Final Report Number: NCAP-TRC-21-004

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

FORD MOTOR CO.

2021 Ford Bronco Sport

NHTSA Number: M20210221

PREPARED BY:
Transportation Research Center Inc.
10820 State Route 347
P. O. Box B-67
East Liberty, OH 43319

Report Date: September 14, 2021

FINAL REPORT

Prepared For:
U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
1200 New Jersey Ave, SE Room W43-410
Washington, DC 20590

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Prepared By: ILO Project Operations Group

Approved By: John Shultz

Approval Date: September 14, 2021

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date _____

_____

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

Date _____

Technical Report Documentation Page

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Final Report of NEW CAR ASSESSMENT PROGRAM Frontal Impact Testing of a 2021 Ford Bronco Sport NHTSA No. M20210221	September 14, 2021
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15. Supplemental Notes

16. Abstract

A 56.0 km/h NCAP Frontal Impact Test was conducted on a 2021 Ford Bronco Sport, in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. The test was conducted at the Transportation Research Center Inc. in East Liberty, Ohio on June 9, 2021.

The impact velocity was 56.54 km/h, and the ambient temperature at the barrier face at the time of impact was 21.6° C. The target vehicle post-test maximum crush was 525 millimeters at crush zone 3 at left side. The test vehicle's performance is as follows:

	Driver ATD			Passenger ATD		
Measurement Description	Units	Threshold	Result	Units	Threshold	Result
Head Injury Criteria (HIC_{15})	NA	700	140	NA	700	153
Maximum Chest Compression	mm	63	-26.0	mm	52	-14.3
3ms Chest Clip	Gs	60	34.0	Gs	60	38.9
Nij	NA	1	0.26	NA	1	0.37
Neck Tension	Newtons	4170	793.4	Newtons	2620	787.5
Neck Compression	Newtons	4000	-126.8	Newtons	2520	-240.0
Left Femur Force	Newtons	10000	-546.3	Newtons	6800	-1713.1
Right Femur Force	Newtons	10000	-1053.1	Newtons	6800	-1296.2

17. Key Words	18. Distribution Statement
56.3 km/h (35 mph) Full Frontal Rigid Barrier Impact Test New Car Assessment Program (NCAP)	Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division 1200 New Jersey Ave, SE Washington, DC 20590

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Unclassified	Unclassified	176	

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1: PURPOSE AND SUMMARY OF THE TEST

PURPOSE

This 56 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. 693JJ919D000007. The purpose of this test was to obtain vehicle crashworthiness and occupant restraint system performance data for consumer information purposes.

This 56 km/h frontal barrier impact test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Test Procedure or NCAP Full Frontal Rigid Barrier Impact Testing dated May 2018.

SUMMARY

A load cell barrier consisting of 288 load cells was impacted by a 2021 Ford Bronco Sport at a velocity of 56.54 km/h. The test was performed at Transportation Research Center, Inc. on June 9, 2021. Pre- and post-test photographs of the vehicle and dummies can be found in Appendix A.

One real-time camera and 16 high-speed cameras were used to document the frontal barrier impact event. Camera locations and other pertinent camera information can be found in this report.

One Part 572E 50th percentile male anthropomorphic test device (ATD) was placed in the driver seating position and one Part 572O 5th percentile female ATD was placed in the right-front passenger position according to dummy placement instructions specified in the Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck transducers, femur load cells, and lower leg instrumentation.

The driver (position 1) ATD (Serial No. 037), and the right-front passenger (position 2) ATD (Serial No. EB7513) were qualified prior to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 102 channels of data were recorded on an on-board data acquisition system. Appendix B contains the vehicle, load cell barrier and dummy response data traces.

There was 100.0 percent windshield retention and no intrusion into the protected zone of the windshield during the event. There was no Stoddard solvent leakage (or electrolyte spillage) after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 525 mm and both the driver and passenger side doors remained closed during the impact event and were operable after the impact.

The driver's visible contact points were as follows: front airbag, headrest and knee airbag. The passenger's visible contact points were as follows: front airbag, headrest and glove box.

The occupant data is summarized below:

ATD Position	HIC_{15}	Nij	Neck Tension (N)	Neck Compression (N)	3 ms Chest Clip (Gs)	Chest Disp. (mm)	Left Femur (N)	Right Femur (N)
Driver (50^{th} Male)	140	0.26	793.4	-126.8	34.0	-26.0	-546.3	-1053.1
Passenger (5^{th} Female)	153	0.37	787.5	-240.0	38.9	-14.3	-1713.1	-1296.2

TEST COMMENTS:

PASSENGER LEFT FOOT AFT Z; CF AT 55.0 MS

BARRIER C-11 FX; CF THROUGHOUT

Cameras 2 and 16 failed to record the event

BARRIER G-03 MZ; CHANNEL FAILURE

Driver Shoulder Belt Force and Lap Belt Force load cells were not included

Passenger Shoulder Belt Force and Lap Belt Force load cells were not included

2.2 REPORT AREA 2: DATA SHEETS

DATA SHEET NO. 1 - GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

TEST VEHICLE INFORMATION

NHTSA No.	M20210221
Model Year	2021
Make	Ford
Model	Bronco Sport
Body Style	MPV
VIN	3FMCR9A64MRA59550
Body Color	Carbonized Gray Metallic
Odometer Reading (km/mi)	6.8 mi
Engine Displacement (L)	1.5
Type/No. Cylinders	Straight/3
Engine Placement	Transverse
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	4WD
Roof Rack	Yes
Sunroof/T-Top	No
Running Boards	No
Tilt Steering Wheel	Yes
Power Seats	No
Anti-Lock Brakes (ABS)	Yes
Automatic Door Locks (ADLs)	Yes

TEST VEHICLE OPTIONS

Traction Control System (TCS)	Yes
Power Steering	Yes
Power Window Auto-Reverse	Yes
Driver Frontal Airbag	Yes
Driver Curtain Airbag	Yes
Driver Head/Torso Airbag	No
Driver Torso Airbag	No
Driver Torso/Pelvis Airbag	Yes
Driver Pelvis Airbag	No
Driver Knee Airbag	Yes
Front Pass. Frontal Airbag	Yes
Front Pass. Curtain Airbag	Yes
Front Pass. Head/Torso Airbag	No
Front Pass. Torso Airbag	No
Front Pass. Torso/Pelvis Airbag	Yes
Front Pass. Pelvis Airbag	No
Front Pass. Knee Airbag	No
Driver Pretensioner	Yes
Driver Load Limiter	Yes
Front Pass. Pretensioner	Yes
Front Pass. Load Limiter	Yes
Other:	No

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

DATA FROM CERTIFICATION LABEL

Manufactured by	FORD MOTOR CO.
Date of Manufacture	03/21

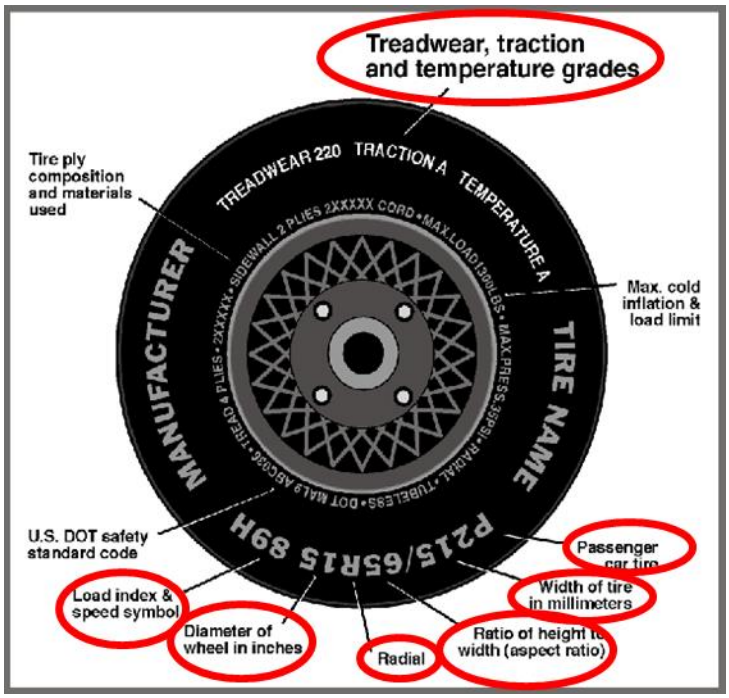
GVWR (kg)	2100 (4630 lbs)
GAWR Front (kg)	1089 (2400 lbs)
GAWR Rear (kg)	1066 (2350 lbs)

VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	N/A	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				530.0
Cargo Wt. (RCLW) (kg)				190.0

DATA SHEET NO. 1 - GENERAL TEST AND VEHICLE PARAMETER DATA (CONT'D)

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold / Test Pressure (kPa)	230	230
Recommended Tire Size	225/65R17 102H	225/65R17 102H
Tire Size on Vehicle	225/65R17	225/65R17
Tire Manufacturer	Continental	Continental
Tire Model	ProContact	ProContact
Treadwear	500	500
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	1	1
Tire Plies Body	4	4
Load Index/Speed Symbol	102H	102H
Tire Material	Polyester, Steel, Polyamide	Polyester, Steel, Polyamide
DOT Safety Code Right	1P50FBC3K 0521	1P50FBC3K 0521
DOT Safety Code Left	1P50FBC3K 0521	1P50FBC3K 0521

DATA SHEET NO. 1 - GENERAL TEST AND VEHICLE PARAMETER DATA (CONT'D)

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	457.0	342.2		493.8	450.8	
Right	kg	444.2	322.6		456.0	434.6	
Ratio	%	57.5	42.5		51.8	48.2	
Totals	kg	901.2	664.8	1566.0	949.8	885.4	1835.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1566.0
Weight of 1 P572E ATD & 1 P572O ATD	kg	139.3
Rated Cargo/Luggage Weight (RCLW)[1]	kg	136.0
Vehicle Target Weight (TVTW)	kg	1841.3

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front)
As Delivered	mm	808	810	825	830	1133
As Tested	mm	799	805	795	798	1288
Post Test	mm	857	925	770	807	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2670
Total Vehicle Length at Left Side	mm	4290
Total Vehicle Length at Centerline	mm	4370
Total Vehicle Length at Right Side	mm	4290
Weight of Ballast in Cargo Area	kg	83.8
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	58.8

LIST OF COMPONENTS REMOVED TO MEET TEST WEIGHT: None

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

DATA SHEET NO. 1 - GENERAL TEST AND VEHICLE PARAMETER DATA (CONT'D)

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

TARGET VEHICLE STRUCTURAL MEASUREMENT

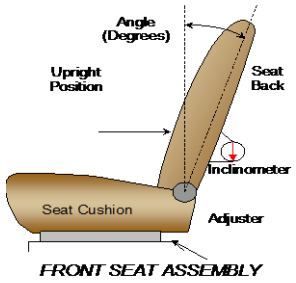
	Elements	Pre-Test (mm)
1	Total Length	4370
2	Total Width	1830
3	Bumper Top Height	640
4	Bumper Bottom Height	540
5	Longitudinal Member Top Height	270
6	Distance Between Longitudinal Members	860
7	Longitudinal Member Width	90
8	Engine Top Height	930
9	Engine Bottom Height	285
10	Engine and Gearbox Width	775
11	Front Bumper-Engine Distance	435
12	Front Shock Absorber Fixing Height	950
13	Bonnet Leading Edge Height	995
14	Front Shock Absorber Fixing Width	1215
15	Front Bumper – Front Axle Distance	850
16	Front Axle – A-Pillar Distance	590
17	A-Pillar – B-Pillar Distance	980
18	B-Pillar – Rear Axle Distance	1105
19	B-Pillar – C-Pillar Distance	880
20	Roof Sill Bottom Height	1594
21	Roof Sill Top Height	1655
22	Floor Sill Bottom Height	420
23	Floor Sill Top Height	455

DATA SHEET NO. 2 - SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat backs. Please describe how to position the inclinometer to measure the seat back angle. Include description of the location of the adjustment latch detent, if applicable



	Degree
Driver Seat back angle:	3.0
Passenger Seat back angle:	5.1

SEAT FORE/AFT POSITIONS

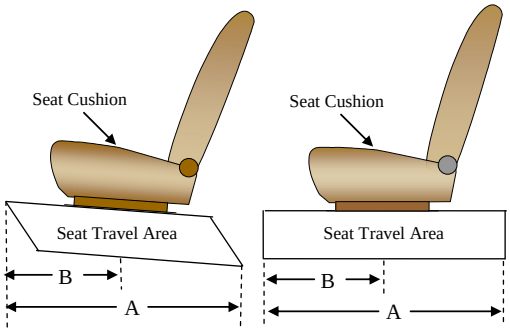
Describe the method of determining seat fore/aft positions.
Driver: Mid position, Positioned according to Form 1
Passenger: Full forward, Positioned according to Form 1

	Total Fore/Aft Travel	Placed in Position No.
Driver Seat	280mm; 26 notches	145mm, 16 notches from full forward
Passenger Seat	260mm; 38 notches	0, Full forward

SEAT BELT UPPER ANCHORAGE

Describe the method of positioning seat belt upper anchorages.
Driver: Uppermost, Positioned according to Form 1
Passenger: Uppermost, Positioned according to Form 1

	Total No. of Positions	Placed in Position No.
Driver Seat	4	0 (uppermost)
Passenger Seat	4	0 (uppermost)



DATA SHEET NO. 2 - SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA (CONT'D)

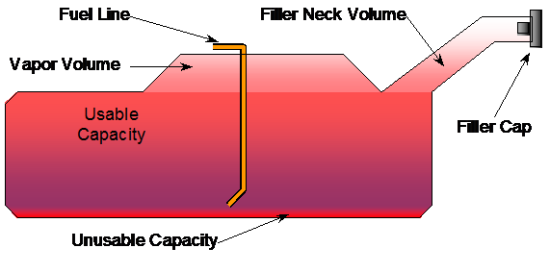
Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	63.2
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	58.8
Actual Amount of Solvent Used	58.8
1/3 of Usable Capacity	21.1

Describe the fuel system - what type of fuel pump, details about how it operates, etc.

Fuel pump cycles for a brief period when key is moved to on position, but does not pump fuel unless engine is running.

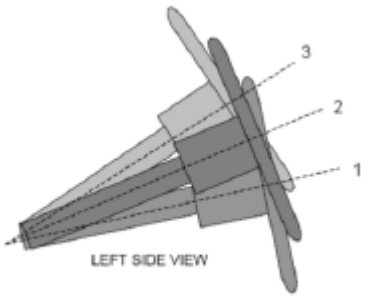


VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. Describe how this measurement was taken.

Steel square was placed across the rim of the steering wheel, an inclinometer was placed on plate and the angle was measured. Telescope travel was measured full in and full out and set at the midpoint.



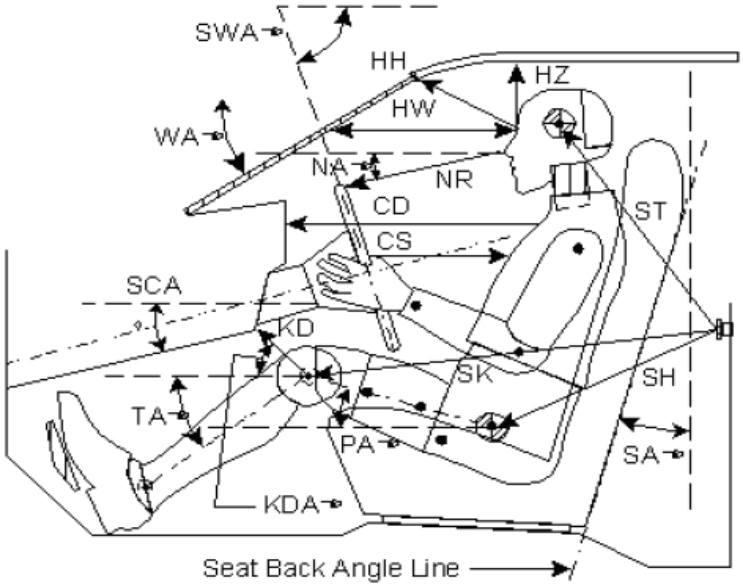
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost Position No. 1	22.1	0
Geometric Center Position No. 2	24.2	27
Uppermost Position No. 3	26.3	55
Telescoping Steering Wheel Travel		55
Test Position	24.2	27

DATA SHEET NO. 3 - DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

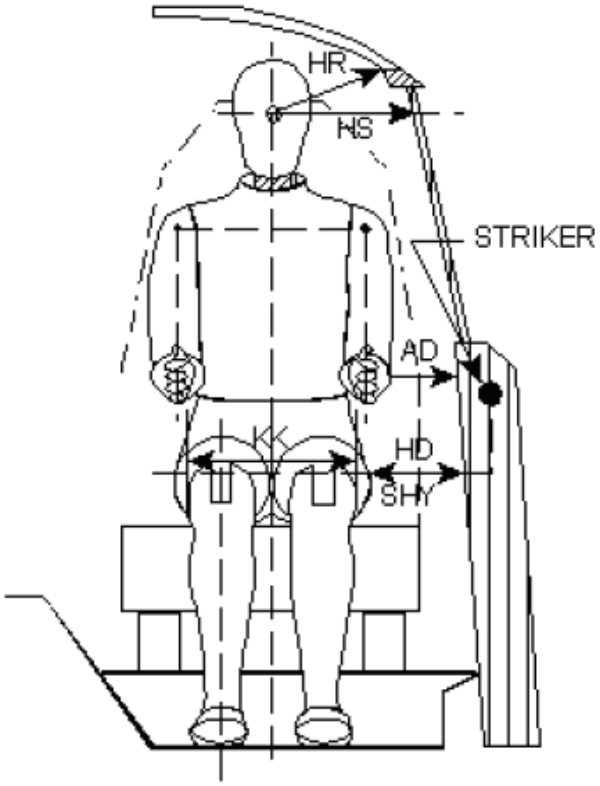
Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WAº	Windshield Angle		36.0		
SWAº	Steering Wheel Angle		65.3		
SCAº	Steering Column Angle		21.8		
SAº	Seat Back Angle (on head rest post)		3.0		3.5
HZ	Head to Roof (Z)	300		297	
HH	Head to Header	434		356	
HW	Head to Windshield	676		594	
NR	Nose to Rim	404	8.8		
CD	Chest to Dash	545		355	
CS	Chest to Steering Hub	319			
RA	Rim to Abdomen	183			
KDL	Left Knee to Dash	196	36.3	92	29.2
KDR	Right Knee to Dash	195	36.8	93	27.7
PAº	Pelvic Angle		21.2		21.3
TAº	Tibia Angle		54.2		63.5
SK	Striker to Knee	607	0.4	764	2.9
ST	Striker to Head	632	75.7	624	56.0
SH	Striker to H-Point	343	27.1	478	9.0

DATA SHEET NO. 4 - DUMMY LATERAL CLEARANCE DIMENSIONS

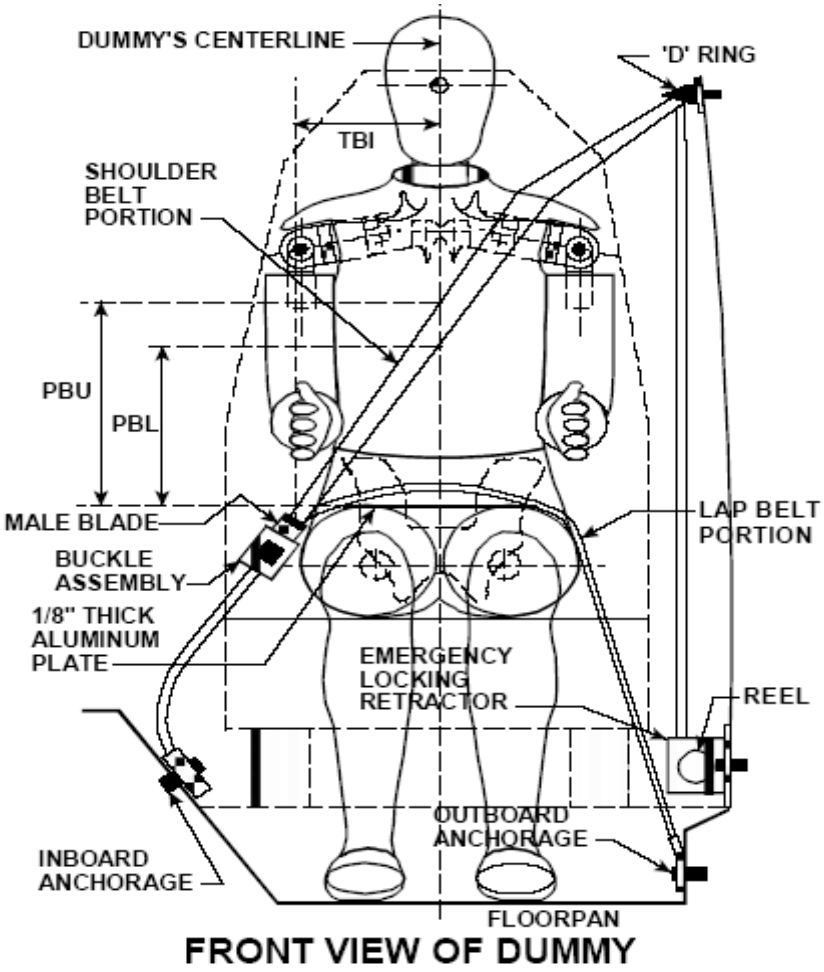
Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021



Code	Measurement Description	Driver	Passenger
AD	Arm to Door	114	85
HD	H-Point to Door	143	176
HR	Head to Side Header	236	295
HS	Head to Side Window	383	399
KK	Knee to Knee	274	169
SHY	Striker to H-Point (Y Direction)	235	271
AA	Ankle to Ankle	355	195

DATA SHEET NO. 5 - SEAT BELT POSITIONING DATA

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU – Top surface of reference to belt upper edge	mm	319	293
PBL – Top surface of reference to belt lower edge	mm	211	201

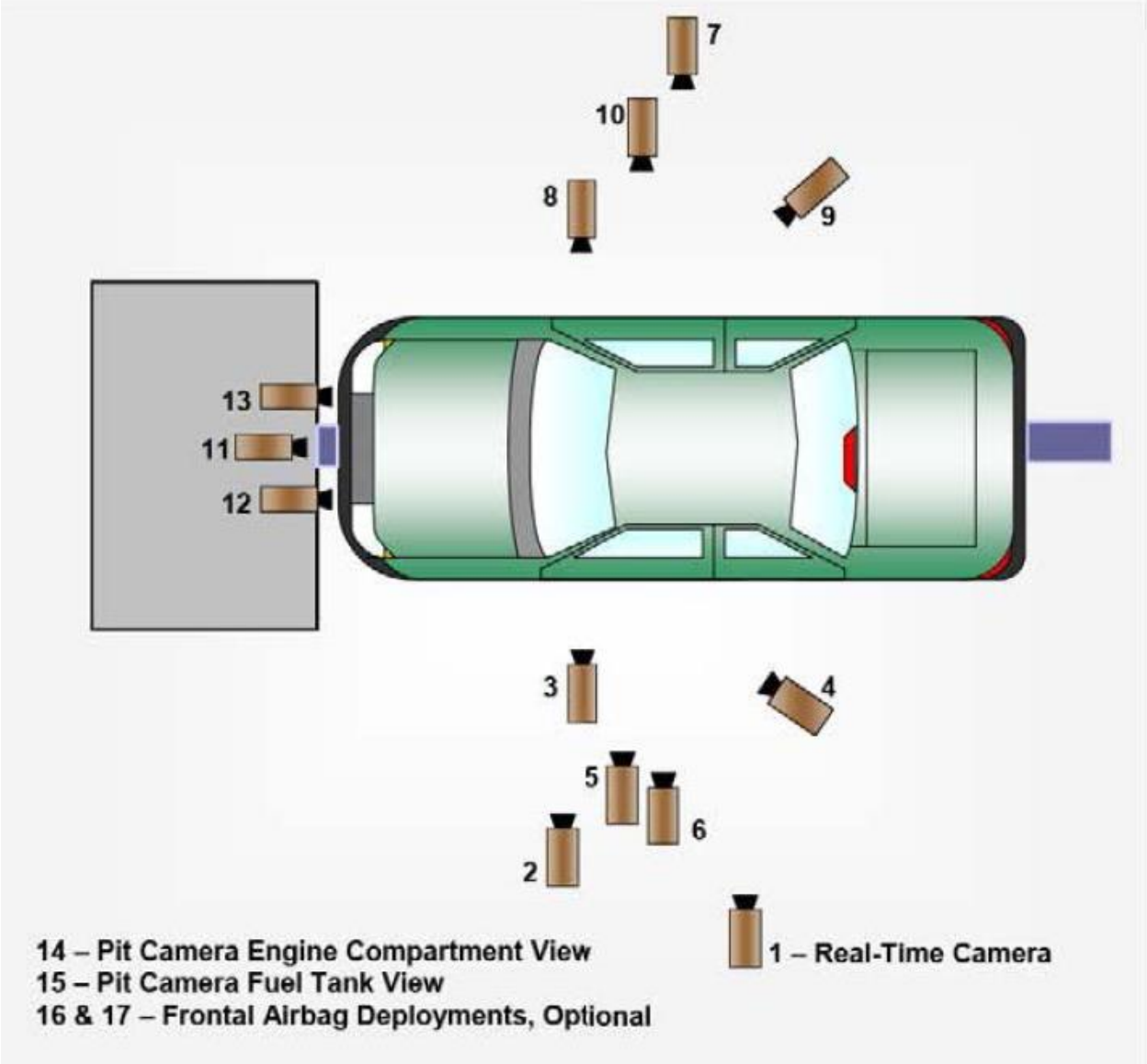
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	848	958
Lap belt length as measured on ATD	mm	609	757
Remainder of belt on reel	mm	953	685
Total belt length for continuous webbing systems	mm	2410	2400

DATA SHEET NO. 6 - HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	2021 Ford Bronco Sport	NHTSA No.:	M20210221
Test Program:	NCAP Frontal Impact	Test Date:	6/9/2021

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 - HIGH SPEED CAMERA LOCATIONS AND DATA (CONT'D)

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

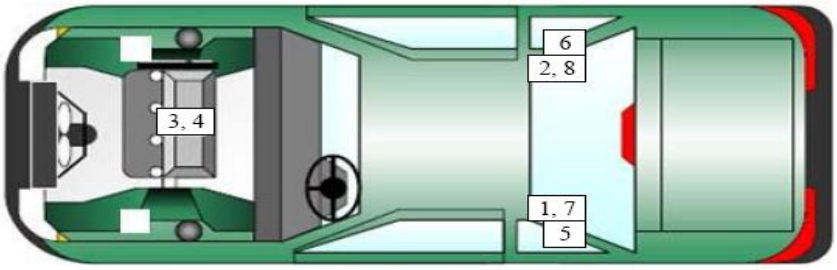
CAMERA LOCATIONS

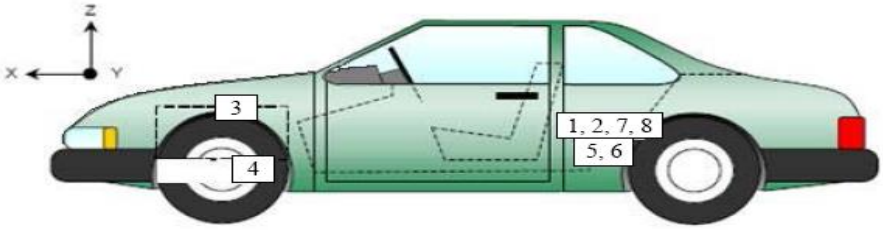
No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	REAL-TIME LEFT OVERALL	-1565	-5828	-1394	Zoom	30
2	LEFT OVERALL	-2187	-5102	-1532	8.5	1000
3	DRIVER CLOSE-UP	-1952	-5469	-1515	50	1000
4	LEFT FRONT HALF	-503	-4788	-1485	28	1000
5	LEFT ANGLE	-3632	-2421-	-1536	25	1000
6	STEERING COLUMN	-2296	-4988	-1378	50	1000
7	RIGHT OVERALL	-2005	5234	-1425	8.5	1000
8	PASSENGER CLOSE-UP	-2186	5175	-1538	50	1000
9	RIGHT FRONT HALF	-712	5423	-1432	70	1000
10	RIGHT ANGLE	-3852	2827	-1708	25	1000
11	WINDSHIELD	0	0	-2650	20	1000
12	DRIVER WINDSHIELD	0	-313	-2642	16	1000
13	PASSENGER WINDSHIELD	0	203	-2644	16	1000
14	PIT FRONT	876	0	-3021	20	1000
15	PIT REAR	3108	0	-3045	20	1000
16	DRIVER ONBOARD				12.5	1000
17	PASSENGER ONBOARD				12.5	1000

Reference Points: +X – forward of impact plane
+Y – right of monorail center
+Z – into ground

DATA SHEET NO. 7 - VEHICLE ACCELEROMETER DATA

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	1654	-310	-487
2	Right Rear Accelerometer – X Direction	1654	320	-485
3	Engine Top X	3580	100	-930
4	Engine Bottom X	3740	115	-515
5	Left Rear Accelerometer – Z Direction	1654	-310	-489
6	Right Rear Accelerometer – Z Direction	1654	320	-490
7	Left Rear Accelerometer – X Direction Redundant	1654	-340	-487
8	Right Rear Accelerometer- X Direction Redundant	1654	350	-485

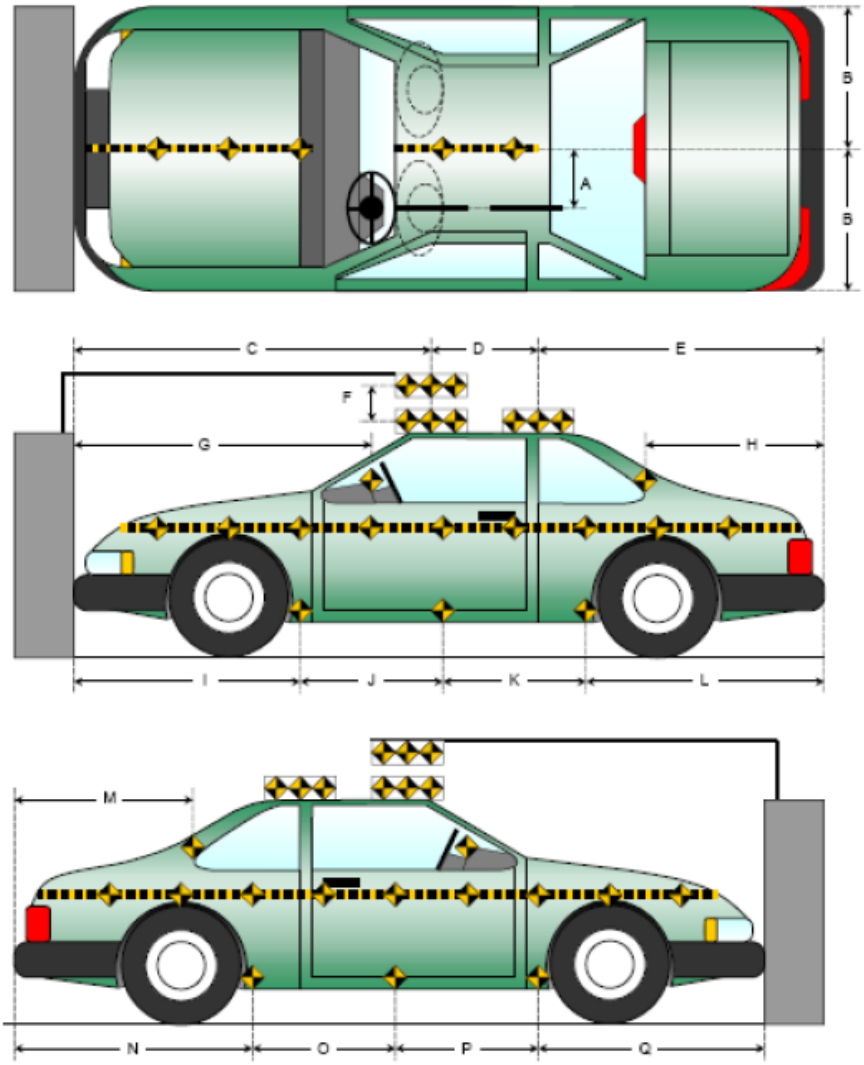
Reference Points: X – Rear Surface of Vehicle (+ forward)
Y – Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

DATA SHEET NO. 8 - PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

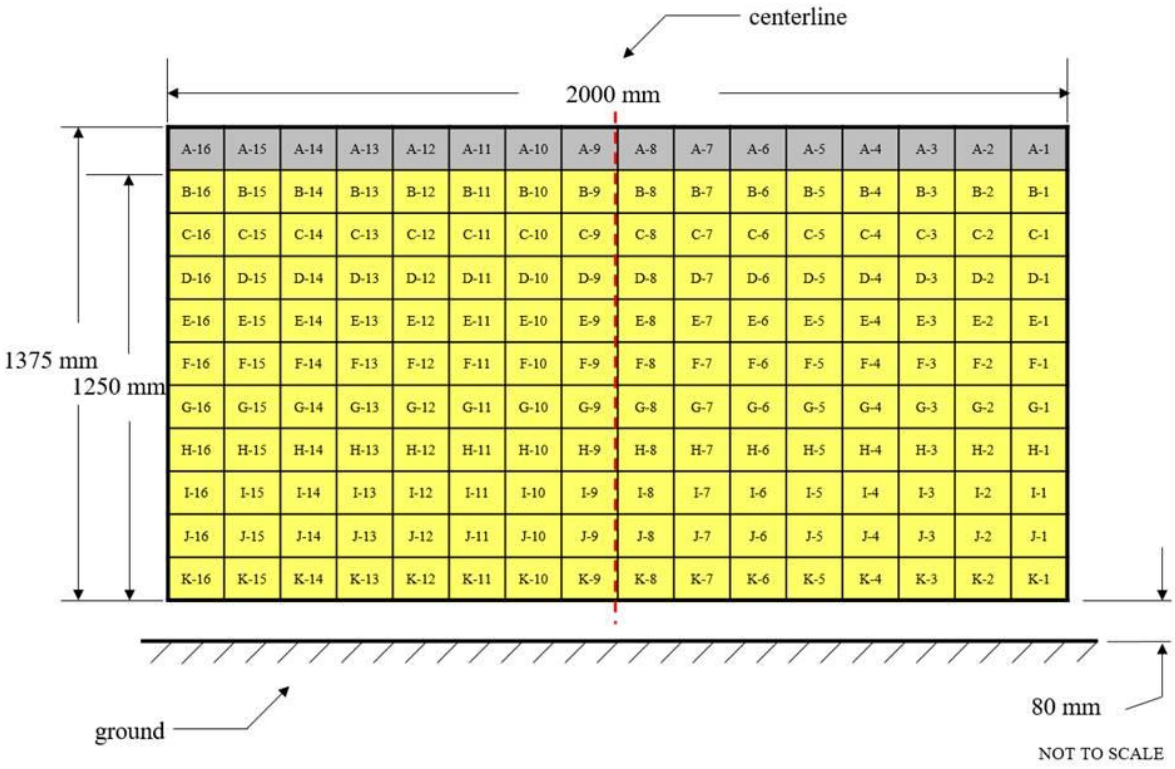
Item	Value
A	390
B	915
C	2190
D	595
E	1500
F	210
G	1635
H	1190
I	1328
J	848
K	836
L	1358
M	1183
N	1342
O	835
P	842
Q	1351

All units in millimeters



DATA SHEET NO. 9 - LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021



DATA SHEET NO. 10 - TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	47
Passenger Dummy Accelerometers	47
Vehicle Structure Accelerometers	8
Total	102

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	2
High-Speed Offboard	14
Real-Time Panning	2
Total	18

DATA SHEET NO. 11 - POST-TEST OBSERVATIONS

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	Hybrid III 50th / 037	Hybrid III 5th / EB7513
Head Contact	Frontal Airbag and Head Restraint	Frontal Airbag and Head Restraint
Upper Torso Contact	Airbag	Airbag
Lower Torso Contact	None	None
Left Knee Contact	Knee Airbag	Glove Box
Right Knee Contact	Knee Airbag	Glove Box

DOOR OPENING, TRUNK OPENING, AND SEAT TRACK INFORMATION

Description	Driver	Passenger	Other
Locked/Unlocked Doors**	Unlocked	Unlocked	
Front Door Opening**	No	No	
Rear Door Opening**	No	No	
Trunk/Hatch/Tailgate Opening**			No
Seat Track Shift (mm) **	No	No	
Seat Back Movement from Initial Position**	No	No	

**NOTE: Indicate "No", "N/A, or "Yes", and if "Yes", describe

POST- OTHER VEHICLE POST-TEST OBSERVATIONS

Critical Areas of Performance	Observations
Windshield Damage	Passenger side mostly cracked
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

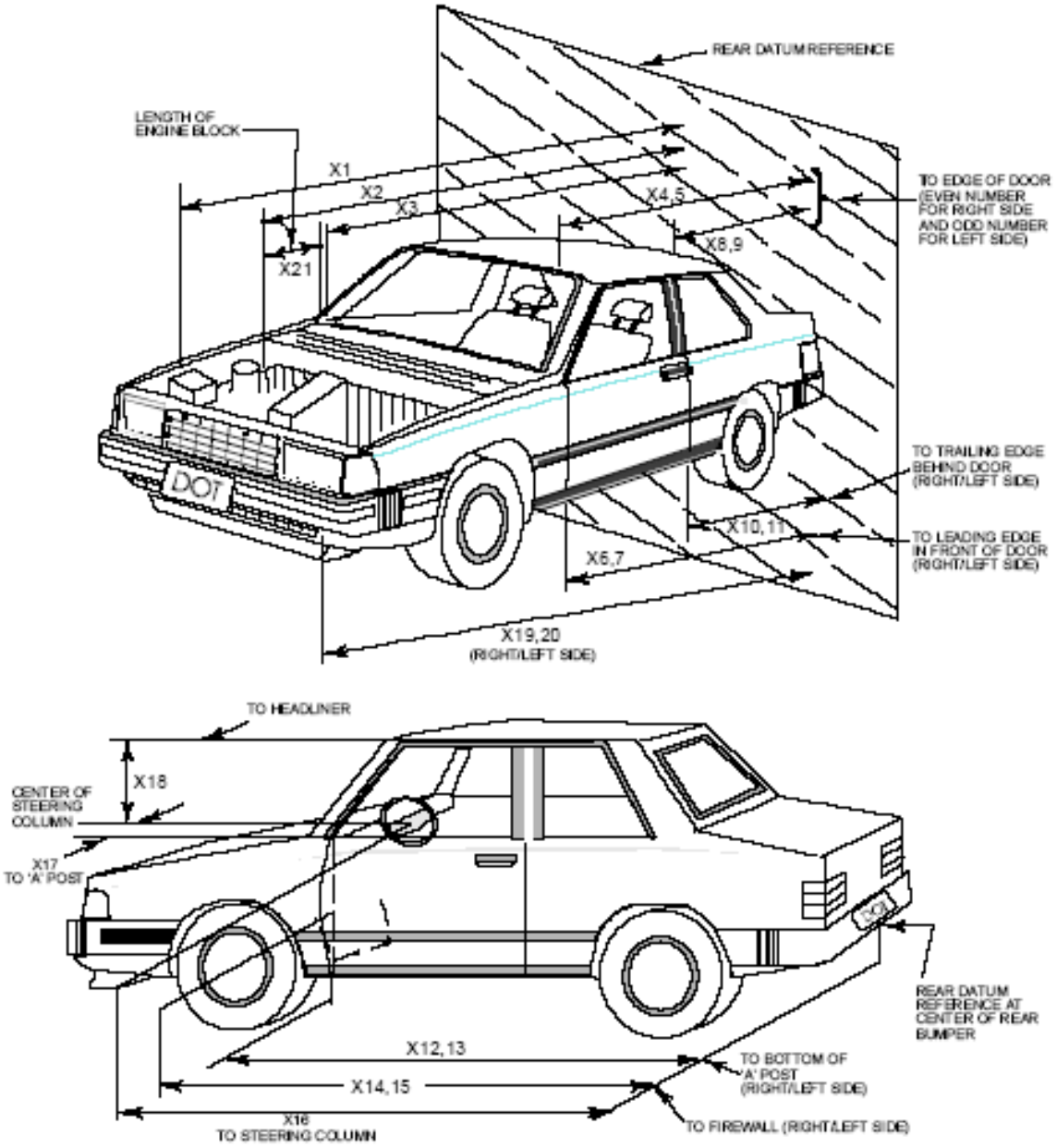
Measured Parameter	Units	Value
Left Side	mm	1794
Center	mm	1605
Right Side	mm	1760
Average	mm	1720

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Driver (Occupant 1)		Passenger (Occupant 2)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	Yes	Yes	Yes
Torso/Pelvis Side Airbag	Yes	No	Yes	No
Curtain Side Airbag	Yes	No	Yes	No
Knee Airbag	Yes	Yes	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	Yes	Yes	Yes
Seat Belt Buckle Pretensioner	No	N/A	No	N/A
Other	No	N/A	No	N/A

DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021



DATA SHEET NO. 12 - VEHICLE PROFILE MEASUREMENTS (CONT'D)

