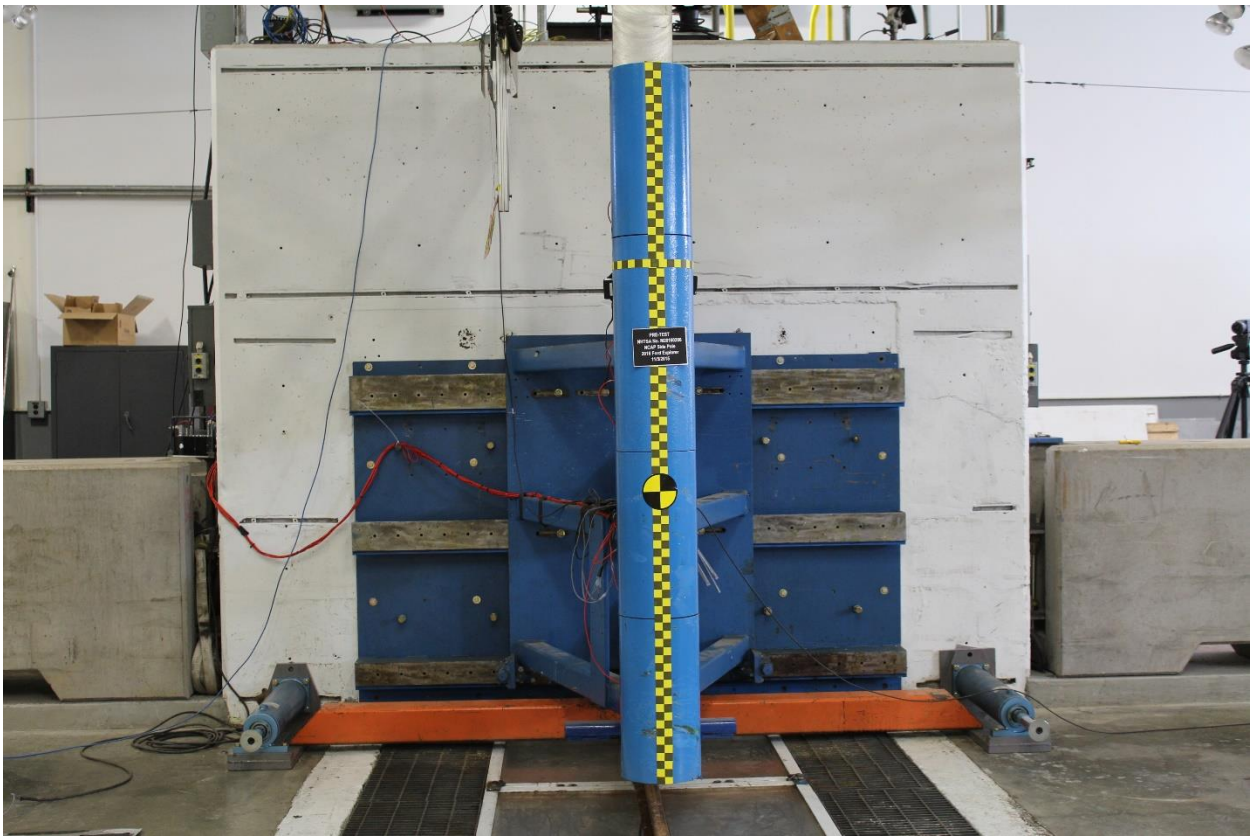


Figure A-57: Pre-Test Pole Barrier Front View

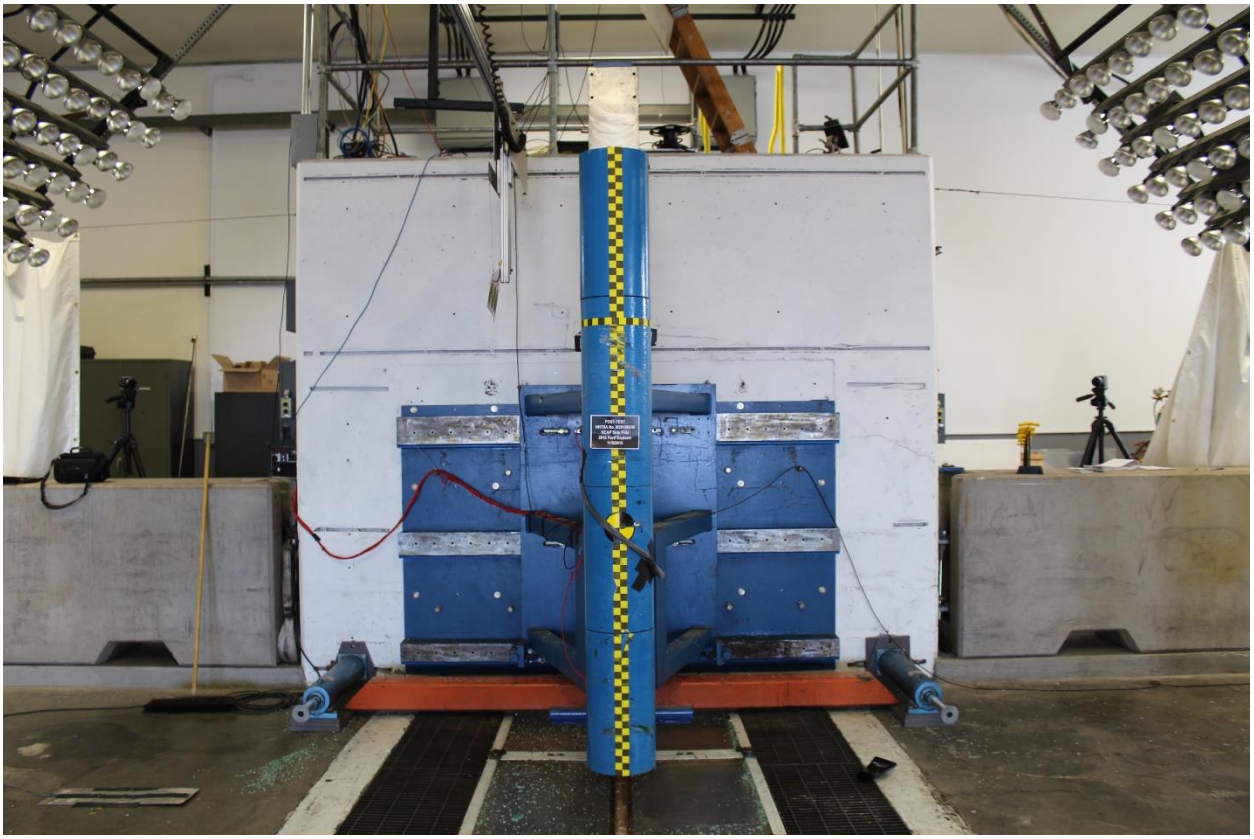


Figure A-58: Post-Test Pole Barrier Front View

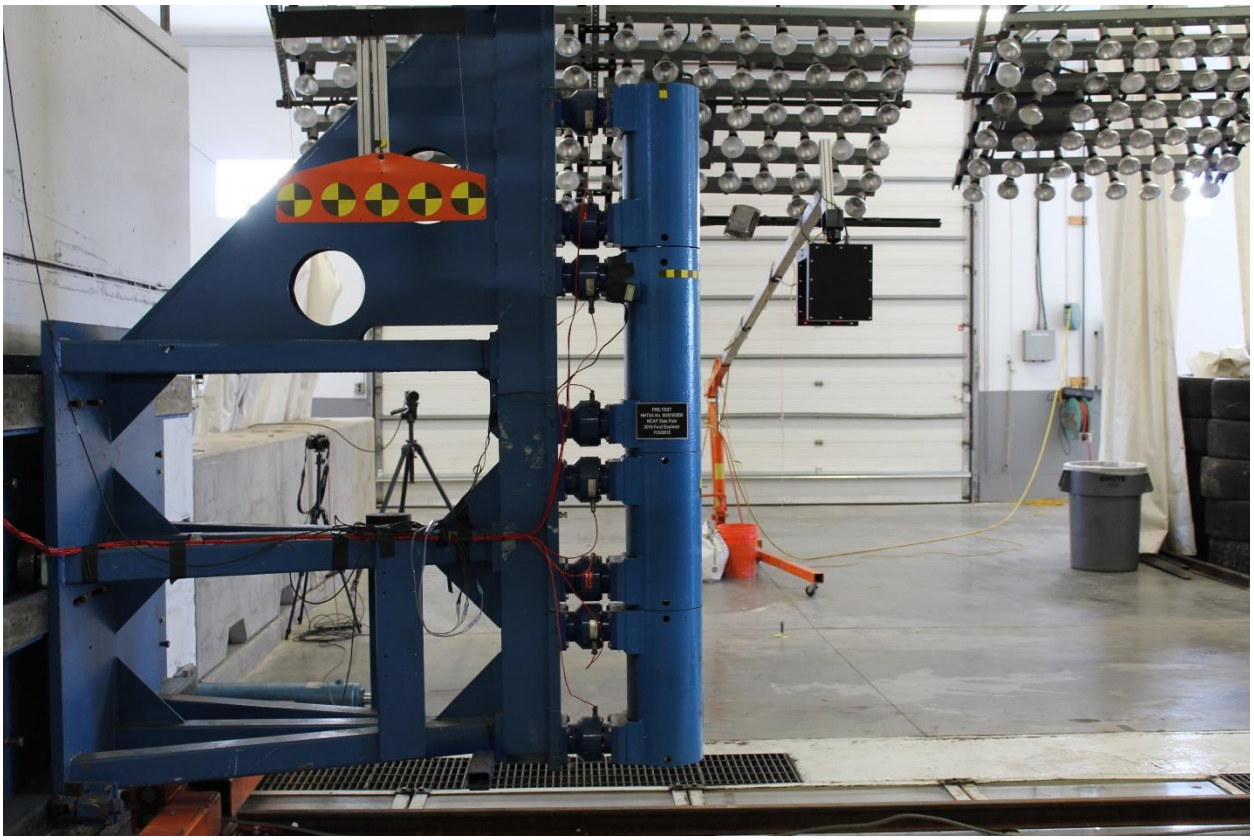


Figure A-59: Pre-Test Pole Barrier Side View

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

Figure A-61: Pre-Test Ballast View

Photo Not Available

Speed Determined by Video Analysis

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

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

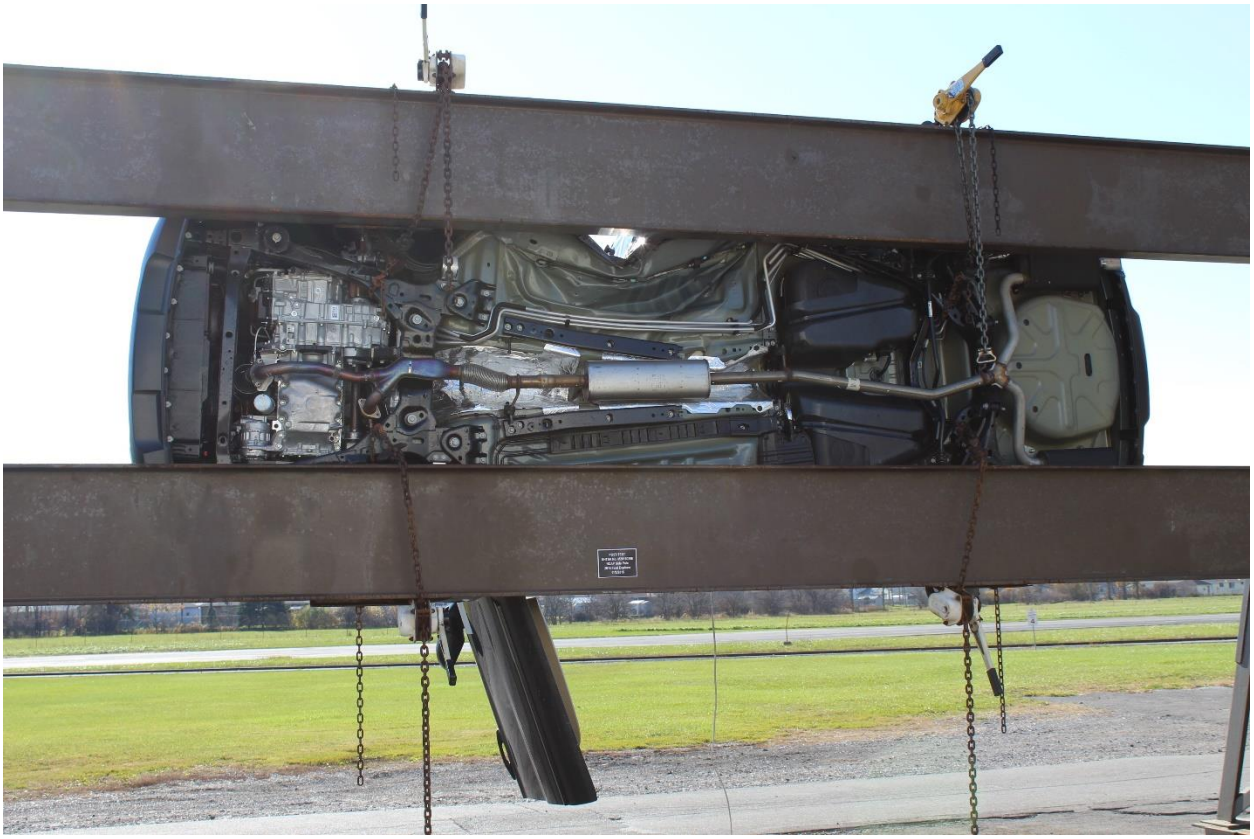


Figure A-64: FMVSS No. 301 Static Rollover 90 Degrees

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

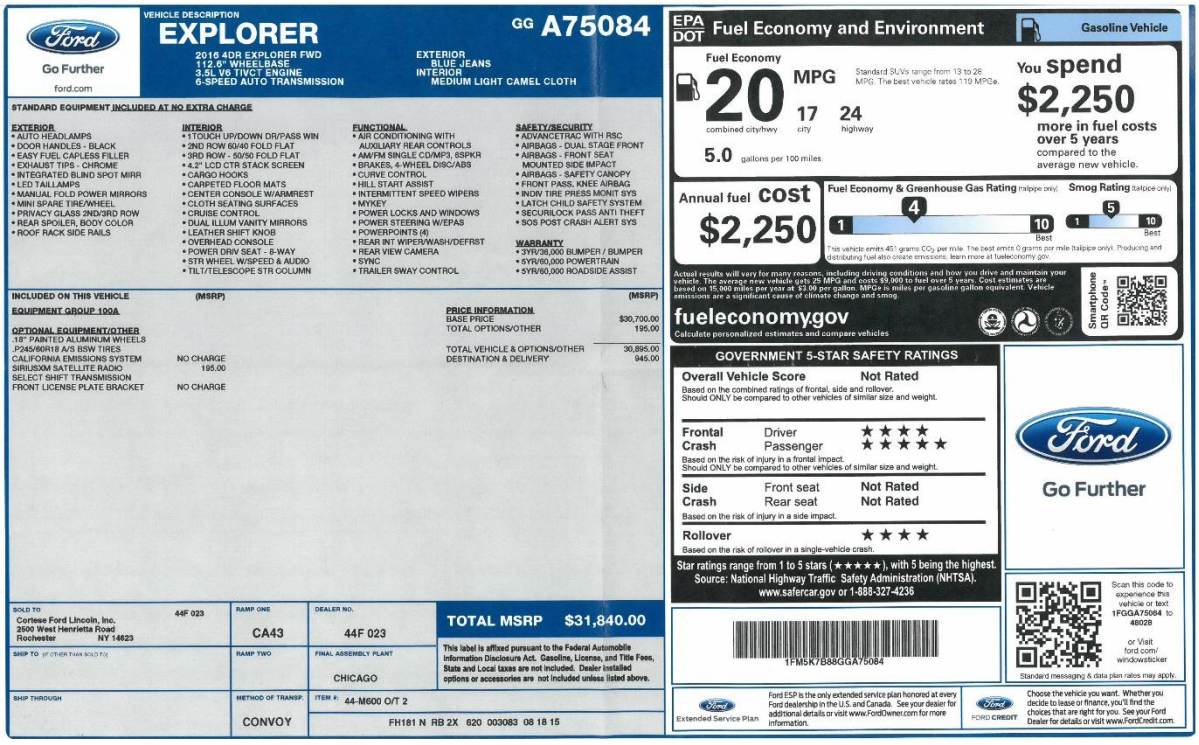


Figure A-69: Monroney Label

Seats

WARNINGS

Install the head restraint properly to help minimize the risk of neck injury in the event of a crash.

Note: *Adjust the seatback to an upright driving position before adjusting the head restraint. Adjust the head restraint so that the top of it is level with the top of your head and as far forward as possible. Make sure that you remain comfortable. If you are extremely tall, adjust the head restraint to its highest position.*

Front seat head restraints

The head restraints consist of:

A An energy absorbing head restraint.

B Two steel stems.

C Guide sleeve adjust and release button.

D Guide sleeve unlock and remove button.

Adjusting the Head Restraint

Raising the Head Restraint

Pull the head restraint up.

Lowering the Head Restraint

1. Press and hold button C.
2. Push the head restraint down.

Removing the Head Restraint

1. Pull the head restraint up until it reaches its highest position.
2. Press and hold buttons C and D.
3. Pull the head restraint up.

E138642

Second-row center seat head restraint (if equipped)

E138645

141

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

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)

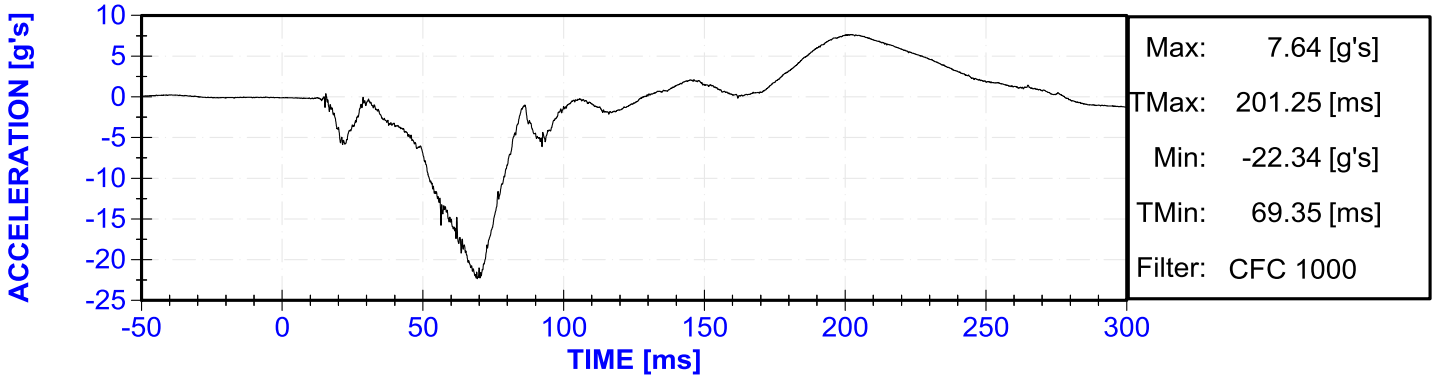
Vehicle Instrumentation Data

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)

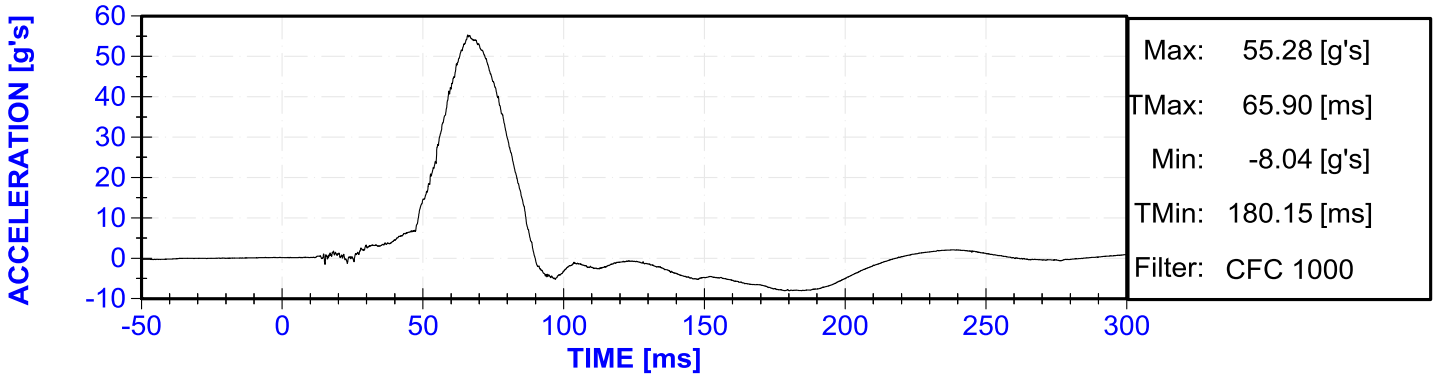
Pole Instrumentation Data

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)

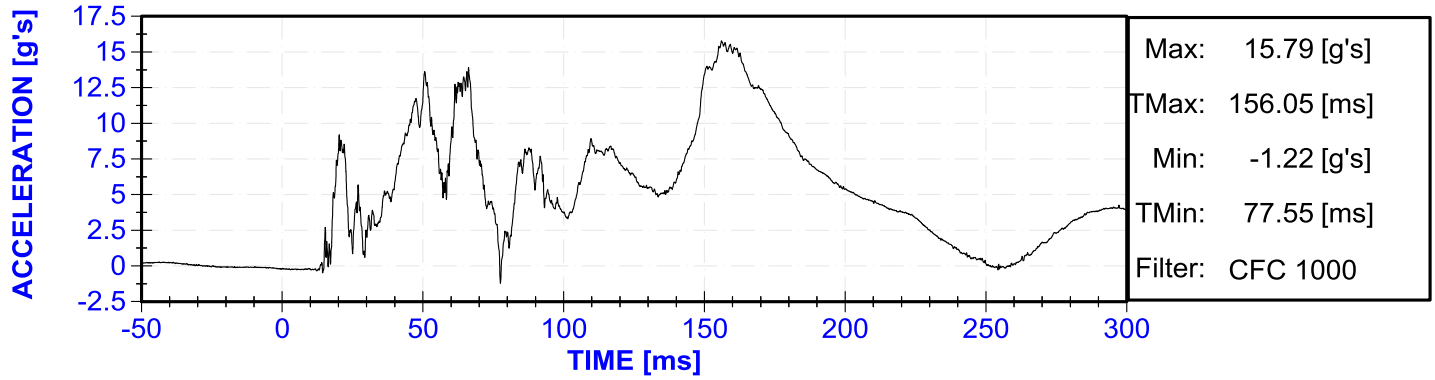
Driver Head Acceleration (X) Primary vs. Time



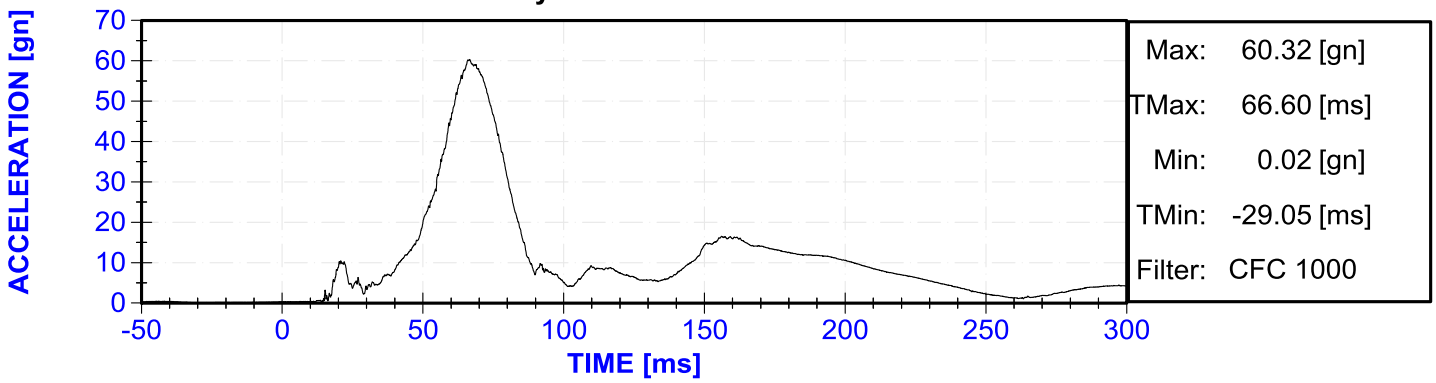
Driver Head Acceleration (Y) Primary vs. Time



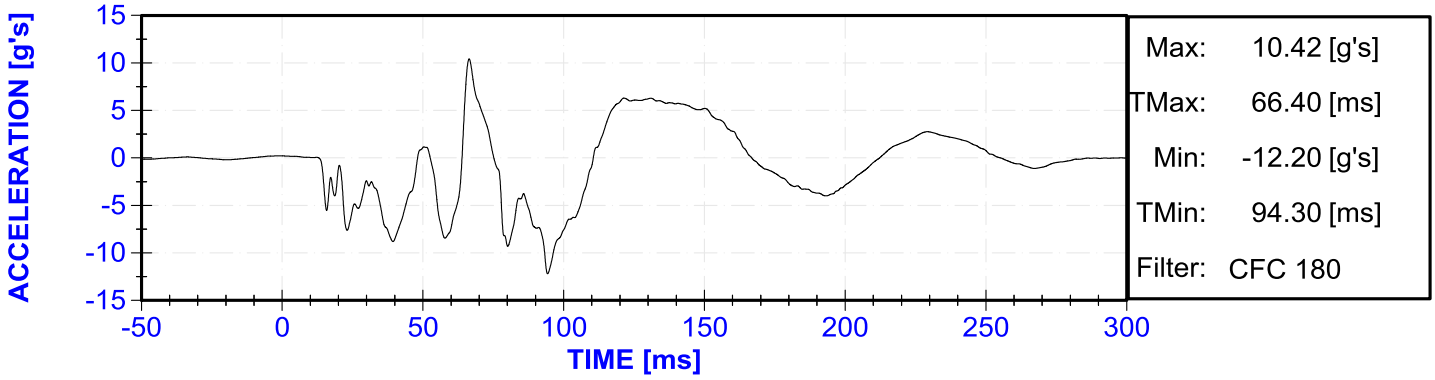
Driver Head Acceleration (Z) Primary vs. Time



