

FINAL REPORT NUMBER: SPole-TRC-18-001

RESEARCH SIDE IMPACT POLE TEST

**HONDA OF AMERICA MFG., INC.
2018 Honda Accord 4-DR Sedan
NHTSA NUMBER: R20185382**

**PREPARED BY:
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Report Date: April 28, 2020

FINAL REPORT

**PREPARED FOR:
U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Research
Mail Code: NSR-210
1200 New Jersey Ave, SE
Washington, D.C. 20590**

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Report Approved By: 

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Approval Date: April 28, 2020

FINAL REPORT ACCEPTANCE BY NHTSA:

Division Chief, Structures and Restraints Research
NHTSA, Office of Crashworthiness Research

Date: _____

COTR, Structures and Restraints Research
NHTSA, Office of Crashworthiness Research

Date: _____

1. Report No. SPole-TRC-18-001	2. Government Accession No.	3. Recipient's Catalog No.																												
4. Title and Subtitle Final Report of Research Side Impact MDB Testing of a 2018 Honda Accord 4-DR Sedan, NHTSA No.: R20185382		5. Report Date April 28, 2020																												
		6. Performing Organization Code TRC Inc.																												
7. Author(s) John Shultz, Project Manager		8. Performing Organization Report No. 190729																												
9. Performing Organization Name And Address Transportation Research Center Inc. 10820 State Route 347, East Liberty, OH 43319		10. Work Unit No.																												
		11. Contract Or Grant No. DTNH22-17-F-00151																												
12. Sponsoring Agency Name And Address U.S. Department of Transportation National Highway Traffic Safety Administration Office of Crashworthiness Research (NSR-210) 1200 New Jersey Ave, SE Washington, DC 20590		13. Type Of Report And Period Covered Final Test Report July 29, 2019 – April 28, 2020																												
		14. Sponsoring Agency Code NRS-210																												
15. Supplemental Notes																														
16. Abstract A 32.20 km/h, 75° Oblique Rigid Pole Research Side Impact Test was conducted on the subject 2018 Honda Accord 4-DR Sedan in accordance with the specifications of the Laboratory Test Procedure for the Research Side Impact Rigid Pole Test for the generation of consumer information on vehicle side pole crash protection. This test was conducted by Transportation Research Center Inc. in East Liberty, Ohio, on July 29, 2019. The impact velocity was 31.98 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 23.3°C. The test vehicle post-test maximum crush was 309 mm at level 3. The test vehicle's performance was as follows: <table border="1" data-bbox="371 942 1295 1232"> <thead> <tr> <th></th><th colspan="2">Driver ATD (WorldSID-50M)</th></tr> <tr> <th>Measurement Description</th><th>Units</th><th>Result</th></tr> </thead> <tbody> <tr> <td>Head Injury Criterion (HIC15)</td><td>N/A</td><td>149</td></tr> <tr> <td>Brain Injury Criterion (BrIC)</td><td>N/A</td><td>0.58</td></tr> <tr> <td>Peak Shoulder Force</td><td>N</td><td>-2123.8</td></tr> <tr> <td>Peak Thoracic Rib Deflection</td><td>mm</td><td>63.9</td></tr> <tr> <td>Peak Abdominal Rib Deflection</td><td>mm</td><td>28.0</td></tr> <tr> <td>Pubic Symphysis Force</td><td>N</td><td>-918.6</td></tr> <tr> <td>Peak Resultant Sacro-Iliac Force</td><td>N</td><td>2574.5</td></tr> </tbody> </table>					Driver ATD (WorldSID-50M)		Measurement Description	Units	Result	Head Injury Criterion (HIC15)	N/A	149	Brain Injury Criterion (BrIC)	N/A	0.58	Peak Shoulder Force	N	-2123.8	Peak Thoracic Rib Deflection	mm	63.9	Peak Abdominal Rib Deflection	mm	28.0	Pubic Symphysis Force	N	-918.6	Peak Resultant Sacro-Iliac Force	N	2574.5
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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 Side Impact Pole WorldSID-50M		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, DC 20590																												
19. Security Classification of Report Unclassified	20. Security Classification of page Unclassified	21. Number of Pages 254	22. Price																											

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SECTION 1

PURPOSE AND TEST PROCEDURE

PURPOSE AND TEST PROCEDURE

This rigid pole side impact test is a part of the Federal Motor Vehicle Safety Standard 214 Side Impact Protection program. It was conducted for the National Highway Traffic Safety Administration's (NHTSA) under DTNH22-17-F00151 by Transportation Research Center Inc.. The purpose of this test was to evaluate the repeatability, reproducibility, and durability of the WorldSID 50th percentile male ATD (WorldSID-50M) equipped with RibEye™, to determine whether the dummy is a viable option to replace the EuroSID-2 dummy with rib extension modifiers (ES-2re) in future side impact rigid pole tests conducted by NHTSA. The test was conducted using NHTSA's 'LABORATORY TEST PROCEDURE FOR THE NEW CAR ASSESSMENT PROGRAM SIDE IMPACT RIGID POLE TEST' dated October 2015 as a guideline.

SECTION 2

SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2018 Honda Accord 4-DR Sedan. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 31.98 km/h. The test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on July 29, 2019. Pre-test and post test photographs of the test vehicle and side impact dummy (WorldSID-50M with RibEye) are included in APPENDIX A of this report.

One WorldSID-50M with RibEye dummy was placed in the driver designated seating position according to instructions specified in the Side Pole Laboratory Test Procedure, dated July 2017. The WorldSID was seated per NHTSA report <https://rosap.nhtl.bts.gov/view/dot/41900>. Camera locations and other pertinent camera information are included in this report.

The dummy was instrumented in the following manner:

- Head CG tri-axial accelerometer
- Head angular rate sensor
- Upper and lower neck load cells
- Shoulder load cell
- RibEye measurement system in thorax ribs 1-3 and abdominal ribs 1 and 2, with three LEDs per rib
- Upper (T1), middle (T4), and lower spine (T12) tri-axial accelerometers
- Lumbar load cell
- Pelvic tri-axial accelerometers
- Pubic load cell
- Left and right sacroiliac load cells
- Left femur load cell

APPENDIX B contains the vehicle and dummy response data. Dummy configuration and performance verification data can be found in APPENDIX C of this report. APPENDIX D of this report contains the test equipment and instrumentation calibration data. Worksheets and plots found in Appendix E describe dummy positions in detail.

Dummy injury readings were recorded as follows:

Measurement Description	Driver ATD (WorldSID-50M)	
	Units	Result
Head Injury Criterion (HIC15)	N/A	149
Brain Injury Criterion (BrIC)	N/A	0.58
Peak Shoulder Force	N	-2123.8
Peak Thoracic Rib Deflection	mm	63.9
Peak Abdominal Rib Deflection	mm	28.0
Pubic Symphysis Force	N	-918.6
Peak Resultant Sacro-Iliac Force	N	2574.5

Supplemental restraint information is given below:

Restraint Type	Left Front (Driver) Occupant Location 1	
	Mounted	Deployed
Frontal Airbag	Yes	No
Side Curtain Airbag	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes
Side Pelvis Airbag	No	N/A
Knee Airbag	Yes	No
Seat Belt Pretensioner	Yes	Yes
Seat Belt Load Limiter	Yes	Unknown
Other Safety Restraint	No	N/A

GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact or the static rollover test which followed. Driver seatback reclined during testing and the WorldSID arm fell prior to time zero.

Data Acquisition Explanations

Vehicle Center of Gravity Angular Rate Z; No valid data

Left A-Pillar Sill Acceleration Y; Channel failed at 69.0 ms

Left B-Pillar Sill Acceleration Y; Channel failed at 29.0 ms

Left Front Door Mid Rear Acceleration Y; Channel failed at 17.0 ms

Ribeye Error Codes:

- 1 if the top sensor is blocked or sees too much ambient light
- 2 if the bottom sensor is blocked or sees too much ambient light
- 3 if both top and bottom sensors are blocked or see too much ambient light
- 4 if the middle sensor is blocked or sees too much ambient light
- 5 if the middle and top sensors are blocked or see too much ambient light
- 6 if the middle and bottom sensors are blocked or see too much ambient light
- 7 if all three sensors are blocked or see too much ambient light
- 8 if a divide-by-zero condition occurred in the data processing
- 9 if data goes past the end of the calibration curves

**error codes may be positive or negative in data and will occur to all x, y, and z channels*

Driver Shoulder Rib Rear Led Position; Error Code 9 at 47.9-74.5 ms

Driver Shoulder Rib Middle Led Position; Error Code 9 at 57.9-63.0 ms

Driver Shoulder Rib Front Led Position; Error Code 9 at 56.5-68.5 ms

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	R20185382
Model Year	2018
Make	Honda
Model	Accord
Body Style	Passenger Car
VIN	1HGCV1F17JA007237
Body Color	Modern Steel M.
Odometer Reading (km/mi)	40
Engine Displacement (L)	1.5
Type/No. Cylinders	Gas/4
Engine Placement	Front Transverse
Transmission Type	CVT
Transmission Speeds	N/A
Overdrive	Yes
Final Drive	FWD
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	Yes
Other Optional Feature	No
Driver Front Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	No
Driver Load Limiter	Yes
Rear Pass. Load Limiter	No
Other Safety Restraint	No

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

Yes

DATA FROM CERTIFICATION LABEL

Manufactured By	HONDA OF AMERICA MFG., INC.
Date of Manufacturer	10/17
Vehicle Type	Passenger Car

GVWR (kg)	1950
GAWR Front (kg)	1070
GAWR Rear (kg)	960

VEHICLE SEATING AND WEIGHT CAPACITY DATA

	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	3	N/A	5
Vehicle Capacity Weight (VCW) (kg)				385.0
DSC X 68.04 kg				340.2
Rated Cargo and Luggage Weight (RCLW) (kg)				44.8

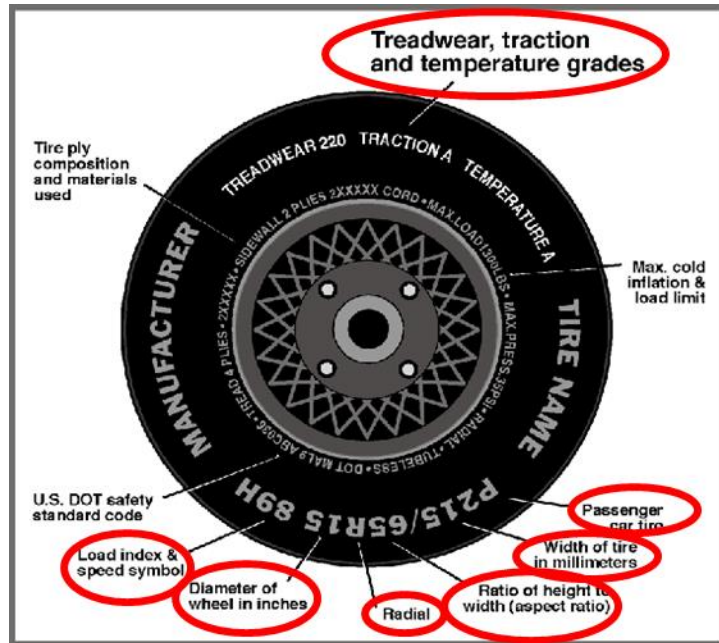
VEHICLE SEAT TYPE

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

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

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	220	220
Recommended Tire Size	225/50R17 94V	225/50R17 94V
Tire Size on Vehicle	225/50R17 94V	225/50R17 94V
Tire Manufacturer	Hankook	Hankook
Tire Model	Kinergy GT	Kinergy GT
Treadwear	500	500
Traction	A	A
Temperature Grades	A	A
Tire Plies Sidewall	4	4
Tire Plies Body	1	1
Load Index/Speed Symbol	94V	94V
Tire Material	Steel/Polyester/Nylon	Steel/Polyester/Nylon
DOT Safety Code Left	1T7AB 1B HO 2717	1T7AB 1B HO 2717
DOT Safety Code Right	1T7AB 1B HO 2717	1T7AB 1B HO 2717

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan

NHTSA No. R20185382

Test Program: SPole Impact

Test Date: 7/29/2019

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	152	185	172	172
Tire Placard	kPa	220	220	220	220
Owner's Manual	kPa	220	220	220	220
As Tested	kPa	220	220	220	220

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	429.2	289.6		453.6	333.0		459.8	334.4	
Right	kg	423.6	276.8		424.4	322.4		433.4	311.4	
Ratio	%	60.1	39.9		57.3	42.7		58.0	42.0	
Totals	kg	852.8	566.4	1419.2	878.0	655.4	1533.4	893.2	645.8	1539.0

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1419.2	(A)
Actual Weight of 1 WorldSID-50M with RibEye Dummy Used	kg	75.0	(B)
Rated Cargo/Luggage Weight (RCLW)	kg	44.8	(C)
Calculated Vehicle Target Weight (TVTW)	kg	1539.0	(A+B+C)

Does the measured As Tested 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

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	-0.6	-0.4	0.4	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	-0.4	-0.2	-0.2	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	0.1	0.0	0.0	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg.	-0.2	-0.3	-0.4	Yes
Vehicle CG (Aft of Front Axle)	mm	1125	1205	1183	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+10	+21	+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 Requirements".

Test height adjustable suspension setting, if applicable:

N/A

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

Test Vehicle:	<u>2018 Honda Accord 4-DR Sedan</u>	NHTSA No.	<u>R20185382</u>
Test Program:	<u>SPole Impact</u>	Test Date:	<u>7/29/2019</u>

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: None	0.0
Components removed: Head lights, tail lights, front and rear fascia, front and rear bumper beams & miscellaneous plastic parts	38.2

DATA SHEET NO. 2

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan

NHTSA No. R20185382

Test Program: SPole Impact

Test Date: 7/29/2019

SEAT POSITIONING

The driver's seat, front center seat (if applicable), and right front passenger's seat should be set to the mid-track, lowest, mid-angle position. The struck-side rear passenger's seat, rear center seat, and nonstruck 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	17.3	11.6	14.4
Front Passenger Seat	N/A	N/A	13.0
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	15.9
Non-Struck Side Rear Seat	N/A	N/A	15.0
Rear Center Seat*	N/A	N/A	13.0

* If applicable.

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	14.4	129	Max	N/A	N/A	N/A
			Mid	118	129	140
			Min	N/A	N/A	N/A
Front Passenger Seat	13.0	133	Max	N/A	N/A	N/A
			Mid	121	133	143
			Min	N/A	N/A	N/A
Front Center Seat*	N/A	N/A	Max	N/A	N/A	N/A
			Mid	N/A	N/A	N/A
			Min	N/A	N/A	N/A
Struck Side Rear Seat	15.9	150	Max	N/A	N/A	N/A
			Mid	N/A	150	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	15.0	150	Max	N/A	N/A	N/A
			Mid	N/A	150	N/A
			Min	N/A	N/A	N/A
Rear Center Seat*	13.0	145	Max	N/A	N/A	N/A
			Mid	N/A	145	N/A
			Min	N/A	N/A	N/A

* If applicable.

DATA SHEET NO. 2 (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan

NHTSA No. R20185382

Test Program: SPole Impact

Test Date: 7/29/2019

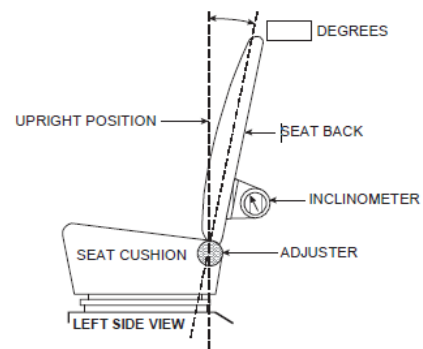
SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	240	25	120	13
Front Passenger Seat	240	25	120	13
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	0	Fixed	0	Fixed
Non-Struck Side Rear Seat	0	Fixed	0	Fixed
Rear Center Seat*	0	Fixed	0	Fixed

* If applicable.

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 50th percentile male dummy in a Side NCAP MDB test. The rear center and non-struck side rear passenger's seat back is set to match the struck-side rear seat back.



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detent*
Driver Seat w/ Seated Dummy	63.9	32	3.4	4
Front Passenger Seat	69.0	32	2.2	4
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	0	Fixed	N/A	Fixed
Non-Struck Side Rear Seat	0	Fixed	N/A	Fixed
Rear Center Seat*	0	Fixed	N/A	Fixed

* If applicable.

DATA SHEET NO. 2 (CONTINUED)**SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA**Test Vehicle: 2018 Honda Accord 4-DR SedanNHTSA No. R20185382Test Program: SPole ImpactTest Date: 7/29/2019**SEAT BELT ANCHORAGE ADJUSTMENT**

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

	Total # of Positions	Placed in Position #
Driver Seat	4	4; Uppermost

HEAD RESTRAINT ADJUSTMENT

Head restraints are adjusted to the lowest and most full rearward in-use position.

	Total # of Positions	Placed in Position #
Driver Seat	6	6; Uppermost

DATA SHEET NO. 2 (CONTINUED)

SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan

NHTSA No. R20185382

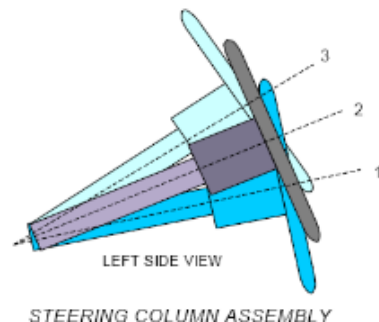
Test Program: SPole Impact

Test Date: 7/29/2019

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel geometric locus it describes when moved through its full range of motion.

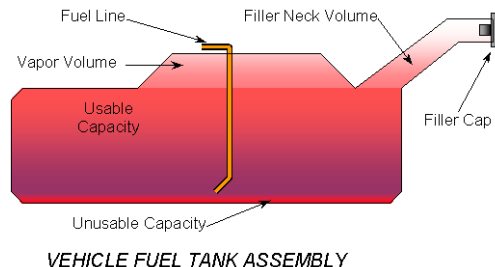
	Degrees	Fore/Aft Position, mm
Lowermost, Position No. 1	17.7	0
Geometric Center, Position No. 2	20.3	20
Uppermost, Position No. 3	22.9	40
Telescoping Steering Wheel Travel		40
Test Position	20.3	20



FUEL PUMP

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

Ignition Stage 2 (Push the engine start button twice) will activate the fuel pump to prime the system.



FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	56.0
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	56.0
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	52.1
Actual Amount of Solvent Used in Test	52.1
1/3 of Usable Capacity	18.7

Is the Actual Amount of Solvent Used in the test equal to 93% +/- 1% of the Usable Capacity stated on Form No. 1? ☒ YES ☐ NO

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	29.53	59.00	-6.06	138.70
	Y	37.57	55.00	-13.11	136.05
	Z	2.48	90.40	-17.48	55.05
	R	45.34	55.00		
Head Angular Rate (deg/sec)	X	1357.46	118.80	-1173.45	208.95
	Y	814.69	115.10	-380.80	59.00
	Z	756.03	83.65	-938.25	208.85
Upper Neck Force (N)	X	235.42	138.70	-289.39	76.00
	Y	165.32	250.15	-501.83	60.60
	Z	729.66	50.90	-74.45	90.25
Upper Neck Moment (Nm)	X	32.93	60.95	-34.12	144.90
	Y	15.29	96.65	-18.94	143.25
	Z	10.85	60.05	-17.52	100.70
Lower Neck Force (N)	X	235.02	134.30	-469.15	62.40
	Y	322.20	47.30	-521.90	112.95
	Z	915.44	52.20	-506.27	149.45
Lower Neck Moment (Nm)	X	36.17	277.05	-100.81	136.90
	Y	50.65	74.70	-61.68	136.00
	Z	11.95	61.75	-18.04	115.90
Driver Shoulder Force (N)	X	108.20	230.40	-725.42	66.20
	Y	24.08	175.50	-2123.81	50.55
	Z	359.78	38.95	-71.55	114.30
Shoulder Rear Ribeye Position (mm) ¹	X	20.71	48.15	-89.25	47.75
	Y	17.55	48.15	-86.10	25.65
	Z	17.57	48.15	-63.31	47.75
Length of Change (mm) ¹		11.80	80.30	-5.17	230.20
Shoulder Middle Ribeye Position (mm) ¹	X	15.18	62.95	-58.53	57.75
	Y	13.61	62.95	-97.84	24.90
	Z	15.10	57.95	-62.56	40.80
Length of Change (mm) ¹		49.97	57.75	-2.42	25.20
Shoulder Front Ribeye Position (mm) ¹	X	32.85	152.20	1.80	56.15
	Y	12.14	56.35	-85.29	24.85
	Z	15.79	56.35	-66.99	41.70
Length of Change (mm) ¹		63.44	56.15	-1.70	23.85

¹See data acquisition explanation

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)Test Vehicle: 2018 Honda Accord 4-DR SedanNHTSA No. R20185382Test Program: SPole ImpactTest Date: 7/29/2019

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 1 Rear Ribeye Position (mm)	X	-20.83	46.50	-43.71	232.80
	Y	-57.09	57.40	-100.90	-32.80
	Z	7.27	110.40	-15.33	38.85
Length of Change (mm)		42.07	57.40	-2.16	235.75
Thorax Rib 1 Middle Ribeye Position (mm)	X	20.76	47.20	-8.28	230.60
	Y	-43.37	58.20	-109.17	22.50
	Z	8.66	111.30	-17.34	38.35
Length of Change (mm)		63.92	58.25	-0.60	22.40
Thorax Rib 1 Front Ribeye Position (mm)	X	67.53	49.05	3.65	49.25
	Y	14.28	49.25	-101.13	22.50
	Z	10.85	49.25	-17.95	38.20
Length of Change (mm)		44.05	68.75	-1.04	22.45
Thorax Rib 2 Rear Ribeye Position (mm)	X	2.68	59.55	-33.72	237.30
	Y	10.46	59.55	-123.27	65.15
	Z	54.06	59.35	-3.82	59.55
Length of Change (mm)		23.31	53.30	-9.94	58.70
Thorax Rib 2 Middle Ribeye Position (mm)	X	35.19	53.15	-6.01	53.35
	Y	22.31	53.35	-118.93	74.85
	Z	52.88	53.15	-9.93	53.35
Length of Change (mm)		28.33	51.25	-10.74	74.90
Thorax Rib 2 Front Ribeye Position (mm)	X	81.58	55.75	-6.68	55.95
	Y	11.15	71.25	-109.56	71.45
	Z	61.02	55.75	-4.49	55.95
Length of Change (mm)		20.22	53.65	-12.94	71.45
Thorax Rib 3 Rear Ribeye Position (mm)	X	-33.68	61.70	-50.55	85.20
	Y	-82.82	58.60	-95.22	282.20
	Z	-29.70	98.60	-41.18	34.50
Length of Change (mm)		13.56	59.40	-1.16	135.95
Thorax Rib 3 Middle Ribeye Position (mm)	X	2.38	59.60	-21.71	129.80
	Y	-85.86	58.15	-102.52	139.50
	Z	-27.97	98.60	-41.48	35.00
Length of Change (mm)		12.95	31.45	-1.05	139.55

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)Test Vehicle: 2018 Honda Accord 4-DR SedanNHTSA No. R20185382Test Program: SPole ImpactTest Date: 7/29/2019

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 3 Front Ribeye Position (mm)	X	36.17	59.60	10.07	135.10
	Y	-75.08	56.65	-94.07	135.80
	Z	-29.01	98.90	-42.04	33.70
Length of Change (mm)		8.35	31.30	-1.14	294.60
Abdomen Rib 1 Rear Ribeye Position (mm)	X	-22.07	65.40	-37.46	134.50
	Y	-73.58	56.00	-95.94	5.50
	Z	7.36	51.70	-4.06	32.20
Length of Change (mm)		21.88	59.45	-0.16	6.45
Abdomen Rib 1 Middle Ribeye Position (mm)	X	16.26	64.35	-5.88	133.60
	Y	-73.77	56.05	-103.44	12.10
	Z	7.19	50.95	-5.10	32.20
Length of Change (mm)		28.01	56.00	-0.14	-34.20
Abdomen Rib 1 Front Ribeye Position (mm)	X	53.28	61.70	28.70	138.65
	Y	-66.23	56.00	-96.64	193.10
	Z	5.86	48.95	-5.93	30.10
Length of Change (mm)		17.25	54.20	-1.30	193.05
Abdomen Rib 2 Rear Ribeye Position (mm)	X	-7.09	65.40	-22.77	39.60
	Y	-75.43	56.00	-92.67	-2.80
	Z	42.32	53.70	28.27	169.05
Length of Change (mm)		14.96	58.15	-2.05	105.50
Abdomen Rib 2 Middle Ribeye Position (mm)	X	29.63	62.20	6.97	136.50
	Y	-80.64	55.55	-103.30	259.55
	Z	41.35	52.00	26.05	170.65
Length of Change (mm)		20.37	55.50	-1.66	259.65
Abdomen Rib 2 Front Ribeye Position (mm)	X	64.05	63.30	39.68	141.30
	Y	-73.22	56.00	-95.13	102.25
	Z	41.50	51.60	27.43	169.00
Length of Change (mm)		14.42	53.05	-0.45	17.95
T1 Acceleration (g)	X	6.42	96.75	-9.86	56.50
	Y	34.13	46.80	-10.81	101.00
	Z	12.39	60.25	-7.51	105.80
	R	35.16	46.85		

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T4 Acceleration (g)	X	13.54	58.85	-9.31	104.80
	Y	31.86	59.50	-12.19	98.20
	Z	3.88	73.25	-8.24	30.95
	R	34.84	59.40		
T12 Acceleration (g)	X	14.82	65.80	-10.25	28.25
	Y	39.77	54.45	-22.37	91.70
	Z	8.72	60.65	-9.30	104.40
	R	40.55	54.55		
Pubic Symphysis (N)	Y	21.78	210.40	-918.62	42.65
Left Sacro-Iliac Force (N)	X	235.29	132.05	-458.73	55.55
	Y	25.49	265.55	-2530.54	49.40
	Z	158.29	159.60	-587.73	71.20
Left Sacro-Iliac Moment (Nm)	X	37.20	70.30	-31.91	42.90
	Y	32.95	58.95	-14.31	113.35
	Z	32.66	39.80	-37.24	71.60
Right Sacro-Iliac Force (N)	X	427.66	69.95	-470.52	40.05
	Y	75.50	169.40	-1079.00	44.70
	Z	845.73	58.30	-28.76	108.20
Right Sacro-Iliac Moment (Nm)	X	53.39	70.00	-6.03	21.50
	Y	12.58	134.60	-18.00	73.15
	Z	29.11	39.95	-35.60	73.15
Lumbar Force (N)	X	703.53	71.55	-299.18	39.50
	Y	1106.67	52.75	-207.53	254.45
	Z	1612.45	64.60	-153.25	156.00
Lumbar Moment (Nm)	X	43.48	54.90	-16.66	251.20
	Y	12.73	133.60	-31.39	70.80
	Z	15.19	42.20	-21.28	115.70
Pelvis Acceleration (g)	X	12.53	63.50	-12.10	37.55
	Y	43.54	43.45	-20.03	85.10
	Z	10.10	38.80	-7.73	56.40
	R	43.85	43.45		

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)Test Vehicle: 2018 Honda Accord 4-DR SedanNHTSA No. R20185382Test Program: SPole ImpactTest Date: 7/29/2019

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Left Femur Force (N)	X	28.52	31.10	-211.98	44.65
	Y	98.98	105.85	-395.06	42.85
	Z	809.07	70.10	-139.89	0.20
Left Femur Moment (Nm)	X	191.32	46.75	-5.04	284.95
	Y	85.46	49.00	-3.38	185.45
	Z	33.83	54.80	-4.72	21.40
Left Femoral Neck Force (N)	X	554.43	49.80	-9.43	4.20
	Y	82.85	21.45	-1869.71	46.35
	Z	102.20	156.75	-1406.06	45.70

¹See data acquisition explanationPositive Direction

Longitudinal Forward
 Lateral Rightward
 Vertical Downward

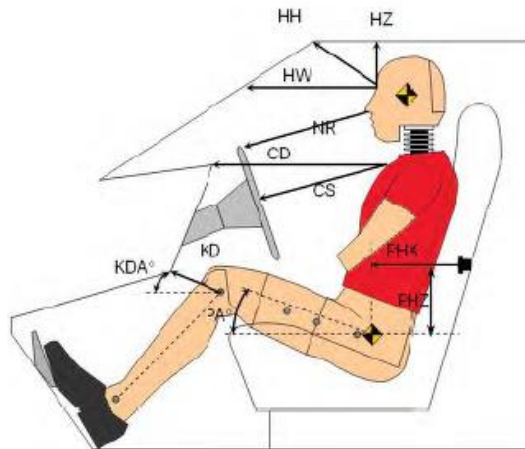
Negative Direction

Longitudinal Rearward
 Lateral Leftward
 Vertical Upward

DATA SHEET NO. 3
DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019



Code	Measurement Description	Driver WorldSID-50M SN # EB8888	
		Length (mm)	Angle
HH	Header to Header	367	
HW	Header to Windshield	628	
HZ	Head to Roof Liner	204	
NR	Nose to Rim/Seat Back	429	
CD	Chest to Dash/Seat Back	596	
CS	Chest to Steering Wheel	372	
KD(L)/KDA(L)°	Left Knee to Dash/Seat Back	131	-44.6
KD(R)/KDA(R)°	Right Knee to Dash/Seat Back	111	-52.7
PAX°	Pelvic Tilt Angle X		-0.8
PAY°	Pelvic Tilt Angle Y		-0.8
PHX	Hip Point to Striker (X-Axis)	274	
PHZ	Hip Point to Striker (Z-Axis)	271	
HAX°	Head Tilt Angle X		0.2
HAY ^{1o}	Head Tilt Angle Y		-2.2
TAX°	Thorax Tilt Angle X		1.2
TAY°	Thorax Tilt Angle Y		-1.7
	Head Rest Angle		3.3
	H-Point Tool Angle		43.2
	Torso Angle		13.2
	Windshield Angle		59.0

Note: All measurements are in millimeters. 2-door vehicle shown. Rear dummy HX, HZ, PHX and PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

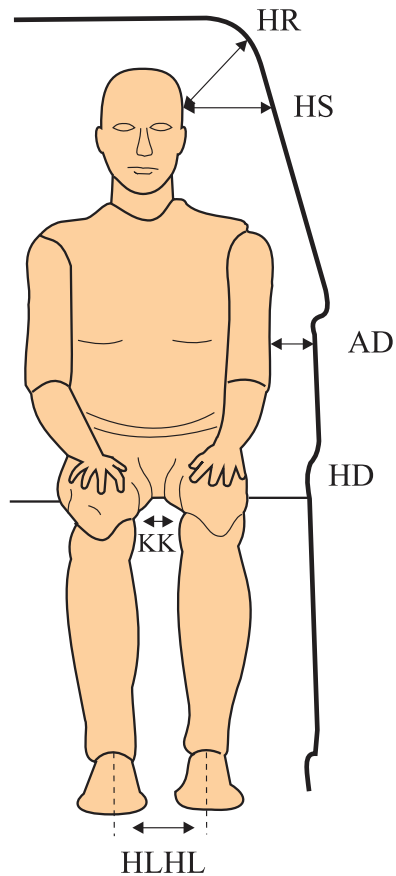
All tilt sensor angles are recorded digitally

WorldSID-50M neck was adjusted 0 notches

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019



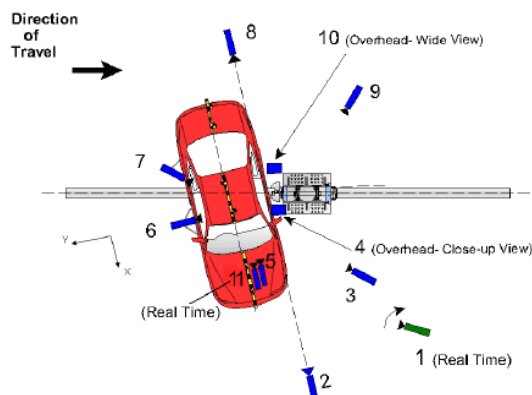
Code	Measurement Description	Driver WorldSID-50M SN # EB8888
HR	Head to Side Header	261
HS	Head to Side Window	363
AD	Arm to Door	160
HD	Hip Point to Door	115
KK	Knee to Knee	312
HLHL	Heel to Heel	352

Note: All measurements are in millimeters.

DATA SHEET NO. 5 CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan
Test Program: SPole Impact

NHTSA No. R20185382
Test Date: 7/29/2019



REFERENCE (from Point of Impact for X and Y; from Ground for Z):
+ X = Forward of vehicle, + Y = Right of vehicle, + Z = Down

CAMERA LOCATIONS AND DATA

Camera No.	View	Coordinates (mm)			Lens Length (mm)	Operating Frame Rate (fps)
		X	Y	Z		
1	Real time (24-30 fps) pan view of impact				Zoom	30
2	Front ground level – impact view	4498	-1981	-1217	20	1000
3	Impact side 45° – forward pole view	3417	-2321	-1475	20	1000
4	Overhead Close-up view of impact	0	0	-5750	25	1000
5	Onboard – dummy front view				25	1000
6	Onboard – dummy side view				12.5	1000
7	Onboard – dummy rear oblique view				12.5	1000
8	Rear ground level – impact view	-6545	-3120	-1550	20	1000
9	Impact side 45° – rearward pole view	-2827	-1723	-1377	20	1000
10	Overhead wide – view of impact	193	0	-5750	18.5	1000
11	Real time (24-30 fps) – dummy front view				Zoom	30

* All measurements accurate to ± 6 mm.

NOTE: Vehicle is at a 75° angle to the rigid pole.

If applicable, explain why camera(s) did not operate as intended: N/A

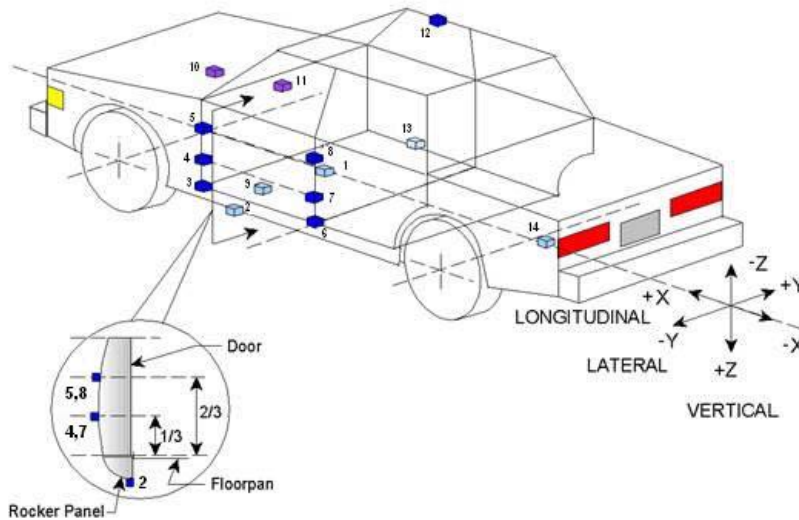
INSTRUMENTATION

Driver Dummy	133
Vehicle Structure	32
Pole Load Cells	8
Contact Channels	4
TOTAL	177

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019



Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	3095	112	-268				
	Longitudinal (g)				1.59	119.40	-7.02	18.70
	Lateral (g)				18.26	13.65	-1.29	268.00
	Vertical (g)				9.77	55.50	-6.72	31.60
	Resultant (g)				18.41	13.70		
2	Vehicle CG ARS	3095	112	-306				
	Longitudinal (deg/s)				154.34	93.30	-69.72	300.00
	Lateral (deg/s)				166.01	46.30	-87.96	69.45
	Vertical (deg/s)				---	---	---	---
3	Left Floor Sill Acceleration	2966	-747	-344				
	Lateral (g)				89.46	13.35	-6.54	31.45
4	Left A-Pillar Sill Acceleration	3378	-767	-502				
	Lateral (g)				---	---	---	---
5	Left Lower A-Pillar Acceleration	3450	-833	-484				
	Lateral (g)				43.81	43.10	-0.62	267.60
6	Left Mid A-Pillar Acceleration	3450	-823	-804				
	Lateral (g)				22.24	52.65	-8.71	68.35
7	Left B-Pillar Sill Acceleration	225	-772	-349				
	Lateral (g)				---	---	---	---
8	Left Lower B-Pillar Acceleration	2300	-841	-595				
	Lateral (g)				28.96	19.70	-99.88	14.95
9	Left Mid B-Pillar Acceleration	2280	-820	-940				
	Lateral (g)				32.85	45.15	-57.41	26.25

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan
Test Program: SPole Impact

NHTSA No. R20185382
Test Date: 7/29/2019

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
10	Driver Seat Track at Dummy H-Point Acceleration	2575	-615	-270				
	Lateral (g)				66.37	24.55	-11.85	52.45
11	Engine Top Acceleration	3873	40	-755				
	Longitudinal (g)				3.93	132.60	-12.09	49.70
	Lateral (g)				20.07	46.20	-2.04	193.50
12	Firewall Center Acceleration	3805	0	-880				
	Lateral (g)				11.72	57.15	-1.03	5.15
13	Right Roof at Vertical Impact Reference Line Acceleration	2415	565	-1420				
	Lateral (g)				22.75	40.50	-1.74	74.55
14	Right Sill at Vertical Impact Reference Line Acceleration	2950	747	-333				
	Lateral (g)				18.75	14.60	-0.95	267.80
15	Rear Floorpan Behind Rear Axle at Centerline Acceleration	873	0	-336				
	Longitudinal (g)				1.80	129.75	-5.69	65.85
	Lateral (g)				16.68	57.80	-1.19	195.95
16	Left Front Door Mid Centerline Acceleration	2870	-810	-668				
	Lateral (g)				128.93	11.60	-109.17	19.50
17	Left Front Door Mid Rear Acceleration	2510	-782	-657				
	Lateral (g)				--- ¹	--- ¹	--- ¹	--- ¹
18	Left Front Door Upper Centerline Acceleration	2860	-778	-935				
	Lateral (g)				80.34	10.75	-19.84	16.70
19	Left Rear Door Mid Rear Acceleration	1605	-785	-671				
	Lateral (g)				31.70	75.25	-7.89	26.10
20	Left Rear Door Upper Centerline Acceleration	1772	-782	-975				
	Lateral (g)				30.53	48.95	-11.70	61.50
21	Rear Deck Acceleration	190	0	-432				
	Longitudinal (g)				4.02	26.00	-8.13	65.80
	Lateral (g)				19.93	74.90	-1.75	197.30
	Vertical (g)				4.33	37.40	-5.42	48.90
	Resultant (g)				20.13	74.90		

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019

Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
22	Rear Deck ARS	190	0	-432				
	Longitudinal (deg/s)				116.32	89.05	-68.56	300.00
	Lateral (deg/s)				37.01	66.00	-30.37	136.40
	Vertical (deg/s)				149.49	71.75	-51.46	28.20

*0,0,0 located at rear bumper

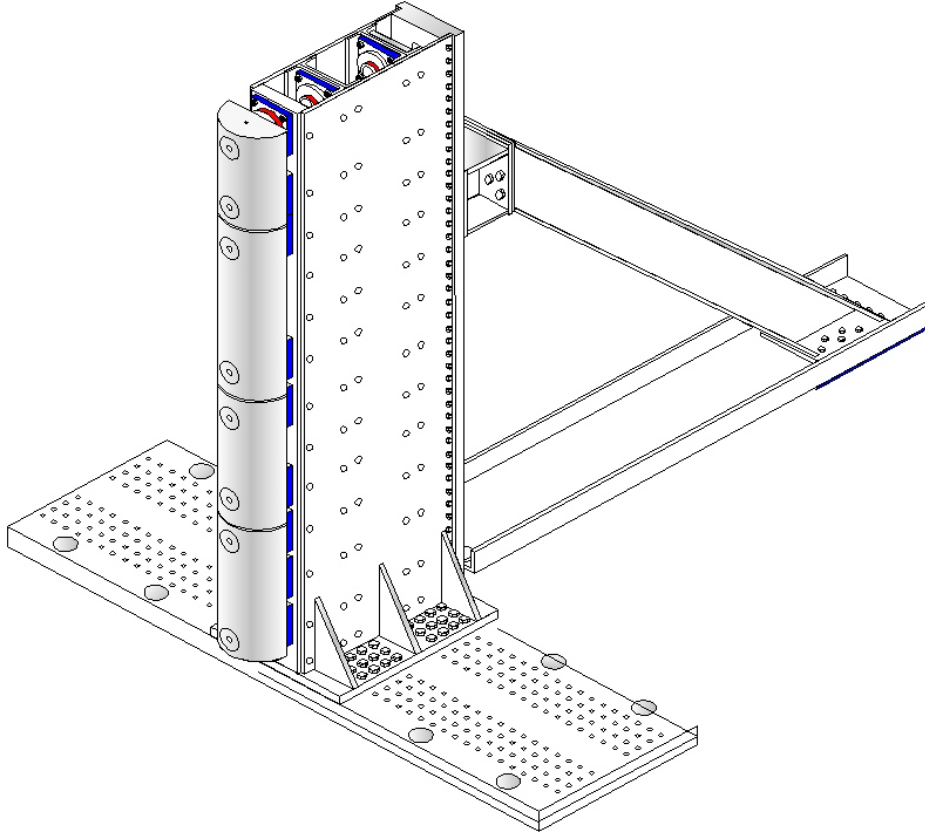
¹See data acquisition explanation

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan
Test Program: SPole Impact

NHTSA No. R20185382
Test Date: 7/29/2019

FOIL 300K RIGID POLE



Load Cell Locations	
ID	Height From Top of Carrier (mm)
1	87
2	468
3	648
4	978
5	1168
6	1651
7	1816
8	2057

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

Test Vehicle: 2018 Honda Accord 4-DR Sedan
Test Program: SPole Impact

NHTSA No. R20185382
Test Date: 7/29/2019

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver WorldSID-50M Dummy
Face	SCAB
Top of Head	SCAB
Left Side of Head	SCAB
Back of head	None
Left Shoulder	SAB, Door panel
Upper Torso	Seat back bolster, SAB
Lower Torso	Seat back bolster, SAB
Left Hip	SAB, Door panel
Left Knee	None

POST-TEST DOOR PERFORMANCE

Description	Struck Side		Non-Struck Side		Rear Hatch/ Other Door
	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, Record Width of Opening at Striker (mm)	N/A	N/A	N/A	N/A	N/A

* Indicate "Yes", "No", or "NA".

POST-TEST SEAT PERFORMANCE

Description	Struck Side		Non-Struck Side	
	Front	Rear	Front	Rear
Seat Movement Along Seat Track	No	N/A	No	N/A
Seat Disengagement from Floor pan	No	No	No	No
Seat Back Movement from Initial Position	Yes	No	No	No
Seat Back Collapse	Yes	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	Along driver A pillar and across top
Side Window Damage	Driver window broken out
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Struck Side (Driver)		Struck Side (Rear Passenger)	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	Yes	No		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Torso Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	No	N/A
Seat Belt Load Limiter	Yes	Unknown	No	N/A
Other	No	N/A	No	N/A

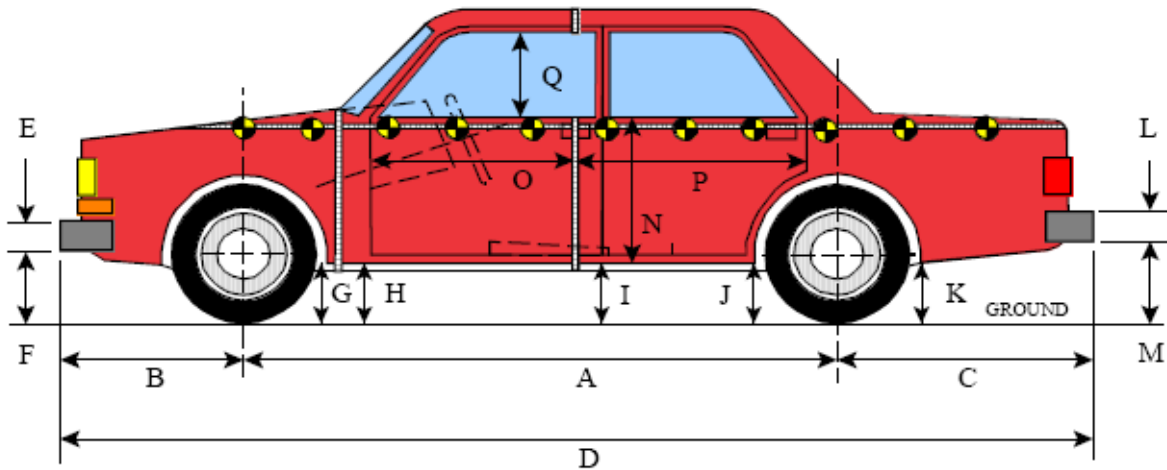
VEHICLE SPEED, VEHICLE ANGLE AT IMPACT, AND IMPACT POINT LOCATION DATA

Measured Parameter	Units	Tolerance	Value
Vertical Impact Reference Line (Aft of Front Axle) (Intended Impact Point)	mm		1311
Actual Impact Point (Aft of Front Axle)	mm		1313
Horizontal Offset (+ forward / - rearward)	mm	+/- 38 of Intended Impact Point	-2
Angle Between Vehicle's Longitudinal Centerline and Line of Forward Motion	Degrees	75 +/- 3	75
Trap No. 1 Velocity (Primary)	km/h	31.4 to 33.0	31.98
Trap No. 2 Velocity (Redundant)	km/h		31.97

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019



LEFT SIDE VIEW

All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3 mm

VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

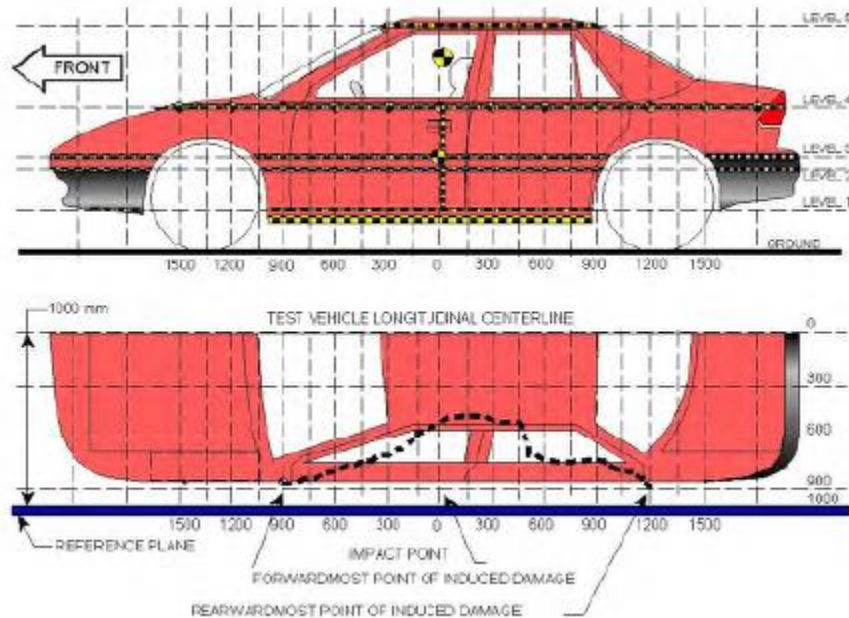
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2820	2800	20
B	Front Axle to FSOV	925	925	0
C	Rear Axle to RSOV	1125	1125	0
D	Total Length at Centerline	4870	4860	10
E	Front Bumper Thickness	120	120	0
F	Front Bumper Bottom to Ground	410	448	-38
G	Sill Height at Front Wheel Well	243	272	-29
H	Sill Height at Front Door Leading Edge	243	270	-27
I	Sill Height at B Pillar	275	290	-15
J1	Sill Height at Rear Wheel Well	308	354	-46
J2	Pinch Weld Height at Rear Wheel Well	160	190	-30
K	Sill Height Aft of Rear Wheel Well	400	430	-30
L	Rear Bumper Thickness	158	158	0
M	Rear Bumper Bottom to Ground	417	440	-23
N	Sill Height to Bottom of Front Window Sill	750	755	-5
O	Front Door Leading Edge to Impact CL	838	780	58
P	Rear Door Trailing Edge to Impact CL	1383	1305	78
Q	Front Window Opening	390	345	45
R	Right Side Length	4540	4580	-40
S	Left Side Length	4540	4500	40
T	Maximum Vehicle Width at B-Pillars	1850	1730	120
U	Maximum Vehicle Width	1864	1860	4

**All Dimensions in mm

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	314	237	0
2	Occupant H-Point	497	285	0
3	Mid-Door	634	309	0
4	Window Sill	932	300	0
5	Window Top	1385	82	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)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019

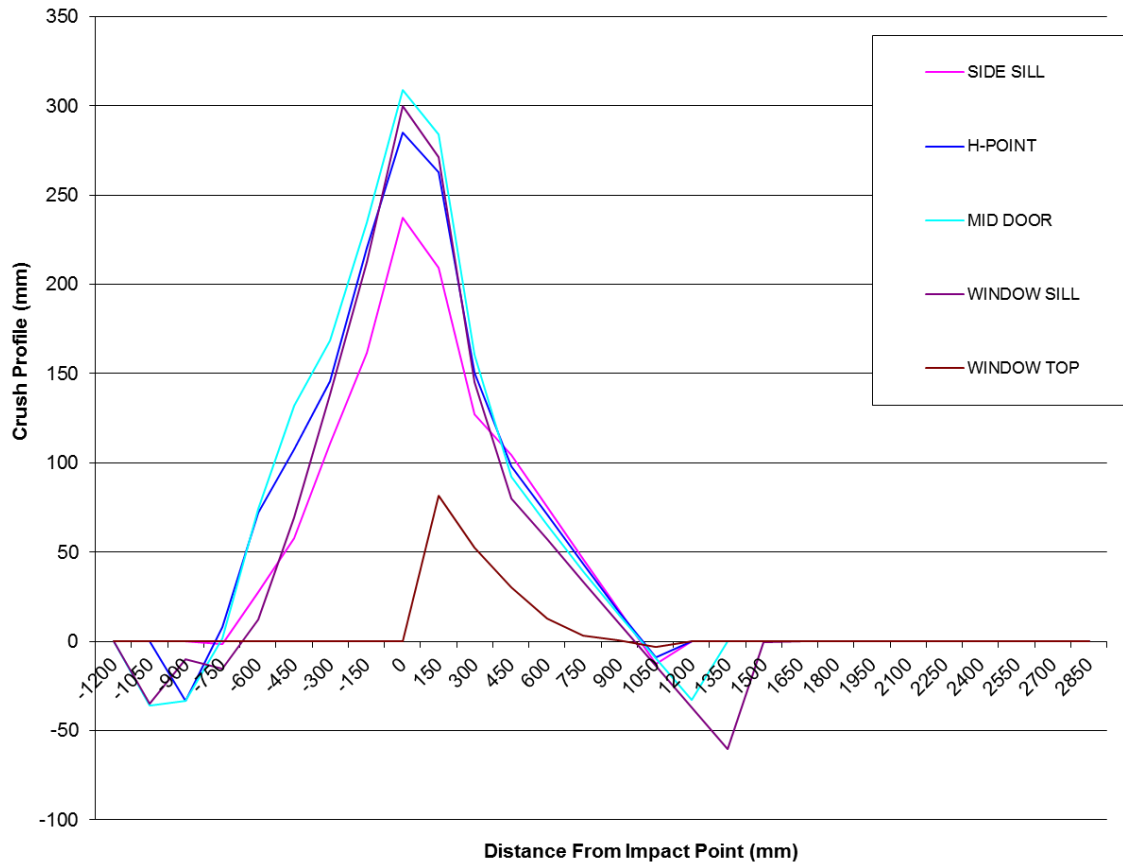
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-750	889	912	918	809		891	904	917	825		-2	8	1	-16	
-600	884	910	918	822		856	838	844	809		28	72	74	13	
-450	881	909	918	840		823	801	786	770		58	108	132	70	
-300	878	908	918	855		767	762	749	717		111	146	169	138	
-150	875	907	918	869		713	686	683	656		162	221	235	213	
0	870	905	917	883		633	620	608	583		237	285	309	300	
150	868	904	917	891	602	659	641	633	620	520	209	263	284	271	82
300	868	902	916	893	611	740	752	756	748	559	128	150	160	145	52
450	868	900	913	894	616	764	801	820	814	585	104	99	93	80	31
600	873	900	911	894	617	797	829	846	837	604	76	71	65	57	13
750	881	902	912	893	612	835	859	872	860	609	46	43	40	33	3
900	890	908	915	891	604	873	891	900	881	603	17	17	15	10	1

NOTE: Pre-test measurements are taken when the vehicle is in the "As Tested" weight condition. Vehicle measurements forward of the vertical impact reference line are negative. The crush profile grid is established prior to the test based on an estimated impact point. The vertical impact reference line was set at (0, 0, 0).

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

Test Vehicle: 2018 Honda Accord 4-DR Sedan
Test Program: SPole Impact

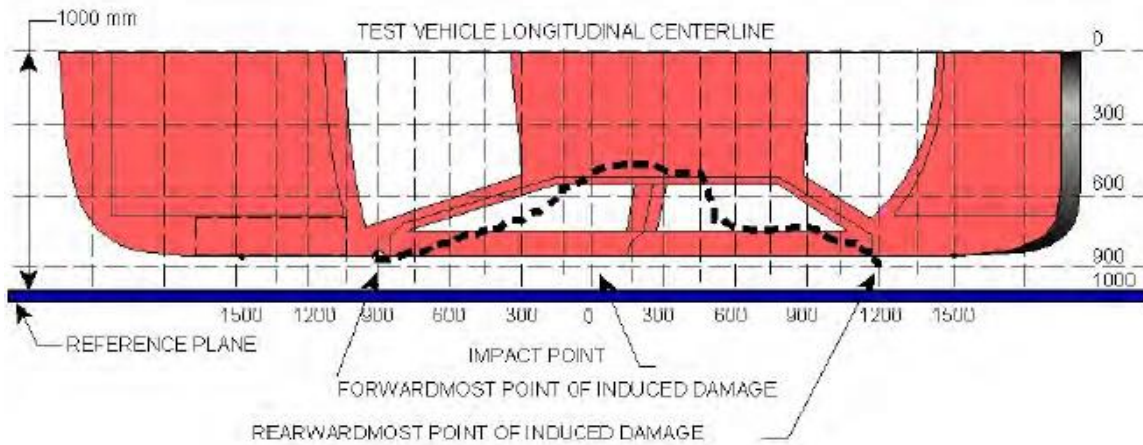
NHTSA No. R20185382
Test Date: 7/29/2019



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2018 Honda Accord 4-DR Sedan
 Test Program: SPole Impact

NHTSA No. R20185382
 Test Date: 7/29/2019



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1 ¹	900	1	873	890	0
		2	891	908	0
2	600	1	797	873	76
3	300	3	765	916	160
4	0	3	608	917	309
5	-450	3	786	918	132
6 ¹	-750	2	904	912	0

¹ DPD 1 and 6 are defined as zero crush since the crush does not extend to the end of the vehicle.

DATA SHEET NO. 12

FMVSS NO. 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2019 Chevrolet Malibu 4-DR Sedan

NHTSA No.: M20190117

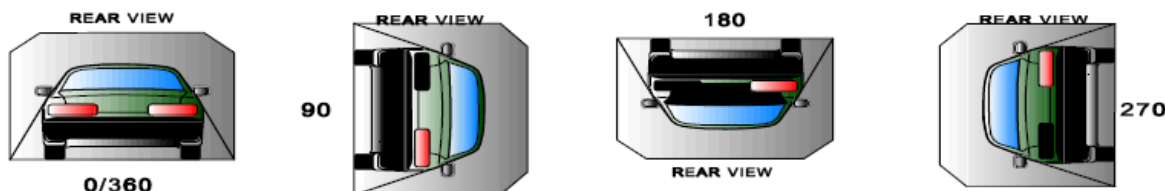
Test Program: SPNCAP Side Impact

Test Date: 6/3/2019

Test Time: 16:16 Temperature: 21.8°C

- A. From impact until vehicle motion ceases: 0 oz.
(Maximum allowable is 1 ounce)
- B. For the 5 minute period after motion ceases: 0 oz.
(Maximum allowable is 5 ounces)
- C. For the following 25 minutes: 0 oz.
(Maximum allowable is 1 ounce/minute)
- D. Spillage Details: None

FMVSS 301 STATIC ROLLOVER DATA



ROLLOVER SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0 to 90	90	330	420
90 to 180	90	330	840
180 to 270	90	330	1260
270 to 360	90	330	1680

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	None
90 to 180	None
180 to 270	None
270 to 360	None

DATA SHEET NO. 13

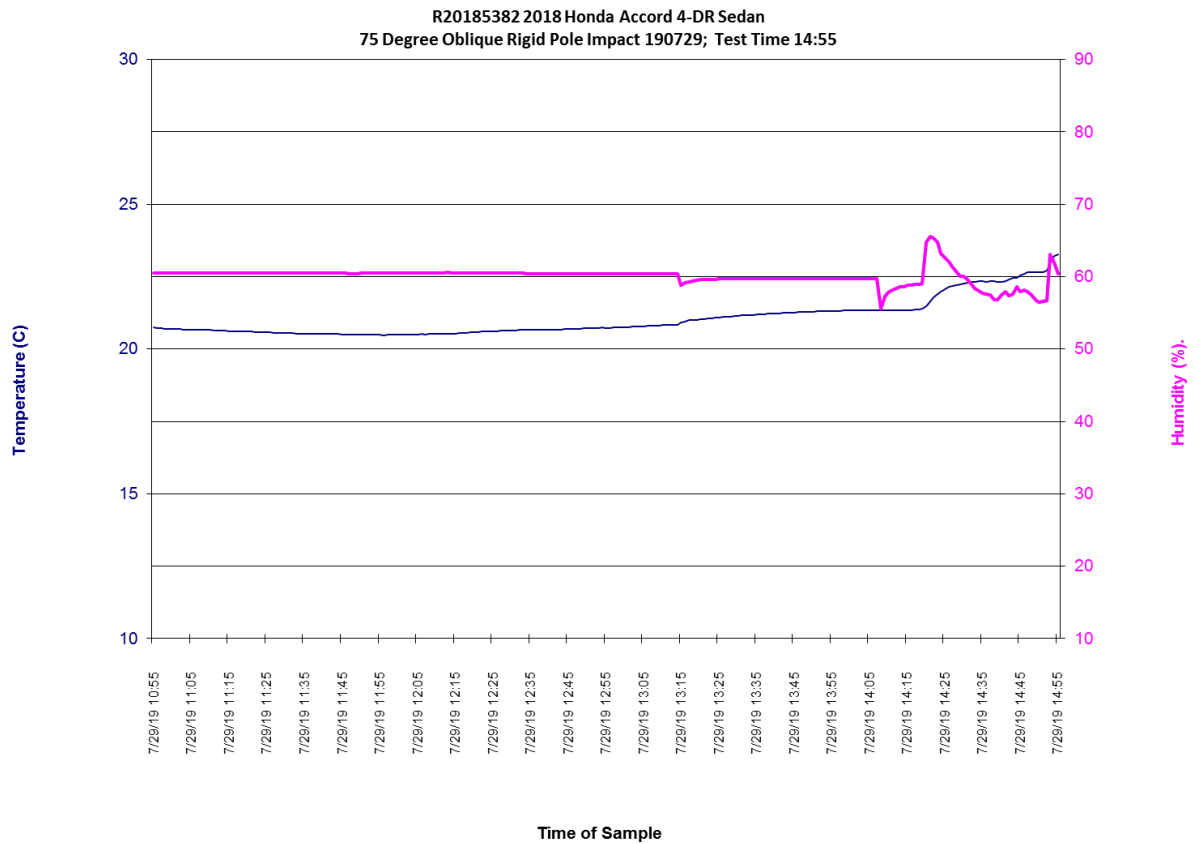
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2018 Honda Accord 4-DR Sedan

NHTSA No. R20185382

Test Program: SPole Impact

Test Date: 7/29/2019



APPENDIX A
PHOTOGRAPHS

TABLE OF PHOTOGRAPHS

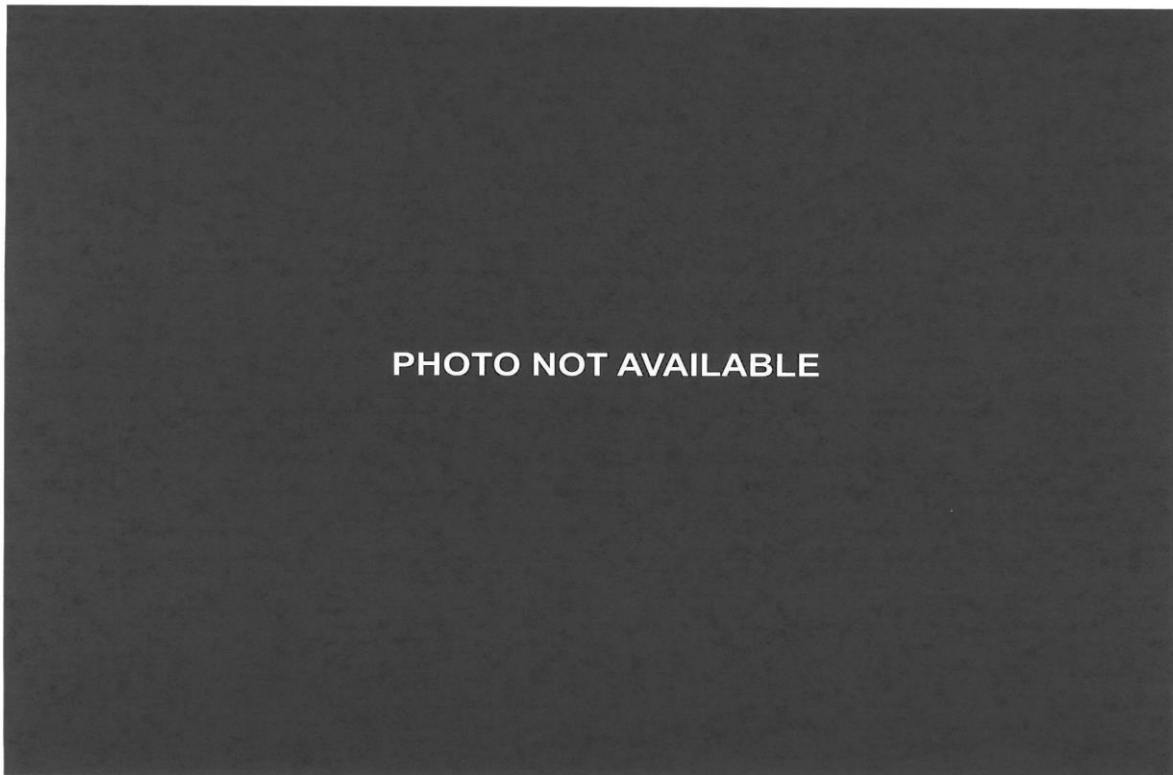
No.	Description	Page
1	As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle	A-4
2	As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle	A-4
3	Pre-Test Frontal View of Test Vehicle	A-5
4	Post-Test Frontal View of Test Vehicle	A-5
5	Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle	A-6
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
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23	Pre-Test Left Side View of Dummy Showing Belt and Chalking	A-15
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38	Pre-Test Close-Up Left Side View of Driver Seat Back	A-23
39	Pre-Test Close-Up View of Driver Seat Back or Head Restraint	A-23
40	Pre-Test Dummy and Door Clearance View	A-24
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-25
43	Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment	A-25
44	Pre-Test Inner Driver Door Panel View	A-26
45	Post-Test Inner Driver Door Panel View Showing Dummy Contact Location	A-26
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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-28
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-29
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61	Pre-Test Ballast View	A-35
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72	Pre-Test Tilt Sensor View for WorldSID-50M	A-41



No. 001 As Delivered Right Front $\frac{3}{4}$ View of Test Vehicle



No. 002 As Delivered Left Rear $\frac{3}{4}$ View of Test Vehicle



No. 003 Pre-Test Frontal View of Test Vehicle



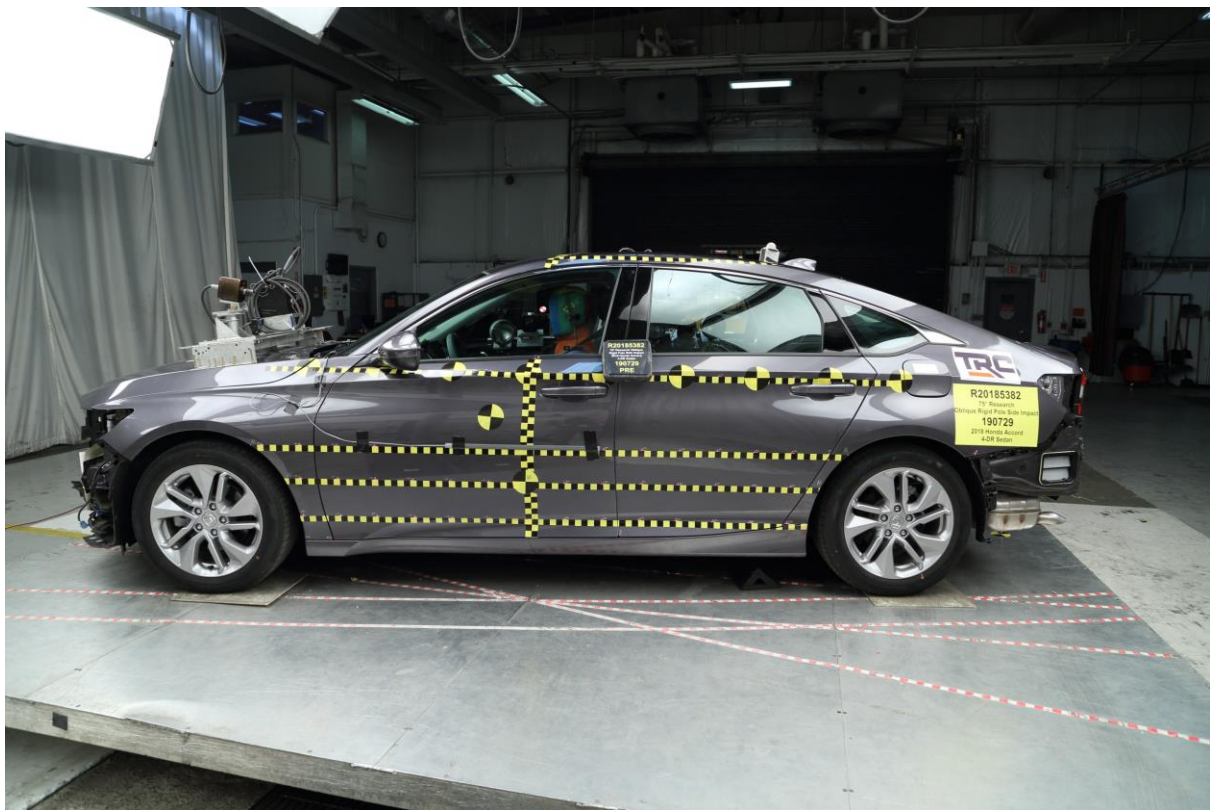
No. 004 Post-Test Frontal View of Test Vehicle



No. 005 Pre-Test Left Front $\frac{3}{4}$ View of Test Vehicle



No. 006 Post-Test Left Front $\frac{3}{4}$ View of Test Vehicle



No. 007 Pre-Test Left Side View of Test Vehicle



No. 008 Post-Test Left Side View of Test Vehicle



No. 009 Pre-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



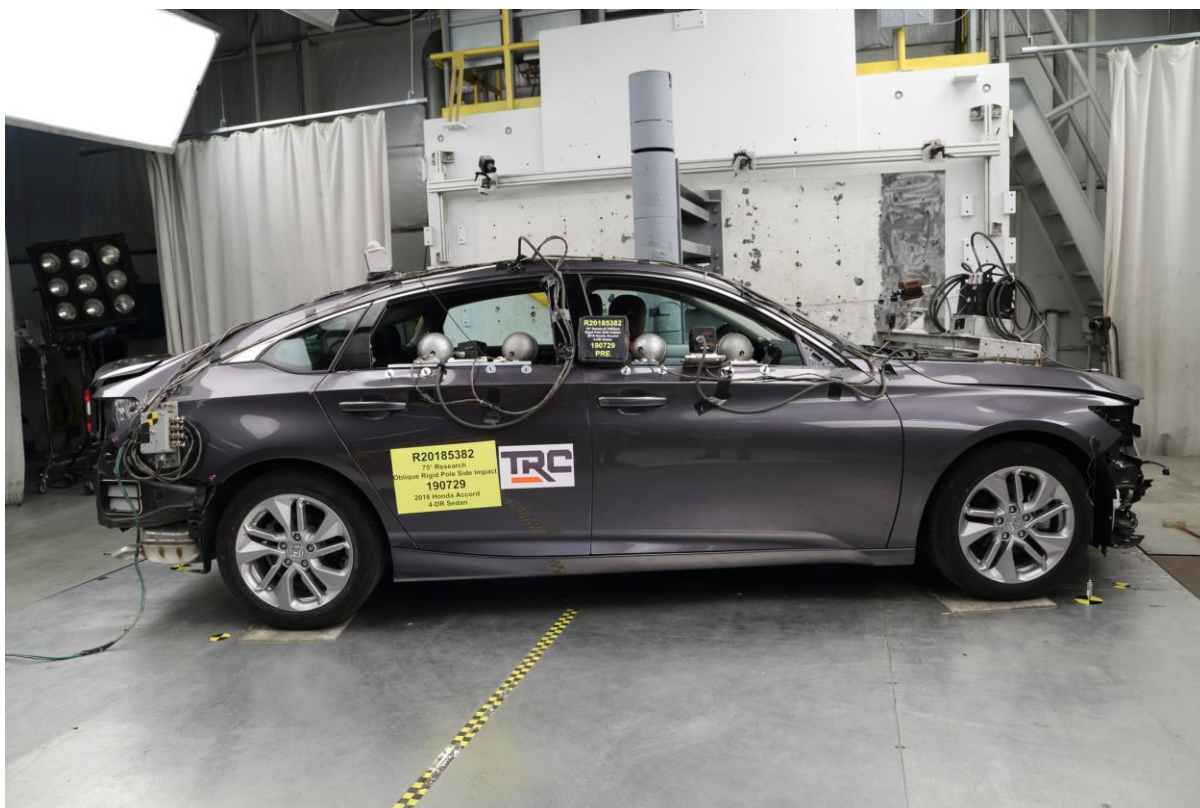
No. 010 Post-Test Left Rear $\frac{3}{4}$ View of Test Vehicle