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	4370	3863	507
2	Rear Surface of Vehicle (RSOV) to Front of Engine	3960	3852	108
3	RSOV to Firewall	3252	3212	40
4	RSOV to Upper Leading Edge of Right Door	3020	3036	-16
5	RSOV to Upper Leading Edge of Left Door	3040	3032	8
6	RSOV to Lower Leading Edge of Right Door	2970	2968	2
7	RSOV to Lower Leading Edge of Left Door	2980	2978	2
8	RSOV to Upper Trailing Edge of Right Door	1930	1935	-5
9	RSOV to Upper Trailing Edge of Left Door	1948	1942	6
10	RSOV to Lower Trailing Edge of Right Door	1955	1948	7
11	RSOV to Lower Trailing Edge of Left Door	1980	1979	1
12	RSOV to Bottom of "A" Post-of Right Side	2932	2930	2
13	RSOV to Bottom of "A" Post-of Left Side	2945	2943	2
14	RSOV to Firewall, Right Side	3215	3180	35
15	RSOV to Firewall, Left Side	3190	3167	23
16	RSOV to Steering Column	2565	2585	-20
17	Center of Steering Column to "A" Post	382	352	30
18	Center of Steering Column to Headliner	490	450	40
19	RSOV to Right Side of Front Bumper	4290	3893	397
20	RSOV to Left Side of Front Bumper	4290	3867	423
21	Length of Engine Block	500	500	0
RD	RSOV to Right Side of Dash Panel	2770	2771	-1
CD	RSOV to Center of Dash Panel	2745	2744	1
LD	RSOV to Left Side of Dash Panel	2770	2772	-2

All Dimensions in mm

DATA SHEET NO. 13 - ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

VEHICLE INFORMATION

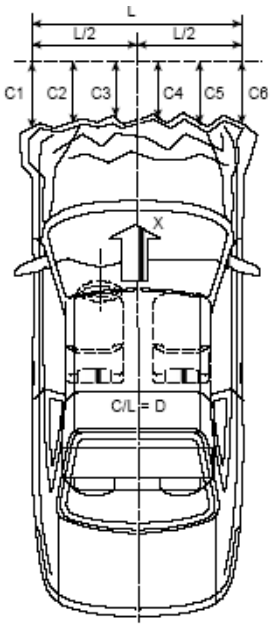
VIN: 3FMCR9A64MRA59550 Wheelbase: 2670
Vehicle Size Category: MPV Test Weight (kg): 1835.2

ACCELEROMETER DATA

Accelerometer Locations: As listed on Page 15 of this report.
Cal. Procedure/Interval: TRC procedure / 6 month interval
Integration Algorithm: Trapezoidal
Linearity: > 99%
Impact Velocity (km/h): 56.54
Velocity Change (km/h): 67.96
Time of Separation (ms): 115

CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
Midpoint of Damage: Centerline
Damage Region Length (mm): 1320
Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	4290	3867	423
C2	Crush zone 2 at left side	mm	4358	3890	468
C3	Crush zone 3 at left side	mm	4400	3875	525
C4	Crush zone 4 at right side	mm	4400	3876	524
C5	Crush zone 5 at right side	mm	4350	3879	471
C6	Crush zone 6 at right side	mm	4290	3893	397
L	C1 to C6	mm	1320	1300	20

DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS

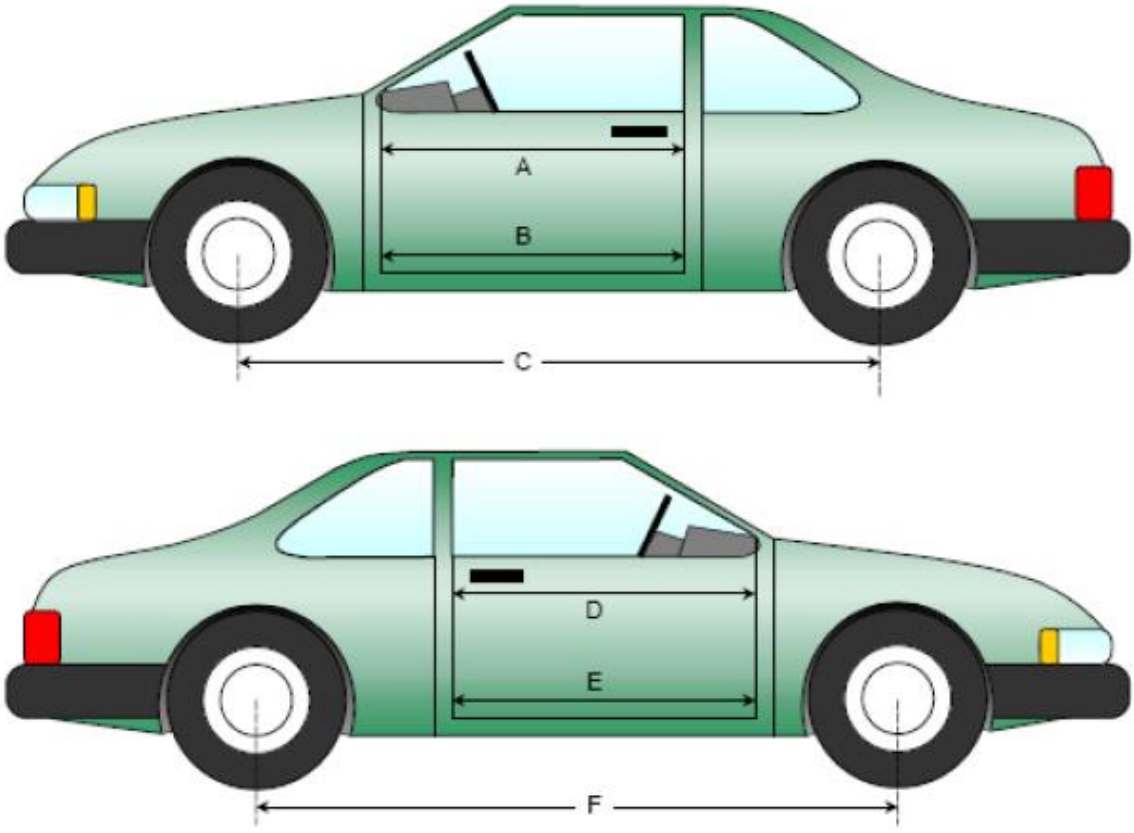
Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

DOOR OPENING WIDTH

No.	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	920	920	0
B	Left Side Lower	mm	780	780	0
D	Right Side Upper	mm	920	920	0
E	Right Side Lower	mm	780	780	0

WHEELBASE MEASUREMENTS

No.	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	2670	---[1]	---[1]
F	Right Side Wheelbase	mm	2670	---[1]	---[1]



[1] Front suspension damaged and wheels fell off measurements not available

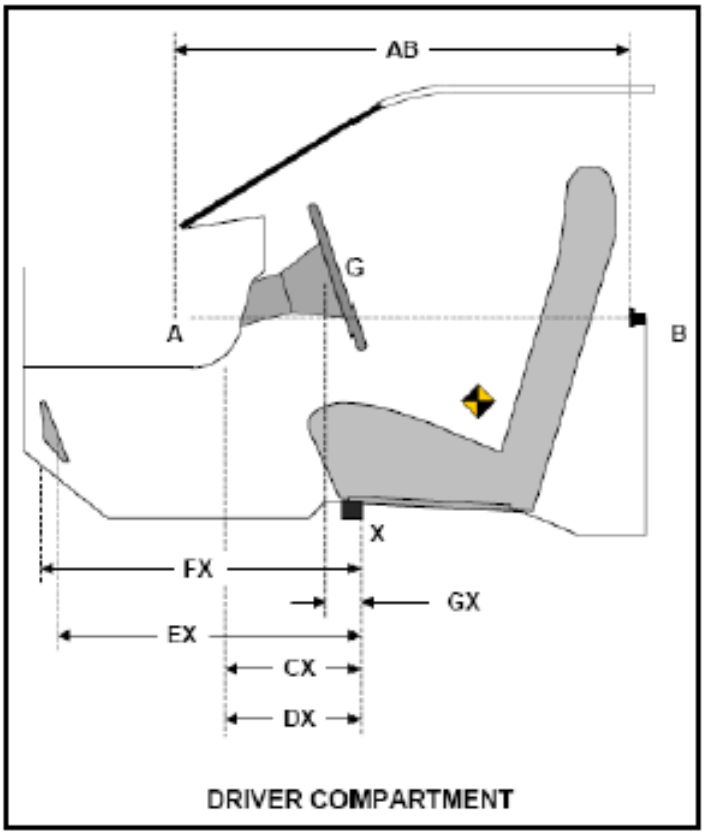
DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS (CONT'D)

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	920	920	0
CX	Left Knee Bolster to X	mm	350	358	-8
DX	Right Knee Bolster to X	mm	345	357	-12
EX	Brake Pedal to X	mm	550	510	40
FX	Foot Rest to X	mm	580	585	-5
GX	Center of Steering Column Wheel Hub to X	mm	100	120	-20

X = Front of Seat Track (Stationary)



DATA SHEET NO. 15 - SUMMARY OF INDICANT FMVSS 212 AND FMVSS 219 (PARTIAL) DATA

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

Please provide windshield mounting details.

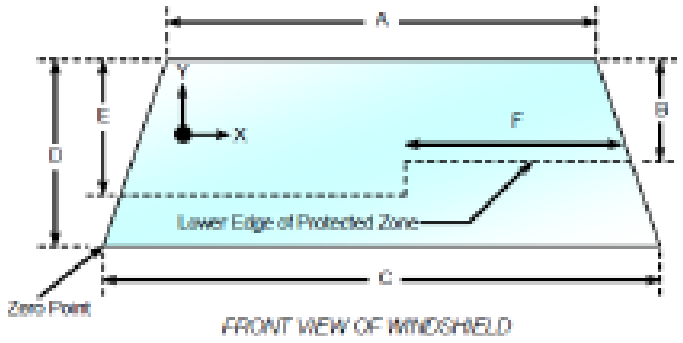
The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicle not equipped with occupant passive restraint and 50% for each side of the windshield for vehicle which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.6°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	3900	3900	100.0
Right Side	3900	3900	100.0
Total	7800	7800	100.0

Item	Units	Value
A	mm	1345
B	mm	440
C	mm	1370
D	mm	790
E	mm	418
F	mm	420



FRONT VIEW OF WINDSHIELD

AREAS OF PROTECTED ZONE FAILURES

A. Provide coordinates of the area that the protected zone was penetrated more than .25 inches by a vehicle component other than one that is normally in contact with the windshield.

X	Y
NA	NA
NA	NA
NA	NA
NA	NA

B. The inner surface of the windshield was penetrated by the hood support beneath the protected zone.

X	Y
NA	NA
NA	NA
NA	NA
NA	NA

DATA SHEET NO. 16 - FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

FMVSS 301 FUEL SYSTEM INTEGRTY POST IMPACT DATA

Temperature at Time of Impact: 21.6°C Test Time: 19:37

Stoddard Solvent Spillage Measurements

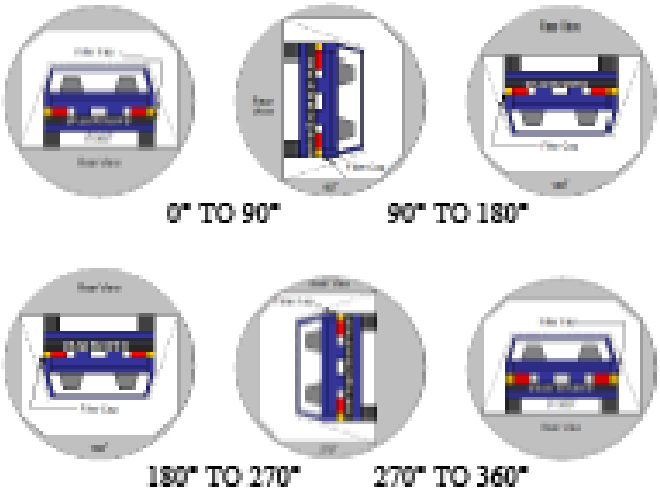
A	From impact until vehicle motion ceases: (maximum allowable – 1 oz.)	0 oz.
B	For the 5-minute period after motion ceases: (maximum allowable – 5 oz.)	0 oz.
C	For the following 25 minutes: (maximum allowable – 1 oz./minutes)	0 oz.
D	Spillage: None	

DATA SHEET NO. 16 - FMVSS 301 BARRIER IMPACT AND STATIC ROLLOVER RESULTS (CONT'D)

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

1. The specified fixture rollover rate for each 90º of rotation is 60 to 180 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage:

None



SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0º to 90º	90	330	420
90º to 180º	90	330	840
180º to 270º	90	330	1260
270º to 360º	90	330	1480

FMVSS 301 SPILLAGE TABLE

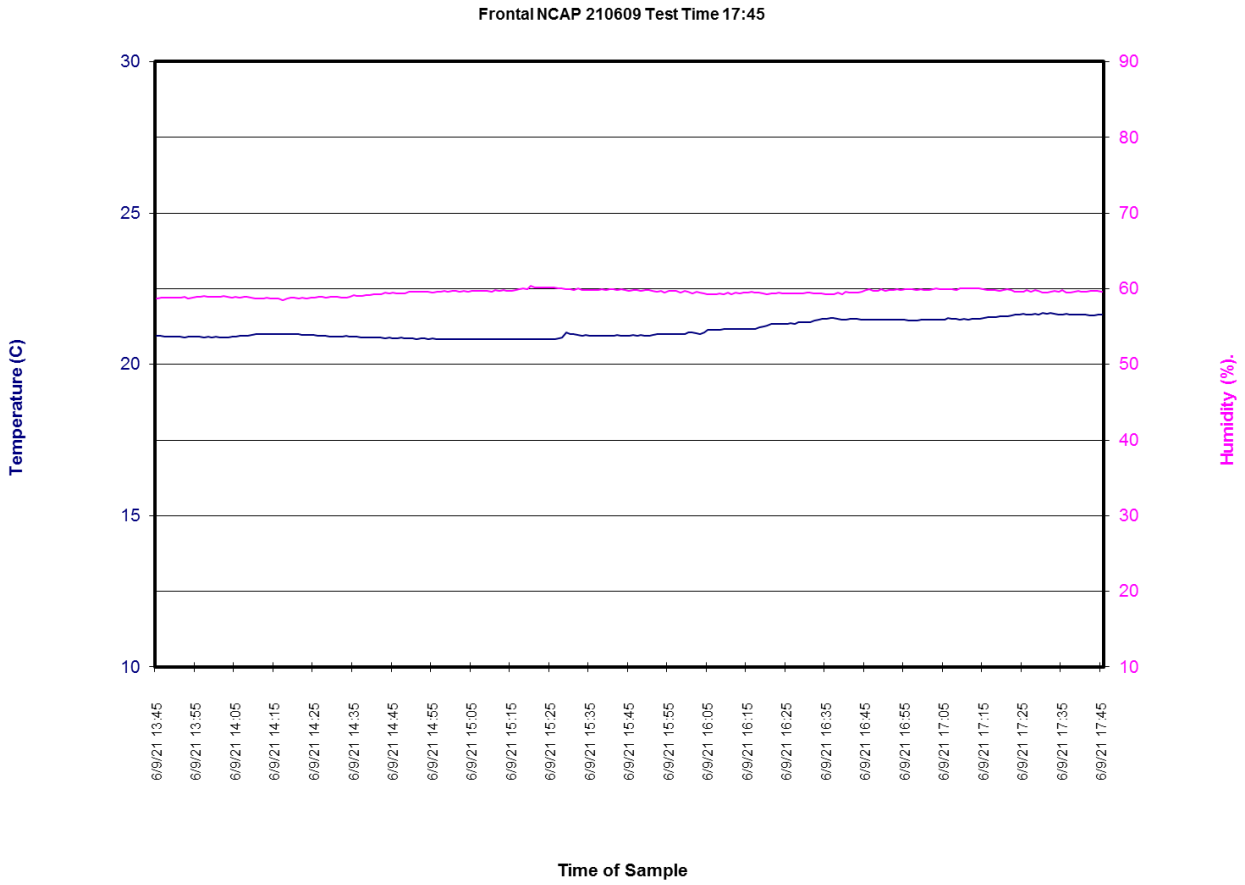
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0º to 90º	0	0	0	N/A
90º to 180º	0	0	0	N/A
180º to 270º	0	0	0	N/A
270º to 360º	0	0	0	N/A

SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0º to 90º	None
90º to 180º	None
180º to 270º	None
270º to 360º	None

DATA SHEET NO. 17 - DUMMY/VEHICLE TEMPERATURE STABILIZATION

Test Vehicle: 2021 Ford Bronco Sport NHTSA No.: M20210221
Test Program: NCAP Frontal Impact Test Date: 6/9/2021

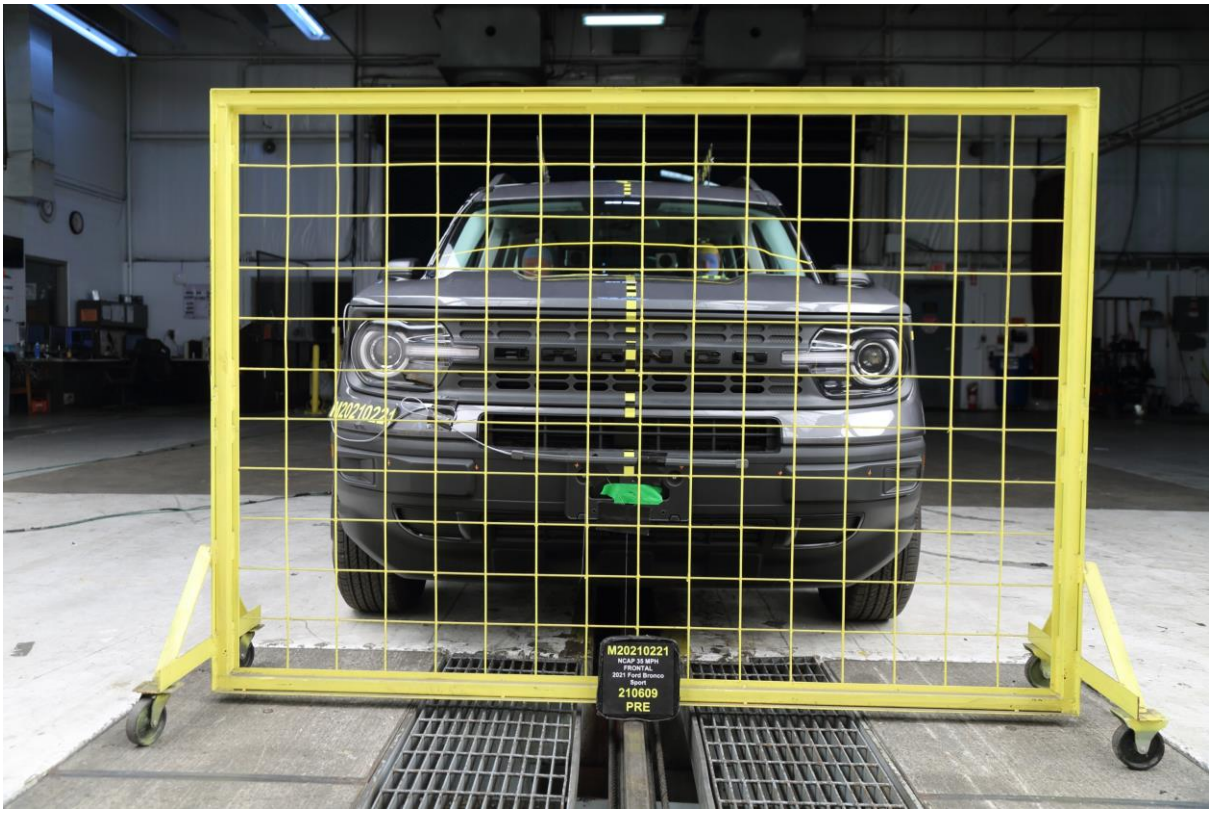


APPENDIX A
PHOTOGRAPHS

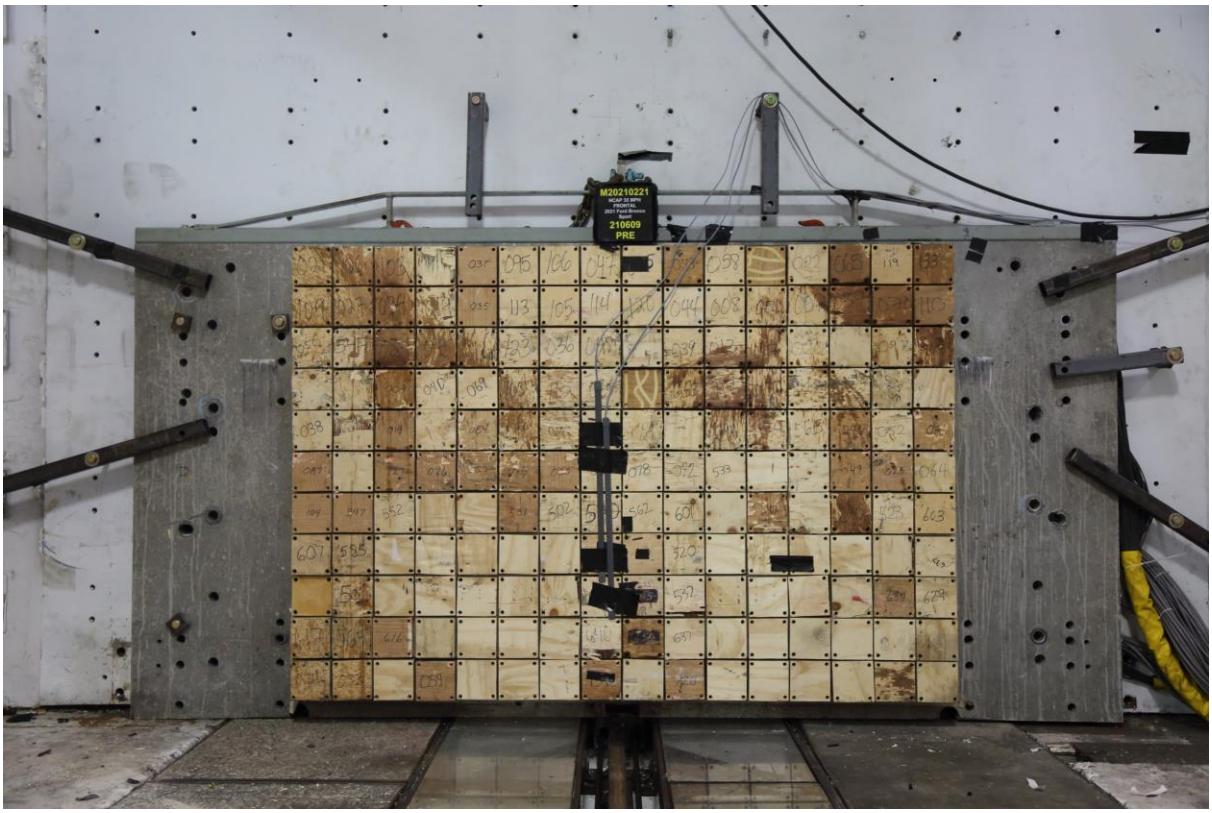
TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

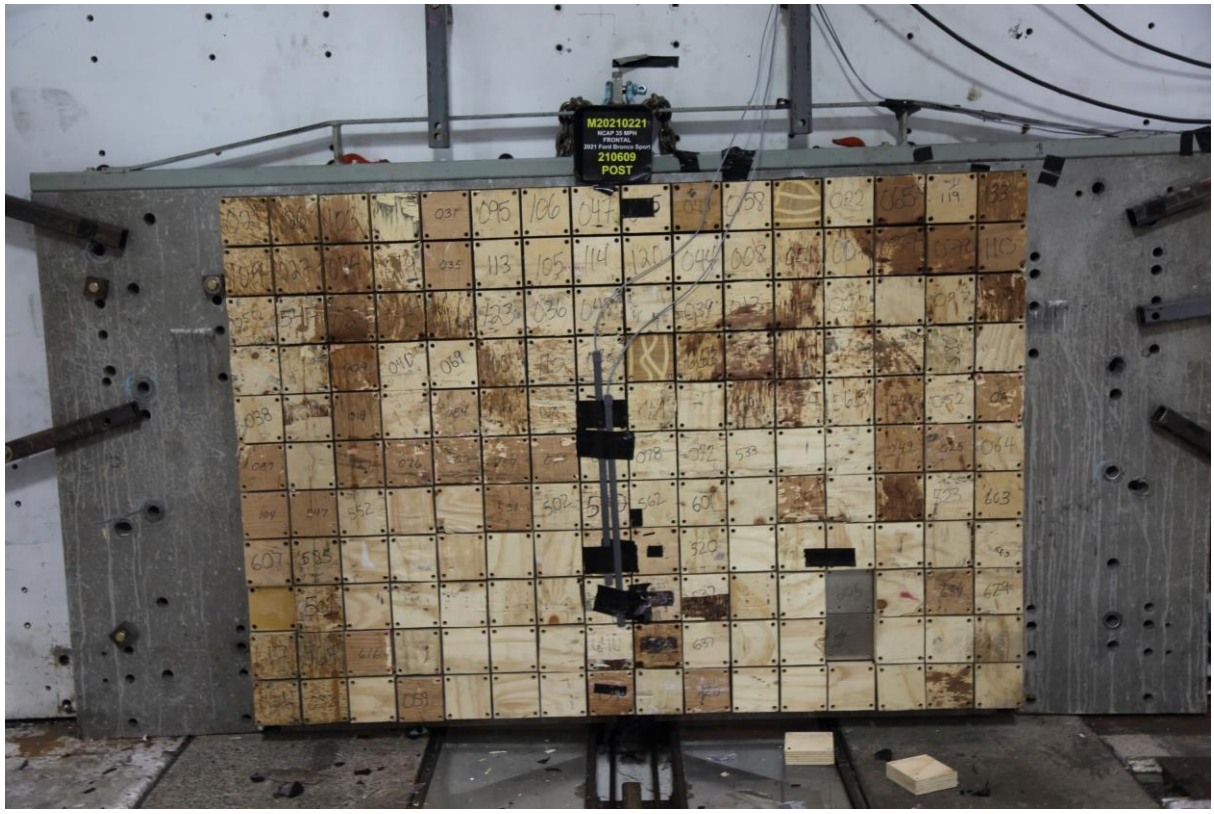
TABLE OF PHOTOGRAPHS (CONTINUED)



001 Load Cell Location



002 Pre-Test Load Cell Wall



003 Post-Test Load Cell Wall

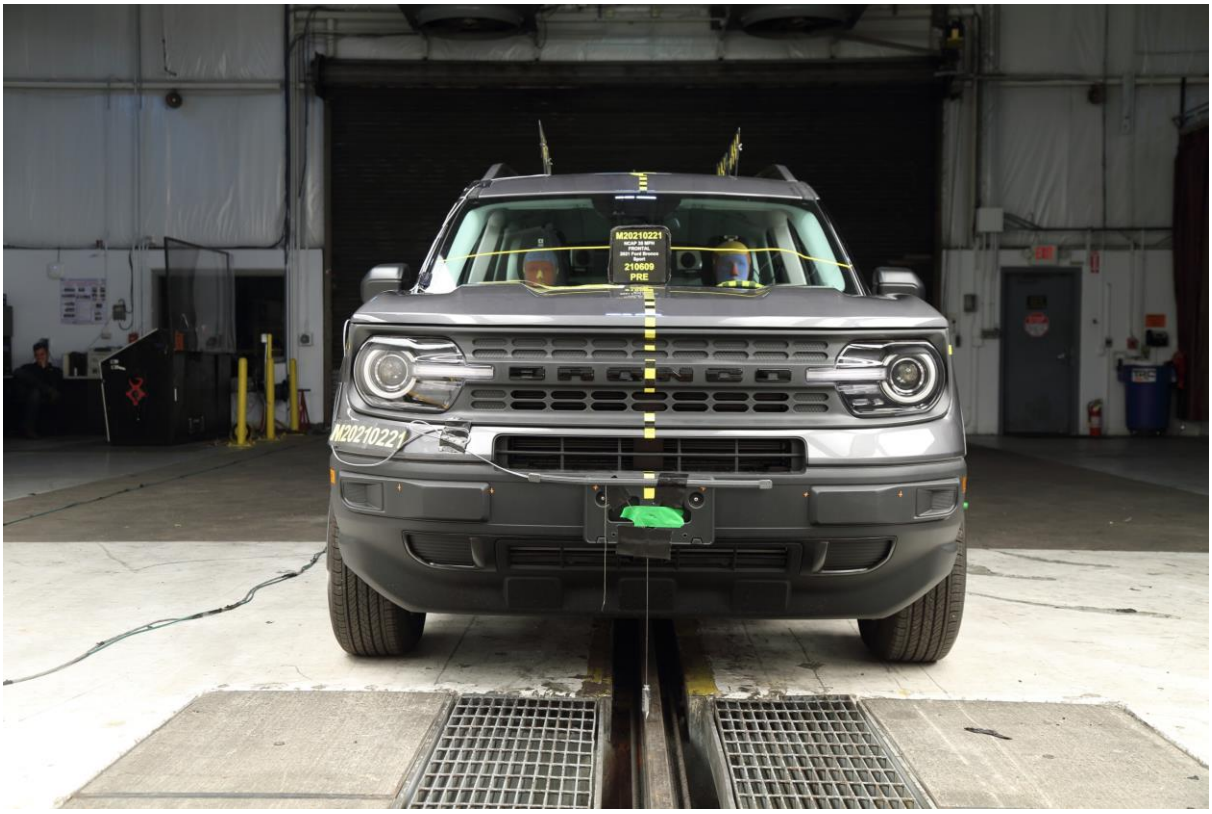
004 Manufacturer's Label

005 Tire Placard

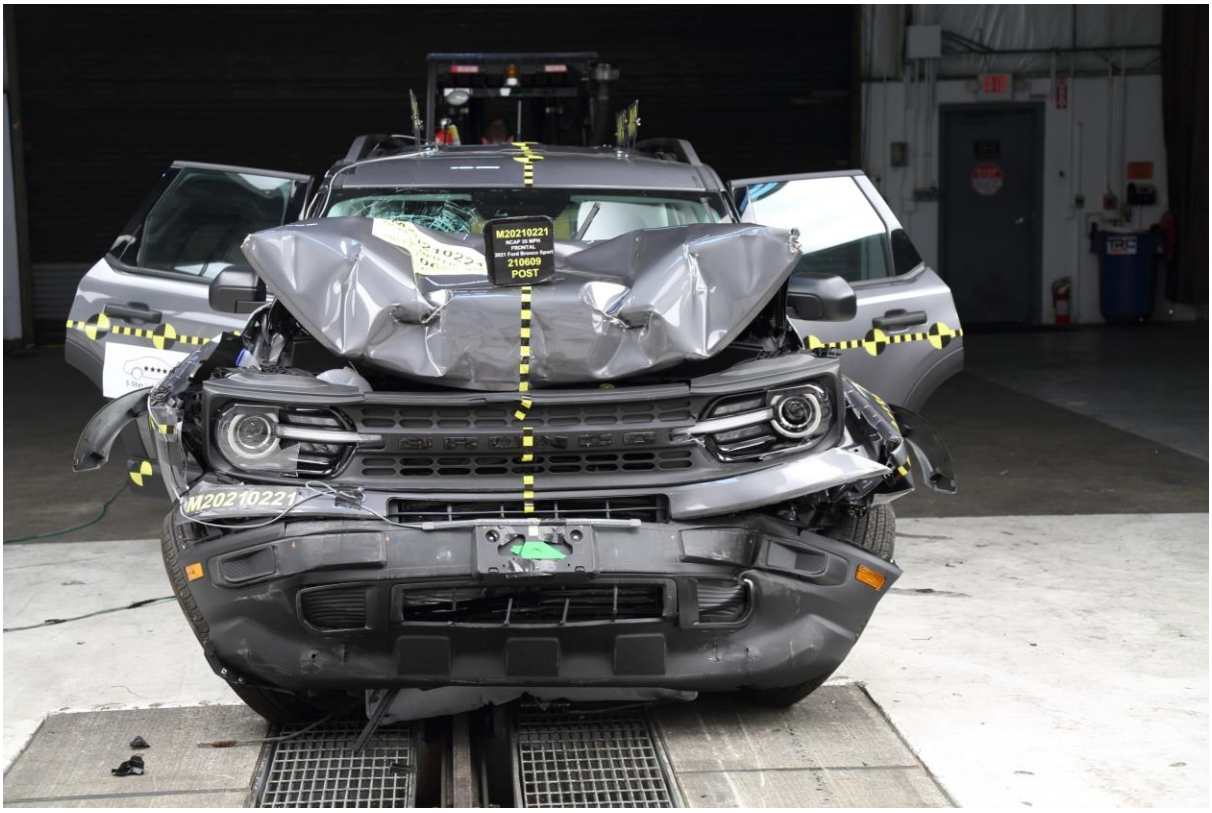
Intentionally Left Blank

006 2021 Ford Bronco Sport Frontal As Delivered

007 Left Rear 3-4 View, as Received



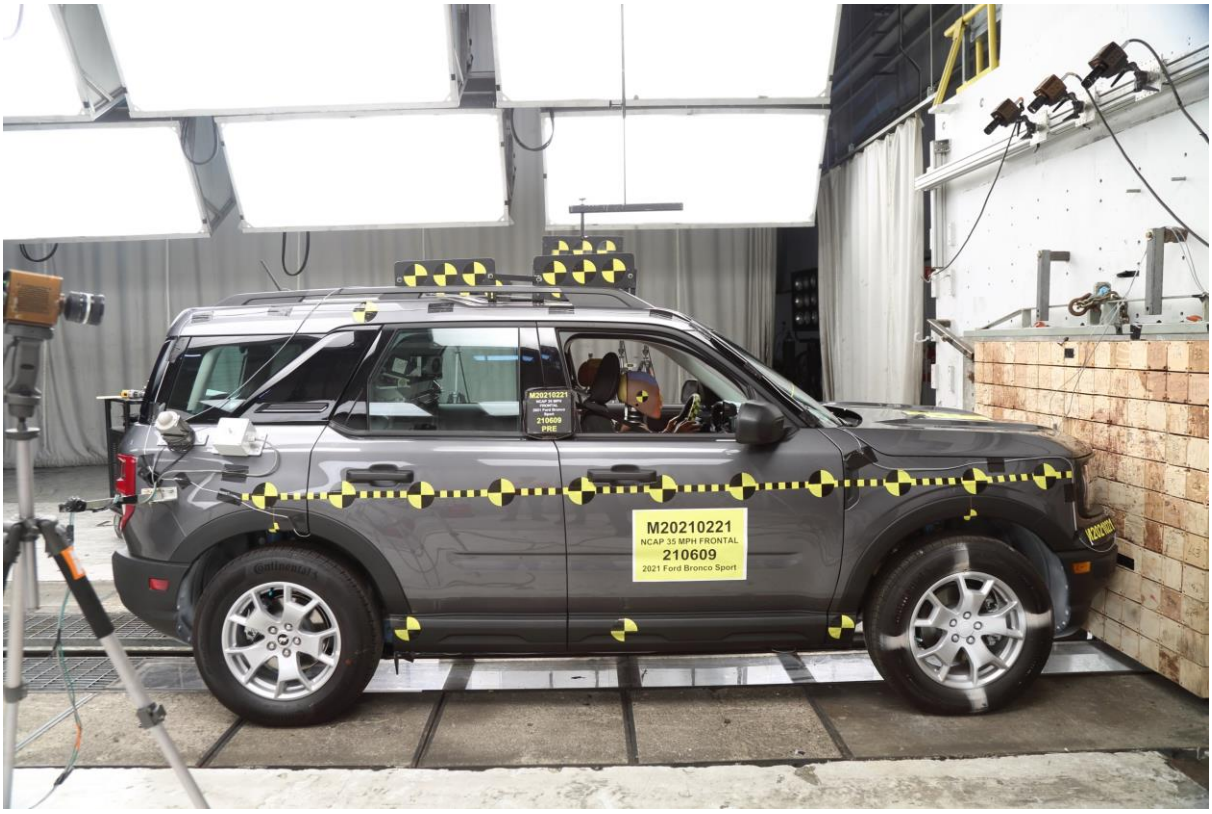
008 Pre-Test Front View of Test Vehicle



009 Post-Test Front View of Test Vehicle

010 Pre-Test Left View of Test Vehicle

011 Post-Test Left View of Test Vehicle



012 Pre-Test Right View of Test Vehicle

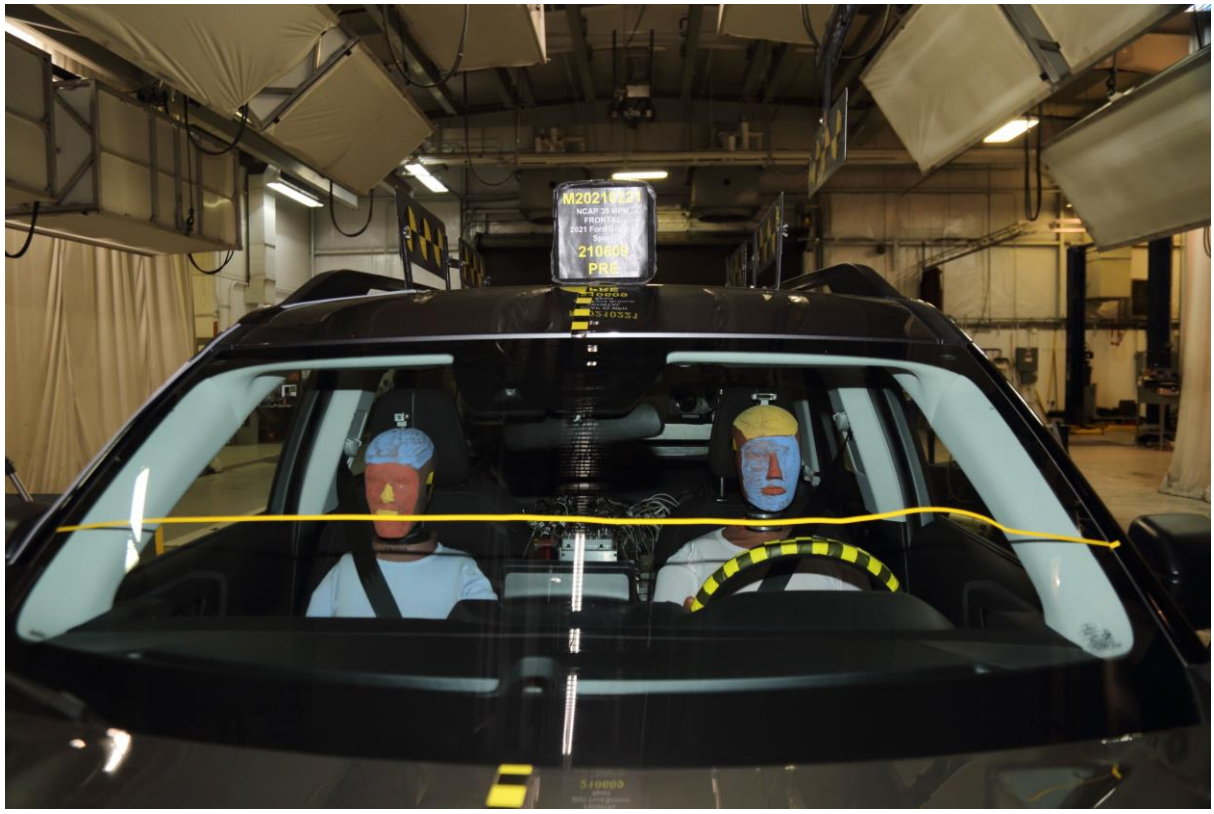
013 Post-Test Right View of Test Vehicle