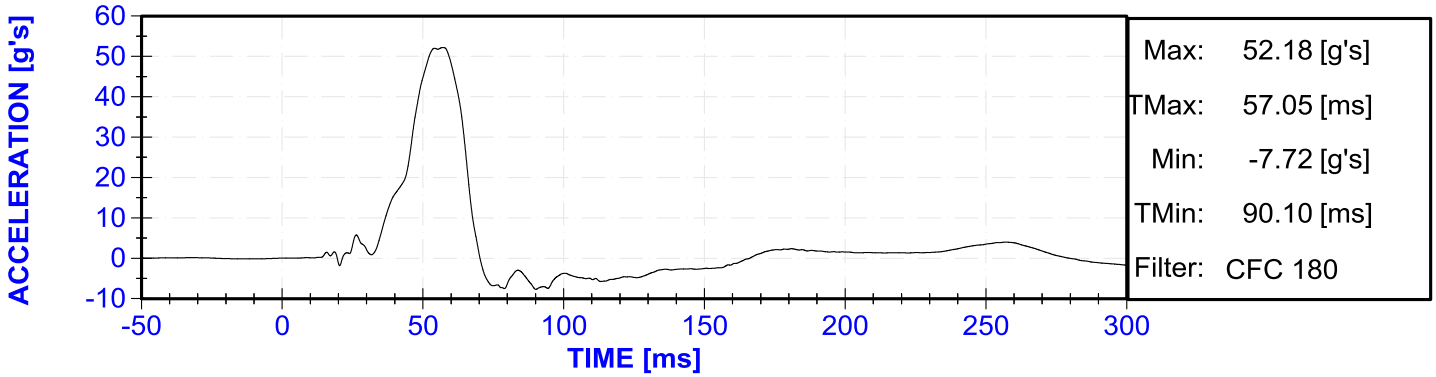
Driver Head Resultant Primary vs. Time



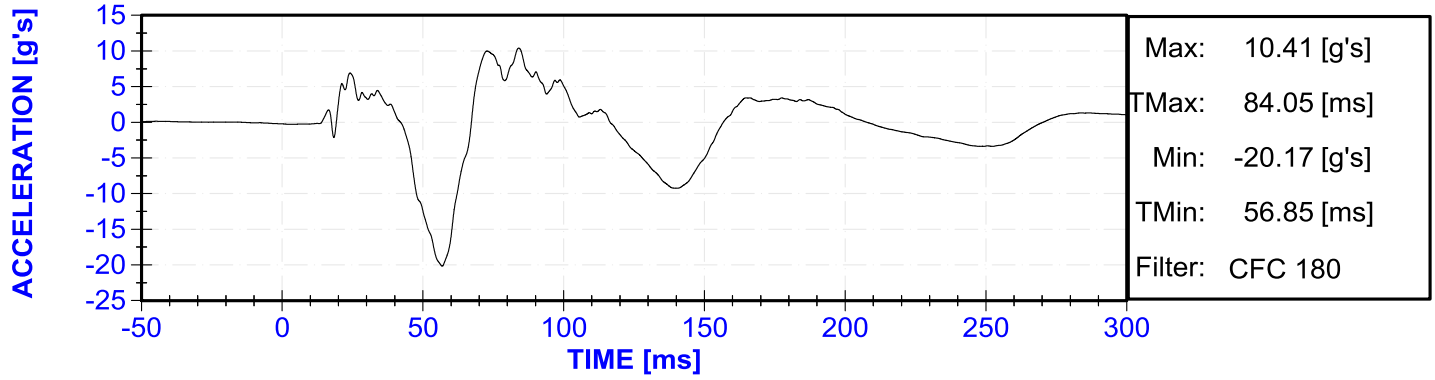
Driver Lower Spine T12 Acceleration (X) vs. Time



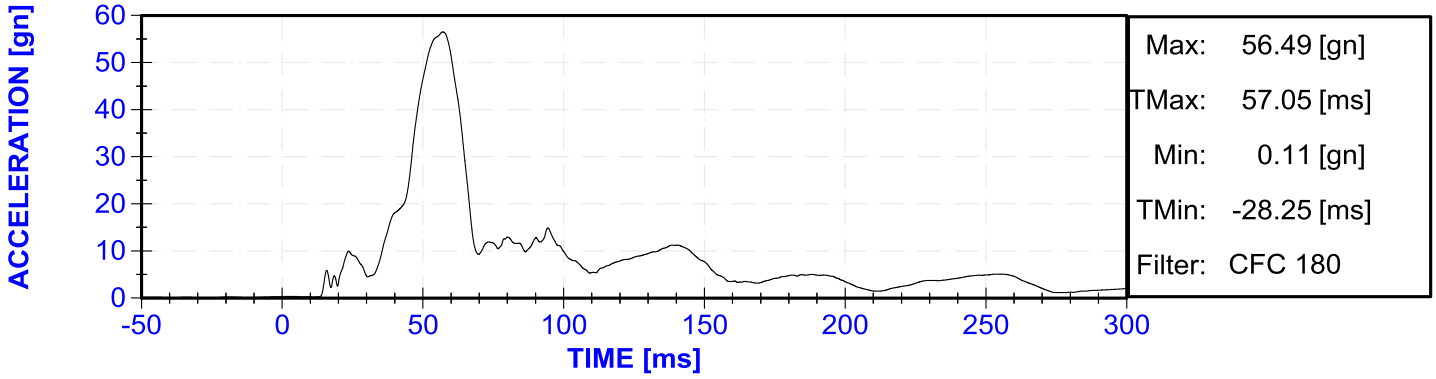
Driver Lower Spine T12 Acceleration (Y) vs. Time



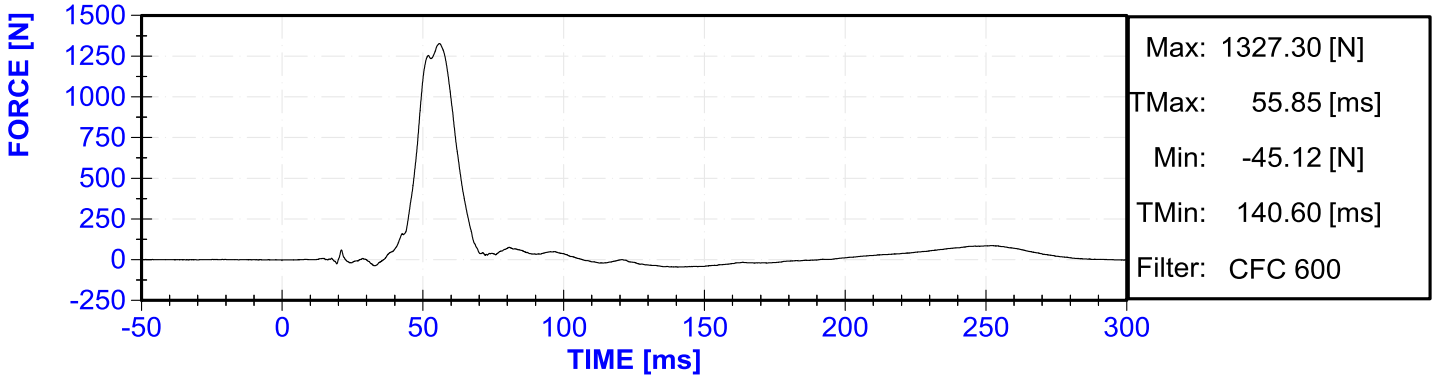
Driver Lower Spine T12 Acceleration (Z) vs. Time



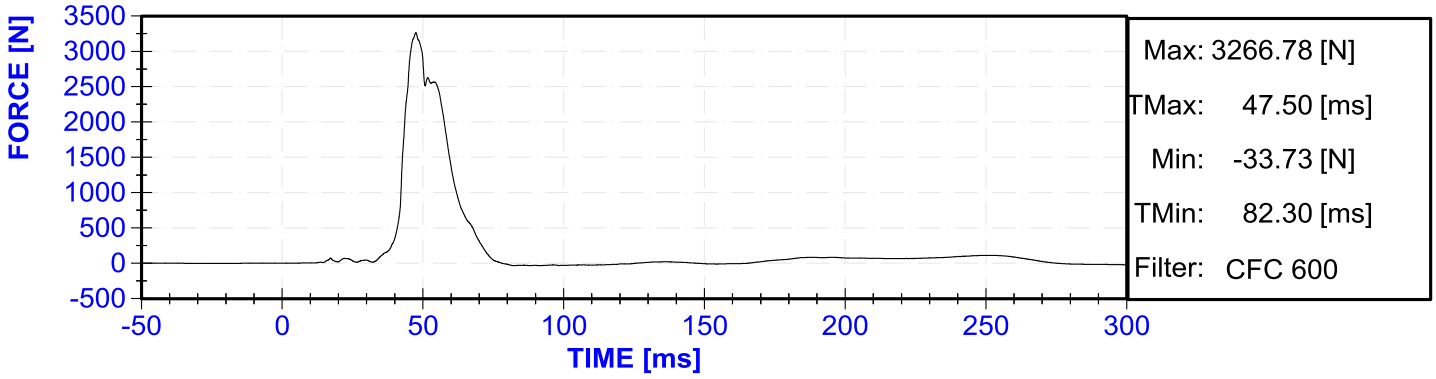
Driver Lower Spine T12 Resultant Acceleration vs. Time



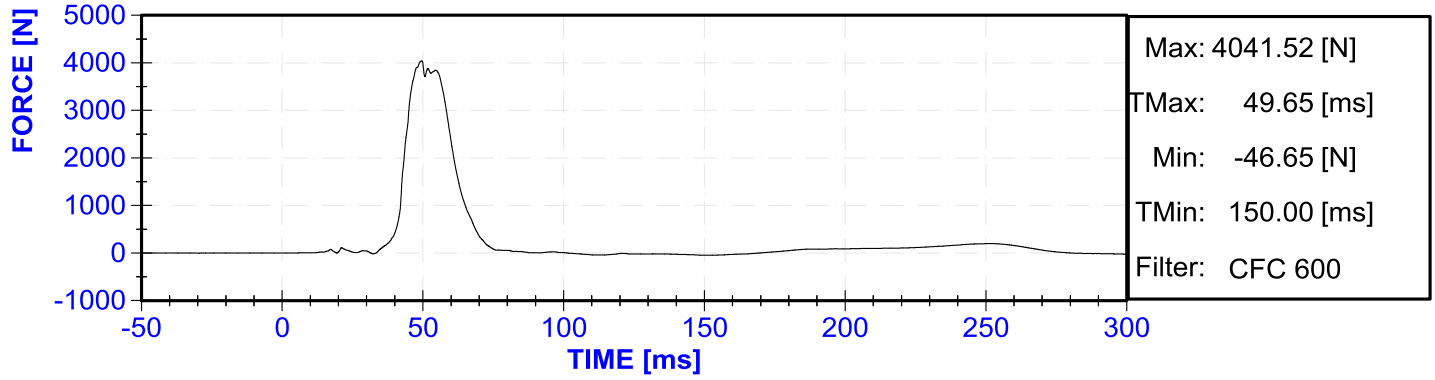
Driver Iliac Wing Force on Impact Side (Y) vs. Time



Driver Acetabulum Force on Impact Side (Y) vs. Time



Driver Total Pelvis Force on Impact Side (Y) vs. Time



APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

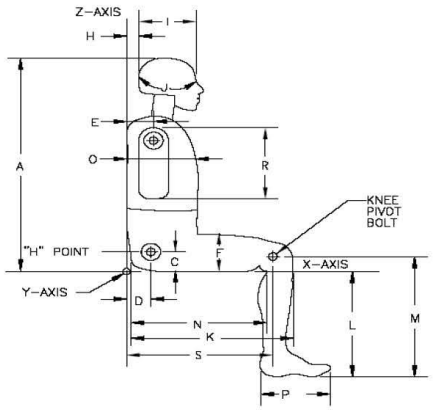
SERIAL NO: DG8012

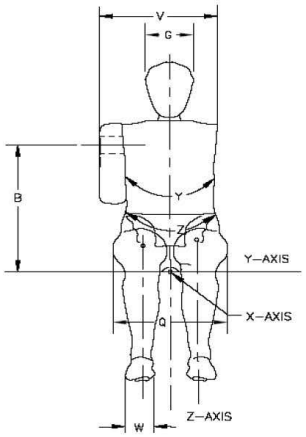
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: M. Geesey Date: 10/13/2015

Dummy Serial Number: DG8012





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	782	Pass
B	Shoulder Pivot Height	437	453	446	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	102	Pass
F	Thigh Clearance	119	135	127	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	545	Pass
K	Buttock to Knee Length	514	540	529	Pass
L	Popliteal Height	343	369	349	Pass
M	Knee Pivot to floor height	392	409	399	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	222	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	320	Pass
R	Arm Length	249	259	252	Pass
S	Knee Joint to seatback	477	493	480	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	862	Pass
Z	Waist Circumference	761	791	768	Pass

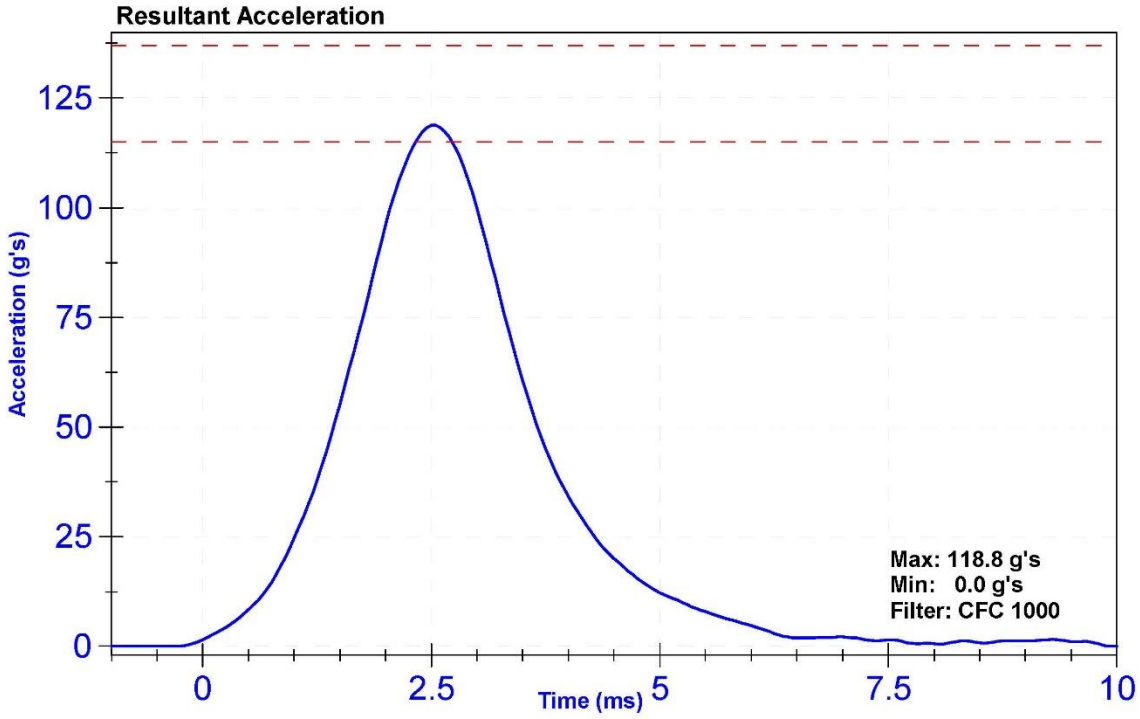
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

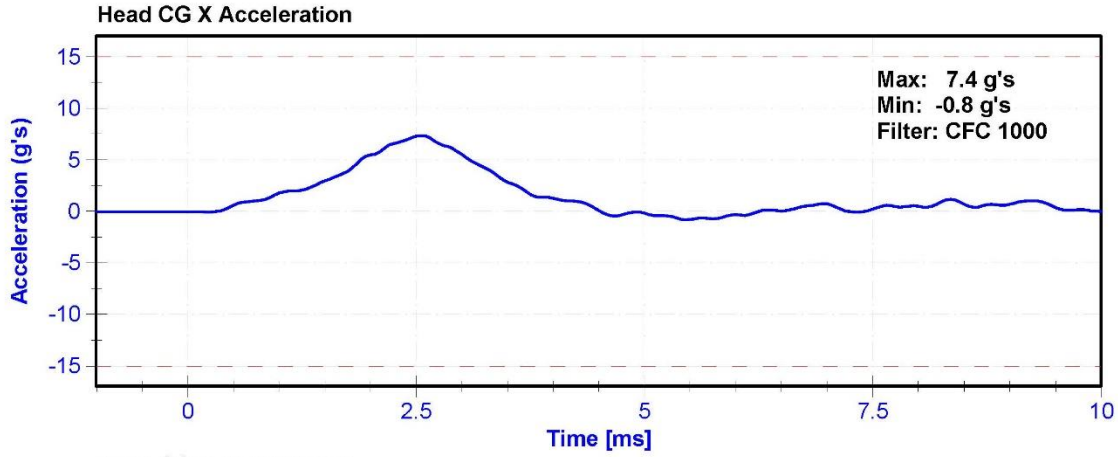
Results

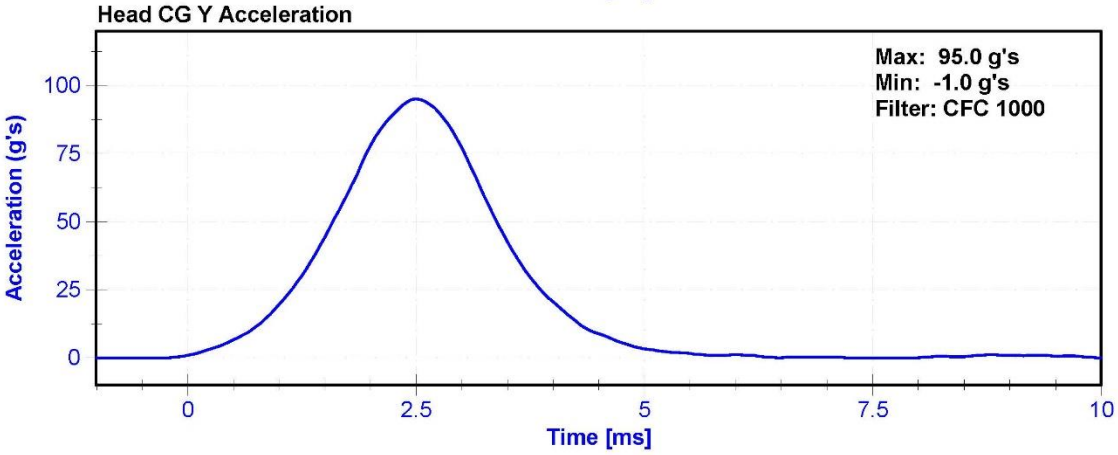
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	45.3	Pass
Resultant Acceleration	115	137	g's	118.8	Pass
Oscillation	0	15	%	1.8	Pass
Fore-Aft Acceleration	-15	15	g's	7.4	Pass

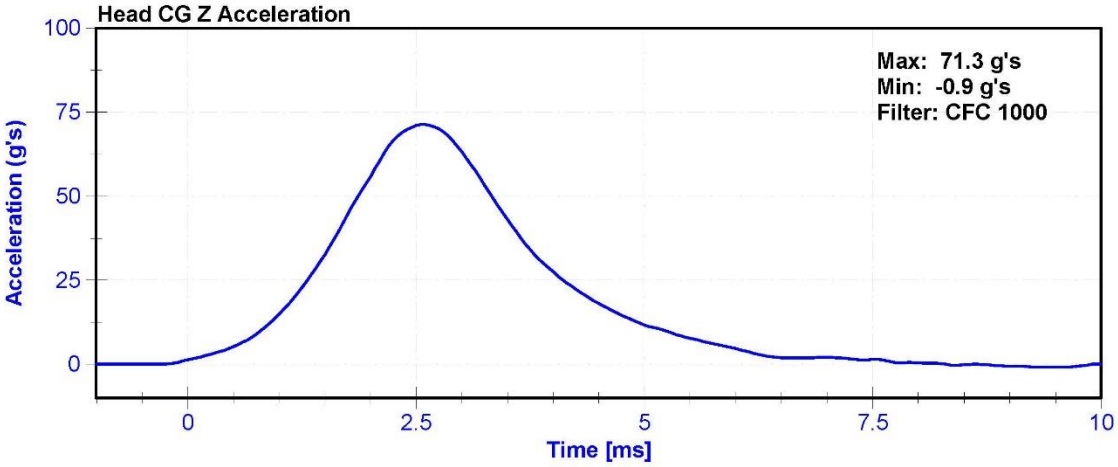
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P51685	5/22/2015	11/20/2015
Y Accelerometer	ENDEVCO 7264CT	AC-P51682	5/22/2015	11/20/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P51699	5/22/2015	11/20/2015




Head CG X Acceleration
Max: 7.4 g's
Min: -0.8 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 95.0 g's
Min: -1.0 g's
Filter: CFC 1000
Acceleration (g's)
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 71.3 g's
Min: -0.9 g's
Filter: CFC 1000
Acceleration (g's)
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]

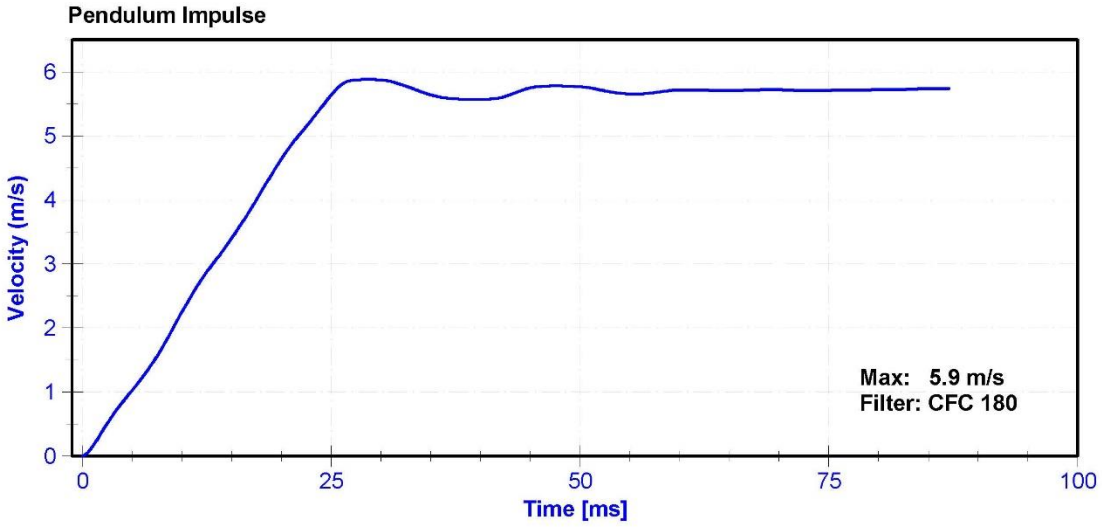
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

