REPORT NUMBER: SPNCAP-CAL-15-005

NEW CAR ASSESSMENT PROGRAM (NCAP)
SIDE IMPACT POLE TEST

Ford Motor Co.
2015 Ford Focus
Four Door Sedan

NHTSA No: M20150223

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

April 14, 2015

FINAL REPORT

PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
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1200 NEW JERSEY AVE SE, ROOM W43-410
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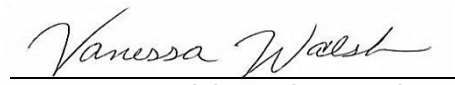
Prepared by:  Date: April 14, 2015

Vanessa Walsh, Project Engineer

Approved by:  Date: April 14, 2015

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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4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2015 Ford Focus four door sedan NHTSA No.: M20150223		***5. Report Date*** April 14, 2015 ***6. Performing Organization Code*** CAL
7. Author(s) Vanessa Walsh, Test Engineer Edward Dutton, Senior Test Engineer		***8. Performing Organization Report No.*** CAL-DOT-2015-005
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 (NVS-111) 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590		***13. Type of Report and Period Covered:*** Final Test Report, February 12, 2015 - April 14, 2015 ***14. Sponsoring Agency Code*** NVS-111
15. *Supplementary Notes*		

16. Abstract

A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2015 Ford Focus four door sedan 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 February 12, 2015.

The impact velocity of the vehicle was 32.58 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 353 mm located at level 3. 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	172.972
Resultant Lower Spine Acceleration	G	82	39.631
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2799.817
Maximum Thoracic Rib Deflection	mm	38	14.986
Maximum Abdomen Rib Deflection	mm	45	12.029

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 2015 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 2015 Ford Focus four door sedan. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated September 2013.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2015 Ford Focus four door sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.58 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on February 12, 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 September 2013. 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	172.972
Resultant Lower Spine Acceleration	g	82	39.631
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	2799.817
Maximum Thoracic Rib Deflection	mm	38*	14.986
Maximum Abdominal Rib Deflection	mm	45*	12.029

***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 Airbag	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 - 300

Data Anomalies:

- None

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: 2015 Ford Focus four door sedan NHTSA No.: M20150223
Test Program: NCAP Side Pole Impact Test Test Date: 2/12/2015

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20150223
Model Year	2015
Make	Ford
Model	Focus
Body Style	Four Door Sedan
VIN	1FADP3F26FL200577
Body Color	Tan
Odometer Reading (km/mi)	252.7 km / 157 mi
Engine Displacement (L)	2.0
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	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	12/14
Vehicle Type	Passenger

GVWR (kg)	1810
GAWR Front (kg)	972
GAWR Rear (kg)	880

VEHICLE SEATING AND WEIGHT CAPACITY DATA

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

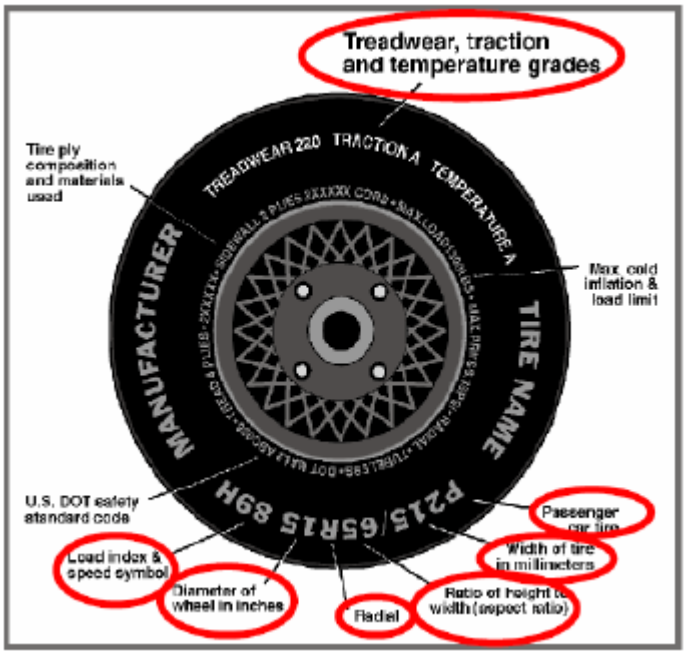
VEHICLE SEAT TYPE

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015

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)	350	350
Cold Pressure (kPa)	250	250
Recommended Tire Size	P215/55R16	P215/55R16
Tire Size on Vehicle	P215/55R16	P215/55R16
Tire Manufacturer	Continental	Continental
Tire Model	Conti Touring Contact	Conti Touring Contact
Treadwear	360	360
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	1 Polyester	1 Polyester
Tire Plies Body	1 Polyester, 2 Steel, 1 Polyamide	1 Polyester, 2 Steel, 1 Polyamide
Load Index/Speed Symbol	93H	93H
Tire Material	Rubber	Rubber
DOT Safety Code Left	A3B347PB4214	A3B347PB4214
DOT Safety Code Right	A3B347PB4214	A3B347PB4214

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

Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150223
Test Program: NCAP Side Pole Impact Test Test Date: 2/12/2015

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	252	252	250	256
Tire Placard	kPa	250	250	250	250
Owner's Manual	kPa	250	250	250	250
As Tested	kPa	250	250	250	250

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front	Rear	Total	Front	Rear	Total	Front	Rear	Total
Left	kg	434	246		446	283		446	288	
Right	kg	376	305		394	316		383	329	
Ratio	%	60%	40%		58%	42%		57%	43%	
Totals	kg	810	551	1361	840	599	1439	829	617	1446

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1361	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	51	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	34.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1446.8	(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	-0.4	-0.4	-0.2	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-0.2	-0.2	-0.2	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	0.1	-0.1	-0.4	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	0.1	-0.2	-0.2	Yes
Vehicle CG (Aft of Front Axle)	mm	1074	1104	1132	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	0	11	12	

* 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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Tail light	2
Trunk Carpeting	7
Rear Decking	3
Passenger Side Windows	7
Spare Tire / Jack	17
Ballast / Equipment Added	5

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015

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	17.5	12.6	15.0
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	13.7	46	Max	43	54	66
			Mid	22	33	46
			Min	0	13	24
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

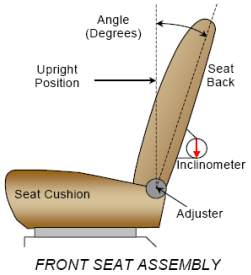
Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150223
Test Program: NCAP Side Pole Impact Test Test Date: 2/12/2015

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detents*
Driver Seat	253	38	0	0
Front Passenger Seat	254	38	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.



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	-10 to 40.3	N/A	-4.4	N/A
Front Passenger Seat	-11.5 to 39.1	N/A	-5.8	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	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.

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	2 - Lowest

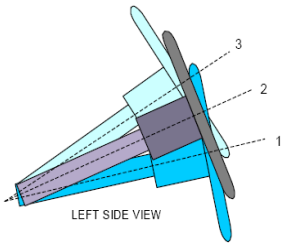
DATA SHEET NO. 2 … (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015

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	20.7	
Geometric Center – Position 2	23.7	
Uppermost – Position 3	26.7	
Telescoping Steering Wheel Travel		40
Test Position	23.7	20

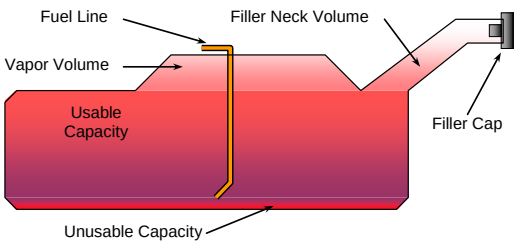


STEERING COLUMN ASSEMBLY

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

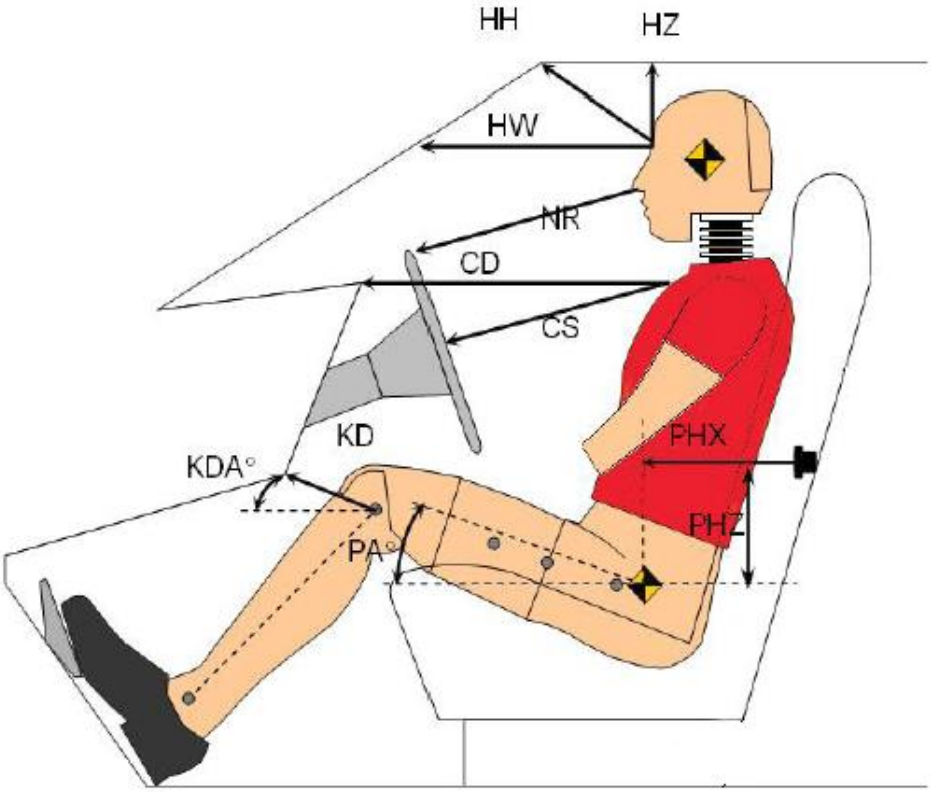
Description			Liters
Usable Capacity of "Standard Tank"	-	see Form No. 1	46.9
Usable Capacity of "Optional Tank"	-	see Form No. 1	N/A
Usable Capacity of "Standard Tank"	-	see Owner's Manual	46.9
Usable Capacity of "Optional Tank"	-	see Owner's Manual	
93% of Usable Capacity			43.6
Actual Amount of Solvent Used in Test			43.6
1/3 of Usable Capacity			15.6

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015



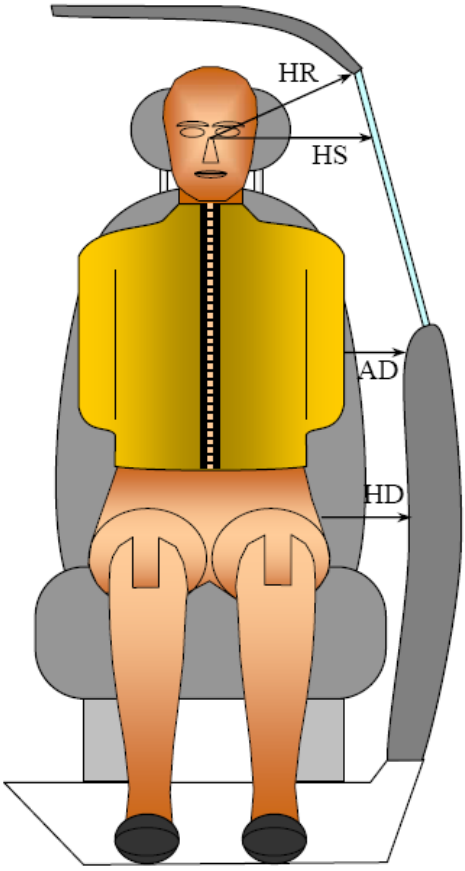
Left Side View

DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (◦)
HH	Head to Header	264	
HW	Head to Windshield	667	
HZ	Head to Roof Liner	195	
NR	Nose to Rim	210	
CD	Chest to Dash	395	
CS	Chest to Steering Wheel	175	
KD(L) / KDA(L)◦	Left Knee to Dash	80	35.9
KD(R) / KDA(R)◦	Right Knee to Dash	79	30.5
PAX◦	Pelvic Tilt Angle (X-Axis)		18.9
PAY◦	Pelvic Tilt Angle (Y-Axis)		0.1
PHX	Hip Point to Striker (X-Axis)	334	
PHZ	Hip Point to Striker (Z-Axis)	91	

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015



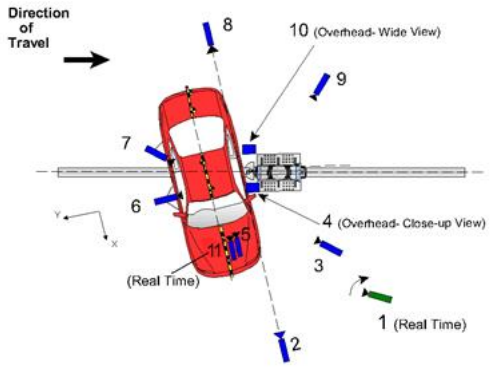
FRONT VIEW OF DUMMY

DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver - Length (Serial No. 300)
HR	Head To Side Header	mm	248
HS	Head to Side Window	mm	385
AD	Arm to Door	mm	160
HD	Hip Point to Door	mm	233

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2015 Ford Focus four door sedan NHTSA No.: M20150223
Test Program: NCAP Side Pole Impact Test Test Date: 2/12/2015



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	6065	-1599	-1178	24	1000
3	Impact side 45º - forward pole view	3277	-3160	-1744	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	-6971	-1879	-1164	24	1000
9	Impact side 45º - rearward pole view	-3597	-3093	-1668	24	1000
10	Overhead wide - view of impact	0	290	-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.*

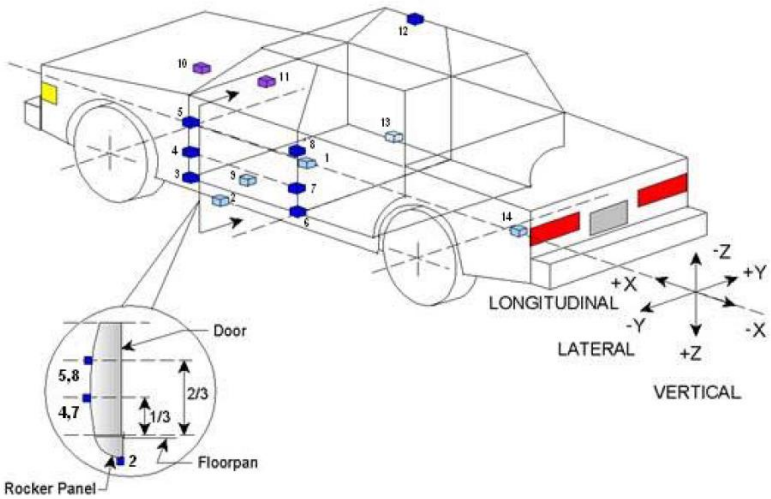
Comments: All cameras operated as intended.

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	2366	68	-98
2	Left Floor Sill	2747	-659	196
3	A-Pillar Sill	3069	-645	148
4	A-Pillar Low	3098	-642	-37
5	A-Pillar Mid	3091	-646	-487
6	B-Pillar Sill	2133	-680	137
7	B-Pillar Low	2115	-689	-109
8	B-Pillar Mid	2101	-692	-317
9	Driver Seat Track	2361	-541	198
10	Engine Top	3777	114	-301
11	Firewall	3556	109	-299
12	Right Roof	2179	499	-940
13	Right Floor Sill	2713	659	202
14	Rear Floorpan	1147	-140	20

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015

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: 2015 Ford Focus four door sedan NHTSA No.: M20150223
Test Program: NCAP Side Pole Impact Test Test Date: 2/12/2015

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver Seat Dummy (SID-IIs)
Face	Curtain & Torso/Pelvis Airbag
Top of Head	Curtain Airbag
Left Side of Head	Curtain & Torso/Pelvis Airbag
Back of Head	Curtain Airbag & Headrest
Left Shoulder	Seatback & Torso/Pelvis Airbag
Upper Torso	Seatback
Lower Torso	Seatback
Left Hip	Seat pan & 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	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: 2015 Ford Focus four door sedan NHTSA No.: M20150223
Test Program: NCAP Side Pole Impact Test Test Date: 2/12/2015

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar, B-Pillar & C-Pillar Buckled
Sill Separation	None
Windshield Damage	Cracks throughout and separation along driver's A-Pillar
Side Window Damage	Driver's window shattered during impact
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	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Yes	No	N/A
Other				

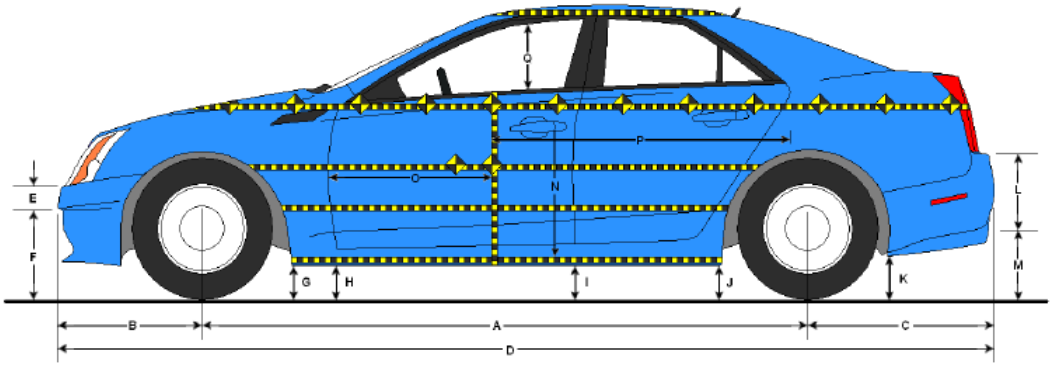
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT AND IMPACT POINT LOCATION DATA

Measured Parameter		Units	Tolerance	Value
Vertical Impact Ref Line	- Aft of Front Axle, Intended Impact Pt	mm		1075
Actual Impact Point	- Aft of Front Axle	mm		1071
Horizontal Offset (+ forward / - rearward)		mm	+/- 38 *	+4
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	32.58
Trap No. 2 Velocity	- Redundant	kph	31.4 to 33.0	32.54

* Of Intended Impact Point

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2015 Ford Focus four door sedan
Test Program: NCAP Side Pole Impact Test
NHTSA No.: M20150223
Test Date: 2/12/2015



LEFT SIDE VIEW

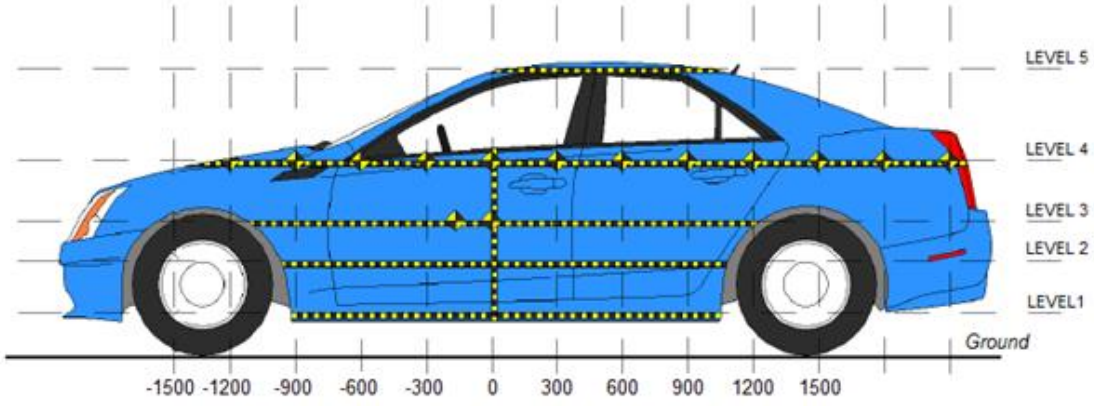
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	2653	2563	90
B	Front Axle to FSOV	897	942	-45
C	Rear Axle to RSOV	991	992	-1
D	Total Length at Centerline	4541	4496	45
E	Front Bumper Thickness	80	80	0
F	Front Bumper Bottom to Ground	417	426	-9
G	Sill Height at Front Wheel Well	158	165	-7
H	Sill Height at Front Door Leading Edge	158	152	6
I	Sill Height at B-Pillar	165	150	15
J1	Sill Height at Rear Wheel Well	174	203	-29
J2	Pinch Weld Height at Rear Wheel Well	165	184	-19
K	Sill Height Aft of Rear Wheel Well	231	241	-10
L	Rear Bumper Thickness	80	80	0
M	Rear Bumper Bottom to Ground	408	410	-2
N	Sill Height to Bottom of Front Window Sill	699	707	-8
O	Front Door Leading Edge to Impact CL	604	460	144
P	Rear Door Trailing Edge to Impact CL	1416	1328	88
Q	Front Window Opening	409	405	4
R	Right Side Length	4401	4387	14
S	Left Side Length	4398	4318	80
T	Vehicle Width at B-Pillars	1789	1641	148

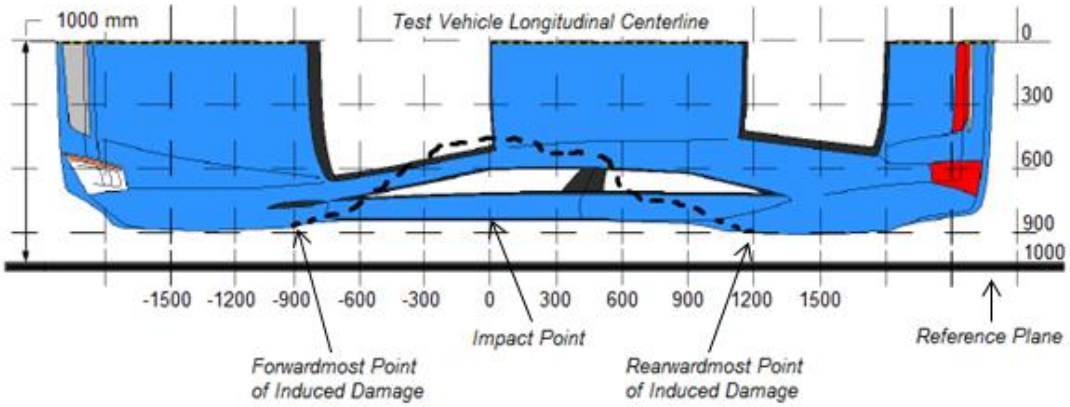
* All measurements in mm with tolerance of ± 3mm

DATA SHEET NO. 10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015



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	231	278	0
2	Occupant Hip Point	mm	597	346	150
3	Mid - Door	mm	627	353	150
4	Window Sill	mm	871	342	150
5	Window Top	mm	1393	154	150

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: 2015 Ford Focus four door sedan NHTSA No.: M20150223
Test Program: NCAP Side Pole Impact Test Test Date: 2/12/2015

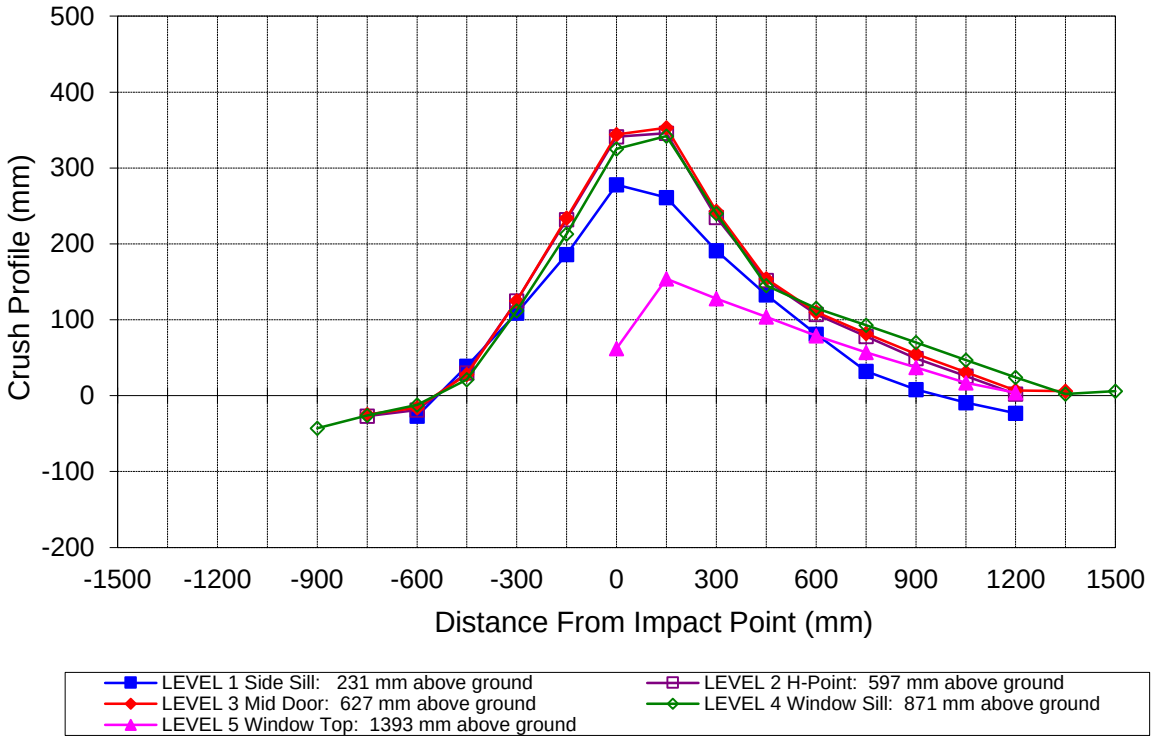
EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

	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				791					834					-43	
-750		901	902	813			928	927	839			-27	-25	-26	
-600	864	887	888	827		891	906	904	839		-27	-19	-16	-12	
-450	862	887	888	837		823	857	860	816		39	30	28	21	
-300	860	891	891	847		751	766	766	735		109	125	125	112	
-150	858	893	893	857		672	661	659	644		186	232	234	213	
0	855	894	894	866	528	577	553	550	541	466	278	341	344	325	62
150	851	891	894	871	596	590	545	541	529	442	261	346	353	342	154
300	847	890	893	876	614	656	655	650	636	486	191	235	243	240	128
450	842	888	892	878	617	709	736	738	733	513	133	152	154	145	104
600	839	885	889	878	618	758	778	779	763	539	81	107	110	115	79
750	839	882	886	878	617	807	804	804	785	560	32	78	82	93	57
900	839	877	881	875	613	831	828	826	805	576	8	49	55	70	37
1050	836	872	876	872	605	845	846	845	825	588	-9	26	31	47	17
1200	832	876	877	858	570	855	874	870	834	566	-23	2	7	24	4
1350			887	863				881	861				6	2	
1500				855					849					6	

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015

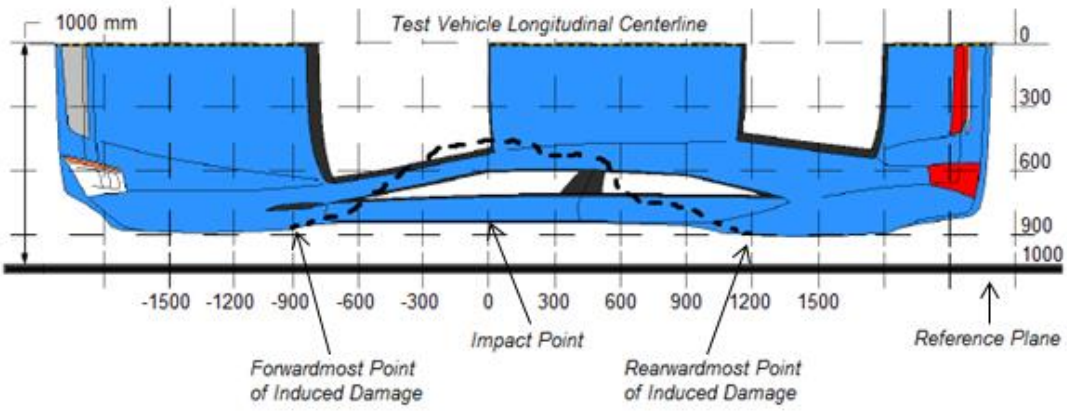


Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015

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	-750	3	73	98	-25
2	-330	3	215	110	105
3	90	3	455	106	349
4	510	3	246	109	137
5	930	3	170	120	50
6	1350	3	119	113	6

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

Test Vehicle:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side MDB Impact Test	Test Date:	2/12/2015
Test Time:	1:20 PM	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°	73	300	373
90° to 180°	63	300	363
180° to 270°	62	300	362
270° to 360°	71	300	371

FMVSS NO. 301 ROLLOVER SPILLAGE TABLE

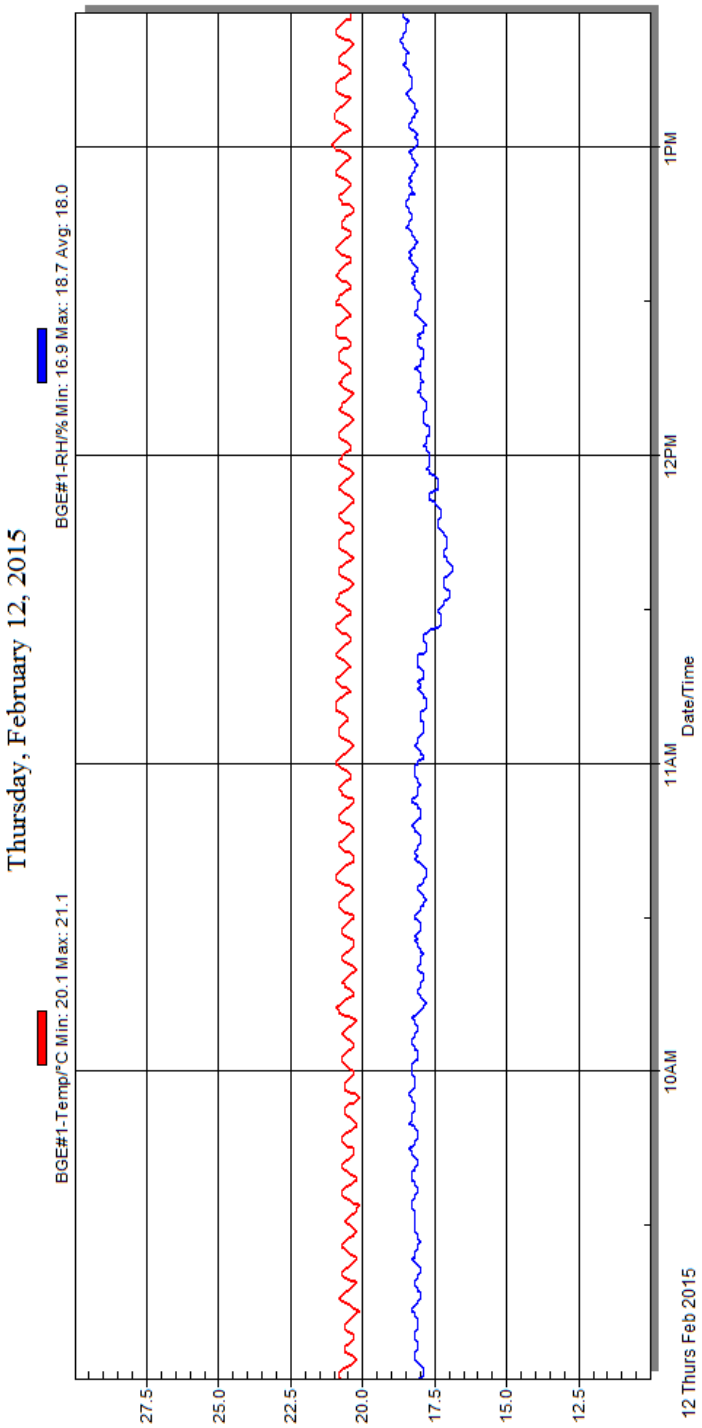
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0	0	0	0
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

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:	2015 Ford Focus four door sedan	NHTSA No.:	M20150223
Test Program:	NCAP Side Pole Impact Test	Test Date:	2/12/2015



