Final Report Number: NCAP-TRC-20-005

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

FCA US LLC

2020 Ram 2500 Crew Cab

NHTSA Number: M20200313

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

Report Date: November 20, 2020

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

Notice

Transportation Research Center Inc. does not endorse or certify products of manufacturers. The manufacturer's name appears solely to identify the test article. Transportation Research Center Inc. assumes no liability for the report or use thereof. It is responsible for the facts and the accuracy of the data presented herein. This report does not constitute a standard, specification, or regulation.

Prepared By: ILO Project Operations Group

Approved By: John Shultz

Approval Date: November 20, 2020

FINAL REPORT ACCEPTANCE BY OCWS:

_____

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

Date _____

_____

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

Date _____

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
NCAP-TRC-20-005		

4. Title and Subtitle	5. Report Date
Final Report of NEW CAR ASSESSMENT PROGRAM Frontal Impact Testing of a 2020 Ram 2500 Crew Cab NHTSA No. M20200313	November 20, 2020
	6. Performing Organization Code TRC Inc.
7. Author(s) John Shultz, Project Manager	8. Performing Organization Report No. 200903
9. Performing Organization Name and Address Transportation Research Center Inc. 10820 State Route 347 East Liberty, OH 43319-0367	10. Work Unit No. (TRAIS) 11. Contract or Grant No. 693JJ919D000007
12. Sponsoring Agency Name and Address 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	13. Type of Report and Period Covered Final Report September 3, 2020 – November 20, 2020
	14. Sponsoring Agency Code NRM-110

15. Supplemental Notes

16. Abstract

A 56.0 km/h NCAP Frontal Impact Test was conducted on a 2020 Ram 2500 Crew Cab, in accordance with the specifications of the Office of Crashworthiness Standards Laboratory Procedure for NCAP Full Frontal Rigid Barrier Impact Testing. This test was conducted to obtain data related to FMVSS Nos. 208, 212, 219 (partial), and 301 performance. The test was conducted at the Transportation Research Center Inc. in East Liberty, Ohio on September 3, 2020.

The impact velocity was 55.71 km/h, and the ambient temperature at the barrier face at the time of impact was 21.4° C. The target vehicle post-test maximum crush was 745 millimeters at crush zone 4 at right 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	283	NA	700	293
Maximum Chest Compression	mm	63	-37.1	mm	52	-13.6
3ms Chest Clip	Gs	60	35.3	Gs	60	33.1
Nij	NA	1	0.26	NA	1	0.39
Neck Tension	Newtons	4170	870.1	Newtons	2620	683.8
Neck Compression	Newtons	4000	-280.9	Newtons	2520	-236.1
Left Femur Force	Newtons	10000	-2848.1	Newtons	6800	-2111.1
Right Femur Force	Newtons	10000	-1989.2	Newtons	6800	-2145.0

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

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. Number of Pages	22. Price
Unclassified	Unclassified	179	

Table of Contents

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 2020 Ram 2500 Crew Cab at a velocity of 55.71 km/h. The test was performed at Transportation Research Center, Inc. on September 3, 2020. 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 106 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 745 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 bolster. 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)	283	0.26	870.1	-280.9	35.3	-37.1	-2848.1	-1989.2
Passenger (5^{th} Female)	293	0.39	683.8	-236.1	33.1	-13.6	-2111.1	-2145.0

TEST COMMENTS:

DRIVER HEAD Y ACCEL PRIMARY - NOISE SPIKES at 190 & 243ms
PASSENGER PELVIS Z ACCEL - NOISE SPIKES THROUGHOUT SIGNAL
ENGINE TOP X - QUESTIONABLE DATA

2.2 REPORT AREA 2: DATA SHEETS

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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

TEST VEHICLE INFORMATION

NHTSA No.	M20200313
Model Year	2020
Make	Ram
Model	2500 Crew Cab
Body Style	Truck
VIN	3C6UR5HJ8LG101165
Body Color	Flame Red Clear-Coat
Odometer Reading (km/mi)	16 mi
Engine Displacement (L)	6.4
Type/No. Cylinders	V/8
Engine Placement	Front/Longitudinal
Transmission Type	Automatic
Transmission Speeds	8
Overdrive	Yes
Final Drive	4WD
Roof Rack	No
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	No
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	FCA US LLC
Date of Manufacture	11-19

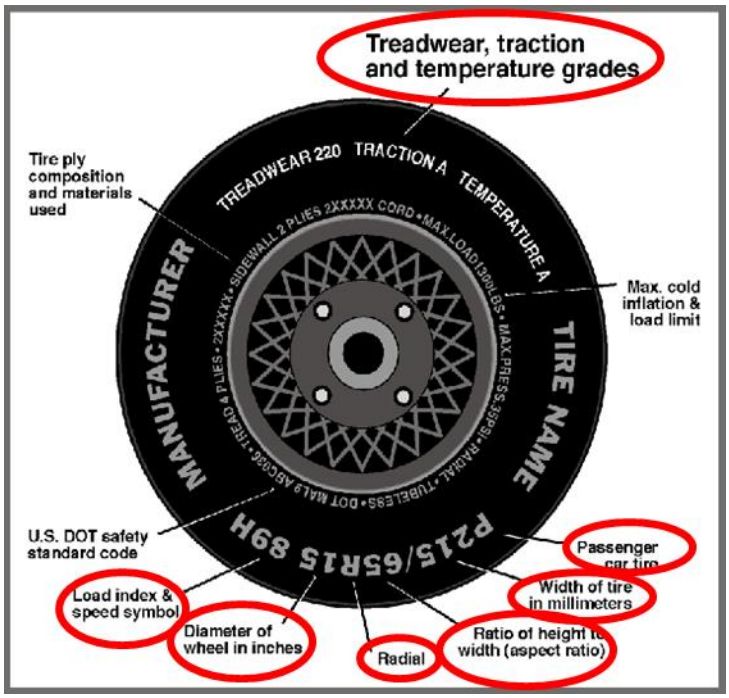
GVWR (kg)	4536 (10000 lbs)
GAWR Front (kg)	2495 (5500 lbs)
GAWR Rear (kg)	2722 (6000 lbs)

VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Split Bench	Bench	N/A	
Number of Occupants	3	3	N/A	6
Capacity Wt. (VCW) (kg)				1415.0
Cargo Wt. (RCLW) (kg)				1007.0

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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	550	550
Cold / Test Pressure (kPa)	520	550
Recommended Tire Size	LT245/70R17E	LT245/70R17E
Tire Size on Vehicle	LT245/70R17	LT245/70R17
Tire Manufacturer	Firestone	Firestone
Tire Model	Transforce HT	Transforce HT
Treadwear[1]	N/A	N/A
Traction Grade[1]	N/A	N/A
Temperature Grade[1]	N/A	N/A
Tire Plies Sidewall	2	2
Tire Plies Body	5	5
Load Index/Speed Symbol	119/116R	119/116R
Tire Material	Polyester/Steel/Nylon	Polyester/Steel/Nylon
DOT Safety Code Right	VNP8 TF7 3319	VNP8 TF7 3319
DOT Safety Code Left	VNP8 TF7 3319	VNP8 TF7 3319

[1] Load Range E

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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	907.6	677.8		961.4	744.8	
Right	kg	915.2	612.0		965.6	711.0	
Ratio	%	58.6	41.4		57.0	43.0	
Totals	kg	1822.8	1289.8	3112.6	1927.0	1455.8	3382.8

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	3112.6
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	3387.9

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front)
As Delivered	mm	1002	1005	1069	1072	1784
As Tested	mm	990	996	1056	1050	1853
Post Test	mm	977	1046	1050	1052	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	4305
Total Vehicle Length at Left Side	mm	6500
Total Vehicle Length at Centerline	mm	6630
Total Vehicle Length at Right Side	mm	6500
Weight of Ballast in Cargo Area	kg	52.6
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	112.7

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: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

TARGET VEHICLE STRUCTURAL MEASUREMENT

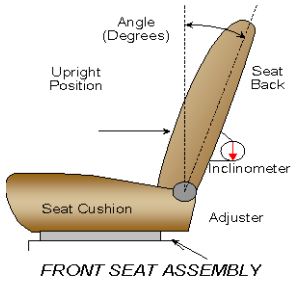
	Elements	Pre-Test (mm)
1	Total Length	6630
2	Total Width	2015
3	Bumper Top Height	755
4	Bumper Bottom Height	430
5	Longitudinal Member Top Height	675
6	Distance Between Longitudinal Members	885
7	Longitudinal Member Width	55
8	Engine Top Height	1295
9	Engine Bottom Height	415
10	Engine and Gearbox Width	800
11	Front Bumper-Engine Distance	800
12	Front Shock Absorber Fixing Height	865
13	Bonnet Leading Edge Height	1325
14	Front Shock Absorber Fixing Width	1045
15	Front Bumper – Front Axle Distance	995
16	Front Axle – A-Pillar Distance	640
17	A-Pillar – B-Pillar Distance	1020
18	B-Pillar – Rear Axle Distance	2595
19	B-Pillar – C-Pillar Distance	950
20	Roof Sill Bottom Height	1835
21	Roof Sill Top Height	1895
22	Floor Sill Bottom Height	660
23	Floor Sill Top Height	535

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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

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:	5.3
Passenger Seat back angle:	1.8

SEAT FORE/AFT POSITIONS

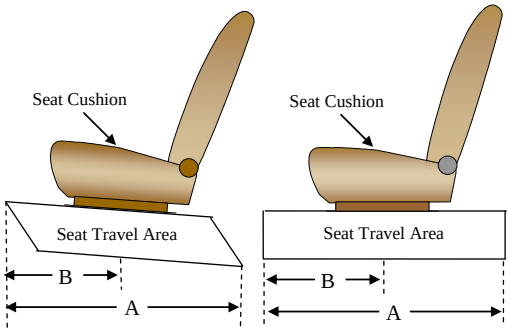
Describe the method of determining seat fore/aft positions.
Driver: Mid position, Positioned according to Form 1
Passenger: Full forward, Positioned according to Form 1

	Total Fore/Aft Travel	Placed in Position No.
Driver Seat	230 mm, 24 detents	120 mm, 12 detent
Passenger Seat	230 mm, 24 detents	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	5	1 (Uppermost)
Passenger Seat	5	1 (Uppermost)



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

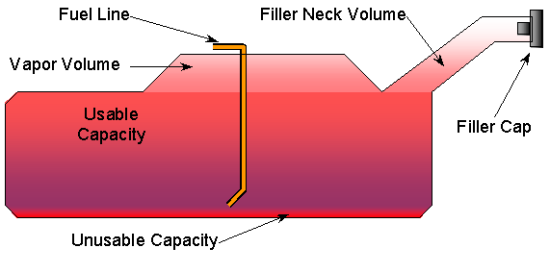
Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	121.1
Usable Capacity of "Optional Tank"	N/A
92%-94% of Usable Capacity	112.7
Actual Amount of Solvent Used	112.7
1/3 of Usable Capacity	40.4

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

Ignition key in and turned to the run position

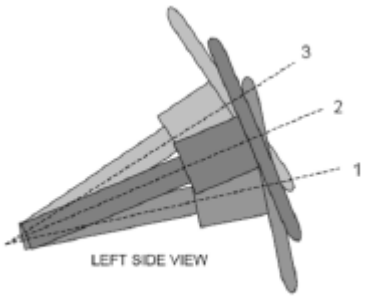


VEHICLE FUEL TANK ASSEMBLY

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.



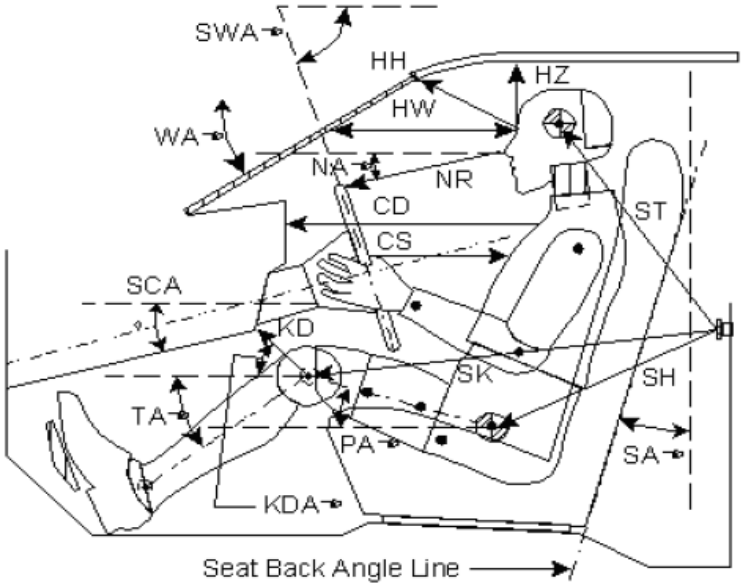
STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost Position No. 1	14.2	N//A
Geometric Center Position No. 2	21.6	N//A
Uppermost Position No. 3	31.4	N//A
Telescoping Steering Wheel Travel		N//A
Test Position	21.6	N//A

DATA SHEET NO. 3 - DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

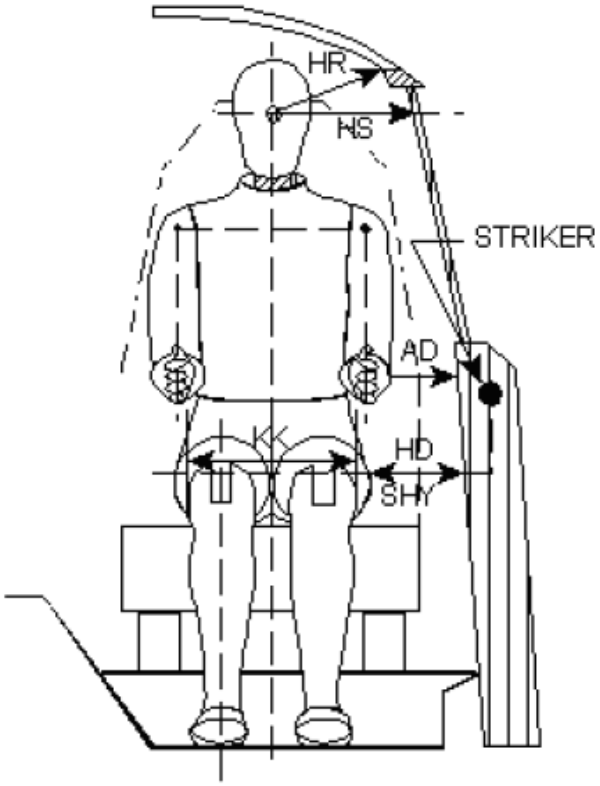
Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020



Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (°)	Length (mm)	Angle (°)
WAº	Windshield Angle		32.2		
SWAº	Steering Wheel Angle		66.4		
SCAº	Steering Column Angle		23.6		
SAº	Seat Back Angle (on head rest post)		5.3		1.8
HZ	Head to Roof (Z)	248		280	
HH	Head to Header	469		398	
HW	Head to Windshield	701		701	
NR	Nose to Rim	426	13.7		
CD	Chest to Dash	588		427	
CS	Chest to Steering Hub	362			
RA	Rim to Abdomen	221			
KDL	Left Knee to Dash	170	13.1	69	23.0
KDR	Right Knee to Dash	130	17.1	81	26.1
PAº	Pelvic Angle		21.6		19.2
TAº	Tibia Angle		55.7		68.9
SK	Striker to Knee	564	-7.9	674	-5.3
ST	Striker to Head	684	-81.1	616	-70.8
SH	Striker to H-Point	185	-1.1	349	-1.2

DATA SHEET NO. 4 - DUMMY LATERAL CLEARANCE DIMENSIONS

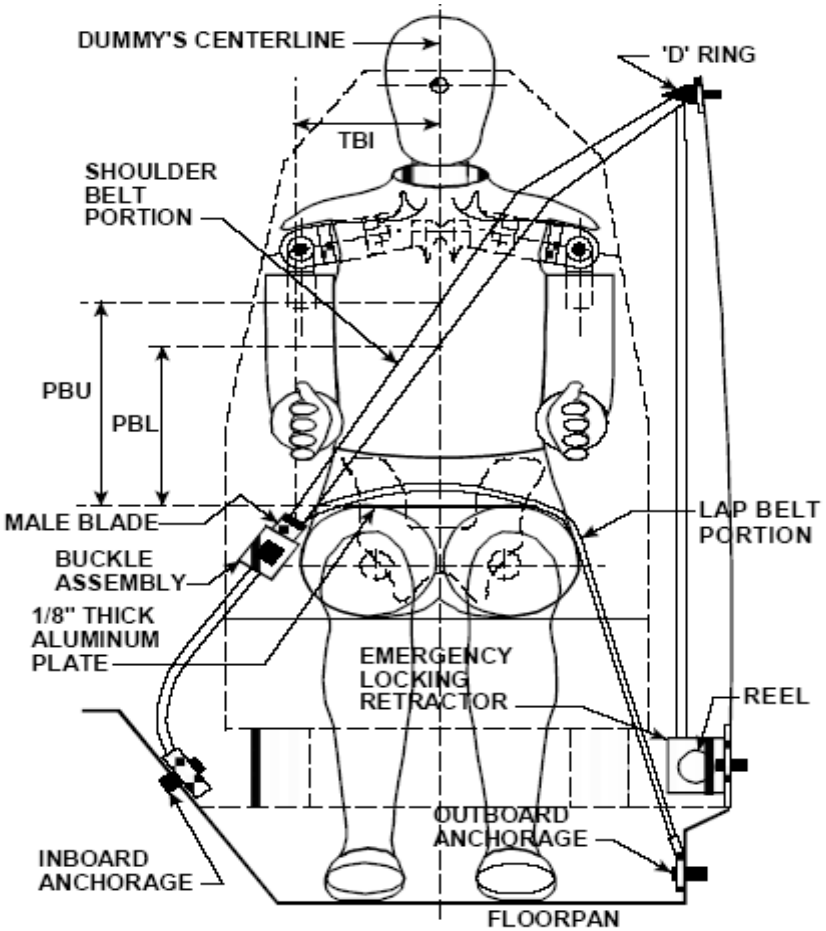
Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020



Code	Measurement Description	Driver	Passenger
AD	Arm to Door	156	81
HD	H-Point to Door	163	176
HR	Head to Side Header	213	255
HS	Head to Side Window	336	350
KK	Knee to Knee	271	169
SHY	Striker to H-Point (Y Direction)	247	260
AA	Ankle to Ankle	260	164

DATA SHEET NO. 5 - SEAT BELT POSITIONING DATA

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU – Top surface of reference to belt upper edge	mm	350	330
PBL – Top surface of reference to belt lower edge	mm	255	225

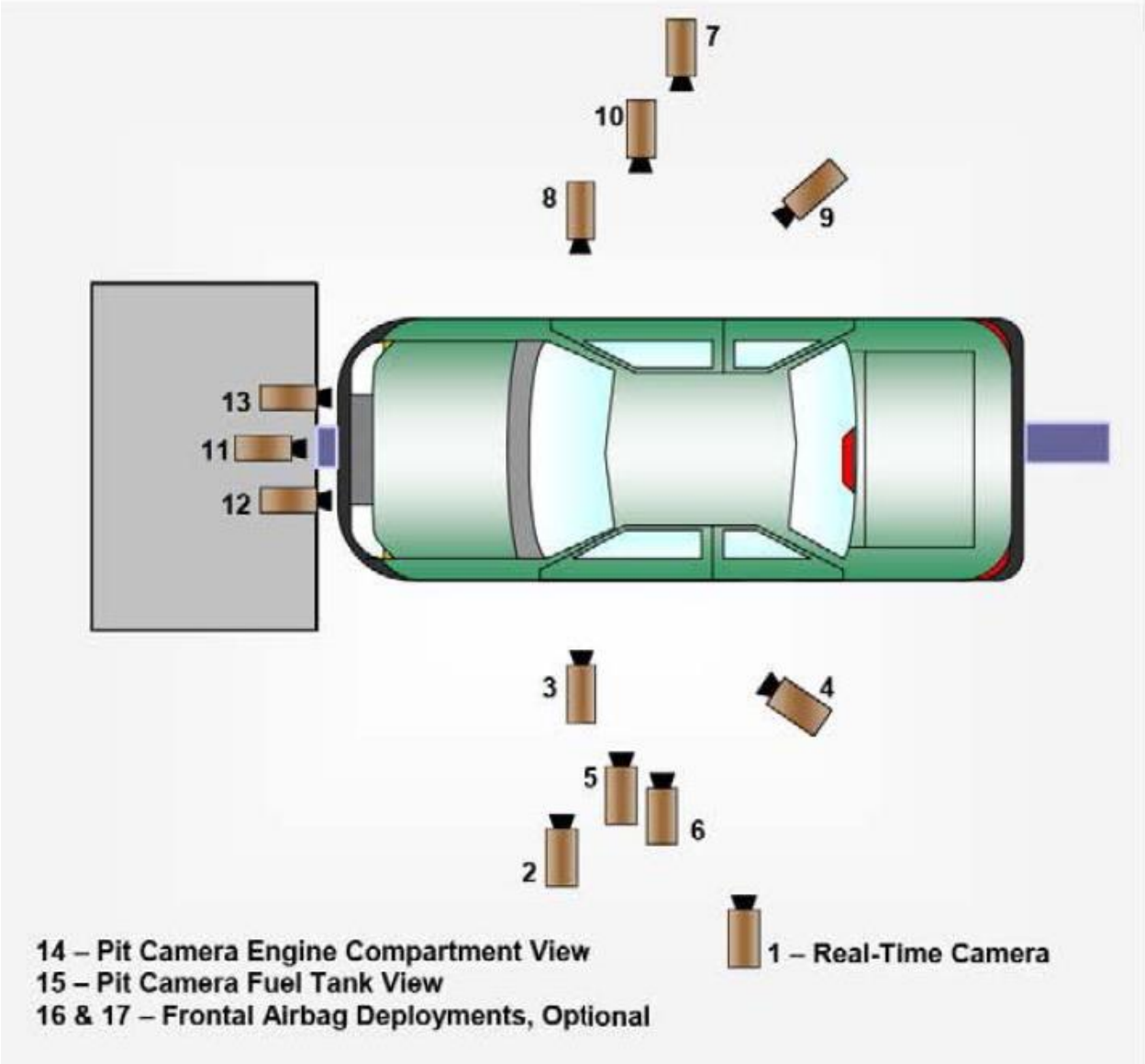
BELT LENGTH DATA

Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	855	916
Lap belt length as measured on ATD	mm	685	754
Remainder of belt on reel	mm	1310	1180
Total belt length for continuous webbing systems	mm	2850	2850

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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

CAMERA POSITIONS FOR FRONTAL IMPACTS



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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

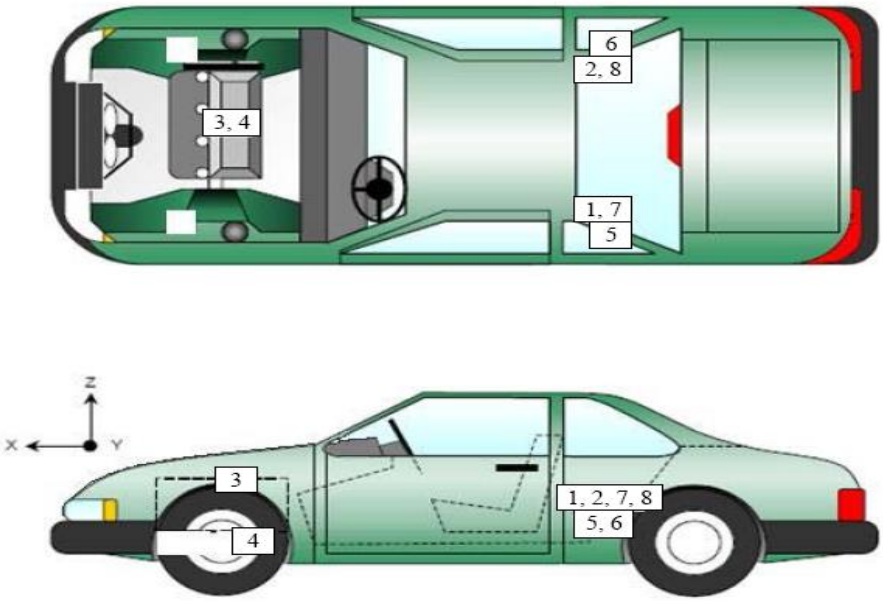
CAMERA LOCATIONS

No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	REAL-TIME LEFT OVERALL	408	-4611	-1502	Zoom	30
2	LEFT OVERALL	2280	-3669	-1491	8.5	1000
3	DRIVER CLOSE-UP	2782	-4513	-1474	50	1000
4	LEFT FRONT HALF	1413	-4430	-1461	20	1000
5	LEFT ANGLE	3627	-1928	-1851	25	1000
6	STEERING COLUMN	2510	-4887	-1564	50	1000
7	RIGHT OVERALL	2376	3926	-1479	8.5	1000
8	PASSENGER CLOSE-UP	2220	4017	-1554	50	1000
9	RIGHT FRONT HALF	1078	4502	-1536	20	1000
10	RIGHT ANGLE	3646	2170	-1823	25	1000
11	WINDSHIELD	1566	0	-5614	28	1000
12	DRIVER WINDSHIELD	0	-608	-2544	16	1000
13	PASSENGER WINDSHIELD	0	731	-2512	16	1000
14	PIT FRONT	1392	0	2954	28	1000
15	PIT REAR	3032	0	3034	18	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: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020



VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Measurements (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	3430	-475	-841
2	Right Rear Accelerometer – X Direction	3430	498	-832
3	Engine Top X	5447	0	-1097
4	Engine Bottom X	5400	80	-422
5	Left Rear Accelerometer – Z Direction	3430	-475	-846
6	Right Rear Accelerometer – Z Direction	3430	498	-836
7	Left Rear Accelerometer – X Direction Redundant	3430	-450	-841
8	Right Rear Accelerometer- X Direction Redundant	3430	473	-832

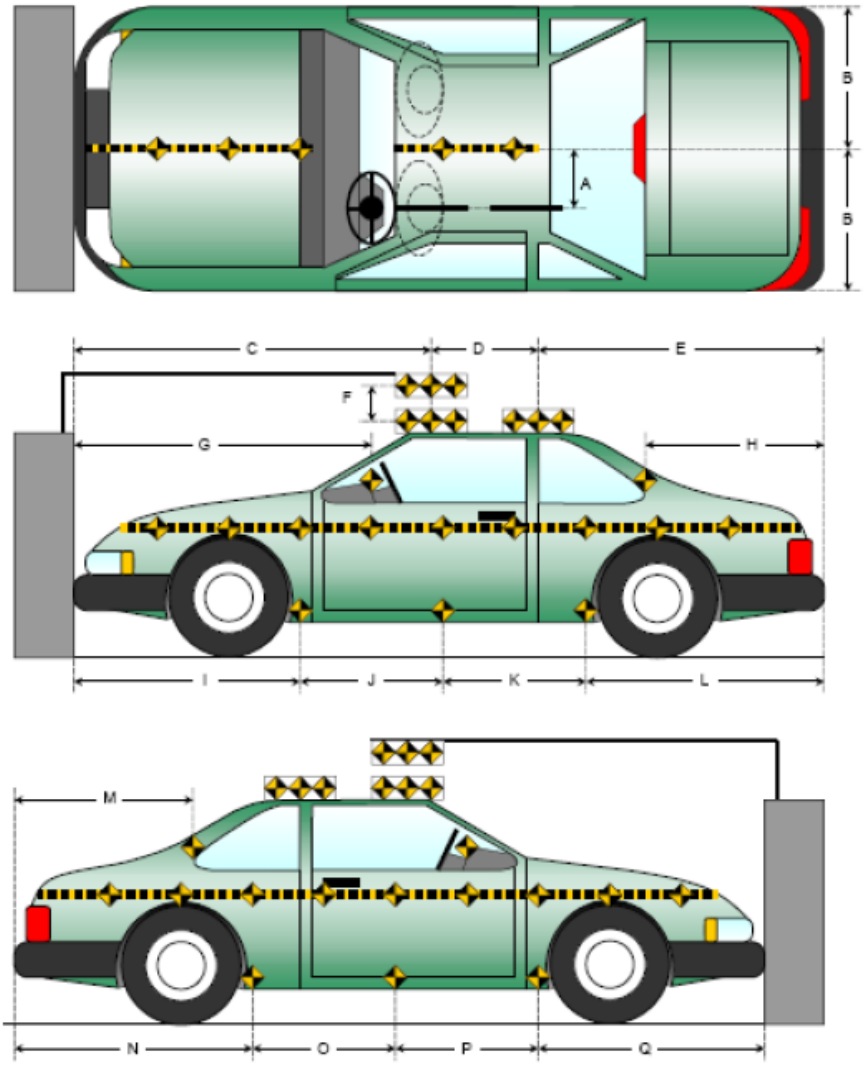
Reference Points: X – Rear Surface of Vehicle (+ forward)
Y – Vehicle Centerline (+ to right)
Z – Ground Plane (+ down)

DATA SHEET NO. 8 - PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

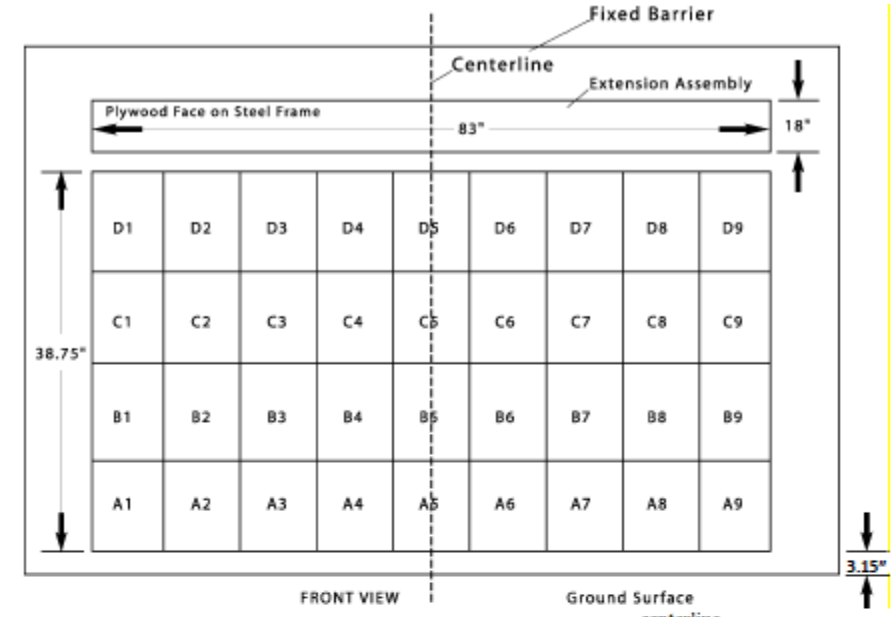
Item	Value
A	490
B	1007
C	2512
D	610
E	3510
F	218
G	1920
H	2950
I	1620
J	1580
K	1555
L	1875
M	2940
N	1870
O	1550
P	1585
Q	1625

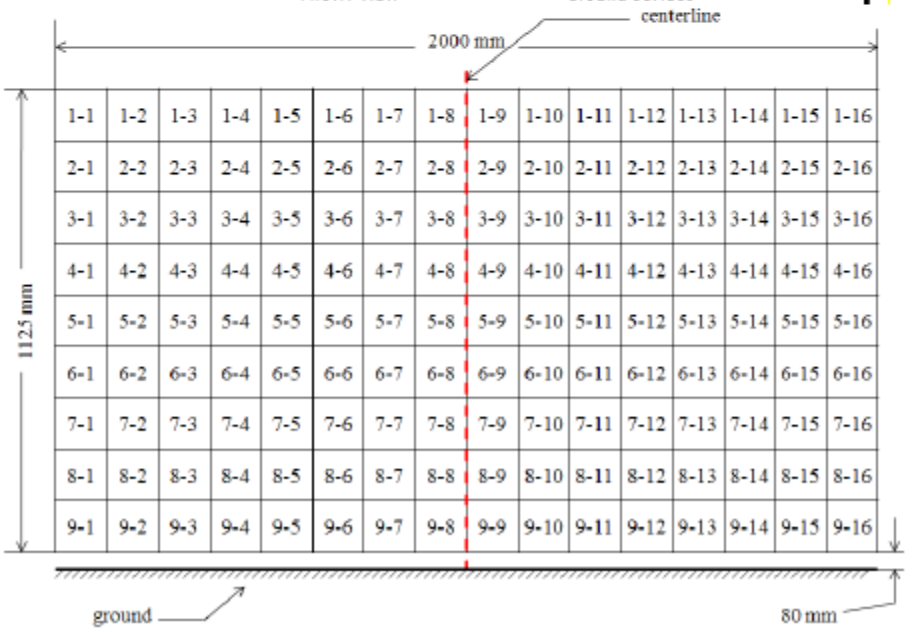
All units in millimeters



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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020





DATA SHEET NO. 10 - TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

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: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

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 Bolster	Glove Box
Right Knee Contact	Knee Bolster	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**			N/A
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	Cracked at lower corners
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

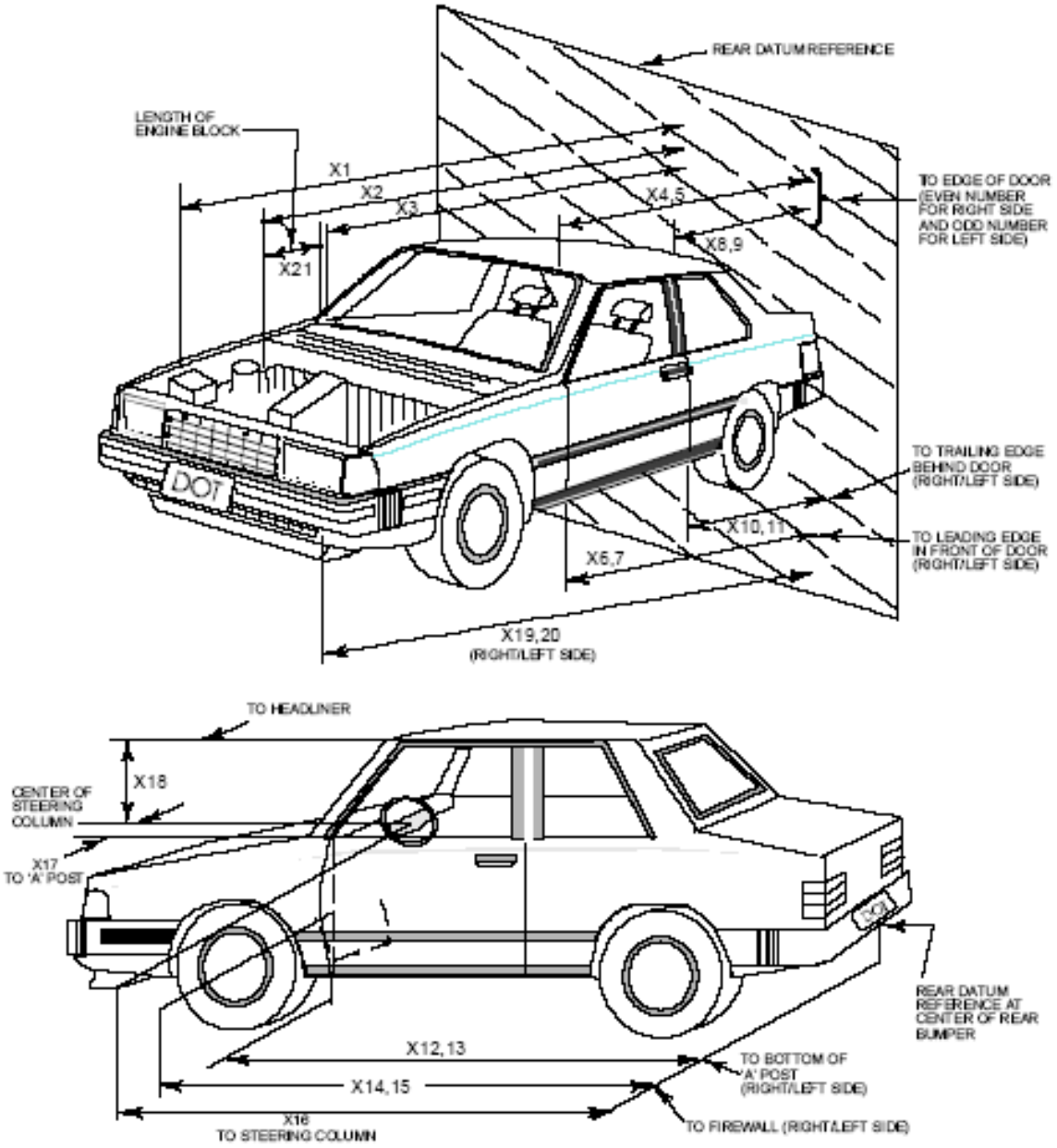
Measured Parameter	Units	Value
Left Side	mm	1875
Center	mm	1891
Right Side	mm	1895
Average	mm	1887

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	No	N/A	No	N/A
Seat Belt Pretensioner	Yes	Yes	Yes	Yes
Seat Belt Load Limiter	Yes	No	Yes	No
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: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020



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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	6630	5895	735
2	Rear Surface of Vehicle (RSOV) to Front of Engine	5830	5628	202
3	RSOV to Firewall	5435	5360	75
4	RSOV to Upper Leading Edge of Right Door	5000	4980	20
5	RSOV to Upper Leading Edge of Left Door	5010	4995	15
6	RSOV to Lower Leading Edge of Right Door	4954	4950	4
7	RSOV to Lower Leading Edge of Left Door	4960	4960	0
8	RSOV to Upper Trailing Edge of Right Door	3930	3910	20
9	RSOV to Upper Trailing Edge of Left Door	3933	3923	10
10	RSOV to Lower Trailing Edge of Right Door	3930	3927	3
11	RSOV to Lower Trailing Edge of Left Door	3935	3936	-1
12	RSOV to Bottom of "A" Post-of Right Side	4945	4925	20
13	RSOV to Bottom of "A" Post-of Left Side	4950	4940	10
14	RSOV to Firewall, Right Side	5455	5380	75
15	RSOV to Firewall, Left Side	5430	5415	15
16	RSOV to Steering Column	4510	4450	60
17	Center of Steering Column to "A" Post	300	255	45
18	Center of Steering Column to Headliner	465	480	-15
19	RSOV to Right Side of Front Bumper	6500	5895	605
20	RSOV to Left Side of Front Bumper	6500	5895	605
21	Length of Engine Block	800	800	0
RD	RSOV to Right Side of Dash Panel	4835	4815	20
CD	RSOV to Center of Dash Panel	4700	4685	15
LD	RSOV to Left Side of Dash Panel	4835	4805	30

All Dimensions in mm

DATA SHEET NO. 13 - ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

VEHICLE INFORMATION

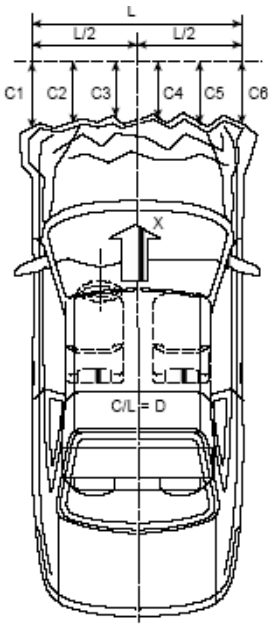
VIN: 3C6UR5HJ8LG101165 Wheelbase: 4305
Vehicle Size Category: Truck Test Weight (kg): 3382.8

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): 55.71
Velocity Change (km/h): 64.21
Time of Separation (ms): 185

CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
Midpoint of Damage: Centerline
Damage Region Length (mm): 1525
Impact Mode: Frontal



No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	6500	5895	605
C2	Crush zone 2 at left side	mm	6605	5915	690
C3	Crush zone 3 at left side	mm	6630	5904	726
C4	Crush zone 4 at right side	mm	6630	5885	745
C5	Crush zone 5 at right side	mm	6605	5895	710
C6	Crush zone 6 at right side	mm	6500	5895	605
L	C1 to C6	mm	1525	1500	25

DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS

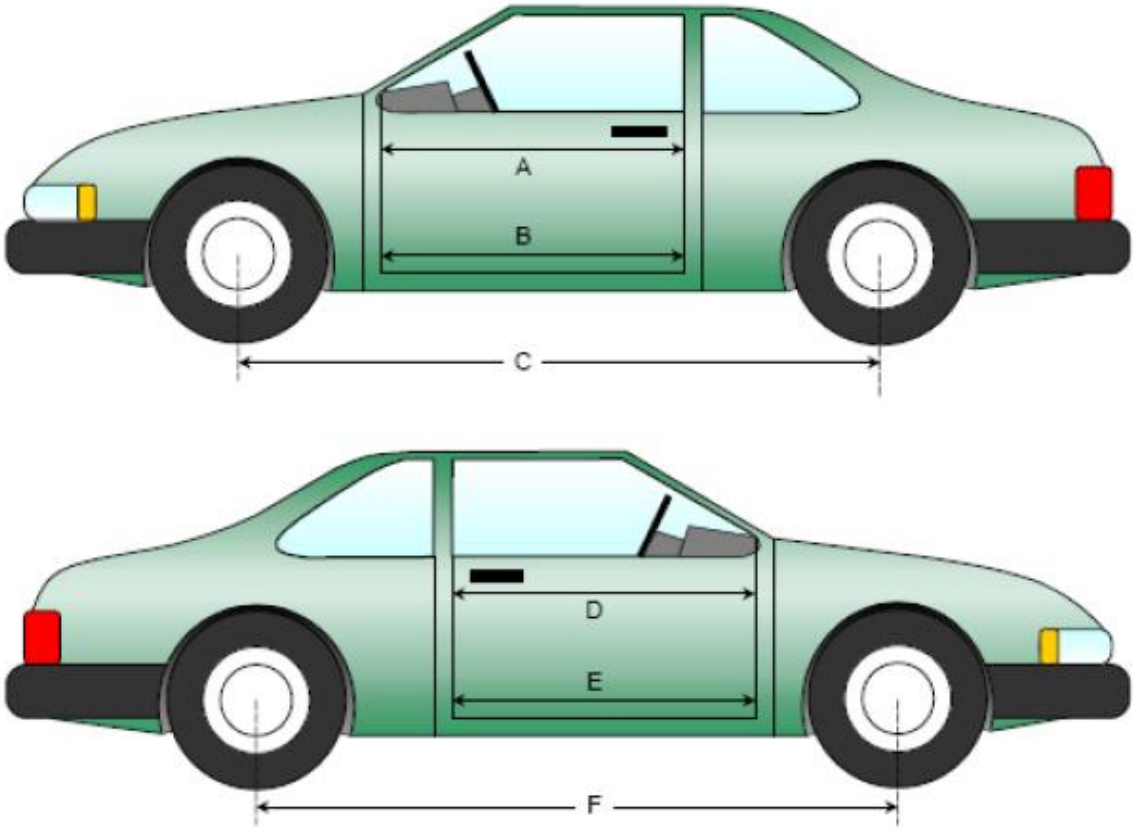
Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

DOOR OPENING WIDTH

No.	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	970	970	0
B	Left Side Lower	mm	940	940	0
D	Right Side Upper	mm	970	970	0
E	Right Side Lower	mm	940	940	0

WHEELBASE MEASUREMENTS

No.	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	4305	4190	115
F	Right Side Wheelbase	mm	4305	4290	15



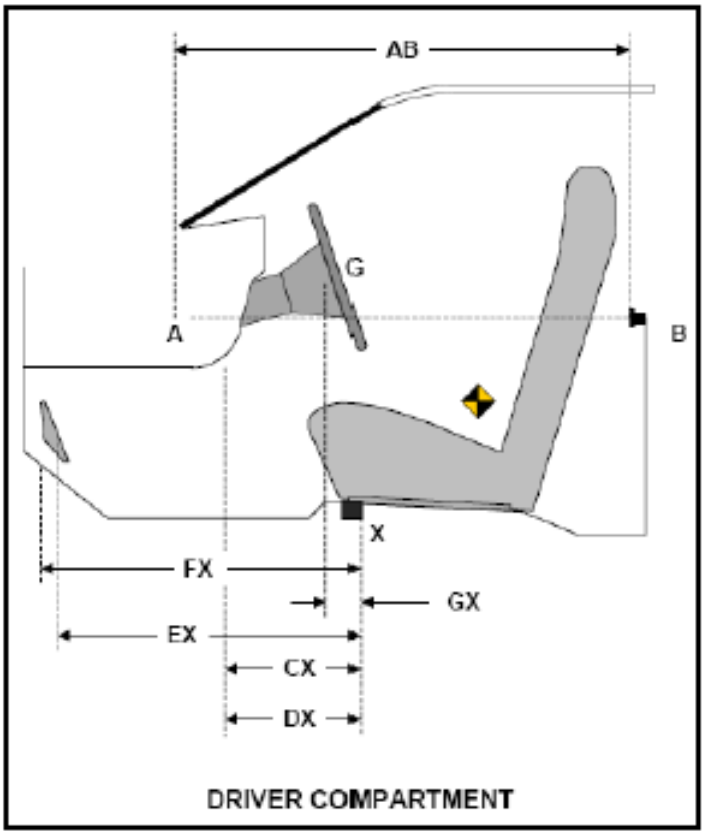
DATA SHEET NO. 14 - VEHICLE INTRUSION MEASUREMENTS (CONT'D)

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	980	980	0
CX	Left Knee Bolster to X	mm	235	220	15
DX	Right Knee Bolster to X	mm	200	110	90
EX	Brake Pedal to X	mm	510	410	100
FX	Foot Rest to X	mm	625	570	55
GX	Center of Steering Column Wheel Hub to X	mm	50	55	-5

X = Front of Seat Track (Stationary)



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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

Please provide windshield mounting details.