No. 011 Pre-Test Rear View of Test Vehicle



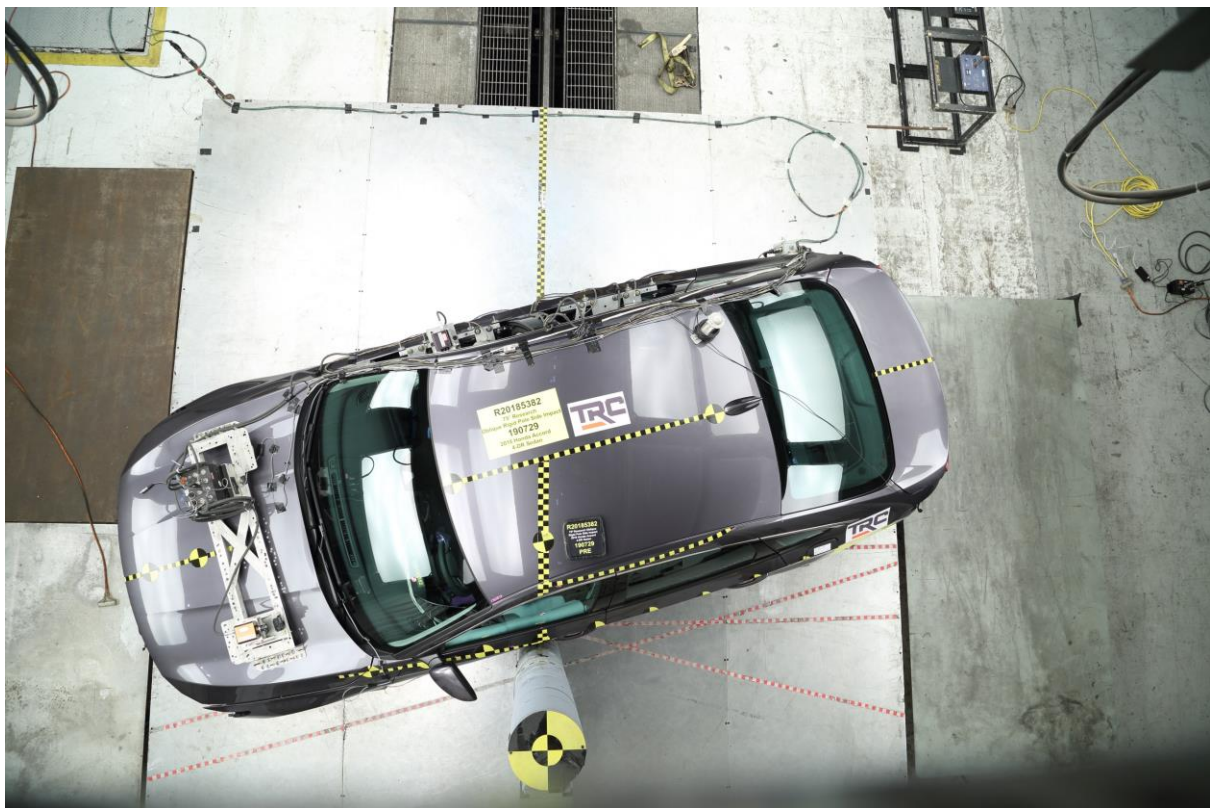
No. 012 Post-Test Rear View of Test Vehicle



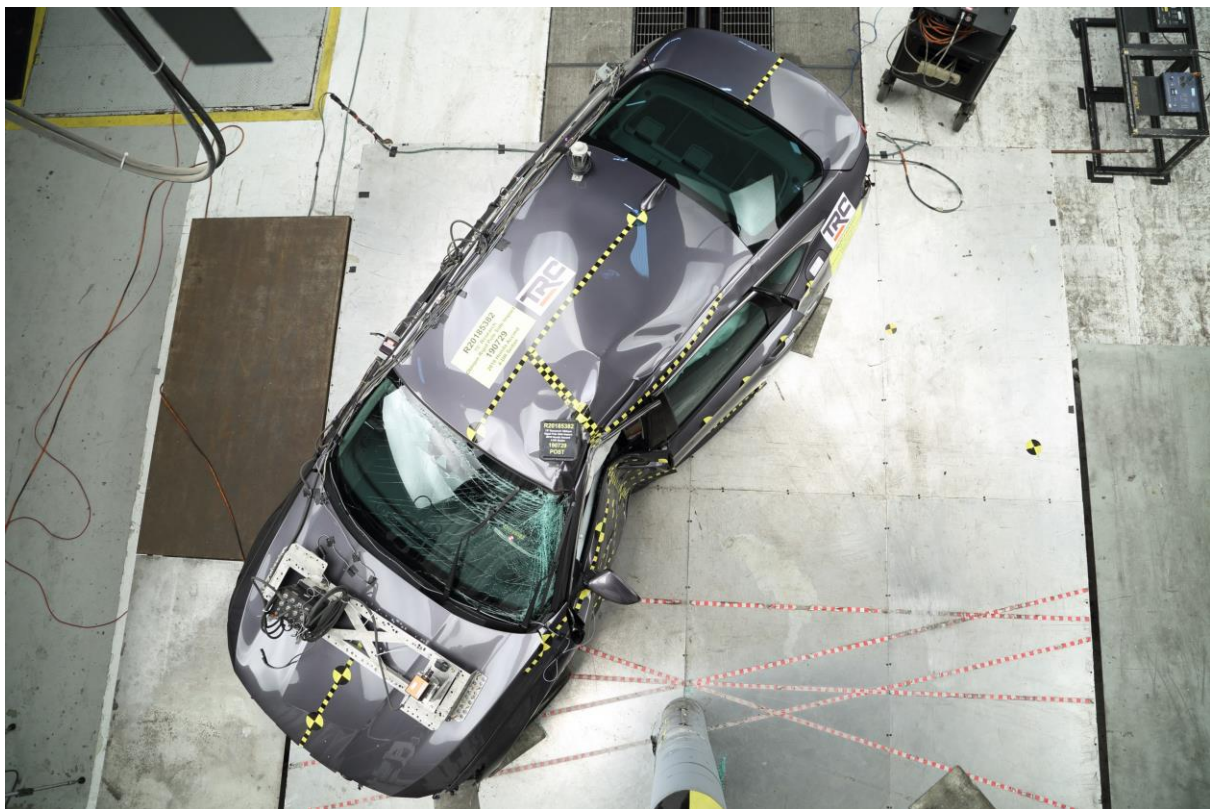
No. 013 Pre-Test Right Side View of Test Vehicle



No. 014 Post-Test Right Side View of Test Vehicle



No. 015 Pre-Test Overhead View of Test Area



No. 016 Post-Test Overhead View of Test Area



No. 017 Pre-Test Left Side View of Pole Positioned Against Side of Vehicle



No. 018 Pre-Test Right Side View of Pole Positioned Against Side of Vehicle



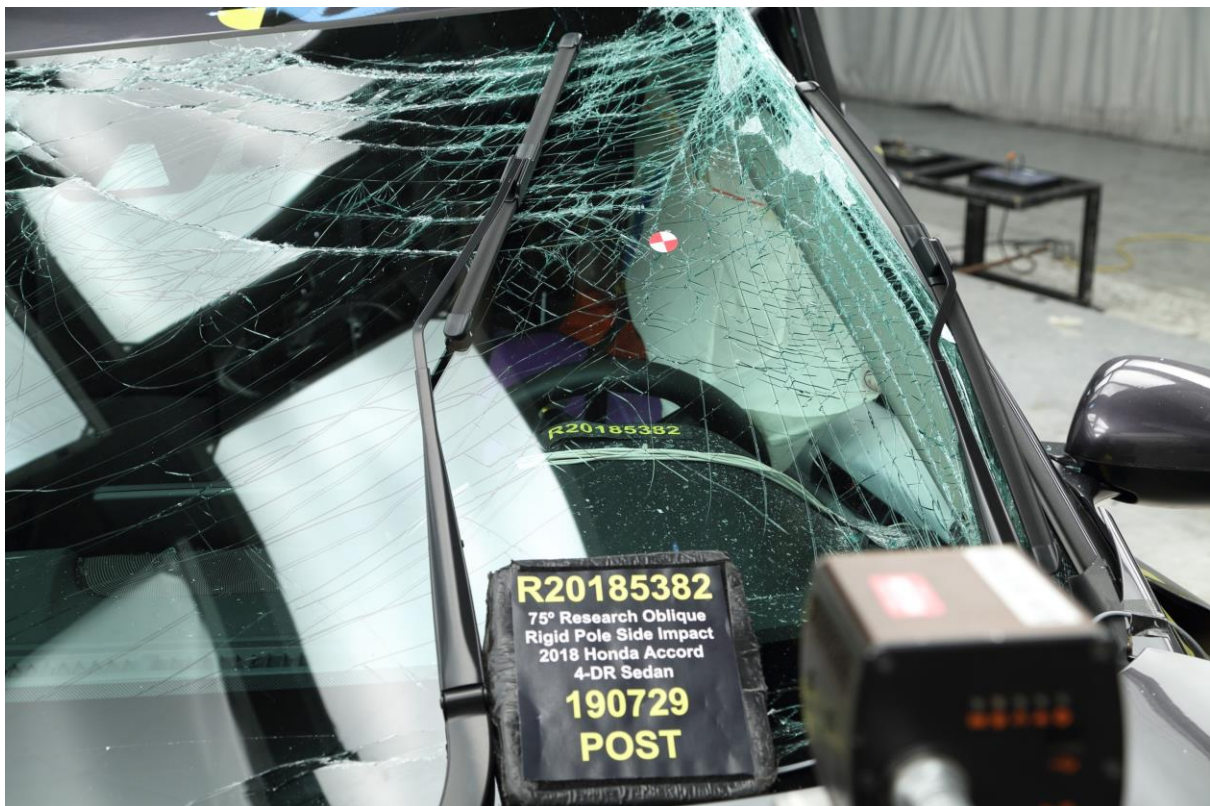
No. 019 Pre-Test Close-Up View of Impact Point Target



No. 020 Post-Test Close-Up View of Impact Point Target Showing Impact Location



No. 021 Pre-Test Front Close-Up View of Dummy Head and Chest



No. 022 Post-Test Front Close-Up View of Dummy



No. 023 Pre-Test Left Side View of Dummy Showing Belt and Chalking

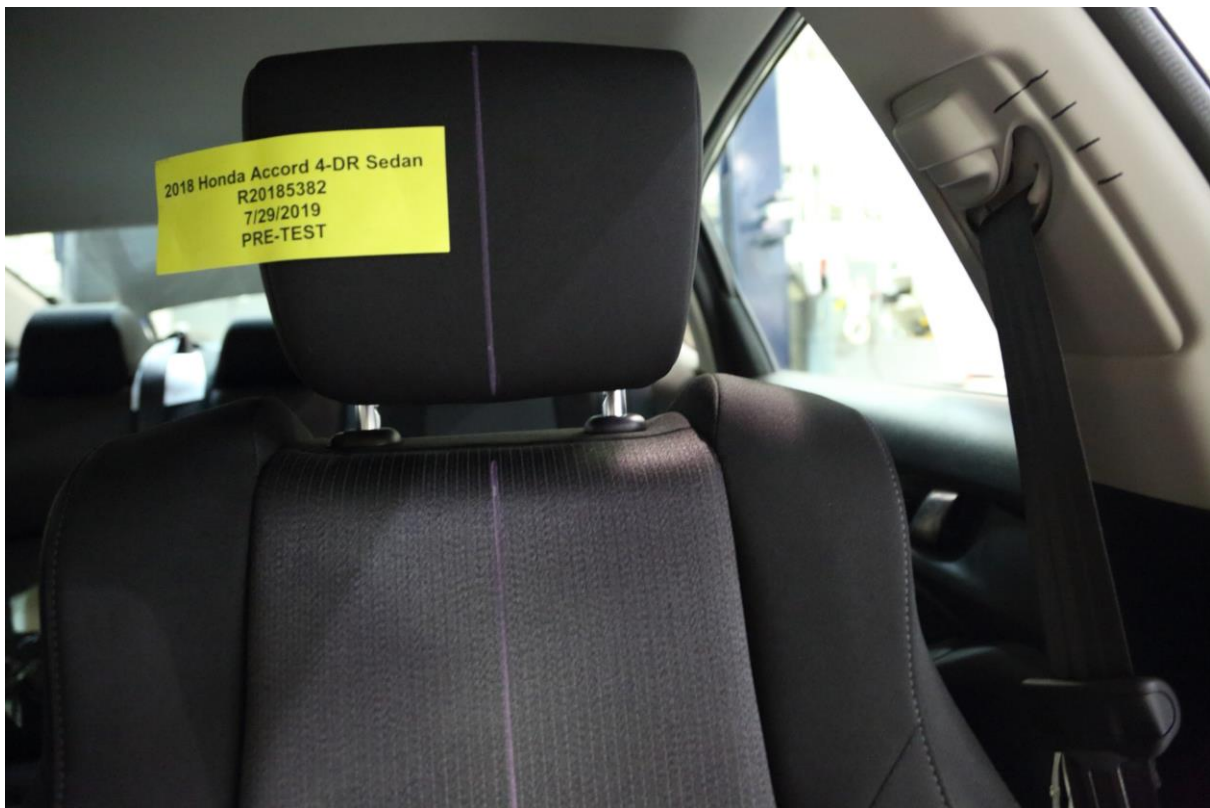
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No. 024 Pre-Test Left Side View of Dummy Shoulder and Door Top View



No. 025 Post-Test Left Side View of Dummy Shoulder and Door Top View



No. 026 Pre-Test Front View of Seat Back Prior to Dummy Positioning



No. 027 Pre-Test Front Close-Up View of Dummy Head and Shoulders in Relation to Head Restraint



No. 028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning



No. 029 Pre-Test Overhead View of Dummy Thighs on Seat Pan

PHOTO NOT APPLICABLE

No. 030 Pre-Test Left Side View of Dummy Neck Showing Position of Adjustable Neck Bracket

PHOTO NOT APPLICABLE

No. 031 Pre-Test Left Side View of Dummy Head Showing Dummy Head is Level



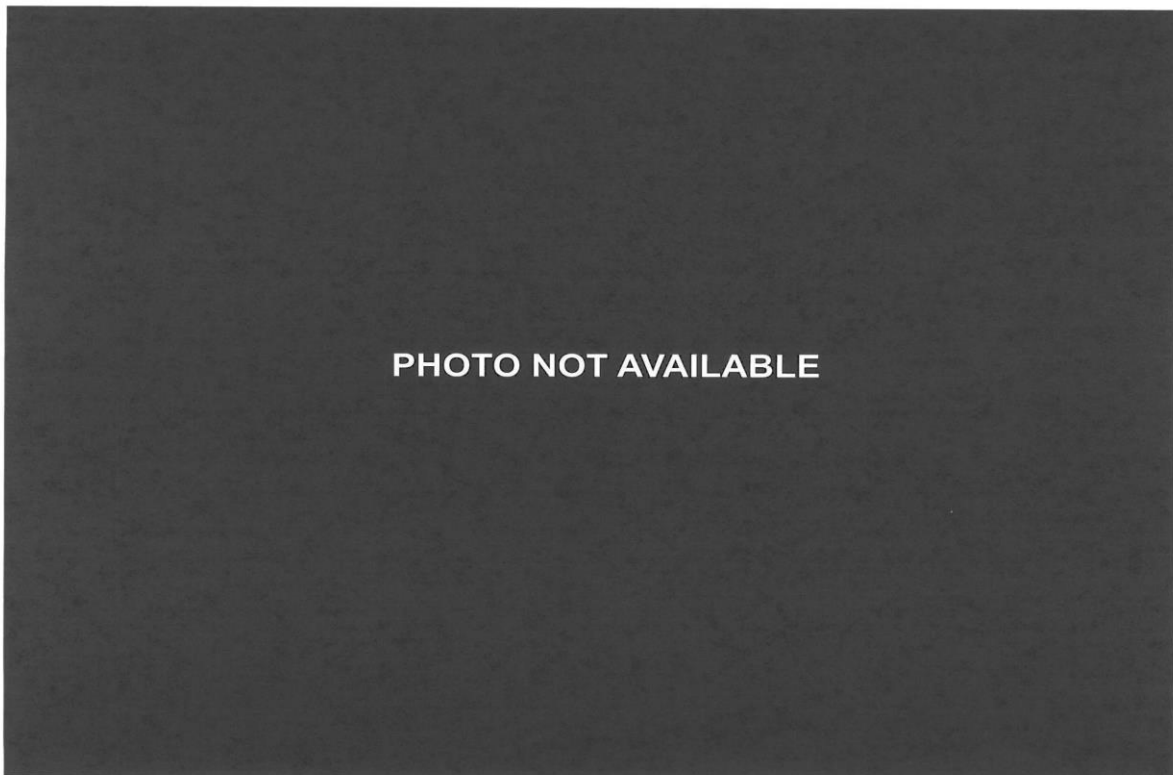
No. 032 Pre-Test Placement of Dummy Feet



No. 033 Pre-Test View of Belt Anchorage for Dummy



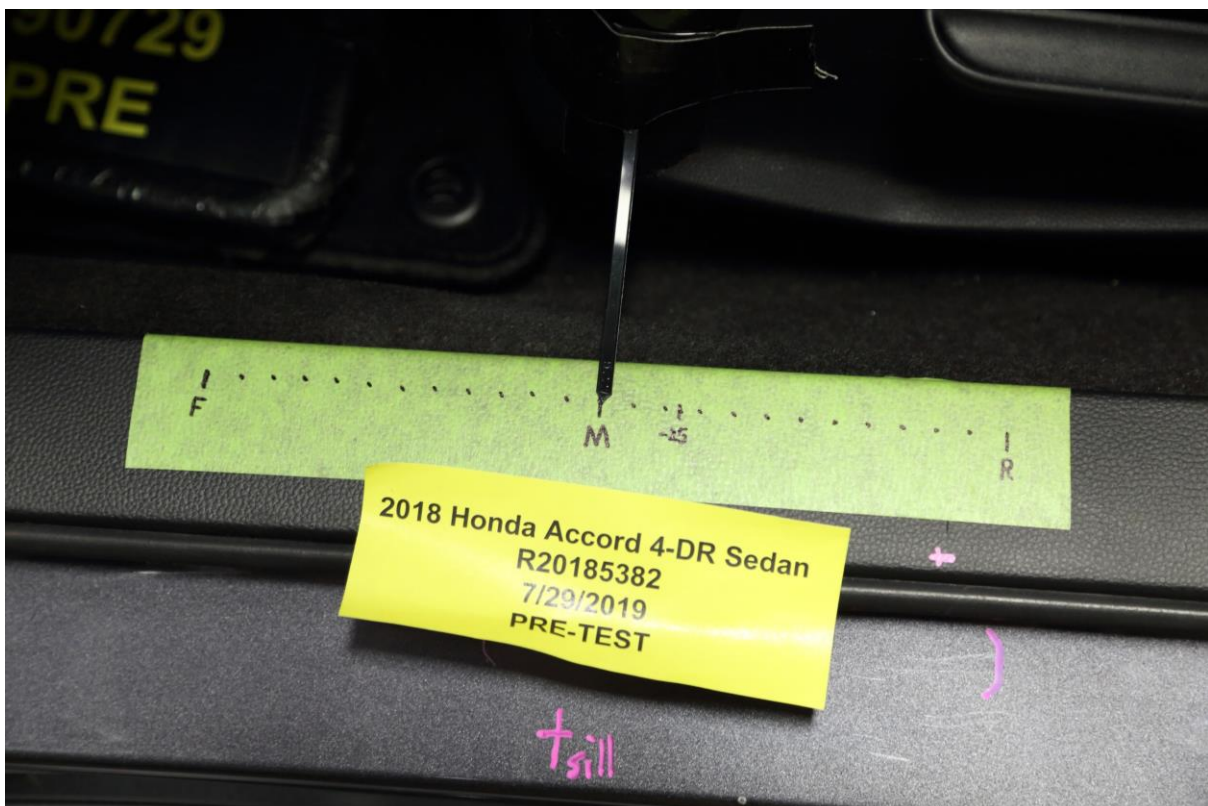
No. 034 Pre-Test Left Side View of Steering Wheel



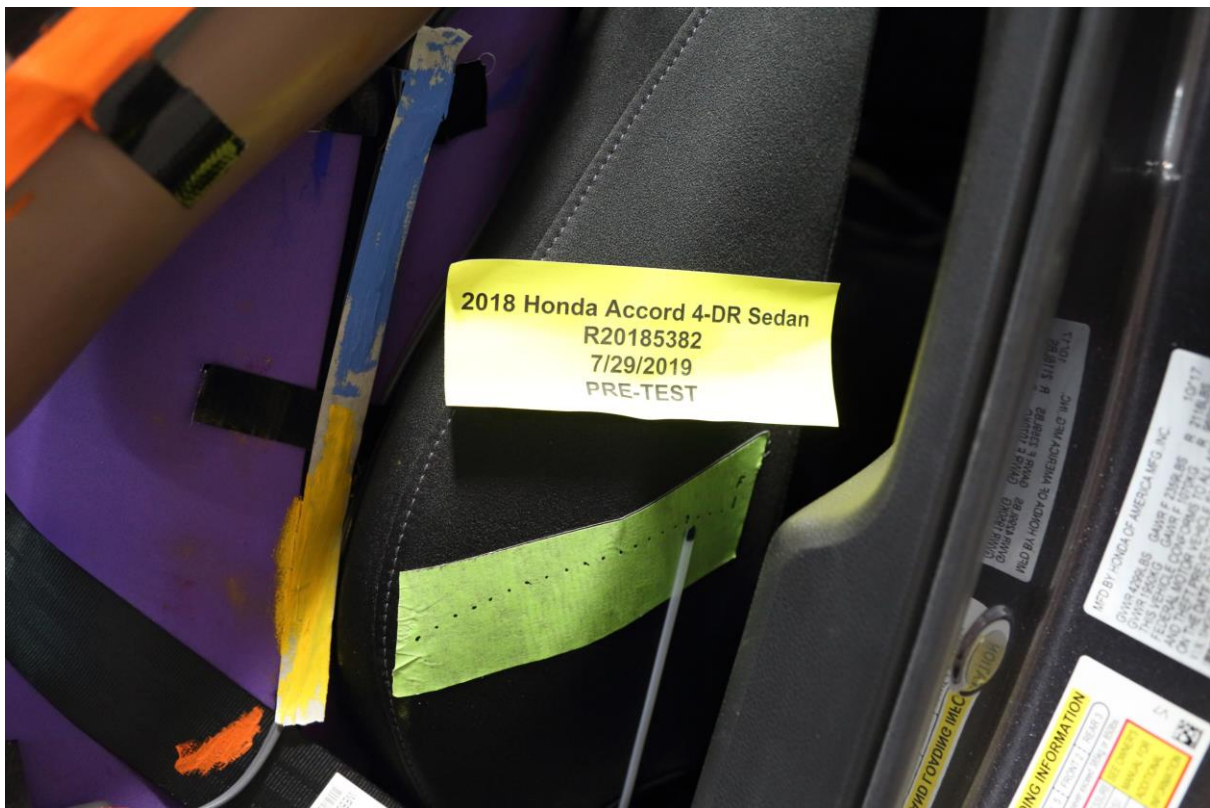
No. 035 Pre-Test View of Disengaged Parking Brake



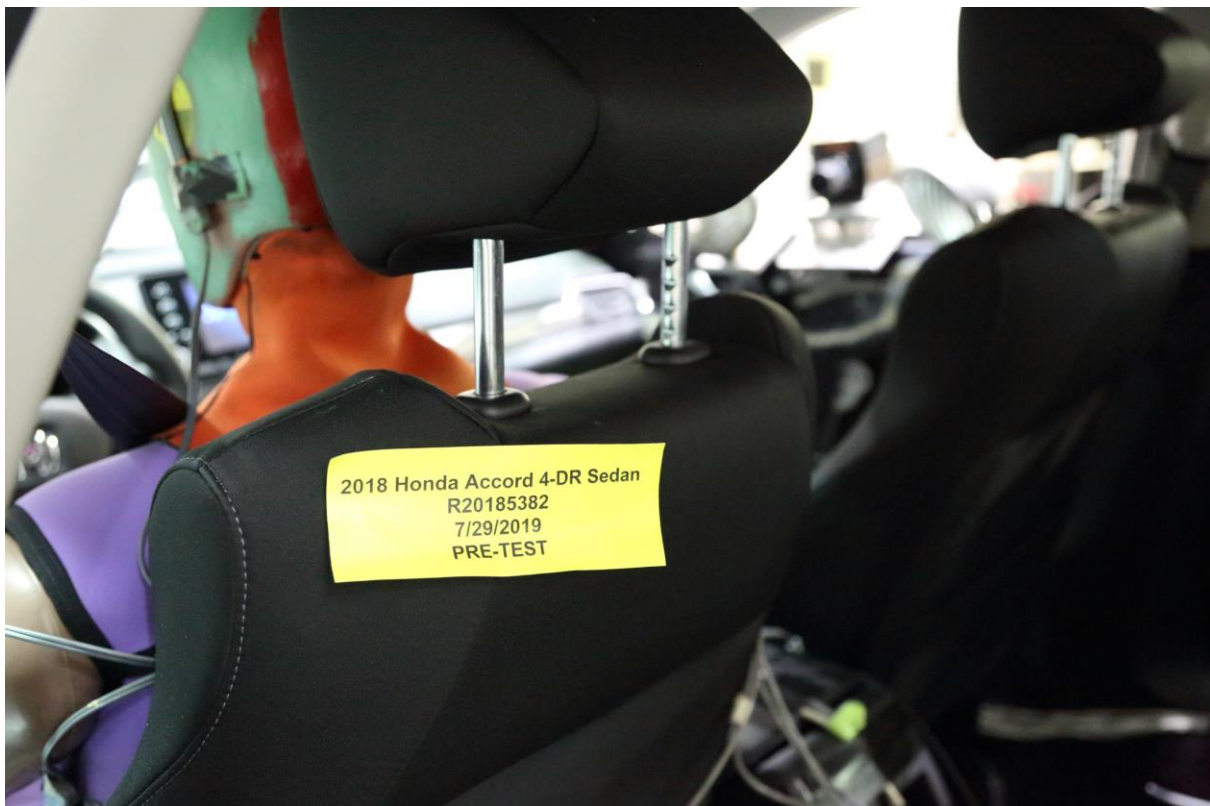
No. 036 Pre-Test View of Parking Brake



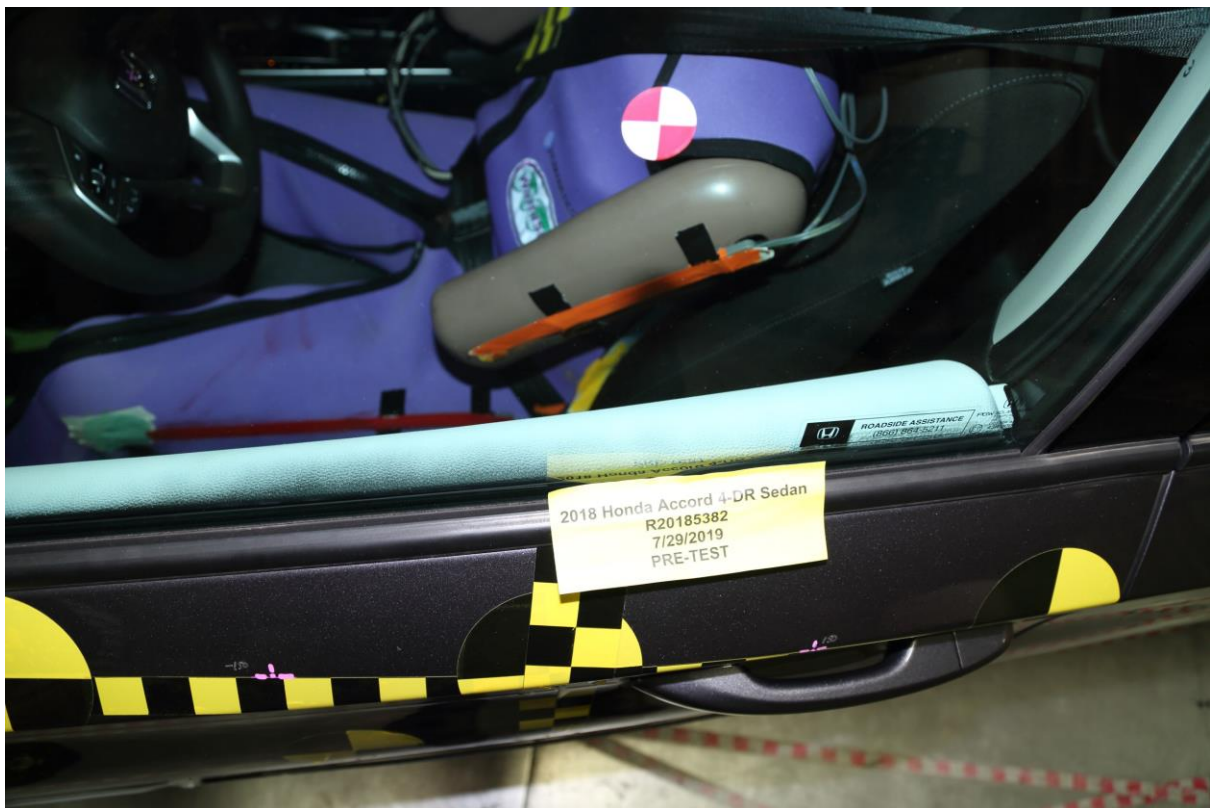
No. 037 Pre-Test Close-Up Left Side View of Driver Seat Track



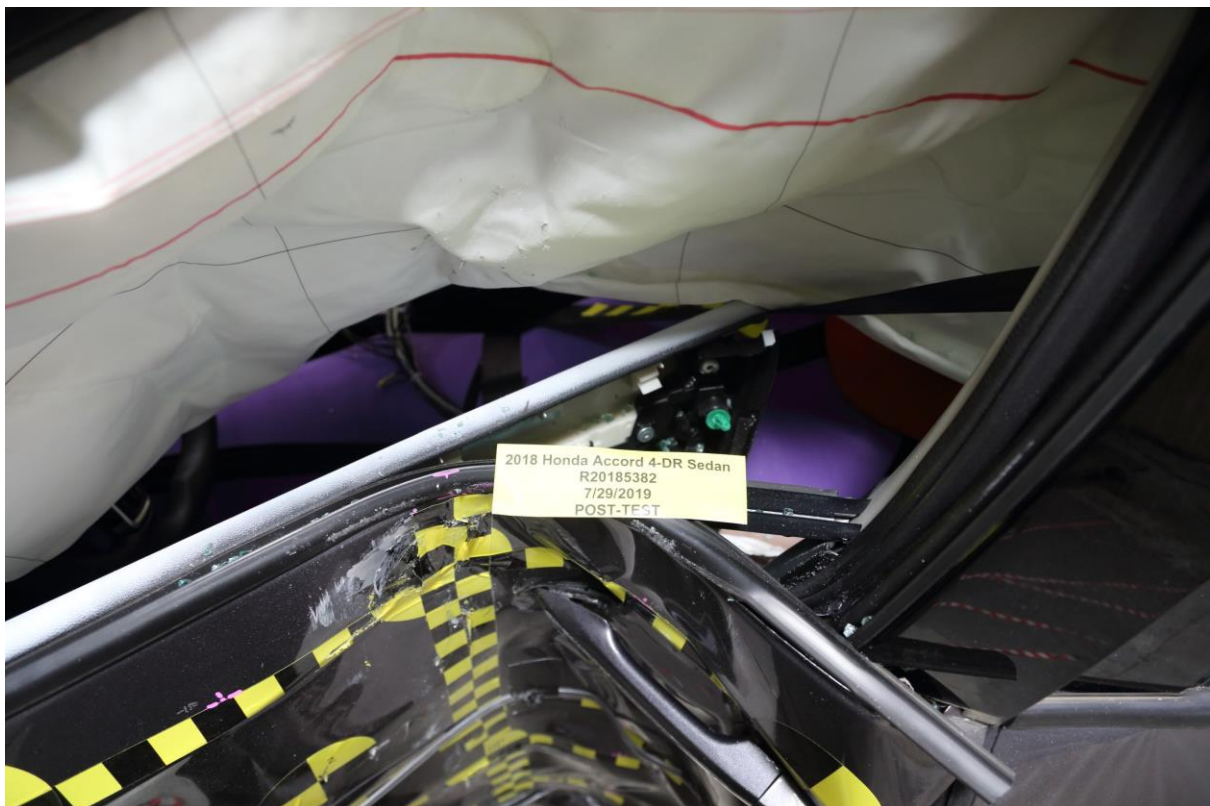
No. 038 Pre-Test Close-Up Left Side View of Driver Seat Back



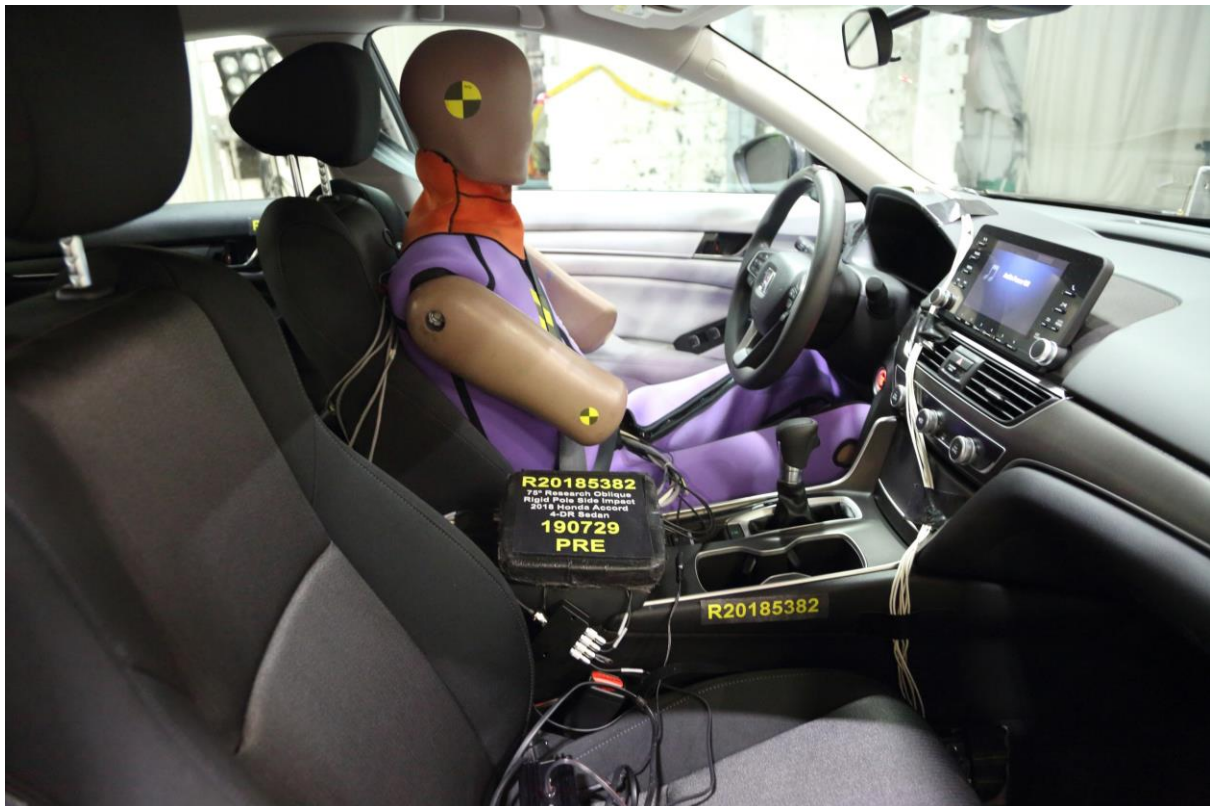
No. 039 Pre-Test Close-Up View of Driver Seat Back or Head Restraint



No. 040 Pre-Test Dummy and Door Clearance View



No. 041 Post-Test Dummy and Door Clearance View



No. 042 Pre-Test Right Side View of Dummy and Front Seat of Occupant Compartment



No. 043 Post-Test Right Side View of Dummy and Front Seat of Occupant Compartment



No. 044 Pre-Test Inner Door Panel View



No. 045 Post-Test Inner Door Panel View Showing Dummy Contact Location

PHOTO NOT APPLICABLE

No. 046 Post-Test Dummy Close-Up Head Contact with Vehicle Interior View

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No. 047 Post-Test Dummy Close-Up Head Contact with Side Airbag View



No. 048 Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View



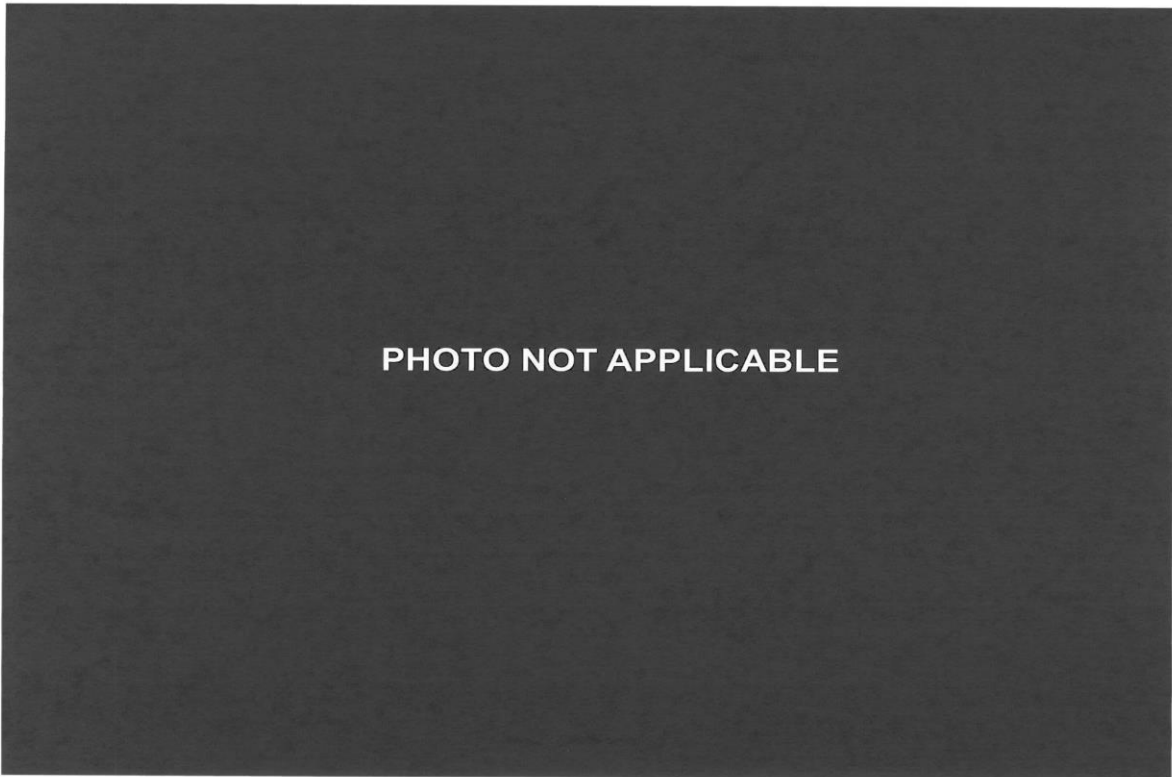
No. 049 Post-Test Dummy Close-Up Torso Contact with Side Airbag View



No. 050 Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View



No. 051 Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View



No. 052 Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View



No. 053 Post-Test Right Side View of Dummy and Rear Seat of Occupant Compartment

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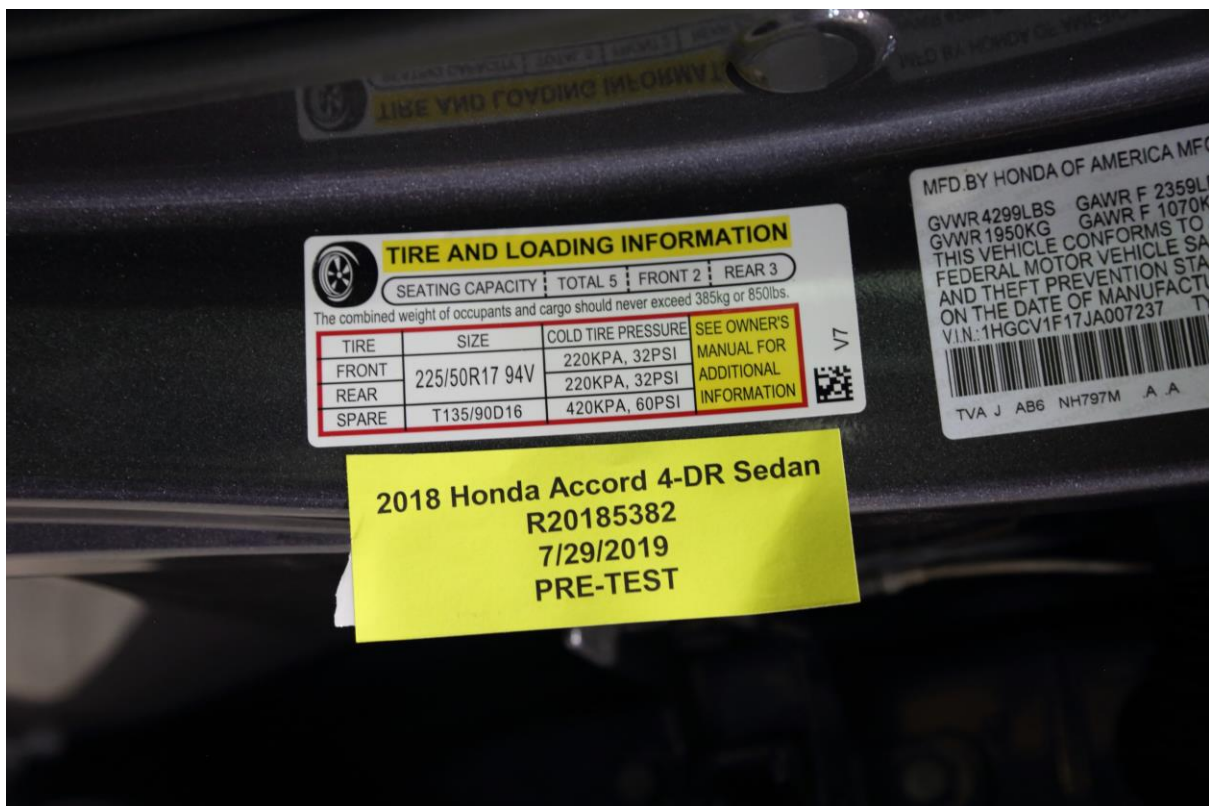
No. 054 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck



No. 055 Post-Test View of Fuel Filler Cap or Fuel Filler Neck



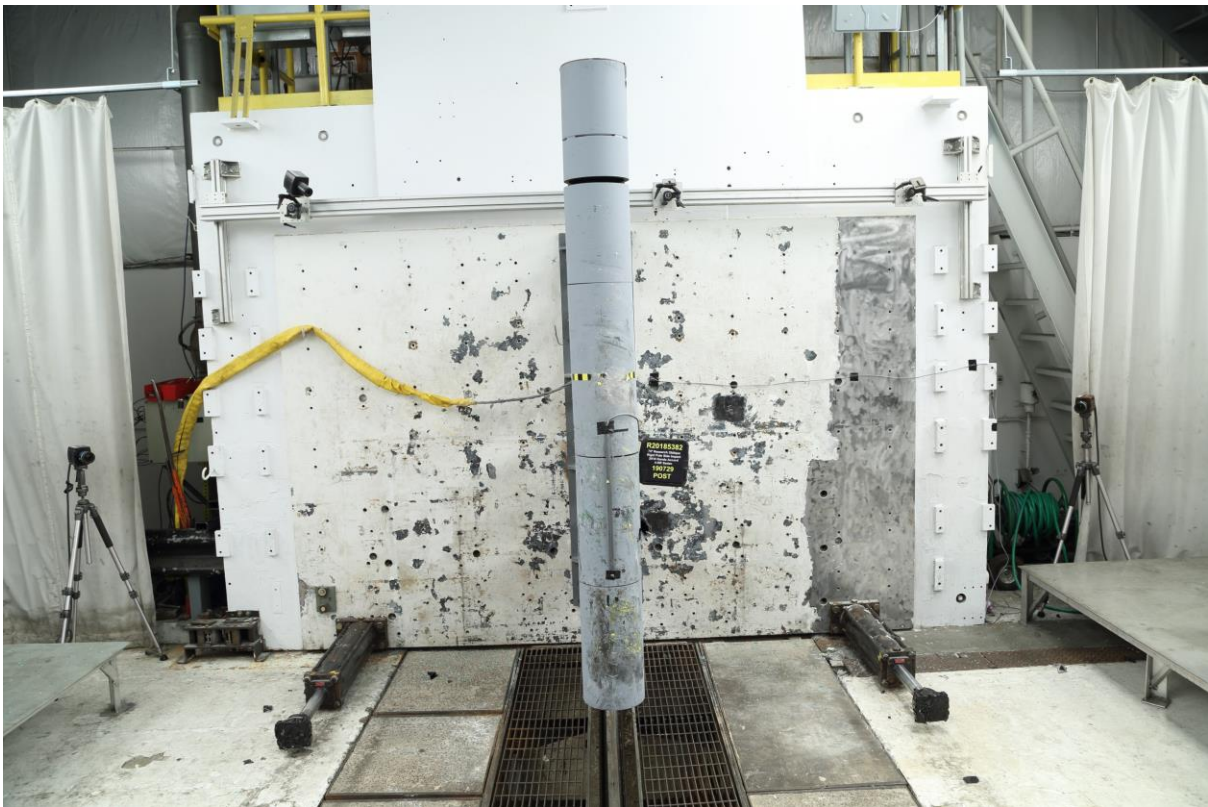
No. 056 Close-Up View of Vehicle Certification Label



No. 057 Close-Up View of Vehicle Tire Information Placard or Label



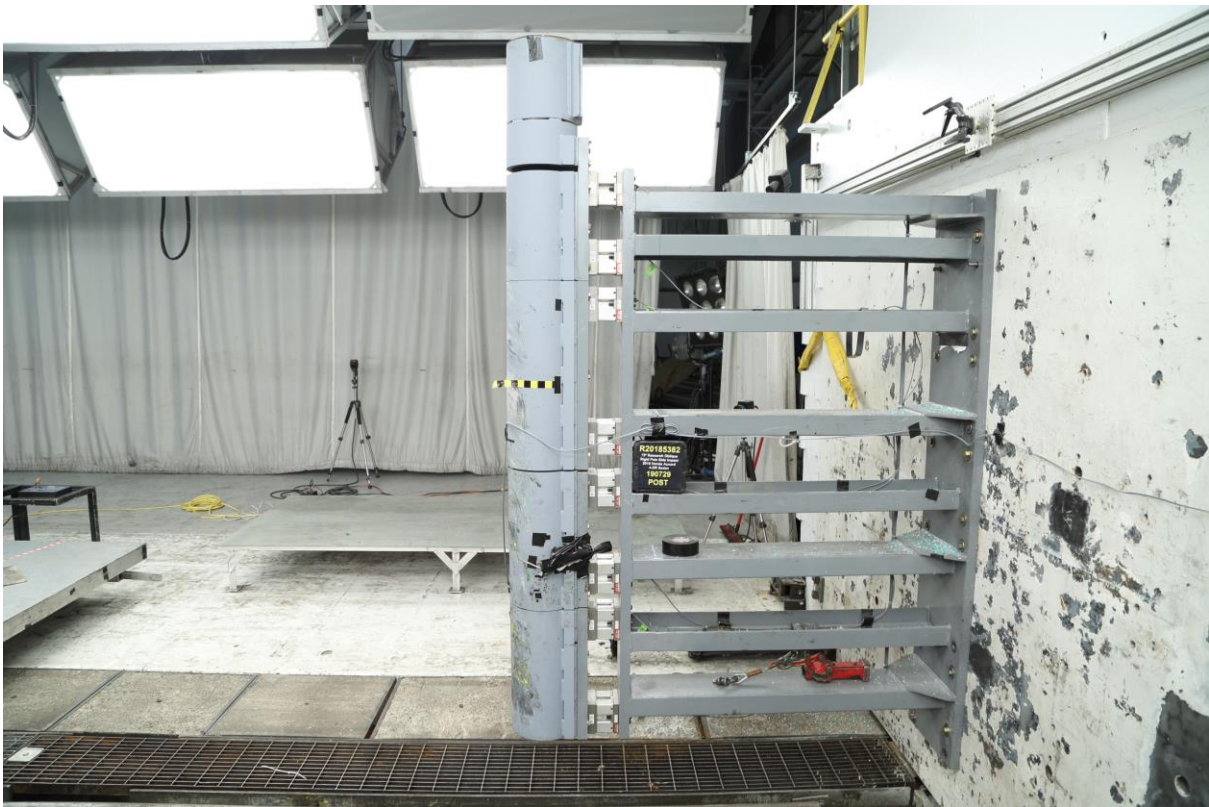
No. 058 Pre-Test Pole Barrier Front View



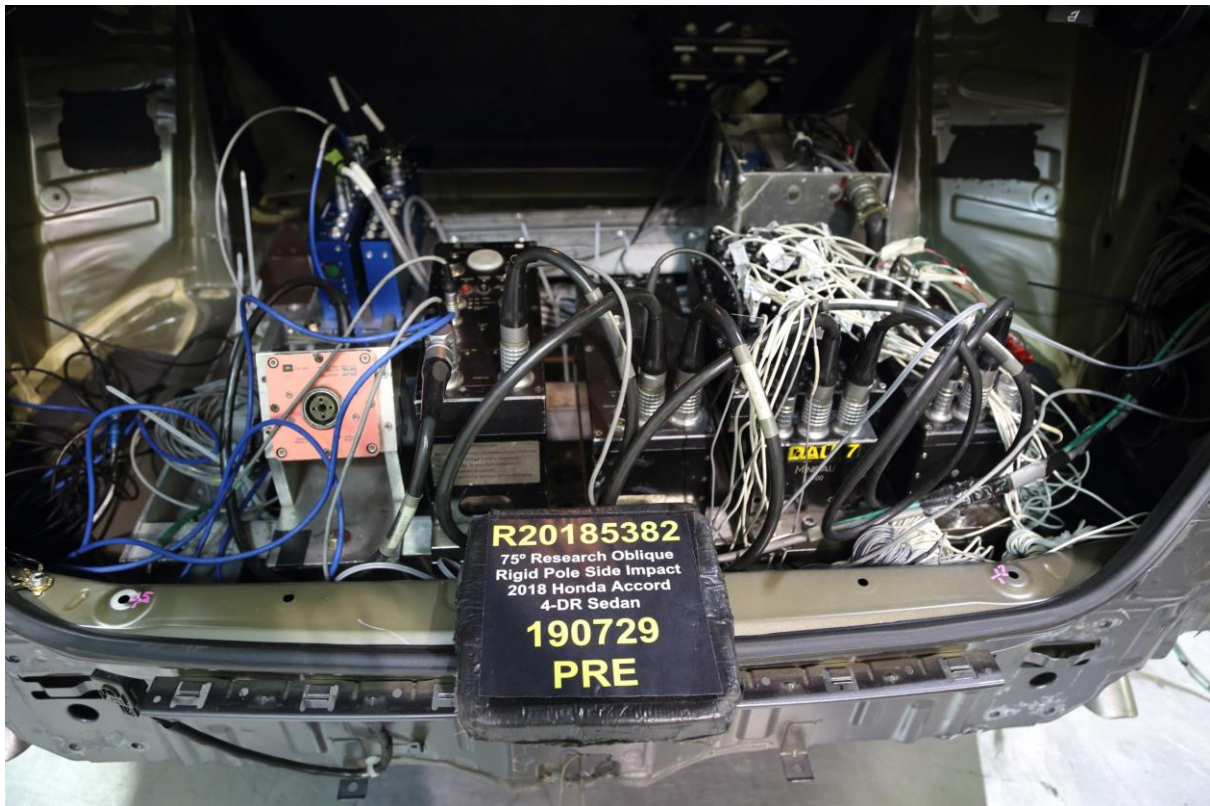
No. 059 Post-Test Pole Barrier Front View



No. 060 Pre-Test Pole Barrier Side View



No. 061 Post-Test Pole Barrier Side View



No. 062 Pre-Test Ballast View



No. 063 Post-Test Primary and Redundant Speed Trap Read Out



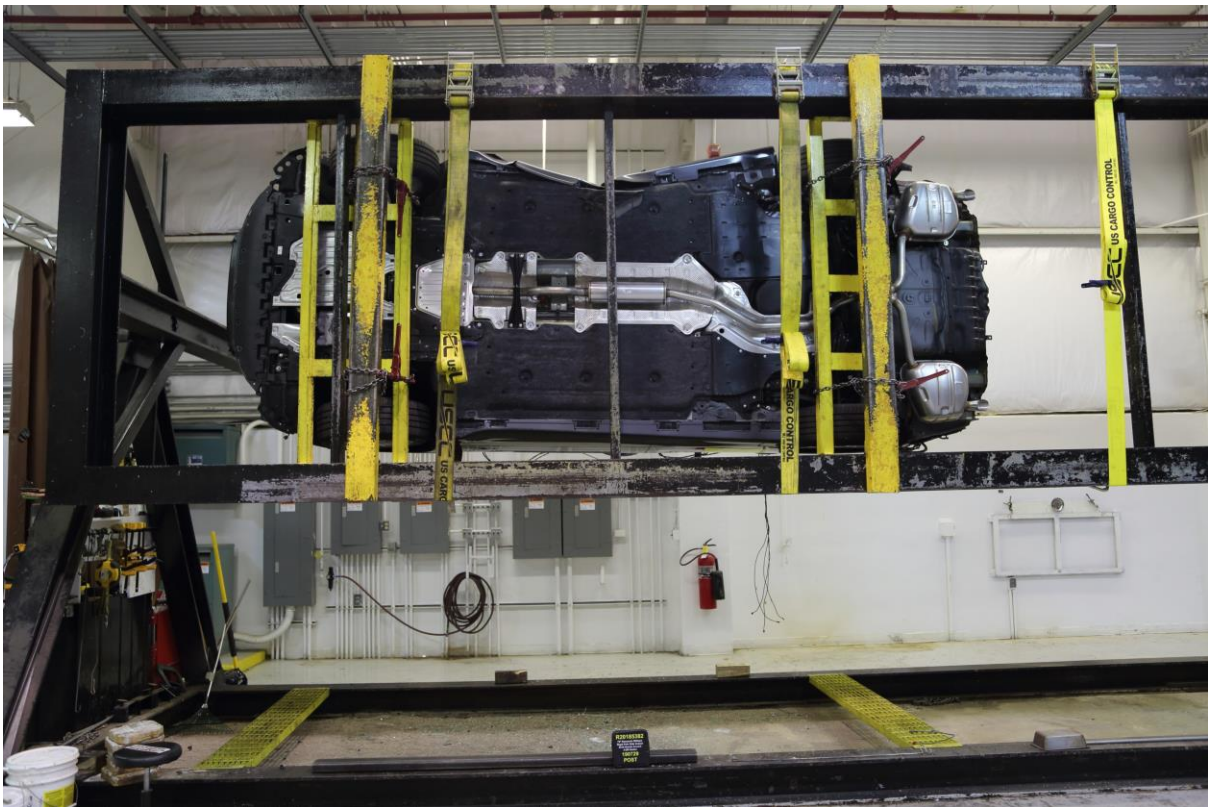
No. 064 FMVSS No. 301 Static Rollover 0 Degrees



No. 065 FMVSS No. 301 Static Rollover 90 Degrees



No. 066 FMVSS No. 301 Static Rollover 180 Degrees



No. 067 FMVSS No. 301 Static Rollover 270 Degrees



No. 068 FMVSS No. 301 Static Rollover 360 Degrees



No. 069 Impact Event

HONDA

2018 ACCORD 1.5T LX

EXT: MODERN STEEL M. ENGINE NUMBER: L15BE-2608289
INT: BLACK

STANDARD EQUIPMENT AT NO EXTRA COST

*** TECHNICAL FEATURES ***

- 190hp 1.5-Liter Direct Injection Turbo-Charged 4-Cylinder Engine
- Continuously Variable Transmission (CVT)
- 4-Wheel Disc Brakes
- Electric Power Steering
- Hill Start Assist

*** SAFETY FEATURES ***

- Driver's and Front Passenger's Airbags
- Driver's and Front Passenger's Side Airbags
- Driver's and Front Passenger's Knee Airbags
- Side Curtain Airbags with Roll-over Sensor
- Anti-Lock Braking System (ABS)
- Electronic Brake Distribution (EBD)
- Vehicle Stability Assist (VSA)
- Tire Pressure Monitoring System
- LED Daytime Running Lights
- LATCH System for Child Seats

*** EXTERIOR FEATURES ***

- Dual-Zone Automatic Climate Control with Air Filtration System
- Push-Button Start
- Driver's Seat Height Adjustment
- Fold-Down Rear Seat Center Armrest
- Power Windows and Door Locks
- Front Auto Up/Down Windows
- Illuminated Visor Vanity Mirrors
- Sunglasses Holder
- Exterior Temperature Display
- Fold-Down Rear Seatback
- Floor Mats
- 12-Volt Power Outlets
- Electric Parking Brake

*** INTERIOR FEATURES ***

- Audio System with 4 Speakers
- Color LCD Screen and Multi-View Rear Camera
- Bluetooth HandsFreeLink
- USB Audio Interface
- Driver Attention Monitor

*** HONDA SENSING ***

- Adaptive Cruise Control (ACC) w/ Low-Speed Follow
- Collision Mitigation Braking System (CMBS)
- Lane Keeping Assist System (LKAS)
- Road Departure Mitigation (RDM)

Manufacturer's Suggested Retail Price **\$23,570.00**

Full Tank of Fuel No Charge

-Honda Roadside Assistance
3YR/36K Mile Warranty Term

Destination and Handling 875.00

TOTAL VEHICLE PRICE
(Includes Pre-Delivery Service)

\$24,445.00

License and title fees, state and local taxes and dealer options and accessories are not included in the manufacturer's suggested retail price.

HSC 39037.05 Low-Emission Motor Vehicle

MULLER HONDA OF GURNEE
7000 GRAND AVENUE
GURNEE, IL 60031

PORT OF ENTRY: MARYSVILLE
DELIVERY POINT: SCHAMBURG
SHIP: ROWSPACE: 524-001
TRANSMETHOD: TRUCK

ORIG. DLR: 208663
REF NO: 40320
HV CODE: HN-9945
EMISSION: 50 STATE
CONTROL NO: 494440
DEALER: 208663

VIN: 1HGCV1F17JA007237

01/17
3 miles
#48565

EPA DOT Fuel Economy and Environment

Fuel Economy

33 MPG
combined city/hwy

30 city 38 highway

3.0 gallons per 100 miles

You save \$1,250
in fuel costs over 5 years compared to the average new vehicle.

Annual fuel cost \$1,100

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

1 **8** **10** **7** **10**

This vehicle emits 268 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 27 MPG and costs \$6,750 to fuel over 5 years. Cost estimates are based on 13,000 miles per year at 0.42 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

PARTS CONTENT INFORMATION

FOR VEHICLES IN THIS CARLINE
U.S./Canadian Parts Content: **60 %**

NOTE: Parts content does not include final assembly, distribution or other non-parts costs.

GOVERNMENT 5-STAR SAFETY RATING

Overall Vehicle Score Not Rated

Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash Driver Passenger Not Rated Not Rated

Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash Front seat Rear seat Not Rated Not Rated

Based on the risk of injury in a side impact.

Rollover Not Rated

Based on the risk of rollover in a single vehicle crash.

Star Ratings range from 1 to 5 stars (****) with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA) www.safercar.gov or 1-888-327-4336

This vehicle is equipped with bumpers that can withstand an impact of 2.5 miles per hour with no damage to the vehicle's body and safety systems, although the bumper and related components may sustain damage. The bumper system on this vehicle conforms to the current federal bumper standard of 2.5 miles per hour.

FOR THIS VEHICLE
Final Assembly Point: **MARYSVILLE, OHIO USA**
Country of Origin: Engine: **U.S.A.**
Transmission: **U.S.A.**

#48565
3 miles
10/17

No. 70 Monroney Label

40 |

VEHICLE CONTROLS

Adjusting the Front and Rear Outer* Head Restraints

Your vehicle is equipped with head restraints in all seating positions. Head restraints are most effective for protection against whiplash and other rear-impact crash injuries.

The center of the back of the occupant's head should rest against the center of the restraint. The tops of the occupant's ears should be level with the center height of the restraint.

To raise the head restraint: Pull it upward.

To lower the head restraint: Push it down while pressing the release button.

To remove the head restraint: Pull the restraint up as far as it will go. Then push the release button and pull the restraint up and out.

To reinstall a head restraint: Insert the legs back in place, then adjust the head restraint to an appropriate height while pressing the release button. Pull up on the restraint to make sure it is locked in position.

For a head restraint system to work properly:

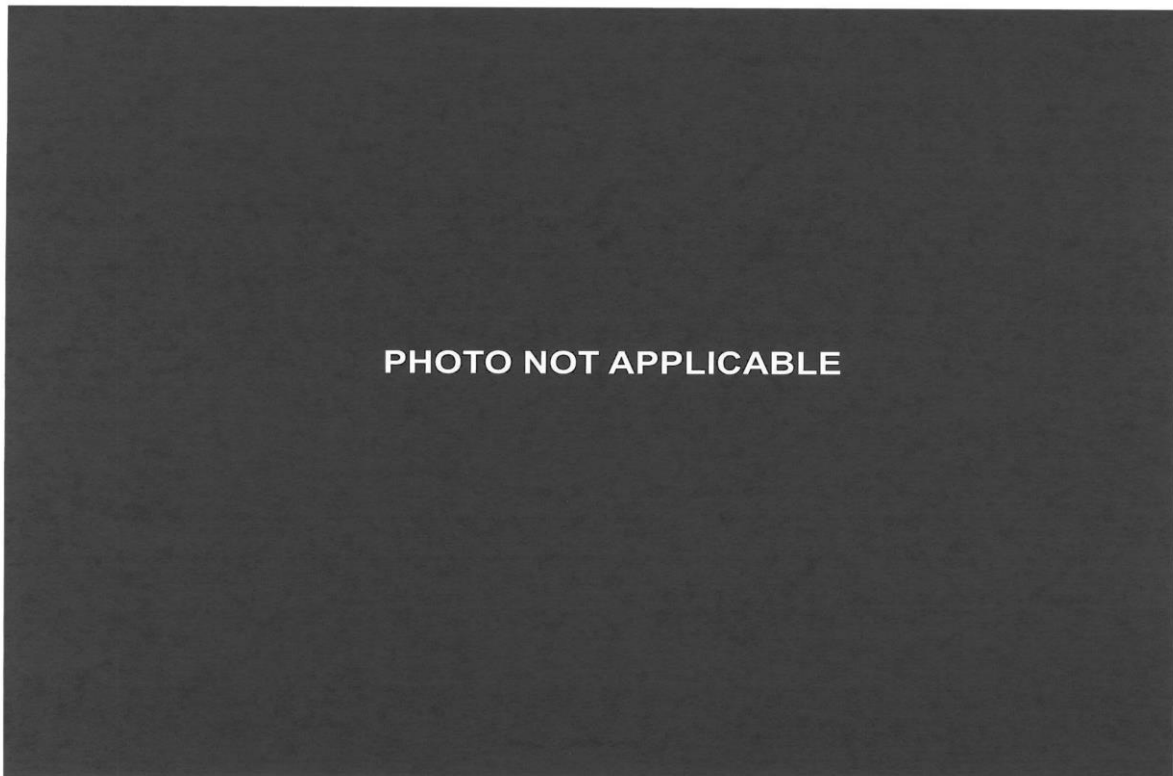
- Do not hang any items on the head restraints or from the restraint legs.
- Do not place any object between an occupant and the seat-back.
- Install each restraint in its proper location.

WARNING

Improperly positioning head restraints reduces their effectiveness and increases the likelihood of serious injury in a crash. Make sure head restraints are in place and positioned properly before driving.