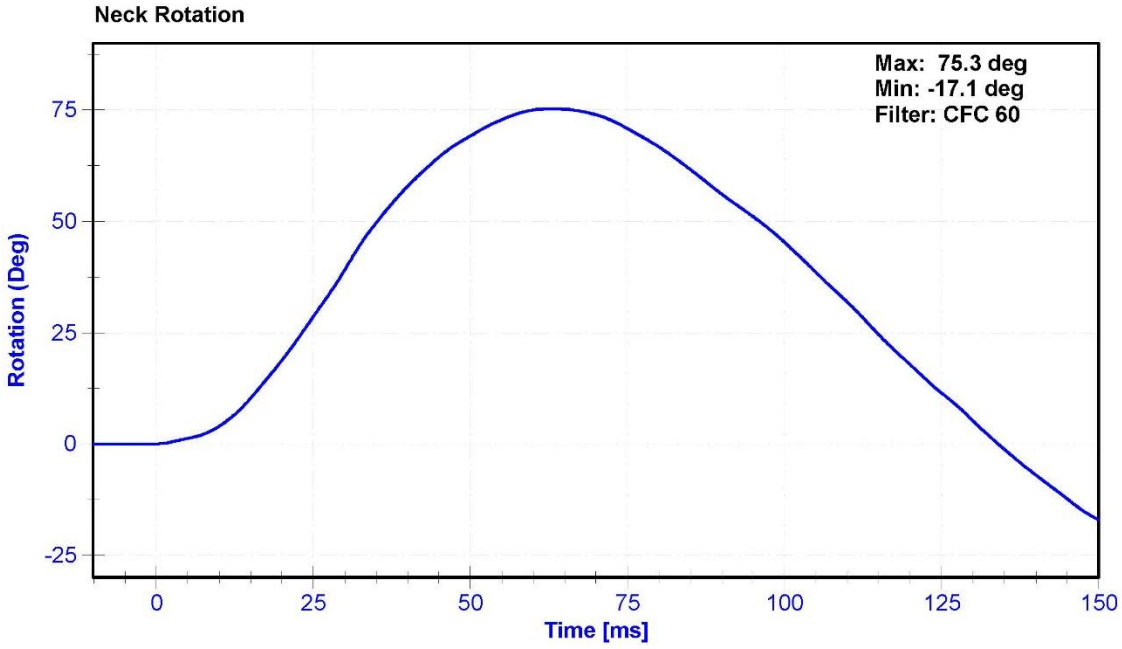
Results

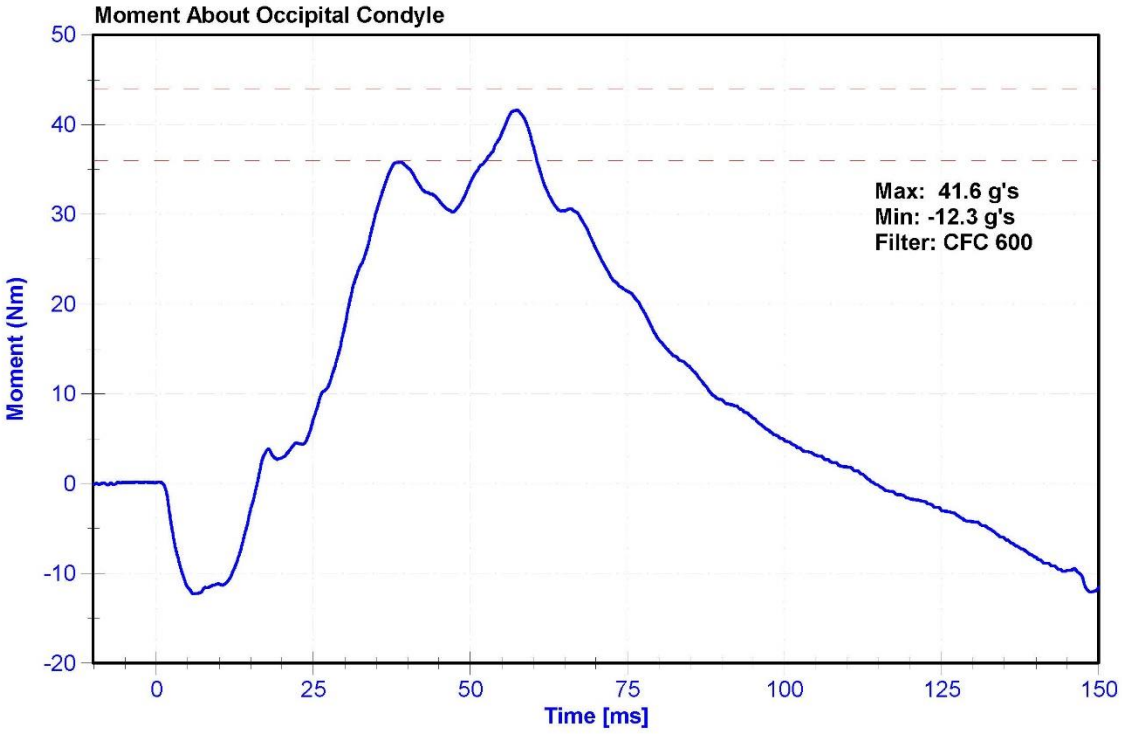
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	44.5	Pass
Velocity	5.51	5.63	m/s	5.583	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.25	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.40	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.64	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.64	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.88	Pass
Neck Rotation	71	81	deg	75.3	Pass
Time at Maximum Rotation	50	70	ms	63.1	Pass
Moment about the OC	36	44	Nm	41.6	Pass
Moment Decay to 0 Nm	102	126	ms	114.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	11/7/2015
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	9/24/2015	9/23/2016
Condyle Potentiometer	Denton 78051-342	DS-185Pend	9/25/2015	9/24/2016
Upper Neck Load Cell	Denton 1716A	LC-798Fy	5/9/2015	5/8/2016




Neck Rotation
Max: 75.3 deg
Min: -17.1 deg
Filter: CFC 60
Rotation (Deg)
75
50
25
0
-25
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 41.6 g's
Min: -12.3 g's
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

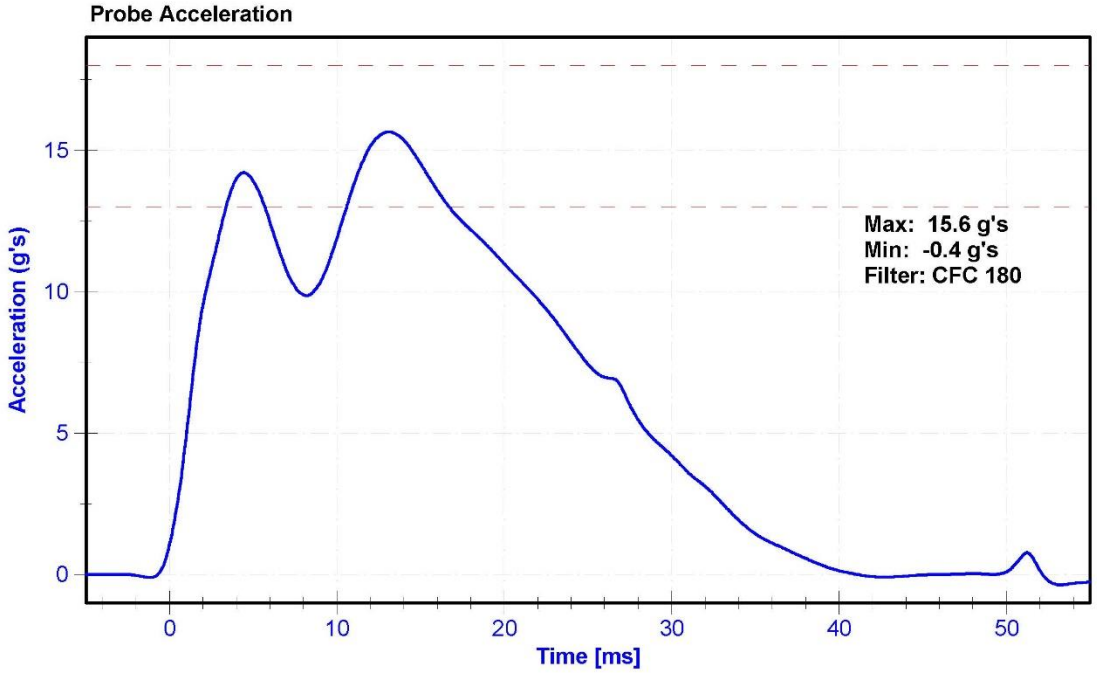
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

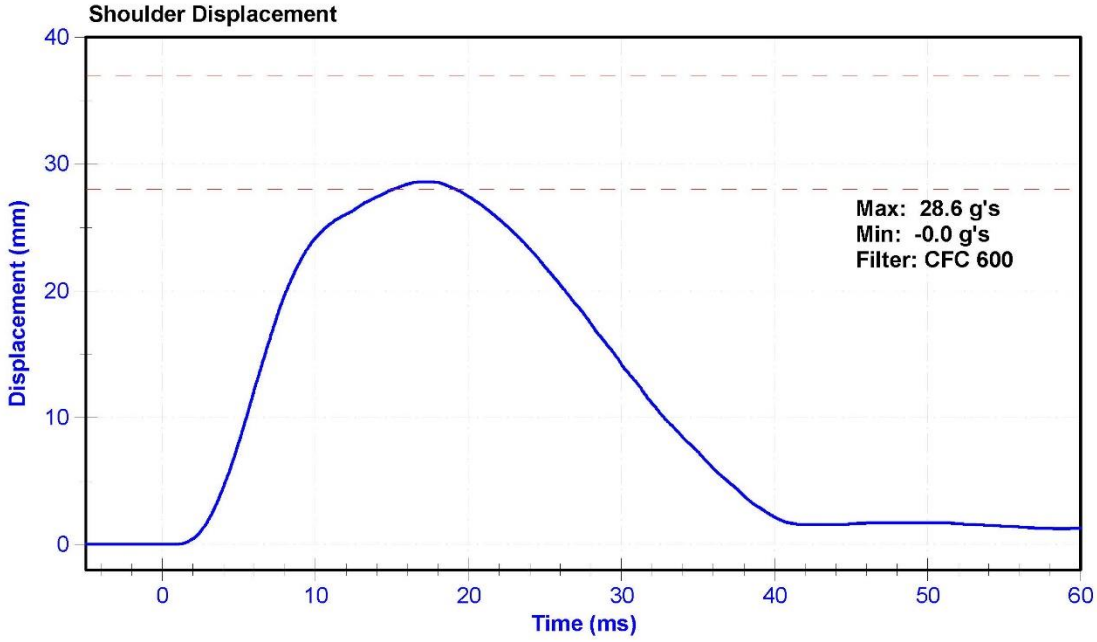
Results

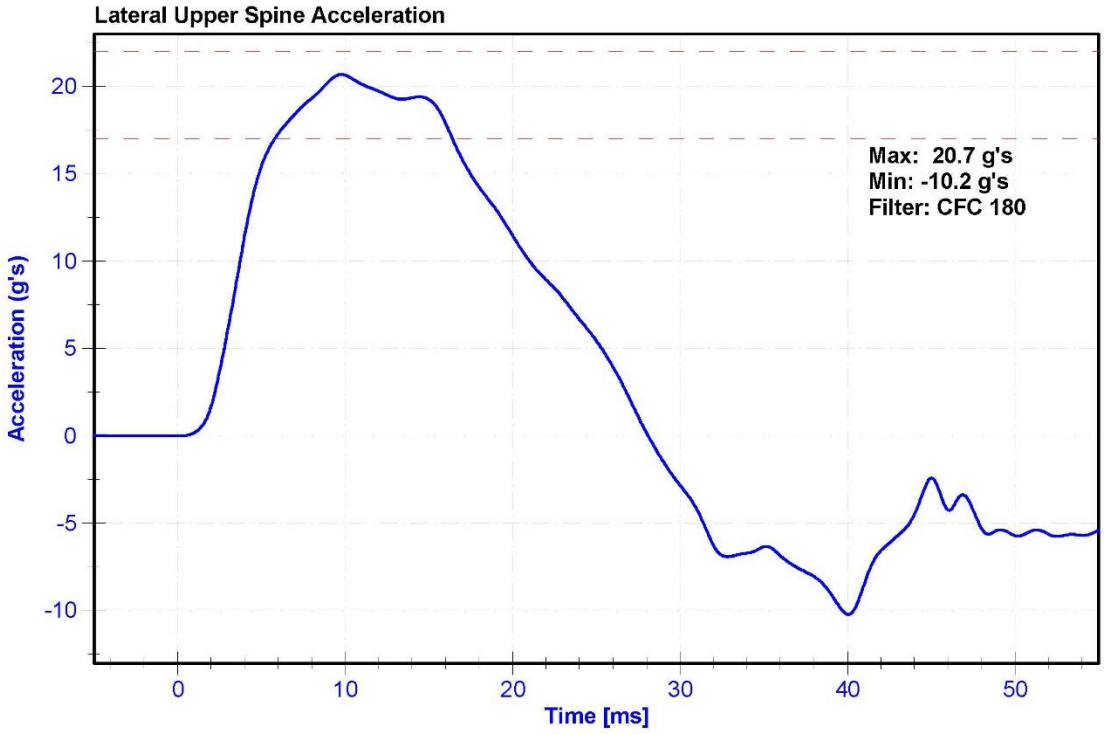
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	29.1	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	13	18	g's	15.6	Pass
Shoulder Deflection	28	37	mm	28.6	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	9/24/2015	9/23/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	8/3/2015	2/1/2016




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 28.6 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 20.7 g's
Min: -10.2 g's
Filter: CFC 180

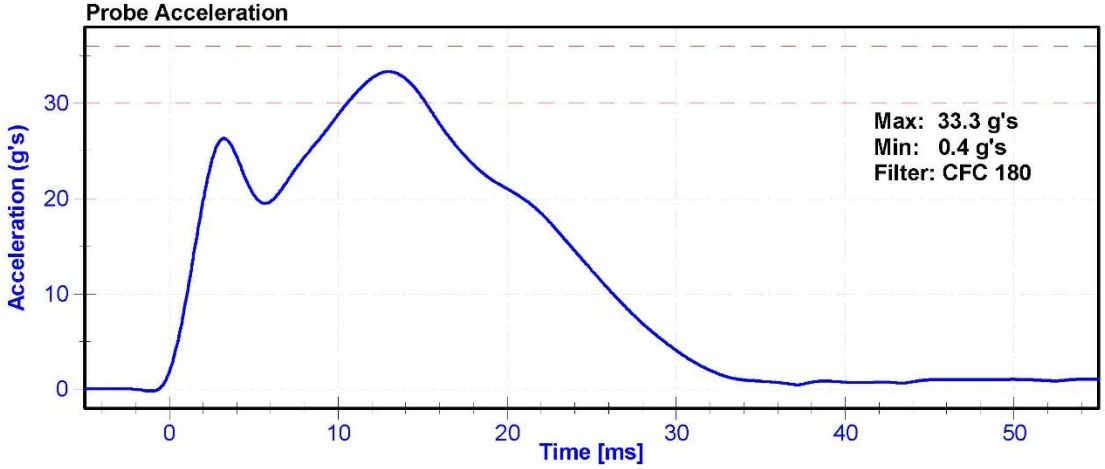
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

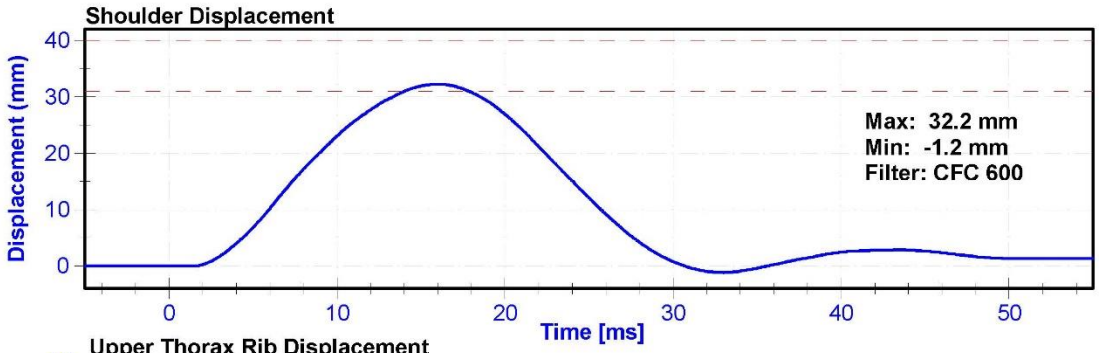
Results

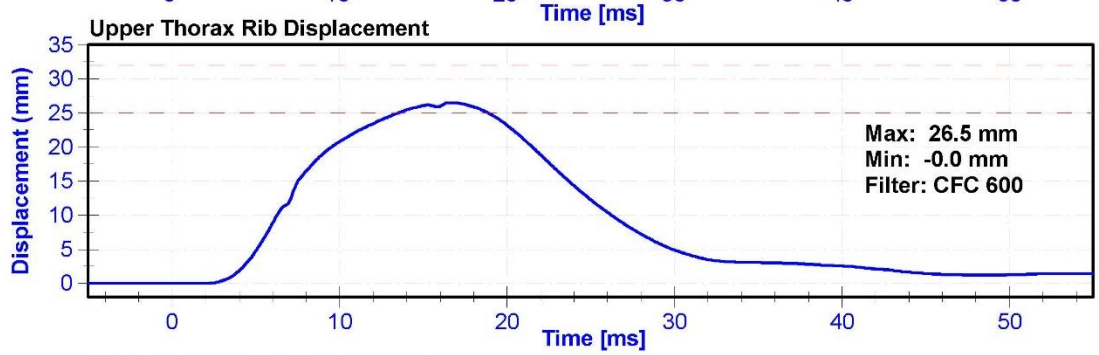
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	27.4	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration after 5 ms	30	36	g's	33.3	Pass
Lateral Upper Spine Acceleration	34	43	g's	39.5	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.9	Pass
Shoulder Deflection	31	40	mm	32.2	Pass
Upper Thorax Rib Deflection	25	32	mm	26.5	Pass
Mid Thorax Rib Deflection	30	36	mm	31.3	Pass
Lower Thorax Rib Deflection	32	38	mm	33.1	Pass

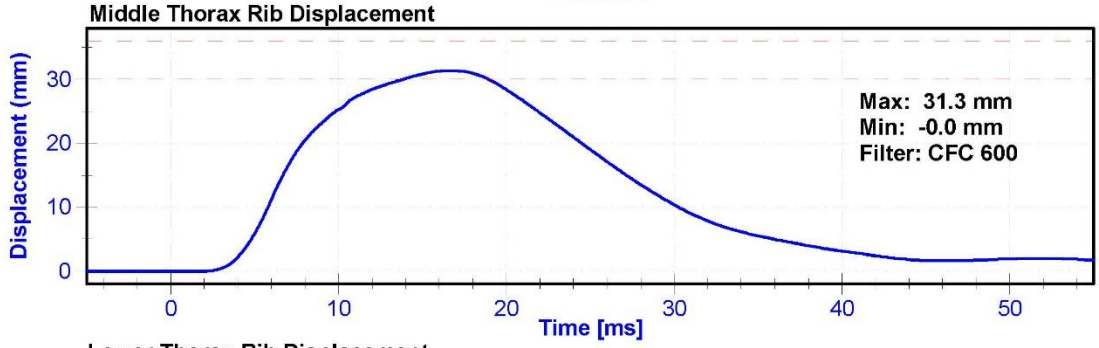
Transducer Calibrations

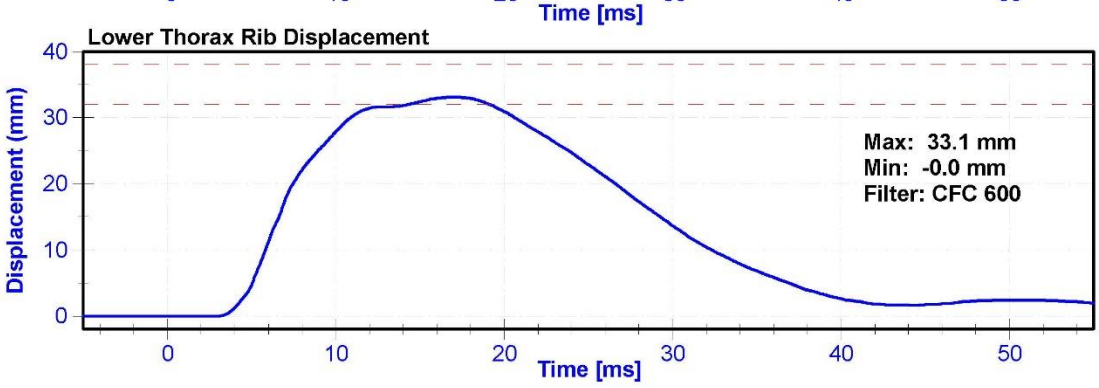
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P51875	8/3/2015	2/1/2016
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P83319	9/23/2015	3/23/2016
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	9/24/2015	9/23/2016
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	9/24/2015	9/23/2016
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	9/24/2015	9/23/2016
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	9/24/2015	9/23/2016

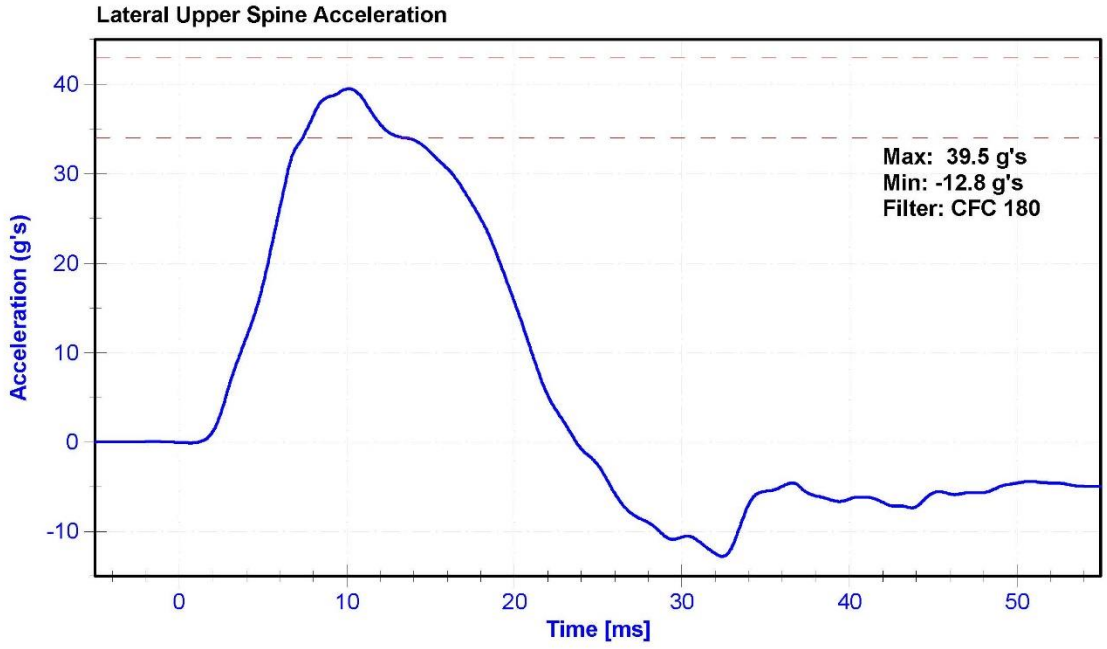


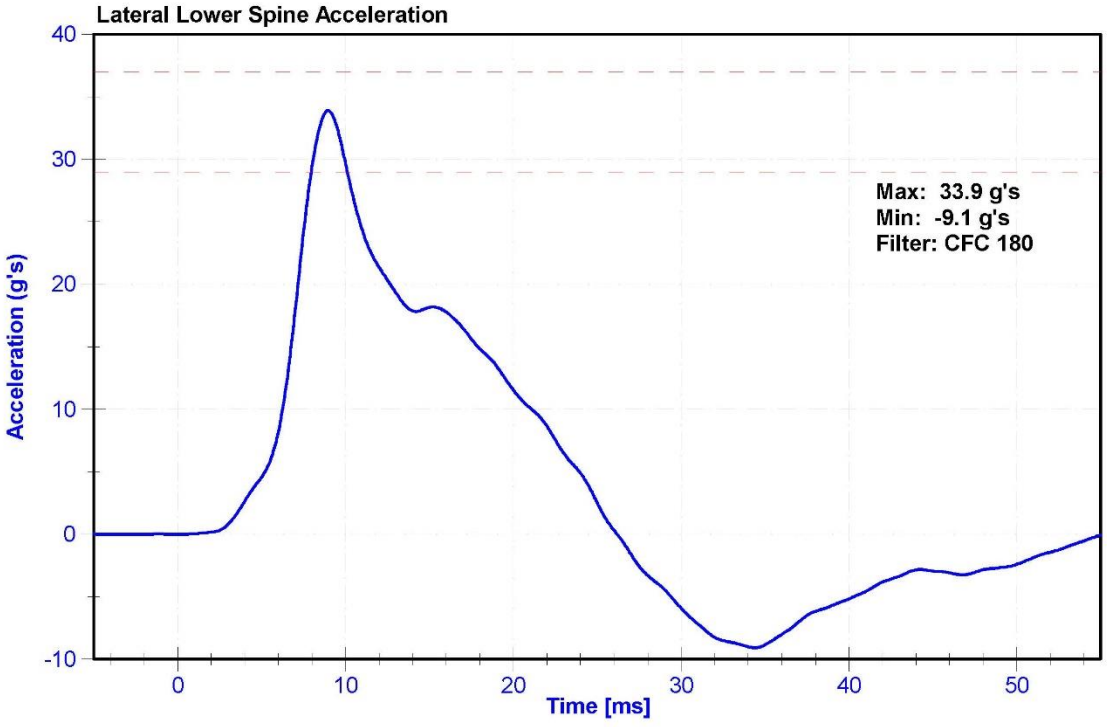

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 32.2 mm
Min: -1.2 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.5 mm
Min: -0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 31.3 mm
Min: -0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.1 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 39.5 g's
Min: -12.8 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 33.9 g's
Min: -9.1 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

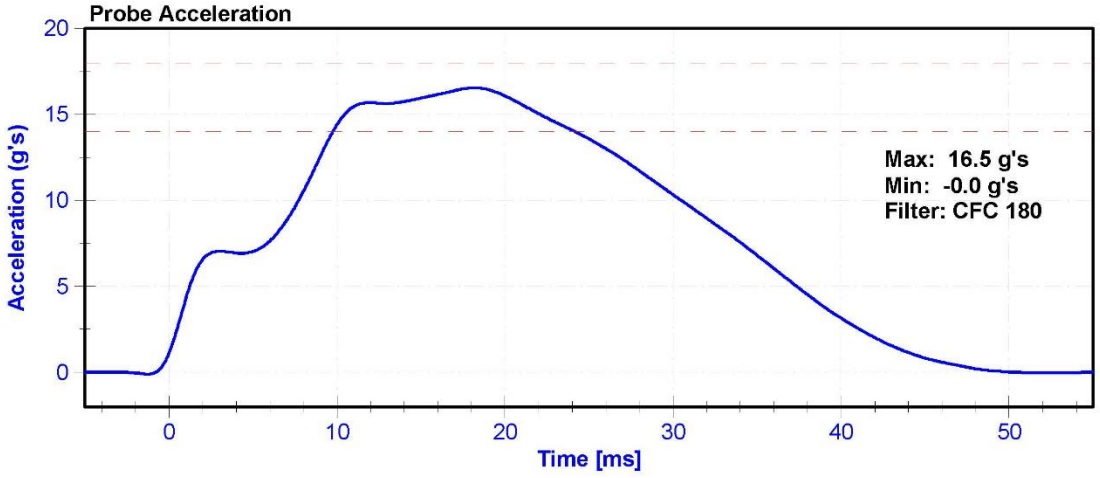
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

