RESEARCH FMVSS 214
RIGID POLE SIDE IMPACT TEST

FORD MOTOR COMPANY
2020 Ford Ranger

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Report Date: October 20, 2021

FINAL REPORT

PREPARED FOR:
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TRC TEST NUMBER: 210408

Project Manager, John Shultz

Report Approved October 20, 2021:

Transportation Research Center Inc.

Final Report Accepted by:

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Final Report of Research FMVSS 214 Rigid Pole Side Impact Testing of a 2020 Ford Ranger		5. Report Date October 20, 2021
		6. Performing Organization Code TRC Inc.
7. Author(s) John Shultz, Project Manager		8. Performing Organization Report No. 210408
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. 693JJ918D000019
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 April 8, 2021 – October 20, 2021
		14. Sponsoring Agency Code NRS-210
15. Supplemental Notes		

16. Abstract

A 31.00 km/h, 75° Oblique Rigid Pole Research Side Impact Test was conducted on the subject 2020 Ford Ranger 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 April 8, 2021.

The impact velocity was 30.94 km/h, and the ambient temperature at the struck (driver's) side of the target vehicle at the time of impact was 21.0°C. The test vehicle post-test maximum crush was 311 mm at level 3. The test vehicle's performance was as follows:

	Driver ATD (WorldSID-50M)	
Measurement Description	**Units**	**Result**
Head Injury Criterion (HIC15)	N/A	326
Brain Injury Criterion (BrIC)	N/A	0.72
Peak Shoulder Force	N	-2038.60
Peak Thoracic Rib Deflection	mm	40.41
Peak Abdominal Rib Deflection	mm	27.82
Pubic Symphysis Force	N	-811.59
Peak Resultant Sacro-Iliac Force	N	2591.27

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 242	22. Price

Form DOT F 1700.7 Reproduction of completed page authorized

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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 693JJ918D000019 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 FMVSS No. 214, DYNAMIC SIDE IMPACT PROTECTION – Rigid Pole Side Impact Test' dated September 2012 as a guideline.

SECTION 2
SUMMARY OF TEST RESULTS

A rigid pole side impact test was conducted on a 2020 Ford Ranger. The subject vehicle was towed into the rigid pole at an angle of 75° and a velocity of 30.94 km/h. The test was conducted by the Transportation Research Center Inc. in East Liberty, Ohio, on April 8, 2021. 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.

The test setup was conducted following the FMVSS 214 test procedure dated September 2012, including instrumentation and camera placement. One WorldSID-50M with RibEye dummy was placed in the driver designated seating position per NHTSA's "WorldSID 50th Male Dummy Seating Procedure, April 2019 (https://rosap.ntl.bts.gov/view/dot/41900).

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:

	Driver ATD (WorldSID-50M)	
Measurement Description	**Units**	**Result**
Head Injury Criterion (HIC15)	N/A	326
Brain Injury Criterion (BrIC)	N/A	0.72
Peak Shoulder Force	N	-2038.60
Peak Thoracic Rib Deflection	mm	40.41
Peak Abdominal Rib Deflection	mm	27.82
Pubic Symphysis Force	N	-811.59
Peak Resultant Sacro-Iliac Force	N	2591.27

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	No	N/A
Seat Belt Pretensioner	Yes	Yes
Seat Belt Load Limiter	Yes	No
Other Safety Restraint	No	N/A

GENERAL COMMENTS

All doors remained closed throughout the test. No fuel spillage occurred during the impact and the static rollover test was not performed.

Data Acquisition Explanations

Left Lower A-Pillar Acceleration (Y); QD after 50.0 ms

Left B-Pillar Sill Acceleration (Y); QD after 30.0 ms

Left Mid B-Pillar Acceleration (Y); QD after 77.0 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 Thorax Rib 2 Middle Displacement: Error code 1 at 54.4-63.1 ms

Driver Thorax Rib 2 Front Displacement: Error code 1 at 51.3-66.3 ms

Driver Sacro-iliac Left Moment (Y): Failed to record and valid dat

SECTION 3
OCCUPANT AND VEHICLE INFORMATION

DATA SHEET NO. 1
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

TEST VEHICLE INFORMATION AND OPTIONS

Model Year	2020
Make	Ford
Model	Ranger
Body Style	Truck
VIN	1FTER1EH4LLA76355
Body Color	Lightning Blue
Odometer Reading (km/mi)	308 mi.
Engine Displacement (L)	2.3
Type/No. Cylinders	Straight/4
Engine Placement	Inline
Transmission Type	Automatic
Transmission Speeds	10
Overdrive	Yes
Final Drive	RWD
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	No
Rear Pass. Curtain Airbag	Yes
Rear Pass. Head/Torso Airbag	No
Rear Pass. Torso Airbag	No
Rear Pass. Torso/Pelvis Airbag	No
Rear Pass. Pelvis Airbag	No
Driver Seat Belt Pretensioner	Yes
Rear Pass. Seat Belt Pretensioner	Yes
Driver Load Limiter	Yes
Rear Pass. Load Limiter	Yes
Other Safety Restraint	No

Does owner's manual provide instructions to turn off automatic door locks? No

DATA FROM CERTIFICATION LABEL

Manufactured By	FORD MOTOR COMPANY
Date of Manufacturer	10/20
Vehicle Type	Truck

GVWR (kg)	2744
GAWR Front (kg)	1309
GAWR Rear (kg)	1588

VEHICLE SEATING AND WEIGHT CAPACITY DATA

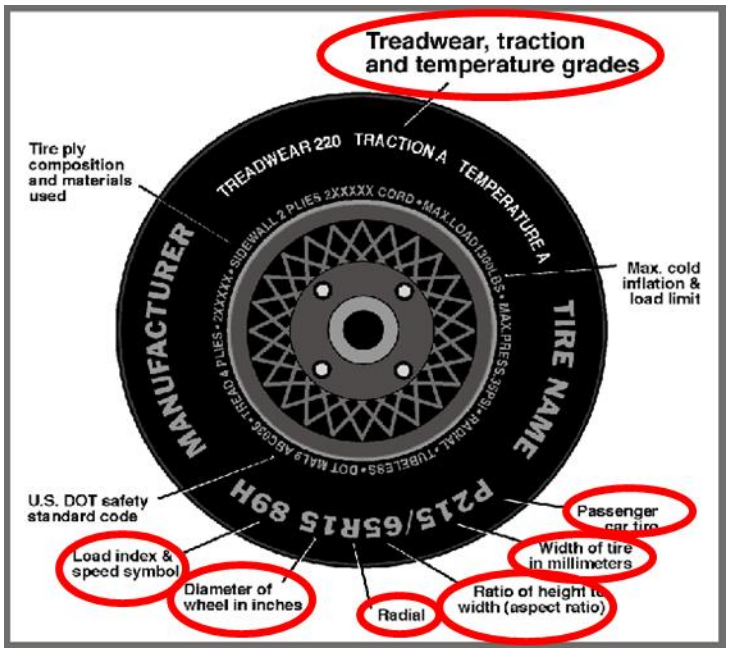
	Front	Rear	Third	Total
Designated Seating Capacity (DSC)	2	2	N/A	4
Vehicle Capacity Weight (VCW) (kg)				839.0
DSC X 68.04 kg				272.2
Rated Cargo and Luggage Weight (RCLW) (kg)				566.8

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	Yes	N/A
Rear or Second Row Seat	Yes	N/A	N/A	N/A	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: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold Pressure (kPa)	240	240
Recommended Tire Size	255/70R16 111T	255/70R16 111T
Tire Size on Vehicle	255/70R16 111T	255/70R16 111T
Tire Manufacturer	Bridgestone	Bridgestone
Tire Model	Dueler	Dueler
Treadwear	520	520
Traction	A	A
Temperature Grades	B	B
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	111T	111T
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Left	9B0K DHT 2520	9B0K DHT 2520
DOT Safety Code Right	9B0K DHT 2520	9B0K DHT 2520

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

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

TIRE PRESSURES

	Units	LF	RF	LR	RR
As Delivered	kPa	296	296	296	289
Tire Placard	kPa	240	240	240	240
Owner's Manual	kPa	240	240	240	240
As Tested	kPa	240	240	240	240

TEST VEHICLE AXLE WEIGHTS

	Units	As Delivered (UVW)			As Tested (ATW)			Fully Loaded		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	539.6	424.0		586.6	506.2		596.0	513.0	
Right	kg	522.0	376.6		523.0	449.6		520.4	443.8	
Ratio	%	57.0	43.0		53.7	46.3		53.8	46.2	
Totals	kg	1061.6	800.6	1862.2	1109.6	955.8	2065.4	1116.4	956.8	2073.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value	
Total As Delivered Weight (UVW)	kg	1862.2	(A)
Actual Weight of 1 WorldSID-50M with RibEye Dummy Used	kg	75.0	(B)
Rated Cargo/Luggage Weight (RCLW)[1]	kg	136.0	(C)
Calculated Vehicle Target Weight (TVTW)	kg	2073.2	(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)? X YES □ NO

TEST VEHICLE ATTITUDES AND CG

	Units	As Delivered	As Tested	Fully Loaded	Meets Requirement***
Driver Door Sill Angle (front-to-rear)*	Deg.	-0.8	-0.8	-0.7	Yes
Front Passenger Sill Angle (front-to-rear)*	Deg.	-0.9	-0.8	-0.8	Yes
Front Bumper-Line Angle (left-to-right)**	Deg.	-0.3	-0.3	-0.4	Yes
Rear Bumper-Line Angle (left-to-right)**	Deg.	-0.2	-0.4	-0.4	Yes
Vehicle CG (Aft of Front Axle)	mm	1382	1488	1484	
Vehicle CG (Left (+) / Right (-) from longitudinal Centerline)	mm	+27	+46	+55	

*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

[1]Rated cargo and luggage weight limited to 136.0 kg or 300.0 lbs.

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

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

WEIGHT OF BALLAST AND VEHICLE COMPONENTS REMOVED TO MEET TVTW

Component Description	Weight (kg)
Ballast: 5x 25 lb plates; 1x 12 lb plate	61.0
Components removed: None	0.0

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

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

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	18.6	13.5	16.1
Front Passenger Seat	18.3	13.4	15.8
Front Center Seat*	N/A	N/A	N/A
Struck Side Rear Seat	N/A	N/A	9.2
Non-Struck Side Rear Seat	N/A	N/A	9.5
Rear Center Seat*	N/A	N/A	N/A

* 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	16.1	312	Max	334	342	350
			Mid	308	312	320
			Min	292	302	312
Front Passenger Seat	15.8	240	Max	266	273	279
			Mid	235	240	249
			Min	223	229	235
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	9.2	142	Max	N/A	N/A	N/A
			Mid	N/A	142	N/A
			Min	N/A	N/A	N/A
Non-Struck Side Rear Seat	9.5	260	Max	N/A	N/A	N/A
			Mid	N/A	260	N/A
			Min	N/A	N/A	N/A
Rear 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

* If applicable.

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

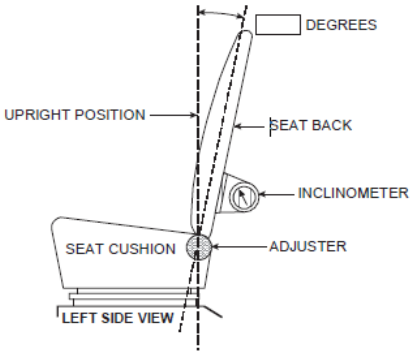
Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

SEAT FORE/AFT POSITION

Seat	Total Fore/Aft Travel		Test Position from Forwardmost Position	
	mm	Detents*	mm	Detent*
Driver Seat	255	38	137	19
Front Passenger Seat	255	38	139	20
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*	N/A	N/A	N/A	N/A

* If applicable.

SEAT BACK ANGLE ADJUSTMENT
The driver's seat back was positioned according to the manufacturer's information as provided on Form 1; resulting in a head rest post angle of 3.9° at the head rest post. The front passenger seat was set to match the driver seat.



FRONT SEAT ASSEMBLY

Seat	Total Seat Back Angle Range		Test Position from Most Upright	
	Degrees	Detents*	Degrees	Detent*
Driver Seat w/ Seated Dummy	50.0	26	3.9	8
Front Passenger Seat	48.4	25	4.7	8
Front Center Seat*	N/A	N/A	N/A	N/A
Struck Side Rear Seat	1.2	Fixed	N/A	Fixed
Non-Struck Side Rear Seat	1.3	Fixed	N/A	Fixed
Rear Center Seat*	N/A	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: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

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	1; Fixed	Fixed

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	4 up, 6 fwd	4, 6; full up, full fwd

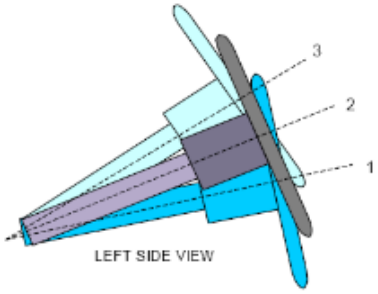
DATA SHEET NO. 2 (CONTINUED)
SEAT, SEAT BELT, STEERING WHEEL ADJUSTMENT AND FUEL SYSTEMS DATA

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

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	22.0	0
Geometric Center, Position No. 2	24.4	22
Uppermost, Position No. 3	27.3	43
Telescoping Steering Wheel Travel		43
Test Position	24.4	22

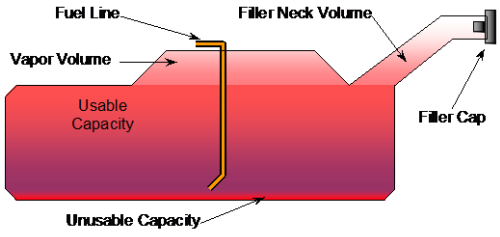


STEERING COLUMN ASSEMBLY

FUEL PUMP

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

The electronic fuel pump operates for a prescribed amount of time to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within two seconds following ignition operation the fuel pump will shut-off. The fuel pump operates continuously while the engine is running. If the engine stalls the fuel pump is deactivated. A fuel system shut-off system is also equipped which is designed to stop the fuel flow to the engine if the vehicle sustains an impact above a certain magnitude.



VEHICLE FUEL TANK ASSEMBLY

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank" (see Form No. 1)	71.2
Usable Capacity of "Optional" Tank (see Form No. 1)	N/A
Usable Capacity of Standard Tank (see Owner's Manual)	71.2
Usable Capacity of Optional Tank (see Owner's Manual)	N/A
93% of Usable Capacity	66.2
Actual Amount of Solvent Used in Test	66.2
1/3 of Usable Capacity	23.7

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: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Head Acceleration (g)	X	5.28	20.60	-22.51	48.10
	Y	54.95	55.60	-13.44	93.75
	Z	1.53	272.50	-14.42	20.35
	R	58.30	55.60		
Head Angular Rate (deg/sec)	X	1132.89	118.30	-1195.84	188.55
	Y	524.85	299.90	-897.59	153.35
	Z	1380.60	73.55	-1448.67	131.50
Upper Neck Force (N)	X	90.42	232.75	-168.00	42.70
	Y	159.17	41.75	-510.76	136.90
	Z	655.10	45.25	-25.48	245.10
Upper Neck Moment (Nm)	X	9.09	89.55	-32.15	135.70
	Y	14.49	277.45	-18.14	105.55
	Z	12.40	151.85	-44.51	100.20
Lower Neck Force (N)	X	367.07	117.05	-382.09	45.65
	Y	566.77	47.65	-568.12	115.60
	Z	740.17	44.75	-452.18	139.75
Lower Neck Moment (Nm)	X	37.14	49.00	-96.97	139.70
	Y	35.15	189.80	-54.50	121.65
	Z	18.01	160.60	-49.72	103.10
Driver Shoulder Force (N)	X	229.26	227.75	-827.82	58.00
	Y	16.08	297.95	-2038.60	49.55
	Z	321.51	31.30	-36.32	103.30
Shoulder Rear Ribeye Position (mm)	X	-42.90	88.00	-77.05	234.20
	Y	-55.85	53.25	-84.74	190.55
	Z	-45.15	117.45	-57.33	42.10
Length of Change (mm)		18.27	48.40	-9.05	234.85
Shoulder Middle Ribeye Position (mm)	X	-9.90	86.50	-47.92	234.40
	Y	-50.46	54.30	-95.11	205.35
	Z	-45.82	115.70	-61.61	42.10
Length of Change (mm)		41.99	51.10	-1.45	216.60
Shoulder Front Ribeye Position (mm)	X	29.40	87.20	-7.97	235.35
	Y	-28.23	57.65	-82.97	16.40
	Z	-49.41	116.25	-67.60	42.85
Length of Change (mm)		47.52	58.40	-0.89	16.55

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 1 Rear Ribeye Position (mm)	X	-25.49	46.50	-46.87	230.85
	Y	-74.73	48.60	-100.58	211.80
	Z	4.87	79.30	-7.64	29.10
Length of Change (mm)		26.56	47.65	-2.53	232.05
Thorax Rib 1 Middle Ribeye Position (mm)	X	12.65	45.40	-12.17	232.95
	Y	-66.96	52.35	-109.68	196.65
	Z	6.24	80.20	-8.18	29.40
Length of Change (mm)		40.41	52.95	-1.70	196.60
Thorax Rib 1 Front Ribeye Position (mm)[1]	X	53.78	45.65	24.88	235.85
	Y	-49.24	54.10	-102.49	195.95
	Z	3.69	79.30	-10.86	29.40
Length of Change (mm)		40.23	56.70	-0.79	195.85
Thorax Rib 2 Rear Ribeye Position (mm)	X	-15.58	49.35	-28.67	89.20
	Y	-80.20	53.85	-99.92	244.95
	Z	39.65	85.60	31.55	64.05
Length of Change (mm)		20.03	53.85	-0.89	245.00
Thorax Rib 2 Middle Ribeye Position (mm) [1]	X	23.41	53.70	-1.01	54.45
	Y	10.24	63.05	-110.82	174.80
	Z	42.67	109.85	-2.27	54.45
Length of Change (mm) [1]		23.48	52.15	-1.25	174.75
Thorax Rib 2 Front Ribeye Position (mm) [1]	X	77.01	51.15	-5.97	51.35
	Y	10.44	65.75	-107.23	66.15
	Z	46.00	109.20	-2.55	51.35
Length of Change (mm) [1]		16.45	47.65	-1.94	268.75
Thorax Rib 3 Rear Ribeye Position (mm)[1]	X	-37.94	48.40	-48.98	91.60
	Y	-79.71	54.55	-94.32	132.95
	Z	-33.02	92.65	-44.27	64.30
Length of Change (mm)		14.71	54.00	-0.40	214.05
Thorax Rib 3 Middle Ribeye Position (mm)	X	-2.87	47.65	-18.47	90.75
	Y	-83.12	54.70	-101.93	190.15
	Z	-31.87	91.15	-44.17	60.20
Length of Change (mm)		16.34	54.60	-0.82	190.20

[1]See data acquisition explanation

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Thorax Rib 3 Front Ribeye Position (mm)	X	31.51	47.25	12.91	96.15
	Y	-73.71	54.90	-92.81	223.70
	Z	-33.54	91.70	-44.72	60.10
Length of Change (mm)		8.03	54.95	-1.02	223.65
Abdomen Rib 1 Rear Ribeye Position (mm)	X	-21.98	48.50	-34.69	96.80
	Y	-80.76	54.50	-96.81	4.40
	Z	-1.01	96.70	-13.86	60.30
Length of Change (mm)		16.63	53.00	-0.65	101.00
Abdomen Rib 1 Middle Ribeye Position (mm)	X	15.31	50.05	-3.26	98.10
	Y	-82.97	54.50	-103.88	295.00
	Z	0.56	120.50	-13.97	60.80
Length of Change (mm)		19.15	54.45	-0.26	294.95
Abdomen Rib 1 Front Ribeye Position (mm)	X	51.13	50.05	29.72	97.70
	Y	-75.00	54.50	-96.67	118.80
	Z	2.12	119.35	-12.27	58.10
Length of Change (mm)		11.55	55.65	-0.40	281.40
Abdomen Rib 2 Rear Ribeye Position (mm)	X	6.29	51.80	-21.15	128.00
	Y	-73.48	54.85	-94.73	-35.10
	Z	36.48	115.70	8.94	53.50
Length of Change (mm)		22.90	54.70	-0.96	99.95
Abdomen Rib 2 Middle Ribeye Position (mm)	X	31.74	48.50	4.37	124.15
	Y	-75.29	53.15	-106.18	101.20
	Z	38.14	117.70	20.03	58.70
Length of Change (mm)		27.82	53.15	-2.56	101.05
Abdomen Rib 2 Front Ribeye Position (mm)	X	68.27	53.10	38.41	113.20
	Y	-64.24	52.90	-97.67	99.30
	Z	38.16	116.70	20.64	57.65
Length of Change (mm)		19.55	52.85	-0.29	-37.35
T1 Acceleration (g)	X	7.51	53.25	-4.43	103.10
	Y	33.07	57.90	-13.59	100.20
	Z	14.25	55.25	-7.07	77.95
	R	36.33	57.25		

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

Driver Dummy Serial Number: EB8888

Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
T4 Acceleration (g)	X	4.99	101.65	-8.27	57.75
	Y	11.35	101.35	-32.26	56.15
	Z	10.62	55.05	-5.39	77.85
	R	34.85	56.00		
T12 Acceleration (g)	X	5.30	17.35	-4.61	100.15
	Y	33.09	52.60	-13.82	88.30
	Z	13.48	21.85	-4.01	68.50
	R	33.44	48.55		
Pubic Symphysis (N)	Y	58.10	18.10	-811.59	48.85
Left Sacro-Iliac Force (N)	X	220.60	103.15	-706.12	46.75
	Y	3.04	-42.85	-2492.54	47.35
	Z	101.96	158.40	-383.30	32.05
Left Sacro-Iliac Moment (Nm)	X	16.94	71.55	-38.45	36.75
	Y	0.23	-4.00	-0.41	120.05
	Z	40.77	18.40	-16.75	63.75
Right Sacro-Iliac Force (N)	X	213.36	70.70	-363.69	19.00
	Y	55.21	176.15	-1441.39	43.50
	Z	436.48	52.10	-11.91	34.25
Right Sacro-Iliac Moment (Nm)	X	24.29	63.20	-23.18	37.25
	Y	20.12	47.30	-5.14	73.65
	Z	38.23	18.20	-15.58	61.10
Lumbar Force (N)	X	371.31	54.60	-401.83	18.30
	Y	592.79	47.70	-92.90	88.95
	Z	803.66	53.70	-95.51	155.95
Lumbar Moment (Nm)	X	38.10	53.70	-8.27	23.90
	Y	13.32	19.00	-22.84	54.05
	Z	9.35	45.60	-13.64	105.70
Pelvis Acceleration (g)	X	26.35	18.30	-19.24	42.40
	Y	43.32	46.40	-14.37	92.10
	Z	25.73	18.35	-7.83	21.55
	R	45.11	46.40		

TABLE 1 WORLDSID-50M INSTRUMENTATION DATA (CONTINUED)

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

Driver Dummy Serial Number: EB8888

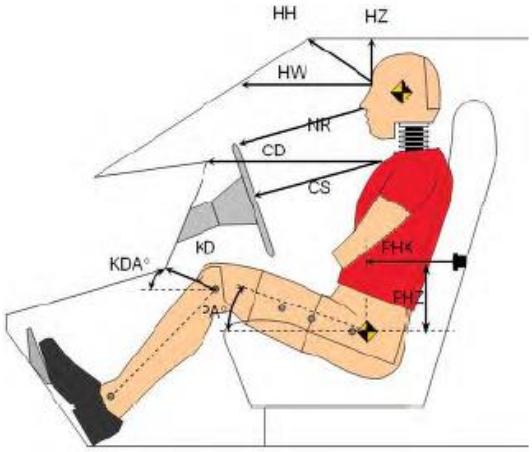
Location		Positive Direction		Negative Direction	
		Max.	Time (ms)	Max.	Time (ms)
Left Femur Force (N)	X	348.71	87.50	-83.14	53.30
	Y	51.32	54.20	-156.80	25.90
	Z	313.30	24.70	-154.40	0.20
Left Femur Moment (Nm)	X	165.74	40.30	-11.10	274.25
	Y	81.61	40.95	-9.94	21.05
	Z	43.16	54.60	-0.33	21.45
Left Femoral Neck Force (N)	X	598.27	54.55	-14.48	21.40
	Y	81.11	18.50	-1211.43	45.65
	Z	105.18	150.75	-682.84	52.95
Outer Knee Force (N)	Y	414.02	70.35	-169.15	24.55
Inner Knee Force (N)	Y	2121.10	70.65	-54.74	21.05

Positive 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: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



Code	Measurement Description	Driver WorldSID-50M SN # EB8888	
		Length (mm)	Angle
HH	Header to Header	392	
HW	Header to Windshield	664	
HZ	Head to Roof Liner	210	
NR	Nose to Rim/Seat Back	444	
CD	Chest to Dash/Seat Back	605	
CS	Chest to Steering Wheel	369	
KD(L)/KDA(L)°	Left Knee to Dash/Seat Back	122	45.1
KD(R)/KDA(R)°	Right Knee to Dash/Seat Back	68	18.1
PAX°	Pelvic Tilt Angle X		0.1
PAY°	Pelvic Tilt Angle Y		2.1
PHX	Hip Point to Striker (X-Axis)	326	
PHZ	Hip Point to Striker (Z-Axis)	136	
HAX°	Head Tilt Angle X		-1.3
HAY[1]°	Head Tilt Angle Y		-0.1
TAX°	Thorax Tilt Angle X		-0.6
TAY°	Thorax Tilt Angle Y		-2.0
	Head Rest Angle		3.6
	H-Point Tool Angle		40.2
	Torso Angle		14.7
	Windshield Angle		59.1

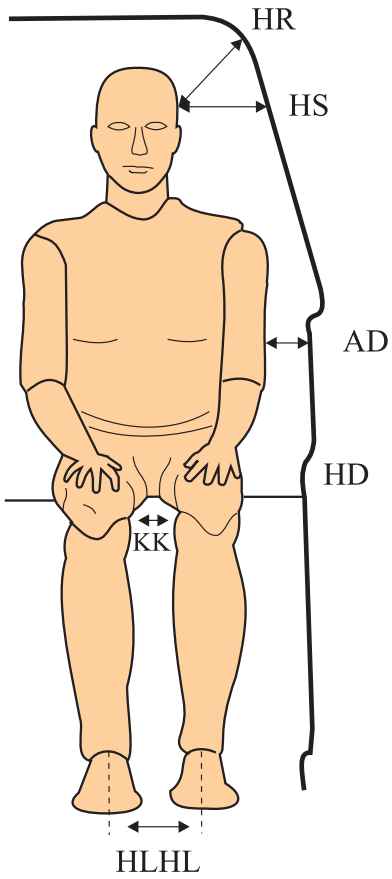
Note: All measurements are in millimeters. 2-door vehicle shown. Rear dummy HX, HZ, PHX and PHZ measurements for 4-door vehicle would use the C-post striker as a reference point.

All tilt sensor angles are recorded digitally

WorldSID-50M neck was adjusted 3 notches

DATA SHEET NO. 4
DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

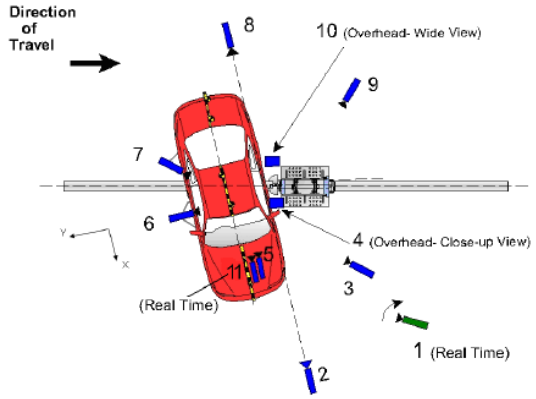


Code	Measurement Description	Driver WorldSID-50M SN # EB8888
HR	Head to Side Header	205
HS	Head to Side Window	311
AD	Arm to Door	133
HD	Hip Point to Door	101
KK	Knee to Knee	479
HLHL	Heel to Heel	303

Note: All measurements are in millimeters.

DATA SHEET NO. 5
CAMERA AND INSTRUMENTATION DATA

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



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	4366	0	-1467	20	1000
3	Impact side 45° – forward pole view	3195	-1126	-1620	20	1000
4	Overhead Close-up view of impact	0	0	-5252	28	1000
5	Onboard – dummy front view				12.5	1000
6	Onboard – dummy side view				12.5	1000
7	Onboard – dummy rear oblique view				12.5	1000
8	Rear ground level – impact view	-5151	0	-1462	20	1000
9	Impact side 45° – rearward pole view	-3058	-2819	-1454	20	1000
10	Overhead wide – view of impact	-301	280	-5261	18	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.

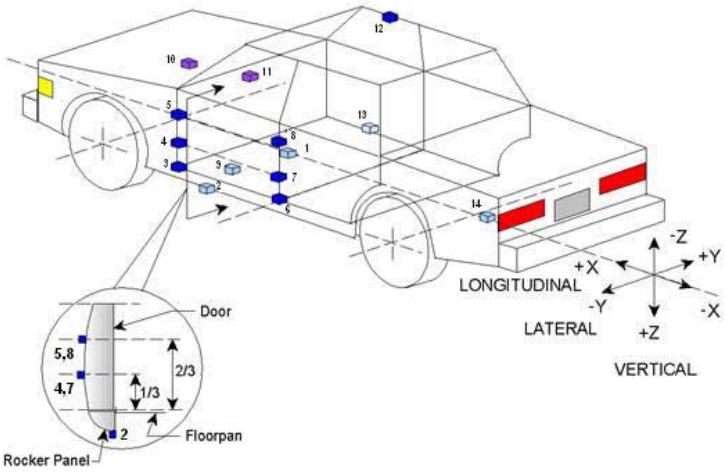
If applicable, explain why camera(s) did not operate as intended: N/A

INSTRUMENTATION

Driver Dummy	135
Vehicle Structure	37
Pole Load Cells	8
Contact Channels	4
TOTAL	184

DATA SHEET NO. 6
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
1	Vehicle CG	3042	-24	-207				
	Longitudinal (g)				4.90	30.60	-6.53	65.25
	Lateral (g)				25.68	35.40	-2.46	47.15
	Vertical (g)				15.29	45.80	-15.58	15.95
	Resultant (g)				26.53	35.75		
2	Vehicle CG ARS	3105	28	-166				
	Longitudinal (deg/s)				1146.50	46.35	-247.09	146.95
	Lateral (deg/s)				51.06	72.55	-80.67	57.20
	Vertical (deg/s)				51.81	40.25	-323.28	53.20
3	Left Floor Sill Acceleration	3441	-682	-36				
	Lateral (g)				37.22	13.15	-8.66	28.30
4	Left A-Pillar Sill Acceleration	3765	-740	-97				
	Lateral (g)				71.84	40.30	-10.21	19.45
5	Left Lower A-Pillar Acceleration	3777	-810	-222				
	Lateral (g)				---[1]	---[1]	---[1]	---[1]
6	Left Mid A-Pillar Acceleration	3812	-808	-482				
	Lateral (g)				18.26	49.45	-1.99	4.05
7	Left B-Pillar Sill Acceleration	2802	-691	-27				
	Lateral (g)				---[1]	---[1]	---[1]	---[1]
8	Left Lower B-Pillar Acceleration	2750	-745	-222				
	Lateral (g)				60.10	8.60	-6.12	61.20
9	Left Mid B-Pillar Acceleration	2738	-726	-714				
	Lateral (g)				---[1]	---[1]	---[1]	---[1]

[1]See data acquisition explanation

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

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	2961	-564	-64				
	Lateral (g)				45.57	26.00	-57.96	82.70
11	Engine Top Acceleration	4544	49	-503				
	Longitudinal (g)				1.38	262.05	-6.85	68.70
	Lateral (g)				34.79	62.20	-9.53	34.20
12	Firewall Center Acceleration	4248	47	-625				
	Lateral (g)				14.52	41.35	-2.21	7.10
13	Right Roof at Vertical Impact Reference Line Acceleration	2983	603	-1209				
	Lateral (g)				35.51	38.70	-1.63	9.60
14	Right Sill at Vertical Impact Reference Line Acceleration	3445	697	-23				
	Longitudinal (g)				4.05	34.75	-6.40	94.80
	Lateral (g)				18.03	45.65	-1.15	221.65
	Vertical (g)				8.46	42.55	-6.04	19.20
	Resultant (g)				18.51	45.70		
15	Right Sill at Rear Seat Acceleration	2676	683	-16				
	Longitudinal (g)				3.88	34.90	-6.28	94.90
	Lateral (g)				20.93	43.20	-1.87	238.70
	Vertical (g)				9.00	41.30	-7.44	65.40
	Resultant (g)				21.88	42.95		
16	Rear Floorpan Behind Rear Axle at Centerline Acceleration	1046	0	-237				
	Longitudinal (g)				3.77	46.25	-7.97	55.00
	Lateral (g)				17.91	86.75	-1.18	213.35
17	Left Front Door Mid Centerline Acceleration	3250	-764	-392				
	Lateral (g)				105.99	11.65	-128.33	21.90
18	Left Front Door Mid Rear Acceleration	2813	-765	-362				
	Lateral (g)				73.91	6.50	-15.17	24.05
19	Left Front Door Upper Centerline Acceleration	3247	-773	-604				
	Lateral (g)				99.08	14.05	-169.61	24.25

[1]See data acquisition explanation

DATA SHEET NO. 6 (CONTINUED)
VEHICLE ACCELEROMETER DATA

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

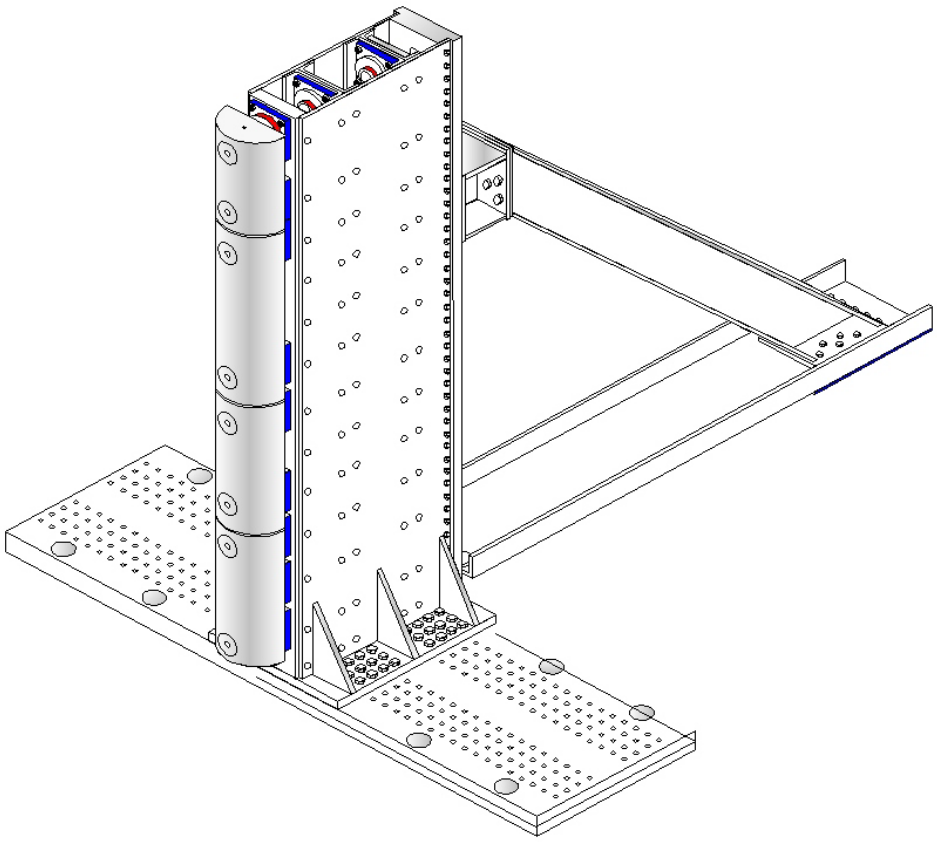
Location		Coordinates (mm)			Positive Direction		Negative Direction	
		X	Y	Z	Max	Time (ms)	Max	Time (ms)
20	Left Rear Door Mid Rear Acceleration	2365	-782	-361				
	Lateral (g)				40.49	41.65	-14.16	29.80
21	Left Rear Door Upper Centerline Acceleration	2480	-764	-681				
	Lateral (g)				45.91	47.70	-19.03	61.25
22	Rear Deck Acceleration	1046	0	-237				
	Longitudinal (g)				3.54	45.95	-9.53	55.10
	Lateral (g)				20.12	79.15	-1.96	191.30
	Vertical (g)				11.02	54.30	-12.81	58.40
	Resultant (g)				21.97	86.45		
23	Rear Deck ARS	1046	24	-256				
	Longitudinal (deg/s)				148.94	141.45	-130.76	77.75
	Lateral (deg/s)				152.57	61.60	-139.58	57.15
	Vertical (deg/s)				49.06	141.15	-131.58	59.05

*0,0,0 located at rear bumper

DATA SHEET NO. 7
RIGID POLE LOAD CELL DATA

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

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: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

TEST DUMMY INFORMATION AND CONTACT POINTS

Dummy Body Part	Driver WorldSID-50M Dummy
Face	SCAB
Top of Head	SCAB; side header
Left Side of Head	SCAB; side header
Back of head	SCAB
Left Shoulder	SAB
Upper Torso	Side seat bolster
Lower Torso	Side seat bolster
Left Hip	SAB
Left Knee	Door panel

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	No	No	No
Seat Disengagement from Floor pan	No	No	No	No
Seat Back Movement from Initial Position	No	No	No	No
Seat Back Collapse	No	No	No	No

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	Good
Sill Separation	None
Windshield Damage	Webbing cracks across entire windshield
Side Window Damage	Driver side blown out; passenger no damage
Other Notable Effects	None

DATA SHEET NO. 8 (CONTINUED)
POST TEST OBSERVATIONS

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

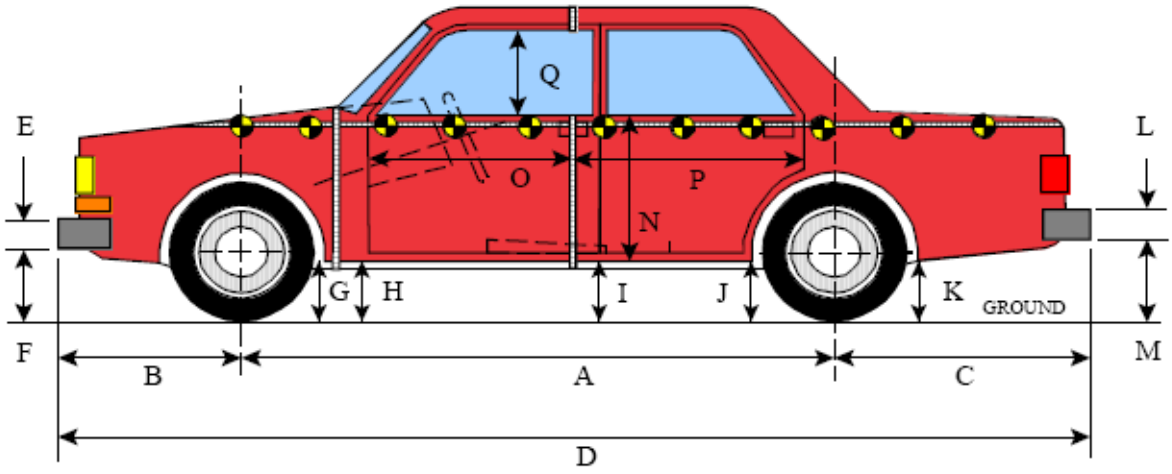
Restraint Type	Struck Side (Driver)		Struck Side (Rear Passenger)	
	Mounted	Deployed	Mounted	Deployed
Front Airbag	Yes	No		
Knee Airbag	No	N/A		
Side Curtain Airbag	Yes	Yes	Yes	Yes
Side Torso/Pelvis Airbag	Yes	Yes	No	N/A
Side Torso Airbag	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	No
Seat Belt Load Limiter	Yes	No	Yes	No
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		1350
Actual Impact Point (Aft of Front Axle)	mm		1352
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	30.1 to 31.9	30.94
Trap No. 2 Velocity (Redundant)	km/h	30.1 to 31.9	30.93

DATA SHEET NO. 9
VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



LEFT SIDE VIEW
All MEASUREMENTS IN (mm) WITH TOLERANCE OF ± 3mm

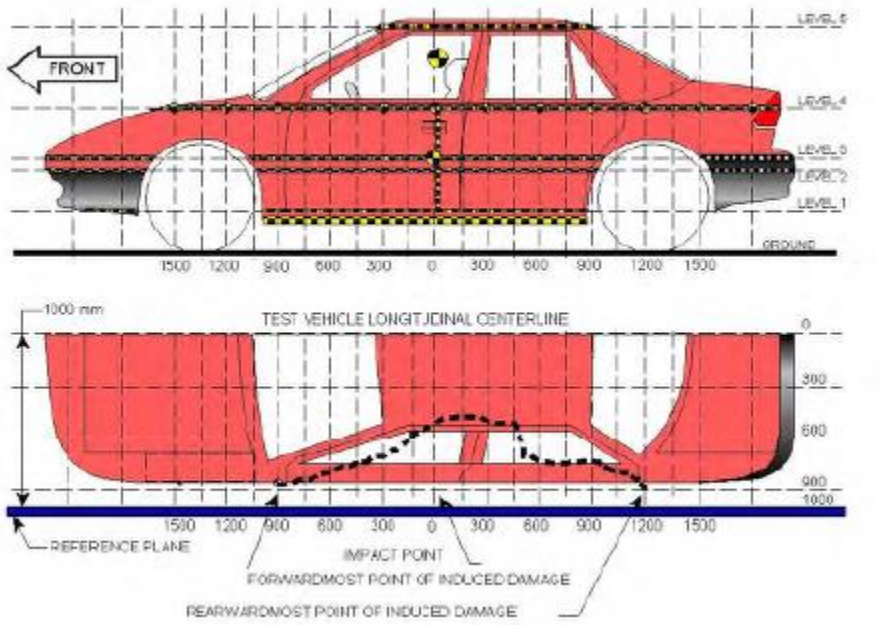
VEHICLE PRE- AND POST-TEST MEASUREMENT INFORMATION

Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	3215	3185	30
B	Front Axle to FSOV	920	920	0
C	Rear Axle to RSOV	1255	1255	0
D	Total Length at Centerline	5390	5350	40
E	Front Bumper Thickness	243	243	0
F	Front Bumper Bottom to Ground	428	480	-52
G	Sill Height at Front Wheel Well	524	547	-23
H	Sill Height at Front Door Leading Edge	500	515	-15
I	Sill Height at B Pillar	518	575	-57
J1	Sill Height at Rear Wheel Well	530	563	-33
J2	Pinch Weld Height at Rear Wheel Well	395	421	-26
K	Sill Height Aft of Rear Wheel Well	520	585	-65
L	Rear Bumper Thickness	198	198	0
M	Rear Bumper Bottom to Ground	528	577	-49
N	Sill Height to Bottom of Front Window Sill	820	823	-3
O	Front Door Leading Edge to Impact CL	797	694	103
P	Rear Door Trailing Edge to Impact CL	375	910	50
Q	Front Window Opening	435	405	30
R	Right Side Length	5209	5228	-19
S	Left Side Length	5206	5190	16
T	Maximum Vehicle Width at B-Pillars	1810	1662	148
U	Maximum Vehicle Width	1862	1860	2

**All Dimensions in mm

DATA SHEET NO. 10
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



MAXIMUM EXTERIOR CRUSH MEASUREMENTS

Level	Measurement Description	Height Above Ground	Maximum Exterior Static Crush	Distance from Impact
1	Sill Top	505	264	0
2	Occupant H-Point	833	294	0
3	Mid-Door	930	311	0
4	Window Sill	1205	286	0
5	Window Top	1774	103	0

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

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

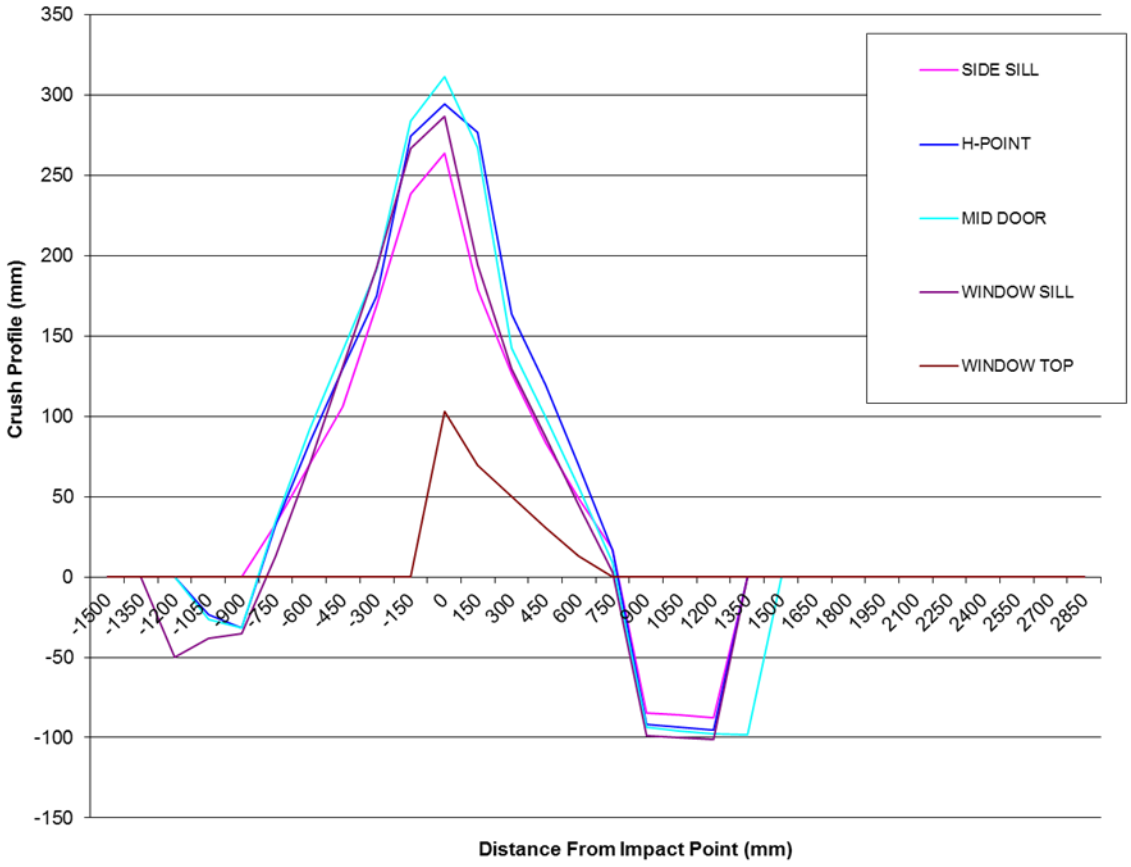
Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021

	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-1350			926					974					-48		
-1200		921	920	827			956	957	877			-35	-37	-50	
-1050		911	906	838			934	932	876			-23	-26	-38	
-900	856	890	894	847		861	922	926	882		-5	-32	-32	-35	
-750	843	891	896	853		810	859	861	840		33	32	35	13	
-600	840	891	897	859		770	807	805	789		70	84	92	70	
-450	840	888	898	865		734	759	757	734		106	129	141	131	
-300	838	887	899	870		669	712	707	677		169	175	192	193	
-150	839	888	899	874		601	613	616	608		238	275	283	266	
0	840	888	900	878	625	576	594	589	592	522	264	294	311	286	103
150	838	889	900	882	632	659	613	633	688	562	179	276	267	194	70
300	835	890	899	883	635	708	726	756	754	585	127	164	143	129	50
450	832	891	898	884	637	748	771	799	797	607	84	120	99	87	30
600	831	892	898	886	641	782	822	842	841	628	49	70	56	45	13
750	827	892	897	886	634	809	876	889	883	634	18	16	8	3	0
900	822	886	891	881		907	978	985	980		-85	-92	-94	-99	
1050	825	888	892	881		910	982	988	981		-85	-94	-96	-100	
1200	855	915	909	881		942	1010	1007	983		-87	-95	-98	-102	
1350			928					1026					-98		

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).

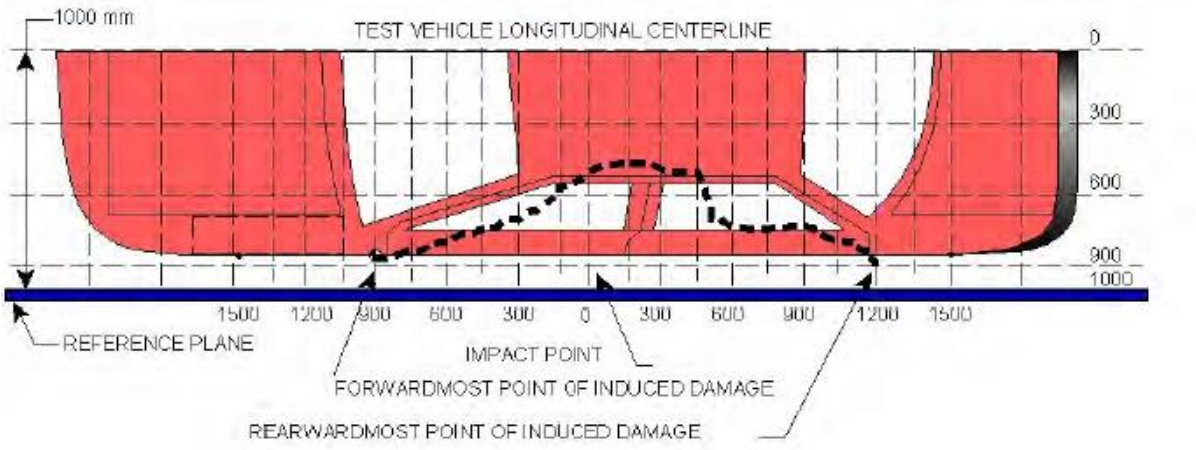
DATA SHEET NO. 10 (CONTINUED)
VEHICLE EXTERIOR CRUSH MEASUREMENTS

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



DATA SHEET NO. 11
VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



VEHICLE DAMAGE PROFILE DISTANCES

DPD	Distance From Impact Point (mm)	Level	Post-Test (mm)	Pre-Test (mm)	Crush (mm)
1[1]	750	1	809	827	0
2	450	2	771	891	120
3	150	2	613	889	276
4	-150	3	616	899	283
5	-450	3	757	898	141
6[1]	-750	3	861	896	0

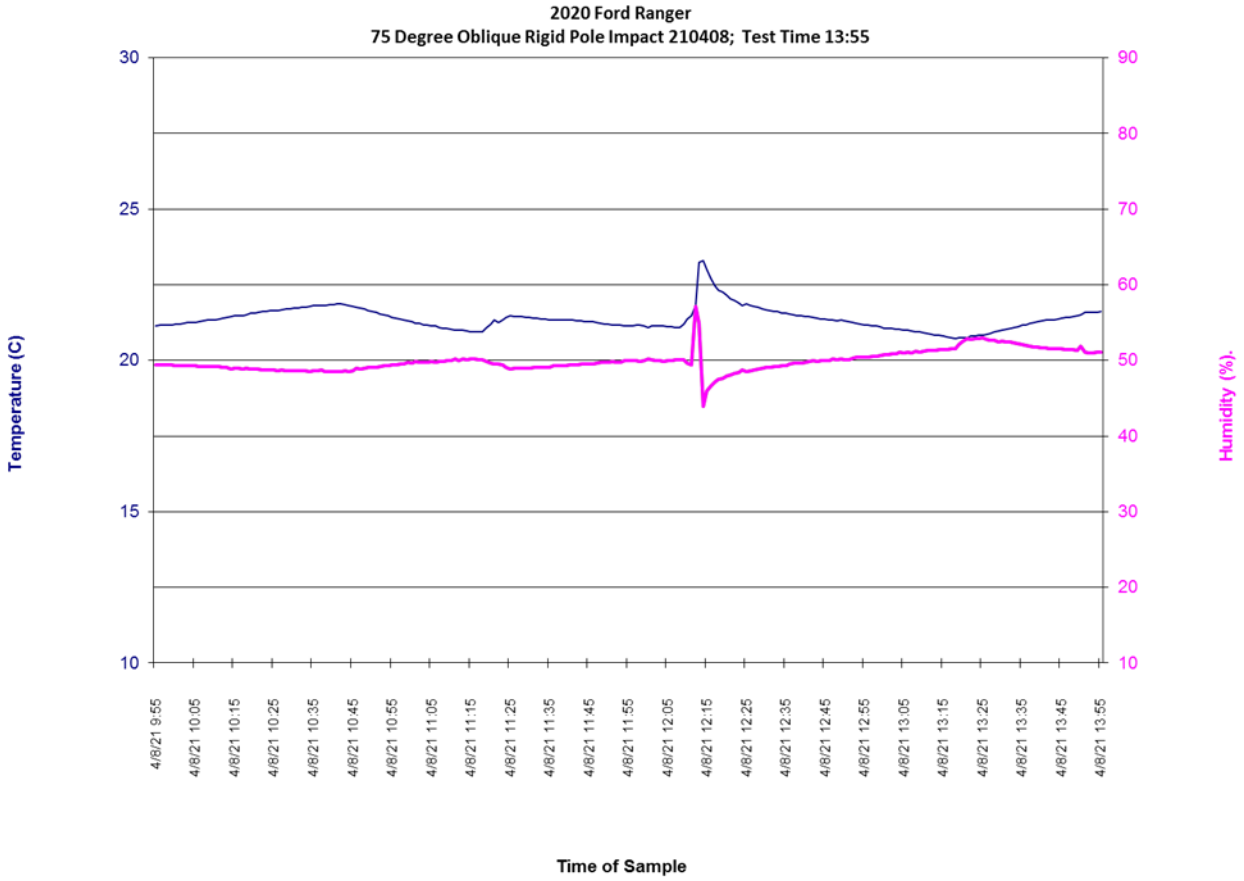
[1] DPD 1 and 6 are defined as zero crush since the crush does not extend to the end of the vehicle

DATA SHEET NO. 12

DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

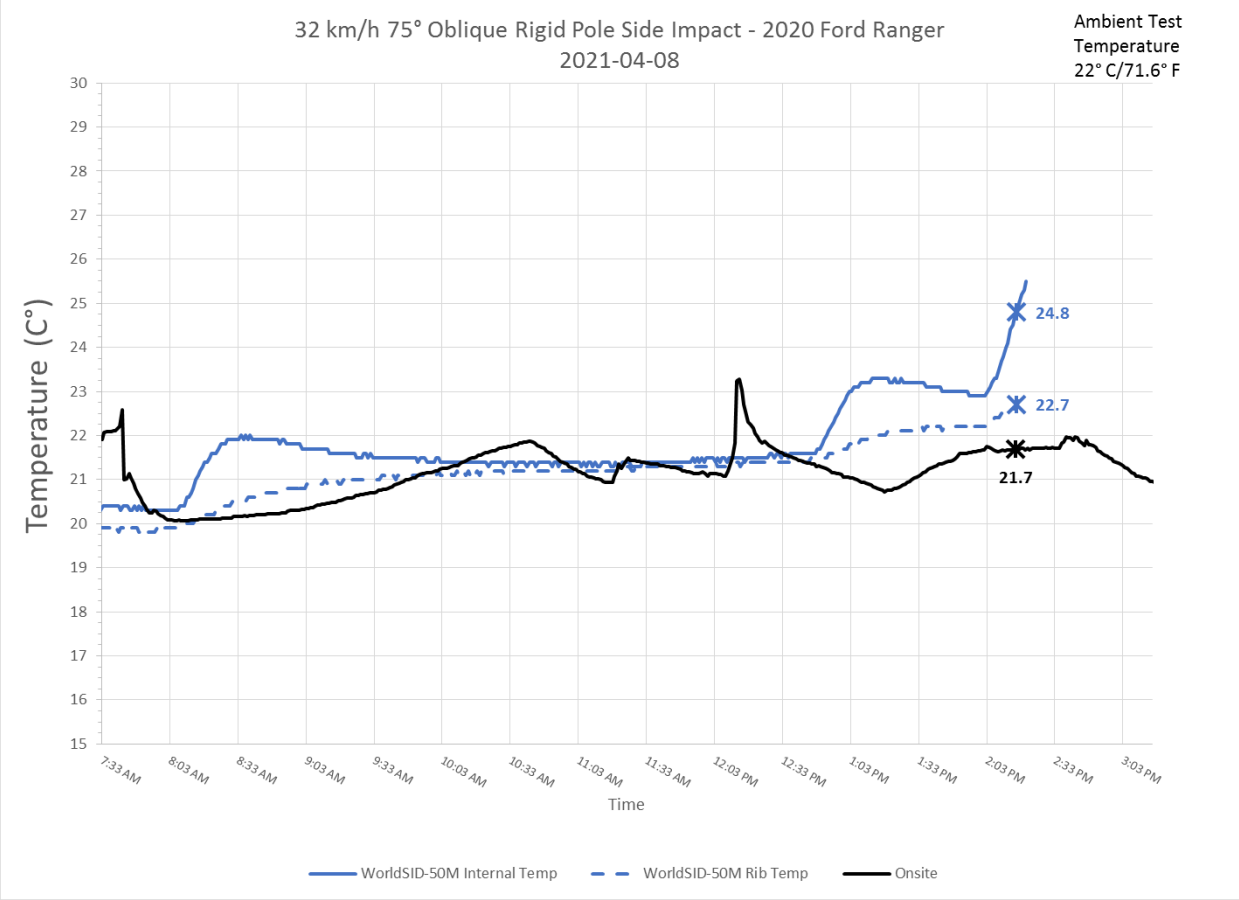
Test Vehicle: 2020 Ford Ranger

Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



DATA SHEET NO. 12, CONTINUED
DUMMY/VEHICLE TEMPERATURE AND HUMIDITY STABILIZATION DATA

Test Vehicle: 2020 Ford Ranger
Test Program: Rigid Pole Side Impact Test Date: 4/8/2021



APPENDIX A

PHOTOGRAPHS

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2	As Delivered Left Rear ¾ View of Test Vehicle	A-4
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9	Pre-Test Left Rear ¾ View of Test Vehicle	A-8
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11	Pre-Test Rear View of Test Vehicle	A-9
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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**
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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**
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48	Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View	**A-28**
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50	Post-Test Dummy Close-Up Pelvis Contact with Vehicle Interior View	**A-29**
51	Post-Test Dummy Close-Up Pelvis Contact with Side Airbag View	**A-29**
52	Post-Test Dummy Close-Up Knee Contact with Vehicle Interior View	**A-30**
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54	Pre-Test View of Fuel Filler Cap or Fuel Filler Neck	**A-32**
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60	Pre-Test Pole Barrier Side View	**A-35**
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64	FMVSS No. 301 Static Rollover 0 Degrees	**A-37**
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71	Head Restraint Use and Adjustment Information from Vehicle Owner's Manual	**A-40**
72	Post-Test View of Shattered Vehicle Inner Door Panel	**A-41**
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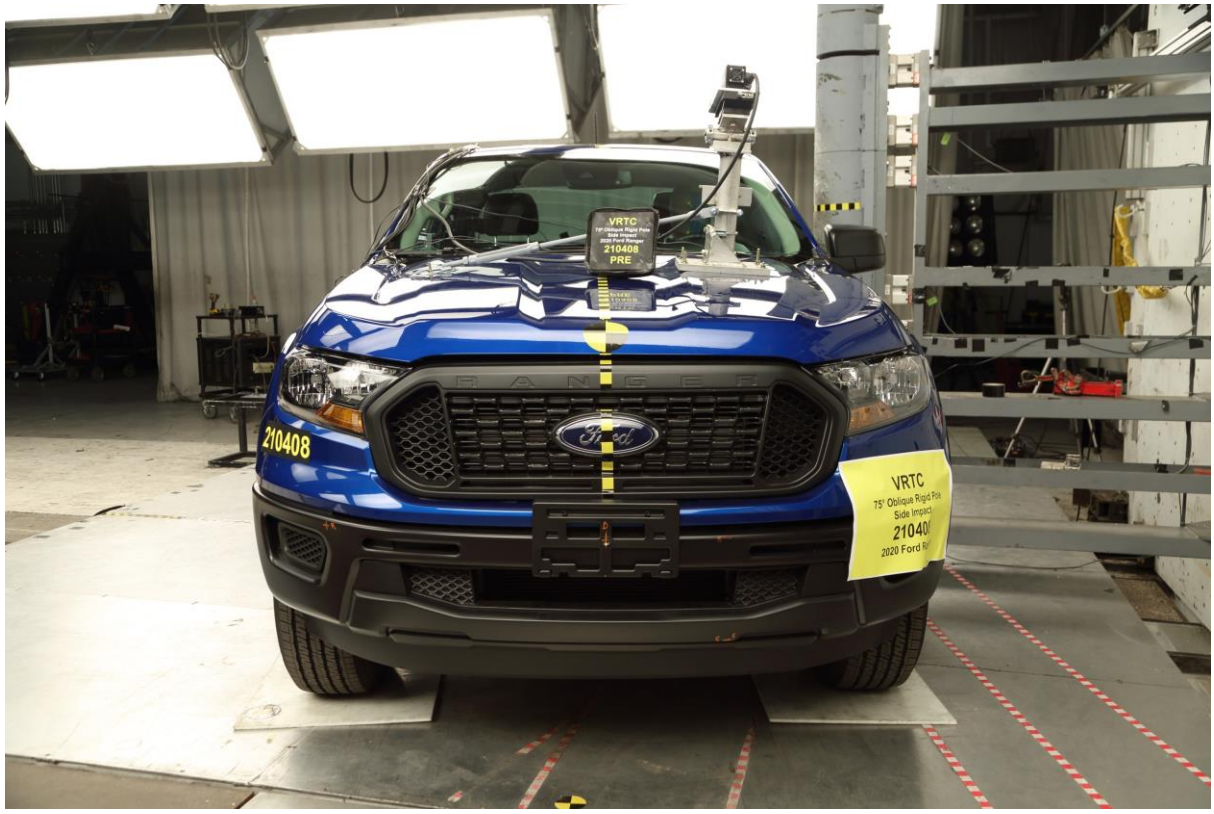
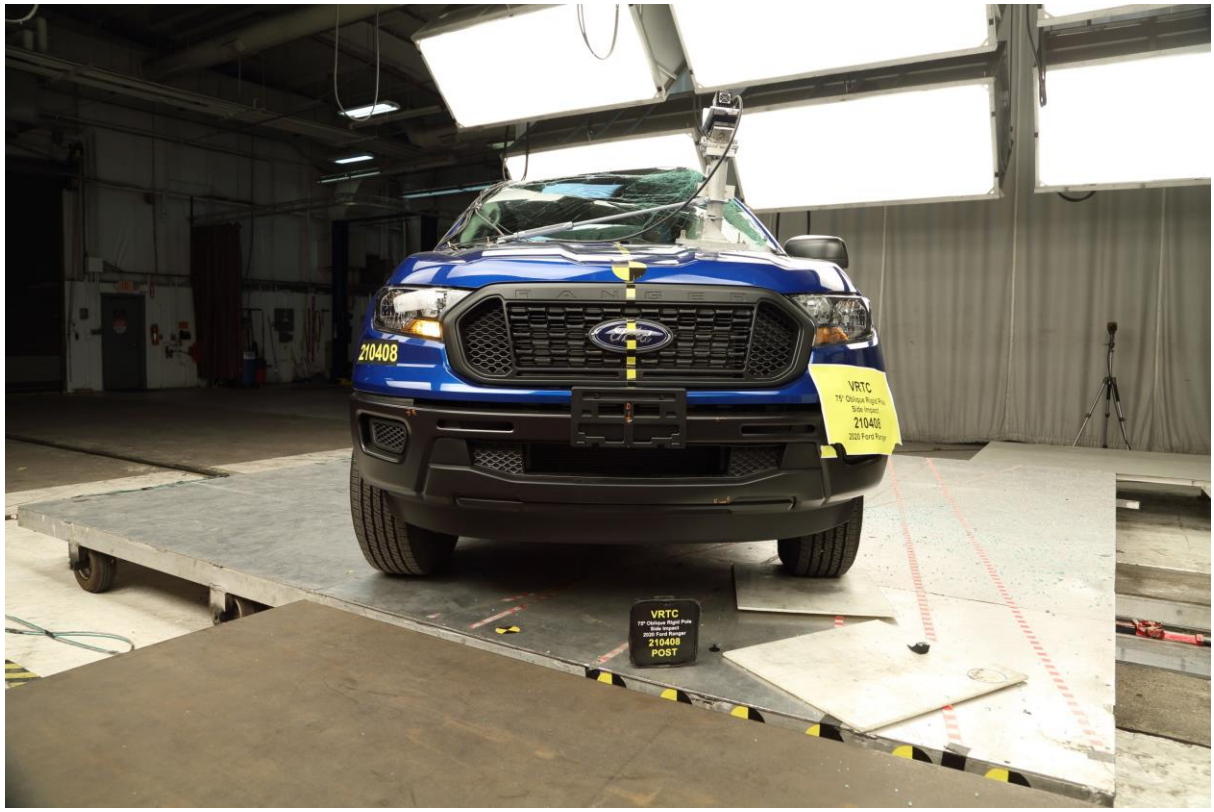
No. 001 As Delivered Right Front ¾ View of Test Vehicle

No. 002 As Delivered Left Rear ¾ View of Test Vehicle



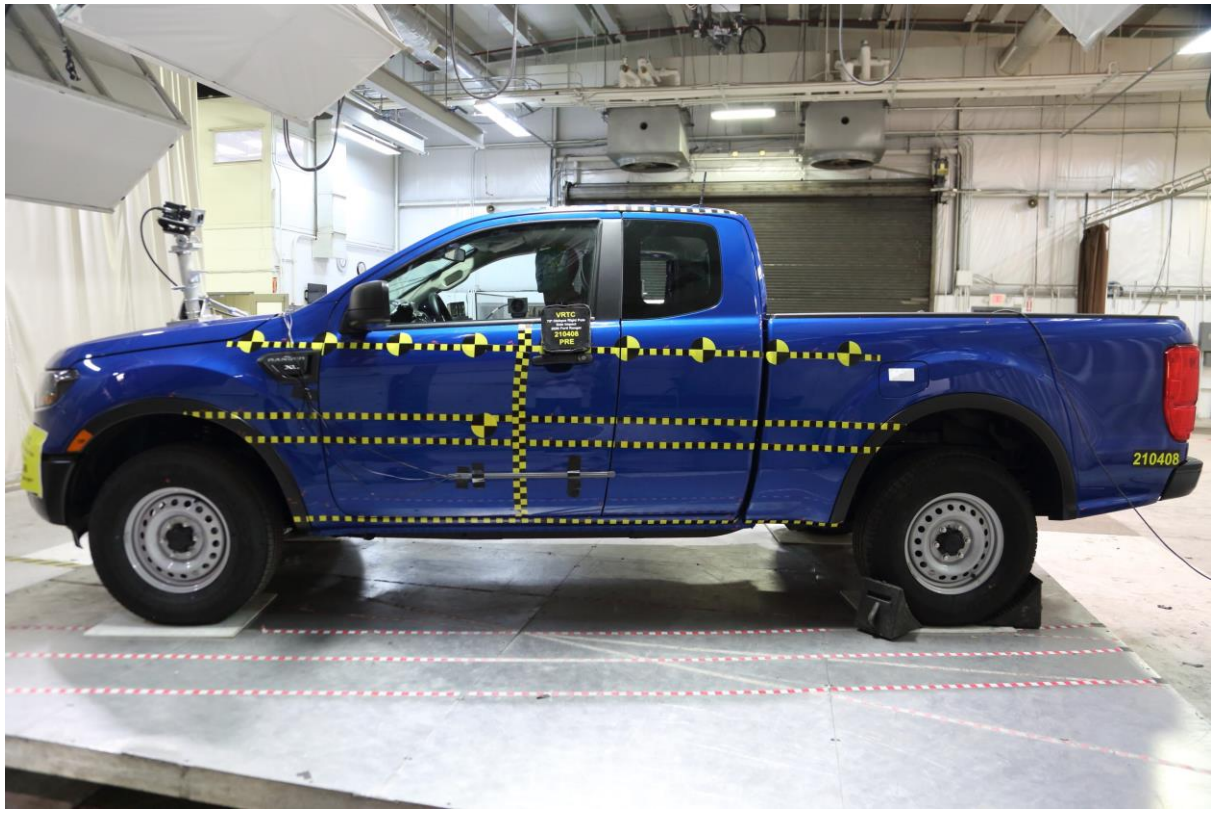
No. 003 Pre-Test Frontal View of Test Vehicle