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

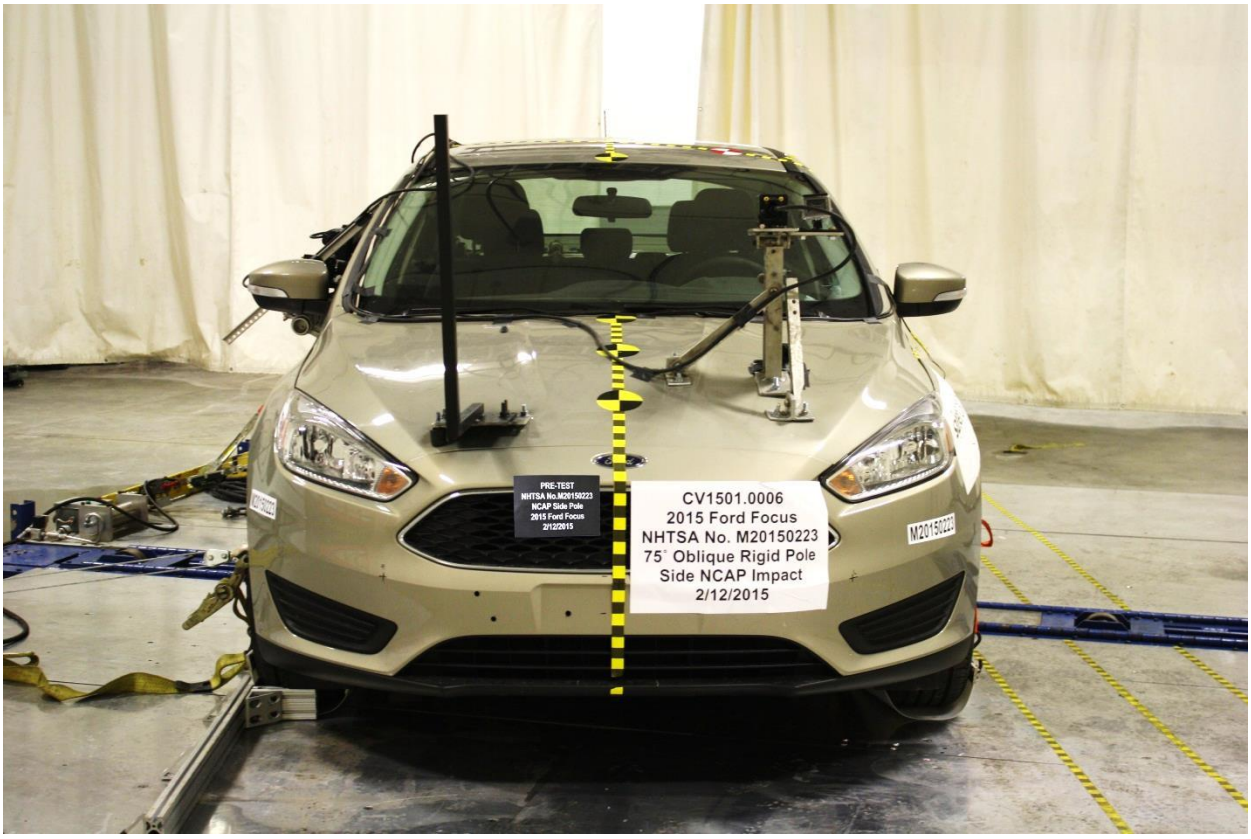


Figure A-3: Pre-Test Frontal View of Test Vehicle

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

Figure A-5: Pre-Test Left Front ¾ View of Test Vehicle

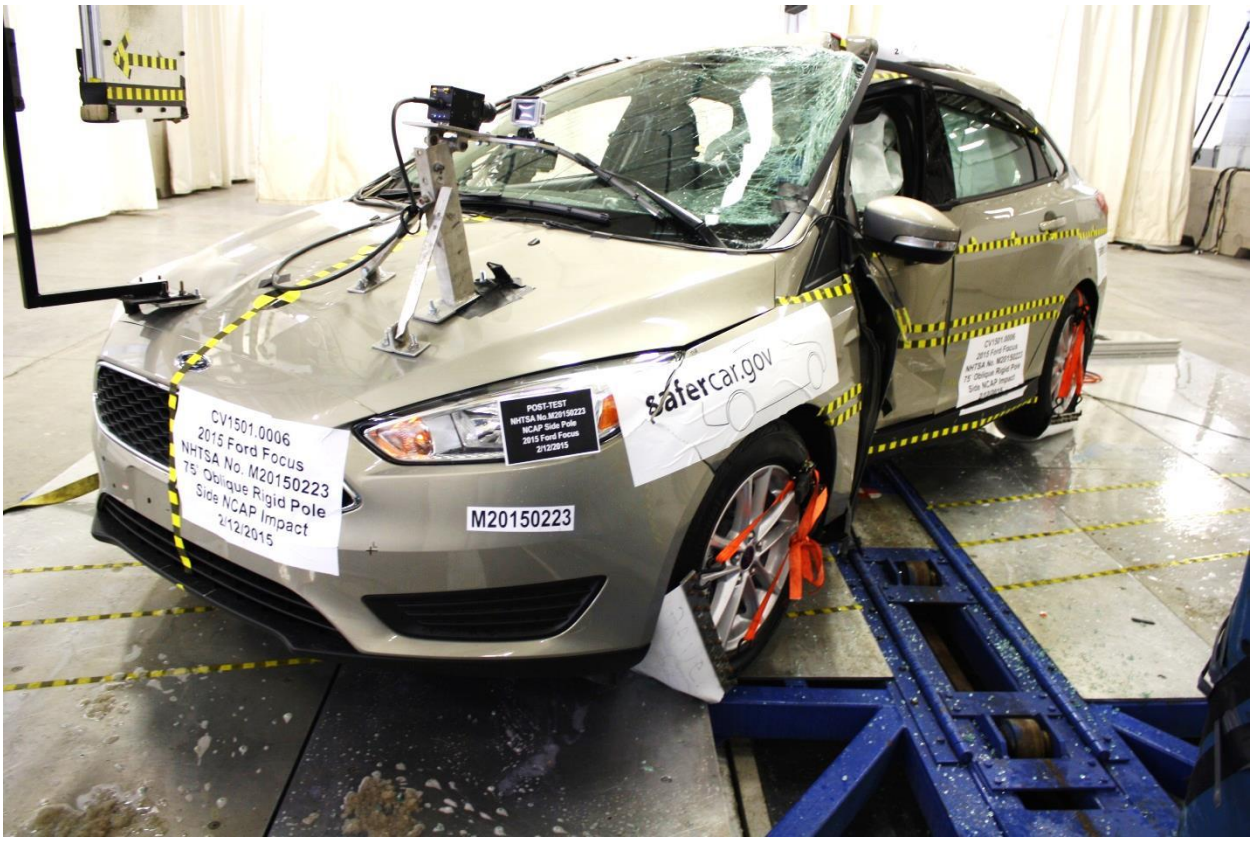


Figure A-6: Post-Test Left Front ¾ View of Test Vehicle

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

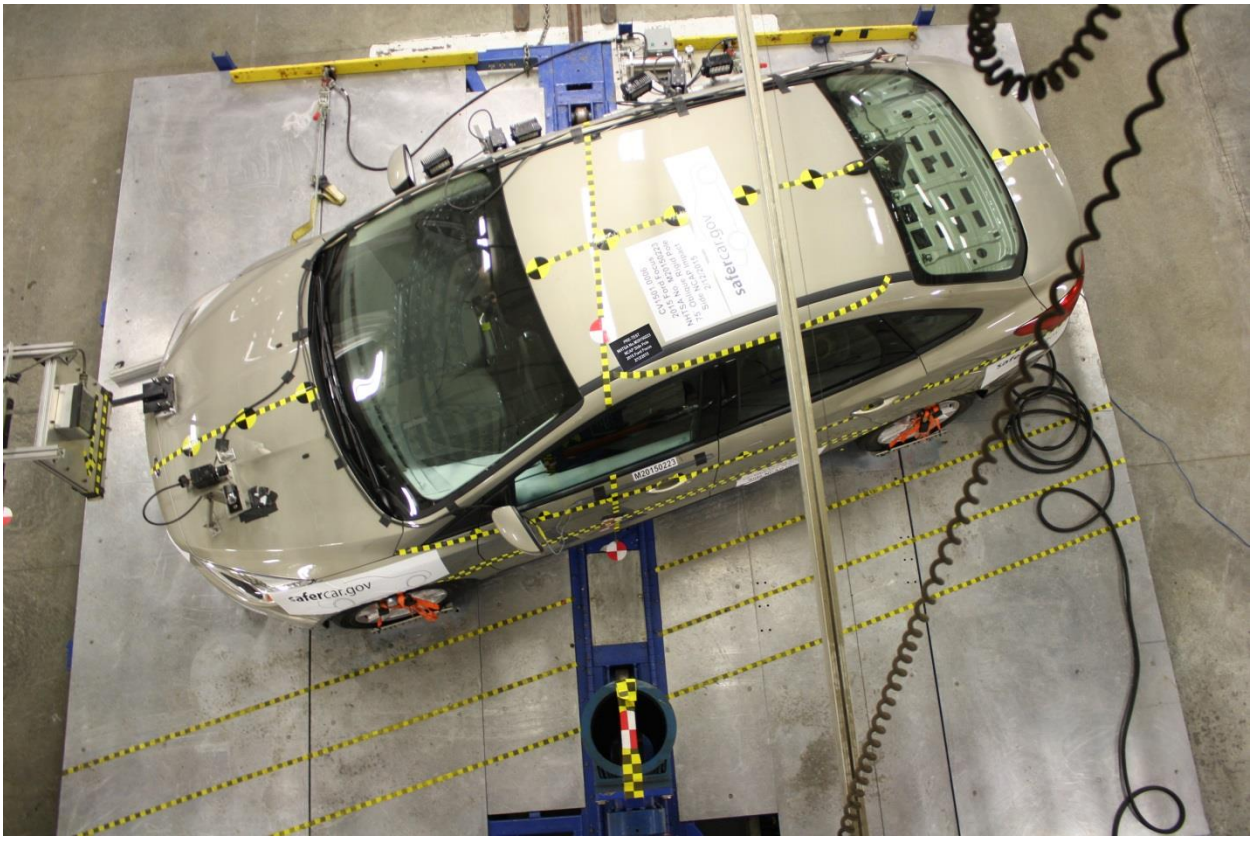


Figure A-15: Pre-Test Overhead View of Test Area

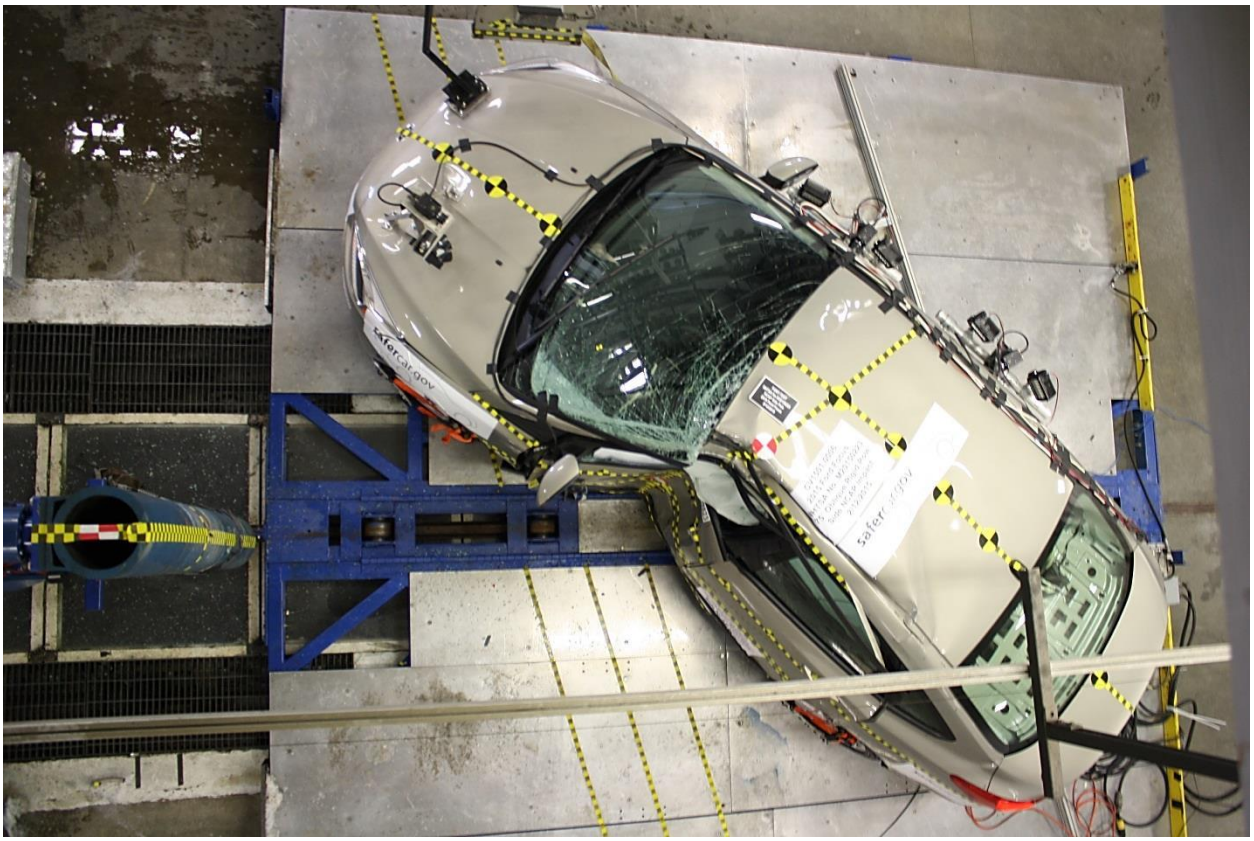


Figure A-16: Post-Test Overhead View of Test Area

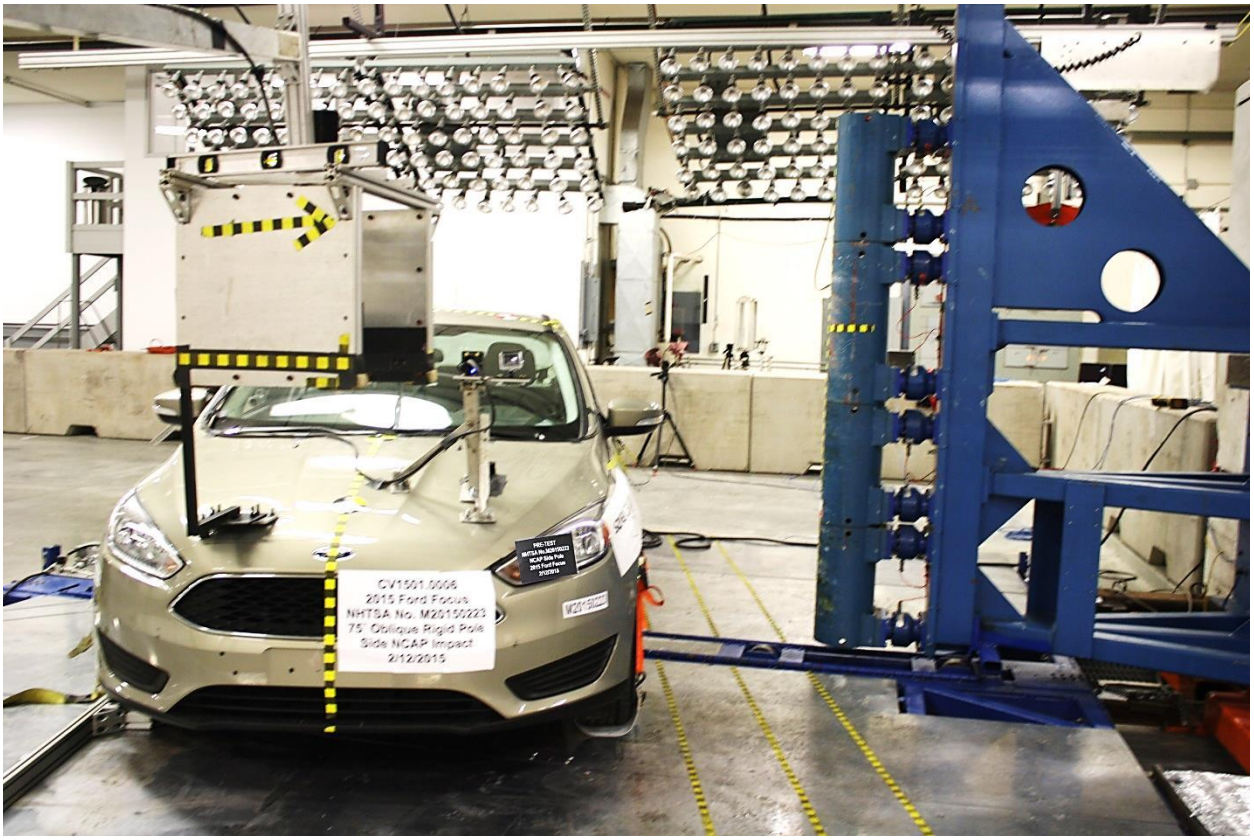


Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle

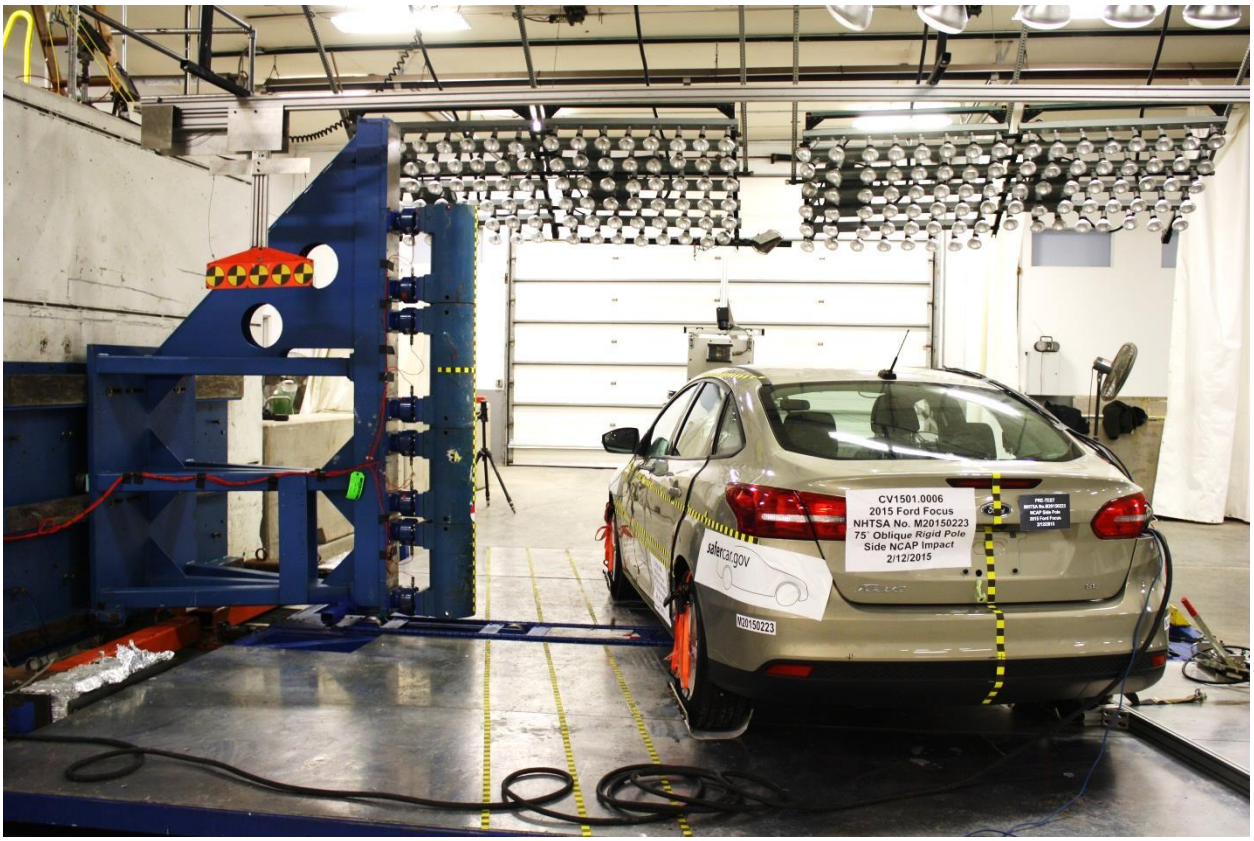


Figure A-18: Pre-Test Right Side View of Pole Positioned Against Side of Vehicle

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

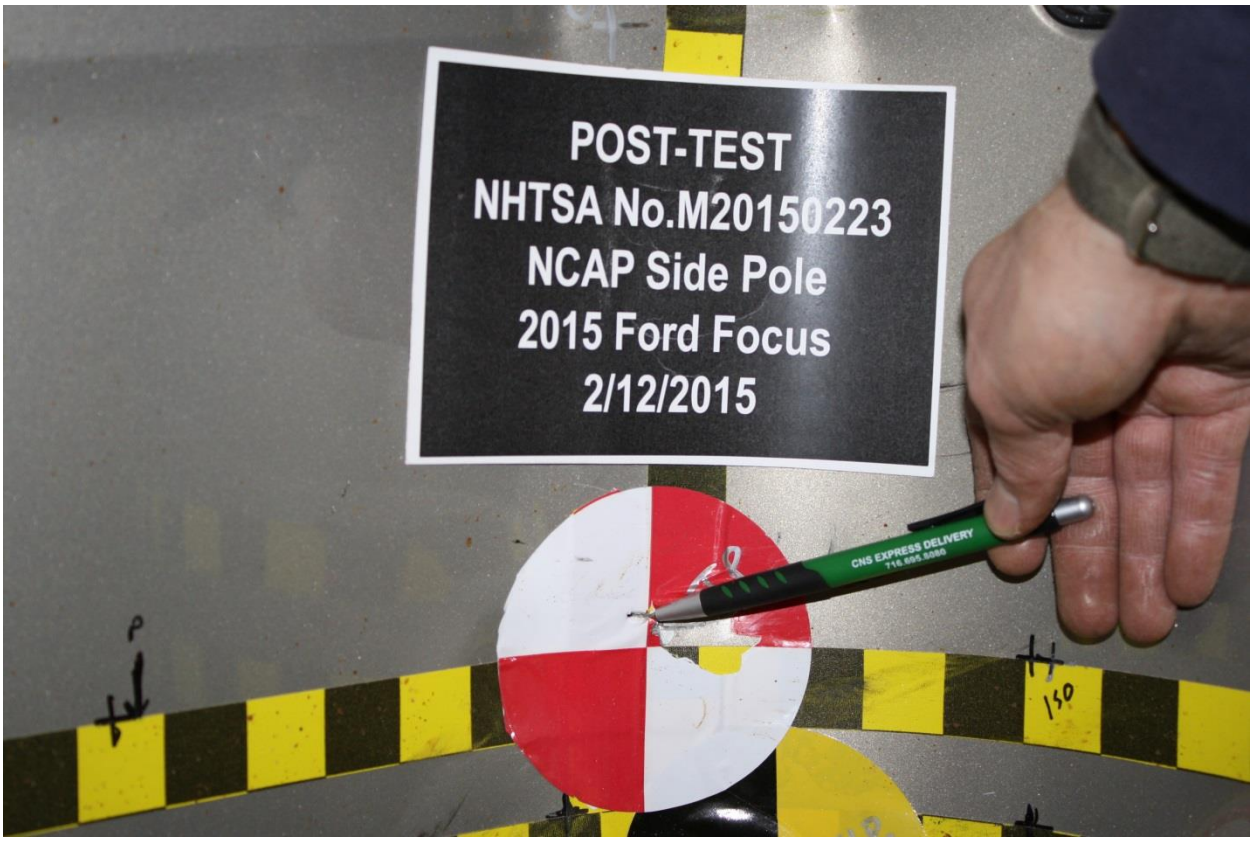


Figure A-20: Post-Test Close-Up View of Impact Point Target Showing Impact Location