014 Pre-Test Right Front 3-4 View

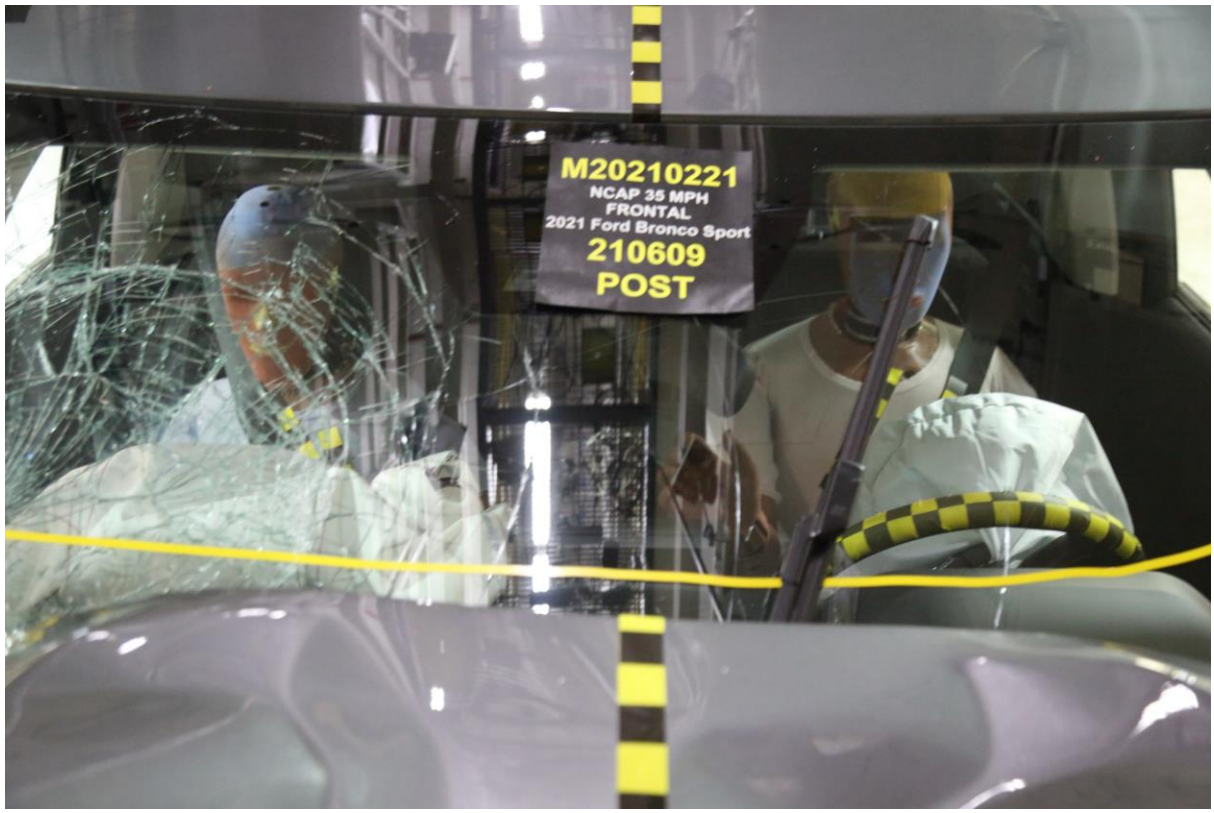
015 Post-Test Right Front 3-4 View

016 Pre-Test Left Rear 3-4 View

017 Post-Test Left Rear 3-4 View



018 Pre-Test Windshield View



019 Post-Test Windshield View

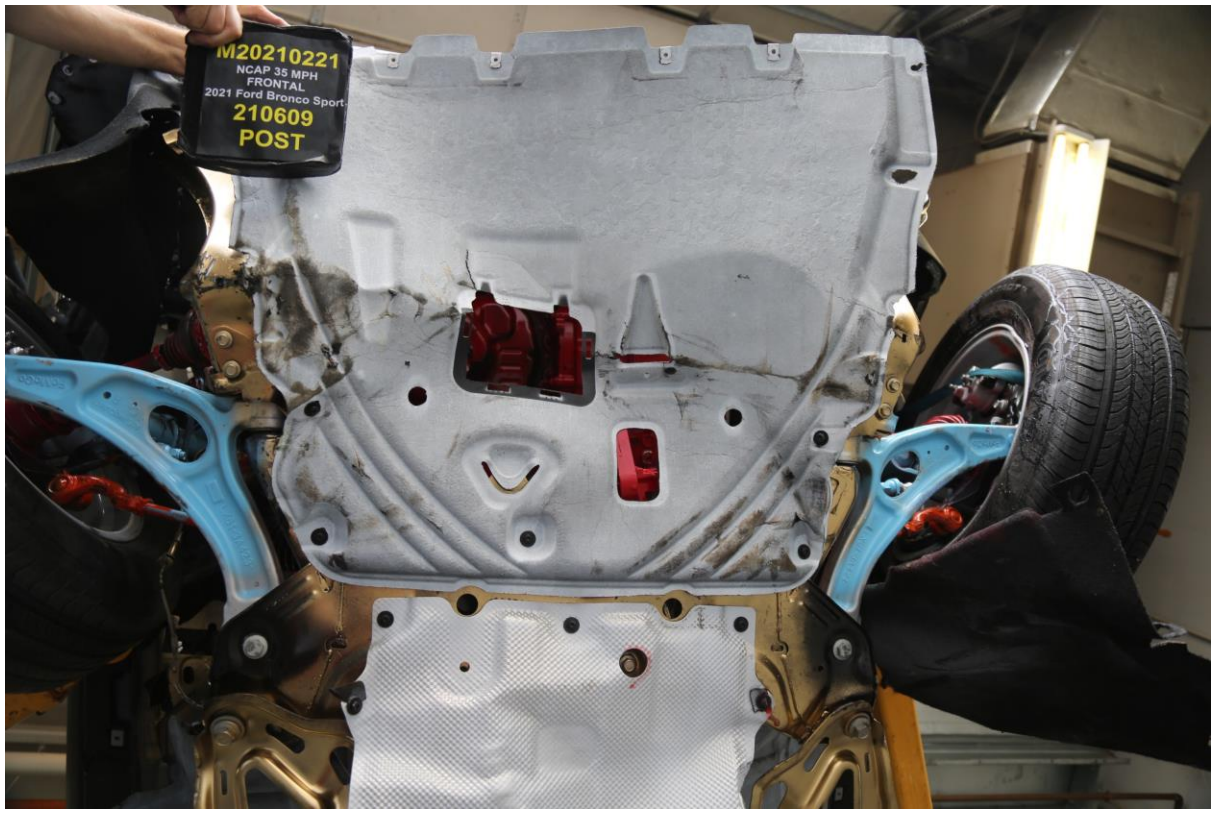
020 Pre-Test Engine Compartment View

021 Post-Test Engine Compartment View

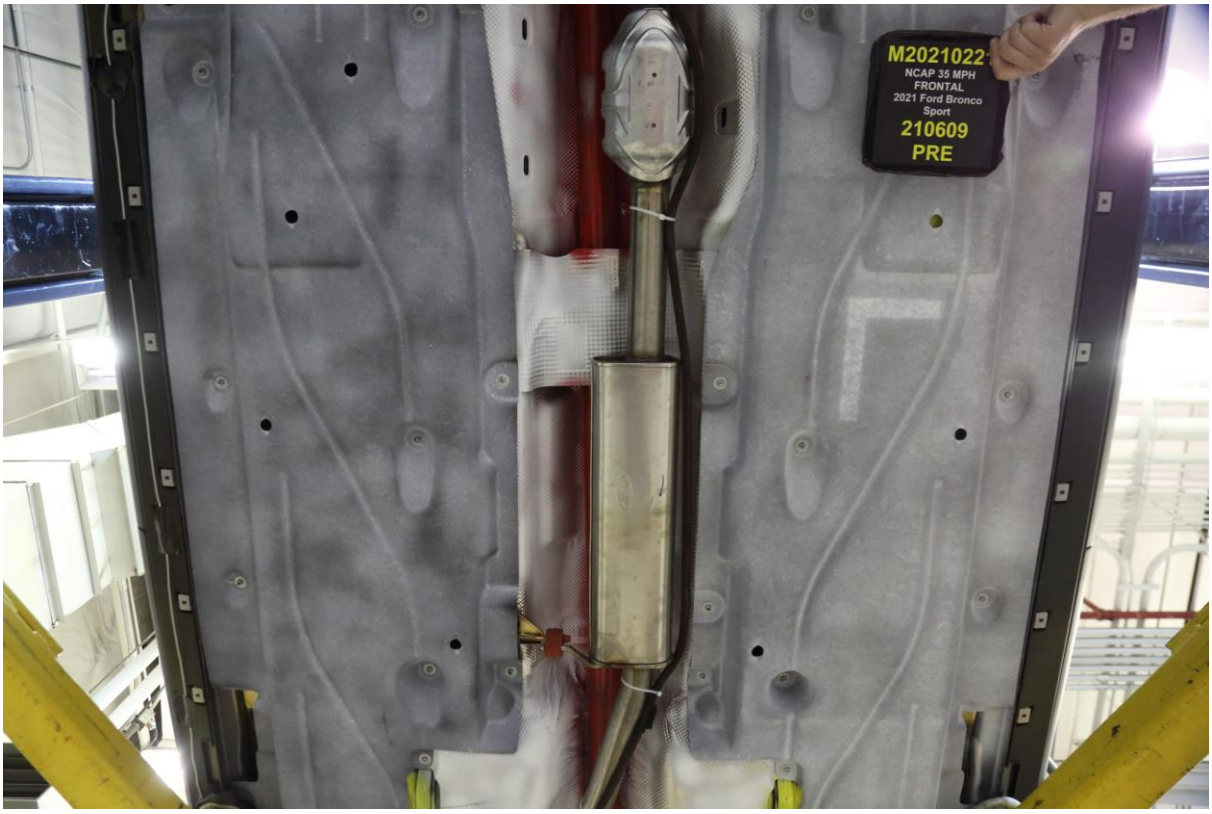
022 Pre-Test Fuel Filler Cap View

023 Post-Test Fuel Filler Cap View

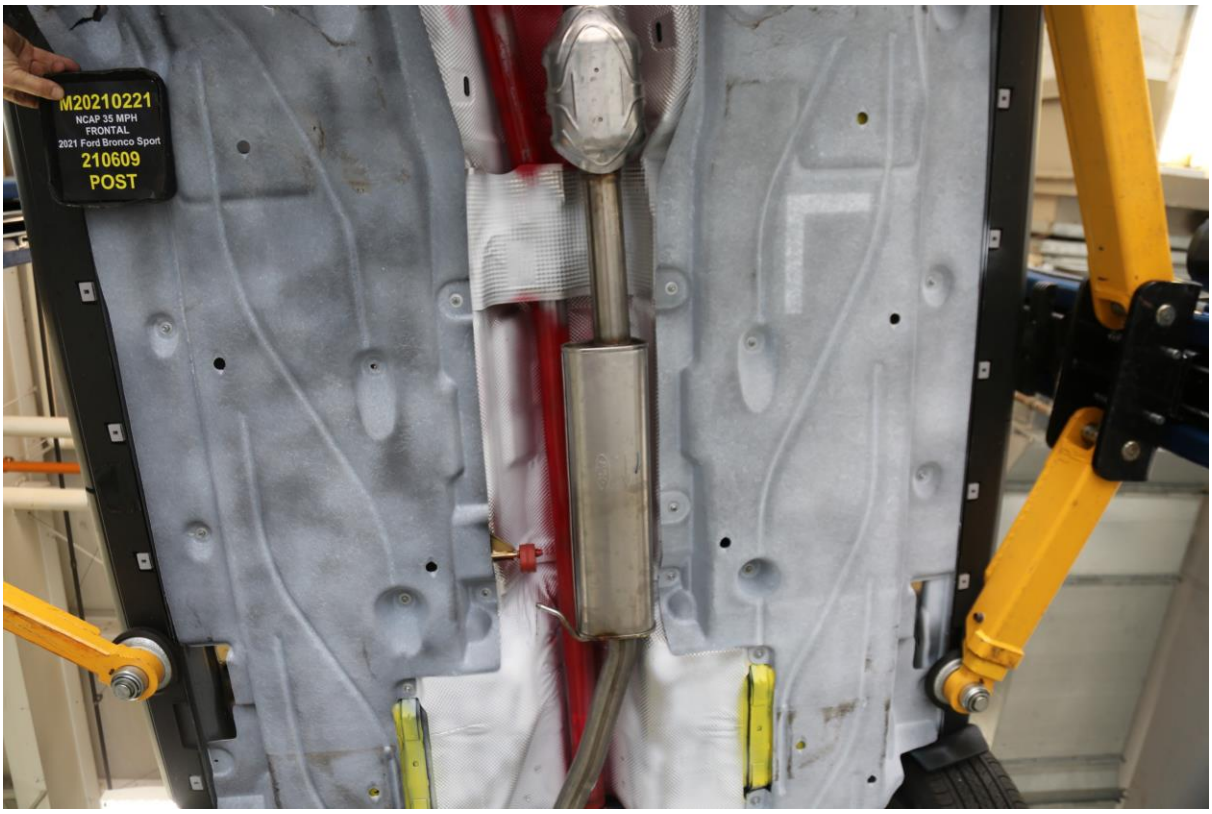
024 Pre-Test Front Underbody View



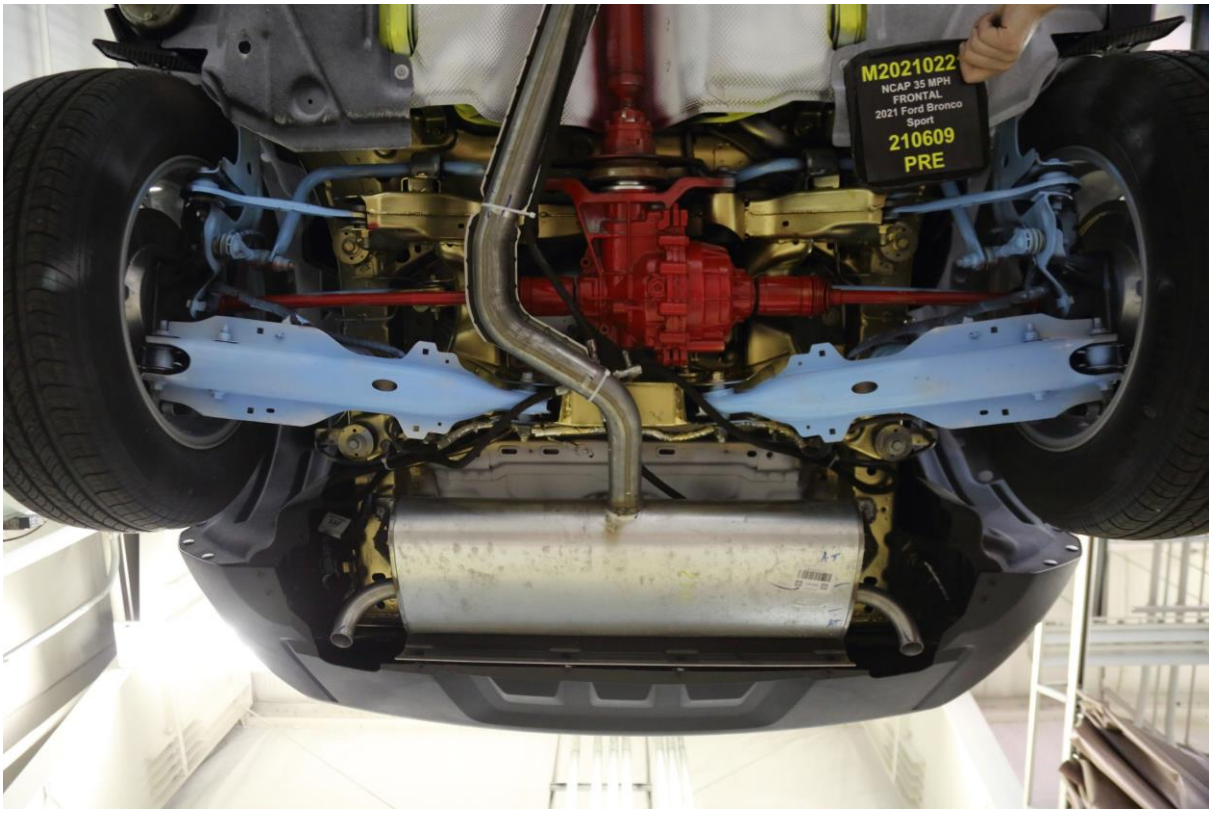
025 Post-Test Front Underbody View



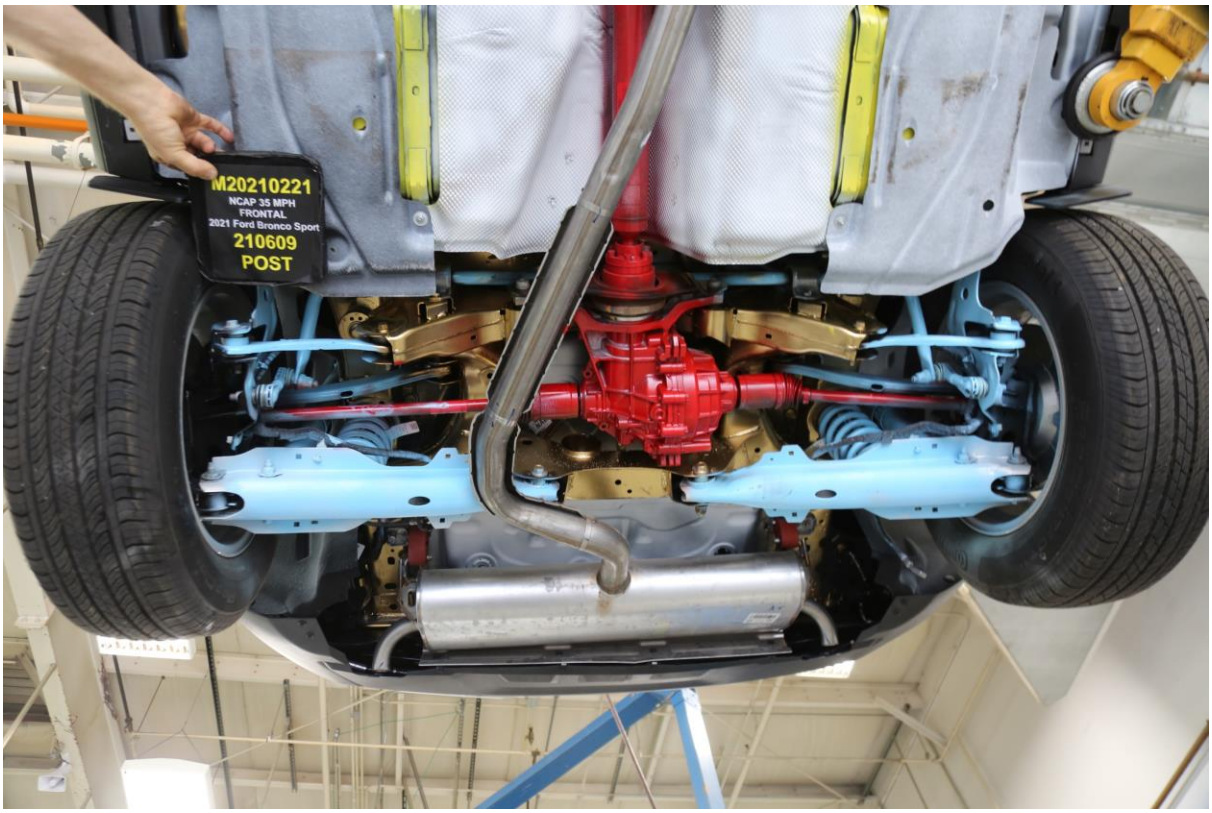
No. 025a Pre-Test Mid Underbody View



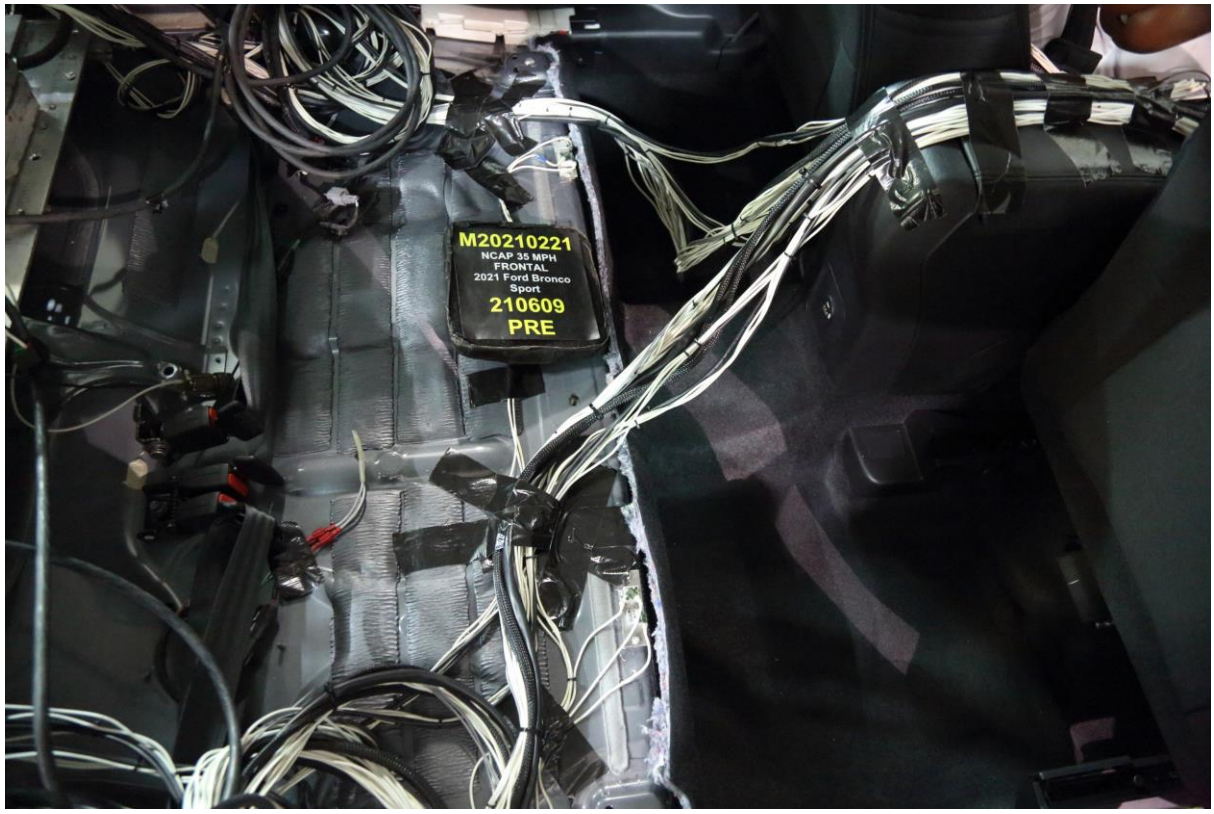
No. 025b Post-Test Mid Underbody View



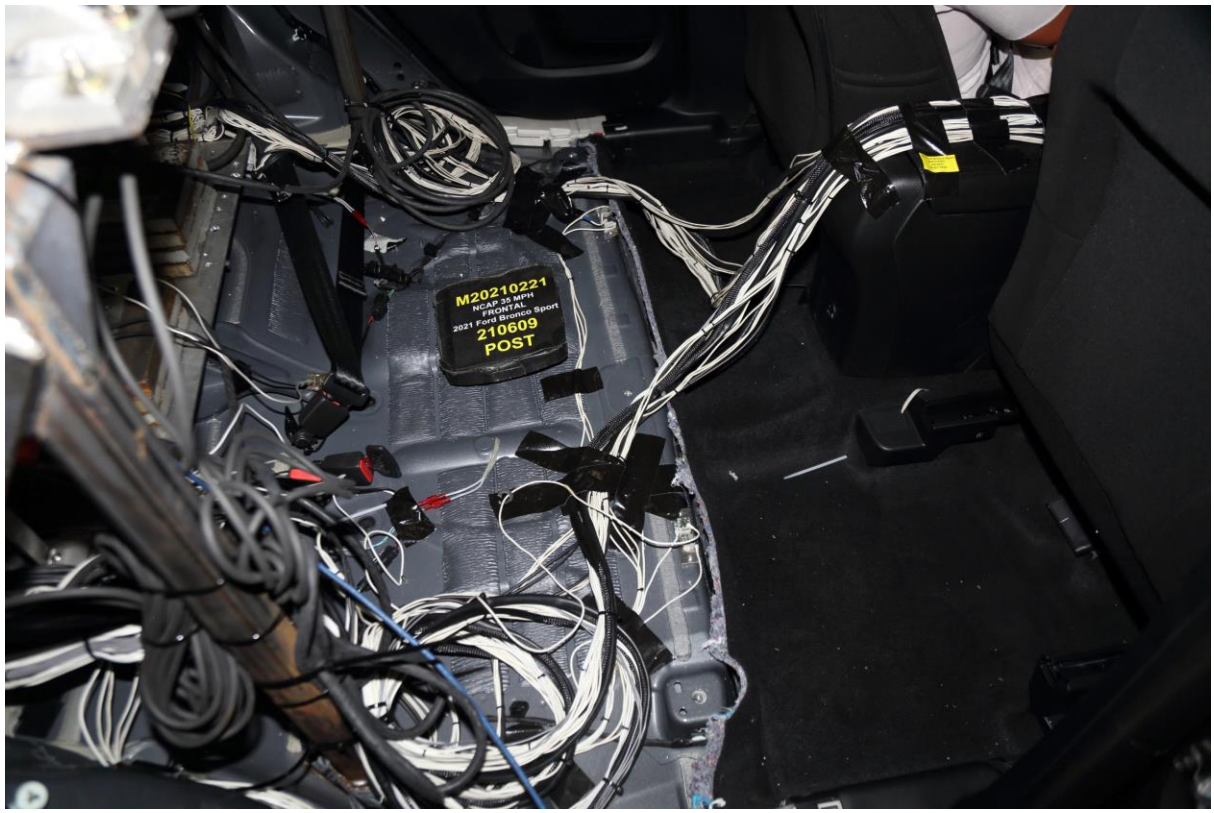
026 Pre-Test Rear Underbody View



027 Post-Test Rear Underbody View

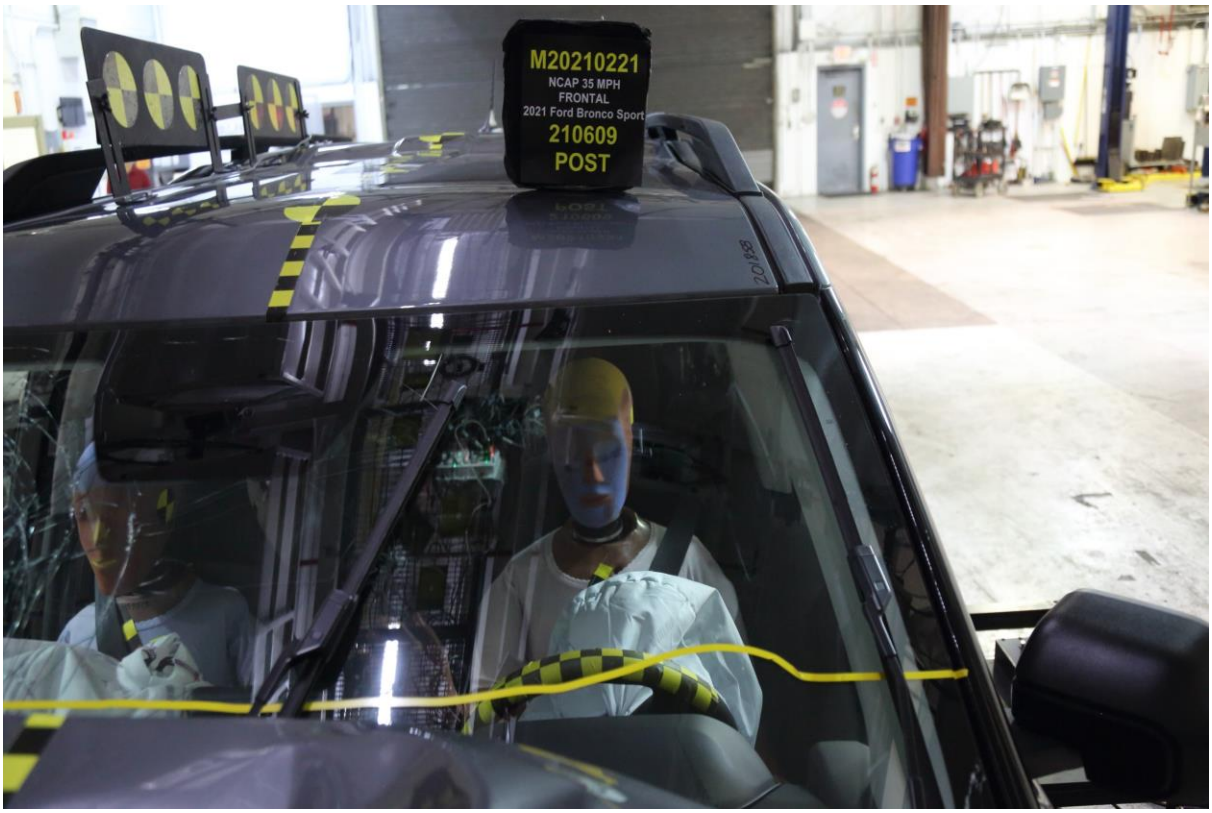


028 Pre-Test Dummy Cable Routing



029 Post-Test Dummy Cable Routing

030 Pre-Test Driver Dummy Front View

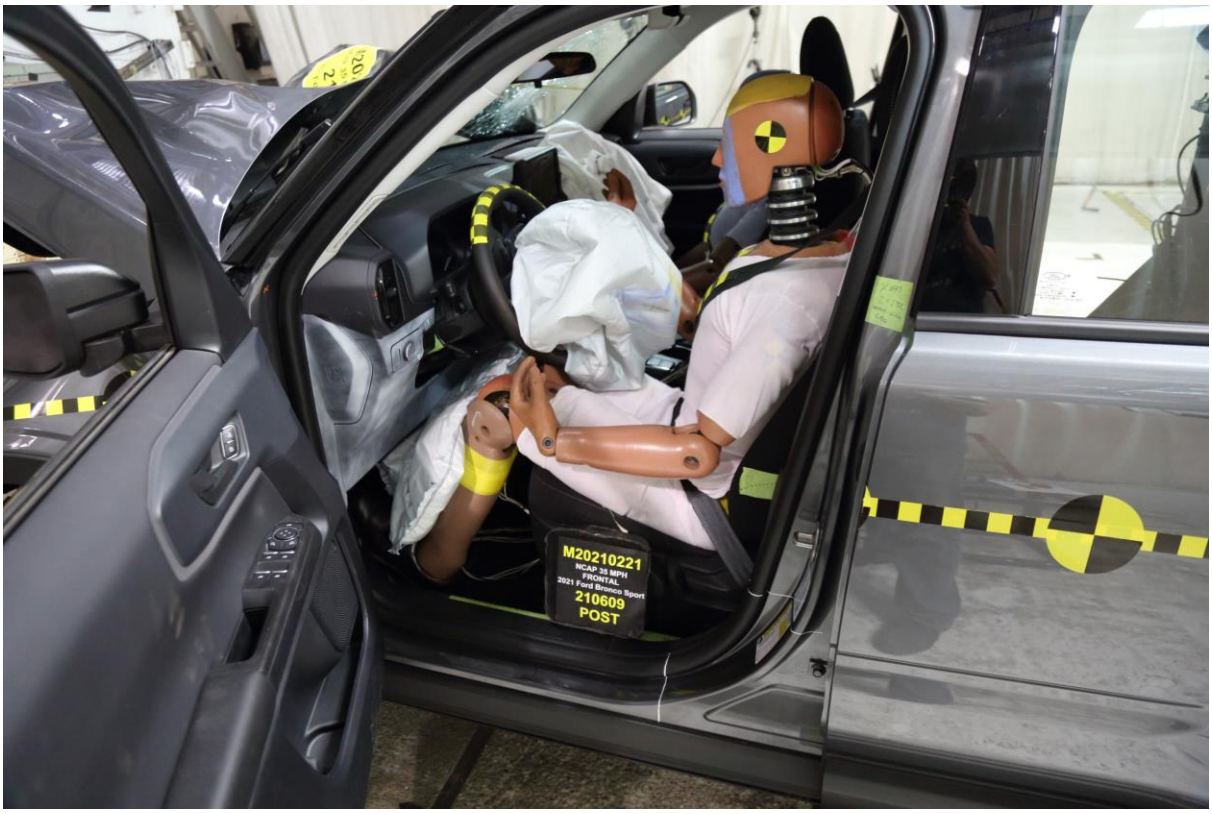


031 Post-Test Driver Dummy Front View

032 Pre-Test Driver Dummy Window View

033 Post-Test Driver Dummy Window View

034 Pre-Test Driver Dummy and Vehicle Interior View



035 Post-Test Driver Dummy and Vehicle Interior View

036 Pre-Test Driver's Seat Fore-Aft Markings

037 Post-Test Driver's Seat Fore-Aft Markings

038 Pre-Test View of Belt Anchorage for Driver Dummy

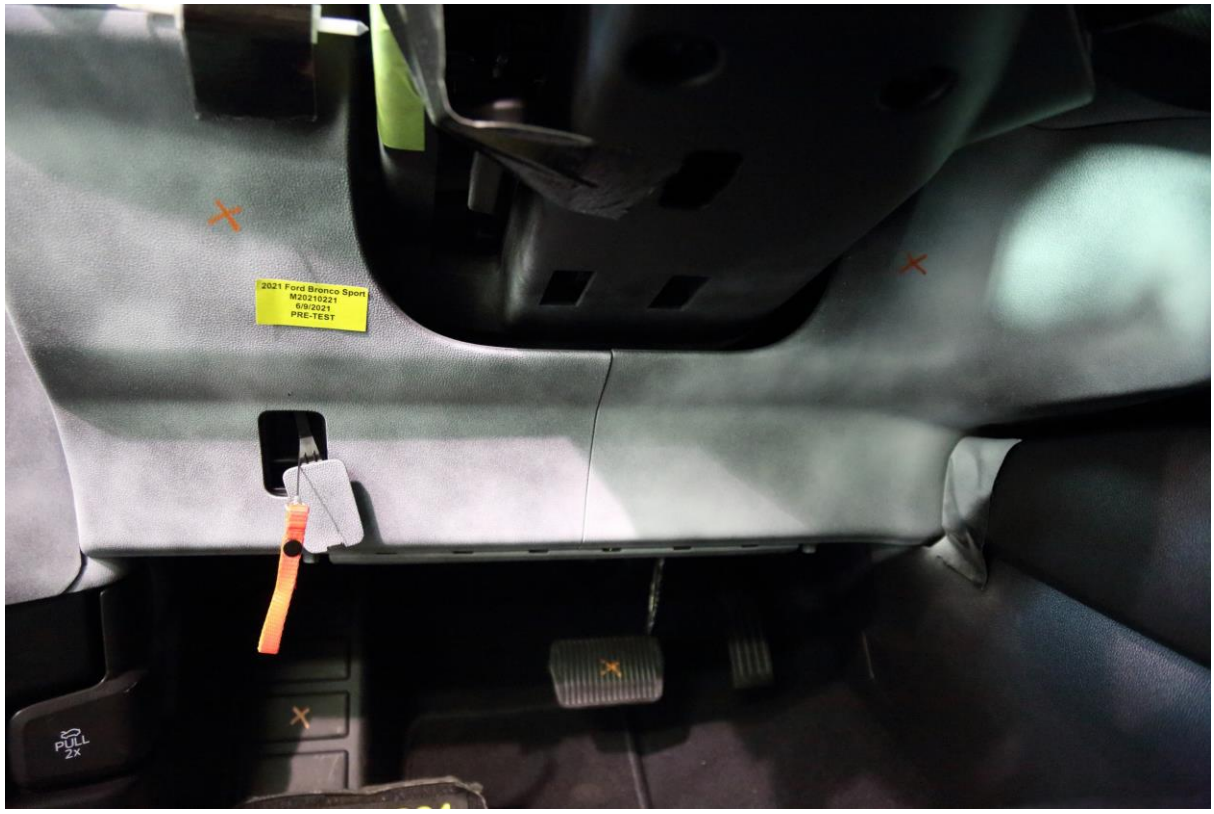
039 Post-Test View of Belt Anchorage for Driver Dummy

040 Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy

041 Post-Test View of Belt Buckle and Latch Plate for Driver Dummy

042 Pre-Test Driver Dummy Feet

043 Post-Test Driver Dummy Feet

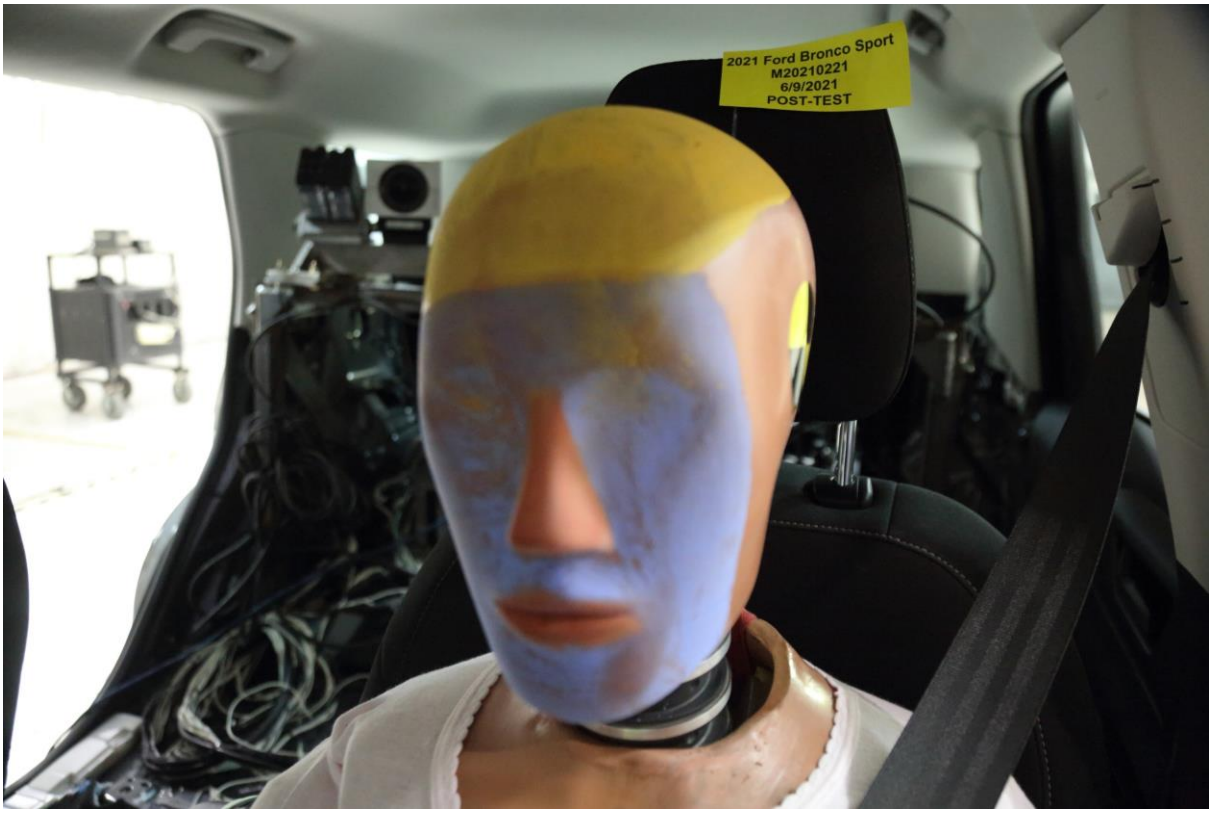


044 Pre-Test Driver's Side Knee Bolster

045 Post-Test Driver's Side Knee Bolster

046 Pre-Test Driver's Side Floorpan

047 Post-Test Driver's Side Floorpan



048 Post-Test Driver Dummy Face

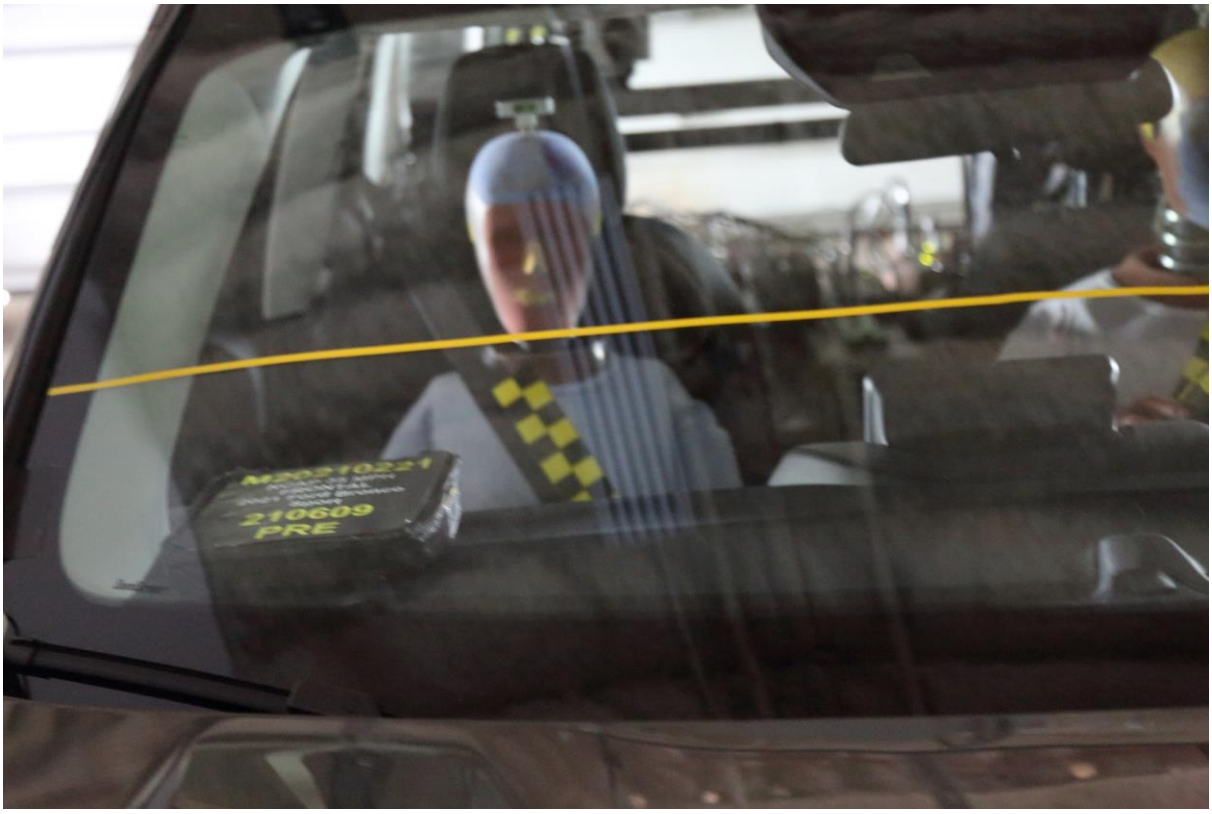
049 Post-Test Driver Dummy Contact with Airbag