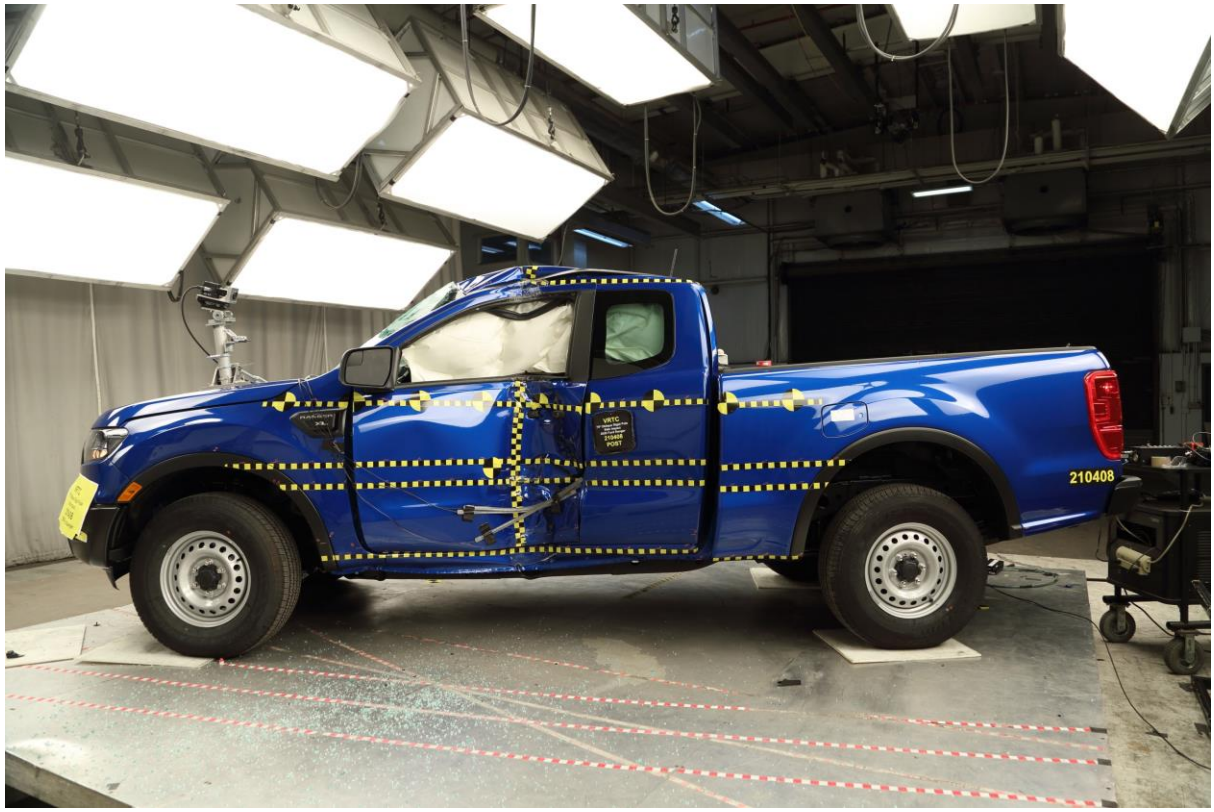
No. 004 Post-Test Frontal View of Test Vehicle

No. 005 Pre-Test Left Front ¾ View of Test Vehicle

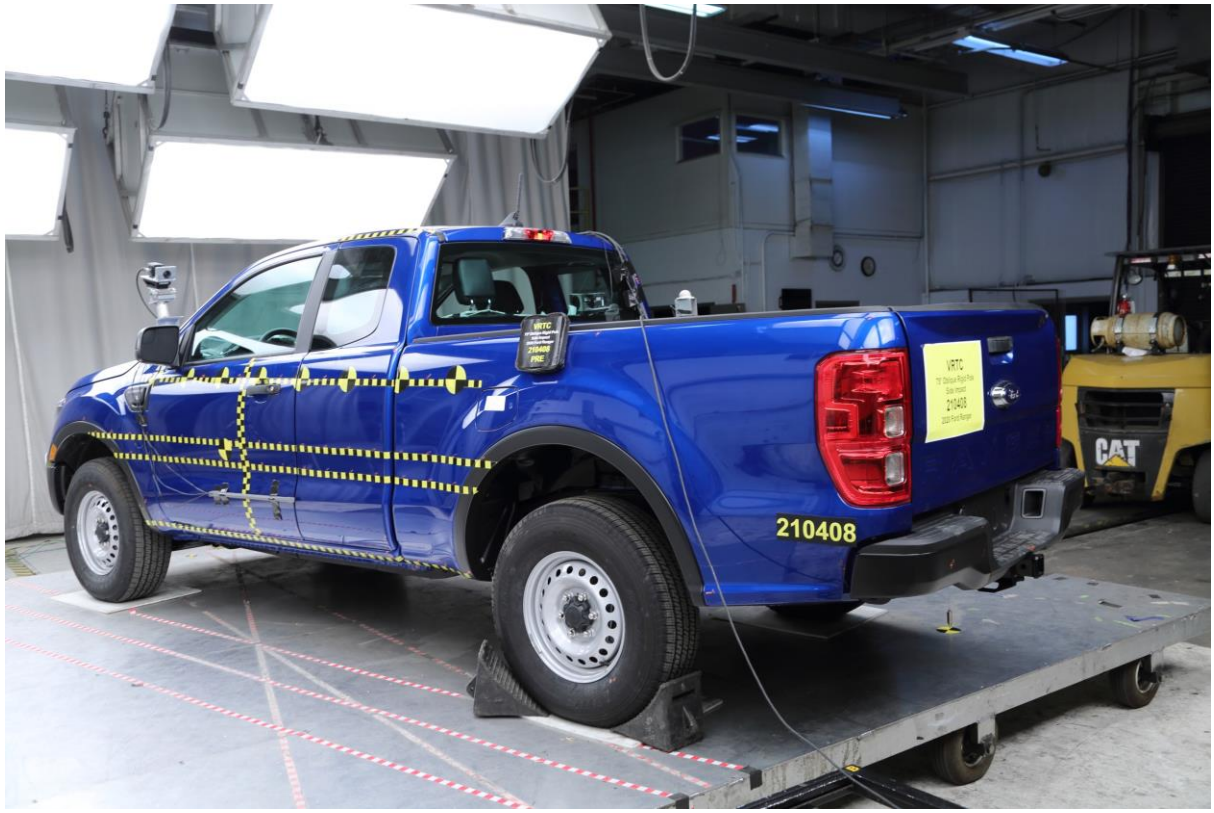
No. 006 Post-Test Left Front ¾ View of Test Vehicle



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 ¾ View of Test Vehicle

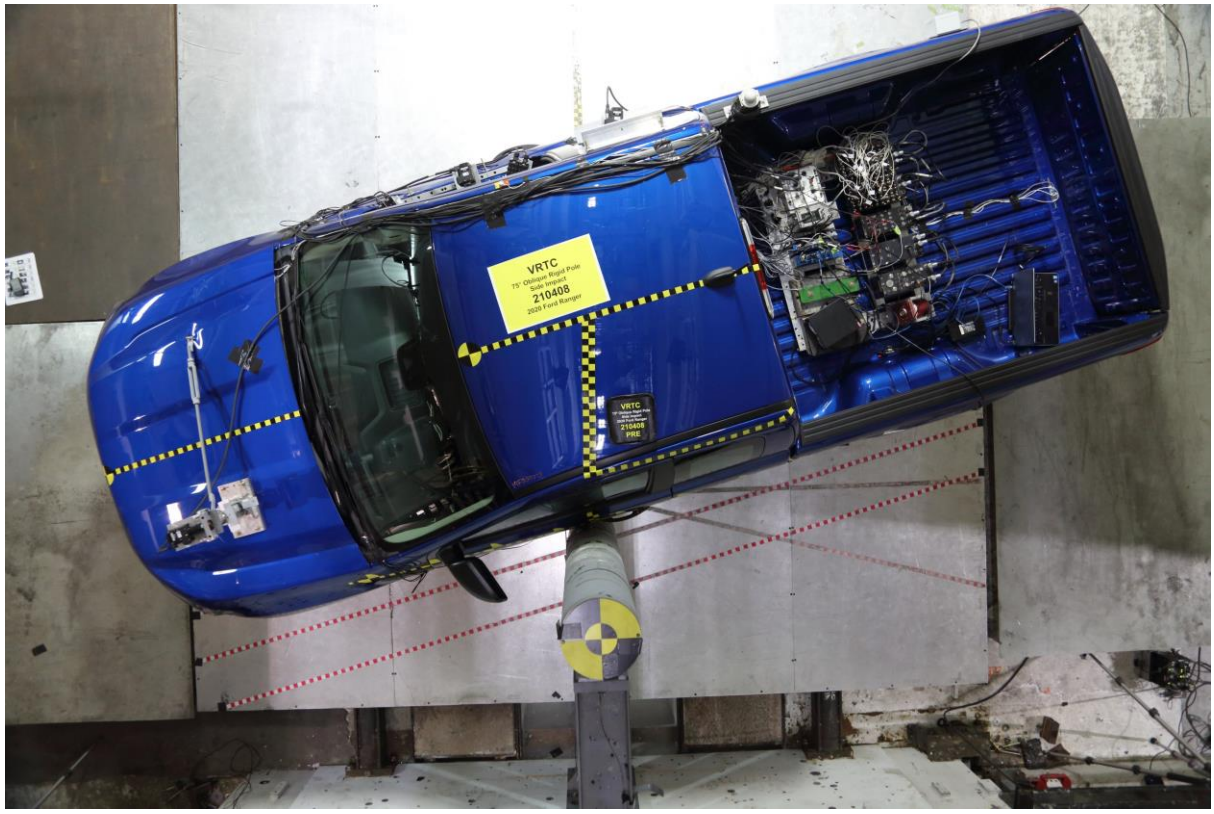
No. 010 Post-Test Left Rear ¾ View of Test Vehicle

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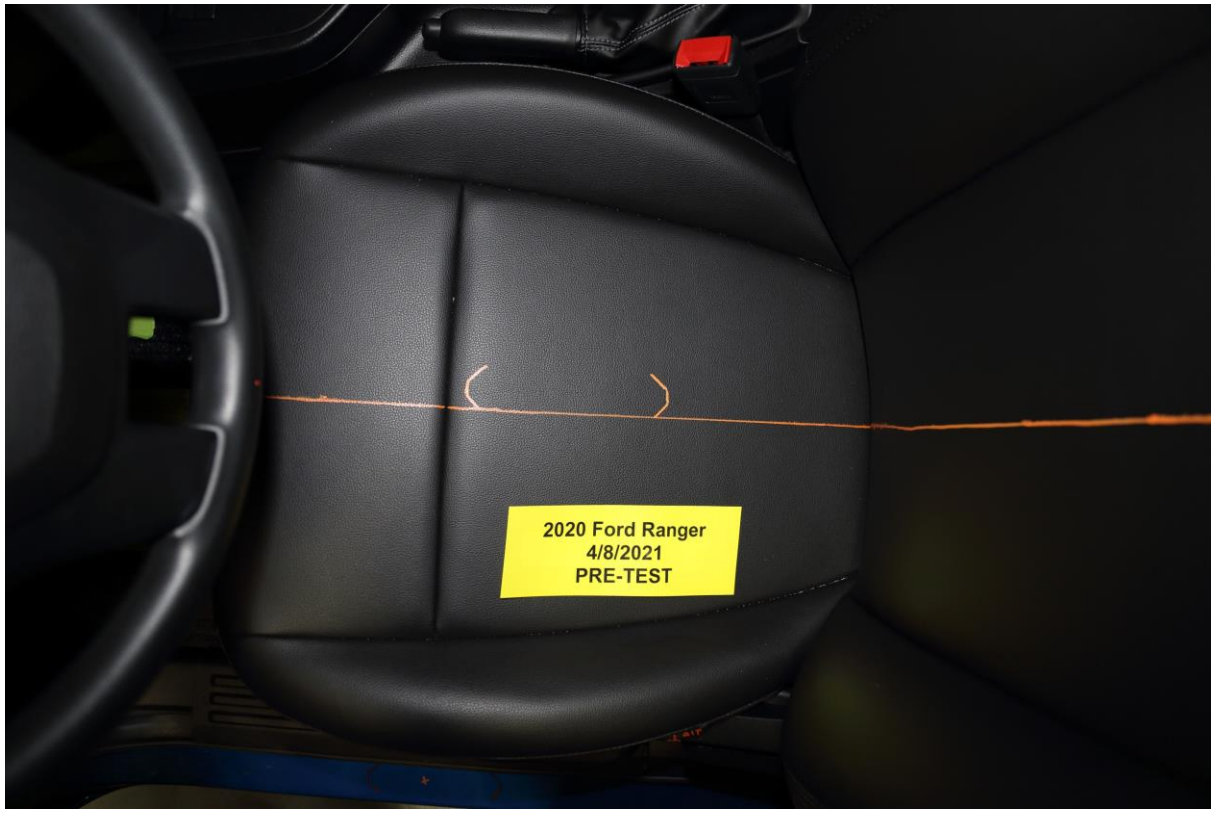
No. 024 Pre-Test Left Side View of Dummy Shoulder and Door Top View

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

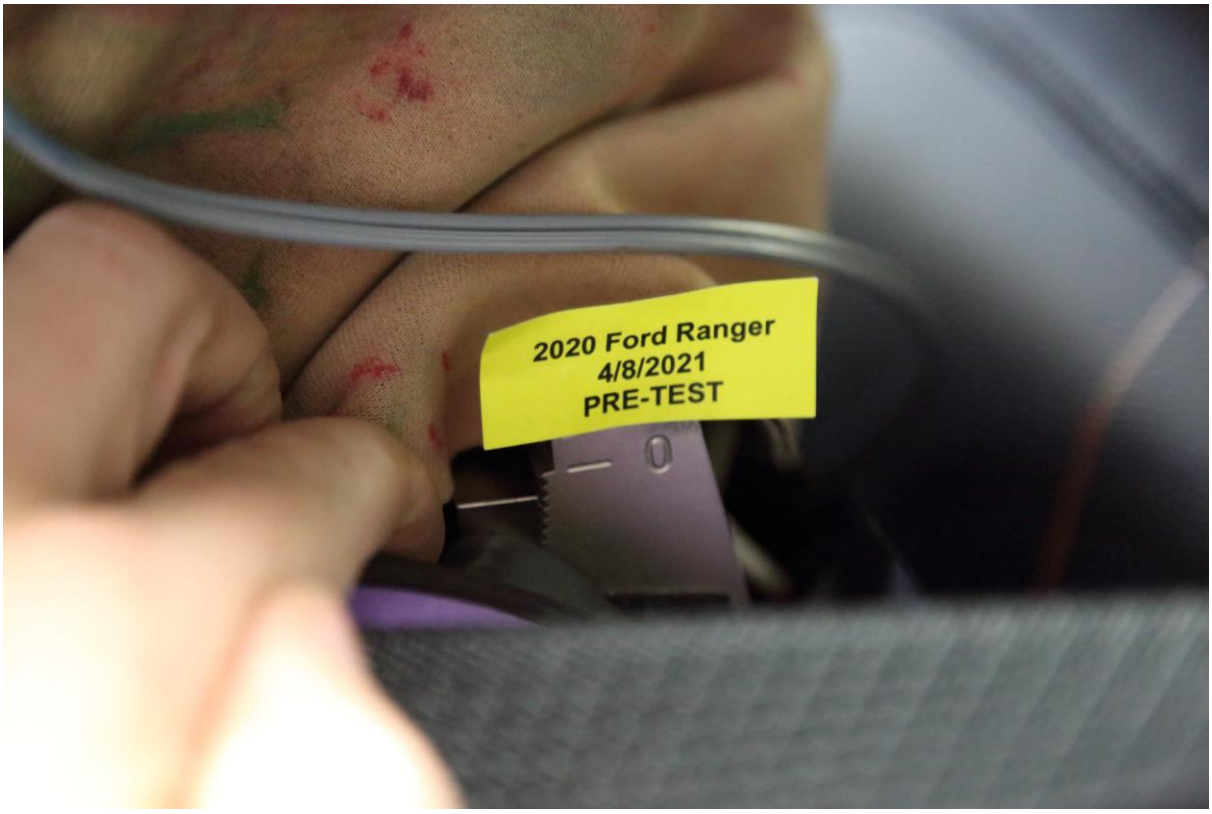
No. 026 Pre-Test Front View of Seat Back Prior to Dummy Positioning

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

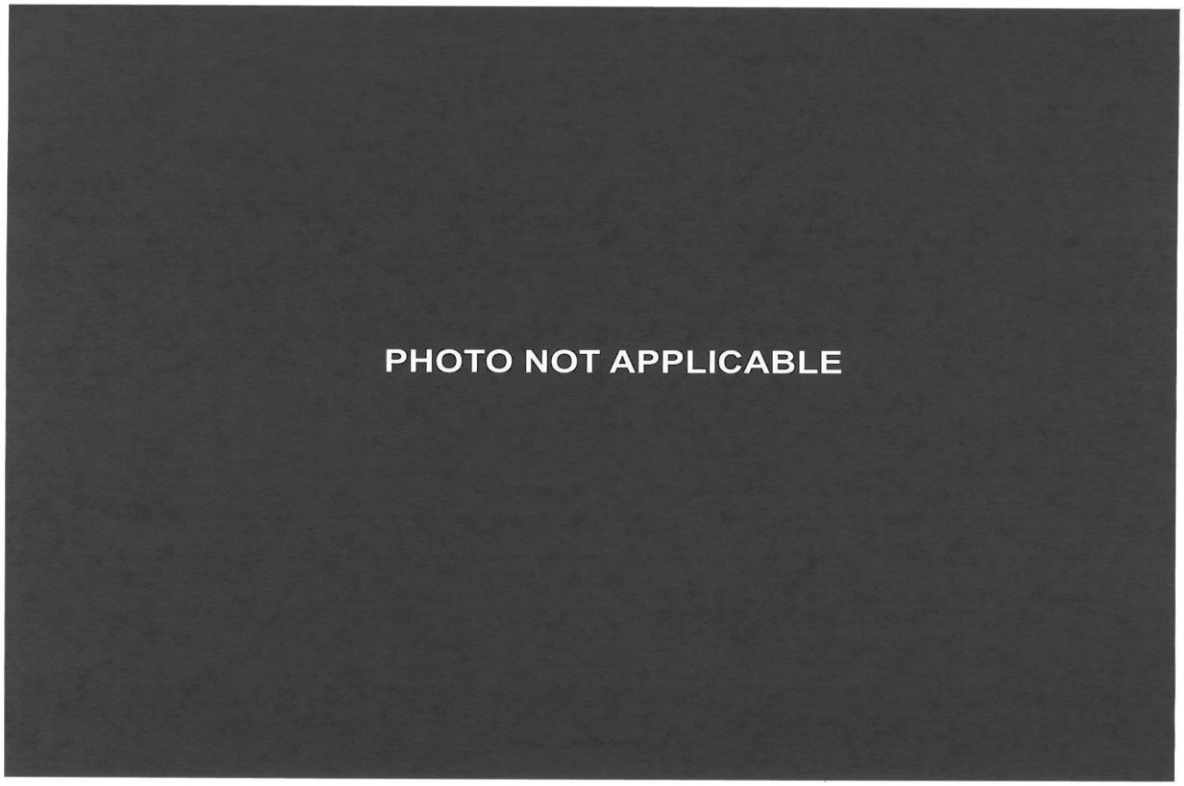


No. 028 Pre-Test Front View of Seat Pan Prior to Dummy Positioning

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



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



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

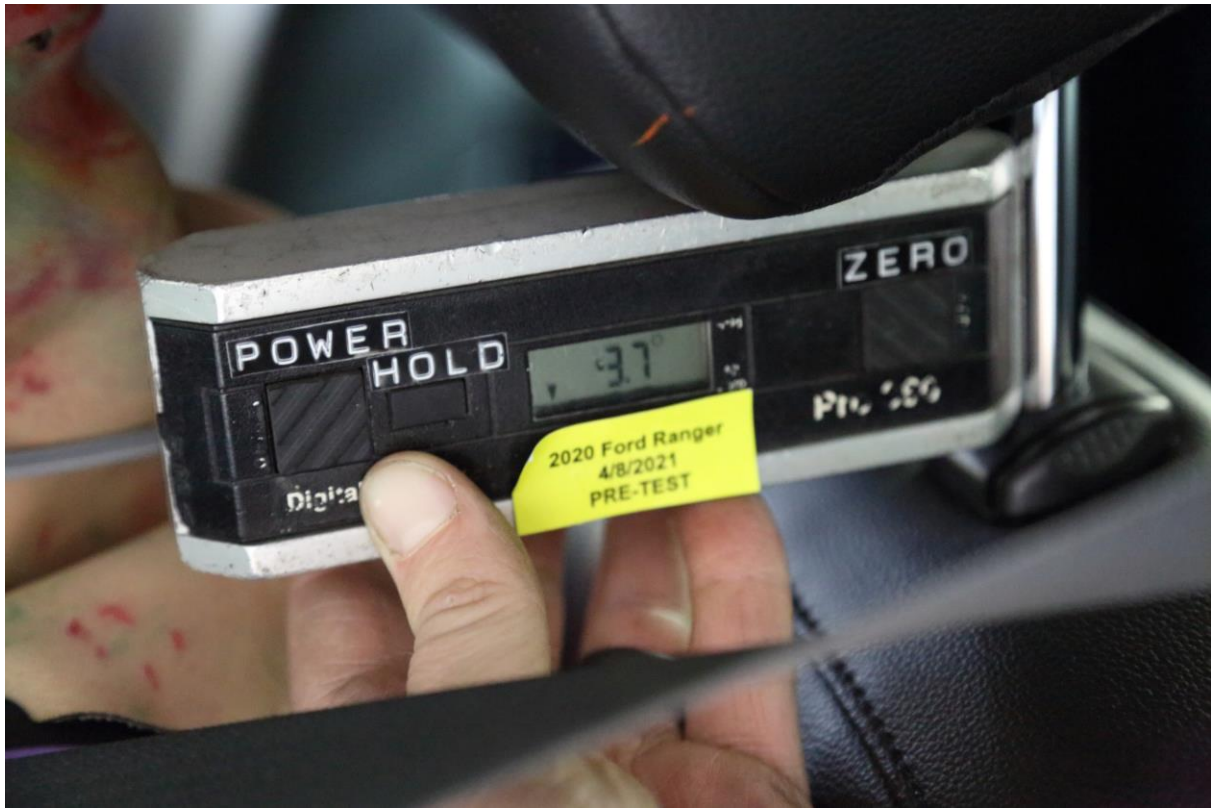
No. 034 Pre-Test Left Side View of Steering Wheel

No. 035 Pre-Test View of Disengaged Parking Brake

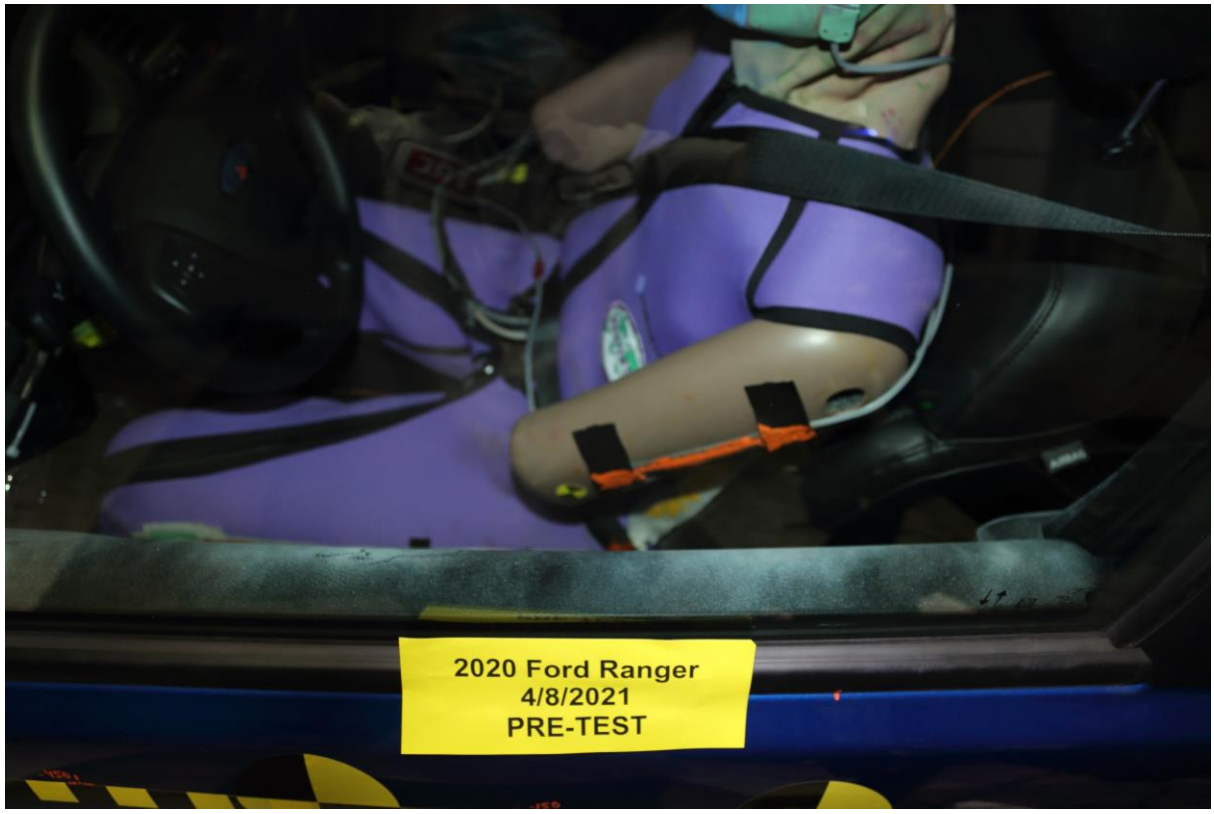
No. 036 Pre-Test View of Parking Brake

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

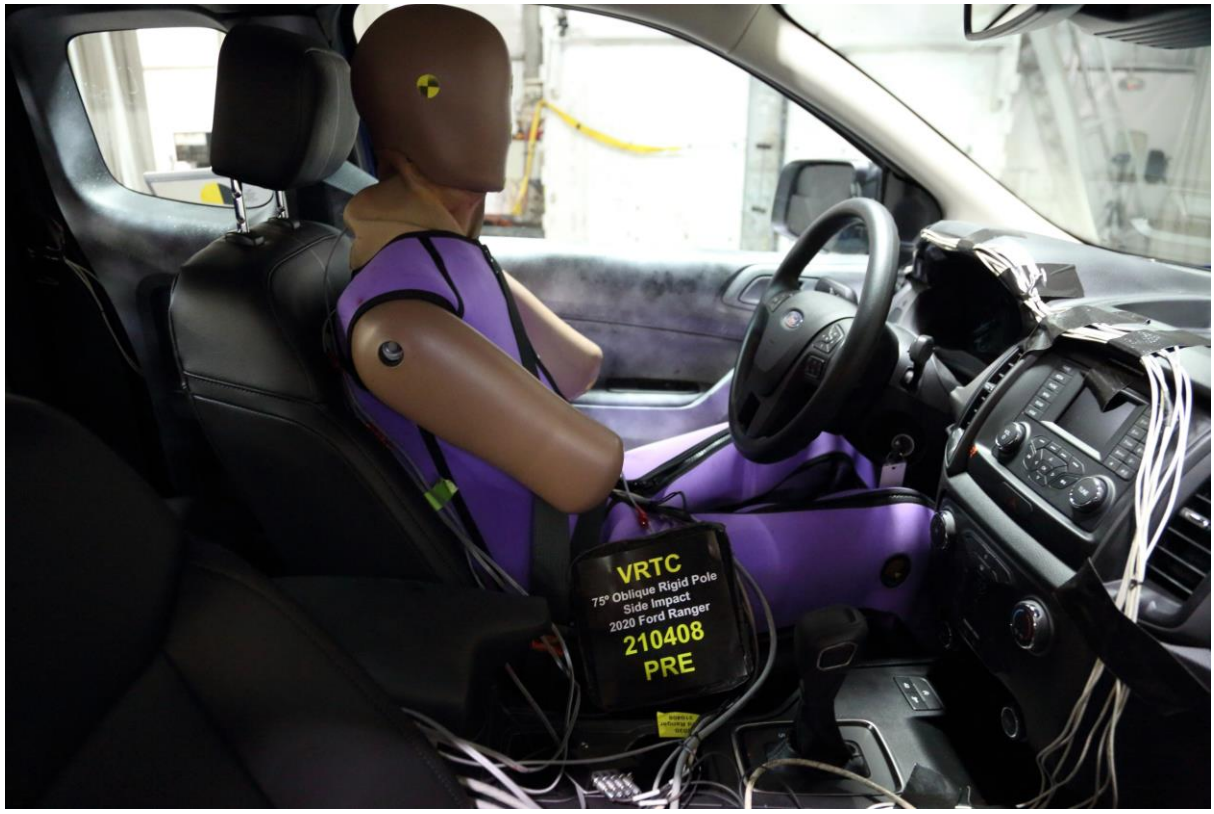


No. 039 Pre-Test Close-Up View of Driver Seat Back or Head Restraint

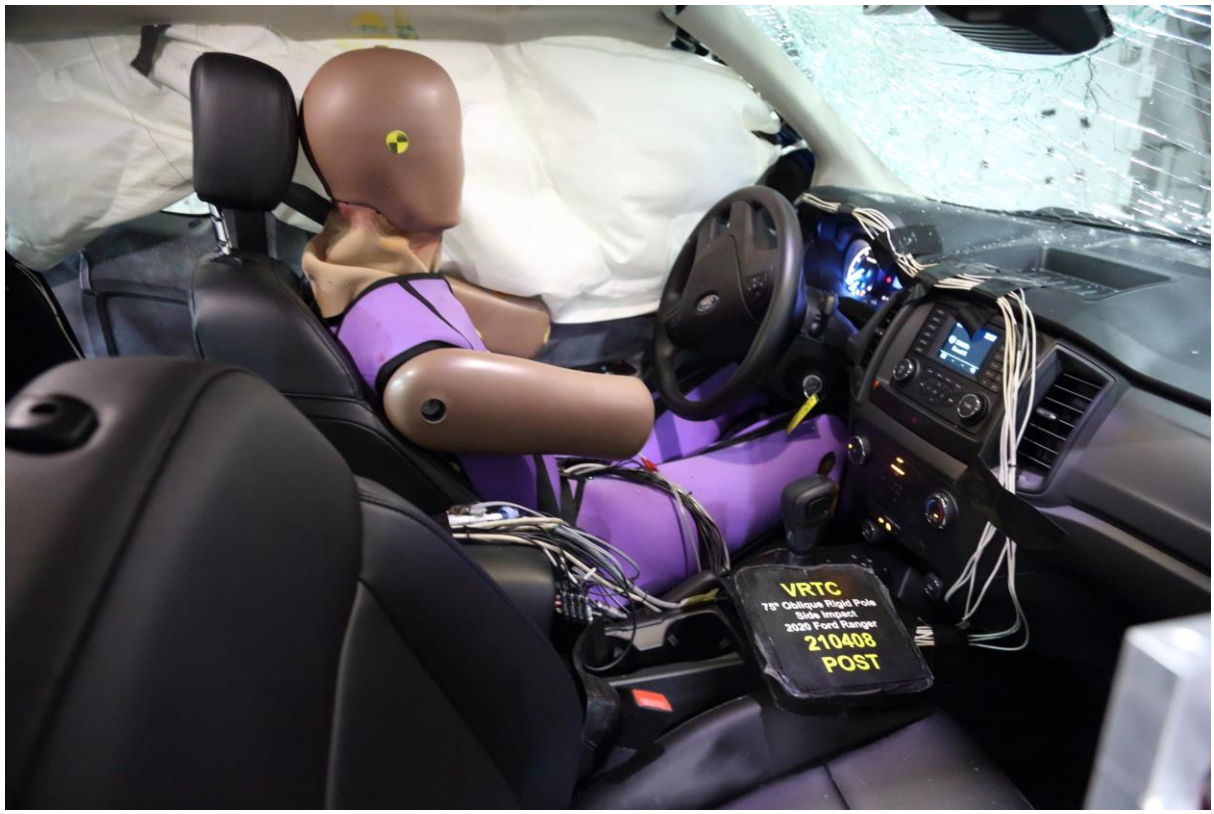


No. 040 Pre-Test Dummy and Door Clearance View

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

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

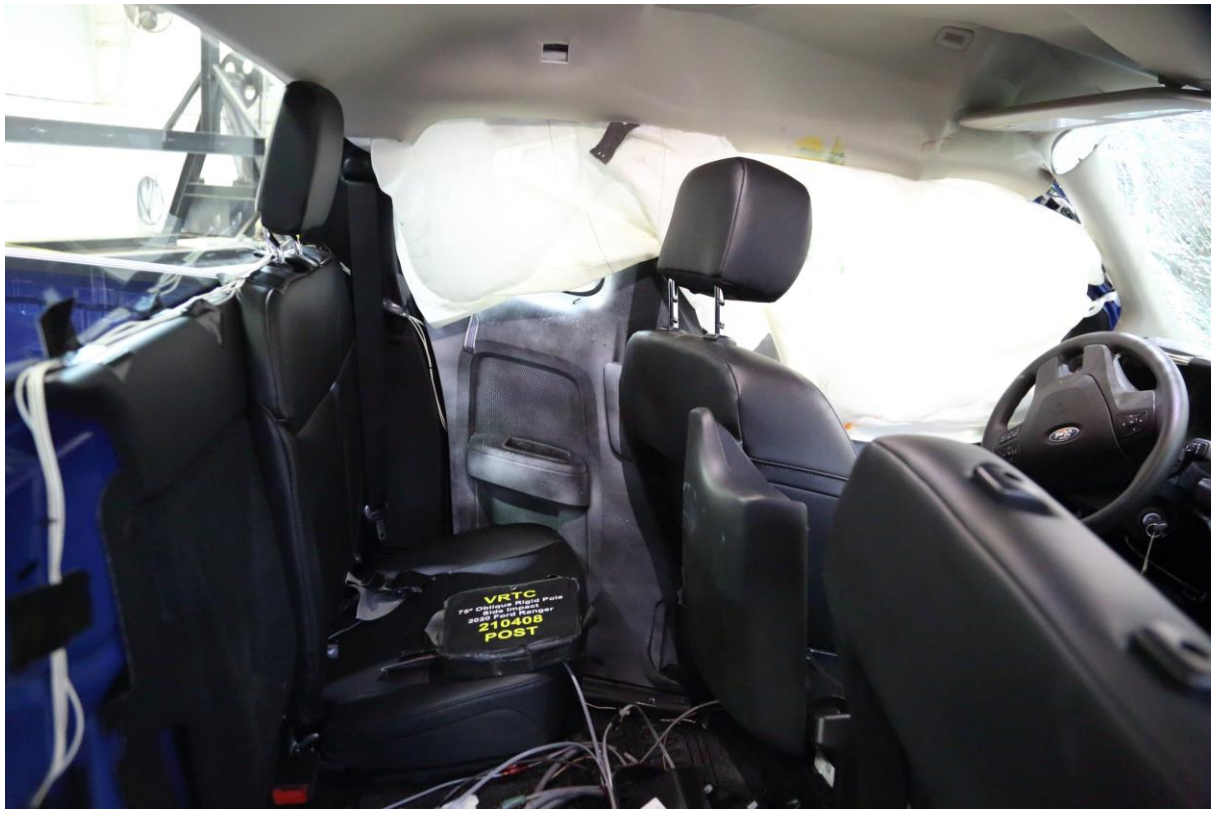
No. 048 Post-Test Dummy Close-Up Torso Contact with Vehicle Interior View

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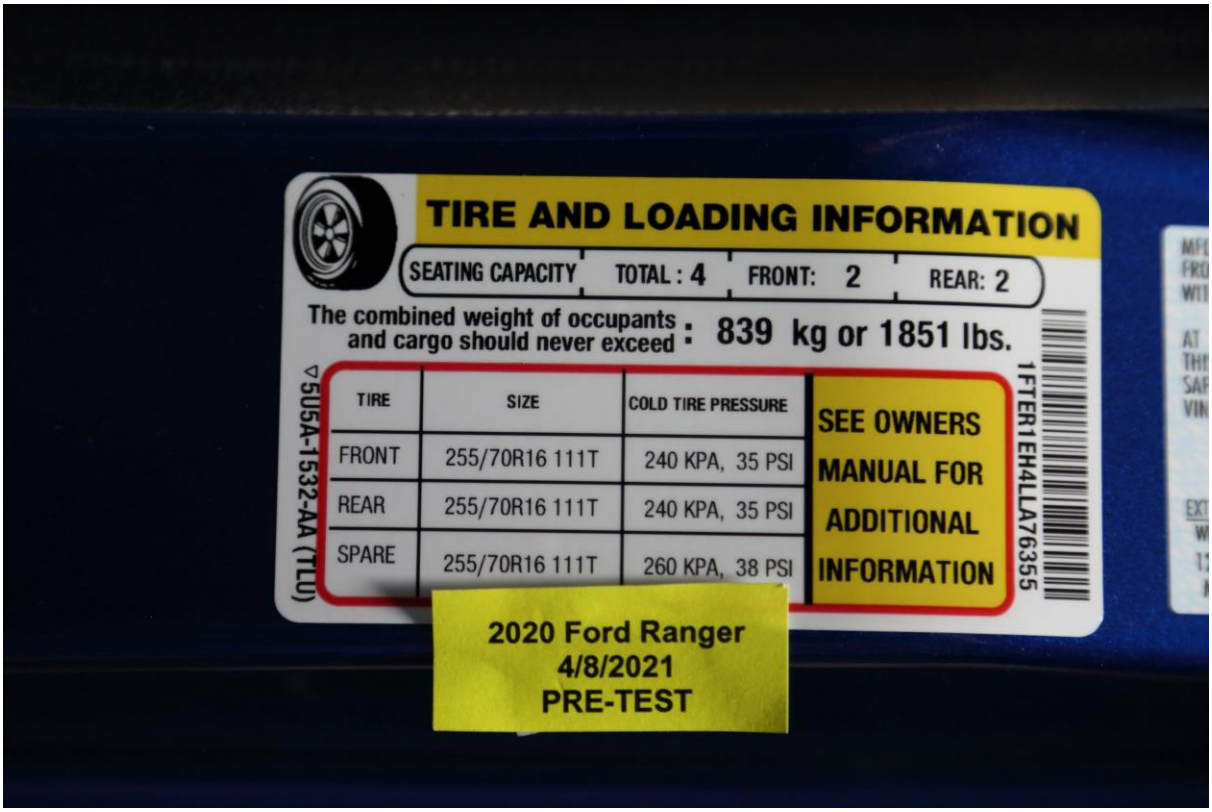
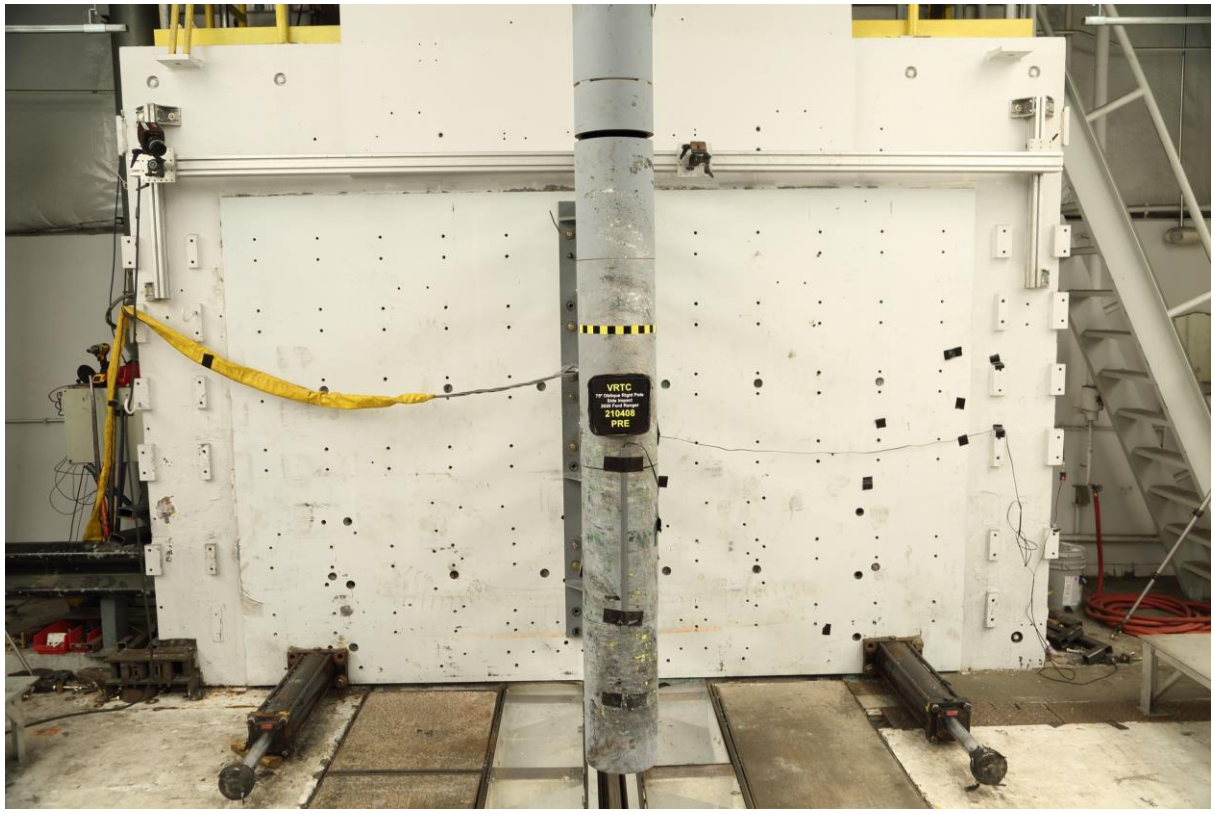
No. 054 Pre-Test View of Fuel Filler Cap or Fuel Filler Neck

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

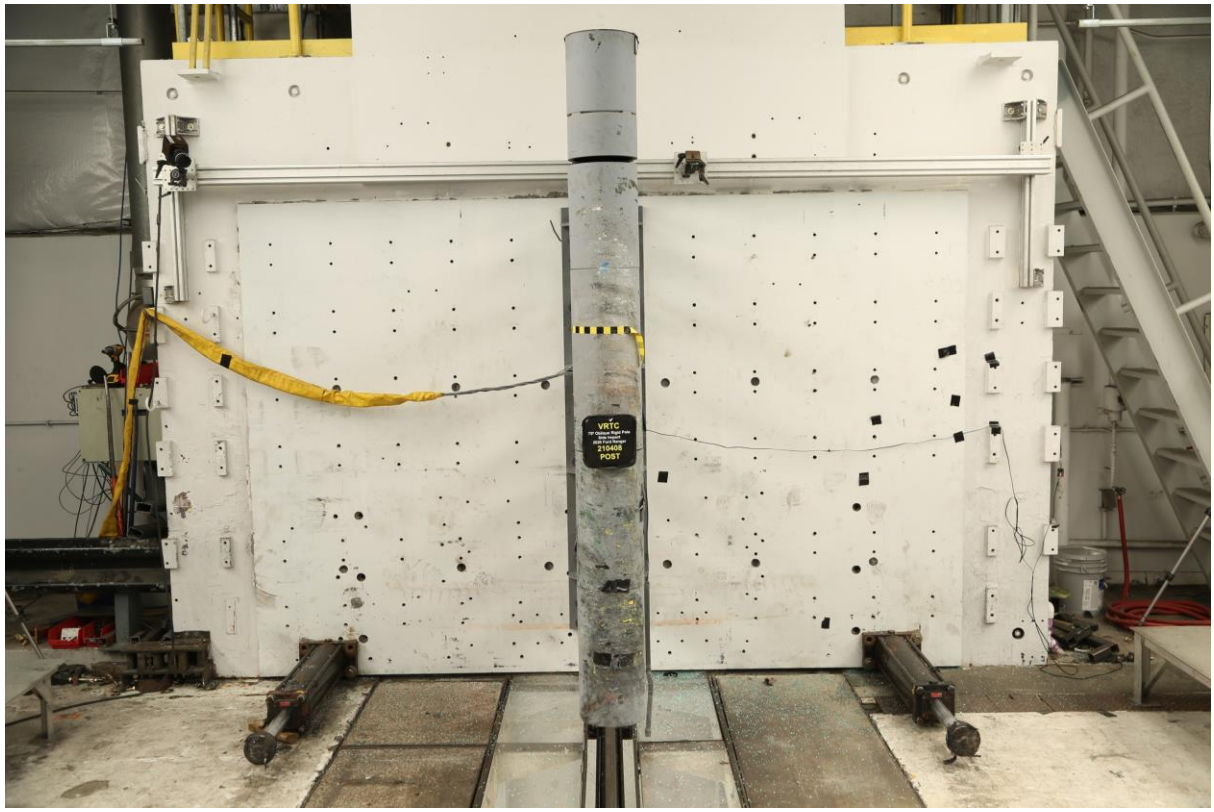
No. 056 Close-Up View of Vehicle Certification Label



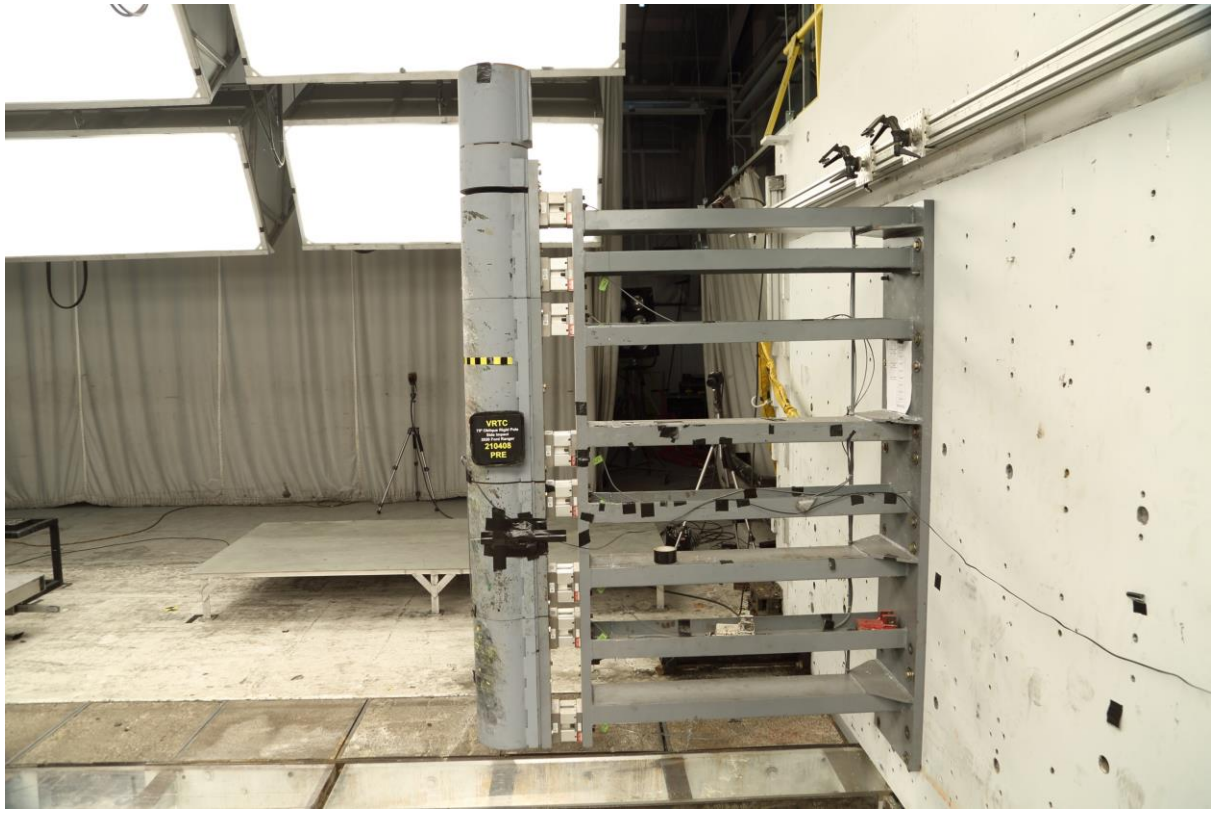
No. 057 Close-Up View of Vehicle Tire Information Placard or Label



No. 058 Pre-Test Pole Barrier Front View

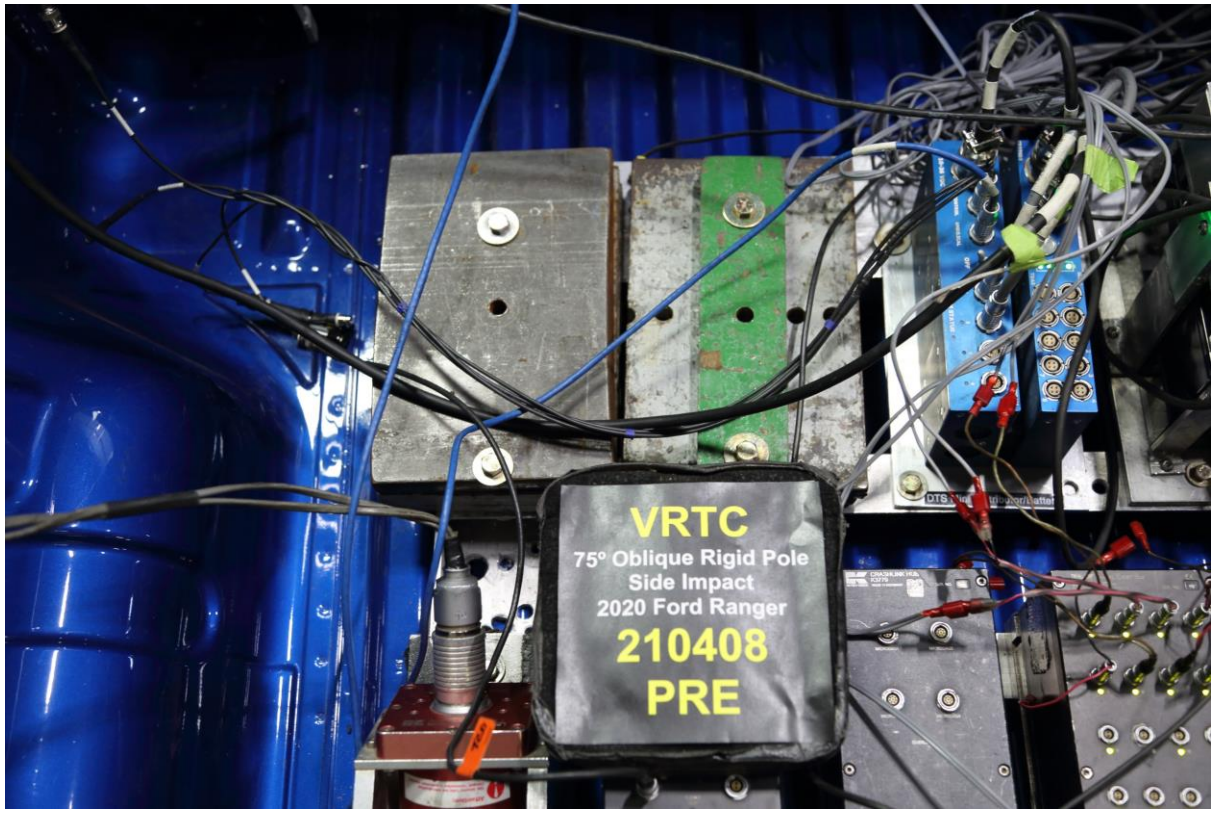


No. 059 Post-Test Pole Barrier Front View

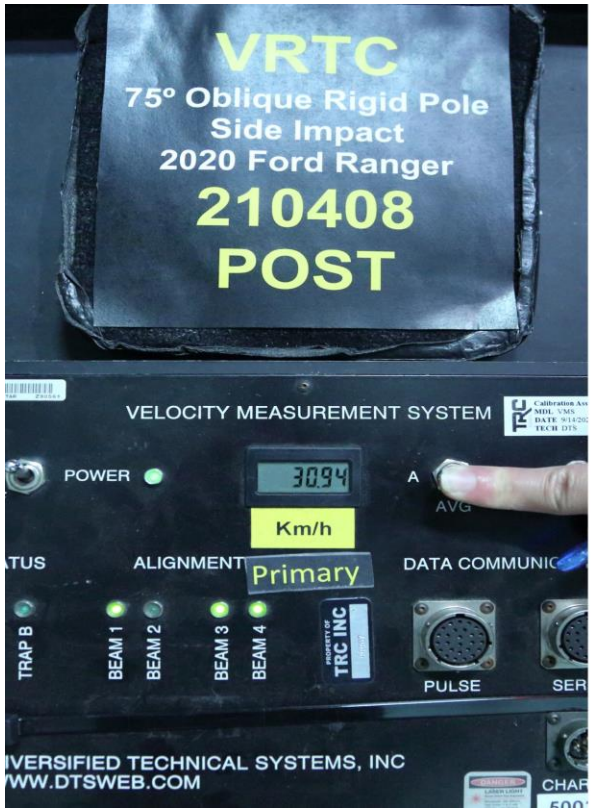


No. 060 Pre-Test Pole Barrier Side View

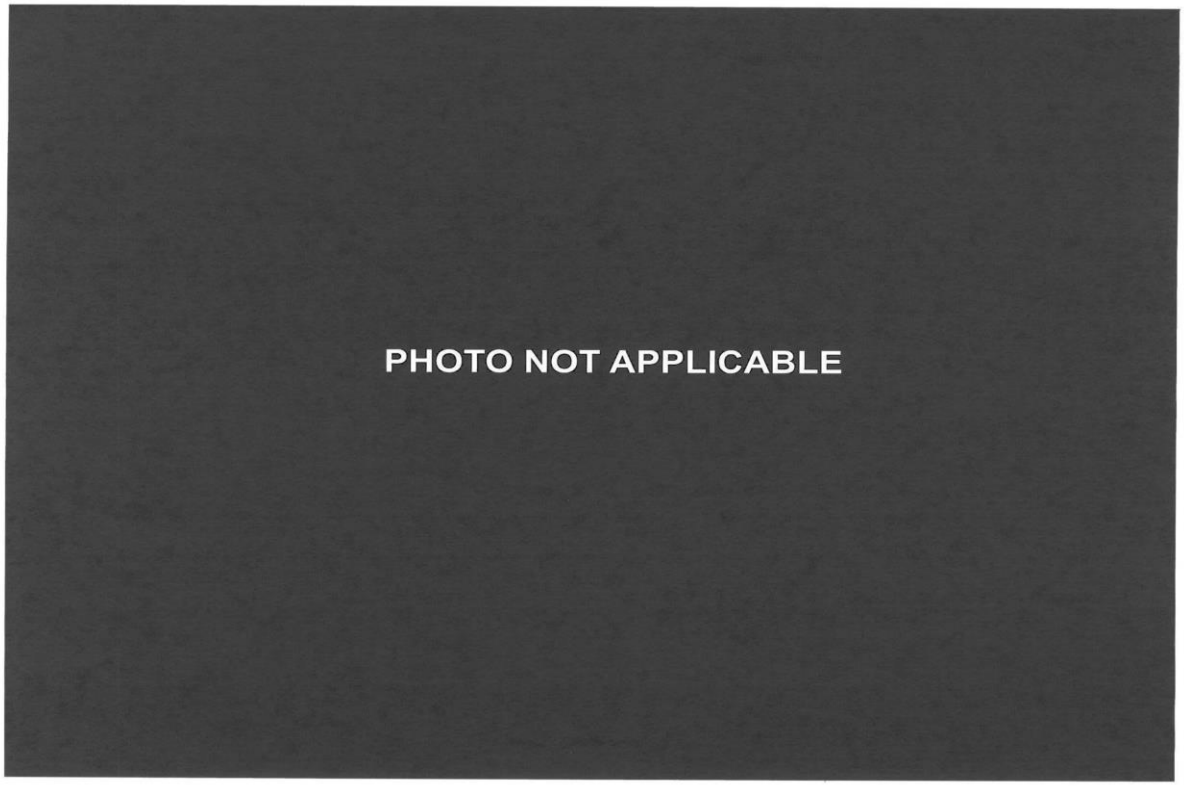
No. 061 Post-Test Pole Barrier Side View



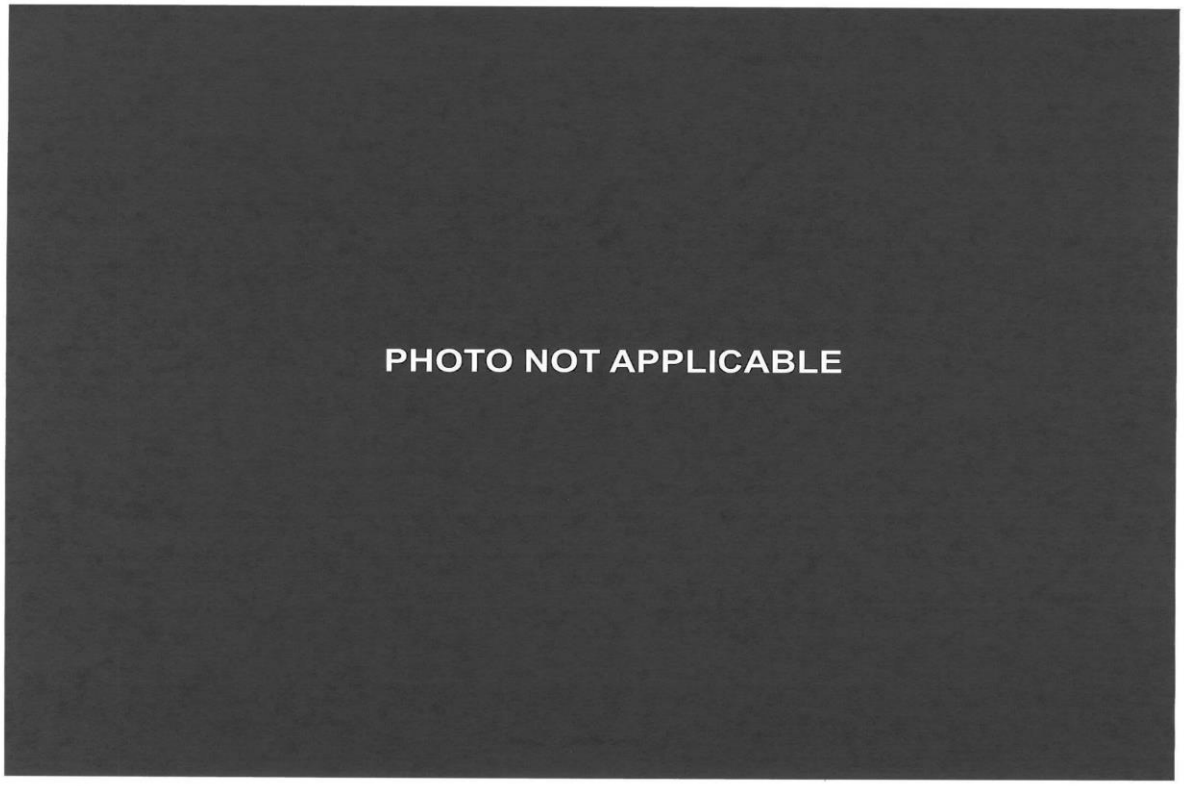
No. 062 Pre-Test Ballast View



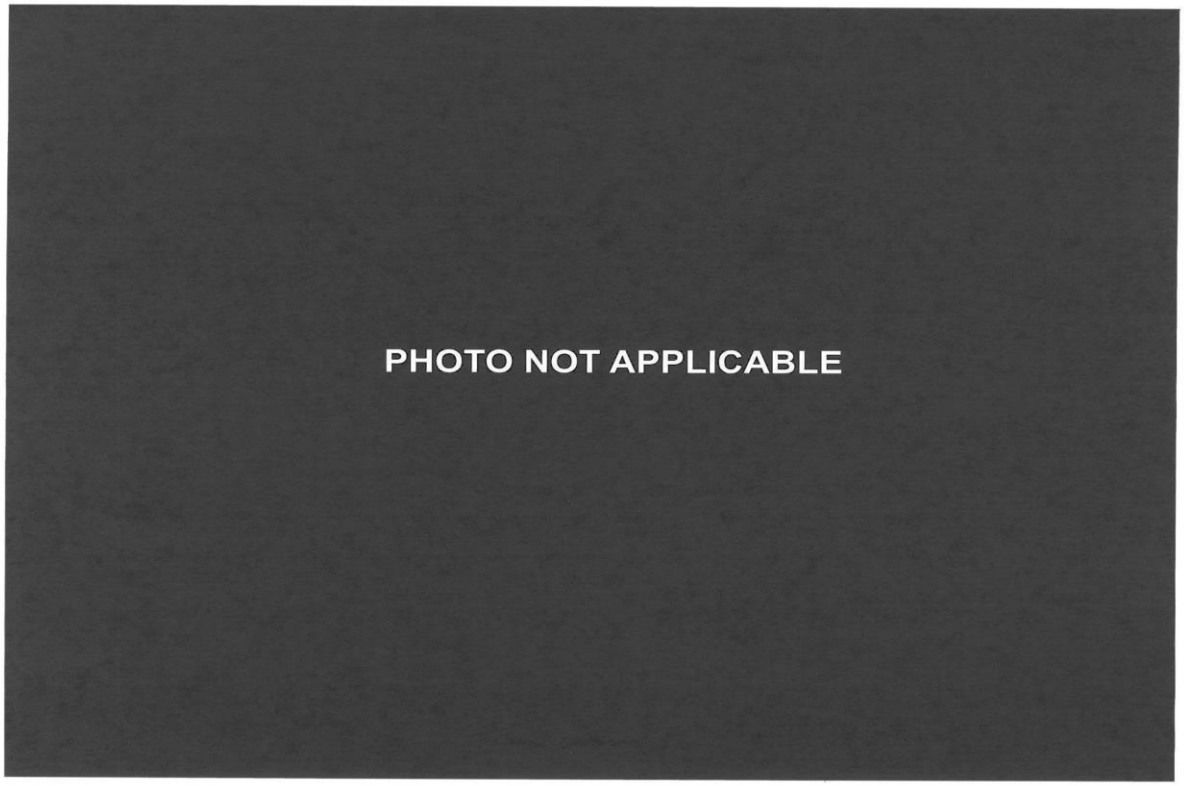
No. 063 Post-Test Primary and Redundant Speed Trap Read Out



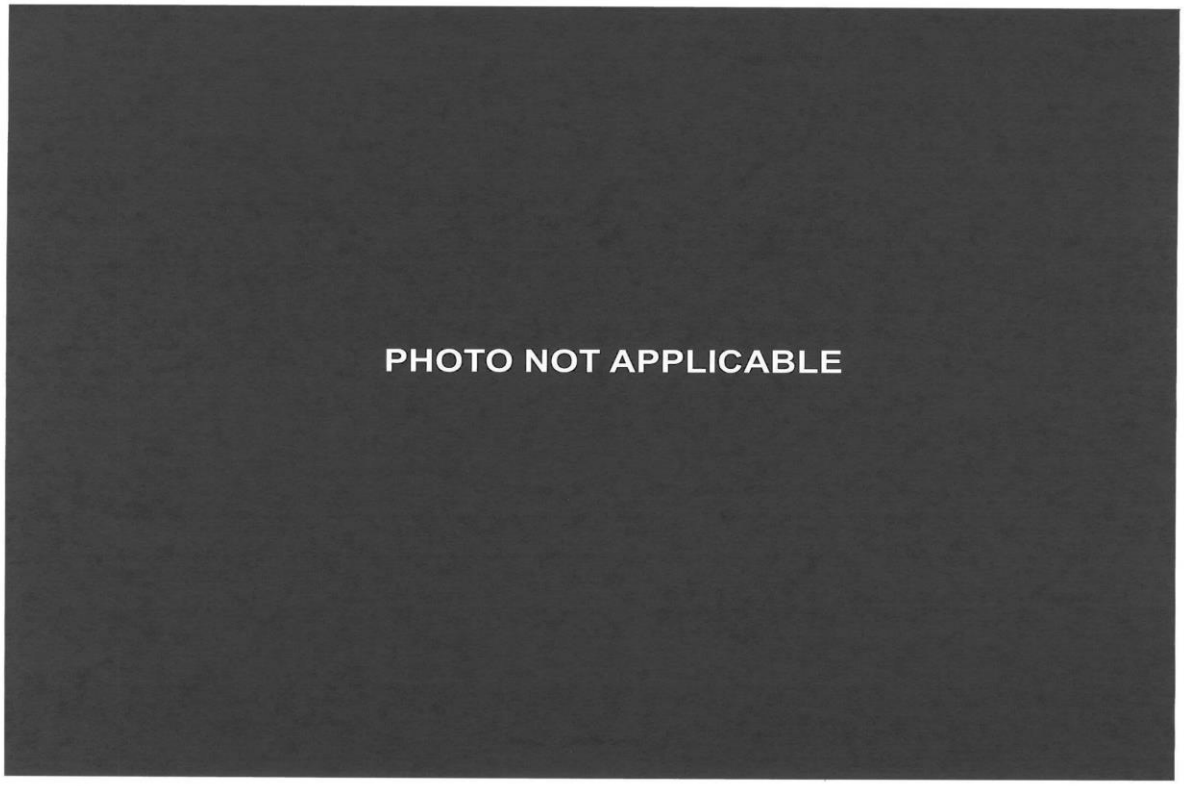
No. 064 FMVSS No. 301 Static Rollover 0 Degrees



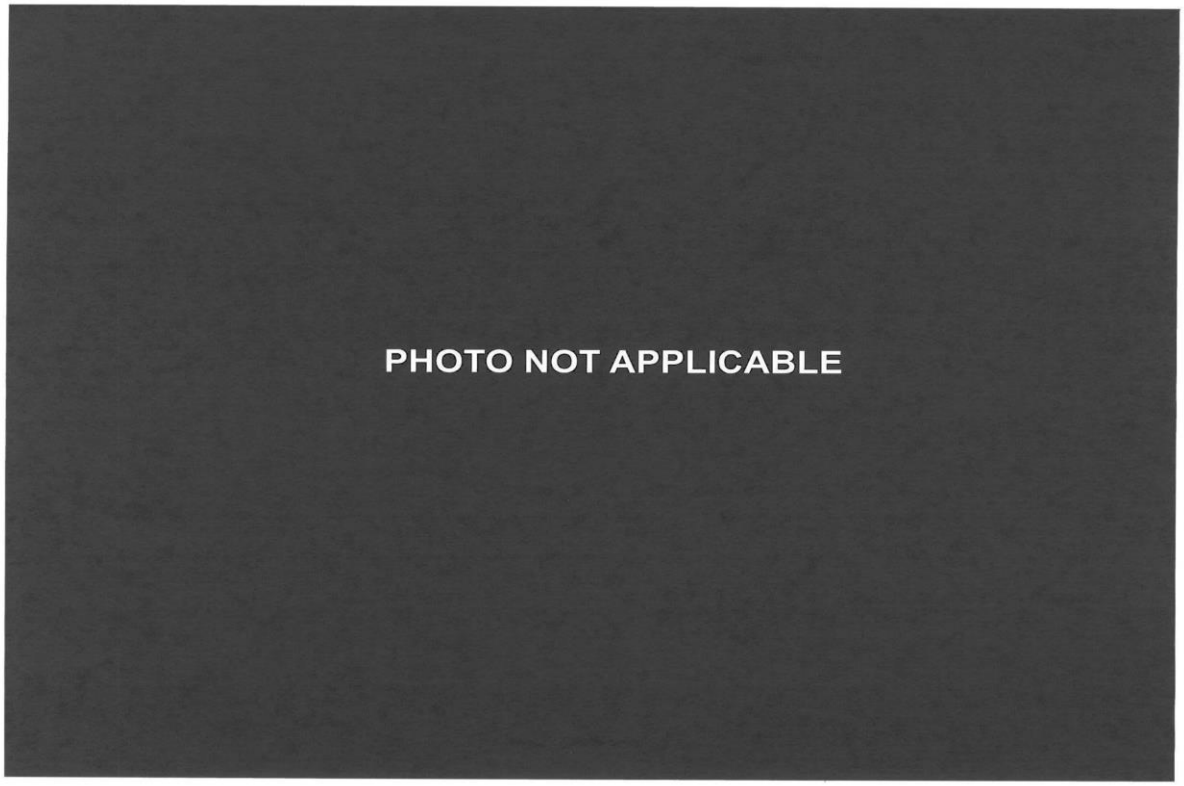
No. 065 FMVSS No. 301 Static Rollover 90 Degrees



No. 066 FMVSS No. 301 Static Rollover 180 Degrees

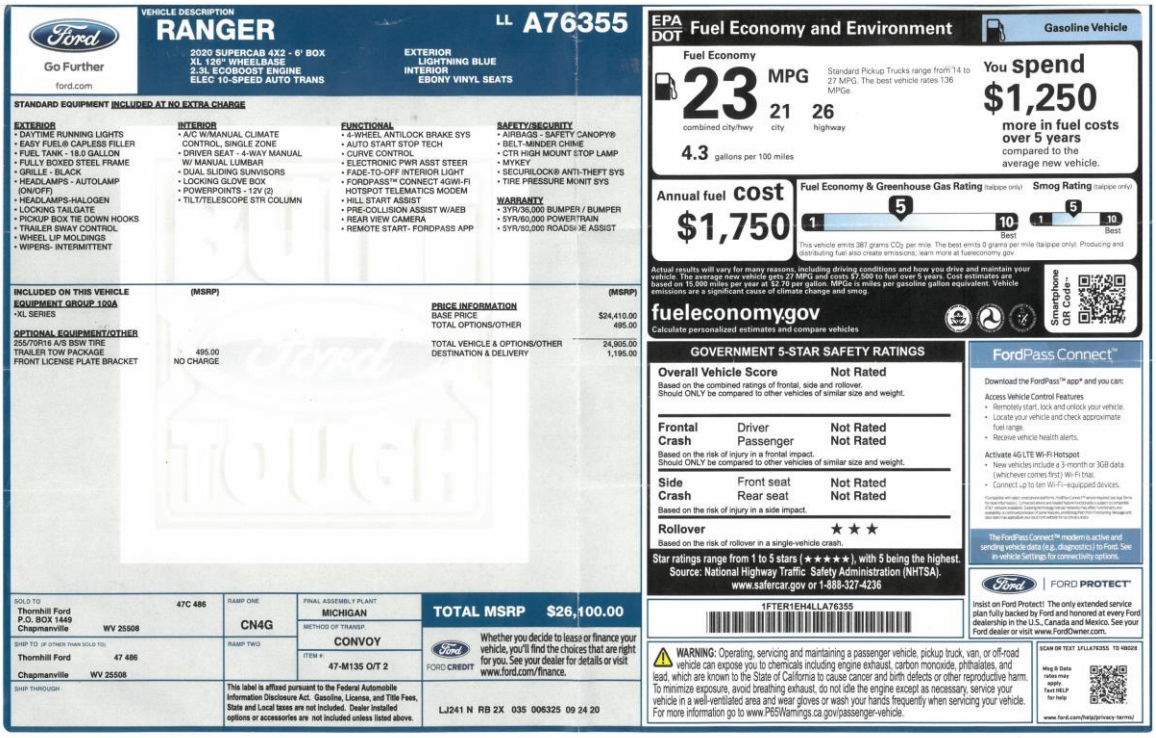


No. 067 FMVSS No. 301 Static Rollover 270 Degrees



No. 068 FMVSS No. 301 Static Rollover 360 Degrees

No. 069 Impact Event



VEHICLE DESCRIPTION
RANGER
LL A76355
2020 SUPERCAB 4X2 - 6' BOX
XL 126" WHEELBASE
2.3L ECOBOOST ENGINE
ELEC 10-SPEED AUTO TRANS
EXTERIOR LIGHTNING BLUE
INTERIOR EBONY VINYL SEATS

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR
• DAYTIME RUNNING LIGHTS
• EASY FUEL® CAPLESS FILLER
• FUEL TANK - 18.0 GALLON
• FULLY BOXED STEEL FRAME
• GRILLE - BLACK
• HEADLAMPS - AUTOLAMP (ON/OFF)
• HEADLAMPS-HALOGEN
• LOCKING TAILGATE
• PICKUP BOX TIE DOWN HOOKS
• TRAILER SWAY CONTROL
• WHEEL LIP MOLDINGS
• WIPERS- INTERMITTENT

INTERIOR
• A/C W/MANUAL CLIMATE CONTROL, SINGLE ZONE
• DRIVER SEAT - 4-WAY MANUAL W/ MANUAL LUMBAR
• DUAL SLIDING SUNVISORS
• LOCKING GLOVE BOX
• POWERPOINTS - 12V (2)
• TILT/TELESCOPE STR COLUMN

FUNCTIONAL
• 4-WHEEL ANTILOCK BRAKE SYS
• AUTO START STOP TECH
• CURVE CONTROL
• ELECTRONIC PWR ASST STEER
• FADE-TO-OFF INTERIOR LIGHT
• FORDPASS™ CONNECT 4GWi-Fi HOTSPOT TELEMATICS MODEM
• HILL START ASSIST
• PRE-COLLISION ASSIST W/AEB
• REAR VIEW CAMERA
• REMOTE START- FORDPASS APP

SAFETY/SECURITY
• AIRBAGS - SAFETY CANOPY®
• BELT-MINDER CHIME
• CTR HIGH MOUNT STOP LAMP
• MYKEY
• SECURILOCK® ANTI-THEFT SYS
• TIRE PRESSURE MONIT SYS

WARRANTY
• 3YR/36,000 BUMPER / BUMPER
• 5YR/60,000 POWERTRAIN
• 5YR/60,000 ROADSIDE ASSIST

INCLUDED ON THIS VEHICLE
EQUIPMENT GROUP 100A (MSRP)
•XL SERIES

OPTIONAL EQUIPMENT/OTHER
255/70R16 A/S BSW TIRE 495.00
TRAILER TOW PACKAGE NO CHARGE
FRONT LICENSE PLATE BRACKET

PRICE INFORMATION (MSRP)
BASE PRICE $24,410.00
TOTAL OPTIONS/OTHER 495.00
TOTAL VEHICLE & OPTIONS/OTHER 24,905.00
DESTINATION & DELIVERY 1,195.00

SOLD TO: Thornhill Ford, P.O. BOX 1449, Chapmanville WV 25508 — 47C 486
SHIP TO: Thornhill Ford, Chapmanville WV 25508 — 47 486
SHIP THROUGH
RAMP ONE: CN4G
RAMP TWO
FINAL ASSEMBLY PLANT: MICHIGAN
METHOD OF TRANSP: CONVOY
ITEM #: 47-M135 O/T 2

TOTAL MSRP $26,100.00

FORD CREDIT Whether you decide to lease or finance your vehicle, you'll find the choices that are right for you. See your dealer for details or visit www.ford.com/finance.