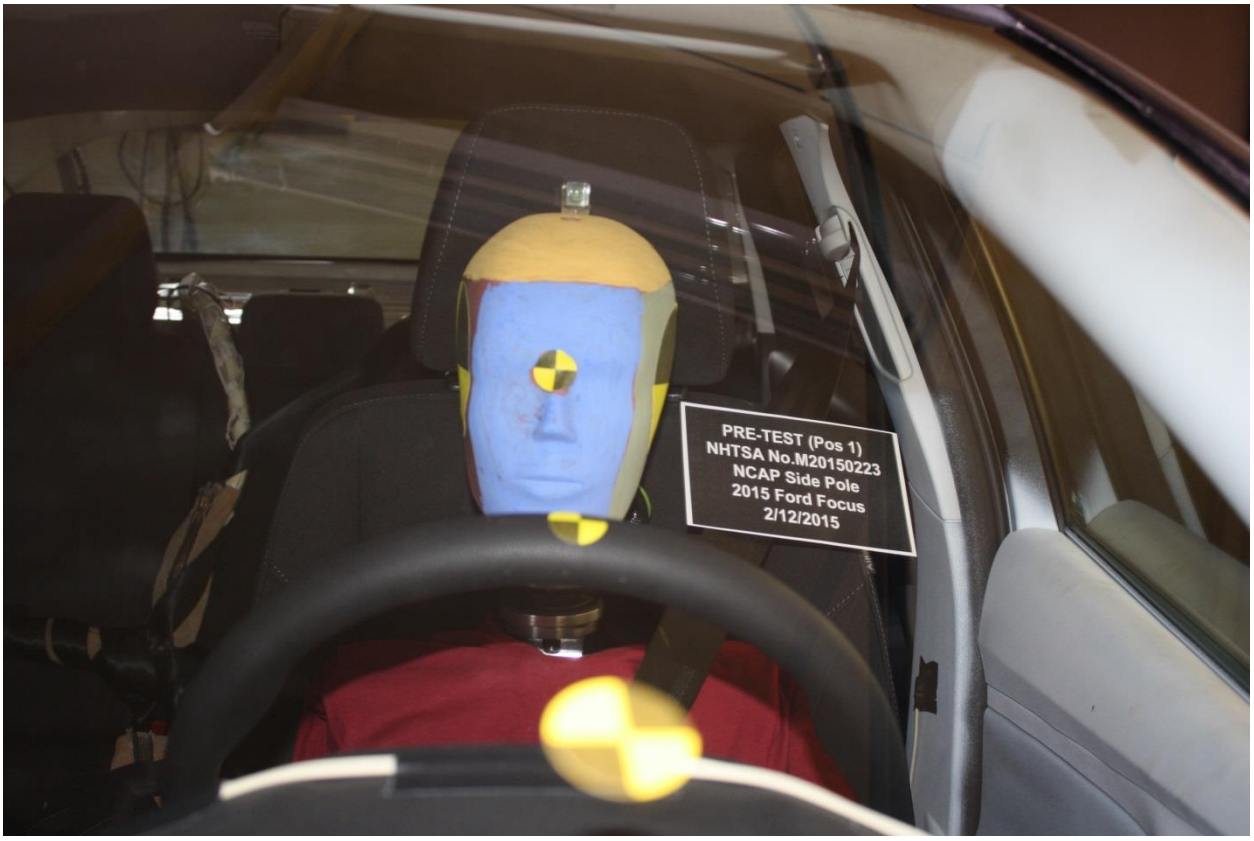


Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest

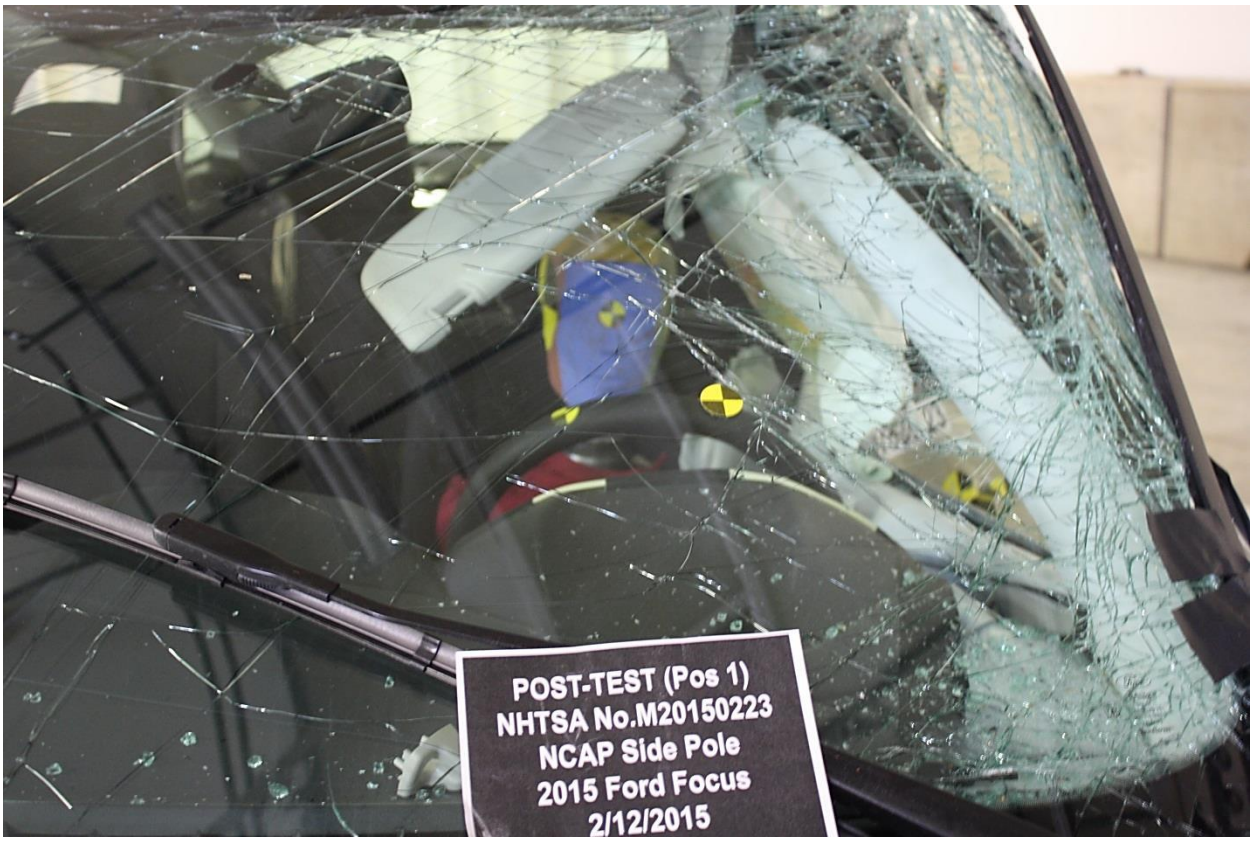


Figure A-22: Post-Test Front Close-Up View of Dummy

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

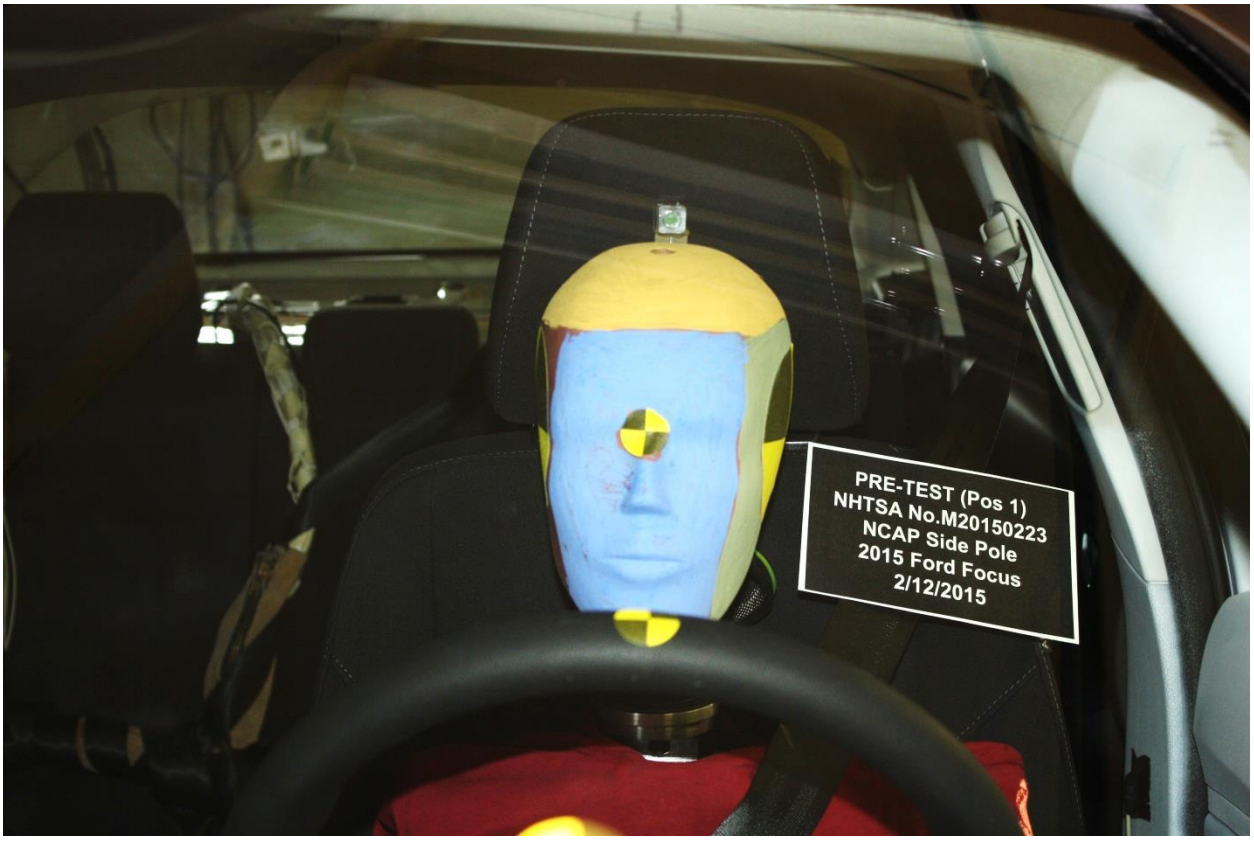


Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint

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

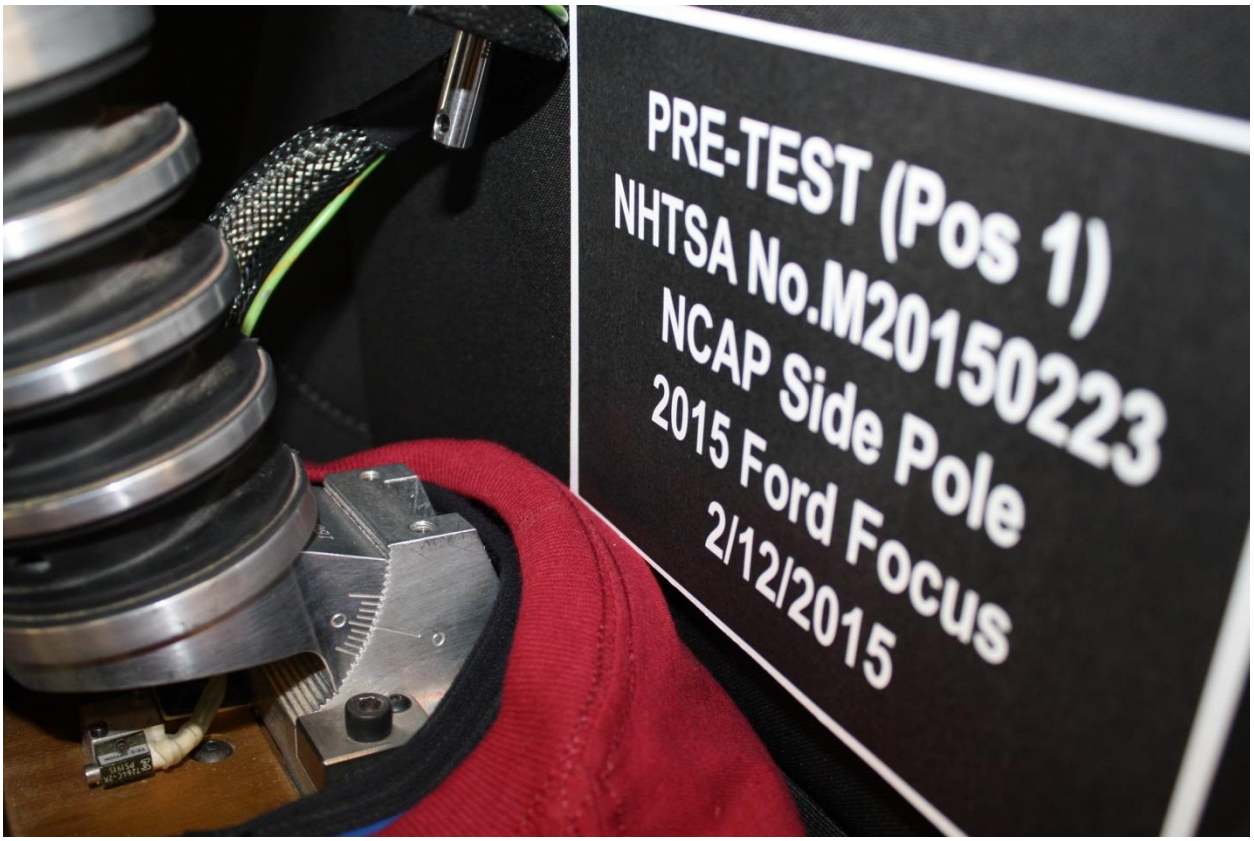


Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket

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

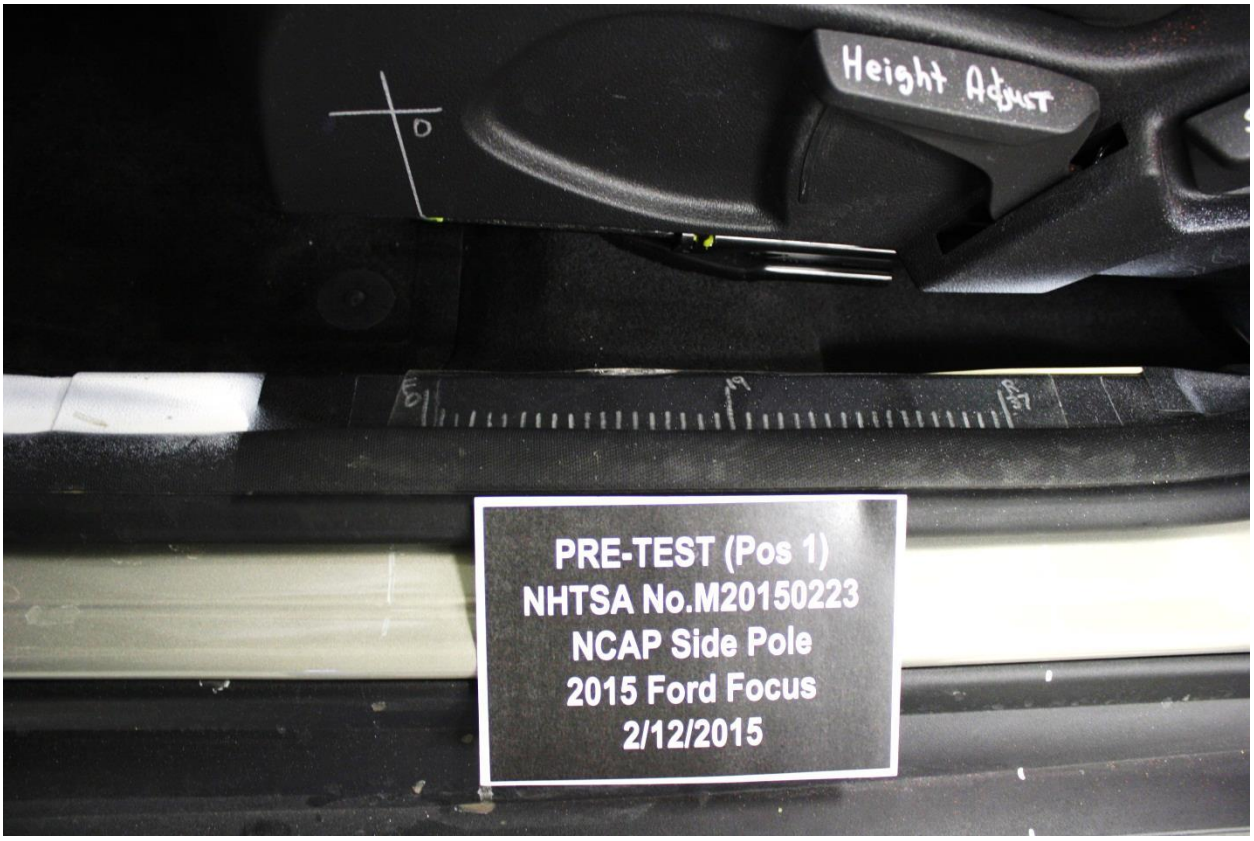


Figure A-37: Pre-Test Close-Up Left Side View of Driver Seat Track

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

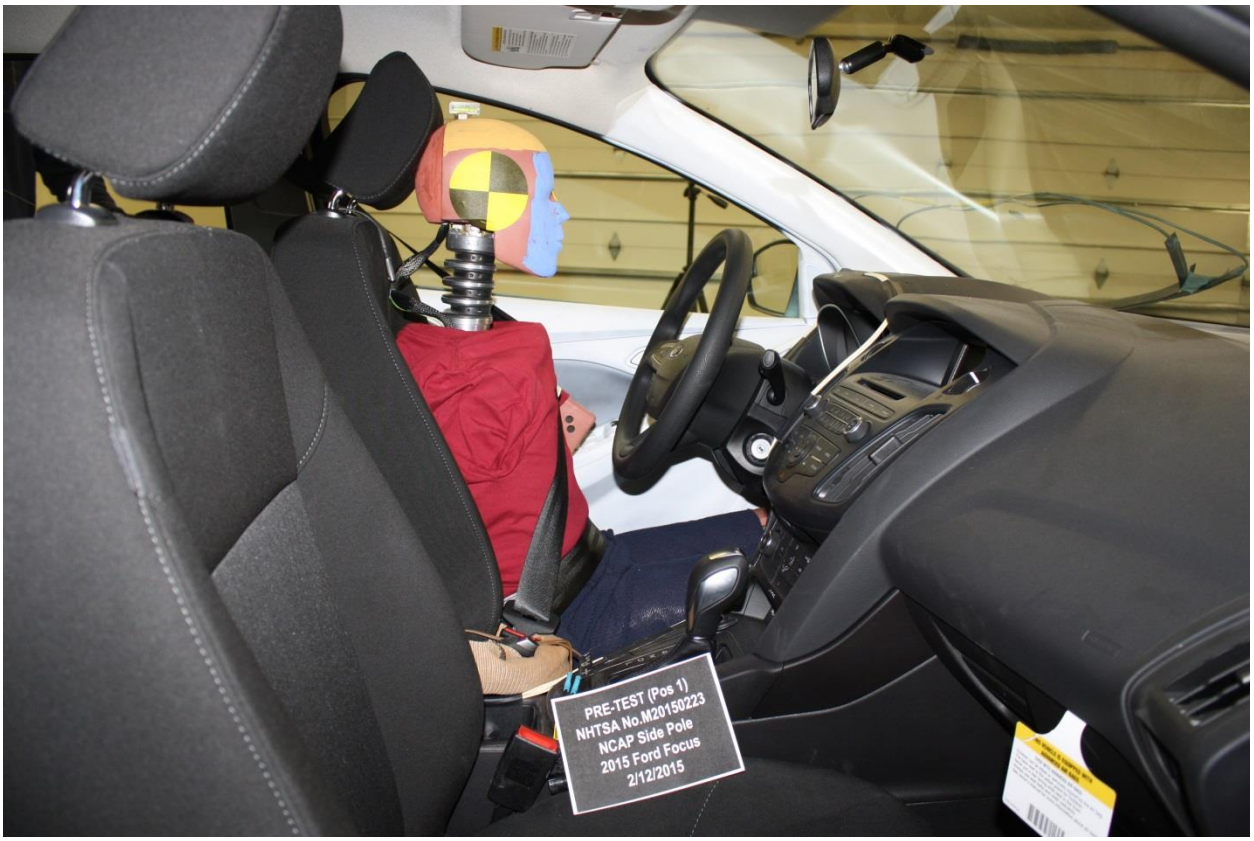


Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment

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

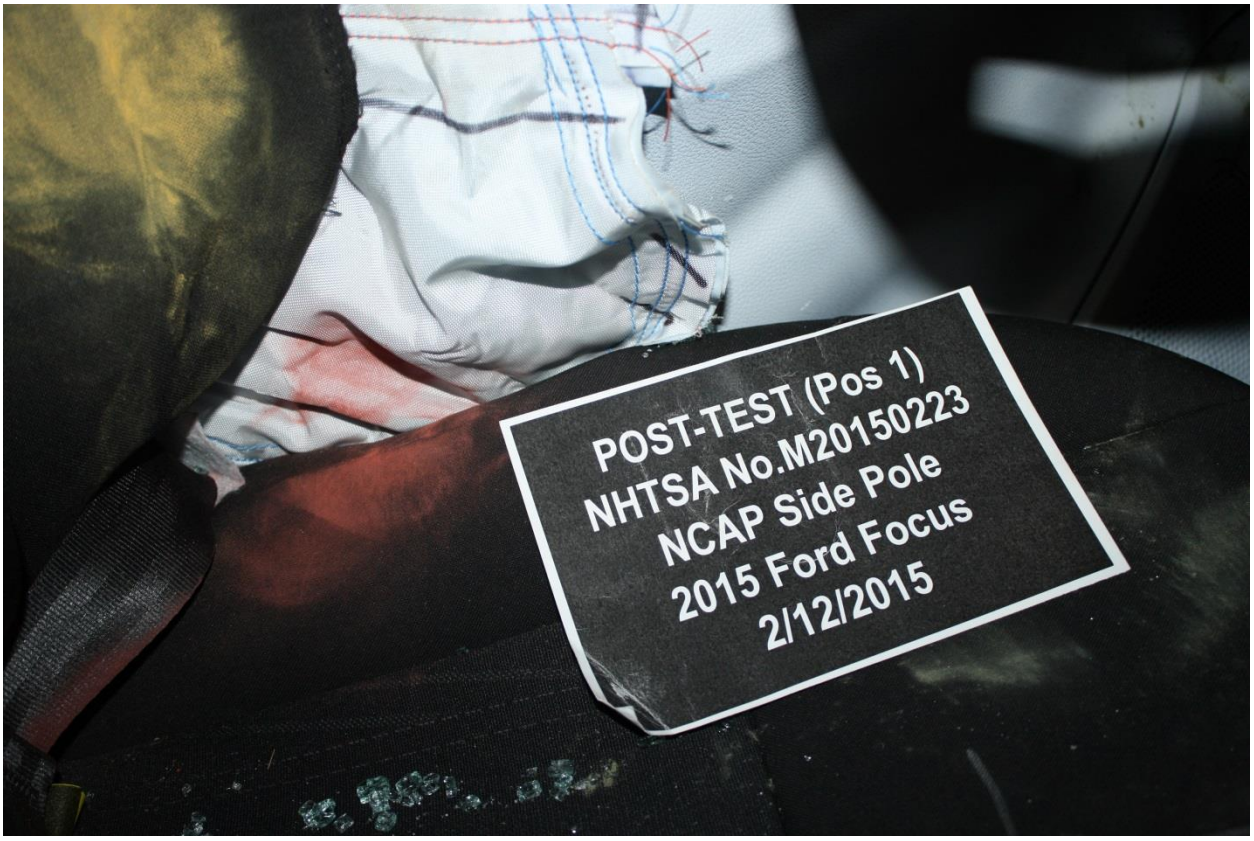


Figure A-51: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View

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

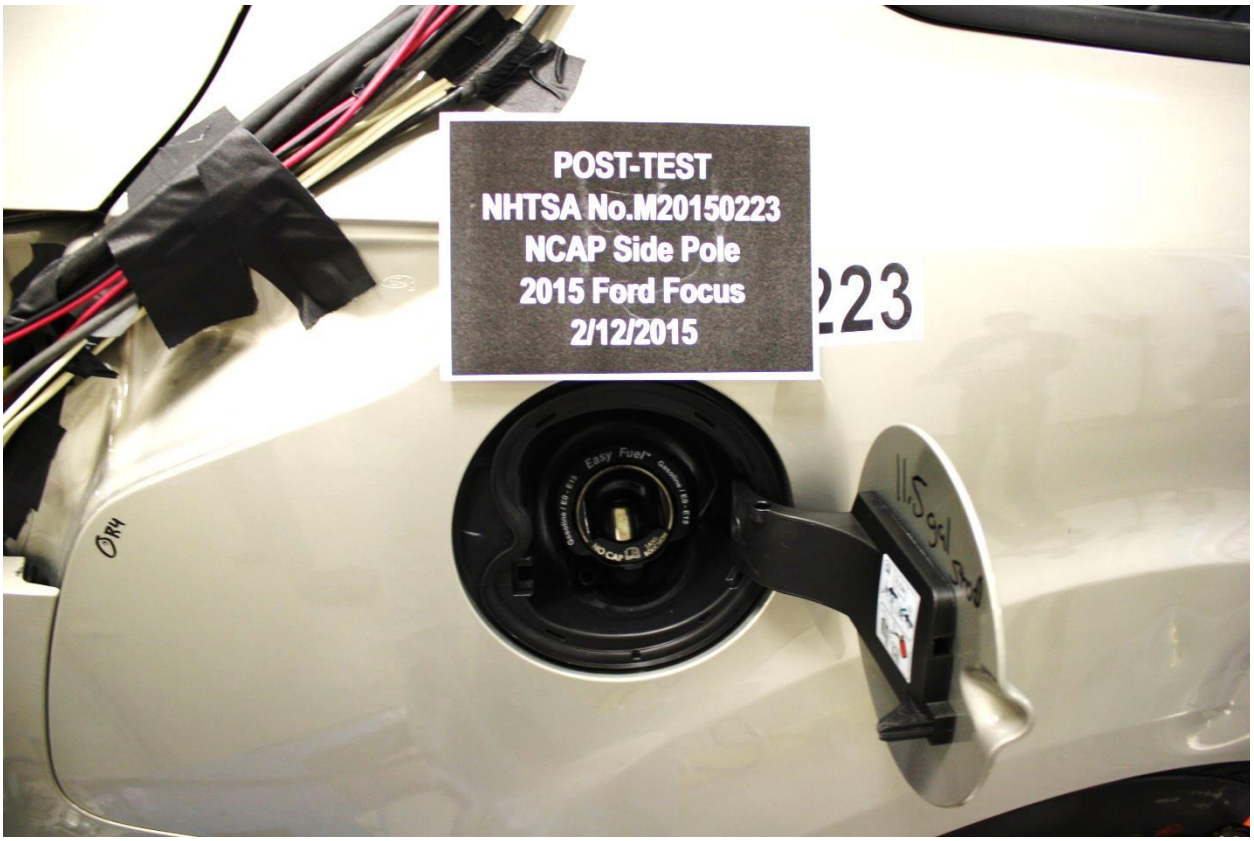


Figure A-54: Post-Test View of Fuel Filler Cap or Fuel Filler Neck

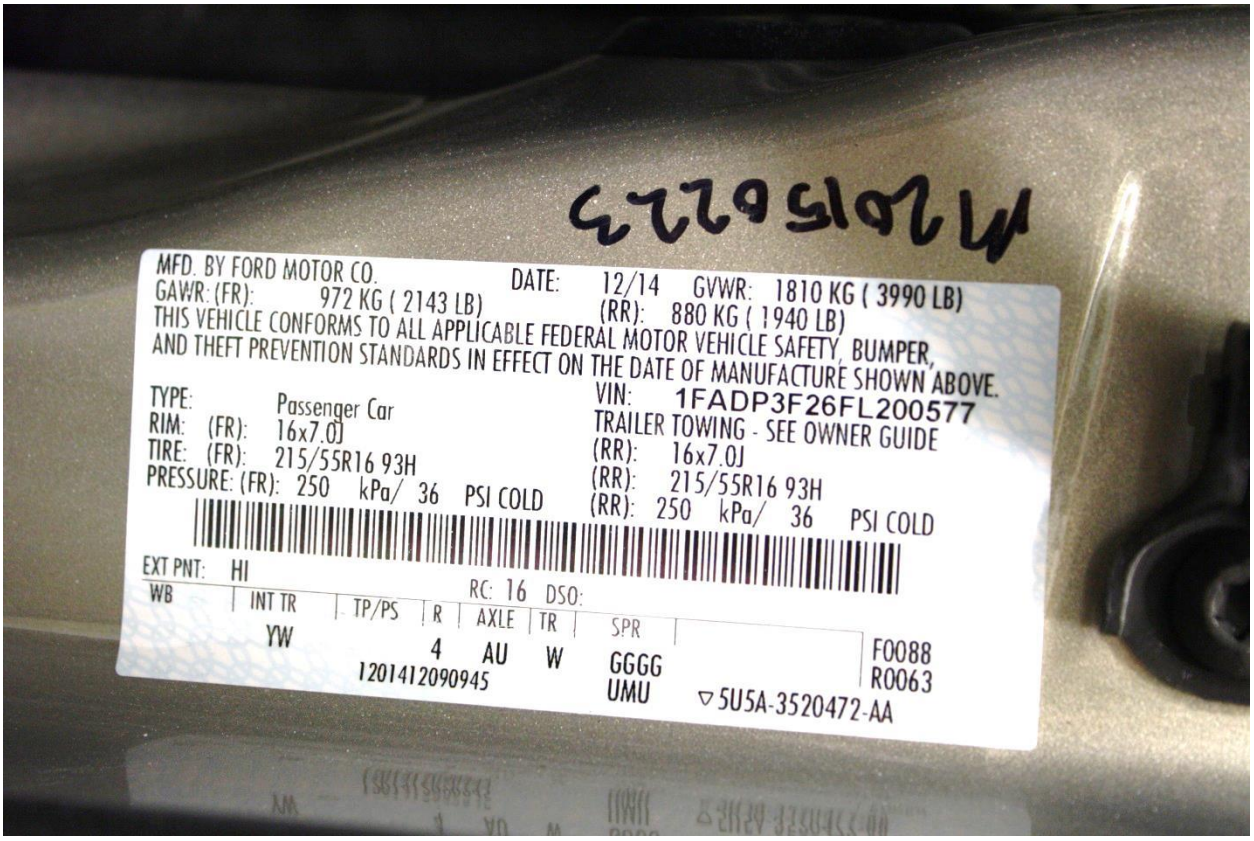


Figure A-55: Close-Up View of Vehicle's Certification Label

Photo Not Applicable

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

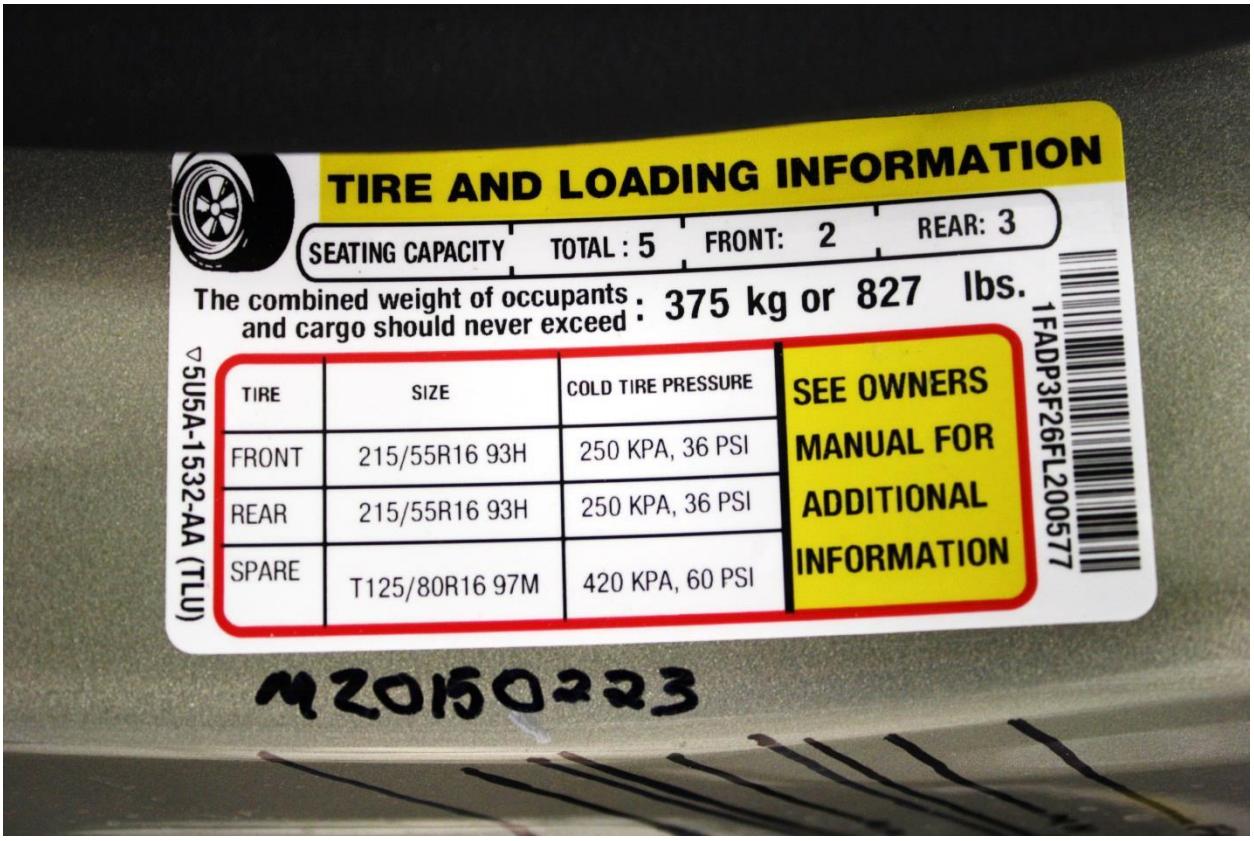


Figure A-56: Close-Up View of Vehicle's Tire Information Placard or Label

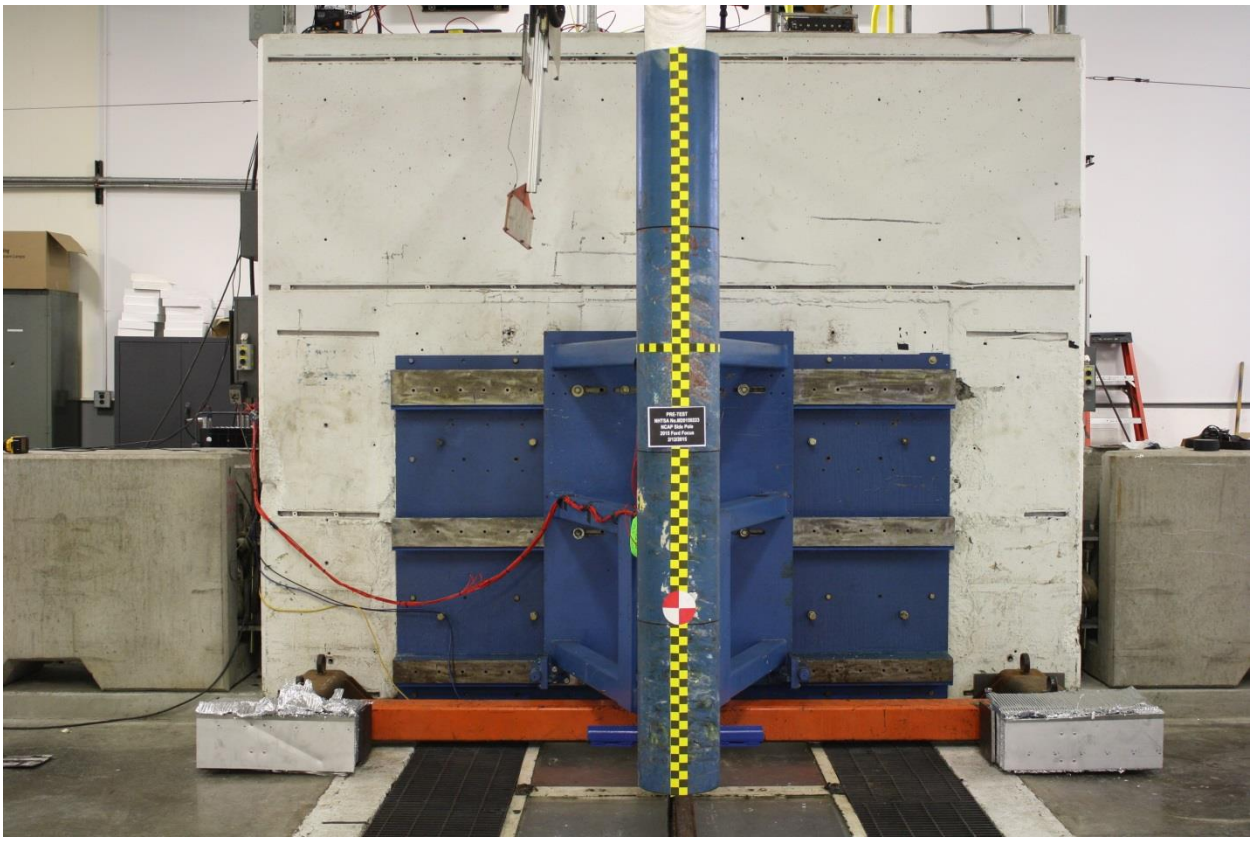


Figure A-57: Pre-Test Pole Barrier Front View

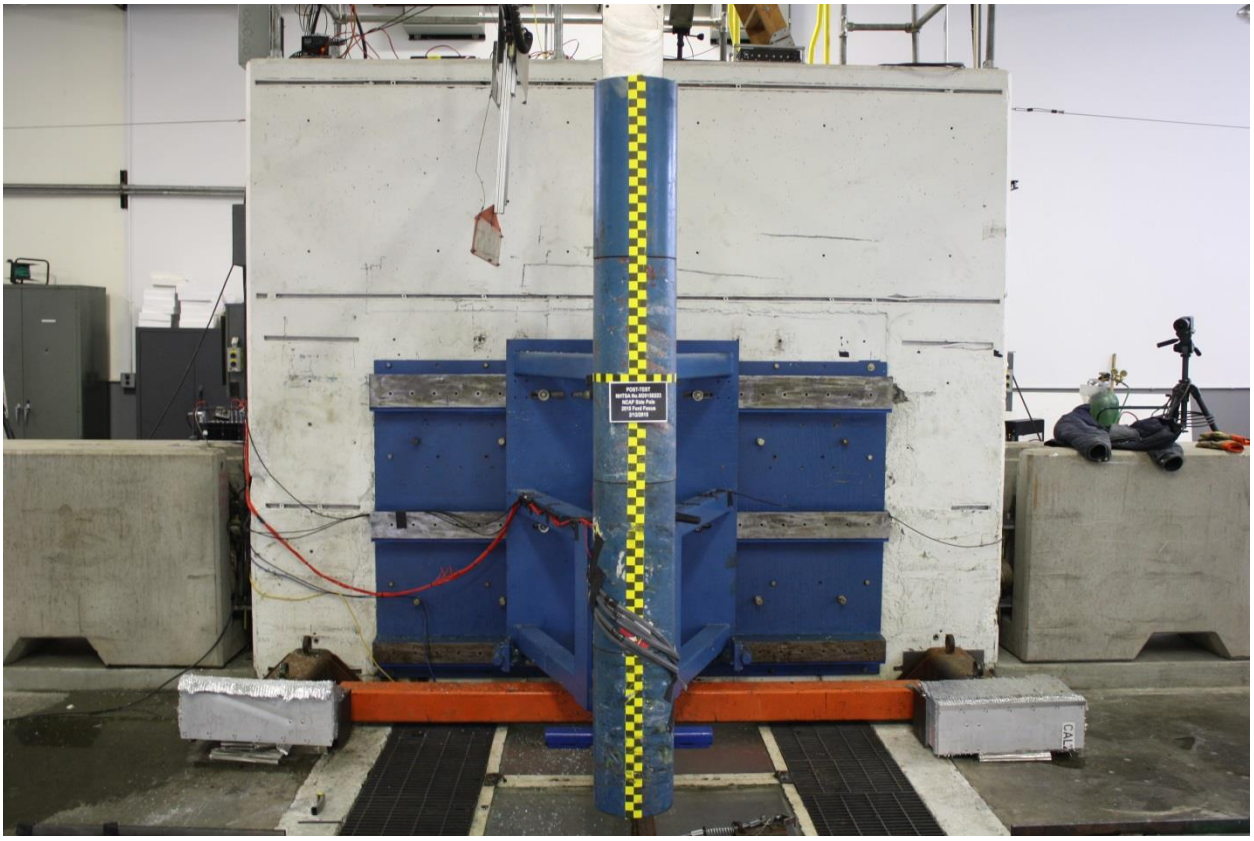


Figure A-58: Post-Test Pole Barrier Front View

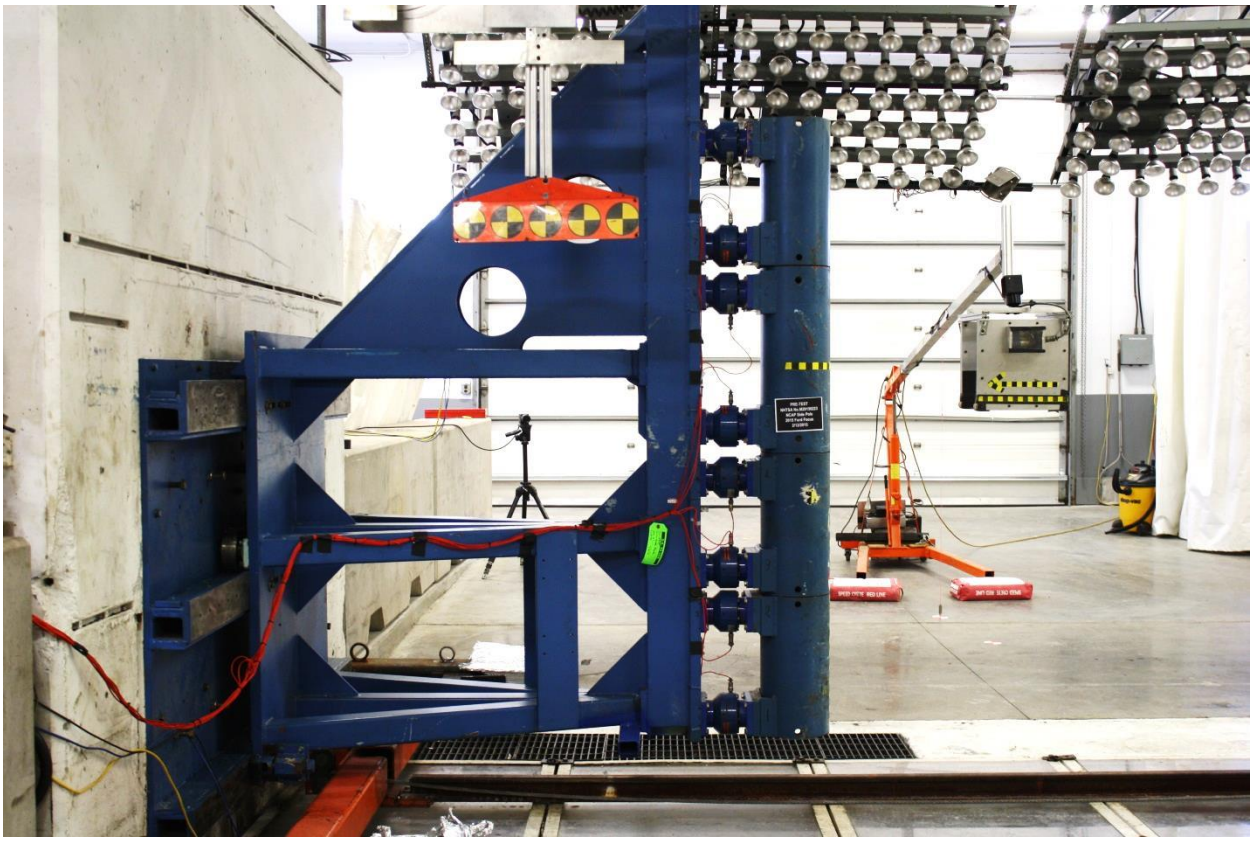


Figure A-59: Pre-Test Pole Barrier Side View

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

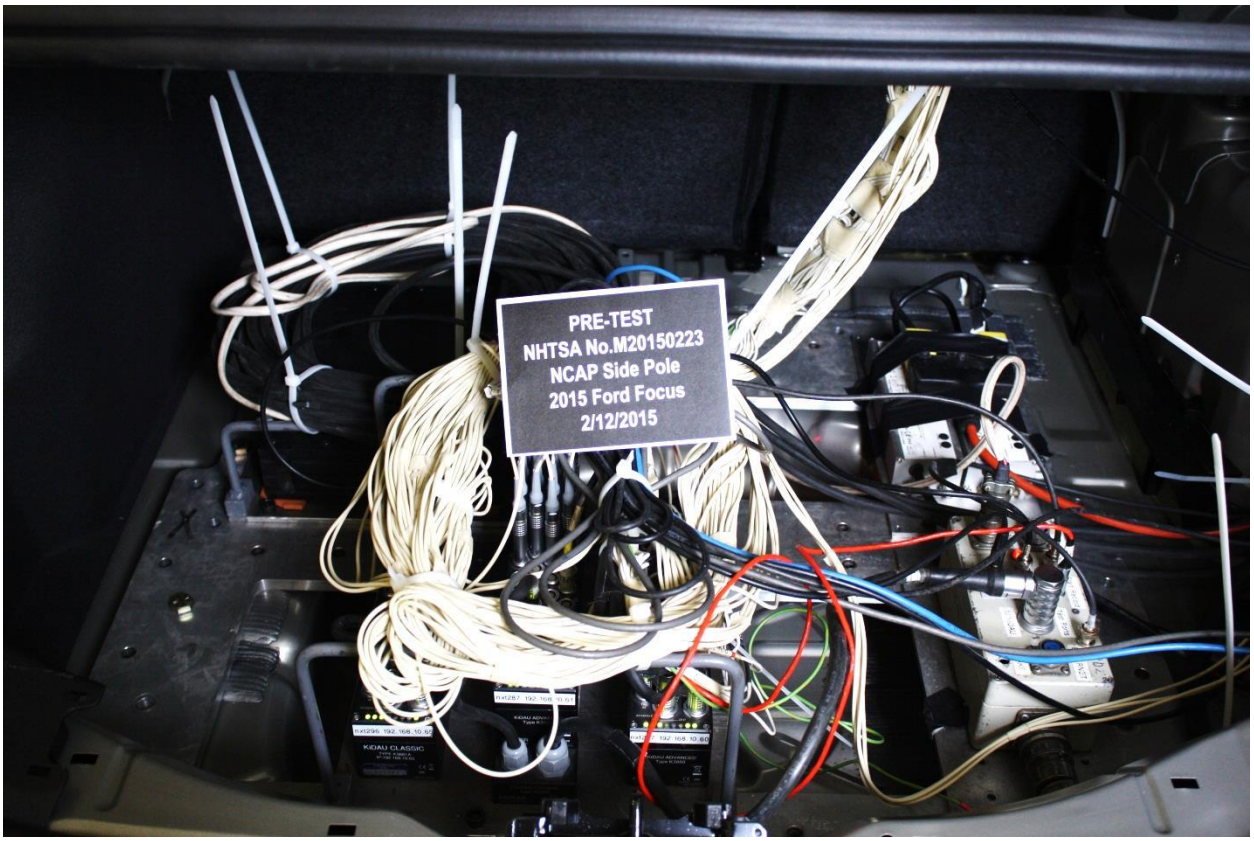


Figure A-61: Pre-Test Ballast View

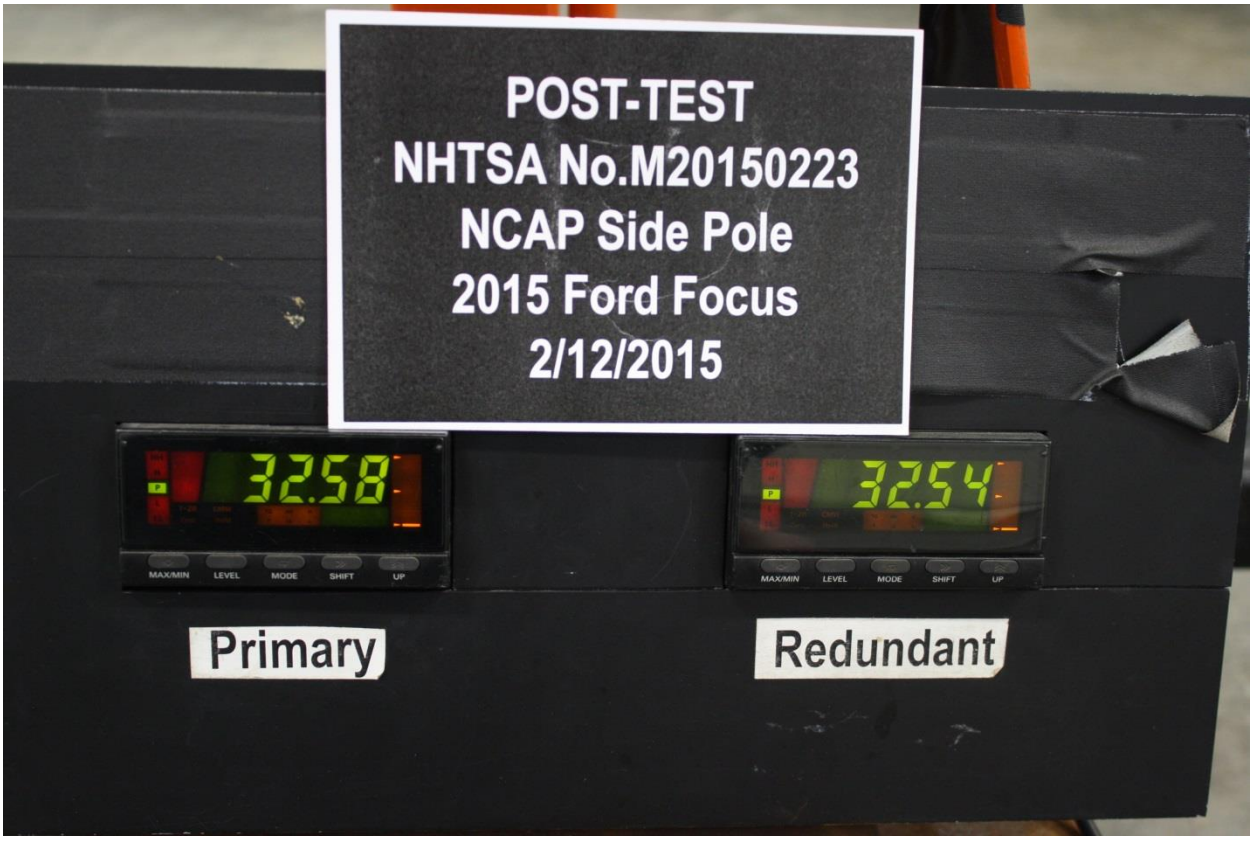


Figure A-62: Post-Test Primary and Redundant Speed Trap Read-Out

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

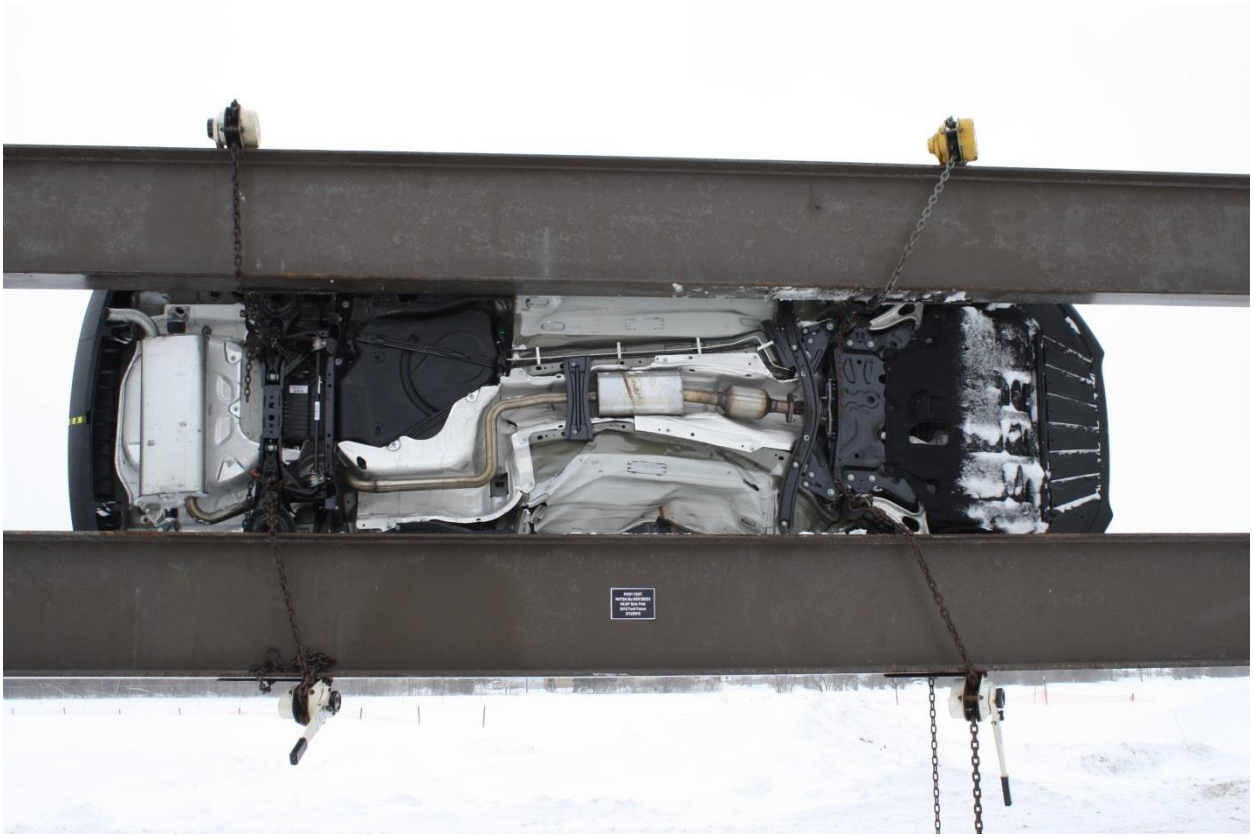


Figure A-66: FMVSS No. 301 Static Rollover 270 Degrees

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

Figure A-68: Impact Event

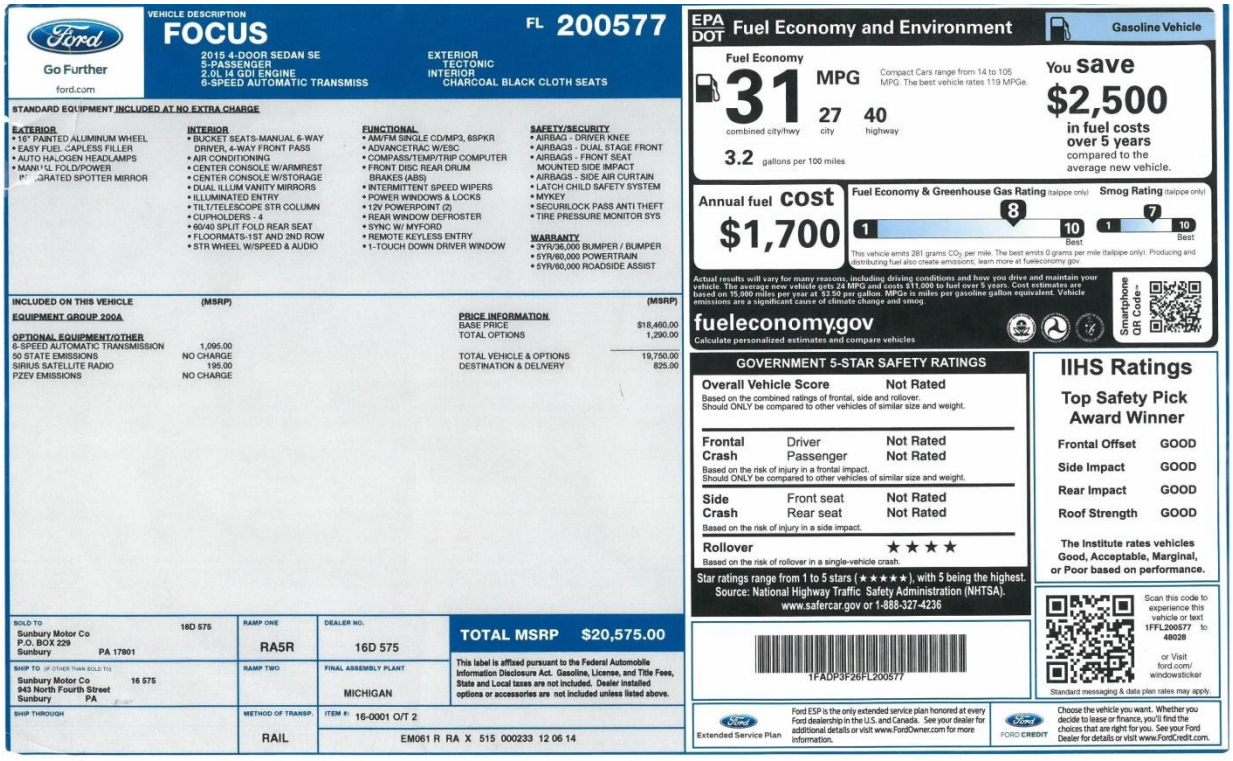


Figure A-69: Monroney Label

Seats

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 and rear seat outboard head restraints

E138642

Rear center head restraint

E198013

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.

