Final Report Number: NCAP-TRC-18-002

New Car Assessment Program (NCAP)

Frontal Barrier Impact Test

FORD MOTOR CO.

2018 Ford F-150 SuperCrew

NHTSA Number: M20180206

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

Report Date: February 22, 2018

FINAL REPORT

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

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Prepared By: ILO Project Operations Group

Approved By: John Shultz

Approval Date: February 22, 2018

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-18-002		

4. Title and Subtitle	5. Report Date
Final Report of NEW CAR ASSESSMENT PROGRAM Frontal Impact Testing of a 2018 Ford F-150 SuperCrew NHTSA No. M20180206	February 22, 2018
	6. Performing Organization Code TRC Inc.
7. Author(s) John Shultz, Project Manager	8. Performing Organization Report No. 171201
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. DTNH22-12-D-00257
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 December 1, 2017 – February 22, 2018
	14. Sponsoring Agency Code NRM-110

15. Supplemental Notes

16. Abstract

A 56.0 km/h NCAP Frontal Impact Test was conducted on a 2018 Ford F-150 SuperCrew, in accordance with the specifications of the Office of Crashworthiness Standards Frontal NCAP Laboratory Test Procedure. This test was conducted to obtain data indicant of FMVSS 208, 212, 219 (partial), 301 and foot well intrusion performance. This test was conducted at the Transportation Research Center Inc. in East Liberty, Ohio on December 1, 2017.

The impact velocity was 56.57 km/h, and the ambient temperature at the barrier face at the time of impact was 21.3° C. The target vehicle post-test maximum crush was 564 millimeters at crush zone 4. 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	263	NA	700	320
Maximum Chest Compression	mm	63	-21.7	mm	52	-12.4
3ms Chest Clip	Gs	60	36.1	Gs	60	42.6
Nij	NA	1	0.27	NA	1	0.25
Neck Tension	Newtons	4170	1266.3	Newtons	2620	494.9
Neck Compression	Newtons	4000	-363.3	Newtons	2520	-346.8
Left Femur Force	Newtons	10000	-1676.5	Newtons	6800	-947.8
Right Femur Force	Newtons	10000	-223.9	Newtons	6800	-649.5

17. Key Words	18. Distribution Statement
35 mph Frontal Barrier Impact Test New Car Assessment Program (NCAP)	Copies of this report are available from: National Highway Traffic Safety Administration Technical Information Services Division, NPO-411 1200 New Jersey Ave, SE Washington, DC 20590 e-mail: tis@nhtsa.dot.gov FAX: 202-493-2833

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. Number of Pages	22. Price
Unclassified	Unclassified	171	

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1: PURPOSE AND SUMMARY OF THE TEST

PURPOSE

This 56 km/h frontal barrier impact test is part of the Vehicle Barrier Impact Testing Program sponsored by the National Highway Traffic Safety Administration (NHTSA) under Contract No. DTNH22-12-D-00257. 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 Front NCAP Laboratory Test Procedure dated October 2015.

SUMMARY

A 2018 Ford F-150 SuperCrew impacted the barrier wall at a velocity of 56.57 km/h. The test was performed at Transportation Research Center, Inc. on December 1, 2017. 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 Frontal NCAP Laboratory Test Procedure.

Both ATDs were fully instrumented with head, chest and pelvis tri-axial accelerometers, chest displacement potentiometers, upper neck load cells, right/left femur load cells, and lower leg instrumentation. Seat belt load cells were also on the driver's lap belts to measure dummy pelvic section loading.

The driver (position 1) ATD (Serial No. 037), and the right-front passenger (position 2) ATD (Serial No. 070) were calibrated previous to this test. Certification details, along with instrumentation calibration data, are found in Appendix C of this report.

The 98 channels of data were recorded on an on-board data acquisition system. The 288 barrier channels of data were recorded on an off-board high resolution barrier 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 after the event or during any phase of the static rollover.

The maximum static crush of the vehicle was 564 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)	263	0.27	1266.3	-363.3	36.1	-21.7	-1676.5	-223.9
Passenger (5^{th} Female)	320	0.25	494.9	-346.8	42.6	-12.4	-947.8	-649.5

2: OCCUPANT AND VEHICLE INFORMATION / DATA SHEETS

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

TEST VEHICLE INFORMATION

NHTSA No.	M20180206
Model Year	2018
Make	Ford
Model	F-150 SuperCrew
Body Style	Truck
VIN	1FTFW1E5XJFA42757
Body Color	Race Red
Odometer Reading (km/mi)	163.7 mi
Engine Displacement (L)	5.0
Type/No. Cylinders	V/8
Engine Placement	Front Longitudinal
Transmission Type	Automatic
Transmission Speeds	10
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? Yes

DATA FROM CERTIFICATION LABEL

Manufactured by	FORD MOTOR CO.
Date of Manufacture	08/17

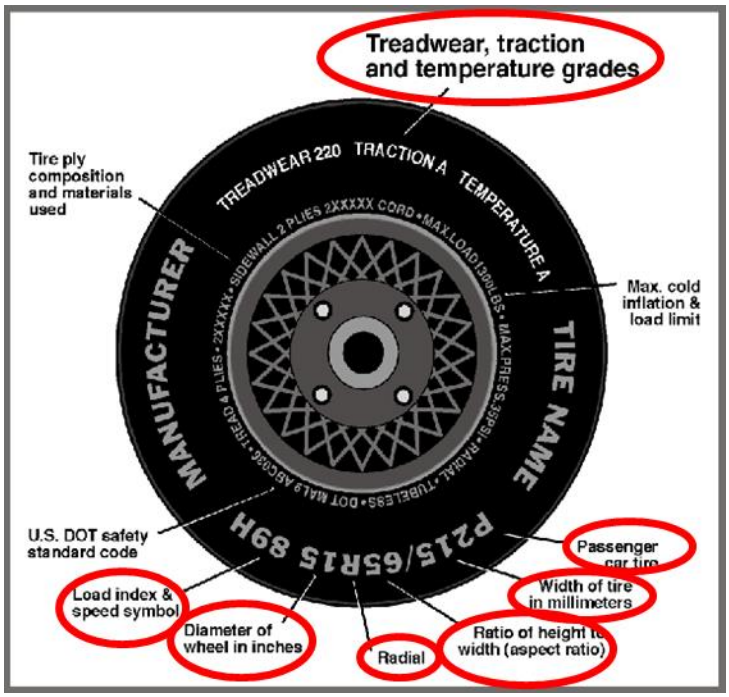
GVWR (kg)	3198 (3800 lbs)
GAWR Front (kg)	1565 (3450 lbs)
GAWR Rear (kg)	1724 (3800 lbs)

VEHICLE SEATING AND WEIGHT CAPACITY

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Split Bench	N/A	
Number of Occupants	2	3	N/A	5
Capacity Wt. (VCW) (kg)				914
Cargo Wt. (RCLW) (kg)				573.8

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

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017



DATA FROM TIRE PLACARD

Measured Parameter	Front	Rear
Maximum Tire Pressure (kPa)	350	350
Cold / Test Pressure (kPa)	240	240
Recommended Tire Size	275/55R20	275/55R20
Tire Size on Vehicle	275/55R20	275/55R20
Tire Manufacturer	Hankook	Hankook
Tire Model	Dynapro ATM	Dynapro ATM
Treadwear	560	560
Traction Grade	A	A
Temperature Grade	A	A
Tire Plies Sidewall	2	2
Tire Plies Body	6	6
Load Index/Speed Symbol	113T	113T
Tire Material	Polyester, Steel, Nylon	Polyester, Steel, Nylon
DOT Safety Code Right	5M8D RFH 2617	5M8D RFH 2617
DOT Safety Code Left	5M8D RFH 2617	5M8D RFH 2617

DATA SHEET NO. 1 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

TEST VEHICLE WEIGHTS

	Units	As Delivered (UVW) (Axle)			As Tested (ATW) (Axle)		
		Front	Rear	Total	Front	Rear	Total
Left	kg	683.0	468.8		720.0	557.0	
Right	kg	685.8	462.6		720.4	572.8	
Ratio	%	59.5	40.5		56.0	44.0	
Totals	kg	1368.8	931.1	2300.2	1440.4	1129.8	2570.2

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	2300.2
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	2575.5

TEST VEHICLE ATTITUDES AND CG

	Units	LF	RF	LR	RR	CG (aft of front)
As Delivered	mm	953	948	1037	1033	1615
As Tested	mm	942	945	1014	1000	1754
Post Test	mm	926	1012	1042	1097	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	3990
Total Vehicle Length at Left Side	mm	6000
Total Vehicle Length at Centerline	mm	6180
Total Vehicle Length at Right Side	mm	6005
Weight of Ballast in Cargo Area	kg	45.6
Weight of Vehicle Components Removed	kg	0.0
Amount of Stoddard Solvent in Fuel Tank	liters	91.6

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 (CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

TARGET VEHICLE STRUCTURAL MEASUREMENT

	Elements	Pre-Test (mm)
1	Total Length	6180
2	Total Width	2033
3	Bumper Top Height	550
4	Bumper Bottom Height	440
5	Longitudinal Member Top Height	590
6	Distance Between Longitudinal Members	750
7	Longitudinal Member Width	95
8	Engine Top Height	1100
9	Engine Bottom Height	348
10	Engine and Gearbox Width	700
11	Front Bumper-Engine Distance	740
12	Front Shock Absorber Fixing Height	850
13	Bonnet Leading Edge Height	1145
14	Front Shock Absorber Fixing Width	995
15	Front Bumper – Front Axle Distance	960
16	Front Axle – A-Pillar Distance	704
17	A-Pillar – B-Pillar Distance	1175
18	B-Pillar – Rear Axle Distance	2120
19	B-Pillar – C-Pillar Distance	912
20	Roof Sill Bottom Height	1761
21	Roof Sill Top Height	1836
22	Floor Sill Bottom Height	545
23	Floor Sill Top Height	496

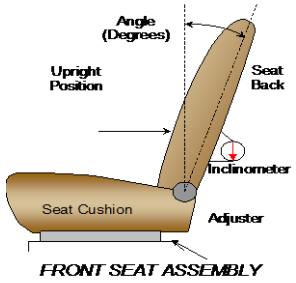
DATA SHEET NO. 2

SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

NORMAL DESIGN RIDING POSITION

For adjustable driver and passenger seat back. 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. Inclinometer measurement at the top of the backrest at the seat centerline, according to Form 1 attachment.



	Degree
Driver Seat back angle:	3.2
Passenger Seat back angle:	2.5

SEAT FORE/AFT POSITIONS

Describe the method used of determining seat for/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	254	130 (19th detent)
Passenger Seat	254	0 (0 detent)

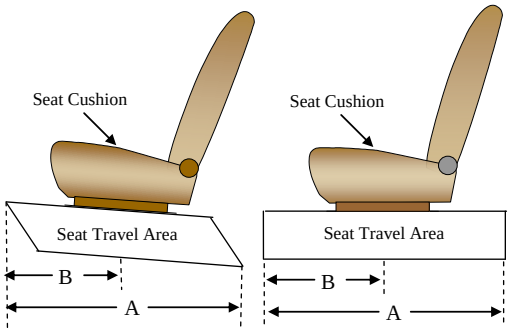
SEAT BELT UPPER ANCHORAGE

Describe the method of positioning seat belt upper anchorages.

Driver: Uppermost, Positioned according to Form 1

Passenger: Uppermost, Positioned according to Form 1.

	Total No. of Positions	Placed in Position No.
Driver Seat	4	1
Passenger Seat	4	0 (full up)



DATA SHEET NO. 2 (CONTINUED)

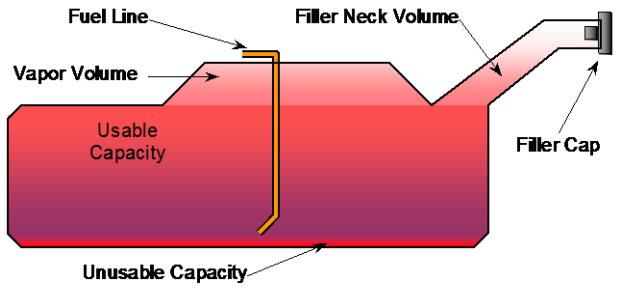
SEAT ADJUSTMENT, FUEL SYSTEM AND STEERING WHEEL DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	98.4
Usable Capacity of "Optional Tank"	136.3
92%-94% of Usable Capacity	91.6
Actual Amount of Solvent Used	91.6
1/3 of Usable Capacity	30.5

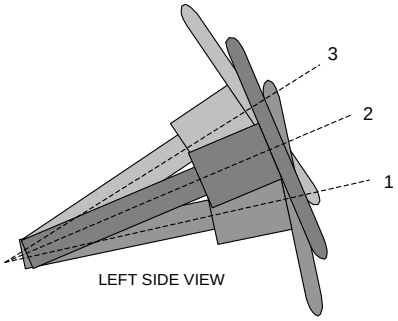
The electric fuel pump operates for 3 seconds to pressurize the fuel system following the actuation of the ignition. If no attempt has been made to start the engine within 3 seconds following ignition actuation the fuel pump will shut off. The fuel pump operates continuously while the engine is running. If the engine stalls, the fuel pump deactivates. In addition, a fuel pump shut-off switch is provided, designed to stop fuel flow to the engine if the vehicle sustains an impact above a certain magnitude.



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



STEERING COLUMN ASSEMBLY

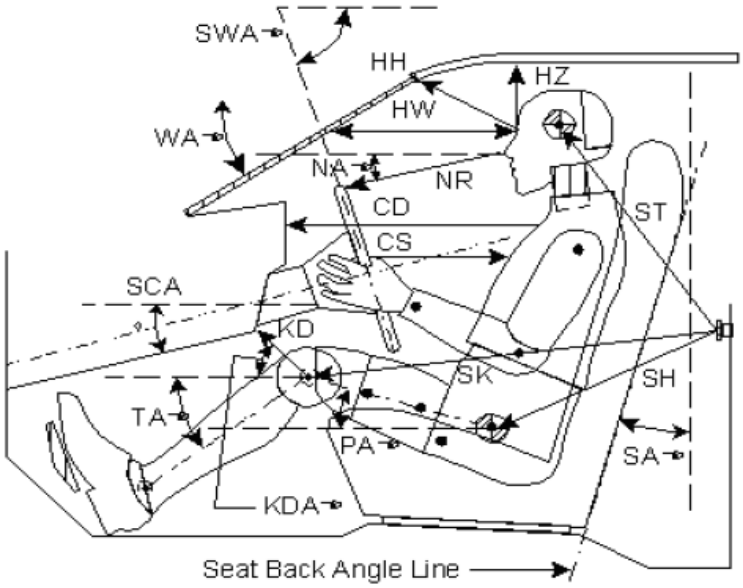
STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost Position No. 1	19.5	130
Geometric Center Position No. 2	21.6	151
Uppermost Position No. 3	23.7	173
Telescoping Steering Wheel Travel		43
Test Position	21.6	151

DATA SHEET NO. 3

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

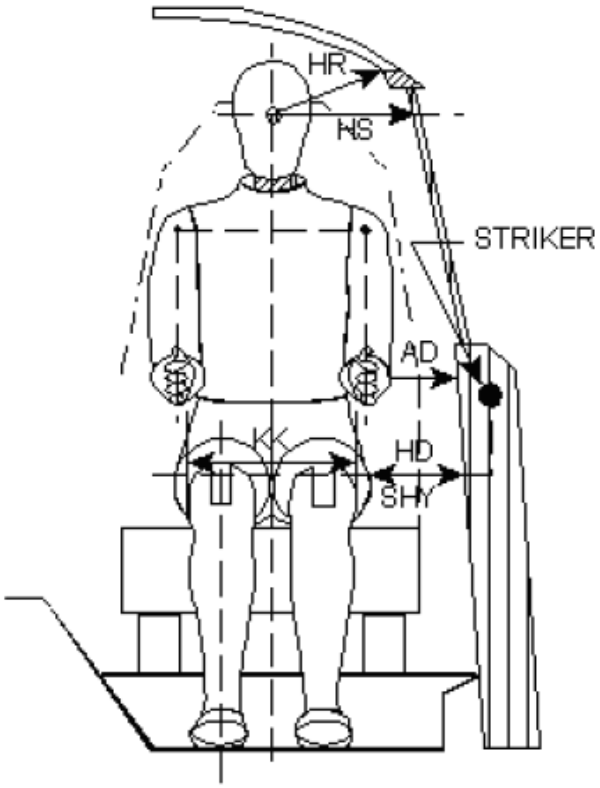


Code	Measurement Description	Driver		Passenger	
		Length (mm)	Angle (º)	Length (mm)	Angle (º)
WAº	Windshield Angle		35.4		
SWAº	Steering Wheel Angle		21.6		
SCAº	Steering Column Angle		65.8		
SAº	Seat Back Angle (on headrest post)		3.2		2.5
HZ	Head to Roof (Z)	251		287	
HH	Head to Header	494		423	
HW	Head to Windshield	736		733	
NR	Nose to Rim	437	7.9		
CD	Chest to Dash	610		465	
CS	Chest to Steering Hub	361			
RA	Rim to Abdomen	225			
KDL	Left Knee to Dash	170	24.7	80	27.4
KDR	Right Knee to Dash	160	26.0	90	28.0
PAº	Pelvic Angle		22.8		21.0
TAº	Tibia Angle		54.1		68.1
SK	Striker to Knee	699	-3.5	795	-1.4
ST	Striker to Head	600	-76.2	585	-85.2
SH	Striker to H-Point	304	16.1	462	6.6

DATA SHEET NO. 4

DUMMY LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

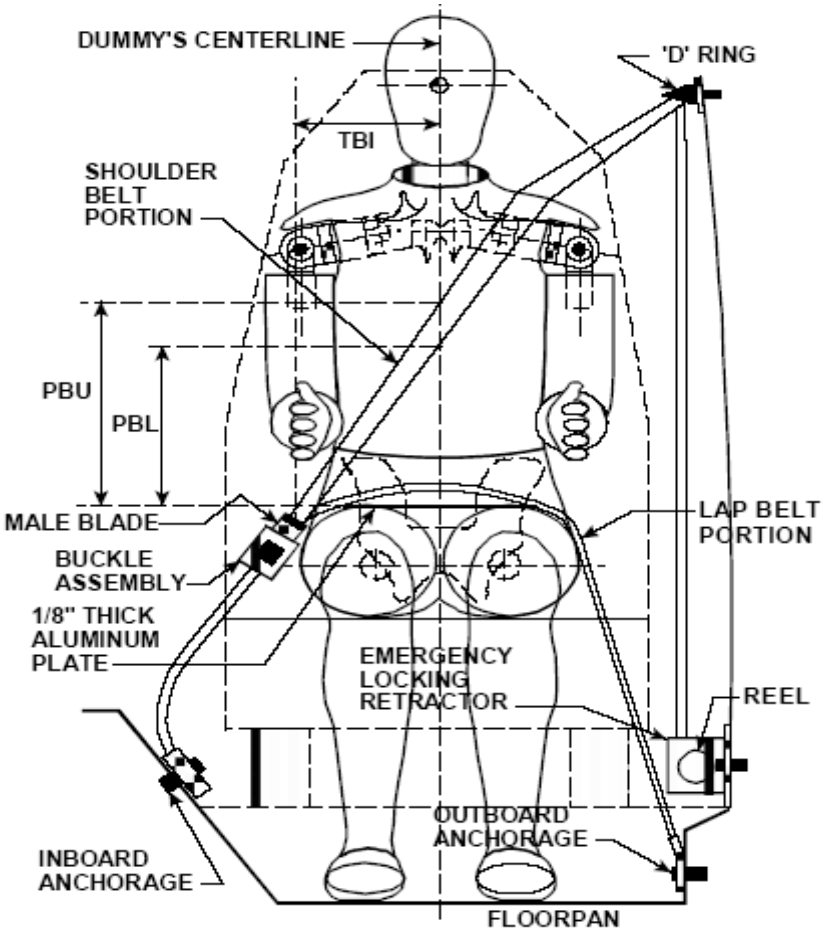


Code	Measurement Description	Driver	Passenger
AD	Arm to Door	154	103
HD	H-Point to Door	162	178
HR	Head to Side Header	246	284
HS	Head to Side Window	364	384
KK	Knee to Knee	341	165
SHY	Striker to H-Point (Y Direction)	252	273
AA	Ankle to Ankle	340	165

DATA SHEET NO. 5

SEAT BELT POSITIONING DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017



FRONT VIEW OF DUMMY

SEAT BELT POSITIONING MEASUREMENTS

Measurement Description	Units	Driver	Passenger
PBU – Top surface of reference to belt upper edge	mm	340	303
PBL – Top surface of reference to belt lower edge	mm	264	195

BELT LENGTH DATA

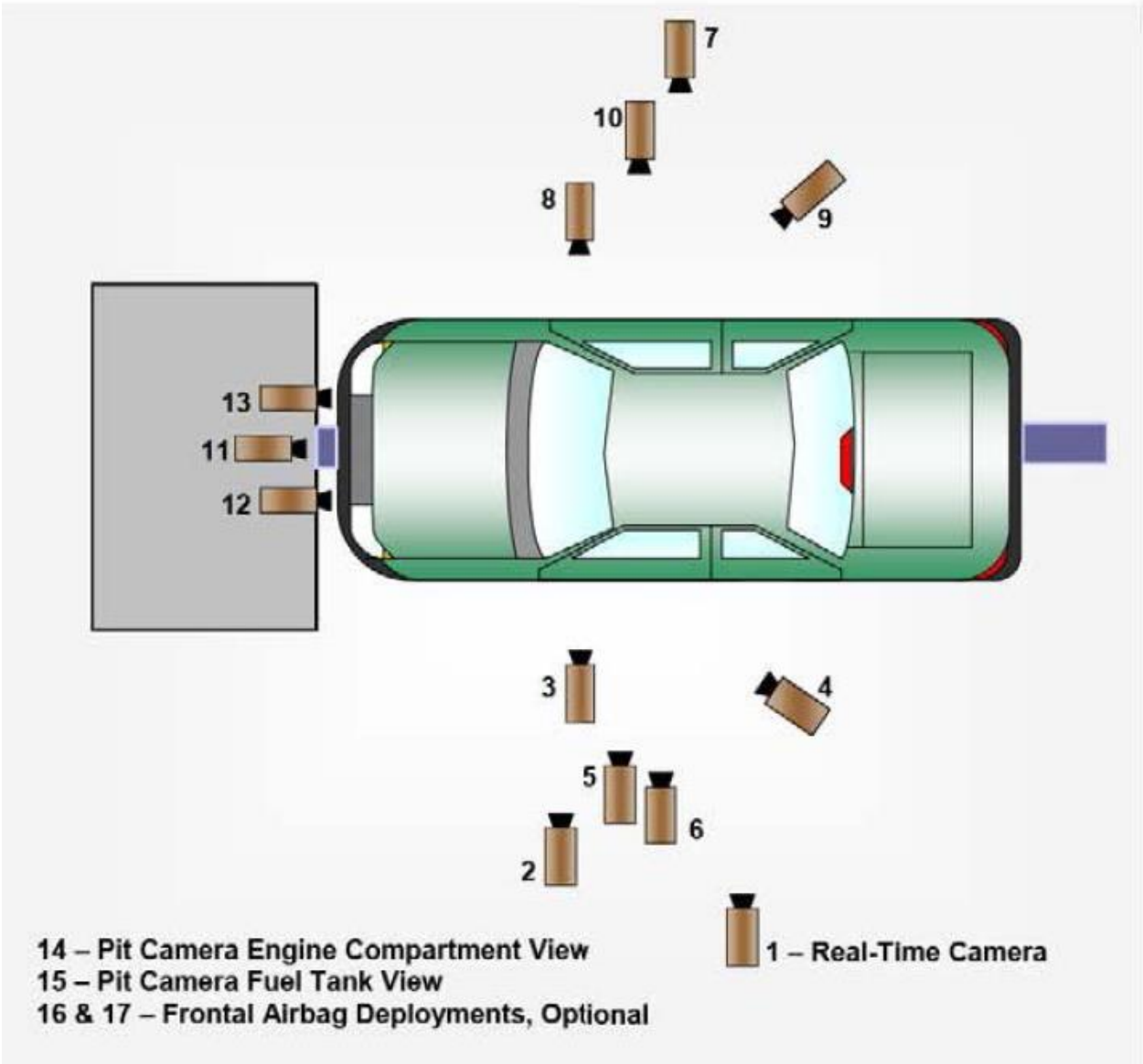
Measurement Description	Units	Driver	Passenger
Shoulder belt length as measured on ATD	mm	881	970
Lap belt length as measured on ATD	mm	845	797
Remainder of belt on reel	mm	1019	1228
Total belt length for continuous webbing systems	mm	2745	2995

DATA SHEET NO. 6

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle:	2018 Ford F-150 SuperCrew	NHTSA No.:	M20180206
Test Program:	NCAP Frontal Impact	Test Date:	12/1/2017

CAMERA POSITIONS FOR FRONTAL IMPACTS



DATA SHEET NO. 6 (CONTINUED)

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

CAMERA LOCATIONS

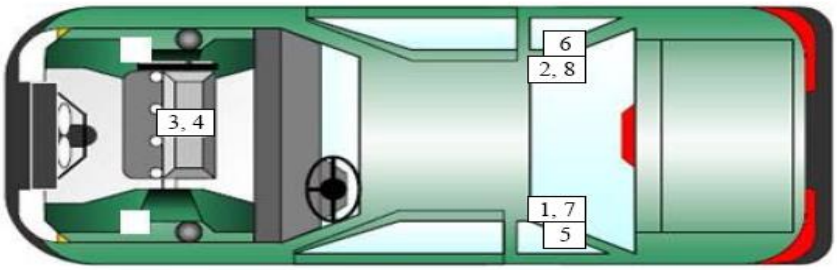
No.	Camera View	Location (mm)			Lens (mm)	Frame Speed (fps)
		X	Y	Z		
1	Real-Time Left Overall	407	-6273	-1577	Zoom	30
2	Driver Close-Up	1609	-5426	-1505	50	1000
3	Left Front Half	1600	-5465	-1541	28	1000
4	Left Angle	4412	-2585	-2100	25	1000
5	Steering Column - Top	2050	-5789	-2239	50	1000
6	Steering Column – Bottom	1970	-5171	-1715	50	1000
7	Right Overall	1862	6218	-1449	20	1000
8	Passenger Close-Up	1336	5540	-1567	50	1000
9	Right Front Half	4316	2833	-2101	25	1000
10	Right Angle	1201	4996	-1534	28	1000
11	Windshield	294	0	-2576	12.5	1000
12	Driver Windshield	294	-530	-2576	20	1000
13	Passenger Windshield	294	531	-2576	20	1000
14	Pit Front	1004	0	3256	25	1000
15	Pit Rear	3446	0	3256	25	1000
16	Onboard Driver Airbag (Optional)				12.5	1000
17	Onboard Passenger Airbag (Optional)				12.5	1000

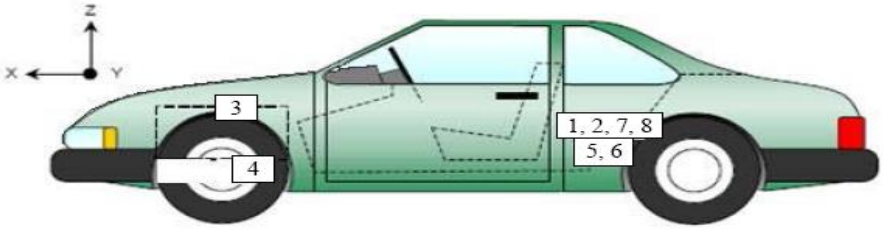
Reference Points: +X – forward of impact plane
+Y – right of monorail center
+Z – into ground

DATA SHEET NO. 7

VEHICLE ACCELEROMETER DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017





VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

No.	Accelerometer Location	Location (mm)		
		X	Y	Z
1	Left Rear Accelerometer – X Direction	2325	-505	-725
2	Right Rear Accelerometer – X Direction	2328	490	-731
3	Engine Top X	5215	50	-984
4	Engine Bottom X	4955	60	-389
5	Left Rear Accelerometer – Z Direction	2325	-505	-725
6	Right Rear Accelerometer – Z Direction	2328	490	-731
7	Left Rear Accelerometer – X Direction Redundant	2325	-565	-725
8	Right Rear Accelerometer- X Direction Redundant	2328	550	-731

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

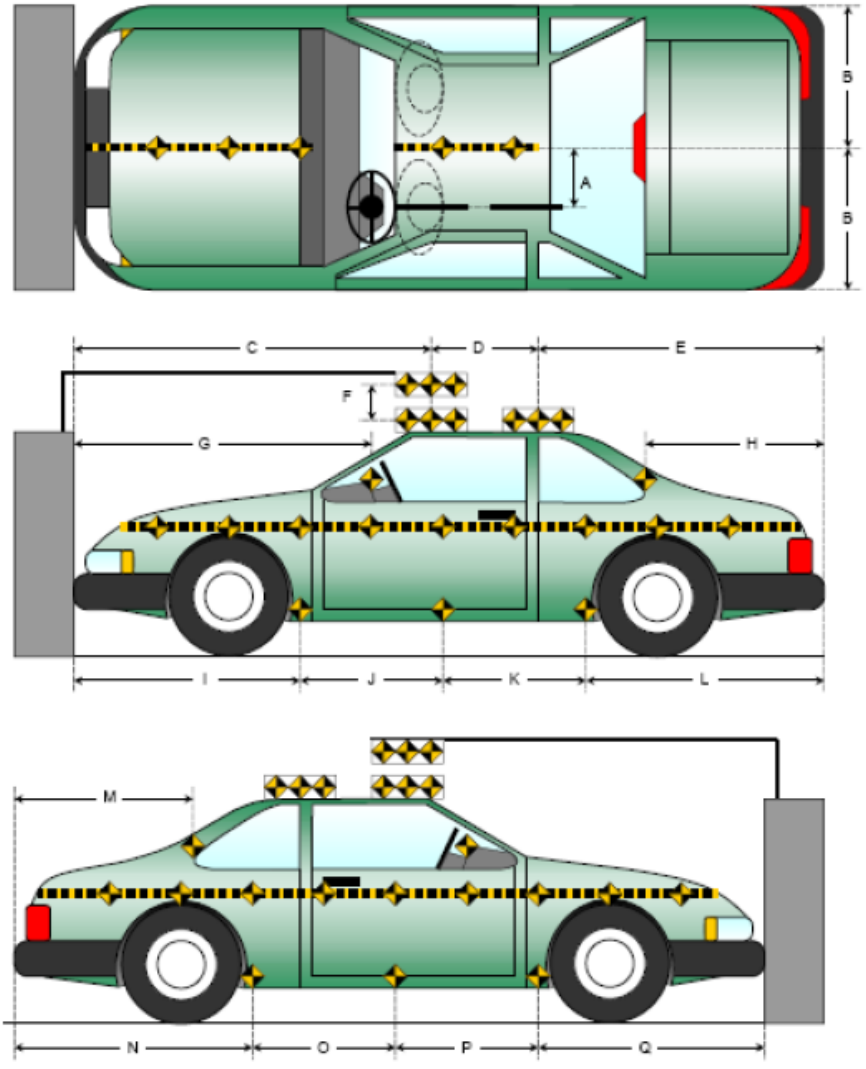
DATA SHEET NO. 8

PHOTOGRAPHIC REFERENCE TARGET LOCATIONS

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

Item	Value
A	452
B	1016
C	2435
D	600
E	3145
F	260
G	1875
H	2373
I	1518
J	1425
K	1430
L	1803
M	2380
N	1810
O	1422
P	1435
Q	1513

All units in millimeters



DATA SHEET NO. 9

LOAD CELL LOCATIONS ON FIXED BARRIER

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

Centerline

A-16	A-15	A-14	A-13	A-12	A-11	A-10	A-09	A-08	A-07	A-06	A-05	A-04	A-03	A-02	A-01
B-16	B-15	B-14	B-13	B-12	B-11	B-10	B-09	B-08	B-07	B-06	B-05	B-04	B-03	B-02	B-01
C-16	C-15	C-14	C-13	C-12	C-11	C-10	C-09	C-08	C-07	C-06	C-05	C-04	C-03	C-02	C-01
D-16	D-15	D-14	D-13	D-12	D-11	D-10	D-09	D-08	D-07	D-06	D-05	D-04	D-03	D-02	D-01
E-16	E-15	E-14	E-13	E-12	E-11	E-10	E-09	E-08	E-07	E-06	E-05	E-04	E-03	E-02	E-01
F-16	F-15	F-14	F-13	F-12	F-11	F-10	F-09	F-08	F-07	F-06	F-05	F-04	F-03	F-02	F-01
G-16	G-15	G-14	G-13	G-12	G-11	G-10	G-09	G-08	G-07	G-06	G-05	G-04	G-03	G-02	G-01
H-16	H-15	H-14	H-13	H-12	H-11	H-10	H-09	H-08	H-07	H-06	H-05	H-04	H-03	H-02	H-01
I-16	I-15	I-14	I-13	I-12	I-11	I-10	I-09	I-08	I-07	I-06	I-05	I-04	I-03	I-02	I-01
J-16	J-15	J-14	J-13	J-12	J-11	J-10	J-09	J-08	J-07	J-06	J-05	J-04	J-03	J-02	J-01
K-16	K-15	K-14	K-13	K-12	K-11	K-10	K-09	K-08	K-07	K-06	K-05	K-04	K-03	K-02	K-01

DATA SHEET NO. 10

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

INSTRUMENTATION

Instrumentation	Number of Channels Collected
Driver Dummy Accelerometers	44
Passenger Dummy Accelerometers	44
Vehicle Structure Accelerometers	8
Total	96

CAMERA COVERAGE

Type of Camera	Number Used in this Test
High-Speed Vehicle Onboard	2
High-Speed Offboard	14
Real-Time Panning	1
Total	17

DATA SHEET NO. 11

POST-TEST OBSERVATIONS

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

TEST DUMMY INFORMATION AND CONTACT LOCATIONS

Description	Driver	Passenger
Dummy Type / Serial No.	Hybrid III 50th/ 037	Hybrid III 5th/ 070
Head Contact	Frontal Airbag, Head Restraint	Frontal Airbag, 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 AND SEAT TRACK INFORMATION

Description	Front	Rear
Locked/Unlocked Doors	Unlocked	Unlocked
Front Door Opening	Remained closed & latched, operational	Remained closed & latched, operational
Rear Door Opening	Remained closed & latched, operational	Remained closed & latched, operational
Seat Track Shift (mm)	0	0
Seat Back Failure	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Windshield Damage	None
Window Damage	None
Other Notable Effects	None

VEHICLE REBOUND FROM BARRIER

Measured Parameter	Units	Value
Left Side	mm	388
Center	mm	448
Right Side	mm	428
Average	mm	421

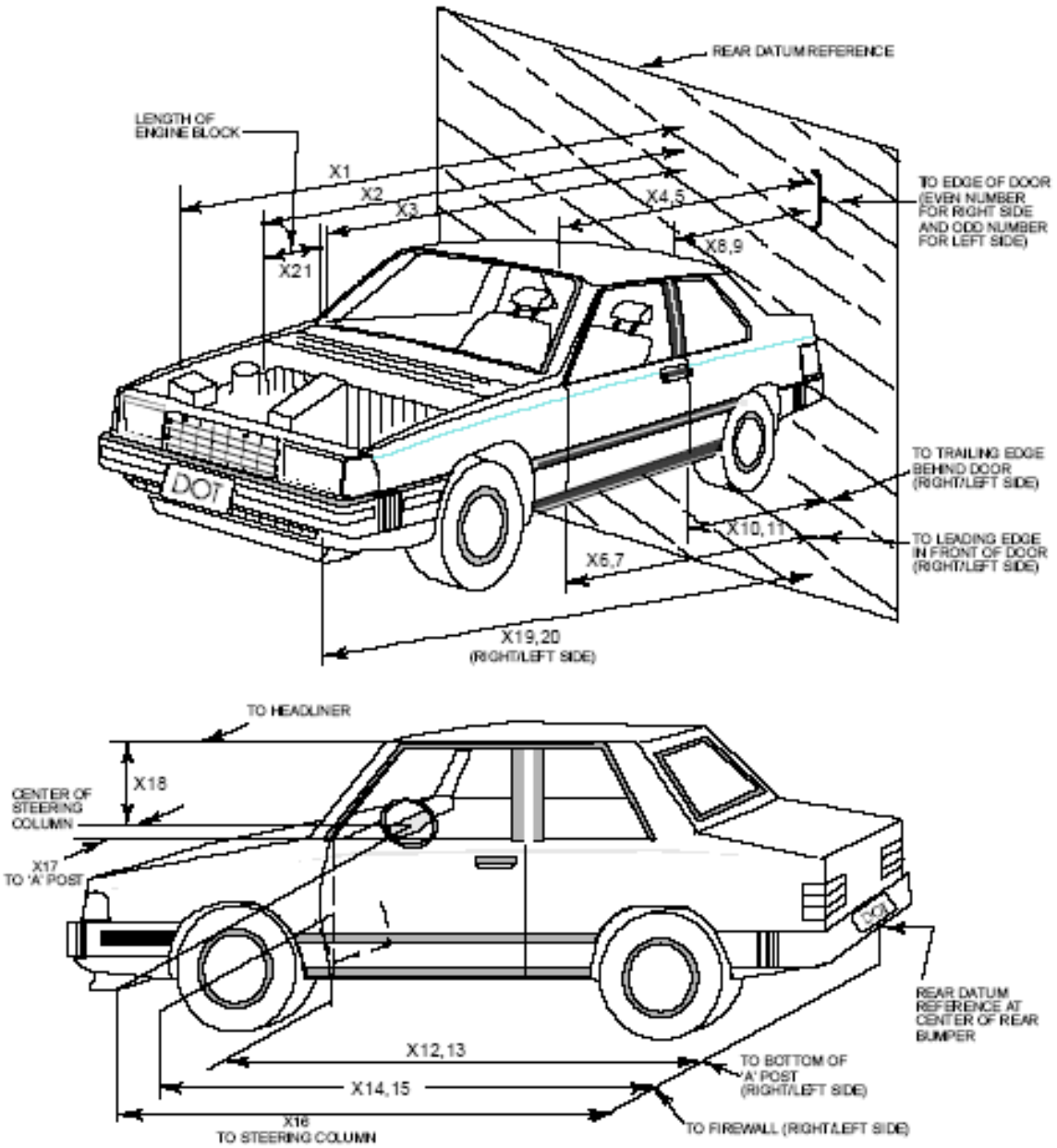
SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

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

DATA SHEET NO. 12

VEHICLE PROFILE MEASUREMENTS

Test Vehicle:	2018 Ford F-150 SuperCrew	NHTSA No.:	M20180206
Test Program:	NCAP Frontal Impact	Test Date:	12/1/2017



DATA SHEET NO. 12 (CONTINUED)

VEHICLE PROFILE MEASUREMENTS

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

No.	Measurement Description	Pre-Test	Post-Test	Difference
1	Total Length of Vehicle at Centerline	6180	5621	559
2	Rear Surface of Vehicle (RSOV) to Front of Engine	5235	5213	22
3	RSOV to Firewall	5050	5103	-53
4	RSOV to Upper Leading Edge of Right Door	4582	4584	-2
5	RSOV to Upper Leading Edge of Left Door	4582	4583	-1
6	RSOV to Lower Leading Edge of Right Door	4540	4542	-2
7	RSOV to Lower Leading Edge of Left Door	4543	4540	3
8	RSOV to Upper Trailing Edge of Right Door	3405	3406	-1
9	RSOV to Upper Trailing Edge of Left Door	3405	3406	-1
10	RSOV to Lower Trailing Edge of Right Door	3390	3396	-6
11	RSOV to Lower Trailing Edge of Left Door	3391	3390	1
12	RSOV to Bottom of "A" Post-of Right Side	4533	4545	-12
13	RSOV to Bottom of "A" Post-of Left Side	4532	4547	-15
14	RSOV to Firewall, Right Side	5025	5049	-24
15	RSOV to Firewall, Left Side	5020	5096	-76
16	RSOV to Steering Column	4100	4150	-50
17	Center of Steering Column to "A" Post	330	352	-22
18	Center of Steering Column to Headliner	455	475	-20
19	RSOV to Right Side of Front Bumper	6005	5597	408
20	RSOV to Left Side of Front Bumper	6000	5706	294
21	Length of Engine Block	500	500	0
RD	RSOV to Right Side of Dash Panel	4320	4342	-22
CD	RSOV to Center of Dash Panel	4324	4342	-18
LD	RSOV to Left Side of Dash Panel	4326	4323	3

All Dimensions in mm

DATA SHEET NO. 13

ACCIDENT INVESTIGATION DIVISION DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

VEHICLE INFORMATION

VIN: 1FTFW1E5XJFA42757 Wheelbase: 3990
Vehicle Size Category: Truck Test Weight (kg): 2570.2

ACCELEROMETER DATA

Accelerometer Locations: As listed on Page 15 of this report.