050 Post-Test Driver Dummy Contact with Headrest

Intentionally Left Blank

051 Pre-Test View of the Steering Wheel

052 Post-Test View of the Steering Wheel



53 Pre-Test Passenger Dummy Front View

054 Post-Test Passenger Dummy Front View

055 Pre-Test Passenger Dummy Window View

056 Post-Test Passenger Dummy Window View

057 Pre-Test Passenger Dummy and Vehicle Interior View

058 Post-Test Passenger Dummy and Vehicle Interior View

059 Pre-Test Passenger's Seat Fore-Aft Markings

060 Post-Test Passenger's Seat Fore-Aft Markings

061 Pre-Test View of Belt Anchorage for Passenger Dummy

062 Post-Test View of Belt Anchorage for Passenger Dummy

063 Pre-Test View of Belt Buckle and Latch Plate for Passenger Dummy

064 Post-Test View of Belt Buckle and Latch Plate for Passenger Dummy

065 Pre-Test Passenger Dummy Feet

066 Post-Test Passenger Dummy Feet

067 Pre-Test Passenger's Side Knee Bolster

068 Post-Test Passenger's Side Knee Bolster

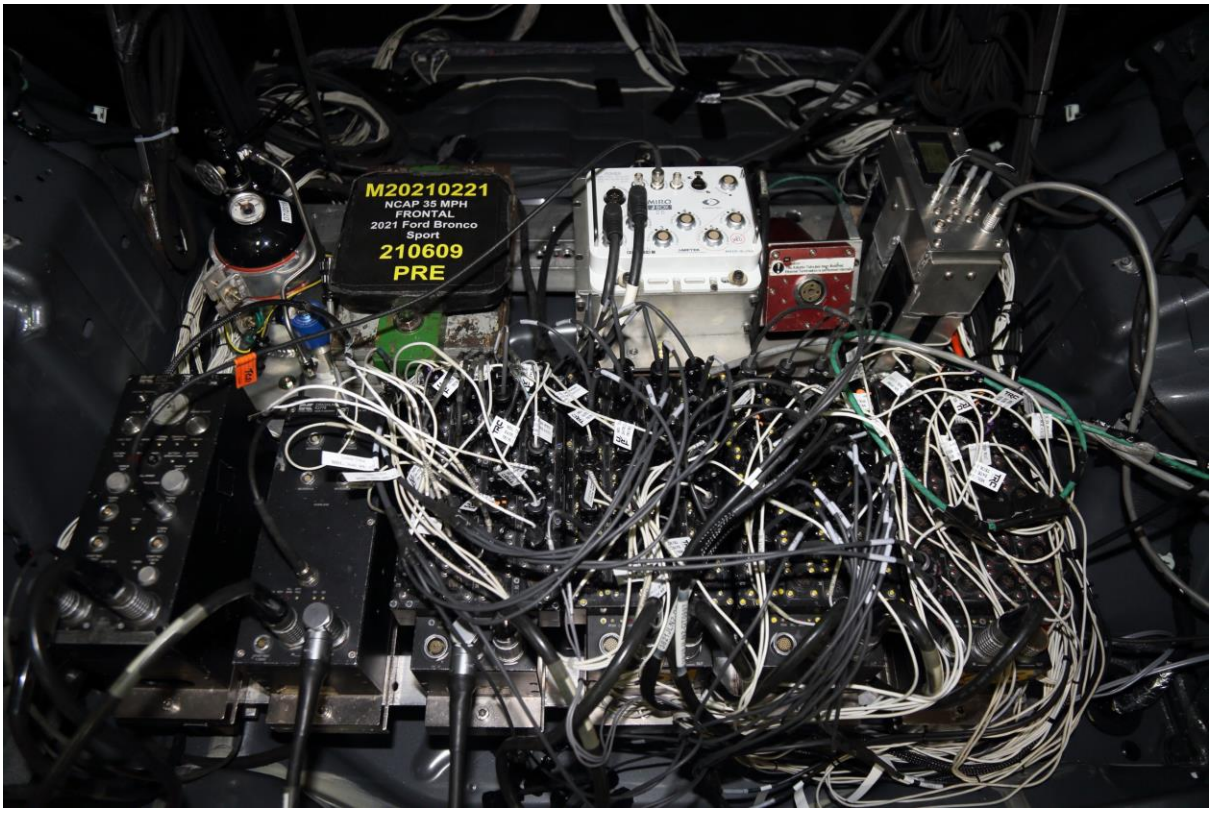
069 Pre-Test Passenger's Side Floorpan

070 Post-Test Passenger's Side Floorpan

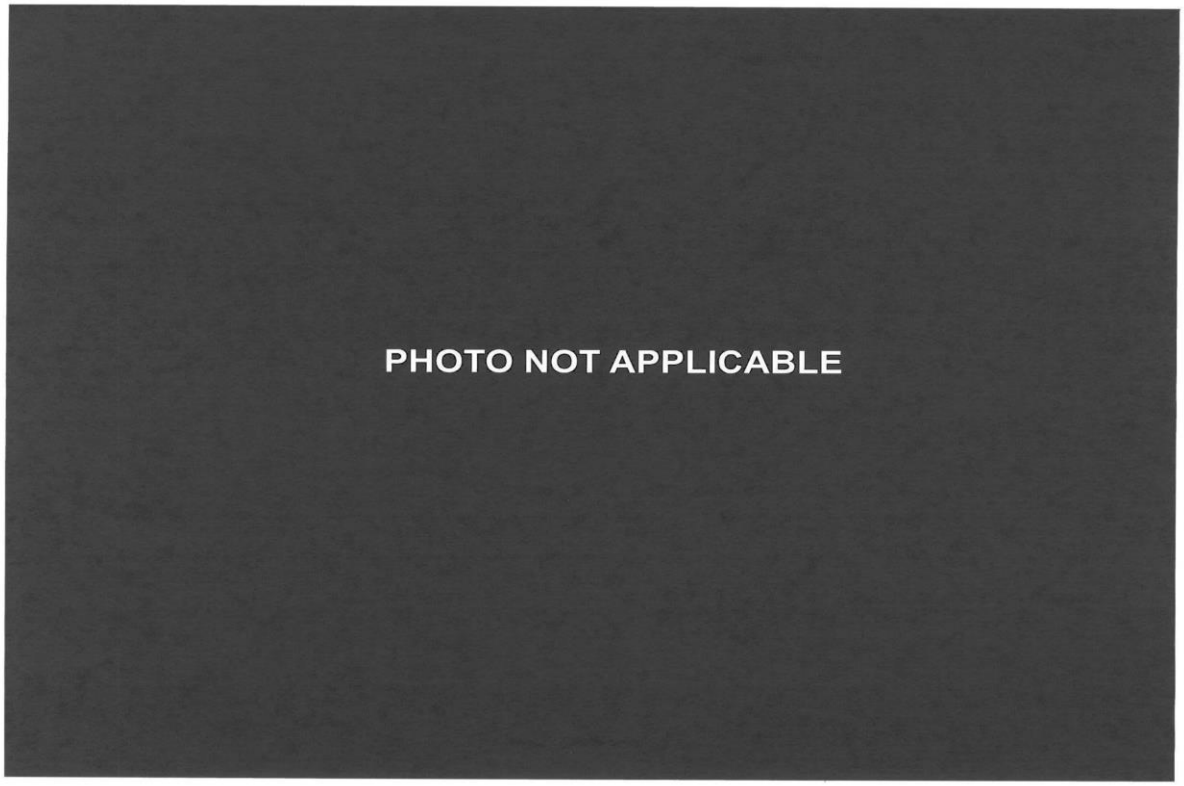
071 Post-Test Passenger Dummy Face

072 Post-Test Passenger Dummy Contact with Airbag

073 Post-Test Passenger Dummy Contact with Headrest



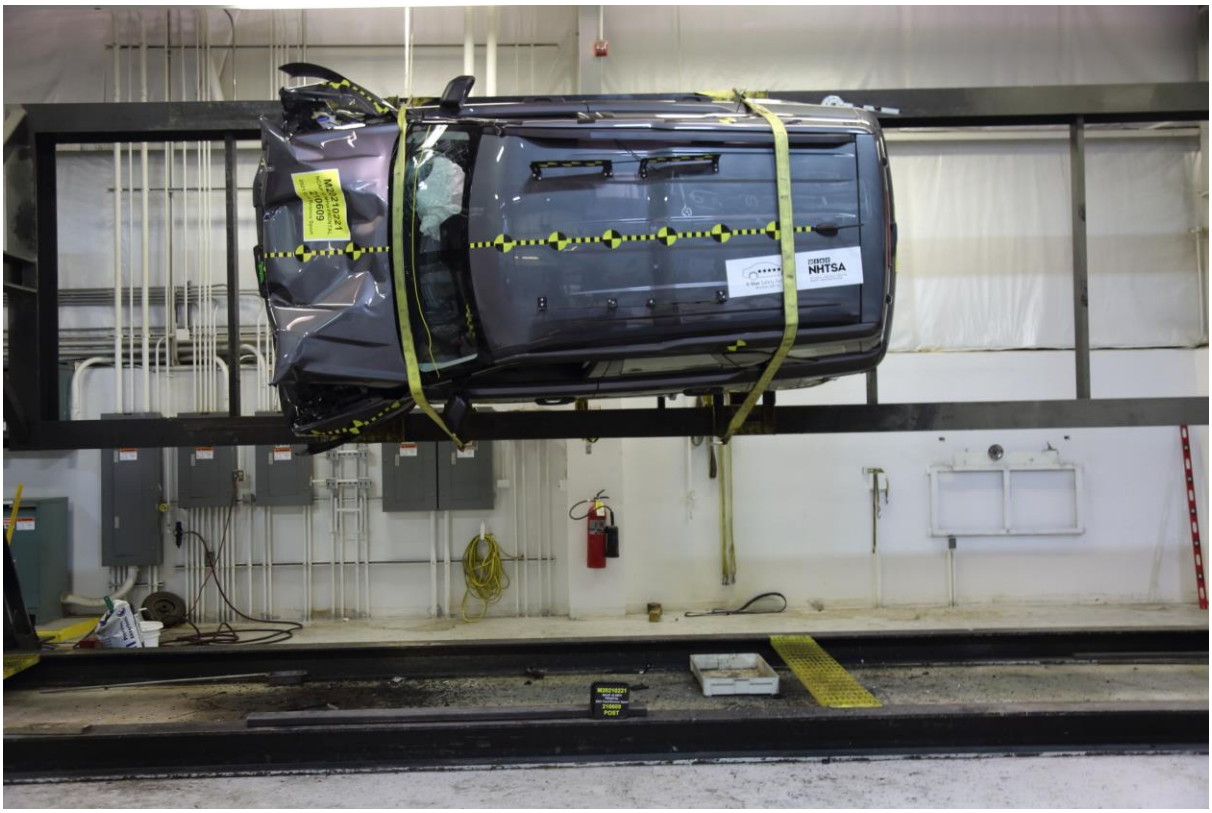
074 Photograph of Ballast Installed in Vehicle



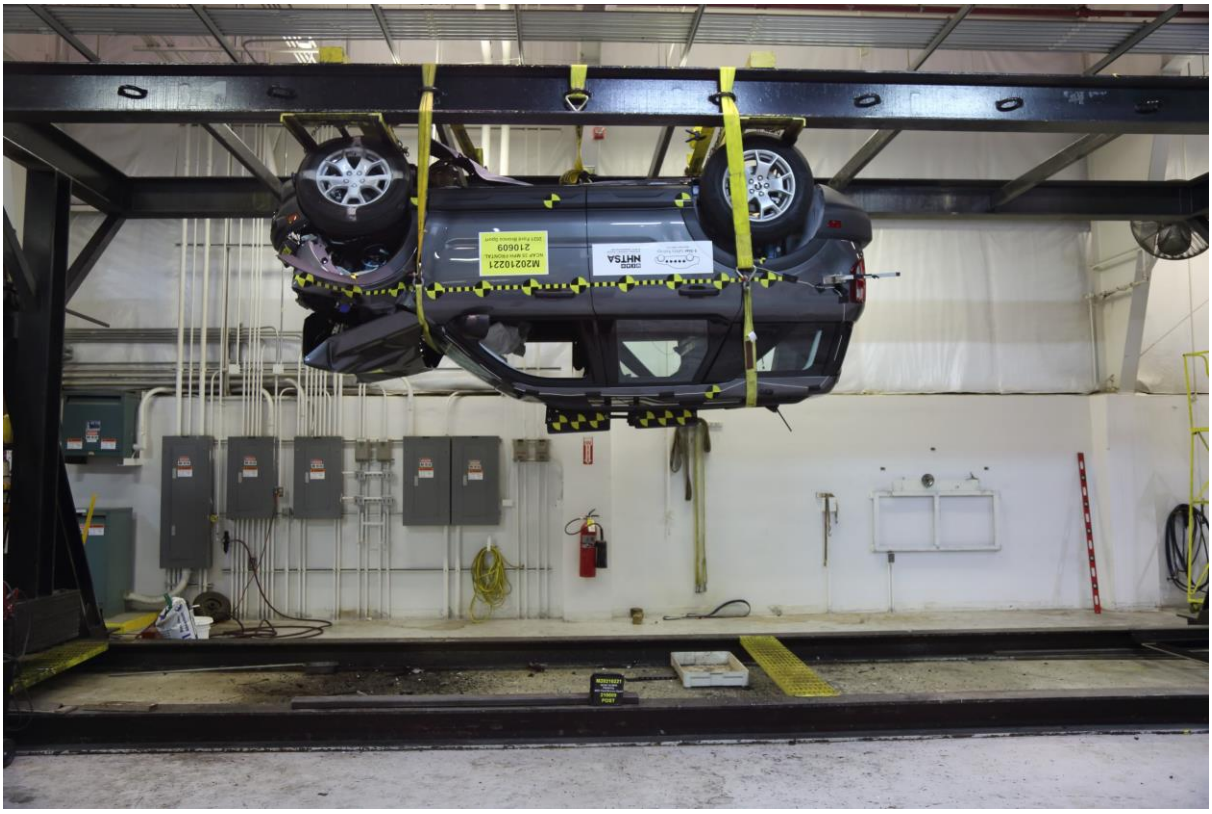
075 Post-Test Stoddard Spillage Location View

076 Post-Test Speed Trap Read out

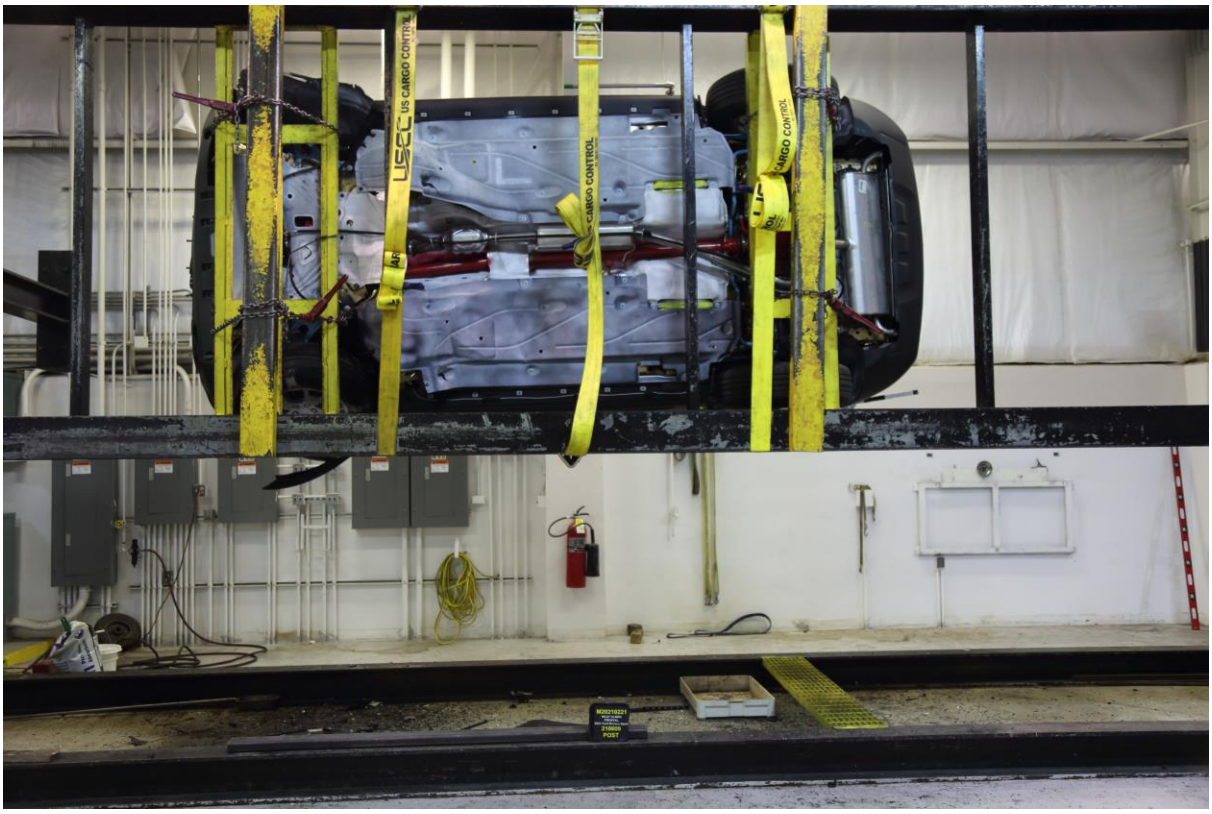
077 Vehicle at 0º on Static Rollover Device



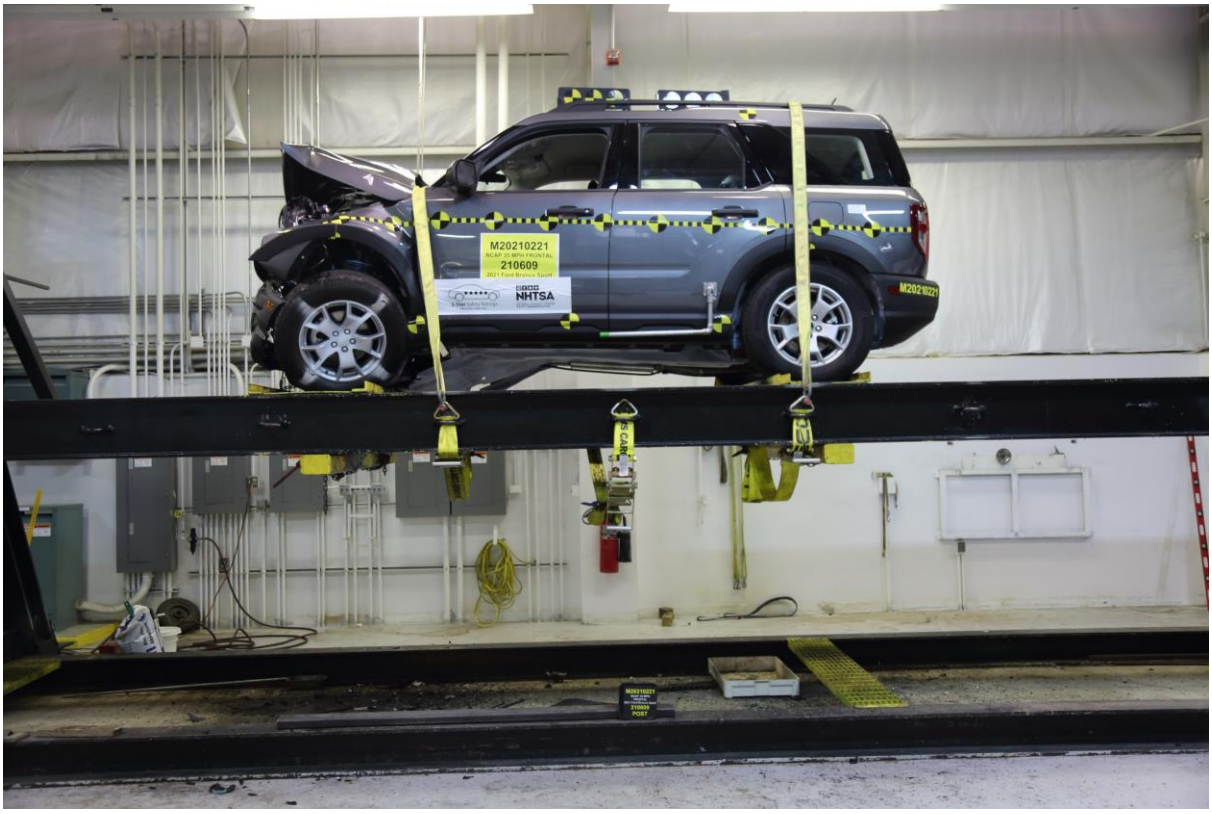
078 Vehicle at 90º on Static Rollover Device



079 Vehicle at 180º on Static Rollover Device

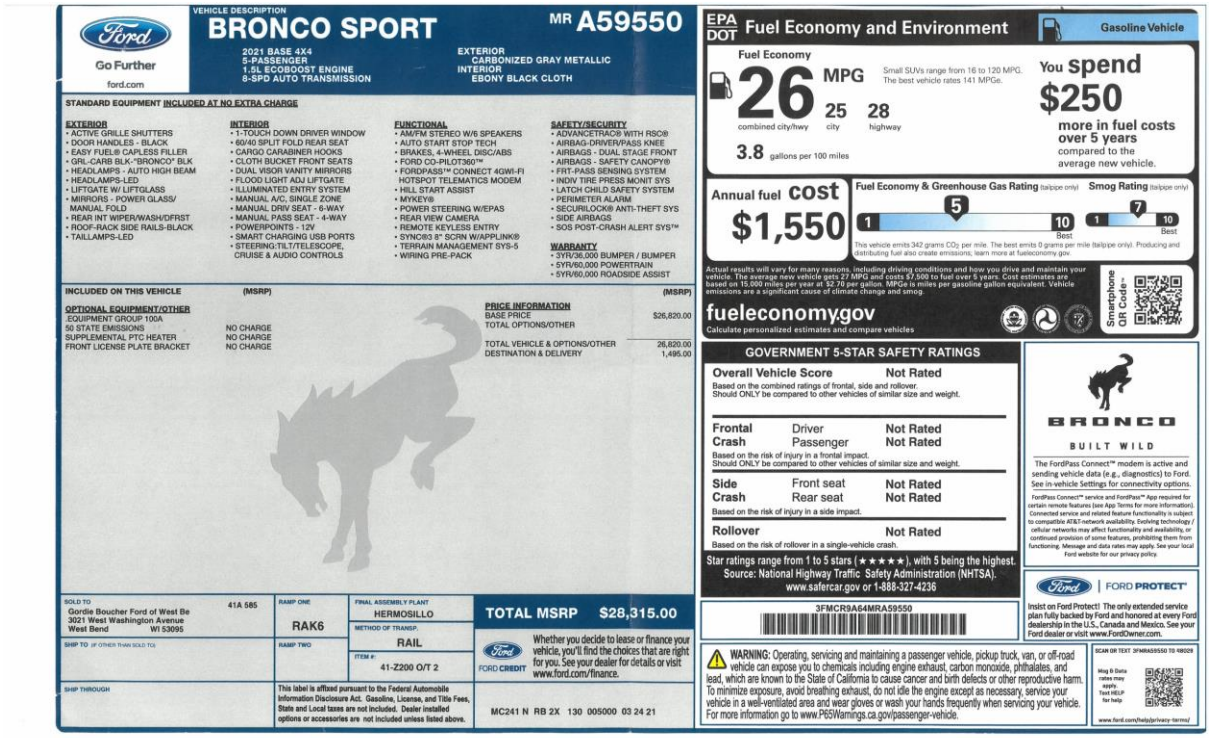


080 Vehicle at 270º on Static Rollover Device



081 Vehicle at 360º on Static Rollover Device

082 2021 Ford Bronco Sport Frontal Impact Event



083 Monroney Label Photograph

APPENDIX B
VEHICLE AND DUMMY RESPONSE DATA PLOTS

TABLE OF DATA PLOTS

The following additional dummy and vehicle response data can be found in the R & D section of the NHTSA website at: www.nhtsa.gov.

Driver Head Acceleration X Redundant
Driver Head Acceleration Y Redundant
Driver Head Acceleration Z Redundant
Driver Upper Neck Force Y
Driver Upper Neck Moment X
Driver Upper Neck Moment Z
Driver Chest X Acceleration Redundant
Driver Chest Y Acceleration Redundant
Driver Chest Z Acceleration Redundant
Driver Pelvis X
Driver Pelvis Y
Driver Pelvis Z
Driver Left Femur Redundant
Driver Right Femur Redundant
Driver Left Upper Tibia Moment X
Driver Left Upper Tibia Moment Y
Driver Left Upper Tibia Force Z
Driver Left Lower Tibia Moment X
Driver Left Lower Tibia Moment Y
Driver Left Lower Tibia Force Z
Driver Right Upper Tibia Moment X
Driver Right Upper Tibia Moment Y
Driver Right Upper Tibia Force Z
Driver Right Lower Tibia Moment X
Driver Right Lower Tibia Moment Y
Driver Right Lower Tibia Force Z
Driver Left Foot Fore Z
Driver Left Foot Aft X
Driver Left Foot Aft Z
Driver Right Foot Fore Z
Driver Right Foot Aft X
Driver Right Foot Aft Z

Driver Head Angular Velocity X
Driver Head Angular Velocity Y
Driver Head Angular Velocity Z
Passenger Head Acceleration X Redundant
Passenger Head Acceleration Y Redundant
Passenger Head Acceleration Z Redundant
Passenger Upper Neck Force Y
Passenger Upper Neck Moment X
Passenger Upper Neck Moment Z
Passenger Chest X Acceleration Redundant
Passenger Chest Y Acceleration Redundant
Passenger Chest Z Acceleration Redundant
Passenger Pelvis X
Passenger Pelvis Y
Passenger Pelvis Z
Passenger Left Femur Redundant
Passenger Right Femur Redundant
Passenger Left Upper Tibia Moment X
Passenger Left Upper Tibia Moment Y
Passenger Left Upper Tibia Force Z
Passenger Left Lower Tibia Moment X
Passenger Left Lower Tibia Moment Y
Passenger Left Lower Tibia Force Z
Passenger Right Upper Tibia Moment X
Passenger Right Upper Tibia Moment Y
Passenger Right Upper Tibia Force Z
Passenger Right Lower Tibia Moment X
Passenger Right Lower Tibia Moment Y
Passenger Right Lower Tibia Force Z
Passenger Left Foot Fore Z
Passenger Left Foot Aft X
Passenger Left Foot Aft Z
Passenger Right Foot Fore Z
Passenger Right Foot Aft X
Passenger Right Foot Aft Z

Passenger Head Angular Velocity X
Passenger Head Angular Velocity Y
Passenger Head Angular Velocity Z
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Left Rear Seat Crossmember X Redundant
Right Rear Seat Crossmember X Redundant
Vehicle Engine Top X
Vehicle Engine Bottom X
Load Cell Barrier Forces and Moments

NHTSA

Test Date: 06/09/2021

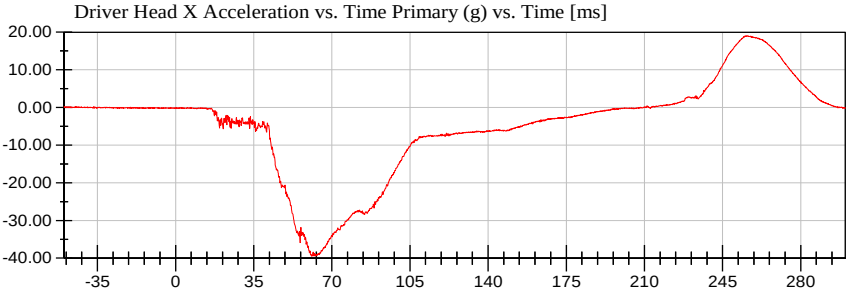
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

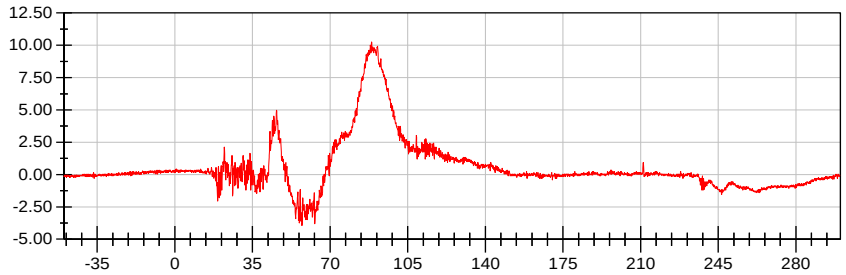
18.99 g at 255.44 ms

<Min>

-39.48 g at 60.96 ms

CFC_1000

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



<Max>

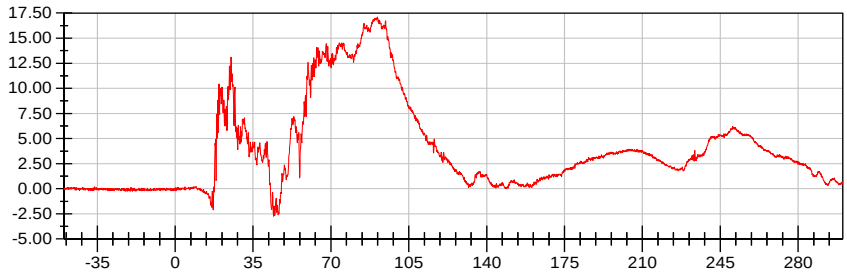
10.26 g at 88.72 ms

<Min>

-3.94 g at 57.36 ms

CFC_1000

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



<Max>

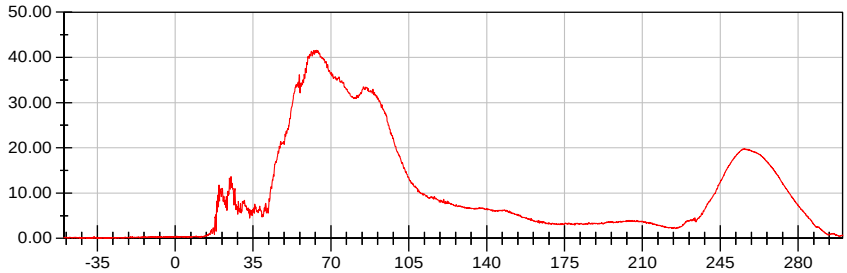
17.12 g at 90.80 ms

<Min>

-2.73 g at 44.24 ms

CFC_1000

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



<Max>

41.59 g at 63.60 ms

<Min>

0.04 g at -39.92 ms

CFC_1000

NHTSA

Test Date: 06/09/2021

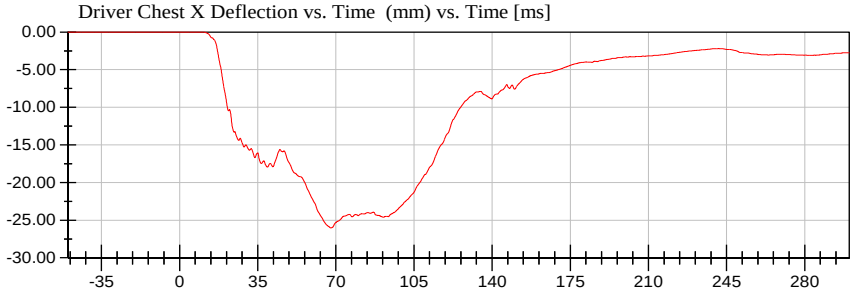
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

Driver Chest X Deflection vs. Time (mm) vs. Time [ms]



<Max>

0.00 mm at -50.00 ms

<Min>

-26.03 mm at 67.76 ms

CFC_600

NHTSA

Test Date: 06/09/2021

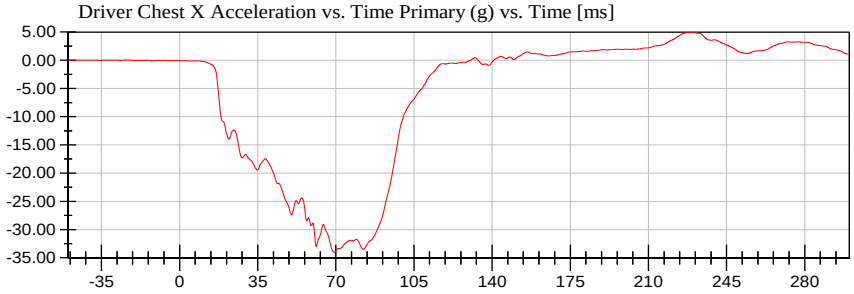
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

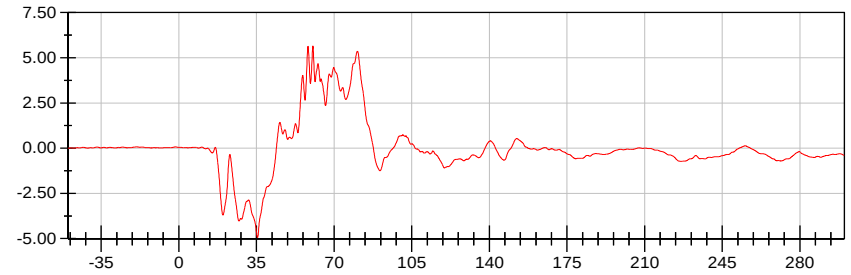
4.95 g at 229.44 ms

<Min>

-34.02 g at 69.28 ms

CFC_180

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



<Max>

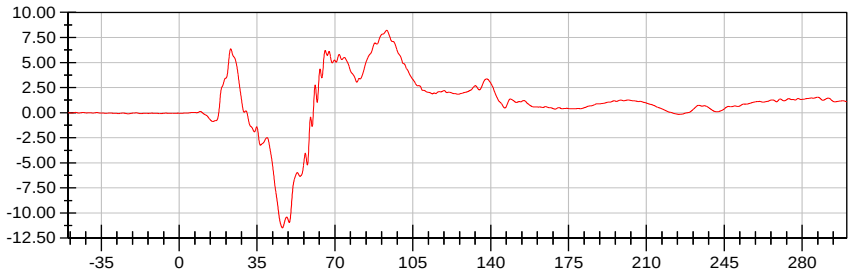
5.65 g at 60.48 ms

<Min>

-4.94 g at 35.44 ms

CFC_180

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



<Max>

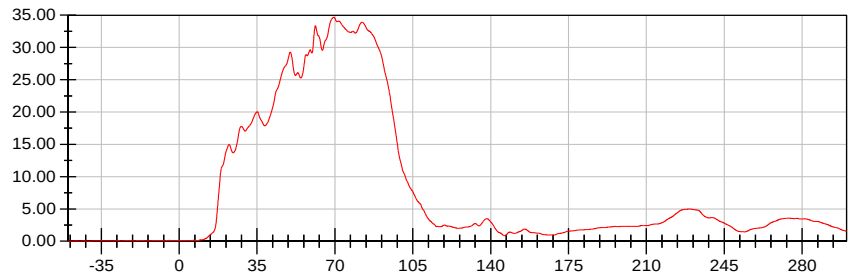
8.22 g at 93.28 ms

<Min>

-11.48 g at 46.40 ms

CFC_180

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



<Max>

34.67 g at 69.44 ms

<Min>

0.01 g at -47.52 ms

CFC_180

NHTSA

Test Date: 06/09/2021

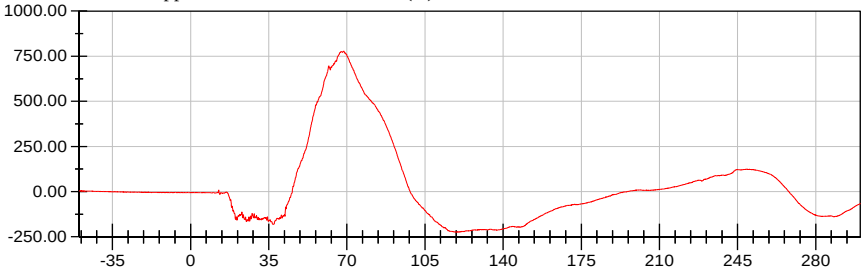
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

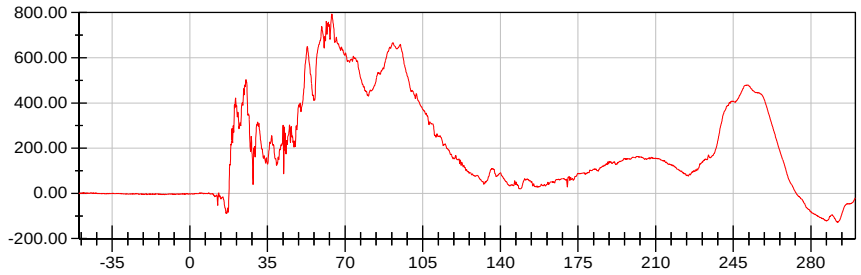
778.42 N at 68.64 ms

<Min>

-225.48 N at 119.92 ms

CFC_1000

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



<Max>

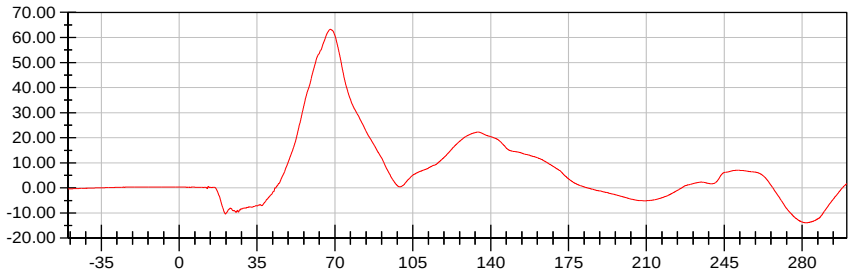
793.37 N at 64.08 ms

<Min>

-126.81 N at 291.84 ms

CFC_1000

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



<Max>

63.22 Nm at 67.92 ms

<Min>

-13.86 Nm at 281.44 ms

CFC_600

2021 Ford Bronco Sport NCAP 35 mph Frontal Impact

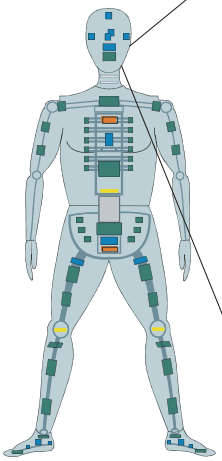
Neck Injury Predictor (NIJ)

Date: 06/09/2021
Time: 17:45

Customer: NHTSA
Test Number: M20210221

TRC Inc. Test Lab: CTF
Test Number: 210609

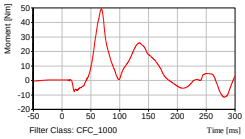
Test Orientation = Frontal
Fzc(Tension) = 6806
Fzc(Compression) = 6160
Myc(Extension) = 135
Myc(Flexion) = 310



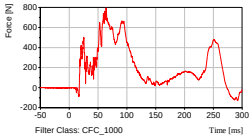
Dummy:HIII 50th Male
Seating Position:
Driver

NIJ Source Code: (Fz/Fzc)+(My/Myc)

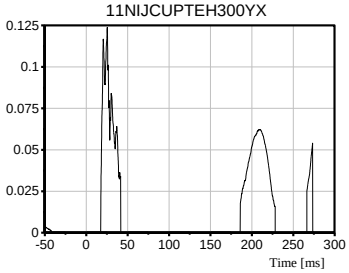
11TMONUP00H3MOYX



11NECKUP00H3FOZA

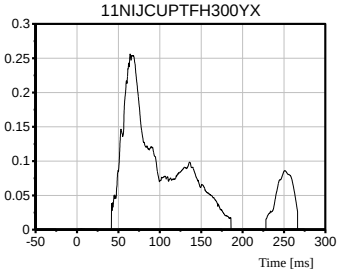


11NIJCUPTEH300YX



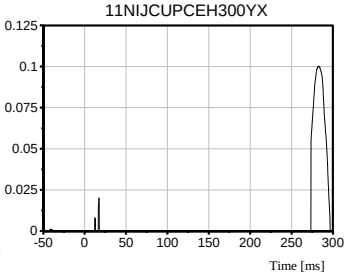
Max [NTE] 0.1239 at 25.44 ms

11NIJCUPTFH300YX



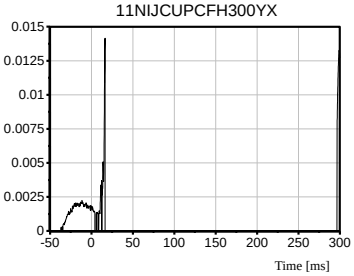
Max [NTF] 0.2560 at 64.24 ms

11NIJCUPCEH300YX



Max [NCE] 0.1002 at 282.48 ms

11NIJCUPCFH300YX



Max [NCF] 0.0142 at 16.40 ms

NHTSA

Test Date: 06/09/2021

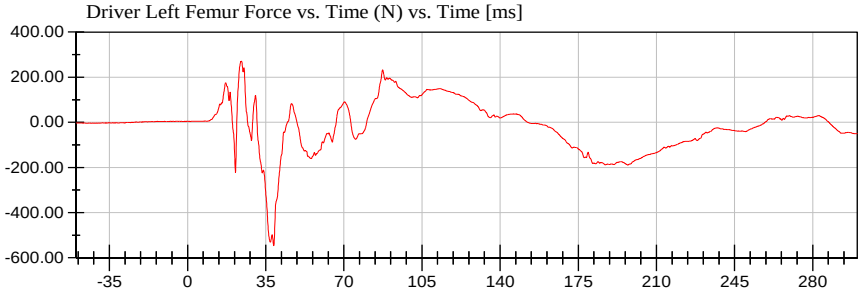
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

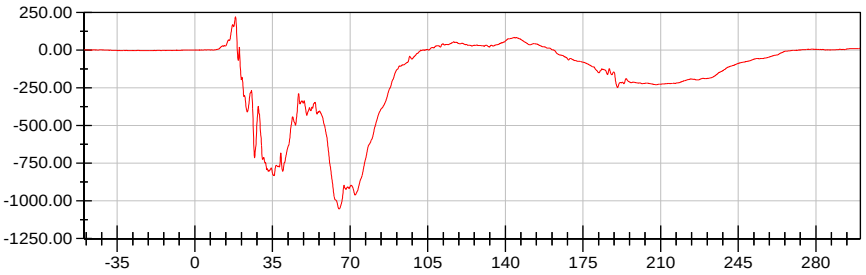
270.47 N at 24.16 ms

<Min>

-546.30 N at 38.56 ms

CFC_600

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



<Max>

221.50 N at 18.32 ms

<Min>

-1,053.11 N at 65.12 ms

CFC_600

NHTSA

Test Date: 06/09/2021

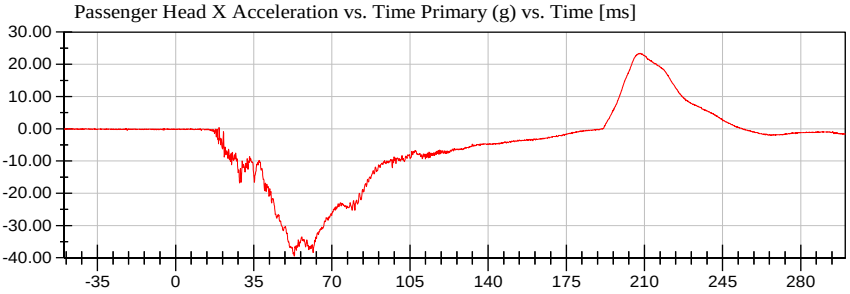
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