Note: *For the front head restraints, you may need to use a key or similar object to release the head restraint. Press the key into the guide sleeve unlock and remove button to release the head restraint.*

Installing the Head Restraint

Align the steel stems into the guide sleeves and push the head restraint down until it locks.

Tilting Head Restraints

The front head restraints tilt for extra comfort. To tilt the head restraint, do the following:

115

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

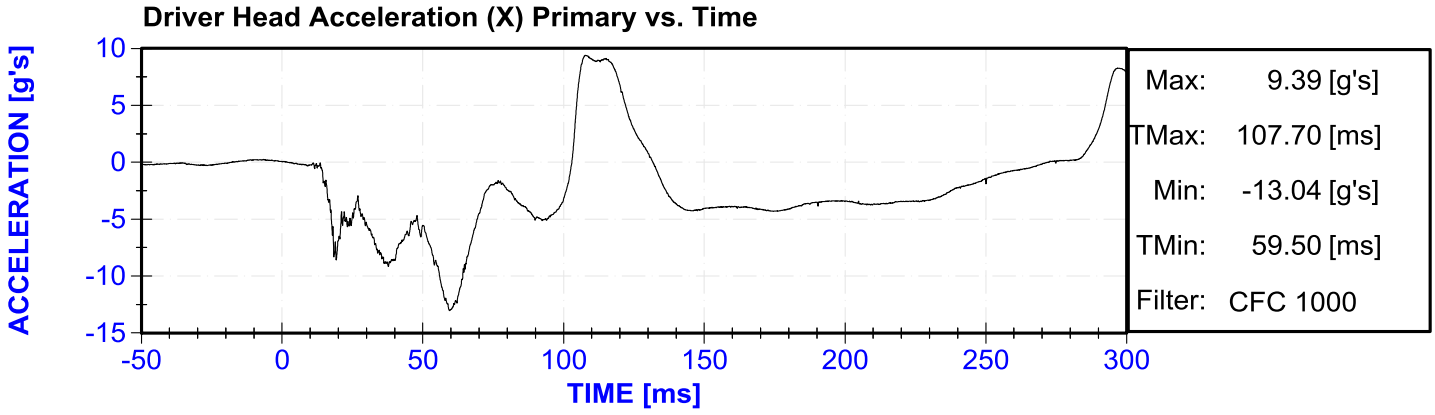
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection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

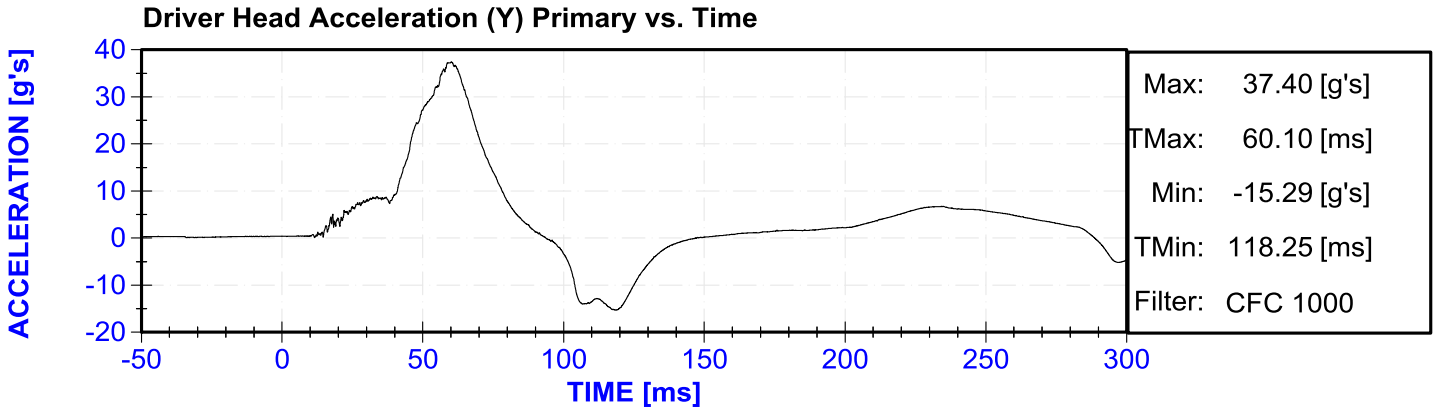
Vehicle Instrumentation Data

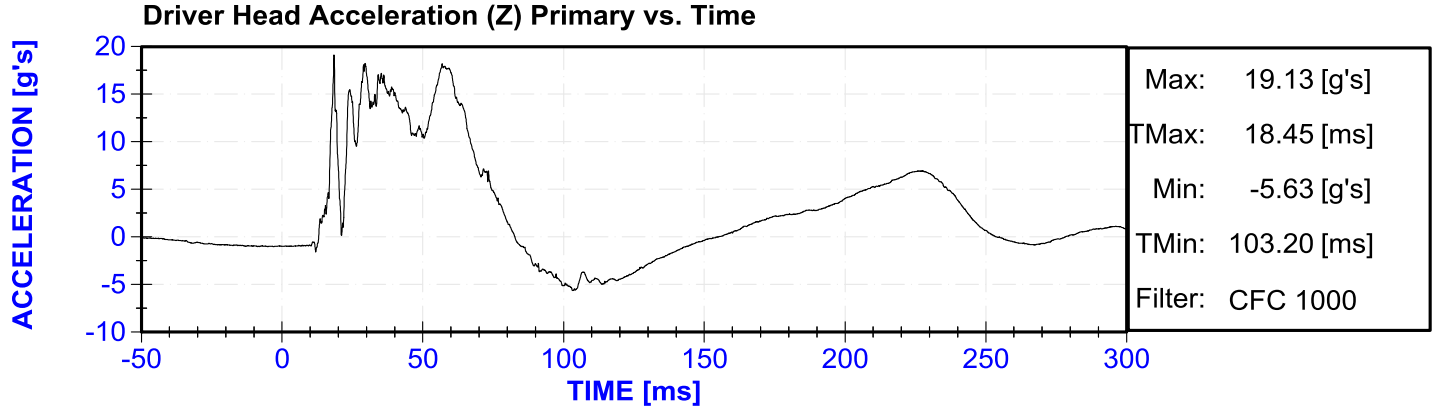
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration (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)

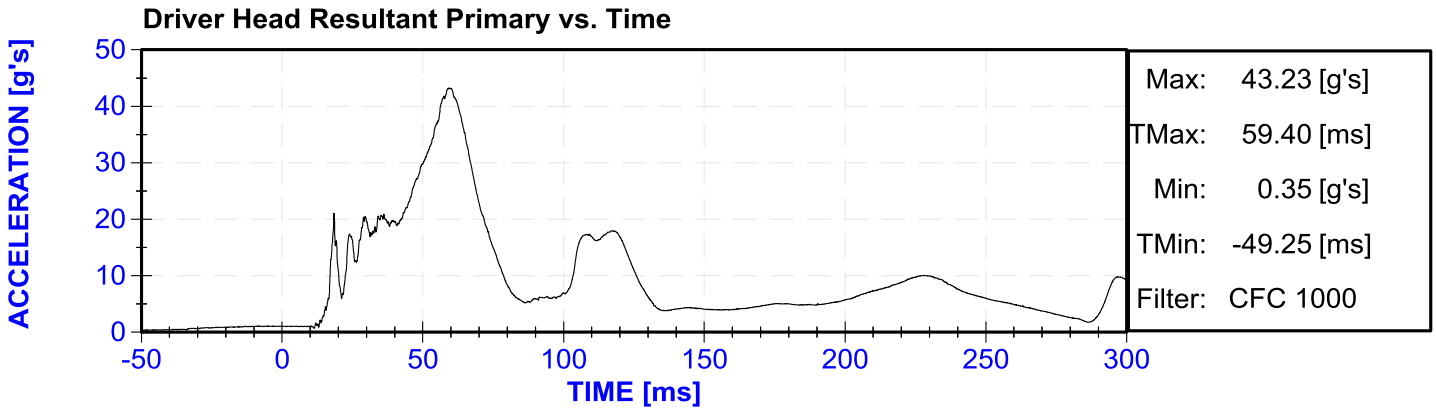
Pole Instrumentation Data

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)

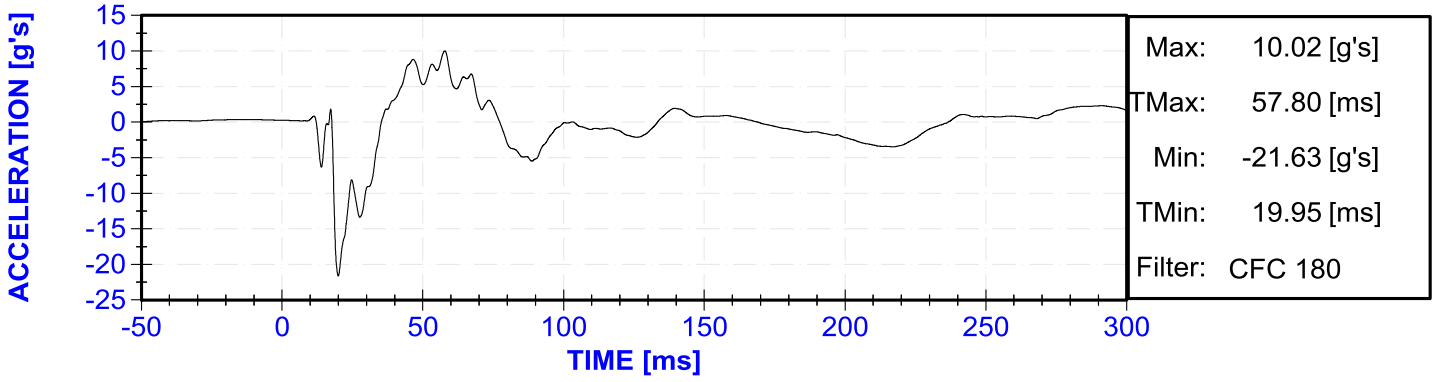

Driver Head Acceleration (X) Primary vs. Time
ACCELERATION [g's]
TIME [ms]
Max: 9.39 [g's]
TMax: 107.70 [ms]
Min: -13.04 [g's]
TMin: 59.50 [ms]
Filter: CFC 1000


Driver Head Acceleration (Y) Primary vs. Time
ACCELERATION [g's]
TIME [ms]
Max: 37.40 [g's]
TMax: 60.10 [ms]
Min: -15.29 [g's]
TMin: 118.25 [ms]
Filter: CFC 1000

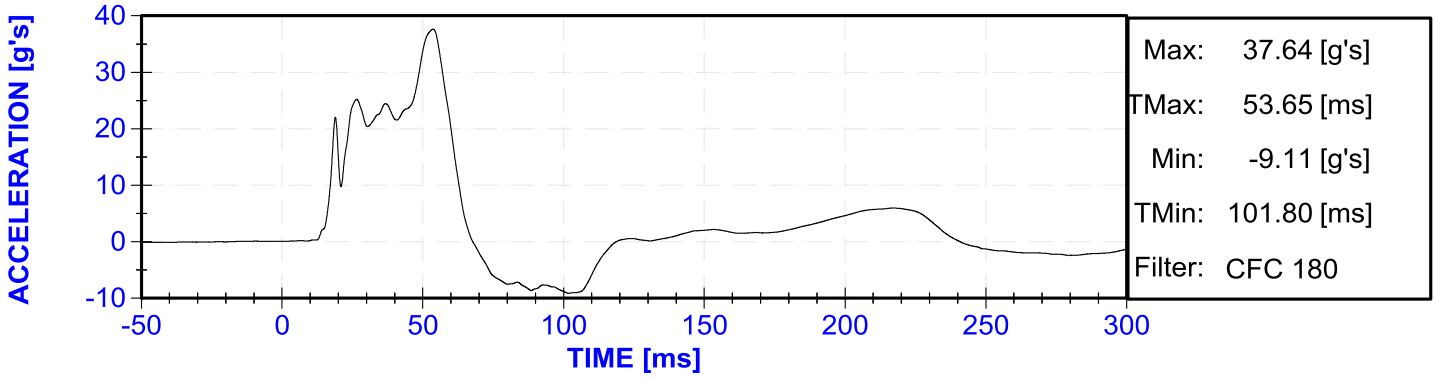

Driver Head Acceleration (Z) Primary vs. Time
ACCELERATION [g's]
TIME [ms]
Max: 19.13 [g's]
TMax: 18.45 [ms]
Min: -5.63 [g's]
TMin: 103.20 [ms]
Filter: CFC 1000


Driver Head Resultant Primary vs. Time
ACCELERATION [g's]
TIME [ms]
Max: 43.23 [g's]
TMax: 59.40 [ms]
Min: 0.35 [g's]
TMin: -49.25 [ms]
Filter: CFC 1000

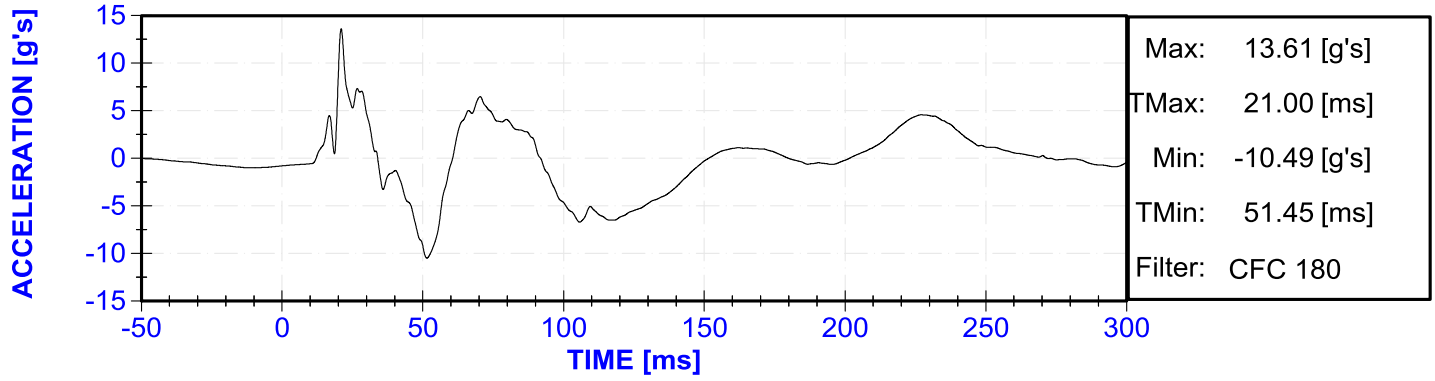
Driver Lower Spine T12 Acceleration (X) vs. Time



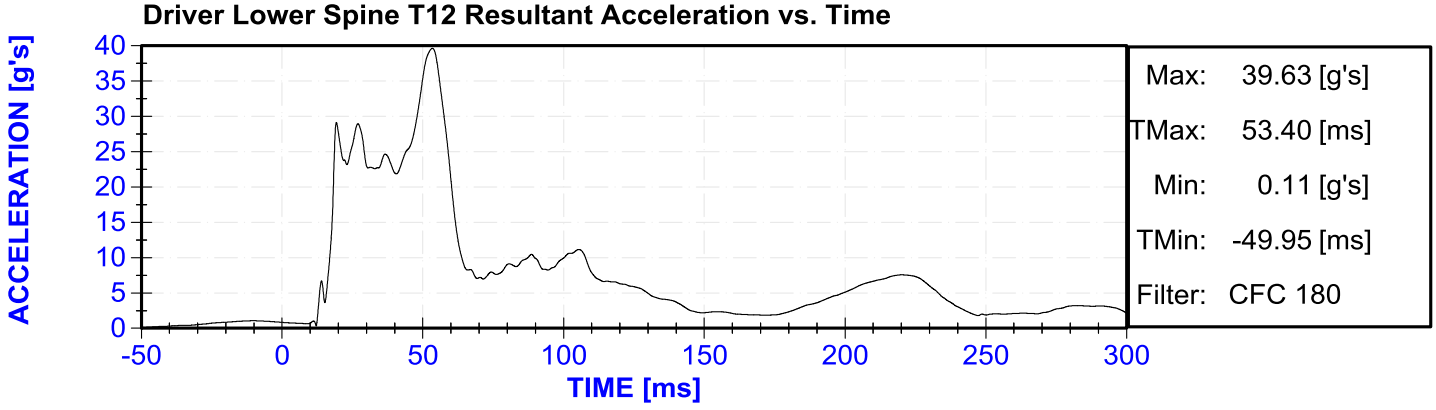
Driver Lower Spine T12 Acceleration (Y) vs. Time



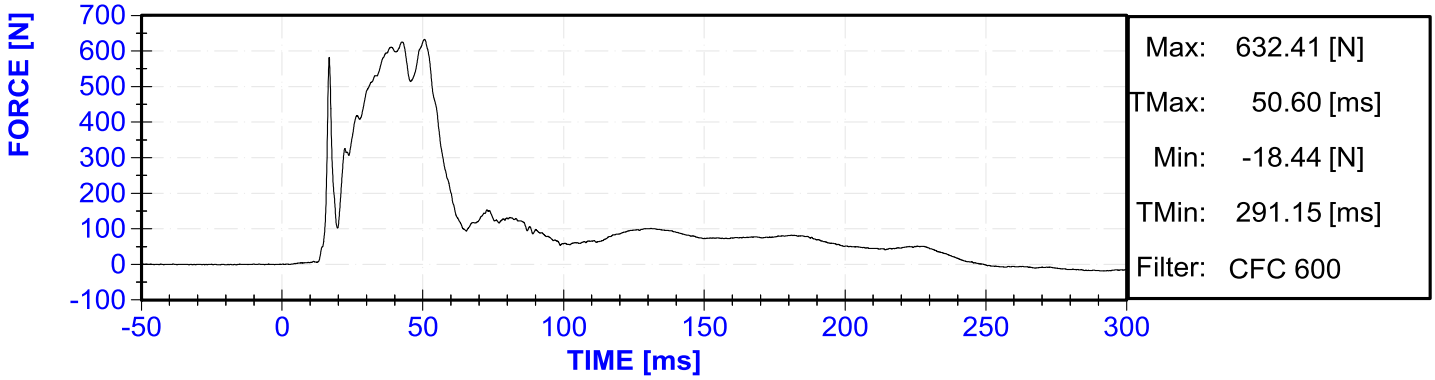
Driver Lower Spine T12 Acceleration (Z) vs. Time



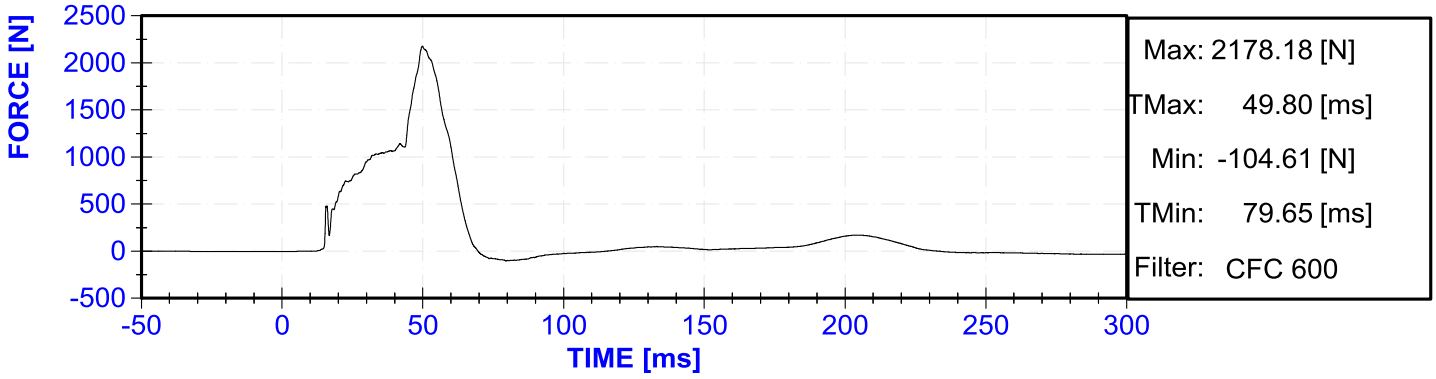
Driver Lower Spine T12 Resultant Acceleration vs. Time



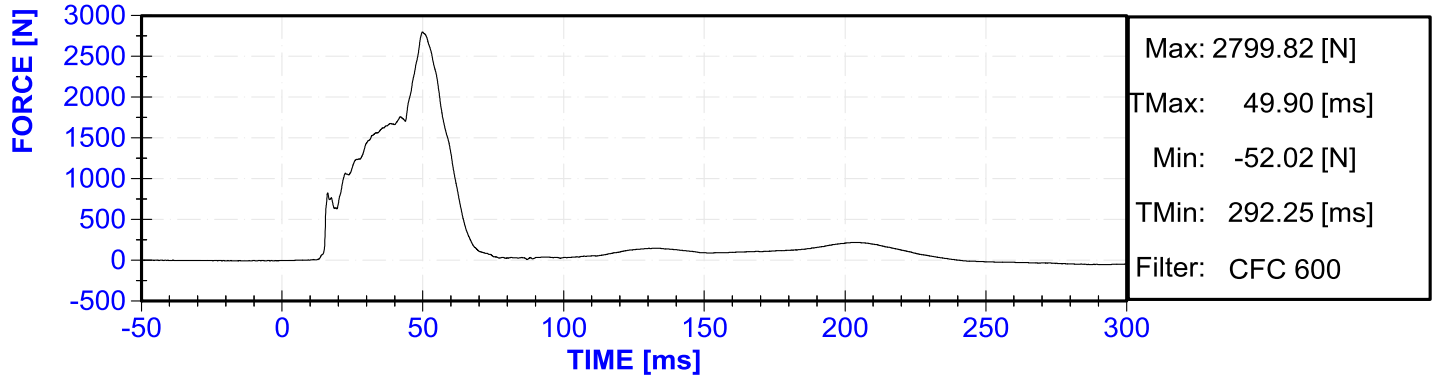
Driver Iliac Wing Force on Impact Side (Y) vs. Time



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

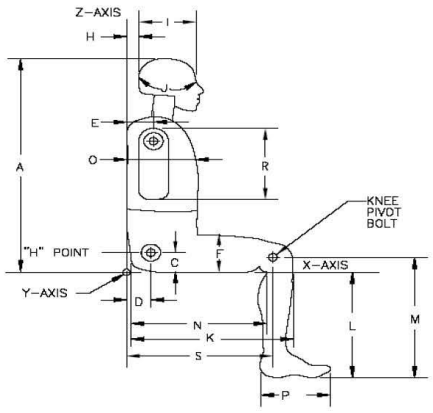
SERIAL NO: 300

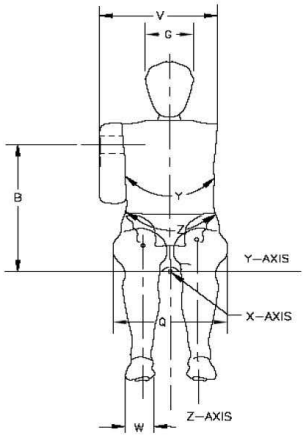
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: M. Geesey Date: 02/06/2015

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	449	Pass
C	H-point Height	79	89	86	Pass
D	H-point from seatback	141	151	148	Pass
E	Shoulder Pivot from Backline	97	107	104	Pass
F	Thigh Clearance	119	135	124	Pass
G	Head Breadth	140	148	143	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	182	Pass
J	Head Circumference	541	551	548	Pass
K	Buttock to Knee Length	514	540	537	Pass
L	Popliteal Height	343	369	358	Pass
M	Knee Pivot to floor height	392	409	402	Pass
N	Buttock Popliteal Length	416	442	437	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	219	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	250	Pass
S	Knee Joint to seatback	477	493	488	Pass
V	Shoulder Width	341	357	349	Pass
W	Foot Width	78	94	83	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	770	Pass

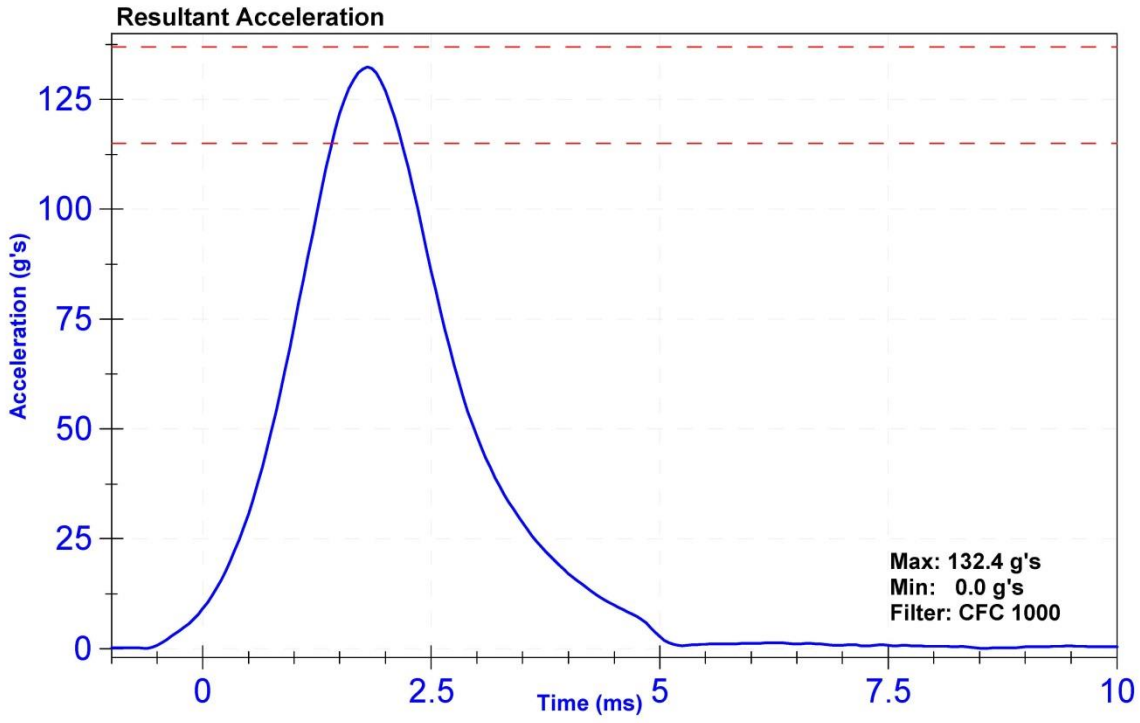
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

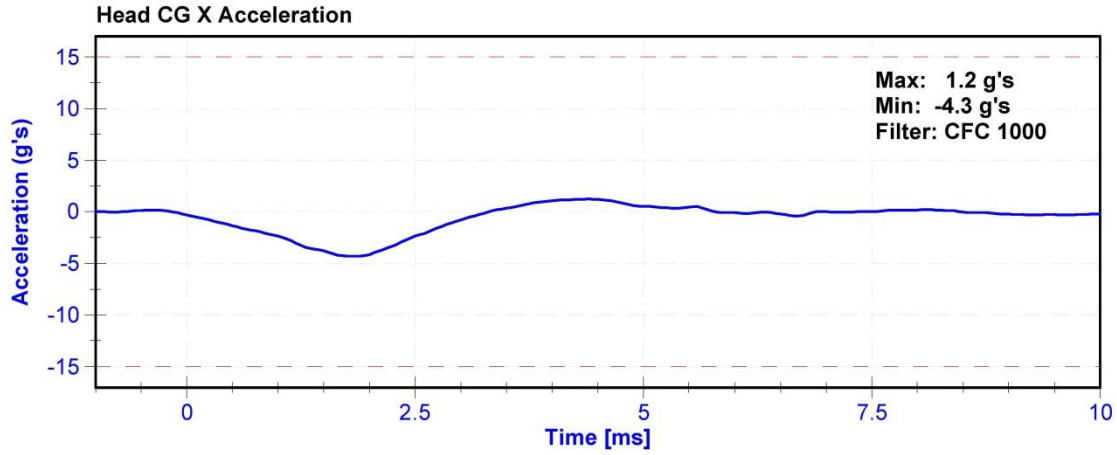
Results

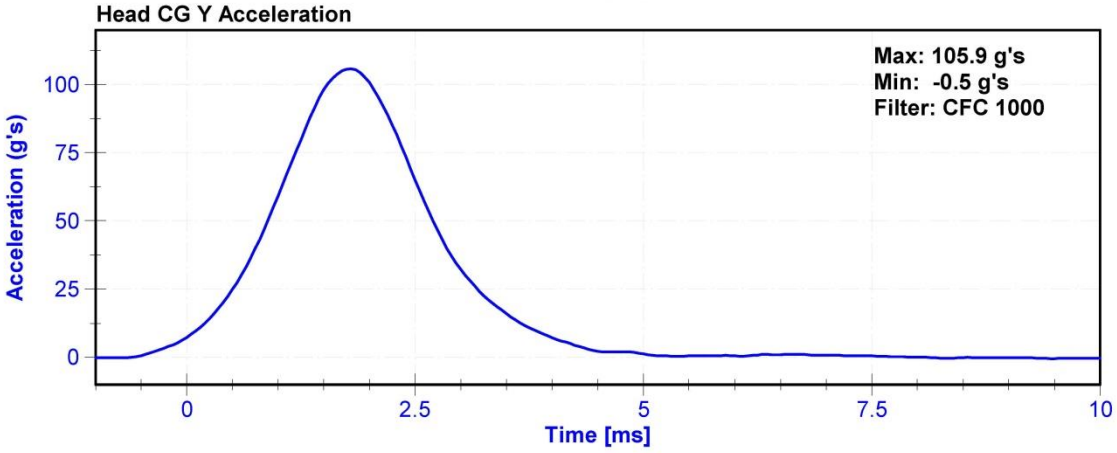
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22.2	Pass
Humidity	10	70	%	14.6	Pass
Resultant Acceleration	115	137	g's	132.4	Pass
Oscillation	0	15	%	1.0	Pass
Fore-Aft Acceleration	-15	15	g's	-4.3	Pass

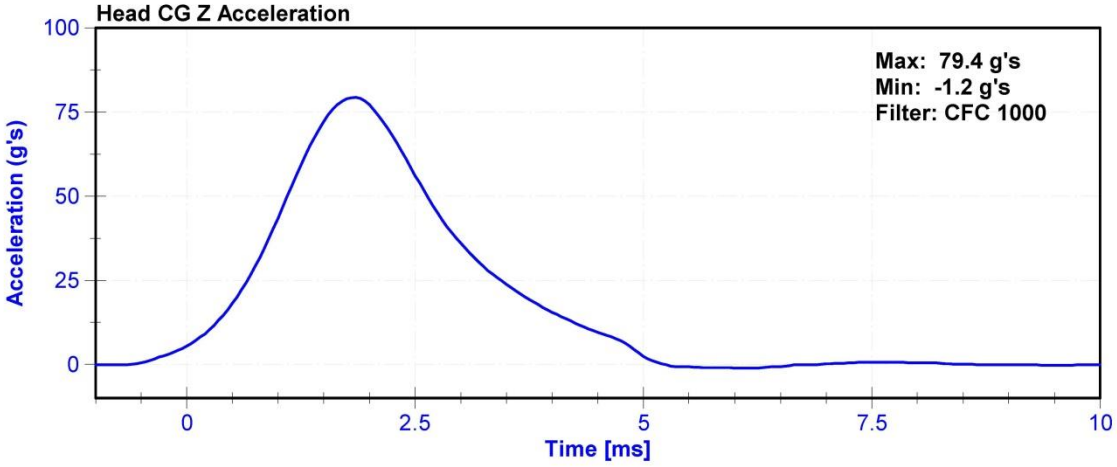
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	8/28/2014	2/26/2015
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	8/28/2014	2/26/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P68608	8/28/2014	2/26/2015