Cal. Procedure/Interval: TRC procedure / 6 month interval

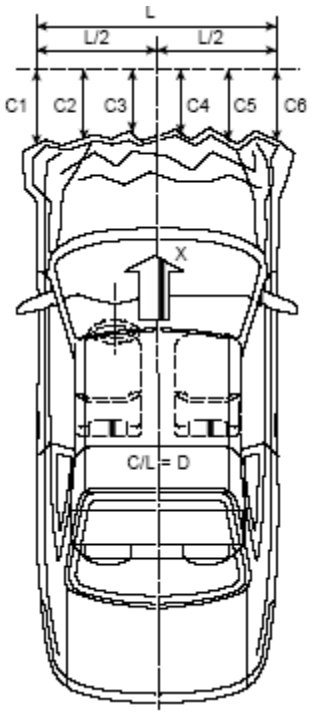
Integration Algorithm: Trapezoidal

Linearity: > 99%

Impact Velocity (km/h): 56.57

Velocity Change (km/h): 63.83

Time of Separation (ms): 155



CRUSH PROFILE

Collision Deformation Classification: 12FDEW2
Midpoint of Damage: Centerline
Damage Region Length (mm): 1524
Impact Mode: Frontal

No.	Measurement Description	Units	Pre-Test	Post-Test	Difference
C1	Crush zone 1 at left side	mm	6000	5706	294
C2	Crush zone 2 at left side	mm	6130	5630	500
C3	Crush zone 3 at left side	mm	6170	5617	553
C4	Crush zone 4 at right side	mm	6165	5601	564
C5	Crush zone 5 at right side	mm	6130	5615	515
C6	Crush zone 6 at right side	mm	6005	5597	408
L	C1 to C6	mm	1524	1500	24

DATA SHEET NO. 14

VEHICLE INTRUSION MEASUREMENTS

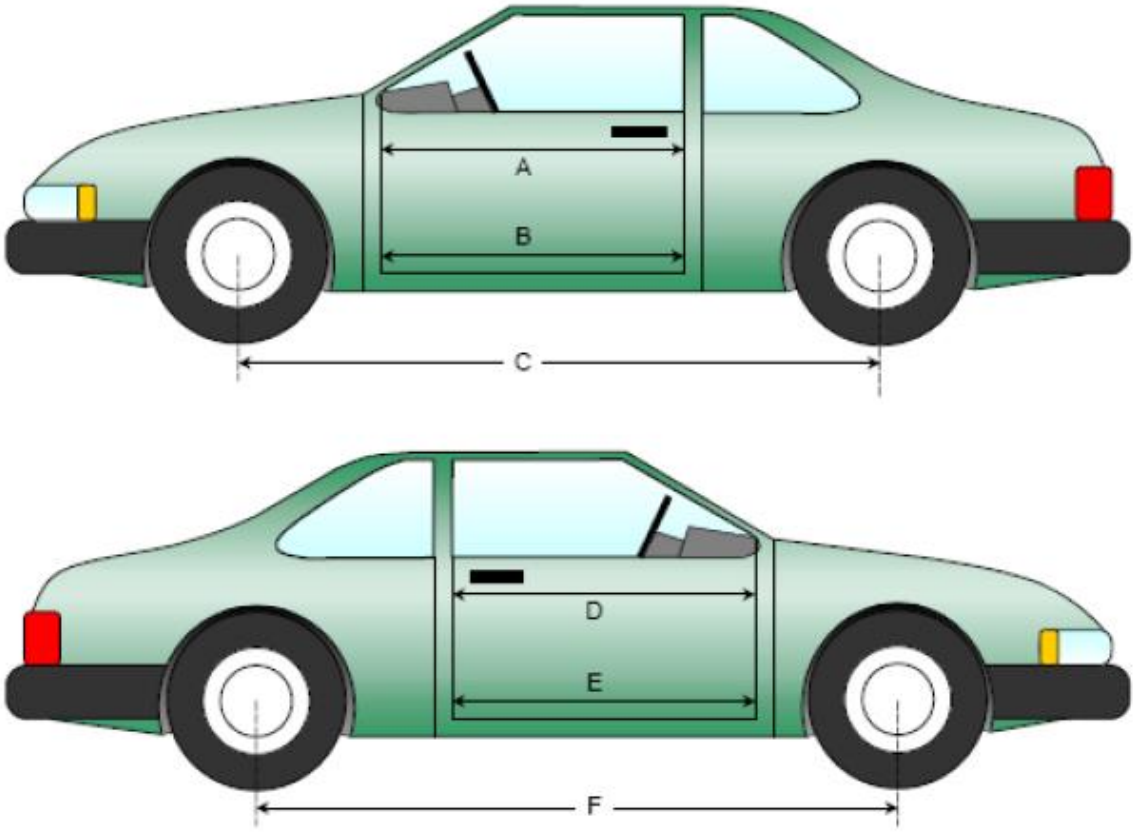
Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

DOOR OPENING WIDTH

No.	Description	Units	Pre-Test	Post-Test	Difference
A	Left Side Upper	mm	1102	1098	4
B	Left Side Lower	mm	988	984	4
C	Right Side Upper	mm	1102	1103	-1
D	Right Side Lower	mm	945	940	5

WHEELBASE MEASUREMENTS

No.	Description	Units	Pre-Test	Post-Test	Difference
C	Left Side Wheelbase	mm	3990	3874	116
F	Right Side Wheelbase	mm	3990	3897	93



DATA SHEET NO. 14 (CONTINUED)

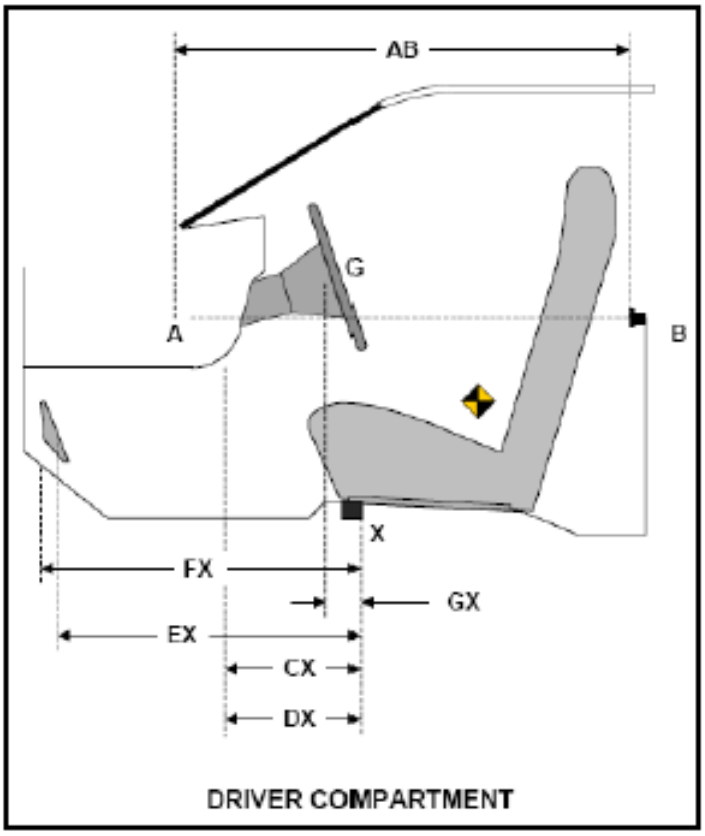
VEHICLE INTRUSION MEASUREMENTS

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

DRIVER COMPARTMENT INTRUSION

Item	Description	Units	Pre-Test	Post-Test	Difference
AB	Door Opening (Inside Window Jam)	mm	1100	1102	-2
CX	Left Knee Bolster to X	mm	290	280	10
DX	Right Knee Bolster to X	mm	290	270	20
EX	Brake Pedal to X	mm	543	545	-2
FX	Foot Rest to X	mm	585	570	15
GX	Center of Steering Column Wheel Hub to X	mm	90	92	-2

X = Front of Seat Track (Stationary)



DATA SHEET NO. 15

SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

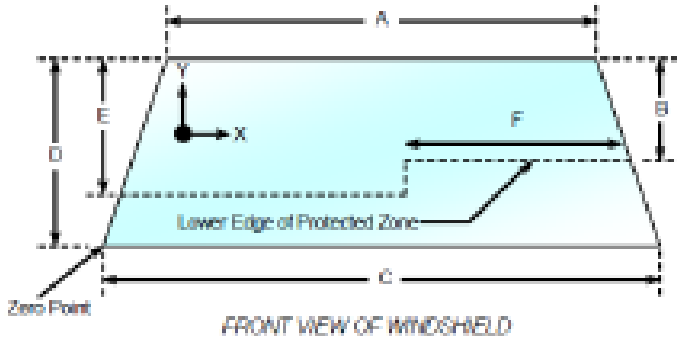
Please provide windshield mounting details.

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: 21.3° C

WINDSHIELD PERIPHERY MEASUREMENTS[1]

Measurement	Pre-Test (mm)	Post-Test (mm)	% Retention
Left Side	2410.0	2410.0	100.0
Right Side	2410.0	2410.0	100.0
Total	4820.0	4820.0	100.0

Item	Units	Value
A	mm	1480
B	mm	490
C	mm	1770
D	mm	785
E	mm	543
F	mm	545



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. 15 (CONTINUED)

SUMMARY OF FMVSS 212, 219 (PARTIAL), AND 301 DATA

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

FMVSS 301 FUEL SYSTEM INTEGRTY POST IMPACT DATA

Temperature at Time of Impact: 21.1°C Test Time: 17:30

Stoddard Solvent Spillage Measurements

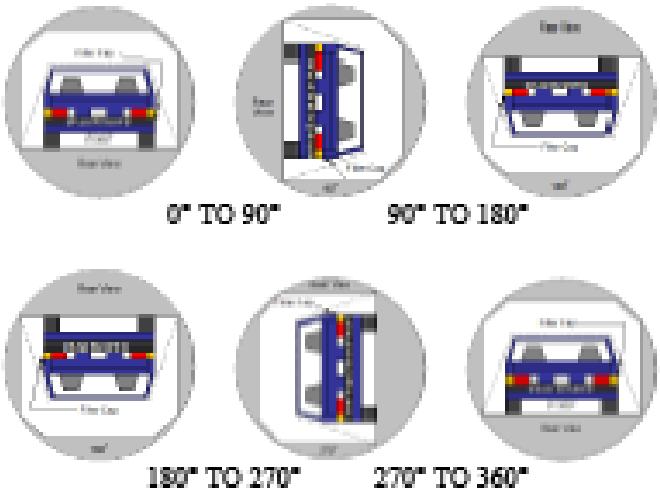
A	From impact until vehicle motion ceases: (maximum allowable – 1 oz.)	0 oz.
B	For the 5-minute period after motion ceases: (maximum allowable – 5 oz.)	0 oz.
C	For the following 25 minutes: (maximum allowable – 1 oz./minutes)	0 oz.
D	Spillage: None	

DATA SHEET NO. 16

FMVSS 301 STATIC ROLLOVER RESULTS

Test Vehicle: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

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

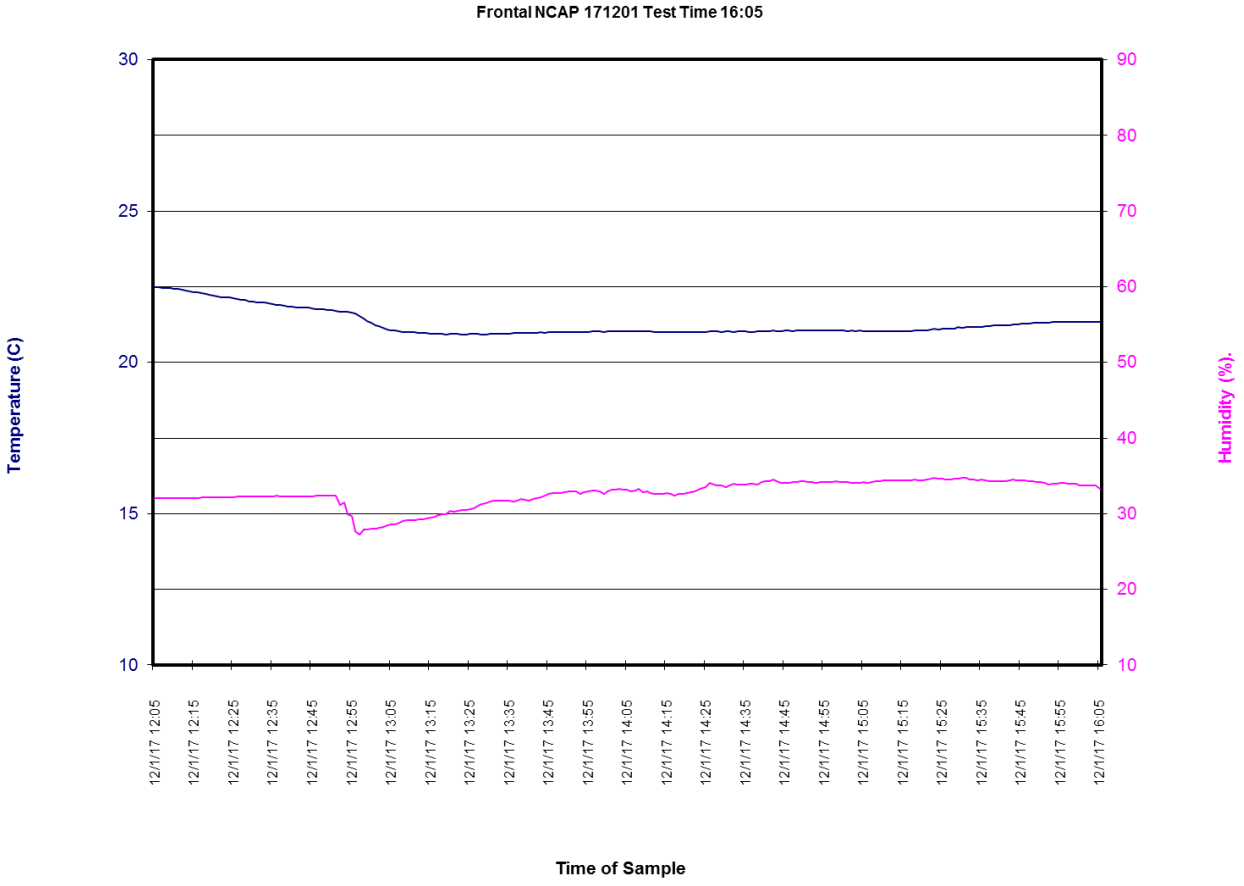
SOLVENT SPILLAGE LOCATION TABLE

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: 2018 Ford F-150 SuperCrew NHTSA No.: M20180206
Test Program: NCAP Frontal Impact Test Date: 12/1/2017

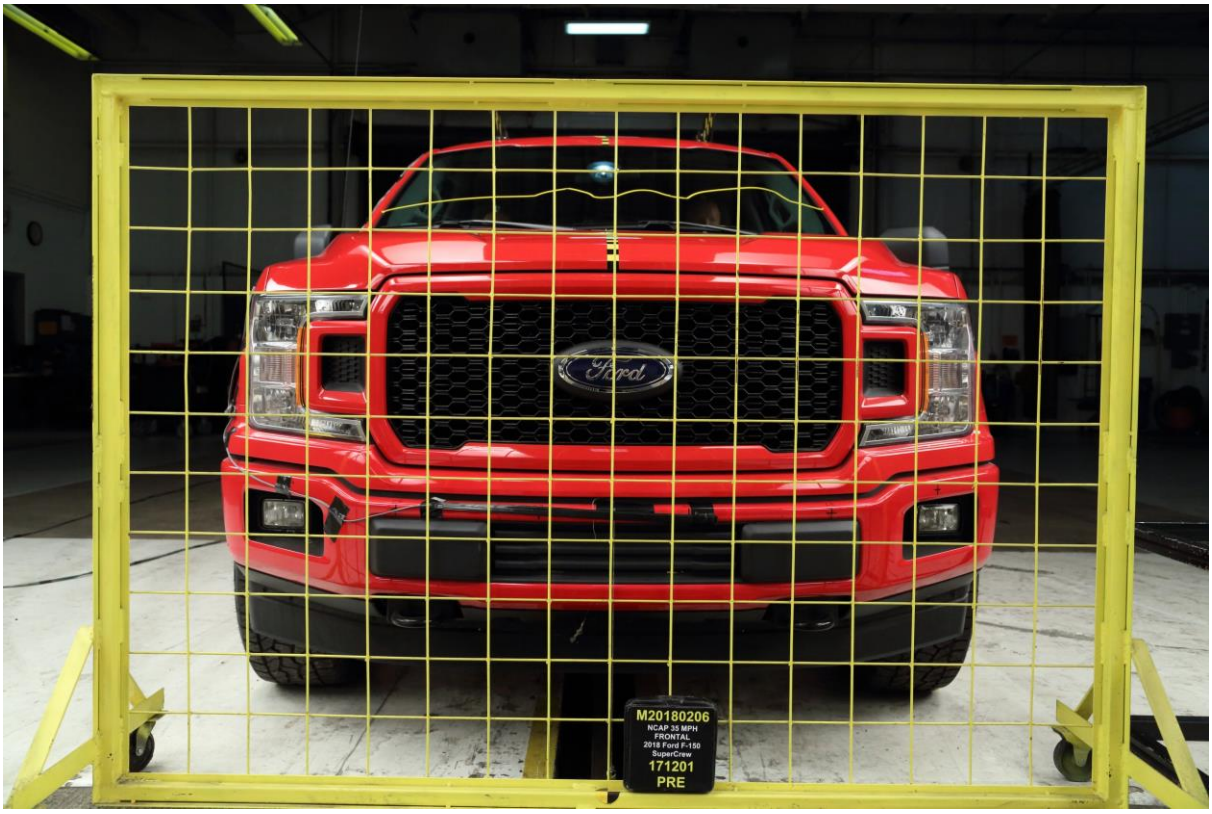


APPENDIX A
PHOTOGRAPHS

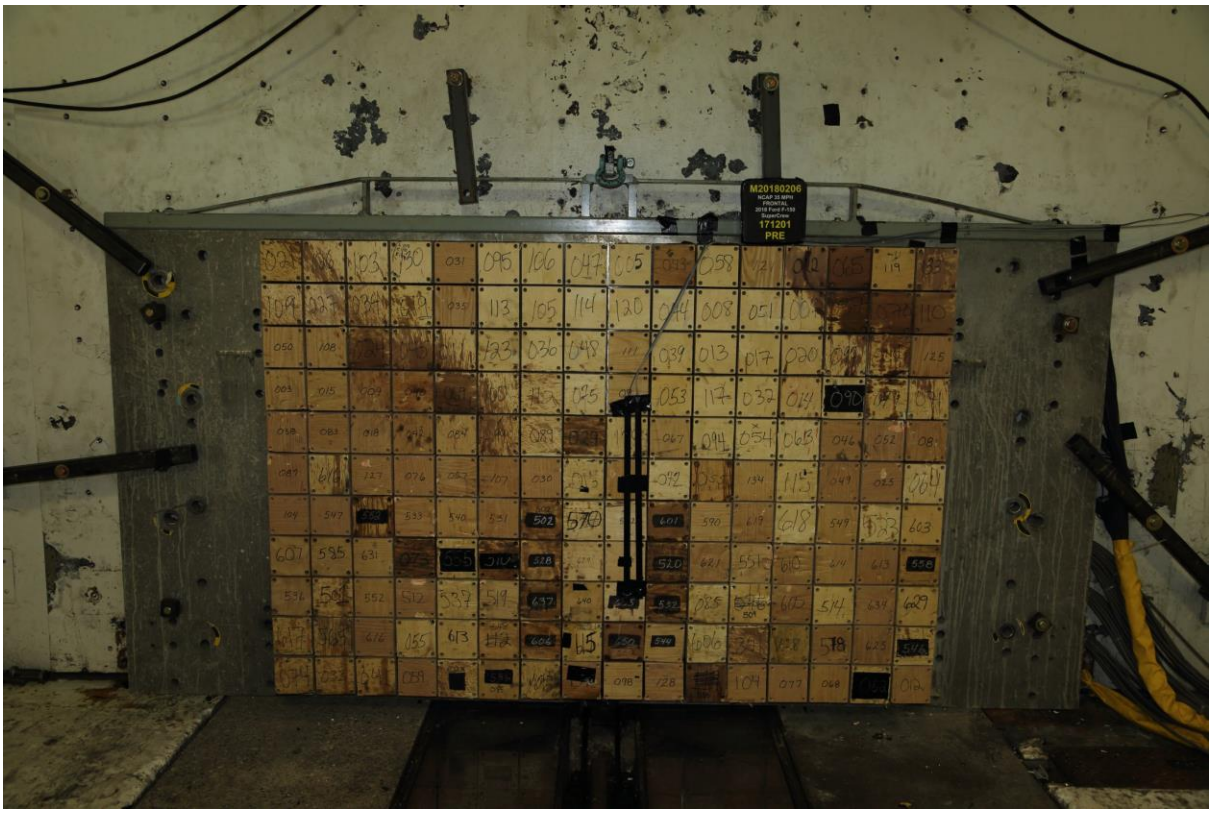
TABLE OF PHOTOGRAPHS

TABLE OF PHOTOGRAPHS (CONTINUED)

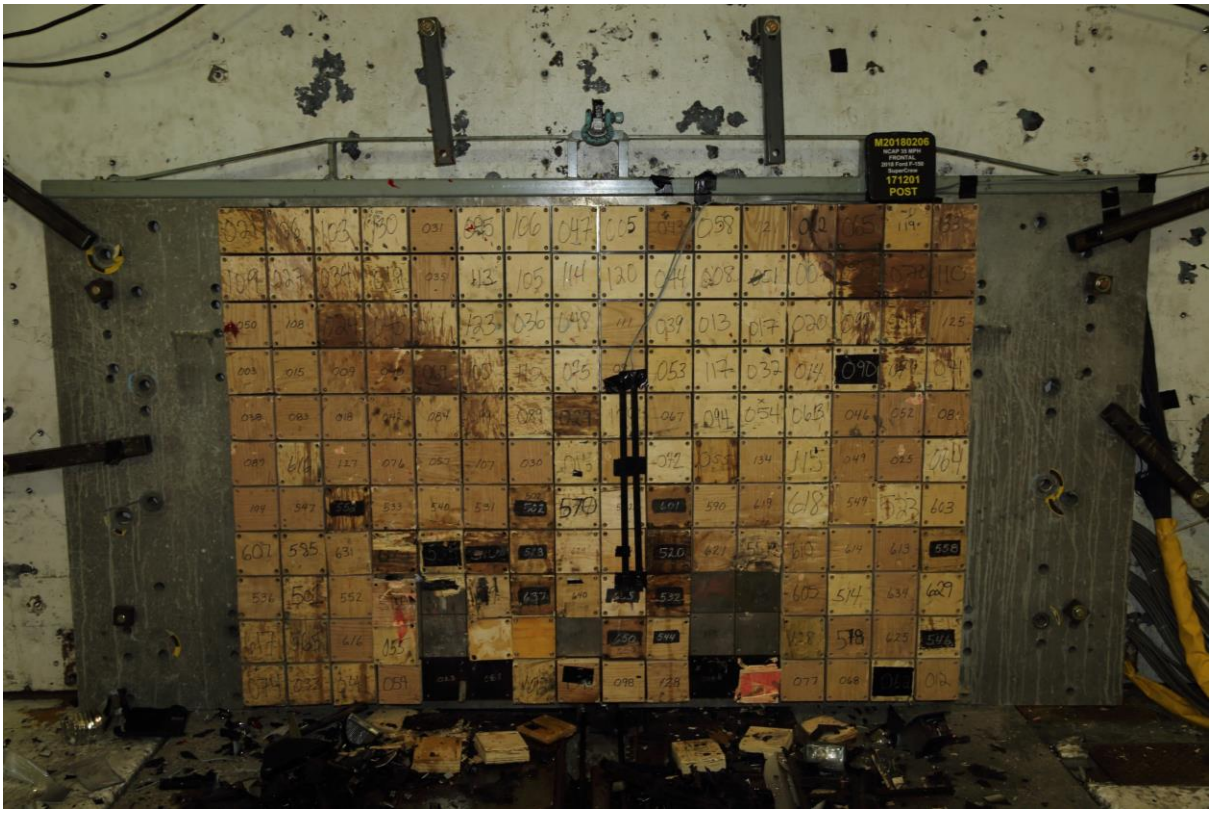
TABLE OF PHOTOGRAPHS (CONTINUED)



001 Load Cell Location

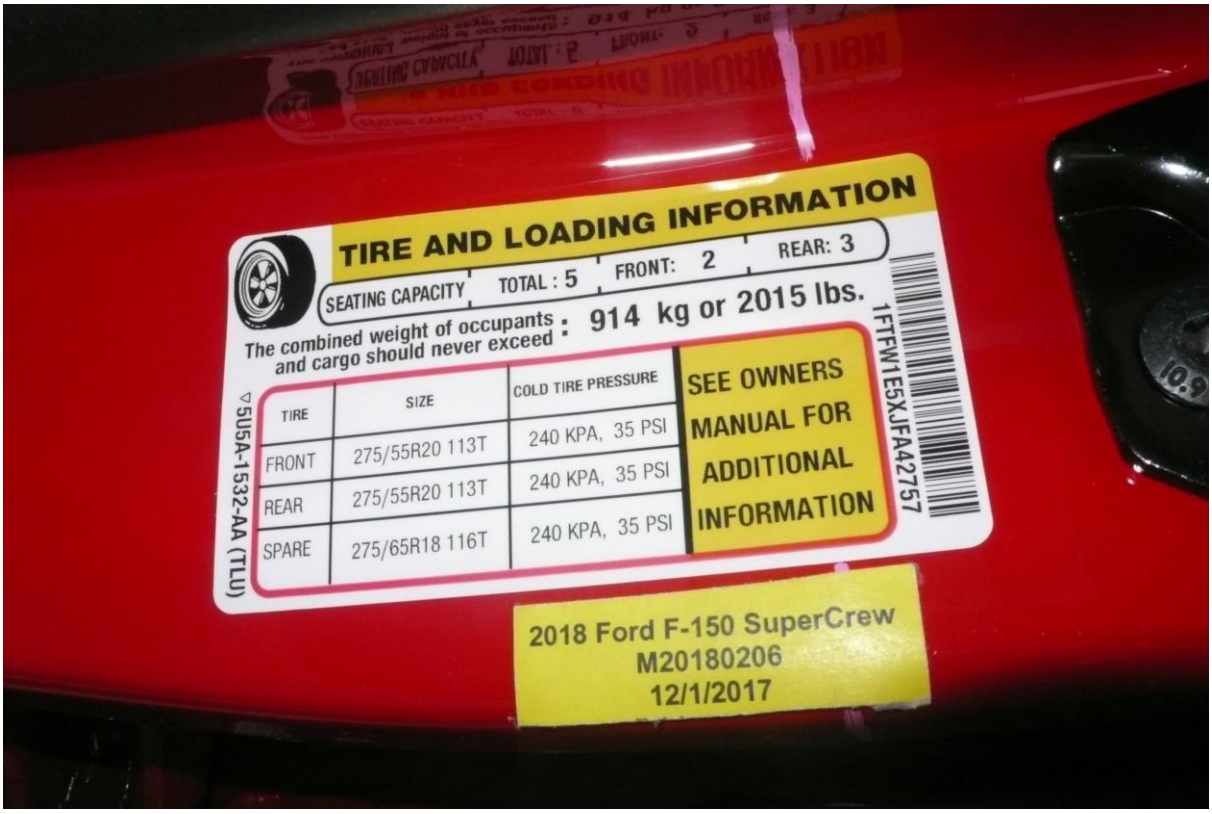


002 Pre-Test Load Cell Wall



003 Post-Test Load Cell Wall

004 Manufacturer's Label



005 Tire Placard

Intentionally Left Blank

006 2018 Ford F-150 SuperCrew 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

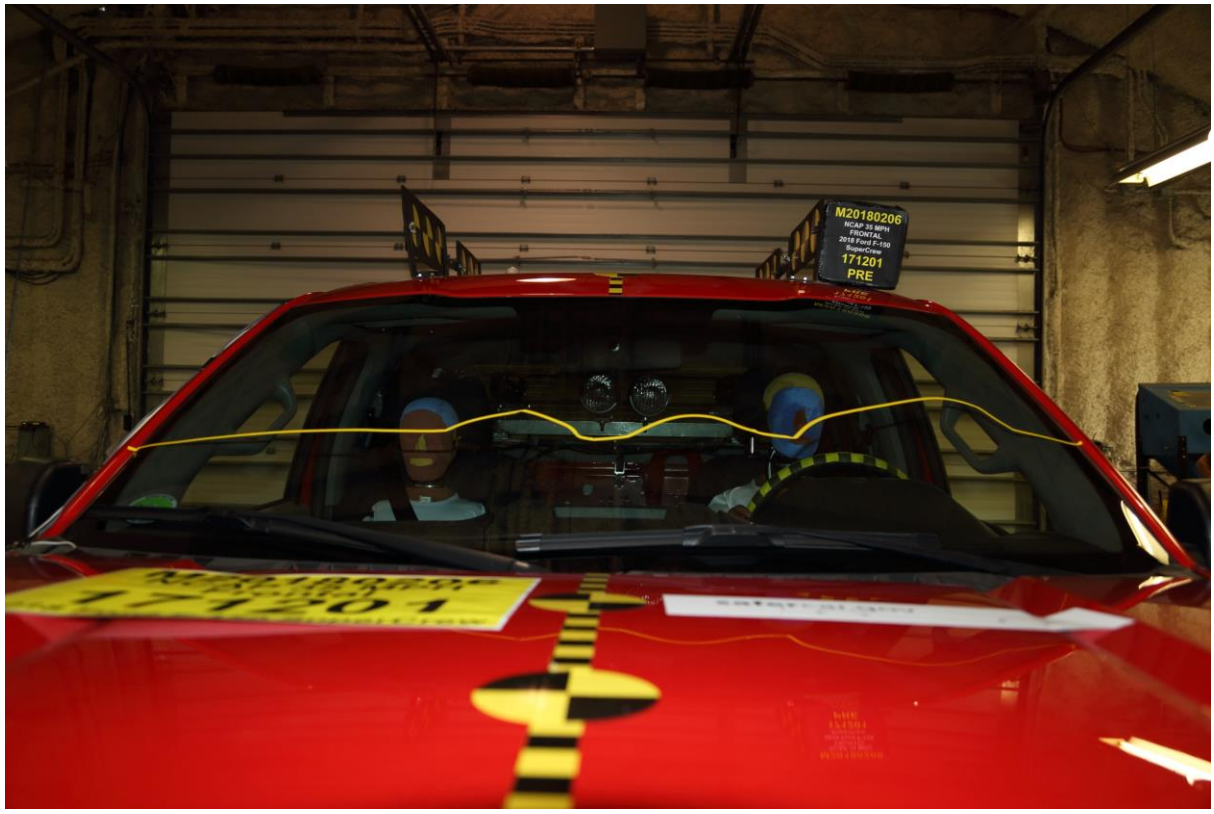
013 Post-Test Right View of Test Vehicle