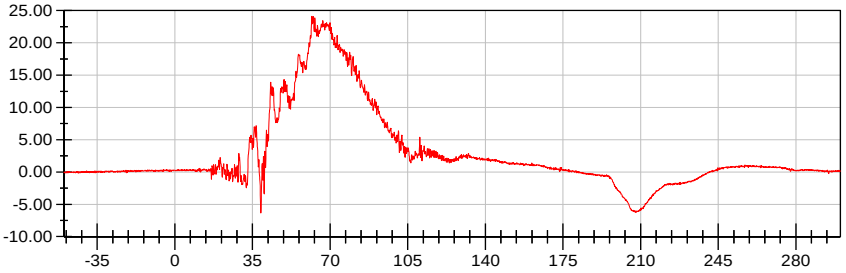
23.39 g at 208.00 ms

<Min>

-39.48 g at 53.20 ms

CFC_1000

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



<Max>

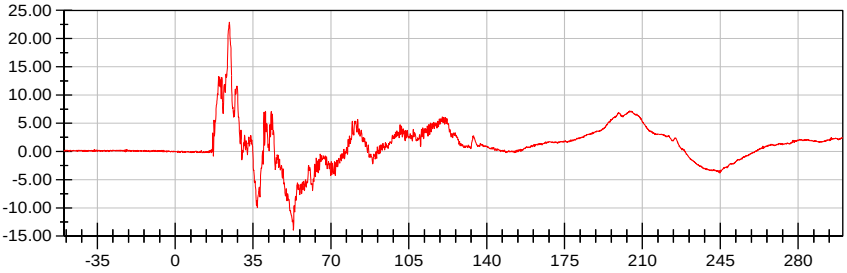
24.13 g at 61.84 ms

<Min>

-6.37 g at 38.80 ms

CFC_1000

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



<Max>

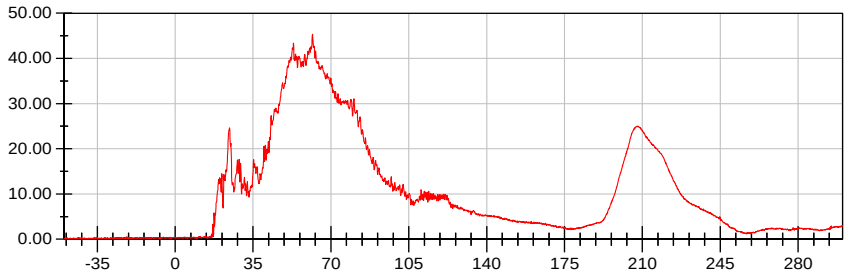
22.92 g at 24.40 ms

<Min>

-13.95 g at 53.12 ms

CFC_1000

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



<Max>

45.37 g at 61.68 ms

<Min>

0.02 g at -41.12 ms

CFC_1000

NHTSA

Test Date: 06/09/2021

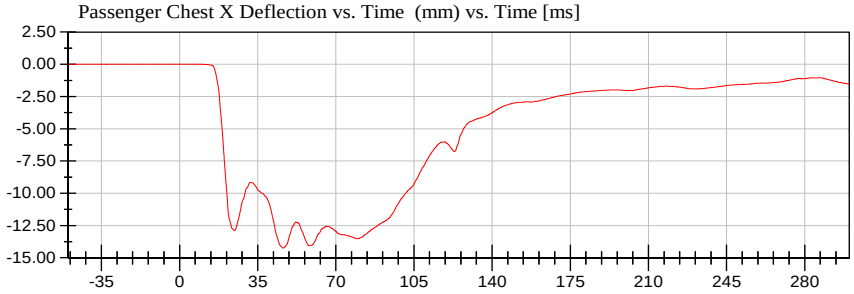
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

Passenger Chest X Deflection vs. Time (mm) vs. Time [ms]



<Max>

0.01 mm at -44.80 ms

<Min>

-14.25 mm at 46.40 ms

CFC_600

NHTSA

Test Date: 06/09/2021

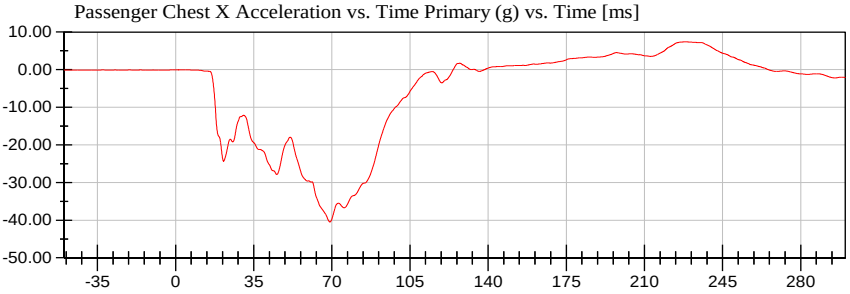
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

Passenger Chest X Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

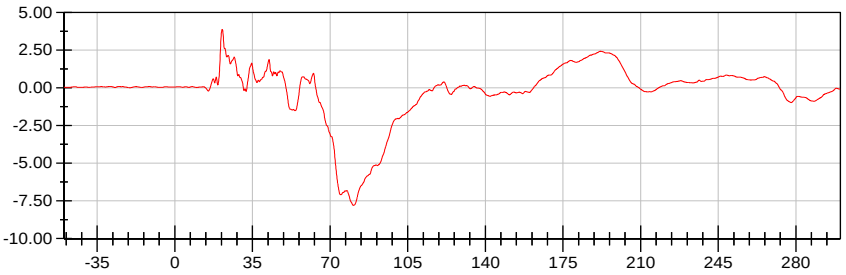
7.38 g at 228.80 ms

<Min>

-40.49 g at 69.12 ms

CFC_180

Passenger Chest Y Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

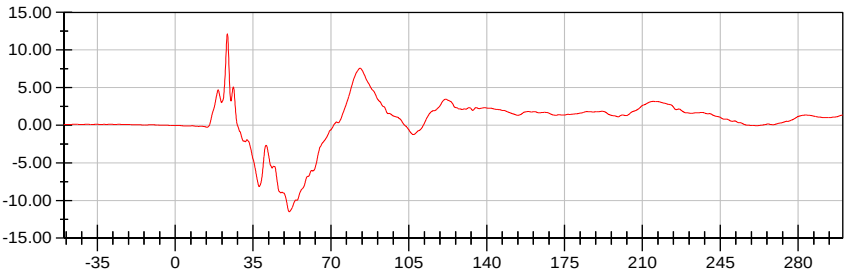
3.88 g at 21.36 ms

<Min>

-7.80 g at 80.40 ms

CFC_180

Passenger Chest Z Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

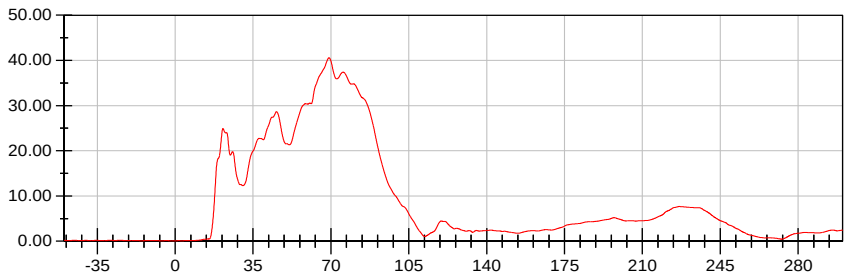
12.13 g at 23.44 ms

<Min>

-11.49 g at 51.28 ms

CFC_180

Passenger Chest Resultant Acceleration vs. Time Primary (g) vs. Time [ms]



<Max>

40.59 g at 69.12 ms

<Min>

0.09 g at -1.84 ms

CFC_180

NHTSA

Test Date: 06/09/2021

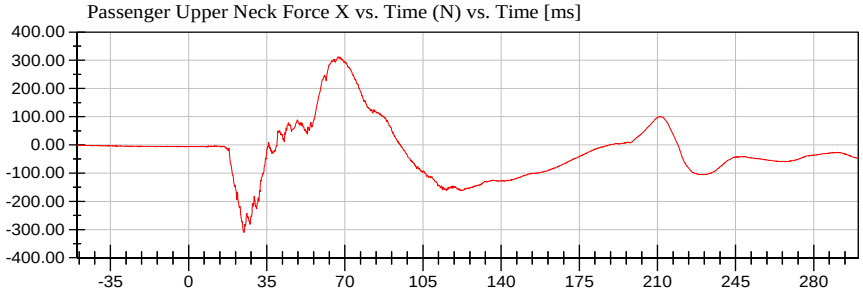
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

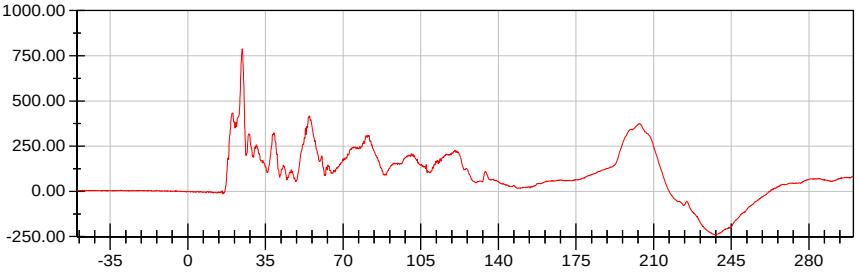
311.88 N at 66.96 ms

<Min>

-310.42 N at 24.80 ms

CFC_1000

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



<Max>

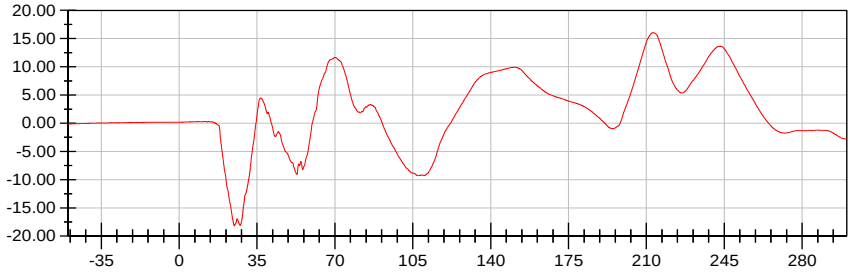
787.48 N at 24.56 ms

<Min>

-240.04 N at 237.84 ms

CFC_1000

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



<Max>

16.05 Nm at 213.04 ms

<Min>

-18.16 Nm at 24.80 ms

CFC_600

2021 Ford Bronco Sport NCAP 35 mph Frontal Impact

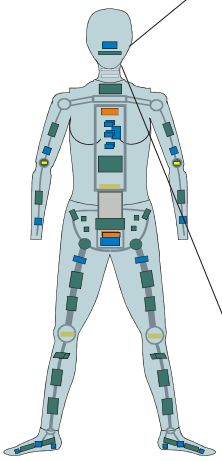
Neck Injury Predictor (NIJ)

Date: 06/09/2021
Time: 17:45

Customer: NHTSA
Test Number: M20210221

TRC Inc. Test Lab: CTF
Test Number: 210609

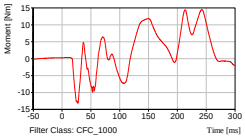
Test Orientation = Frontal
Fzc(Tension) = 4287
Fzc(Compression) = 3880
Myc(Extension) = 67
Myc(Flexion) = 155



Dummy:HIII 5th Female
Seating Position:
Right Front Passenger

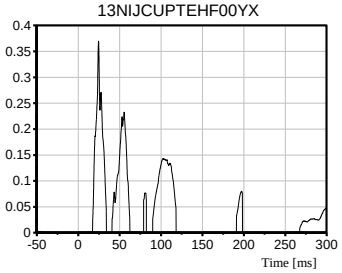
NIJ Source Code: (Fz/Fzc)+(My/Myc)

13TMONUP00HFMOYX



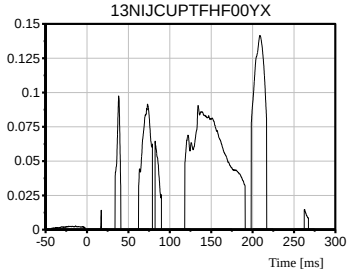
13NECKUP00HFFOZA

13NIJCUPTEHF00YX



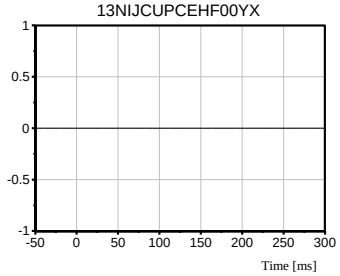
Max [NTE] 0.3698 at 24.56 ms

13NIJCUPTFHF00YX



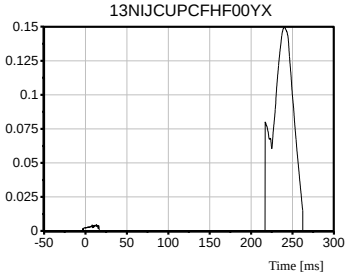
Max [NTF] 0.1416 at 208.88 ms

13NIJCUPCEHF00YX



Max [NCE] 0.0000 at -50.00 ms

13NIJCUPCFHF00YX



Max [NCF] 0.1498 at 240.72 ms

NHTSA

Test Date: 06/09/2021

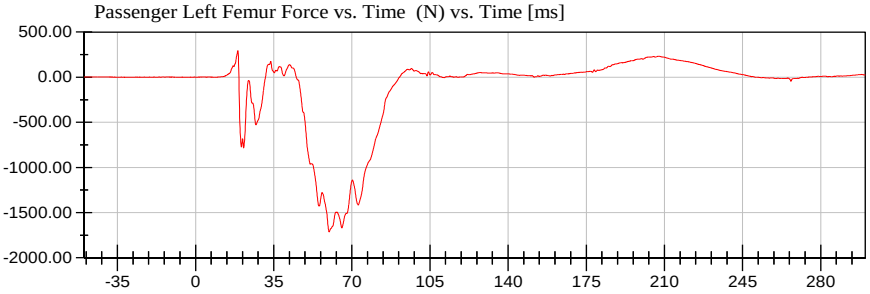
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Test Number: 210609 (M20210221)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

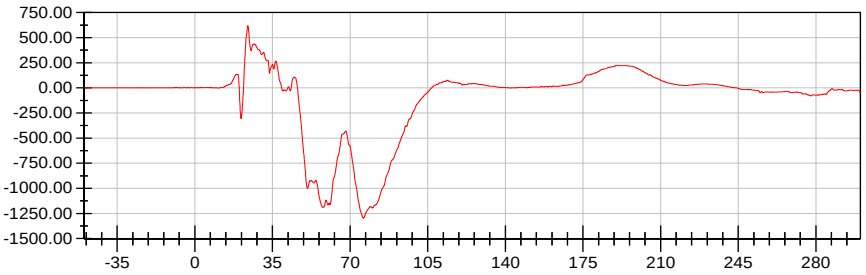
293.41 N at 18.96 ms

<Min>

-1,713.10 N at 59.84 ms

CFC_600

Passenger Right Femur Force vs. Time (N) vs. Time [ms]



<Max>

622.10 N at 23.92 ms

<Min>

-1,296.18 N at 76.00 ms

CFC_600

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION

Pre-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 73

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	881	Yes
B	Shoulder Pivot Height	505.5 - 520.7	511	Yes
C	H-Point Height	83.8 - 88.9	86	Yes
D	H-Point From Seatback	134.6 - 139.7	137	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	90	Yes
F	Thigh Clearance	139.7 - 154.9	145	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	295	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	337	Yes
J	Elbow Rest Height	190.5 - 210.8	198	Yes
K	Buttock Knee Length	579.1 - 604.5	601	Yes
L	Popliteal Height	429.3 - 454.7	440	Yes
M	Knee Pivot Height	485.1 - 500.4	494	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	221	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	425	Yes
W	Foot Breadth	91.4 - 106.7	96	Yes
Y	Chest Circumference	970.3 - 1000.8	990	Yes
Z	Waist Circumference	835.7 - 866.1	865	Yes
AA	Location For Chest Circumference	429.3 - 434.3	432	Yes
BB	Location For Waist Circumference	226.1 - 231.1	229	Yes

Transportation Research Center Inc.

Front Head Drop
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	236.8 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	4.1 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.49 %	Yes

Test meets specifications.

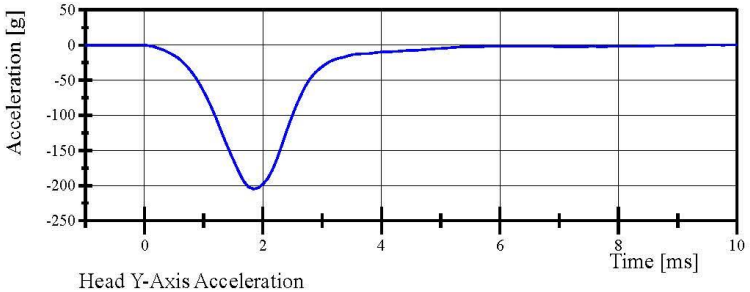
Condition: Used

Comments:
Head Skin S/N: N/A

Transportation Research Center Inc.

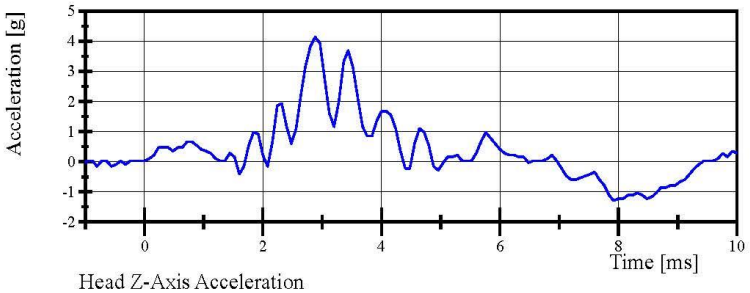
Front Head Drop
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Head X-Axis Acceleration



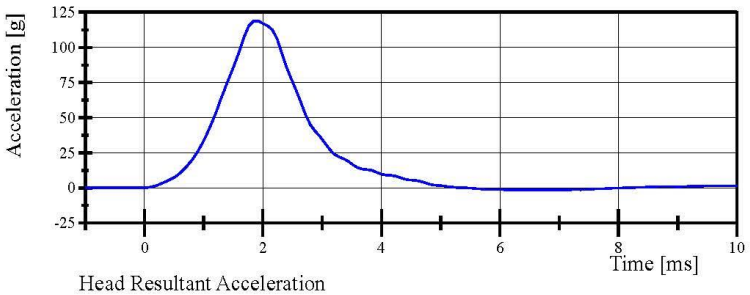
Filter Class: CFC_1000
Max: 0.3 g at 10.0 ms
Min: -204.8 g at 1.8 ms

Head Y-Axis Acceleration



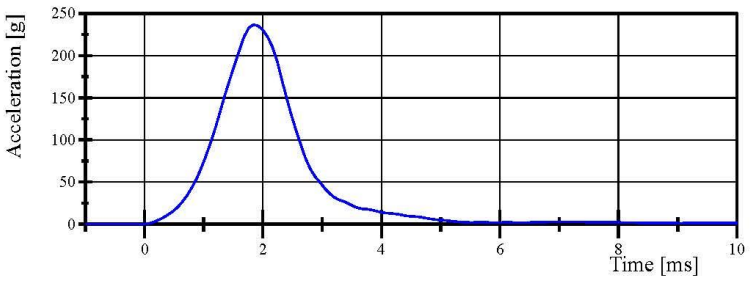
Filter Class: CFC_1000
Max: 4.1 g at 2.9 ms
Min: -1.3 g at 7.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 118.8 g at 1.8 ms
Min: -1.5 g at 6.6 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 236.8 g at 1.8 ms
Min: 0.1 g at -0.1 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.13.2021 11:35:41 614

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 73-2
Test Date: 5/13/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.909 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	39.6 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-22.53 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.46 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.22 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.22 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-70.1 °	Yes
Time of Peak	57 - 64 ms	59.3 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	118.4 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	104.24 N·m	Yes
Time of Peak	47 - 58 ms	52.1 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.7 ms	Yes

Test meets specifications.

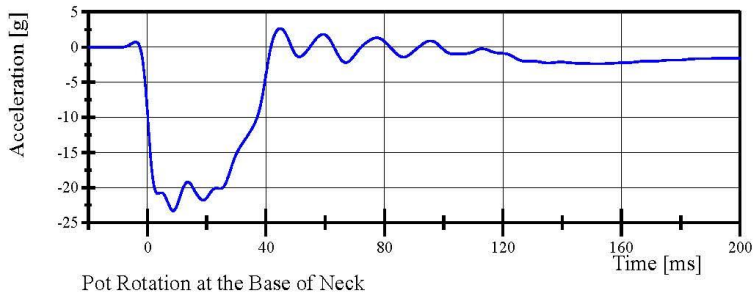
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

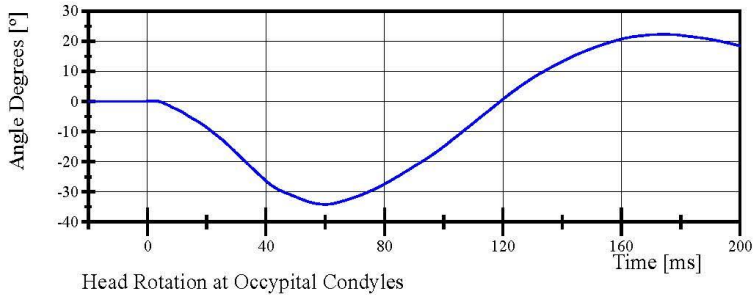
Neck Flexion
HIII 50th Serial No. 037 Certification No. 73-2
Test Date: 5/13/2021

Pendulum Acceleration



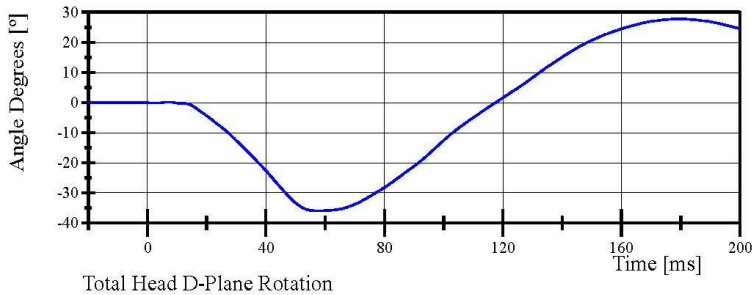
Filter Class: CFC_60
Max: 2.6 g at 44.8 ms
Min: -23.3 g at 8.7 ms

Pot Rotation at the Base of Neck



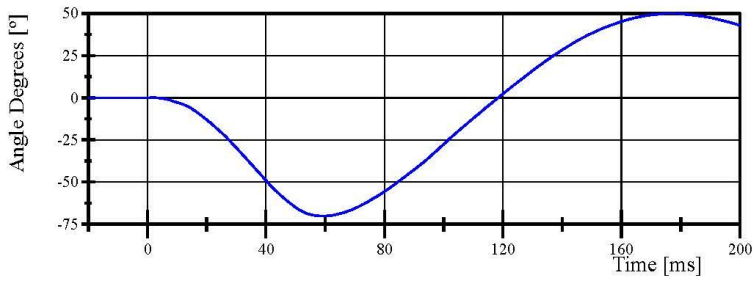
Filter Class: CFC_60
Max: 22.3 ° at 174.3 ms
Min: -34.2 ° at 60.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 27.8 ° at 179.5 ms
Min: -36.0 ° at 57.7 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 50.0 ° at 176.9 ms
Min: -70.1 ° at 59.3 ms

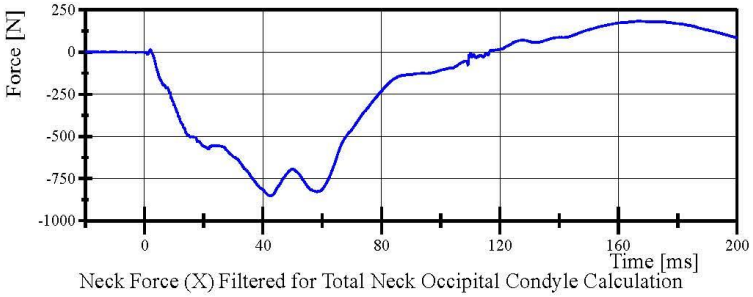
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.13.2021 13:23:33 1876

Transportation Research Center Inc.

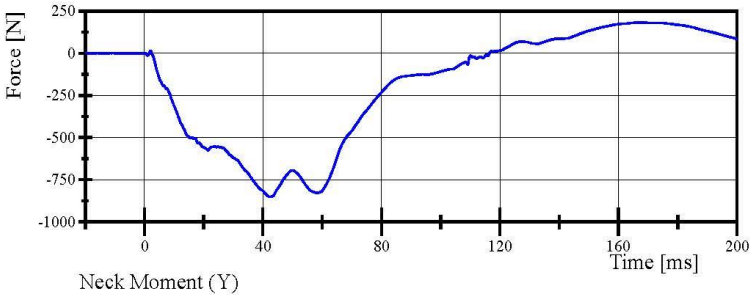
Neck Flexion
HIII 50th Serial No. 037 Certification No. 73-2
Test Date: 5/13/2021

Neck Force (X)



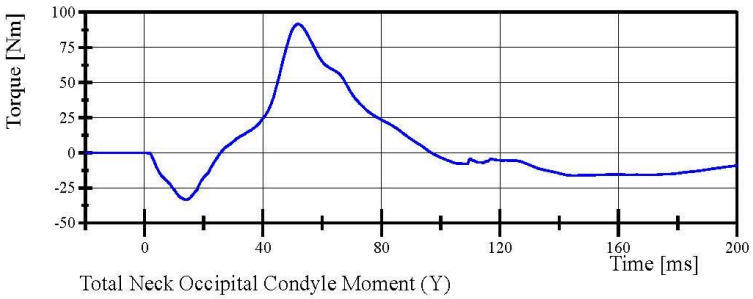
Filter Class: CFC_1000
Max: 184.5 N at 166.7 ms
Min: -852.1 N at 42.6 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



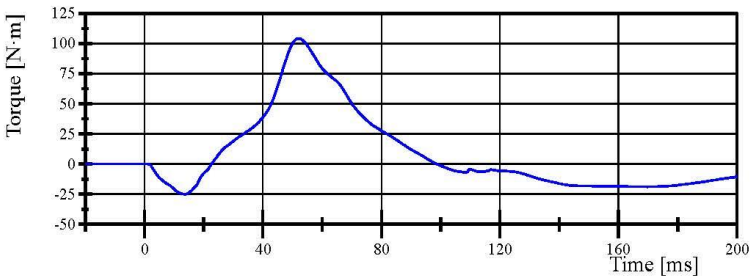
Filter Class: CFC_600
Max: 183.9 N at 166.6 ms
Min: -851.7 N at 42.6 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 91.5 Nm at 51.9 ms
Min: -33.5 Nm at 14.1 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 104.2 N·m at 52.1 ms
Min: -25.1 N·m at 13.5 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.13.2021 13:23:34 1876

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.963 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	38.5 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.52 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.68 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.54 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.66 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	96.9 °	Yes
Time of Peak	72 - 82 ms	75.9 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	159.0 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-69.52 N·m	Yes
Time of Peak	65 - 79 ms	70.6 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	140.8 ms	Yes

Test meets specifications.

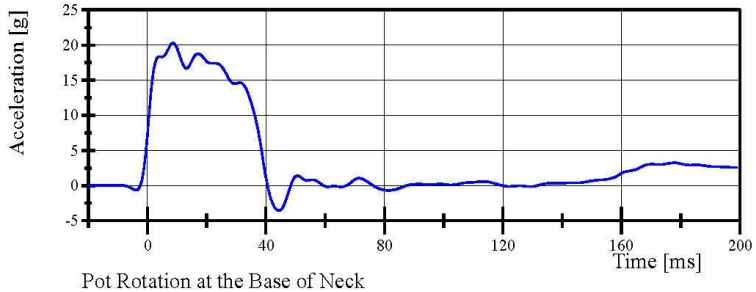
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

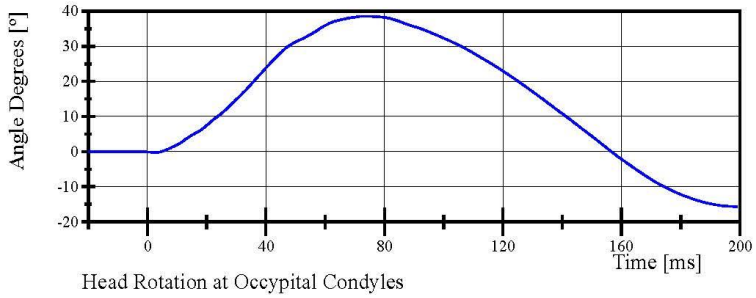
Neck Extension
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Pendulum Acceleration



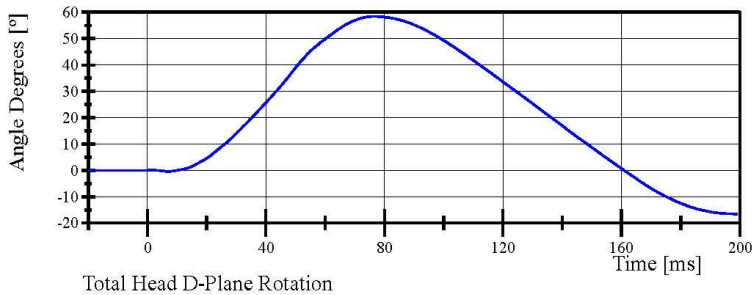
Filter Class: CFC_60
Max: 20.3 g at 8.6 ms
Min: -3.6 g at 44.4 ms

Pot Rotation at the Base of Neck



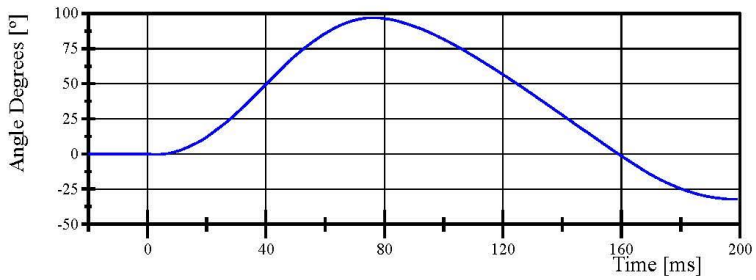
Filter Class: CFC_60
Max: 38.5 ° at 73.8 ms
Min: -15.7 ° at 199.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 58.5 ° at 76.5 ms
Min: -16.6 ° at 199.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 96.9 ° at 75.9 ms
Min: -32.2 ° at 199.0 ms

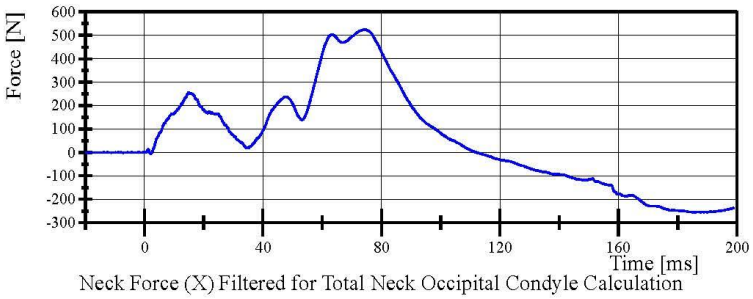
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.13.2021 13:57:45 2020

Transportation Research Center Inc.

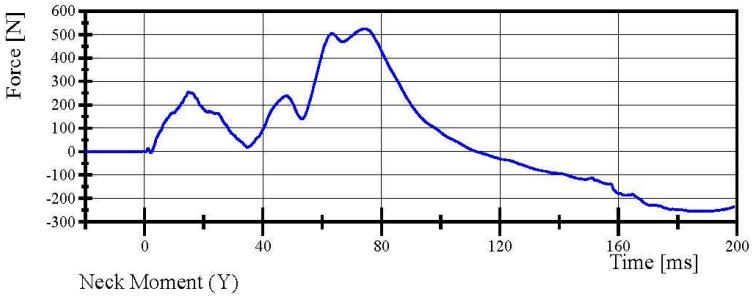
Neck Extension
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Neck Force (X)



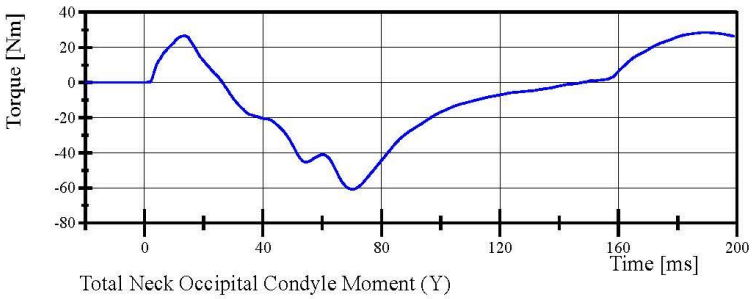
Filter Class: CFC_1000
Max: 525.1 N at 74.2 ms
Min: -255.8 N at 185.1 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



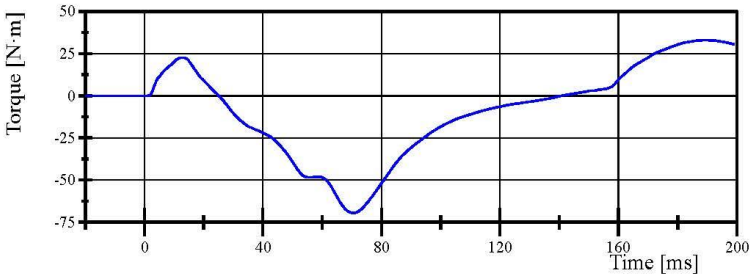
Filter Class: CFC_600
Max: 524.6 N at 74.3 ms
Min: -255.5 N at 185.1 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 28.5 Nm at 189.3 ms
Min: -60.7 Nm at 70.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 33.0 N·m at 189.3 ms
Min: -69.5 N·m at 70.6 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

05.13.2021 13:57:45 2020

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.707 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,624.1 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-71.78 mm	Yes
Internal Hysteresis	69 - 85 %	71.8 %	Yes

Test meets specifications.

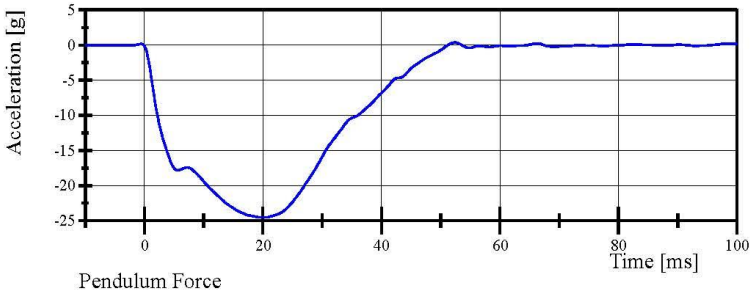
Condition: Used

Comments:
Jacket S/N: 2565
Rib Set S/N: 02033121A

Transportation Research Center Inc.

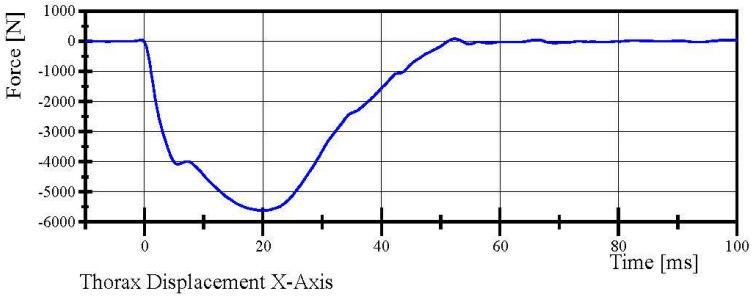
Front Thorax
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Pendulum Acceleration



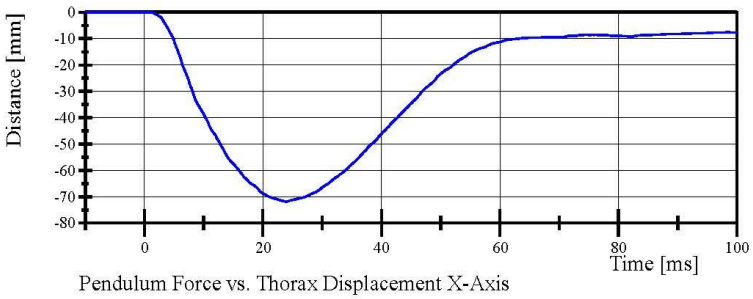
Filter Class: CFC_180
Max: 0.4 g at 52.4 ms
Min: -24.5 g at 19.8 ms

Pendulum Force



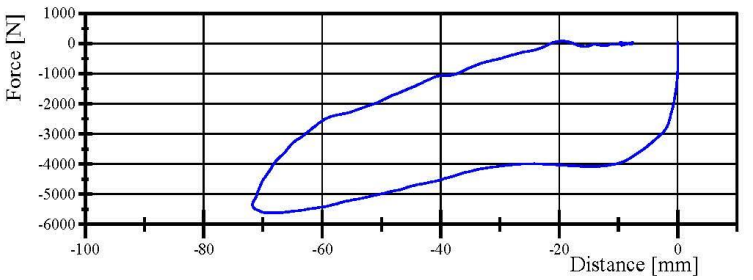
Filter Class: CFC_180
Max: 82.0 N at 52.4 ms
Min: -5,624.1 N at 19.8 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -7.4 ms
Min: -71.8 mm at 23.9 ms

Pendulum Force vs. Thorax Displacement X-Axis



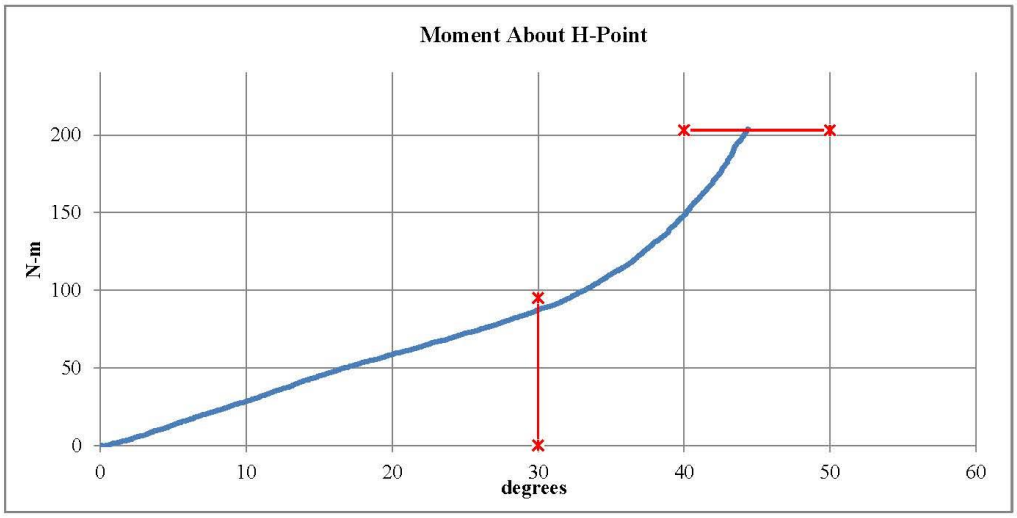
Filter Class: CFC_180
Max: 82.0 N at -19.4 mm
Min: -5,624.1 N at -68.4 mm

Transportation Research Center Inc.

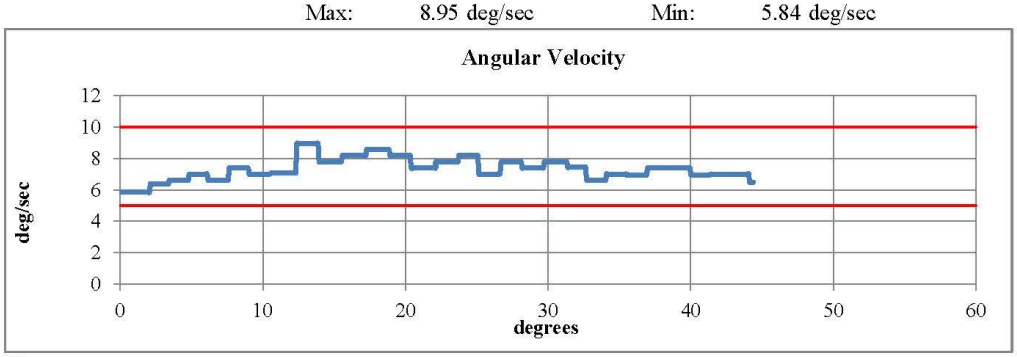
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	13-May-2021
Side Tested:	Left Hip	Time:	12:58
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.4	°C	Pass
Humidity	10	-	70	35	%	Pass
Moment at 30°	0	≤	94.9	87.7	N-m	Pass
Angle at 203 Nm	40	-	50	44.38	deg	Pass
Average Velocity	5	-	10	7.29	deg/sec	Pass



Max: 8.95 deg/sec Min: 5.84 deg/sec



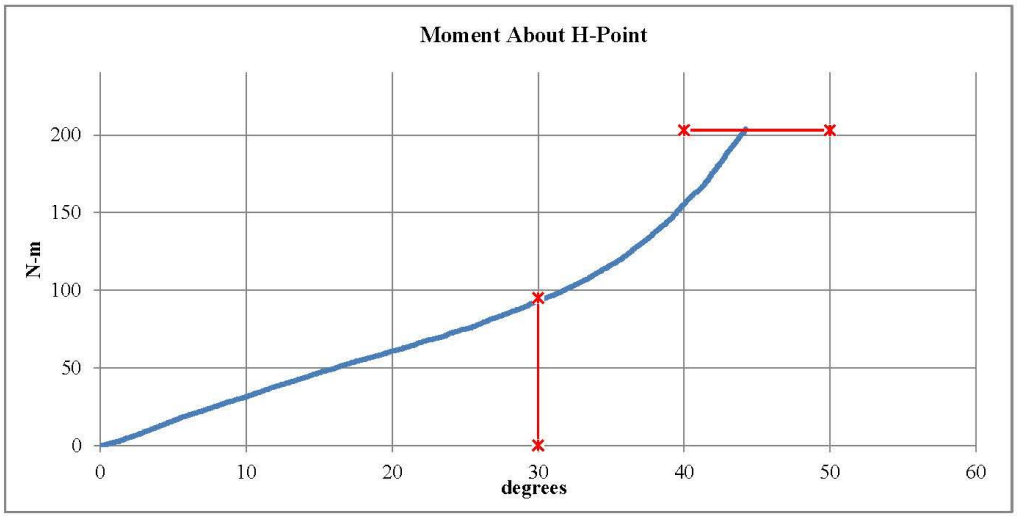
Comments:
Pelvis Skin S/N: EK3565

Transportation Research Center Inc.