Head CG X Acceleration
Max: 1.2 g's
Min: -4.3 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: 105.9 g's
Min: -0.5 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: 79.4 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]

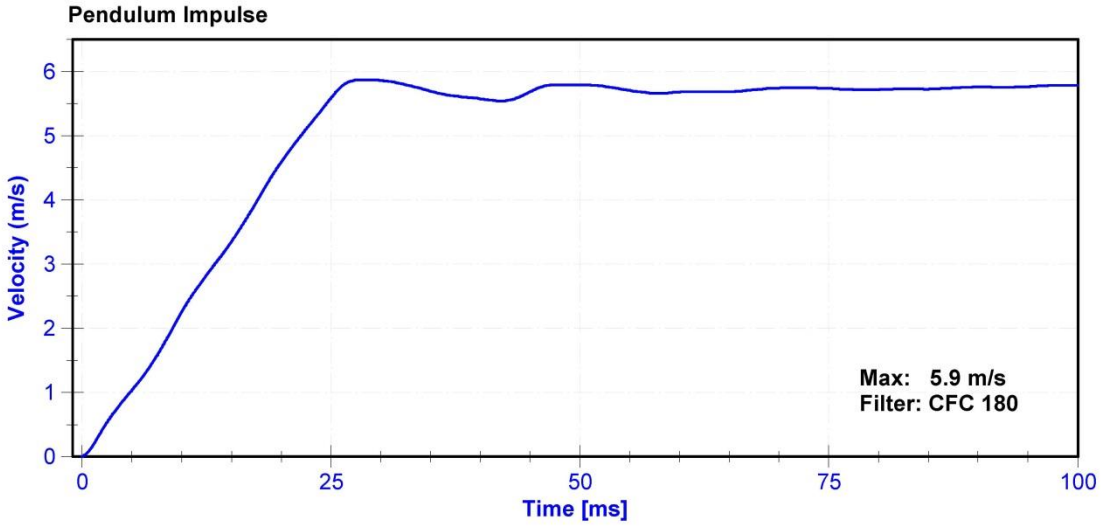
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

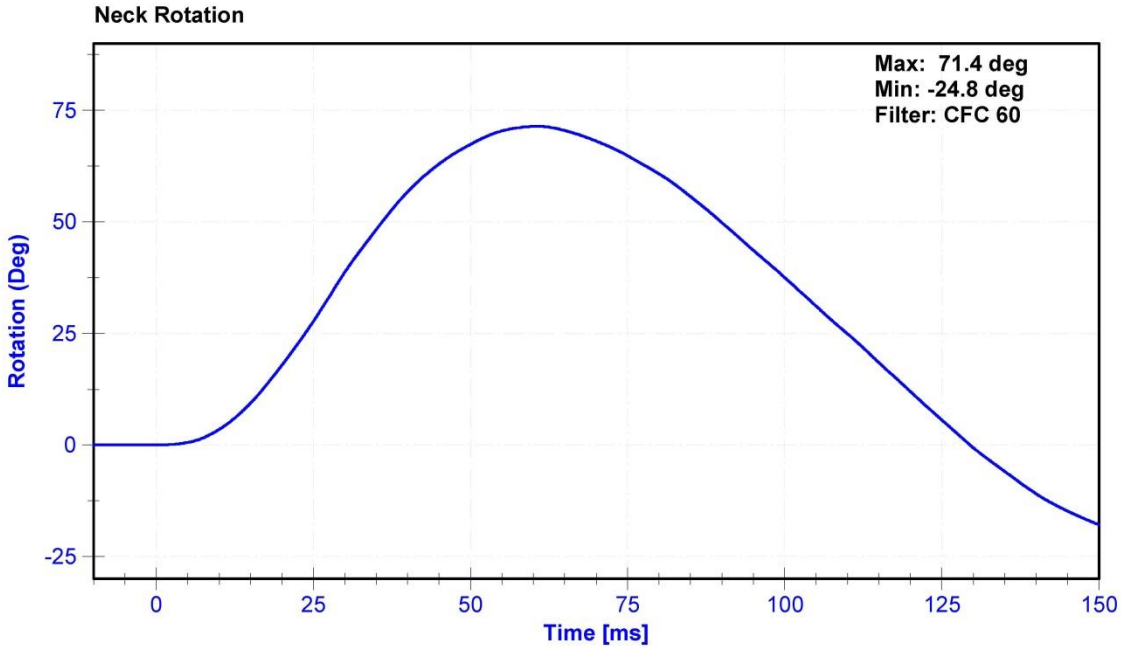
Results

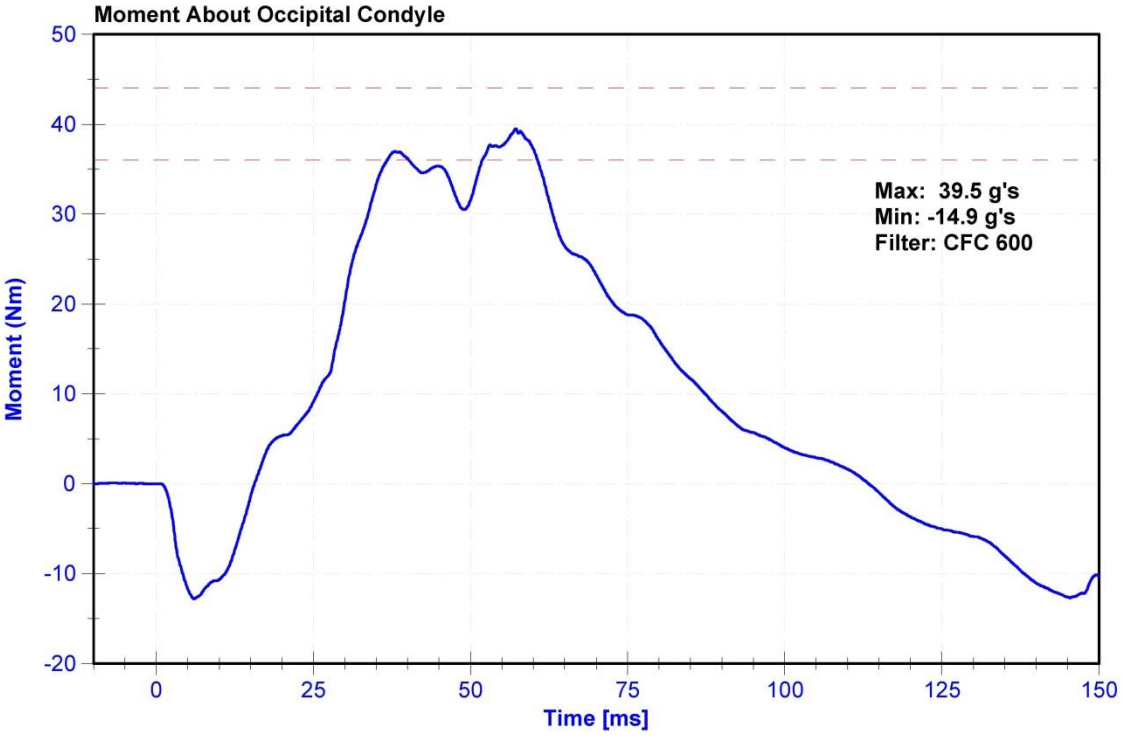
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	15.1	Pass
Velocity	5.51	5.63	m/s	5.546	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.25	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.35	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.59	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.59	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.87	Pass
Neck Rotation	71	81	deg	71.4	Pass
Time at Maximum Rotation	50	70	ms	60.6	Pass
Moment about the OC	36	44	Nm	39.5	Pass
Moment Decay to 0 Nm	102	126	ms	113.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/13/2014	11/13/2015
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/13/2014	11/13/2015
Upper Neck Load Cell	DENTON 1716A	LC-130Mx	9/12/2014	9/12/2015




Neck Rotation
Max: 71.4 deg
Min: -24.8 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: 39.5 g's
Min: -14.9 g's
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

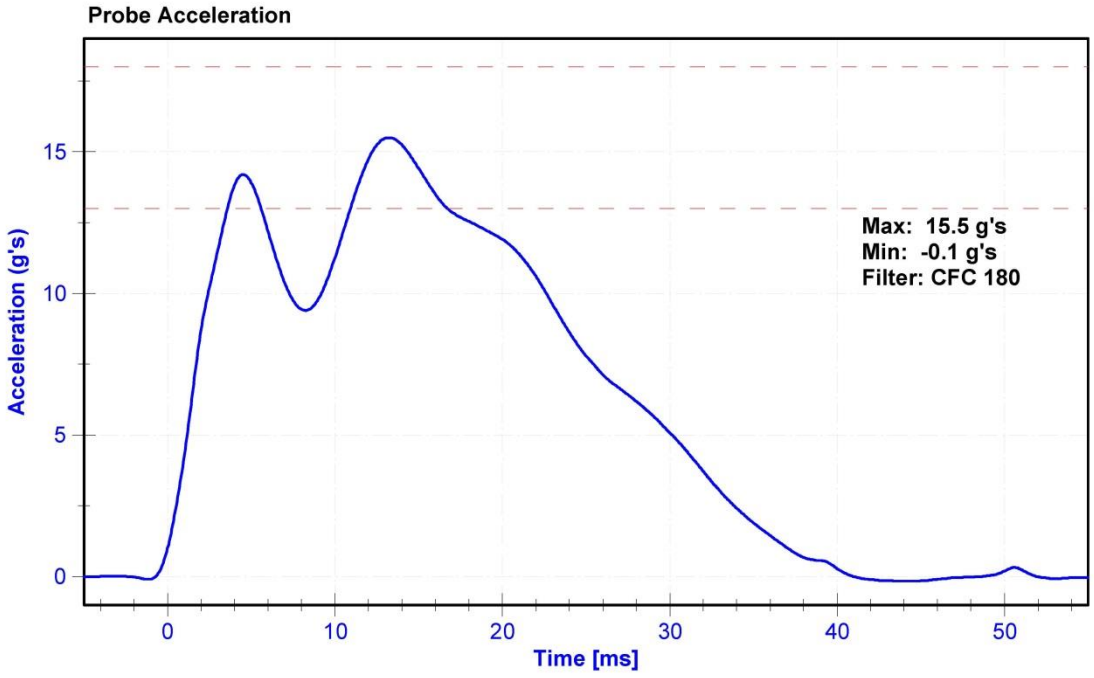
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

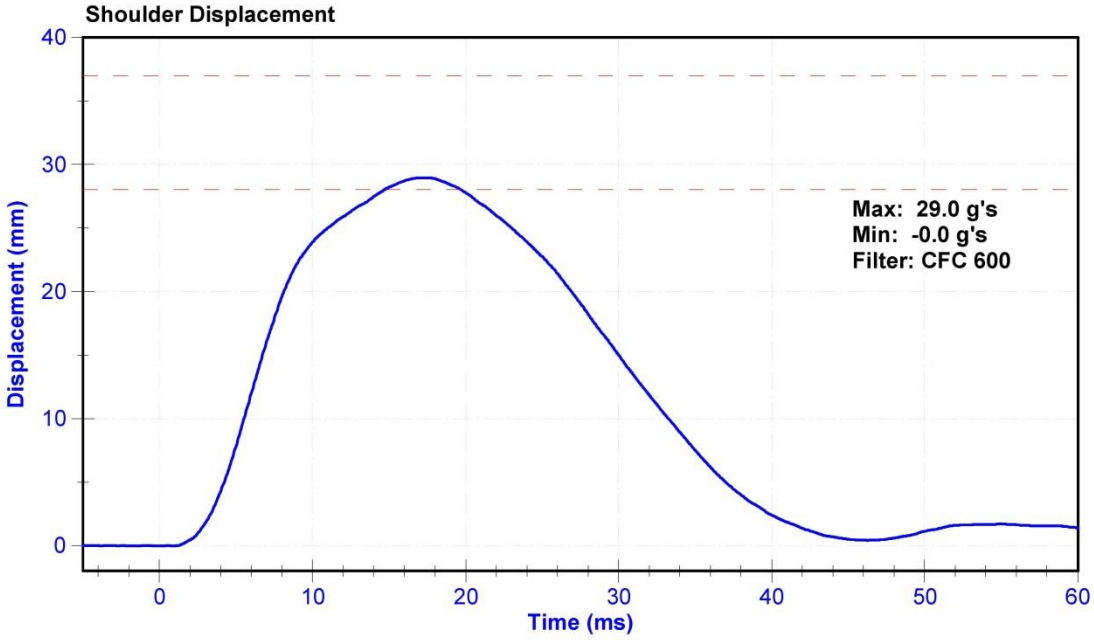
Results

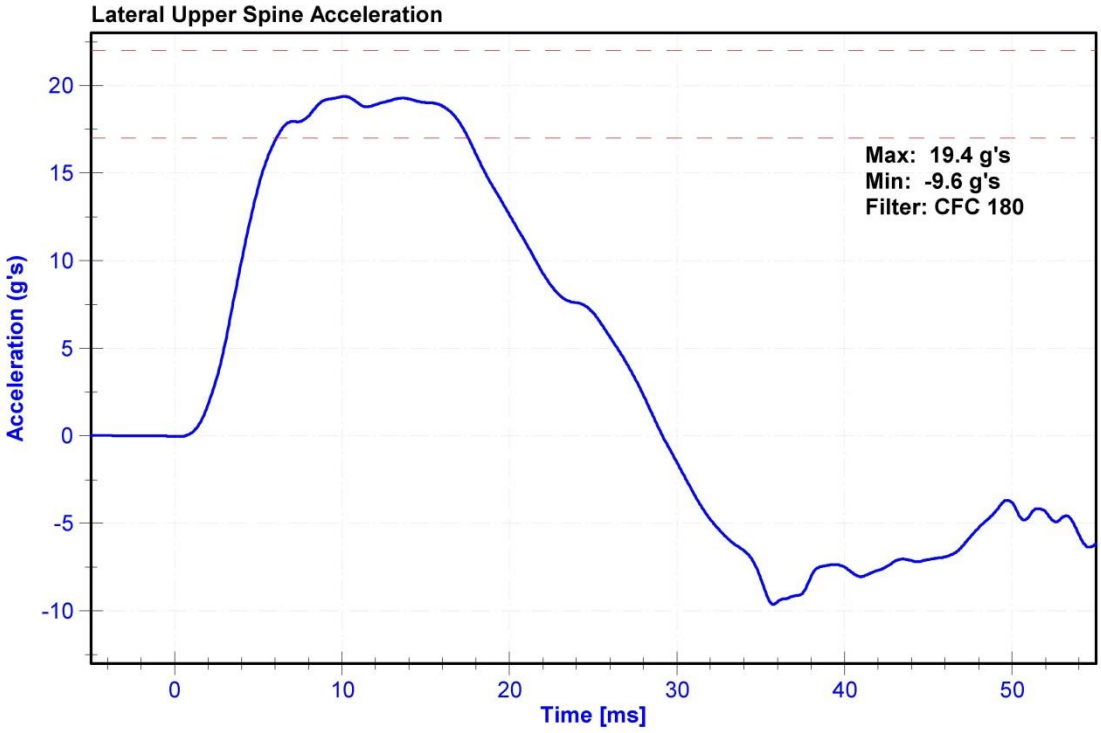
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	14.8	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	13	18	g's	15.5	Pass
Shoulder Deflection	28	37	mm	29.0	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	8/7/2014	8/7/2015
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P51915	8/28/2014	8/28/2015




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 29.0 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 19.4 g's
Min: -9.6 g's
Filter: CFC 180

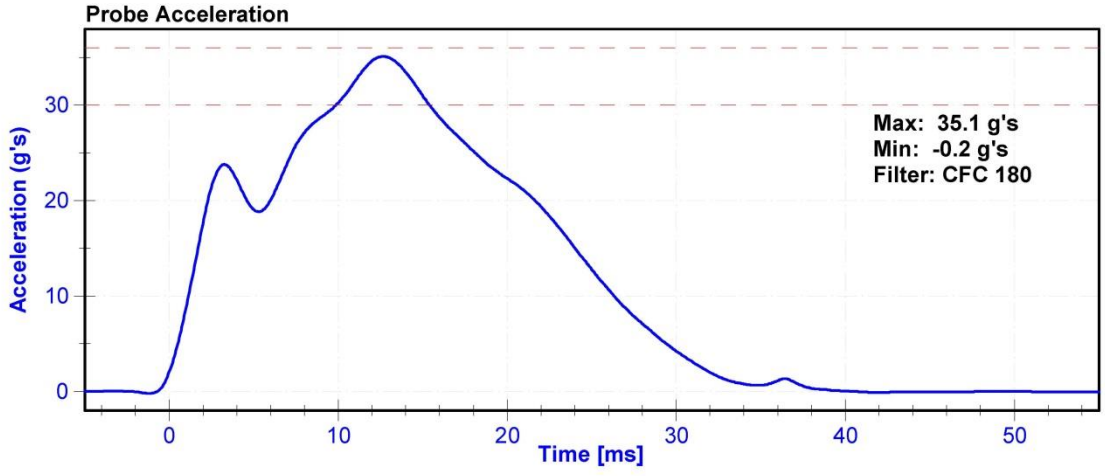
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

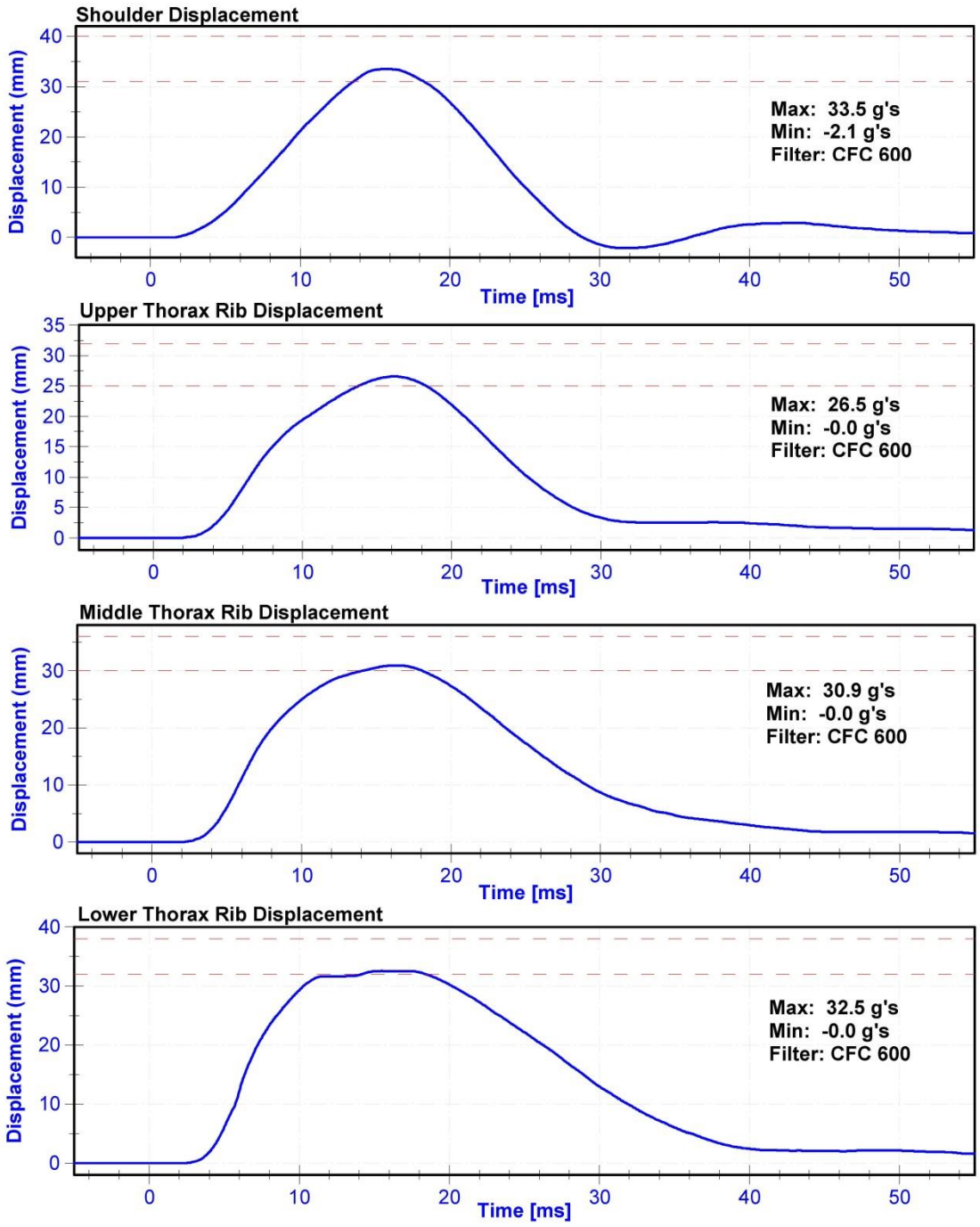
Results

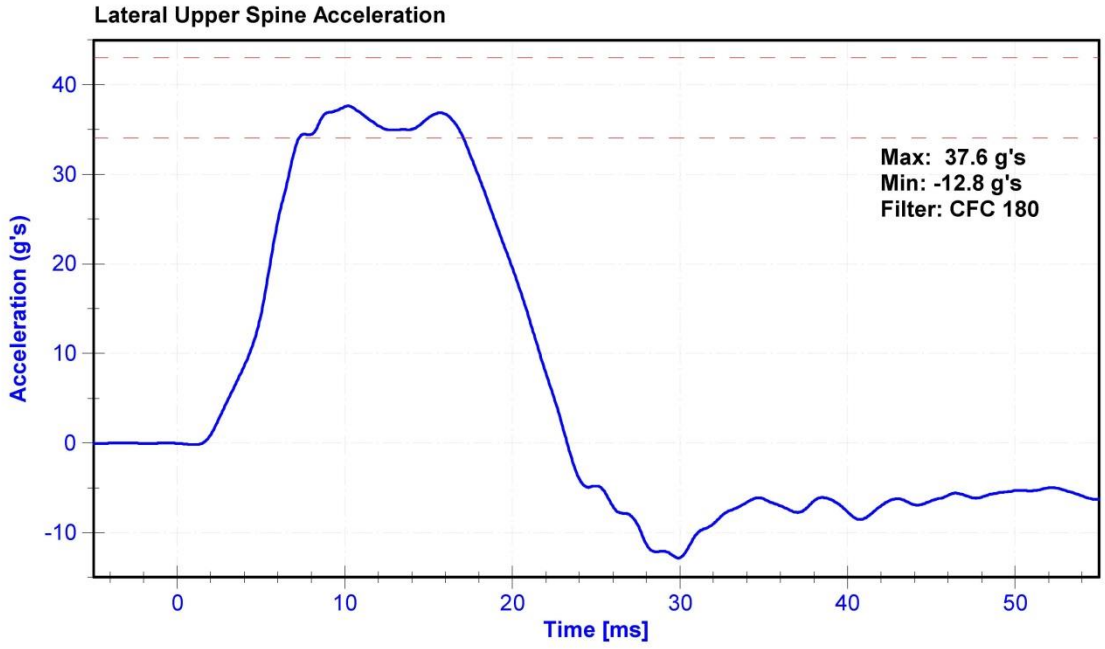
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	14.8	Pass
Velocity	6.6	6.8	m/s	6.71	Pass
Probe Acceleration after 5 ms	30	36	g's	35.1	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.6	Pass
Lateral Lower Spine Acceleration	29	37	g's	36.4	Pass
Shoulder Deflection	31	40	mm	33.5	Pass
Upper Thorax Rib Deflection	25	32	mm	26.5	Pass
Mid Thorax Rib Deflection	30	36	mm	30.9	Pass
Lower Thorax Rib Deflection	32	38	mm	32.5	Pass

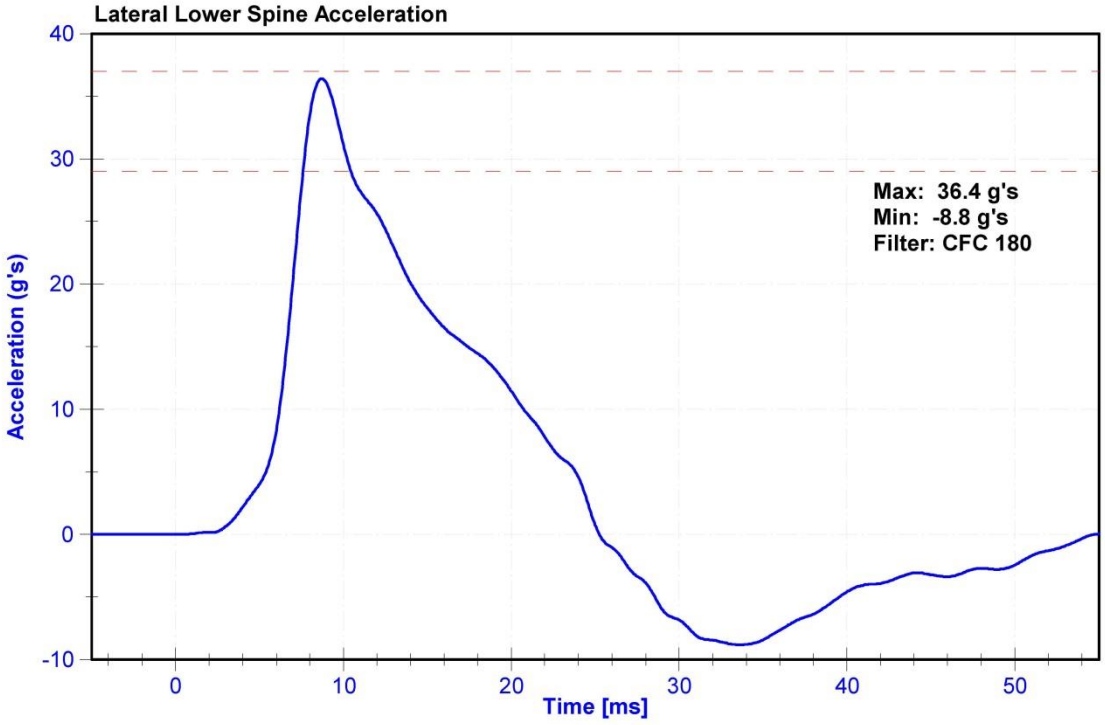
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Spine T1 Y Accelerometer	ENDEVCO 7264	AC-P51915	8/28/2014	8/28/2015
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	8/28/2014	2/26/2015
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	8/7/2014	8/7/2015
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	8/12/2014	8/12/2015
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	8/12/2014	8/12/2015
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	8/12/2014	8/12/2015




Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 33.5 g's
Min: -2.1 g's
Filter: CFC 600
Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.5 g's
Min: -0.0 g's
Filter: CFC 600
Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 30.9 g's
Min: -0.0 g's
Filter: CFC 600
Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 32.5 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 37.6 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: 36.4 g's
Min: -8.8 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

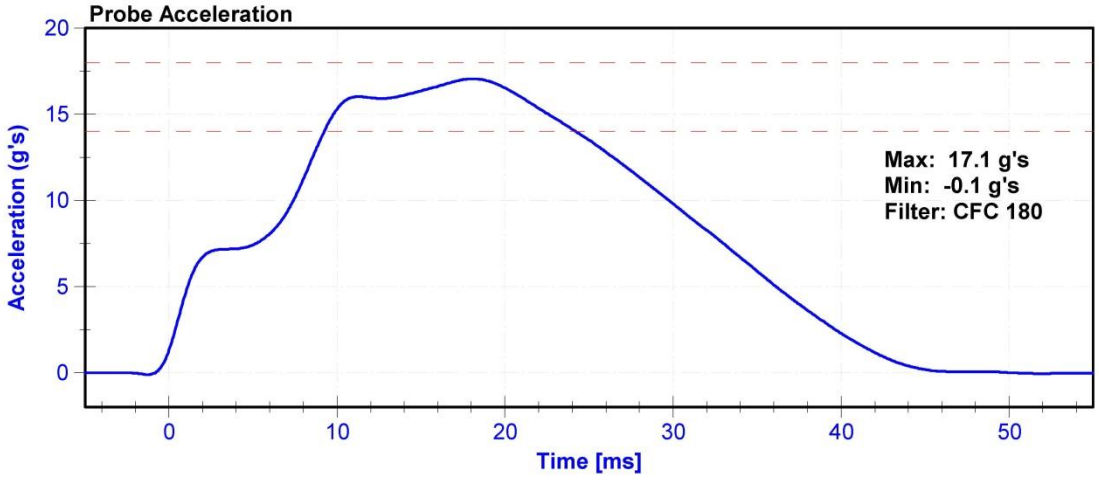
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

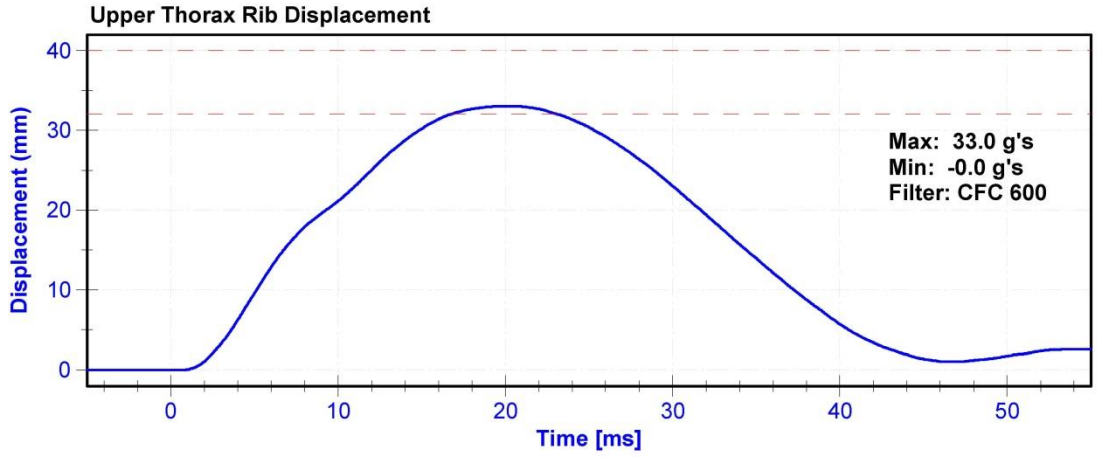
Results

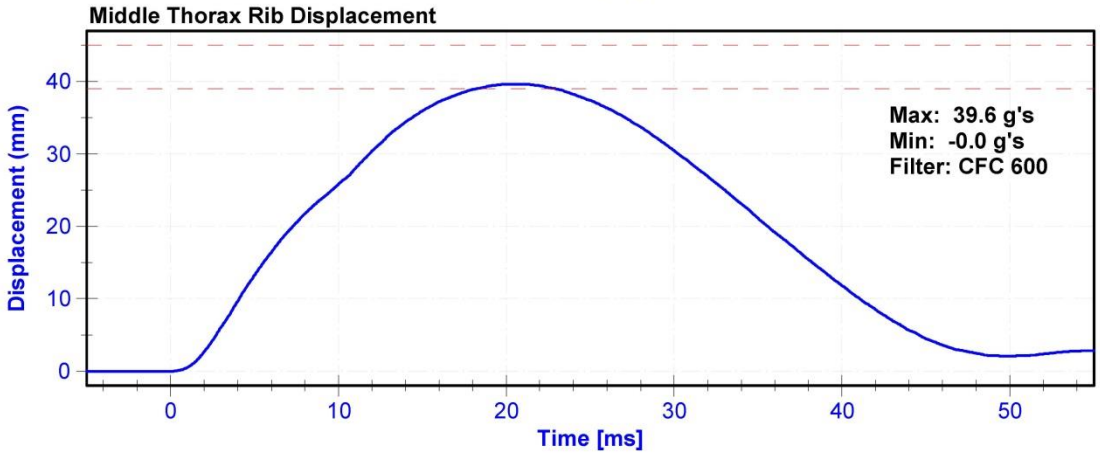
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.7	Pass
Humidity	10	70	%	15.1	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	14	18	g's	17.1	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.3	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.1	Pass
Upper Thorax Rib Deflection	32	40	mm	33.0	Pass
Middle Thorax Rib Deflection	39	45	mm	39.6	Pass
Lower Thorax Rib Deflection	35	43	mm	37.3	Pass

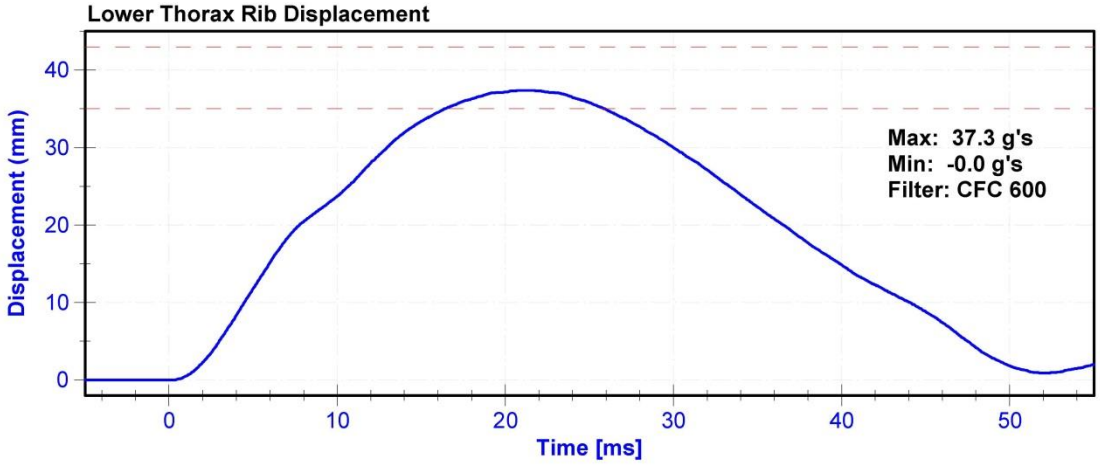
Transducer Calibrations

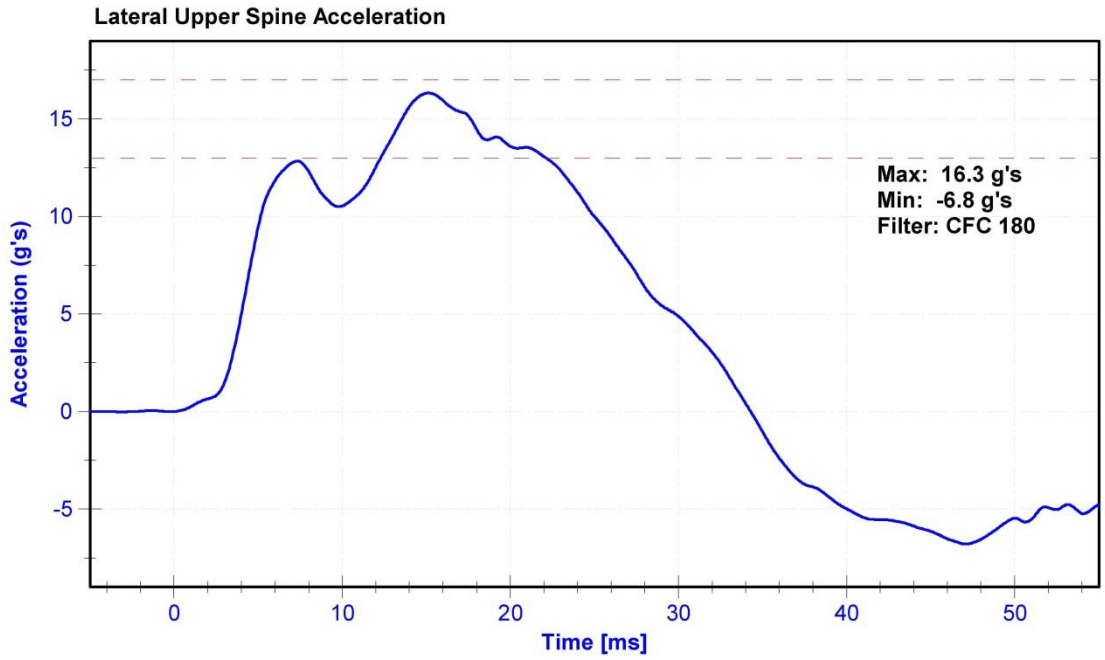
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P51915	8/28/2014	8/28/2015
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	8/28/2014	2/26/2015
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	8/12/2014	8/12/2015
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	8/12/2014	8/12/2015
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	8/12/2014	8/12/2015