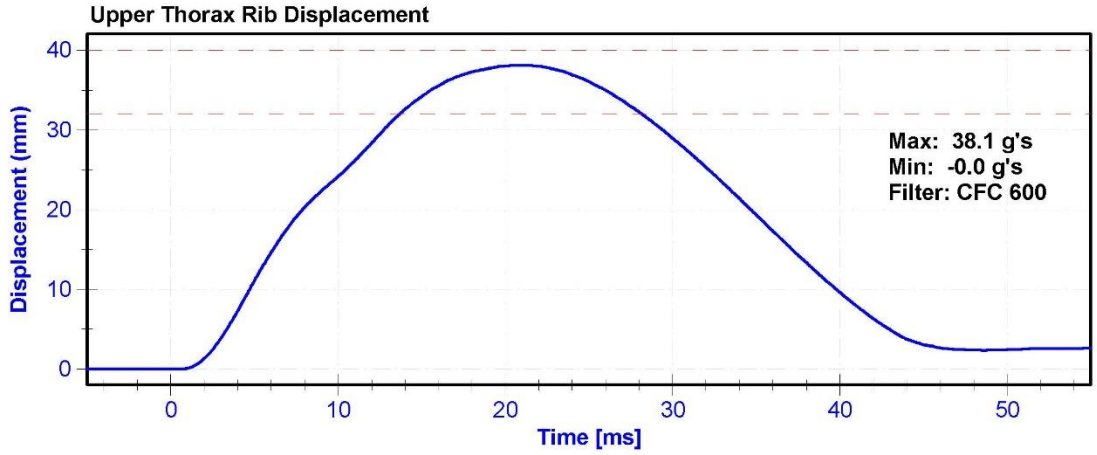
Results

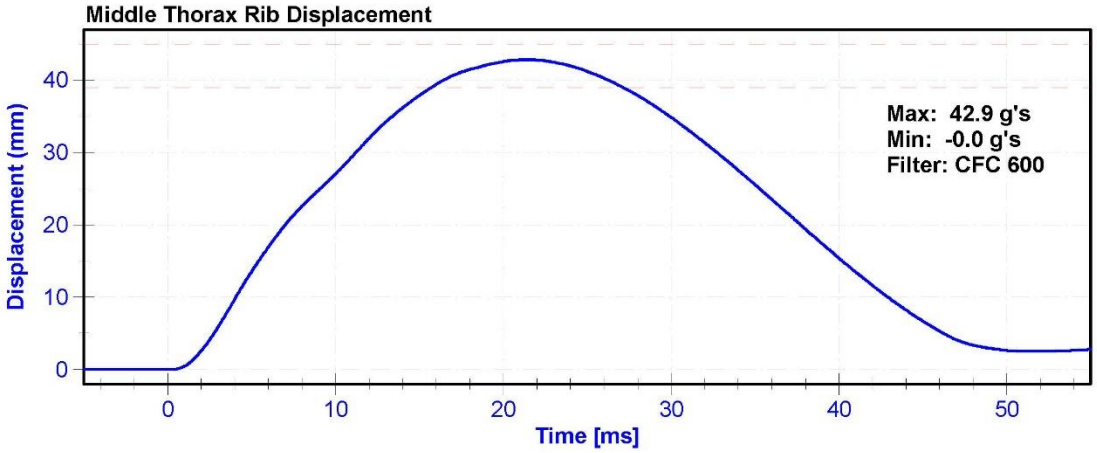
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	29.3	Pass
Velocity	4.2	4.4	m/s	4.38	Pass
Probe Acceleration	14	18	g's	16.5	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.4	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.4	Pass
Upper Thorax Rib Deflection	32	40	mm	38.1	Pass
Middle Thorax Rib Deflection	39	45	mm	42.9	Pass
Lower Thorax Rib Deflection	35	43	mm	38.6	Pass

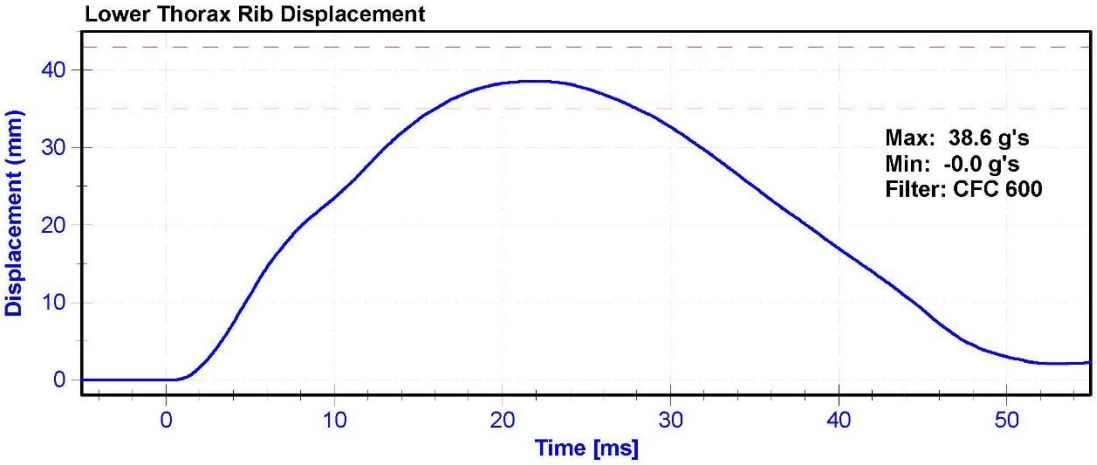
Transducer Calibrations

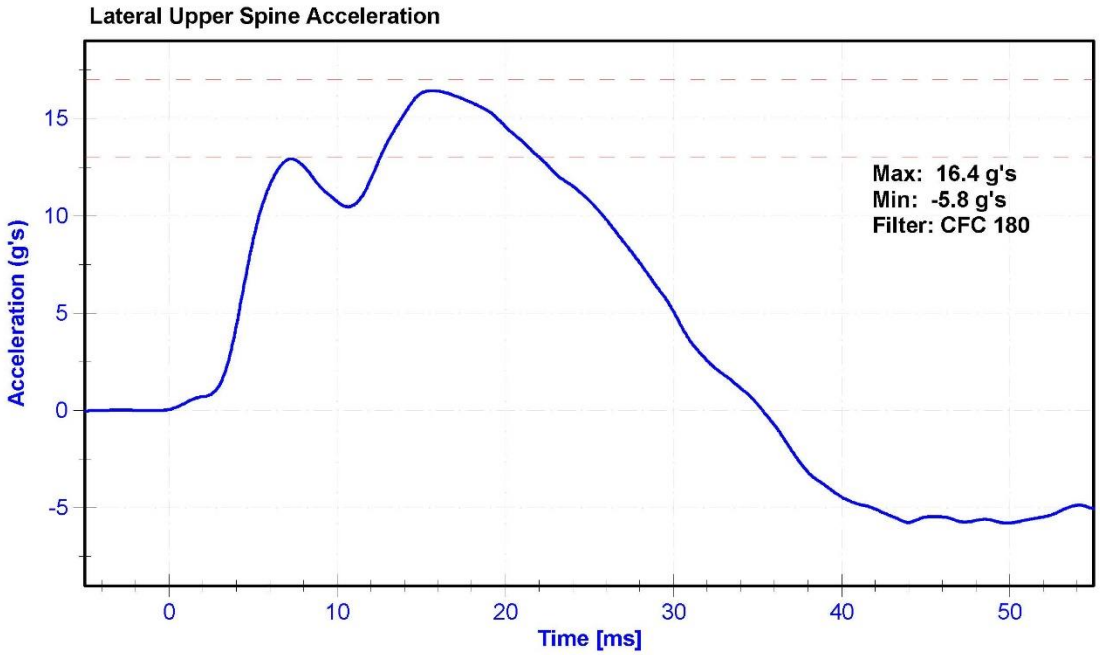
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	8/3/2015	2/1/2016
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	9/23/2015	3/23/2016
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	9/24/2015	9/23/2016
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	9/24/2015	9/23/2016
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	9/24/2015	9/23/2016

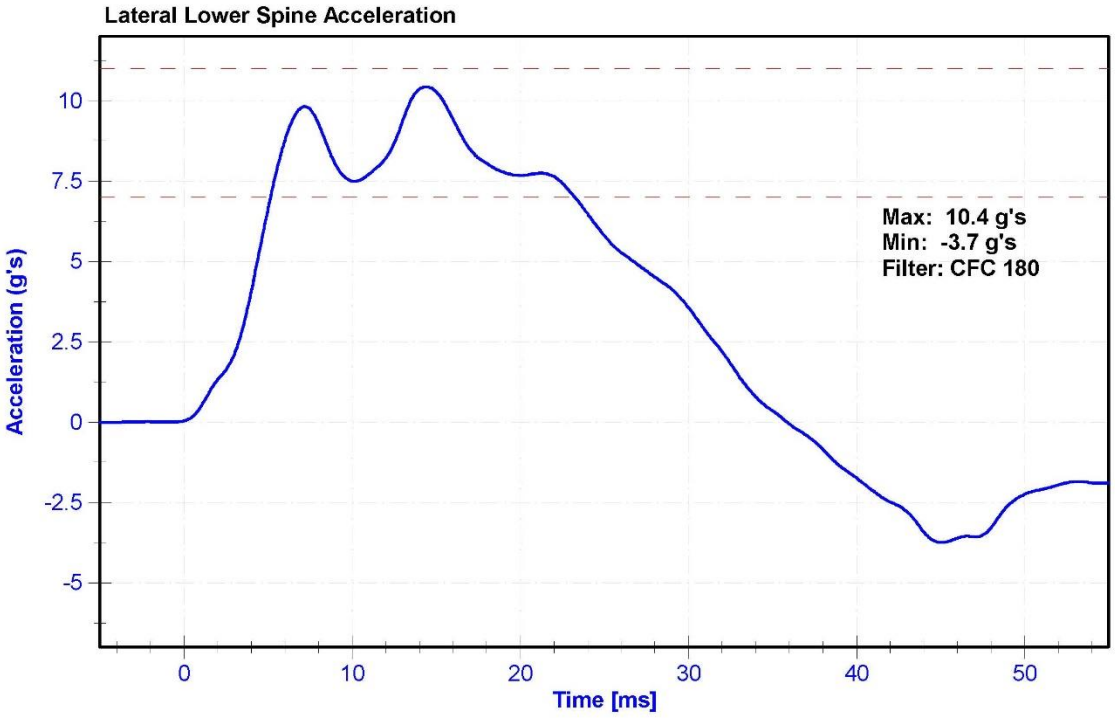



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.1 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 42.9 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.6 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 16.4 g's
Min: -5.8 g's
Filter: CFC 180
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
Time [ms]


Lateral Lower Spine Acceleration
Max: 10.4 g's
Min: -3.7 g's
Filter: CFC 180
Acceleration (g's)
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
Time [ms]

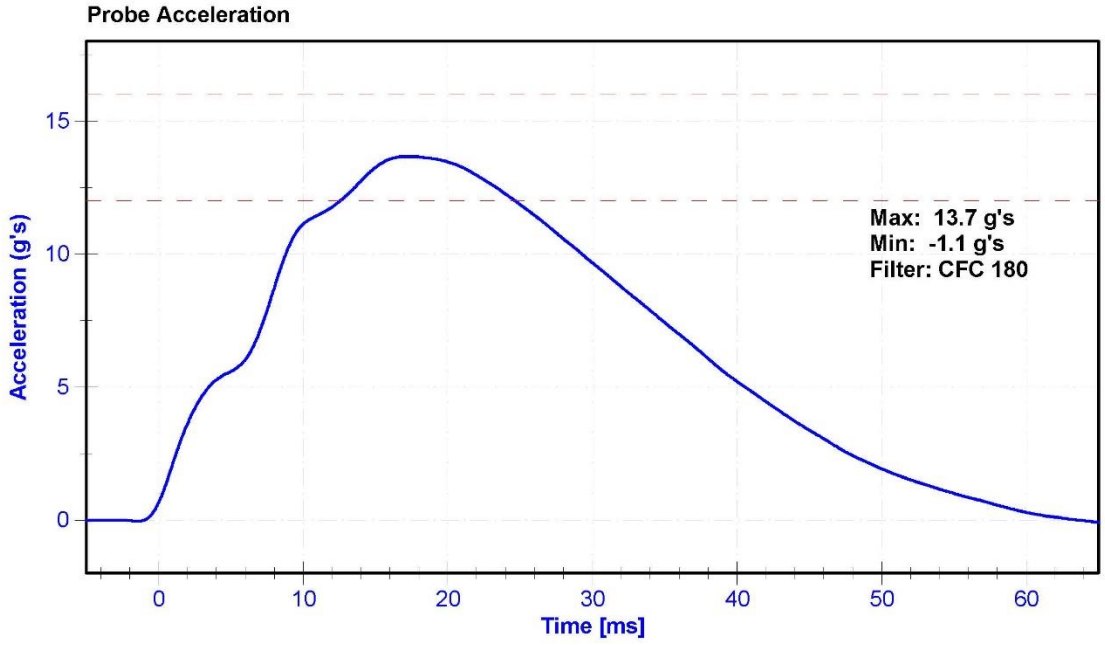
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

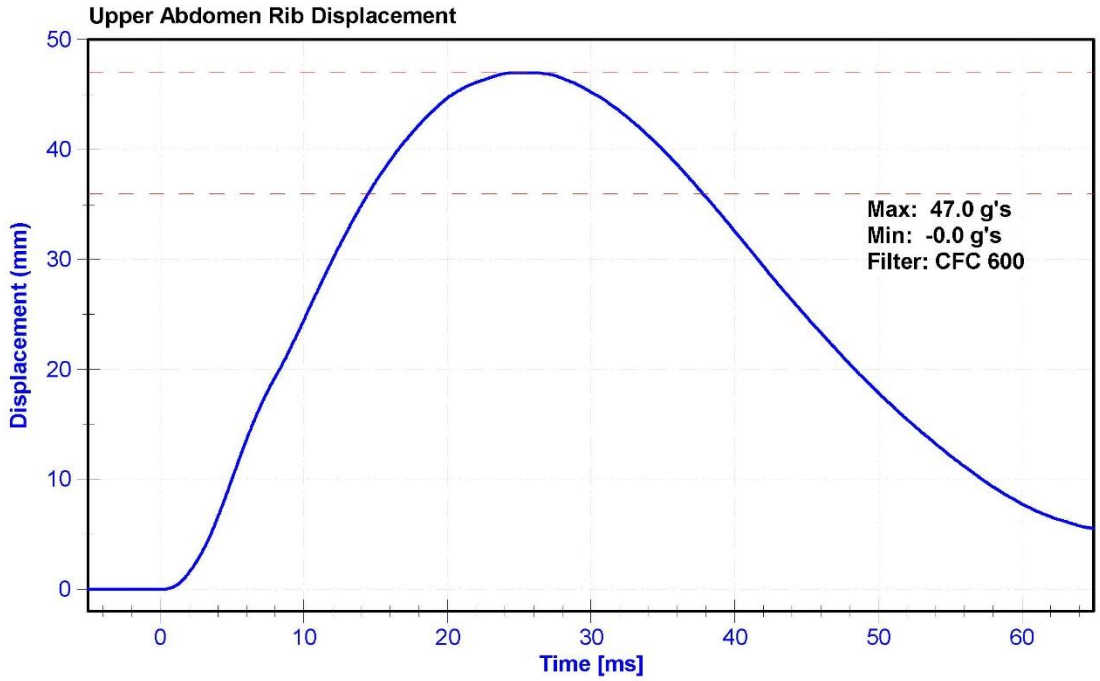
Results

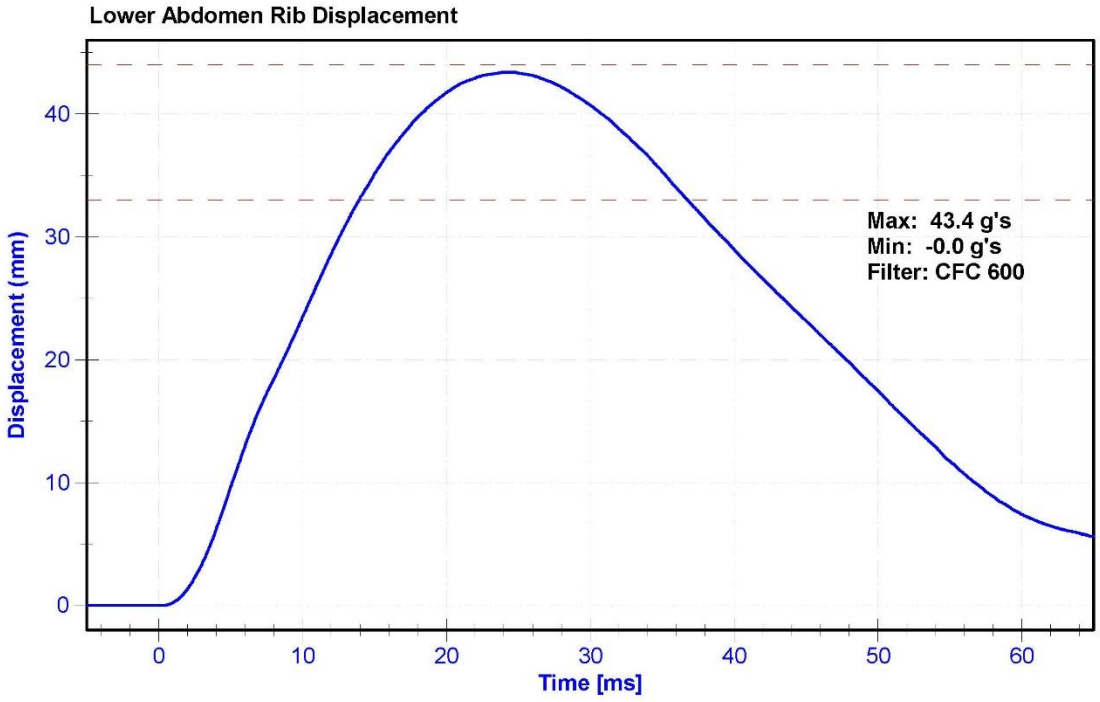
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.0	Pass
Humidity	10	70	%	27.0	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	12	16	g's	13.7	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.7	Pass
Upper Abdomen Rib Deflection	36	47	mm	47.0	Pass
Lower Abdomen Rib Deflection	33	44	mm	43.4	Pass

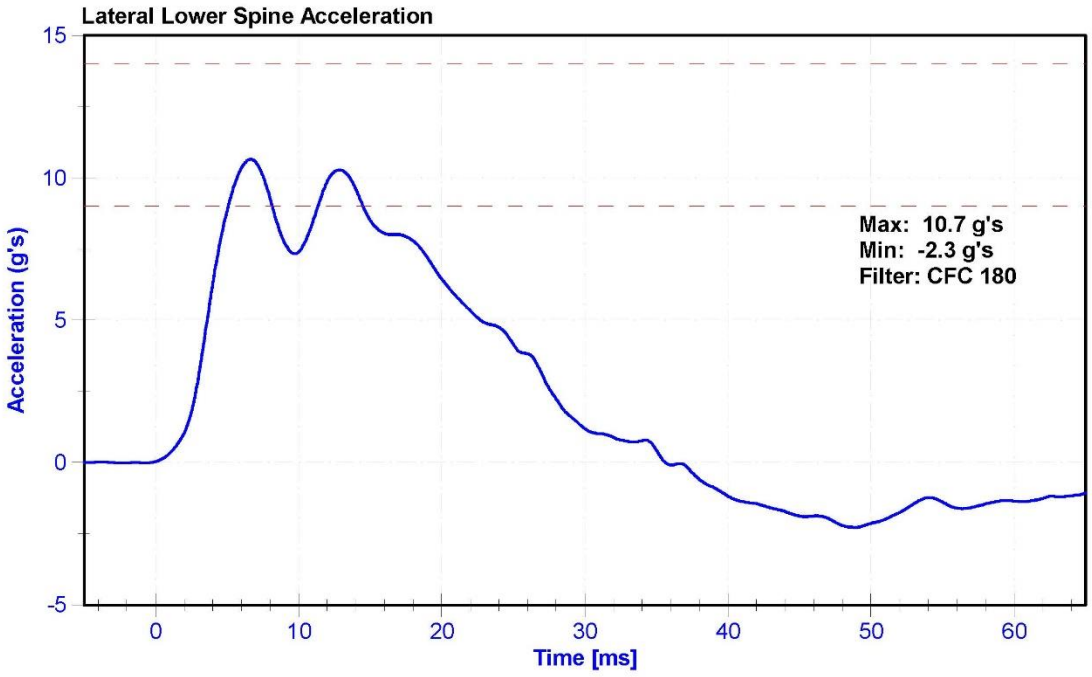
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibratio Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	9/23/2015	3/23/2016
Upper Abdomen Rib Potentiometer	Servo 08TC1-3787	DS-015GFE	9/24/2015	9/23/2016
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	9/24/2015	9/23/2016

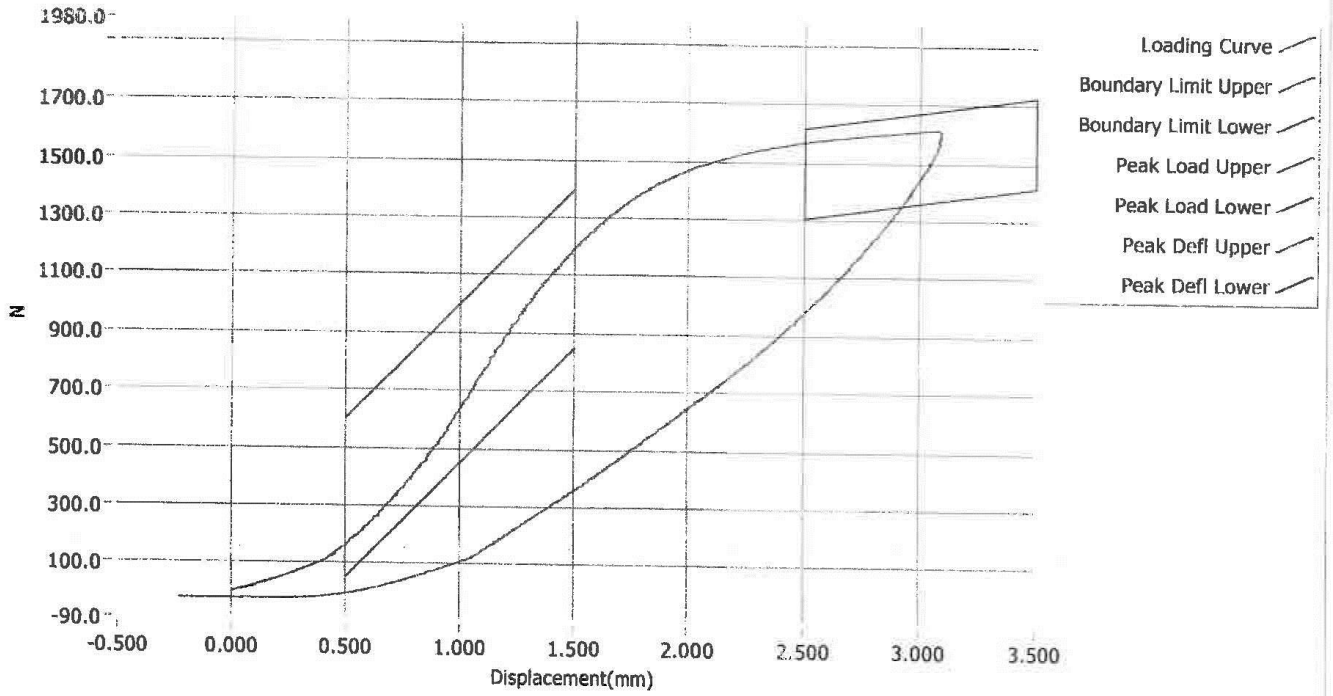



Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 47.0 g's
Min: -0.0 g's
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 43.4 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
60
Time [ms]
Max: 10.7 g's
Min: -2.3 g's
Filter: CFC 180