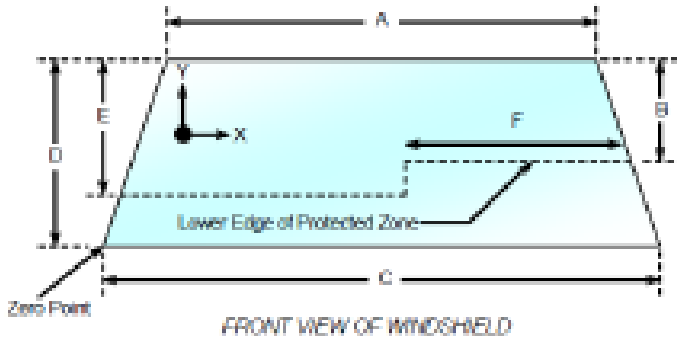
The standard requires that the post-test retention measurement be a minimum of 75% of the pre-test total periphery measurement for vehicle not equipped with occupant passive restraint and 50% for each side of the windshield for vehicle which are equipped with occupant passive restraints.

Temperature of windshield molding during test: 21.4°C

WINDSHIELD PERIPHERY MEASUREMENTS

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2290	2290	100.0
Right Side	2290	2290	100.0
Total	4580	4580	100.0

Item	Units	Value
A	mm	1390
B	mm	417
C	mm	1560
D	mm	815
E	mm	480
F	mm	473



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: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

FMVSS 301 FUEL SYSTEM INTEGRTY POST IMPACT DATA

Temperature at Time of Impact: 21.4°C Test Time: 16:15

Stoddard Solvent Spillage Measurements

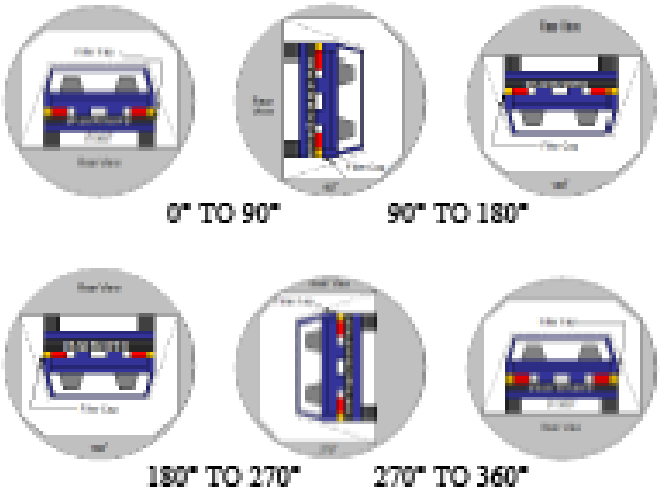
A	From impact until vehicle motion ceases: (maximum allowable – 1 oz.)	0 oz.
B	For the 5-minute period after motion ceases: (maximum allowable – 5 oz.)	0 oz.
C	For the following 25 minutes: (maximum allowable – 1 oz./minutes)	0 oz.
D	Spillage: None	

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

Test Vehicle: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

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

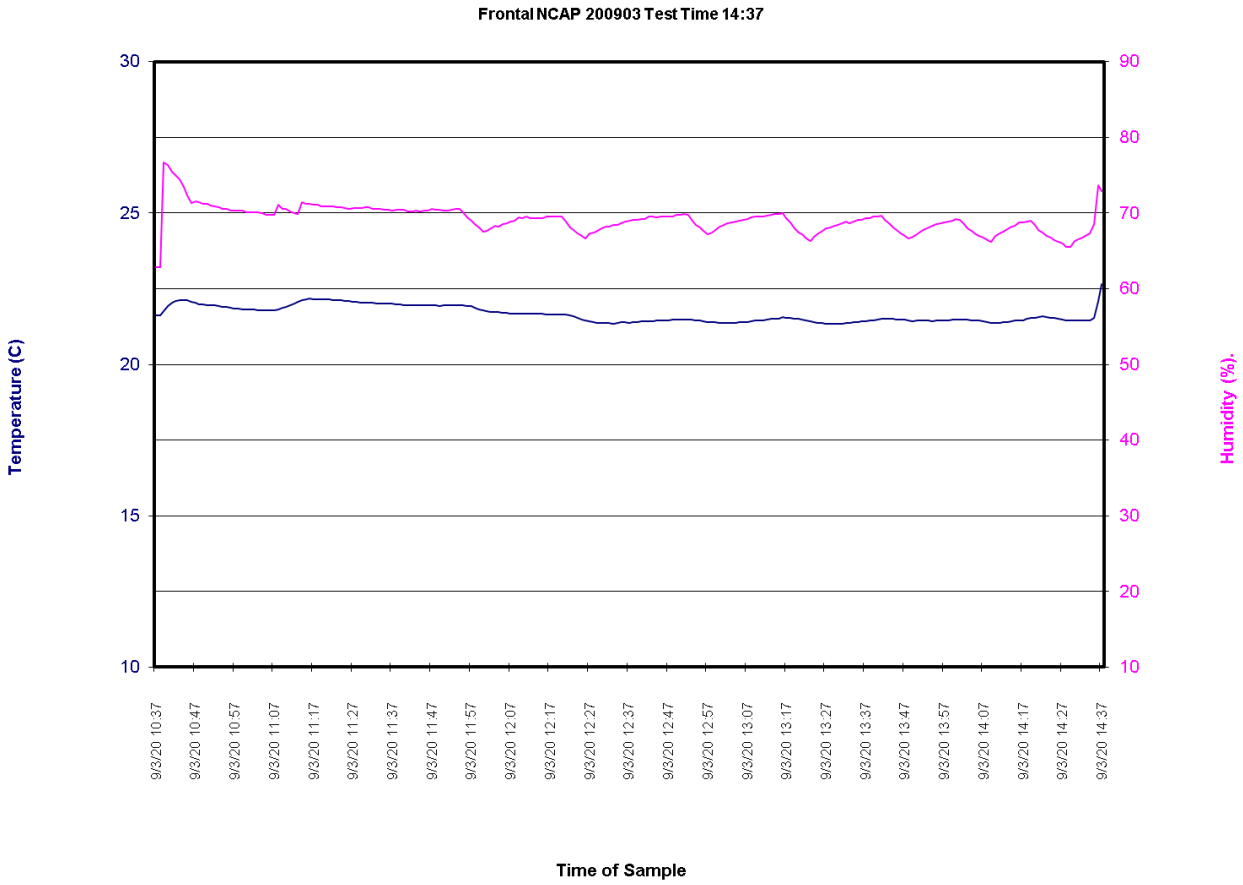
Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0º to 90º	0	0	0	N/A
90º to 180º	0	0	0	N/A
180º to 270º	0	0	0	N/A
270º to 360º	0	0	0	N/A

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: 2020 Ram 2500 Crew Cab NHTSA No.: M20200313
Test Program: NCAP Frontal Impact Test Date: 9/3/2020

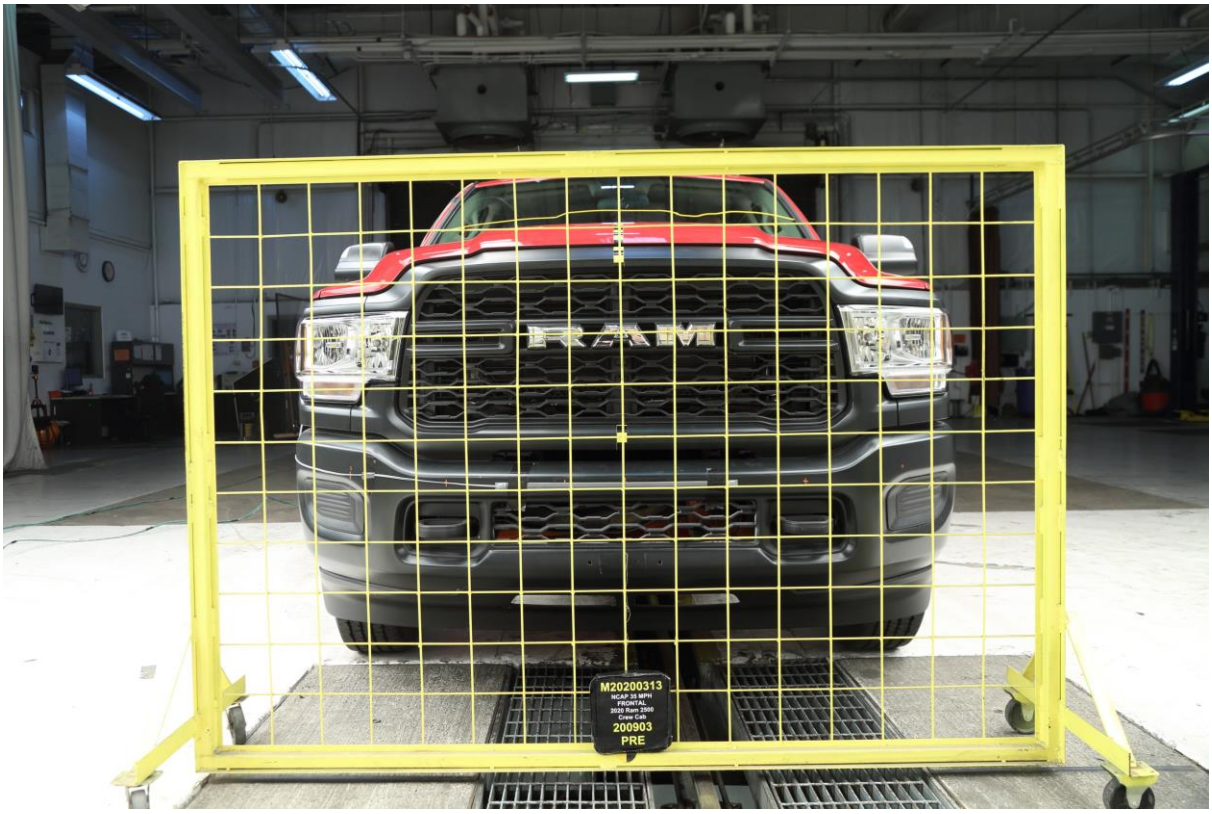


APPENDIX A
PHOTOGRAPHS

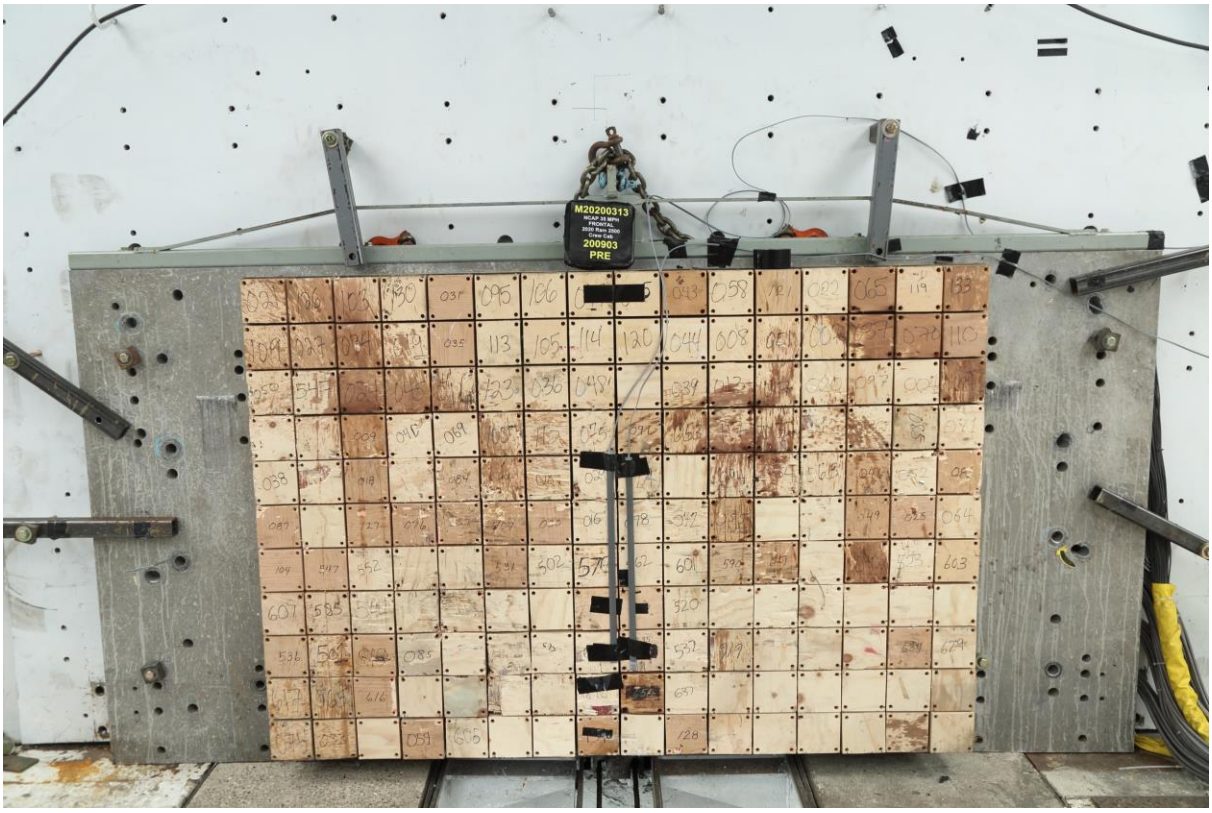
TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

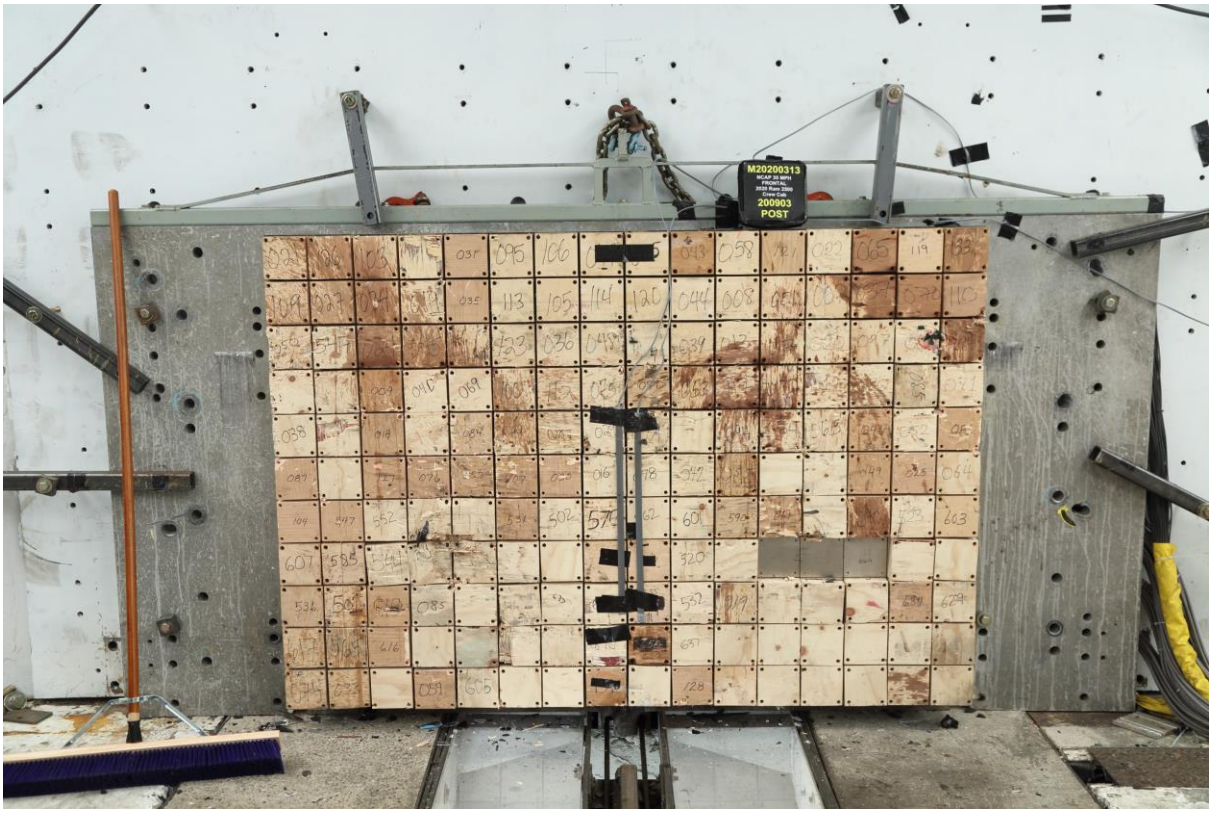
TABLE OF PHOTOGRAPHS (CONTINUED)