*Not adjustable on all models

No. 071 Head Restraint Use and Adjustment Information from Vehicle Owner Manual



No. 072 Post-Test View of Shattered Vehicle Inner Door Panel



No. 073 WorldSID-50M Pre-Test Tilt Sensor View

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

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5	Driver Head Angular Rate (X)	B-9
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7	Driver Head Angular Rate (Z)	B-9
8	Driver Upper Neck Force (X)	B-10
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10	Driver Upper Neck Force (Z)	B-10
11	Driver Upper Neck Moment (X)	B-11
12	Driver Upper Neck Moment (Y)	B-11
13	Driver Upper Neck Moment (Z)	B-11
14	Driver Lower Neck Force (X)	B-12
15	Driver Lower Neck Force (Y)	B-12
16	Driver Lower Neck Force (Z)	B-12
17	Driver Lower Neck Moment (X)	B-13
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19	Driver Lower Neck Moment (Z)	B-13
20	Driver Shoulder Force (X)	B-14
21	Driver Shoulder Force (Y)	B-14
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23	Driver Shoulder Rear Displacement (X)	B-15
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Driver dummy Instrumentation Plots

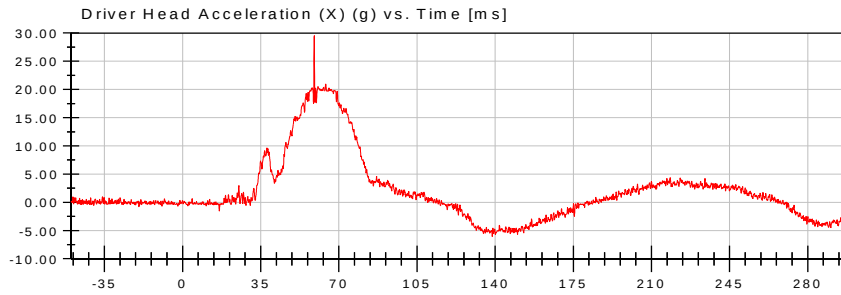
No.	Description	Page
166	Rear Deck Acceleration (X)	B-54
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168	Rear Deck Acceleration (Z)	B-54
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NHTSA

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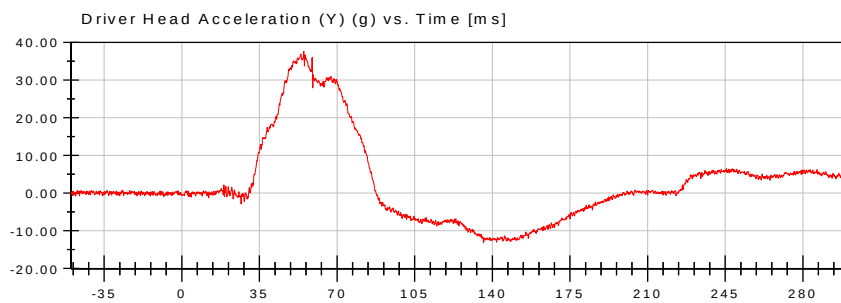
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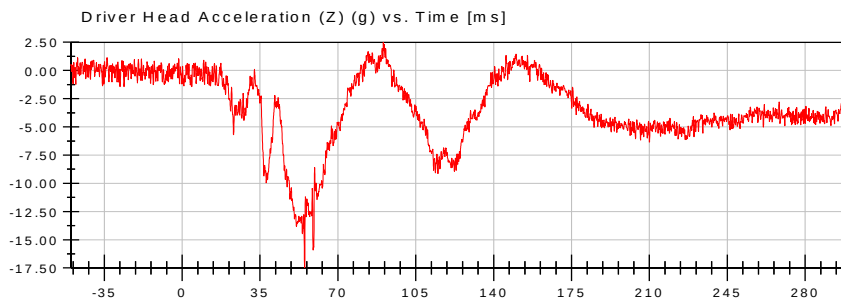
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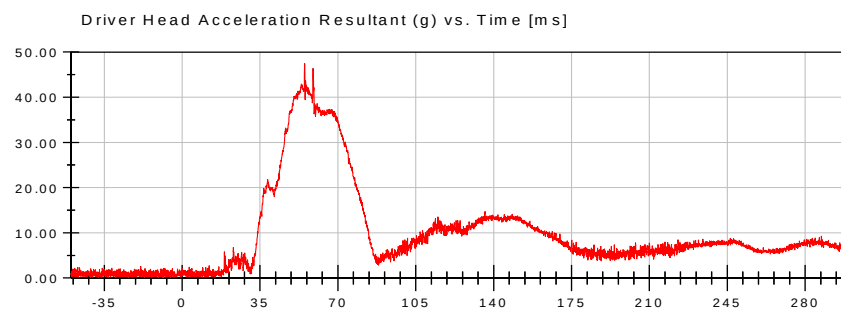
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-17.48 g at 55.05 ms

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Prefiltered_> CFC 1000

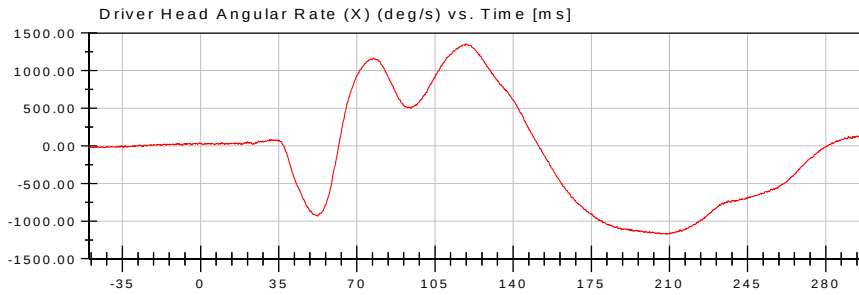


NHTSA

Test Lab: CTF

Test Number: 190729 (R20185382)

Test Date: 07/29/2019



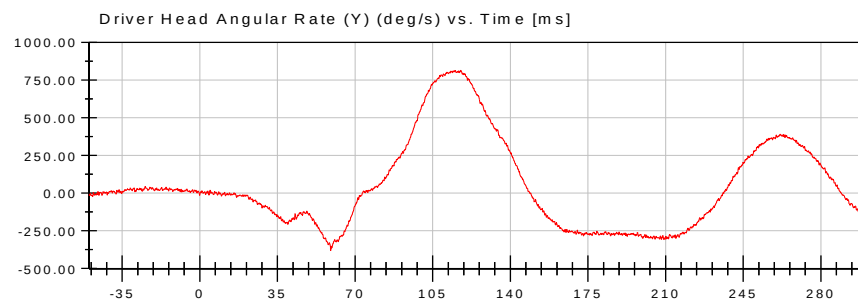
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-1,173.45 deg/s at 208.95 ms

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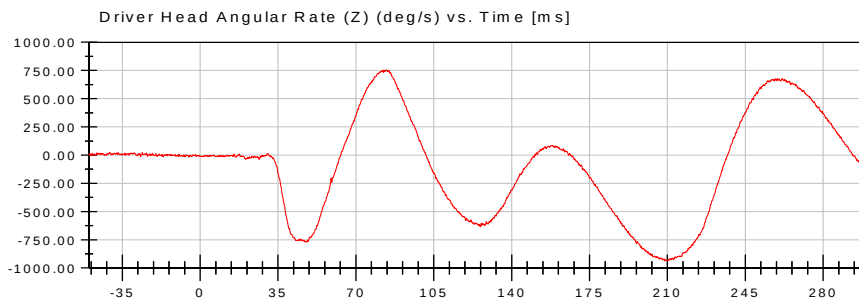
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-938.25 deg/s at 208.85 ms

CFC_1000

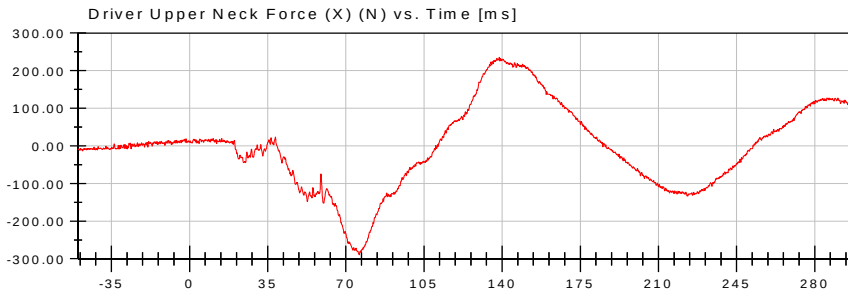


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



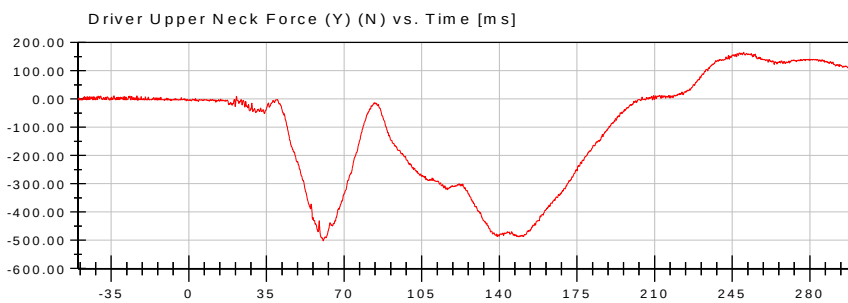
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235.42 N at 138.70 ms

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-289.39 N at 76.00 ms

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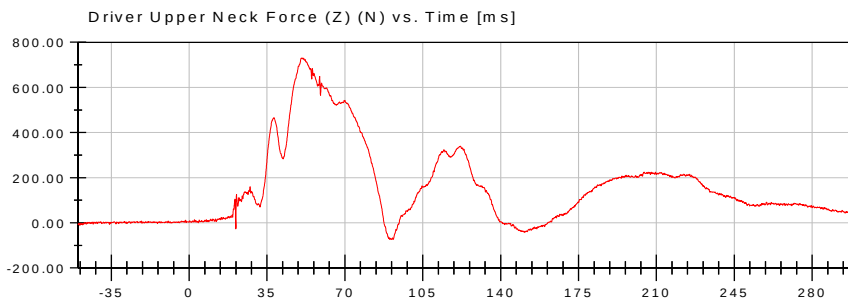
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165.32 N at 250.15 ms

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-501.83 N at 60.60 ms

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729.66 N at 50.90 ms

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-74.45 N at 90.25 ms

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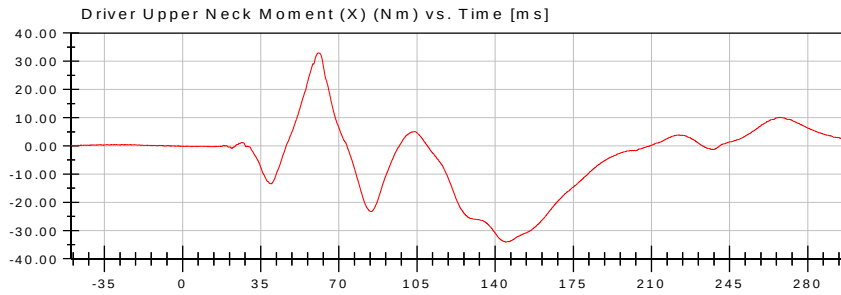


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Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



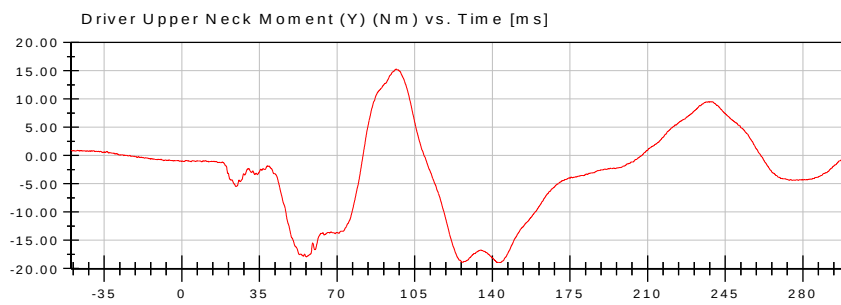
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32.93 Nm at 60.95 ms

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-34.12 Nm at 144.90 ms

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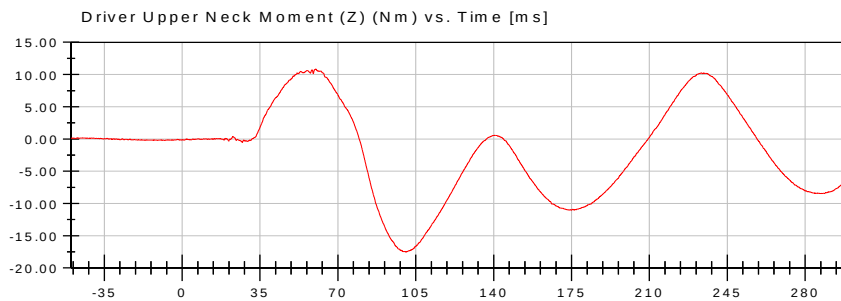
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15.29 Nm at 96.65 ms

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-18.94 Nm at 143.25 ms

CFC_600



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10.85 Nm at 60.05 ms

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-17.52 Nm at 100.70 ms

CFC_600

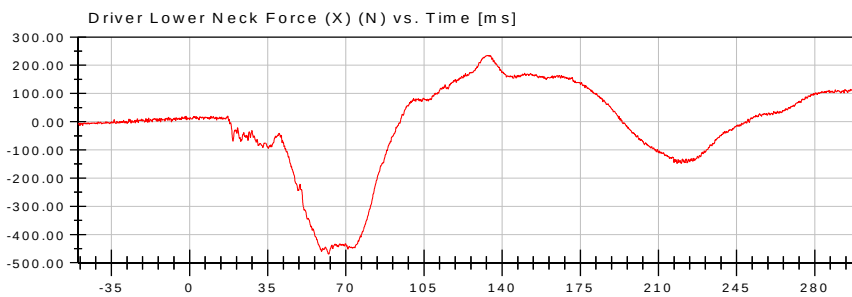


NHTSA

Test Lab: CTF

Test Number: 190729 (R20185382)

Test Date: 07/29/2019



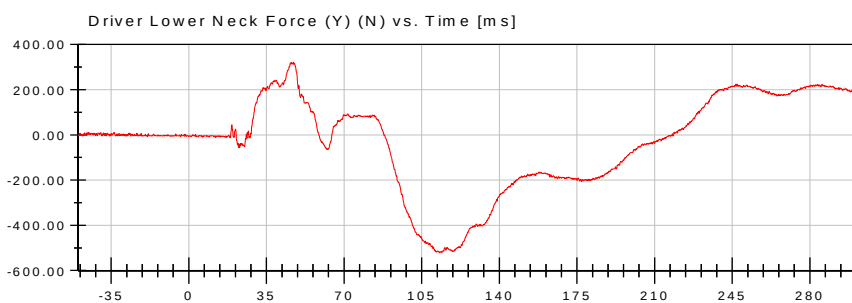
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235.02 N at 134.30 ms

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-469.15 N at 62.40 ms

CFC_1000



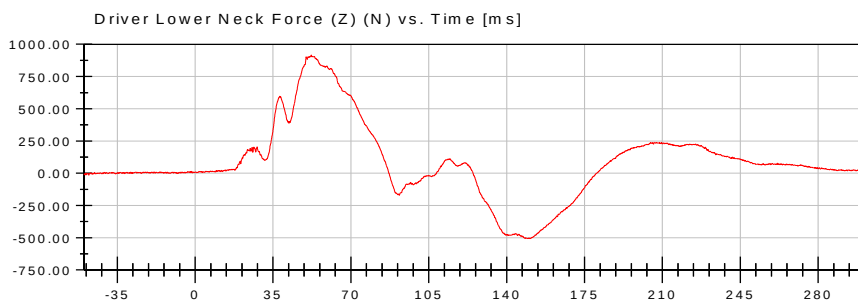
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322.20 N at 47.30 ms

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-521.90 N at 112.95 ms

CFC_1000



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915.44 N at 52.20 ms

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-506.26 N at 149.45 ms

CFC_1000

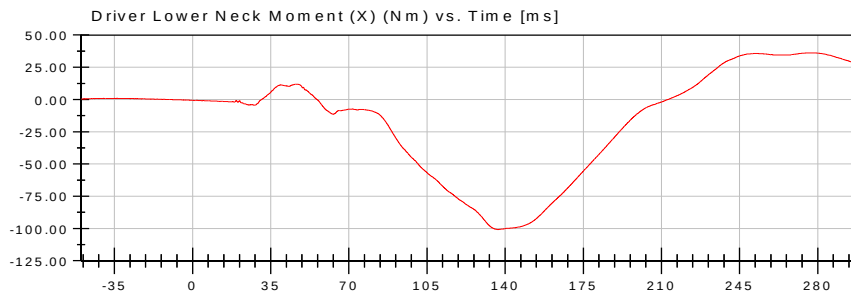


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Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



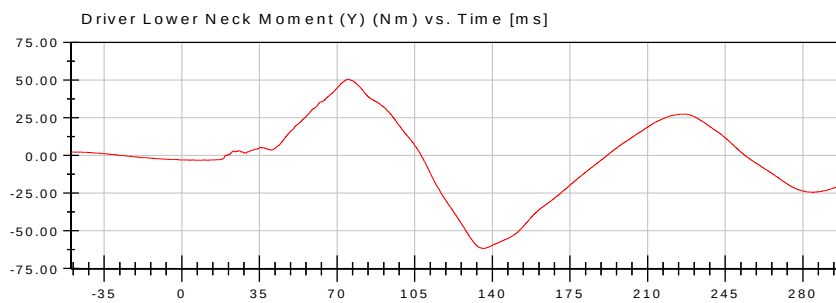
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36.17 Nm at 277.05 ms

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-100.81 Nm at 136.90 ms

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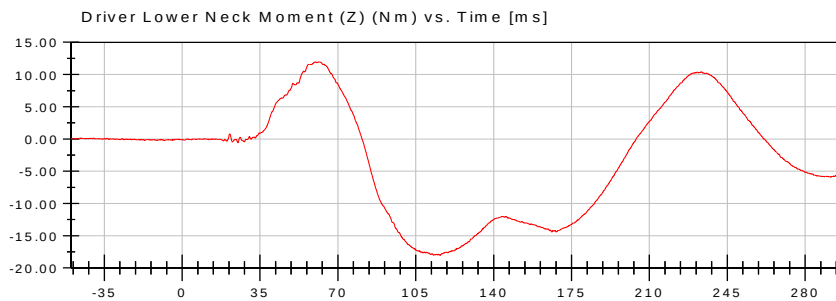
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50.65 Nm at 74.70 ms

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-61.68 Nm at 136.00 ms

CFC_600



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11.95 Nm at 61.75 ms

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-18.04 Nm at 115.90 ms

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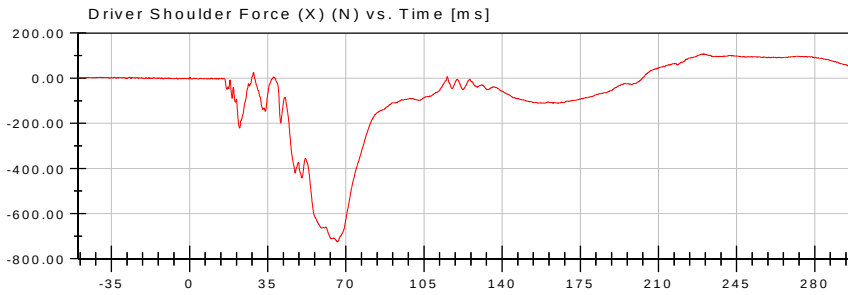


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

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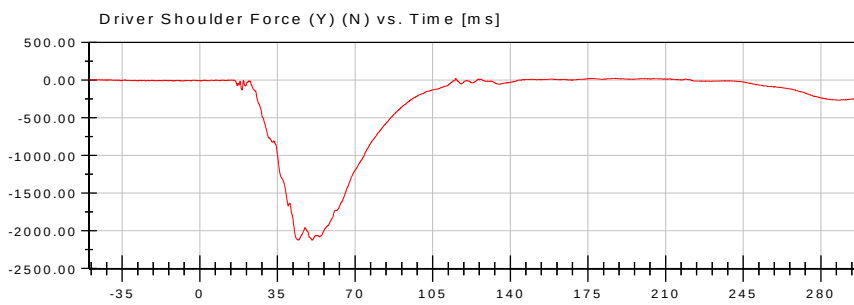
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108.20 N at 230.40 ms

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-725.42 N at 66.20 ms

CFC_600



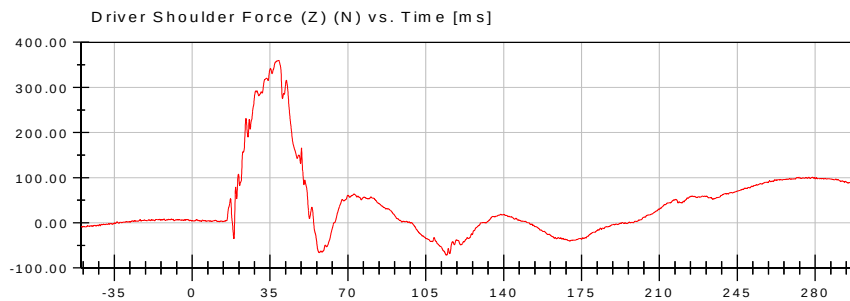
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24.08 N at 175.50 ms

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-2,123.81 N at 50.55 ms

CFC_600



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-71.55 N at 114.30 ms

CFC_600



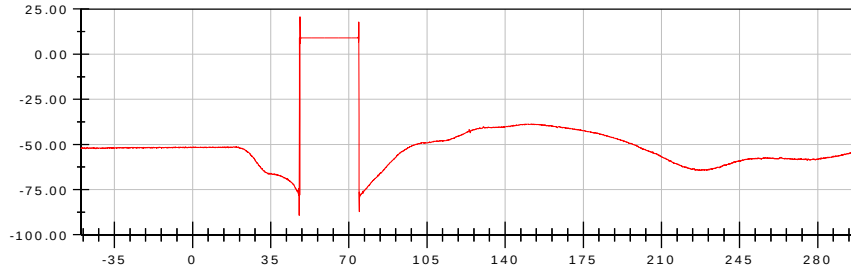
NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)

Driver Shoulder Rear Displacement (X) (mm) vs. Time [ms]



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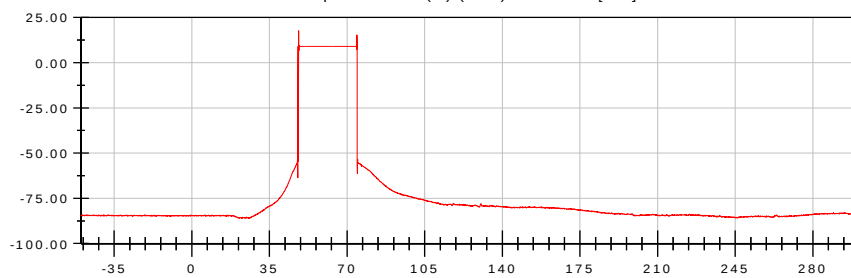
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-89.25 mm at 47.75 ms

Unfiltered

Driver Shoulder Rear Displacement (Y) (mm) vs. Time [ms]



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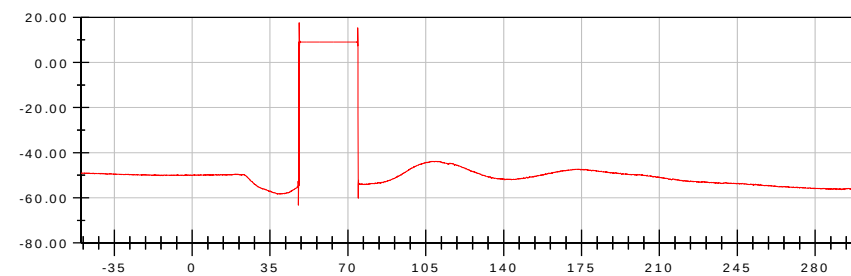
17.55 mm at 48.15 ms

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-86.10 mm at 25.65 ms

Unfiltered

Driver Shoulder Rear Displacement (Z) (mm) vs. Time [ms]



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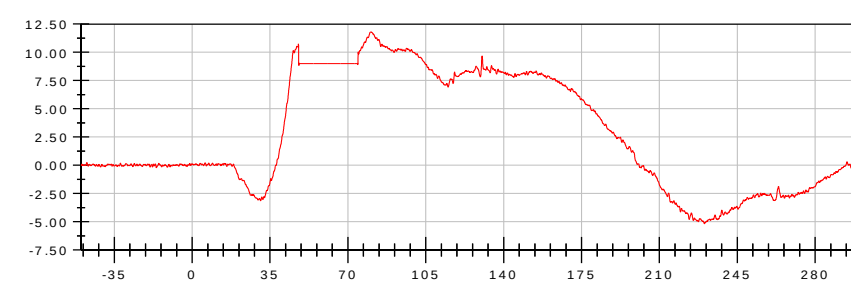
17.57 mm at 48.15 ms

<Min>

-63.31 mm at 47.75 ms

Unfiltered

Driver Shoulder Rear Length Change (mm) vs. Time [ms]



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11.79 mm at 80.30 ms

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-5.17 mm at 230.20 ms

CFC_600

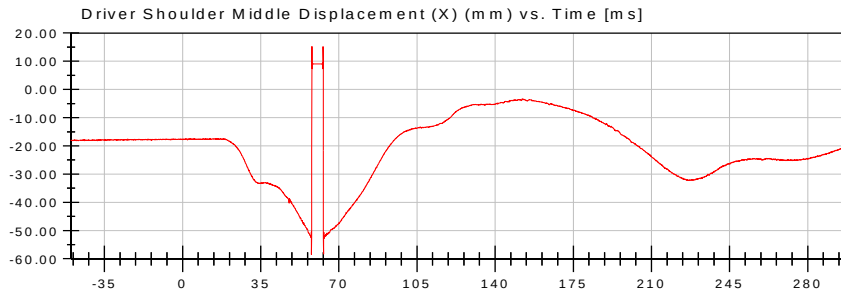


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



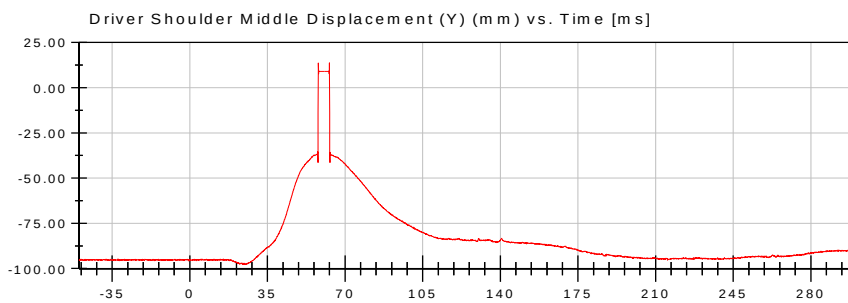
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15.18 mm at 62.95 ms

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-58.53 mm at 57.75 ms

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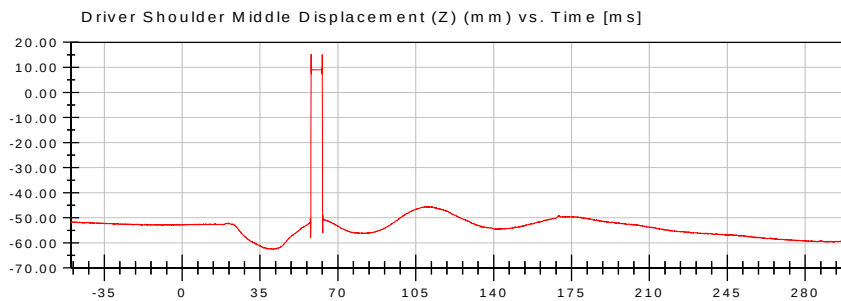
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13.61 mm at 62.95 ms

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Unfiltered



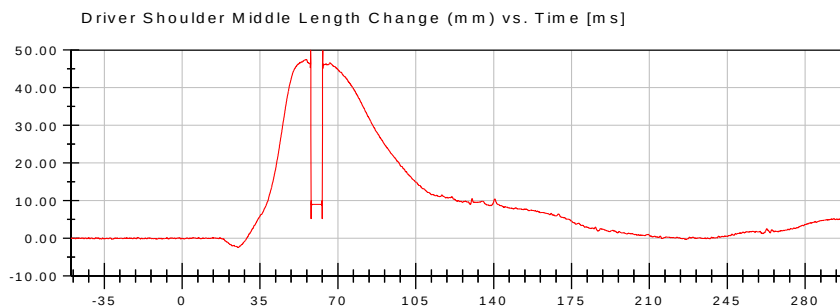
<Max>

15.10 mm at 57.95 ms

<Min>

-62.56 mm at 40.80 ms

Unfiltered



<Max>

49.97 mm at 57.75 ms

<Min>

-2.42 mm at 25.20 ms

CFC_600

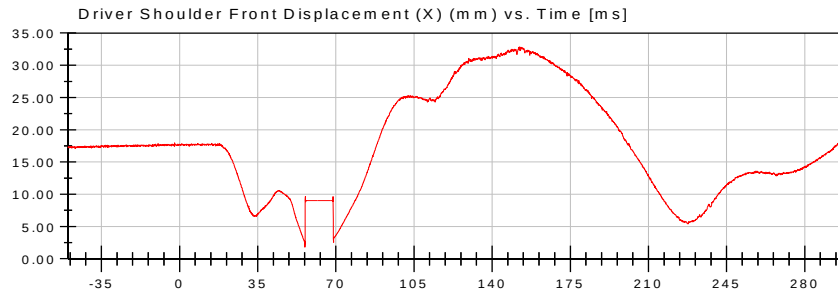


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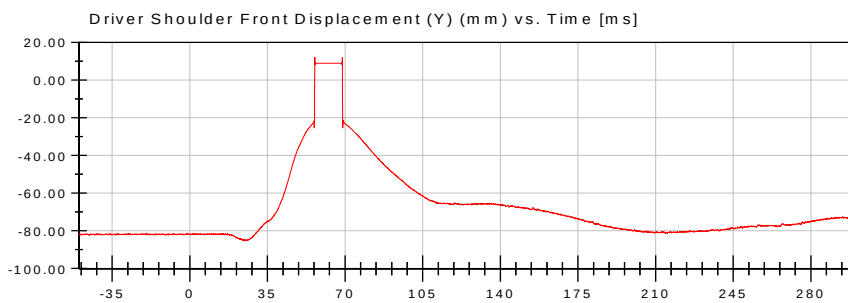
<Max>

32.85 mm at 152.20 ms

<Min>

1.80 mm at 56.15 ms

Unfiltered



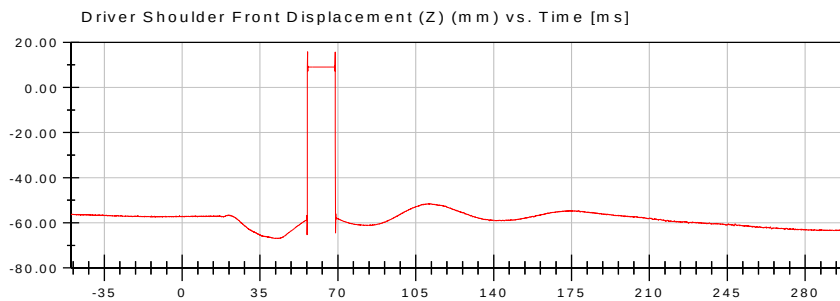
<Max>

12.14 mm at 56.35 ms

<Min>

-85.29 mm at 24.85 ms

Unfiltered



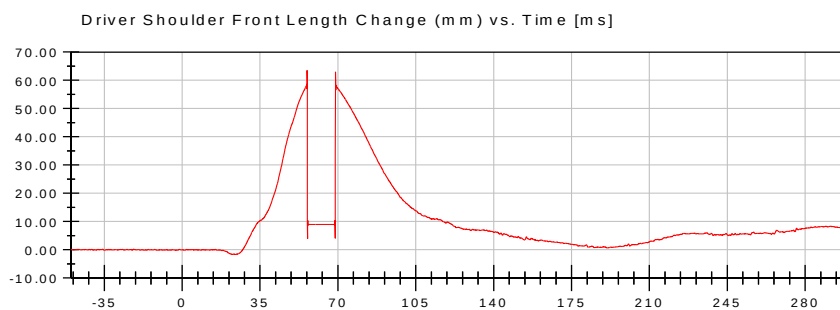
<Max>

15.79 mm at 56.35 ms

<Min>

-66.98 mm at 41.70 ms

Unfiltered



<Max>

63.44 mm at 56.15 ms

<Min>

-1.70 mm at 23.85 ms

CFC_600

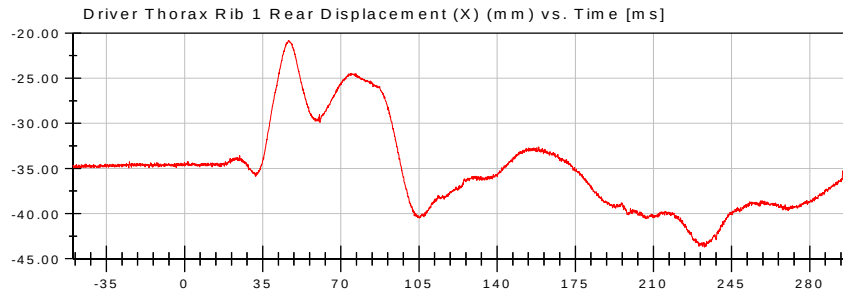


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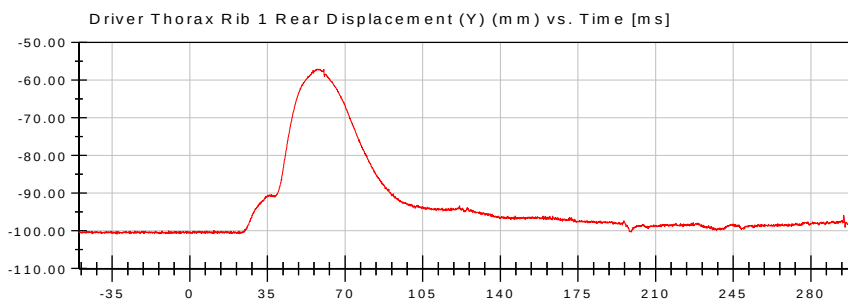
<Max>

-20.83 mm at 46.50 ms

<Min>

-43.71 mm at 232.80 ms

Unfiltered



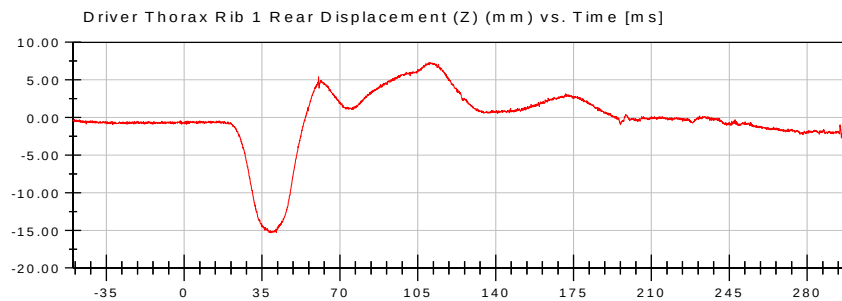
<Max>

-57.09 mm at 57.40 ms

<Min>

-100.90 mm at -32.80 ms

Unfiltered



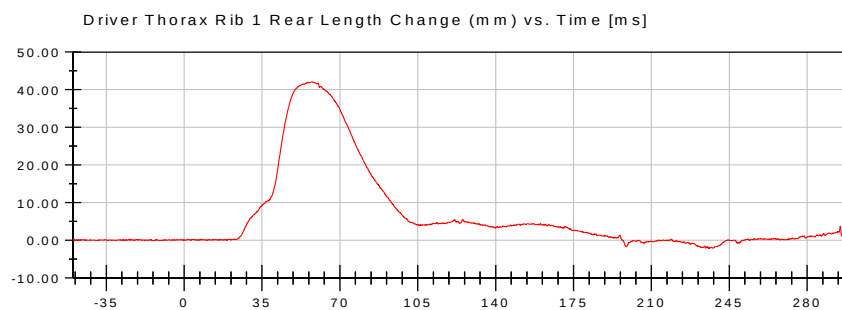
<Max>

7.27 mm at 110.40 ms

<Min>

-15.33 mm at 38.85 ms

Unfiltered



<Max>

42.07 mm at 57.40 ms

<Min>

-2.16 mm at 235.75 ms

CFC_600

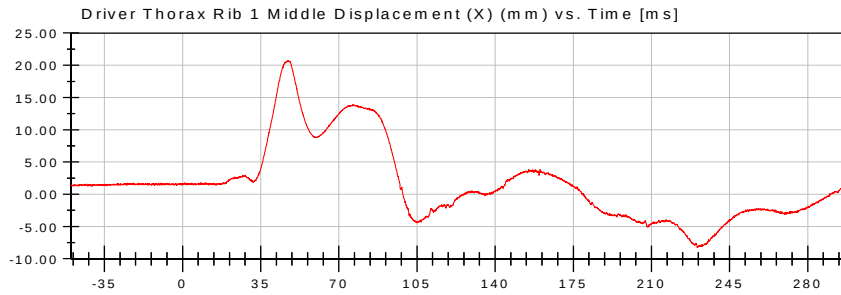


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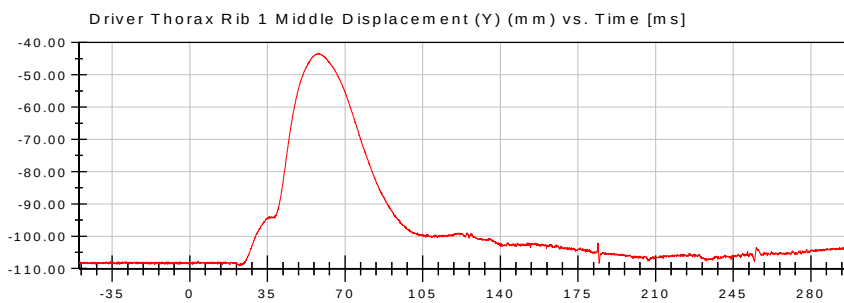
<Max>

20.75 mm at 47.20 ms

<Min>

-8.27 mm at 230.60 ms

Unfiltered



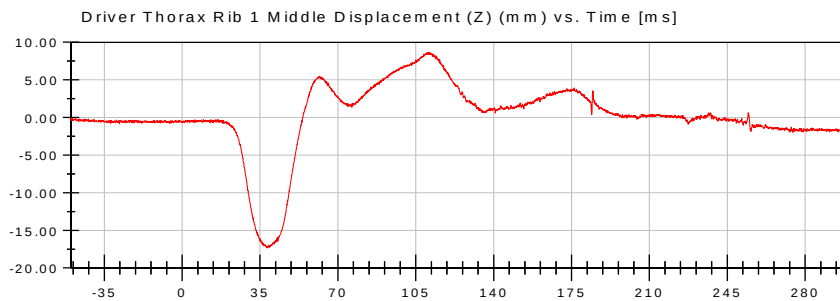
<Max>

-43.37 mm at 58.20 ms

<Min>

-109.17 mm at 22.50 ms

Unfiltered



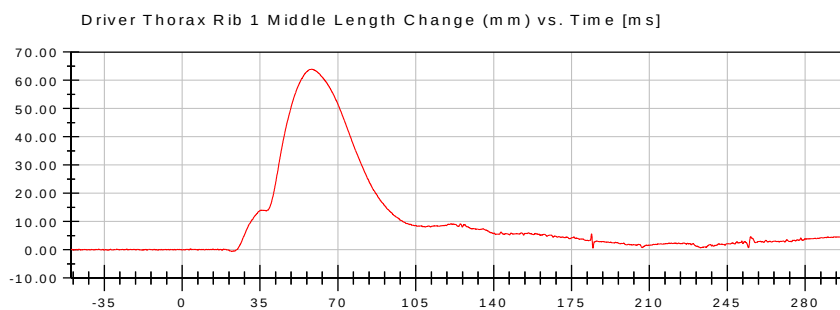
<Max>

8.66 mm at 111.30 ms

<Min>

-17.34 mm at 38.35 ms

Unfiltered



<Max>

63.92 mm at 58.25 ms

<Min>

-0.60 mm at 22.40 ms

CFC_600

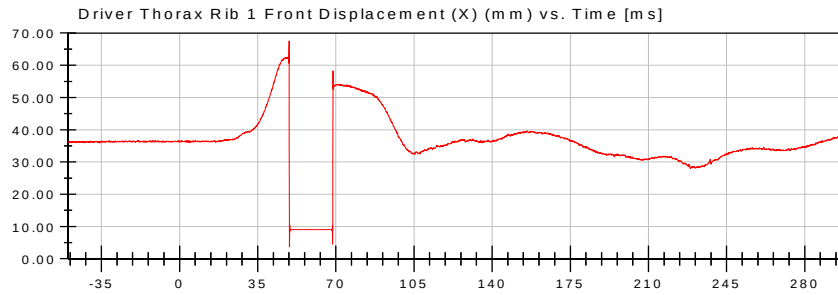


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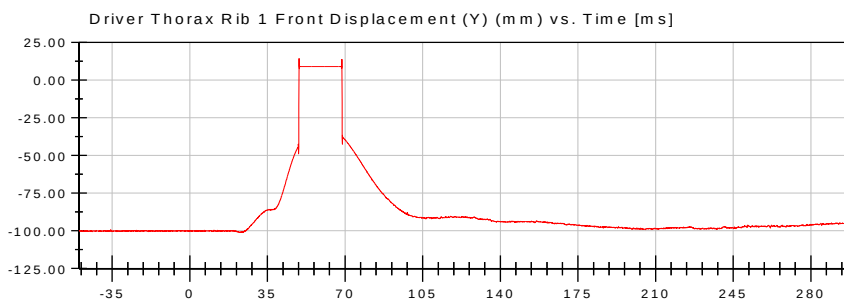
<Max>

67.52 mm at 49.05 ms

<Min>

3.65 mm at 49.25 ms

Unfiltered



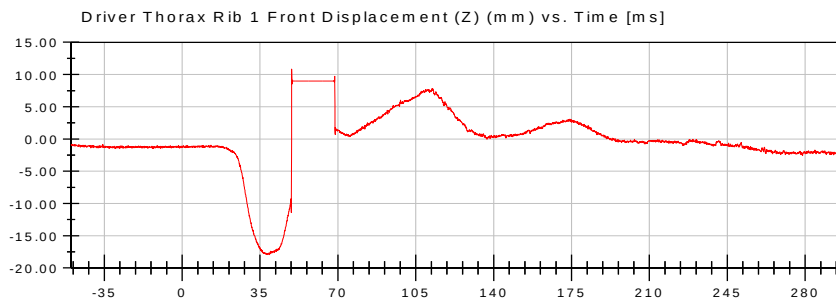
<Max>

14.28 mm at 49.25 ms

<Min>

-101.13 mm at 22.50 ms

Unfiltered



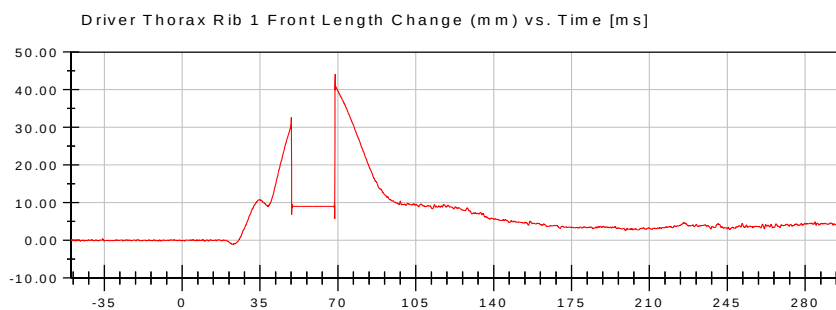
<Max>

10.85 mm at 49.25 ms

<Min>

-17.95 mm at 38.20 ms

Unfiltered



<Max>

44.05 mm at 68.75 ms

<Min>

-1.04 mm at 22.45 ms

CFC_600

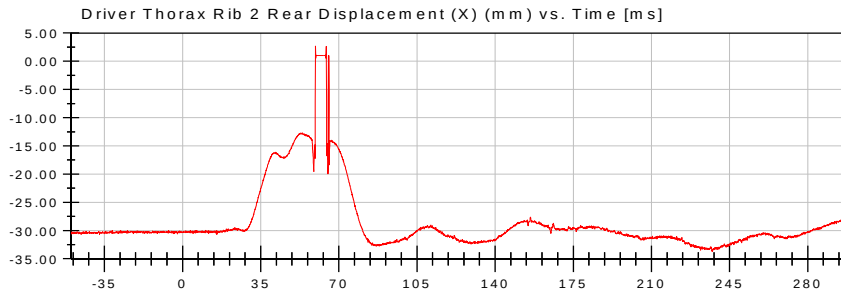


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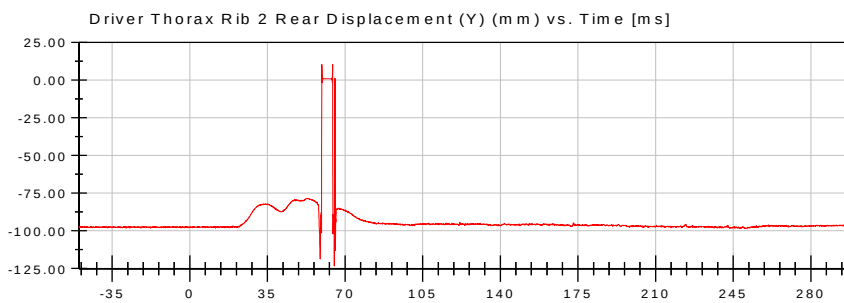
<Max>

2.68 mm at 59.55 ms

<Min>

-33.72 mm at 237.30 ms

Unfiltered



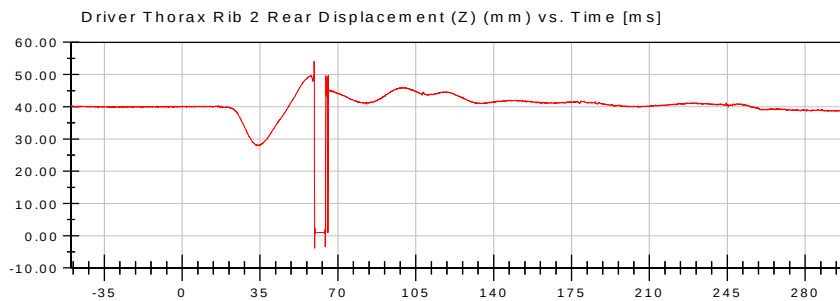
<Max>

10.46 mm at 59.55 ms

<Min>

-123.27 mm at 65.15 ms

Unfiltered



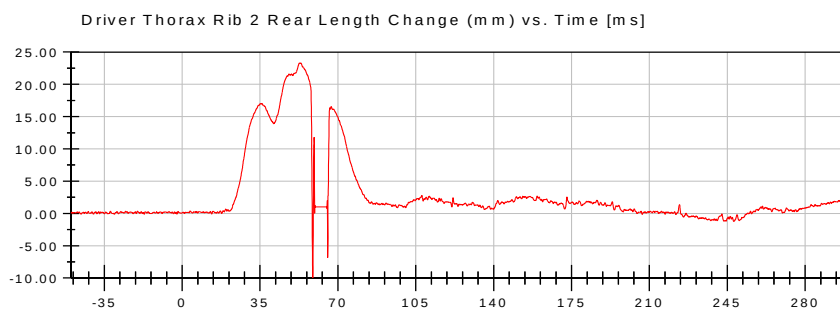
<Max>

54.06 mm at 59.35 ms

<Min>

-3.82 mm at 59.55 ms

Unfiltered



<Max>

23.31 mm at 53.30 ms

<Min>

-9.94 mm at 58.70 ms

CFC_600

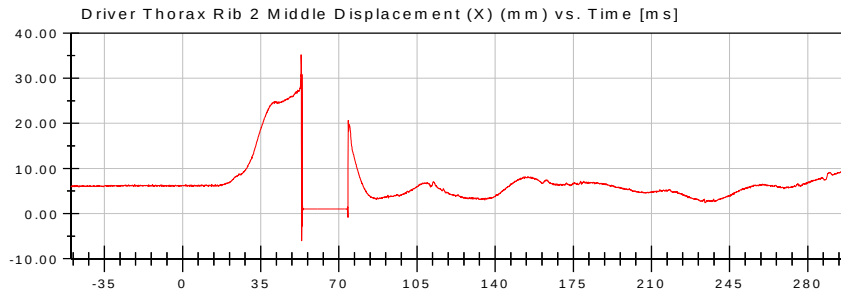


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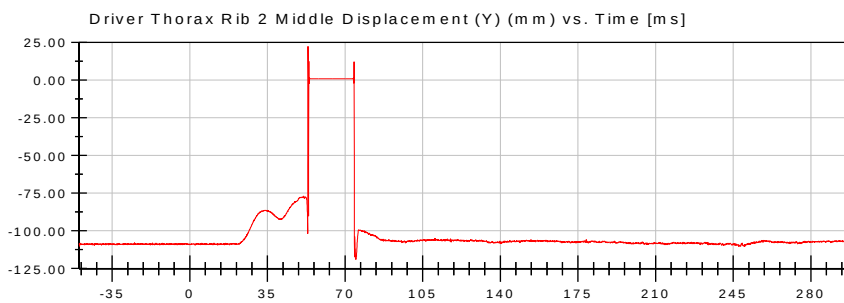
<Max>

35.19 mm at 53.15 ms

<Min>

-6.01 mm at 53.35 ms

Unfiltered



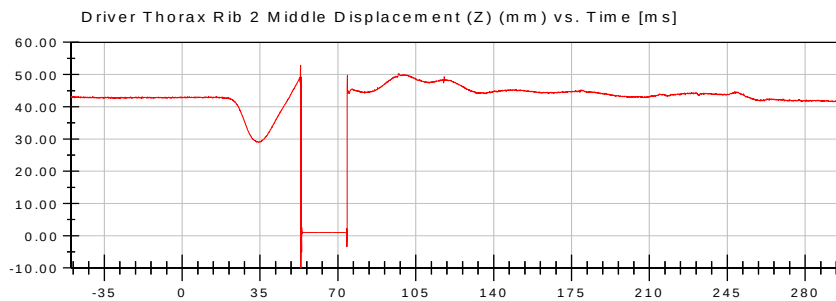
<Max>

22.31 mm at 53.35 ms

<Min>

-118.93 mm at 74.85 ms

Unfiltered



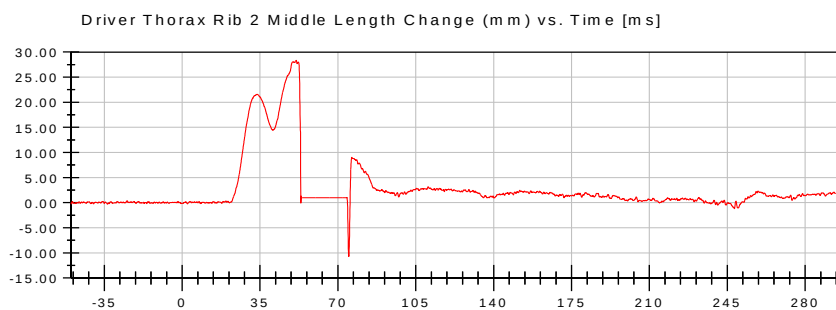
<Max>

52.87 mm at 53.15 ms

<Min>

-9.93 mm at 53.35 ms

Unfiltered



<Max>

28.33 mm at 51.25 ms

<Min>

-10.74 mm at 74.90 ms

CFC_600

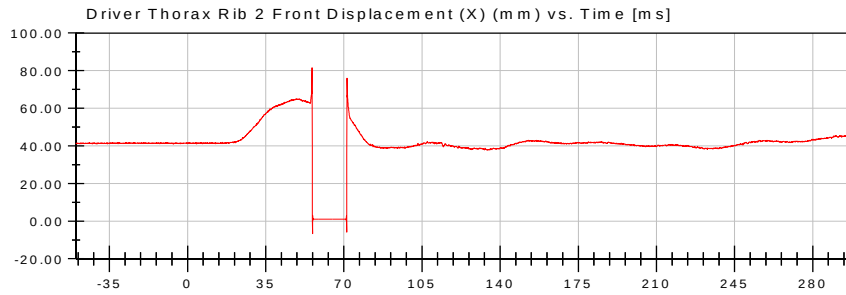


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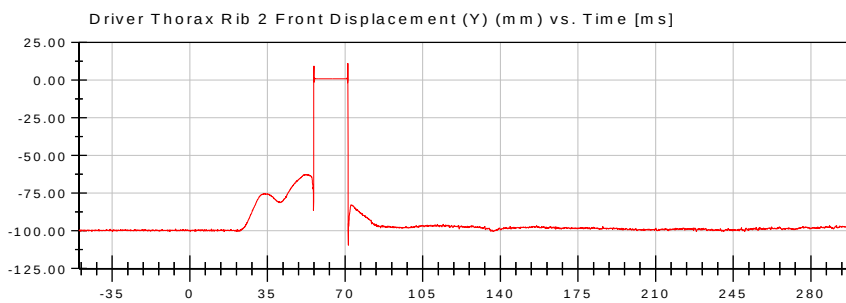
<Max>

81.58 mm at 55.75 ms

<Min>

-6.68 mm at 55.95 ms

Unfiltered



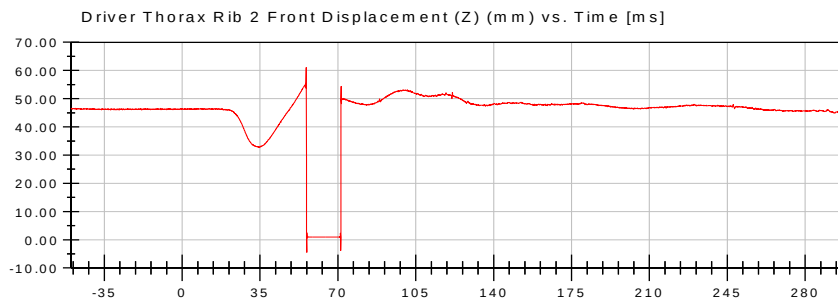
<Max>

11.15 mm at 71.25 ms

<Min>

-109.56 mm at 71.45 ms

Unfiltered



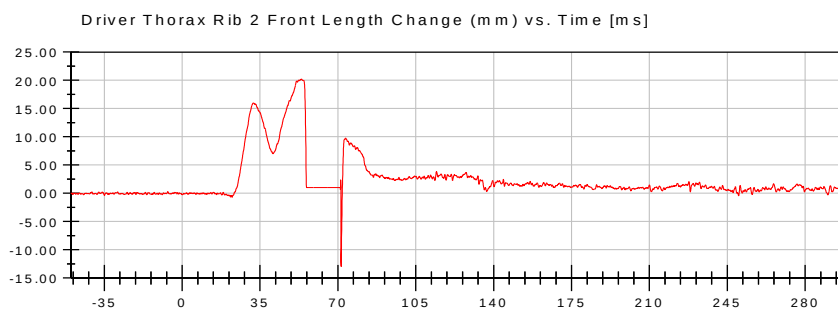
<Max>

61.02 mm at 55.75 ms

<Min>

-4.49 mm at 55.95 ms

Unfiltered



<Max>

20.22 mm at 53.65 ms

<Min>

-12.94 mm at 71.45 ms

CFC_600



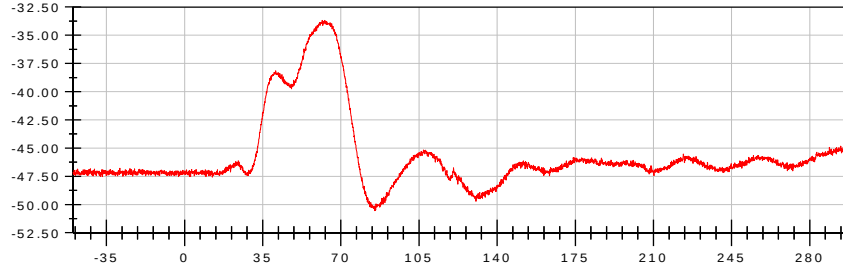
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Driver Thorax Rib 3 Rear Displacement (X) (mm) vs. Time [ms]



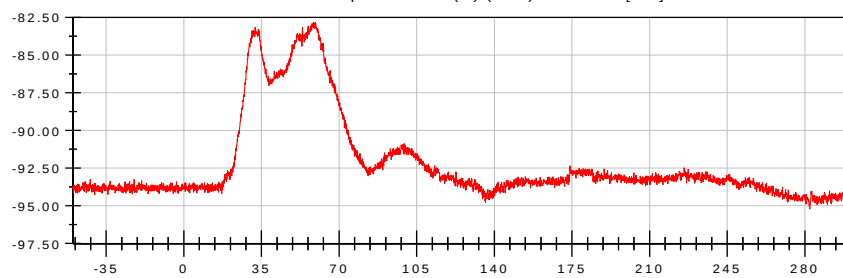
<Max>

-33.68 mm at 61.70 ms

<Min>

-50.55 mm at 85.20 ms

Driver Thorax Rib 3 Rear Displacement (Y) (mm) vs. Time [ms]



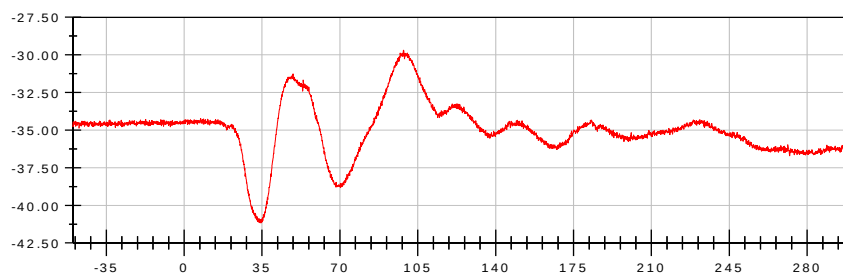
<Max>

-82.82 mm at 58.60 ms

<Min>

-95.22 mm at 282.20 ms

Driver Thorax Rib 3 Rear Displacement (Z) (mm) vs. Time [ms]



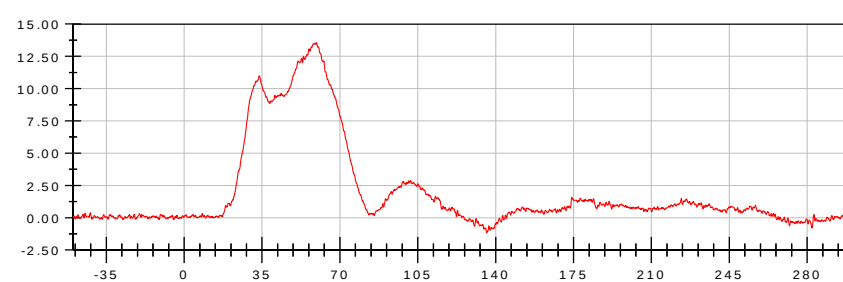
<Max>

-29.70 mm at 98.60 ms

<Min>

-41.18 mm at 34.50 ms

Driver Thorax Rib 3 Rear Length Change (mm) vs. Time [ms]



<Max>

13.56 mm at 59.40 ms

<Min>

-1.16 mm at 135.95 ms

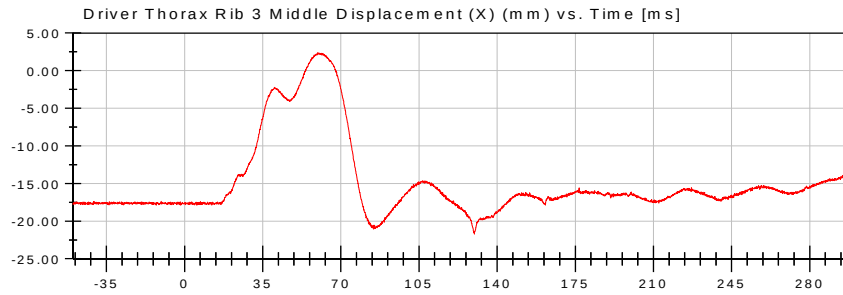


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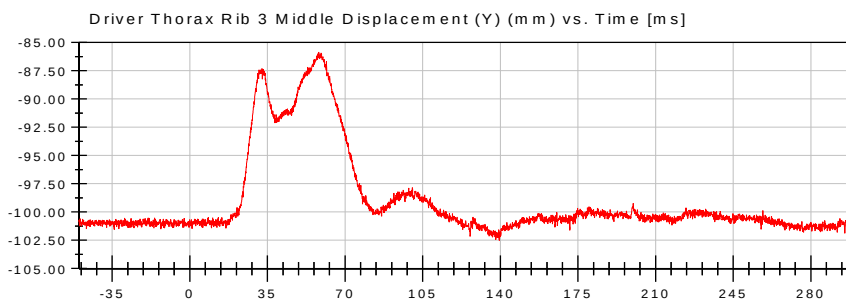
<Max>

2.38 mm at 59.60 ms

<Min>

-21.71 mm at 129.80 ms

Unfiltered



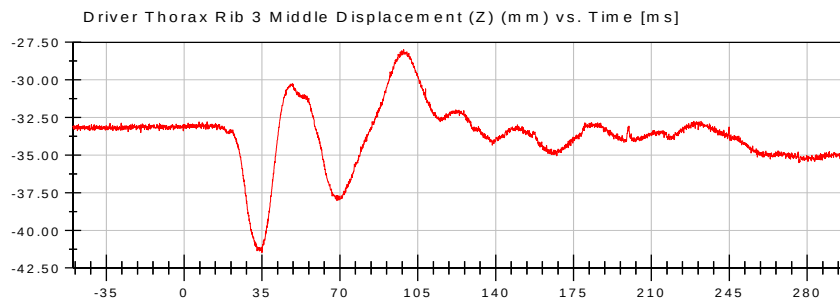
<Max>

-85.86 mm at 58.15 ms

<Min>

-102.52 mm at 139.50 ms

Unfiltered



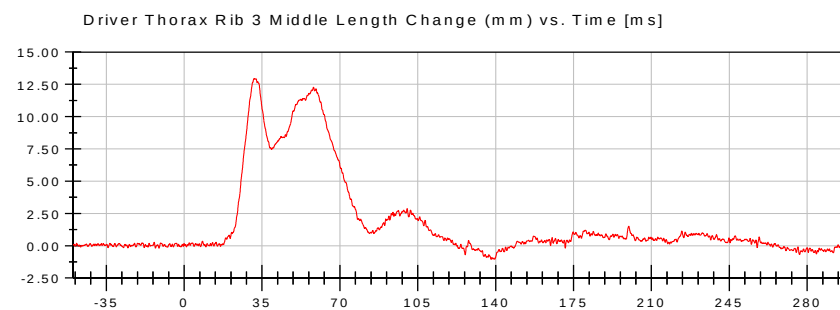
<Max>

-27.97 mm at 98.60 ms

<Min>

-41.48 mm at 35.00 ms

Unfiltered



<Max>

12.95 mm at 31.45 ms

<Min>

-1.05 mm at 139.55 ms

CFC_600



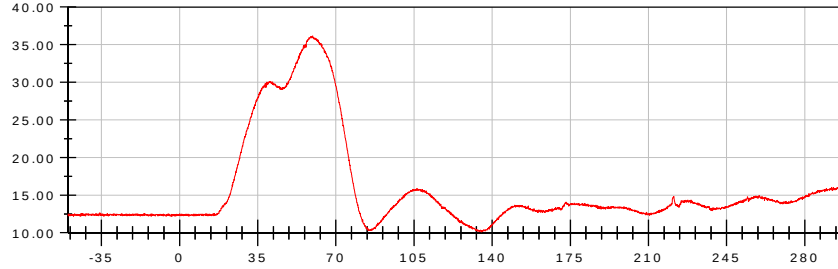
NHTSA

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Driver Thorax Rib 3 Front Displacement (X) (mm) vs. Time [ms]



<Max>

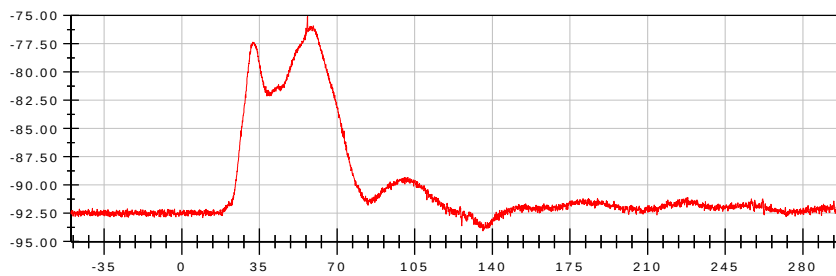
36.17 mm at 59.60 ms

<Min>

10.07 mm at 135.10 ms

Unfiltered

Driver Thorax Rib 3 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

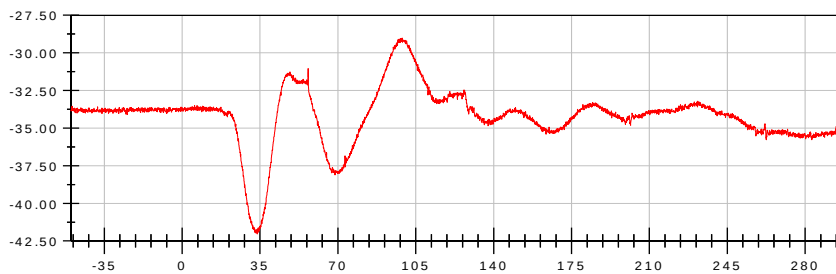
-75.08 mm at 56.65 ms

<Min>

-94.07 mm at 135.80 ms

Unfiltered

Driver Thorax Rib 3 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

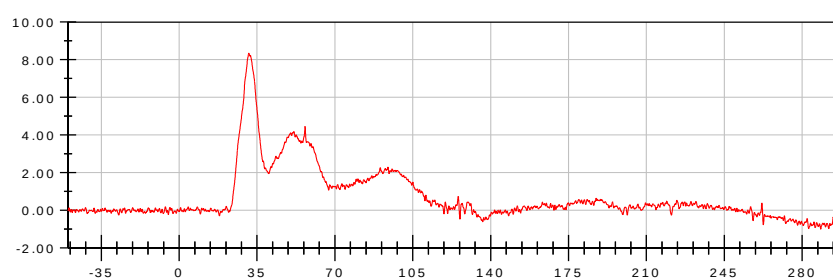
-29.01 mm at 98.90 ms

<Min>

-42.04 mm at 33.70 ms

Unfiltered

Driver Thorax Rib 3 Front Length Change (mm) vs. Time [ms]



<Max>

8.34 mm at 31.30 ms

<Min>

-1.14 mm at 294.60 ms

CFC_600

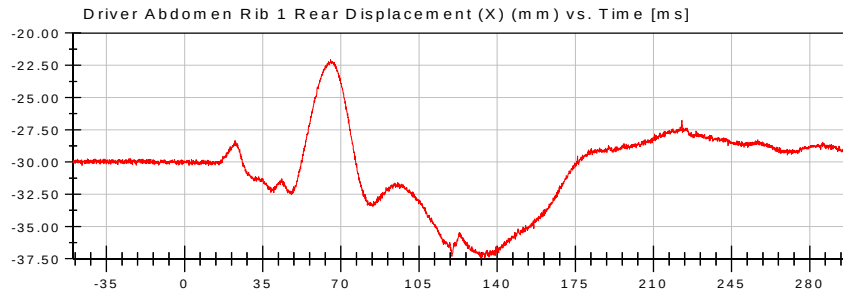


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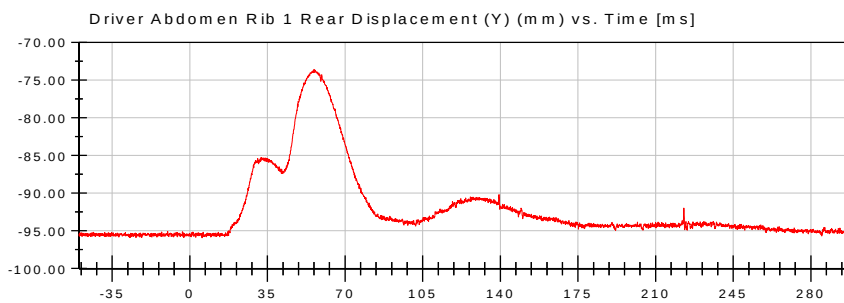
<Max>

-22.07 mm at 65.40 ms

<Min>

-37.46 mm at 134.50 ms

Unfiltered



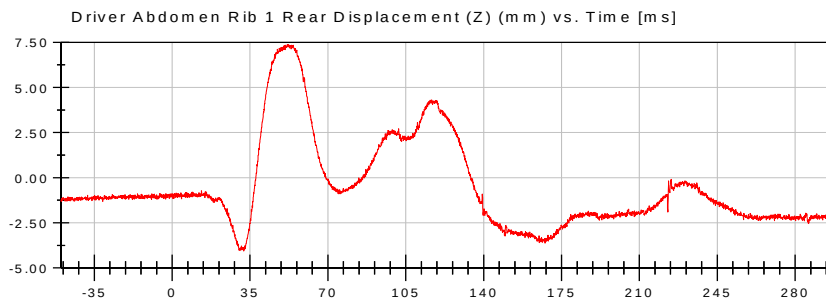
<Max>

-73.58 mm at 56.00 ms

<Min>

-95.94 mm at 5.50 ms

Unfiltered



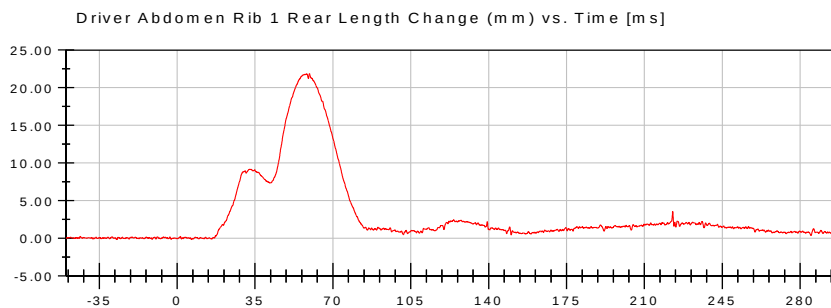
<Max>

7.36 mm at 51.70 ms

<Min>

-4.06 mm at 32.20 ms

Unfiltered



<Max>

21.88 mm at 59.45 ms

<Min>

-0.16 mm at 6.45 ms

CFC_600

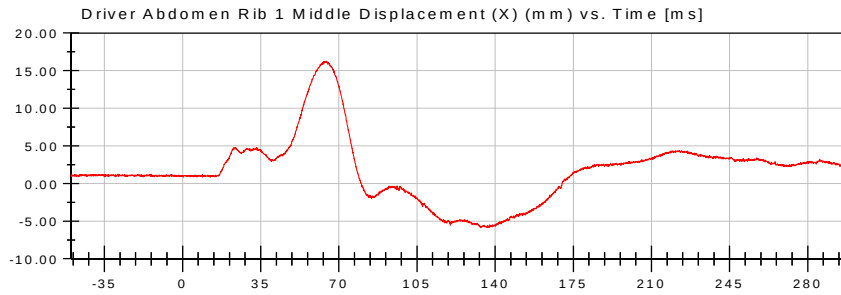


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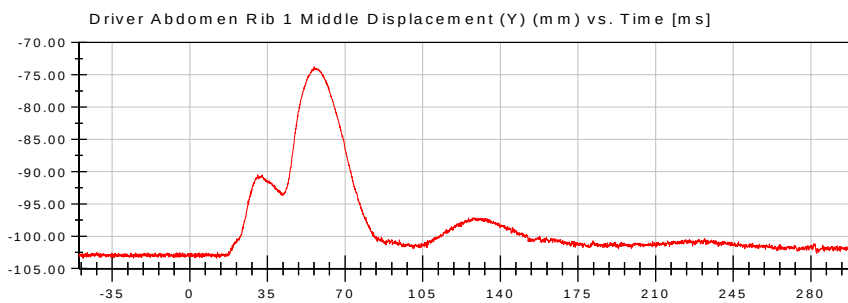
<Max>

16.26 mm at 64.35 ms

<Min>

-5.88 mm at 133.60 ms

Unfiltered



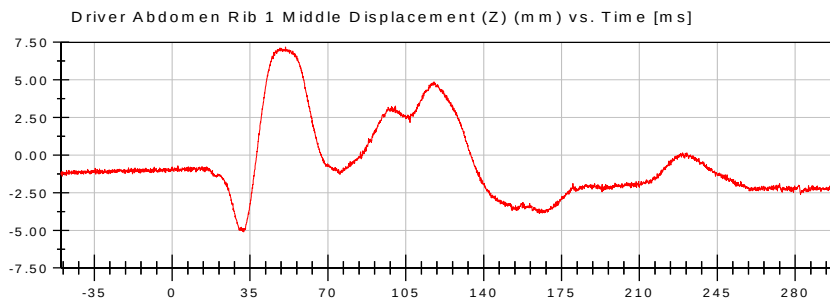
<Max>

-73.77 mm at 56.05 ms

<Min>

-103.44 mm at 12.10 ms

Unfiltered



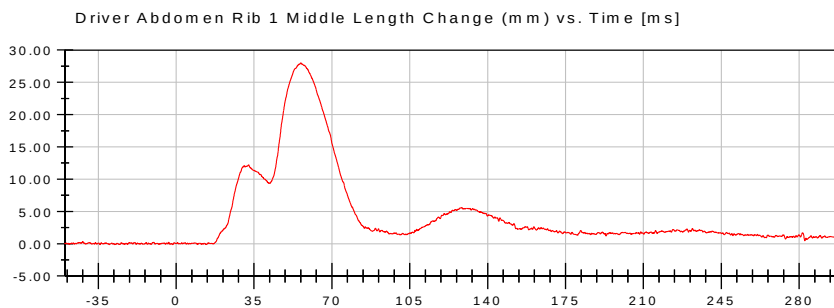
<Max>

7.19 mm at 50.95 ms

<Min>

-5.10 mm at 32.20 ms

Unfiltered



<Max>

28.01 mm at 56.00 ms

<Min>

-0.14 mm at -34.20 ms

CFC_600

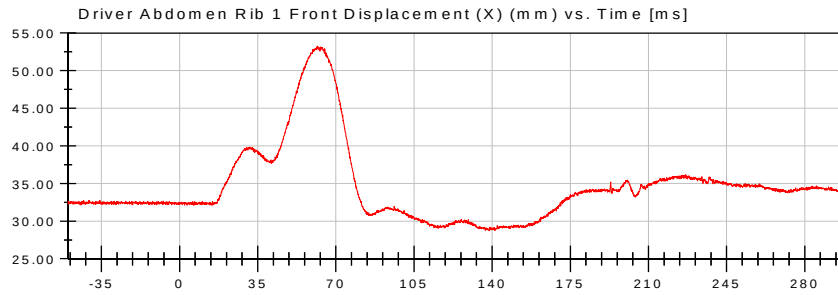


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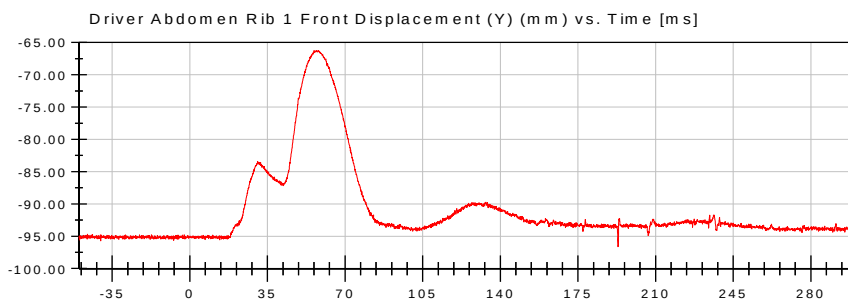
<Max>

53.28 mm at 61.70 ms

<Min>

28.70 mm at 138.65 ms

Unfiltered



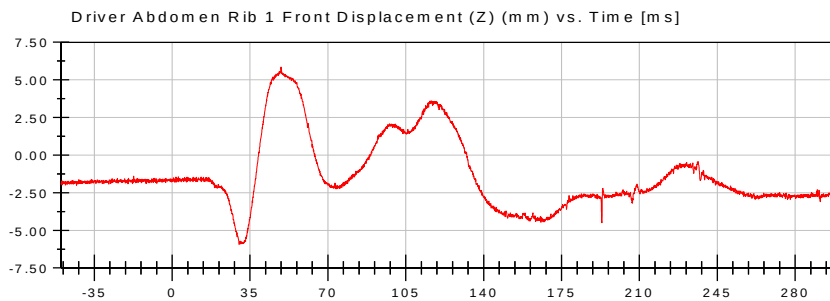
<Max>

-66.22 mm at 56.00 ms

<Min>

-96.64 mm at 193.10 ms

Unfiltered



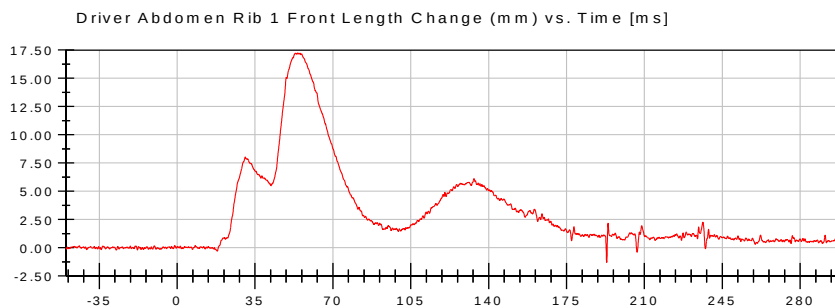
<Max>

5.86 mm at 48.95 ms

<Min>

-5.93 mm at 30.10 ms

Unfiltered



<Max>

17.24 mm at 54.20 ms

<Min>

-1.30 mm at 193.05 ms

CFC_600

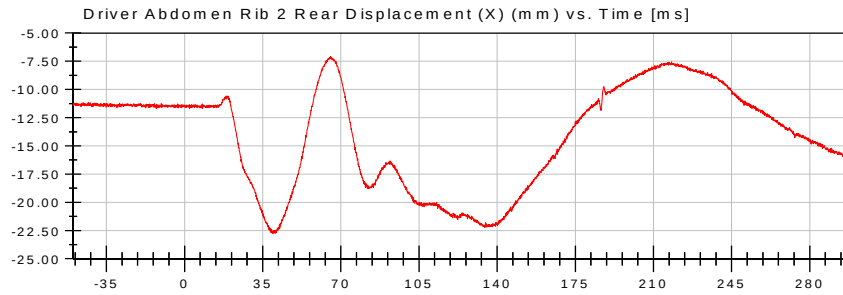


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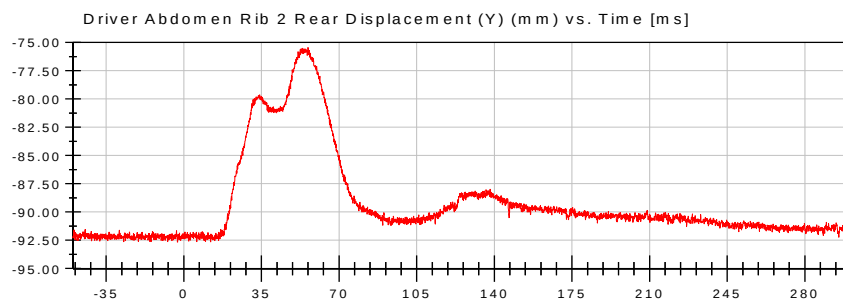
<Max>