Resultant Data - SIDIIs Plug Compression



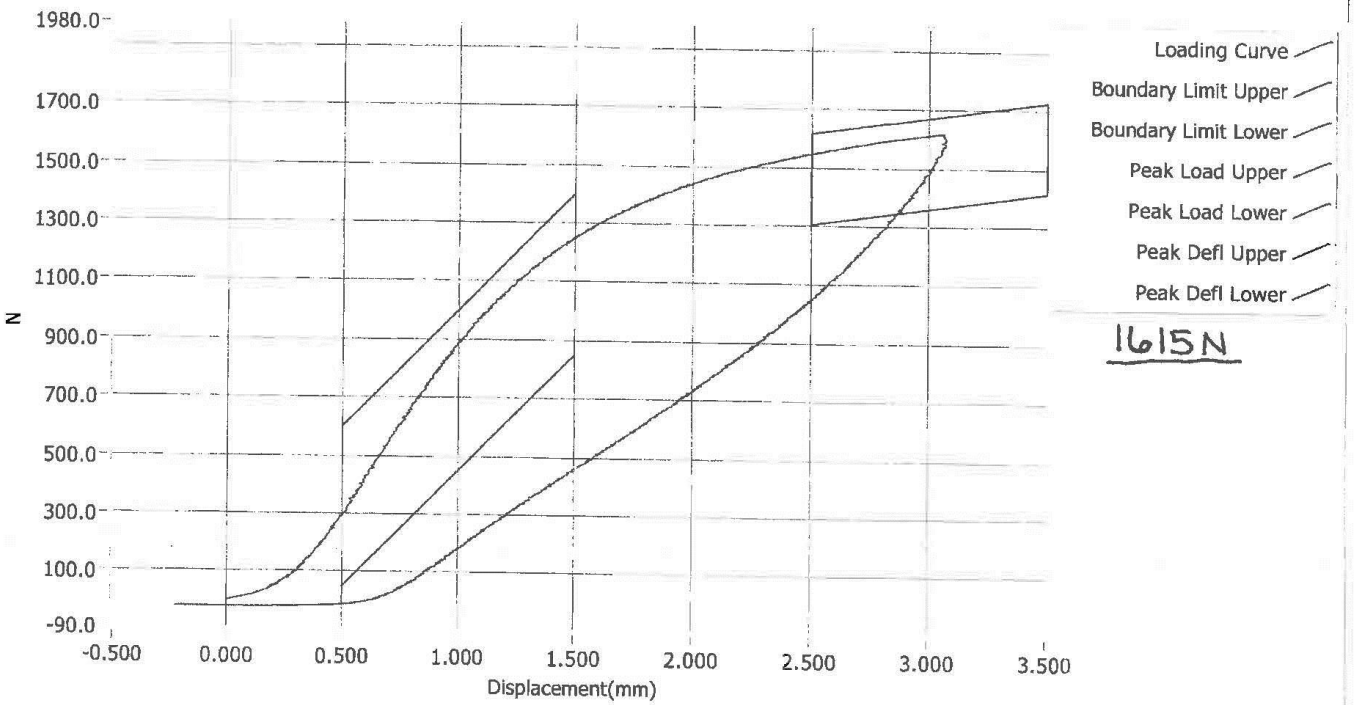
ATD Calibration Lab

Certification
10/26/15
MRC

Test ID	Part Serial Number	Test Date	Test Time
	49015	12/7/2011	12:47 AM
Cert ID	**ATD Serial Number**	**ATD Type**	
	N/A	SIDIIs	

Current Date : 12/7/2011 Current Time : 00:48:05

Resultant Data - SIDIIs Plug Compression



1615N

ATD Calibration Lab

Crash
10/26/15
MLC

Test ID	Part Serial Number	Test Date	Test Time
	63011	1/18/2013	9:29 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

Current Date : 1/18/2013 Current Time : 21:30:00

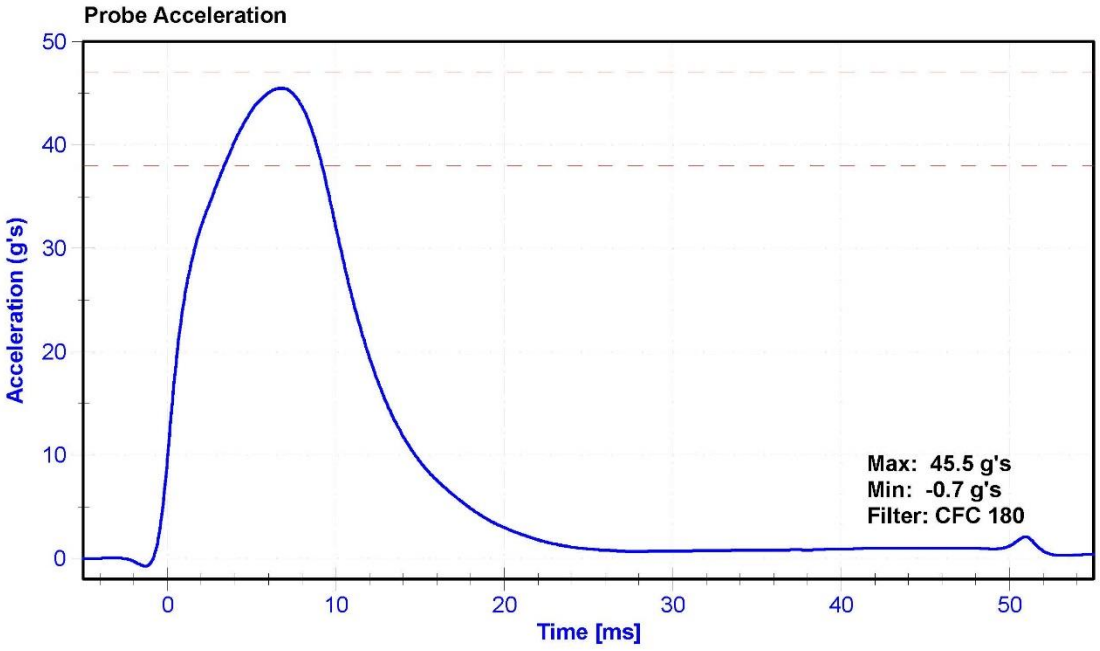
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

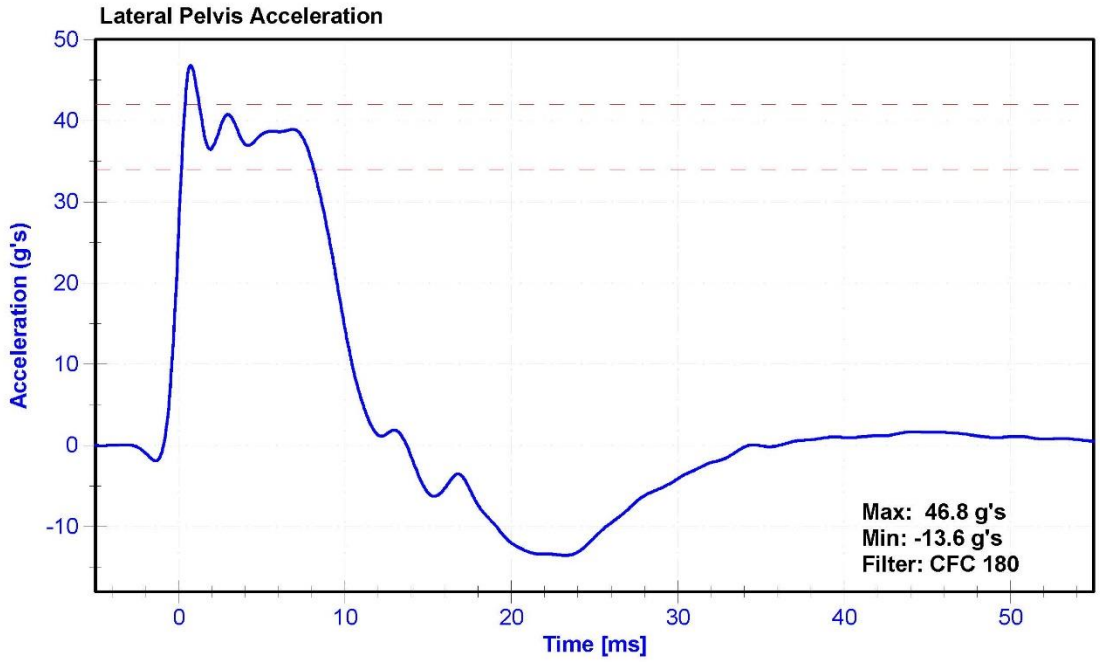
Results

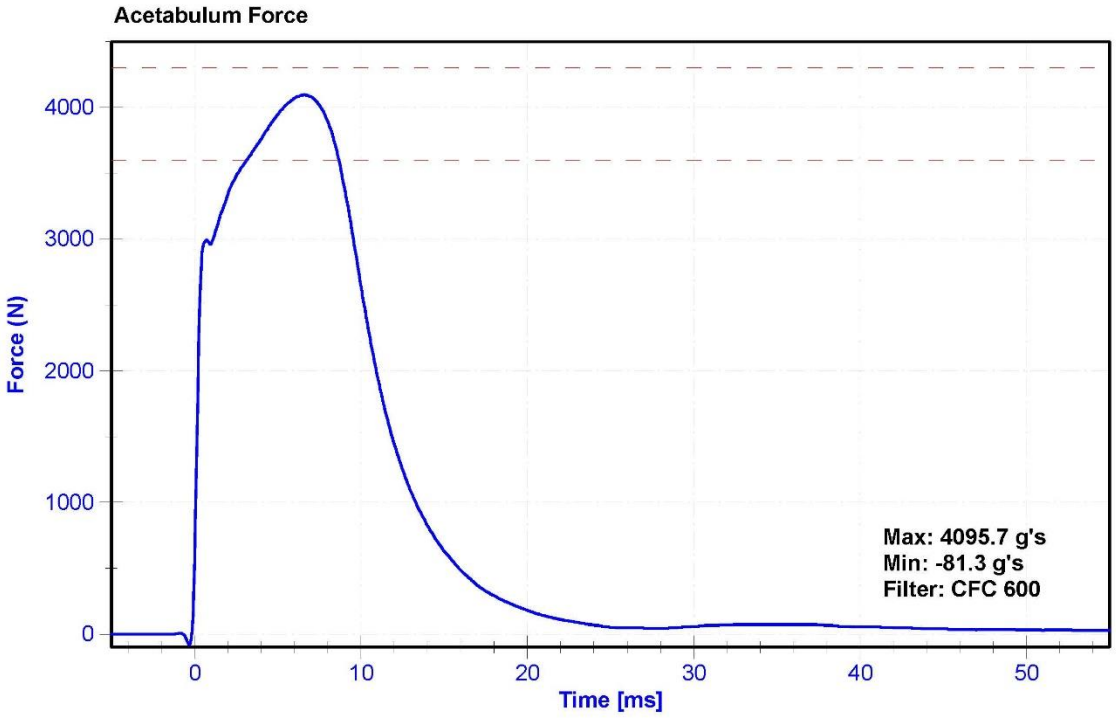
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	34.7	Pass
Velocity	6.6	6.8	m/s	6.61	Pass
Probe Acceleration	38	47	g's	45.5	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	38.9	Pass
Acetabulum Force	3,600	4,300	N	4095.7	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	8/3/2015	2/1/2016
Acetabulum Load Cell	Denton 3249J	LC-267Fy	6/30/2015	6/29/2016
Certification Plug	Humanetics	40915	12/07/2011	N/A
Crash Test Plug	Humanetics	63011	01/18/2013	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 46.8 g's
Min: -13.6 g's
Filter: CFC 180


Acetabulum Force
Force (N)
4000
3000
2000
1000
0
0
10
20
30
40
50
Time [ms]
Max: 4095.7 g's
Min: -81.3 g's
Filter: CFC 600

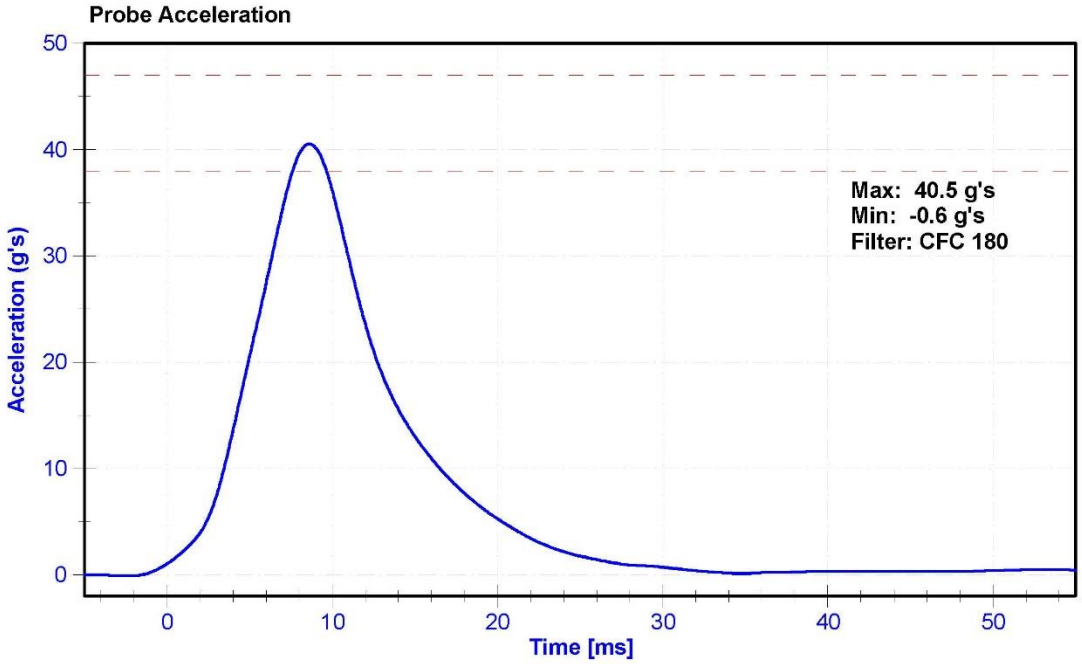
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

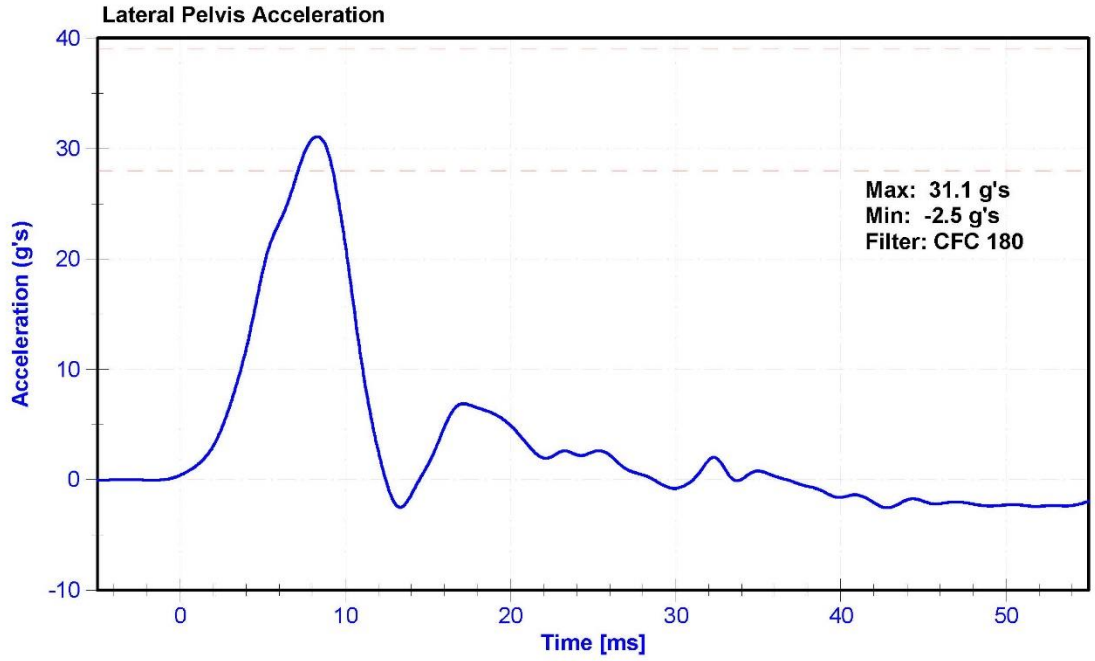
Results

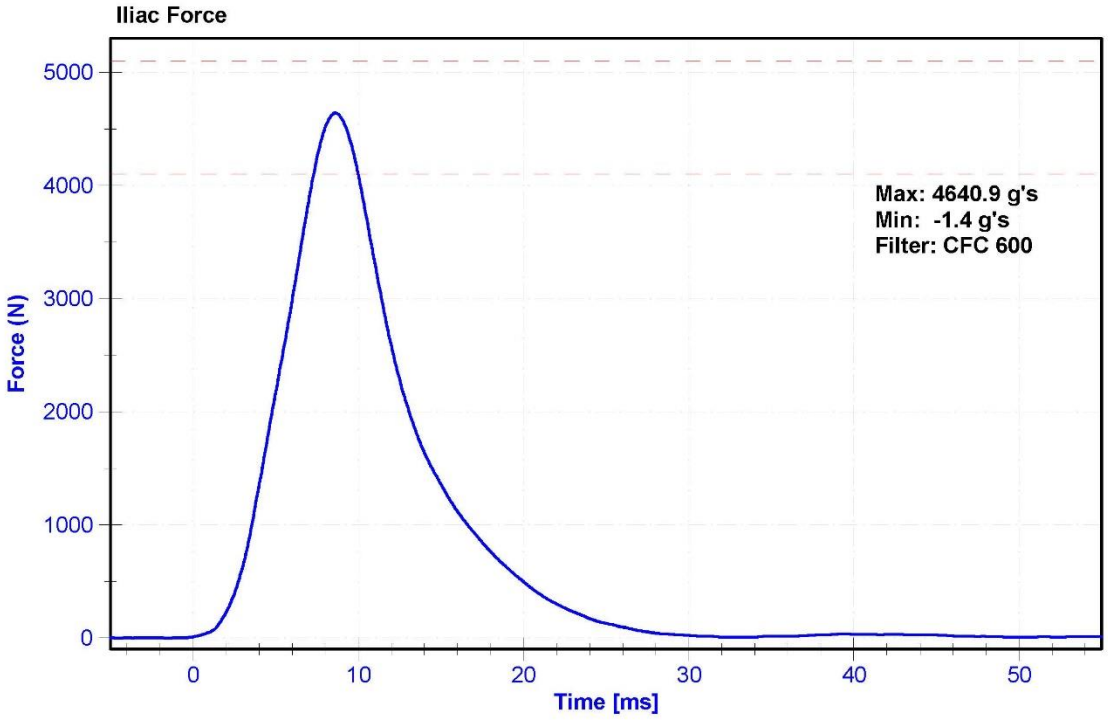
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.5	Pass
Humidity	10	70	%	31.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	36	45	g's	40.5	Pass
Lateral Pelvis Acceleration	28	39	g's	31.1	Pass
Iliac Force	4,100	5,100	N	4640.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	8/3/2015	2/1/2016
Iliac Load Cell	DENTON 3228J	LC-281Fy	6/30/2015	6/29/2016




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 31.1 g's
Min: -2.5 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4640.9 g's
Min: -1.4 g's
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

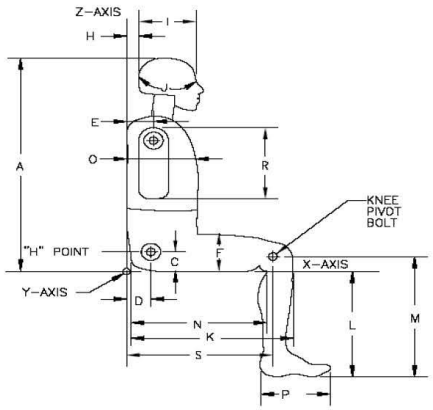
SERIAL NO: DG8012

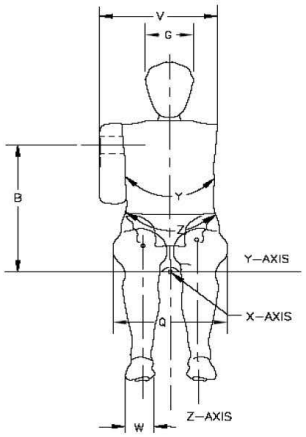
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: M. Geesey Date: 11/11/2015

Dummy Serial Number: DG8012





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	147	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	127	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	528	Pass
L	Popliteal Height	343	369	350	Pass
M	Knee Pivot to floor height	392	409	399	Pass
N	Buttock Popliteal Length	416	442	430	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	222	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	480	Pass
V	Shoulder Width	341	357	351	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	861	Pass
Z	Waist Circumference	761	791	767	Pass

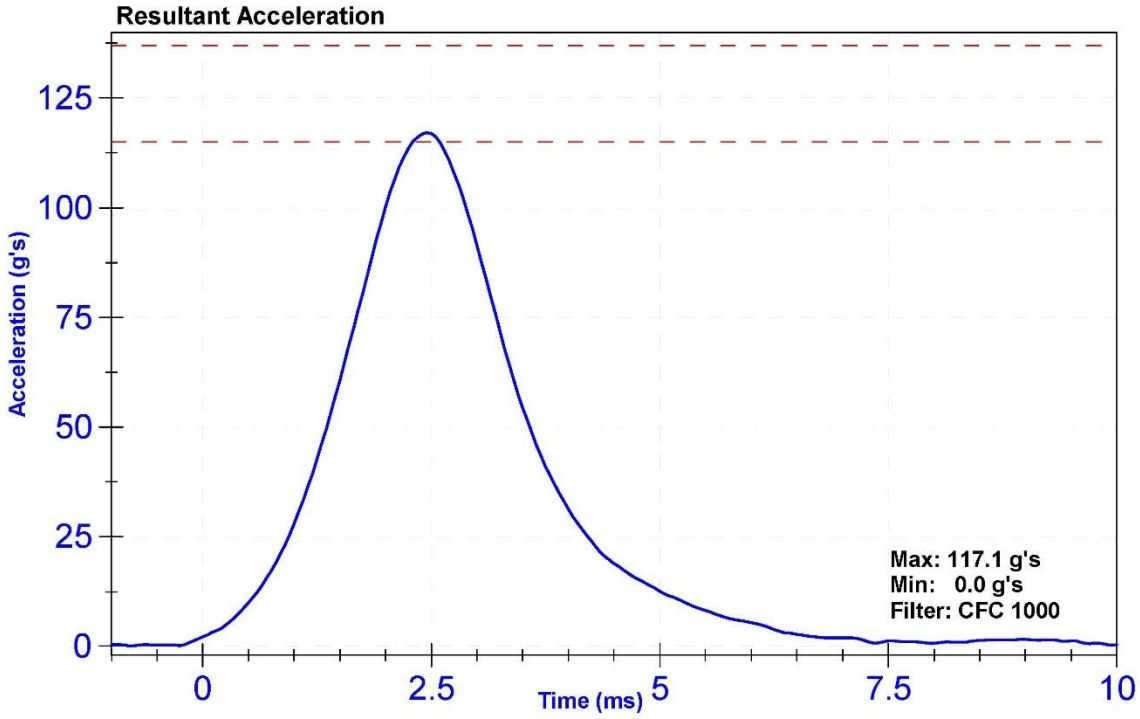
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

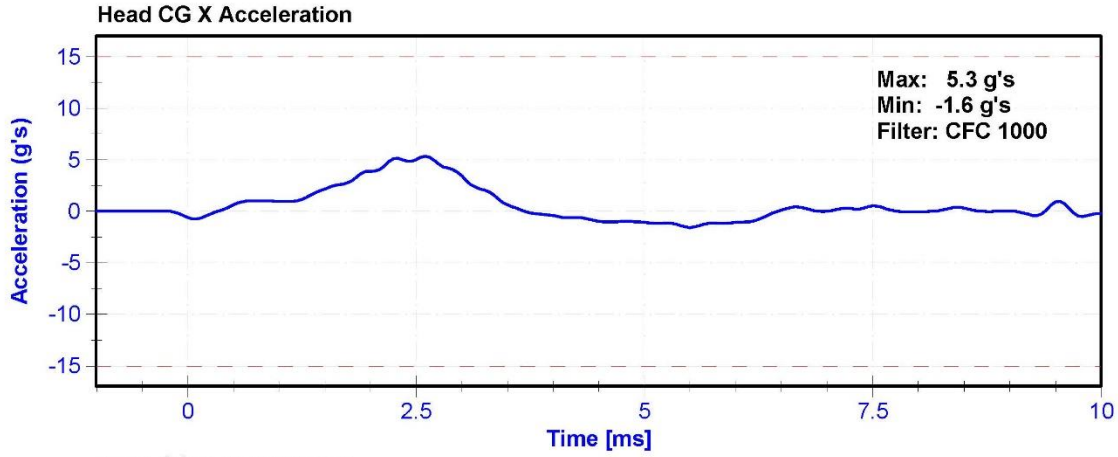
Results

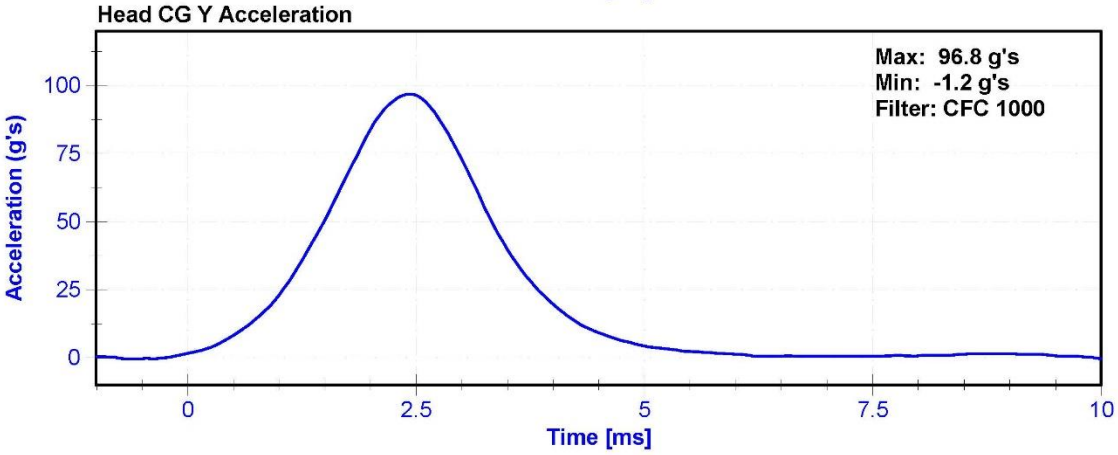
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	30.7	Pass
Resultant Acceleration	115	137	g's	117.1	Pass
Oscillation	0	15	%	1.7	Pass
Fore-Aft Acceleration	-15	15	g's	5.3	Pass