This label is affixed pursuant to the Federal Automobile Information Disclosure Act. Gasoline, License, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above.

LJ241 N RB 2X 035 006325 09 24 20

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EPA DOT Fuel Economy and Environment — Gasoline Vehicle

Fuel Economy
23 MPG combined city/hwy (21 city, 26 highway)
Standard Pickup Trucks range from 14 to 27 MPG. The best vehicle rates 136 MPGe.
4.3 gallons per 100 miles

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

Annual fuel cost $1,750

Fuel Economy & Greenhouse Gas Rating (tailpipe only) 5 (1 – 10 Best)
Smog Rating (tailpipe only) 5 (1 – 10 Best)
This vehicle emits 387 grams CO_2 per mile. The best emits 0 grams per mile (tailpipe only). Producing and distributing fuel also create emissions; learn more at fueleconomy.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 $7,500 to fuel over 5 years. Cost estimates are based on 15,000 miles per year at $2.70 per gallon. MPGe is miles per gasoline gallon equivalent. Vehicle emissions are a significant cause of climate change and smog.

fueleconomy.gov
Calculate personalized estimates and compare vehicles

Smartphone QR Code -

GOVERNMENT 5-STAR SAFETY RATINGS

Overall Vehicle Score: Not Rated
Based on the combined ratings of frontal, side and rollover. Should ONLY be compared to other vehicles of similar size and weight.

Frontal Crash — Driver: Not Rated; Passenger: Not Rated
Based on the risk of injury in a frontal impact. Should ONLY be compared to other vehicles of similar size and weight.

Side Crash — Front seat: Not Rated; Rear seat: Not Rated
Based on the risk of injury in a side impact.

Rollover: ★★★
Based on the risk of rollover in a single-vehicle crash.

Star ratings range from 1 to 5 stars (★★★★★), with 5 being the highest. Source: National Highway Traffic Safety Administration (NHTSA). www.safercar.gov or 1-888-327-4236

1FTER1EH4LLA76355

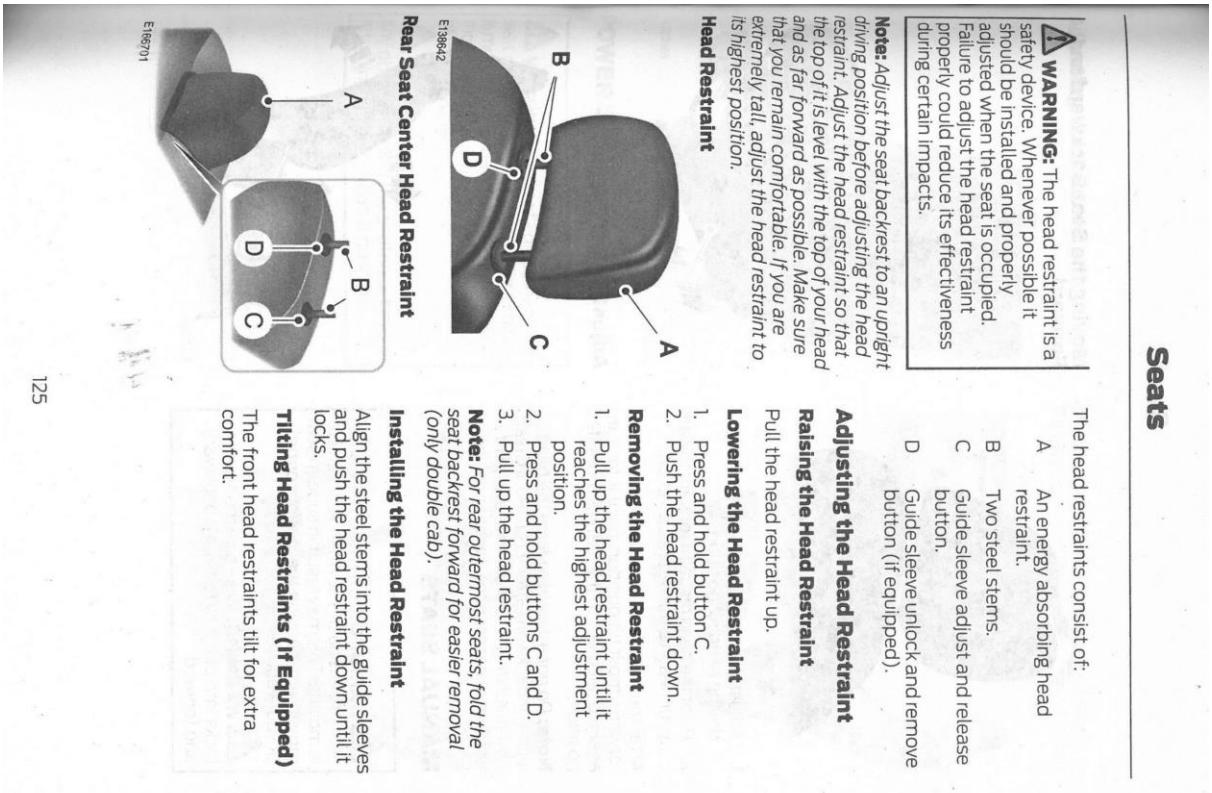
WARNING: Operating, servicing and maintaining a passenger vehicle, pickup truck, van, or off-road vehicle can expose you to chemicals including engine exhaust, carbon monoxide, phthalates, and lead, which are known to the State of California to cause cancer and birth defects or other reproductive harm. To minimize exposure, avoid breathing exhaust, do not idle the engine except as necessary, service your vehicle in a well-ventilated area and wear gloves or wash your hands frequently when servicing your vehicle. For more information go to www.P65Warnings.ca.gov/passenger-vehicle.

FordPass Connect™
Download the FordPass™ app* and you can:
Access Vehicle Control Features
• Remotely start, lock and unlock your vehicle.
• Locate your vehicle and check approximate fuel range.
• Receive vehicle health alerts.
Activate 4G LTE Wi-Fi Hotspot
• New vehicles include a 3-month or 3GB data (whichever comes first) Wi-Fi trial.
• Connect up to ten Wi-Fi-equipped devices.
The FordPass Connect™ modem is active and sending vehicle data (e.g., diagnostics) to Ford. See in-vehicle Settings for connectivity options.

FORD PROTECT
Insist on Ford Protect! The only extended service plan fully backed by Ford and honored at every Ford dealership in the U.S., Canada and Mexico. See your Ford dealer or visit www.FordOwner.com.

SCAN OR TEXT 1FLLA76355 TO 48026
Msg & Data rates may apply. Text HELP for help
www.ford.com/help/privacy-terms/

No. 70 Monroney Label



Seats

The head restraints consist of:
A An energy absorbing head restraint.
B Two steel stems.
C Guide sleeve adjust and release button.
D Guide sleeve unlock and remove button (if equipped).

Adjusting the Head Restraint

Raising the Head Restraint
Pull the head restraint up.

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

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

Note: *For rear outermost seats, fold the seat backrest forward for easier removal (only double cab).*

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

Tilting Head Restraints (If Equipped)
The front head restraints tilt for extra comfort.

WARNING: The head restraint is a safety device. Whenever possible it should be installed and properly adjusted when the seat is occupied. Failure to adjust the head restraint properly could reduce its effectiveness during certain impacts.

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

Head Restraint

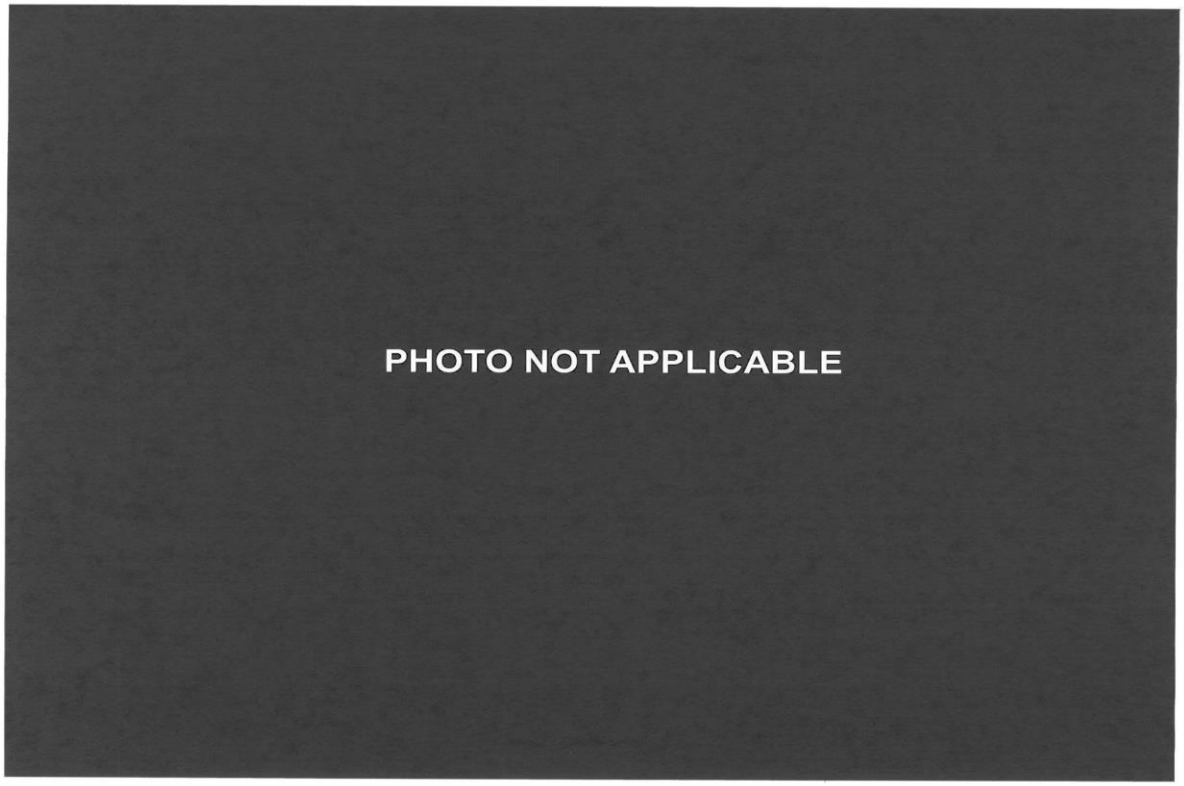
E138642

Rear Seat Center Head Restraint

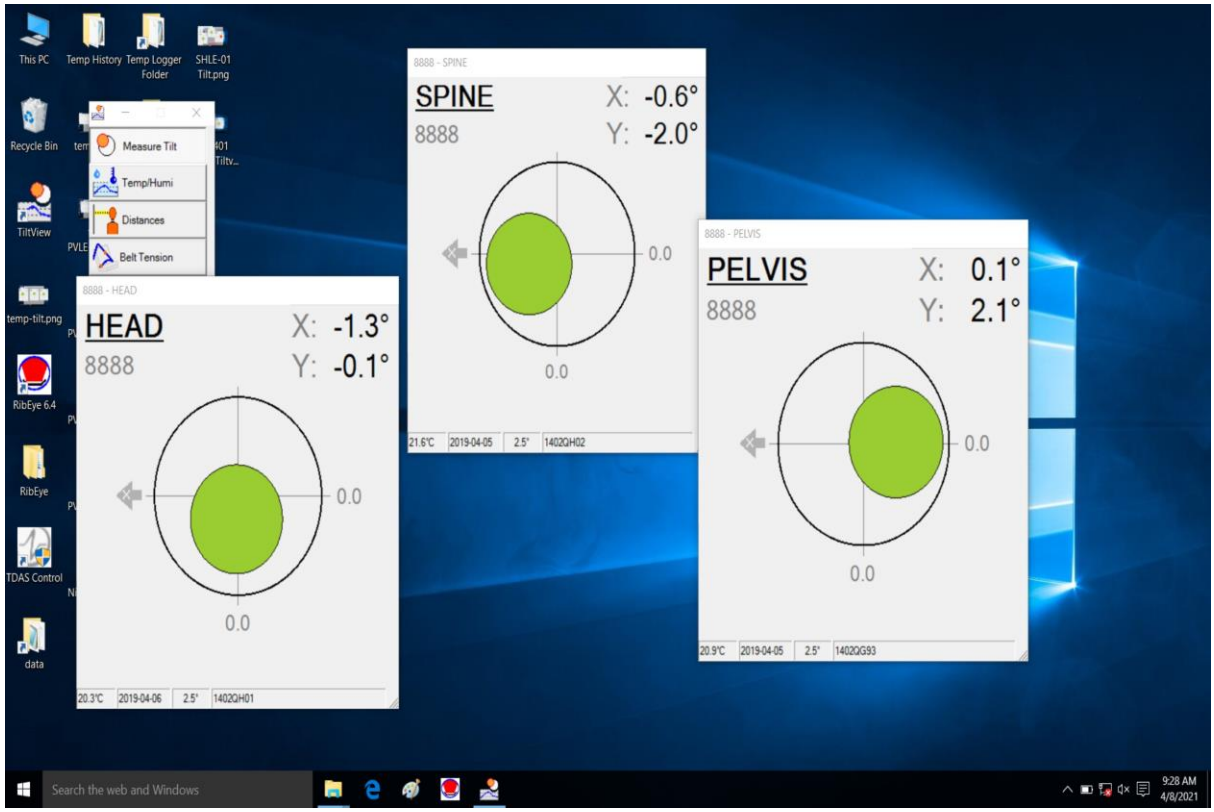
E168701

125

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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VRTC

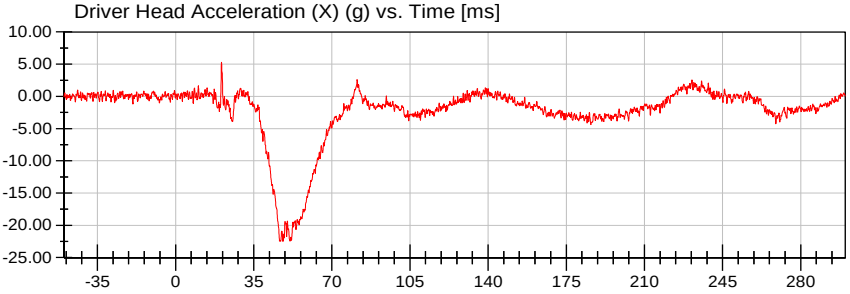
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Head Acceleration (X) (g) vs. Time [ms]



<Max>

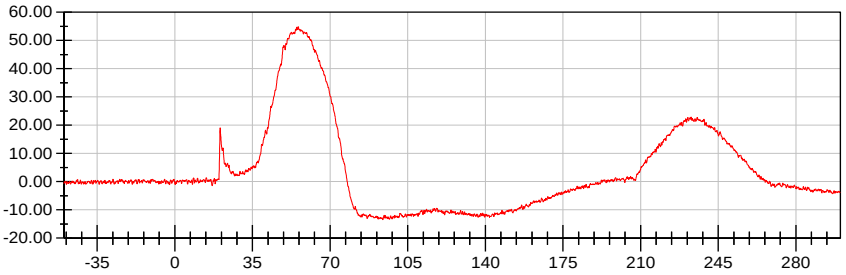
5.28 g at 20.60 ms

<Min>

-22.51 g at 48.10 ms

CFC_1000

Driver Head Acceleration (Y) (g) vs. Time [ms]



<Max>

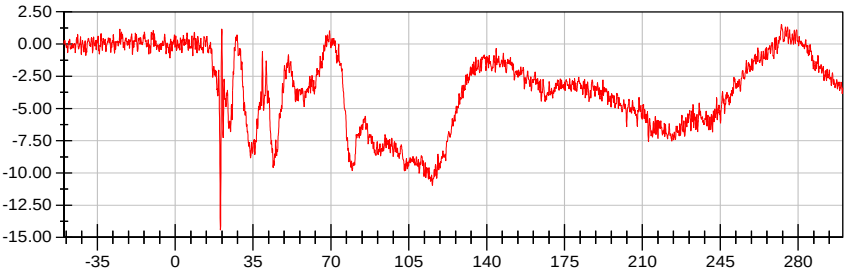
54.95 g at 55.60 ms

<Min>

-13.44 g at 93.75 ms

CFC_1000

Driver Head Acceleration (Z) (g) vs. Time [ms]



<Max>

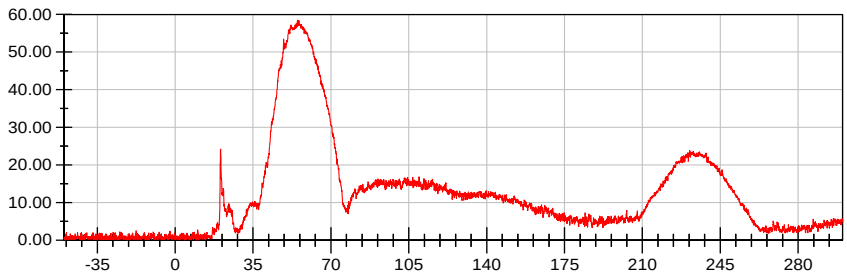
1.53 g at 272.50 ms

<Min>

-14.42 g at 20.35 ms

CFC_1000

Driver Head Acceleration Resultant (g) vs. Time [ms]



<Max>

58.50 g at 55.05 ms

<Min>

0.08 g at -42.70 ms

Prefiltered_> CFC 1000

VRTC

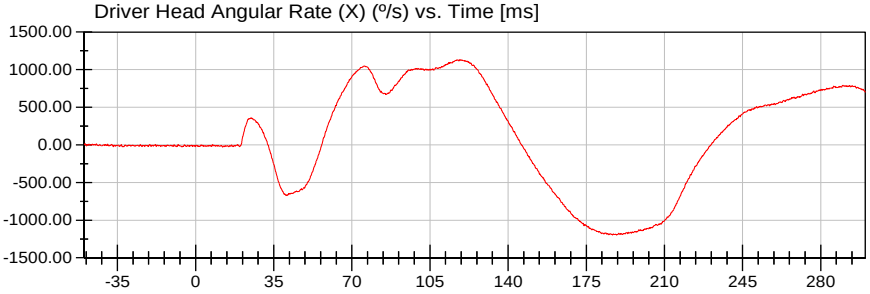
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Head Angular Rate (X) (º/s) vs. Time [ms]



<Max>

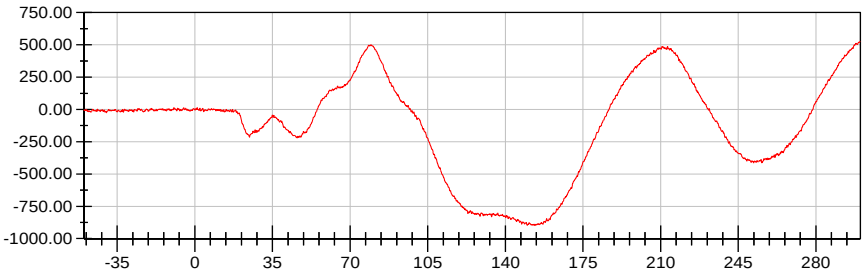
1,132.89 º/s at 118.30 ms

<Min>

-1,195.83 º/s at 188.55 ms

CFC_1000

Driver Head Angular Rate (Y) (º/s) vs. Time [ms]



<Max>

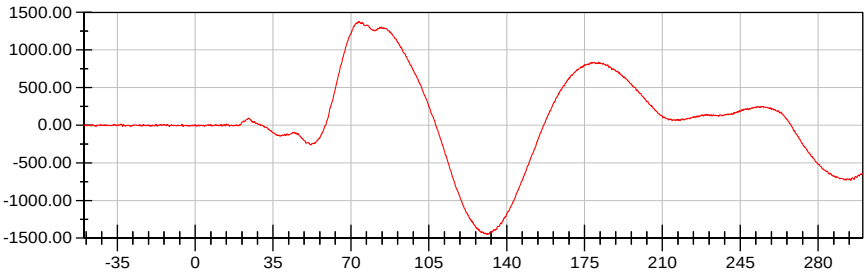
524.85 º/s at 299.90 ms

<Min>

-897.58 º/s at 153.35 ms

CFC_1000

Driver Head Angular Rate (Z) (º/s) vs. Time [ms]



<Max>

1,380.60 º/s at 73.55 ms

<Min>

-1,448.67 º/s at 131.50 ms

CFC_1000

VRTC

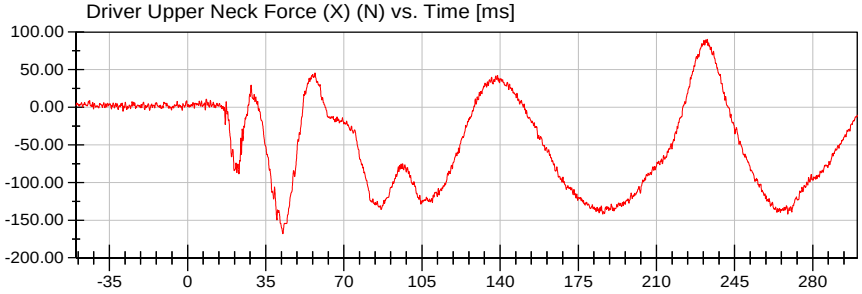
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Upper Neck Force (X) (N) vs. Time [ms]



<Max>

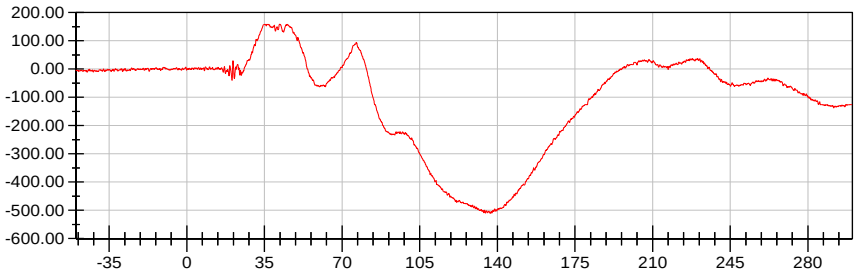
90.42 N at 232.75 ms

<Min>

-168.00 N at 42.70 ms

CFC_1000

Driver Upper Neck Force (Y) (N) vs. Time [ms]



<Max>

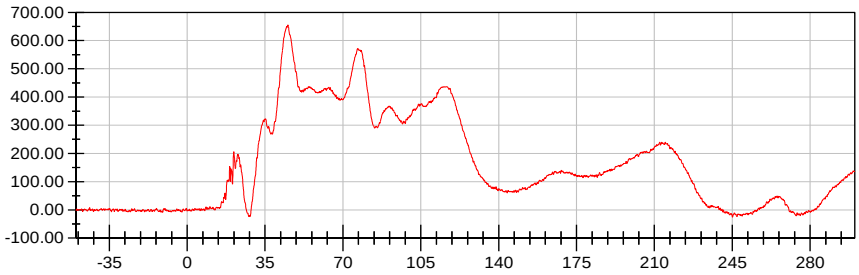
159.17 N at 41.75 ms

<Min>

-510.76 N at 136.90 ms

CFC_1000

Driver Upper Neck Force (Z) (N) vs. Time [ms]



<Max>

655.10 N at 45.25 ms

<Min>

-25.48 N at 245.10 ms

CFC_1000

VRTC

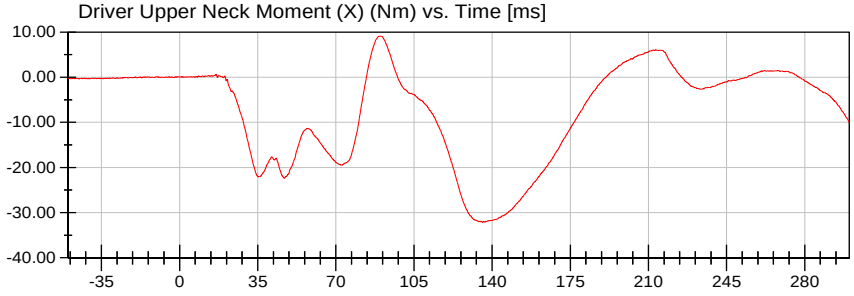
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Upper Neck Moment (X) (Nm) vs. Time [ms]



<Max>

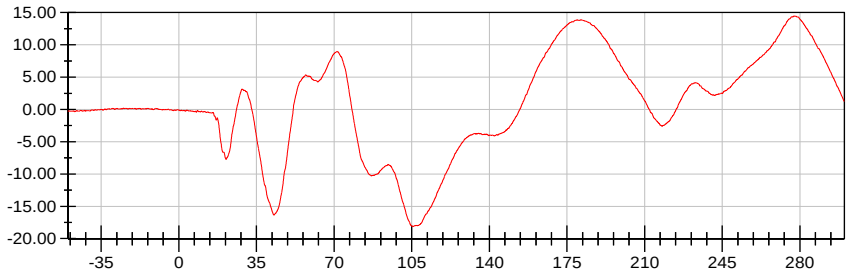
9.09 Nm at 89.55 ms

<Min>

-32.14 Nm at 135.70 ms

CFC_600

Driver Upper Neck Moment (Y) (Nm) vs. Time [ms]



<Max>

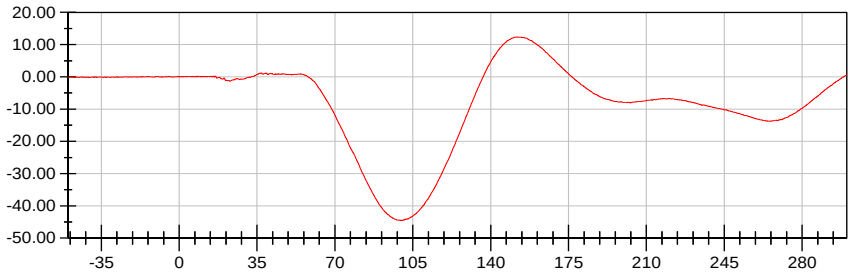
14.49 Nm at 277.45 ms

<Min>

-18.14 Nm at 105.55 ms

CFC_600

Driver Upper Neck Moment (Z) (Nm) vs. Time [ms]



<Max>

12.40 Nm at 151.85 ms

<Min>

-44.51 Nm at 100.20 ms

CFC_600

VRTC

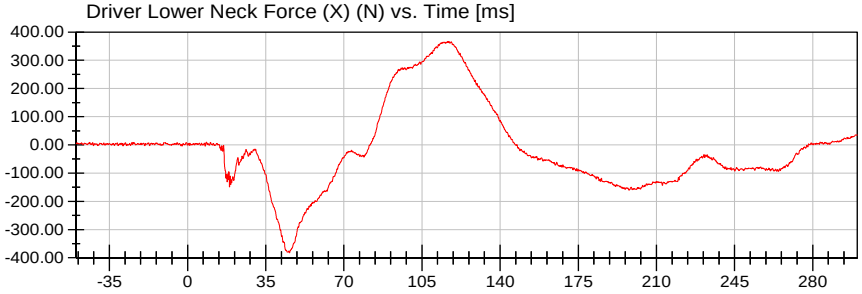
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Lower Neck Force (X) (N) vs. Time [ms]



<Max>

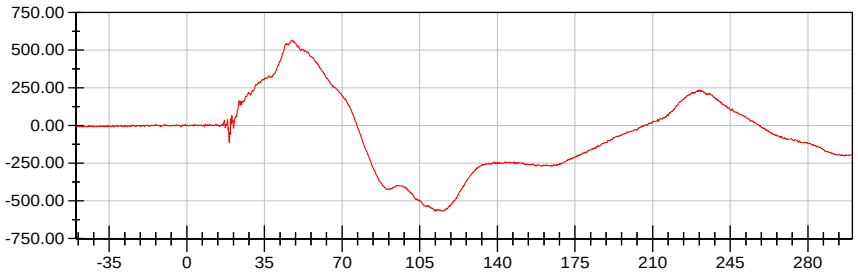
367.07 N at 117.05 ms

<Min>

-382.09 N at 45.65 ms

CFC_1000

Driver Lower Neck Force (Y) (N) vs. Time [ms]



<Max>

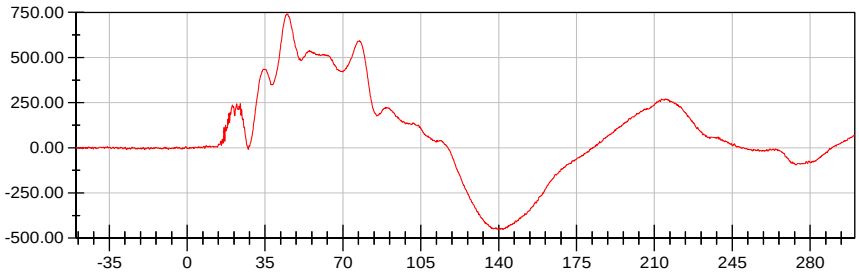
566.77 N at 47.65 ms

<Min>

-568.12 N at 115.60 ms

CFC_1000

Driver Lower Neck Force (Z) (N) vs. Time [ms]



<Max>

740.17 N at 44.75 ms

<Min>

-452.18 N at 139.75 ms

CFC_1000

VRTC

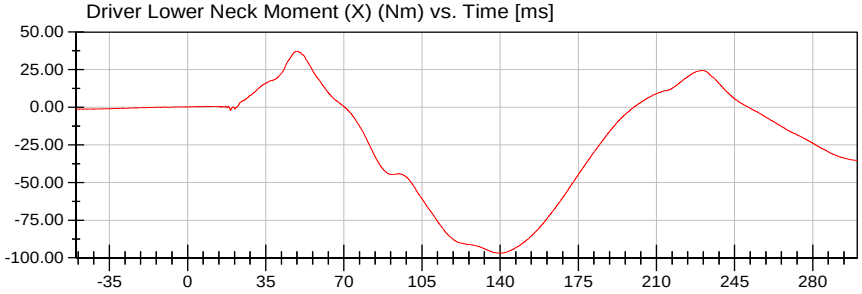
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Lower Neck Moment (X) (Nm) vs. Time [ms]



<Max>

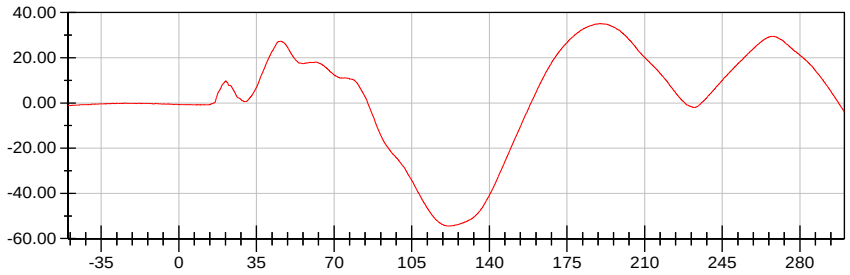
37.14 Nm at 49.00 ms

<Min>

-96.97 Nm at 139.70 ms

CFC_600

Driver Lower Neck Moment (Y) (Nm) vs. Time [ms]



<Max>

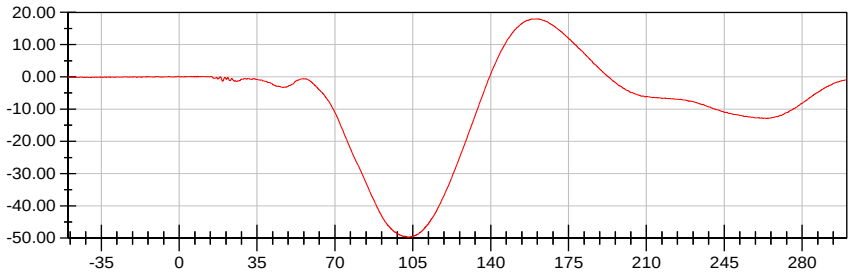
35.15 Nm at 189.80 ms

<Min>

-54.50 Nm at 121.65 ms

CFC_600

Driver Lower Neck Moment (Z) (Nm) vs. Time [ms]



<Max>

18.01 Nm at 160.60 ms

<Min>

-49.72 Nm at 103.10 ms

CFC_600

VRTC

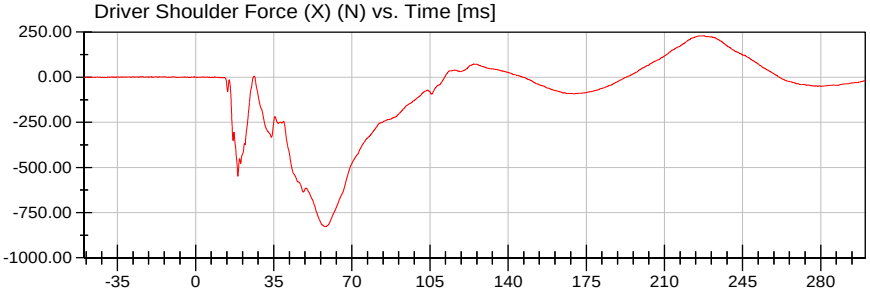
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Shoulder Force (X) (N) vs. Time [ms]



<Max>

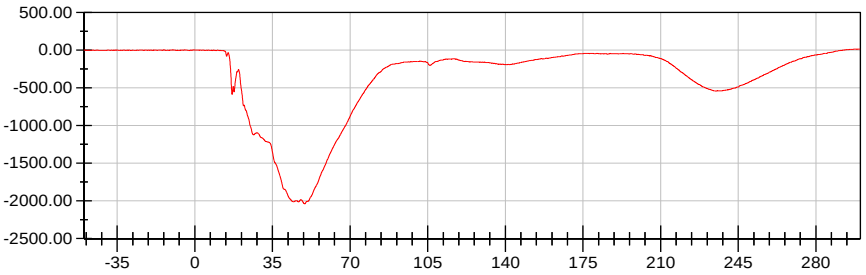
229.26 N at 227.75 ms

<Min>

-827.82 N at 58.00 ms

CFC_600

Driver Shoulder Force (Y) (N) vs. Time [ms]



<Max>

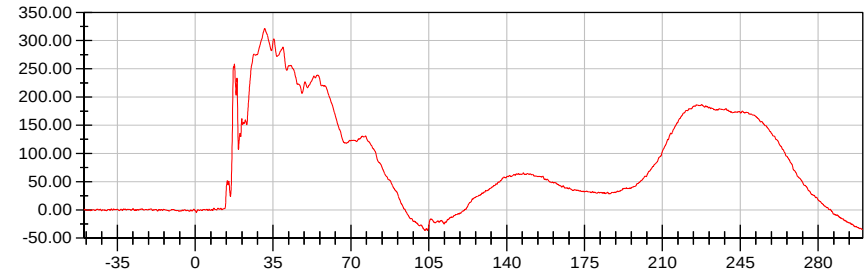
16.08 N at 297.95 ms

<Min>

-2,038.60 N at 49.55 ms

CFC_600

Driver Shoulder Force (Z) (N) vs. Time [ms]



<Max>

321.51 N at 31.30 ms

<Min>

-36.32 N at 103.30 ms

CFC_600

VRTC

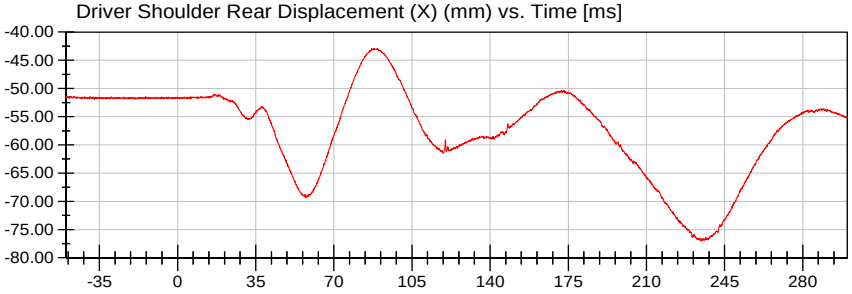
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

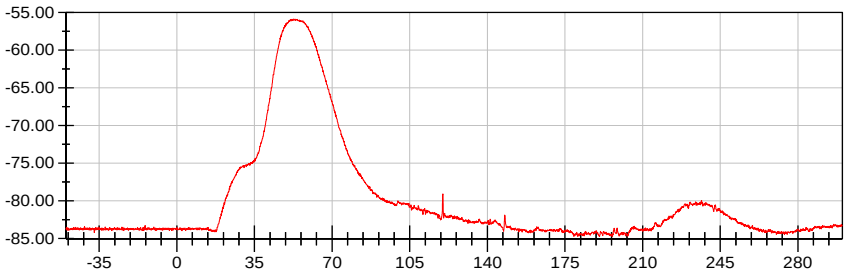
-42.90 mm at 88.00 ms

<Min>

-77.05 mm at 234.20 ms

Unfiltered

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



<Max>

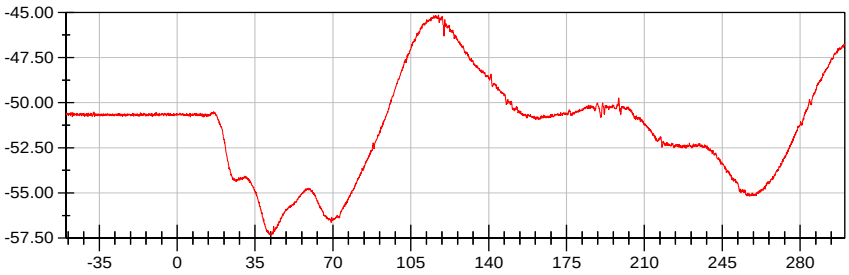
-55.84 mm at 53.25 ms

<Min>

-84.74 mm at 190.55 ms

Unfiltered

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



<Max>

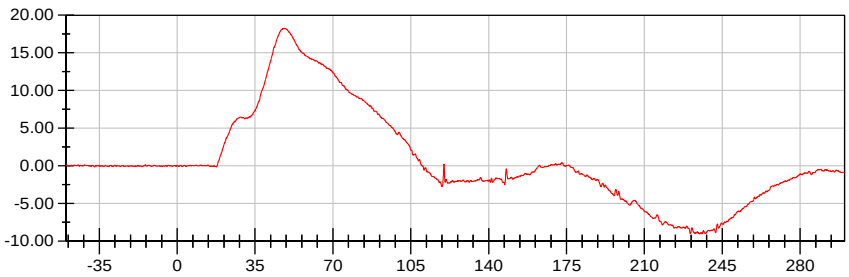
-45.15 mm at 117.45 ms

<Min>

-57.33 mm at 42.10 ms

Unfiltered

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



<Max>

18.27 mm at 48.40 ms

<Min>

-9.05 mm at 234.85 ms

CFC_600

VRTC

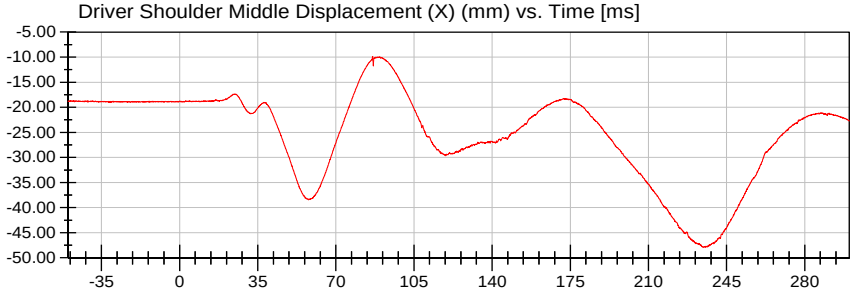
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

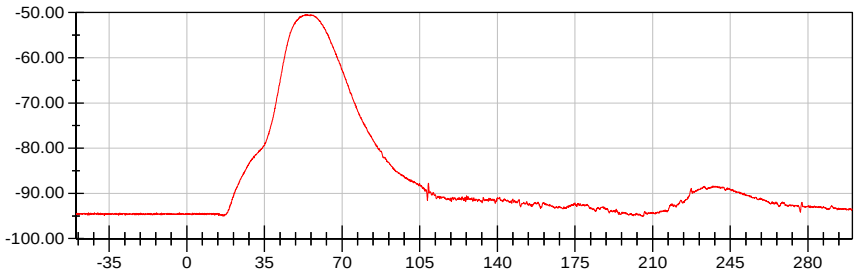
-9.90 mm at 86.50 ms

<Min>

-47.92 mm at 234.40 ms

Unfiltered

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



<Max>

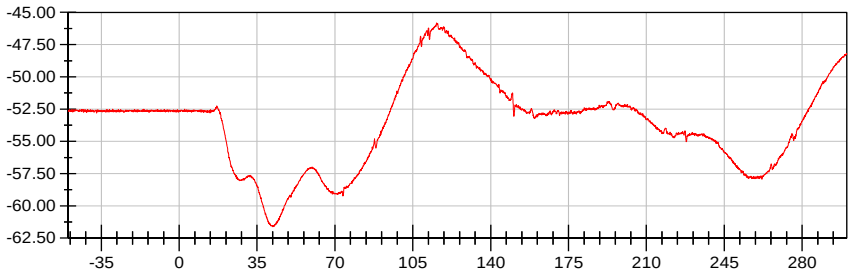
-50.46 mm at 54.30 ms

<Min>

-95.11 mm at 205.35 ms

Unfiltered

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



<Max>

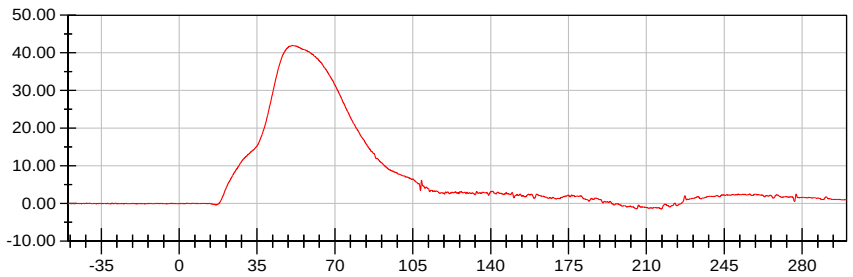
-45.82 mm at 115.70 ms

<Min>

-61.61 mm at 42.10 ms

Unfiltered

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



<Max>

41.99 mm at 51.10 ms

<Min>

-1.45 mm at 216.60 ms

CFC_600

VRTC

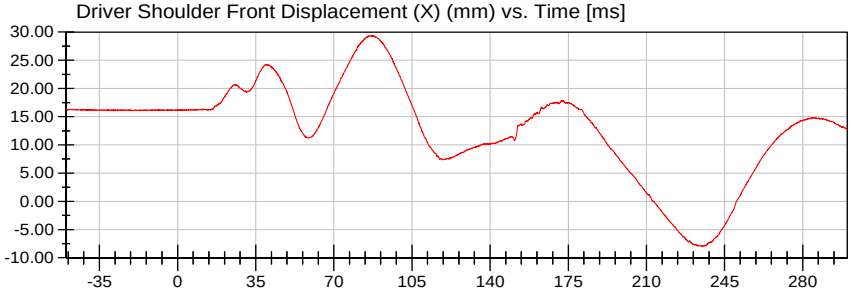
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

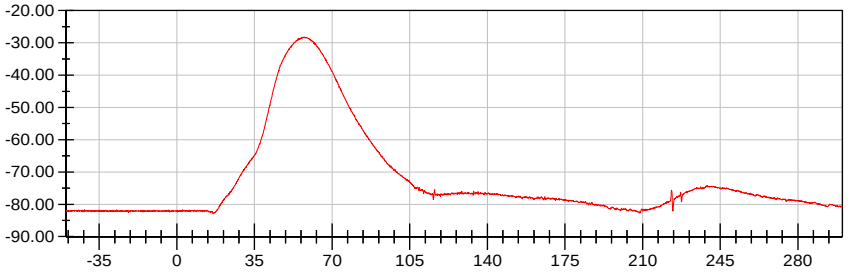
29.40 mm at 87.20 ms

<Min>

-7.97 mm at 235.35 ms

Unfiltered

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



<Max>

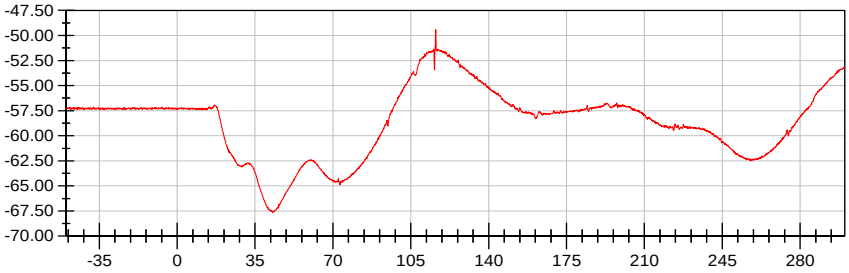
-28.23 mm at 57.65 ms

<Min>

-82.97 mm at 16.40 ms

Unfiltered

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



<Max>

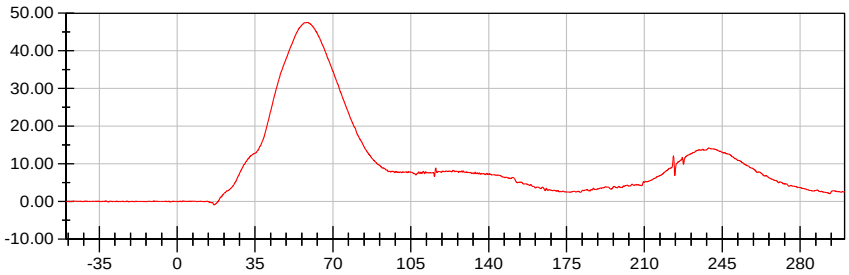
-49.41 mm at 116.25 ms

<Min>

-67.60 mm at 42.85 ms

Unfiltered

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



<Max>

47.52 mm at 58.40 ms

<Min>

-0.89 mm at 16.55 ms

CFC_600

VRTC

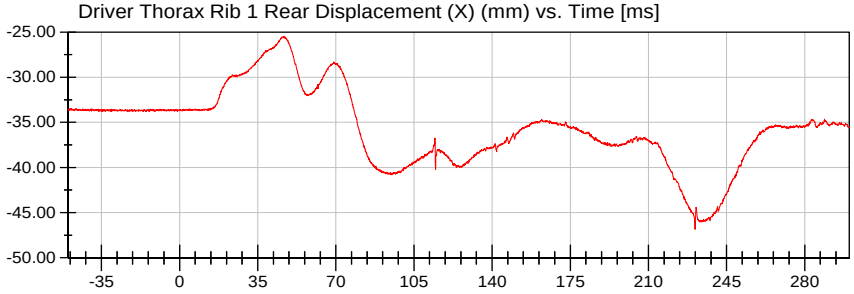
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Thorax Rib 1 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

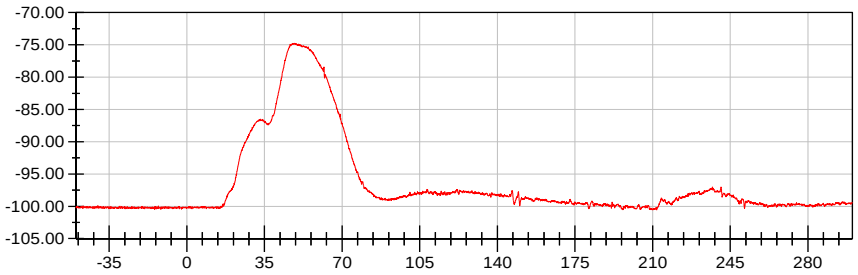
-25.49 mm at 46.50 ms

<Min>

-46.87 mm at 230.85 ms

Unfiltered

Driver Thorax Rib 1 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

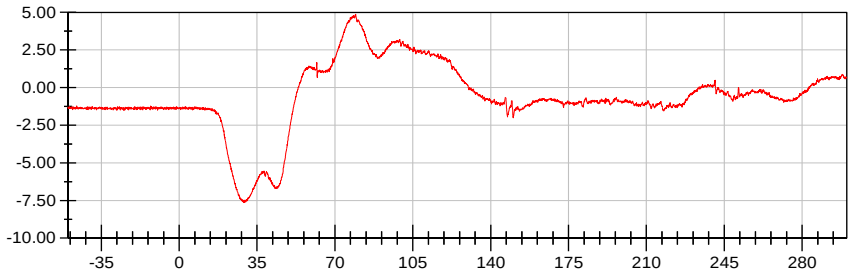
-74.73 mm at 48.60 ms

<Min>

-100.58 mm at 211.80 ms

Unfiltered

Driver Thorax Rib 1 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

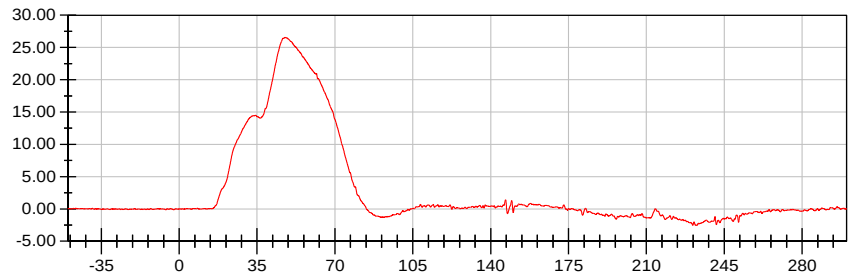
4.87 mm at 79.30 ms

<Min>

-7.64 mm at 29.10 ms

Unfiltered

Driver Thorax Rib 1 Rear Length Change (mm) vs. Time [ms]



<Max>

26.56 mm at 47.65 ms

<Min>

-2.53 mm at 232.05 ms

CFC_600

VRTC

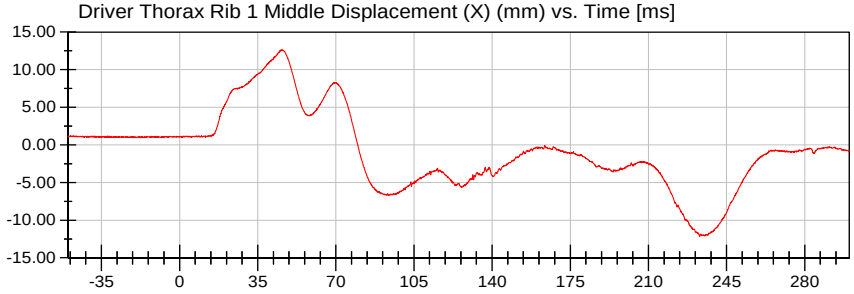
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Thorax Rib 1 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

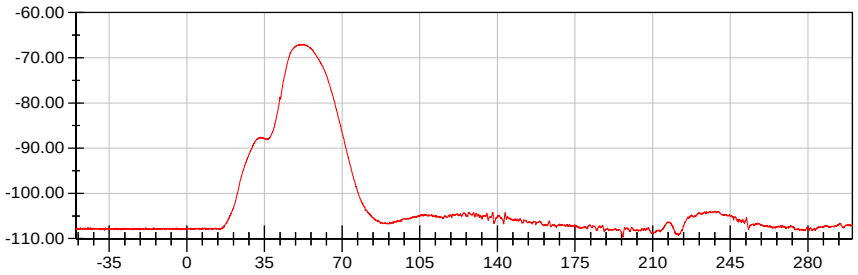
12.65 mm at 45.40 ms

<Min>

-12.17 mm at 232.95 ms

Unfiltered

Driver Thorax Rib 1 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

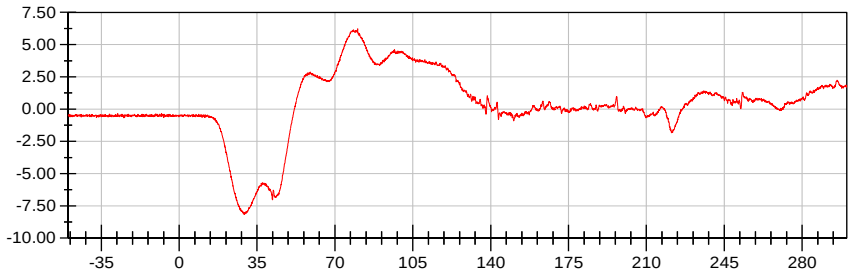
-66.96 mm at 52.35 ms

<Min>

-109.68 mm at 196.65 ms

Unfiltered

Driver Thorax Rib 1 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

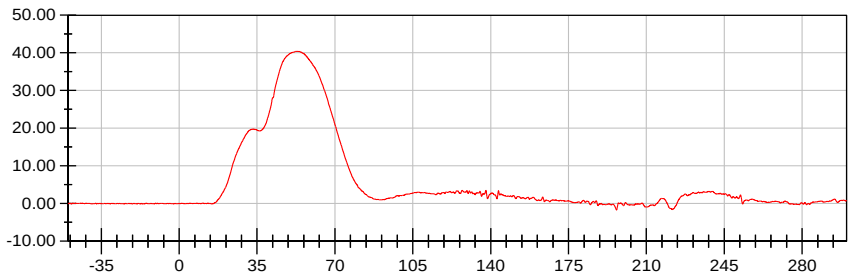
6.24 mm at 80.20 ms

<Min>

-8.18 mm at 29.40 ms

Unfiltered

Driver Thorax Rib 1 Middle Length Change (mm) vs. Time [ms]



<Max>

40.41 mm at 52.95 ms

<Min>

-1.69 mm at 196.60 ms

CFC_600

VRTC

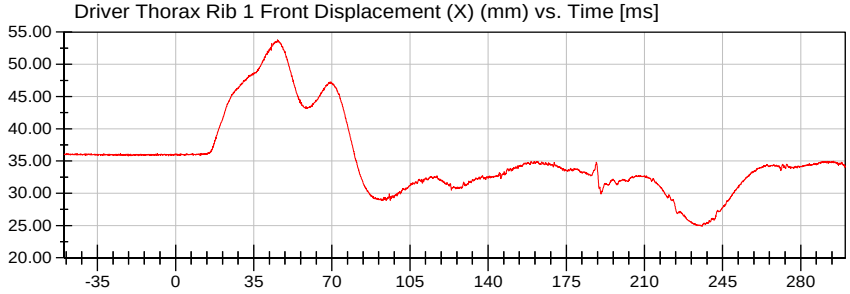
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Thorax Rib 1 Front Displacement (X) (mm) vs. Time [ms]



<Max>

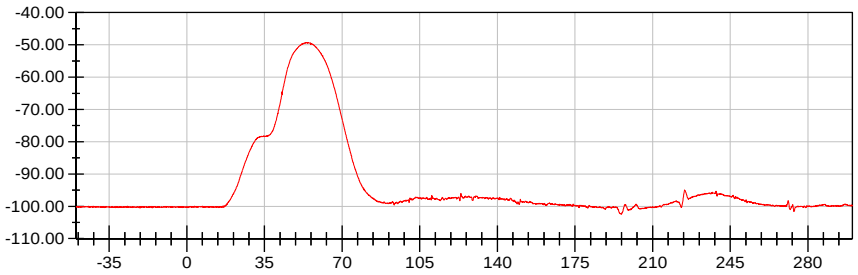
53.78 mm at 45.65 ms

<Min>

24.88 mm at 235.85 ms

Unfiltered

Driver Thorax Rib 1 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

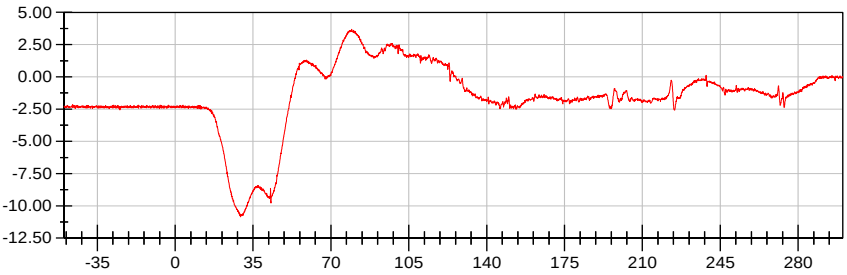
-49.24 mm at 54.10 ms

<Min>

-102.49 mm at 195.95 ms

Unfiltered

Driver Thorax Rib 1 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

3.69 mm at 79.30 ms

<Min>

-10.86 mm at 29.40 ms

Unfiltered

Driver Thorax Rib 1 Front Length Change (mm) vs. Time [ms]

<Max>

40.23 mm at 56.70 ms

<Min>

-0.79 mm at 195.85 ms

CFC_600

VRTC

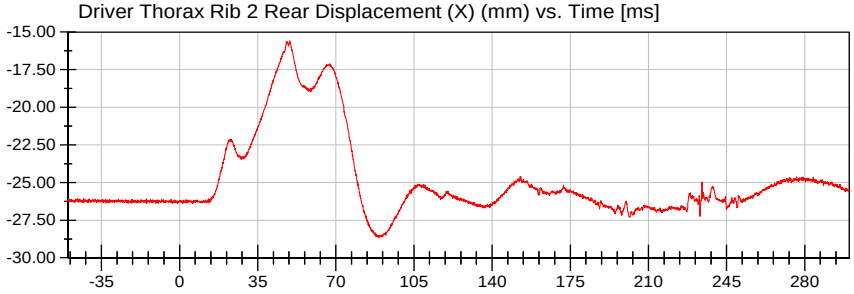
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Thorax Rib 2 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

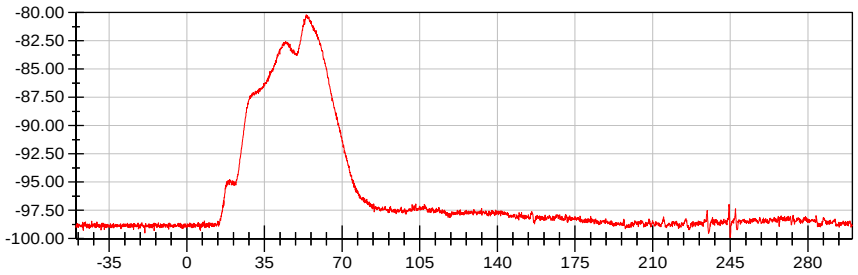
-15.58 mm at 49.35 ms

<Min>

-28.67 mm at 89.20 ms

Unfiltered

Driver Thorax Rib 2 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

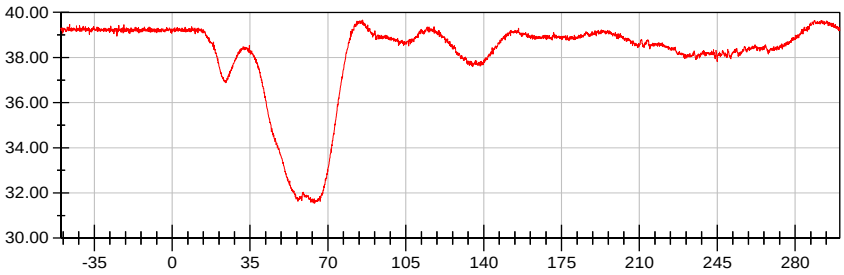
-80.20 mm at 53.85 ms

<Min>

-99.92 mm at 244.95 ms

Unfiltered

Driver Thorax Rib 2 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

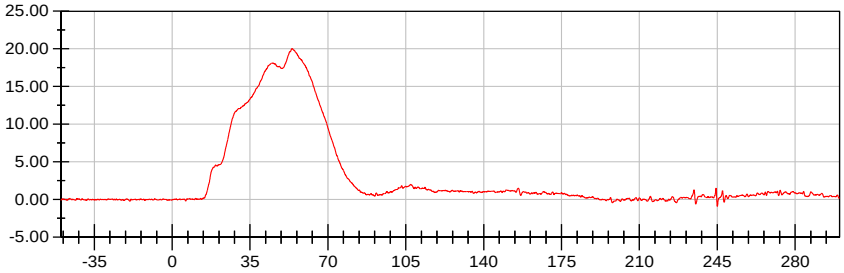
39.65 mm at 85.60 ms

<Min>

31.55 mm at 64.05 ms

Unfiltered

Driver Thorax Rib 2 Rear Length Change (mm) vs. Time [ms]



<Max>

20.03 mm at 53.85 ms

<Min>

-0.89 mm at 245.00 ms

CFC_600

VRTC

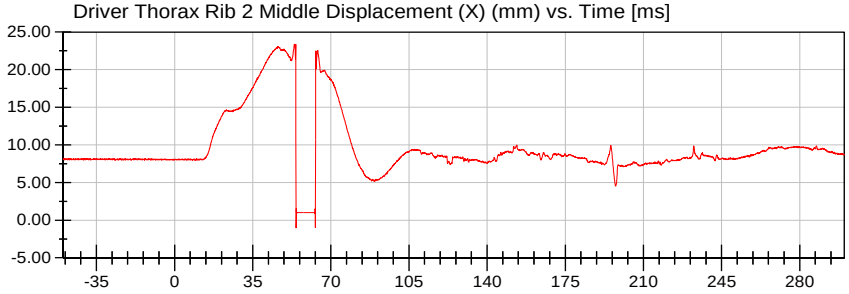
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Thorax Rib 2 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

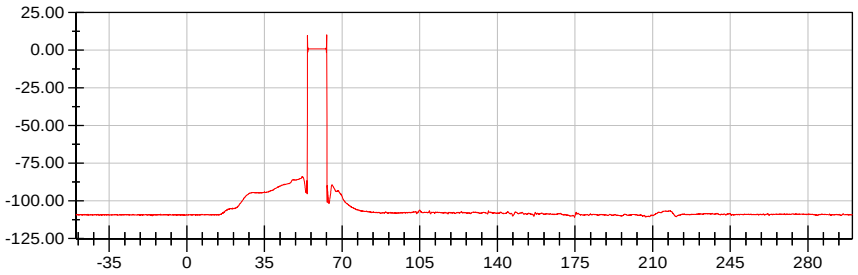
23.41 mm at 53.70 ms

<Min>

-1.01 mm at 54.45 ms

Unfiltered

Driver Thorax Rib 2 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

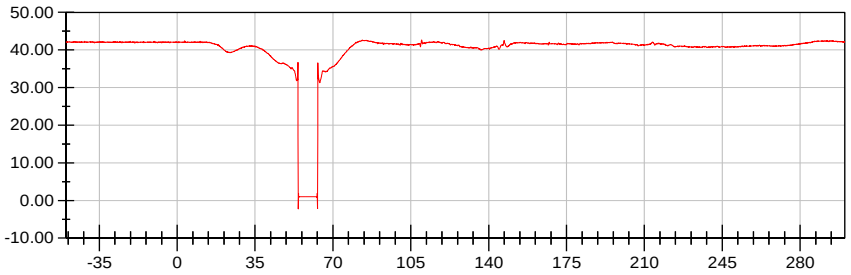
10.24 mm at 63.05 ms

<Min>

-110.82 mm at 174.80 ms

Unfiltered

Driver Thorax Rib 2 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

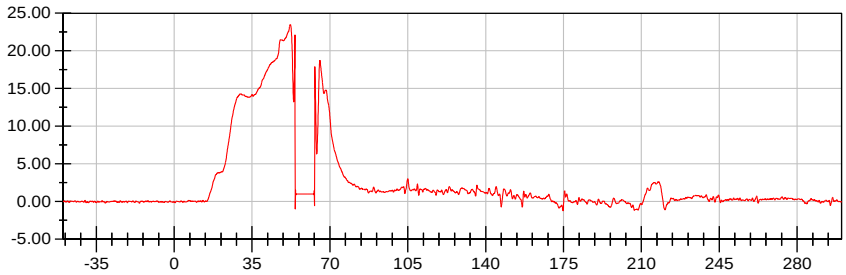
42.67 mm at 109.85 ms

<Min>

-2.27 mm at 54.45 ms

Unfiltered

Driver Thorax Rib 2 Middle Length Change (mm) vs. Time [ms]



<Max>

23.48 mm at 52.15 ms

<Min>

-1.25 mm at 174.75 ms

CFC_600

VRTC

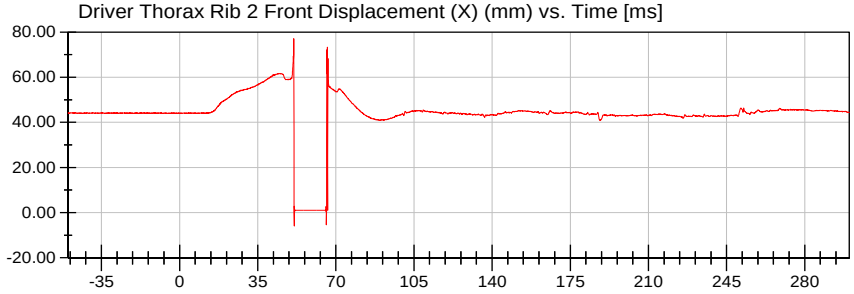
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Thorax Rib 2 Front Displacement (X) (mm) vs. Time [ms]



