

REPORT NUMBER: SPNCAP-CAL-19-006

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

**FCA US LLC
2019 Ram 1500 Quad Cab
Truck**

NHTSA No: M20190316

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



July 31, 2019

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
OFFICE OF CRASHWORTHINESS STANDARDS
MAIL CODE: NRM-110
1200 NEW JERSEY AVE SE, ROOM W43-410
WASHINGTON, D.C. 20590**

This final test report was prepared for the U.S. Department of Transportation, National Highway Traffic Safety Administration, in response to Contract Number DTNH22-14-D-00352.

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Date: July 31, 2019

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

1. Report No. SPNCAP-CAL-19-006	2. Government Accession No.	3. Recipient's Catalog No.																												
4. Title and Subtitle Final Report of New Car Assessment Program Side Impact Pole Testing of a 2019 Ram 1500 Quad Cab Truck NHTSA No.: M20190316		5. Report Date July 31, 2019																												
		6. Performing Organization Code CAL																												
7. Author(s) Vince Paolini, Project Engineer Edward Dutton, Operations Manager		8. Performing Organization Report No. CAL-DOT-2019-006																												
9. Performing Organization Name and Address Calspan Corporation Transportation Test Operation P.O. Box 400 Buffalo, New York 14225		10. Work Unit No.																												
		11. Contract or Grant No. DTNH22-14-D-00352																												
12. Sponsoring Agency Name and Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Standards (NRM-110) 1200 New Jersey Ave., SE, Room W43-410 Washington, D.C. 20590		13. Type of Report and Period Covered: Final Test Report, April 30, 2019 - July 31, 2019																												
		14. Sponsoring Agency Code NRM-110																												
15. Supplementary Notes																														
16. Abstract A 32.20 km/h (20 mph), 75° oblique impact Side NCAP Test was conducted on the subject 2019 Ram 1500 Quad Cab Truck 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 April 30, 2019. The impact velocity of the vehicle was 32.22 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 402 mm located at level 3. The test vehicle's occupant performance data is as follows:																														
<table border="1"> <thead> <tr> <th rowspan="2">Measurement Description</th> <th colspan="3">Driver ATD (SID-IIs) (Serial No. 300)</th> </tr> <tr> <th>Units</th> <th>Threshold</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td>Head Injury Criteria (HIC₃₆)</td> <td></td> <td>1000</td> <td>211.062</td> </tr> <tr> <td>Resultant Lower Spine Acceleration</td> <td>G</td> <td>82</td> <td>45.387</td> </tr> <tr> <td>Total Pelvic Force (sum of acetabular and iliac forces)</td> <td>N</td> <td>5525</td> <td>3245.233</td> </tr> <tr> <td>Maximum Thoracic Rib Deflection</td> <td>mm</td> <td>38</td> <td>21.322</td> </tr> <tr> <td>Maximum Abdomen Rib Deflection</td> <td>mm</td> <td>45</td> <td>23.970</td> </tr> </tbody> </table>				Measurement Description	Driver ATD (SID-IIs) (Serial No. 300)			Units	Threshold	Result	Head Injury Criteria (HIC ₃₆)		1000	211.062	Resultant Lower Spine Acceleration	G	82	45.387	Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3245.233	Maximum Thoracic Rib Deflection	mm	38	21.322	Maximum Abdomen Rib Deflection	mm	45	23.970
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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																												
19. Security Class. (of this report) UNCLASSIFIED	20. Security Class. (of this page) UNCLASSIFIED	21. No. of Pages 123	22. Price																											

TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1	Test Purpose and Procedure	1-1
2	Summary of Test Results	2-1
3	Occupant and Vehicle Information	3-1
 <u>Data Sheet</u>		 <u>Page</u>
1	General Test and Vehicle Parameter Data	3-2
2	Seat, Seat Belt, Steering Wheel Adjustment and Fuel Systems Data	3-6
3	Dummy Longitudinal Clearance Dimensions	3-9
4	Dummy Lateral Clearance Dimensions	3-10
5	Camera and instrumentation Data	3-11
6	Vehicle Accelerometer Data	3-12
7	Rigid Pole Load Cell Data	3-13
8	Post-Test Observations	3-14
9	Test Vehicle Profile Measurements	3-16
10	Test Vehicle Exterior Crush Measurements	3-17
11	Vehicle Damage Profile Distances	3-20
12	FMVSS No. 301 Static Rollover Results	3-21
13	Dummy / Vehicle Temperature and Humidity Stabilization Data	3-22
 <u>Appendix</u>		 <u>Page</u>
A	Photographs	A-1
B	Vehicle and Dummy Response Data Plots	B-1
C	Dummy Configuration and Performance Verification Data	C-1
D	Test Equipment and Instrumentation Calibration Data	D-1

SECTION 1

TEST PURPOSE AND PROCEDURE

This side impact test was conducted as part of the MY 2019 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 2019 Ram 1500 Quad Cab Truck. The side impact test was conducted in accordance with the Office of Crashworthiness Standard's Side NCAP Pole Laboratory Test Procedure, dated October 2015.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2019 Ram 1500 Quad Cab Truck. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 32.22 km/h. The test was conducted by Calspan Corporation's Transportation Test Operations facility in Buffalo, New York on April 30, 2019. Pre-test and post-test photographs of the test vehicle and side impact dummy (SID-IIs) are included in Appendix A of this report.

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

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

Head CG tri-axial accelerometers

Thorax upper, middle, and lower rib displacement potentiometers

Abdomen upper and lower rib displacement potentiometers

Lower spine tri-axial accelerometers

Iliac load cell

Acetabulum load cell

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

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

INJURY READINGS

Measurement Description	Driver ATD (SID-IIs)		
	Units	IARV	Result
Head Injury Criteria (HIC ₃₆)		1000	211.062
Resultant Lower Spine Acceleration	g	82	45.387
Total Pelvic Force (sum of acetabular and iliac forces)	N	5525	3245.233
Maximum Thoracic Rib Deflection	mm	38*	21.322
Maximum Abdominal Rib Deflection	mm	45*	23.970

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

GENERAL COMMENTS:

1. P1 serial number – 300

Data Anomalies:

- Left Front Sill Y Acceleration, Exceeded calibration range at 23.1ms, 26.4ms
- Left Sill B-Pillar Y Acceleration, Exceeded calibration range at 17 ms, 57.9 ms, 71.6 ms

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: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M20190316
Model Year	2019
Make	Ram 1500
Model	Quad Cab
Body Style	Truck
VIN	1C6RRECT2KN666256
Body Color	Brown
Odometer Reading (km/mi)	12 miles
Engine Displacement (L)	5.7
Type / No. Cylinders	V8
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	8-Speed
Overdrive	Yes
Final Drive	Rear 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	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head / Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso / Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	No

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

No

DATA FROM CERTIFICATION LABEL

Manufactured By	FCA US LLC
Date of Manufacture	11-18
Vehicle Type	Truck

GVWR (kg)	3130
GAWR Front (kg)	1679
GAWR Rear (kg)	1860

VEHICLE SEATING AND WEIGHT CAPACITY DATA

Measured Parameter	Front	Rear	Third	Total		
Designated Seating Capacity (DSC)	3	3	-	6		
Capacity Weight (VCW) (kg)					831	(A)
DSC X 68.04 kg					408.24	(B)
Cargo Weight (RCLW) (kg)					136	(A-B)

VEHICLE SEAT TYPE

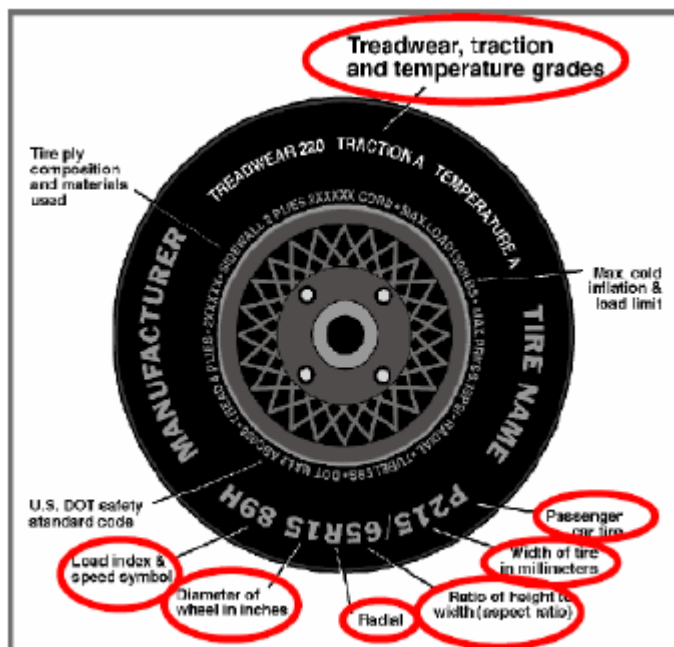
Seating Location	Type of Seat Pan				Type of Seat Back		
	Bucket	Bench	Split Bench	Contoured	Fixed	Adjustable	
						W/ Lever	W/ Knob
Front Seat	X					X	
Rear or Second Row Seat		X			X		
Third Row seat							

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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

Collected for year, make, model, & VIN, all items circled in red, tire manufacturer and tire name.



VEHICLE TIRE INFORMATION

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	300	300
Cold Pressure (kPa)	250	250
Recommended Tire Size	275/65R18	275/65R18
Tire Size on Vehicle	275/65R18	275/65R18
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler H/T	Dueler H/T
Treadwear	520	520
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	2 Polyester	2 Polyester
Tire Plies Body	2 Polyester, 2 Steel, 1 Nylon	2 Polyester, 2 Steel, 1 Nylon
Load Index/Speed Symbol	116T	116T
Tire Material	Rubber	Rubber
DOT Safety Code Left	9BYJDHT3718	9BYJDHT3718
DOT Safety Code Right	9BYJDHT3718	9BYJDHT3718

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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
Test Date: 4/30/2019

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	256	254	249	253
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	686	489		699	561		715	571	
Right	kg	656	476		673	552		661	550	
Ratio	%	58	42		55	45		55	45	
Totals	kg	1342	965	2307	1372	1113	2485	1376	1121	2497

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	2307	(A)
Actual Weight of 1 P572V (SID-IIs) ATD Used	kg	50	(B)
Rated Cargo / Luggage Weight (RCLW)	kg	136	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2493	(A+B+C)

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

TEST VEHICLE ATTITUDES AND CG

Measurement Description	Units	As Delivered	As Tested	Fully Loaded	Meets Rqmt***
Driver Door Sill Angle (front-to-rear)*	Deg	-1.55	-0.9	-0.45	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg	-1.30	-2.1	-2.70	Yes
Front Bumper-Line Angle (left-to-right)**	Deg	-0.35	-0.9	-1.30	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg	0.0	-1.0	-1.60	Yes
Vehicle CG (Aft of Front Axle)	mm	1496	1602	1606	
Vehicle CG (Left (+) / Right (-) from Longitudinal Centerline)	mm	16	12	26	

* 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: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Passenger Windows and door parts	10
Ballast / Equipment Added	95
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: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

SEAT POSITIONING

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

SCRL ANGLE RANGE

Seat	SCRL (°)		
	Max	Min	Mid
Driver Seat	Not Adjustable		
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) (°)	As Tested SCRP Height (mm)	SCRP Height Position	SCRP Height (mm)		
				Rearmost	Mid-Fore / Aft	Forward-Most
Driver Seat	Not Adjustable		Max	-	-	-
			Mid	-	-	-
			Min	-	-	-
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: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

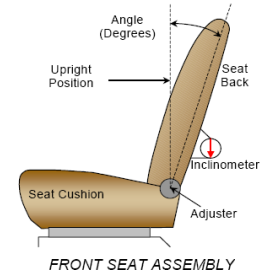
NHTSA No.: M20190316
 Test Date: 4/30/2019

SEAT FORE / AFT POSITION

Seat	Total Fore / Aft Travel		Test Position from Forward most Position	
	mm	Detents*	mm	Detents*
Driver Seat	220	33 (0-32)	0	0
Front Passenger Seat	220	33 (0-32)	0	0
Front Center Seat	N/A	N/A	N/A	N/A
Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Non-Struck Side Rear Seat	FIXED	FIXED	FIXED	FIXED
Rear Center Seat	FIXED	FIXED	FIXED	FIXED

SEAT BACK ANGLE ADJUSTMENT

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



Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detents*
Driver Seat w/Seated Dummy	69.9	N/A	0.1	N/A
Front Passenger Seat	63.9	N/A	0.8	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. Zero is defined as the uppermost detent

Seat	Total # of Positions	Placed in Position #
Driver Seat	5	0

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	5	Lowest

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

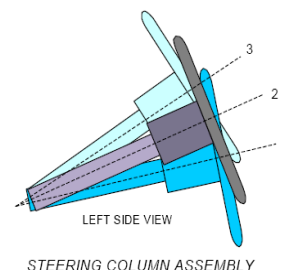
Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

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.

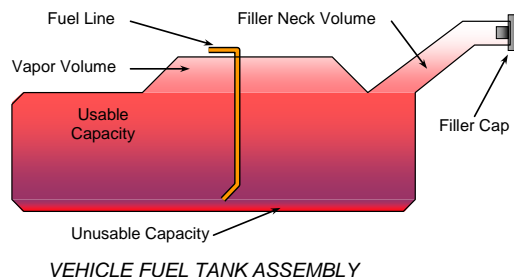
	Degrees	Fore / Aft Position (mm)
Lowermost – Position 1	20.7	
Geometric Center – Position 2	23	
Uppermost – Position 3	25.3	
Telescoping Steering Wheel Travel		60
Test Position	23	30



FUEL PUMP

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

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



FUEL TANK CAPACITY DATA

Description	Liters
Usable Capacity of "Standard Tank" - see Form No. 1	98.4
Usable Capacity of "Optional Tank" - see Form No. 1	124.9
Usable Capacity of "Standard Tank" - see Owner's Manual	98.4
Usable Capacity of "Optional Tank" - see Owner's Manual	124.9
93% of Usable Capacity	116.2
Actual Amount of Solvent Used in Test	116.2
1/3 of Usable Capacity	41.6

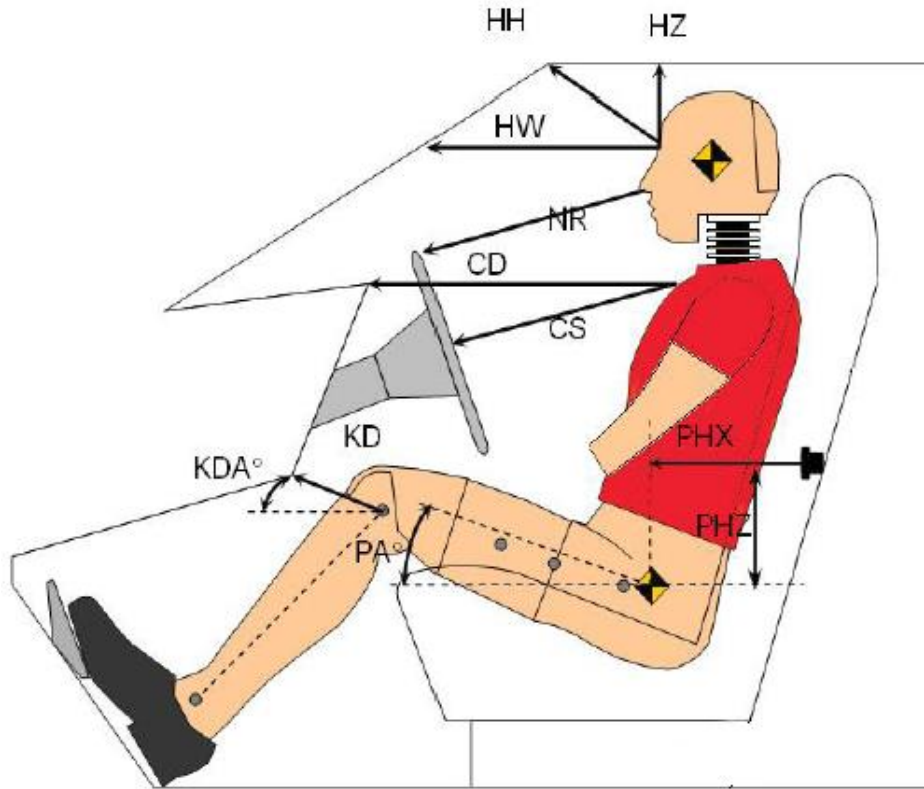
Is the Actual Amount of Solvent Used in the test equal to 93% ±1% of the Usable Capacity stated in Form No. 1?

Yes No

**DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019



Left Side View

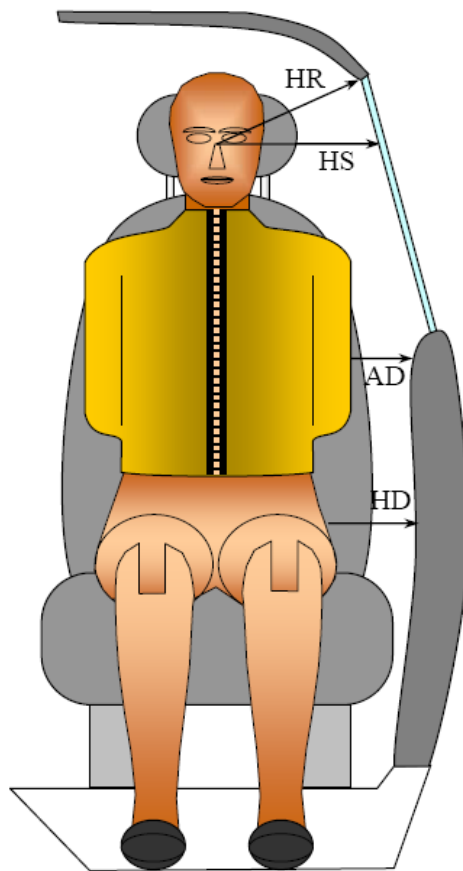
DUMMY LONGITUDINAL CLEARANCE DIMENSION INFORMATION

Driver Code	Description	Driver (Serial No. 300)	
		Length (mm)	Angle (°)
HH	Head to Header	386	
HW	Head to Windshield	728	
HZ	Head to Roof Liner	228	
NR	Nose to Rim	273	
CD	Chest to Dash	456	
CS	Chest to Steering Wheel	226	
KD(L) / KDA(L)°	Left Knee to Dash	90	21.8
KD(R) / KDA(R)°	Right Knee to Dash	78	14.8
PAX°	Pelvic Tilt Angle (X-Axis)		20.7
PAY°	Pelvic Tilt Angle (Y-Axis)		0.3
PHX	Hip Point to Striker (X-Axis)	334	
PHZ	Hip Point to Striker (Z-Axis)	5	

**DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019



FRONT VIEW OF DUMMY

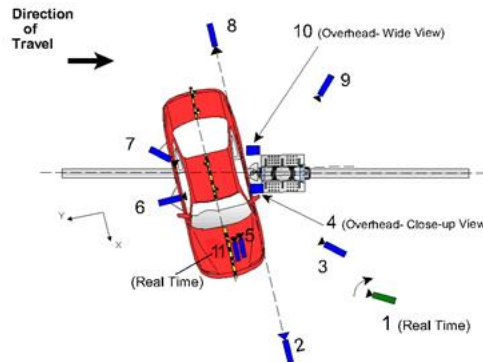
DUMMY LATERAL CLEARANCE DIMENSION INFORMATION

Code	Measurement Description	Units	Driver - Length (Serial No. 300)
HR	Head To Side Header	mm	275
HS	Head to Side Window	mm	354
AD	Arm to Door	mm	147
HD	Hip Point to Door	mm	165

**DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019



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	8508	0	-1433	28	1000
3	Impact side 45° - forward pole view	5349	-1488	-1330	24	1000
4	Overhead Close-up view of impact	0	0	-9370	28	1000
5	Onboard - dummy front view				25	1000
6	Onboard - dummy side view				12.5	1000
7	Onboard - dummy rear oblique view				8	1000
8	Rear ground level - impact view	-8882	0	-1270	28	1000
9	Impact side 45° - rearward pole view	-3509	-4147	-1283	24	1000
10	Overhead wide - view of impact	0	0	-9370	12.5	1000
11	Real-time (24 - 30 fps) - dummy front view				Zoom	60

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

Comments: All cameras operated as intended.

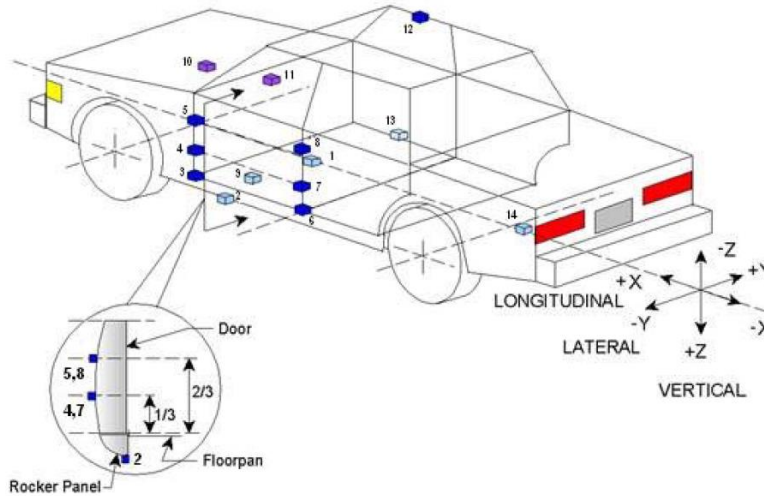
INSTRUMENTATION

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

**DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019



TEST VEHICLE ACCELEROMETER LOCATIONS

No.	Accelerometer Location	Coordinates (mm)		
		X	Y	Z
1	Vehicle CG	3637	1	-254
2	Left Floor Sill	3627	-828	-17
3	A-Pillar Sill	4240	-752	-56
4	A-Pillar Low	4234	-753	-280
5	A-Pillar Mid	4191	-744	-828
6	B-Pillar Sill	3143	-733	-43
7	B-Pillar Low	3120	-772	-261
8	B-Pillar Mid	3102	-767	-546
9	Driver Seat Track	3354	-680	-101
10	Engine Top	4811	52	-517
11	Firewall	4395	41	-536
12	Right Roof	3132	623	-1317
13	Right Floor Sill	3630	831	-21
14	Rear Floorpan	1140	2	-283

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: 2019 Ram 1500 Quad Cab Truck
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
Test Date: 4/30/2019

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: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

TEST DUMMY INFORMATION AND CONTACT POINTS

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

POST-TEST DOOR PERFORMANCE

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

POST-TEST SEAT PERFORMANCE

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

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

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	A-Pillar Buckled
Sill Separation	None
Windshield Damage	Cracks throughout
Side Window Damage	Cracks throughout
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

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

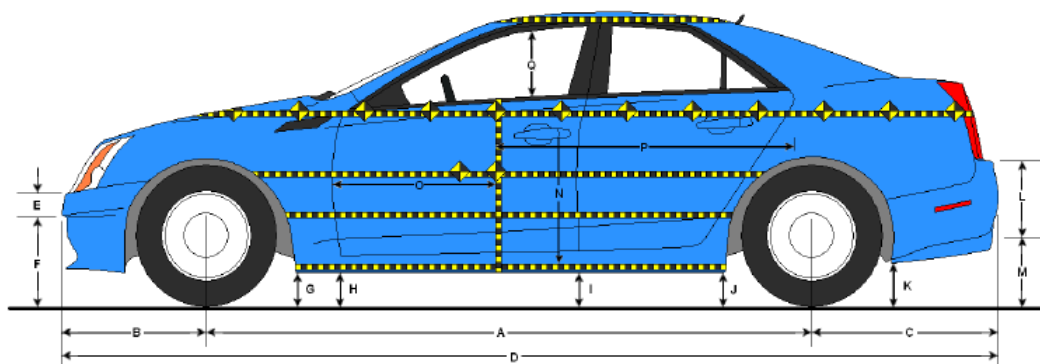
Measured Parameter	Units	Tolerance	Value
Vertical Impact Ref Line - Aft of Front Axle, Intended Impact Pt	mm		1232
Actual Impact Point - Aft of Front Axle	mm		1232
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 *	0
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	deg	75 +/- 3	75.0
Trap No. 1 Velocity - Primary	kph	31.4 to 33.0	32.22
Trap No. 2 Velocity - Redundant	kph	31.4 to 33.0	32.23

* Of Intended Impact Point

DATA SHEET NO. 9
TEST VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
Test Date: 4/30/2019



LEFT SIDE VIEW

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

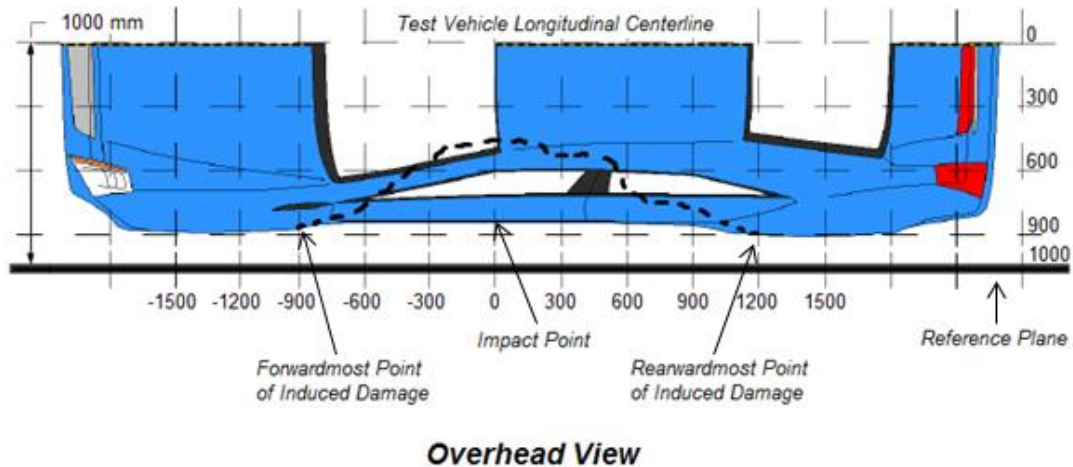
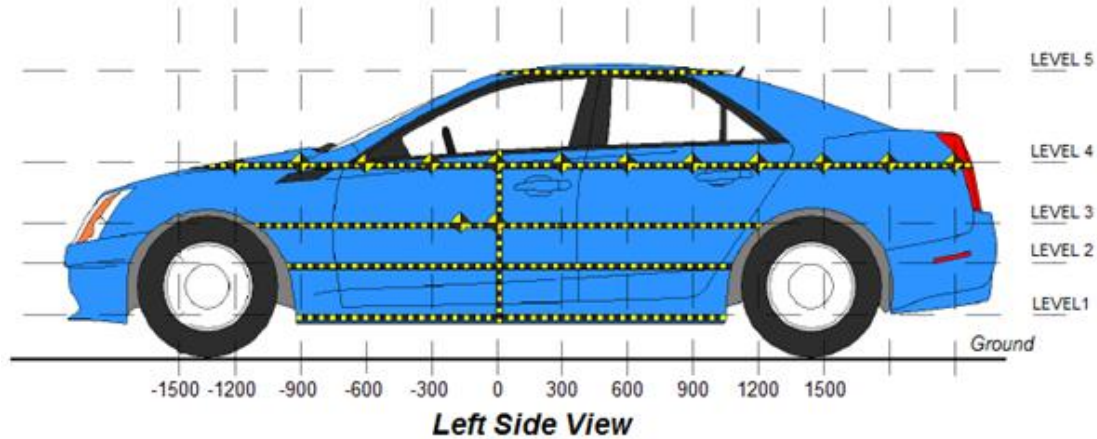
Code	Description	Pre-Test	Post-Test	Difference
A	Vehicle Wheelbase	3577	3550	27
B	Front Axle to FSOV	1006	1045	-39
C	Rear Axle to RSOV	1235	1198	37
D	Total Length at Centerline	5818	5793	25
E	Front Bumper Thickness	270	270	0
F	Front Bumper Bottom to Ground	397	412	-15
G	Sill Height at Front Wheel Well	285	281	4
H	Sill Height at Front Door Leading Edge	333	335	-2
I	Sill Height at B-Pillar	346	350	-4
J1	Sill Height at Rear Wheel Well	313	360	-47
J2	Pinch Weld Height at Rear Wheel Well	356	305	51
K	Sill Height Aft of Rear Wheel Well	347	371	-24
L	Rear Bumper Thickness	220	220	0
M	Rear Bumper Bottom to Ground	582	602	-20
N	Sill Height to Bottom of Front Window Sill	849	852	-3
O	Front Door Leading Edge to Impact CL	683	567	116
P	Rear Door Trailing Edge to Impact CL	1241	1108	133
Q	Front Window Opening	495	506	-11
R	Right Side Length	5748	5745	3
S	Left Side Length	5750	5724	26
T	Vehicle Width at B-Pillars	2033	1958	75

* All measurements in mm with tolerance of ± 3 mm

**DATA SHEET NO. 10
TEST VEHICLE EXTERIOR CRUSH MEASUREMENTS**

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Units	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	mm	441	352	0
2	Occupant Hip Point	mm	928	400	0
3	Mid - Door	mm	850	402	0
4	Window Sill	mm	1268	370	0
5	Window Top	mm	1852	133	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: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

EXTERIOR CRUSH MEASUREMENTS AT EACH LEVEL

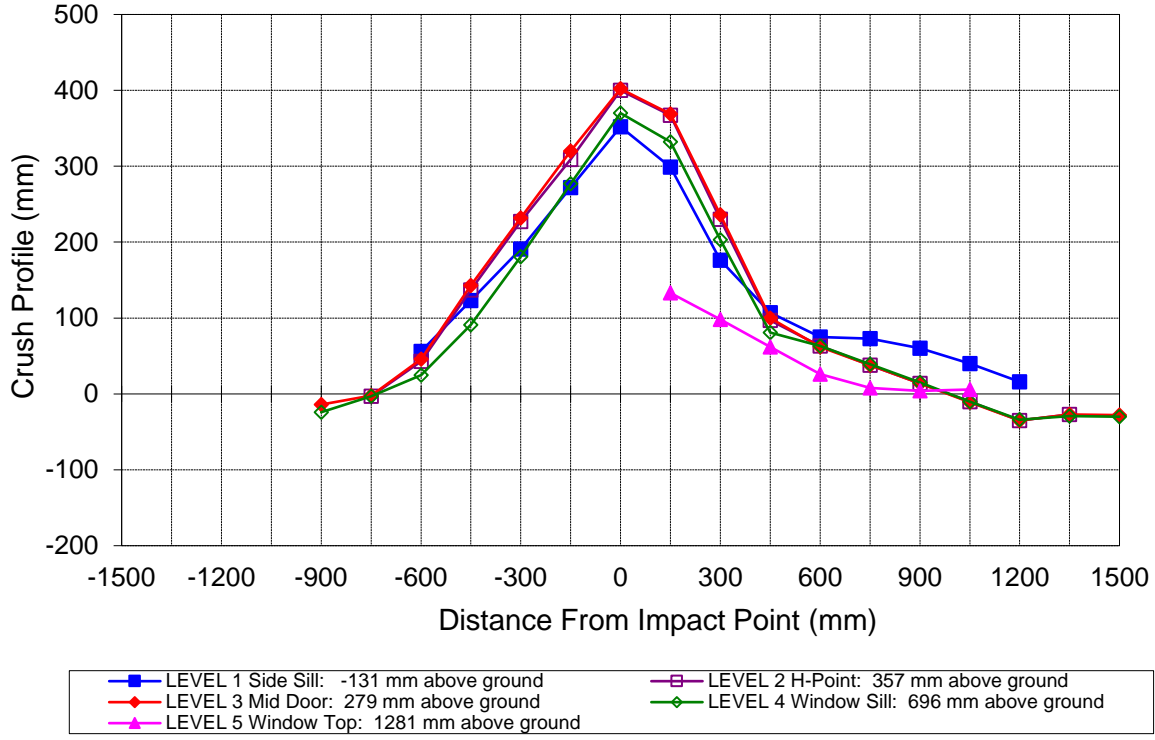
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1500															
-1350															
-1200															
-1050															
-900			1010	901				1024	925				-14	-24	
-750		1005	1007	916			1008	1009	919			-3	-2	-3	
-600	955	1000	1001	927		899	957	955	902		56	43	46	25	
-450	940	996	997	933		817	859	854	842		123	137	143	91	
-300	938	992	993	941		747	765	761	760		191	227	232	181	
-150	938	990	993	947		666	681	673	670		272	309	320	277	
0	939	990	994	953		587	590	592	583		352	400	402	370	
150	940	991	997	958	705	641	624	628	626	572	299	367	369	332	133
300	939	994	1000	963	714	763	764	764	760	616	176	230	236	203	98
450	938	996	1002	967	720	831	899	902	886	658	107	97	100	81	62
600	938	993	1001	969	724	863	930	939	906	698	75	63	62	63	26
750	937	993	1002	971	726	864	955	964	932	718	73	38	38	39	8
900	933	993	1002	973	728	873	979	988	958	724	60	14	14	15	4
1050	927	992	1001	972	727	887	1002	1012	982	721	40	-10	-11	-10	6
1200	917	988	997	970		901	1023	1032	1004		16	-35	-35	-34	
1350		972	980	953			999	1007	982			-27	-27	-29	
1500			988	956				1016	986				-28	-30	

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: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019



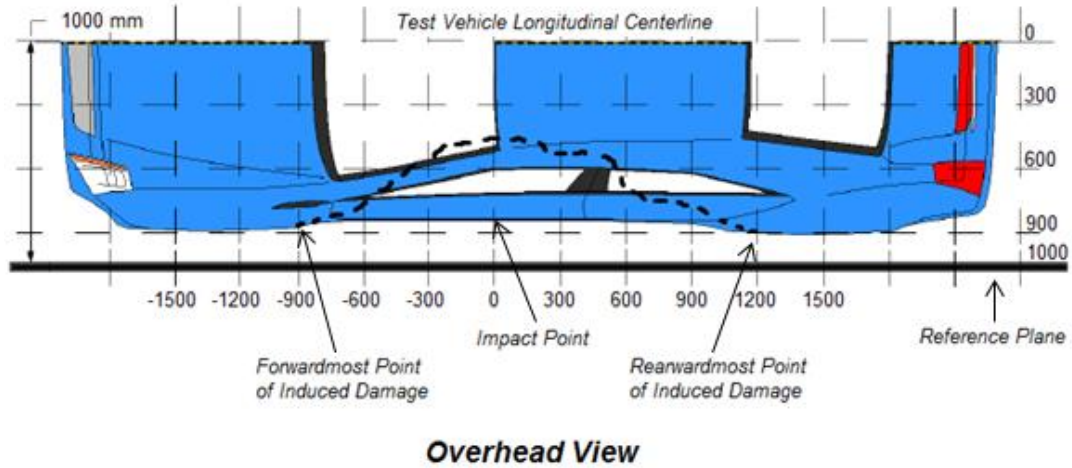
Vehicle Exterior Crush Measurements - Visual Representation

DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019

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



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1	-900	3	-24	-10	-14
2	-420	3	165	4	161
3	60	3	394	5	389
4	540	3	76	-1	77
5	1020	3	-7	-1	-6
6	1500	3	-16	12	-28

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

Test Vehicle:	<u>2019 Ram 1500 Quad Cab Truck</u>	NHTSA No.:	<u>M20190316</u>
Test Program:	<u>NCAP Side MDB Impact Test</u>	Test Date:	<u>4/30/2019</u>
Test Time:	<u>1:41 PM</u>	Temperature:	<u>21° C</u>

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 oz.)
- B. For the 5-minute period after motion ceases: 0 oz.
(Maximum allowable is 5 oz.)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable is 1 oz./minute)
- D. Spillage Details: No Spillage Occurred

FMVSS NO. 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	65	300	365
90° to 180°	66	300	366
180° to 270°	65	300	365
270° to 360°	66	300	366

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

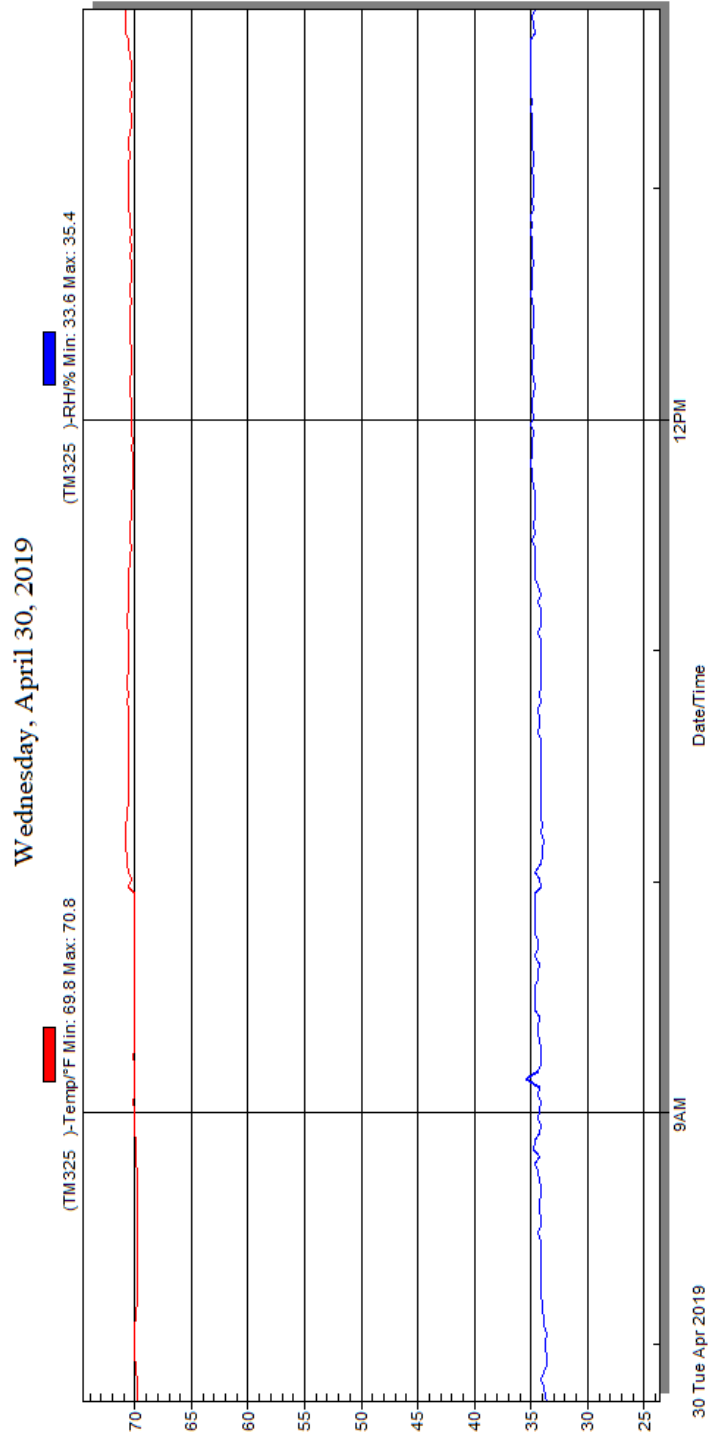
ROLLOVER SOLVENT SPILLAGE LOCATION TABLE