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

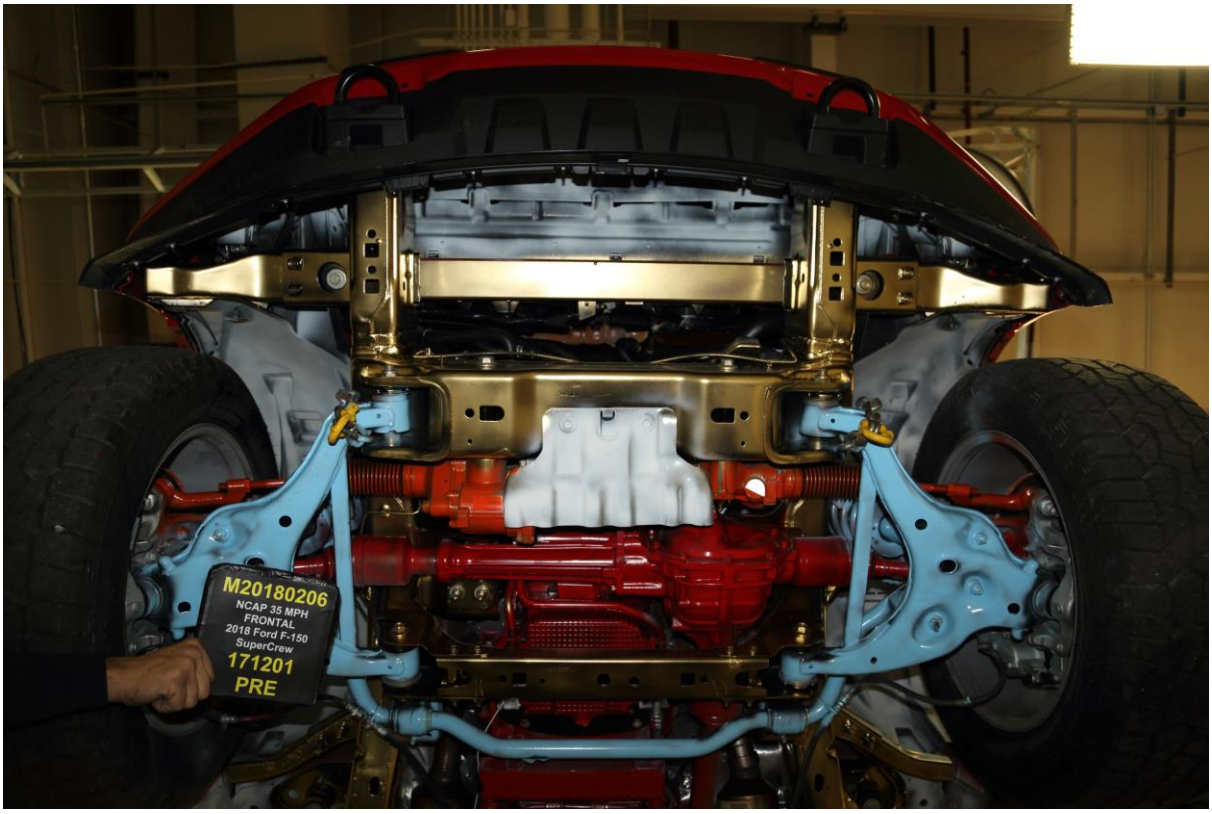
019 Post-Test Windshield View

020 Pre-Test Engine Compartment View

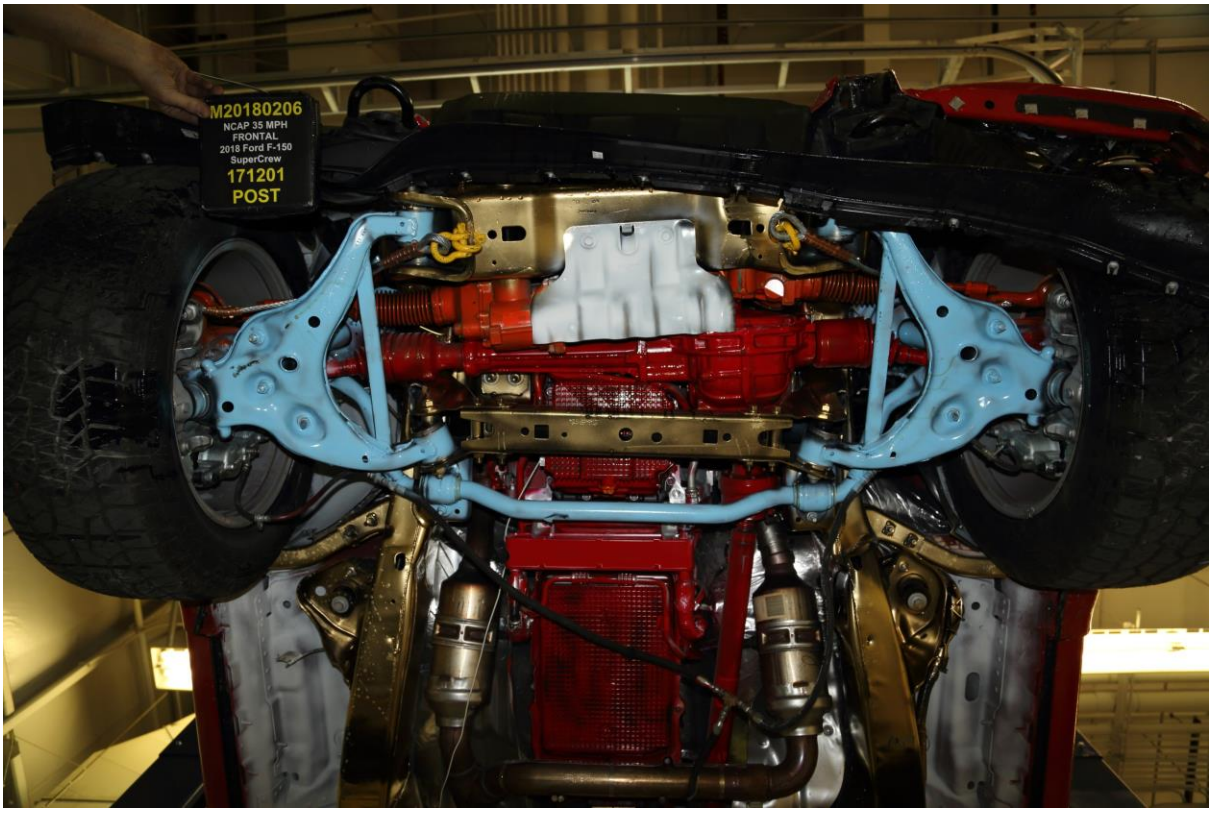
021 Post-Test Engine Compartment View

022 Pre-Test Fuel Filler Cap View

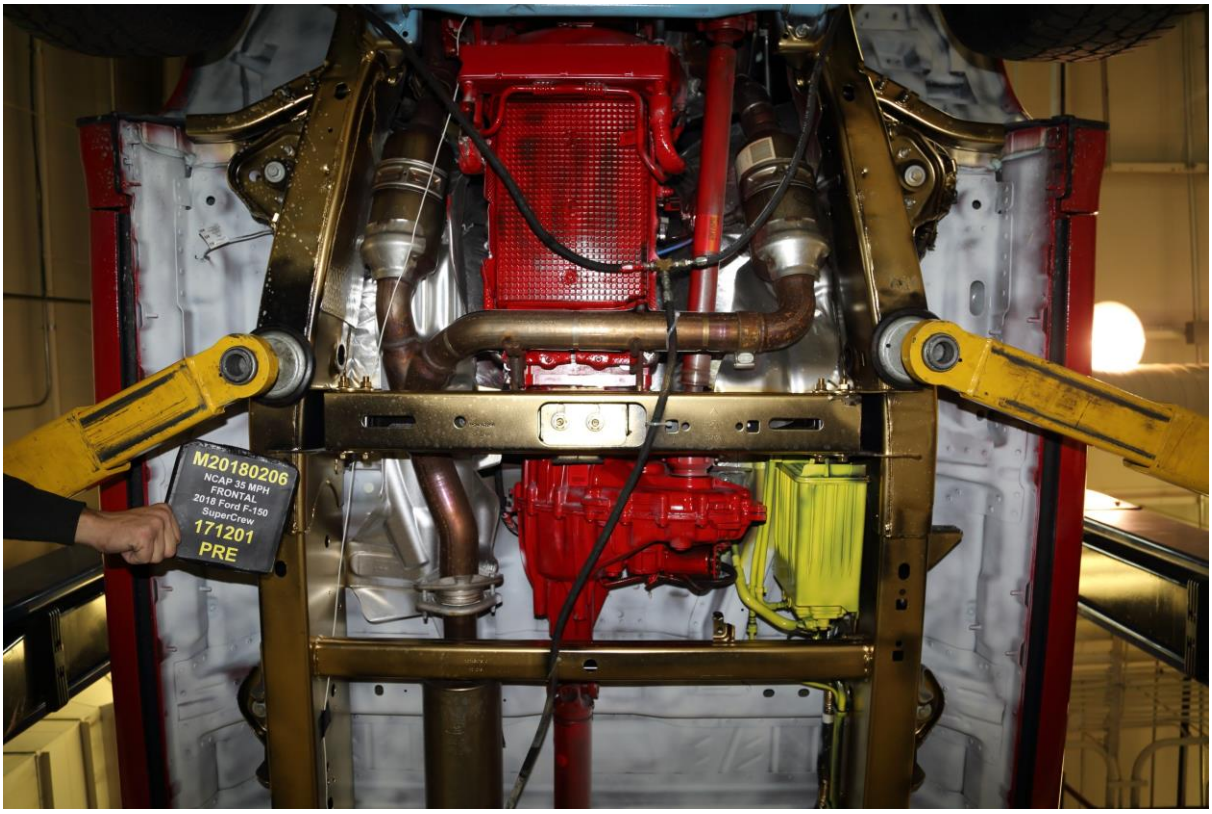
023 Post-Test Fuel Filler Cap View



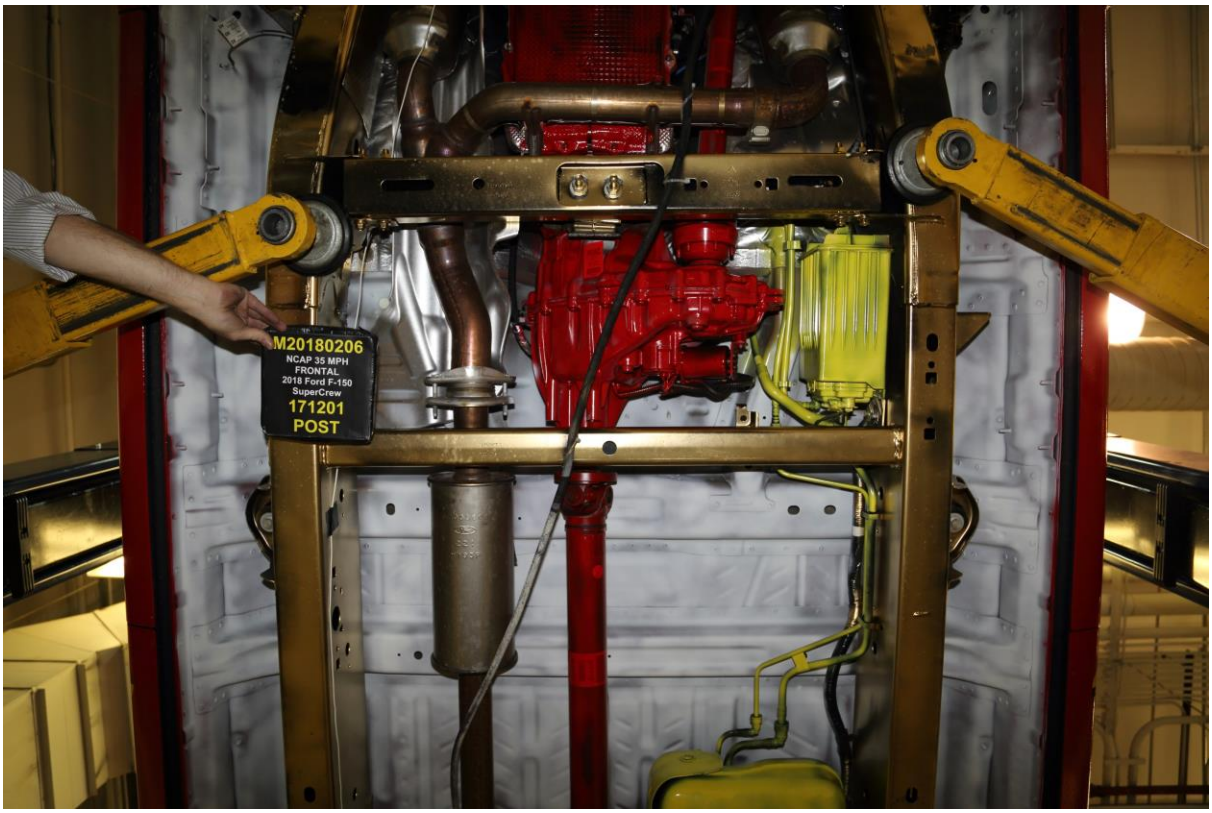
024 Pre-Test Front Underbody View



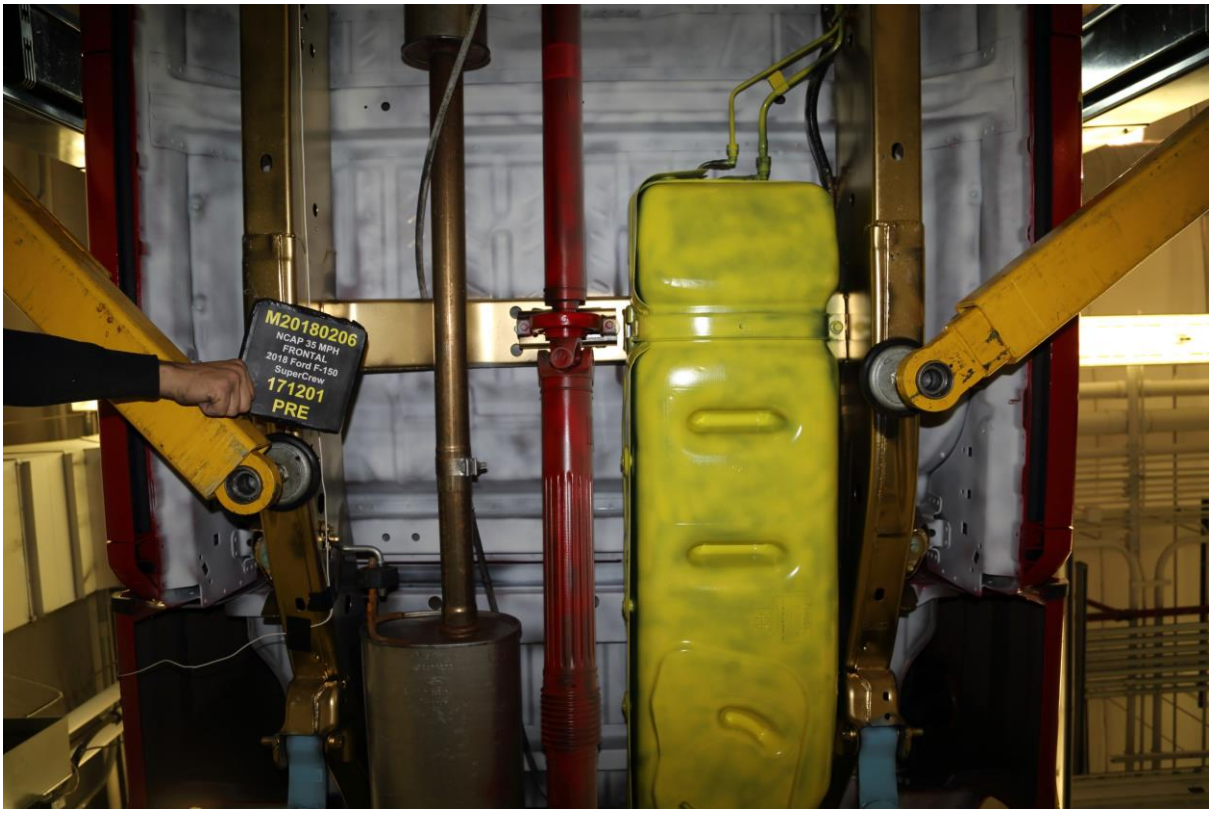
025 Post-Test Front Underbody View



025a Pre-Test Mid Front Underbody View

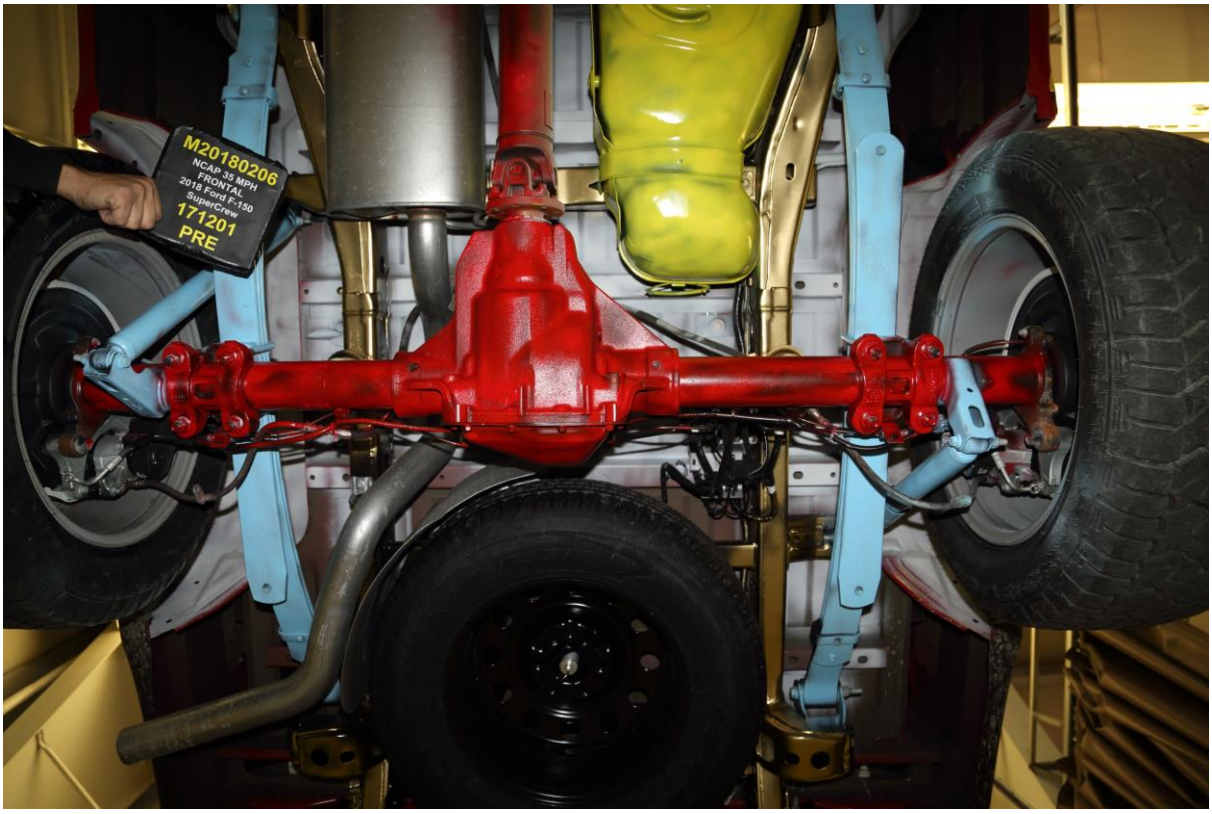


025b Post-Test Mid Front Underbody View

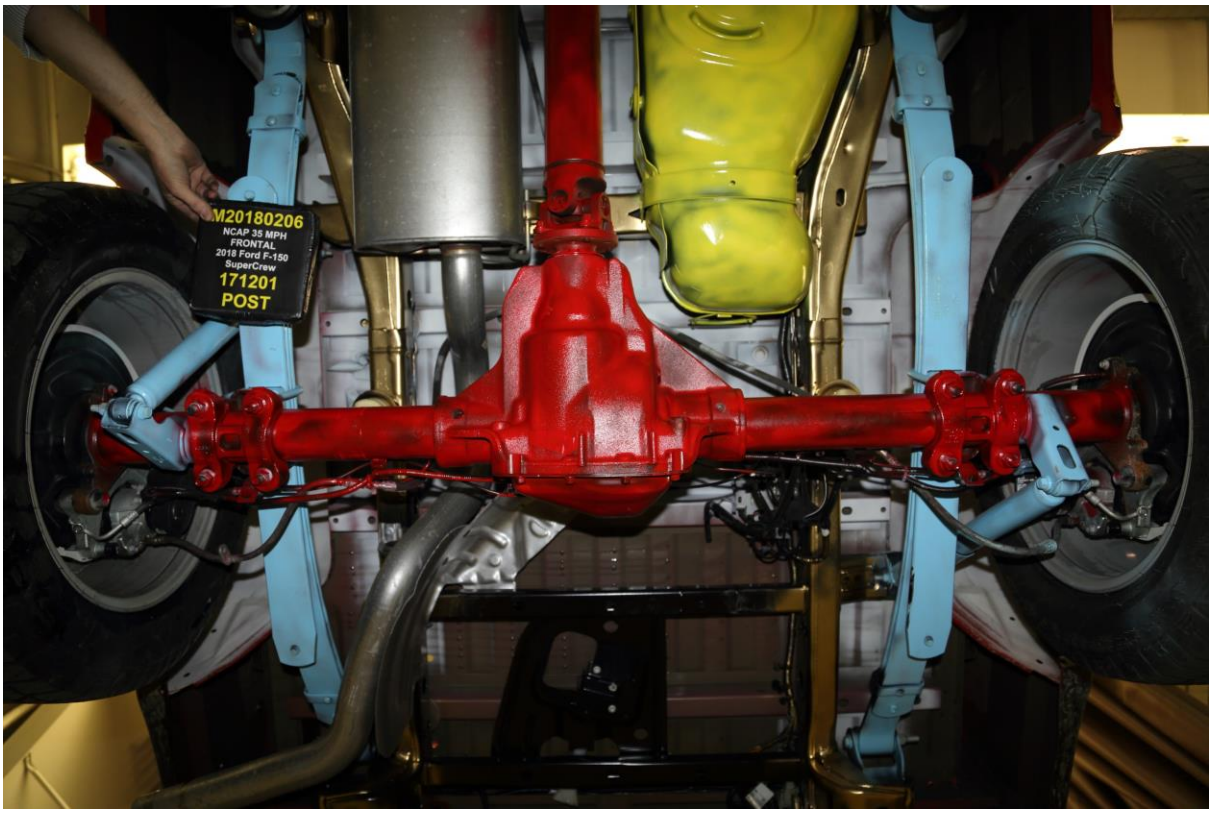


025c Pre-Test Mid Underbody View

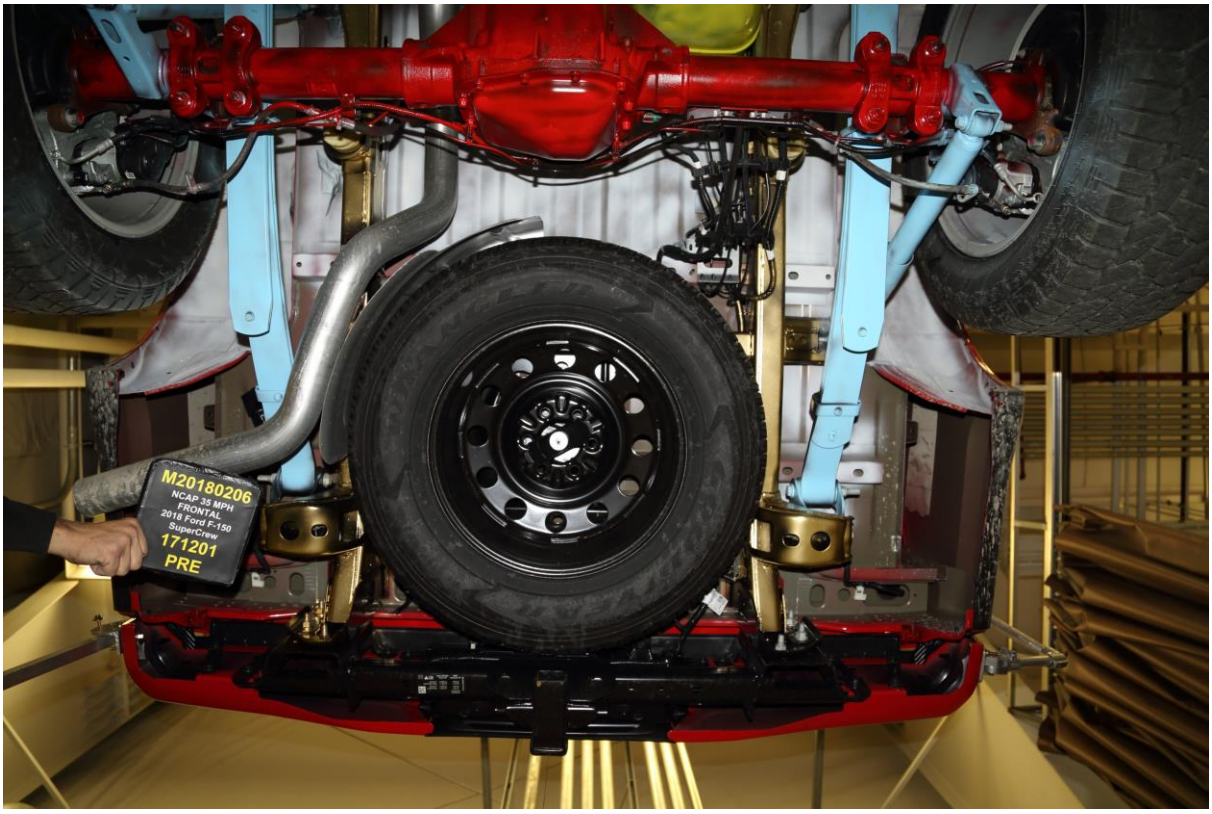
025d Post-Test Mid Underbody View



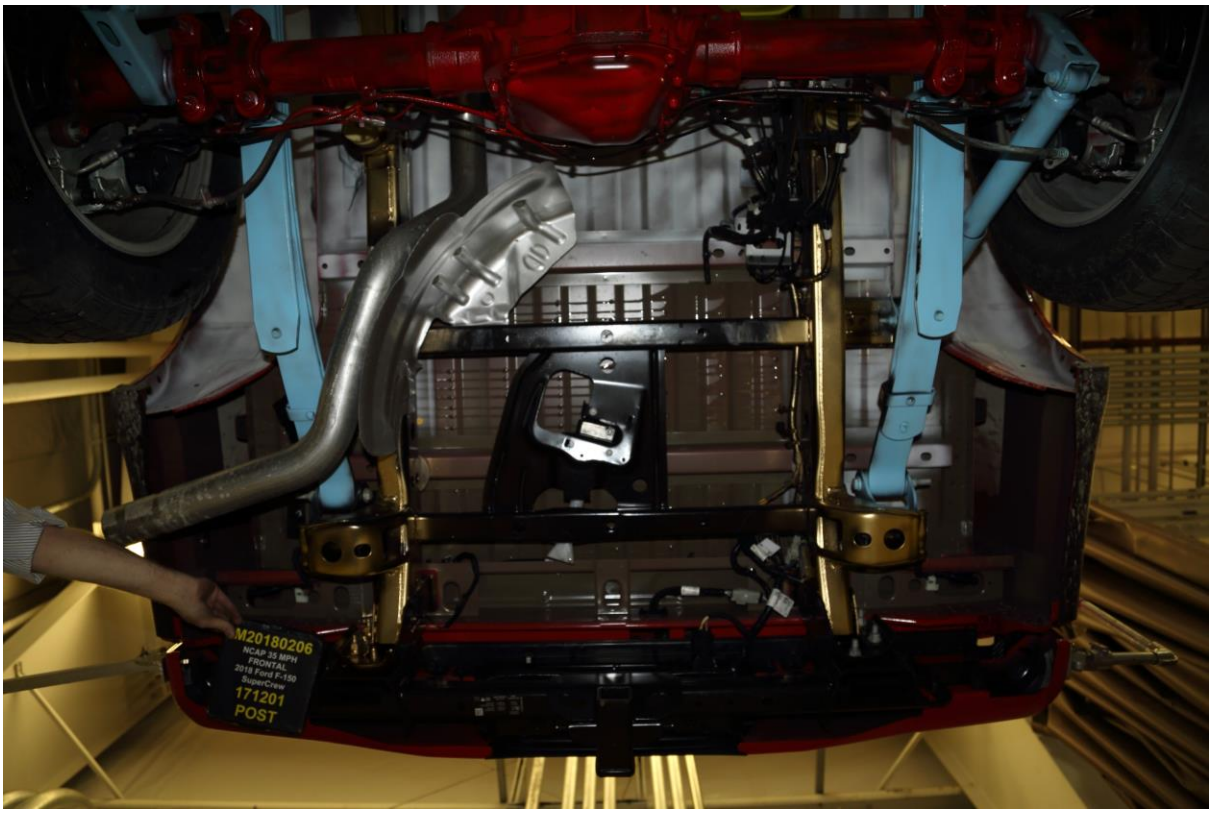
025e Pre-Test Mid Rear Underbody View



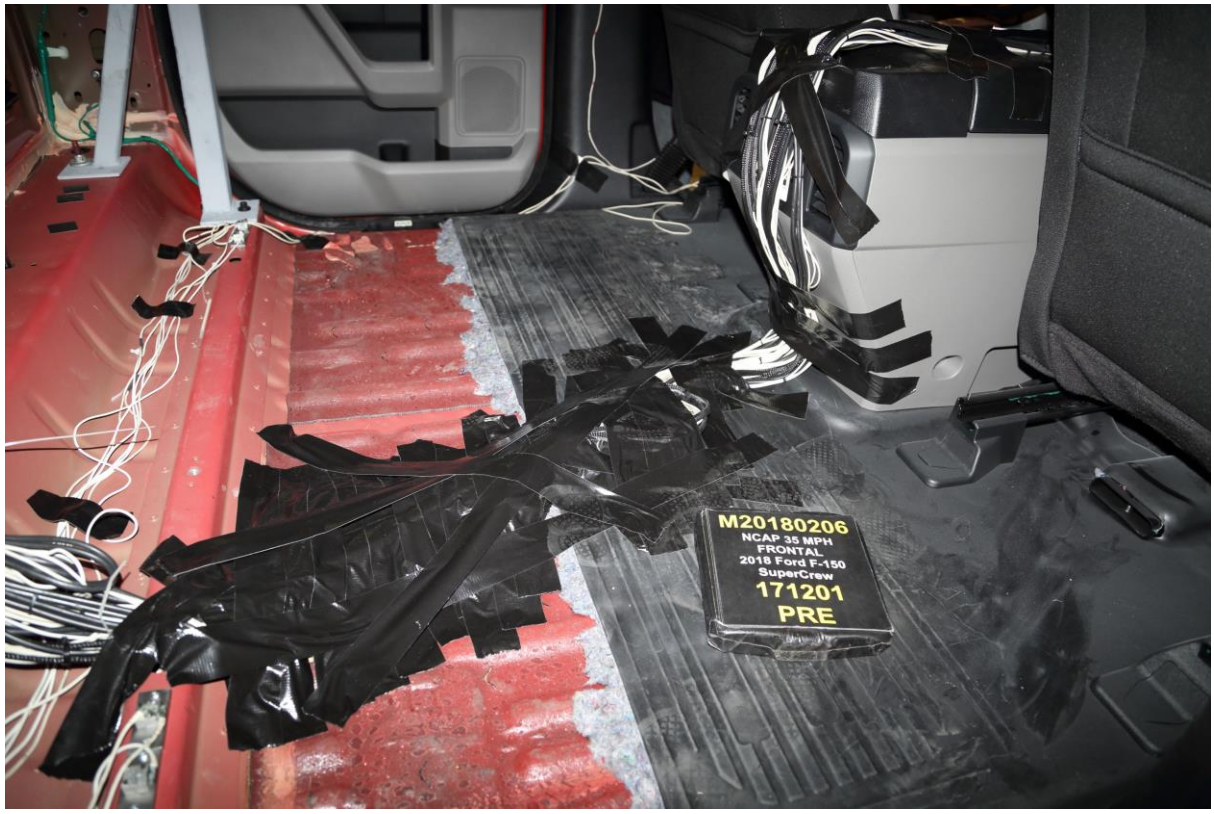
025f Post-Test Mid Rear Underbody View



026 Pre-Test Rear Underbody View

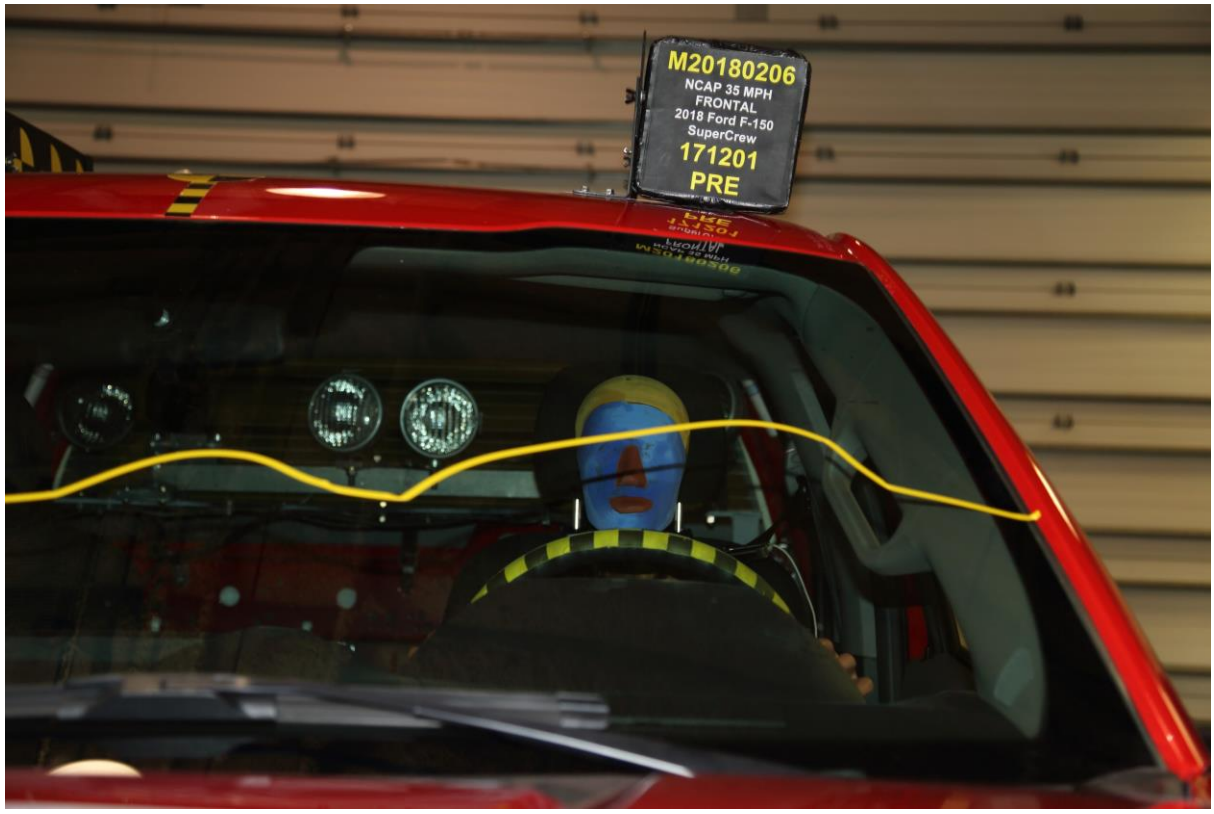


027 Post-Test Rear Underbody View



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 Driver Dummy Feet

041 Post-Test Driver Dummy Feet

042 Pre-Test Driver's Side Knee Bolster

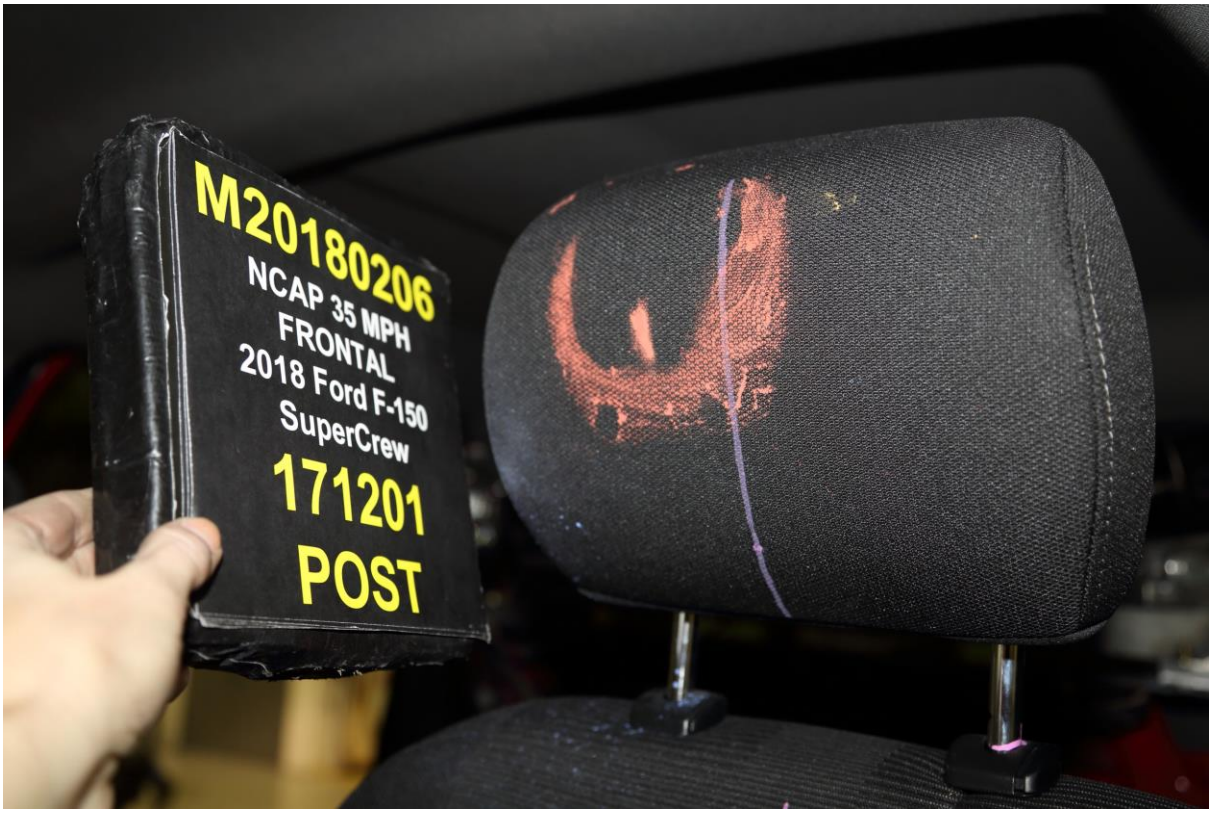
043 Post-Test Driver's Side Knee Bolster

044 Pre-Test Driver's Side Floorpan

045 Post-Test Driver's Side Floorpan

046 Post-Test Driver Dummy Face

047 Post-Test Driver Dummy Contact With Airbag



048 Post-Test Driver Dummy Contact With Headrest

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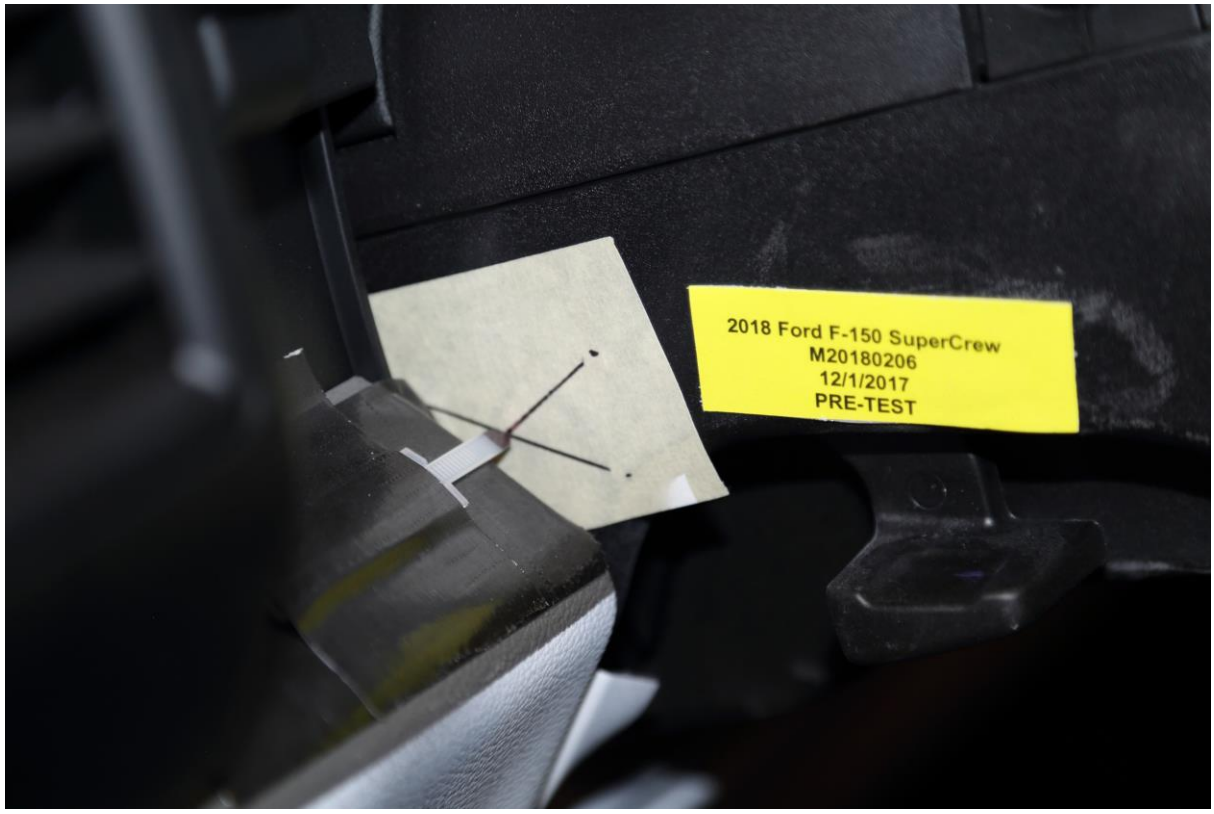


049 Pre-Test View of the Steering Wheel

050 Post-Test View of the Steering Wheel

051 Pre-Test Passenger Dummy Front View

052 Post-Test Passenger Dummy Front View

053 Pre-Test Passenger Dummy Window View

054 Post-Test Passenger Dummy Window View

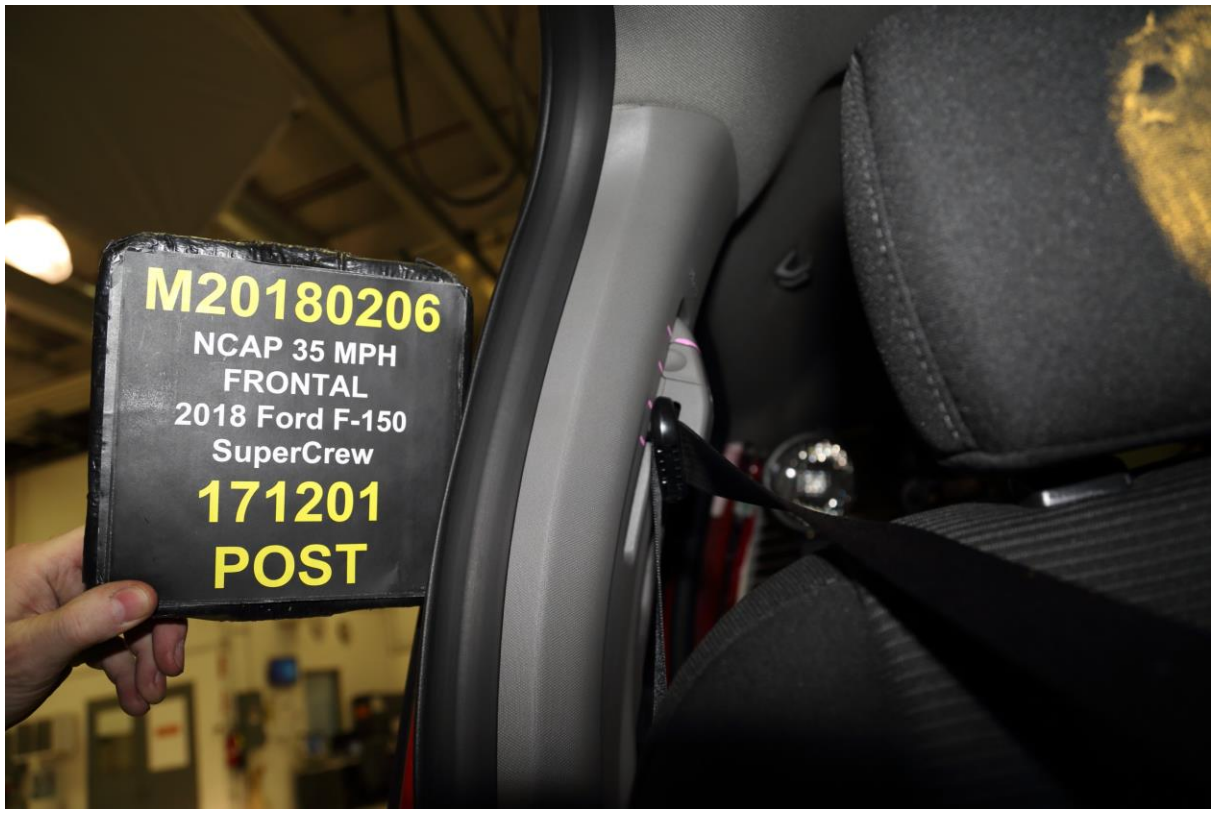
055 Pre-Test Passenger Dummy and Vehicle Interior View