001 Load Cell Location

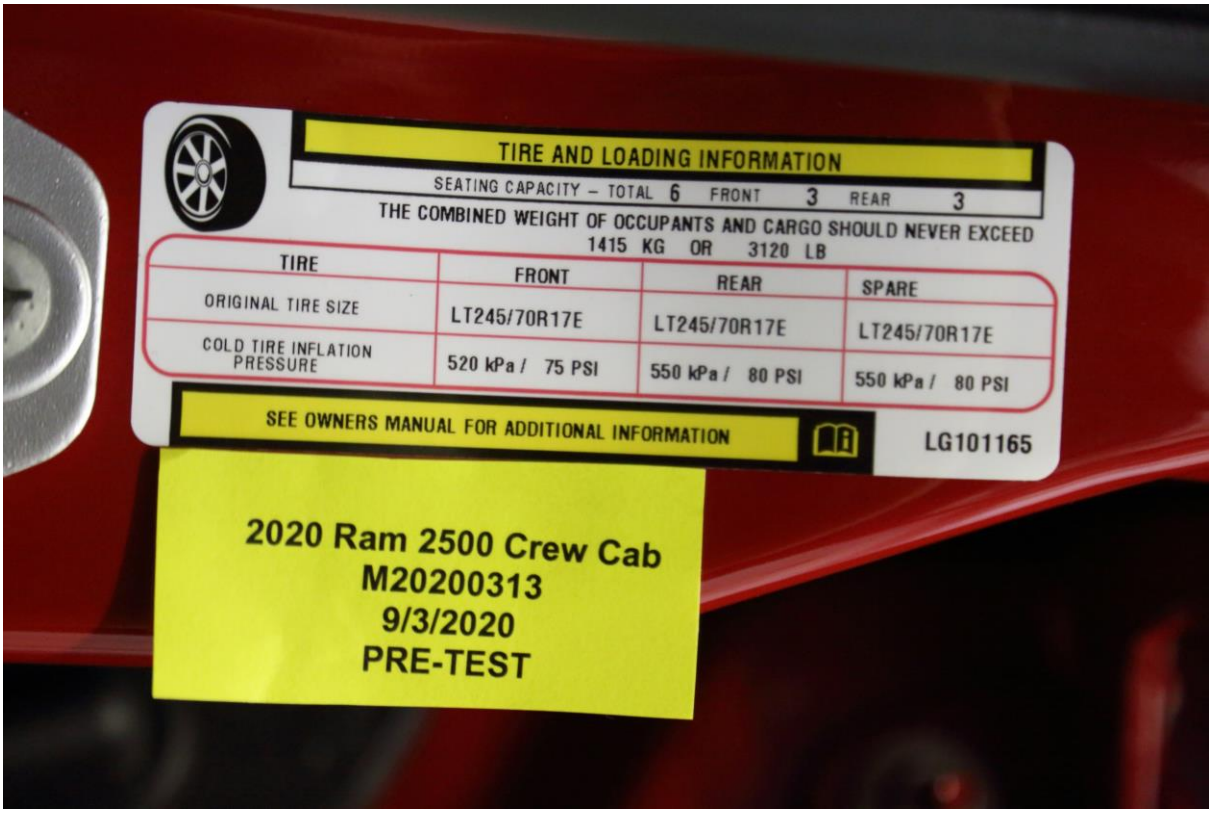


002 Pre-Test Load Cell Wall



003 Post-Test Load Cell Wall

004 Manufacturer's Label



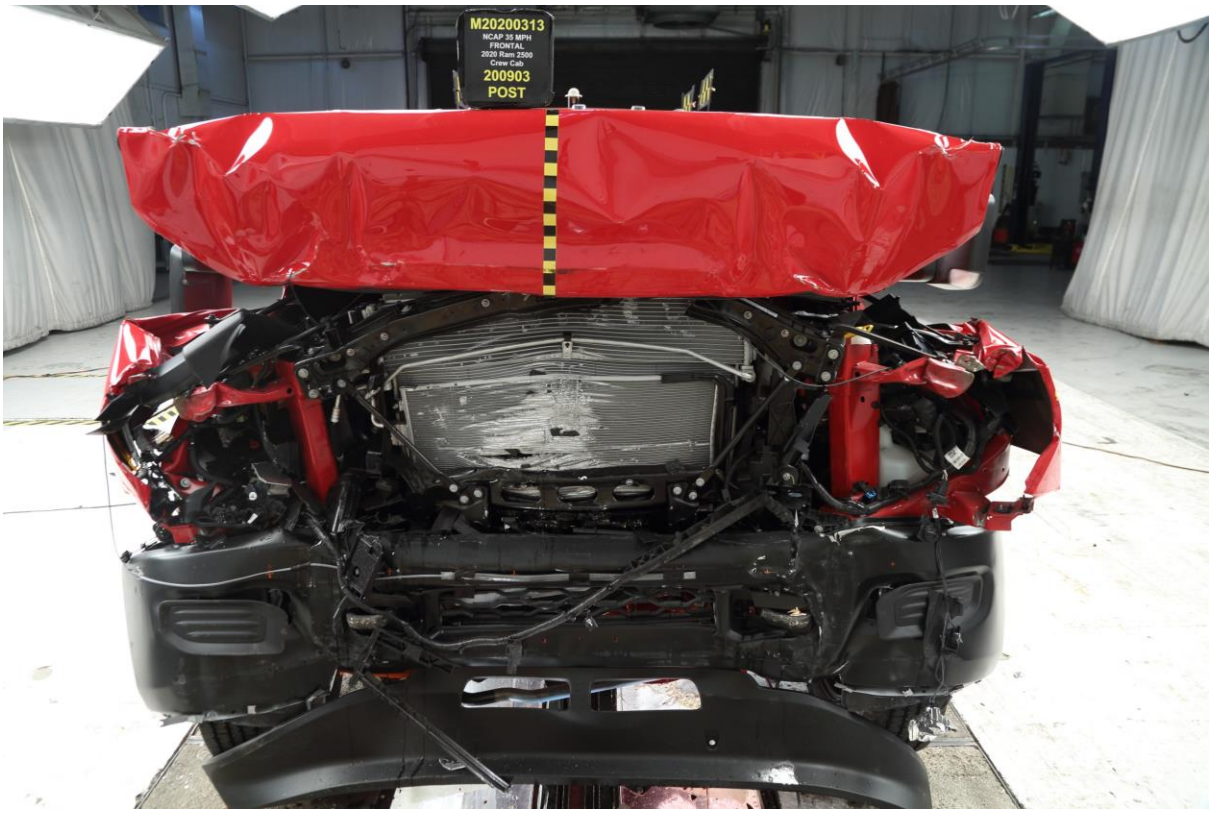
005 Tire Placard

Intentionally Left Blank

006 2020 Ram 2500 Crew Cab 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

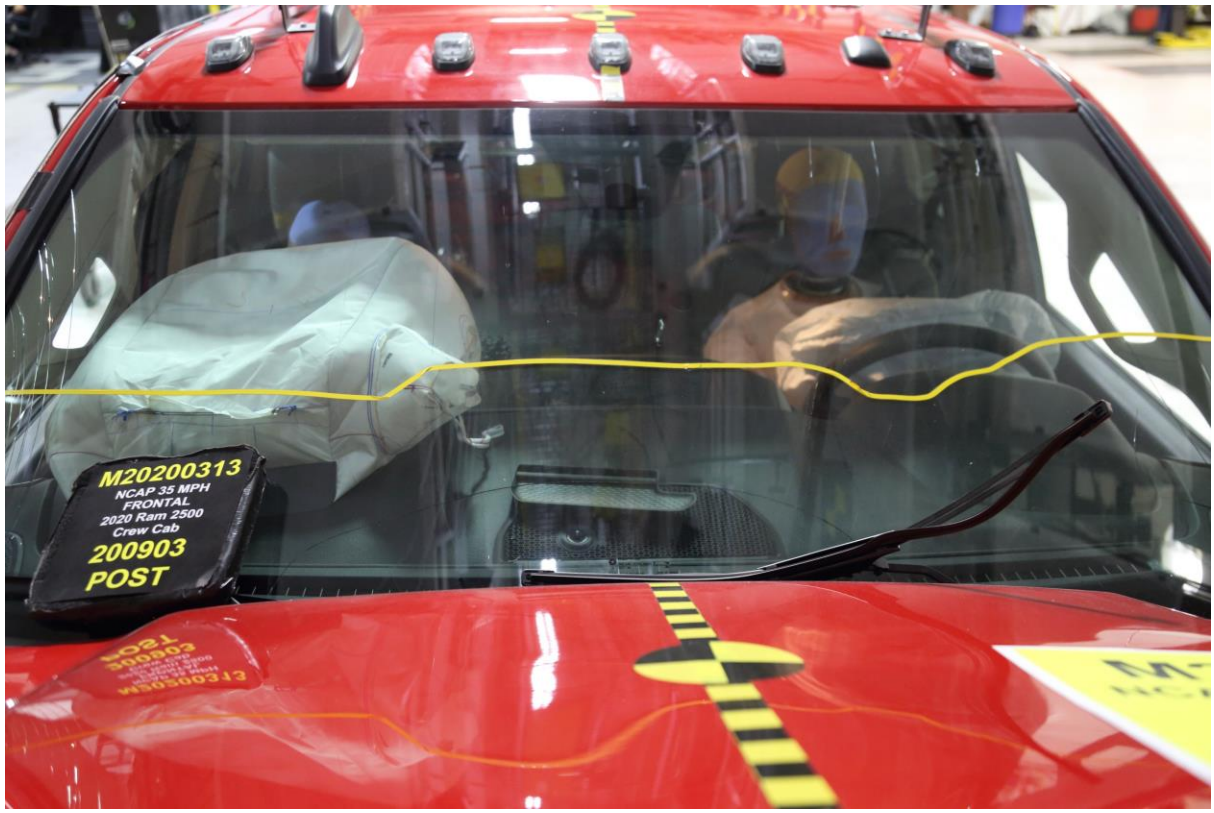
014 Pre-Test Right Front 3-4 View

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

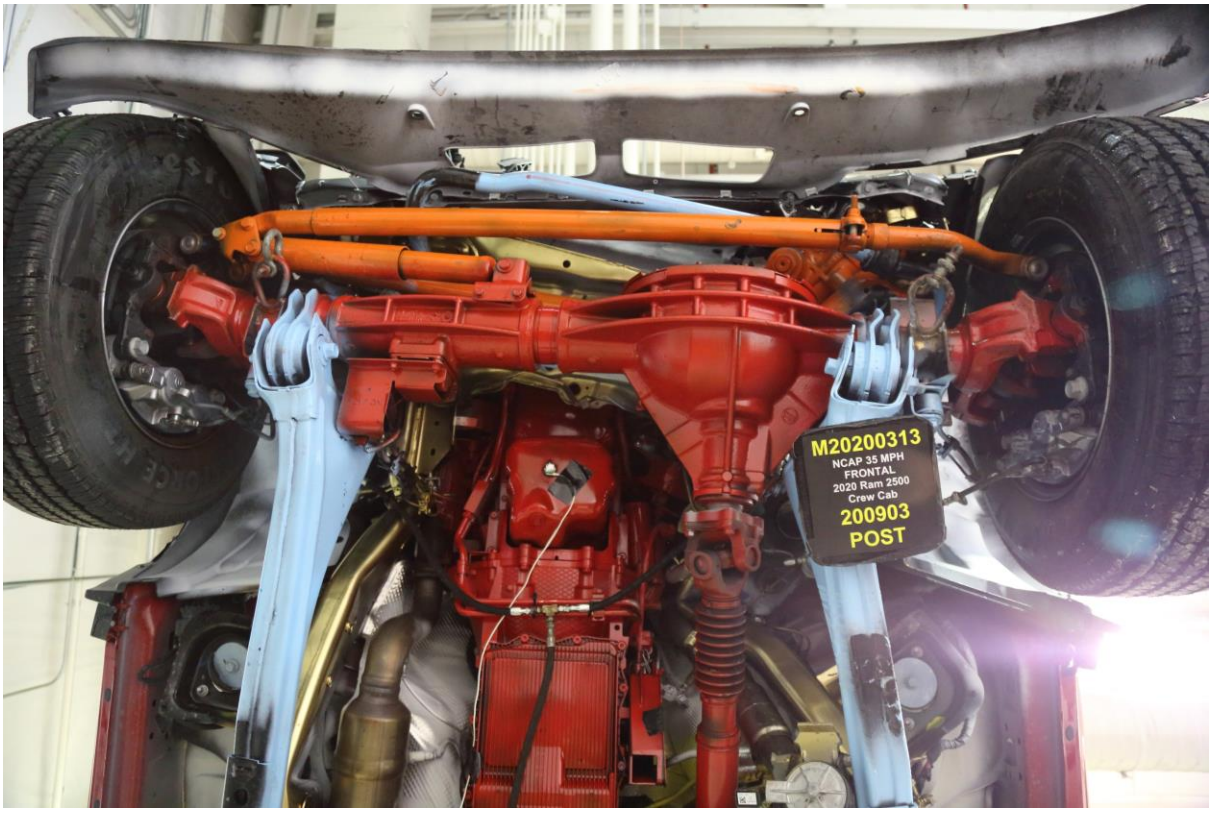
020 Pre-Test Engine Compartment View

021 Post-Test Engine Compartment View

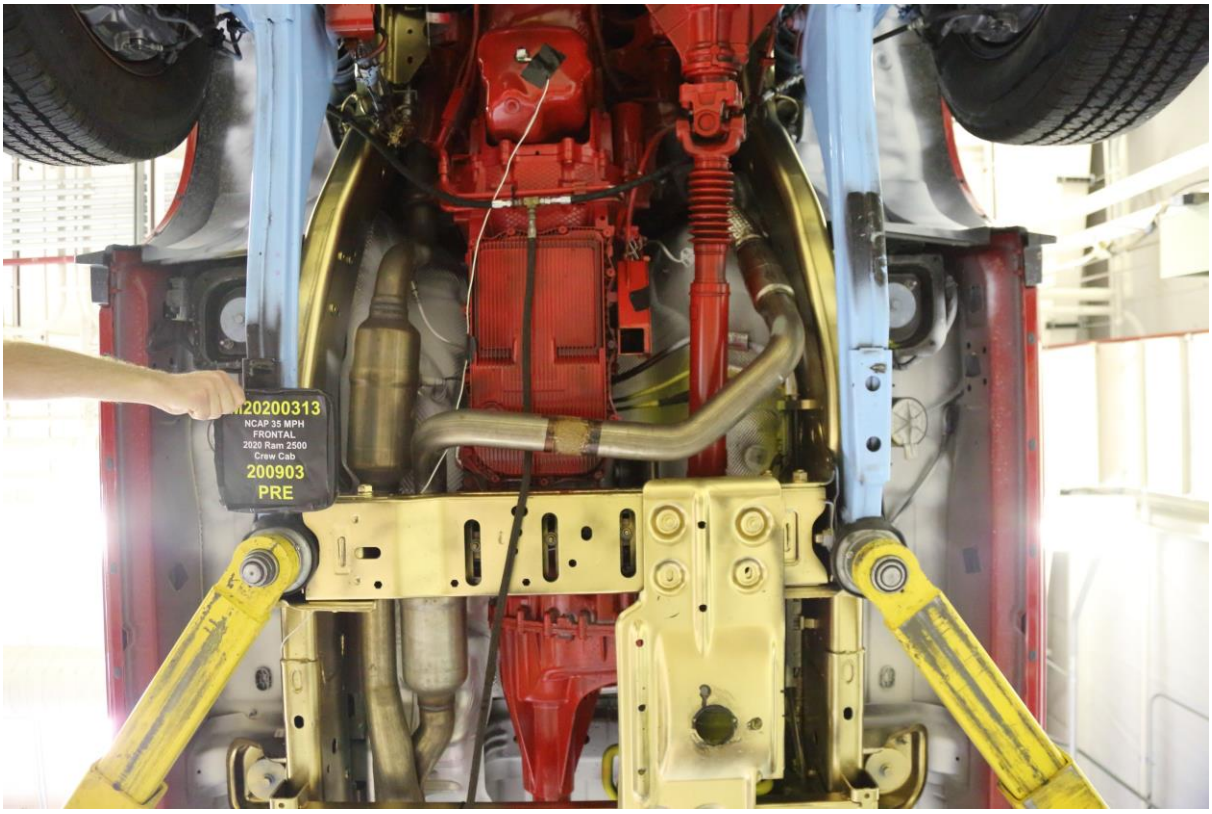
022 Pre-Test Fuel Filler Cap View

023 Post-Test Fuel Filler Cap View

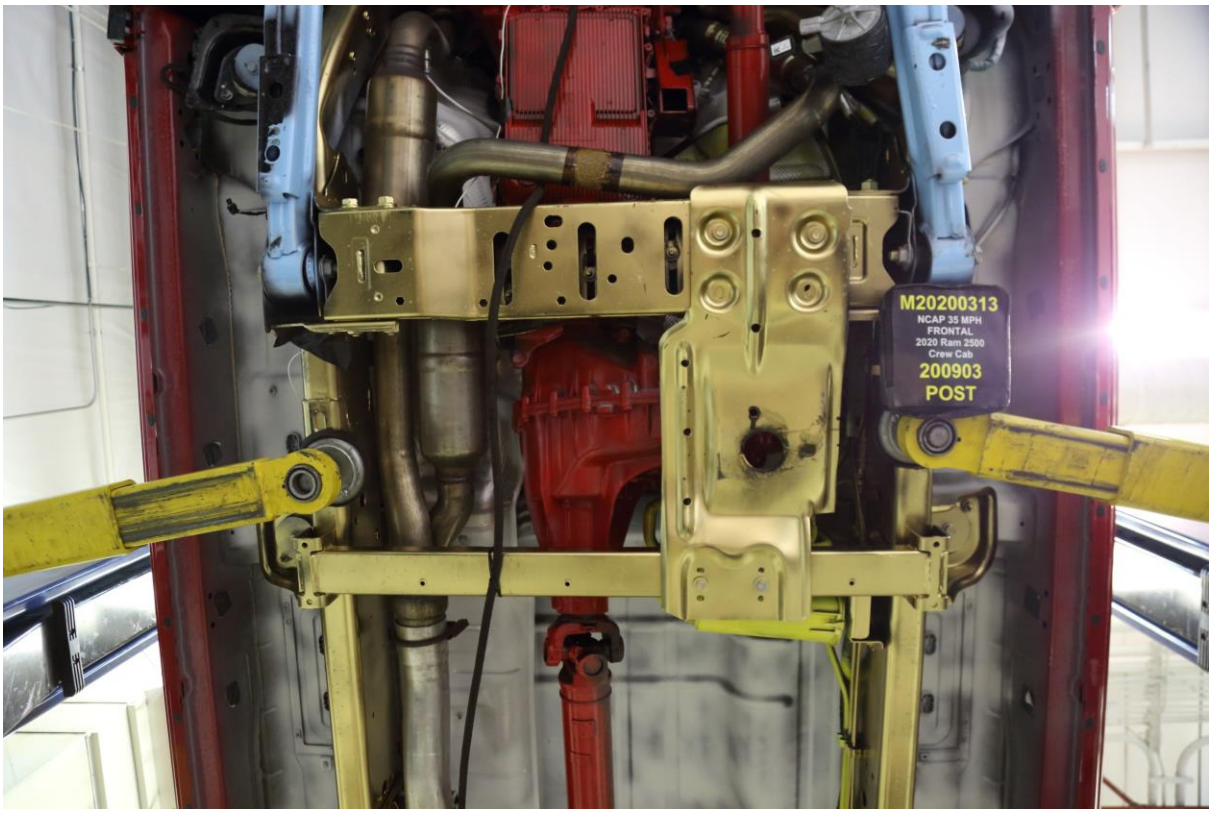
024 Pre-Test Front Underbody View



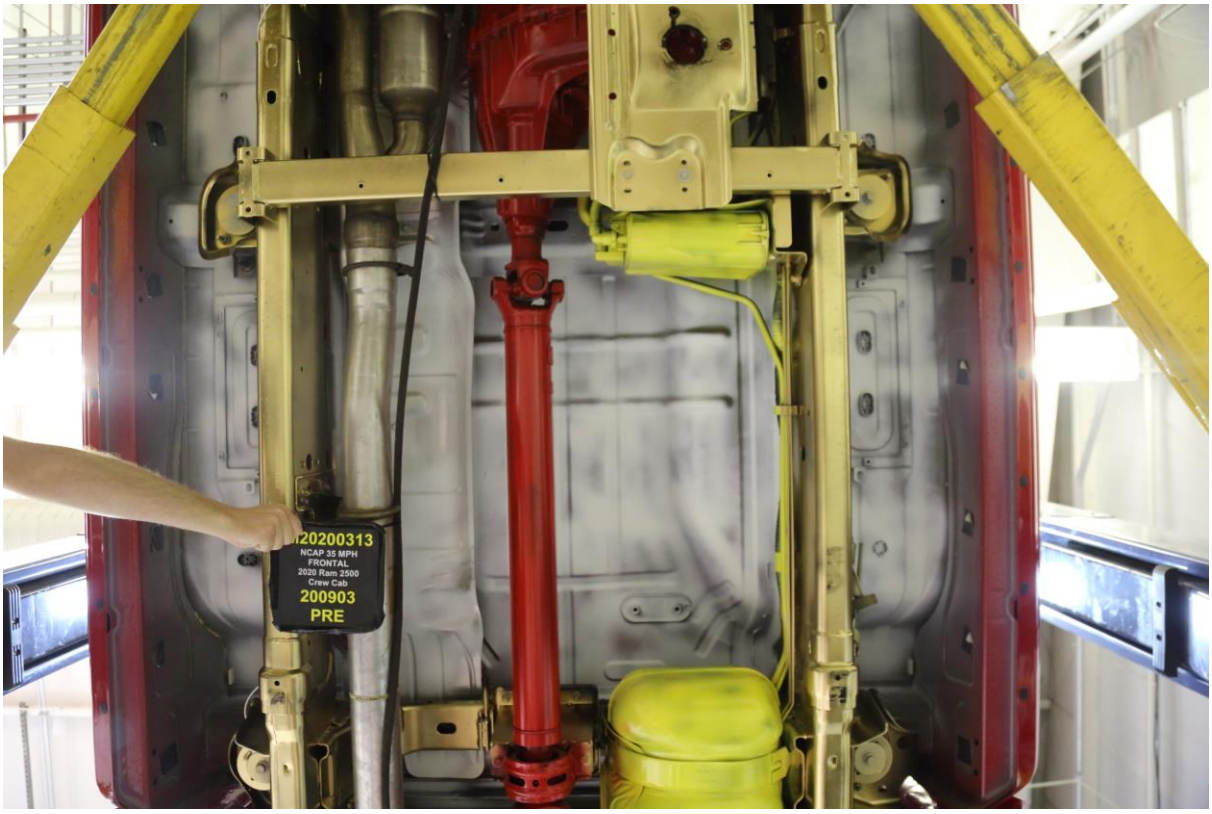
025 Post-Test Front Underbody View



025a Pre-Test Mid Front Underbody View



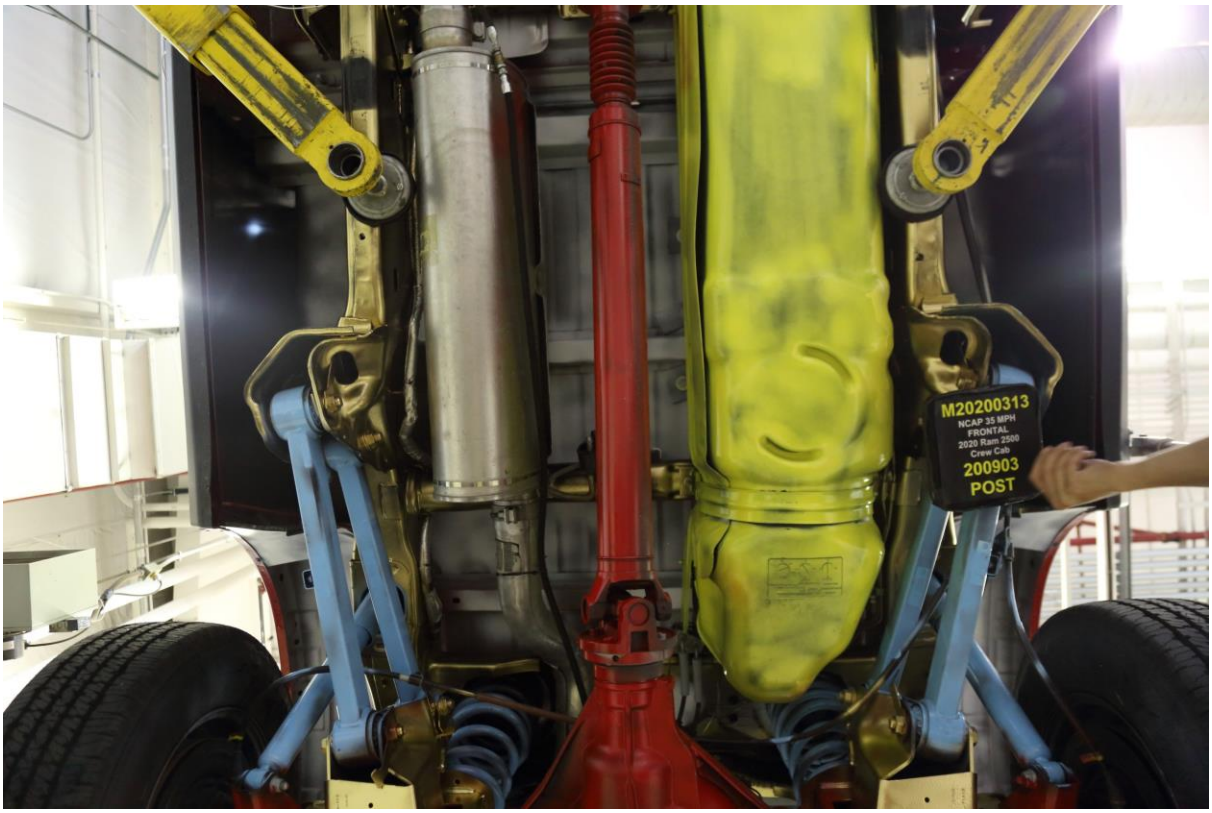
025b Post-Test Mid Front Underbody View



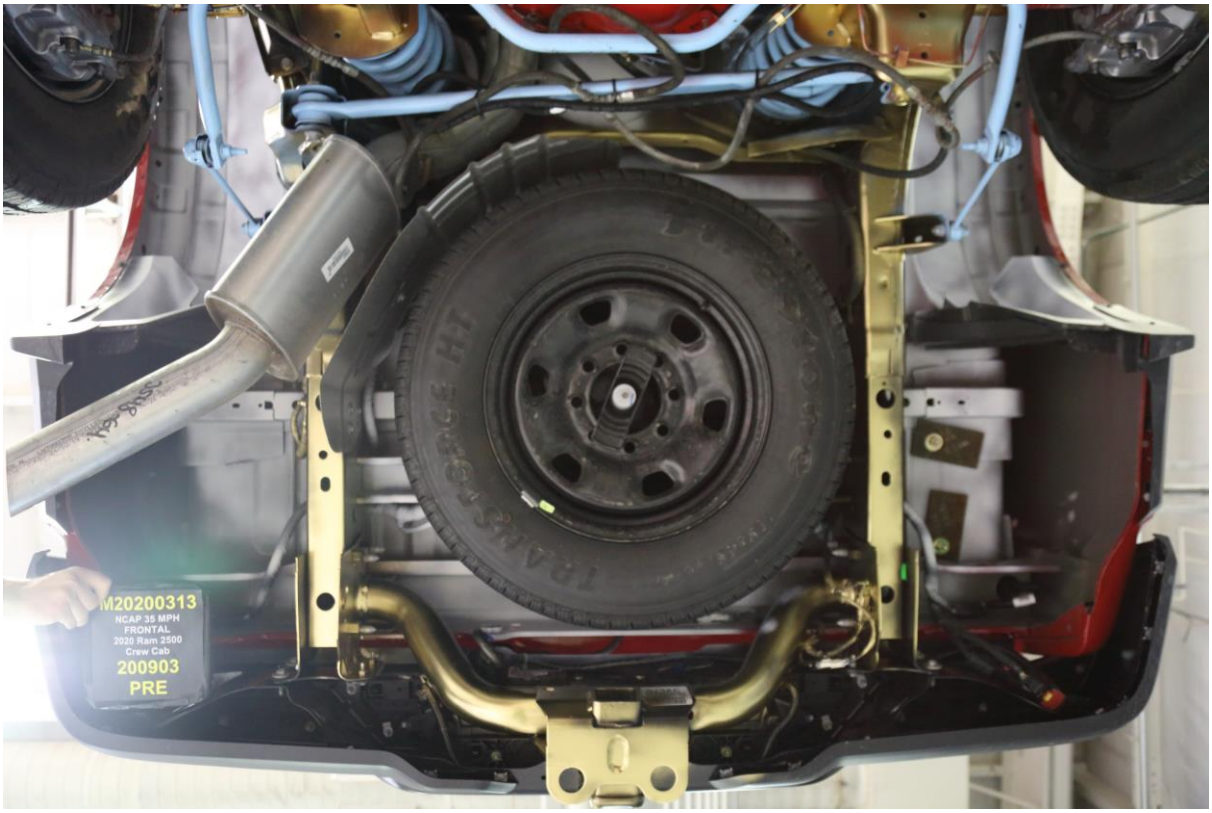
025c Pre-Test Mid Underbody View

025d Post-Test Mid Underbody View

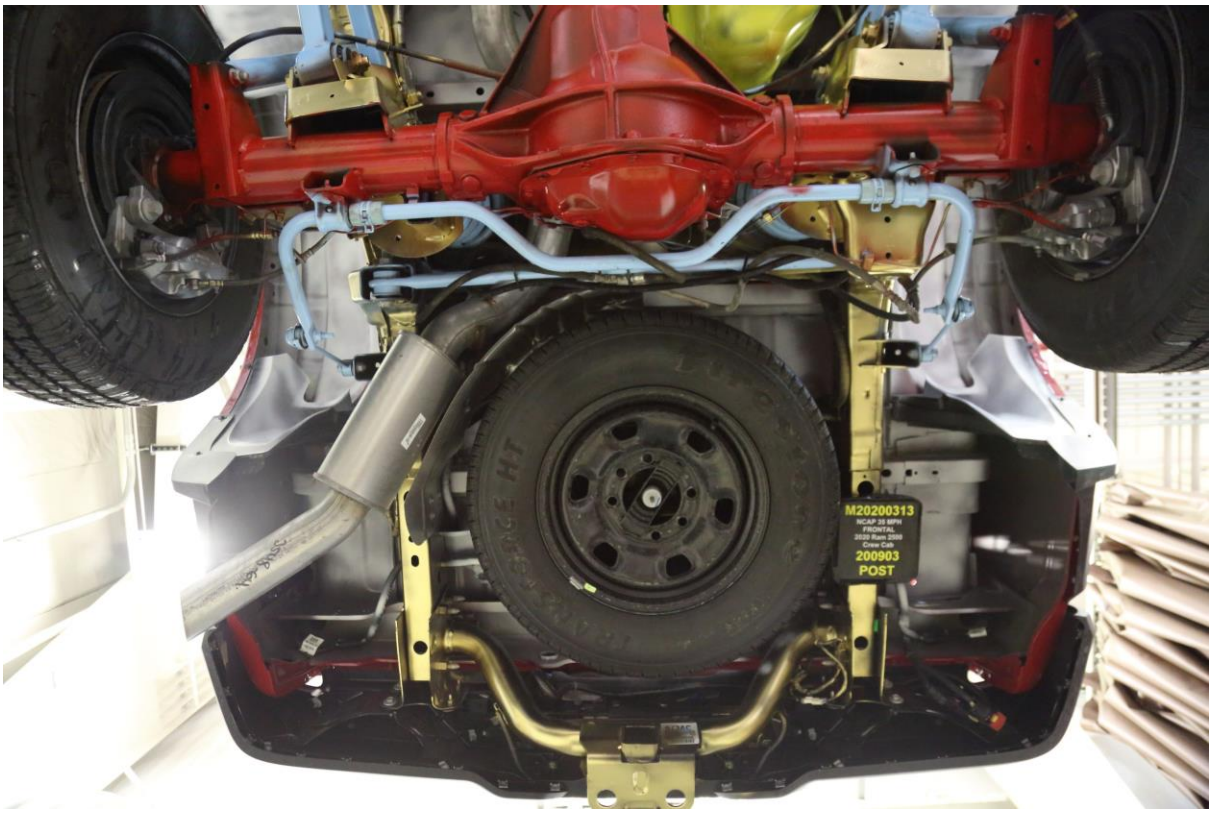
025e Pre-Test Mid Rear Underbody View



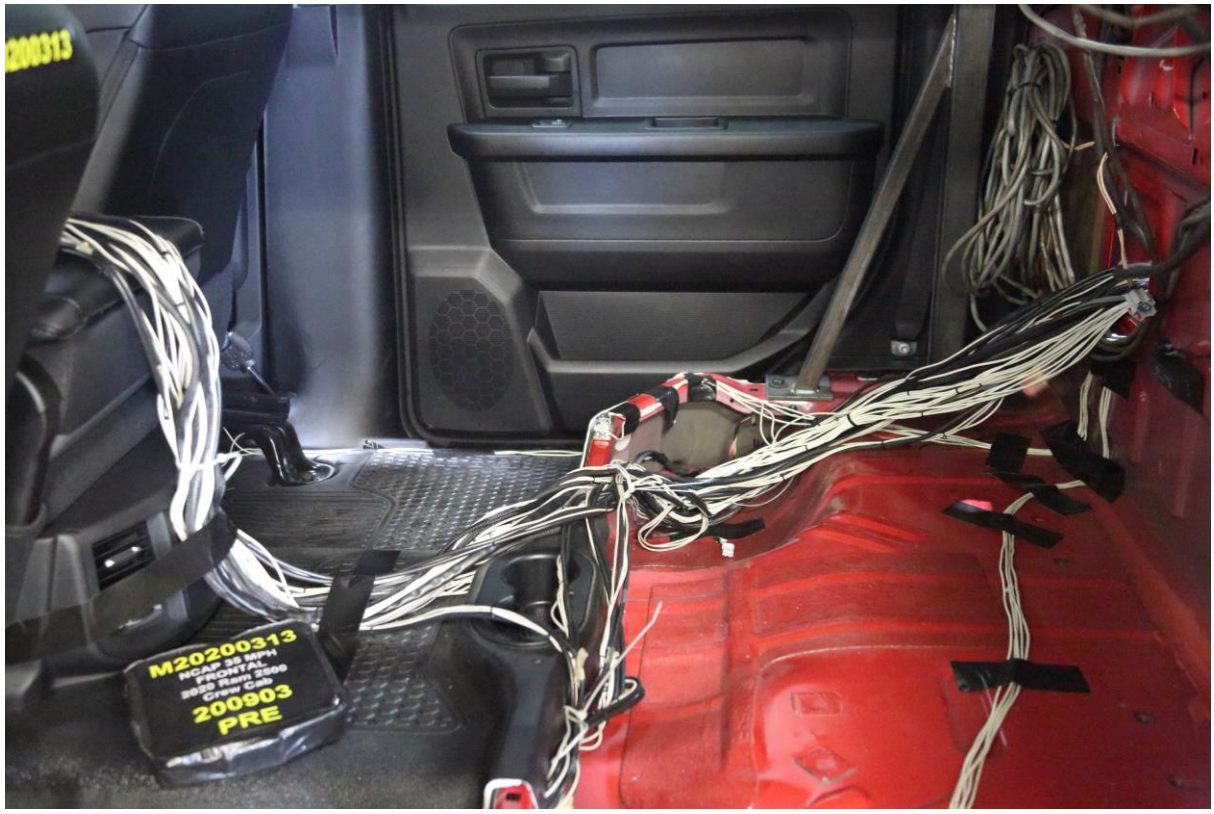
025f Post-Test Mid Rear Underbody View



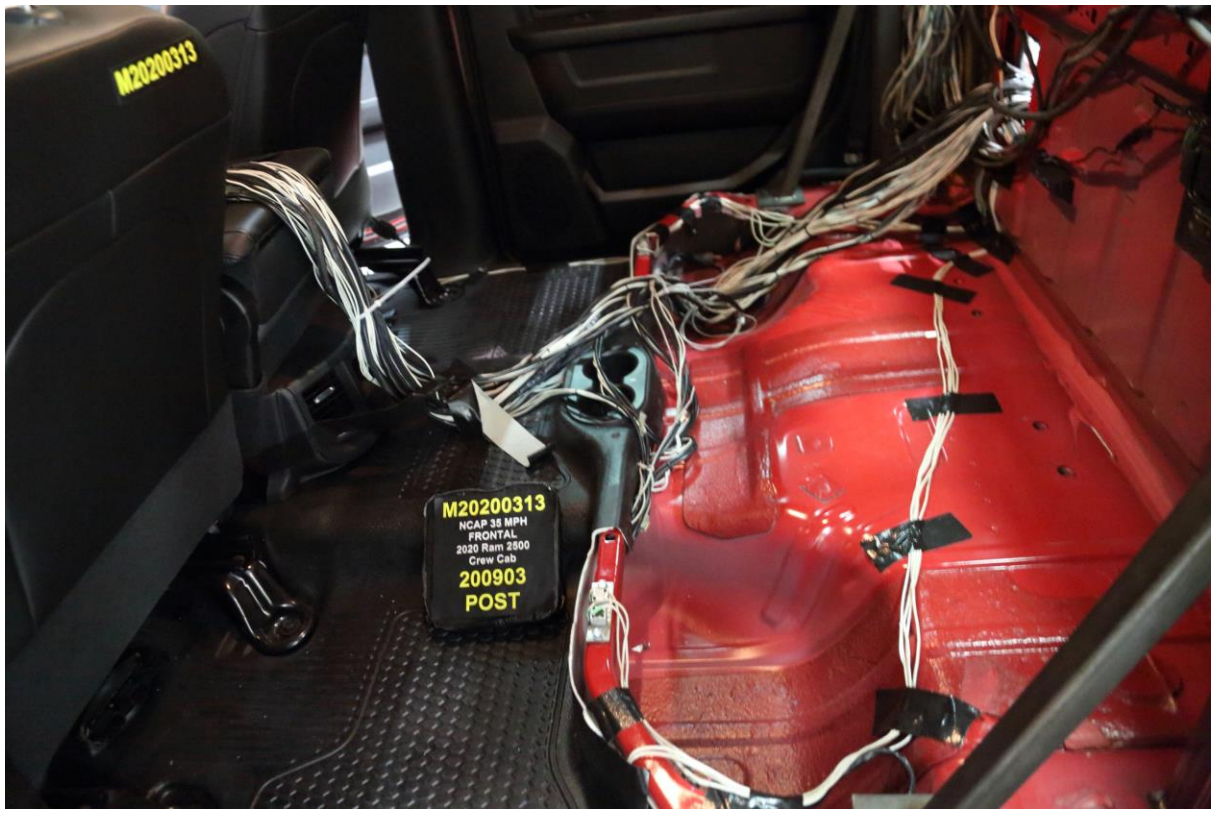
026 Pre-Test Rear Underbody View



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

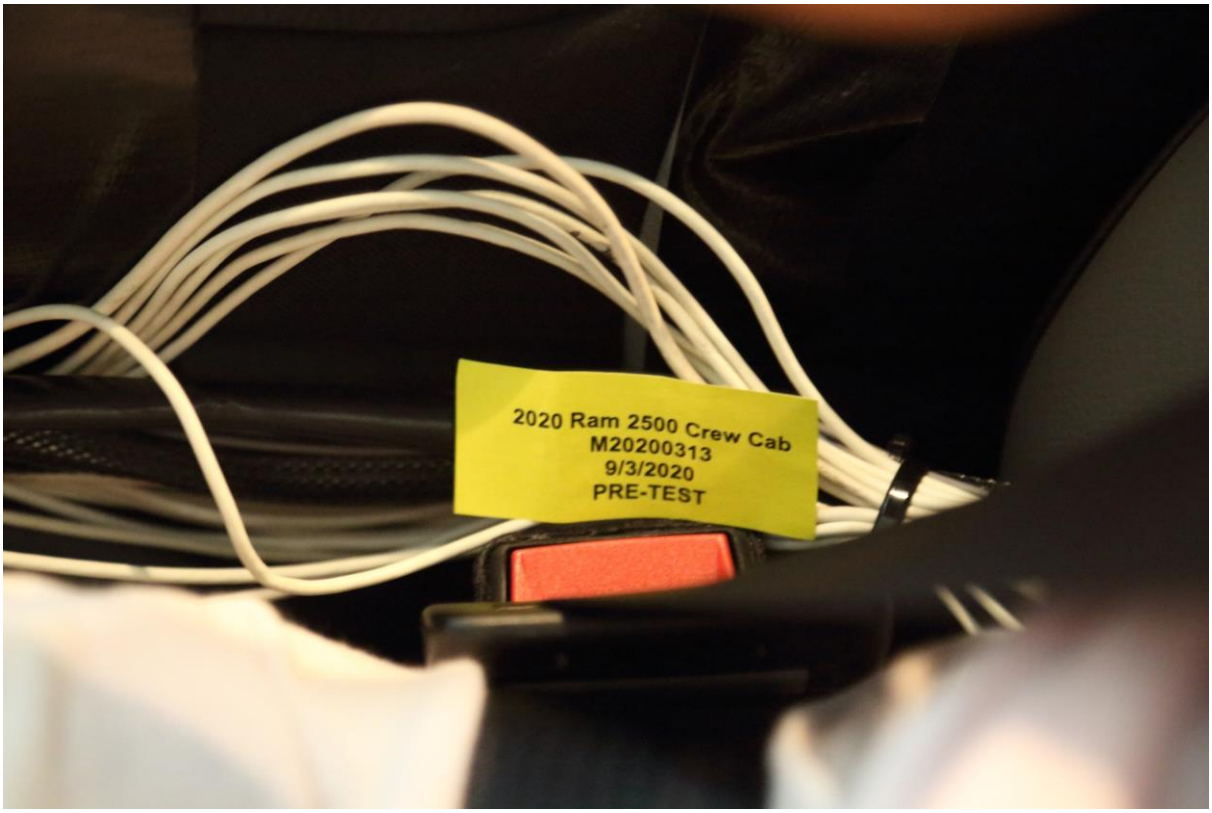
035 Post-Test Driver Dummy and Vehicle Interior View

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



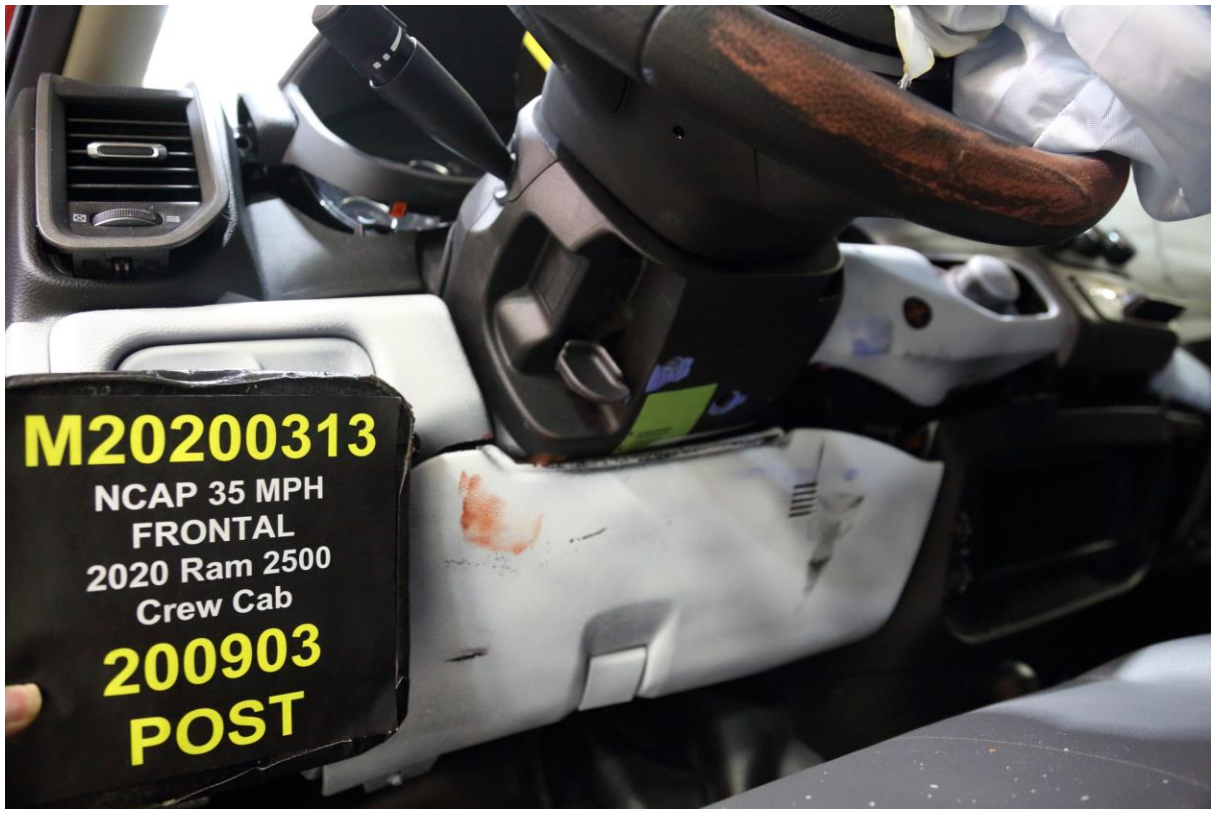
040 Pre-Test View of Belt Buckle and Latch Plate for Driver Dummy

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

042 Pre-Test Driver Dummy Feet

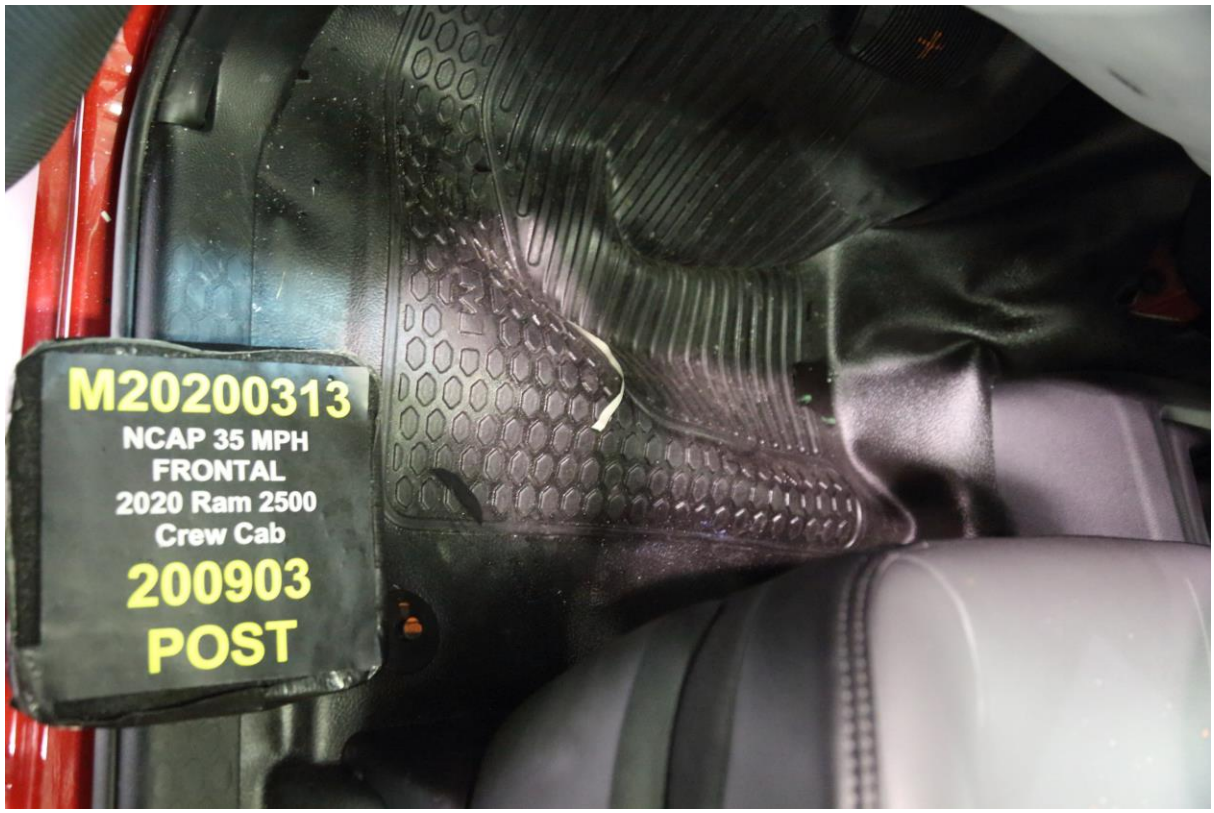
043 Post-Test Driver Dummy Feet

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

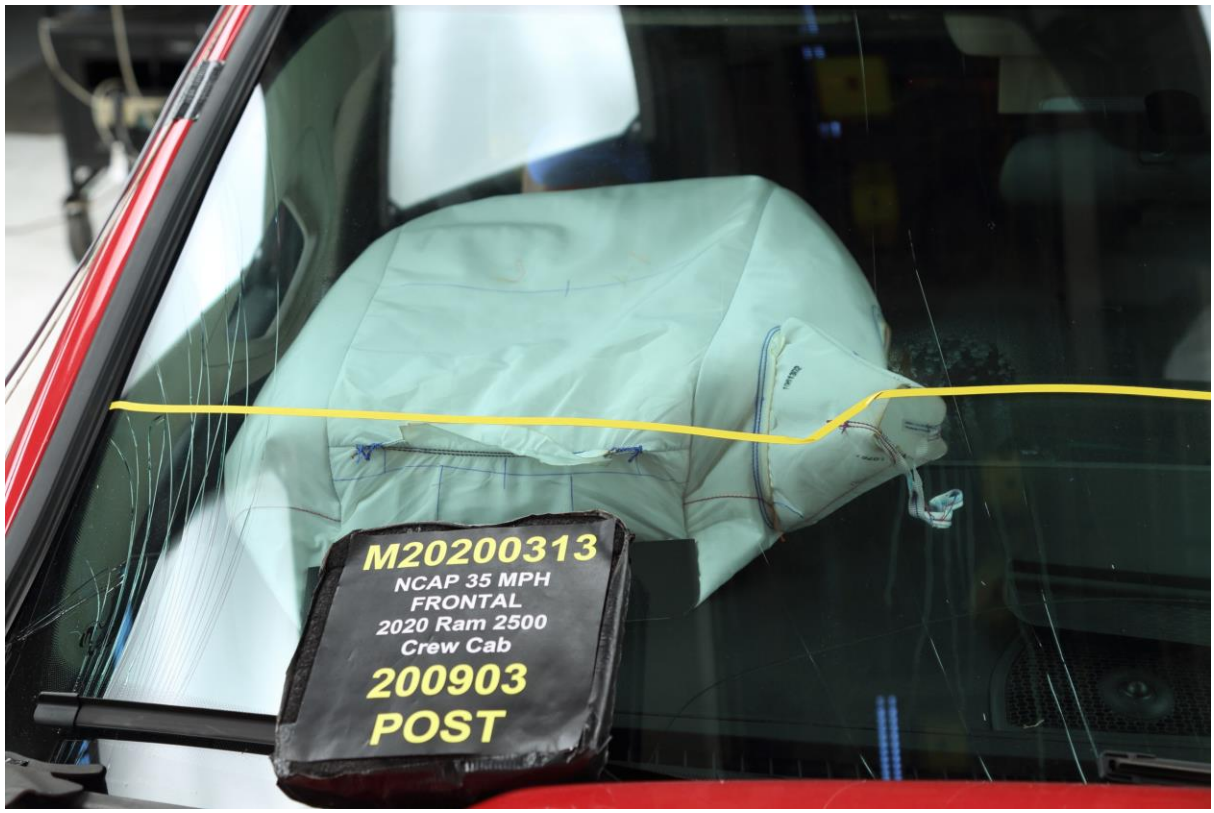
050 Post-Test Driver Dummy Contact with Headrest

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

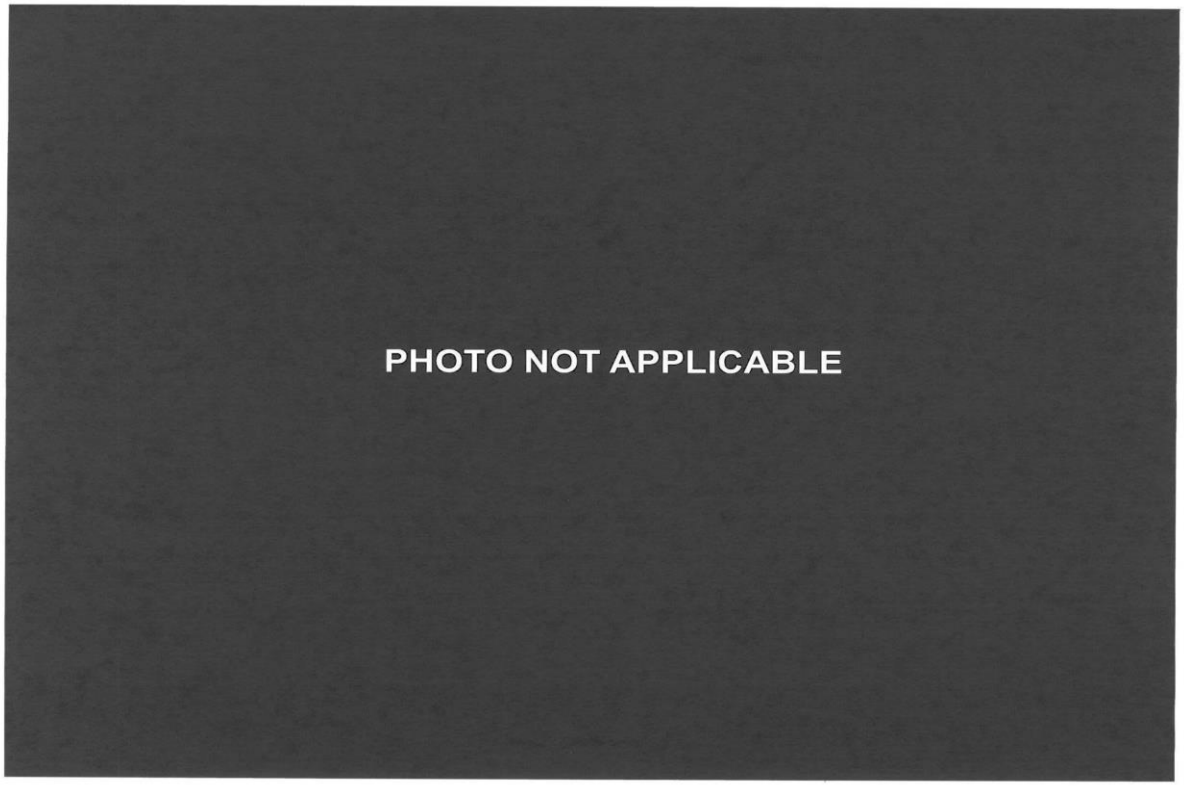
070 Post-Test Passenger's Side Floorpan

071 Post-Test Passenger Dummy Face

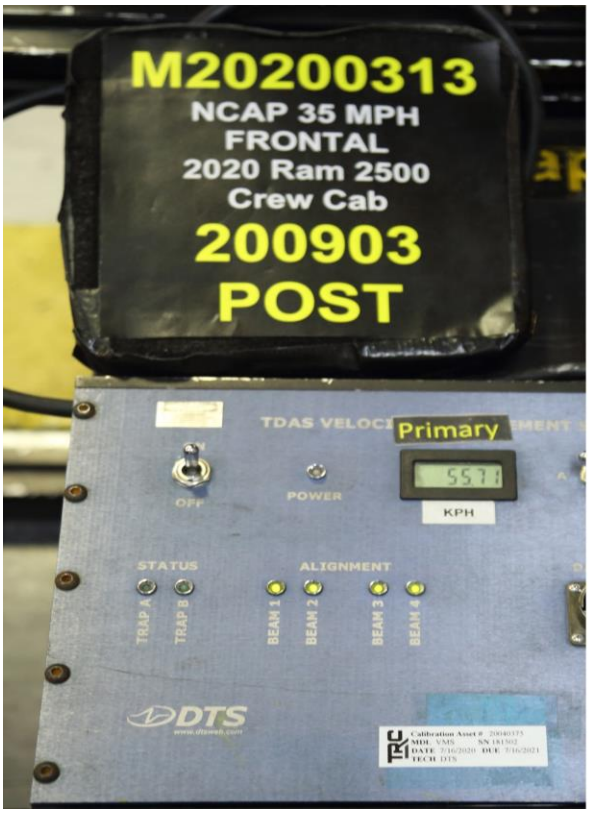
072 Post-Test Passenger Dummy Contact with Airbag