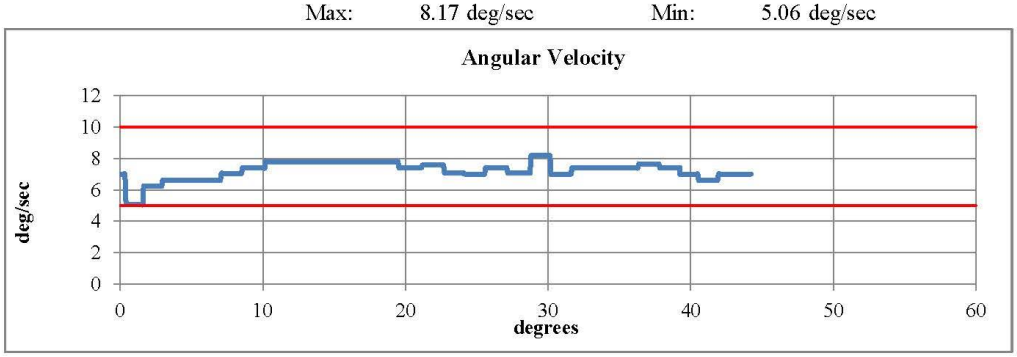
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	13-May-2021
Side Tested:	Right Hip	Time:	14:00
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.3	°C	Pass
Humidity	10	-	70	36	%	Pass
Moment at 30°	0	≤	94.9	93.66	N-m	Pass
Angle at 203 Nm	40	-	50	44.22	deg	Pass
Average Velocity	5	-	10	7.19	deg/sec	Pass



Max: 8.17 deg/sec Min: 5.06 deg/sec



Comments:
Pelvis Skin S/N: EK3565

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.104 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,592.22 N	Yes

Test meets specifications.

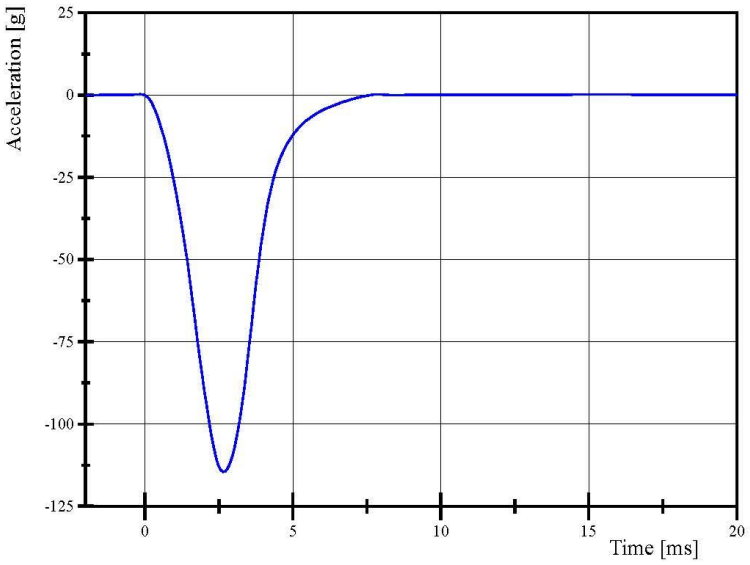
Condition: Used

Comments:
Knee Skin S/N: 2672

Transportation Research Center Inc.

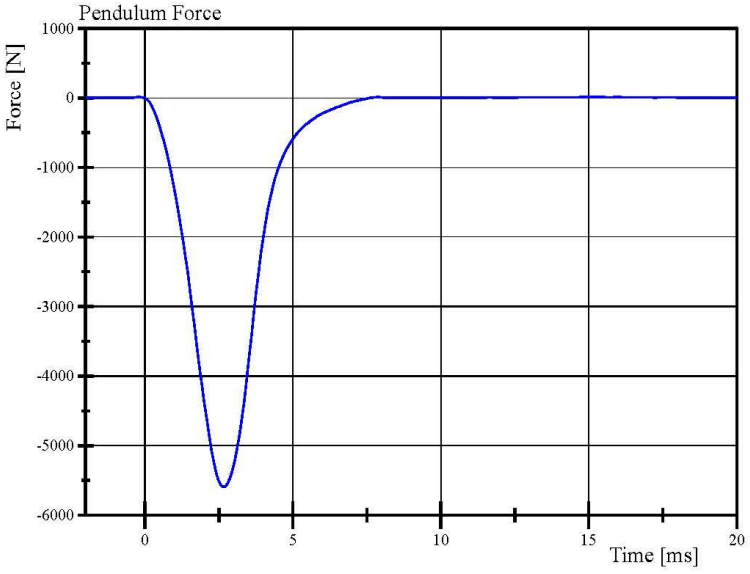
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at -0.2 ms
Min: -114.5 g at 2.6 ms

Pendulum Force



Filter Class: CFC_600
Max: 10.8 N at -0.2 ms
Min: -5,592.2 N at 2.6 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.107 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,727.17 N	Yes

Test meets specifications.

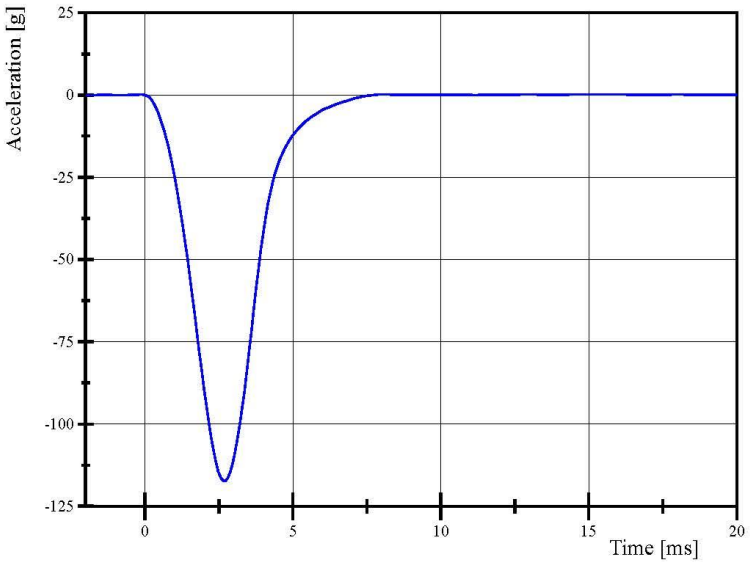
Condition: Used

Comments:
Knee Skin S/N: 1248

Transportation Research Center Inc.

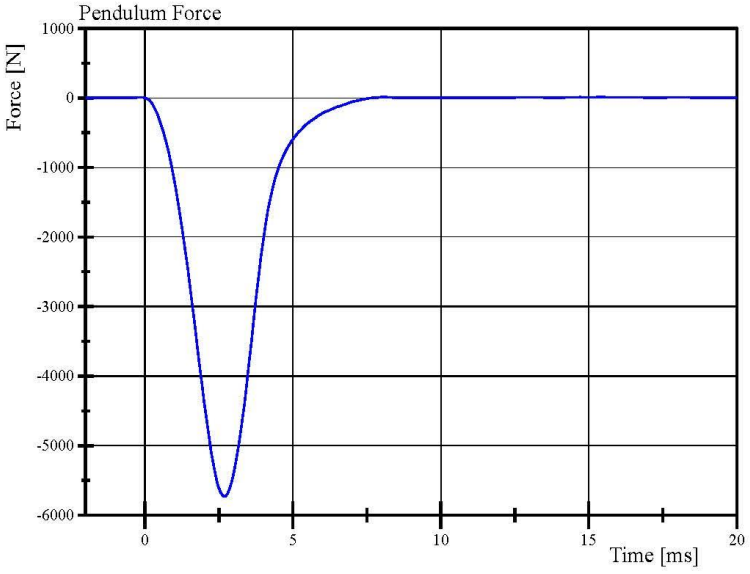
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 73-1
Test Date: 5/13/2021

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 8.1 ms
Min: -117.3 g at 2.7 ms

Pendulum Force



Filter Class: CFC_600
Max: 9.3 N at 8.1 ms
Min: -5,727.2 N at 2.7 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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Post-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 74

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	878.8 - 889.0	880	Yes
B	Shoulder Pivot Height	505.5 - 520.7	510	Yes
C	H-Point Height	83.8 - 88.9	86	Yes
D	H-Point From Seatback	134.6 - 139.7	137	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	90	Yes
F	Thigh Clearance	139.7 - 154.9	146	Yes
G	Back Of Elbow To Wrist Pivot	289.6 - 304.8	295	Yes
H	Skull Cap To Backline	40.6 - 45.7	45	Yes
I	Shoulder-Elbow Length	330.2 - 345.4	337	Yes
J	Elbow Rest Height	190.5 - 210.8	198	Yes
K	Buttock Knee Length	579.1 - 604.5	601	Yes
L	Popliteal Height	429.3 - 454.7	440	Yes
M	Knee Pivot Height	485.1 - 500.4	494	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	221	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	425	Yes
W	Foot Breadth	91.4 - 106.7	96	Yes
Y	Chest Circumference	970.3 - 1000.8	990	Yes
Z	Waist Circumference	835.7 - 866.1	865	Yes
AA	Location For Chest Circumference	429.3 - 434.3	432	Yes
BB	Location For Waist Circumference	226.1 - 231.1	229	Yes

Transportation Research Center Inc.

Front Head Drop
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	53 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	250.4 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-10.7 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	5.39 %	Yes

Test meets specifications.

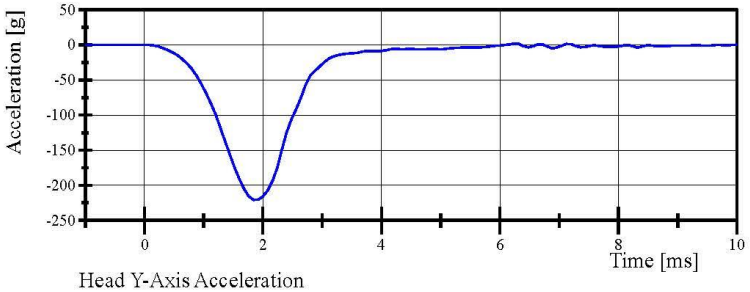
Condition: Used

Comments:
Head Skin S/N: N/A

Transportation Research Center Inc.

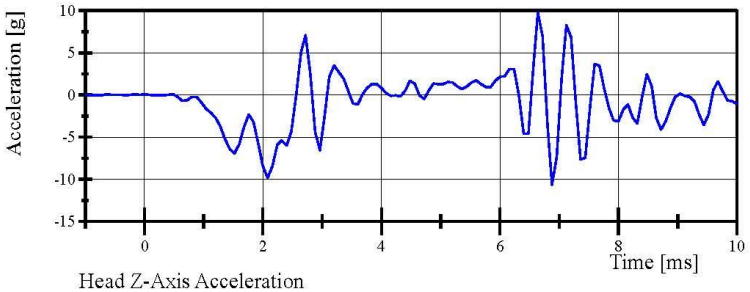
Front Head Drop
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Head X-Axis Acceleration



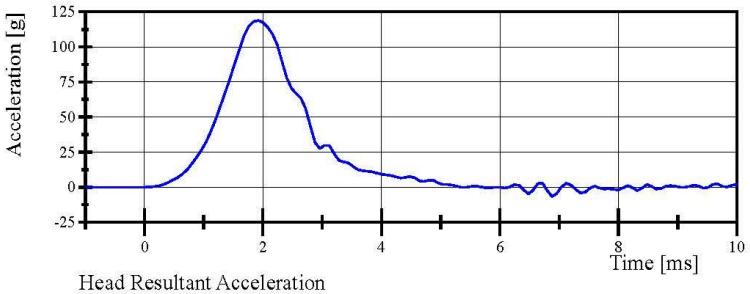
Filter Class: CFC_1000
Max: 2.0 g at 6.2 ms
Min: -220.8 g at 1.8 ms

Head Y-Axis Acceleration



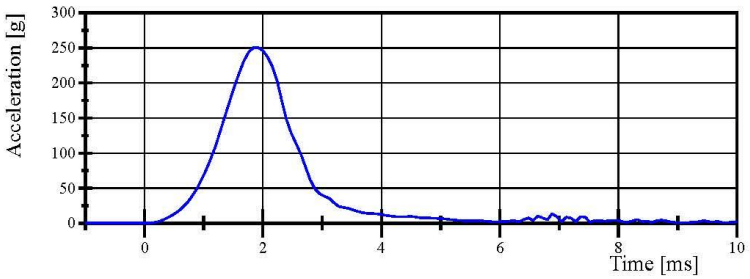
Filter Class: CFC_1000
Max: 9.8 g at 6.6 ms
Min: -10.7 g at 6.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 118.7 g at 1.9 ms
Min: -6.7 g at 6.9 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 250.4 g at 1.9 ms
Min: 0.0 g at -0.1 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.903 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	36.4 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-24.79 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.38 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-16.87 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-16.87 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-68.9 °	Yes
Time of Peak	57 - 64 ms	59.4 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	119.7 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	100.10 N·m	Yes
Time of Peak	47 - 58 ms	50.5 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.2 ms	Yes

Test meets specifications.

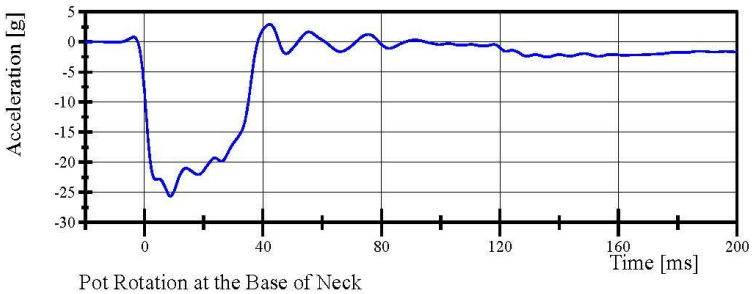
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

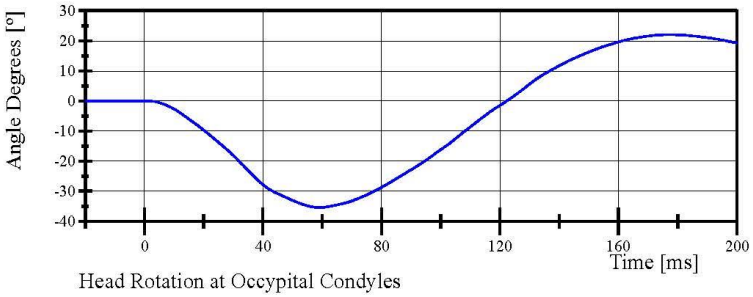
Neck Flexion
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Pendulum Acceleration



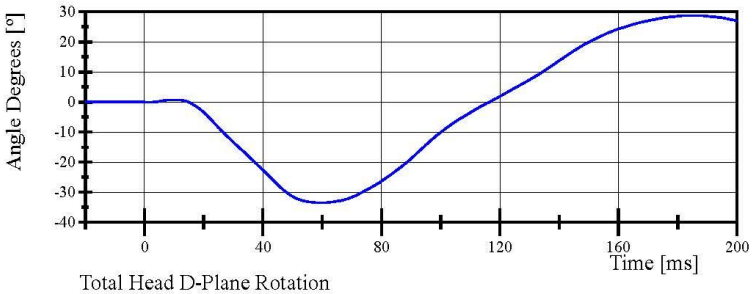
Filter Class: CFC_60
Max: 2.9 g at 42.3 ms
Min: -25.6 g at 8.8 ms

Pot Rotation at the Base of Neck



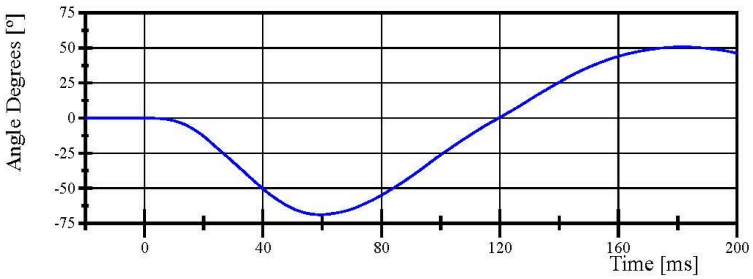
Filter Class: CFC_60
Max: 22.0 ° at 177.3 ms
Min: -35.4 ° at 59.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 28.7 ° at 185.1 ms
Min: -33.5 ° at 59.8 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 50.5 ° at 181.8 ms
Min: -68.9 ° at 59.4 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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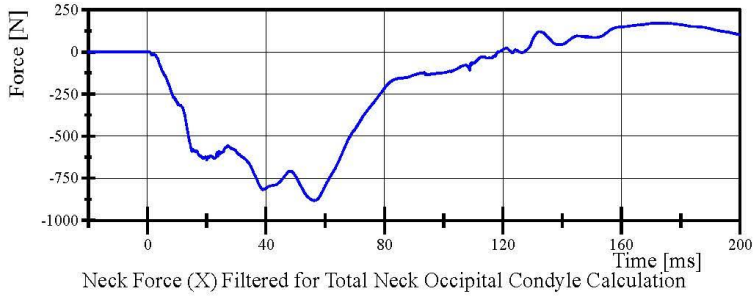
Transportation Research Center Inc.

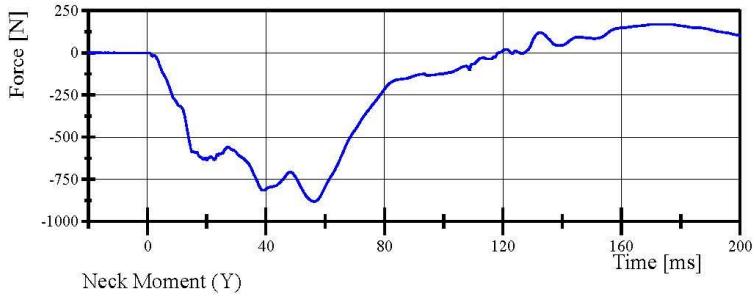
Neck Flexion
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Neck Force (X)



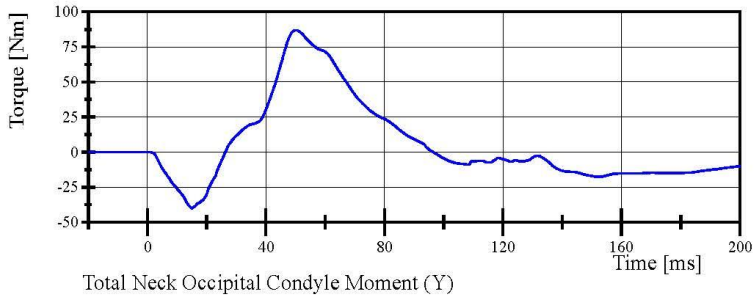
Filter Class: CFC_1000
Max: 170.9 N at 172.2 ms
Min: -882.3 N at 56.2 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



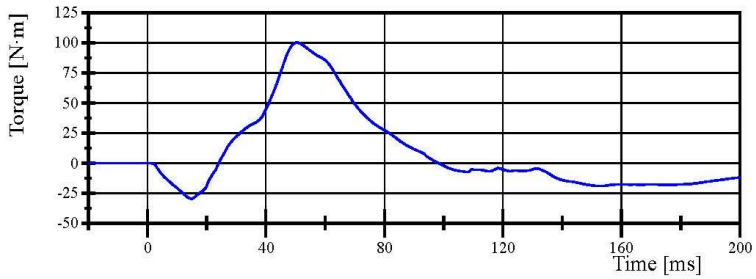
Filter Class: CFC_600
Max: 170.5 N at 174.6 ms
Min: -882.0 N at 56.2 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 86.9 Nm at 50.1 ms
Min: -39.9 Nm at 15.0 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 100.1 N·m at 50.5 ms
Min: -29.5 N·m at 15.0 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

06.10.2021 13:12:16 1871

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 74-2
Test Date: 6/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.951 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	41.8 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.31 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.82 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.09 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.09 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	95.8 °	Yes
Time of Peak	72 - 82 ms	79.0 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	159.1 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-66.25 N·m	Yes
Time of Peak	65 - 79 ms	72.4 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	145.2 ms	Yes

Test meets specifications.

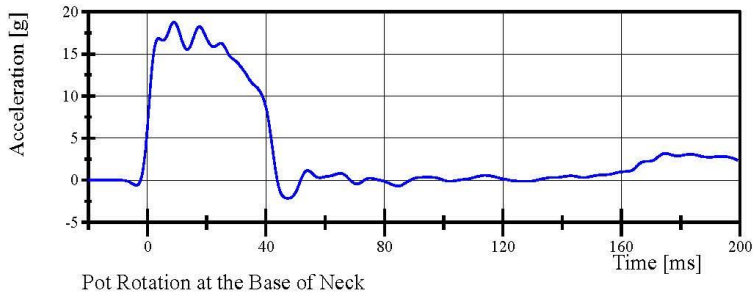
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

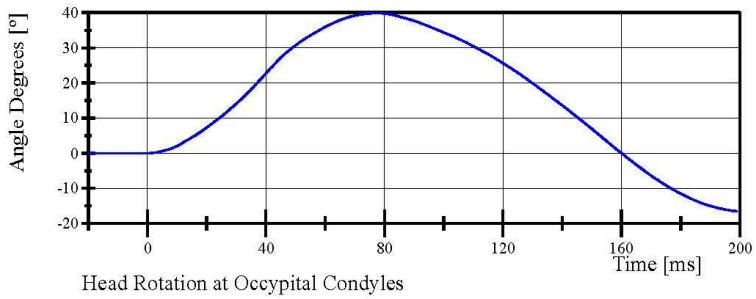
Neck Extension
HIII 50th Serial No. 037 Certification No. 74-2
Test Date: 6/10/2021

Pendulum Acceleration



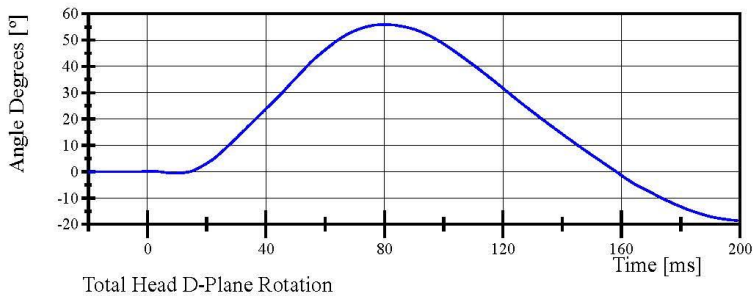
Filter Class: CFC_60
Max: 18.8 g at 9.0 ms
Min: -2.1 g at 47.4 ms

Pot Rotation at the Base of Neck



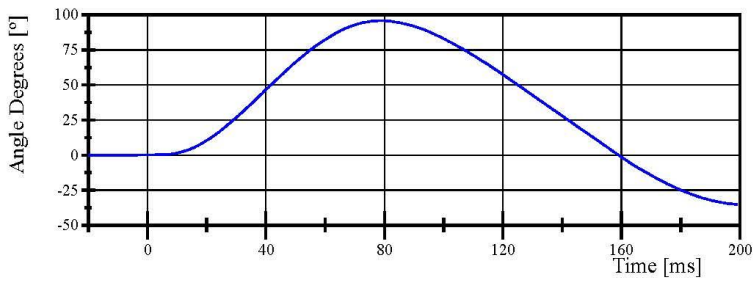
Filter Class: CFC_60
Max: 39.9 ° at 77.7 ms
Min: -16.6 ° at 199.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 55.9 ° at 79.9 ms
Min: -18.6 ° at 199.2 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 95.8 ° at 79.0 ms
Min: -35.2 ° at 199.2 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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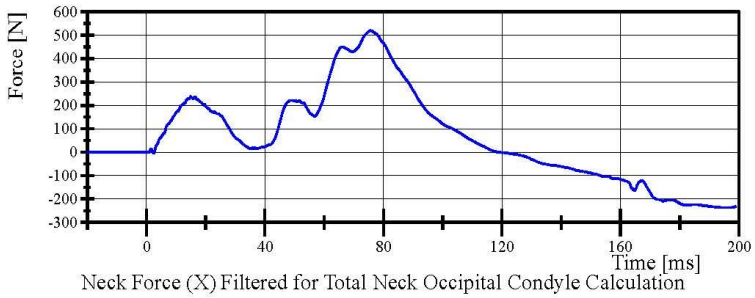
Transportation Research Center Inc.

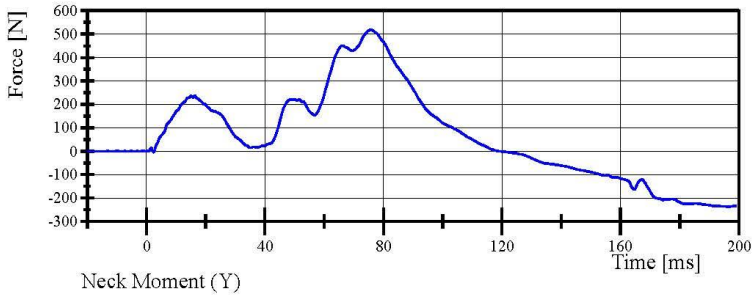
Neck Extension
HIII 50th Serial No. 037 Certification No. 74-2
Test Date: 6/10/2021

Neck Force (X)



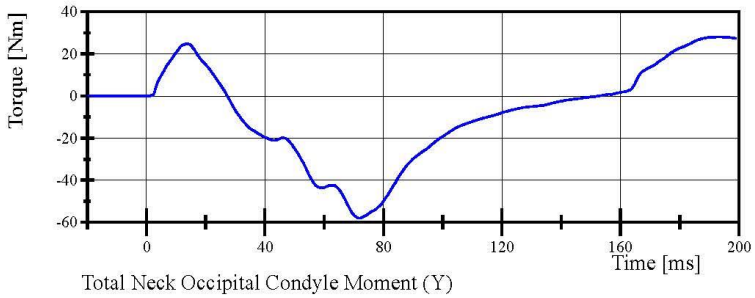
Filter Class: CFC_1000
Max: 519.7 N at 75.5 ms
Min: -237.2 N at 195.9 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



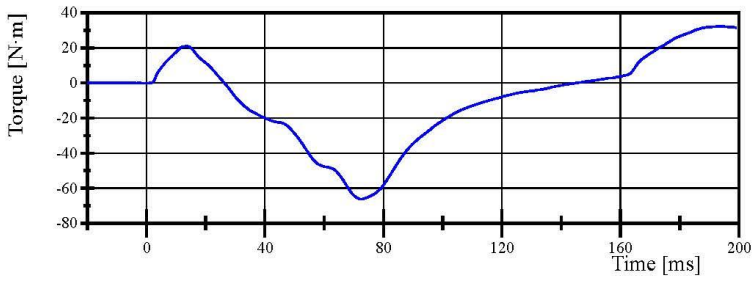
Filter Class: CFC_600
Max: 519.5 N at 75.6 ms
Min: -236.7 N at 196.8 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 28.0 Nm at 193.2 ms
Min: -58.1 Nm at 72.0 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 32.2 N·m at 193.9 ms
Min: -66.3 N·m at 72.4 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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Report Number: 037_H3F74

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Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 74-2
Test Date: 6/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.602 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,234.4 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-72.47 mm	Yes
Internal Hysteresis	69 - 85 %	69.4 %	Yes

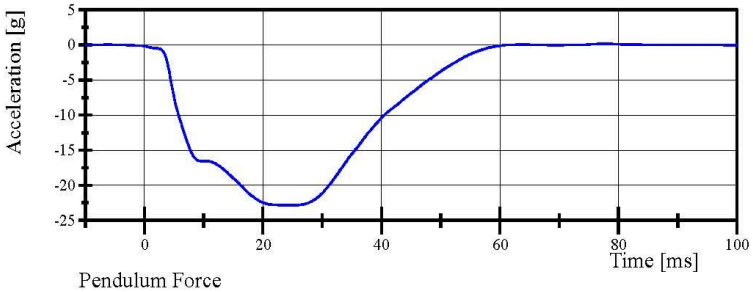
Test meets specifications.

Condition: Used
Comments:
Jacket S/N: 2565
Rib Set S/N: 02033121A

Transportation Research Center Inc.

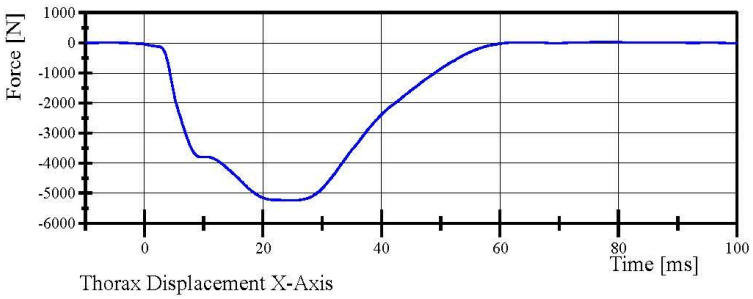
Front Thorax
HIII 50th Serial No. 037 Certification No. 74-2
Test Date: 6/10/2021

Pendulum Acceleration



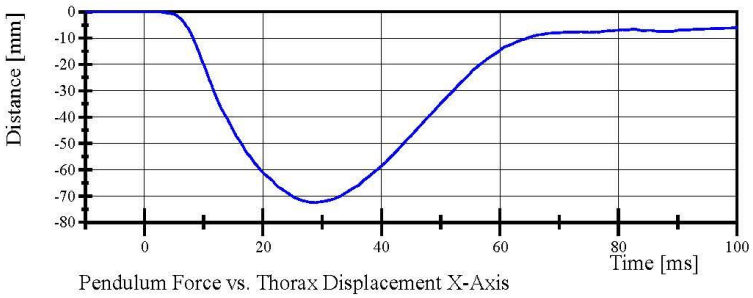
Filter Class: CFC_180
Max: 0.1 g at 77.0 ms
Min: -22.8 g at 25.4 ms

Pendulum Force



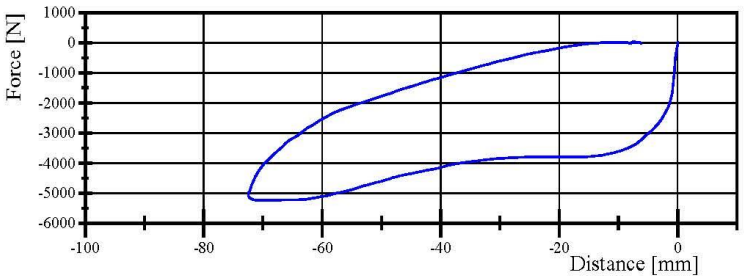
Filter Class: CFC_180
Max: 29.4 N at 77.0 ms
Min: -5,234.4 N at 25.4 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -5.4 ms
Min: -72.5 mm at 28.8 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 29.4 N at -7.6 mm
Min: -5,234.4 N at -70.6 mm

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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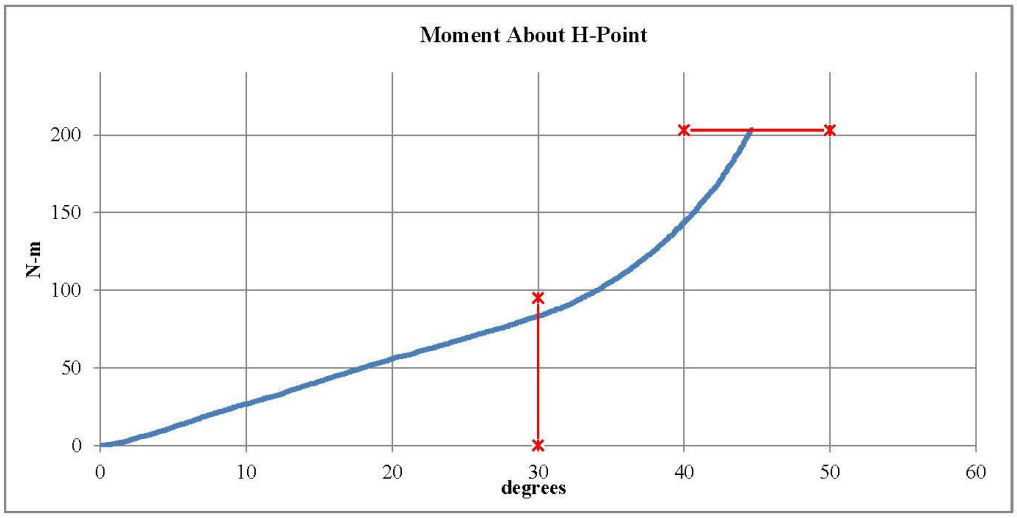
Transportation Research Center Inc.

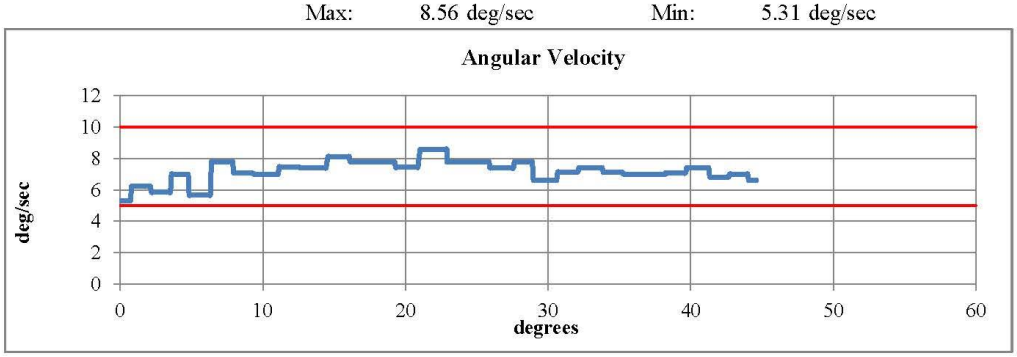
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	10-Jun-2021
Side Tested:	Left Hip	Time:	11:39
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	20.8	°C	Pass
Humidity	10	-	70	54	%	Pass
Moment at 30°	0	≤	94.9	83.44	N-m	Pass
Angle at 203 Nm	40	-	50	44.61	deg	Pass
Average Velocity	5	-	10	7.18	deg/sec	Pass



Max: 8.56 deg/sec Min: 5.31 deg/sec



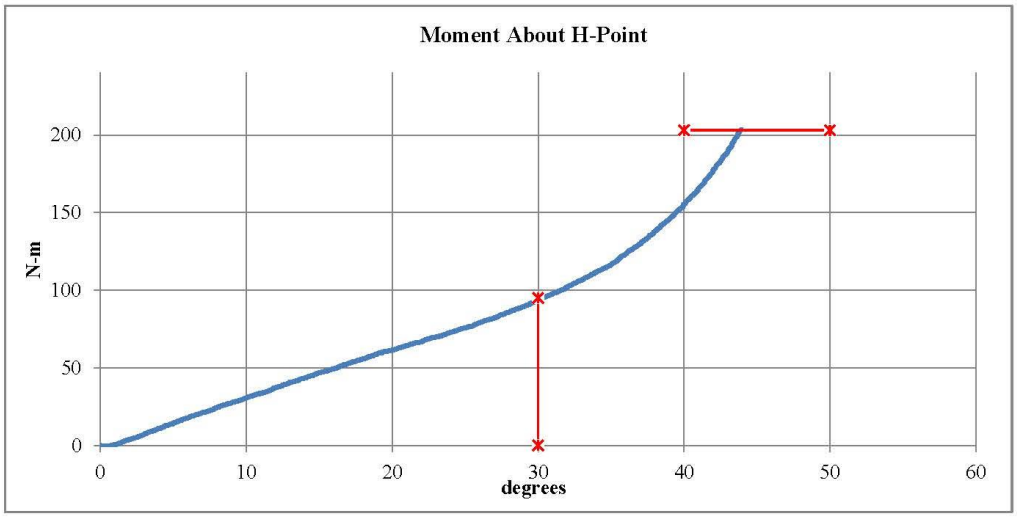
Comments:
Pelvis Skin S/N: EK3565

Transportation Research Center Inc.

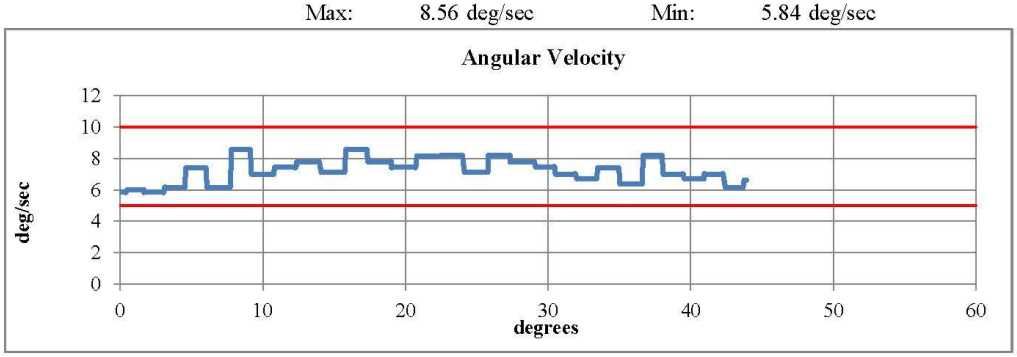
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	10-Jun-2021
Side Tested:	Right Hip	Time:	12:43
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.1	°C	Pass
Humidity	10	-	70	49	%	Pass
Moment at 30°	0	≤	94.9	93.94	N-m	Pass
Angle at 203 Nm	40	-	50	43.91	deg	Pass
Average Velocity	5	-	10	7.22	deg/sec	Pass



Max: 8.56 deg/sec Min: 5.84 deg/sec



Comments:
Pelvis Skin S/N: EK3565

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.104 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,559.63 N	Yes

Test meets specifications.

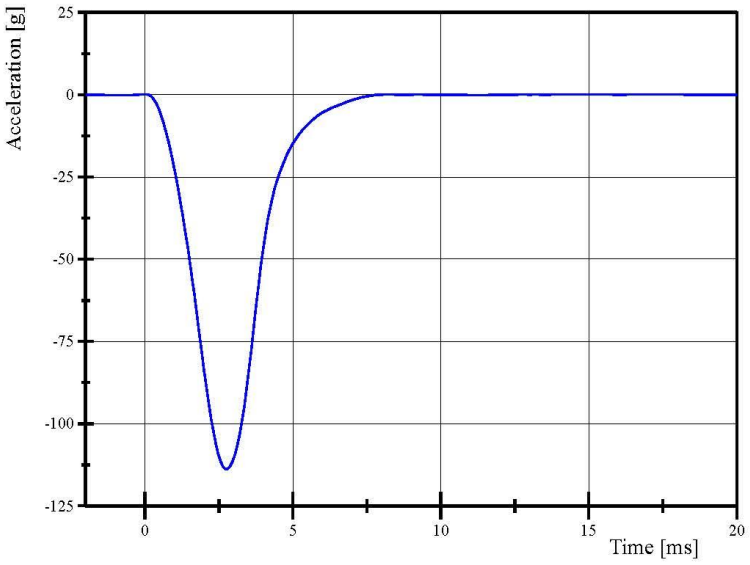
Condition: Used

Comments:
Knee Skin S/N: 2672

Transportation Research Center Inc.

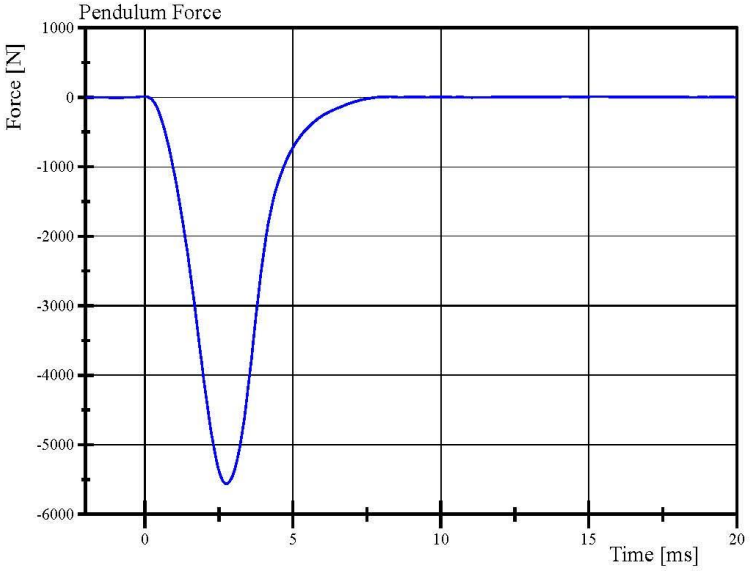
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 0.0 ms
Min: -113.8 g at 2.7 ms

Pendulum Force



Filter Class: CFC_600
Max: 8.5 N at 0.0 ms
Min: -5,559.6 N at 2.7 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.104 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,582.43 N	Yes

Test meets specifications.