056 Post-Test Passenger Dummy and Vehicle Interior View

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

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

059 Pre-Test View of Belt Anchorage for Passenger Dummy



060 Post-Test View of Belt Anchorage for Passenger Dummy

061 Pre-Test Passenger Dummy Feet

062 Post-Test Passenger Dummy Feet

063 Pre-Test Passenger's Side Knee Bolster

064 Post-Test Passenger's Side Knee Bolster

065 Pre-Test Passenger's Side Floorpan

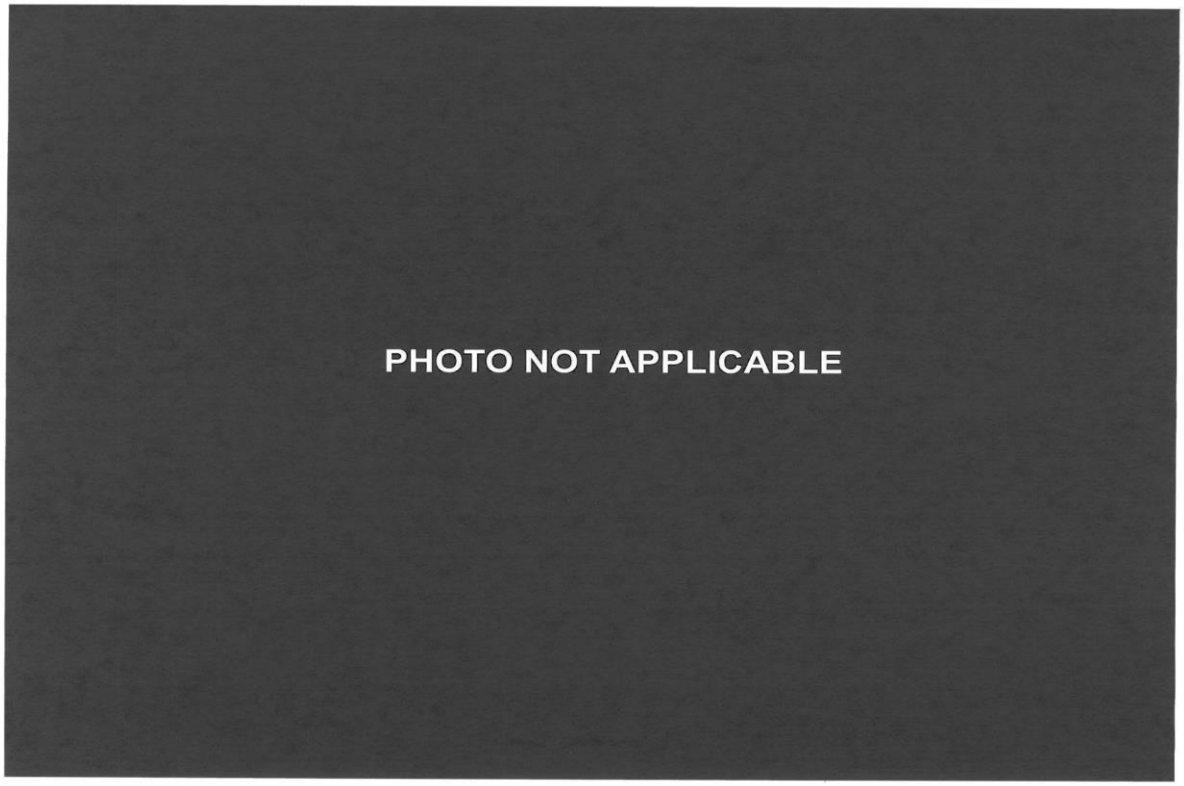
066 Post-Test Passenger's Side Floorpan

067 Post-Test Passenger Dummy Face

068 Post-Test Passenger Dummy Contact With Airbag

069 Post Test Passenger Dummy Contact With Headrest

070 Photograph of Ballast Installed in Vehicle



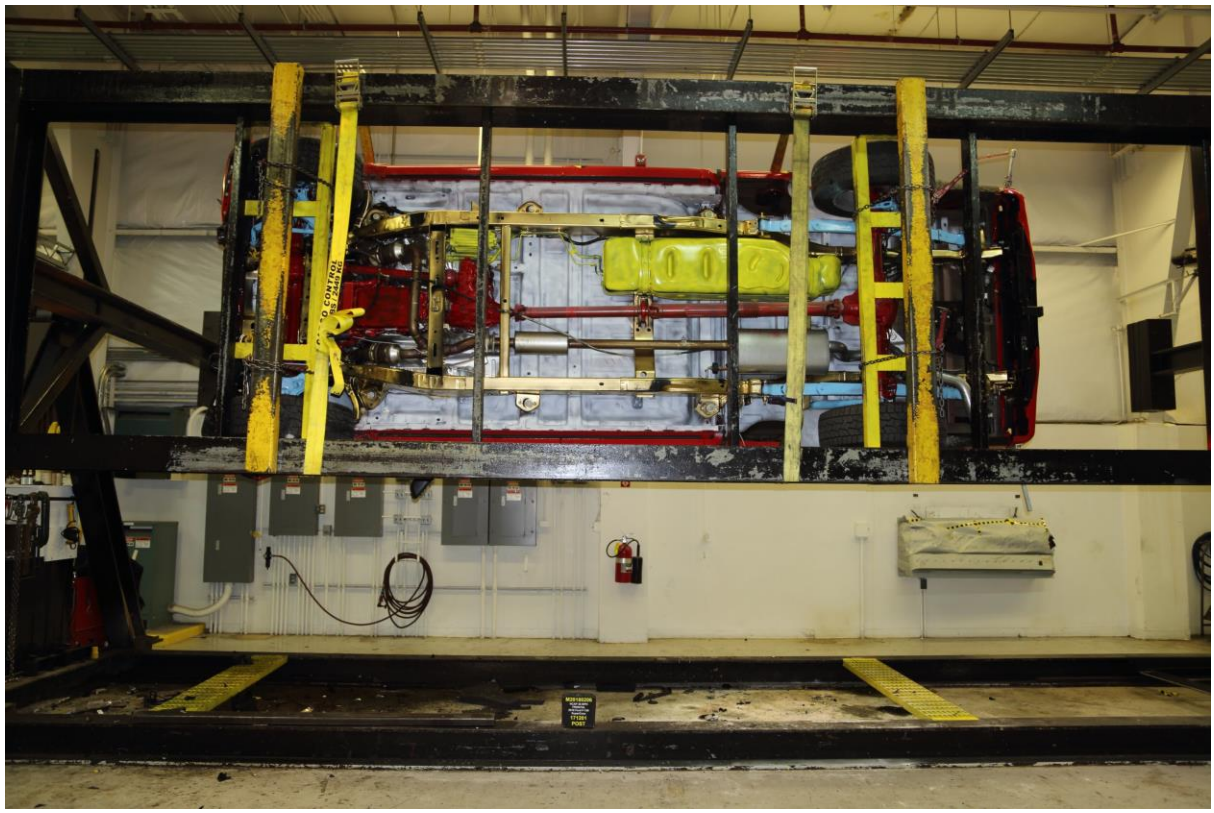
071 Post-Test Stoddard Spillage Location View

072 Post-Test Speed Trap Readout

073 Vehicle at 0º on Static Rollover Device

074 Vehicle at 90º on Static Rollover Device

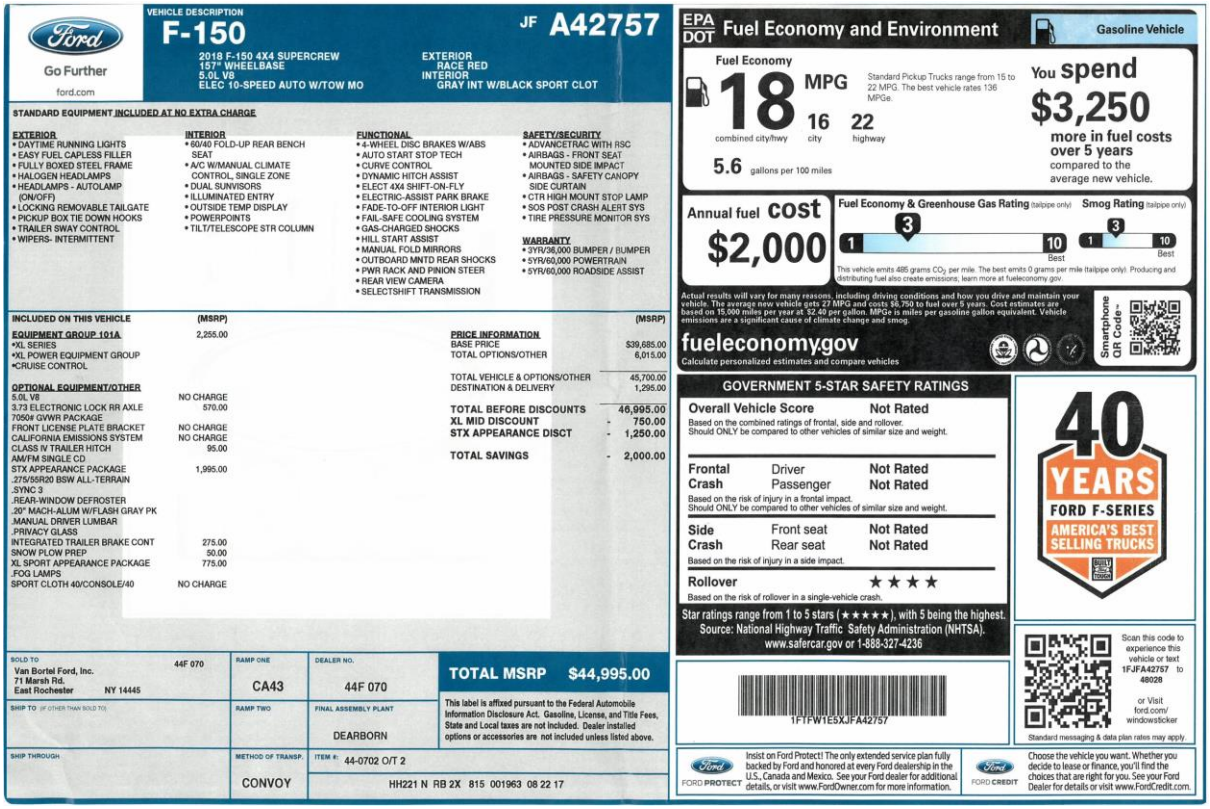
075 Vehicle at 180º on Static Rollover Device



076 Vehicle at 270º on Static Rollover Device

077 Vehicle at 360º on Static Rollover Device

078 2018 Ford F-150 SuperCrew Frontal Impact Event



079 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.dot.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 Acceleration
Driver Pelvis Y Acceleration
Driver Pelvis Z Acceleration
Driver Left Femur Force Redundant
Driver Right Femur Force 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
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 Force Redundant
Passenger Right Femur Force 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
Left Rear Seat Crossmember X
Left Rear Seat Crossmember Z
Right Rear Seat Crossmember X
Right Rear Seat Crossmember Z
Left Rear Seat Crossmember X Redundant
Right Rear Seat Crossmember X Redundant
Vehicle Engine Top X
Vehicle Engine Bottom X
Load Cell Barrier Forces and Moments

NHTSA

Test Date: 12/01/2017

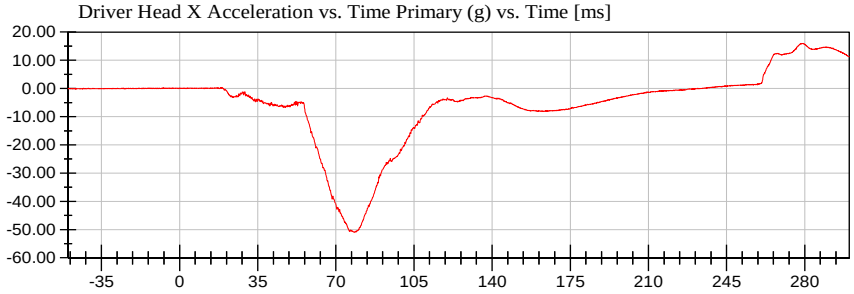
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

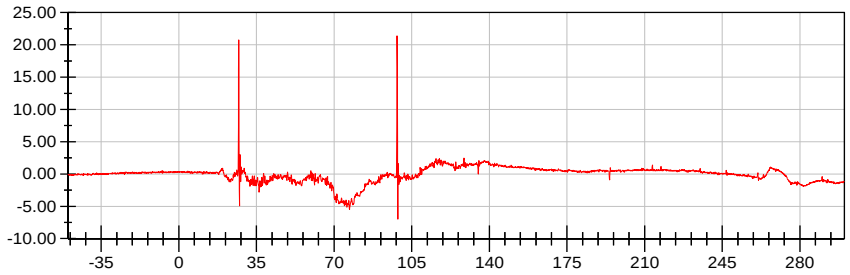
15.98 g at 278.88 ms

<Min>

-50.93 g at 78.24 ms

CFC_1000

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



<Max>

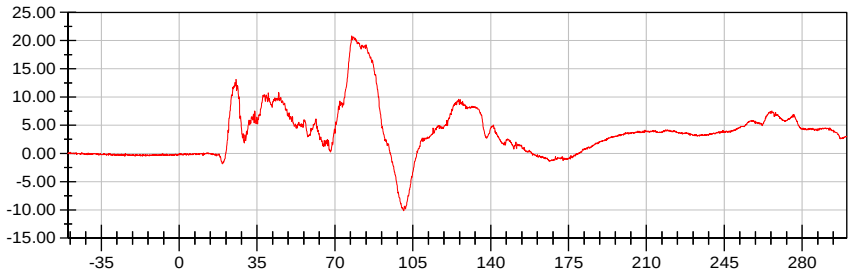
21.41 g at 98.40 ms

<Min>

-6.97 g at 98.72 ms

CFC_1000

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



<Max>

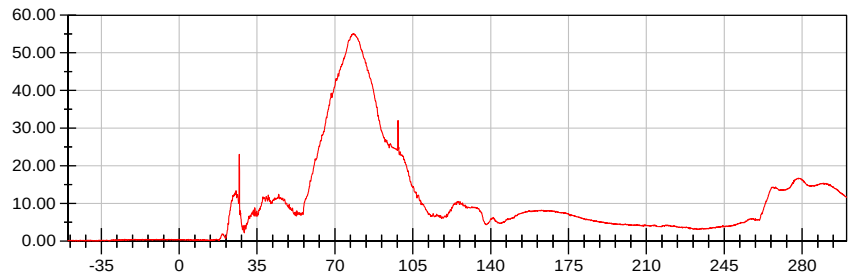
20.85 g at 77.52 ms

<Min>

-10.16 g at 100.88 ms

CFC_1000

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



<Max>

55.12 g at 78.24 ms

<Min>

0.03 g at -44.80 ms

CFC_1000

NHTSA

Test Date: 12/01/2017

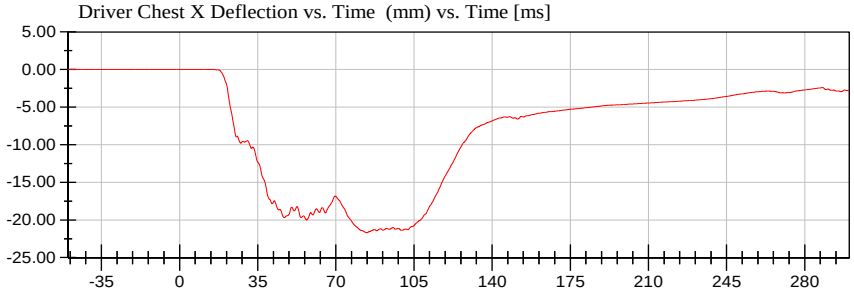
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

0.02 mm at -34.64 ms

<Min>

-21.69 mm at 83.84 ms

CFC_600

NHTSA

Test Date: 12/01/2017

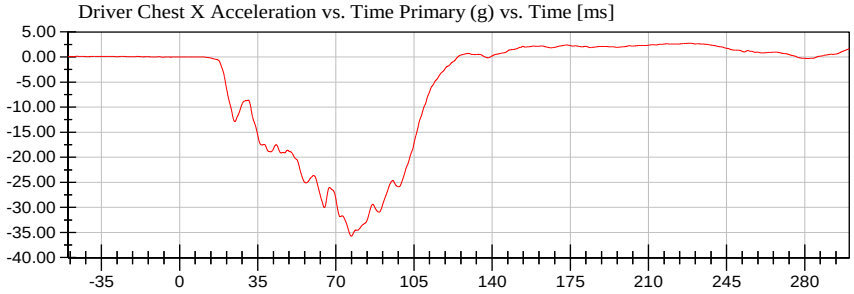
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

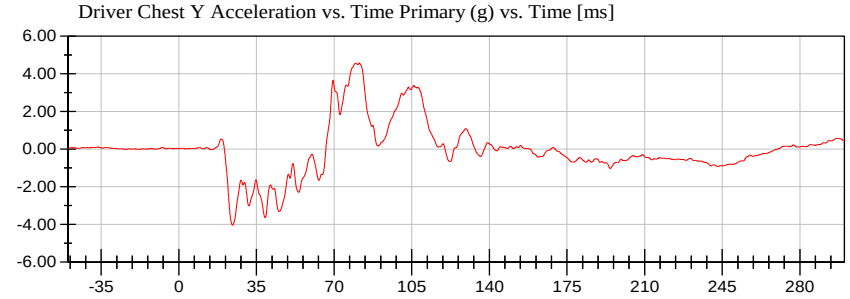
2.76 g at 228.80 ms

<Min>

-35.74 g at 76.88 ms

CFC_180

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



<Max>

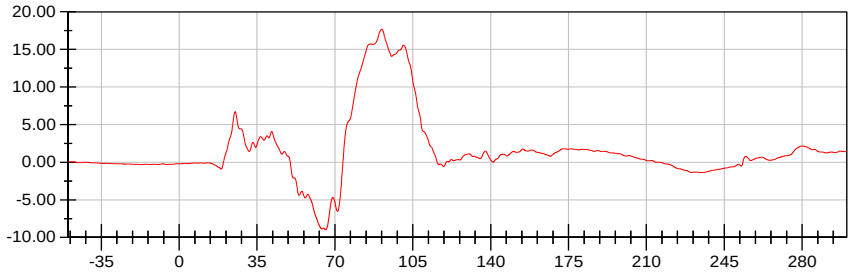
4.58 g at 81.44 ms

<Min>

-4.04 g at 24.16 ms

CFC_180

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



<Max>

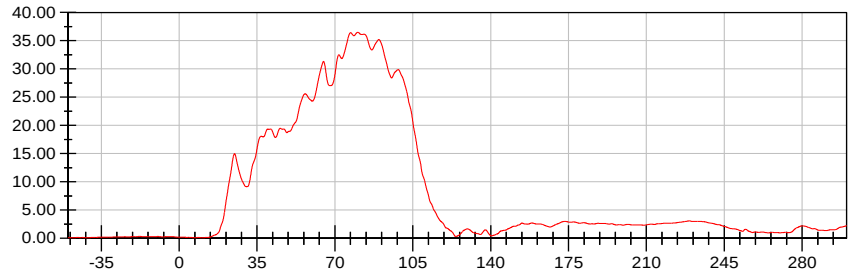
17.68 g at 91.04 ms

<Min>

-8.97 g at 65.84 ms

CFC_180

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



<Max>

36.48 g at 80.24 ms

<Min>

0.09 g at -40.80 ms

CFC_180

NHTSA

Test Date: 12/01/2017

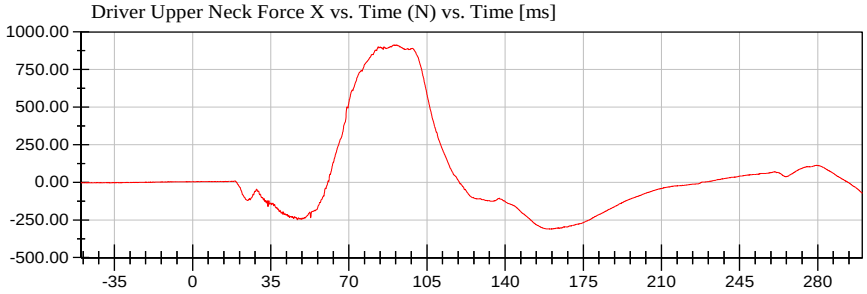
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

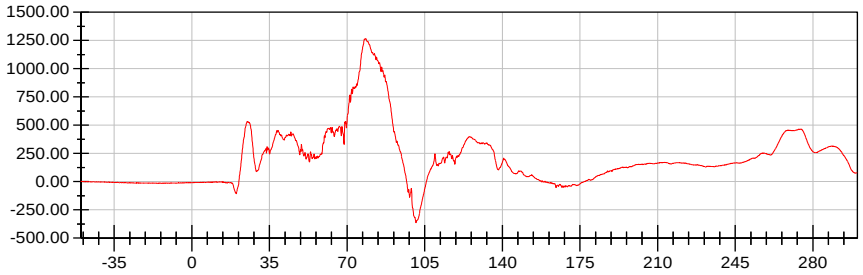
913.16 N at 90.24 ms

<Min>

-311.24 N at 160.72 ms

CFC_1000

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



<Max>

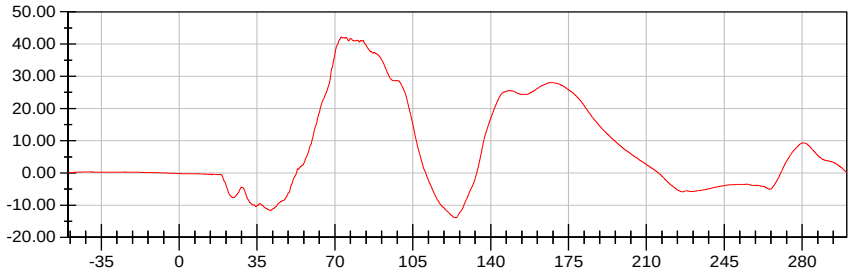
1,266.34 N at 78.40 ms

<Min>

-363.26 N at 101.04 ms

CFC_1000

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



<Max>

42.24 Nm at 72.80 ms

<Min>

-13.85 Nm at 124.32 ms

CFC_600

2018 Ford F-150 SuperCrew NCAP 35 mph Frontal Impact

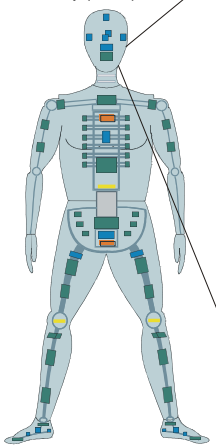
Neck Injury Predictor (NIJ)

Date: 12/01/2017
Time: 16:05

Customer: NHTSA
Test Number: M20180206

TRC Inc. Test Lab: CTF
Test Number: 171201

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



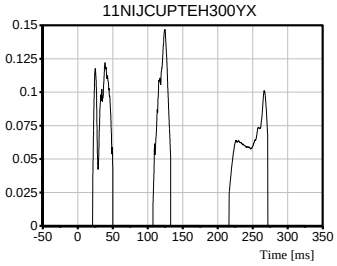
Dummy:HIII 50th Male
Seating Position:
Driver

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

11TMONUP00H3MOYX

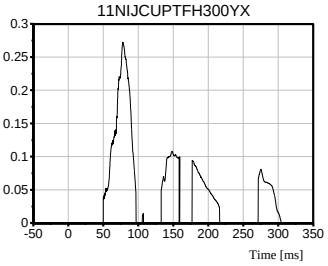
11NECKUP00H3FOZA

11NIJCUPTEH300YX



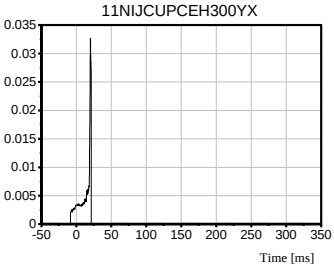
Max [NTE] 0.1470 at 124.48 ms

11NIJCUPTFH300YX



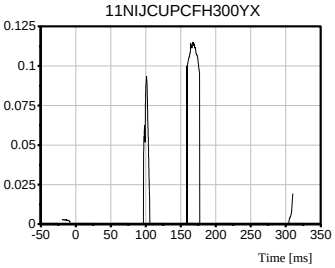
Max [NTF] 0.2725 at 77.84 ms

11NIJCUPCEH300YX



Max [NCE] 0.0327 at 20.08 ms

11NIJCUPCFH300YX



Max [NCF] 0.1150 at 167.44 ms

NHTSA

Test Date: 12/01/2017

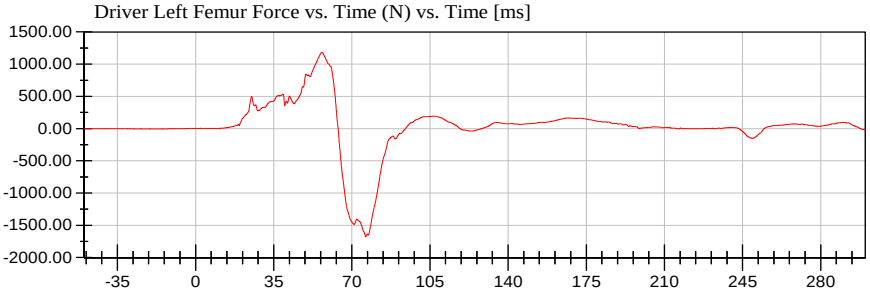
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

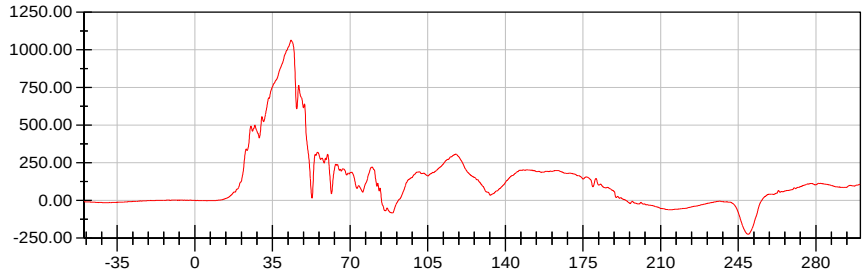
1,183.90 N at 56.64 ms

<Min>

-1,676.51 N at 76.24 ms

CFC_600

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



<Max>

1,064.91 N at 43.44 ms

<Min>

-223.87 N at 249.60 ms

CFC_600

NHTSA

Test Date: 12/01/2017

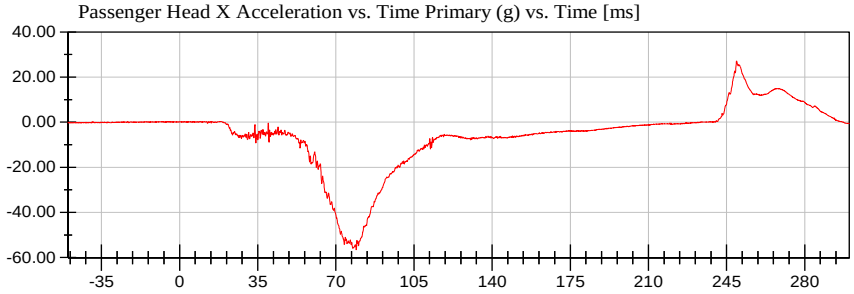
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

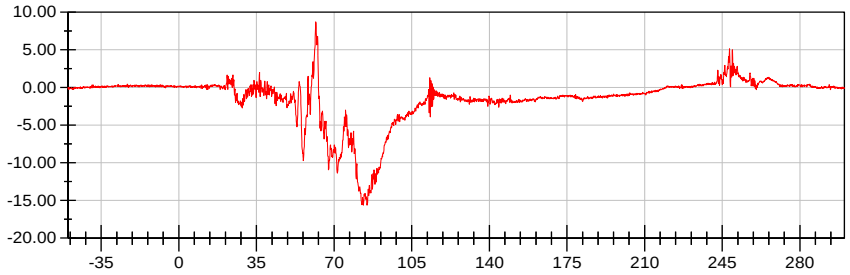
27.13 g at 249.44 ms

<Min>

-56.57 g at 79.12 ms

CFC_1000

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



<Max>

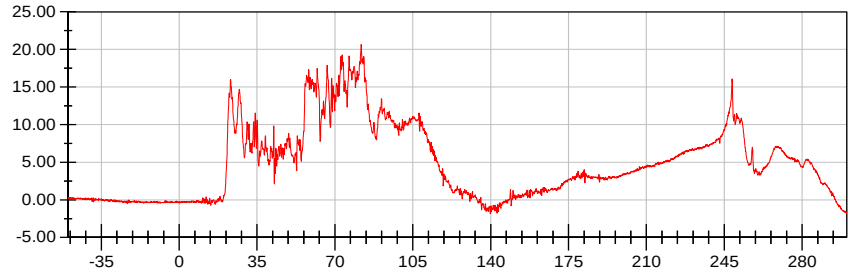
8.73 g at 61.76 ms

<Min>

-15.61 g at 83.20 ms

CFC_1000

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



<Max>

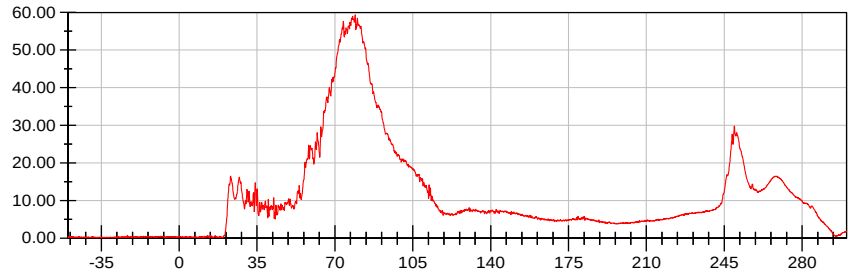
20.65 g at 81.84 ms

<Min>

-1.85 g at 139.84 ms

CFC_1000

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



<Max>

59.40 g at 79.12 ms

<Min>

0.07 g at 10.56 ms

CFC_1000

NHTSA

Test Date: 12/01/2017

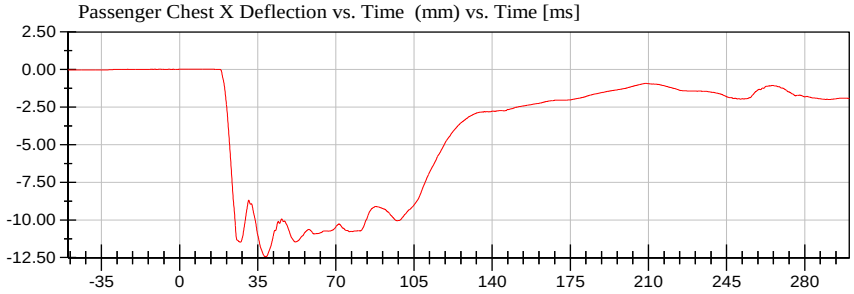
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

0.02 mm at 11.60 ms

<Min>

-12.43 mm at 38.80 ms

CFC_600

NHTSA

Test Date: 12/01/2017

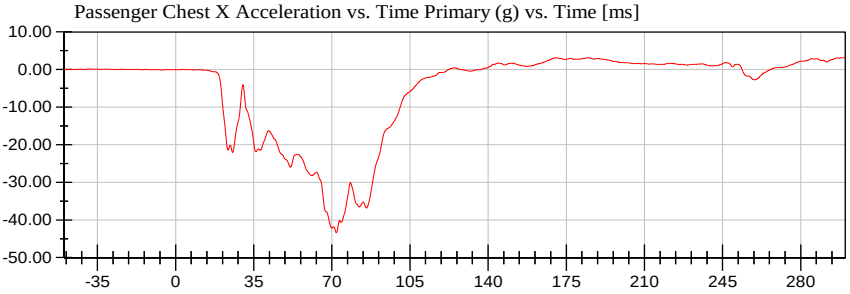
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

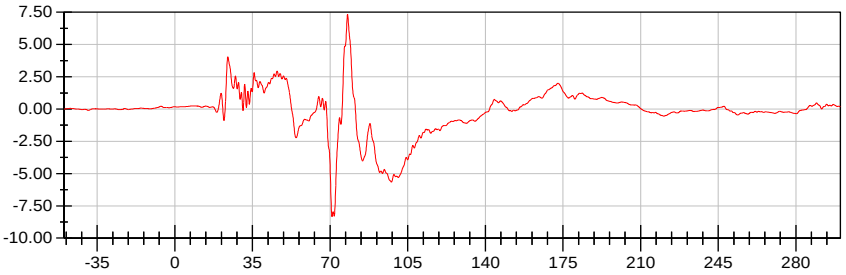
3.17 g at 184.80 ms

<Min>

-43.43 g at 72.00 ms

CFC_180

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



<Max>

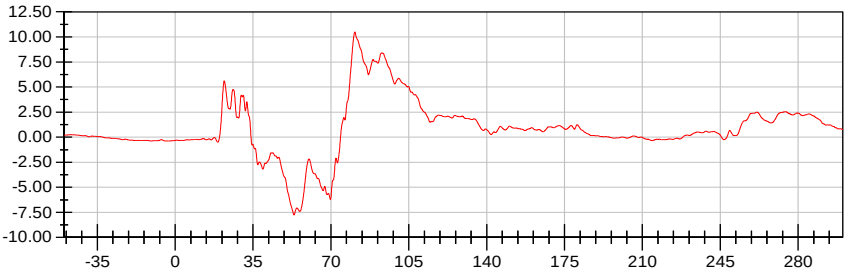
7.33 g at 77.84 ms

<Min>

-8.34 g at 70.88 ms

CFC_180

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



<Max>

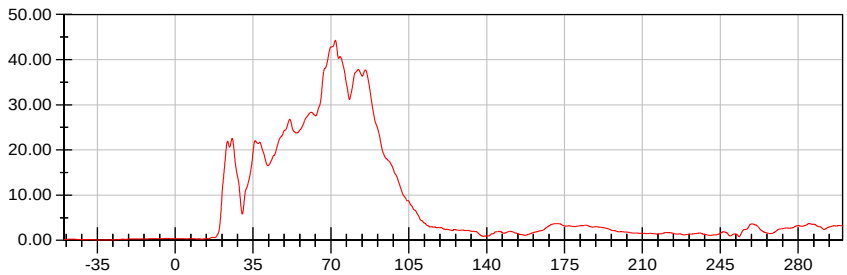
10.48 g at 80.72 ms

<Min>

-7.76 g at 53.44 ms

CFC_180

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



<Max>

44.26 g at 72.00 ms

<Min>

0.06 g at -33.12 ms

CFC_180

NHTSA

Test Date: 12/01/2017

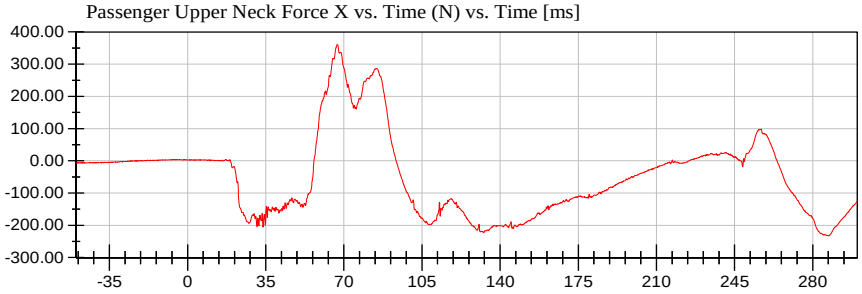
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

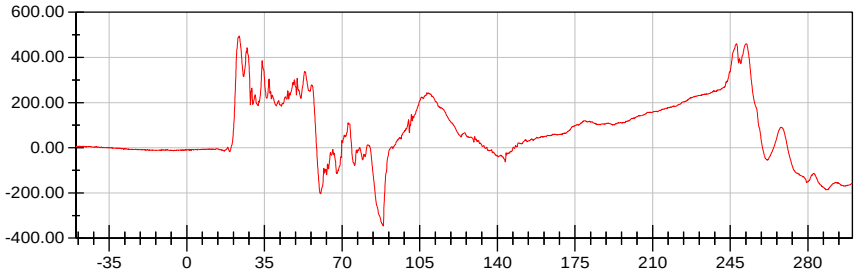
361.25 N at 67.04 ms

<Min>

-232.45 N at 287.04 ms

CFC_1000

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



<Max>

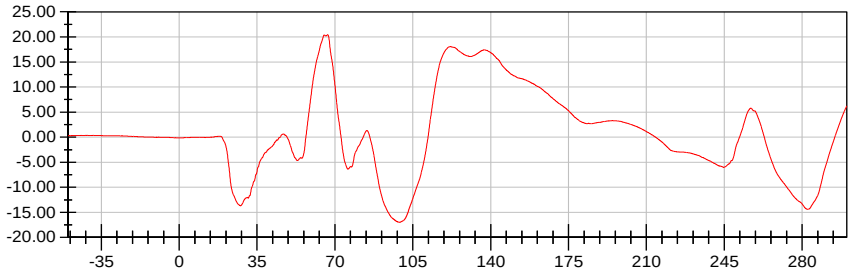
494.91 N at 23.60 ms

<Min>

-346.77 N at 88.56 ms

CFC_1000

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



<Max>

20.44 Nm at 66.80 ms

<Min>

-17.00 Nm at 99.12 ms

CFC_600

2018 Ford F-150 SuperCrew NCAP 35 mph Frontal Impact

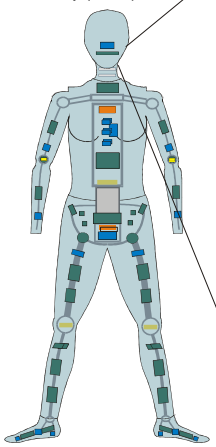
Neck Injury Predictor (NIJ)

Date: 12/01/2017
Time: 16:05

Customer: NHTSA
Test Number: M20180206

TRC Inc. Test Lab: CTF
Test Number: 171201

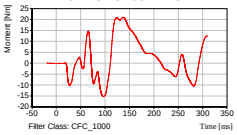
Test Orientation = Frontal
Fzc(Tension) = 4287
Fzc(Compression) = 3880
Myc(Extension) = 67
Myc(Flexion) = 155



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

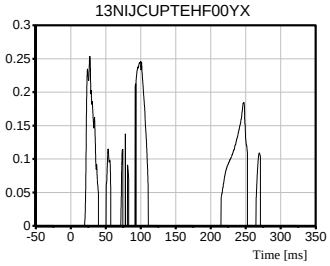
NIJ Source Code: (Fz/Fzc)+(My/Myc)

13TMONUP00HFMOYX



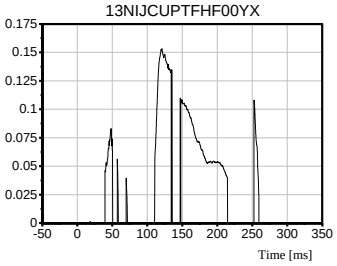
13NECKUP00HFFOZA

13NIJCUPTEHF00YX



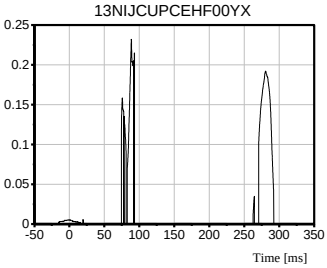
Max [NTE] 0.2537 at 27.20 ms

13NIJCUPTFHF00YX



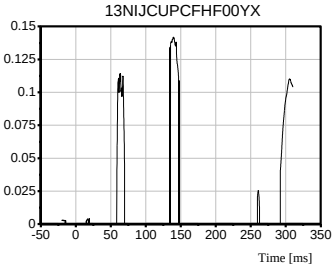
Max [NTF] 0.1533 at 120.72 ms

13NIJCUPCEHF00YX



Max [NCE] 0.2321 at 88.56 ms

13NIJCUPCFHF00YX



Max [NCF] 0.1419 at 139.52 ms

NHTSA

Test Date: 12/01/2017

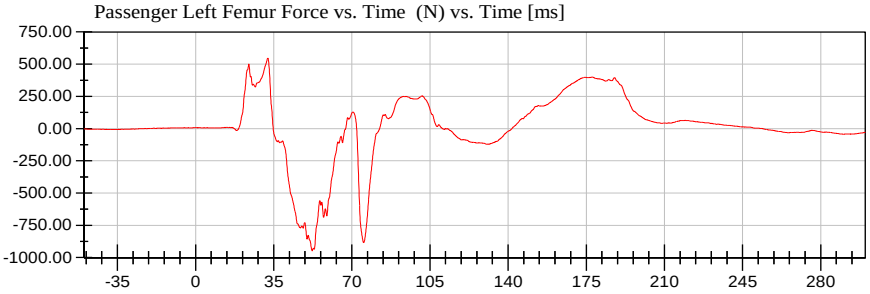
Test Lab: CTF

Position #1 Hybrid III Mid-Sized Adult Male Dummy (37)

Test Number: 171201 (M20180206)

Position #2 Hybrid III Small Adult Female (70)

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



<Max>

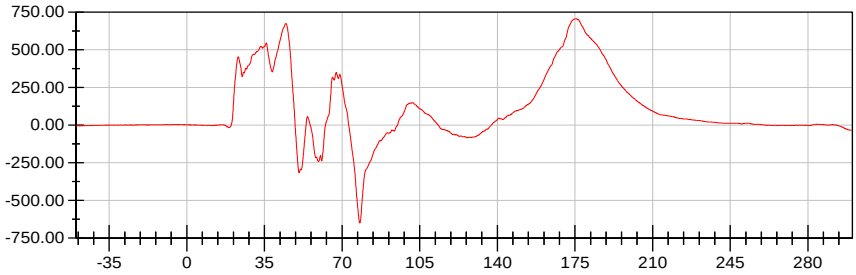
546.14 N at 32.40 ms

<Min>

-947.83 N at 52.24 ms

CFC_600

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



<Max>

707.63 N at 175.52 ms

<Min>

-649.49 N at 78.00 ms

CFC_600

APPENDIX C
DUMMY CALIBRATION AND PERFORMANCE VERIFICATION

Pre-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 45

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	514	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	91	Yes
F	Thigh Clearance	139.7 - 154.9	150	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	340	Yes
J	Elbow Rest Height	190.5 - 210.8	200	Yes
K	Buttock Knee Length	579.1 - 604.5	599	Yes
L	Popliteal Height	429.3 - 454.7	440	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	225	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	430	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	990	Yes
Z	Waist Circumference	835.7 - 866.1	865	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Revised 8/10/12

Transportation Research Center Inc.