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: 2019 Ram 1500 Quad Cab Truck
 Test Program: NCAP Side Pole Impact Test

NHTSA No.: M20190316
 Test Date: 4/30/2019



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

APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

Fig.	Description	Page
1	As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-4
2	As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-4
3	Pre-Test Frontal View of Test Vehicle	A-5
4	Post-Test Frontal View of Test Vehicle	A-5
5	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-6
6	Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-6
7	Pre-Test Left Side View of Test Vehicle	A-7
8	Post-Test Left Side View of Test Vehicle	A-7
9	Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-8
10	Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle	A-8
11	Pre-Test Rear View of Test Vehicle	A-9
12	Post-Test Rear View of Test Vehicle	A-9
13	Pre-Test Right Side View of Test Vehicle	A-10
14	Post-Test Right Side View of Test Vehicle	A-10
15	Pre-Test Overhead View of Test Area	A-11
16	Post-Test Overhead View of Test Area	A-11
17	Pre-Test Left Side View of Pole Positioned Against Side of Vehicle	A-12
18	Pre-Test Right Side View of Pole Positioned Against Side of Vehicle	A-12
19	Pre-Test Close-Up View of Impact Point Target	A-13
20	Post-Test Close-Up View of Impact Point Target Showing Impact Location	A-13
21	Pre-Test Front Close-Up View of Dummy Head and Chest	A-14
22	Post-Test Front Close-Up View of Dummy	A-14
23	Pre-Test Left Side View of Dummy Showing Belt and Chalking	A-15
24	Pre-Test Left Side View of Dummy Shoulder and Door Top View	A-15
25	Post-Test Left Side View of Dummy Shoulder and Door Top View	A-16
26	Pre-Test Frontal View of Seat Back Prior to Dummy Positioning	A-16
27	Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint	A-17
28	Pre-Test Frontal View of Seat Pan Prior to Dummy Positioning	A-17
29	Pre-Test Overhead View of Dummy Thighs on Seat Pan	A-18
30	Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket	A-18
31	Pre-Test Left Side View of Dummy's Head Showing Dummy's Head is Level	A-19
32	Pre-Test Placement of Dummy's Feet	A-19
33	Pre-Test View of Belt Anchorage for Dummy	A-20
34	Pre-Test Left Side View of Steering Wheel	A-20
35	Pre-Test View of Disengaged Parking Brake	A-21

Fig.	Description	Page
36	Pre-Test View of Parking Brake	A-21
37	Pre-Test Close-Up Left Side View of Driver Seat Track	A-22
38	Pre-Test Close-Up Left Side View of Driver Seat Back	A-22
39	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-23
40	Pre-Test Dummy and Door Clearance View	A-23
41	Post-Test Dummy and Door Clearance View	A-24
42	Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-24
43	Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-25
44	Pre-Test Inner Door Panel View	A-25
45	Post-Test Inner Door Panel View Showing Dummy Contact Location	A-26
46	Post-Test Dummy Close-Up Head Contact with Vehicle Interior View	A-26
47	Post-Test Dummy Close-Up Head Contact with Side Airbag View	A-27
48	Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View	A-27
49	Post-Test Dummy Close-Up Torso Contact with Side Airbag View	A-28
50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	A-28
51	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	A-29
52	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	A-29
53	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	A-30
54	Post-Test View of Fuel Filler Cap or Fuel Filler Neck	A-30
55	Close-Up View of Vehicle's Certification Label	A-31
55a	Close-Up View of Reduced Load Capacity Label	A-31
56	Close-Up View of Vehicle's Tire Information Placard or Label	A-32
57	Pre-Test Pole Barrier Front View	A-32
58	Post-Test Pole Barrier Front View	A-33
59	Pre-Test Pole Barrier Side View	A-33
60	Post-Test Pole Barrier Side View	A-34
61	Pre-Test Ballast View	A-34
62	Post-Test Primary and Redundant Speed Trap Read-Out	A-35
63	FMVSS No. 301 Static Rollover 0 Degrees	A-35
64	FMVSS No. 301 Static Rollover 90 Degrees	A-36
65	FMVSS No. 301 Static Rollover 180 Degrees	A-36
66	FMVSS No. 301 Static Rollover 270 Degrees	A-37
67	FMVSS No. 301 Static Rollover 360 Degrees	A-37
68	Impact Event	A-38
69	Monroney Label	A-38
70	Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	A-39
71	Post-Test View of Shattered Vehicle Inner Door Panel	A-39



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



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

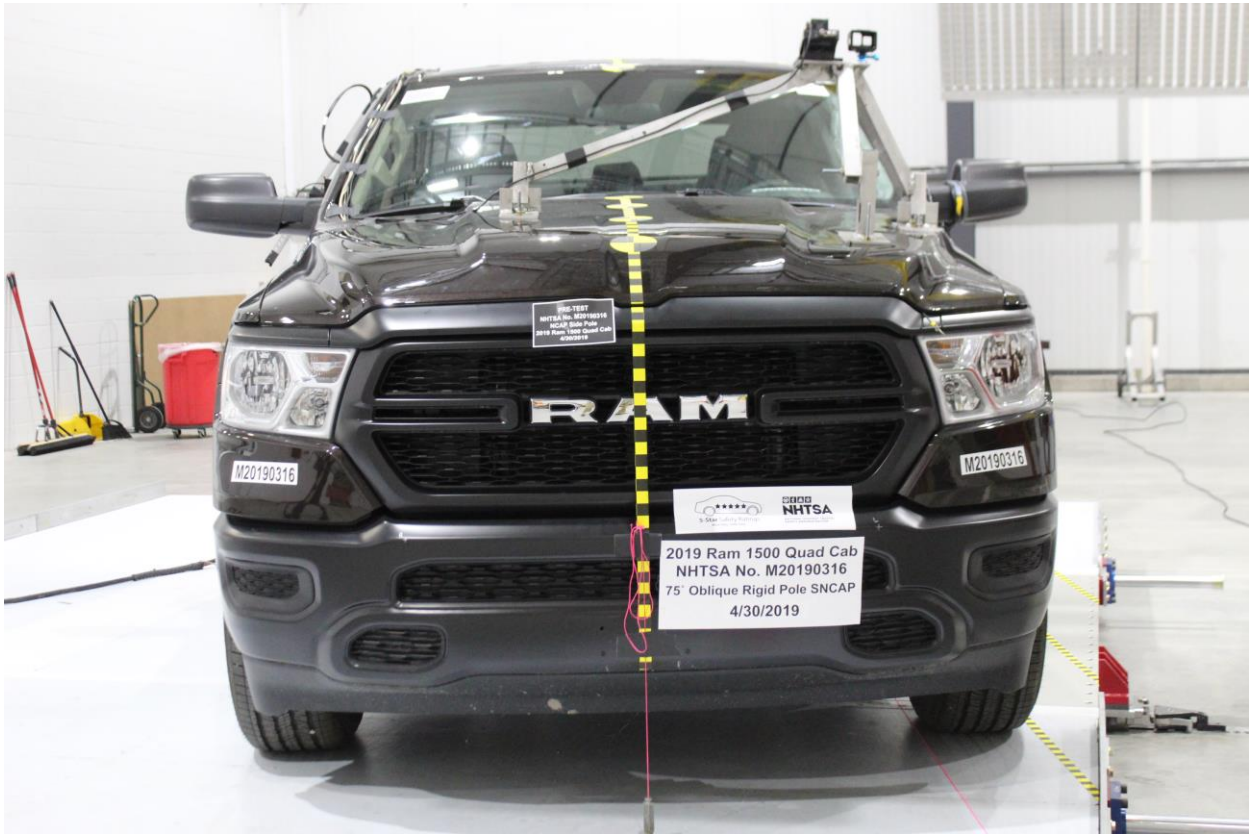


Figure A-3: Pre-Test Frontal View of Test Vehicle



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

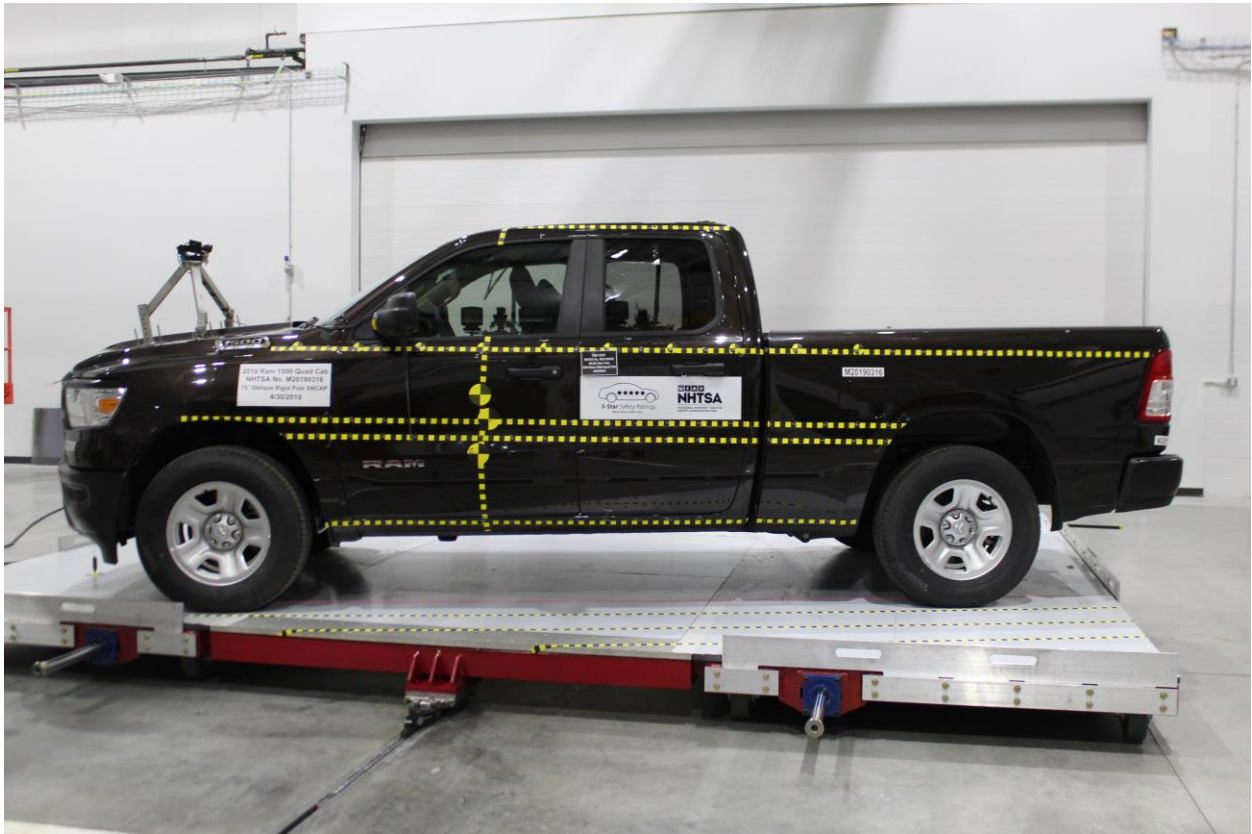


Figure A-7: Pre-Test Left Side View of Test Vehicle



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



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



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



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

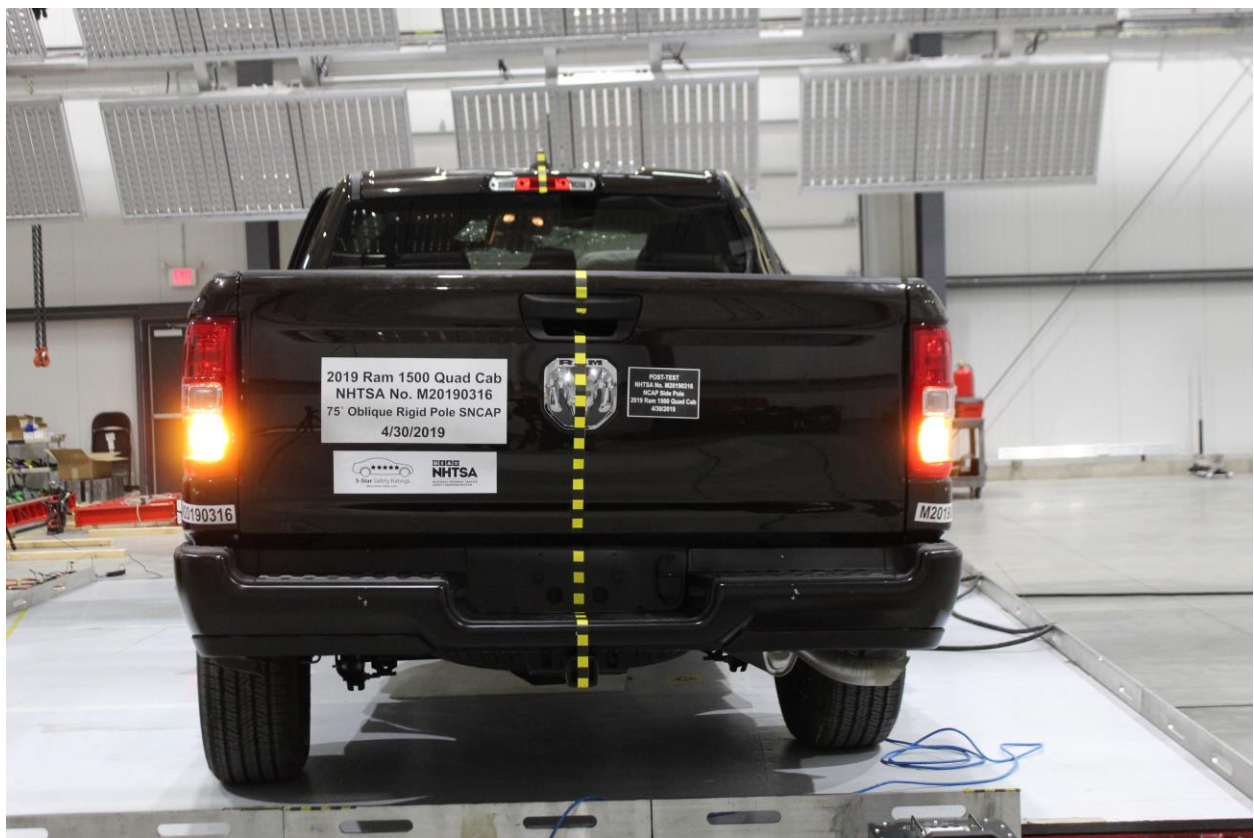


Figure A-12: Post-Test Rear View of Test Vehicle



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



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

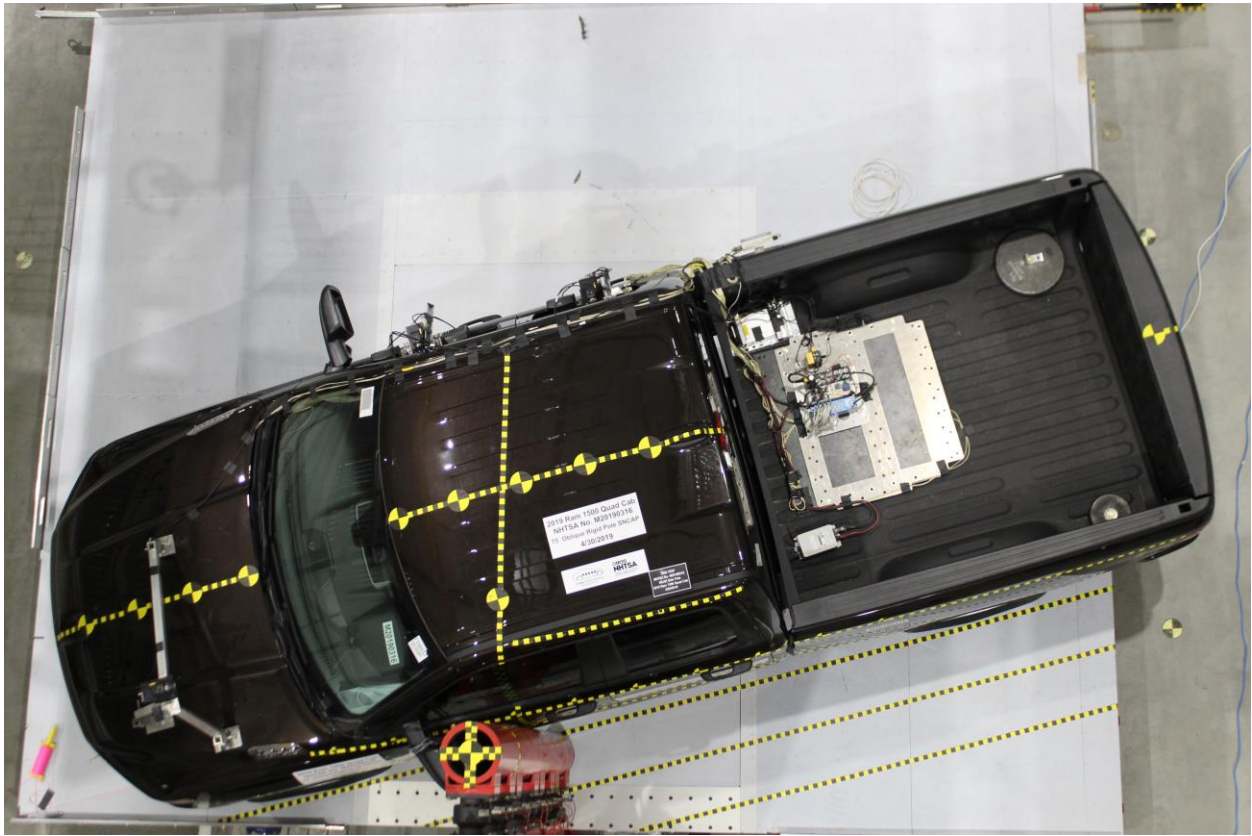


Figure A-15: Pre-Test Overhead View of Test Area

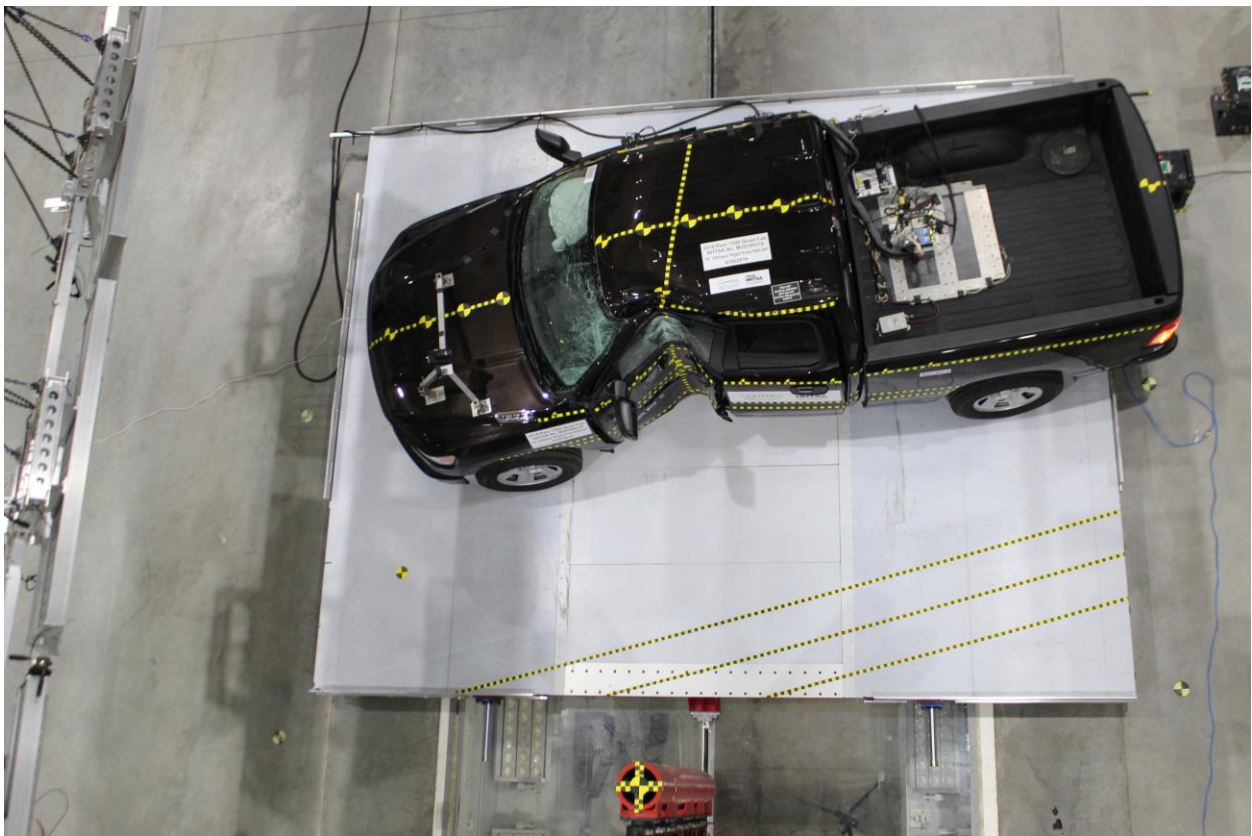


Figure A-16: Post-Test Overhead View of Test Area

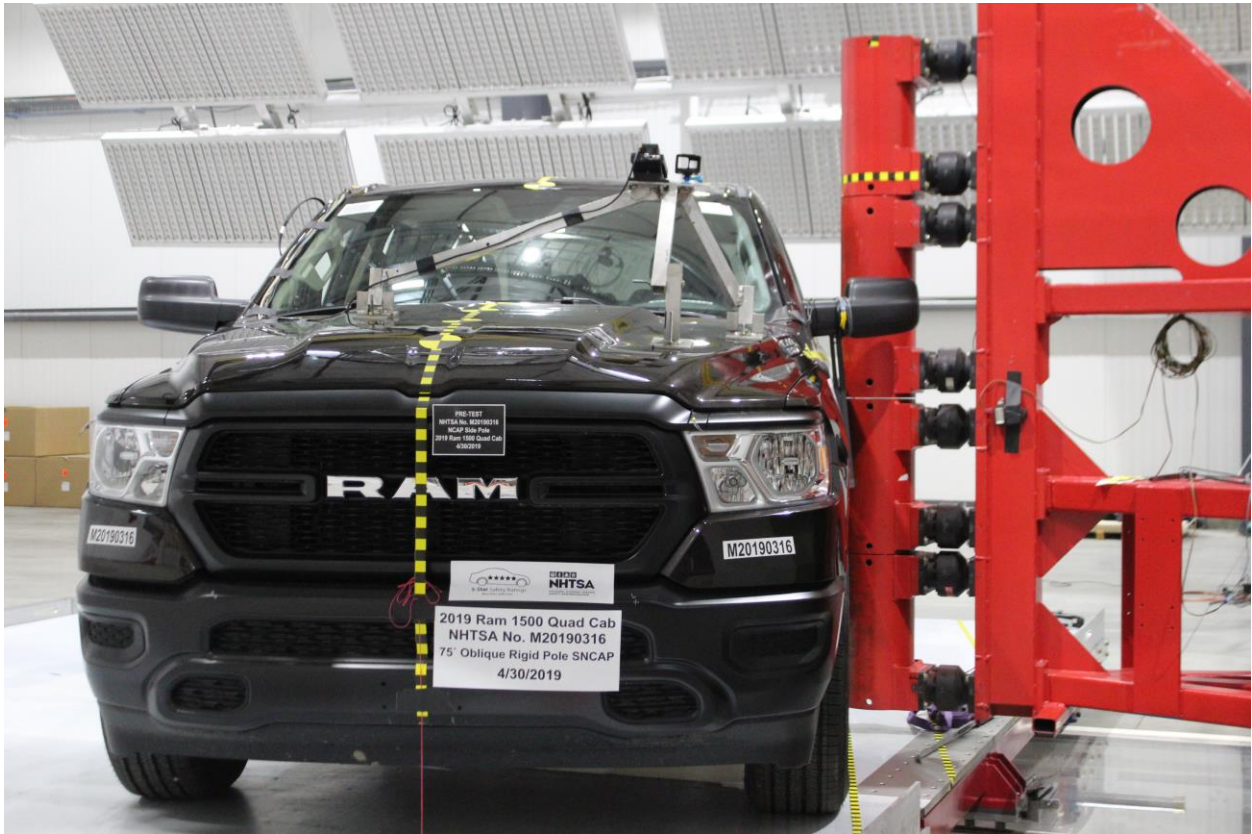


Figure A-17: Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



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

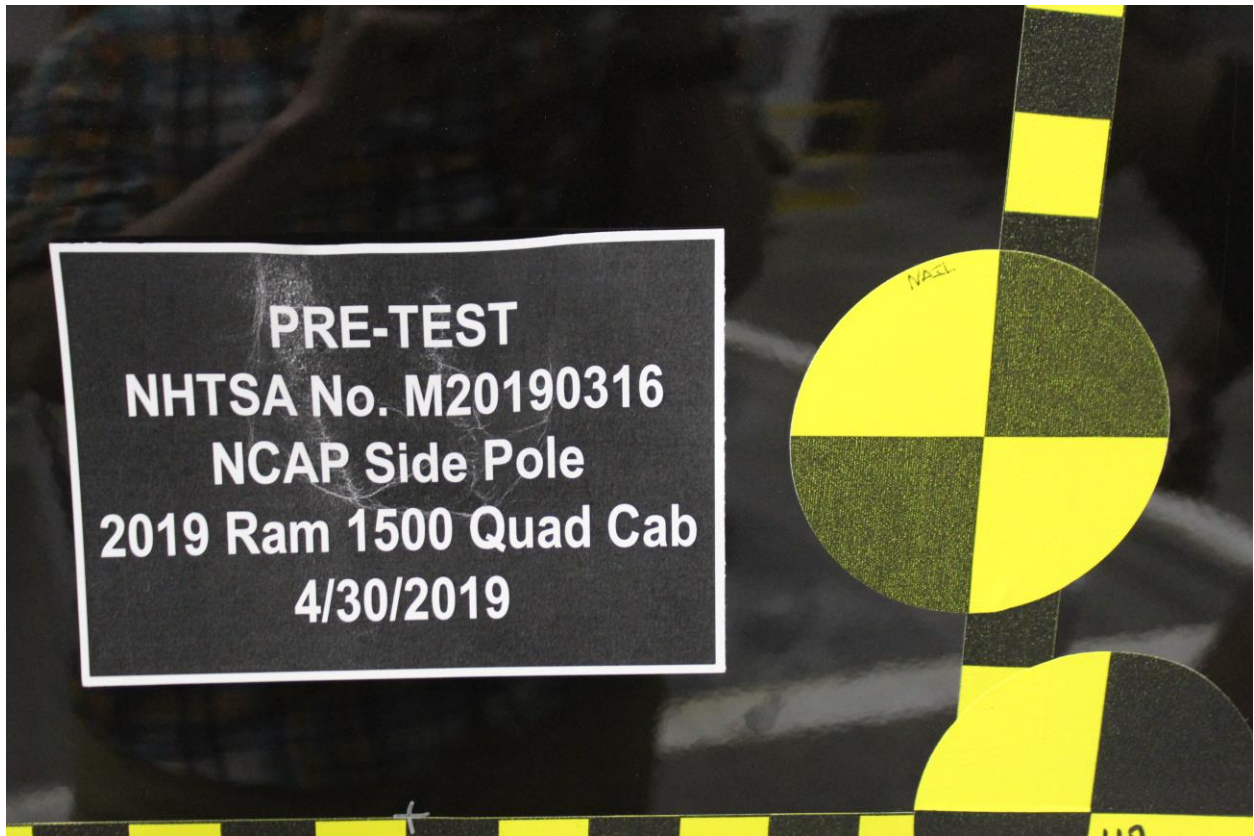


Figure A-19: Pre-Test Close-Up View of Impact Point Target



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

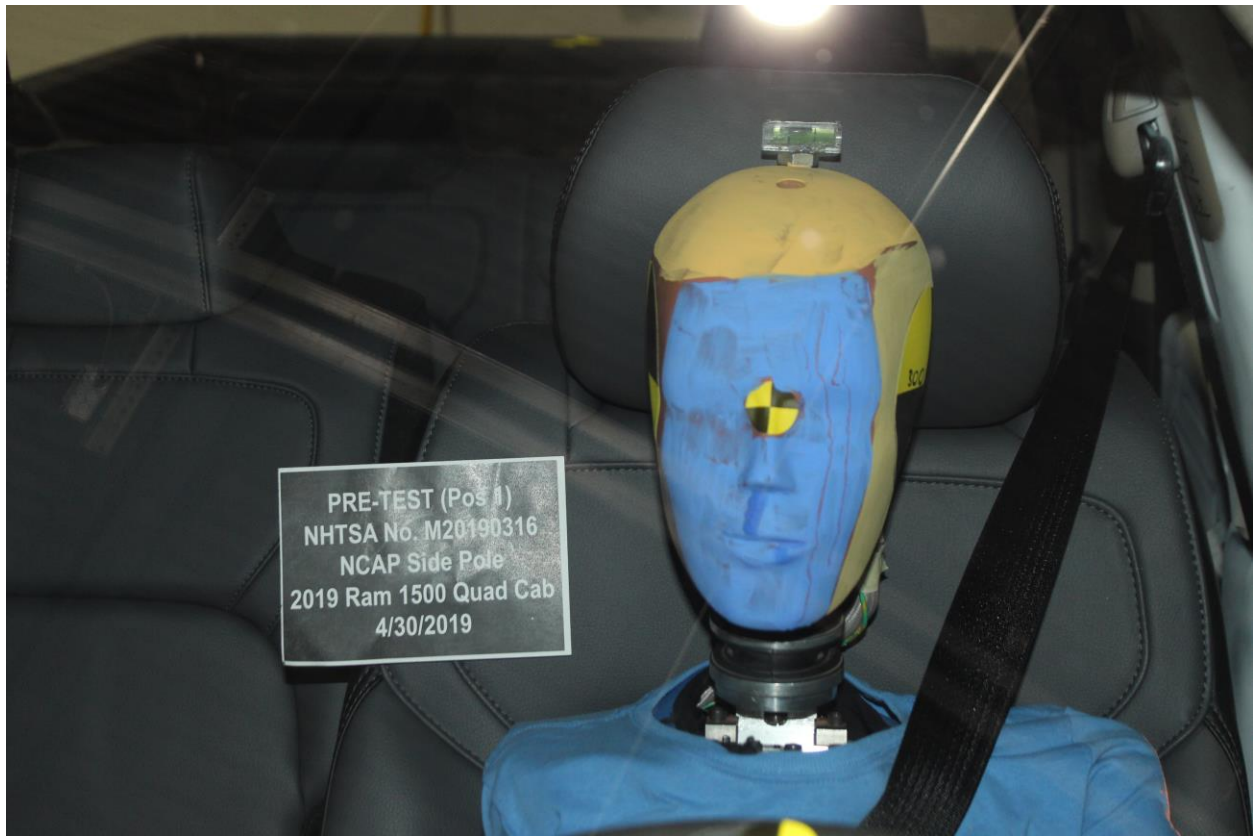


Figure A-21: Pre-Test Front Close-Up View of Dummy Head and Chest



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



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



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



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



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

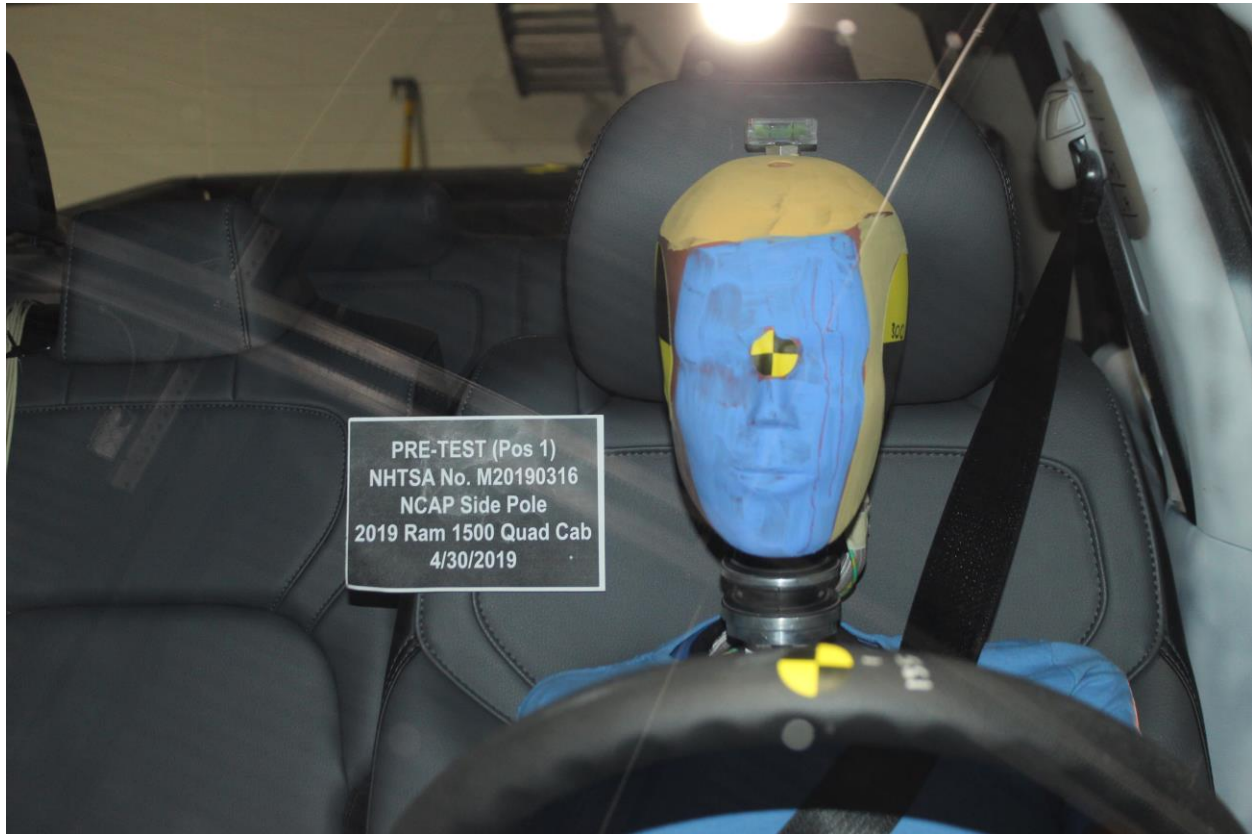


Figure A-27: Pre-Test Frontal Close-Up View of Dummy Head / Shoulders in Relation to Head Restraint



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

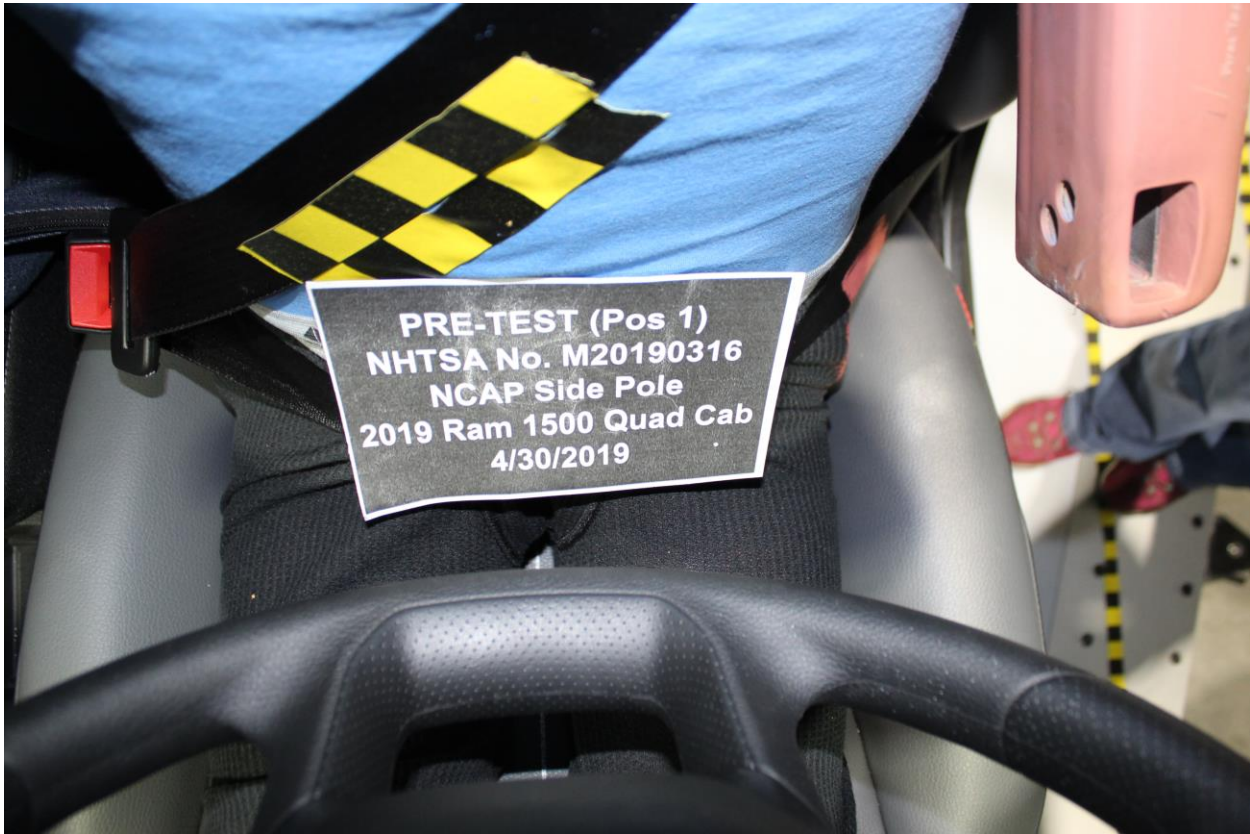


Figure A-29: Pre-Test Overhead View of Dummy Thighs on Seat Pan

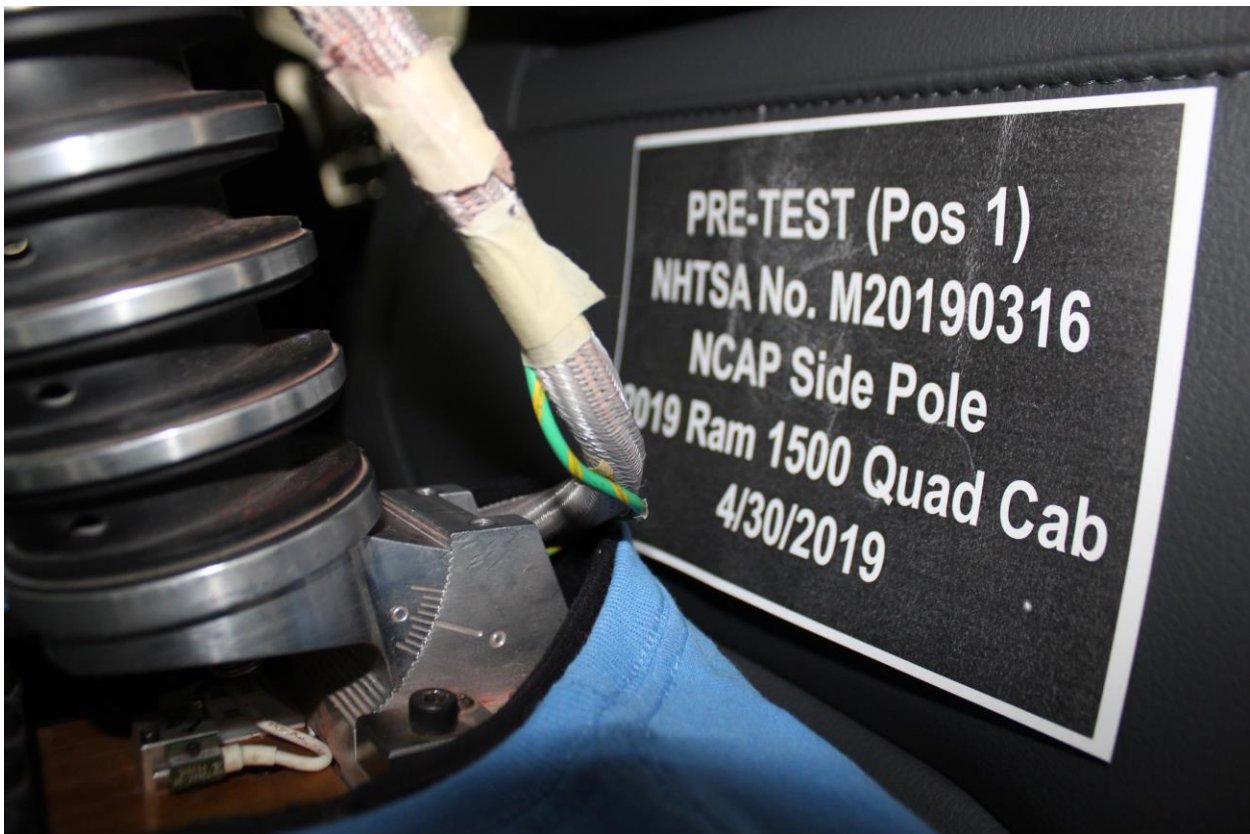


Figure A-30: Pre-Test Left Side View of Dummy's Neck Showing Position of Adjustable Neck Bracket