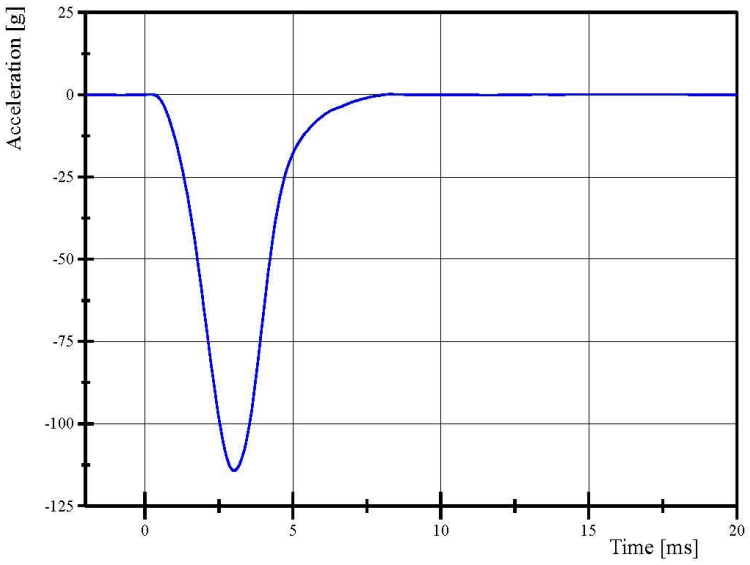
Condition: Used

Comments:
Knee Skin S/N: 1248

Transportation Research Center Inc.

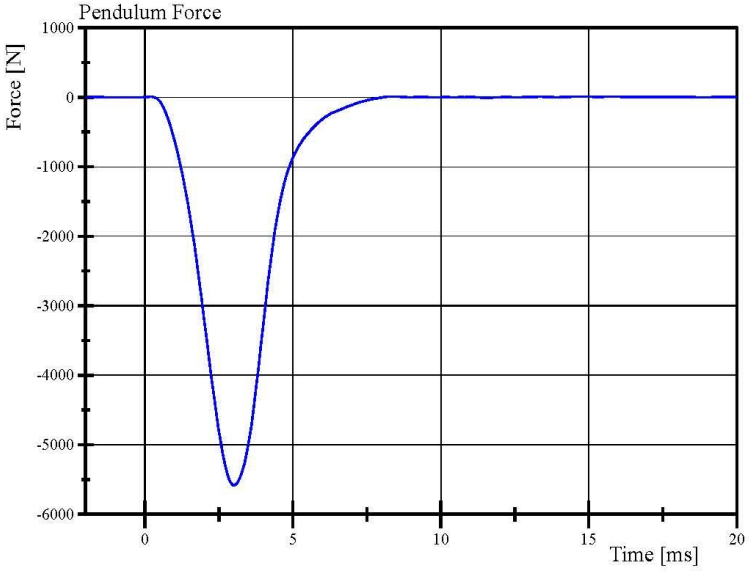
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 74-1
Test Date: 6/10/2021

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 8.3 ms
Min: -114.3 g at 3.0 ms

Pendulum Force



Filter Class: CFC_600
Max: 10.6 N at 8.3 ms
Min: -5,582.4 N at 3.0 ms

Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

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Pre-Test Calibration Sheets

Front Passenger S/N EB7513

Transportation Research Center Inc.
572O HIII 5th Dummy
External Dimensions
Serial No. EB7513 Calibration No. 16

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	780	Yes
B	Shoulder Pivot Height	431.8 - 457.2	445	Yes
C	Hip Pivot Height	81.3 - 86.3	85	Yes
D	Hip Pivot from Backline	144.8 - 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	80	Yes
F	Thigh Clearance	119.4 - 134.6	131	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	249	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	286	Yes
J	Elbow Rest Height	182.8 - 203.2	198	Yes
K	Buttock Knee Length	520.7 - 546.1	533	Yes
L	Popliteal Height	355.6 - 376.0	359	Yes
M	Knee Pivot Height	393.7 - 419.1	409	Yes
N	Buttock Popliteal Length	414.0 - 439.4	430	Yes
O	Chest Depth without Jacket	175.3 - 190.5	183	Yes
P	Foot Length	218.5 - 233.7	225	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	141	Yes
T	Head Depth	177.8 - 188.0	180	Yes
U	Hip Breadth	299.7 - 314.9	306	Yes
V	Shoulder Breadth	350.5 - 365.7	356	Yes
W	Foot Breadth	78.8 - 94.0	85	Yes
X	Head Circumference	528.3 - 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	867	Yes
Z	Waist Circumference	759.5 - 789.9	775	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	345	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	165	Yes

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. EB7513 Certification No. 16-1
Test Date: 5/13/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	253.0 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.8 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.30 %	Yes

Test meets specifications.

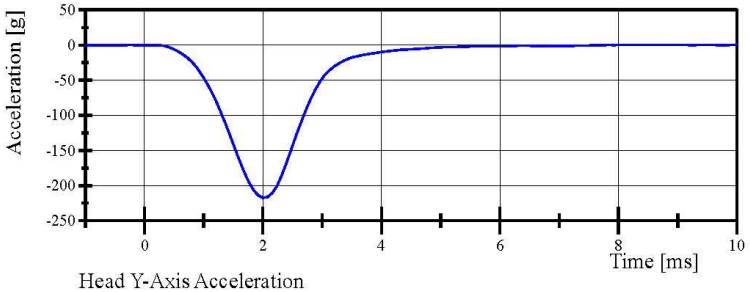
Condition: Used

Comments:
Head Skin S/N: EA8751

Transportation Research Center Inc.

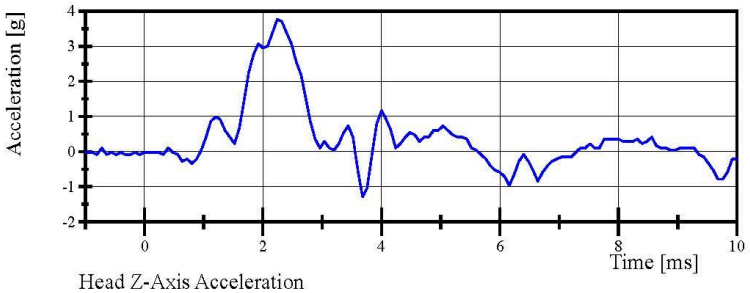
Front Head Drop
HIII 5th Serial No. EB7513 Certification No. 16-1
Test Date: 5/13/2021

Head X-Axis Acceleration



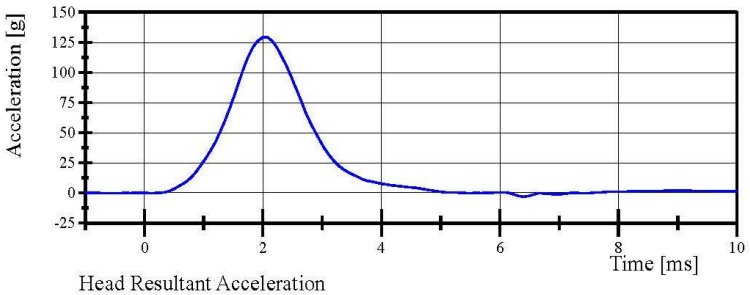
Filter Class: CFC_1000
Max: 0.6 g at 10.0 ms
Min: -217.5 g at 2.0 ms

Head Y-Axis Acceleration



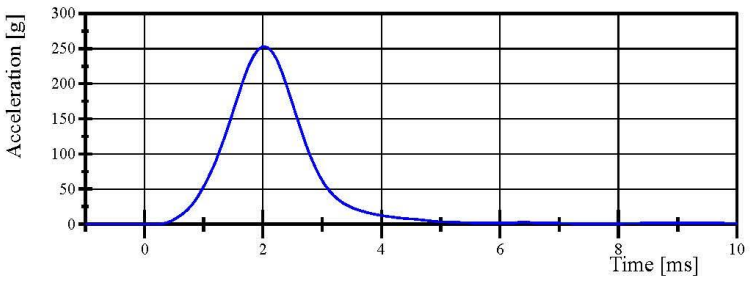
Filter Class: CFC_1000
Max: 3.8 g at 2.2 ms
Min: -1.3 g at 3.7 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 129.3 g at 2.0 ms
Min: -3.2 g at 6.4 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 253.0 g at 2.0 ms
Min: 0.0 g at -1.0 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 16-2
Test Date: 5/13/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.062 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.22 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.41 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.36 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-86.6 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	74.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	90.1 ms	Yes

Test meets specifications.

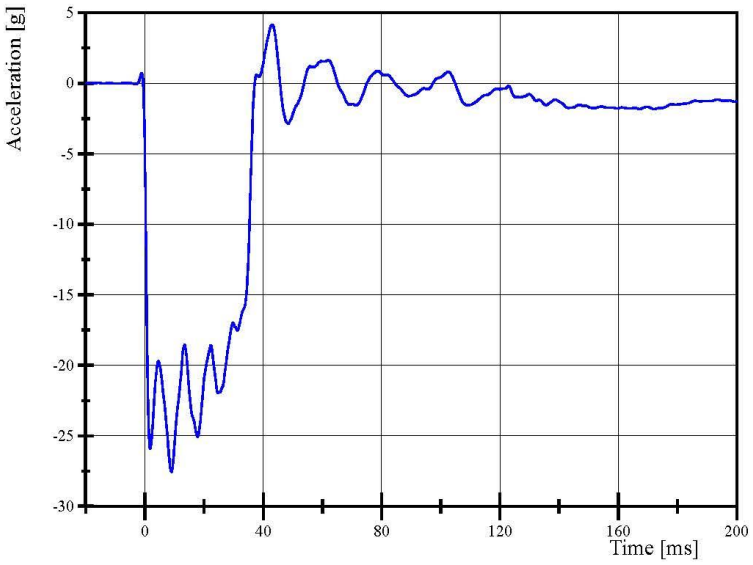
Condition: Used

Comments:
Neck S/N: EB6930

Transportation Research Center Inc.

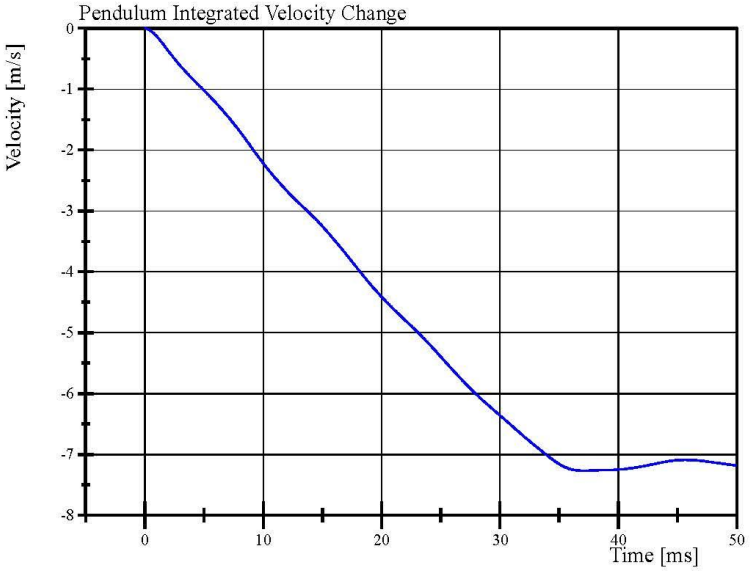
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 16-2
Test Date: 5/13/2021

Pendulum Acceleration



Filter Class: CFC_180
Max: 4.2 g at 43.1 ms
Min: -27.5 g at 9.0 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.3 m/s at 37.2 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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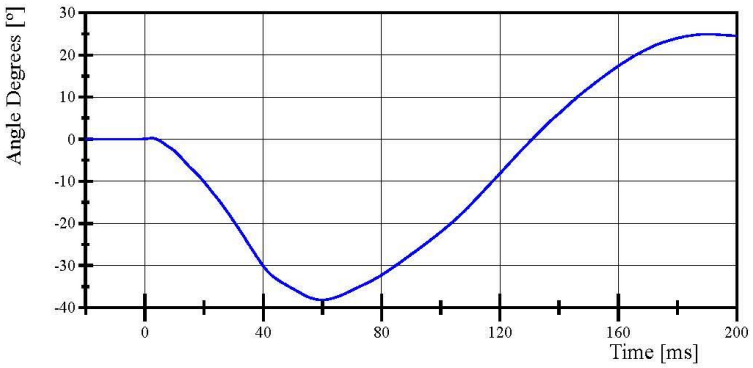
Transportation Research Center Inc.

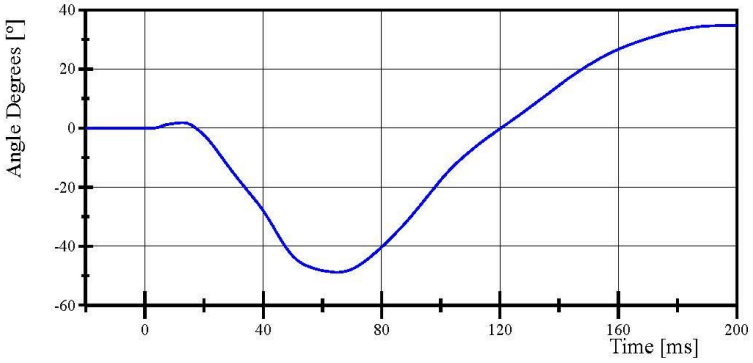
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 16-2
Test Date: 5/13/2021

Pot Rotation at the Base of Neck



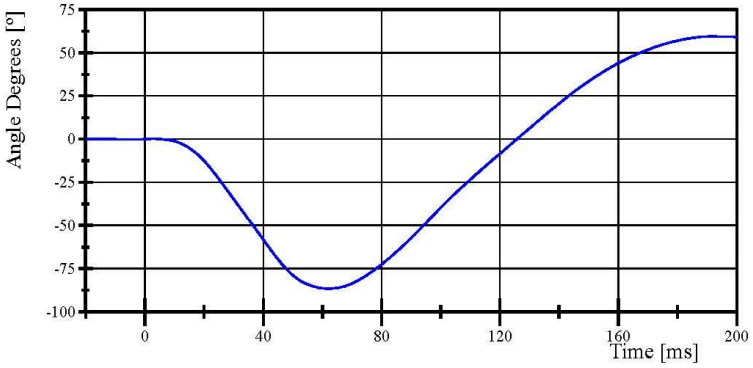
Filter Class: CFC_60
Max: 25.0 ° at 190.5 ms
Min: -38.1 ° at 59.9 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 34.8 ° at 196.8 ms
Min: -48.8 ° at 64.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 59.6 ° at 191.6 ms
Min: -86.6 ° at 62.1 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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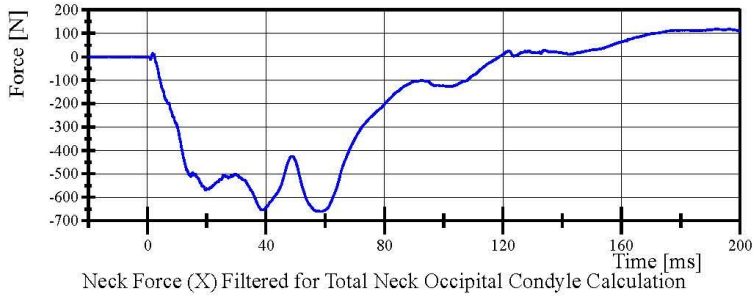
Transportation Research Center Inc.

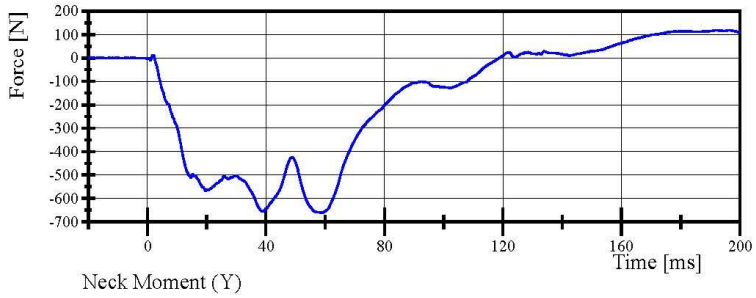
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 16-2
Test Date: 5/13/2021

Neck Force (X)



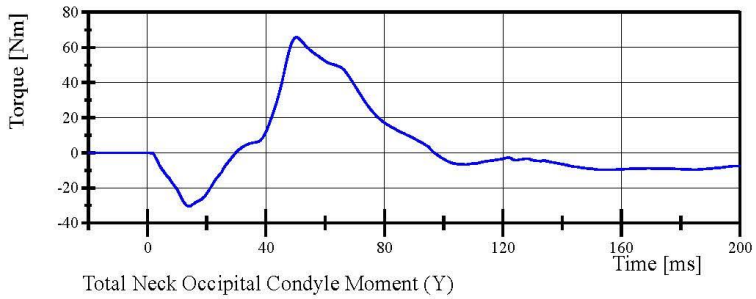
Filter Class: CFC_1000
Max: 119.3 N at 191.8 ms
Min: -661.2 N at 59.0 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



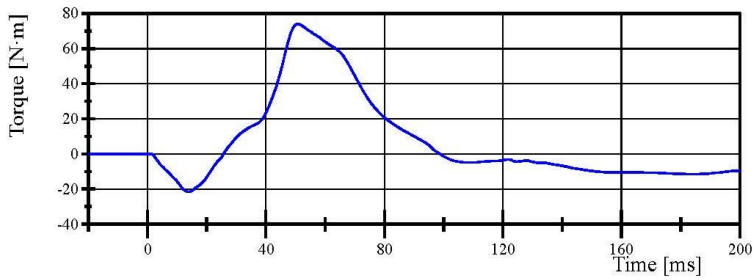
Filter Class: CFC_600
Max: 118.8 N at 191.8 ms
Min: -660.8 N at 58.9 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 65.7 Nm at 50.3 ms
Min: -30.4 Nm at 14.0 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 74.0 N·m at 50.7 ms
Min: -21.6 N·m at 13.8 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.13.2021 15:16:33 1853

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. EB7513 Certification No. 16-2
Test Date: 5/14/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.042 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.71 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.50 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.13 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	113.7 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-58.5 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	105.5 ms	Yes

Test meets specifications.

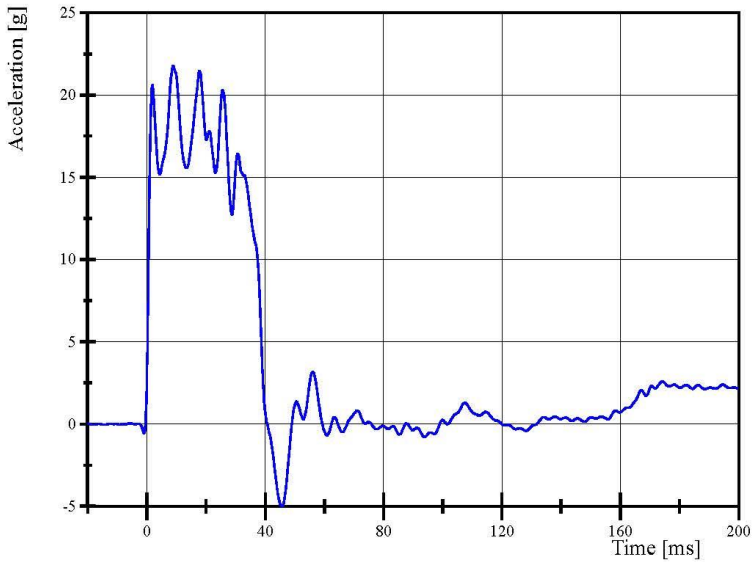
Condition: Used

Comments:
Neck S/N: EB6930

Transportation Research Center Inc.

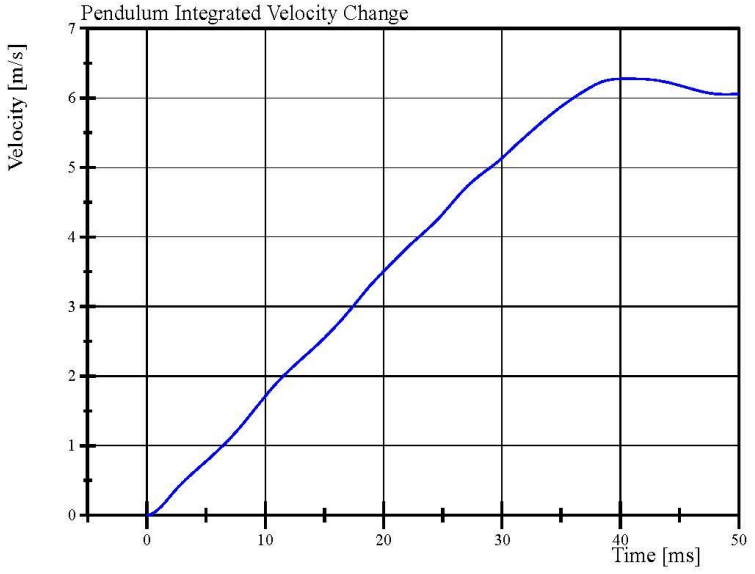
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 16-2
Test Date: 5/14/2021

Pendulum Acceleration



Filter Class: CFC_180
Max: 21.8 g at 8.9 ms
Min: -5.0 g at 45.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.3 m/s at 40.7 ms
Min: 0.0 m/s at 0.0 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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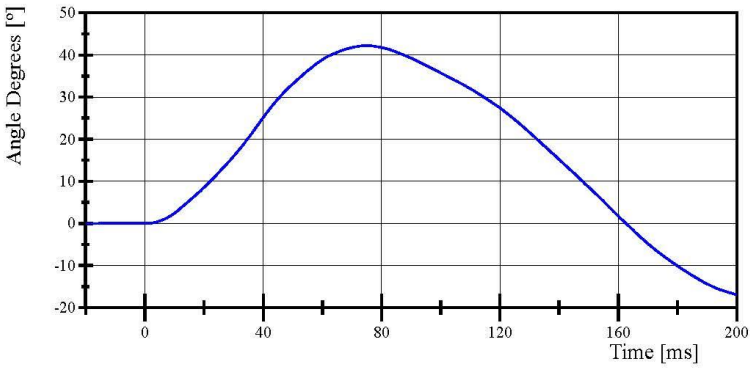
Transportation Research Center Inc.

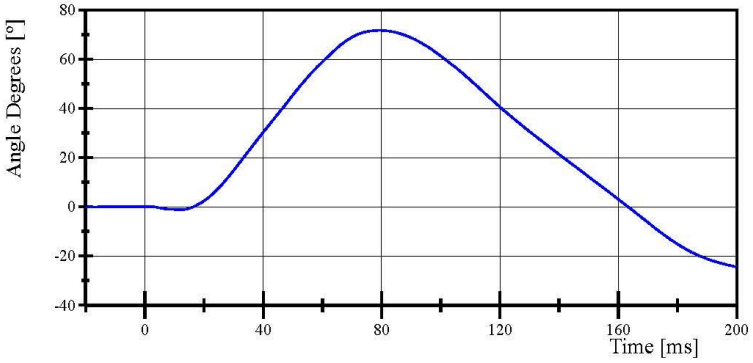
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 16-2
Test Date: 5/14/2021

Pot Rotation at the Base of Neck



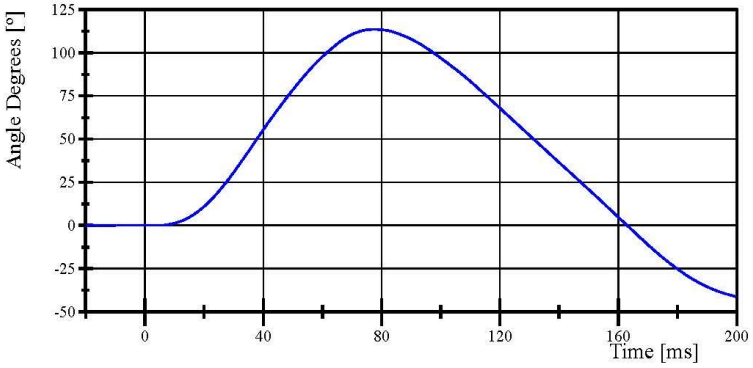
Filter Class: CFC_60
Max: 42.2 ° at 75.0 ms
Min: -16.9 ° at 199.8 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 71.7 ° at 79.4 ms
Min: -24.4 ° at 199.8 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 113.7 ° at 77.6 ms
Min: -41.3 ° at 199.8 ms

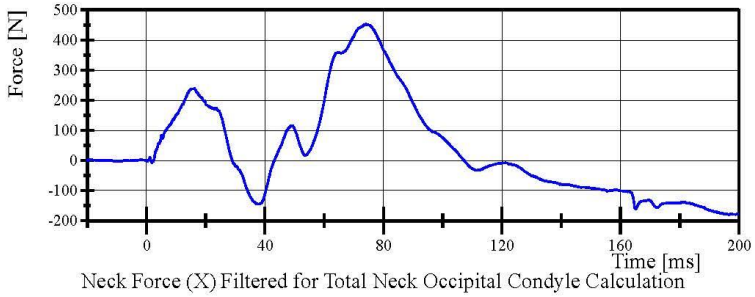
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.14.2021 09:23:25 2005

Transportation Research Center Inc.

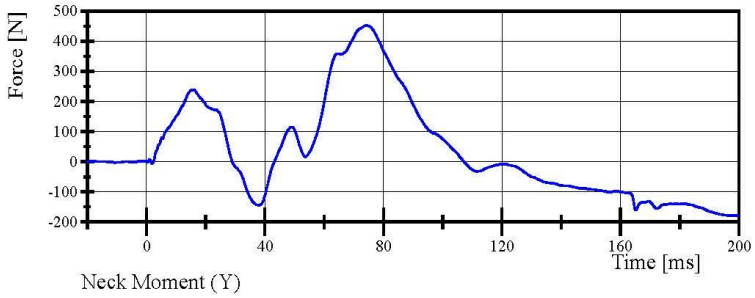
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 16-2
Test Date: 5/14/2021

Neck Force (X)



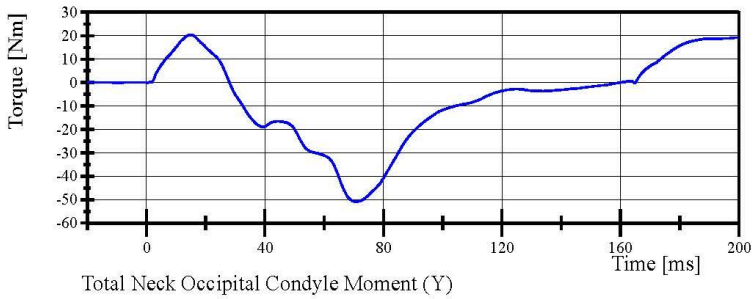
Filter Class: CFC_1000
Max: 453.4 N at 74.2 ms
Min: -179.5 N at 196.9 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



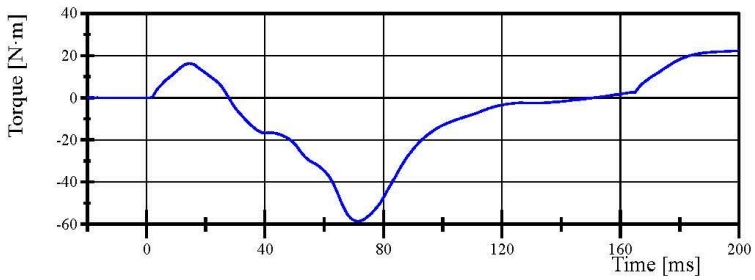
Filter Class: CFC_600
Max: 452.5 N at 74.2 ms
Min: -179.0 N at 198.9 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 20.4 Nm at 14.9 ms
Min: -50.9 Nm at 70.9 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 22.3 N·m at 199.8 ms
Min: -58.5 N·m at 71.1 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.14.2021 09:23:25 2005

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. EB7513 Certification No. 16-1
Test Date: 5/17/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	48 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.803 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,351.8 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,412.9 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-51.9 mm	Yes
Internal Hysteresis	69 - 85 %	76.1 %	Yes

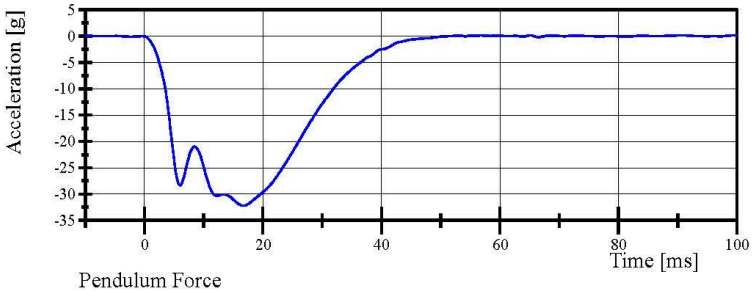
Test meets specifications.

Condition: Used
Comments:
Jacket S/N: DZ8735
Rib Set S/N: EB7630

Transportation Research Center Inc.

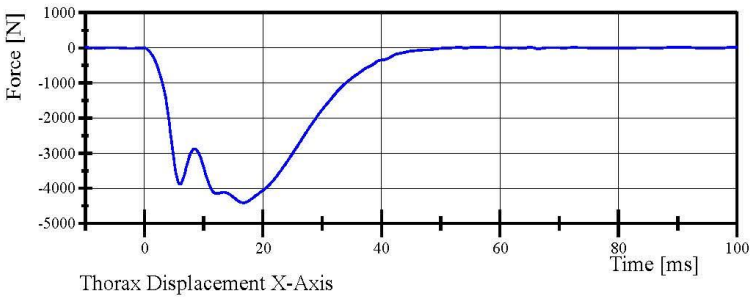
Front Thorax
HIII 5th Serial No. EB7513 Certification No. 16-1
Test Date: 5/17/2021

Pendulum Acceleration



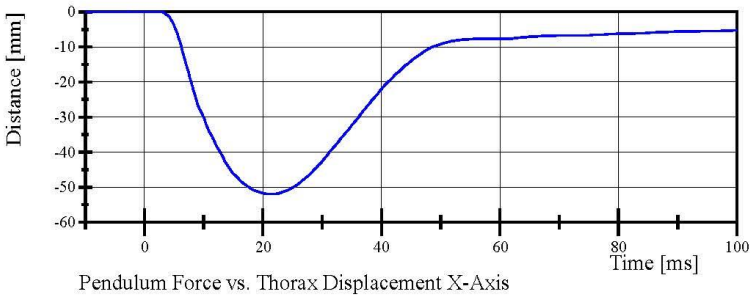
Filter Class: CFC_180
Max: 0.2 g at 90.6 ms
Min: -32.2 g at 16.7 ms

Pendulum Force



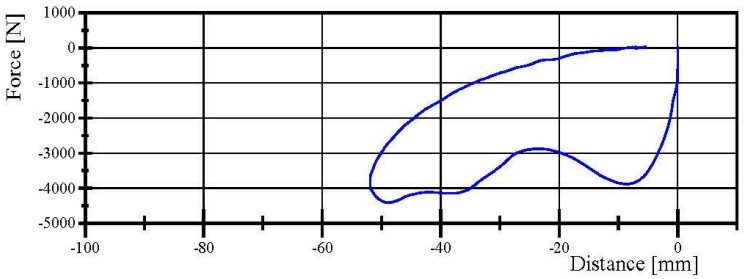
Filter Class: CFC_180
Max: 22.1 N at 90.6 ms
Min: -4,412.9 N at 16.7 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -2.6 ms
Min: -51.9 mm at 21.0 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 22.1 N at -5.6 mm
Min: -4,412.9 N at -48.9 mm

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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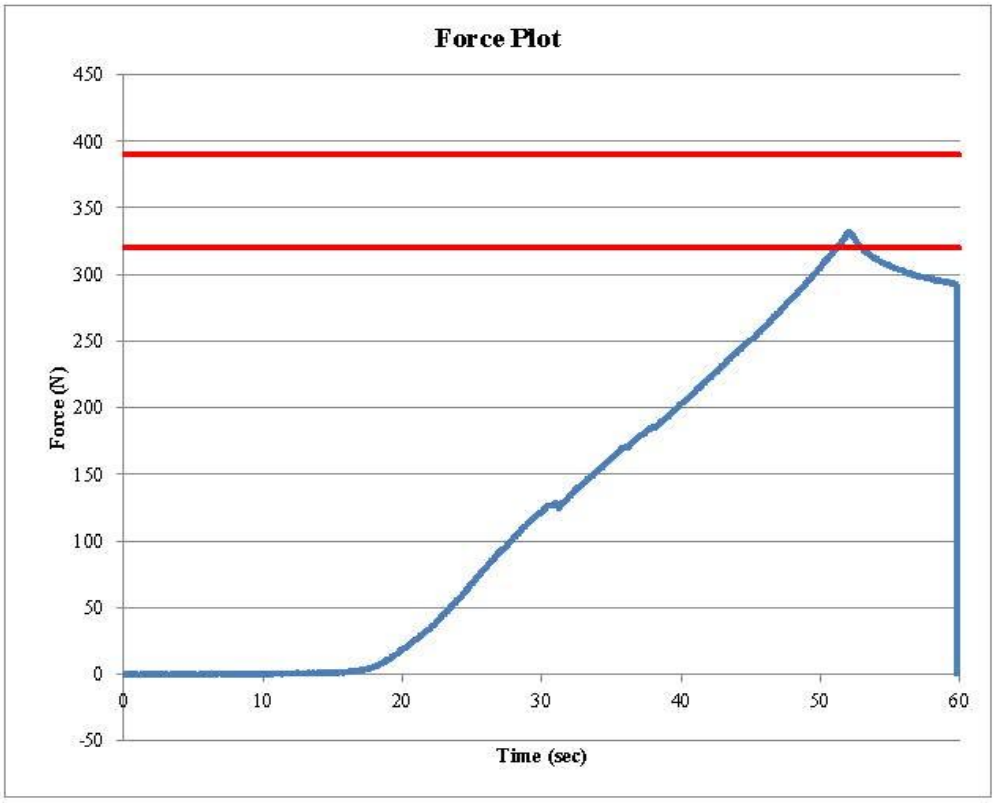
Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

Customer:	NHTSA		
Serial Number:	EB7513	Date:	5/17/2021
Test Number:	1	Time:	15:29

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.1	°C	Pass
Humidity	10	-	70	47	%	Pass
Average Angular Velocity	0.5	-	1.5	0.91	deg/sec	Pass
Initial Angle	0	-	20	13.21	deg	Pass
Peak Force at 45.23°	320	-	390	331.86	N	Pass
Final Angle	-8	-	8	3.94	deg	Pass



Comments:
Abdomen S/N: EB8206
Lumbar S/N: N/A

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 16-1
Test Date: 5/14/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.120 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,719.4 N	Yes

Test meets specifications.

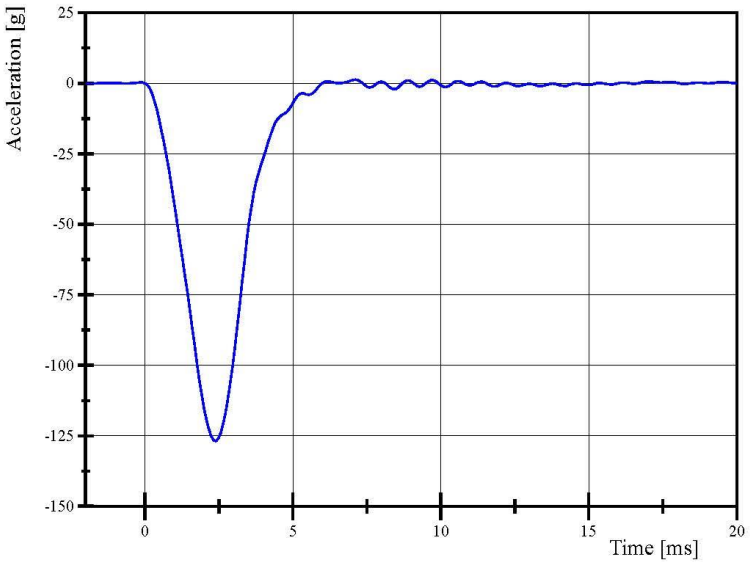
Condition: Used

Comments:
Knee Skin S/N: EB7773

Transportation Research Center Inc.

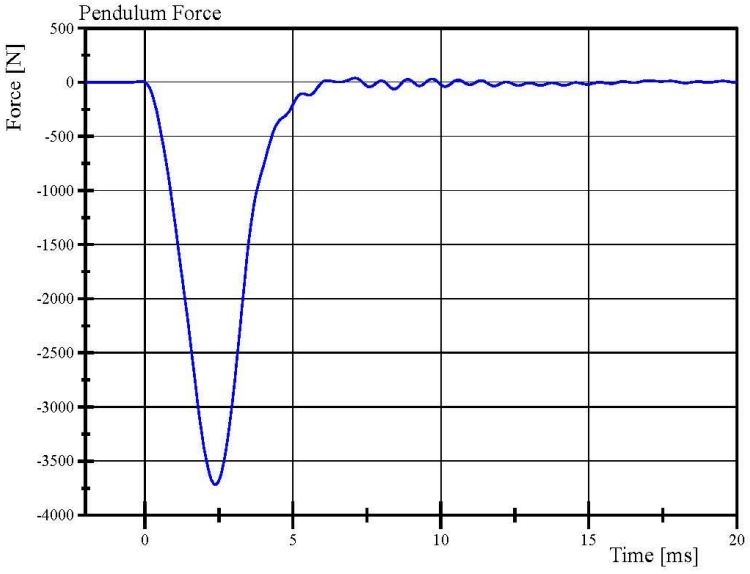
Left Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 16-1
Test Date: 5/14/2021

Pendulum Acceleration



Filter Class: CFC_600
Max: 1.3 g at 7.1 ms
Min: -126.8 g at 2.4 ms

Pendulum Force



Filter Class: CFC_600
Max: 38.7 N at 7.1 ms
Min: -3,719.4 N at 2.4 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 16-1
Test Date: 5/14/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.121 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,817.4 N	Yes

Test meets specifications.

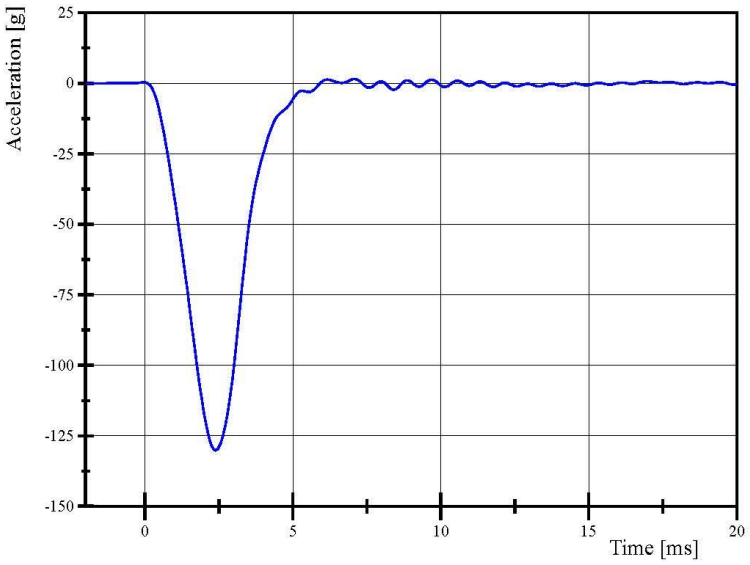
Condition: Used

Comments:
Knee Skin S/N: EB7550

Transportation Research Center Inc.

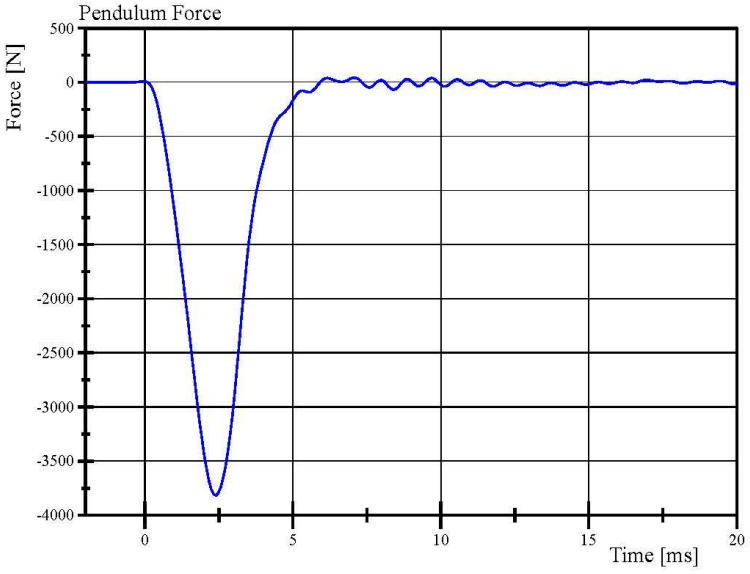
Right Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 16-1
Test Date: 5/14/2021

Pendulum Acceleration



Filter Class: CFC_600
Max: 1.5 g at 7.1 ms
Min: -130.2 g at 2.4 ms

Pendulum Force



Filter Class: CFC_600
Max: 43.1 N at 7.1 ms
Min: -3,817.4 N at 2.4 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

05.14.2021 10:04:00 1800

Post-Test Calibration Sheets

Front Passenger S/N EB7513

Transportation Research Center Inc.
572O HIII 5th Dummy
External Dimensions
Serial No. EB7513 Calibration No. 17

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	780	Yes
B	Shoulder Pivot Height	431.8 - 457.2	445	Yes
C	Hip Pivot Height	81.3 - 86.3	85	Yes
D	Hip Pivot from Backline	144.8 - 149.8	148	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	80	Yes
F	Thigh Clearance	119.4 - 134.6	131	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	249	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	286	Yes
J	Elbow Rest Height	182.8 - 203.2	198	Yes
K	Buttock Knee Length	520.7 - 546.1	533	Yes
L	Popliteal Height	355.6 - 376.0	359	Yes
M	Knee Pivot Height	393.7 - 419.1	409	Yes
N	Buttock Popliteal Length	414.0 - 439.4	430	Yes
O	Chest Depth without Jacket	175.3 - 190.5	183	Yes
P	Foot Length	218.5 - 233.7	225	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	141	Yes
T	Head Depth	177.8 - 188.0	180	Yes
U	Hip Breadth	299.7 - 314.9	306	Yes
V	Shoulder Breadth	350.5 - 365.7	356	Yes
W	Foot Breadth	78.8 - 94.0	85	Yes
X	Head Circumference	528.3 - 548.7	539	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	867	Yes
Z	Waist Circumference	759.5 - 789.9	775	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	345	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	165	Yes

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	256.9 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	6.2 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.45 %	Yes

Test meets specifications.