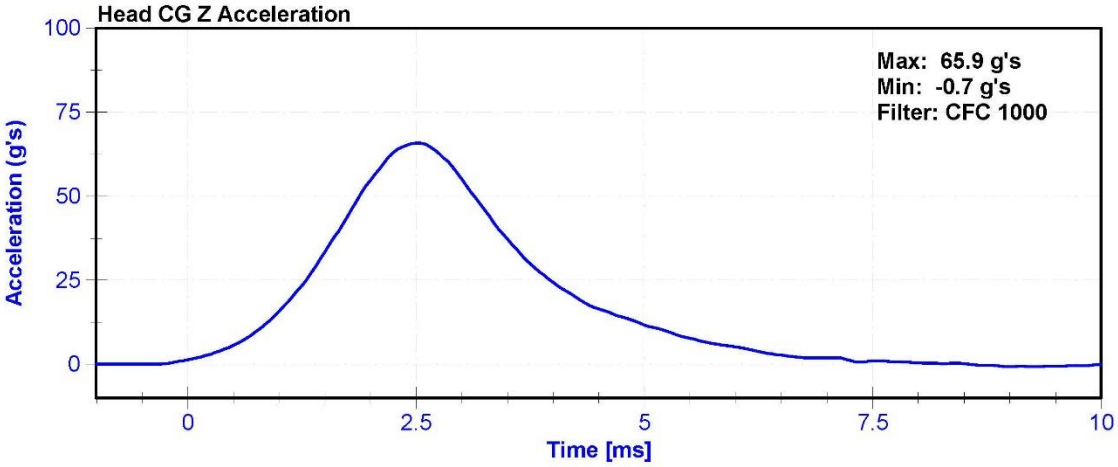
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P51685	5/22/2015	11/20/2015
Y Accelerometer	ENDEVCO 7264CT	AC-P51682	5/22/2015	11/20/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P51699	5/22/2015	11/20/2015




Head CG X Acceleration
Max: 5.3 g's
Min: -1.6 g's
Filter: CFC 1000
Acceleration (g's)
15
10
5
0
-5
-10
-15
0
2.5
5
7.5
10
Time [ms]


Head CG Y Acceleration
Max: 96.8 g's
Min: -1.2 g's
Filter: CFC 1000
Acceleration (g's)
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]


Head CG Z Acceleration
Max: 65.9 g's
Min: -0.7 g's
Filter: CFC 1000
Acceleration (g's)
100
75
50
25
0
0
2.5
5
7.5
10
Time [ms]

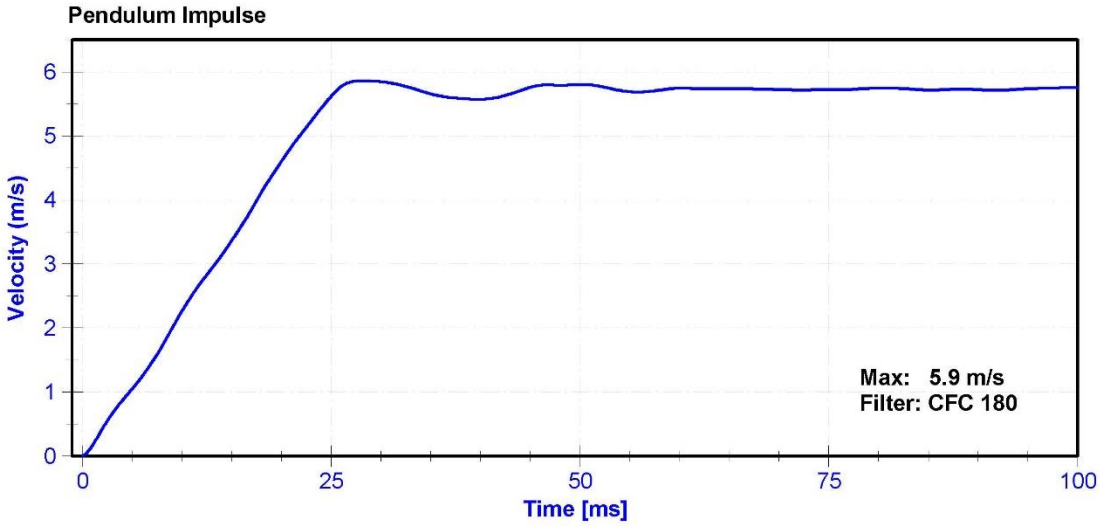
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

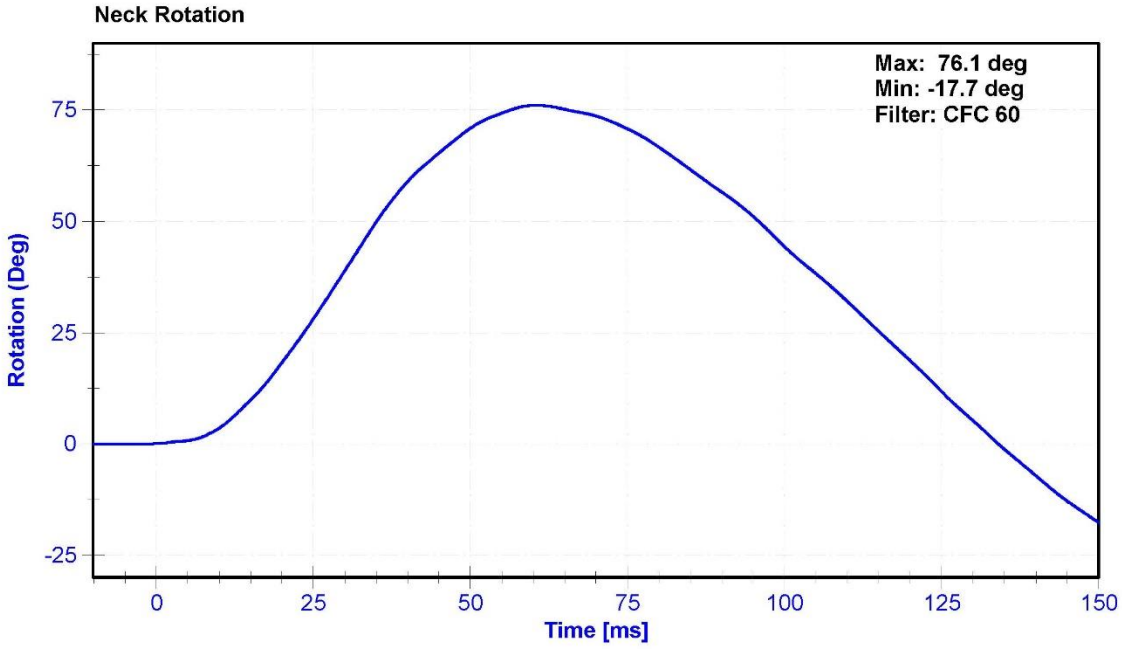
Results

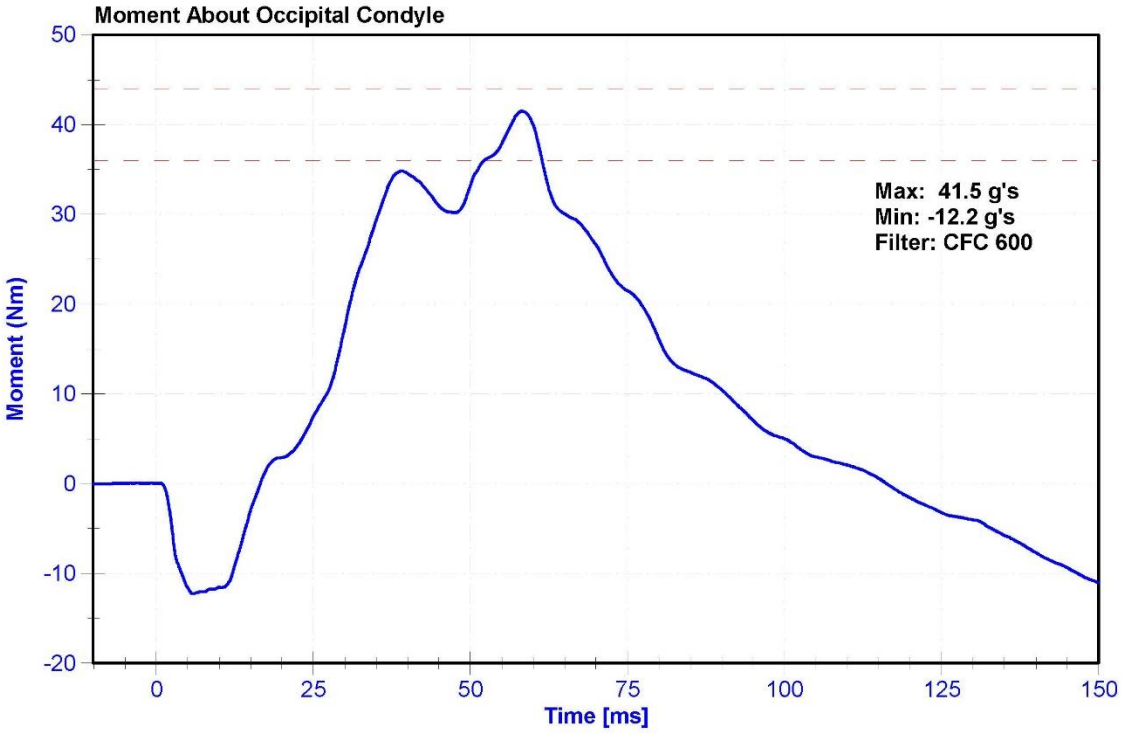
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.4	Pass
Humidity	10	70	%	29.6	Pass
Velocity	5.51	5.63	m/s	5.583	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.26	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.36	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.60	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.62	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.86	Pass
Neck Rotation	71	81	deg	76.1	Pass
Time at Maximum Rotation	50	70	ms	60.4	Pass
Moment about the OC	36	44	Nm	41.5	Pass
Moment Decay to 0 Nm	102	126	ms	116.2	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	5/7/2015	5/6/2016
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	9/24/2015	9/23/2016
Condyle Potentiometer	Denton 78051-342	DS-185Pend	9/25/2015	9/24/2016
Upper Neck Load Cell	Denton 1716A	LC-798Fy	5/9/2015	5/8/2016




Neck Rotation
Max: 76.1 deg
Min: -17.7 deg
Filter: CFC 60
Rotation (Deg)
75
50
25
0
-25
0
25
50
75
100
125
150
Time [ms]


Moment About Occipital Condyle
Max: 41.5 g's
Min: -12.2 g's
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

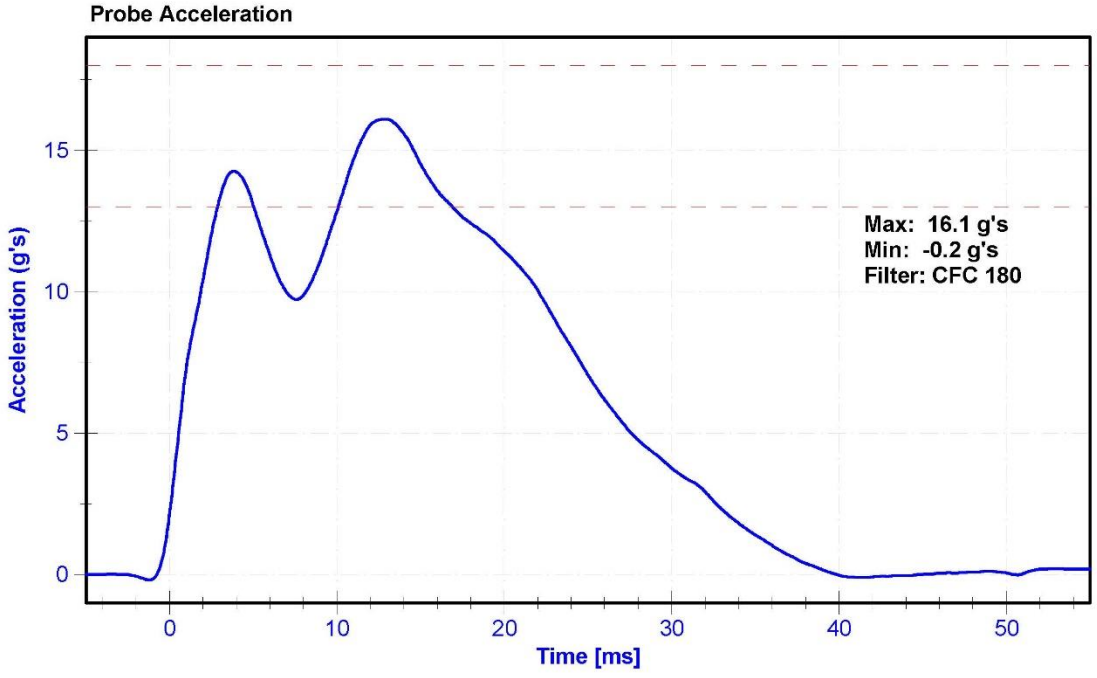
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

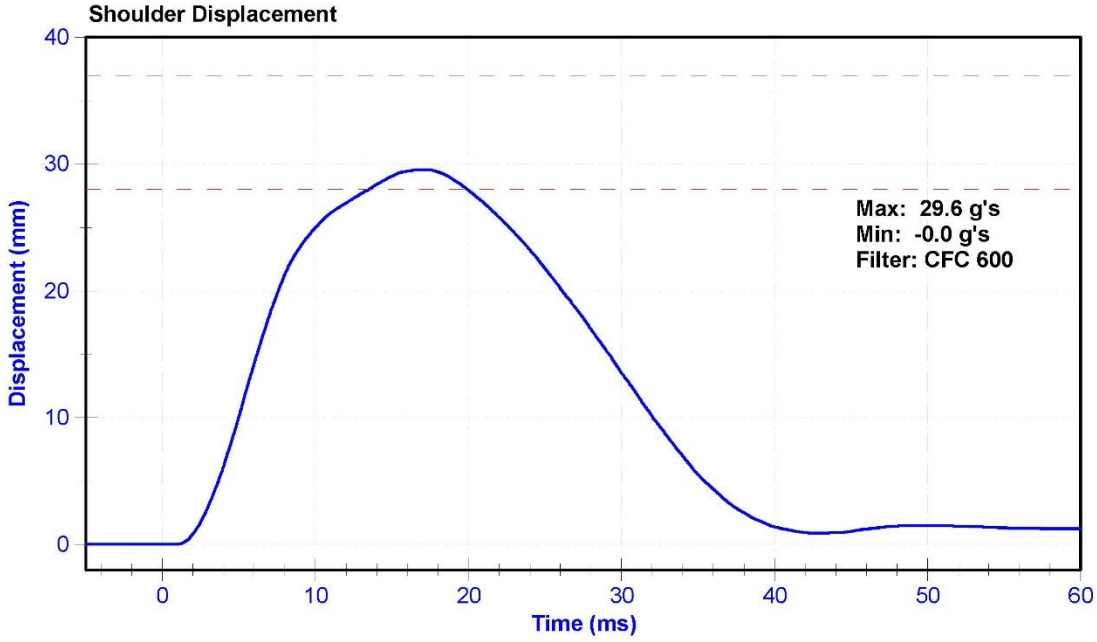
Results

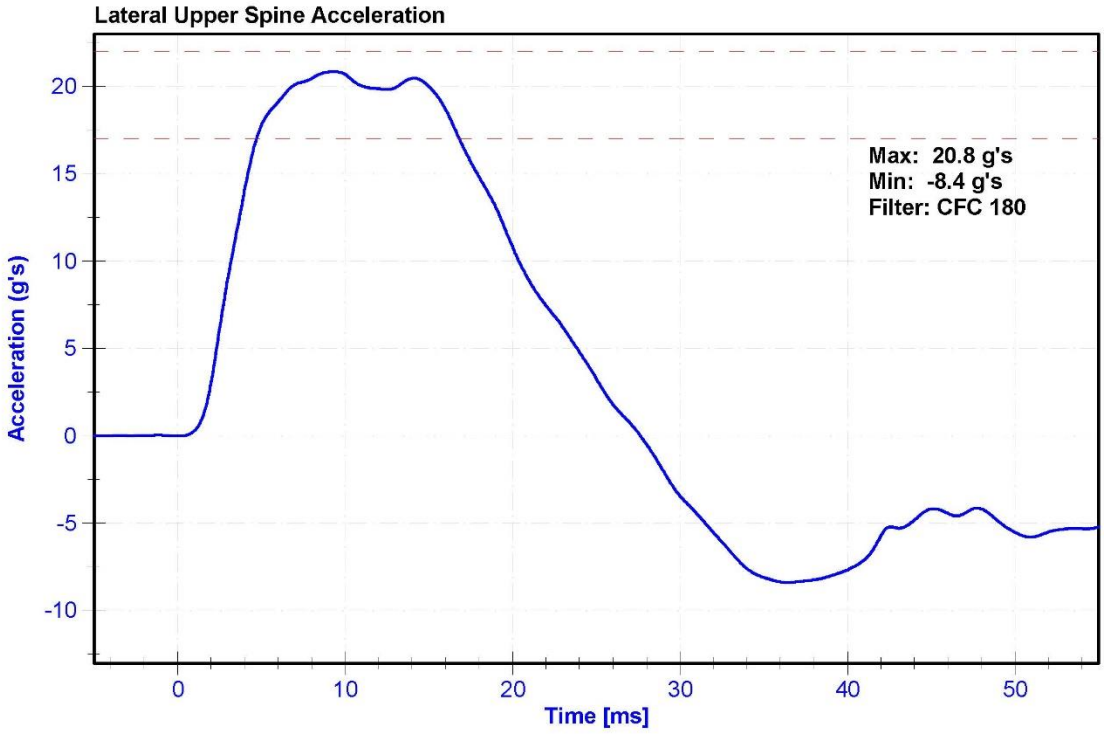
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	44.7	Pass
Velocity	4.2	4.4	m/s	4.36	Pass
Probe Acceleration	13	18	g's	16.1	Pass
Shoulder Deflection	28	37	mm	29.6	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	9/24/2015	9/23/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	8/3/2015	2/1/2016




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 29.6 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 20.8 g's
Min: -8.4 g's
Filter: CFC 180

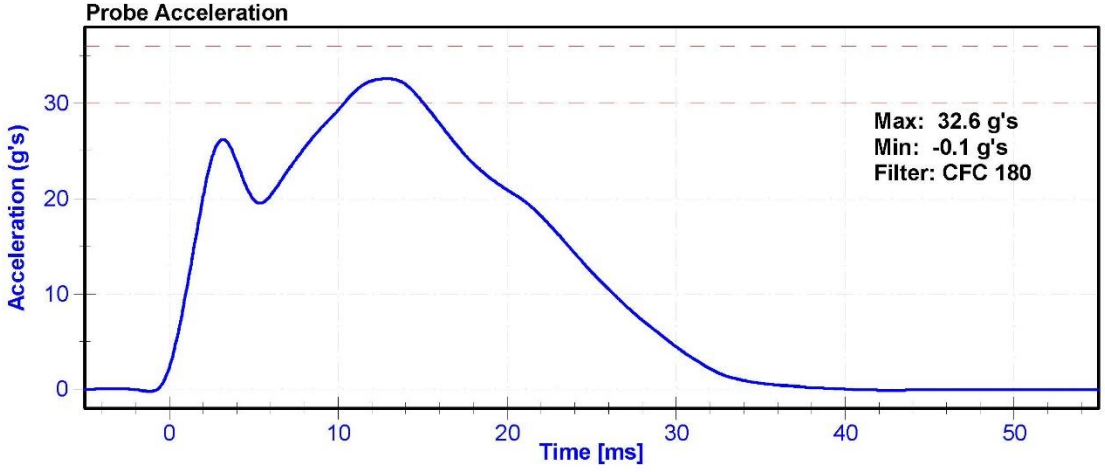
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

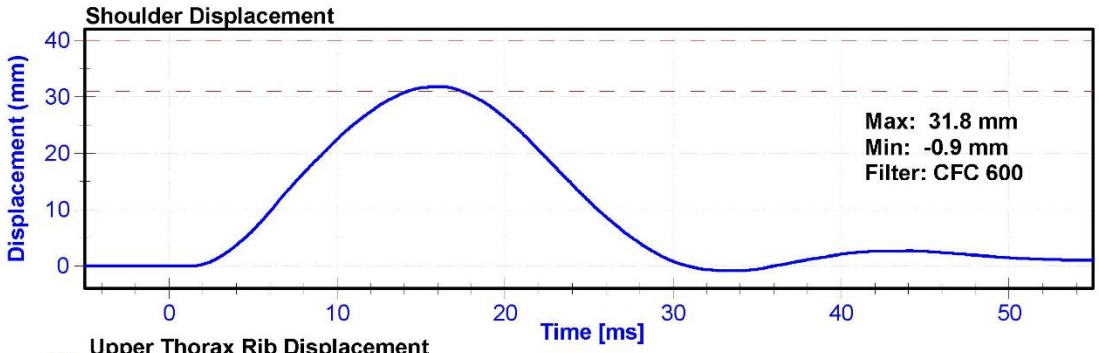
Results

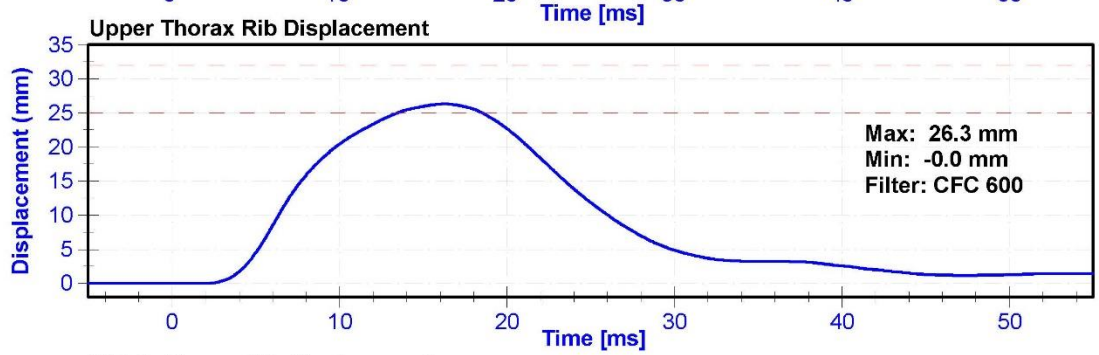
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	44.5	Pass
Velocity	6.6	6.8	m/s	6.67	Pass
Probe Acceleration after 5 ms	30	36	g's	32.6	Pass
Lateral Upper Spine Acceleration	34	43	g's	40.0	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.8	Pass
Shoulder Deflection	31	40	mm	31.8	Pass
Upper Thorax Rib Deflection	25	32	mm	26.3	Pass
Mid Thorax Rib Deflection	30	36	mm	31.8	Pass
Lower Thorax Rib Deflection	32	38	mm	34.2	Pass

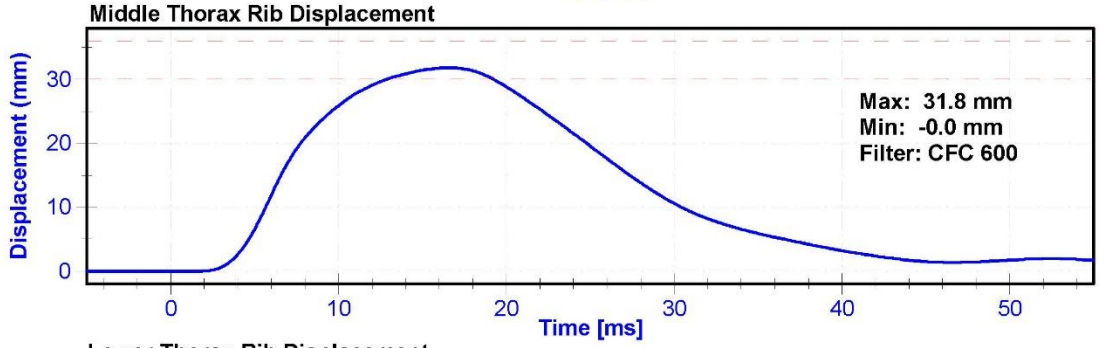
Transducer Calibrations

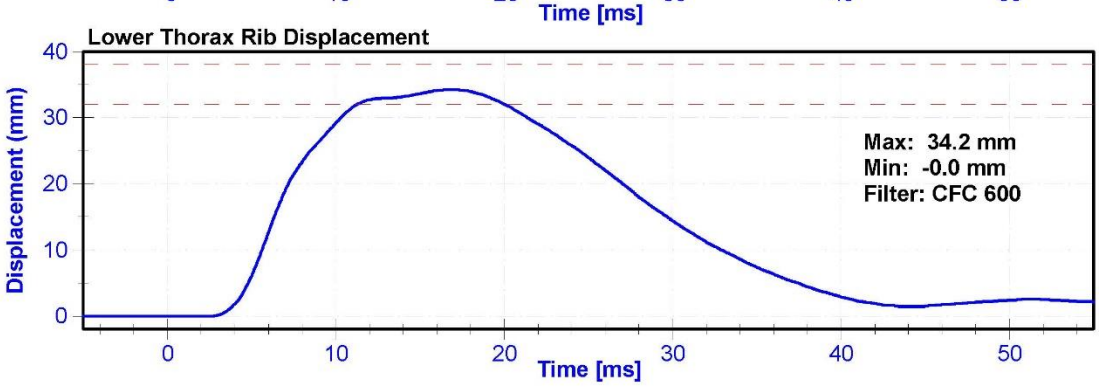
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P51875	8/3/2015	2/1/2016
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P83319	9/23/2015	3/23/2016
Shoulder Potentiometer	Servo 08TC1-3745	DS-1845GFE	9/24/2015	9/23/2016
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	9/24/2015	9/23/2016
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	9/24/2015	9/23/2016
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	9/24/2015	9/23/2016