-7.09 mm at 65.40 ms

<Min>

-22.77 mm at 39.60 ms

Unfiltered



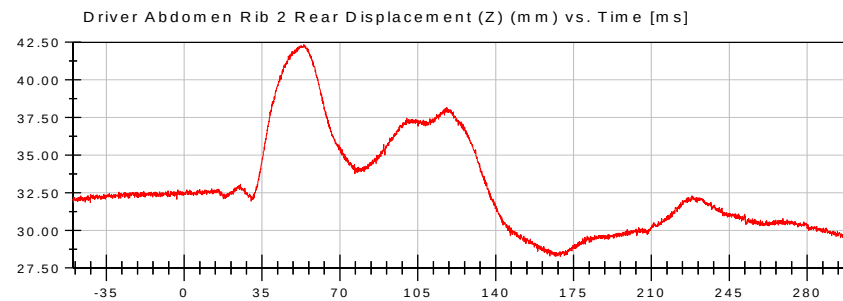
<Max>

-75.43 mm at 56.00 ms

<Min>

-92.67 mm at -2.80 ms

Unfiltered



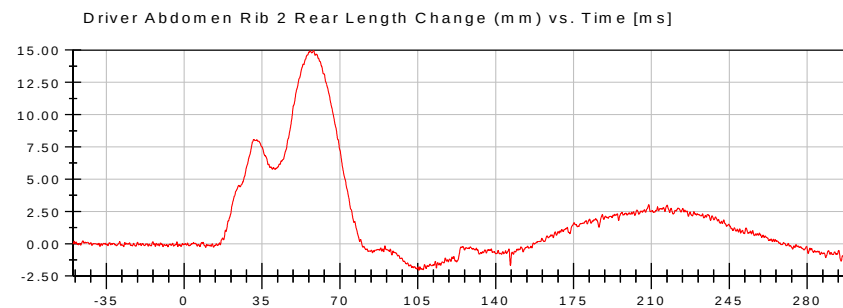
<Max>

42.32 mm at 53.70 ms

<Min>

28.27 mm at 169.05 ms

Unfiltered



<Max>

14.96 mm at 58.15 ms

<Min>

-2.05 mm at 105.50 ms

CFC_600

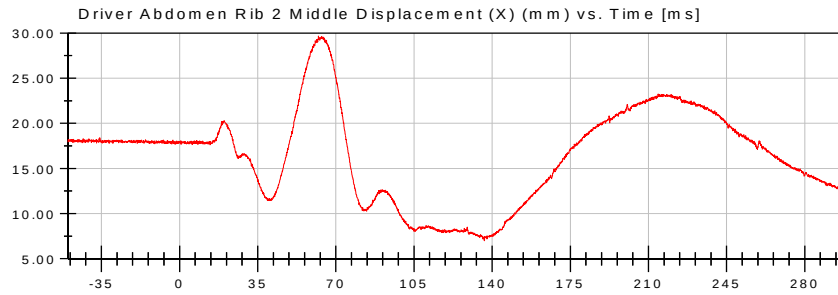


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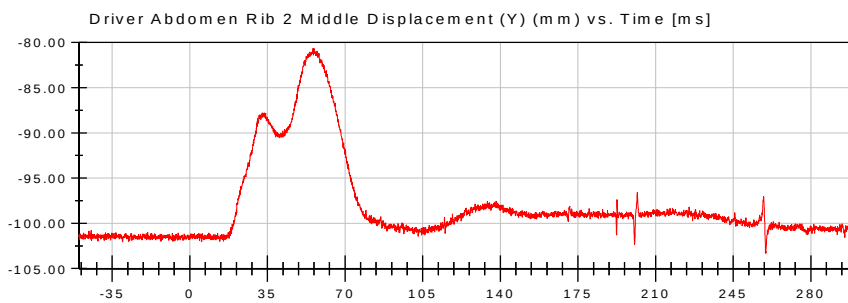
<Max>

29.63 mm at 62.20 ms

<Min>

6.97 mm at 136.50 ms

Unfiltered



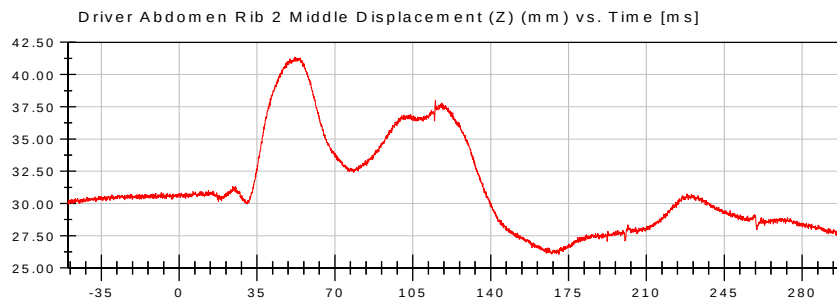
<Max>

-80.64 mm at 55.55 ms

<Min>

-103.30 mm at 259.55 ms

Unfiltered



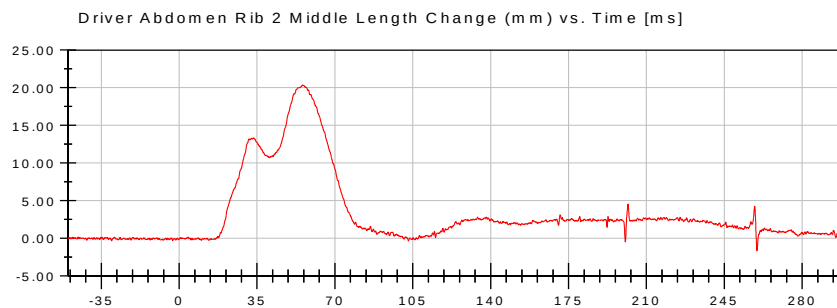
<Max>

41.35 mm at 52.00 ms

<Min>

26.05 mm at 170.65 ms

Unfiltered



<Max>

20.37 mm at 55.50 ms

<Min>

-1.66 mm at 259.65 ms

CFC_600

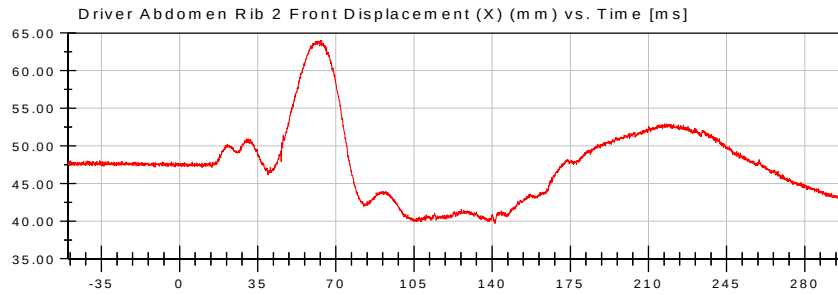


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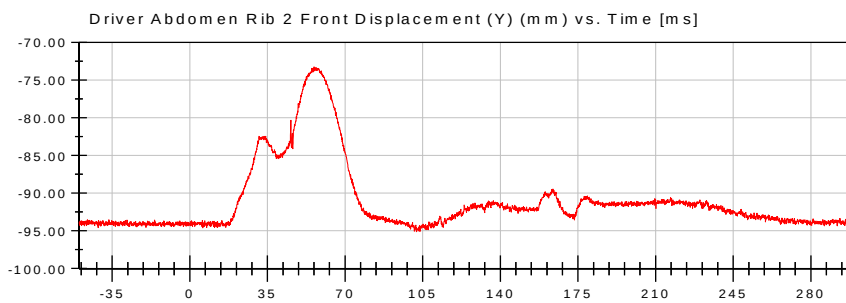
<Max>

64.05 mm at 63.30 ms

<Min>

39.68 mm at 141.30 ms

Unfiltered



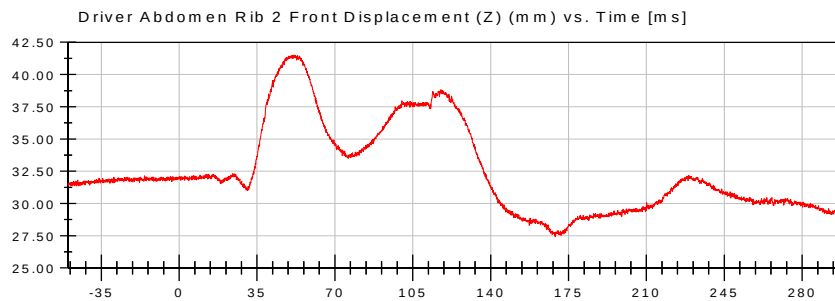
<Max>

-73.22 mm at 56.00 ms

<Min>

-95.13 mm at 102.25 ms

Unfiltered



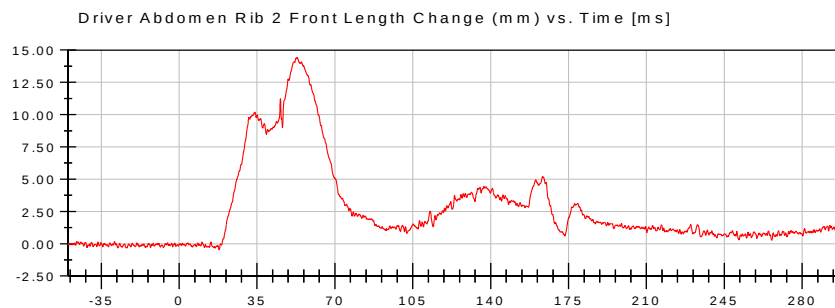
<Max>

41.50 mm at 51.60 ms

<Min>

27.43 mm at 169.00 ms

Unfiltered



<Max>

14.42 mm at 53.05 ms

<Min>

-0.45 mm at 17.95 ms

CFC_600

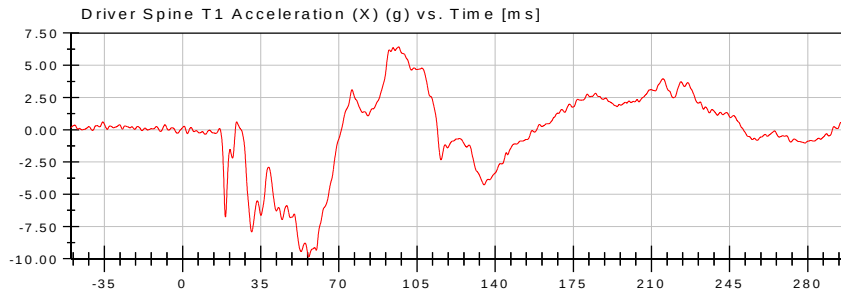


NHTSA

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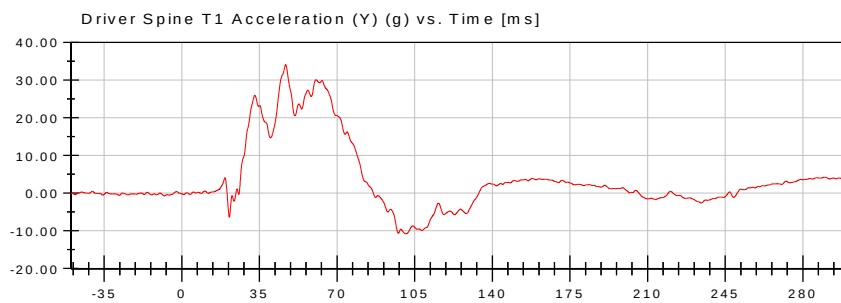
<Max>

6.42 g at 96.75 ms

<Min>

-9.86 g at 56.50 ms

CFC_180



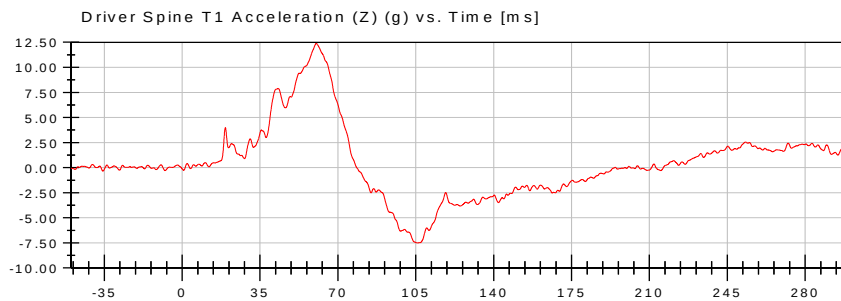
<Max>

34.13 g at 46.80 ms

<Min>

-10.81 g at 101.00 ms

CFC_180



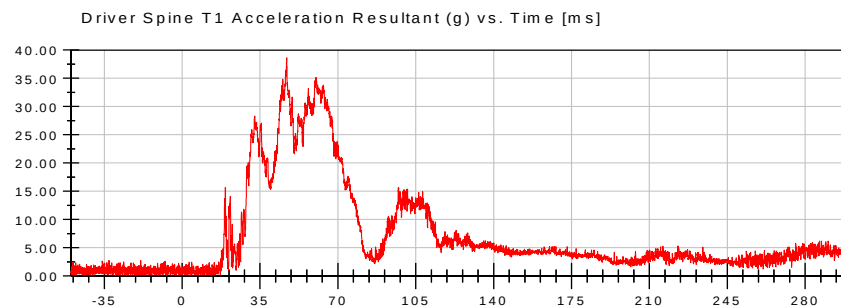
<Max>

12.39 g at 60.25 ms

<Min>

-7.51 g at 105.80 ms

CFC_180



<Max>

38.63 g at 46.95 ms

<Min>

0.09 g at -29.95 ms

Prefiltered_> CFC 1000

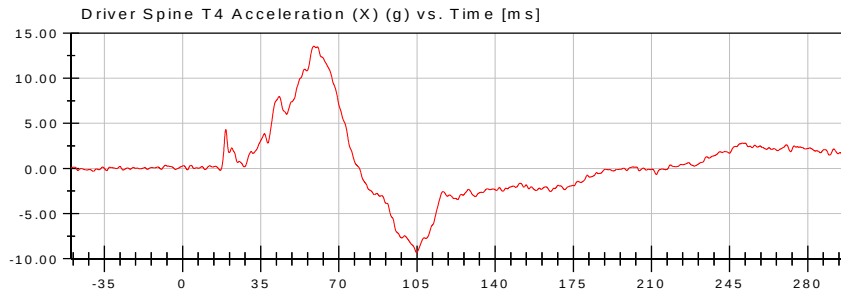


NHTSA

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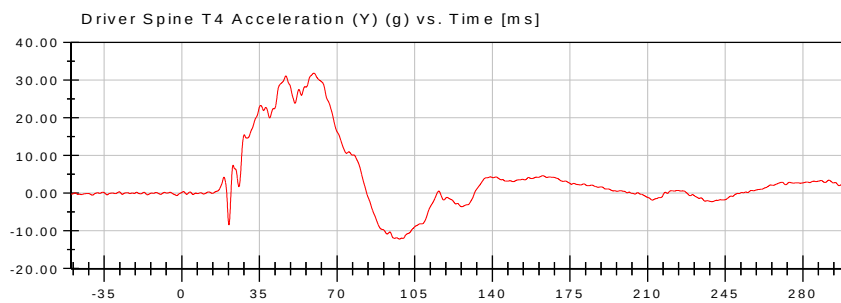
<Max>

13.54 g at 58.85 ms

<Min>

-9.31 g at 104.80 ms

CFC_180



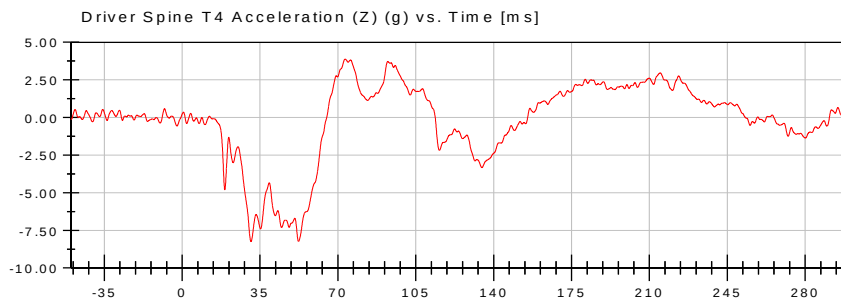
<Max>

31.86 g at 59.50 ms

<Min>

-12.19 g at 98.20 ms

CFC_180



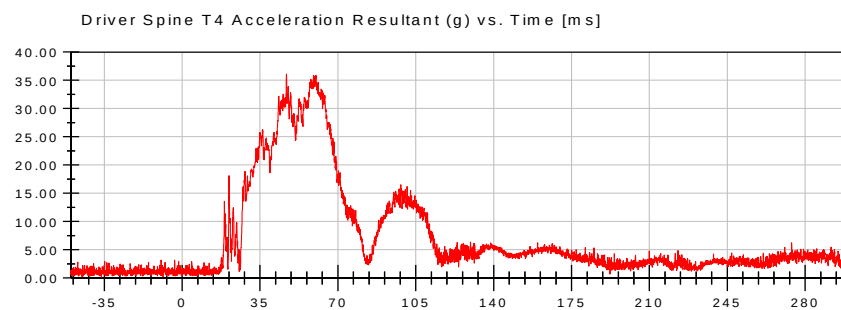
<Max>

3.88 g at 73.25 ms

<Min>

-8.24 g at 30.95 ms

CFC_180



<Max>

36.11 g at 46.90 ms

<Min>

0.22 g at -45.00 ms

Prefiltered_> CFC 1000

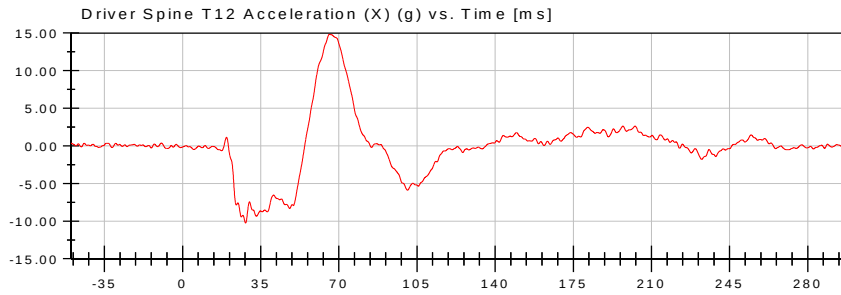


NHTSA

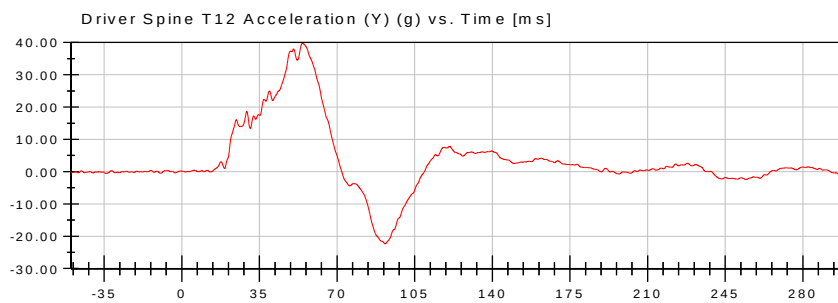
Test Date: 07/29/2019

Test Lab: CTF

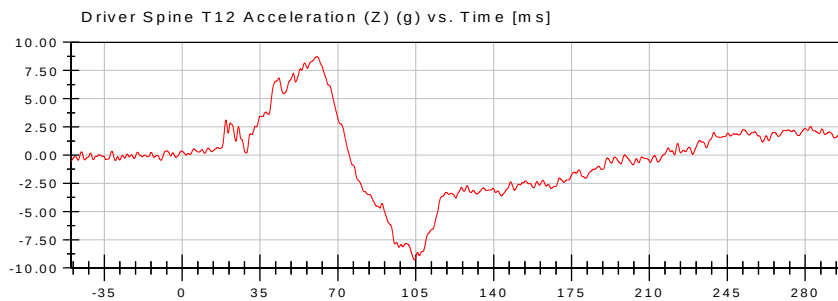
Test Number: 190729 (R20185382)



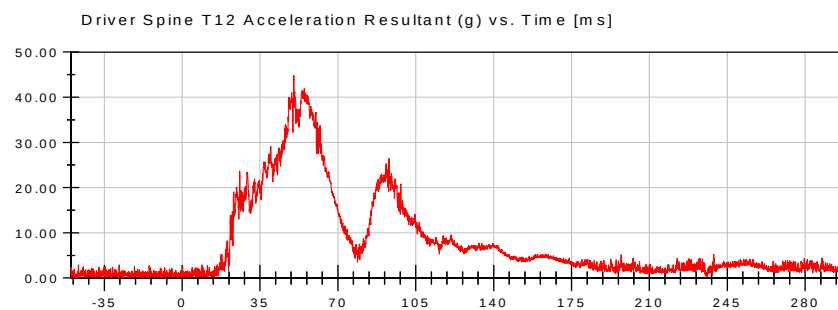
<Max>
14.82 g at 65.80 ms
<Min>
-10.25 g at 28.25 ms
CFC_180



<Max>
39.77 g at 54.45 ms
<Min>
-22.37 g at 91.70 ms
CFC_180



<Max>
8.72 g at 60.65 ms
<Min>
-9.30 g at 104.40 ms
CFC_180



<Max>
44.86 g at 50.20 ms
<Min>
0.08 g at -28.50 ms
Prefiltered_> CFC 1000

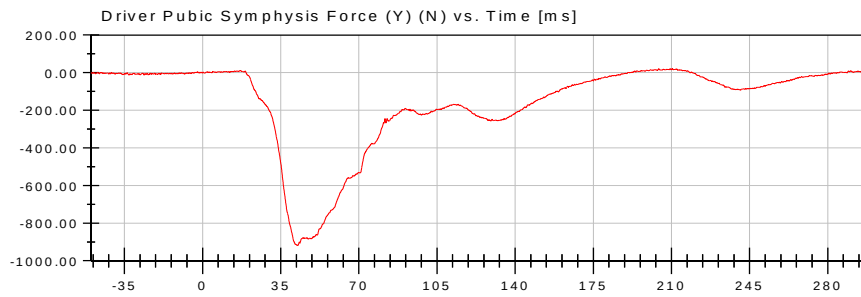


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<Max>

21.78 N at 210.40 ms

<Min>

-918.62 N at 42.65 ms

CFC_600

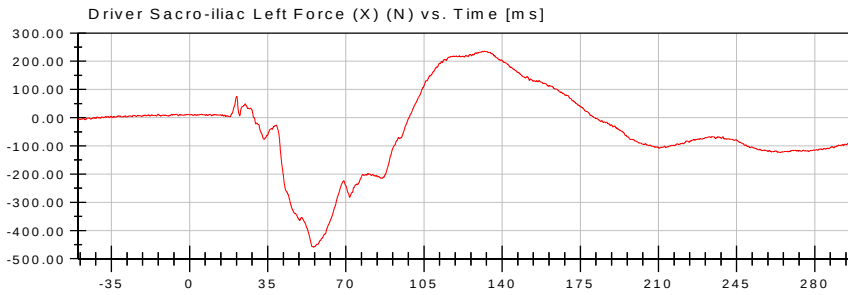


NHTSA

Test Lab: CTF

Test Number: 190729 (R20185382)

Test Date: 07/29/2019



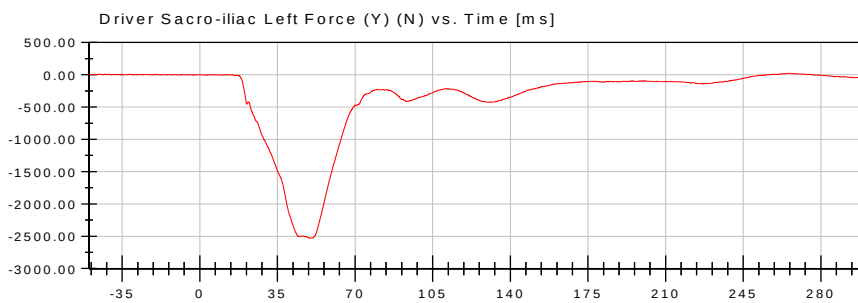
<Max>

235.29 N at 132.05 ms

<Min>

-458.72 N at 55.55 ms

CFC_600



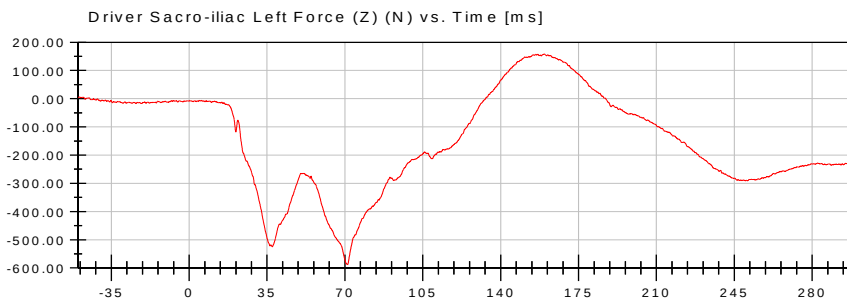
<Max>

25.49 N at 265.55 ms

<Min>

-2,530.54 N at 49.40 ms

CFC_600



<Max>

158.29 N at 159.60 ms

<Min>

-587.73 N at 71.20 ms

CFC_600

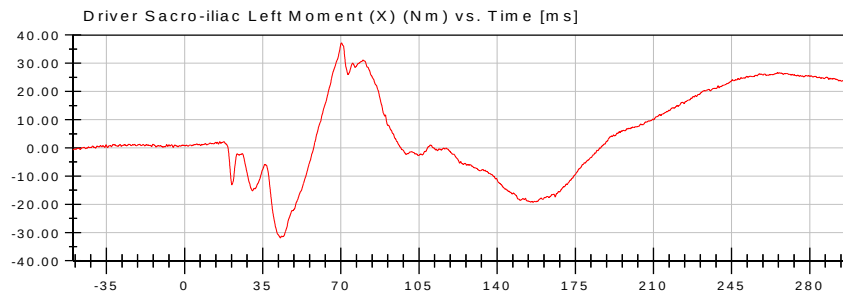


NHTSA

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Test Lab: CTF

Test Number: 190729 (R20185382)



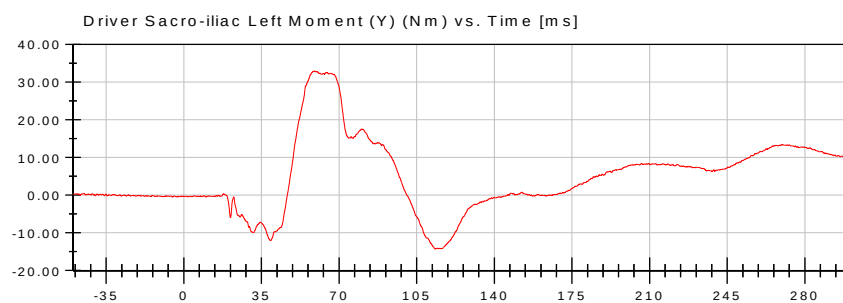
<Max>

37.20 Nm at 70.30 ms

<Min>

-31.91 Nm at 42.90 ms

CFC_600



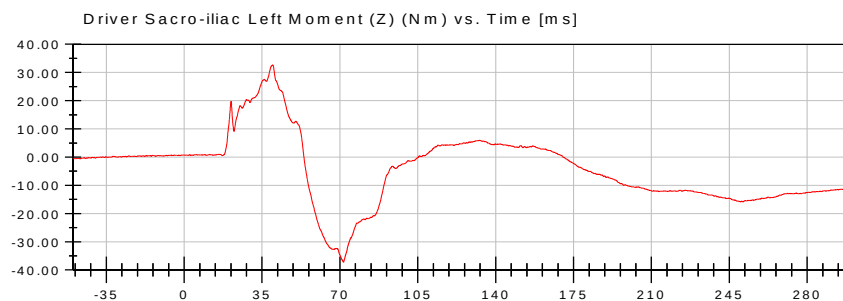
<Max>

32.95 Nm at 58.95 ms

<Min>

-14.31 Nm at 113.35 ms

CFC_600



<Max>

32.66 Nm at 39.80 ms

<Min>

-37.24 Nm at 71.60 ms

CFC_600

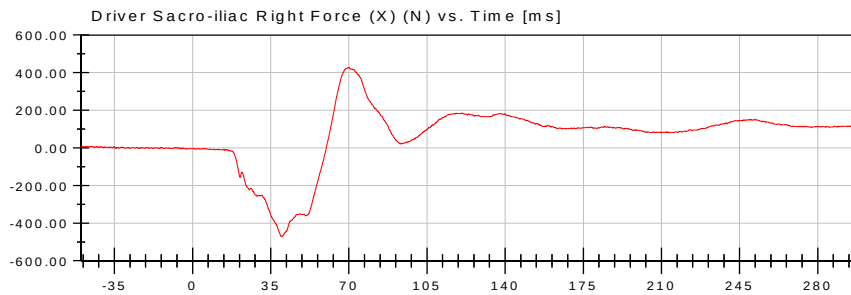


NHTSA

Test Lab: CTF

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Test Date: 07/29/2019



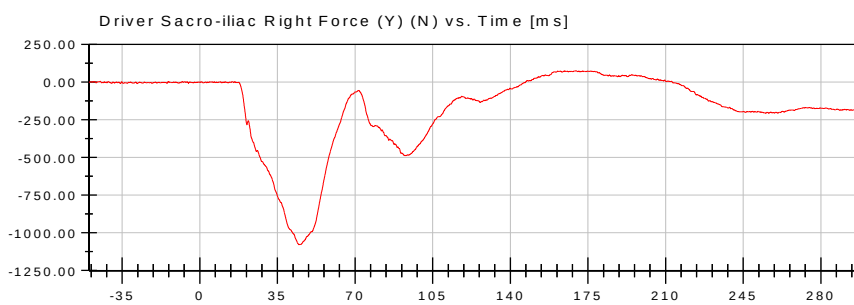
<Max>

427.66 N at 69.95 ms

<Min>

-470.52 N at 40.05 ms

CFC_600



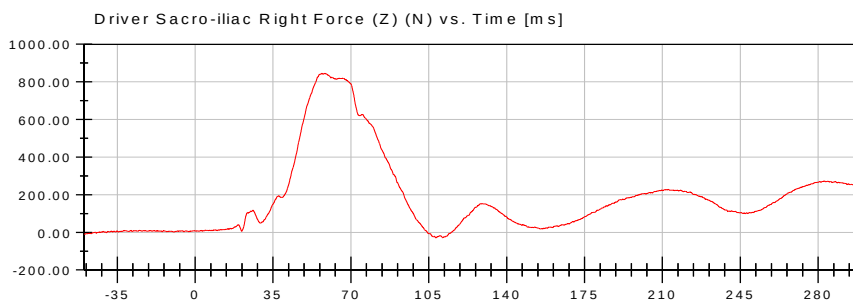
<Max>

75.50 N at 169.40 ms

<Min>

-1,079.00 N at 44.70 ms

CFC_600



<Max>

845.73 N at 58.30 ms

<Min>

-28.76 N at 108.20 ms

CFC_600

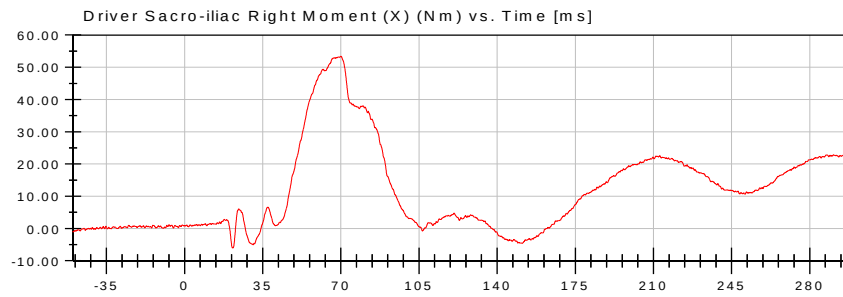


NHTSA

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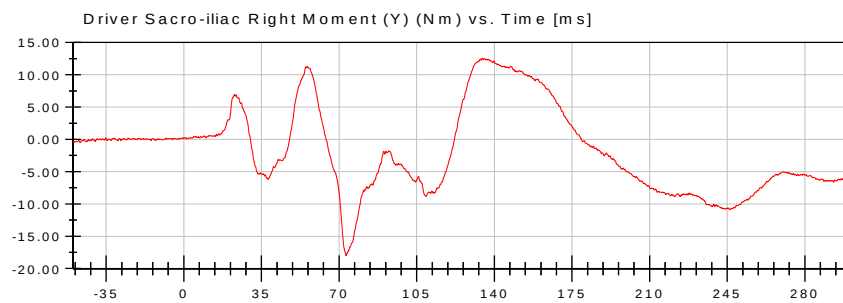
<Max>

53.39 Nm at 70.00 ms

<Min>

-6.03 Nm at 21.50 ms

CFC_600



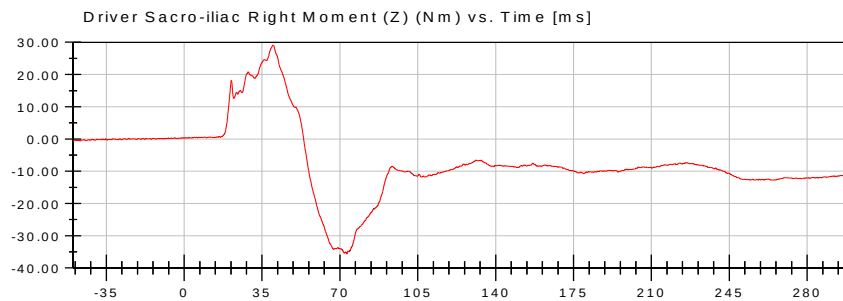
<Max>

12.58 Nm at 134.60 ms

<Min>

-18.00 Nm at 73.15 ms

CFC_600



<Max>

29.11 Nm at 39.95 ms

<Min>

-35.60 Nm at 73.15 ms

CFC_600

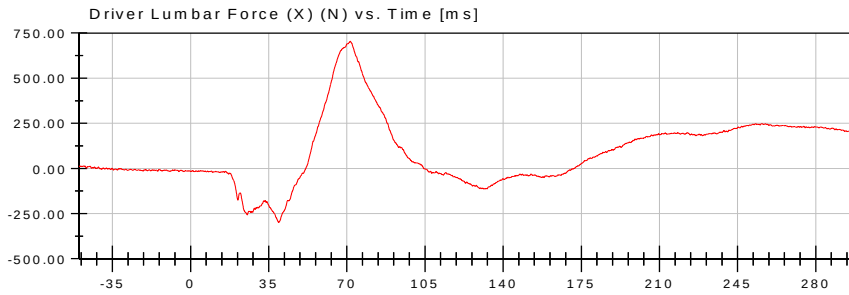


NHTSA

Test Lab: CTF

Test Number: 190729 (R20185382)

Test Date: 07/29/2019



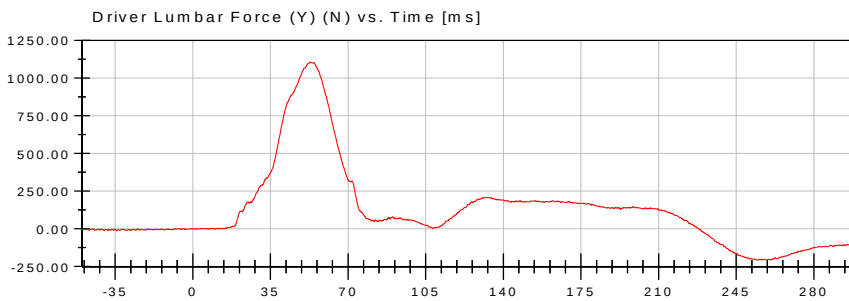
<Max>

703.53 N at 71.55 ms

<Min>

-299.18 N at 39.50 ms

CFC_600



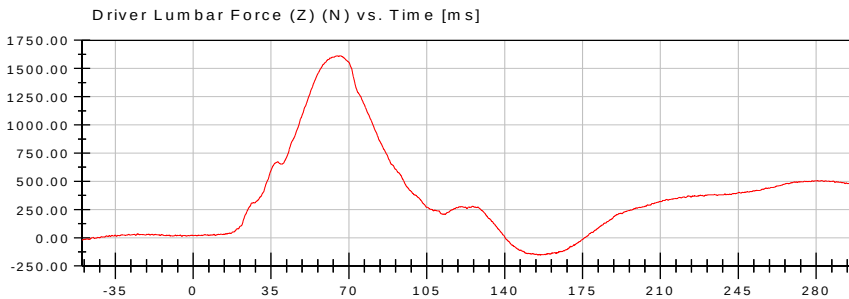
<Max>

1,106.67 N at 52.75 ms

<Min>

-207.53 N at 254.45 ms

CFC_600



<Max>

1,612.45 N at 64.60 ms

<Min>

-153.25 N at 156.00 ms

CFC_600

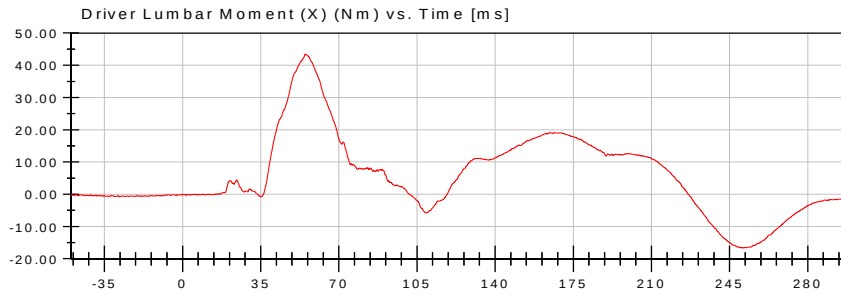


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

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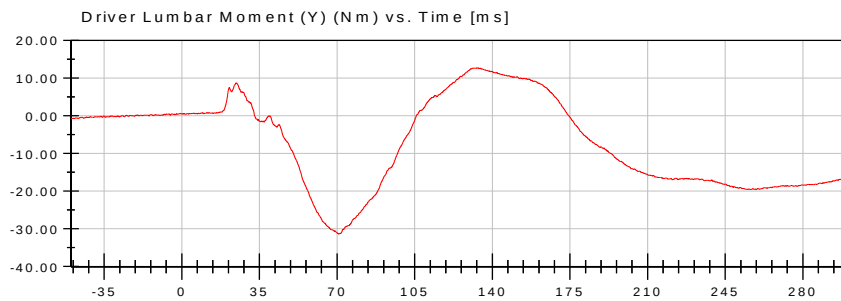
<Max>

43.48 Nm at 54.90 ms

<Min>

-16.66 Nm at 251.20 ms

CFC_600



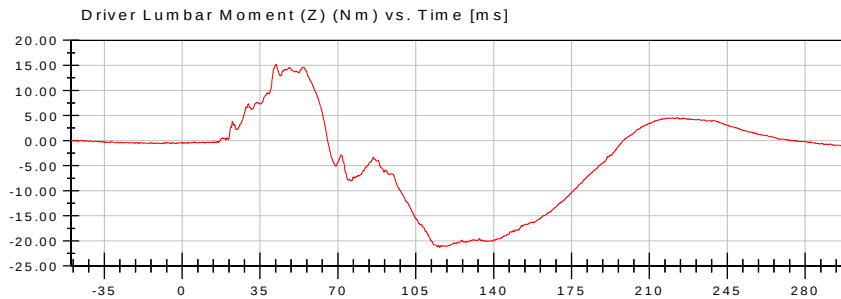
<Max>

12.73 Nm at 133.60 ms

<Min>

-31.39 Nm at 70.80 ms

CFC_600



<Max>

15.19 Nm at 42.20 ms

<Min>

-21.28 Nm at 115.70 ms

CFC_600

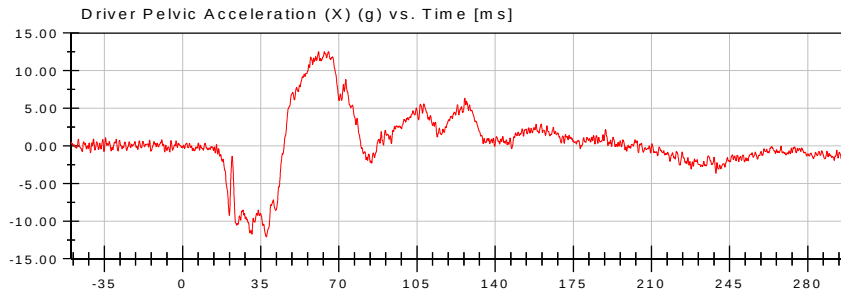


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



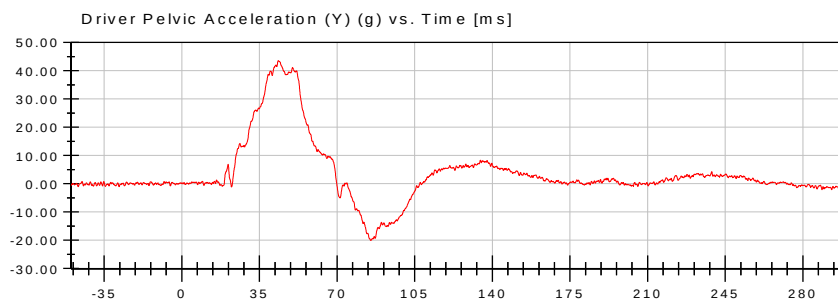
<Max>

12.53 g at 63.50 ms

<Min>

-12.10 g at 37.55 ms

CFC_600



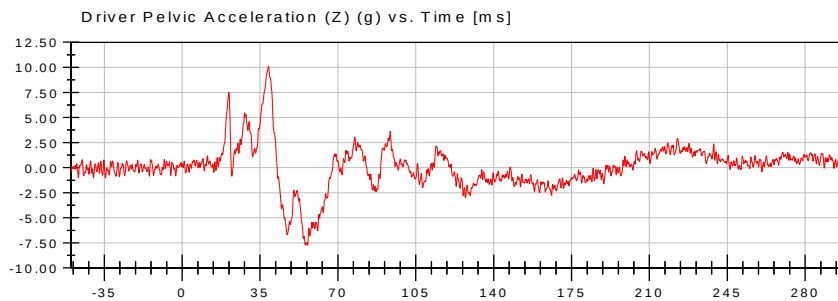
<Max>

43.54 g at 43.45 ms

<Min>

-20.03 g at 85.10 ms

CFC_600



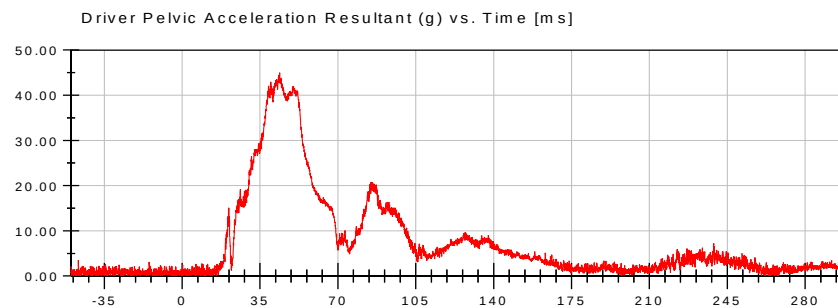
<Max>

10.10 g at 38.80 ms

<Min>

-7.73 g at 56.40 ms

CFC_600



<Max>

44.95 g at 43.80 ms

<Min>

0.05 g at -27.20 ms

Prefiltered_> CFC 1000

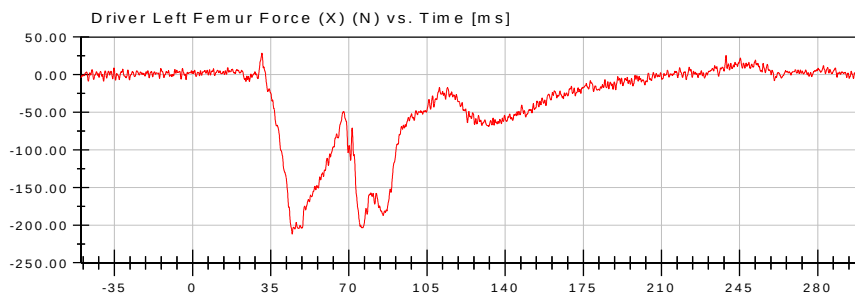


NHTSA

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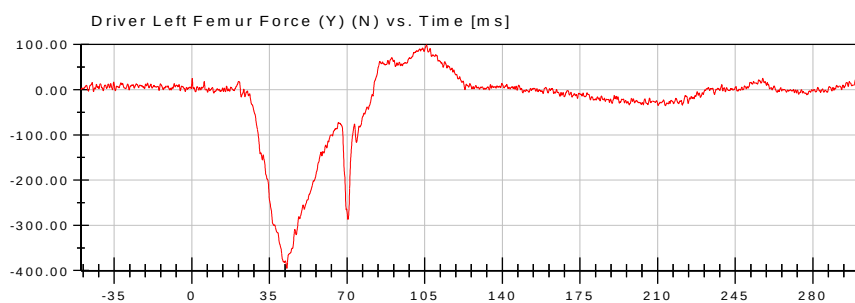
<Max>

28.52 N at 31.10 ms

<Min>

-211.98 N at 44.65 ms

CFC_600



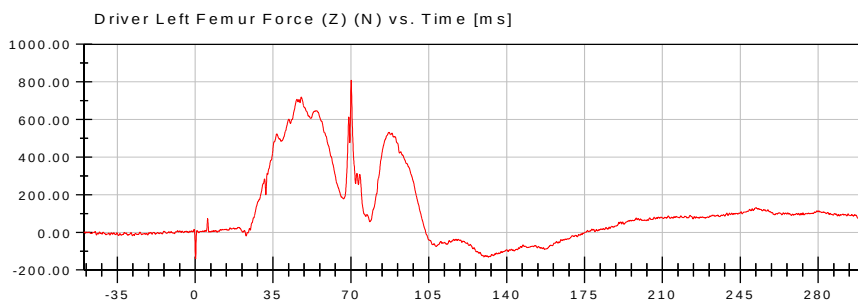
<Max>

98.98 N at 105.85 ms

<Min>

-395.06 N at 42.85 ms

CFC_600



<Max>

809.07 N at 70.10 ms

<Min>

-139.89 N at 0.20 ms

CFC_600



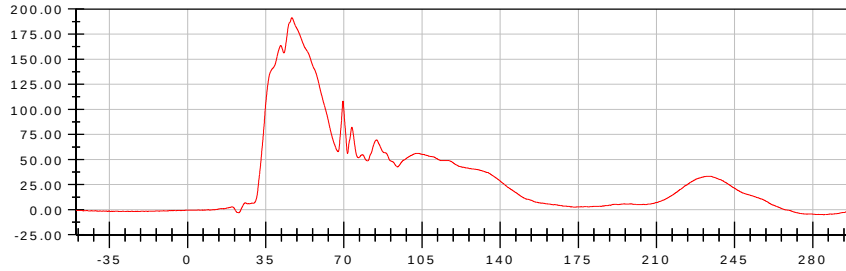
NHTSA

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Driver Left Femur Moment (X) (Nm) vs. Time [ms]



<Max>

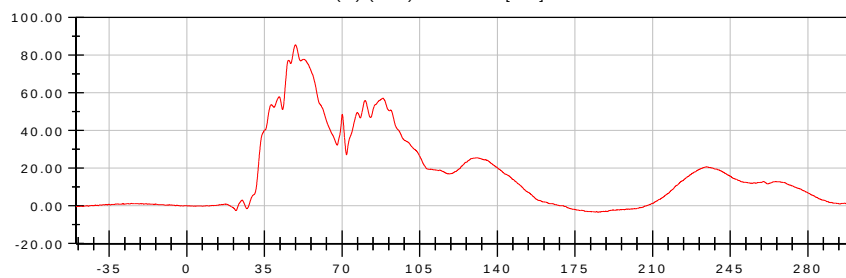
191.32 Nm at 46.75 ms

<Min>

-5.04 Nm at 284.95 ms

CFC_600

Driver Left Femur Moment (Y) (Nm) vs. Time [ms]



<Max>

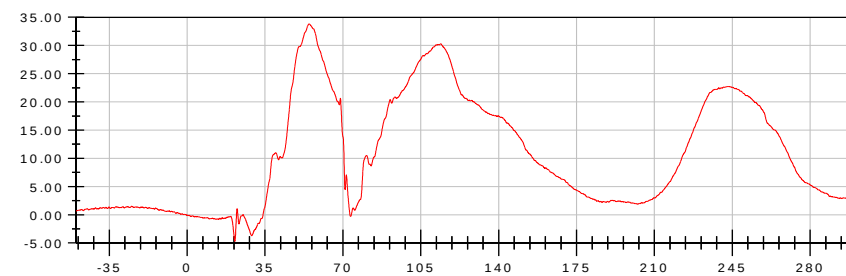
85.46 Nm at 49.00 ms

<Min>

-3.38 Nm at 185.45 ms

CFC_600

Driver Left Femur Moment (Z) (Nm) vs. Time [ms]



<Max>

33.83 Nm at 54.80 ms

<Min>

-4.72 Nm at 21.40 ms

CFC_600

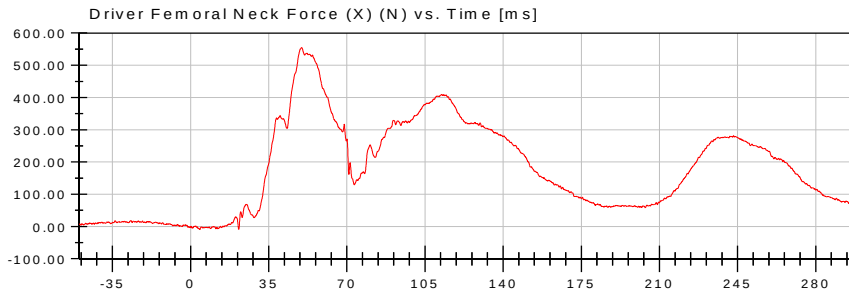


NHTSA

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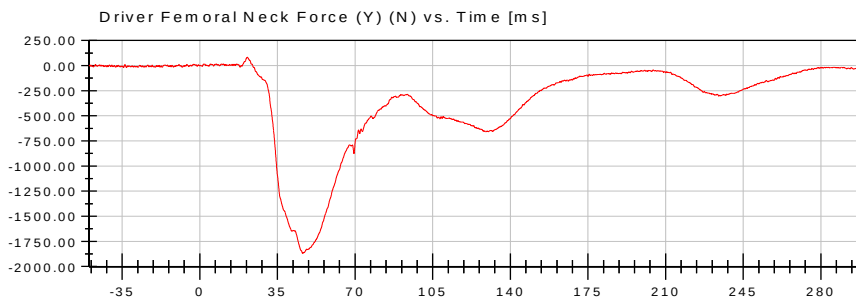
<Max>

554.43 N at 49.80 ms

<Min>

-9.43 N at 4.20 ms

CFC_600



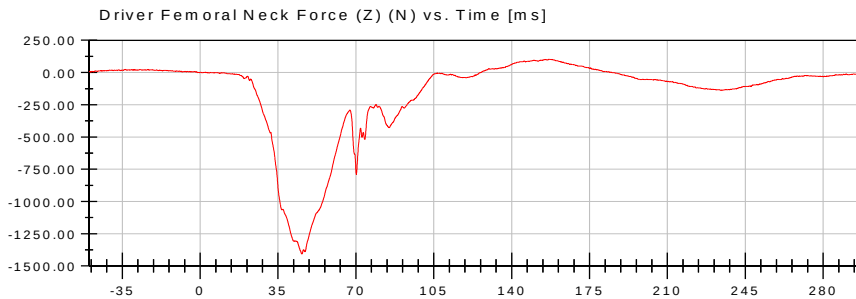
<Max>

82.85 N at 21.45 ms

<Min>

-1,869.71 N at 46.35 ms

CFC_600



<Max>

102.20 N at 156.75 ms

<Min>

-1,406.06 N at 45.70 ms

CFC_600



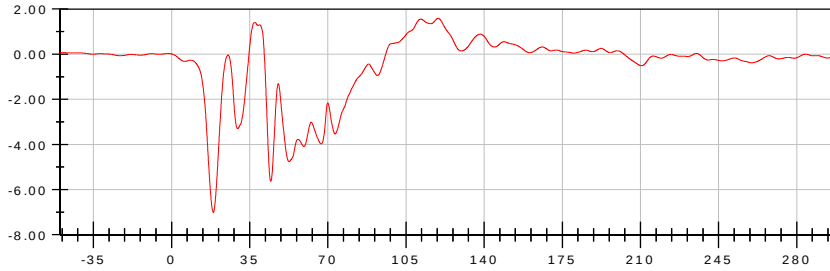
NHTSA

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Vehicle Center of Gravity Acceleration (X) (g) vs. Time [ms]



<Max>

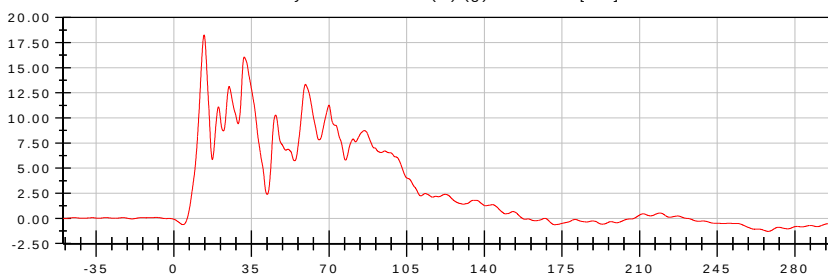
1.59 g at 119.40 ms

<Min>

-7.02 g at 18.70 ms

CFC_60

Vehicle Center of Gravity Acceleration (Y) (g) vs. Time [ms]



<Max>

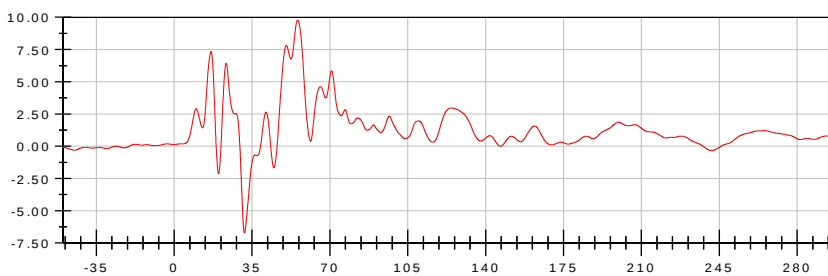
18.26 g at 13.65 ms

<Min>

-1.29 g at 268.00 ms

CFC_60

Vehicle Center of Gravity Acceleration (Z) (g) vs. Time [ms]



<Max>

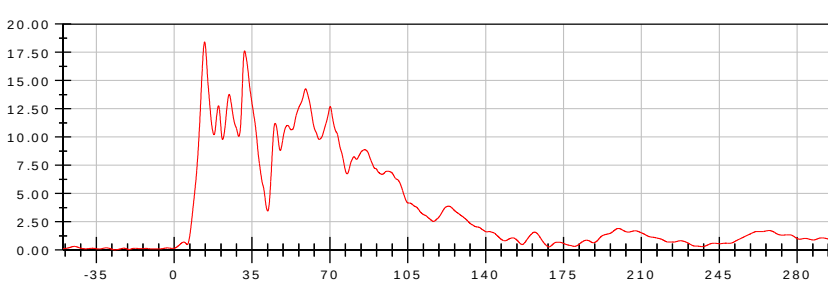
9.77 g at 55.50 ms

<Min>

-6.71 g at 31.60 ms

CFC_60

Vehicle Center of Gravity Acceleration Resultant (g) vs. Time [ms]



<Max>

18.41 g at 13.70 ms

<Min>

0.02 g at -26.75 ms

CFC_60

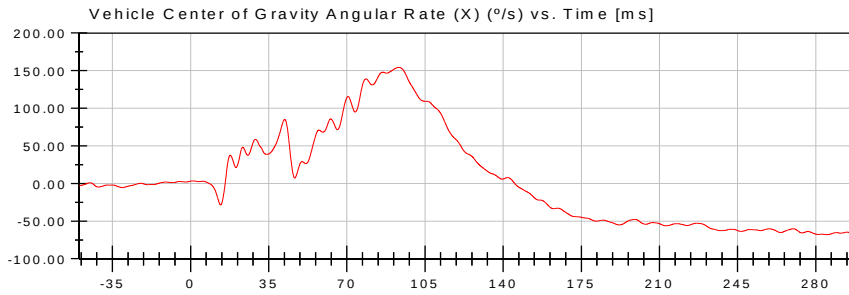


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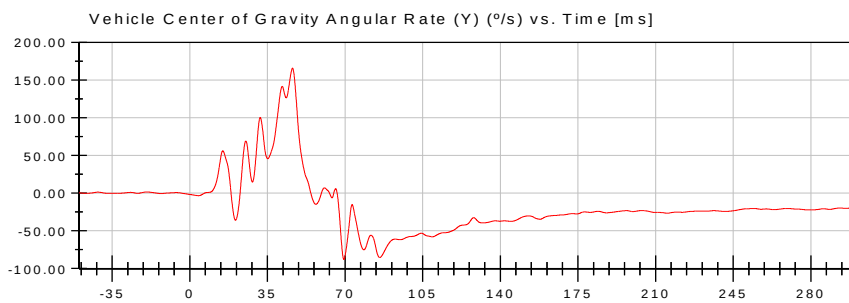
<Max>

154.34 °/s at 93.30 ms

<Min>

-69.72 °/s at 300.00 ms

CFC_60



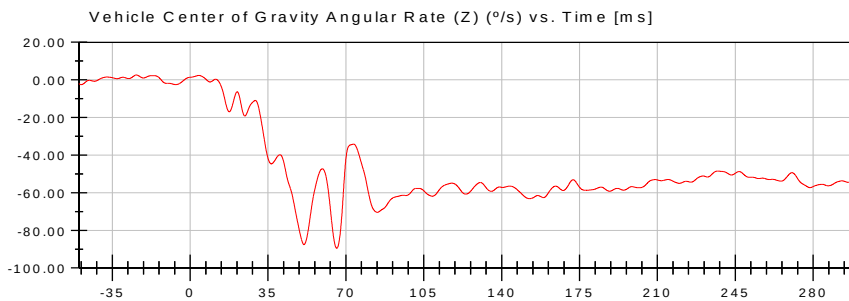
<Max>

166.01 °/s at 46.30 ms

<Min>

-87.96 °/s at 69.45 ms

CFC_60



<Max>

2.57 °/s at -24.15 ms

<Min>

-89.55 °/s at 65.90 ms

CFC_60



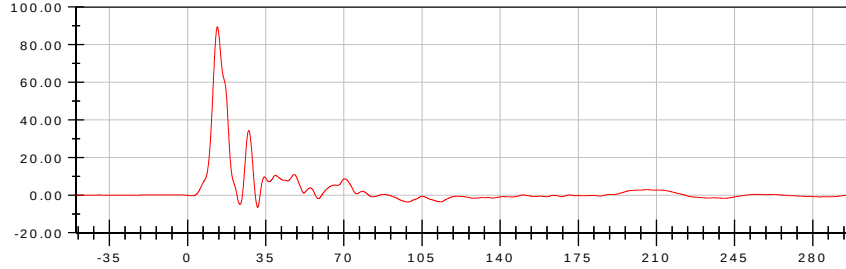
NHTSA

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Test Lab: CTF

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Left Floor Sill Acceleration (Y) (g) vs. Time [ms]



<Max>

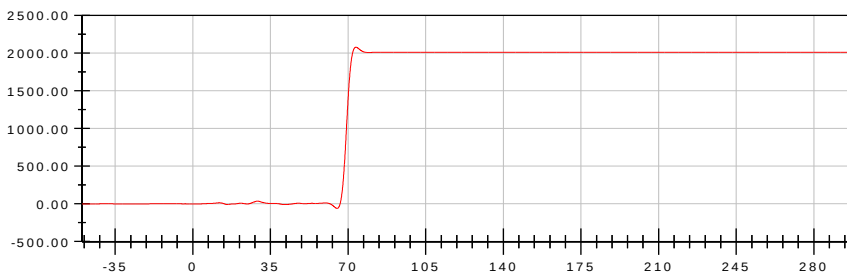
89.46 g at 13.35 ms

<Min>

-6.54 g at 31.45 ms

CFC_60

Left A-Pillar Sill Acceleration (Y) (g) vs. Time [ms]



<Max>

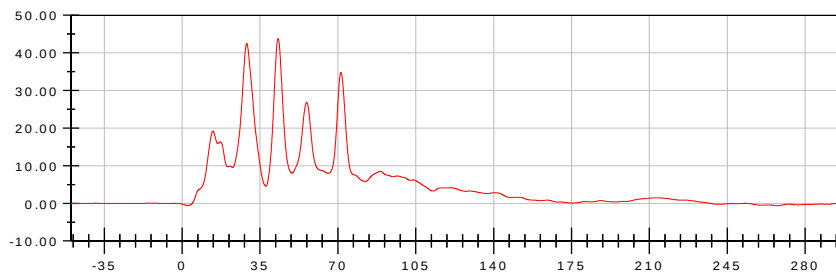
2,079.24 g at 73.55 ms

<Min>

-60.45 g at 65.05 ms

CFC_60

Left Lower A-Pillar Acceleration (Y) (g) vs. Time [ms]



<Max>

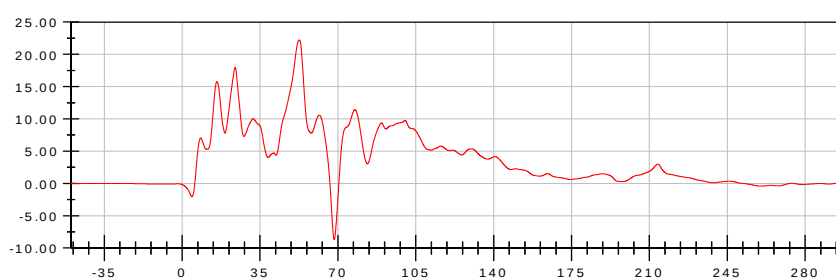
43.81 g at 43.10 ms

<Min>

-0.62 g at 267.60 ms

CFC_60

Left Mid A-Pillar Acceleration (Y) (g) vs. Time [ms]



<Max>

22.24 g at 52.65 ms

<Min>

-8.71 g at 68.35 ms

CFC_60



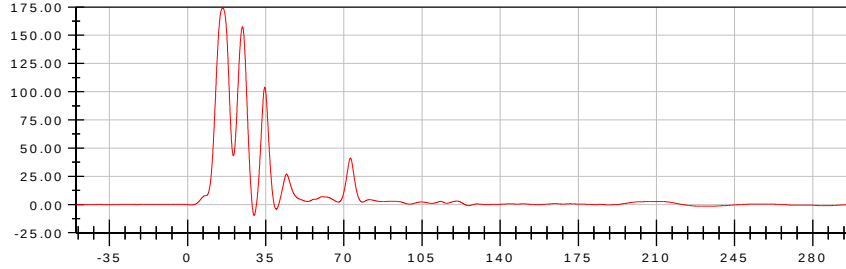
NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)

Left B-Pillar Sill Acceleration (Y) (g) vs. Time [ms]



<Max>

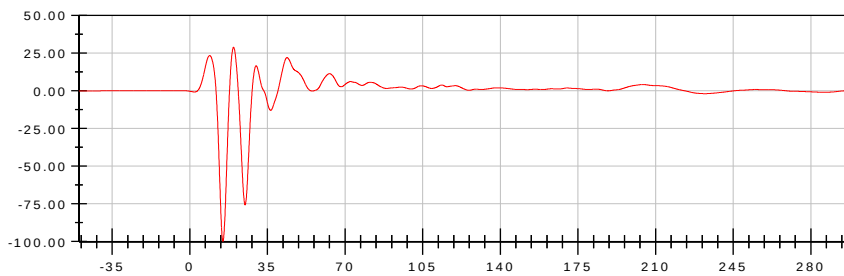
174.05 g at 15.75 ms

<Min>

-9.72 g at 29.80 ms

CFC_60

Left Lower B-Pillar Acceleration (Y) (g) vs. Time [ms]



<Max>

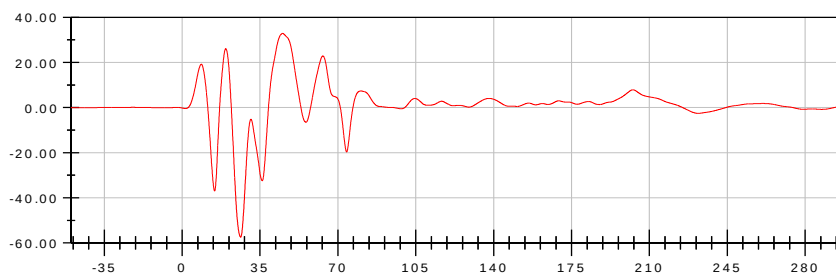
28.96 g at 19.70 ms

<Min>

-99.88 g at 14.95 ms

CFC_60

Left Mid B-Pillar Acceleration (Y) (g) vs. Time [ms]



<Max>

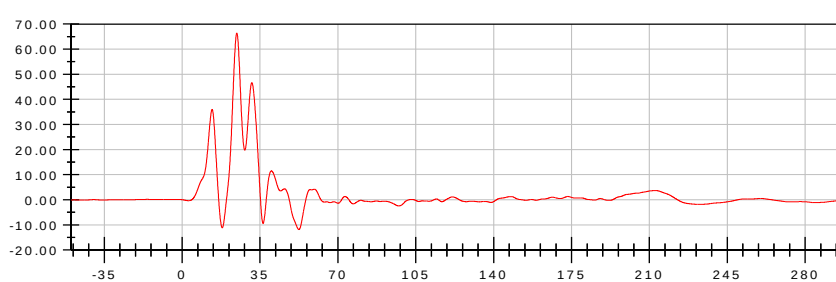
32.85 g at 45.15 ms

<Min>

-57.41 g at 26.25 ms

CFC_60

Driver Seat Track at Dummy H-Point Acceleration (Y) (g) vs. Time [ms]



<Max>

66.37 g at 24.55 ms

<Min>

-11.85 g at 52.45 ms

CFC_60

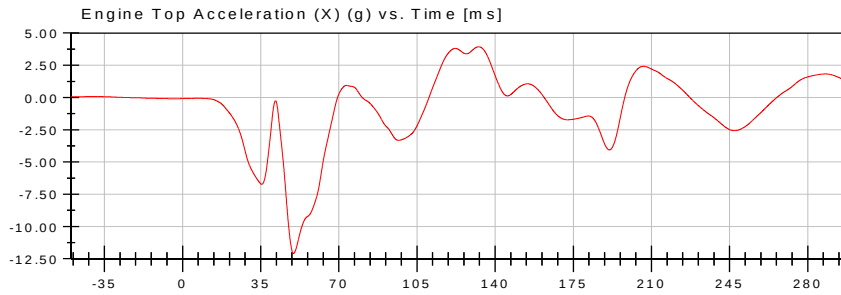


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



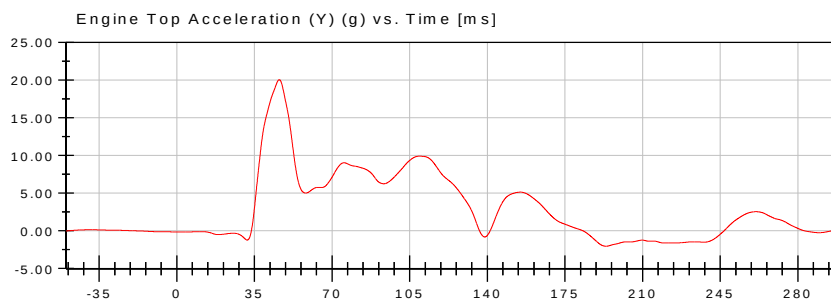
<Max>

3.93 g at 132.60 ms

<Min>

-12.09 g at 49.70 ms

CFC_60



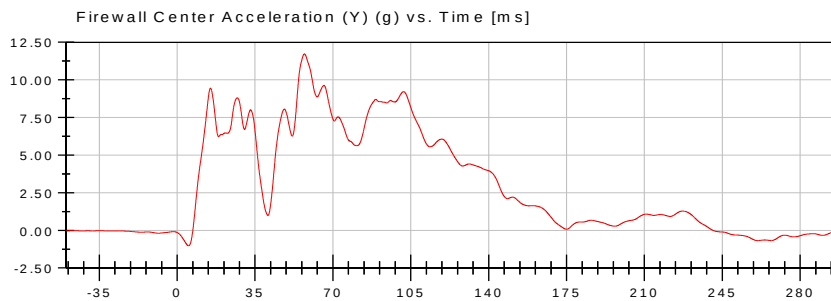
<Max>

20.07 g at 46.20 ms

<Min>

-2.04 g at 193.50 ms

CFC_60



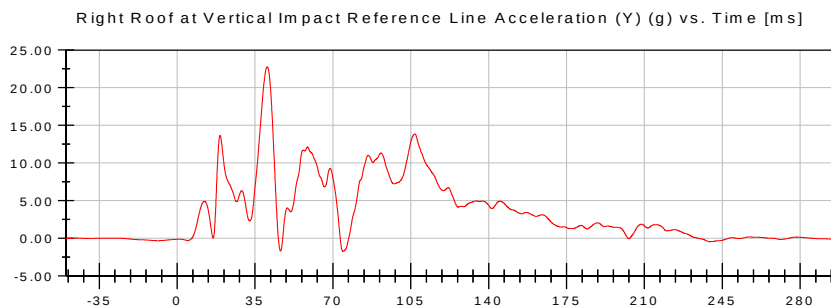
<Max>

11.72 g at 57.15 ms

<Min>

-1.02 g at 5.15 ms

CFC_60



<Max>

22.75 g at 40.50 ms

<Min>

-1.74 g at 74.55 ms

CFC_60

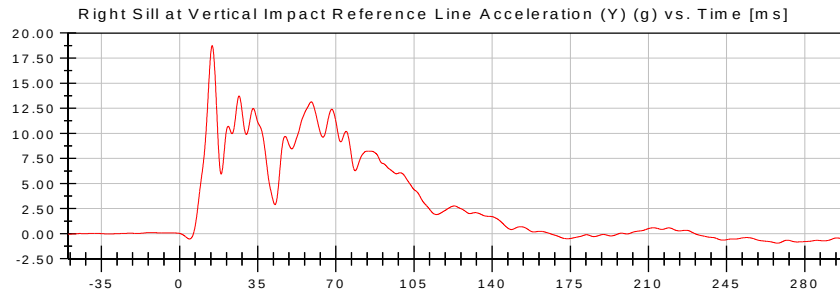


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



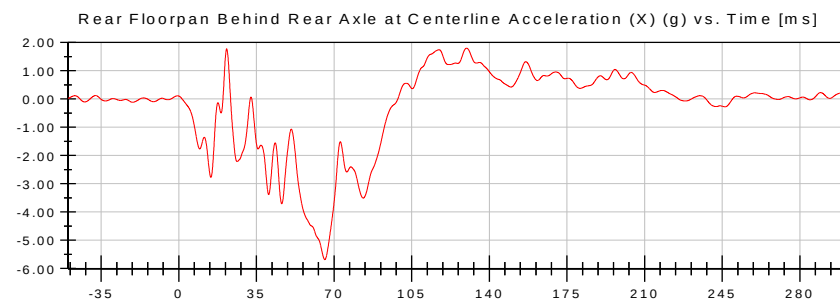
<Max>

18.75 g at 14.60 ms

<Min>

-0.94 g at 267.80 ms

CFC_60



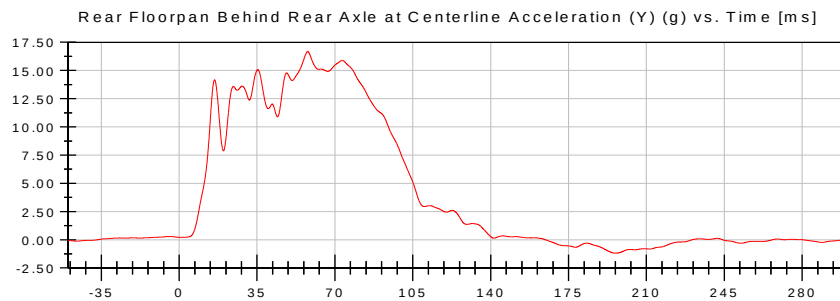
<Max>

1.80 g at 129.75 ms

<Min>

-5.69 g at 65.85 ms

CFC_60



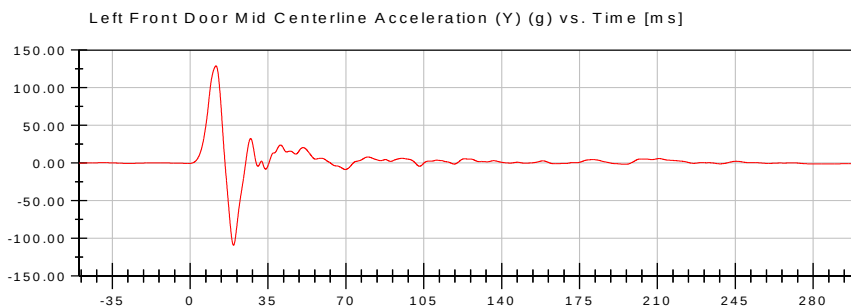
<Max>

16.68 g at 57.80 ms

<Min>

-1.19 g at 195.95 ms

CFC_60



<Max>

128.93 g at 11.60 ms

<Min>

-109.17 g at 19.50 ms

CFC_60



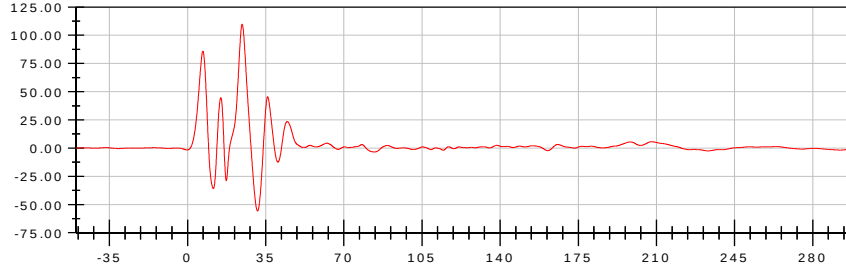
NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)