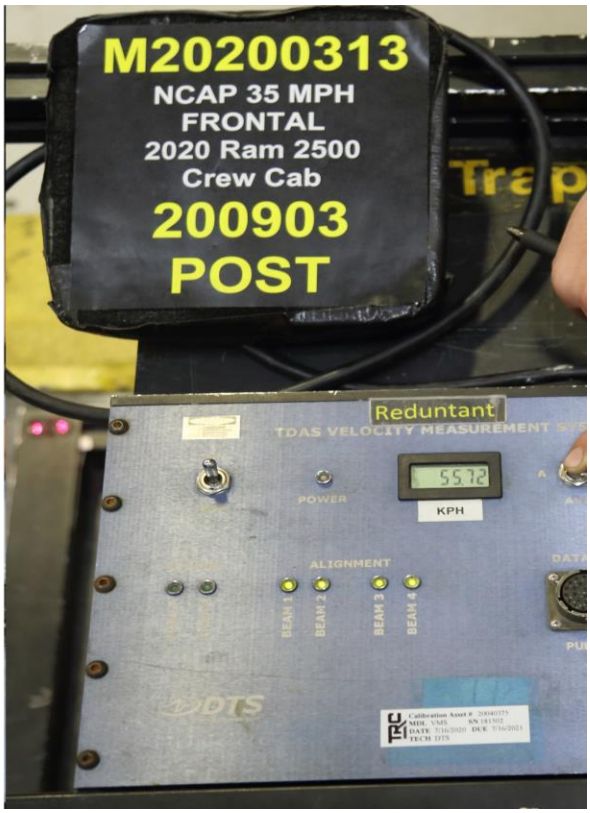
073 Post-Test Passenger Dummy Contact with Headrest

074 Photograph of Ballast Installed in Vehicle



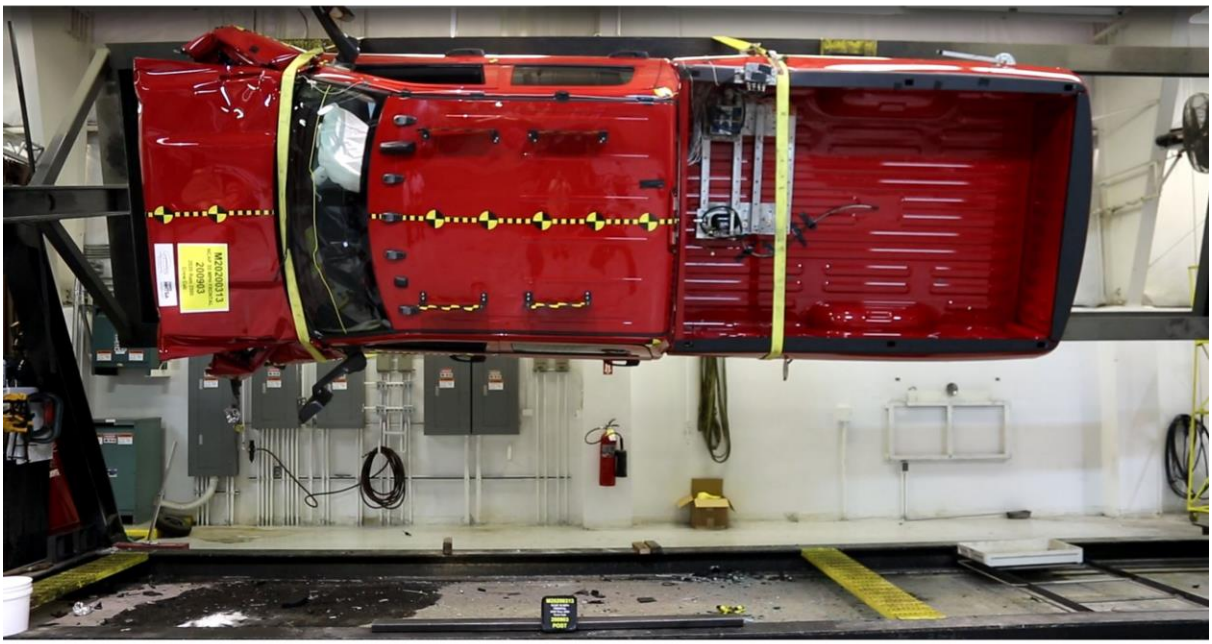
075 Post-Test Stoddard Spillage Location View



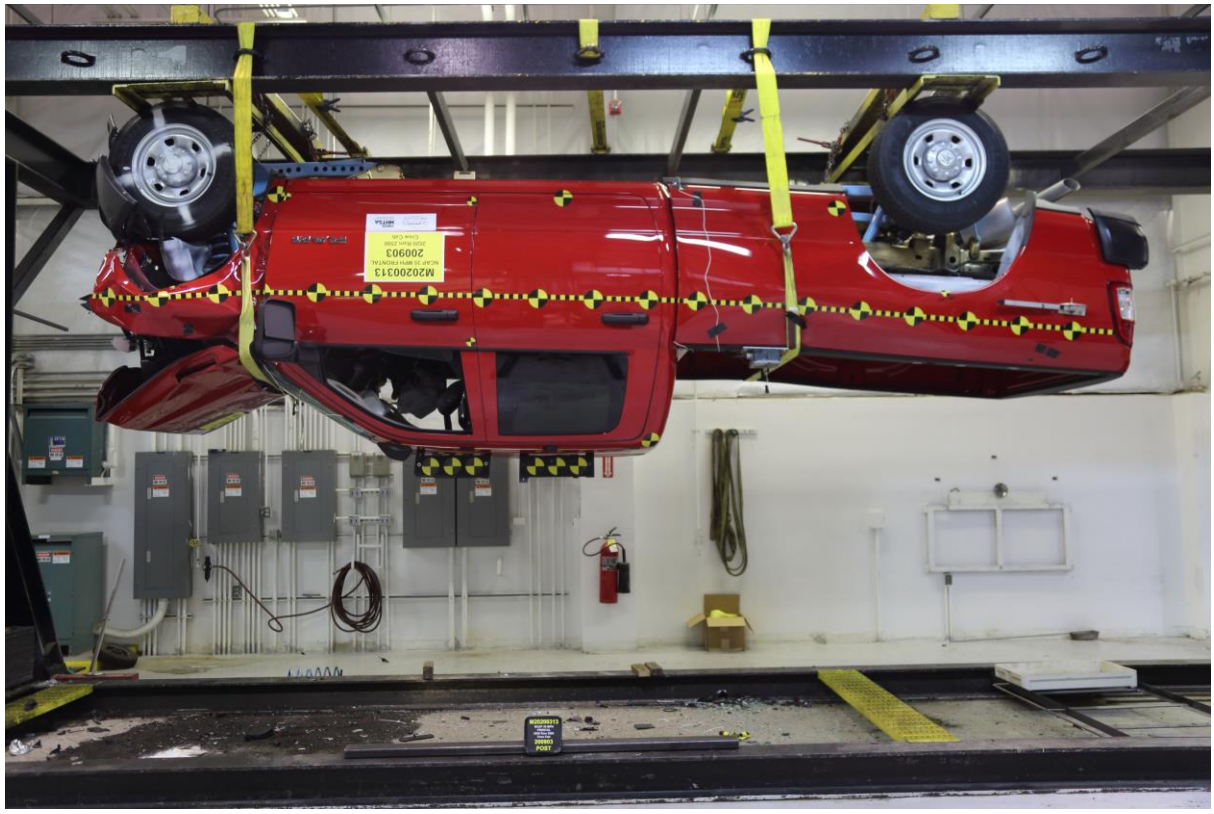


076 Post-Test Speed Trap Read out

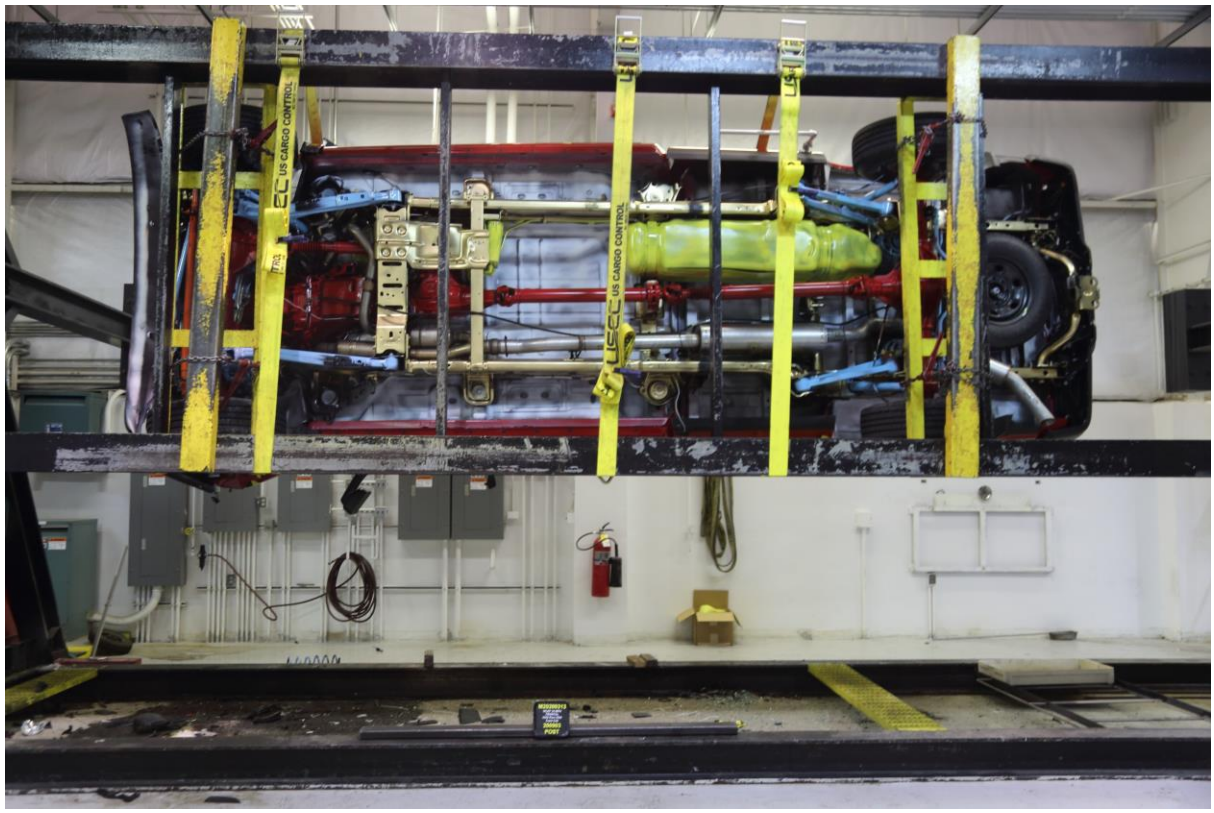
077 Vehicle at 0º on Static Rollover Device



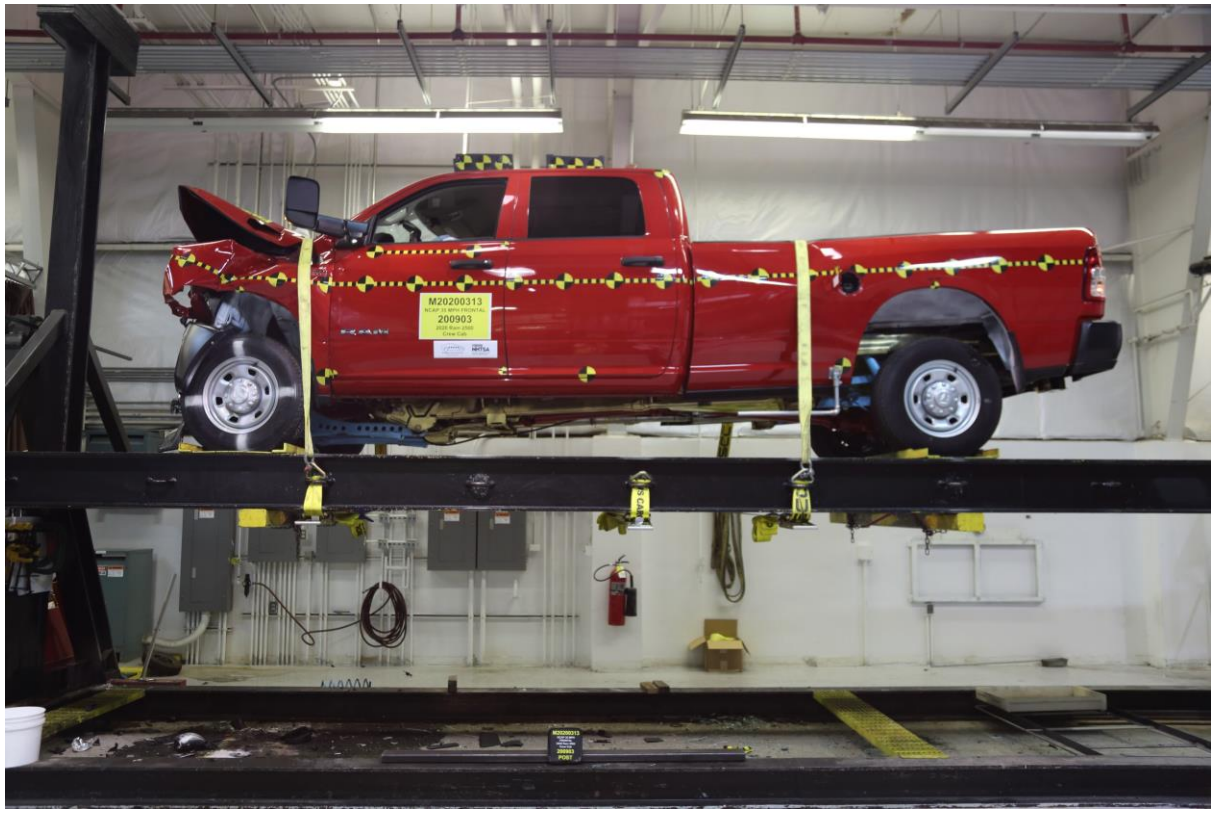
078 Vehicle at 90º on Static Rollover Device



079 Vehicle at 180º on Static Rollover Device

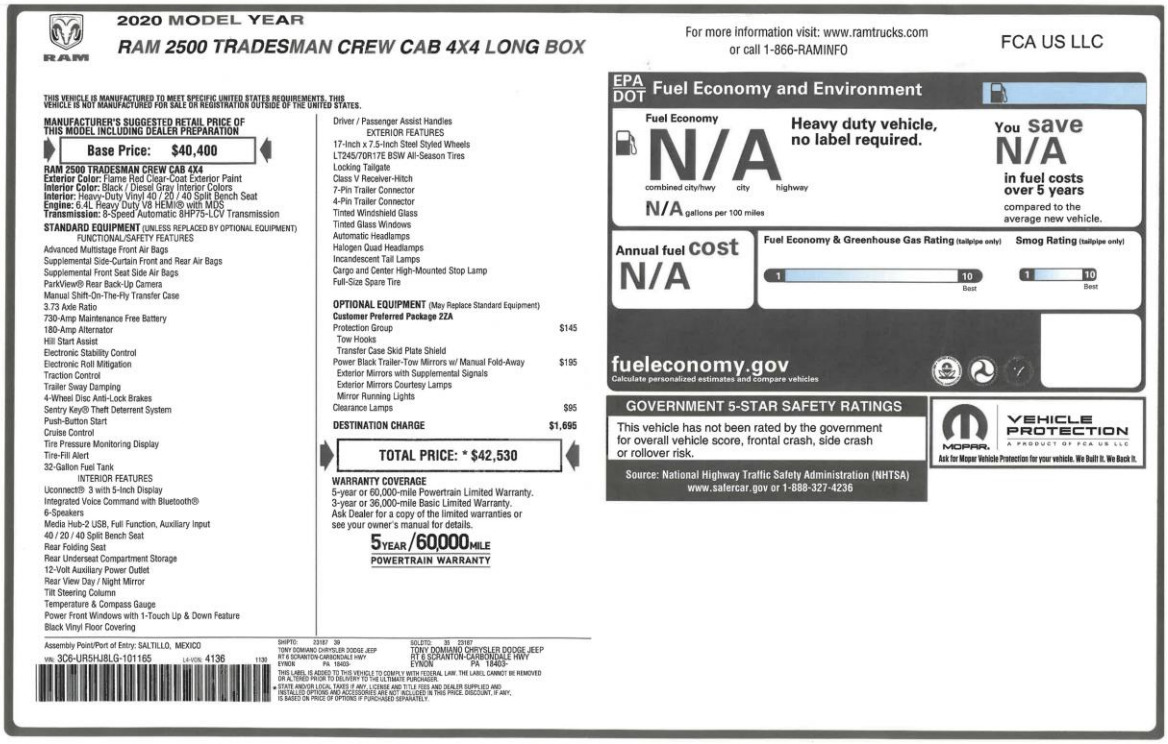


080 Vehicle at 270º on Static Rollover Device



081 Vehicle at 360º on Static Rollover Device

082 2020 Ram 2500 Crew Cab Frontal Impact Event



2020 MODEL YEAR

RAM 2500 TRADESMAN CREW CAB 4X4 LONG BOX

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

FCA US LLC

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

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

Base Price: $40,400

RAM 2500 TRADESMAN CREW CAB 4X4
Exterior Color: Flame Red Clear-Coat Exterior Paint
Interior Color: Black / Diesel Gray Interior Colors
Interior: Heavy-Duty Vinyl 40 / 20 / 40 Split Bench Seat
Engine: 6.4L Heavy Duty V8 HEMI® with MDS
Transmission: 8-Speed Automatic 8HP75-LCV Transmission

STANDARD EQUIPMENT (UNLESS REPLACED BY OPTIONAL EQUIPMENT)

FUNCTIONAL/SAFETY FEATURES
Advanced Multistage Front Air Bags
Supplemental Side-Curtain Front and Rear Air Bags
Supplemental Front Seat Side Air Bags
ParkView® Rear Back-Up Camera
Manual Shift-On-The-Fly Transfer Case
3.73 Axle Ratio
730-Amp Maintenance Free Battery
180-Amp Alternator
Hill Start Assist
Electronic Stability Control
Electronic Roll Mitigation
Traction Control
Trailer Sway Damping
4-Wheel Disc Anti-Lock Brakes
Sentry Key® Theft Deterrent System
Push-Button Start
Cruise Control
Tire Pressure Monitoring Display
Tire-Fill Alert
32-Gallon Fuel Tank

INTERIOR FEATURES
Uconnect® 3 with 5-Inch Display
Integrated Voice Command with Bluetooth®
6-Speakers
Media Hub-2 USB, Full Function, Auxiliary Input
40 / 20 / 40 Split Bench Seat
Rear Folding Seat
Rear Underseat Compartment Storage
12-Volt Auxiliary Power Outlet
Rear View Day / Night Mirror
Tilt Steering Column
Temperature & Compass Gauge
Power Front Windows with 1-Touch Up & Down Feature
Black Vinyl Floor Covering

Driver / Passenger Assist Handles

EXTERIOR FEATURES
17-Inch x 7.5-Inch Steel Styled Wheels
LT245/70R17E BSW All-Season Tires
Locking Tailgate
Class V Receiver-Hitch
7-Pin Trailer Connector
4-Pin Trailer Connector
Tinted Windshield Glass
Tinted Glass Windows
Automatic Headlamps
Halogen Quad Headlamps
Incandescent Tail Lamps
Cargo and Center High-Mounted Stop Lamp
Full-Size Spare Tire

OPTIONAL EQUIPMENT (May Replace Standard Equipment)

Customer Preferred Package 2ZA	
Protection Group	$145
Tow Hooks	
Transfer Case Skid Plate Shield	
Power Black Trailer-Tow Mirrors w/ Manual Fold-Away	$195
Exterior Mirrors with Supplemental Signals	
Exterior Mirrors Courtesy Lamps	
Mirror Running Lights	
Clearance Lamps	$95
DESTINATION CHARGE	$1,695

TOTAL PRICE: * $42,530

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

5 YEAR / 60,000 MILE
POWERTRAIN WARRANTY

Assembly Point/Port of Entry: SALTILLO, MEXICO

VIN: 3C6-UR5HJ8LG-101165 L4-VOL: 4136 1130

SHIPTO: 23187 39
TONY DOMIANO CHRYSLER DODGE JEEP
RT 6 SCRANTON-CARBONDALE HWY
EYNON PA 18403

SOLDTO: 35 23187
TONY DOMIANO CHRYSLER DODGE JEEP
RT 6 SCRANTON-CARBONDALE HWY
EYNON PA 18403-

THIS LABEL IS AFFIXED TO THIS VEHICLE TO COMPLY WITH FEDERAL LAW. THE LABEL CANNOT BE REMOVED OR ALTERED PRIOR TO DELIVERY TO THE ULTIMATE PURCHASER.

* STATE AND/OR LOCAL TAXES IF ANY, LICENSE AND TITLE FEES AND DEALER SUPPLIED AND INSTALLED OPTIONS AND ACCESSORIES ARE NOT INCLUDED IN THIS PRICE. DISCOUNT, IF ANY, IS BASED ON PRICE OF OPTIONS IF PURCHASED SEPARATELY.

EPA DOT Fuel Economy and Environment

Fuel Economy
N/A
combined city/hwy city highway
N/A gallons per 100 miles

Heavy duty vehicle, no label required.

You save N/A in fuel costs over 5 years compared to the average new vehicle.

Annual fuel COST
N/A

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

Smog Rating (tailpipe only)
1 10 Best

fueleconomy.gov
Calculate personalized estimates and compare vehicles

GOVERNMENT 5-STAR SAFETY RATINGS

This vehicle has not been rated by the government for overall vehicle score, frontal crash, side crash or rollover risk.

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

MOPAR. VEHICLE PROTECTION
A PRODUCT OF FCA US LLC
Ask for Mopar Vehicle Protection for your vehicle. We Built It. We Back It.

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 Shoulder Belt Force
Driver Lap Belt Force

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 Shoulder Belt Force
Passenger Lap Belt Force

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 Lab: CTF

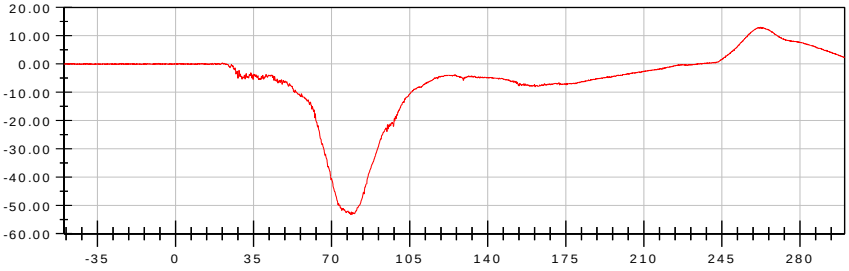
Test Number: 200903 (M20200313)

Test Date: 09/03/2020

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

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

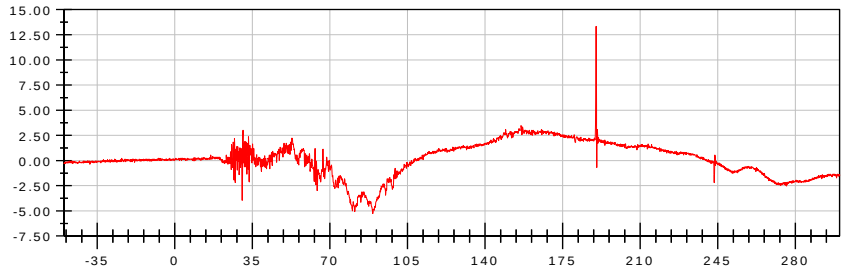
12.98 g at 262.40 ms

<Min>

-53.29 g at 78.64 ms

CFC_1000

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



<Max>

13.34 g at 190.08 ms

<Min>

-5.26 g at 89.28 ms

CFC_1000

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

<Max>

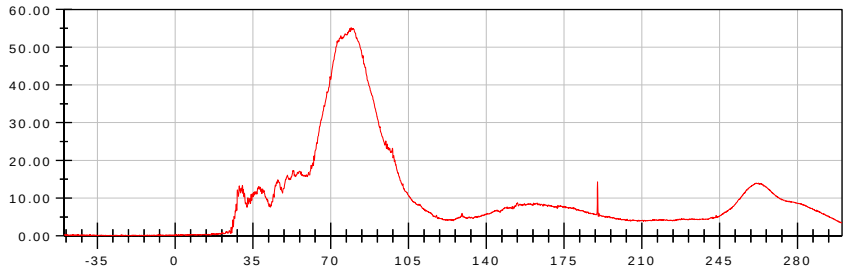
14.23 g at 80.00 ms

<Min>

-4.17 g at 148.32 ms

CFC_1000

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



<Max>

55.15 g at 79.20 ms

<Min>

0.05 g at -31.52 ms

CFC_1000

NHTSA

Test Date: 09/03/2020

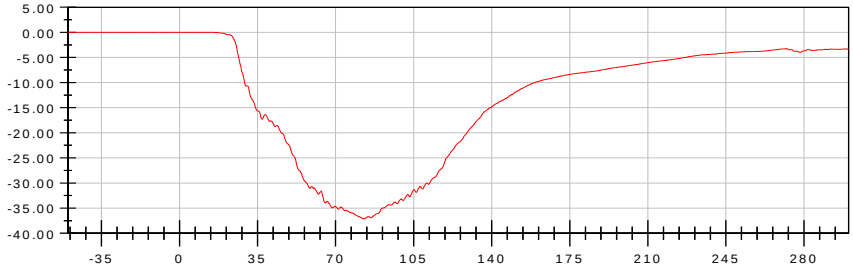
Test Lab: CTF

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

Test Number: 200903 (M20200313)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

0.01 mm at -40.80 ms

<Min>

-37.12 mm at 82.88 ms

CFC_600

NHTSA

Test Date: 09/03/2020

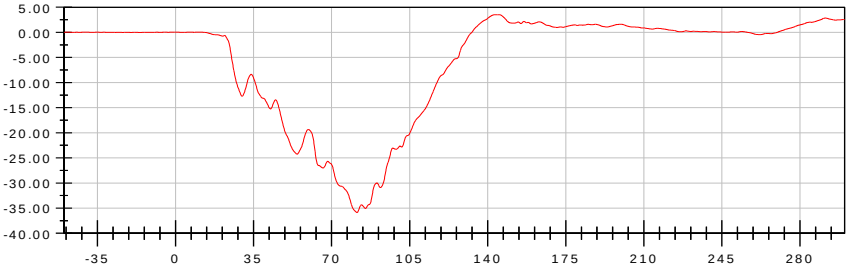
Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (EB7513)

Test Lab: CTF

Test Number: 200903 (M20200313)

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



<Max>

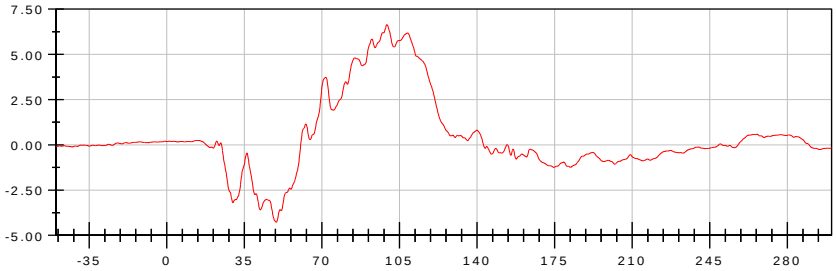
3.51 g at 144.88 ms

<Min>

-35.86 g at 81.36 ms

CFC_180

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



<Max>

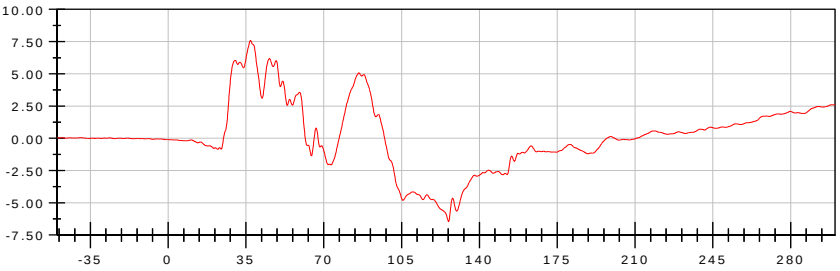
6.64 g at 99.36 ms

<Min>

-4.28 g at 49.44 ms

CFC_180

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



<Max>

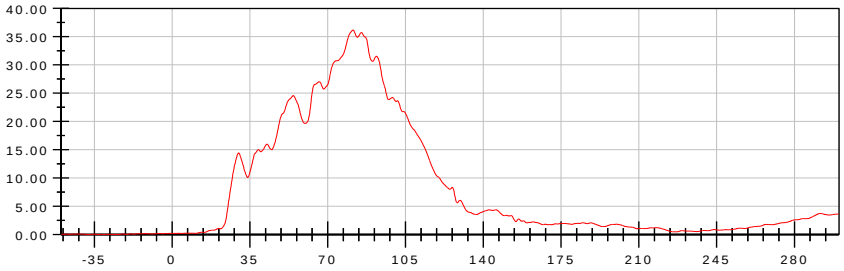
7.59 g at 37.04 ms

<Min>

-6.46 g at 126.08 ms

CFC_180

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



<Max>

36.17 g at 81.44 ms

<Min>

0.01 g at -25.28 ms

CFC_180

NHTSA

Test Date: 09/03/2020

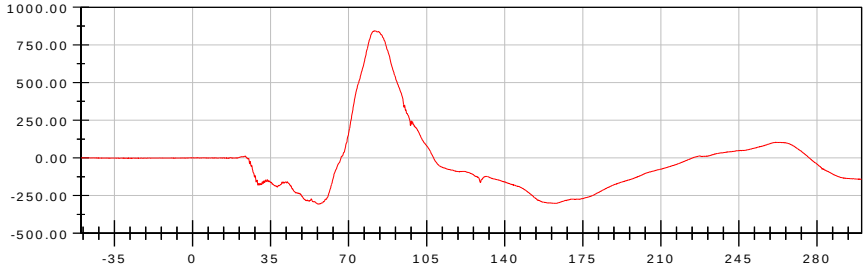
Test Lab: CTF

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

Test Number: 200903 (M20200313)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

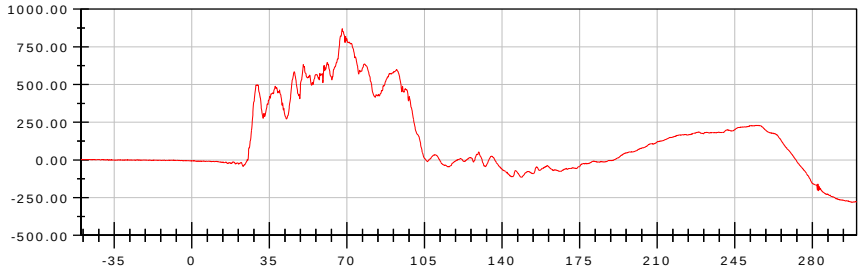
843.22 N at 81.44 ms

<Min>

-306.94 N at 56.48 ms

CFC_1000

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



<Max>

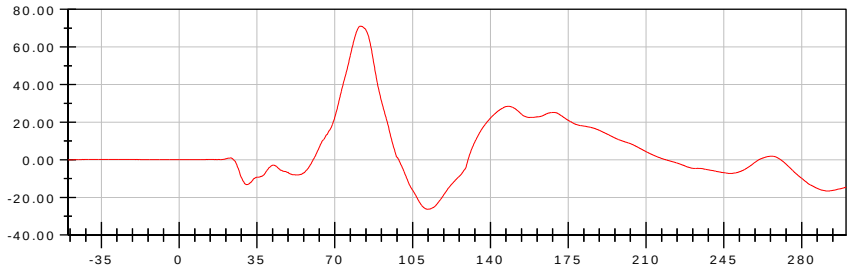
870.10 N at 67.84 ms

<Min>

-280.94 N at 297.92 ms

CFC_1000

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



<Max>

71.06 Nm at 81.60 ms

<Min>

-26.31 Nm at 111.68 ms

CFC_600

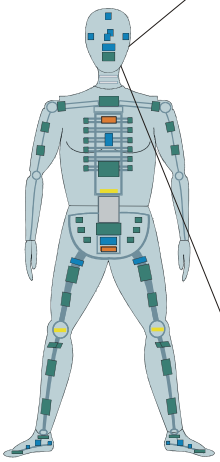
Date: 09/03/2020
Time: 14:37

Neck Injury Predictor (NIJ)

Customer: NHTSA

Test Number: M20200313

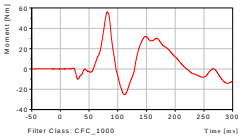
Test Orientation = Frontal
Fzc(Tension) = 6806
Fzc(Compression) = 6160
Myc(Extension) = 135
Myc(Flexion) = 310



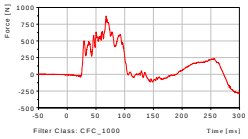
Dummy:HIII 50th Male
Seating Position:
Driver

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

11TMONUP00H3MOYX



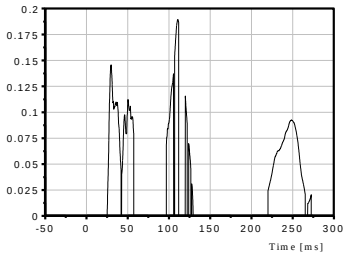
11NECKUP00H3FOZA



TRC Inc. Test Lab: CTF

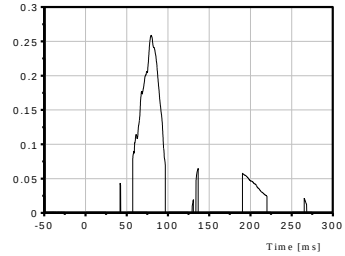
Test Number: 200903

11NIJCUPTEH300YX



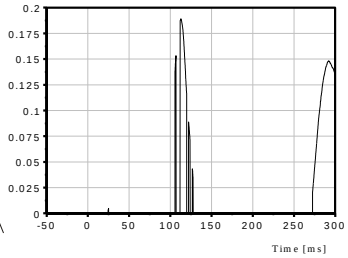
Max [NTE] 0.1894 at 110.88 ms

11NIJCUPTFH300YX



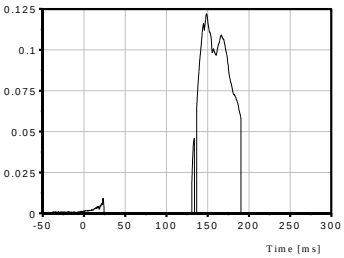
Max [NTF] 0.2588 at 79.68 ms

11NIJCUPCEH300YX



Max [NCE] 0.1891 at 112.72 ms

11NIJCUPCFH300YX



Max [NCF] 0.1221 at 148.72 ms

NHTSA

Test Date: 09/03/2020

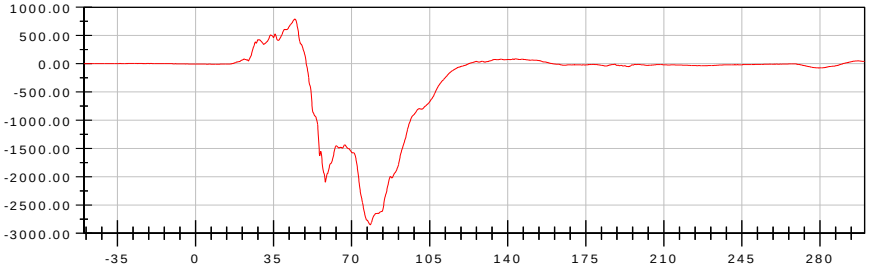
Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (EB7513)

Test Lab: CTF

Test Number: 200903 (M20200313)

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



<Max>

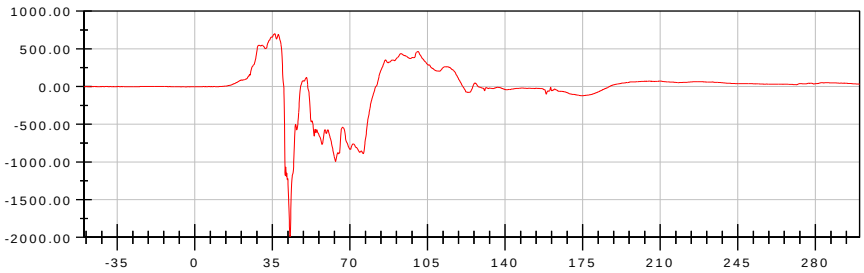
790.95 N at 44.56 ms

<Min>

-2,848.14 N at 78.32 ms

CFC_600

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



<Max>

700.83 N at 36.08 ms

<Min>

-1,989.15 N at 42.96 ms

CFC_600

NHTSA

Test Lab: CTF

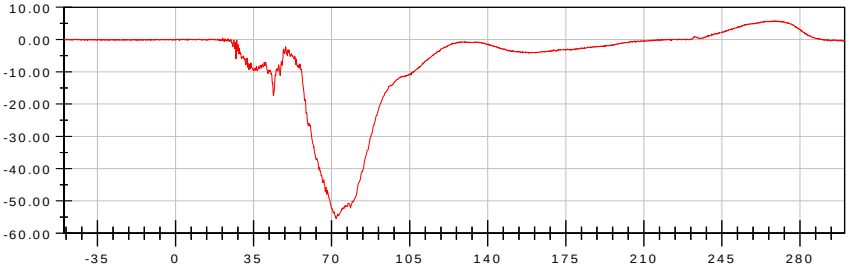
Test Number: 200903 (M20200313)

Test Date: 09/03/2020

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

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

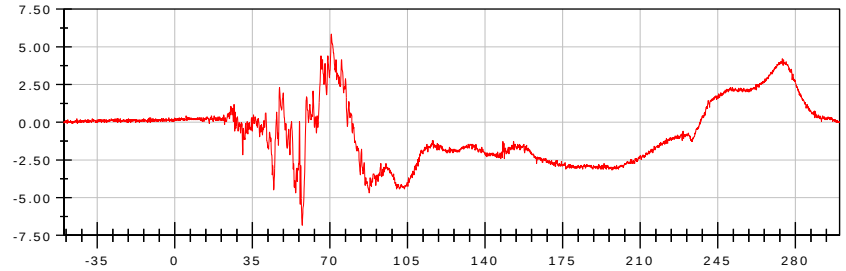
5.68 g at 267.12 ms

<Min>

-55.46 g at 72.00 ms

CFC_1000

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



<Max>

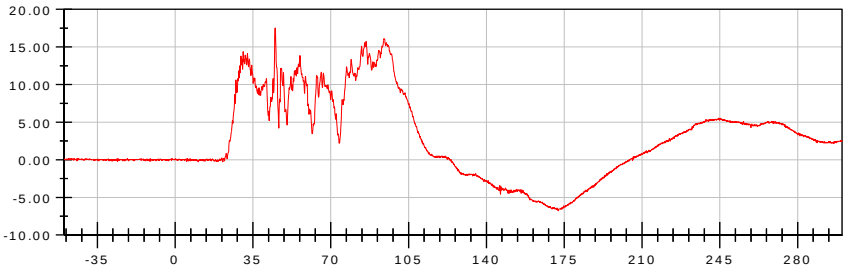
5.85 g at 70.64 ms

<Min>

-6.83 g at 57.52 ms

CFC_1000

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



<Max>

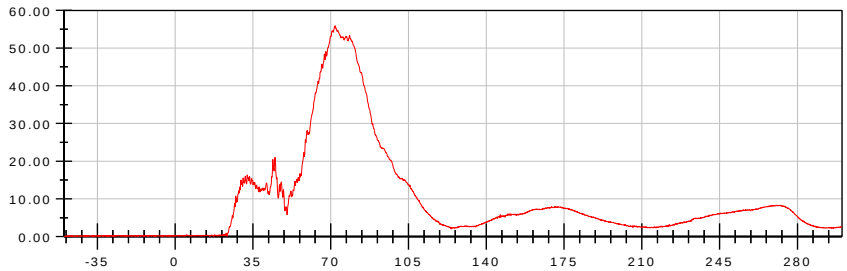
17.51 g at 45.04 ms

<Min>

-6.79 g at 172.32 ms

CFC_1000

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



<Max>

55.92 g at 72.00 ms

<Min>

0.03 g at -48.40 ms

CFC_1000

NHTSA

Test Date: 09/03/2020

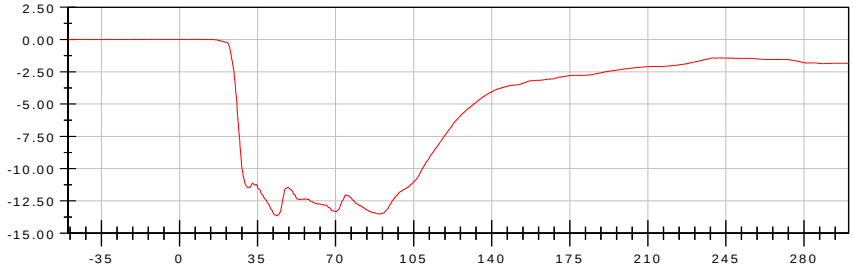
Test Lab: CTF

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

Test Number: 200903 (M20200313)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