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



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



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



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



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



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



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



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

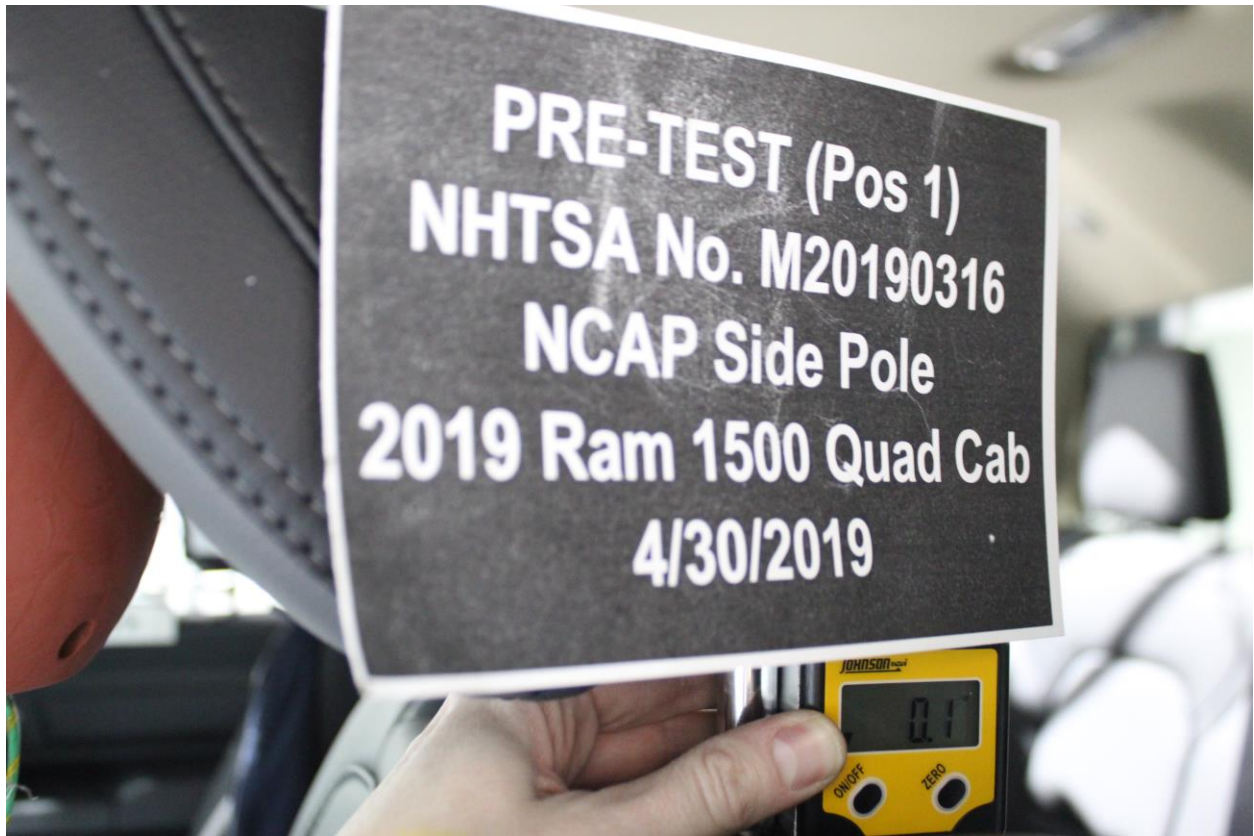


Figure A-39: Pre-Test Close-Up View of Driver Seat Back or Head Restraint



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



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

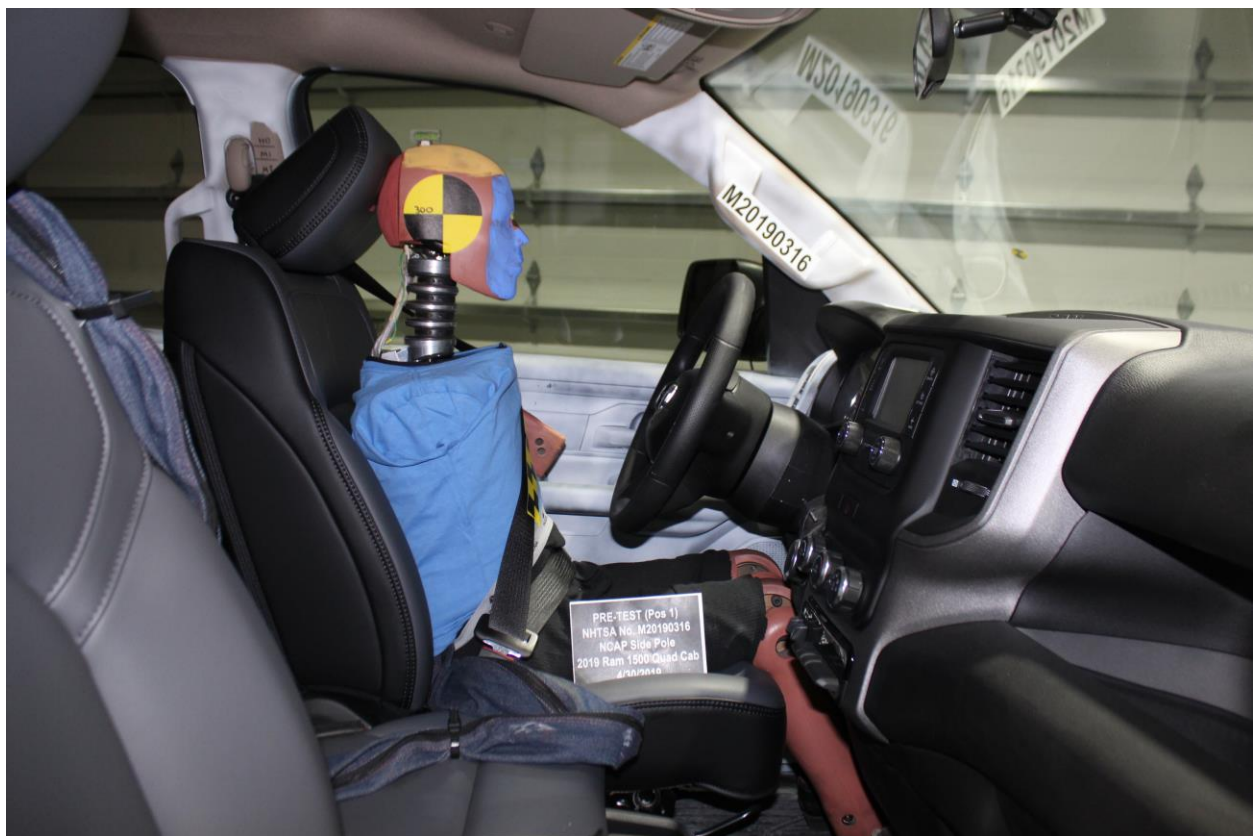


Figure A-42: Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



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



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



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

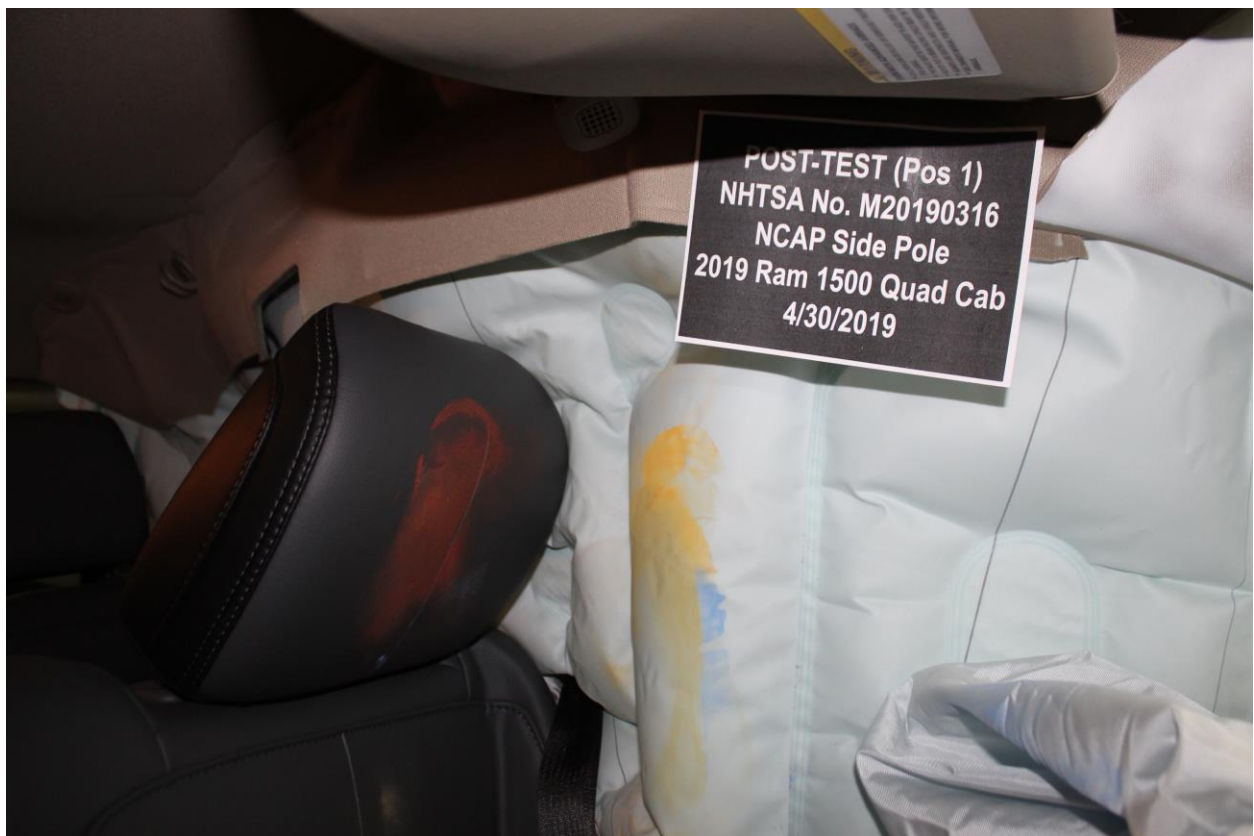


Figure A-46: Post-Test Dummy Close-Up Head Contact with Vehicle Interior View



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



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

Photo Not Applicable

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

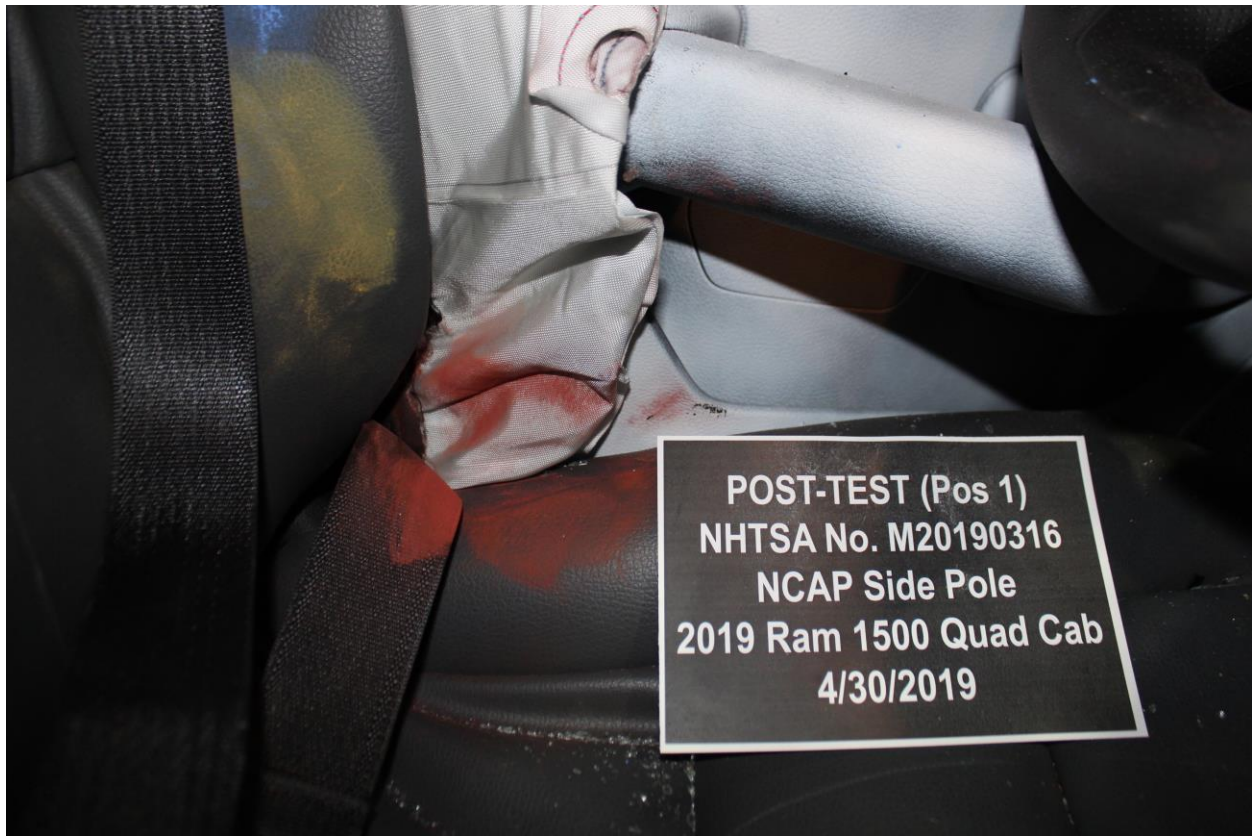


Figure A-51: Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



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

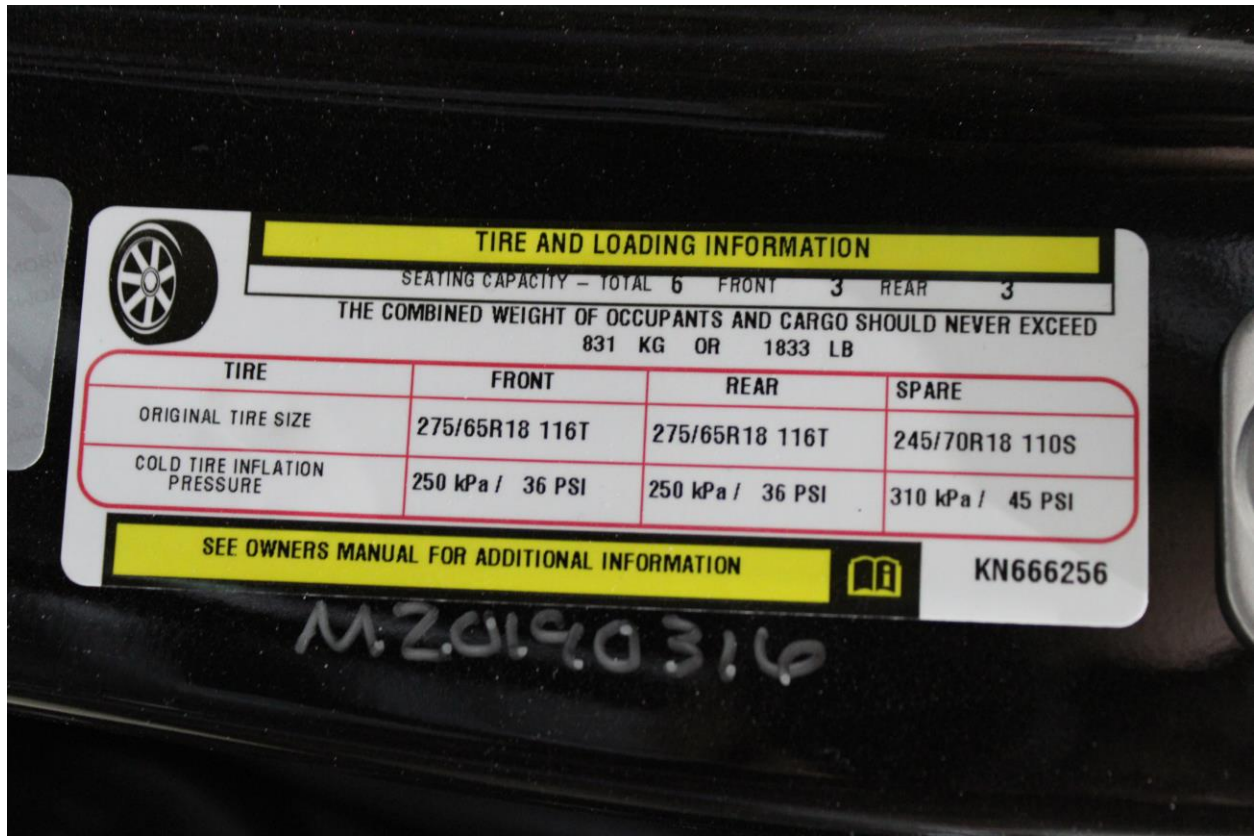


Figure A-56: Close-Up View of Vehicle's Tire Information Placard or Label

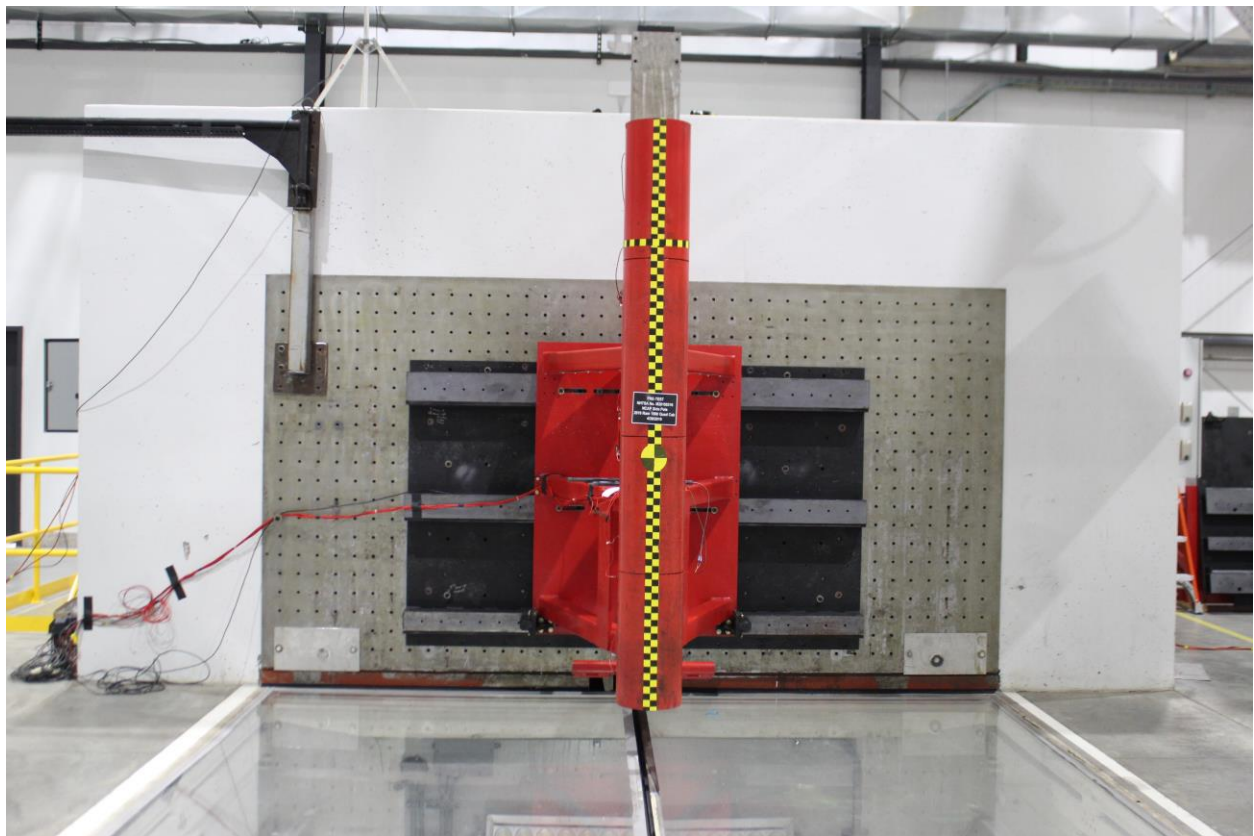


Figure A-57: Pre-Test Pole Barrier Front View

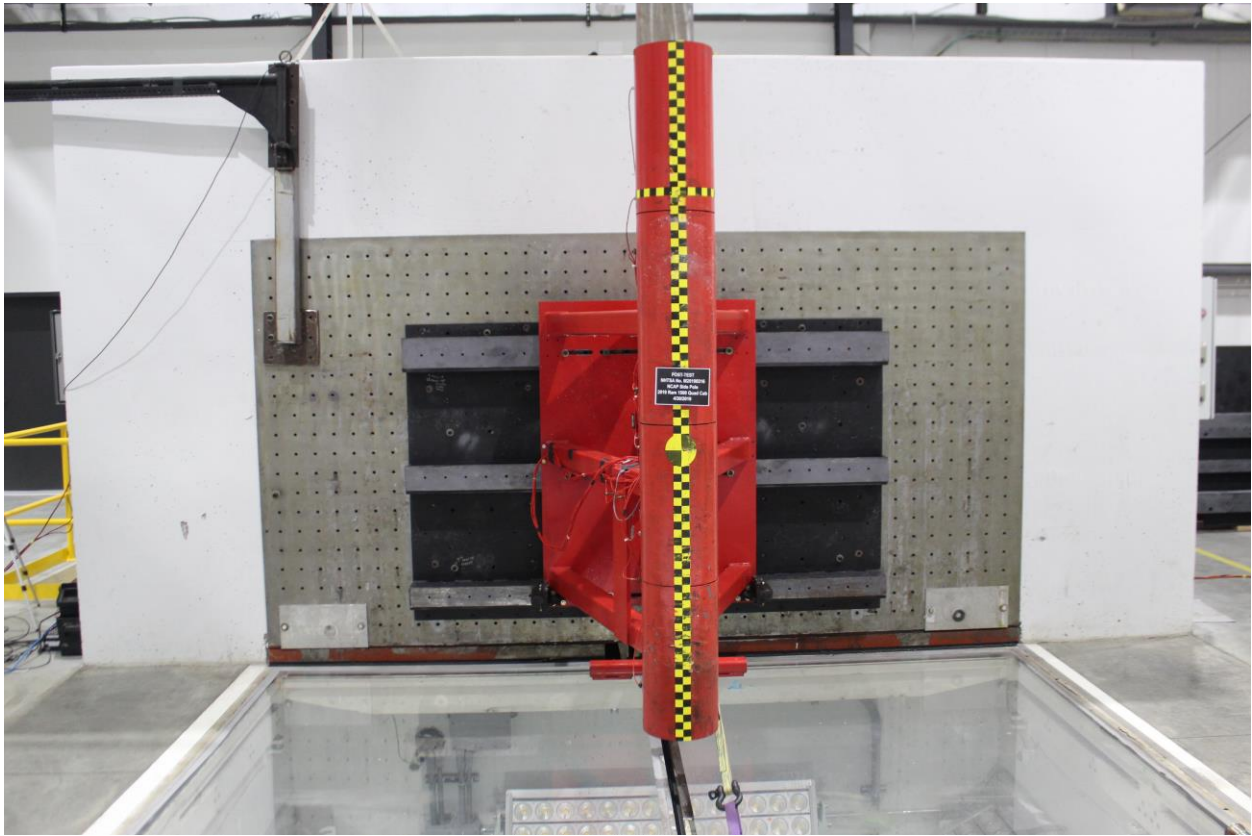


Figure A-58: Post-Test Pole Barrier Front View

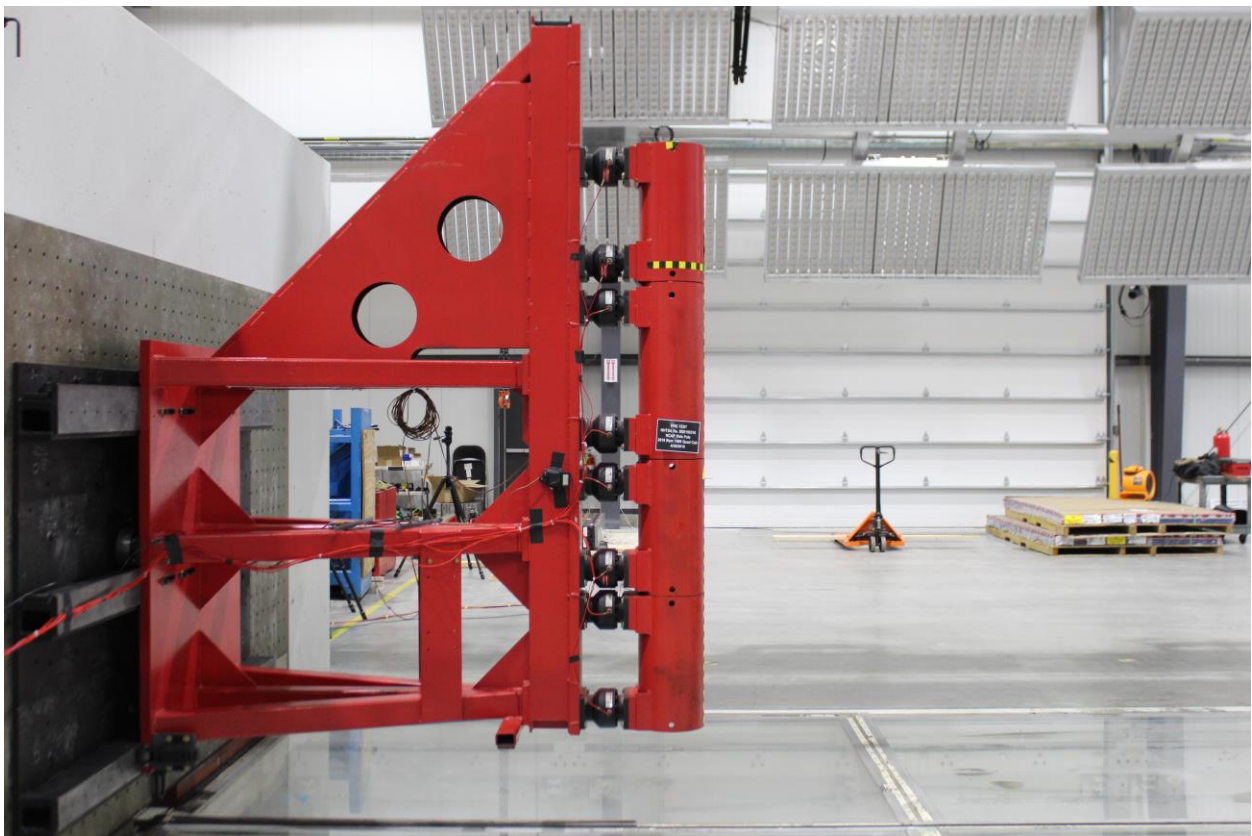


Figure A-59: Pre-Test Pole Barrier Side View

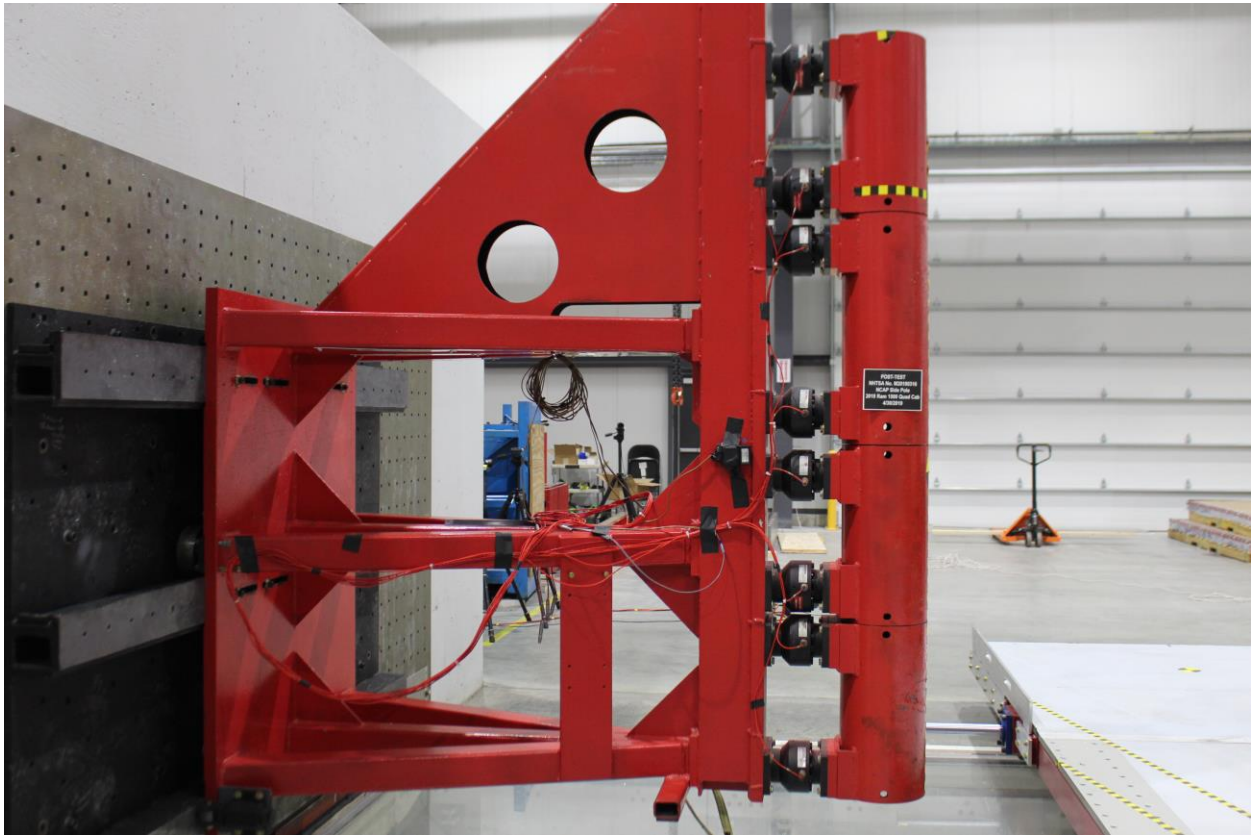


Figure A-60: Post-Test Pole Barrier Side View

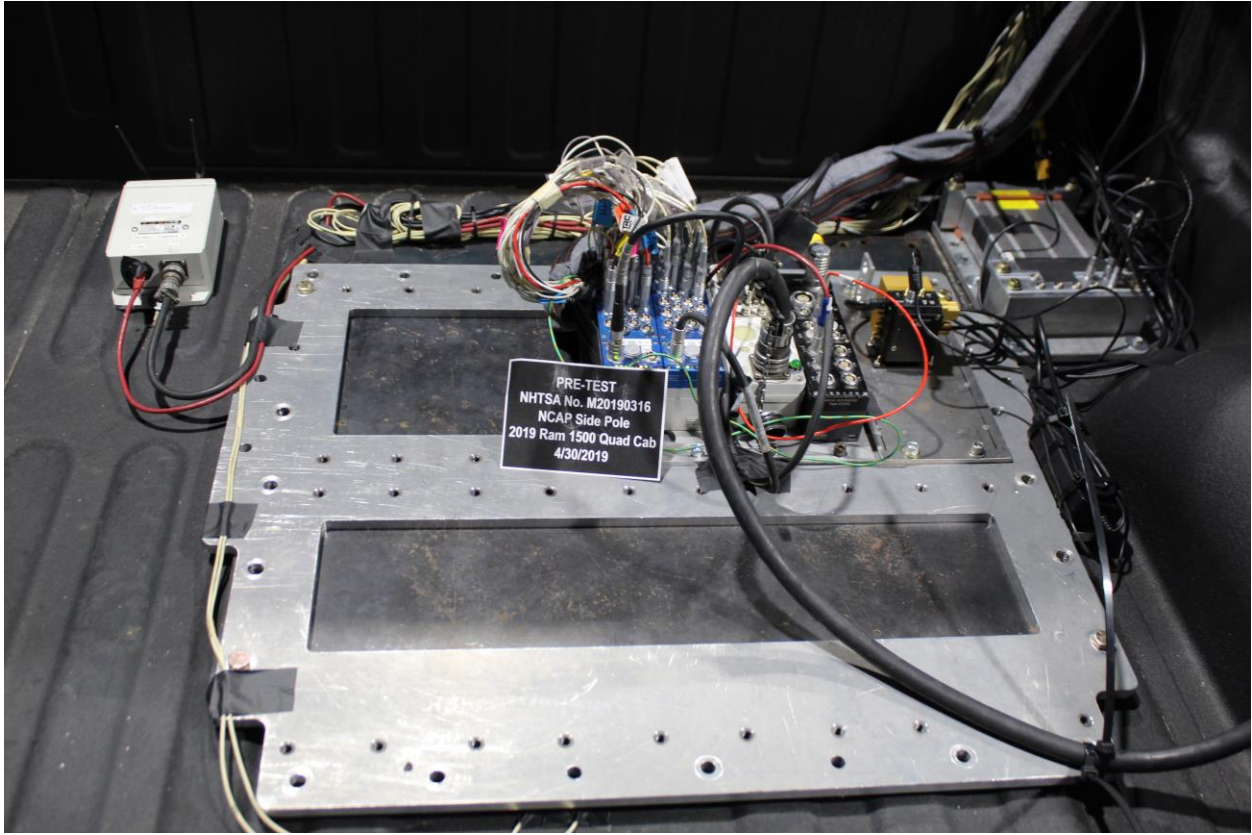


Figure A-61: Pre-Test Ballast View



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



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

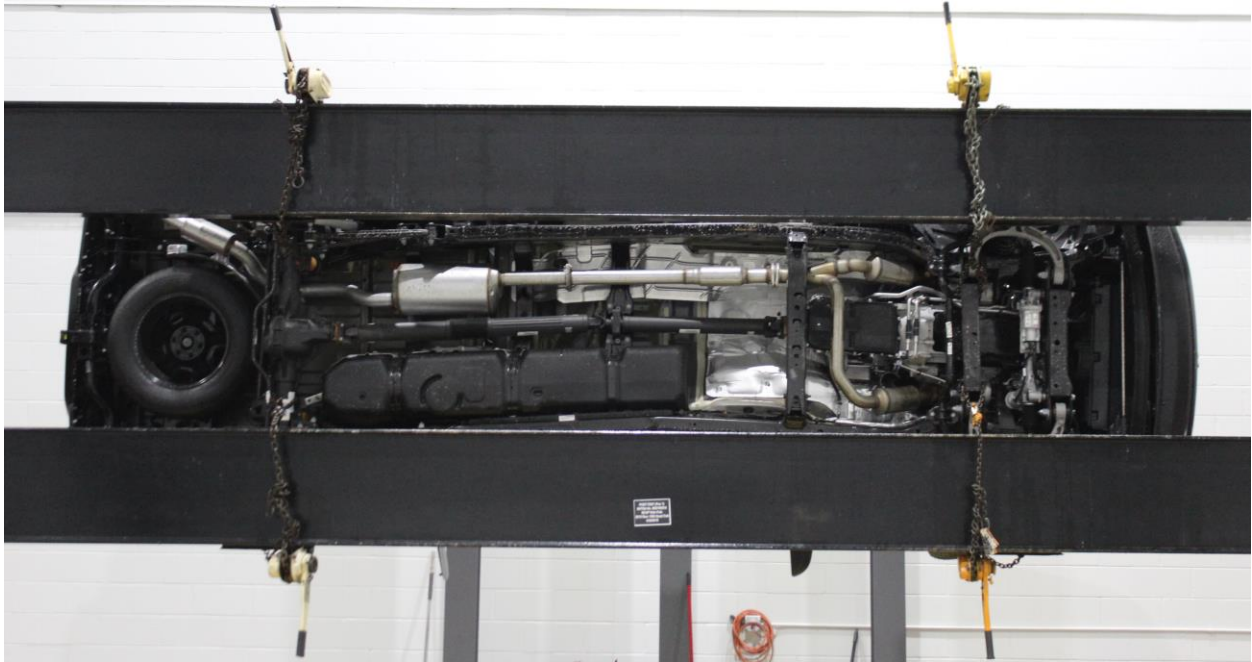


Figure A-64: FMVSS No. 301 Static Rollover 90 Degrees

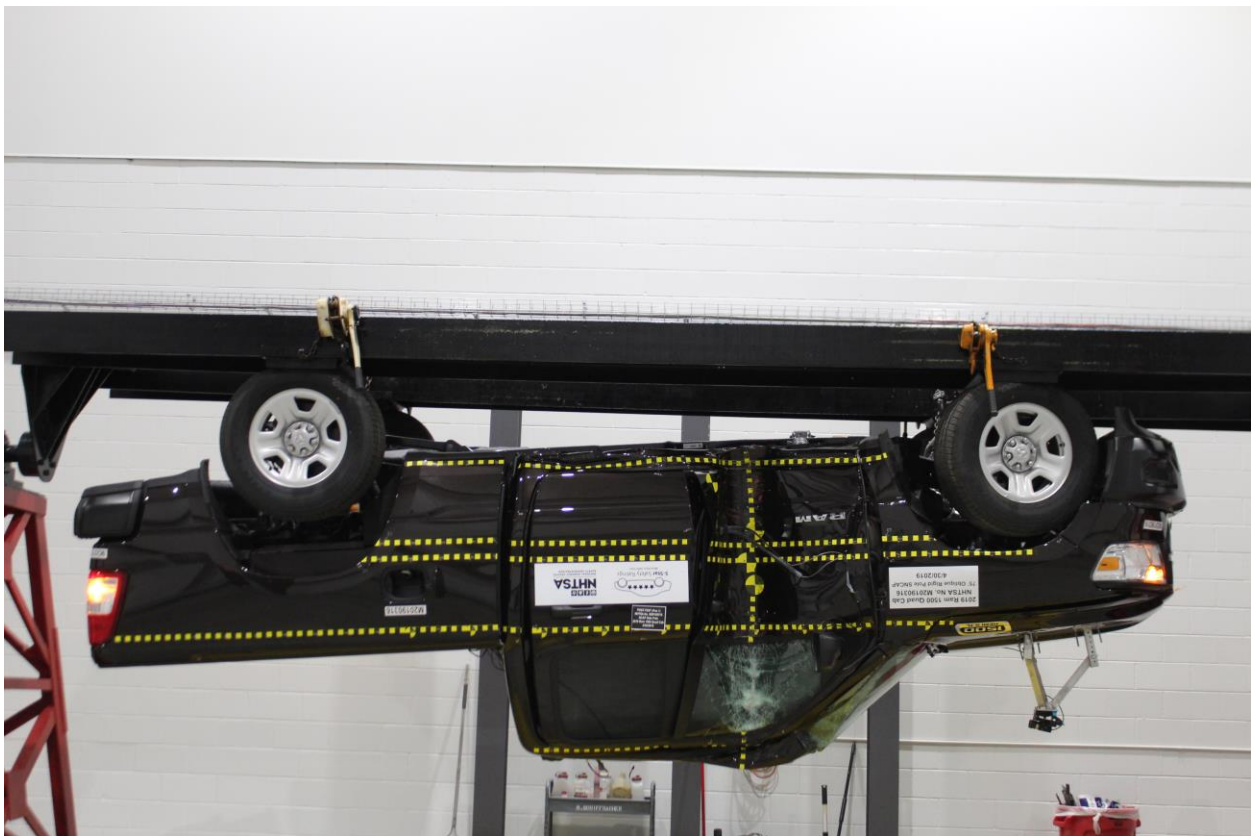


Figure A-65: FMVSS No. 301 Static Rollover 180 Degrees

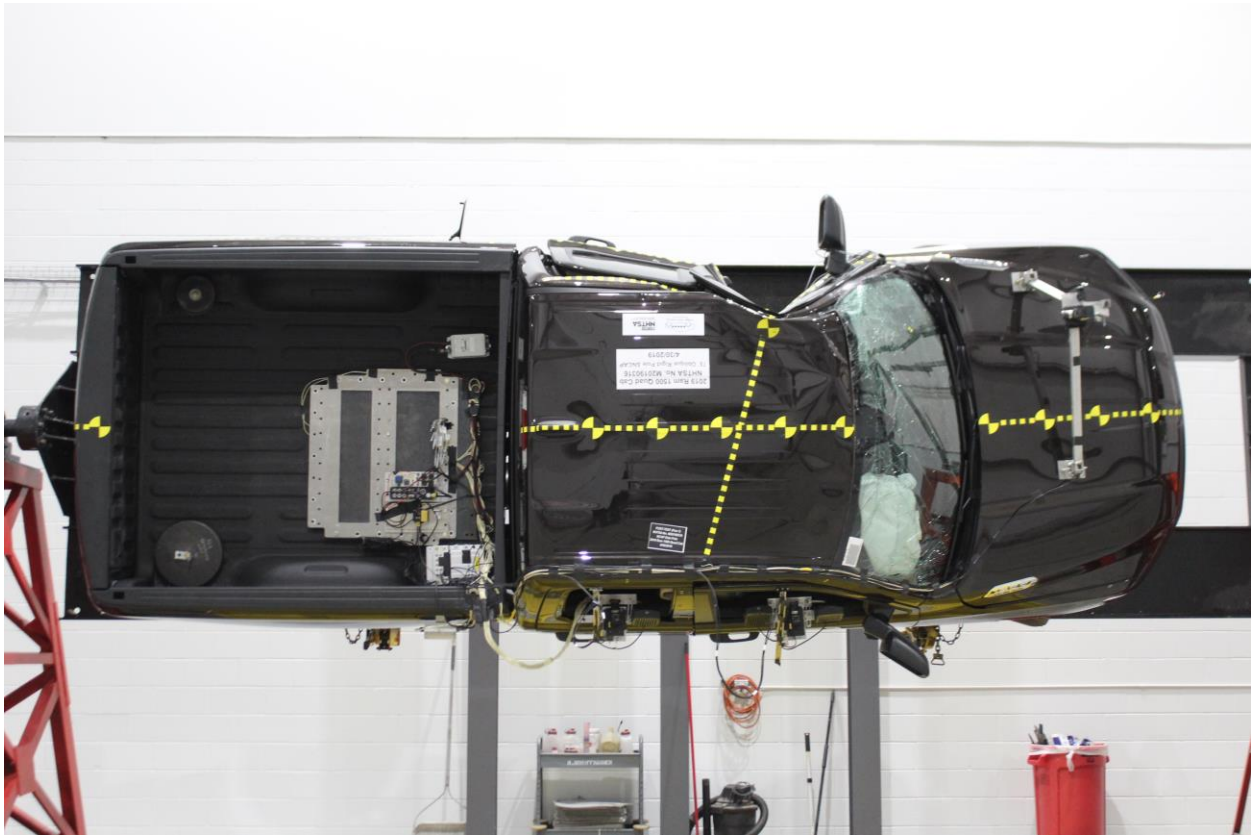



Figure A-66: FMVSS No. 301 Static Rollover 270 Degrees



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



Figure A-68: Impact Event



2019 MODEL YEAR
RAM 1500 TRADESMAN QUAD CAB 4X2

THIS VEHICLE IS MANUFACTURED TO MEET SPECIFIC UNITED STATES REQUIREMENTS. THIS VEHICLE IS NOT MANUFACTURED FOR SALE OR REGISTRATION OUTSIDE OF THE UNITED STATES.

MANUFACTURER'S SUGGESTED RETAIL PRICE OF THIS MODEL INCLUDING DEALER PREPARATION

Base Price: \$31,795

RAM 1500 TRADESMAN QUAD CAB 4X2
 Exterior Color: Rugged Brown Pearl-Coat Exterior Paint
 Interior Colors: Black / Diesel Grey Interior Colors
 Interior: HD Vinyl 40 / 20 / 40 Split Bench Seat
 Engine: 5.7-Liter V8 HEMI® MDS VVT Engine
 Transmission: 8-Speed Automatic 8HP75 Transmission

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL/SAFETY FEATURES
 Advanced Multistage Front Air Bags
 Supplemental Front Seat Side Air Bags
 Supplemental Side-Curtain Front / Rear Air Bags
 3.21 Rear Axle Ratio
 Keyless Go™
 Remote Keyless Entry with All-Secure
 ParkView® Rear Back-Up Camera
 Sentry Key® Theft Deterrent System
 4-Wheel Disc Anti-Lock Brakes
 Electric Park Brake
 Ready-Alert Braking
 Rain Brake Support
 Tire-Fill Alert
 Electronic Roll Mitigation
 Electronic Stability Control
 Trailer Sway Damping
 Hill Start Assist
 Speed Control
 Black Rotary Shifter
 Class III Receiver Hitch
 7-Pin Wiring Harness
 Capless Fuel-Fill

INTERIOR FEATURES
 Uconnect® 3 with 5-Inch Display
 Cluster 3.5-Inch TFT 8&W Display
 Integrated Voice Command with Bluetooth®
 Media Hub-2 USB, Full Function, Aux
 12-Volt Auxiliary Power Outlet
 6-Speakers
 4-Way Manual Adjustable Driver Seat
 Front Passenger Seat - Manual Adjust 4-Way

Power Windows w/ Front 1-Touch Up and Down Feature
 Front / Rear Climate-Control Outlets
 Steering Wheel Mounted Shift Control
 Tilt/Telescope Steering Column

EXTERIOR FEATURES
 18.0-Inch x 7.5-Inch Steel Painted Wheels
 275/65R18 BSW All-Season Tires
 18-Inch Full Size Steel Spare Wheel
 Power-Heated Mirrors with Manual Fold-Away
 Automatic Headlamps
 Halogen Quad Headlamps
 Cargo Tie-Down Loops
 Locking Tailgate

OPTIONAL EQUIPMENT (May Replace Standard Equipment)

Rugged Brown Pearl-Coat Exterior Paint \$100
 Customer Preferred Package 24A \$845
 Tradesman Group
 Class IV Receiver Hitch
 Spray-In Bedliner \$1,195
 5.7-Liter V8 HEMI® MDS VVT Engine
 36-Gallon Fuel Tank \$445
 33-Gallon Fuel Tank \$295
 Trailer Brake Control \$1,895

DESTINATION CHARGE

TOTAL PRICE: *\$36,370

WARRANTY COVERAGE
 5-year or 60,000-mile Powertrain Limited Warranty,
 3-year or 36,000-mile Basic Limited Warranty.
 Ask Dealer for a copy of the limited warranties or see your owner's manual for details.

**5 YEAR / 60,000 MILE
POWERTRAIN WARRANTY**

For more information visit: www.ramtrucks.com
or call 1-866-RAMINFO

FCA US LLC

EPA DOT Fuel Economy and Environment Gasoline Vehicle

Fuel Economy These estimates reflect new EPA methods beginning with 2017 models. Standard pickups range from 14 to 22 MPG. The best vehicle rates 136 MPG.

17 MPG combined city/hwy
15 city
22 highway
 5.9 gallons per 100 miles

You spend \$5,250 more in fuel costs over 5 years compared to the average new vehicle.

Annual fuel Cost \$2,450

Fuel Economy & Greenhouse Gas Rating (tailpipe only) 1 3 10 10
 Best Worst

Smog Rating (tailpipe only) 1 5 10
 Best Worst

This vehicle emits 814 grams CO2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also creates emissions. Learn more at fuelconomy.gov