<Max>

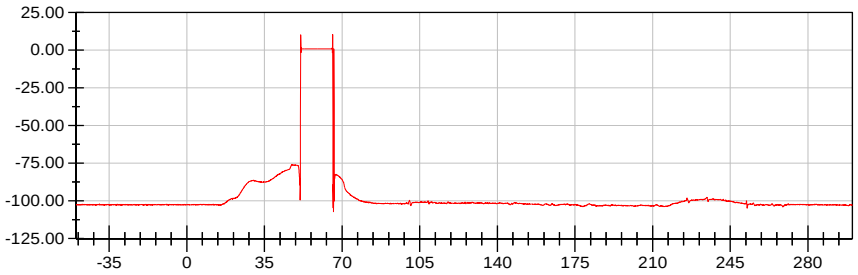
77.01 mm at 51.15 ms

<Min>

-5.96 mm at 51.35 ms

Unfiltered

Driver Thorax Rib 2 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

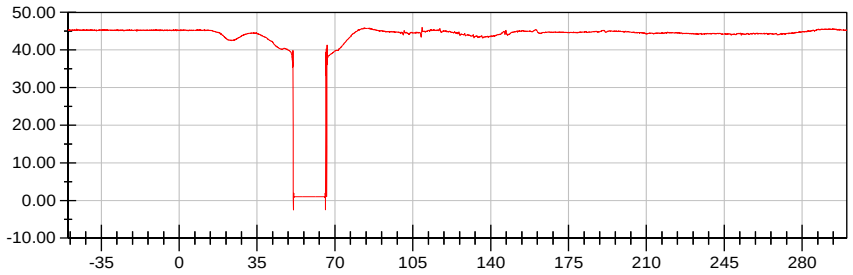
10.44 mm at 65.75 ms

<Min>

-107.23 mm at 66.15 ms

Unfiltered

Driver Thorax Rib 2 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

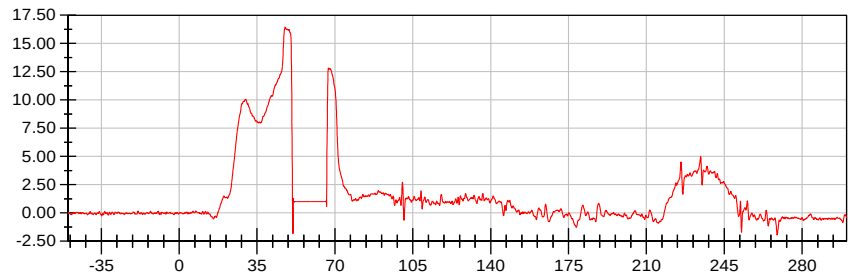
46.00 mm at 109.20 ms

<Min>

-2.55 mm at 51.35 ms

Unfiltered

Driver Thorax Rib 2 Front Length Change (mm) vs. Time [ms]



<Max>

16.45 mm at 47.65 ms

<Min>

-1.94 mm at 268.75 ms

CFC_600

VRTC

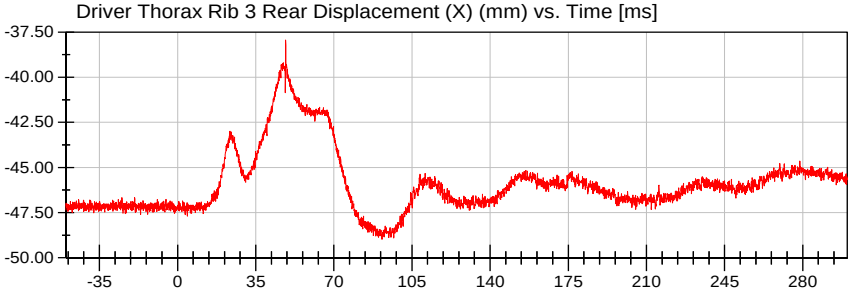
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

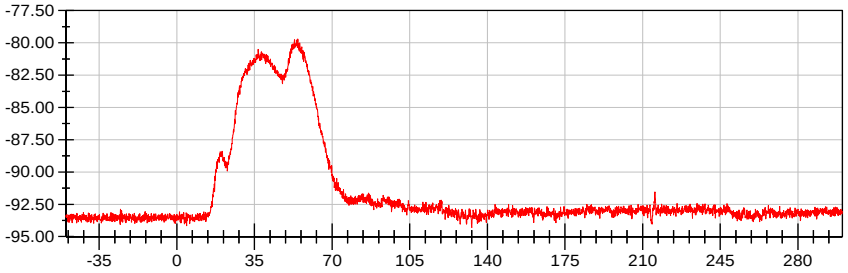
-37.94 mm at 48.40 ms

<Min>

-48.98 mm at 91.60 ms

Unfiltered

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



<Max>

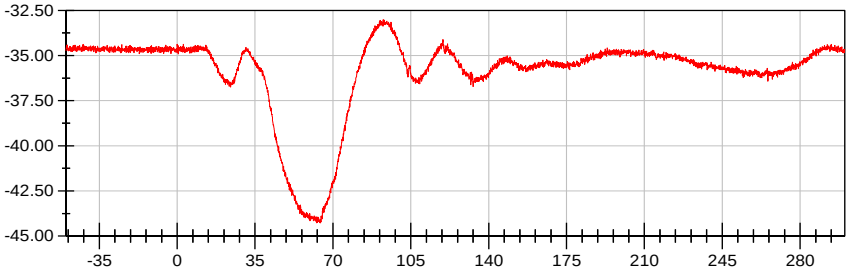
-79.71 mm at 54.55 ms

<Min>

-94.32 mm at 132.95 ms

Unfiltered

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



<Max>

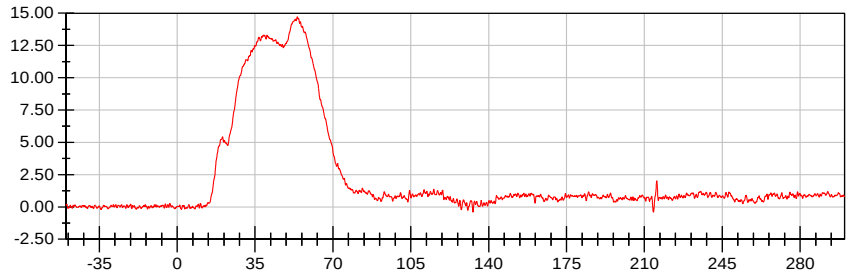
-33.02 mm at 92.65 ms

<Min>

-44.27 mm at 64.30 ms

Unfiltered

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



<Max>

14.71 mm at 54.00 ms

<Min>

-0.40 mm at 214.05 ms

CFC_600

VRTC

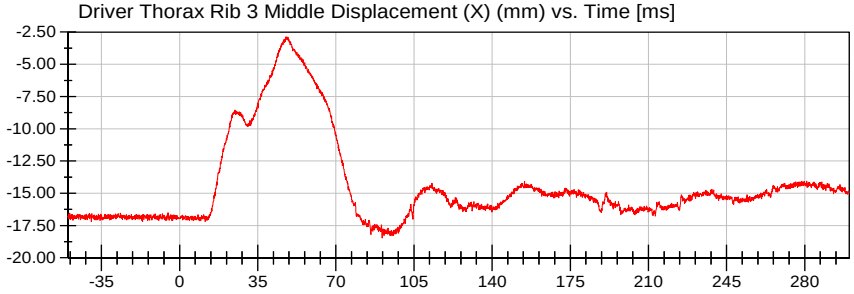
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

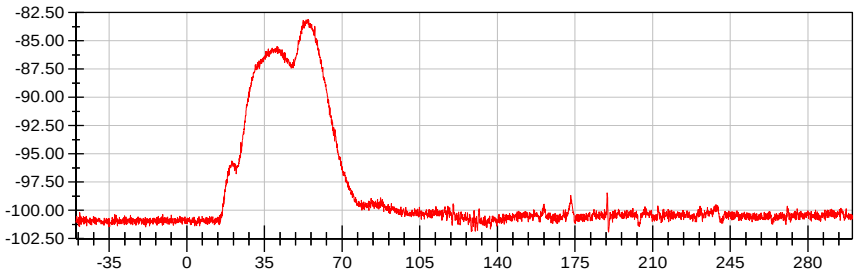
-2.87 mm at 47.65 ms

<Min>

-18.47 mm at 90.75 ms

Unfiltered

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



<Max>

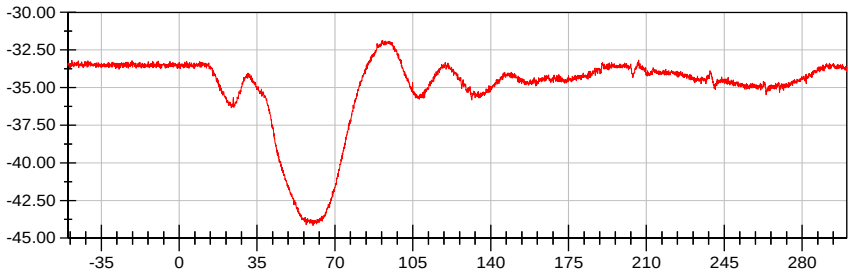
-83.12 mm at 54.70 ms

<Min>

-101.93 mm at 190.15 ms

Unfiltered

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



<Max>

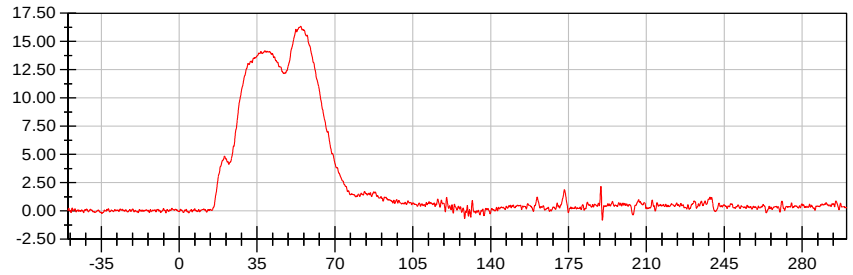
-31.87 mm at 91.15 ms

<Min>

-44.17 mm at 60.20 ms

Unfiltered

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



<Max>

16.34 mm at 54.60 ms

<Min>

-0.82 mm at 190.20 ms

CFC_600

VRTC

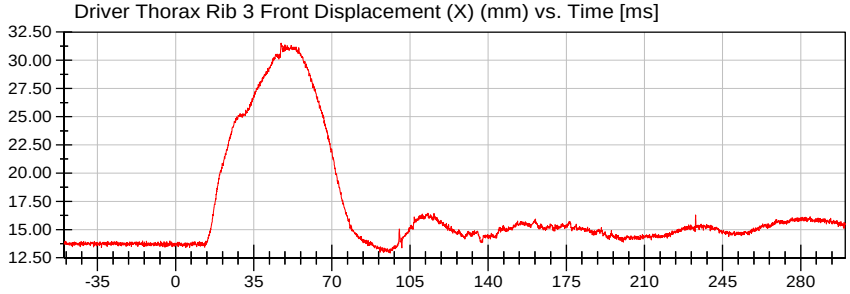
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

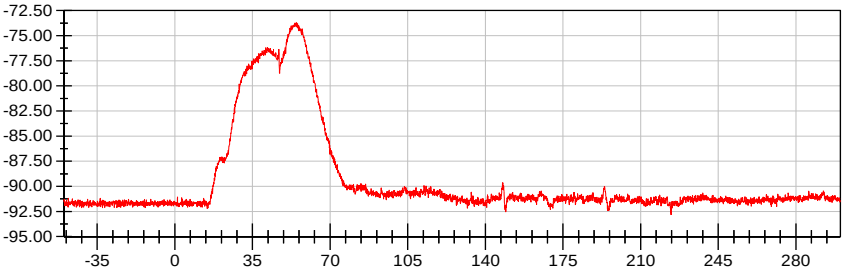
31.51 mm at 47.25 ms

<Min>

12.91 mm at 96.15 ms

Unfiltered

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



<Max>

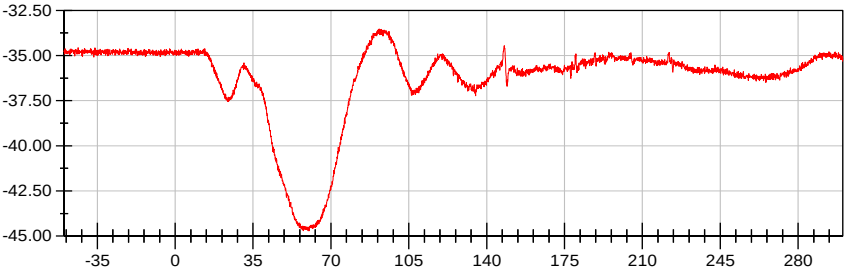
-73.71 mm at 54.90 ms

<Min>

-92.81 mm at 223.70 ms

Unfiltered

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



<Max>

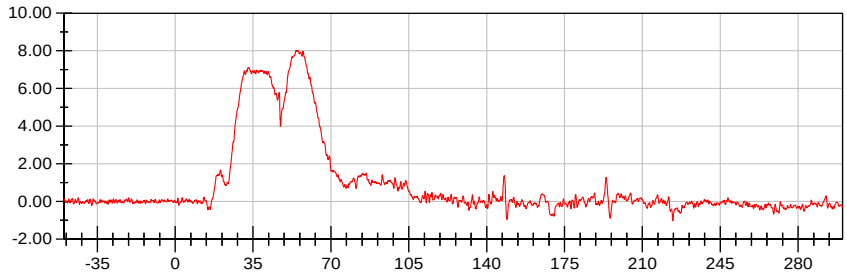
-33.54 mm at 91.70 ms

<Min>

-44.72 mm at 60.10 ms

Unfiltered

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



<Max>

8.03 mm at 54.95 ms

<Min>

-1.01 mm at 223.65 ms

CFC_600

VRTC

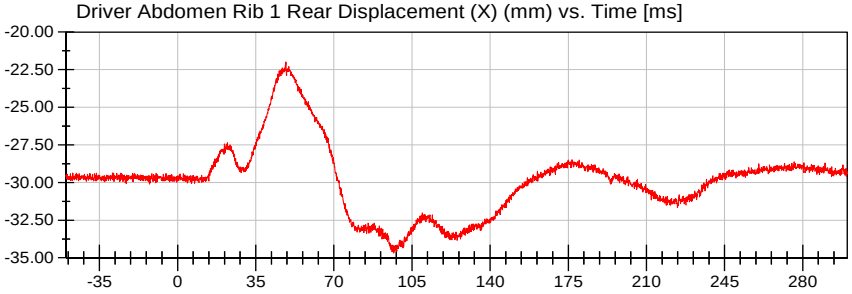
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Abdomen Rib 1 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

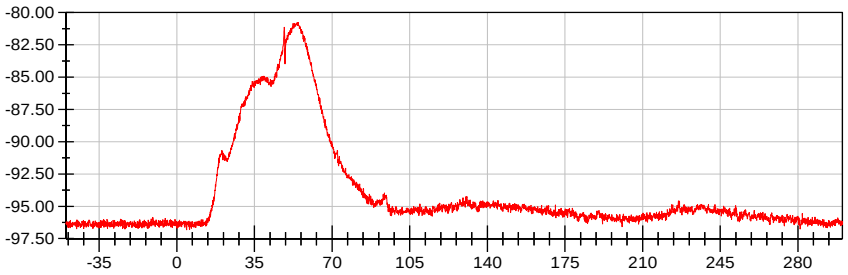
-21.98 mm at 48.50 ms

<Min>

-34.69 mm at 96.80 ms

Unfiltered

Driver Abdomen Rib 1 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

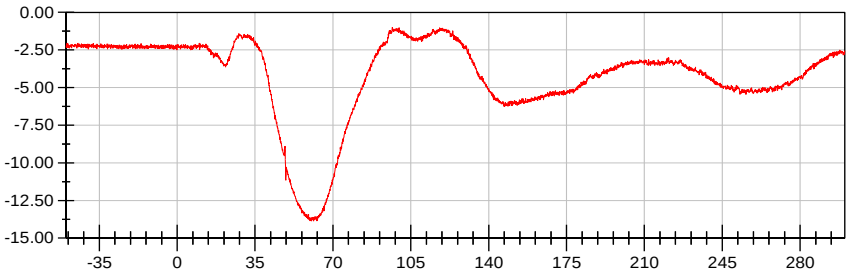
-80.76 mm at 54.50 ms

<Min>

-96.81 mm at 4.40 ms

Unfiltered

Driver Abdomen Rib 1 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

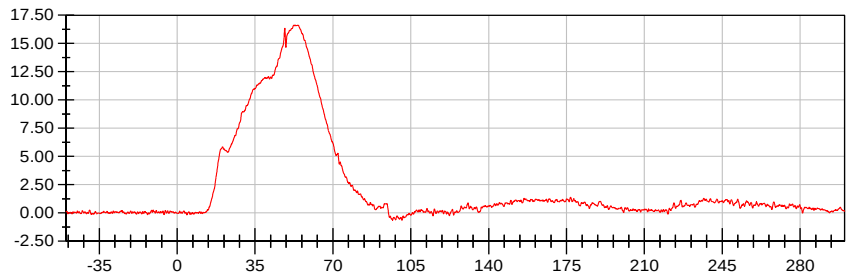
-1.01 mm at 96.70 ms

<Min>

-13.86 mm at 60.30 ms

Unfiltered

Driver Abdomen Rib 1 Rear Length Change (mm) vs. Time [ms]



<Max>

16.63 mm at 53.00 ms

<Min>

-0.65 mm at 101.00 ms

CFC_600

VRTC

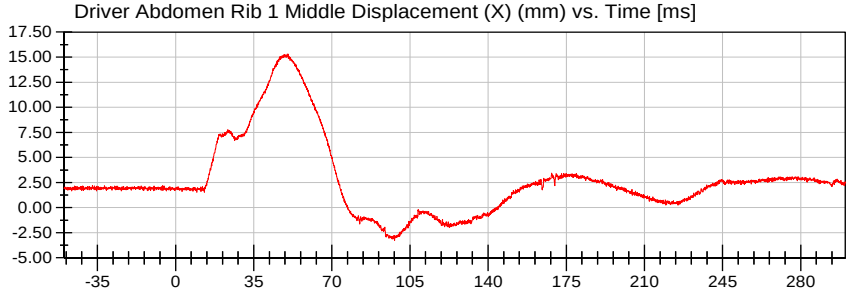
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Abdomen Rib 1 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

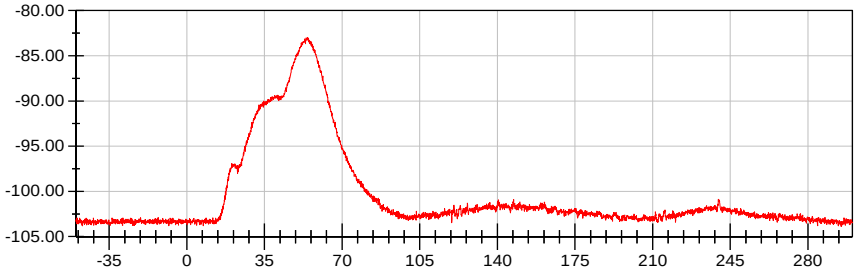
15.31 mm at 50.05 ms

<Min>

-3.26 mm at 98.10 ms

Unfiltered

Driver Abdomen Rib 1 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

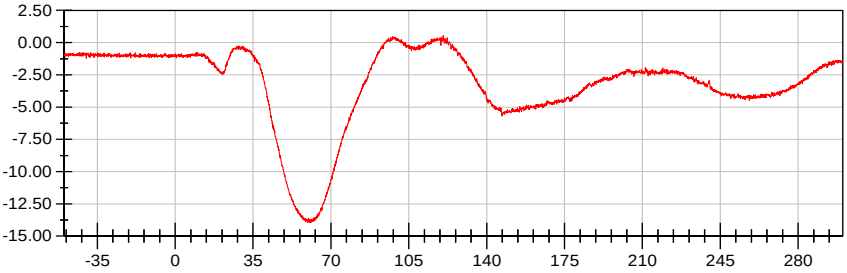
-82.97 mm at 54.50 ms

<Min>

-103.87 mm at 295.00 ms

Unfiltered

Driver Abdomen Rib 1 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

0.56 mm at 120.50 ms

<Min>

-13.97 mm at 60.80 ms

Unfiltered

Driver Abdomen Rib 1 Middle Length Change (mm) vs. Time [ms]

<Max>

19.15 mm at 54.45 ms

<Min>

-0.26 mm at 294.95 ms

CFC_600

VRTC

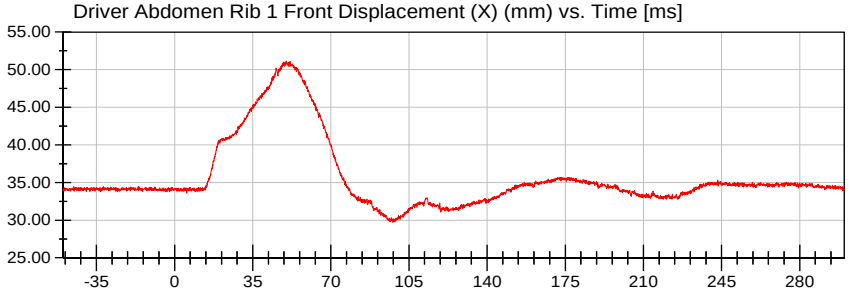
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Abdomen Rib 1 Front Displacement (X) (mm) vs. Time [ms]



<Max>

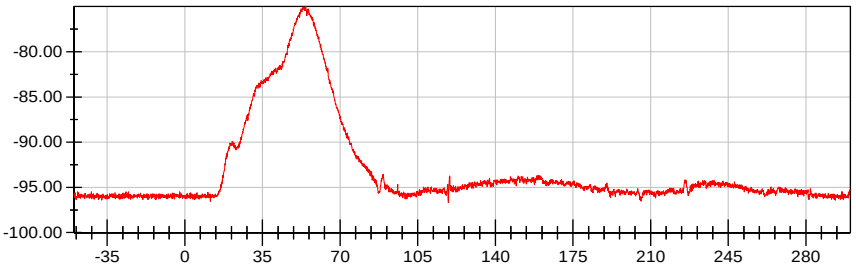
51.12 mm at 50.05 ms

<Min>

29.71 mm at 97.70 ms

Unfiltered

Driver Abdomen Rib 1 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

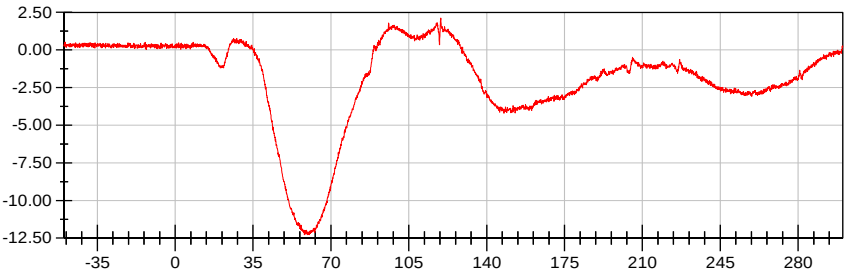
-75.00 mm at 54.50 ms

<Min>

-96.67 mm at 118.80 ms

Unfiltered

Driver Abdomen Rib 1 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

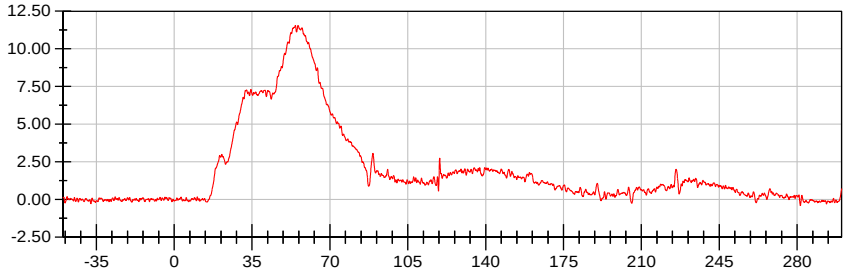
2.12 mm at 119.35 ms

<Min>

-12.27 mm at 58.10 ms

Unfiltered

Driver Abdomen Rib 1 Front Length Change (mm) vs. Time [ms]



<Max>

11.55 mm at 55.65 ms

<Min>

-0.40 mm at 281.40 ms

CFC_600

VRTC

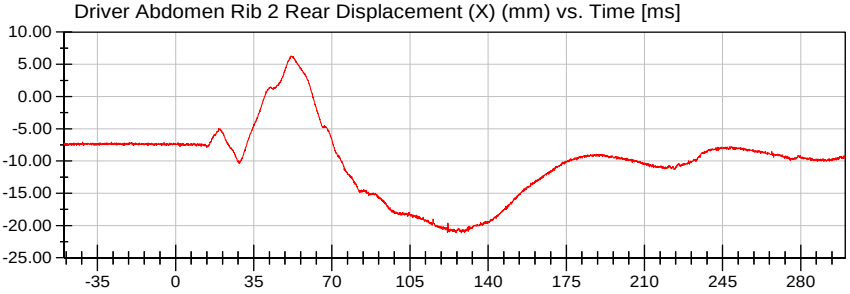
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Abdomen Rib 2 Rear Displacement (X) (mm) vs. Time [ms]



<Max>

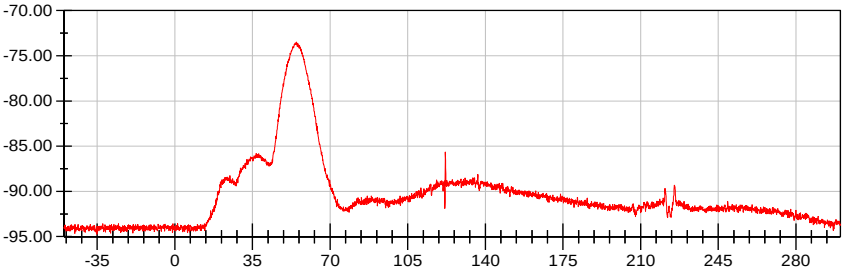
6.29 mm at 51.80 ms

<Min>

-21.15 mm at 128.00 ms

Unfiltered

Driver Abdomen Rib 2 Rear Displacement (Y) (mm) vs. Time [ms]



<Max>

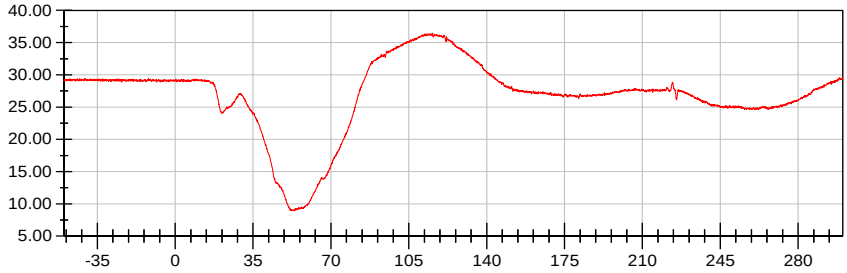
-73.48 mm at 54.85 ms

<Min>

-94.73 mm at -35.10 ms

Unfiltered

Driver Abdomen Rib 2 Rear Displacement (Z) (mm) vs. Time [ms]



<Max>

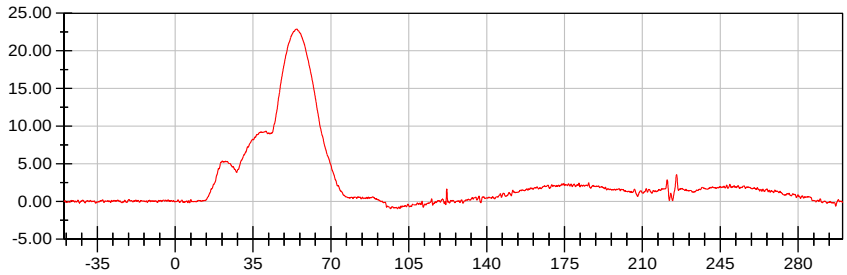
36.48 mm at 115.70 ms

<Min>

8.94 mm at 53.50 ms

Unfiltered

Driver Abdomen Rib 2 Rear Length Change (mm) vs. Time [ms]



<Max>

22.90 mm at 54.70 ms

<Min>

-0.96 mm at 99.95 ms

CFC_600

VRTC

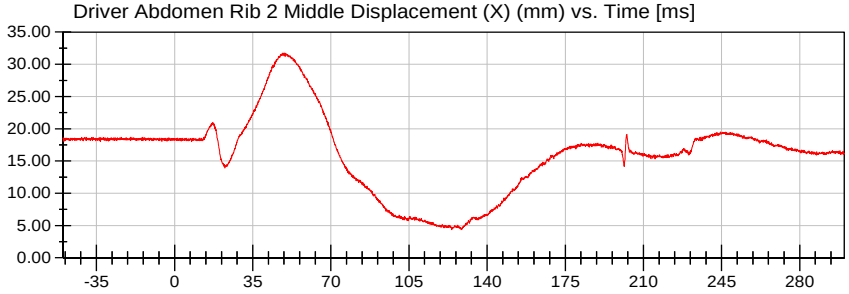
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Abdomen Rib 2 Middle Displacement (X) (mm) vs. Time [ms]



<Max>

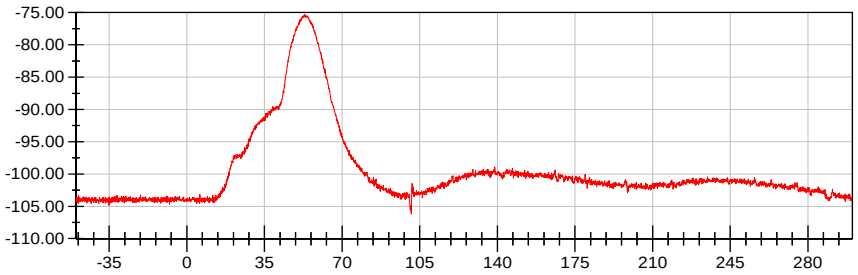
31.74 mm at 48.50 ms

<Min>

4.37 mm at 124.15 ms

Unfiltered

Driver Abdomen Rib 2 Middle Displacement (Y) (mm) vs. Time [ms]



<Max>

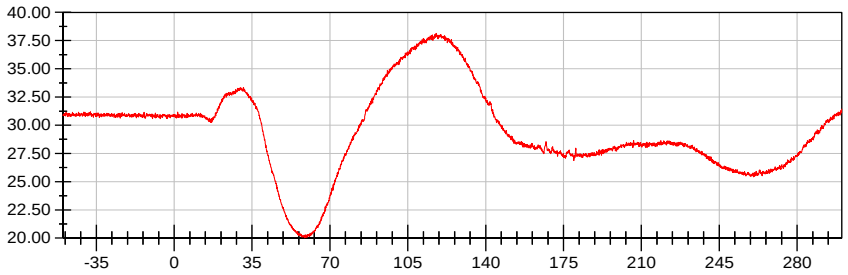
-75.29 mm at 53.15 ms

<Min>

-106.18 mm at 101.20 ms

Unfiltered

Driver Abdomen Rib 2 Middle Displacement (Z) (mm) vs. Time [ms]



<Max>

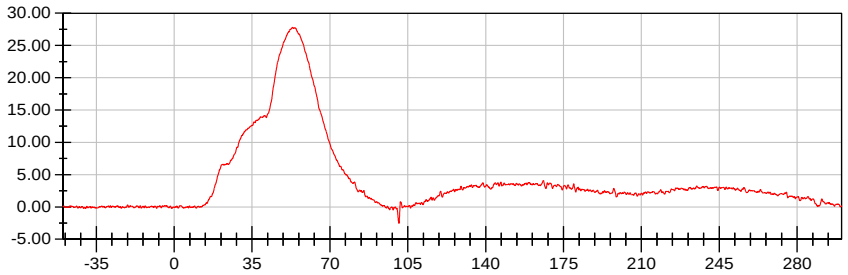
38.14 mm at 117.70 ms

<Min>

20.03 mm at 58.70 ms

Unfiltered

Driver Abdomen Rib 2 Middle Length Change (mm) vs. Time [ms]



<Max>

27.82 mm at 53.15 ms

<Min>

-2.56 mm at 101.05 ms

CFC_600

VRTC

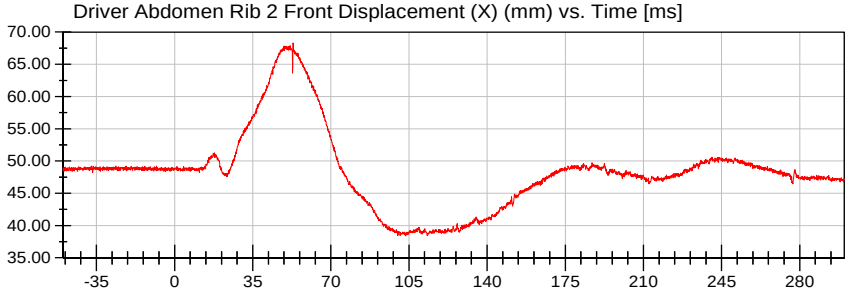
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Abdomen Rib 2 Front Displacement (X) (mm) vs. Time [ms]



<Max>

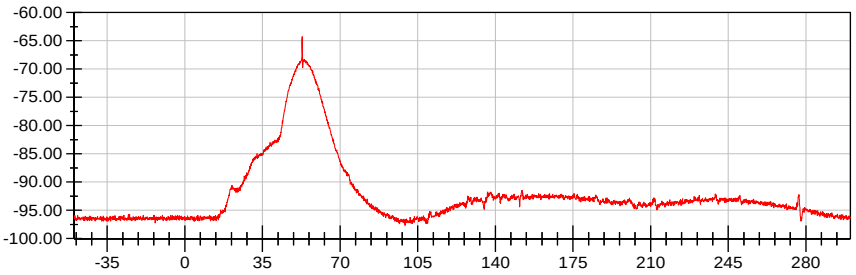
68.27 mm at 53.10 ms

<Min>

38.41 mm at 113.20 ms

Unfiltered

Driver Abdomen Rib 2 Front Displacement (Y) (mm) vs. Time [ms]



<Max>

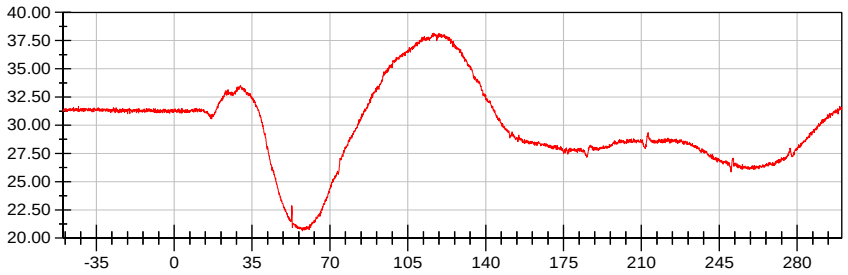
-64.24 mm at 52.90 ms

<Min>

-97.67 mm at 99.30 ms

Unfiltered

Driver Abdomen Rib 2 Front Displacement (Z) (mm) vs. Time [ms]



<Max>

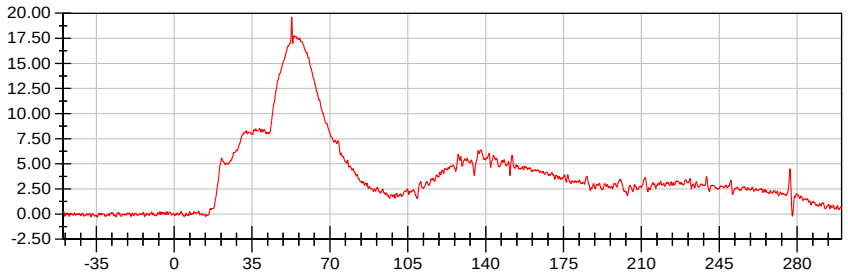
38.16 mm at 116.70 ms

<Min>

20.64 mm at 57.65 ms

Unfiltered

Driver Abdomen Rib 2 Front Length Change (mm) vs. Time [ms]



<Max>

19.54 mm at 52.85 ms

<Min>

-0.29 mm at -37.35 ms

CFC_600

VRTC

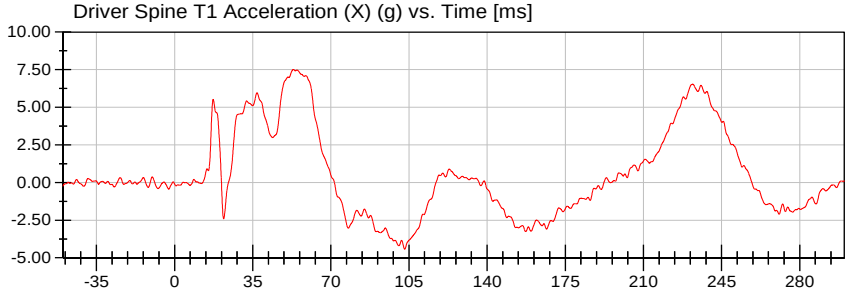
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Spine T1 Acceleration (X) (g) vs. Time [ms]



<Max>

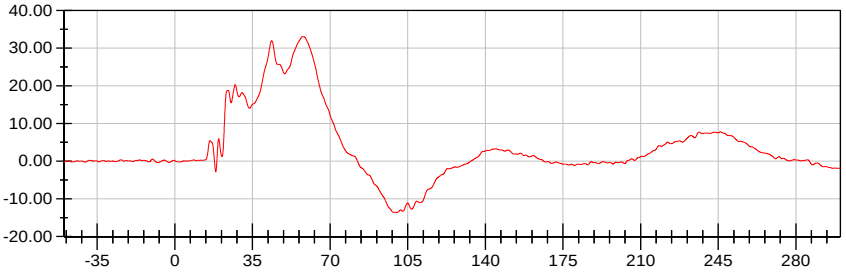
7.51 g at 53.25 ms

<Min>

-4.43 g at 103.10 ms

CFC_180

Driver Spine T1 Acceleration (Y) (g) vs. Time [ms]



<Max>

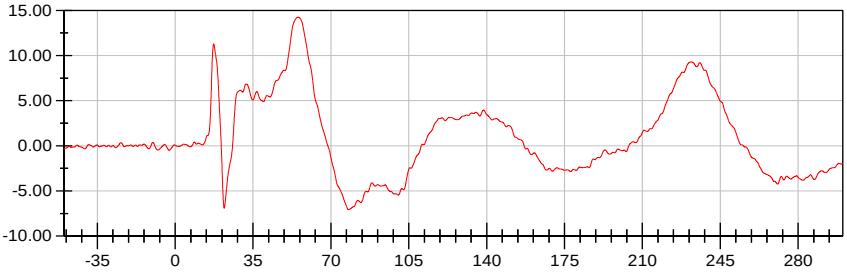
33.07 g at 57.90 ms

<Min>

-13.59 g at 100.20 ms

CFC_180

Driver Spine T1 Acceleration (Z) (g) vs. Time [ms]



<Max>

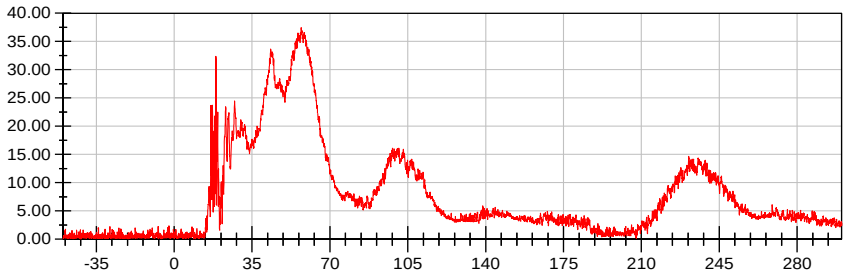
14.24 g at 55.25 ms

<Min>

-7.07 g at 77.95 ms

CFC_180

Driver Spine T1 Acceleration Resultant (g) vs. Time [ms]



<Max>

37.41 g at 57.10 ms

<Min>

0.06 g at -45.45 ms

Prefiltered_> CFC 1000

VRTC

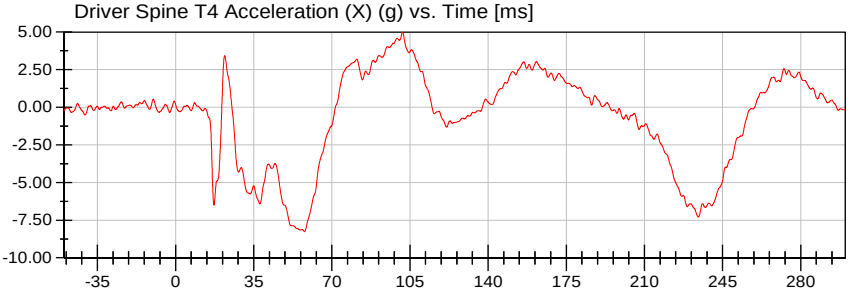
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Spine T4 Acceleration (X) (g) vs. Time [ms]



<Max>

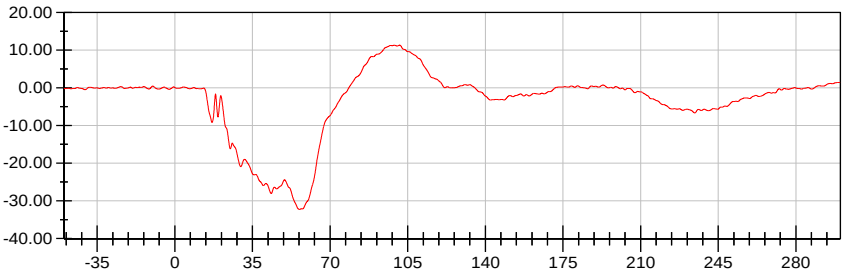
4.98 g at 101.65 ms

<Min>

-8.27 g at 57.75 ms

CFC_180

Driver Spine T4 Acceleration (Y) (g) vs. Time [ms]



<Max>

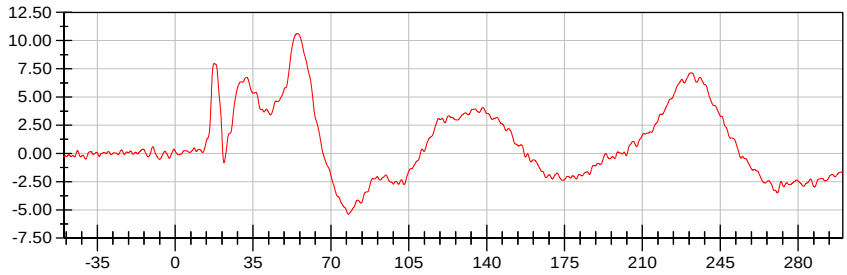
11.35 g at 101.35 ms

<Min>

-32.26 g at 56.15 ms

CFC_180

Driver Spine T4 Acceleration (Z) (g) vs. Time [ms]



<Max>

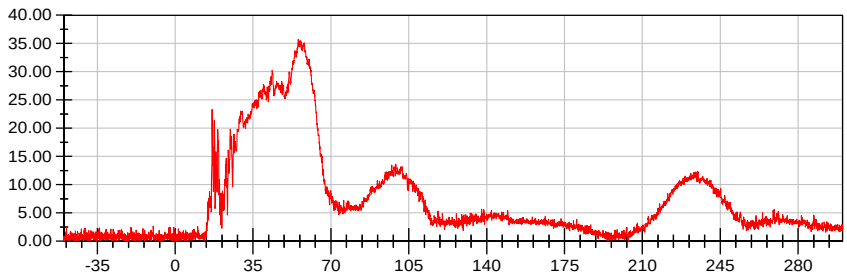
10.62 g at 55.05 ms

<Min>

-5.39 g at 77.85 ms

CFC_180

Driver Spine T4 Acceleration Resultant (g) vs. Time [ms]



<Max>

35.69 g at 55.30 ms

<Min>

0.04 g at -45.45 ms

Prefiltered_> CFC 1000

VRTC

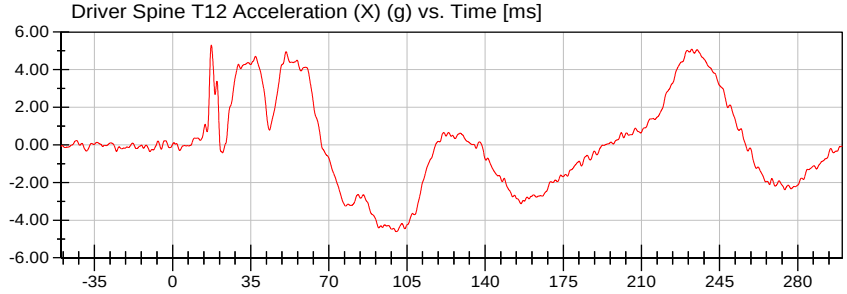
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Spine T12 Acceleration (X) (g) vs. Time [ms]



<Max>

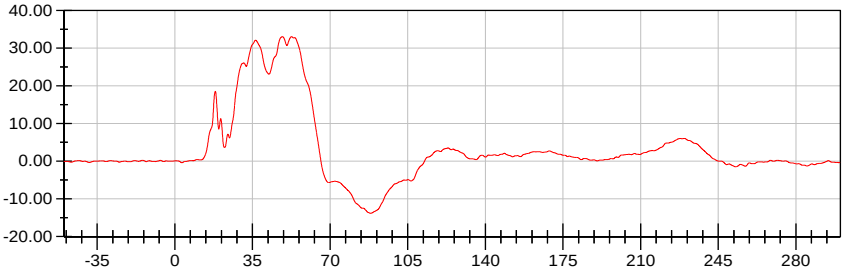
5.30 g at 17.35 ms

<Min>

-4.61 g at 100.15 ms

CFC_180

Driver Spine T12 Acceleration (Y) (g) vs. Time [ms]



<Max>

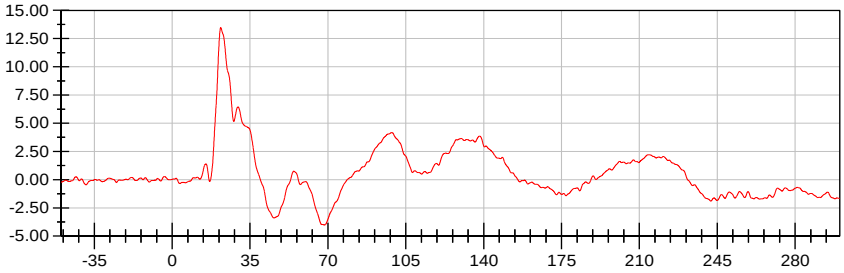
33.09 g at 52.60 ms

<Min>

-13.82 g at 88.30 ms

CFC_180

Driver Spine T12 Acceleration (Z) (g) vs. Time [ms]



<Max>

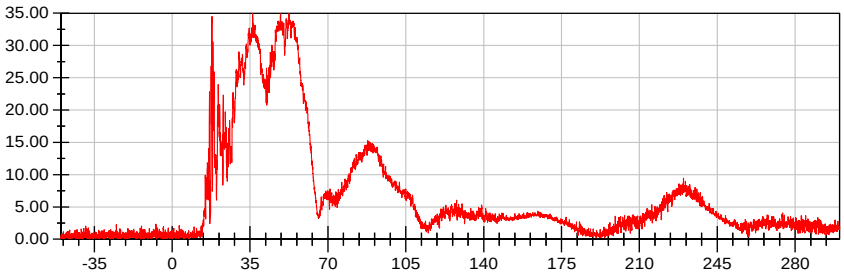
13.48 g at 21.85 ms

<Min>

-4.01 g at 68.50 ms

CFC_180

Driver Spine T12 Acceleration Resultant (g) vs. Time [ms]



<Max>

34.99 g at 36.20 ms

<Min>

0.05 g at -30.40 ms

Prefiltered_> CFC 1000

VRTC

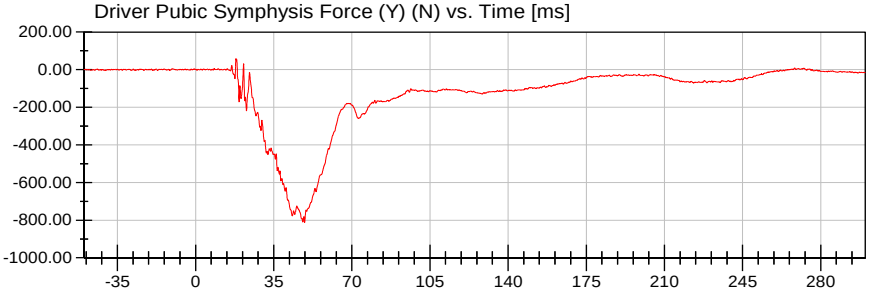
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Pubic Symphysis Force (Y) (N) vs. Time [ms]



<Max>

58.10 N at 18.10 ms

<Min>

-811.59 N at 48.85 ms

CFC_600

VRTC

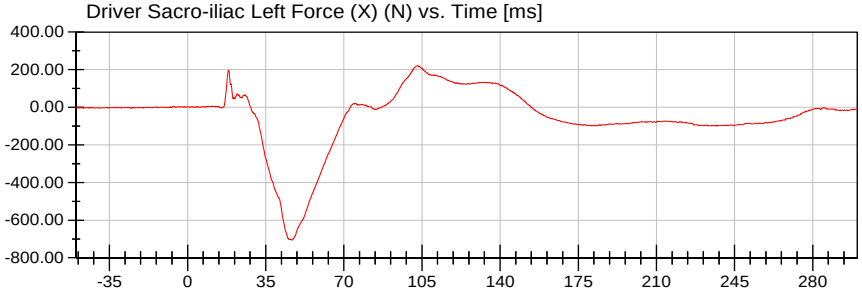
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Sacro-iliac Left Force (X) (N) vs. Time [ms]



<Max>

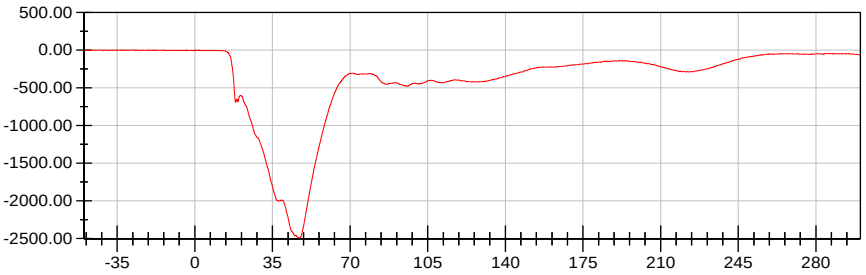
220.60 N at 103.15 ms

<Min>

-706.12 N at 46.75 ms

CFC_600

Driver Sacro-iliac Left Force (Y) (N) vs. Time [ms]



<Max>

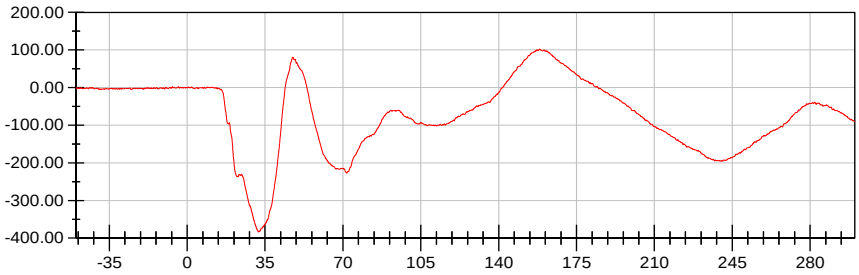
3.04 N at -42.85 ms

<Min>

-2,492.53 N at 47.35 ms

CFC_600

Driver Sacro-iliac Left Force (Z) (N) vs. Time [ms]



<Max>

101.96 N at 158.40 ms

<Min>

-383.30 N at 32.05 ms

CFC_600

VRTC

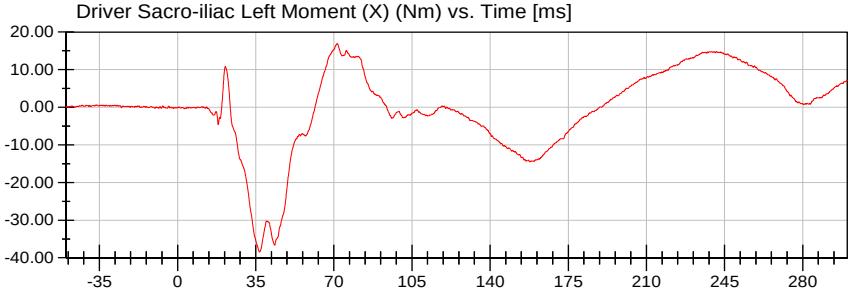
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Sacro-iliac Left Moment (X) (Nm) vs. Time [ms]



<Max>

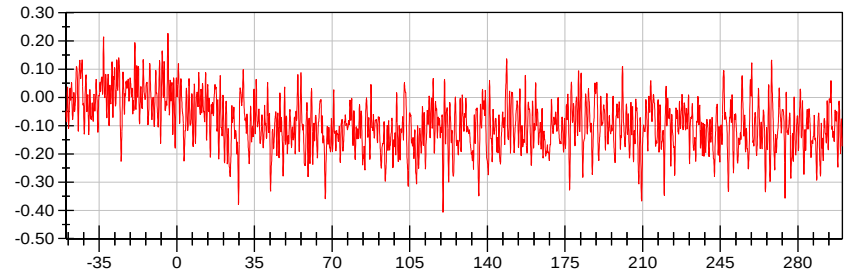
16.94 Nm at 71.55 ms

<Min>

-38.45 Nm at 36.75 ms

CFC_600

Driver Sacro-iliac Left Moment (Y) (Nm) vs. Time [ms]



<Max>

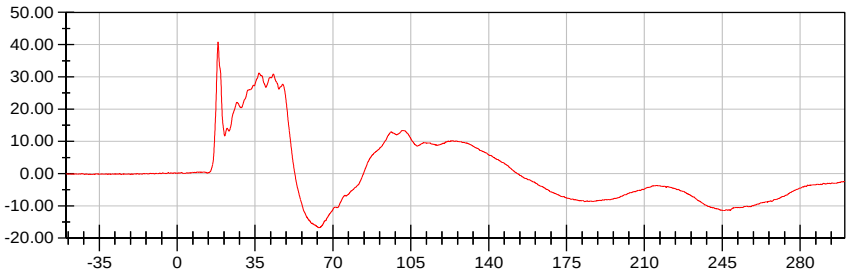
0.23 Nm at -4.00 ms

<Min>

-0.41 Nm at 120.05 ms

CFC_600

Driver Sacro-iliac Left Moment (Z) (Nm) vs. Time [ms]



<Max>

40.77 Nm at 18.40 ms

<Min>

-16.75 Nm at 63.75 ms

CFC_600

VRTC

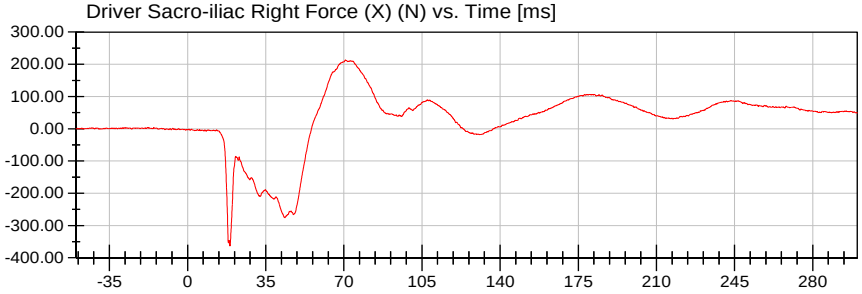
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Sacro-iliac Right Force (X) (N) vs. Time [ms]



<Max>

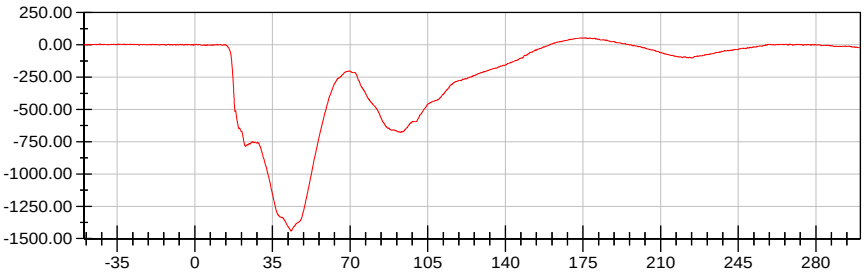
213.36 N at 70.70 ms

<Min>

-363.69 N at 19.00 ms

CFC_600

Driver Sacro-iliac Right Force (Y) (N) vs. Time [ms]



<Max>

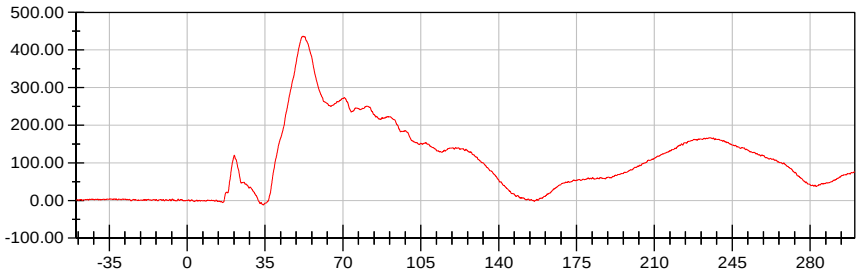
55.21 N at 176.15 ms

<Min>

-1,441.39 N at 43.50 ms

CFC_600

Driver Sacro-iliac Right Force (Z) (N) vs. Time [ms]



<Max>

436.48 N at 52.10 ms

<Min>

-11.91 N at 34.25 ms

CFC_600

VRTC

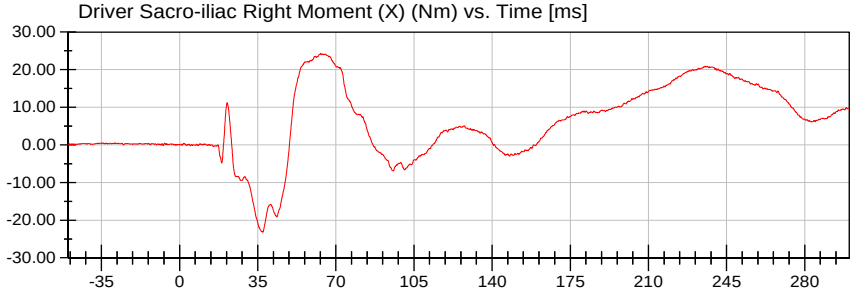
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Sacro-iliac Right Moment (X) (Nm) vs. Time [ms]



<Max>

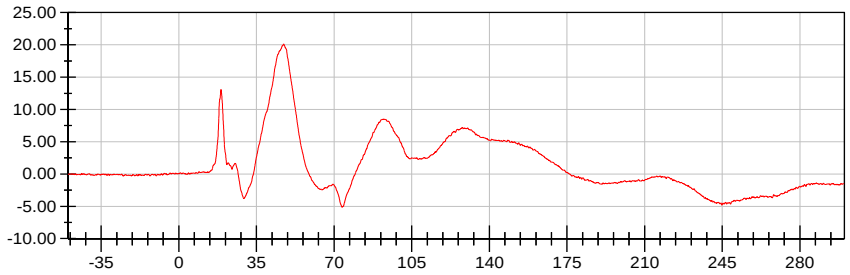
24.29 Nm at 63.20 ms

<Min>

-23.18 Nm at 37.25 ms

CFC_600

Driver Sacro-iliac Right Moment (Y) (Nm) vs. Time [ms]



<Max>

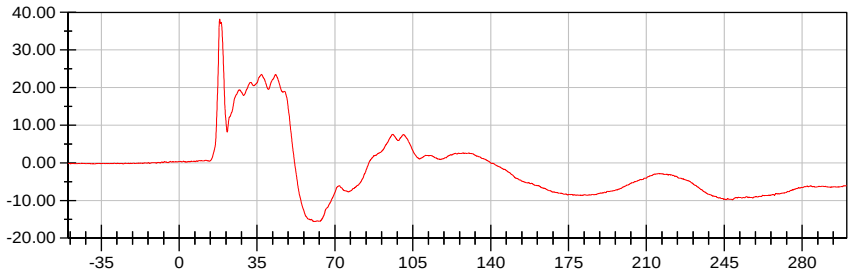
20.12 Nm at 47.30 ms

<Min>

-5.14 Nm at 73.65 ms

CFC_600

Driver Sacro-iliac Right Moment (Z) (Nm) vs. Time [ms]



<Max>

38.23 Nm at 18.20 ms

<Min>

-15.58 Nm at 61.10 ms

CFC_600

VRTC

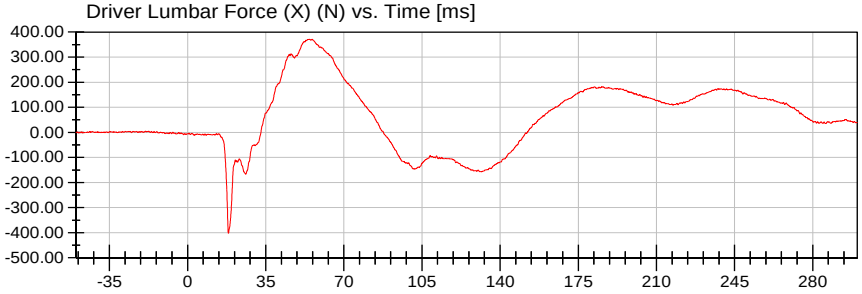
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Lumbar Force (X) (N) vs. Time [ms]



<Max>

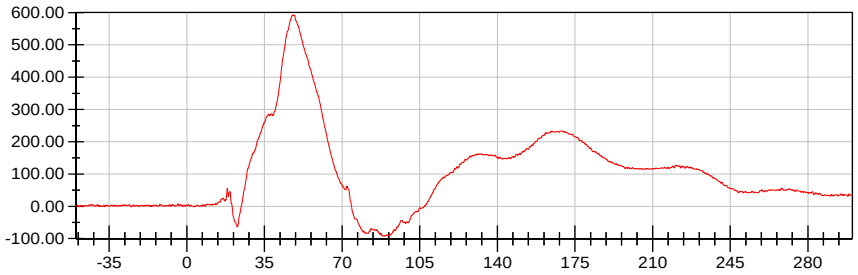
371.31 N at 54.60 ms

<Min>

-401.83 N at 18.30 ms

CFC_600

Driver Lumbar Force (Y) (N) vs. Time [ms]



<Max>

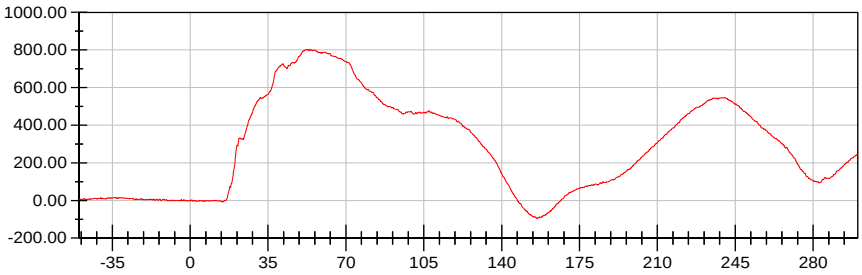
592.79 N at 47.70 ms

<Min>

-92.90 N at 88.95 ms

CFC_600

Driver Lumbar Force (Z) (N) vs. Time [ms]



<Max>

803.66 N at 53.70 ms

<Min>

-95.51 N at 155.95 ms

CFC_600

VRTC

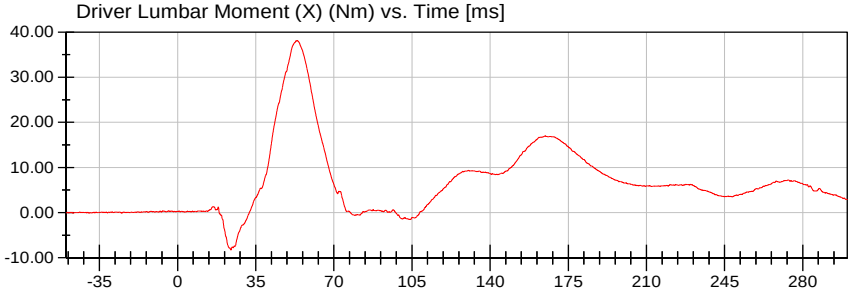
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

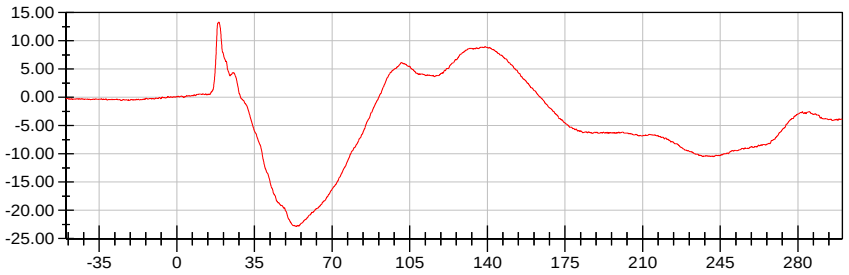
38.10 Nm at 53.70 ms

<Min>

-8.27 Nm at 23.90 ms

CFC_600

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



<Max>

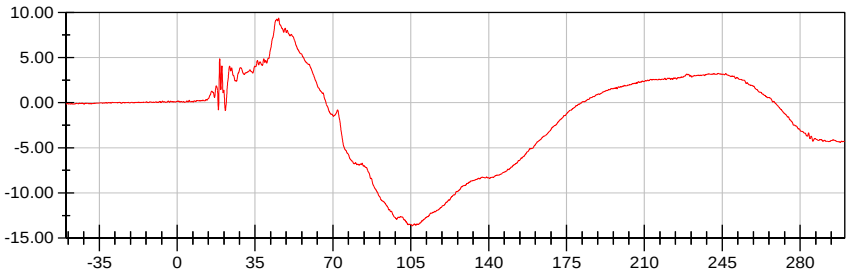
13.32 Nm at 19.00 ms

<Min>

-22.84 Nm at 54.05 ms

CFC_600

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



<Max>

9.35 Nm at 45.60 ms

<Min>

-13.64 Nm at 105.70 ms

CFC_600

VRTC

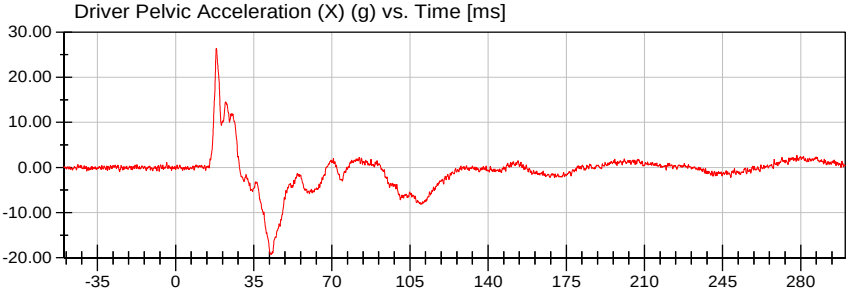
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Pelvic Acceleration (X) (g) vs. Time [ms]



<Max>

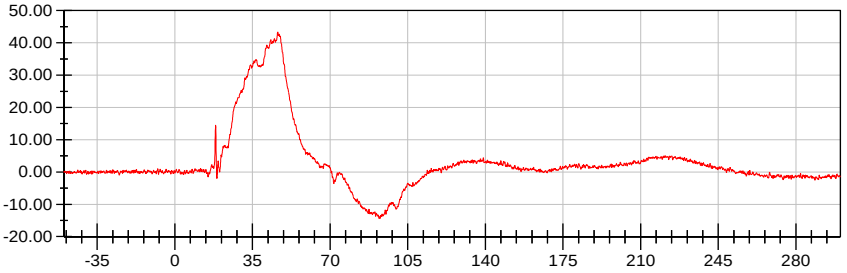
26.35 g at 18.30 ms

<Min>

-19.23 g at 42.40 ms

CFC_1000

Driver Pelvic Acceleration (Y) (g) vs. Time [ms]



<Max>

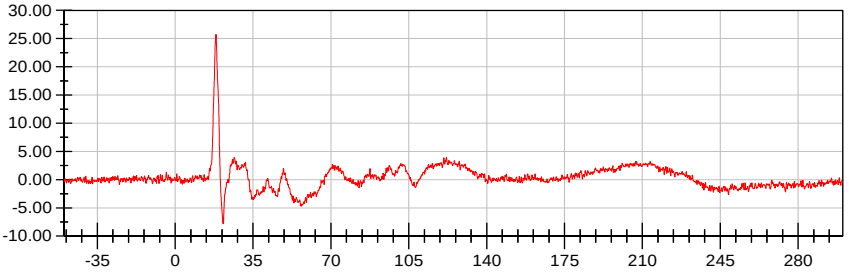
43.32 g at 46.40 ms

<Min>

-14.37 g at 92.10 ms

CFC_1000

Driver Pelvic Acceleration (Z) (g) vs. Time [ms]



<Max>

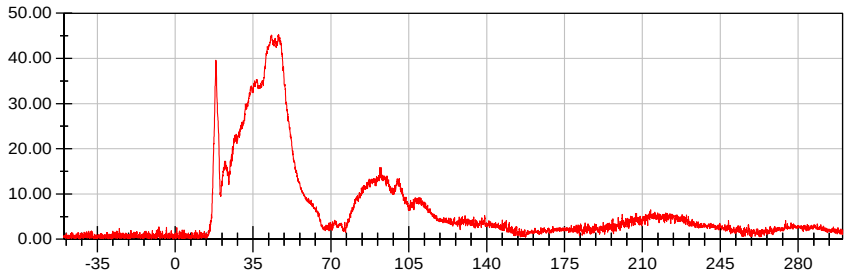
25.73 g at 18.35 ms

<Min>

-7.83 g at 21.55 ms

CFC_1000

Driver Pelvic Acceleration Resultant (g) vs. Time [ms]