Left Front Door Mid Rear Acceleration (Y) (g) vs. Time [ms]



<Max>

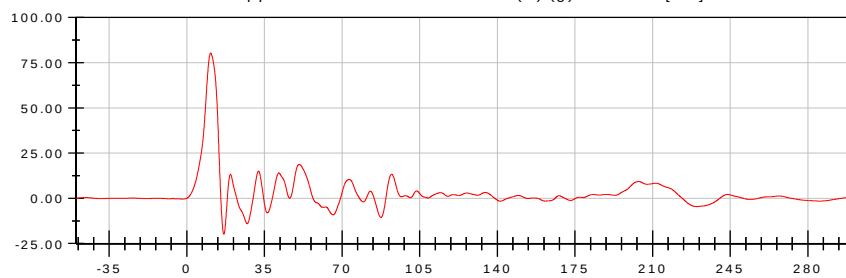
109.74 g at 24.45 ms

<Min>

-55.76 g at 31.35 ms

CFC_60

Left Front Door Upper Centerline Acceleration (Y) (g) vs. Time [ms]



<Max>

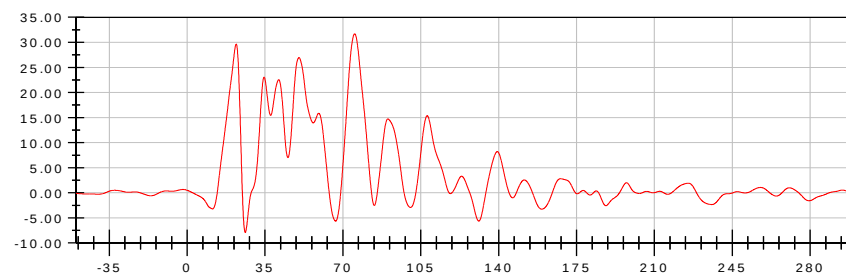
80.34 g at 10.75 ms

<Min>

-19.84 g at 16.70 ms

CFC_60

Left Rear Door Mid Rear Acceleration (Y) (g) vs. Time [ms]



<Max>

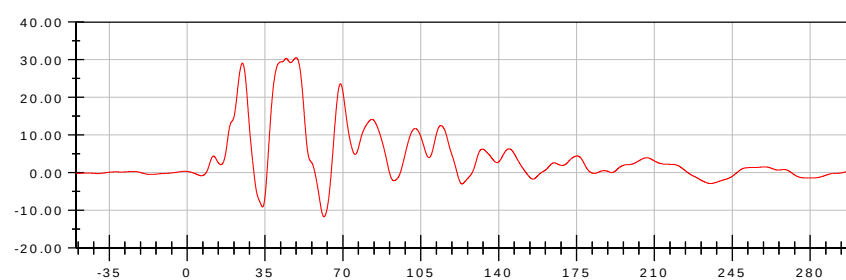
31.70 g at 75.25 ms

<Min>

-7.89 g at 26.10 ms

CFC_60

Left Rear Door Upper Centerline Acceleration (Y) (g) vs. Time [ms]



<Max>

30.52 g at 48.95 ms

<Min>

-11.70 g at 61.50 ms

CFC_60

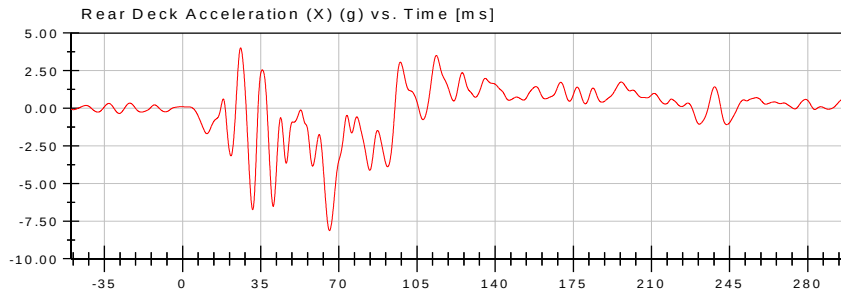


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



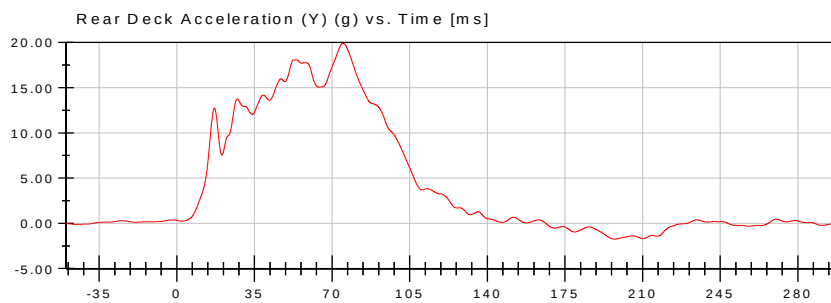
<Max>

4.02 g at 26.00 ms

<Min>

-8.13 g at 65.80 ms

CFC_60



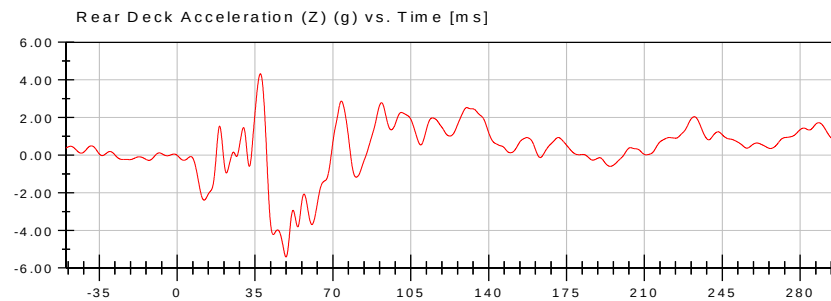
<Max>

19.93 g at 74.90 ms

<Min>

-1.75 g at 197.30 ms

CFC_60



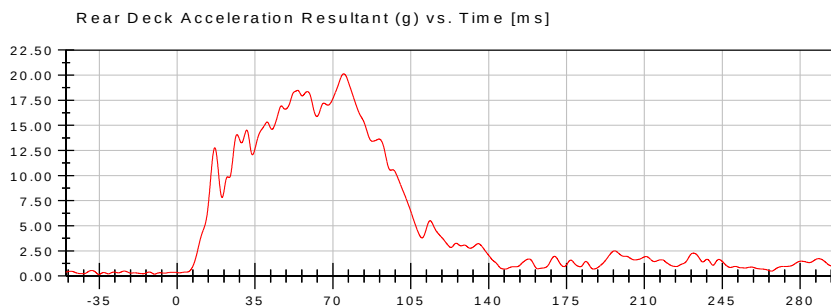
<Max>

4.33 g at 37.40 ms

<Min>

-5.42 g at 48.90 ms

CFC_60



<Max>

20.13 g at 74.90 ms

<Min>

0.14 g at -35.20 ms

CFC_60



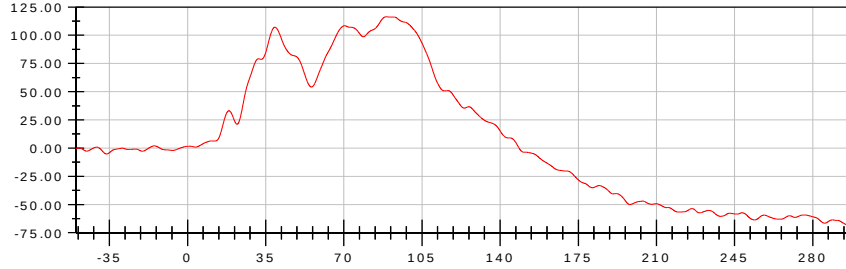
NHTSA

Test Lab: CTF

Test Number: 190729 (R20185382)

Test Date: 07/29/2019

Rear Deck Angular Rate (X) (°/s) vs. Time [ms]



<Max>

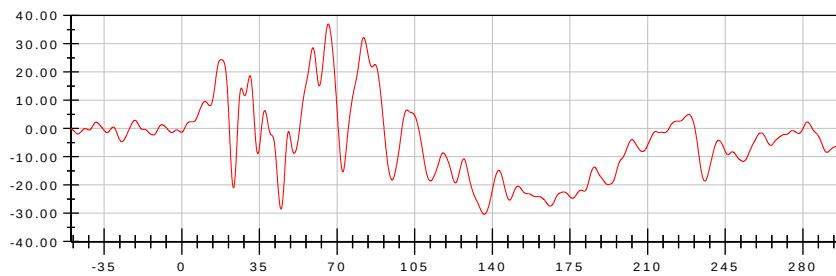
116.32 °/s at 89.05 ms

<Min>

-68.55 °/s at 300.00 ms

CFC_60

Rear Deck Angular Rate (Y) (°/s) vs. Time [ms]



<Max>

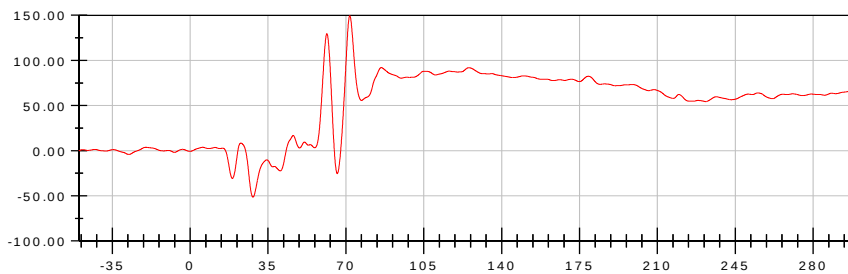
37.01 °/s at 66.00 ms

<Min>

-30.37 °/s at 136.40 ms

CFC_60

Rear Deck Angular Rate (Z) (°/s) vs. Time [ms]



<Max>

149.49 °/s at 71.75 ms

<Min>

-51.46 °/s at 28.20 ms

CFC_60

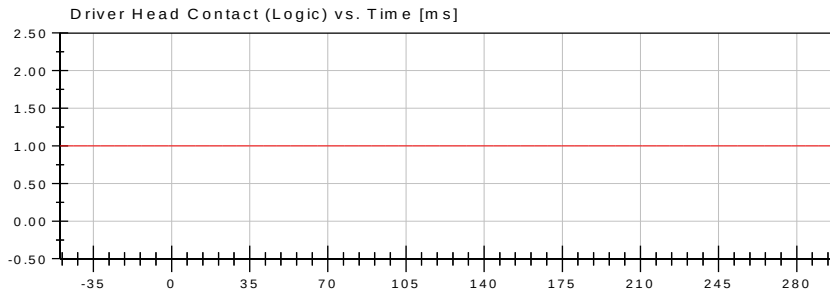


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



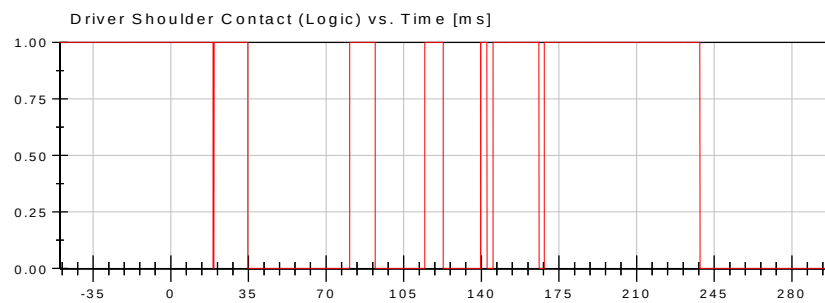
<Max>

1.00 Logic at -50.00 ms

<Min>

1.00 Logic at -50.00 ms

Unfiltered



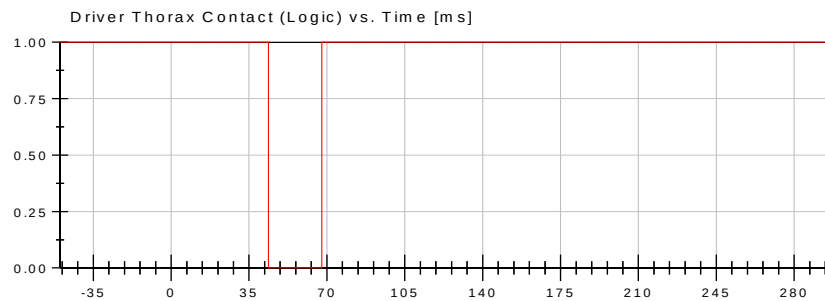
<Max>

1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 19.10 ms

Unfiltered



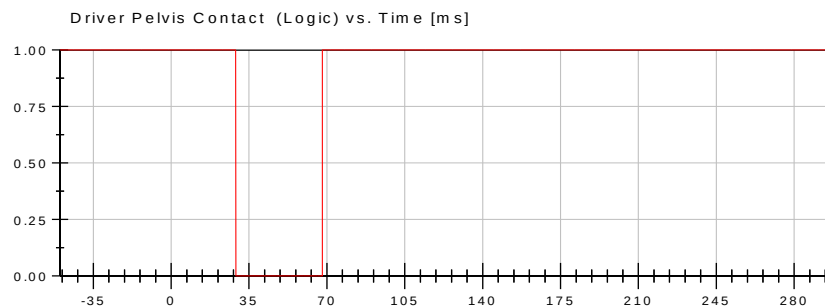
<Max>

1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 43.75 ms

Unfiltered



<Max>

1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 29.05 ms

Unfiltered

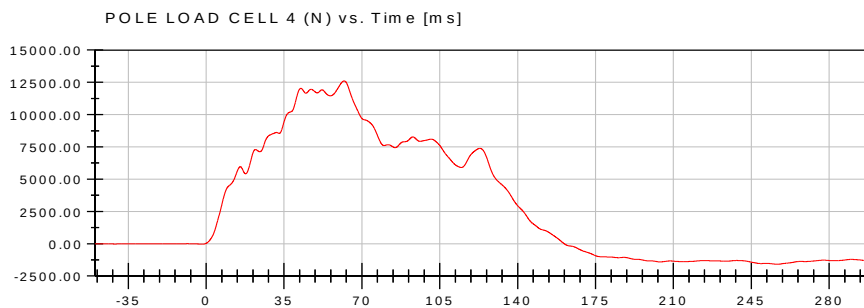
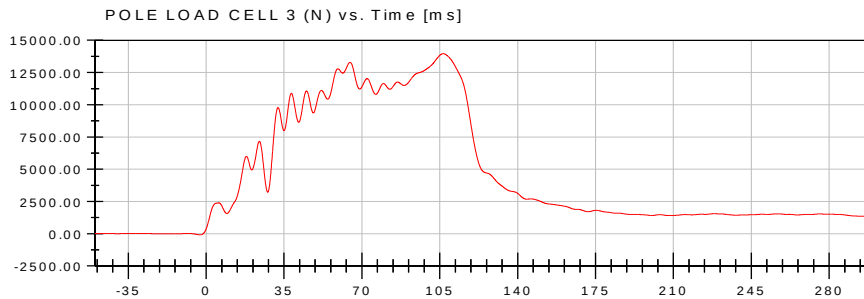
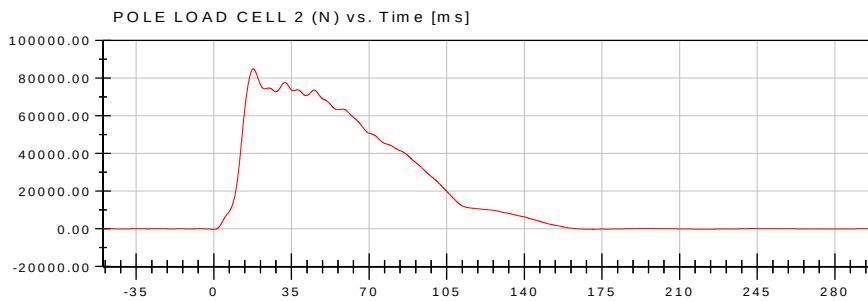
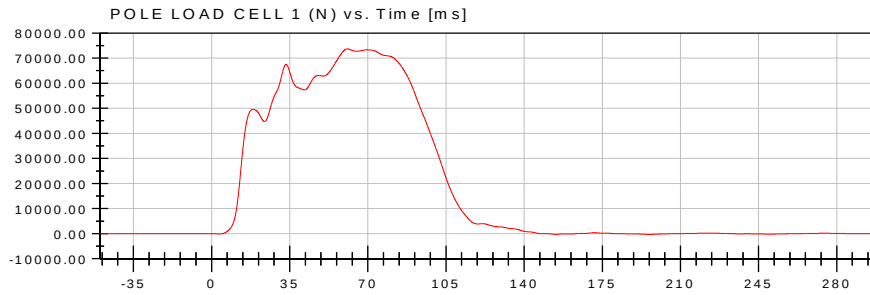


NHTSA

Test Date: 07/29/2019

Test Lab: CTF

Test Number: 190729 (R20185382)



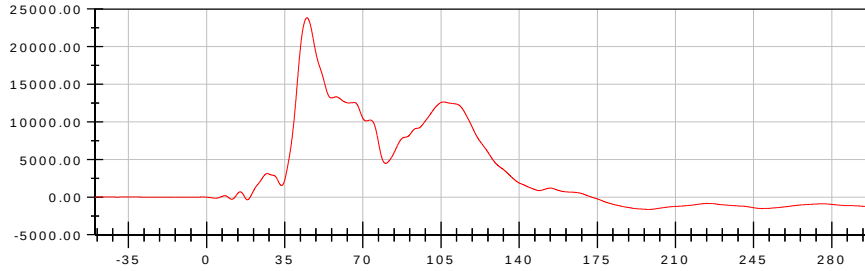
NHTSA

Test Lab: CTF

Test Number: 190729 (R20185382)

Test Date: 07/29/2019

POLE LOAD CELL 5 (N) vs. Time [ms]



<Max>

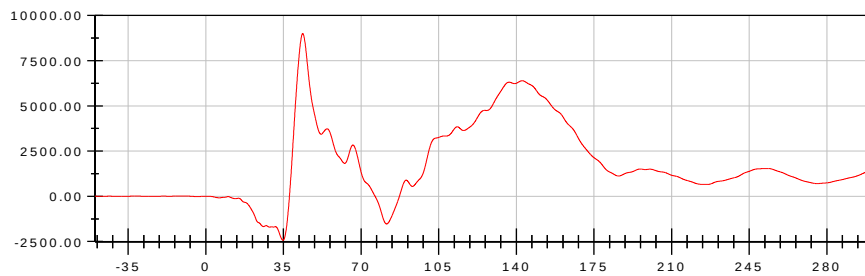
23,830.67 N at 45.00 ms

<Min>

-1,627.47 N at 198.20 ms

CFC_60

POLE LOAD CELL 6 (N) vs. Time [ms]



<Max>

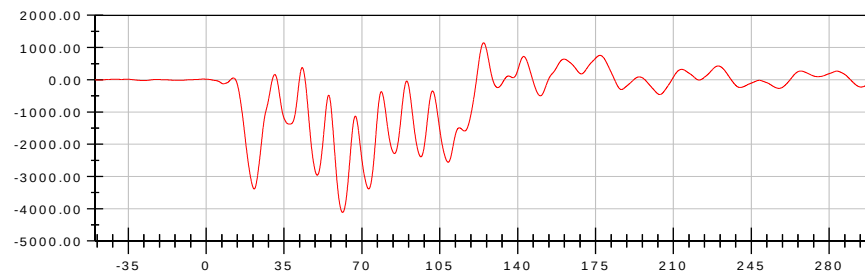
9,002.95 N at 43.70 ms

<Min>

-2,429.63 N at 34.80 ms

CFC_60

POLE LOAD CELL 7 (N) vs. Time [ms]



<Max>

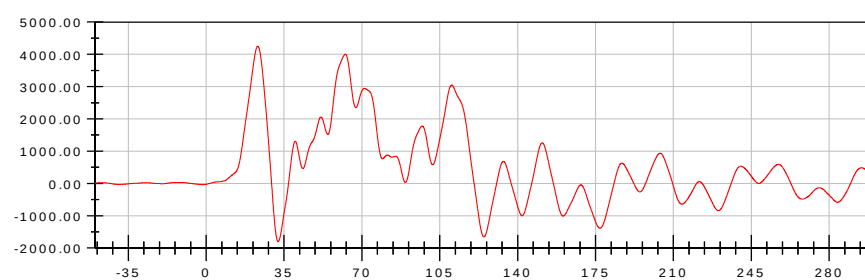
1,145.17 N at 124.70 ms

<Min>

-4,116.07 N at 61.30 ms

CFC_60

POLE LOAD CELL 8 (N) vs. Time [ms]



<Max>

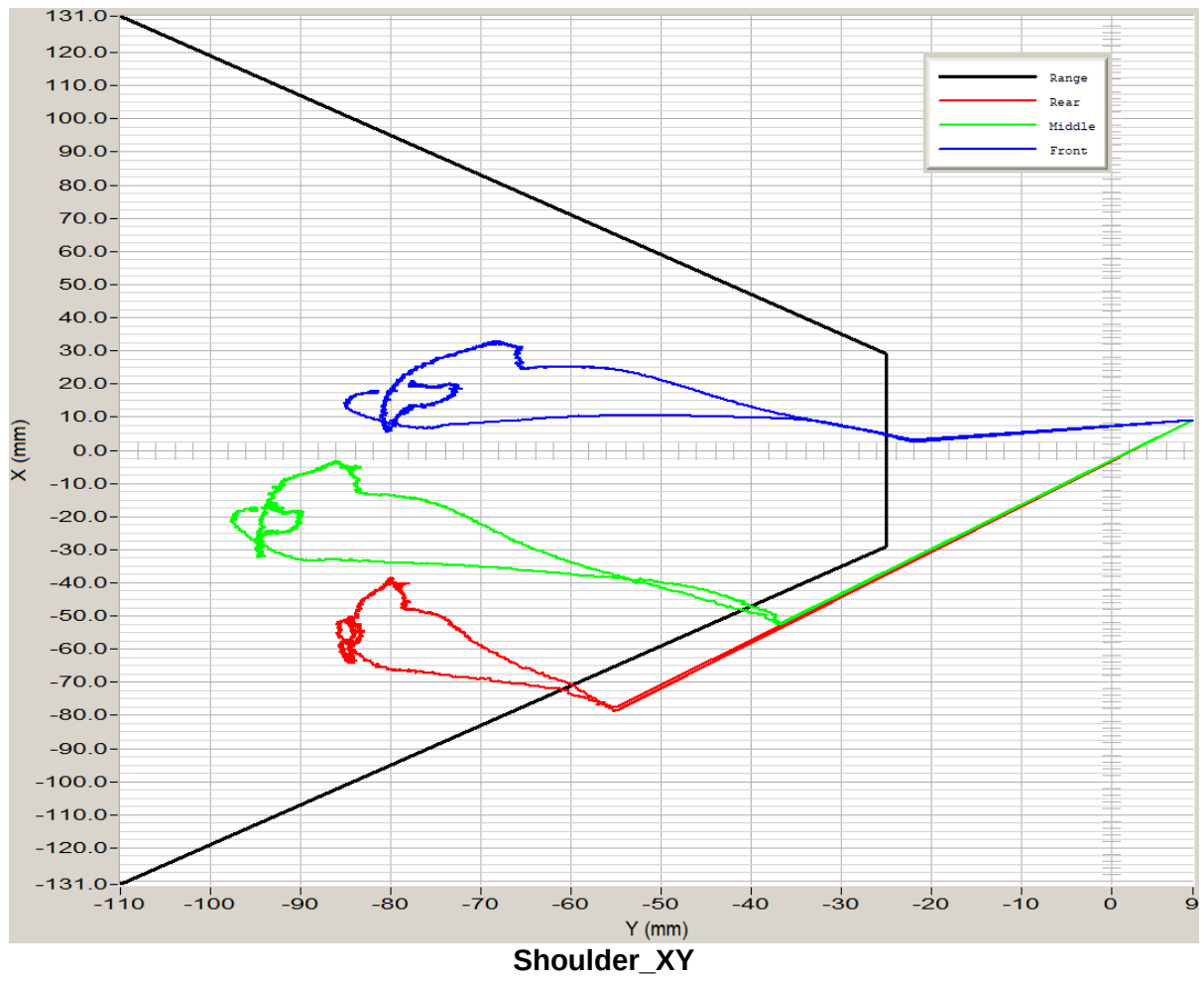
4,250.81 N at 23.15 ms

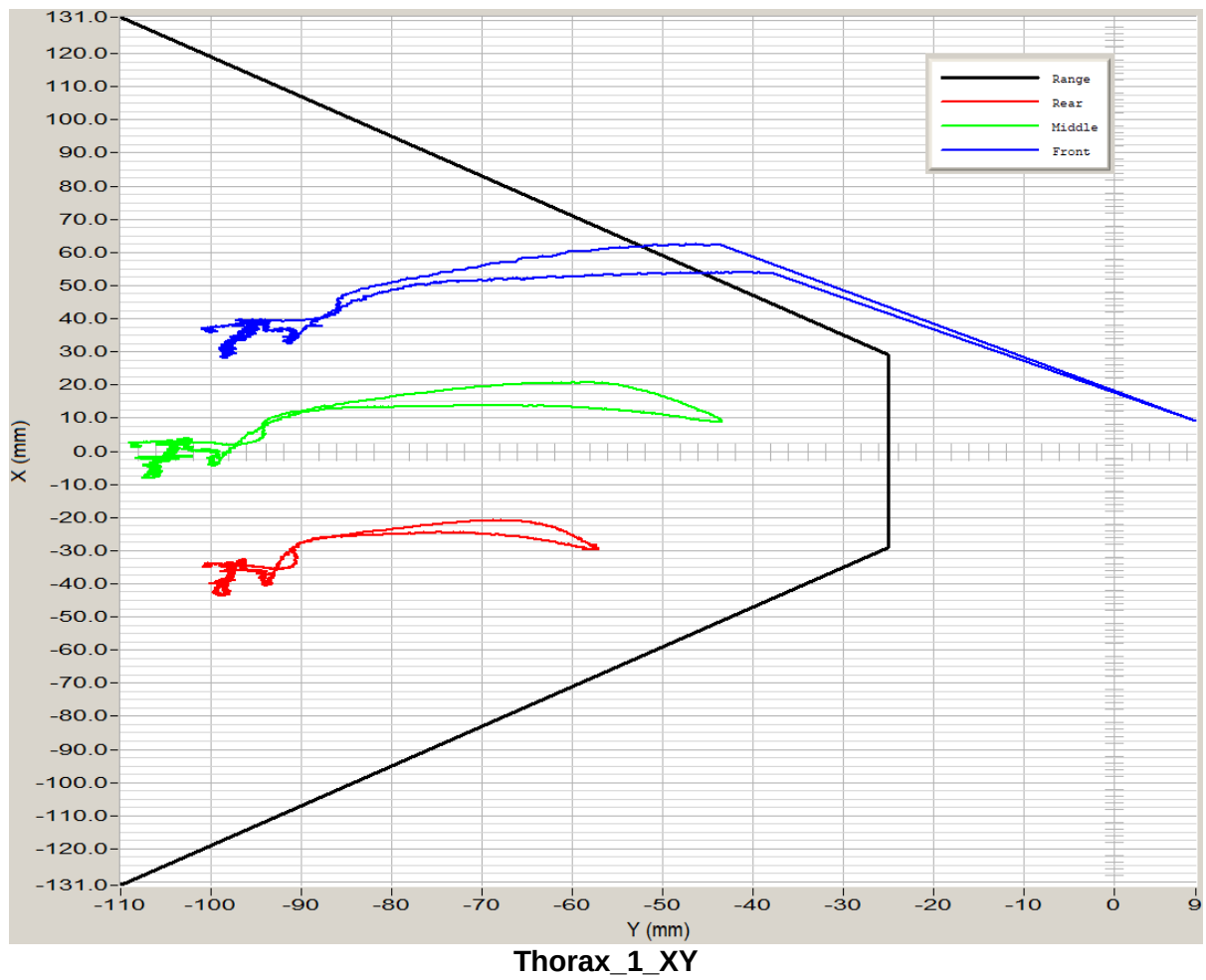
<Min>

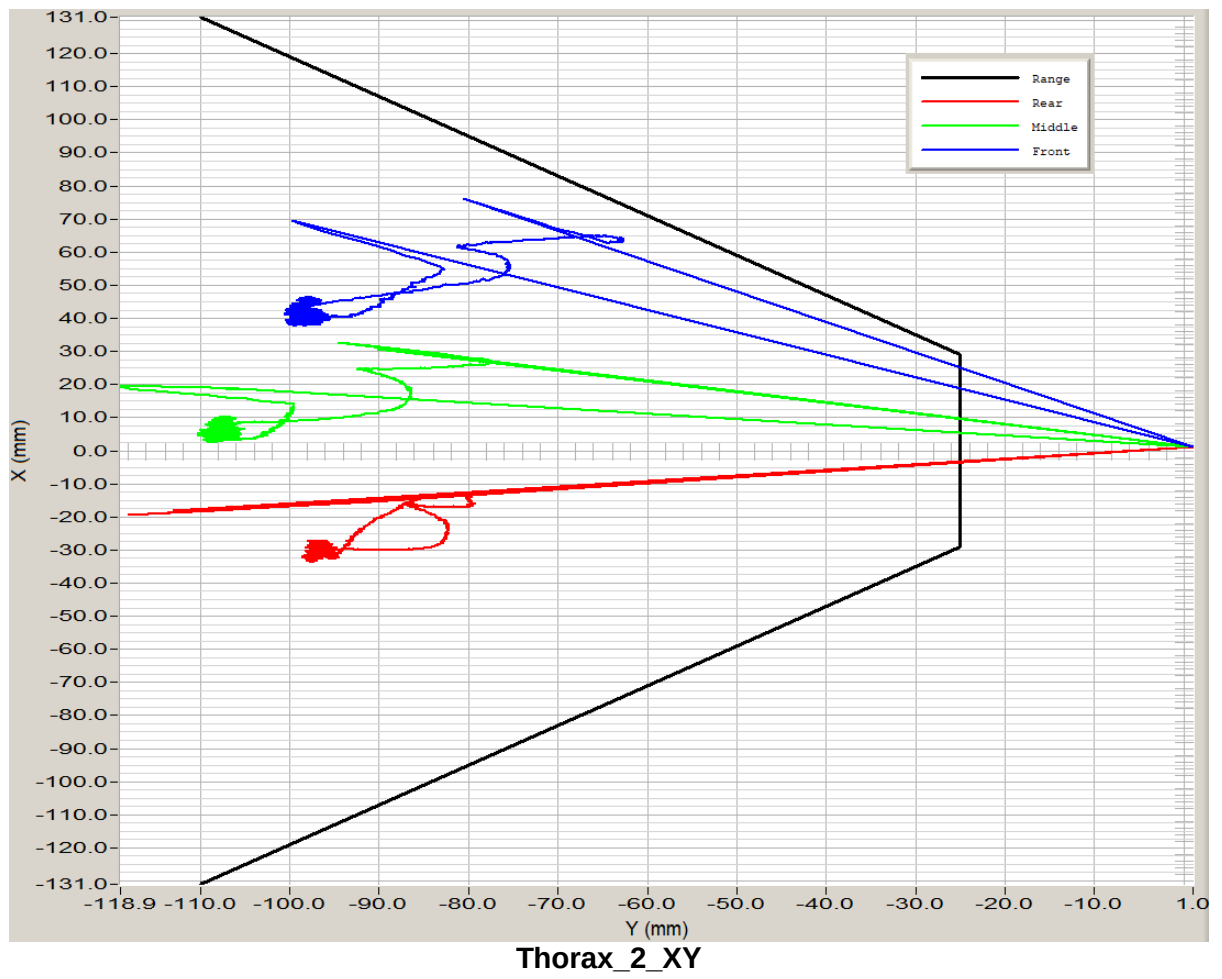
-1,797.14 N at 32.35 ms

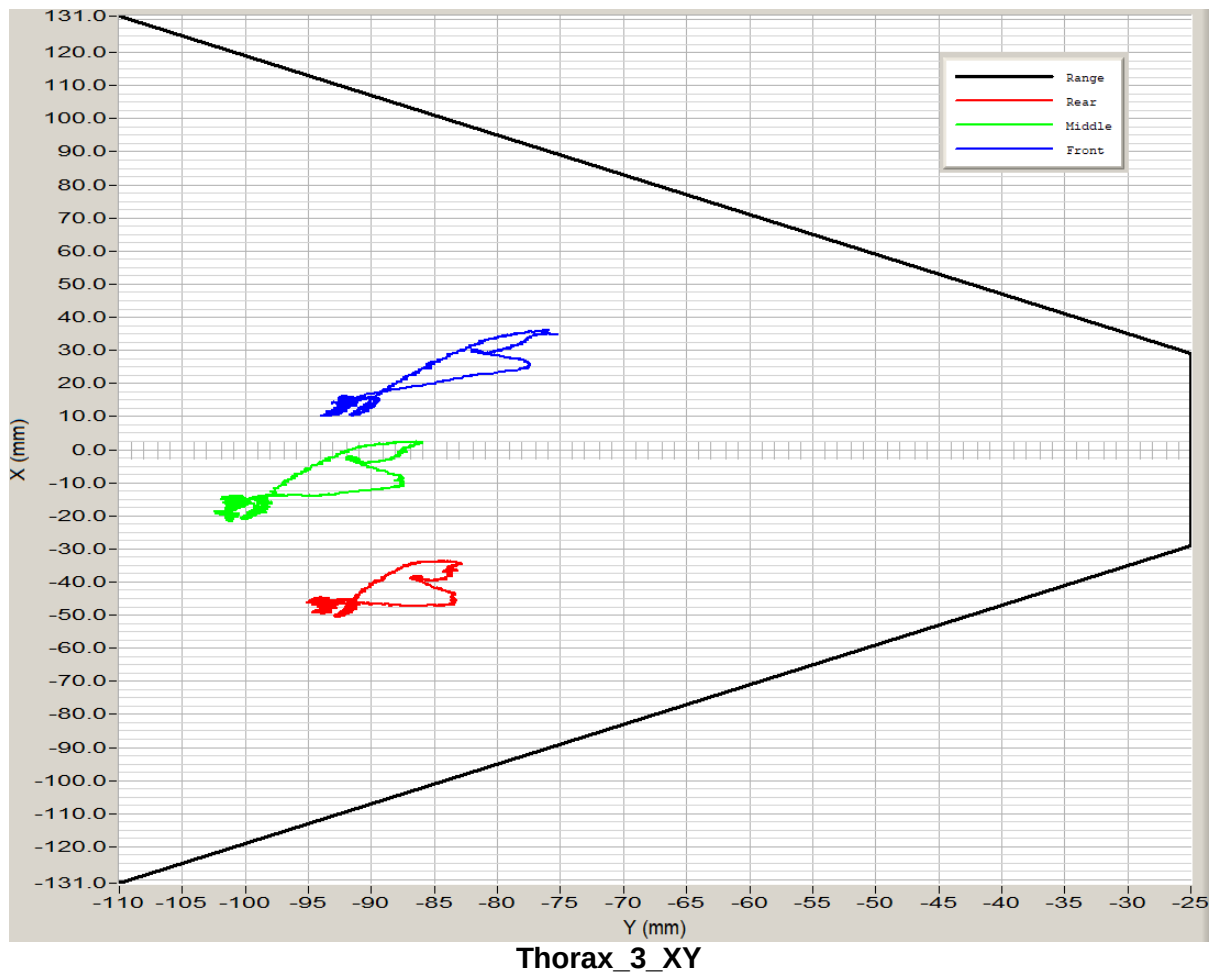
CFC_60

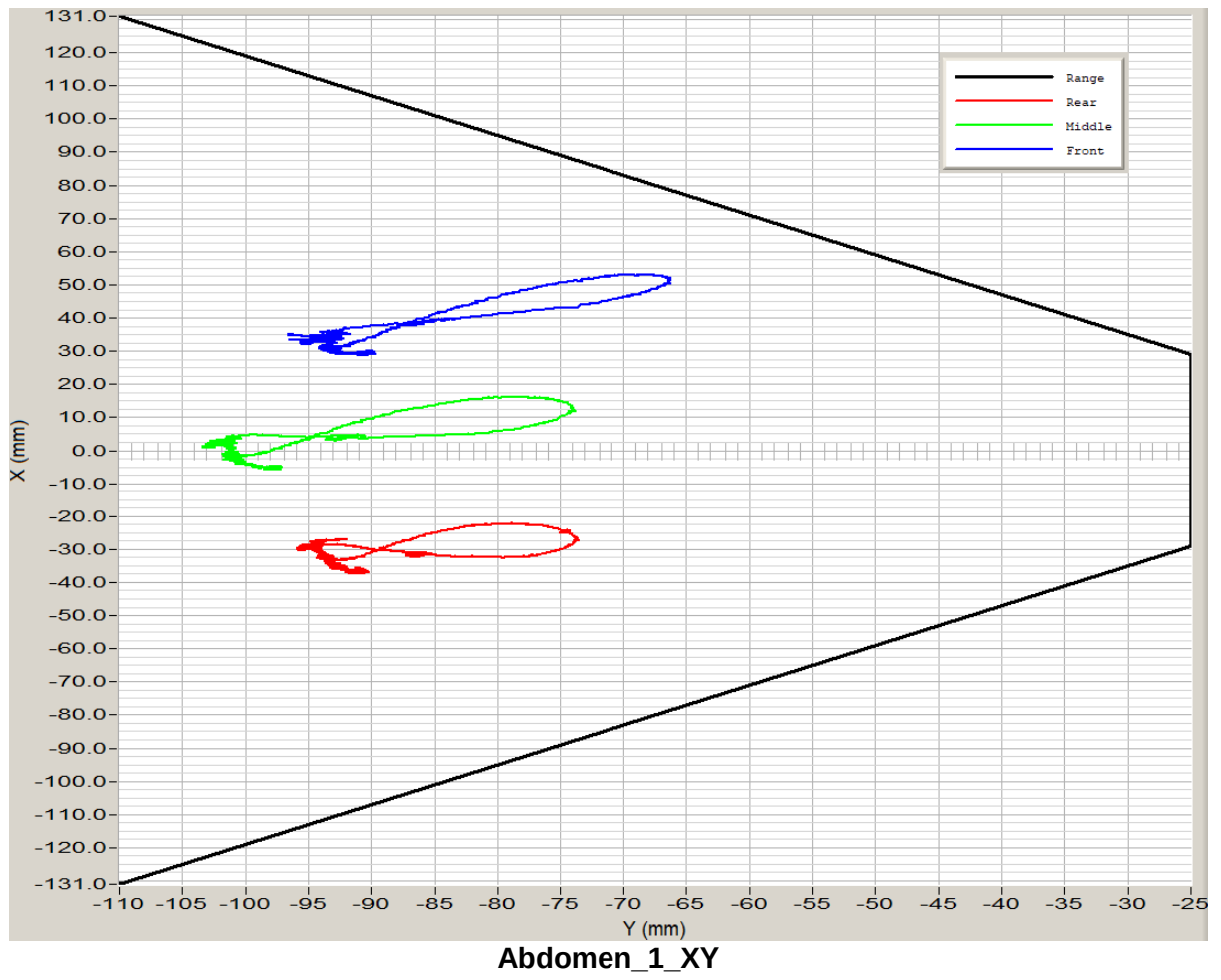


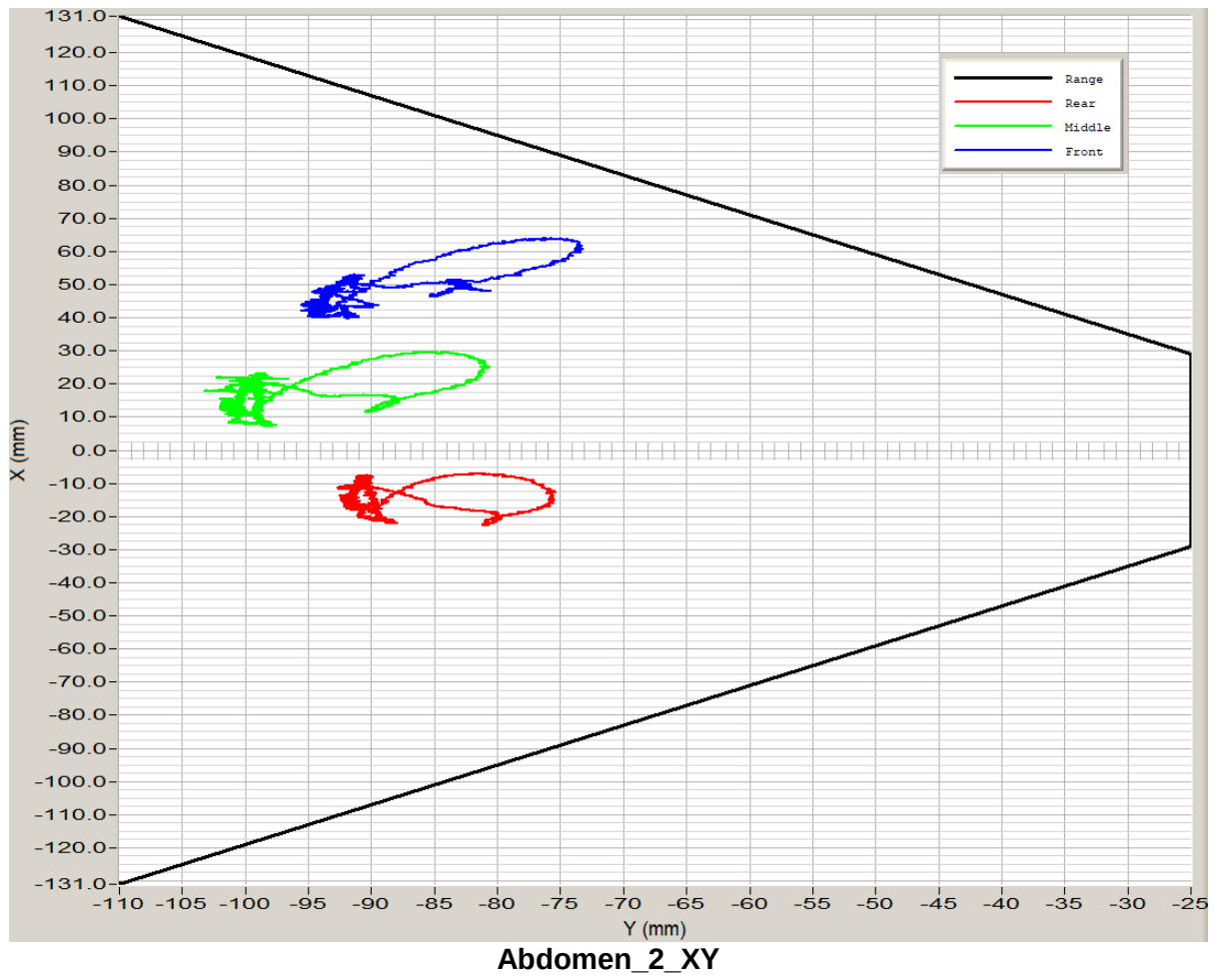












APPENDIX C
DUMMY PERFORMANCE QUALIFICATION TEST DATA

TABLE OF QUALIFICATION MEASUREMENTS AND PLOTS

WorldSID-50M (Driver) Dummy

Description

Table 1. External Measurements

Table 2. Front Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)

Head (X) Acceleration (G's) vs. Time (ms)

Head (Y) Acceleration (G's) vs. Time (ms)

Head (Z) Acceleration (G's) vs. Time (ms)

Table 3. Left Lateral Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)

Head (X) Acceleration (G's) vs. Time (ms)

Head (Y) Acceleration (G's) vs. Time (ms)

Head (Z) Acceleration (G's) vs. Time (ms)

Table 4. Right Lateral Head Drop Test

Resultant Head Acceleration (G's) vs. Time (ms)

Head (X) Acceleration (G's) vs. Time (ms)

Head (Y) Acceleration (G's) vs. Time (ms)

Head (Z) Acceleration (G's) vs. Time (ms)

Table 5. Left Lateral Neck Pendulum Test

Pendulum Acceleration (G's) vs. Time (ms)

Pendulum Velocity (m/s) vs. Time (ms)

Flexion Angle (°) vs. Time (ms)

Forward Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Rear Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Center Headform Potentiometer Rotation at CG (°) vs. Time (ms)

Neck Force Y (N) vs. Time (ms)

Neck Force Y (N) Filtered for Total Neck Occipital Condyle Moment Calculation vs. Time (ms)

Neck Moment X (Nm) vs. Time (ms)

Total Neck Occipital Condyle Moment X (Nm) vs. Time (ms)

Table 6. Right Lateral Neck Pendulum Test

Pendulum Acceleration (G's) vs. Time (ms)

Pendulum Velocity (m/s) vs. Time (ms)

Flexion Angle (°) vs. Time (ms)

Forward Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Rear Potentiometer Rotation at Base of Pendulum (°) vs. Time (ms)

Center Headform Potentiometer Rotation at CG (°) vs. Time (ms)

Neck Force Y (N) vs. Time (ms)

Neck Force Y (N) Filtered for Total Neck Occipital Condyle Moment Calculation vs. Time (ms)

Neck Moment X (Nm) vs. Time (ms)

Total Neck Occipital Condyle Moment X (Nm) vs. Time (ms)

Table 7. Left Lateral Shoulder Impact Test

Impactor Acceleration (G's) vs. Time (ms)

Impactor Force (N) vs. Time (ms)

Shoulder Displacement (mm) vs. Time (ms)

Table 8. Left Lateral Thorax with Arm Impact Test

Impactor Acceleration (G's) vs. Time (ms)

Impactor Force (N) vs. Time (ms)

TABLE OF QUALIFICATION MEASUREMENTS AND PLOTS (CONTUNUED)

WorldSID-50M (Driver) Dummy

Description

Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)
Upper Thorax Rib Displacement (mm) vs. Time (ms)
Center Thorax Rib Displacement (mm) vs. Time (ms)
Lower Thorax Rib Displacement (mm) vs. Time (ms)

Table 9. Left Lateral Thorax without Arm Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Impactor Force (N) vs. Time (ms)
Upper Spine Acceleration (G's) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)
Upper Thorax Rib Displacement (mm) vs. Time (ms)
Center Thorax Rib Displacement (mm) vs. Time (ms)
Lower Thorax Rib Displacement (mm) vs. Time (ms)

Table 10. Left Lateral Abdomen Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Impactor Force (N) vs. Time (ms)
Upper Abdominal Rib Displacement (mm) vs. Time (ms)
Lower Abdominal Rib Displacement (mm) vs. Time (ms)
Lower Spine Acceleration (G's) vs. Time (ms)

Table 11. Left Lateral Pelvis Impact Test

Impactor Acceleration (G's) vs. Time (ms)
Impactor Force (N) vs. Time (ms)
Pelvis Acceleration Y (G's) vs. Time (ms)
Lower Spine Acceleration Y (G's) vs. Time (ms)

Pre-Test Calibration Sheets
Driver S/N EB8888

Transportation Research Center Inc.

Front Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 1-3

Test Date: 7/2/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	205 - 255 g	210.6 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-5.7 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	0.64 %	Yes

Test meets specifications.

Condition: Used

Comments:

Head S/N: EG2845

Specification Source: WorldSID 50th Qualification Manual, dated Aug. 2016
with Polarity in accordance with J211

07.02.2019 09:51:55 953



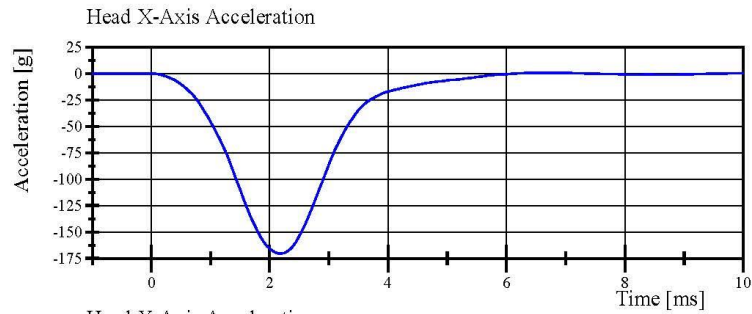
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Transportation Research Center Inc.

Front Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 1-3

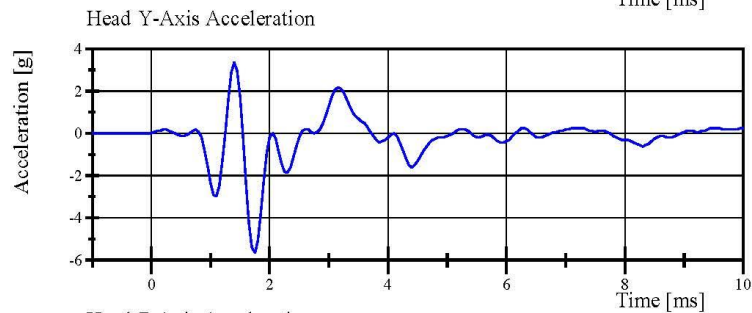
Test Date: 7/2/2019



Filter Class: CFC_1000

Max: 0.9 g at 6.6 ms

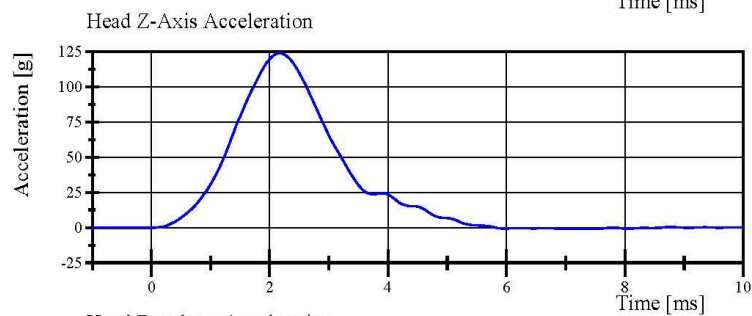
Min: -170.3 g at 2.2 ms



Filter Class: CFC_1000

Max: 3.4 g at 1.4 ms

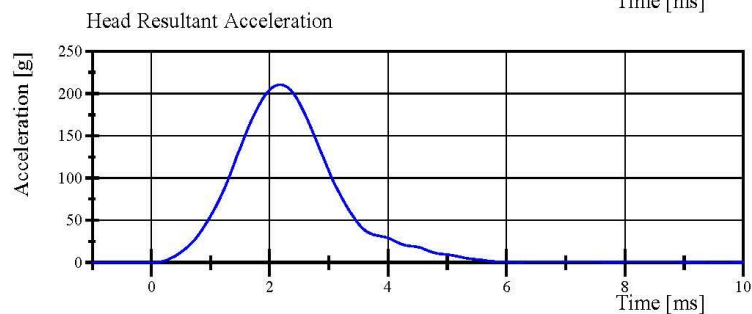
Min: -5.7 g at 1.8 ms



Filter Class: CFC_1000

Max: 123.9 g at 2.2 ms

Min: -1.0 g at 7.0 ms



Filter Class: CFC_1000

Max: 210.6 g at 2.2 ms

Min: 0.0 g at -1.0 ms

Specification Source: WorldSID 50th Qualification Manual, dated Aug. 2016
with Polarity in accordance with J211

07.02.2019 09:53:14 953



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Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/2/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Peak Head Resultant Acceleration	104 - 123 g	113.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.4 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.62 %	Yes

Test meets specifications.

Condition: Used

Comments:

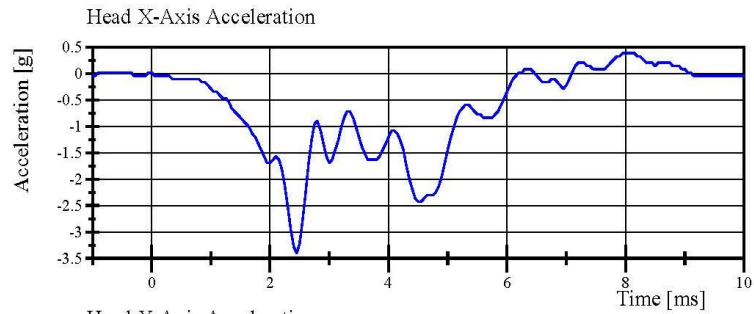
Head S/N: EG2845

Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 1-2

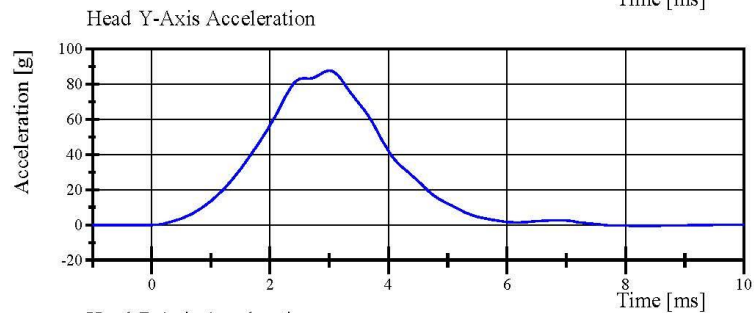
Test Date: 7/2/2019



Filter Class: CFC_1000

Max: 0.4 g at 8.0 ms

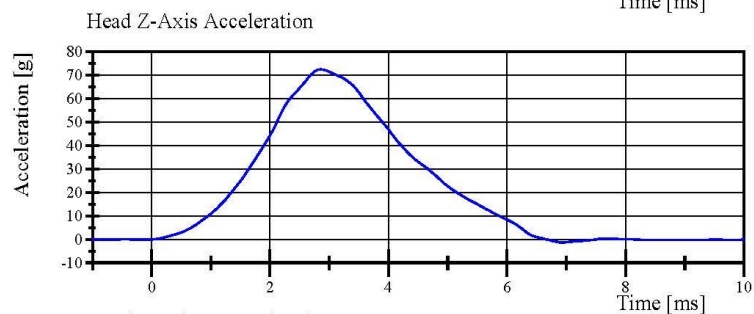
Min: -3.4 g at 2.5 ms



Filter Class: CFC_1000

Max: 87.7 g at 3.0 ms

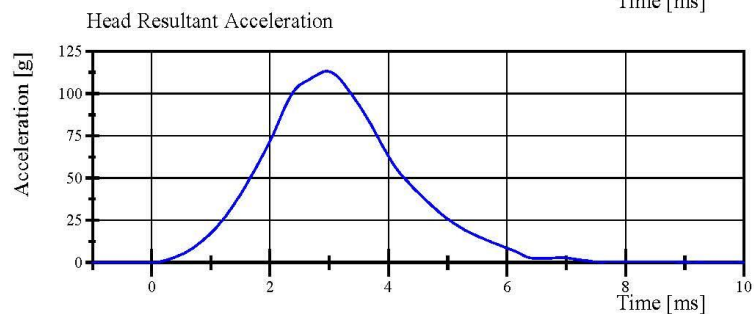
Min: -0.5 g at 8.1 ms



Filter Class: CFC_1000

Max: 72.4 g at 2.9 ms

Min: -1.3 g at 6.9 ms



Filter Class: CFC_1000

Max: 113.3 g at 3.0 ms

Min: 0.0 g at +0.9 ms

Specification Source: WorldSID 50th Qualification Manual, dated Aug. 2016
with Polarity in accordance with J211

07.02.2019 13:04:14 945



Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 1-1

Test Date: 7/2/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	104 - 123 g	112.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.1 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.62 %	Yes

Test meets specifications.

Condition: Used

Comments:

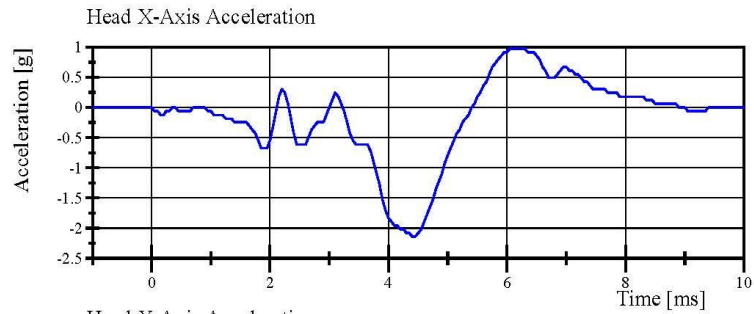
Head S/N: EG2845

Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 1-1

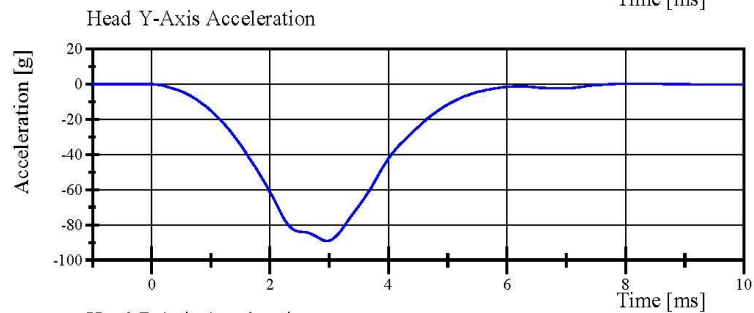
Test Date: 7/2/2019



Filter Class: CFC_1000

Max: 1.0 g at 6.1 ms

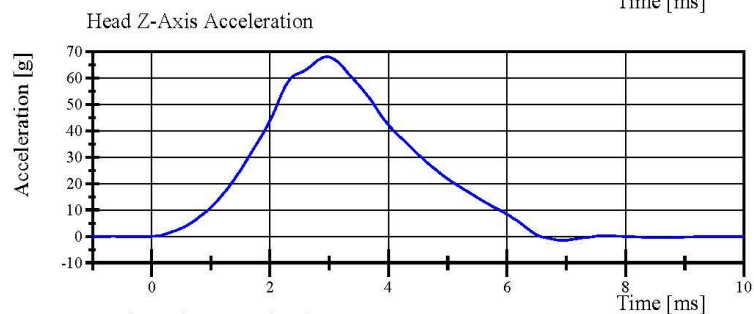
Min: -2.1 g at 4.4 ms



Filter Class: CFC_1000

Max: 0.2 g at 8.0 ms

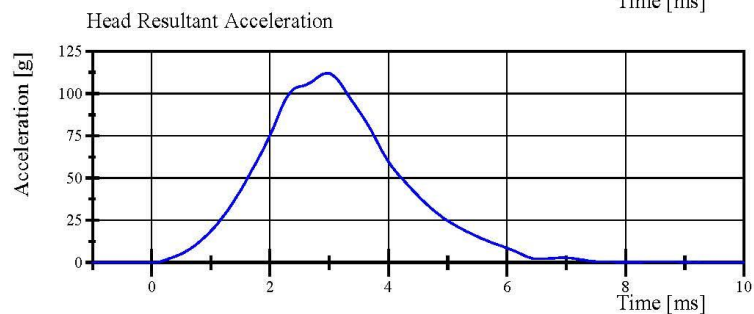
Min: -89.1 g at 3.0 ms



Filter Class: CFC_1000

Max: 68.1 g at 3.0 ms

Min: -1.5 g at 7.0 ms



Filter Class: CFC_1000

Max: 112.1 g at 3.0 ms

Min: 0.0 g at -1.0 ms

Specification Source: WorldSID 50th Qualification Manual, dated Aug. 2016
with Polarity in accordance with J211

07.02.2019 10:10:27 946



Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-3

Test Date: 7/3/2019

Test Parameter	Specifications	Test Results	Pass
Temperature	20.6 - 22.2 C	20.8 C	Yes
Relative Humidity	10 - 70 %	56 %	Yes
Pendulum Velocity	3.3 - 3.5 m/s	3.32 m/s	Yes
Pendulum Integrated Velocity			
Change at 4ms	0.77 - 1.04 m/s	0.950 m/s	Yes
Change at 8ms	1.6 - 1.9 m/s	1.862 m/s	Yes
Change at 12ms	2.43 - 3.29 m/s	2.814 m/s	Yes
Peak Flexion Angle	50 - 61 deg	51.00 deg	Yes
Peak Flexion Angle Decay to 0	58.72 ms	58.800 ms	Yes
Peak OC Momentnt	54 - 67 Nm	63.6 Nm	Yes
Peak OC Moment Decay to 0	71 - 87 ms	74.00 ms	Yes
Peak Forward Pot Angle	32 - 39 deg	32.89 deg	Yes
Time of Forward Pot Angle Peak	56 - 68 ms	59.10 ms	Yes
Peak Rear Pot Angle	29 - 36 deg	29.43 deg	Yes
Time of Rear Pot Angle Peak	56 - 68 ms	56.95 ms	Yes
Peak Headform Angular Rate	2164 - 2393 deg/sec	2246.12 deg/sec	Yes

Test meets specifications.

Condition: Used

Comments:

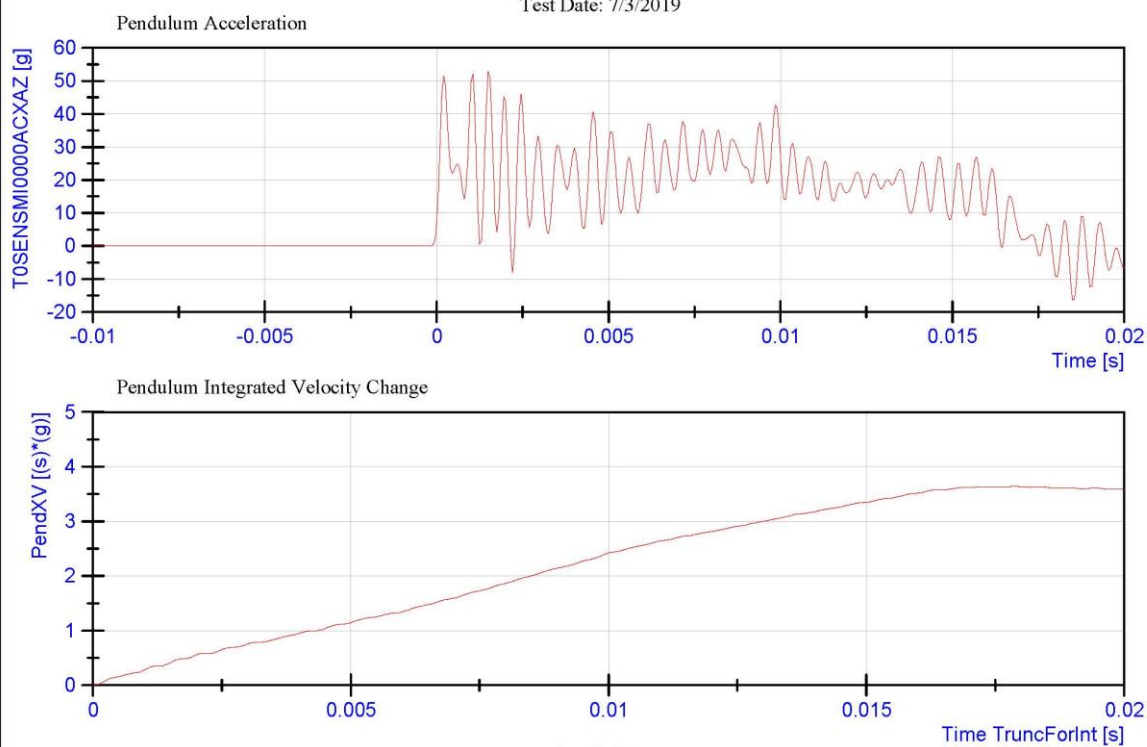
Neck S/N: DM3419

Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-3

Test Date: 7/3/2019

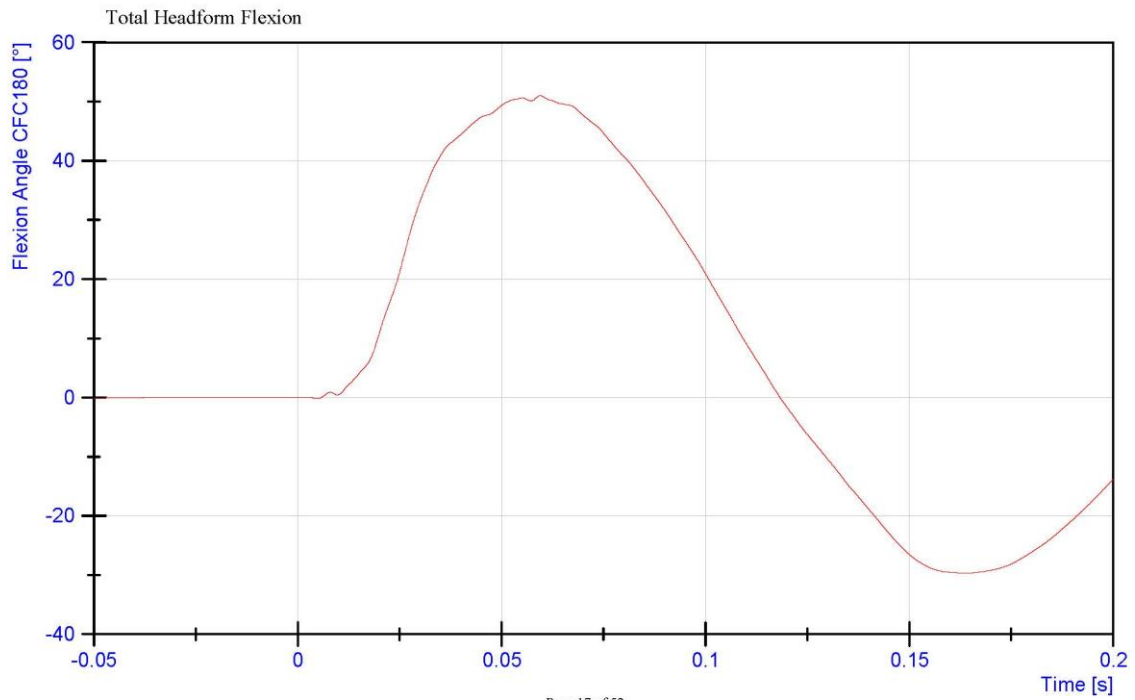


Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-3

Test Date: 7/3/2019



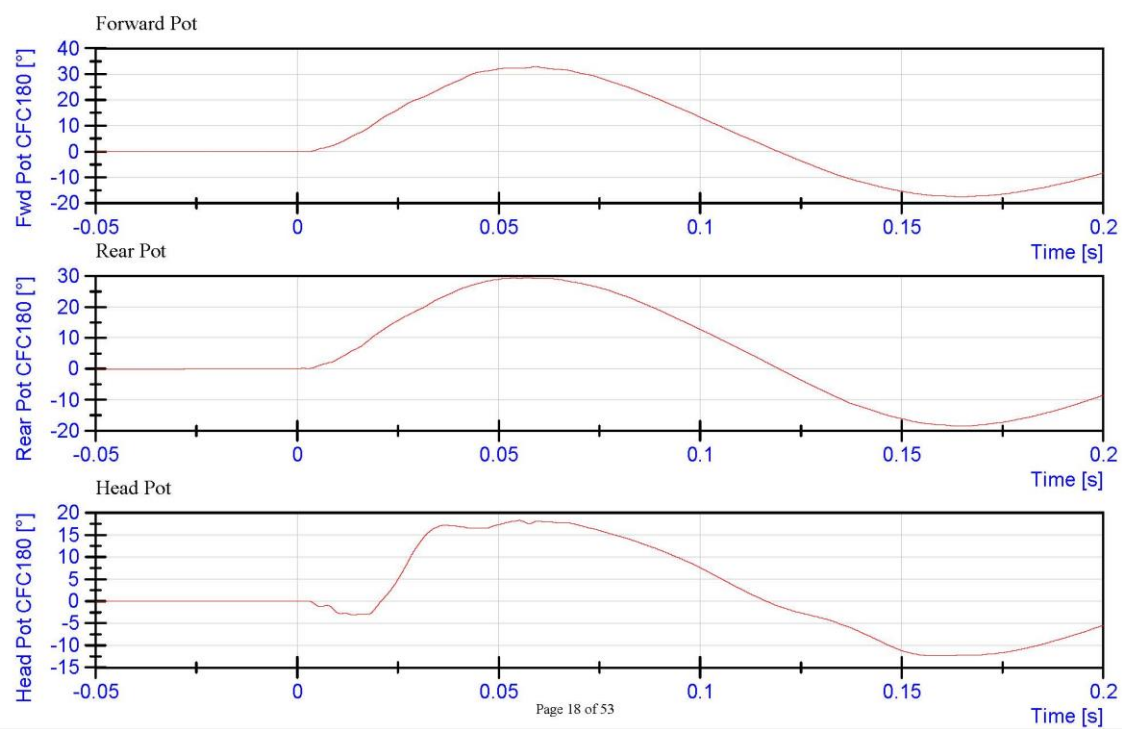
Page 17 of 53

Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-3

Test Date: 7/3/2019

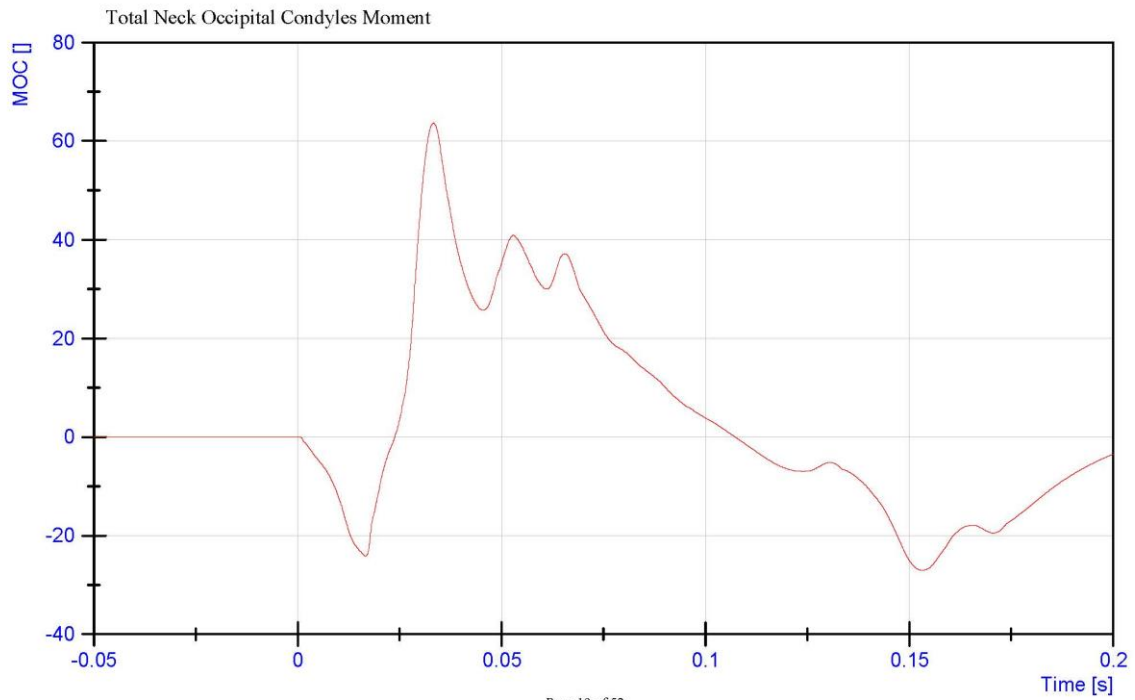


Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-3

Test Date: 7/3/2019

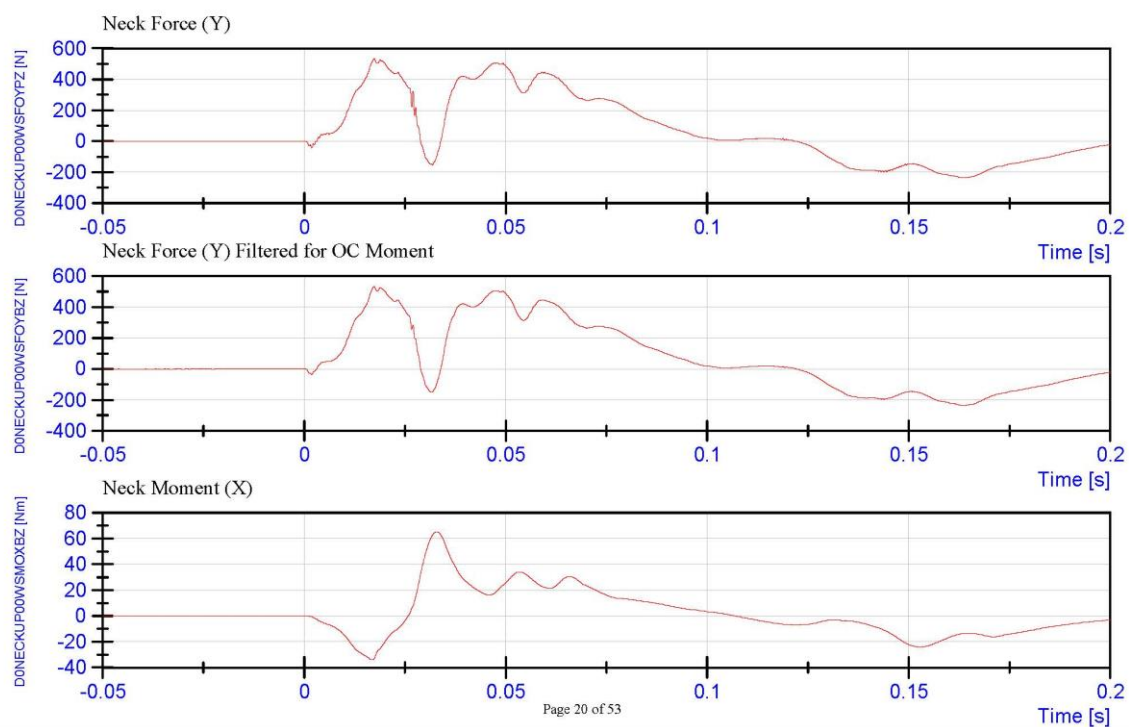


Transportation Research Center Inc.