Actual results will vary for many reasons, including driving conditions and how you drive and maintain your vehicle. The average new vehicle gets 22 MPG and costs \$2,000 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at \$2.80 per gallon. MPG is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fuelconomy.gov
Calculate personalized estimates and compare vehicles.

GOVERNMENT 5-STAR SAFETY RATINGS
 This vehicle has not been rated by the government for frontal crash, side crash or rollover risk.



Source: National Highway Traffic Safety Administration (NHTSA)
www.safercar.gov or 1-888-327-4236

PARTS CONTENT INFORMATION FOR VEHICLES IN THIS COUNTRY:
 U.S./CANADIAN PARTS CONTENT: 57%
 MAJOR SOURCES OF FOREIGN PARTS CONTENT:
 MEXICO: 28%
 NOTE: PARTS CONTENT DOES NOT INCLUDE FINAL ASSEMBLY, DISTRIBUTION, OR OTHER NON-PARTS COSTS.

FOR THIS VEHICLE:
 FINAL ASSEMBLY POINT: STERLING HTS, MICH., U.S.A.
 COUNTRY OF ORIGIN: ENGINE: MEXICO
 TRANSMISSION: GERMANY

VEHICLE PROTECTION
 A PRODUCT OF FCA US LLC
 Add for Major Vehicle Protection for your vehicle. We Built It. We Back It.

Figure A-69: Monroney Label

- Push the ventilated seat button  a third time to choose LO.
- Push the ventilated seat button  a fourth time to turn the ventilated seat off.

NOTE:
The engine must be running for the ventilated seats to operate.

HEAD RESTRAINTS

Head restraints are designed to reduce the risk of injury by restricting head movement in the event of a rear impact. Head restraints should be adjusted so that the top of the head restraint is located above the top of your ear.

WARNING!

- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.
- Head restraints should never be adjusted while the vehicle is in motion.

WARNING!

Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

NOTE:
Do not reverse the head restraints (making the rear of the head restraint face forward) in an attempt to gain additional clearance to the back of your head.

Front Head Restraints


Your vehicle is equipped with front four way driver and passenger head restraints.

To raise the head restraint, pull upward on the head restraint. To lower the head restraint, push the adjustment button, located at the base of the head restraint, and push downward on the head restraint.

To adjust the head restraint forward, pull the top of the head restraint toward the front of the vehicle as desired and release. To adjust the head restraint rearward, pull the top of

the head restraint to the forward most position and release. The head restraint will return to the rear most position.

NOTE:
If your vehicle is equipped with a front bench seat, the center head restraint is not adjustable or removable.



Head Restraint Adjustment Button

WARNING!

- All occupants, including the driver, should not operate a vehicle or sit in a vehicle's seat until the head restraints are placed in their proper positions in order to minimize the risk of neck injury in the event of a crash.
- Head restraints should never be adjusted while the vehicle is in motion. Driving a vehicle with the head restraints improperly adjusted or removed could cause serious injury or death in the event of a collision.

NOTE:
The head restraints should only be removed by qualified technicians, for service purposes only. If either of the head restraints require removal, see an authorized dealer.

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



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

APPENDIX B

VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS
Driver Dummy Instrumentation Plots

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

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

Additional Driver Dummy Instrumentation Data

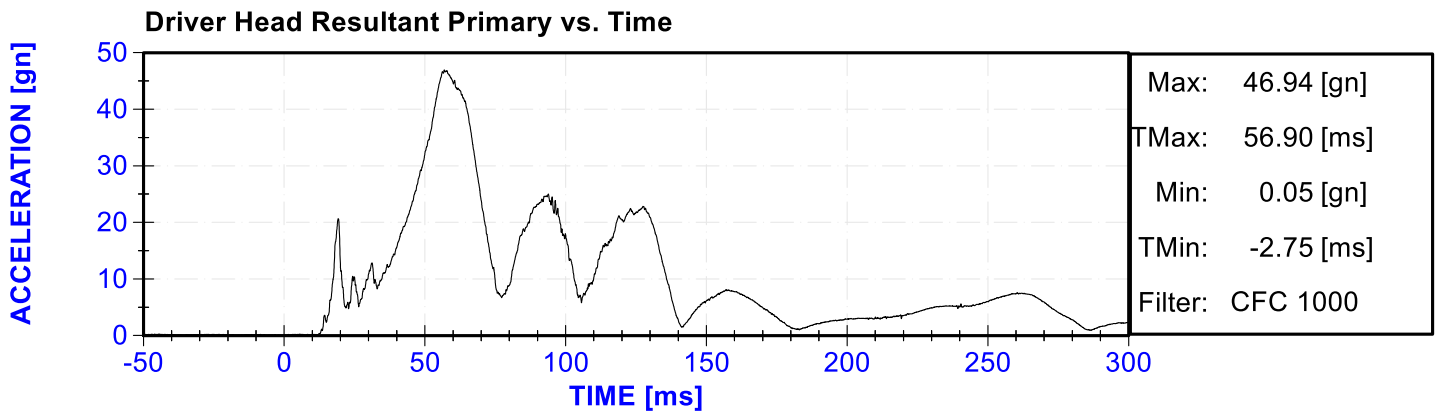
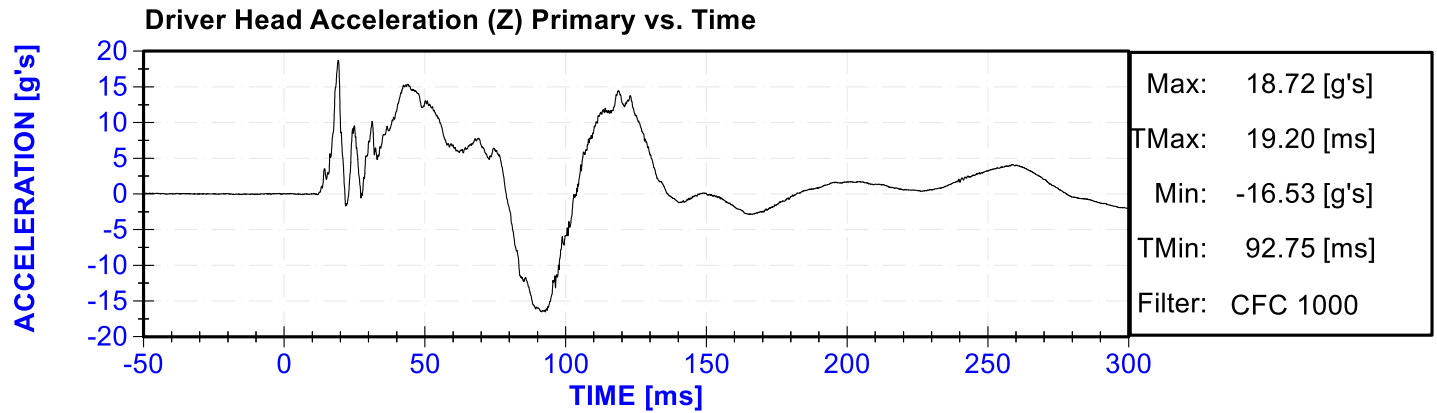
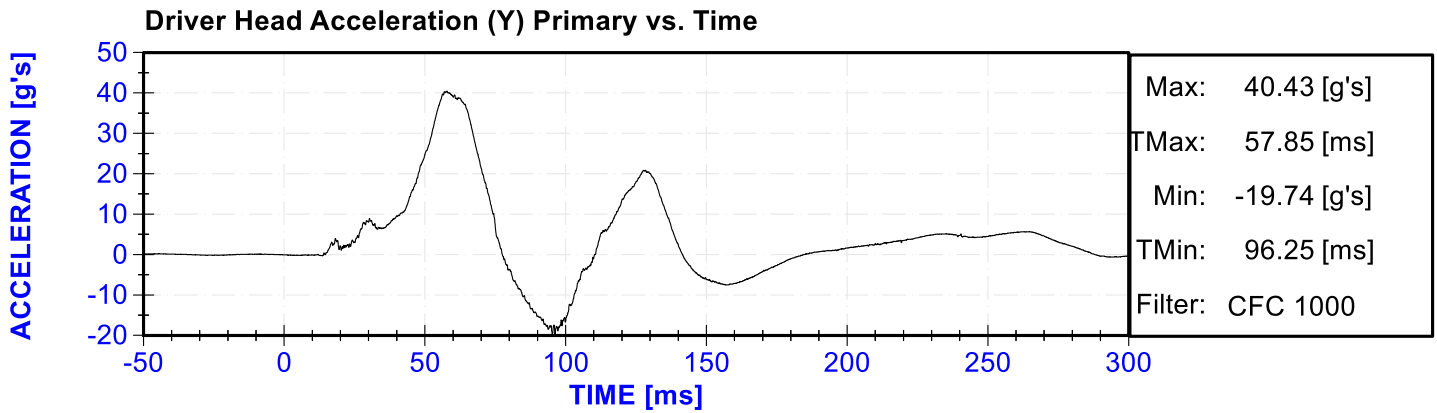
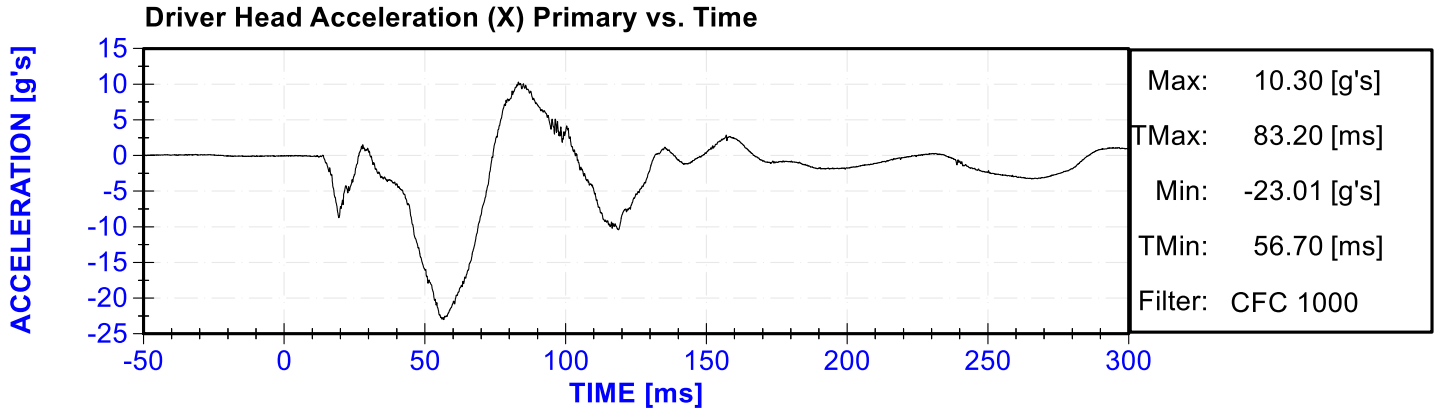
Driver Head Acceleration Redundant (X)
Driver Head Acceleration Redundant (Y)
Driver Head Acceleration Redundant (Z)
Driver Upper Thorax Rib Deflection (Y)
Driver Middle Thorax Rib Deflection (Y)
Driver Lower Thorax Rib Deflection (Y)
Driver Upper Abdomen Rib Deflection (Y)
Driver Lower Abdomen Rib Deflection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

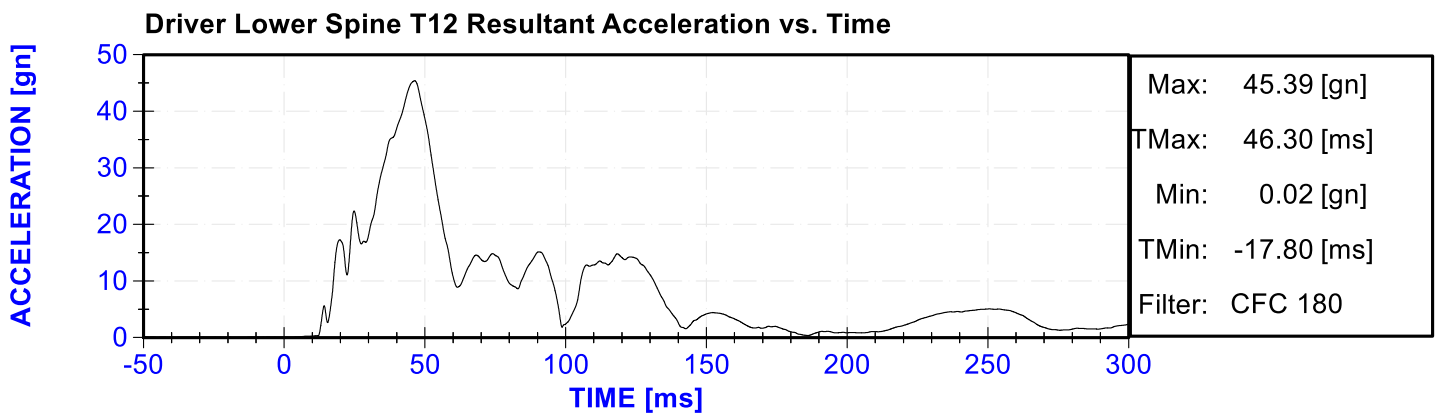
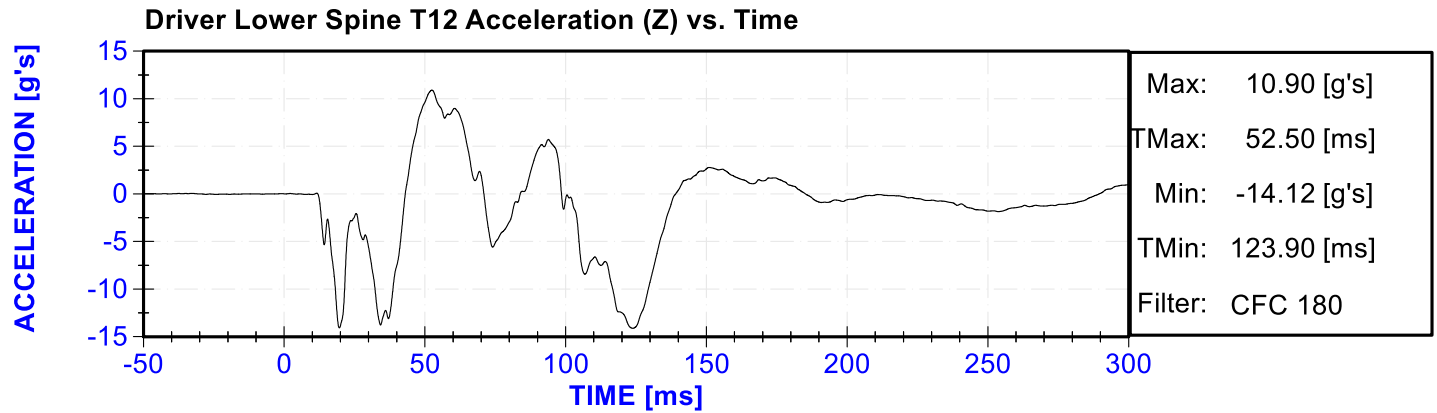
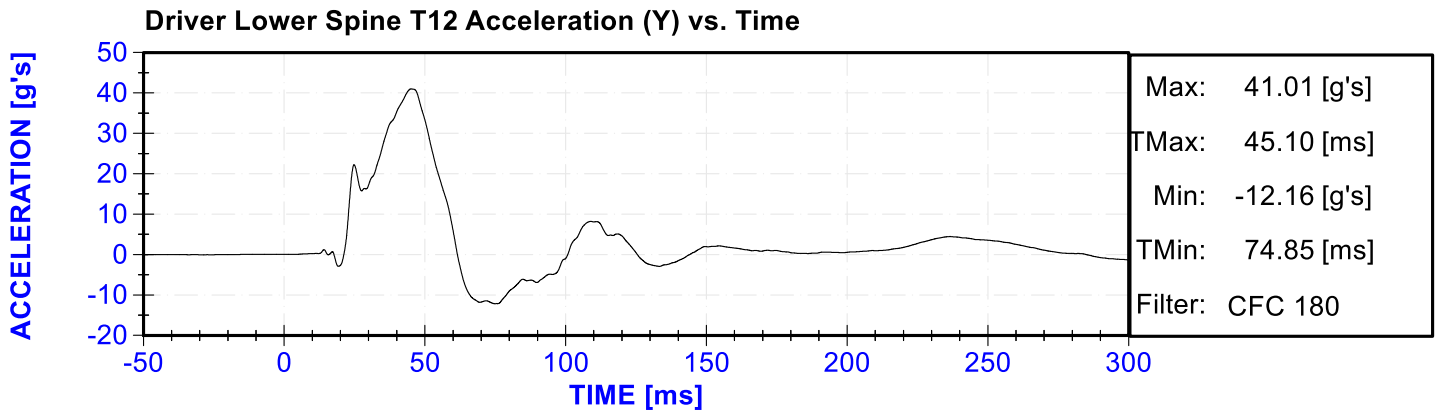
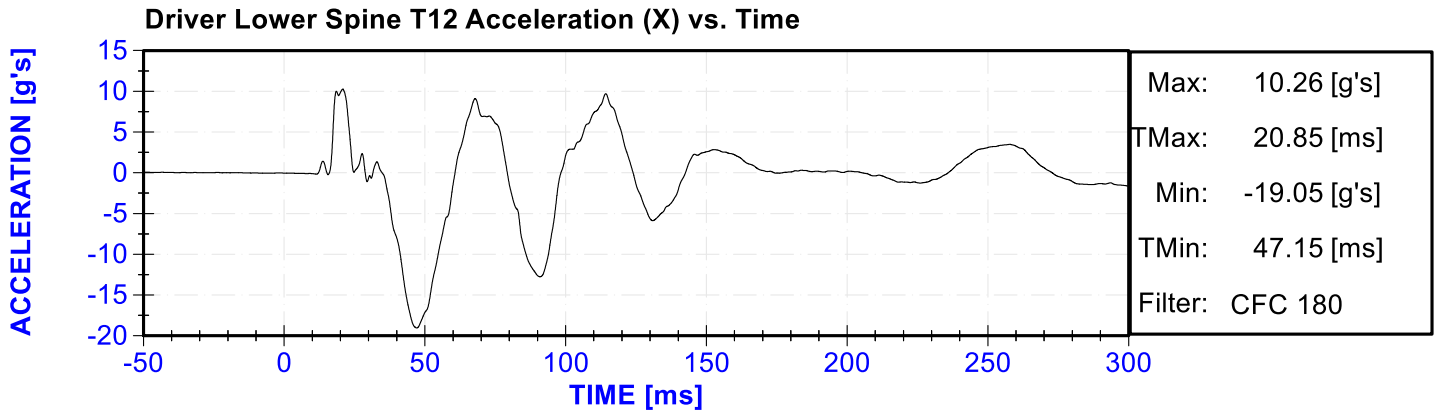
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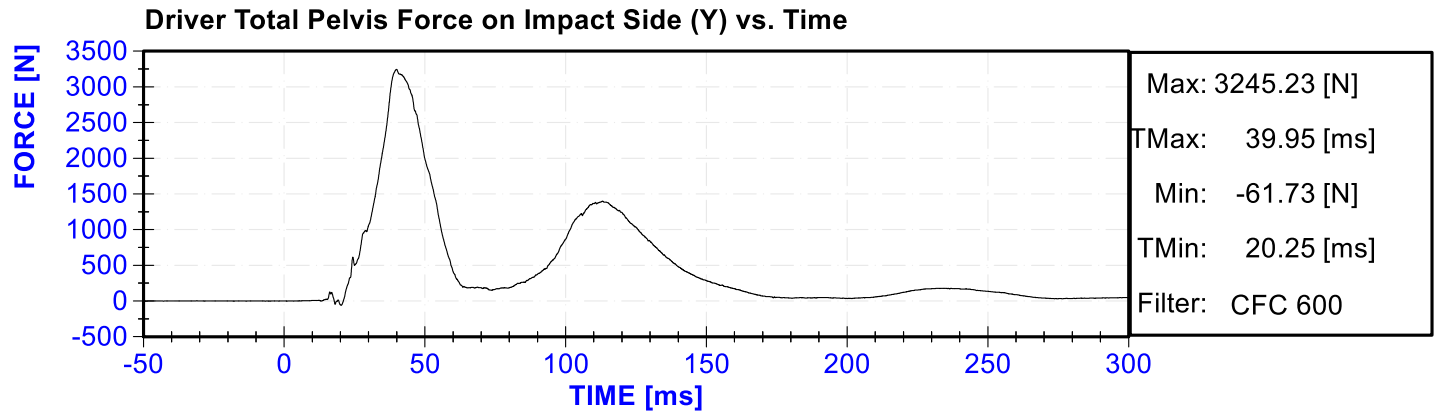
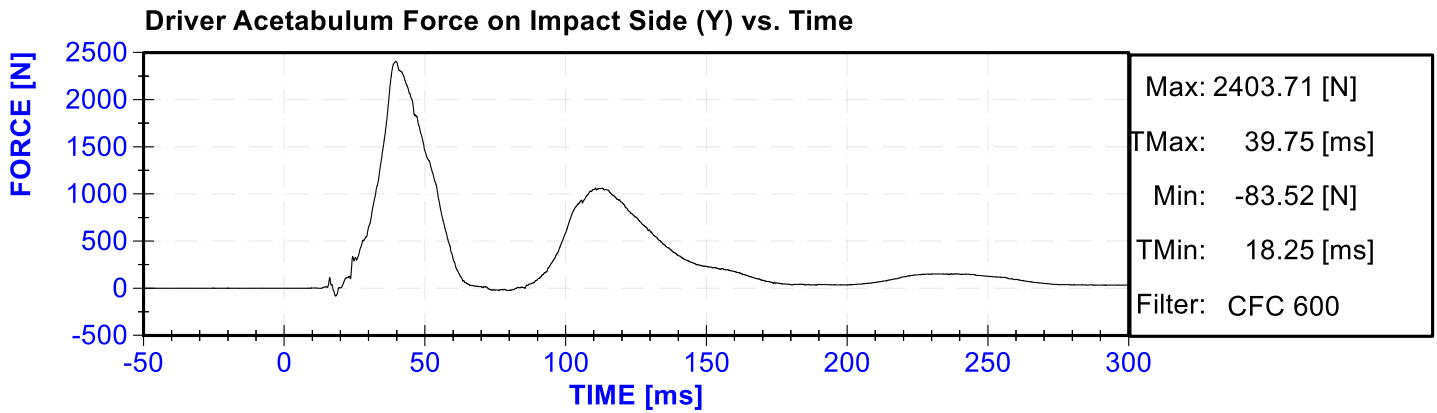
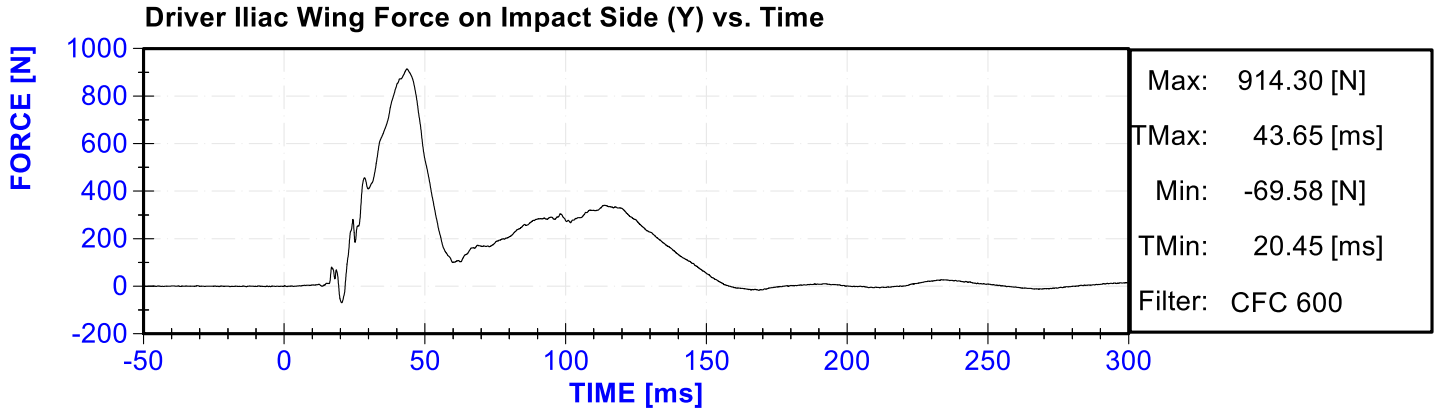
Vehicle Center of Gravity Acceleration (X)
Vehicle Center of Gravity Acceleration (Y)
Vehicle Center of Gravity Acceleration (Z)
Left Floor Sill Acceleration (Y)
Left A-Pillar Sill Acceleration (Y)
Left Lower A-Pillar Acceleration (Y)
Left Mid A-Pillar Acceleration (Y)
Left B-Pillar Sill Acceleration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

Pole Instrumentation Data

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







APPENDIX C

DUMMY CONFIGURATION AND PERFORMANCE VERIFICATION DATA

CALIBRATION TEST RESULTS

PRE-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: 300

(CONFIGURED FOR LEFT SIDE IMPACT)

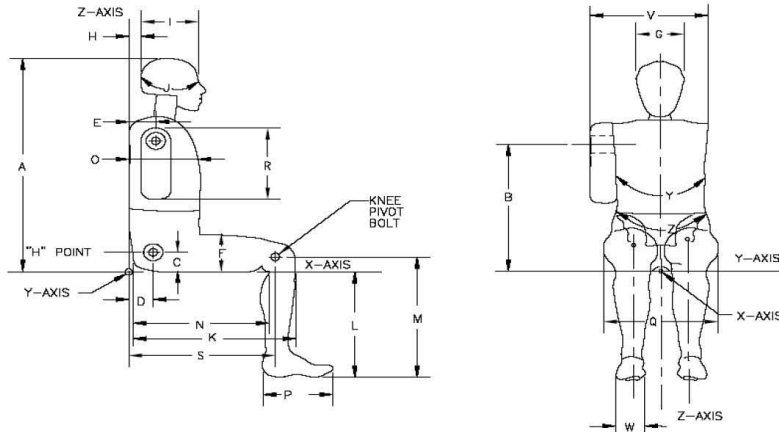


External Measurements - SID-IIs

Technician: K. Dutton

Date: 3/23/2019

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	450	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	144	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	144	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	185	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	357	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	203	Pass
P	Foot Length	216	232	222	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	350	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	769	Pass

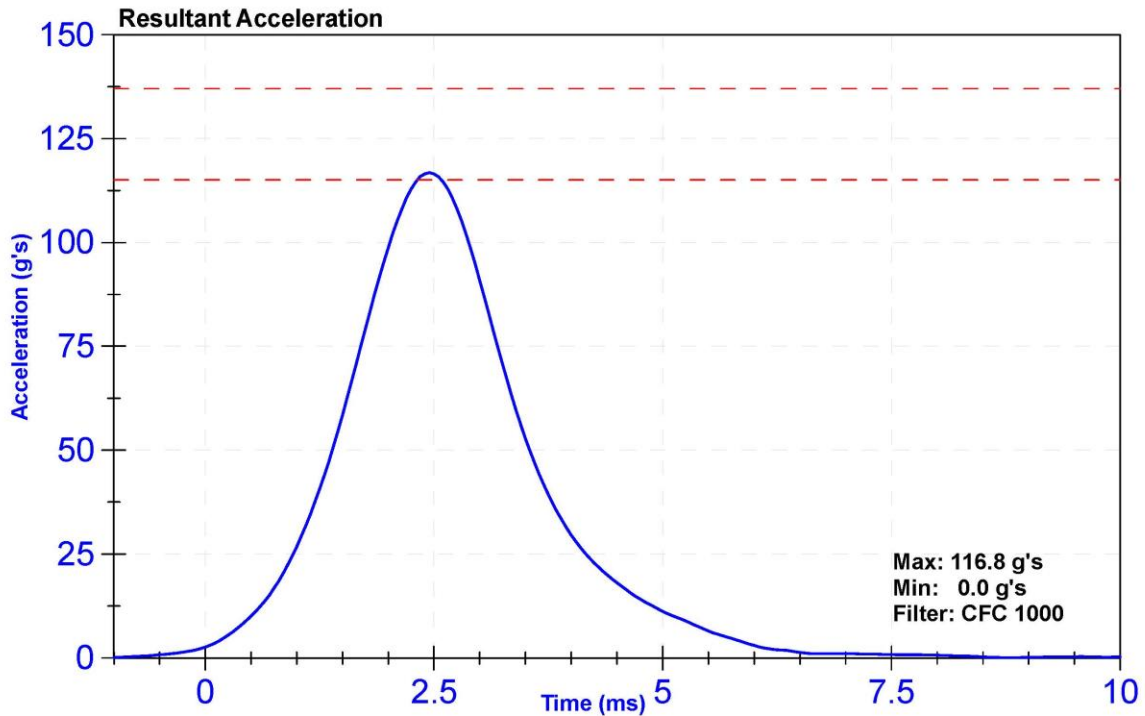
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