0.01 mm at 0.48 ms

<Min>

-13.64 mm at 43.68 ms

CFC_600

NHTSA

Test Date: 09/03/2020

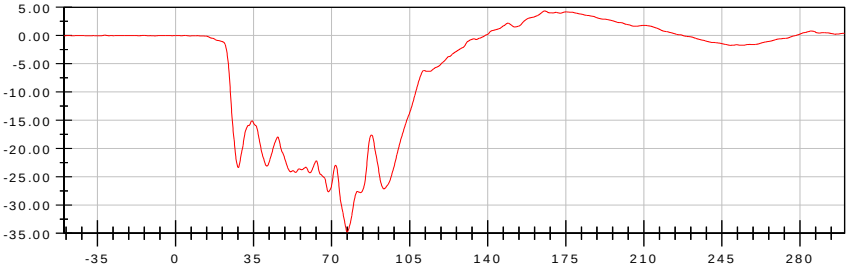
Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (EB7513)

Test Lab: CTF

Test Number: 200903 (M20200313)

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



<Max>

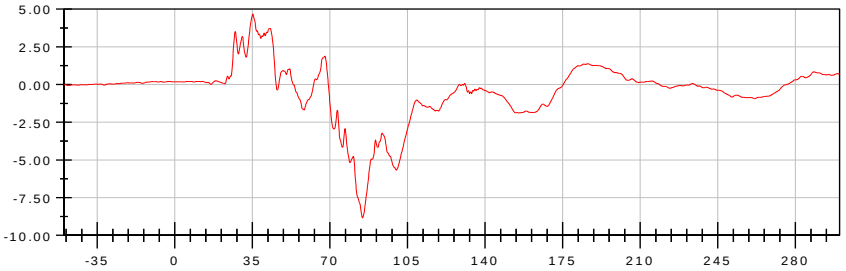
4.33 g at 165.52 ms

<Min>

-34.76 g at 77.04 ms

CFC_180

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



<Max>

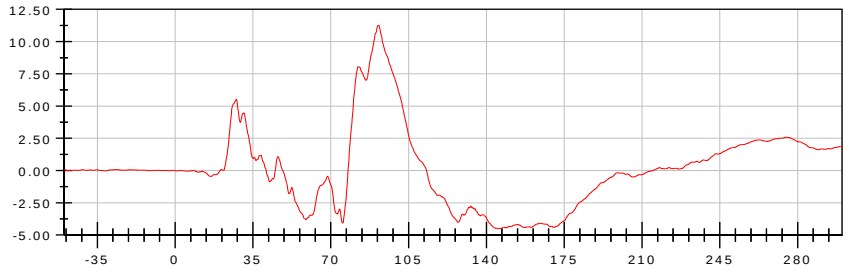
4.67 g at 35.20 ms

<Min>

-8.84 g at 84.72 ms

CFC_180

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



<Max>

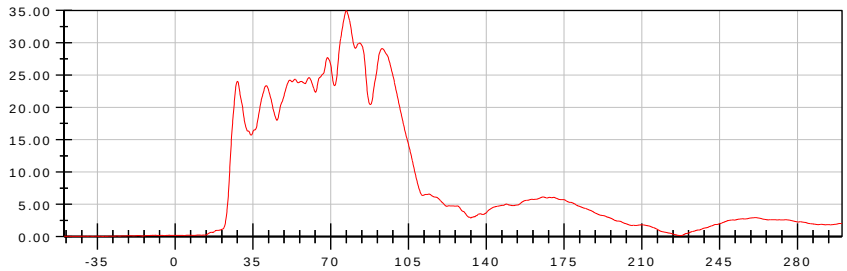
11.25 g at 91.28 ms

<Min>

-4.51 g at 145.36 ms

CFC_180

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



<Max>

34.94 g at 76.96 ms

<Min>

0.01 g at -32.48 ms

CFC_180

NHTSA

Test Date: 09/03/2020

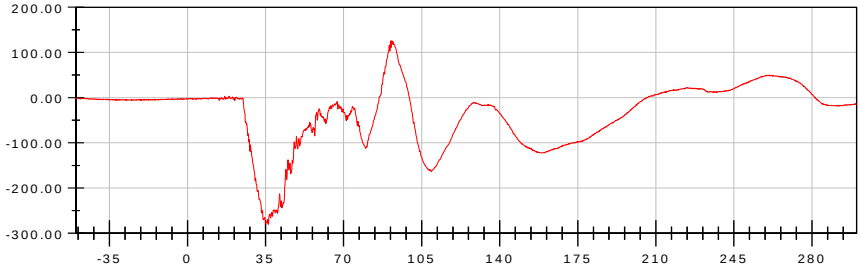
Position #1 Hybrid III Mid-Sized Adult Male Dummy (037)

Position #2 Hybrid III Small Adult Female (EB7513)

Test Lab: CTF

Test Number: 200903 (M20200313)

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



<Max>

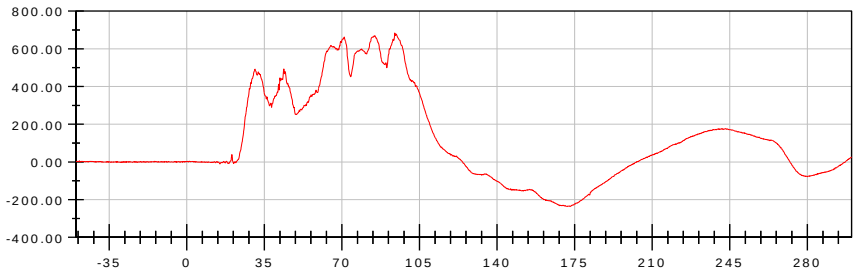
125.96 N at 91.60 ms

<Min>

-280.46 N at 36.16 ms

CFC_1000

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



<Max>

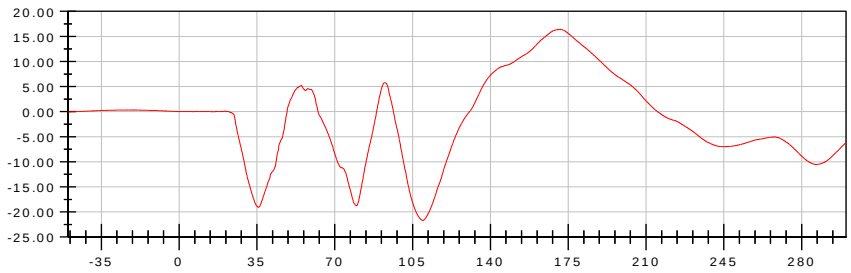
683.78 N at 93.84 ms

<Min>

-236.05 N at 172.96 ms

CFC_1000

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



<Max>

16.39 Nm at 170.64 ms

<Min>

-21.68 Nm at 109.60 ms

CFC_600

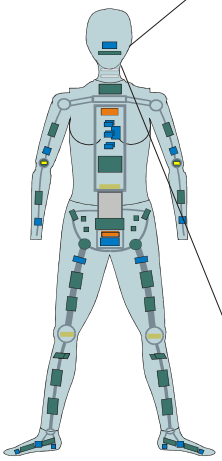
Date: 09/03/2020
Time: 14:37

Neck Injury Predictor (NIJ)

Customer: NHTSA

Test Number: M20200313

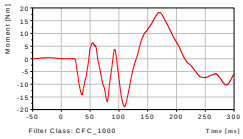
Test Orientation = Frontal
Fzc(Tension) = 4287
Fzc(Compression) = 3880
Myc(Extension) = 67
Myc(Flexion) = 155



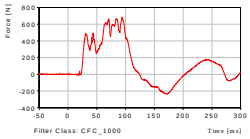
Dummy:HIII 5th Female
Seating Position:
Right Front Passenger

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

13TMONUP00HFMOYX



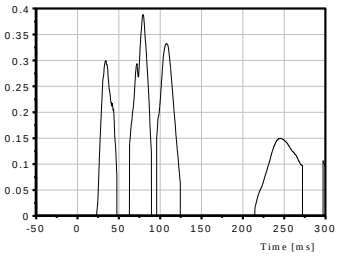
13NECKUP00HFFOZA



TRC Inc. Test Lab: CTF

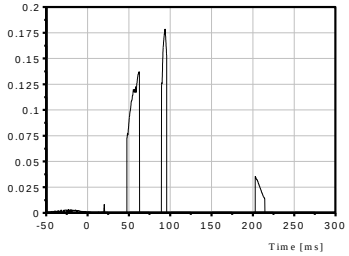
Test Number: 200903

13NIJCUPTEHF00YX



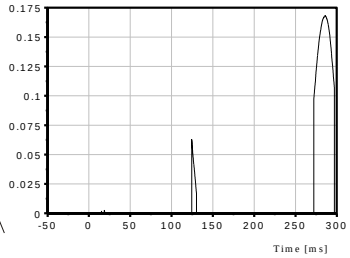
Max [NTE] 0.3886 at 79.60 ms

13NIJCUPTFHF00YX



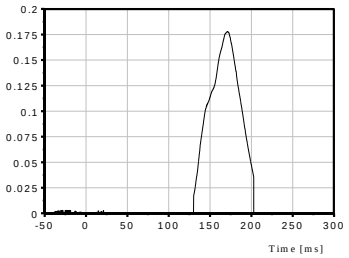
Max [NTF] 0.1784 at 93.84 ms

13NIJCUPCEHF00YX



Max [NCE] 0.1682 at 285.92 ms

13NIJCUPCFHF00YX



Max [NCF] 0.1779 at 171.52 ms

NHTSA

Test Date: 09/03/2020

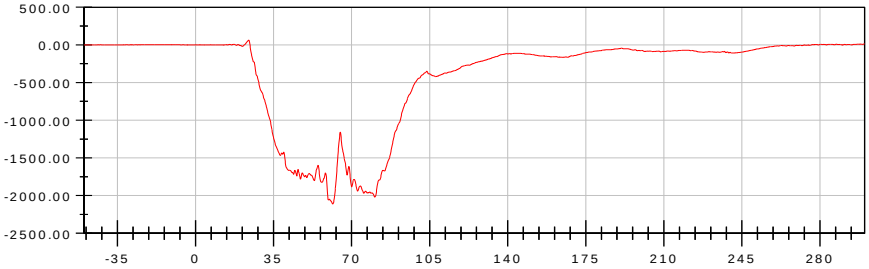
Test Lab: CTF

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

Test Number: 200903 (M20200313)

Position #2 Hybrid III Small Adult Female (EB7513)

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



<Max>

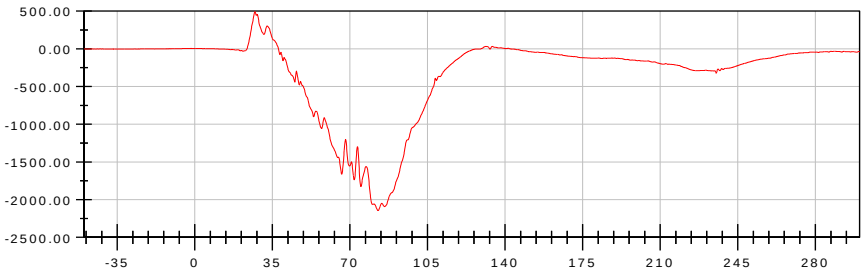
62.69 N at 23.84 ms

<Min>

-2,111.10 N at 61.52 ms

CFC_600

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



<Max>

492.64 N at 27.12 ms

<Min>

-2,144.96 N at 82.64 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. 67

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	85	Yes
D	H-Point From Seatback	134.6 - 139.7	137	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	91	Yes
F	Thigh Clearance	139.7 - 154.9	147	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	199	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	222	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	991	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. 67-1
Test Date: 8/11/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	272.7 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.17 %	Yes

Test meets specifications.

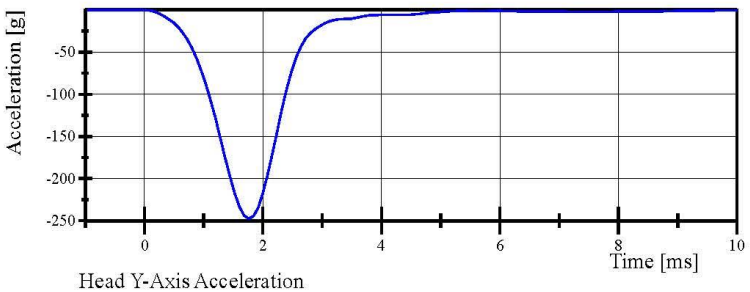
Condition: Used

Comments:
Head Skin S/N: N/A

Transportation Research Center Inc.

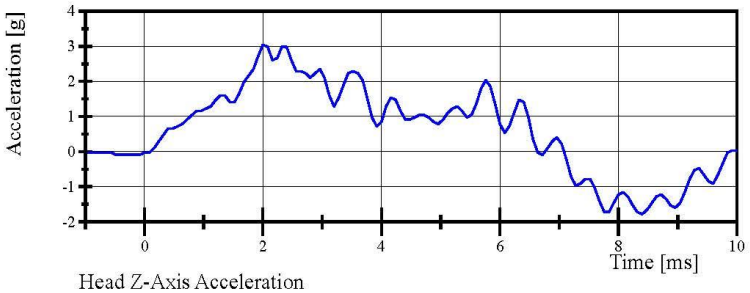
Front Head Drop
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/11/2020

Head X-Axis Acceleration



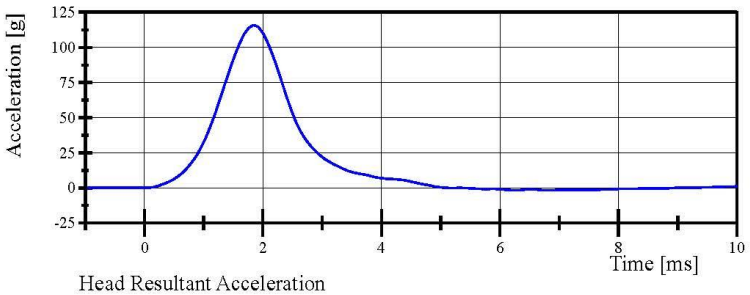
Filter Class: CFC_1000
Max: -0.0 g at -0.8 ms
Min: -247.7 g at 1.8 ms

Head Y-Axis Acceleration



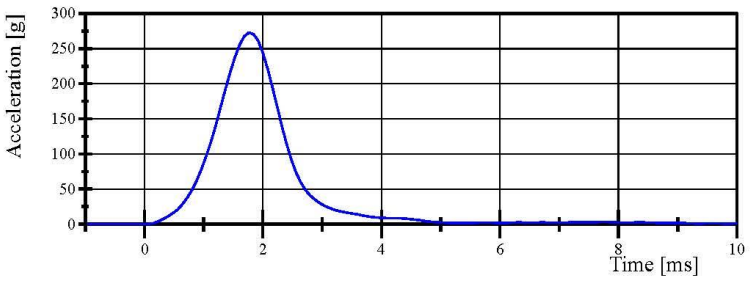
Filter Class: CFC_1000
Max: 3.0 g at 2.0 ms
Min: -1.8 g at 8.4 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 115.9 g at 1.8 ms
Min: -1.7 g at 6.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 272.7 g at 1.8 ms
Min: 0.0 g at -0.8 ms

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

08.11.2020 13:37:15 579

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 67-3
Test Date: 8/14/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.3 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.913 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	39.0 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.05 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.63 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.56 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.56 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-66.3 °	Yes
Time of Peak	57 - 64 ms	59.7 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	107.57 N·m	Yes
Time of Peak	47 - 58 ms	51.5 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	97.9 ms	Yes

Test meets specifications.

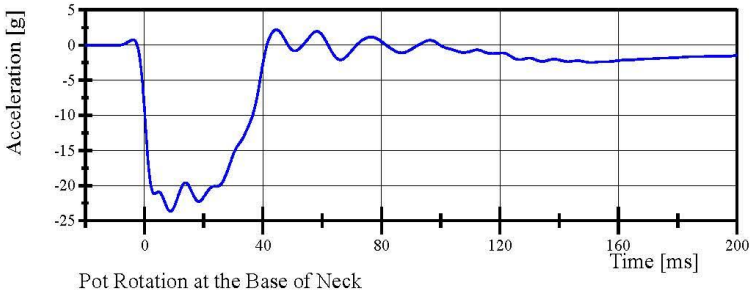
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

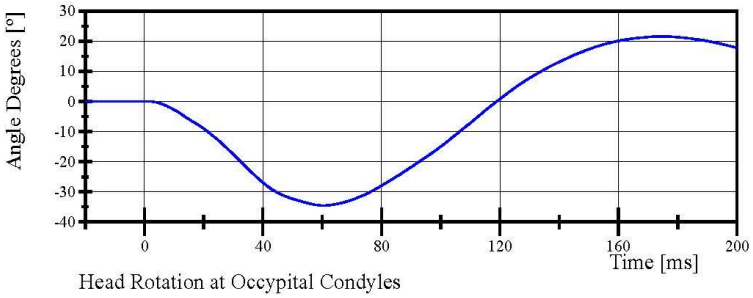
Neck Flexion
HIII 50th Serial No. 037 Certification No. 67-3
Test Date: 8/14/2020

Pendulum Acceleration



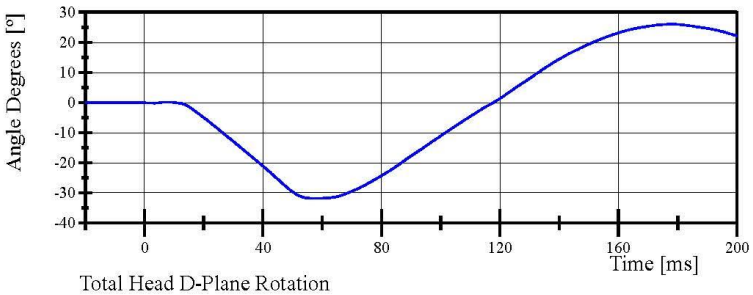
Filter Class: CFC_60
Max: 2.2 g at 44.6 ms
Min: -23.7 g at 8.8 ms

Pot Rotation at the Base of Neck



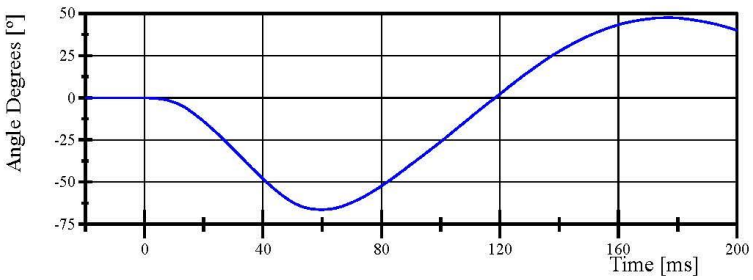
Filter Class: CFC_60
Max: 21.6 ° at 174.6 ms
Min: -34.6 ° at 60.5 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 26.0 ° at 178.1 ms
Min: -31.8 ° at 57.7 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 47.5 ° at 176.9 ms
Min: -66.3 ° at 59.7 ms

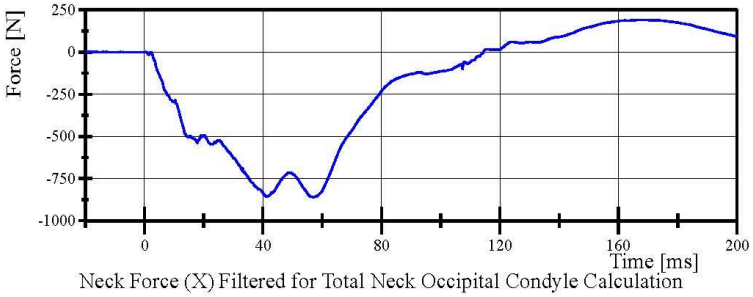
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

08.14.2020 14:30:19 1838

Transportation Research Center Inc.

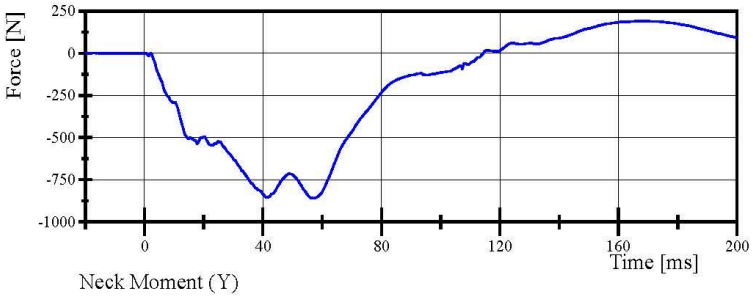
Neck Flexion
HIII 50th Serial No. 037 Certification No. 67-3
Test Date: 8/14/2020

Neck Force (X)



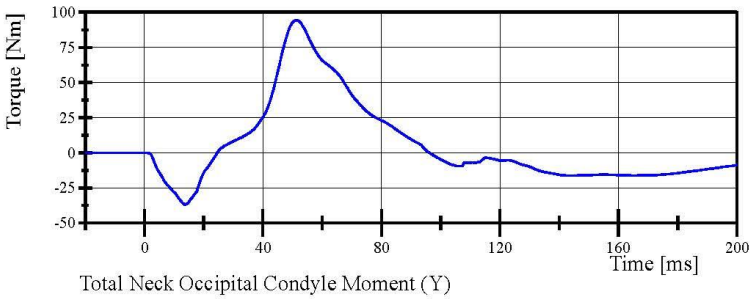
Filter Class: CFC_1000
Max: 191.9 N at 167.0 ms
Min: -859.8 N at 57.2 ms

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



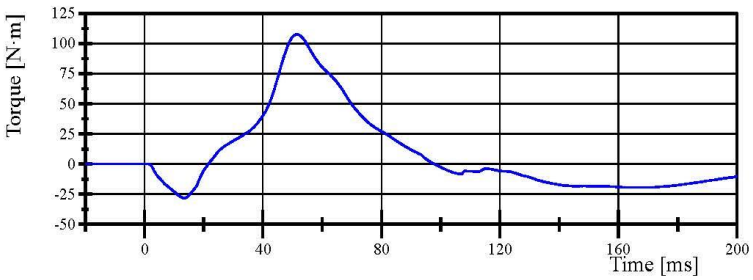
Filter Class: CFC_600
Max: 191.8 N at 167.6 ms
Min: -859.6 N at 57.2 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 94.4 Nm at 51.2 ms
Min: -36.9 Nm at 13.8 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 107.6 N·m at 51.5 ms
Min: -28.4 N·m at 13.6 ms

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

08.14.2020 14:30:19 1838

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/14/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.963 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	40.2 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.97 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.52 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.92 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.93 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	94.5 °	Yes
Time of Peak	72 - 82 ms	76.7 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	158.7 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-68.25 N·m	Yes
Time of Peak	65 - 79 ms	71.1 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	142.5 ms	Yes

Test meets specifications.

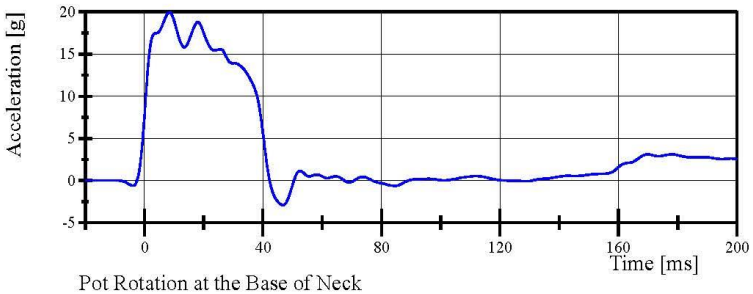
Condition: Used

Comments:
Neck S/N: 4728

Transportation Research Center Inc.

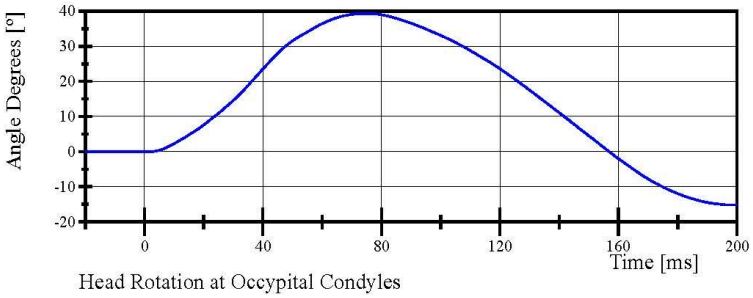
Neck Extension
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/14/2020

Pendulum Acceleration



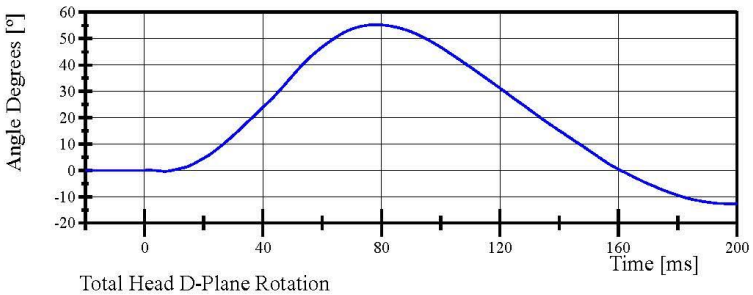
Filter Class: CFC_60
Max: 20.0 g at 8.4 ms
Min: -2.9 g at 46.7 ms

Pot Rotation at the Base of Neck



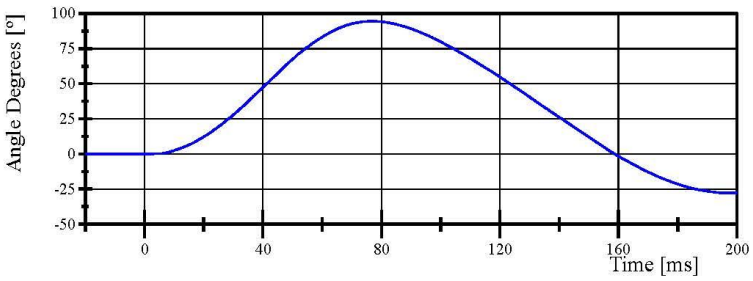
Filter Class: CFC_60
Max: 39.3 ° at 74.9 ms
Min: -15.2 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 55.2 ° at 77.9 ms
Min: -12.7 ° at 197.4 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 94.5 ° at 76.7 ms
Min: -27.8 ° at 197.9 ms

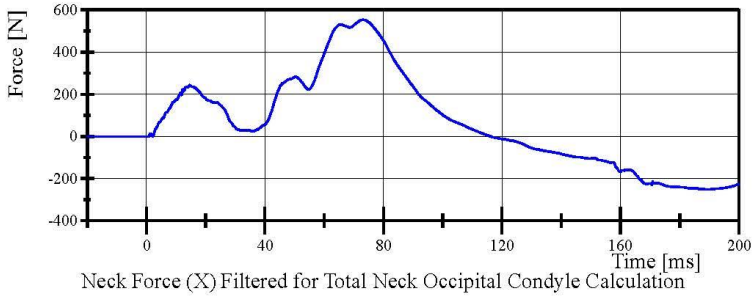
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

08.14.2020 15:01:42 1986

Transportation Research Center Inc.

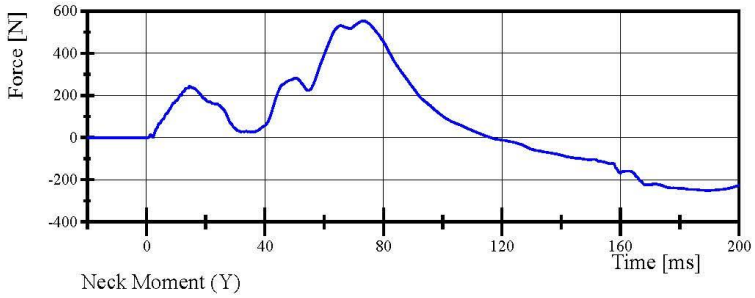
Neck Extension
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/14/2020

Neck Force (X)



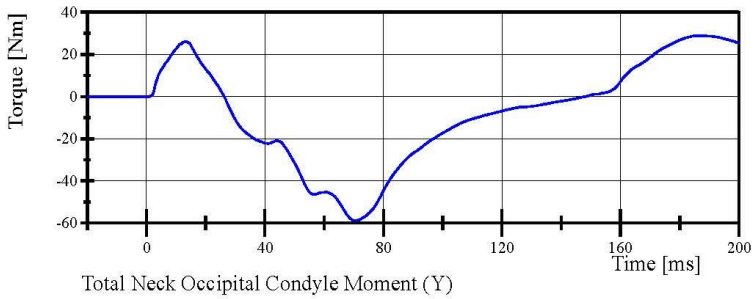
Filter Class: CFC_1000
Max: 554.3 N at 73.2 ms
Min: -252.0 N at 189.3 ms

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



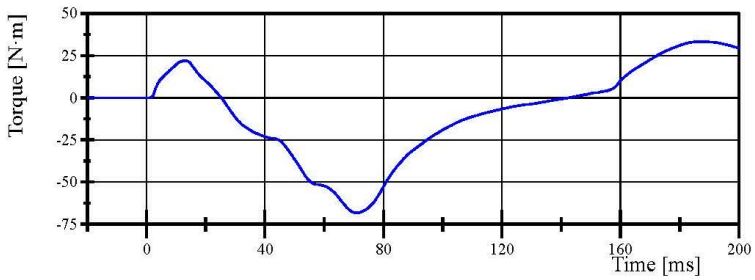
Filter Class: CFC_600
Max: 554.1 N at 73.2 ms
Min: -251.7 N at 189.3 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 28.9 Nm at 186.0 ms
Min: -58.8 Nm at 70.5 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 33.2 N·m at 186.2 ms
Min: -68.2 N·m at 71.1 ms

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

08.14.2020 15:01:43 1986

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/17/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.759 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,726.0 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-71.87 mm	Yes
Internal Hysteresis	69 - 85 %	72.3 %	Yes

Test meets specifications.

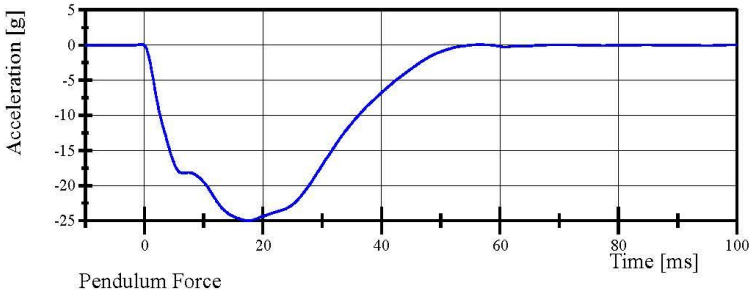
Condition: Used

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

Transportation Research Center Inc.

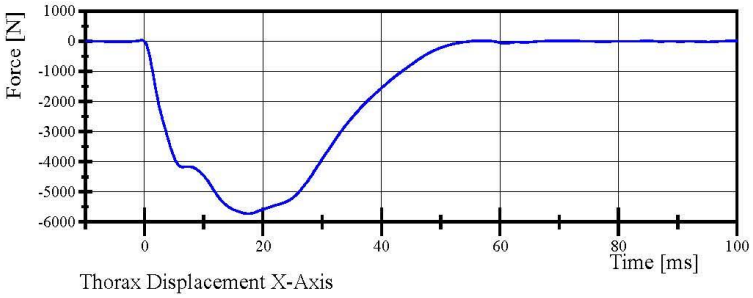
Front Thorax
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/17/2020

Pendulum Acceleration



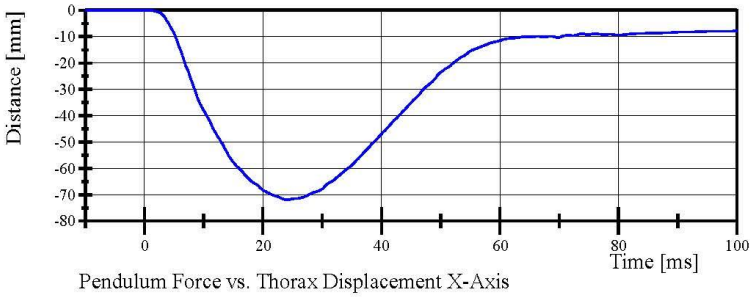
Filter Class: CFC_180
Max: 0.1 g at -0.5 ms
Min: -25.0 g at 17.5 ms

Pendulum Force



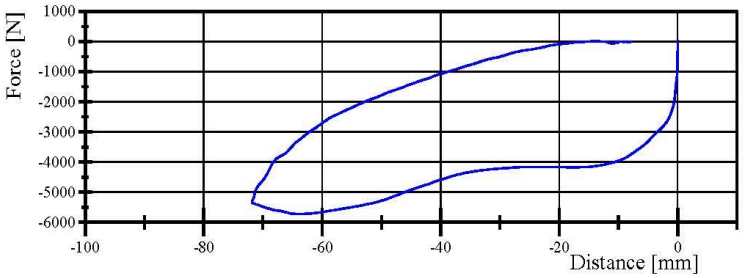
Filter Class: CFC_180
Max: 28.3 N at -0.5 ms
Min: -5,726.0 N at 17.5 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -8.5 ms
Min: -71.9 mm at 24.1 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 28.3 N at -0.0 mm
Min: -5,726.0 N at -63.7 mm

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

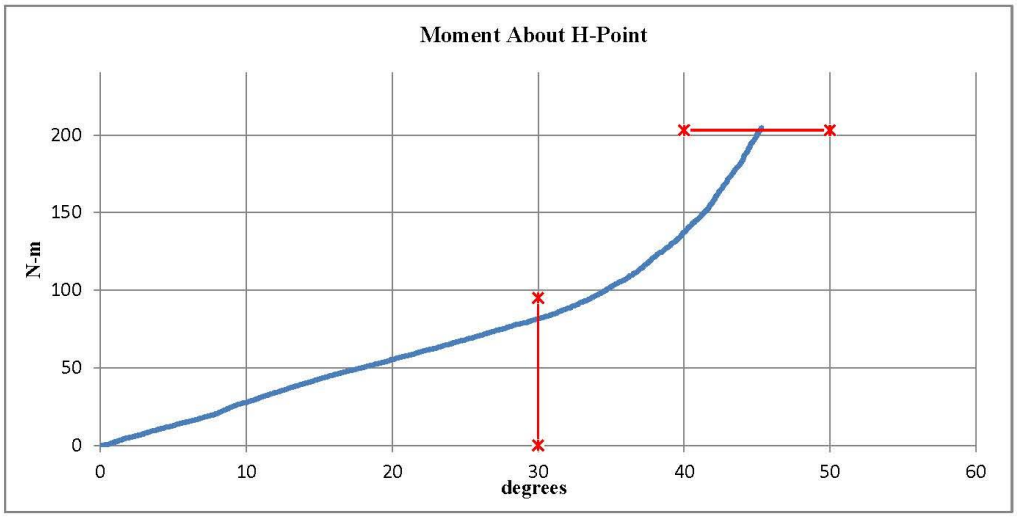
08.17.2020 16:26:00 404

Transportation Research Center Inc.

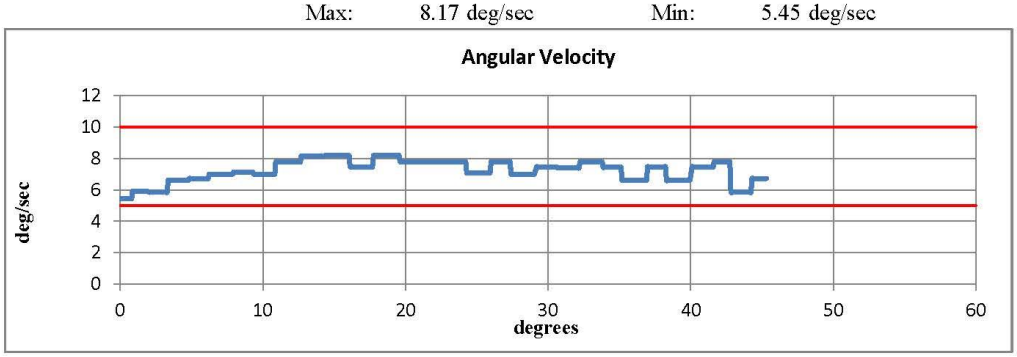
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	11-Aug-2020
Side Tested:	Left Hip	Time:	13:09
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.2	°C	Pass
Humidity	10	-	70	60	%	Pass
Moment at 30°	0	≤	94.9	81.76	N-m	Pass
Angle at 203 Nm	40	-	50	45.31	deg	Pass
Average Velocity	5	-	10	7.2	deg/sec	Pass



Max: 8.17 deg/sec Min: 5.45 deg/sec



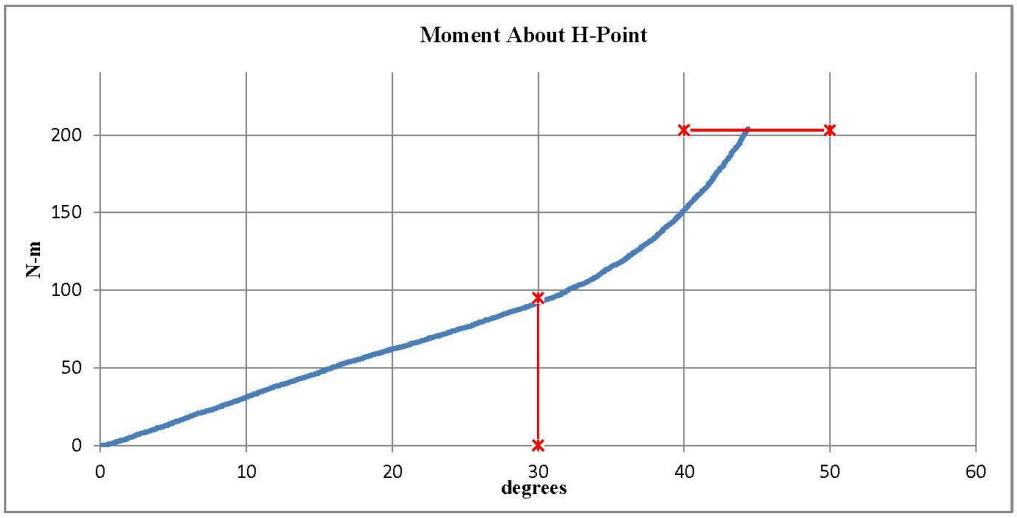
Comments:
Pelvis Skin S/N: EK3565

Transportation Research Center Inc.

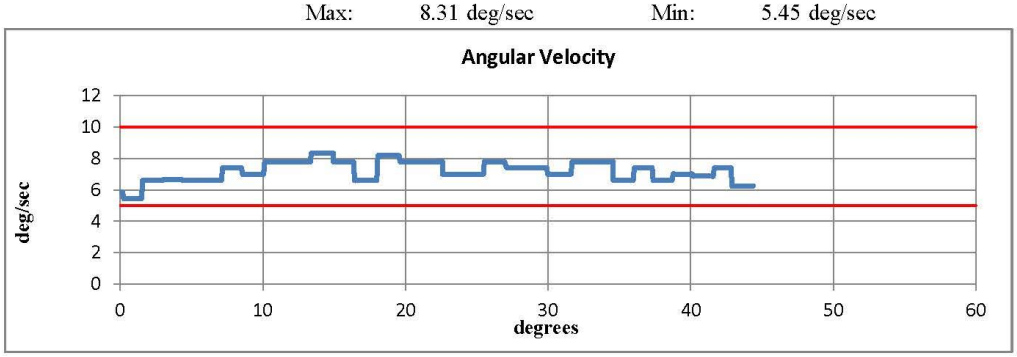
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	12-Aug-2020
Side Tested:	Right Hip	Time:	8:06
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.1	°C	Pass
Humidity	10	-	70	58	%	Pass
Moment at 30°	0	≤	94.9	92.3	N-m	Pass
Angle at 203 Nm	40	-	50	44.38	deg	Pass
Average Velocity	5	-	10	7.17	deg/sec	Pass



Max: 8.31 deg/sec Min: 5.45 deg/sec



Comments:
Pelvis Skin S/N: EK3565

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/11/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.074 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,695.03 N	Yes

Test meets specifications.