Left Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-3

Test Date: 7/3/2019



Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/3/2019

Test Parameter	Specifications	Test Results	Pass
Temperature	20.6 - 22.2 C	21.1 C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Pendulum Velocity	3.3 - 3.5 m/s	3.32 m/s	Yes
Pendulum Integrated Velocity			
Change at 4ms	0.77 - 1.04 m/s	0.951 m/s	Yes
Change at 8ms	1.6 - 1.9 m/s	1.813 m/s	Yes
Change at 12ms	2.43 - 3.29 m/s	2.745 m/s	Yes
Peak Flexion Angle	50 - 61 deg	51.15 deg	Yes
Peak Flexion Angle Decay to 0	58.72 ms	59.350 ms	Yes
Peak OC Momentnt	54 - 67 Nm	63.2 Nm	Yes
Peak OC Moment Decay to 0	71 - 87 ms	74.55 ms	Yes
Peak Forward Pot Angle	32 - 39 deg	33.29 deg	Yes
Time of Forward Pot Angle Peak	56 - 68 ms	59.65 ms	Yes
Peak Rear Pot Angle	29 - 36 deg	29.72 deg	Yes
Time of Rear Pot Angle Peak	56 - 68 ms	59.00 ms	Yes
Peak Headform Angular Rate	2164 - 2393 deg/sec	2213.09 deg/sec	Yes

Test meets specifications.

Condition: Used

Comments:

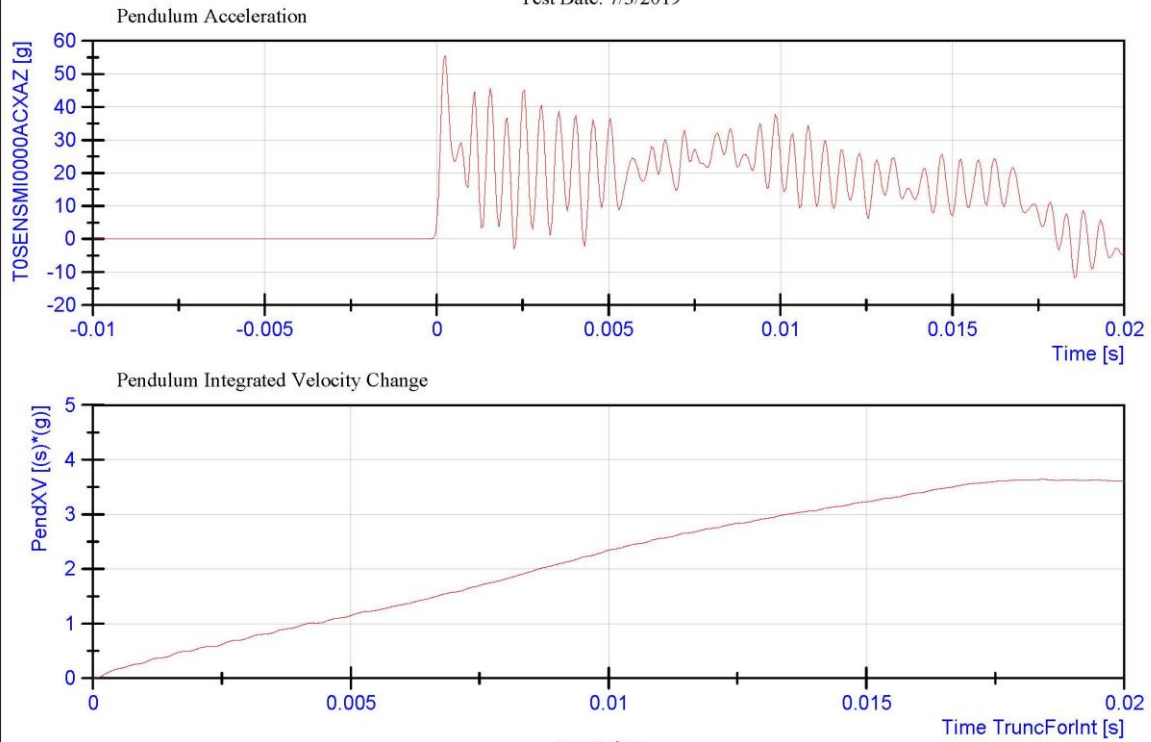
Neck S/N: DM3419

Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/3/2019



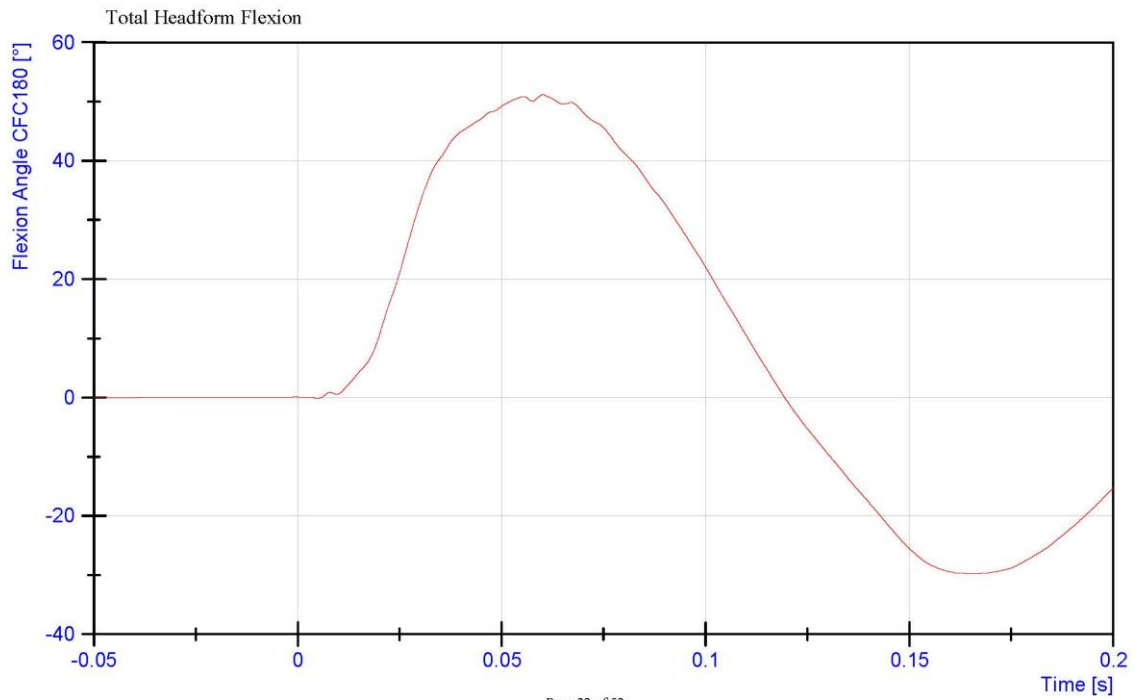
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Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/3/2019



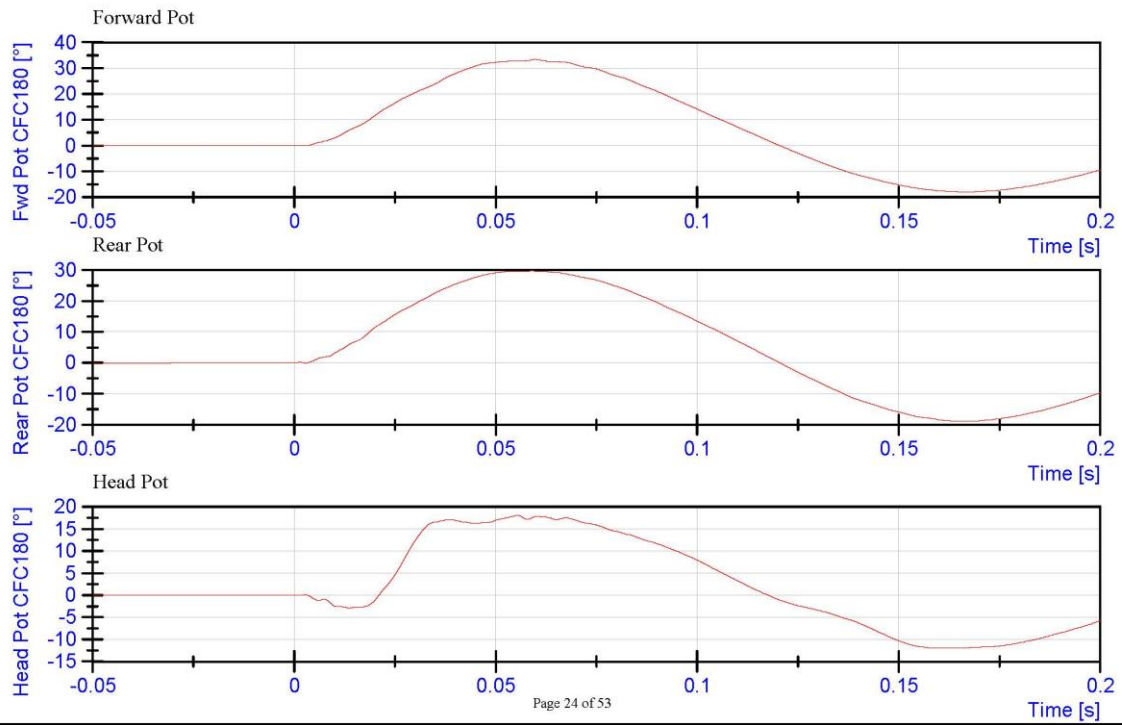
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Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/3/2019

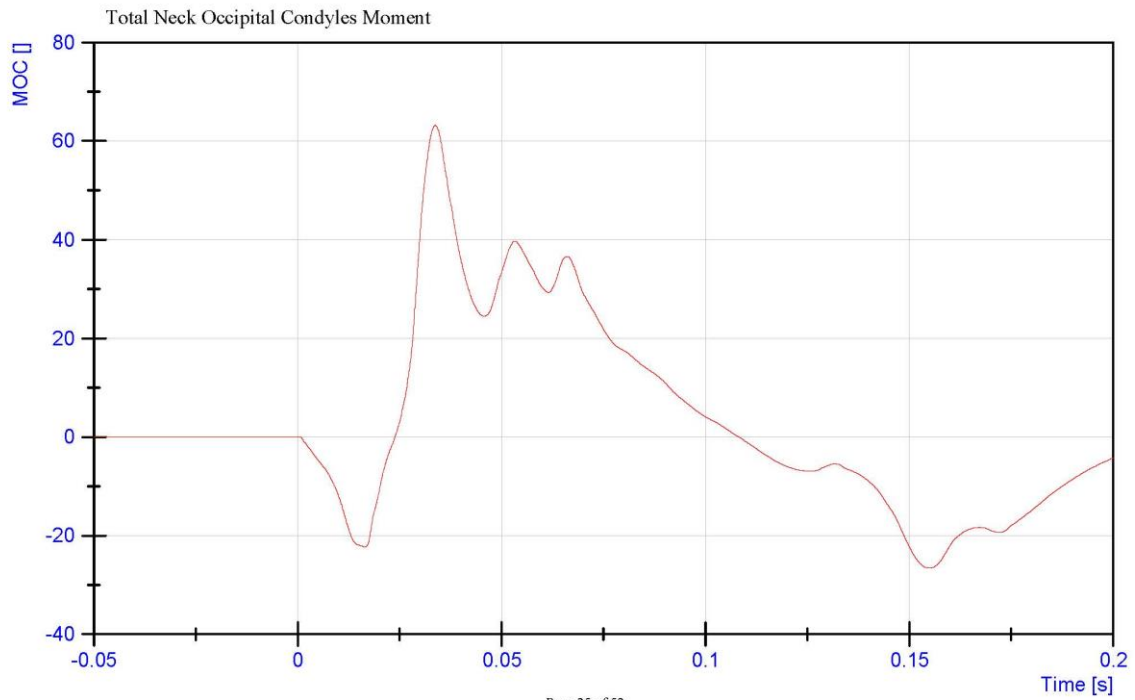


Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/3/2019



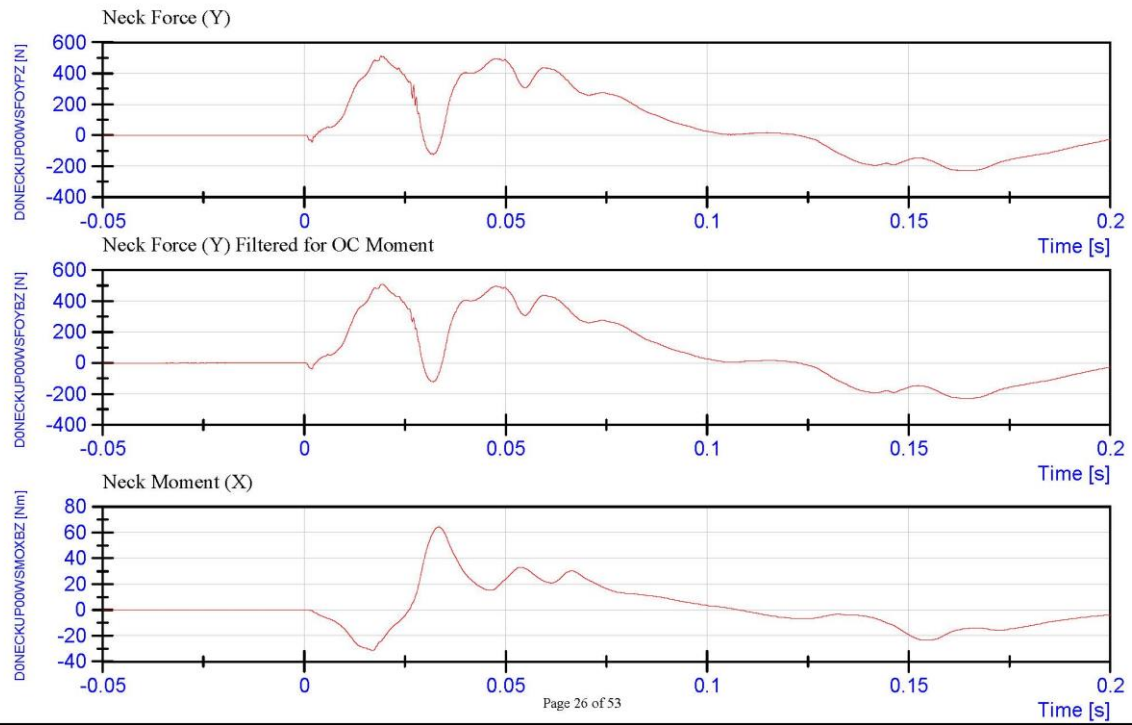
Page 25 of 53

Transportation Research Center Inc.

Right Lateral Neck

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/3/2019



Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-6

Test Date: 7/16/2019

Test Parameter	Specifications	Test Results	Pass
Temperature	20.6 - 22.2 C	20.8 C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.13 m/s	Yes
Pendulum Integrated Velocity			
Change at 10ms	2.04 - 2.28 m/s	2.148 m/s	No
Change at 20ms	3.2 - 3.57 m/s	3.323 m/s	Yes
Change at 30ms	4.32 - 4.83 m/s	4.427 m/s	Yes
Peak Fixture Rotation	47.9 - 45 deg	43.57 deg	No
Decay Time to 0 deg from Peak Angle	37.9 - 40.57 ms	38.300 ms	Yes
Peak Head Angular Velocity Z-axis	1536 - 1470 deg/s	1438.7 deg/s	No
Peak Lower Neck Moment Z-axis	39.1 - 35.9 Nm	40.11 Nm	No

Test does not meet specifications.

Condition: Used

Comments:

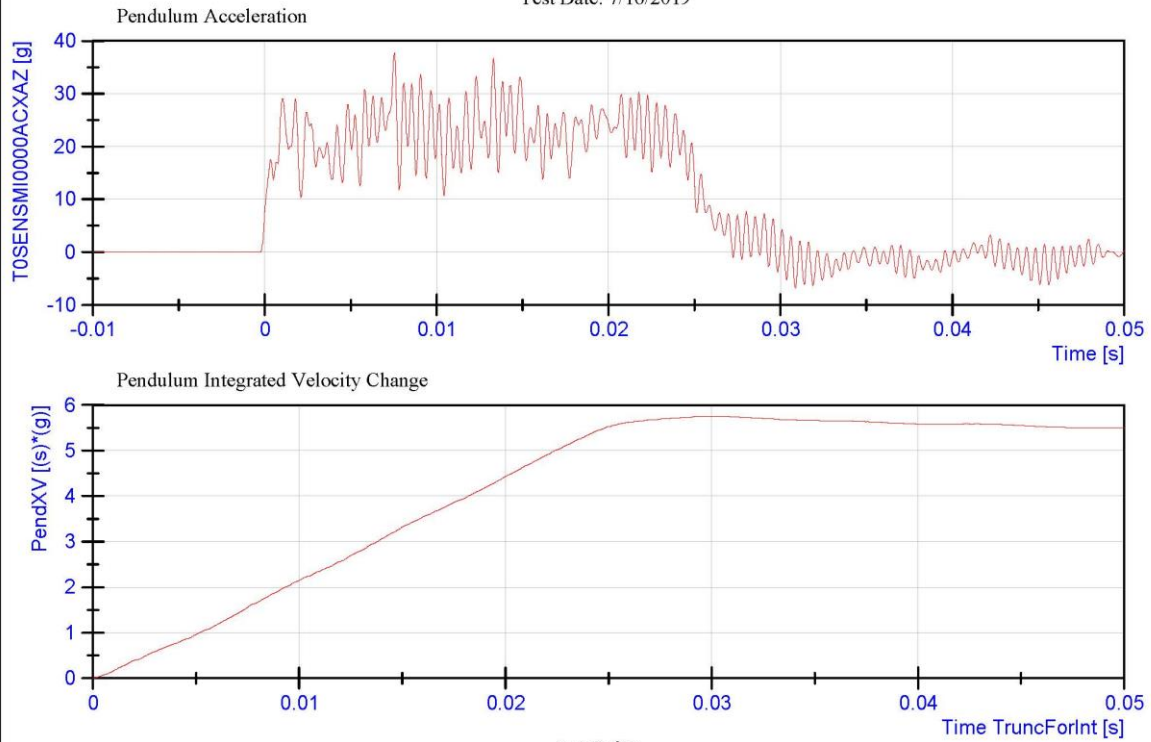
Neck S/N: DM3419

Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-6

Test Date: 7/16/2019



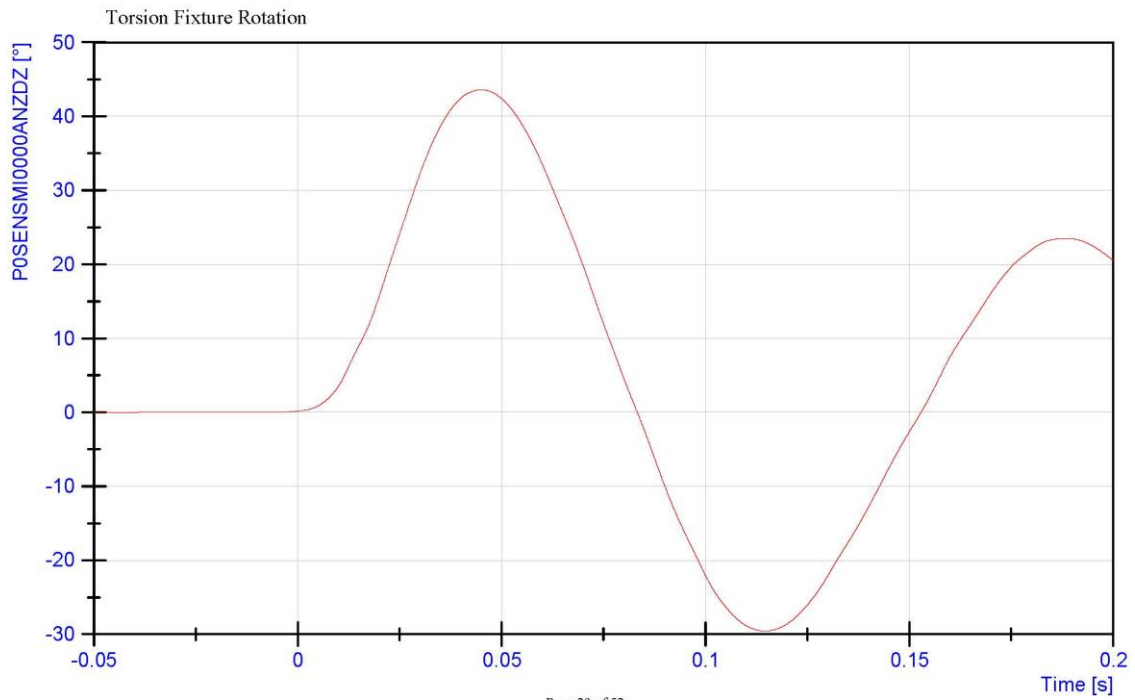
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Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-6

Test Date: 7/16/2019

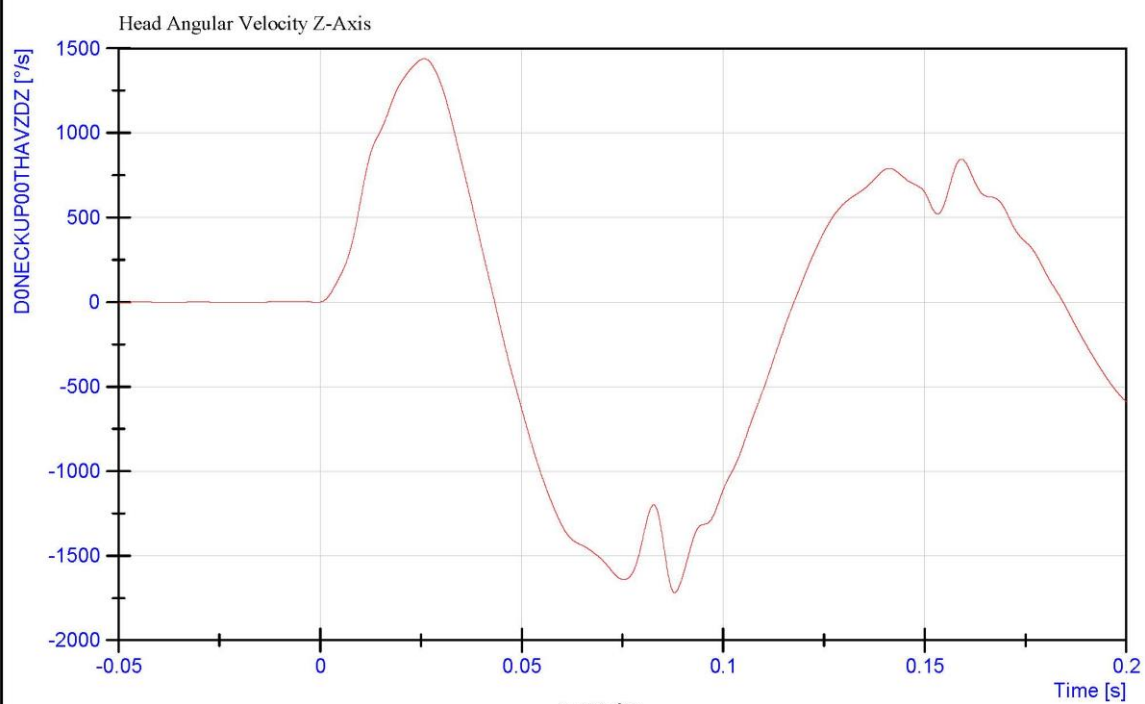


Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-6

Test Date: 7/16/2019

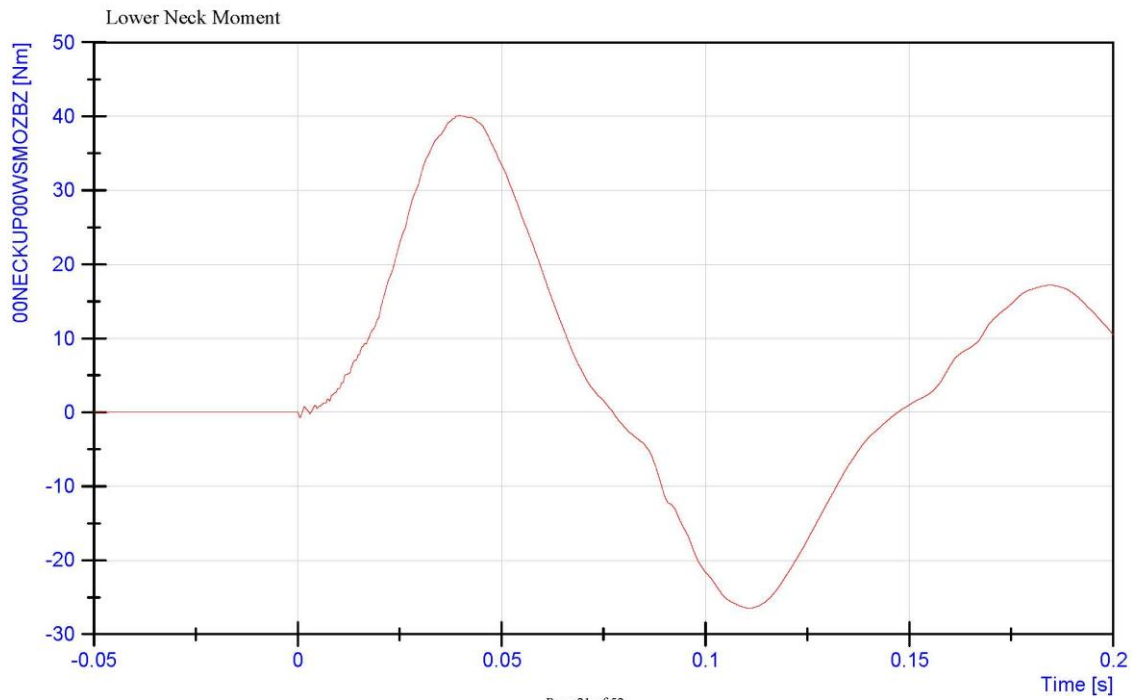


Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-6

Test Date: 7/16/2019



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Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-8

Test Date: 7/16/2019

Test Parameter	Specifications	Test Results	Pass
Temperature	20.6 - 22.2 C	20.9 C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.13 m/s	Yes
Pendulum Integrated Velocity			
Change at 10ms	2.04 - 2.28 m/s	2.240 m/s	Yes
Change at 20ms	3.2 - 3.57 m/s	3.413 m/s	Yes
Change at 30ms	4.32 - 4.83 m/s	4.519 m/s	Yes
Peak Fixture Rotation	47.9 - 45 deg	43.57 deg	No
Decay Time to 0 deg from Peak Angle	37.9 - 40.57 ms	38.000 ms	Yes
Peak Head Angular Velocity Z-axis	1536 - 1470 deg/s	1471.6 deg/s	Yes
Peak Lower Neck Moment Z-axis	39.1 - 35.9 Nm	40.43 Nm	No

Test does not meet specifications.

Condition: Used

Comments:

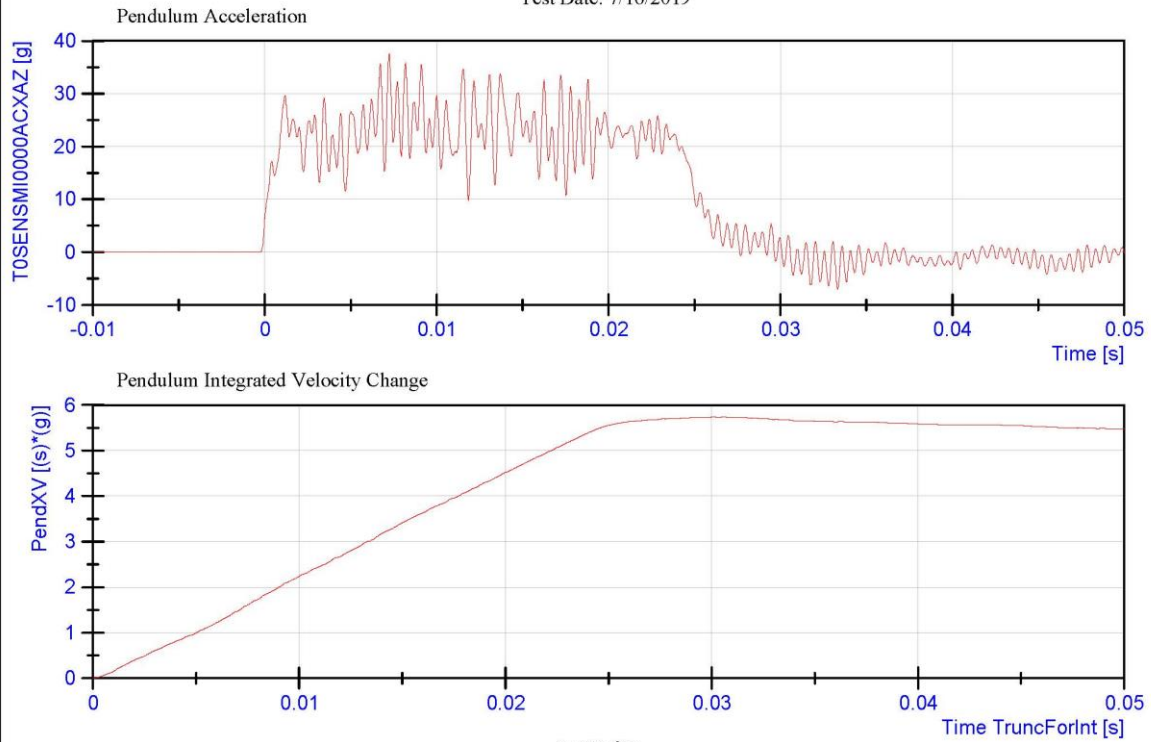
Neck S/N: DM3419

Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-8

Test Date: 7/16/2019



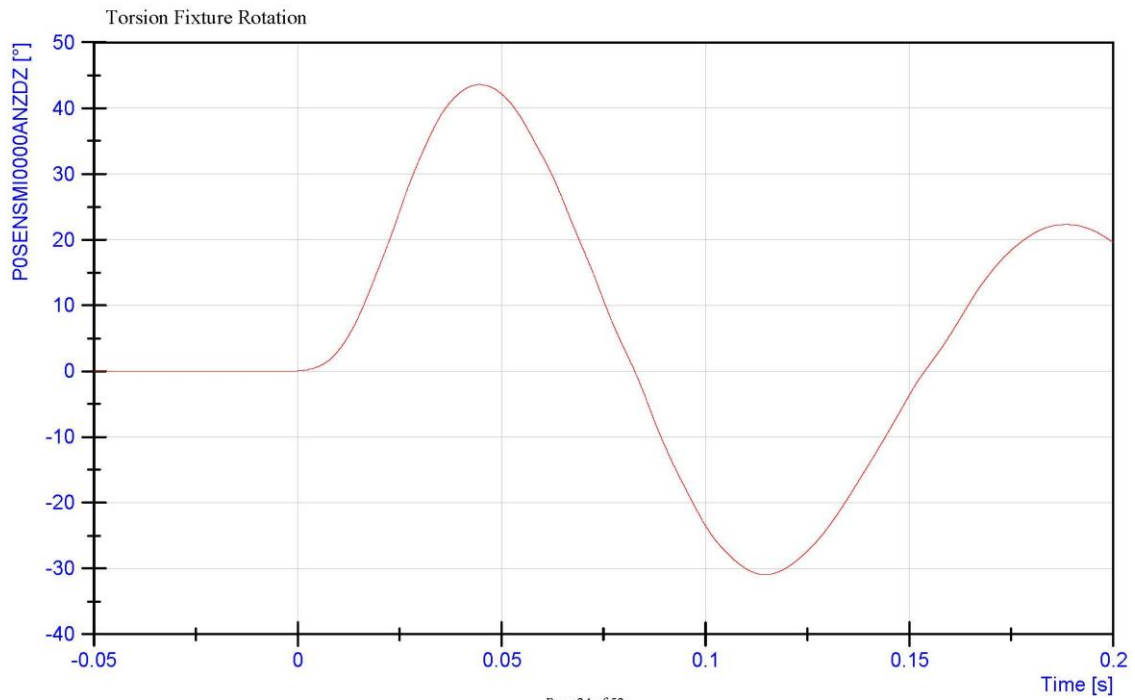
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Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-8

Test Date: 7/16/2019

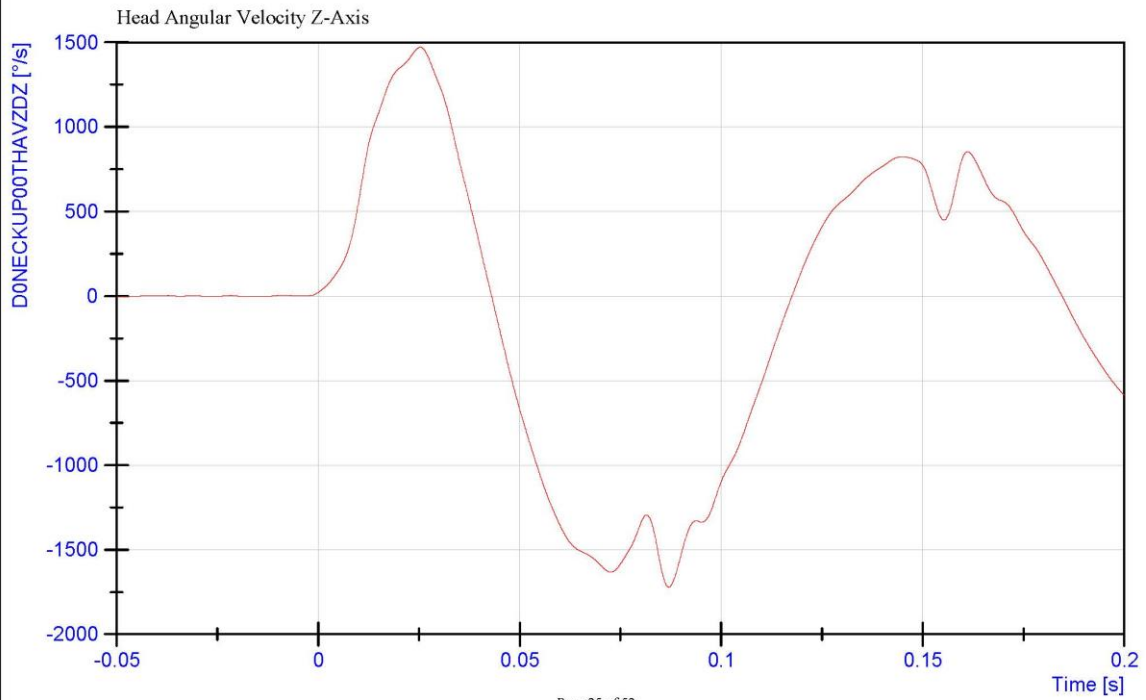


Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-8

Test Date: 7/16/2019



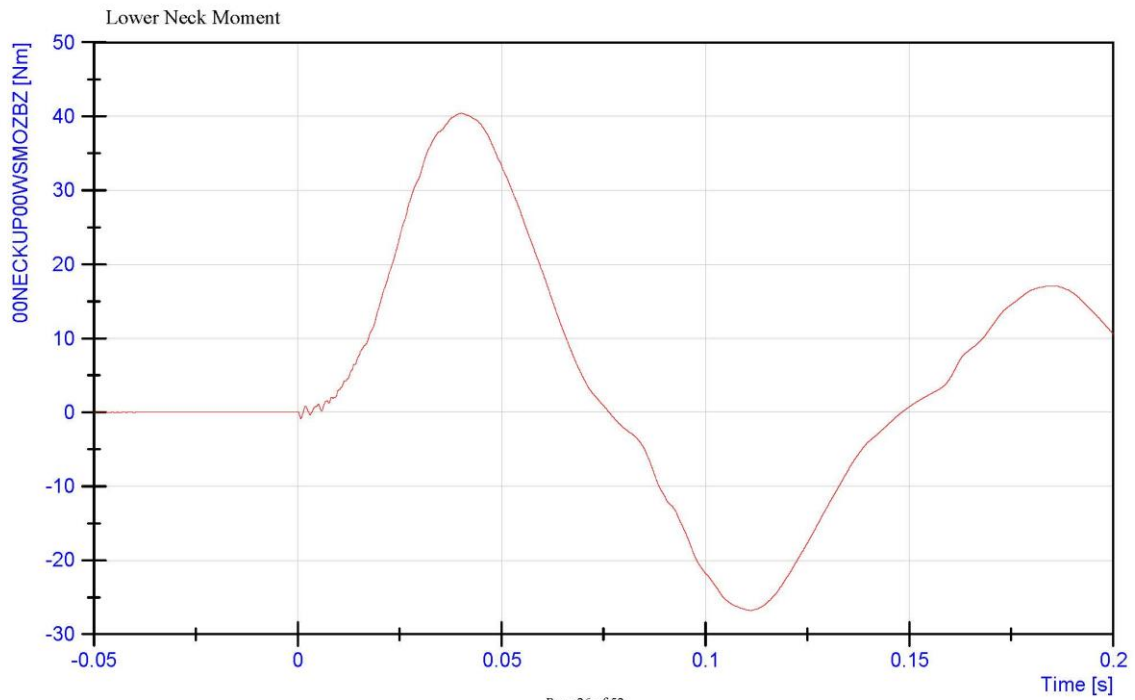
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Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 1-8

Test Date: 7/16/2019



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Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID 50th Serial No. EB8888 Certification No. 1-1

Test Date: 7/10/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Force	2,600 - 3,300 N	2,852.2 N	Yes
Shoulder Force	1,500 - 1,900 N	1,600.9 N	Yes
S1 RibEye Max	37.5 - 46.5 mm	43.62 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: EC3594

Shoulder Rib S/N: EB8887

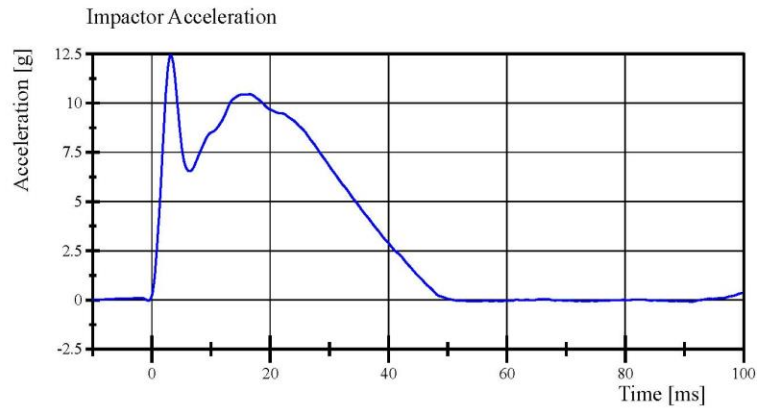
RibEYE S/N: 123

Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID 50th Serial No. EB8888 Certification No. 1-1

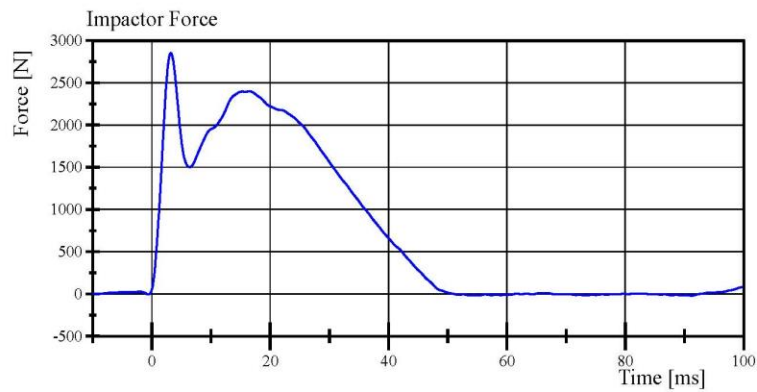
Test Date: 7/10/2019



Filter Class: CFC_180

Max: 12.4 g at 3.2 ms

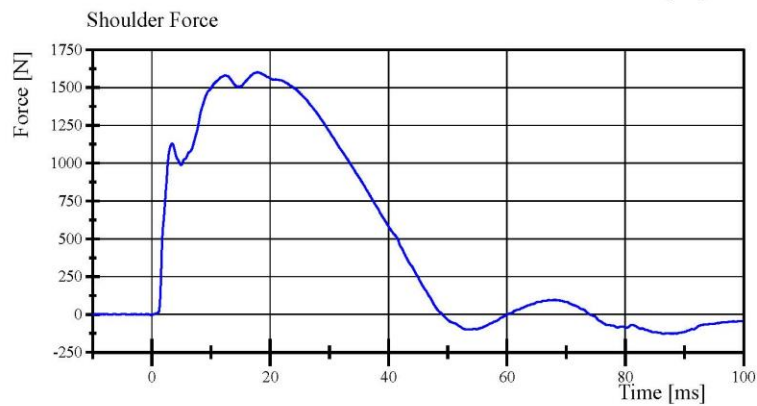
Min: -0.1 g at 91.2 ms



Filter Class: CFC_180

Max: 2,852.2 N at 3.2 ms

Min: -20.3 N at 91.2 ms



Filter Class: CFC_600

Max: 1,600.9 N at 17.9 ms

Min: -128.6 N at 86.5 ms

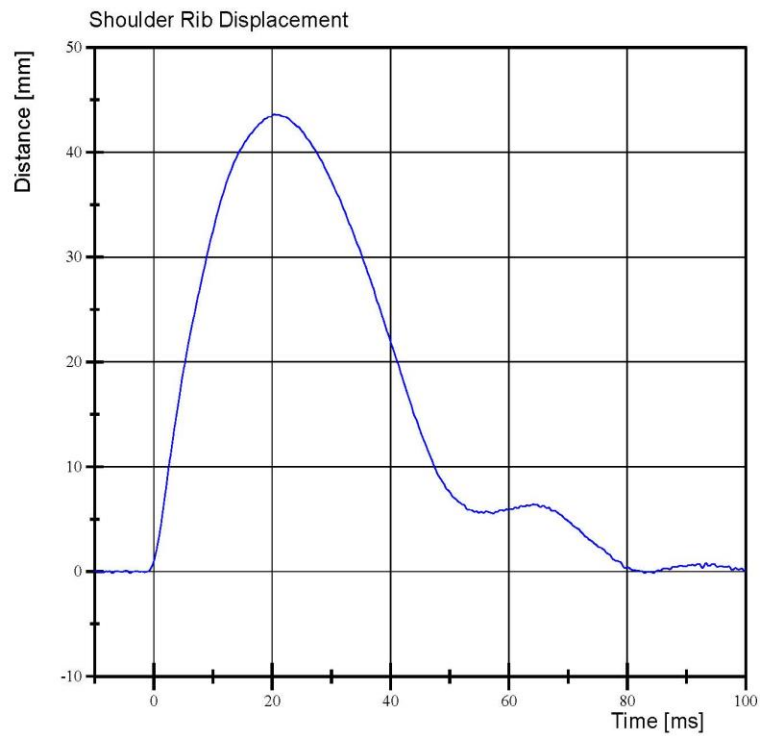
Specification Source: WS50 R&R qual specs July 2019.xlsx
worldSID 50th VRTC July 2019

07.12.2019 12:00:44 1006



Transportation Research Center Inc.

Shoulder Left Lateral
WorldSID 50th Serial No. EB8888 Certification No. 1-1
Test Date: 7/10/2019



Filter Class: CFC_600
Max: 43.6 mm at 20.4
Min: -1.0 mm at 107.6

Transportation Research Center Inc.

Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 1-1
Test Date: 7/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.7 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.64 m/s	Yes
Impactor Force	5,300 - 6,200 N	5,710.9 N	Yes
Upper Thorax Rib Displacement	35 - 47 mm	43.8 mm	Yes
Center Thorax Rib Displacement	46 - 56 mm	50.2 mm	Yes
Lower Thorax Rib Displacement	33.5 - 41.5 mm	36.45 mm	Yes
Upper Spine Lateral Acceleration	28 - 37 g	34.3 g	Yes
Lower Spine Lateral Acceleration	22 - 28 g	22.4 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: EC3594

Throax Rib 1 S/N: EB5400

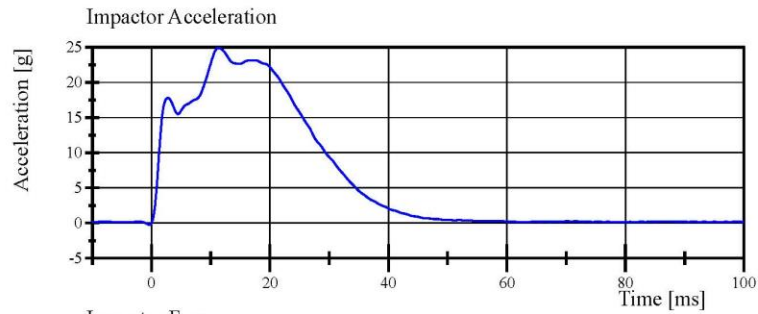
Thorax Rib 2 S/N: EB5401

Throax Rib 3 S/N: EB5402

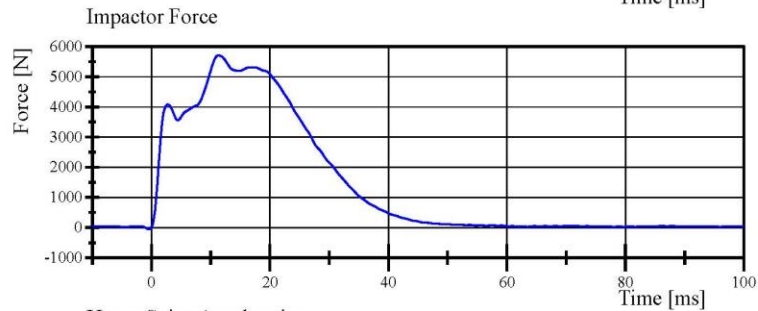
RibEYE S/N: 123

Transportation Research Center Inc.

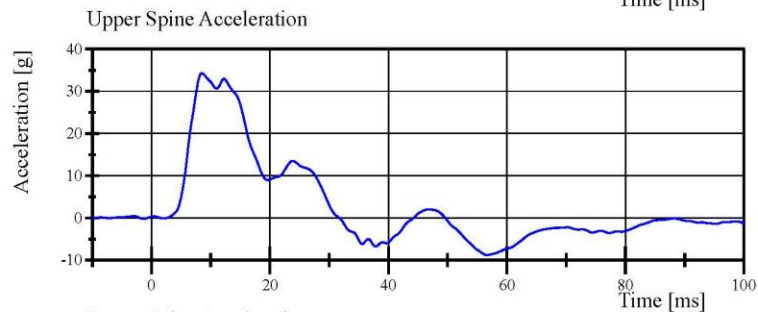
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 1-1
Test Date: 7/12/2019



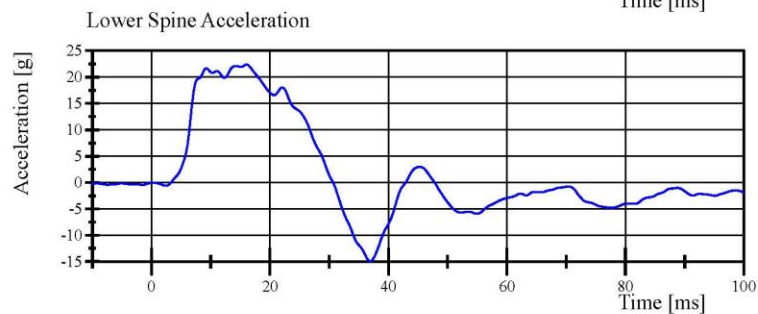
Filter Class: CFC_180
Max: 24.9 g at 11.4 ms
Min: -0.3 g at -0.4 ms



Filter Class: CFC_180
Max: 5,710.9 N at 11.4 ms
Min: -57.6 N at -0.4 ms



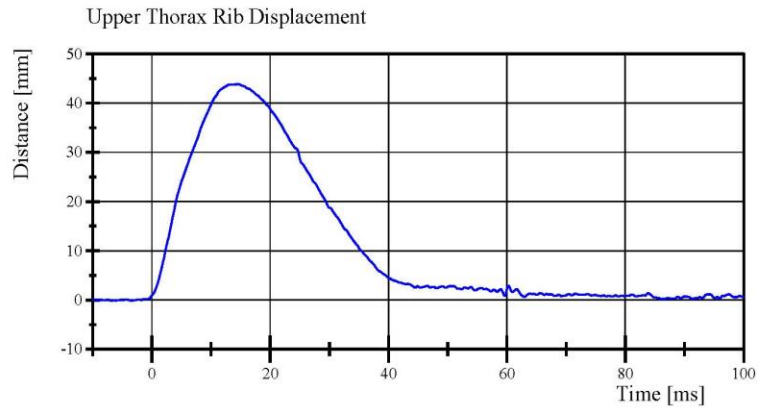
Filter Class: CFC_180
Max: 34.3 g at 8.5 ms
Min: -8.8 g at 56.6 ms



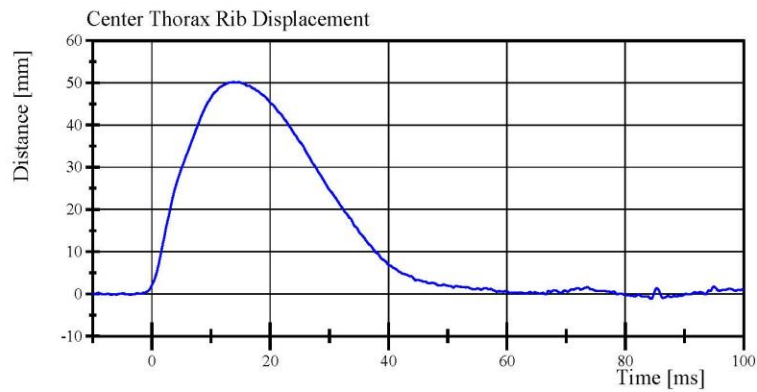
Filter Class: CFC_180
Max: 22.4 g at 16.1 ms
Min: -15.0 g at 36.9 ms

Transportation Research Center Inc.

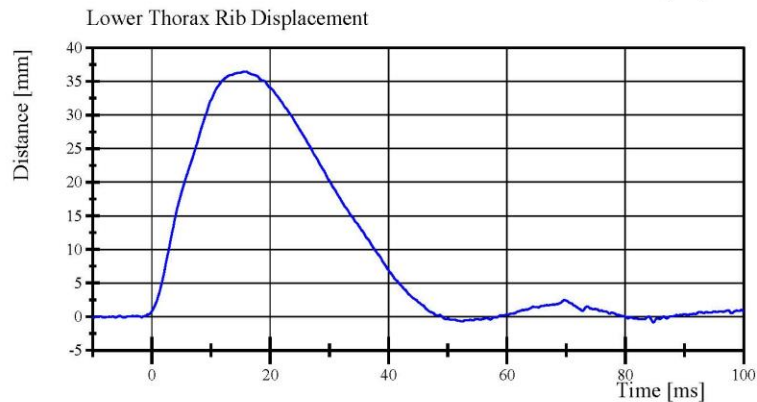
Thorax wArm Left Lateral
WorldSID 50th Serial No. EB8888 Certification No. 1-1
Test Date: 7/12/2019



Filter Class: CFC_600
Max: 43.8 mm at 14.6
Min: -0.5 mm at 115.8



Filter Class: CFC_600
Max: 50.2 mm at 14.7
Min: -2.9 mm at 107.4



Filter Class: CFC_600
Max: 36.4 mm at 15.7
Min: -1.8 mm at 311.9

Transportation Research Center Inc.

Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 1-1
Test Date: 7/12/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.276 m/s	Yes
Impactor Force	3,400 - 4,000 N	3,573.6 N	Yes
Upper Thorax Rib Displacement	33 - 43 mm	39.2 mm	Yes
Center Thorax Rib Displacement	35 - 43 mm	42.3 mm	Yes
Lower Thorax Rib Displacement	32 - 40 mm	35.0 mm	Yes
Upper Spine Lateral Acceleration	14 - 20 g	15.6 g	Yes
Lower Spine Lateral Acceleration	14 - 22 g	16.4 g	Yes

Test meets specifications.

Condition: Used

Comments:

Thorax Rib 1 S/N: EB5400

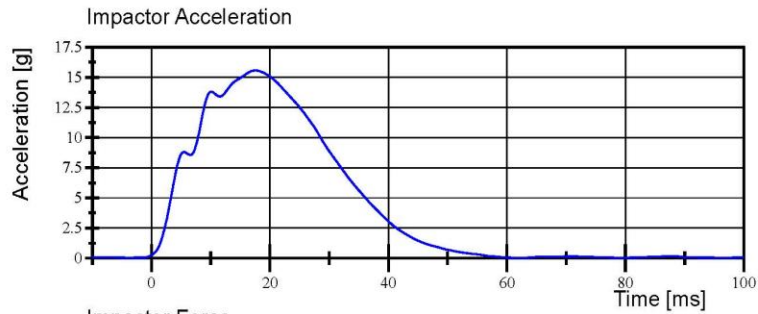
Throax Rib 2 S/N: EB5401

Thorax Rib 3 S/N: EB5402

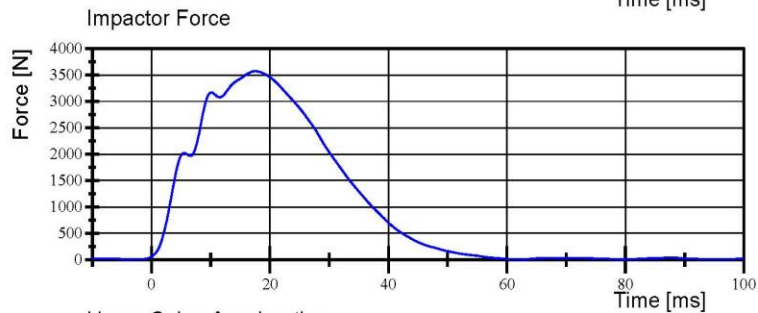
RibEYE S/N: 123

Transportation Research Center Inc.

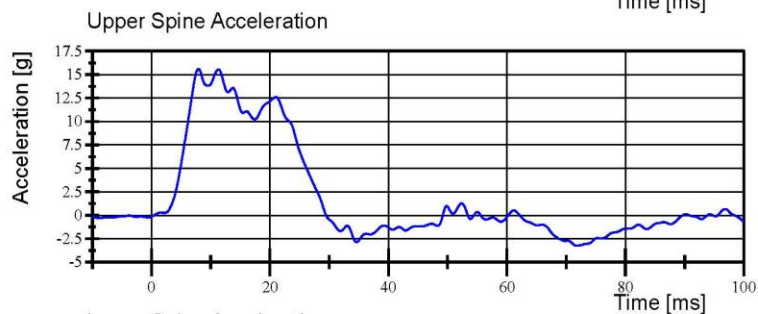
Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 1-1
Test Date: 7/12/2019



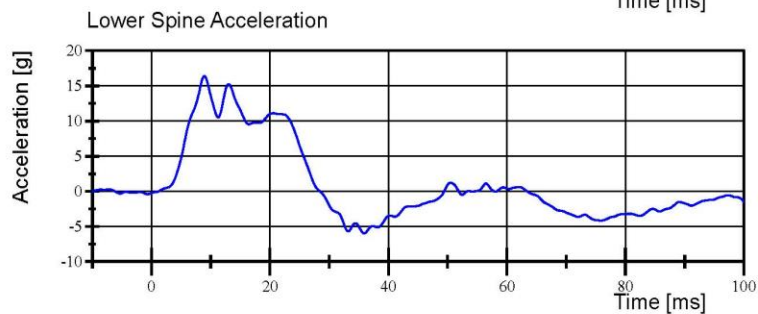
Filter Class: CFC_180
Max: 15.6 g at 17.6 ms
Min: 0.0 g at 79.7 ms



Filter Class: CFC_180
Max: 3,573.6 N at 17.6 ms
Min: 4.9 N at 79.7 ms



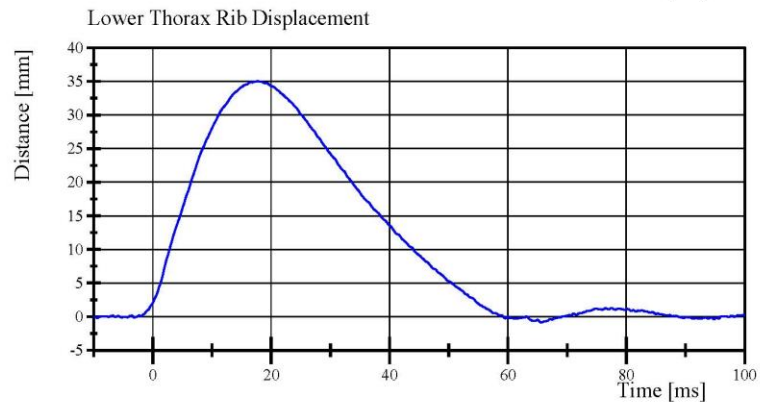
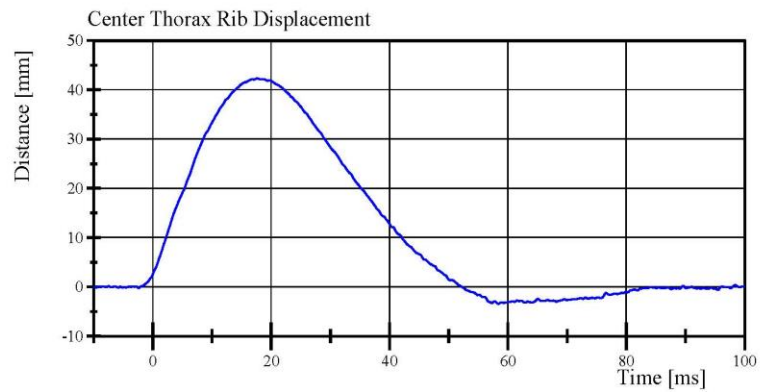
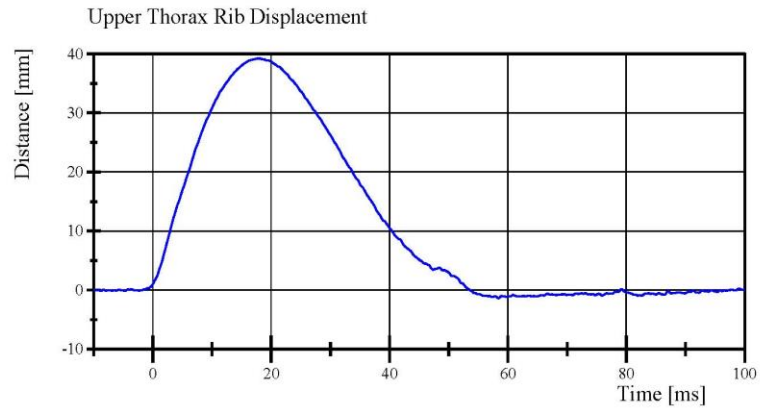
Filter Class: CFC_180
Max: 15.6 g at 7.9 ms
Min: -3.3 g at 71.8 ms



Filter Class: CFC_180
Max: 16.4 g at 9.0 ms
Min: -6.0 g at 35.9 ms

Transportation Research Center Inc.

Thorax woArm Left Lateral
WorldSID 50th Serial No. EB8888 Certification No. 1-1
Test Date: 7/12/2019



Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019

07.12.2019 15:01:35 137



Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/15/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Force	2,700 - 3,100 N	3,045.0 N	Yes
Upper Abdominal Rib Displacement	32.5 - 39.5 mm	33.15 mm	Yes
Lower Abdominal Rib Displacement	30 - 36 mm	32.6 mm	Yes
Lower Spine Lateral Acceleration	14.5 - 19.5 g	18.80 g	Yes

Test meets specifications.

Condition: Used

Comments:

Abdomen Rib 1 S/N: DY5252

Abdomen Rib 2 S/N: DY5253

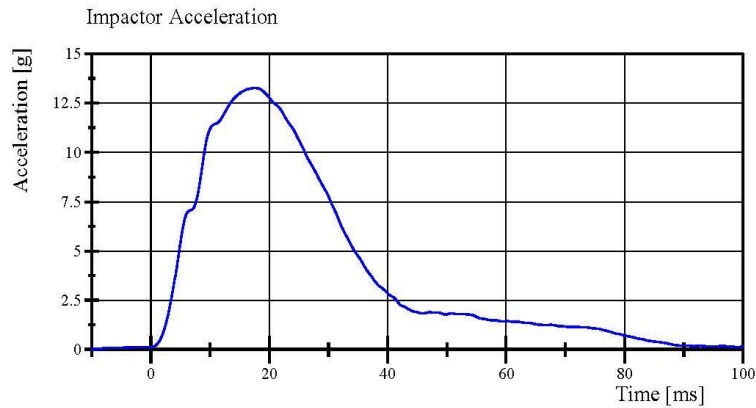
RibEYE S/N: 123

Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID 50th Serial No. EB8888 Certification No. 1-2

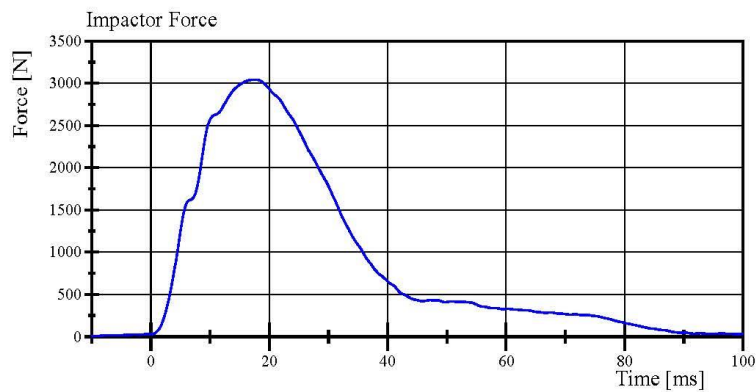
Test Date: 7/15/2019



Filter Class: CFC_180

Max: 13.3 g at 17.7 ms

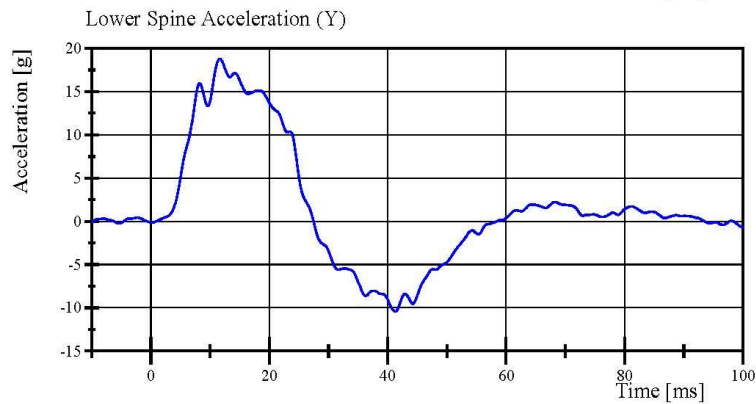
Min: 0.0 g at -10.0 ms



Filter Class: CFC_180

Max: 3,045.0 N at 17.7 ms

Min: 6.0 N at -10.0 ms



Filter Class: CFC_180

Max: 18.8 g at 11.7 ms

Min: -10.4 g at 41.3 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019

07.15.2019 16:16:43 1001



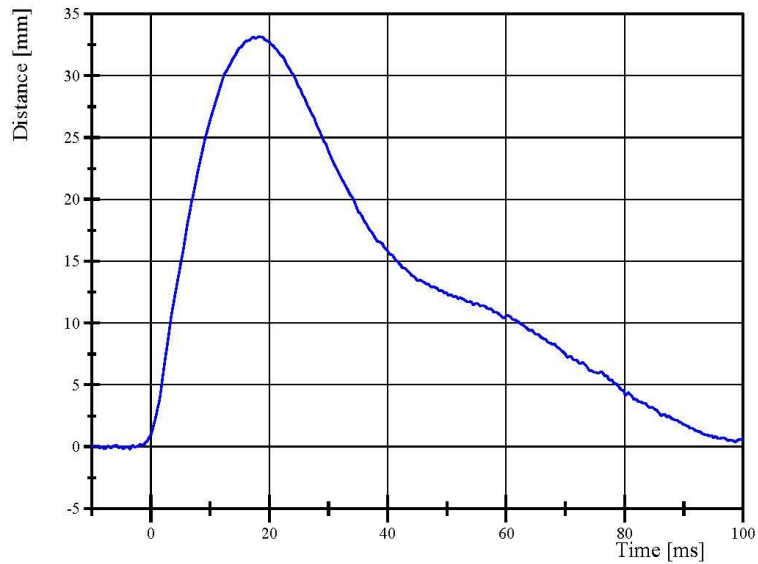
Transportation Research Center Inc.

Abdomen Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 1-2

Test Date: 7/15/2019

Upper Abdominal Rib Displacement

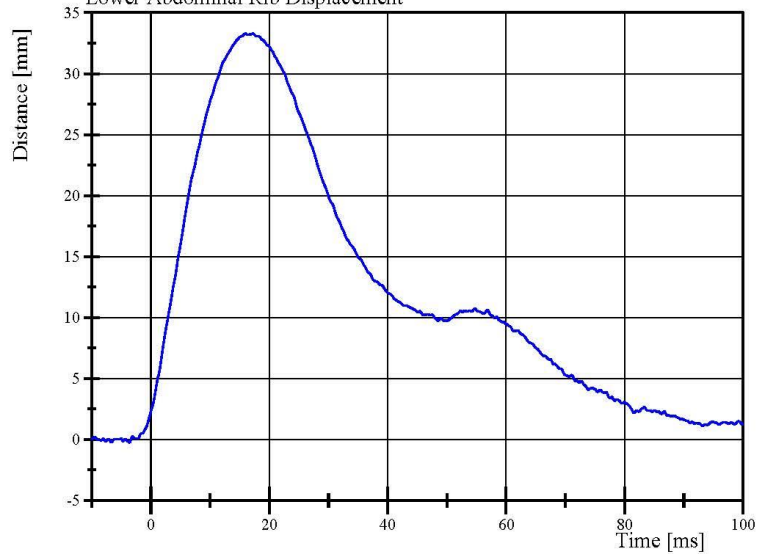


Filter Class: CFC_600

Max: 33.1 mm at 18.3

Min: -0.2 mm at -3.5

Lower Abdominal Rib Displacement



Filter Class: CFC_600

Max: 33.3 mm at 17.2

Min: -0.3 mm at -6.7

Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID 50th Serial No. EB8888 Certification No. 1-7

Test Date: 7/15/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.791 m/s	Yes
Impactor Force	6,800 - 8,200 N	7,210.4 N	Yes
Pelvis Lateral Acceleration	38.5 - 48.5 g	40.95 g	Yes
Lower Spine Lateral Acceleration	10 - 14 g	11.3 g	Yes
Pubic Lateral Force	(-1,300) - (-1,600) N	-1,265.5 N	No
Sacroiliac Lateral Force	(-1,900) - (-2,200) N	-2,182.3 N	Yes

Test does not meet specifications.