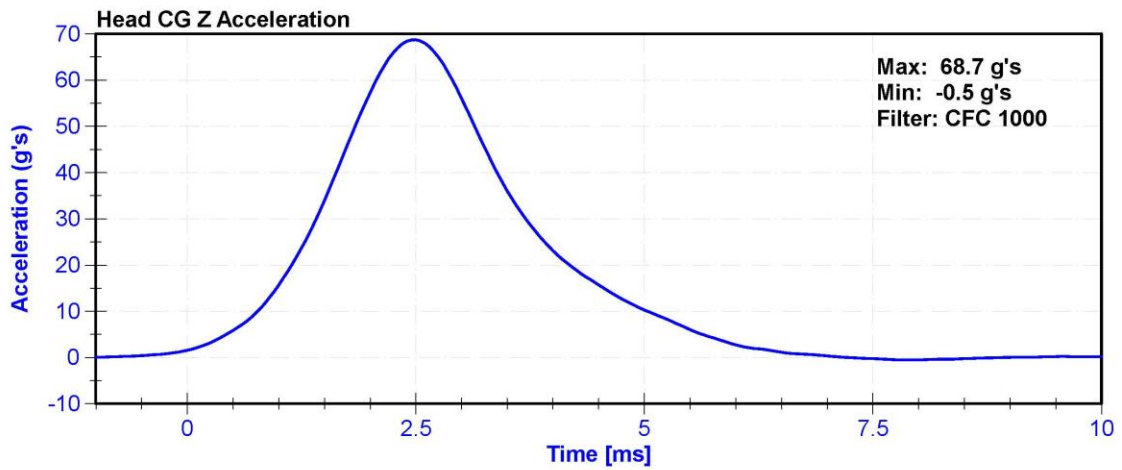
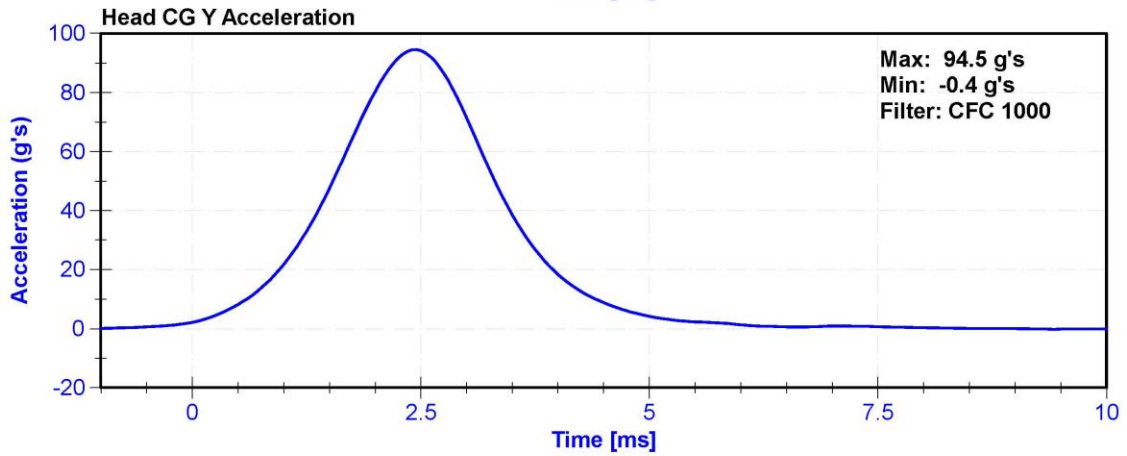
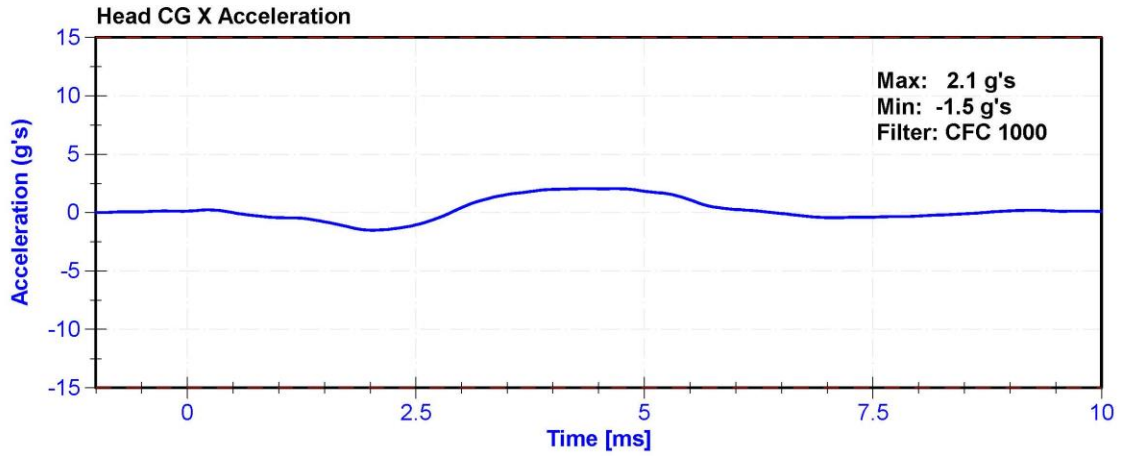
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.8	Pass
Humidity	10	70	%	30.7	Pass
Resultant Acceleration	115	137	g's	116.8	Pass
Oscillation	0	15	%	0.8	Pass
Fore-Aft Acceleration	-15	15	g's	2.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	10/5/2018	4/5/2019
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	10/5/2018	4/5/2019
Z Accelerometer	ENDEVCO 7264	AC-P79189	10/5/2018	4/5/2019





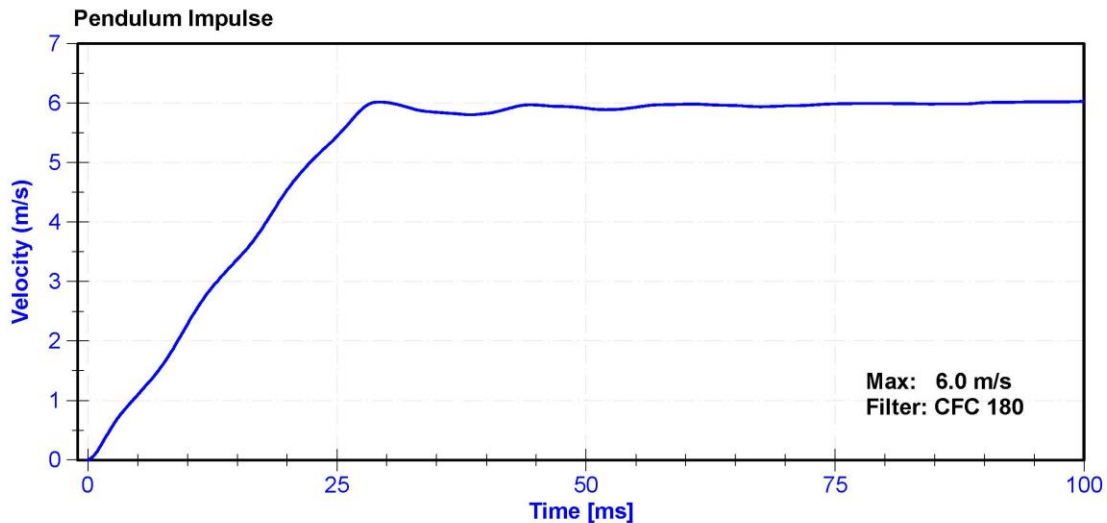
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

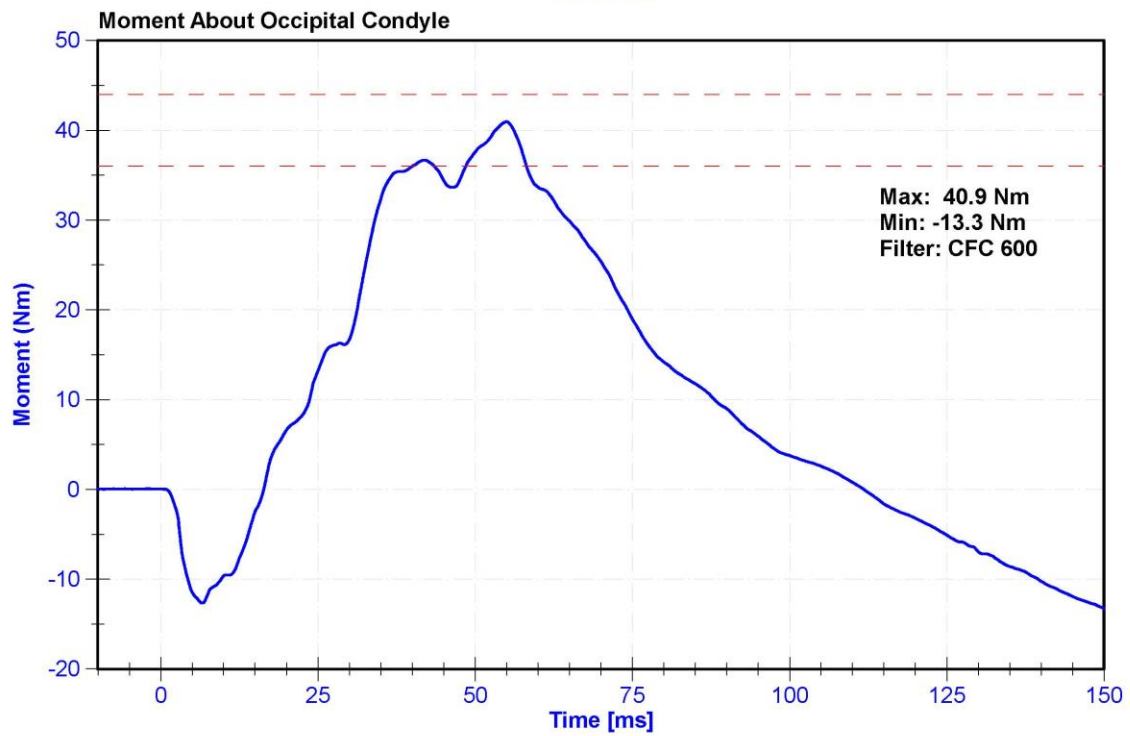
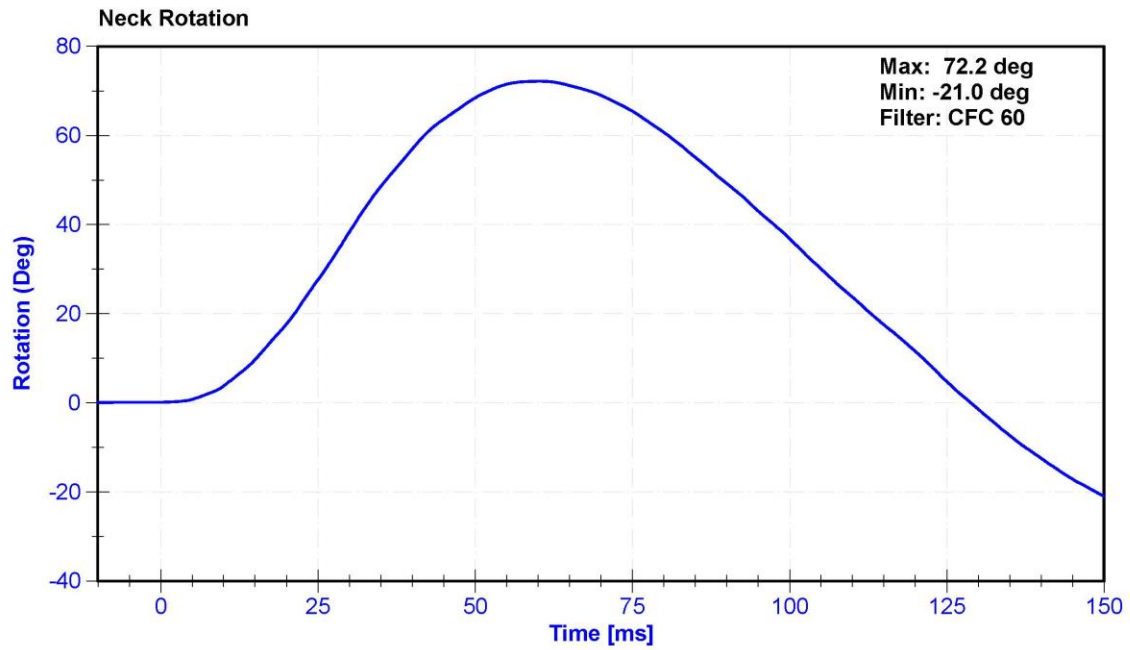
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21	Pass
Humidity	10	70	%	31	Pass
Velocity	5.51	5.63	m/s	5.514	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.28	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.37	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.54	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.44	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.02	Pass
Neck Rotation	71	81	deg	72.2	Pass
Time at Maximum Rotation	50	70	ms	60.3	Pass
Moment about the OC	36	44	Nm	40.9	Pass
Moment Decay to 0 Nm	102	126	ms	111.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/1/2018	11/1/2019
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/1/2018	11/1/2019
Upper Neck Load Cell	Denton 1716	LC-2018 FY	9/28/2018	9/28/2019





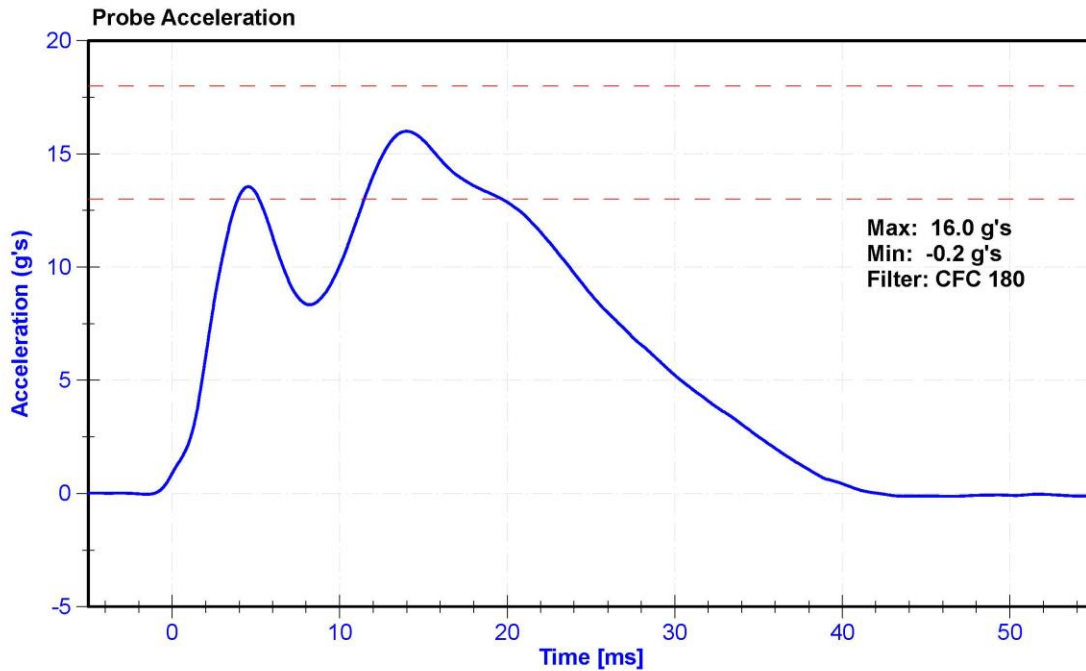
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

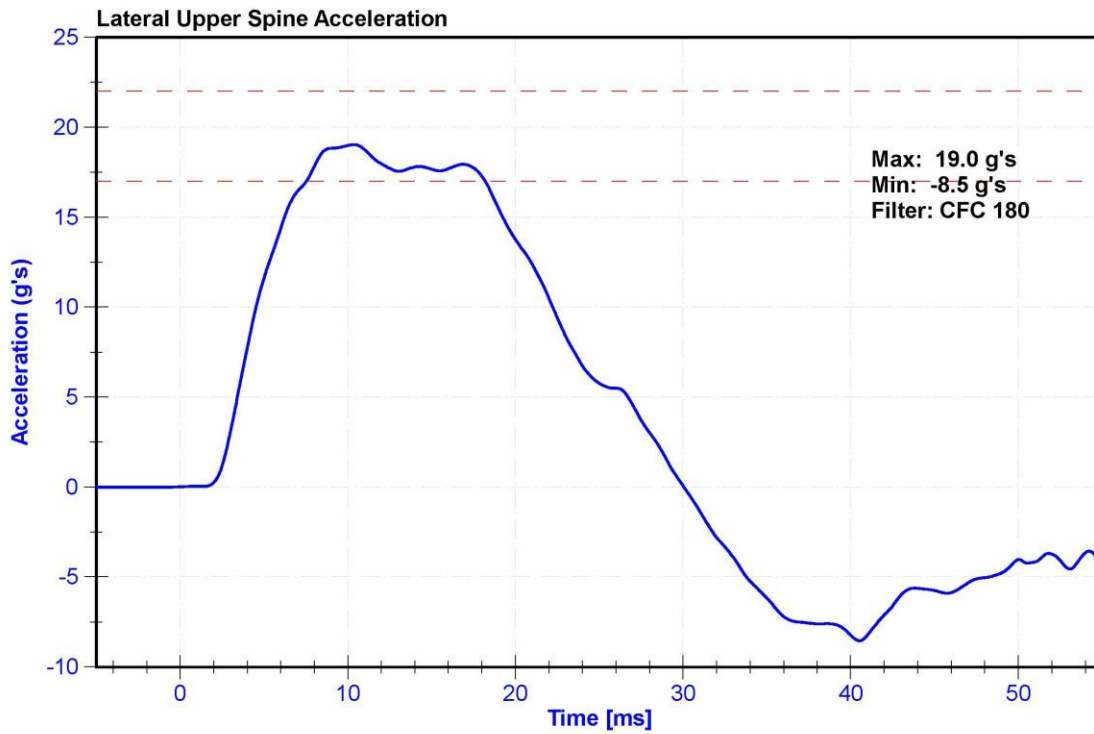
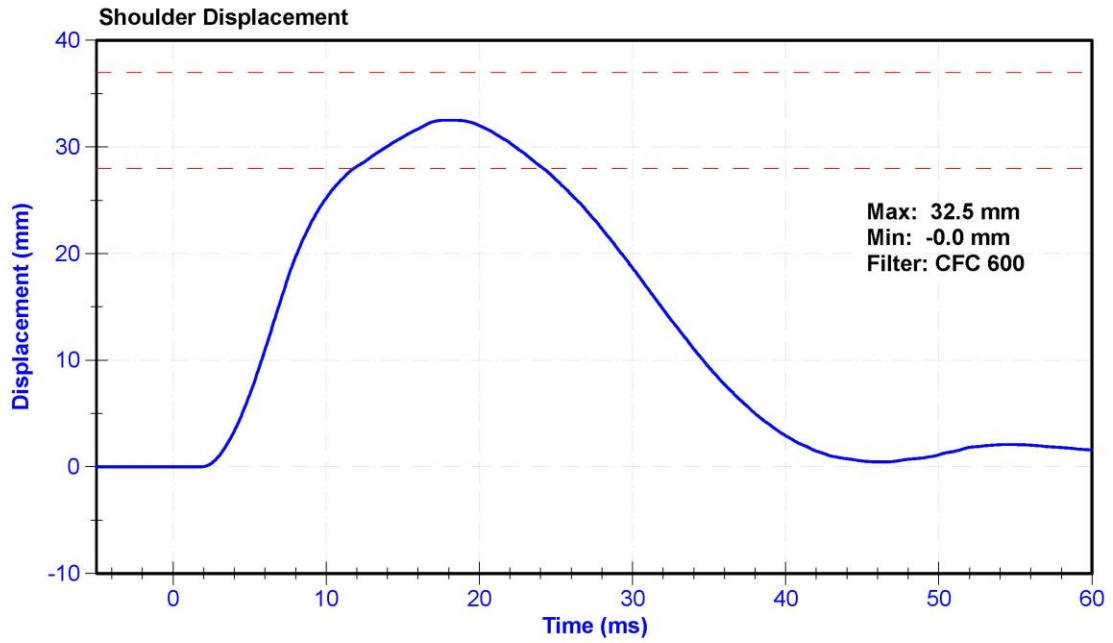
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	32	Pass
Velocity	4.2	4.4	m/s	4.40	Pass
Probe Acceleration	13	18	g's	16.0	Pass
Shoulder Deflection	28	37	mm	32.5	Pass
Lateral Upper Spine Acceleration	17	22	g's	19.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco 7264C	AC-P94667	11/1/2018	11/1/2019
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	10/30/2018	10/30/2019
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/24/2018	4/24/2019





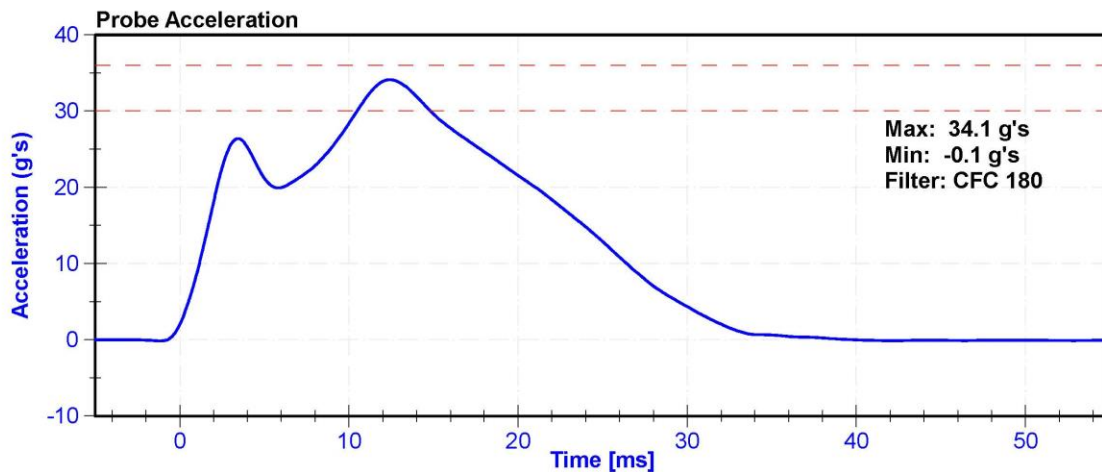
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

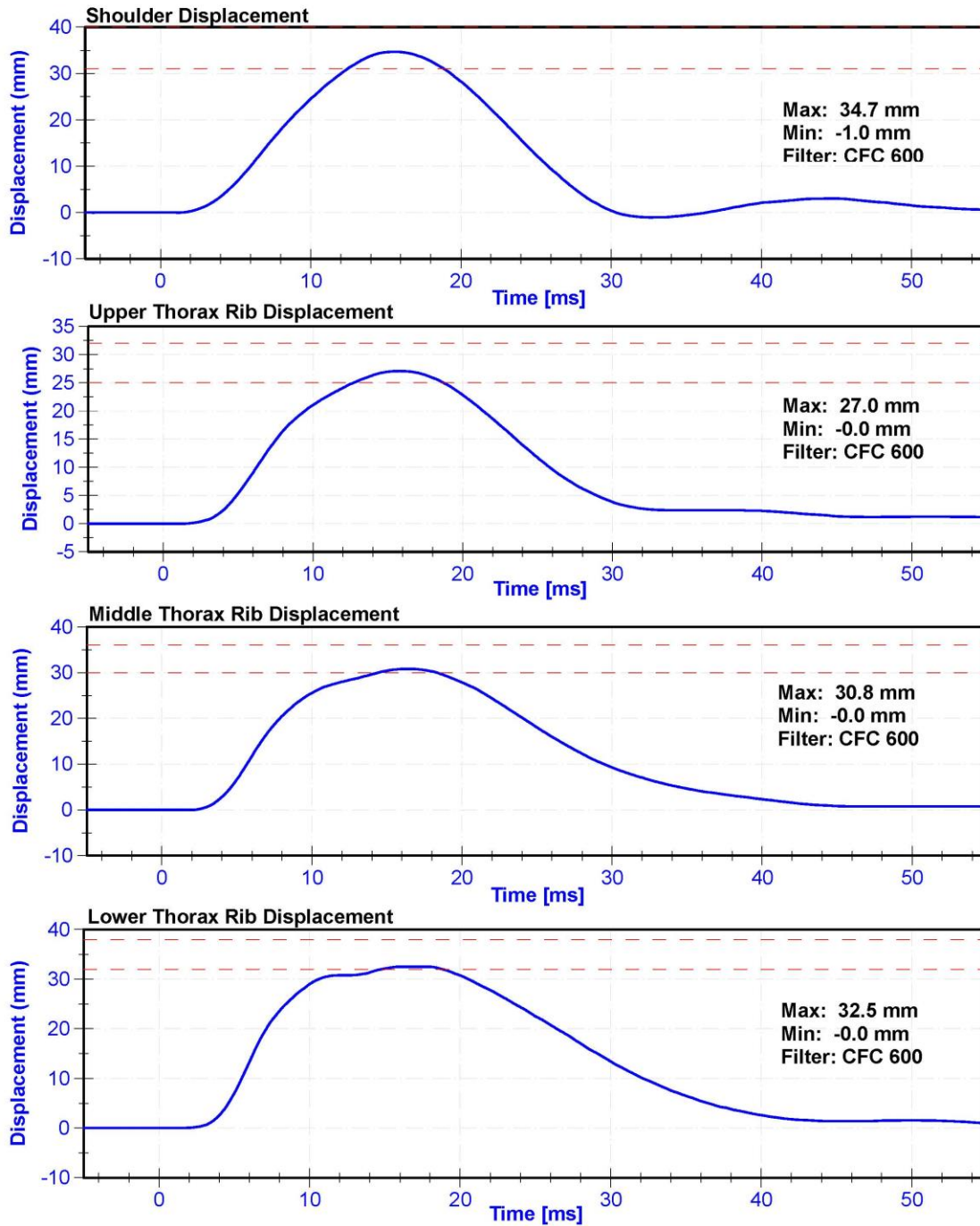
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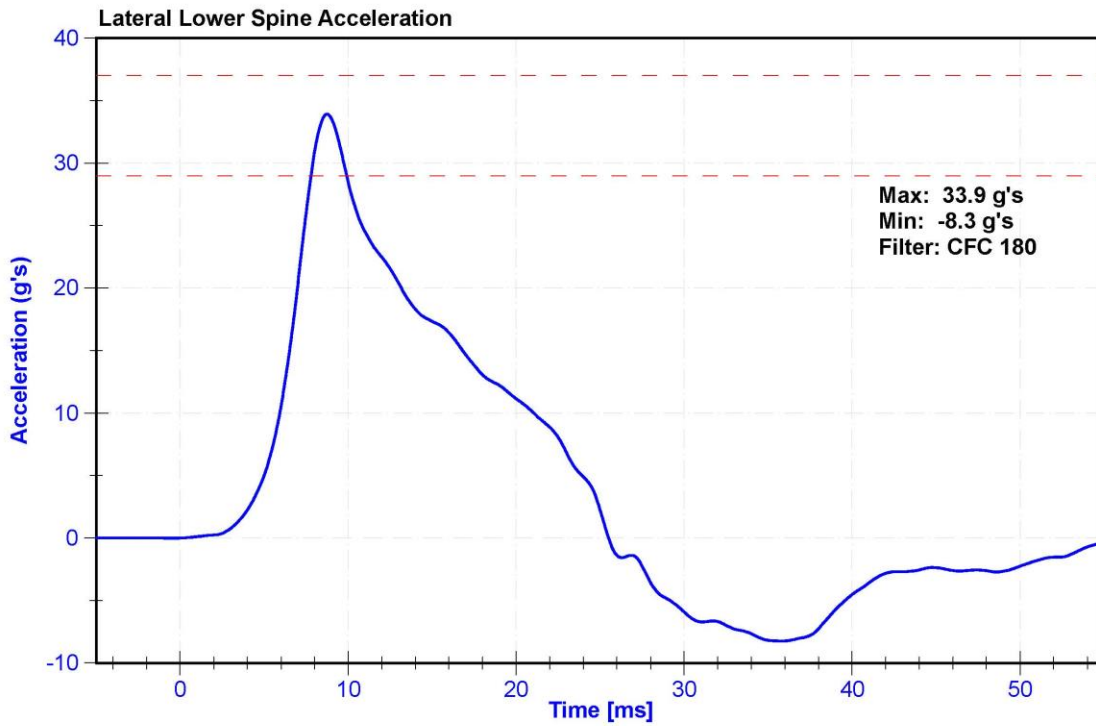
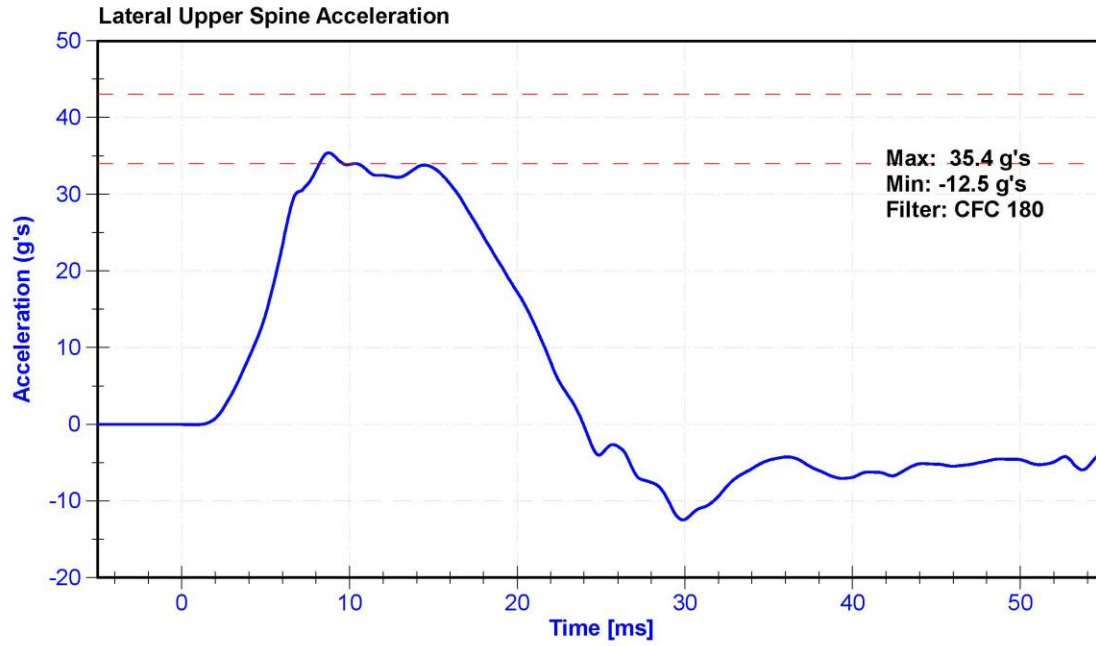
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	30.2	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration after 5 ms	30	36	g's	34.1	Pass
Lateral Upper Spine Acceleration	34	43	g's	35.4	Pass
Lateral Lower Spine Acceleration	29	37	g's	33.9	Pass
Shoulder Deflection	31	40	mm	34.7	Pass
Upper Thorax Rib Deflection	25	32	mm	27.0	Pass
Mid Thorax Rib Deflection	30	36	mm	30.8	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 7264C	AC-P94667	11/1/2018	11/1/2019
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/24/2018	4/24/2019
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	1/10/2019	7/11/2019
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	10/30/2018	10/30/2019
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	10/10/2018	10/10/2019
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	10/11/2018	10/11/2019
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	10/10/2018	10/10/2019







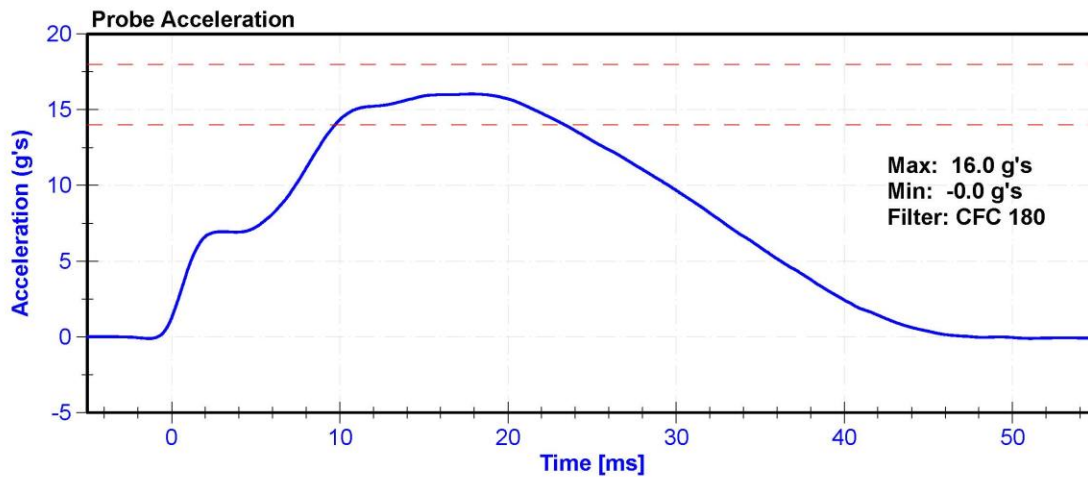
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