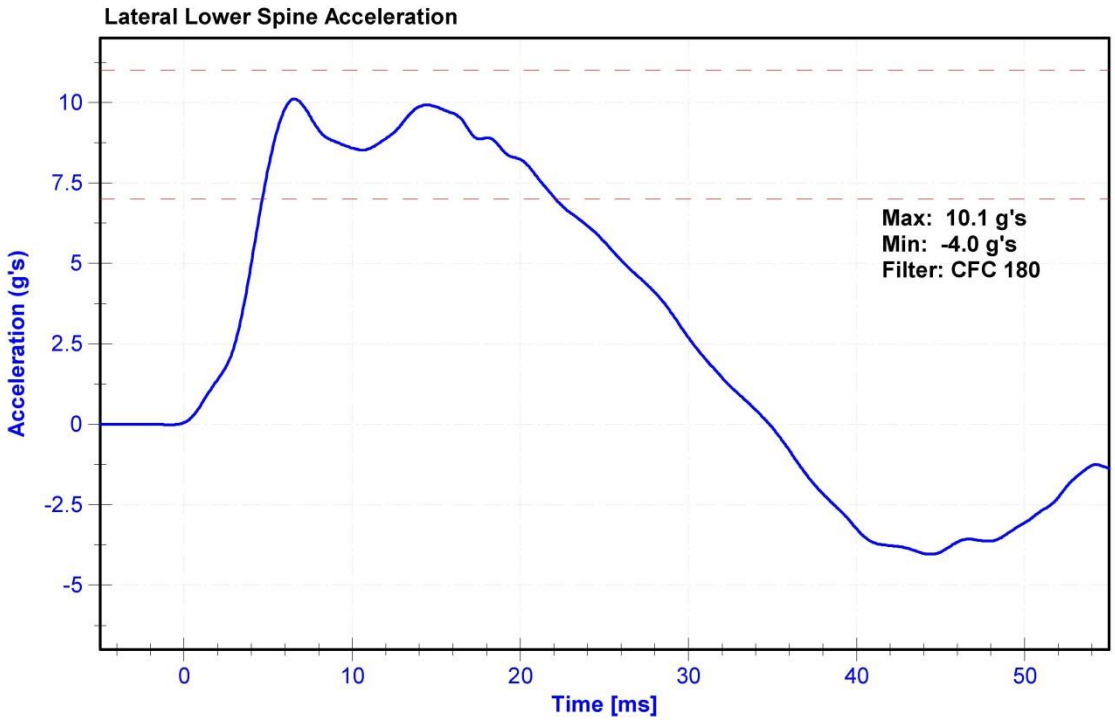



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.0 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 39.6 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.3 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 16.3 g's
Min: -6.8 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: 10.1 g's
Min: -4.0 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. Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

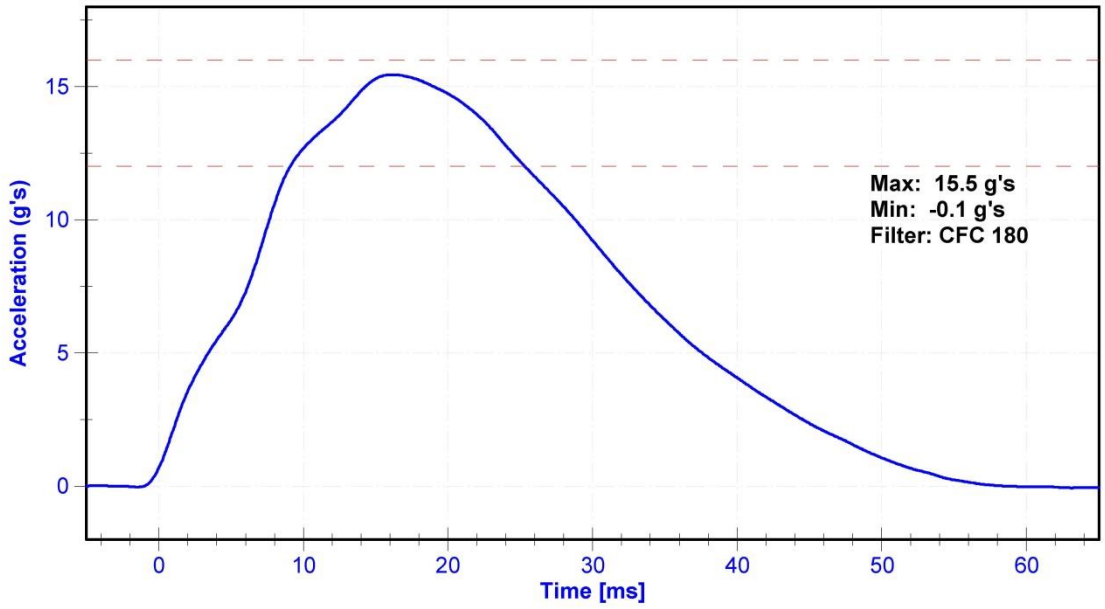
Results

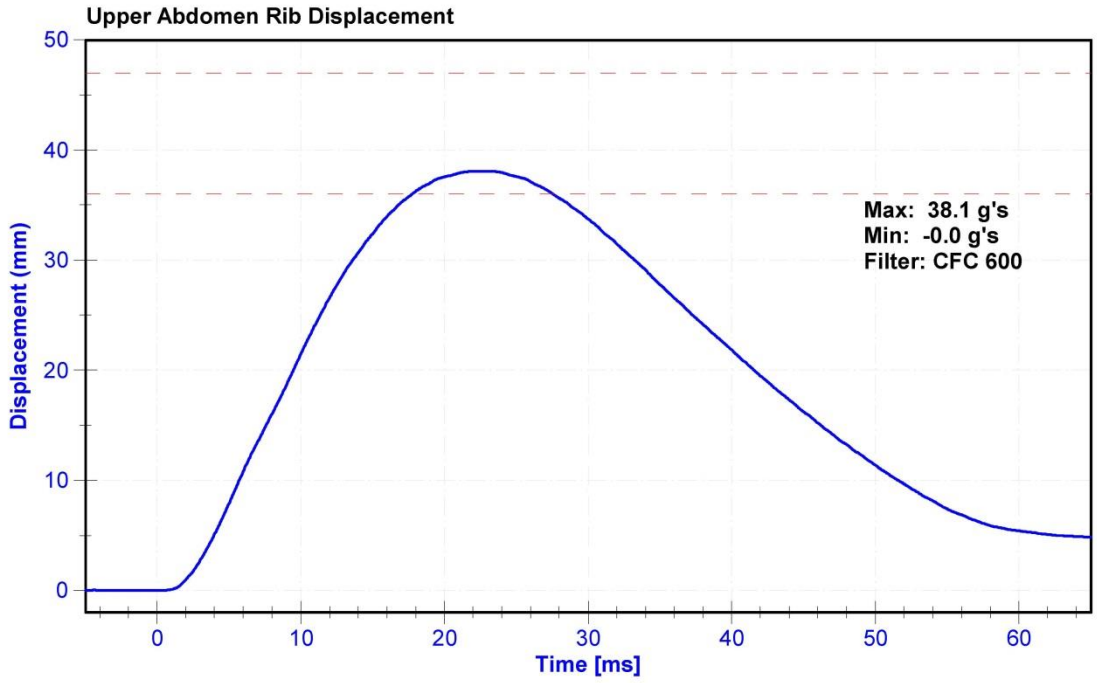
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	14.7	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	15.5	Pass
Lateral Lower Spine Acceleration	9	14	g's	12.0	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.1	Pass
Lower Abdomen Rib Deflection	33	44	mm	37.2	Pass

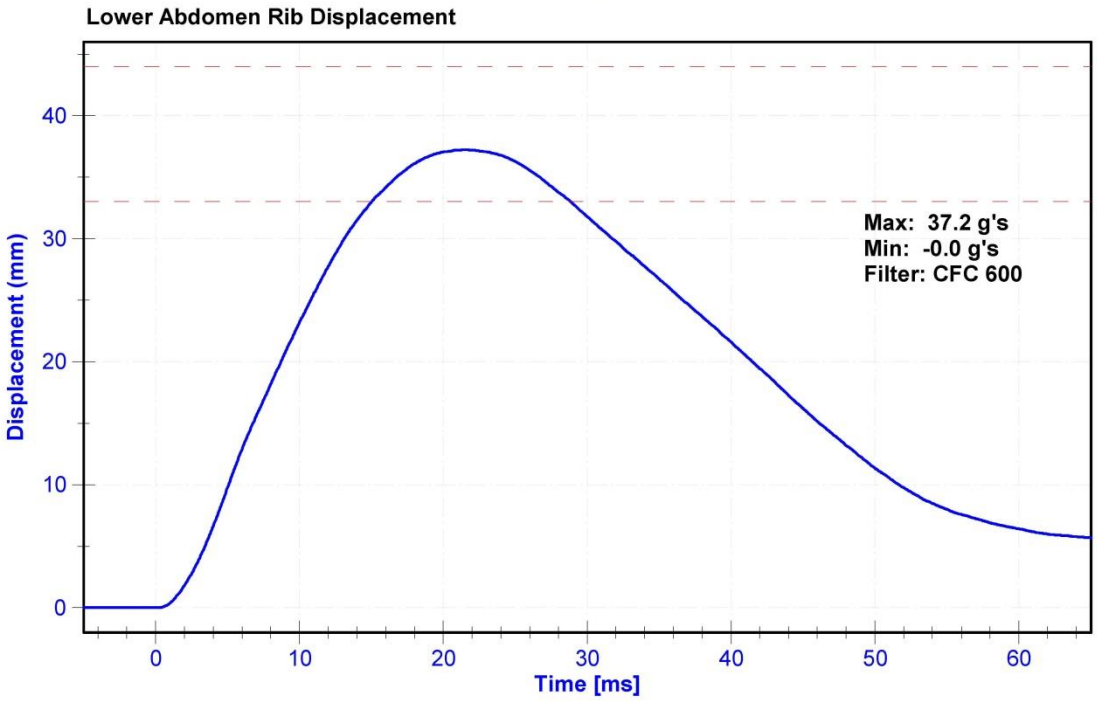
Transducer Calibrations

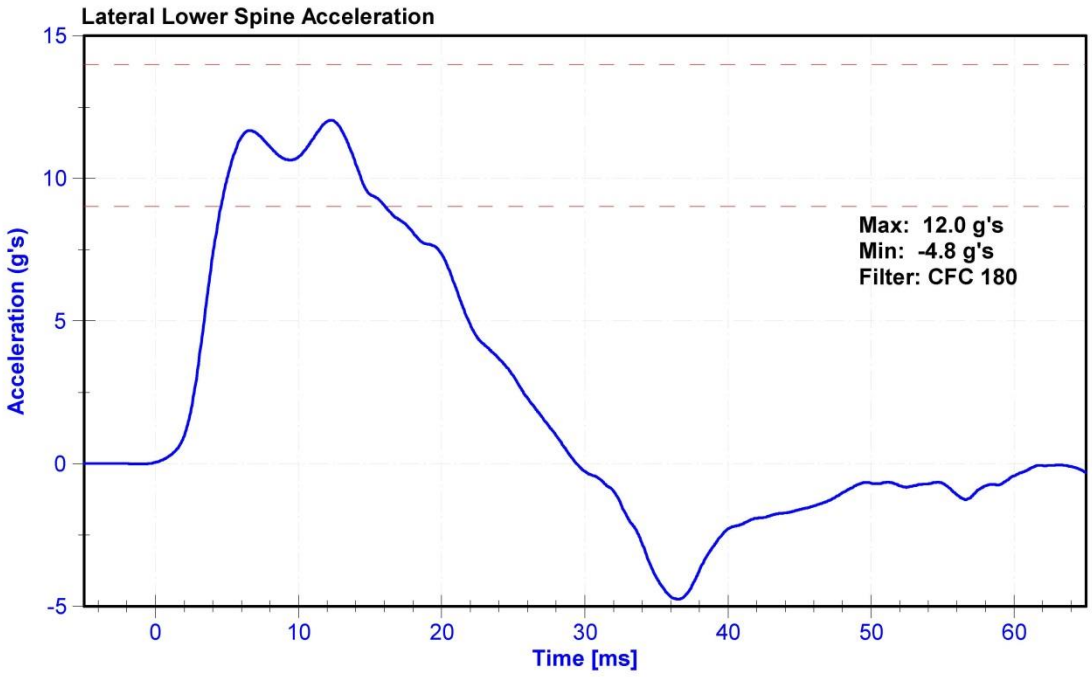
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	8/28/2014	2/26/2015
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	8/12/2014	8/12/2015
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	8/7/2014	8/7/2015

Probe Acceleration




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.1 g's
Min: -0.0 g's
Filter: CFC 600
0
10
20
30
40
50
60


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.2 g's
Min: -0.0 g's
Filter: CFC 600
0
10
20
30
40
50
60


Lateral Lower Spine Acceleration
Acceleration (g's)
15
10
5
0
-5
0
10
20
30
40
50
60
Time [ms]
Max: 12.0 g's
Min: -4.8 g's
Filter: CFC 180

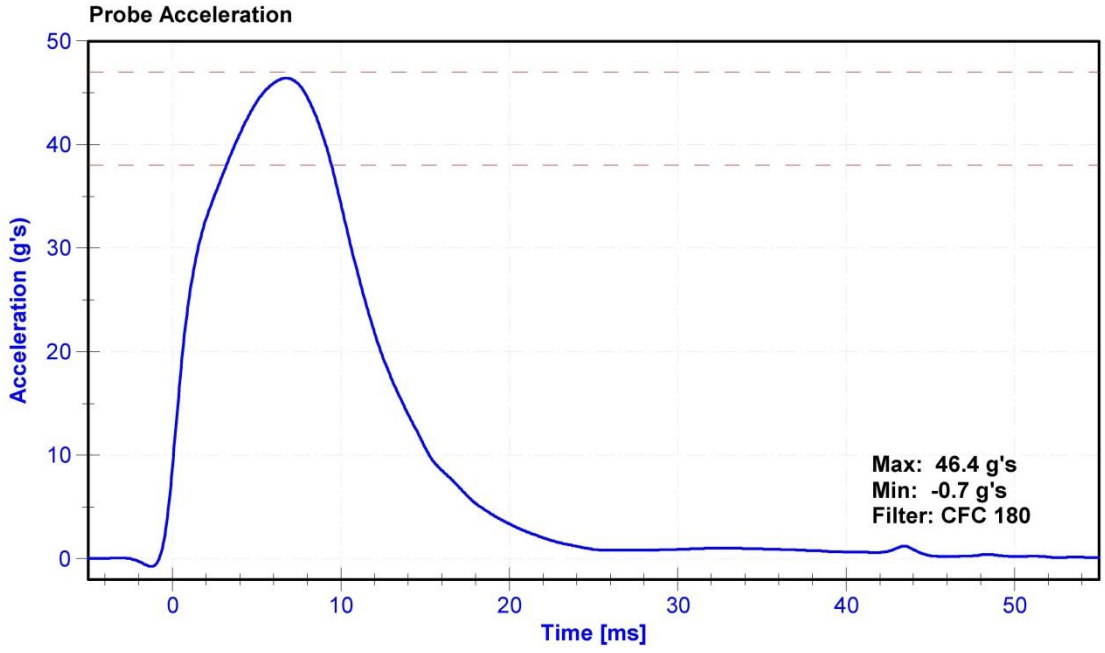
ATD Manufacturer	FTSS	Test Technician	M.Hartung
ATD Serial Number	300	Laboratory Supervisor	M.Goehle

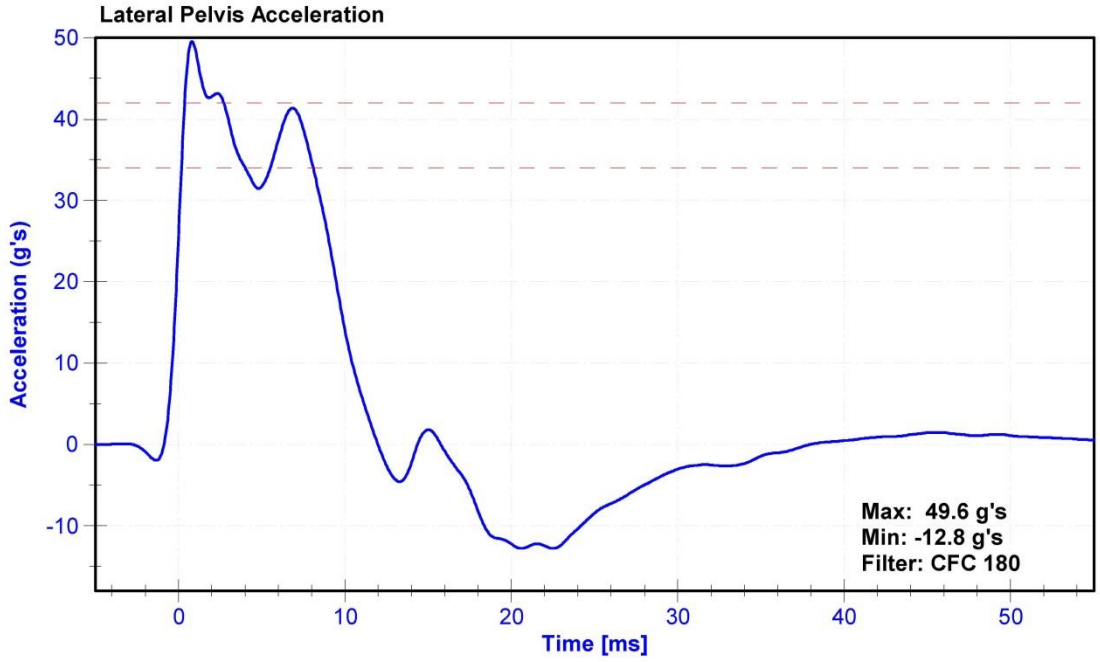
Results

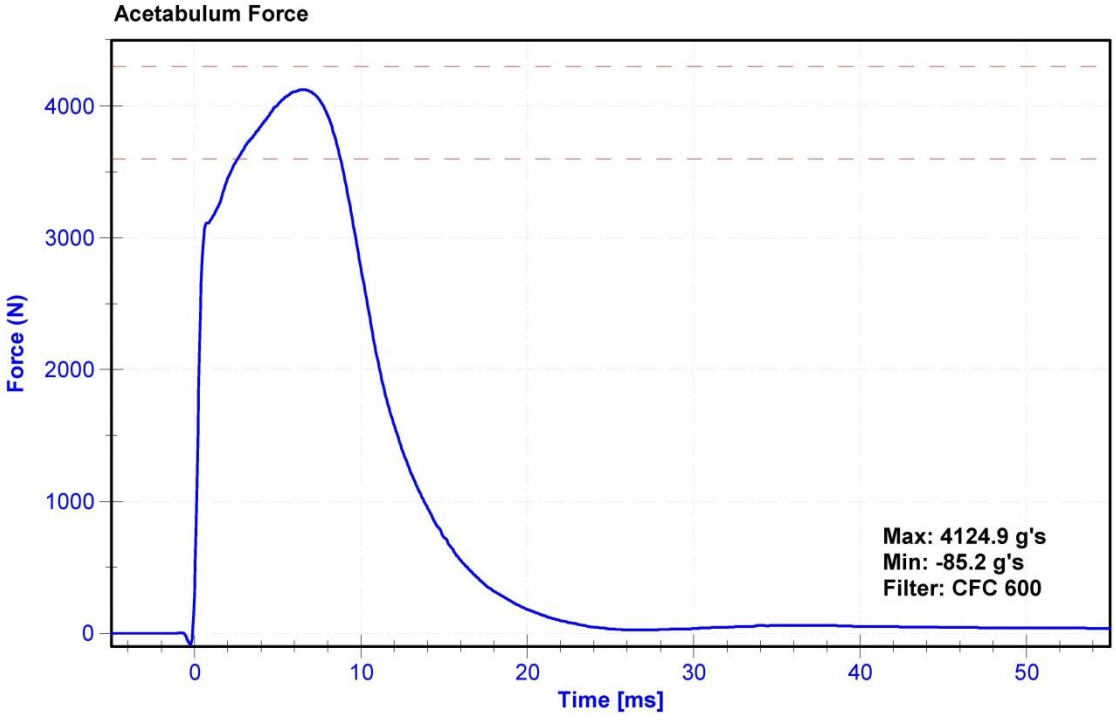
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.3	Pass
Humidity	10	70	%	14.7	Pass
Velocity	6.6	6.8	m/s	6.68	Pass
Probe Acceleration	38	47	g's	46.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.4	Pass
Acetabulum Force	3,600	4,300	N	4124.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P35797	11/24/2014	5/25/2015
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	5/13/2014	5/13/2015
Certification Plug	Humanetics	46466	9/22/2011	N/A
Crash Test Plug	Humanetics	46431	9/22/2011	N/A




Lateral Pelvis Acceleration
Acceleration (g's)
50
40
30
20
10
0
-10
0
10
20
30
40
50
Time [ms]
Max: 49.6 g's
Min: -12.8 g's
Filter: CFC 180


Acetabulum Force
Force (N)
4000
3000
2000
1000
0
0
10
20
30
40
50
Time [ms]
Max: 4124.9 g's
Min: -85.2 g's
Filter: CFC 600

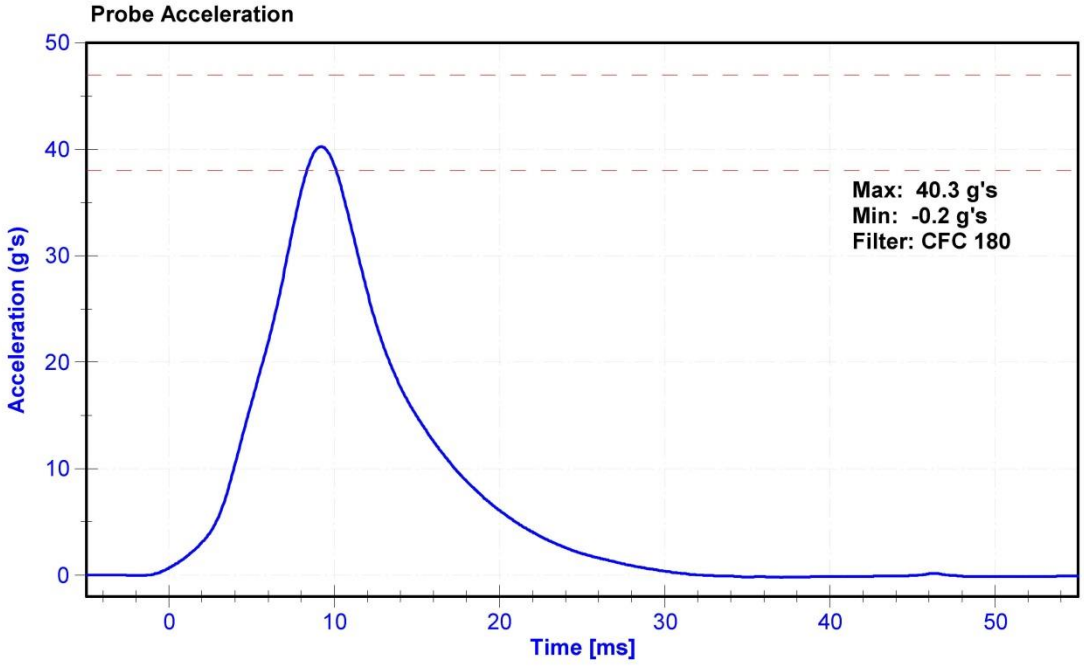
ATD Manufacturer	FTSS	Test Technician	M. Hartung
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

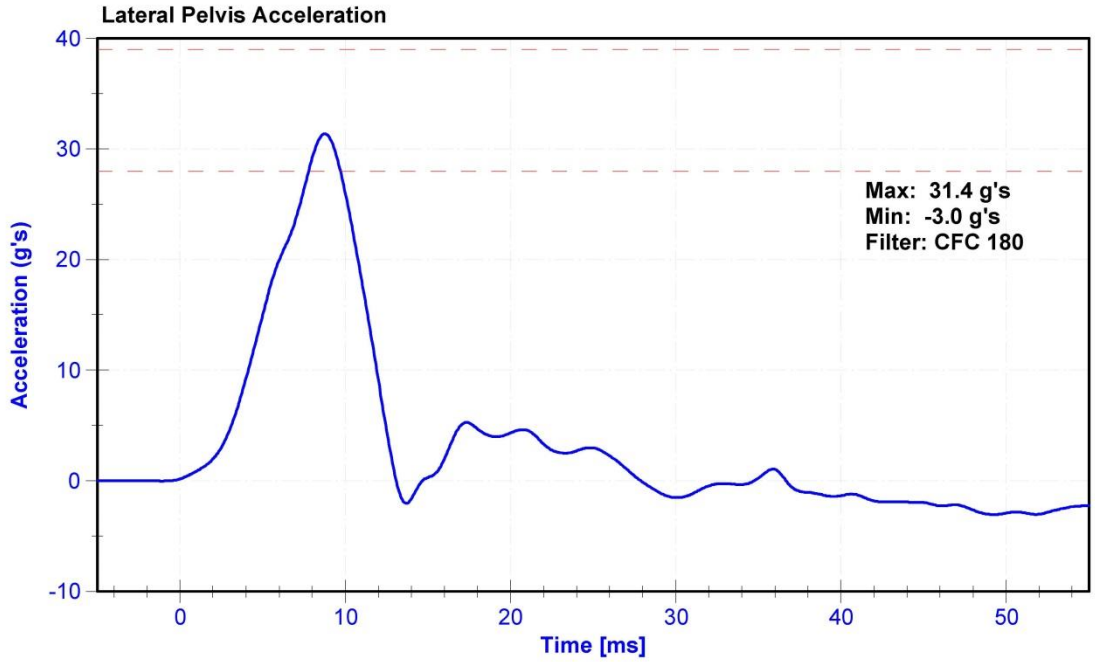
Results

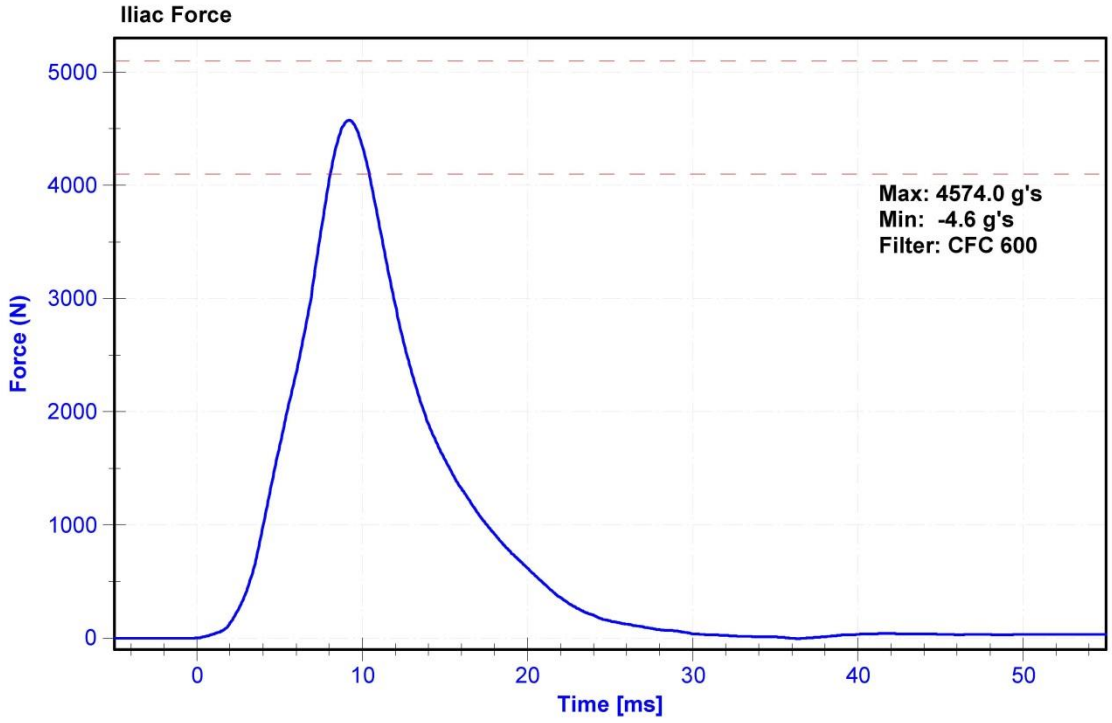
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	15.0	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	36	45	g's	40.3	Pass
Lateral Pelvis Acceleration	28	39	g's	31.4	Pass
Iliac Force	4,100	5,100	N	4574.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P35797	11/24/2014	5/25/2015
Iliac Load Cell	DENTON 3228J	LC-279Fy	5/14/2014	5/14/2015




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 31.4 g's
Min: -3.0 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4574.0 g's
Min: -4.6 g's
Filter: CFC 600

CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

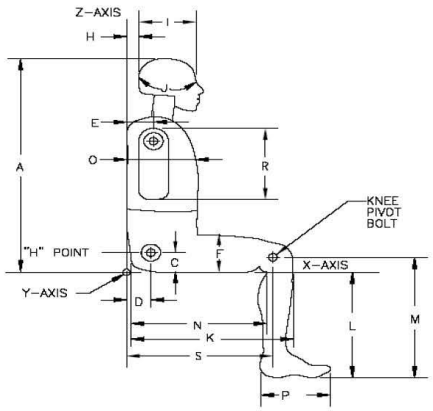
SERIAL NO: 300

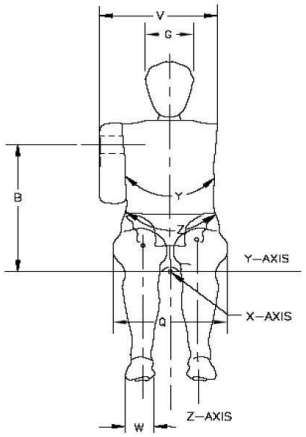
(CONFIGURED FOR LEFT SIDE IMPACT)

External Measurements - SID-IIs

Technician: M. Geesey Date: 2/16/2015

Dummy Serial Number: 300





Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	781	Pass
B	Shoulder Pivot Height	437	453	448	Pass
C	H-point Height	79	89	87	Pass
D	H-point from seatback	141	151	146	Pass
E	Shoulder Pivot from Backline	97	107	104	Pass
F	Thigh Clearance	119	135	123	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	183	Pass
J	Head Circumference	541	551	548	Pass
K	Buttock to Knee Length	514	540	539	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	404	Pass
N	Buttock Popliteal Length	416	442	438	Pass
O	Chest Depth w/o jacket	195	211	205	Pass
P	Foot Length	216	232	219	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	318	Pass
R	Arm Length	249	259	251	Pass
S	Knee Joint to seatback	477	493	486	Pass
V	Shoulder Width	341	357	347	Pass
W	Foot Width	78	94	82	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	770	Pass

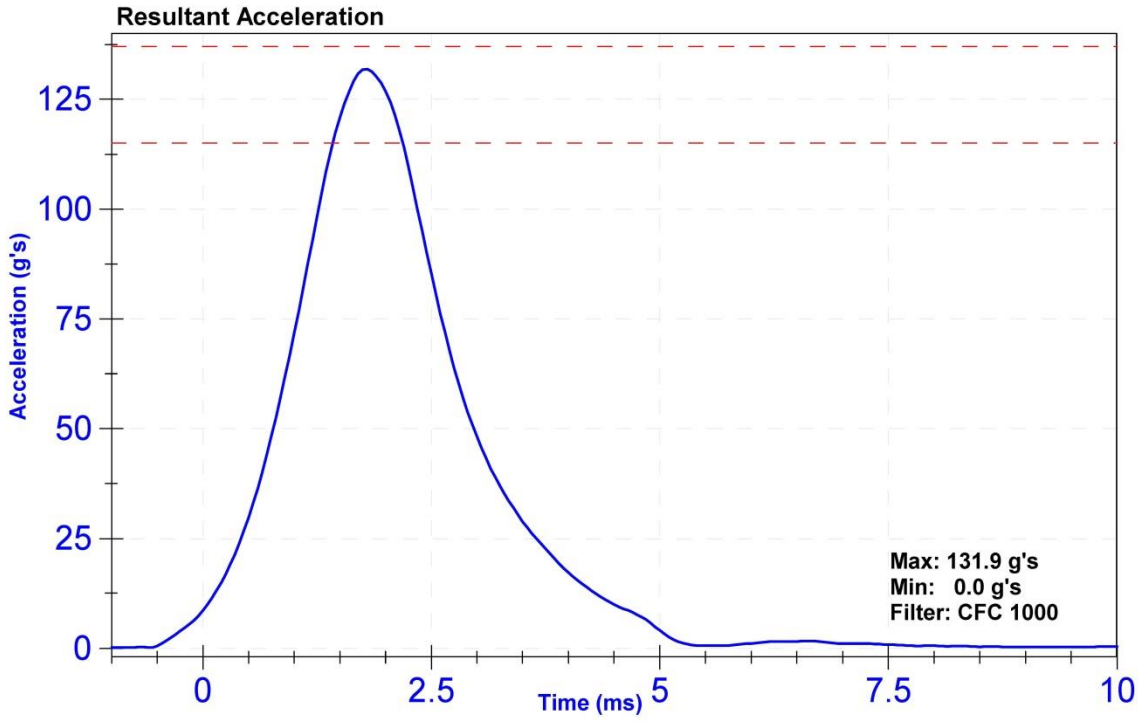
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

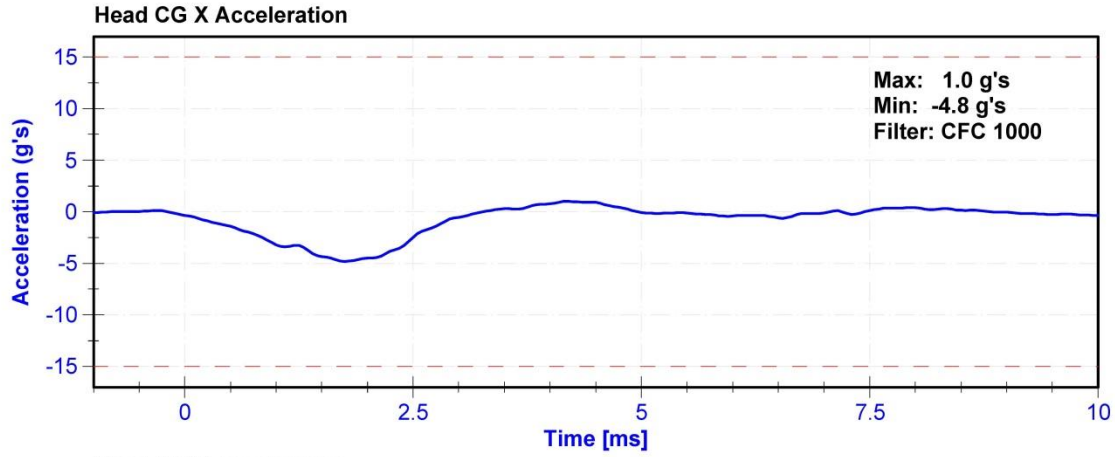
Results

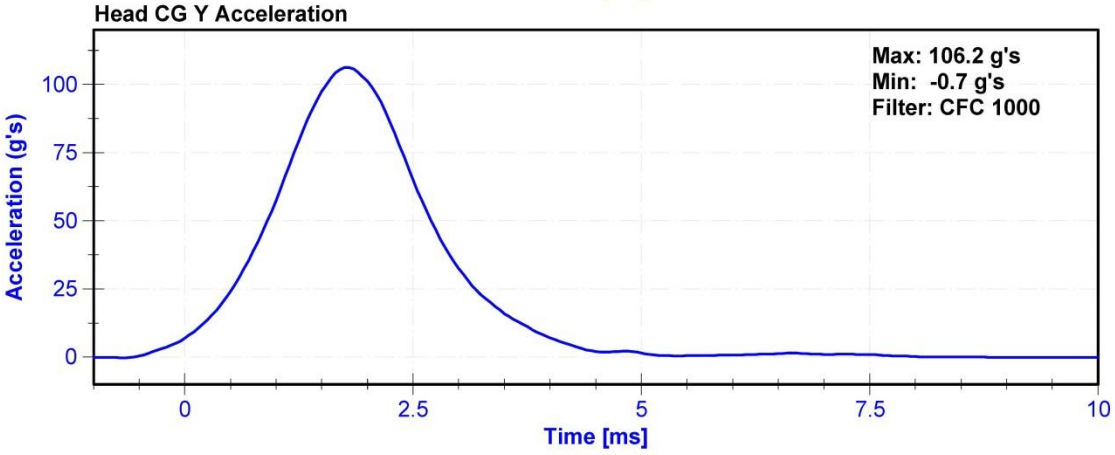
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	21.4	Pass
Humidity	10	70	%	11.7	Pass
Resultant Acceleration	115	137	g's	131.9	Pass
Oscillation	0	15	%	1.2	Pass
Fore-Aft Acceleration	-15	15	g's	-4.8	Pass