Condition: Used

Comments:
Knee S/N: 2672

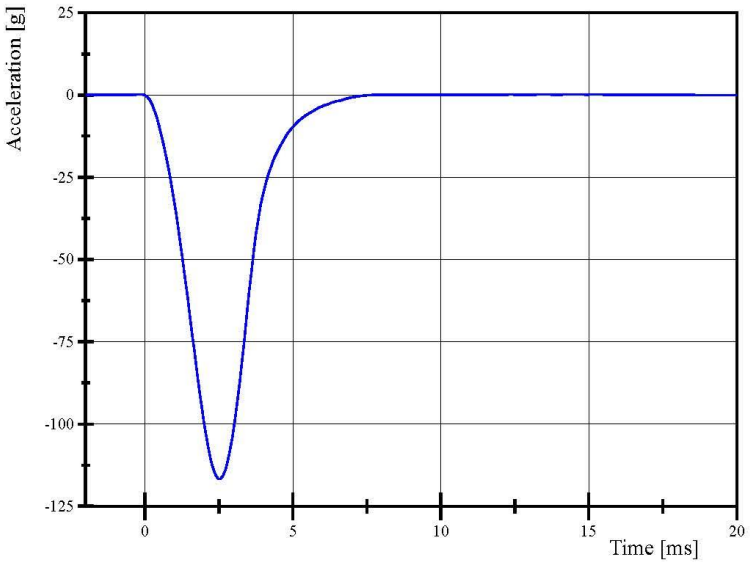
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

08.11.2020 10:57:49 1824

Transportation Research Center Inc.

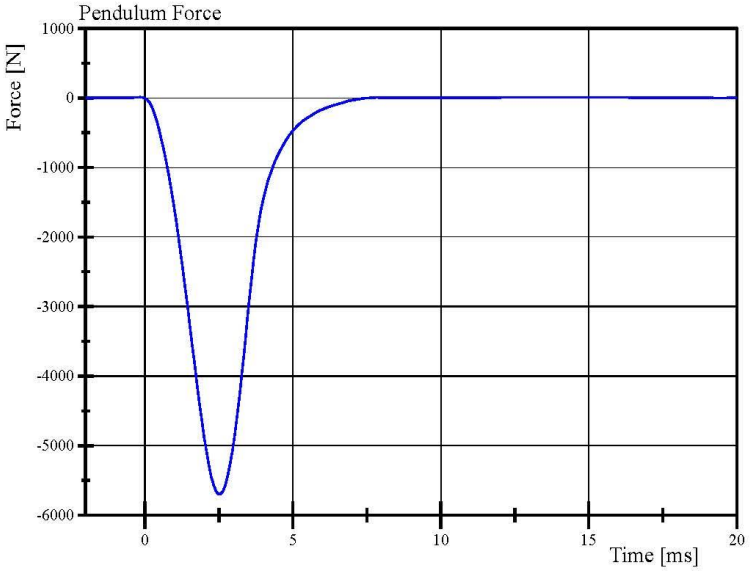
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/11/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at -0.2 ms
Min: -116.6 g at 2.6 ms

Pendulum Force



Filter Class: CFC_600
Max: 9.1 N at -0.2 ms
Min: -5,695.0 N at 2.6 ms

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

08.11.2020 10:58:10 1824

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/11/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.072 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,576.86 N	Yes

Test meets specifications.

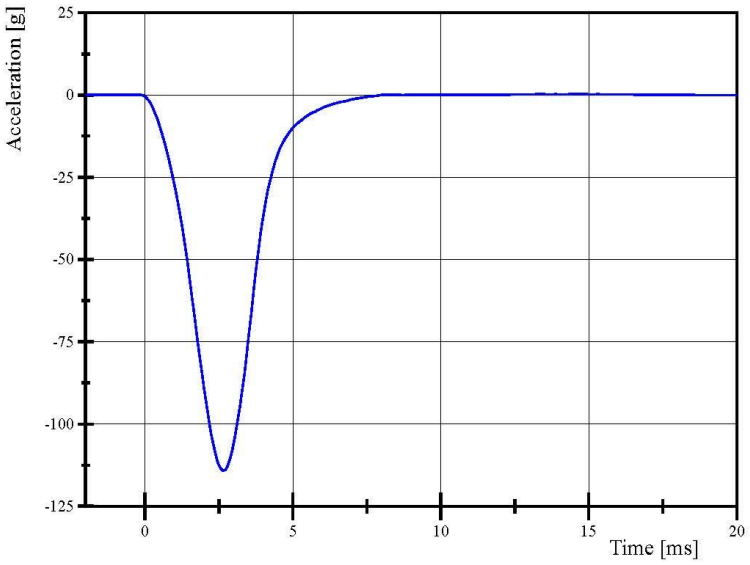
Condition: Used

Comments:
Knee Skin S/N: 1248

Transportation Research Center Inc.

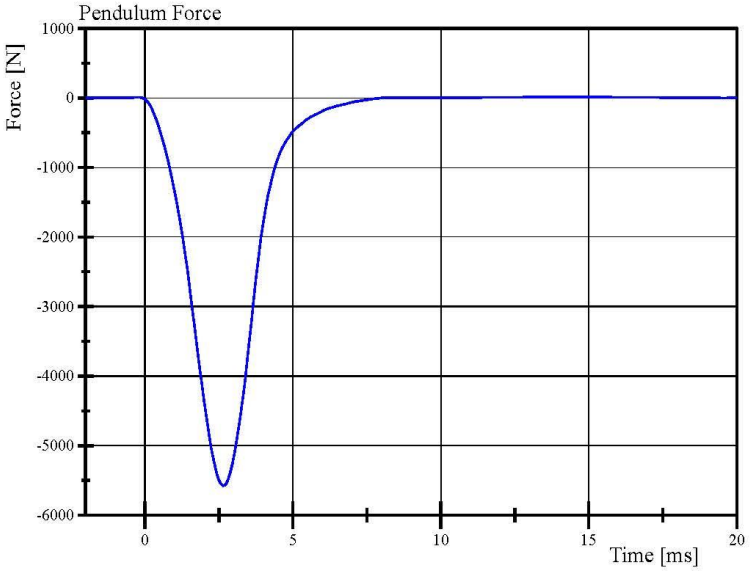
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 67-1
Test Date: 8/11/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 13.4 ms
Min: -114.2 g at 2.6 ms

Pendulum Force



Filter Class: CFC_600
Max: 11.7 N at 13.4 ms
Min: -5,576.9 N at 2.6 ms

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

08.11.2020 11:00:50 1820

Post-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 68

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	510	Yes
C	H-Point Height	83.8 - 88.9	85	Yes
D	H-Point From Seatback	134.6 - 139.7	137	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	91	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	199	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	222	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	991	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. 68-1
Test Date: 9/4/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	245.9 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	5.3 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	3.45 %	Yes

Test meets specifications.

Condition: Used

Comments:
Head Skin S/N: N/A

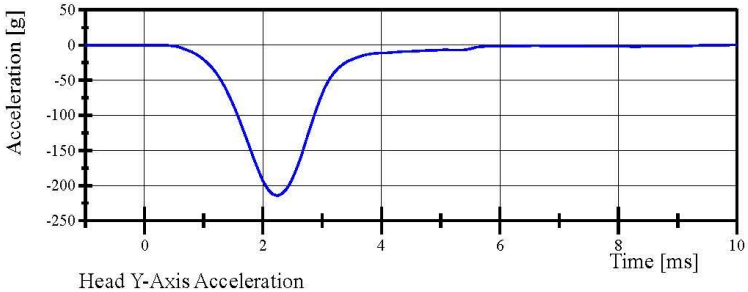
Specification Source: CFR49 Part 572 Subpart E with Polarity in accordance with J211

09.04.2020 11:40:40 574

Transportation Research Center Inc.

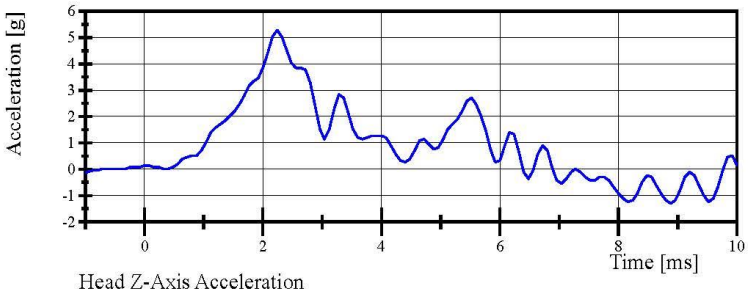
Front Head Drop
HIII 50th Serial No. 037 Certification No. 68-1
Test Date: 9/4/2020

Head X-Axis Acceleration



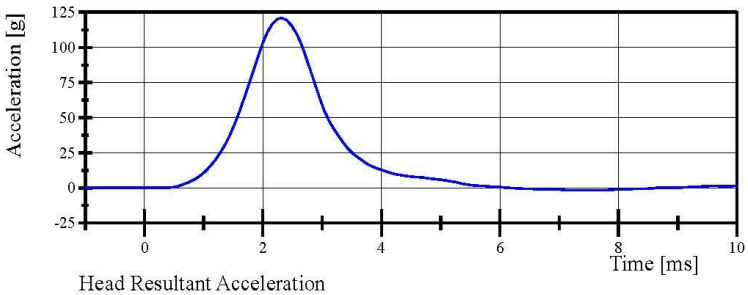
Filter Class: CFC_1000
Max: 0.4 g at 10.0 ms
Min: -214.5 g at 2.2 ms

Head Y-Axis Acceleration



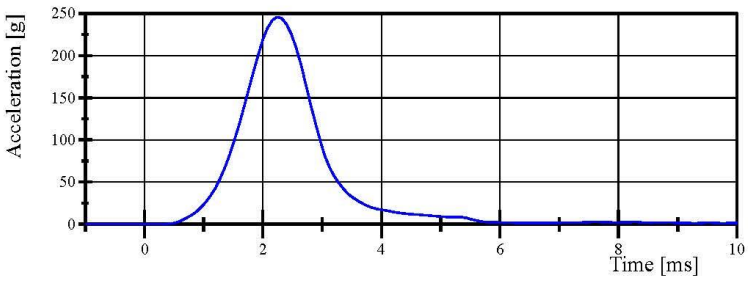
Filter Class: CFC_1000
Max: 5.3 g at 2.2 ms
Min: -1.3 g at 8.9 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 121.0 g at 2.3 ms
Min: -1.7 g at 7.2 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 245.9 g at 2.2 ms
Min: 0.1 g at -0.7 ms

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

09.04.2020 11:41:19 574

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 68-4
Test Date: 9/8/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.914 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	38.6 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-23.03 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.20 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-15.88 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-15.88 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-70.2 °	Yes
Time of Peak	57 - 64 ms	58.7 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	118.9 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88.1 - 108.4 N·m	105.41 N·m	Yes
Time of Peak	47 - 58 ms	51.6 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	98.4 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: 4728

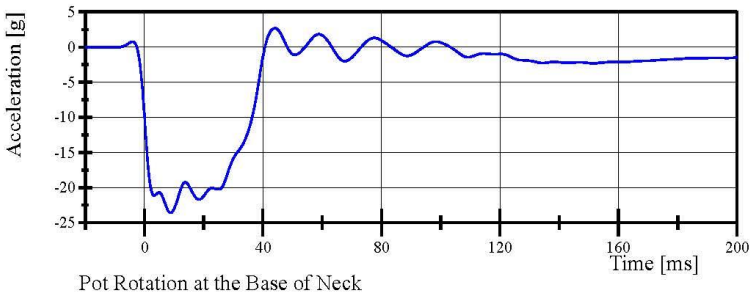
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

09.08.2020 14:14:39 1842

Transportation Research Center Inc.

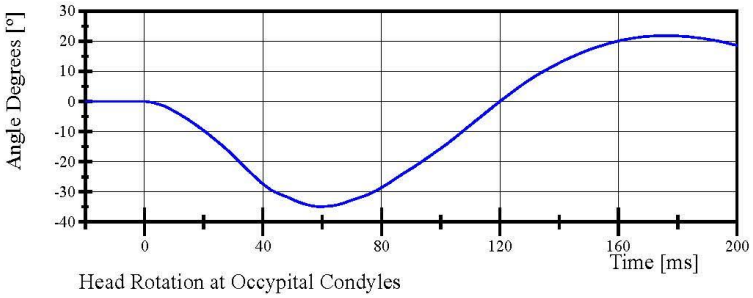
Neck Flexion
HIII 50th Serial No. 037 Certification No. 68-4
Test Date: 9/8/2020

Pendulum Acceleration



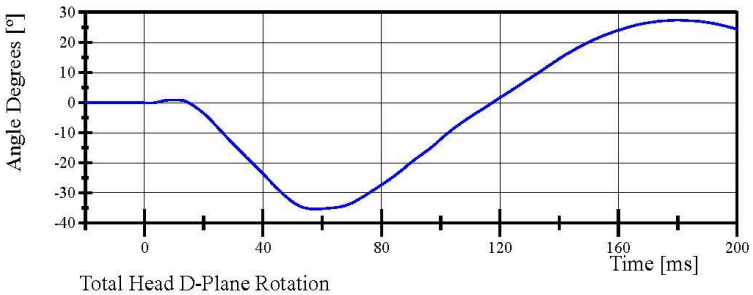
Filter Class: CFC_60
Max: 2.7 g at 44.1 ms
Min: -23.6 g at 8.8 ms

Pot Rotation at the Base of Neck



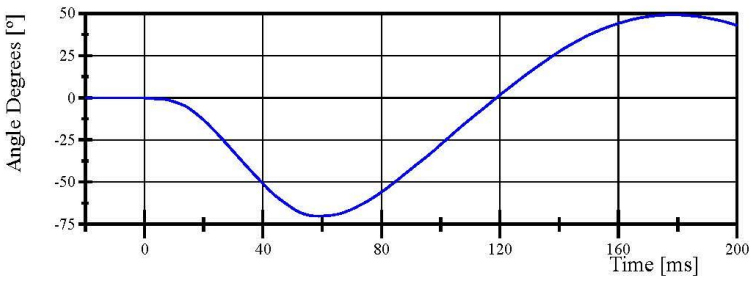
Filter Class: CFC_60
Max: 21.9 ° at 175.9 ms
Min: -34.9 ° at 59.3 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 27.4 ° at 180.0 ms
Min: -35.3 ° at 57.6 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 49.2 ° at 178.6 ms
Min: -70.2 ° at 58.7 ms

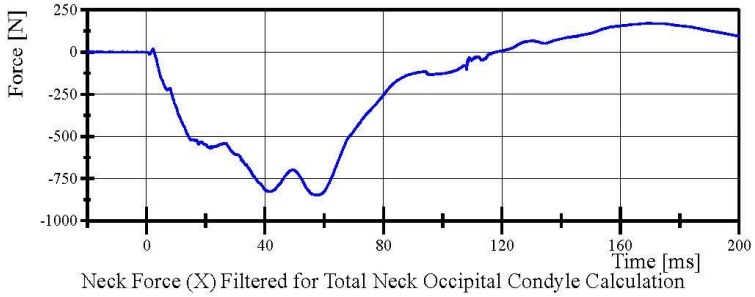
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

09.08.2020 14:14:51 1842

Transportation Research Center Inc.

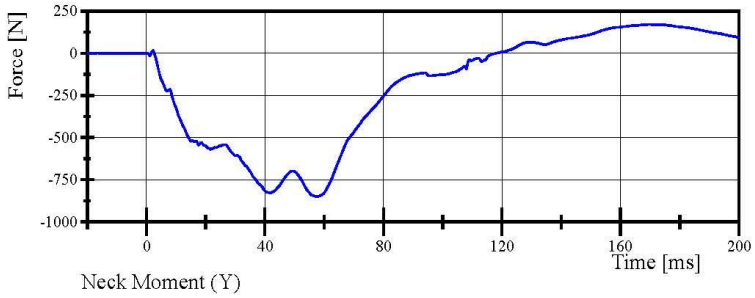
Neck Flexion
HIII 50th Serial No. 037 Certification No. 68-4
Test Date: 9/8/2020

Neck Force (X)



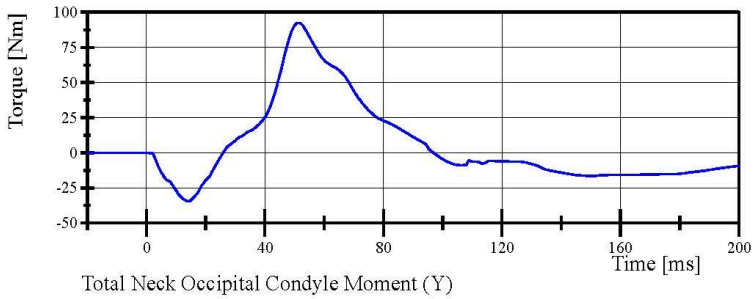
Filter Class: CFC_1000
Max: 172.0 N at 169.7 ms
Min: -848.6 N at 57.1 ms

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



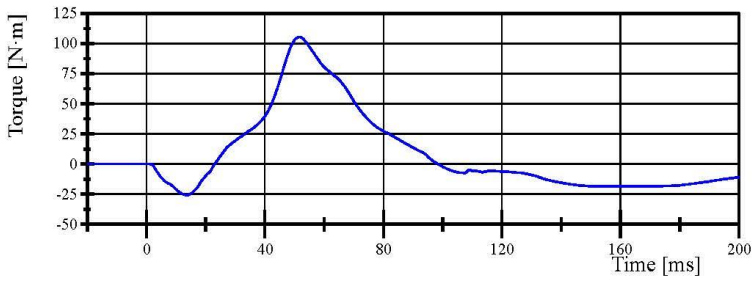
Filter Class: CFC_600
Max: 171.7 N at 169.7 ms
Min: -848.2 N at 57.1 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 92.5 Nm at 51.4 ms
Min: -34.4 Nm at 14.1 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 105.4 N·m at 51.6 ms
Min: -25.8 N·m at 13.7 ms

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

09.08.2020 14:14:51 1842

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 68-2
Test Date: 9/8/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.967 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	39.9 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.16 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	17.31 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	14.46 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	14.46 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	95.7 °	Yes
Time of Peak	72 - 82 ms	77.0 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	159.3 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-52.9) - (-80) N·m	-69.40 N·m	Yes
Time of Peak	65 - 79 ms	71.8 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	144.3 ms	Yes

Test meets specifications.

Condition: Used

Comments:
Neck S/N: 4728

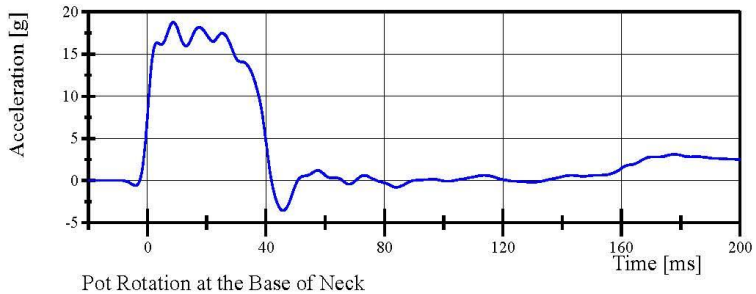
Specification Source: CFR49 Part 572 Subpart E with Polarity in accordance with J211

09.08.2020 14:49:29 1989

Transportation Research Center Inc.

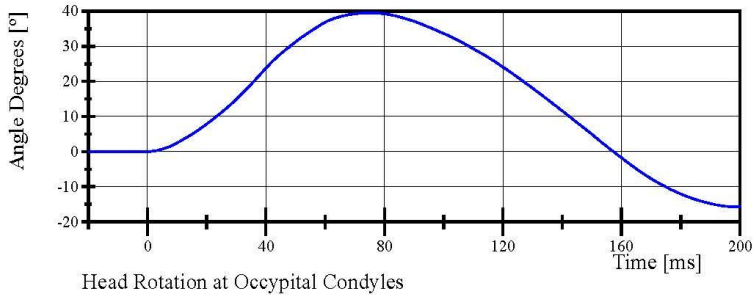
Neck Extension
HIII 50th Serial No. 037 Certification No. 68-2
Test Date: 9/8/2020

Pendulum Acceleration



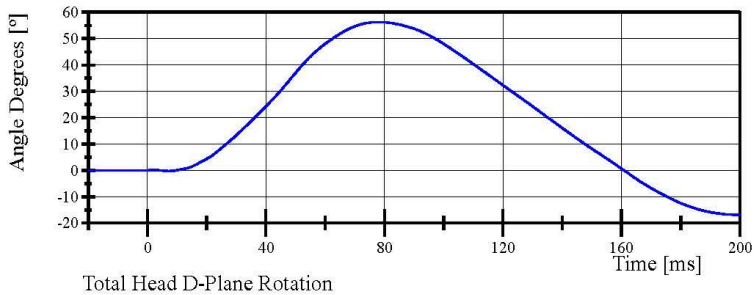
Filter Class: CFC_60
Max: 18.8 g at 8.7 ms
Min: -3.6 g at 45.8 ms

Pot Rotation at the Base of Neck



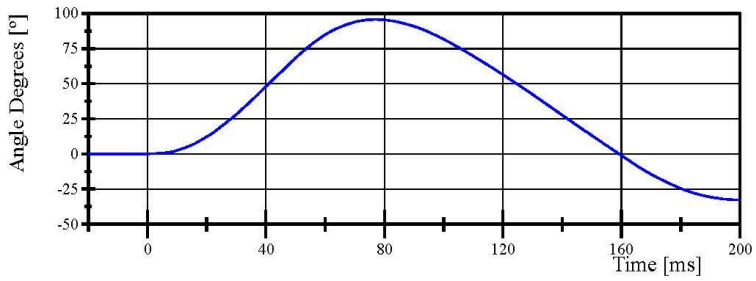
Filter Class: CFC_60
Max: 39.5 ° at 75.4 ms
Min: -15.8 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 56.3 ° at 78.1 ms
Min: -16.9 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 95.7 ° at 77.0 ms
Min: -32.6 ° at 200.0 ms

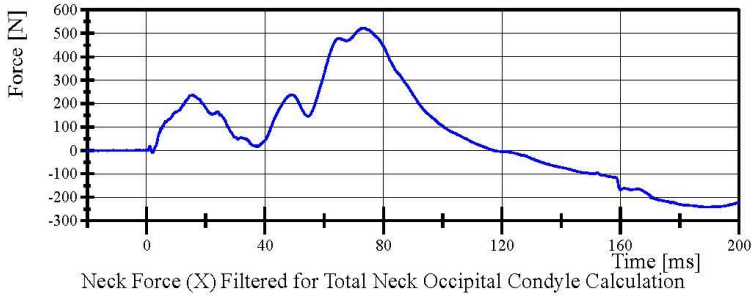
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

09.08.2020 14:49:39 1989

Transportation Research Center Inc.

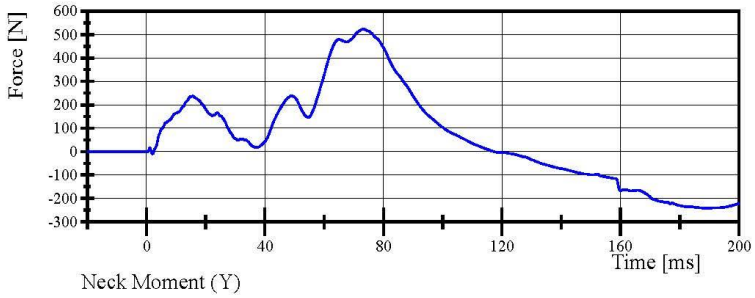
Neck Extension
HIII 50th Serial No. 037 Certification No. 68-2
Test Date: 9/8/2020

Neck Force (X)



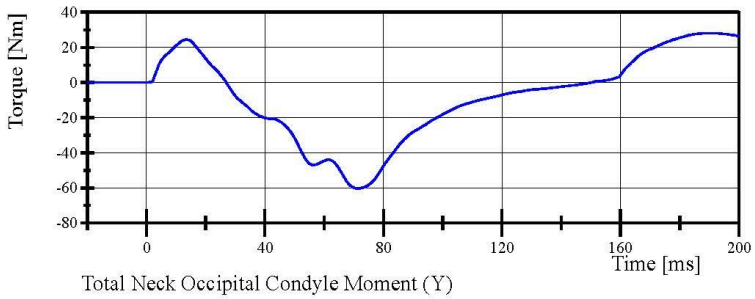
Filter Class: CFC_1000
Max: 523.5 N at 73.3 ms
Min: -241.8 N at 189.4 ms

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



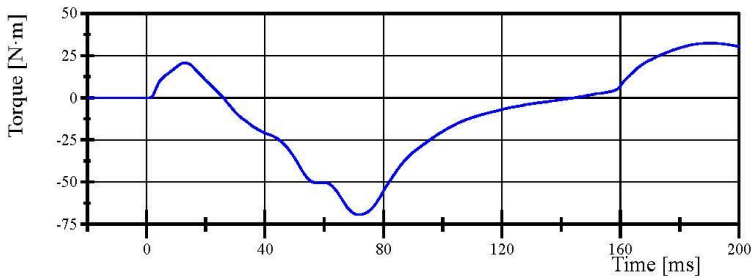
Filter Class: CFC_600
Max: 523.1 N at 73.3 ms
Min: -241.6 N at 189.5 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 28.2 Nm at 191.3 ms
Min: -60.3 Nm at 71.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 32.5 N·m at 190.4 ms
Min: -69.4 N·m at 71.8 ms

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

09.08.2020 14:49:39 1989

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 68-1
Test Date: 9/4/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.639 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,423.7 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-71.45 mm	Yes
Internal Hysteresis	69 - 85 %	70.8 %	Yes

Test meets specifications.

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

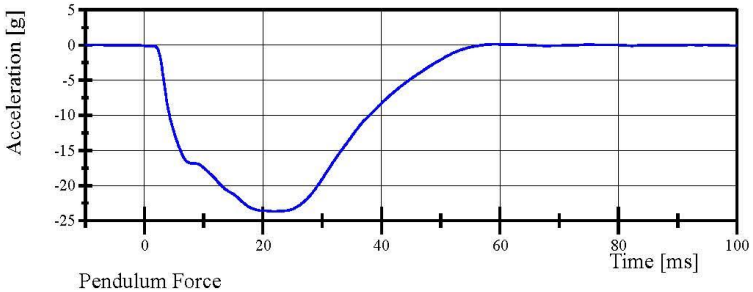
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

09.04.2020 10:20:47 343

Transportation Research Center Inc.

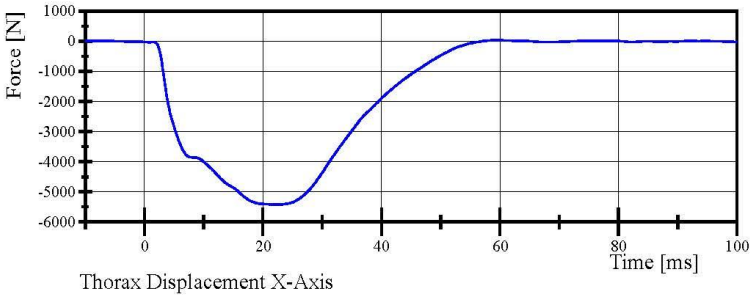
Front Thorax
HIII 50th Serial No. 037 Certification No. 68-1
Test Date: 9/4/2020

Pendulum Acceleration



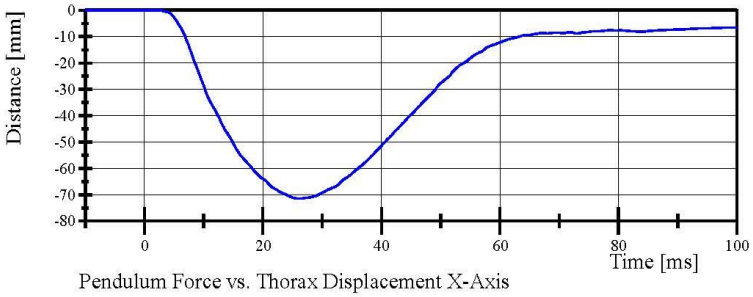
Filter Class: CFC_180
Max: 0.1 g at 59.0 ms
Min: -23.7 g at 21.8 ms

Pendulum Force



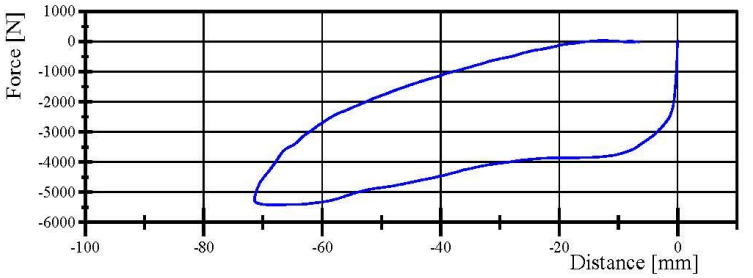
Filter Class: CFC_180
Max: 30.2 N at 59.0 ms
Min: -5,423.7 N at 21.8 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -8.2 ms
Min: -71.4 mm at 26.1 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 30.2 N at -13.0 mm
Min: -5,423.7 N at -67.4 mm

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

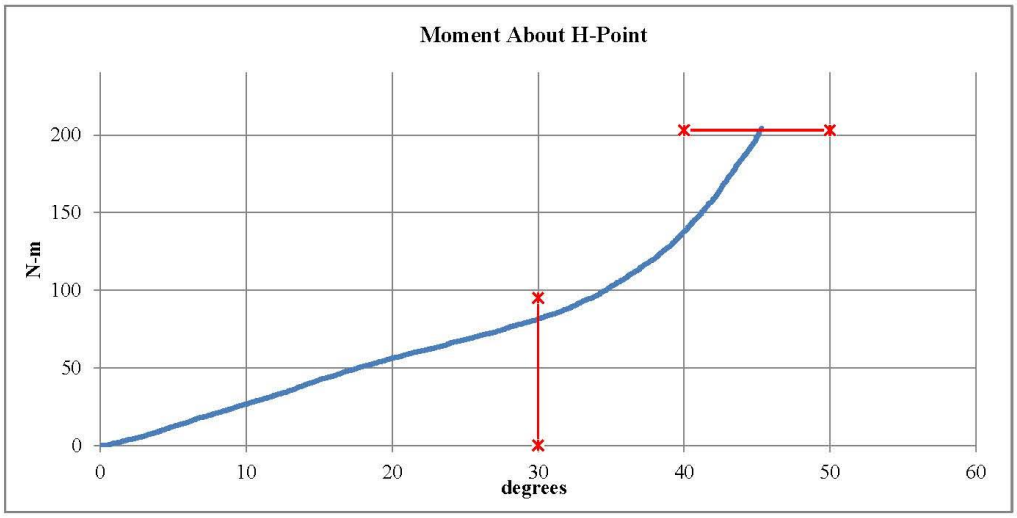
09.04.2020 10:21:56 343

Transportation Research Center Inc.

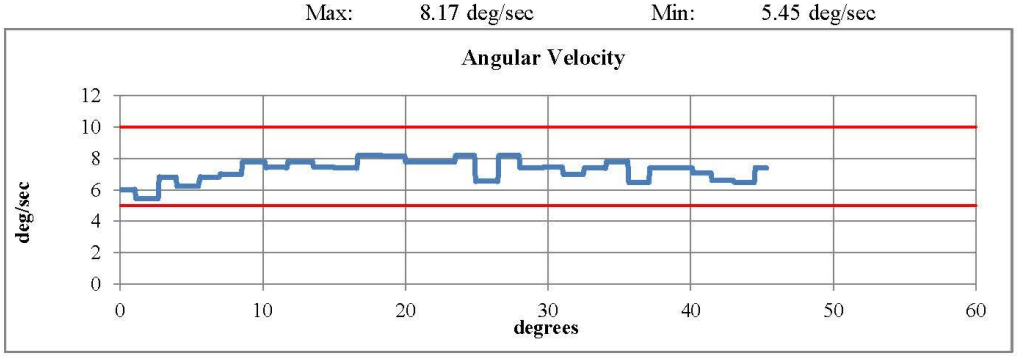
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	04-Sep-2020
Side Tested:	Left Hip	Time:	10:53
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	20.8	°C	Pass
Humidity	10	-	70	61	%	Pass
Moment at 30°	0	≤	94.9	81.76	N-m	Pass
Angle at 203 Nm	40	-	50	45.31	deg	Pass
Average Velocity	5	-	10	7.22	deg/sec	Pass



Max: 8.17 deg/sec Min: 5.45 deg/sec



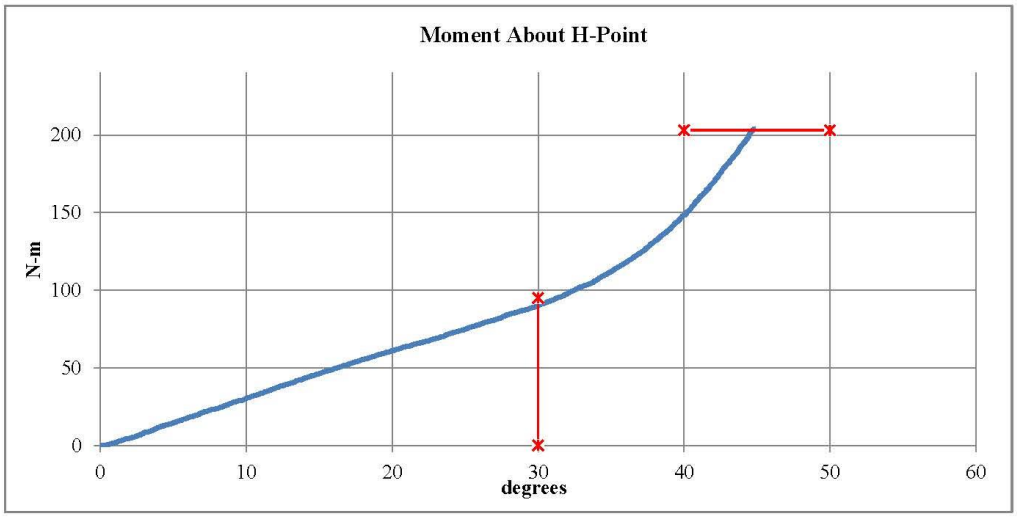
Comments:
Pelvis Skin S/N: EK3565

Transportation Research Center Inc.

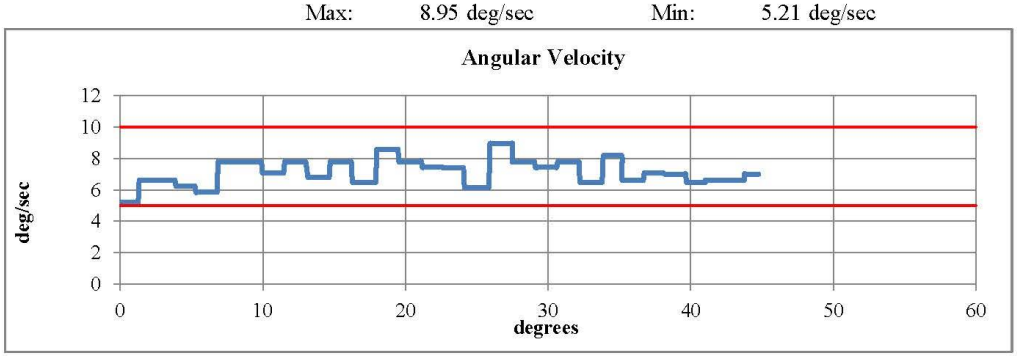
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	04-Sep-2020
Side Tested:	Right Hip	Time:	12:10
Test Number:	1		

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.1	°C	Pass
Humidity	10	-	70	60	%	Pass
Moment at 30°	0	≤	94.9	90.3	N-m	Pass
Angle at 203 Nm	40	-	50	44.76	deg	Pass
Average Velocity	5	-	10	7.11	deg/sec	Pass



Max: 8.95 deg/sec Min: 5.21 deg/sec



Comments:
Pelvis Skin S/N: EK3565

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 68-1
Test Date: 9/4/2020

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	2.075 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,729.16 N	Yes

Test meets specifications.

Condition: Used

Comments:
Knee S/N: 2672

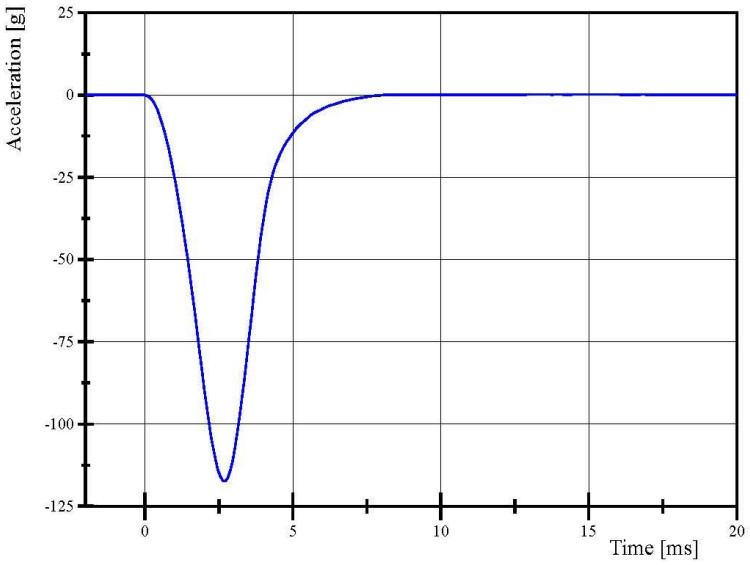
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

09.04.2020 11:17:42 1909

Transportation Research Center Inc.

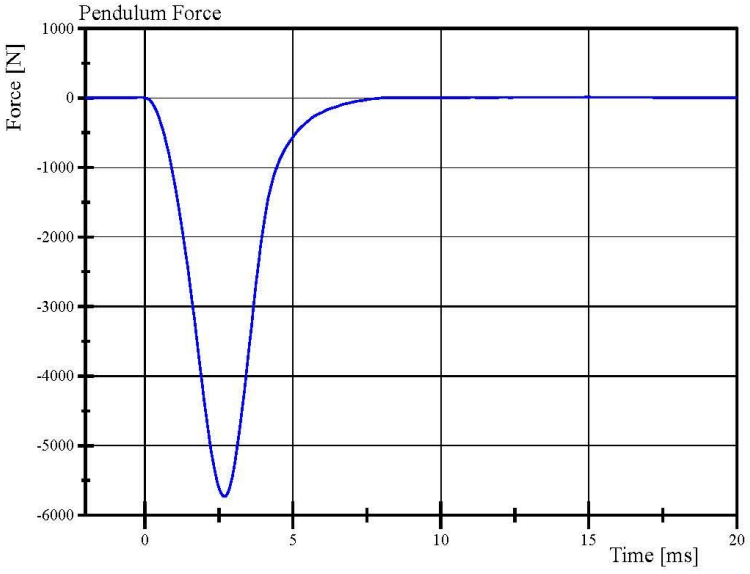
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 68-1
Test Date: 9/4/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 15.0 ms
Min: -117.3 g at 2.7 ms

Pendulum Force



Filter Class: CFC_600
Max: 8.7 N at 15.0 ms
Min: -5,729.2 N at 2.7 ms

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

09.04.2020 11:18:11 1909

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 68-1
Test Date: 9/4/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	57 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.076 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,654.88 N	Yes

Test meets specifications.