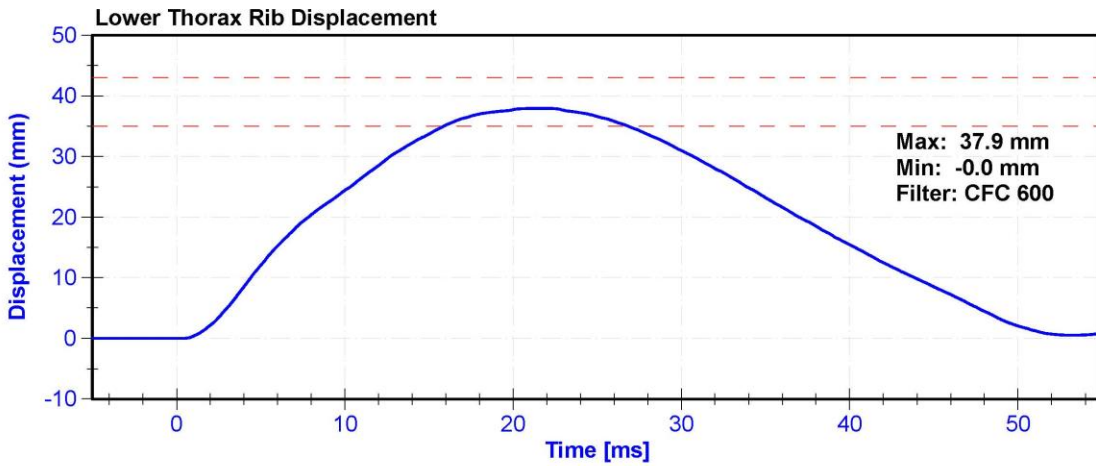
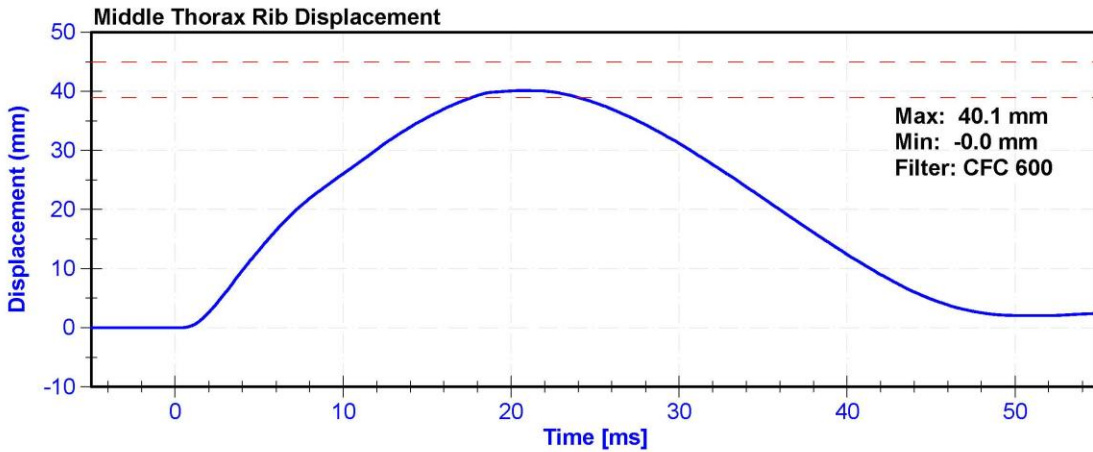
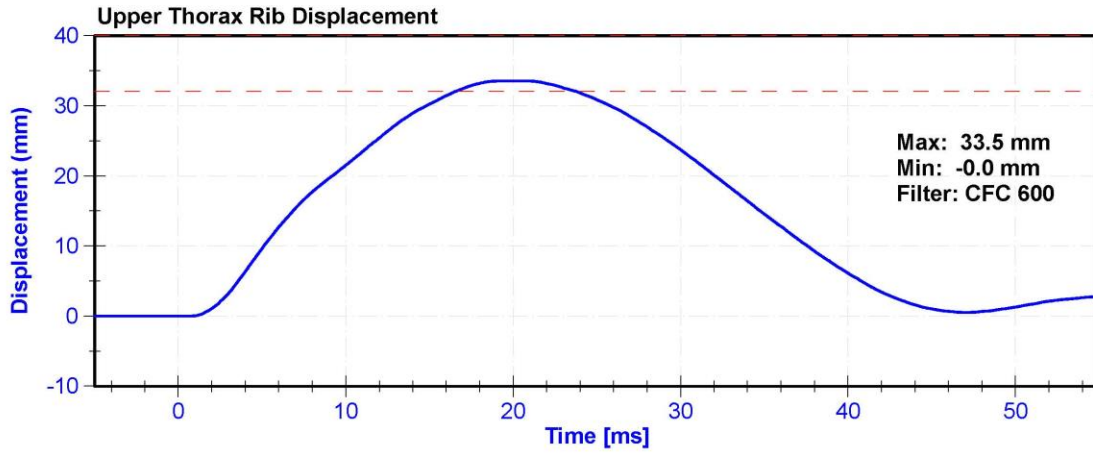
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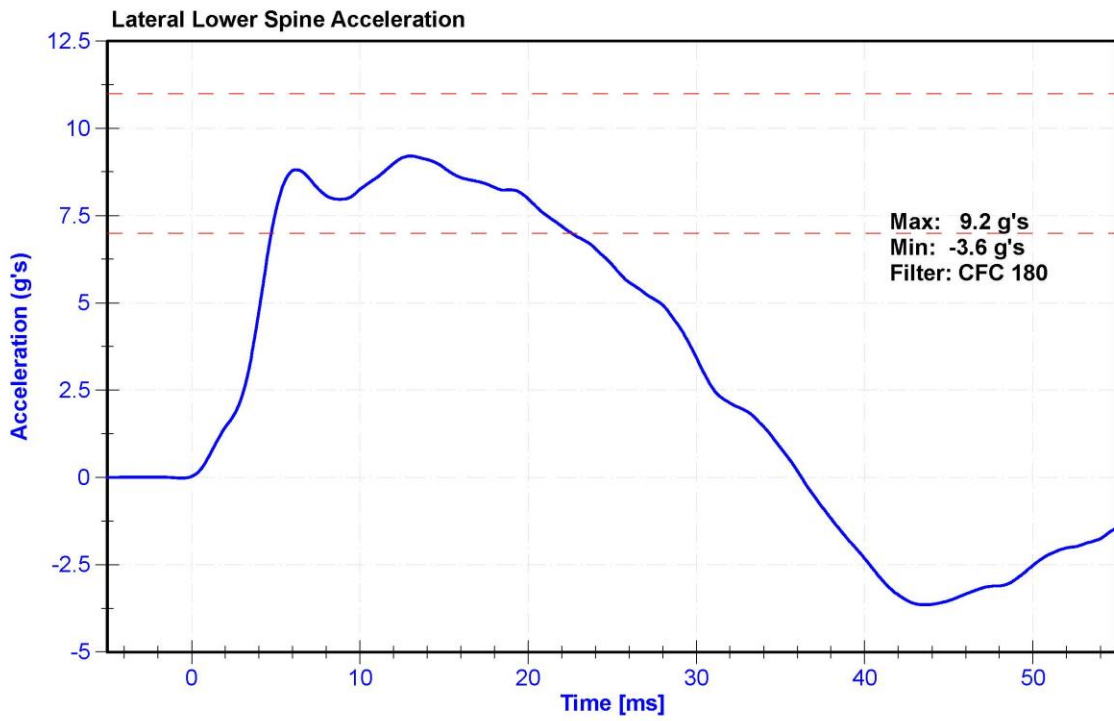
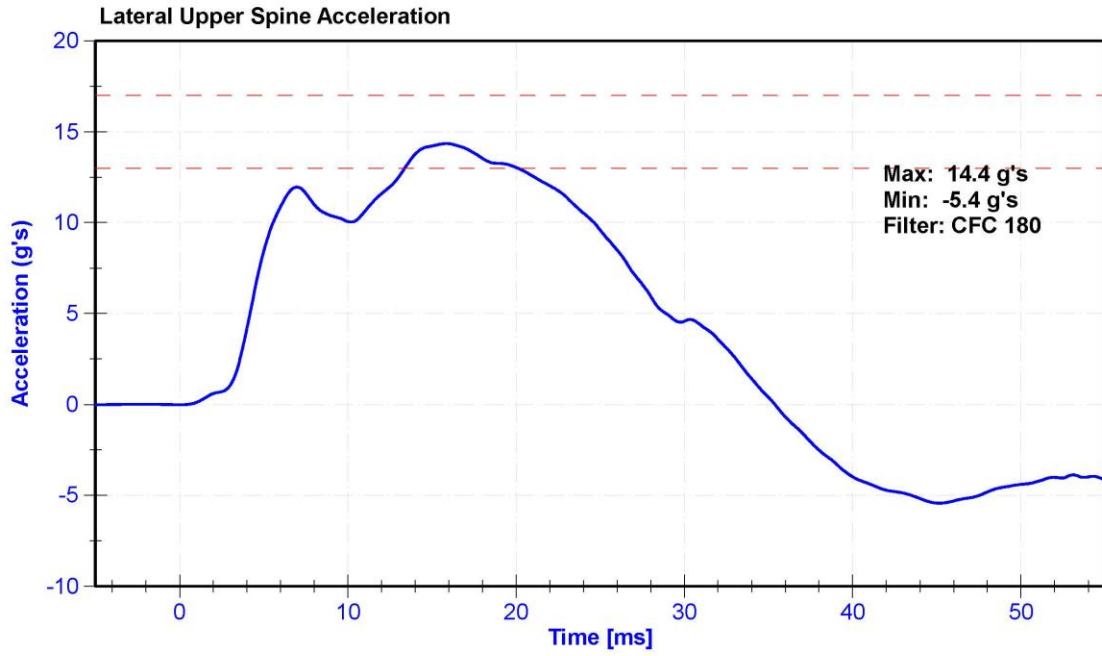
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.1	Pass
Humidity	10	70	%	32	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	14	18	g's	16.0	Pass
Lateral Upper Spine Acceleration	13	17	g's	14.4	Pass
Lateral Lower Spine Acceleration	7	11	g's	9.2	Pass
Upper Thorax Rib Deflection	32	40	mm	33.5	Pass
Middle Thorax Rib Deflection	39	45	mm	40.1	Pass
Lower Thorax Rib Deflection	35	43	mm	37.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco 7264C	AC-P94667	11/1/2018	11/1/2019
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P63315	10/24/2018	4/24/2019
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	1/10/2019	7/11/2019
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	10/10/2018	10/10/2019
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	10/11/2018	10/11/2019
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	10/10/2018	10/10/2019







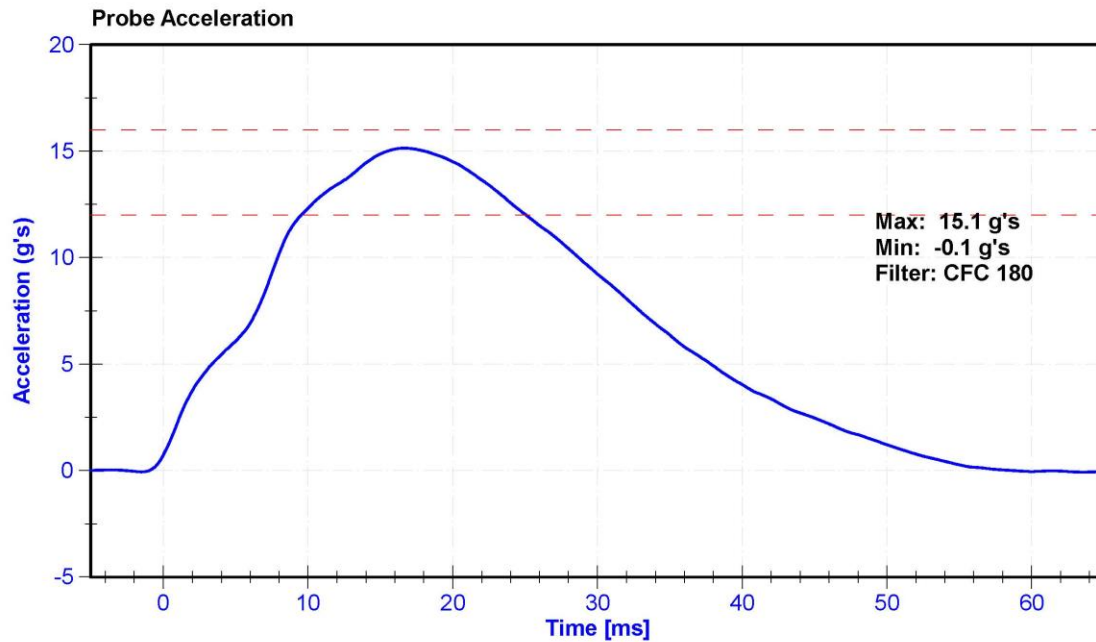
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

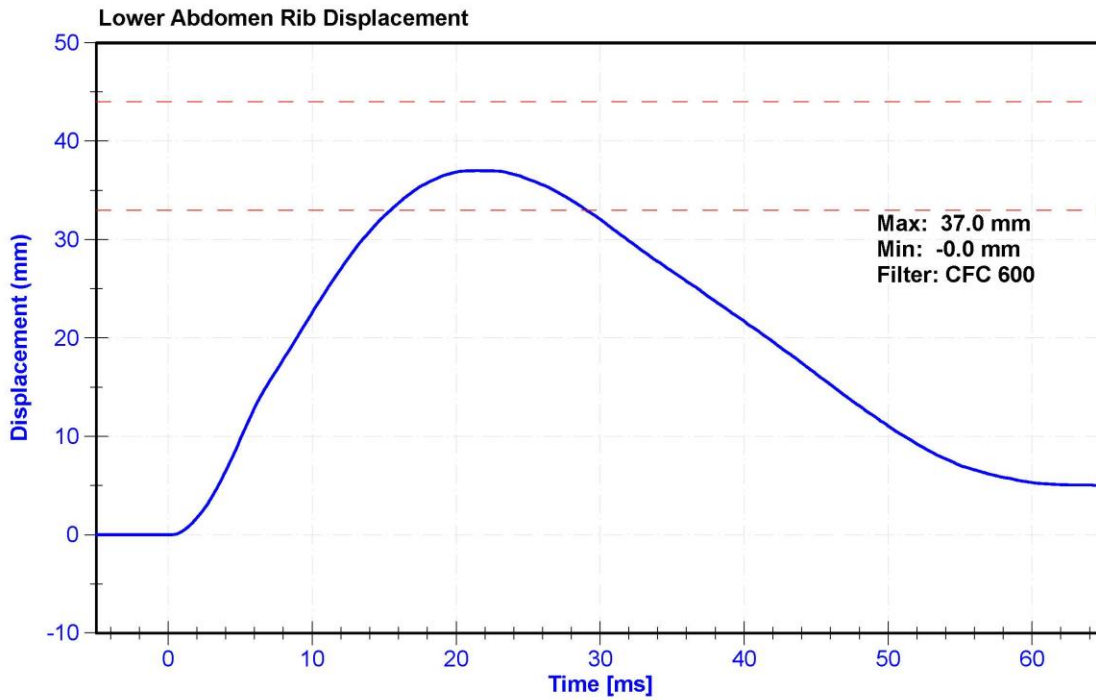
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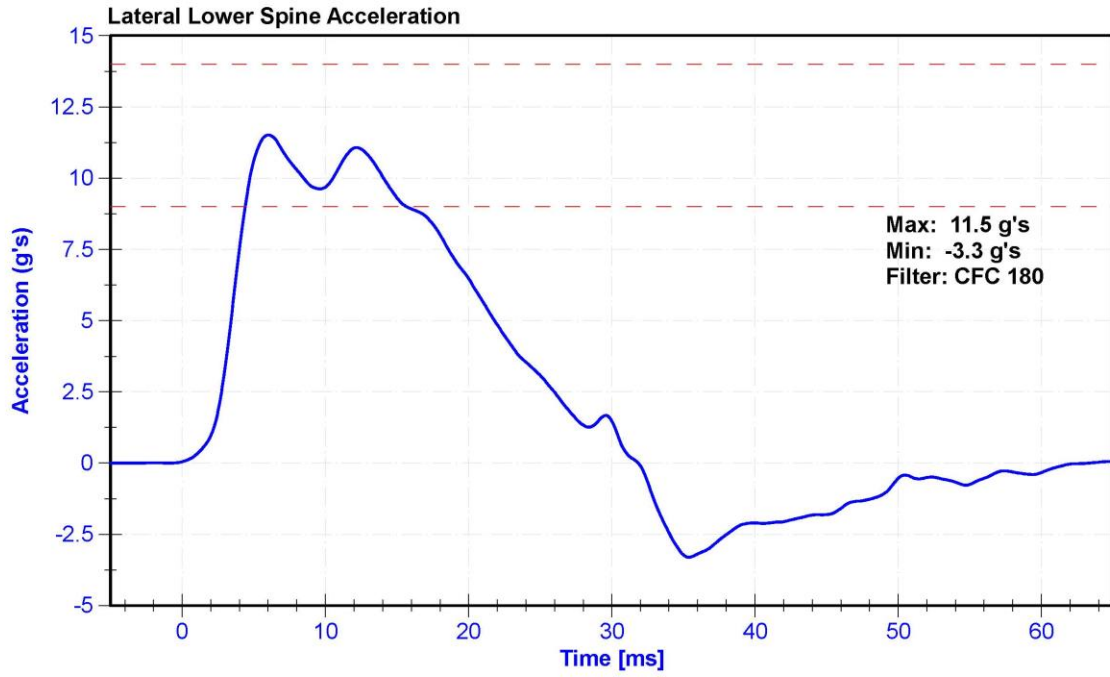
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.0	Pass
Humidity	10	70	%	32.0	Pass
Velocity	4.2	4.4	m/s	4.31	Pass
Probe Acceleration	12	16	g's	15.1	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.5	Pass
Upper Abdomen Rib Deflection	36	47	mm	39.8	Pass
Lower Abdomen Rib Deflection	33	44	mm	37.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	Endevco 7264C	AC-P94667	11/1/2018	11/1/2019
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	1/10/2019	7/11/2019
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	10/10/2018	10/10/2019
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	10/11/2018	10/11/2019







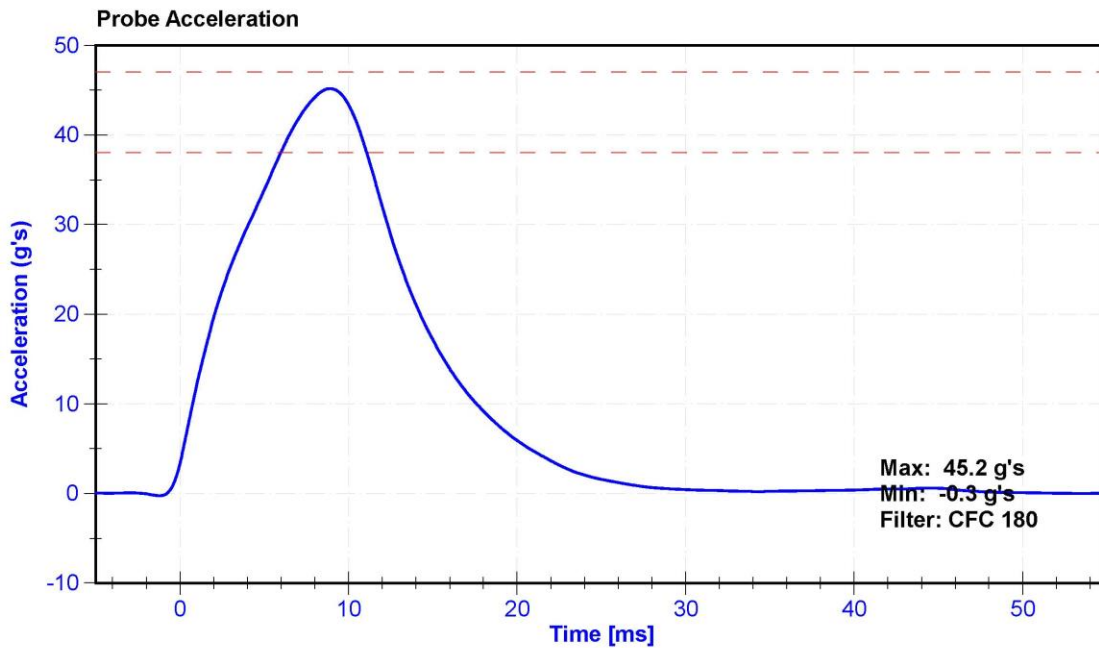
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

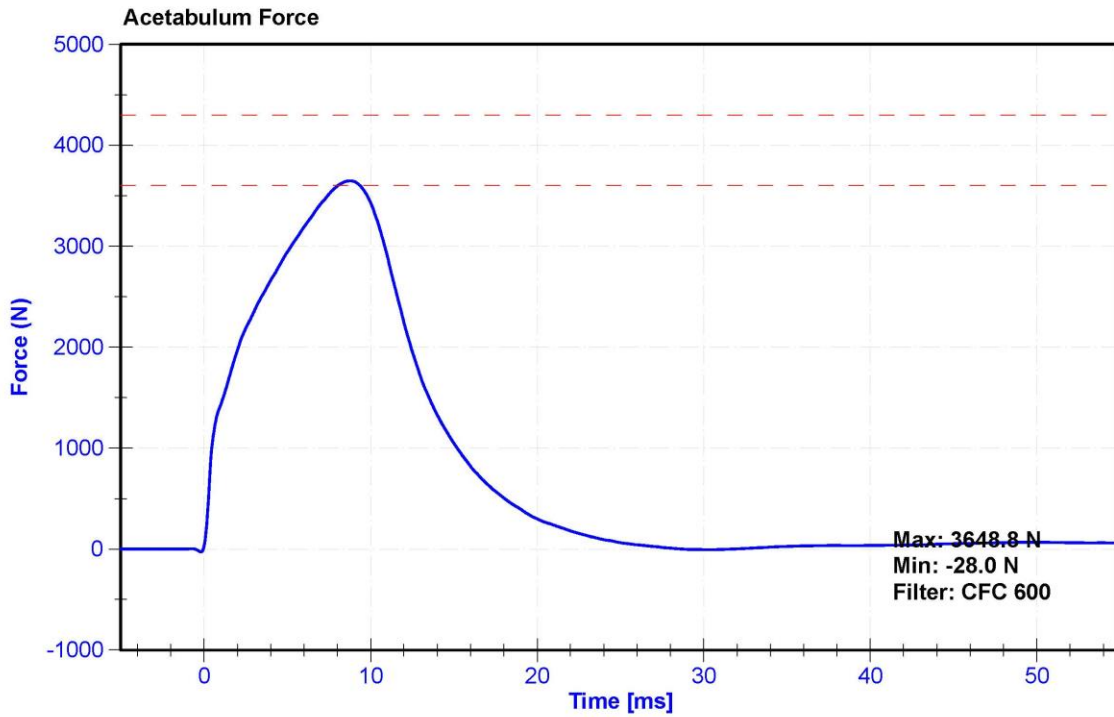
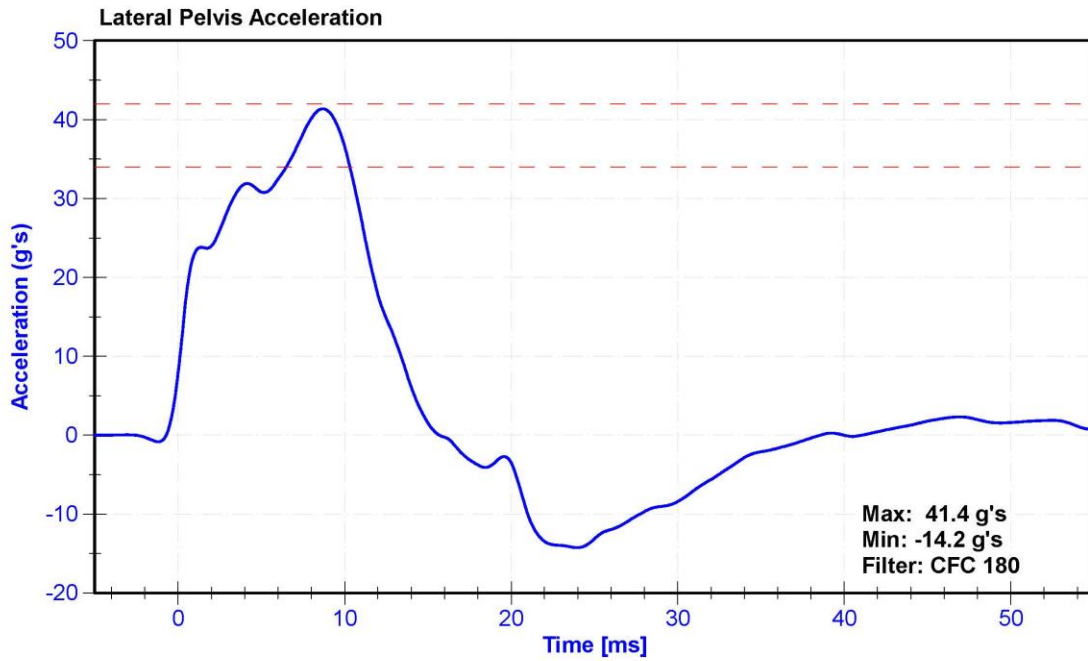
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.2	Pass
Humidity	10	70	%	31.2	Pass
Velocity	6.6	6.8	m/s	6.66	Pass
Probe Acceleration	38	47	g's	45.2	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	41.4	Pass
Acetabulum Force	3600	4300	N	3648.8	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco 7264C	AC-P94667	11/1/2018	11/1/2019
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51668	10/24/2018	4/24/2019
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	10/4/2018	10/4/2019
Certification Plug	Humanetics	11641	3/28/2018	N/A
Crash Test Plug	Humanetics	12523	10/2/2018	N/A







300 / 3/22/19 cert 2

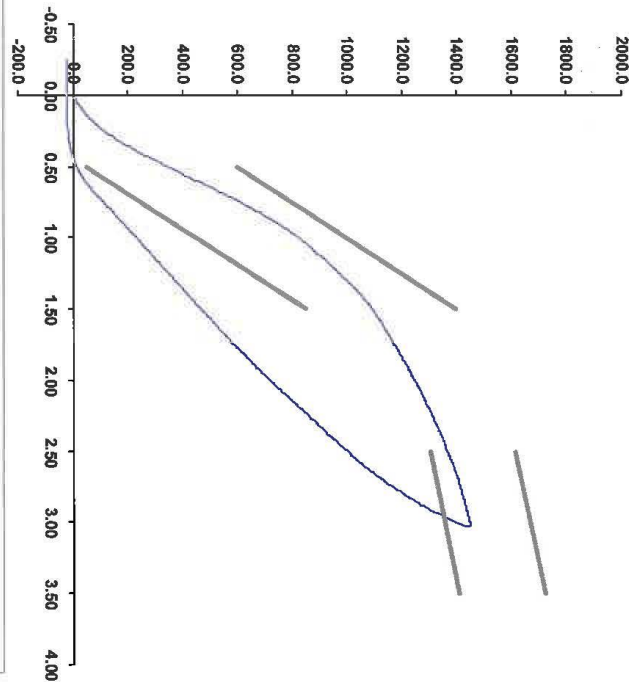
SID-11s Pelvis Plug Certification Test

Force (-N) vs Extension (-mm)

Plug S/N 11641
 Test Number 3484
 Report Number 3477
 Test Date 3/28/2017 11:15:30 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,391.00	1,673.00

Testing Machine STM-20 5985542
 Load Cell S/N (T1240913), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 127
 Extension or Position Measured by XHD_100 (XHD100)



Operator DC

Part Number 180-4450

Template No 107 28-Mar-17
 SACO Research

By: DC Date: 3/28/17
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



300 3/22/19 crash

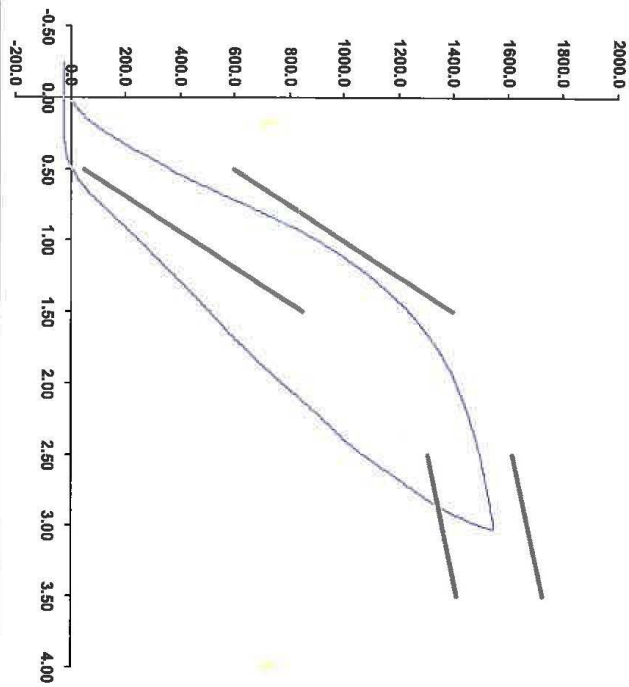
SID-11s Pelvis Plug Certification Test

Force (-N) vs Extension (-mm)

Plug S/N 12523
Test Number 7450
Report Number 7464
Test Date 10/2/2018 8:28:24 AM

Test Results	Spec Min	Spec Max
Force @ 0.5 mm (N)	50.00	600.00
Force @ 1.5 mm (N)	850.00	1,400.00
Force @ 2.5 mm (N)	1,306.00	1,618.00
Force @ 3.0 mm (N)	1,361.00	1,673.30

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)



Notes:

Operator DC
 Part Number 180-4450

Template No 107 02-Oct-18
 SACO Research

By: DC Date: 10/2/18
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2092 FAX

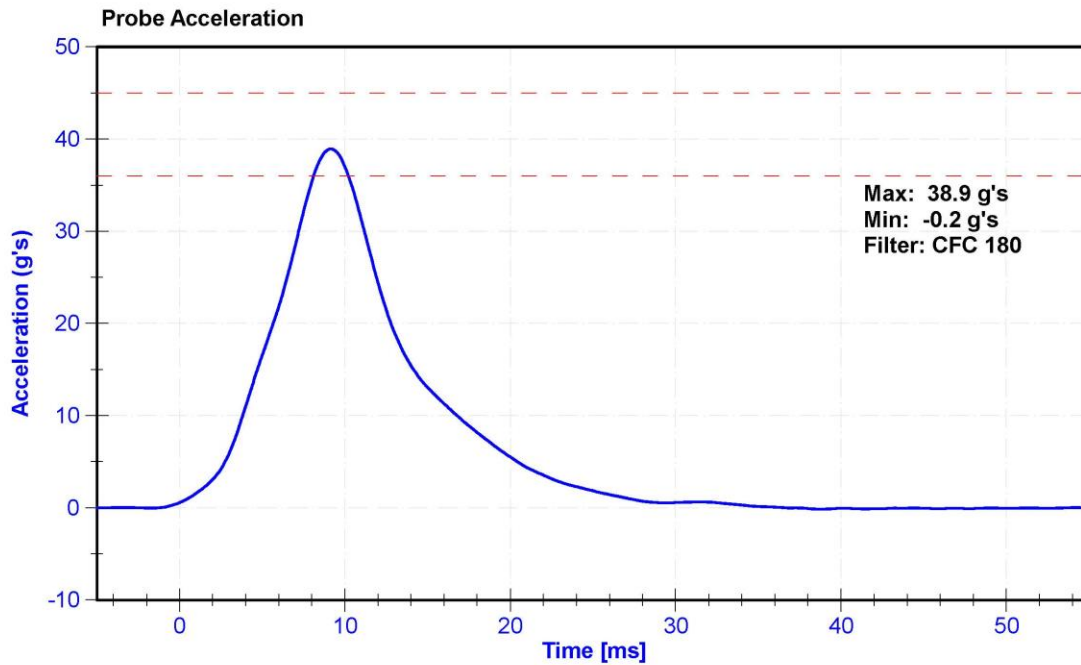
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D.Reinhard

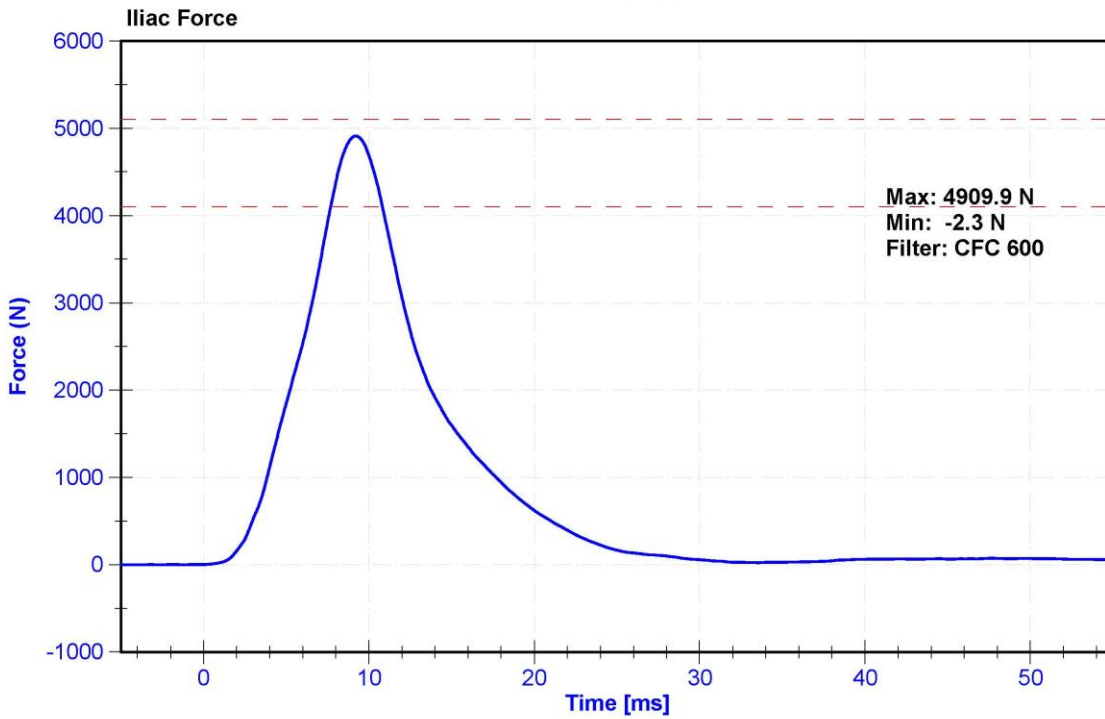
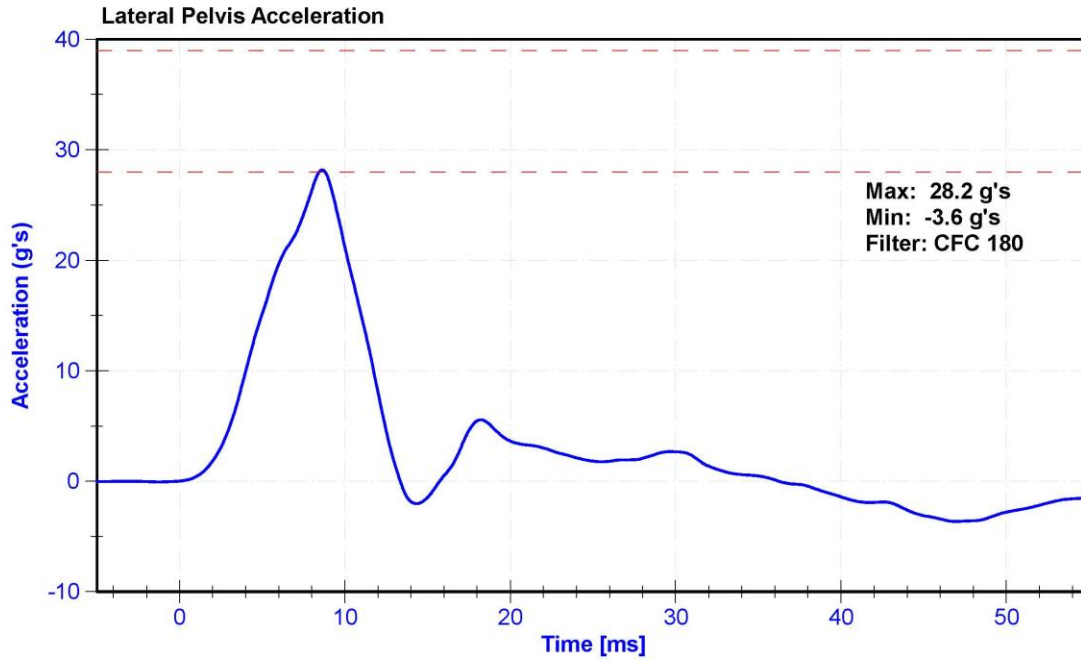
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	30.4	Pass
Velocity	4.2	4.4	m/s	4.30	Pass
Probe Acceleration	36	45	g's	38.9	Pass
Lateral Pelvis Acceleration	28	39	g's	28.2	Pass
Iliac Force	4100	5100	N	4909.9	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	Endevco 7264C	AC-P94667	11/1/2018	11/1/2019
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51668	10/24/2018	4/24/2019
Iliac Load Cell	Kistler 3228J	LC-DM5054 Fy	2/6/2019	2/6/2020





CALIBRATION TEST RESULTS

POST-TEST

SID-IIS 5TH PERCENTILE FEMALE - DRIVER ATD

SERIAL NO: 300

(CONFIGURED FOR LEFT SIDE IMPACT)

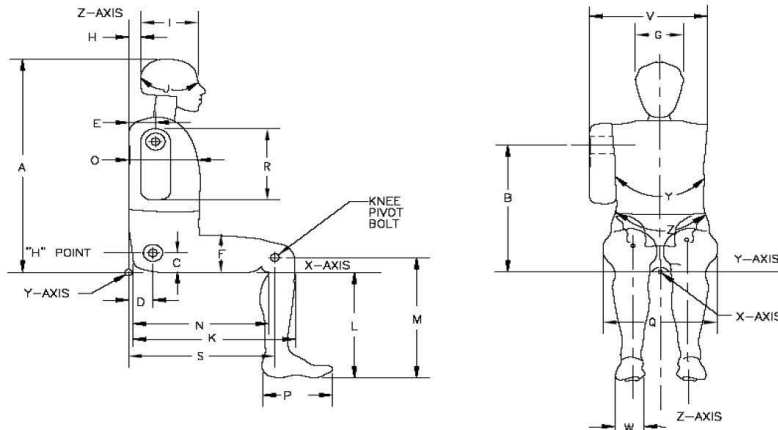


External Measurements - SID-IIs

Technician: K. Dutton

Date: 5/1/2019

Dummy Serial Number: 300



Symbol	Description	Specification (mm)		Result (mm)	Pass/Fail
A	Sitting Height	772	788	779	Pass
B	Shoulder Pivot Height	437	453	450	Pass
C	H-point Height	79	89	85	Pass
D	H-point from seatback	141	151	145	Pass
E	Shoulder Pivot from Backline	97	107	103	Pass
F	Thigh Clearance	119	135	125	Pass
G	Head Breadth	140	148	145	Pass
H	Head Back from Backline	40	46	43	Pass
I	Head Depth	178	188	185	Pass
J	Head Circumference	541	551	546	Pass
K	Buttock to Knee Length	514	540	530	Pass
L	Popliteal Height	343	369	356	Pass
M	Knee Pivot to floor height	392	409	401	Pass
N	Buttock Popliteal Length	416	442	431	Pass
O	Chest Depth w/o jacket	195	211	203	Pass
P	Foot Length	216	232	222	Pass
Q	Hip Breadth (w/pelvic plugs)	313	323	319	Pass
R	Arm Length	249	259	253	Pass
S	Knee Joint to seatback	477	493	485	Pass
V	Shoulder Width	341	357	351	Pass
W	Foot Width	78	94	84	Pass
Y	Chest Circumference w/jacket	851	881	870	Pass
Z	Waist Circumference	761	791	769	Pass

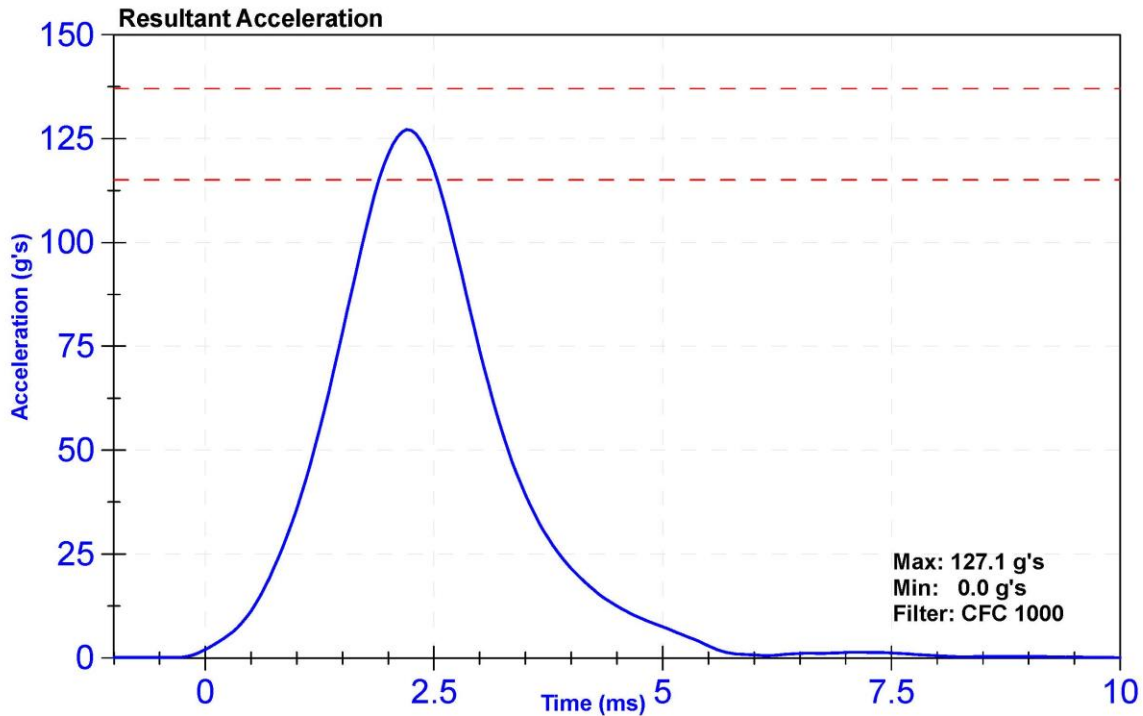
ATD Manufacturer	FTSS	Test Technician	K. Dutton
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