<Max>

45.23 g at 46.55 ms

<Min>

0.04 g at -28.65 ms

Prefiltered_> CFC 1000

VRTC

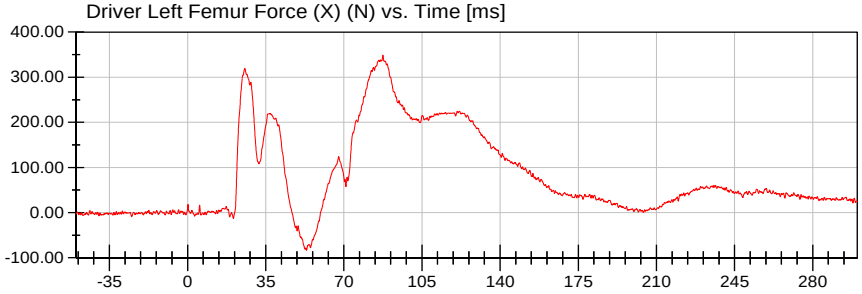
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Left Femur Force (X) (N) vs. Time [ms]



<Max>

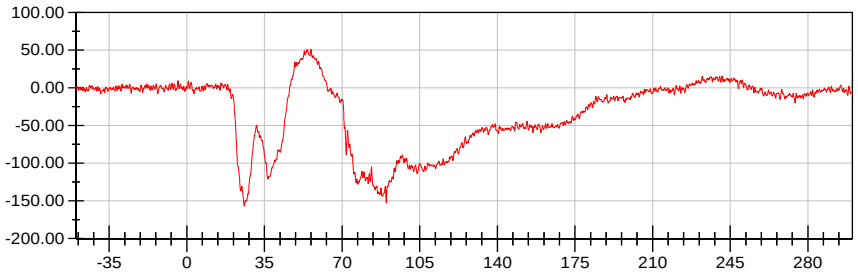
348.70 N at 87.50 ms

<Min>

-83.14 N at 53.30 ms

CFC_600

Driver Left Femur Force (Y) (N) vs. Time [ms]



<Max>

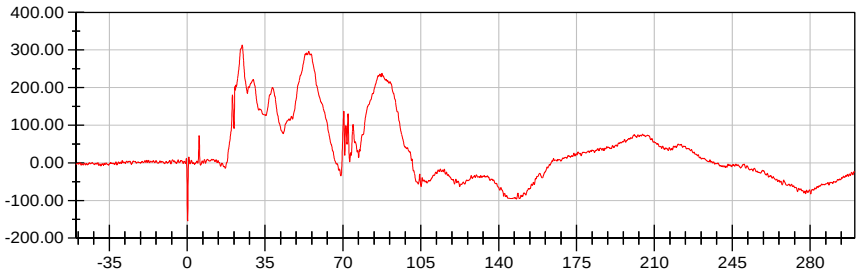
51.32 N at 54.20 ms

<Min>

-156.80 N at 25.90 ms

CFC_600

Driver Left Femur Force (Z) (N) vs. Time [ms]



<Max>

313.30 N at 24.70 ms

<Min>

-154.40 N at 0.20 ms

CFC_600

VRTC

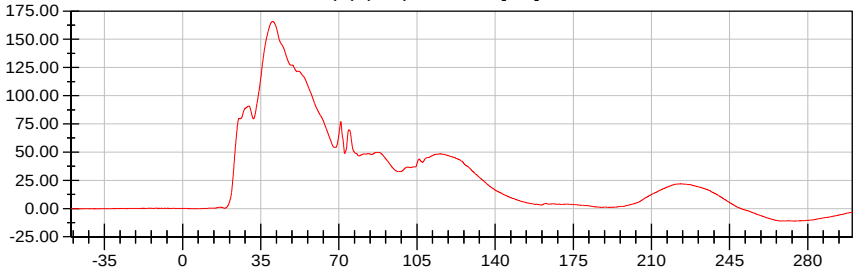
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

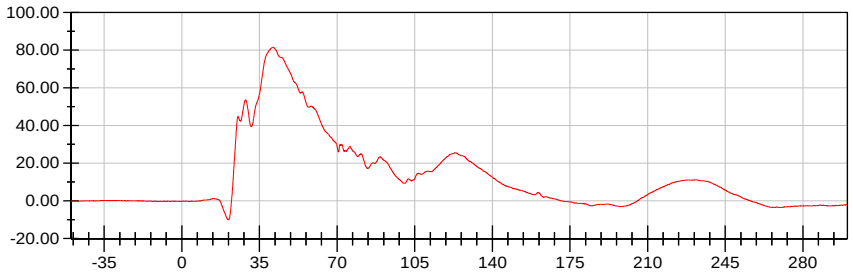
165.74 Nm at 40.30 ms

<Min>

-11.10 Nm at 274.25 ms

CFC_600

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



<Max>

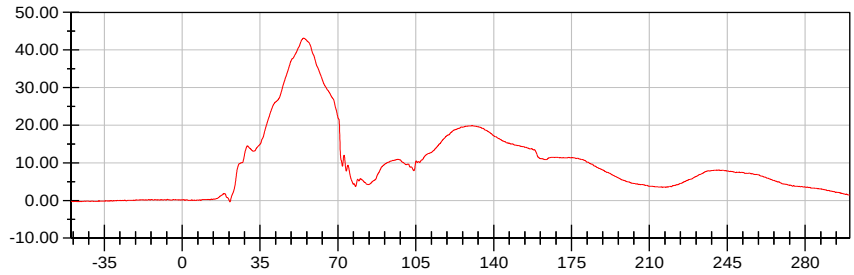
81.61 Nm at 40.95 ms

<Min>

-9.94 Nm at 21.05 ms

CFC_600

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



<Max>

43.16 Nm at 54.60 ms

<Min>

-0.33 Nm at 21.45 ms

CFC_600

VRTC

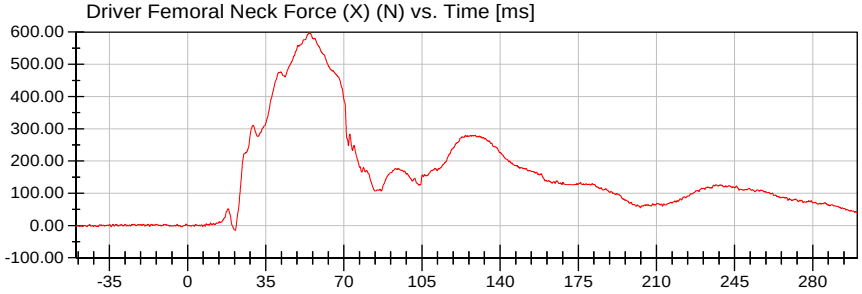
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Femoral Neck Force (X) (N) vs. Time [ms]



<Max>

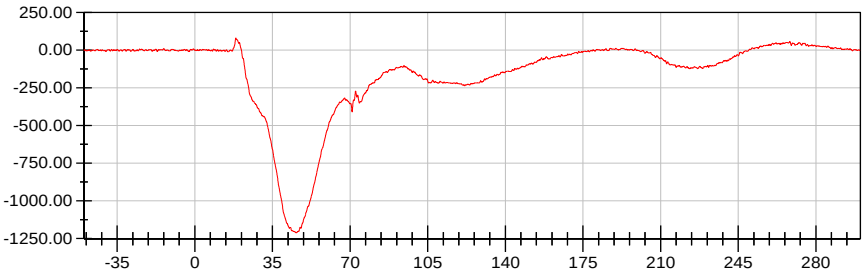
598.27 N at 54.55 ms

<Min>

-14.48 N at 21.40 ms

CFC_600

Driver Femoral Neck Force (Y) (N) vs. Time [ms]



<Max>

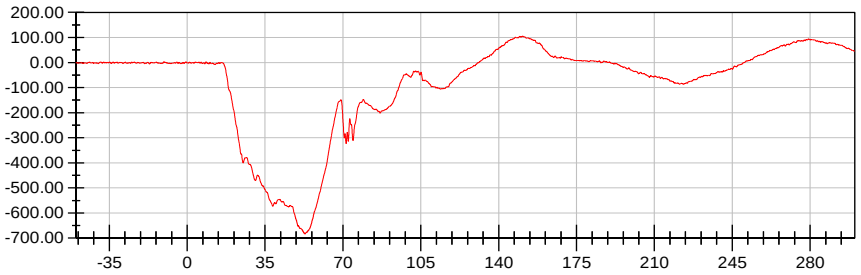
81.11 N at 18.50 ms

<Min>

-1,211.42 N at 45.65 ms

CFC_600

Driver Femoral Neck Force (Z) (N) vs. Time [ms]



<Max>

105.18 N at 150.75 ms

<Min>

-682.84 N at 52.95 ms

CFC_600

VRTC

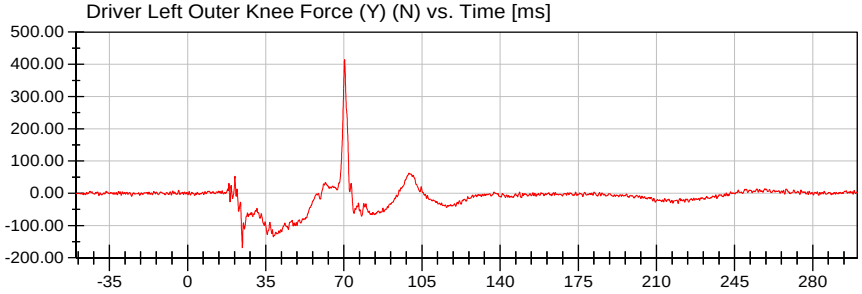
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Left Outer Knee Force (Y) (N) vs. Time [ms]



<Max>

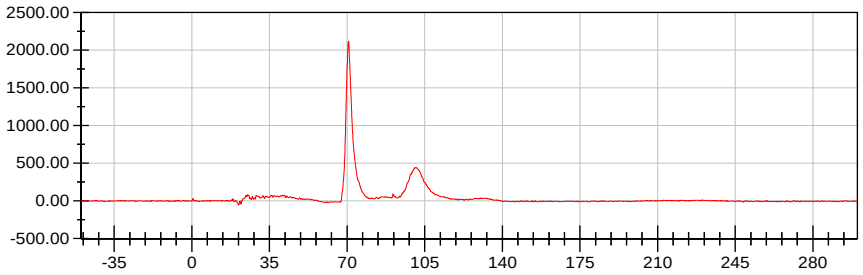
414.01 N at 70.35 ms

<Min>

-169.15 N at 24.55 ms

CFC_600

Driver Left Inner Knee Force (Y) (N) vs. Time [ms]



<Max>

2,121.10 N at 70.65 ms

<Min>

-54.74 N at 21.05 ms

CFC_600

VRTC

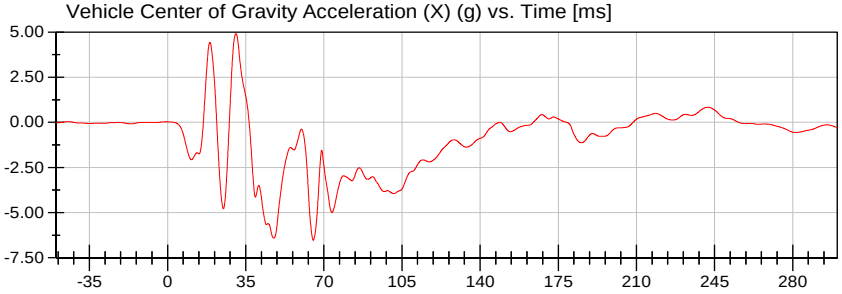
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

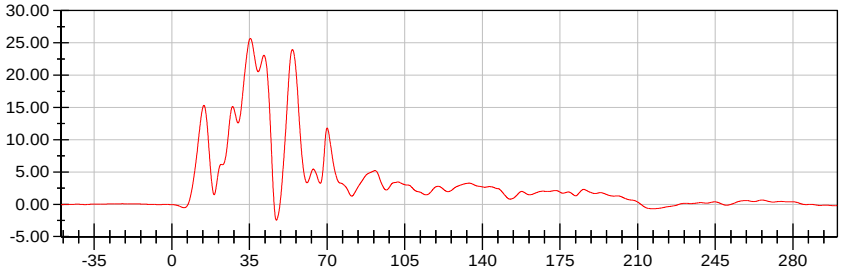
4.90 g at 30.60 ms

<Min>

-6.53 g at 65.25 ms

CFC_60

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



<Max>

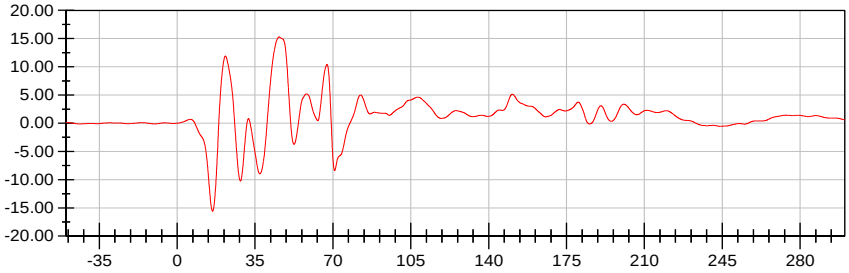
25.68 g at 35.40 ms

<Min>

-2.46 g at 47.15 ms

CFC_60

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



<Max>

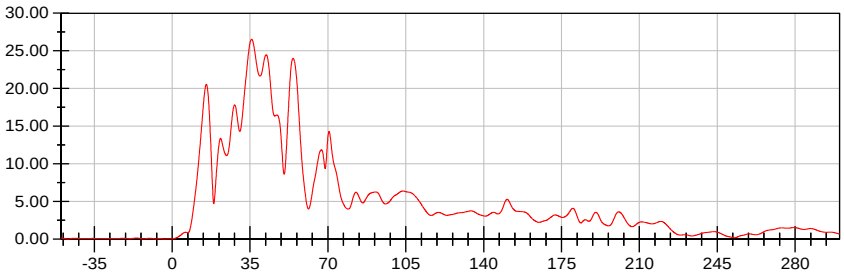
15.29 g at 45.80 ms

<Min>

-15.58 g at 15.95 ms

CFC_60

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



<Max>

26.53 g at 35.75 ms

<Min>

0.01 g at -46.85 ms

CFC_60

VRTC

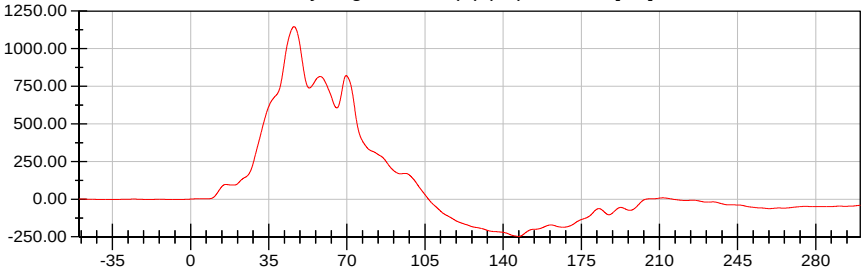
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Vehicle Center of Gravity Angular Rate (X) (º/s) vs. Time [ms]



<Max>

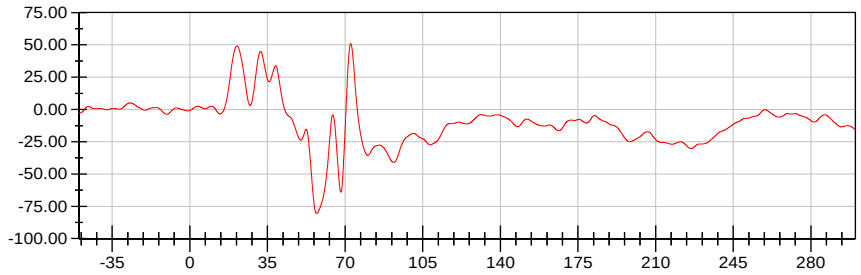
1,146.50 º/s at 46.35 ms

<Min>

-247.09 º/s at 146.95 ms

CFC_60

Vehicle Center of Gravity Angular Rate (Y) (º/s) vs. Time [ms]



<Max>

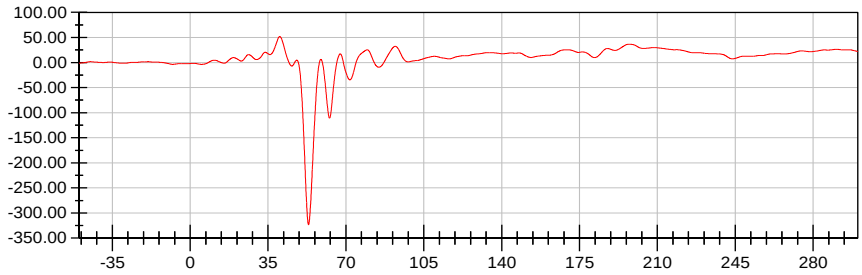
51.06 º/s at 72.55 ms

<Min>

-80.67 º/s at 57.20 ms

CFC_60

Vehicle Center of Gravity Angular Rate (Z) (º/s) vs. Time [ms]



<Max>

51.81 º/s at 40.25 ms

<Min>

-323.28 º/s at 53.20 ms

CFC_60

VRTC

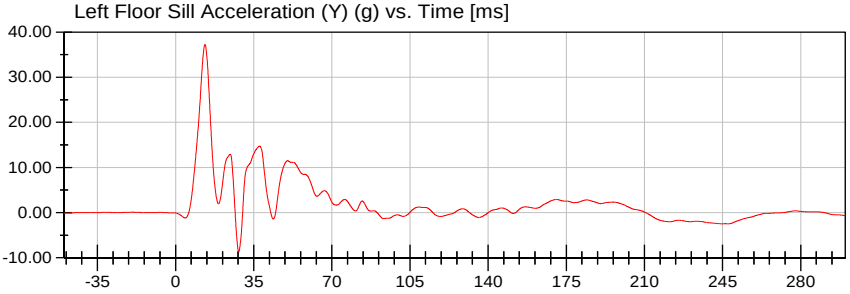
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

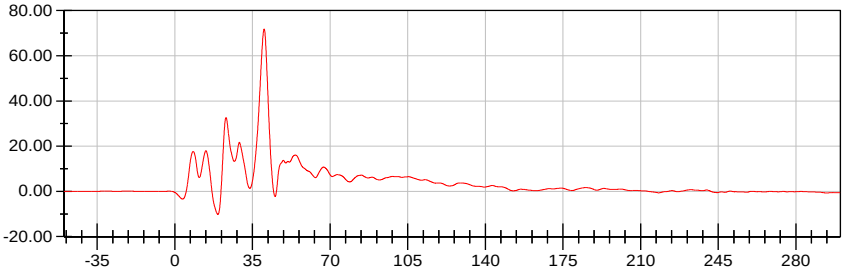
37.22 g at 13.15 ms

<Min>

-8.66 g at 28.30 ms

CFC_60

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



<Max>

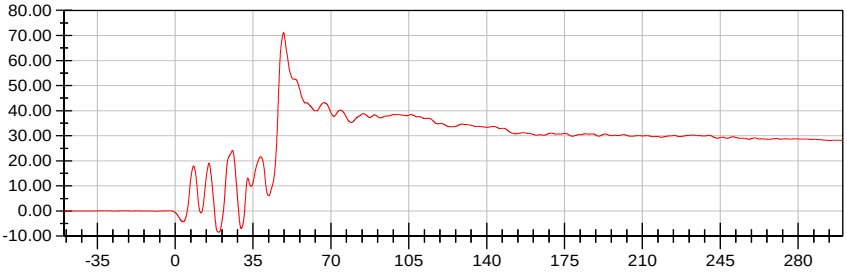
71.84 g at 40.30 ms

<Min>

-10.21 g at 19.45 ms

CFC_60

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



<Max>

71.15 g at 48.70 ms

<Min>

-8.47 g at 19.70 ms

CFC_60

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

<Max>

18.26 g at 49.45 ms

<Min>

-1.99 g at 4.05 ms

CFC_60

VRTC

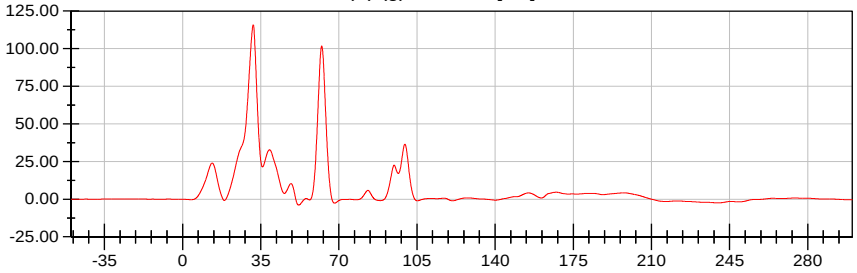
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

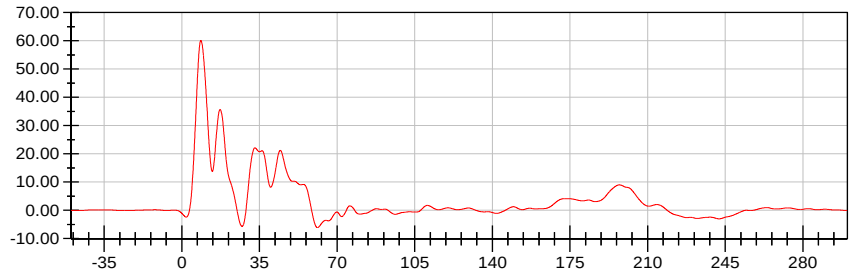
115.85 g at 31.65 ms

<Min>

-3.95 g at 52.00 ms

CFC_60

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



<Max>

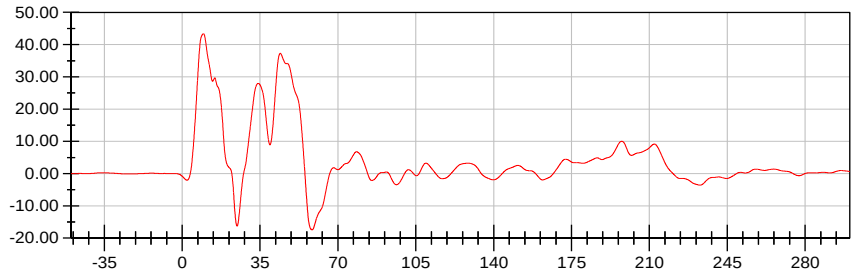
60.10 g at 8.60 ms

<Min>

-6.12 g at 61.20 ms

CFC_60

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



<Max>

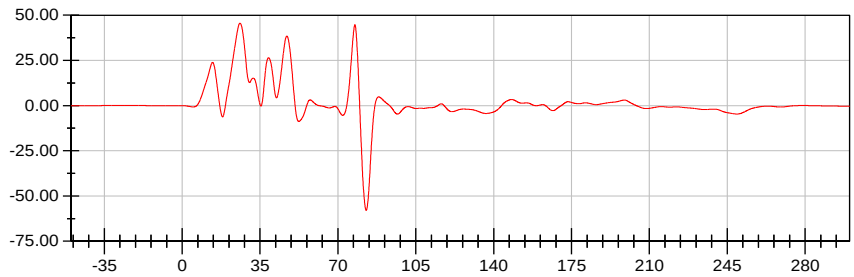
43.37 g at 9.55 ms

<Min>

-17.43 g at 58.40 ms

CFC_60

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



<Max>

45.57 g at 26.00 ms

<Min>

-57.95 g at 82.70 ms

CFC_60

VRTC

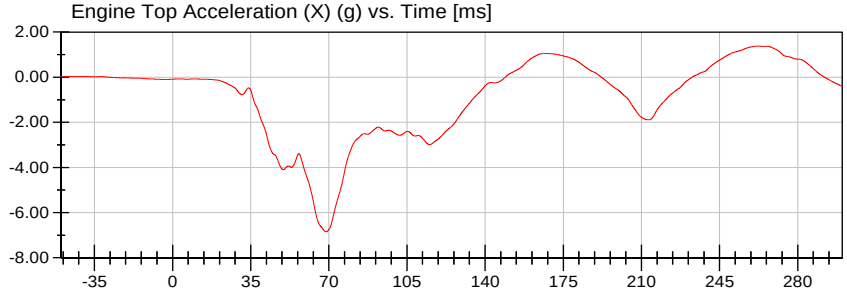
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Engine Top Acceleration (X) (g) vs. Time [ms]



<Max>

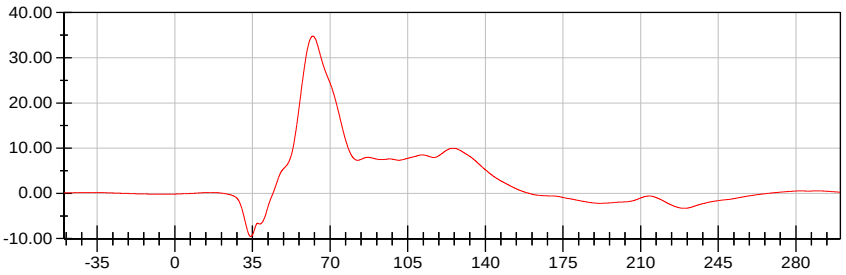
1.38 g at 262.05 ms

<Min>

-6.84 g at 68.70 ms

CFC_60

Engine Top Acceleration (Y) (g) vs. Time [ms]



<Max>

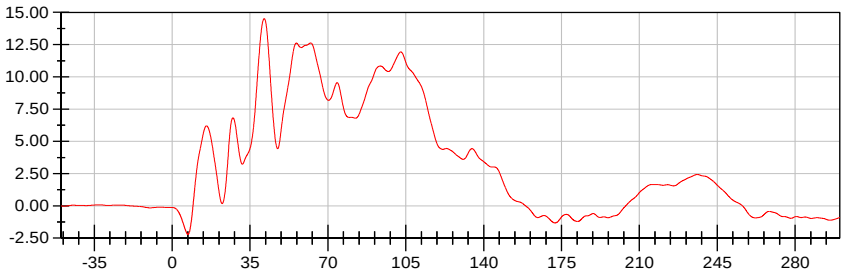
34.79 g at 62.20 ms

<Min>

-9.53 g at 34.20 ms

CFC_60

Firewall Center Acceleration (Y) (g) vs. Time [ms]



<Max>

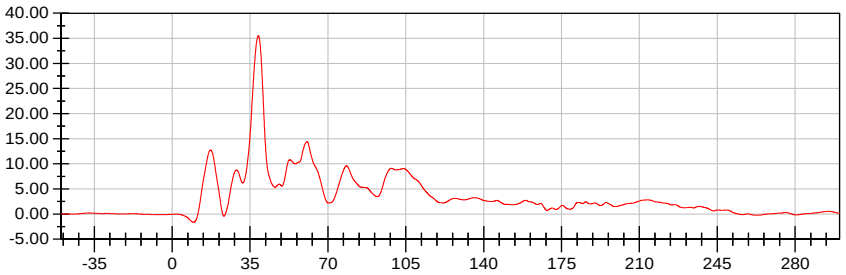
14.52 g at 41.35 ms

<Min>

-2.21 g at 7.10 ms

CFC_60

Right Roof at Vertical Impact Reference Line Acceleration (Y) (g) vs. Time [ms]



<Max>

35.51 g at 38.70 ms

<Min>

-1.63 g at 9.60 ms

CFC_60

VRTC

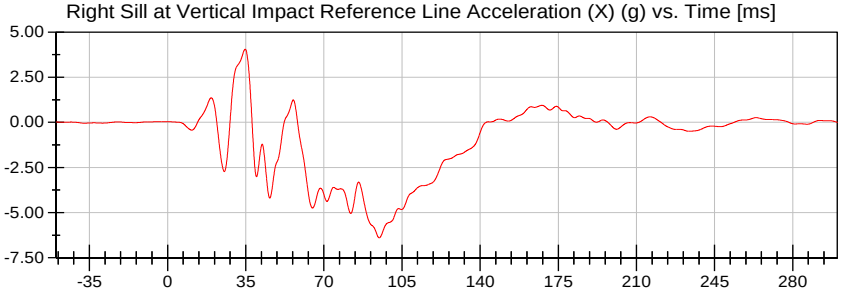
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Right Sill at Vertical Impact Reference Line Acceleration (X) (g) vs. Time [ms]



<Max>

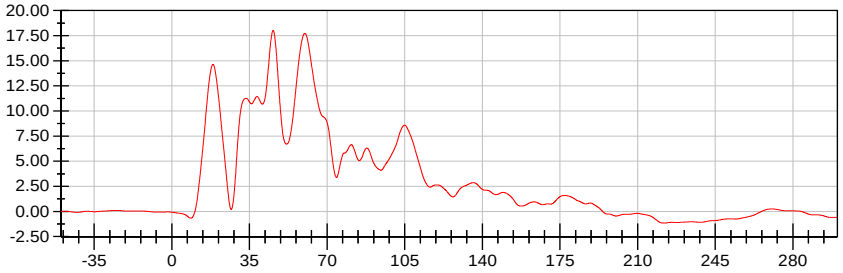
4.05 g at 34.75 ms

<Min>

-6.40 g at 94.80 ms

CFC_60

Right Sill at Vertical Impact Reference Line Acceleration (Y) (g) vs. Time [ms]



<Max>

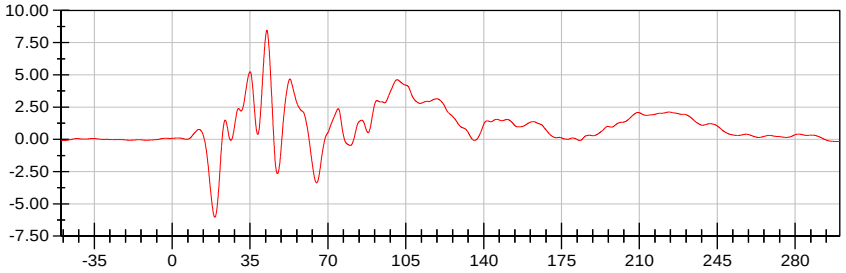
18.03 g at 45.65 ms

<Min>

-1.15 g at 221.65 ms

CFC_60

Right Sill at Vertical Impact Reference Line Acceleration (Z) (g) vs. Time [ms]



<Max>

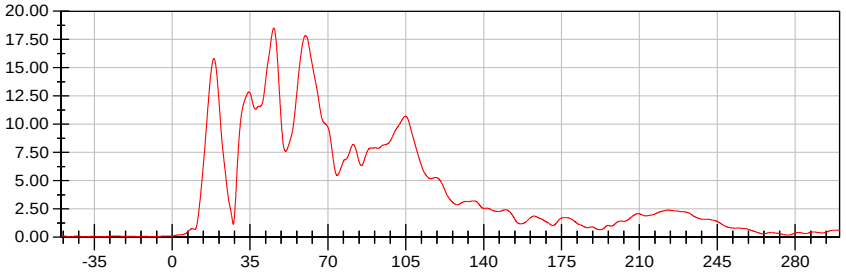
8.46 g at 42.55 ms

<Min>

-6.04 g at 19.20 ms

CFC_60

Right Sill at Vertical Impact Reference Line Acceleration Resultant (g) vs. Time [ms]



<Max>

18.51 g at 45.70 ms

<Min>

0.02 g at -45.65 ms

CFC_60

VRTC

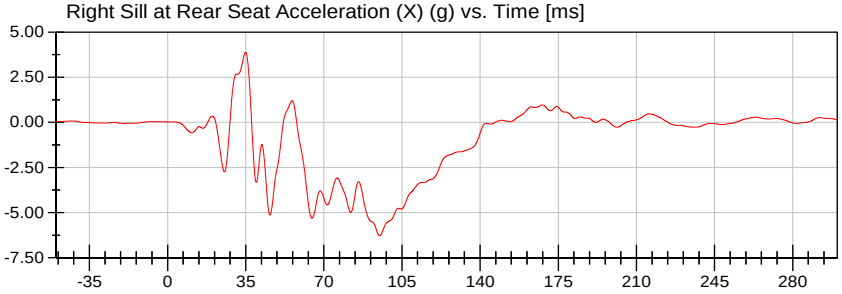
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Right Sill at Rear Seat Acceleration (X) (g) vs. Time [ms]



<Max>

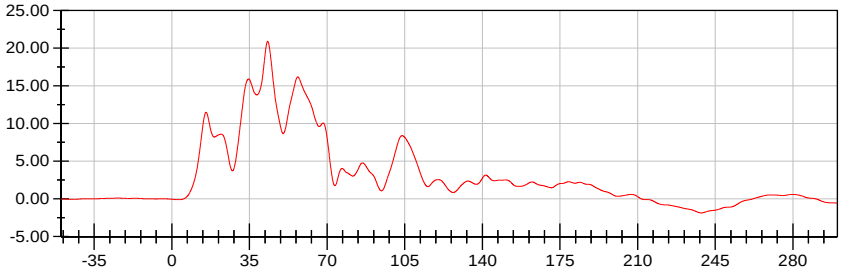
3.88 g at 34.90 ms

<Min>

-6.28 g at 94.90 ms

CFC_60

Right Sill at Rear Seat Acceleration (Y) (g) vs. Time [ms]



<Max>

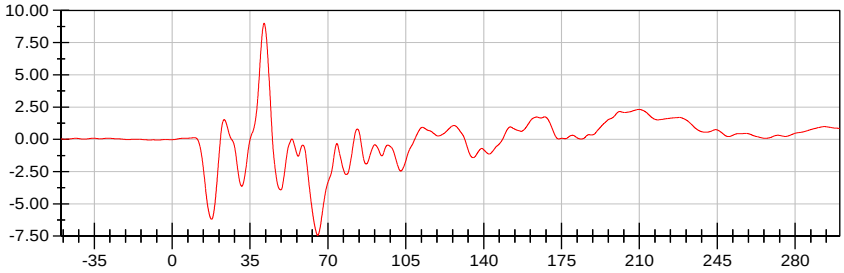
20.93 g at 43.20 ms

<Min>

-1.87 g at 238.70 ms

CFC_60

Right Sill at Rear Seat Acceleration (Z) (g) vs. Time [ms]



<Max>

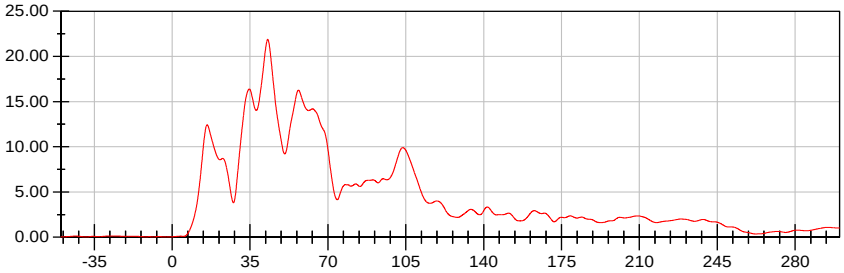
9.00 g at 41.30 ms

<Min>

-7.44 g at 65.40 ms

CFC_60

Right Sill at Rear Seat Acceleration Resultant (g) vs. Time [ms]



<Max>

21.88 g at 42.95 ms

<Min>

0.04 g at -1.95 ms

CFC_60

VRTC

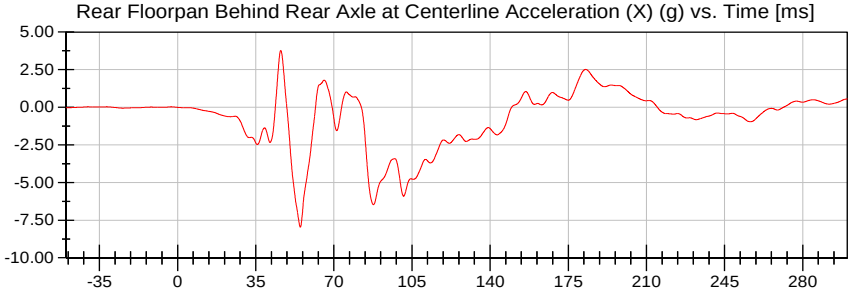
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Rear Floorpan Behind Rear Axle at Centerline Acceleration (X) (g) vs. Time [ms]



<Max>

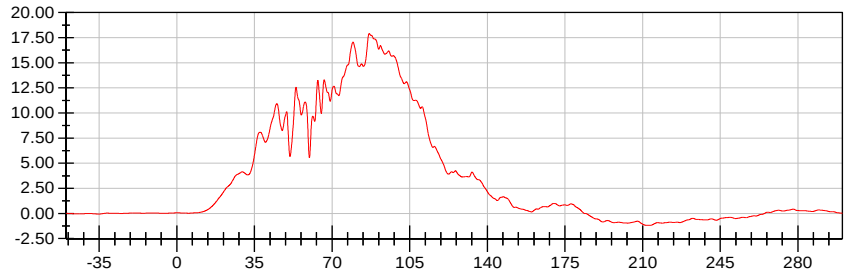
3.77 g at 46.25 ms

<Min>

-7.97 g at 55.00 ms

CFC_60

Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y) (g) vs. Time [ms]



<Max>

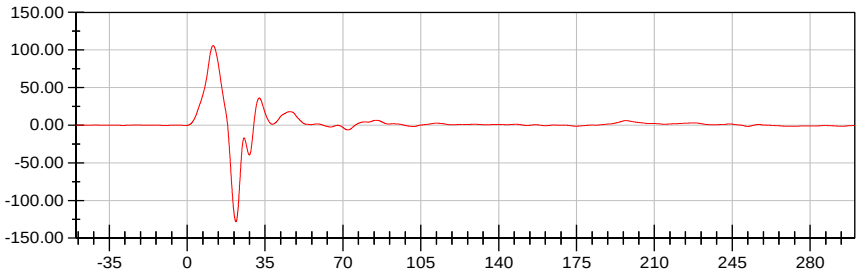
17.91 g at 86.75 ms

<Min>

-1.18 g at 213.35 ms

CFC_60

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



<Max>

105.99 g at 11.65 ms

<Min>

-128.33 g at 21.90 ms

CFC_60

VRTC

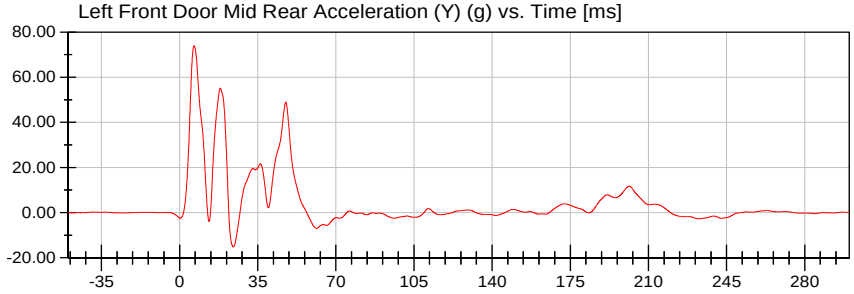
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

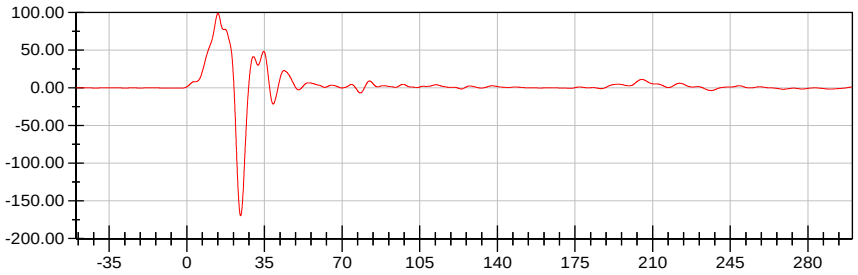
73.91 g at 6.50 ms

<Min>

-15.17 g at 24.05 ms

CFC_60

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



<Max>

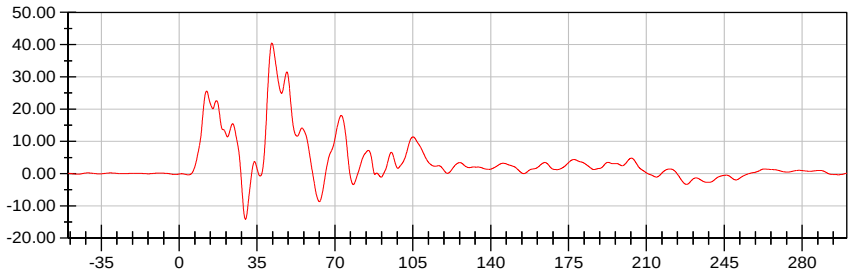
99.08 g at 14.05 ms

<Min>

-169.61 g at 24.25 ms

CFC_60

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



<Max>

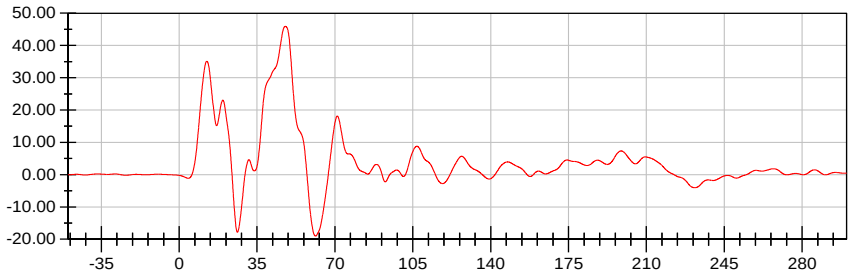
40.49 g at 41.65 ms

<Min>

-14.16 g at 29.80 ms

CFC_60

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



<Max>

45.91 g at 47.70 ms

<Min>

-19.03 g at 61.25 ms

CFC_60

VRTC

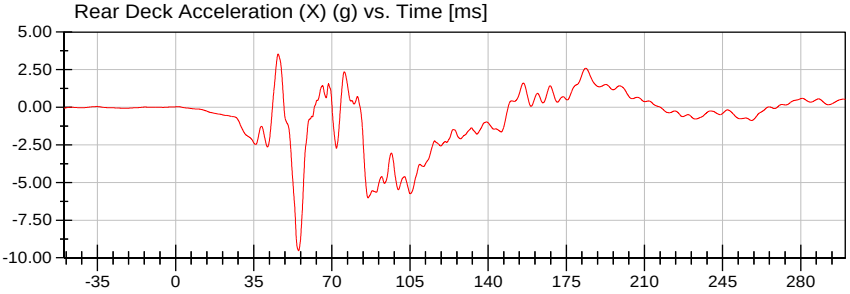
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Rear Deck Acceleration (X) (g) vs. Time [ms]



<Max>

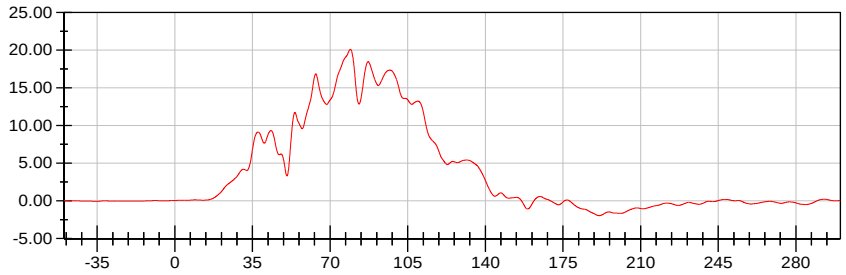
3.54 g at 45.95 ms

<Min>

-9.53 g at 55.10 ms

CFC_60

Rear Deck Acceleration (Y) (g) vs. Time [ms]



<Max>

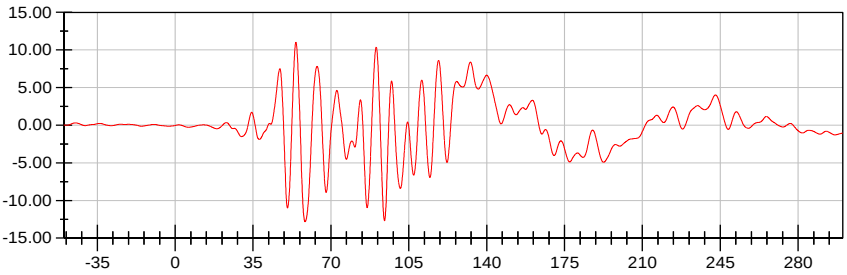
20.12 g at 79.15 ms

<Min>

-1.96 g at 191.30 ms

CFC_60

Rear Deck Acceleration (Z) (g) vs. Time [ms]



<Max>

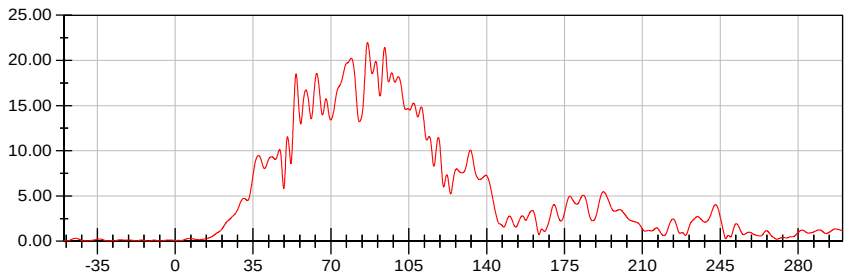
11.02 g at 54.30 ms

<Min>

-12.81 g at 58.40 ms

CFC_60

Rear Deck Acceleration Resultant (g) vs. Time [ms]



<Max>

21.97 g at 86.45 ms

<Min>

0.01 g at -39.25 ms

CFC_60

VRTC

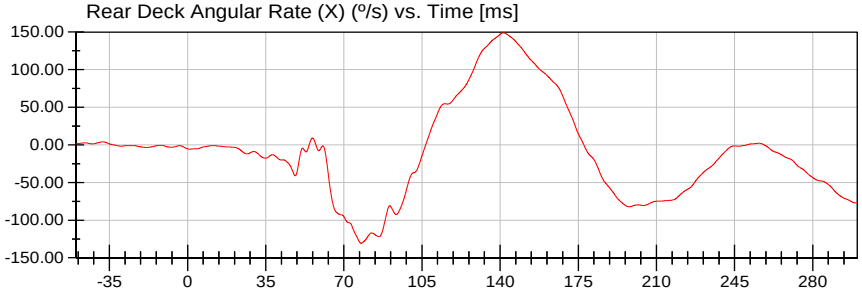
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

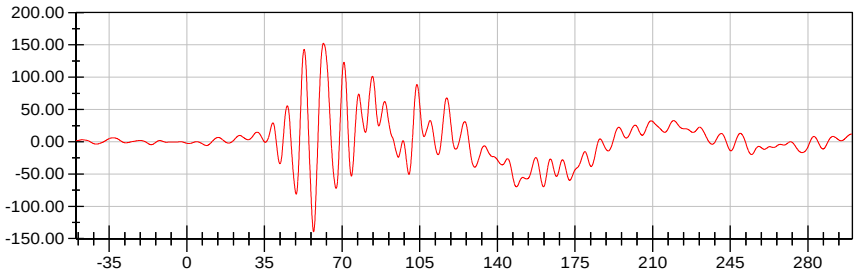
148.94 º/s at 141.45 ms

<Min>

-130.76 º/s at 77.75 ms

CFC_60

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



<Max>

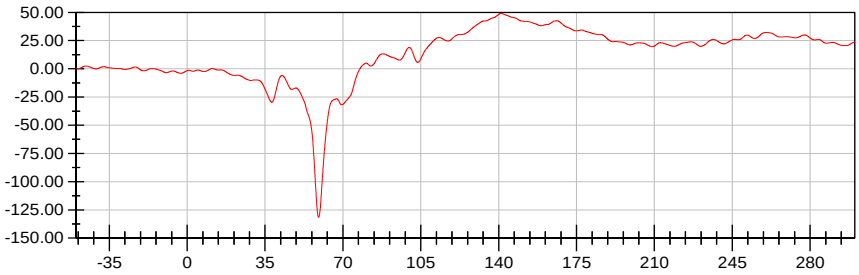
152.57 º/s at 61.60 ms

<Min>

-139.58 º/s at 57.15 ms

CFC_60

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



<Max>

49.05 º/s at 141.15 ms

<Min>

-131.58 º/s at 59.05 ms

CFC_60

VRTC

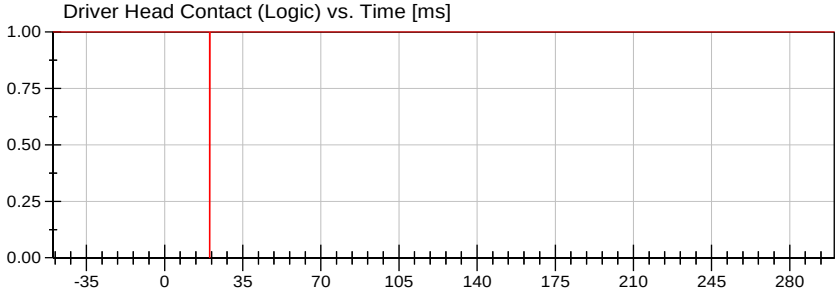
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

Driver Head Contact (Logic) vs. Time [ms]



<Max>

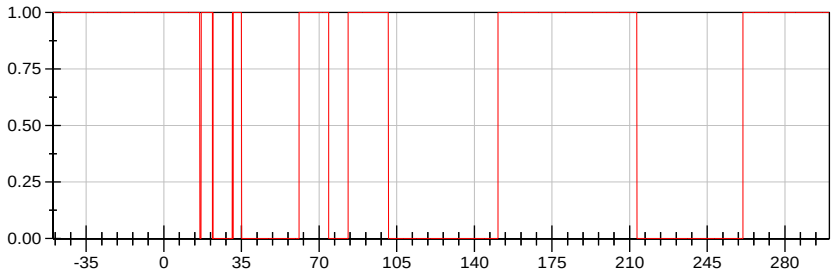
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 20.10 ms

Unfiltered

Driver Shoulder Contact (Logic) vs. Time [ms]



<Max>

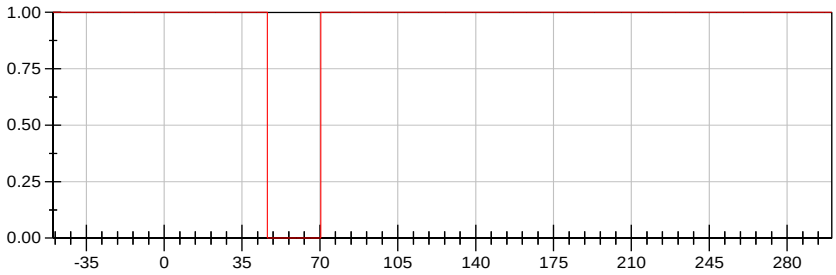
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 16.25 ms

Unfiltered

Driver Thorax Contact (Logic) vs. Time [ms]



<Max>

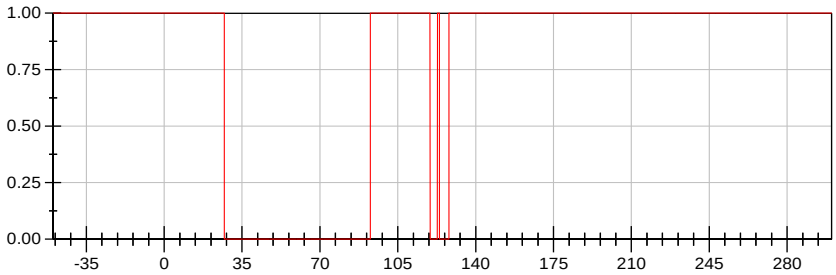
1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 46.45 ms

Unfiltered

Driver Pelvis Contact (Logic) vs. Time [ms]



<Max>

1.00 Logic at -50.00 ms

<Min>

0.00 Logic at 27.05 ms

Unfiltered

VRTC

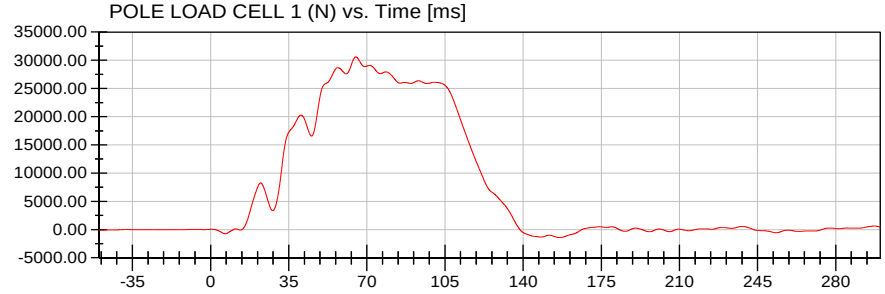
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

POLE LOAD CELL 1 (N) vs. Time [ms]



<Max>

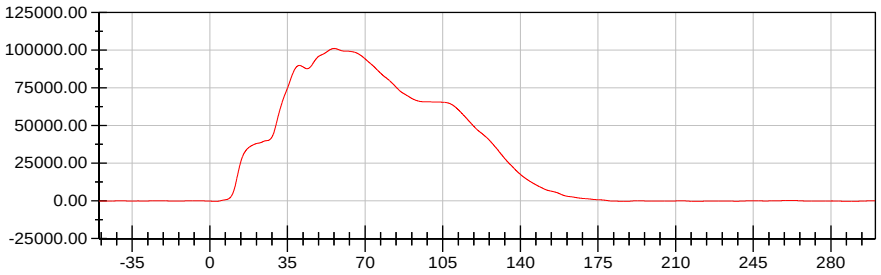
30,594.63 N at 65.10 ms

<Min>

-1,429.25 N at 156.45 ms

CFC_60

POLE LOAD CELL 2 (N) vs. Time [ms]



<Max>

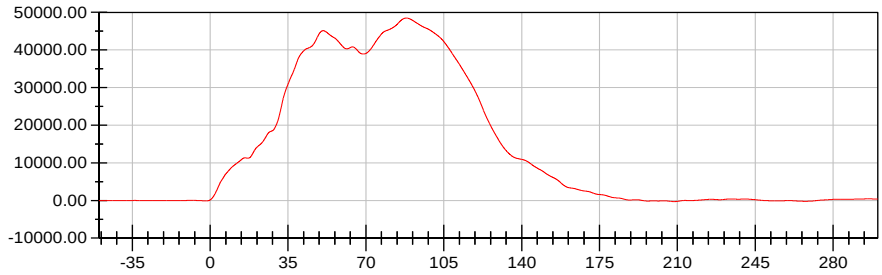
101,184.20 N at 56.05 ms

<Min>

-308.90 N at 187.35 ms

CFC_60

POLE LOAD CELL 3 (N) vs. Time [ms]



<Max>

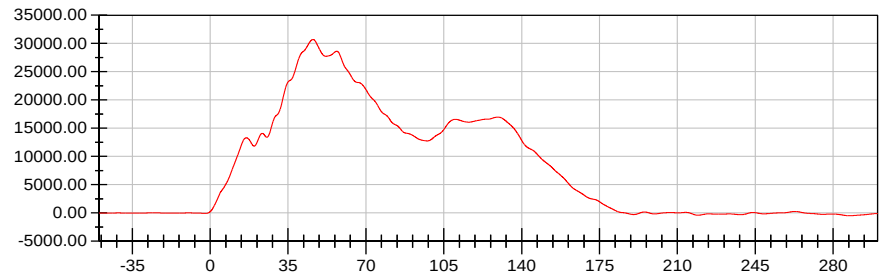
48,471.90 N at 88.15 ms

<Min>

-275.33 N at 208.50 ms

CFC_60

POLE LOAD CELL 4 (N) vs. Time [ms]



<Max>

30,716.88 N at 46.20 ms

<Min>

-487.77 N at 287.30 ms

CFC_60

VRTC

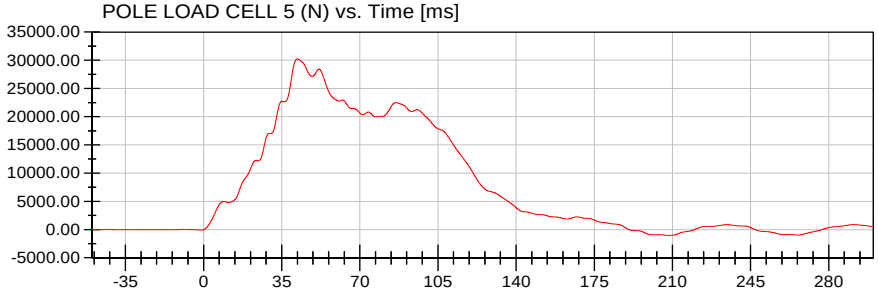
Test Date: 04/08/2021

Position #1 (11WS)

Test Lab: CTF

Test Number: 210408 ()

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



<Max>

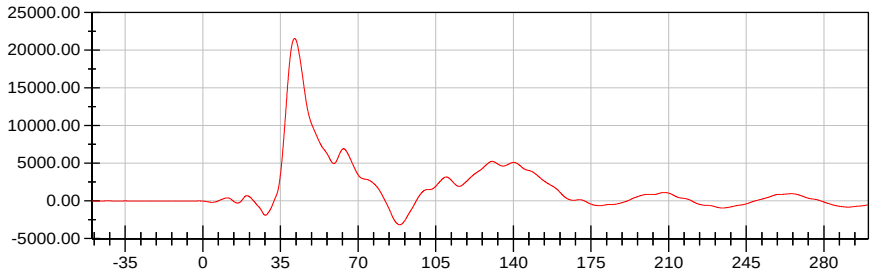
30,229.77 N at 42.05 ms

<Min>

-1,032.74 N at 208.55 ms

CFC_60

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



<Max>

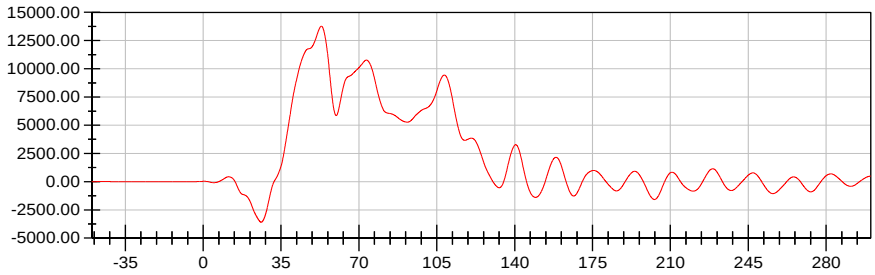
21,560.10 N at 41.40 ms

<Min>

-3,152.94 N at 88.80 ms

CFC_60

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



<Max>

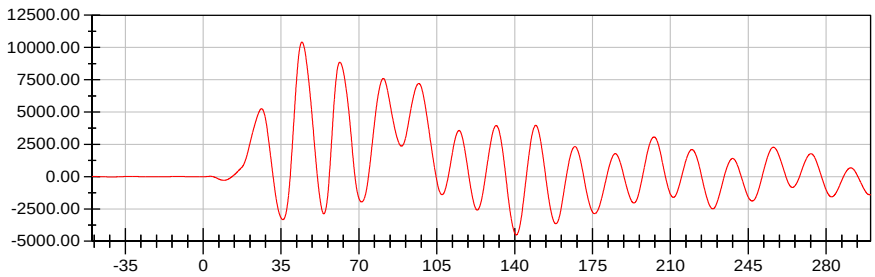
13,772.66 N at 53.10 ms

<Min>

-3,591.58 N at 26.10 ms

CFC_60

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



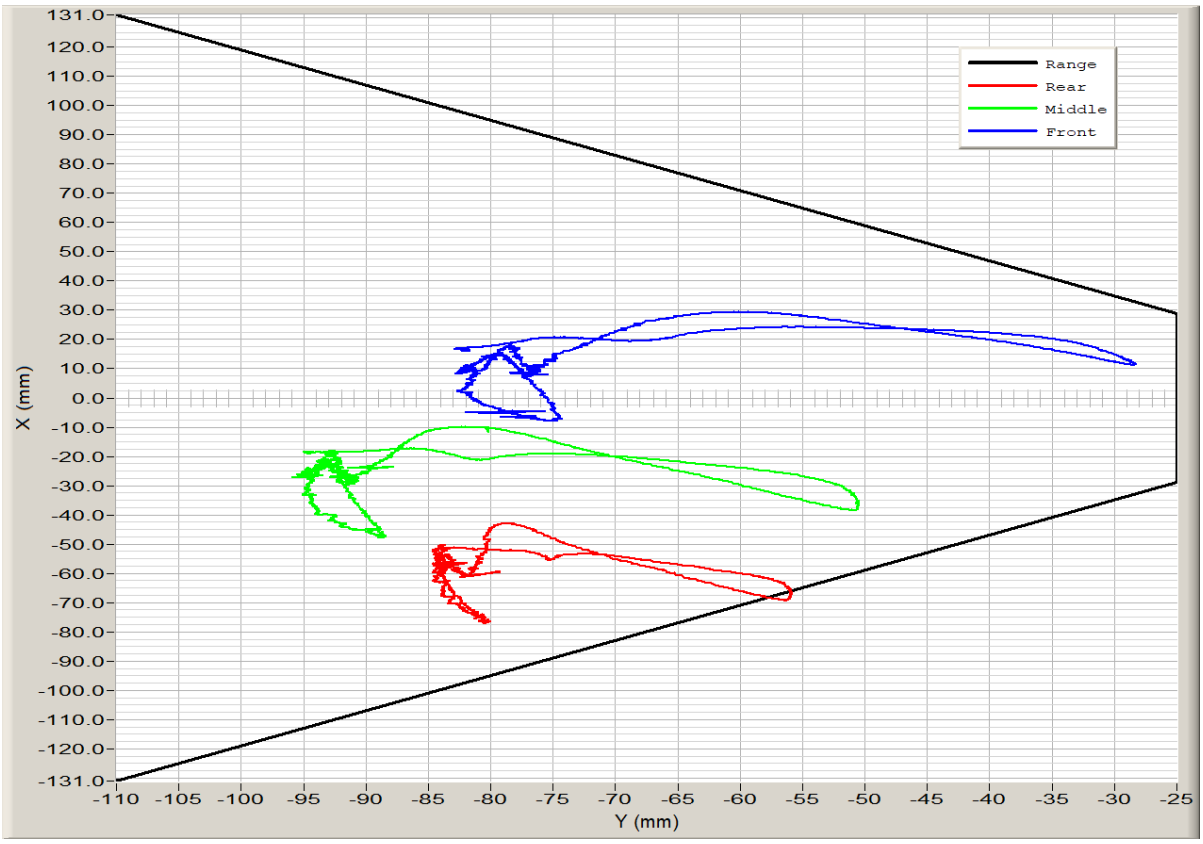
<Max>

10,418.19 N at 44.40 ms

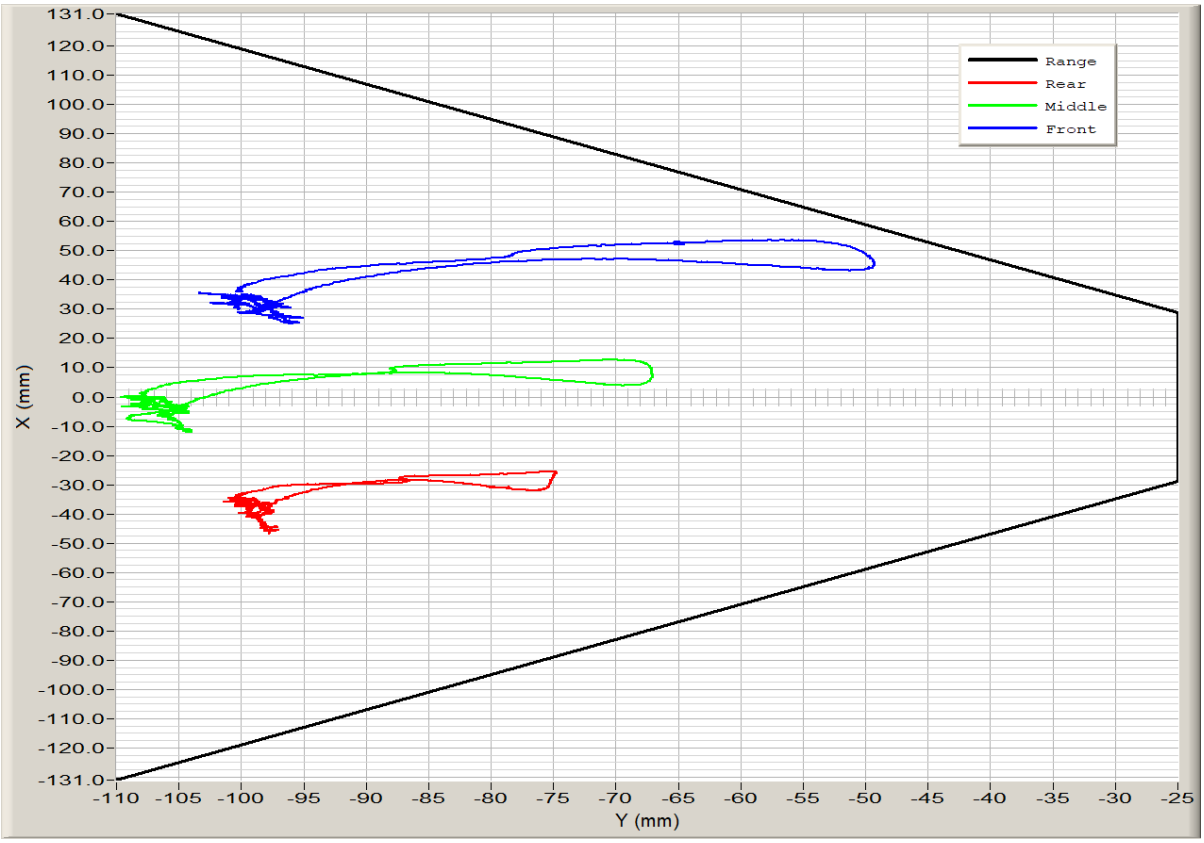
<Min>

-4,513.03 N at 140.75 ms

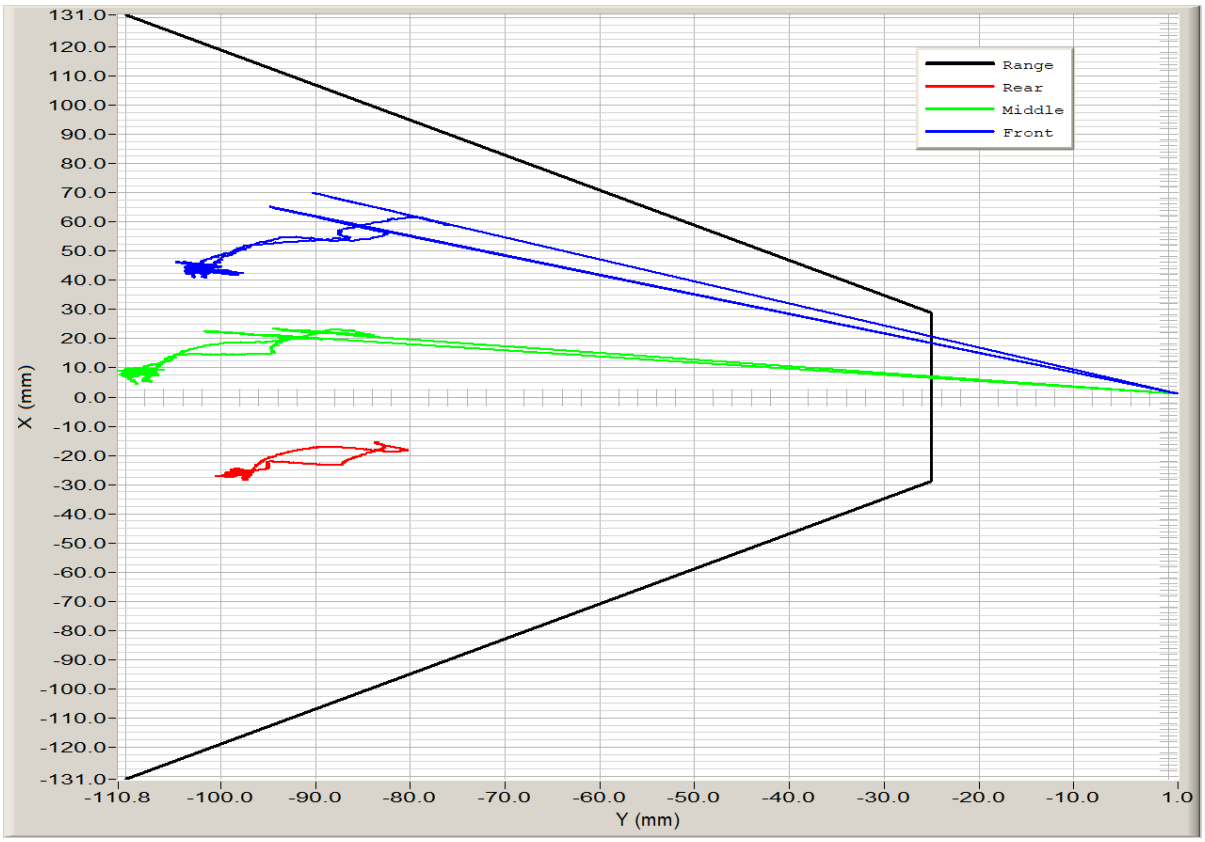
CFC_60



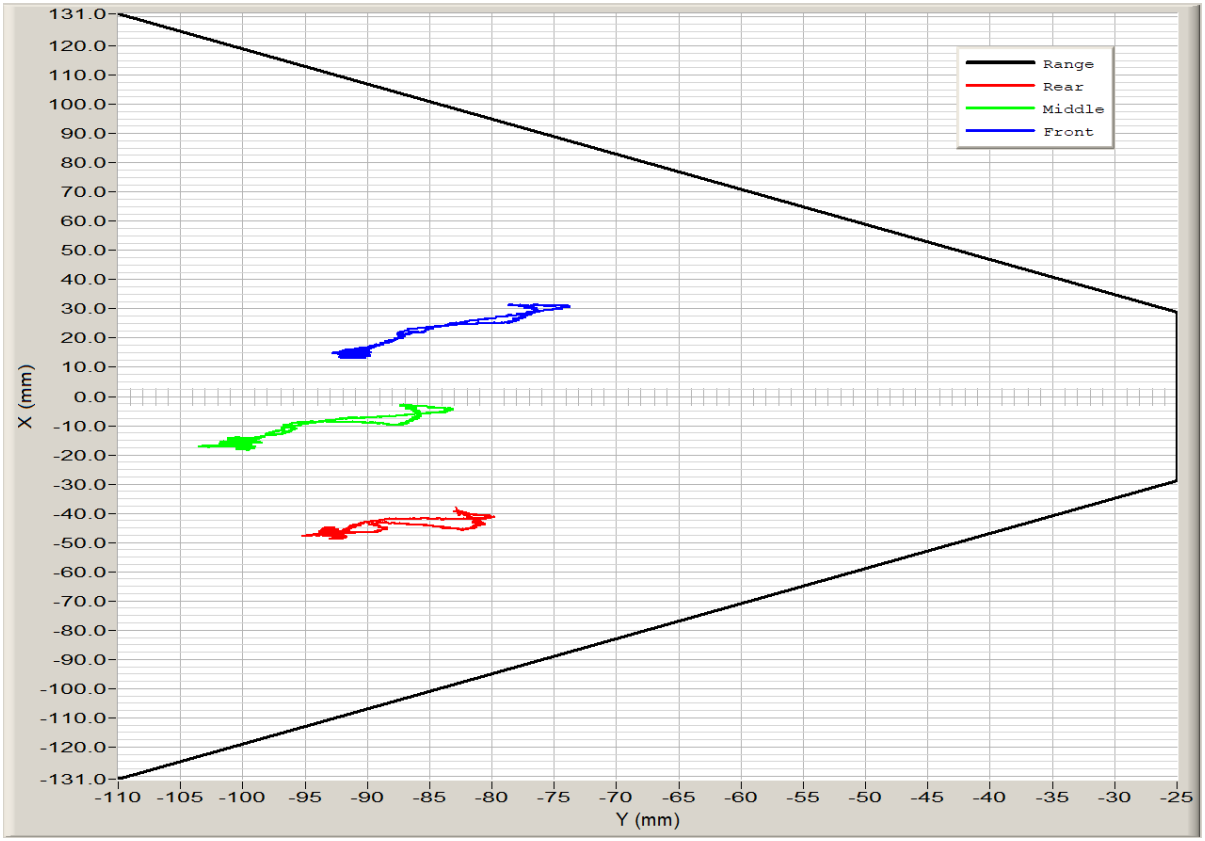
Shoulder_XY



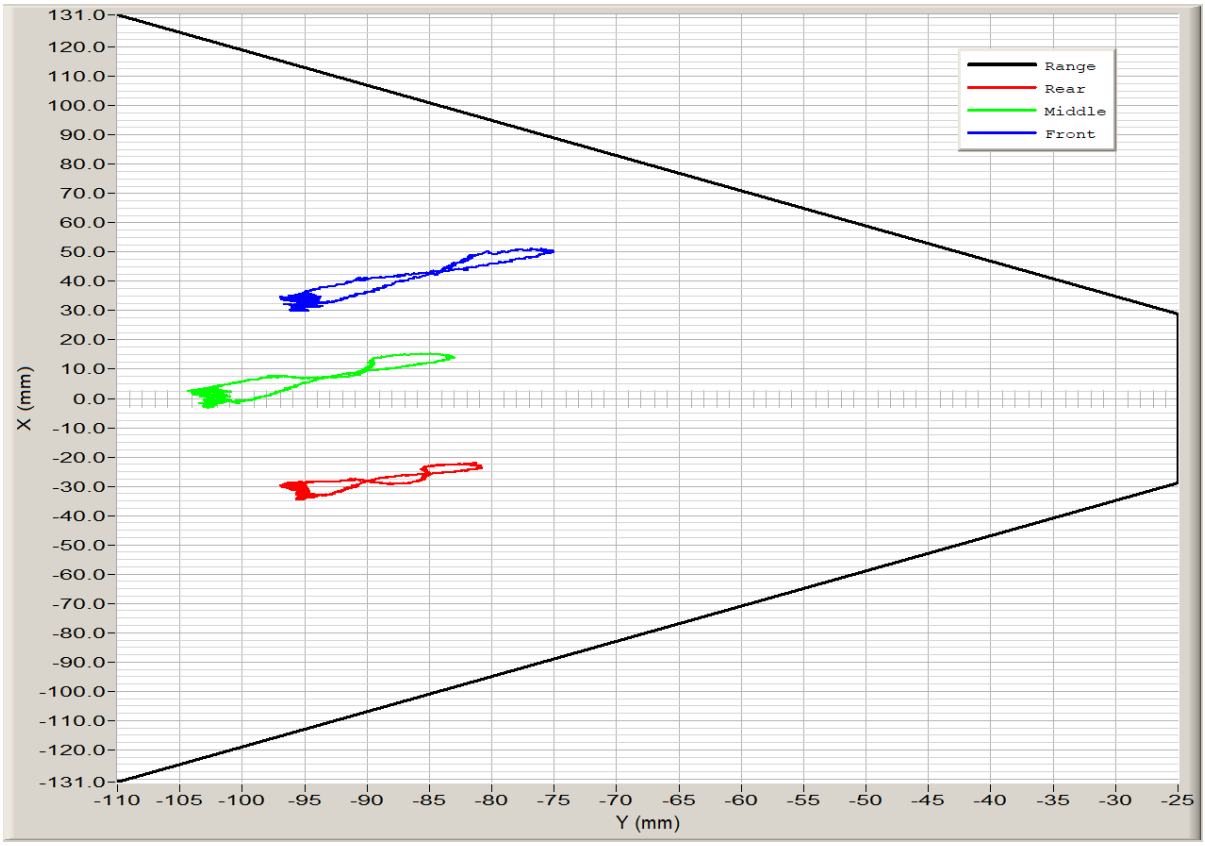
Thorax_1_XY



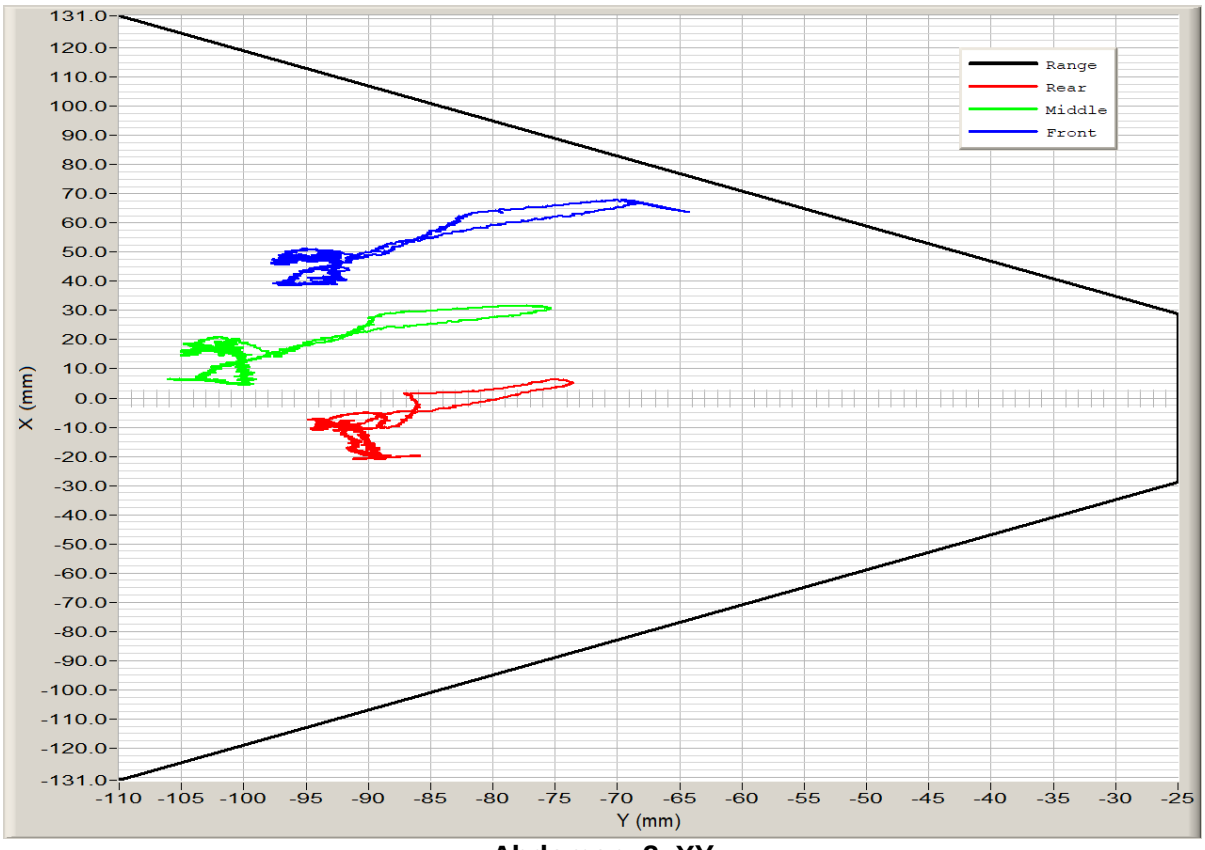
Thorax_2_XY



Thorax_3_XY



Abdomen_1_XY



Abdomen_2_XY

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 Occiptal 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 Occiptal 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.
WorldSID-50M
External Measurments
Serial No. EB8888 Certification No. 09

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	2.2	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	33.1	33.9

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	89
Hip Pivot to Back Line	L3	n/a	187	177
Thigh Clearance	L4	n/a	181	180
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. 9-1
Test Date: 3/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	211 - 261 g	234.5 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	7.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.33 %	Yes

Test meets specifications.