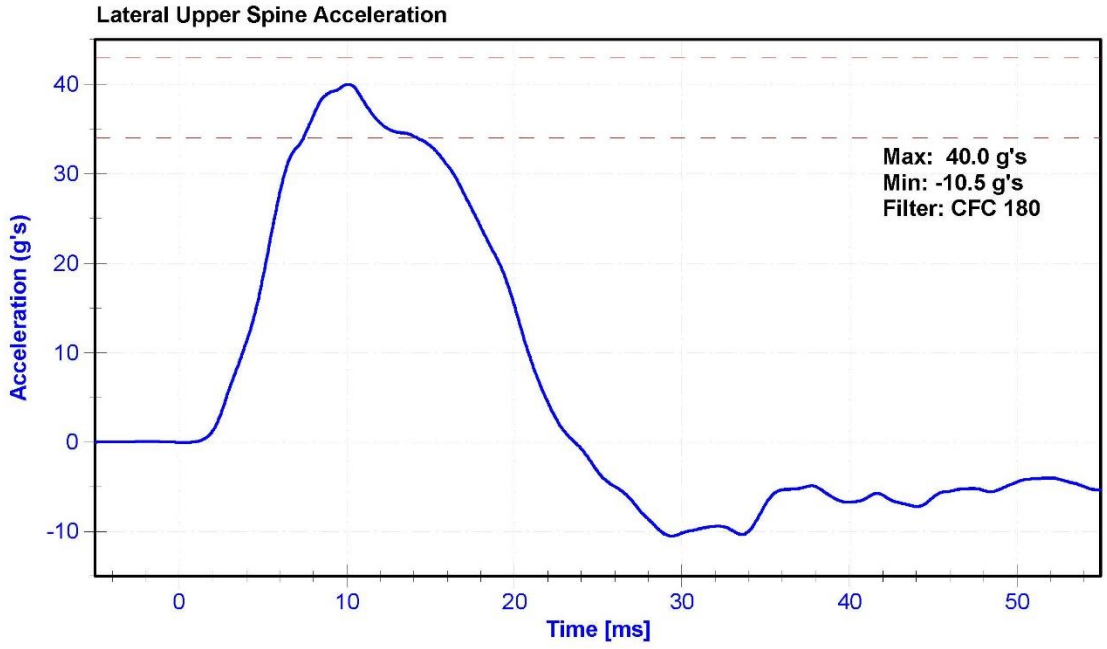


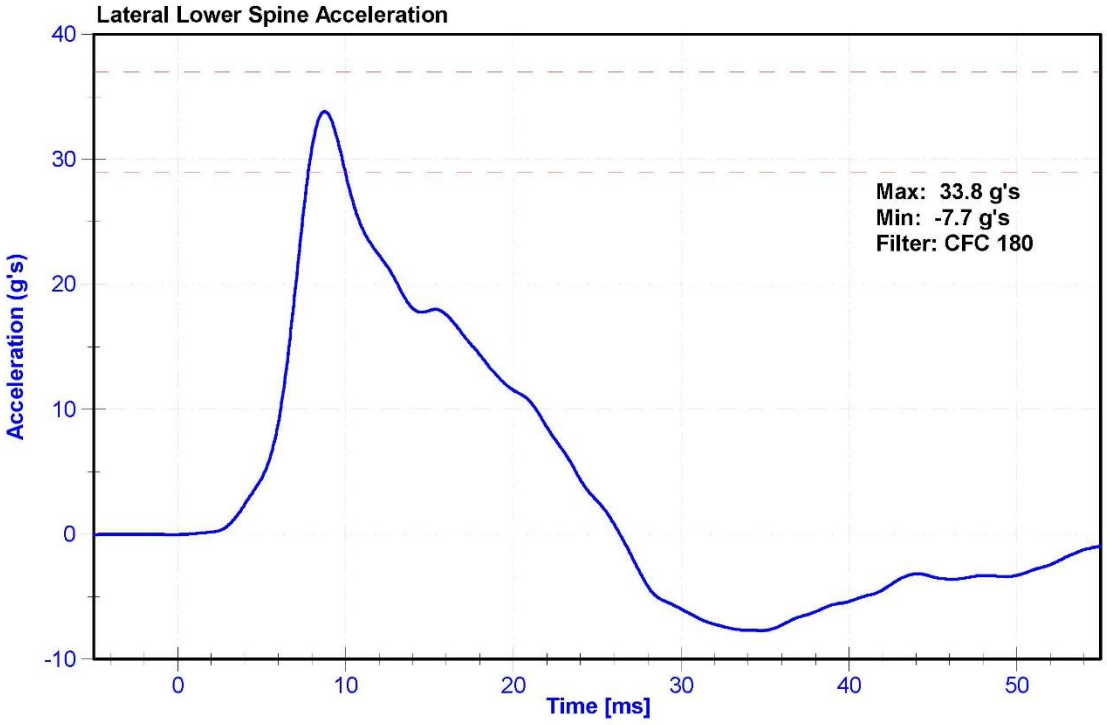

Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 31.8 mm
Min: -0.9 mm
Filter: CFC 600


Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.3 mm
Min: -0.0 mm
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 31.8 mm
Min: -0.0 mm
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 34.2 mm
Min: -0.0 mm
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 40.0 g's
Min: -10.5 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50


Lateral Lower Spine Acceleration
Max: 33.8 g's
Min: -7.7 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

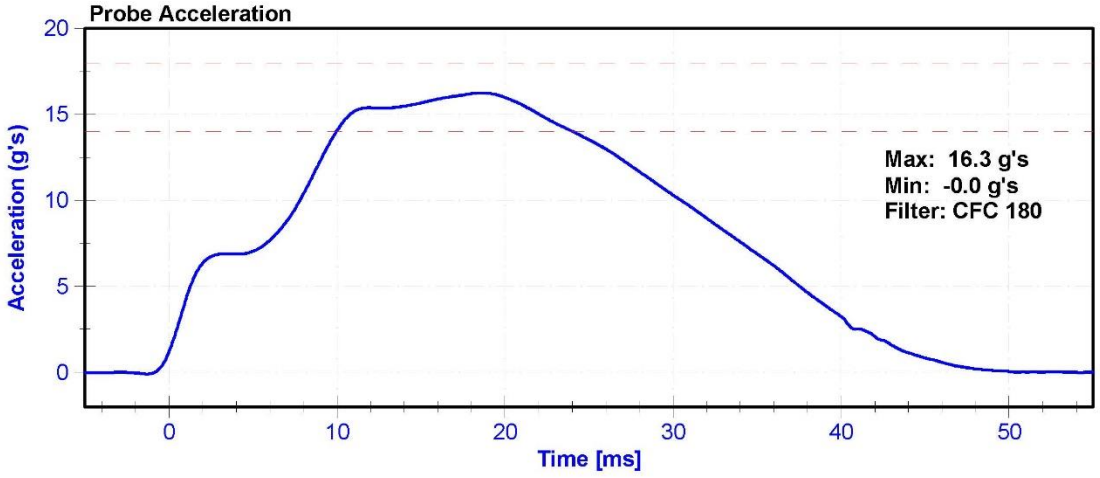
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

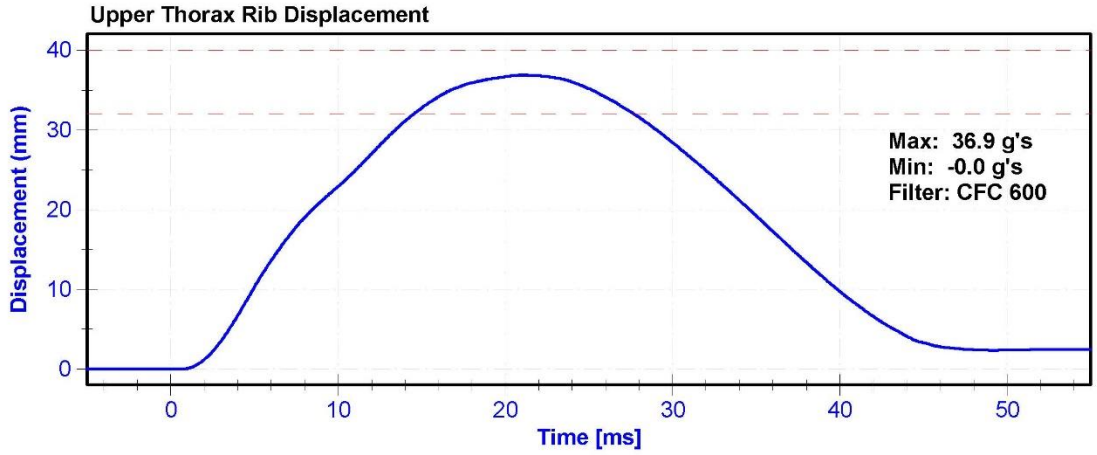
Results

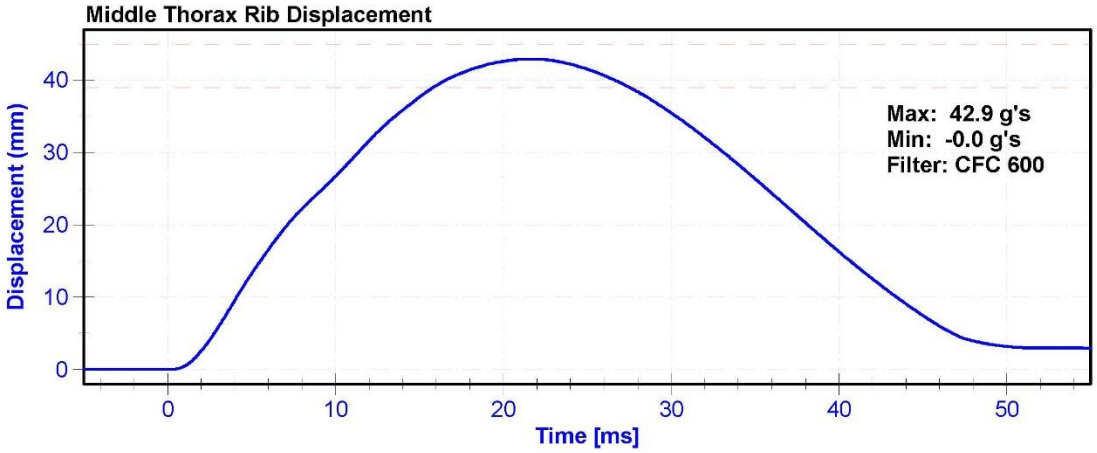
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	45.5	Pass
Velocity	4.2	4.4	m/s	4.34	Pass
Probe Acceleration	14	18	g's	16.3	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.7	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.2	Pass
Upper Thorax Rib Deflection	32	40	mm	36.9	Pass
Middle Thorax Rib Deflection	39	45	mm	42.9	Pass
Lower Thorax Rib Deflection	35	43	mm	39.9	Pass

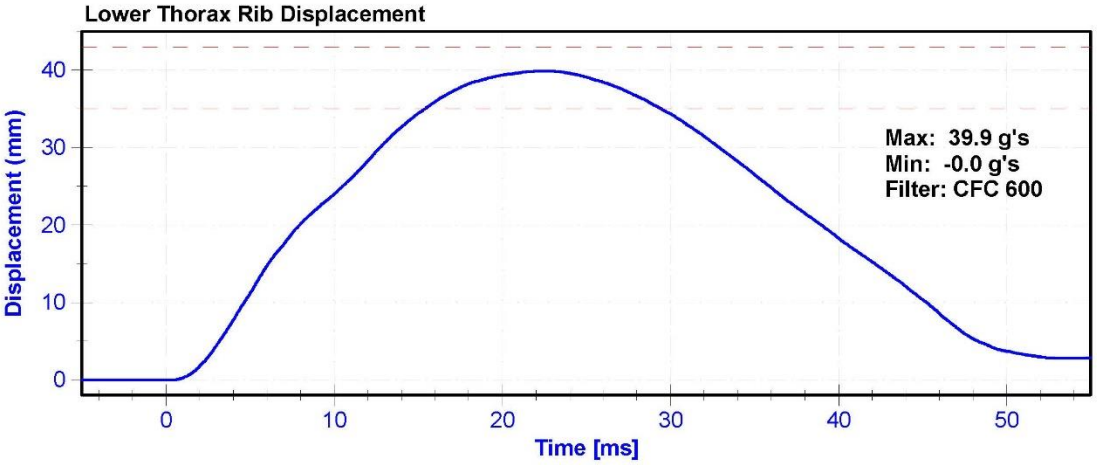
Transducer Calibrations

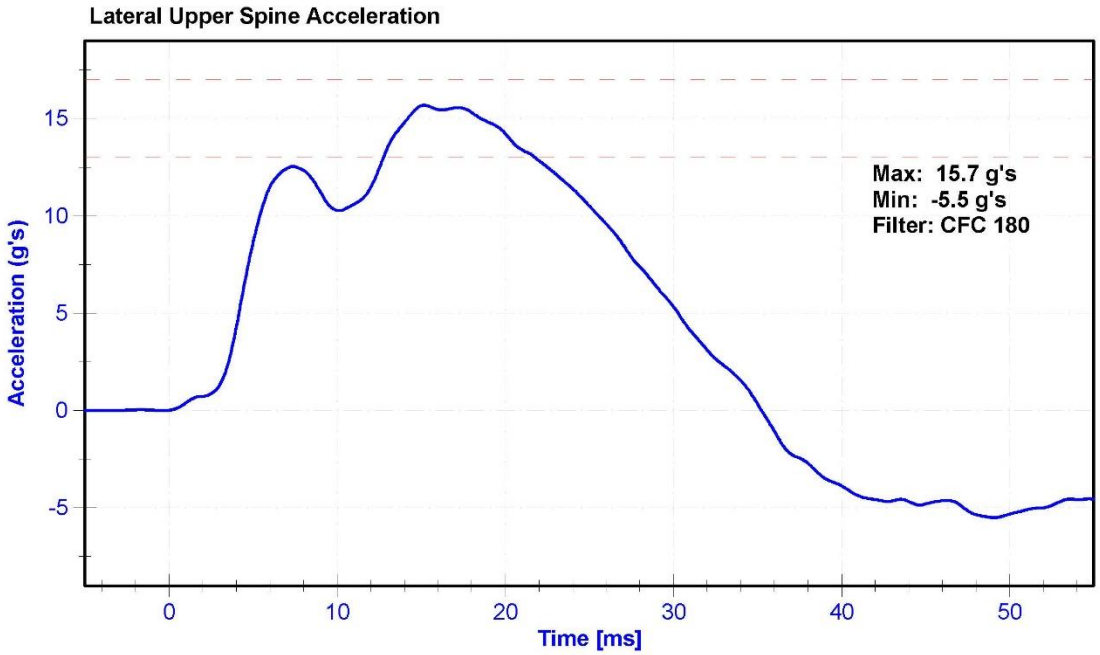
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51875	8/3/2015	2/1/2016
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	9/23/2015	3/23/2016
Upper Thorax Rib Potentiometer	Servo 08TC1-3621	DS-808GFE	9/24/2015	9/23/2016
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-1514GFE	9/24/2015	9/23/2016
Lower Thorax Rib Potentiometer	Servo 08TC1-3787	DS-011GFE	9/24/2015	9/23/2016

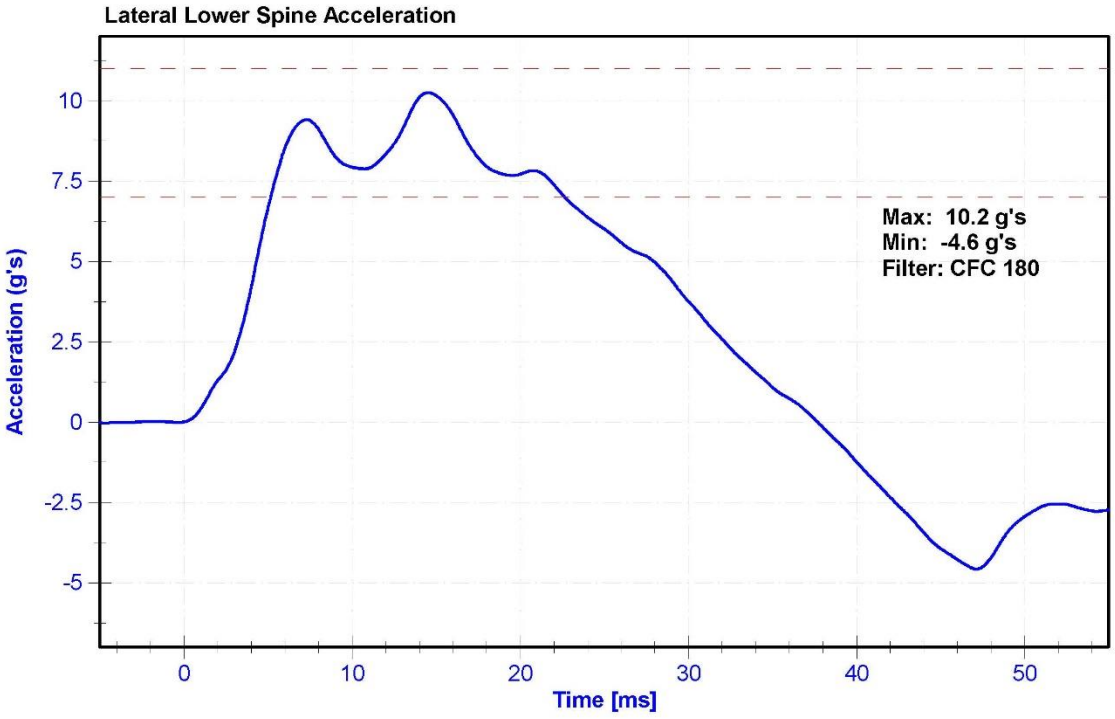



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 36.9 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 42.9 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 39.9 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 15.7 g's
Min: -5.5 g's
Filter: CFC 180
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
Time [ms]


Lateral Lower Spine Acceleration
Max: 10.2 g's
Min: -4.6 g's
Filter: CFC 180
Acceleration (g's)
10
7.5
5
2.5
0
-2.5
-5
0
10
20
30
40
50
Time [ms]

ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

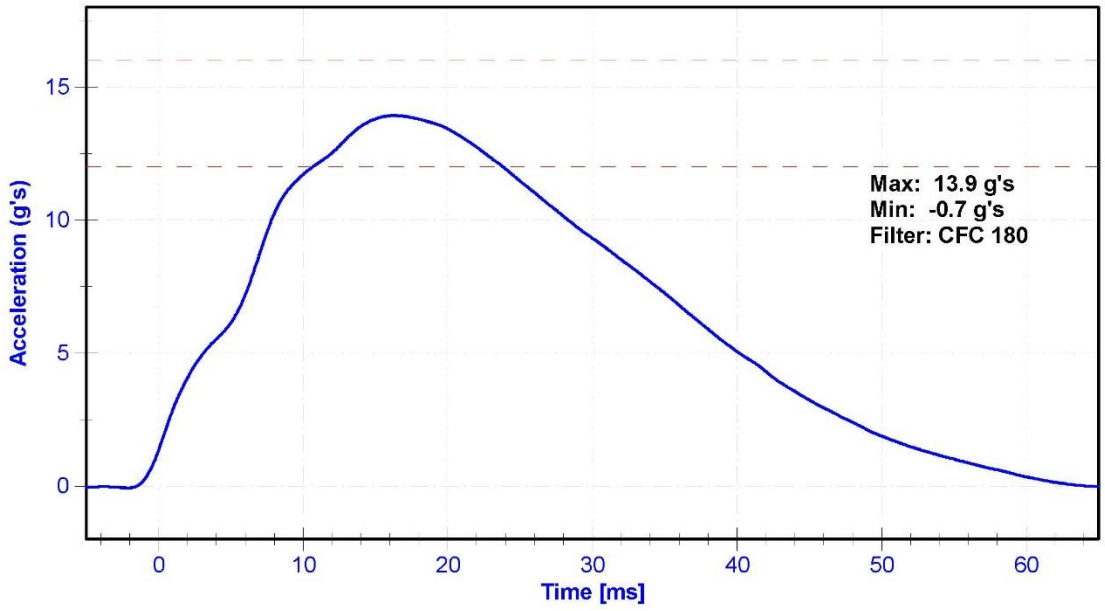
Results

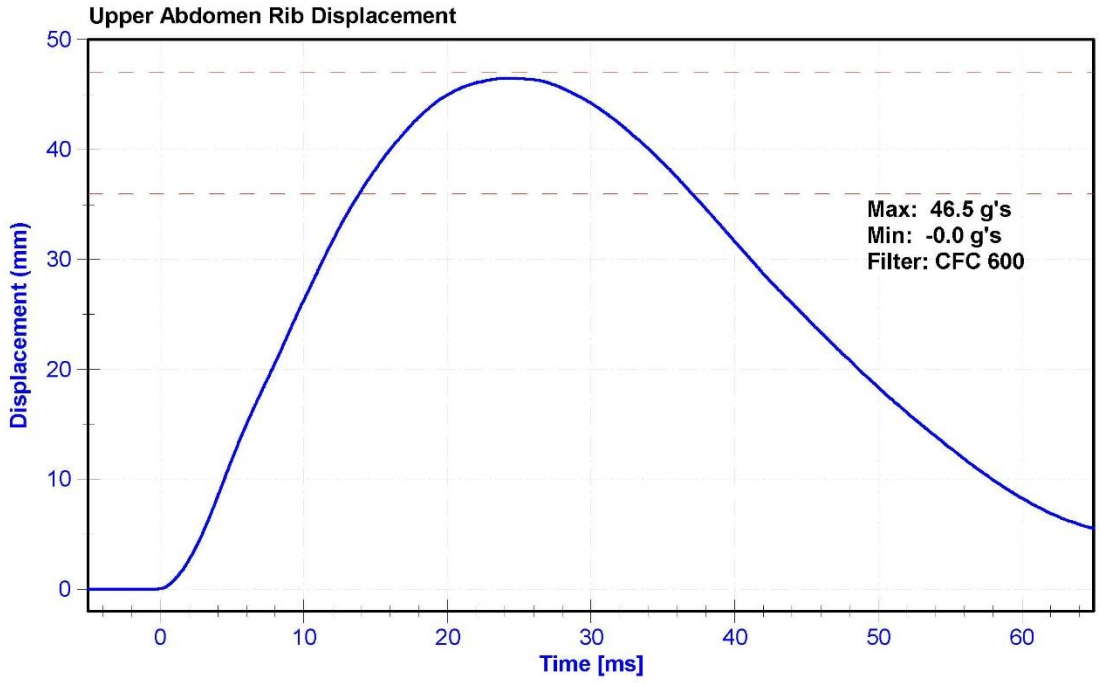
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	44.2	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	12	16	g's	13.9	Pass
Lateral Lower Spine Acceleration	9	14	g's	10.3	Pass
Upper Abdomen Rib Deflection	36	47	mm	46.5	Pass
Lower Abdomen Rib Deflection	33	44	mm	42.3	Pass

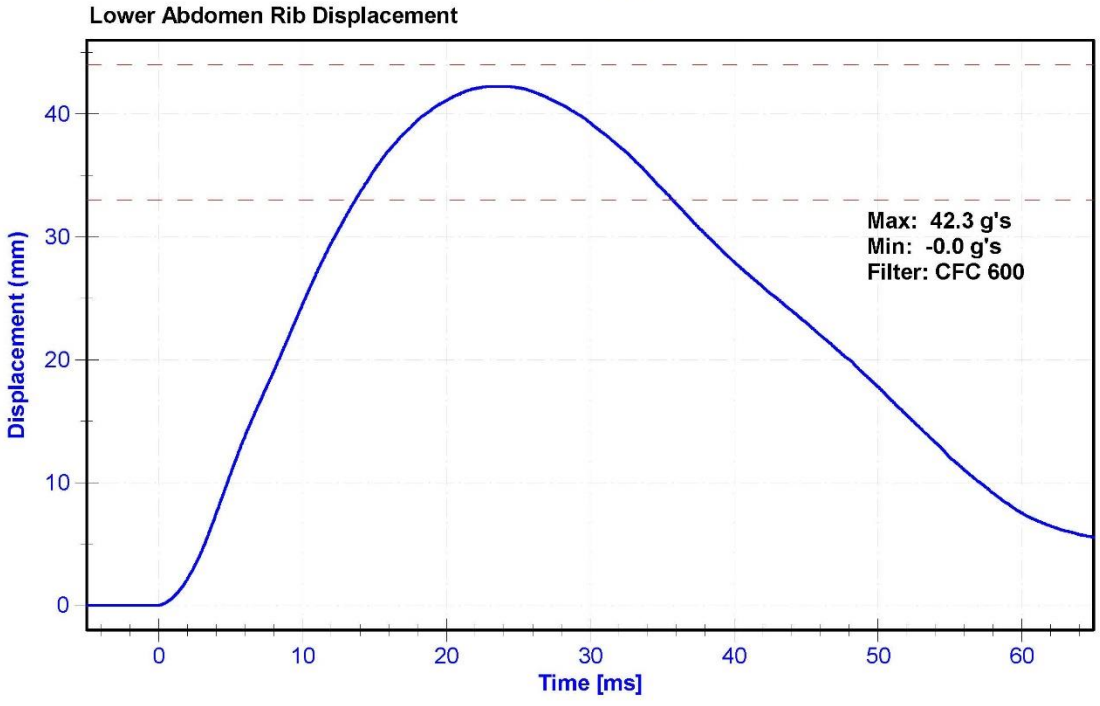
Transducer Calibrations

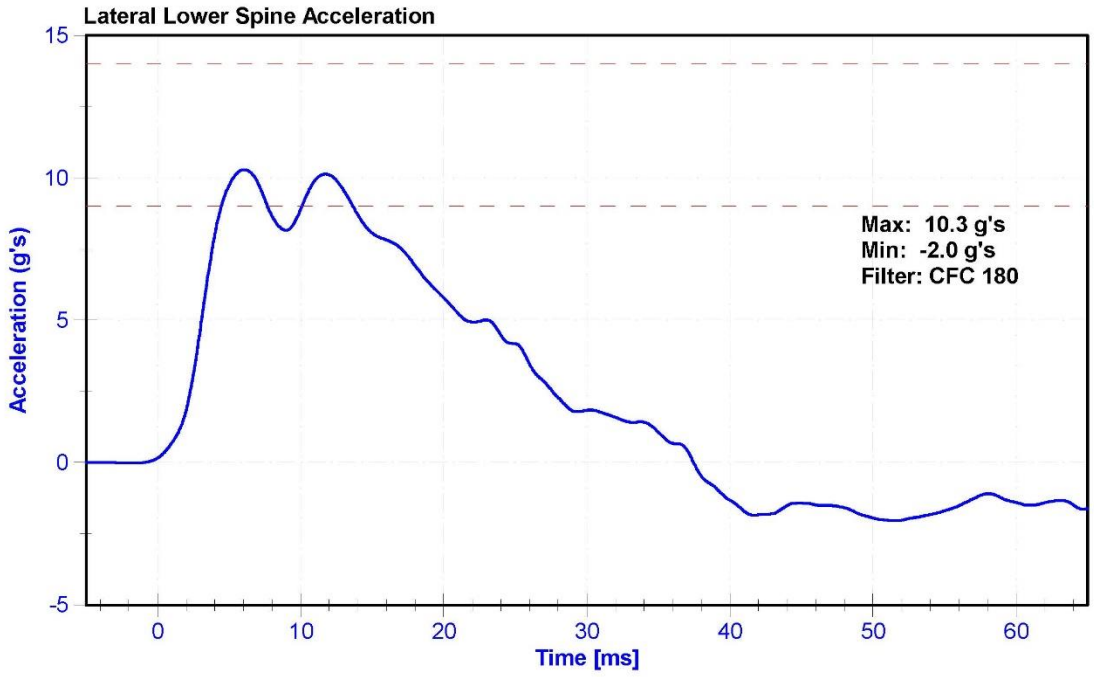
Channel	Manufacturer	Serial Number	Calibratio Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P83319	9/23/2015	3/23/2016
Upper Abdomen Rib Potentiometer	Servo 08TC1-3787	DS-015GFE	9/24/2015	9/23/2016
Lower Abdomen Rib Potentiometer	Servo 08TC1-3745	DS-1774GFE	9/24/2015	9/23/2016