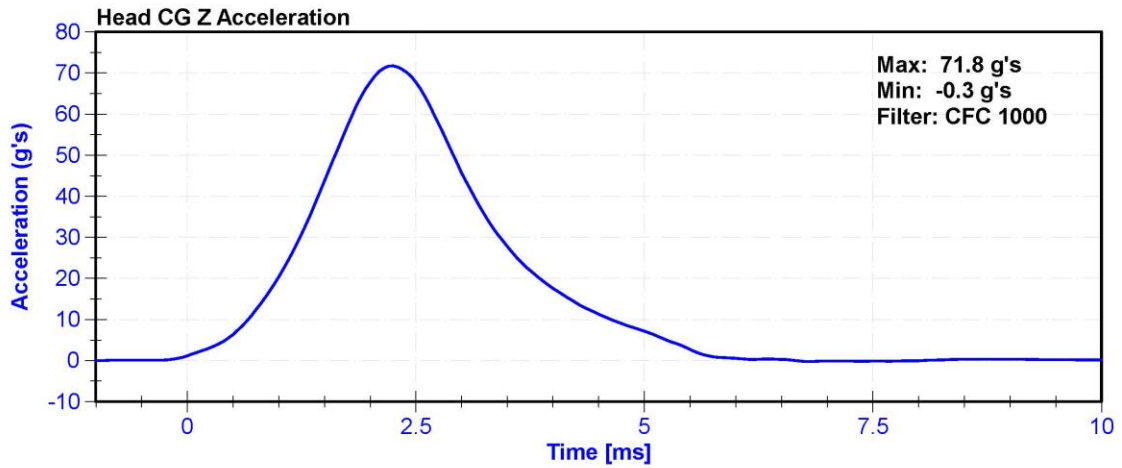
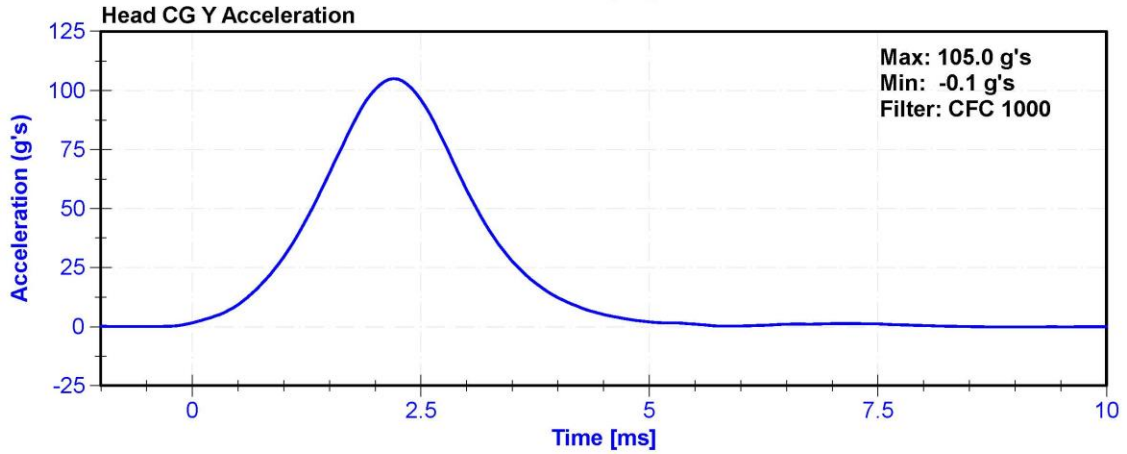
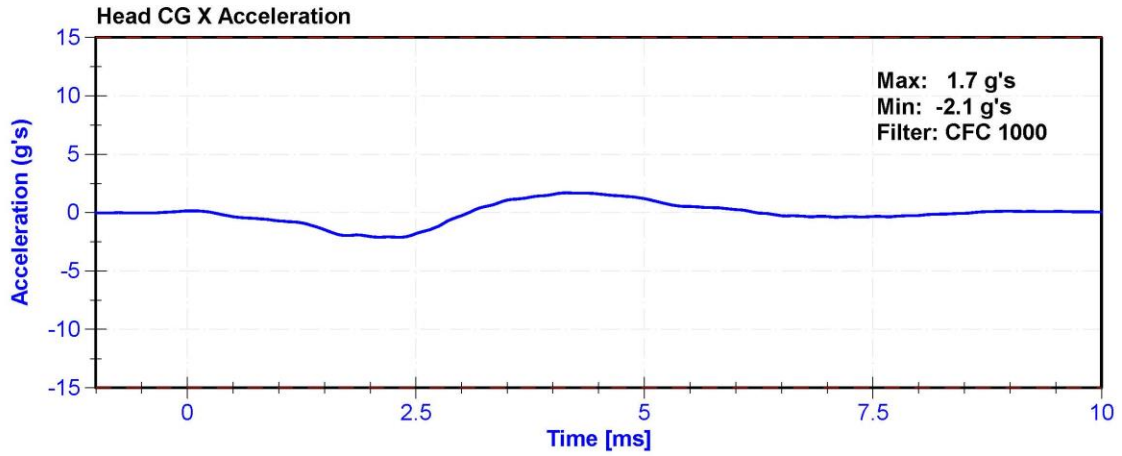
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.9	Pass
Humidity	10	70	%	53	Pass
Resultant Acceleration	115	137	g's	127.1	Pass
Oscillation	0	15	%	1.0	Pass
Fore-Aft Acceleration	-15	15	g's	-2.1	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
X Accelerometer	ENDEVCO 7264CT	AC-P58777	4/20/2019	10/19/2019
Y Accelerometer	ENDEVCO 7264CT	AC-P59018	4/20/2019	10/19/2019
Z Accelerometer	ENDEVCO 7264	AC-P79189	4/20/2019	10/19/2019





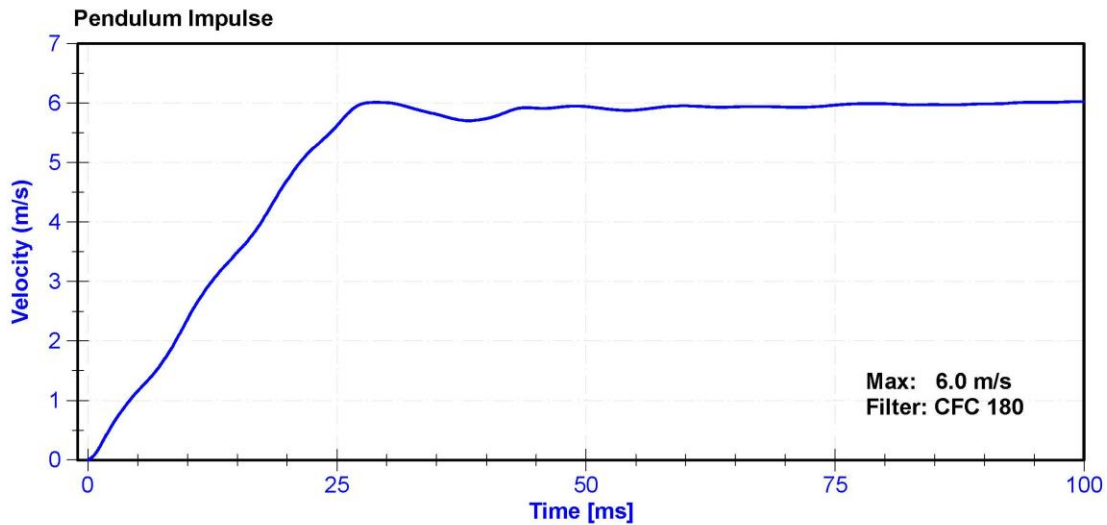
ATD Manufacturer	FTSS	Test Technician	C. Mantell
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

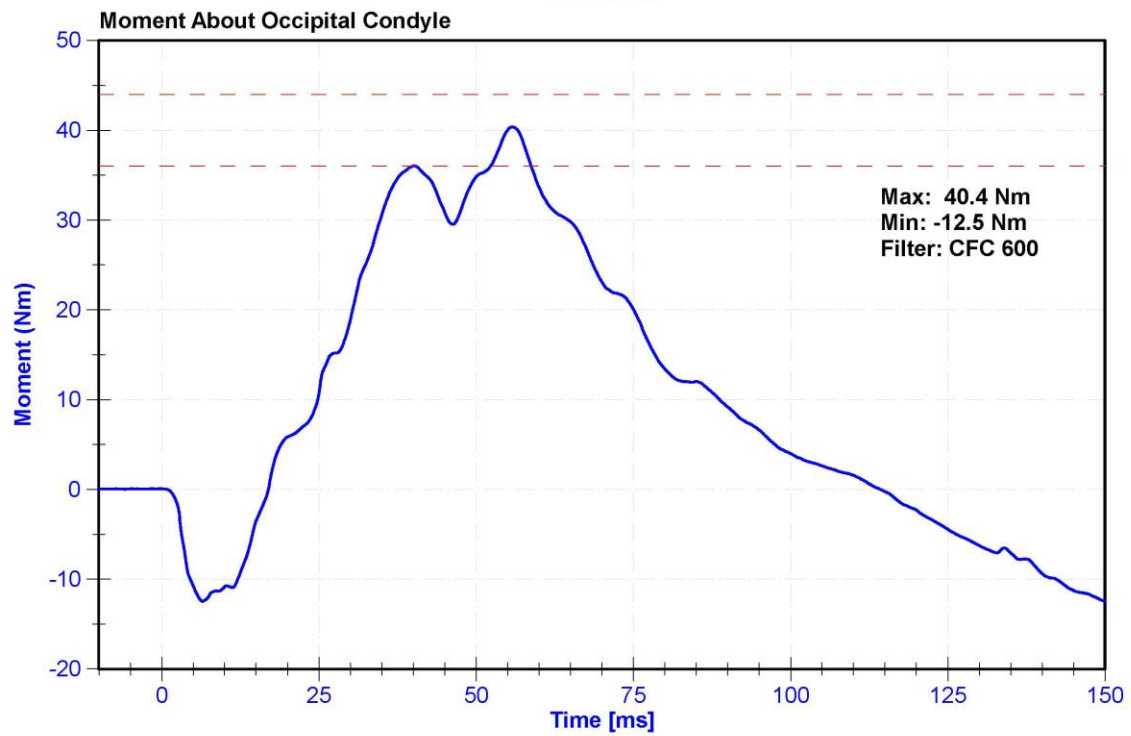
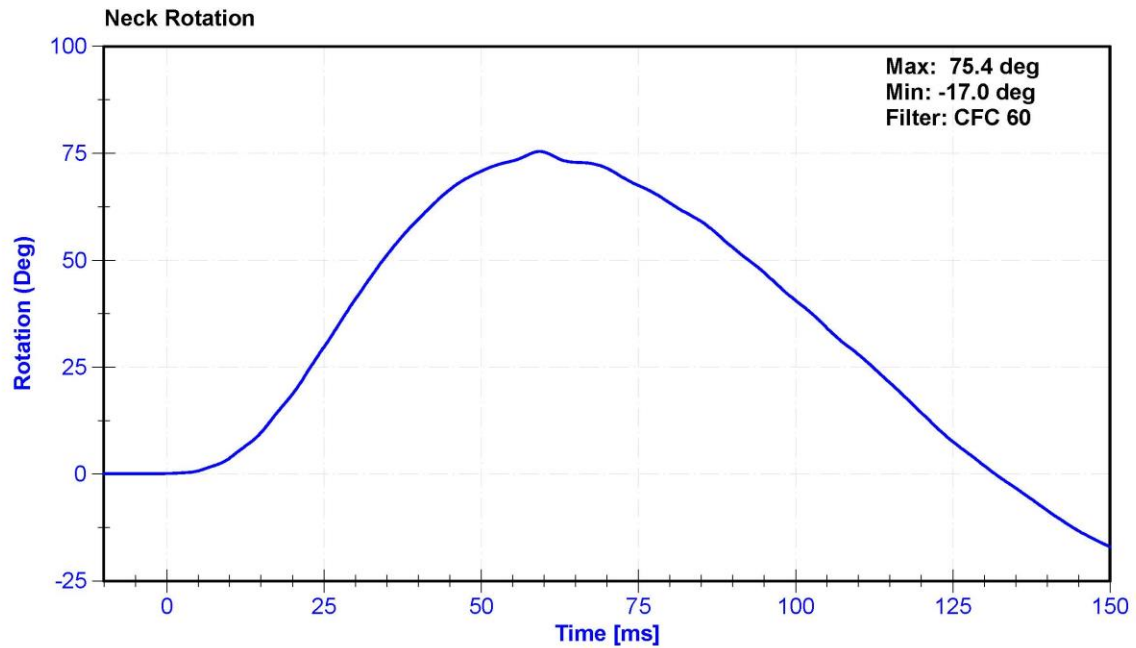
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	50.6	Pass
Velocity	5.51	5.63	m/s	5.514	Pass
Pendulum Impulse at 10ms	2.2	2.8	m/s	2.37	Pass
Pendulum Impulse at 15ms	3.3	4.1	m/s	3.49	Pass
Pendulum Impulse at 20ms	4.4	5.4	m/s	4.70	Pass
Pendulum Impulse at 25ms	5.4	6.1	m/s	5.62	Pass
Pendulum Impulse from 25 to 100ms	5.5	6.2	m/s	6.02	Pass
Neck Rotation	71	81	deg	75.4	Pass
Time at Maximum Rotation	50	70	ms	59.3	Pass
Moment about the OC	36	44	Nm	40.4	Pass
Moment Decay to 0 Nm	102	126	ms	114.3	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	ENDEVCO 7231CT	AC-AH5M9 Pend	1/29/2019	1/29/2020
Pendulum Potentiometer	Denton 78051-342	DS-184Pend	11/1/2018	11/1/2019
Condyle Potentiometer	Denton 78051-342	DS-185Pend	11/1/2018	11/1/2019
Upper Neck Load Cell	Denton 1716	LC-2018 FY	9/28/2018	9/28/2019





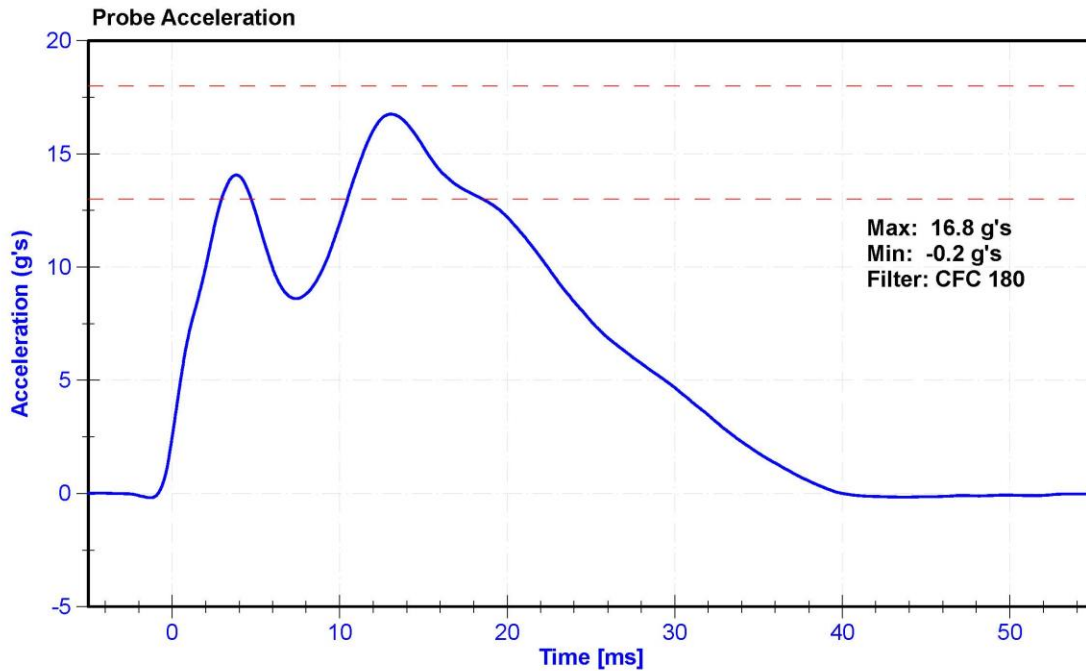
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

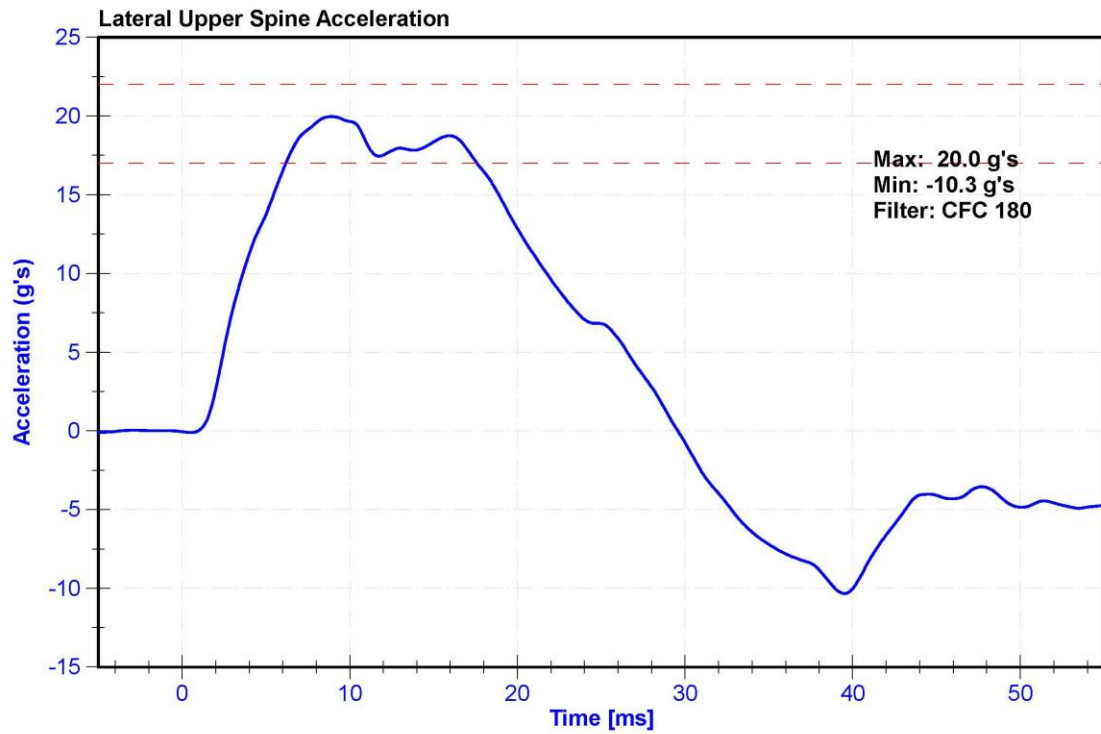
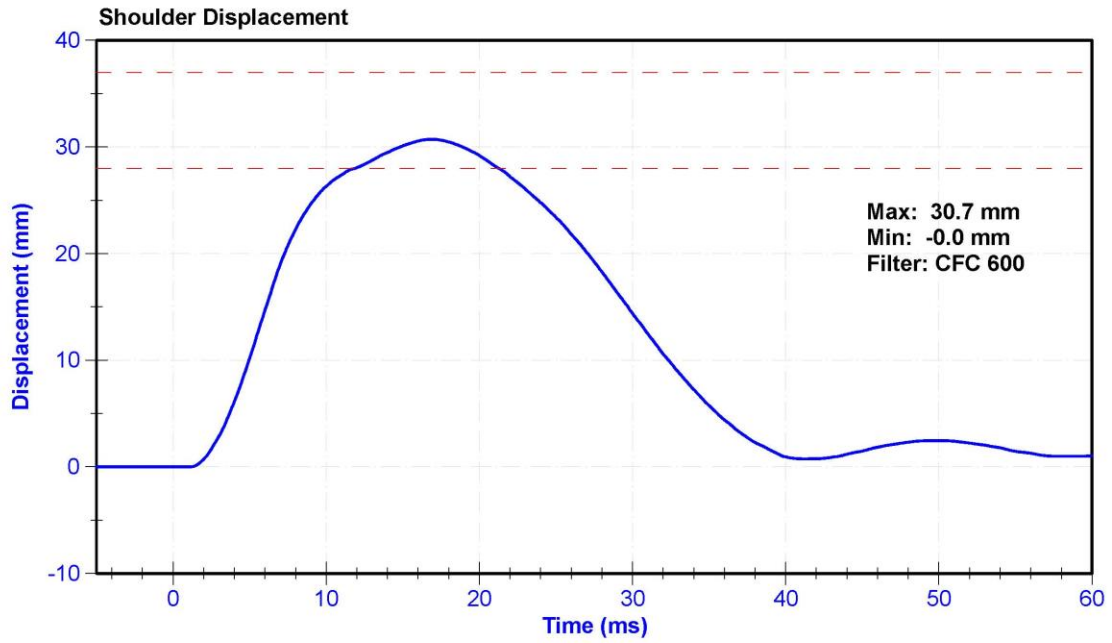
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	54	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	13	18	g's	16.8	Pass
Shoulder Deflection	28	37	mm	30.7	Pass
Lateral Upper Spine Acceleration	17	22	g's	20.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	2/21/2019	8/22/2019
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	10/30/2018	10/30/2019
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51963	4/29/2019	10/28/2019





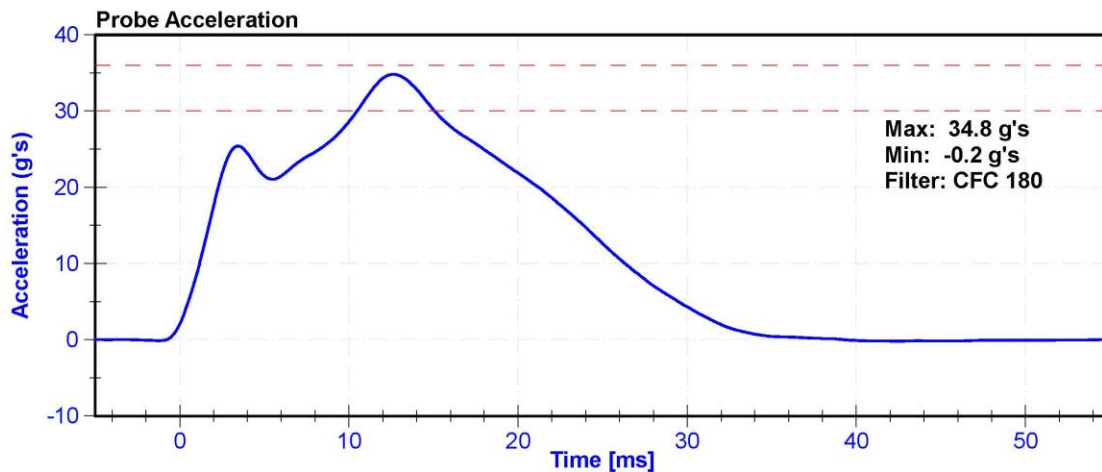
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

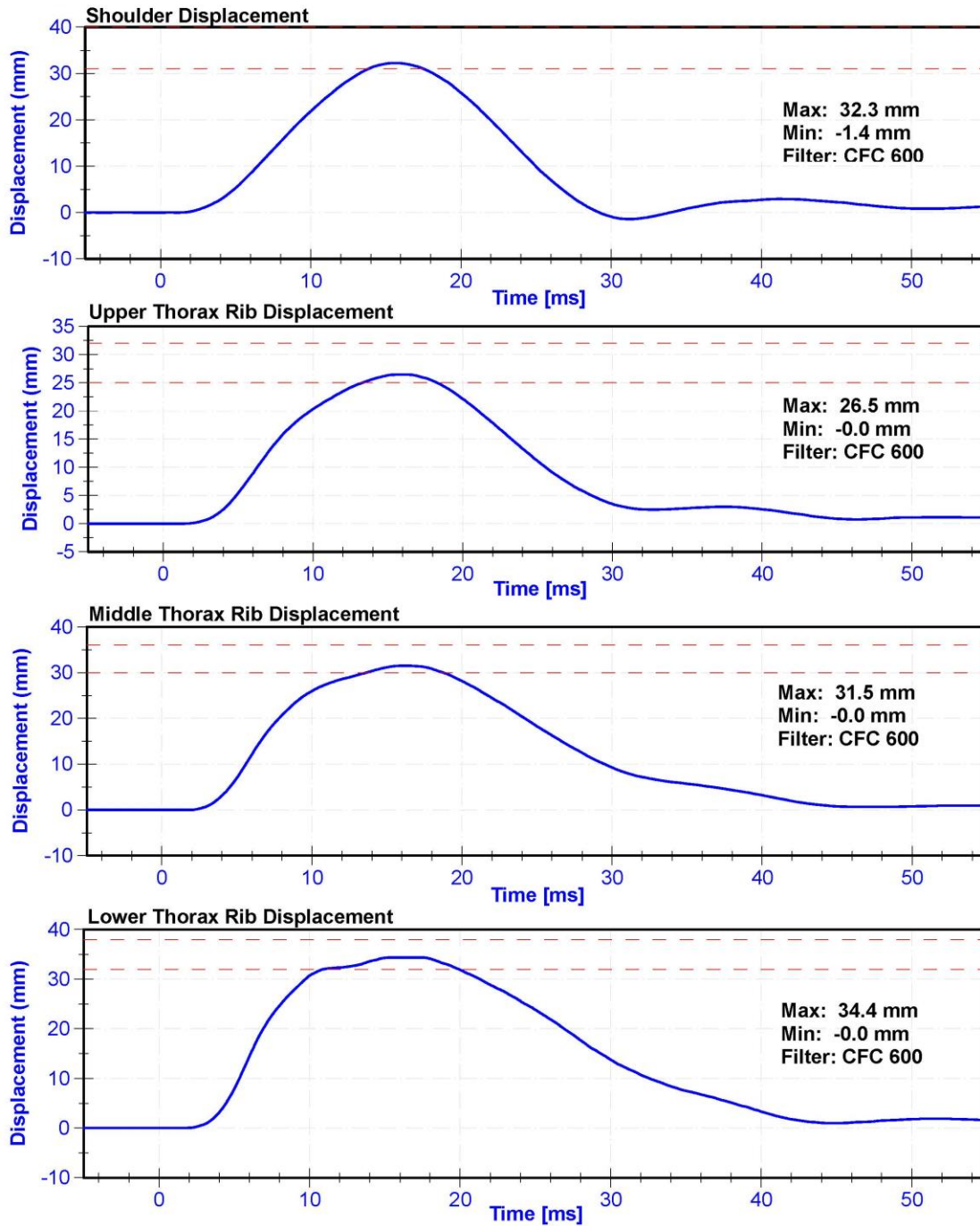
Results

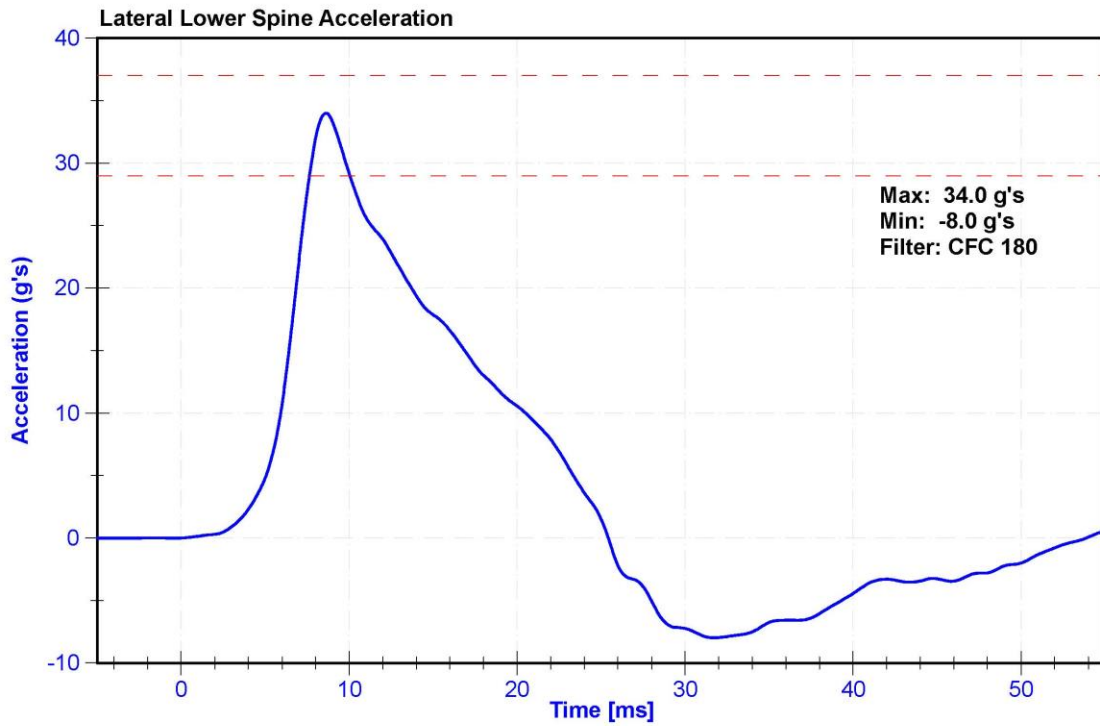
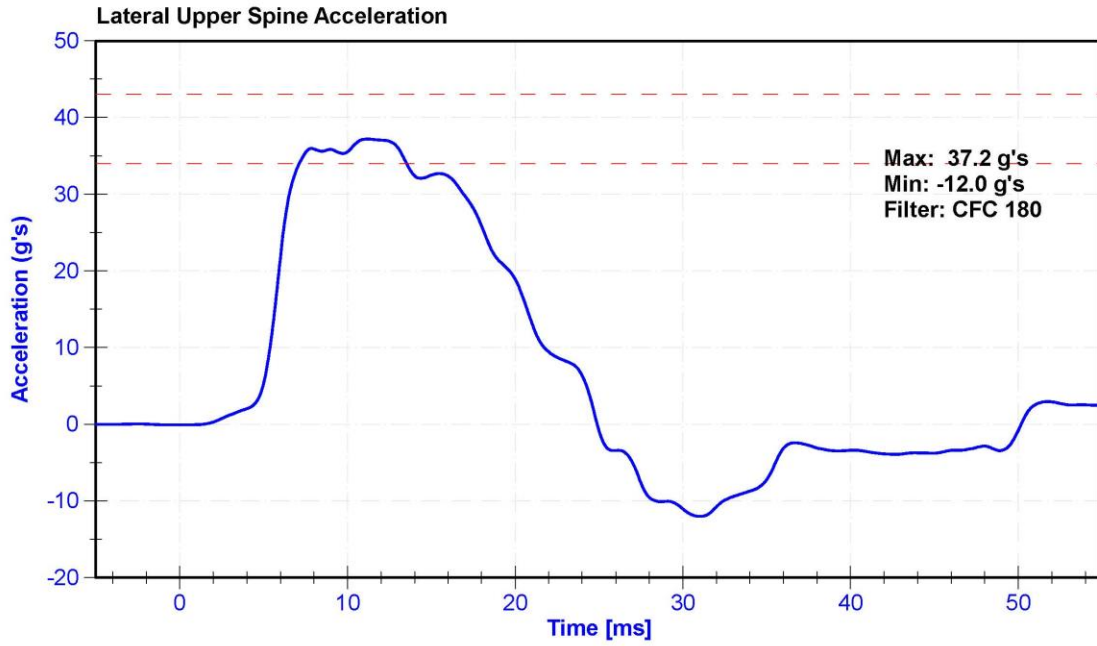
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.7	Pass
Humidity	10	70	%	57.4	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration after 5 ms	30	36	g's	34.8	Pass
Lateral Upper Spine Acceleration	34	43	g's	37.2	Pass
Lateral Lower Spine Acceleration	29	37	g's	34.0	Pass
Shoulder Deflection	31	40	mm	32.3	Pass
Upper Thorax Rib Deflection	25	32	mm	26.5	Pass
Mid Thorax Rib Deflection	30	36	mm	31.5	Pass
Lower Thorax Rib Deflection	32	38	mm	34.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	2/21/2019	8/22/2019
Upper Spine T1 Y Accelerometer	ENDEVCO 7264CT	AC-P51963	4/29/2019	10/28/2019
Upper Spine T12 Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2019	10/19/2019
Shoulder Potentiometer	Servo 08CT1-3725	DS-053 GFE	10/30/2018	10/30/2019
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	10/10/2018	10/10/2019
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	10/11/2018	10/11/2019
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	10/10/2018	10/10/2019







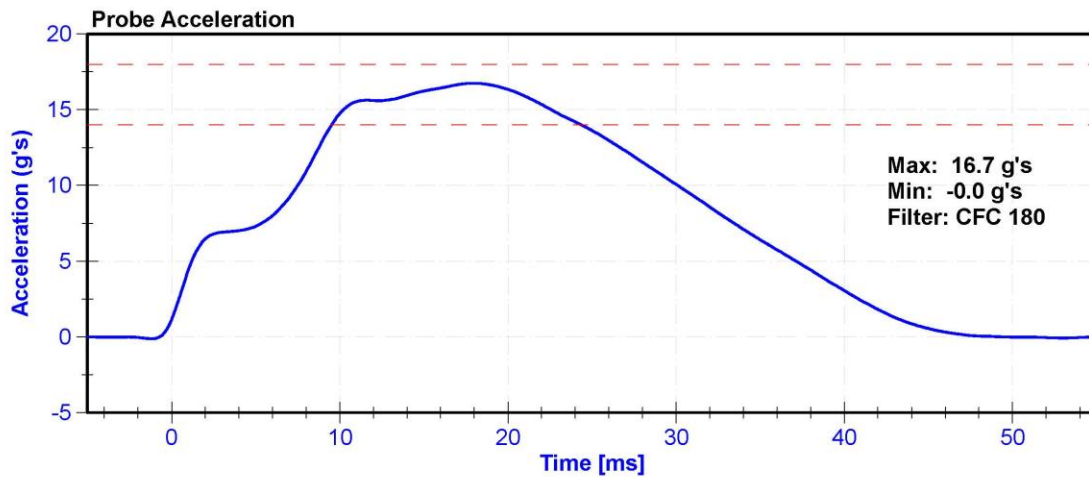
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

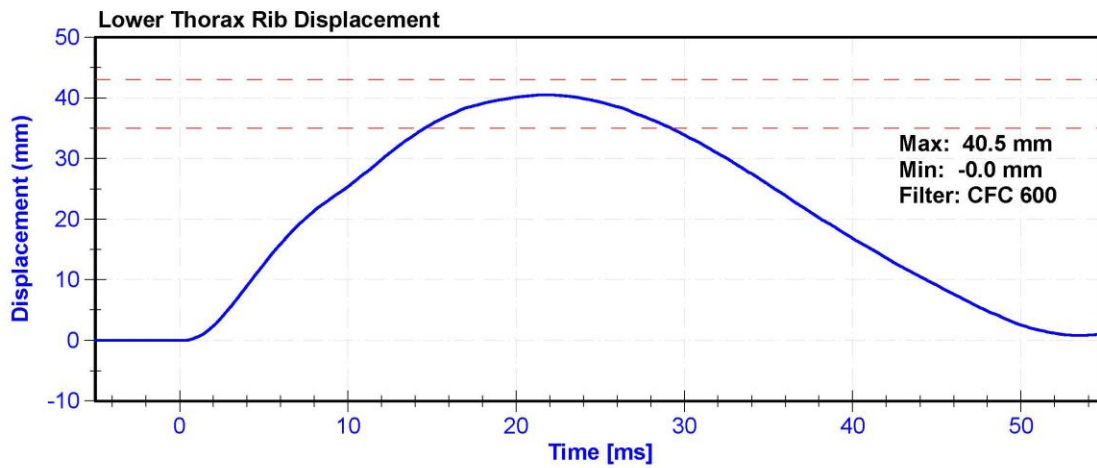
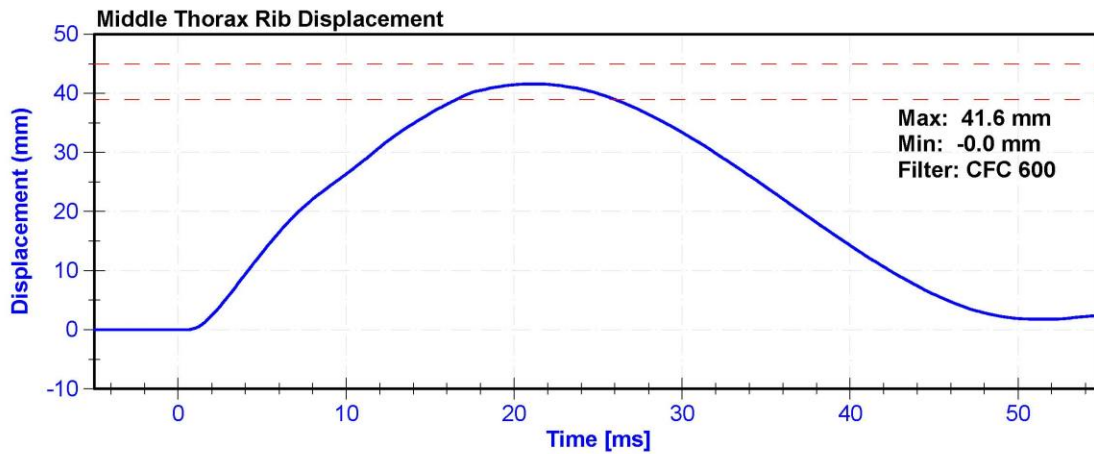
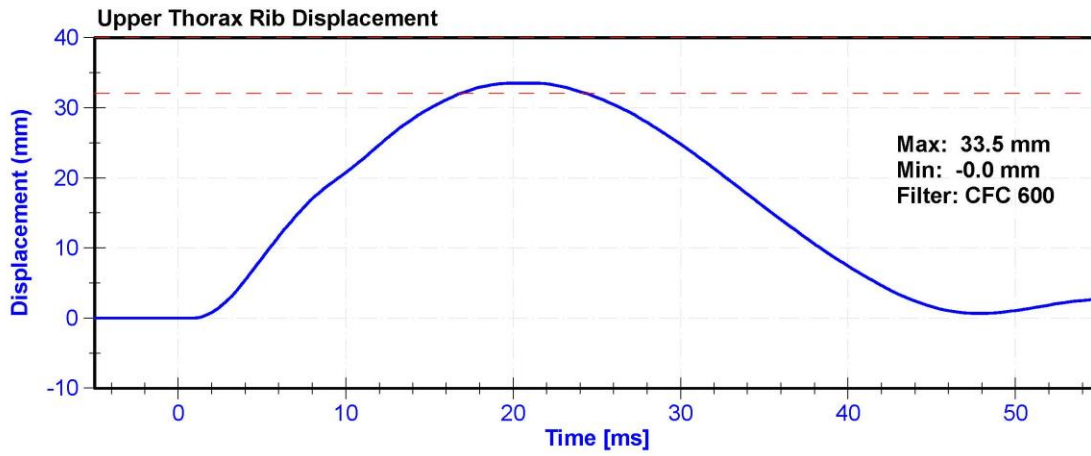
Results