Front Head Drop
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	257.2 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-10.5 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

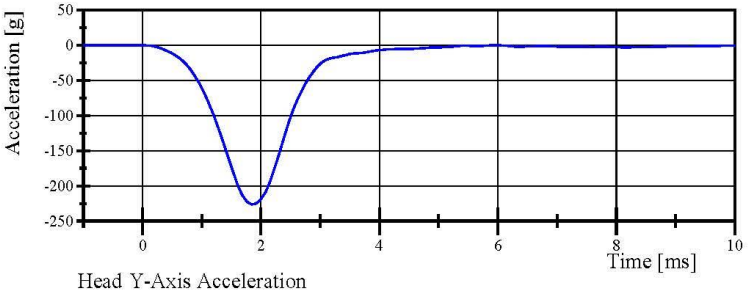
Condition: Used

Comments:
Head Skin S/N: N/A
Skull S/N: N/A

Transportation Research Center Inc.

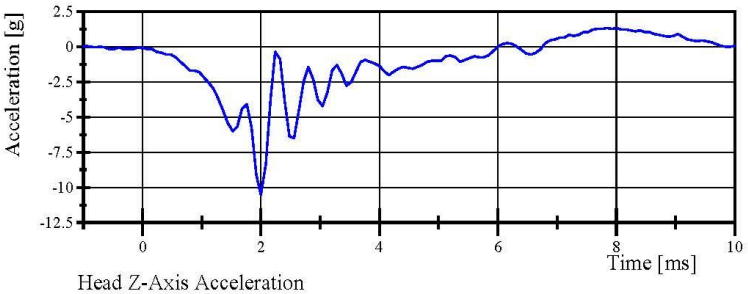
Front Head Drop
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Head X-Axis Acceleration



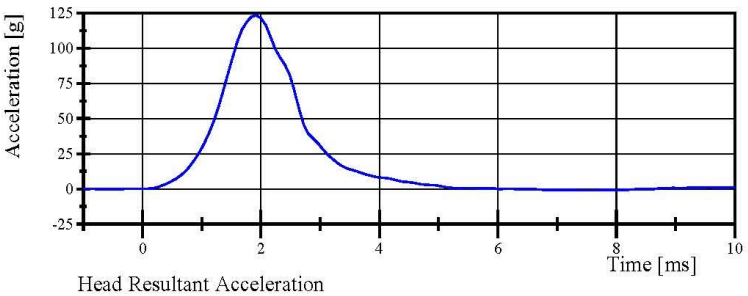
Filter Class: CFC_1000
Max: 0.1 g at -0.5 ms
Min: -226.1 g at 1.8 ms

Head Y-Axis Acceleration



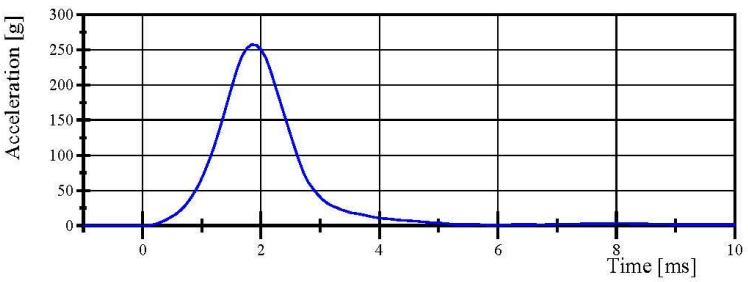
Filter Class: CFC_1000
Max: 1.3 g at 7.8 ms
Min: -10.5 g at 2.0 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 123.4 g at 1.9 ms
Min: -1.0 g at 7.5 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 257.2 g at 1.8 ms
Min: 0.0 g at -0.7 ms

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

10.09.2017 10:48:59 613

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	50 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.941 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	36.9 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.10 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-20.21 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-16.81 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-16.81 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-67.1 °	Yes
Time of Peak	57 - 64 ms	58.6 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	119.1 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88 - 108 N·m	97.8 N·m	Yes
Time of Peak	47 - 58 ms	50.3 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	101.0 ms	Yes

Test meets specifications.

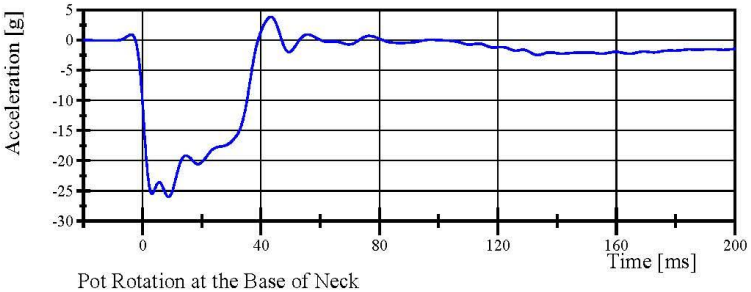
Condition: Used

Comments:
Neck S/N: 780 51 336-4727
Nodding Blocks: N/A
Neck Cable: N/A

Transportation Research Center Inc.

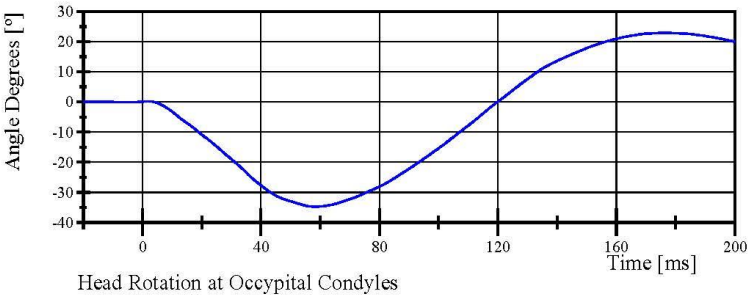
Neck Flexion
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Pendulum Acceleration



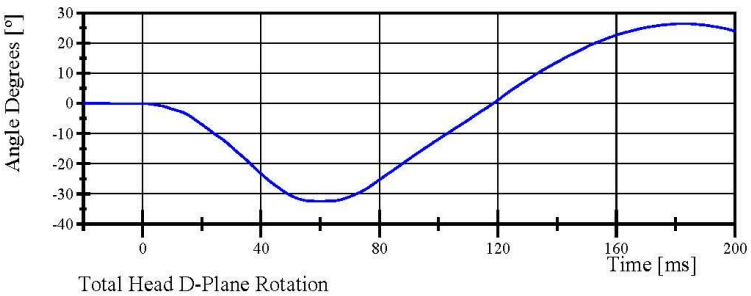
Filter Class: CFC_60
Max: 3.9 g at 43.3 ms
Min: -26.0 g at 8.8 ms

Pot Rotation at the Base of Neck



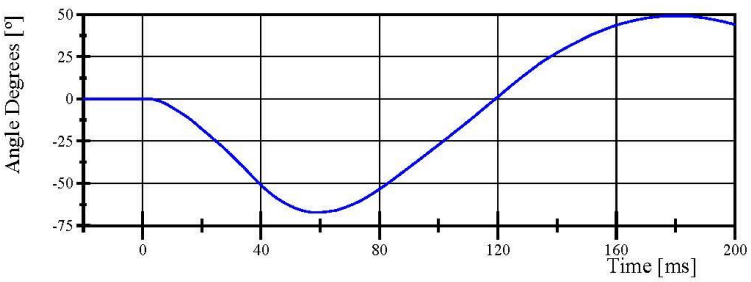
Filter Class: CFC_60
Max: 22.9 ° at 176.4 ms
Min: -34.7 ° at 58.3 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 26.5 ° at 182.7 ms
Min: -32.4 ° at 59.6 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 49.3 ° at 180.3 ms
Min: -67.1 ° at 58.6 ms

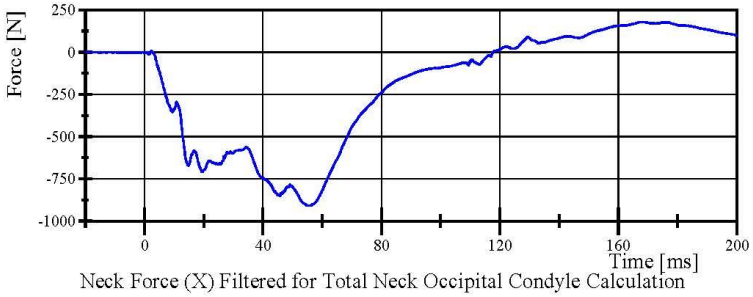
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

10.09.2017 11:08:26 3041

Transportation Research Center Inc.

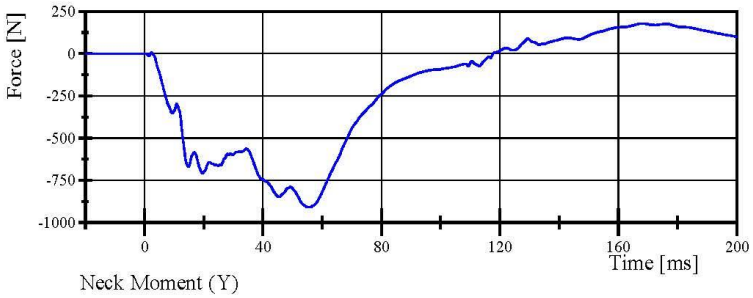
Neck Flexion
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Neck Force (X)



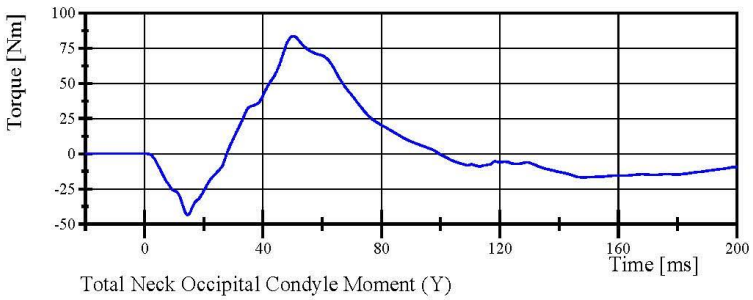
Filter Class: CFC_1000
Max: 179.2 N at 168.3 ms
Min: -909.1 N at 55.4 ms

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



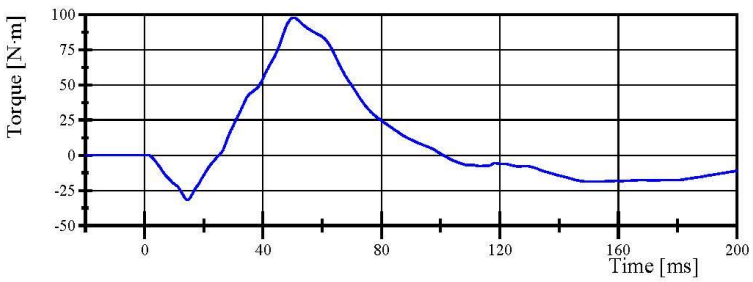
Filter Class: CFC_600
Max: 178.8 N at 168.7 ms
Min: -908.9 N at 55.5 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 83.6 Nm at 50.1 ms
Min: -43.4 Nm at 14.6 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 97.8 N·m at 50.3 ms
Min: -31.6 N·m at 14.5 ms

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

10.09.2017 11:08:27 3041

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 45-2
Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	20.9 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.990 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	41.5 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	18.91 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	16.37 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.85 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.85 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	93.9 °	Yes
Time of Peak	72 - 82 ms	78.6 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	161.4 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-70.1 N·m	Yes
Time of Peak	65 - 79 ms	72.8 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	147.7 ms	Yes

Test meets specifications.

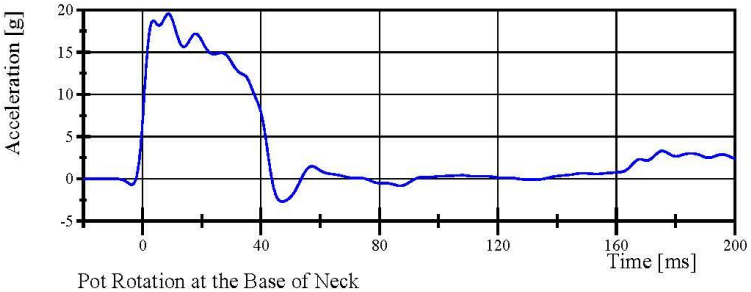
Condition: Used

Comments:
Neck S/N: 780 51 336-4727
Nodding Blocks: N/A
Neck Cable: N/A

Transportation Research Center Inc.

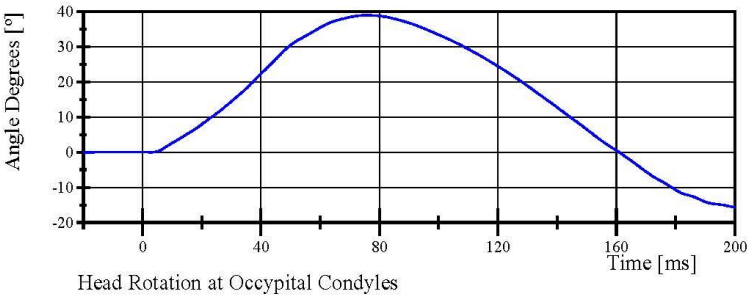
Neck Extension
HIII 50th Serial No. 037 Certification No. 45-2
Test Date: 10/9/2017

Pendulum Acceleration



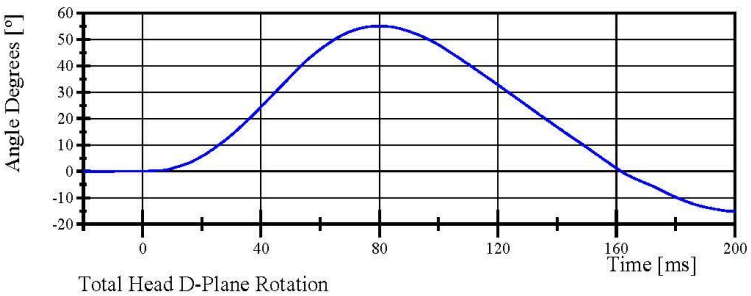
Filter Class: CFC_60
Max: 19.6 g at 8.7 ms
Min: -2.7 g at 47.1 ms

Pot Rotation at the Base of Neck



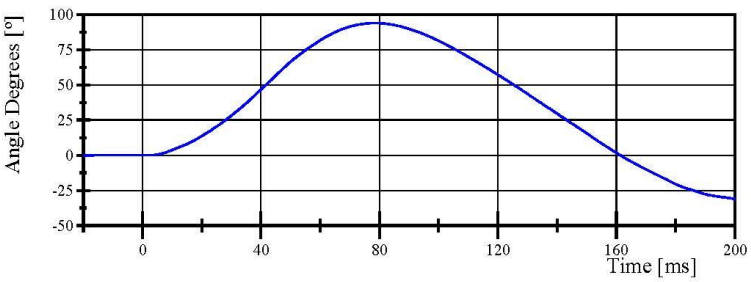
Filter Class: CFC_60
Max: 38.9 ° at 75.5 ms
Min: -15.7 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 55.1 ° at 79.8 ms
Min: -15.3 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 93.9 ° at 78.6 ms
Min: -30.9 ° at 200.0 ms

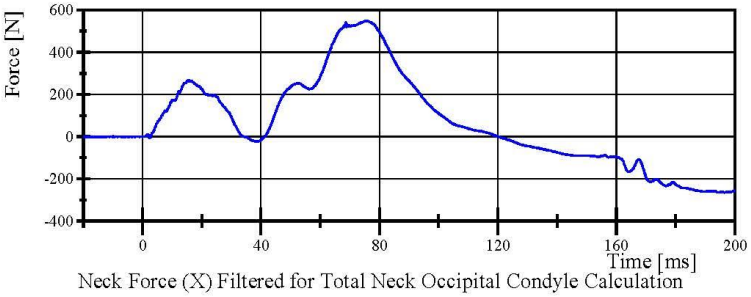
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

10.09.2017 12:50:38 3129

Transportation Research Center Inc.

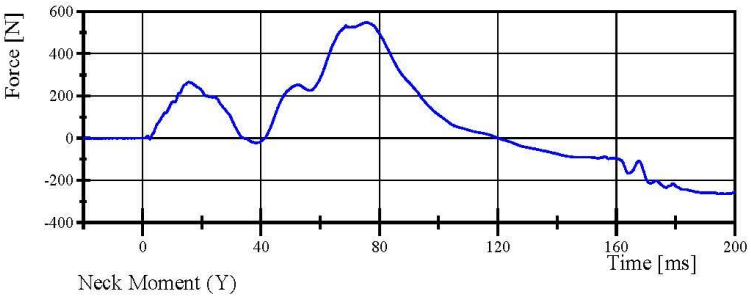
Neck Extension
HIII 50th Serial No. 037 Certification No. 45-2
Test Date: 10/9/2017

Neck Force (X)



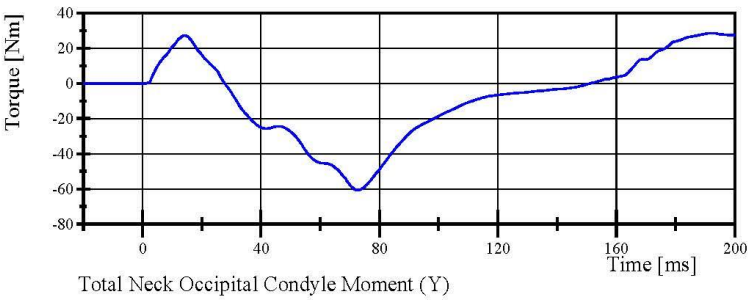
Filter Class: CFC_1000
Max: 548.4 N at 75.6 ms
Min: -264.6 N at 196.6 ms

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



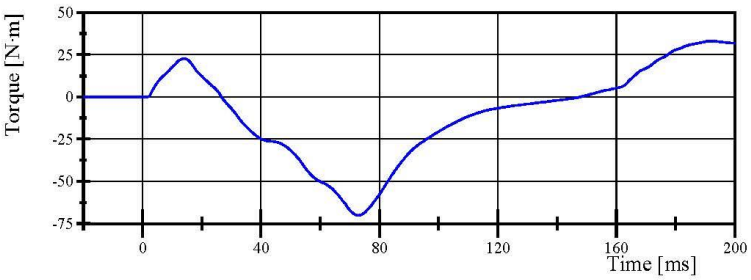
Filter Class: CFC_600
Max: 548.2 N at 75.6 ms
Min: -264.3 N at 196.6 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 28.6 Nm at 192.6 ms
Min: -60.7 Nm at 72.6 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 33.2 N·m at 192.0 ms
Min: -70.1 N·m at 72.8 ms

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

10.09.2017 12:50:40 3129

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.695 m/s	Yes
Probe Force Peak	(-5,160) - (-5,893) N	-5,434.5 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-70.42 mm	Yes
Internal Hysteresis	65 - 85 %	72.8 %	Yes

Test meets specifications.

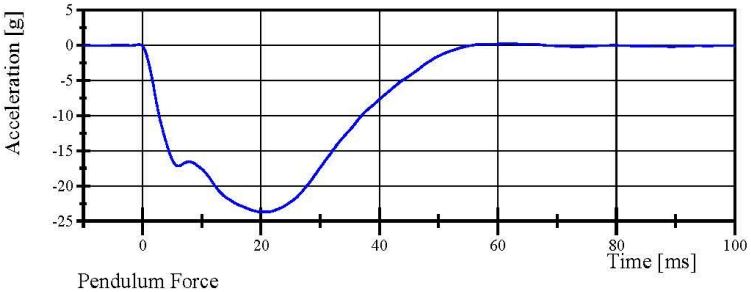
Condition: Used

Comments:
Jacket S/N: 2565
Rib 1 S/N: 780851-35 16550
Rib 2 S/N: 780851-36 16526
Rib 3 S/N: 780851-37 16543
Rib 4 S/N: 780851-38 16538
Rib 5 S/N: 780851-39 16530
Rib 6 S/N: 780851-40 16548
Stiffners S/N: N/A
Bib S/N: N/A
Sternum Plate S/N: N/A

Transportation Research Center Inc.

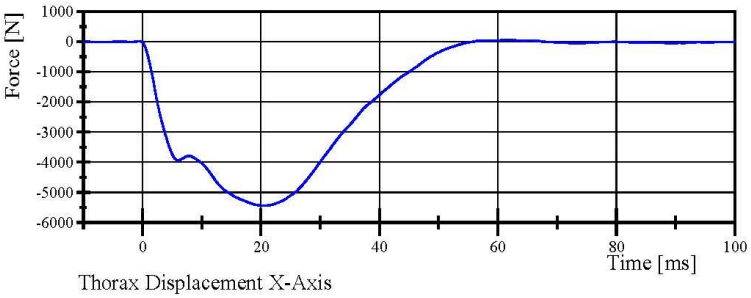
Front Thorax
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Pendulum Acceleration



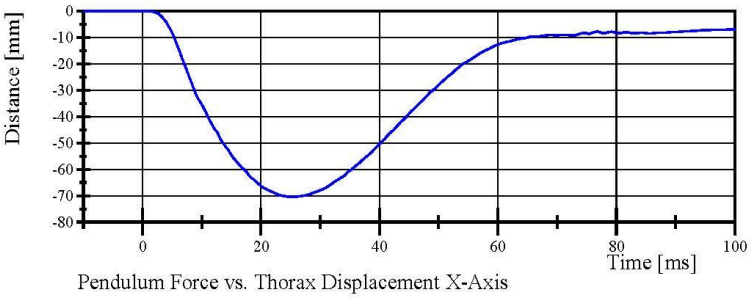
Filter Class: CFC_180
Max: 0.3 g at 61.7 ms
Min: -23.7 g at 20.5 ms

Pendulum Force



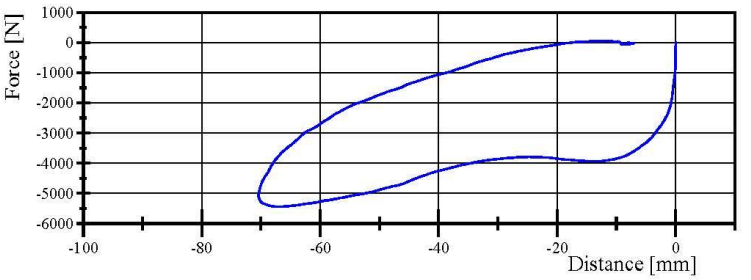
Filter Class: CFC_180
Max: 62.1 N at 61.7 ms
Min: -5,434.5 N at 20.5 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -9.1 ms
Min: -70.4 mm at 25.5 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 62.1 N at -11.6 mm
Min: -5,434.5 N at -67.0 mm

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

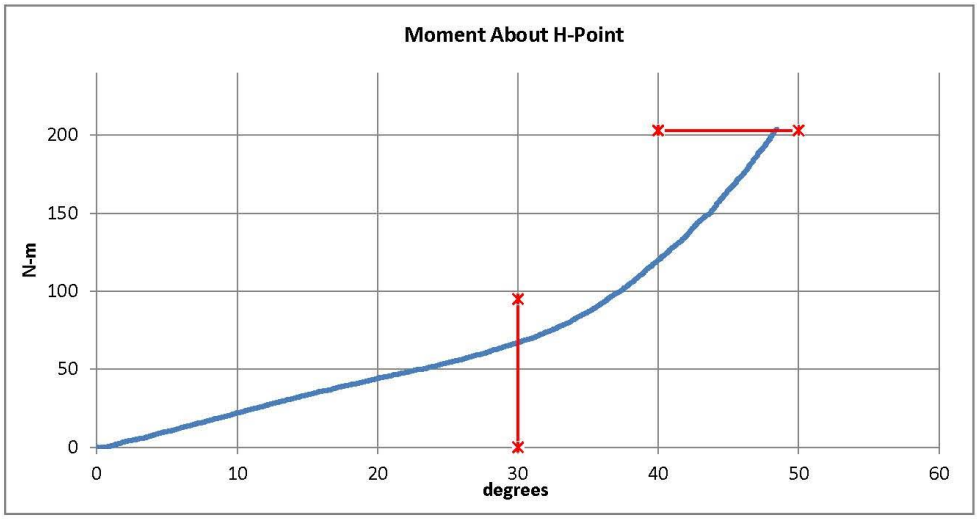
10.09.2017 14:05:31 424

Transportation Research Center Inc.

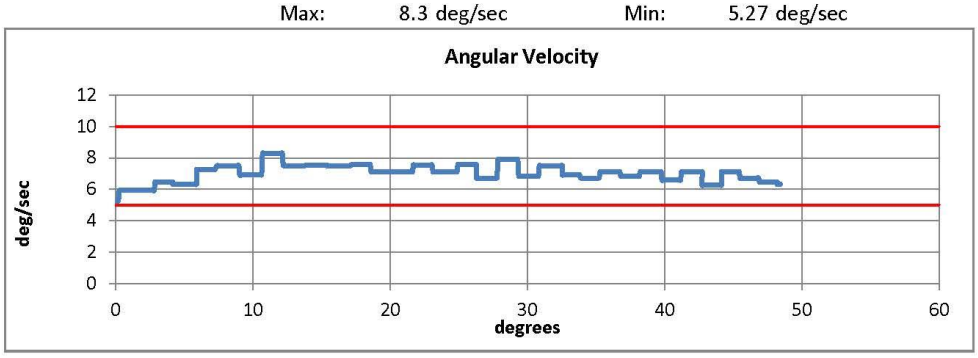
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	09-Oct-2017
Side Tested:	Left Hip	Time:	10:11
Test Number:	1	Comments:	

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.3	°C	Pass
Humidity	10	-	70	49	%	Pass
Moment at 30°	0	≤	94.9	67.27	N-m	Pass
Angle at 203 Nm	40	-	50	48.42	deg	Pass
Average Velocity	5	-	10	7.02	deg/sec	Pass



Max: 8.3 deg/sec Min: 5.27 deg/sec



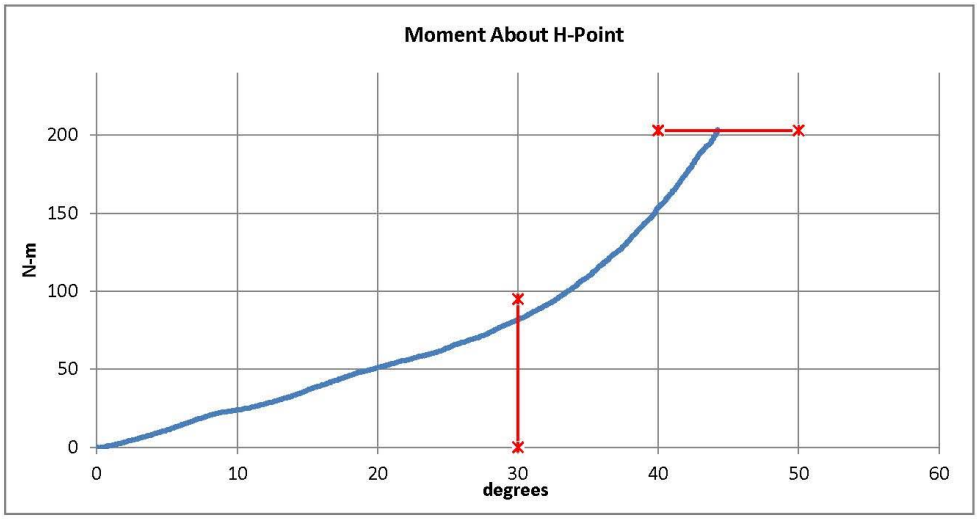
Comments:
Pelvis Skin S/N: N/A
Lumbar Spine S/N: 0551
Lumbar Cable S/N: N/A

Transportation Research Center Inc.

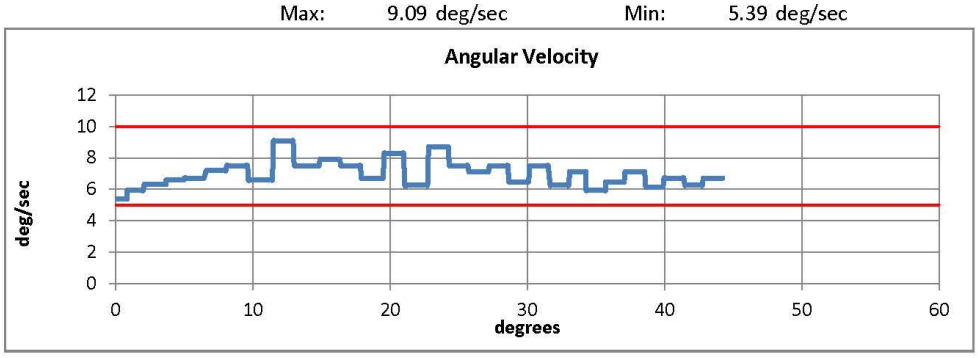
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	09-Oct-2017
Side Tested:	Right Hip	Time:	11:19
Test Number:	1	Comments:	

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21	°C	Pass
Humidity	10	-	70	49	%	Pass
Moment at 30°	0	≤	94.9	82.08	N-m	Pass
Angle at 203 Nm	40	-	50	44.23	deg	Pass
Average Velocity	5	-	10	6.99	deg/sec	Pass



Max: 9.09 deg/sec Min: 5.39 deg/sec



Comments:
Pelvis Skin S/N: N/A
Lumbar Spine S/N: 0551
Lumbar Cable S/N: N/A

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	20.8 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.102 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,558.70 N	Yes

Test meets specifications.

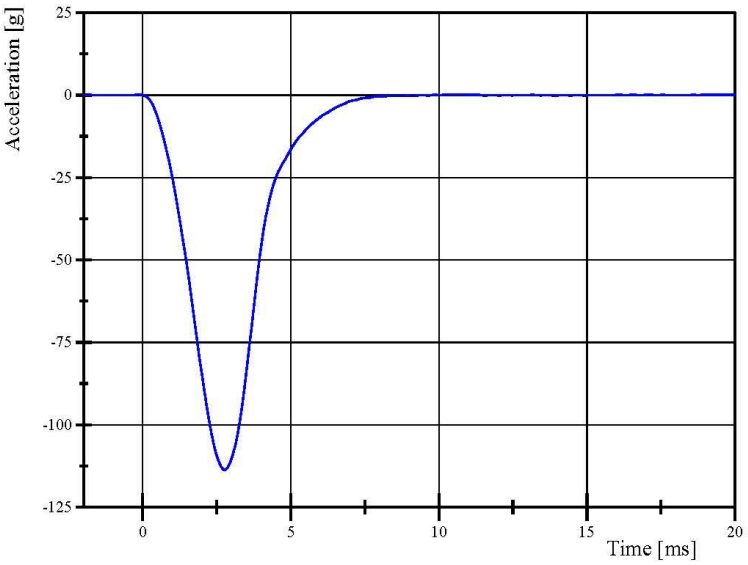
Condition: Used

Comments:
Knee Skin S/N: 2672
Knee Insert S/N: N/A

Transportation Research Center Inc.

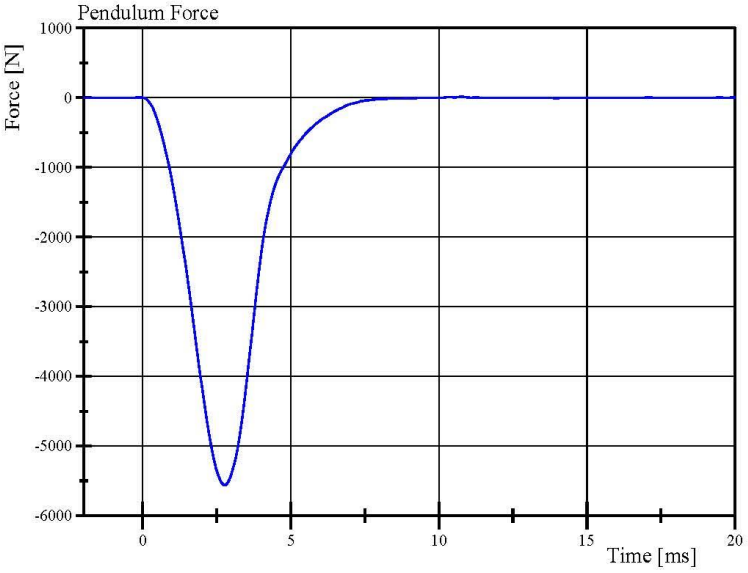
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.3 g at 10.8 ms
Min: -113.6 g at 2.8 ms

Pendulum Force



Filter Class: CFC_600
Max: 14.3 N at 10.8 ms
Min: -5,558.7 N at 2.8 ms

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

10.09.2017 10:20:41 1745

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.1 °C	Yes
Relative Humidity	10 - 70 %	49 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.101 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,430.46 N	Yes

Test meets specifications.

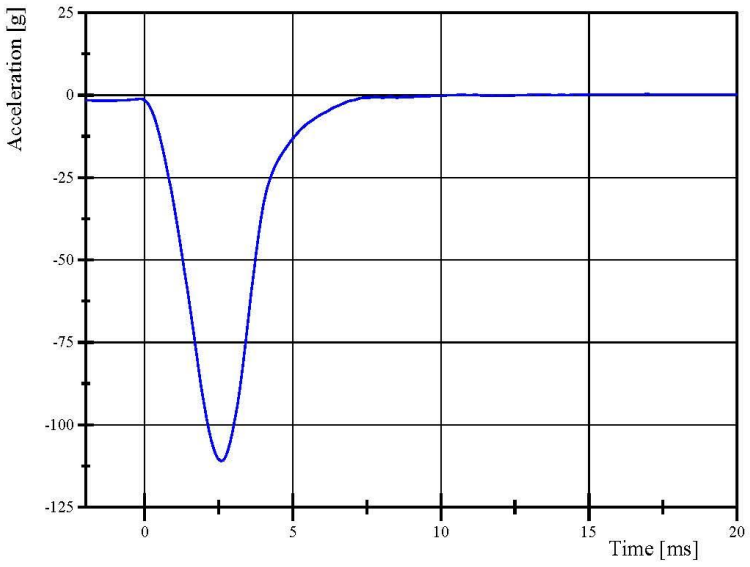
Condition: Used

Comments:
Knee skin S/N: 3131
Knee Insert S/N: N/A

Transportation Research Center Inc.

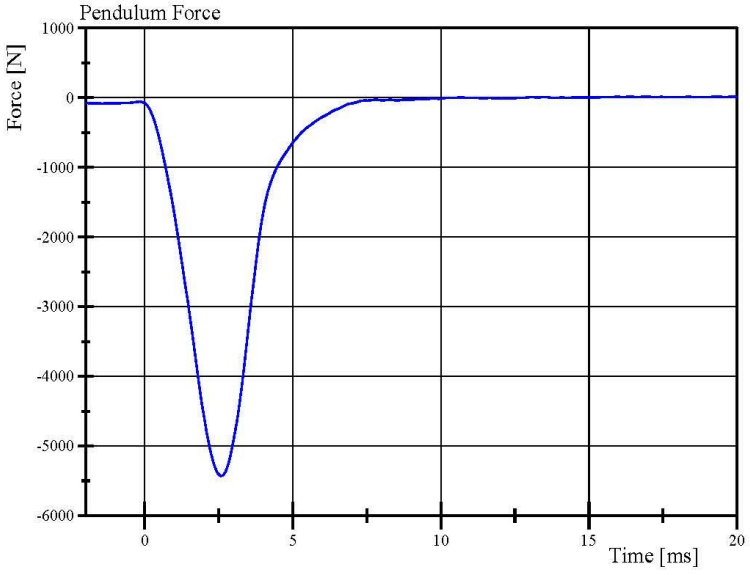
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 45-1
Test Date: 10/9/2017

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.3 g at 17.0 ms
Min: -111.0 g at 2.6 ms

Pendulum Force



Filter Class: CFC_600
Max: 15.0 N at 17.0 ms
Min: -5,430.5 N at 2.6 ms

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

10.09.2017 10:40:54 1748

Post-Test Calibration Sheets

Driver S/N 037

Transportation Research Center Inc.
572E HIII 50th Male Dummy
External Dimensions
Serial No. 037
Calibration No. 46

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	514	Yes
C	H-Point Height	83.8 - 88.9	87	Yes
D	H-Point From Seatback	134.6 - 139.7	138	Yes
E	Shoulder Pivot From Backline	83.8 - 94.0	91	Yes
F	Thigh Clearance	139.7 - 154.9	150	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	340	Yes
J	Elbow Rest Height	190.5 - 210.8	201	Yes
K	Buttock Knee Length	579.1 - 604.5	599	Yes
L	Popliteal Height	429.3 - 454.7	440	Yes
M	Knee Pivot Height	485.1 - 500.4	495	Yes
N	Buttock Popliteal Length	452.1 - 477.5	470	Yes
O	Chest Depth	213.4 - 228.6	226	Yes
P	Foot Length	251.5 - 266.7	264	Yes
V	Shoulder Breadth	421.6 - 436.9	430	Yes
W	Foot Breadth	91.4 - 106.7	97	Yes
Y	Chest Circumference	970.3 - 1000.8	990	Yes
Z	Waist Circumference	835.7 - 866.1	866	Yes
AA	Location For Chest Circumference	429.3 - 434.3	430	Yes
BB	Location For Waist Circumference	226.1 - 231.1	230	Yes

Comments:

Revised 8/10/12

Transportation Research Center Inc.