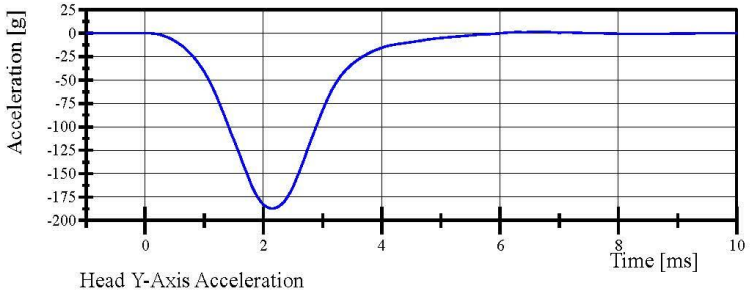
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

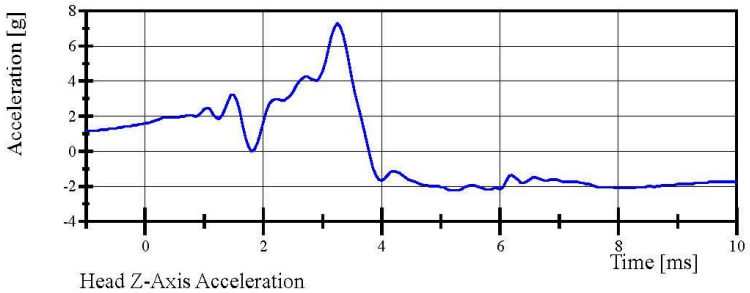
Front Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Head X-Axis Acceleration



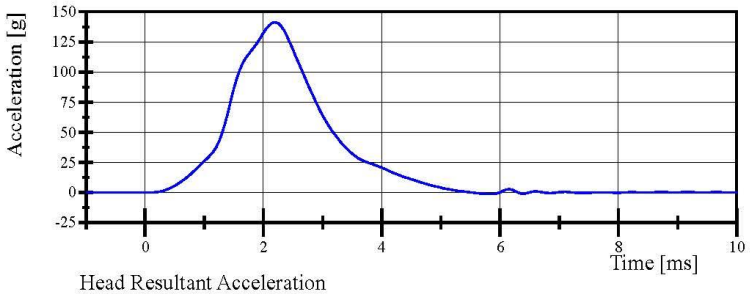
Filter Class: CFC_1000
Max: 1.8 g at 6.7 ms
Min: -187.3 g at 2.2 ms

Head Y-Axis Acceleration



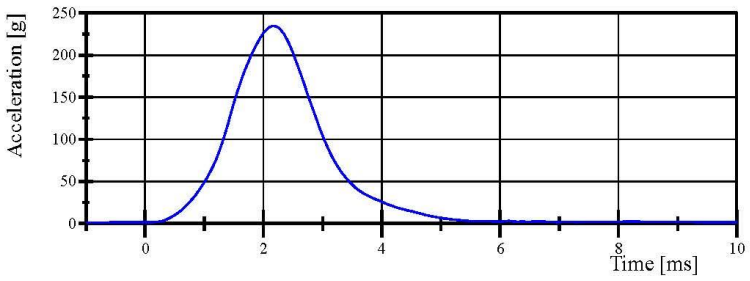
Filter Class: CFC_1000
Max: 7.3 g at 3.3 ms
Min: -2.2 g at 5.2 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 141.5 g at 2.2 ms
Min: -1.2 g at 5.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 234.5 g at 2.2 ms
Min: 1.2 g at -1.0 ms

Transportation Research Center Inc.

Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	41 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	113.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	1.9 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.20 %	Yes

Test meets specifications.

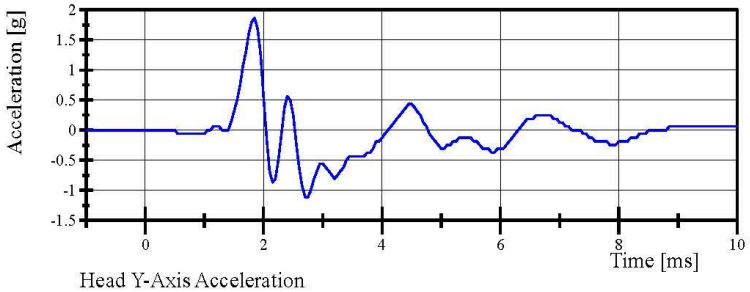
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

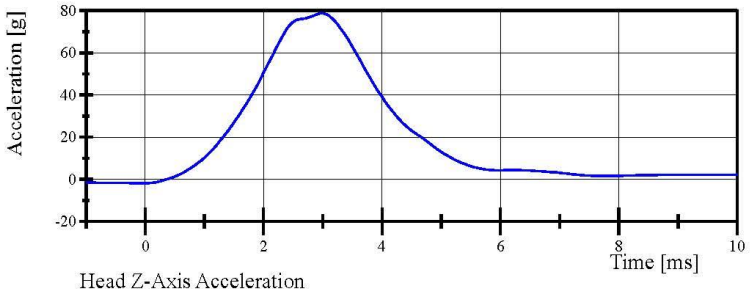
Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Head X-Axis Acceleration



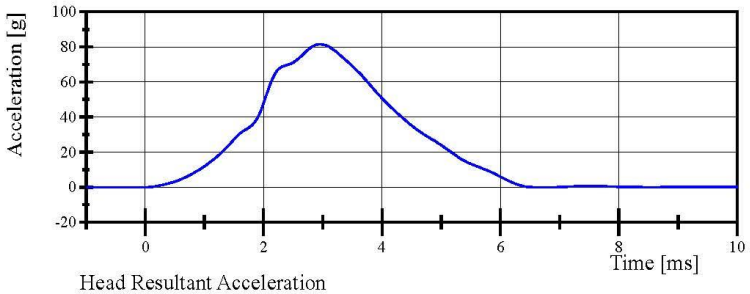
Filter Class: CFC_1000
Max: 1.9 g at 1.9 ms
Min: -1.1 g at 2.7 ms

Head Y-Axis Acceleration



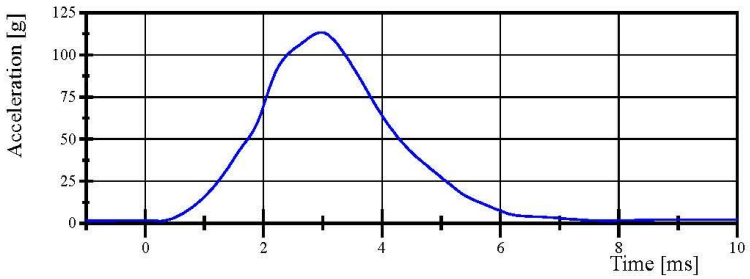
Filter Class: CFC_1000
Max: 78.8 g at 3.0 ms
Min: -1.8 g at -0.1 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 81.5 g at 3.0 ms
Min: -0.1 g at -1.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 113.3 g at 3.0 ms
Min: 1.4 g at 0.3 ms

Transportation Research Center Inc.

Right Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	116.3 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-3.7 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.53 %	Yes

Test meets specifications.

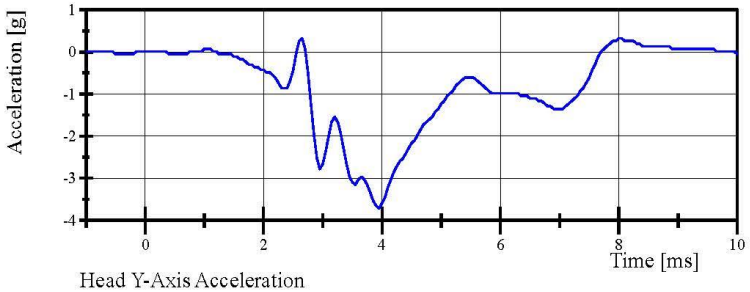
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

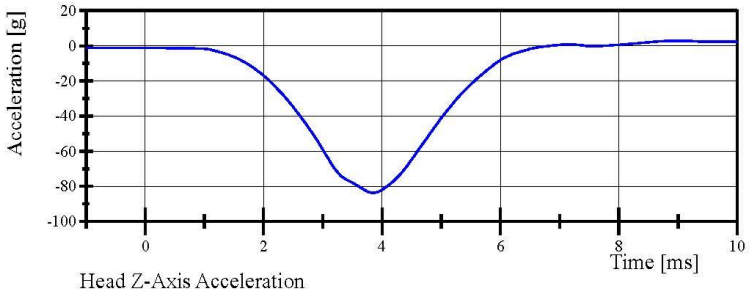
Right Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Head X-Axis Acceleration



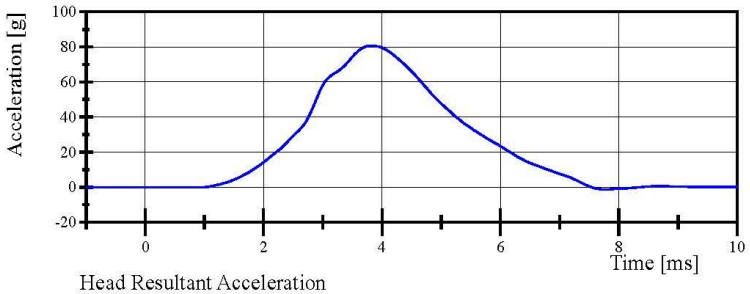
Filter Class: CFC_1000
Max: 0.3 g at 2.7 ms
Min: -3.7 g at 4.0 ms

Head Y-Axis Acceleration



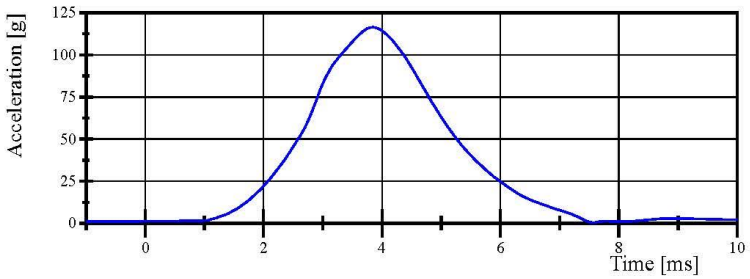
Filter Class: CFC_1000
Max: 2.8 g at 8.9 ms
Min: -83.8 g at 3.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 80.7 g at 3.8 ms
Min: -1.3 g at 7.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 116.3 g at 3.9 ms
Min: 0.5 g at 7.6 ms

Transportation Research Center Inc.

Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 ℃	21.2 ℃	Yes
Relative Humidity	10 - 70 %	39 %	Yes
Pendulum Velocity	(-3.30) - (-3.50) m/s	-3.323 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	0.87 - 1.09 m/s	1.001 m/s	Yes
Change at 8 ms	1.72 - 2.1 m/s	1.952 m/s	Yes
Change at 12 ms	2.63 - 3.17 m/s	2.940 m/s	Yes
Maximum Headform Flexion	(-50) - (-61) deg	-53.4 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	60.6 ms	Yes
Total Neck Occipital Condyles Moment	54 - 67 N·m	59.3 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	75.9 ms	Yes
Maximum Forward Pot Rotation			
Peak	(-32) - (-39) °	-34.6 °	Yes
Time of Peak	56 - 68 ms	61.7 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-29) - (-36) °	-31.0 °	Yes
Time of Peak	56 - 68 ms	61.9 ms	Yes
Maximum Headform Angular Rate	(-2,047) - (-2,503) °/s	-2,278.2 °/s	Yes

Test meets specifications.

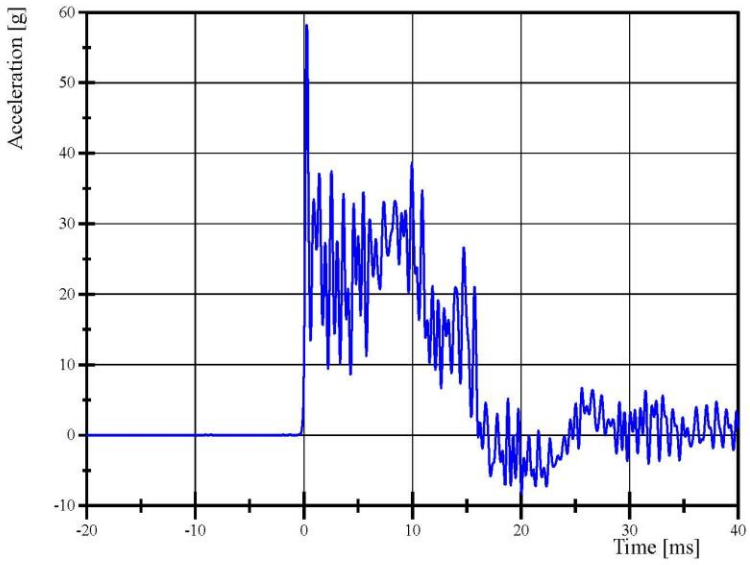
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

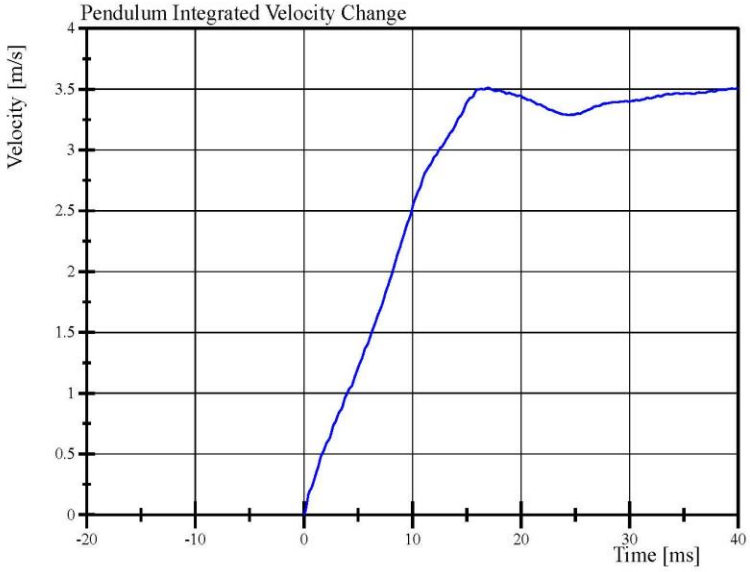
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 58.2 g at 0.3 ms
Min: -8.3 g at 20.1 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_1000
Max: 3.5 m/s at 17.0 ms
Min: 0.0 m/s at -0.0 ms

Specification Source: WordSID 50th(WS) VRTC Nov 2020.xlsx
WorldSID 50th_Qalification Manual 11_09_2020

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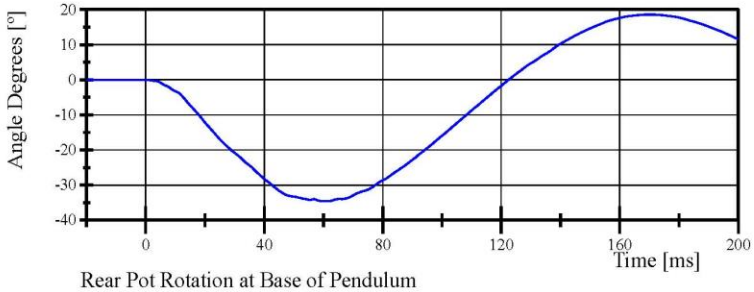
Transportation Research Center Inc.

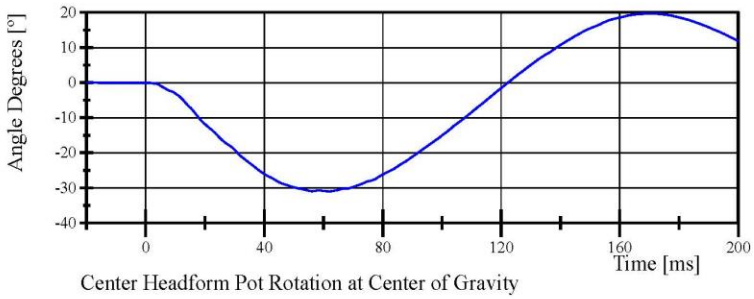
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Forward Pot Rotation at Base of Pendulum



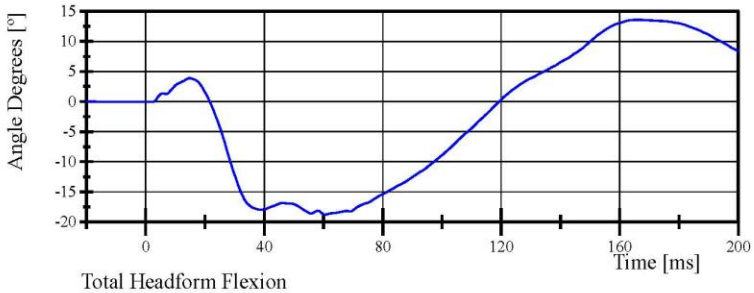
Filter Class: CFC_180
Max: 18.6 ° at 170.2 ms
Min: -34.6 ° at 61.7 ms

Rear Pot Rotation at Base of Pendulum



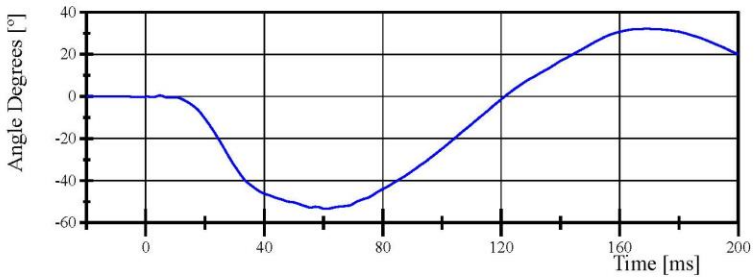
Filter Class: CFC_180
Max: 19.7 ° at 170.9 ms
Min: -31.0 ° at 61.9 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 13.6 ° at 165.6 ms
Min: -18.8 ° at 60.5 ms

Total Headform Flexion

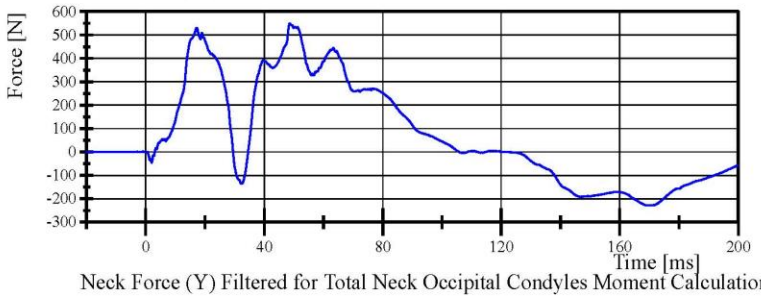


Filter Class: CFC_180
Max: 32.1 ° at 169.2 ms
Min: -53.4 ° at 60.6 ms

Transportation Research Center Inc.

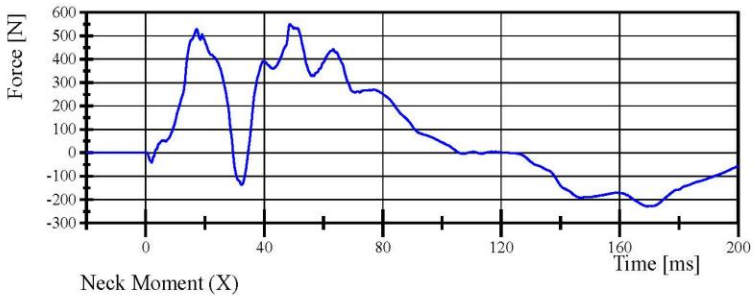
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Neck Force (Y)



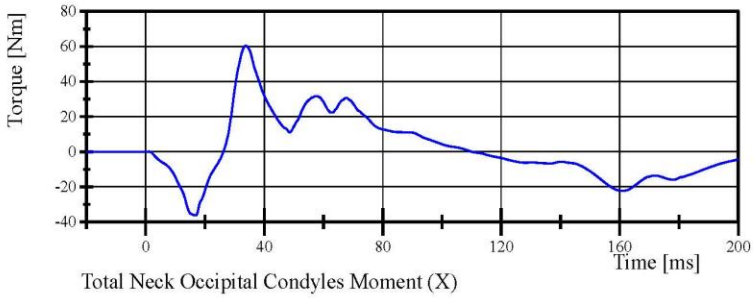
Filter Class: CFC_1000
Max: 550.1 N at 48.6 ms
Min: -228.5 N at 169.1 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



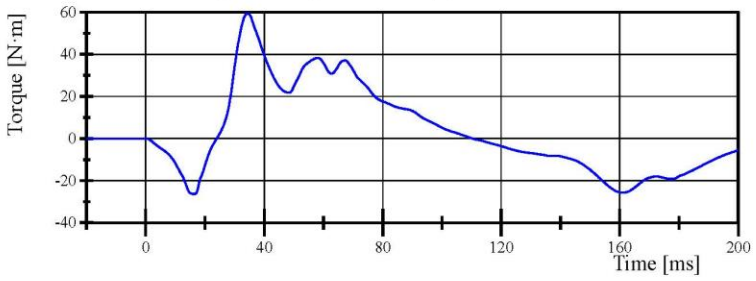
Filter Class: CFC_600
Max: 549.5 N at 48.7 ms
Min: -228.5 N at 169.3 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 60.4 Nm at 33.8 ms
Min: -36.3 Nm at 16.8 ms

Total Neck Occipital Condyles Moment (X)

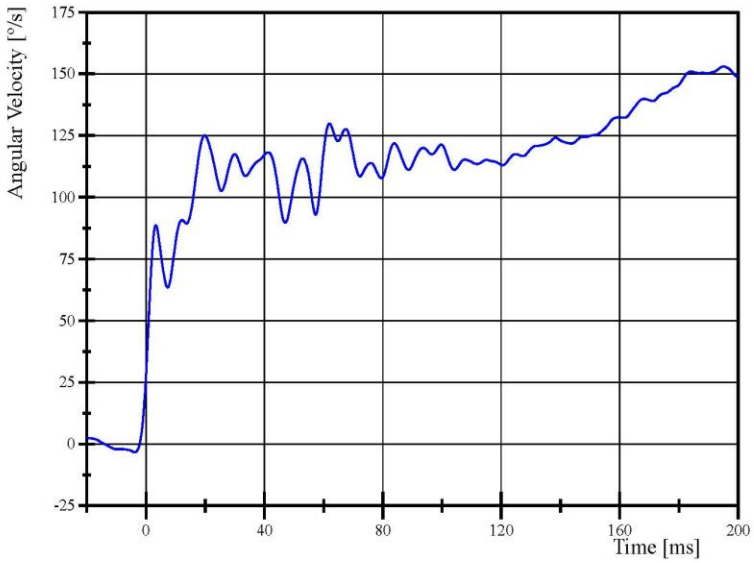


Filter Class: Without_(Constar
Max: 59.3 N·m at 34.4 ms
Min: -26.3 N·m at 16.3 ms

Transportation Research Center Inc.

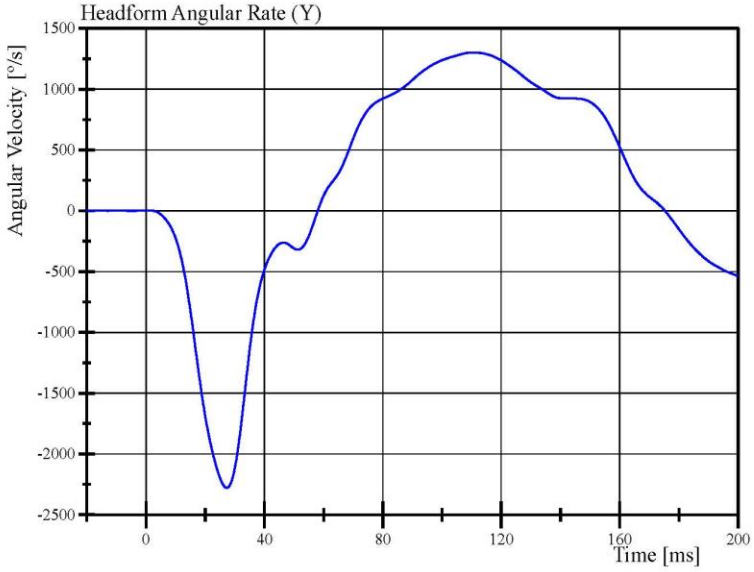
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Pendulum Angular Rate (Y)



Filter Class: CFC_60
Max: 153.0 °/s at 195.0 ms
Min: -3.4 °/s at -3.8 ms

Headform Angular Rate (Y)



Filter Class: CFC_60
Max: 1,300.9 °/s at 110.5 ms
Min: -2,278.2 °/s at 27.3 ms

Transportation Research Center Inc.

Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	3.30 - 3.50 m/s	3.332 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	(-0.87) - (-1.09) m/s	-0.969 m/s	Yes
Change at 8 ms	(-1.72) - (-2.1) m/s	-1.938 m/s	Yes
Change at 12 ms	(-2.63) - (-3.17) m/s	-2.901 m/s	Yes
Maximum Headform Flexion	50 - 61 deg	53.8 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	61.0 ms	Yes
Total Neck Occipital Condyles Moment	(-54) - (-67) N·m	-62.2 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	76.9 ms	Yes
Maximum Forward Pot Rotation			
Peak	32 - 39 °	34.8 °	Yes
Time of Peak	56 - 68 ms	61.2 ms	Yes
Maximum Rear Pot Rotation			
Peak	29 - 36 °	31.1 °	Yes
Time of Peak	56 - 68 ms	62.2 ms	Yes
Maximum Headform Angular Rate	2,047 - 2,503 °/s	2,289.6 °/s	Yes

Test meets specifications.

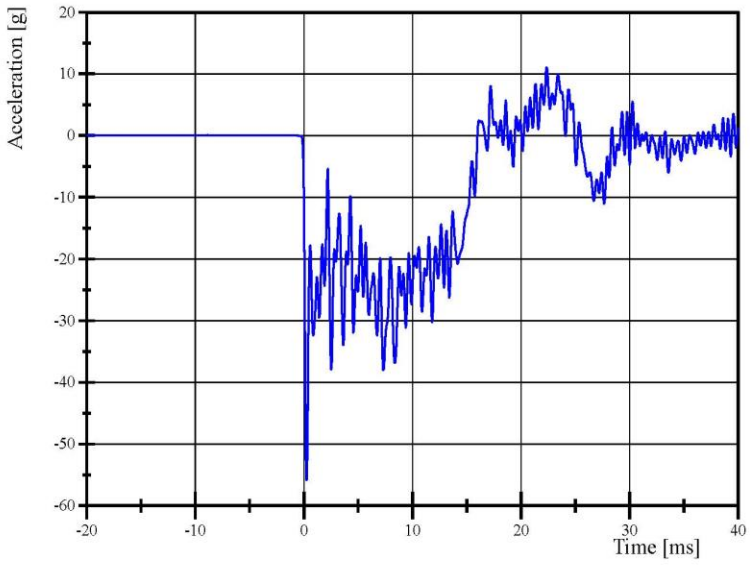
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

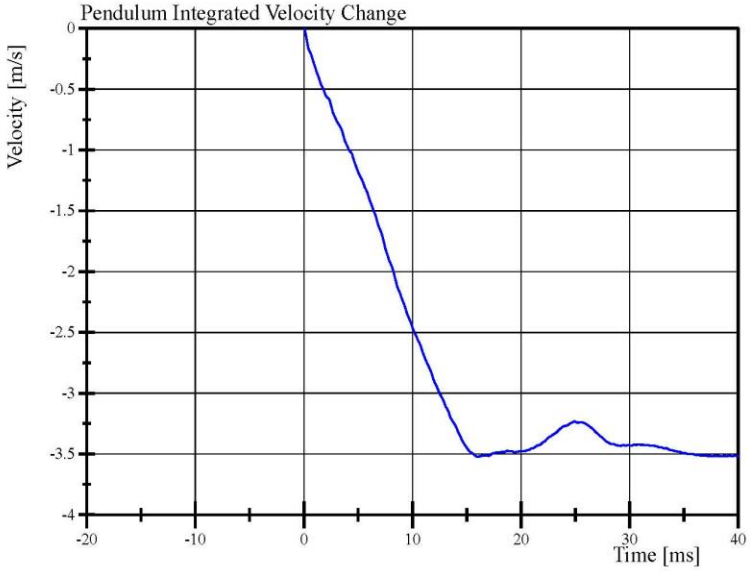
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 11.1 g at 22.4 ms
Min: -55.9 g at 0.3 ms

Pendulum Integrated Velocity Change

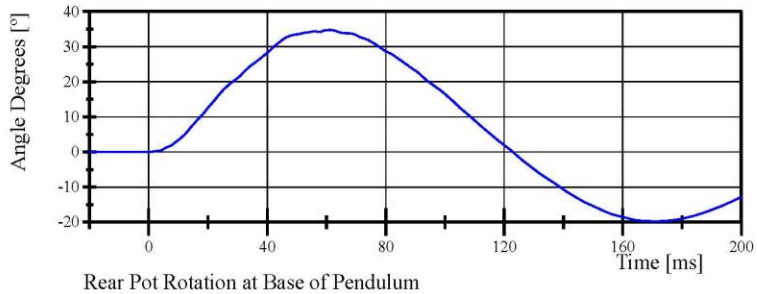


Filter Class: CFC_1000
Max: 0.0 m/s at 0.0 ms
Min: -3.5 m/s at 16.0 ms

Transportation Research Center Inc.

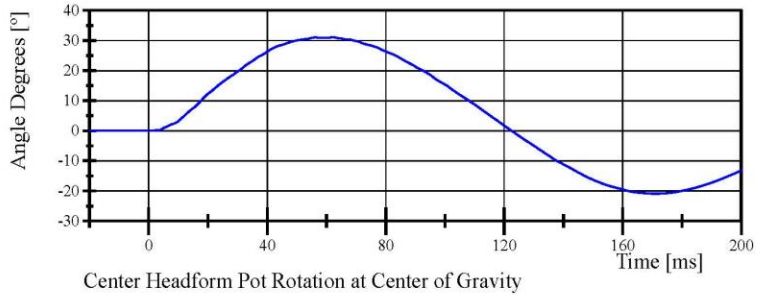
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Forward Pot Rotation at Base of Pendulum



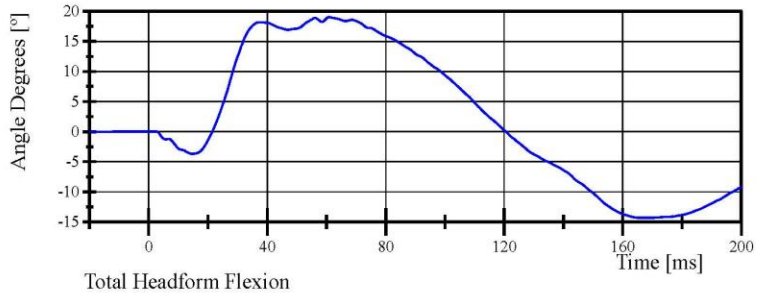
Filter Class: CFC_180
Max: 34.8 ° at 61.2 ms
Min: -19.8 ° at 171.0 ms

Rear Pot Rotation at Base of Pendulum



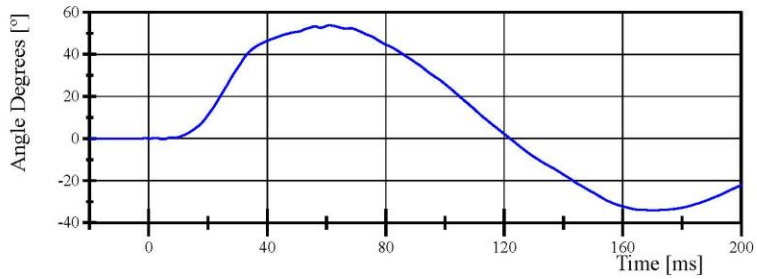
Filter Class: CFC_180
Max: 31.1 ° at 62.2 ms
Min: -20.9 ° at 171.1 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 19.0 ° at 60.9 ms
Min: -14.3 ° at 165.5 ms

Total Headform Flexion

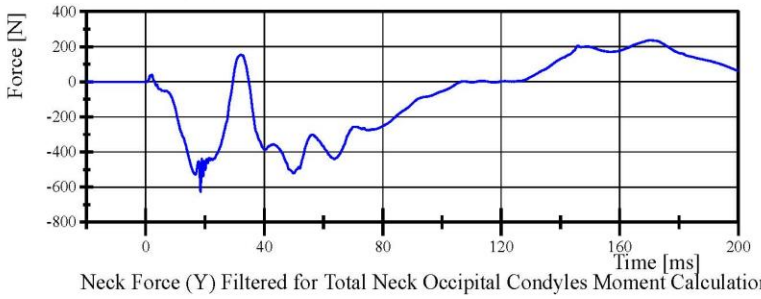


Filter Class: CFC_180
Max: 53.8 ° at 61.0 ms
Min: -34.1 ° at 170.7 ms

Transportation Research Center Inc.

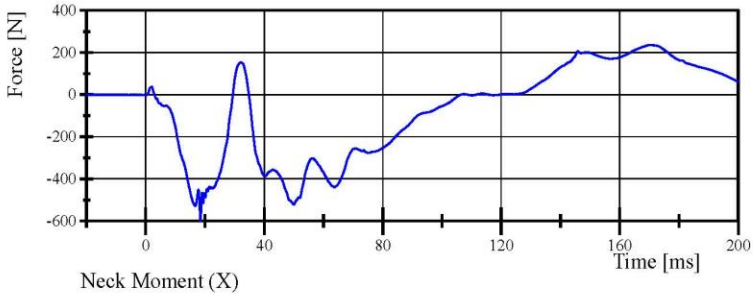
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Neck Force (Y)



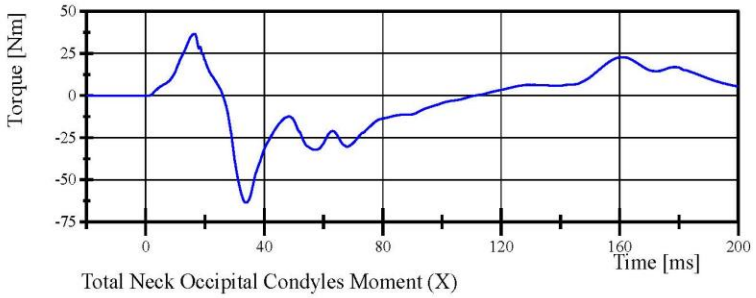
Filter Class: CFC_1000
Max: 236.9 N at 169.9 ms
Min: -626.8 N at 18.5 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



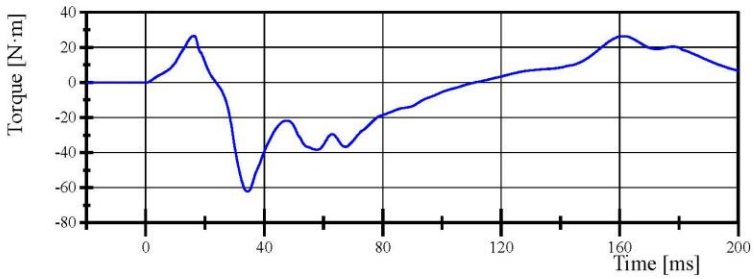
Filter Class: CFC_600
Max: 236.7 N at 170.0 ms
Min: -598.3 N at 18.5 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 36.6 Nm at 16.5 ms
Min: -63.6 Nm at 33.9 ms

Total Neck Occipital Condyles Moment (X)

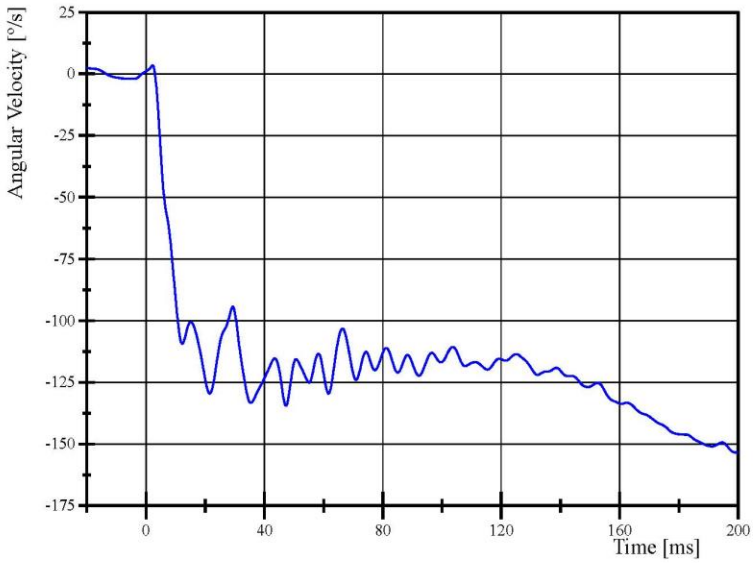


Filter Class: Without_(Constar
Max: 26.4 N·m at 16.2 ms
Min: -62.2 N·m at 34.3 ms

Transportation Research Center Inc.

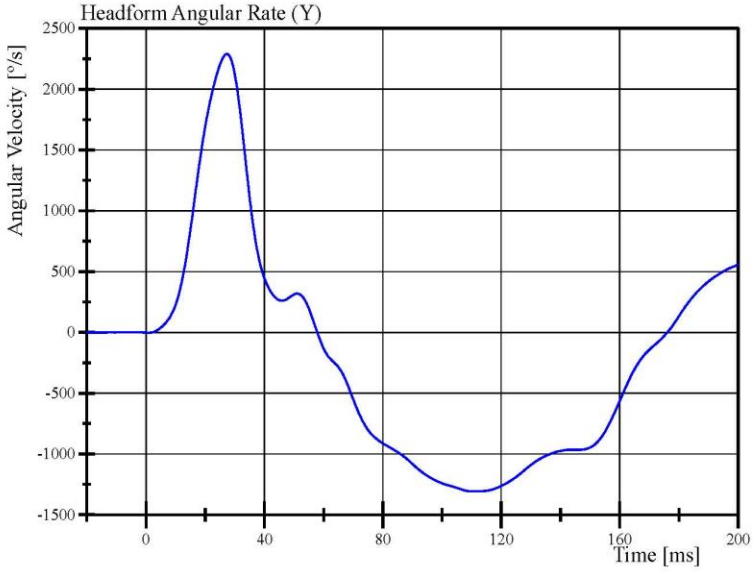
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Pendulum Angular Rate (Y)



Filter Class: CFC_60
Max: 3.4 °/s at 2.3 ms
Min: -153.6 °/s at 200.0 ms

Headform Angular Rate (Y)



Filter Class: CFC_60
Max: 2,289.6 °/s at 27.4 ms
Min: -1,307.8 °/s at 111.0 ms

Transportation Research Center Inc.

Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	44 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.364 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.565 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.771 m/s	Yes
Peak Fixture Rotation	(-41.5) - (-51) °	-48.01 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	40.4 ms	Yes
Peak Head Angular Velocity Z-axis	(-1,345) - (-1,655) °/s	-1,590.8 °/s	Yes
Peak Lower Neck Moment Z-axis	34 - 42 N·m	37.5 N·m	Yes

Test meets specifications.

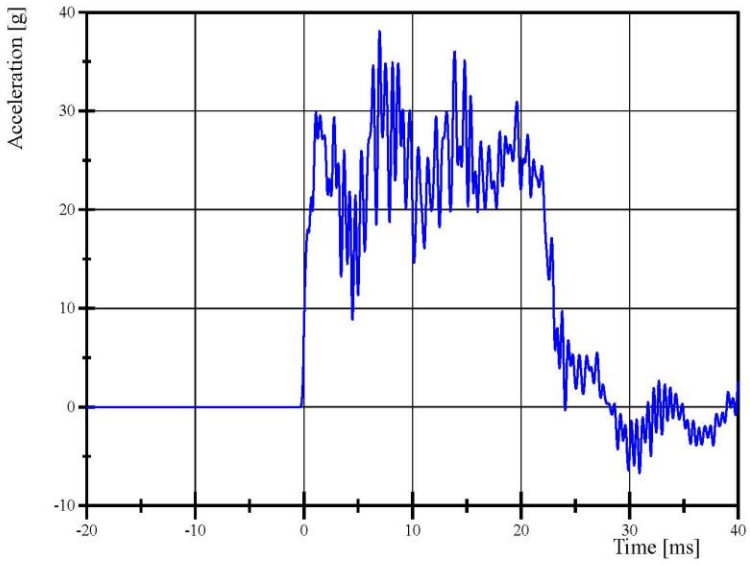
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

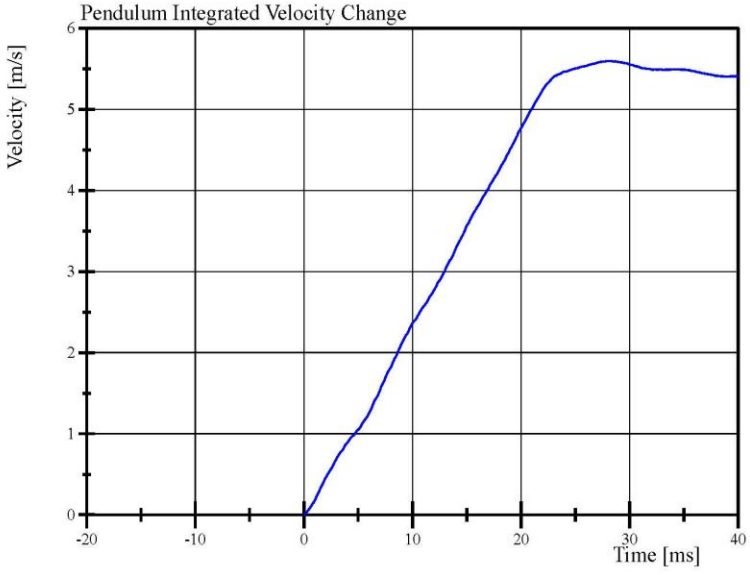
Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 38.1 g at 7.0 ms
Min: -6.7 g at 30.9 ms

Pendulum Integrated Velocity Change

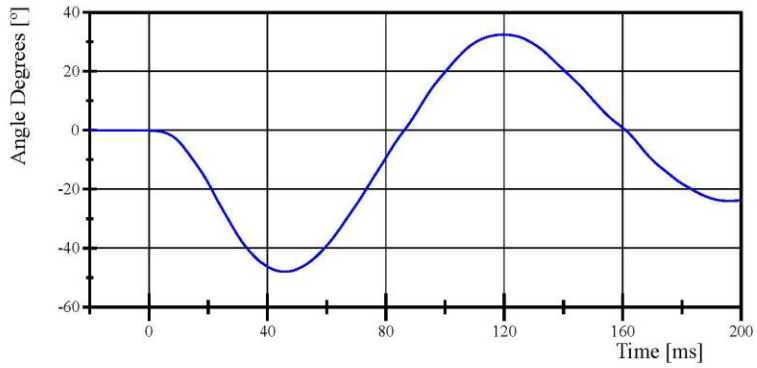


Filter Class: CFC_1000
Max: 5.6 m/s at 28.2 ms
Min: 0.0 m/s at -0.0 ms

Transportation Research Center Inc.

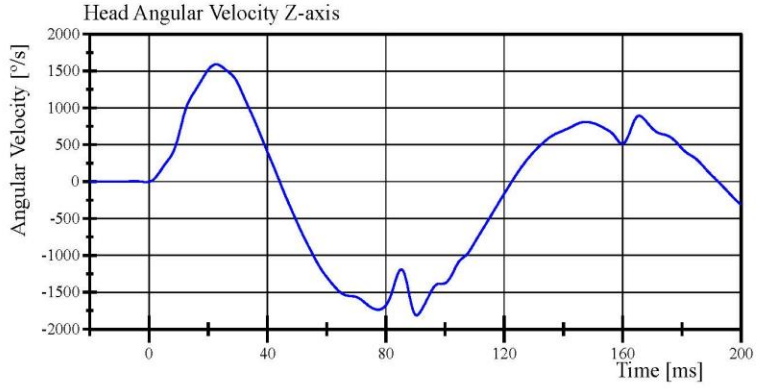
Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Torsion Fixture Rotation



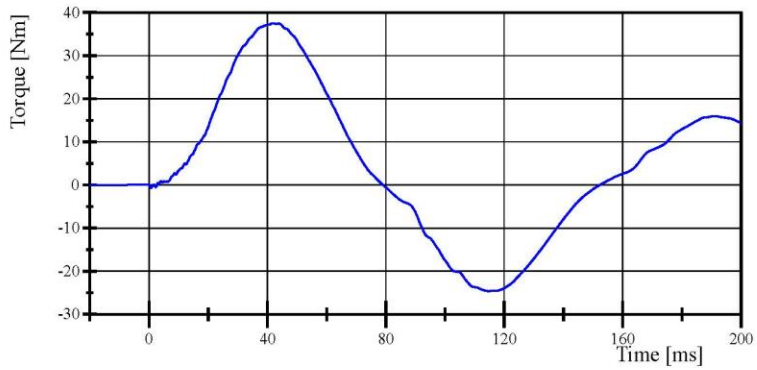
Filter Class: CFC_60
Max: 32.4 ° at 119.7 ms
Min: -48.0 ° at 45.9 ms

Head Angular Velocity Z-axis



Filter Class: CFC_60
Max: 1,590.8 °/s at 22.7 ms
Min: -1,812.1 °/s at 90.4 ms

Lower Neck Moment



Filter Class: CFC_600
Max: 37.5 Nm at 41.7 ms
Min: -24.6 Nm at 114.6 ms

Transportation Research Center Inc.

Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.249 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.373 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.527 m/s	Yes
Peak Fixture Rotation	41.5 - 51 °	47.63 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	40.1 ms	Yes
Peak Head Angular Velocity Z-axis	1,345 - 1,655 °/s	1,572.6 °/s	Yes
Peak Lower Neck Moment Z-axis	(-34) - (-42) N·m	-37.9 N·m	Yes

Test meets specifications.

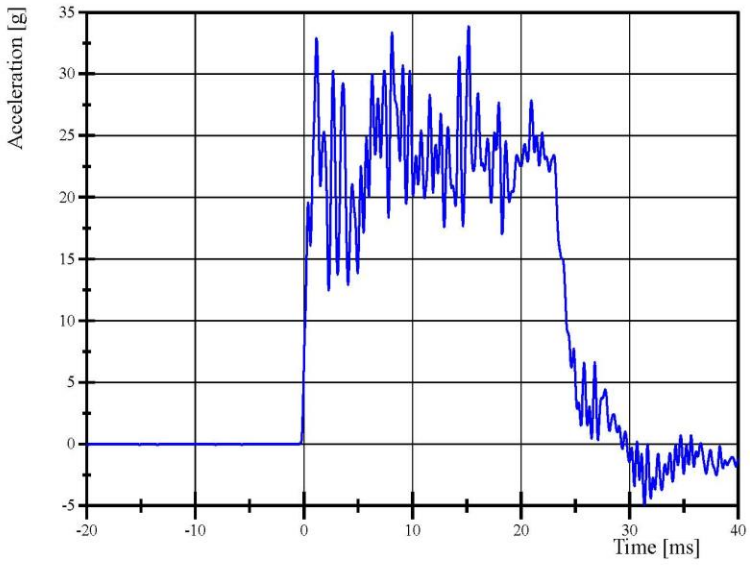
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

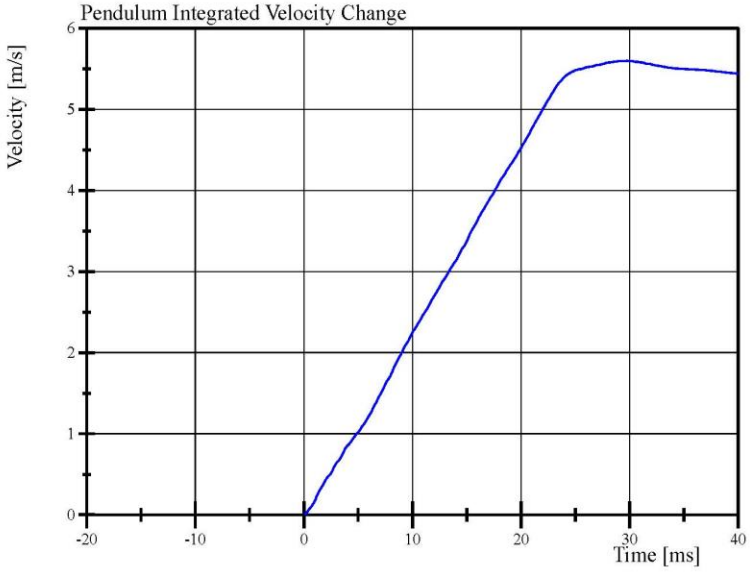
Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 33.9 g at 15.2 ms
Min: -4.9 g at 31.4 ms

Pendulum Integrated Velocity Change

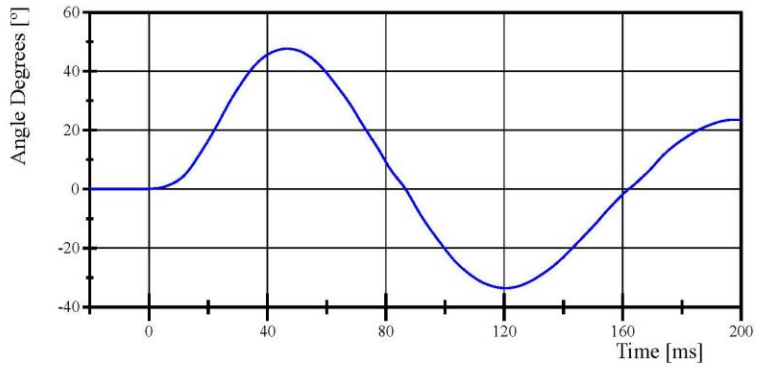


Filter Class: CFC_1000
Max: 5.6 m/s at 29.8 ms
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

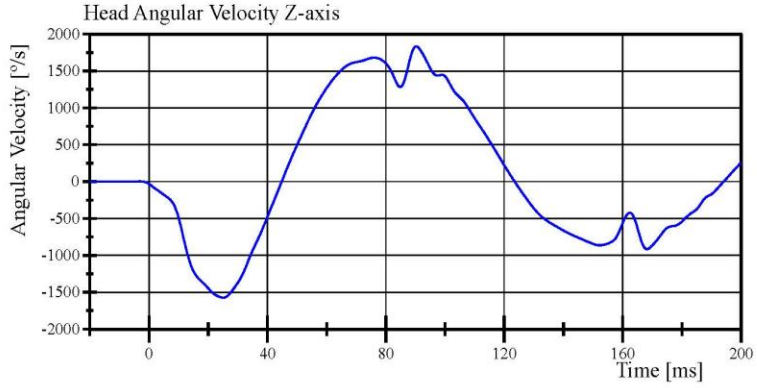
Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/25/2021

Torsion Fixture Rotation



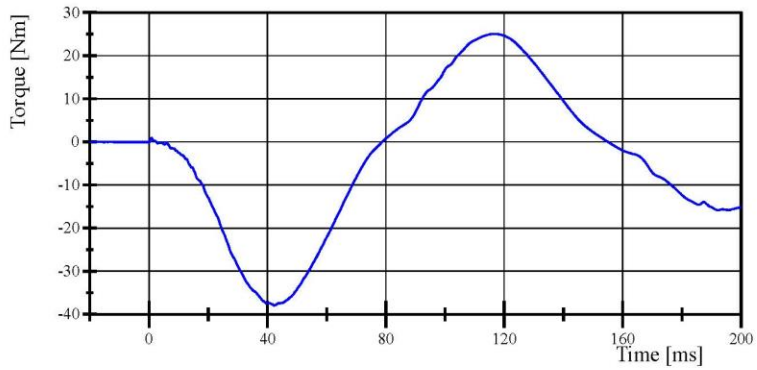
Filter Class: CFC_60
Max: 47.6 ° at 46.6 ms
Min: -33.6 ° at 120.5 ms

Head Angular Velocity Z-axis



Filter Class: CFC_60
Max: 1,833.1 °/s at 90.3 ms
Min: -1,572.6 °/s at 25.1 ms

Lower Neck Moment



Filter Class: CFC_600
Max: 25.0 Nm at 116.2 ms
Min: -37.9 Nm at 42.2 ms

Transportation Research Center Inc.

Left Lateral Shoulder
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Force	2,600 - 3,300 N	3,027.4 N	Yes
Shoulder Force	(-1,470) - (-1,800) N	-1,668.3 N	Yes
Shoulder Rib Length Change	37 - 46 mm	41.2 mm	Yes

Test meets specifications.

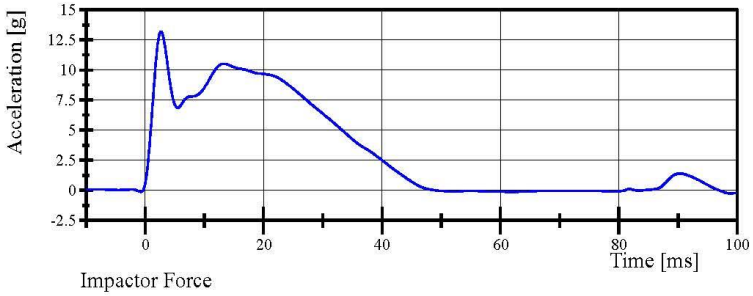
Condition: Used

Comments:
Arm S/N: EG3799
Shoulder Rib S/N: DW1916
RibEye S/N: 124

Transportation Research Center Inc.

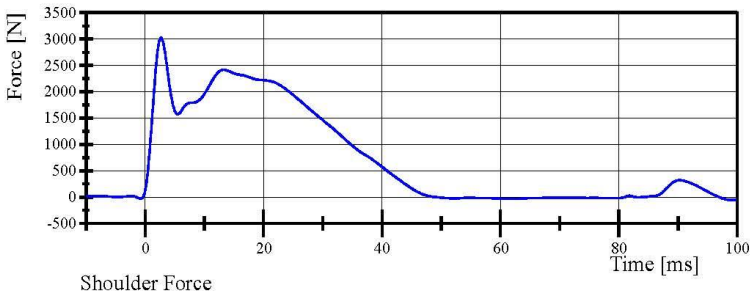
Left Lateral Shoulder
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Impactor Acceleration



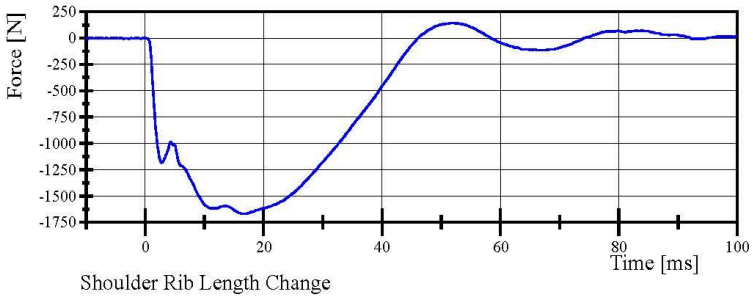
Filter Class: CFC_180
Max: 13.2 g at 2.7 ms
Min: -0.3 g at 98.8 ms

Impactor Force



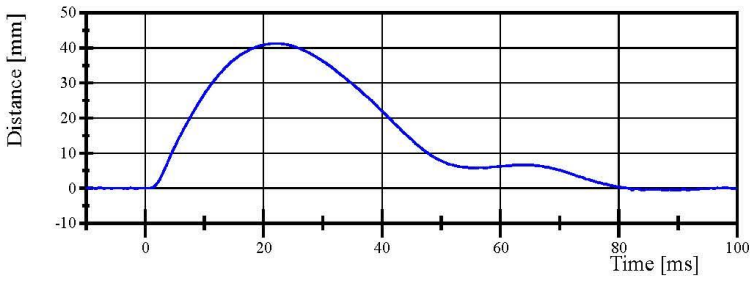
Filter Class: CFC_180
Max: 3,027.4 N at 2.7 ms
Min: -57.5 N at 98.8 ms

Shoulder Force



Filter Class: CFC_600
Max: 144.3 N at 51.9 ms
Min: -1,668.3 N at 16.4 ms

Shoulder Rib Length Change



Filter Class: CFC_600
Max: 41.2 mm at 22.7 ms
Min: -0.5 mm at 82.3 ms

Transportation Research Center Inc.

Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.70 m/s	Yes
Impactor Force	5,300 - 6,200 N	5,783.1 N	Yes
Peak Thorax Rib 1 Length Change	35 - 47 mm	41.0 mm	Yes
Peak Thorax Rib 2 Length Change	46 - 56 mm	48.3 mm	Yes
Peak Thorax Rib 3 Length Change	33.5 - 40.5 mm	34.97 mm	Yes
Peak T4 Acceleration, y-axis	28 - 37 g	32.8 g	Yes
Peak T12 Acceleration, y-axis	22 - 28 g	23.5 g	Yes

Test meets specifications.

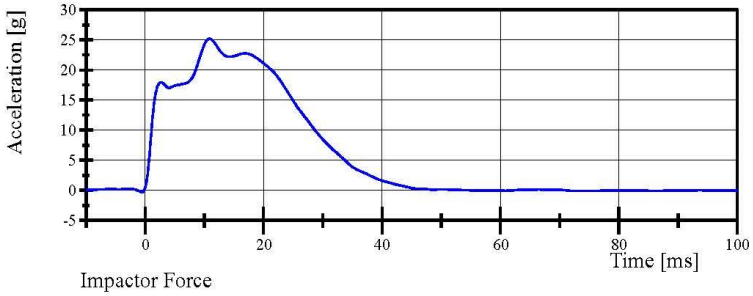
Condition: Used

Comments:
Arm S/N: EG3799
Shoulder Rib S/N: DW1916
Thorax Rib 1 S/N: EB5400
Thorax Rib 2 S/N: EB5401
Thorax Rib 3 S/N: EB5402
RibEye S/N: 124

Transportation Research Center Inc.