Condition: Used

Comments:

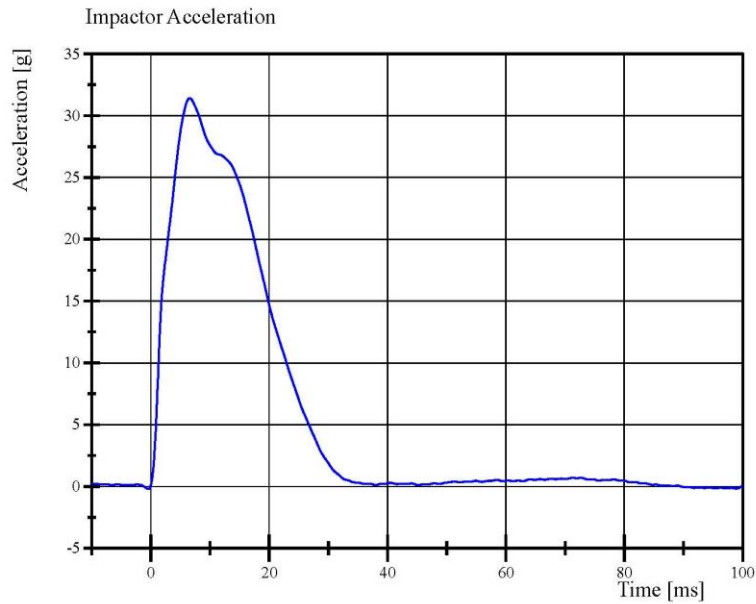
Pelvis Skin S/N: EC1494

Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID 50th Serial No. EB8888 Certification No. 1-7

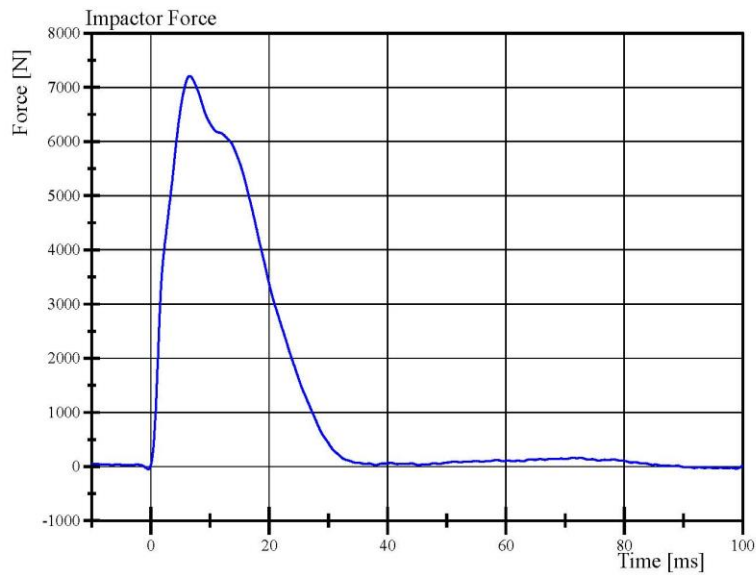
Test Date: 7/15/2019



Filter Class: CFC_180

Max: 31.4 g at 6.6 ms

Min: -0.2 g at -0.4 ms



Filter Class: CFC_180

Max: 7,210.4 N at 6.6 ms

Min: -46.7 N at -0.4 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.24.2019 15:03:00 1001

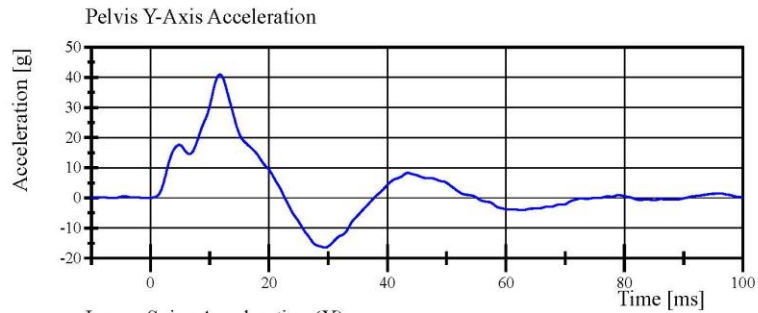


Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID 50th Serial No. EB8888 Certification No. 1-7

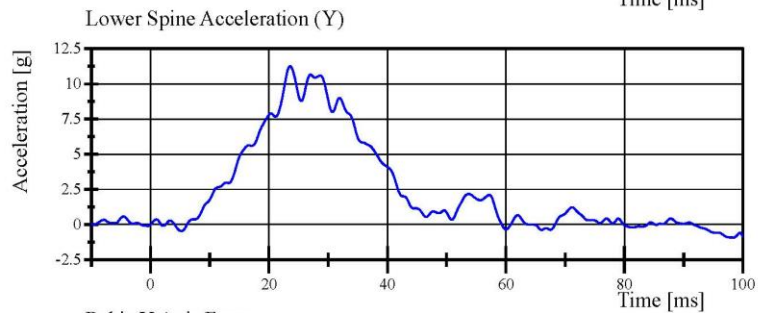
Test Date: 7/15/2019



Filter Class: CFC_180

Max: 41.0 g at 11.7 ms

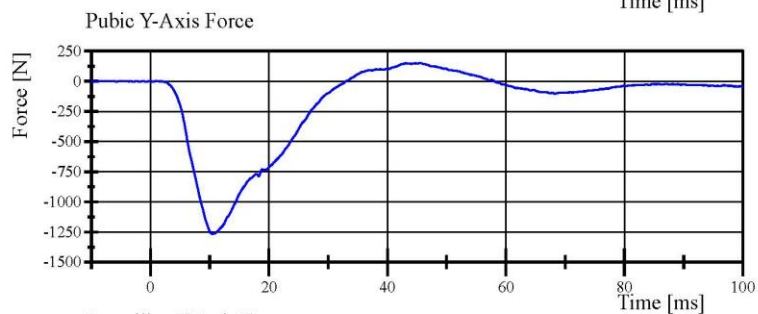
Min: -16.5 g at 29.5 ms



Filter Class: CFC_180

Max: 11.3 g at 23.6 ms

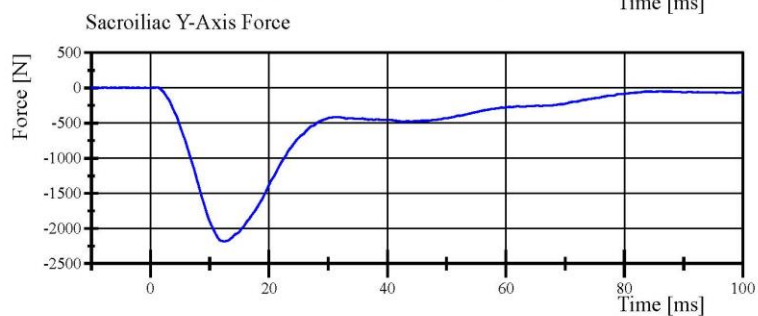
Min: -0.9 g at 98.4 ms



Filter Class: CFC_600

Max: 149.8 N at 45.5 ms

Min: -1,265.5 N at 10.5 ms



Filter Class: CFC_600

Max: 4.6 N at 1.1 ms

Min: -2,182.3 N at 12.5 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.24.2019 15:03:01 1001



Post-Test Calibration Sheets
Driver S/N EB8888

Transportation Research Center Inc.
WorldSID-50M
External Measurements
Serial No. EB8888 Certification No. 2

WorldSID-50M Angular Reference Measurements					
Parameter	Symbol	Tilt Sensor (°)	Inclinometer (°)		
			Center	Left	Right
Head X-Axis	A1	0	n/a	n/a	n/a
Head Y-Axis	A2	2.3	n/a	2	Note 1
Neck Bracket X-Axis	A3	n/a	-0.5	n/a	n/a
Neck Bracket Y-Axis	A4	n/a	-3.1	n/a	n/a
Thorax X-Axis	A5	1.3	n/a	n/a	n/a
Thorax Y-Axis	A6	3.9	n/a	n/a	n/a
Pelvis X-Axis	A7	0.7	n/a	n/a	n/a
Pelvis Y-Axis	A8	10.2	n/a	n/a	n/a
H-point Tool	A9	n/a	n/a	32.5	33.6

WorldSID-50M External Linear Dimensions				
Parameter	Symbol	Specification (mm)		
		Center	Left	Right
Seated Height	L1	870	n/a	n/a
Hip Pivot Height	L2	n/a	89	88
Hip Pivot to Back Line	L3	n/a	187	176
Thigh Clearance	L4	n/a	181	179
Knee Height	L5	n/a	580	583
Knee to Backline	L6	n/a	667	670
Head Back to Seat Back	L7	156	n/a	n/a
Thorax Rib 1 Front to Back	L8	n/a	209	209
Abdomen Rib 2 Front to Back	L9	n/a	223	226
Arm Length	L10	n/a	330	330
Width Across Arms	L11	482	n/a	n/a
Waist Width	L12	341	n/a	n/a

Note 1: No land marks on the right side of head. Unable to align level.

Transportation Research Center Inc.

Front Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	210 - 260 g	230.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-7.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.78 %	Yes

Test meets specifications.

Condition: Used

Comments:

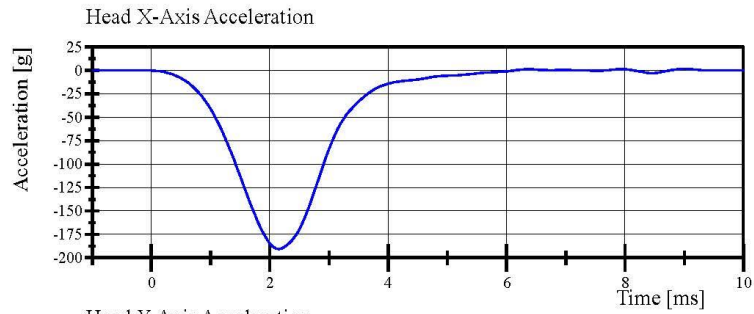
Head Skin S/N: EG2845

Transportation Research Center Inc.

Front Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 2-1

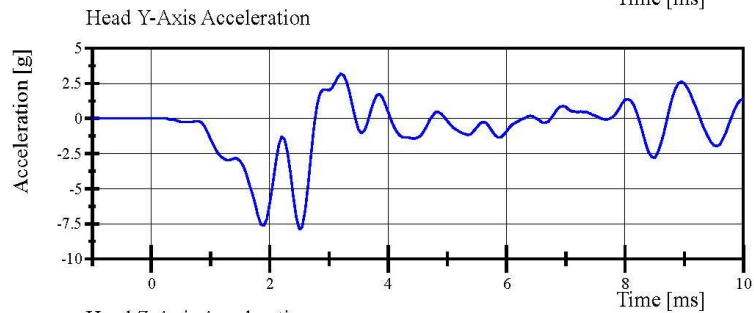
Test Date: 8/1/2019



Filter Class: CFC_1000

Max: 1.6 g at 9.0 ms

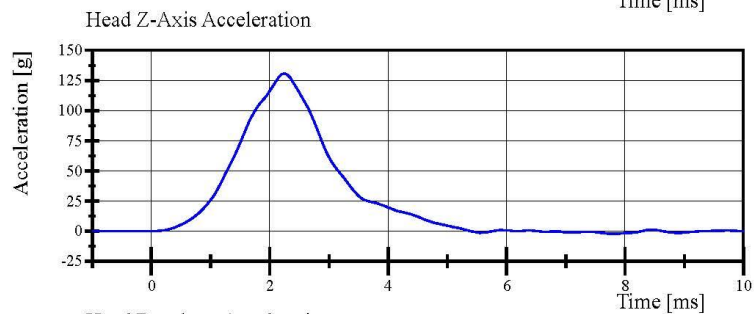
Min: -190.8 g at 2.2 ms



Filter Class: CFC_1000

Max: 3.2 g at 3.2 ms

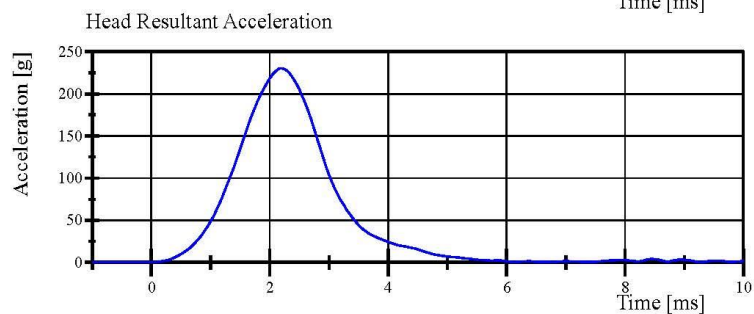
Min: -7.9 g at 2.5 ms



Filter Class: CFC_1000

Max: 130.9 g at 2.3 ms

Min: -2.2 g at 7.8 ms



Filter Class: CFC_1000

Max: 230.4 g at 2.2 ms

Min: 0.0 g at -0.8 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

08.01.2019 09:39:22 951



Transportation Research Center Inc.

Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 2-1
Test Date: 8/1/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	115.2 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	1.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	6.22 %	Yes

Test meets specifications.

Condition: Used

Comments:

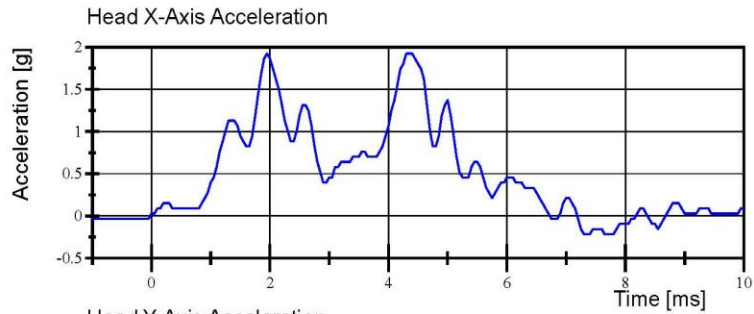
Head Skin S/N: EG2845

Transportation Research Center Inc.

Left Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 2-1

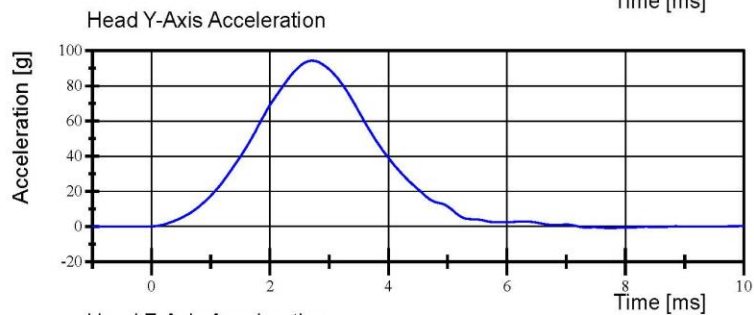
Test Date: 8/1/2019



Filter Class: CFC_1000

Max: 1.9 g at 2.0 ms

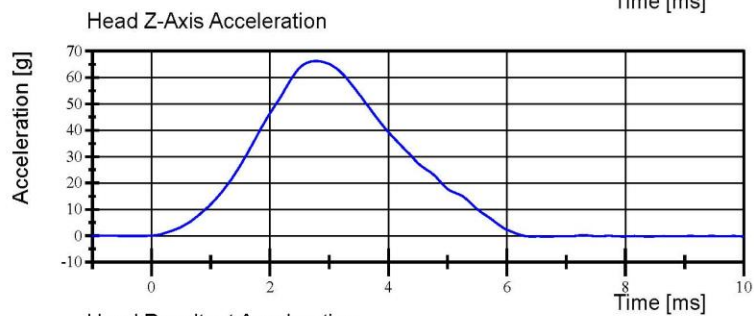
Min: -0.2 g at 7.3 ms



Filter Class: CFC_1000

Max: 94.3 g at 2.7 ms

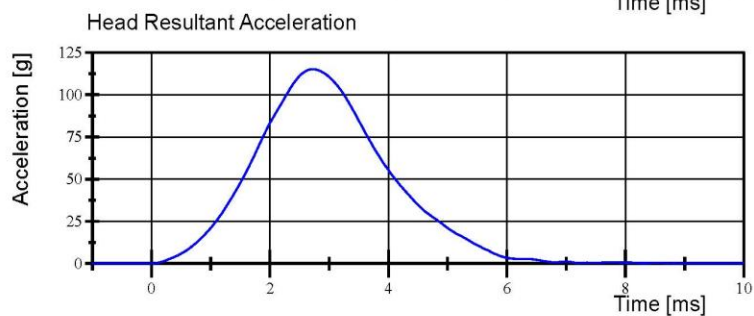
Min: -0.8 g at 7.7 ms



Filter Class: CFC_1000

Max: 66.2 g at 2.8 ms

Min: -0.4 g at 6.7 ms



Filter Class: CFC_1000

Max: 115.2 g at 2.7 ms

Min: 0.0 g at 0.0 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

08.08.2019 12:45:14 947



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Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	113.1 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-2.4 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.55 %	Yes

Test meets specifications.

Condition: Used

Comments:

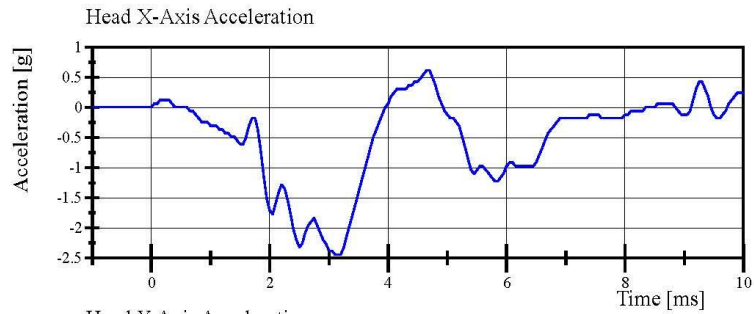
Head S/N: EG2845

Transportation Research Center Inc.

Right Lateral Head Drop

WorldSID 50th Serial No. EB8888 Certification No. 2-1

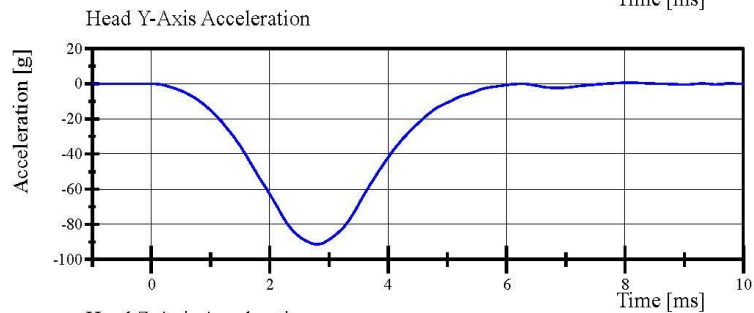
Test Date: 8/1/2019



Filter Class: CFC_1000

Max: 0.6 g at 4.7 ms

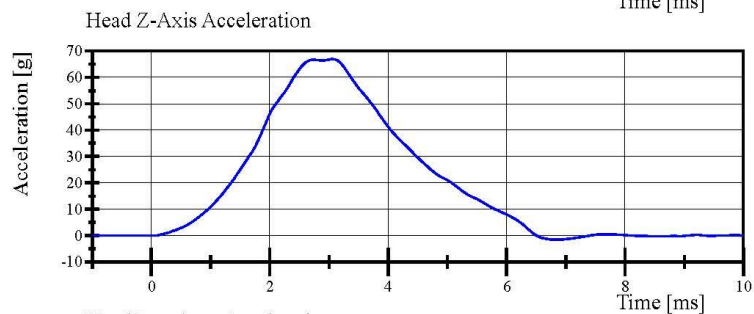
Min: -2.4 g at 3.1 ms



Filter Class: CFC_1000

Max: 0.6 g at 8.1 ms

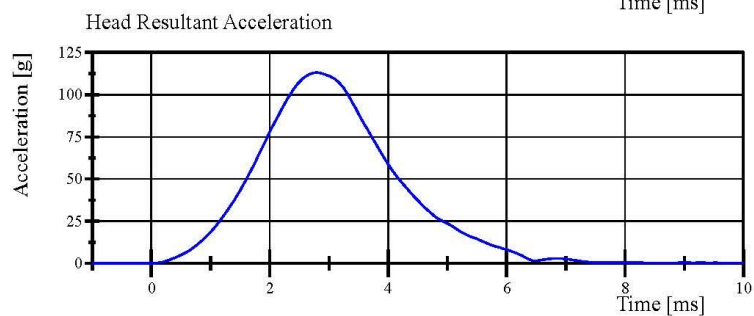
Min: -91.4 g at 2.8 ms



Filter Class: CFC_1000

Max: 67.0 g at 3.1 ms

Min: -1.5 g at 6.8 ms



Filter Class: CFC_1000

Max: 113.1 g at 2.8 ms

Min: 0.0 g at -1.0 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

08.01.2019 10:09:36 946



Transportation Research Center Inc.

Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/1/2019

Test Parameter	Specifications	Test Results	Pass
Temperature	20.6 - 22.2 C	21.3 C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	3.3 - 3.5 m/s	3.331 m/s	Yes
Pendulum Integrated Velocity			
Change at 4ms	0.77 - 1.04 m/s	0.963 m/s	Yes
Change at 8ms	1.6 - 1.9 m/s	1.862 m/s	Yes
Change at 12ms	2.43 - 3.29 m/s	2.776 m/s	Yes
Peak Flexion Angle	50 - 61 deg	51.39 deg	Yes
Peak Flexion Angle Decay to 0	58.72 ms	58.750 ms	Yes
Peak OC Moment	54 - 67 Nm	62.2 Nm	Yes
Peak OC Moment Decay to 0	71 - 87 ms	74.15 ms	Yes
Peak Forward Pot Angle	32 - 39 deg	33.39 deg	Yes
Time of Forward Pot Angle Peak	56 - 68 ms	59.60 ms	Yes
Peak Rear Pot Angle	29 - 36 deg	29.80 deg	Yes
Time of Rear Pot Angle Peak	56 - 68 ms	57.45 ms	Yes
Peak Headform Angular Rate	2164 - 2393 deg/sec	2240.74 deg/sec	Yes

Test meets specifications.

Condition: Used

Comments:

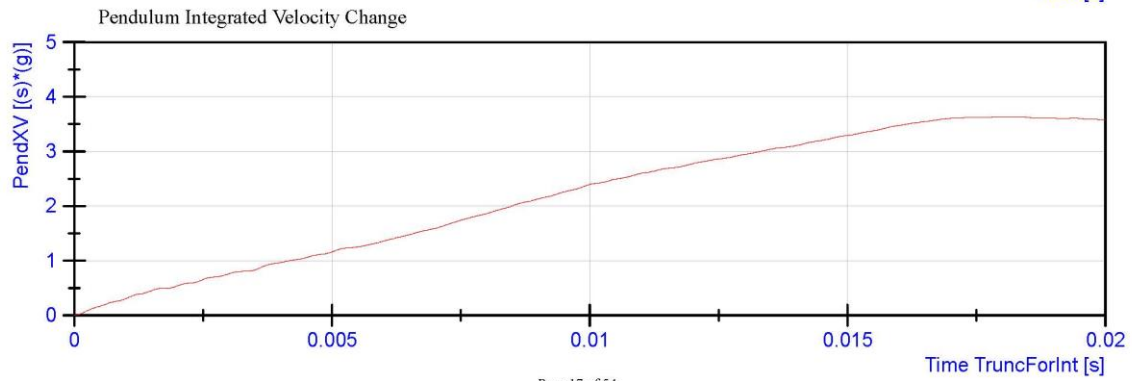
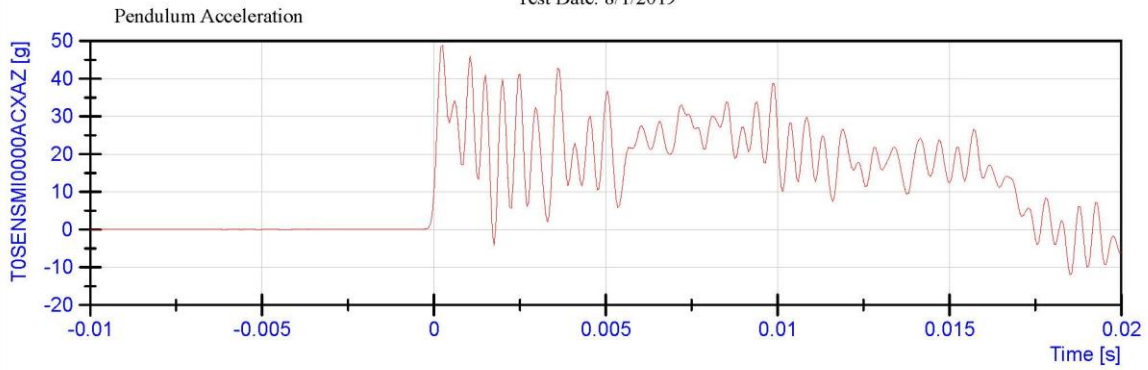
Neck S/N: DM3419

Transportation Research Center Inc.

Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/1/2019

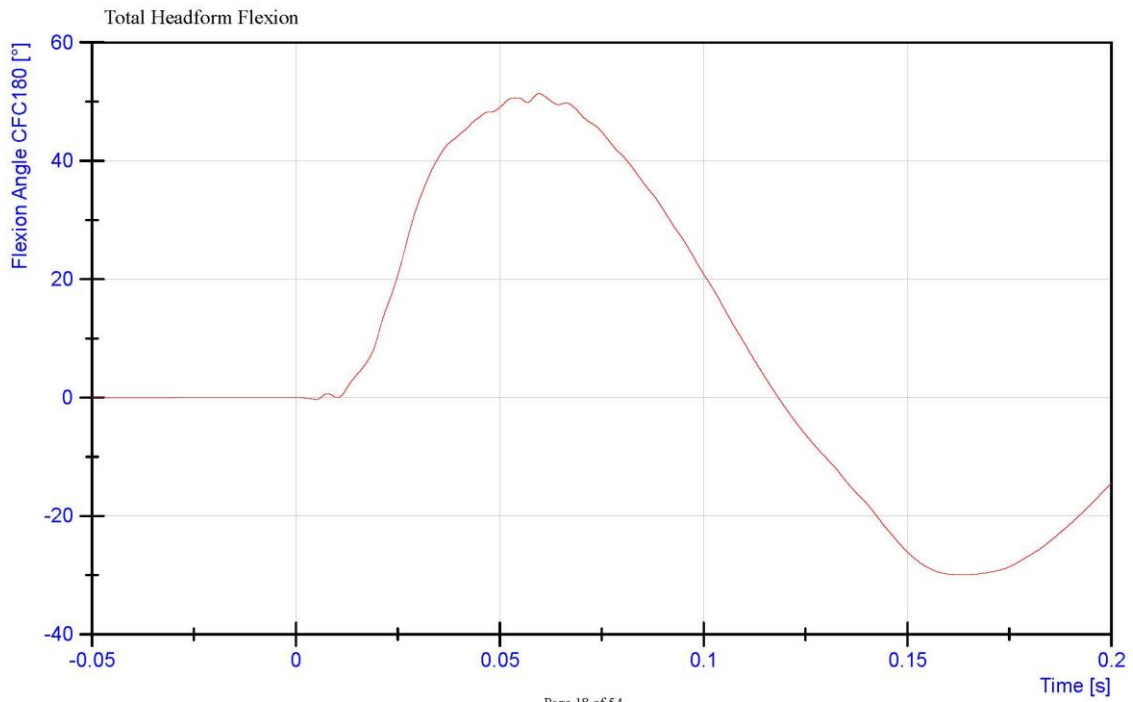


Transportation Research Center Inc.

Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/1/2019



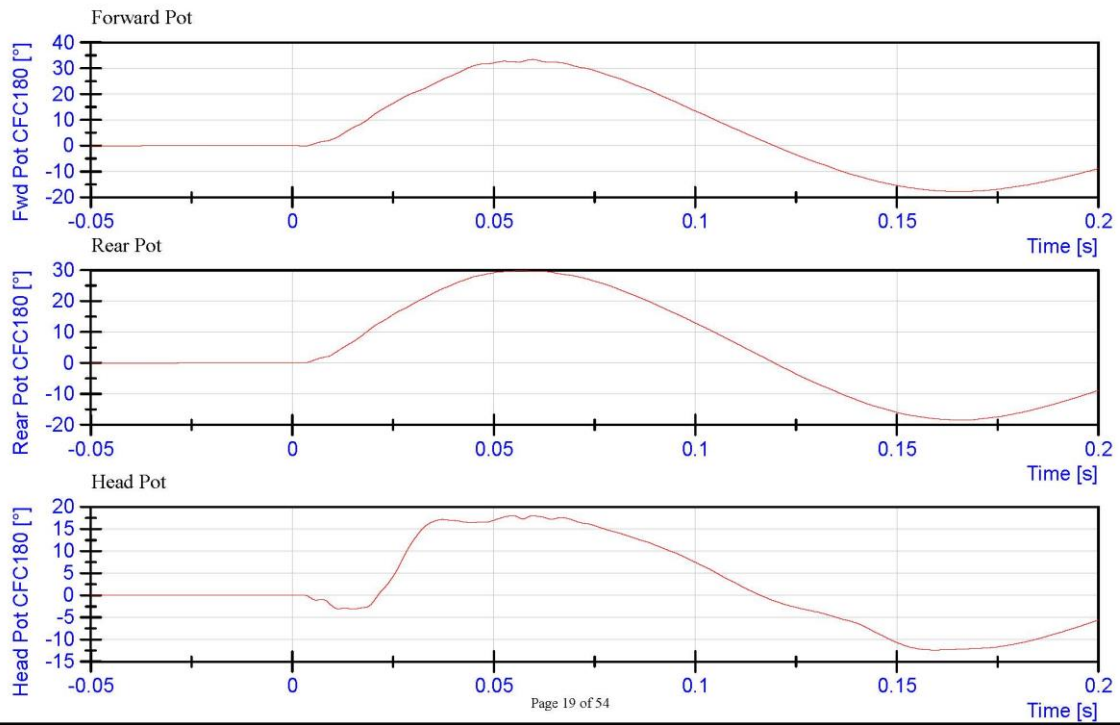
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Transportation Research Center Inc.

Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/1/2019

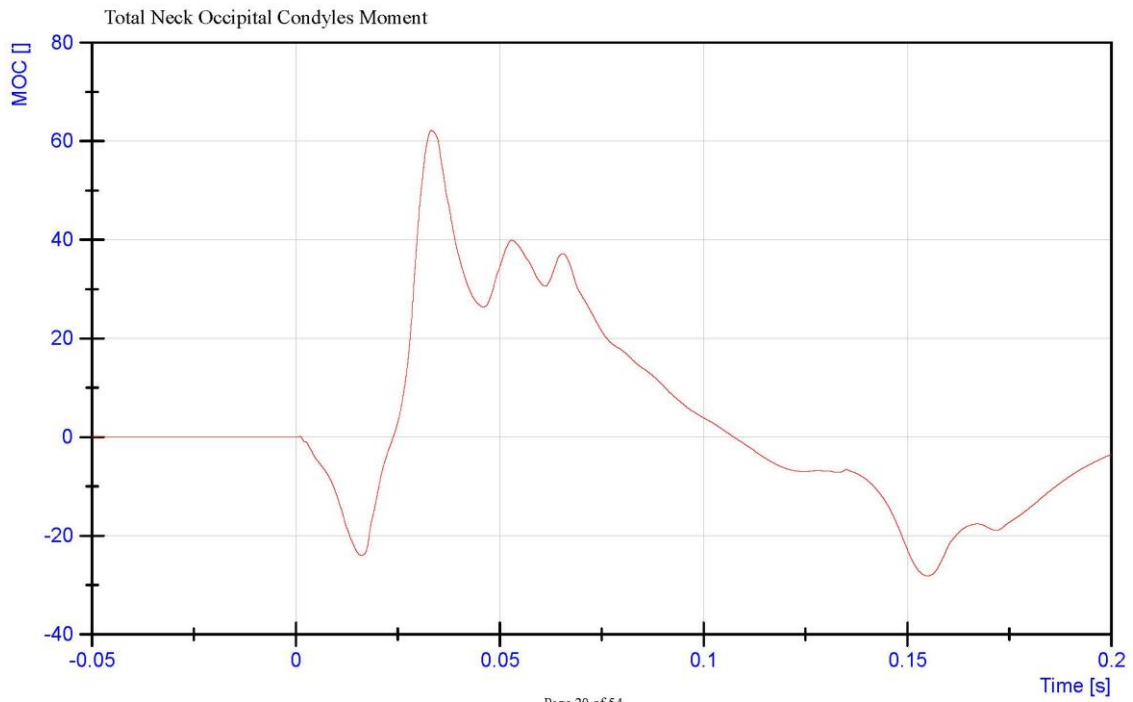


Transportation Research Center Inc.

Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/1/2019

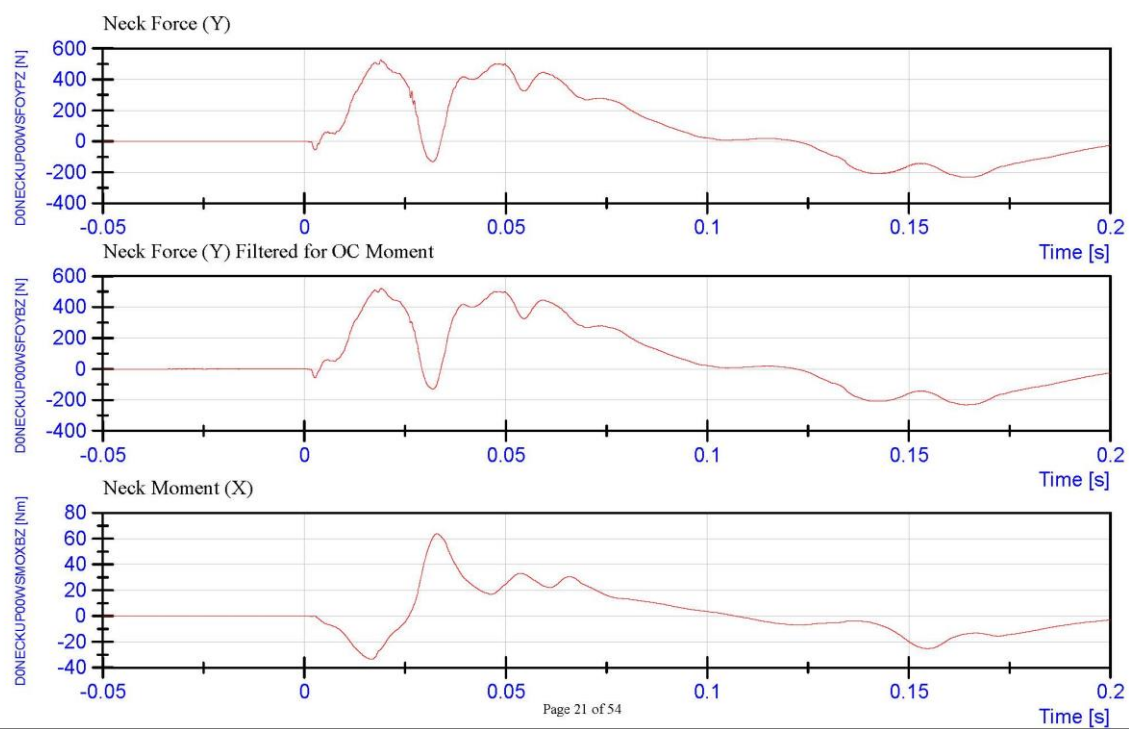


Transportation Research Center Inc.

Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/1/2019



Transportation Research Center Inc.

Right Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019

Test Parameter	Specifications	Test Results	Pass
Temperature	20.6 - 22.2 C	20.8 C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	3.3 - 3.5 m/s	3.332 m/s	Yes
Pendulum Integrated Velocity			
Change at 4ms	0.77 - 1.04 m/s	0.932 m/s	Yes
Change at 8ms	1.6 - 1.9 m/s	1.798 m/s	Yes
Change at 12ms	2.43 - 3.29 m/s	2.668 m/s	Yes
Peak Flexion Angle	50 - 61 deg	51.32 deg	Yes
Peak Flexion Angle Decay to 0	58.72 ms	58.950 ms	Yes
Peak OC Momentnt	54 - 67 Nm	63.8 Nm	Yes
Peak OC Moment Decay to 0	71 - 87 ms	74.45 ms	Yes
Peak Forward Pot Angle	32 - 39 deg	33.55 deg	Yes
Time of Forward Pot Angle Peak	56 - 68 ms	59.80 ms	Yes
Peak Rear Pot Angle	29 - 36 deg	29.96 deg	Yes
Time of Rear Pot Angle Peak	56 - 68 ms	56.60 ms	Yes
Peak Headform Angular Rate	2164 - 2393 deg/sec	2209.39 deg/sec	Yes

Test meets specifications.

Condition: Used

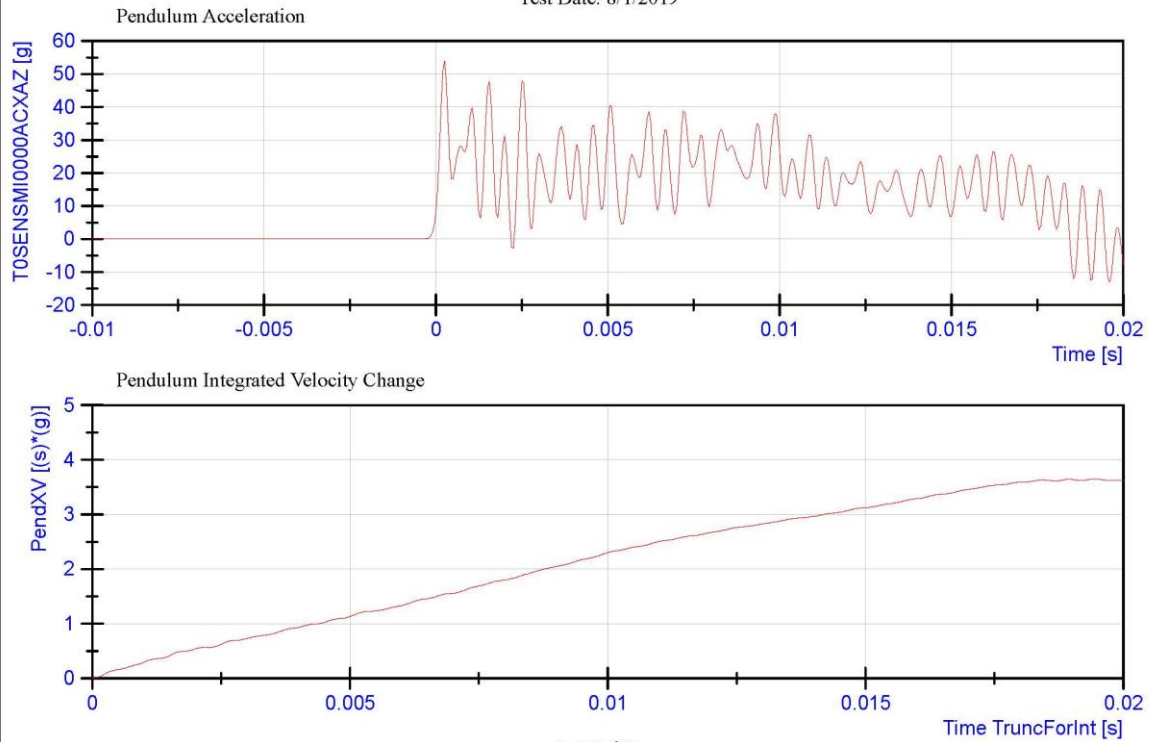
Comments:
Neck S/N: DM3419

Transportation Research Center Inc.

Right Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019



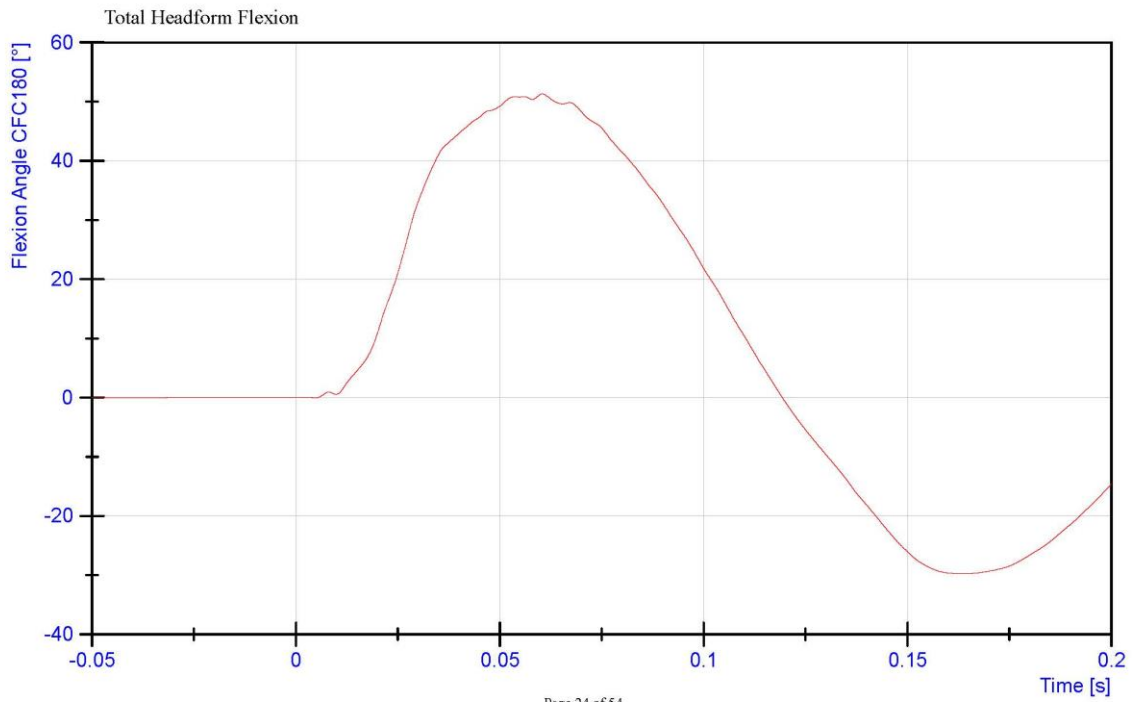
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Transportation Research Center Inc.

Right Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019



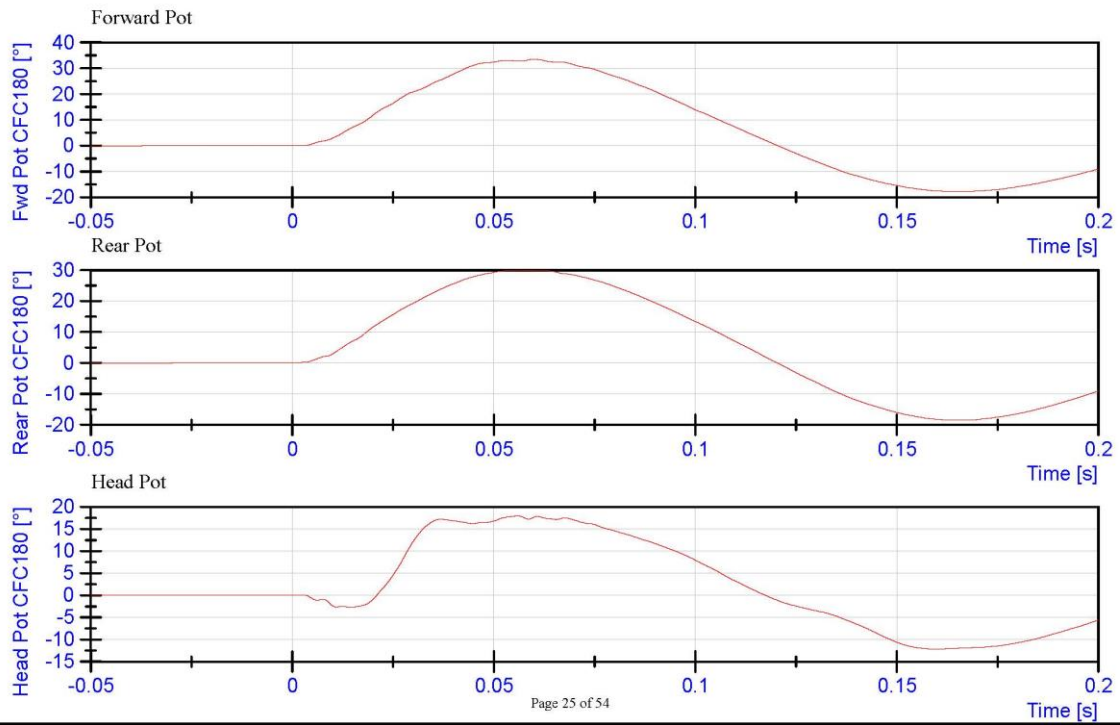
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Transportation Research Center Inc.

Right Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019

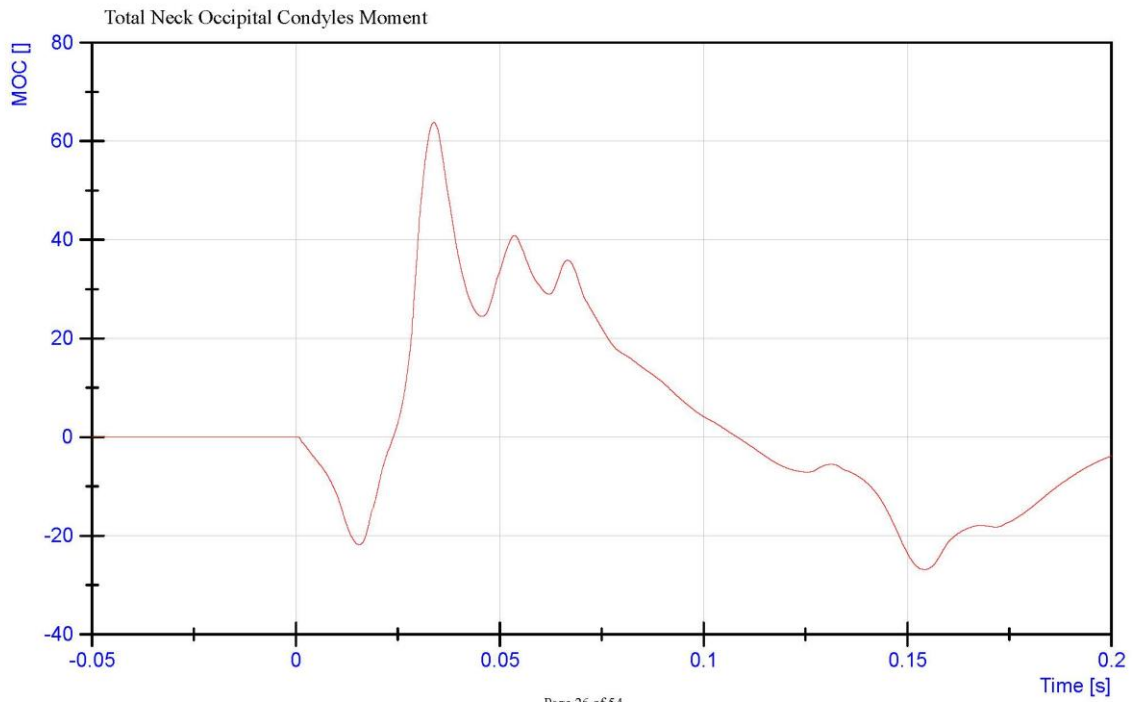


Transportation Research Center Inc.

Right Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019

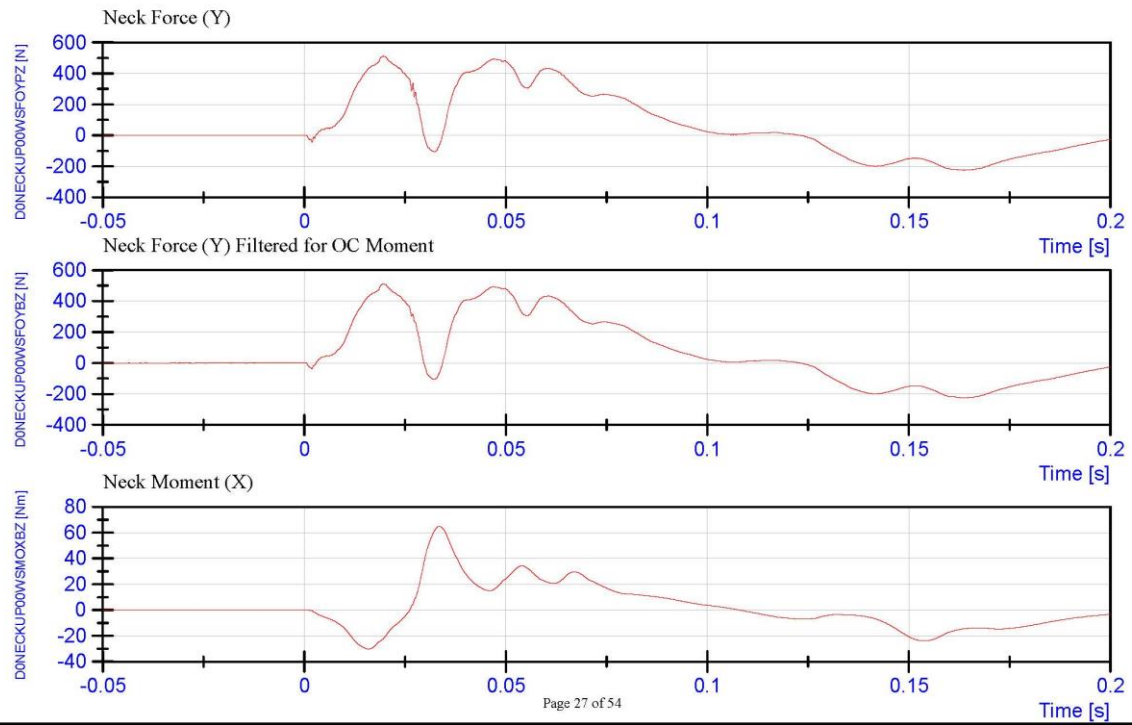


Transportation Research Center Inc.

Right Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019



Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-5

Test Date: 8/3/2019

Test Parameter	Specifications	Test Results	Pass
Temperature	20.6 - 22.2 C	21.1 C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity			
Change at 10ms	2.04 - 2.28 m/s	2.249 m/s	Yes
Change at 20ms	3.2 - 3.57 m/s	3.344 m/s	Yes
Change at 30ms	4.32 - 4.83 m/s	4.447 m/s	Yes
Peak Fixture Rotation	47.9 - 45 deg	43.91 deg	No
Decay Time to 0 deg from Peak Angle	37.9 - 40.57 ms	38.200 ms	Yes
Peak Head Angular Velocity Z-axis	1536 - 1470 deg/s	1449.8 deg/s	No
Peak Lower Neck Moment Z-axis	39.1 - 35.9 Nm	39.87 Nm	Yes

Test does not meets specifications.

Condition: Used

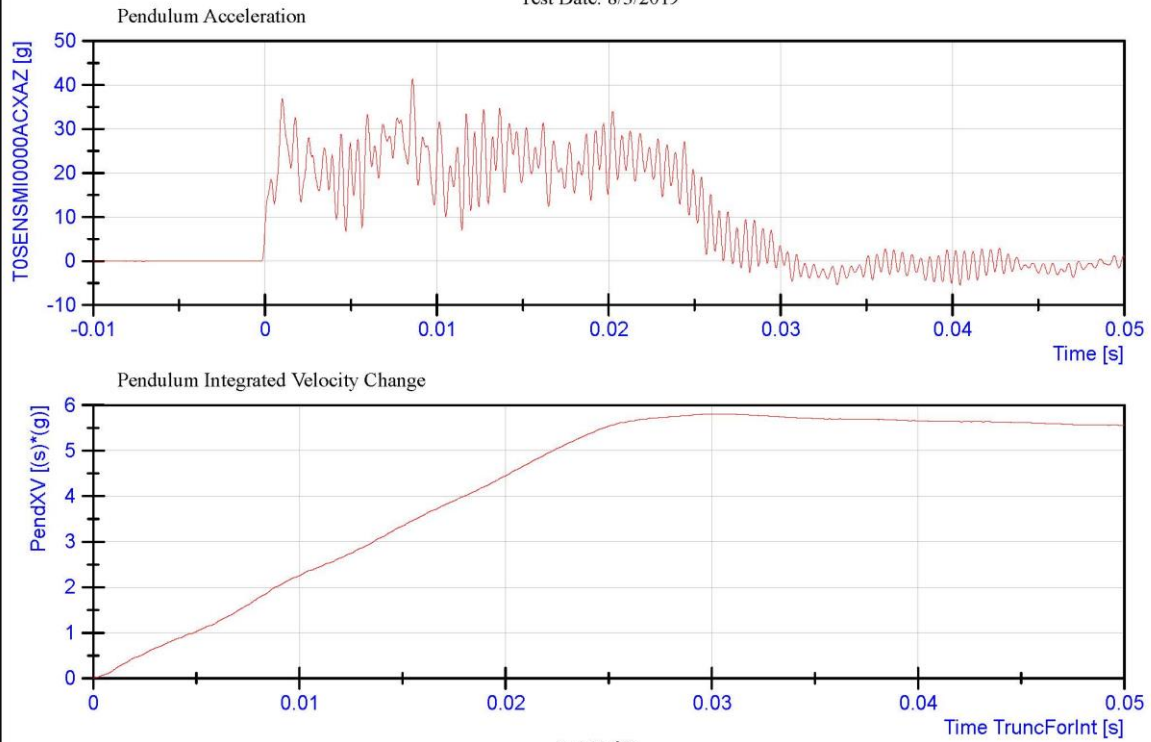
Comments:
Neck S/N: DM3419

Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-5

Test Date: 8/3/2019



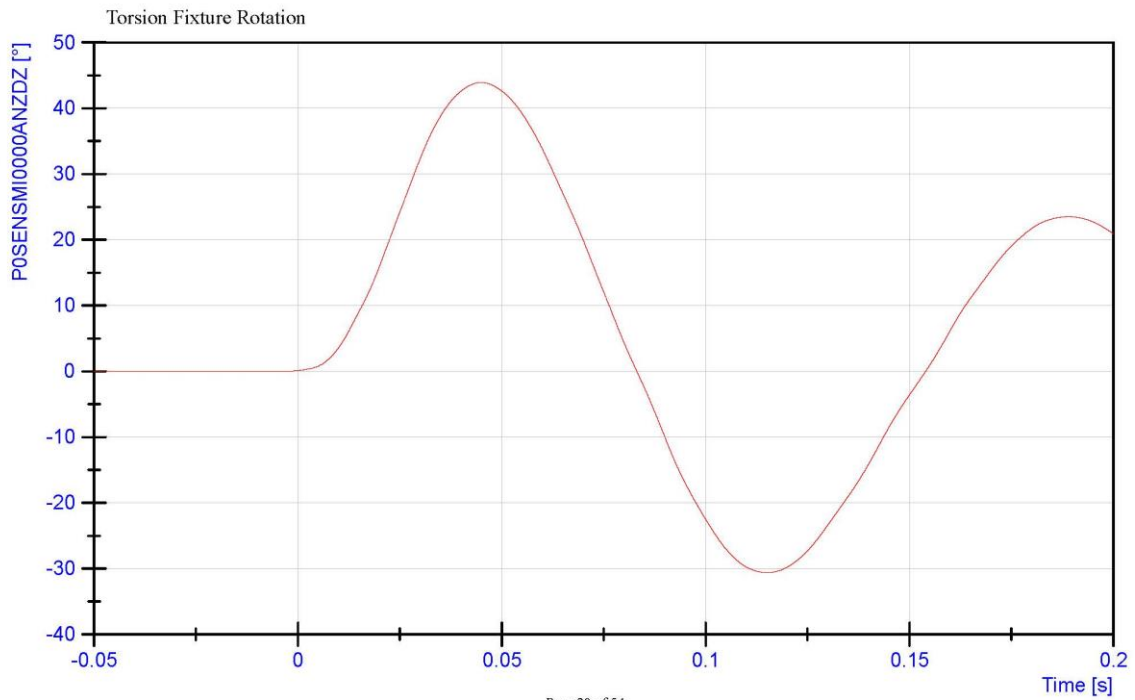
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Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-5

Test Date: 8/3/2019

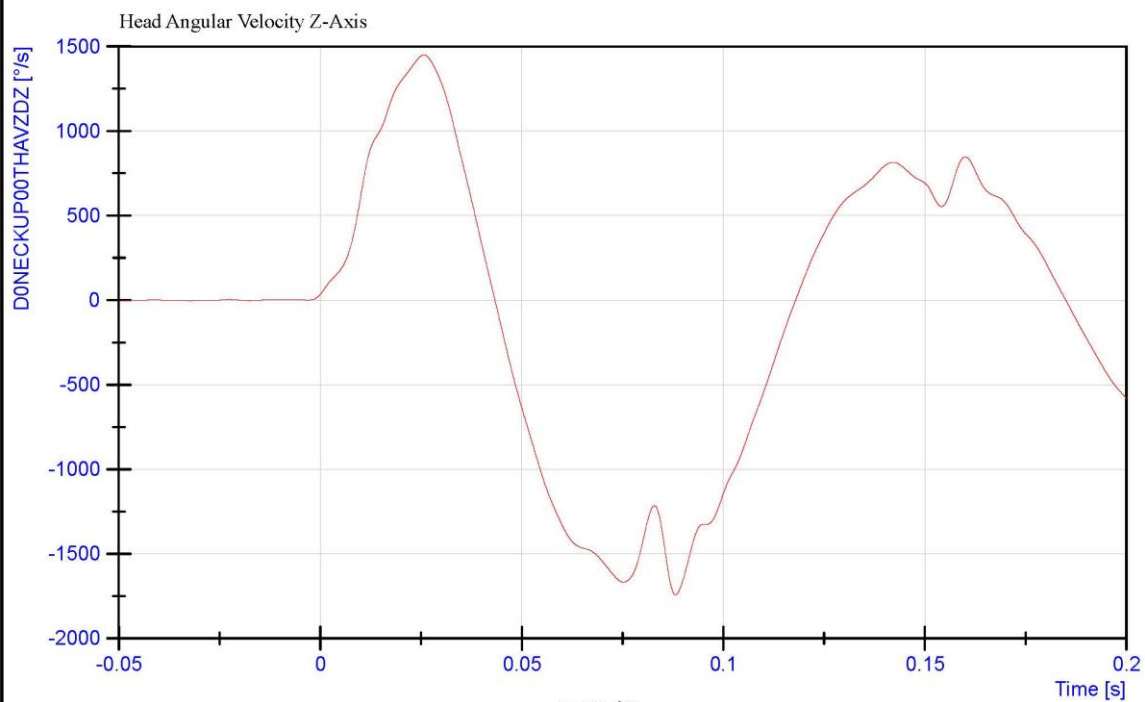


Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-5

Test Date: 8/3/2019



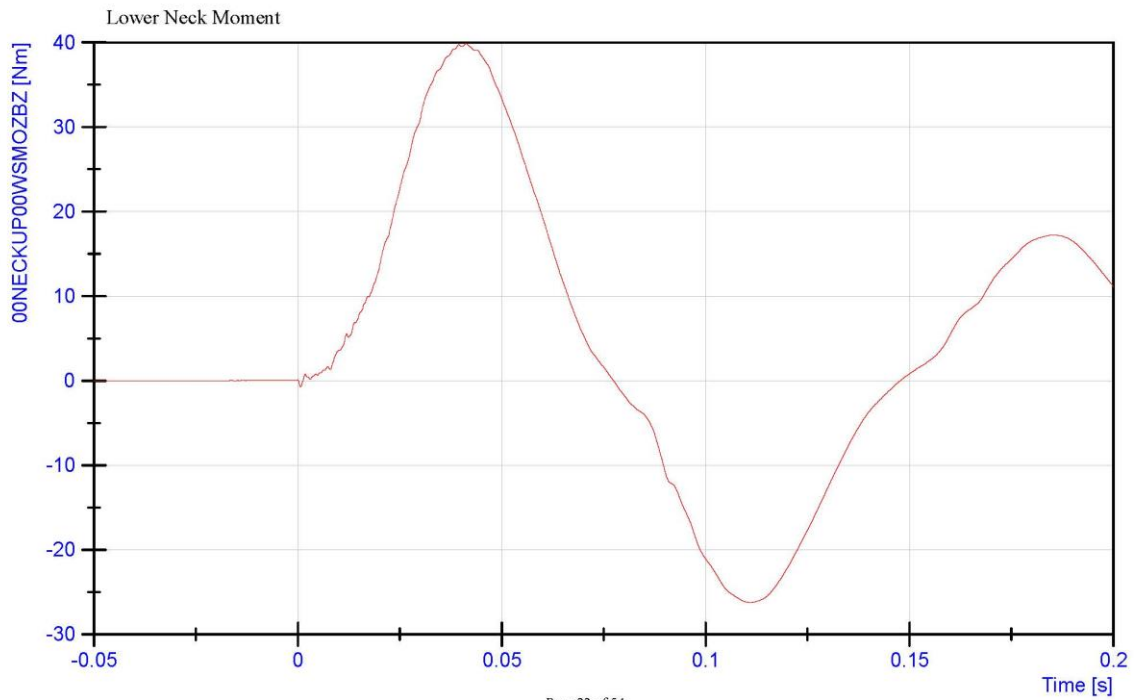
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Transportation Research Center Inc.

Left Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-5

Test Date: 8/3/2019



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Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/3/2019

Test Parameter	Specifications	Test Results	Pass
Temperature	20.6 - 22.2 C	21.0 C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity			
Change at 10ms	2.04 - 2.28 m/s	2.262 m/s	Yes
Change at 20ms	3.2 - 3.57 m/s	3.441 m/s	Yes
Change at 30ms	4.32 - 4.83 m/s	4.555 m/s	Yes
Peak Fixture Rotation	47.9 - 45 deg	43.92 deg	No
Decay Time to 0 deg from Peak Angle	37.9 - 40.57 ms	38.300 ms	Yes
Peak Head Angular Velocity Z-axis	1536 - 1470 deg/s	1468.4 deg/s	Yes
Peak Lower Neck Moment Z-axis	39.1 - 35.9 Nm	39.96 Nm	Yes

Test does not meets specifications.

Condition: Used

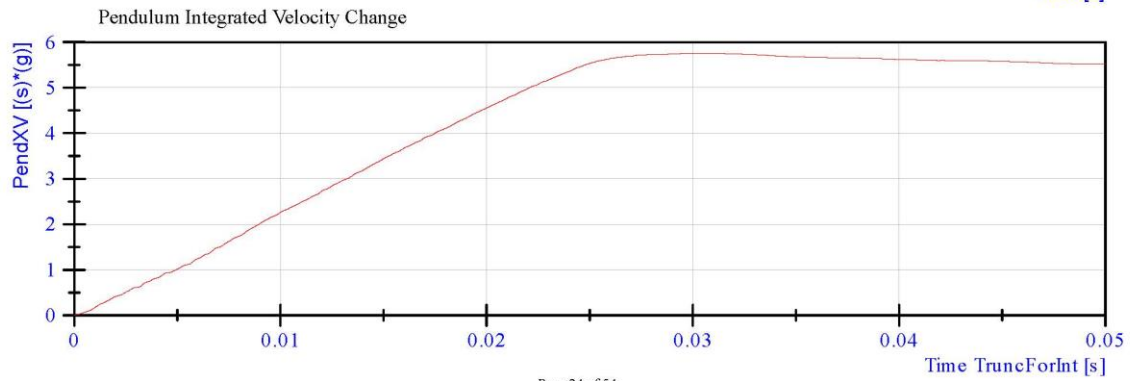
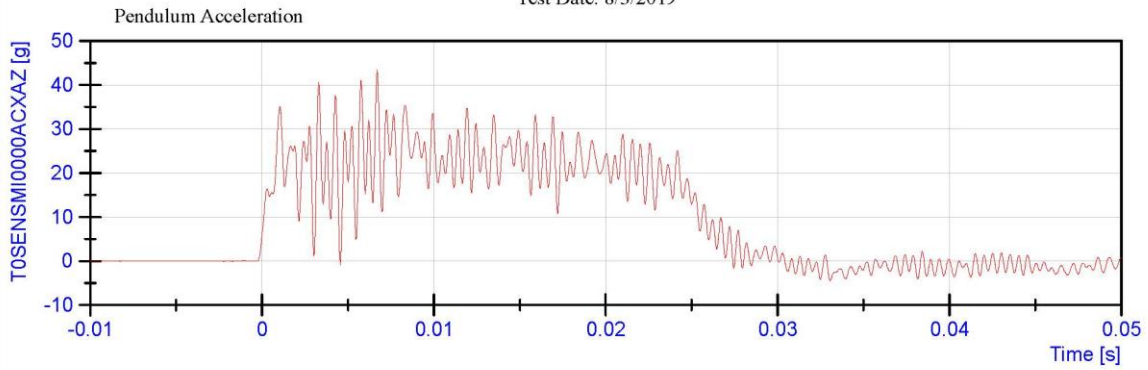
Comments:
Neck S/N: DM3419

Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/3/2019



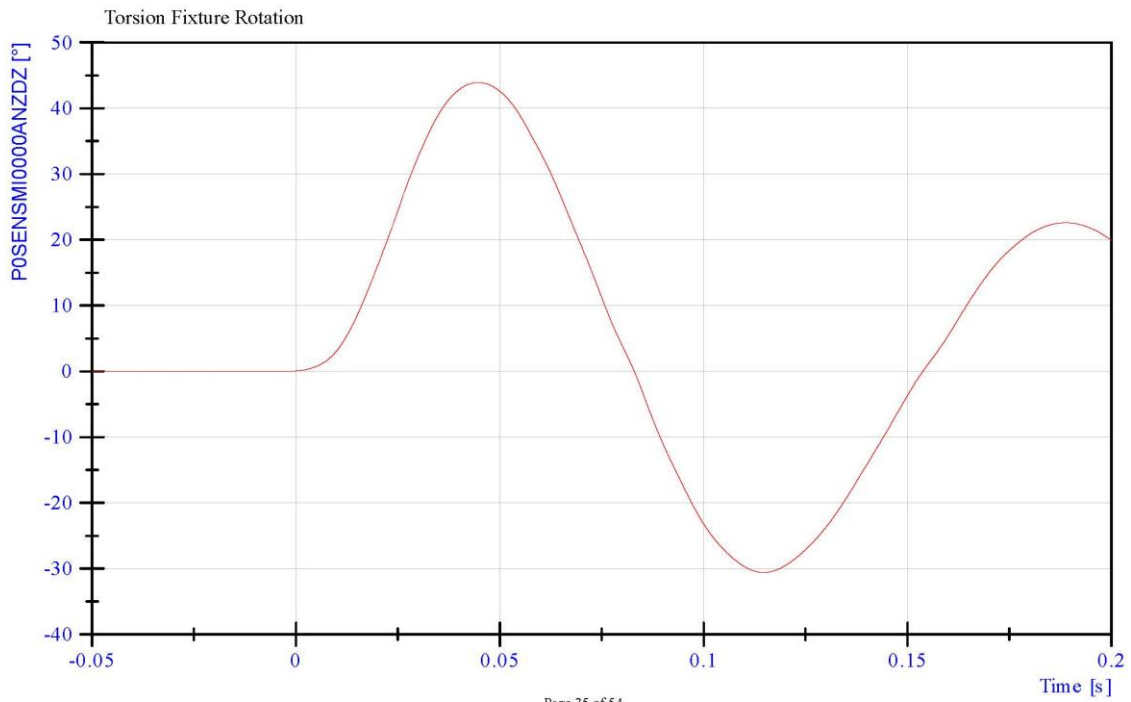
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Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/3/2019

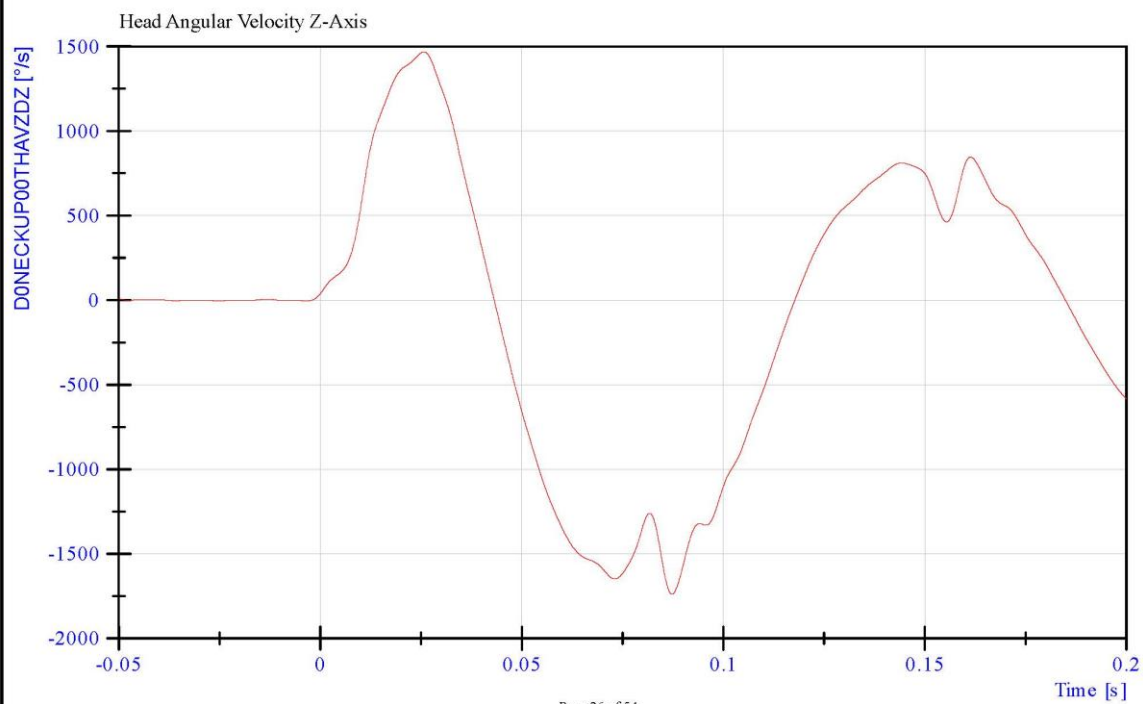


Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/3/2019



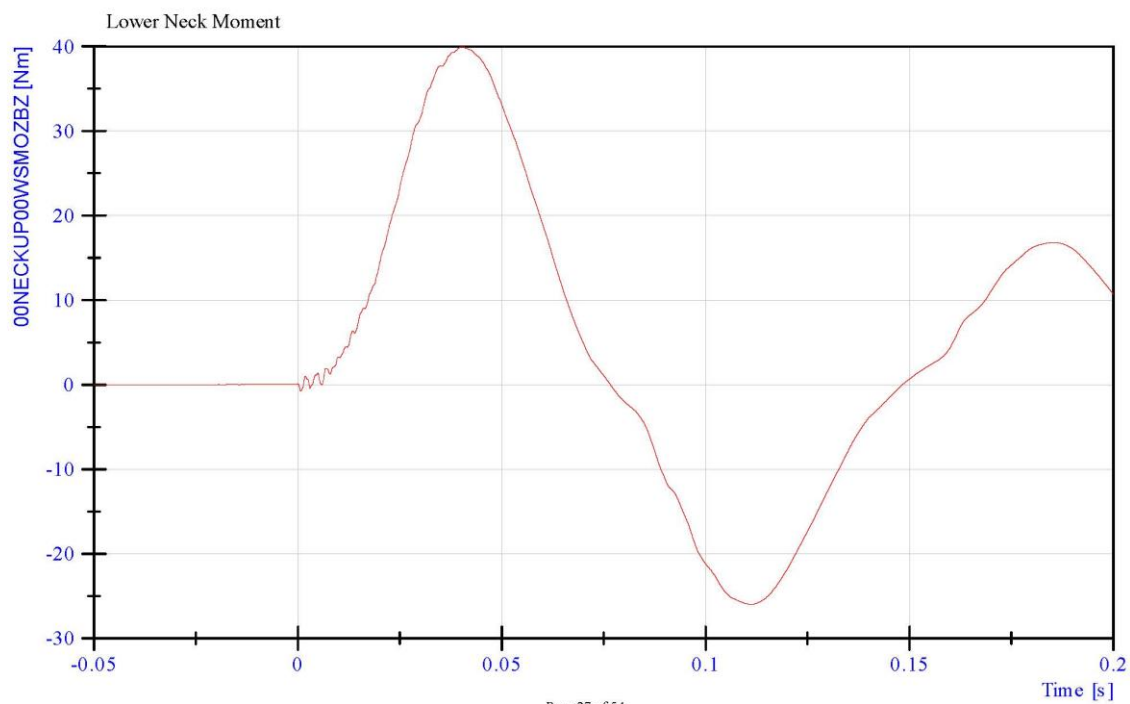
Page 36 of 54

Transportation Research Center Inc.