Probe Acceleration

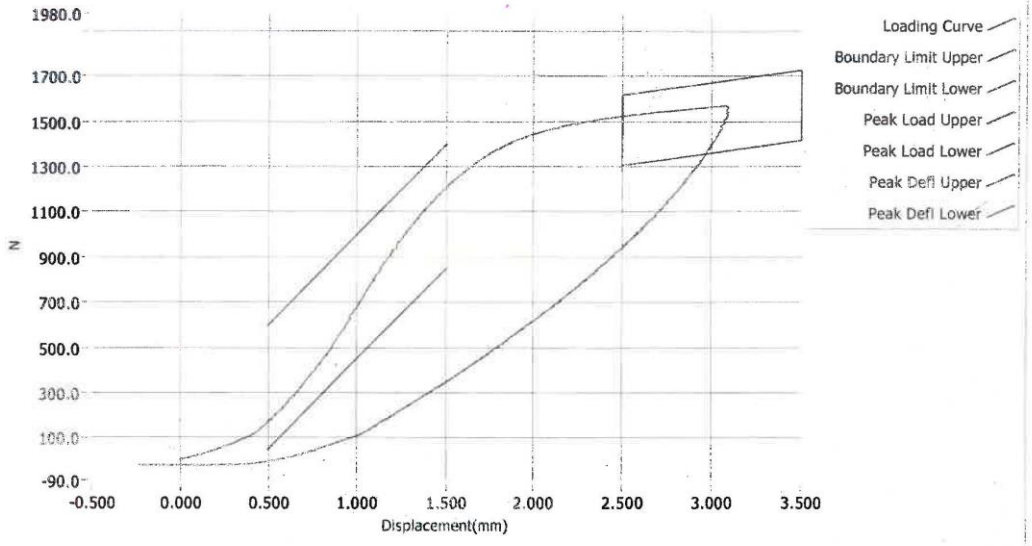



Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 46.5 g's
Min: -0.0 g's
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 42.3 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Lower Spine Acceleration
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
60
Time [ms]
Max: 10.3 g's
Min: -2.0 g's
Filter: CFC 180

Resultant Data - SIDIIs Plug Compression



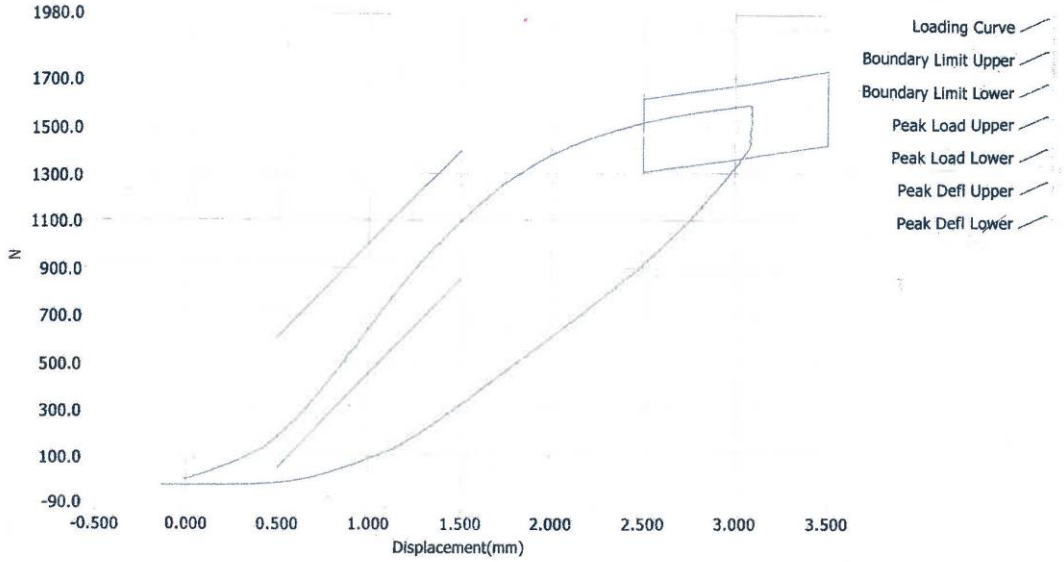
ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	49012	12/7/2011	12:38 AM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

CERTIFICATION
HIIIS MKG

Current Date : 12/7/2011 Current Time : 00:39:07

Resultant Data - SIDIIs Plug Compression



ATD Calibration Lab

Test ID	Part Serial Number	Test Date	Test Time
	46467	9/22/2011	8:52 PM
Cert ID	ATD Serial Number	ATD Type	
	N/A	SIDIIs	

CRASH
11/11/15 MKG

Current Date : 9/22/2011 Current Time : 20:54:05

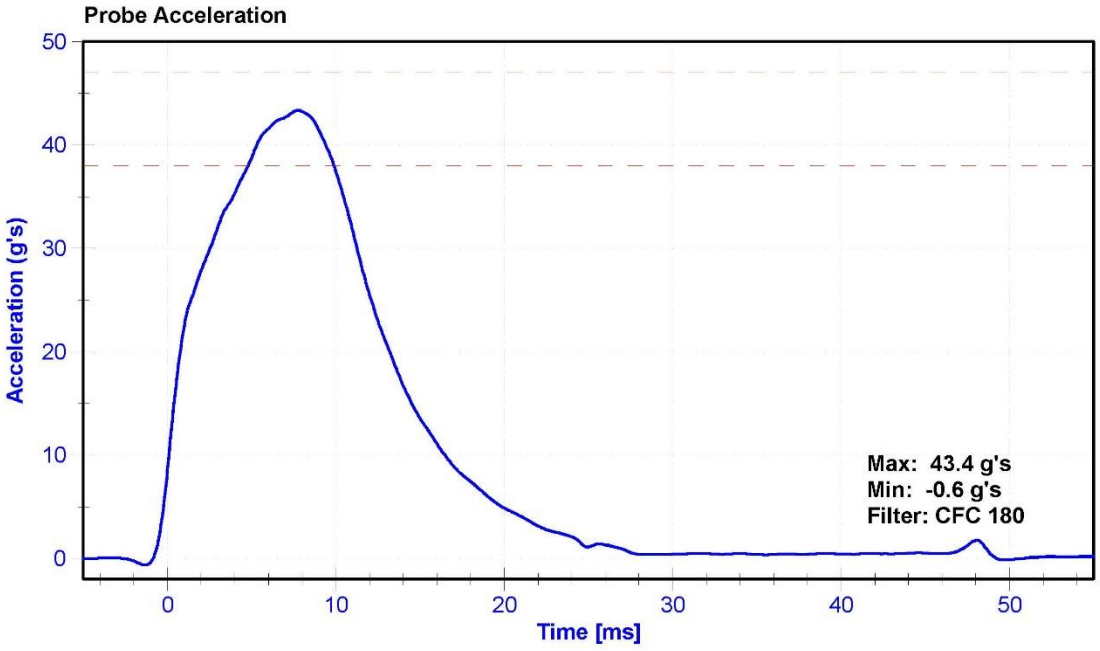
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

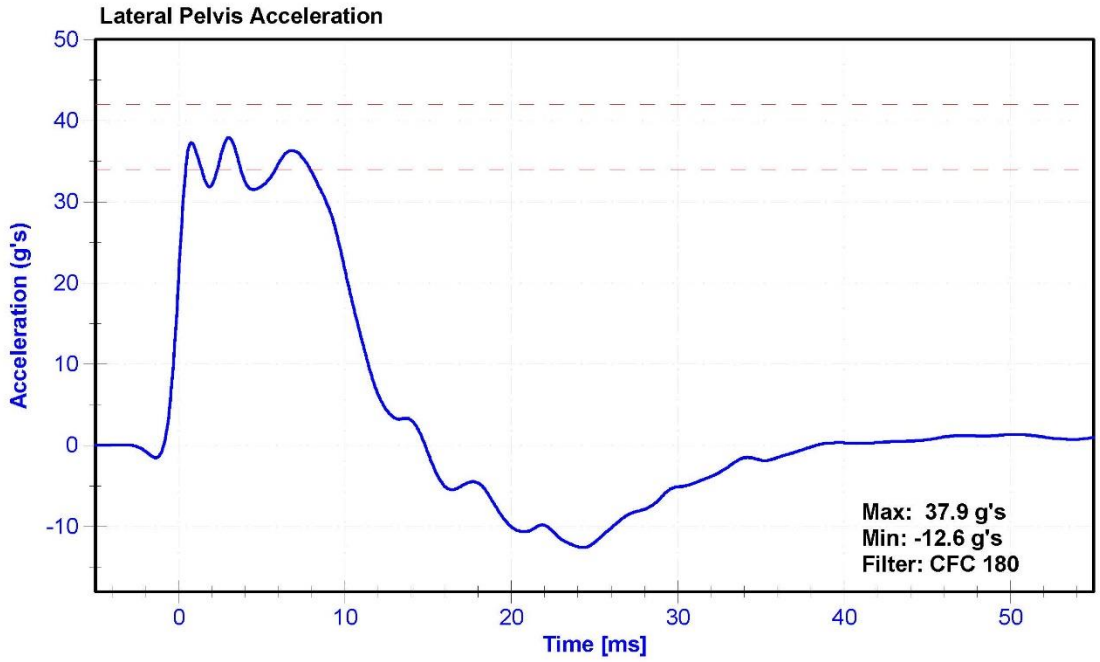
Results

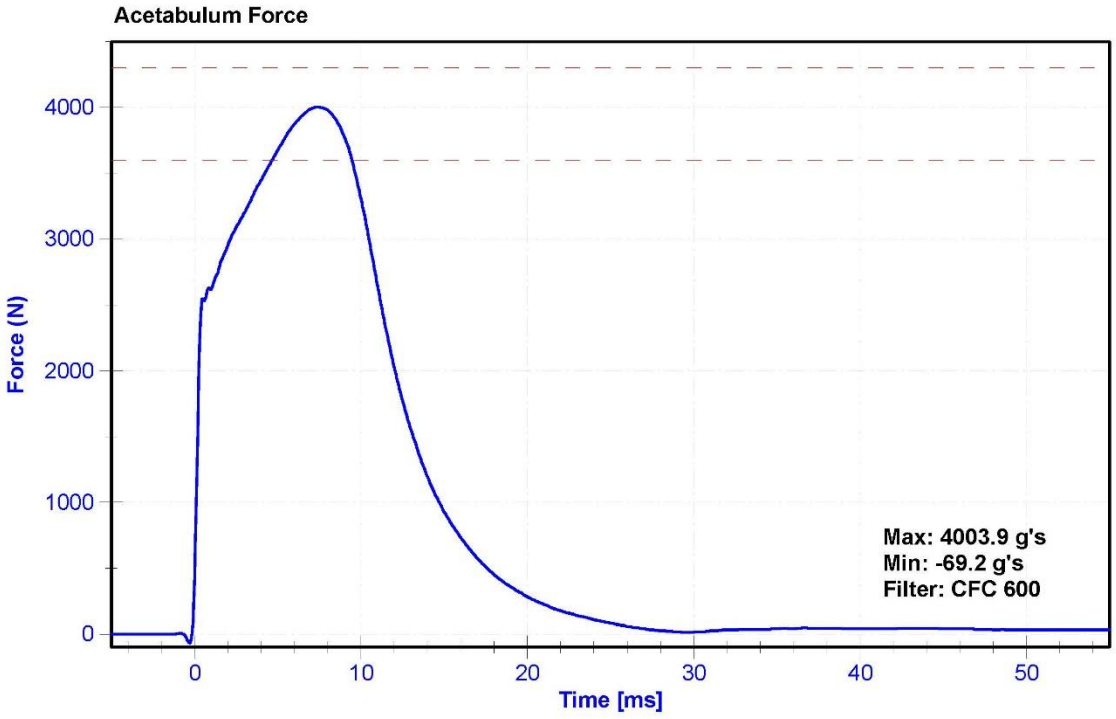
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	46.7	Pass
Velocity	6.6	6.8	m/s	6.60	Pass
Probe Acceleration	38	47	g's	43.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	36.3	Pass
Acetabulum Force	3,600	4,300	N	4003.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	8/3/2015	2/1/2016
Acetabulum Load Cell	Denton 3249J	LC-267Fy	6/30/2015	6/29/2016
Certification Plug	Humanetics	49012	12/07/2011	N/A
Crash Test Plug	Humanetics	46467	09/22/2011	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 37.9 g's
Min: -12.6 g's
Filter: CFC 180


Acetabulum Force
Force (N)
4000
3000
2000
1000
0
0
10
20
30
40
50
Time [ms]
Max: 4003.9 g's
Min: -69.2 g's
Filter: CFC 600

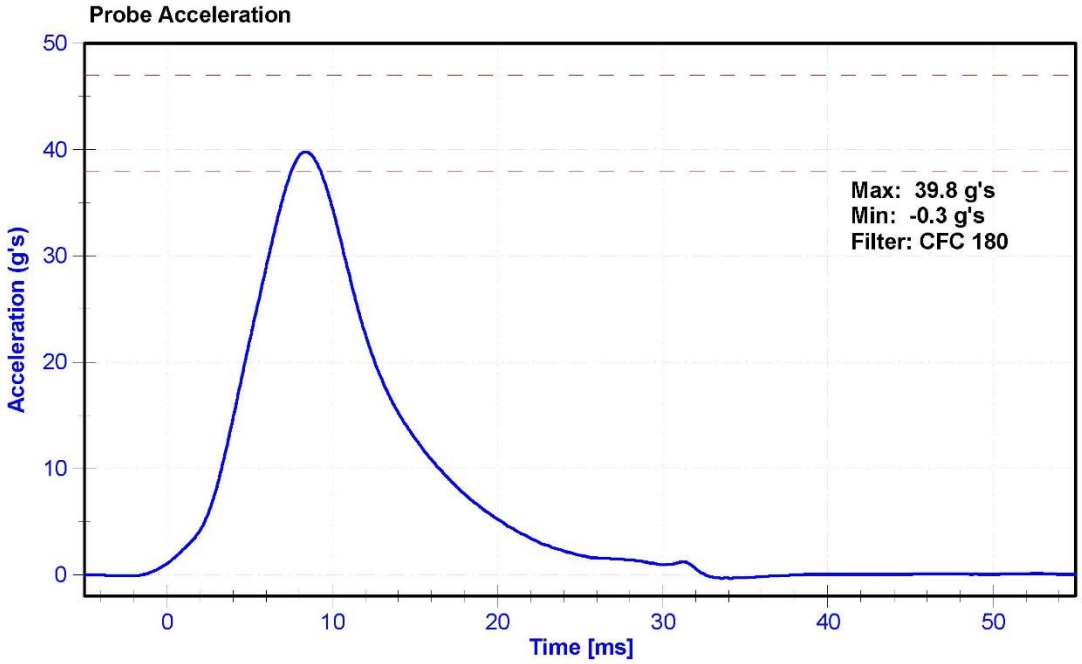
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	DG8012	Laboratory Supervisor	M. Goehle

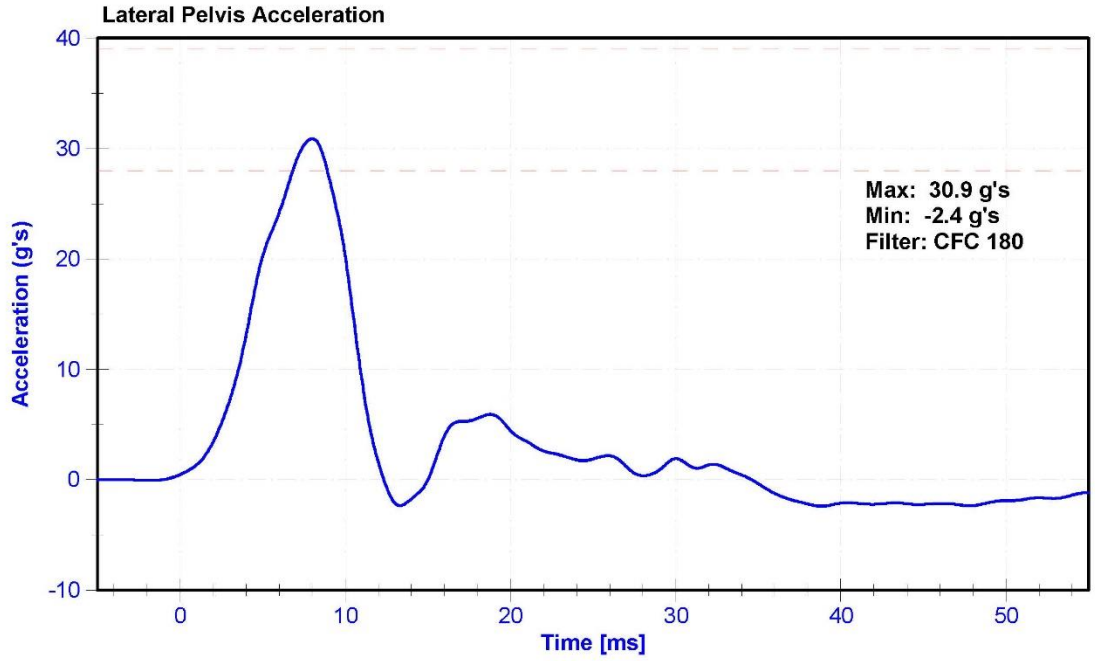
Results

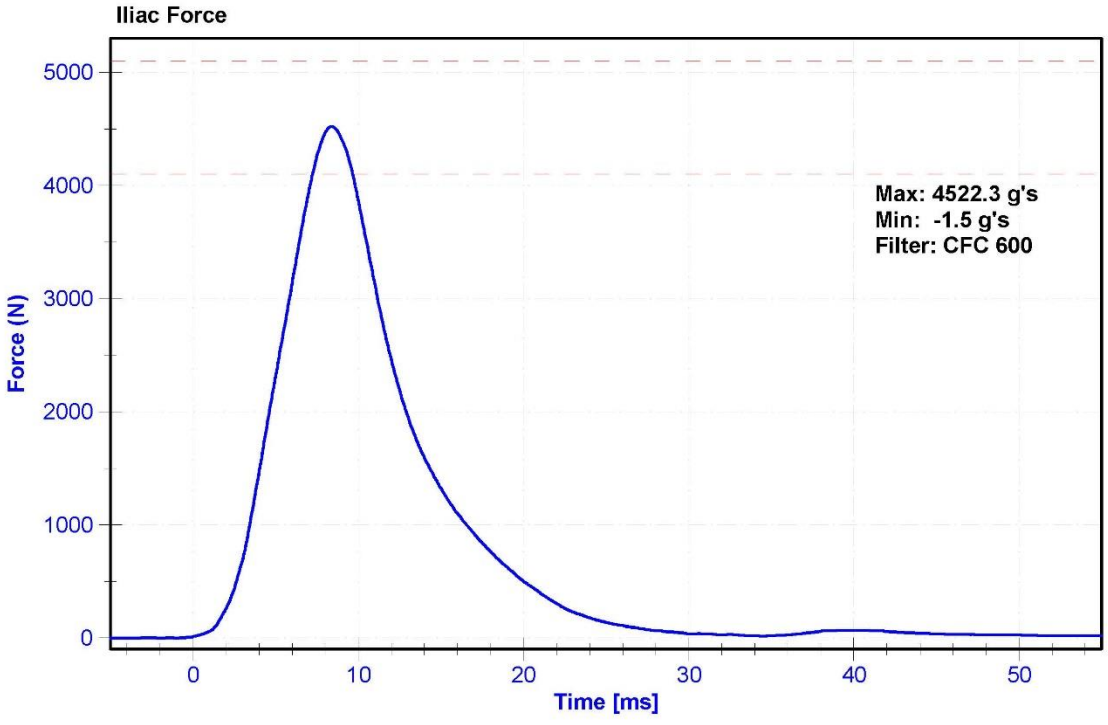
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	47.0	Pass
Velocity	4.2	4.4	m/s	4.35	Pass
Probe Acceleration	36	45	g's	39.8	Pass
Lateral Pelvis Acceleration	28	39	g's	30.9	Pass
Iliac Force	4,100	5,100	N	4522.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	8/13/2015	2/11/2016
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P63561	8/3/2015	2/1/2016
Iliac Load Cell	DENTON 3228J	LC-281Fy	6/30/2015	6/29/2016




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 30.9 g's
Min: -2.4 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4522.3 g's
Min: -1.5 g's
Filter: CFC 600

APPENDIX D

TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

Table 1 – Dummy Instrumentation (SID-IIs)

				SID-IIs S/N: DG8012		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers			X	AC-P51685	ENDEVCO	5/22/2015
			Y	AC-P51682	ENDEVCO	5/22/2015
			Z	AC-P51699	ENDEVCO	5/22/2015
Head Accelerometers - Redundant			X	AC-P51701	ENDEVCO	5/22/2015
			Y	AC-P45019	ENDEVCO	5/22/2015
			Z	AC-P51690	ENDEVCO	5/22/2015
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	DS-808GFE	Servo	9/24/2015
		Middle	Y	DS-1514GFE	Servo	9/24/2015
		Lower	Y	DS-011GFE	Servo	9/24/2015
	Abdominal Rib	Upper	Y	DS-015GFE	Servo	9/24/2015
		Lower	Y	DS-1774GFE	Servo	9/24/2015
Lower Spine Accelerometers (T12)			X	AC-P74788	ENDEVCO	9/23/2015
			Y	AC-P83319	ENDEVCO	9/23/2015
			Z	AC-P83432	ENDEVCO	9/23/2015
Acetabulum Load Cell			Y	LC-267Fy	DENTON	6/30/2015
Lilac Wing Load Cell			Y	LC-281Fy	DENTON	6/30/2015
Pelvis Plug (Struck Side)				46467	HUMANETICS	9/22/2011
Pelvis Plug (Non-Struck Side)						

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	AC-A156946	MSI 1201	10/9/2015
Vehicle Center of Gravity	Y	AC-A127674	MSI 1201	10/15/2015
Vehicle Center of Gravity	Z	AC-A127666	MSI 1201	10/15/2015
Left Floor Sill	Y	AC-A035006	MSI 1201	10/8/2015
A-Pillar Sill	Y	AC-A120610	MSI 1201	10/7/2015
A-Pillar Low	Y	AC-A016518	MSI 1201	10/20/2015
A-Pillar Mid	Y	AC-A081426	MSI 1201	10/20/2015
B-Pillar Sill	Y	AC-A081438	MSI 1201	10/9/2015
B-Pillar Low	Y	AC-A156944	MSI 1201	10/9/2015
B-Pillar Mid	Y	AC-A156949	MSI 1201	10/9/2015
Driver Seat	Y	AC-A156926	MSI 1201	10/8/2015
Engine Top	X	AC-A005916	MSI 1201	10/9/2015
Engine Top	Y	AC-A127663	MSI 1201	10/9/2015
Firewall	Y	AC-A156912	MSI 1201	10/15/2015
Right Roof	Y	AC-A126839	MSI 1201	10/8/2015
Right Floor Sill	Y	AC-A156950	MSI 1201	10/8/2015
Rear Floorpan	X	AC-A156925	MSI 1201	10/7/2015
Rear Floorpan	Y	AC-A081458	MSI 1201	10/7/2015

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	LC-18879	INTERFACE	6/5/2015
Load Cell 2	LC-18852	INTERFACE	6/5/2015
Load Cell 3	LC-46955	INTERFACE	6/5/2015
Load Cell 4	LC-18882	INTERFACE	6/5/2015
Load Cell 5	LC-18864	INTERFACE	6/5/2015
Load Cell 6	LC-18847	INTERFACE	6/5/2015
Load Cell 7	LC-62086	INTERFACE	6/5/2015
Load Cell 8	LC-46962	INTERFACE	6/5/2015