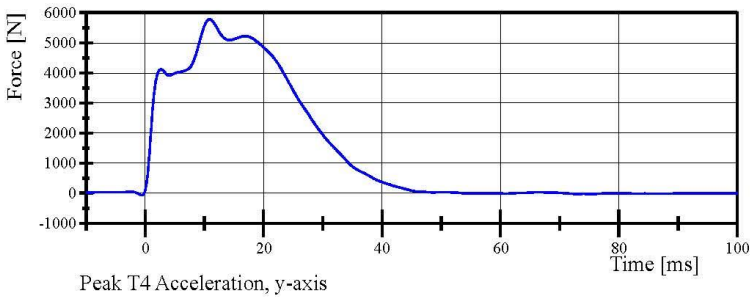
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Impactor Acceleration



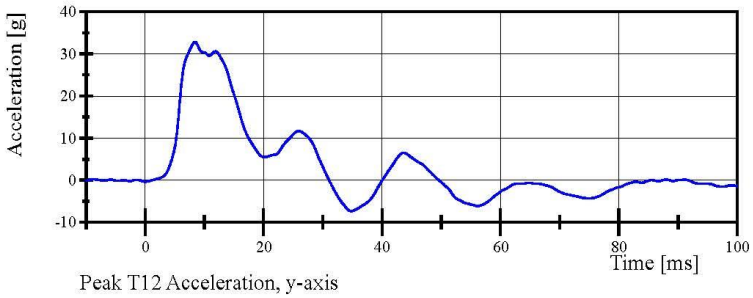
Filter Class: CFC_180
Max: 25.2 g at 10.9 ms
Min: -0.3 g at -0.6 ms

Impactor Force



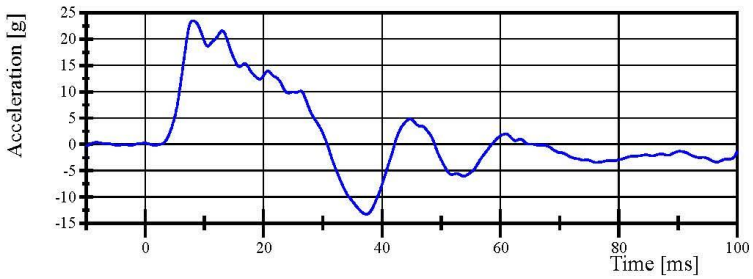
Filter Class: CFC_180
Max: 5,783.1 N at 10.9 ms
Min: -68.8 N at -0.6 ms

Peak T4 Acceleration, y-axis



Filter Class: CFC_180
Max: 32.8 g at 8.4 ms
Min: -7.4 g at 34.9 ms

Peak T12 Acceleration, y-axis

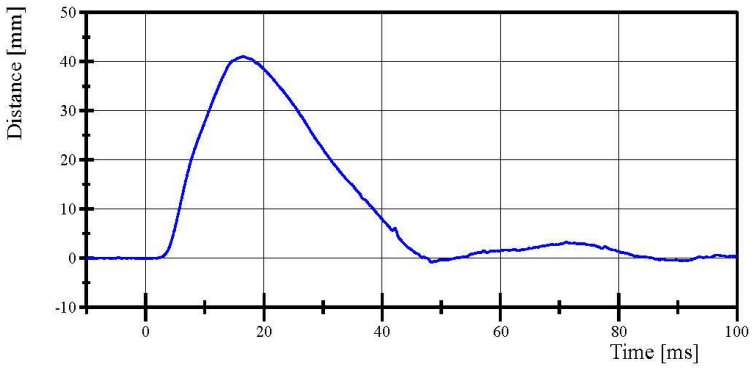


Filter Class: CFC_180
Max: 23.5 g at 8.1 ms
Min: -13.3 g at 37.4 ms

Transportation Research Center Inc.

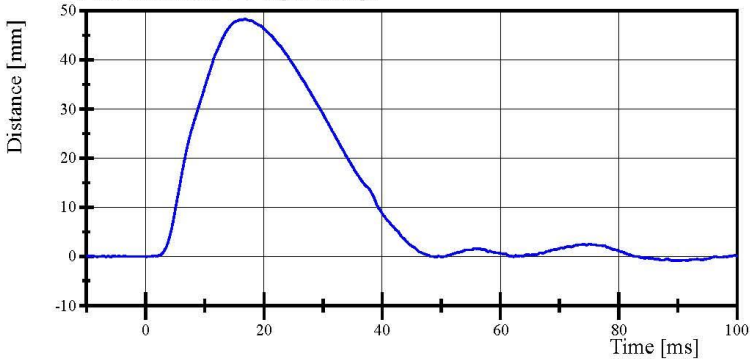
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Peak Thorax Rib 1 Length Change



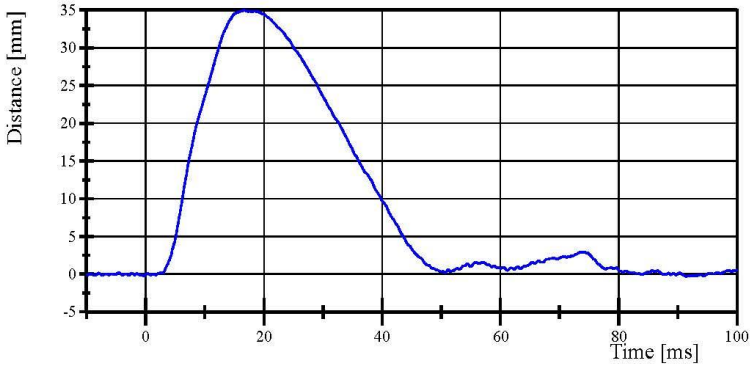
Filter Class: CFC_600
Max: 41.0 mm at 16.5 ms
Min: -0.8 mm at 48.4 ms

Peak Thorax Rib 2 Length Change



Filter Class: CFC_600
Max: 48.3 mm at 16.8 ms
Min: -0.9 mm at 91.6 ms

Peak Thorax Rib 3 Length Change



Filter Class: CFC_600
Max: 35.0 mm at 16.7 ms
Min: -0.3 mm at 91.5 ms

Transportation Research Center Inc.

Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	45 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.25 m/s	Yes
Impactor Force	3,200 - 3,800 N	3,449.3 N	Yes
Peak Thorax Rib 1 Length Change	33 - 43 mm	36.6 mm	Yes
Peak Thorax Rib 2 Length Change	35 - 43 mm	42.1 mm	Yes
Peak Thorax Rib 3 Length Change	32 - 40 mm	33.7 mm	Yes
Peak T4 Acceleration, y-axis	14 - 20 g	15.4 g	Yes
Peak T12 Acceleration, y-axis	14 - 22 g	14.8 g	Yes

Test meets specifications.

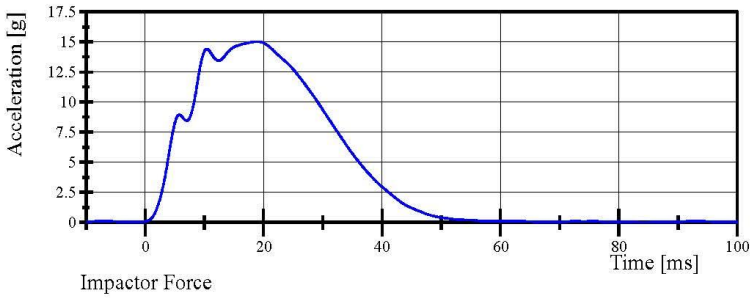
Condition: Used

Comments:
Thorax Rib 1 S/N: EB5400
Thorax Rib 2 S/N: EB5401
Thorax Rib 3 S/N: EB5402
RibEye S/N: 124

Transportation Research Center Inc.

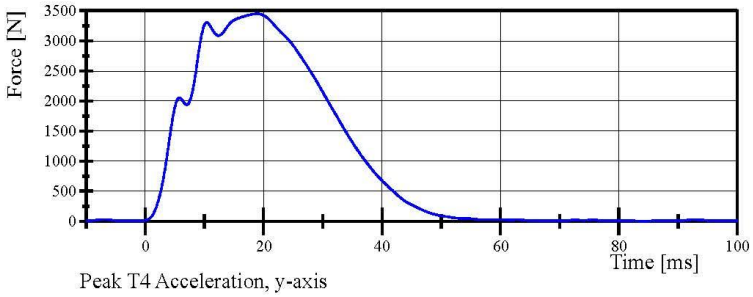
Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Impactor Acceleration



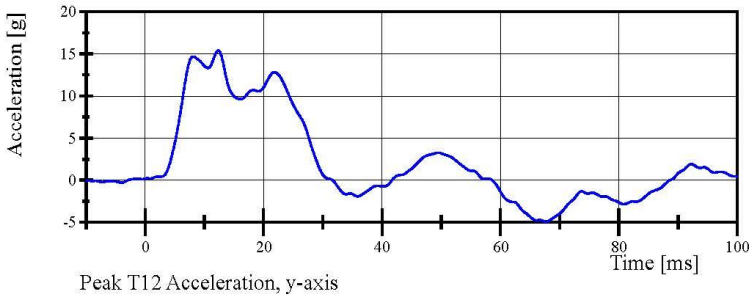
Filter Class: CFC_180
Max: 15.0 g at 18.9 ms
Min: 0.0 g at 84.2 ms

Impactor Force



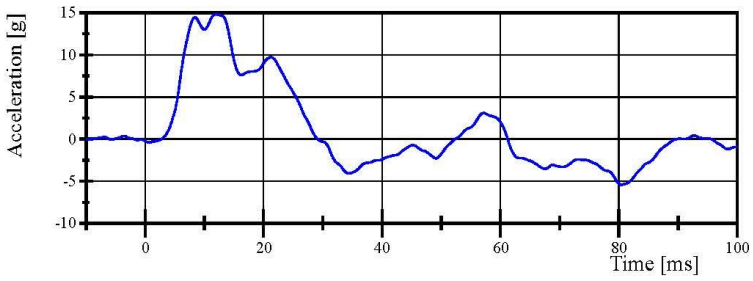
Filter Class: CFC_180
Max: 3,449.3 N at 18.9 ms
Min: 0.1 N at 84.2 ms

Peak T4 Acceleration, y-axis



Filter Class: CFC_180
Max: 15.4 g at 12.4 ms
Min: -4.9 g at 67.7 ms

Peak T12 Acceleration, y-axis

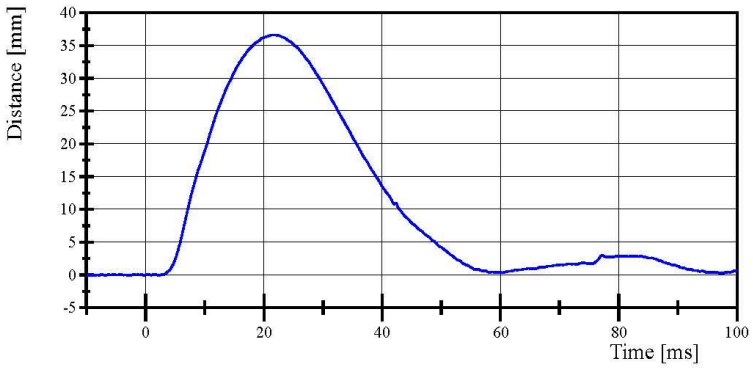


Filter Class: CFC_180
Max: 14.8 g at 12.0 ms
Min: -5.4 g at 80.4 ms

Transportation Research Center Inc.

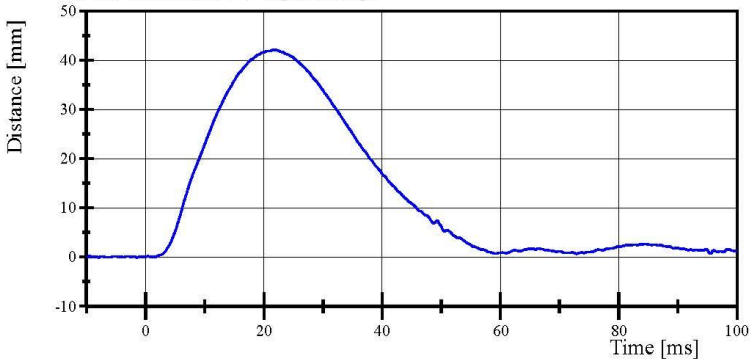
Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Peak Thorax Rib 1 Length Change



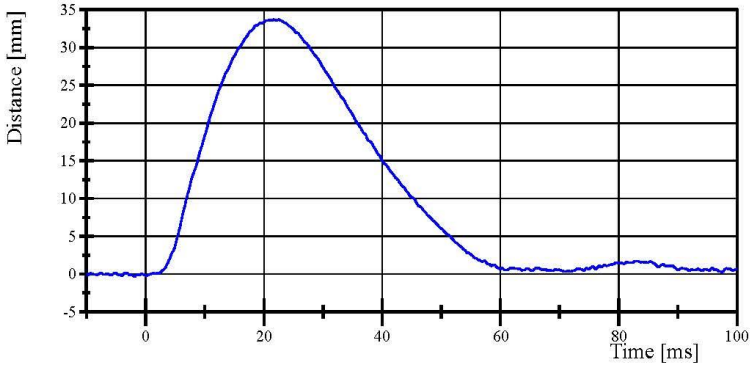
Filter Class: CFC_600
Max: 36.6 mm at 21.5 ms
Min: -0.1 mm at -9.8 ms

Peak Thorax Rib 2 Length Change



Filter Class: CFC_600
Max: 42.1 mm at 21.9 ms
Min: -0.1 mm at -7.9 ms

Peak Thorax Rib 3 Length Change



Filter Class: CFC_600
Max: 33.7 mm at 22.5 ms
Min: -0.3 mm at -1.9 ms

Transportation Research Center Inc.

Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	46 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.32 m/s	Yes
Impactor Force	2,700 - 3,100 N	3,006.5 N	Yes
Peak Abdomen Rib 1 Length Change	32.5 - 39.5 mm	35.48 mm	Yes
Peak Abdomen Rib 2 Length Change	32 - 38 mm	34.5 mm	Yes
Peak T12 Acceleration, y-axis	14.5 - 19.5 g	17.94 g	Yes

Test meets specifications.

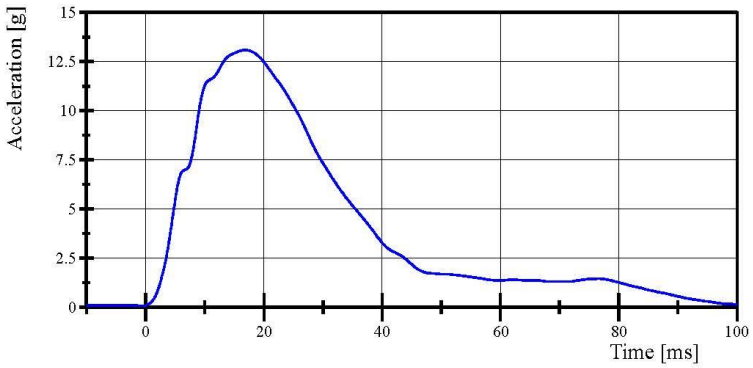
Condition: Used

Comments:
Abdomen Rib #1 S/N: DY5252
Abdomen Rib #2 S/N: DY5253
RibEye S/N: 124

Transportation Research Center Inc.

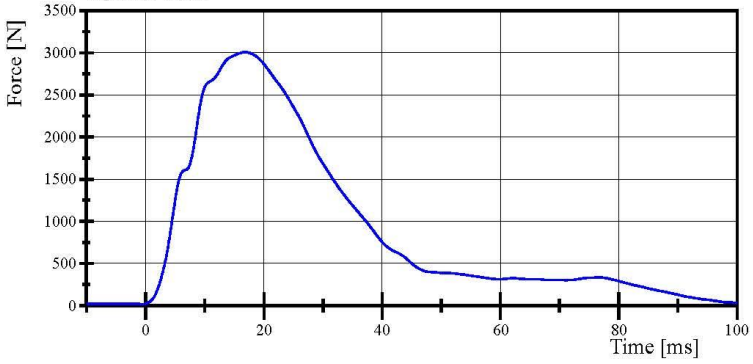
Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Impactor Acceleration



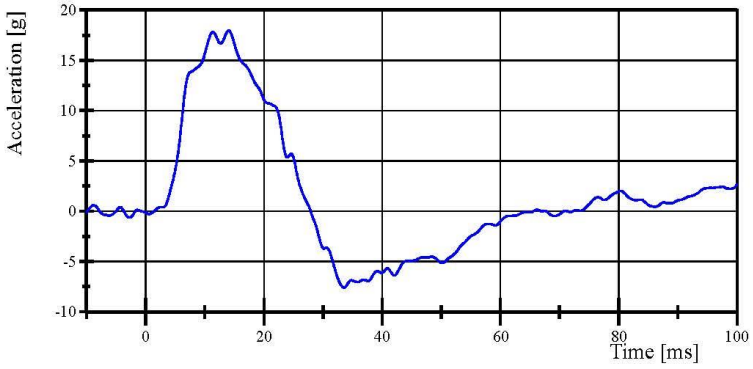
Filter Class: CFC_180
Max: 13.1 g at 16.9 ms
Min: 0.1 g at -0.5 ms

Impactor Force



Filter Class: CFC_180
Max: 3,006.5 N at 16.9 ms
Min: 16.4 N at -0.5 ms

Peak T12 Acceleration, y-axis

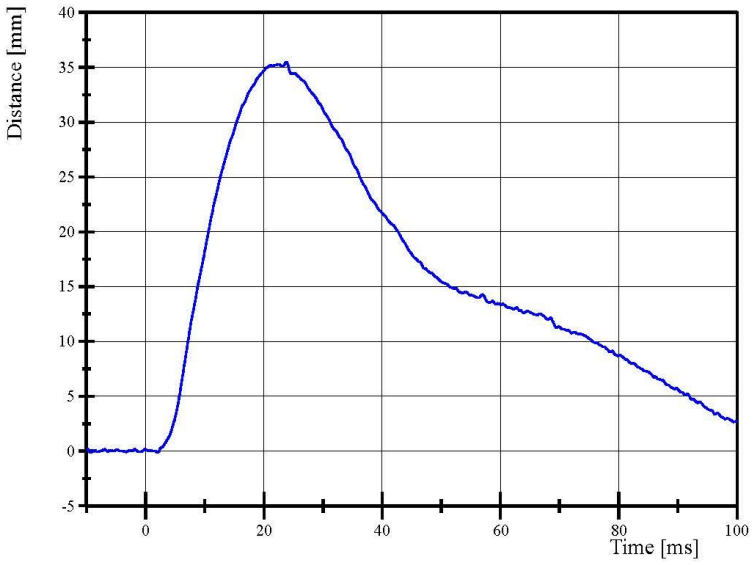


Filter Class: CFC_180
Max: 17.9 g at 14.1 ms
Min: -7.6 g at 33.6 ms

Transportation Research Center Inc.

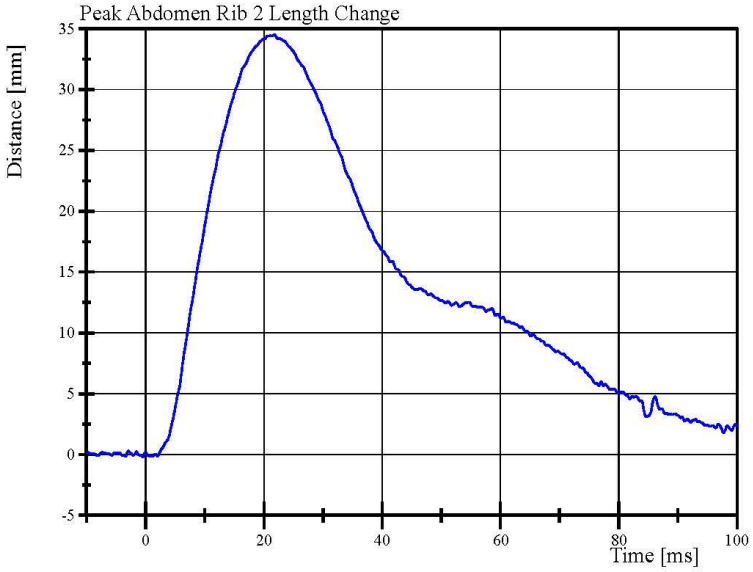
Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/26/2021

Peak Abdomen Rib 1 Length Change



Filter Class: CFC_600
Max: 35.5 mm at 23.8 ms
Min: -0.1 mm at -9.4 ms

Peak Abdomen Rib 2 Length Change



Filter Class: CFC_600
Max: 34.5 mm at 21.8 ms
Min: -0.2 mm at -0.5 ms

Transportation Research Center Inc.

Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/29/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.71 m/s	Yes
Impactor Force	6,800 - 8,200 N	7,475.3 N	Yes
Pelvis Lateral Acceleration	38.5 - 48.5 g	42.15 g	Yes
Peak T12 Acceleration, y-axis	10 - 14 g	12.4 g	Yes
Pubic Lateral Force	(-1,300) - (-1,590) N	-1,359.1 N	Yes
Sacroiliac Lateral Force	(-1,860) - (-2,280) N	-2,118.0 N	Yes

Test meets specifications.

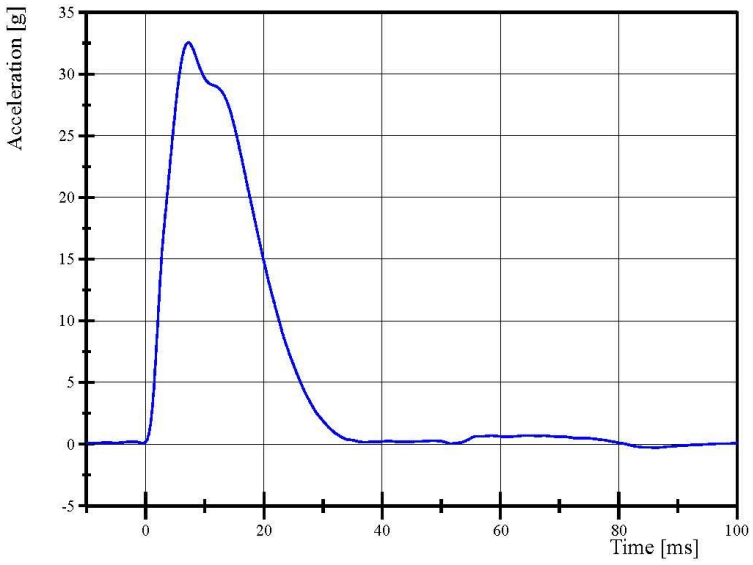
Condition: Used

Comments:
Pelvis S/N: EC3628

Transportation Research Center Inc.

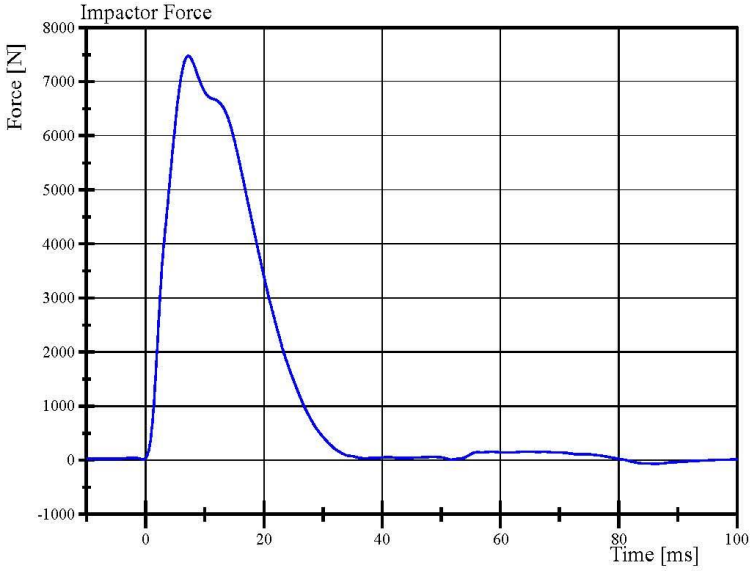
Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/29/2021

Impactor Acceleration



Filter Class: CFC_180
Max: 32.6 g at 7.2 ms
Min: -0.3 g at 86.2 ms

Impactor Force

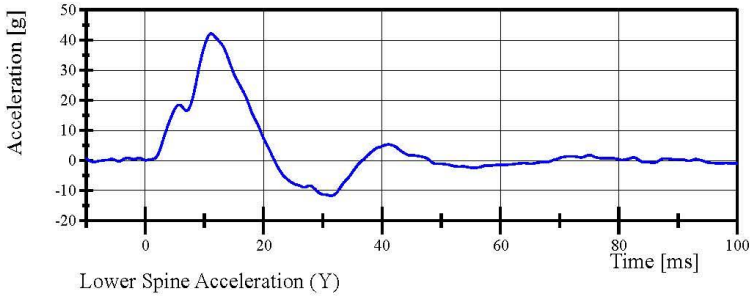


Filter Class: CFC_180
Max: 7,475.3 N at 7.2 ms
Min: -65.0 N at 86.2 ms

Transportation Research Center Inc.

Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 9-1
Test Date: 3/29/2021

Pelvis Y-Axis Acceleration

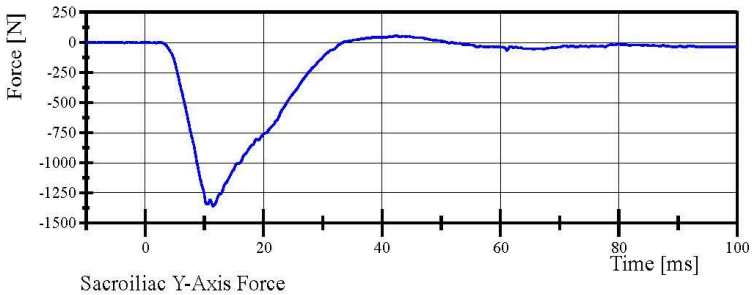


Filter Class: CFC_180
Max: 42.1 g at 11.1 ms
Min: -11.7 g at 31.5 ms

Lower Spine Acceleration (Y)

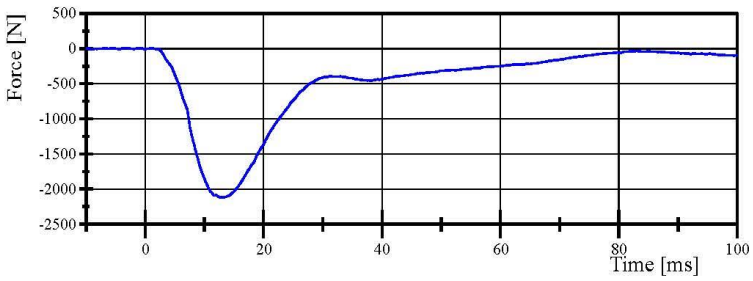
Filter Class: CFC_180
Max: 12.4 g at 23.0 ms
Min: -2.0 g at 80.1 ms

Pubic Y-Axis Force



Filter Class: CFC_600
Max: 55.1 N at 42.5 ms
Min: -1,359.1 N at 11.5 ms

Sacroiliac Y-Axis Force



Filter Class: CFC_600
Max: 9.0 N at -0.9 ms
Min: -2,118.0 N at 12.7 ms

Post-Test Calibration Sheets
Driver S/N EB8888

Transportation Research Center Inc.
WorldSID-50M
External Measurments
Serial No. EB8888 Certification No. 10

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	2.2	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	33.1	33.9

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	89
Hip Pivot to Back Line	L3	n/a	187	177
Thigh Clearance	L4	n/a	181	180
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. 10-2
Test Date: 4/19/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	211 - 261 g	239.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-11.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	0.84 %	Yes

Test meets specifications.

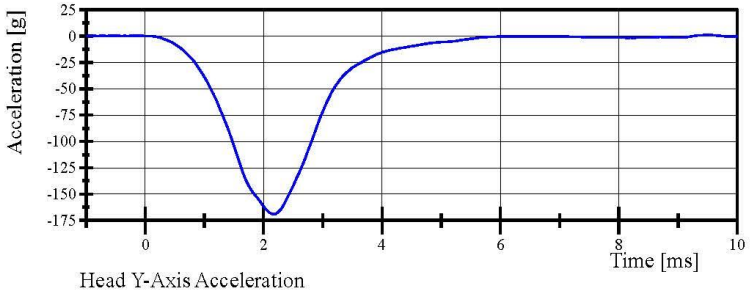
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

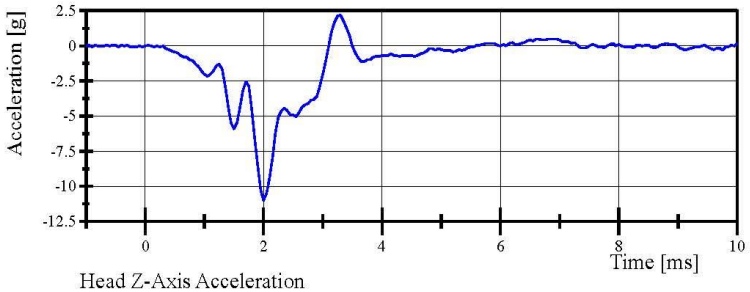
Front Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Head X-Axis Acceleration



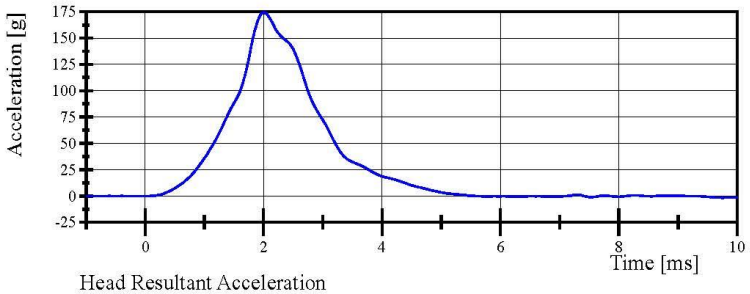
Filter Class: CFC_1000
Max: 1.0 g at 9.5 ms
Min: -169.2 g at 2.2 ms

Head Y-Axis Acceleration



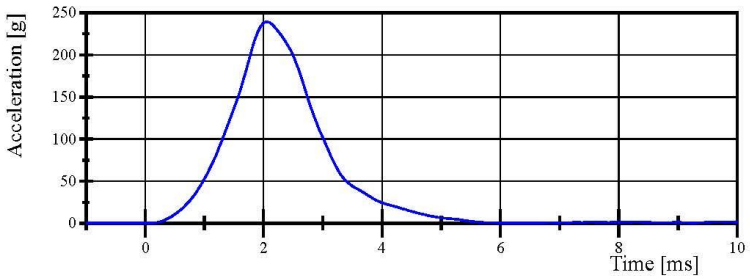
Filter Class: CFC_1000
Max: 2.2 g at 3.3 ms
Min: -11.0 g at 2.0 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 174.6 g at 2.0 ms
Min: -1.7 g at 9.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 239.4 g at 2.1 ms
Min: 0.1 g at -1.0 ms

Transportation Research Center Inc.

Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 10-4
Test Date: 4/19/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	118.7 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-6.1 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.52 %	Yes

Test meets specifications.

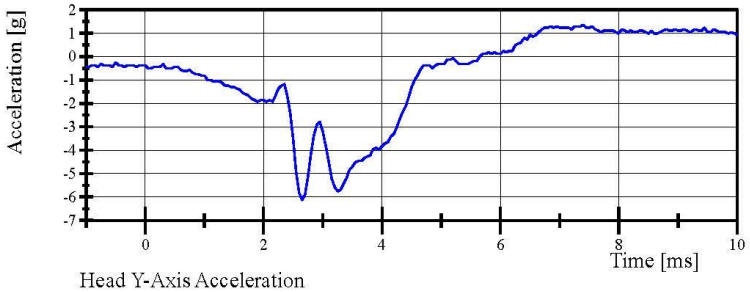
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

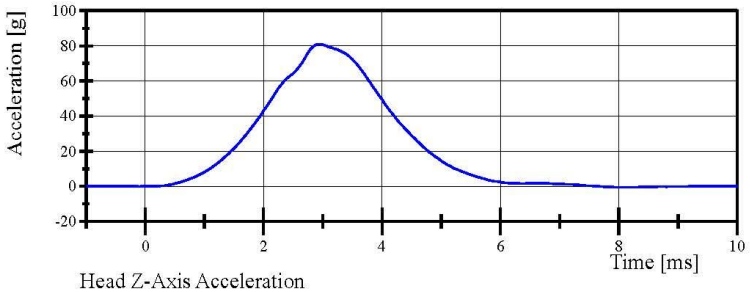
Left Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 10-4
Test Date: 4/19/2021

Head X-Axis Acceleration



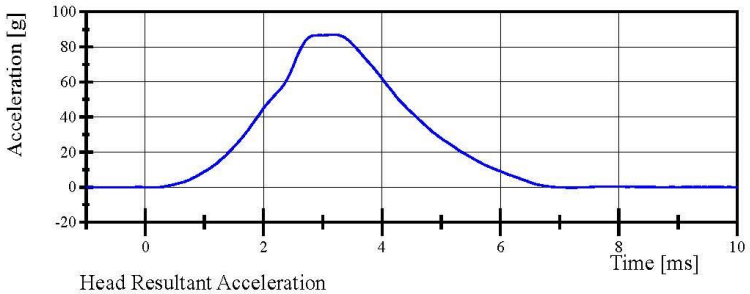
Filter Class: CFC_1000
Max: 1.4 g at 7.4 ms
Min: -6.1 g at 2.7 ms

Head Y-Axis Acceleration



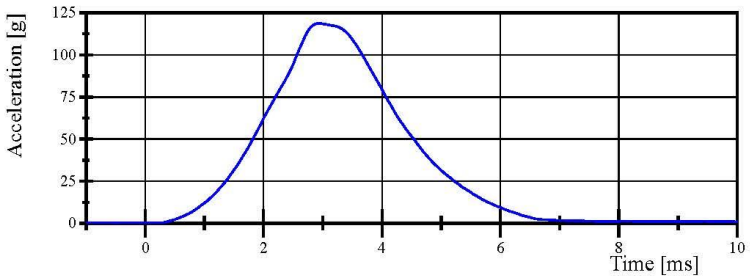
Filter Class: CFC_1000
Max: 81.1 g at 3.0 ms
Min: -0.6 g at 8.2 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 87.0 g at 3.2 ms
Min: -0.3 g at 7.3 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 118.7 g at 3.0 ms
Min: 0.3 g at -0.5 ms

Transportation Research Center Inc.

Right Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Peak Head Resultant Acceleration	107 - 126 g	112.6 g	Yes
Peak Head Longitudinal Acceleration	(-15) - 15 g	-4.2 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	2.34 %	Yes

Test meets specifications.

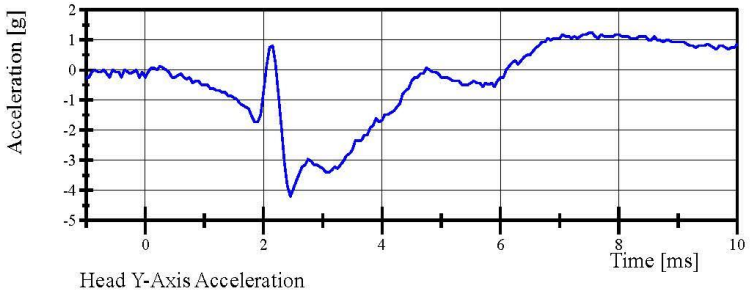
Condition: Used

Comments:
Head Skin S/N: EG2845

Transportation Research Center Inc.

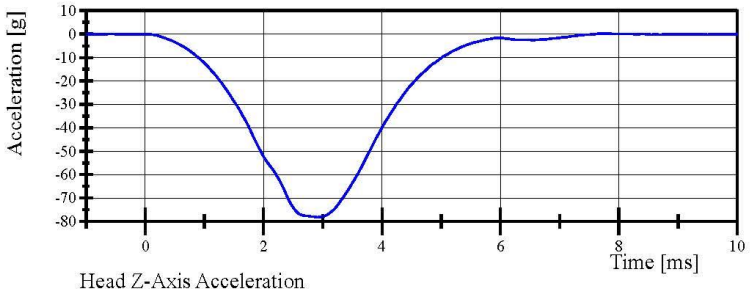
Right Lateral Head Drop
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Head X-Axis Acceleration



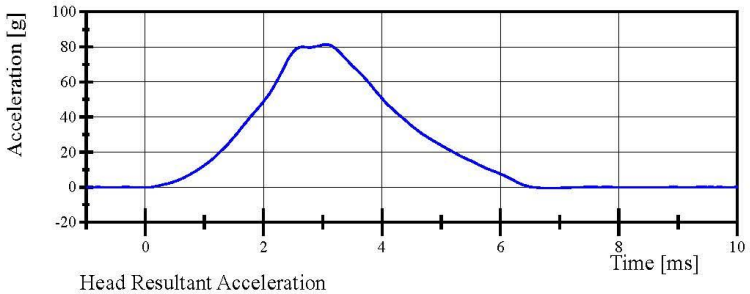
Filter Class: CFC_1000
Max: 1.2 g at 7.5 ms
Min: -4.2 g at 2.5 ms

Head Y-Axis Acceleration



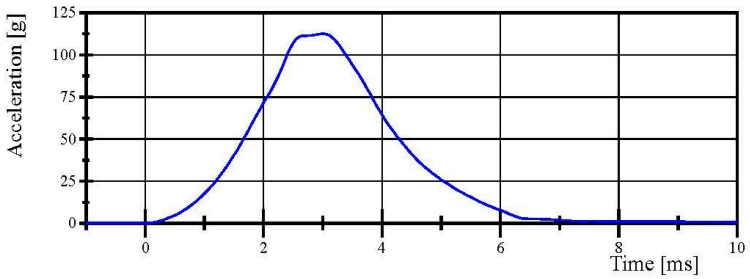
Filter Class: CFC_1000
Max: 0.3 g at 7.8 ms
Min: -78.2 g at 2.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 81.3 g at 3.1 ms
Min: -0.5 g at 6.7 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 112.6 g at 3.0 ms
Min: 0.0 g at -0.7 ms

Transportation Research Center Inc.

Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-5
Test Date: 4/15/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	(-3.30) - (-3.50) m/s	-3.345 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	0.87 - 1.09 m/s	0.944 m/s	Yes
Change at 8 ms	1.72 - 2.1 m/s	1.830 m/s	Yes
Change at 12 ms	2.63 - 3.17 m/s	2.742 m/s	Yes
Maximum Headform Flexion	(-50) - (-61) deg	-55.2 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	60.6 ms	Yes
Total Neck Occipital Condyles Moment	54 - 67 N·m	60.3 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	76.9 ms	Yes
Maximum Forward Pot Rotation			
Peak	(-32) - (-39) °	-35.8 °	Yes
Time of Peak	56 - 68 ms	63.2 ms	Yes
Maximum Rear Pot Rotation			
Peak	(-29) - (-36) °	-31.9 °	Yes
Time of Peak	56 - 68 ms	61.3 ms	Yes
Maximum Headform Angular Rate	(-2,047) - (-2,503) °/s	-2,300.2 °/s	Yes

Test meets specifications.

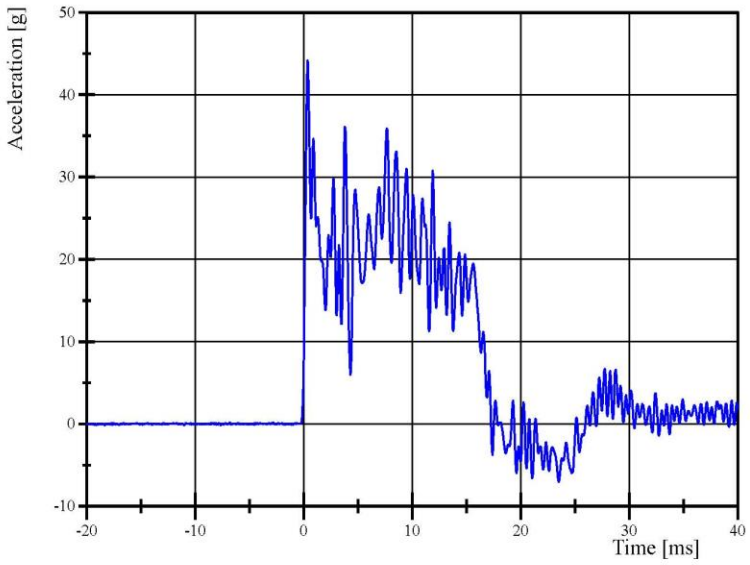
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

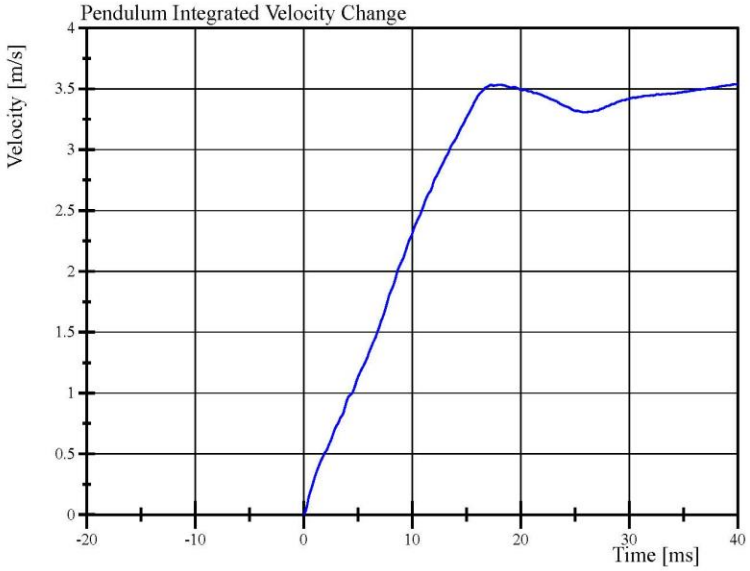
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-5
Test Date: 4/15/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 44.1 g at 0.4 ms
Min: -7.0 g at 23.5 ms

Pendulum Integrated Velocity Change

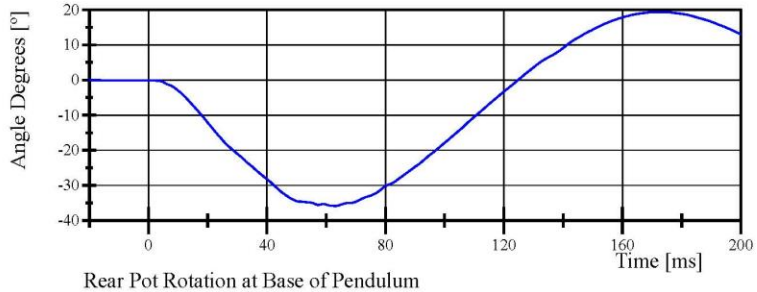


Filter Class: CFC_1000
Max: 3.5 m/s at 40.0 ms
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

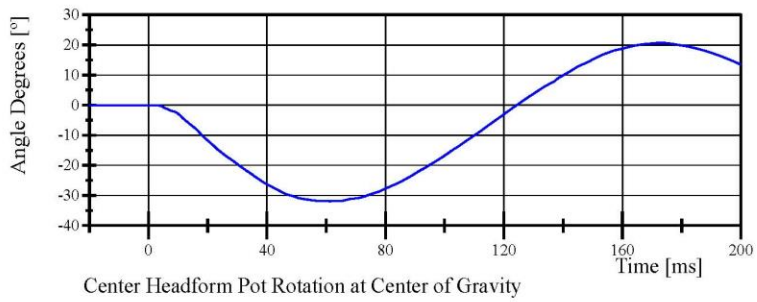
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-5
Test Date: 4/15/2021

Forward Pot Rotation at Base of Pendulum



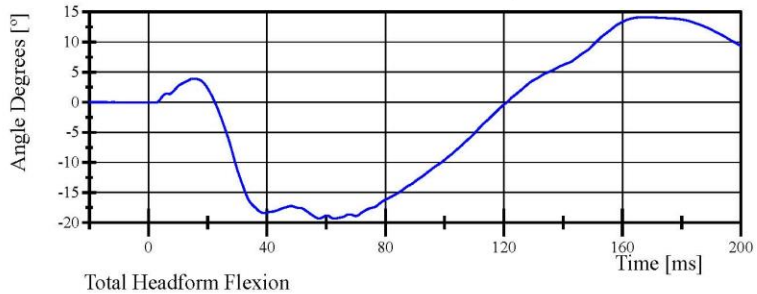
Filter Class: CFC_180
Max: 19.4 ° at 172.6 ms
Min: -35.8 ° at 63.2 ms

Rear Pot Rotation at Base of Pendulum



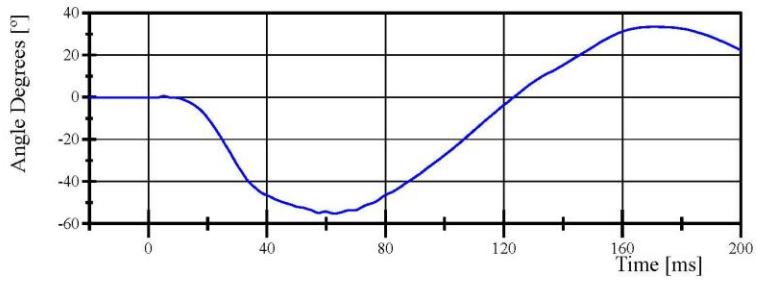
Filter Class: CFC_180
Max: 20.7 ° at 173.2 ms
Min: -31.9 ° at 61.3 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 14.1 ° at 168.0 ms
Min: -19.3 ° at 62.7 ms

Total Headform Flexion

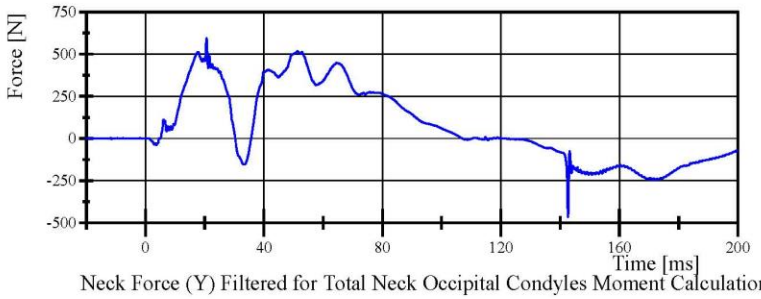


Filter Class: CFC_180
Max: 33.4 ° at 170.8 ms
Min: -55.2 ° at 62.8 ms

Transportation Research Center Inc.

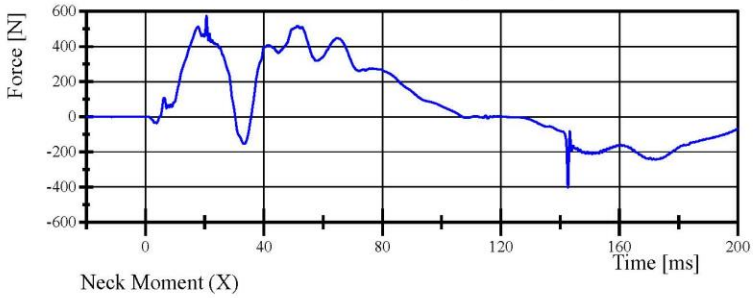
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-5
Test Date: 4/15/2021

Neck Force (Y)



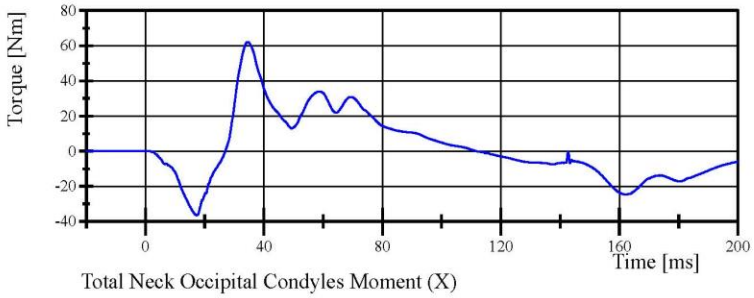
Filter Class: CFC_1000
Max: 594.3 N at 20.6 ms
Min: -464.0 N at 142.7 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



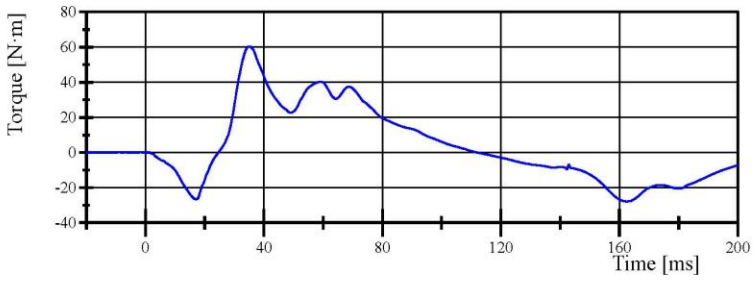
Filter Class: CFC_600
Max: 574.6 N at 20.6 ms
Min: -403.0 N at 142.6 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 62.1 Nm at 34.5 ms
Min: -36.4 Nm at 17.3 ms

Total Neck Occipital Condyles Moment (X)

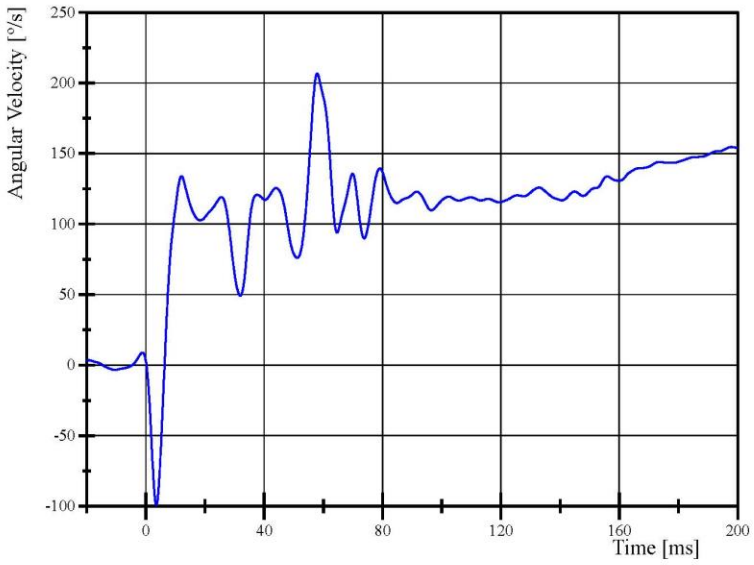


Filter Class: Without_(Constar
Max: 60.3 N·m at 35.1 ms
Min: -27.9 N·m at 162.5 ms

Transportation Research Center Inc.

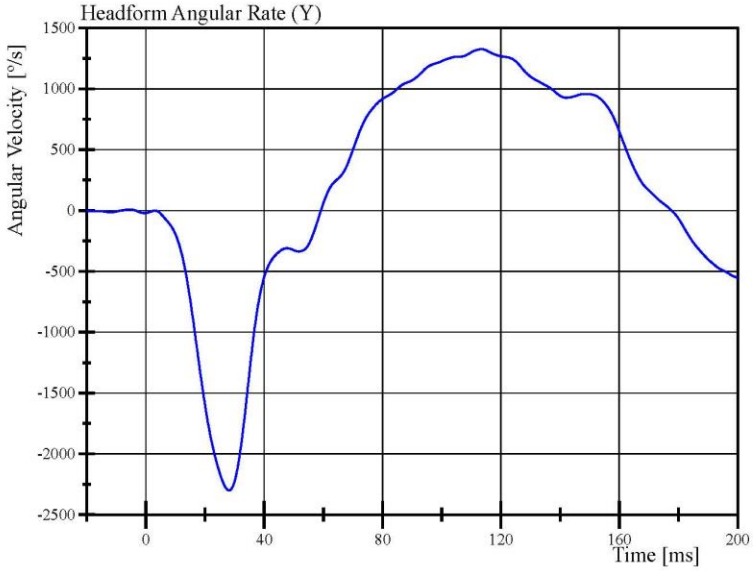
Left Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-5
Test Date: 4/15/2021

Pendulum Angular Rate (Y)



Filter Class: CFC_60
Max: 206.7 °/s at 57.9 ms
Min: -99.1 °/s at 3.6 ms

Headform Angular Rate (Y)



Filter Class: CFC_60
Max: 1,325.6 °/s at 113.4 ms
Min: -2,300.2 °/s at 28.2 ms

Transportation Research Center Inc.

Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/15/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	3.30 - 3.50 m/s	3.339 m/s	Yes
Pendulum Integrated Velocity Change at 4 ms	(-0.87) - (-1.09) m/s	-0.882 m/s	Yes
Change at 8 ms	(-1.72) - (-2.1) m/s	-1.778 m/s	Yes
Change at 12 ms	(-2.63) - (-3.17) m/s	-2.718 m/s	Yes
Maximum Headform Flexion	50 - 61 deg	53.8 deg	Yes
Headform Flexion Decay - from Peak to Zero Degrees	58 - 72 ms	60.2 ms	Yes
Total Neck Occipital Condyles Moment	(-54) - (-67) N·m	-62.1 N·m	Yes
Total Neck Occipital Condyles Moment Decay Time to 0 N·m	71 - 87 ms	76.8 ms	Yes
Maximum Forward Pot Rotation			
Peak	32 - 39 °	34.9 °	Yes
Time of Peak	56 - 68 ms	62.5 ms	Yes
Maximum Rear Pot Rotation			
Peak	29 - 36 °	31.2 °	Yes
Time of Peak	56 - 68 ms	60.0 ms	Yes
Maximum Headform Angular Rate	2,047 - 2,503 °/s	2,285.3 °/s	Yes

Test meets specifications.

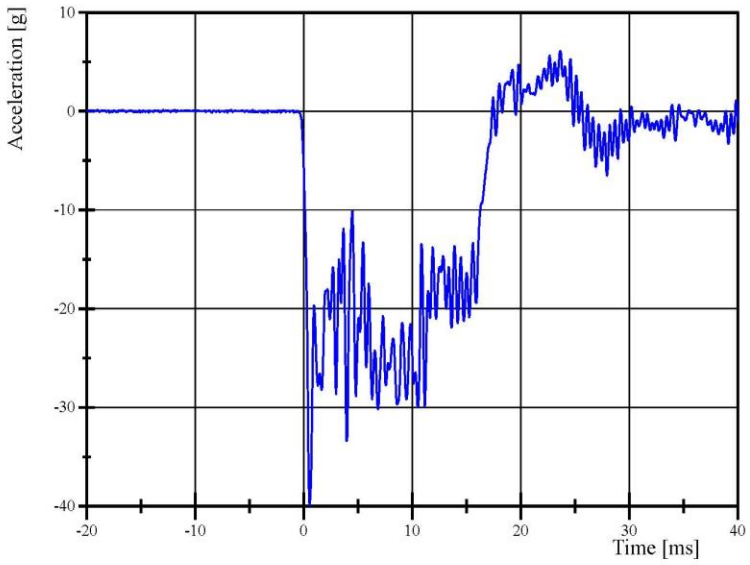
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

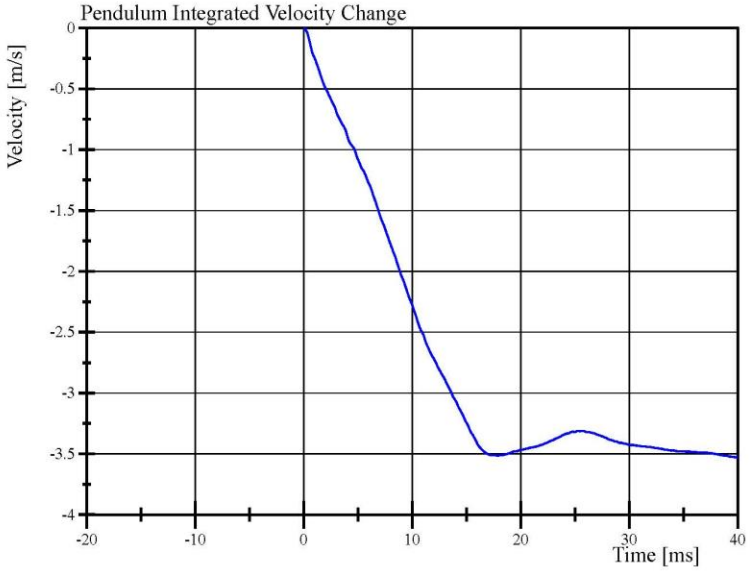
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/15/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 6.1 g at 23.7 ms
Min: -39.9 g at 0.6 ms

Pendulum Integrated Velocity Change

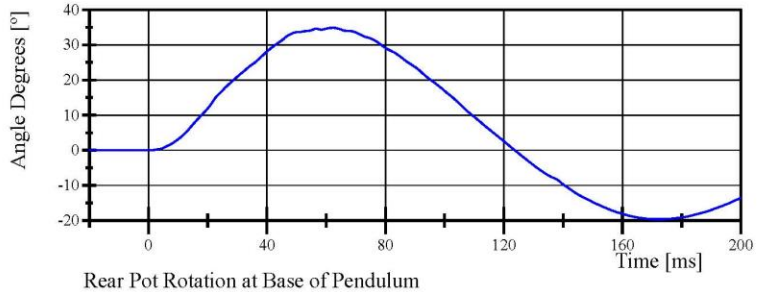


Filter Class: CFC_1000
Max: 0.0 m/s at 0.0 ms
Min: -3.5 m/s at 39.8 ms

Transportation Research Center Inc.

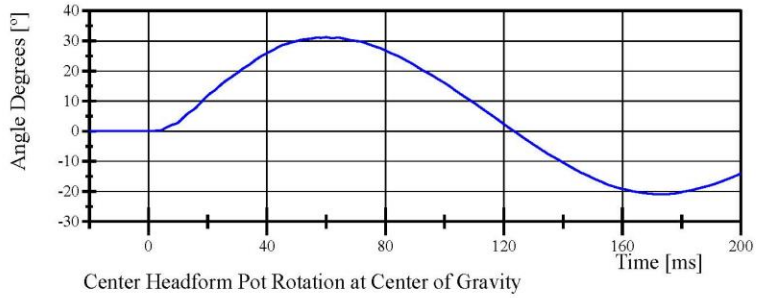
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/15/2021

Forward Pot Rotation at Base of Pendulum



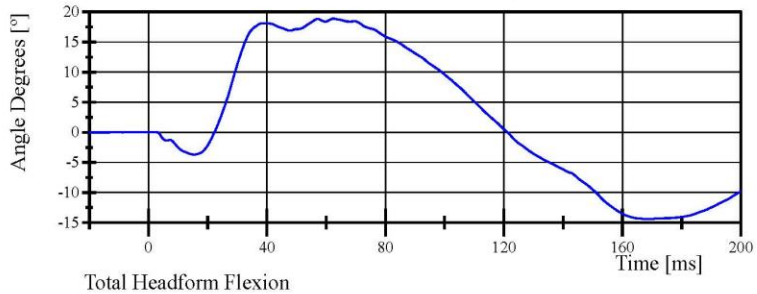
Filter Class: CFC_180
Max: 34.9 ° at 62.5 ms
Min: -19.6 ° at 171.6 ms

Rear Pot Rotation at Base of Pendulum



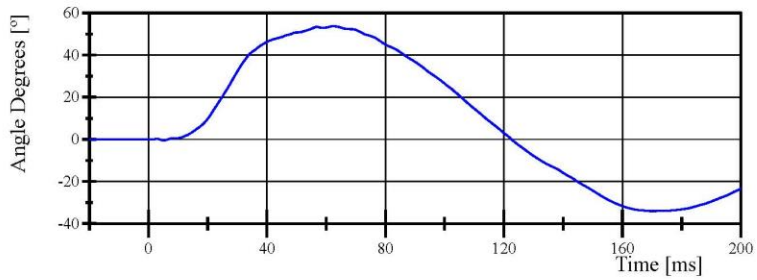
Filter Class: CFC_180
Max: 31.2 ° at 60.0 ms
Min: -20.9 ° at 171.8 ms

Center Headform Pot Rotation at Center of Gravity



Filter Class: CFC_180
Max: 18.9 ° at 62.4 ms
Min: -14.4 ° at 169.0 ms

Total Headform Flexion

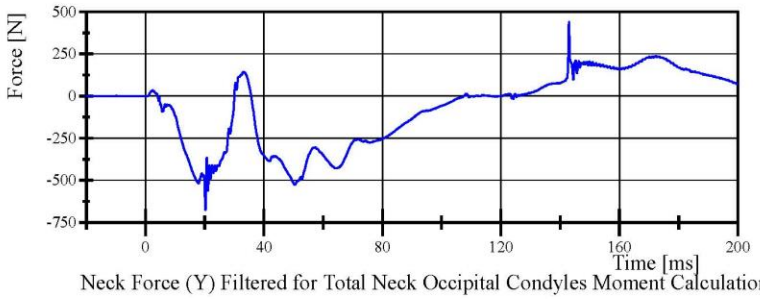


Filter Class: CFC_180
Max: 53.8 ° at 62.5 ms
Min: -34.0 ° at 170.1 ms

Transportation Research Center Inc.

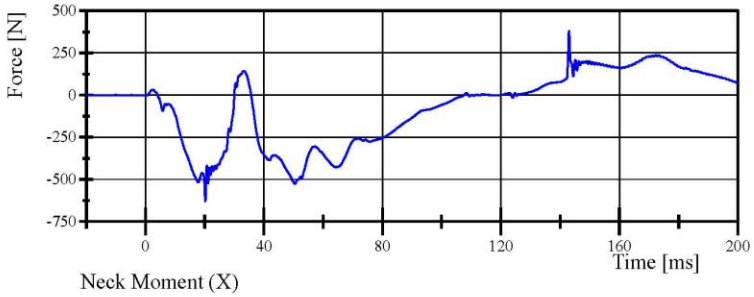
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/15/2021

Neck Force (Y)



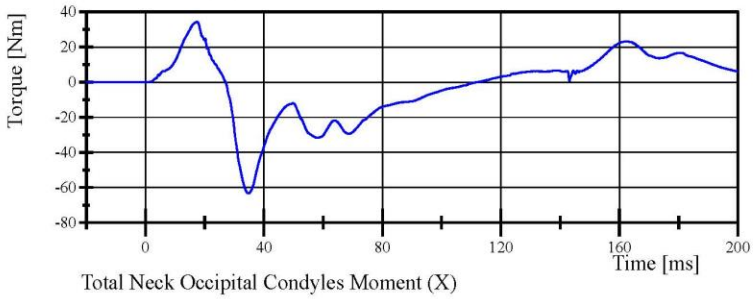
Filter Class: CFC_1000
Max: 440.3 N at 143.0 ms
Min: -676.2 N at 20.3 ms

Neck Force (Y) Filtered for Total Neck Occipital Condyles Moment Calculation



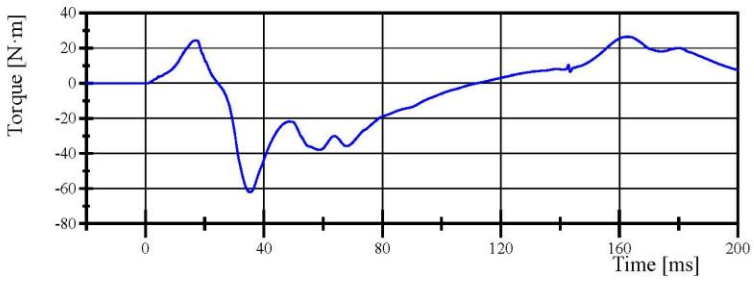
Filter Class: CFC_600
Max: 379.9 N at 143.0 ms
Min: -631.1 N at 20.2 ms

Neck Moment (X)



Filter Class: CFC_600
Max: 34.2 Nm at 17.4 ms
Min: -63.3 Nm at 34.8 ms

Total Neck Occipital Condyles Moment (X)

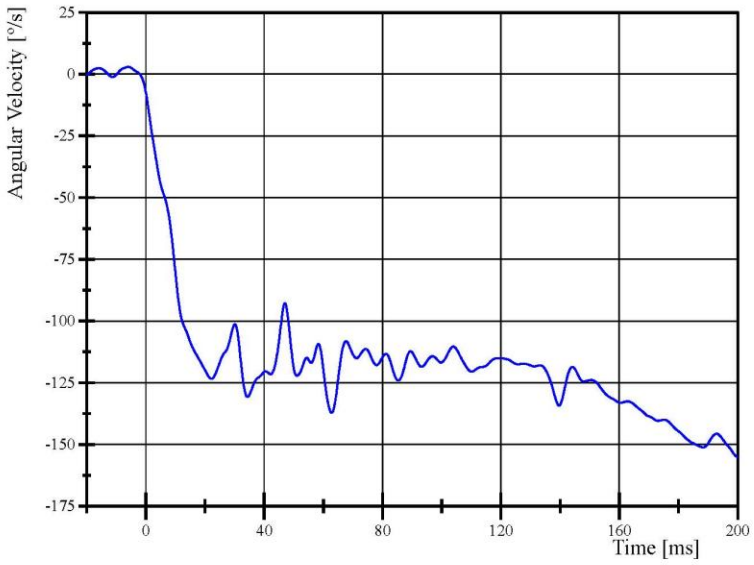


Filter Class: Without_(Constar
Max: 26.5 N·m at 162.7 ms
Min: -62.1 N·m at 35.3 ms

Transportation Research Center Inc.

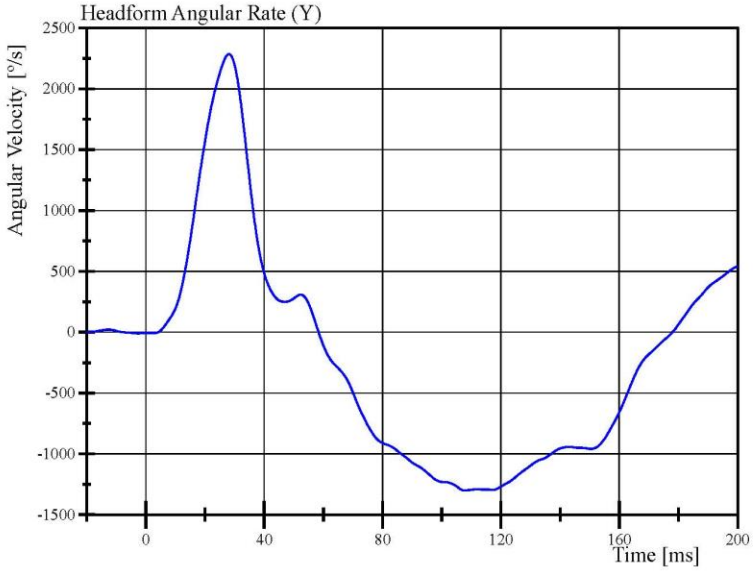
Right Lateral Neck
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/15/2021

Pendulum Angular Rate (Y)



Filter Class: CFC_60
Max: 2.9 °/s at -6.0 ms
Min: -155.0 °/s at 200.0 ms

Headform Angular Rate (Y)



Filter Class: CFC_60
Max: 2,285.3 °/s at 28.1 ms
Min: -1,301.0 °/s at 107.8 ms

Transportation Research Center Inc.

Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/16/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.277 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.419 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.604 m/s	Yes
Peak Fixture Rotation	(-41.5) - (-51) °	-47.66 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	39.9 ms	Yes
Peak Head Angular Velocity Z-axis	(-1,345) - (-1,655) °/s	-1,548.2 °/s	Yes
Peak Lower Neck Moment Z-axis	34 - 42 N·m	37.9 N·m	Yes

Test meets specifications.

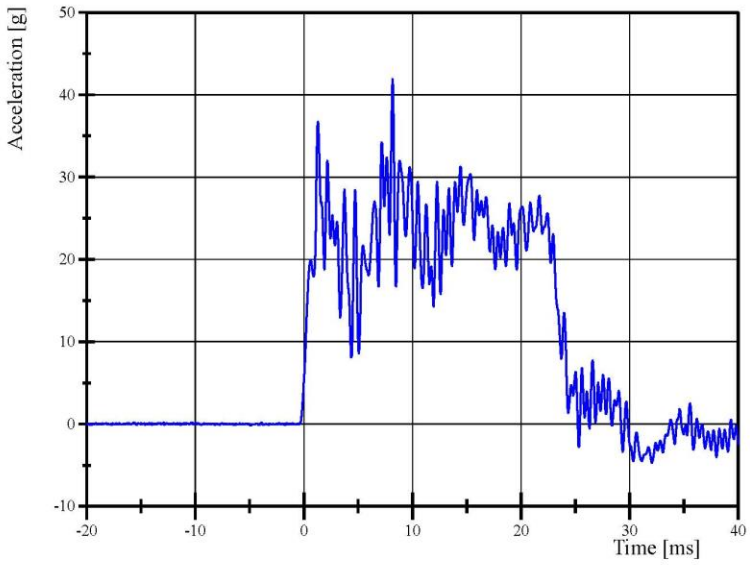
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/16/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 41.9 g at 8.2 ms
Min: -4.7 g at 32.1 ms

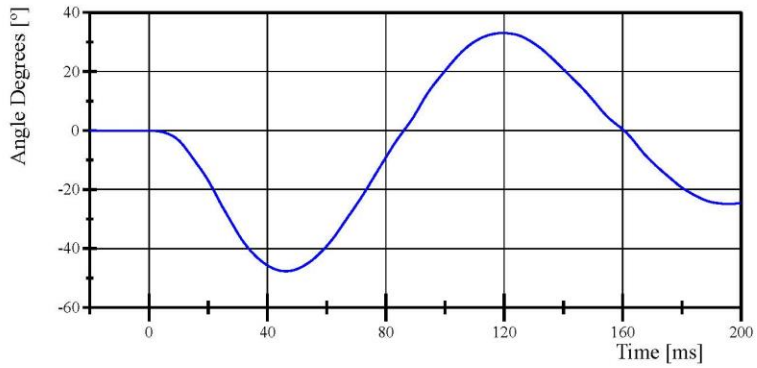
Pendulum Integrated Velocity Change

Filter Class: CFC_1000
Max: 5.6 m/s at 29.2 ms
Min: 0.0 m/s at -0.0 ms

Transportation Research Center Inc.

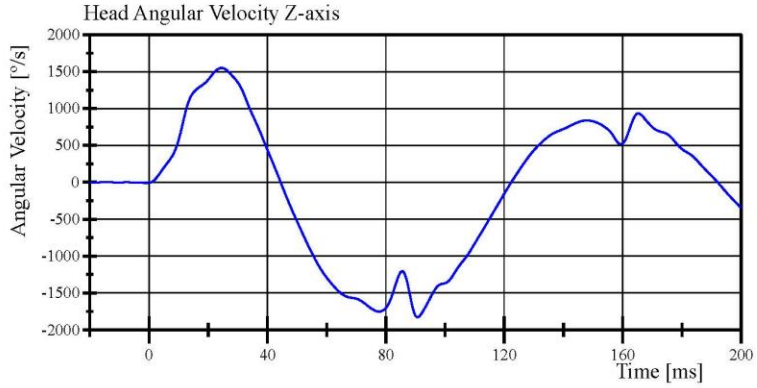
Left Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/16/2021

Torsion Fixture Rotation



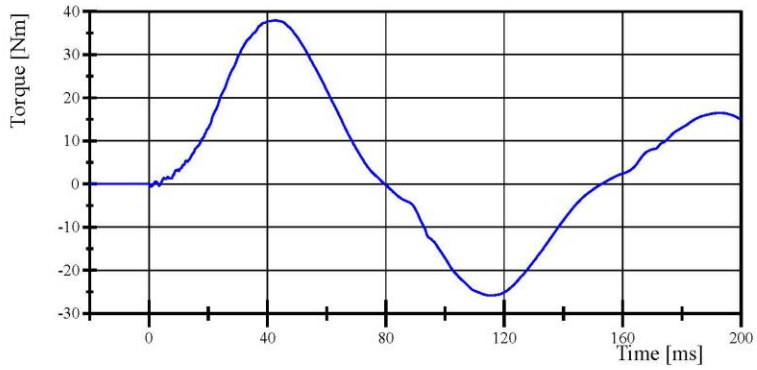
Filter Class: CFC_60
Max: 33.0 ° at 119.4 ms
Min: -47.7 ° at 46.2 ms

Head Angular Velocity Z-axis



Filter Class: CFC_60
Max: 1,548.2 °/s at 24.5 ms
Min: -1,828.6 °/s at 90.7 ms

Lower Neck Moment



Filter Class: CFC_600
Max: 37.9 Nm at 42.7 ms
Min: -25.9 Nm at 115.7 ms

Transportation Research Center Inc.

Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/16/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Pendulum Velocity	5.1 - 5.3 m/s	5.18 m/s	Yes
Pendulum Integrated Velocity Change at 10 ms	2.09 - 2.37 m/s	2.273 m/s	Yes
Change at 15 ms	3.19 - 3.63 m/s	3.451 m/s	Yes
Change at 20 ms	4.27 - 4.87 m/s	4.676 m/s	Yes
Peak Fixture Rotation	41.5 - 51 °	47.44 °	Yes
Decay Time to 0 deg from Peak Angle	35 - 43 ms	39.6 ms	Yes
Peak Head Angular Velocity Z-axis	1,345 - 1,655 °/s	1,570.6 °/s	Yes
Peak Lower Neck Moment Z-axis	(-34) - (-42) N·m	-38.6 N·m	Yes

Test meets specifications.

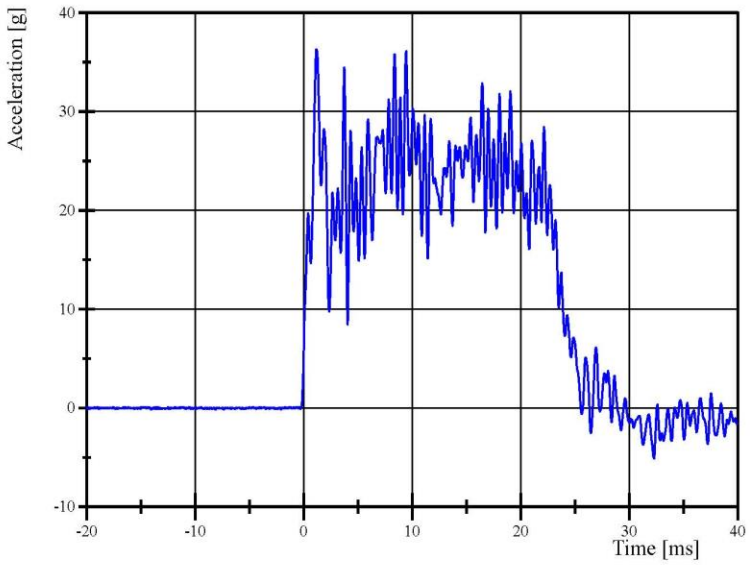
Condition: Used

Comments:
Neck S/N: EE8804

Transportation Research Center Inc.

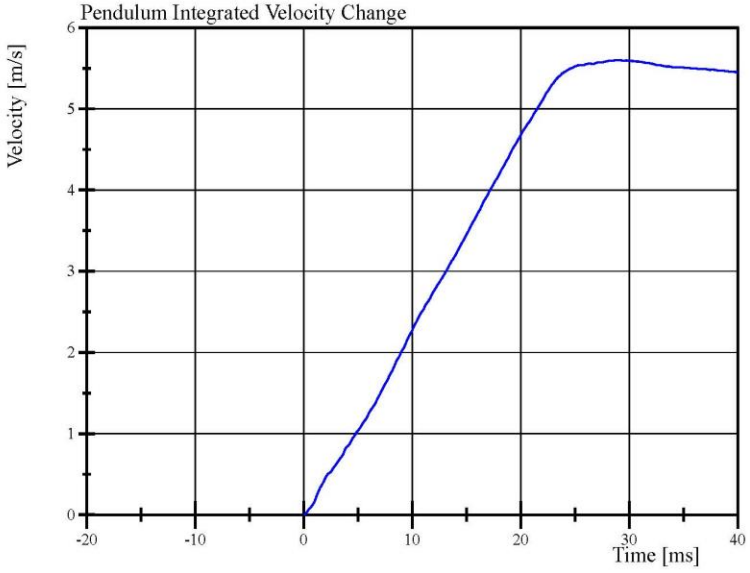
Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/16/2021

Pendulum Acceleration



Filter Class: CFC_1000
Max: 36.3 g at 1.2 ms
Min: -5.1 g at 32.3 ms

Pendulum Integrated Velocity Change

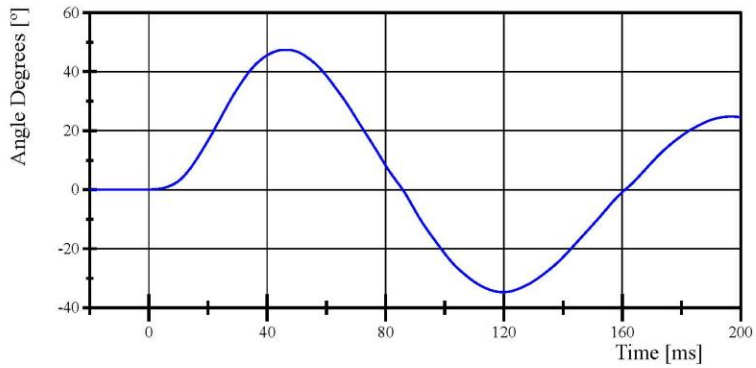


Filter Class: CFC_1000
Max: 5.6 m/s at 28.9 ms
Min: 0.0 m/s at 0.0 ms

Transportation Research Center Inc.

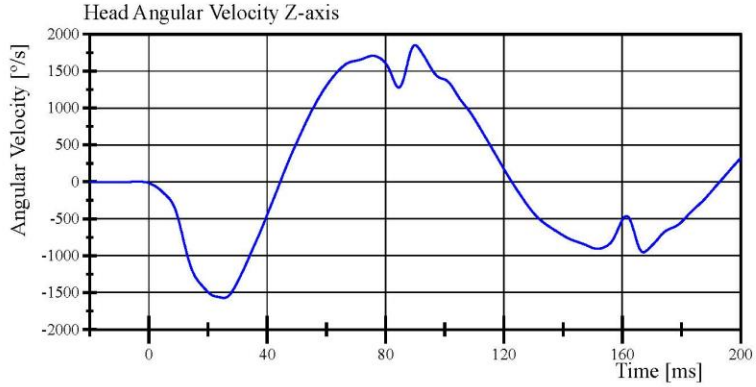
Right Lateral Torsion
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/16/2021

Torsion Fixture Rotation



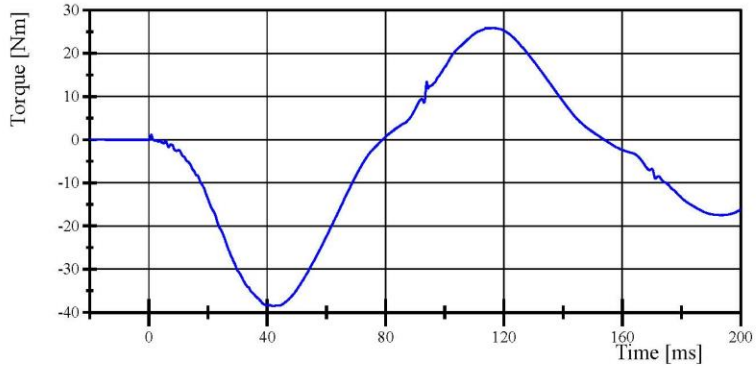
Filter Class: CFC_60
Max: 47.4 ° at 46.3 ms
Min: -34.7 ° at 119.7 ms

Head Angular Velocity Z-axis



Filter Class: CFC_60
Max: 1,850.0 °/s at 90.0 ms
Min: -1,570.6 °/s at 25.3 ms

Lower Neck Moment



Filter Class: CFC_600
Max: 25.9 Nm at 116.1 ms
Min: -38.6 Nm at 42.1 ms

Transportation Research Center Inc.

Left Lateral Shoulder
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/19/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	38 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.30 m/s	Yes
Impactor Force	2,600 - 3,300 N	2,958.6 N	Yes
Shoulder Force	(-1,470) - (-1,800) N	-1,672.0 N	Yes
Shoulder Rib Length Change	37 - 46 mm	42.0 mm	Yes

Test meets specifications.

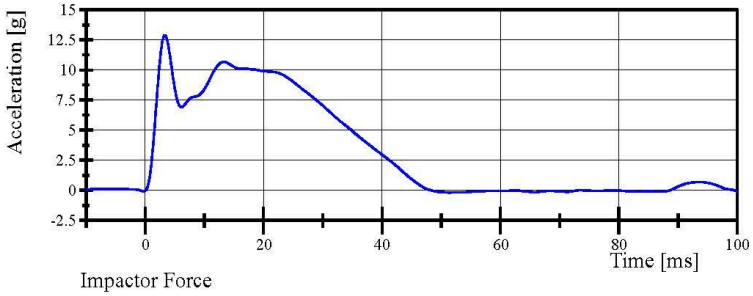
Condition: Used

Comments:
Arm S/N: EG3799
Shoulder Rib S/N: DW1916
RibEye S/N: 124

Transportation Research Center Inc.

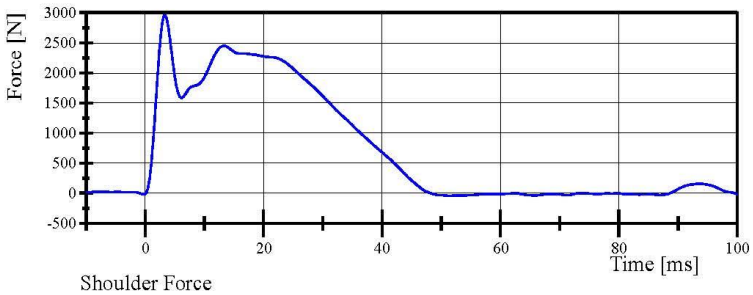
Left Lateral Shoulder
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/19/2021

Impactor Acceleration



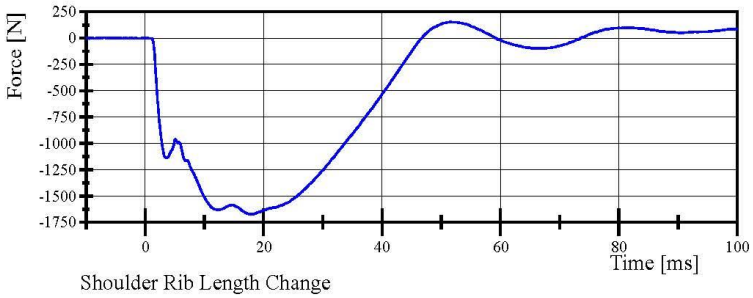
Filter Class: CFC_180
Max: 12.9 g at 3.3 ms
Min: -0.2 g at 51.3 ms

Impactor Force



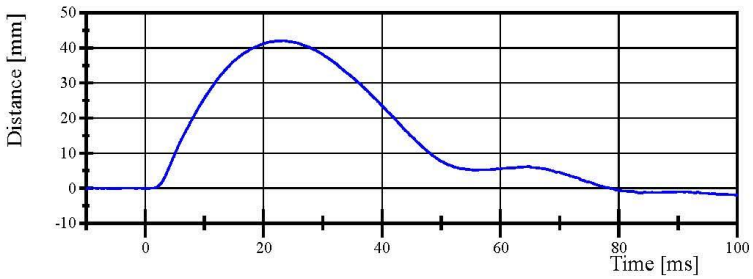
Filter Class: CFC_180
Max: 2,958.6 N at 3.3 ms
Min: -41.2 N at 51.3 ms

Shoulder Force



Filter Class: CFC_600
Max: 151.5 N at 51.5 ms
Min: -1,672.0 N at 18.2 ms

Shoulder Rib Length Change



Filter Class: CFC_600
Max: 42.0 mm at 23.3 ms
Min: -1.9 mm at 99.8 ms

Transportation Research Center Inc.

Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/20/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.75 m/s	Yes
Impactor Force	5,300 - 6,200 N	5,441.6 N	Yes
Peak Thorax Rib 1 Length Change	35 - 47 mm	44.8 mm	Yes
Peak Thorax Rib 2 Length Change	46 - 56 mm	49.7 mm	Yes
Peak Thorax Rib 3 Length Change	33.5 - 40.5 mm	36.33 mm	Yes
Peak T4 Acceleration, y-axis	28 - 37 g	32.1 g	Yes
Peak T12 Acceleration, y-axis	22 - 28 g	22.2 g	Yes

Test meets specifications.

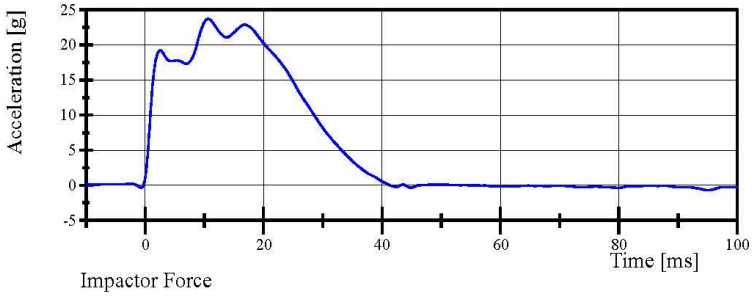
Condition: Used

Comments:
Arm S/N: EG3799
Shoulder Rib S/N: DW1916
Thorax Rib 1 S/N: EB5400
Thorax Rib 2 S/N: EB5401
Thorax Rib 3 S/N: EB5402
RibEye S/N: 124

Transportation Research Center Inc.

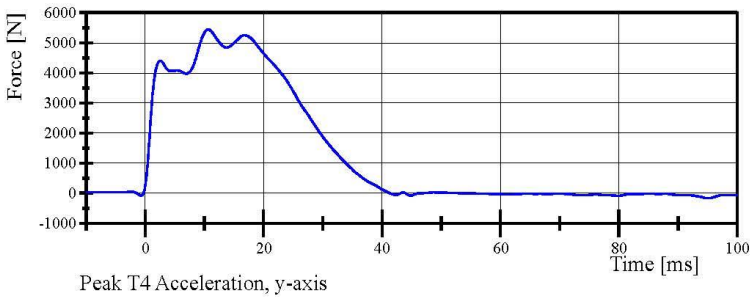
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/20/2021

Impactor Acceleration



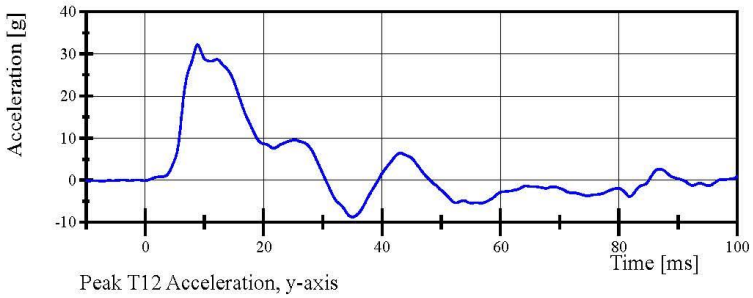
Filter Class: CFC_180
Max: 23.7 g at 10.7 ms
Min: -0.7 g at 95.1 ms

Impactor Force



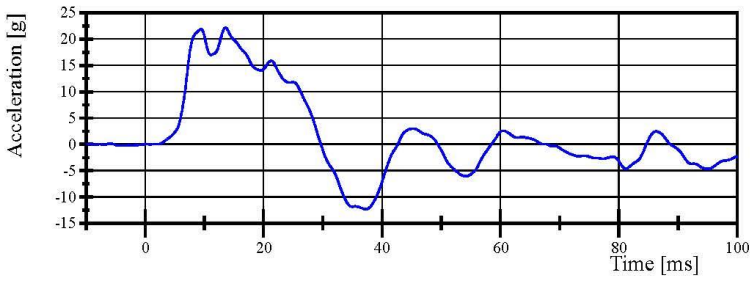
Filter Class: CFC_180
Max: 5,441.6 N at 10.7 ms
Min: -164.2 N at 95.1 ms

Peak T4 Acceleration, y-axis



Filter Class: CFC_180
Max: 32.1 g at 8.9 ms
Min: -8.7 g at 35.0 ms

Peak T12 Acceleration, y-axis

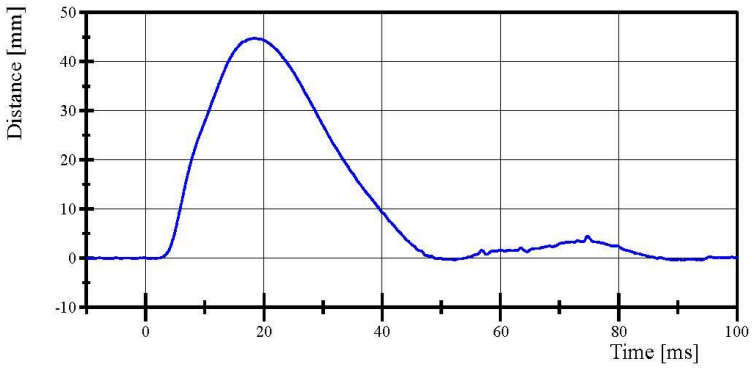


Filter Class: CFC_180
Max: 22.2 g at 13.6 ms
Min: -12.3 g at 37.3 ms

Transportation Research Center Inc.

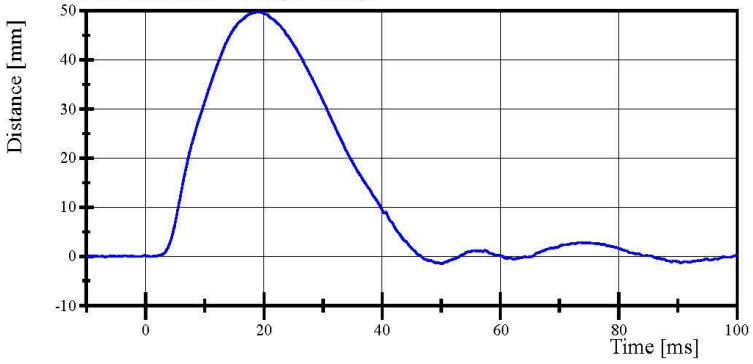
Left Lateral Thorax with Arm
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/20/2021

Peak Thorax Rib 1 Length Change



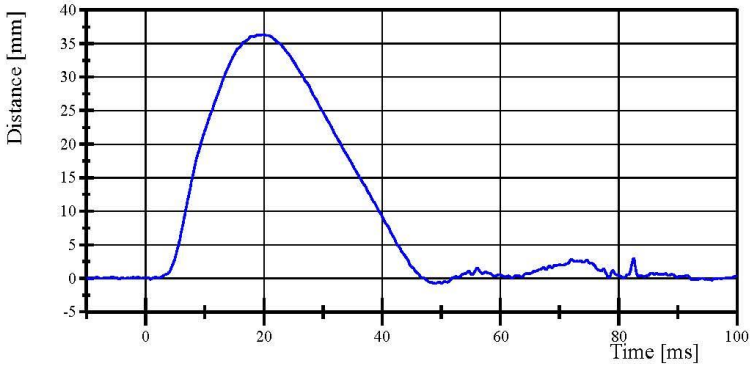
Filter Class: CFC_600
Max: 44.8 mm at 18.4 ms
Min: -0.4 mm at 90.8 ms

Peak Thorax Rib 2 Length Change



Filter Class: CFC_600
Max: 49.7 mm at 19.1 ms
Min: -1.4 mm at 50.1 ms

Peak Thorax Rib 3 Length Change



Filter Class: CFC_600
Max: 36.3 mm at 19.8 ms
Min: -0.8 mm at 49.0 ms

Transportation Research Center Inc.

Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	40 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.29 m/s	Yes
Impactor Force	3,200 - 3,800 N	3,485.7 N	Yes
Peak Thorax Rib 1 Length Change	33 - 43 mm	35.3 mm	Yes
Peak Thorax Rib 2 Length Change	35 - 43 mm	41.4 mm	Yes
Peak Thorax Rib 3 Length Change	32 - 40 mm	35.0 mm	Yes
Peak T4 Acceleration, y-axis	14 - 20 g	14.2 g	Yes
Peak T12 Acceleration, y-axis	14 - 22 g	14.1 g	Yes

Test meets specifications.

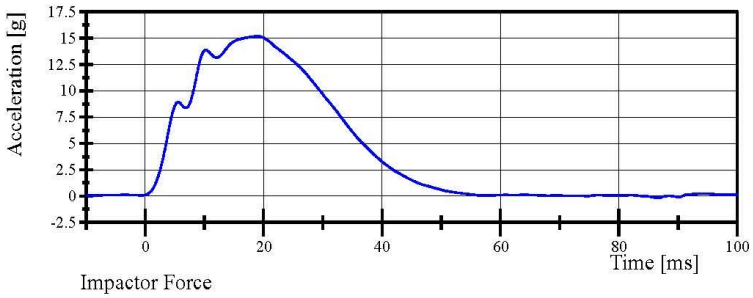
Condition: Used

Comments:
Thorax Rib 1 S/N: EB5400
Thorax Rib 2 S/N: EB5401
Thorax Rib 3 S/N: EB5402
RibEye S/N: 124

Transportation Research Center Inc.

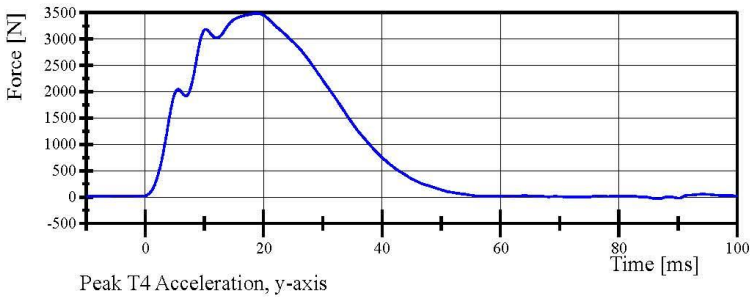
Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Impactor Acceleration



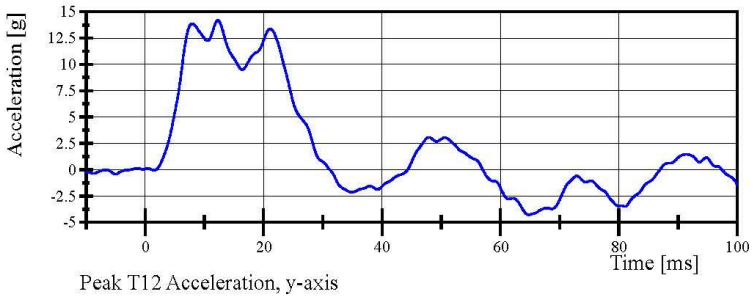
Filter Class: CFC_180
Max: 15.2 g at 18.9 ms
Min: -0.2 g at 86.6 ms

Impactor Force



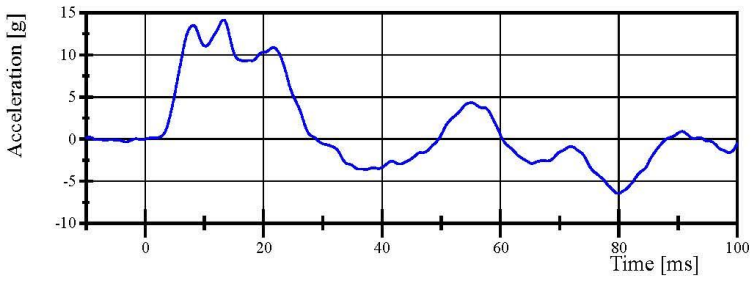
Filter Class: CFC_180
Max: 3,485.7 N at 18.9 ms
Min: -36.8 N at 86.6 ms

Peak T4 Acceleration, y-axis



Filter Class: CFC_180
Max: 14.2 g at 12.3 ms
Min: -4.3 g at 64.8 ms

Peak T12 Acceleration, y-axis

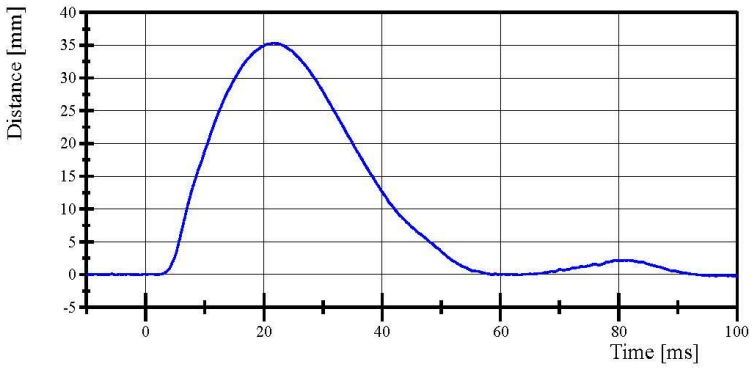


Filter Class: CFC_180
Max: 14.1 g at 13.2 ms
Min: -6.5 g at 79.9 ms

Transportation Research Center Inc.

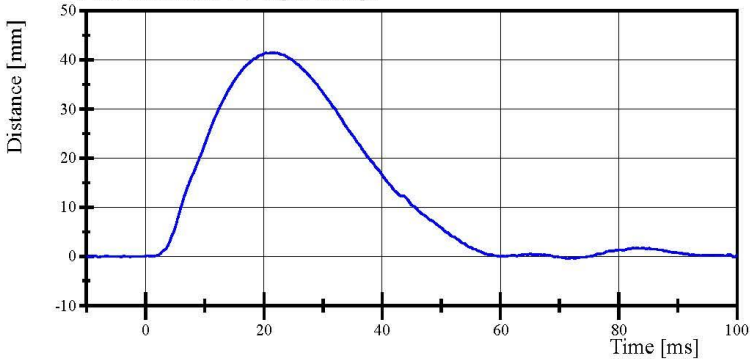
Left Lateral Thorax without Arm
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Peak Thorax Rib 1 Length Change



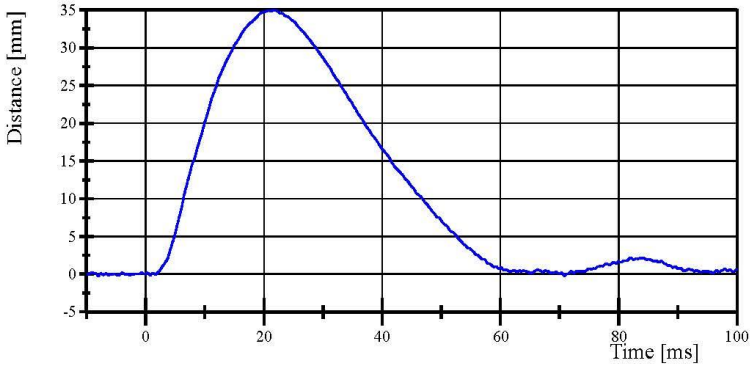
Filter Class: CFC_600
Max: 35.3 mm at 21.7 ms
Min: -0.2 mm at 96.5 ms

Peak Thorax Rib 2 Length Change



Filter Class: CFC_600
Max: 41.4 mm at 21.5 ms
Min: -0.4 mm at 71.4 ms

Peak Thorax Rib 3 Length Change



Filter Class: CFC_600
Max: 35.0 mm at 21.6 ms
Min: -0.2 mm at -8.0 ms

Transportation Research Center Inc.

Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	22.0 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Impactor Velocity	4.2 - 4.4 m/s	4.33 m/s	Yes
Impactor Force	2,700 - 3,100 N	3,049.8 N	Yes
Peak Abdomen Rib 1 Length Change	32.5 - 39.5 mm	34.41 mm	Yes
Peak Abdomen Rib 2 Length Change	32 - 38 mm	35.3 mm	Yes
Peak T12 Acceleration, y-axis	14.5 - 19.5 g	17.55 g	Yes

Test meets specifications.

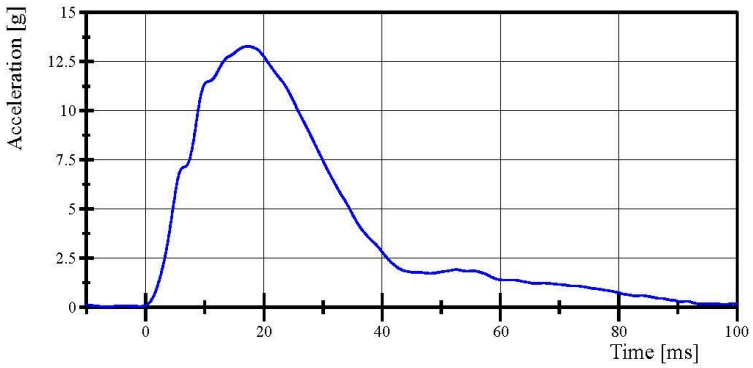
Condition: Used

Comments:
Abdomen Rib #1 S/N: DY5252
Abdomen Rib #2 S/N: DY5253
RibEye S/N: 124

Transportation Research Center Inc.

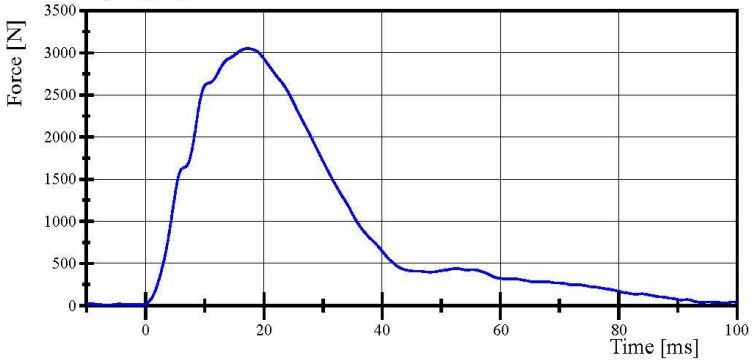
Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Impactor Acceleration



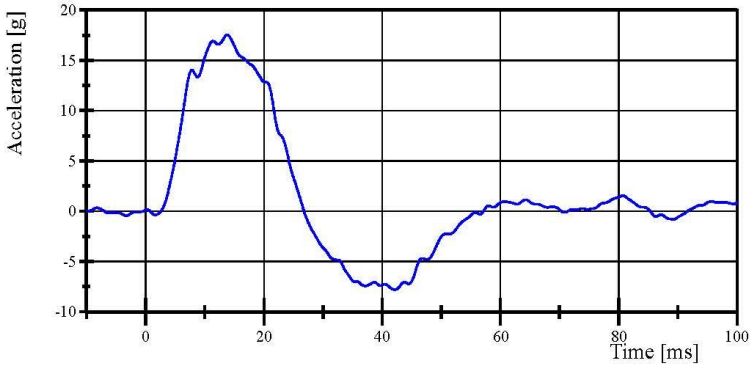
Filter Class: CFC_180
Max: 13.3 g at 17.3 ms
Min: 0.0 g at -6.2 ms

Impactor Force



Filter Class: CFC_180
Max: 3,049.8 N at 17.3 ms
Min: 6.8 N at -6.2 ms

Peak T12 Acceleration, y-axis

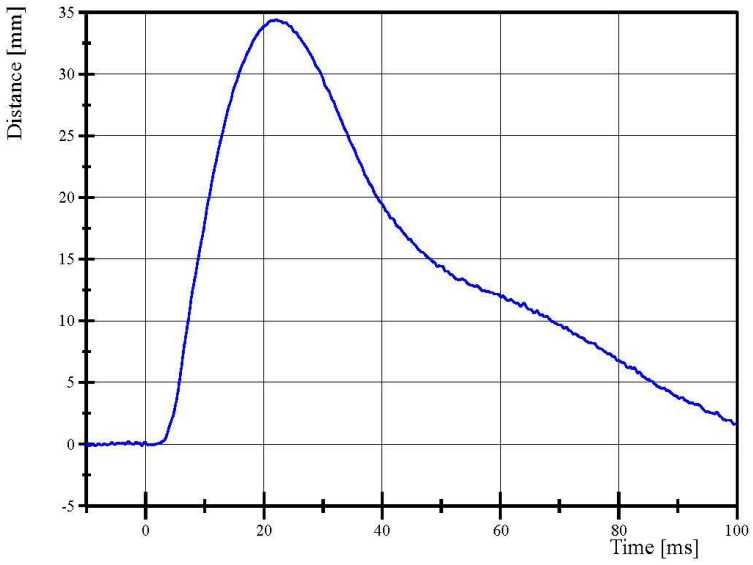


Filter Class: CFC_180
Max: 17.6 g at 13.8 ms
Min: -7.8 g at 42.2 ms

Transportation Research Center Inc.

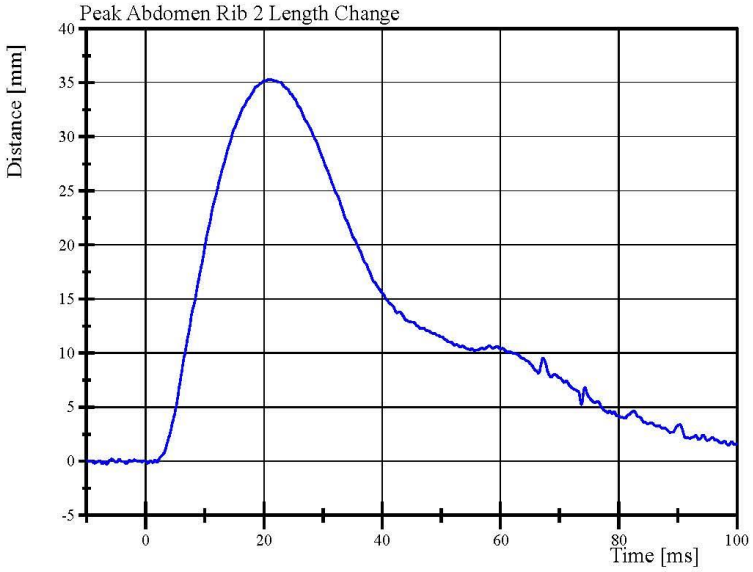
Left Lateral Abdomen
WorldSID 50th Serial No. EB8888 Certification No. 10-2
Test Date: 4/19/2021

Peak Abdomen Rib 1 Length Change



Filter Class: CFC_600
Max: 34.4 mm at 22.1 ms
Min: -0.1 mm at -9.5 ms

Peak Abdomen Rib 2 Length Change



Filter Class: CFC_600
Max: 35.3 mm at 20.8 ms
Min: -0.3 mm at -6.6 ms

Transportation Research Center Inc.

Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/20/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Impactor Velocity	6.6 - 6.8 m/s	6.72 m/s	Yes
Impactor Force	6,800 - 8,200 N	7,370.2 N	Yes
Pelvis Lateral Acceleration	38.5 - 48.5 g	40.71 g	Yes
Peak T12 Acceleration, y-axis	10 - 14 g	11.9 g	Yes
Pubic Lateral Force	(-1,300) - (-1,590) N	-1,422.0 N	Yes
Sacroiliac Lateral Force	(-1,860) - (-2,280) N	-1,997.7 N	Yes

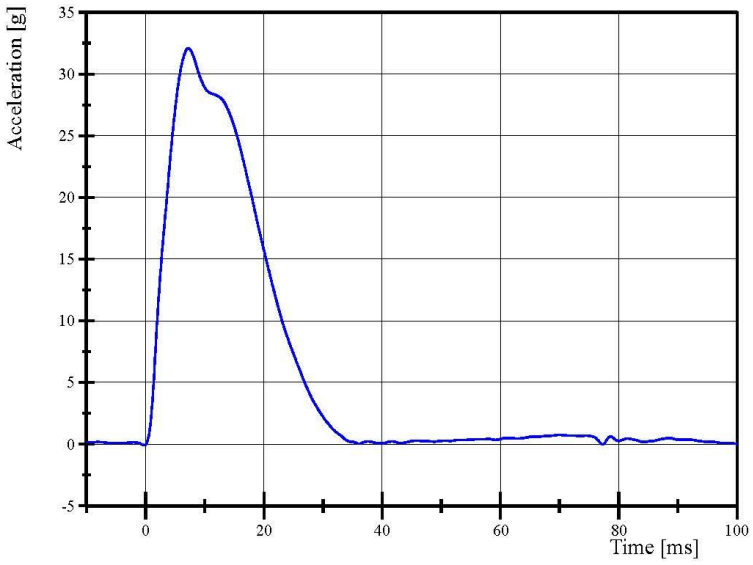
Test meets specifications.

Condition: Used
Comments:
Pelvis S/N: EC3628

Transportation Research Center Inc.

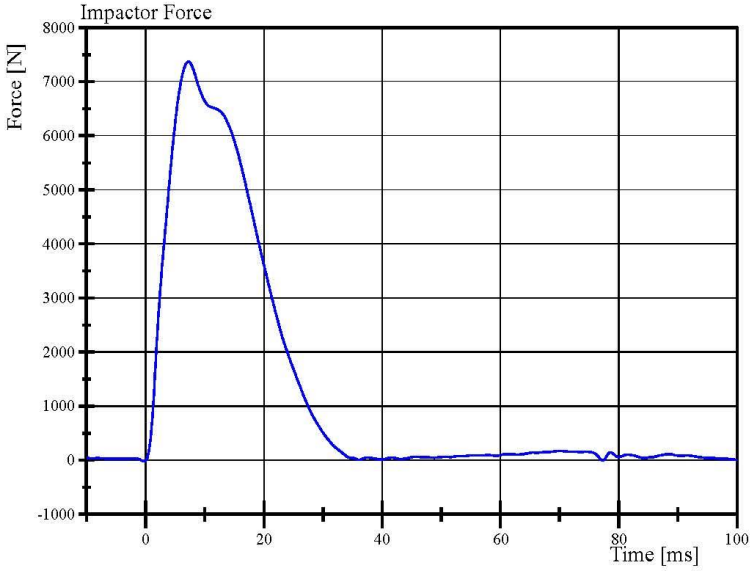
Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/20/2021

Impactor Acceleration



Filter Class: CFC_180
Max: 32.1 g at 7.3 ms
Min: -0.1 g at -0.3 ms

Impactor Force

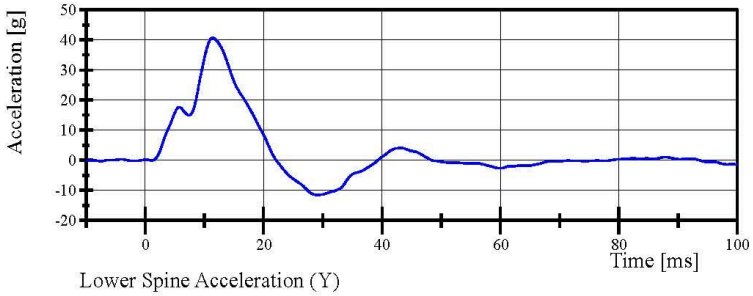


Filter Class: CFC_180
Max: 7,370.2 N at 7.3 ms
Min: -18.2 N at -0.3 ms

Transportation Research Center Inc.

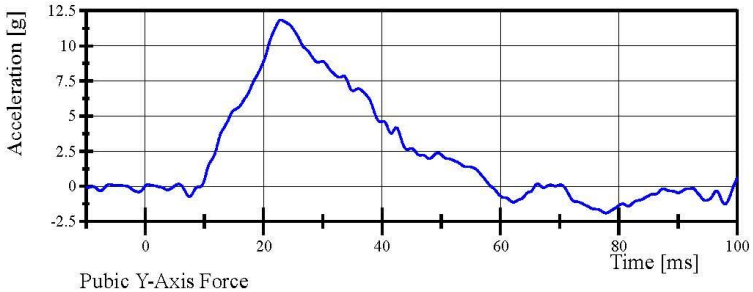
Left Lateral Pelvis
WorldSID 50th Serial No. EB8888 Certification No. 10-1
Test Date: 4/20/2021

Pelvis Y-Axis Acceleration



Filter Class: CFC_180
Max: 40.7 g at 11.4 ms
Min: -11.6 g at 29.1 ms

Lower Spine Acceleration (Y)

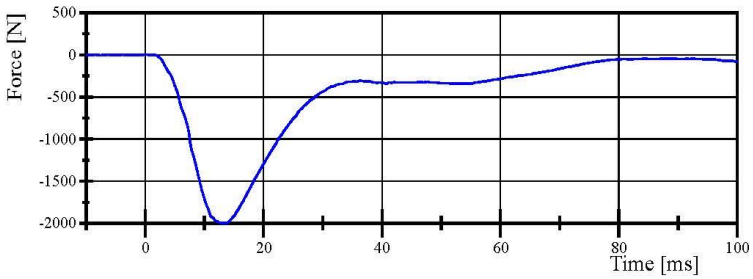


Filter Class: CFC_180
Max: 11.9 g at 22.9 ms
Min: -1.9 g at 77.8 ms

Pubic Y-Axis Force

Filter Class: CFC_600
Max: 123.5 N at 40.3 ms
Min: -1,422.0 N at 10.9 ms

Sacroiliac Y-Axis Force



Filter Class: CFC_600
Max: 2.5 N at 0.1 ms
Min: -1,997.7 N at 13.3 ms

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	12324-1	Endevco	22-Jul-2020
	Y	12324-3	Endevco	22-Jul-2020
	Z	12324-2	Endevco	22-Jul-2020
Head Angular Rates Sensors (deg/sec)	X	ARS12047	DTS	4-Aug-2020
	Y	ARS15094	DTS	4-Aug-2020
	Z	ARS11060	DTS	4-Aug-2020
Upper Neck Force (N)	X	DO9753	Humanetics	21-Jul-2020
	Y	DO9753	Humanetics	21-Jul-2020
	Z	DO9753	Humanetics	21-Jul-2020
Upper Neck Moment (Nm)	X	DO9753	Humanetics	21-Jul-2020
	Y	DO9753	Humanetics	21-Jul-2020
	Z	DO9753	Humanetics	21-Jul-2020
Lower Neck Force (N)	X	EB8143	Humanetics	21-Jul-2020
	Y	EB8143	Humanetics	21-Jul-2020
	Z	EB8143	Humanetics	21-Jul-2020
Lower Neck Moment (Nm)	X	EB8143	Humanetics	21-Jul-2020
	Y	EB8143	Humanetics	21-Jul-2020
	Z	EB8143	Humanetics	21-Jul-2020
Shoulder Force (N)	X	EC1630	Humanetics	21-Jul-2020
	Y	EC1630	Humanetics	21-Jul-2020
	Z	EC1630	Humanetics	21-Jul-2020
Upper Spine Accelerometers (T1) (g)	X	12037-3	Endevco	21-Jul-2020
	Y	12037-2	Endevco	21-Jul-2020
	Z	12037-1	Endevco	21-Jul-2020
Middle Spine Accelerometers (T4) (g)	X	12352-3	Endevco	21-Jul-2020
	Y	12352-2	Endevco	21-Jul-2020
	Z	12352-1	Endevco	21-Jul-2020
Lower Spine Accelerometers (T12) (g)	X	12375-3	Endevco	22-Jul-2020
	Y	12375-2	Endevco	22-Jul-2020
	Z	12375-1	Endevco	22-Jul-2020
Pubic Symphysis Force (N)	Y	EC4386	Humanetics	21-Jul-2020
Sacro-Iliac Left Force (N)	X	EG4066	Humanetics	21-Jul-2020
	Y	EG4066	Humanetics	21-Jul-2020
	Z	EG4066	Humanetics	21-Jul-2020
Sacro-Iliac Left Moment (Nm)	X	EG4066	Humanetics	21-Jul-2020
	Y	EG4066	Humanetics	21-Jul-2020
	Z	EG4066	Humanetics	21-Jul-2020

1

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	EG4066	Humanetics	21-Jul-2020
	Y	EG4066	Humanetics	21-Jul-2020
	Z	EG4066	Humanetics	21-Jul-2020
Sacro-Iliac Right Moment (Nm)	X	EG4066	Humanetics	21-Jul-2020
	Y	EG4066	Humanetics	21-Jul-2020
	Z	EG4066	Humanetics	21-Jul-2020
Lumbar Force (N)	X	EC2349	Humanetics	21-Jul-2020
	Y	EC2349	Humanetics	21-Jul-2020
	Z	EC2349	Humanetics	21-Jul-2020
Lumbar Moment (Nm)	X	EC2349	Humanetics	21-Jul-2020
	Y	EC2349	Humanetics	21-Jul-2020
	Z	EC2349	Humanetics	21-Jul-2020
Pelvis Accelerometers (g)	X	11905-3	Endevco	22-Jul-2020
	Y	11905-2	Endevco	22-Jul-2020
	Z	11905-1	Endevco	22-Jul-2020
Left Femur Force (N)	X	EA4925TPS	Humanetics	29-Jul-2020
	Y	EA4925TPS	Humanetics	29-Jul-2020
	Z	EA4925TPS	Humanetics	29-Jul-2020
Left Femur Moment (Nm)	X	EA4925TPS	Humanetics	29-Jul-2020
	Y	EA4925TPS	Humanetics	29-Jul-2020
	Z	EA4925TPS	Humanetics	29-Jul-2020
Left Femoral Neck Force (N)	X	EB6234T	Humanetics	21-Jul-2020
	Y	EB6234T	Humanetics	21-Jul-2020
	Z	EB6234T	Humanetics	21-Jul-2020
Driver Left Outer Knee Force (N)	Y	93	Humanetics	21-Jul-2020
Driver Left Inner Knee Force (N)	Y	95	Humanetics	21-Jul-2020

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

			WorldSID-50M S/N EB8888		
			Serial Number	**Manufacturer**	**Calibration Date**
Shoulder RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
Thorax Rib 1 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
Thorax Rib 2 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
Thorax Rib 3 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020

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	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
Abdomen Rib 2 RibEye (mm)	Front	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Middle	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020
	Rear	X	124	Boxboro Systems	7-Jul-2020
		Y	124	Boxboro Systems	7-Jul-2020
		Z	124	Boxboro Systems	7-Jul-2020

TABLE 2 – VEHICLE INSTRUMENTATION

Vehicle Instrumentation		Serial Number	Manufacturer	Calibration Date
Vehicle Center of Gravity (g)	X	P54294	ENDEVCO	19-Mar-2021
	Y	P50487	ENDEVCO	19-Mar-2021
	Z	P94557	ENDEVCO	19-Mar-2021
Vehicle Center of Gravity Angular Rate (deg/sec)	X	ARS8736	DTS	11-Sep-2020
	Y	ARS8714	DTS	11-Sep-2020
	Z	ARS9190	DTS	11-Sep-2020
Left Floor Sill (g)	Y	P62618	ENDEVCO	18-Mar-2021
Left A-Pillar Sill (g)	Y	P76454	ENDEVCO	1-Feb-2021
Left Lower A-Pillar (g)	Y	P61295	ENDEVCO	1-Feb-2021
Left Mid A-Pillar (g)	Y	P58611	ENDEVCO	1-Feb-2021
Left B-Pillar Sill (g)	Y	P80720	ENDEVCO	8-Feb-2021
Left Lower B-Pillar (g)	Y	P76114	ENDEVCO	20-Nov-2020
Left Mid B-Pillar (g)	Y	P76171	ENDEVCO	20-Nov-2020
Driver Seat Track at Dummy H-Point (g)	Y	P87134	ENDEVCO	11-Feb-2021
Engine Top (g)	X	P91965	ENDEVCO	11-Feb-2021
	Y	P91613	ENDEVCO	11-Feb-2021
Firewall Center (g)	Y	P84600	ENDEVCO	18-Mar-2021
Right Roof at Vertical Impact Reference Line (g)	Y	P97889	ENDEVCO	18-Mar-2021
Right Sill at Vertical Impact Reference Line (g)	X	T16770	ENDEVCO	1-Mar-2021
	Y	P61501	ENDEVCO	1-Mar-2021
	Z	T11835	ENDEVCO	1-Mar-2021
Right Sill at Rear Seat Acceleration (g)	X	P68755	ENDEVCO	19-Mar-2021
	Y	P68518	ENDEVCO	19-Mar-2021
	Z	P68750	ENDEVCO	19-Mar-2021
Rear Floorpan Behind Rear Axle at Centerline (g)	X	T25513	ENDEVCO	15-Mar-2021
Rear Floorpan Behind Rear Axle at Centerline (g)	Y	T20648	ENDEVCO	15-Mar-2021
Left Front Door Mid Centerline (g)	Y	P88555	ENDEVCO	18-Mar-2021
Left Front Door Mid Rear (g)	Y	P94564	ENDEVCO	18-Mar-2021
Left Front Door Upper Centerline (g)	Y	P91467	ENDEVCO	18-Mar-2021
Left Rear Door Mid Rear (g)	Y	P88030	ENDEVCO	11-Feb-2021
Left Rear Door Upper Centerline (g)	Y	P90297	ENDEVCO	11-Feb-2021
Rear Deck (g)	X	P34046	ENDEVCO	11-Feb-2021
	Y	P50393	ENDEVCO	11-Feb-2021
	Z	P57803	ENDEVCO	11-Feb-2021
Rear Deck Angular Rate (deg/sec)	X	ARS9194	DTS	11-Sep-2020
	Y	ARS7974	DTS	6-Jul-2020
	Z	ARS8743	DTS	11-Sep-2020

TABLE 3 – POLE INSTRUMENTATION

Pole Instrumentation	Serial Number	Manufacturer	Calibration Date
Pole Load Cell 1	DK7091S	Humanetics	12-Nov-2020
Pole Load Cell 2	DK7120S	Humanetics	12-Nov-2020
Pole Load Cell 3	DK7118S	Humanetics	12-Nov-2020
Pole Load Cell 4	DK7124S	Humanetics	12-Nov-2020
Pole Load Cell 5	DK7111S	Humanetics	12-Nov-2020
Pole Load Cell 6	DK7126S	Humanetics	12-Nov-2020
Pole Load Cell 7	DK7112S	Humanetics	12-Nov-2020
Pole Load Cell 8	DK7074S	Humanetics	12-Nov-2020

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

Lumbar load cells:	+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

Typical Test Measurements	Channel Class
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	11SHRILEREWSDSX0	Driver Shoulder Rear Displacement (X)	0	+	no	60
23	11SHRILEREWSDSY0	Driver Shoulder Rear Displacement (Y)	0	+	no	60
24	11SHRILEREWSDSZ0	Driver Shoulder Rear Displacement (Z)	0	+	no	60
25	11SHRILEREWSDSLB	Driver Shoulder Rear Length Change	600	+	no	60
26	11SHRILEMIWSDSX0	Driver Shoulder Middle Displacement (X)	0	+	no	60
27	11SHRILEMIWSDSY0	Driver Shoulder Middle Displacement (Y)	0	+	no	60
28	11SHRILEMIWSDSZ0	Driver Shoulder Middle Displacement (Z)	0	+	no	60
29	11SHRILEMIWSDSLB	Driver Shoulder Middle Length Change	600	+	no	60
30	11SHRILEFRWSDSX0	Driver Shoulder Front Displacement (X)	0	+	no	60
31	11SHRILEFRWSDSY0	Driver Shoulder Front Displacement (Y)	0	+	no	60
32	11SHRILEFRWSDSZ0	Driver Shoulder Front Displacement (Z)	0	+	no	60
33	11SHRILEFRWSDSLB	Driver Shoulder Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
34	11TRRILUREWSDSX0	Driver Thorax Rib 1 Rear Displacement (X)	0	+	no	60
35	11TRRILUREWSDSY0	Driver Thorax Rib 1 Rear Displacement (Y)	0	+	no	60
36	11TRRILUREWSDSZ0	Driver Thorax Rib 1 Rear Displacement (Z)	0	+	no	60
37	11TRRILUREWSDSLB	Driver Thorax Rib 1 Rear Length Change	600	+	no	60
38	11TRRILUMIWSDSX0	Driver Thorax Rib 1 Middle Displacement (X)	0	+	no	60
39	11TRRILUMIWSDSY0	Driver Thorax Rib 1 Middle Displacement (Y)	0	+	no	60
40	11TRRILUMIWSDSZ0	Driver Thorax Rib 1 Middle Displacement (Z)	0	+	no	60
41	11TRRILUMIWSDSLB	Driver Thorax Rib 1 Middle Length Change	600	+	no	60
42	11TRRILUFRWSDSX0	Driver Thorax Rib 1 Front Displacement (X)	0	+	no	60
43	11TRRILUFRWSDSY0	Driver Thorax Rib 1 Front Displacement (Y)	0	+	no	60
44	11TRRILUFRWSDSZ0	Driver Thorax Rib 1 Front Displacement (Z)	0	+	no	60
45	11TRRILUFRWSDSLB	Driver Thorax Rib 1 Front Length Change	600	+	no	60
46	11TRRILMREWSDSX0	Driver Thorax Rib 2 Rear Displacement (X)	0	+	no	60
47	11TRRILMREWSDSY0	Driver Thorax Rib 2 Rear Displacement (Y)	0	+	no	60
48	11TRRILMREWSDSZ0	Driver Thorax Rib 2 Rear Displacement (Z)	0	+	no	60
49	11TRRILMREWSDSLB	Driver Thorax Rib 2 Rear Length Change	600	+	no	60
50	11TRRILMMIWSDSX0	Driver Thorax Rib 2 Middle Displacement (X)	0	+	no	60
51	11TRRILMMIWSDSY0	Driver Thorax Rib 2 Middle Displacement (Y)	0	+	no	60
52	11TRRILMMIWSDSZ0	Driver Thorax Rib 2 Middle Displacement (Z)	0	+	no	60
53	11TRRILMMIWSDSLB	Driver Thorax Rib 2 Middle Length Change	600	+	no	60
54	11TRRILMFRWSDSX0	Driver Thorax Rib 2 Front Displacement (X)	0	+	no	60
55	11TRRILMFRWSDSY0	Driver Thorax Rib 2 Front Displacement (Y)	0	+	no	60
56	11TRRILMFRWSDSZ0	Driver Thorax Rib 2 Front Displacement (Z)	0	+	no	60
57	11TRRILMFRWSDSLB	Driver Thorax Rib 2 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
58	11TRRILLREWSDSX0	Driver Thorax Rib 3 Rear Displacement (X)	0	+	no	60
59	11TRRILLREWSDSY0	Driver Thorax Rib 3 Rear Displacement (Y)	0	+	no	60
60	11TRRILLREWSDSZ0	Driver Thorax Rib 3 Rear Displacement (Z)	0	+	no	60
61	11TRRILLREWSDSLB	Driver Thorax Rib 3 Rear Length Change	600	+	no	60
62	11TRRILLMIWSDSX0	Driver Thorax Rib 3 Middle Displacement (X)	0	+	no	60
63	11TRRILLMIWSDSY0	Driver Thorax Rib 3 Middle Displacement (Y)	0	+	no	60
64	11TRRILLMIWSDSZ0	Driver Thorax Rib 3 Middle Displacement (Z)	0	+	no	60
65	11TRRILLMIWSDSLB	Driver Thorax Rib 3 Middle Length Change	600	+	no	60
66	11TRRILLFRWSDSX0	Driver Thorax Rib 3 Front Displacement (X)	0	+	no	60
67	11TRRILLFRWSDSY0	Driver Thorax Rib 3 Front Displacement (Y)	0	+	no	60
68	11TRRILLFRWSDSZ0	Driver Thorax Rib 3 Front Displacement (Z)	0	+	no	60
69	11TRRILLFRWSDSLB	Driver Thorax Rib 3 Front Length Change	600	+	no	60
70	11ABRILUREWSDSX0	Driver Abdomen Rib 1 Rear Displacement (X)	0	+	no	60
71	11ABRILUREWSDSY0	Driver Abdomen Rib 1 Rear Displacement (Y)	0	+	no	60
72	11ABRILUREWSDSZ0	Driver Abdomen Rib 1 Rear Displacement (Z)	0	+	no	60
73	11ABRILUREWSDSLB	Driver Abdomen Rib 1 Rear Length Change	600	+	no	60
74	11ABRILUMIWSDSX0	Driver Abdomen Rib 1 Middle Displacement (X)	0	+	no	60
75	11ABRILUMIWSDSY0	Driver Abdomen Rib 1 Middle Displacement (Y)	0	+	no	60
76	11ABRILUMIWSDSZ0	Driver Abdomen Rib 1 Middle Displacement (Z)	0	+	no	60
77	11ABRILUMIWSDSLB	Driver Abdomen Rib 1 Middle Length Change	600	+	no	60
78	11ABRILUFRWSDSX0	Driver Abdomen Rib 1 Front Displacement (X)	0	+	no	60
79	11ABRILUFRWSDSY0	Driver Abdomen Rib 1 Front Displacement (Y)	0	+	no	60
80	11ABRILUFRWSDSZ0	Driver Abdomen Rib 1 Front Displacement (Z)	0	+	no	60
81	11ABRILUFRWSDSLB	Driver Abdomen Rib 1 Front Length Change	600	+	no	60

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
82	11ABRILLREWSDSX0	Driver Abdomen Rib 2 Rear Displacement (X)	0	+	no	60
83	11ABRILLREWSDSY0	Driver Abdomen Rib 2 Rear Displacement (Y)	0	+	no	60
84	11ABRILLREWSDSZ0	Driver Abdomen Rib 2 Rear Displacement (Z)	0	+	no	60
85	11ABRILLREWSDSLB	Driver Abdomen Rib 2 Rear Length Change	600	+	no	60
86	11ABRILLMIWSDSX0	Driver Abdomen Rib 2 Middle Displacement (X)	0	+	no	60
87	11ABRILLMIWSDSY0	Driver Abdomen Rib 2 Middle Displacement (Y)	0	+	no	60
88	11ABRILLMIWSDSZ0	Driver Abdomen Rib 2 Middle Displacement (Z)	0	+	no	60
89	11ABRILLMIWSDSLB	Driver Abdomen Rib 2 Middle Length Change	600	+	no	60
90	11ABRILLFRWSDSX0	Driver Abdomen Rib 2 Front Displacement (X)	0	+	no	60
91	11ABRILLFRWSDSY0	Driver Abdomen Rib 2 Front Displacement (Y)	0	+	no	60
92	11ABRILLFRWSDSZ0	Driver Abdomen Rib 2 Front Displacement (Z)	0	+	no	60
93	11ABRILLFRWSDSLB	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)	1000	+	yes	2000
123	11PELV0000WSACYP	Driver Pelvic Acceleration (Y)	1000	+	yes	2000
124	11PELV0000WSACZP	Driver Pelvic Acceleration (Z)	1000	+	yes	2000
124A	11PELV0000WSACRP	Driver Pelvic Acceleration Resultant	1000			
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	11KNEELEOUWSFOYP	Driver Left Outer Knee Force (Y)	600	+	yes	20000
135	11KNEELEINWSFOYP	Driver Left Inner Knee Force (Y)	600	+	yes	20000
136	11VEHCCG0000ACXA	Vehicle Center of Gravity Acceleration (X)	60	+	yes	2000
137	11VEHCCG0000ACYA	Vehicle Center of Gravity Acceleration (Y)	60	+	yes	2000
138	11VEHCCG0000ACZA	Vehicle Center of Gravity Acceleration (Z)	60	+	yes	2000
138A	11VEHCCG0000ACRA	Vehicle Center of Gravity Acceleration Resultant	60			
139	11VEHCCG0000AVXA	Vehicle Center of Gravity Angular Rate (X)	60	+	yes	8000
140	11VEHCCG0000AVYA	Vehicle Center of Gravity Angular Rate (Y)	60	+	yes	1500
141	11VEHCCG0000AVZA	Vehicle Center of Gravity Angular Rate (Z)	60	+	yes	8000
142	11VEHC00LO00ACYA	Left Floor Sill Acceleration (Y)	60	+	yes	2000
143	11APIL000000ACYA	Left A-Pillar Sill Acceleration (Y)	60	+	yes	2000
144	11APILLO0000ACYA	Left Lower A-Pillar Acceleration (Y)	60	+	yes	2000
145	11APILMI0000ACYA	Left Mid A-Pillar Acceleration (Y)	60	+	yes	2000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
146	11BPIL000000ACYA	Left B-Pillar Sill Acceleration (Y)	60	+	yes	2000
147	11BPILLO0000ACYA	Left Lower B-Pillar Acceleration (Y)	60	+	yes	2000
148	11BPILMI0000ACYA	Left Mid B-Pillar Acceleration (Y)	60	+	yes	2000
149	11SETR000000ACYA	Driver Seat Track at Dummy H-Point Acceleration (Y)	60	+	yes	2000
150	11ENGNTP0000ACXA	Engine Top Acceleration (X)	60	+	yes	2000
151	11ENGNTP0000ACYA	Engine Top Acceleration (Y)	60	+	yes	2000
152	12FIRCX00000ACYA	Firewall Center Acceleration (Y)	60	+	yes	2000
153	13ROFR000000ACYA	Right Roof at Vertical Impact Reference Line Acceleration (Y)	60	+	yes	2000
154	13SILB000000ACXA	Right Sill at Vertical Impact Reference Line Acceleration (X)	60	+	yes	2000
155	13SILB000000ACYA	Right Sill at Vertical Impact Reference Line Acceleration (Y)	60	+	yes	2000
156	13SILB000000ACZA	Right Sill at Vertical Impact Reference Line Acceleration (Z)	60	+	yes	2000
156A	13SILB000000ACRA	Right Sill at Vertical Impact Reference Line Acceleration Resultant	60			
157	16SILB000000ACXA	Right Sill at Rear Seat Acceleration (X)	60	+	yes	2000
158	16SILB000000ACYA	Right Sill at Rear Seat Acceleration (Y)	60	+	yes	2000
159	16SILB000000ACZA	Right Sill at Rear Seat Acceleration (Z)	60	+	yes	2000
159A	16SILB000000ACRA	Right Sill at Rear Seat Acceleration Resultant	60			
160	11FORA000000ACXA	Rear Floorpan Behind Rear Axle at Centerline Acceleration (X)	60	+	yes	2000
161	11FORA000000ACYA	Rear Floorpan Behind Rear Axle at Centerline Acceleration (Y)	60	+	yes	2000
162	11DOORMIMI71ACYA	Left Front Door Mid Centerline Acceleration (Y)	60	+	yes	2000
163	11DOORMIRE71ACYA	Left Front Door Mid Rear Acceleration (Y)	60	+	yes	2000
164	11DOORMIUP71ACYA	Left Front Door Upper Centerline Acceleration (Y)	60	+	yes	2000
165	14DOORMIRE71ACYA	Left Rear Door Mid Rear Acceleration (Y)	60	+	yes	2000
166	14DOORMIUP71ACYA	Left Rear Door Upper Centerline Acceleration (Y)	60	+	yes	2000
167	10FORARD0000ACXA	Rear Deck Acceleration (X)	60	+	yes	2000
168	10FORARD0000ACYA	Rear Deck Acceleration (Y)	60	+	yes	2000
169	10FORARD0000ACZA	Rear Deck Acceleration (Z)	60	+	yes	2000
169A	10FORARD0000ACRA	Rear Deck Acceleration Resultant	60			
170	10FORARD0000AVXA	Rear Deck Angular Rate (X)	60	+	yes	8000
171	10FORARD0000AVYA	Rear Deck Angular Rate (Y)	60	+	yes	8000
172	10FORARD0000AVZA	Rear Deck Angular Rate (Z)	60	+	yes	8000

Channel Number	ISO mnemonic	Channel Title	Filter Class	Flip	Zero	Full Scale
173	11HEADCONT00VO00	Driver Head Contact	0	+	no	1
174	11SHOUCONT00VO00	Driver Shoulder Contact	0	+	no	1
175	11THORCONT00VO00	Driver Thorax Contact	0	+	no	1
176	11PELVCONT00VO00	Driver Pelvis Contact	0	+	no	1
177	K0FBAR010000FOXA	POLE LOAD CELL 1	60	+	yes	400000
178	K0FBAR020000FOXA	POLE LOAD CELL 2	60	+	yes	400000
179	K0FBAR030000FOXA	POLE LOAD CELL 3	60	+	yes	400000
180	K0FBAR040000FOXA	POLE LOAD CELL 4	60	+	yes	400000
181	K0FBAR050000FOXA	POLE LOAD CELL 5	60	+	yes	400000
182	K0FBAR060000FOXA	POLE LOAD CELL 6	60	+	yes	400000
183	K0FBAR070000FOXA	POLE LOAD CELL 7	60	+	yes	400000
184	K0FBAR080000FOXA	POLE LOAD CELL 8	60	+	yes	400000

APPENDIX E
SEATING PROCEDURE WORKSHEETS AND PLOTS

Driver WSID 50th Seating Worksheet

Vehicle	2020 Ford Ranger	**Technician**	K. Brown
VIN #	1C6RRECT3KN884657	**Position**	Driver
ATD	EB8888	**Date**	4/8/2021
Test #	210408		

SCRL Angle	Max	18.6	**WSID 50th Tilt Sensors**		**X**	**Y**
	Min -	13.5	Head	0°±2	-1.3	-0.1
	Difference	5.1				
	/2	2.55	T6	0°±2	-0.6	-2.0
	Min +	2.55				
	Mid Angle	16.05	Pelvis	0°±2	0.1	2.1

Seat Back Angle	W/Level °	3.9	**HEAD REST POST**			**FINAL HEAD REST**	
Seat Pan Angle	W/Level °	11.2	**ANGLE**	3.9		**POST ANGLE**	3.6
Pelvis Angle	WSID 50th 0° +/-2.5°		Manual Inclinometer	39.7	Tilt Sensor	2.1	

Collected Points			
Name	Meas X	Meas Y	Meas Z
SBU -	-26.412	-11.184	-16.252
SBL -	-26.007	-9.680	19.316
STRIKER -	0.000	0.000	0.000
FOSB -	513.862	259.308	404.447
FISB -	513.484	554.096	402.383
ROSB -	127.988	197.456	408.703
RISB -	125.940	616.642	406.888
PCP - (Pedal Center Point)	1141.738	538.766	281.950
RHP - (Right Heel Point)	1024.688	538.775	444.688
LHP - (Left Heel Point)	1027.948	281.178	441.837
S0 -	612.894	404.717	-235.334
TS -	686.422	395.791	-389.537
BS -	546.964	405.135	-66.295
SC1 -	800.912	301.890	-119.941
OSCAR H-POINT -	300.147	212.498	150.743
DR PROJECTED WSID H-POINT AT MID-POSITION -	320.000		131.000
DRIVER STP 15.27 MID-POSITION -	321.863	149.400	234.926
DRIVER STP STEP 18.6 TRIAL 1 -	323.000		234.000
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 1 -	322.000		131.000
DRIVER STP STEP 18.6 TRIAL 2 -			
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 2 -			
DRIVER STP STEP 18.6 TRIAL 3 -			
DR PROJECTED WSID H-POINT STEP 18.6.2 TRIAL 3 -			
RHDCG -	159.960	486.374	-524.306
3DLHCG -	177.925	329.012	-523.032
LHDCG -	152.513	327.143	-523.375
BON -	251.655	401.787	-529.293
TN -	250.060	403.011	-471.135
TC -	240.236	405.297	-405.642
SHLD R1 -	214.463	410.000	-296.819
THX R1 -	249.188	411.117	-218.552
THX R2 -	283.227	410.994	-154.687
THX R3 -	299.835	411.957	-107.522
ABD R1 -	317.280	420.425	-51.598
ABD R2 -	333.781	406.662	-9.070
TPS -	366.912	421.027	13.749
C1 -	226.210	405.668	-284.468
C2 -	243.774	412.586	-233.710
C3 -	337.536	415.974	-64.088
SHT -	130.976	195.179	-254.470
E1 -	326.423	172.627	-112.564
P1 -	270.816	192.669	89.371
H-POINT -	325.617	191.200	135.607
H-POINT 2 -	325.112	197.747	137.649

OK -	714.001	176.030	19.501
IK -	688.270	654.753	10.634
OA -	988.687	214.827	328.474
IA -	979.558	499.334	329.873
OH -	1008.990	225.483	456.863
IH -	1028.743	527.731	448.997
OP -	-67.588	330.570	-365.638
R -	252.247	402.444	-738.927
H -	611.629	401.726	-684.039
W1 -	915.825	402.022	-529.671
W1 - Outside	933.270	401.085	-529.210
W2 - Outside	1184.909	402.050	-378.707
D1 -	827.738	405.489	-348.844
D2 -	799.807	172.280	-66.478
D3 -	752.114	641.981	-10.177
HRP -	250.756	249.182	-665.513
HSP -	251.170	90.881	-528.931
ADP -	325.846	39.849	-112.668
HDP -	325.815	89.746	134.843

Calculated Measurements

Name	Cal X	Cal Y	Cal Z	Cal 3D Distance	Deg
HZ -			210		
HH -				392	
HW -	664				
NR -				444	
CD -				605	
CS -	369				
CBS -	209				
IKD -				68	
OKD -				122	
HR -				205	
HS -		311			
AD -		133			
HD -		101			
HLHL -				303	
KK -				479	
SH -				401	
HRA -					3.6
H-POINT TOOL ANGLE -					40.2
TORSO ANGLE -					14.7
WINDSHIELD ANGLE -					59.1