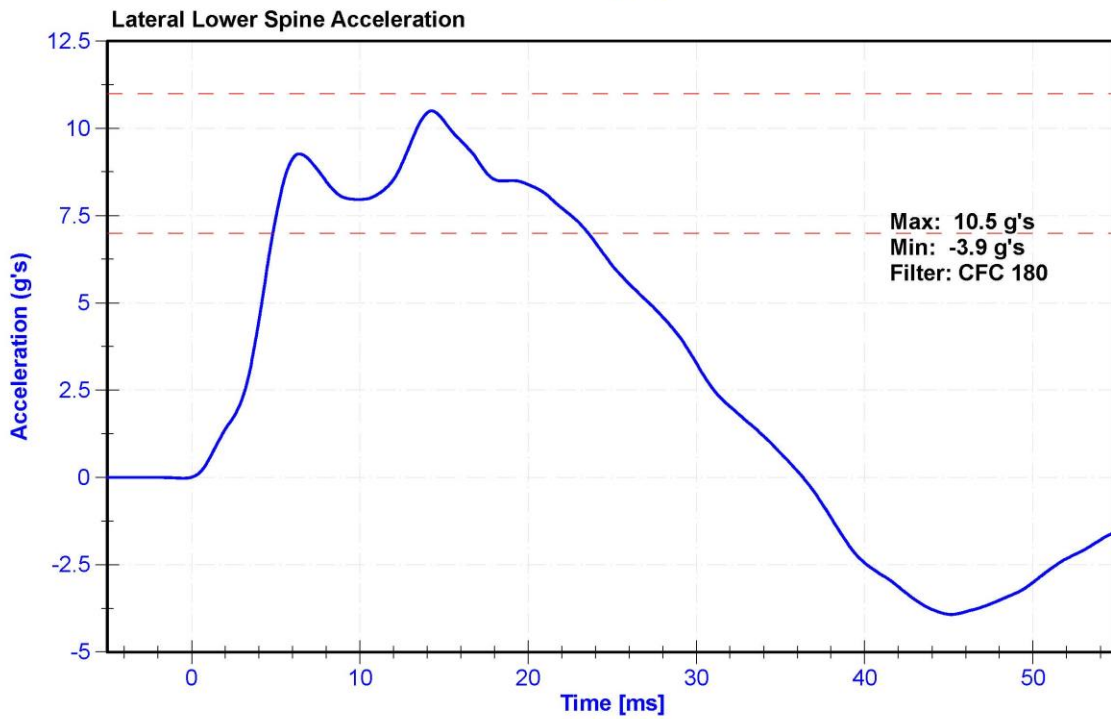
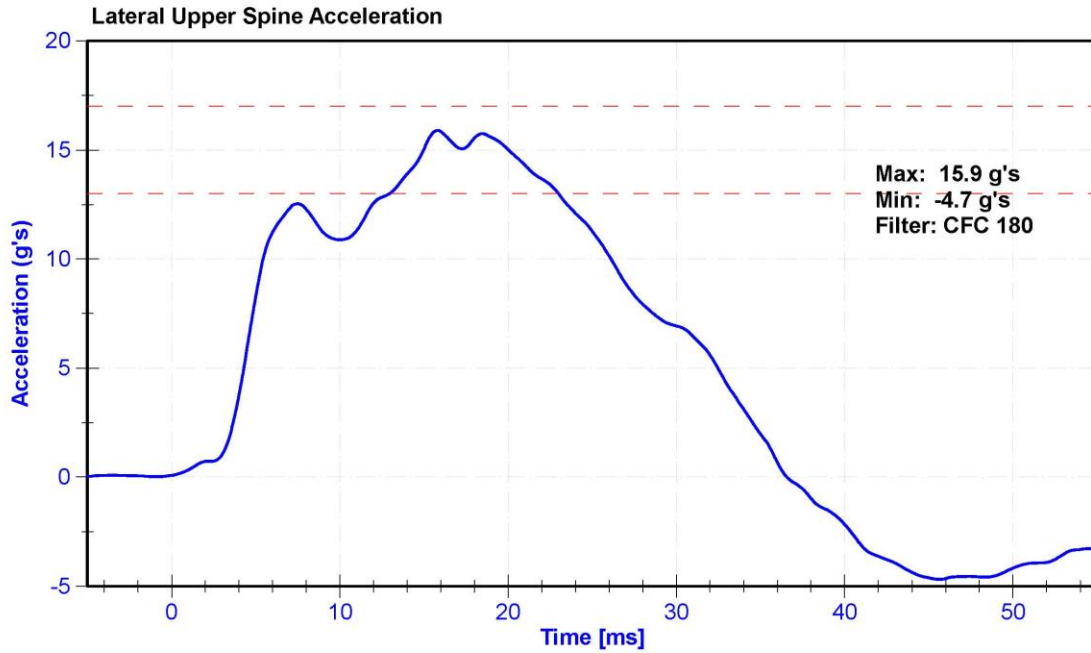
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.8	Pass
Humidity	10	70	%	54.4	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	14	18	g's	16.7	Pass
Lateral Upper Spine Acceleration	13	17	g's	15.9	Pass
Lateral Lower Spine Acceleration	7	11	g's	10.5	Pass
Upper Thorax Rib Deflection	32	40	mm	33.5	Pass
Middle Thorax Rib Deflection	39	45	mm	41.6	Pass
Lower Thorax Rib Deflection	35	43	mm	40.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	2/21/2019	8/22/2019
Upper Spine Y Accelerometer	ENDEVCO 7264CT	AC-P51963	4/29/2019	10/28/2019
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2019	10/19/2019
Upper Thorax Rib Potentiometer	Servo 08CT1-3725	DS-451GFE	10/10/2018	10/10/2019
Middle Thorax Rib Potentiometer	Servo 08TC1-3745	DS-040GFE	10/11/2018	10/11/2019
Lower Thorax Rib Potentiometer	Servo 08TC1-3725	DS-1156GFE	10/10/2018	10/10/2019







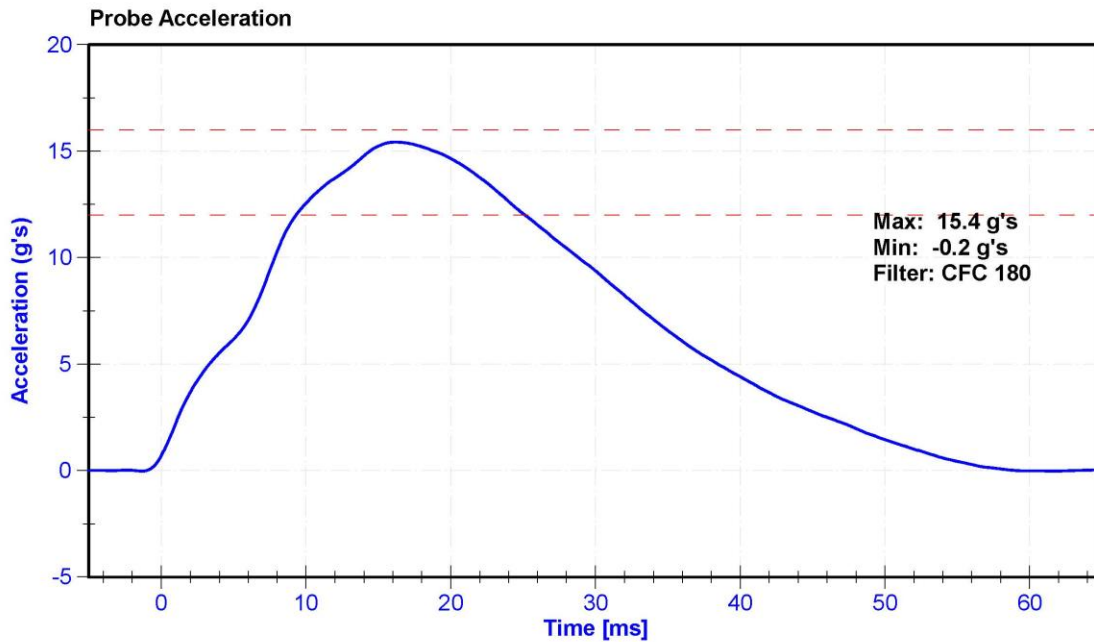
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

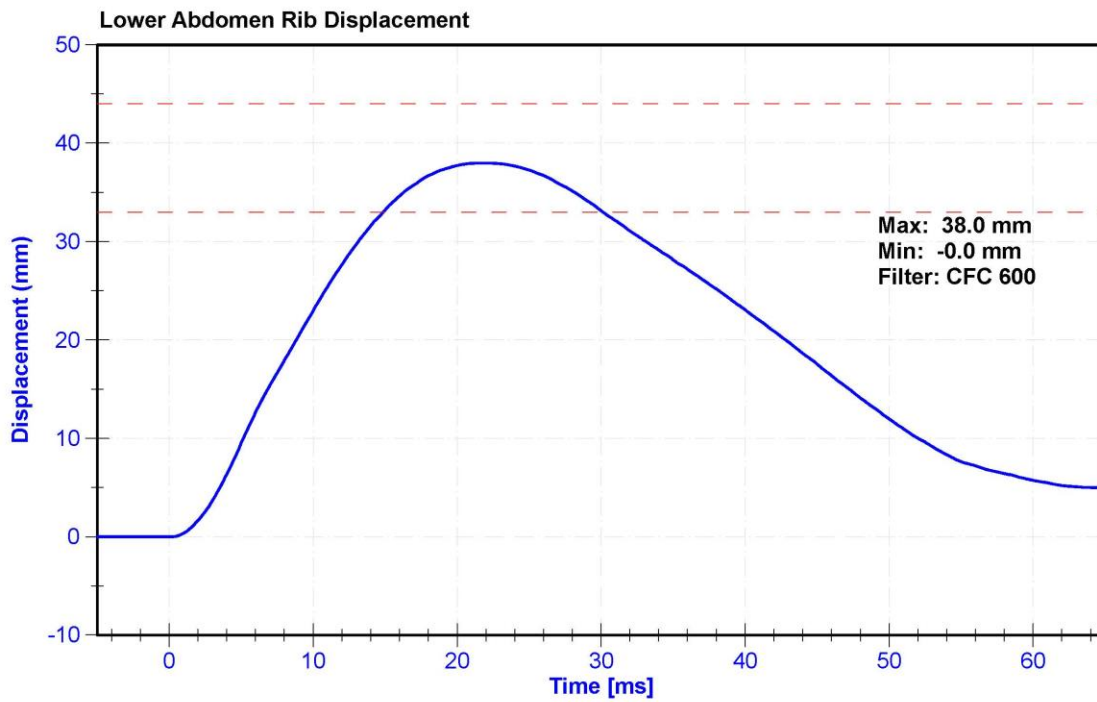
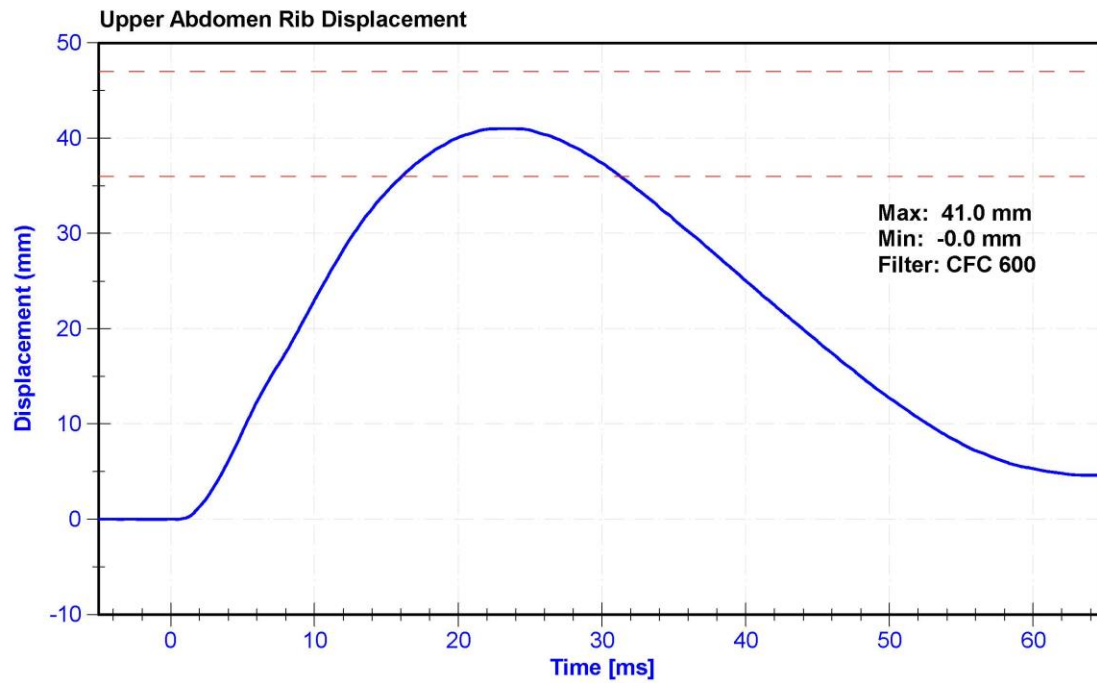
Results

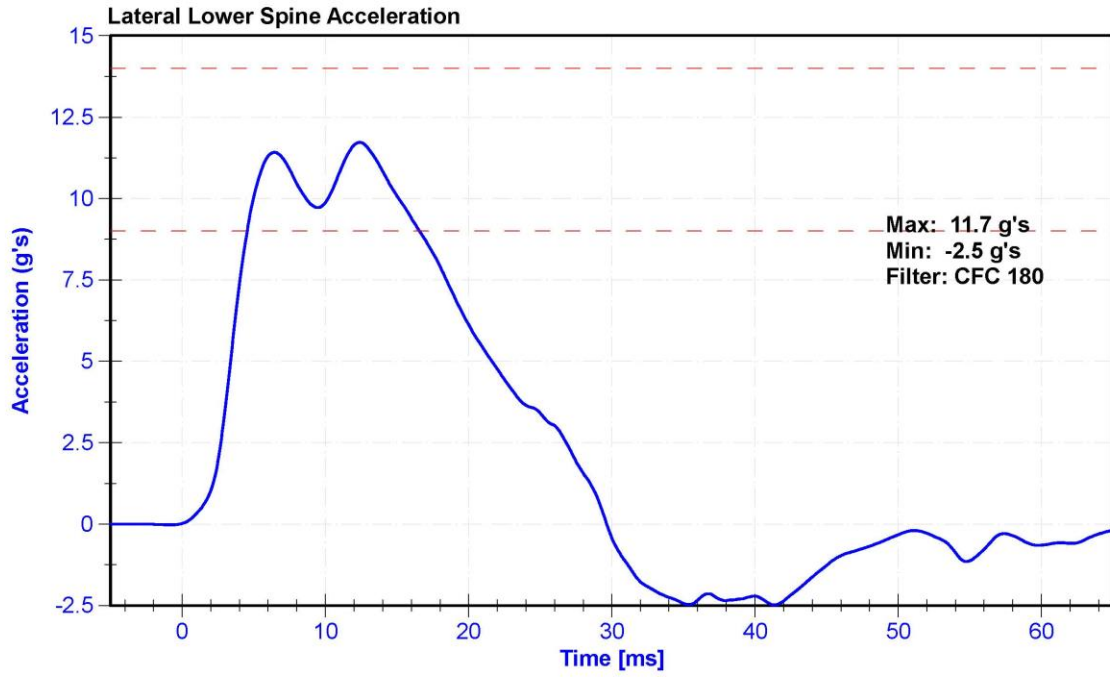
Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	21.9	Pass
Humidity	10	70	%	53.7	Pass
Velocity	4.2	4.4	m/s	4.39	Pass
Probe Acceleration	12	16	g's	15.4	Pass
Lateral Lower Spine Acceleration	9	14	g's	11.7	Pass
Upper Abdomen Rib Deflection	36	47	mm	41.0	Pass
Lower Abdomen Rib Deflection	33	44	mm	38.0	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Probe Accelerometer	MSI 64C-2000	A260487	2/21/2019	8/22/2019
Lower Spine Y Accelerometer	ENDEVCO 7264	AC-P64147	4/20/2019	10/19/2019
Upper Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-308GFE	10/10/2018	10/10/2019
Lower Abdomen Rib Potentiometer	Servo 08CT1-3725	DS-307GFE	10/11/2018	10/11/2019







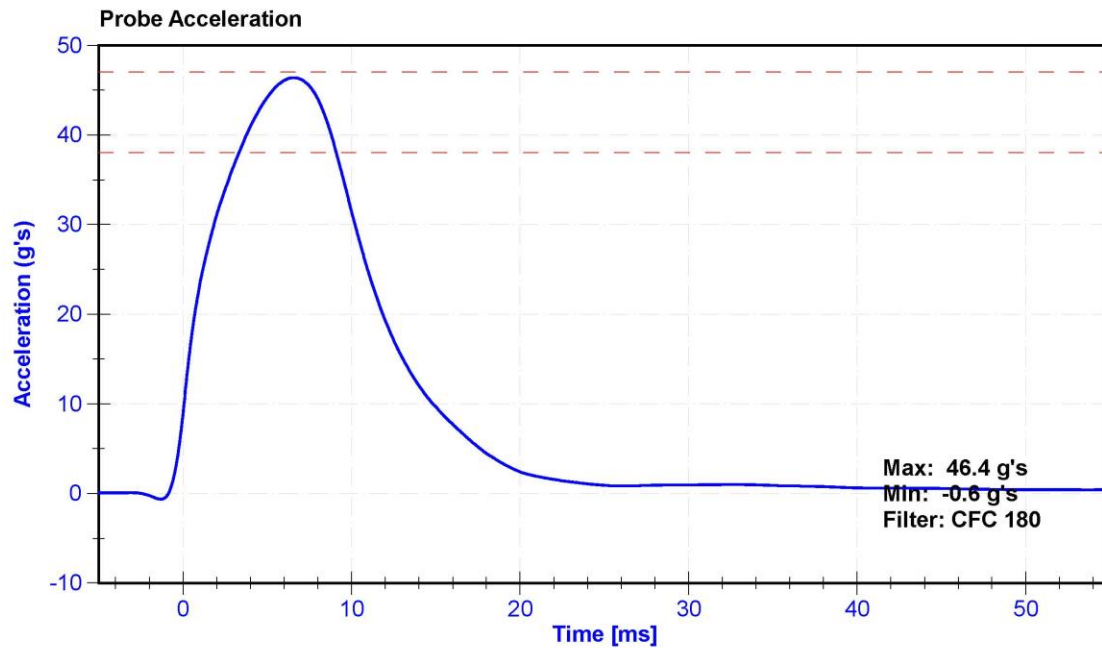
ATD Manufacturer	FTSS	Test Technician	D.Reinhard
ATD Serial Number	300	Laboratory Supervisor	K. Brogan

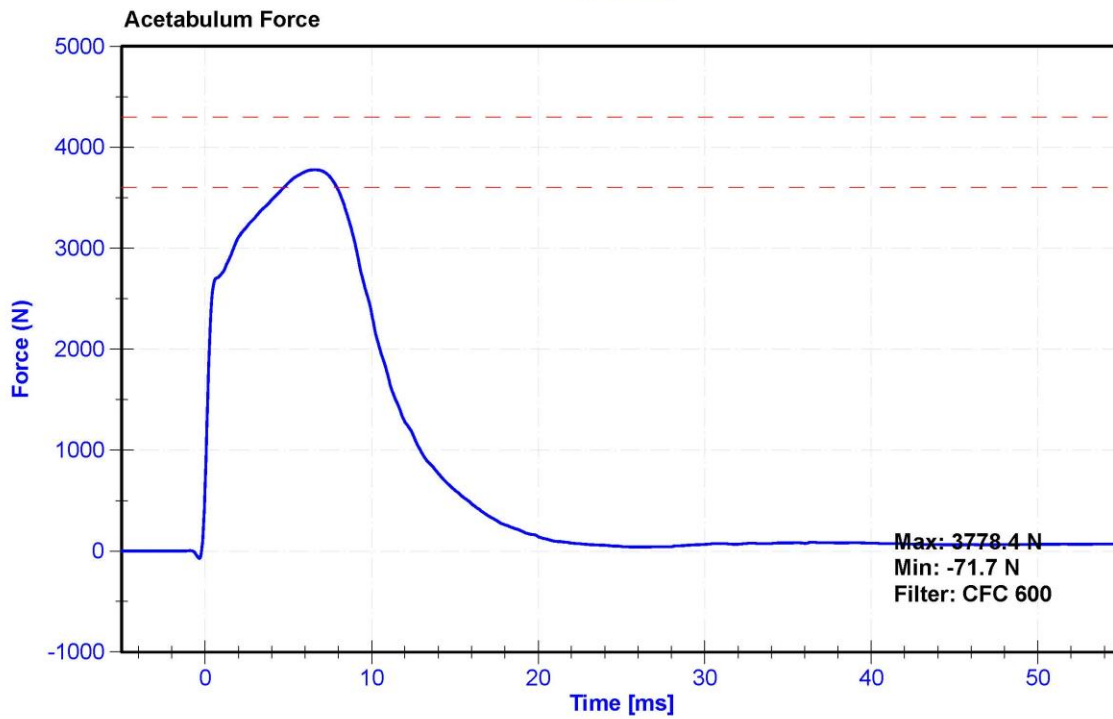
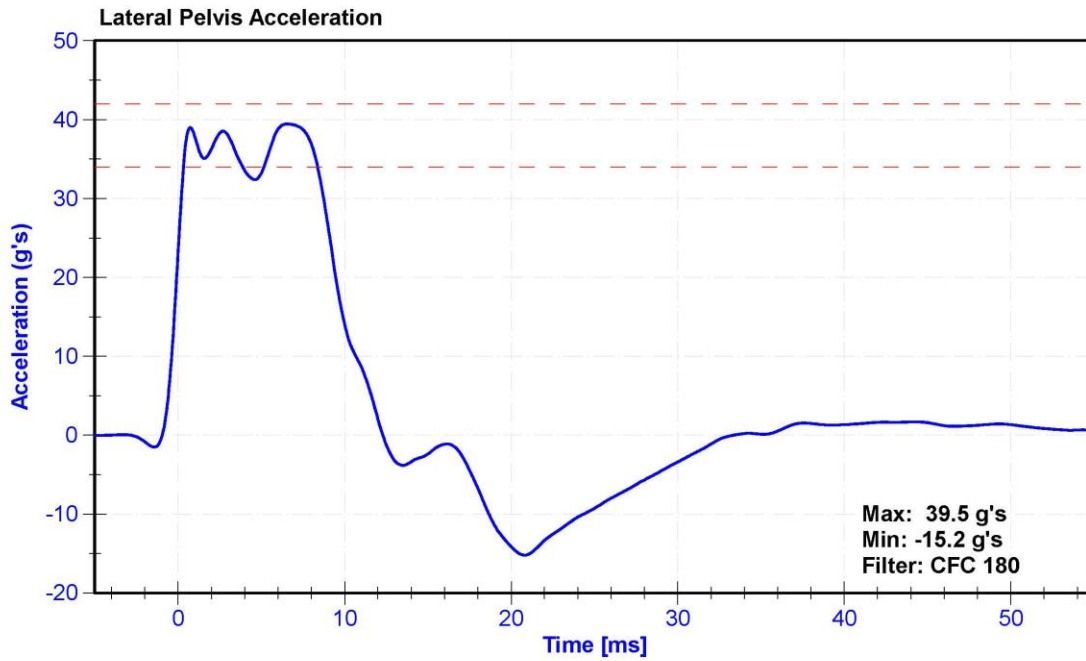
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	22	Pass
Humidity	10	70	%	54.2	Pass
Velocity	6.6	6.8	m/s	6.63	Pass
Probe Acceleration	38	47	g's	46.4	Pass
Lateral Pelvis Acceleration after 6ms	34	42	g's	39.5	Pass
Acetabulum Force	3600	4300	N	3778.4	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	2/21/2019	8/22/2019
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51668	4/22/2019	10/21/2019
Acetabulum Load Cell	DENTON 3249J	LC-275Fy	10/4/2018	10/4/2019
Certification Plug	SACO	11606	10/4/2016	N/A
Crash Test Plug	SACO	12589	10/3/2018	N/A







Crash 300 5/2/19

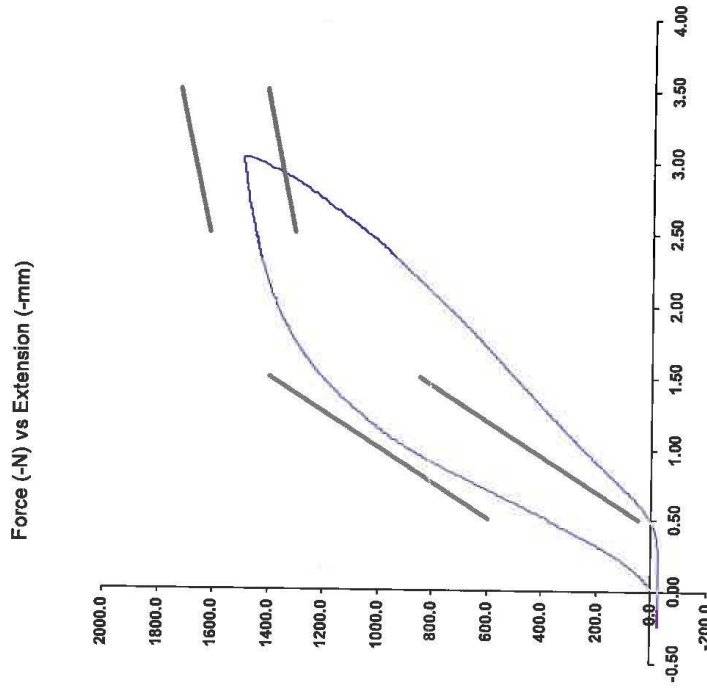
SID-IIs Pelvis Plug Certification Test

Plug S/N 12589
 Test Number 7519
 Report Number 7534
 Test Date 10/3/2018 10:25:58 AM

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

Testing Machine STM-20 5965542
 Load Cell S/N (F1360947), Units (LBS) 1000
 Crosshead Speed (mm / min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator _____
 Part Number 180-4450

Template No 107 03-Oct-18
 SACO Research

By: DC Date: 10/3/18
 SACO Research 41735 Elm St, #401 Murrieta, CA 92562 Tel 310-694-2082 FAX



Set 2 3005/2/19

SID-Its Pelvis Plug Certification Test

Plug S/N 11606

Test Number 3149

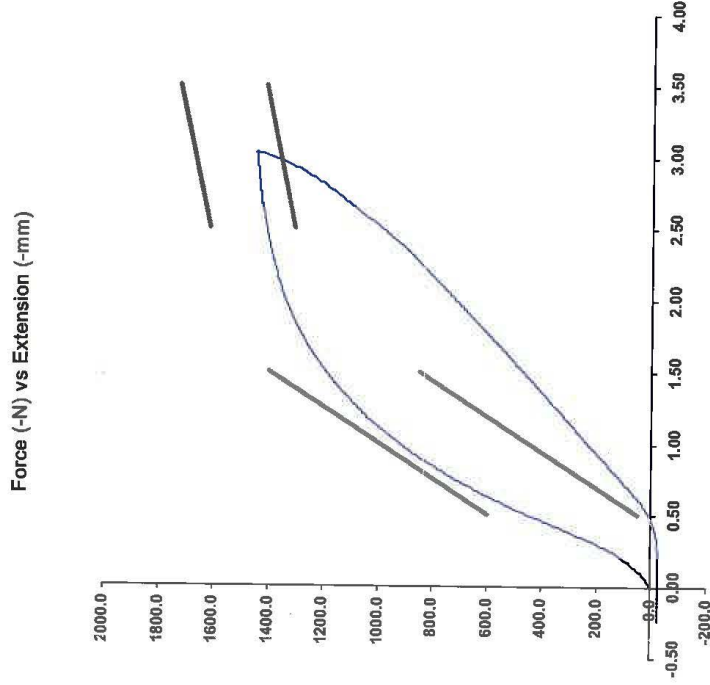
Report Number 3142

Test Date 10/4/2016 1:22:37 PM

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

Testing Machine STM-20 5965542
 Load Cell S/N (T1240813), Units (LBS) 1000
 Crosshead Speed (mm/min) or Rate 12.7
 Extension or Position Measured by XHD_100 (XHD100)

Notes:



Operator DC
 Part Number 180-4450

Template No 107 04-Oct-16
 SACO Research

By: DC Date: 10/4/16

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

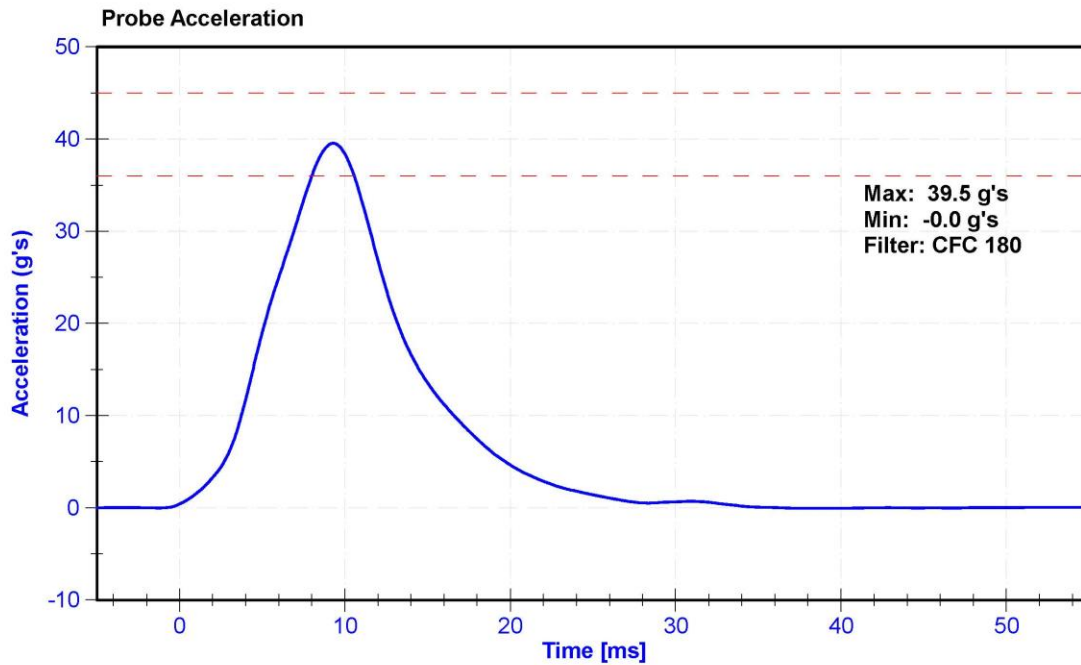
ATD Manufacturer	FTSS	Test Technician	K. Brogan
ATD Serial Number	300	Laboratory Supervisor	D.Reinhard

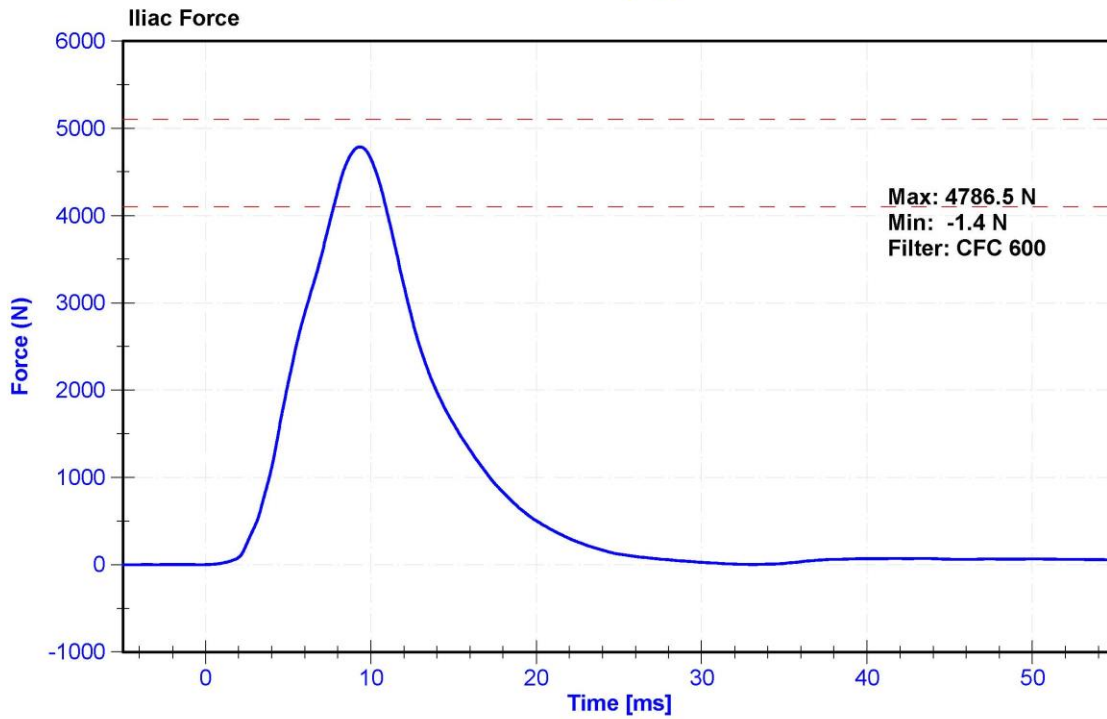
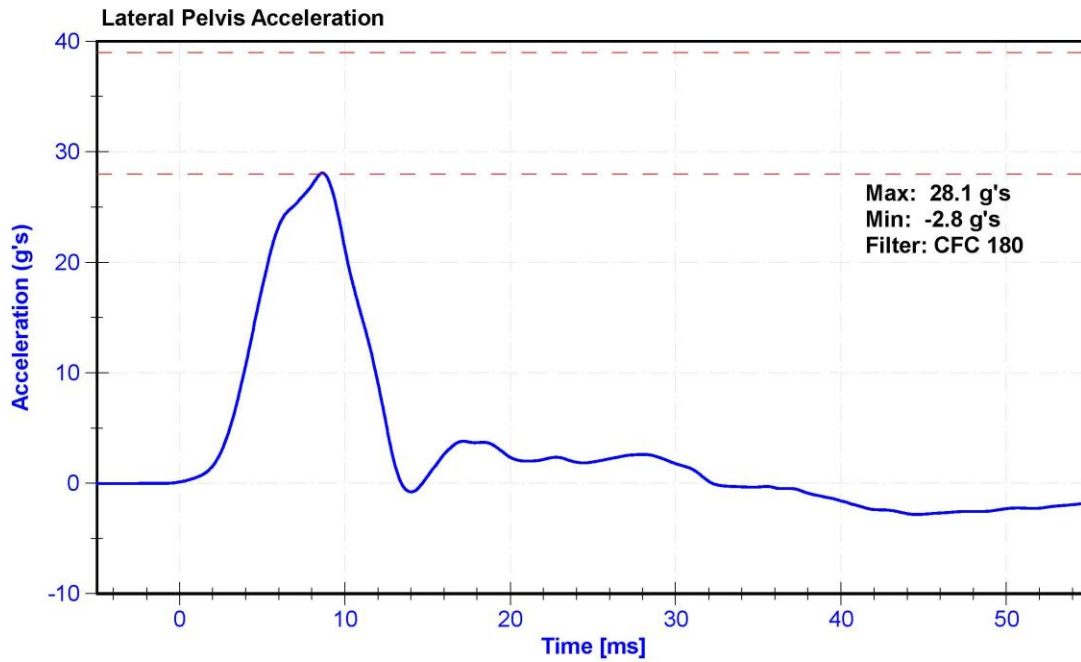
Results

Test Parameter	Minimum Specification	Maximum Specification	Unit	Result	Pass/Fail
Temperature	20.6	22.2	°C	20.6	Pass
Humidity	10	70	%	54.8	Pass
Velocity	4.2	4.4	m/s	4.40	Pass
Probe Acceleration	36	45	g's	39.5	Pass
Lateral Pelvis Acceleration	28	39	g's	28.1	Pass
Iliac Force	4100	5100	N	4786.5	Pass

Transducer Calibrations

Channel	Manufacturer	Serial Number	Calibration Date	Calibration Due Date
Pendulum Accelerometer	MSI 64C-2000	A260487	2/21/2019	8/22/2019
Pelvis Y Accelerometer	ENDEVCO 7264CT	AC-P51668	4/22/2019	10/21/2019
Iliac Load Cell	Kistler 3228J	LC-DM5054 Fy	2/6/2019	2/6/2020





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	4/20/2019	
		Y	AC-P59018	ENDEVCO	4/20/2019	
		Z	AC-P79189	ENDEVCO	4/20/2019	
Head Accelerometers - Redundant		X	AC-P52095	ENDEVCO	4/20/2019	
		Y	AC-P58986	ENDEVCO	4/20/2019	
		Z	AC-P68057	ENDEVCO	4/20/2019	
Displacement Potentiometer	Shoulder		Y			
	Thoracic Rib	Upper	Y	DS-451GFE	Servo	10/10/2018
		Middle	Y	DS-040GFE	Servo	10/11/2018
		Lower	Y	DS-1156GFE	Servo	10/10/2018
	Abdominal Rib	Upper	Y	DS-308GFE	Servo	10/10/2018
		Lower	Y	DS-307GFE	Servo	10/11/2018
Lower Spine Accelerometers (T12)		X	AC-P58883	ENDEVCO	4/20/2019	
		Y	AC-P64147	ENDEVCO	4/20/2019	
		Z	AC-P58786	ENDEVCO	4/20/2019	
Acetabulum Load Cell		Y	LC-275Fy	Denton	10/4/2018	
Lilac Wing Load Cell		Y	LC-DM5054 Fy	Kistler 3228J	2/6/2019	
Pelvis Plug (Struck Side)			12523	SACO	10/2/2018	
Pelvis Plug (Non-Struck Side)						

Table 2 – Vehicle Instrumentation

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity	X	AC-A280211	MSI 1201-1000	3/22/2019
Vehicle Center of Gravity	Y	AC-A280318	MSI 1201-1000	3/22/2019
Vehicle Center of Gravity	Z	AC-A281460	MSI 1201-1000	3/22/2019
Left Floor Sill	Y	AC-A280324	MSI 1201-1000	4/11/2019
A-Pillar Sill	Y	AC-A280882	MSI 1201-1000	3/22/2019
A-Pillar Low	Y	AC-A280925	MSI 1201-1000	11/22/2018
A-Pillar Mid	Y	AC-A280204	MSI 1201-1000	11/13/2018
B-Pillar Sill	Y	AC-A281032	MSI 1201-1000	11/23/2018
B-Pillar Low	Y	AC-A280913	MSI 1201-1000	4/5/2019
B-Pillar Mid	Y	AC-A280011	MSI 1201-1000	4/11/2019
Driver Seat	Y	AC-A280939	MSI 1201-1000	4/11/2019
Engine Top	X	AC-A217572	MSI 1201-1000	4/11/2019
Engine Top	Y	AC-A250358	MSI 1201-1000	4/11/2019
Firewall	Y	AC-A280396	MSI 1201-1000	11/16/2018
Right Roof	Y	AC-A280903	MSI 1201-1000	3/11/2019
Right Floor Sill	Y	AC-A280929	MSI 1201-1000	11/22/2018
Rear Floorpan	X	AC-A280325	MSI 1201-1000	2/28/2019
Rear Floorpan	Y	AC-A280900	MSI 1201-1000	2/28/2019

Table 3 – Pole Instrumentation

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Load Cell 1	LC-18879	Interface 1220-FS	8/3/2018
Load Cell 2	LC-18852	Interface 1220-FS	8/3/2018
Load Cell 3	LC-46955	Interface 1220-FS	8/3/2018
Load Cell 4	LC-18882	Interface 1220-FS	8/3/2018
Load Cell 5	LC-18864	Interface 1220-FS	8/3/2018
Load Cell 6	LC-18847	Interface 1220-FS	8/3/2018
Load Cell 7	LC-62086	Interface 1220-FS	8/3/2018
Load Cell 8	LC-46962	Interface 1220-FS	8/3/2018