Front Head Drop
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/3/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.2 °C	Yes
Relative Humidity	10 - 70 %	37 %	Yes
Peak Head Resultant Acceleration	225 - 275 g	268.0 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	-5.7 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

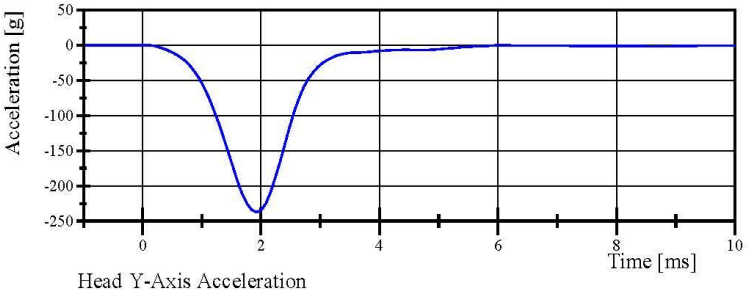
Condition: Used

Comments:
Head Skin S/N: N/A
Skull S/N: N/A

Transportation Research Center Inc.

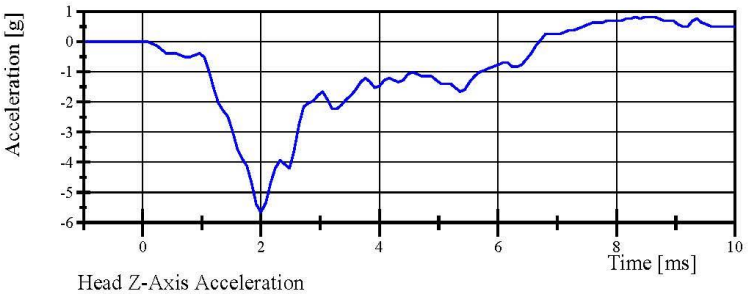
Front Head Drop
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/3/2017

Head X-Axis Acceleration



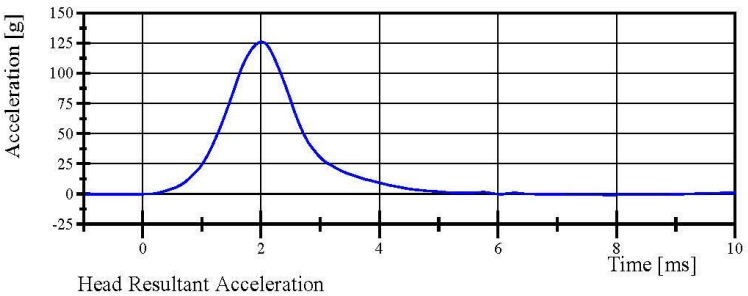
Filter Class: CFC_1000
Max: 0.1 g at 6.0 ms
Min: -237.4 g at 1.9 ms

Head Y-Axis Acceleration



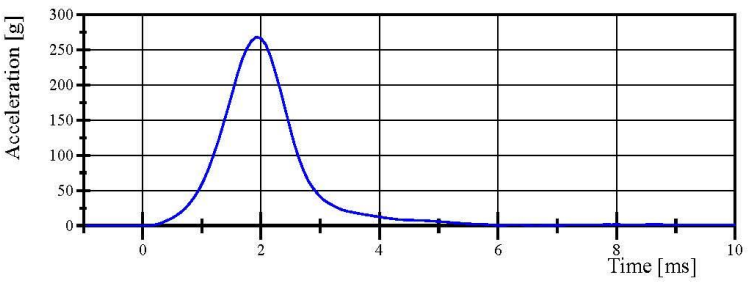
Filter Class: CFC_1000
Max: 0.8 g at 8.3 ms
Min: -5.7 g at 2.0 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 126.3 g at 2.0 ms
Min: -0.8 g at 7.8 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 268.0 g at 1.9 ms
Min: 0.0 g at -1.0 ms

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

12.03.2017 11:57:55 579

Transportation Research Center Inc.

Neck Flexion
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/3/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	6.927 m/s	Yes
Pendulum Acceleration Decay Crossing -5g	34 - 42 ms	34.9 ms	Yes
Pendulum Acceleration at 10ms	(-22.5) - (-27.5) g	-25.81 g	Yes
Pendulum Acceleration at 20ms	(-17.6) - (-22.6) g	-21.41 g	Yes
Pendulum Acceleration at 30ms	(-12.5) - (-18.5) g	-17.15 g	Yes
Pendulum Acceleration > 30ms	>= (-29.0) g	-17.15 g	Yes
Total Head D-Plane Rotation			
Peak	(-64) - (-78) °	-73.2 °	Yes
Time of Peak	57 - 64 ms	58.2 ms	Yes
Total Head D-Plane Rotation Decay to 0°	113 - 128 ms	120.6 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	88 - 108 N·m	97.2 N·m	Yes
Time of Peak	47 - 58 ms	48.8 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	97 - 107 ms	99.4 ms	Yes

Test meets specifications.

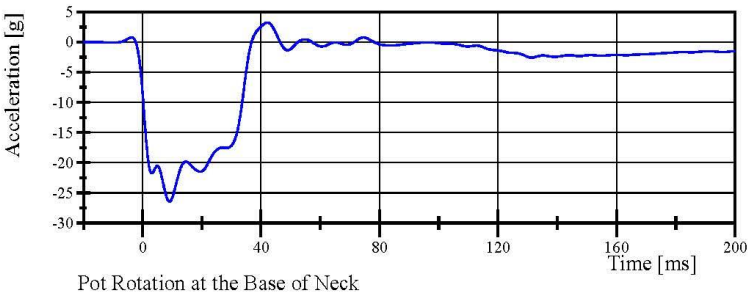
Condition: Used

Comments:
Neck S/N: 78051-336 #4727
Neck Cable S/N: N/A
Nodding Blocks:
Front S/N: N/A
Rear S/N: N/A

Transportation Research Center Inc.

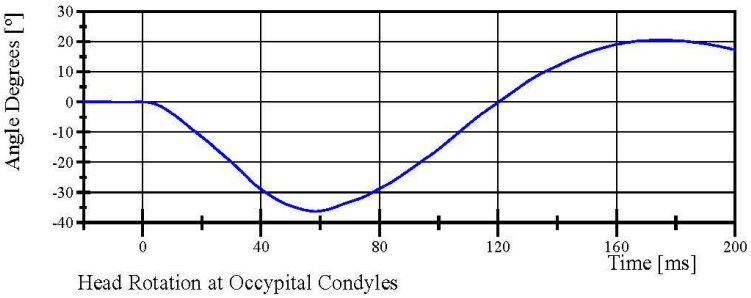
Neck Flexion
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/3/2017

Pendulum Acceleration



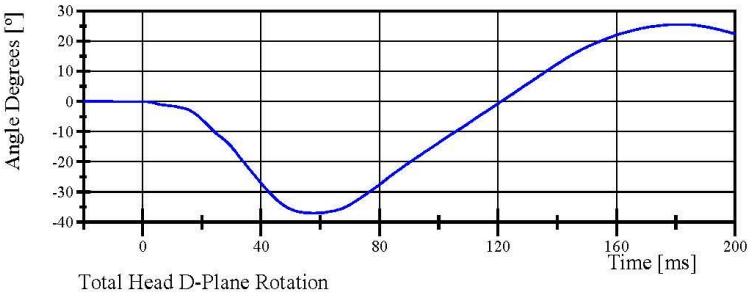
Filter Class: CFC_60
Max: 3.3 g at 42.2 ms
Min: -26.4 g at 9.1 ms

Pot Rotation at the Base of Neck



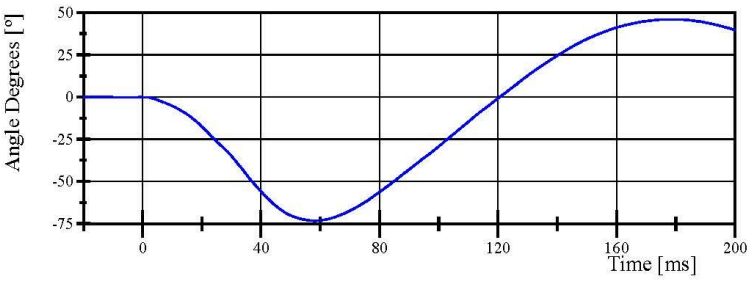
Filter Class: CFC_60
Max: 20.6 ° at 175.0 ms
Min: -36.2 ° at 58.3 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 25.5 ° at 181.9 ms
Min: -37.0 ° at 57.7 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 46.0 ° at 178.5 ms
Min: -73.2 ° at 58.2 ms

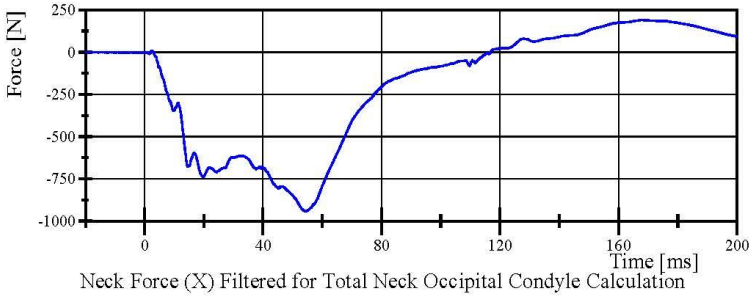
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

12.03.2017 09:01:16 3006

Transportation Research Center Inc.

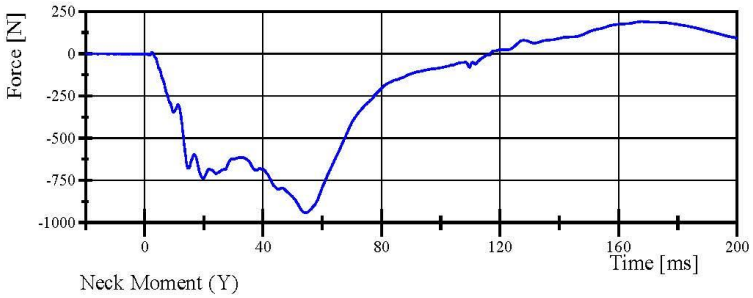
Neck Flexion
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/3/2017

Neck Force (X)



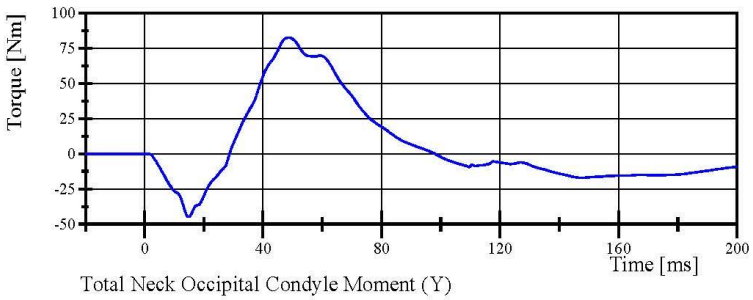
Filter Class: CFC_1000
Max: 191.7 N at 168.2 ms
Min: -940.7 N at 54.4 ms

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



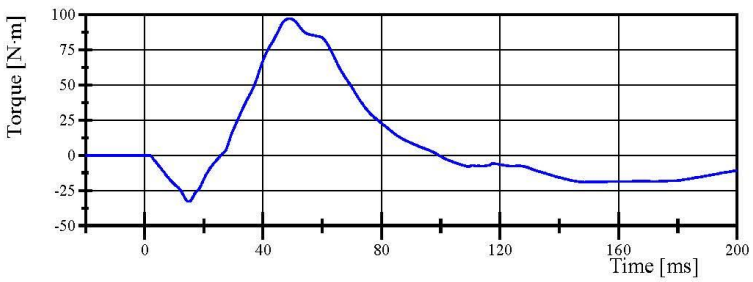
Filter Class: CFC_600
Max: 191.4 N at 168.2 ms
Min: -940.8 N at 54.5 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 82.6 Nm at 48.6 ms
Min: -44.8 Nm at 14.8 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 97.2 N·m at 48.8 ms
Min: -32.8 N·m at 14.9 ms

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

12.03.2017 09:01:17 3006

Transportation Research Center Inc.

Neck Extension
HIII 50th Serial No. 037 Certification No. 46-3
Test Date: 12/3/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Pendulum Velocity	(-5.95) - (-6.18) m/s	-5.974 m/s	Yes
Pendulum Acceleration Decay Crossing 5g	38 - 46 ms	41.1 ms	Yes
Pendulum Acceleration at 10ms	17.2 - 21.2 g	19.30 g	Yes
Pendulum Acceleration at 20ms	14.0 - 19.0 g	15.91 g	Yes
Pendulum Acceleration at 30ms	11.0 - 16.0 g	13.60 g	Yes
Pendulum Acceleration > 30ms	<= 22.0 g	13.68 g	Yes
Total Head D-Plane Rotation			
Peak	81 - 106 °	94.9 °	Yes
Time of Peak	72 - 82 ms	76.8 ms	Yes
Total Head D-Plane Rotation Decay to 0°	147 - 174 ms	160.1 ms	Yes
Total Neck Occipital Condyles Moment			
Peak	(-53) - (-80) N·m	-70.7 N·m	Yes
Time of Peak	65 - 79 ms	72.9 ms	Yes
Total Neck Occipital Condyles Moment Decay to 0 N·m	120 - 148 ms	147.5 ms	Yes

Test meets specifications.

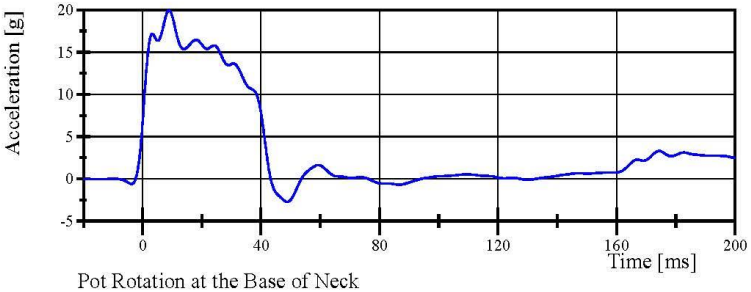
Condition: Used

Comments:
Neck S/N: 78051-336 #4727
Neck Cable S/N: N/A
Nodding Block S/N's:
Front : N/A
Rear: N/A

Transportation Research Center Inc.

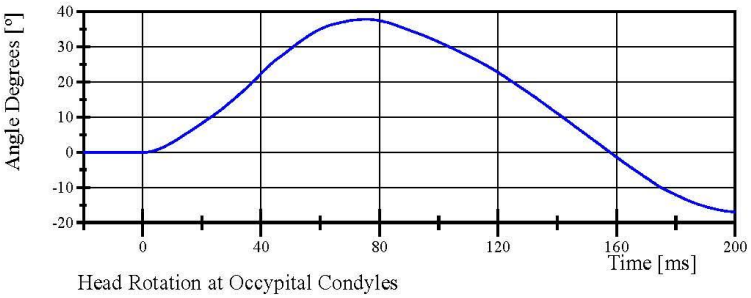
Neck Extension
HIII 50th Serial No. 037 Certification No. 46-3
Test Date: 12/3/2017

Pendulum Acceleration



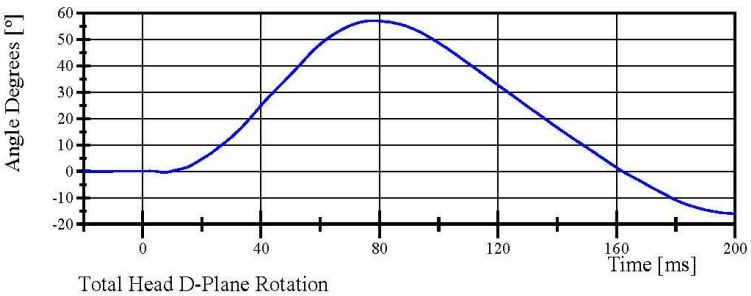
Filter Class: CFC_60
Max: 20.0 g at 9.0 ms
Min: -2.7 g at 48.9 ms

Pot Rotation at the Base of Neck



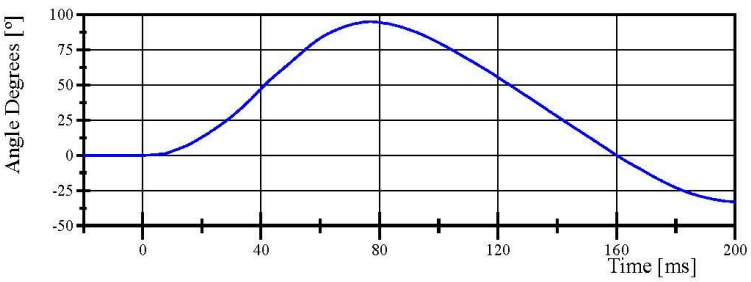
Filter Class: CFC_60
Max: 37.8 ° at 75.5 ms
Min: -17.0 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 57.1 ° at 77.8 ms
Min: -16.1 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 94.9 ° at 76.8 ms
Min: -33.0 ° at 200.0 ms

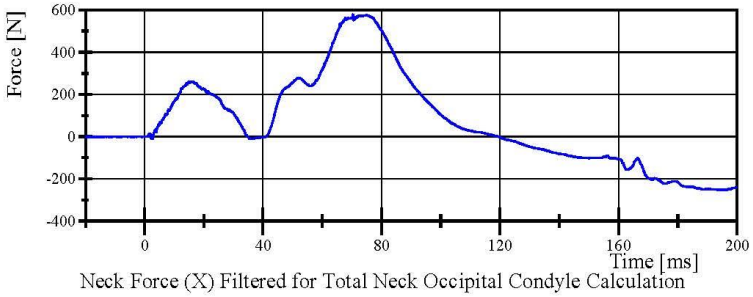
Specification Source: CFR49 Part 572 Subpart E
with Polarity in accordance with J211

12.03.2017 10:58:44 3099

Transportation Research Center Inc.

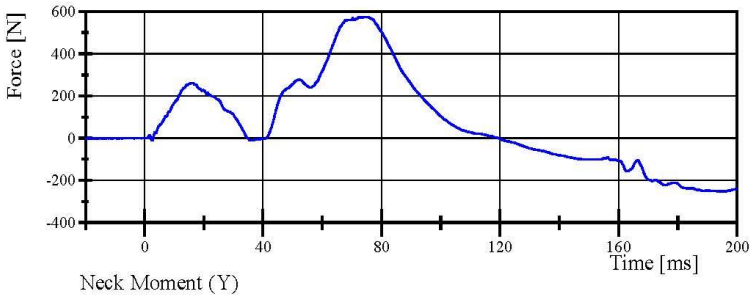
Neck Extension
HIII 50th Serial No. 037 Certification No. 46-3
Test Date: 12/3/2017

Neck Force (X)



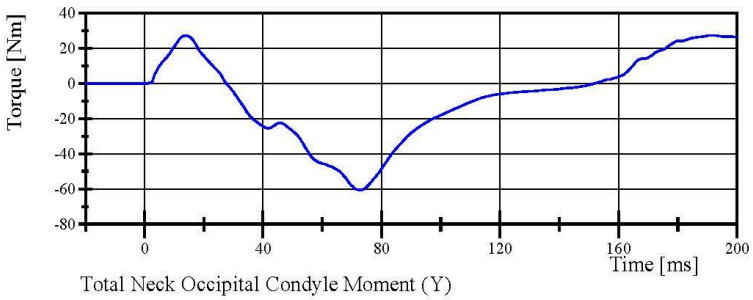
Filter Class: CFC_1000
Max: 579.0 N at 70.3 ms
Min: -252.7 N at 195.8 ms

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



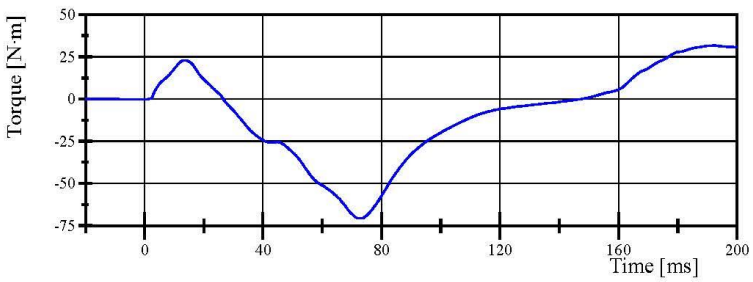
Filter Class: CFC_600
Max: 575.5 N at 74.8 ms
Min: -252.3 N at 195.8 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 27.3 Nm at 14.1 ms
Min: -60.5 Nm at 72.9 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 31.6 N·m at 192.5 ms
Min: -70.7 N·m at 72.9 ms

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

12.03.2017 10:58:45 3099

Transportation Research Center Inc.

Front Thorax
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/3/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.6 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.669 m/s	Yes
Probe Force Peak	(-5,160) - (-5,894) N	-5,577.0 N	Yes
Maximum Chest Compression	(-63.5) - (-72.6) mm	-64.92 mm	Yes
Internal Hysteresis	69 - 85 %	74.0 %	Yes

Test meets specifications.

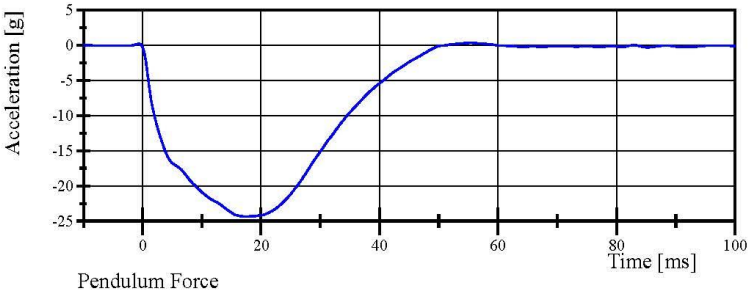
Condition: Used

Comments:
Jacket S/N:2565
Rib Module #1 S/N: 178051-35 H16550
Rib Module #2 S/N: 36 16526
Rib Module #3 S/N: 37 16543
Rib Module #4 S/N: 38 16538
Rib Module #5 S/N: 39 H16530
Rib Module #6 S/N: 40 16548
Rear Support S/N: N/A
Bib S/N: N/A
Sternum Plate S/N: N/A

Transportation Research Center Inc.

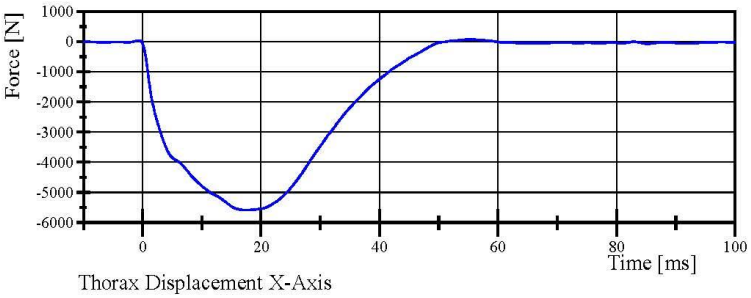
Front Thorax
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/3/2017

Pendulum Acceleration



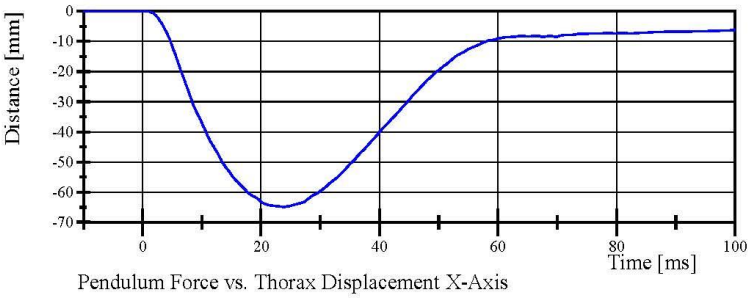
Filter Class: CFC_180
Max: 0.3 g at 55.4 ms
Min: -24.3 g at 17.4 ms

Pendulum Force



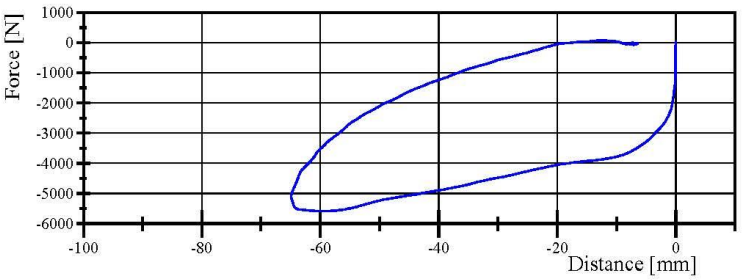
Filter Class: CFC_180
Max: 76.7 N at 55.4 ms
Min: -5,577.0 N at 17.4 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -9.0 ms
Min: -64.9 mm at 23.8 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 76.7 N at -12.3 mm
Min: -5,577.0 N at -59.3 mm

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

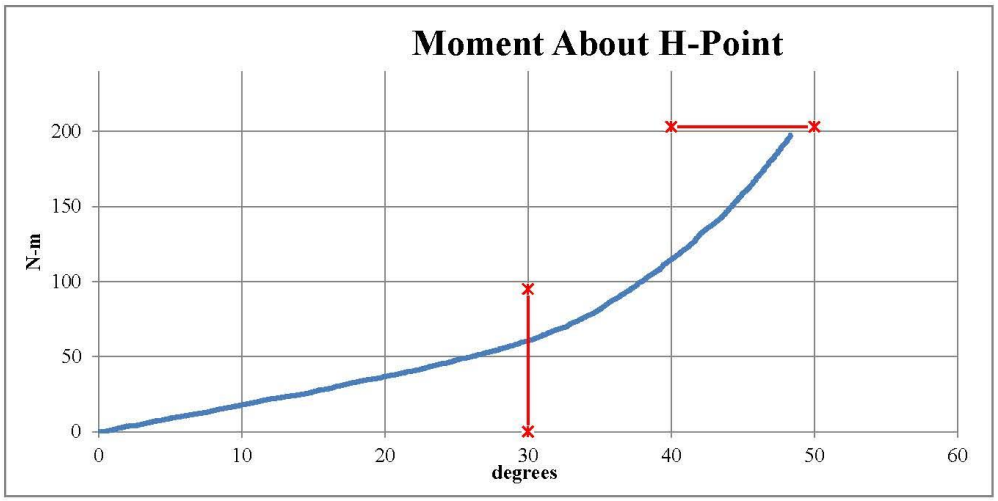
12.03.2017 07:39:07 358

Transportation Research Center Inc.

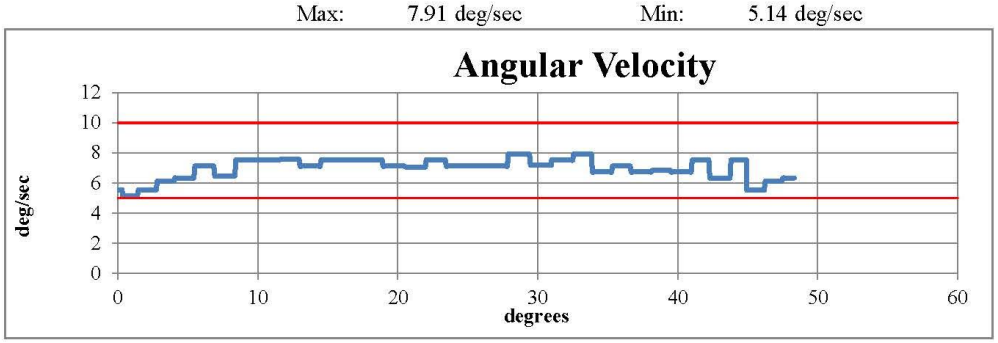
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	03-Dec-2017
Side Tested:	Left Hip	Time:	3:06
Test Number:	1	Comments:	

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.6	°C	Pass
Humidity	10	-	70	35	%	Pass
Moment at 30°	0	≤	94.9	60.67	N-m	Pass
Angle at 203 Nm	40	-	50	48.87	deg	Pass
Average Velocity	5	-	10	6.93	deg/sec	Pass



Max: 7.91 deg/sec Min: 5.14 deg/sec



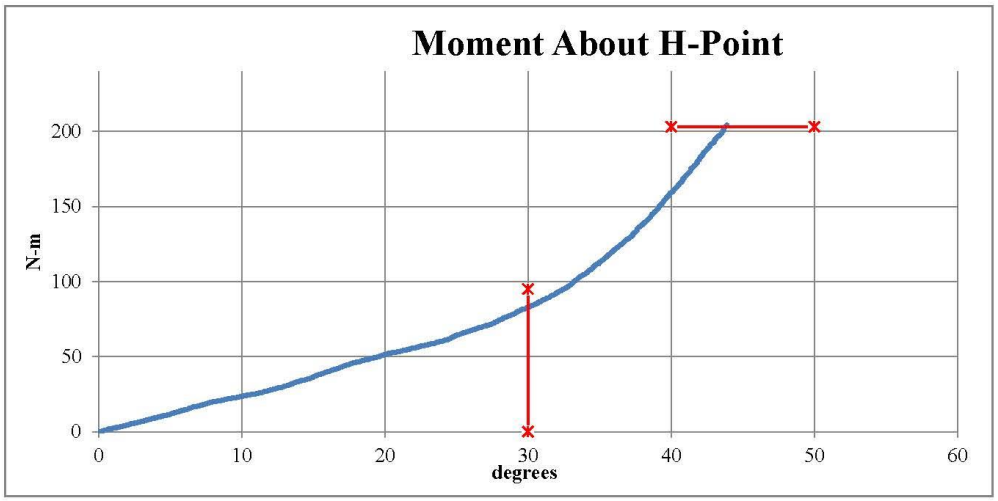
Comments:
Pelvis Skin S/N: N/A
Lumbar Spine S/N: 0551
Lumbar Cable S/N: N/A

Transportation Research Center Inc.

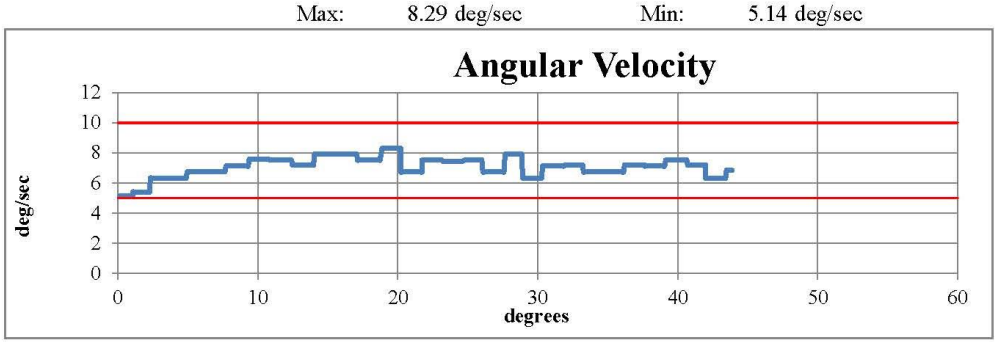
Hybrid III 50th Male Hip Range of Motion

Serial Number:	037	Date:	04-Dec-2017
Side Tested:	Right Hip	Time:	9:31
Test Number:	1	Comments:	

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.8	°C	Pass
Humidity	10	-	70	33	%	Pass
Moment at 30°	0	≤	94.9	82.87	N-m	Pass
Angle at 203 Nm	40	-	50	43.89	deg	Pass
Average Velocity	5	-	10	7.04	deg/sec	Pass



Max: 8.29 deg/sec Min: 5.14 deg/sec



Comments:
Pelvis Skin S/N: N/A
Lumbar Spine S/N: 0551
Lumbar Cable S/N: N/A

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 46-2
Test Date: 12/4/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.086 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,451.91 N	Yes

Test meets specifications.

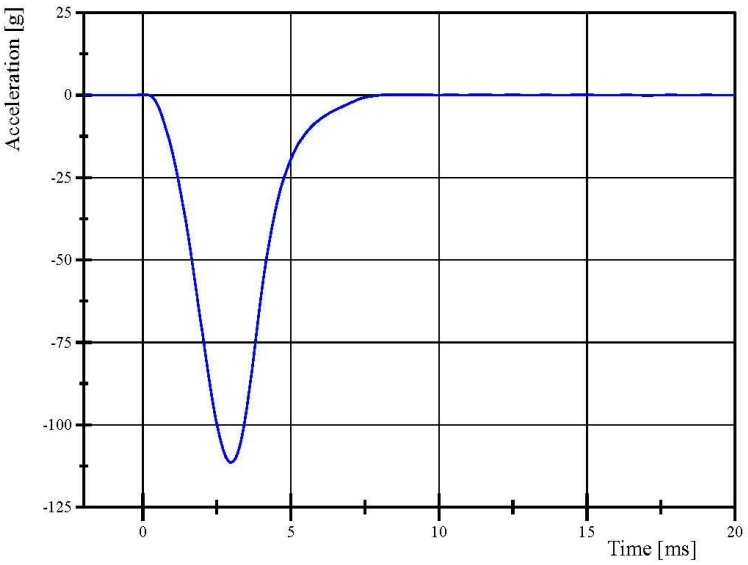
Condition: Used

Comments:
Knee Skin S/N: 2672
Knee Insert S/N: N/A

Transportation Research Center Inc.

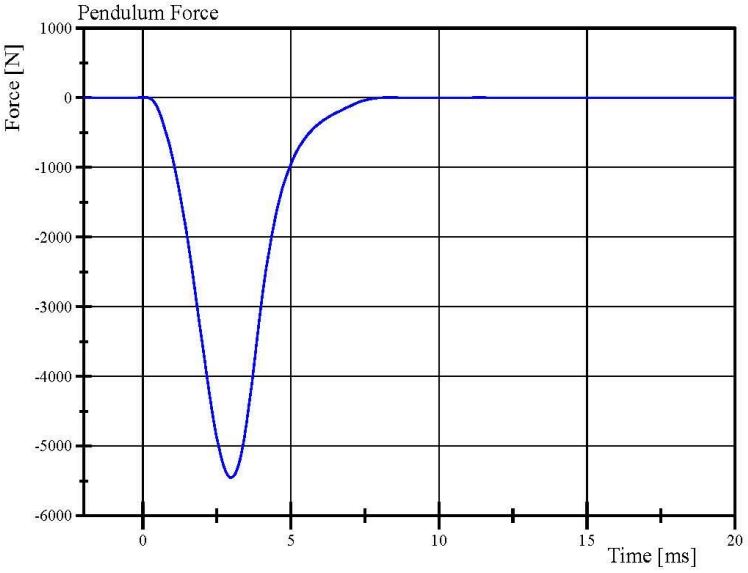
Left Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 46-2
Test Date: 12/4/2017

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at 0.1 ms
Min: -111.4 g at 3.0 ms

Pendulum Force



Filter Class: CFC_600
Max: 8.2 N at 0.1 ms
Min: -5,451.9 N at 3.0 ms

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

12.04.2017 08:29:32 1727

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/4/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.091 m/s	Yes
Peak Femur Force	(-4,715.2) - (-5,782.6) N	-5,507.89 N	Yes

Test meets specifications.

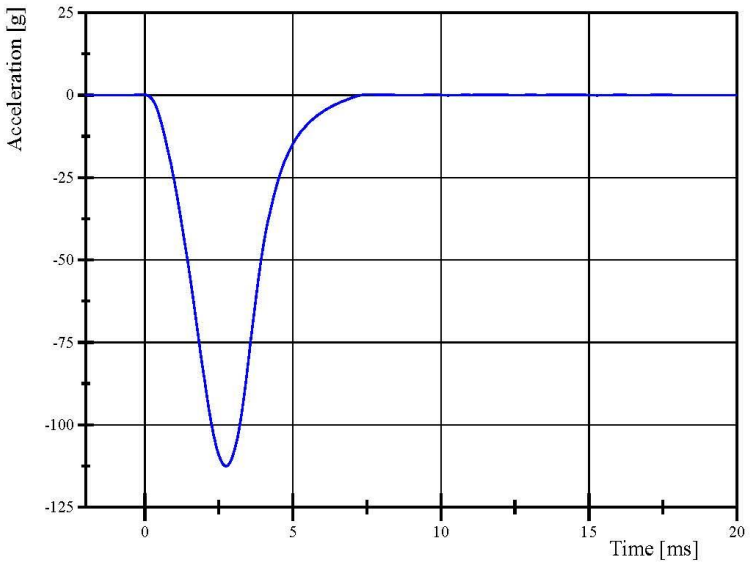
Condition: Used

Comments:
Knee skin S/N: 3131
Knee Insert S/N: N/A

Transportation Research Center Inc.

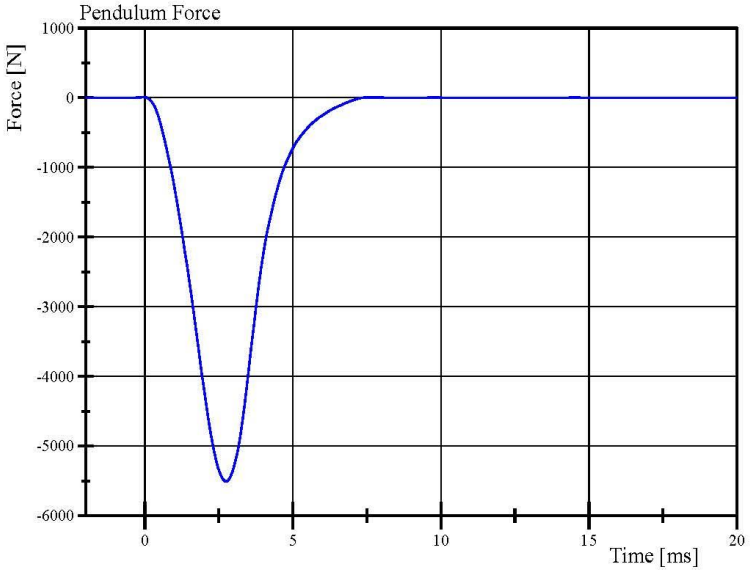
Right Knee Femur Response Test
HIII 50th Serial No. 037 Certification No. 46-1
Test Date: 12/4/2017

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.2 g at -0.1 ms
Min: -112.6 g at 2.7 ms

Pendulum Force



Filter Class: CFC_600
Max: 9.7 N at -0.1 ms
Min: -5,507.9 N at 2.7 ms

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

12.04.2017 08:35:51 1726

Pre-Test Calibration Sheets

Front Passenger S/N 070

Transportation Research Center Inc.
572O HIII 5th Female Dummy
External Dimensions
Serial No. 070 Calibration No. 31

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	781	Yes
B	Shoulder Pivot Height	431.8 - 457.2	445	Yes
C	Hip Pivot Height	81.3 - 86.3	82	Yes
D	Hip Pivot from Backline	144.8 - 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	79	Yes
F	Thigh Clearance	119.4 - 134.6	126	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	250	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	282	Yes
J	Elbow Rest Height	182.8 - 203.2	185	Yes
K	Buttock Knee Length	520.7 - 546.1	538	Yes
L	Popliteal Height	355.6 - 376.0	367	Yes
M	Knee Pivot Height	393.7 - 419.1	403	Yes
N	Buttock Popliteal Length	414.0 - 439.4	430	Yes
O	Chest Depth without Jacket	175.3 - 190.5	180	Yes
P	Foot Length	218.5 - 233.7	222	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	140	Yes
T	Head Depth	177.8 - 188.0	180	Yes
U	Hip Breadth	299.7 - 314.9	305	Yes
V	Shoulder Breadth	350.5 - 365.7	360	Yes
W	Foot Breadth	78.8 - 94.0	85	Yes
X	Head Circumference	528.3 - 548.7	538	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	869	Yes
Z	Waist Circumference	759.5 - 789.9	779	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	355	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	164	Yes

Revised 8/10/2012

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. 070 Certification No. 31-4
Test Date: 11/13/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.4 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	275.7 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	3.5 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

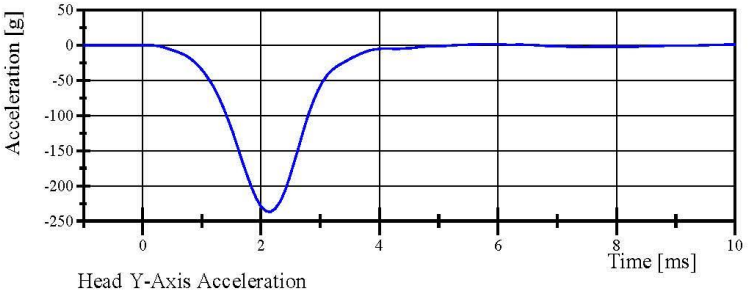
Condition: Used

Comments:
Head skin S/N:06211
Skull S/N: 88105/101C 05 010218

Transportation Research Center Inc.