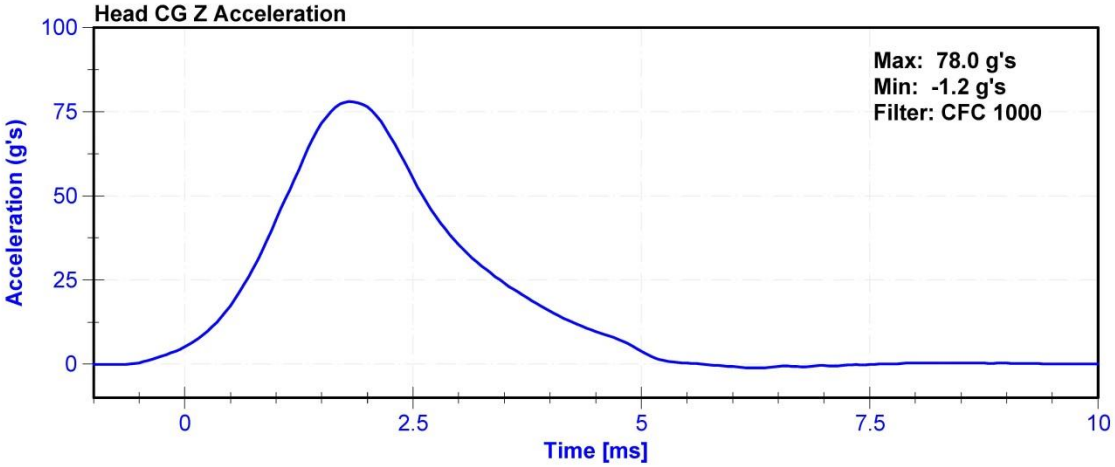
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	8/28/2014	2/26/2015
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	8/28/2014	2/26/2015
Z Accelerometer	ENDEVCO 7264CT	AC-P68608	8/28/2014	2/26/2015




Head CG X Acceleration
Max: 1.0 g's
Min: -4.8 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: 106.2 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]


Head CG Z Acceleration
Max: 78.0 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]

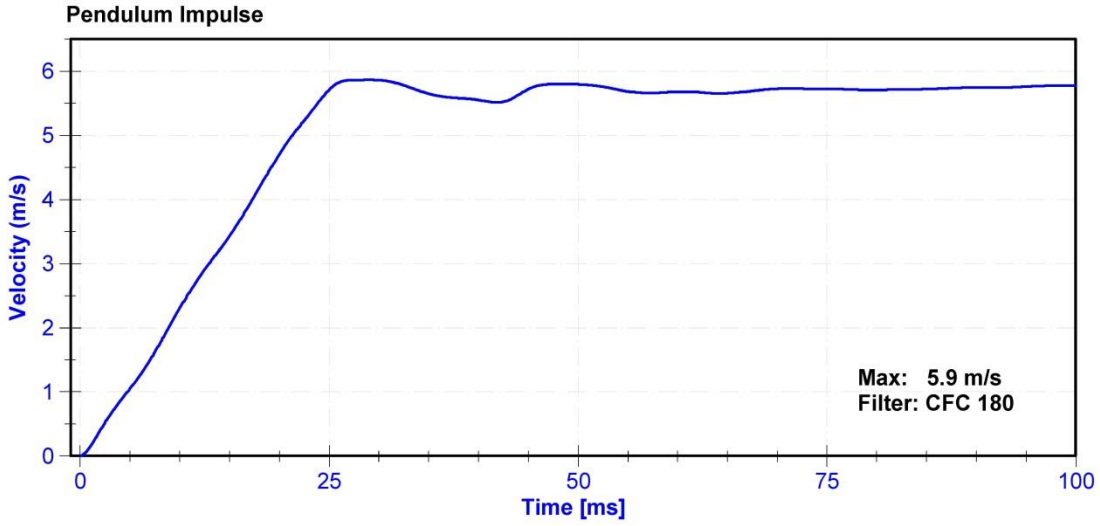
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

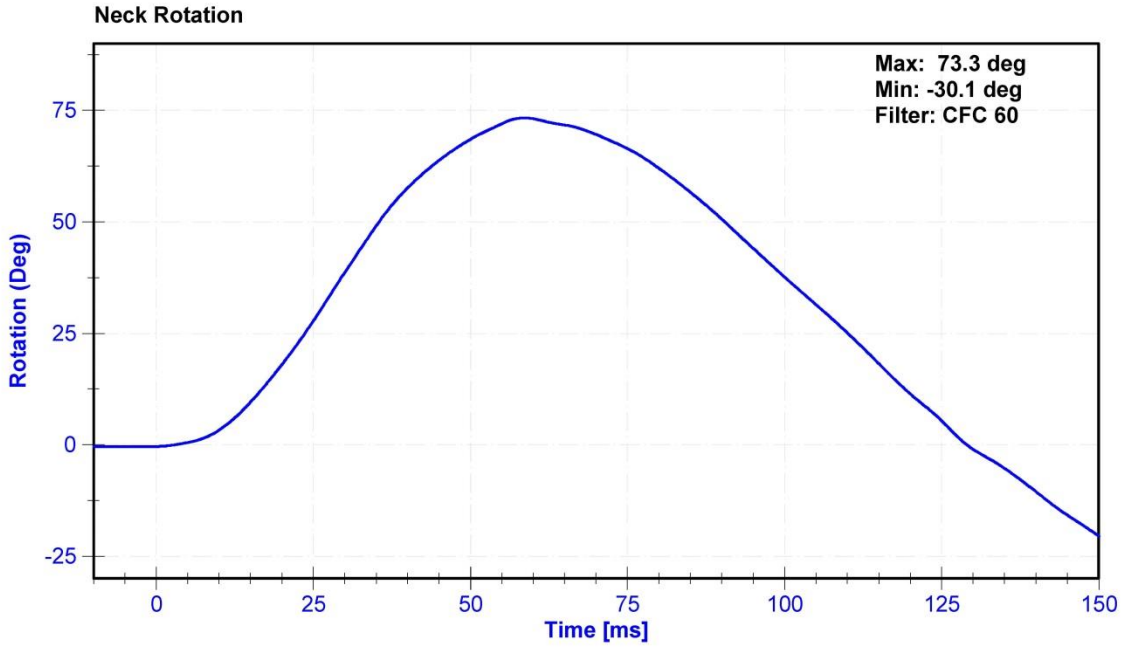
Results

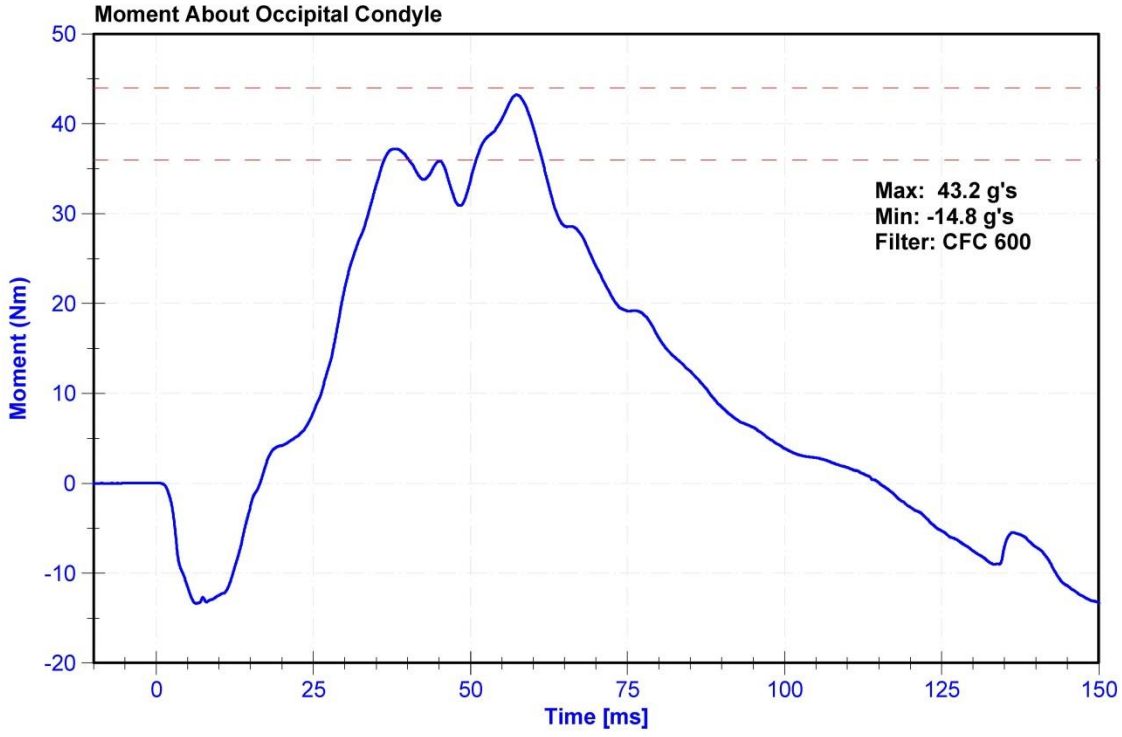
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	21.4	Pass
Humidity	10	70	%	11.7	Pass
Velocity	5.51	5.63	m/s	5.546	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.31	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.43	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.71	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.71	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	5.87	Pass
Neck Rotation	71	81	deg	73.3	Pass
Time at Maximum Rotation	50	70	ms	58.5	Pass
Moment about the OC	36	44	Nm	43.2	Pass
Moment Decay to 0 Nm	102	126	ms	115.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5F3	11/6/2014	11/6/2015
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/13/2014	11/13/2015
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/13/2014	11/13/2015
Upper Neck Load Cell	DENTON 1716A	LC-130Fy	9/12/2014	9/12/2015




Neck Rotation
Max: 73.3 deg
Min: -30.1 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: 43.2 g's
Min: -14.8 g's
Filter: CFC 600
Moment (Nm)
50
40
30
20
10
0
-10
-20
0
25
50
75
100
125
150
Time [ms]

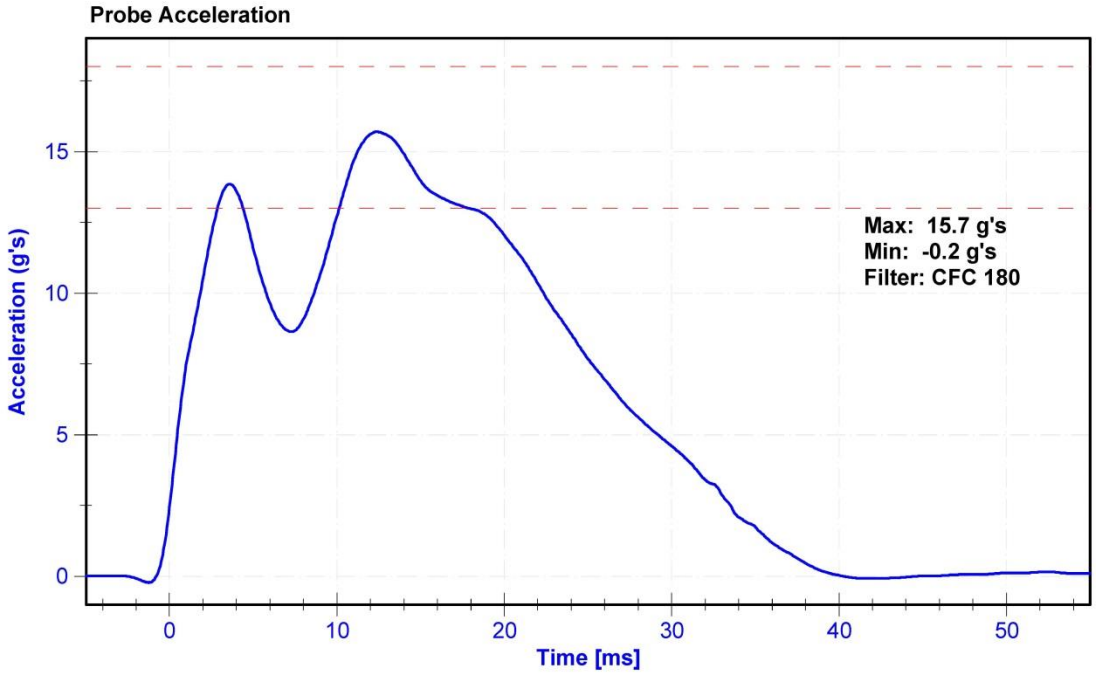
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

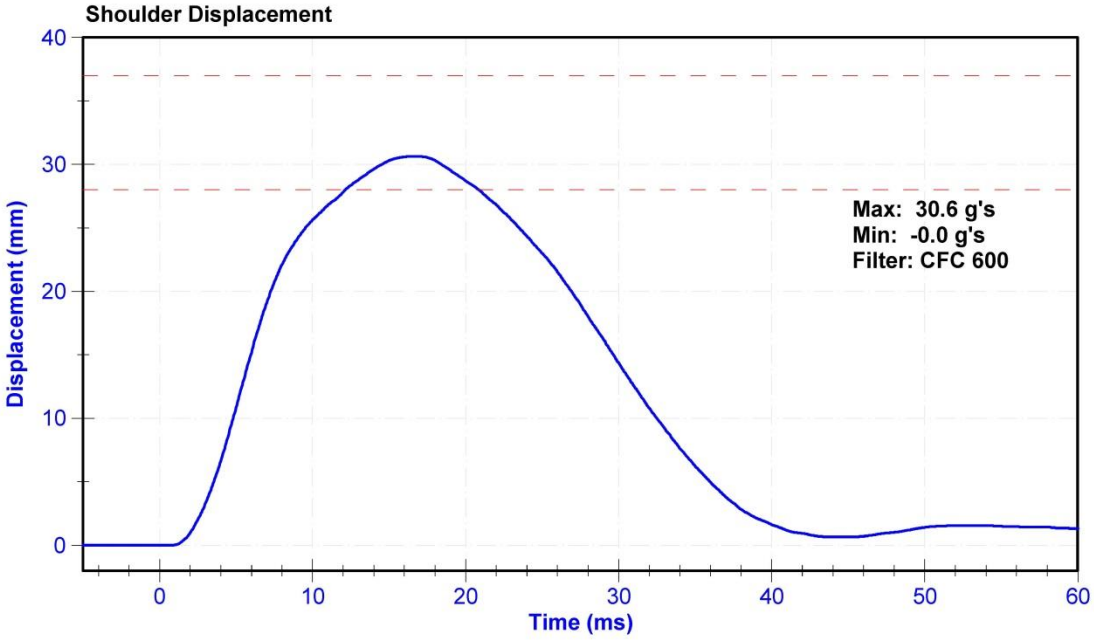
Results

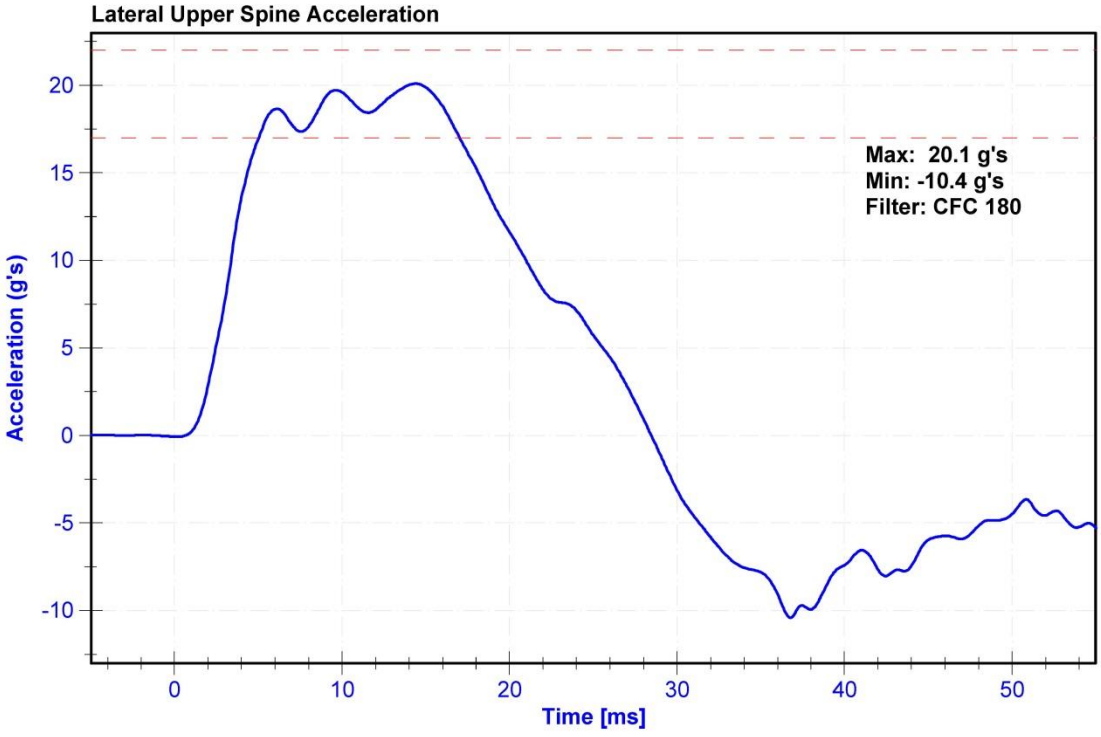
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.6	Pass
Humidity	10	70	%	13.5	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	13	18	g's	15.7	Pass
Shoulder Deflection	28	37	mm	30.6	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	8/7/2014	8/7/2015
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P51915	8/28/2014	8/28/2015




Shoulder Displacement
Displacement (mm)
Time (ms)
Max: 30.6 g's
Min: -0.0 g's
Filter: CFC 600
0
10
20
30
40
50
60


Lateral Upper Spine Acceleration
Acceleration (g's)
Time [ms]
Max: 20.1 g's
Min: -10.4 g's
Filter: CFC 180
-10
-5
0
5
10
15
20
30
40
50

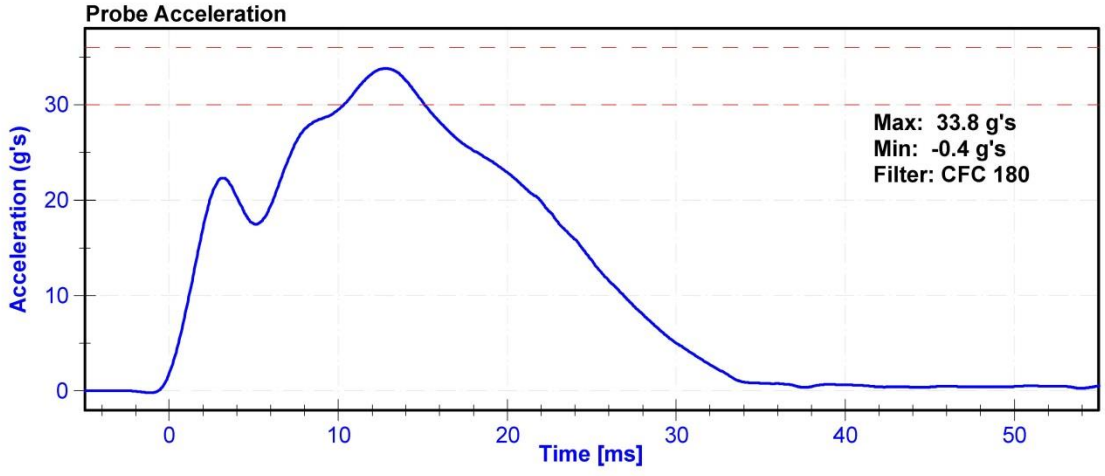
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

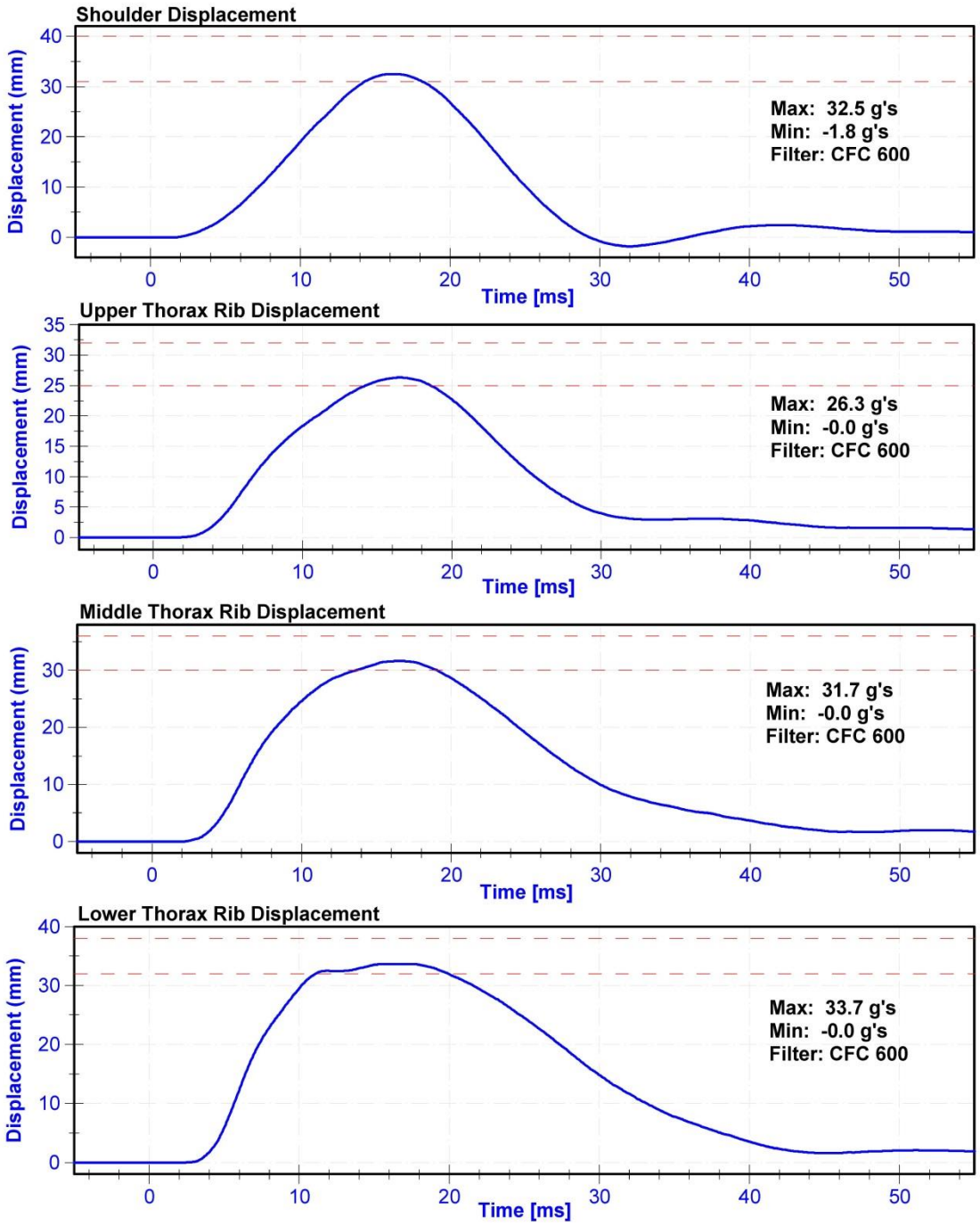
Results

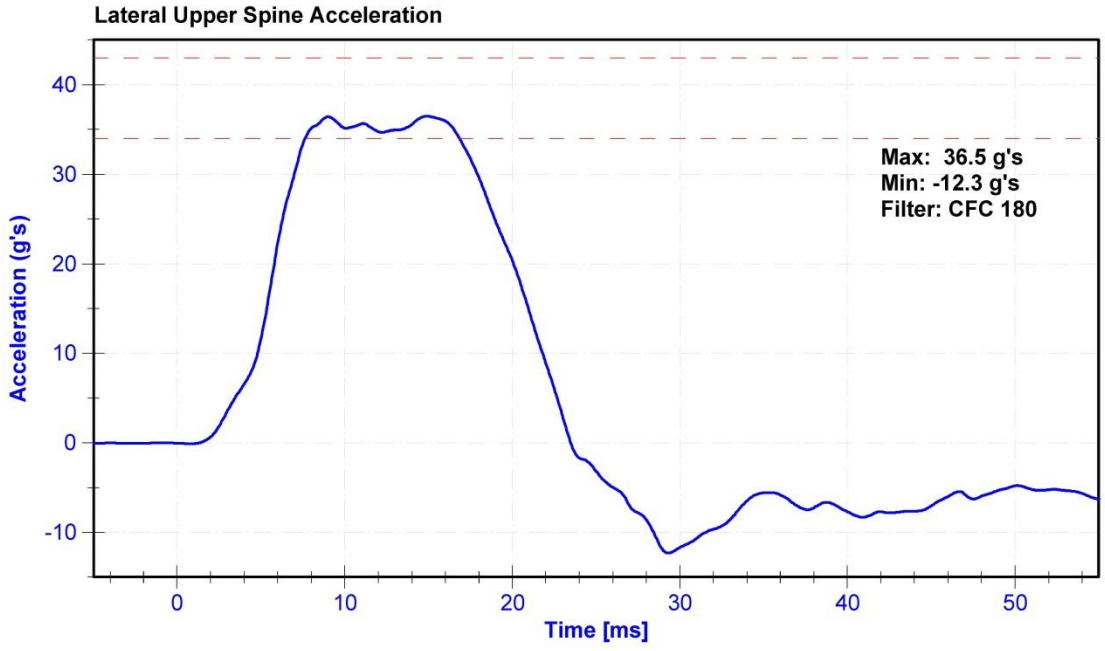
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	21.0	Pass
Humidity	10	70	%	12.8	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration after 5 ms	30	36	g's	33.8	Pass
Lateral Upper Spine Acceleration	34	43	g's	36.5	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.9	Pass
Shoulder Deflection	31	40	mm	32.5	Pass
Upper Thorax Rib Deflection	25	32	mm	26.3	Pass
Mid Thorax Rib Deflection	30	36	mm	31.7	Pass
Lower Thorax Rib Deflection	32	38	mm	33.7	Pass

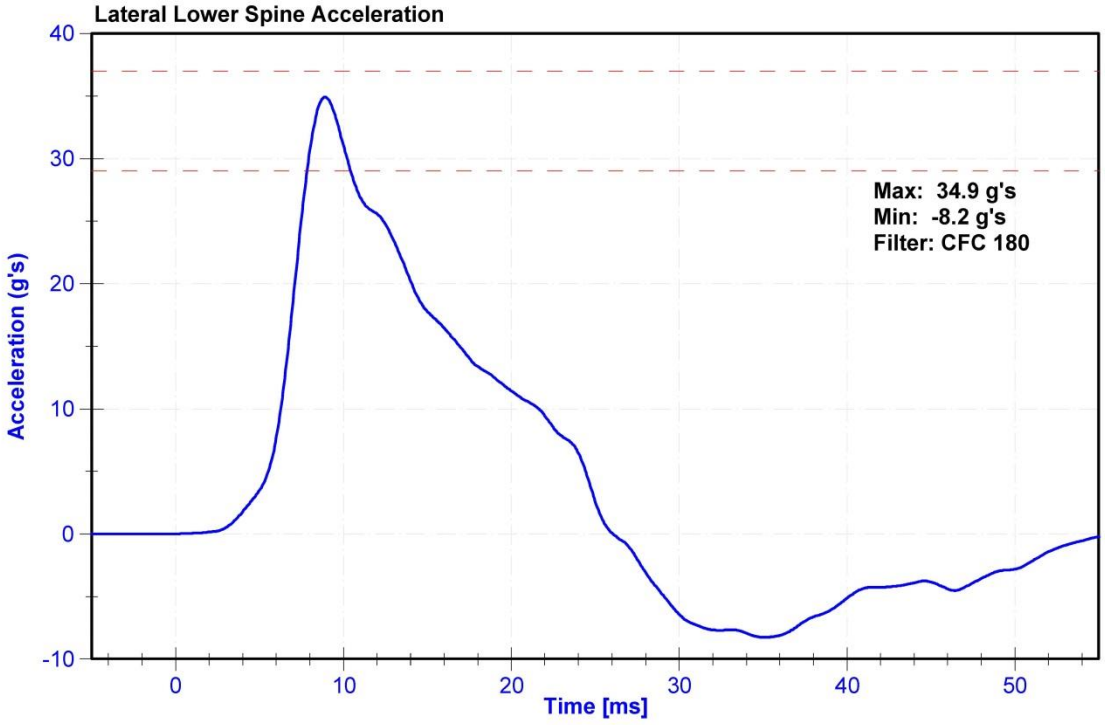
Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Spine T1 Y Accelerometer	ENDEVCO 7264	AC-P51915	8/28/2014	8/28/2015
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	8/28/2014	2/26/2015
Shoulder Potentiometer	Servo 08TC1-3725	DS-1063GFE	8/7/2014	8/7/2015
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	8/12/2014	8/12/2015
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	8/12/2014	8/12/2015
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	8/12/2014	8/12/2015




Shoulder Displacement
Displacement (mm)
Time [ms]
Max: 32.5 g's
Min: -1.8 g's
Filter: CFC 600
Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 26.3 g's
Min: -0.0 g's
Filter: CFC 600
Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 31.7 g's
Min: -0.0 g's
Filter: CFC 600
Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.7 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 36.5 g's
Min: -12.3 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: 34.9 g's
Min: -8.2 g's
Filter: CFC 180
Acceleration (g's)
Time [ms]
40
30
20
10
0
-10
0
10
20
30
40
50

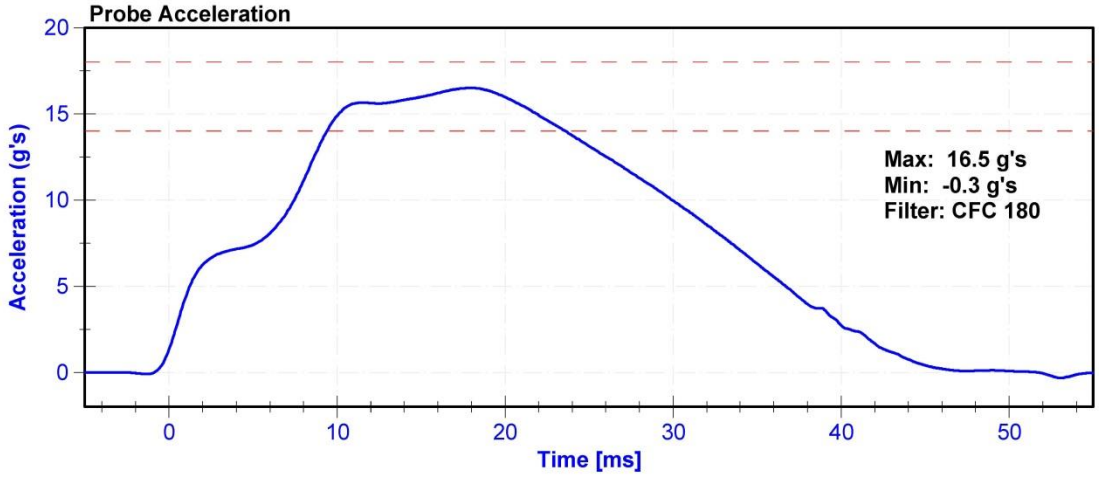
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

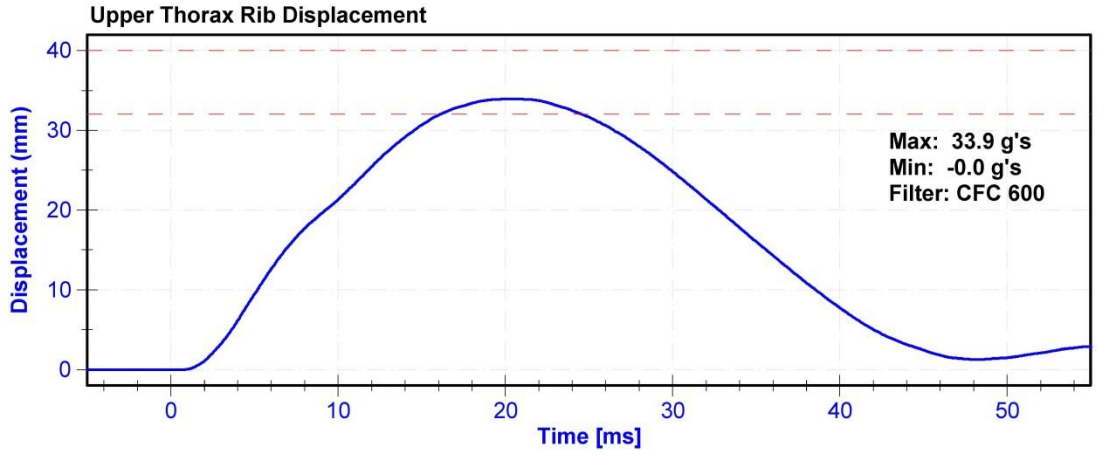
Results

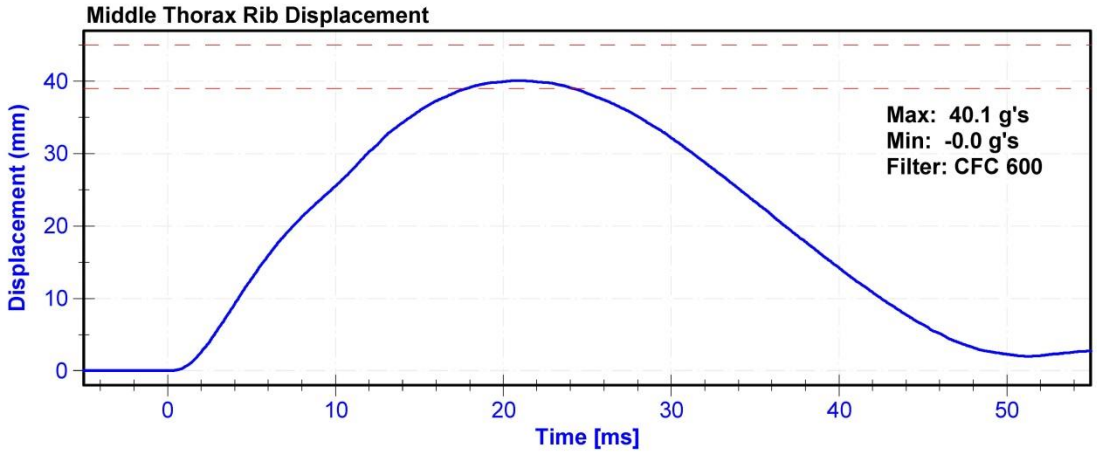
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.8	Pass
Humidity	10	70	%	13	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	14	18	g's	16.5	Pass
Lateral Upper Spine Acceleration	13	17	g's	16.2	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.8	Pass
Upper Thorax Rib Deflection	32	40	mm	33.9	Pass
Middle Thorax Rib Deflection	39	45	mm	40.1	Pass
Lower Thorax Rib Deflection	35	43	mm	37.5	Pass