Right Torsion

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 8/3/2019



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Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 7/30/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.28 m/s	Yes
Impactor Force	2,600 - 3,300 N	2,855.7 N	Yes
Shoulder Force	1,500 - 1,900 N	1,532.7 N	Yes
S1 RibEye Max	37.5 - 46.5 mm	42.79 mm	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: EC3594

Shoulder Rib S/N: EB8887

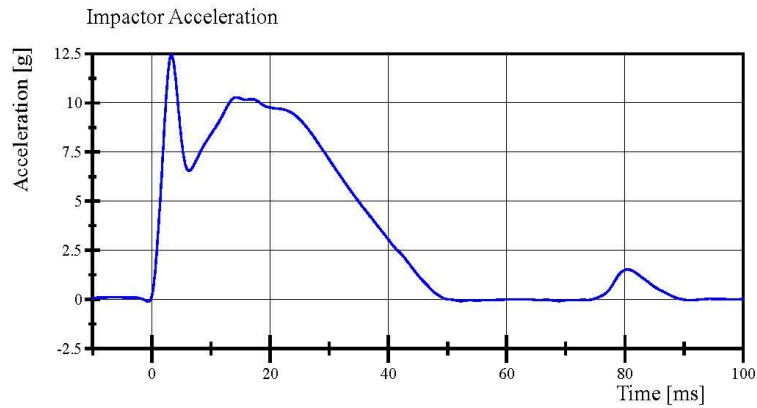
RibEye S/N: 123

Transportation Research Center Inc.

Left Lateral Shoulder

WorldSID 50th Serial No. EB8888 Certification No. 2-1

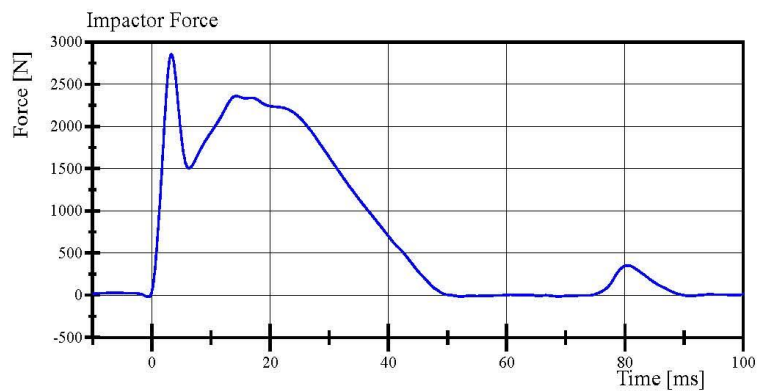
Test Date: 7/30/2019



Filter Class: CFC_180

Max: 12.4 g at 3.3 ms

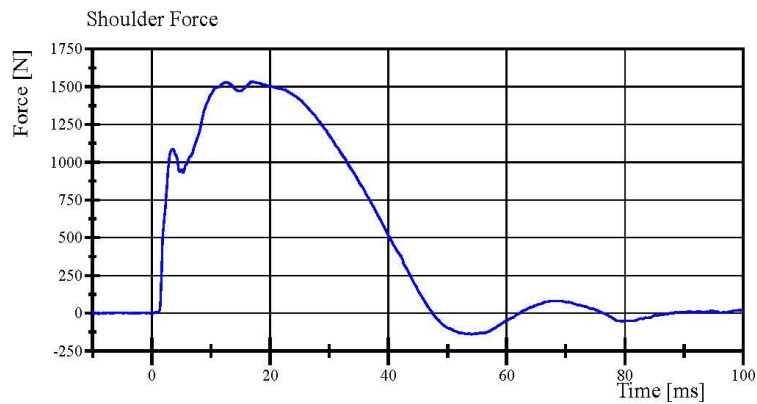
Min: -0.1 g at -0.6 ms



Filter Class: CFC_180

Max: 2,855.7 N at 3.3 ms

Min: -22.1 N at -0.6 ms



Filter Class: CFC_600

Max: 1,532.7 N at 17.0 ms

Min: -139.5 N at 54.1 ms

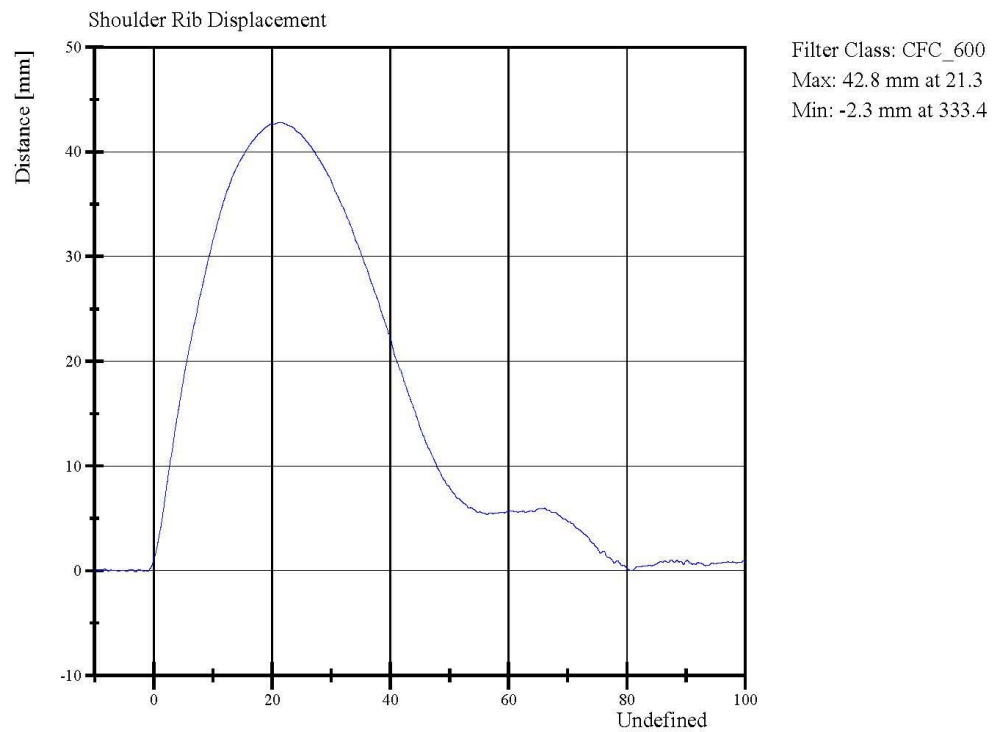
Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.30.2019 16:22:40 1001



Transportation Research Center Inc.

Shoulder Left Lateral
WorldSID 50th Serial No. EB8888 Certification No. 2-1
Test Date: 7/30/2019



Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.30.2019 16:17:01 126



Transportation Research Center Inc.

Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 2-2
Test Date: 7/31/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.66 m/s	Yes
Impactor Force	5,300 - 6,200 N	5,584.1 N	Yes
Upper Thorax Rib Displacement	35 - 47 mm	41.1 mm	Yes
Center Thorax Rib Displacement	46 - 56 mm	48.2 mm	Yes
Lower Thorax Rib Displacement	33.5 - 41.5 mm	37.81 mm	Yes
Upper Spine Lateral Acceleration	28 - 37 g	33.6 g	Yes
Lower Spine Lateral Acceleration	22 - 28 g	25.6 g	Yes

Test meets specifications.

Condition: Used

Comments:

Arm S/N: EC3594

Thorax Rib 1 S/N: EB5400

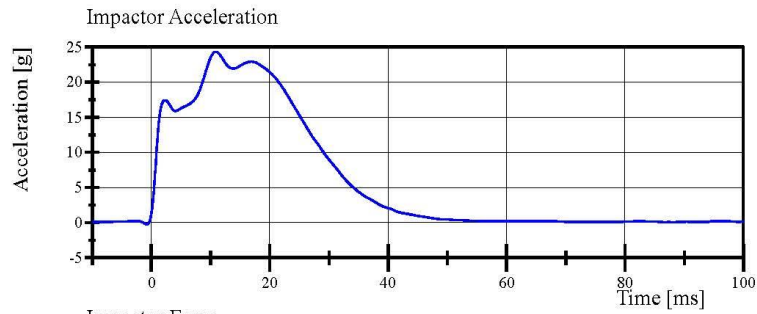
Thorax Rib 2 S/N: EB5401

Thorax Rib 3 S/N: EB5402

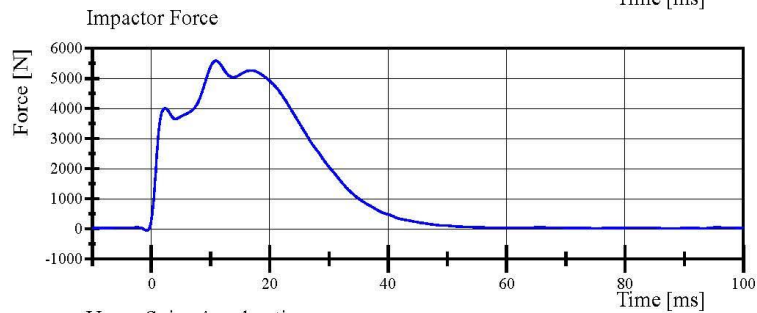
RibEye S/N: 123

Transportation Research Center Inc.

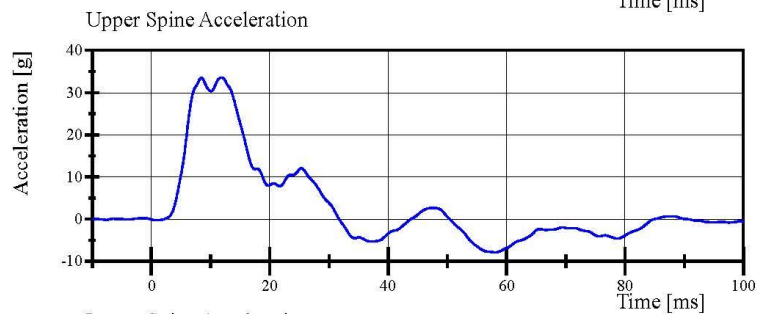
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 2-2
Test Date: 7/31/2019



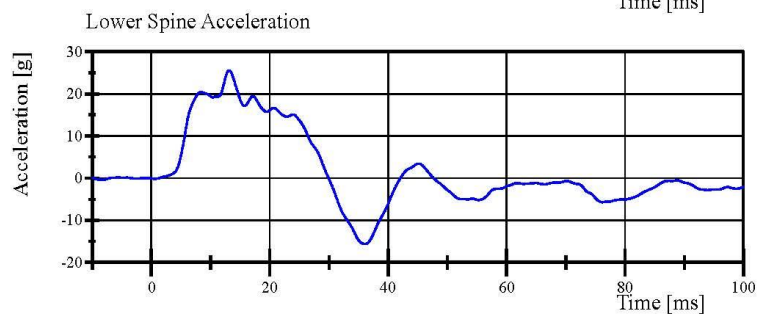
Filter Class: CFC_180
Max: 24.3 g at 10.9 ms
Min: -0.2 g at -0.8 ms



Filter Class: CFC_180
Max: 5,584.1 N at 10.9 ms
Min: -53.2 N at -0.8 ms



Filter Class: CFC_180
Max: 33.6 g at 11.9 ms
Min: -7.9 g at 58.1 ms



Filter Class: CFC_180
Max: 25.6 g at 13.2 ms
Min: -15.6 g at 36.1 ms

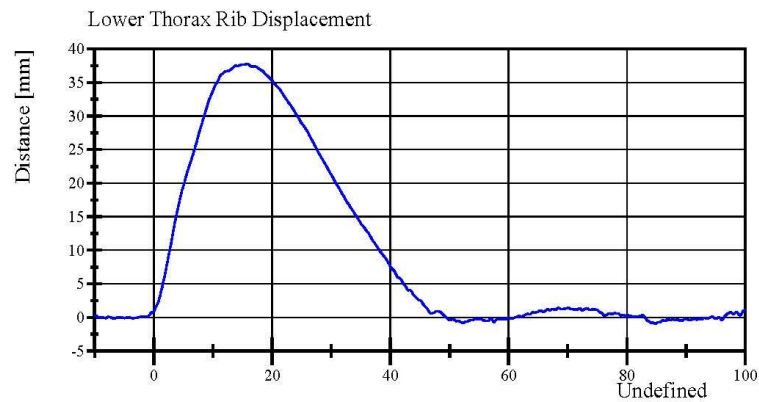
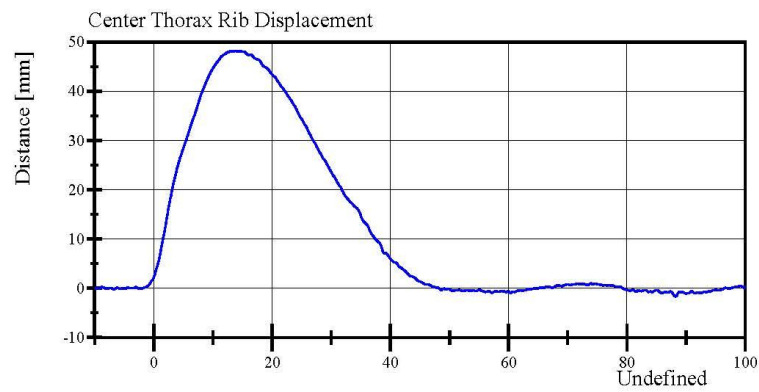
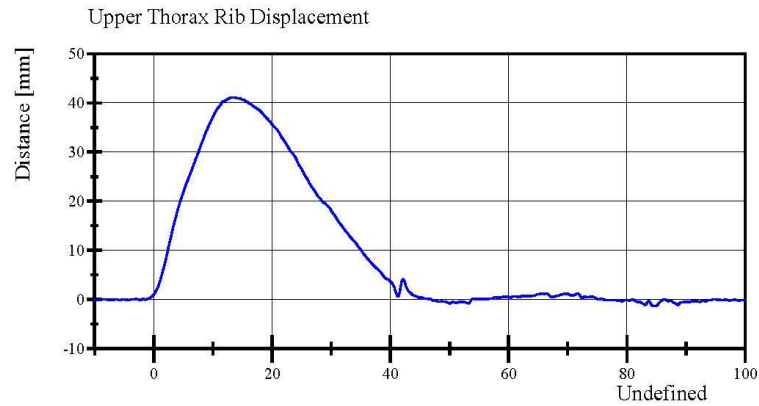
Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.31.2019 09:46:18 1001



Transportation Research Center Inc.

Thorax wArm Left Lateral
WorldSID 50th Serial No. EB8888 Certification No. 2-2
Test Date: 7/31/2019



Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.31.2019 09:16:08 135



Transportation Research Center Inc.

Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 2-1
Test Date: 7/31/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.20 - 4.40 m/s	4.285 m/s	Yes
Impactor Force	3,400 - 4,000 N	3,442.8 N	Yes
Upper Thorax Rib Displacement	33 - 43 mm	36.5 mm	Yes
Center Thorax Rib Displacement	35 - 43 mm	40.2 mm	Yes
Lower Thorax Rib Displacement	32 - 40 mm	35.5 mm	Yes
Upper Spine Lateral Acceleration	14 - 20 g	16.5 g	Yes
Lower Spine Lateral Acceleration	14 - 22 g	16.9 g	Yes

Test meets specifications.

Condition: Used

Comments:

Thorax Rib 1 S/N: EB5400

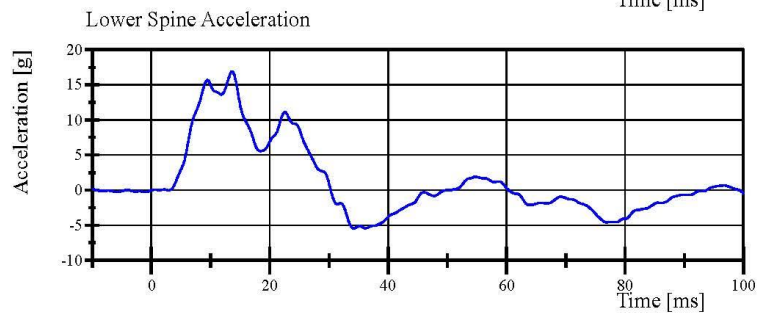
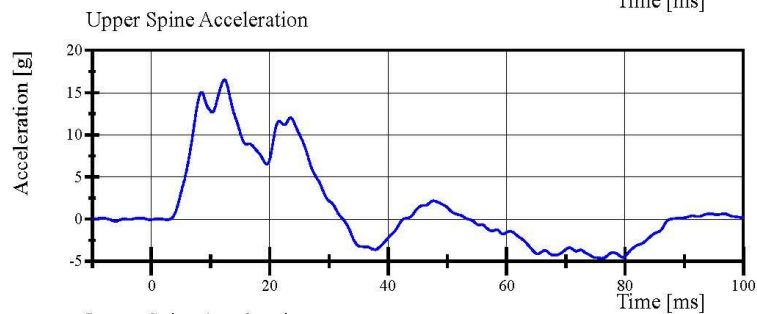
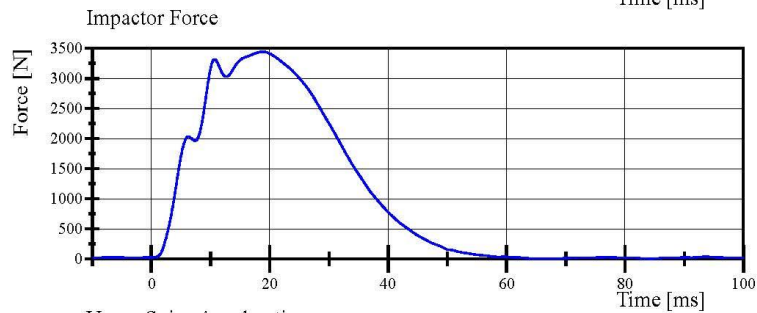
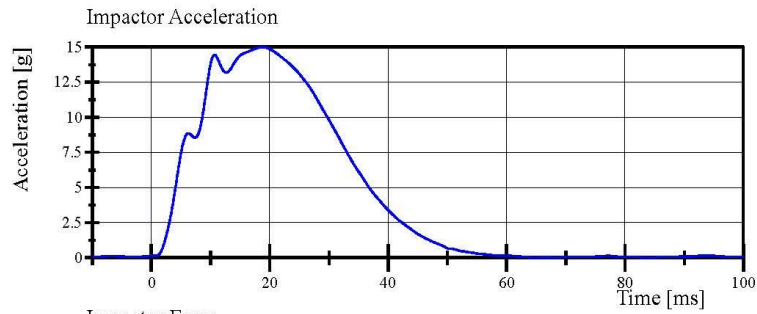
Thorax Rib 2 S/N: EB5401

Thorax Rib 3 S/N: EB5402

RibEye S/N: 123

Transportation Research Center Inc.

Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 2-1
Test Date: 7/31/2019



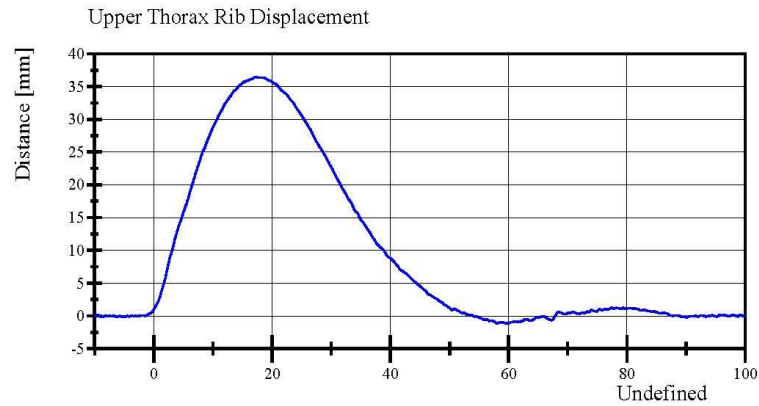
Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.31.2019 12:07:17 1001

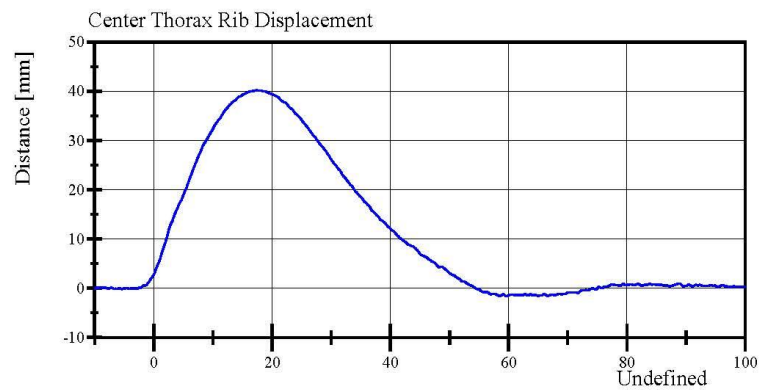


Transportation Research Center Inc.

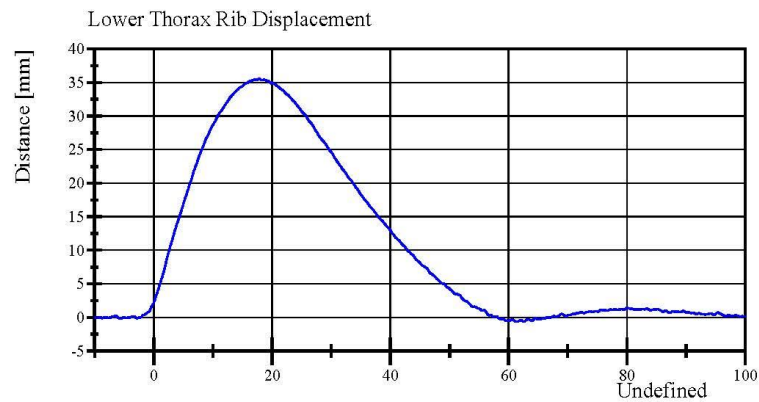
Thorax woArm Left Lateral
WorldSID 50th Serial No. EB8888 Certification No. 2-1
Test Date: 7/31/2019



Filter Class: CFC_600
Max: 36.5 mm at 17.3
Min: -1.1 mm at 58.1



Filter Class: CFC_600
Max: 40.2 mm at 17.4
Min: -1.6 mm at 59.6



Filter Class: CFC_600
Max: 35.5 mm at 17.8
Min: -0.7 mm at 61.3

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.31.2019 12:00:17 146



Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID 50th Serial No. EB8888 Certification No. 2-2

Test Date: 7/31/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.31 m/s	Yes
Impactor Force	2,700 - 3,100 N	3,031.1 N	Yes
Upper Abdominal Rib Displacement	32.5 - 39.5 mm	33.50 mm	Yes
Lower Abdominal Rib Displacement	30 - 36 mm	34.5 mm	Yes
Lower Spine Lateral Acceleration	14.5 - 19.5 g	17.69 g	Yes

Test meets specifications.

Condition: Used

Comments:

Abdomen Rib 1 S/N: DY5252

Abdomen Rib 2 S/N: DY5253

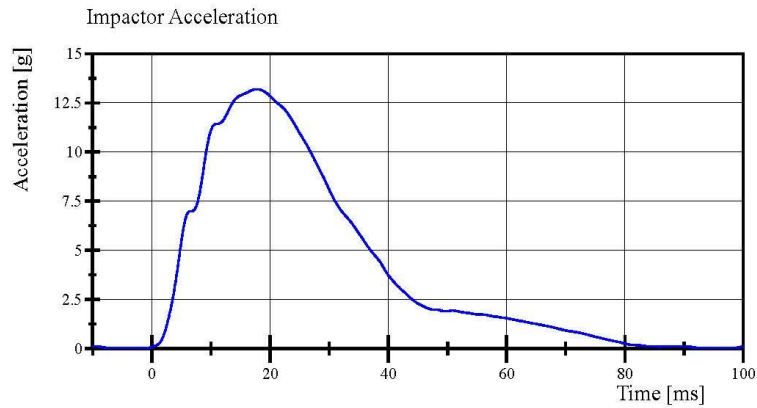
RibEye S/N: 123

Transportation Research Center Inc.

Left Lateral Abdomen

WorldSID 50th Serial No. EB8888 Certification No. 2-2

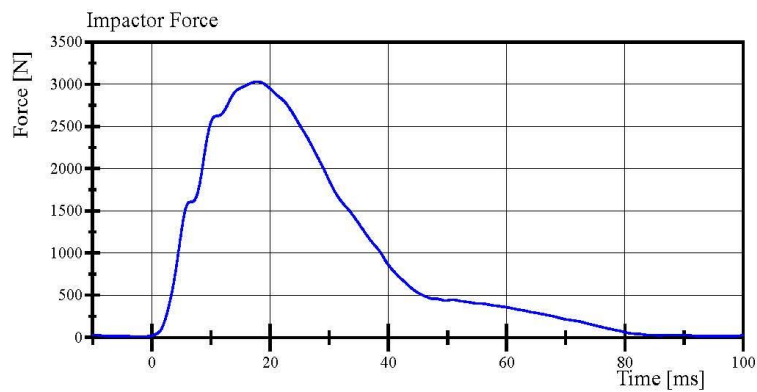
Test Date: 7/31/2019



Filter Class: CFC_180

Max: 13.2 g at 17.8 ms

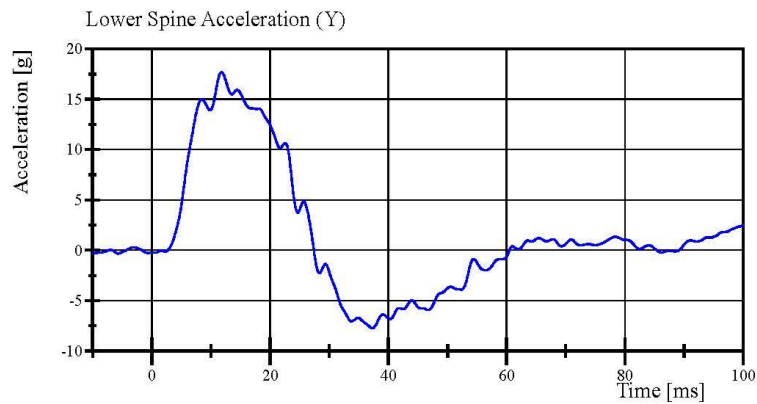
Min: 0.0 g at -2.5 ms



Filter Class: CFC_180

Max: 3,031.1 N at 17.8 ms

Min: 10.2 N at -2.5 ms



Filter Class: CFC_180

Max: 17.7 g at 11.8 ms

Min: -7.8 g at 37.3 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.31.2019 15:24:07 1001



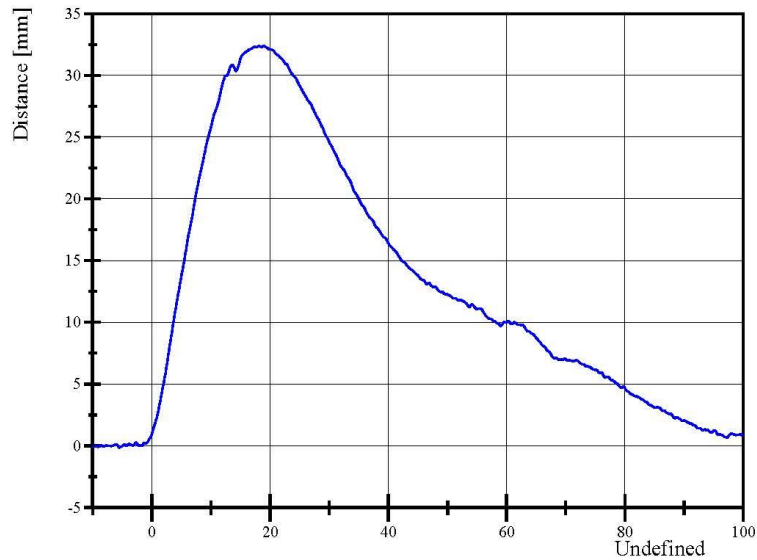
Transportation Research Center Inc.

Abdomen Left Lateral

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 7/31/2019

Upper Abdominal Rib Displacement

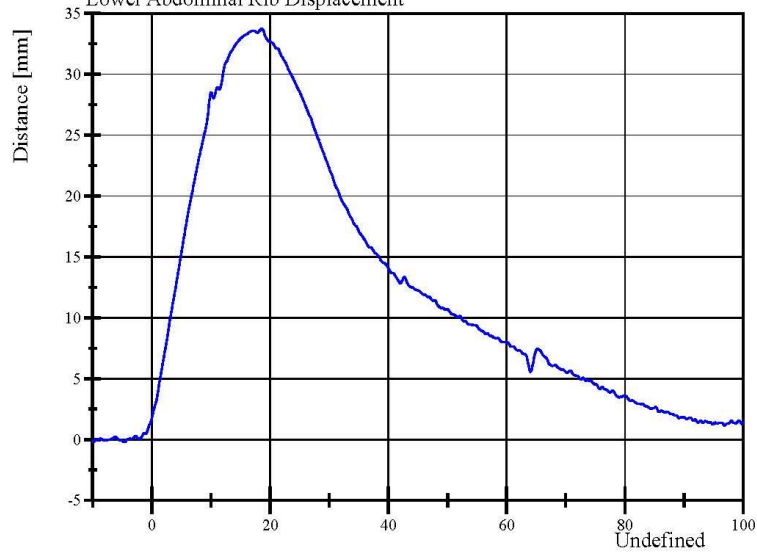


Filter Class: CFC_600

Max: 32.4 mm at 18.9

Min: -0.2 mm at -5.5

Lower Abdominal Rib Displacement



Filter Class: CFC_600

Max: 33.8 mm at 18.6

Min: -0.3 mm at 320.2

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

07.31.2019 14:03:11 142



Transportation Research Center Inc.

Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 2-1
Test Date: 8/1/2019

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Impactor Velocity	6.60 - 6.80 m/s	6.694 m/s	Yes
Impactor Force	6,800 - 8,200 N	7,397.4 N	Yes
Pelvis Lateral Acceleration	38.5 - 48.5 g	40.76 g	Yes
Lower Spine Lateral Acceleration	10 - 14 g	10.6 g	Yes
Pubic Lateral Force	(-1,300) - (-1,600) N	-1,329.1 N	Yes
Sacroiliac Lateral Force	(-1,900) - (-2,200) N	-1,985.6 N	Yes

Test meets specifications.

Condition: Used

Comments:

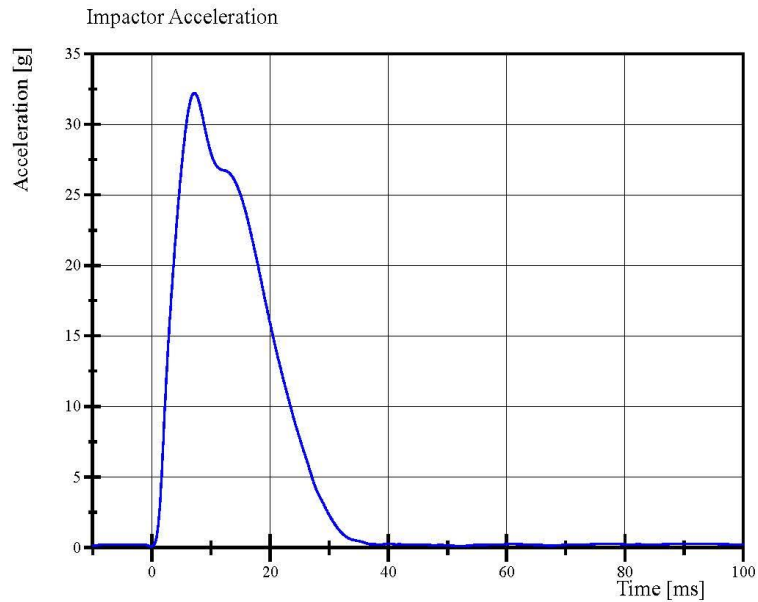
Pelvis Skin S/N: EC1494

Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID 50th Serial No. EB8888 Certification No. 2-1

Test Date: 8/1/2019



Filter Class: CFC_180

Max: 32.2 g at 7.2 ms

Min: 0.1 g at -0.1 ms



Filter Class: CFC_180

Max: 7,397.4 N at 7.2 ms

Min: 19.6 N at -0.1 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

08.01.2019 07:29:28 1001

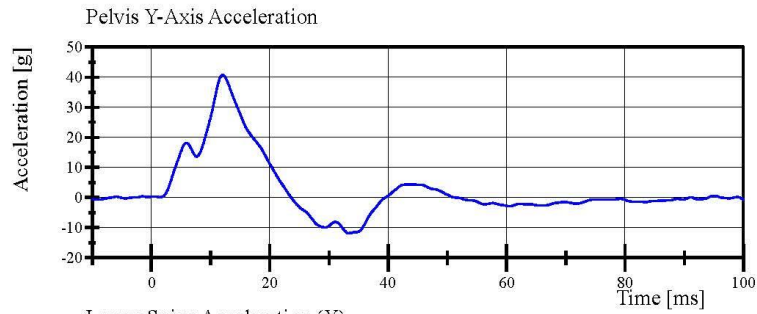


Transportation Research Center Inc.

Left Lateral Pelvis

WorldSID 50th Serial No. EB8888 Certification No. 2-1

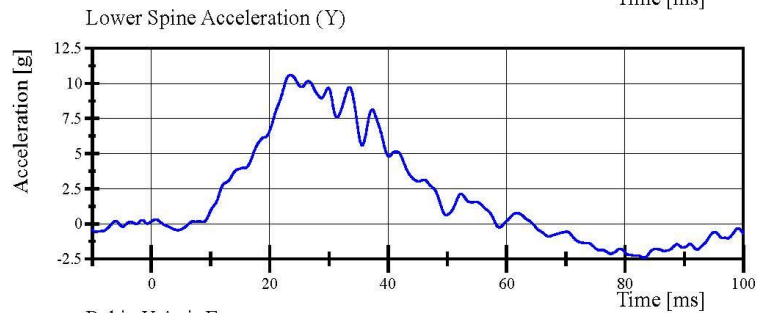
Test Date: 8/1/2019



Filter Class: CFC_180

Max: 40.8 g at 12.1 ms

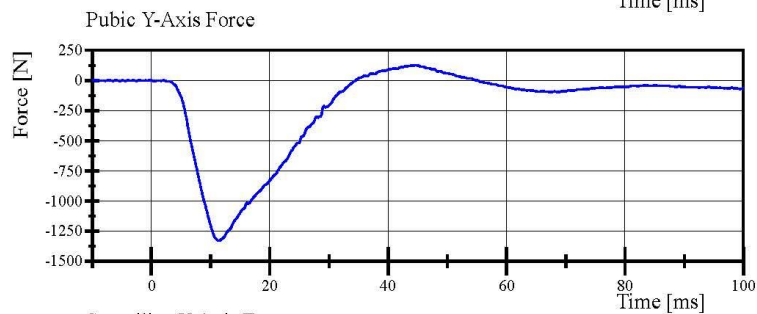
Min: -11.9 g at 33.4 ms



Filter Class: CFC_180

Max: 10.6 g at 23.5 ms

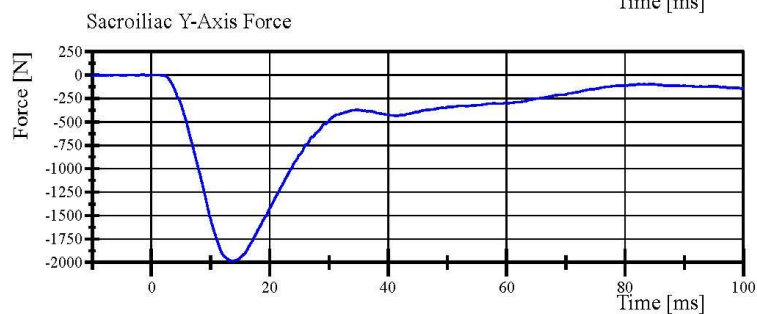
Min: -2.4 g at 83.3 ms



Filter Class: CFC_600

Max: 127.5 N at 44.7 ms

Min: -1,329.1 N at 11.4 ms



Filter Class: CFC_600

Max: 6.8 N at -1.5 ms

Min: -1,985.6 N at 13.8 ms

Specification Source: WS50 R&R qual specs July 2019.xlsx
WorldSID 50th VRTC July 2019 v1.1

08.01.2019 07:29:29 1001



APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION DATA

TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™)

		WorldSID-50M S/N EB8888		
		Serial Number	Manufacturer	Calibration Date
Head Accelerometers (g)	X	12362-1	Endevco	23-May-2019
	Y	12362-2	Endevco	23-May-2019
	Z	12362-3	Endevco	23-May-2019
Head Angular Rates Sensors (deg/sec)	X	ARS15092	DTS	1-Oct-2018
	Y	ARS12311	DTS	1-Oct-2018
	Z	ARS15089	DTS	1-Oct-2018
Upper Neck Force (N)	X	110	Humanetics	27-Nov-2018
	Y	110	Humanetics	27-Nov-2018
	Z	110	Humanetics	27-Nov-2018
Upper Neck Moment (Nm)	X	110	Humanetics	27-Nov-2018
	Y	110	Humanetics	27-Nov-2018
	Z	110	Humanetics	27-Nov-2018
Lower Neck Force (N)	X	EB8143	Denton	27-Nov-2018
	Y	EB8143	Denton	27-Nov-2018
	Z	EB8143	Denton	27-Nov-2018
Lower Neck Moment (Nm)	X	EB8143	Denton	27-Nov-2018
	Y	EB8143	Denton	27-Nov-2018
	Z	EB8143	Denton	27-Nov-2018
Upper Spine Accelerometers (T1) (g)	X	12040-1	Endevco	23-May-2019
	Y	12040-2	Endevco	23-May-2019
	Z	12040-3	Endevco	23-May-2019
Middle Spine Accelerometers (T4) (g)	X	12078-1	Endevco	21-May-2019
	Y	12078-2	Endevco	21-May-2019
	Z	12078-3	Endevco	21-May-2019
Lower Spine Accelerometers (T12) (g)	X	12058-1	Endevco	23-May-2019
	Y	12058-2	Endevco	23-May-2019
	Z	12058-3	Endevco	23-May-2019
Shoulder Force (N)	X	EA8982	Humanetics	27-Nov-2018
	Y	EA8982	Humanetics	27-Nov-2018
	Z	EA8982	Humanetics	27-Nov-2018
Pubic Symphysis Force (N)	Y	EB8675	Humanetics	27-Nov-2018
Sacro-Iliac Left Force (N)	X	EA8971	Humanetics	26-Nov-2018
	Y	EA8971	Humanetics	26-Nov-2018
	Z	EA8971	Humanetics	26-Nov-2018
Sacro-Iliac Left Moment (Nm)	X	EA8971	Humanetics	26-Nov-2018
	Y	EA8971	Humanetics	26-Nov-2018
	Z	EA8971	Humanetics	26-Nov-2018

TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)

		WorldSID-50M S/N EB8888		
		Serial Number	Manufacturer	Calibration Date
Sacro-Iliac Right Force (N)	X	EA8971	Humanetics	26-Nov-2018
	Y	EA8971	Humanetics	26-Nov-2018
	Z	EA8971	Humanetics	26-Nov-2018
Sacro-Iliac Right Moment (Nm)	X	EA8971	Humanetics	26-Nov-2018
	Y	EA8971	Humanetics	26-Nov-2018
	Z	EA8971	Humanetics	26-Nov-2018
Lumbar Force (N)	X	EB8157	Humanetics	27-Nov-2018
	Y	EB8157	Humanetics	27-Nov-2018
	Z	EB8157	Humanetics	27-Nov-2018
Lumbar Moment (Nm)	X	EB8157	Humanetics	27-Nov-2018
	Y	EB8157	Humanetics	27-Nov-2018
	Z	EB8157	Humanetics	27-Nov-2018
Pelvis Accelerometers (g)	X	12300-1	Endevco	23-May-2019
	Y	12300-2	Endevco	23-May-2019
	Z	12300-3	Endevco	23-May-2019
Left Femur Force (N)	X	DZ5708T	Denton	27-Nov-2018
	Y	DZ5708T	Denton	27-Nov-2018
	Z	DZ5708T	Denton	27-Nov-2018
Left Femur Moment (Nm)	X	DZ5708T	Denton	27-Nov-2018
	Y	DZ5708T	Denton	27-Nov-2018
	Z	DZ5708T	Denton	27-Nov-2018
Left Femoral Neck Force (N)	X	EB8707-FX	Denton	27-Nov-2018
	Y	EB8707-FY	Denton	27-Nov-2018
	Z	EB8707-FZ	Denton	27-Nov-2018

TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)

			WorldSID-50M S/N EB8888		
			Serial Number	Manufacturer	Calibration Date
Shoulder RibEye (mm)	Front	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Middle	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Rear	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
Thorax Rib 1 RibEye (mm)	Front	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Middle	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Rear	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
Thorax Rib 2 RibEye (mm)	Front	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Middle	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Rear	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
Thorax Rib 3 RibEye (mm)	Front	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Middle	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Rear	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018

TABLE 1 – Dummy Instrumentation (WorldSID-50M with RibEye™) (CONTINUED)

			WorldSID-50M S/N EB8888		
			Serial Number	Manufacturer	Calibration Date
Abdomen Rib 1 RibEye (mm)	Front	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Middle	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Rear	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
Abdomen Rib 2 RibEye (mm)	Front	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Middle	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018
	Rear	X	123	Boxboro Systems	10-Nov-2018
		Y	123	Boxboro Systems	10-Nov-2018
		Z	123	Boxboro Systems	10-Nov-2018

TABLE 2 – VEHICLE INSTRUMENTATION

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity (g)	X	P94524	Endevco	18-Jun-2019
	Y	P88460	Endevco	18-Jun-2019
	Z	P87822	Endevco	18-Jun-2019
Vehicle Center of Gravity Angular Rate (deg/sec)	X	ARS6470	DTS	15-Feb-2019
	Y	ARS6687	DTS	15-Feb-2019
	Z	ARS6372	DTS	19-Apr-2019
Left Floor Sill (g)	Y	P91492	Endevco	7-May-2019
Left A-Pillar Sill (g)	Y	P91909	Endevco	6-May-2019
Left Lower A-Pillar (g)	Y	P45629	Endevco	7-May-2019
Left Mid A-Pillar (g)	Y	P50293	Endevco	7-May-2019
Left B-Pillar Sill (g)	Y	P57917	Endevco	8-May-2019
Left Lower B-Pillar (g)	Y	P50400	Endevco	7-May-2019
Left Mid B-Pillar (g)	Y	T10347	Endevco	6-May-2019
Driver Seat Track at Dummy H-Point (g)	Y	P91180	Endevco	6-May-2019
Engine Top (g)	X	P57946	Endevco	8-May-2019
	Y	P88038	Endevco	15-Apr-2019
Firewall Center (g)	Y	P81065	Endevco	3-Jan-2019
Right Roof at Vertical Impact Reference Line (g)	Y	T11397	Endevco	26-Jun-2019
Right Sill at Vertical Impact Reference Line (g)	Y	P57192	Endevco	3-Jan-2019
Rear Floorpan Behind Rear Axle at Centerline (g)	X	P80720	Endevco	7-May-2019
Rear Floorpan Behind Rear Axle at Centerline (g)	Y	P50428	Endevco	7-May-2019
Left Front Door Mid Centerline (g)	Y	P97889	Endevco	8-May-2019
Left Front Door Mid Rear (g)	Y	P44288	Endevco	8-May-2019
Left Front Door Upper Centerline (g)	Y	P57961	Endevco	7-May-2019
Left Rear Door Mid Rear (g)	Y	P50491	Endevco	8-May-2019
Left Rear Door Upper Centerline (g)	Y	P50313	Endevco	8-May-2019
Rear Deck (g)	X	T11835	Endevco	18-Jun-2019
	Y	P61501	Endevco	8-May-2019
	Z	P94485	Endevco	17-Jun-2019
Rear Deck Angular Rate (deg/sec)	X	ARS7974	DTS	19-Apr-2019
	Y	ARS6469	DTS	15-Feb-2019
	Z	ARS7979	DTS	15-Feb-2019

TABLE 3 – POLE INSTRUMENTATION

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Pole Load Cell 1	DK7091S	Humanetics	14-Nov-2018
Pole Load Cell 2	DK7120S	Humanetics	14-Nov-2018
Pole Load Cell 3	DK7118S	Humanetics	14-Nov-2018
Pole Load Cell 4	DK7124S	Humanetics	14-Nov-2018
Pole Load Cell 5	DK7111S	Humanetics	14-Nov-2018
Pole Load Cell 6	DK7126S	Humanetics	14-Nov-2018
Pole Load Cell 7	DK7112S	Humanetics	14-Nov-2018
Pole Load Cell 8	DK7074S	Humanetics	14-Nov-2018

Sign Convention
SAE J211 MAR95

Accelerometers:

+X: Forward
+Y: Rightward
+Z: Downward

Potentiometers:

+Chest longitudinal deflection: Outward
+Chest lateral deflection: Rightward
+Seat belt displacement: Outward
+Seat belt extension: Elongation
+Knee slider displacement: Distance between femur and tibia increased (in relation to a seated dummy)

Rotation potentiometers:

+About the X-axis: Left foot-eversion
Right foot-inversion
+About the Y-axis: Left/right foot-dorsiflexion
+About the Z-axis: Left foot-internal
Right foot-external

Load cells:

+Femur force: Tension
+Seat belt force: Tension
+Barrier force: Tension

Neck load cells:

+X force: Head pushed rearward
+Y force: Head pushed leftward
+Z force: Head pulled upward (tension on neck)
+X moment: Left ear rotating toward left shoulder
+Y moment: Chin rotating toward chest
+Z moment: Chin rotating toward left shoulder

Tibia load cells:

+X force: Ankle forward, knee rearward
+Y force: Ankle rightward, knee leftward
+Z force: Tension
+X moment: Bottom of tibia moving leftward
+Y moment: Bottom of tibia moving rearward

Sign Convention (Continued)
SAE J211 MAR95

<u>Lumbar load cells:</u>	+X force:	Chest rearward, pelvis forward
	+Y force:	Chest leftward, pelvis rightward
	+Z force:	Chest upward, pelvis downward
	+X moment:	Left shoulder toward left hip
	+Y moment:	Sternum toward front of legs
	+Z moment:	Right shoulder forward, left shoulder rearward

Frequency Response Classes
SAE J211 MAR95

<u>Typical Test Measurements</u>	<u>Channel Class</u>
Vehicle Structural Accelerations for use in:	
Total vehicle comparison	60
Collision simulation input	60
Component analysis	600
Integration for velocity or displacement	180
Barrier Face Forces	60
Belt Restraint System Loads	60
Anthropomorphic Test Device	
Head accelerations (linear and angular)	1000
Neck	
Forces	1000
Moments	600
Thorax	
Spine accelerations	180
Rib accelerations	1000
Sternum accelerations	1000
Deflections	600
Lumbar	
Forces	1000
Moments	1000
Pelvis	
Accelerations	1000
Forces	1000
Moments	1000
Femur/Knee/Tibia/Ankle	
Forces	600
Moments	600
Displacements	180
Sled Accelerations	60
Steering Column Loads	600
Head Form Accelerations	1000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
1	11HEADCG00WSACXP	Driver Head Acceleration (X)	1000	+	yes	2000
2	11HEADCG00WSACYP	Driver Head Acceleration (Y)	1000	+	yes	2000
3	11HEADCG00WSACZP	Driver Head Acceleration (Z)	1000	+	yes	2000
3A	11HEADCG00WSACRP	Driver Head Acceleration Resultant	1000			
4	11HEADCG00WSAVXP	Driver Head Angular Rate (X)	1000	+	yes	8000
5	11HEADCG00WSAVYP	Driver Head Angular Rate (Y)	1000	+	yes	8000
6	11HEADCG00WSAVZP	Driver Head Angular Rate (Z)	1000	+	yes	8000
7	11NECKUP00WSFOXP	Driver Upper Neck Force (X)	1000	+	yes	10000
8	11NECKUP00WSFOYP	Driver Upper Neck Force (Y)	1000	+	yes	10000
9	11NECKUP00WSFOZP	Driver Upper Neck Force (Z)	1000	+	yes	12000
10	11NECKUP00WSMOXP	Driver Upper Neck Moment (X)	600	+	yes	300
11	11NECKUP00WSMOYP	Driver Upper Neck Moment (Y)	600	+	yes	300
12	11NECKUP00WSMOZP	Driver Upper Neck Moment (Z)	600	+	yes	200
13	11NECKLO00WSFOXP	Driver Lower Neck Force (X)	1000	+	yes	10000
14	11NECKLO00WSFOYP	Driver Lower Neck Force (Y)	1000	+	yes	10000
15	11NECKLO00WSFOZP	Driver Lower Neck Force (Z)	1000	+	yes	12000
16	11NECKLO00WSMOXP	Driver Lower Neck Moment (X)	600	+	yes	300
17	11NECKLO00WSMOYP	Driver Lower Neck Moment (Y)	600	+	yes	300
18	11NECKLO00WSMOZP	Driver Lower Neck Moment (Z)	600	+	yes	200
19	11SHLDLE00WSFOXP	Driver Shoulder Force (X)	600	+	yes	5000
20	11SHLDLE00WSFOYP	Driver Shoulder Force (Y)	600	+	yes	10000
21	11SHLDLE00WSFOZP	Driver Shoulder Force (Z)	600	+	yes	5000
22	11SHRI01REWSDSX0	Driver Shoulder Rear Displacement (X)	0	+	no	60
23	11SHRI01REWSDSY0	Driver Shoulder Rear Displacement (Y)	0	+	no	60
24	11SHRI01REWSDSZ0	Driver Shoulder Rear Displacement (Z)	0	+	no	60
25	11SHRI01REWSDSLB	Driver Shoulder Rear Length Change	600	+	no	60
26	11SHRI01MIWSDSX0	Driver Shoulder Middle Displacement (X)	0	+	no	60
27	11SHRI01MIWSDSY0	Driver Shoulder Middle Displacement (Y)	0	+	no	60
28	11SHRI01MIWSDSZ0	Driver Shoulder Middle Displacement (Z)	0	+	no	60
29	11SHRI01MIWSDSLB	Driver Shoulder Middle Length Change	600	+	no	60
30	11SHRI01FRWSDSX0	Driver Shoulder Front Displacement (X)	0	+	no	60
31	11SHRI01FRWSDSY0	Driver Shoulder Front Displacement (Y)	0	+	no	60
32	11SHRI01FRWSDSZ0	Driver Shoulder Front Displacement (Z)	0	+	no	60
33	11SHRI01FRWSDSLB	Driver Shoulder Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
34	11TRRI01REWSDSX0	Driver Thorax Rib 1 Rear Displacement (X)	0	+	no	60
35	11TRRI01REWSDSY0	Driver Thorax Rib 1 Rear Displacement (Y)	0	+	no	60
36	11TRRI01REWSDSZ0	Driver Thorax Rib 1 Rear Displacement (Z)	0	+	no	60
37	11TRRI01REWSDSLB	Driver Thorax Rib 1 Rear Length Change	600	+	no	60
38	11TRRI01MIWSDSX0	Driver Thorax Rib 1 Middle Displacement (X)	0	+	no	60
39	11TRRI01MIWSDSY0	Driver Thorax Rib 1 Middle Displacement (Y)	0	+	no	60
40	11TRRI01MIWSDSZ0	Driver Thorax Rib 1 Middle Displacement (Z)	0	+	no	60
41	11TRRI01MIWSDSLB	Driver Thorax Rib 1 Middle Length Change	600	+	no	60
42	11TRRI01FRWSDSX0	Driver Thorax Rib 1 Front Displacement (X)	0	+	no	60
43	11TRRI01FRWSDSY0	Driver Thorax Rib 1 Front Displacement (Y)	0	+	no	60
44	11TRRI01FRWSDSZ0	Driver Thorax Rib 1 Front Displacement (Z)	0	+	no	60
45	11TRRI01FRWSDSLB	Driver Thorax Rib 1 Front Length Change	600	+	no	60
46	11TRRI02REWSDSX0	Driver Thorax Rib 2 Rear Displacement (X)	0	+	no	60
47	11TRRI02REWSDSY0	Driver Thorax Rib 2 Rear Displacement (Y)	0	+	no	60
48	11TRRI02REWSDSZ0	Driver Thorax Rib 2 Rear Displacement (Z)	0	+	no	60
49	11TRRI02REWSDSLB	Driver Thorax Rib 2 Rear Length Change	600	+	no	60
50	11TRRI02MIWSDSX0	Driver Thorax Rib 2 Middle Displacement (X)	0	+	no	60
51	11TRRI02MIWSDSY0	Driver Thorax Rib 2 Middle Displacement (Y)	0	+	no	60
52	11TRRI02MIWSDSZ0	Driver Thorax Rib 2 Middle Displacement (Z)	0	+	no	60
53	11TRRI02MIWSDSLB	Driver Thorax Rib 2 Middle Length Change	600	+	no	60
54	11TRRI02FRWSDSX0	Driver Thorax Rib 2 Front Displacement (X)	0	+	no	60
55	11TRRI02FRWSDSY0	Driver Thorax Rib 2 Front Displacement (Y)	0	+	no	60
56	11TRRI02FRWSDSZ0	Driver Thorax Rib 2 Front Displacement (Z)	0	+	no	60
57	11TRRI02FRWSDSLB	Driver Thorax Rib 2 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
58	11TRRI03REWSDSX0	Driver Thorax Rib 3 Rear Displacement (X)	0	+	no	60
59	11TRRI03REWSDSY0	Driver Thorax Rib 3 Rear Displacement (Y)	0	+	no	60
60	11TRRI03REWSDSZ0	Driver Thorax Rib 3 Rear Displacement (Z)	0	+	no	60
61	11TRRI03REWSDSLB	Driver Thorax Rib 3 Rear Length Change	600	+	no	60
62	11TRRI03MIWSDSX0	Driver Thorax Rib 3 Middle Displacement (X)	0	+	no	60
63	11TRRI03MIWSDSY0	Driver Thorax Rib 3 Middle Displacement (Y)	0	+	no	60
64	11TRRI03MIWSDSZ0	Driver Thorax Rib 3 Middle Displacement (Z)	0	+	no	60
65	11TRRI03MIWSDSLB	Driver Thorax Rib 3 Middle Length Change	600	+	no	60
66	11TRRI03FRWSDSX0	Driver Thorax Rib 3 Front Displacement (X)	0	+	no	60
67	11TRRI03FRWSDSY0	Driver Thorax Rib 3 Front Displacement (Y)	0	+	no	60
68	11TRRI03FRWSDSZ0	Driver Thorax Rib 3 Front Displacement (Z)	0	+	no	60
69	11TRRI03FRWSDSLB	Driver Thorax Rib 3 Front Length Change	600	+	no	60
70	11ABRI01REWSDSX0	Driver Abdomen Rib 1 Rear Displacement (X)	0	+	no	60
71	11ABRI01REWSDSY0	Driver Abdomen Rib 1 Rear Displacement (Y)	0	+	no	60
72	11ABRI01REWSDSZ0	Driver Abdomen Rib 1 Rear Displacement (Z)	0	+	no	60
73	11ABRI01REWSDSLB	Driver Abdomen Rib 1 Rear Length Change	600	+	no	60
74	11ABRI01MIWSDSX0	Driver Abdomen Rib 1 Middle Displacement (X)	0	+	no	60
75	11ABRI01MIWSDSY0	Driver Abdomen Rib 1 Middle Displacement (Y)	0	+	no	60
76	11ABRI01MIWSDSZ0	Driver Abdomen Rib 1 Middle Displacement (Z)	0	+	no	60
77	11ABRI01MIWSDSLB	Driver Abdomen Rib 1 Middle Length Change	600	+	no	60
78	11ABRI01FRWSDSX0	Driver Abdomen Rib 1 Front Displacement (X)	0	+	no	60
79	11ABRI01FRWSDSY0	Driver Abdomen Rib 1 Front Displacement (Y)	0	+	no	60
80	11ABRI01FRWSDSZ0	Driver Abdomen Rib 1 Front Displacement (Z)	0	+	no	60
81	11ABRI01FRWSDSLB	Driver Abdomen Rib 1 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
82	11ABRI02REWSDSX0	Driver Abdomen Rib 2 Rear Displacement (X)	0	+	no	60
83	11ABRI02REWSDSY0	Driver Abdomen Rib 2 Rear Displacement (Y)	0	+	no	60
84	11ABRI02REWSDSZ0	Driver Abdomen Rib 2 Rear Displacement (Z)	0	+	no	60
85	11ABRI02REWSDSLB	Driver Abdomen Rib 2 Rear Length Change	600	+	no	60
86	11ABRI02MIWSDSX0	Driver Abdomen Rib 2 Middle Displacement (X)	0	+	no	60
87	11ABRI02MIWSDSY0	Driver Abdomen Rib 2 Middle Displacement (Y)	0	+	no	60
88	11ABRI02MIWSDSZ0	Driver Abdomen Rib 2 Middle Displacement (Z)	0	+	no	60
89	11ABRI02MIWSDSLB	Driver Abdomen Rib 2 Middle Length Change	600	+	no	60
90	11ABRI02FRWSDSX0	Driver Abdomen Rib 2 Front Displacement (X)	0	+	no	60
91	11ABRI02FRWSDSY0	Driver Abdomen Rib 2 Front Displacement (Y)	0	+	no	60
92	11ABRI02FRWSDSZ0	Driver Abdomen Rib 2 Front Displacement (Z)	0	+	no	60
93	11ABRI02FRWSDSLB	Driver Abdomen Rib 2 Front Length Change	600	+	no	60
94	11THSP0100WSACXP	Driver Spine T1 Acceleration (X)	180	+	yes	2000
95	11THSP0100WSACYP	Driver Spine T1 Acceleration (Y)	180	+	yes	2000
96	11THSP0100WSACZP	Driver Spine T1 Acceleration (Z)	180	+	yes	2000
96A	11THSP0100WSACRP	Driver Spine T1 Acceleration Resultant	180			
97	11THSP0400WSACXP	Driver Spine T4 Acceleration (X)	180	+	yes	2000
98	11THSP0400WSACYP	Driver Spine T4 Acceleration (Y)	180	+	yes	2000
99	11THSP0400WSACZP	Driver Spine T4 Acceleration (Z)	180	+	yes	2000
99A	11THSP0400WSACRP	Driver Spine T4 Acceleration Resultant	180			
100	11THSP1200WSACXP	Driver Spine T12 Acceleration (X)	180	+	yes	2000
101	11THSP1200WSACYP	Driver Spine T12 Acceleration (Y)	180	+	yes	2000
102	11THSP1200WSACZP	Driver Spine T12 Acceleration (Z)	180	+	yes	2000
102A	11THSP1200WSACRP	Driver Spine T12 Acceleration Resultant	180			
103	11PUBC0000WSFOYP	Driver Pubic Symphysis Force (Y)	600	+	yes	12000
104	11SACRLE00WSFOXP	Driver Sacro-iliac Left Force (X)	600	+	yes	6000
105	11SACRLE00WSFOYP	Driver Sacro-iliac Left Force (Y)	600	+	yes	12000
106	11SACRLE00WSFOZP	Driver Sacro-iliac Left Force (Z)	600	+	yes	6000
107	11SACRLE00WSMOXP	Driver Sacro-iliac Left Moment (X)	600	+	yes	800
108	11SACRLE00WSMOYP	Driver Sacro-iliac Left Moment (Y)	600	+	yes	400
109	11SACRLE00WSMOZP	Driver Sacro-iliac Left Moment (Z)	600	+	yes	400

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
110	11SACRRI00WSFOXP	Driver Sacro-iliac Right Force (X)	600	+	yes	6000
111	11SACRRI00WSFOYP	Driver Sacro-iliac Right Force (Y)	600	+	yes	12000
112	11SACRRI00WSFOZP	Driver Sacro-iliac Right Force (Z)	600	+	yes	6000
113	11SACRRI00WSMOXP	Driver Sacro-iliac Right Moment (X)	600	+	yes	800
114	11SACRRI00WSMOYP	Driver Sacro-iliac Right Moment (Y)	600	+	yes	400
115	11SACRRI00WSMOZP	Driver Sacro-iliac Right Moment (Z)	600	+	yes	400
116	11LUSP0000WSFOXP	Driver Lumbar Force (X)	600	+	yes	10000
117	11LUSP0000WSFOYP	Driver Lumbar Force (Y)	600	+	yes	10000
118	11LUSP0000WSFOZP	Driver Lumbar Force (Z)	600	+	yes	12000
119	11LUSP0000WSMOXP	Driver Lumbar Moment (X)	600	+	yes	300
120	11LUSP0000WSMOYP	Driver Lumbar Moment (Y)	600	+	yes	300
121	11LUSP0000WSMOZP	Driver Lumbar Moment (Z)	600	+	yes	200
122	11PELV0000WSACXP	Driver Pelvic Acceleration (X)	600	+	yes	2000
123	11PELV0000WSACYP	Driver Pelvic Acceleration (Y)	600	+	yes	2000
124	11PELV0000WSACZP	Driver Pelvic Acceleration (Z)	600	+	yes	2000
124A	11PELV0000WSACRP	Driver Pelvic Acceleration Resultant	600			
125	11FEMRLE00WSFOXP	Driver Left Femur Force (X)	600	+	yes	15000
126	11FEMRLE00WSFOYP	Driver Left Femur Force (Y)	600	+	yes	15000
127	11FEMRLE00WSFOZP	Driver Left Femur Force (Z)	600	+	yes	15000
128	11FEMRLE00WSMOXP	Driver Left Femur Moment (X)	600	+	yes	350
129	11FEMRLE00WSMOYP	Driver Left Femur Moment (Y)	600	+	yes	350
130	11FEMRLE00WSMOZP	Driver Left Femur Moment (Z)	600	+	yes	300
131	11FEACLE00WSFOXP	Driver Femoral Neck Force (X)	600	+	yes	10000
132	11FEACLE00WSFOYP	Driver Femoral Neck Force (Y)	600	+	yes	25000
133	11FEACLE00WSFOZP	Driver Femoral Neck Force (Z)	600	+	yes	10000
134	11VEHCCG0000ACXA	Vehicle Center of Gravity Acceleration (X)	60	+	yes	2000
135	11VEHCCG0000ACYA	Vehicle Center of Gravity Acceleration (Y)	60	+	yes	2000
136	11VEHCCG0000ACZA	Vehicle Center of Gravity Acceleration (Z)	60	+	yes	2000
136A	11VEHCCG0000ACRA	Vehicle Center of Gravity Acceleration Resultant	60			
137	11VEHCCG0000AVXA	Vehicle Center of Gravity Angular Rate (X)	60	+	yes	8000
138	11VEHCCG0000AVYA	Vehicle Center of Gravity Angular Rate (Y)	60	+	yes	1500
139	11VEHCCG0000AVZA	Vehicle Center of Gravity Angular Rate (Z)	60	+	yes	8000
140	11VEHC00LO00ACYA	Left Floor Sill Acceleration (Y)	60	+	yes	2000
141	11APIL000000ACYA	Left A-Pillar Sill Acceleration (Y)	60	+	yes	2000
142	11APILLO0000ACYA	Left Lower A-Pillar Acceleration (Y)	60	+	yes	2000
143	11APILMI0000ACYA	Left Mid A-Pillar Acceleration (Y)	60	+	yes	2000
144	11BPIL000000ACYA	Left B-Pillar Sill Acceleration (Y)	60	+	yes	2000
145	11BPILLO0000ACYA	Left Lower B-Pillar Acceleration (Y)	60	+	yes	2000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
146	11BPILMI0000ACYA	Left Mid B-Pillar Acceleration (Y)	60	+	yes	2000
147	11SETR000000ACYA	Driver Seat Track at Dummy H-Point Acceleration (Y)	60	+	yes	2000
148	11ENGNT00000ACXA	Engine Top Acceleration (X)	60	+	yes	2000
149	11ENGNT00000ACYA	Engine Top Acceleration (Y)	60	+	yes	2000
150	12FIRCX00000ACYA	Firewall Center Acceleration (Y)	60	+	yes	2000
151	13ROFR000000ACYA	Right Roof at Vertical Impact Reference Line Acceleration (Y)	60	+	yes	2000
152	13SILB000000ACYA	Right Sill at Vertical Impact Reference Line Acceleration (Y)	60	+	yes	2000
153	11FORA000000ACXA	Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)	60	+	yes	2000
154	11FORA000000ACYA	Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)	60	+	yes	2000
155	11DOORMIMI71ACYA	Left Front Door Mid Centerline Acceleration (Y)	60	+	yes	2000
156	11DOORMIRE71ACYA	Left Front Door Mid Rear Acceleration (Y)	60	+	yes	2000
157	11DOORMIUP71ACYA	Left Front Door Upper Centerline Acceleration (Y)	60	+	yes	2000
158	14DOORMIRE71ACYA	Left Rear Door Mid Rear Acceleration (Y)	60	+	yes	2000
159	14DOORMIUP71ACYA	Left Rear Door Upper Centerline Acceleration (Y)	60	+	yes	2000
160	10FORARD0000ACXA	Rear Deck Acceleration (X)	60	+	yes	2000
161	10FORARD0000ACYA	Rear Deck Acceleration (Y)	60	+	yes	2000
162	10FORARD0000ACZA	Rear Deck Acceleration (Z)	60	+	yes	2000
162A	10FORARD0000ACRA	Rear Deck Acceleration Resultant	60			
163	10FORARD0000AVXA	Rear Deck Angular Rate (X)	60	+	yes	8000
164	10FORARD0000AVYA	Rear Deck Angular Rate (Y)	60	+	yes	8000
165	10FORARD0000AVZA	Rear Deck Angular Rate (Z)	60	+	yes	8000
166	11HEADCONT00VO00	Driver Head Contact	0	+	no	1
167	11SHOUCONT00VO00	Driver Shoulder Contact	0	+	no	1
168	11THORCONT00VO00	Driver Thorax Contact	0	+	no	1
169	11PELVCONT00VO00	Driver Pelvis Contact	0	+	no	1
170	K0FBAR010000FOXA	Pole Load Cell 1	60	+	yes	400000
171	K0FBAR020000FOXA	Pole Load Cell 2	60	+	yes	400000
172	K0FBAR030000FOXA	Pole Load Cell 3	60	+	yes	400000
173	K0FBAR040000FOXA	Pole Load Cell 4	60	+	yes	400000
174	K0FBAR050000FOXA	Pole Load Cell 5	60	+	yes	400000
175	K0FBAR060000FOXA	Pole Load Cell 6	60	+	yes	400000
176	K0FBAR070000FOXA	Pole Load Cell 7	60	+	yes	400000
177	K0FBAR080000FOXA	Pole Load Cell 8	60	+	yes	400000

APPENDIX E
SEATING PROCEDURE WORKSHEETS AND PLOTS

Driver WSID 50th Seating Worksheet

Vehicle	2018 Honda Accord	Technician	T. Ramadan
VIN #	1HGCV1F17JA007237	Position	
ATD	WorldSID 50th	Date	7/29/2019
Test #	R20185382		

SCRL Angle

Max	17.3
Min -	11.6
Difference	5.7
/2	2.85
Min +	2.85
Mid Angle	14.45

WSID 50th Tilt Sensors

		X	Y
Head	0°±2	0.2	-2.2
T6	0°±2	1.2	-1.7
Pelvis	0°±2	-0.8	-0.8

Seat Back Angle

W/Level °	20.9
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Seat Pan Angle

W/Level °	12.8
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HEAD REST POST

ANGLE	2.9
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FINAL HEAD REST

POST ANGLE	3.4
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Pelvis Angle

WSID 50th 0° +/-2.5°

Manual
Inclinometer

46.3

Tilt Sensor

-0.8

Collected Points			
Name	Meas X	Meas Y	Meas Z
SBU -	-35.1257	2.466457	-14.1477
SBL -	-31.2524	0.4238	21.73951
STRIKER -	0.066	0.147	-0.031
FOSB -	494.226	207.6526	495.2617
FISB -	493.8912	643.5403	496.7927
ROSB -	94.320	207.221	511.228
RISB -	93.258	657.762	503.498
PCP-(Pedal Center Point)	1122.254	624.840	367.569
RHP - (Right Heel Point)	1000.577	625.160	526.954
LHP -(Left Heel Point)	1000.486	254.265	523.719
S0 -	567.393	436.081	-106.527
TS -	628.546	435.476	-269.333
BS -	508.898	436.181	50.094
SC1 -	748.934	335.550	-10.691
OSCAR H-POINT -	242.314	244.930	281.023
DR PROJECTED WSID H-POINT AT MID-POSITION -	262.000		261.000
DRIVER STP 15.27 MID-POSITION -	263.000		347.000
DRIVER STP STEP 18.6 TRIAL 1 -	242.000		351.000
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 1 -	241.000		265.000
DRIVER STP STEP 18.6 TRIAL 2 -	263.000		349.000
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 2 -	262.000		263.000
DRIVER STP STEP 18.6 TRIAL 3 -			
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 3 -	-1.000		-86.000
3DRHCG-	116.258	516.949	-400.456
3DLHCG-	136.202	363.590	-401.680
LHDCG -	116.056	361.528	-402.381
BON -	208.436	439.959	-380.905
TN -	207.794	439.777	-351.814
TC -	189.969	440.646	-274.201
SHLD R1 -	161.736	442.638	-172.808
THX R1 -	196.413	441.186	-95.301
THX R2 -	228.568	442.376	-30.440
THX R3 -	246.123	440.635	16.491
ABD R1 -	262.256	438.472	69.796
ABD R2 -	280.776	438.832	115.653
TPS	292.869	447.316	150.465
C1 -	176.896	451.309	-139.355
C2 -	195.392	435.566	-104.930
C3 -	262.673	433.437	50.037
SHT -	88.672	221.485	-138.460
E1 -	286.962	200.258	4.124
P1 -	220.662	217.683	220.851
H-POINT -	273.574	219.231	270.593

OK -	658.535	230.972	126.792
IK -	680.586	541.804	123.200
OA -	969.855	231.099	401.729
IA -	962.352	560.603	412.663
OH -	1005.228	242.893	524.080
IH -	991.622	594.261	524.624
OP -	-132.651	363.966	-270.200
R -	207.458	439.695	-584.850
H -	545.974	440.776	-524.679
W1	836.360	440.391	-381.052
W1 - Outside	850.876	439.241	-381.642
W2 - Outside	1110.881	440.295	-225.434
D1 -	765.704	450.614	-234.694
D2 -	752.150	231.643	34.603
D3 -	747.974	541.685	34.694
HRP -	207.834	213.454	-510.005
HSP -	209.091	76.525	-380.086
ADP -	287.304	40.396	3.410
HDP -	274.413	104.557	271.060

Calculated Measurements					
Name	Cal X	Cal Y	Cal Z	Cal 3D Distance	Deg
HZ -			204		
HH -				367	
HW -	628				
NR -				429	
CD -				596	
CS -	372				
IKD -				111	
OKD -				131	
HR -				261	
HS -		363			
AD -		160			
HD -		115			
HLHL -				352	
KK -				312	
SH -				443	
HRA -					3.3
H-POINT TOOL ANGLE -					43.2
TORSO ANGLE -					13.2
WINDSHIELD ANGLE -					59.0