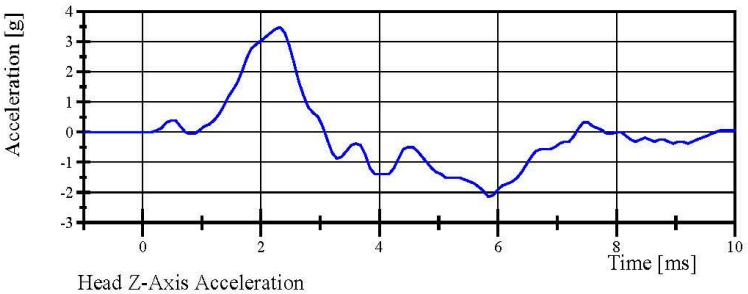
Front Head Drop
HIII 5th Serial No. 070 Certification No. 31-4
Test Date: 11/13/2017

Head X-Axis Acceleration



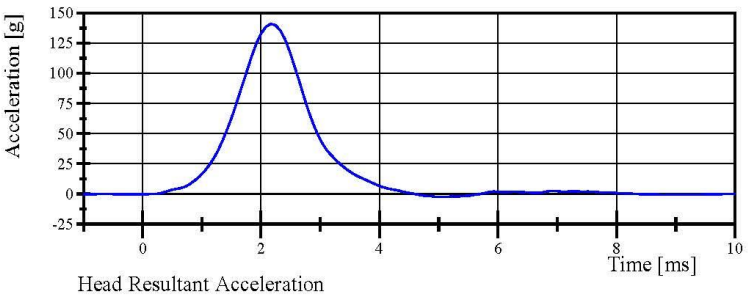
Filter Class: CFC_1000
Max: 1.8 g at 5.8 ms
Min: -236.8 g at 2.2 ms

Head Y-Axis Acceleration



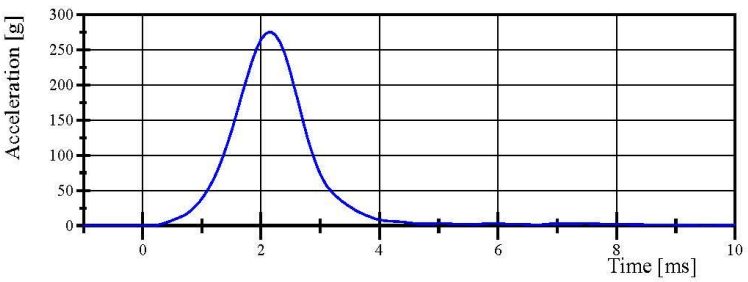
Filter Class: CFC_1000
Max: 3.5 g at 2.3 ms
Min: -2.1 g at 5.8 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 141.0 g at 2.2 ms
Min: -2.5 g at 5.0 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 275.7 g at 2.2 ms
Min: 0.0 g at -1.0 ms

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

11.13.2017 07:50:18 578

Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.014 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.19 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.24 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.08 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-80.1 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	75.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	88.0 ms	Yes

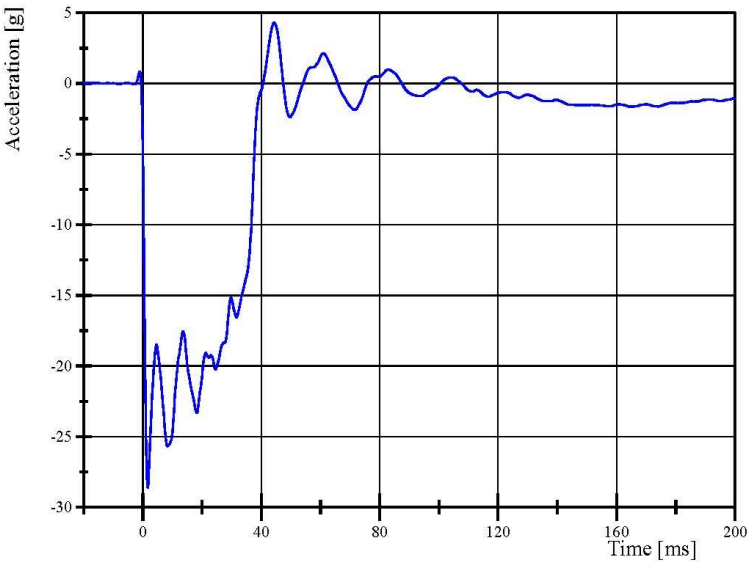
Test meets specifications.

Condition: Used
Comments:
Neck S/N: DJ2788
Neck Cable: S/N: N/A
Nodding Blocks:
Front S/N: 85-DI7305
Rear S/N: 85-DI7105

Transportation Research Center Inc.

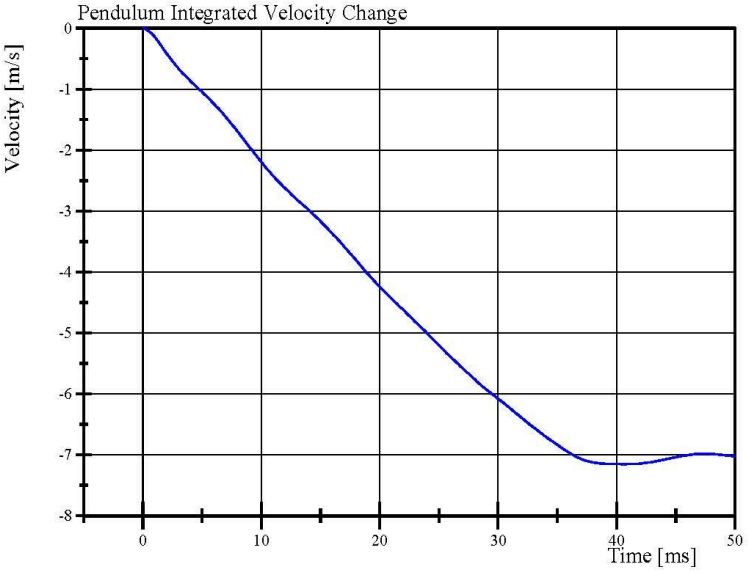
Neck Flexion
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/9/2017

Pendulum Acceleration



Filter Class: CFC_180
Max: 4.3 g at 44.4 ms
Min: -28.6 g at 1.7 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.2 m/s at 40.6 ms

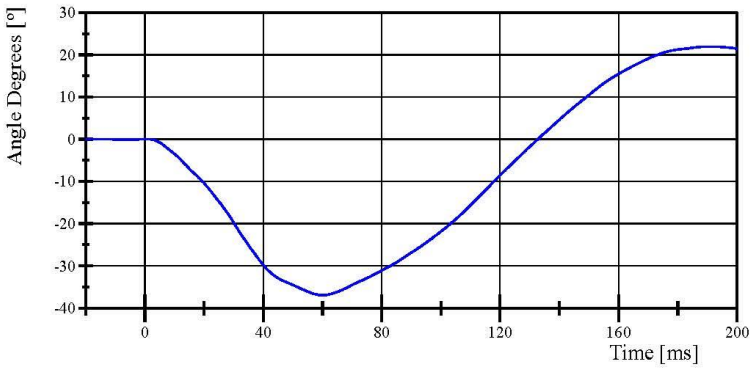
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

11.09.2017 08:15:39 1859

Transportation Research Center Inc.

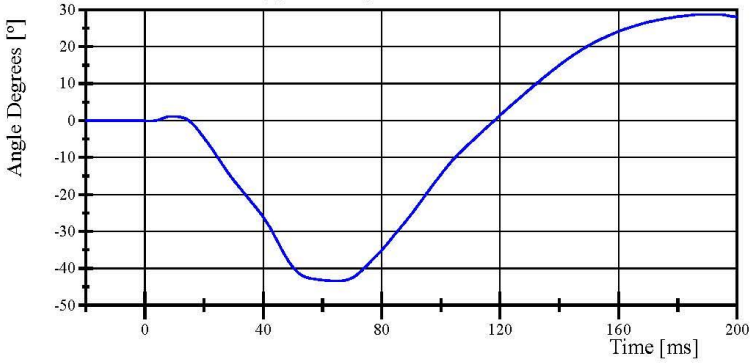
Neck Flexion
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/9/2017

Pot Rotation at the Base of Neck



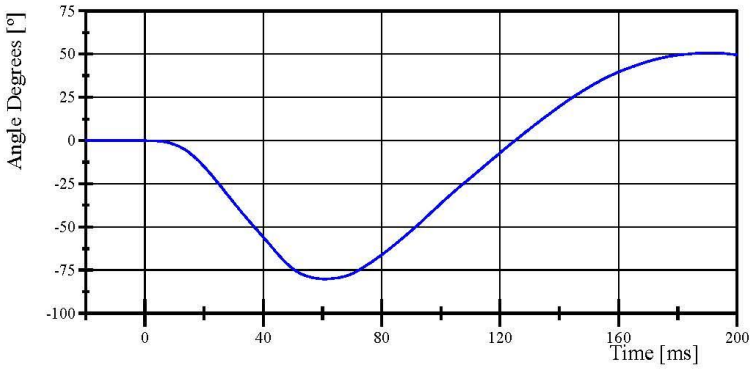
Filter Class: CFC_60
Max: 21.9 ° at 191.1 ms
Min: -36.9 ° at 60.1 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 28.8 ° at 191.9 ms
Min: -43.4 ° at 65.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 50.7 ° at 191.4 ms
Min: -80.1 ° at 60.8 ms

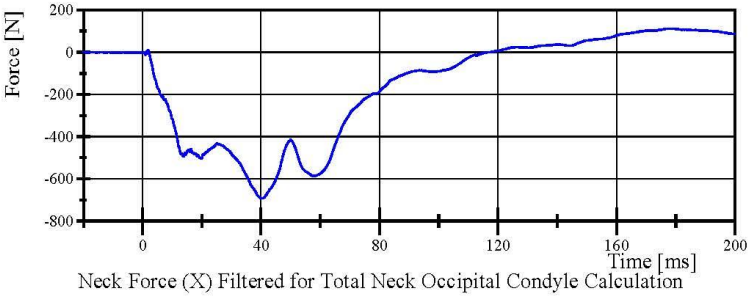
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

11.09.2017 08:15:40 1859

Transportation Research Center Inc.

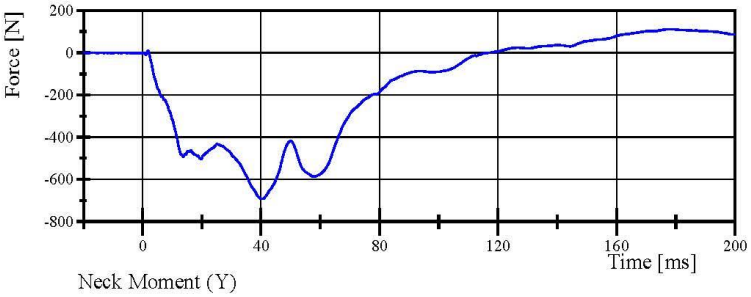
Neck Flexion
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/9/2017

Neck Force (X)



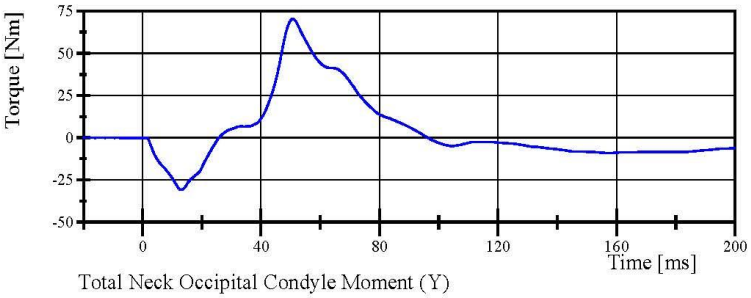
Filter Class: CFC_1000
Max: 112.2 N at 176.8 ms
Min: -691.1 N at 40.1 ms

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



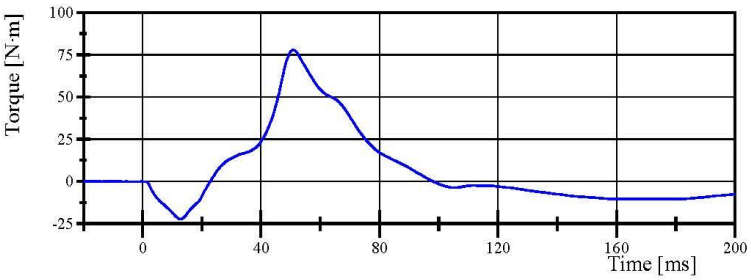
Filter Class: CFC_600
Max: 111.6 N at 176.8 ms
Min: -690.9 N at 40.5 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 70.4 Nm at 50.7 ms
Min: -30.8 Nm at 13.0 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 78.0 N·m at 50.8 ms
Min: -22.3 N·m at 12.8 ms

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

11.09.2017 08:15:41 1859

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/9/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.076 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.88 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	5.33 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	110.9 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-54.7 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	103.2 ms	Yes

Test meets specifications.

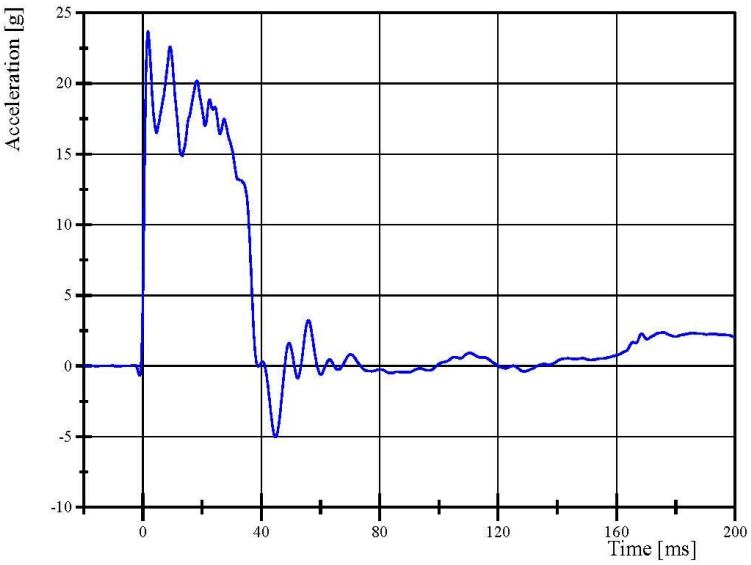
Condition: Used

Comments:
Neck S/N: DJ2788
Neck Cable: S/N: N/A
Nodding Blocks:
Front S/N: 85-DI7305
Rear S/N: 85-DI7105

Transportation Research Center Inc.

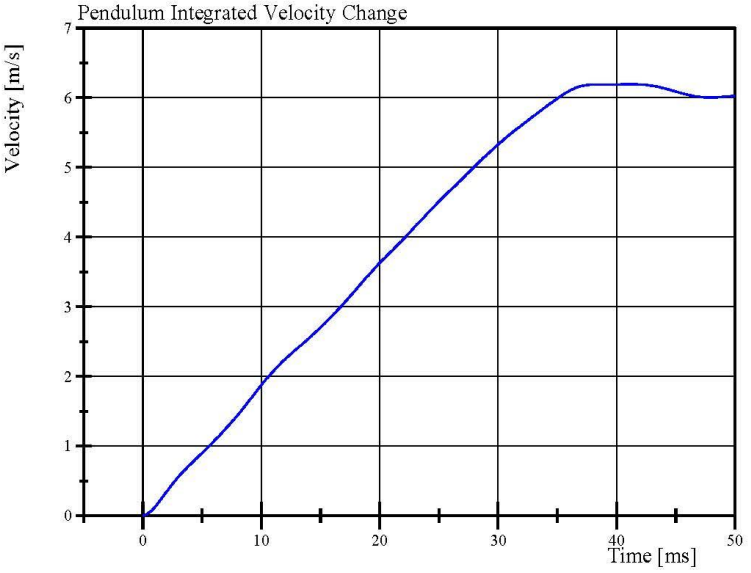
Neck Extension
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/9/2017

Pendulum Acceleration



Filter Class: CFC_180
Max: 23.7 g at 1.8 ms
Min: -5.0 g at 44.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 6.2 m/s at 41.2 ms
Min: 0.0 m/s at 0.0 ms

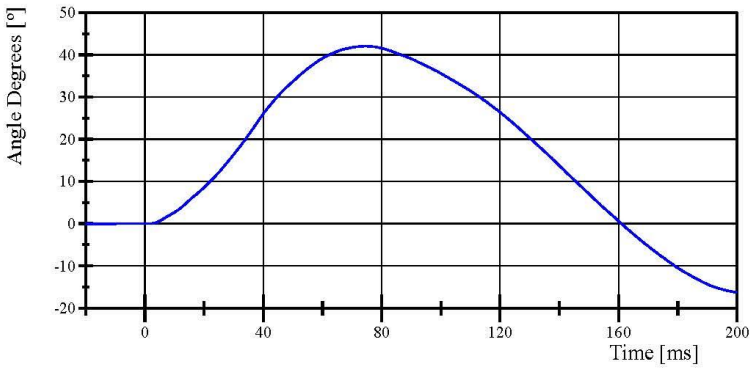
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

11.09.2017 08:41:21 2001

Transportation Research Center Inc.

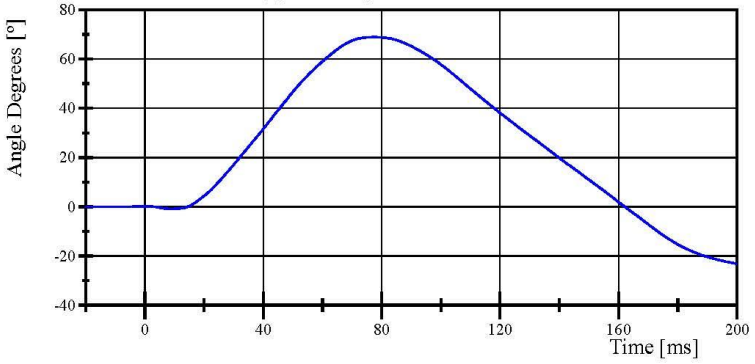
Neck Extension
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/9/2017

Pot Rotation at the Base of Neck



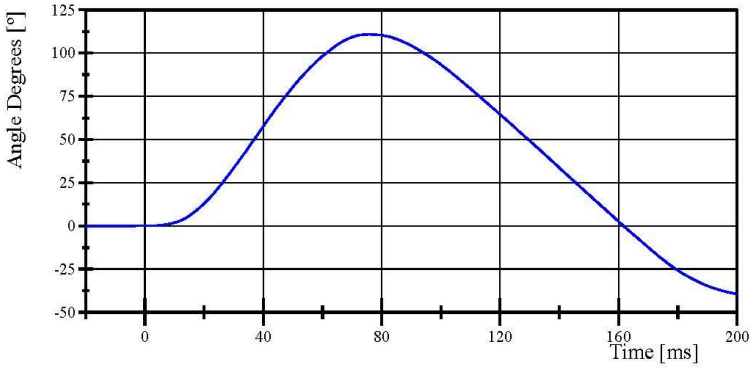
Filter Class: CFC_60
Max: 42.1 ° at 74.6 ms
Min: -16.3 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 68.9 ° at 77.6 ms
Min: -23.1 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 110.9 ° at 75.9 ms
Min: -39.4 ° at 200.0 ms

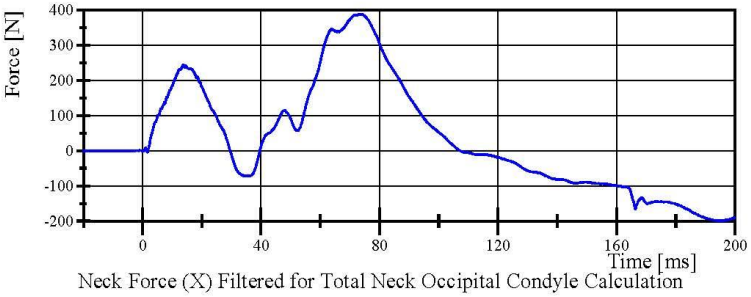
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

11.09.2017 08:41:22 2001

Transportation Research Center Inc.

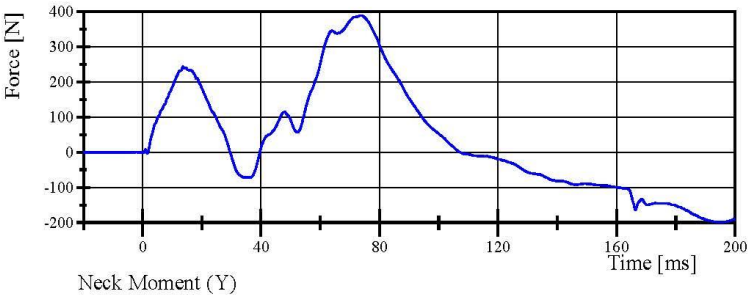
Neck Extension
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/9/2017

Neck Force (X)



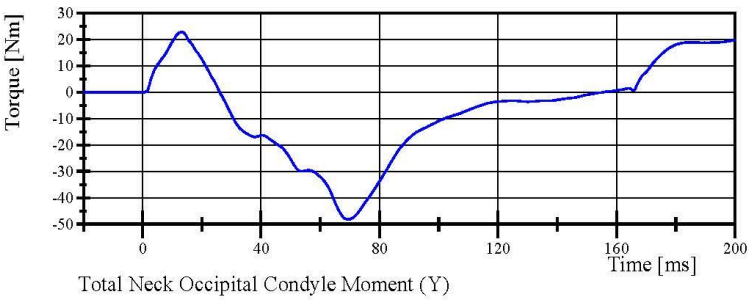
Filter Class: CFC_1000
Max: 389.1 N at 73.4 ms
Min: -199.2 N at 195.0 ms

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



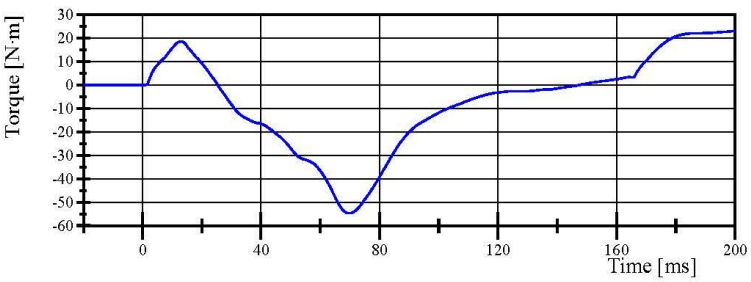
Filter Class: CFC_600
Max: 388.6 N at 73.9 ms
Min: -198.9 N at 195.5 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 22.8 Nm at 13.5 ms
Min: -48.2 Nm at 69.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 23.1 N·m at 200.0 ms
Min: -54.7 N·m at 69.8 ms

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

11.09.2017 08:41:23 2001

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/14/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.8 °C	Yes
Relative Humidity	10 - 70 %	33 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.727 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-3,996.9 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,043.8 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-51.2 mm	Yes
Internal Hysteresis	69 - 85 %	72.6 %	Yes

Test meets specifications.

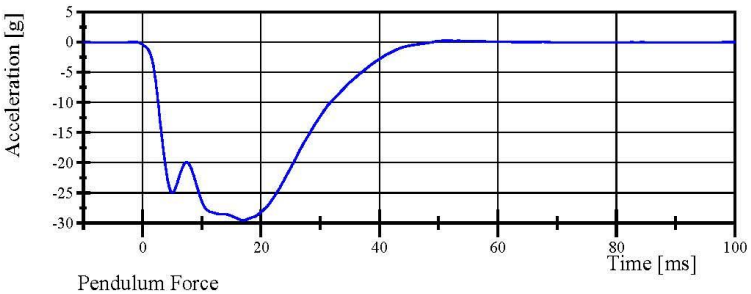
Condition: Used

Comments:

Transportation Research Center Inc.

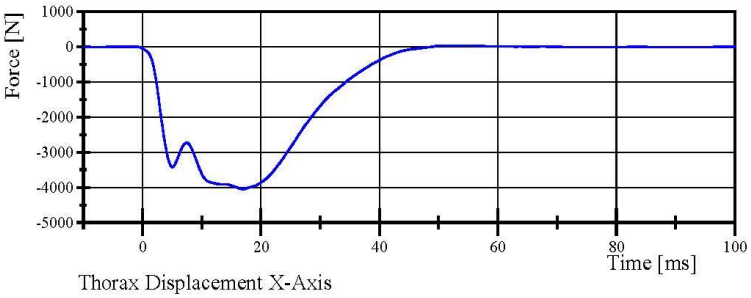
Front Thorax
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/14/2017

Pendulum Acceleration



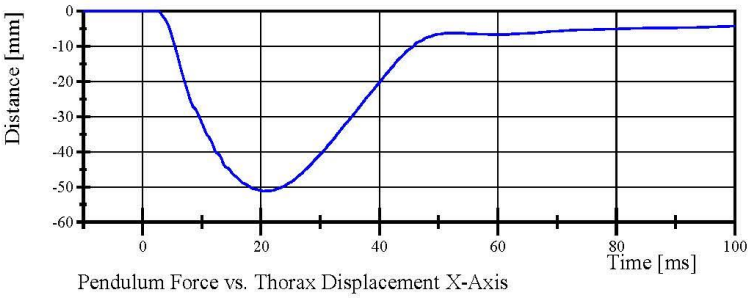
Filter Class: CFC_180
Max: 0.3 g at 51.4 ms
Min: -29.5 g at 17.0 ms

Pendulum Force



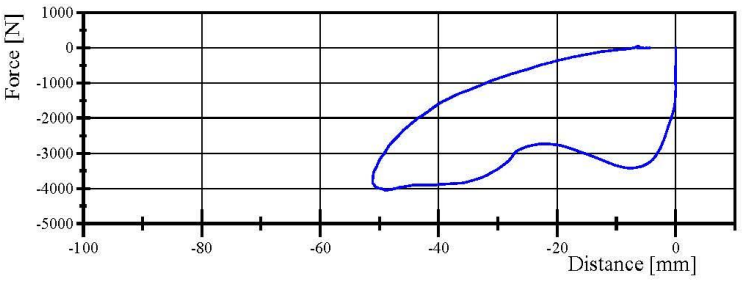
Filter Class: CFC_180
Max: 39.8 N at 51.4 ms
Min: -4,043.8 N at 17.0 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -9.5 ms
Min: -51.2 mm at 20.5 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 39.8 N at -6.3 mm
Min: -4,043.8 N at -48.9 mm

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

11.14.2017 07:55:31 404

Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/8/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 ºC	21.9 ºC	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.098 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,678.0 N	Yes

Test meets specifications.

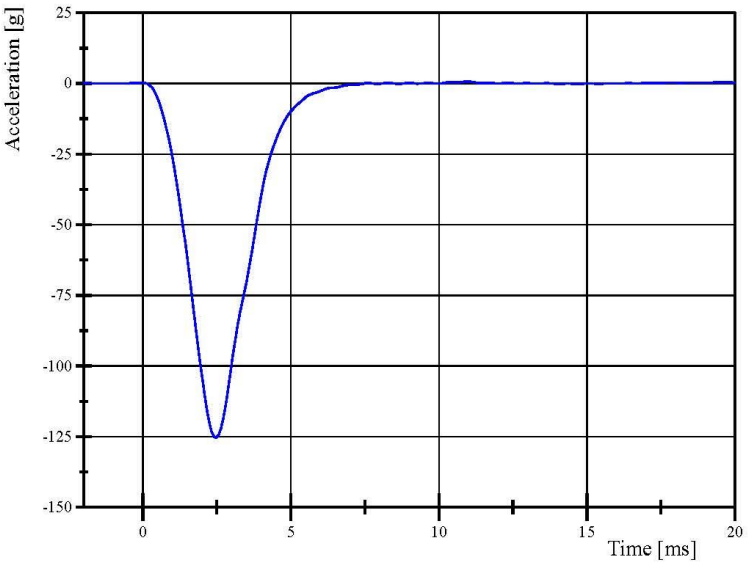
Condition: Used

Comments:
Knee Skin S/N: 0505856
Knee Insert S/N: N/A

Transportation Research Center Inc.

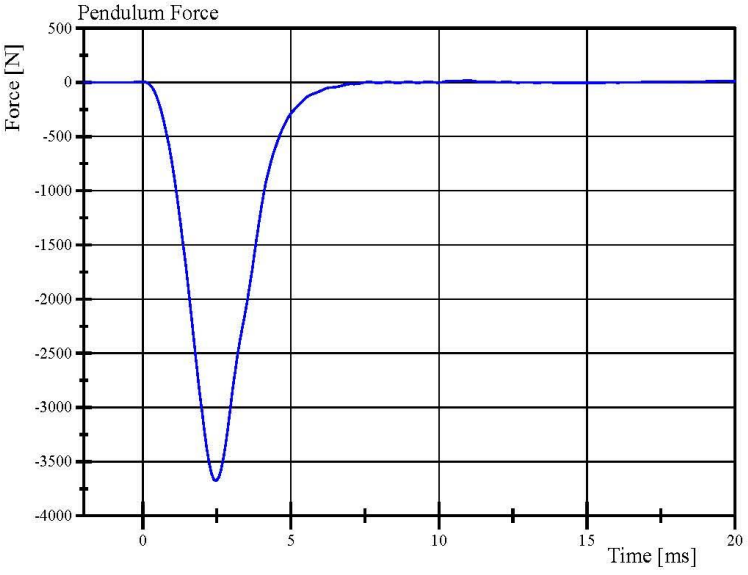
Left Knee Femur Response Test
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/8/2017

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.6 g at 11.0 ms
Min: -125.4 g at 2.5 ms

Pendulum Force



Filter Class: CFC_600
Max: 18.2 N at 11.0 ms
Min: -3,678.0 N at 2.5 ms

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

11.08.2017 08:41:22 1865

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/8/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 ºC	21.6 ºC	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	2.08 - 2.13 m/s	2.082 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,712.8 N	Yes

Test meets specifications.

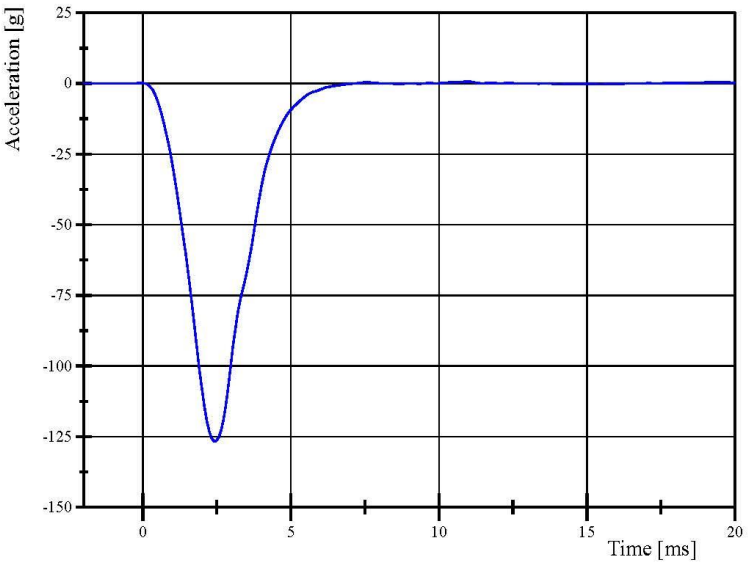
Condition: Used

Comments:
Knee Skin S/N: 0505269
Knee Insert S/N: N/A

Transportation Research Center Inc.

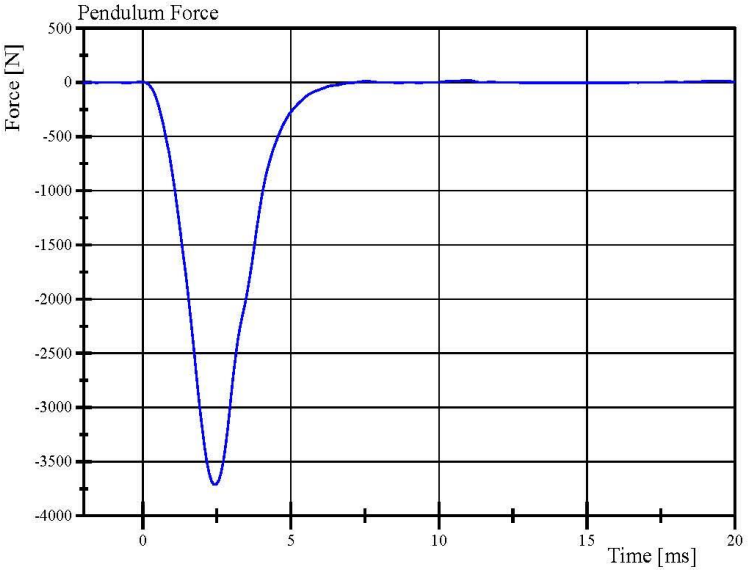
Right Knee Femur Response Test
HIII 5th Serial No. 070 Certification No. 31-1
Test Date: 11/8/2017

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.7 g at 11.0 ms
Min: -126.6 g at 2.4 ms

Pendulum Force



Filter Class: CFC_600
Max: 19.2 N at 11.0 ms
Min: -3,712.8 N at 2.4 ms

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

11.08.2017 08:52:10 1871

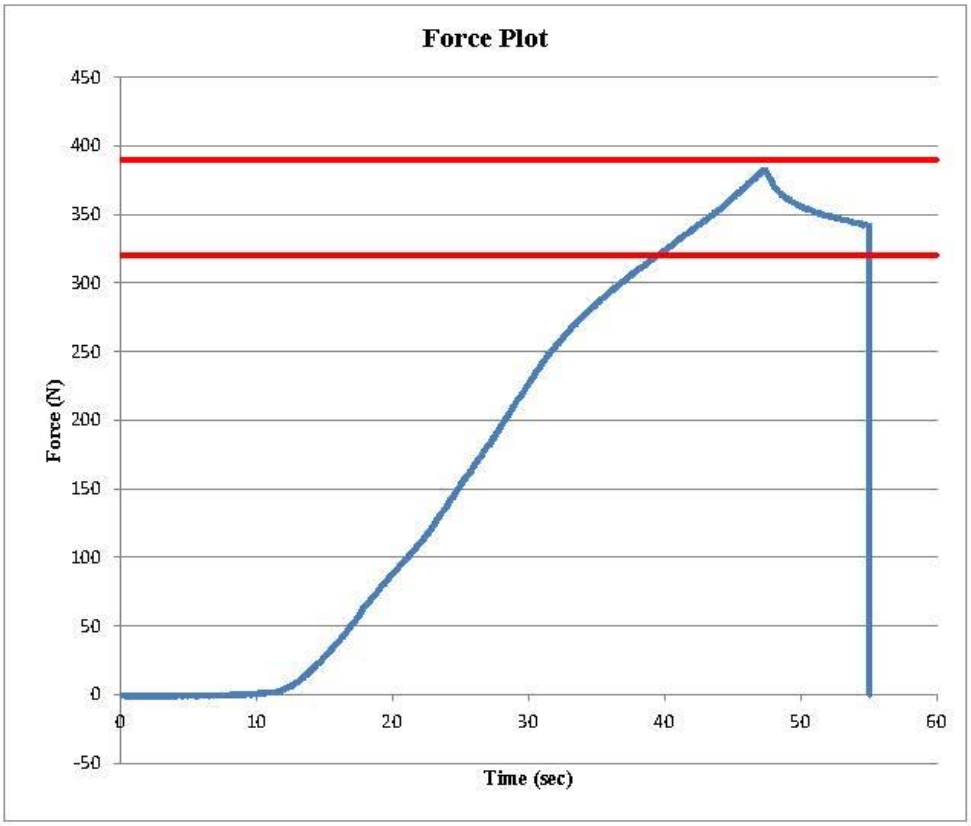
Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

NHTSA

Serial Number:	070	Date:	11/13/2017
Test Number:	01	Time:	14:43
Comments:			

TEST PARAMETER	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.8	°C	Pass
Humidity	10	-	70	35	%	Pass
Average Angular Velocity	0.5	-	1.5	0.85	deg/sec	Pass
Initial Angle	0	-	20	15.39	deg	Pass
Peak Force at 45.23°	320	-	390	382.21	N	Pass
Final Angle	-8	-	8	3.92	deg	Pass



Post-Test Calibration Sheets

Front Passenger S/N 070

Transportation Research Center Inc.
572O HIII 5th Female Dummy
External Dimensions
Serial No. 070 Calibration No. 32

Symbol	Description	Specification	Results	Pass
		mm	mm	
A	Total Sitting Height	774.7 - 800.1	781	Yes
B	Shoulder Pivot Height	431.8 - 457.2	444	Yes
C	Hip Pivot Height	81.3 - 86.3	82	Yes
D	Hip Pivot from Backline	144.8 - 149.8	146	Yes
E	Shoulder Pivot from Backline	68.6 - 83.8	81	Yes
F	Thigh Clearance	119.4 - 134.6	126	Yes
G	Back of Elbow to Wrist Pivot	243.9 - 259.1	251	Yes
H	Head Back to Backline	43.2 - 48.2	45	Yes
I	Shoulder to Elbow Length	276.8 - 297.2	282	Yes
J	Elbow Rest Height	182.8 - 203.2	185	Yes
K	Buttock Knee Length	520.7 - 546.1	537	Yes
L	Popliteal Height	355.6 - 376.0	364	Yes
M	Knee Pivot Height	393.7 - 419.1	403	Yes
N	Buttock Popliteal Length	414.0 - 439.4	430	Yes
O	Chest Depth without Jacket	175.3 - 190.5	181	Yes
P	Foot Length	218.5 - 233.7	222	Yes
R	Buttock to Knee Pivot Length	457.2 - 482.6	473	Yes
S	Head Breadth	137.1 - 147.3	139	Yes
T	Head Depth	177.8 - 188.0	180	Yes
U	Hip Breadth	299.7 - 314.9	305	Yes
V	Shoulder Breadth	350.5 - 365.7	361	Yes
W	Foot Breadth	78.8 - 94.0	85	Yes
X	Head Circumference	528.3 - 548.7	538	Yes
Y	Chest Circumference with Jacket	850.9 - 881.3	871	Yes
Z	Waist Circumference	759.5 - 789.9	778	Yes
AA	Reference Location for Chest Circumference	332.7 - 358.1	355	Yes
BB	Reference Location for Waist Circumference	160.0 - 170.2	163	Yes

Transportation Research Center Inc.

Front Head Drop
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.5 °C	21.5 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Peak Head Resultant Acceleration	250 - 300 g	269.3 g	Yes
Peak Head Lateral Acceleration	(-15) - 15 g	8.2 g	Yes
Is Acceleration Curve Unimodal within 10% of Peak?	Yes	Yes	Yes

Test meets specifications.

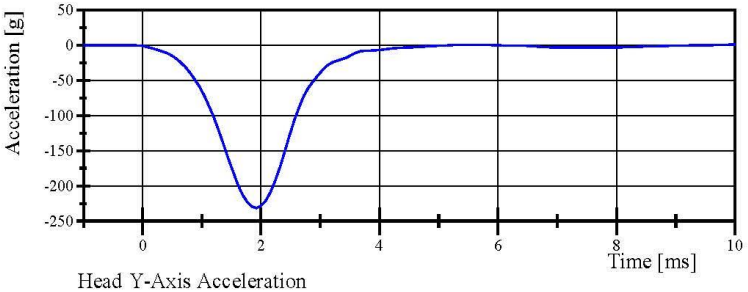
Condition: Used

Comments:
Head skin S/N:06211
Skull S/N: 88105/101C 05 010218

Transportation Research Center Inc.