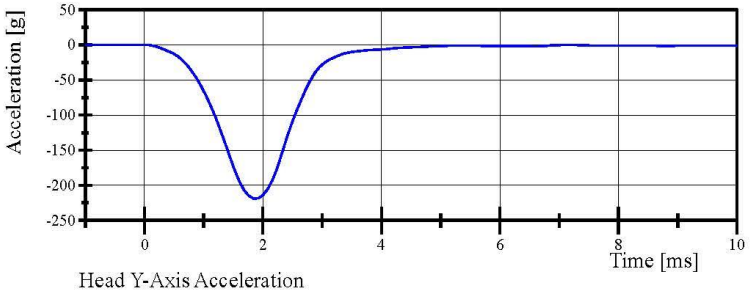
Condition: Used

Comments:
Head Skin S/N: EA8751

Transportation Research Center Inc.

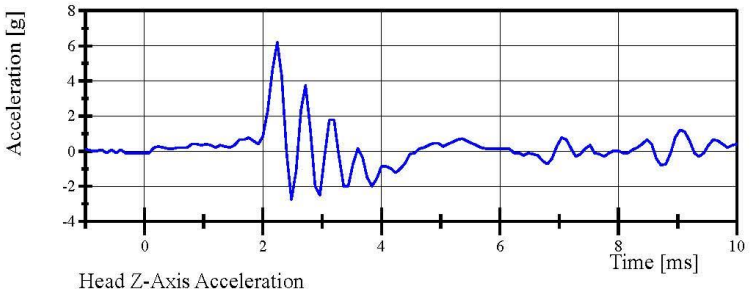
Front Head Drop
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/10/2021

Head X-Axis Acceleration



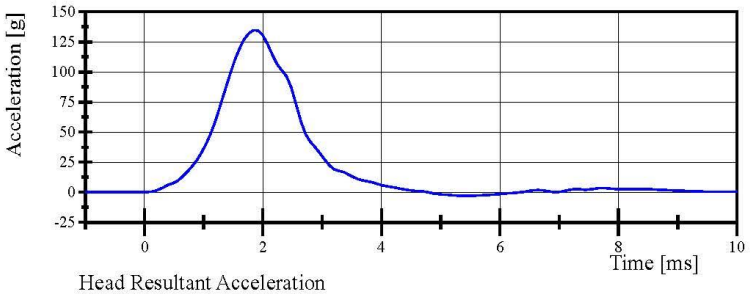
Filter Class: CFC_1000
Max: 0.1 g at -0.9 ms
Min: -218.7 g at 1.8 ms

Head Y-Axis Acceleration



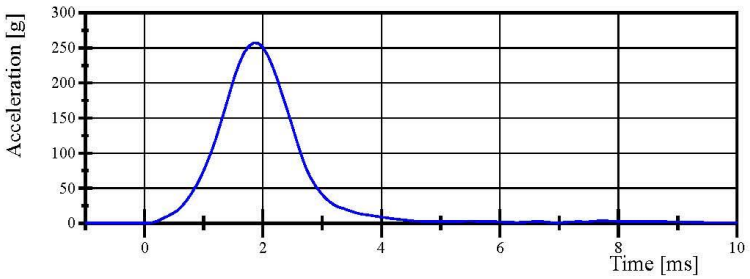
Filter Class: CFC_1000
Max: 6.2 g at 2.2 ms
Min: -2.8 g at 2.5 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 134.8 g at 1.8 ms
Min: -3.0 g at 5.5 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 256.9 g at 1.8 ms
Min: 0.0 g at -0.8 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

06.10.2021 12:54:15 614

Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.066 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.28 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.46 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.44 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-86.2 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	73.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	89.7 ms	Yes

Test meets specifications.

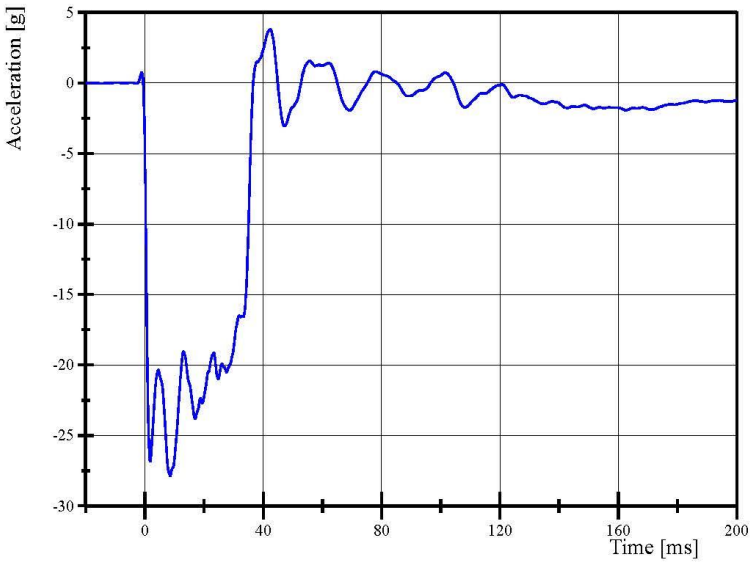
Condition: Used

Comments:
Neck S/N: EB6930

Transportation Research Center Inc.

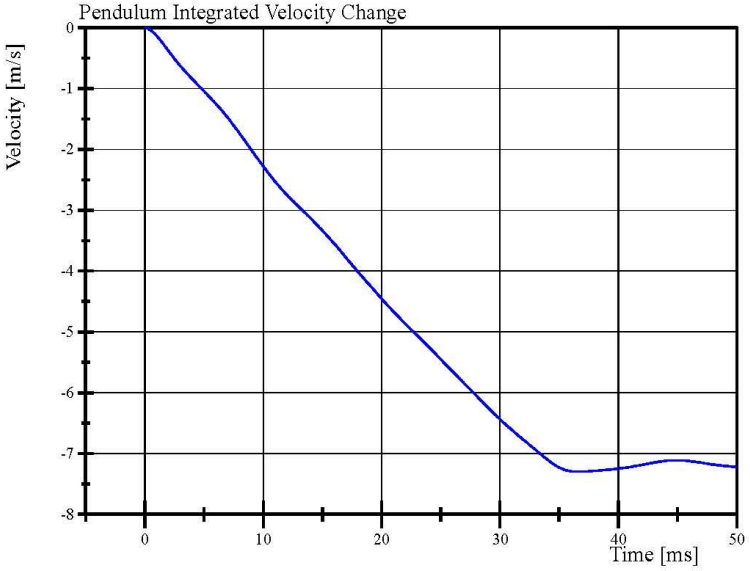
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Pendulum Acceleration



Filter Class: CFC_180
Max: 3.8 g at 42.4 ms
Min: -27.9 g at 8.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.3 m/s at 36.6 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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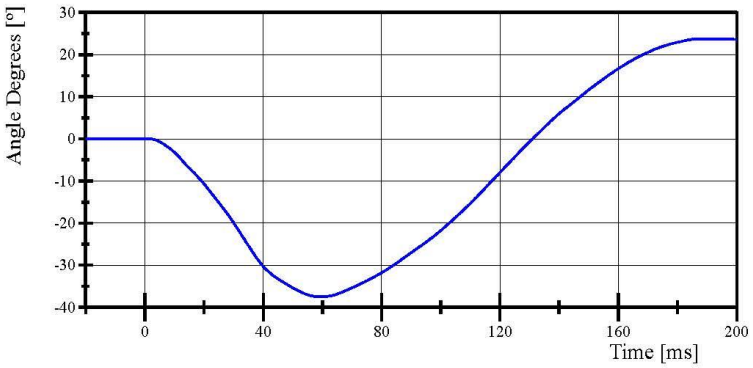
Transportation Research Center Inc.

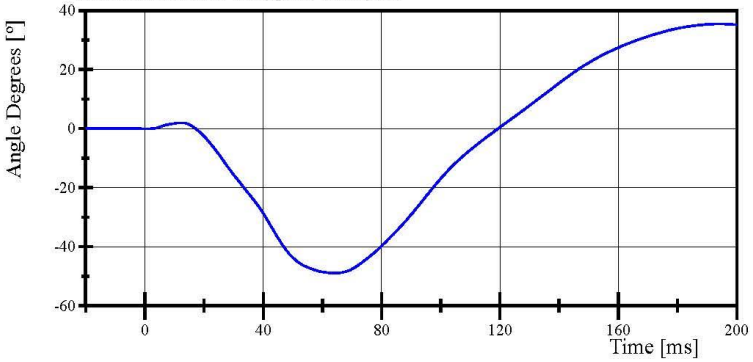
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Pot Rotation at the Base of Neck



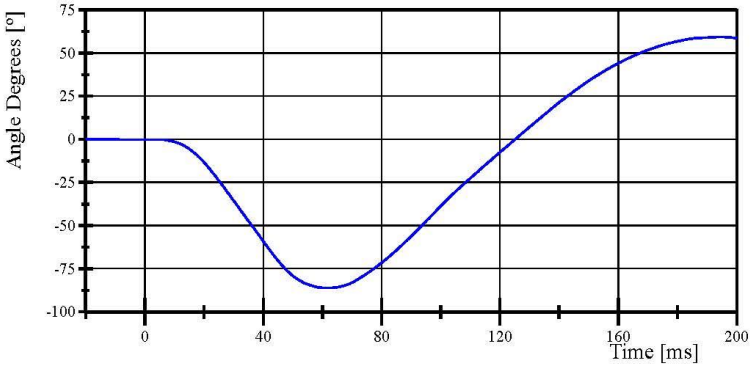
Filter Class: CFC_60
Max: 23.8 ° at 187.1 ms
Min: -37.5 ° at 59.4 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 35.5 ° at 194.1 ms
Min: -48.9 ° at 64.2 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 59.3 ° at 194.6 ms
Min: -86.2 ° at 61.5 ms

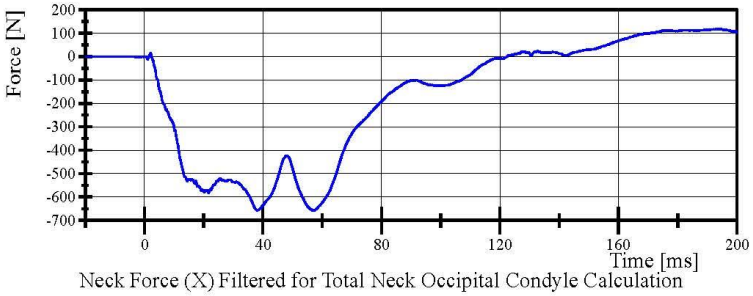
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

06.11.2021 11:24:15 1852

Transportation Research Center Inc.

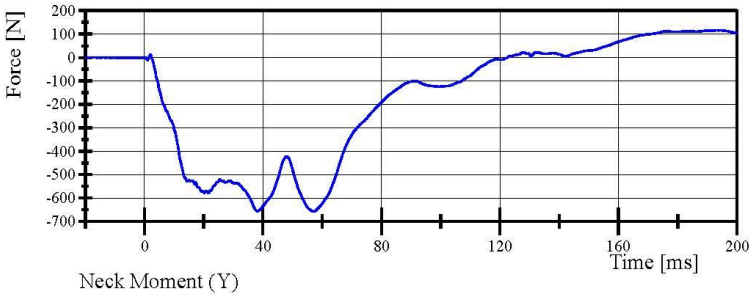
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Neck Force (X)



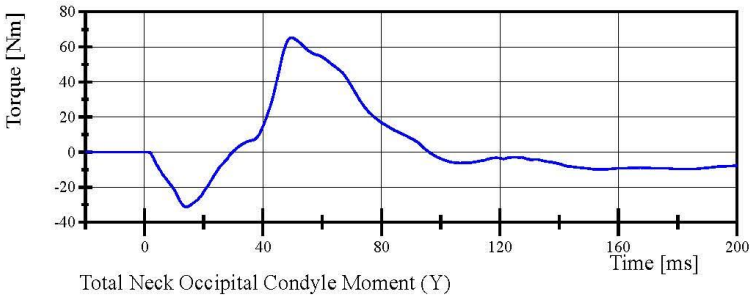
Filter Class: CFC_1000
Max: 117.4 N at 194.7 ms
Min: -659.0 N at 57.1 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



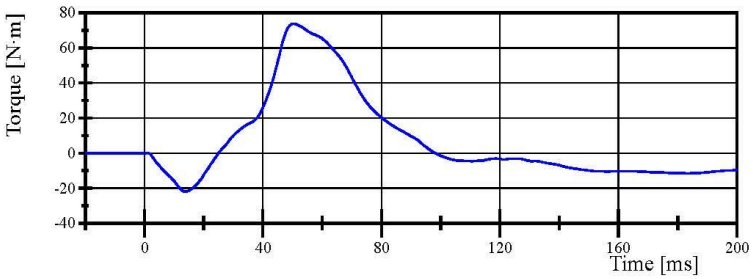
Filter Class: CFC_600
Max: 116.9 N at 194.6 ms
Min: -658.4 N at 57.2 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 65.2 Nm at 49.7 ms
Min: -31.3 Nm at 14.3 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 73.7 N·m at 50.3 ms
Min: -22.0 N·m at 13.9 ms

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	52 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.036 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.76 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.62 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.31 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	113.3 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-58.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	103.9 ms	Yes

Test meets specifications.

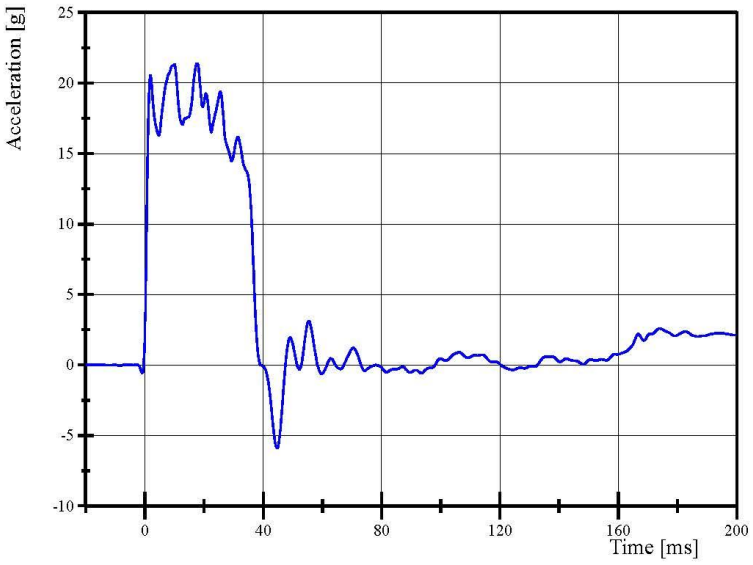
Condition: Used

Comments:
Neck S/N: EB6930

Transportation Research Center Inc.

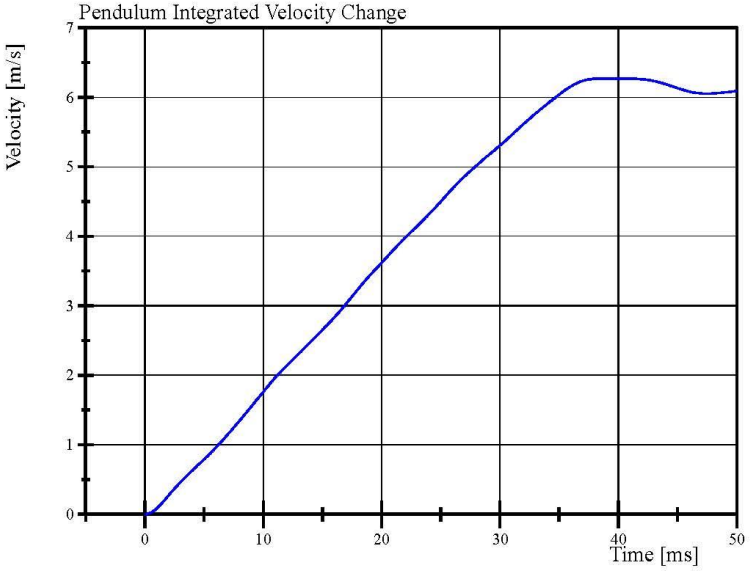
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Pendulum Acceleration



Filter Class: CFC_180
Max: 21.4 g at 17.7 ms
Min: -5.9 g at 44.7 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.3 m/s at 39.1 ms
Min: 0.0 m/s at 0.0 ms

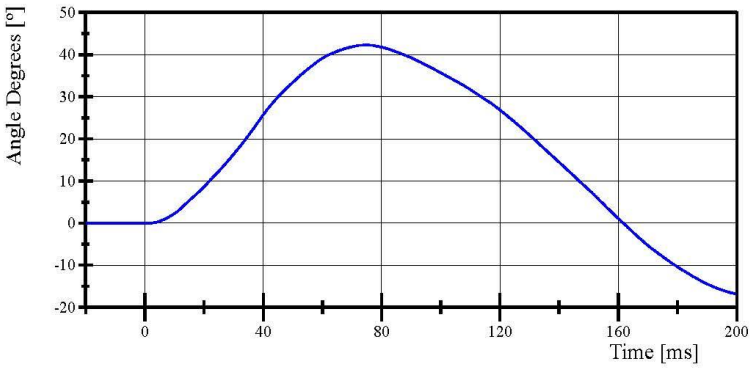
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

06.11.2021 12:57:26 2004

Transportation Research Center Inc.

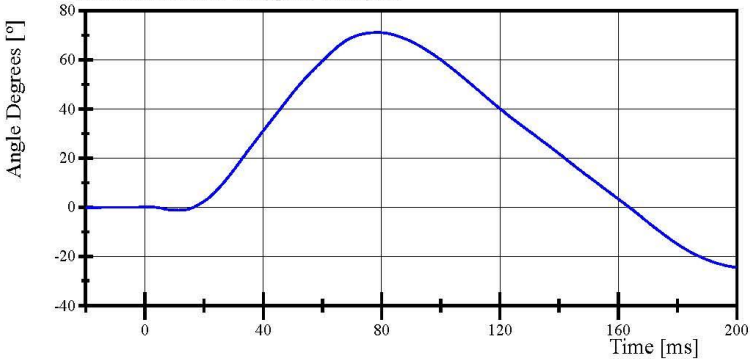
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Pot Rotation at the Base of Neck



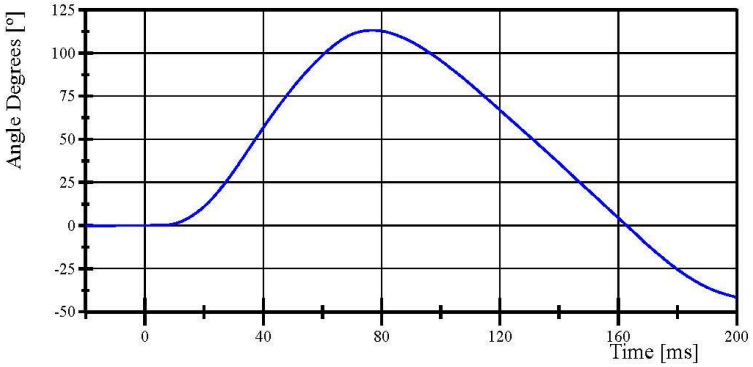
Filter Class: CFC_60
Max: 42.3 ° at 74.7 ms
Min: -16.9 ° at 199.8 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 71.1 ° at 78.6 ms
Min: -24.6 ° at 199.8 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 113.3 ° at 76.8 ms
Min: -41.5 ° at 199.8 ms

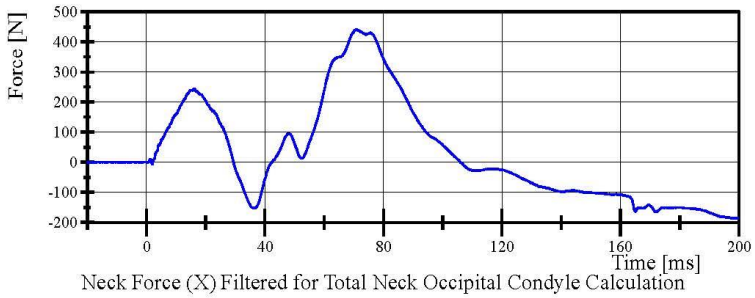
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

06.11.2021 12:57:26 2004

Transportation Research Center Inc.

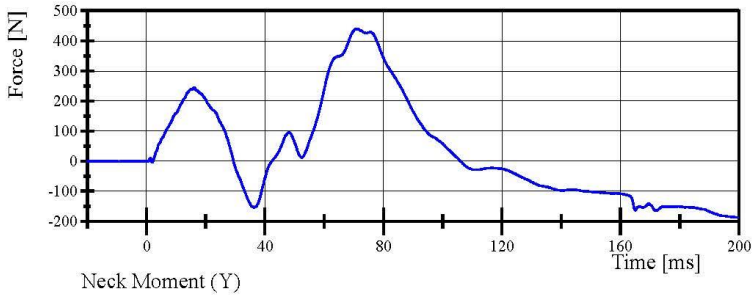
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Neck Force (X)



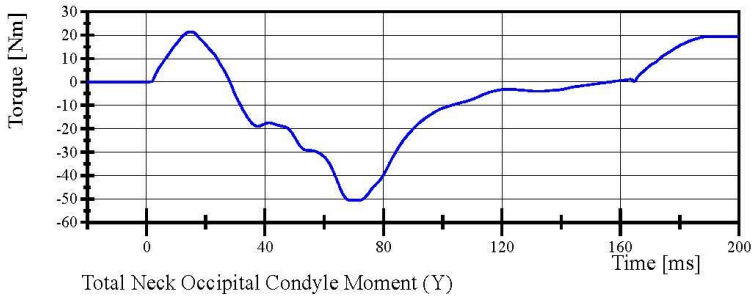
Filter Class: CFC_1000
Max: 441.3 N at 70.9 ms
Min: -187.0 N at 198.8 ms

Neck Force (X) Filtered for Total Neck Occipital Condyle Calculation



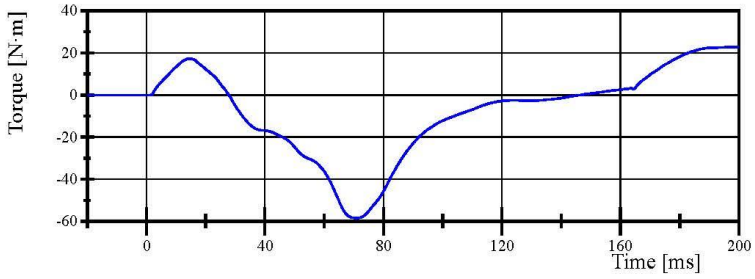
Filter Class: CFC_600
Max: 440.9 N at 70.9 ms
Min: -186.6 N at 198.8 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 21.5 Nm at 14.9 ms
Min: -50.6 Nm at 69.6 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 22.7 N·m at 196.9 ms
Min: -58.4 N·m at 70.9 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

06.11.2021 12:57:27 2004

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/10/2021

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.813 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,392.6 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,436.3 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-52.1 mm	Yes
Internal Hysteresis	69 - 85 %	75.4 %	Yes

Test meets specifications.

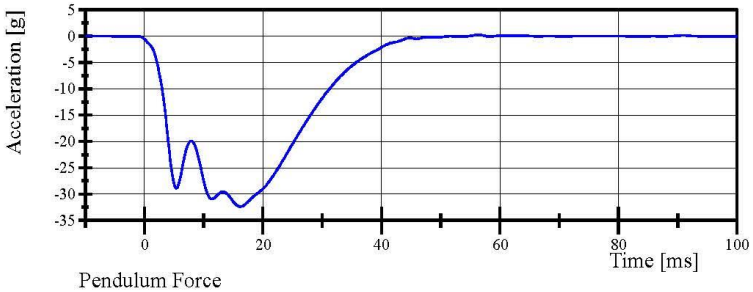
Condition: Used

Comments:
Jacket S/N: DZ8735
Rib Set S/N: EB7630

Transportation Research Center Inc.

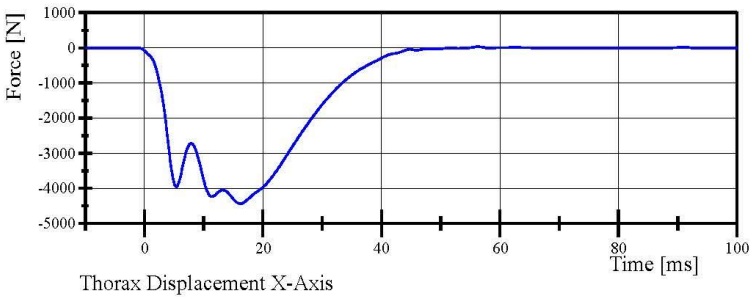
Front Thorax
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/10/2021

Pendulum Acceleration



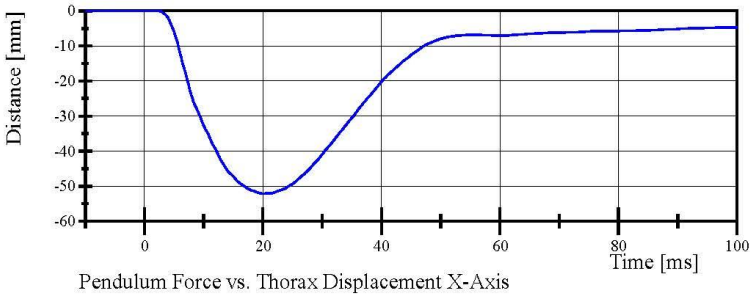
Filter Class: CFC_180
Max: 0.2 g at 56.2 ms
Min: -32.4 g at 16.2 ms

Pendulum Force



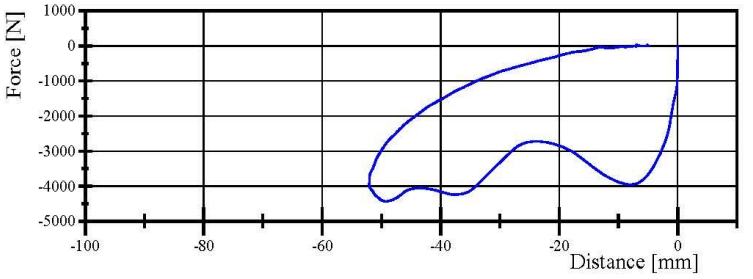
Filter Class: CFC_180
Max: 33.2 N at 56.2 ms
Min: -4,436.3 N at 16.2 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -5.6 ms
Min: -52.1 mm at 20.1 ms

Pendulum Force vs. Thorax Displacement X-Axis



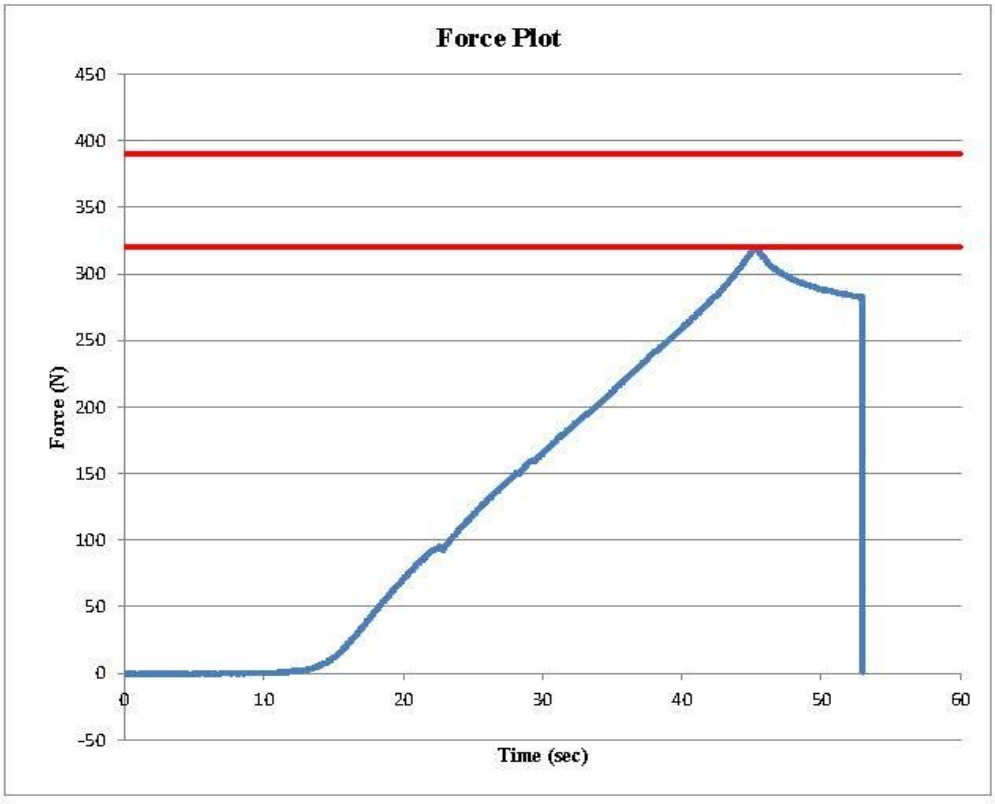
Filter Class: CFC_180
Max: 33.2 N at -6.9 mm
Min: -4,436.3 N at -49.2 mm

Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

Customer:	NHTSA		
Serial Number:	EB7513	Date:	6/10/2021
Test Number:	1	Time:	13:45

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	20.9	°C	Pass
Humidity	10	-	70	56	%	Pass
Average Angular Velocity	0.5	-	1.5	0.95	deg/sec	Pass
Initial Angle	0	-	20	15.49	deg	Pass
Peak Force at 45.23°	320	-	390	320.1	N	Pass
Final Angle	-8	-	8	3.63	deg	Pass



Comments:
Abdomen S/N: EB8206
Lumbar S/N: N/A

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.122 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,539.9 N	Yes

Test meets specifications.

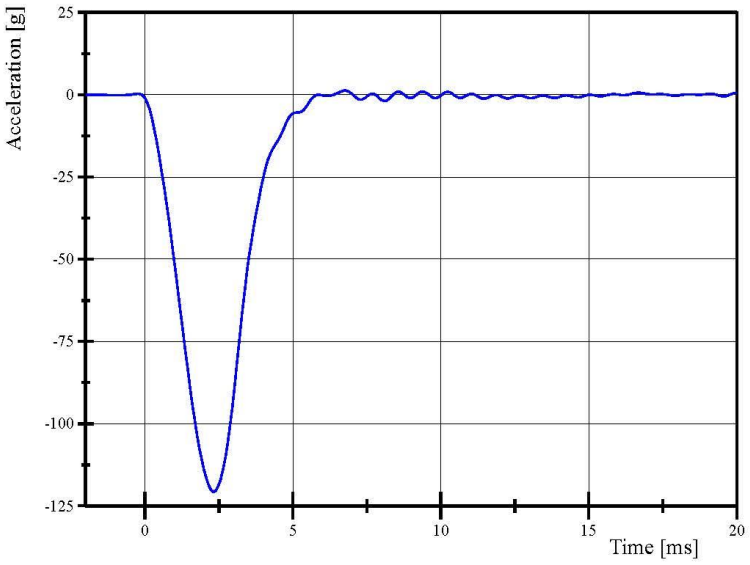
Condition: Used

Comments:
Knee Skin S/N: EB7773

Transportation Research Center Inc.

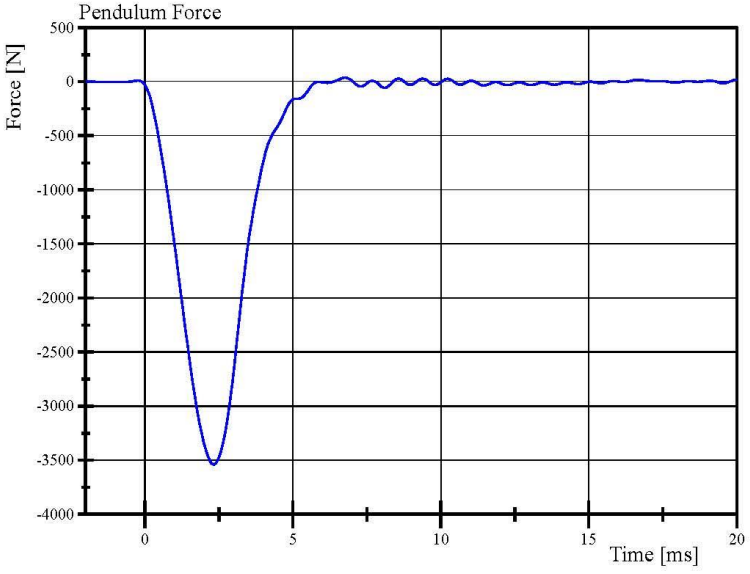
Left Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Pendulum Acceleration



Filter Class: CFC_600
Max: 1.3 g at 6.8 ms
Min: -120.7 g at 2.3 ms

Pendulum Force



Filter Class: CFC_600
Max: 37.6 N at 6.8 ms
Min: -3,539.9 N at 2.3 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.125 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,702.2 N	Yes

Test meets specifications.

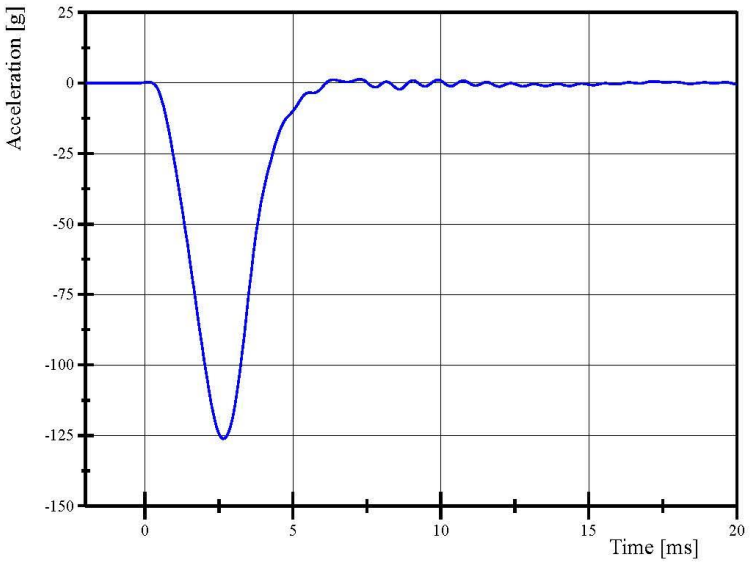
Condition: Used

Comments:
Knee Skin S/N: EB7550

Transportation Research Center Inc.

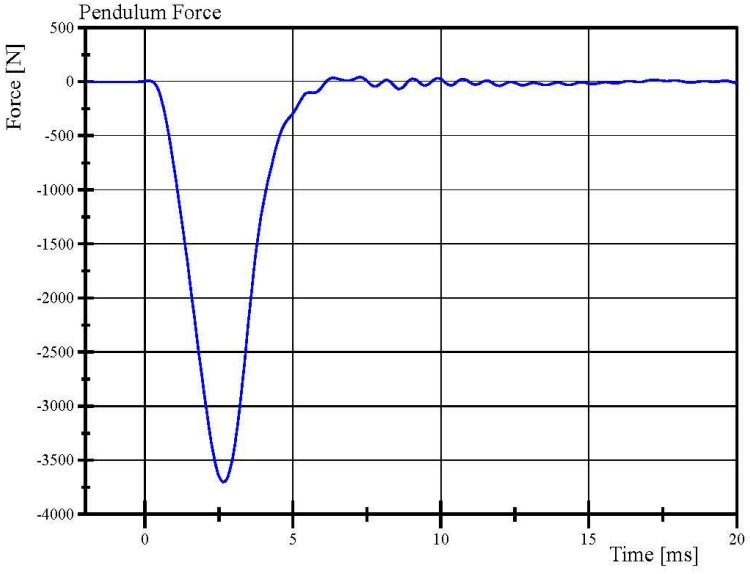
Right Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 17-1
Test Date: 6/11/2021

Pendulum Acceleration



Filter Class: CFC_600
Max: 1.4 g at 7.3 ms
Min: -126.3 g at 2.6 ms

Pendulum Force



Filter Class: CFC_600
Max: 41.6 N at 7.3 ms
Min: -3,702.2 N at 2.6 ms

Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

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APPENDIX D
TEST EQUIPMENT AND INSTRUMENTATION CALIBRATION

TABLE 1 – Driver Dummy Instrumentation

Instrumentation			Axis/Location	Hybrid III 50th S/N 037		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	T10650	Endevco	4-Feb-2021
			Y	P94650	Endevco	4-Feb-2021
			Z	P94622	Endevco	4-Feb-2021
		Redundant	X	P94431	Endevco	4-Feb-2021
			Y	P94487	Endevco	4-Feb-2021
			Z	P94645	Endevco	4-Feb-2021
Head Angular Rate Sensors			X	ARS15689	DTS	2-Mar-2021
			Y	ARS13183	DTS	2-Mar-2021
			Z	ARS4731	DTS	2-Mar-2021
Upper Neck Load Cell			FX, FY, FZ, MX, MY, MZ	2021	Humanetics	14-Aug-2020
Chest Accelerometers		Primary	X	P87834	Endevco	4-Feb-2021
			Y	P61255	Endevco	4-Feb-2021
			Z	P45008	Endevco	4-Feb-2021
		Redundant	X	P91177	Endevco	4-Feb-2021
			Y	P94570	Endevco	4-Feb-2021
			Z	P91172	Endevco	4-Feb-2021
Chest Potentiometer			X	CST037	Servo	13-Aug-2020
Pelvis Accelerometers			X	T11801	Endevco	4-Feb-2021
			Y	P91876	Endevco	4-Feb-2021
			Z	T11390	Endevco	4-Feb-2021
Femur Load Cells	Left	Primary	Z	DI4215-FZ1	Denton	13-Aug-2020
		Redundant	Z	DI4215-FZ2	Denton	13-Aug-2020
	Right	Primary	Z	DI4216-FZ1	Denton	13-Aug-2020
		Redundant	Z	DI4216-FZ2	Denton	13-Aug-2020
Tibia Load Cells	Left	Upper	MX, MY, FZ	3643-94	Denton	13-Aug-2020
		Lower	MX, MY, FZ	3644-370	Denton	13-Aug-2020
	Right	Upper	MX, MY, FZ	3643-413	Denton	13-Aug-2020
		Lower	MX, MY, FZ	3644-401	Denton	14-Aug-2020
Foot Accelerometers	Left	Rear	X	P90848	Endevco	4-Feb-2021
			Z	P91498	Endevco	4-Feb-2021
		Front	Z	P90841	Endevco	4-Feb-2021
	Right	Rear	X	P93467	Endevco	4-Feb-2021
			Z	P97619	Endevco	4-Feb-2021
		Front	Z	P94523	Endevco	4-Feb-2021
Seat Belt Load Cells		Lap	N/A	N/A	N/A	N/A
		Shoulder	N/A	N/A	N/A	N/A

TABLE 2 – Front Passenger Dummy Instrumentation

Instrumentation			Axis/Location	Hybrid III 5th S/N EB7513		
				Serial Number	Manufacturer	Calibration Date
Head Accelerometers		Primary	X	P44972	Endevco	14-May-2021
			Y	T11806	Endevco	14-May-2021
			Z	P69062	Endevco	14-May-2021
		Redundant	X	T11046	Endevco	14-May-2021
			Y	P97525	Endevco	14-May-2021
			Z	P73228	Endevco	14-May-2021
Head Angular Rate Sensors			X	ARS10789	DTS	2-Mar-2021
			Y	ARS11583	DTS	2-Mar-2021
			Z	ARS11366	DTS	2-Mar-2021
Upper Neck Load Cell			FX, FY, FZ, MX, MY, MZ	1874	Denton	17-Dec-2020
Chest Accelerometers		Primary	X	P80855	Endevco	14-May-2021
			Y	P97544	Endevco	14-May-2021
			Z	P57791	Endevco	14-May-2021
		Redundant	X	P73221	Endevco	14-May-2021
			Y	T11872	Endevco	14-May-2021
			Z	T16784	Endevco	14-May-2021
Chest Potentiometer			X	4223	Servo	24-Aug-2020
Pelvis Accelerometers			X	P91969	Endevco	14-May-2021
			Y	P91958	Endevco	14-May-2021
			Z	P80721	Endevco	14-May-2021
Femur Load Cells	Left	Primary	Z	DT0997-FZ1	Denton	24-Aug-2020
		Redundant	Z	DT0997-FZ2	Denton	24-Aug-2020
	Right	Primary	Z	DS4140-FZ1	Denton	24-Aug-2020
		Redundant	Z	DS4140-FZ2	Denton	24-Aug-2020
Tibia Load Cells	Left	Upper	MX, MY, FZ	3643-92	Denton	24-Aug-2020
		Lower	MX, MY, FZ	3644-92	Denton	24-Aug-2020
	Right	Upper	MX, MY, FZ	3643-484	Denton	24-Aug-2020
		Lower	MX, MY, FZ	3644-369	Denton	24-Aug-2020
Foot Accelerometers	Left	Rear	X	P90866	Endevco	14-May-2021
			Z	T11455	Endevco	14-May-2021
		Front	Z	P97890	Endevco	14-May-2021
	Right	Rear	X	P97640	Endevco	14-May-2021
			Z	P91471	Endevco	14-May-2021
		Front	Z	P91907	Endevco	14-May-2021
Seat Belt Load Cells		Lap	N/A	N/A	N/A	N/A
		Shoulder	N/A	N/A	N/A	N/A

TABLE 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	T16770	Endevco	1-Mar-2021
			Z	T11835	Endevco	1-Mar-2021
		Redundant	X	P61501	Endevco	1-Mar-2021
	Right	Primary	X	P87064	Endevco	18-Mar-2021
			Z	P94559	Endevco	18-Mar-2021
		Redundant	X	P81617	Endevco	18-Mar-2021
Engine Accelerometers	Top		X	P87031	Endevco	22-Mar-2021
	Bottom		X	P87069	Endevco	22-Mar-2021