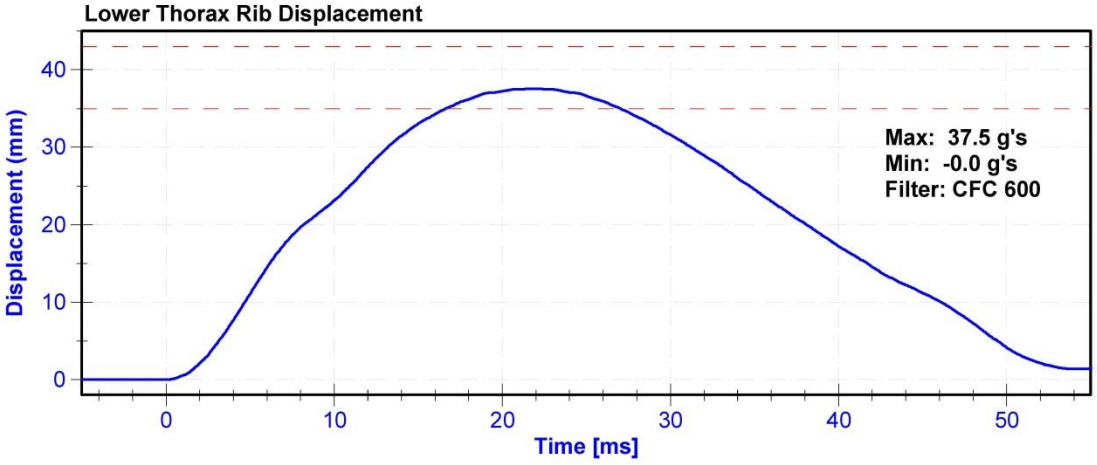
Transducer Calibrations

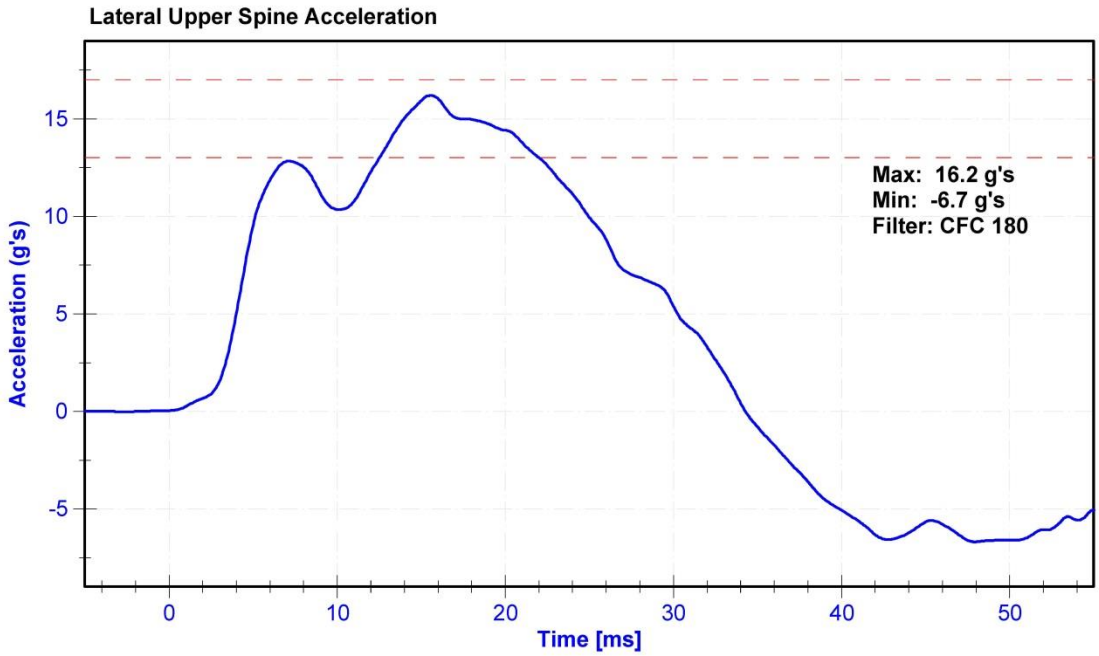
Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Upper Spine Y Accelerometer	ENDEVCO 7264	AC-P51915	8/28/2014	8/28/2015
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	8/28/2014	2/26/2015
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	8/12/2014	8/12/2015
Middle Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1151GFE	8/12/2014	8/12/2015
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	8/12/2014	8/12/2015

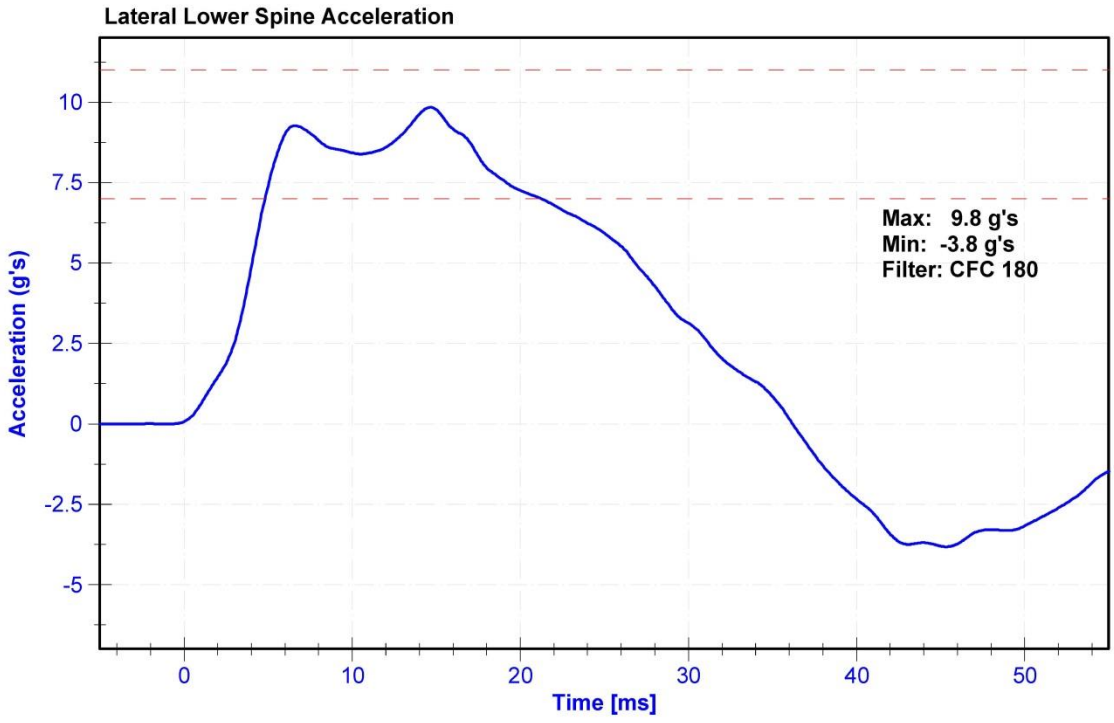



Upper Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 33.9 g's
Min: -0.0 g's
Filter: CFC 600


Middle Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 40.1 g's
Min: -0.0 g's
Filter: CFC 600


Lower Thorax Rib Displacement
Displacement (mm)
Time [ms]
Max: 37.5 g's
Min: -0.0 g's
Filter: CFC 600


Lateral Upper Spine Acceleration
Max: 16.2 g's
Min: -6.7 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: 9.8 g's
Min: -3.8 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	300	Laboratory Supervisor	M. Goehle

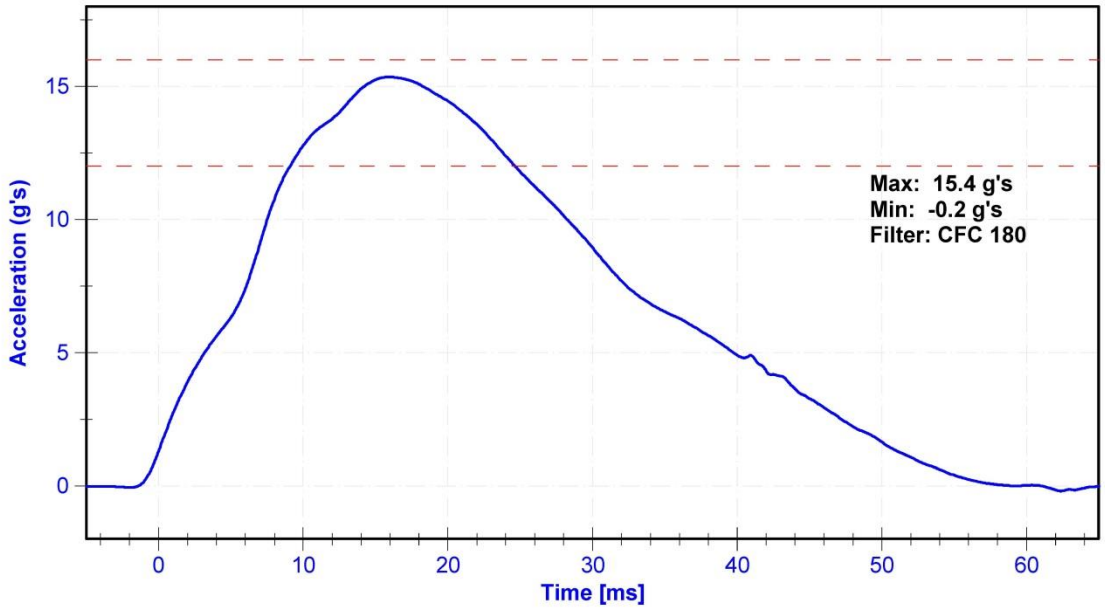
Results

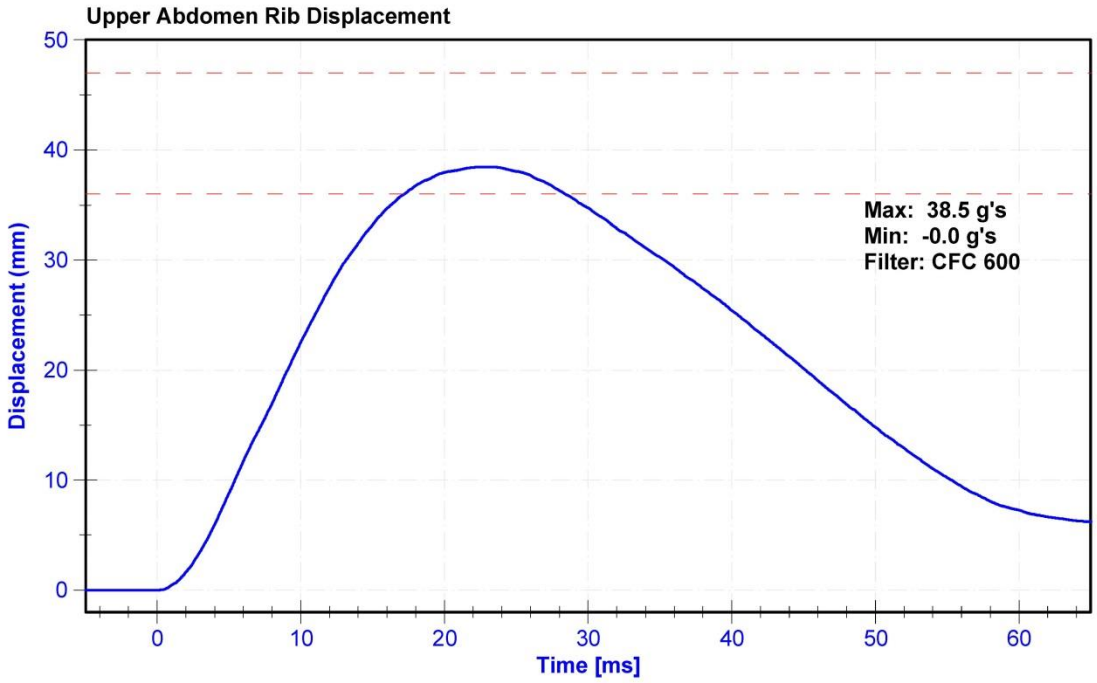
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	20.9	Pass
Humidity	10	70	%	12.8	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	12	16	g's	15.4	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.4	Pass
Upper Abdomen Rib Deflection	36	47	mm	38.5	Pass
Lower Abdomen Rib Deflection	33	44	mm	39.1	Pass

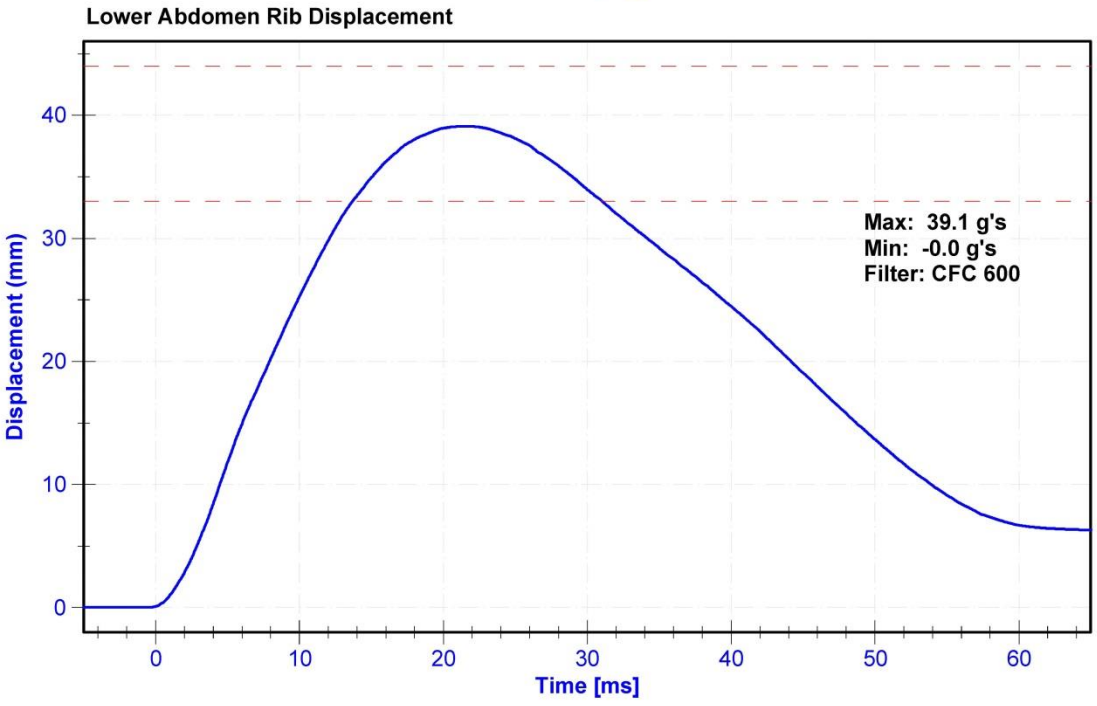
Transducer Calibrations

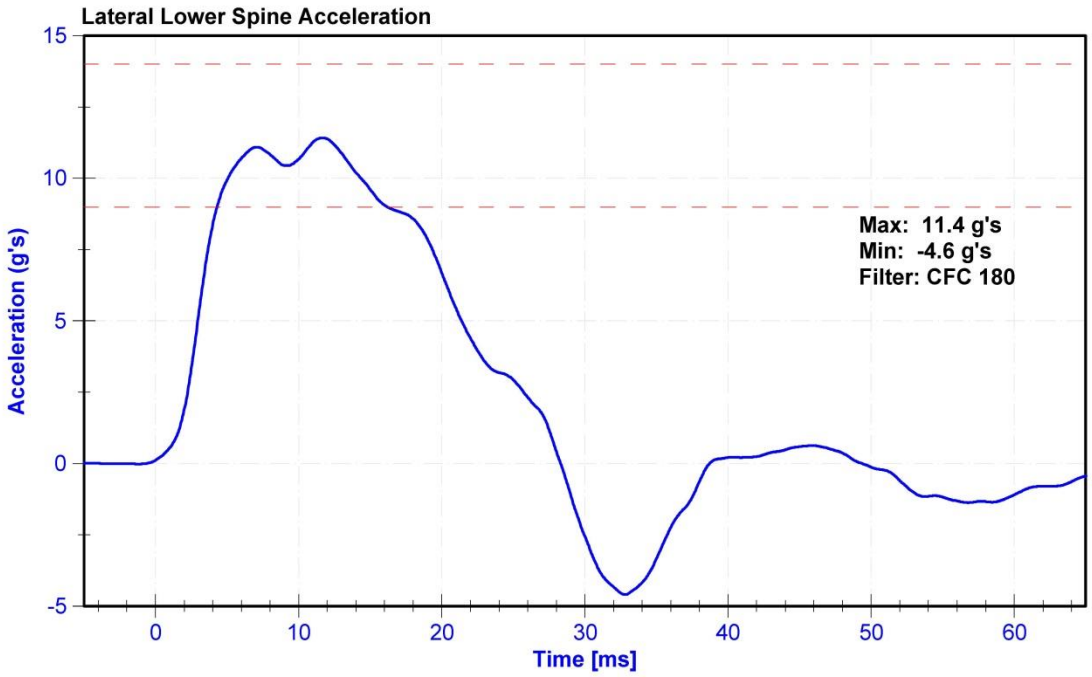
Channel	Manufacturer	Serial Number	Calibratio Date	Calibration Due Date
Probe Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	8/28/2014	2/26/2015
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	8/12/2014	8/12/2015
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	8/7/2014	8/7/2015

Probe Acceleration




Upper Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 38.5 g's
Min: -0.0 g's
Filter: CFC 600


Lower Abdomen Rib Displacement
Displacement (mm)
Time [ms]
Max: 39.1 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: 11.4 g's
Min: -4.6 g's
Filter: CFC 180

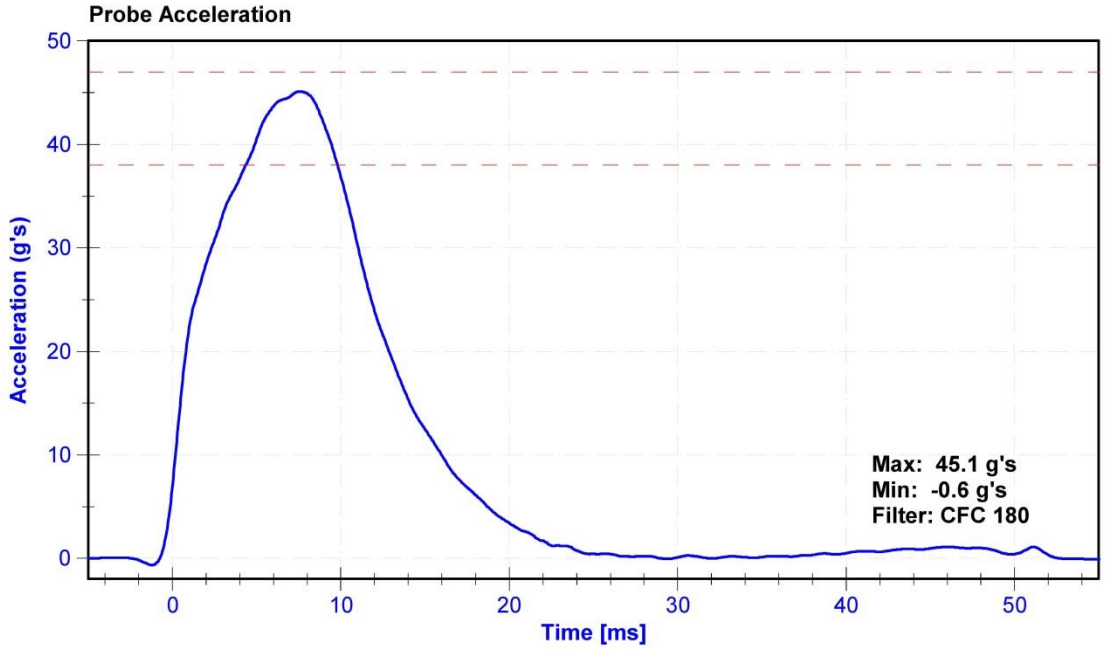
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

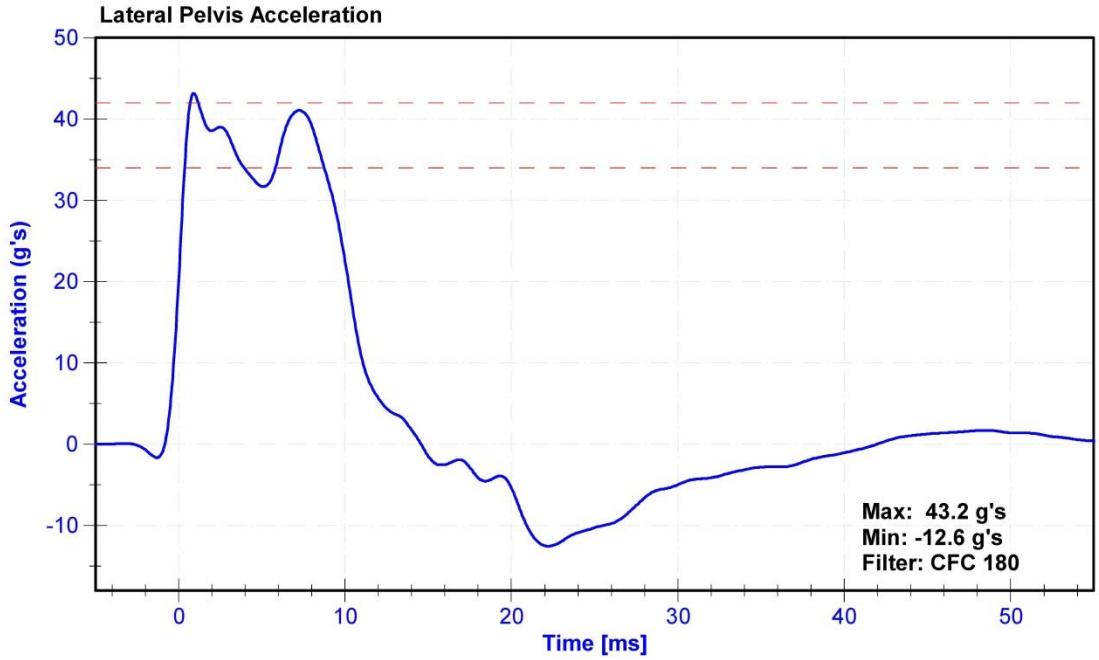
Results

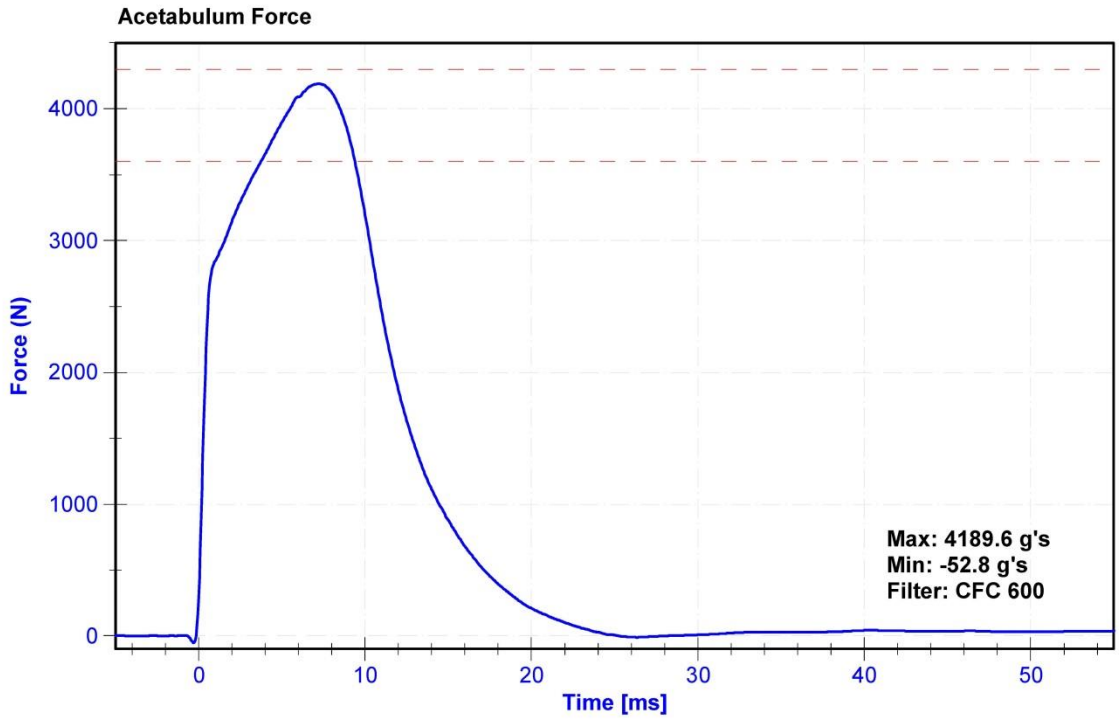
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	12.9	Pass
Velocity	6.6	6.8	m/s	6.70	Pass
Probe Acceleration	38	47	g's	45.1	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.1	Pass
Acetabulum Force	3,600	4,300	N	4189.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P35797	11/24/2014	5/25/2015
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	5/13/2014	5/13/2015
Certification Plug	Humanetics	49013	12/07/2011	N/A
Crash Test Plug	Humanetics	63008	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: 43.2 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: 4189.6 g's
Min: -52.8 g's
Filter: CFC 600

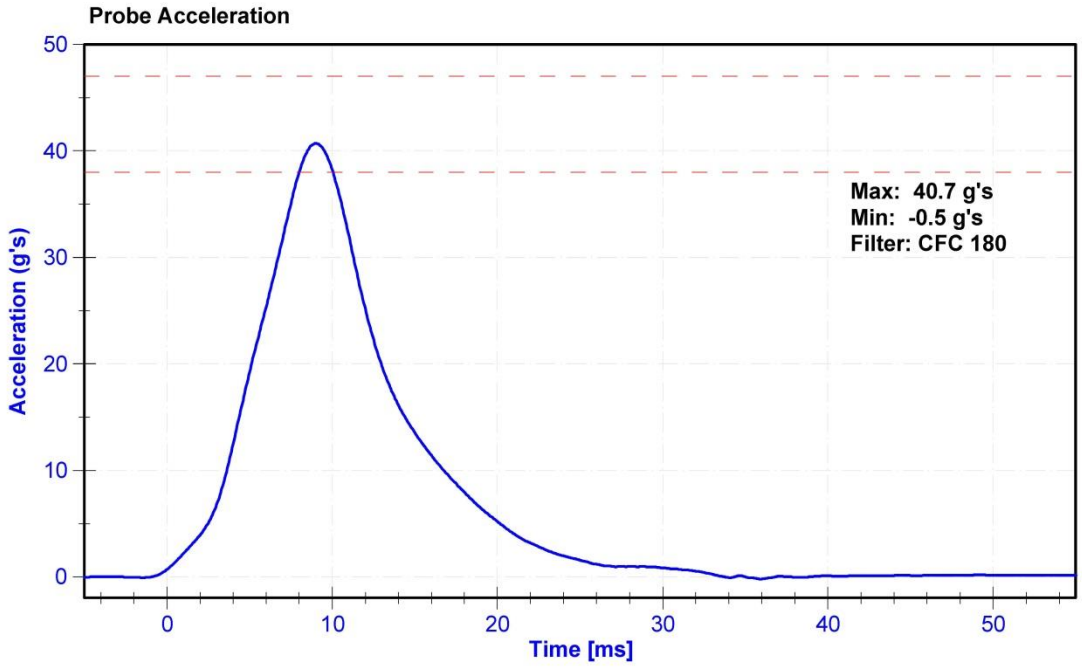
ATD Manufacturer	FTSS	Test Technician	M. Geesey
ATD Serial Number	300	Laboratory Supervisor	M. Goehle

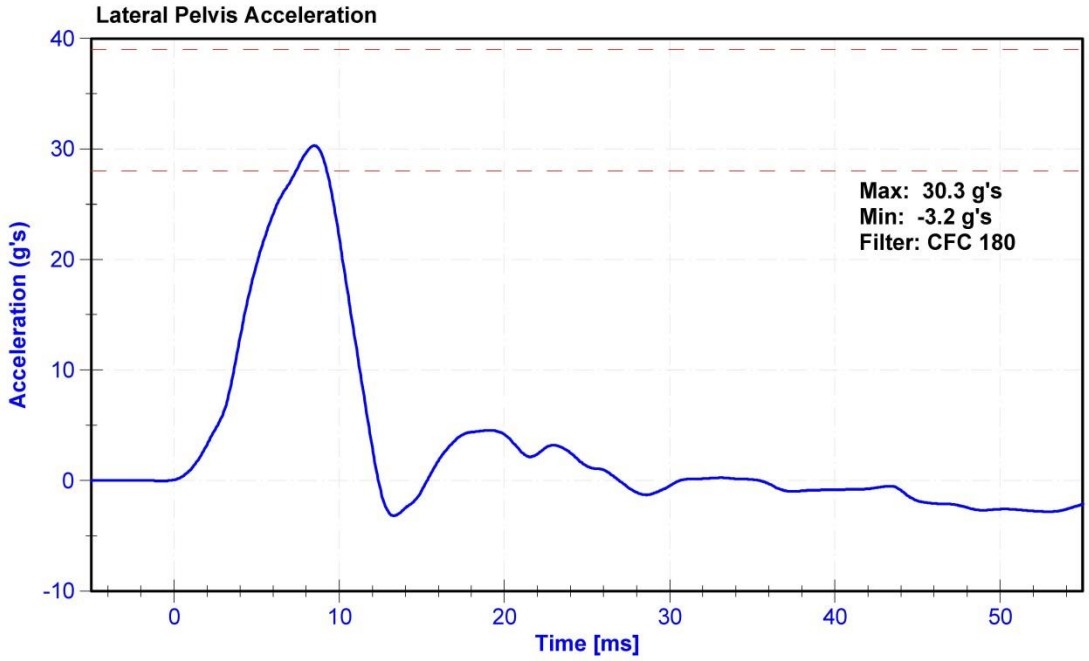
Results

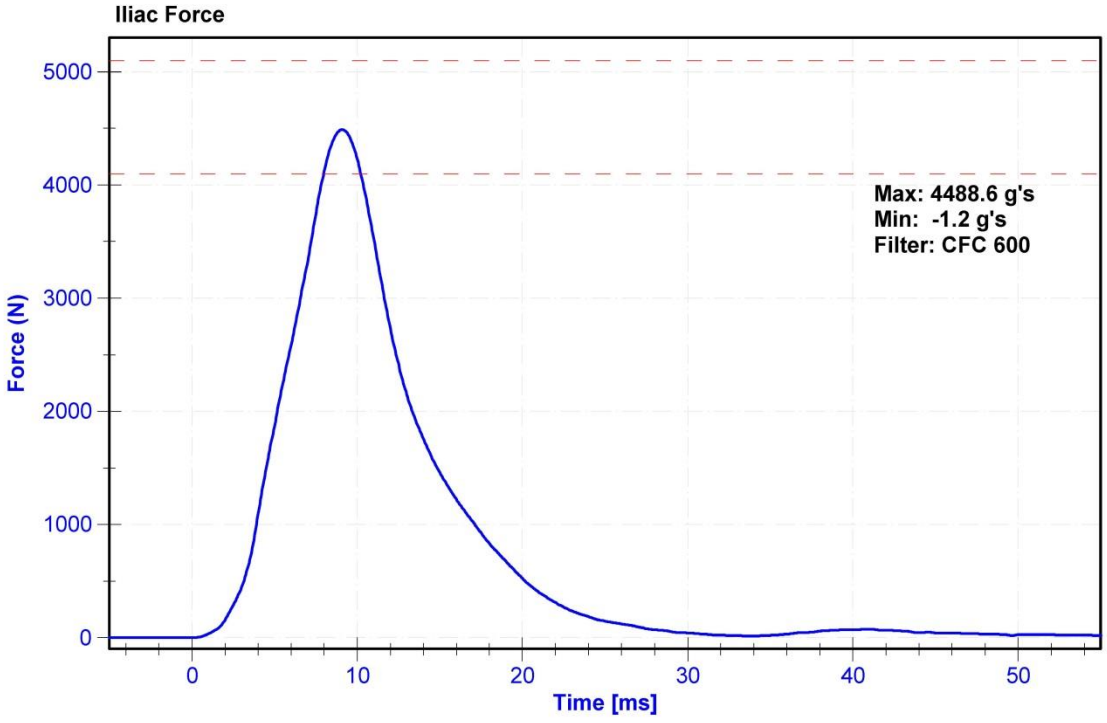
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	C	21.0	Pass
Humidity	10	70	%	12.4	Pass
Velocity	4.2	4.4	m/s	4.32	Pass
Probe Acceleration	36	45	g's	40.7	Pass
Lateral Pelvis Acceleration	28	39	g's	30.3	Pass
Iliac Force	4,100	5,100	N	4488.6	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-C14972	2/6/2015	8/7/2015
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P35797	11/24/2014	5/25/2015
Iliac Load Cell	DENTON 3228J	LC-279Fy	5/14/2014	5/14/2015




Lateral Pelvis Acceleration
Acceleration (g's)
Time [ms]
Max: 30.3 g's
Min: -3.2 g's
Filter: CFC 180


Iliac Force
Force (N)
Time [ms]
Max: 4488.6 g's
Min: -1.2 g's
Filter: CFC 600

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	8/28/2014
			Y	AC-P59018	ENDEVCO	8/28/2014
			Z	AC-P68608	ENDEVCO	8/28/2014
Head Accelerometers - Redundant			X	AC-P52095	ENDEVCO	8/28/2014
			Y	AC-P58986	ENDEVCO	8/28/2014
			Z	AC-P68057	ENDEVCO	10/16/2014
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	DS-451GFE	SERVO	8/12/2014
		Middle	Y	DS-1151GFE	SERVO	8/12/2014
		Lower	Y	DS-1156GFE	SERVO	8/12/2014
	Abdominal Rib	Upper	Y	DS-308GFE	SERVO	8/12/2014
		Lower	Y	DS-307GFE	SERVO	8/7/2014
Lower Spine Accelerometers (T12)			X	AC-P58883	ENDEVCO	8/28/2014
			Y	AC-P64147	ENDEVCO	8/28/2014
			Z	AC-P58786	ENDEVCO	8/28/2014
Acetabulum Load Cell			Y	LC-275Fy	DENTON	5/13/2014
Lilac Wing Load Cell			Y	LC-279Fy	DENTON	5/14/2014
Pelvis Plug (Struck Side)				46431	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-A156918	MSI 1201	1/9/2015
Vehicle Center of Gravity	Y	AC-A156929	MSI 1201	1/9/2015
Vehicle Center of Gravity	Z	AC-A156938	MSI 1201	1/9/2015
Left Floor Sill	Y	AC-A156916	MSI 1201	1/9/2015
A-Pillar Sill	Y	AC-A156942	MSI 1201	1/9/2015
A-Pillar Low	Y	AC-A156937	MSI 1201	1/9/2015
A-Pillar Mid	Y	AC-A156946	MSI 1201	1/9/2015
B-Pillar Sill	Y	AC-A156943	MSI 1201	1/9/2015
B-Pillar Low	Y	AC-A156930	MSI 1201	1/9/2015
B-Pillar Mid	Y	AC-A156947	MSI 1201	1/9/2015
Driver Seat	Y	AC-A156912	MSI 1201	1/9/2015
Engine Top	X	AC-A156950	MSI 1201	1/9/2015
Engine Top	Y	AC-A156933	MSI 1201	1/9/2015
Firewall	Y	AC-A156931	MSI 1201	1/9/2015
Right Roof	Y	AC-A156935	MSI 1201	1/9/2015
Right Floor Sill	Y	AC-A156926	MSI 1201	1/9/2015
Rear Floorpan	X	AC-A156922	MSI 1201	1/9/2015
Rear Floorpan	Y	AC-A156915	MSI 1201	1/9/2015

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	LC-18867	INTERFACE	8/25/2014
Load Cell 2	LC-18850	INTERFACE	8/25/2014
Load Cell 3	LC-46979	INTERFACE	8/25/2014
Load Cell 4	LC-18882	INTERFACE	8/25/2014
Load Cell 5	LC-62094	INTERFACE	8/25/2014
Load Cell 6	LC-46933	INTERFACE	8/25/2014
Load Cell 7	LC-18866	INTERFACE	8/25/2014
Load Cell 8	LC-46949	INTERFACE	8/25/2014