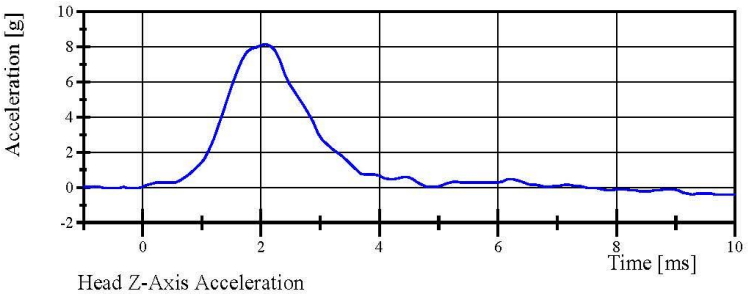
Front Head Drop
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Head X-Axis Acceleration



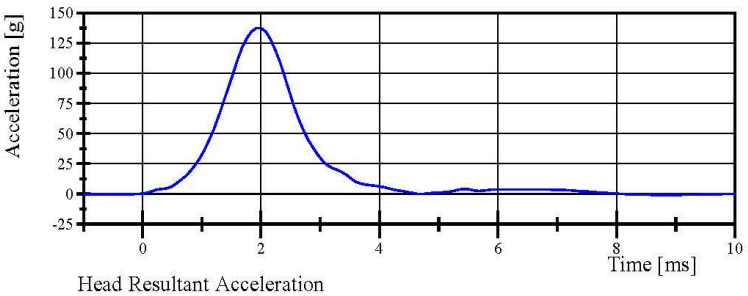
Filter Class: CFC_1000
Max: 1.0 g at 10.0 ms
Min: -231.4 g at 1.9 ms

Head Y-Axis Acceleration



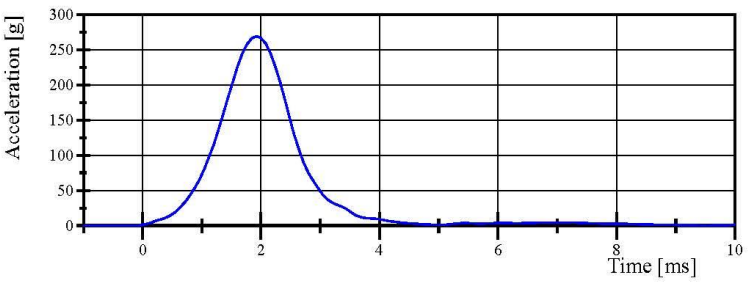
Filter Class: CFC_1000
Max: 8.2 g at 2.1 ms
Min: -0.4 g at 9.3 ms

Head Z-Axis Acceleration



Filter Class: CFC_1000
Max: 137.6 g at 2.0 ms
Min: -0.8 g at 8.7 ms

Head Resultant Acceleration



Filter Class: CFC_1000
Max: 269.3 g at 1.9 ms
Min: 0.0 g at -1.0 ms

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

12.02.2017 12:45:02 580

Transportation Research Center Inc.

Neck Flexion
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	36 %	Yes
Pendulum Velocity	6.89 - 7.13 m/s	7.025 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	(-2.1) - (-2.5) m/s	-2.32 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	(-4.0) - (-5.0) m/s	-4.44 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	(-5.8) - (-7.0) m/s	-6.35 m/s	Yes
Total Head D-Plane Rotation	(-77) - (-91) °	-82.9 °	Yes
Total Neck Occipital Condyles Moment Between -77° and -91° Rotation	69 - 83 N·m	72.5 N·m	Yes
Total Neck Occipital Condyles Moment Decay to 10 N·m	80 - 100 ms	87.1 ms	Yes

Test meets specifications.

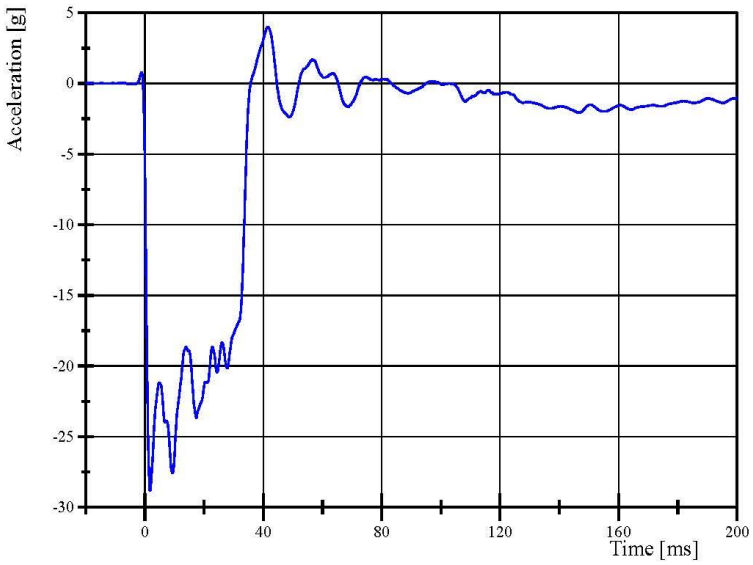
Condition: Used

Comments:
Neck S/N: DJ2788
Neck Cable: S/N: N/A
Nodding Blocks:
Front S/N: 85-DI7305
Rear S/N: 85-DI7105

Transportation Research Center Inc.

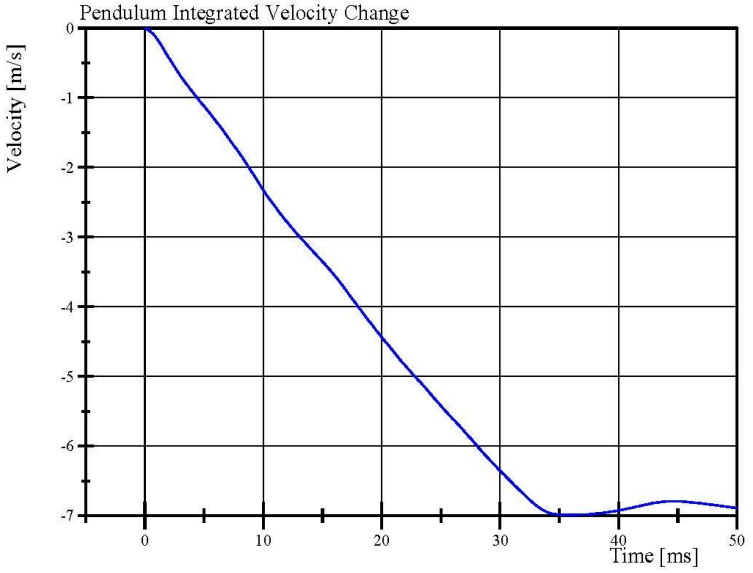
Neck Flexion
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Pendulum Acceleration



Filter Class: CFC_180
Max: 4.0 g at 41.6 ms
Min: -28.8 g at 1.8 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 0.0 m/s at 0.0 ms
Min: -7.0 m/s at 35.8 ms

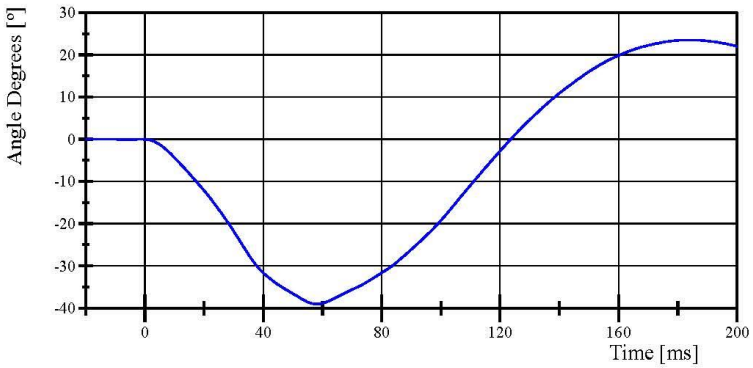
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

12.02.2017 14:34:49 1828

Transportation Research Center Inc.

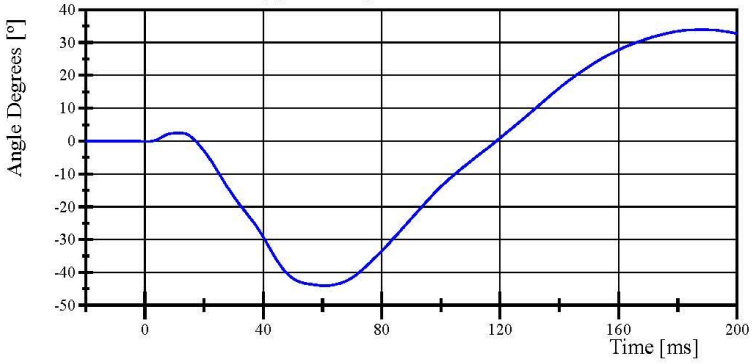
Neck Flexion
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Pot Rotation at the Base of Neck



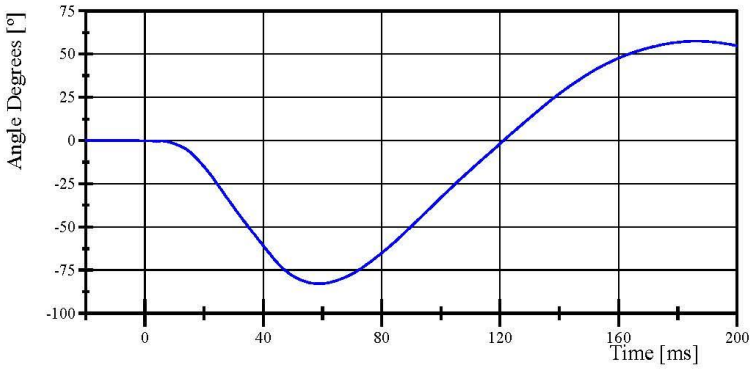
Filter Class: CFC_60
Max: 23.5 ° at 183.8 ms
Min: -39.0 ° at 58.1 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 34.0 ° at 187.9 ms
Min: -44.0 ° at 60.9 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 57.4 ° at 186.2 ms
Min: -82.9 ° at 59.0 ms

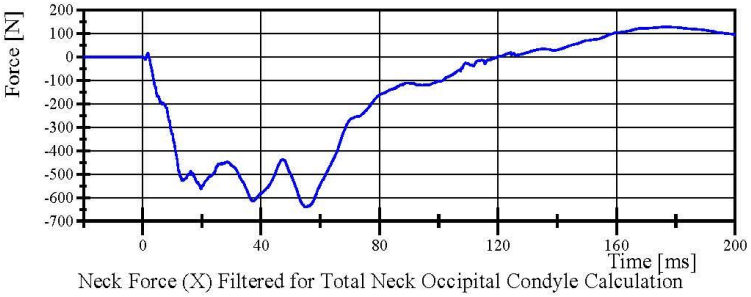
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

12.02.2017 14:34:49 1828

Transportation Research Center Inc.

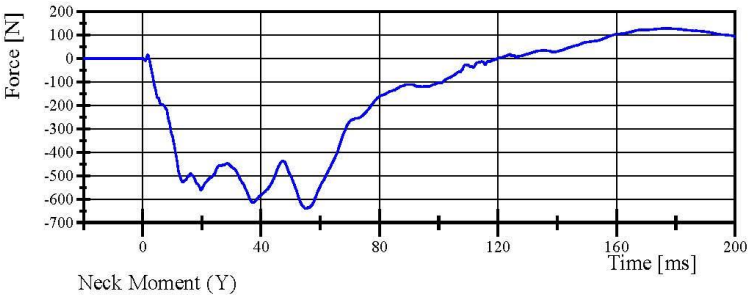
Neck Flexion
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Neck Force (X)



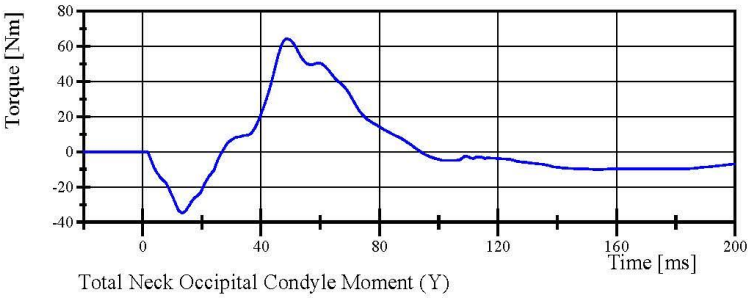
Filter Class: CFC_1000
Max: 128.9 N at 176.1 ms
Min: -640.4 N at 55.3 ms

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



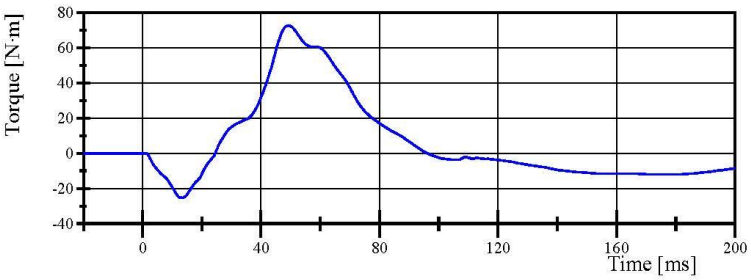
Filter Class: CFC_600
Max: 128.8 N at 176.2 ms
Min: -640.0 N at 55.4 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 64.2 Nm at 48.7 ms
Min: -34.7 Nm at 13.4 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 72.5 N·m at 49.3 ms
Min: -25.4 N·m at 13.4 ms

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

12.02.2017 14:34:50 1828

Transportation Research Center Inc.

Neck Extension
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.9 °C	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Pendulum Velocity	(-5.95) - (-6.19) m/s	-6.105 m/s	Yes
Pendulum Integrated Velocity Change at 10ms	1.5 - 1.9 m/s	1.74 m/s	Yes
Pendulum Integrated Velocity Change at 20ms	3.1 - 3.9 m/s	3.65 m/s	Yes
Pendulum Integrated Velocity Change at 30ms	4.6 - 5.6 m/s	5.37 m/s	Yes
Total Head D-Plane Rotation	99 - 114 °	109.8 °	Yes
Total Neck Occipital Condyles Moment Between 99° and 114° Rotation	(-53) - (-65) N·m	-58.0 N·m	Yes
Total Neck Occipital Condyles Moment Decay to -10 N·m	94 - 114 ms	101.4 ms	Yes

Test meets specifications.

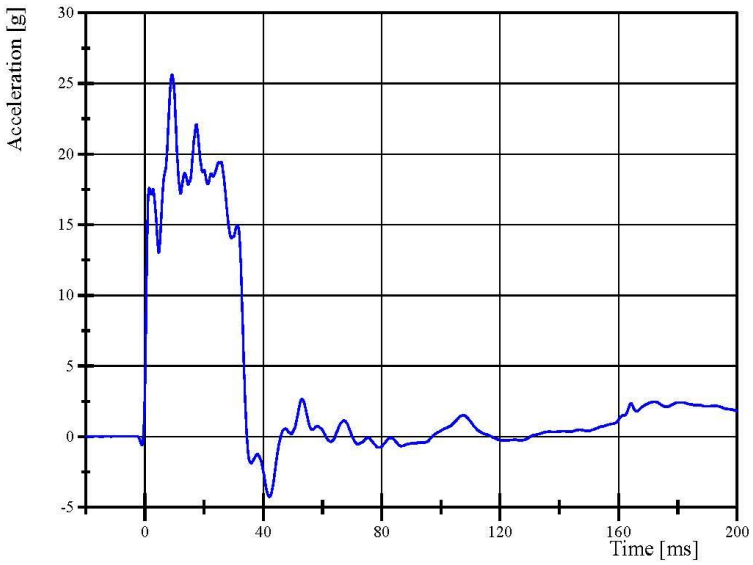
Condition: Used

Comments:
Neck S/N: DJ2788
Neck Cable: S/N: N/A
Nodding Blocks:
Front S/N: 85-DI7305
Rear S/N: 85-DI7105

Transportation Research Center Inc.

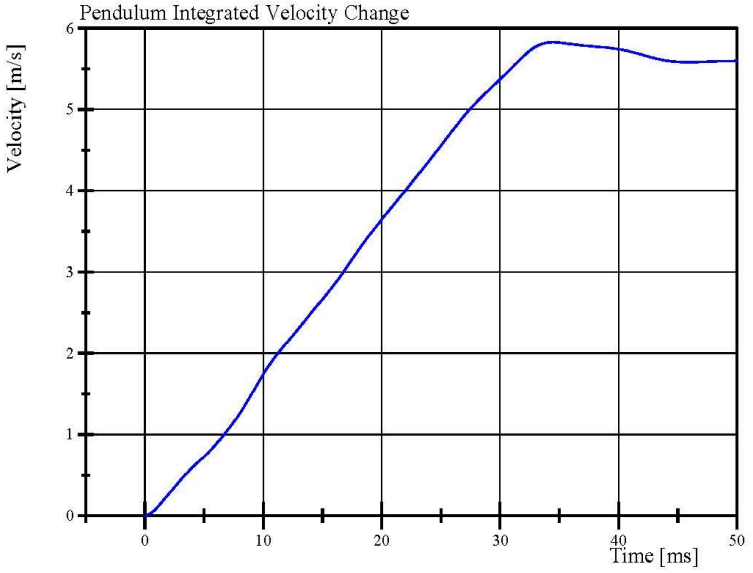
Neck Extension
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Pendulum Acceleration



Filter Class: CFC_180
Max: 25.6 g at 9.2 ms
Min: -4.3 g at 42.1 ms

Pendulum Integrated Velocity Change



Filter Class: CFC_180
Max: 5.8 m/s at 34.5 ms
Min: 0.0 m/s at 0.0 ms

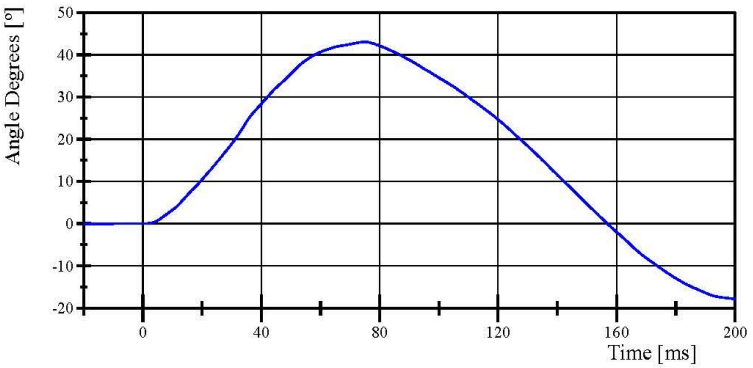
Specification Source: CFR49 Part 572 Subpart O
with Polarity in accordance with J211

12.02.2017 15:21:26 1961

Transportation Research Center Inc.

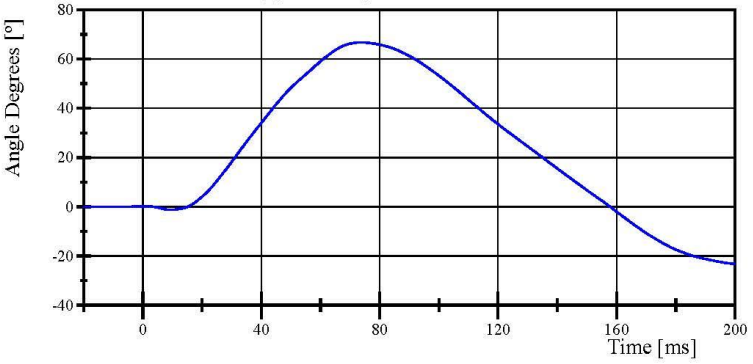
Neck Extension
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Pot Rotation at the Base of Neck



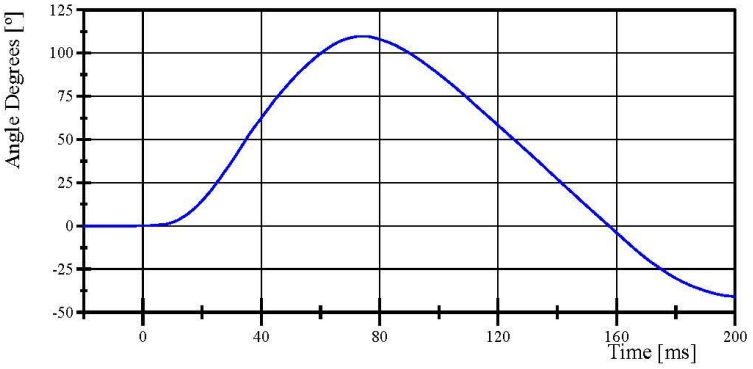
Filter Class: CFC_60
Max: 43.1 ° at 75.0 ms
Min: -17.8 ° at 200.0 ms

Head Rotation at Occypital Condyles



Filter Class: CFC_60
Max: 66.7 ° at 73.8 ms
Min: -23.1 ° at 200.0 ms

Total Head D-Plane Rotation



Filter Class: CFC_60
Max: 109.8 ° at 74.5 ms
Min: -40.8 ° at 200.0 ms

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

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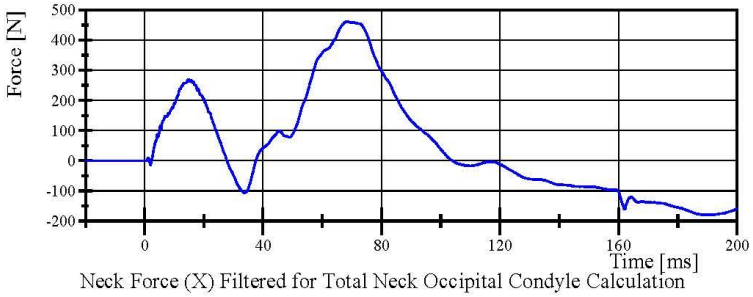
Transportation Research Center Inc.

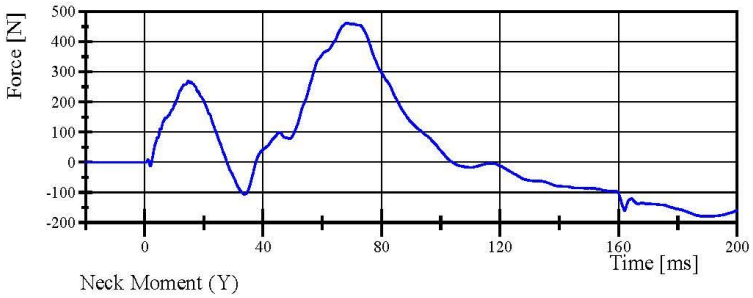
Neck Extension
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/2/2017

Neck Force (X)



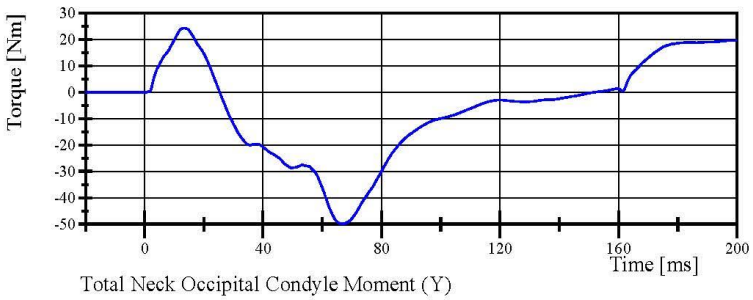
Filter Class: CFC_1000
Max: 462.6 N at 68.2 ms
Min: -179.5 N at 189.3 ms

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



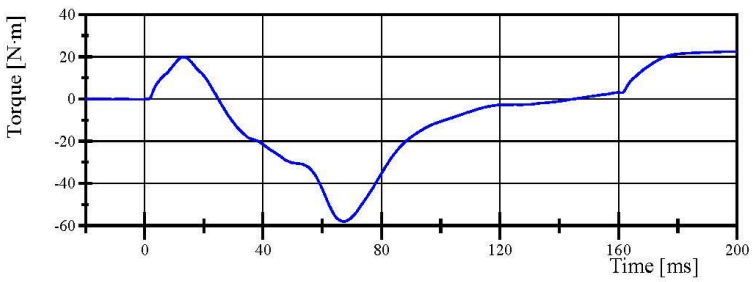
Filter Class: CFC_600
Max: 462.3 N at 68.3 ms
Min: -179.4 N at 189.5 ms

Neck Moment (Y)



Filter Class: CFC_600
Max: 24.4 Nm at 13.3 ms
Min: -49.9 Nm at 67.0 ms

Total Neck Occipital Condyle Moment (Y)



Filter Class: Without_(Constar
Max: 22.6 N·m at 197.1 ms
Min: -58.0 N·m at 67.3 ms

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

12.02.2017 15:21:27 1961

Transportation Research Center Inc.

Front Thorax
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/3/2017

Test Parameter	Specification	Test Results	Pass
Temperature	20.6 - 22.2 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	6.59 - 6.83 m/s	6.721 m/s	Yes
Probe Force Peak Between 50.0 mm and 58.0 mm Chest Deflection	(-3,900) - (-4,400) N	-4,118.3 N	Yes
Probe Force Peak Between 18.0 mm and 50.0 mm Chest Deflection	>= (-4,600) N	-4,123.7 N	Yes
Maximum Chest Compression	(-50) - (-58) mm	-51.9 mm	Yes
Internal Hysteresis	69 - 85 %	72.7 %	Yes

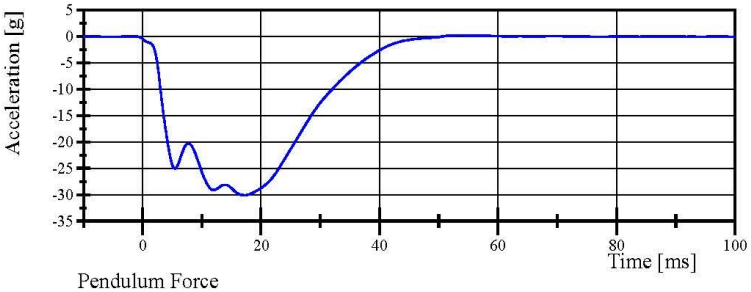
Test meets specifications.

Condition: Used
Comments:
Jacket S/N: N/A
Rib 1 S/N: N/A
Rib 2 S/N: N/A
Rib 3 S/N: N/A
Rib 4 S/N: N/A
Rib 5 S/N: N/A
Rib 6 S/N: N/A
Stiffners S/N: N/A
Bib S/N: N/A
Sternum Plate S/N: N/A

Transportation Research Center Inc.

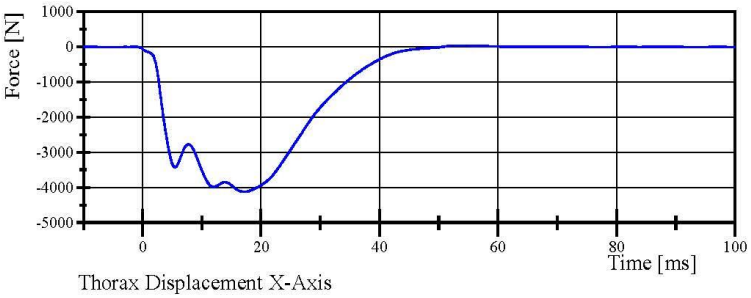
Front Thorax
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/3/2017

Pendulum Acceleration



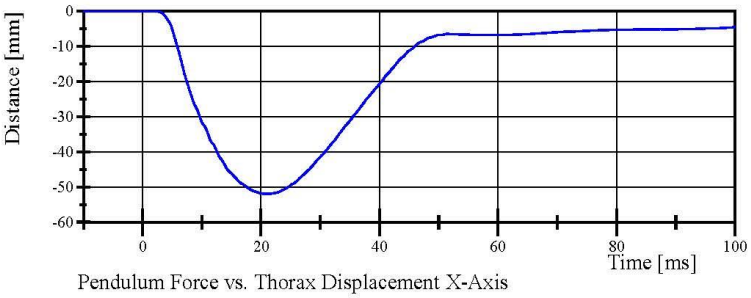
Filter Class: CFC_180
Max: 0.2 g at 53.5 ms
Min: -30.1 g at 17.2 ms

Pendulum Force



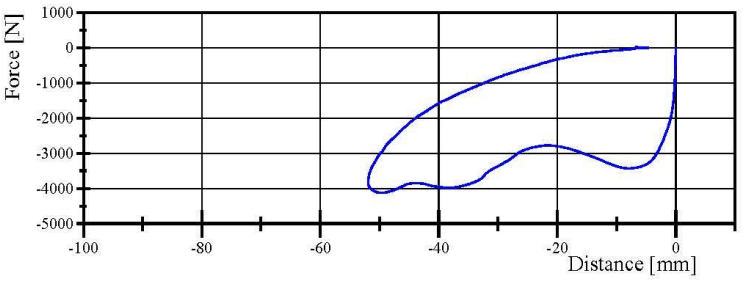
Filter Class: CFC_180
Max: 29.2 N at 53.5 ms
Min: -4,123.7 N at 17.2 ms

Thorax Displacement X-Axis



Filter Class: CFC_600
Max: 0.0 mm at -9.7 ms
Min: -51.9 mm at 21.1 ms

Pendulum Force vs. Thorax Displacement X-Axis



Filter Class: CFC_180
Max: 29.2 N at -6.6 mm
Min: -4,123.7 N at -49.5 mm

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

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Transportation Research Center Inc.

Left Knee Femur Response Test
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/3/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 ºC	21.5 ºC	Yes
Relative Humidity	10 - 70 %	34 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.097 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,633.7 N	Yes

Test meets specifications.

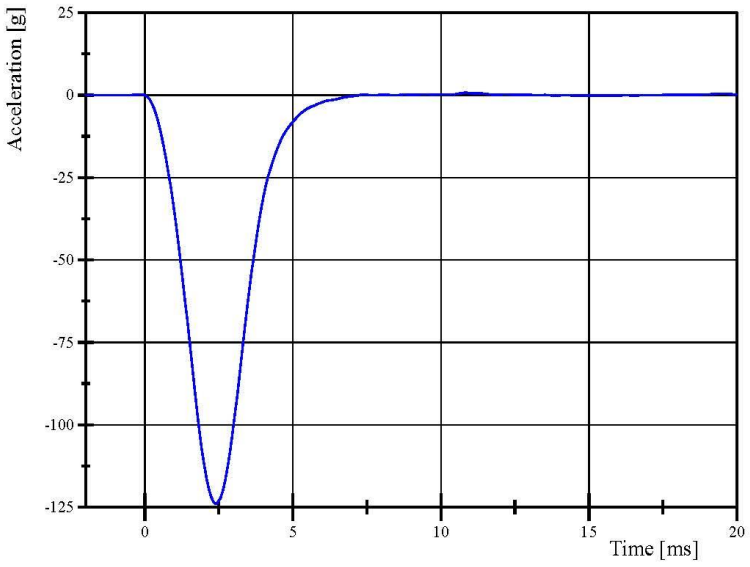
Condition: Used

Comments:
Knee Skin S/N: 05856
Knee Insert S/N: N/A

Transportation Research Center Inc.

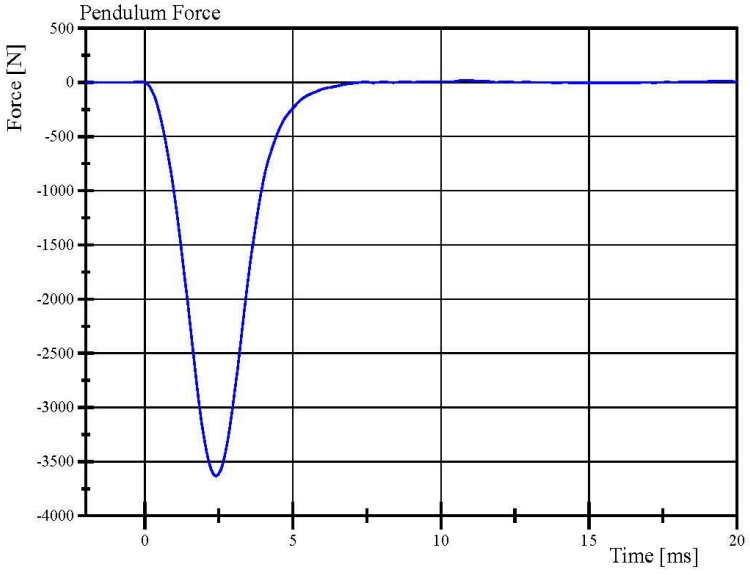
Left Knee Femur Response Test
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/3/2017

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.7 g at 10.8 ms
Min: -123.9 g at 2.4 ms

Pendulum Force



Filter Class: CFC_600
Max: 20.7 N at 10.8 ms
Min: -3,633.7 N at 2.4 ms

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

12.03.2017 10:38:14 1744

Transportation Research Center Inc.

Right Knee Femur Response Test
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/3/2017

Test Parameter	Specification	Test Results	Pass
Temperature	18.9 - 25.6 °C	21.7 °C	Yes
Relative Humidity	10 - 70 %	35 %	Yes
Probe Velocity	2.07 - 2.13 m/s	2.096 m/s	Yes
Peak Femur Force	(-3,450) - (-4,060) N	-3,750.8 N	Yes

Test meets specifications.

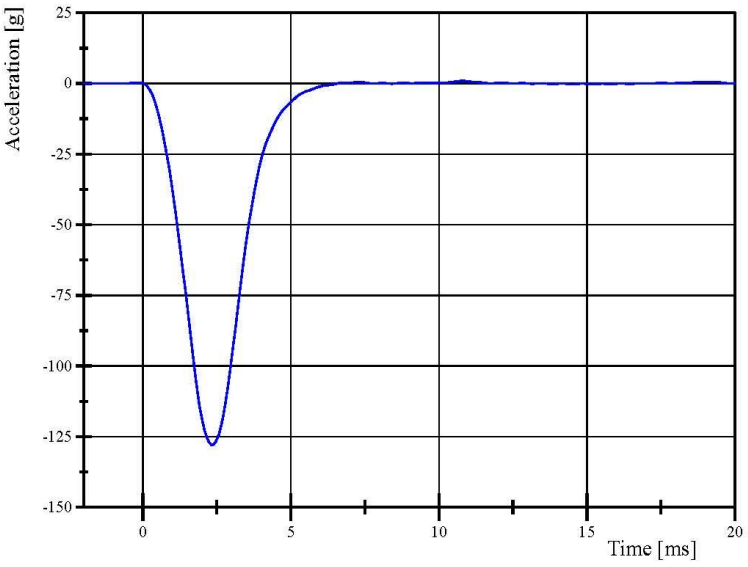
Condition: Used

Comments:
Knee Skin S/N: 05269
Knee Insert S/N: N/A

Transportation Research Center Inc.

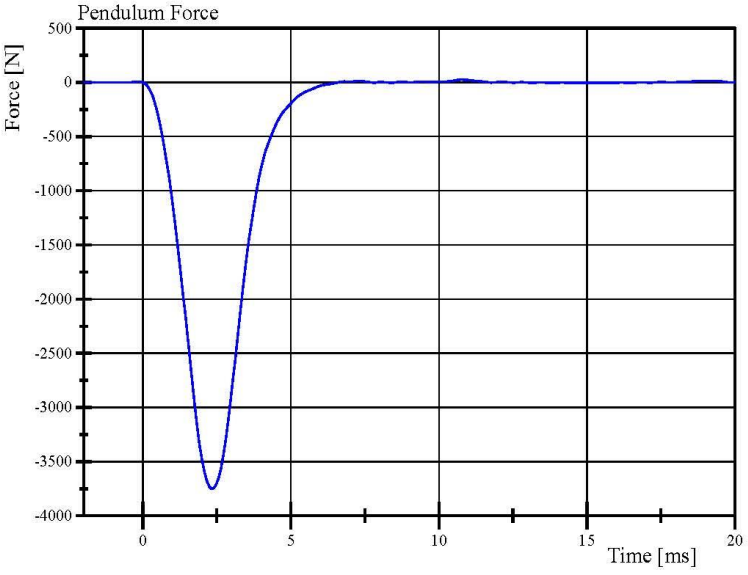
Right Knee Femur Response Test
HIII 5th Serial No. 070 Certification No. 32-1
Test Date: 12/3/2017

Pendulum Acceleration



Filter Class: CFC_600
Max: 0.9 g at 10.8 ms
Min: -127.9 g at 2.3 ms

Pendulum Force



Filter Class: CFC_600
Max: 25.4 N at 10.8 ms
Min: -3,750.8 N at 2.3 ms

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

12.03.2017 10:45:57 1744

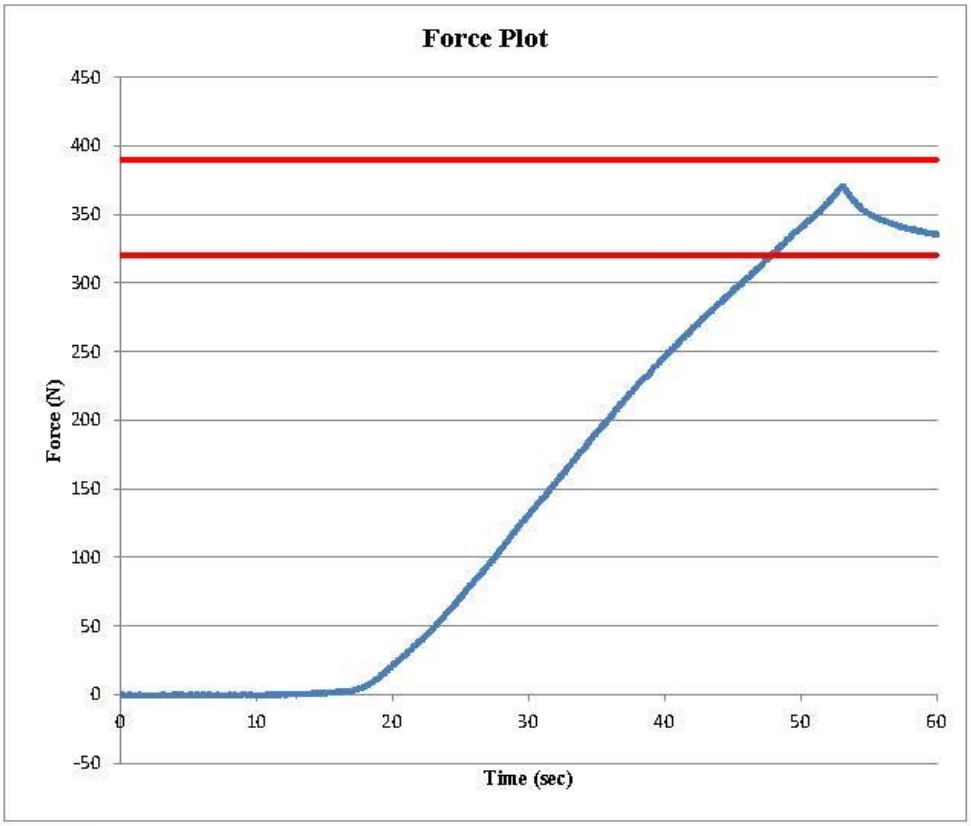
Transportation Research Center Inc.

Hybrid III Small Female Torso Flexion

NHTSA

Serial Number:	070	Date:	12/3/2017
Test Number:	2	Time:	7:55
Comments:			

TEST PARAMETEI	SPECIFICATION			TEST RESULTS		
Temperature	18.9	-	25.6	21.8	°C	Pass
Humidity	10	-	70	34	%	Pass
Average Angular Velocity	0.5	-	1.5	0.92	deg/sec	Pass
Initial Angle	0	-	20	12.49	deg	Pass
Peak Force at 45.12°	320	-	390	370.42	N	Pass
Final Angle	-8	-	8	2.37	deg	Pass



Comments:
Jacket S/N: N/A
Abdomen S/N: N/A
Pelvis Skin S/N: N/A
Lumbar Spine S/N: N/A
Lumbar Cable S/N: N/A