Condition: Used

Comments:
Knee Skin S/N: 1248

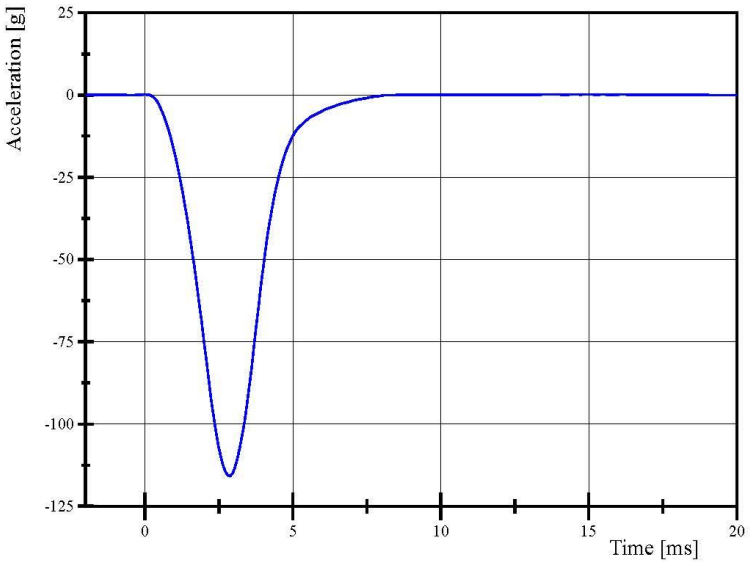
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

09.04.2020 11:22:23 1903

Transportation Research Center Inc.

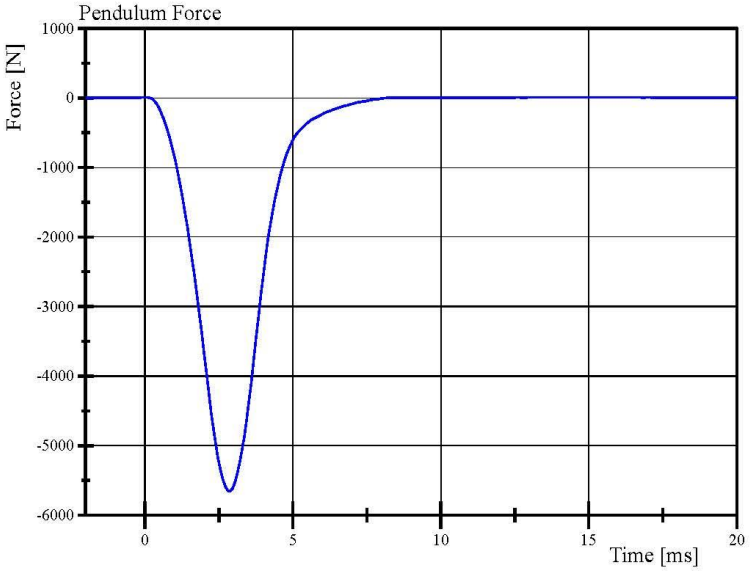
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 68-1
Test Date: 9/4/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 14.5 ms
Min: -115.8 g at 2.9 ms

Pendulum Force



Filter Class: CFC_600
Max: 7.4 N at 14.5 ms
Min: -5,654.9 N at 2.9 ms

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

09.04.2020 11:22:55 1903

Pre-Test Calibration Sheets

Front Passenger S/N EB7513

Transportation Research Center Inc.
572O HIII 5th Dummy
External Dimensions
Serial No. EB7513 Calibration No. 11

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	779	Yes
B	Shoulder Pivot Height	431.8 - 457.2	443	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	79	Yes
F	Thigh Clearance	119.4 - 134.6	130	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	197	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	182	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	164	Yes

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	260.7 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	5.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	0.69 %	Yes

Test meets specifications.

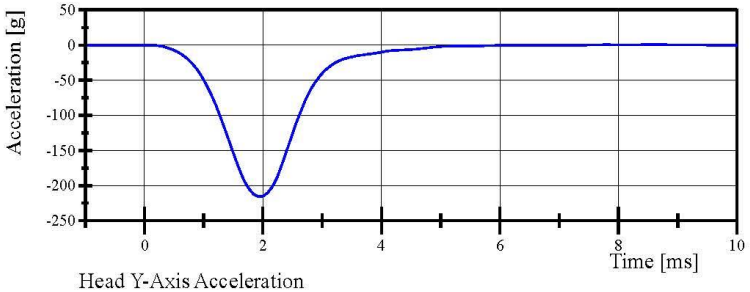
Condition: Used

Comments:
Head Skin S/N: EA8751

Transportation Research Center Inc.

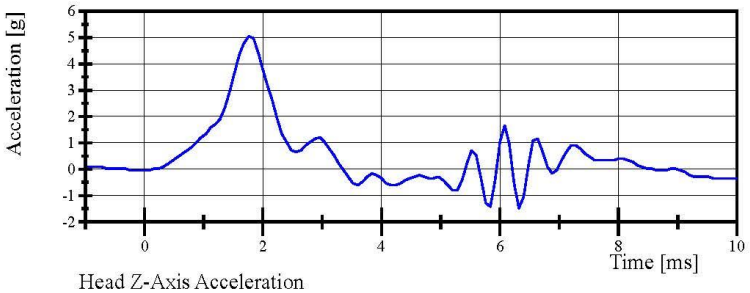
Front Head Drop
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/24/2020

Head X-Axis Acceleration



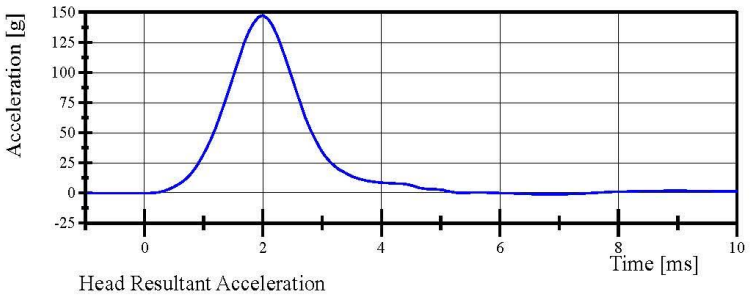
Filter Class: CFC_1000
Max: 0.6 g at 8.5 ms
Min: -215.7 g at 1.9 ms

Head Y-Axis Acceleration



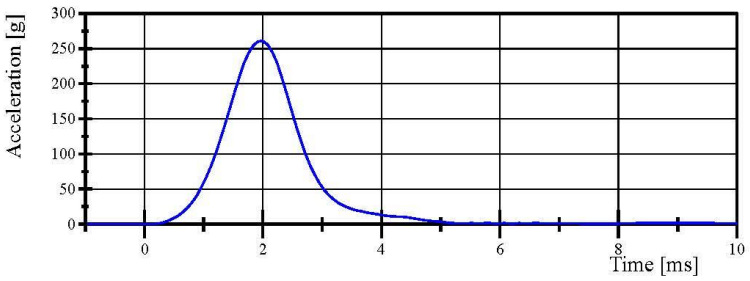
Filter Class: CFC_1000
Max: 5.0 g at 1.8 ms
Min: -1.5 g at 6.3 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 147.4 g at 2.0 ms
Min: -1.1 g at 6.9 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 260.7 g at 2.0 ms
Min: 0.0 g at -0.6 ms

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

08.24.2020 10:56:11 577

Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 11-3
Test Date: 8/25/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.089 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.12 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.22 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.12 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-83.2 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	77.4 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	88.4 ms	Yes

Test meets specifications.

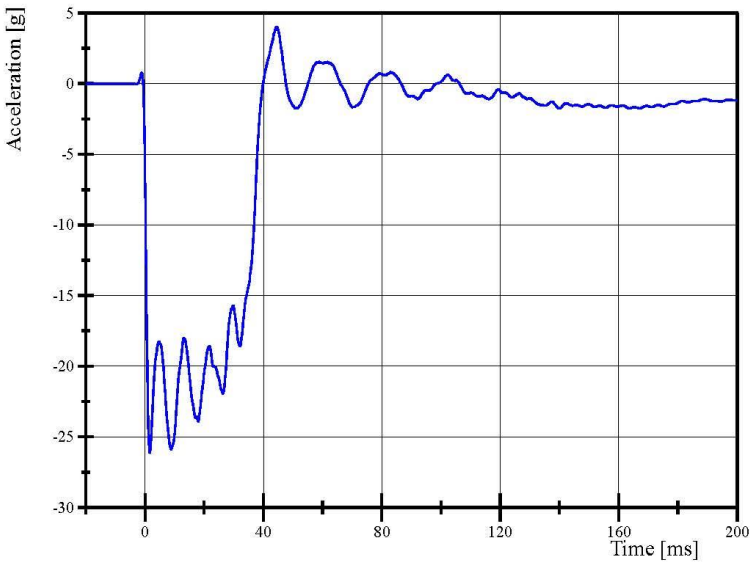
Condition: Used

Comments:
Neck S/N: EB6930

Transportation Research Center Inc.

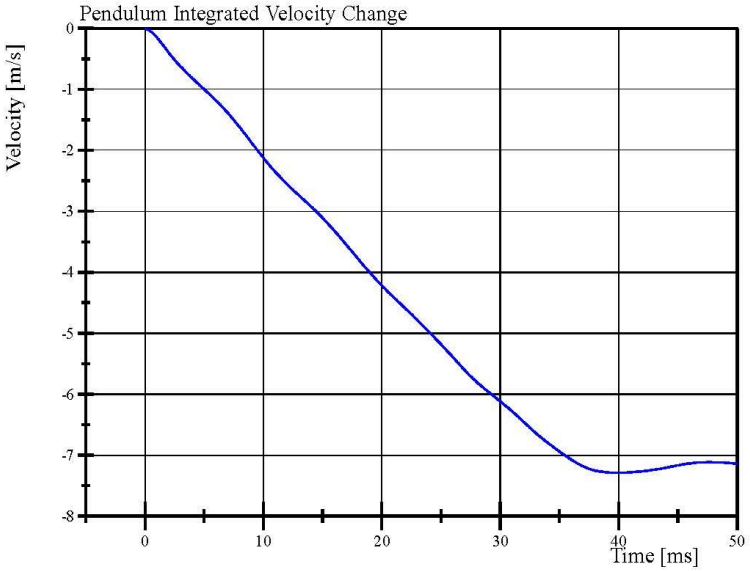
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 11-3
Test Date: 8/25/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 4.0 g at 44.5 ms
Min: -26.1 g at 1.6 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.3 m/s at 39.9 ms

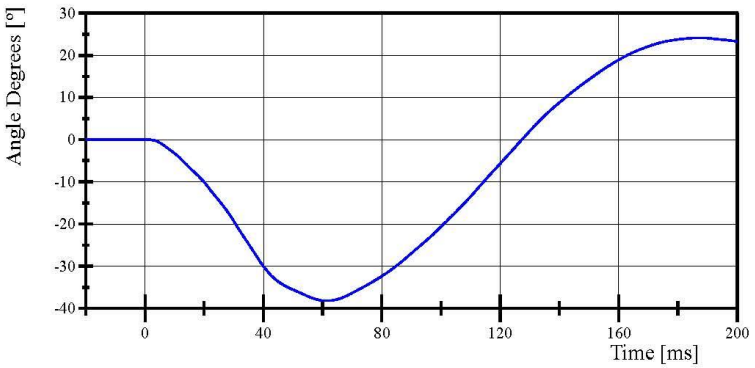
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

08.27.2020 14:32:56 1820

Transportation Research Center Inc.

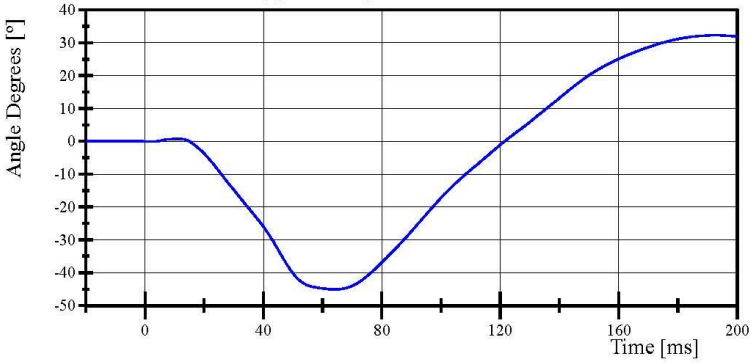
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 11-3
Test Date: 8/25/2020

Pot Rotation at the Base of Neck



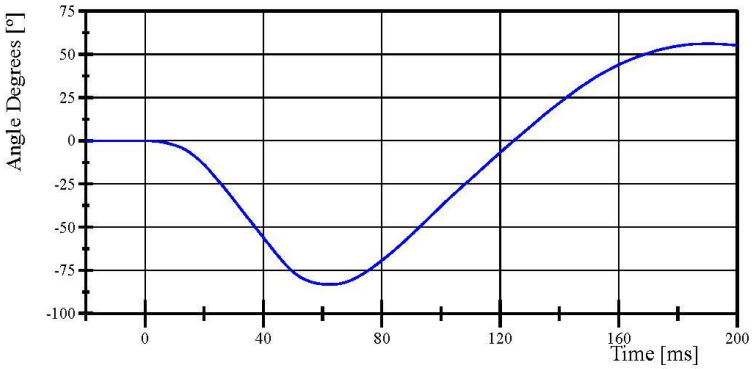
Filter Class: CFC_60
Max: 24.1 ° at 187.8 ms
Min: -38.2 ° at 61.3 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 32.3 ° at 192.7 ms
Min: -45.1 ° at 64.1 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 56.3 ° at 190.3 ms
Min: -83.2 ° at 62.6 ms

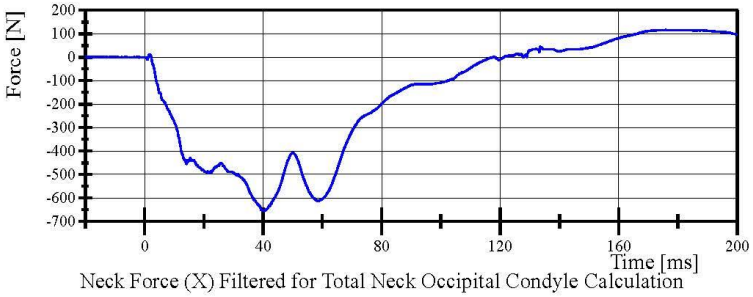
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

08.27.2020 14:32:56 1820

Transportation Research Center Inc.

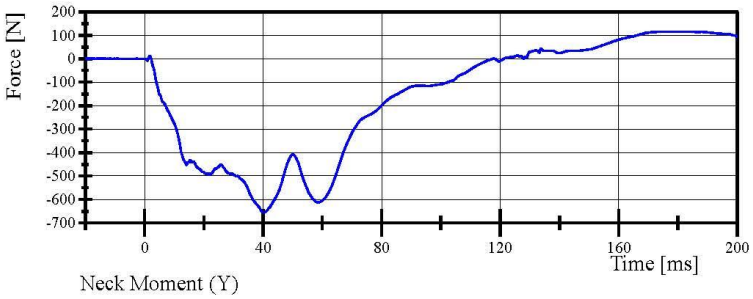
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 11-3
Test Date: 8/25/2020

Neck Force (X)



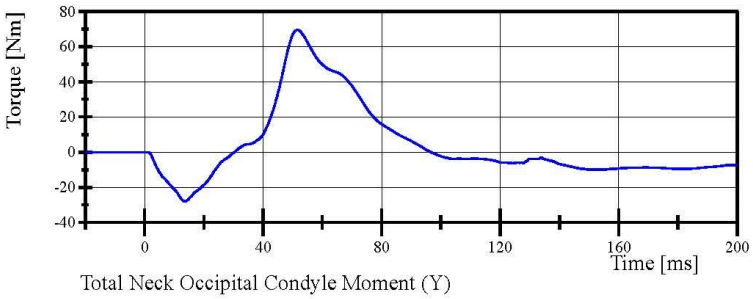
Filter Class: CFC_1000
Max: 116.4 N at 175.8 ms
Min: -655.1 N at 40.2 ms

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



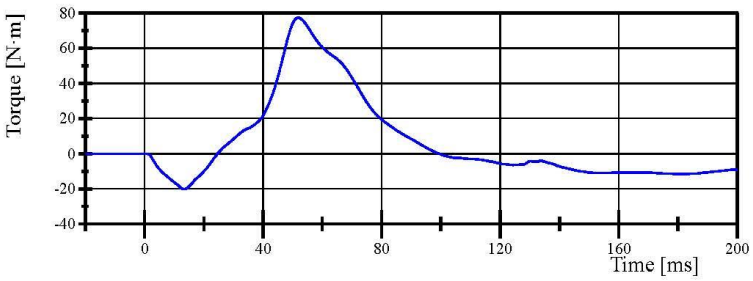
Filter Class: CFC_600
Max: 116.2 N at 175.9 ms
Min: -654.9 N at 40.3 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 69.6 Nm at 51.6 ms
Min: -27.9 Nm at 14.0 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 77.4 N·m at 51.9 ms
Min: -20.1 N·m at 13.4 ms

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

08.27.2020 14:32:57 1820

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/25/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 ºC	20.8 ºC	Yes
Relative Humidity	10 - 70 %	54 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.061 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.79 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.54 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.16 m/s	Yes
Total Head D-Plane Rotation	99 - 114 º	110.1 º	Yes
Total Neck Occipital Condyles Moment Between 99º and 114º Rotation	(-53) - (-65) N·m	-56.6 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	104.3 ms	Yes

Test meets specifications.

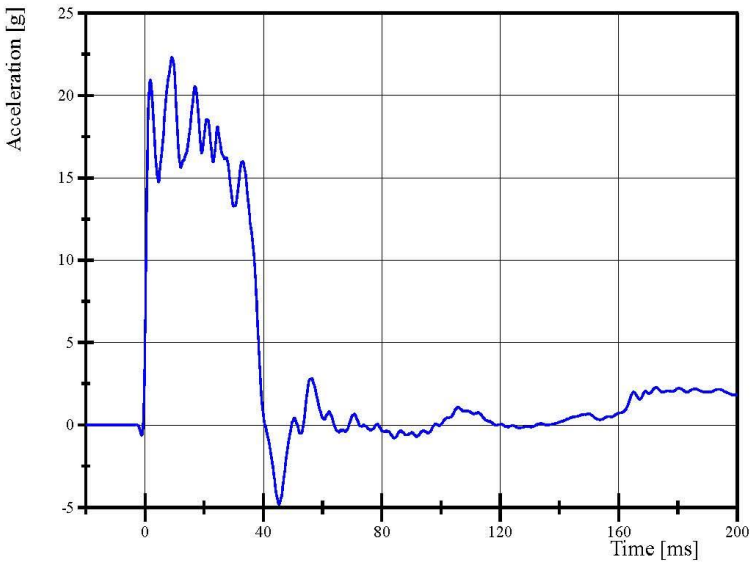
Condition: Used

Comments:
Neck S/N: EB6930

Transportation Research Center Inc.

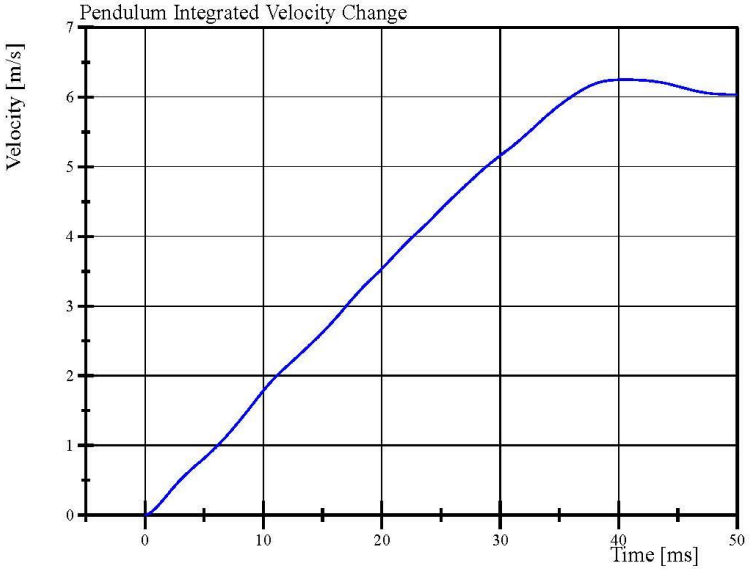
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/25/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 22.3 g at 9.1 ms
Min: -4.8 g at 45.3 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.3 m/s at 40.5 ms
Min: 0.0 m/s at 0.0 ms

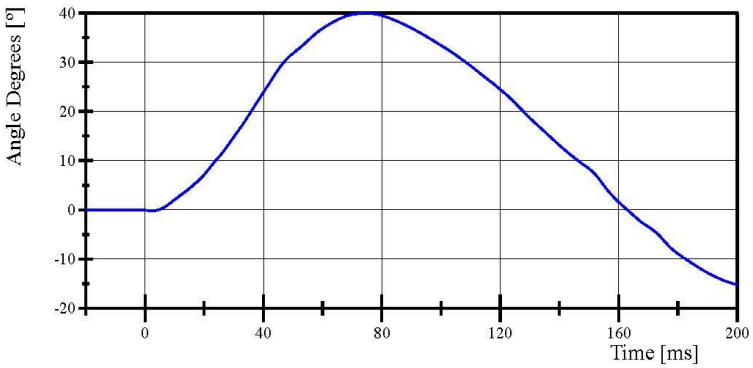
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

08.27.2020 16:47:45 1973

Transportation Research Center Inc.

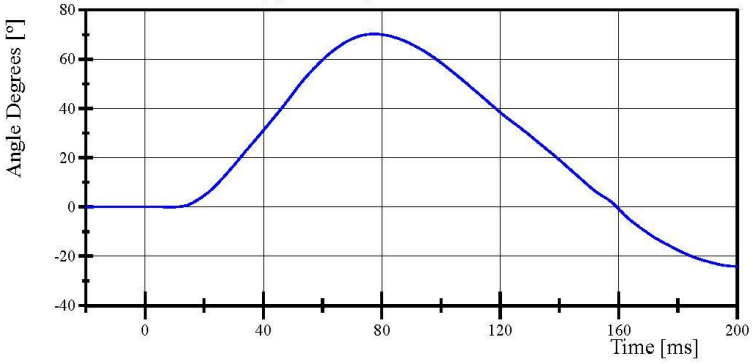
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/25/2020

Pot Rotation at the Base of Neck



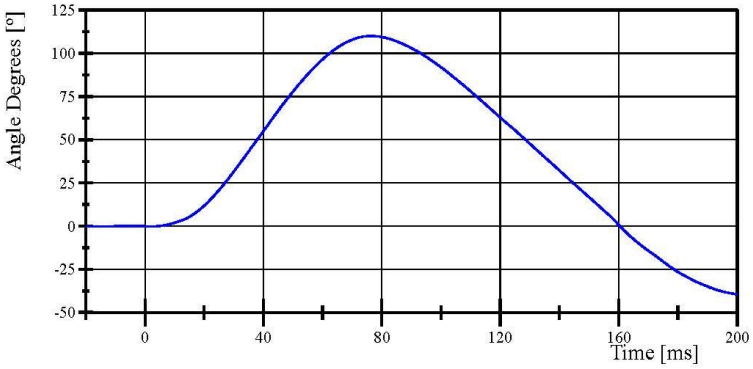
Filter Class: CFC_60
Max: 40.0 ° at 74.6 ms
Min: -15.2 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 70.2 ° at 77.4 ms
Min: -24.2 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 110.1 ° at 76.4 ms
Min: -39.4 ° at 200.0 ms

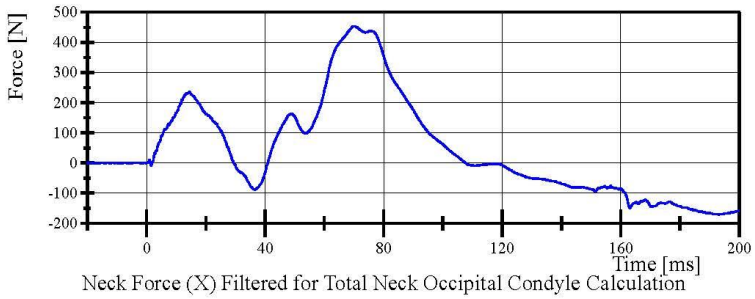
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

08.27.2020 16:47:45 1973

Transportation Research Center Inc.

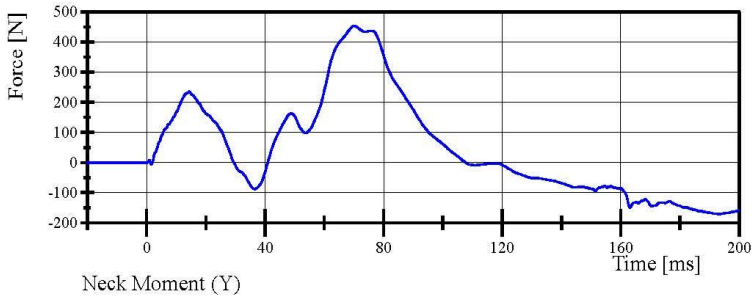
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/25/2020

Neck Force (X)



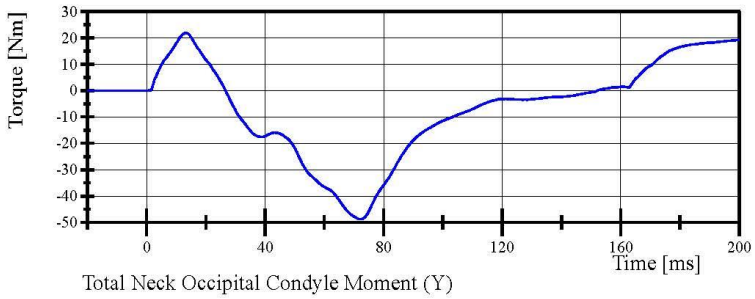
Filter Class: CFC_1000
Max: 453.8 N at 70.0 ms
Min: -170.7 N at 192.9 ms

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



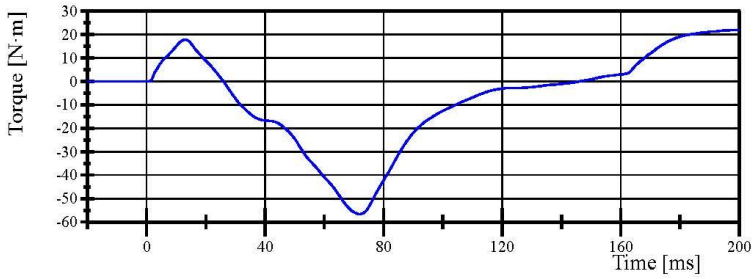
Filter Class: CFC_600
Max: 453.7 N at 70.0 ms
Min: -170.7 N at 193.1 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 21.8 Nm at 13.3 ms
Min: -48.8 Nm at 72.3 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 22.0 N·m at 198.7 ms
Min: -56.6 N·m at 72.1 ms

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

08.27.2020 16:47:45 1973

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/25/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.785 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,217.0 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,221.2 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-52.6 mm	Yes
Internal Hysteresis	69 - 85 %	76.1 %	Yes

Test meets specifications.

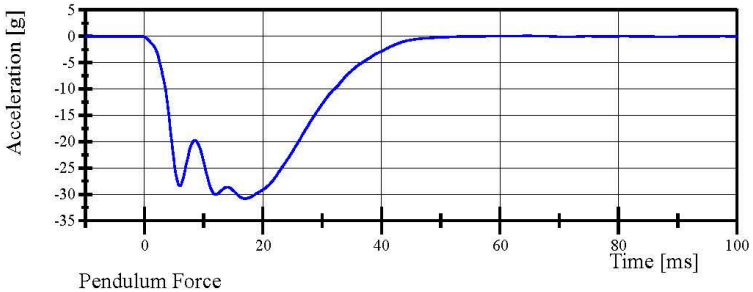
Condition: Used

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

Transportation Research Center Inc.

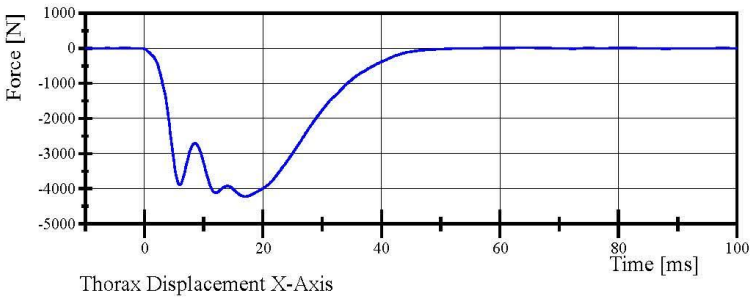
Front Thorax
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/25/2020

Pendulum Acceleration



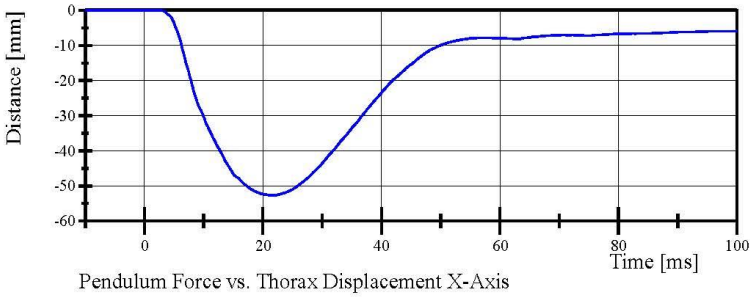
Filter Class: CFC_180
Max: 0.1 g at 64.7 ms
Min: -30.8 g at 17.0 ms

Pendulum Force



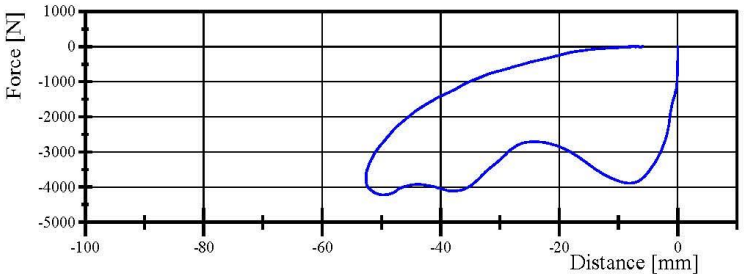
Filter Class: CFC_180
Max: 14.0 N at 64.7 ms
Min: -4,221.2 N at 17.0 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -5.5 ms
Min: -52.6 mm at 21.3 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 14.0 N at -7.8 mm
Min: -4,221.2 N at -49.6 mm

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

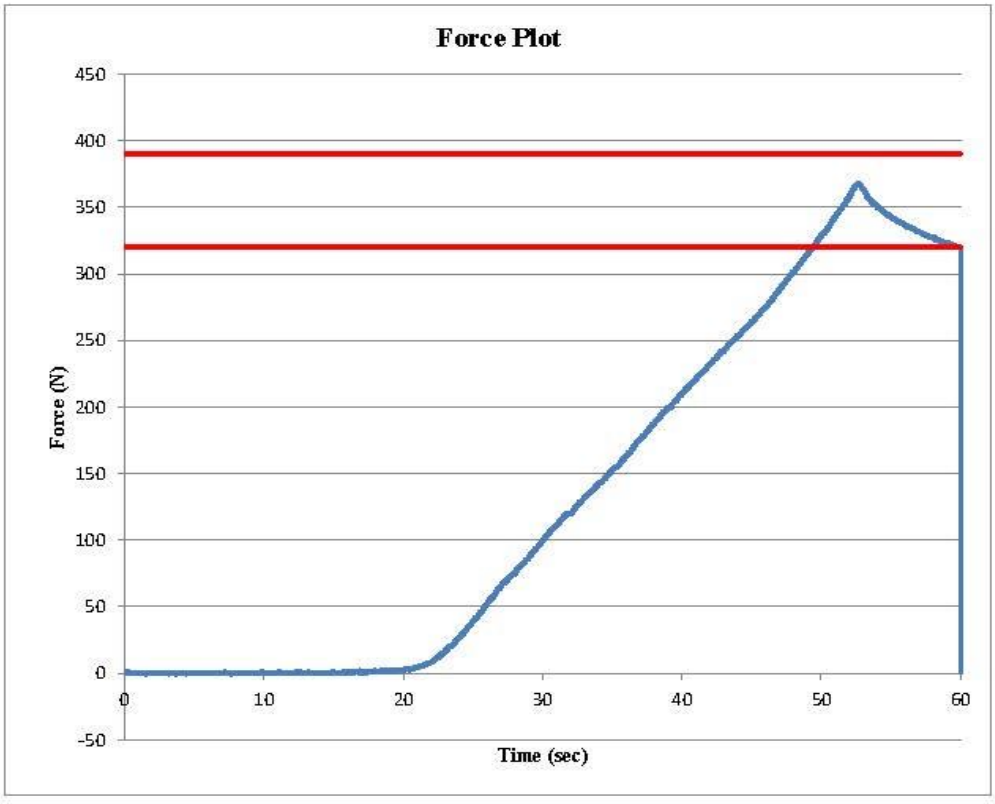
08.25.2020 14:47:59 409

Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

Customer:	NHTSA		
Serial Number:	EB7513	Date:	8/25/2020
Test Number:	1	Time:	15:21

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.5	°C	Pass
Humidity	10	-	70	58	%	Pass
Average Angular Velocity	0.5	-	1.5	0.95	deg/sec	Pass
Initial Angle	0	-	20	14.77	deg	Pass
Peak Force at 45.26°	320	-	390	367.98	N	Pass
Final Angle	-8	-	8	2.41	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. 11-1
Test Date: 8/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.086 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,842.5 N	Yes

Test meets specifications.

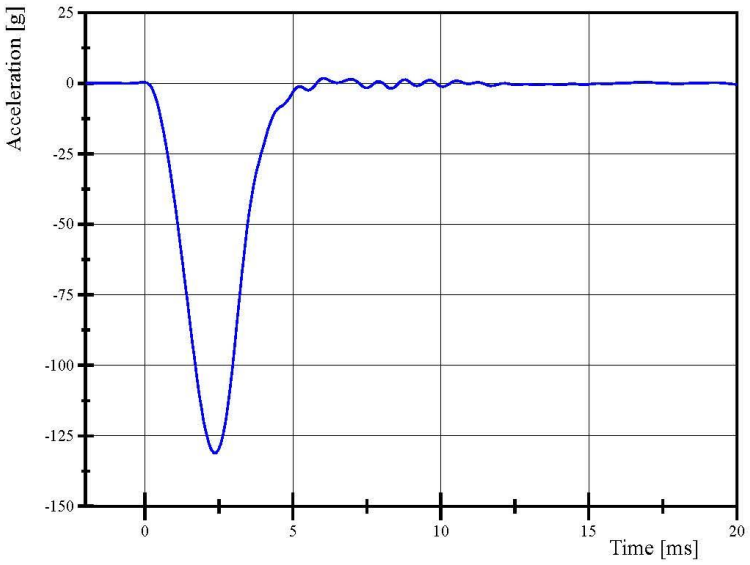
Condition: Used

Comments:
Knee Skin S/N: EB7773

Transportation Research Center Inc.

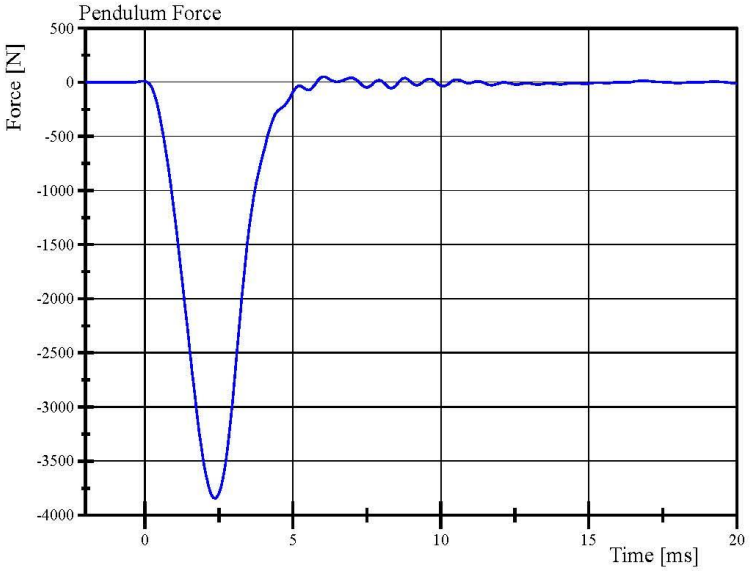
Left Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/24/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 1.7 g at 6.0 ms
Min: -131.0 g at 2.4 ms

Pendulum Force



Filter Class: CFC_600
Max: 51.0 N at 6.0 ms
Min: -3,842.5 N at 2.4 ms

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

08.24.2020 10:41:30 1807

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/24/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.085 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-4,029.9 N	Yes

Test meets specifications.

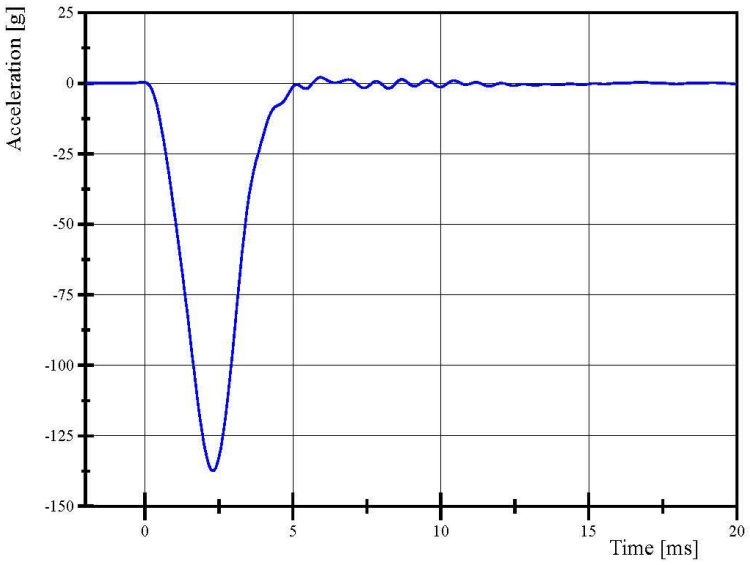
Condition: Used

Comments:
Knee Skin S/N: EB7550

Transportation Research Center Inc.

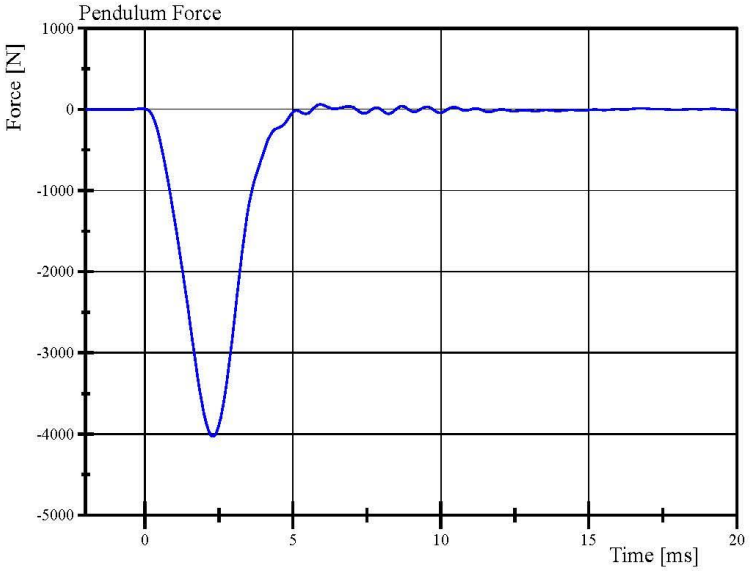
Right Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 11-1
Test Date: 8/24/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 2.1 g at 5.9 ms
Min: -137.4 g at 2.3 ms

Pendulum Force



Filter Class: CFC_600
Max: 62.2 N at 5.9 ms
Min: -4,029.9 N at 2.3 ms

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

08.24.2020 10:35:44 1808

Post-Test Calibration Sheets

Front Passenger S/N EB7513

Transportation Research Center Inc.
572O HIII 5th Dummy
External Dimensions
Serial No. EB7513 Calibration No. 12

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	443	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	79	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	197	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	182	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	164	Yes

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	60 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	252.0 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	6.0 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	< 10 %	1.30 %	Yes

Test meets specifications.

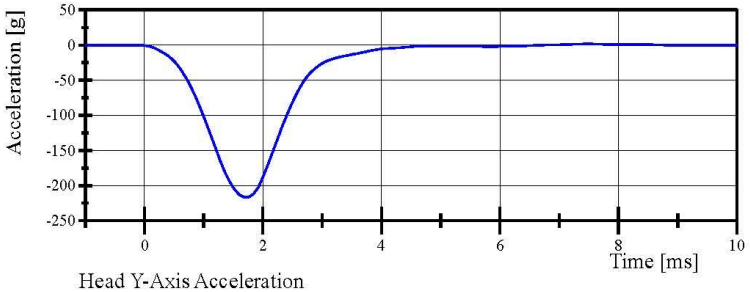
Condition: Used

Comments:
Head Skin S/N: EA8751

Transportation Research Center Inc.

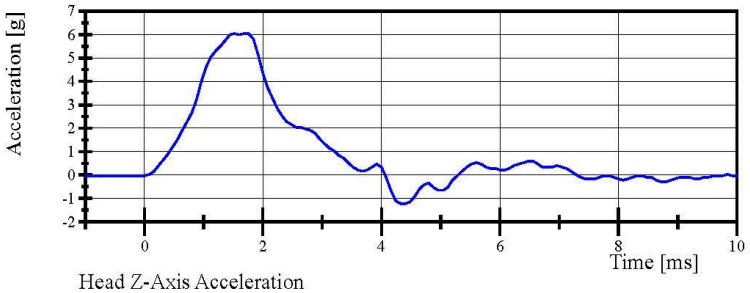
Front Head Drop
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Head X-Axis Acceleration



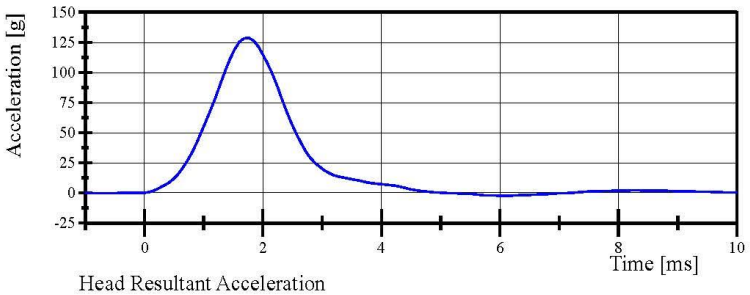
Filter Class: CFC_1000
Max: 1.8 g at 7.5 ms
Min: -216.5 g at 1.7 ms

Head Y-Axis Acceleration



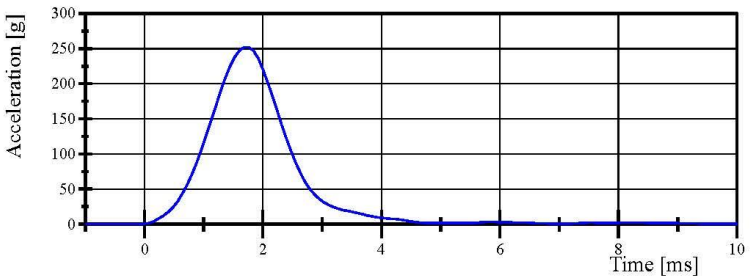
Filter Class: CFC_1000
Max: 6.0 g at 1.5 ms
Min: -1.2 g at 4.3 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 128.9 g at 1.8 ms
Min: -2.3 g at 6.1 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 252.0 g at 1.8 ms
Min: 0.0 g at -1.0 ms

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

09.08.2020 08:46:45 580

Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	58 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.085 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.16 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.27 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.25 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-85.3 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	78.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	89.8 ms	Yes

Test meets specifications.

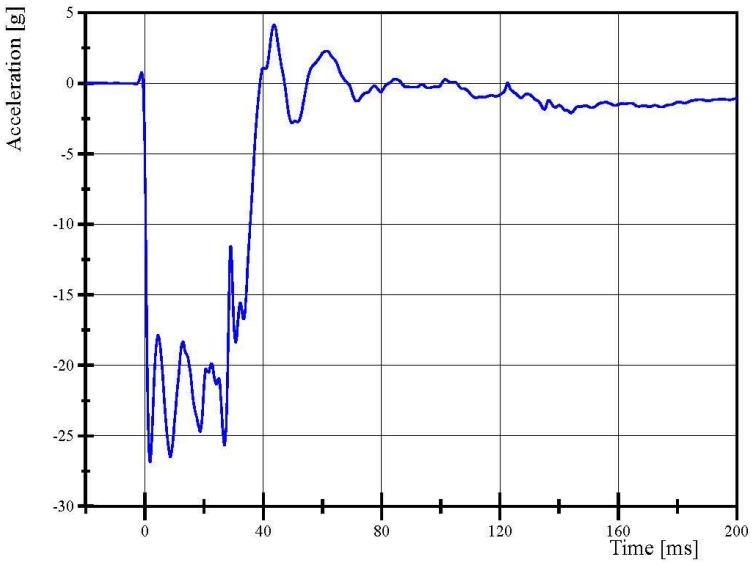
Condition: Used

Comments:
Neck S/N: EB6930

Transportation Research Center Inc.

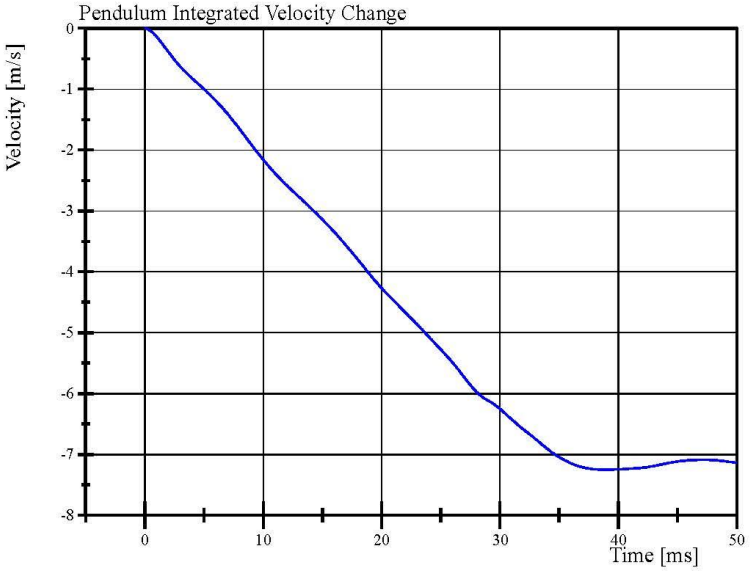
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 4.1 g at 43.7 ms
Min: -26.8 g at 1.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.3 m/s at 38.9 ms

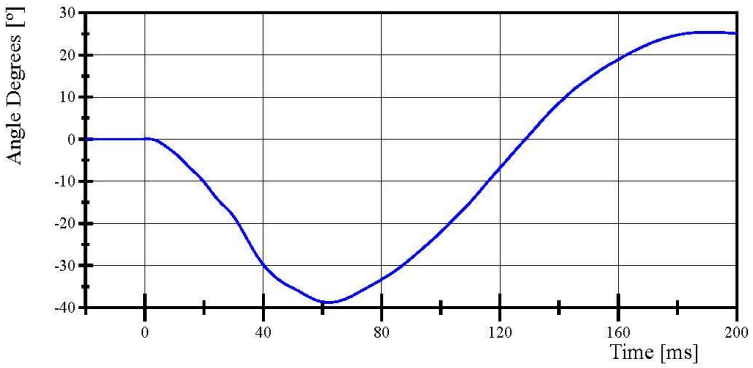
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

09.08.2020 09:23:39 1821

Transportation Research Center Inc.

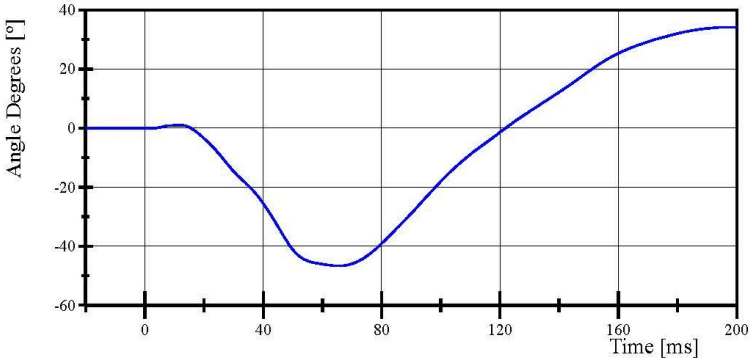
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Pot Rotation at the Base of Neck



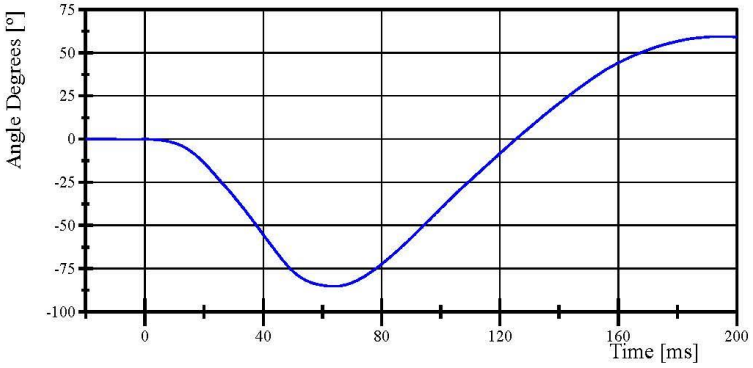
Filter Class: CFC_60
Max: 25.4 ° at 190.9 ms
Min: -38.7 ° at 62.2 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 34.2 ° at 197.0 ms
Min: -46.7 ° at 65.5 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 59.4 ° at 194.9 ms
Min: -85.3 ° at 63.8 ms

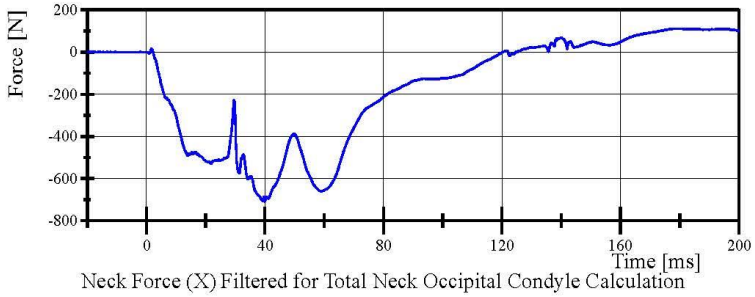
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

09.08.2020 09:23:40 1821

Transportation Research Center Inc.

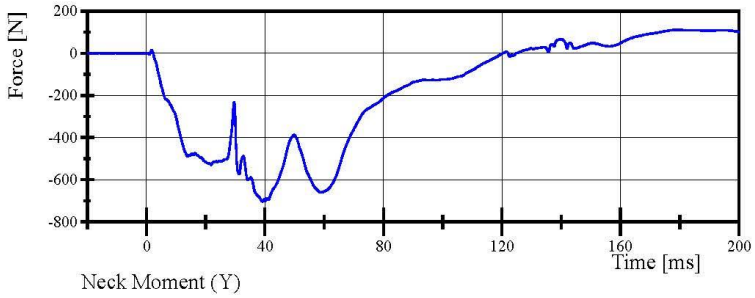
Neck Flexion
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Neck Force (X)



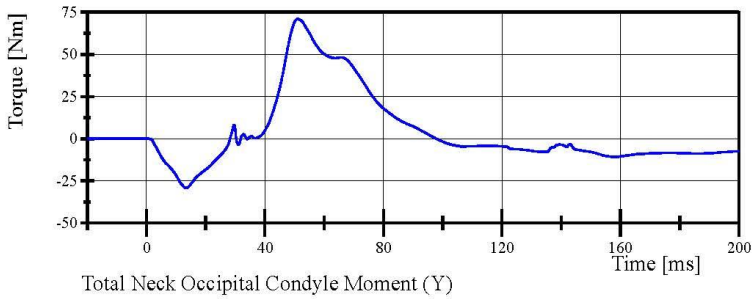
Filter Class: CFC_1000
Max: 111.5 N at 178.8 ms
Min: -708.9 N at 40.0 ms

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



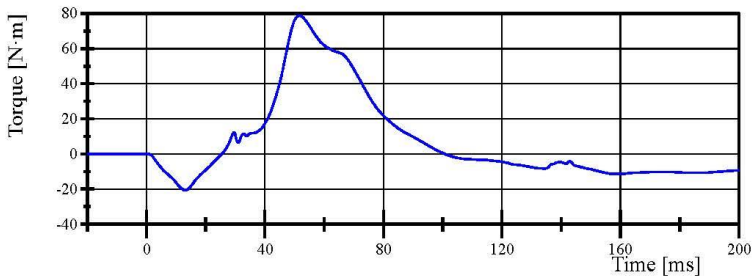
Filter Class: CFC_600
Max: 111.5 N at 179.0 ms
Min: -703.3 N at 39.2 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 71.1 Nm at 51.1 ms
Min: -29.1 Nm at 13.5 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 78.7 N·m at 51.6 ms
Min: -20.7 N·m at 13.2 ms

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

09.08.2020 09:23:40 1821

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.0 °C	Yes
Relative Humidity	10 - 70 %	60 %	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	1.83 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.63 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.26 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	113.1 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-60.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	103.7 ms	Yes

Test meets specifications.

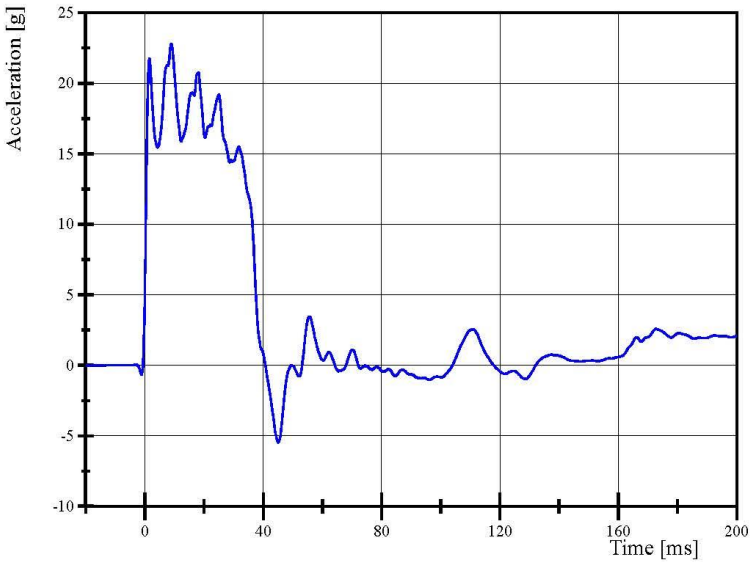
Condition: Used

Comments:
Neck S/N: EB6930

Transportation Research Center Inc.

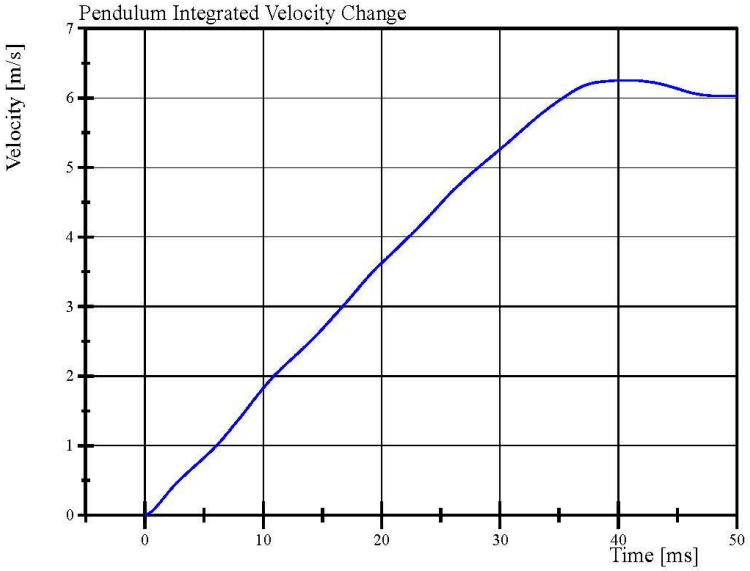
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Pendulum Acceleration



Filter Class: CFC_180
Max: 22.8 g at 8.9 ms
Min: -5.5 g at 45.1 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.3 m/s at 40.8 ms
Min: 0.0 m/s at 0.0 ms

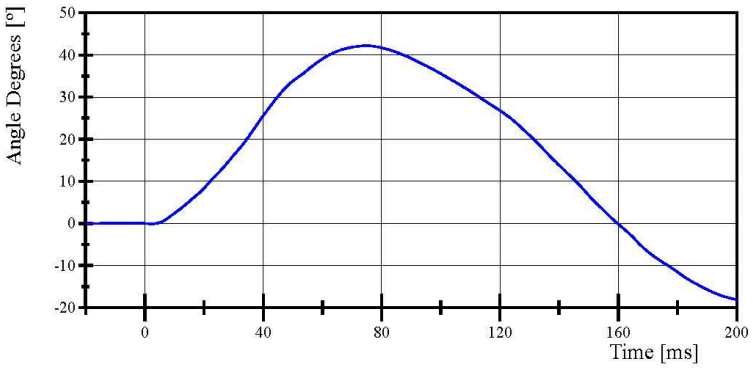
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

09.08.2020 10:03:10 1977

Transportation Research Center Inc.

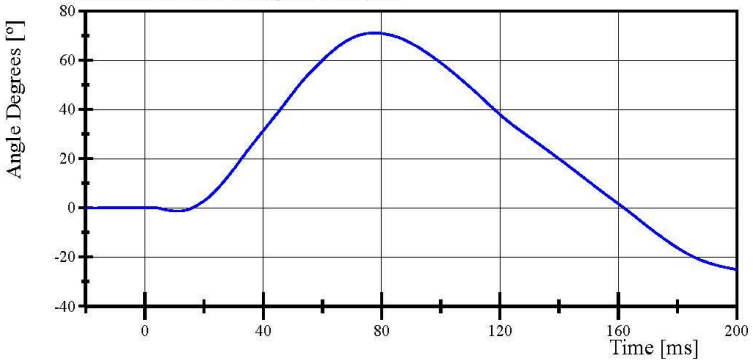
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Pot Rotation at the Base of Neck



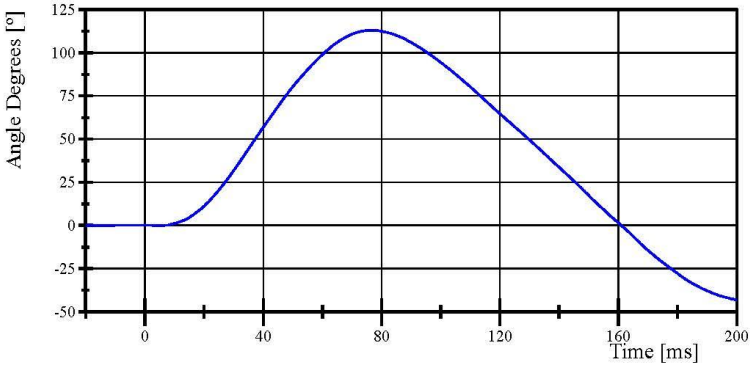
Filter Class: CFC_60
Max: 42.1 ° at 74.9 ms
Min: -18.1 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 71.1 ° at 77.7 ms
Min: -25.0 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 113.1 ° at 76.7 ms
Min: -43.1 ° at 200.0 ms

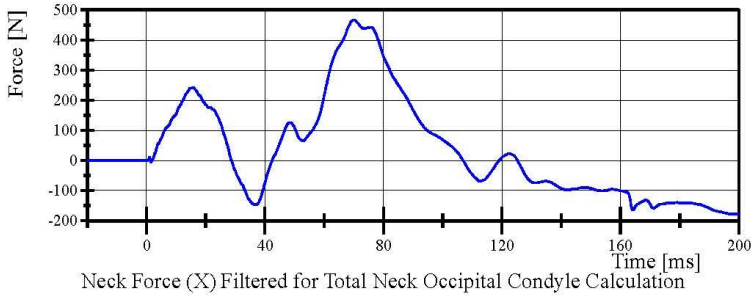
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

09.08.2020 10:03:11 1977

Transportation Research Center Inc.

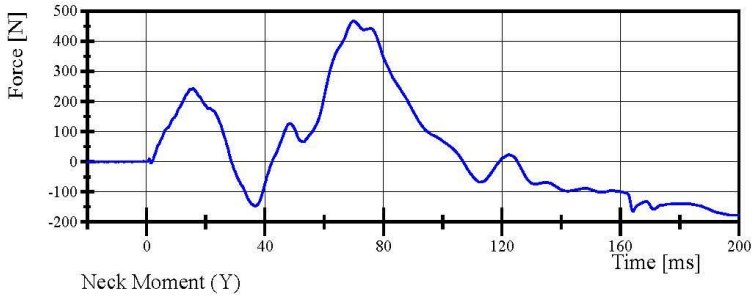
Neck Extension
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/8/2020

Neck Force (X)



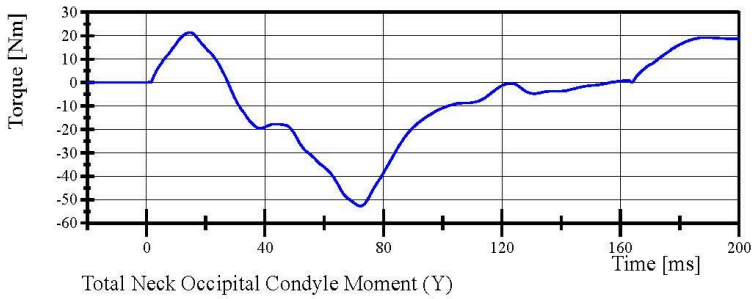
Filter Class: CFC_1000
Max: 467.4 N at 69.9 ms
Min: -178.3 N at 197.4 ms

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



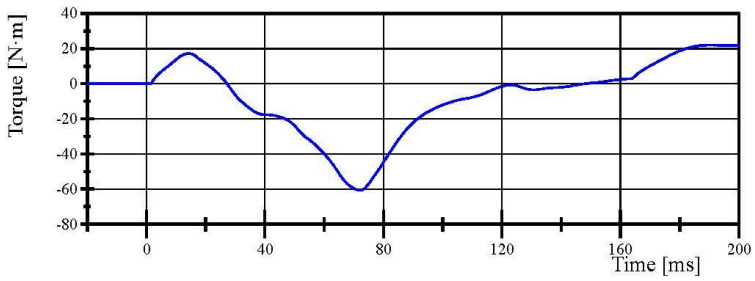
Filter Class: CFC_600
Max: 467.2 N at 70.0 ms
Min: -178.3 N at 198.5 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 21.4 Nm at 14.7 ms
Min: -52.7 Nm at 72.2 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 22.0 N·m at 189.7 ms
Min: -60.7 N·m at 72.0 ms

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

09.08.2020 10:03:11 1977

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/4/2020

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	55 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.778 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,187.8 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,314.6 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-51.4 mm	Yes
Internal Hysteresis	69 - 85 %	75.8 %	Yes

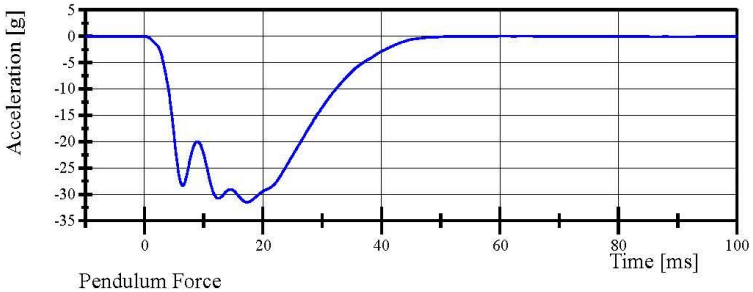
Test meets specifications.

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

Transportation Research Center Inc.

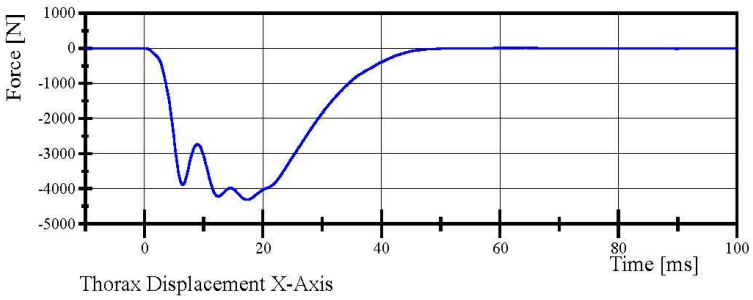
Front Thorax
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/4/2020

Pendulum Acceleration



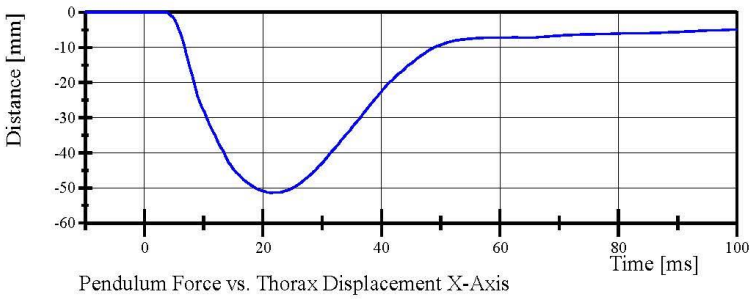
Filter Class: CFC_180
Max: 0.1 g at 64.4 ms
Min: -31.5 g at 17.3 ms

Pendulum Force



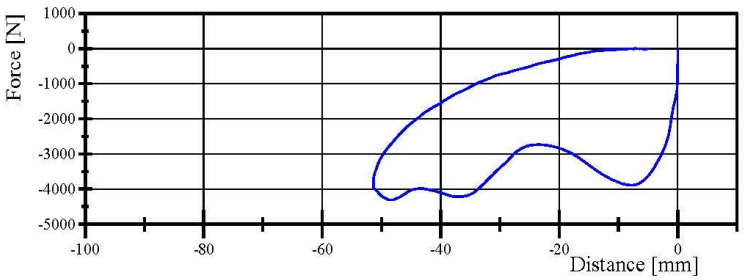
Filter Class: CFC_180
Max: 10.2 N at 64.4 ms
Min: -4,314.6 N at 17.3 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -9.9 ms
Min: -51.4 mm at 21.4 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 10.2 N at -7.2 mm
Min: -4,314.6 N at -48.3 mm

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

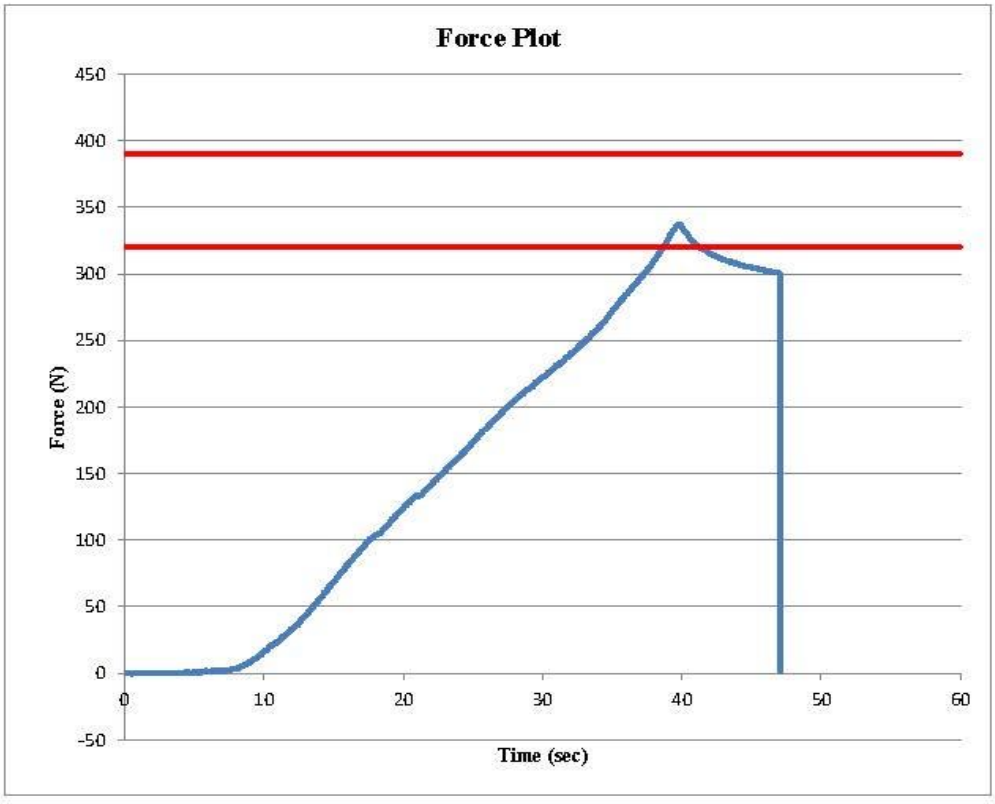
09.04.2020 14:30:16 380

Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

Customer:	NHTSA		
Serial Number:	EB7513	Date:	9/8/2020
Test Number:	1	Time:	11:05

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.4	°C	Pass
Humidity	10	-	70	60	%	Pass
Average Angular Velocity	0.5	-	1.5	0.97	deg/sec	Pass
Initial Angle	0	-	20	12.57	deg	Pass
Peak Force at 45.26°	320	-	390	337.27	N	Pass
Final Angle	-8	-	8	3.98	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. 12-1
Test Date: 9/4/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.085 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-4,092.3 N	No

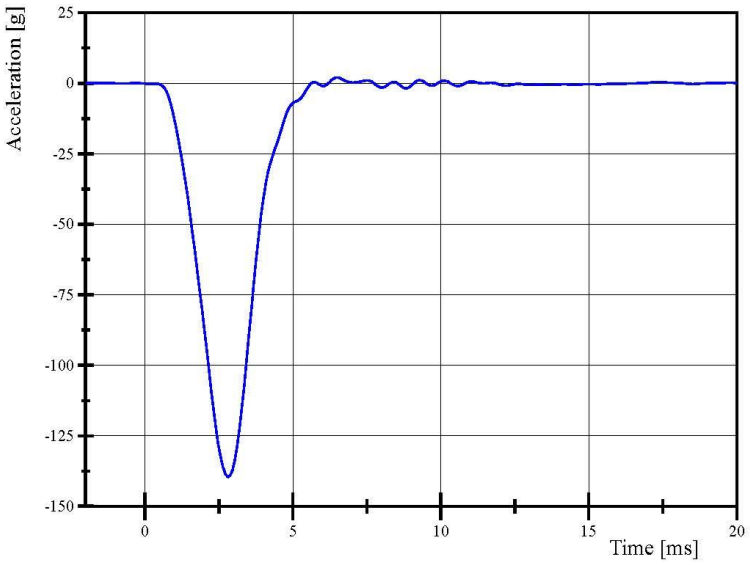
Test does not meet specifications.

Condition: Used
Comments:
Knee Skin S/N: EB7773

Transportation Research Center Inc.

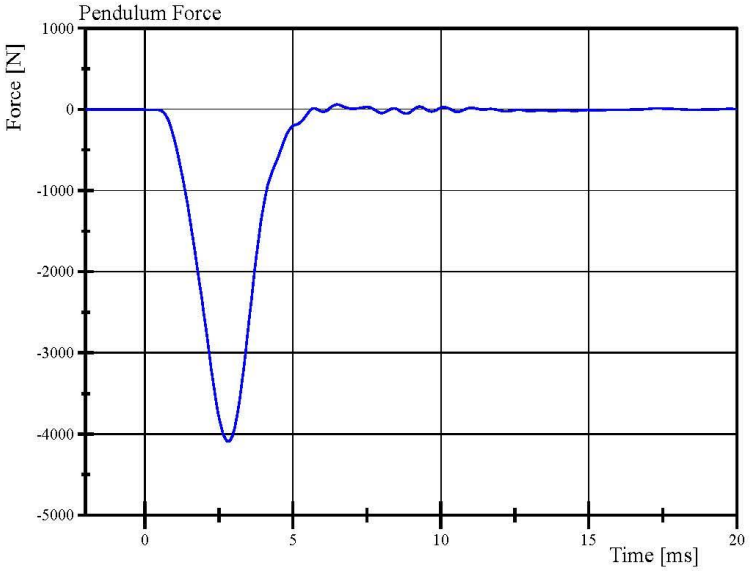
Left Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/4/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 2.0 g at 6.5 ms
Min: -139.6 g at 2.8 ms

Pendulum Force



Filter Class: CFC_600
Max: 59.8 N at 6.5 ms
Min: -4,092.3 N at 2.8 ms

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

09.04.2020 15:06:56 1766

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/4/2020

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	59 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.084 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,743.2 N	Yes

Test meets specifications.

Condition: Used

Comments:
Knee Skin S/N: EB7550

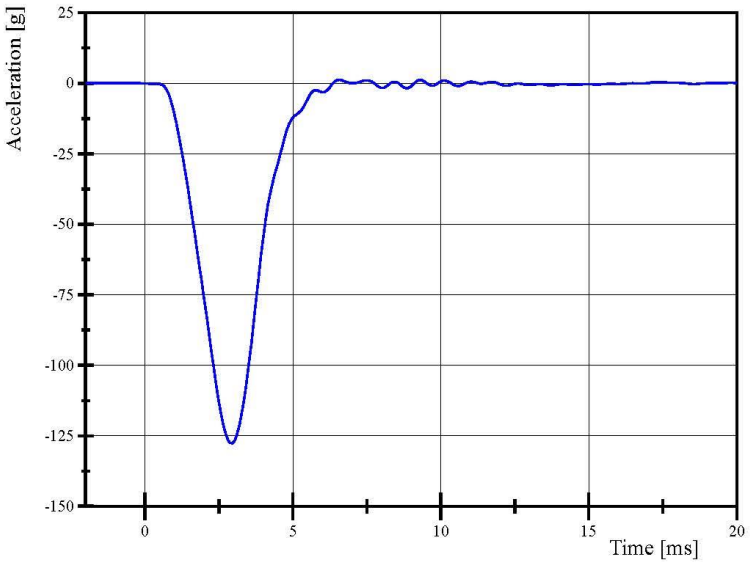
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

09.04.2020 15:09:47 1768

Transportation Research Center Inc.

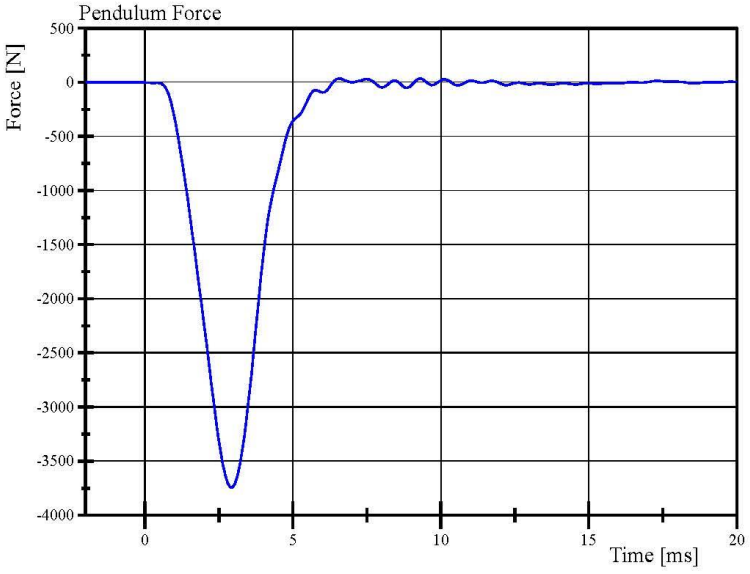
Right Knee Femur Response Test
HIII 5th Serial No. EB7513 Certification No. 12-1
Test Date: 9/4/2020

Pendulum Acceleration



Filter Class: CFC_600
Max: 1.2 g at 6.6 ms
Min: -127.7 g at 3.0 ms

Pendulum Force



Filter Class: CFC_600
Max: 35.9 N at 6.6 ms
Min: -3,743.2 N at 3.0 ms

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

09.04.2020 15:10:14 1768

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	13-Aug-2020
			Y	P94650	Endevco	13-Aug-2020
			Z	P94622	Endevco	13-Aug-2020
		Redundant	X	P94431	Endevco	13-Aug-2020
			Y	P94487	Endevco	13-Aug-2020
			Z	P94645	Endevco	13-Aug-2020
Head Angular Rate Sensors			X	ARS14245	DTS	23-Aug-2019
			Y	ARS13616	DTS	23-Aug-2019
			Z	ARS4740	DTS	23-Aug-2019
Upper Neck Load Cell			FX, FY, FZ, MX, MY, MZ	2021	Humanetics	14-Aug-2020
Chest Accelerometers		Primary	X	P87834	Endevco	13-Aug-2020
			Y	P61255	Endevco	13-Aug-2020
			Z	P45008	Endevco	13-Aug-2020
		Redundant	X	P91177	Endevco	13-Aug-2020
			Y	P94570	Endevco	13-Aug-2020
			Z	P91172	Endevco	13-Aug-2020
Chest Potentiometer			X	CST037	Servo	13-Aug-2020
Pelvis Accelerometers			X	T11801	Endevco	13-Aug-2020
			Y	P91876	Endevco	13-Aug-2020
			Z	T11390	Endevco	13-Aug-2020
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	13-Aug-2020
			Z	P91498	Endevco	13-Aug-2020
		Front	Z	P90841	Endevco	13-Aug-2020
	Right	Rear	X	P93467	Endevco	13-Aug-2020
			Z	P97619	Endevco	13-Aug-2020
		Front	Z	P94523	Endevco	13-Aug-2020
Seat Belt Load Cells		Lap	N/A	X08012	Measurement Specialties	10-Jan-2020
		Shoulder	N/A	N100E9	Measurement Specialties	06-Jul-2020

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	24-Aug-2020
			Y	T11806	Endevco	24-Aug-2020
			Z	P69062	Endevco	24-Aug-2020
		Redundant	X	T11046	Endevco	24-Aug-2020
			Y	P97525	Endevco	24-Aug-2020
			Z	P73228	Endevco	24-Aug-2020
Head Angular Rate Sensors			X	ARS13118	DTS	23-Aug-2019
			Y	ARS4737	DTS	23-Aug-2019
			Z	ARS11370	DTS	23-Aug-2019
Upper Neck Load Cell			FX, FY, FZ, MX, MY, MZ	1634	Humanetics	24-Aug-2020
Chest Accelerometers		Primary	X	P80855	Endevco	24-Aug-2020
			Y	P97544	Endevco	24-Aug-2020
			Z	P57791	Endevco	24-Aug-2020
		Redundant	X	P73221	Endevco	24-Aug-2020
			Y	T11872	Endevco	24-Aug-2020
			Z	T16784	Endevco	24-Aug-2020
Chest Potentiometer			X	4223	Servo	24-Aug-2020
Pelvis Accelerometers			X	P91969	Endevco	24-Aug-2020
			Y	P91958	Endevco	24-Aug-2020
			Z	P80721	Endevco	24-Aug-2020
Femur Load Cells	Left	Primary	Z	DS4140-FZ1	Humanetics	24-Aug-2020
		Redundant	Z	DS4140-FZ2	Humanetics	24-Aug-2020
	Right	Primary	Z	92-FZ1	Humanetics	24-Aug-2020
		Redundant	Z	92-FZ2	Humanetics	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	24-Aug-2020
			Z	T11455	Endevco	26-Aug-2020
		Front	Z	P97890	Endevco	24-Aug-2020
	Right	Rear	X	P97640	Endevco	24-Aug-2020
			Z	P91471	Endevco	24-Aug-2020
		Front	Z	P91907	Endevco	24-Aug-2020
Seat Belt Load Cells		Lap	N/A	R141C8	Measurement Specialties	11-Dec-2019
		Shoulder	N/A	N100E7	Measurement Specialties	6-Jul-2020

TABLE 3 – Vehicle Instrumentation

Instrumentation			Axis	Serial Number	Manufacturer	Calibration Date
Crossmember/Rear Seat Accelerometers	Left	Primary	X	P58548	Endevco	23-Jun-2020
			Z	P83356	Endevco	23-Jun-2020
		Redundant	X	P58530	Endevco	23-Jun-2020
	Right	Primary	X	P74456	Endevco	03-Jun-2020
			Z	P58537	Endevco	03-Jun-2020
		Redundant	X	P58494	Endevco	03-Jun-2020
Engine Accelerometers	Top		X	P81065	Endevco	27-Aug-2020
	Bottom		X	T16777	Endevco	27-Aug-2020